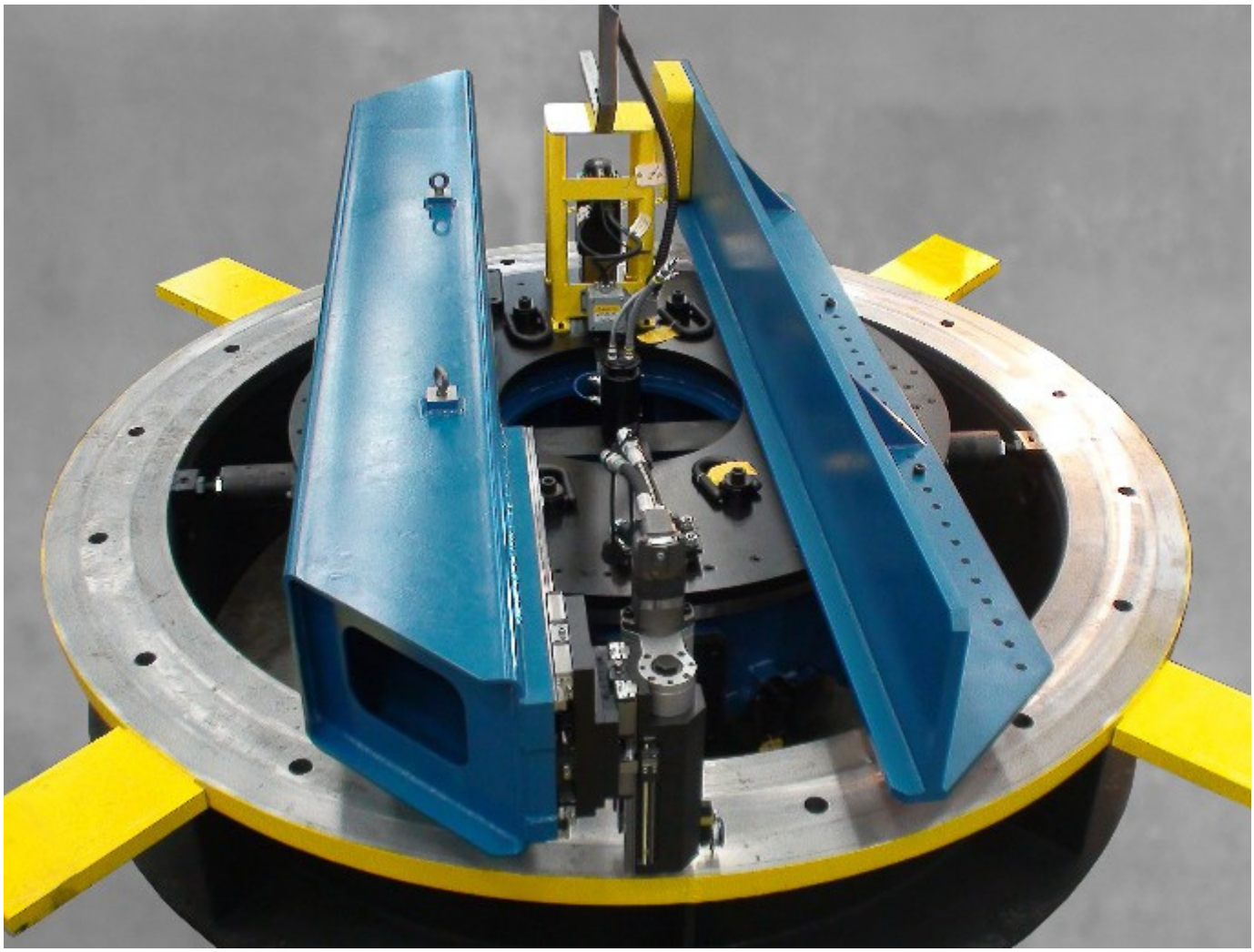
CE

CM6200

CIRCULAR MILLING MACHINE

CM6200 OPERATING MANUAL

ORIGINAL INSTRUCTIONS



CLIMAX
Portable Machining & Welding Systems

P/N 63674
May 2021
Revision 9

CLIMAX | BORTECH CALDER H&S TOOL

At CLIMAX, we value your opinion.

For comments or questions about this manual or other CLIMAX documentation, please e-mail documentation@cpmt.com.

For comments or questions about CLIMAX products or services, please call CLIMAX or e-mail info@cpmt.com. For quick and accurate service, please provide your representative with the following:

- Your name
- Shipping address
- Telephone number
- Machine model
- Serial number (if applicable)
- Date of purchase

CLIMAX World Headquarters

2712 East 2nd Street
Newberg, Oregon 97132 USA

Telephone (worldwide): +1-503-538-2815
Toll-free (North America): 1-800-333-8311
Fax: 503-538-7600

H&S Tool World Headquarters

715 Weber Dr.
Wadsworth, OH 44281 USA

Telephone: +1-330-336-4550
Fax: 1-330-336-9159
hstool.com

CLIMAX | H&S Tool (UK Headquarters)

Unit 7 Castlehill Industrial Estate
Bredbury Industrial Park
Horsfield Way
Stockport SK6 2SU, UK

Telephone: +44 (0) 161-406-1720

CLIMAX | H&S Tool (European Headquarters)

Am Langen Graben 8
52353 Düren, Germany

Telephone: +49 24-219-1770
E-mail: ClimaxEurope@cpmt.com

CLIMAX | H&S Tool (Asia Pacific Headquarters)

316 Tanglin Road #02-01
Singapore 247978

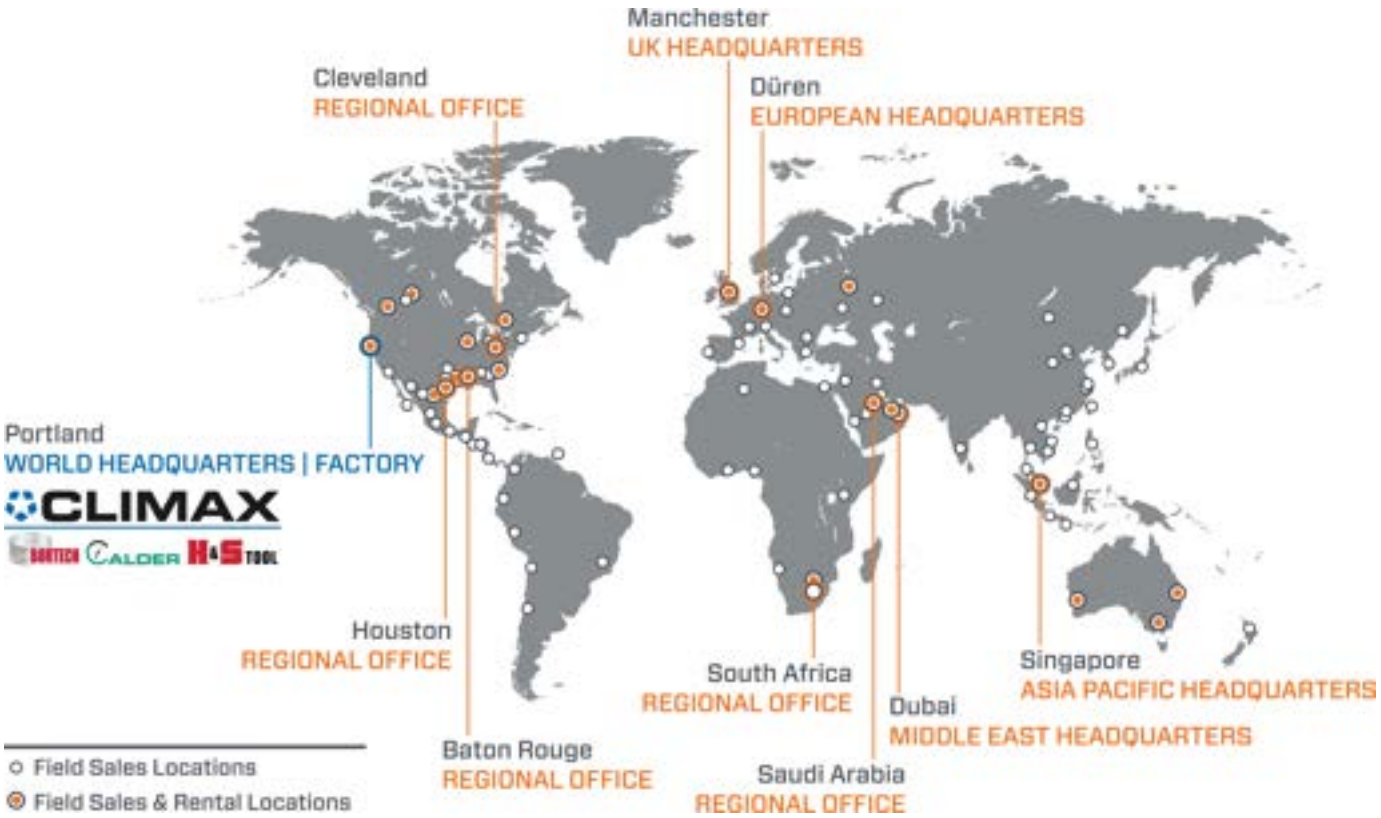
Telephone: +65 9647-2289
Fax: +65 6801-0699

CLIMAX | H&S Tool (Middle East Headquarters)

Warehouse #5, Plot: 369 272
Um Sequim Road
Al Quoz 4
PO Box 414 084
Dubai, UAE

Telephone: +971 04-321-0328

CLIMAX GLOBAL LOCATIONS



CE DOCUMENTATION

Declaration of Conformity

2006/42/EC Machinery Directive

2014/35/EU Low Voltage Directive

2014/30/EU EMC Directive

Name of Manufacturer:
Climax Portable Machining and Welding Systems
Full postal address including country of origin:
2712 E. Second St., Newberg, OR 97132, USA
Object(s) of the Declaration:
Portable Milling Machine(s)

Name, type or model, batch or serial number:
CM6200 S/N Range: 150000268 and up
Harmonised Standards used, including number:
BS EN ISO 13854:2019 - Safety of Machinery; Gaps
BS EN ISO 4413:2010 - Safety of Machinery; Fluid Power
EN ISO 11201:2010 - Acoustics; Noise Emitted
EN ISO 12100:2010 - Safety for Machinery; Principles
EN ISO 13732-1:2008 - Temperature of Touchable Surfaces
EN 60204-1:2018 - Safety of Machinery; Electrical Equipment
EN 61000 series - EMC Emissions and Immunity
EN ISO 13849-1:2015 - Safety of Machinery; Controls
EN ISO 13850: Safety of Mach-E Stop
EN ISO 13857:2019 Safety of mach-Safe Distances

Full postal address of the authorized person in the Community:
Guido Ewers zum Rode
Climax GmbH
Am Langen Graben 8
52353 Duren, Germany

Approved as conforming to Standard ISO 9001:2015 by:
Eagle Registrations Inc.
40 N. Main Street, Suite 1880
Dayton, OH 45423

Declaration
I declare that the above information in relation to the supply / manufacture of this product is in conformity with the relevant provisions of the Directives and Harmonised Standards listed above in this document along with their respective amendments and other related documents. This declaration of conformity is issued under the sole responsibility of the manufacturer.

Signature of Manufacturer: _____ **Position: VP of Engineering**

Date and Place: 3/2/2022 **, USA**

CE

CE	Standard No. **EN 3744 & EN 11201**	CLIMAX

The Declared **Sound Power** Level is:	L_{WA}=	74.4	dBA
The Declared ***Operator*** **Sound Pressure** Level is:	L_{pA}=	65.2	dBA
The Declared ***Bystander*** **Sound Pressure** Level is:	L_{pA}=	65.3	dBA

LIMITED WARRANTY

Climax Portable Machine Tools, Inc (hereafter referred to as “CLIMAX”) warrants that all new machines are free from defects in materials and workmanship This warranty is available to the original purchaser for a period of one year after delivery If the original purchaser finds any defect in materials or workmanship within the warranty period, the original purchaser should contact its factory representative and return the entire machine, shipping prepaid, to the factory CLIMAX will, at its option, either repair or replace the defective machine at no charge and will return the machine with shipping prepaid.

CLIMAX warrants that all parts are free from defects in materials and workmanship, and that all labor has been performed properly This warranty is available to the customer purchasing parts or labor for a period of 90 days after delivery of the part or repaired machine or 180 days on used machines and components If the customer purchasing parts or labor finds any defect in materials or workmanship within the warranty period, the purchaser should contact its factory representative and return the part or repaired machine, shipping prepaid, to the factory CLIMAX will, at its option, either repair or replace the defective part and/ or correct any defect in the labor performed, both at no charge, and return the part or repaired machine shipping prepaid.

These warranties do not apply to the following:

- Damage after the date of shipment not caused by defects in materials or workmanship
- Damage caused by improper or inadequate machine maintenance
- Damage caused by unauthorized machine modification or repair
- Damage caused by machine abuse
- Damage caused by using the machine beyond its rated capacity

All other warranties, express or implied, including without limitation the warranties of merchantability and fitness for a particular purpose are disclaimed and excluded.

Terms of Sale

Be sure to review the terms of sale which appear on the reverse side of your invoice These terms control and limit your rights with respect to the goods purchased from CLIMAX.

About This Manual

CLIMAX provides the contents of this manual in good faith as a guideline to the operator. CLIMAX cannot guarantee that the information contained in this manual is correct for applications other than the application described in this manual product specifications are subject to change without notice.

This page intentionally left blank

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

CHAPTER/SECTION **PAGE**

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

FIGURE **PAGE**

LIST OF FIGURES (CONTINUED)

FIGURE **PAGE**

LIST OF FIGURES (CONTINUED)

FIGURE **PAGE**

LIST OF FIGURES (CONTINUED)

FIGURE **PAGE**

LIST OF TABLES

This page intentionally left blank

1 INTRODUCTION

IN THIS CHAPTER:

1.1 How to use this manual

This manual describes information necessary for the setup, operation, maintenance, storage, shipping, and decommissioning of the CM6200.

The first page of each chapter includes a summary of the chapter contents to help you locate specific information. The appendices contain supplemental product information to aid in setup, operation, and maintenance tasks.

Read this entire manual to familiarize yourself with the CM6200 before attempting to set it up or operate it.

1.2 Safety alerts

Pay careful attention to the safety alerts printed throughout this manual. Safety alerts will call your attention to specific hazardous situations that may be encountered when operating this machine. Examples of safety alerts used in this manual are defined here:[1]

DANGER

indicates a hazardous situation which, if not avoided, ***WILL*** result in death or serious injury

WARNING

indicates a hazardous situation which, if not avoided, ***COULD*** result in death or serious injury

1. For more information on safety alerts, refer to *ANSI/NEMA Z5356-2011, Product safety Information in Product Manuals, Instructions, and Other Collateral Materials*

⚠ CAUTION

indicates a hazardous situation which, if not avoided, could result in minor or moderate injury

NOTICE

indicates a hazardous situation which, if not avoided, could result in property damage, equipment failure, or undesired work results

1.3 GENERAL SAFETY PRECAUTIONS

CLIMAX leads the way in promoting the safe use of portable machine tools. Safety is a joint effort. You, the end user, must do your part by being aware of your work environment and closely following the operating procedures and safety precautions contained in this manual, as well as your employer's safety guidelines.

Observe the following safety precautions when operating or working around the machine:

Training – Before operating this or any machine tool, you should receive instruction from a qualified trainer. Contact CLIMAX for machine-specific training information.

Risk assessment – Working with and around this machine poses risks to your safety. You, the end user, are responsible for conducting a risk assessment of each job site before setting up and operating this machine.

Intended use – Use this machine in accordance with the instructions and precautions in this manual. Do not use this machine for any purpose other than its intended use as described in this manual.

Personal protective equipment – Always wear appropriate personal protective gear when operating this or any other machine tool. Flame-resistant clothing with long sleeves and legs is recommended when operating the machine, as hot flying chips from the workpiece may burn or cut bare skin.

Work area – Keep the work area around the machine clear of clutter. Restrain cords and hoses connected to the machine. Keep other cords and hoses away from the work area.

Lifting – Many CLIMAX machine components are very heavy. Whenever possible, lift the machine or its components using proper hoisting equipment and rigging. Always use designated lifting points on the machine. Follow and lifting instructions in the setup procedures of this manual.

Lock out/tag out – Lock out and tag out the machine before performing maintenance.

Moving parts – CLIMAX machines have numerous exposed moving parts and interfaces that can cause severe impact, pinching, cutting, and other

injuries. Except for stationary operating controls, avoid contact with moving parts by hands or tools during machine operation. Remove gloves and secure hair, clothing, jewelry, and pocket items to prevent them from becoming entangled in moving parts.

Sharp edges – Cutting tools and workpieces have sharp edges that can easily cut skin. Wear protective gloves and exercise caution when handling a cutting tool or workpiece.

Hot surfaces – During operation, motors, pumps, hydraulic pump units (HPUs), and cutting tools can generate enough heat to cause severe burns. Pay attention to hot surface labels, and avoid contact with bare skin until the machine has cooled.

1.4 MACHINE-SPECIFIC SAFETY PRECAUTIONS

Eye hazard – This machine produces metal chips during operation. Always wear eye protection when operating the machine.

Sound level – This machine produces potentially harmful sound levels. Hearing protection is required when operating this machine or working around it. During testing, the machine produced the following sound levels[1]:

- Sound power – 74.4 dBA
- Operator sound pressure – 65.2 dBA
- Bystander sound pressure – 65.3 dBA

Hazardous environments – Do not operate the machine in environments where explosive materials, toxic chemicals, or radiation may be present. Do not expose the machine to rain or other wet conditions.

Rotating machinery – Rotating machinery can seriously injure an operator. Lock out all power sources before you interact with the machine.

Secure loose clothing and long hair – Rotating machinery can cause serious injuries. Do not wear loose fitting clothing or jewelry. Tie back long hair or wear a hat.

Hoses, pendants, and electrical cables – Follow all of these guidelines:

- Do not abuse the pendant cable as this can damage the cable and pedant.
- Never use the cord for carrying, pulling or unplugging.
- Remove any and all kinks before straightening the cable.
- Keep cords and hoses away from heat, oil, sharp edges or moving parts.
- Plugs must match the outlet.
- Never modify the plugs in any way.
- Do not use an adapter plug with grounded power tools.

1. Machine sound testing was conducted in accordance with European Harmonized Standards EN ISO 3744:2010 and EN 11201:2010

- Do not expose the machine to rain or wet conditions.
- Always examine hoses and cables for damage before use.
- Be cautious and never drop electrical equipment, this will damage the components.

Adjustments and maintenance – All adjustments, lubrication and maintenance should be done with the machine stopped, and locked out from all power sources. The shut-off valve should be locked and tagged out before any maintenance occurs.

Controls –The machine controls are designed to withstand the rigors of normal use and external factors. The on-off switches are clearly visible and identifiable. If a compressed air supply failure occurs, be sure to turn off the on-off valve before leaving the machine.

1.5 RISK ASSESSMENT AND HAZARD MITIGATION

Machine Tools are specifically designed to perform precise material-removal operations.

Stationery Machine Tools include lathes and milling machines and are typically found in a machine shop. They are mounted in a fixed location during operation and are considered to be a complete, self-contained machine. Stationery Machine Tools achieve the rigidity needed to accomplish material-removal operations from the structure that is an integral part of the machine tool.

Portable Machine Tools are designed for on-site machining applications. They typically attach directly to the workpiece itself, or to an adjacent structure, and achieve their rigidity from the structure to which it is attached. The design intent is that the Portable Machine Tool and the structure to which it is attached become one complete machine during the material-removal process.

To achieve the intended results and to promote safety, the operator must understand and follow the design intent, set-up, and operation practices that are unique to Portable Machine Tools.

The operator must perform an overall review and on-site risk assessment of the intended application. Due to the unique nature of portable machining applications, identifying one or more hazards that must be addressed is typical.

When performing the on-site risk assessment, it is important to consider the Portable Machine Tool and the workpiece as a whole.

1.6 RISK ASSESSMENT CHECKLIST

The following checklist is not intended to be an all inclusive list of things to watch out for when setting up and operating this Portable Machine Tool. However, these checklists are typical of the types of risks the assembler and operator should consider. Use these checklists as part of your risk assessment:

TABLE 1-1. RISK ASSESSMENT CHECKLIST BEFORE SET-UP

	Before set-up
☐	I took note of all the warning labels on the machine.
☐	I removed or mitigated all identified risks (such as tripping, cutting, crushing, entanglement, shearing, or falling objects).
☐	I considered the need for personnel safety guarding and installed any necessary guards.
☐	I read the setup instructions (Section 3) and took inventory of all the items required but not supplied (Section 1.8).
☐	I created a lift plan, including identifying the proper rigging, for each of the setup lifts required during the setup of the support structure and machine.
☐	I located the fall paths involved in lifting and rigging operations. I have taken precautions to keep workers away from the identified fall path.
☐	I considered how this machine operates and identified the best placement for the controls, cabling, and the operator.
☐	I evaluated and mitigated any other potential risks specific to my work area.

TABLE 1-2. RISK ASSESSMENT CHECKLIST AFTER SET-UP

	After set-up
☐	I checked that the machine is safely installed (according to Section 3) and the potential fall path is clear. If the machine is installed at an elevated position, I checked that the machine is safeguarded against falling.
☐	I identified all possible pinch points, such as those caused by rotating parts, and informed the affected personnel.
☐	I planned for containment of any chips or swarf produced by the machine.
☐	I followed the required maintenance intervals (Section 5.1) with the recommended lubricants (Section 5.3).
☐	I checked that all affected personnel have the recommended personal protective equipment, as well as any site-required or regulatory equipment.
☐	I checked that all affected personnel understand and are clear of the danger zone.
☐	I evaluated and mitigated any other potential risks specific to my work area.

1.7 LABEL IDENTIFICATION

The following warning labels should be on your machine. If any are defaced or missing, contact CLIMAX immediately for replacements.

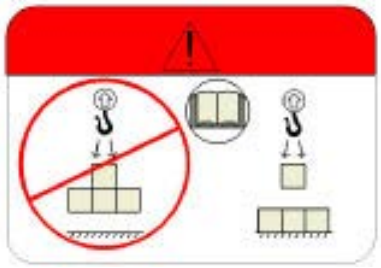
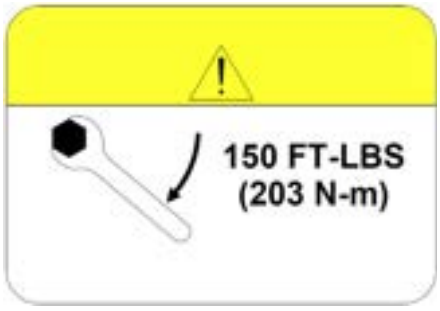
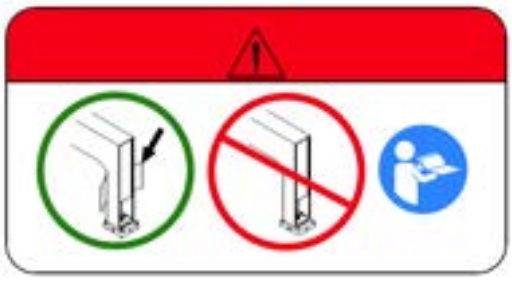
TABLE 1-3. LABEL IDENTIFICATION

	P/N 27462 Single point machine warning label		P/N 29152 Mass plate
	P/N 29154 CLIMAX serial number, year and model number plate		
	P/N 35772 Ball valve direction label		P/N 35828 Serial year model plate
	P/N 46286 Circular mill crush hazard danger label		P/N 46902 Hot surface warning

TABLE 1-3. LABEL IDENTIFICATION (CONTINUED)

	P/N 59035 Wear eye protection warning label		P/N 59037 Wear ear protection warning label
	P/N 59039 Lift point warning label		P/N 59044 Read operators manual warning label
	P/N 62884 Flange facer impact hazard danger label		
			P/N 64156 Counterweight and arm position label
	P/N 69422 Info and serial number tag		
	P/N 84019 CLIMAX logo label		

TABLE 1-3. LABEL IDENTIFICATION (CONTINUED)

	P/N 79385 Warning label: see the manual for lift instructions		
	P/N 80510 Warning label: danger of cut fingers in rotating blade		P/N 82157 Torque warning label
	P/N 82163 Warning label: hand crush		P/N 82164 Warning label: body crush
	P/N 82172 OD mount guard placement label danger label		
	P/N 82195 Lockout/electrical warning label		

For identification of location placement, see the exploded views in Appendix A.

1.8 ITEMS REQUIRED BUT NOT SUPPLIED

- Torque wrench
- Level
- Dial indicator
- Support blocks
- Scab plates (steel plates that are bolted, clamped, or welded to the flange or web of a workpiece to mount or secure the attachment of a machine tool to the workpiece)

This page intentionally left blank

2 OVERVIEW

IN THIS CHAPTER:

2.1 Features and options

The CM6200 is a highly configurable machine with many options and accessories. This manual covers the use and operation of some of those possible options. The machine configuration purchased may not contain all of the options and accessories detailed herein. If a specific machine application requires additional options or accessories please contact a CLIMAX sales representative for assistance in obtaining the needed components.

The CM6200 is designed to perform various machining operations on a circular workpiece, such as a flange. The machine consists primarily of a rotary table with a precision circular bearing and a servo electric drive. An adjustable machining arm and counterweight arm are mounted on the table to provide precise machining in any orientation. A milling head is mounted on a radial slide. The CM6200 mounts to the workpiece by either an ID or OD mount system.

The most common application of the CM6200 is for wind tower connection flanges. It is used for large diameter flanges with the following dimensions:

- For ID mounting, 78.9–177.2" (2,000– 4,500 mm) inside diameter (see Figure 2-4 on page 17)
  The ID mount machining range is 78.9–197" (2,000– 5,004 mm) with a 8" (203 mm) face mill.

- For OD mounting, 135.5–200.4" (3,442–5,090 mm) outside diameter (see Figure 2-5 on page 18)
  The OD mount machining range is 67.5–197" (1,715– 5,004 mm) with a 8" (203 mm) face mill.

- For face mounting, 67.5" (1,715 mm) or larger (see Figure 2-5 on page 18)

The machine is easily mounted into place by chucking bolts in the inner diameter of the working surface. The machine can easily be leveled and centered into place.

The machining arm rotates about the bearing allowing the milling head, (or the optional grinder, or single point tooling) to cut smoothly.

For milling (or optional grinding) applications, the radial and axial travel can be manually actuated with a hand wheel. The milling head can rotate a full 360° with an optional swivel plate.

2.1.1 Features

The CM6200 includes the following features:

Kingpin clearance – 25" (635 mm) diameter for dock and construction cranes.

Rigid rotational drive system – Large diameter and preloaded bearing provides optimal rigidity during machining.

Adjustable turning and counterweight arms – Both the machining arm and counterweight arm can be adjusted for the desired swing clearance and machining range. The counterweight is recommended, but not required for horizontal machining applications.

Chucking design – Tubular rigid chucking system with a level in place and adjustable feet designed for simple and speedy setup.

Modular design – Allows many of the machine components to be removed to facilitate easier setup and storage.

Touch screen controls – The servo option comes complete with full touch screen pendant controls.

2.1.2 Available machine options

The CM6200 is configurable for many specific machining needs. The following are available options:

ID mount – This machine can be mounted on the inside of the workpiece using chucking bolts on the inner surface.

OD mount – This machine can be mounted to the outside diameter of the workpiece using our optional OD mount kit, and customer-supplied outriggers or scab plates.

ID and OD mount – This machine can be mounted to the workpiece using a combination of the ID and OD machines.

Face mounting – A face mount kit is available to allow mounting the chuck directly to the work piece or a customer supplied mounting apparatus.

Single point machining – Provides flange facing capabilities at larger diameters. This option is compatible with all options.

Grinding attachment – Provides much finer surface finish capabilities. This

option is compatible with all options.

Contact CLIMAX for more information on these functions and options, or if a specific machine application requires additional options or accessories.

2.1.3 Rotary table speeds using hydraulic motors when single-point machining

Table 2-1 shows the effective maximum rotary speeds for each available hydraulic motor when single-point machining (that is, flange facing).

TABLE 2-1. ROTARY TABLE SPEEDS WHEN SINGLE-POINT MACHINING

Motor P/N	Hydraulic motor displacement	Maximum speed[a] at 20 gpm		Maximum speed[b] at 10 gpm	
		60 Hz HPU	*50 Hz HPU*	*60 Hz HPU*	*50 Hz HPU*
46950	11.9 in^3 (195.0 cm^3)	32 rpm	26 rpm	16 rpm	13 rpm
46375	14.9 in^3 (244.2 cm^3)	25 rpm	20 rpm	13 rpm	10 rpm
46549	18.7 in^3 (306.4 cm^3)	20 rpm	16 rpm	10 rpm	8 rpm
46550	24.0 in^3 (393.3 cm^3)	16 rpm	13 rpm	8 rpm	6.5 rpm
48968	29.8 in^3 (488.3 cm^3)	13 rpm	10 rpm	6 rpm	5 rpm

a.Maximum rotary table RPM
b.Maximum rotary table RPM

2.2 MACHINE COMPONENTS

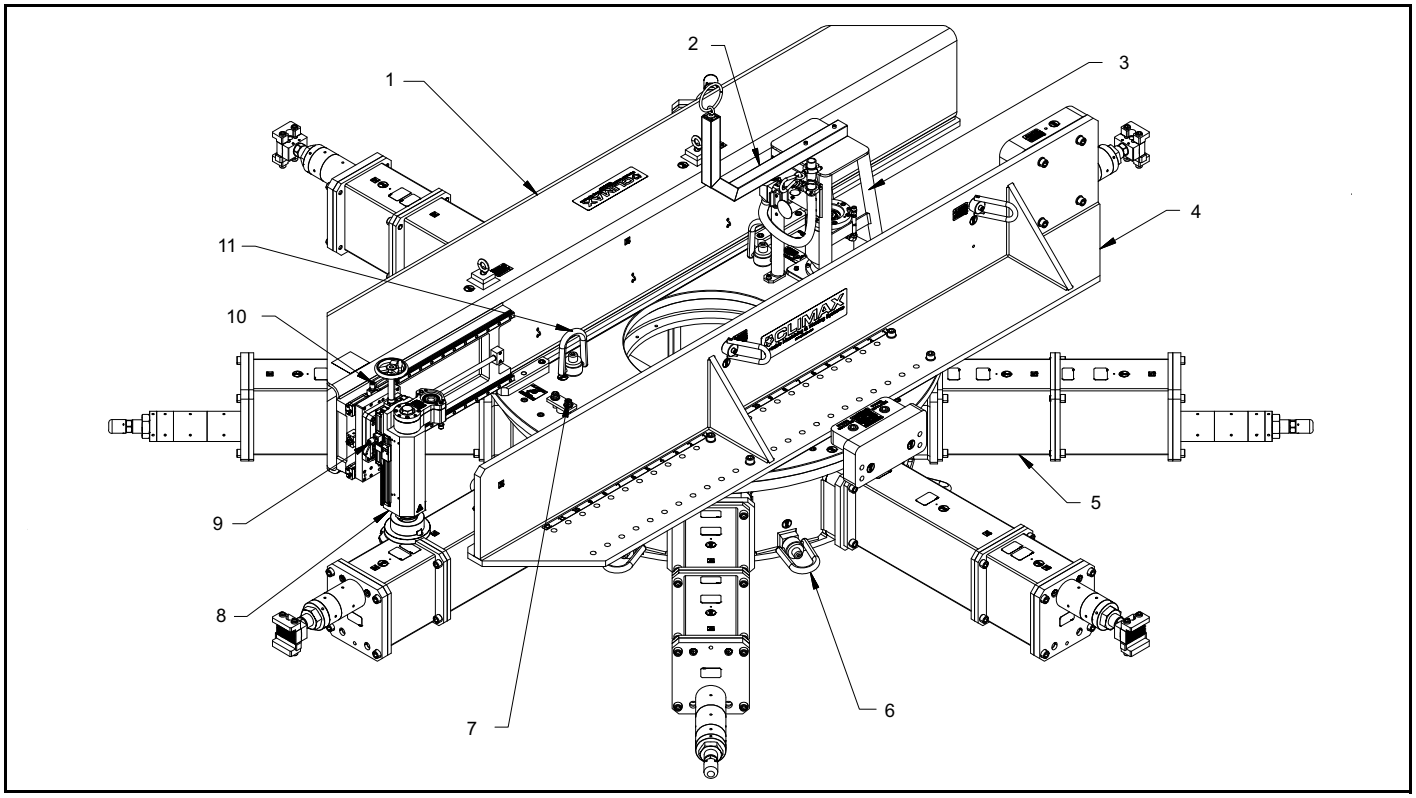


FIGURE 2-1. ID MOUNT COMPONENTS

TABLE 2-2. ID MOUNT IDENTIFICATION

Number	Component
1	Machining arm
2	Hose tower
3	Encoder guard
4	Counterweight assembly
5	Adjustable chuck assembly
6	Hoist rings
7	Drag brake
8	Milling head
9	Axial travel brake
10	Radial travel brake
11	Hoist rings

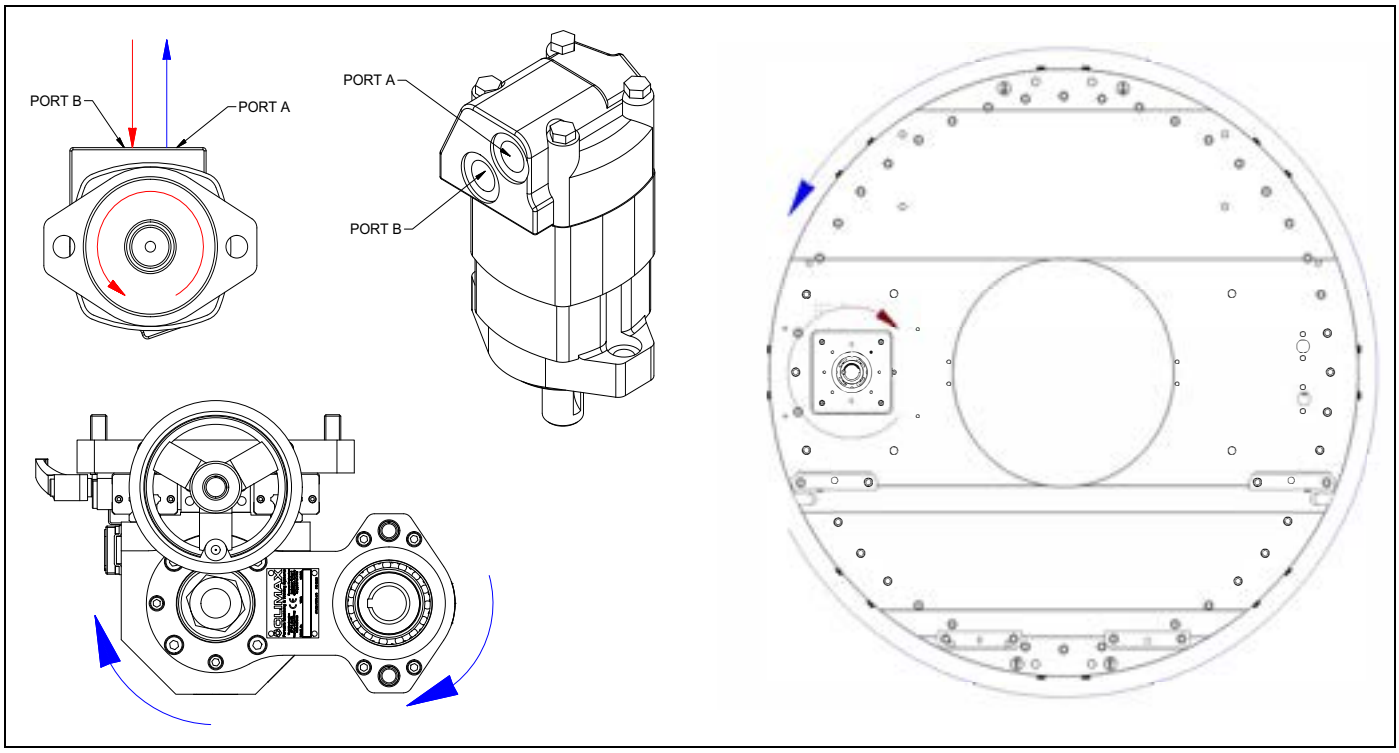


FIGURE 2-2. ROTATION DIRECTION FOR HYDRAULIC MOTOR, ROTATION TABLE, AND MILLING HEAD

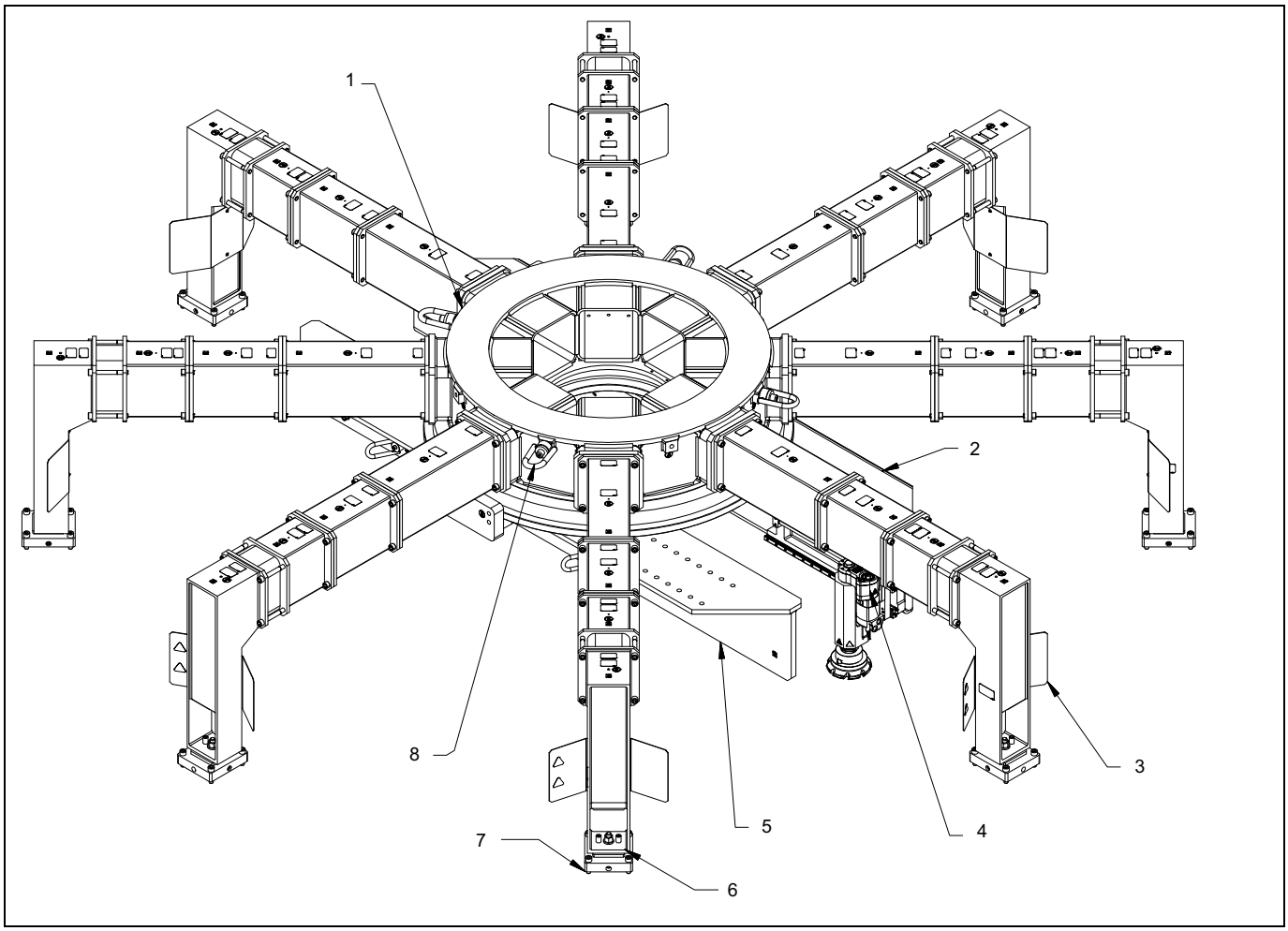


FIGURE 2-3. OD MOUNT COMPONENTS

TABLE 2-3. OD MOUNT COMPONENT IDENTIFICATION

Number	Component
1	Adjustable chuck assembly
2	Machining arm
3	Safety shield
4	Milling head
5	Counterweight assembly
6	Leveling plate
7	Centering plate
8	Hoist rings

2.3 MACHINE ENVELOPE AND OPERATING DIMENSIONS

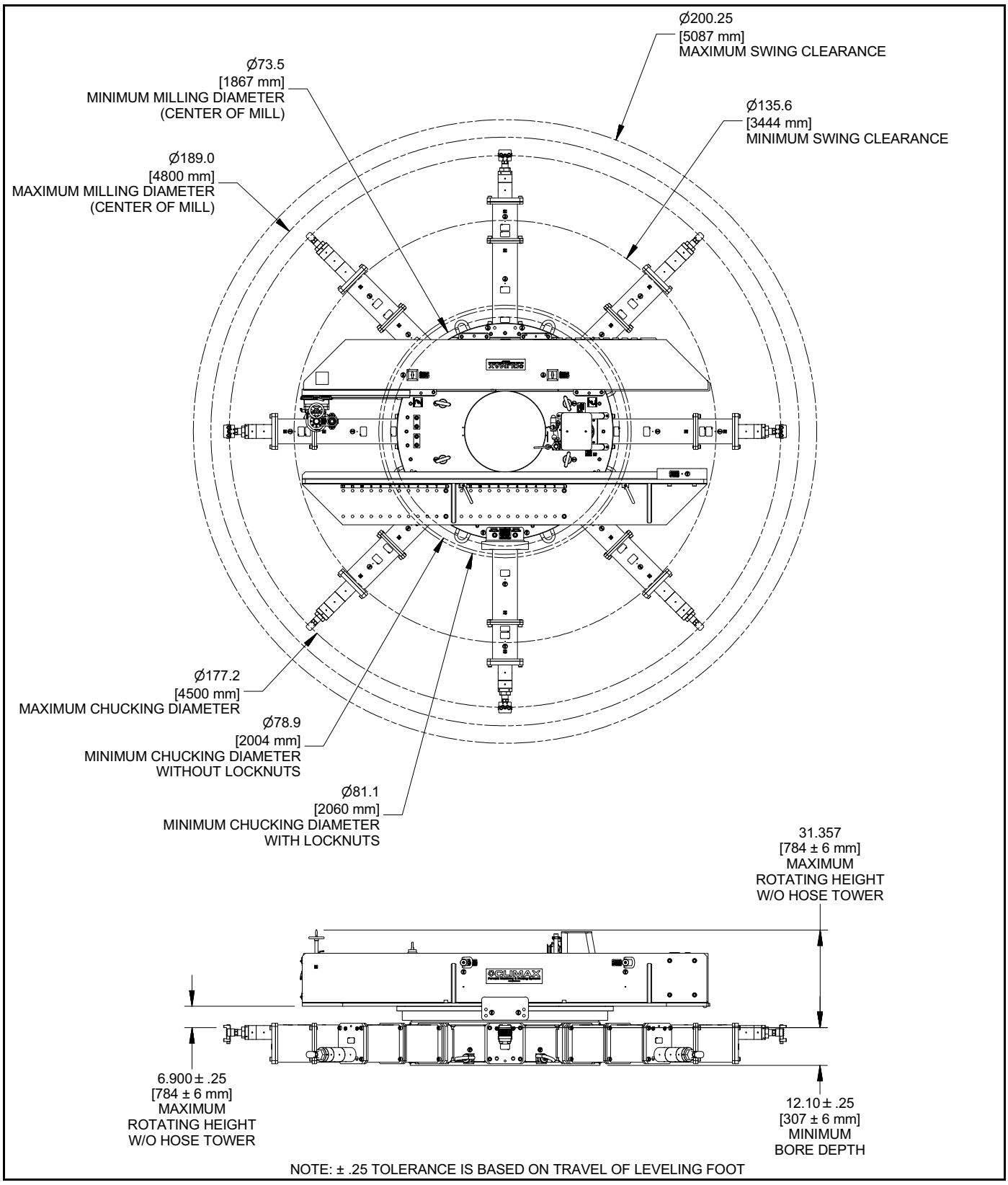


FIGURE 2-4. ID MOUNT MACHINE DIMENSIONS

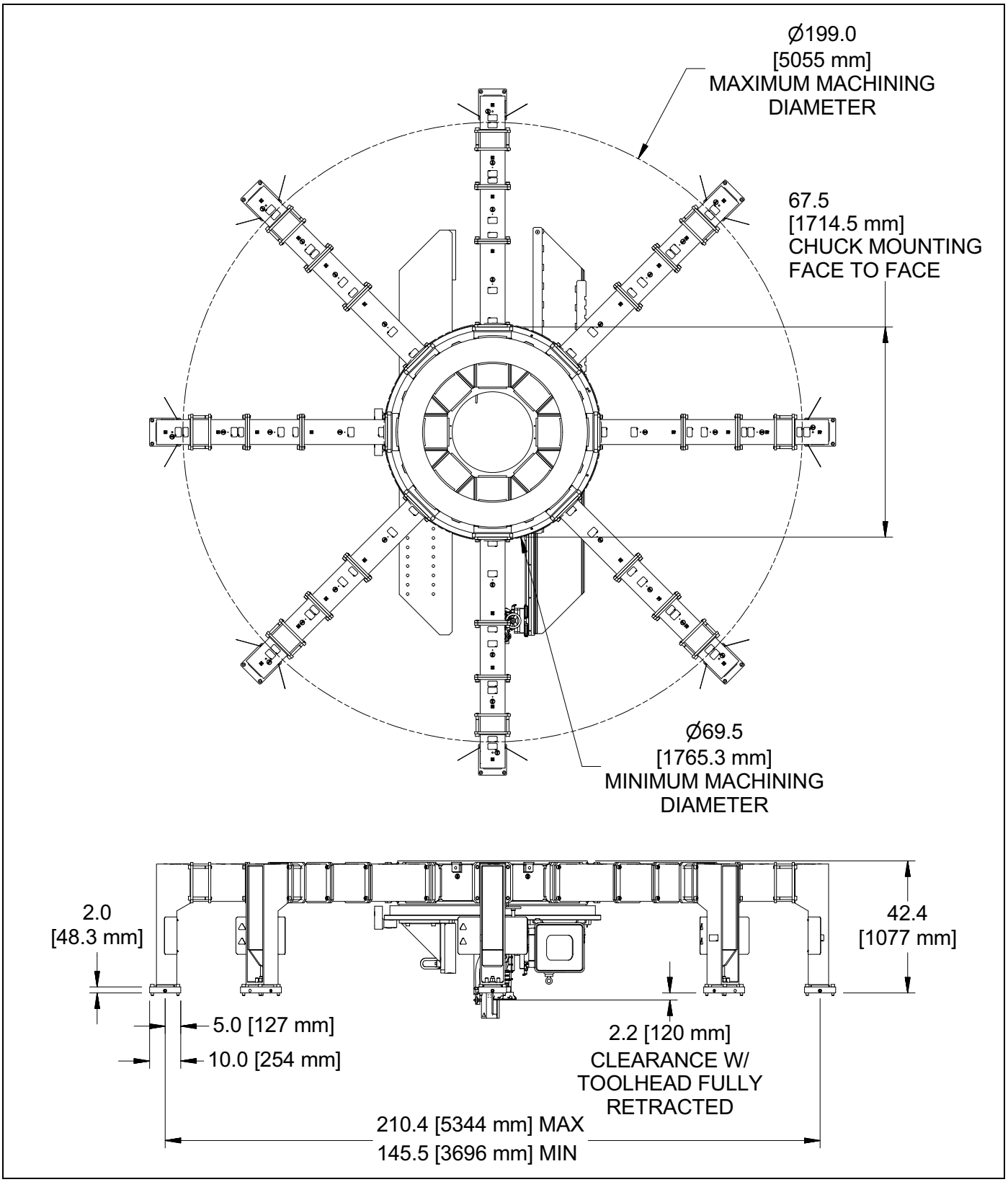


FIGURE 2-5. OD MOUNT MACHINE DIMENSIONS

2.4 SPECIFICATIONS

2.4.1 Weight specifications

TABLE 2-4. SUBASSEMBLY WEIGHTS

Subassembly	Part Number	Weight
Rotary table:	62028	3,493 lb (1584 kg)
Machining arm:	72676	1,310 lb (594 kg)
Counterweight arm:	62031	1,590 lb (721 kg)
12" ID mount leg section:	62038	70.5 lb (32 kg)
17.5" ID mount leg section:	62038	90.4 lb (41 kg)
27.5" ID mount leg section:	62038	110 lb (50 kg)
5" OD mount leg section:	60755	25.5 lb (11.6 kg)
12.5" OD mount leg section:	57724	66.5 lb (30.2 kg)
17.5" OD mount leg section:	57851	80.3 lb (36.4 kg)
27.5" OD mount leg section:	57852	108 lb (49.0 kg)
Milling head:	72277	112 lb (55 kg)

2.4.2 Hydraulic motor specifications

Refer to Figure 2-6 on page 20 for the maximum speeds, pressures, and flow rates for the various hydraulic motors. Do not exceed these limits or the limits of the HPU.

⚠ WARNING

Exceeding the designated parameters of the hydraulic system can cause the machine to malfunction, leading to damage to the machine or injury to personnel.

Specification Data — 2000 Series Motors

Displ. cm³/r [in³/r]		80 [4.9]	90 [5.5]	100 [6.2]	130 [8.0]	160 [9.6]	195 [11.9]	245 14.9]	305 [18.7]	395 [24.0]	490 [29.8]
Max. Speed (RPM) @ Flow	Continuous	908	836	742	576	477	385	308	246	191	153
	Intermittent	908	1042	924	720	713	577	462	365	287	230
Flow l/min [GPM]	Continuous	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]	75 [20]
	Intermittent	75 [20]	95 [25]	95 [25]	95 [25]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]	115 [30]
Torque* Nm [lb-in]	Continuous	235 [2065]	265 [2326]	295 [2630]	385 [3420]	455 [4040]	540 [4780]	660 [5850]	765 [6750]	775 [6840]	845 [7470]
	Intermittent	345 [3035]	390 [3458]	445 [3950]	560 [4970]	570 [5040]	685 [5890]	920 [7250]	885 [7820]	925 [8170]	930 [8225]
Pressure Δ bar [Δ PSI]	Continuous	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	205 [3000]	155 [2250]	120 [1750]
	Intermittent	310 [4500]	310 [4500]	310 [4500]	310 [4500]	260 [3750]	260 [3750]	260 [3750]	260 [3700]	170 [2750]	140 [2000]
	Peak	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	310 [4500]	205 [3250]	170 [2500]
Weight kg [lb]	Standard or Wheel Mount	9.3 [20.5]	9.3 [20.5]	9.5 [21.0]	9.8 [21.5]	10.0 [22.0]	10.4 [23.0]	10.9 [24.0]	11.3 [25.0]	11.8 [26.0]	12.2 [27.0]
	Bearingless	7.3 [16.0]	7.3 [16.0]	7.5 [16.5]	7.7 [17.0]	7.9 [17.5]	8.4 [18.5]	8.8 [18.5]	9.3 [20.5]	9.8 [21.5]	10.2 [22.5]

Maximum Case Pressure: See case pressure seal limitation graph.

*See shaft torque ratings for limitations.

FIGURE 2-6. HYDRAULIC MOTOR SPECIFICATIONS

For temperature ranges of operating conditions, refer to the HPU manual.

3 SETUP

IN THIS CHAPTER:

This chapter covers information about how to set up the CM6200 machine for inner diameter (ID), outer diameter (OD), inverted mounting, face mounting, and counterweight mounting. Your machine may not have all these components. Contact CLIMAX for training and more parts.

3.1 RECEIPT AND INSPECTION

Your CLIMAX product was inspected and tested prior to shipment, and packaged for normal shipment conditions. CLIMAX does not guarantee the condition of your machine upon delivery. When you receive your CLIMAX product, perform the following receipt checks.

1. Inspect the shipping containers for damage.
2. Check the contents of the shipping containers against the included invoice to ensure that all components have been shipped.
3. Inspect all components for damage.

4. When unpacking the machine, place machine on 4" (102 mm) high blocks to prevent damaging the components.
5. Use solvent to remove any protective coatings.

The machine ships from CLIMAX with a heavy coating of LPS 3. The recommended cleaner is LPS PreSolve Orange Degreaser. During machine use, an alternate long-term corrosion preventative may be used. Always use the correct cleaner for the applied protective coating.

Contact CLIMAX immediately to report damaged or missing components.

3.2 PREPARING THE MACHINE FOR USE

3.2.1 Pre-setup check

The CM6200 can be set up and mounted in many ways. Before setting up the mill, check the following:

- The machine assemblies are positioned correctly.
- There is enough room to position the entire machine on or near the work piece.
- All connections are correctly attached.

3.2.2 Assessing the work area

The CM6200 often is used in dangerous locations (in elevated positions, near other operating equipment, overhead, etc.). CLIMAX cannot foresee where this machine will be used; therefore, you must perform a site-specific risk assessment (Section 1.5 on page 4 and Section 1.6 on page 5) for each job before starting work.

The CM6200 has remote operation features that enable you to choose the optimum location to work from (Section 1.6 on page 5).

⚠ WARNING

Always follow safe work practices, including site-specific safety requirements. It is your responsibility to perform a risk assessment before you set up the machine and each time before you operate the machine.

3.3 LIFTING AND RIGGING

⚠ DANGER

The CM6200 can weigh 10,000 lbs (4,536 kg) when fully assembled in the ID configuration, and 12,000 lbs (5,456 kg) in the OD configuration.

Use caution and follow all site rigging procedures such as a lift plan, never allowing anyone under the load, etc. Falling or uncontrolled swinging of machinery can cause serious injury or death to the operator and bystanders.

The CM6200 has lifting points for individual sub-assemblies and for the completely assembled machine. The lifting points are labeled with the label shown in Figure 3-1.

FIGURE 3-1. LIFTING EYE IDENTIFICATION LABEL

⚠ CAUTION

Lift the machine only by the hoist rings marked by Figure 3-1.

The sub-assemblies can be disassembled and individually lifted by the labeled lifting eyes on each sub-assembly.

⚠ DANGER

Do not lift the assembled machine by the lifting eyes or hoist rings on the counterweight or the machining arm! Only lift the assembled machine by the four hoist rings shown in Figure 3-2 and Figure 3-3. Lifting the assembled machine by other lifting points can cause the machine to fall from the rigging. Falling machinery can cause serious injury or death.

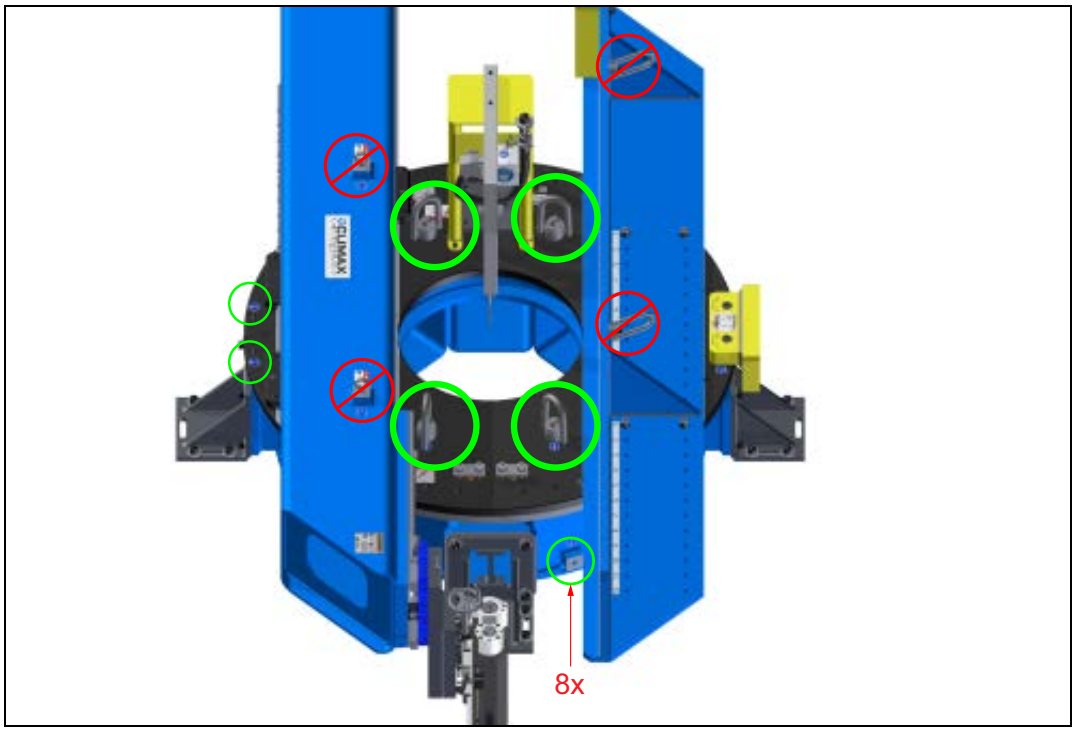


FIGURE 3-2. HOIST RINGS FOR ASSEMBLED MACHINE LIFTING

There are four hoist rings locations on the top of the rotary table (Figure 3-2 on page 23) and eight hoist ring locations around sides of the hub (one shown in Figure 3-3). Depending on the application orientation, secure the supplied hoist rings in the necessary locations.

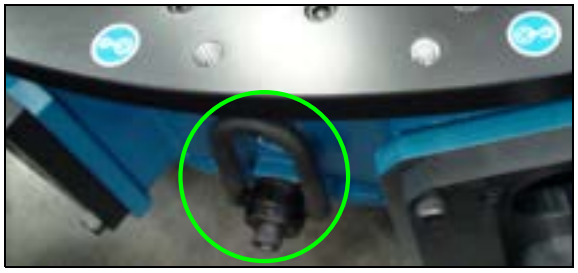


FIGURE 3-3. HOIST RINGS FOR LIFTING ASSEMBLED MACHINE IN VERTICAL POSITION

When lifting the machine, pay special attention to the location of the center of gravity. Always make sure that all machine parts are tightened properly to prevent hazards.

Vertical rigging

The lifting assembly, as shown in Figure 3-4, enables the machine to hang level with the ID chuck, or to hang level with the OD chuck.

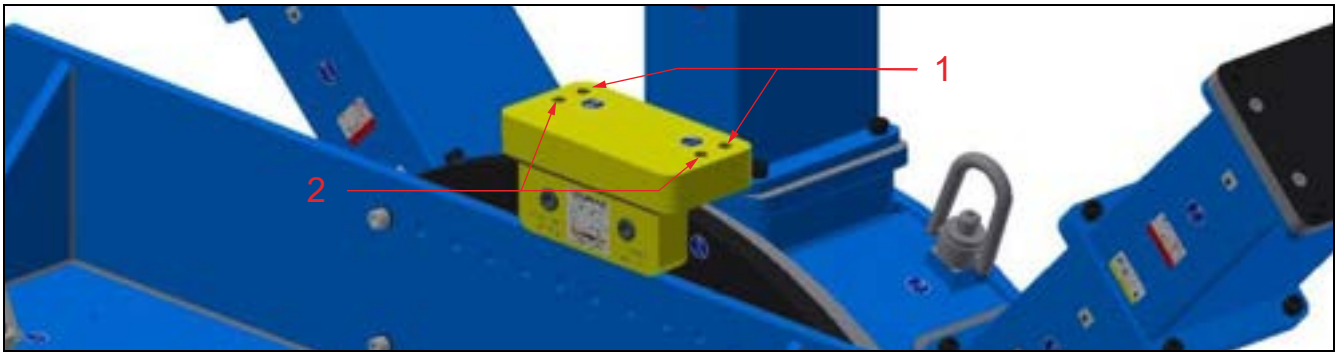


FIGURE 3-4. LIFTING ASSEMBLY ON MACHINE

TABLE 3-1. LIFTING ASSEMBLY IDENTIFICATION

Number	Component
1	Position A
2	Position B

Install lifting eyes in Position A for ID mounting or in Position B for OD mounting.

Note that only two of these holes are necessary for lifting the machine with lifting eyes installed. The holes are spaced apart to clear the mounting legs.

The lifting assembly should be torqued to 230 ft-lbs (310 Nm).

3.4 INSTALLATION HAZARDS

The installation stage can be dangerous, as it relies on the operator and other personnel following the recommended safety precautions. Consider the following warnings carefully before undertaking the assembly process.

⚠ WARNING

Swinging or falling machinery could seriously injure or be fatal to personnel who are near the machine. Secure all components to the machine before lifting. Serious injury or fatalities can result from improper lifting methods.

⚠ WARNING

If not properly secured, this machine can fall and cause fatal injuries to personnel. Pay special attention to vertical flange installations.
• Chucking feet must be secured to the workpiece.
• Setup fingers and safety weld plates should be utilized when possible.

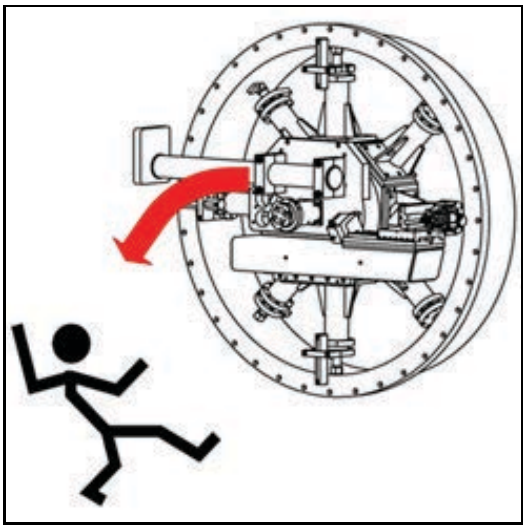


FIGURE 3-5. VERTICAL INSTALLATION HAZARD

To avoid the risk of a falling machine, secure the machine by tack-welding safety blocks over the upper jaws or by using clamps bolted to the underside of the leveling chuck feet (safety blocks and clamps not included with the machine).

⚠ WARNING

Do not remove the crane until at least one of the securing methods is in place and the chuck feet jacking screws are torqued to 325 ft-lb (441 Nm).

NOTICE

If the torque value cannot be achieved without acceptable workpiece deformation, the operator must apply their own secondary support and restraint devices.

⚠ WARNING

Do not extend the chuck feet jacking screws past the full-extension groove in the threaded screw. If needed, add additional leg sections to minimize the length of the threaded jacking screw that is exposed.

3.5 INSTALLING MACHINE ON WORKPIECE

3.5.1 Overview of CM6200 circular milling machine setup

Inspect and perform necessary maintenance on the machine before mounting on a workpiece. The following steps are an overview of the processes involved with setting up the CM6200 in the ID mounting configuration. The OD mount setup is listed in Section 3.5.3 on page 33.

Do the following to mount the machine to the workpiece:

1. Check that power sources are disconnected.
2. Measure the surface for mounting and select proper parts for machining, attaching (customer-supplied) scab plates or other mounting surfaces as needed (Figure 3-6).
3. Before inserting the circular mill into the work piece, confirm the legs are securely attached to the machine.
   a) For ID mounting: Confirm that the ID mounting legs are set to a diameter smaller than the internal mounting diameter.

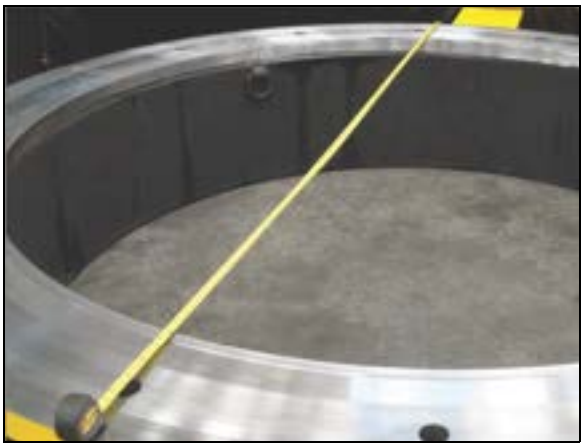


FIGURE 3-6. MEASURE WORKPIECE

b) For OD mounting: Confirm that the OD mounting legs are set to a diameter larger than the flange diameter (Figure 3-7). See Section 3.5.2 on page 29 and Section 3.5.3 on page 33 for the complete procedure for chuck leg setup.

FIGURE 3-7. LEG MEASUREMENT

NOTICE

If mounting the CM6200 in the vertical position, then the machining arm and counterweight should be attached to the rotary table (step 5) before mounting the machine to the workpiece (step 8).This will reduce the possibility of an unintentional rotational shift during the installation process.

4. Position the counterweight and machining arm in location slots that are equidistant from the machine center, with the same location number, in order to balance the machine.
5. Secure the machining arm and counterweight to the rotary table. See Section 3.6 on page 35 and Section 3.7 on page 39 for specific torque values.
6. Attach the crane slings to the lifting points on the rotary table.

⚠ WARNING

Only use individual slings for each hoist rings and be sure that they are of appropriate and equal length, and rated for the machine weight, and sling angle.

7. Lift the machine slowly and carefully. If it is out of balance, lower the machine to the ground. Make adjustments before attempting to lift and maneuver it again.

8. Mount the machine to the workpiece using setup fingers (Figure 3-8).
9. Connect any control cables that may be necessary (depending on configuration).
10. Check that the machine is centered and leveled before performing any machining operations.

FIGURE 3-8. SETUP FINGER

Horizontal to vertical lifting

When lifting the CM6200 from horizontal to vertical position, make sure that the load tested lifting assembly (Figure 3-9) is correctly installed on the machine, as described in Section 3.8.3 on page 41 and Section 3.8.4 on page 42.

This lifting device will keep the machine stable and perpendicular, making it safer and easier to lift the machine vertically.

FIGURE 3-9. LOAD TESTED LIFTING ASSEMBLY P/N 68425

3.5.2 ID mount leg assembly

The highlighted items in Figure 3-10 are 4”-4UN triple lead threaded.

The leveling chuck feet jaws include clamps for internal flanges up to 8" (210 mm).

TABLE 3-2. LOCKING NUT AND LEVELING JAW IDENTIFICATION

Number	Component
1	Internal locking nut
2	Leveling jaw

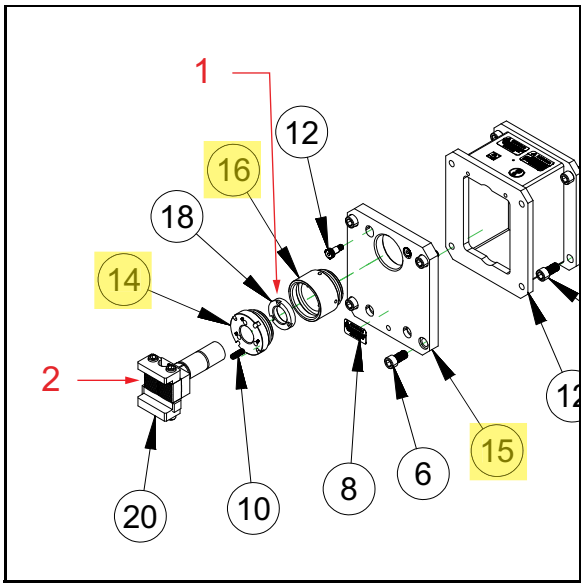


FIGURE 3-10. LOCKING NUT AND LEVELING JAW

On the end cap, the highlighted lock symbols are for the jacking screw locking system (see Figure 3-11).

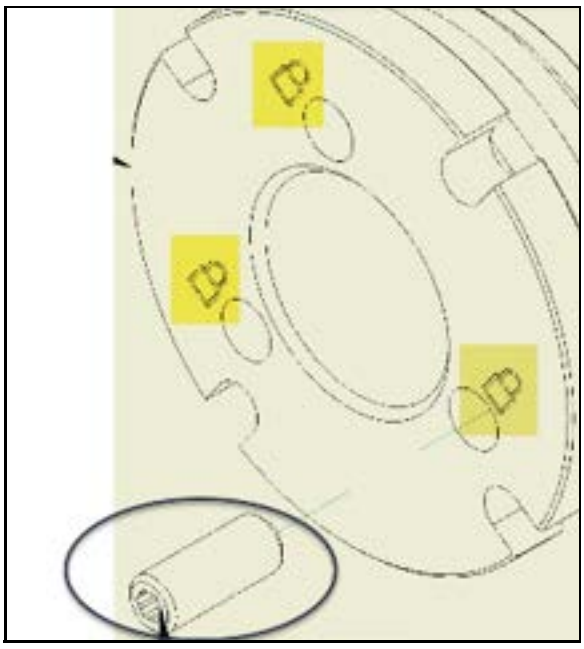


FIGURE 3-11. LOCKING SYMBOLS ON END CAP

NOTICE

After the final adjustments are complete on the chuck feet, tighten one of the three socket head set screw (P/N 74499 M12 x 40mm long to 29 ft-lbs (40 Nm) (shown circled in Figure 3-11) to lock the jacking screw position. Loosen this screw before making additional jacking adjustments—or removing the machine from the flange.

NOTICE

The chuck legs will alternate high and low around the hub for double plane. For single plane, the jacking screws will normally all be mounted high.

⚠ WARNING

Use supplemental rigging, such as setup fingers, when mounting the machine, in case it falls out or through the chucking diameter.

The rotary table can be set up in the ID or the optional OD configuration. An ID configuration allows mounting internally on a flange. An OD configuration allows attaching the machine to the outside of a flange. See Section 4.5.1 on page 84.

The double-plane setup in the ID configuration uses alternating legs so that the leveling legs are higher than the non-leveling legs. This arrangement may provide additional stability to the machine, depending on the nature of the workpiece.

NOTICE

If the workpiece will not accommodate the double-plane setup, then other methods for increasing stability of the machine should be used. See Section 3.5.3 on page 33 for attachment methods.

Do the following to set up the rotary table mounting feet:

1. Measure the workpiece bore.
2. Select the appropriate parts for assembly.
3. Apply anti-seize (provided in the tool kit) to the following locations:
   - The threads and contacting faces of each chuck extension leg section, as shown in Figure 3-12.

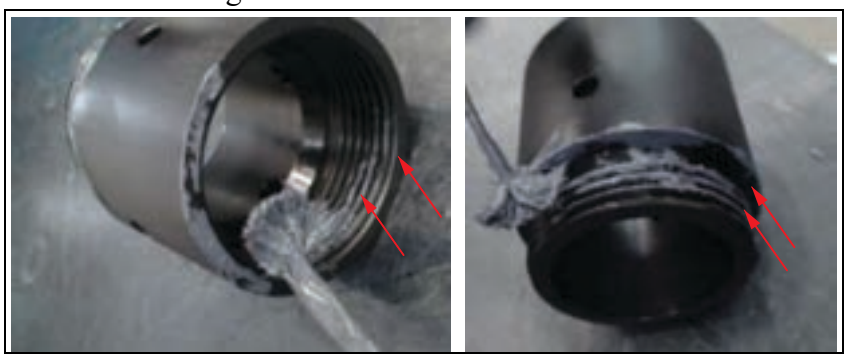


FIGURE 3-12. LOCATIONS TO APPLY ANTI-SEIZE

   - The jacking screw threads, to prevent thread galling (Figure 3-13.)

FIGURE 3-13. JACKING SCREW

4. Refer to the exploded view drawings Figure A-7 on page 126, Figure A-8 on page 127, and Figure A-9 on page 128, Table 3-5 on page 32 and Table 3-6 on page 34 when assembling the chuck legs.
5. The chuck legs will alternate high and low around the hub. Secure the chuck arms to the hub with the bolts supplied.
6. After attaching the end cap to the chuck extensions leg, install the leveling and non-leveling chuck feet assemblies. The leveling chuck feet must be mounted to the four upper leg end caps. The non-leveling chuck feet must be mounted to the lower leg end caps.
7. Secure the chuck arms to the hub with the bolts supplied.
8. After attaching the end cap to the chuck extensions leg, install the leveling chuck feet assemblies.

⚠ CAUTION

The jacking screw must be inserted so that the full extension groove is inside the end cap.

Do not extend the jacking feet past the full-extension groove in the threaded screw (Figure 3-14), as that may overload the jacking screw and result in damage to the screw.

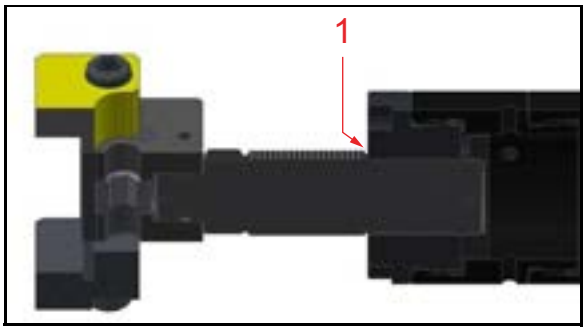


FIGURE 3-14. JACKING SCREW GROOVE (LEVELING FOOT)

If needed, add additional leg sections to minimize the length of the threaded jacking screw that is exposed.

TABLE 3-3. JACKING SCREW GROOVE IDENTIFICATION

Number	Component
1	Jacking screw groove

9. Adjust the jacking bolts equally until they are approximately 3/8" (10 mm) less than the workpiece inside diameter.

TABLE 3-4. NON-LEVELING JACKING FOOT IDENTIFICATION

Number	Component
1	Gripper pad
2	Jacking bolt

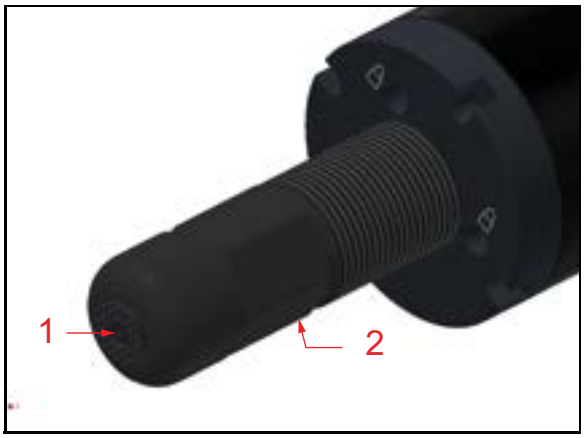


FIGURE 3-15. NON-LEVELING JACKING FOOT

10. Install the setup fingers onto the leveling blocks. Adjust the fingers so they will rest on the workpiece flange.

⚠ CAUTION

Before putting the chuck onto the workpiece, check that the jacking screws are roughly equally retracted and equipped with the set-up fingers.

TABLE 3-5. ID CHUCKING LEG SETUP SPECIFICATIONS

Range	Workpiece inside diameter	12.5" (318 mm) standoff	17.5" (445 mm) standoff	27.5" (699 mm) standoff	2.5" (64 mm) leg	5" (127 mm) leg
1	78.9–83.9" (2,004–2,131 mm)[a]	0	0	0	0	0
2	83.9–88.9" (2,131–2,285 mm)	0	0	0	1	0
3	88.9–93.9" (2,285–2,385 mm)	0	0	0	0	1
4	93.9–98.9" (2,385–2,512 mm)	0	0	0	1	1
5	98.9–103.9" (2,512–2639 mm)	0	0	0	0	2[b]
6	103.9–108.9" (2,639–2,766 mm)	1	0	0	0	0
7	108.9–113.9" (2,766–2,893 mm)	1	0	0	1	0
8	113.9– 118.9" (2,893–3020 mm)	0	1	0	0	0
9	118.9–123.9" (3,020–3,147 mm)	0	1	0	1	0
10	123.9–128.9" (3,147–3,274 mm)	0	1	0	0	1
11	128.9–133.9" (3,274–3,401 mm)	0	1	0	1	1
12	133.9–138.9" (3,401–3,528 mm)	0	0	1	0	0
13	138.9–143.9" (3,528–3,655 mm)	1	1	0	0	0
14	143.9–148.9" (3,655–3,782 mm)	1	1	0	1	0

TABLE 3-5. ID CHUCKING LEG SETUP SPECIFICATIONS

Range	Workpiece inside diameter	12.5" (318 mm) standoff	17.5" (445 mm) standoff	27.5" (699 mm) standoff	2.5" (64 mm) leg	5" (127 mm) leg
15	148.9–153.9" (3,782–3,909 mm)	1	1	0	0	1
16	153.9– 58.9" (3,909–4,036 mm)	1	1	0	1	1
17	158.9–163.9" (4,036–4,163 mm)	1	0	1	0	0
18	163.9– 168.9" (4,163–4,290 mm)	1	0	1	1	0
19	168.9–173.9" (4,290–4,417 mm)	1	0	1	0	1
20	173.9–178.9" (4,417–4,544 mm)	1	0	1	1	1
21	178.9–183.9" (4,544–4,671 mm)	0	1	1	0	1

a. Do not use the internal locking nut.
b. There are twelve 5" legs in the bill of materials. When two 5" legs per leg assembly are required (16 total), screw two 2.5" legs together to created the additional four 5" legs.

3.5.3 OD mount leg assembly

Do the following to mount the OD leg assembly:

1. Identify the necessary length of the OD mount leg sections based on measurements of the outer diameter of the workpiece and the OD configurations in Table 3-6 on page 34.
2. Assemble the OD mount legs (Figure 3-16) according to the exploded view in Figure A-10 on page 129.

FIGURE 3-16. OD MOUNT LEG ASSEMBLY

3. Attach the centering plate onto the ends of each OD mount leg (Figure 3-17).

NOTICE

In Table 3-6, the first four rows highlighted in dark gray are not practical because of the minimum arm swing length. See Figure 3-18 on page 35.

FIGURE 3-17. OD MOUNT CENTERING PLATE

TABLE 3-6. OD CHUCKING LEG SETUP CHART

Diameter				12.5" (318 mm) standoff	17.5" (445 mm) standoff	27.5" (699 mm) standoff	5" (127 mm) leg
Range	A[a]	B[b]	C[c]				
1	92.5" (2,350 mm)	102.38" (2,600 mm)	110.4" (2,804 mm)	1	0	0	0
2	102.5" (2,604 mm)	112.38" (2,854 mm)	120.4" (3,058 mm)	0	1	0	0
3	112.5" (2,858 mm)	122.38" (3,108 mm)	130.4" (3,312 mm)	0	1	0	1
4	122.5" (3,112 mm)	132.38" (3,362 mm)	140.4" (3,566 mm)	0	0	1	0
5	127.5" (3,239 mm)	137.38" (3,489 mm)	145.4" (3,693 mm)	1	1	0	0
6	137.5" (3,493 mm)	147.38" (3,743 mm)	155.4" (3,947 mm)	1	1	0	1
7	147.5" (3,747 mm)	157.38" (3,997 mm)	165.4" (4,201 mm)	1	0	1	0
8	157.5" (4,001 mm)	167.38" (4,251 mm)	175.4" (4,455 mm)	1	0	1	1
9	167.5" (4,255 mm)	177.38" (4,505 mm)	185.4" (4,709 mm)	0	1	1	1
10	182.5" (4,636 mm)	192.38" (4,886 mm)	200.4" (5,090 mm)	1	1	1	0
11	192.5" (4,890 mm)	202.38" (5,140 mm)	210.4" (5,344 mm)	1	1	1	1

a. A is measured from mounting face to mounting face of the vertical supports.
b. B is the swing clearance inside the vertical supports for the machining arm.
c. C is measured from center of mounting plate to center of mounting plate.

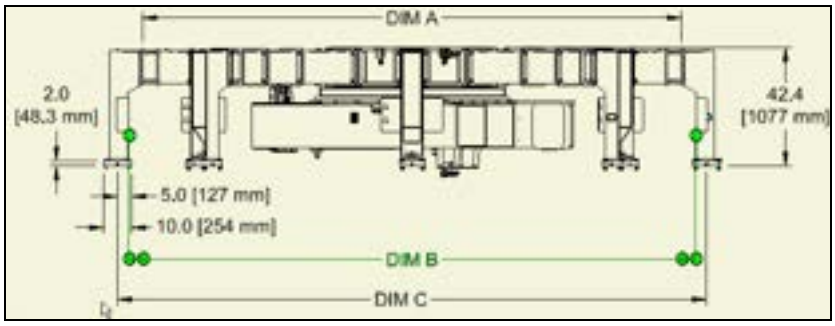


FIGURE 3-18. OD CHUCKING LEG DIMENSIONS

3.6 MOUNTING THE MACHINING ARM

3.6.1 Mounting the machining arm to the rotary table

After the chuck legs are correctly configured and assembled on the chuck hub, the machining arm should be mounted on the machine.

NOTICE

If the machine will be mounted in the vertical position, then this step must be completed before mounting the machine.

The machining arm may be mounted in a horizontal orientation after the chuck is mounted to the workpiece, but the machining arm should be mounted first.

The CM6200 machining arm is attached to the rotary table with clamps. Two of the clamps (closest to the center hole of the table) attach directly to the CM6200 rotary table top and do not need to be removed.

Do the following to mount the machining arm to the rotary table:

1. Keep the machining arm level and flat when lifting by using two of the lifting eyes mounted on top of the machining arm.
2. Position the machining arm against the two fixed clamps.

NOTICE

The machining arm mounting surface, opposite the milling head, is notched to allow access by the safety clamp. Make sure the notches fit against the safety pin in the clamp.

3. Install the two remaining clamps and install the 5/8-SHCS screws to secure the clamps.

⚠ WARNING

Tighten the clamp bolts to 110 ft-lb (150 Nm) to prevent unexpected movement that could cause serious injury or death.

TIP:

The selector pin does not need to be engaged in a notch after the turning arm adjustment. It is intended just to limit the turning arm's maximum amount of travel in the event that the turning arm comes loose during operation.

⚠ WARNING

Do not disable the safety stop pin. The safety stop pin is intended to prevent unwanted shifting of the machining arm, which could result in serious injury or death.

3.6.2 Repositioning the machining arm

The machining arm is incrementally adjustable for versatile positioning and to clear obstructions.

Do the following to reposition the machining arm:

1. Loosen the screws holding the four clamps.
2. Hold the safety stop pin open (Figure 3-19).
3. Slide the arm to the necessary position.
4. Release the safety stop pin.
5. Re-tighten the clamps.

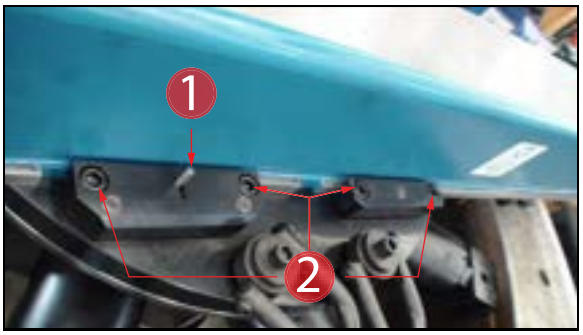


FIGURE 3-19. CLAMP SCREWS AND STOP PIN

TABLE 3-7. CLAMP SCREWS AND STOP PIN IDENTIFICATION

Number	Component
1	Stop pin
2	Clamp screws

⚠ CAUTION

After adjusting the machining arm, make sure that the counterweight is set to the corresponding bolt location increment.
For precise machining and to avoid damage to the machine, the counterweight and machining arm should always be equally spaced from the center of the machine.

The counterweight and machining arm have numbered increments along the mounting surfaces. Each numbered slot in the machining arm coincides with a numbered bolt position on the counterweight arm. Make sure that you move the counterweight one bolt space for each slot you move the machining arm.

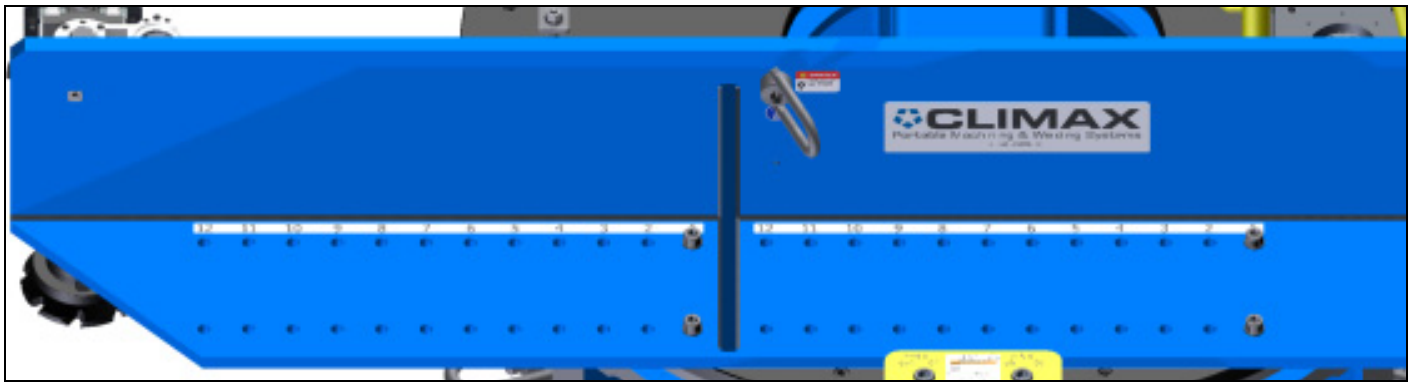


FIGURE 3-20. COUNTERWEIGHT

FIGURE 3-21. MACHINING ARM

The milling head has 24" (609.6 mm) of travel along the machining arm.

To set the machine for a milling range, use the minimum and maximum of your surface to determine the settings for the machining arm and counterweight, as shown in Table 3-8.

TABLE 3-8. POSITION OF MACHINING ARM AND COUNTERWEIGHT

Position	Surface range in inches (mm)
1	123–73.5" (3,124.2–1,866.9 mm)
2	129–79.5" (3,276.6–2,019.3 mm)
3	135–85.5" (3,429.0–2,171.7 mm)
4	141–91.5" (3,581.4–2,324.1 mm)
5	147–97.5" (3,733.8–2,476.5 mm)
6	153–103.5" (3,886.2–2,628.9 mm)
7	159–109.5" (4,038.6–2,781.3 mm)
8	165–115.5" (4,191.0–2,933.7 mm)
9	171–121.5" (4,343.4–3,073.4 mm)
10	177–127.5" (4,495.8–3,238.5 mm)
11	183–133.5" (4,648.2–3,390.9 mm)
12	189–149.5" (4,800.6–3,797.3 mm)

3.6.3 Milling, grinding, or single-point setup

See Section 4.4 on page 81 for grinding configuration.

See Section 4.5 on page 82 for single-point configuration.

For milling, the milling head mounts to the CM6200 using an adapter plate.

Bolt-hole patterns in the adapter plate allow the milling head assembly to be placed in 180° increments.

Before lifting the milling head assembly, determine which alignment is required for machining operations.

Do the following to install the milling head:

1. Hoist the adapter plate into place and align.
2. Mount the adapter to the radial slide saddle and bolt in place.
3. Align milling head plate to dowel pins in adapter plate.
4. Remove all tools and lifting or rigging equipment.
5. Check that all fasteners are tightened properly.

FIGURE 3-22. INSTALLED MILLING HEAD

3.7 POSITIONING THE COUNTERWEIGHT

After the chuck legs are correctly configured and assembled on the chuck hub, the counterweight should be mounted on the machine.

NOTICE

The counterweight must be installed when the machine is used in a vertical machining application. CLIMAX recommends that you always use the counterweight as it improves the performance of the machine and produces a flatter surface.

The machining arm may be mounted in a horizontal orientation after the chuck is mounted to the workpiece, but the machining arm should be mounted first.

The counterweight serves to reduce the load on the servo drive motor and protect the drive system from excessive force. The counterweight also provides stability to the machine that creates more precise machining tolerances.

The counterweight has multiple settings and can be positioned by sliding it radially to the next bolt-hole position (Figure 3-23). Follow the parameters in Table 3-8 on page 38 to position the machining arm and counterweight in the necessary position for correct range of the machining operation.

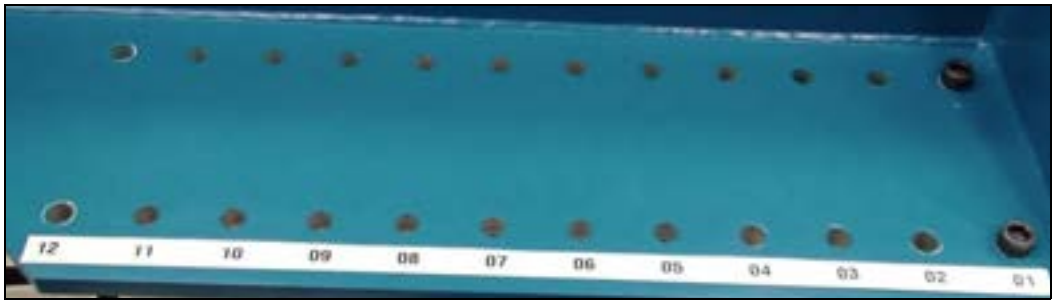


FIGURE 3-23. COUNTERWEIGHT BOLT-HOLE POSITIONS

⚠ WARNING

Tighten the counterweight arm mounting bolts to 110 ft-lb (150 Nm) to prevent unexpected movement that could cause serious injury or death.

Check that all mounting hardware is secure. A loose counterweight can fall off during operation, seriously injuring the operator or bystanders.

Do the following to mount the counterweight:

1. Position the counterweight to the location required by your machining needs.

2. Bolt the counterweight securely into place (Figure 3-24).

⚠ CAUTION

For precise machining and to avoid damage to the machine, the counterweight and machining arm should always be equally spaced from the center of the machine. The location numbers should be the same.

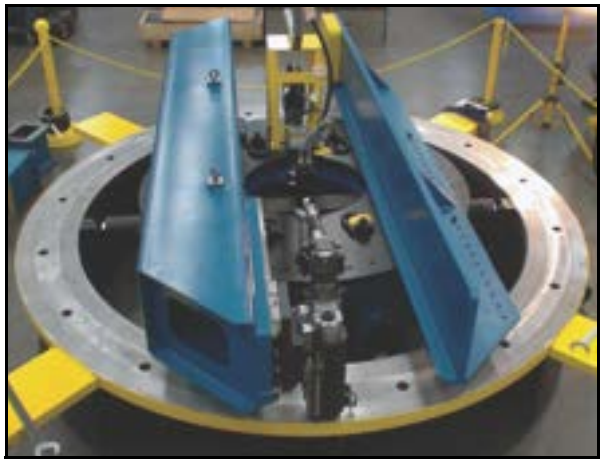


FIGURE 3-24. COUNTERWEIGHT AND MACHINING ARM ON THE ROTARY TABLE

3.8 MOUNTING MACHINE TO WORKPIECE

Once the chuck feet are correctly configured and attached to the chuck, the machine is ready to be mounted to the workpiece.

See Section 3.4 on page 25 for a full list of installation hazards.

3.8.1 ID mounting the machine horizontally

Do the following to ID mount the machine to a horizontal flange:

1. Set the ID mounting chuck feet to a dimension that is 0.01" (0.25 mm) less per leg than the dimension of the inner diameter of the workpiece.
2. Position the machining arm (see Section 3.6 on page 35) and the counterweight arm (see Section 3.7 on page 39) before lifting (see Section 3.3 on page 22).
3. Lift the machine into the inner diameter of the workpiece—using the four hoist rings on the top hub (as shown in Figure 3-2 on page 23).
4. Extend the chuck feet at the 6:00, 9:00, 12:00, and 3:00 positions to secure the machine into position.

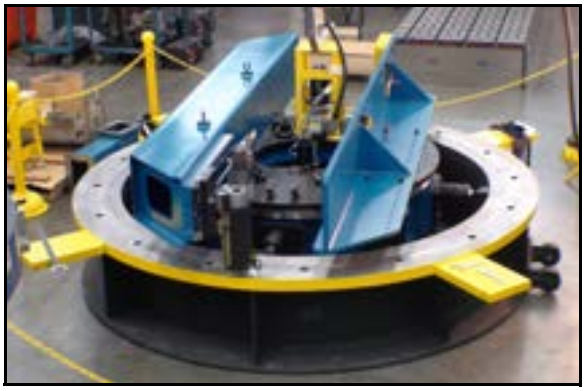


FIGURE 3-25. HORIZONTALLY MOUNTED MACHINE

5. Center and level the machine on the flange as described in Section 3.9 on page 47.

3.8.2 OD mounting the machine horizontally

Do the following to OD mount the machine to a horizontal flange:

1. Position the machining arm (see Section 3.6 on page 35) and the counterweight arm (see Section 3.7 on page 39) before lifting (see Section 3.3 on page 22).
2. Lift the machine over the flange using the four indicated lift points (as shown in Figure 3-2 on page 23).
3. Center and level the machine on the flange as described in Section 3.9 on page 47.
4. Tighten the nut (shown in the middle of Figure 3-26) to 230 ft-lbs (310 Nm).

TABLE 3-9. OD MOUNT CENTERING PLATE IDENTIFICATION

Number	Component
1	Tightening
2	Leveling
3	Centering

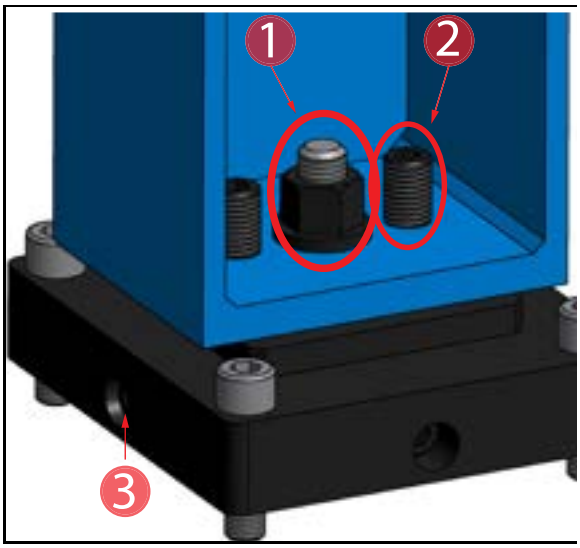


FIGURE 3-26. OD MOUNT CENTERING PLATE ADJUSTMENTS

3.8.3 ID mounting the machine vertically

When mounting the CM6200 in the vertical position, make sure that the lifting assembly (P/N 68425 in Figure 3-9 on page 28) is properly installed on the machine. This lifting device will help keep the machine stable and perpendicular, making it safer and easier to mount the machine vertically.

Do the following to ID mount the machine to a vertical flange:

1. Set the ID mounting chuck feet to a dimension that is 0.01" (0.254 mm) less per leg than what is required.
2. Position the machining arm (see Section 3.6 on page 35) and the counterweight arm (see Section 3.7 on page 39) before lifting (see Section 3.3 on page 22).

⚠ WARNING

Secure all moving parts to prevent them from swinging to the lowest point.

3. Attach and torque to 230 ft-lbs (310 Nm) the lifting assembly (P/N 68425 in Figure 3-9).
4. Lift the machine into the inner diameter of the flange using the lifting assembly, until the setup fingers rest against the flange.
5. Extend the chuck feet at the 6:00, 9:00, 12:00, and 3:00 positions to secure the machine into position.
6. Use a second method of fixation, in addition to the locking feet. See Section 3.5.3 on page 33 for fixation options for ID mounting.

⚠ DANGER

Either the weld plate or the flange clamp must be used for securing the CM6200 in the workpiece, **in addition to** locking the jacking feet. Failure to properly secure the machine may result in the machine falling from the workpiece, potentially causing serious injury or death.

7. Remove all tools from workpiece and machine.
8. Center and level the machine on the flange as described in Section 3.9 on page 47.

3.8.4 OD mounting the machine vertically

When mounting the CM6200 in the vertical position, make sure that the lifting assembly (P/N 68425 in Figure 3-9) is properly installed on the machine. This lifting device will help keep the machine stable and perpendicular, making it safer and easier to mount the machine vertically.

Do the following to OD mount the machine to a vertical flange:

1. Position the machining arm (see Section 3.6 on page 35) and the counterweight arm (see Section 3.7 on page 39) before lifting (see Section 3.3 on page 22).

⚠ WARNING

Secure all moving parts to prevent them from swinging to the lowest point.

2. Attach and torque to 230 ft-lbs (310 Nm) the lifting assembly (P/N 68425, Figure 3-9).
3. Lift the machine over the flange using the lifting assembly, until the setup fingers rest against the flange.

4. Securely attach the OD leg to (customer-supplied) scab plates or other suitable mounting structure (see Section 3.8 on page 40).

⚠ DANGER

Failure to properly secure the machine may result in the machine falling from the workpiece, potentially causing serious injury or death.

5. Remove all tools from workpiece and machine.
6. Center and level the machine on the flange as described in Section 3.9 on page 47.
7. Tighten the nut (shown in the middle of Figure 3-26 on page 41) to 230 ft-lbs (310 Nm).

3.8.5 Inverted mounting

The CM6200 can also be mounted in an inverted position on the workpiece. The machining arm and counterweight are below the chuck in this position, as opposed to being above the chuck in the horizontal position. The horizontal mount procedure should be followed to mount the inverted ID mount. Use extreme caution when rotating the machine.

⚠ DANGER

Swinging or falling machinery could seriously injure or be fatal to personnel who are near machine. Secure all components to the machine and prevent the rotary table from turning before lifting the machine. Serious injury or fatalities can result from improper lifting methods.

Refer to Section 3.3 on page 22 for instructions on lifting the device, paying special attention to Figure 3-2 on page 23 and the use of the lifting assembly as shown in Figure 3-4 on page 24.

⚠ DANGER

Either the weld plate or the flange clamp must be used for securing the CM6200 in the workpiece, **in addition to** locking the jacking feet. Failure to properly secure the machine may result in the machine falling from the workpiece, potentially causing serious injury or death.

TIP:

The preferred method for inverting the machine is with two cranes.

Do the following for inverted mounting:

1. Remove the chucking legs or face mount if they are attached (Figure 3-27).

FIGURE 3-27. ASSEMBLY BEFORE INVERSION

2. Place a piece of plywood by the machine for it to rest on after lifting (Figure 3-28).
3. Attach the lifting device straps to four lifting eyes on the body of the chuck (two on opposite sides), as shown in Figure 3-28.
4. Lift the machine slowly to a vertical position (see Figure 3-29).

FIGURE 3-28. PLYWOOD AND STRAPS FOR INVERSION

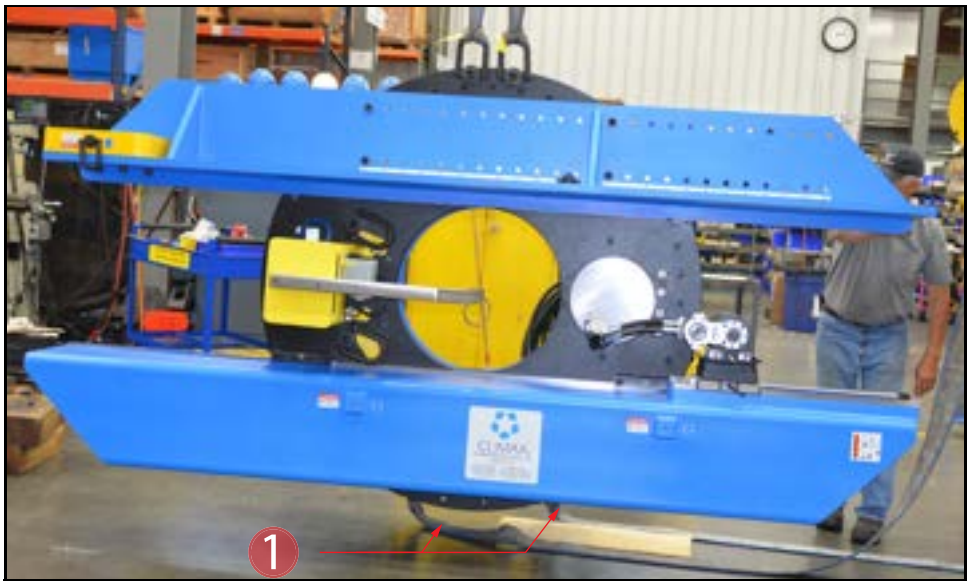


FIGURE 3-29. CM6200 IN VERTICAL POSITION

TABLE 3-10. VERTICAL CM6200 IDENTIFICATION

Number	Component
1	Lower straps

5. If using two cranes, detach the lower straps seen in Figure 3-29.
6. Raise the machine high enough to place blocks under the turning arm and chuck body.
7. Lower the machine onto the blocks (see Figure 3-30). If using two cranes, re-attach the straps to the bottom lifting eyes.

FIGURE 3-30. VERTICAL CM6200 ON BLOCKS WITH STRAPS RE-ATTACHED

8. Lift the machine vertically clear of the floor and blocks (see Figure 3-31).
9. Remove the blocks.

FIGURE 3-31. LIFTING THE CM6200 OFF THE BLOCKS

10. Raise the lower straps until the machine is completely inverted (see Figure 3-32).
11. Replace the blocks under the turning arm and counterweight arm.

FIGURE 3-32. INVERTING THE CM6200

12. Lower the machine onto the blocks (see Figure 3-33).
13. Install the appropriate mounting apparatus (ID mount, OD mount, or face mount).

FIGURE 3-33. BLOCKING LOCATIONS

3.9 CENTERING AND LEVELING THE MACHINE

NOTICE

When machining outdoors or in direct sunlight, be aware that temperature changes can affect final tolerances. CLIMAX recommends setting up temporary shade in these circumstances.

Do the following to precision center and level the machine:

1. Use a dial indicator to indicate the workpiece surface for level while rotating the machine.
2. Level the machine by doing the following:

FIGURE 3-34. ATTACHED DIAL INDICATOR

a) For ID, adjust the leveling screws in each of the leveling chuck feet (see Figure 3-35).

TABLE 3-11. LEVELING CHUCK FOOT IDENTIFICATION

Number	Component
1	Set-up finger
2	Jaw adjuster
3	Base adjuster
4	Jacking bolt
5	Leveling screw

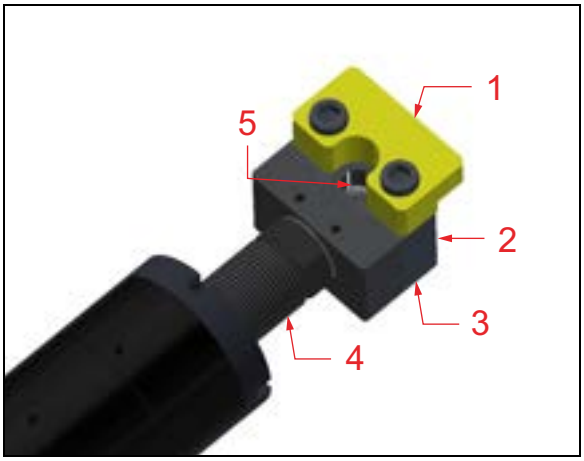


FIGURE 3-35. LEVELING CHUCK FOOT ASSEMBLY

b) For OD, adjust the leveling set screws above the centering plate (see Figure 3-26 on page 41).

3. Reposition the dial indicator to check machine centering.
4. Center the machine by doing the following:
   a) For ID, adjust the opposing pairs of chuck feet (one foot shown in Figure 3-35).
   b) For OD, adjust the centering set screws in the centering plate (see Figure 3-26 on page 41).
5. Check the machine for level and center again.
6. Repeat step 2 through step 6 until the machine is aligned.
7. Fix the machine in place according to Section 3.10 on page 48 (for ID) and Section 3.5.3 on page 33 (for OD).
8. Recheck machine alignment. If any adjustments are necessary, repeat "Fixation of ID mount" on page 48 (for ID) and Section 3.5.3 on page 33 (for OD).
9. Mark the high point of the flange so that the initial milling depth can be set at this point.
10. Remove any rigging.

3.10 FIXATION OF ID MOUNT

In ID configurations, the CM6200 is held in the workpiece by friction force from torquing eight chuck feet jacking screws.

NOTICE

All chuck feet jacking screws must be torqued to at least 325 ft-lb (441 Nm). Minimum jacking bolt torque value was determined with lubricated thread bolts and a dry bolt/workpiece interface.

Before installing the CM6200 on the workpiece, check the following:

- The workpiece surface area that will contact the CM6200 jacking screws is dry and completely free of oil, grease, or other lubricant.

⚠ WARNING

Moisture, oil, or lubricants on the chucking foot contact areas of the workpiece may result in insufficient jacking friction force and allow the machine to shift or fall out of the workpiece.

- Chuck feet jacking screw threads are coated with anti-seize lubricant.

⚠ WARNING

Failure to apply anti-seize lubricant to the jacking screw threads may result in lower-than-anticipated jacking bolt clamping force, which may allow the machine to shift or fall out of the workpiece.

Do the following to install the ID mount:

1. Tighten all the leveling jacking screws to a **minimum** torque of 325 ft-lb (441 Nm). Alternate opposite jacking legs when tightening to ensure that the setup alignment is not disturbed.
2. Extend all the non-leveling chuck feet jacking screws and tighten to a **minimum** torque of 325 ft-lb (441 Nm).

⚠ WARNING

The leveling and non-leveling chuck feet must be tightened to the torque specifications listed in the instructions above. Failure to sufficiently tighten chuck feet may cause the machine to slip or fall from the workpiece, potentially resulting in severe injury or death. Refer to Section 3.5.3 for methods of securing the CM6200 in the workpiece.

3. Secure the jacking screws using the methods described in Section 3.5.3 on page 33.
4. Remove setup fingers if the machine operation cannot be accomplished with setup fingers still attached to the leveling chuck feet.

⚠ WARNING

Do not remove more than one setup finger at time as this can allow the machine to slip in the flange and fall out of the workpiece, causing injury or death.

Setup fingers should only be removed if the mill cannot perform the necessary machining operations on the workpiece with them still attached to the chuck feet. Removing the setup fingers reduces stability of the machine.

In addition to this minimum torque of 325 ft-lb (441 Nm), as many of the following securing methods as possible should be used in combination. **Vertical and inverted mounting applications must use either the weld plate or the flange clamp, in addition to locking the jacking feet.** See Section 3.8.3 on page 41 and Section 3.8.5 on page 43 for more information on vertical and inverted mounting.

- Internal locking nut: An internal locking nut is provided with each jacking screw, and it should be tightened when the machine is centered and the jacking screws are torqued to spec. The intent of using the internal locking nut is to help prevent back-off of the jacking screw due to machine vibration during operation. See Section 3.5.2 on page 29.
- Weld plate: These four plates must be thoroughly welded onto the workpiece (with a fillet weld the length of each end and a couple short fillets across the front) with the machine in place, and bolted onto the adjustable leveling chuck foot.
- Flange clamp: The flange clamps are provided with the adjustable leveling jacking bolts and are composed by the setup finger and the internal flange clamp. These elements will clamp onto an interior surface of the mounting flange.

⚠ DANGER

Do not remove the crane until the jacking screws are tightened to the specified torque (325 ft-lb [441 Nm]) and at least one of the securing methods is in place.

3.11 INSTALLING CABLES

⚠ WARNING

Falling or rotating machinery can seriously injure the operator. Make sure the machine is secured to the workpiece before connecting power cables.

Do the following to enable the electric power connection:

1. Check that all cable plugs and fittings are clean.
2. Replace any worn or damaged parts.
3. Check that the main disconnect power switch is in the OPEN position.
4. Check that the E-stop on the pendant control is depressed.
5. Lock out all power.
6. Connect the main control cable to the main junction box on the CM6200 pendant.
7. Connect the conduit to the servo motor.
8. Attach the carabiner conduit support to the hose tower.
9. Connect the other end to the HPU control panel.
10. Secure the conduit clamp to the HPU frame.
11. Connect all other control cables to the HPU electrical panel.

NOTICE

The servo motor must be connected to the HPU—but not attached to the machine. There is a danger of damaging the servo drive if the motor is disconnected when the HPU is powered up.

⚠ CAUTION

To avoid damaging the power lines, ensure that they are clear of moving parts and pinch points during operation.

12. Check that all personnel are clear of the rotary table.
13. Close the main disconnect switch on the HPU.
14. Twist and release the e-stop on the HPU control panel.
15. Twist and release the e-stop on the control pendant.
16. Start the HPU.
17. Jog the spindle motor to be sure the spindle is rotating in the expected direction.
18. If the direction needs to be changed, stop the jog. For hydraulically powered spindle motors, remove and switch the hoses so that the direction of flow is correct. For electrically powered spindle motors, switch the direction of the servo system on the control panel.

⚠ CAUTION

Disconnecting the main control cable while under power may damage electrical components in the main panel.

This page intentionally left blank

4 OPERATION

IN THIS CHAPTER:

4.1 Operation setup

Do not operate this machine without adequate training to fully understand the safe setup, operation, and maintenance procedures.

⚠ WARNING

Only operators who have been trained on the use of the CM6200 should setup and operate the machine. Do not operate this machine in inclement weather without protection from the elements.
To avoid serious personal injury, keep clear of moving machinery during operation. Always be aware of the location of all personnel near the machine.

NOTICE

The servo motor must be connected to the HPU—but not attached to the machine. There is a danger of damaging the servo drive if the motor is disconnected when the HPU is powered up.

4.1.1 Pre-start checks

⚠ WARNING

Rotating machinery can cause serious injuries. Turn off and lock out the machine before making the pre-operation checks. When operating, always be aware of the location of all people near the machine.

Before starting the machine, always check for the following items:

- The machining arm and counterweight are secured to the turntable with a torque of 110 ft-lb (150 Nm).

⚠ CAUTION

Check that the machine (including the spindle and all movable parts) can rotate without collisions.

- The machine is securely mounted to the work piece.
- The spindle is secured to the machining arm and the adapter plate.
- All jacking and clamping screws are secured (torqued to 325 ft-lb [441 Nm]).
- Cables and hoses are secured away from the path of moving machine parts.
- All handles and tools are removed from the machine.
- The area is clearly marked with a safety zone.

4.1.2 Tool setup

The milling head has four tramming screws adjacent to the mounting screws of the housing. This allows the milling head to be jacked away from the adapter plate to tram the vertical orientation of the spindle. On top of the plate, two additional screws allow for adjusting the tilt angle of the milling head.

Since the milling head is mounted on a center pivot, the angle of the milling head must be aligned before machining can begin. This adjustment is made using the adjustment screws in the blocks mounted either below or above the housing. The rotational adjustment screws allow the housing to be rotated slightly to achieve vertical or horizontal orientation relative to the machining arm.

Do the following to adjust the milling head and spindle:

1. Loosen the lock.
2. Adjust the milling head and spindle.
3. Use the DRO to position the milling head.
4. Tighten the lock before machining.

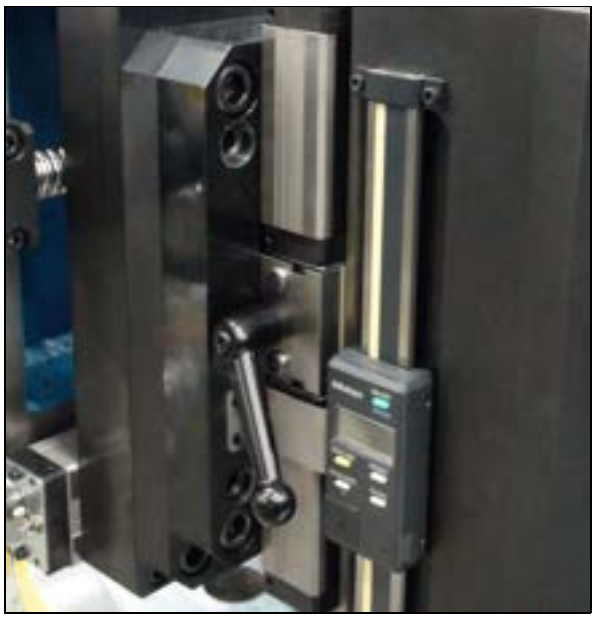


FIGURE 4-1. SPINDLE LOCK AND DRO

4.1.3 Spindle tramming

Spindle tramming is the process of orienting the spindle.

NOTICE

The spindle must be oriented perpendicular to the machine tool itself rather than to the workpiece, which is not a reliable reference point.

Do the following to tram the spindle:

1. If the spindle drive motor is installed, remove it from the spindle gearbox to allow easy hand-rotation of the spindle.

2. Install a magnetic-base dial indicator to the body of the face milling cutter (see Figure 4-2).

FIGURE 4-2. DIAL INDICATOR ON THE FACE MILL

TIP:

A right-angle fixture oriented from the linear slide rail can serve as a reference point that is perpendicular to the milling arm.

3. Extend the indicator out to make contact with the bottom of the machine ram surface (see Figure 4-3).
4. With the stylus of the indicator touching the ram surface, set the dial of the indicator to "0."

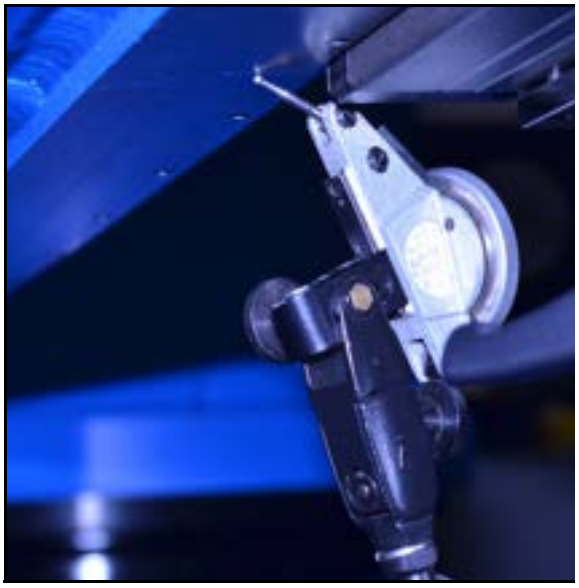


FIGURE 4-3. INDICATOR TOUCHING MACHINE RAM SURFACE

5. Rotate the spindle 180° to the machine ram surface (see Figure 4-4).

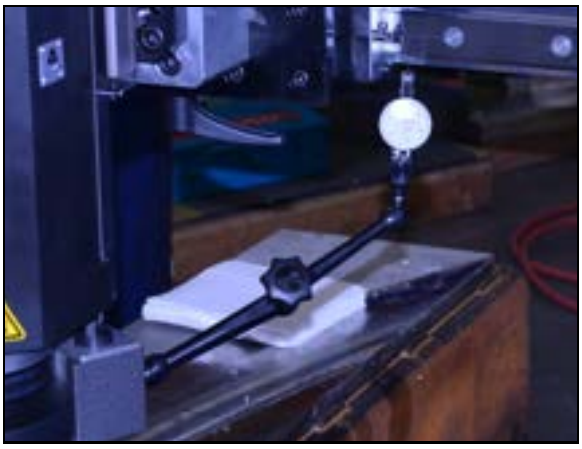


FIGURE 4-4. SPINDLE ROTATED TO THE RAM SURFACE

TIP:

With the standard spindle, the angle is limited to ±1°. If a greater angle is needed, a swivel head adapter will be needed. For further information, contact CLIMAX.

6. Note the dial reading. If it is more than 0.001" (0.03 mm) out of tramming tolerance, do the following:

   a) Loosen the four cap screws so that they are just slightly snug (between 1–3 ft-lb ([1–4 Nm]), as shown in Figure 4-5, so that the tramming setscrews can adjust the plate.

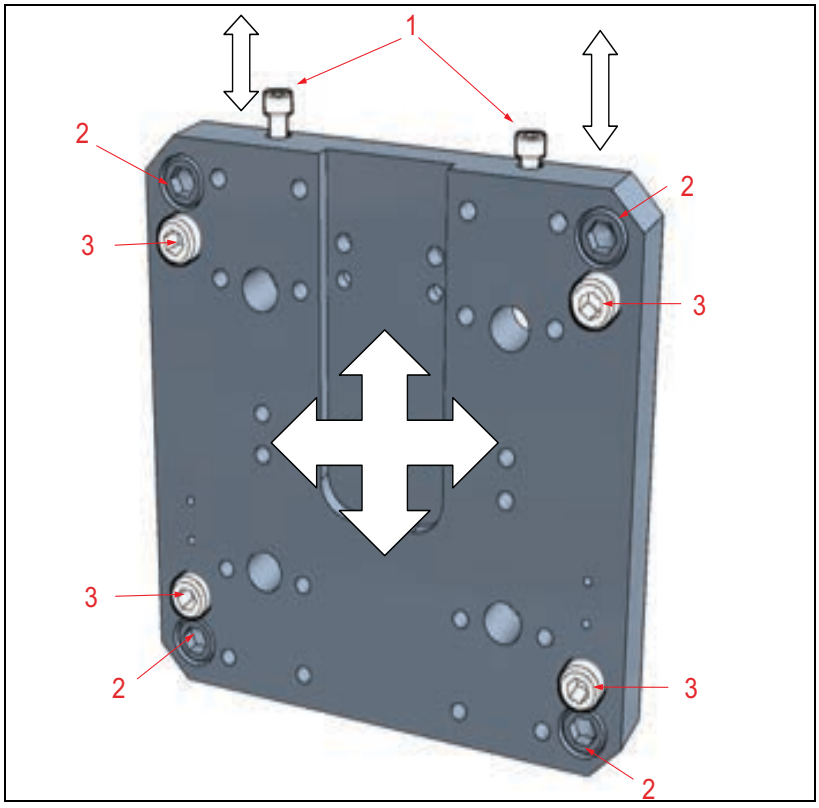


FIGURE 4-5. MILLING HEAD MOUNTING PLATE AND TRAMMING POINTS

TABLE 4-1. MILLING HEAD MOUNTING PLATE IDENTIFICATION

Number	Component
1	Y-axis tramming points rotation
2	Loosen first
3	X-axis tramming point

NOTICE

There are two cap screws on each side of the milling head, which is mounted in the center of the tramming plate shown in Figure 4-5.

b) Adjust the Y-axis screws until the indicator reads within 0.001" (0.03 mm). See Figure 4-6.

FIGURE 4-6. Y-AXIS SCREW ADJUSTMENT

c) Adjust the X-axis screws (where shown in Figure 4-7) until the indicator reads within 0.001" (0.03 mm).

7. Repeat the process of sweeping the indicator at the 0° and 180° locations and adjusting the spindle orientation until the same reading is achieved at both locations.
8. Once both axes are within tolerance, tighten the mounting bolts to 45 ft-lbs (61 Nm).

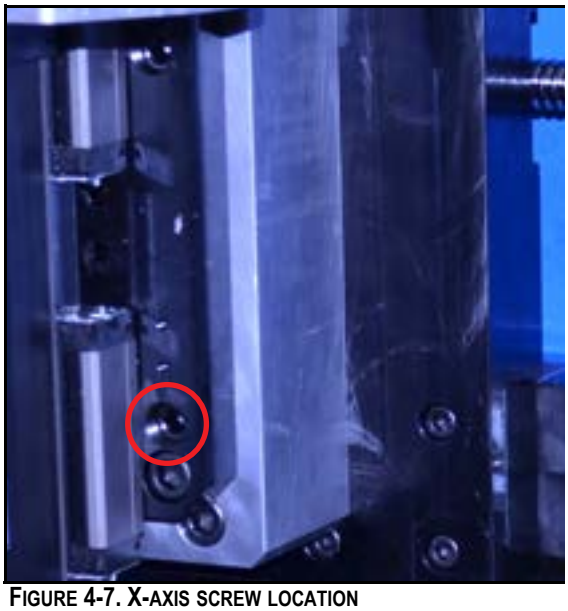


FIGURE 4-7. X-AXIS SCREW LOCATION

TIP:

Keep the dial indicator installed during the final tightening of the mounting screws, so you can recheck that the housing does not move during tensioning.

9. Reinstall the spindle drive motor (if necessary).

When ready to operate the machine, note the machined surface after the first pass.

A crosshatched pattern is the optimal result, as shown in the right of Figure 4-8.

If the results are heel-edged, as shown in the left of Figure 4-8, adjust the X-axis screws according to step c on page 59.

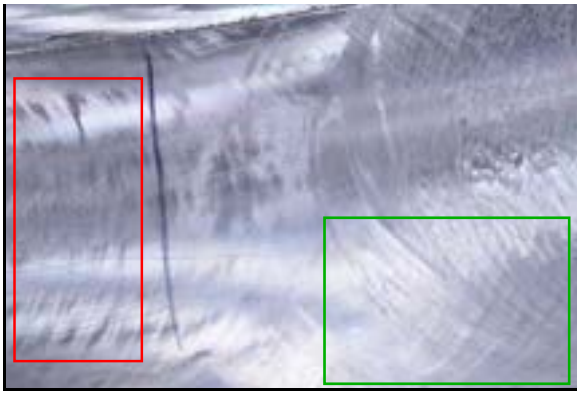


FIGURE 4-8. MACHINING PASS RESULTS

4.2 CONTROL PENDANT

4.2.1 Coordinate systems

This machine has two separate coordinate systems that track the position of the machine. The zero point can be reset at any time on either of the coordinate systems without affecting the position in the other system.

NOTICE

The machine will respond to movement instructions differently based on what coordinate system is being used.

Absolute coordinates

In the absolute coordinate system all move destinations are relative to a designated absolute zero position. For example: a destination input of 90 degrees will result in the machine moving to the absolute 90 degree position, regardless of where the current position of the machine happens to be. The machine will end up at the 90 degree position, whether the move direction is in the + or - direction. The direction of travel for absolute coordinates can be controlled.

A move from 0 to 90 degrees in the plus direction results in 90 degrees of rotation in the plus direction. A move from 0 to 90 degrees in the minus direction results in 270 degrees of rotation in the minus direction with the final position still being the absolute 90 degrees position.

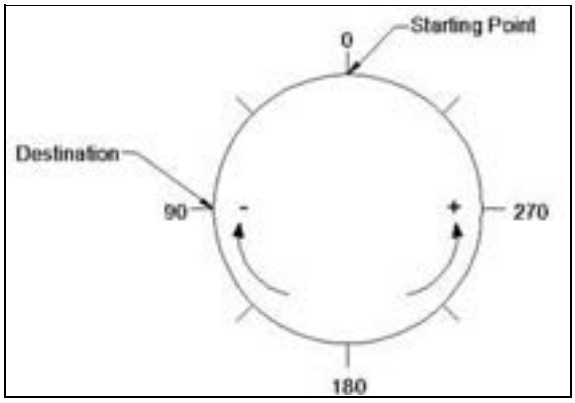


FIGURE 4-9. ABSOLUTE COORDINATES

Incremental coordinates

In the incremental coordinates system, the move increments are always relative to the current position of the machine. For example: if the machine is at the 180 degree point relative to absolute zero, a move of minus 90 will result in a final absolute position of 90 degrees. A move of plus 90 will result in an absolute position of 270 degrees.

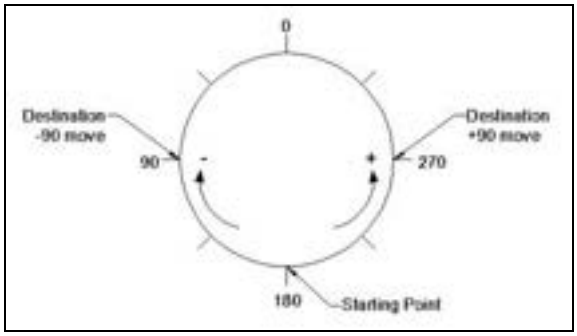


FIGURE 4-10. INCREMENTAL COORDINATES

4.2.2 Machine controls overview

The HMI control pendant is the interface for managing the operations of the CM6200. You will use the following screens to control and setup the various functions of the machine. The control pendant is shown in Figure 4-11 on page 61.

FIGURE 4-11. CM6200 CONTROL PENDANT

When the HMI is turned on, the screen shown in Figure 4-12 will appear. The default setting will be set for all of the parameters of the machine.

FIGURE 4-12. OPENING SPLASH SCREEN AT STARTUP

NOTICE

User settings are not saved when the unit is shut off.

Following the Splash Screen, the Start Screen (Figure 4-13 on page 62) will appear on the HMI. The user is cautioned about operating the machine and must reset the

parameters and connections by pressing the RESET button to navigate to the main menu.

FIGURE 4-13. RESET START SCREEN

If the E-Stop button is still depressed when the machine is powered up, the blue start (RESET) button will not be active and the text below the button will give instructions for starting.

FIGURE 4-14. RESET DEPRESSED SCREEN

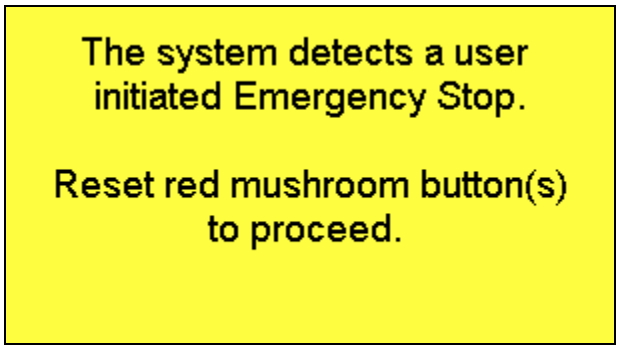


FIGURE 4-15. POP-UP SCREEN AFTER EMERGENCY STOP INITIATION

This pop-up screen also appears after the E-STOP is initiated. After the operator resolves the fault, the Start System Screen will appear.

Other possible faults in the system will be displayed with pop-up screens:

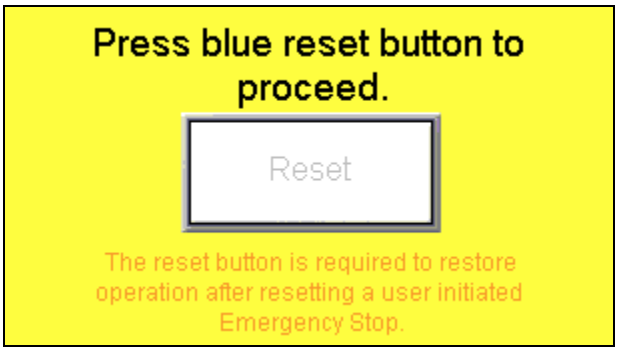


FIGURE 4-16. POP-UP SCREEN RESET REQUEST

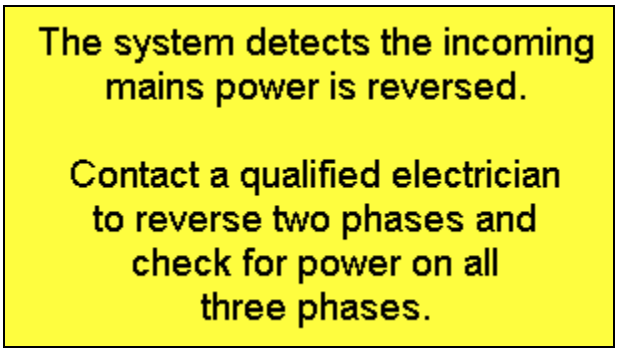


FIGURE 4-17. REVERSED POWER WARNING

After the faults are resolved, the reset button will become active and the system may be reset. After resetting the system, the HMI will redirect to the Main Menu Screen.

⚠ CAUTION

Do not disconnect any cables from the system while energized! This will result in damage to the system.

⚠ WARNING

Servo motor warning: do not connect or disconnect cables while the unit is energized.

4.2.3 Main menu

The Main Menu Screen, shown in Figure 4-18, provides access to all the main screens for machine operation.

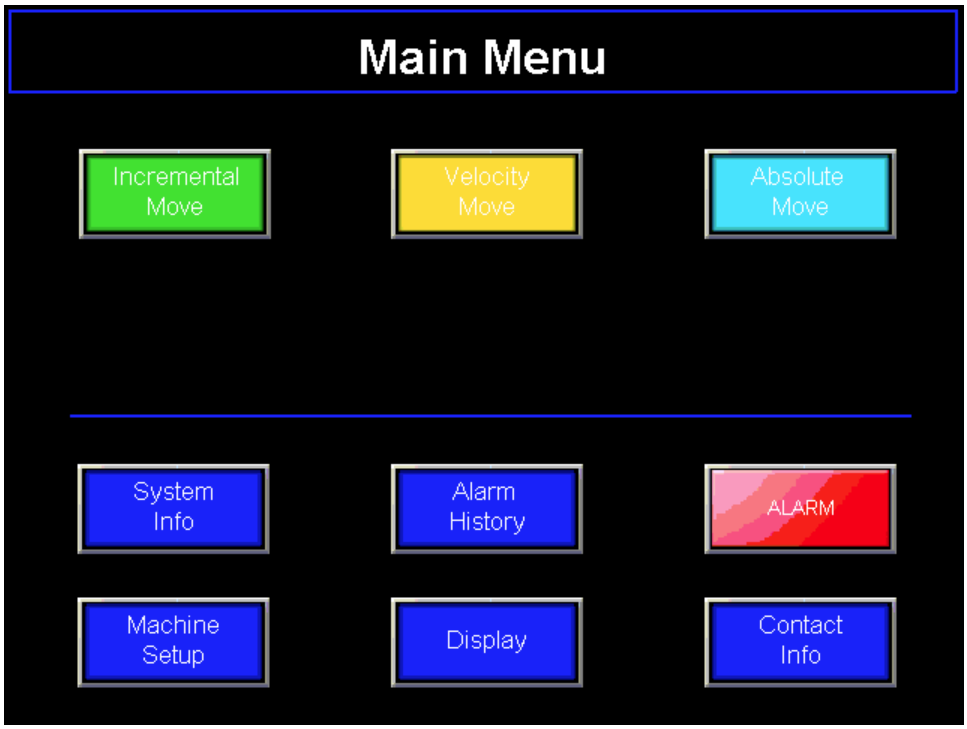


FIGURE 4-18. MAIN MENU WITHOUT SERVO MOTOR WARNING

All buttons are touch activated. Some of the buttons will also activate sub-screens for input. Further explanations on each screen are provided below.

Buttons are color coded to assist with recognition for different modes of operation. Incremental coordinate functions are coded with a green color and absolute coordinate functions are coded with a light blue color.

4.2.4 Machine setup

The Machine Setup Screen, shown in Figure 4-19, displays the parameters of the machine that can be adjusted by the operator.

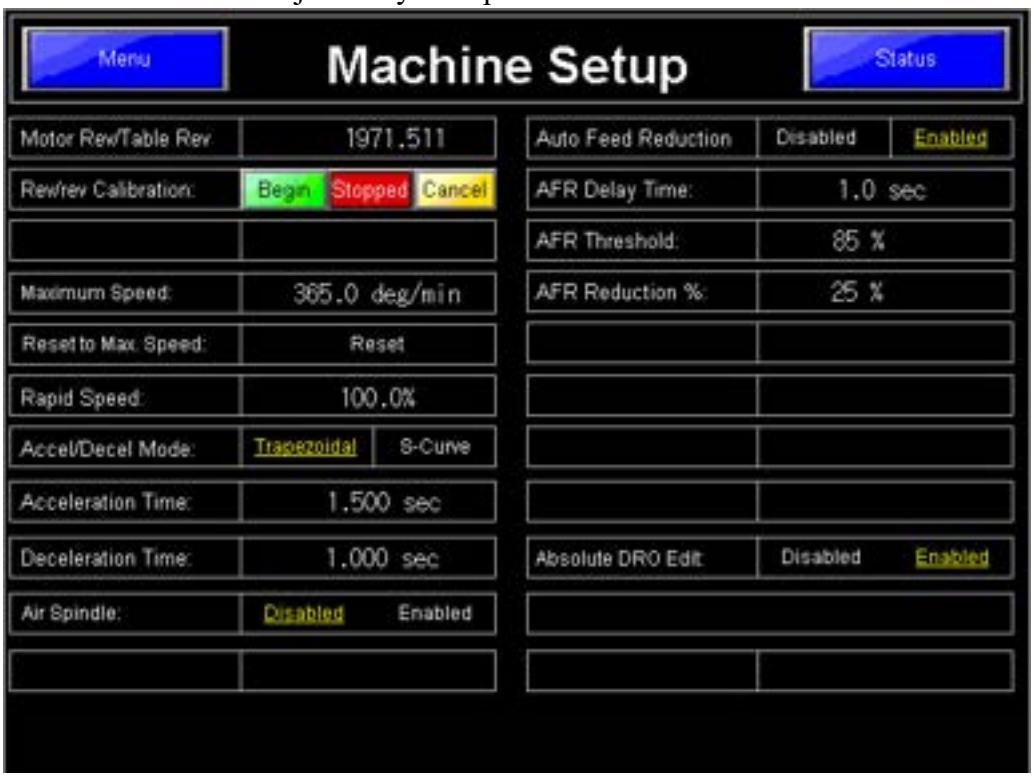


FIGURE 4-19. MACHINE SETUP SCREEN

The standard factory settings for this machine are shown in Figure 4-19. Do not change the Motor Rev/Table Rev data, as this data is based on the actual total gear ratio for this machine.

The Rapid Speed is set on this screen. This feature is available in other screens, but is edited here.

Auto Feed Reduction (AFR) is ENABLED by default. This feature helps protects the machine from being damaged by overload. If the machine encounters resistance from high spots or other irregularities during machining that push past the AFR THRESHOLD setting, the system will count for the AFR DELAY TIME and automatically reduce the feed rate by the AFR REDUCTION % specified. If the resistance is still present, the system will continue to monitor it in the AFR DELAY TIME intervals and continue to reduce the feed by the AFR REDUCTION % each time. The operator can return the machine to normal speeds manually at the control pendant.

By touching any of the number fields, the input screen below will appear (Figure 4-20). Enter the necessary data and press ENTER.

All settings on this page are retentive and are held in permanent memory even when the machine is disconnected from power.

If any of the setup parameters have not been set to a valid number, the message shown in Figure 4-21 will be displayed. Acknowledge this pop-up by pressing the OK, and enter the required data into the SETUP screen.

FIGURE 4-20. MACHINE SETUP NUMBER INPUT PAD

FIGURE 4-21. SETUP PARAMETERS VERIFICATION SCREEN

4.2.5 Incremental move

The Incremental Move Screen, shown in Figure 4-22, allows the operations of the CM6200 to be controlled according to a incremental coordinate system.

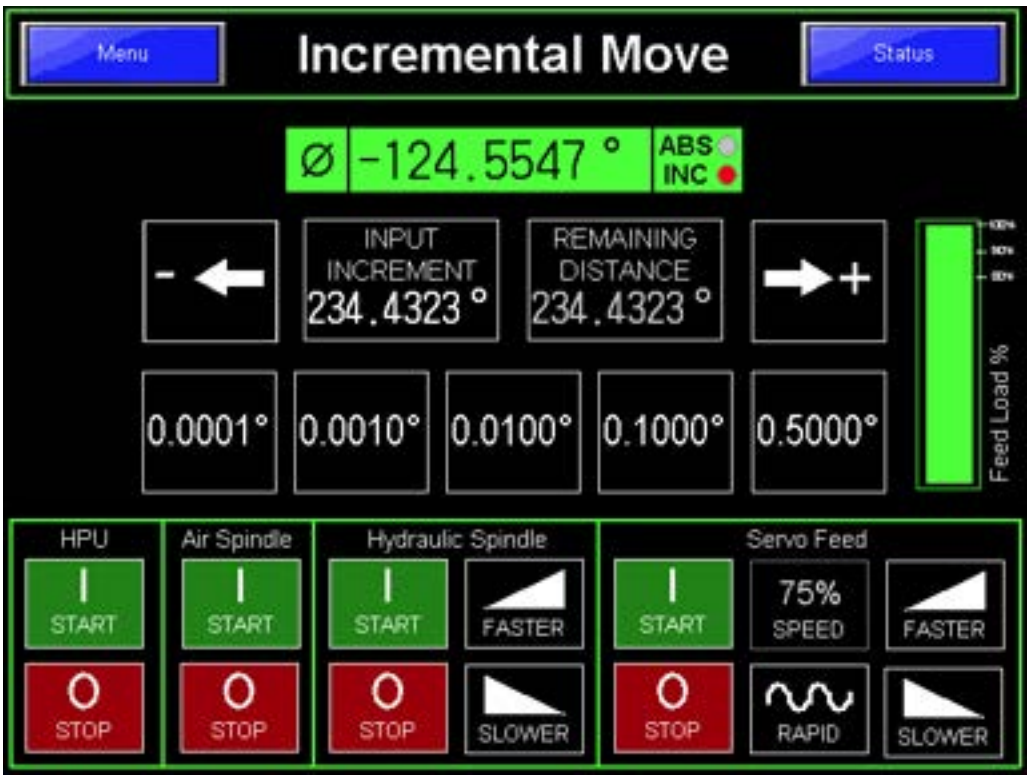


FIGURE 4-22. INCREMENTAL MOVE SCREEN

Incremental moves are relative to the current position, in the direction and speed you enter.

An incremental move will always be the distance entered in the “input increment” field, and in the selected direction and speed.

NOTICE

Based on the requested configuration of the CM6200 options, only certain functions will be enabled and visible. As a result, some functions shown above may not be available on the control pendant supplied.

4.2.6 Absolute move

The Absolute Move Screen, shown in Figure 4-23, allows the operations of the CM6200 to be controlled according to a absolute coordinate system.

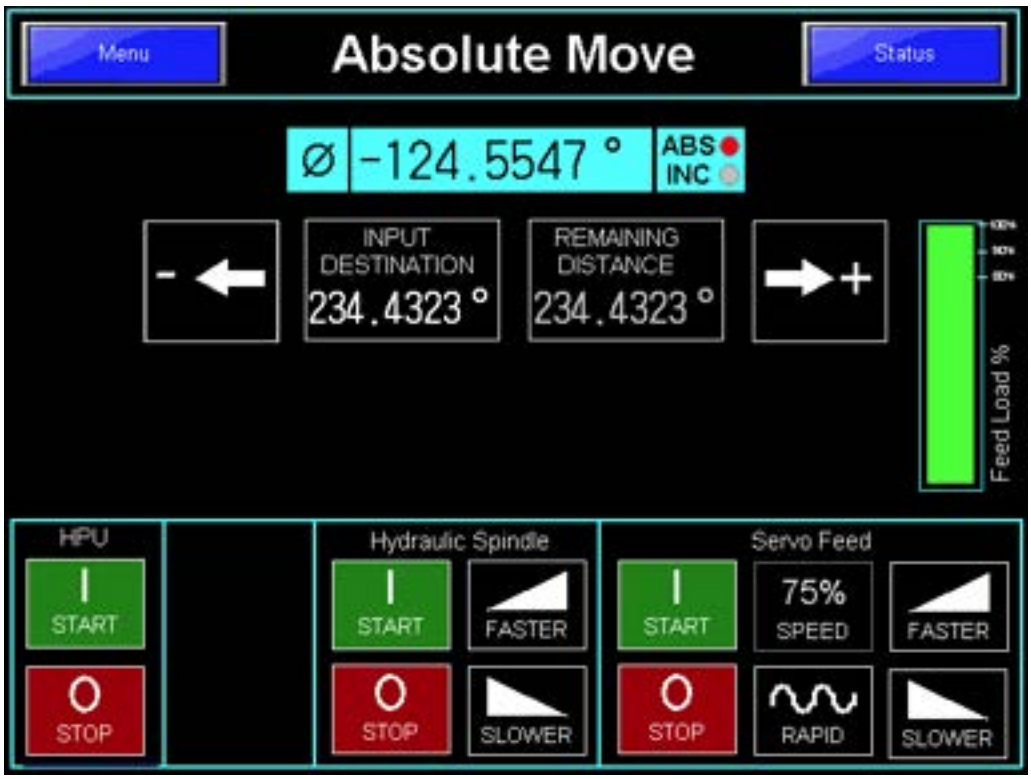


FIGURE 4-23. ABSOLUTE MOVE SCREEN

Absolute moves are relative to the absolute zero position, which can be anywhere along the circumference of a 360-degree circle. Not to be confused with incremental moves, the absolute move will move to the destination entered, at the direction and speed you entered, relative to the ZERO position.

NOTICE

Based on the requested configuration of the CM6200 options, only certain functions will be enabled and visible. As a result, some functions shown above may not be available on the control pendant supplied.

4.2.7 Incremental velocity move

The Incremental Velocity Move Screen, shown in Figure 4-24, allows the movement of the CM6200 to be controlled based on percent of the maximum speed.

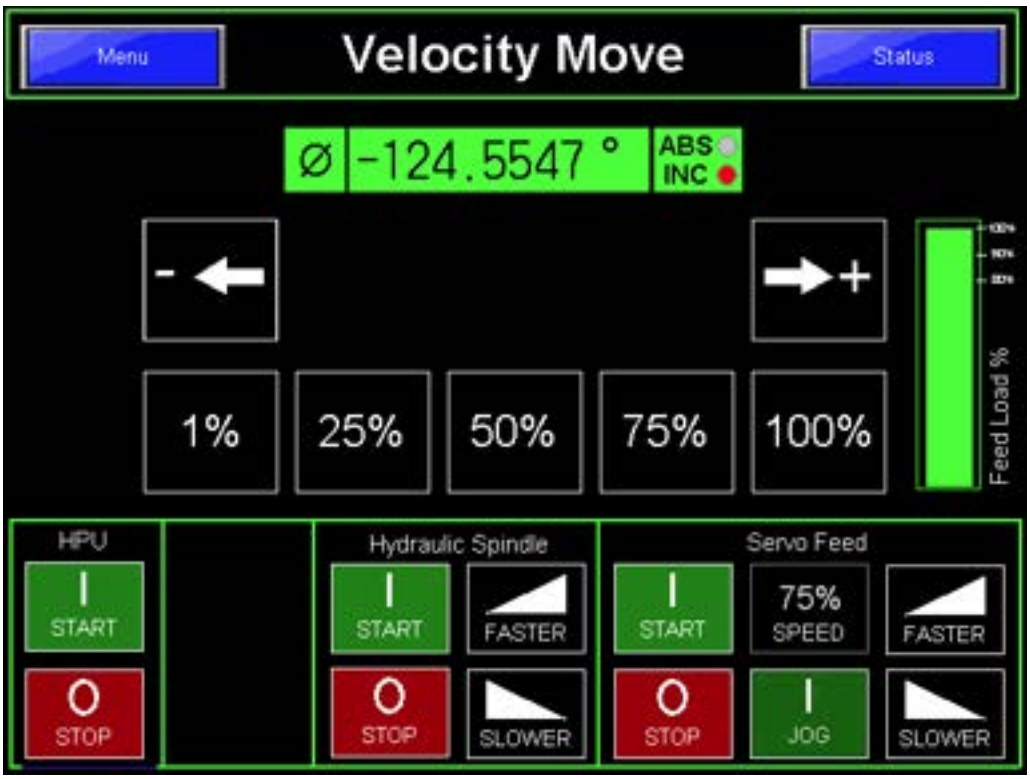


FIGURE 4-24. INCREMENTAL VELOCITY MOVE SCREEN

Note the color code and the identification dot for the increment versus the absolute velocity movement screens. To move to any position incrementally, hold down the JOG button or touch the start button.

WARNING

Based on the requested configuration of the CM6200 options, only certain functions will be enabled and visible. As a result, some functions shown above may not be available on the control pendant supplied.

4.2.8 Absolute velocity move

The Absolute Velocity Move Screen, shown in Figure 4-25, allows the movement of the CM6200 to be controlled based on percent of the maximum speed.

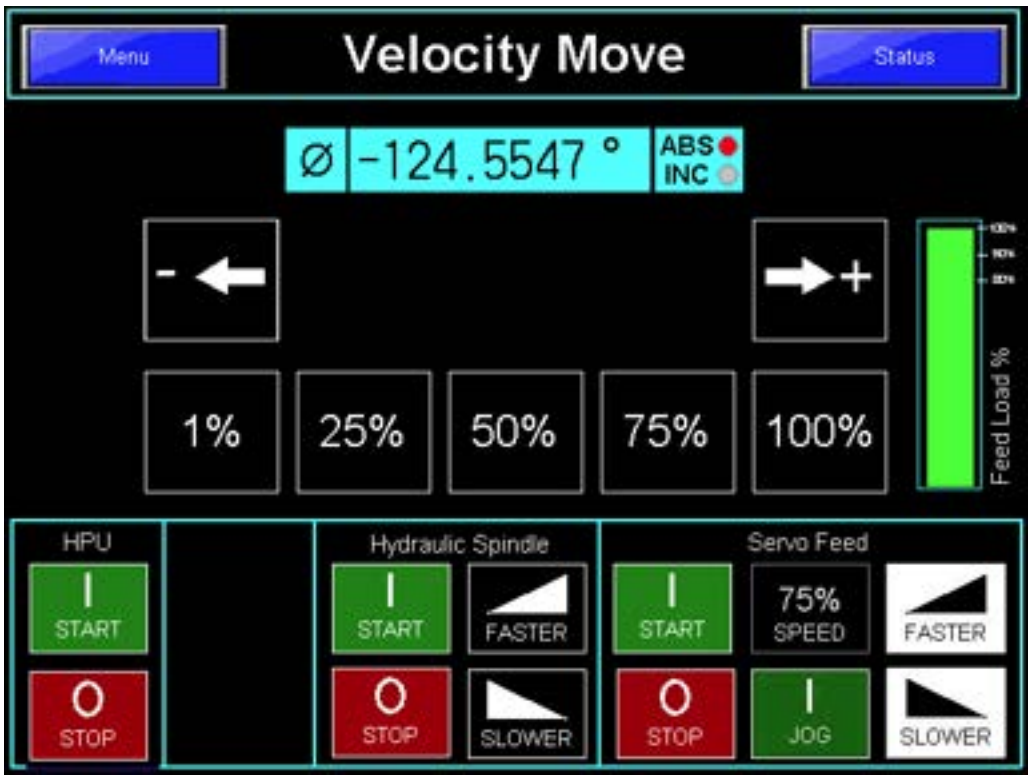


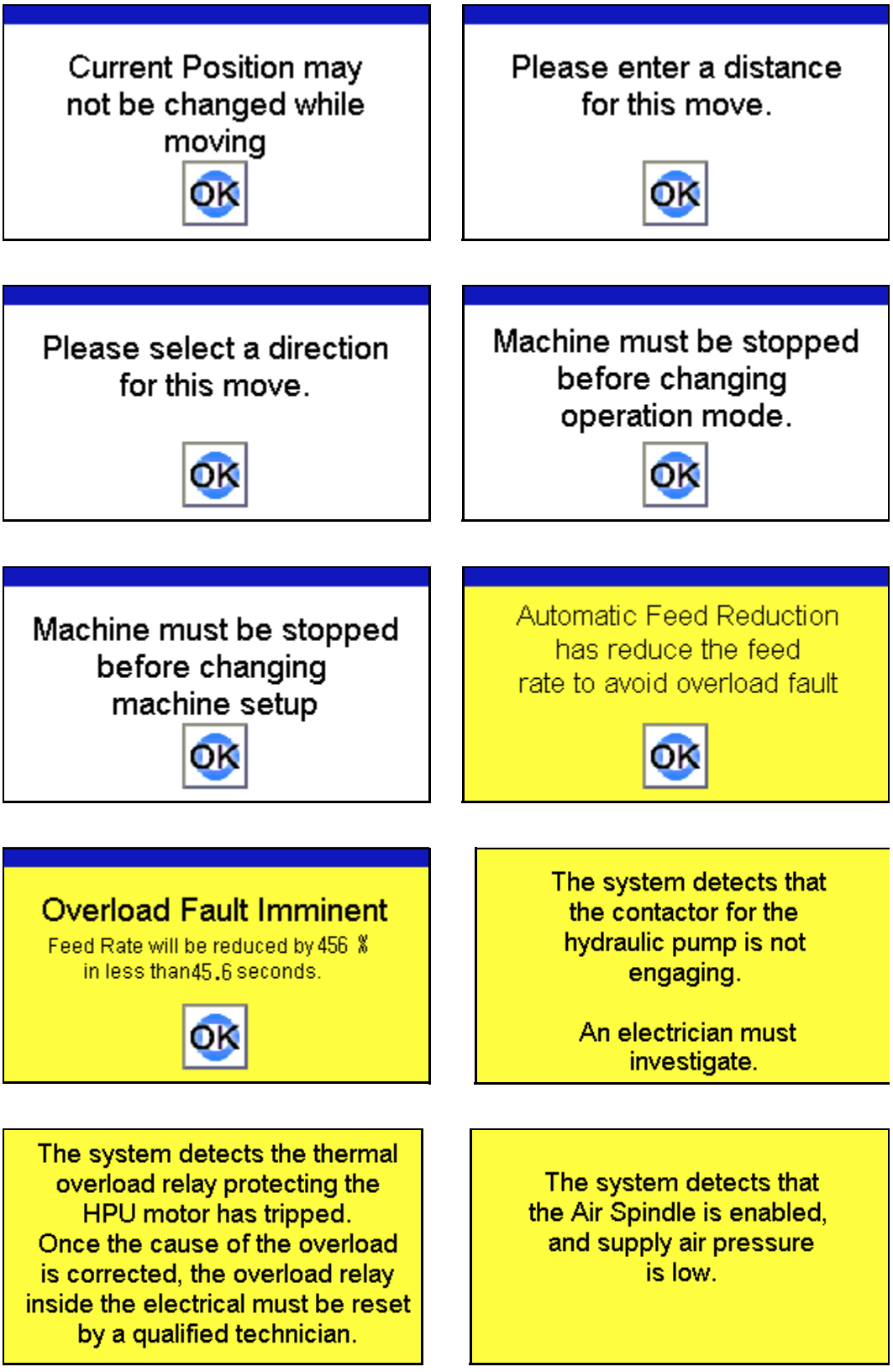
FIGURE 4-25. ABSOLUTE VELOCITY MOVE SCREEN

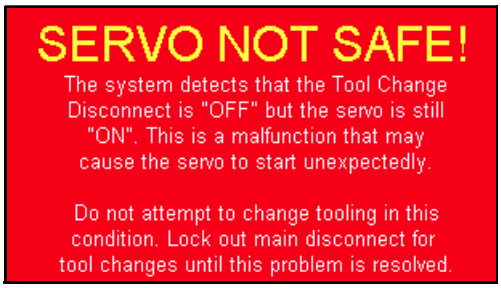
Note the color and the identification dot for absolute coordinates. The function is the same as the incremental screen, but the move will be in relation to the absolute zero.

NOTICE

Based on the requested configuration of the CM6200 options, only certain functions will be enabled and visible. As a result, some functions shown above may not be available on the control pendant supplied.

4.2.9 Pop-up screens





4.2.10 Alarm history screens

4.2.11 Status screen

The status screen, shown in Figure 4-26, shows the current status of the components of the CM6200.

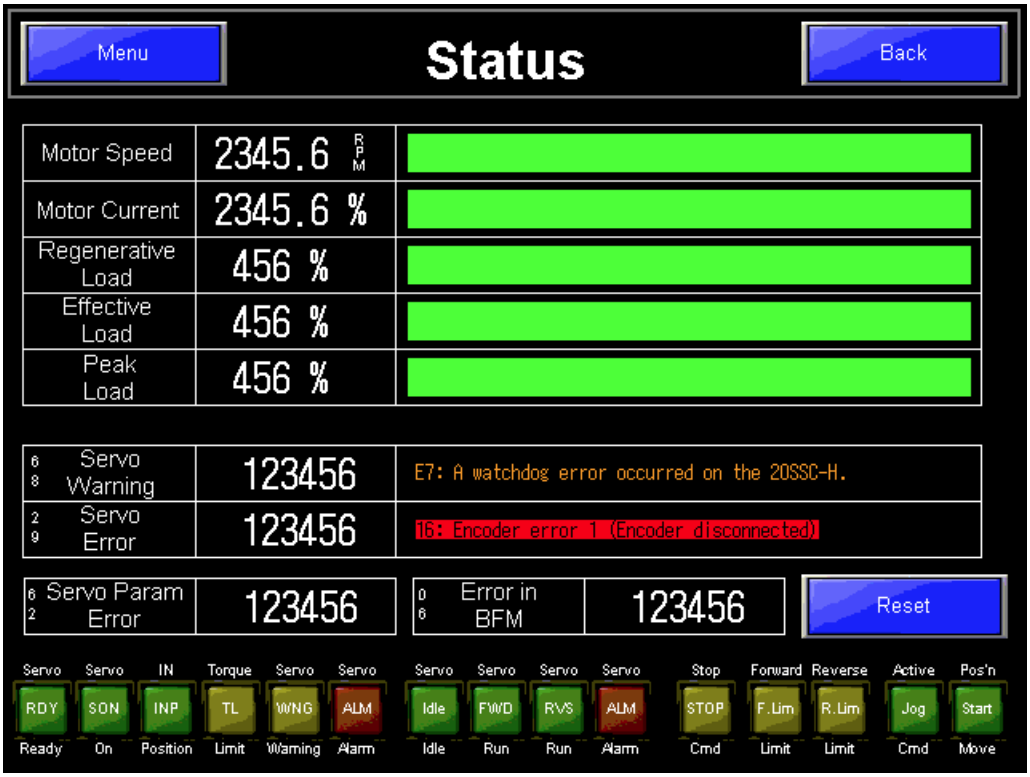


FIGURE 4-26. STATUS SCREEN

The status screen is normally only used for troubleshooting or when contacting CLIMAX for help with issues.

NOTICE

Based on the requested configuration of the CM6200 options, only certain functions will be enabled and visible. As a result, some functions shown above may not be available on the control pendant supplied.

4.2.12 System info

The System Information Screen, shown in Figure 4-27, displays information regarding the operation and identification of the machine.

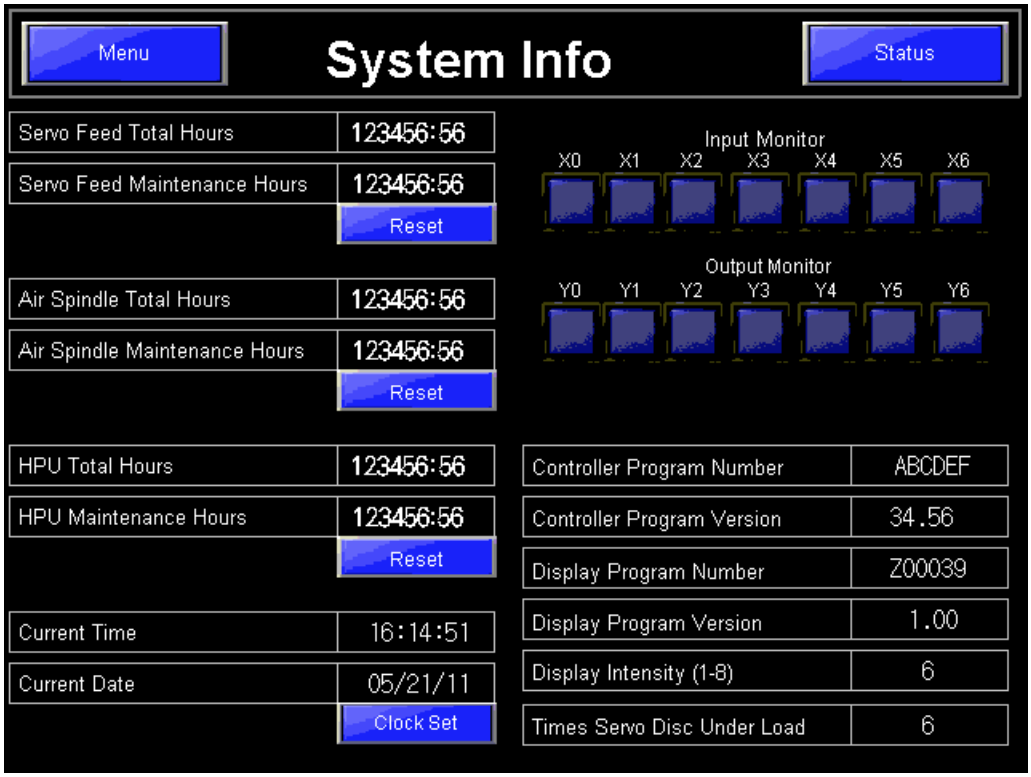


FIGURE 4-27. SYSTEM INFO SCREEN

NOTICE

Based on the requested configuration of the CM6200 options, only certain functions will be enabled and visible. As a result, some functions shown above may not be available on the control pendant supplied.

4.3 CIRCULAR MILLING

⚠ WARNING

Prior to machining make a visual inspection and review of the setup area. Make sure all necessary steps have been taken to prevent accidental blockage of rotating parts. Obstructions in the rotating machining or, counterweight assembly, and milling head are a safety hazard for machining operations and may result in severe injury or death.

4.3.1 Installing the milling head cutter

Do the following to install the milling head cutter:

1. Check that the cutter is sharp and free of nicks.
2. Check that the spindle is completely stopped and machine power is locked out.
3. Clean dirt and chips from the spindle taper surface.
4. Insert the cutter into the spindle. Be sure the cutter is engaged with the drive lugs.
5. Install the draw bolt to secure the cutter into the spindle.

4.3.2 Setting the DRO (milling head equipment)

For most operations, simply turn on the DRO and press the ZERO/ABS button to zero the display before making any adjustments to the milling head. The DRO will display the correct distances in the digital readout (see Figure 4-28).

FIGURE 4-28. DRO BUTTONS AND DISPLAY

4.3.3 Safe operating ranges

Table 4-2 on page 77 shows the surface feet per minute (sfpm) and surface meters per minute (smpm) for a given tool diameter and hydraulic motor size at 60 Hz and 20 gallons per minute (gpm) or 76 liters per minute (lpm). Table 4-3 on page 78 shows the same information at 50 Hz and 16.6 gpm (63 lpm).

⚠ CAUTION

Do not pick a motor and tool combination that is less than 150 sfpm (45.72 smpm) at 20 gpm (76 lpm). The resulting peak force at the cutter

could damage the machine. It is acceptable to run a tool at less than 150 sfpm (45.72 smpm) as long as at 20 gpm (76 lpm) it is greater than 150 sfpm (45.72 smpm).

If the operator chooses to run the machine beyond the design limitations, they do so at their own risk.

TABLE 4-2. MAXIMUM SFPM/SMPM CAPABLE FROM THE HYDRAULIC MOTOR AT 60 HZ AND 20 GPM (76 LPM)

Tooling diameter	Optional hydraulic motor sizes							
	6.2 cu-in (101.6 cucm)	**8.0 cu-in (131 cucm)**	**9.6 cu-in (157.3 cu-cm)**	**11.9 cu-in (195.0 cucm)**	**14.9 cu-in (244.17 cu-cm)**	**18.7 cu-in (244.2 cucm)**	**24.0 cu-in (393.3 cucm)**	**29.8 cu-in (488.3 cucm)**
1" (25 mm)	194 sfpm (59.1 smpm)	151 sfpm (46 smpm)	125 sfpm (38.1 smpm)	101 sfpm (30.8 smpm)	81 sfpm (24.7 smpm)	64 sfpm (24.7 smpm)	50 sfpm (15.2 smpm)	40 sfpm (12.2 smpm)
2" (51 mm)	389 sfpm (118.6 smpm)	302 sfpm (92.1 smpm)	250 sfpm (76.2 smpm)	202 sfpm (61.6 smpm)	161 sfpm (49.1 smpm)	129 sfpm (39.3 smpm)	100 sfpm (30.5 smpm)	80 sfpm (24.4 smpm)
4" (102 mm)	777 sfpm (236.8 smpm)	603 sfpm (183.8 smpm)	500 sfpm (152.4 smpm)	403 sfpm (122.8 smpm)	323 sfpm (98.5 smpm)	258 sfpm (78.6 smpm)	200 sfpm (61.0 smpm)	160 sfpm (48.8 smpm)
5" (127 mm)	971 sfpm (296.0 smpm)	754 sfpm (229.8 smpm)	624 sfpm (190.2 smpm)	504 sfpm (153.6 smpm)	403 sfpm (122.8 smpm)	322 sfpm (98.2 smpm)	250 sfpm (76.2 smpm)	200 sfpm (61.0 smpm)
6" (152 mm)	1,166 sfpm (355.4 smpm)	905 sfpm (275.8 smpm)	749 sfpm (228.3 smpm)	605 sfpm (184.4 smpm)	484 sfpm (147.5 smpm)	386 sfpm (117.7 smpm)	300 sfpm (91.4 smpm)	240 sfpm (73.2 smpm)
8" (203 mm)	1,554 sfpm (473.7 smpm)	1,206 sfpm (367.6 smpm)	905 sfpm (275.8 smpm)	806 sfpm (245.7 smpm)	645 sfpm (196.6 smpm)	515 sfpm (157.0 smpm)	400 sfpm (121.9 smpm)	320 sfpm (97.5 smpm)
10" (254 mm)	1,943 sfpm (592.2 smpm)	1,508 sfpm (459.6 smpm)	1,206 sfpm (367.6 smpm)	1,008 sfpm (307.2 smpm)	806 sfpm (245.7 smpm)	644 sfpm (196.3 smpm)	500 sfpm (152.4 smpm)	401 sfpm (122.2 smpm)

TABLE 4-3. MAXIMUM SFPM/SMPM CAPABLE FROM THE HYDRAULIC MOTOR AT 50 HZ AND 16.6 GPM (63 LPM)

Tooling diameter	Optional hydraulic motor sizes							
	8.0 cu-in (131 cucm)	9.6 cu-in (157.3 cu-cm)	11.9 cu-in (195.0 cucm)	14.9 cu-in (244.17 cu-cm)	18.7 cu-in (244.2 cucm)	24.0 cu-in (393.3 cucm)	29.8 cu-in (488.3 cucm)	6.2 cu-in (101.6 cucm)
1" (25 mm)	161 sfpm (49.1 smpm)	125 sfpm (38.1 smpm)	104 sfpm (31.7 smpm)	84 sfpm (25.6 smpm)	67 sfpm (20.4 smpm)	53 sfpm (16.2 smpm)	41 sfpm (12.5 smpm)	33 sfpm (10.1 smpm)
2" (51 mm)	323 sfpm (98.5 smpm)	251 sfpm (76.5 smpm)	208 sfpm (63.4 smpm)	168 sfpm (51.2 smpm)	134 sfpm (40.8 smpm)	108 sfpm (32.9 smpm)	83 sfpm (25.3 smpm)	66 sfpm (20.1 smpm)
4" (102 mm)	645 sfpm (196.6 smpm)	500 sfpm (152.4 smpm)	415 sfpm (126.49 smpm)	334 sfpm (101.8 smpm)	268 sfpm (81.7 smpm)	214 sfpm (65.2 smpm)	166 sfpm (50.6 smpm)	133 sfpm (40.5 smpm)
5" (127 mm)	806 sfpm (245.7 smpm)	626 sfpm (109.8 smpm)	518 sfpm (157.9 smpm)	418 sfpm (127.4 smpm)	334 sfpm (101.8 smpm)	267 sfpm (81.4 smpm)	208 sfpm (63.4 smpm)	166 sfpm (50.6 smpm)
6" (152 mm)	968 sfpm (295.1 smpm)	751 sfpm (228.9 smpm)	622 sfpm (189.6 smpm)	502 sfpm (153.0 smpm)	402 sfpm (122.5 smpm)	320 sfpm (97.5 smpm)	249 sfpm (75.9 smpm)	199 sfpm (60.7 smpm)
8" (203 mm)	1,290 sfpm (393.2 smpm)	1,001 sfpm (305.1 smpm)	751 sfpm (228.9 smpm)	669 sfpm (203.9 smpm)	535 sfpm (163.1 smpm)	427 sfpm (130.2 smpm)	332 sfpm (101.2 smpm)	266 sfpm (81.1 smpm)
10" (254 mm)	1,613 sfpm (491.6 smpm)	1,252 sfpm (381.6 smpm)	1,001 sfpm (305.1 smpm)	837 sfpm (255.1 smpm)	669 sfpm (203.9 smpm)	551 sfpm (167.9 smpm)	415 sfpm (126.5 smpm)	333 sfpm (101.5 smpm)

The colors shown correspond to the definitions in Table 4-4.

TABLE 4-4. OPERATING RANGE COLOR DEFINITIONS

SFPM/SMPM	Definition
<150 sfpm (45.7 smpm)	Do not operate
150–250 sfpm (45.7–76.2 smpm)	Okay to operate
250–500 sfpm (76.2–152.4 smpm)	Optimal operating range
>500 sfpm (152.4 smpm)	Okay to operate

4.3.4 Replacing the milling assembly

Do the following to replace the milling assembly with the single-point tool head assembly:

1. Completely de-energize and lock out the power source.
2. Remove the milling head assembly, including the miller head adapter plate, from the cross-slide plate (see Figure 4-38, which is also seen in Figure A-11 on page 130).
3. Attach the single-point tool head assembly (P/N 62984) to the cross-slide plate.

TABLE 4-5. CROSS-SLIDE PLATE IDENTIFICATION

Number	Component
1	Saddle plate
2	Milling head adapter plate

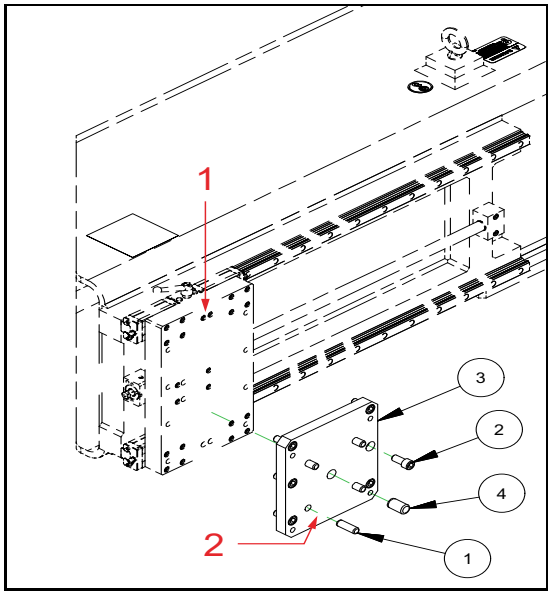


FIGURE 4-29. CROSS-SLIDE PLATE

4. Attach the tool head assembly to the adapter (see Figure 4-39, which is seen in Figure A-27 on page 146).

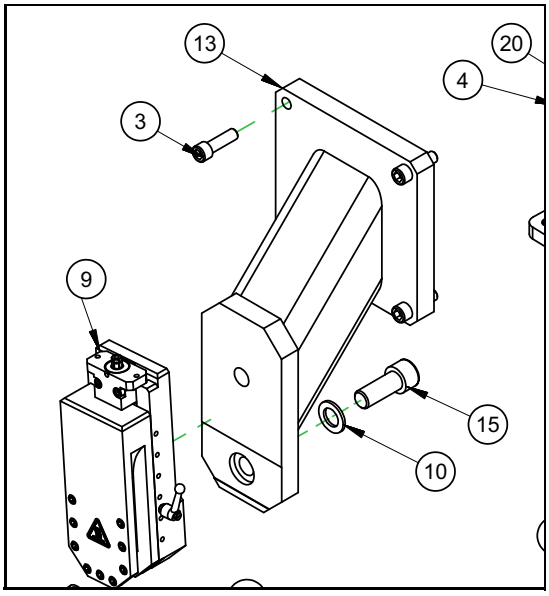


FIGURE 4-30. TOOL HEAD ASSEMBLY ADAPTER

4.3.5 Performing circular milling

Machining in either direction is possible with a facing mill on general flanges. It is recommended to make one pass in one direction and the next pass in the opposite direction.

⚠ CAUTION

If conditions or tooling requires that all passes be made in a single direction, then withdraw the spindle at the end of each one or two passes and reverse the table to prevent excessive twisting and kinking of hoses and electric cables.

Do the following to perform circular milling:

1. Set the spindle over the workpiece to the desired starting point.
2. Set the speed of the rotary table to zero.
3. Start the turntable and set a desired speed for milling.
4. Stop the table.
5. Advance the spindle toward the work until the cutter just contacts the surface. Reset the DRO.
6. Feed the spindle away from the piece so that it is no longer over the surface that will be machined.
7. Adjust the spindle to set the desired depth of cut.
8. Turn on the power and start spindle rotation.
9. Radially feed the cutter into the workpiece using the radial axis feed.
10. When the cutter is fully engaged in the work, start the rotary table rotation.

⚠ CAUTION

Never stop the spindle until the rotary table is completely stopped. Stopping the spindle before the rotary table stops will damage the machine.

TIP:

Setup fingers may need to be removed when milling.

⚠ DANGER

Removing the setup fingers from the machine will reduce stability of the machine. Make sure that the machine is secured onto the workpiece according the specifications listed in Section 3.4 on page 25 before removing setup fingers.

11. Adjust the speed control knob on the pendant until the turntable is rotating at the necessary speed.

WARNING

To protect yourself from flying chips, wear eye protection while operating the machine.

12. To stop machine rotation, press the stop button for the circular mill control pendant.
13. Repeat cutting passes as required. For very fine finishes make several rough cuts and one fine finish cut.

Move the cutter radially off the work piece between cuts or when the cut is complete.

4.4 GRINDING OPTION

4.4.1 Grinding attachment setup

The grinding attachment uses the same mount adapter as the single point tool option. See the exploded views (Figure A-16 on page 135, Figure A-17 on page 136, or Figure A-18 on page 137) for more information about the parts needed for grinding.

Do the following to set up the grinding attachment:

1. Set up the machine in the flange, according to the mounting instruction in Section 3.4 on page 25.
2. Install the grinding head to the arm (see Section 4.5.2 on page 89 for instructions on replacing the milling head).
3. Use the screws provided to attach the grinder to the face of the tool head.
4. Attach hoses from the grinding attachment to the PCU.

NOTICE

Only make a maximum of two or three passes in either direction. Then reverse direction to prevent binding up the hoses.

5. Adjust leveling screws until you achieve the desired grinding angle (Figure 4-31).
6. Use height adjusting screw on the grinding head to adjust the height.
7. Check that the guard is in place and all fasteners are tight.

FIGURE 4-31. GRINDING HEAD LEVELING SCREWS

4.4.2 Operation

Grinding should be done after the flange has been cut flat with a single point tool or the milling head.

1. Turn on grinding head and ramp to desired operating speed.
2. Set the spindle to touch the surface and make a light grind.
3. Check the surface finish.
4. Make any necessary adjustments to the grinder settings.
5. When the finish is satisfactory, continue grinding the surface as required.

⚠ WARNING

Stay clear of the grinder during operation. Chips of metal may be thrown into the air from the grinder. Wear eye protection while operating the machine.

6. When the grinding operation is complete, lift the spindle and shut off the grinder.

4.5 SINGLE-POINT OPTION

As seen in Figure 4-32 on page 84, the single-point option requires an adapter and tool head assembly, plus the pneumatic systems for feed control. This adapter mounts directly to the existing tool arm. See also Figure 4-33 on page 85 and Figure 4-34 on page 86.

For the hydraulic motor mount assembly, see Section 4.5.3 on page 90.

The PCU supplies air to the pneumatic feed box through the rotary union.

The single-point tool holder mounts to the saddle plate on the turning arm in place of the milling head. See Section 4.5.2 on page 89.

The pneumatic feed box and adapter mounts on the end of the ball screw on the turning arm.

The rotary union assembly mounts to the center of the rotary table and transmits fluid to the hydraulic motor and air to the feed box. See Section 4.5.3 on page 90. The air valve that cycles the feed box is also located here.

The emergency stop procedure is in Section 5.2.1 on page 98.

4.5.1 Configuring the rotary union for ID or OD mount

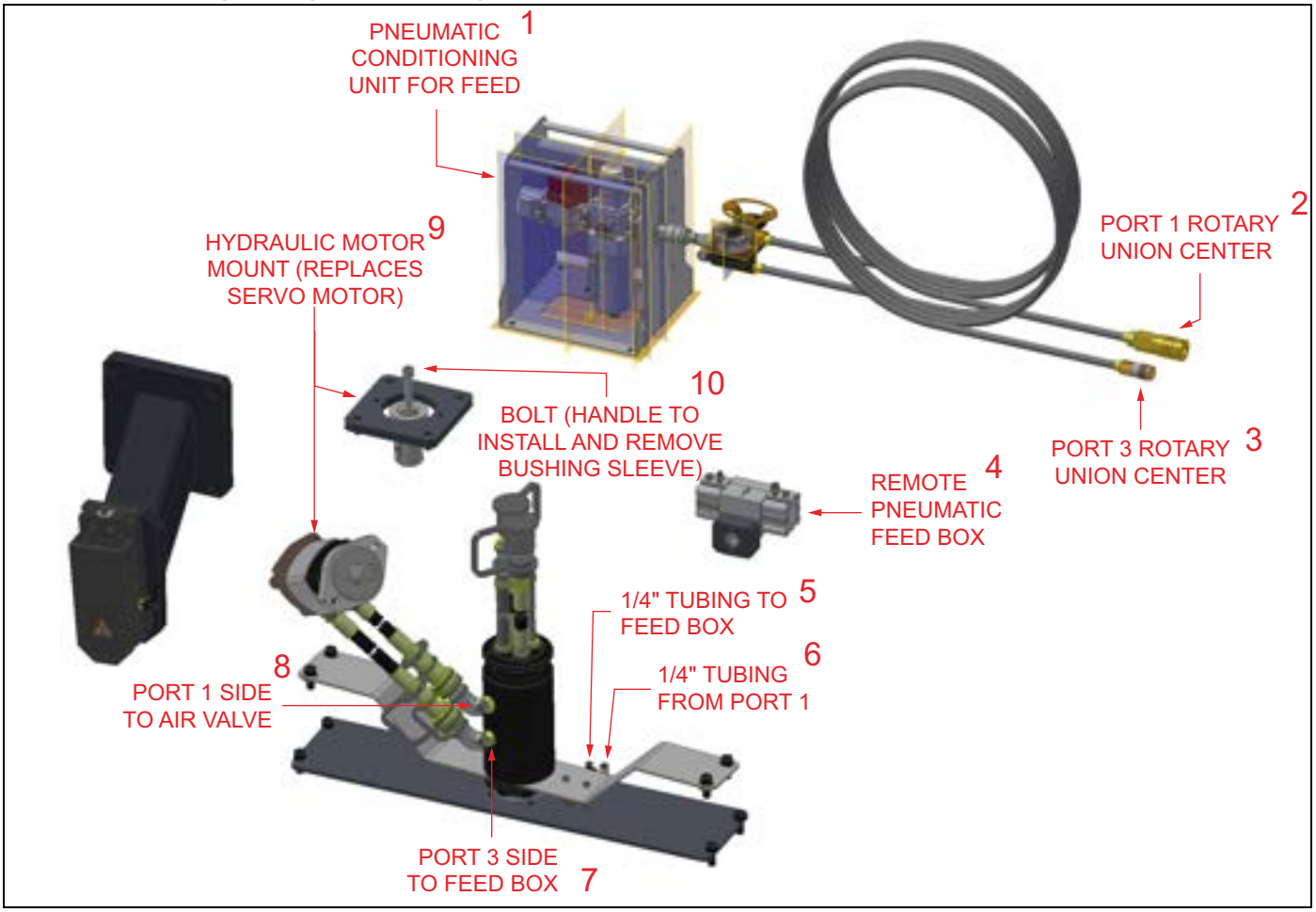


FIGURE 4-32. ROTARY UNION CONFIGURATION COMPONENTS

TABLE 4-6. ROTARY UNION CONFIGURATION COMPONENT IDENTIFICATION

Number	Component
1	Pneumatic conditioning unit for feed
2	Port 1 rotary union center
3	Port 3 rotary union center
4	Remote pneumatic feed box (see Figure 4-33 on page 85 and Figure 4-34 on page 86 for more detail)
5	1/4" tubing to feed box
6	1/4" tubing from port 1
7	Port 3 side to feed box
8	Port 1 side to air valve
9	Hydraulic motor mount (replaces servo motor)
10	Bolt (handle to install and remove the bushing sleeve)

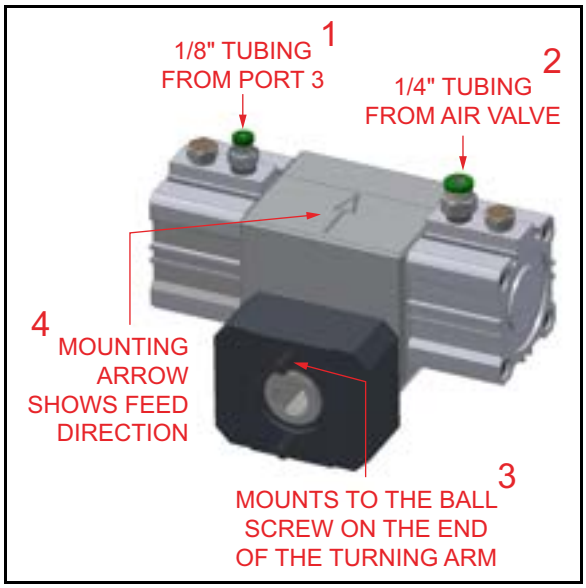


FIGURE 4-33. FEED BOX DETAIL

TABLE 4-7. FEED BOX DETAIL IDENTIFICATION

Number	Component
1	1/8" tubing from port 3
2	1/4" tubing from air valve
3	Mounts to the ball screw on the end of the turning arm
4	Mounting arrow shows the feed direction

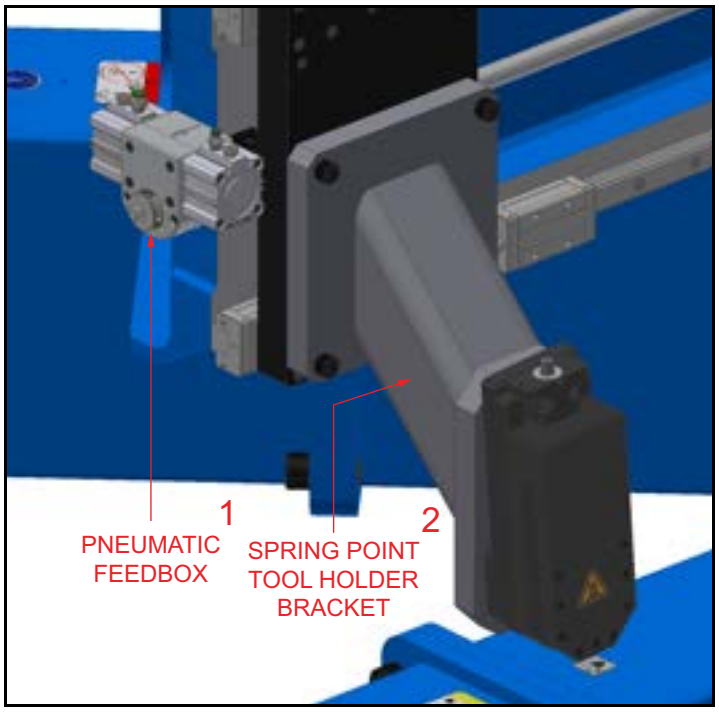


FIGURE 4-34. PNEUMATIC FEED BOX LOCATION

TABLE 4-8. PNEUMATIC FEED BOX IDENTIFICATION

Number	Component
1	Pneumatic feed box
2	Spring point tool holder bracket

4.5.1.1 ID mount configuration

Figure 4-35 shows an exploded view of the rotary union configuration for an ID mount. See Figure A-31 on page 150 for identification of the numbered parts.

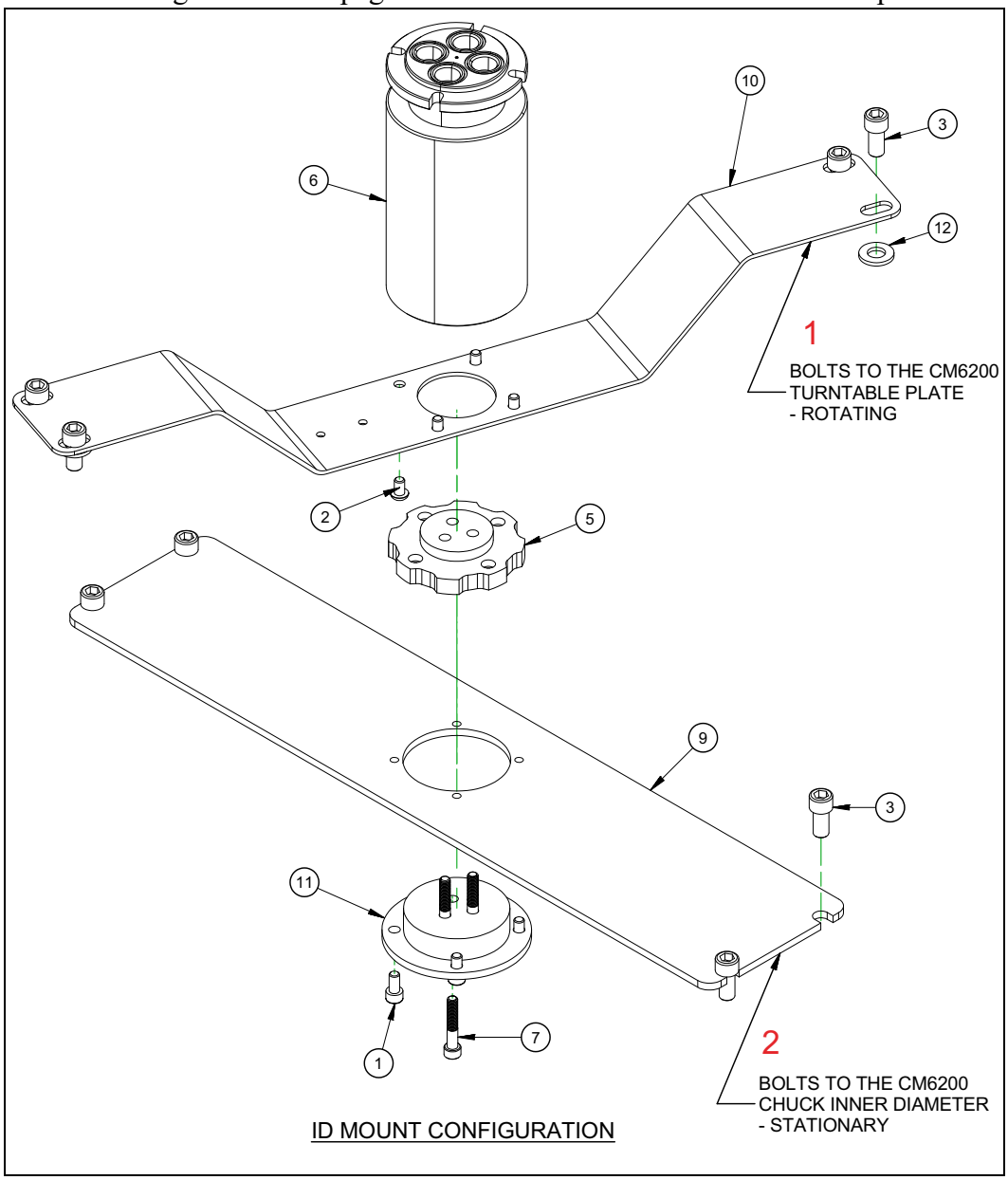


FIGURE 4-35. ID MOUNT CONFIGURATION OF THE ROTARY UNION

TABLE 4-9. ID MOUNT CONFIGURATION IDENTIFICATION

Number	Component
1	Bolts to the CM6200 turntable plate (rotating)
2	Bolts to the CM6200 chuck inner diameter (stationary)

Do the following to configure the rotary union for an ID mount, referring to Figure 4-35:

1. Bolt the torque restraint arm to the CM6200 turntable plate. It will rotate with the machine.
2. Bolt the rotary union mount to the CM6200 chuck inner diameter. It will remain stationary.

4.5.1.2 OD mount configuration

Figure 4-36 shows the parts used to configure the OD mount of the rotary union. See Figure A-31 on page 150 for part identification.

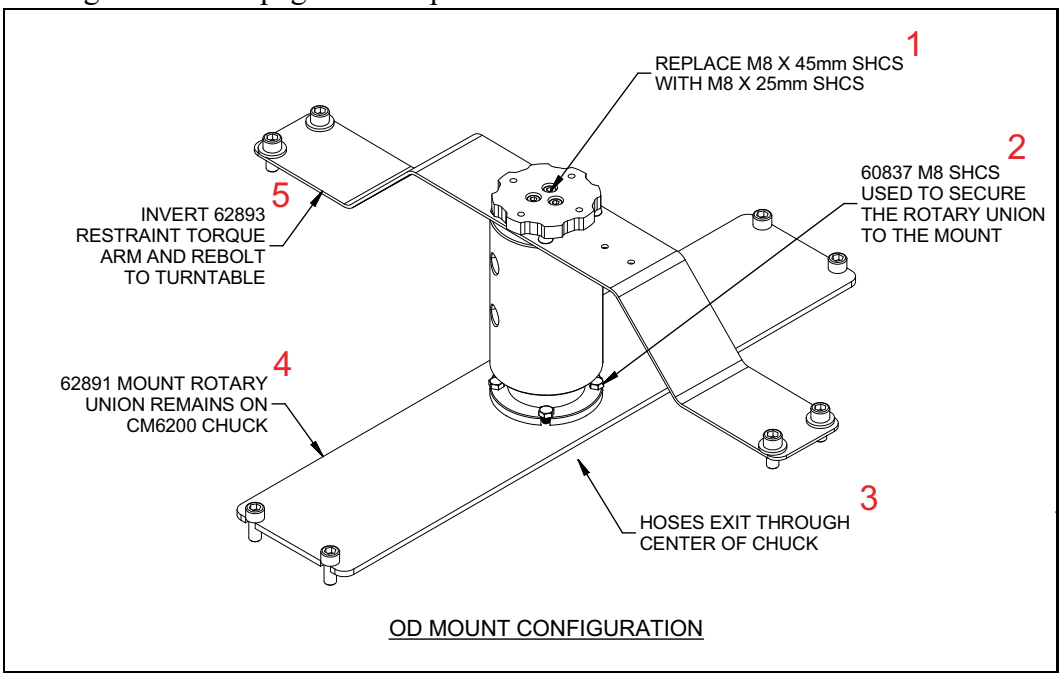


FIGURE 4-36. OD MOUNT CONFIGURATION OF THE ROTARY UNION

TABLE 4-10. OD MOUNT CONFIGURATION IDENTIFICATION

Number	Component
1	Replace M8 x 45 mm SHCS with M8 x 25 mm SHCS
2	P/N 60837 M8 SHCS used to secure the rotary union to the mount
3	Hoses exit through the center of the chuck
4	P/N 62891 mount rotary union remains on the CM6200 chuck
8	Invert P/N 62893 restraint torque arm and re-bolt to the turntable

Do the following to configure the rotary union for an ID mount, referring to Figure 4-37:

1. Replace the M8 x 45 mm SHCS with M8 x 25 mm SHCS. Keep the same cam in place.
2. Invert the torque restrain arm and re-bolt it to the turntable.

3. Secure the rotary union to the mount with the M8 SHCS (P/N 55799). The rotary union mount remains on the CM6200 chuck.

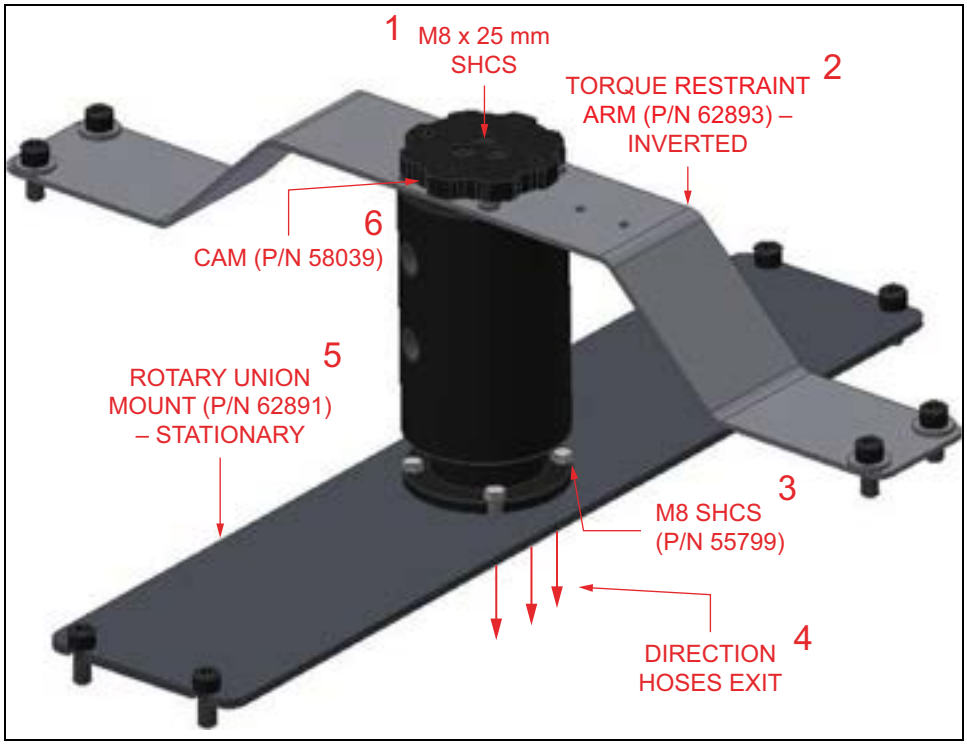


FIGURE 4-37. OD MOUNT CONFIGURATION OF ROTARY UNION

TABLE 4-11. OD MOUNT ROTARY UNION CONFIGURATION IDENTIFICATION

Number	Component
1	M8 x 25 mm socket head cap screw (SHCS)
2	Torque restraint arm (P/N 62893) – inverted
3	M8 SHCS (P/N 55799)
4	Direction that the hoses exit
5	Rotary union mount (P/N 62891) – stationary
6	Cam (P/N 58039)

4.5.2 Replacing the milling assembly

Do the following to replace the milling assembly with the single-point tool head assembly:

1. Completely de-energize and lock out the power source.

2. Remove the milling head assembly, including the miller head adapter plate, from the cross-slide plate (see Figure 4-38, which is also seen in Figure A-11 on page 130).
3. Attach the single-point tool head assembly (P/N 62984) to the cross-slide plate.

TABLE 4-12. CROSS-SLIDE PLATE IDENTIFICATION

Number	Component
1	Saddle plate
2	Milling head adapter plate

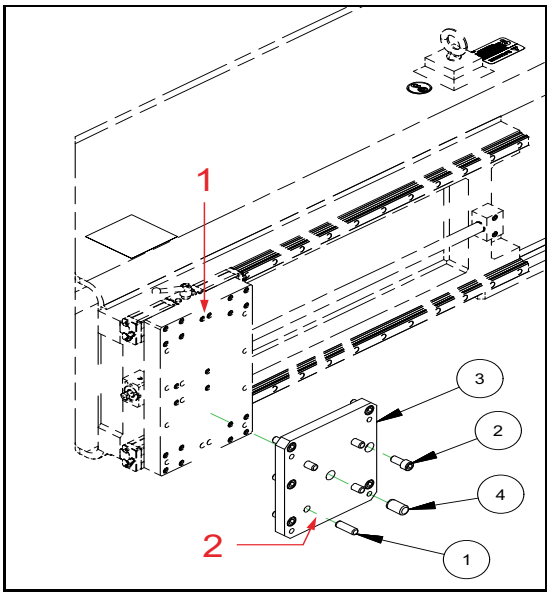


FIGURE 4-38. CROSS-SLIDE PLATE

4. Attach the tool head assembly to the adapter (see Figure 4-39, which is seen in Figure A-27 on page 146).

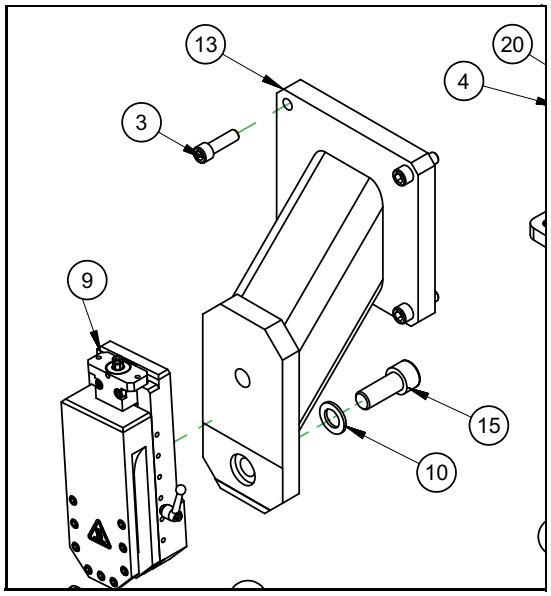


FIGURE 4-39. TOOL HEAD ASSEMBLY ADAPTER

4.5.3 Installing the hydraulic drive in the single-point configuration

Do the following to set up the hydraulic drive in the single-point configuration for flange facing:

1. Completely de-energize and lock out the power source.

2. Remove the servo motor and planetary gearbox (see Figure 4-40).
3. Install the hydraulic motor with an adapter drive shaft and adapter plate to the main ring pinion. When selecting the motor size, see Table 2-1 on page 13 for hydraulic motor speeds.

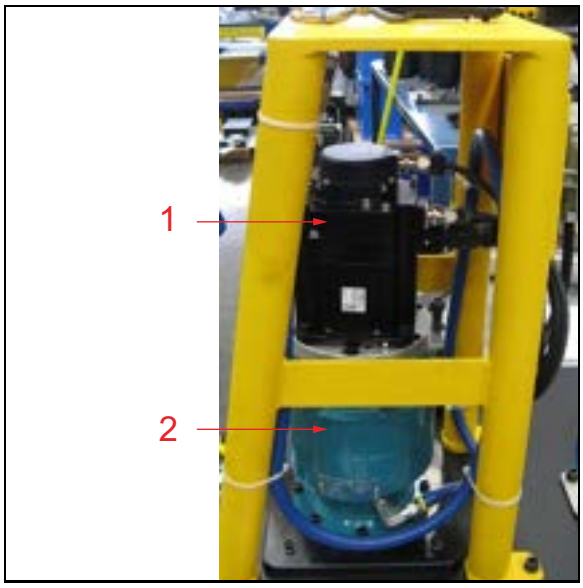


FIGURE 4-40. SERVO MOTOR AND GEARBOX

TABLE 4-13. SERVO MOTOR AND GEARBOX IDENTIFICATION

Number	Component
1	Servo motor
2	Gearbox

4. Mount a rotary union to the machine (see Figure 4-41).
5. Run hoses from the HPU and PCU to the rotary union, and from there to the hydraulic motor and to the pneumatic feed box (see the figures in Section 4.5.1 on page 84).

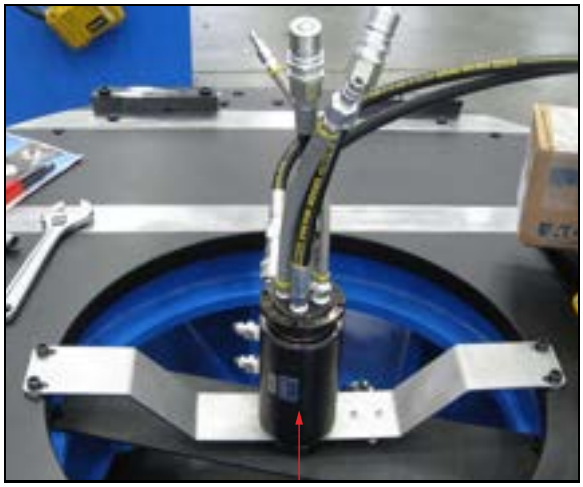


FIGURE 4-41. ROTARY UNION

NOTICE

The servo motor must be connected to the HPU—but not attached to the machine. There is a danger of damaging the servo drive if the motor is disconnected when the HPU is powered up.

See Section 4.5 on page 82 for how to install the pneumatic feed box and the adapter plate onto the end of the machining arm.

4.5.4 Installing the feed box

The pneumatic feed box is fitted with a remote feed box adjustment at the air shut-off valve. All adjustments to the feed rate are done from this point. The air supply lines to the feed box are supplied in two sizes: 0.25" (6.35 mm) and 0.125" (3.175 mm). This prevents accidentally swapping hoses.

Do the following to install the feed box:

1. Install the feed box adapter assembly (P/N 62994, seen in Figure 4-42) onto the end of the turning arm by bolting it down with the two M6 x 1.0 x 30 mm SHCS.
2. Take the pneumatic feed box assembly (P/N 58671) and mount it onto the feed box adapter assembly by bolting it down with the two M6 x 1.0 x 60 mm SHCS.

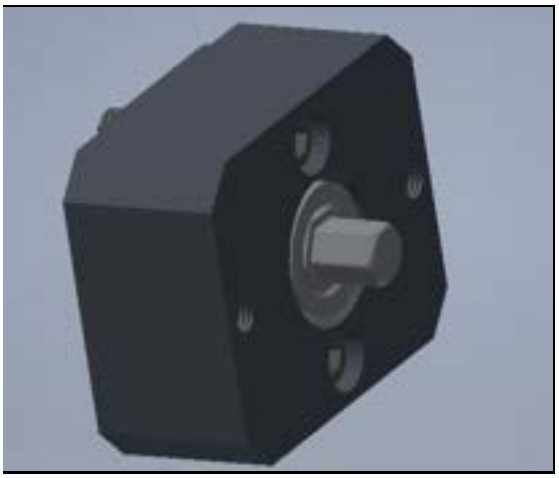


FIGURE 4-42. PNEUMATIC FEED BOX ADAPTER

When mounting, check that the arrow is pointing in the intended feed direction (see Figure 4-43.)

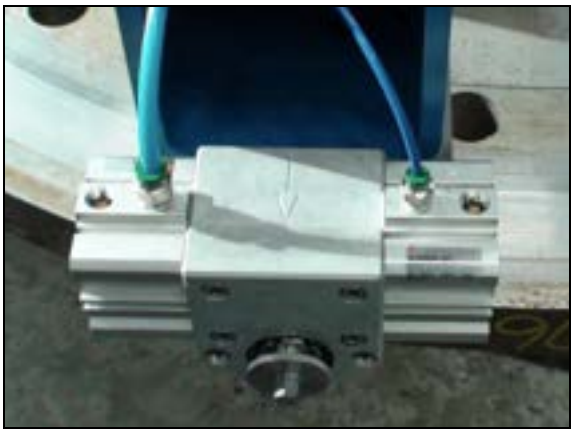


FIGURE 4-43. FEED DIRECTION OF FEED BOX

4.5.5 Reversing the feed box direction

The feed box only feeds in one direction, without a setup change.

Do the following to reverse the feed box direction:

1. Remove the feed shaft and two bolts connecting it to the arm (Figure 4-44).

TIP:

Disconnecting and switching the hoses will NOT reverse the feed direction.

FIGURE 4-44. REMOVAL OF BOLTS TO REVERSE FEED DIRECTION

2. Rotate feed box until the arrow points in the desired feed direction.
3. Reinstall the bolts and feed shaft.

This feed box has two modes, engaged and disengaged (neutral), as seen in Figure 4-45.

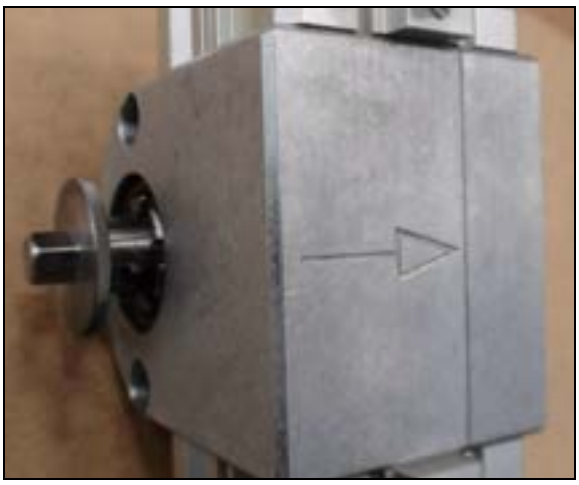


FIGURE 4-45. FEED DIRECTION ARROW

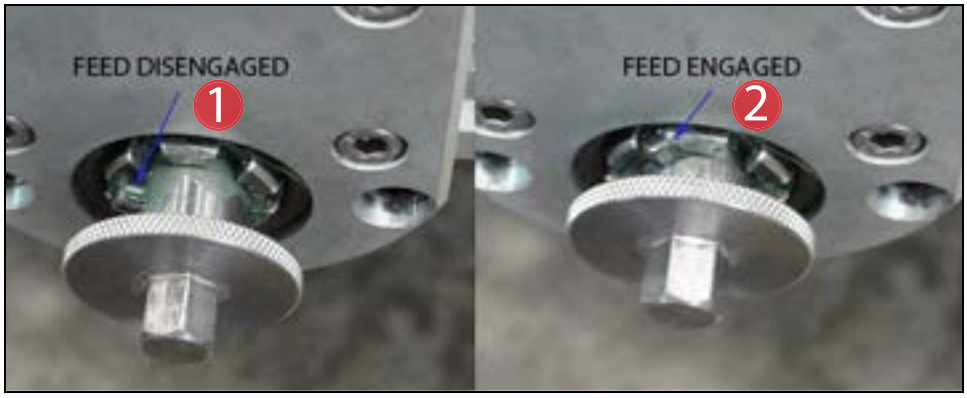


FIGURE 4-46. FEED BOX MODE POSITIONS

TABLE 4-14. FEED BOX MODE IDENTIFICATION

Number	Component
1	Feed disengaged
2	Feed engaged

In neutral, the tool may be manually fed in either direction. Hoses connected to the feed box should have approximately 12" (304.8 mm) of extra length coiled inside the arm to allow the arm to move and still keep the hoses clear of snag hazards.

To disconnect the feed hoses, press down on the collar around the hose and pull the hose out.

FIGURE 4-47. FEED HOSE DISCONNECT METHOD

4.5.6 Operating the pneumatic feed system

Do the following to operate the pneumatic feed system:

1. Connect the energy sources.

TABLE 4-15. PCU VALVES IDENTIFICATION

Number	Component
1	Feed on/off valve
2	Speed adjustment valve
3	Feed rate adjustment

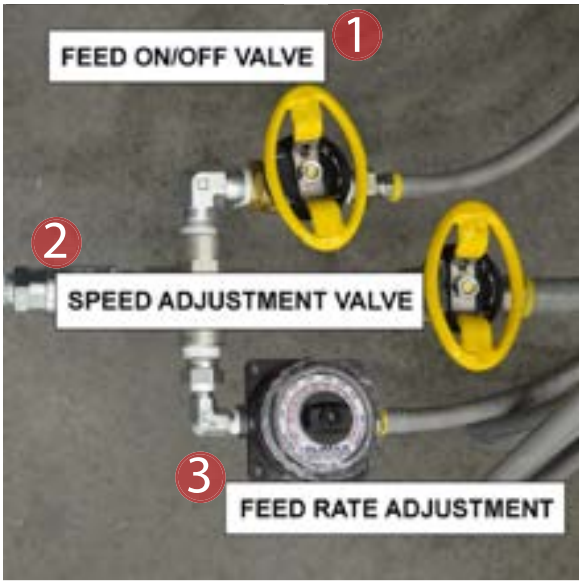


FIGURE 4-48. PCU VALVES

2. Push the START button on the PCU.
3. To adjust the turntable rotations per minute (RPM), use the speed adjustment valve to turn on the drive motor.
4. To adjust the feed rate per revolution, turn the feed rate adjustment dial to the minimum feed or to the desired setting, if known.
5. Using the feed on/off valve, turn on the feed and adjust the feed rate for the desired cut.

NOTICE

Turn the feed on/off valve fully to activate or deactivate the feed rate.

6. Use the speed adjustment valve to adjust the drive motor to achieve the desired cut.
7. When the cut is complete, first stop the feed and then stop the machine rotation.

⚠ WARNING

To avoid serious injury, do not reach inside the swing of the machining arm during operation.

4.5.7 Adjusting cut characteristics

Do the following to adjust the cut characteristics:

1. When the cut is finished, stop the feed and the machine.
2. Machine must be locked out before changing tooling or making any adjustments on the machine.
3. Adjust the machine direction, depth of cut, or tool position, as needed.
4. Start the machine and feed again to start new cut, as required.
5. Repeat until the desired surface is achieved.

⚠ WARNING

To avoid serious injury, do not reach inside the swing of the machining arm during operation.

4.6 DISASSEMBLY

⚠ WARNING

If not properly secured, this machine can fall and cause fatal injuries to personnel. Pay special attention to vertical flange installations.

The machine must be properly rigged and attached to a crane or other suitable lifting apparatus before beginning any disassembly steps. Use supplemental rigging as a precaution.

Do the following to disassemble the machine:

1. Position the table and machining arm at the proper lifting position.
2. Completely de-energize and lock out the hydraulic power unit.
3. Retract the spindle and remove the milling cutter from the spindle.
4. Disconnect the power cables and hydraulic hoses.
5. Replace any setup fingers that were removed.
6. Rig the machine in the same manner that it was installed (see Section 3.3 on page 22).

7. Put the hose tower in the stow position (see Figure 4-49).
8. Support the machine with a hoist.
9. Loosen the jacking screws. If in the vertical or inclined position, leave the lower stacking bolt in position and loosen the other jacking screws. This keeps the machine from dropping when all other jacking feet are loosened.
10. Using a hoist, remove the machine from the work piece.

FIGURE 4-49. HOSE TOWER STOW POSITION

If storing the machine, see Section 6.

5 MAINTENANCE AND TROUBLESHOOTING

IN THIS CHAPTER:

5.1 MAINTENANCE INTERVALS

⚠ CAUTION

Failure to properly clean and maintain the machine can result in machine damage and void the warranty.
Always keep chips away from moving machine parts.

Following the maintenance schedule described in Table 5-1 on page 98 is critical to obtain normal machine life. Keep all machine components in clean working condition.

Check that parts like the mounting surfaces, hydraulic fittings, and the tools themselves are free of metal chips, nicks or burrs. To prevent corrosion, thoroughly rinse any machine parts that are exposed to salt water with fresh, clear water.

TABLE 5-1. MAINTENANCE INTERVALS AND TASKS

Interval	Task	See section
Before each use	Check the pneumatic conditioning unit emergency stop.	5.2.1
	Check the pneumatic conditioning unit drop-out circuit.	5.2.2
Before and after each use	Remove chips from the circular bearing, reducer mount, and the radial slide.	5.2
After each use	Wipe the machine down with clean, dry rags.	--
	Remove debris and moisture from the machine surface.	--
Every five years	Replace the battery in the PLC.	

5.2 MAINTENANCE TASKS

5.2.1 Check the pneumatic conditioning unit emergency stop

Before each use, check the emergency stop by doing the following:

1. With the machine running, press the emergency stop button (shown in Figure 4-11 on page 61).
2. Check that the machine stops.
3. Reset the emergency stop by pulling the button up.

If the machine restarts immediately without any operator action, press the emergency stop button again. Discontinue machine use and contact CLIMAX.

5.2.2 Check the pneumatic conditioning unit drop-out circuit

The pneumatic conditioning unit drop-out circuit prevents the machine from restarting unexpectedly after air supply to the PCU is lost and restored.

Do the following to check the PCU drop-out circuit:

1. Check that the PCU is connected to an air supply and to the CM6200.
2. Check that the air supply lock-out is open (pulled up).
3. Press the START button.
4. Slowly open the PCU speed adjustment valve until the rotary drive engages.
5. Close (press down) the lock-out valve.
6. Check that the machine stops.
7. Open the lock-out valve.

If the machine restarts immediately without any operator action, press the emergency stop button. Discontinue machine use and contact CLIMAX.

5.2.3 Maintain the rotary table and drive assembly

Before and after operating the CM6200, wipe or vacuum chips away from the circular bearing, reducer mount, and the radial slide. CLIMAX does not recommend using compressed air around the linear bearing or seals.

The main bearings and gear reducer are lubricated for life under normal use.

5.2.4 Replacing the PLC battery

NOTICE

The programmable logic controller (PLC) in the CM6200 control system uses a battery to maintain the program when mains power is turned off. This battery must be replaced periodically or the PLC program will be lost and the machine will not operate until the PLC program has been restored. In order to avoid unexpected shutdown of the CM6200 controls, it is important that the battery be replaced regularly.

The service life of the battery is approximately five years, but that varies depending on the temperature at which the machine is operated and stored (see Figure 5-1).

Battery life & replacement guidelines

FX3U-32BL battery life : Approx. 5 years (ambient temperature : 25°C(77°F))
The life of the battery changes with respect to ambient temperature.
When planning for battery replacement, please estimate the battery life according to the graph to the right and order replacement batteries in advance.

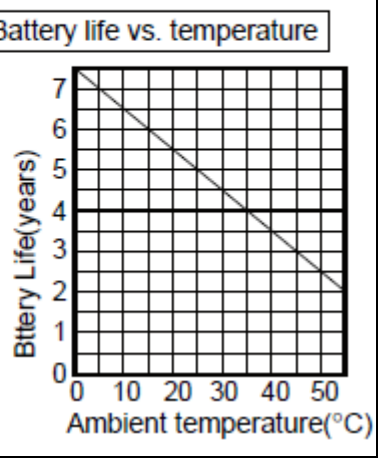


FIGURE 5-1. PLC BATTERY SPECIFICATION

5.2.5 Drag brake settings

The CM6200's drag brake should be checked periodically for proper adjustment. This adjustment should only be necessary after maintenance, or if the machine moves with a jerking motion.

The drag brake is intended to remove backlash from the gear, mainly for vertical applications or special tooling.

FIGURE 5-2. TOP VIEW OF DRAG BRAKE

Figure 5-2 and Figure 5-3 show the location of the drag brake on top of the rotary table.

The system will apply resistance to the gear to reduce backlash and maintain steady velocity in vertical or special tooling applications.

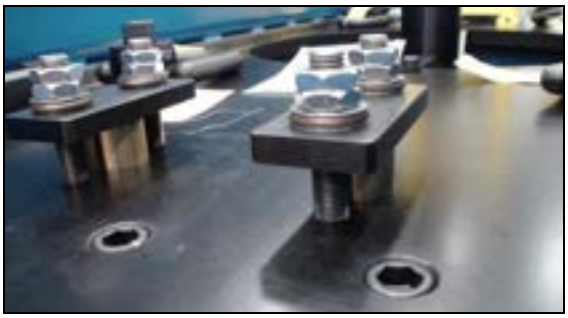


FIGURE 5-3. SIDE VIEW OF DRAG BRAKE

5.2.6 Adjusting the drag brake

For vertical applications, do the following to adjust the drag brake:

1. Completely de-energize and lock out the machine.
2. To set the drag brake, position the machine so that the rotary table is in a horizontal and level position.
3. Remove the motor.

⚠ CAUTION

Do not remove the motor unless the machine is horizontal and all rotating parts have been blocked releasing the motor will allow the hub to rotate freely.

4. Completely release the drag brake by backing off the nuts.

DANGER

Do not remove the bolts if the machine is not in the horizontal position as unexpected movement of the CM6200 rotational turntable can result, causing serious injury or death.

5. Carefully and slowly release any machine blocks.
6. Check the tension of the hub without the drag brake using a torque wrench in the gear keyway, it should read approximately 4 in-lbs (0.452 Nm) without the drag brake engaged.
7. To tighten the drag brake, tighten the nuts slowly and keep testing the torque until there is an additional 4–5 in-lbs (0.452–0.565 Nm) of torque when the hub is rotated manually.
8. Install the motor for your machining application.

CAUTION

Keep spaces between hardware and slides clean of chips and debris so the machine can move freely.

Horizontal single-point machining or milling applications

The drag brake must be disengaged when single pointing. However, there are times when the drag brake must be engaged, such as when milling in any position.

1. Completely lock-out and de-energize the machine.
2. Position the machine so the top plate surface is in a horizontal and level position.
3. Remove the motor.

CAUTION

Do not remove the motor unless the machine is horizontal and all rotating parts have been blocked. Releasing the motor will allow the hub to rotate freely.

4. Completely release the drag brake by backing off the nuts.

DANGER

Do not remove the bolts if the machine is not in the horizontal position as unexpected movement of the CM6200 rotational turntable can result, causing serious injury or death.

5. Carefully and slowly release any machine blocks.

6. Check the tension of the hub without the drag brake using a torque wrench in the gear keyway, it should read approximately 4 in-lbs (0.452 Nm) without the drag brake engaged.
7. Rotating the machine manually in the horizontal position should show around 4 in-lbs of torque without the drag brake engaged. This is measured at the motor gear using a torque wrench in the gear keyway.
8. Tighten the lock nuts on top of the drag brake to lock the drag brake in position, and to keep the lock nuts from vibrating loose.
9. Install the motor for your machining application.

5.3 RECOMMENDED LUBRICANTS

CLIMAX recommends using the following lubricants for maintaining the locations indicated. Failure to use the appropriate lubricants can result in damage and premature machine wear.

⚠ CAUTION

Avoid damage, premature machine wear, and protect your warranty by using only approved lubricants.

TABLE 5-2. APPROVED LUBRICANTS

Application Area	Lubricant	Biodegradable Lubricant	Viscosity (cSt)	Quantity	Frequency
Frequently					
Cutting Tool	AW 32	CONOCO Eco-terra 32	32 @ 40C 544 @ 100C	As required	Continued use while cutting
Daily					
Milling Head Gearbox	Mobilith SHC 460	N/A	414 @ 40C 47 @ 100C	5 cc	Every 8 hours of use
Dovetail Ways[a]	AW 32	CONOCO Eco-terra 32	32 @ 40C 544 @ 100C	As required	Daily during machine use
Unpainted Surfaces	LPS1 or LPS2	N/A	38 @ 25C	As required	Daily during machine use, and before storage
Each Use					
Hydraulic Power Units	CASTROL Hyspin AWS-46 (summer)	CASTROL BioBar 46 (summer); 32 (winter)	46 @ 40C 682 @ 100C	As required to fill reservoir to mid-sight glass level	Refill every use Replace oil every 2 years[b]
	AWS-32 (winter)		32 @ 40C 544 @ 100C		

TABLE 5-2. APPROVED LUBRICANTS

Application Area	Lubricant	Biodegradable Lubricant	Viscosity (cSt)	Quantity	Frequency
Eisenberger Ball Screws	CONOCO Poly-Tac EP [c]	CASTROL BioTac EP 2	129 @ 40C 116 @ 100C	1 cc per nut	Once per use or weekly for continued use
	Microlube GBU-Y 131	N/A	130 @ 40C 15 @ 100C		
Linear Rail	THK Rail – THK AFA Grease2	N/A	32 @ 40C	2 cc per bearing block	Once per use or weekly for continued use
	CONOCO Poly-Tac EP 2	CASTROL BioTac EP 2	129 @ 40C 116 @ 100C		
Weekly					
APU	AW 32	N/A	22-68 @ 40°C 4.3-8.7 @ 100°C	Refill oil lubricator	Each use
Lead Screw on Single Point Tool Head	-NOOK E-100 spray lube -NOOK PAG-1 grease	CASTROL BioTac EP 2	96 @ 40C 113 @ 100C	Light coating applied by hand or spray	Weekly during machine use
Chuck jacking screws	Moly Grade anti-seize	N/A	N/A	1 cc per screw	Weekly during machine use, and before storage
Yearly					
Rotary Table and Drive Assembly[d]	CONOCO Poly-Tac EP 2	CASTROL BioTac EP 2	129 @ 40C 116 @ 100C	20 cc	Once per year
ID Wiper Seal on Rotary Table	3M Silicone Paste 051135-08946	N/A	N/A	3 cc	Once per year
Main Table Gear Reducer	Mobil 629 Gear Oil	N/A	150 @ 40C 158 @ 100C	N/A	Lubricated for life under normal use
Electric Motors	See vendor literature	N/A	N/A	See vendor literature	See vendor literature

a. Use highly anti-corrosive, refined mineral or synthetic oil that forms a strong oil film and is not easily emulsified or washed away by coolant. Hydraulic oils are typically not suitable for slide way lubrication.

b. Always replace hydraulic filters when replacing hydraulic oil. Never assume that oil in drums is clean. Always pump oil through a 5 micron hydraulic filter before/while filling reservoir.

c. Use of other lubricants on THK products will void manufacturer's warranty.

d. While lithium based grease can be used, a calcium based grease allows for greater lubricity while ingesting higher amounts of water (common in portable machine tools).

TIP:

If an approved lubricant cannot be used, contact CLIMAX for an equivalent alternative.

⚠ CAUTION

The lubricant used on the ID wiper seal should be 3M Silicone Paste P/N 051135-08946 or equivalent. No other lubricants are to be used on this seal.

5.3.1 Main ring gear lubrication

TIP:

The main ring gear should be lubricated annually. The ring gear must be lubricated while the table is turning slowly.

⚠ DANGER

Do not remove the motor if the machine is not in the horizontal position as unexpected movement of the CM6200 rotational turntable can result, causing serious injury or death.

Do the following to lubricate the main ring gear, while referring to Figure A-1 on page 120:

1. Remove the encoder guard.
2. Remove the servo motor reducer and drive pinion assembly as a single unit.
3. Slowly allow the table to rotate and lubricate the gear with a thin layer as it passes by.
4. When lubrication is finished, carefully replace the drive pinion assembly and the encoder guard.

5.3.2 Linear rail maintenance

During operation, frequently lubricate the linear rails and ways.

Rails, ways and mating parts are critically aligned at the factory. If re-alignment is necessary, contact CLIMAX to arrange for this service.

Before and after using the machine, wipe the rails and ways with light way oil.

NOTICE

Do not allow anything to be dropped on the rails and do not store items on the rails.

5.4 TROUBLESHOOTING

This section is intended to help you solve basic machine performance problems. For serious maintenance or if you have questions on the following procedures, contact CLIMAX.

5.4.1 The machine isn't turning

If the machine is not rotating, check the following:

- The HPU power is on (Section 3.11 on page 50).
- There is a good connection between the HPU and servo (Section 3.11 on page 50). Try the following:
  a) Power down the HPU.
  b) Clean out any debris in the connections.
  c) Make sure the connections are latched.
  d) Check for no damaged or disconnected tethers.
- No chips are embedded in the cables, and the cables aren't otherwise damaged (Section 1.4 on page 3).
- Any error messages show on the pendant (Section 4.2.2 on page 60).
- When in single-point mode, check that the drag brake is disengaged (Section 5.2.6 on page 100).

5.4.2 The machine isn't feeding or is slow and unresponsive

If the machine isn't feeding properly, check the following:

- The pneumatic connections from the source to the feed have no broken or disconnected lines (Figure 4-47 on page 94).
- The feed box is engaged (Section 4.2 on page 59).
- Any dirty filters have been cleaned (Section 5.3 on page 102).
- The Z-brake is disengaged (Section 4.1.3 on page 55).

5.4.3 The machine is cutting poorly

If the machine is cutting poorly, check the following:

- The correct face mill is used for the application (e.g., the right size for the job).
- The face mill is tight in the spindle (Section 4.3.2 on page 76).
- No face inserts are broken, dull, or loose. Tighten, replace, or turn if necessary.
- The brake is engaged (Section 5.2.6 on page 100).
- No worn or damaged components in the spindle. If any are found, contact CLIMAX for more information.
- The feed rate and spindle RPM is correct for the application. The correct speed will vary by application.

- The clamps are tight on the tool arm (Section 3.6.1 on page 35).
- When milling, the drag brake is properly engaged (Section 5.2.6 on page 100).
- The ID chuck has equal clamping pressure (Section 3.5.3 on page 33).

5.4.4 The machine isn't cutting flat

If the machine isn't cutting flat, check the following:

- The machine is chucked properly to the workpiece (Section 3.7 on page 39).
- The chuck legs are not overtightened, which may deform the workpiece (Section 3.5.3 on page 33).
- The spindle is trammed (Section 4.1.3 on page 55).

5.4.5 The spindle isn't turning

If the spindle isn't turning, check the following:

- The HPU power is on (Section 3.11 on page 50).
- The hydraulic hoses are connected (Section 3.11 on page 50).
- No error messages show on the pendant (Section 4.2.2 on page 60).
- The fluid level is sufficient in the HPU. Refill if necessary.
- The spindle is clear of any elements.

5.4.6 The machine stops suddenly

If the machine stops suddenly, check the following:

- The HPU power is on (Section 3.11 on page 50).
- No error messages show on the pendant (Section 4.2.2 on page 60).
- The tether is not damaged or disconnected.

5.4.7 The cut depth changes involuntarily

If the cut depth changes without your direction, check the following:

- The brake is engaged (Section 5.4 on page 105).
- There is sufficient friction on the lead screw in the Z direction. If too loose, tighten the set screws on either side of the bearing block, to increase tension on the tensioning bushings.

5.4.8 The servo system alarm or warning

For any issues with the servo motor junction box, see Appendix D on page 179.

For the older servo motor (MR-J3), see Section 5.5 on page 107.

5.5 MR-J3 SERVO AMPLIFIER ERROR CODES

POINT
• As soon as an alarm occurs, make the Servo off status and interrupt the main circuit power.

If an alarm/warning has occurred, refer to this chapter and remove its cause.

8.1 Alarms and warning list

When a fault occurs during operation, the corresponding alarm or warning is displayed. If any alarm or warning has occurred, refer to section 8.2 or 8.3 and take the appropriate action. When an alarm occurs, the ALM turns OFF.

After its cause has been removed, the alarm can be deactivated in any of the methods marked ○ in the alarm deactivation column. The alarm is automatically canceled after removing the cause of occurrence.

	Display	Name	Alarm deactivation		
			Power OFF→ON	Error reset	CPU reset
Alarms	10	Undervoltage	○	○	○
	12	Memory error 1 (RAM)	○		
	13	Clock error	○		
	15	Memory error 2 (EEP-ROM)	○		
	16	Encoder error 1 (At power on)	○		
	17	Board error	○		
	19	Memory error 3 (Flash-ROM)	○		
	1A	Motor combination error	○		
	20	Encoder error 2	○		
	24	Main circuit error	○	○	○
	25	Absolute position erase	○		
	30	Regenerative error	(Note 1) ○	(Note 1) ○	(Note 1) ○
	31	Overspeed	○	○	○
	32	Overcurrent	○		
	33	Overvoltage	○	○	○
	34	Receive error 1	○	(Note 2) ○	○
	35	Command frequency error	○	○	○
	36	Receive error 2	○	○	○
	37	Parameter error	○		
	45	Main circuit device overheat	(Note 1) ○	(Note 1) ○	(Note 1) ○
	46	Servo motor overheat	(Note 1) ○	(Note 1) ○	(Note 1) ○
	47	Cooling fan error	○		
	50	Overload 1	(Note 1) ○	(Note 1) ○	(Note 1) ○
	51	Overload 2	(Note 1) ○	(Note 1) ○	(Note 1) ○
	52	Error excessive	○	○	○
	8A	USB communication time-out error	○	○	○
	8E	USB communication error	○	○	○
	888	Watchdog	○		

	Display	Name
Warnings	92	Battery cable disconnection warning
	96	Home position setting warning
	9F	Battery warning
	E0	Excessive regeneration warning
	E1	Overload warning 1
	E3	Absolute position counter warning
	E4	Parameter warning
	E6	Servo forced stop warning
	E7	Controller forced stop warning
	E8	Cooling fan speed reduction warning
	E9	Main circuit off warning
	EC	Overload warning 2
	ED	Output watt excess warning

Note 1. Deactivate the alarm about 30 minutes of cooling time after removing the cause of occurrence.
2. In some controller communication status, the alarm factor may not be removed.

8.2 Remedies for alarms

⚠ CAUTION

- When any alarm has occurred, eliminate its cause, ensure safety, then reset the alarm, and restart operation. Otherwise, injury may occur.
- If an absolute position erase (25) occurred, always make home position setting again. Not doing so may cause unexpected operation.
- As soon as an alarm occurs, mark Servo-off and power off the main circuit and control circuit.

POINT

- When any of the following alarms has occurred, do not deactivate the alarm and resume operation repeatedly. To do so will cause the servo amplifier/servo motor to fail. Remove the cause of occurrence, and leave a cooling time of more than 30 minutes before resuming operation. To protect the main circuit elements, any of these servo alarms cannot be deactivated from the servo system controller until the specified time elapses after its occurrence. Judging the load changing condition until the alarm occurs, the servo amplifier calculates this specified time automatically.
- Regenerative error (30)
- Overload 1 (50)
- Overload 2 (51)
- The alarm can be deactivated by switching power off, then on or by the error reset command • CPU reset from the servo system controller. For details, refer to section 8.1.

When an alarm occurs, the trouble (ALM) switches off and the dynamic brake is operated to stop the servo motor. At this time, the display indicates the alarm No.
The servo motor comes to a stop. Remove the cause of the alarm in accordance with this section. Use the MR Configurator to refer to a factor of alarm occurrence.

Display	Name	Definition	Cause	Action
10	Undervoltage	Power supply voltage dropped. MR-J3-□B: 160VAC or less MR-J3-□B1: 83VAC or less MR-J3-□B4: 280VAC or less	1. Power supply voltage is low.	Check the power supply.
			2. There was an instantaneous control power failure of 60ms or longer.	
			3. Shortage of power supply capacity caused the power supply voltage to drop at start, etc.	
			4. The bus voltage dropped to the following value or less. MR-J3-□B: 200VDC MR-J3-□B1: 158VDC MR-J3-□B4: 380VDC	
			5. Faulty parts in the servo amplifier Checking method Alarm (10) occurs if power is switched on after disconnection of all cables but the control circuit power supply cables.	Change the servo amplifier.

Display	Name	Definition	Cause	Action
12	Memory error 1 (RAM)	RAM, memory fault	Faulty parts in the servo amplifier Checking method Alarm (any of 12 and 13) occurs if power is switched on after disconnection of all cables but the control circuit power supply cables.	Change the servo amplifier.
13	Clock error	Printed board fault		
		Clock error transmitted from the controller	Faulty controller Checking method Alarm (13) occurs, if servo controller is used in multiple CPU system.	Change the servo system controller.
15	Memory error 2 (EEP-ROM)	EEP-ROM fault	1. Faulty parts in the servo amplifier Checking method Alarm (15) occurs if power is switched on after disconnection of all cables but the control circuit power supply cables.	Change the servo amplifier.
			2. The number of write times to EEP-ROM exceeded 100,000.	
16	Encoder error 1 (At power on)	Communication error occurred between encoder and servo amplifier.	1. Encoder connector (CN2) disconnected.	Connect correctly.
			2. Encoder fault	Change the servo motor.
			3. Encoder cable faulty (Wire breakage or shorted)	Repair or change the cable.
			4. Encoder cable type (2-wire, 4-wire) selection was wrong in parameter setting.	Correct the setting in the fourth digit of parameter No.PC04.
17	Board error 2	CPU/parts fault	Faulty parts in the servo amplifier Checking method Alarm (17 or 19) occurs if power is switched on after disconnection of all cables but the control circuit power supply cable.	Change the servo amplifier.
19	Memory error 3 (Flash ROM)	ROM memory fault		
1A	Motor combination error	Wrong combination of servo amplifier and servo motor.	Wrong combination of servo amplifier and servo motor connected.	Use correct combination.
20	Encoder error 2	Communication error occurred between encoder and servo amplifier.	1. Encoder connector (CN2) disconnected.	Connect correctly.
			2. Encoder cable faulty (Wire breakage or shorted)	Repair or change the cable.
			3. Encoder fault	Change the servo motor.
24	Main circuit error	Ground fault occurred at the servo motor power (U,V and W phases) of the servo amplifier.	1. Power input wires and servo motor power wires are in contact.	Connect correctly.
			2. Sheathes of servo motor power cables deteriorated, resulting in ground fault.	Change the cable.
			3. Main circuit of servo amplifier failed. Checking method Alarm (24) occurs if the servo is switched on after disconnecting the U, V, W power cables from the servo amplifier.	Change the servo amplifier.
25	Absolute position erase	Absolute position data in error	1. Voltage drop in encoder (Battery disconnected.)	After leaving the alarm occurring for a few minutes, switch power off, then on again. Always make home position setting again.
			2. Battery voltage low	Change the battery. Always make home position setting again.
			3. Battery cable or battery is faulty.	
		Power was switched on for the first time in the absolute position detection system.	4. Home position not set.	After leaving the alarm occurring for a few minutes, switch power off, then on again. Always make home position setting again.

Display	Name	Definition	Cause	Action
30	Regenerative error	Permissible regenerative power of the built-in regenerative resistor or regenerative option is exceeded.	1. Wrong setting of parameter No. PA02	Set correctly.
			2. Built-in regenerative resistor or regenerative option is not connected.	Connect correctly.
			3. High-duty operation or continuous regenerative operation caused the permissible regenerative power of the regenerative option to be exceeded. Checking method Call the status display and check the regenerative load ratio.	1. Reduce the frequency of positioning. 2. Use the regenerative option of larger capacity. 3. Reduce the load.
			4. Power supply voltage is abnormal. MR-J3-□B:260VAC or more MR-J3-□B1:More than 135VAC MR-J3-□B4: 535VAC or more	Check the power supply.
			5. Built-in regenerative resistor or regenerative option faulty.	Change the servo amplifier or regenerative option.
		Regenerative transistor fault	6. Regenerative transistor faulty. Checking method 1) The regenerative option has overheated abnormally. 2) The alarm occurs even after removal of the built-in regenerative resistor or regenerative option.	Change the servo amplifier.
31	Overspeed	Speed has exceeded the instantaneous permissible speed.	1. Small acceleration/deceleration time constant caused overshoot to be large.	Increase acceleration/deceleration time constant.
			2. Servo system is instable to cause overshoot.	1. Re-set servo gain to proper value. 2. If servo gain cannot be set to proper value. 1) Reduce load inertia moment ratio; or 2) Reexamine acceleration/deceleration time constant.
			3. Encoder faulty.	Change the servo motor.
32	Overcurrent	Current that flew is higher than the permissible current of the servo amplifier. (If the alarm (32) occurs again when turning ON the servo after resetting the alarm by turning OFF/ON the power when the alarm (32) first occurred, the transistor (IPM • IGBT) of the servo amplifier may be at fault. In the case, do not repeat to turn OFF/ON the power. Check the transistor with the checking method of "Cause 2".)	1. Short occurred in servo motor power (U, V, W).	Correct the wiring.
			2. Transistor (IPM • IGBT) of the servo amplifier faulty. Checking method Alarm (32) occurs if power is switched on after U,V and W are disconnected.	Change the servo amplifier.
			3. Ground fault occurred in servo motor power (U, V, W).	Correct the wiring.
			4. External noise caused the overcurrent detection circuit to misoperate.	Take noise suppression measures.

Display	Name	Definition	Cause	Action
33	Overvoltage	The following shows the input value of converter bus voltage. MR-J3-□B(1): 400VDC or more MR-J3-□B4: 800VDC or more	1. Regenerative option is not used.	Use the regenerative option.
			2. Though the regenerative option is used, the parameter No.PA02 setting is "□□00 (not used)".	Set correctly.
			3. Lead of built-in regenerative resistor or regenerative option is open or disconnected.	1. Change the lead. 2. Connect correctly.
			4. Regenerative transistor faulty.	Change the servo amplifier.
			5. Wire breakage of built-in regenerative resistor or regenerative option	1. For wire breakage of built-in regenerative resistor, change the servo amplifier. 2. For wire breakage of regenerative option, change the regenerative option.
			6. Capacity of built-in regenerative resistor or regenerative option is insufficient.	Add regenerative option or increase capacity.
			7. Power supply voltage high.	Check the power supply.
			8. Ground fault occurred in servo motor power (U, V, W).	Correct the wiring.
			9. The jumper across BUE-SD of the FR-BU2 brake unit is removed.	Fit the jumper across BUE-SD.
34	Receive error 1	SSCNETⅢ communication error (Continuously communication error with about 3.5ms interval.)	1. The SSCNETⅢ cable is disconnected.	Connect it after turning off the control circuit power supply for servo amplifier.
			2. The surface at the end of SSCNETⅢ cable got dirty.	Wipe dirt at the surface away. (Refer to section 3.9)
			3. The SSCNETⅢ cable is broken or severed.	Change the cable.
			4. Noise entered the servo amplifier.	Take noise suppression measures.
			5. Optical characteristic of SSCNETⅢ cable deteriorated because vinyl tape and/or wire sheath, which contains migrating plasticizer, adhered to the cable.	Remove the vinyl tape and/or wire sheath, which contains migrating plasticizer, and exchange the cable.
35	Command frequency error	Input pulse frequency of command pulse is too high.	1. Command given is greater than the maximum speed of the servo motor.	Check operation program.
			2. Servo system controller failure.	Change the servo system controller.
			3. Noise entered the servo amplifier.	Take noise of I/O signal suppression measures.
			4. Noise entered the controller.	Take noise from the controller suppression measures.
36	Receive error 2	SSCNETⅢ communication error (Intermittently communication error with about 70ms interval.)	1. The SSCNETⅢ cable is disconnected.	Connect it after turning off the control circuit power supply for servo amplifier.
			2. The surface at the end of SSCNETⅢ cable got dirty.	Wipe dirt away from the surface. (Refer to section 3.9)
			3. The SSCNETⅢ cable is broken or severed.	Change the cable.
			4. Noise entered the servo amplifier.	Take noise suppression measures.
			5. Optical characteristic of SSCNETⅢ cable deteriorated because vinyl tape and/or wire sheath, which contains migrating plasticizer, adhered to the cable.	Remove the vinyl tape and/or wire sheath, which contains migrating plasticizer, and exchange the cable.

Display	Name	Definition	Cause	Action
37	Parameter error	Parameter setting is wrong.	1. Servo amplifier fault caused the parameter setting to be rewritten.	Change the servo amplifier.
			2. There is a parameter whose value was set to outside the setting range by the controller.	Change the parameter value to within the setting range.
			3. The number of write times to EEP-ROM exceeded 100,000 due to parameter write, etc.	Change the servo amplifier.
45	Main circuit device overheat	Main circuit device overheat	1. Servo amplifier faulty.	Change the servo amplifier.
			2. The power supply was turned on and off continuously by overloaded status.	The drive method is reviewed.
			3. Ambient temperature of servo motor is over 55℃.	Check environment so that ambient temperature is 0 to 55℃.
			4. Used beyond the specifications of close mounting.	Use within the range of specifications.
46	Servo motor overheat	Servo motor temperature rise actuated the thermal sensor.	1. Ambient temperature of servo motor is over 40℃.	Check environment so that ambient temperature is 0 to 40℃.
			2. Servo motor is overloaded.	1. Reduce load. 2. Check operation pattern. 3. Use servo motor that provides larger output.
			3. Thermal sensor in encoder is faulty.	Change the servo motor.
47	Cooling fan error	The cooling fan of the servo amplifier stopped, or its speed decreased to or below the alarm level.	1. Cooling fan life expiration (Refer to section 2.5.)	Change the cooling fan of the servo amplifier.
			2. Foreign matter caught in the cooling fan stopped rotation.	Remove the foreign matter.
			3. The power supply of the cooling fan failed.	Change the servo amplifier.
50	Overload 1	Load exceeded overload protection characteristic of servo amplifier.	1. Servo amplifier is used in excess of its continuous output current.	1. Reduce load. 2. Check operation pattern. 3. Use servo motor that provides larger output.
			2. Servo system is instable and hunting.	1. Repeat acceleration/ deceleration to execute auto tuning. 2. Change the auto tuning response setting. 3. Set auto tuning to OFF and make gain adjustment manually.
			3. Machine struck something.	1. Check operation pattern. 2. Install limit switches.
			4. Wrong connection of servo motor. Servo amplifier's output terminals U, V, W do not match servo motor's input terminals U, V, W.	Connect correctly.
			5. Encoder faulty. Checking method When the servo motor shaft is rotated with the servo off, the cumulative feedback pulses do not vary in proportion to the rotary angle of the shaft but the indication skips or returns midway.	Change the servo motor.
			6. After Overload 2 (51) occurred, turn OFF/ON the power supply to clear the alarm. Then the overload operation is repeated.	1. Reduce load. 2. Check operation pattern. 3. Use servo motor that provides larger output.

Display	Name	Definition	Cause	Action
51	Overload 2	Machine collision or the like caused max. For the time of the alarm occurrence, refer to the section 10.1.	1. Machine struck something.	1. Check operation pattern. 2. Install limit switches.
			2. Wrong connection of servo motor. Servo amplifier's output terminals U, V, W do not match servo motor's input terminals U, V, W.	Connect correctly.
			3. Servo system is instable and hunting.	1. Repeat acceleration/deceleration to execute auto tuning. 2. Change the auto tuning response setting. 3. Set auto tuning to OFF and make gain adjustment manually.
			4. Encoder faulty. Checking method When the servo motor shaft is rotated with the servo off, the cumulative feedback pulses do not vary in proportion to the rotary angle of the shaft but the indication skips or returns midway.	Change the servo motor.
52	Error excessive	The deviation between the model position and the actual servo motor position exceeds the parameter No.PC01 setting value (initial value: 3 revolutions).	1. Acceleration/deceleration time constant is too small.	Increase the acceleration/deceleration time constant.
			2. Torque limit value set with controller is too small.	Increase the torque limit value.
			3. Motor cannot be started due to torque shortage caused by power supply voltage drop.	1. Check the power supply capacity. 2. Use servo motor which provides larger output.
			4. Position loop gain 1 (parameter No.PB08) value is small.	Increase set value and adjust to ensure proper operation.
			5. Servo motor shaft was rotated by external force.	1. When torque is limited, increase the limit value. 2. Reduce load. 3. Use servo motor that provides larger output.
			6. Machine struck something.	1. Check operation pattern. 2. Install limit switches.
			7. Encoder faulty	Change the servo motor.
			8. Wrong connection of servo motor. Servo amplifier's output terminals U, V, W do not match servo motor's input terminals U, V, W.	Connect correctly.
			9. SSCNETⅢ cable fault	Change the SSCNETⅢ cable.
			10. Optical characteristic of SSCNETⅢ cable deteriorated because vinyl tape and/or wire sheath, which contains migrating plasticizer, adhered to the cable.	Remove the vinyl tape and/or wire sheath, which contains migrating plasticizer, and exchange the cable.
8A	USB communication time-out error	Communication with MR Configurator in test operation mode stopped for longer than the specified time.	1. USB cable breakage.	Change the USB cable.
8E	USB communication error	Serial communication error occurred between servo amplifier and communication device (e.g. personal computer).	1. USB cable fault (Open cable or short circuit)	Change the USB cable.
			2. Communication device (e.g. personal computer) faulty	Change the communication device (e.g. personal computer).

Display	Name	Definition	Cause	Action
(Note) 888	Watchdog	CPU, parts faulty	Fault of parts in servo amplifier Checking method Alarm (888) occurs if power is switched on after disconnection of all cables but the control circuit power supply cable.	Change the servo amplifier.

Note. At power-on, "888" appears instantaneously, but it is not an error.

8.3 Remedies for warnings

⚠CAUTION • If an absolute position counter warning (E3) occurred, always make home position setting again. Not doing so may cause unexpected operation.

POINT

- When any of the following alarms has occurred, do not resume operation by switching power of the servo amplifier OFF/ON repeatedly. The servo amplifier and servo motor may become faulty. If the power of the servo amplifier is switched OFF/ON during the alarms, allow more than 30 minutes for cooling before resuming operation.
  - Excessive regenerative warning (E0)
  - Overload warning 1 (E1)

If E6, E7 or E9 occurs, the servo off status is established. If any other warning occurs, operation can be continued but an alarm may take place or proper operation may not be performed.
Remove the cause of warning according to this section. Use the MR Configurator to refer to a factor of warning occurrence.

Display	Name	Definition	Cause	Action
92	Battery cable disconnection warning	Absolute position detection system battery voltage is low.	1. Battery cable is open.	Repair cable or changed.
			2. Battery voltage supplied from the servo amplifier to the encoder fell to about 3V or less. (Detected with the encoder)	Change the battery.
96	Home position setting warning	Home position setting could not be made.	1. Droop pulses remaining are greater than the in-position range setting.	Remove the cause of droop pulse occurrence
			2. Command pulse entered after clearing of droop pulses.	Do not enter command pulse after clearing of droop pulses.
			3. Creep speed high.	Reduce creep speed.
9F	Battery warning	Voltage of battery for absolute position detection system reduced.	Battery voltage fell to 3.2V or less. (Detected with the servo amplifier)	Change the battery.
E0	Excessive regeneration warning	There is a possibility that regenerative power may exceed permissible regenerative power of built-in regenerative resistor or regenerative option.	Regenerative power increased to 85% or more of permissible regenerative power of built-in regenerative resistor or regenerative option. Checking method Call the status display and check regenerative load ratio.	1. Reduce frequency of positioning. 2. Change the regenerative option for the one with larger capacity. 3. Reduce load.

Display	Name	Definition	Cause	Action
E1	Overload warning 1	There is a possibility that overload alarm 1 or 2 may occur.	Load increased to 85% or more of overload alarm 1 or 2 occurrence level. Cause, checking method Refer to 50,51.	Refer to 50, 51.
E3	Absolute position counter warning	Absolute position encoder pulses faulty.	1. Noise entered the encoder.	Take noise suppression measures.
			2. Encoder faulty.	Change the servo motor.
		The multi-revolution counter value of the absolute position encoder exceeded the maximum revolution range.	3. The movement amount from the home position exceeded a 32767 rotation or 37268 rotation in succession.	Make home position setting again.
E4	Parameter warning	Parameter outside setting range	Parameter value set from servo system controller is outside setting range	Set it correctly.
E6	Servo forced stop warning	EM1 is off.	External forced stop was made valid. (EM1 was turned off.)	Ensure safety and deactivate forced stop.
E7	Controller forced stop warning		Forced stop signal was entered into the servo system controller.	Ensure safety and deactivate forced stop.
E8	Cooling fan speed reduction warning	The speed of the servo amplifier decreased to or below the warning level. This warning is not displayed with MR-J3-70B/100B among servo amplifiers equipped with a cooling fan.	Cooling fan life expiration (Refer to section 2.5.)	Change the cooling fan of the servo amplifier.
			The power supply of the cooling fan is broken.	Change the servo amplifier.
E9	Main circuit off warning	Servo-on command was issued with main circuit power off.		Switch on main circuit power.
EC	Overload warning 2	Operation, in which a current exceeding the rating flew intensively in any of the U, V and W phases of the servo motor, was repeated.	During a stop, the status in which a current flew intensively in any of the U, V and W phases of the servo motor occurred repeatedly, exceeding the warning level.	1. Reduce the positioning frequency at the specific positioning address. 2. Reduce the load. 3. Replace the servo amplifier/ servo motor with the one of larger capacity.
ED	Output watt excess warning	The status, in which the output wattage (speed × torque) of the servo motor exceeded the rated output, continued steadily.	Continuous operation was performed with the output wattage (speed × torque) of the servo motor exceeding 150% of the rated output.	1. Reduce the servo motor speed. 2. Reduce the load.

For MR-J4 servo amplifier error codes, see Appendix D.

This page intentionally left blank

6 STORAGE AND SHIPPING

IN THIS CHAPTER:

6.1 Storage

The CM6200 is intended to be stored indoors in a temperature and humidity controlled environment. Proper storage of the CM6200 will extend its usefulness and prevent undue damage.

Before storing, do the following:

1. Clean the machine with solvent to remove grease, metal chips, and moisture.
2. Drain all liquids from the pneumatic conditioning unit.

Store the CM6200 in its original shipping container. Keep all packing materials for repackaging the machine.

6.1.1 Short-term storage

Short-term storage is defined as three months or less. For short-term storage:

1. Retract the spindles from the work piece.
2. Remove the tooling.
3. Remove hoses.
4. Remove the machine from the work piece.
5. Clean the machine to remove dirt, grease, metal chips, and moisture. Make sure the machine is free from dirt, grease, chips and other debris before storage.
6. Apply a moisture preventative material to unpainted surfaces (LPS-2 for short-term storage, LPS-3 for long-term storage) to prevent corrosion.
7. Store the machine in a stable position on a stand or in storage container a according to your company policies.

6.1.2 Long-term storage

Long-term storage is defined as longer than three months.

Do the following for long-term storage:

1. Complete steps 1-6 for short-term storage (Section 6.1.2 on page 118).
2. Add a desiccant pouch to the shipping container. Replace according to manufacturer instructions.
3. Store the shipping container in an environment out of direct sunlight with temperature < 70ºF and humidity < 50%.

6.2 SHIPPING

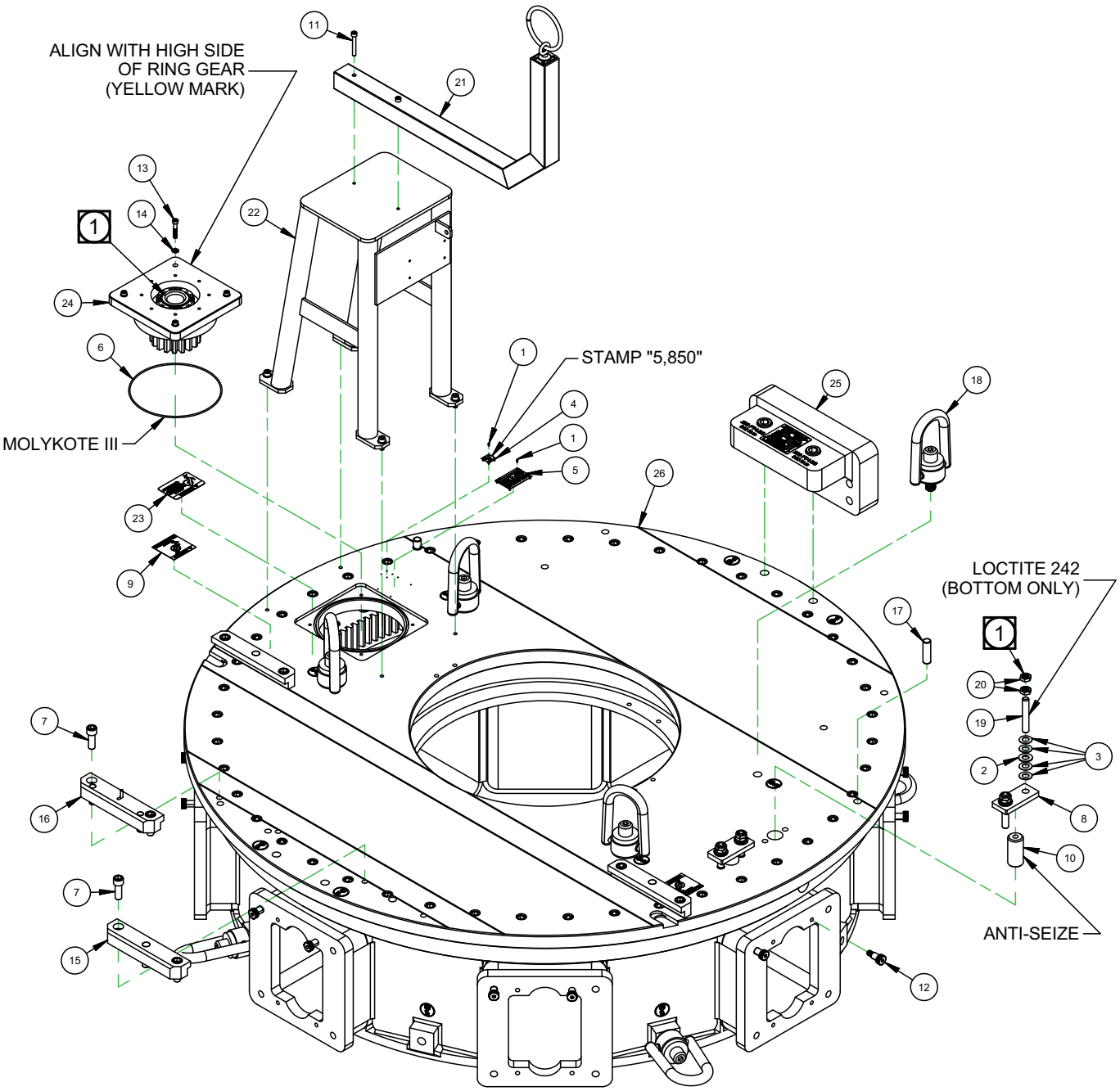
The CM6200 can be shipped in its original shipping container.

6.3 DECOMMISSIONING

To decommission the CM6200 prior to disposal, remove the rotary table hub from the chuck and dispose of the drive assembly separately from the rest of the machine components. Refer to Appendix A for component assembly information.

APPENDIX A ASSEMBLY DRAWINGS

Drawing list



NOTES

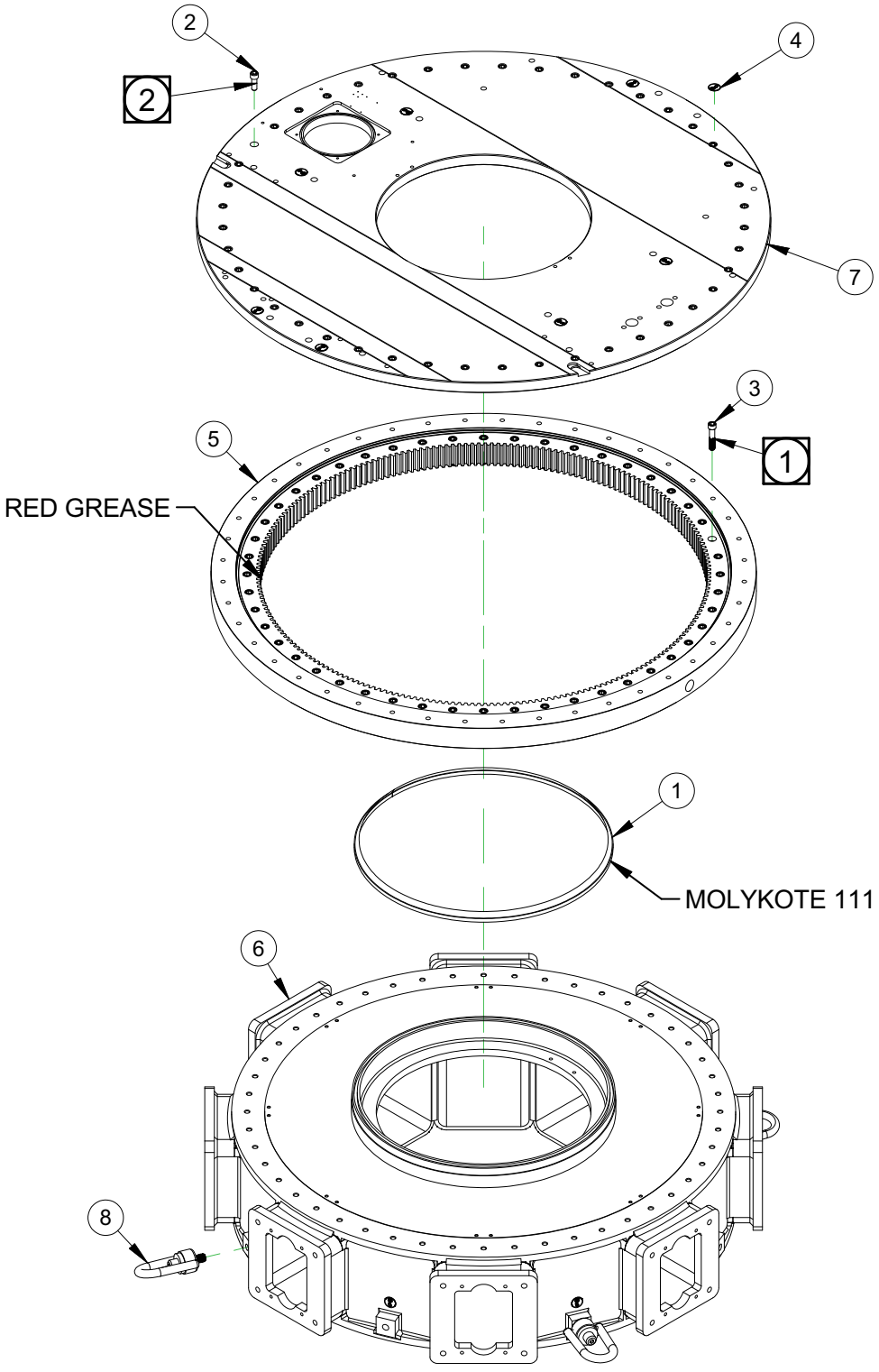
1 ADJUST DRAG BRAKE JAM NUTS UNTIL TABLE ROTATES AT PINION WITH 4-5 IN-LBS OF TORQUE

FIGURE A-1. ROTARY TABLE ASSEMBLY (P/N 62028)

ITEM	QTY	PART No.	DESCRIPTION
1	8	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
2	4	11693	WASHER 5/8 FLTW SAE
3	16	27172	WASHER SPRING BELLEVILLE 5/8 X 1-1/4 X .040
4	1	29152	PLATE MASS CE
5	1	29154	PLATE SERIAL YEAR MODEL CE 2.0 X 3.0
6	1	44658	O-RING 1/8 X 8-3/4 ID X 9 OD SILICONE
7	8	46222	SCREW M16 X 2.0 X 55mm SHCS
8	2	46232	BAR BRAKE SHOE CLAMP
9	2	46286	LABEL CIRCULAR MILL CRUSH HAZARD
10	2	54165	SHOE BRAKE 1.6m CIRCULAR MILL
11	2	57874	SCREW M8 X 1.25 X 60MM SHCS
12	16	58202	SCREW 16MM DIA X 20MM X M12 X 1.75 SHLDCS
13	4	59349	SCREW M8 X 1.25 X 45MM SHCS
14	4	59432	WASHER M8 FLTW 16MM OD 1.6MM THICK
15	3	62601	CLAMP ARM PINNED
16	1	62602	CLAMP SAFETY STOP ASSY
17	2	62605	PIN DOWEL 3/4 DIA X 3
18	4	62606	HOIST RING M24 X 3 X 38MM 70 ID X 130 OD 225 OAL 9250 LBS 4200 KG SWIVEL
19	4	62612	STUD THREADED M16 X 2 X 100MM FULL THD
20	8	62613	NUT M16 X 2.0 JAMN
21	1	62616	TOWER HOSE CM6200
22	1	62869	ASSY GUARD ENCODER CM6200
23	1	62884	LABEL FLANGE FACERS IMPACT HAZARD
24	1	63743	ASSY PINION DRIVE CM6200
25	1	68425	ASSY LIFTING CM6200 LOAD TESTED 5000 KG
26	1	96031	ASSY TABLE ROTARY CM6200

PARTS LIST

FIGURE A-2. ROTARY TABLE ASSEMBLY PARTS LIST (P/N 62028)



SEE SHEET 2 FOR PARTS LIST & TORQUE SPECIFICATIONS

FIGURE A-3. ROTARY TABLE ASSEMBLY (P/N 96031)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	45623	PUSH-ON TRIM SEAL - FLEXIBLE SEGMENTED CORE
2	44	46222	SCREW M16 X 2.0 X 55mm SHCS
3	48	58106	SCREW M16 X 2.0 X 80 SHCS
4	16	59039	LABEL WARNING LIFT POINT ROUND 1.5"
5	1	61565	ASSY BRG AND GEAR KAYDON 66 OD PRELOADED
6	1	61967	HUB CHUCK CM6200
7	1	62600	PLATE TABLE ROTARY CM6200
8	4	62606	HOIST RING M24 X 3 X 38MM 70 ID X 130 OD 225 OAL 9250 LBS 4200 KG SWIVEL

(1) TORQUE SPECIFICATION: CM6200 BEARING TO CHUCK

LABEL BOLT HOLES FROM 1 TO 48 CLOCKWISE AROUND THE BEARING

TIGHTEN THE BOLTS USING THE FOLLING PATTERN IN THREE STAGES 70 FT-LBS, 140 FT-LBS, 200 FT-LBS. NOTE: TORQUE VALUES ARE FOR LUBRICATED FASTENERS. ENSURE TO USE BLUE LOCTITE DURING ASSEMBLY.

1 - 25 - 13 - 37 7 - 31 - 19 - 43 4 - 28 - 16 - 40 10 - 34 - 22 - 46
2 - 26 - 14 - 38 3 - 27 - 15 - 39 5 - 29 - 17 - 41 6 - 30 - 18 - 42
8 - 32 - 20 - 44 9 - 33 - 21 - 45 11 - 35 - 23 - 47 12 - 36 - 24 - 48

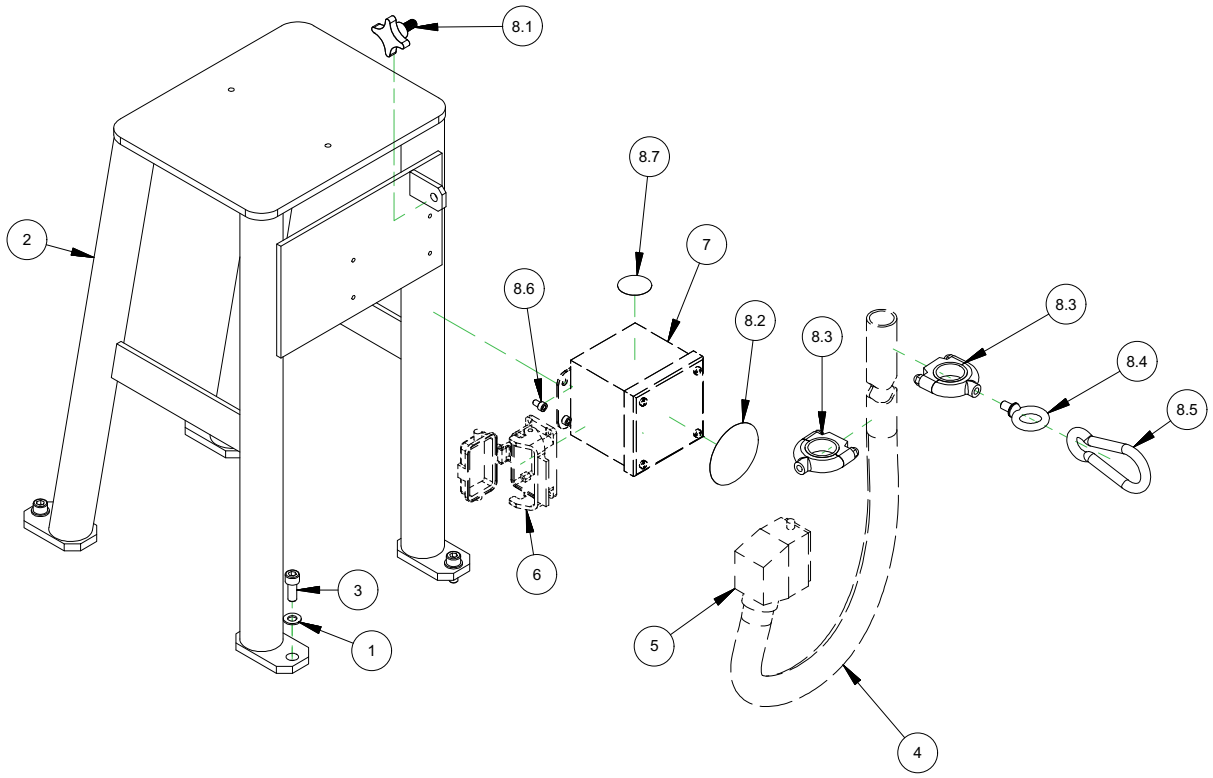
(2) TORQUE SPECIFICATION: CM6200 TOP PLATE TO BEARING

LABEL BOLT HOLES FROM 1 TO 44 CLOCKWISE AROUND THE TOP PLATE

TIGHTEN THE BOLTS USING THE FOLLING PATTERN IN THREE STAGES 70 FT-LBS, 140 FT-LBS, 200 FT-LBS. NOTE: TORQUE VALUES ARE FOR LUBRICATED FASTENERS. ENSURE TO USE BLUE LOCTITE DURING ASSEMBLY.

1 - 23 - 12 - 34 6 - 28 - 17 - 39 3 - 25 - 14 - 36 8 - 30 - 19 - 41
4 - 26 - 15 - 37 9 - 31 - 20 - 42 2 - 24 - 13 - 35 7 - 29 - 18 - 40
5 - 27 - 16 - 38 10 - 32 - 21 - 43 11 - 33 - 22 - 44

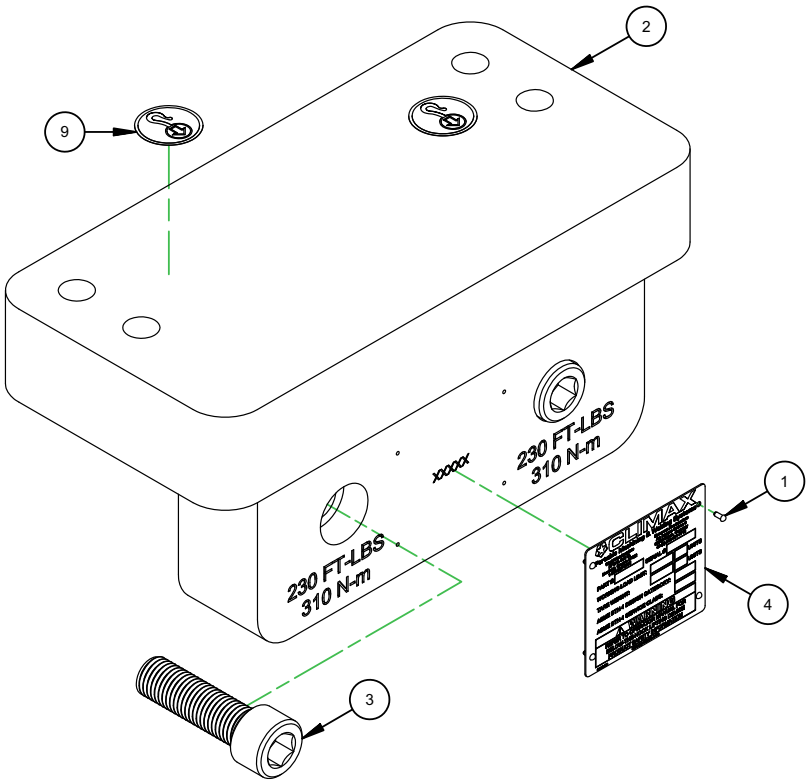
FIGURE A-4. ROTARY TABLE ASSEMBLY PARTS LIST (P/N 96031)



* ITEMS 4, 5, 6, AND 7 IN PHANTOM ARE FOR REFERENCE ONLY

PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	4	62875	WASHER M10 FLTW DIN 125
2	1	62615	GUARD ENCODER CM6200
3	4	35339	SCREW M10 X 1.5 X 25mm SHCS
4	1	N/A*	CARFLEX X-FLEX 1 INCH NONMETALLIC CONDUIT
5	1	N/A*	HAN 10B-gs-R-29 HOOD SIDE ENTRY METAL
6	1	N/A*	HAN 10B-agg-LB-K HOUSING BULKHEAD MOUNTING METAL
7	1	N/A*	4 X 4 X 4 SCREW COVER SC JUNCTION BOX
8	1	63180	ASSY HARDWARE HOSE AND ENCODER GUARD CM6200
8.1	1	55463	KNOB FOUR ARM 2 DIA X 3/8-16 THREAD 3/4 L MODIFIED
8.2	1	82195	LABEL WARNING - LOCKOUT/ELECTRICAL GRAPHIC 3" DIA BLUE
8.3	2	55290	CONDUIT CLEAN ROOM HANGER 1-1/4 OD 3/8-16 THREAD
8.4	1	19239	EYE LIFTING 3/8 MODIFIED
8.5	1	55393	SPRING SNAP 5/8 SNAP O X 4-3/4 L BLK
8.6	4	57281	SCREW M6 X 1.0 X 10MM SHCS
8.7	1	59044	LABEL WARNING - CONSULT OPERATOR'S MANUAL

FIGURE A-5. ENCODER GUARD ASSEMBLY (P/N 62869)

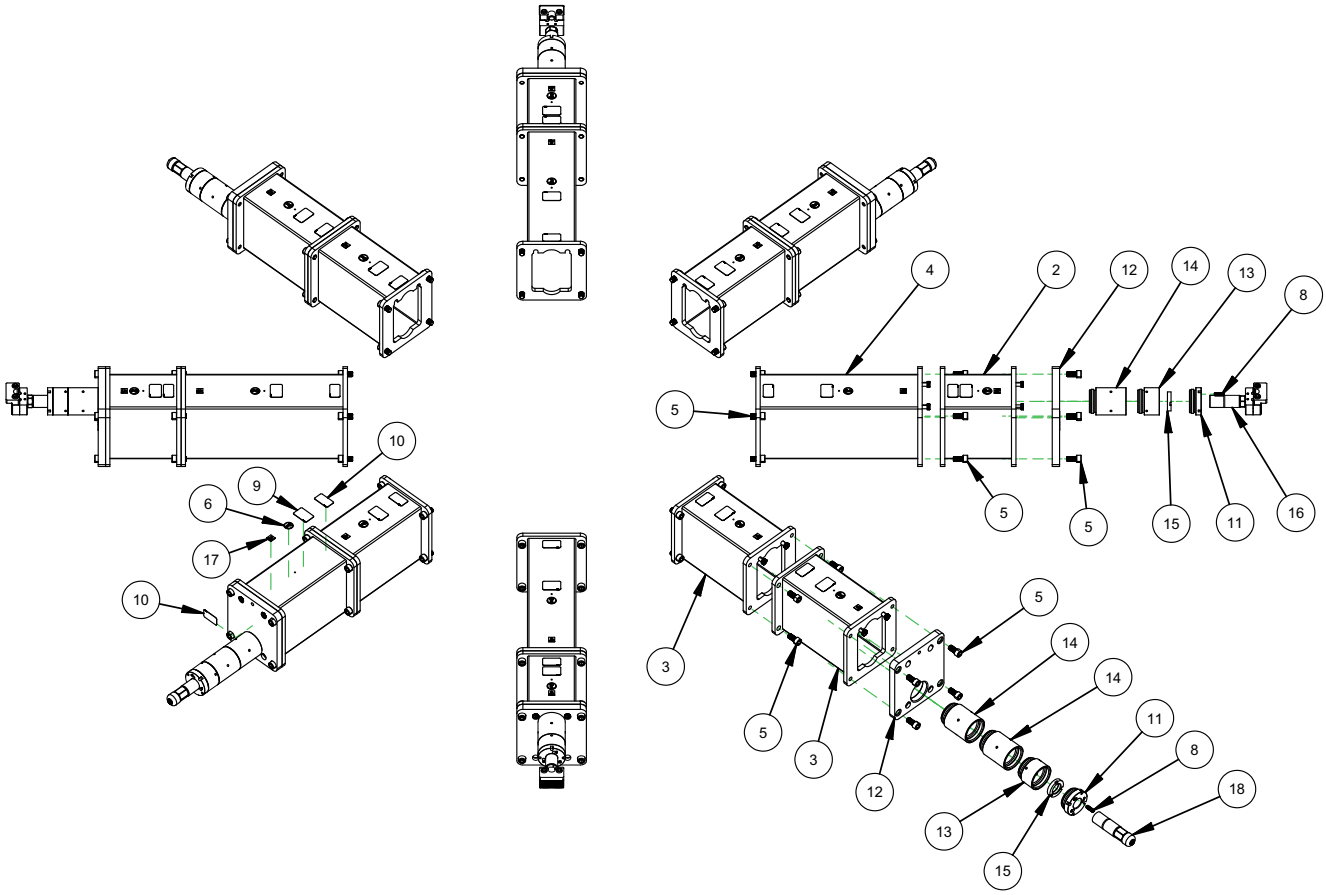


BELOW THE HOOK LIFTING INFO TAG

PART NUMBER:	68425
SERIAL NUMBER:	
WORKING LOAD LIMIT:	6000 KG
TARE WEIGHT:	55 KG
ASME BTH-1 DESIGN CATEGORY:	A
ASME BTH-1 SERVICE CLASS:	0

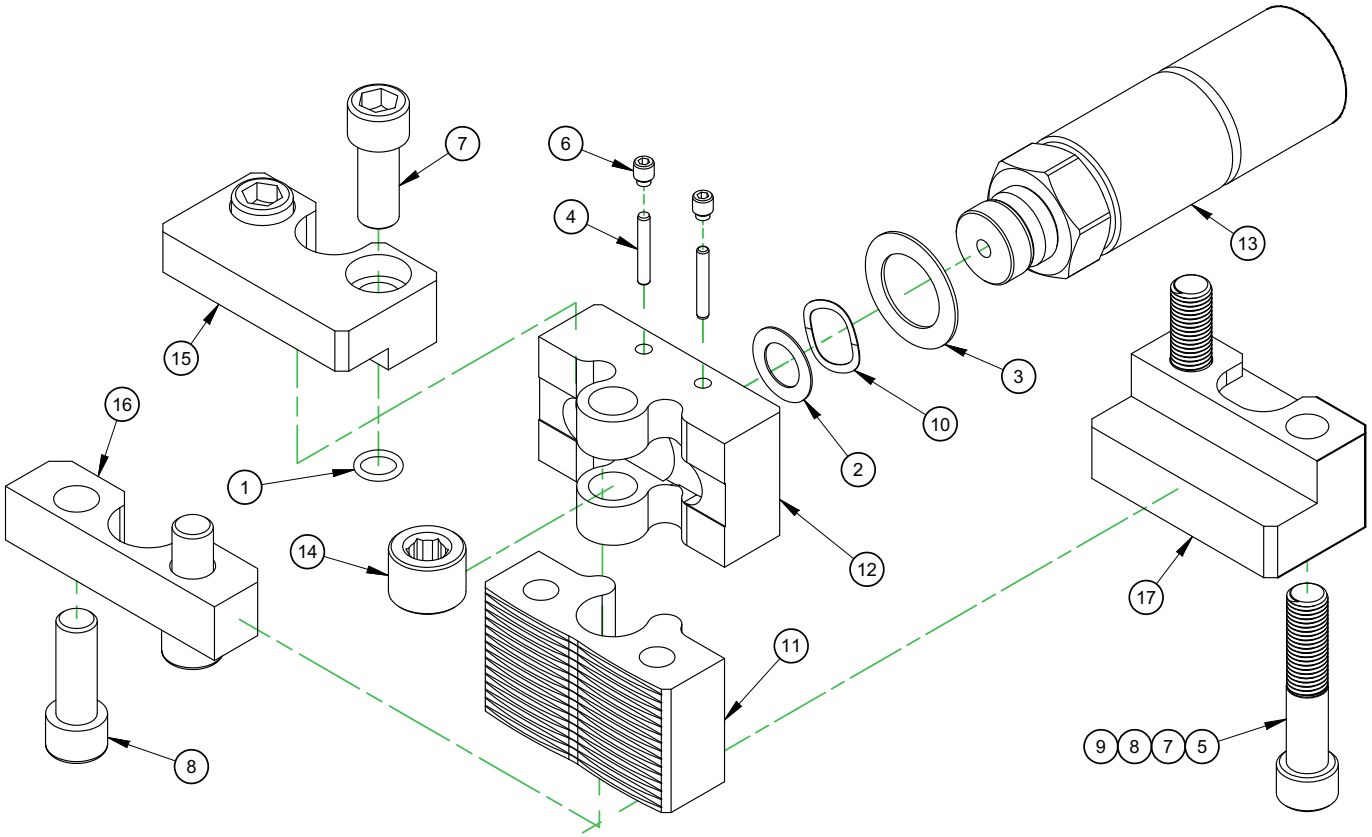
PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	4	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
2	1	68423	PLATE LIFTING CM6200
3	2	68426	SCREW M24 X 3.0 X 80MM SHCS
4	1	69422	TAG BELOW THE HOOK LIFTING INFO AND SERIAL NUMBER
9	2	59039	LABEL WARNING LIFT POINT ROUND 1.5"

FIGURE A-6. LOAD TESTED LIFTING ASSEMBLY (P/N 68425)



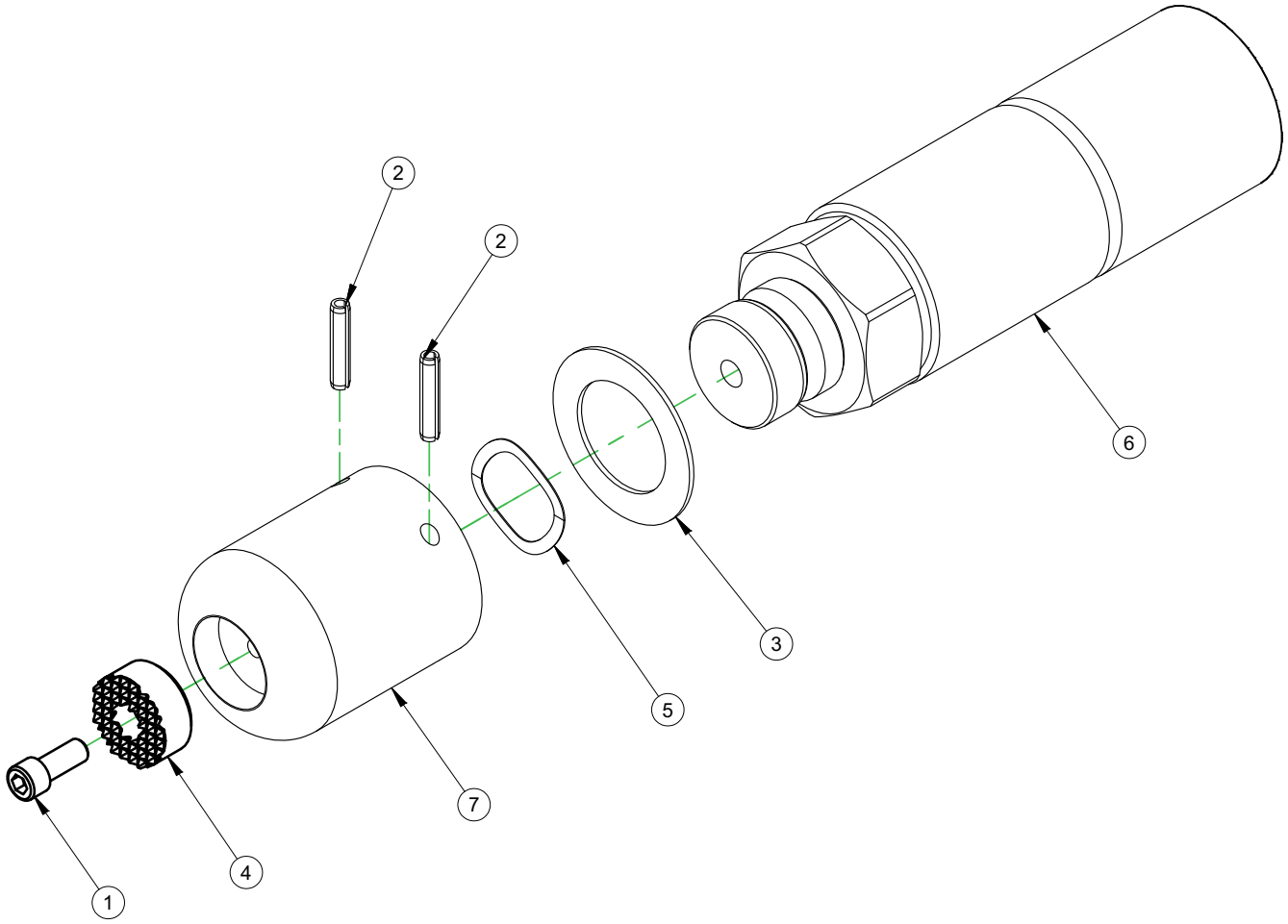
PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	1	19700	(NOT SHOWN) CONTAINER SHIPPING FLAT ROOF 20 X 8.75 X 10.5
2	4	57724	WELDMENT STANDOFF 12.5 FF8200
3	8	57851	WELDMENT STANDOFF 17.5 FF8200
4	4	57852	WELDMENT STANDOFF 27.5 FF8200
5	96	58203	SCREW M20 X 2.5 X 40MM SHCS
6	16	59039	LABEL WARNING LIFT POINT ROUND 1.5"
7	4	63954	(NOT SHOWN) LIFTING EYE M6 X 1 X 12 THREAD 19 ID 460 LBS 210 KG
8	24	74499	SCREW M12 X 1.75 X 40mm SSSFP
9	16	79385	LABEL WARNING - LIFT SUB ASSY ONLY GRAPHIC 2 X 3
10	24	82157	LABEL CAUTION - TORQUE 150 FT-LBS (203 N-M) GRAPHIC 3 X 1.7
11	8	89717	CAP END 4.50 DIA 4-4 OD THREAD 2-8 ID THREAD
12	8	89718	PLATE BASE CHUCK
13	8	89720	LEG CHUCK TUBE 4.5 OD X 2.5 THREADED
14	12	89721	LEG CHUCK TUBE 4.5 OD X 5.0 THREADED
15	8	89726	NUT JACKING LOCK 2-8
16	4	90836	ASSY FOOT CHUCK ADJUSTABLE
17	16	91217	PLATE MASS CE 1.0 X 1.0 KG ADHESIVE BACKED
18	4	91232	ASSY FOOT NON LEVELING GRIPPER LARGE FF LINE

FIGURE A-7. ID MOUNT ASSEMBLY (P/N 62038)



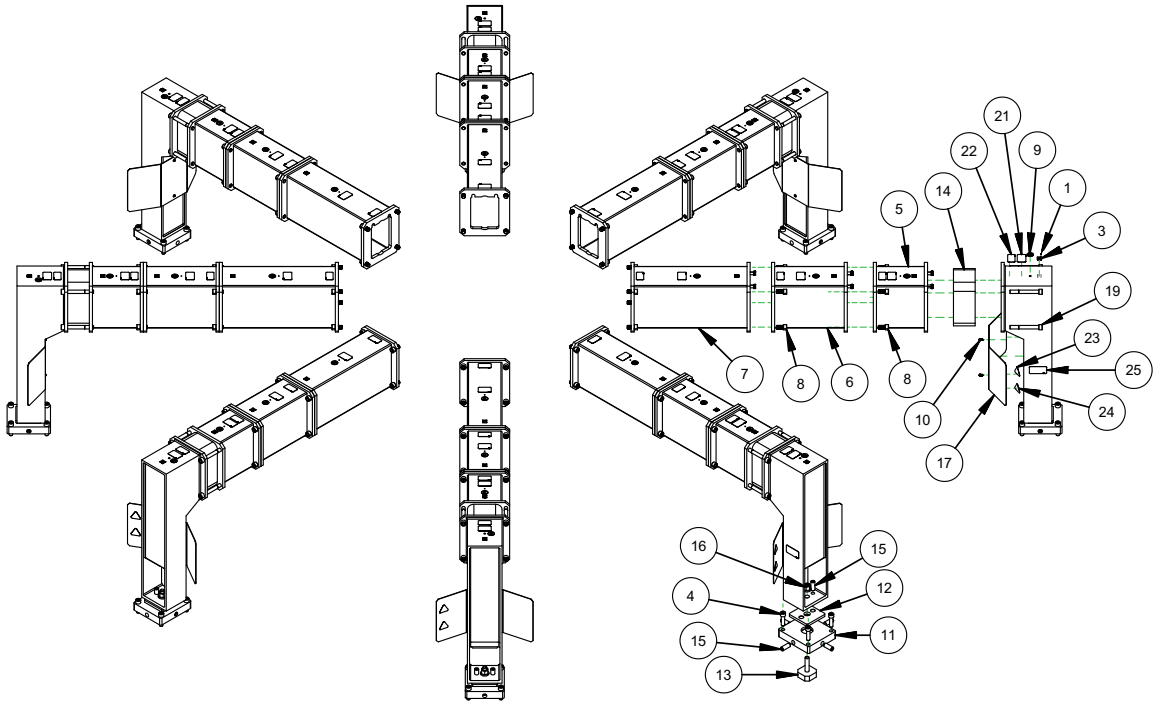
PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	2	10611	RING O 3/32 X 9/16 ID X 3/4 OD
2	1	11739	WASHER THRUST .750 ID X 1.250 OD X .0312
3	1	16666	WASHER THRUST 1.250 ID X 1.937 OD X .060
4	2	19735	PIN DOWEL 3/16 DIA X 1-1/4
5	2	44227	SCREW M16 X 2.0 X 200 SHCS
6	2	44257	SCREW M8 X 1.25 X 10mm SSSDP
7	4	44905	SCREW M16 X 2.0 X 40mm SHCS
8	2	46222	SCREW M16 X 2.0 X 55mm SHCS
9	2	58106	SCREW M16 X 2.0 X 80 SHCS
10	1	58244	WASHER SPRING WAVE 1.235 OD X .961 ID X .014
11	1	63582	JAW ADJUSTER CM6200
12	1	63583	BASE ADJUSTER CM6200
13	1	63584	JAW SCREW CM6200
14	1	63585	SCREW M30 X 1.5 X .875 HOLLOW LOCK MOD
15	1	63586	FINGER SETUP EXTENSION CM6200
16	1	63842	RESTRAINT SAFETY WELD PLATE CM6200
17	1	63853	CLAMP INTERNAL FLANGE CM6200
18	2	64086	SCREW M16 X 2.0 X 120 SHCS
19	2	64087	SCREW M16 X 2.0 X 160 SHCS

FIGURE A-8. ADJUSTABLE CHUCK FOOT ASSEMBLY (P/N 89730)



PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	1	12418	SCREW 1/4-20 X 5/8 SHCS
2	2	12959	PIN ROLL Ø3/16 X 1
3	1	16666	WASHER THRUST 1.250 ID X 1.937 OD X .060
4	1	41644	GRIPPER SERRATED HSS 1 DIAM X 1/2 CBORED
5	1	58244	WASHER SPRING WAVE 1.235 OD X .961 ID X .014
6	1	63584	JAW SCREW CM6200
7	1	91186	CAP FOOT NON LEVELING GRIPPER CM6200

FIGURE A-9. NON-LEVELING FOOT ASSEMBLY (P/N 91317)



PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	128	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
2	1	19700	(NOT SHOWN) CONTAINER SHIPPING FLAT ROOF 20 X 8.75 X 10.5
3	32	29152	PLATE MASS CE
4	32	56192	SCREW M20 X 2.5 X 70 MM SHCS
5	8	57724	WELDMENT STANDOFF 12.5 FF8200
6	8	57851	WELDMENT STANDOFF 17.5 FF8200
7	8	57852	WELDMENT STANDOFF 27.5 FF8200
8	96	58203	SCREW M20 X 2.5 X 40MM SHCS
9	32	59039	LABEL WARNING LIFT POINT ROUND 1.5"
10	16	59827	SCREW M8 X 1.25 X 16MM BHSCS
11	8	60751	PLATE CENTERING OD MOUNT FF8200
12	8	60752	PLATE WASHER OD MOUNT FF8200
13	8	60753	STUD HOLD DOWN M24 OD MOUNT FF8200
14	8	60755	STANDOFF 5 INCH OD MOUNT FF8200
15	48	60756	SCREW M24 X 3.0 X 60MM SSSFP
16	8	60757	NUT M24 X 3.0 FLANGED
17	8	61433	SHIELD OD MOUNT FF8200
18	8	62687	LEG VERTICAL SUPPORT OD MOUNT CM6200
19	32	63935	SCREW M20 X 2.5 X 170MM SHCS
20	4	63954	(NOT SHOWN) LIFTING EYE M6 X 1 X 12 THREAD 19 ID 460 LBS 210 KG
21	32	79385	LABEL WARNING - LIFT SUB ASSY ONLY GRAPHIC 2 X 3
22	32	82157	LABEL CAUTION - TORQUE 150 FT-LBS (203 N-M) GRAPHIC 3 X 1.7
23	8	82163	LABEL WARNING - HAND CRUSH GRAPHIC 1.95"
24	8	82164	LABEL WARNING - BODY CRUSH GRAPHIC 1.95"
25	8	82172	LABEL DANGER - GUARDS OD MOUNT GRAPHIC 4 X 2

FIGURE A-10. OD MOUNT ASSEMBLY (P/N 62039)

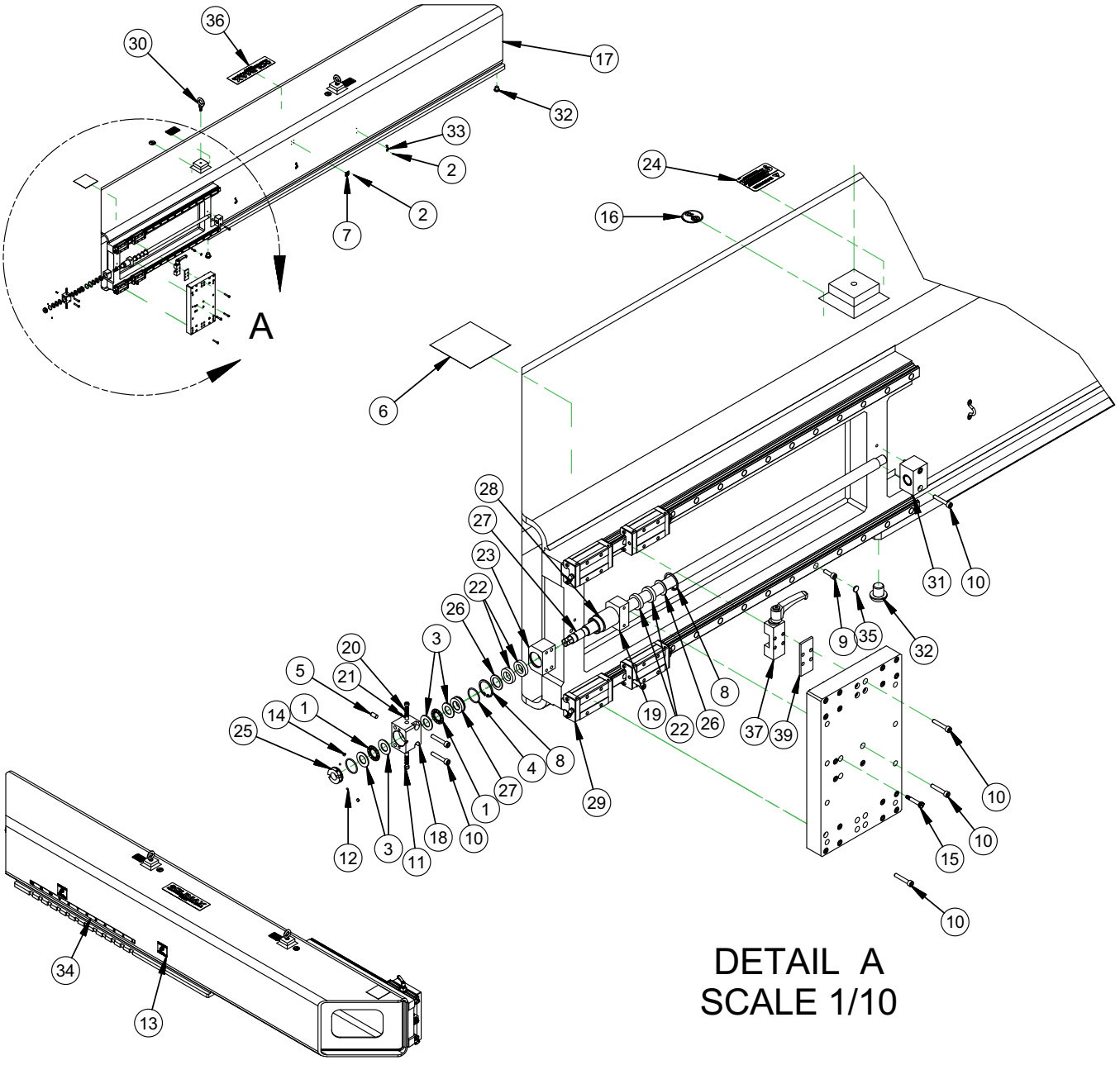
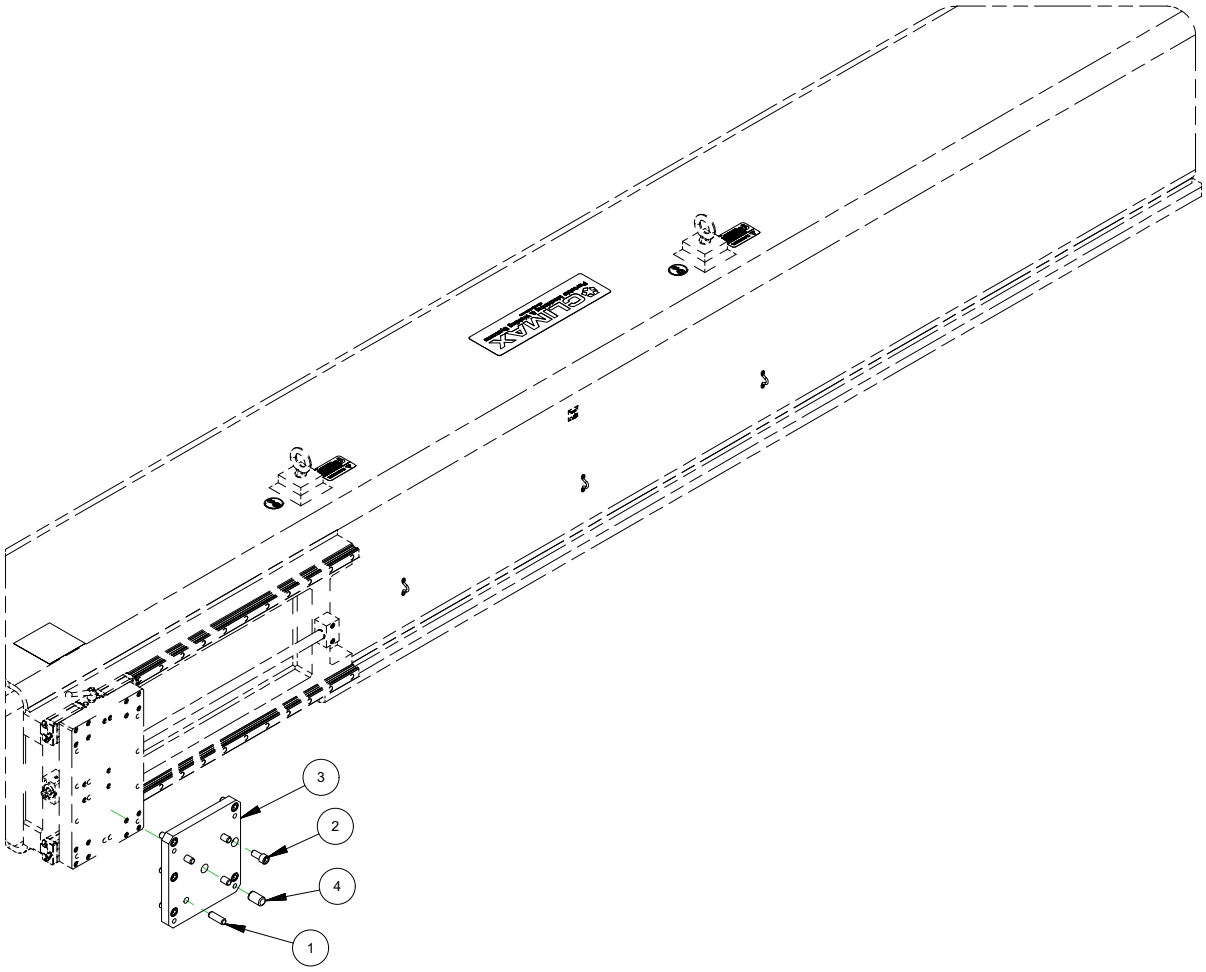


FIGURE A-11. MACHINING ARM ASSEMBLY (P/N 72676)

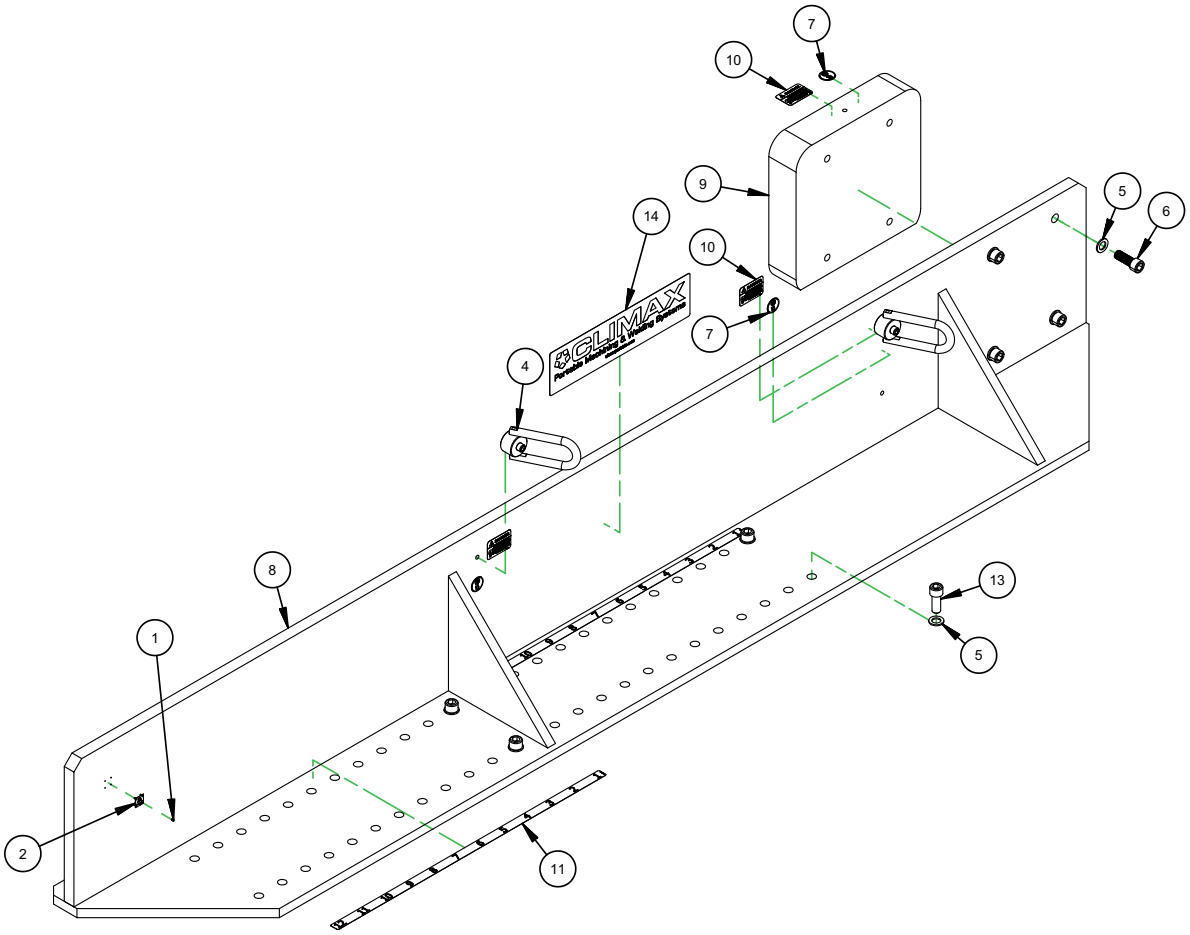
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	10538	BRG THRUST .625 ID X 1.125 OD X .0781
2	10	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
3	4	11165	WASHER THRUST .625 ID X 1.125 OD X .060
4	2	15731	RING O 1/16 X 1 ID X 1-1/8 OD
5	1	20166	PIN DOWEL 1/4 DIA X 1/2
6	1	27462	LABEL WARNING STICKER SINGLE POINT MACHINES
7	1	29152	PLATE MASS CE
8	2	33777	RING SNAP 1-3/16 ID (30MM)
9	30	35009	SCREW M6 X 1.0 X 20 SHCS
10	28	35504	SCREW M6 X 1.0 X 35mm SHCS
11	2	36087	SCREW M8 X 1.25 X 6MM SSSFP
12	2	43489	BALL NYLON 1/8 DIA
13	2	46286	LABEL CIRCULAR MILL CRUSH HAZARD
14	2	53365	SCREW M4 X 0.7 X 4 mm SSSFP
15	2	57581	SCREW 6MM DIA X 25MM X M5 X 0.8 SHLDCS
16	2	59039	LABEL WARNING LIFT POINT ROUND 1.5"
17	1	61980	TOOL ARM CM6200
18	1	62281	BEARING BLOCK BALLSCREW 20MM
19	1	62321	HOLDER FELT WIPER MILLING HEAD
20	12	62376	WASHER SPRING BELLEVILLE 1/8 ID X 1/4 OD X .013 THK
21	2	62378	ROD POLYURETHANE 1/4 DIA X 1/4 LENGTH 95 SHORE A
22	4	62379	SEAL FELT 16MM BALL SCREW 1.015 OD MILLING HEAD
23	1	62423	MOUNT BALL NUT MILLING HEAD
24	2	62888	LABEL DANGER PART LIFT POINT ONLY 2 X 3
25	1	62898	BRG RETAINING NUT 5/8-18 O-RING SEAL SETSCREW LOCK
26	2	62903	WASHER SHIM .75 ID 1.125 OD .062 THICK STEEL
27	1	62930	BALL SCREW 20MM RADIAL TRAVEL CM6200
28	1	62960	BALL SCREW NUT 20MM X 5MM LEAD LEFT HAND 33 MM OD EICHENBERGER ROUND
29	2	62961	SLIDE RAIL THK SHS25 880MM LG PRELOADED METAL SCRAPERS 2 BLOCKS
30	2	62964	LIFTING EYE M12 X 1.75 X 24 THREAD 30 ID 2270 LBS 1030 KG
31	1	62965	TAIL SUPPORT BALL SCREW RADIAL FEED
32	2	62969	SCREW 3/4-10 X 3/4 BHSCS
33	3	64133	GUIDE WIRE ROPE 3/8"
34	1	64156	LABEL COUNTERWEIGHT & ARM POSITION CM6200
35	30	68501	CAP RAIL 25MM METAL THK SHS
36	1	70228	LABEL CLIMAX LOGO 3.5 X 12.5
37	1	72262	ZIMMER BRAKE 25mm RAIL
38	1	72675	PLATE RADIAL TRAVEL CM6200
39	1	72869	ADAPTER BRAKE 25mm RAIL 4mm THICK

FIGURE A-12. MACHINING ARM ASSEMBLY PARTS LIST (P/N 72676)



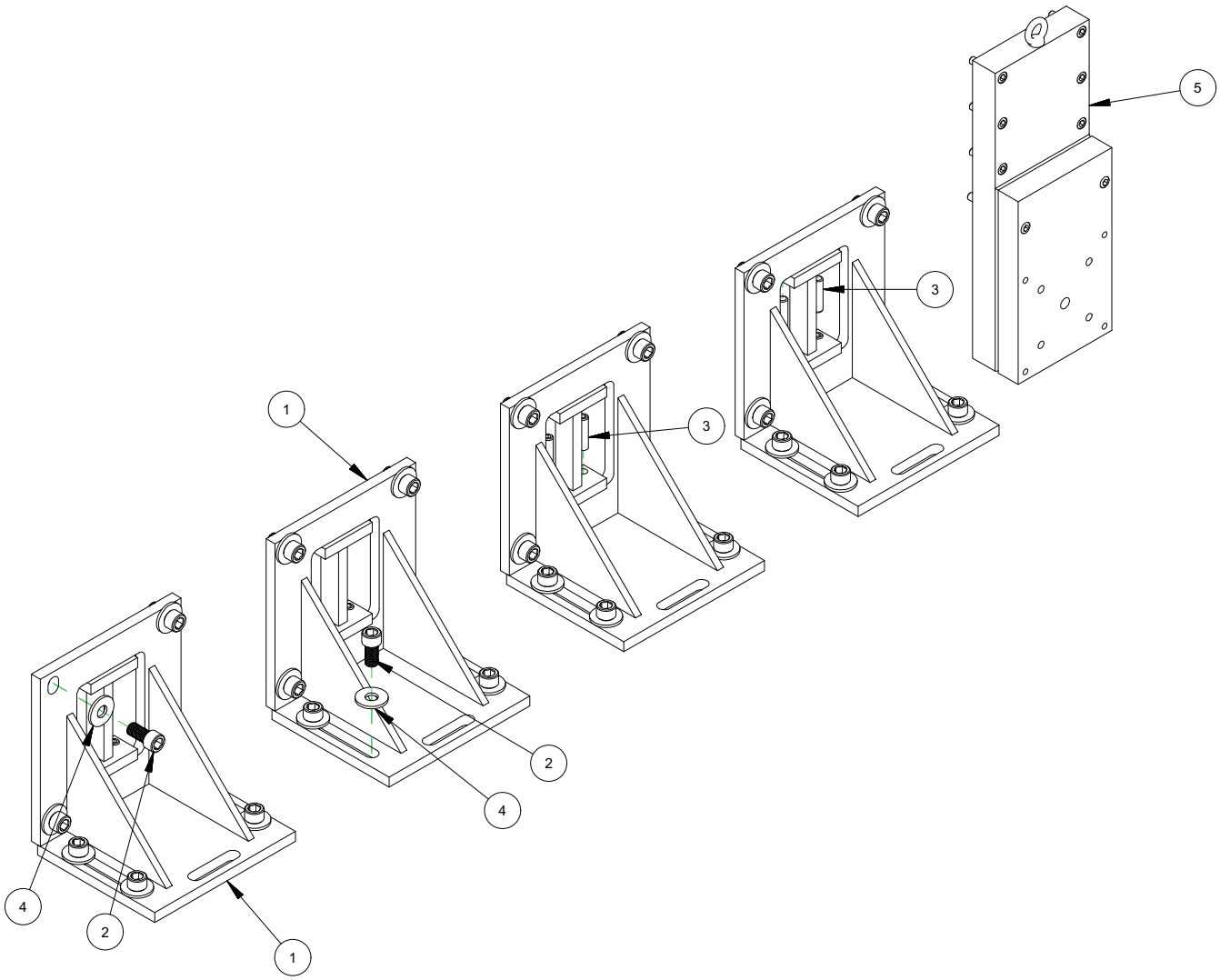
PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	4	11832	PIN DOWEL 1/2 DIA X 1-1/2
2	6	42094	SCREW M12 X 1.75 X 25mm SHCS
3	1	62921	PLATE MILL TRAMMING CM6200
4	1	63557	PIN DOWEL 3/4 DIA X 1-1/4

FIGURE A-13. MACHINING ARM MILLING HEAD TRAM ASSEMBLY (P/N 63124)



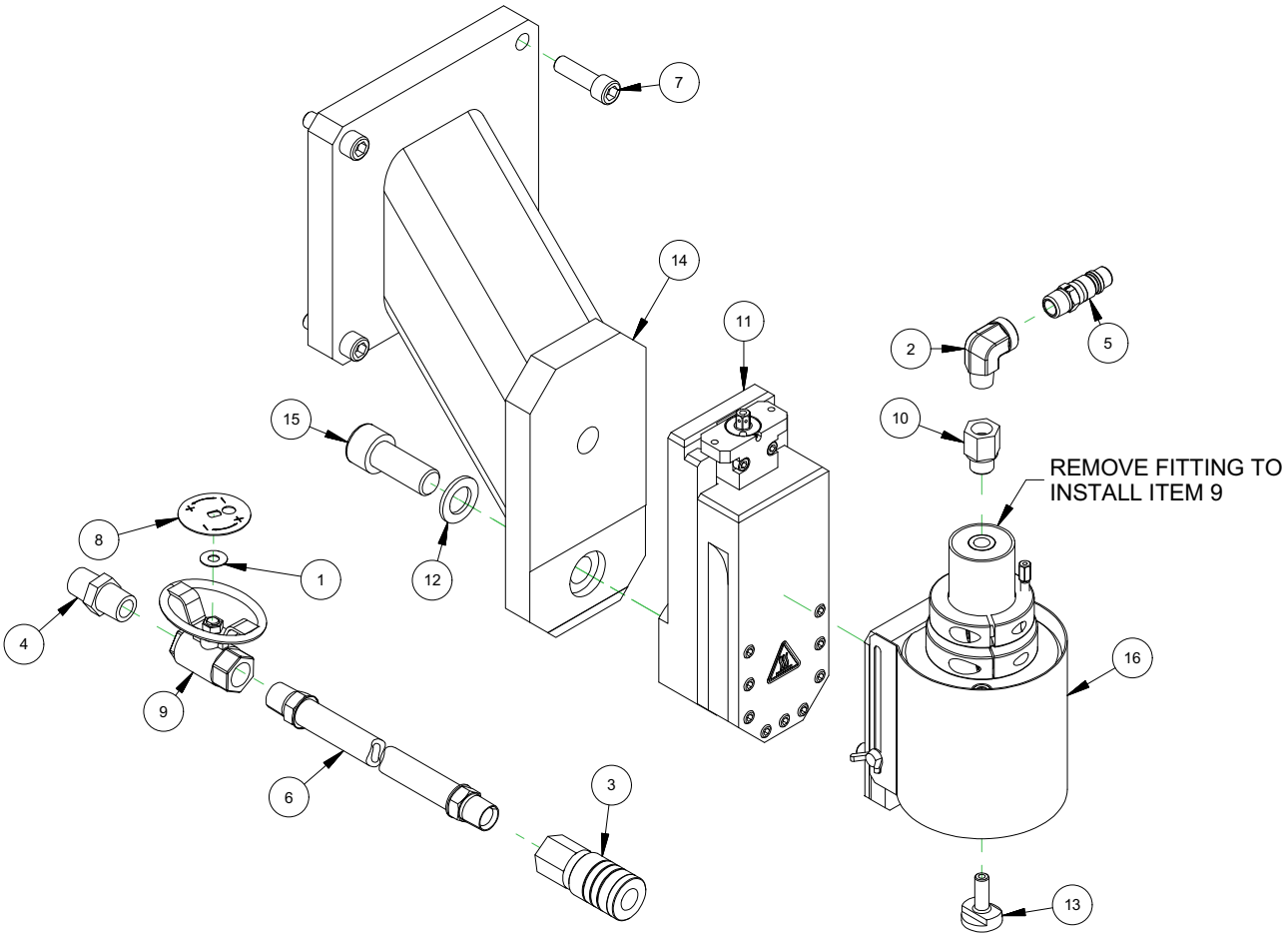
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
2	1	29152	PLATE MASS CE
4	2	43001	HOIST SWIVEL RING M12 X 1.75 1050 KG
5	8	57888	WASHER FIXTURING 21MM ID X 35MM OD X 3MM CASE HARDENED
6	4	58743	SCREW M20 X 2.5 X 55mm SHCS
7	3	59039	LABEL WARNING LIFT POINT ROUND 1.5"
8	1	62059	ARM COUNTERWEIGHT CM6200
9	1	62060	COUNTERWEIGHT CM6200
10	3	62888	LABEL DANGER PART LIFT POINT ONLY 2 X 3
11	2	64156	LABEL COUNTERWEIGHT & ARM POSITION CM6200
13	4	40459	SCREW M20 X 2.5 X 50 mm SHCS
14	1	70229	LABEL CLIMAX LOGO 4.75 X 18

FIGURE A-14. COUNTERWEIGHT ARM ASSEMBLY (P/N 62031)



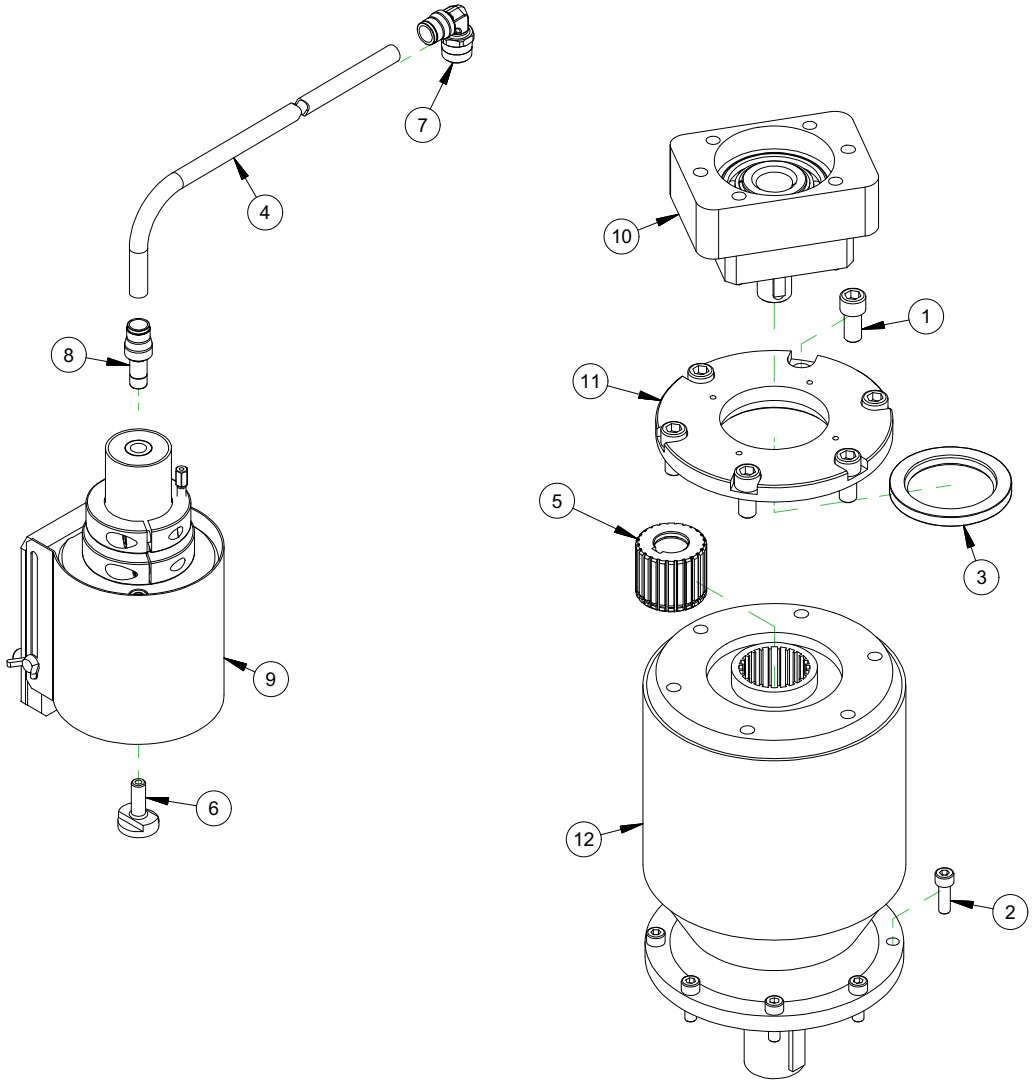
5	1	65840	ASSY EXTENSION MILLING HEAD
4	32	12339	WASHER 3/4 FLATW
3	16	57348	SCREW M16 X 2 X 60mm SSSFP
2	32	58203	SCREW M20 X 2.5 X 40MM SHCS
1	4	62887	BRACKET FACE MOUNT CM6200
ITEM	QTY	PART No.	DESCRIPTION
PARTS LIST			

FIGURE A-15. FACE MOUNT ASSEMBLY (P/N 63106)



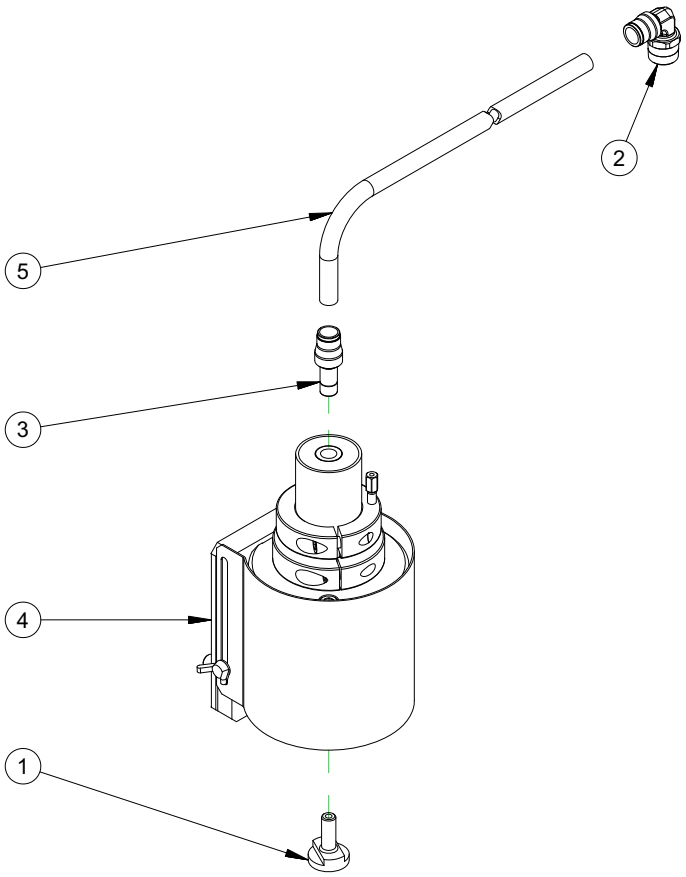
PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	1	10770	WASHER THRUST .75 OD X .312 ID X .03
2	1	11132	FTG ELBOW 3/8 NPTM X 3/8 NPTF STREET 90 DEG
3	1	13208	FTG QUICK COUPLER 1/2B 1/2NPTF FEMALE AIR
4	1	14704	FTG NIPPLE 1/2NPTM CLOSE HEX
5	1	16615	FTG QUICK COUPLER 1/2B 3/8 NPTM MALE AIR
6	1	32196	HOSE ASSY 801 1/2 X 1/2 NPTMS ENDS X 180
7	4	35215	SCREW M12 X 1.75 X 40mm SHCS
8	1	35772	LABEL DIRECTION OVAL HANDLE BALL VALVE
9	1	36328	VALVE BALL 1/2NPTF OVAL HANDLE
10	1	52734	FTG ADPTER 3/8 BSPP MALE X 3/8 NPTF
11	1	57781	TOOL HEAD ASSY FF LINE
12	1	57888	WASHER FIXTURING 21MM ID X 35MM OD X 3MM CASE HARDENED
13	1	62624	ARBOR GRINDING WHEEL CBN 10MM SHANK M8 THREAD
14	1	62984	ADAPTER SINGLE POINT TOOL HEAD TO MILLING ARM
15	1	63018	SCREW M20 X 1.5 X 50MM SHCS
16	1	63063	ASSY GRINDING ATTACHMENT

FIGURE A-16. GRINDING ATTACHMENT W/TOOL HEAD ASSEMBLY (P/N 63239)



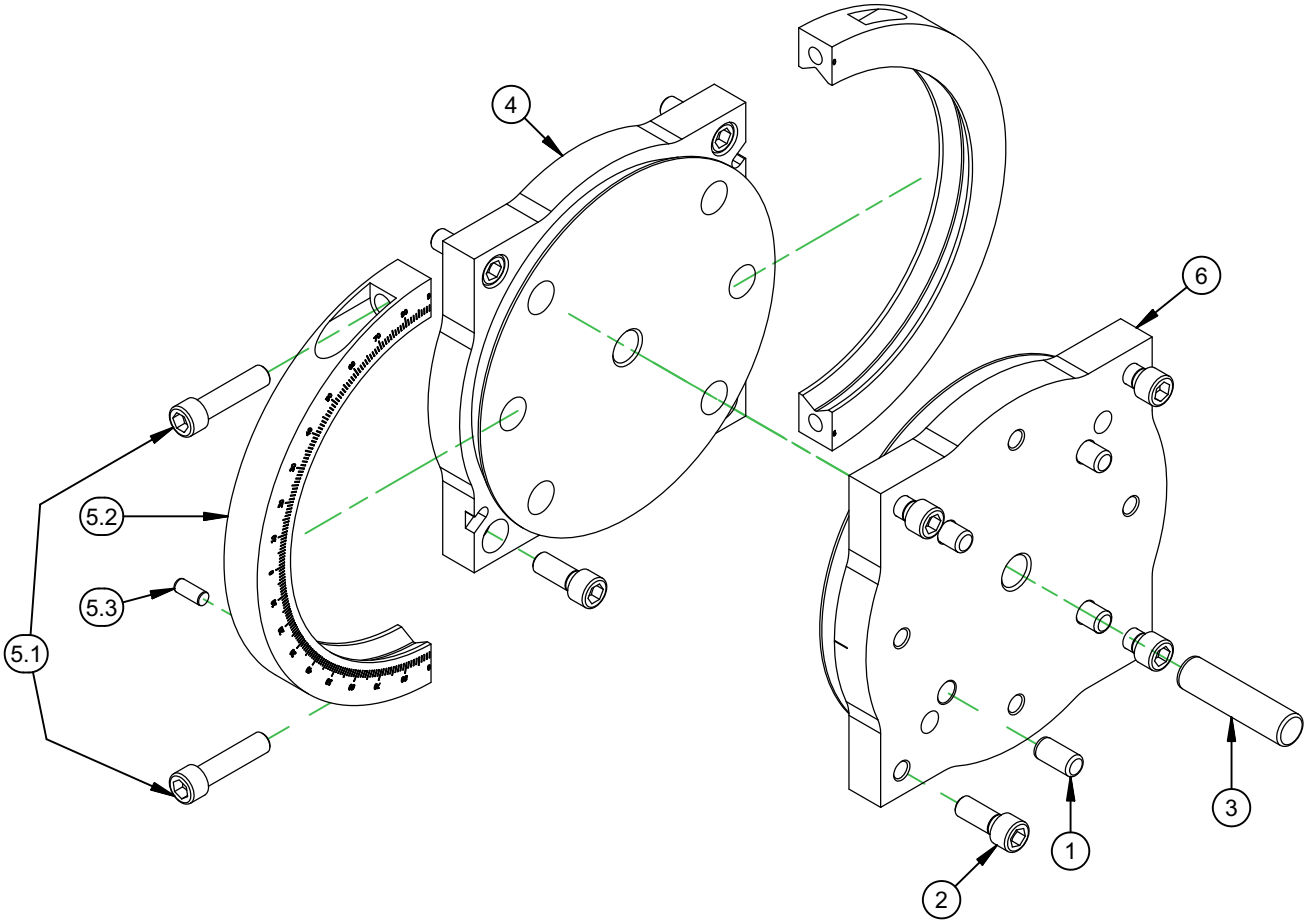
PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	6	42094	SCREW M12 X 1.75 X 25mm SHCS
2	8	42494	SCREW M8 X 1.25 X 25mm SHCS
3	1	44964	SEAL OIL 60 x 85 x 8 DOUBLE LIP
4	130	48281	TUBING PARFLEX 1/2 OD X 3/8 ID POLYURETHANE BLACK X 130"
5	1	51928	SPLINE COUPLING BREVINI
6	1	62624	ARBOR GRINDING WHEEL CBN 10MM SHANK M8 THREAD
7	1	62681	FTG ELBOW 1/2 NPTM x 1/2 O.D. PRESTOLOK TUBING
8	1	62682	FTG ADAPTER 12MM TUBE X 1/2 PRESTOLOK TUBING
9	1	63063	ASSY GRINDING ATTACHMENT
10	1	63072	ASSY TORQUE LIMITER 24 MM OUTPUT
11	1	63714	FLANGE ADAPTER BREVINI UNIVERSAL TO NEMA 42
12	1	63731	REDUCER 162.8:1 PLANETARY

FIGURE A-17. GRINDER FOR SP CM6200 WITH GEAR REDUCER ASSEMBLY (P/N 63240)



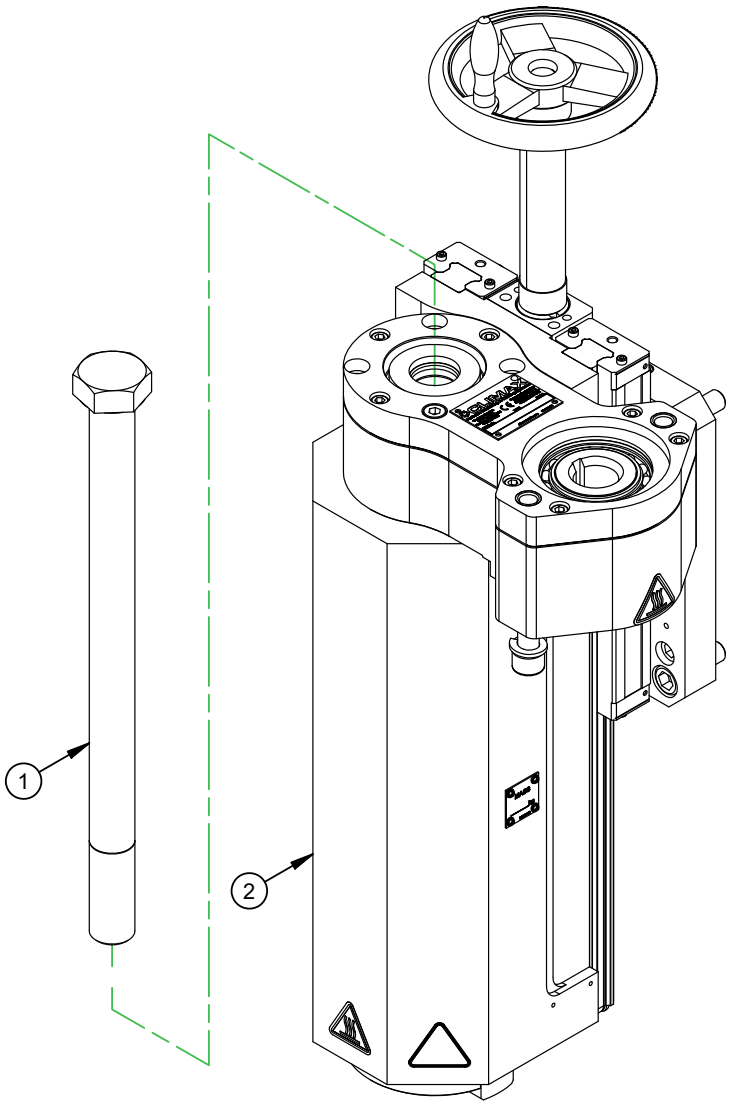
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	62624	ARBOR GRINDING WHEEL CBN 10MM SHANK M8 THREAD
2	1	62681	FTG ELBOW 1/2 NPTM x 1/2 O.D. PRESTOLOK TUBING
3	1	62682	FTG ADAPTER 12MM TUBE X 1/2 PRESTOLOK TUBING
4	1	63063	ASSY GRINDING ATTACHMENT
5	130IN	79025	TUBING PARFLEX 1/2 OD X .328 ID POLYURETHANE BLACK

FIGURE A-18. GRINDER FOR SP PNEUMATIC (P/N 62537)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	20398	PIN DOWEL 1/2 DIA X 1
2	8	40697	SCREW M12 X 1.75 X 30mm SHCS
3	1	46981	PIN DOWEL 3/4 DIA X 3
4	1	53624	PLATE SWIVEL MILLING HEAD RAM SIDE
5.1	2	64281	SCREW M12 X 1.75 X 50MM SHCS
5.2	1	74224	RING CLAMP SWIVEL PLATE MILLING HEAD METRIC
5.3	1	16540	PIN DOWEL 5/16 DIA X 3/4
6	1	74250	PLATE SWIVEL MILLING HEAD QUILL SIDE METRIC

FIGURE A-19. PLATE SWIVEL MILLING HEAD ASSEMBLY (P/N 63250)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	62330	DRAWBOLT 1"-8 X 14.5 (INCH NMTB)
		62331	DRAWBOLT M24X3 X 14.5 (METRIC NMTB)
		62845	DRAWBOLT 1"-8 X 15.5 (INCH V-FLANGE)
		62846	DRAWBOLT M24X3 X 15.5 (METRIC V-FLANGE)
2	1	72277	MILLING HEAD 2-29/32 BRG 8 STROKE #50 TAPER

COMPLETE ASSY (MILLING HEAD W/DRAWBOLT)	
P/N	CONFIGURATION
62282	MILLING HEAD 8 STROKE #50 TAPER INCH NMTB
62734	MILLING HEAD 8 STROKE #50 TAPER INCH V-FLANGE
62644	MILLING HEAD 8 STROKE #50 TAPER METRIC NMTB
62735	MILLING HEAD 8 STROKE #50 TAPER METRIC V-FLANGE

FIGURE A-20. MILLING HEAD AND DRAWBOLT ASSEMBLY (P/N 73354)

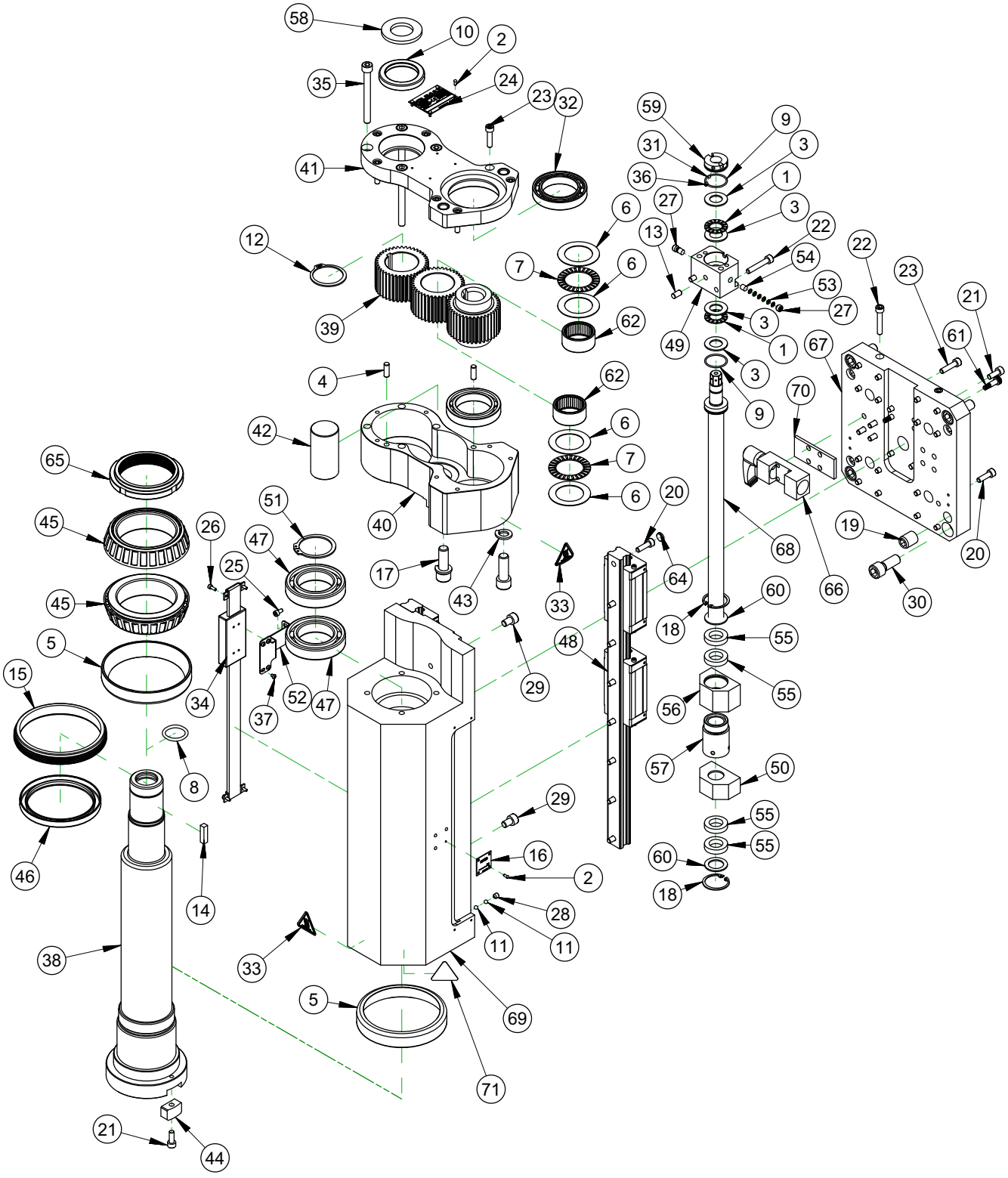


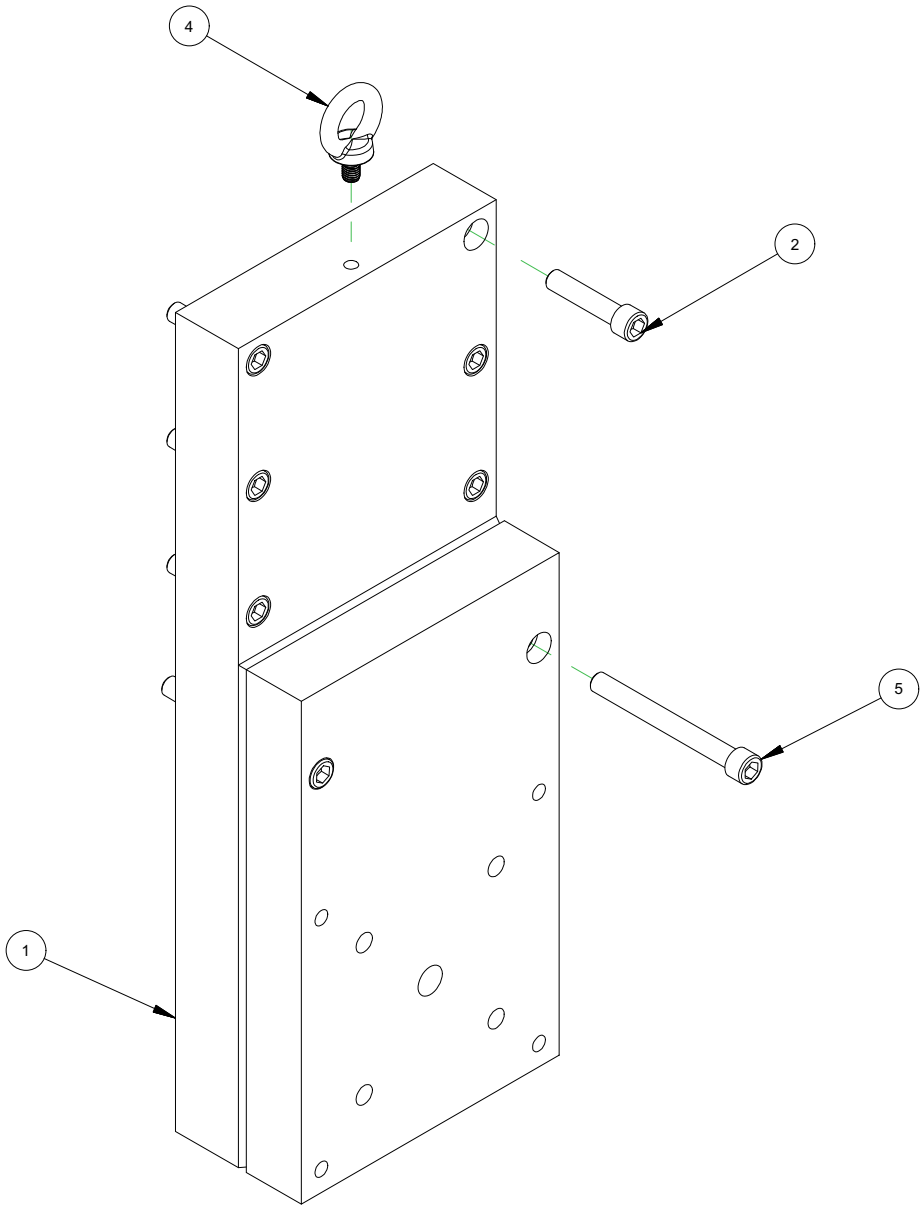
FIGURE A-21. MILLING HEAD 2-29/32 BRG 8 STROKE #50 TAPER (P/N 72277)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	10538	BRG THRUST .625 ID X 1.125 OD X .0781
2	8	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
3	4	11165	WASHER THRUST .625 ID X 1.125 OD X .060
4	2	11729	PIN DOWEL 1/4 DIA X 3/4
5	2	11821	BRG CUP 4.4375 OD X .750 WIDE
6	4	15326	WASHER THRUST 1.375 ID X 2.062 OD X .030
7	2	15327	BRG THRUST 1-375 ID X 2.062 OD X .0781
8	1	15509	RING O 1/8 X 1 ID X 1-1/4 OD
9	2	15731	RING O 1/16 X 1 ID X 1-1/8 OD
10	1	15768	SEAL 1.625 ID X 2.250 OD X .313
11	4	16594	BALL NYLON 3/16 DIA
12	1	19505	RING SNAP 1-5/8 OD .062 WIDE
13	1	20166	PIN DOWEL 1/4 DIA X 1/2
14	1	20273	KEY 1/4 SQ X 1.00 SQ BOTH ENDS
15	1	28219	NUT MAIN BRG PRELOAD
16	1	29152	PLATE MASS CE
17	2	30207	SCREW M12 X 1.75 X 35mm SHCS
18	2	33777	RING SNAP 1-3/16 ID (30MM)
19	4	34643	SCREW M16 X 1.5 X 20mm SSSFP
20	32	35009	SCREW M6 X 1.0 X 20 SHCS
21	6	35014	SCREW M6 X 1.0 X 16mm SHCS
22	4	35504	SCREW M6 X 1.0 X 35mm SHCS
23	11	35652	SCREW M6 X 1.0 X 25 SHCS
24	1	35828	PLATE SERIAL YEAR MODEL CE 1.5 X 2.0
25	2	35910	SCREW M4 X 0.7 X 8MM SHCS
26	4	35994	SCREW M3 X 0.5 X 8mm SHCS
27	2	36087	SCREW M8 X 1.25 X 6MM SSSFP
28	2	36150	SCREW M6 X 1.0 X 6mm SSSCP
29	2	36545	SCREW M8 X 1.25 X 12mm
30	4	40697	SCREW M12 X 1.75 X 30mm SHCS
31	2	43489	BALL NYLON 1/8 DIA
32	2	46352	BRG BALL 1.7717 ID X 2.6772 OD X .4724 W/ 2 SEALS
33	2	46902	LABEL WARNING HOT SURFACE GRAPHIC 2.25 TRI
34	1	51859	SCALE DIGITAL 8 INCH VERTICAL MOUNT
35	4	52936	SCREW M8 X 1.25 X 80MM SHCS

FIGURE A-22. MILLING HEAD ASSEMBLY PARTS LIST 1 (P/N 72277)

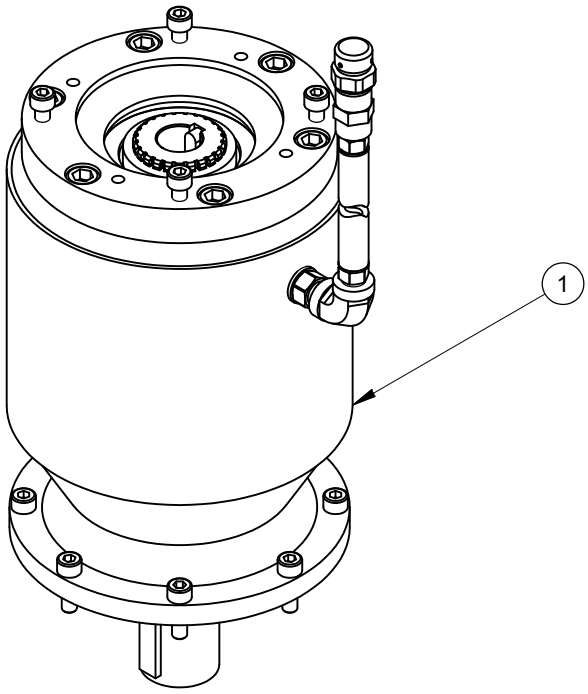
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
36	2	53365	SCREW M4 X 0.7 X 4 mm SSSFP
37	4	54024	SCREW M3 X 0.5 X 4MM BHSCS
38	1	60462	SPINDLE BLOCK 2.75 BRG 8 STROKE #50 TAPER
39	1	60467	GEAR SET 40T 16DP 2.5PD THREE GEARS BLOCK SPINDLE 2.75 BRG
40	1	60468	HOUSING GEARBOX BLOCK SPINDLE 2.75 BRG
41	1	60469	COVER GEARBOX BLOCK SPINDLE 2.75 BRG
42	1	60470	SHAFT GEAR BLOCK SPINDLE 2.75 BRG
43	2	60702	WASHER SPLIT LOCK M12
44	2	60704	LUG DRIVE #50 TAPER BLOCK SPINDLE
45	2	60705	BRG CONE 2.75 ID X 1.00 WIDE
46	1	60706	SEAL 3.25 ID X 4.000 OD X .375
47	2	60793	BRG BALL 1.7717 ID X 2.9528 OD X .6299
48	2	62255	SLIDE RAIL THK SHS25 442MM LG PRELOADED METAL SCRAPERS 2 BLOCKS
49	1	62281	BEARING BLOCK BALLSCREW 20MM
50	1	62321	HOLDER FELT WIPER MILLING HEAD
51	1	62322	RING SNAP 1.771 OD (45MM)
52	1	62324	BRACKET DRO BLOCK SPINDLE 2.75 BRG
53	12	62376	WASHER SPRING BELLEVILLE 1/8 ID X 1/4 OD X .013 THK
54	2	62378	ROD POLYURETHANE 1/4 DIA X 1/4 LENGTH 95 SHORE A
55	4	62379	SEAL FELT 16MM BALL SCREW 1.015 OD MILLING HEAD
56	1	62423	MOUNT BALL NUT MILLING HEAD
57	1	62426	BALL SCREW NUT 20MM X 5MM LEAD 33 MM OD EICHENBERGER ROUND
58	1	62696	WASHER 1 FLTW ASTM F436
59	1	62898	BRG RETAINING NUT 5/8-18 O-RING SEAL SETSCREW LOCK
60	2	62903	WASHER SHIM .75 ID 1.125 OD .062 THICK STEEL
61	2	62909	SCREW 6MM DIA X 12MM X M5 X 0.8 SHLDCS
62	2	63437	BRG NEEDLE 1-3/8 ID X 1-5/8 OD X .750 OPEN
63	1	63927	HANDWHEEL ASSY Z-AXIS (NOT SHOWN)
64	16	68501	CAP RAIL 25MM METAL THK SHS
65	1	68623	NUT LOCKING MODIFIED 2.751-18 FLEXIBLE INSERT LOCKING
66	1	72262	ZIMMER BRAKE 25mm RAIL
67	1	72279	PLATE MOUNTING BLOCK SPINDLE 2.75 BRG
68	1	72283	BALL SCREW MILLING HEAD 2.75 BRG 8" STROKE
69	1	72652	HOUSING SPINDLE 2.9062 BRG 8 STROKE
70	1	72869	ADAPTER BRAKE 25mm RAIL 4mm THICK
71	1	80510	LABEL WARNING CUTTING OF FINGERS/ROTATING BLADE

FIGURE A-23. MILLING HEAD ASSEMBLY PARTS LIST 2 (P/N 72277)



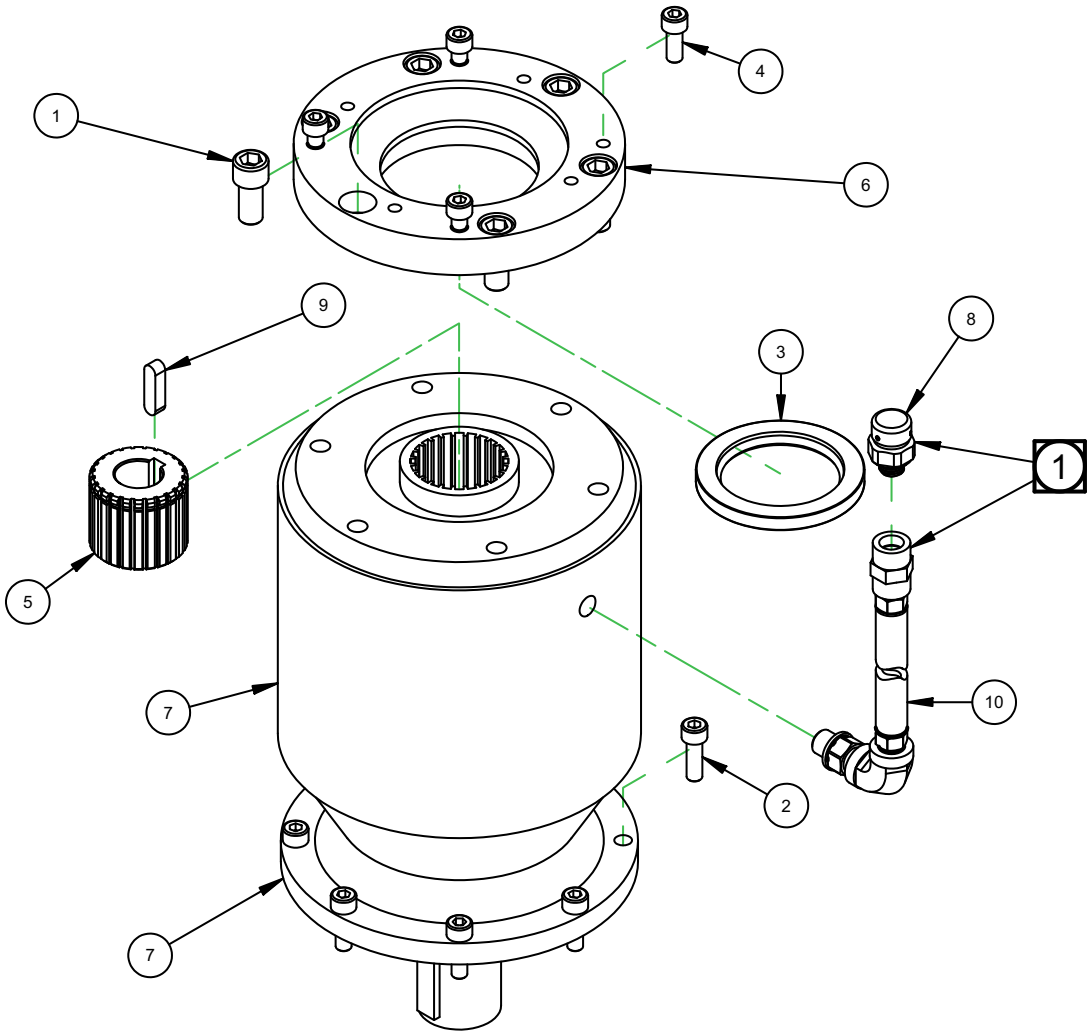
5	2	61164	SCREW M12 X 1.75 X 110 MM SHCS
4	1	59625	BOLT EYE M10 X 1.5 X 17MM LG
2	6	46078	SCREW M12 X 1.75 X 55 SHCS
1	1	65839	EXTENSION MILLING HEAD
ITEM	QTY	PART No.	DESCRIPTION
PARTS LIST			

FIGURE A-24. MILLING HEAD EXTENSION ASSEMBLY (P/N 65840)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	62032	ASSY SERVO DRIVE GEARBOX CM6200

FIGURE A-25. SERVO DRIVE ASSEMBLY (P/N 83156)



NOTE:

[1] REMOVE BREATHER SUPPLIED WITH GEARBOX, INSTALL VENT LINE ASSY 69351, AND ASSEMBLE TO END FITTING

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	6	42094	SCREW M12 X 1.75 X 25mm SHCS
2	8	42494	SCREW M8 X 1.25 X 25mm SHCS
3	1	44964	SEAL OIL 60 x 85 x 8 DOUBLE LIP
4	4	50458	SCREW M8 X 1.25 X 20mm SHCS
5	1	51928	SPLINE COUPLING BREVINI
6	1	51930	FLANGE ADAPTER 110mm PILOT SPECIAL DRILLING
7	1	63731	REDUCER 162.8:1 PLANETARY
8	1	-	FACTORY SUPPLIED BREATHER
9	1	68823	KEY 8mm X 7mm X 30mm RADIUS BOTH ENDS
10	1	69351	ASSY GEARBOX VENT LINE

FIGURE A-26. SERVO DRIVE GEARBOX ASSEMBLY (P/N 62032)

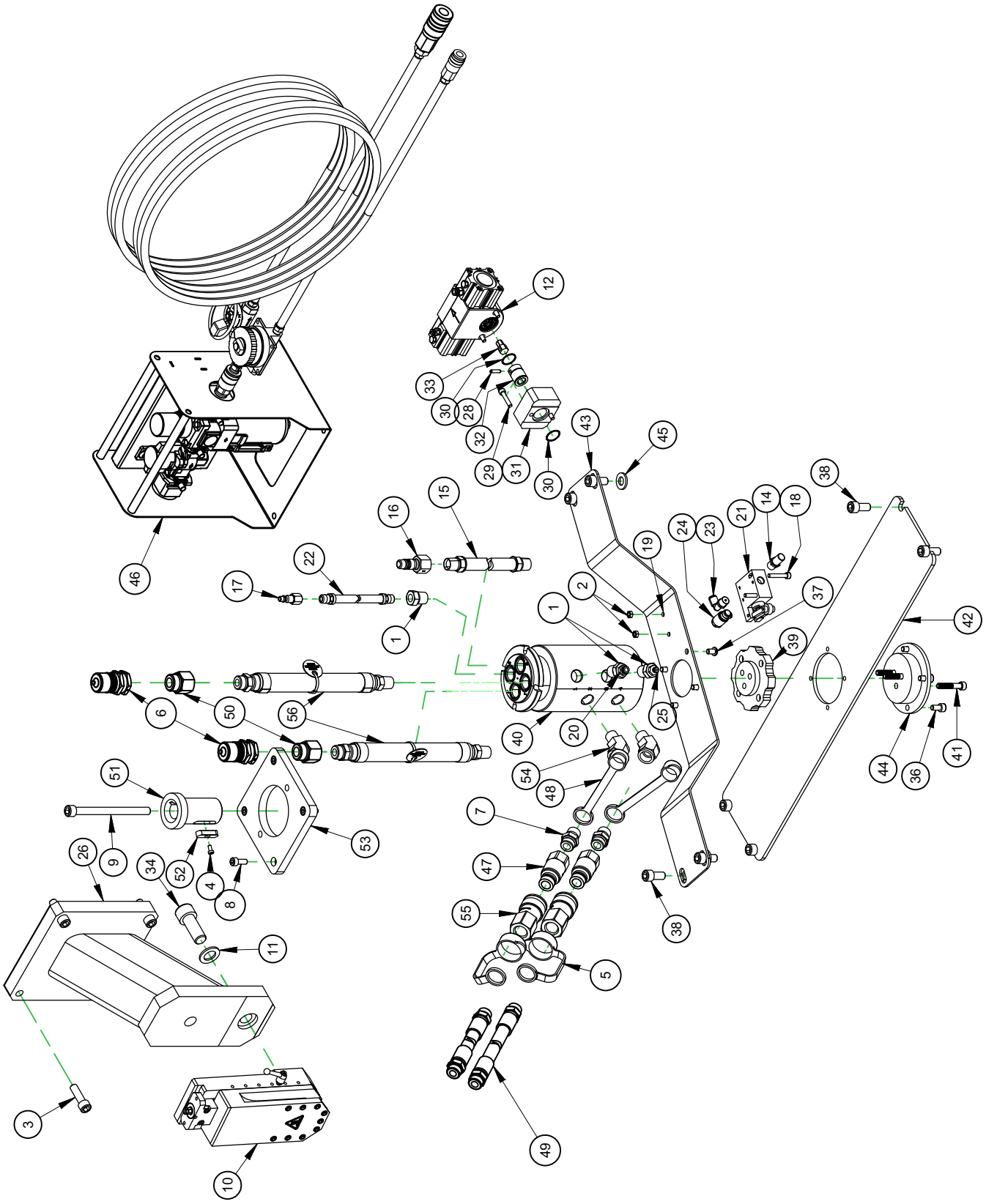


FIGURE A-27. SINGLE POINT EU ASSEMBLY (P/N 83100)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	3	12920	FTG REDUCER BUSHING 1/2 NPTM X 1/4 NPTF STEEL
2	2	20772	NUT M6 X 1.0 STDN ZINC PLATED
3	4	35215	SCREW M12 X 1.75 X 40mm SHCS
4	1	35916	SCREW M5 X 0.8 X 10MM SHCS
5	2	39241	DUST CAP 1/2 COUPLER 1SO 16028
6	2	40612	FTG QD NIPPLE 3/4B X SAE-12F
7	2	46944	FTG ADAPTER 1/2 NPTF MALE X 7/8-14 W/ O-RING
8	4	50458	SCREW M8 X 1.25 X 20mm SHCS
9	1	50907	SCREW M12 X 1.75 X 150mm SHCS
10	1	57781	TOOL HEAD ASSY FF LINE
11	1	57888	WASHER FIXTURING 21MM ID X 35MM OD X 3MM CASE HARDENED
12	1	58671	FEED BOX PNEUMATIC REMOTE FEED ADJUST
13	1	59244	PLUMBING PNEUMATIC FEED ASSY
14	1	13641	FTG MUFFLER 1/4 NPTM
15	1	15625	HOSE ASSY 801 1/2 X 1/2 NPTMS ENDS X 12
16	1	24851	FTG QUICK COUPLER 1/2B 1/2 NPTF MALE AIR
17	1	28493	QUICK COUPLER 1/4B MALE 1/4 NPTF
18	2	35504	SCREW M6 X 1.0 X 35mm SHCS
19	2	35891	WASHER M6 FLTW DIN 125
20	1	51263	FTG ADAPTER 1/4 NPTM X 1/4 TUBE F PRESTOLOCK NICKEL PLATED
21	1	59318	VALVE 2-POSITION 3-WAY NORMALLY OPEN
22	1	59341	HOSE ASSY 801 1/4 X 1/4 NPTM ENDS X 12
23	1	59342	FTG ELBOW 1/4 NPTMS X 1/4 TUBE F PRESTOLOCK NICKEL PLATED
24	1	60669	VALVE 1/4 NPTM X 1/4 TUBE F PRESTOLOCK FLOW CONTROL RIGHT ANGLE METERED AT 5 SCFM
25	1	63083	FTG ADAPTER 1/8 TUBE F PRESTOLOCK X 1/4 NPTM STRAIGHT
26	1	62984	ADAPTER SINGLE POINT TOOL HEAD TO MILLING ARM
27	1	62994	ASSY ADAPTER FEEDBOX CM6200
28	1	10850	PIN ROLL 3/16 DIA X 3/4
29	2	35505	SCREW M6 X 1.0 X 30 SHCS
30	2	39074	RING SNAP 7/8 OD SPIRAL MED DUTY
31	1	62985	PLATE FEEDBOX ADAPTER CM6200
32	1	62986	SHAFT FEEDBOX ADAPTER INNER CM6200
33	1	62988	SHAFT FEEDBOX ADAPTER OUTER CM6200
34	1	63018	SCREW M20 X 1.5 X 50MM SHCS
35	1	63121	ASSY ROTARY UNION CM6200
36	4	13787	SCREW M8 X 1.25 X 16mm
37	4	21769	5/16-18 X 1/2 BHSCS
38	8	42094	SCREW M12 X 1.75 X 25mm SHCS
39	1	58039	CAM FEED
40	1	58751	UNION ROTARY HYDRAULIC 4 CHANNEL 1/2 NPTF PORTS MOD
41	3	59349	SCREW M8 X 1.25 X 45MM SHCS
42	1	62891	MOUNT ROTARY UNION CM6200
43	1	62893	RESTRAINT TORQUE ROTARY UNION CM6200
44	1	62894	SPACER ROTARY UNION CM6200
45	4	62978	WASHER M12 FLTW 27MM OD 3.1 MM THICK
46	1	63156	AIR CONTROL ASSY FOR PNEUMATIC FEED 50 FT
47	2	63427	FTG QD NIPPLE 1/2B ISO 16028 STYLE X SAE-10F
48	2	63428	DUST CAP QD NIPPLE 1/2B ISO 16028 STYLE RUBBER
49	2	63675	HOSE ASSY 451 1/2 X SAE-10M X 36 STRAIGHT FITTINGS CE
50	2	63682	FTG ADAPTER SAE-12M X SAE-10F
51	1	63774	ADAPTER SINGLE POINT DRIVE SHAFT
52	1	63782	KEY 8MM X 12MM X 40MM RADIUS BOTH ENDS WITH CB HOLE
53	1	63784	PLATE ADAPTER HYD MOTOR TO DRIVE ASSY
54	2	64901	FTG ELBOW 1/2 NPTM X 1/2 NPTF ST 45 DEG
55	2	69486	FTG QD COUPLER 1/2B ISO 16028 X SAE-10F
56	2	83120	HOSE ASSY 1/2" 451TC X SAE-10 TO 1/2 NPTM X 12 INCHES CE

FIGURE A-28. SINGLE POINT EU ASSEMBLY PARTS LIST (P/N 83100)

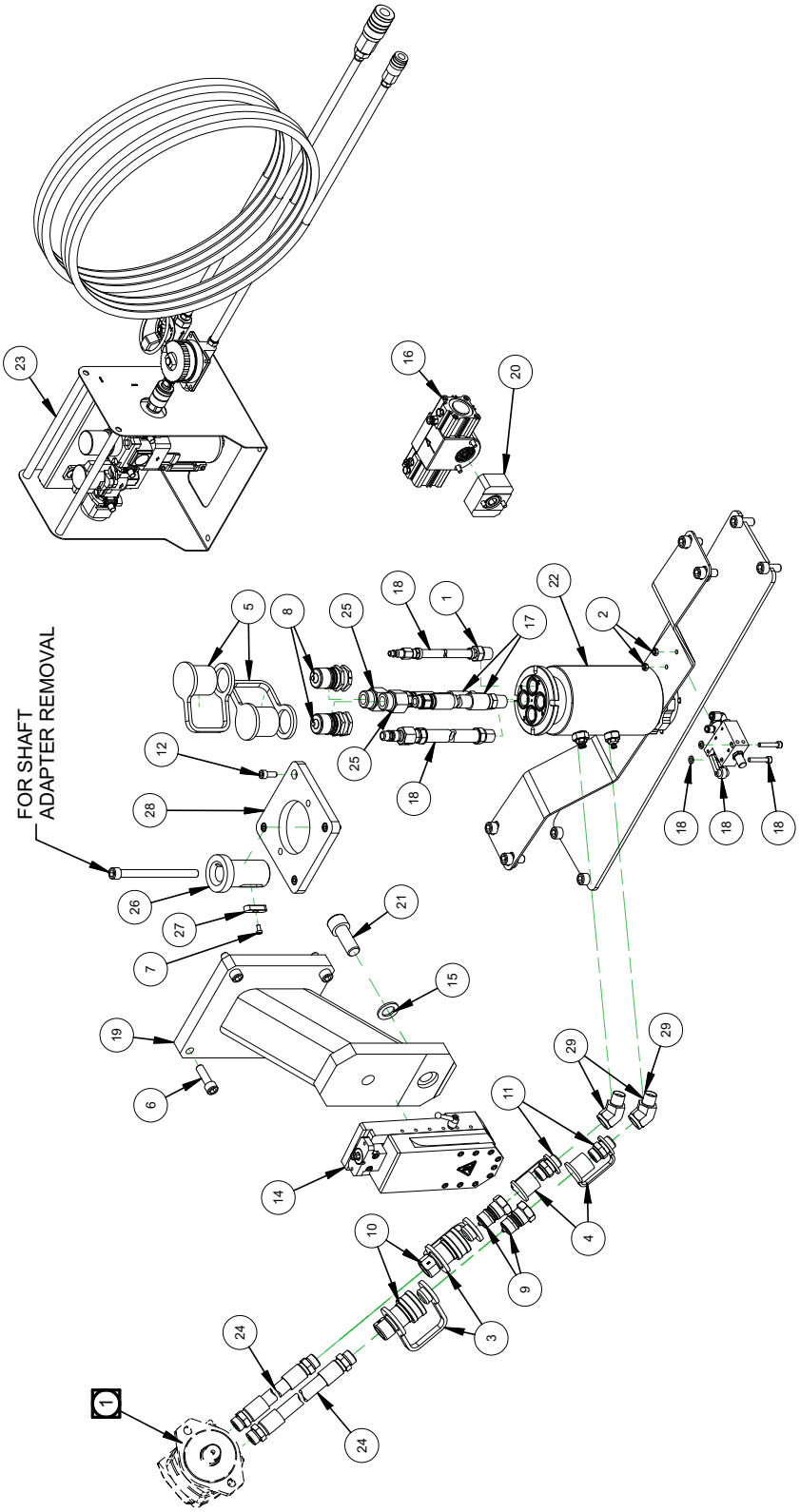
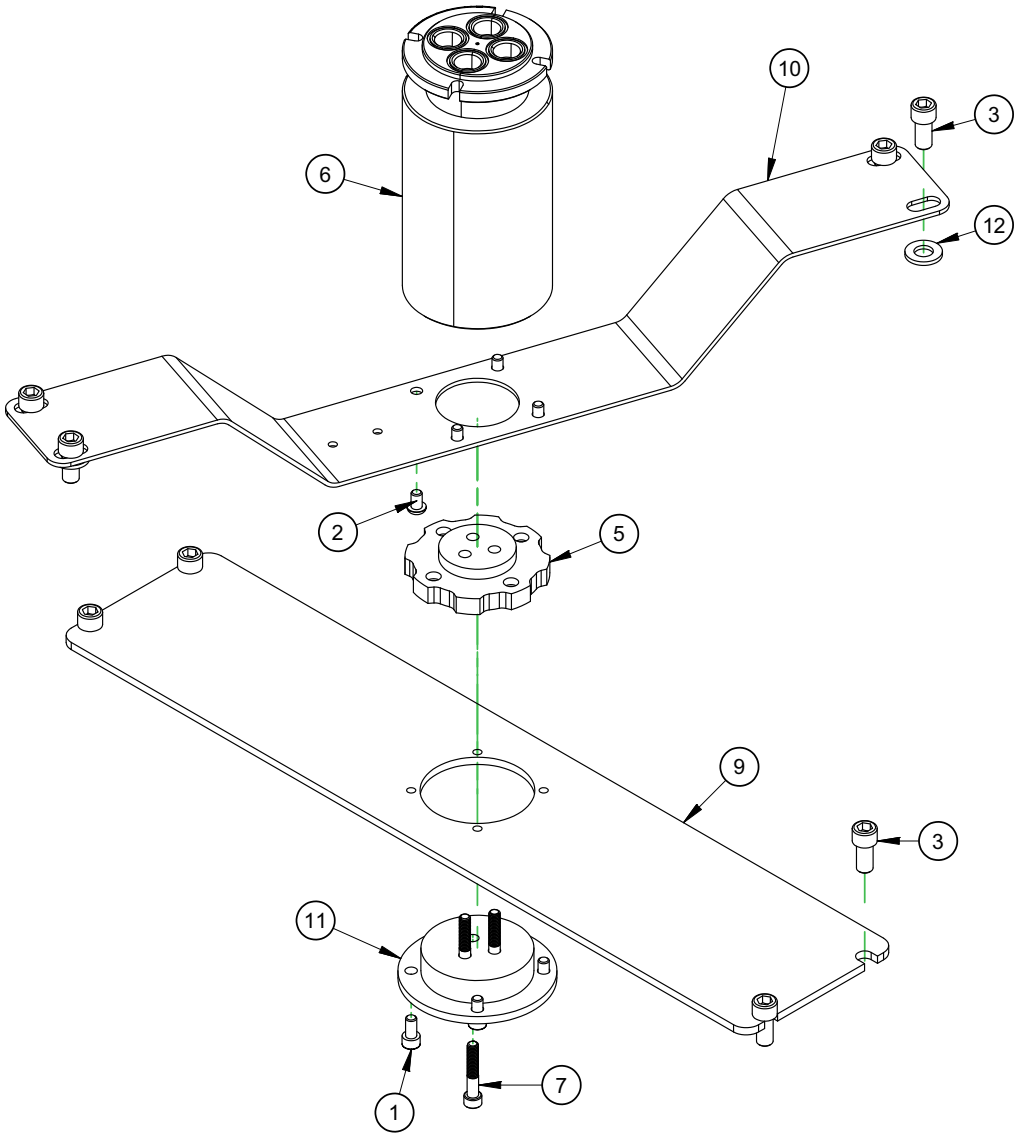


FIGURE A-29. SINGLE POINT ASSEMBLY (P/N 62037)

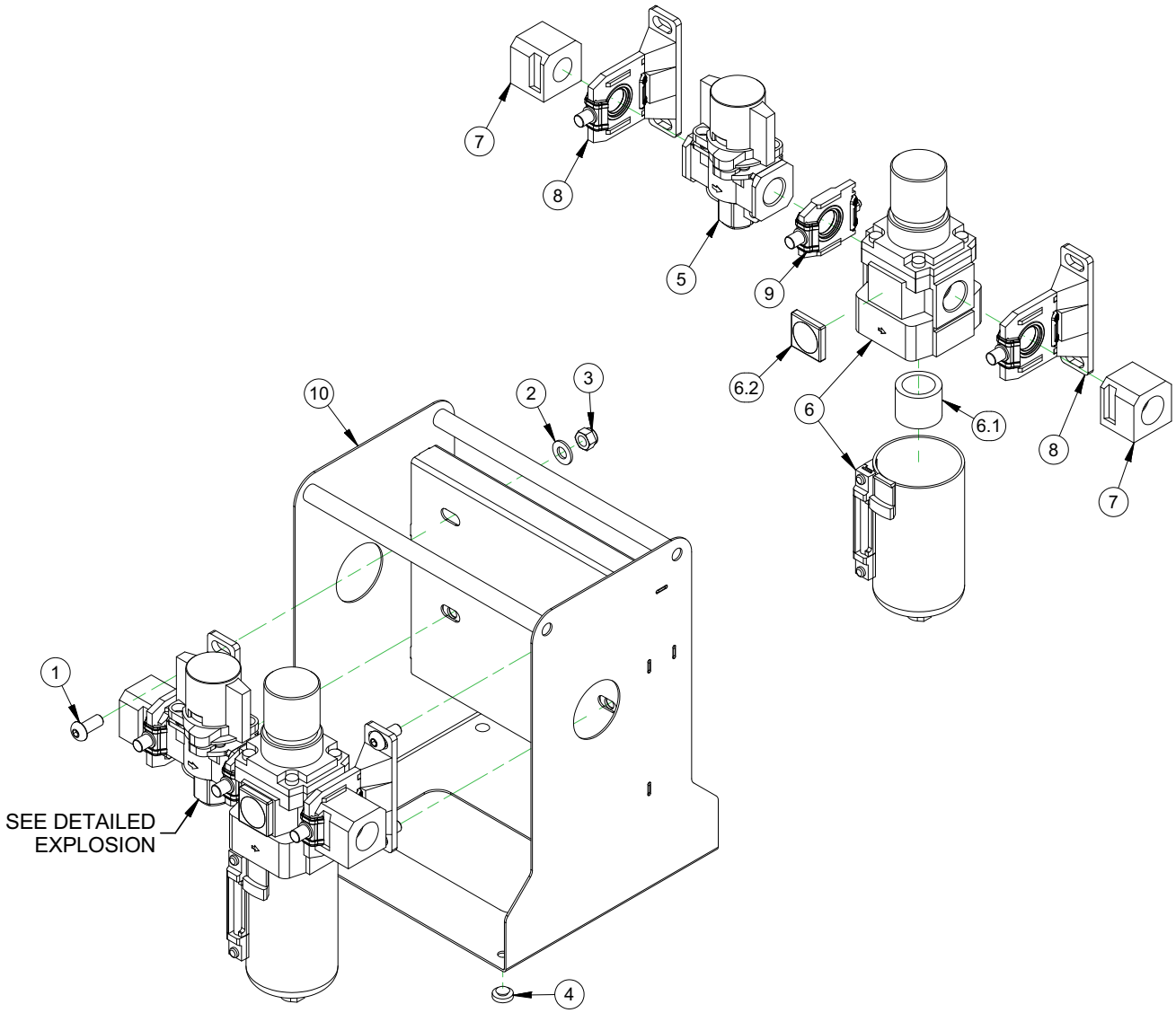
PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	3	12920	FTG REDUCER BUSHING 1/2 NPTM X 1/4 NPTF STEEL
2	2	20772	NUT M6 X 1.0 STDN ZINC PLATED
3	2	27977	FTG DUST PLUG 1/2 QD COUPLER
4	2	27978	FTG DUST CAP 1/2 MALE QUICK COUPLING
5	2	29561	FTG DUST CUP 60 SERIES 3/4 MALE QUICK CONNECT
6	4	35215	SCREW M12 X 1.75 X 40mm SHCS
7	1	35916	SCREW M5 X 0.8 X 10MM SHCS
8	2	40612	FTG QD NIPPLE 3/4B X SAE-12F
9	2	40614	FTG QUICK COUPLER MALE 1/2B X SAE-10F
10	2	40615	FTG QUICK COUPLER FEMALE 60 SERIES 1/2B X SAE-10F
11	2	46944	FTG ADAPTER 1/2 NPTF MALE X 7/8-14 W/ O-RING
12	4	50458	SCREW M8 X 1.25 X 20mm SHCS
13	1	50907	SCREW M12 X 1.75 X 150mm SHCS
14	1	57781	TOOL HEAD ASSY FF LINE
15	1	57888	WASHER FIXTURING 21MM ID X 35MM OD X 3MM CASE HARDENED
16	1	58671	FEED BOX PNEUMATIC REMOTE FEED ADJUST
17	2	59240	HOSE ASSY 451 1/2 X SAE-10M TO 1/2 NPTM X 12 STRAIGHT FITTINGS
18	1	59244	PLUMBING PNEUMATIC FEED ASSY
19	1	62984	ADAPTER SINGLE POINT TOOL HEAD TO MILLING ARM
20	1	62994	ASSY ADAPTER FEEDBOX CM6200
21	1	63018	SCREW M20 X 1.5 X 50MM SHCS
22	1	63121	ASSY ROTARY UNION CM6200
23	1	63156	AIR CONTROL ASSY FOR PNEUMATIC FEED 50 FT
24	2	63675	HOSE ASSY 451 1/2 X SAE-10M X 36 STRAIGHT FITTINGS CE
25	2	63682	FTG ADAPTER SAE-12M X SAE-10F
26	1	63774	ADAPTER SINGLE POINT DRIVE SHAFT
27	1	63782	KEY 8MM X 12MM X 40MM RADIUS BOTH ENDS WITH CB HOLE
28	1	63784	PLATE ADAPTER HYD MOTOR TO DRIVE ASSY
29	2	64901	FTG ELBOW 1/2 NPTM X 1/2 NPTF ST 45 DEG

FIGURE A-30. SINGLE POINT ASSEMBLY PARTS LIST (P/N 62037)



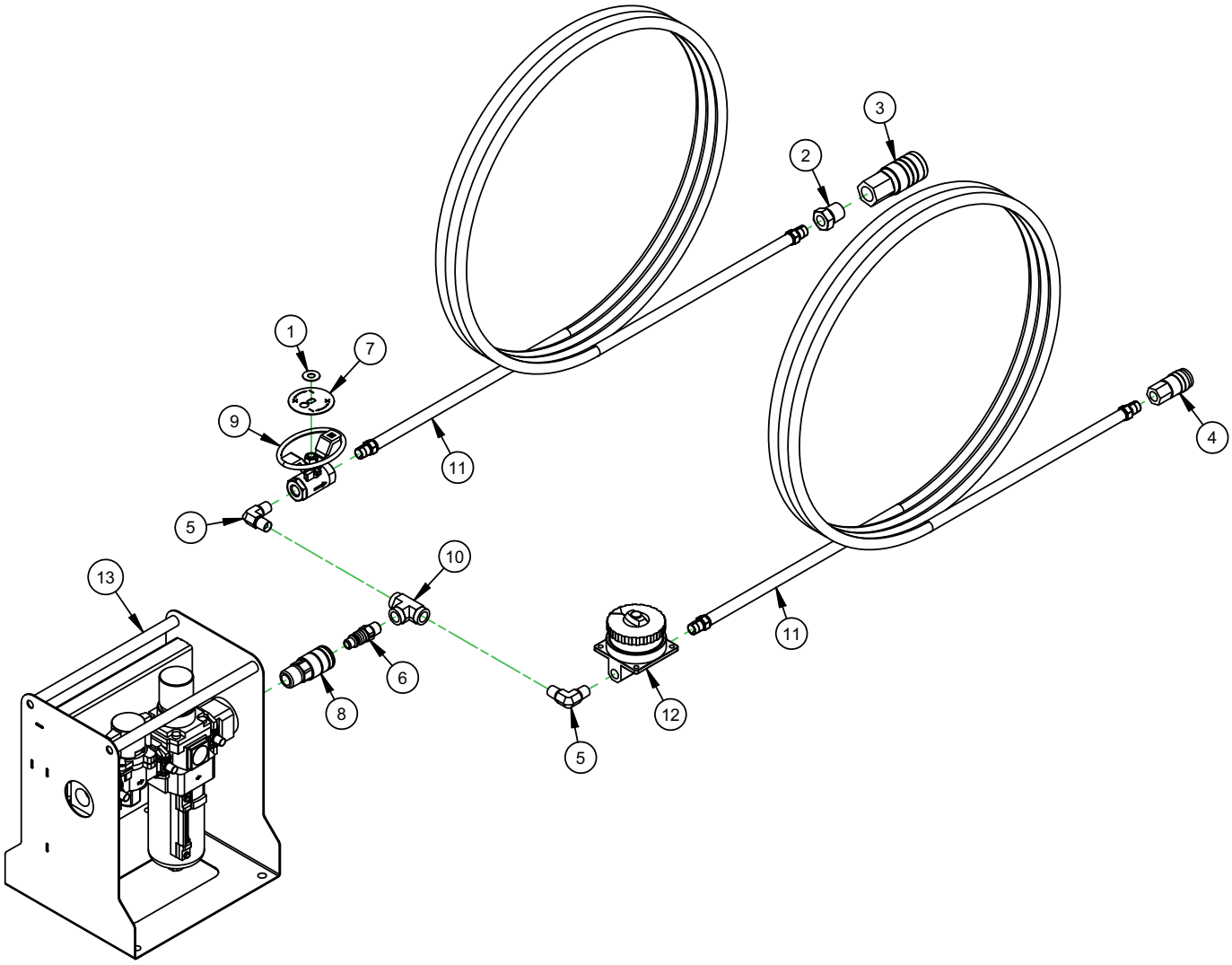
PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	13787	SCREW M8 X 1.25 X 16mm
2	4	21769	5/16-18 X 1/2 BHSCS
3	8	42094	SCREW M12 X 1.75 X 25mm SHCS
4	3	42494	(NOT SHOWN FOR OD CONFIG ONLY) SCREW M8 X 1.25 X 25MM SHCS
5	1	58039	CAM FEED
6	1	58751	UNION ROTARY HYDRAULIC 4 CHANNEL 1/2 NPTF PORTS MOD
7	3	59349	SCREW M8 X 1.25 X 45MM SHCS
8	4	60837	(NOT SHOWN FOR OD CONFIG ONLY) SCREW M8 X 1.25 X 16MM HHCS
9	1	62891	MOUNT ROTARY UNION CM6200
10	1	62893	RESTRAINT TORQUE ROTARY UNION CM6200
11	1	62894	SPACER ROTARY UNION CM6200
12	4	62978	WASHER M12 FLTW 27MM OD 3.1 MM THICK

FIGURE A-31. ROTARY UNION ASSEMBLY (P/N 63121)



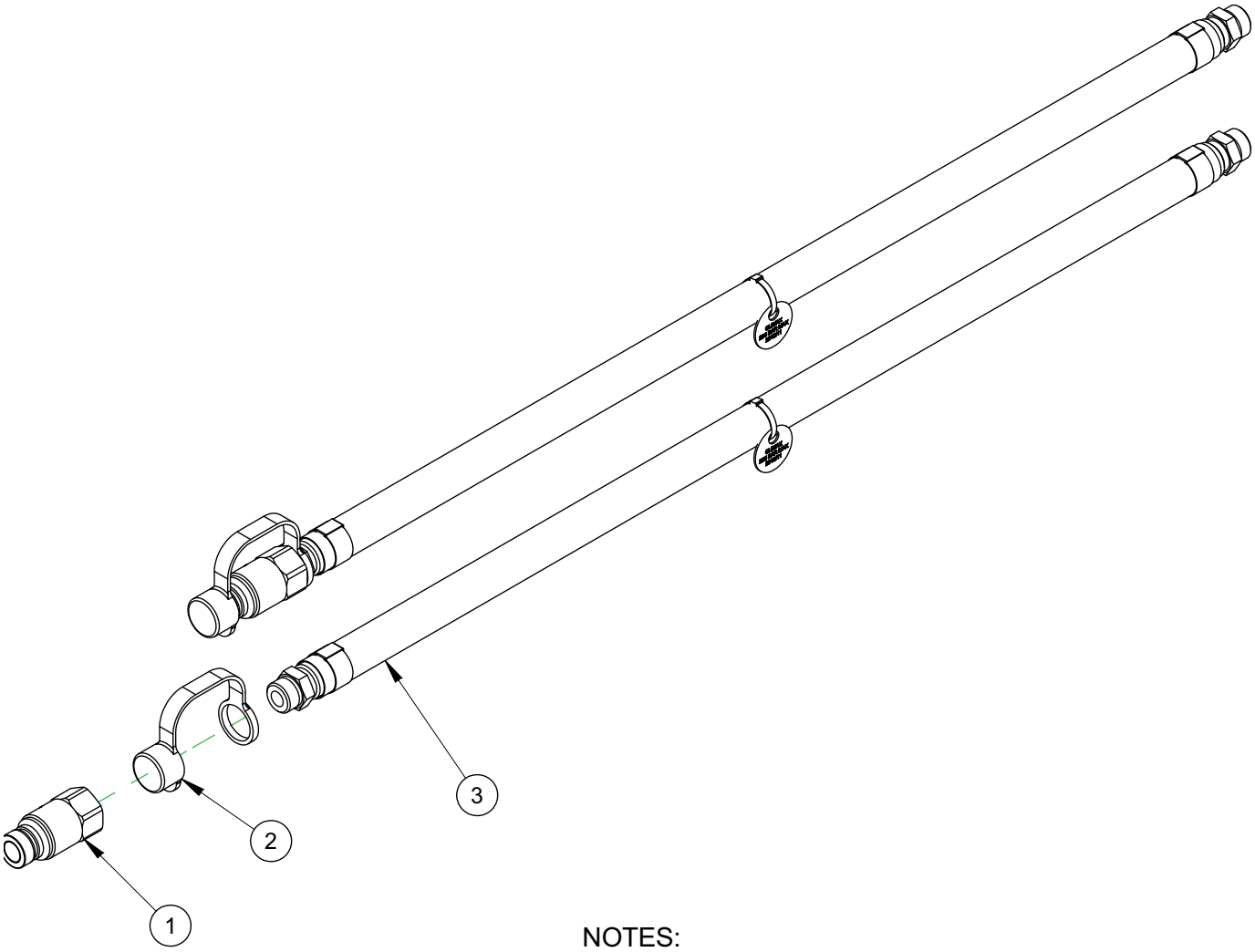
PARTS LIST					
ITEM	QTY	P/N:	DESCRIPTION	MANUFACTURER	MFG P/N
1	4	14771	5/16-18 X 3/4 BHSCS	N/A	N/A
2	4	13489	WASHER 5/16 FLTW SAE	N/A	N/A
3	4	19729	NUT 5/16-18 NYLON INSERT LOCKNUT	N/A	N/A
4	4	83462	RUBBER BUMPER, 9/16 DIA X 1/8 TALL	N/A	N/A
5	1	96732	SP VALVE ISOLATION/SHUTOFF WITH 1/2 INCH PORTS	SMC	VHS40-N04B-S-Z
6	1	96733	SP REGULATOR & FILTER W/ GAGE & SIGHT GLASS 7-125 PSI 1/2 PORTS	SMC	AW40-N04-8Z-B
6.1	1	96735	SP FILTER PNEUMATIC	SMC	AF40P-060S
6.2	1	97635	SP INDICATOR PRESSURE 1 MPA FOR SMC FRL	SMC	GC3-10AS-X2103
7	2	N/A	ADAPTER PIPE 1/2 INCH NPT FOR SMC SIZE 40 FRL	SMC	E400-N04-A
8	2	N/A	SPACER WITH BRACKET FOR SMC SIZE 40 FRL	SMC	Y400T-A
9	1	N/A	SPACER FOR SMC SIZE 40 FRL	SMC	Y400-A
10	1	97739	SHEET METAL FRAME FOR SMC PCU 1/2 INCH PORTS	N/A	N/A

FIGURE A-32. PNEUMATIC CONDITIONING UNIT (P/N 97742)



PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	1	10770	WASHER THRUST .75 OD X .312 ID X .03
2	1	12920	FTG REDUCER BUSHING 1/2 NPTM X 1/4 NPTF STEEL
3	1	13208	FTG QUICK COUPLER 1/2B 1/2NPTF FEMALE AIR
4	1	28494	FTG QUICK COUPLER 1/4B 1/4 NPTF FEMALE AIR
5	2	30502	FTG ELBOW 1/4 NPTM X 1/4 NPTM 90 DEG
6	1	30936	FTG QUICK COUPLER 3/8B 1/4 NPTM MALE AIR
7	1	35772	LABEL DIRECTION OVAL HANDLE BALL VALVE
8	1	55126	FTG QUICK COUPLER 3/8B 1/2 NPTM FEMALE AIR
9	1	59203	VALVE BALL 1/4 NPTF X 1/4 NPTF VENTED OVAL HANDLE
10	1	59695	FTG TEE 1/4 NPTF (3)
11	2	63155	HOSE ASSY 801 1/4 X 1/4 NPTMS ENDS X 600
12	1	71317	REGULATOR PNUE. 2-40 PSI DIAL SET SEMI-PRECISION 1/4 NPTF X 1/4 NPTF
13	1	97742	ASSY PNEUMATIC FILTER & VALVE WITH STAND

FIGURE A-33. AIR CONTROL ASSEMBLY FOR PNEUMATIC FEED (P/N 63156)



NOTES:

1. HOSES WILL ATTACH TO HYDRAULIC MOTOR.
2. QUICK COUPLERS AND DUST CAPS WILL ATTACH TO HOSES ON ROTARY UNION.

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	63427	FTG QD NIPPLE 1/2B ISO 16028 STYLE X SAE-10F
2	2	63428	DUST CAP QD NIPPLE 1/2B ISO 16028 STYLE RUBBER
3	2	83181	HOSE ASSY 451 1/2 X SAE-10M X 36 STRAIGHT FITTINGS CE

FIGURE A-34. SINGLE-POINT HYDRAULIC DRIVE ASSEMBLY (P/N 83186)

TABLE A-1. SPARE PARTS

Qty	Part number	Description
4	62606	HOIST RING M24 X 3 X 38MM 70 ID X 130 OD 225 OAL 9250 LBS 4200 KG SWIVEL
64	58202	SCREW 16MM DIA X 20MM X M12 X 175 SHLDCS
Hose Tower / Encoder Guard		
1	62616	TOWER HOSE CM6200
2	57874	SCREW M8 X 125 X 60MM SHCS
1	62615	GUARD ENCODER CM6200
Turning Arm Clamps		
3	62601	ASSY CLAMP ARM CM6200
1	62602	ASSY CLAMP ARM SAFETY
8	46222	SCREW M16 X 20 X 45MM SHCS
Drag Brakes		
16	27172	WASHER SPRING BELLEVILLE 5/8 X 1-1/4 X 040
4	11693	WASHER 5/8 FLTW SAE
4	62612	STUD THREADED M16 X 2 X 100MM FULL THREAD
8	62613	NUT M16 X 20 JAMN
2	46232	BAR BRAKE CLAMP
2	54165	SHOE BRAKE 16M CIRCULAR MILL
Milling		
2	62255	SLIDE RAIL THK SHS25 442MM LG PRELOADED METAL SCRAPERS 2 BLOCKS
1	62426	BALL SCREW NUT 20MM X 5MM LEAD 33 MM OD EICHENBERGER ROUND
1	62431	BALL SCREW MILLING HEAD 275 BRG 8" STROKE
1	62719	TOOL 1" KEYED SHAFT MANUAL OPERATOR
1	51859	SCALE DIGITAL 8 INCH VERTICAL MOUNT
1	62645	WRENCH SOCKET 38MM 12 PT 1/2 DRIVE
1	53459	ASSY MOTOR HYD 80 CU IN 2000 SERIES W/ 12" QD MALE
1	53458	ASSY MOTOR HYD 96 CU IN 2000 SERIES W/ 12" QD MALE
1	46950	ASSY MOTOR HYD 119 CU IN 2000 SERIES W/ 12" QD MALE
1	46375	ASSY MOTOR HYD 149 CU IN 2000 SERIES W/ 12" QD MALE
1	46549	ASSY MOTOR HYD 187 CU IN 2000 SERIES W/ 12" QD MALE

TABLE A-1. SPARE PARTS

Qty	Part number	Description
1	46550	ASSY MOTOR HYD 140 CU IN 2000 SERIES W/ 12" QD MALE
1	47383	MILL FACE 4 DIA ASSY #50 TAPER W/ INSERTS
1	47384	MILL FACE 5 DIA ASSY #50 TAPER W/ INSERTS
1	47385	MILL FACE 6 DIA ASSY #50 TAPER W/ INSERTS
1	47386	MILL FACE 8 DIA ASSY #50 TAPER W/ INSERTS
1	56175	MILL FACE 10 DIA ASSY #50 TAPER W/ INSERTS
1	47229	INSERT CARBIDE SQUARE 528 IC SEMT13T3AGSN-JM
Single Point		
3	12920	FTG REDUCER BUSHING 1/2 NPTM X 1/4 NPTF STEEL
2	27977	FTG DUST PLUG 1/2 FEMALE QUICK COUPLING
2	27978	FTG DUST CAP 1/2 MALE QUICK COUPLING
2	40614	FTG QUICK COUPLER MALE 60 SERIES 1/2B X SAE-10F
2	40615	FTG QUICK COUPLER FEMALE 60 SERIES 1/2B X SAE-10F
2	46944	FTG ADAPTER 1/2 NPTF MALE X SAE-10M
1	29066	BIT TOOL HSS 3/4 X 50 LH FINISH SINGLE SC
1	29067	BIT TOOL HSS 3/4 X 50 RH FINISH SINGLE SC
1	46252	WRENCH SOCKET HEX 17MM 1/2 DRIVE
1	57794	KNOB ASSY MODIFIED
2	59240	HOSE ASSY 451 1/2 X SAE-10 TO 1/2 NPTM X 12 STRAIGHT FITTINGS
1	60033	HOLDER INSERT 3/4 SQ SHANK LEFT HAND W/ 10 INSERTS SECO TRI-GON
1	60034	HOLDER INSERT 3/4 SQ SHANK RIGHT HAND W/ 10 INSERTS SECO TRI-GON
1	63121	ASSY ROTARY UNION CM6200
Single Point Axial Feed System		
1	58671	FEED BOX PNEUMATIC REMOTE FEED ADJUST
130	50985	TUBING 1/4 OD X 040 WALL DOT 1200 PSI NYLON BLUE
130	59151	TUBING 1/8 OD X 023 WALL DOT 1000 PSI NYLON BLUE
1	59318	VALVE 2-POSITION 3-WAY NORMALLY OPEN
1	58519	SHAFT FEED REMOVABLE FEEDBOX SHAFT
2	58446	CYLINDER AIR 40MM DIA 10MM STROKE SINGLE ACTING SPRING EXTEND INCH
1	57530	BRG NEEDLE 1 ID X 1-5/16 OD X 625 OPEN

TABLE A-1. SPARE PARTS

Qty	Part number	Description
2	25957	BRG ROLLER CLUTCH 1 ID X 1312 OD X 625 (KB)
2	25959	SEAL 1000 ID X 1312 OD X 125 (KB)
2	59156	SCREW M6 X 10 X 60MM SHCS
Grinding		
1	62633	WHEEL GRINDING 15 DIA CBN 130 GRIT 8MM BORE
1	62634	WHEEL GRINDING 225 DIA CBN 130 GRIT 8MM BORE
1	11132	FTG ELBOW 3/8 NPTM X 3/8 NPTF STREET 90 DEG
1	13208	FTG QUICK COUPLER 1/2B X 1/2 NPTF FEMALE AIR
1	14704	FTG NIPPLE 1/2 NPTM X 1/2 NPTM
1	16615	FTG QUICK COUPLER 1/2B X 3/8 NPTM MALE AIR
1	32196	HOSE ASSY 801 1/2 X 1/2 NPTM X 400
1	36328	VALVE BALL 1/2 NPTF X 1/2 NPTF OVAL HANDLE
1	52734	FTG ADAPTER 3/8 BSPP MALE X 3/8 NPTF
1	57888	WASHER FIXTURING 21MM ID X 35MM OD X 3MM CASE HARDENED
1	62624	ARBOR GRINDING WHEEL CBN 10MM SHANK M8 THREAD
1	63018	SCREW M20 X 15 X 50MM SHCS
Drive		
1	62702	GEAR PINION 4DP 18T CM6200
2	63008	BRG BALL 35433 ID X 45276 OD X 5118
1	63014	RING SNAP 3-1/2 OD X 109 THK
2	63042	RING SNAP 4-1/2 OD X 109 THK
ID Chuck		
8	89718	PLATE BASE CHUCK
4	91317	ASSY FOOT GRIPPER NON LEVELING
8	89720	LEG CHUCK TUBE 4.5 OD X 2.5 THREADED
12	89721	LEG CHUCK TUBE 4.5 OD X 5.0 THREADED
8	89717	CAP END 4.50 DIA 4-4 OD 3 LEAD THREAD 2-8 ID
4	57724	WELDMENT STANDOFF 125 FF8200
8	57851	WELDMENT STANDOFF 175 FF8200
4	57852	WELDMENT STANDOFF 275 FF8200
96	58203	SCREW M20 X 25 X 40MM SHCS
4	61362	RESTRAINT SAFETY WELD PLATE

TABLE A-1. SPARE PARTS

Qty	Part number	Description
OD Chuck		
32	56192	SCREW M20 X 25 X 70 MM SHCS
8	57724	WELDMENT STANDOFF 125 FF8200
8	57851	WELDMENT STANDOFF 175 FF8200
8	57852	WELDMENT STANDOFF 275 FF8200
8	60755	STANDOFF 5 INCH OD MOUNT FF8200
96	58203	SCREW M20 X 25 X 40MM SHCS
16	59827	SCREW M8 X 125 X 16MM BHCS
8	60751	PLATE CENTERING OD MOUNT FF8200
8	60752	PLATE WASHER OD MOUNT FF8200
8	60753	WELDMENT STUD HOLD DOWN OD MOUNT FF8200
40	60756	SCREW M24 X 30 X 60MM SSSFP
8	60757	NUT M24 X 30 FLANGED
32	60760	SCREW M20 X 25 160MM SHCS
8	61433	SHIELD OD MOUNT FF8200
8	62687	LEG VERTICAL SUPPORT OD MOUNT CM6200
Face Mount		
32	12339	WASHER 3/4 FLTW
16	57348	SCREW M16 X 20 X 60MM SSSFP
32	58203	SCREW M20 X 25 XX 40MM SHCS
4	62887	BRACKET FACE MOUNT CM6200
Servo / HPU		
1	55609	ASSY JUNCTION BOX AND SERVO MOTOR PIGTAILS CM62000 15 KW
1	55608	ASSY CABLE HARNESS CM6000 15 KW 50 FT
1	53433	CABLE EXTENSION 19 PIN 19 CONDUCTOR MOLDED PLUGS 16 METERS (50 Feet) LONG TPE JACKET
1	56204	HPU 25HP 415V TOUCHSCREEN SERVO WITH ANGULAR CONTROL CE
400V Version		
1	51558	MOTOR SERVO 15 KW 2000 RPM 400 V MITSUBISHI
1	56000	SERVO AMPLIFIER MRJ3 480V 2 KW MITSUBISHI
200V Version		
1	63761	MOTOR SERVO MITSUBISHI 15KW 2000 RPM 200V W/BRAKE
1	63762	SERVO AMPLIFIER MRJ3 200V 2 KW MITSUBISHI

TABLE A-1. TOOL KIT P/N 62029

P/N	Description	QTY
14735	WRENCH EXTENSION 1/2 DRIVE X 10	1
14818	WRENCH RATCHET 1/2 DRIVE	1
19700	CONTAINER SHIPPING FLAT ROOF 20 X 875 X 105	2
33999	WRENCH HEX SET 050 - 3/8 BONDHUS BALL END (KB)	1
35516	HAMMER DEAD BLOW 1-3/4 DIA HEAD (KB)	1
38678	WRENCH HEX SET 15 - 10MM BONDHUS BALL END (KB)	1
46249	WRENCH HEX BIT SOCKET 14MM X 1/2	1
46250	WRENCH HEX BIT SOCKET 10MM X 1/2	1
46252	WRENCH HEX BIT SOCKET 17MM X 1/2	1
46253	WRENCH HEX BIT SOCKET 12MM X 1/2	1
53197	WRENCH COMBINATION 24mm 12PT 338mmLG SATIN FINISH	1
58350	WRENCH END 46mm X 8-9/16 LONG TIGHT ACCESS	2
58368	INDICATOR ELECTRONIC 500 TRAVEL 2-1/4 DIA FACE 0005" INC	1
58375	WRENCH HEX BIT SOCKET 19MM X 1/2	1
63469	HANDWHEEL MODIFIED 5 DIA 1/2" HEX	1
64370	HOLDER INDICATOR ARTICULATED ARM W/ MAG BASE 282MM REACH NOGA	1
65183	LUBRICANT ANTI SEIZE MOLY GRAPHITE EXTREME PRESSURE 10 OZ CAN	1
65188	WRENCH SPANNER 110MM TO 115MM (4-1/2) DIA 300 DIA PIN	2
69465	WRENCH END 46MM COMBINATION LONG	1
76807	WRENCH 3-1/8” SINGLE OPEN END	1

APPENDIX B SCHEMATICS

Schematic list

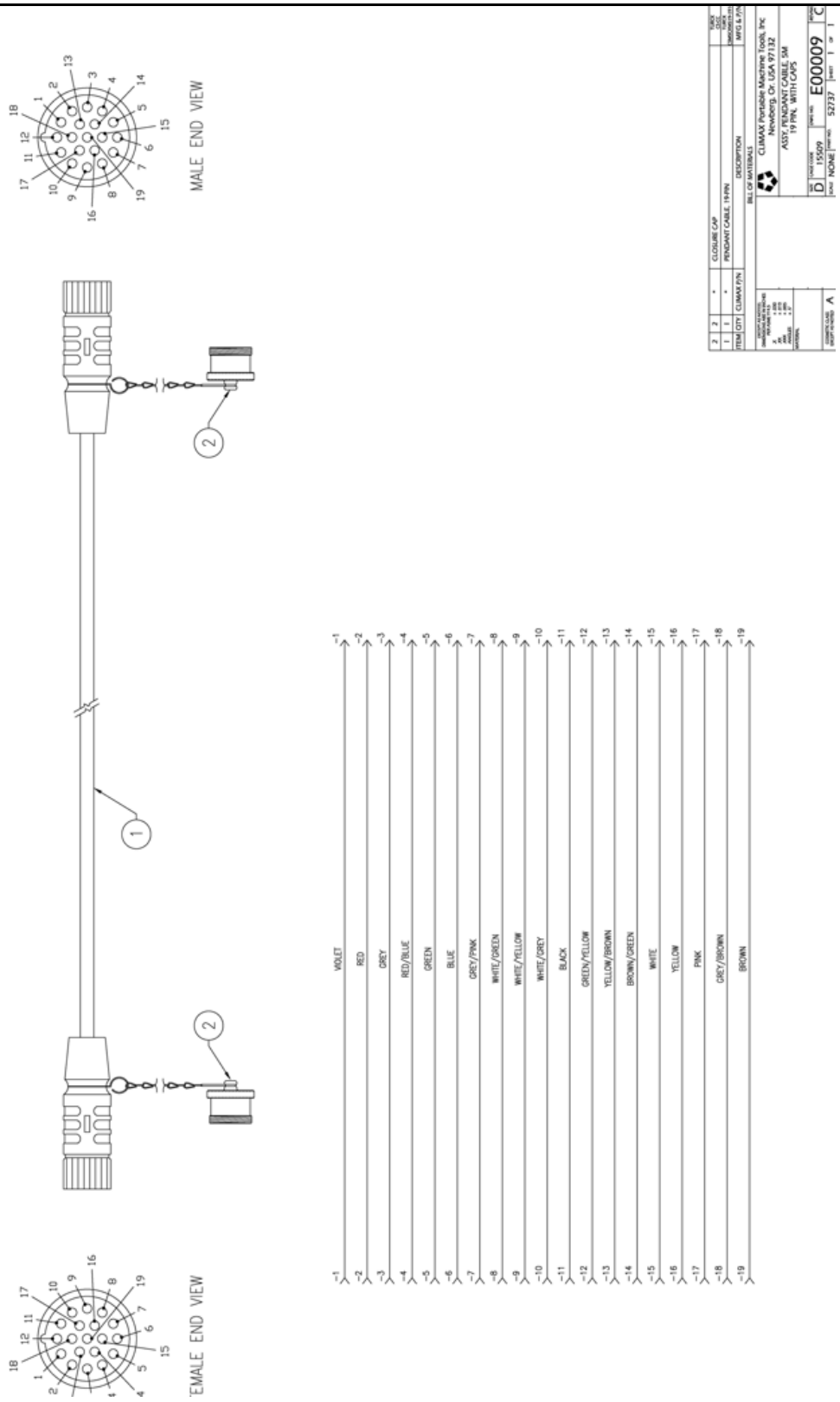
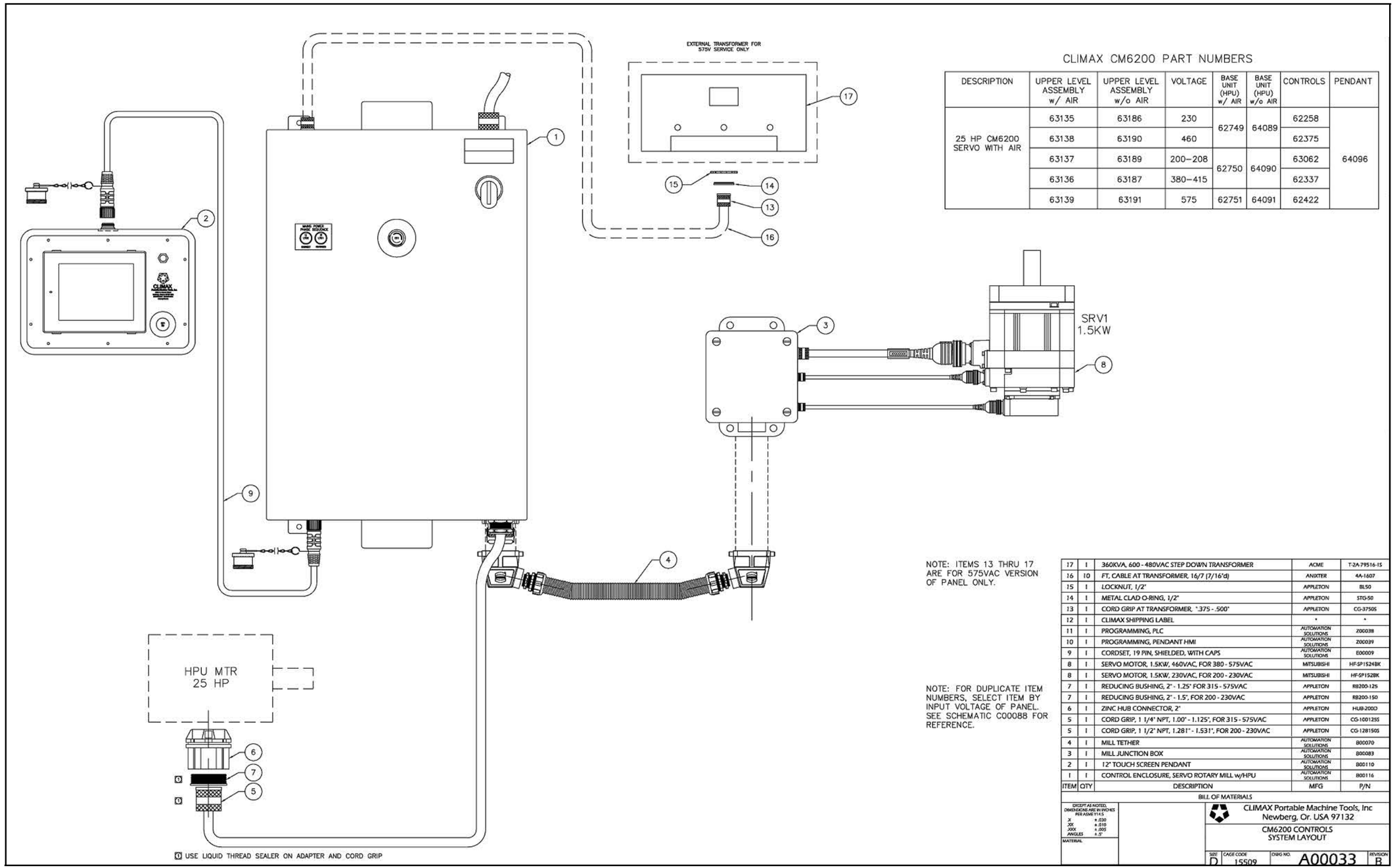


FIGURE B-1. MR-J3 AND MR-J4 PENDANT CABLE SCHEMATIC (P/N E00009)



CLIMAX CM6200 PART NUMBERS

DESCRIPTION	UPPER LEVEL ASSEMBLY w/ AIR	UPPER LEVEL ASSEMBLY w/o AIR	VOLTAGE	BASE UNIT (HPU) w/ AIR	BASE UNIT (HPU) w/o AIR	CONTROLS	PENDANT
25 HP CM6200 SERVO WITH AIR	63135	63186	230	62749	64089	62258	64096
	63138	63190	460			62375	
	63137	63189	200–208	62750	64090	63062	
	63136	63187	380–415			62337	
	63139	63191	575	62751	64091	62422	

NOTE: ITEMS 13 THRU 17 ARE FOR 575VAC VERSION OF PANEL ONLY.

NOTE: FOR DUPLICATE ITEM NUMBERS, SELECT ITEM BY INPUT VOLTAGE OF PANEL. SEE SCHEMATIC C00088 FOR REFERENCE.

ITEM	QTY	DESCRIPTION	MFG	P/N
17	1	360KVA, 600 - 480VAC STEP DOWN TRANSFORMER	ACME	T-2A-79516-1S
16	10	FT, CABLE AT TRANSFORMER, 16/7 (7/16'd)	ANIXTER	4A-1607
15	1	LOCKNUT, 1/2"	APPLETON	BL50
14	1	METAL CLAD O-RING, 1/2"	APPLETON	STG-50
13	1	CORD GRIP AT TRANSFORMER, ".375 - .500"	APPLETON	CG-3750S
12	1	CLIMAX SHIPPING LABEL	*	*
11	1	PROGRAMMING, PLC	AUTOMATION SOLUTIONS	Z00038
10	1	PROGRAMMING, PENDANT HMI	AUTOMATION SOLUTIONS	Z00039
9	1	CORDSET, 19 PIN, SHIELDED, WITH CAPS	AUTOMATION SOLUTIONS	E00009
8	1	SERVO MOTOR, 1.5KW, 460VAC, FOR 380 - 575VAC	MITSUBISHI	HF-SP1524BK
8	1	SERVO MOTOR, 1.5KW, 230VAC, FOR 200 - 230VAC	MITSUBISHI	HF-SP152BK
7	1	REDUCING BUSHING, 2" - 1.25" FOR 315 - 575VAC	APPLETON	RB200-125
7	1	REDUCING BUSHING, 2" - 1.5", FOR 200 - 230VAC	APPLETON	RB200-150
6	1	ZINC HUB CONNECTOR, 2"	APPLETON	HUB-200D
5	1	CORD GRIP, 1 1/4" NPT, 1.00" - 1.125", FOR 315 - 575VAC	APPLETON	CG-1001255
5	1	CORD GRIP, 1 1/2" NPT, 1.281" - 1.531", FOR 200 - 230VAC	APPLETON	CG-1281505
4	1	MILL TETHER	AUTOMATION SOLUTIONS	B00070
3	1	MILL JUNCTION BOX	AUTOMATION SOLUTIONS	B00083
2	1	12" TOUCH SCREEN PENDANT	AUTOMATION SOLUTIONS	B00110
1	1	CONTROL ENCLOSURE, SERVO ROTARY MILL w/HPU	AUTOMATION SOLUTIONS	B00116

BILL OF MATERIALS

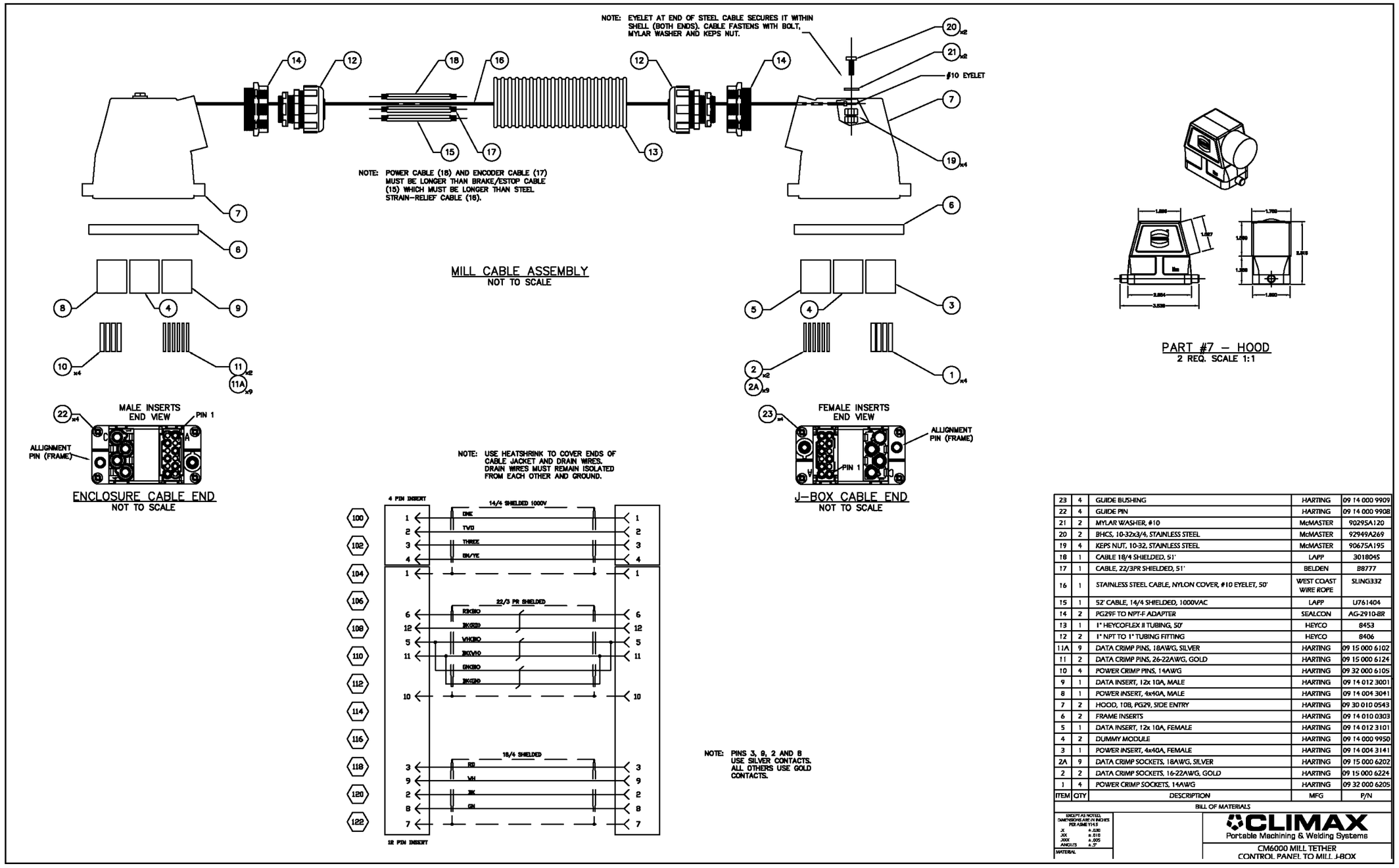
EXCEPT AS NOTED, DIMENSIONS ARE IN INCHES PER ASME Y14.5
.X ± .030
.XX ± .010
.XXX ± .005
ANGLES ± 5°
MATERIAL

CLIMAX Portable Machine Tools, Inc
Newberg, Or. USA 97132

CM6200 CONTROLS
SYSTEM LAYOUT

SIZE D | CAGE CODE 15509 | DWG NO. A00033 | REVISION B

FIGURE B-2. MR-J3 SYSTEM LAYOUT (P/N A00033)



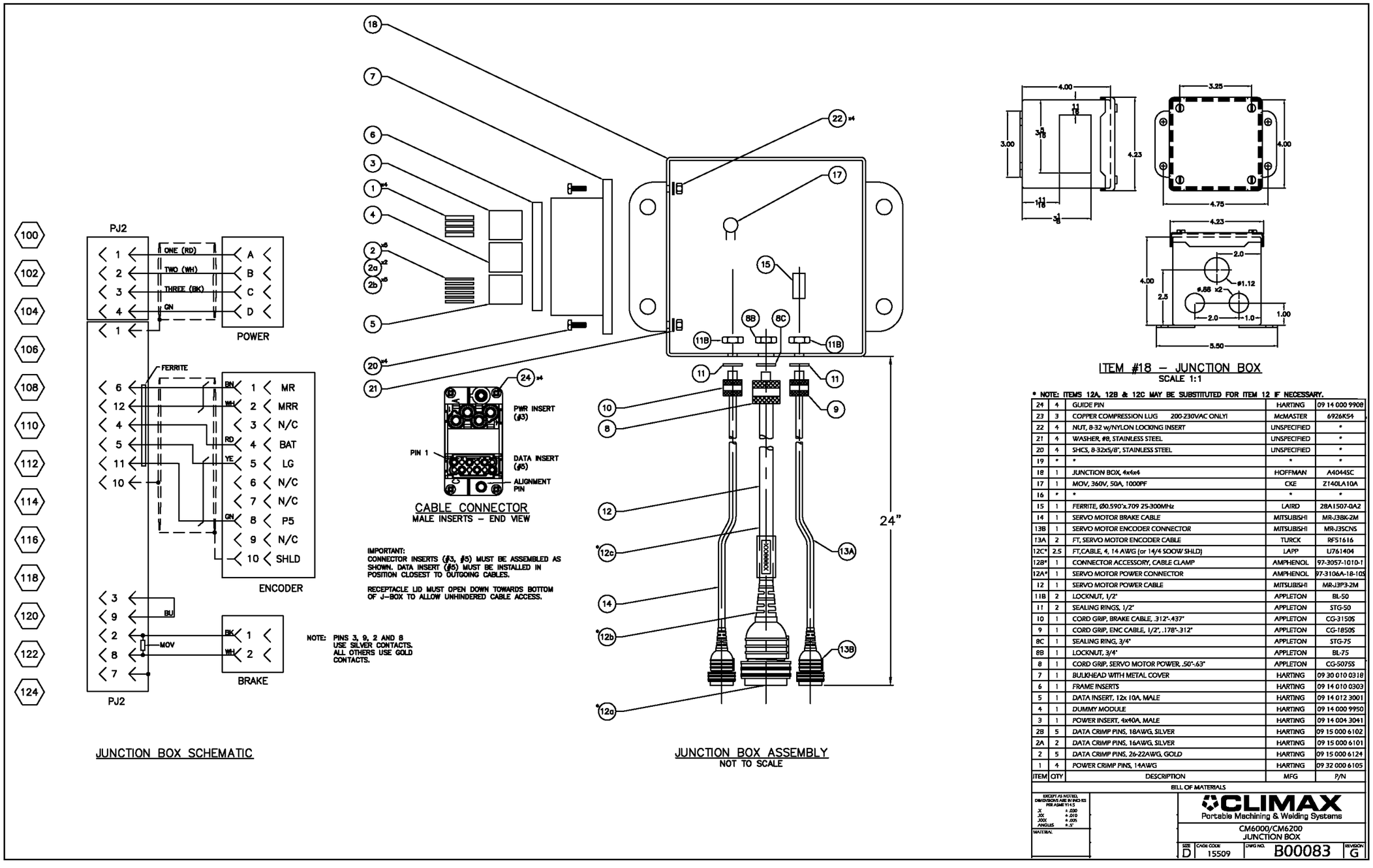
ITEM	QTY	DESCRIPTION	MFG	P/N
23	4	GUIDE BUSHING	HARTING	09 14 000 9909
22	4	GUIDE PIN	HARTING	09 14 000 9908
21	2	MYLAR WASHER, #10	McMASTER	90295A120
20	2	BHCS, 10-32x3/4, STAINLESS STEEL	McMASTER	92949A269
19	4	KEPS NUT, 10-32, STAINLESS STEEL	McMASTER	90675A195
18	1	CABLE 18/4 SHIELDED, 51'	LAPP	3018045
17	1	CABLE, 22/3PR SHIELDED, 51'	BELDEN	88777
16	1	STAINLESS STEEL CABLE, NYLON COVER, #10 EYELET, 50'	WEST COAST WIRE ROPE	SLING332
15	1	52' CABLE, 14/4 SHIELDED, 1000VAC	LAPP	U761404
14	2	PG29F TO NPT-F ADAPTER	SEALCON	AG-2910-BR
13	1	1" HEYCOFLEX II TUBING, 50'	HEYCO	8453
12	2	1" NPT TO 1" TUBING FITTING	HEYCO	8406
11A	9	DATA CRIMP PINS, 18AWG, SILVER	HARTING	09 15 000 6102
11	2	DATA CRIMP PINS, 26-22AWG, GOLD	HARTING	09 15 000 6124
10	4	POWER CRIMP PINS, 14AWG	HARTING	09 32 000 6105
9	1	DATA INSERT, 12x 10A, MALE	HARTING	09 14 012 3001
8	1	POWER INSERT, 4x40A, MALE	HARTING	09 14 004 3041
7	2	HOOD, 10B, PG29, SIDE ENTRY	HARTING	09 30 010 0543
6	2	FRAME INSERTS	HARTING	09 14 010 0303
5	1	DATA INSERT, 12x 10A, FEMALE	HARTING	09 14 012 3101
4	2	DUMMY MODULE	HARTING	09 14 000 9950
3	1	POWER INSERT, 4x40A, FEMALE	HARTING	09 14 004 3141
2A	9	DATA CRIMP SOCKETS, 18AWG, SILVER	HARTING	09 15 000 6202
2	2	DATA CRIMP SOCKETS, 16-22AWG, GOLD	HARTING	09 15 000 6224
1	4	POWER CRIMP SOCKETS, 14AWG	HARTING	09 32 000 6205

BILL OF MATERIALS

UNLESS OTHERWISE DIMENSIONS ARE IN INCHES PER ASME Y14.5
X ±.030
XX ±.010
XXX ±.005
ANGLES ±.5°
MATERIAL

CLIMAX
Portable Machining & Welding Systems
CM6000 MILL TETHER
CONTROL PANEL TO MILL J-BOX

FIGURE B-3. MR-J3 AND MR-J4 MILL TETHER SCHEMATIC (P/N B00070)



* NOTE: ITEMS 12A, 12B & 12C MAY BE SUBSTITUTED FOR ITEM 12 IF NECESSARY.

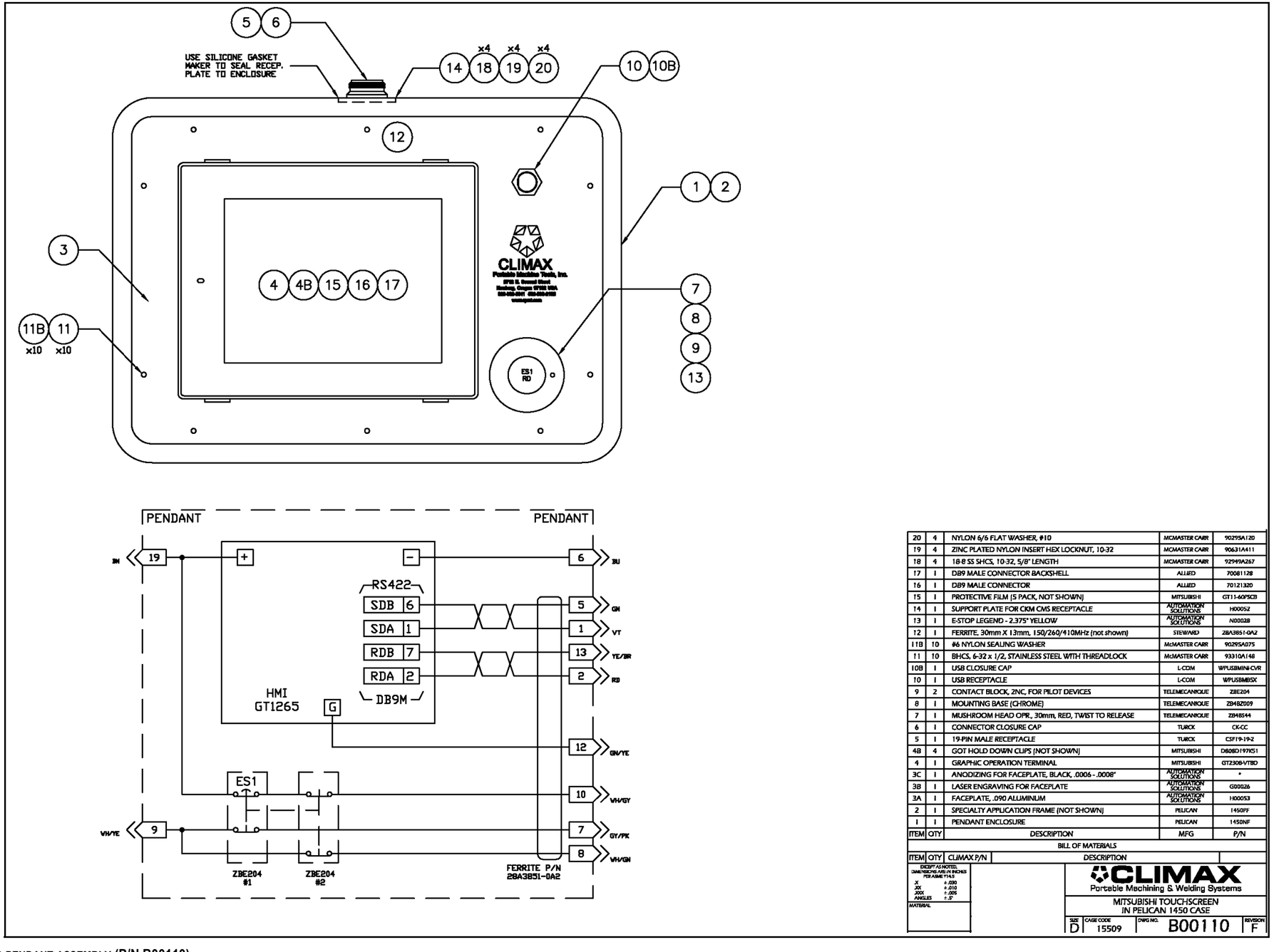
ITEM	QTY	DESCRIPTION	MFG	P/N
24	4	GUIDE PIN	HARTING	09 14 000 9908
23	3	COPPER COMPRESSION LUG 200-230VAC ONLY!	McMASTER	6926K54
22	4	NUT, 8-32 w/NYLON LOCKING INSERT	UNSPECIFIED	*
21	4	WASHER, #8, STAINLESS STEEL	UNSPECIFIED	*
20	4	SHCS, 8-32x5/8", STAINLESS STEEL	UNSPECIFIED	*
19	*	*	*	*
18	1	JUNCTION BOX, 4x4x4	HOFFMAN	A4044SC
17	1	MOV, 360V, 50A, 1000PF	CKE	Z140LA10A
16	*	*	*	*
15	1	FERRITE, Ø0.590"x.709 25-300MHz	LAIRD	28A1507-0A2
14	1	SERVO MOTOR BRAKE CABLE	MITSUBISHI	MR-J3BK-2M
13B	1	SERVO MOTOR ENCODER CONNECTOR	MITSUBISHI	MR-J3SCNS
13A	2	FT, SERVO MOTOR ENCODER CABLE	TURCK	RF51616
12C*	2.5	FT,CABLE, 4, 14 AWG (or 14/4 SOOW SHLD)	LAPP	U761404
12B*	1	CONNECTOR ACCESSORY, CABLE CLAMP	AMPHENOL	97-3057-1010-1
12A*	1	SERVO MOTOR POWER CONNECTOR	AMPHENOL	97-3106A-18-10S
12	1	SERVO MOTOR POWER CABLE	MITSUBISHI	MR-J3P3-2M
11B	2	LOCKNUT, 1/2"	APPLETON	BL-50
11	2	SEALING RINGS, 1/2"	APPLETON	STG-50
10	1	CORD GRIP, BRAKE CABLE, .312"-.437"	APPLETON	CG-3150S
9	1	CORD GRIP, ENC CABLE, 1/2", .178"-.312"	APPLETON	CG-1850S
8C	1	SEALING RING, 3/4"	APPLETON	STG-75
8B	1	LOCKNUT, 3/4"	APPLETON	BL-75
8	1	CORD GRIP, SERVO MOTOR POWER, .50"-.63"	APPLETON	CG-5075S
7	1	BULKHEAD WITH METAL COVER	HARTING	09 30 010 0318
6	1	FRAME INSERTS	HARTING	09 14 010 0303
5	1	DATA INSERT, 12x 10A, MALE	HARTING	09 14 012 3001
4	1	DUMMY MODULE	HARTING	09 14 000 9950
3	1	POWER INSERT, 4x40A, MALE	HARTING	09 14 004 3041
2B	5	DATA CRIMP PINS, 18AWG, SILVER	HARTING	09 15 000 6102
2A	2	DATA CRIMP PINS, 16AWG, SILVER	HARTING	09 15 000 6101
2	5	DATA CRIMP PINS, 26-22AWG, GOLD	HARTING	09 15 000 6124
1	4	POWER CRIMP PINS, 14AWG	HARTING	09 32 000 6105

BILL OF MATERIALS

EXCEPT AS NOTED, DIMENSIONS ARE IN INCHES PER ASME Y14.5
X ±.030
.XX ±.010
.XXX ±.005
ANGLES ±.5°
MATERIAL

CLIMAX
Portable Machining & Welding Systems
CM6000/CM6200
JUNCTION BOX
SIZE D | CAGE CODE 15509 | DWG NO. B00083 | REVISION G

FIGURE B-4. MR-J3 AND MR-J4 JUNCTION BOX ASSEMBLY (P/N B00083)



ITEM	QTY	DESCRIPTION	MFG	P/N
20	4	NYLON 6/6 FLAT WASHER, #10	MCMASTER CARR	90295A120
19	4	ZINC PLATED NYLON INSERT HEX LOCKNUT, 10-32	MCMASTER CARR	90631A411
18	4	18-8 SS SHCS, 10-32, 5/8" LENGTH	MCMASTER CARR	92949A267
17	1	DB9 MALE CONNECTOR BACKSHELL	ALLIED	70081128
16	1	DB9 MALE CONNECTOR	ALLIED	70121320
15	1	PROTECTIVE FILM (5 PACK, NOT SHOWN)	MITSUBISHI	GT11-60PSCB
14	1	SUPPORT PLATE FOR CKM CMS RECEPTACLE	AUTOMATION SOLUTIONS	H00052
13	1	E-STOP LEGEND - 2.375" YELLOW	AUTOMATION SOLUTIONS	N00028
12	1	FERRITE, 30mm X 13mm, 150/260/410MHz (not shown)	STEWARD	28A3851-0A2
11B	10	#6 NYLON SEALING WASHER	MCMASTER CARR	90295A075
11	10	BHCS, 6-32 x 1/2, STAINLESS STEEL WITH THREADLOCK	MCMASTER CARR	93310A148
10B	1	USB CLOSURE CAP	L-COM	WPUSBMINI-CVR
10	1	USB RECEPTACLE	L-COM	WPUSBMBSX
9	2	CONTACT BLOCK, 2NC, FOR PILOT DEVICES	TELEMECANIQUE	ZBE204
8	1	MOUNTING BASE (CHROME)	TELEMECANIQUE	ZB4BZ009
7	1	MUSHROOM HEAD OPR., 30mm, RED, TWIST TO RELEASE	TELEMECANIQUE	ZB4BS44
6	1	CONNECTOR CLOSURE CAP	TURCK	CK-CC
5	1	19-PIN MALE RECEPTACLE	TURCK	CSF19-19-2
4B	4	GOT HOLD DOWN CLIPS (NOT SHOWN)	MITSUBISHI	D8080D197KS1
4	1	GRAPHIC OPERATION TERMINAL	MITSUBISHI	GT2308-VTBD
3C	1	ANODIZING FOR FACEPLATE, BLACK, .0006 - .0008"	AUTOMATION SOLUTIONS	*
3B	1	LASER ENGRAVING FOR FACEPLATE	AUTOMATION SOLUTIONS	G00026
3A	1	FACEPLATE, .090 ALUMINUM	AUTOMATION SOLUTIONS	H00053
2	1	SPECIALTY APPLICATION FRAME (NOT SHOWN)	PELICAN	1450FF
1	1	PENDANT ENCLOSURE	PELICAN	1450NF

BILL OF MATERIALS

ITEM	QTY	CLIMAX P/N	DESCRIPTION

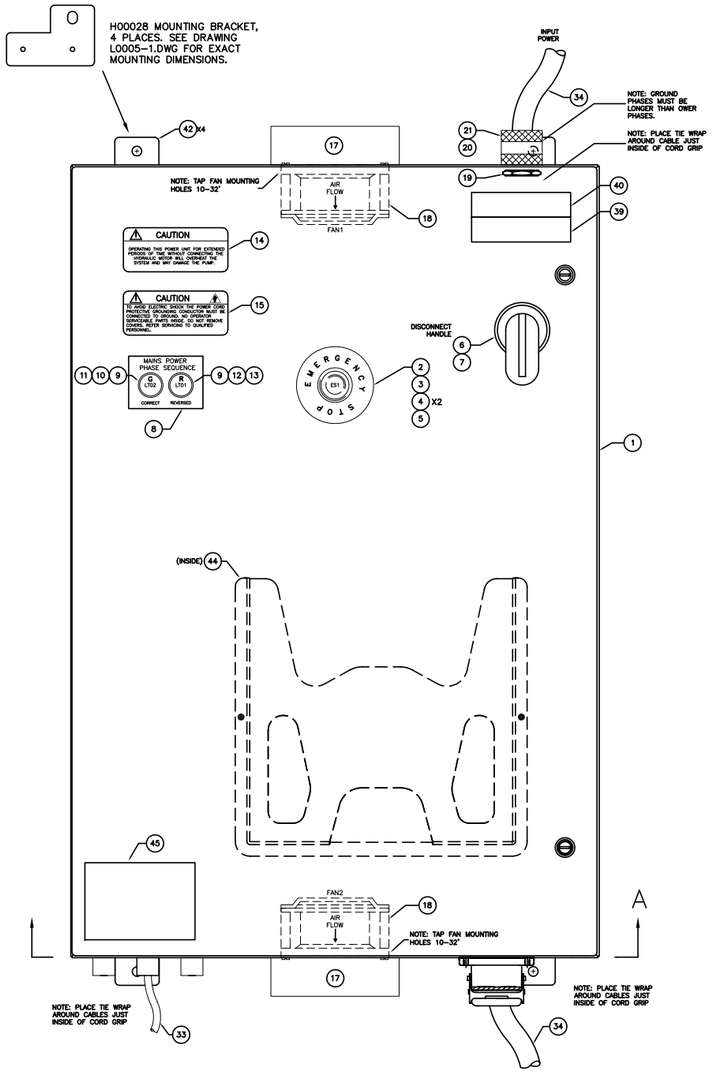
EXCEPT AS NOTED DIMENSIONS ARE IN INCHES PER ASME Y14.5
X ±.030
XX ±.010
.XXX ±.005
ANGLES ±.5°
MATERIAL

CLIMAX
Portable Machining & Welding Systems

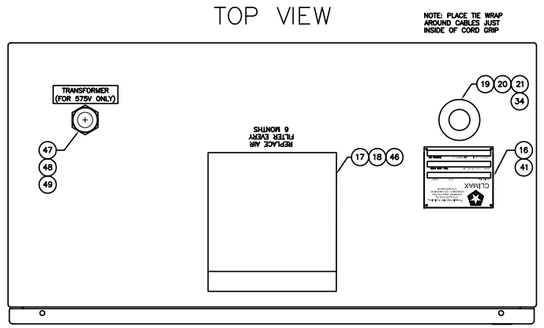
MITSUBISHI TOUCHSCREEN IN PELICAN 1450 CASE

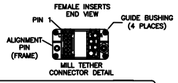
SIZE D | CAGE CODE 15509 | DWG NO. B00110 | REVISION F

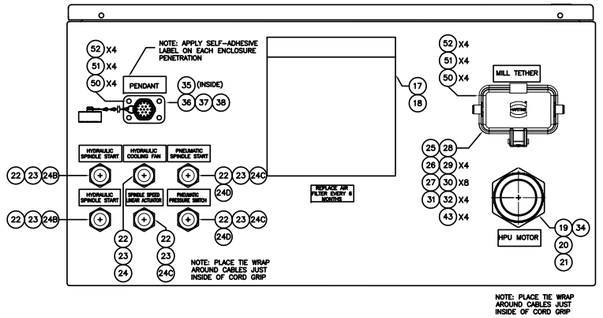
FIGURE B-5. MR-J3 AND MR-J4 OPERATOR PENDANT ASSEMBLY (P/N B00110)



CONTROLS ENCLOSURE







BOTTOM VIEW
(DETAIL A)

NOTE: FOR DUPLICATE ITEM NUMBERS, SELECT ITEM BY INPUT VOLTAGE OF PANEL. SEE SCHEMATIC C00088 FOR REFERENCE.

ITEM	QTY	DESCRIPTION	MFG	P/N
		BILL OF MATERIALS		
43	4	GUIDE BUSHINGS	HARTING	09 14 000 9909
42	4	ENCLOSURE MOUNTING BRACKETS	AUTOMATION SOLUTIONS	H00028
41	4	SCREW DRIVE #2 X 1/4	FASTENAL	32213
40	1	575V LABEL - 4.5 X 1.125	MCMASTER	5894T922
40	1	460V LABEL - 4.5 X 1.125	MCMASTER	5894T862
40	1	415V LABEL - 4.5 X 1.125	PANDUIT	PCV-415BY
40	1	380V LABEL - 4.5 X 1.125	MCMASTER	5894T912
40	1	230V LABEL - 4.5 X 1.125	MCMASTER	5894T832
40	1	208V LABEL - 4.5 X 1.125	MCMASTER	5894T842
39	1	THREE PHASE LABEL - 4.5 X 1.125	MCMASTER	5894T4
38	1	CLOSURE CAP	TURCK	CK-CC
37	1	SUPPORT PLATE FOR CKM CMS SUPPORT PLATE	AUTOMATION SOLUTIONS	H00052
36	1	RECEPTACLE, 19 PIN, FEMALE, 2 METER	TURCK	CKF 19-19-2
35	1	FERRITE BEAD, CABLE, 196 OHMS @ 100MHz	ALLIED	314-0253
34	25	FT, PORTABLE POWER CORD, 8-4C, TYPE W FOR 460-575VAC	ANIXTER	5B-0804C
34	25	FT, PORTABLE POWER CORD, 6-4C, TYPE W FOR 380-415VAC	ANIXTER	5B-0604C
34	25	FT, PORTABLE POWER CORD, 2-4C, TYPE W FOR 200-230VAC	ANIXTER	5B-0204C
33	11	FT, CORD, 16AWG, 2 CONDUCTOR, SEOOW	COMMONLY AVAILABLE	-
32	4	HAN MODULAR CONNECTOR, CONTACT, FEMALE, AWG 14	HARTING	09 32 000 6205
31	1	HAN MODULAR CONNECTOR, HOUSING, BULKHEAD MOUNT	HARTING	09 30 010 0318
30	10	HAN MODULAR CONNECTOR, CONTACT, FEMALE AWG 26-22	HARTING	09 15 000 6224
29	4	HAN MODULAR CONNECTOR, CONTACT, FEMALE AWG 16	HARTING	09 15 000 6201
28	1	HAN MODULAR CONNECTOR, FEMALE INSERT, 12 PIN	HARTING	09 14 012 3101
27	1	HAN MODULAR CONECTOR, FRAME FOR 3 MODULES	HARTING	09 14 010 0303
26	1	HAN MODULAR CONNECTOR, FEMALE INSERT, 4 PINS	HARTING	09 14 004 3141
25	1	HAN MODULAR CONNECTOR, DUMMY MODULE	HARTING	09 14 000 9950
24D	2	HOLE PLUG	HOFFMAN	A5050
24C	3	CORD GRIP, 1/2" NPT, 0.125" - 0.187" CORD	APPLETON	CG-1250S
24B	2	CORD GRIP, 1/2" NPT, 0.187" - 0.312" CORD	APPLETON	CG-1850S
24	1	CORD GRIP, 1/2" NPT, 0.312" - 0.437" CORD	APPLETON	CG-3150S
23	6	LOCKNUT, 1/2" NPT	APPLETON	BL-50
22	6	O-RING 1/2" NPT	APPLETON	STG-50
21	2	CORD GRIP, 1 1/4" NPT, 1.00" - 1.125" CORD, FOR 315 - 575VAC	APPLETON	CG-1001255
21	2	CORD GRIP, 1 1/2" NPT, 1.281" - 1.531" CORD, FOR 200 - 230VAC	APPLETON	CG-1281505
20	2	O-RING 1 1/4" NPT, FOR 315 - 575VAC	APPLETON	STG-125
20	2	O-RING 1 1/2" NPT, FOR 200 - 230VAC	APPLETON	STG-150
19	2	LOCKNUT, 1 1/4" NPT, FOR 315 - 575VAC	APPLETON	BL125
19	2	LOCKNUT, 1 1/2" NPT, FOR 200 -230VAC	APPLETON	BL150
18	2	FANS, 24VDC	ORION	OD1238-24HB
17	2	EXHAUST	HAEWA	3142-0148-00-07
16	1	NAMEPLATE ELECTRICAL PANELS	CLIMAX	39125
15	1	LABEL, CAUTION ELECTRIC	CLIMAX	37576
14	1	LABEL, CAUTION HYDRAULIC OVERHEAT	CLIMAX	15396
13	1	LED MODULE, 24VAC/DC, RED	TELEMECANIQUE	ZBVB4
12	1	PILOT LIGHT OPERATOR, RED	TELEMECANIQUE	ZB4BV043
11	1	LED MODULE, 24VAC/DC, GREEN	TELEMECANIQUE	ZBVB3
10	1	PILOT LIGHT OPERATOR, GREEN	TELEMECANIQUE	ZB4BV033
9	2	MOUNTING BASE	TELEMECANIQUE	ZB4BZ009
8	1	LEGEND PLATE, "PHASE SEQUENCE"	AUTOMATION SOLUTIONS	F00011
7	1	DISCONNECT SHAFT FOR 575VAC	ABB	OXP10X500
7	1	DISCONNECT SHAFT	ABB	OXPX290
6	1	DISCONNECT HANDLE FOR 575VAC	ABB	OHY95L10
6	1	DISCONNECT HANDLE	ABB	OHY80L6
5	1	PUSHBUTTON LEGEND, "EMERGENCY STOP"	TELEMECANIQUE	ZBY8330
4	2	CONTACT BLOCK, NC	TELEMECANIQUE	ZBE102
3	1	MOUNTING BASE, CHROME	TELEMECANIQUE	ZB4BZ009
2	1	MUSH-HEAD OPERATOR	TELEMECANIQUE	ZB4B554
1	1	ENCLOSURE, 36" X 24" X12"	AUTOMATION SOLUTIONS	L00005

52	8	#6 KEPS NUT	McMASTER	90675A007
51	8	#6 NYLON WASHER	MCMASTER	90295A35
50	8	6-32 BUTTON HEAD CAP SCREW, 1/2"	McMASTER	92949A146
49	1	CORD GRIP, 3/4" NPT, .375" - .500" CORD, FOR 575VAC	APPLETON	CG-3775S
48	1	O-RING 3/4" NPT, FOR 575VAC	APPLETON	STG-75
47	1	LOCKNUT, 3/4" NPT, FOR 575VAC	APPLETON	BL75
46	2	LEVER LOCK TERMINAL BLOCKS	WAGO	222-412
45	1	ARCFLASH WARNING LABEL	SAFETY SIGN	J5543
44	1	DATA POCKET	HOFFMAN	ADP2

EXCEPT AS NOTED: DIMENSIONS ARE IN INCHES PER ASME Y14.5
X ± .030
.XX ± .010
.XXX ± .005
ANGLES ± 5°
MATERIAL
COSMETIC CLASS EXCEPT AS NOTED: A

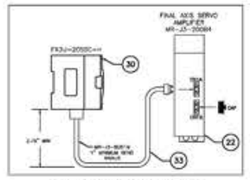
CLIMAX
Portable Machining & Welding Systems

CM6200 ROTARY MILL
MULTIPLE VOLTAGES

SIZE D | CAGE CODE 15509 | DWG NO. B00116 | REVISION K
SCALE NONE | SHEET 1 OF 2

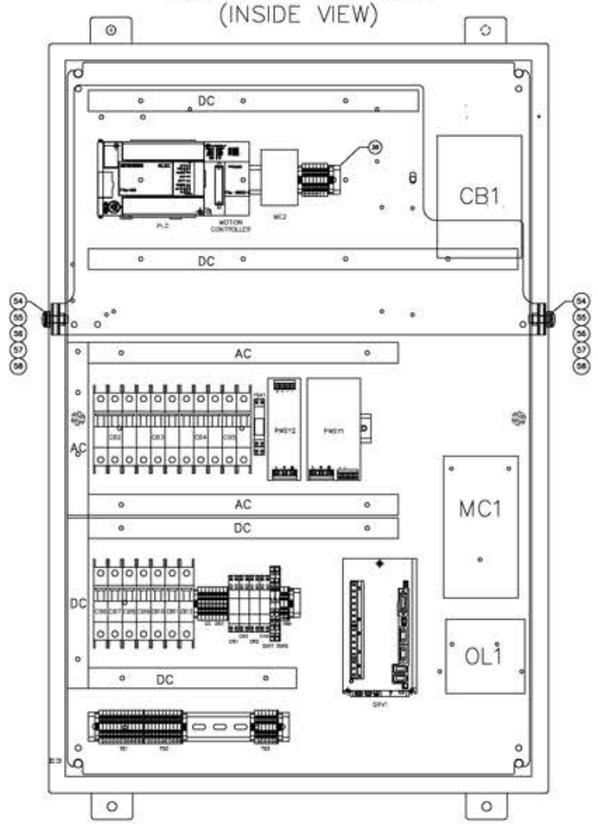
PROJECT DRAWINGS	DRAWING #	CLIMAX PART #	NOTES
TOP LEVEL ASSEMBLY	A00033	"	"
SCHEMATIC	C00088	"	"
LAYOUT: CONTROL PANEL	B00116-1, B00116-2	"	"
LAYOUT: PENDANT	B00110	"	"
LAYOUT: MISC	B00083	"	J-BOX ASSY
CABLE ASSY 1	B00070	"	MILL TETHER ASSY
CABLE ASSY 2	E00009	"	PENDANT CABLE ASSY
CABLE ASSY 3	-	"	-
ENCLOSURE MECHANICALS	L00005	"	MECHANICAL DIMS

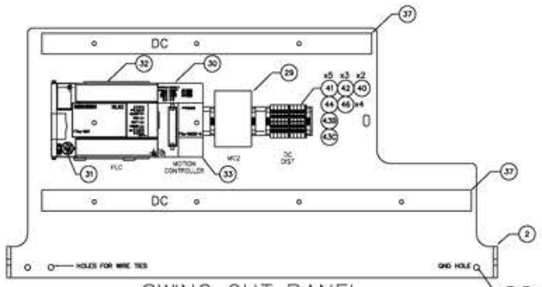
FIGURE B-6. MR-J3 CONTROL PANEL EXTERIOR ASSEMBLY SHEET 1(P/N B00116)



SSCNET CONNECTION DIAGRAM

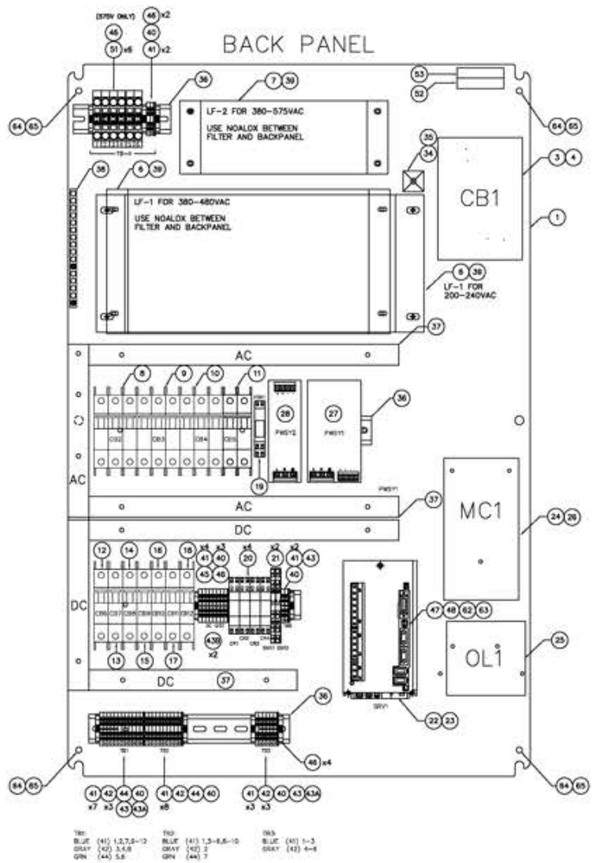
CONTROLS ENCLOSURE
(INSIDE VIEW)





SWING OUT PANEL

BACK PANEL



ITEM	QTY	DESCRIPTION	MFG	P/N
		BILL OF MATERIALS		
1	1	BACK PANEL	AUTOMATION SOLUTIONS	H00029
2	1	SWING-OUT PANEL	AUTOMATION SOLUTIONS	K00031
3	1	CB1, MAIN BREAKER, 150A, FOR 200 - 230VAC	ABB	T3N150TW
3	1	CB1, MAIN BREAKER, 80A, FOR 380 - 460VAC	ABB	T1N080TL
3	1	CB1, MAIN BREAKER, 60A, FOR 575VAC	ABB	T3N060TW
4	1	DISCONNECT KIT FOR T1N & T3N BREAKER	ABB	KT3VD-M
4	1	DISCONNECT KIT FOR T3N BREAKER - 575VAC	ABB	KT3J-VDM
		SEE ITEMS 60 & 61 FOR DISCONNECT LUG KITS		
6	1	LF1, LINE FILTER, 100A FOR 200 - 230VAC	RADIUS POWER	RP325-100-10005
6	1	LF1, LINE FILTER, 60A, FOR 380 - 460VAC	CORCOM	6EAYT6C-F7477
6A	1	LF1, MOUNTING KIT, FOR 380 - 460VAC	CORCOM	AA405
7	1	LF2, LINE FILTER, 15A, FOR 575VAC	RADIUS POWER	RP380-15-10005
7	1	LF2, LINE FILTER, 15A, FOR 380 - 460VAC	RADIUS POWER	RP325-15-10005
8	1	CB2, CIRCUIT BREAKER, 3 POLE, 1A, FOR 200-230VAC	TELEMECANIQUE	60168
8	1	CB2, CIRCUIT BREAKER, 3 POLE, 1A, FOR 380-575VAC	TELEMECANIQUE	MGN61336
9	1	CB3, CIRCUIT BREAKER, 3 POLE, 20A, FOR 200-230VAC	TELEMECANIQUE	60180
9	1	CB3, CIRCUIT BREAKER, 3 POLE, 15A, FOR 380-575VAC	TELEMECANIQUE	MGN61331
10	1	CB4, CIRCUIT BREAKER, 2 POLE, 10A, FOR 200-230VAC	TELEMECANIQUE	60144
10	1	CB4, CIRCUIT BREAKER, 3 POLE, 6A, FOR 380-575VAC	TELEMECANIQUE	MGN61328
11	1	CB5, CIRCUIT BREAKER, 2 POLE, 10A, FOR 200 230VAC	TELEMECANIQUE	60144
11	1	CB5, CIRCUIT BREAKER, 2 POLE, 6A, FOR 380-575VAC	TELEMECANIQUE	MGN61317
12	1	CB6, CIRCUIT BREAKER, 1 POLE, 2A, FOR ALL VOLTAGES	TELEMECANIQUE	60103
13	1	CB7, CIRCUIT BREAKER, 1 POLE, 8A, FOR ALL VOLTAGES	TELEMECANIQUE	60109
14	1	CB8, CIRCUIT BREAKER, 1 POLE, 2A, FOR ALL VOLTAGES	TELEMECANIQUE	60103
15	1	CB9, CIRCUIT BREAKER, 1 POLE, 5A, FOR ALL VOLTAGES	TELEMECANIQUE	60106
16	1	CB10, CIRCUIT BREAKER, 1 POLE, 1A, FOR ALL VOLTAGES	TELEMECANIQUE	60101
17	1	CB11, CIRCUIT BREAKER, 1 POLE, 2A, FOR ALL VOLTAGES	TELEMECANIQUE	60103
18	1	CB12, CIRCUIT BREAKER, 1 POLE, 3A, FOR ALL VOLTAGES	TELEMECANIQUE	60104
19	1	PHASE SEQUENCE RELAY	TELEMECANIQUE	RM4TG20
20	4	CR1, CR2, CR3, CR4, RELAY, DPDT	WAGO	788-312
21	2	SSR1, SSR2, SOLID STATE RELAY	WAGO	859-740
22	1	SERVO AMP, 2KW, 400V FOR 200 - 230VAC	MITSUBISHI	MR-J3-20005
22	1	SERVO AMP, 2KW, 400V FOR 380 - 575VAC	MITSUBISHI	MR-J3-200B4
23	1	ENCODER CABLE, 2M	MITSUBISHI	MR-J3ENSCBL2M-H
24	1	MC1, CONTACTOR, 80A, 24VDC, FOR 200 -230VAC	EATON	XTCE080F00TD
24	1	MC1, CONTACTOR, 40A, 24VDC, FOR 380 - 600VAC	EATON	XTCE040D00TD
25	1	OVERLOAD RELAY, 70A-100A, FOR 200-230VAC	EATON	XTOB100DC1
25	1	OVERLOAD RELAY, 50A-65A, FOR 380-415VAC	EATON	XTOB057DC1
25	1	OVERLOAD RELAY, 24A-40A, FOR 460V-575VAC	EATON	XTOB040DC1
26	1	AUX. CONTACTS FOR MC1	EATON	XTCEXFBG20
27	1	PWS1, POWER SUPPLY, 24VDC, 480W, FOR 380-575VAC	PULS	QT20.241
27	1	PWS1, POWER SUPPLY, 24VDC, 480W, FOR 200-230VAC	PULS	CP520.241
28	1	PWS2, POWER SUPPLY, 24VDC, 120W FOR 380-575VAC	PULS	CT5.241
28	1	PWS2, POWER SUPPLY, 24VDC, 120W FOR 200-230VAC	PULS	CS5.241
29	1	MC2, CONTACTOR, NON-REVERSING, 9A, 24VDC COIL	EATON	XTRMC10A48TD
30	1	FX3U SSCNENT 2 AXIS POSITIONING MODULE	MITSUBISHI	FX3U-20SSC-H
31	1	8 PIN MINI-DIN 8 CABLE - P/N CS-DINPDM8MM02-015	AMPHENOL	SEE DESCRIPTION
32	1	PLC	MITSUBISHI	FX3U-16MT/ESS
33	1	SSCNET III CABLE, 1 METER	MITSUBISHI	MR-J3BUS1M
34	1	THUMB SCREW FOR SWING OUT PANEL STANDOFF	MCMASTER	97008A612
35	1	STANDOFF FOR SWING OUT PANEL, CUT TO 6"	MCMASTER	4706ST209
36	3	DIN RAIL	EATON	XBANS35TSPL
37	3	WIRE DUCT	ABB	QD100K300HW
38	1	GROUND BAR	EATON	GBK14
39	6	TERMINAL INSULATORS, BLACK, 200-230VAC & 575VAC	VTE	800NSV14
39	12	TERMINAL INSULATORS, BLACK, 380-460VAC	VTE	800NSV14
40	8	END PLATE, GRN	WAGO	2002-1292
41	28	TERM BLOCK, 5mm, BLUE	WAGO	2002-1204
42	10	TERM BLOCK, 5mm, GRAY	WAGO	2002-1201
43	3	JUMPER, 2 PIN	WAGO	2002-402
43A	3	JUMPER, 3 PIN	WAGO	2002-403
43B	3	JUMPER, 4 PIN	WAGO	2002-404
43C	1	JUMPER, 5 PIN	WAGO	2002-405
44	5	TERM BLOCK, 5mm, GREEN/YELLOW, GROUND	WAGO	2002-1207
45	1	END PLATE	WAGO	2006-1292
46	19	STOP BLOCK	WAGO	249-116
47	1	CN3 CONNECTOR	3M	10320-52F0-008
48	1	CN3 CONNECTOR	3M	10120-3000PE
49	1	SMALL FERRITE	STEWARD	28A0640-0A2
50	2	LARGE FERRITE	STEWARD	28A3851-0A2

NOTE: FOR DUPLICATE ITEM NUMBERS, SELECT ITEM BY INPUT VOLTAGE OF PANEL. SEE SCHEMATIC C00088 FOR REFERENCE.

ITEM	QTY	DESCRIPTION	MFG	P/N
51	1	CB1, LUG KIT FOR MAIN BREAKER FOR 200 - 230VAC	ABB	KT3225-3
52	1	460V LABEL - 2.25 X .5	MCMASTER	58947863
53	1	415V LABEL - 2.25 X .5	PANDUIT	PCV-415CY
53	1	380V LABEL - 2.25 X .5	MCMASTER	58947913
53	1	230V LABEL - 2.25 X .5	MCMASTER	58947833
53	1	208V LABEL - 2.25 X .5	MCMASTER	58947843
52	1	THREE PHASE LABEL - 2.25 X .5	MCMASTER	58947916
51	6	TERM BLOCK, 10MM, GRAY, 575VAC	WAGO	2006-1201
53	1	575V LABEL - 2.25 X .5	MCMASTER	58947923
60	1	CB1, LUG KIT FOR MAIN BREAKER FOR 200 - 230VAC	ABB	KT3225-3
65	10	1/4-20 KEPS NUT	MCMASTER	90675A029
64	5	1/4-20 x 3/4" GND BOLT	MCMASTER	91309A540
63	1	ENCODER CONNECTOR KIT	MITSUBISHI	MR-J3SCNS
62	1	SERVO SAFETY CABLE PIGTAIL	MITSUBISHI	MR-D05UDL3M-B
61	1	CB1, LUG KIT FOR MAIN BREAKER, OUTGOING LUGS FOR 575V	ABB	KT1TC
60	1	CB1, LUG KIT FOR MAIN BREAKER, INCOMING LUGS FOR 575V	ABB	K3TA
59	1	COPPER COMPRESSION LUGS FOR 200-230VAC	MCMASTER	6926K54
58	2	3/8" GRADE 2 NYLON-INSERT THIN HEX LOCKNUT	MCMASTER	90566A031
57	2	3/4" OD NEOPRENE SEALING WASHER	MCMASTER	94709A418
56	2	1.5" OD, ZINC PLATED STEEL FLAT WASHER	MCMASTER	91090A115
55	4	1.5" OD LOW-FRICTION PTFE FLAT WASHER	MCMASTER	95630A487
54	2	3/8 X 1" MS, 18-8SS PAN HEAD	MCMASTER	91772A677

EXCEPT AS NOTED DIMENSIONS ARE IN INCHES PER ASME Y14.5
X ± .030
XX ± .010
XXX ± .005
ANGLES ± .5°
MATERIAL
COSMETIC CLASS EXCEPT AS NOTED A

CLIMAX
Portable Machining & Welding Systems
CM6200 ROTARY MILL
MULTIPLE VOLTAGES
SIZE D | CAGE CODE 15509 | DWG NO. B00116 | REVISION K
SCALE NONE | SHEET 2 OF 2

FIGURE B-7. MR-J3 CONTROL PANEL INTERIOR ASSEMBLY SHEET 2 (P/N B00116)

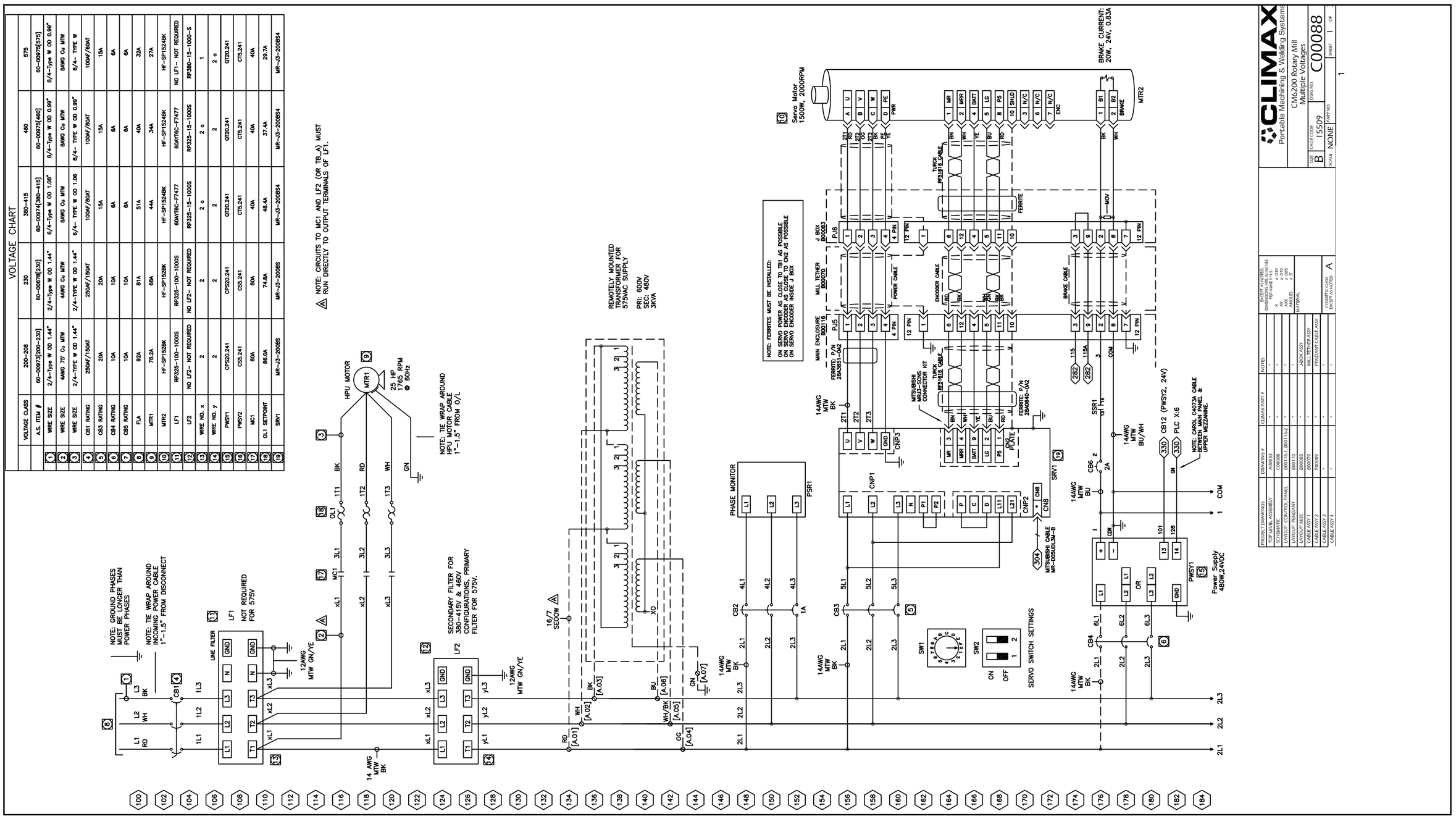


FIGURE B-8. MR-J3 SCHEMATIC SHEET 1 (P/N C00088)

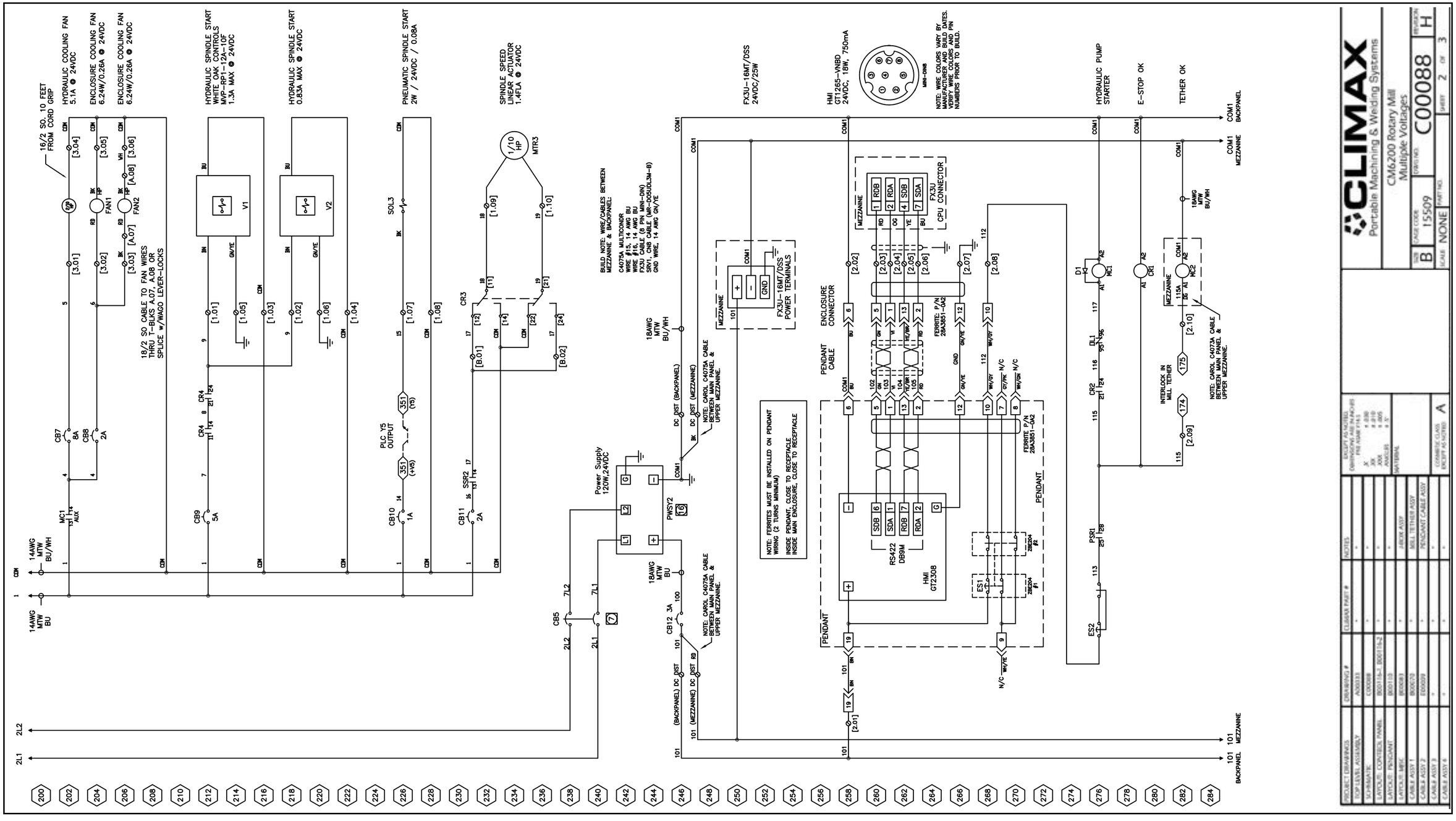


FIGURE B-9. MR-J3 SCHEMATIC SHEET 2 (P/N C00088)

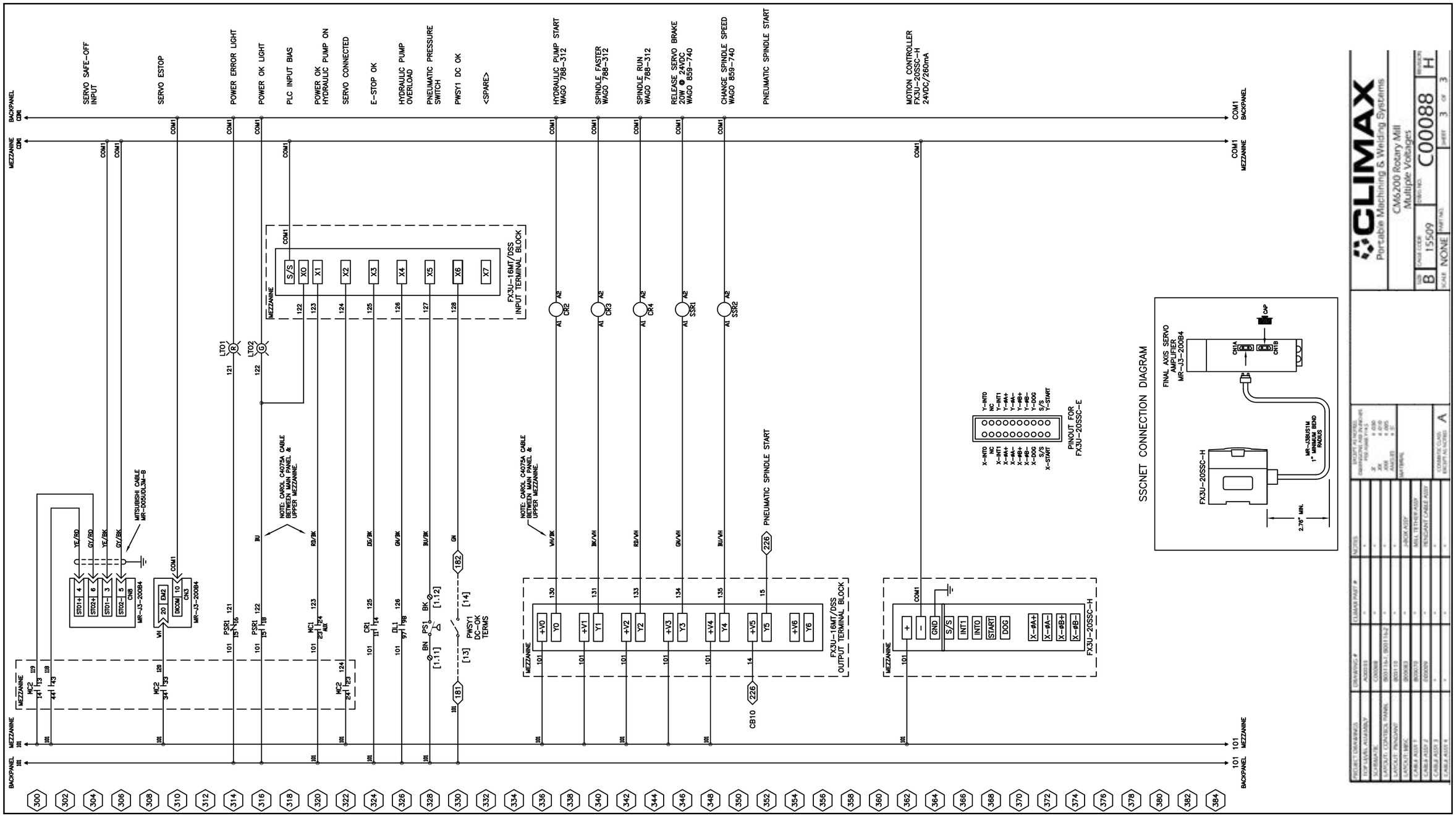
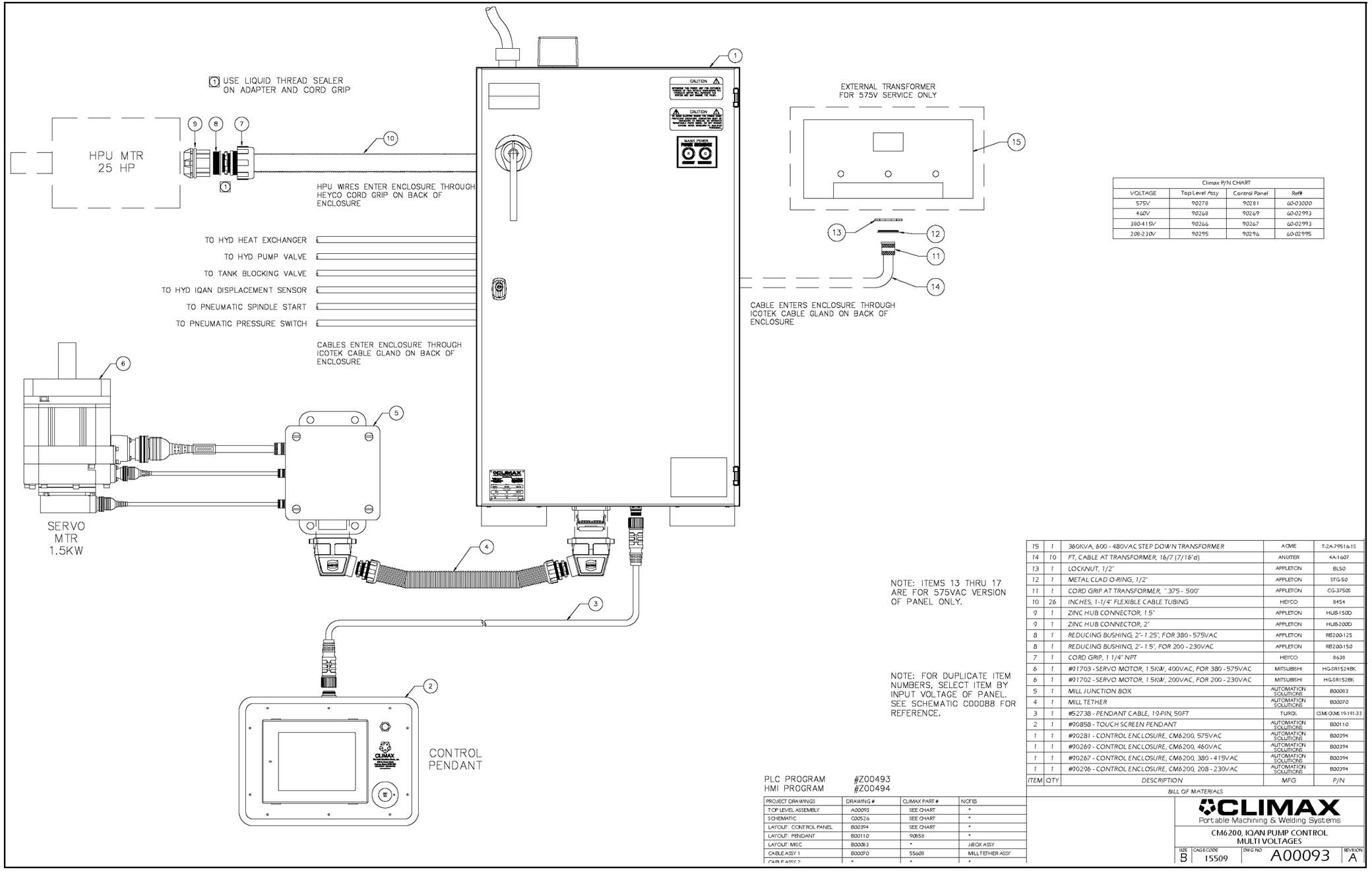


FIGURE B-10. MR-J3 SCHEMATIC SHEET 3 (P/N C00088)



Climax P/N CHART			
VOLTAGE	Top Level Assy	Control Panel	Ref#
575V	90278	90281	60-03000
460V	90268	90269	60-02993
380-415V	90266	90267	60-02993
208-230V	90295	90296	60-02995

NOTE: ITEMS 13 THRU 17 ARE FOR 575VAC VERSION OF PANEL ONLY.

NOTE: FOR DUPLICATE ITEM NUMBERS, SELECT ITEM BY INPUT VOLTAGE OF PANEL. SEE SCHEMATIC C00088 FOR REFERENCE.

ITEM	QTY	DESCRIPTION	MFG	P/N
15	1	360KVA, 600 - 480VAC STEP DOWN TRANSFORMER	ACME	T-2A-79516-1S
14	10	FT, CABLE AT TRANSFORMER, 16/7 (7/16"d)	ANIXTER	4A-1607
13	1	LOCKNUT, 1/2"	APPLETON	BLSO
12	1	METAL CLAD O-RING, 1/2"	APPLETON	STG-50
11	1	CORD GRIP AT TRANSFORMER, .375 - .500"	APPLETON	CG-3750S
10	26	INCHES, 1-1/4" FLEXIBLE CABLE TUBING	HEYCO	8454
9	1	ZINC HUB CONNECTOR, 1.5"	APPLETON	HUB-150D
9	1	ZINC HUB CONNECTOR, 2"	APPLETON	HUB-200D
8	1	REDUCING BUSHING, 2"- 1.25", FOR 380 - 575VAC	APPLETON	RB200-125
8	1	REDUCING BUSHING, 2"- 1.5", FOR 200 - 230VAC	APPLETON	RB200-150
7	1	CORD GRIP, 1 1/4" NPT	HEYCO	8638
6	1	#91703 - SERVO MOTOR, 1.5KW, 400VAC, FOR 380 - 575VAC	MITSUBISHI	HG-SR1524BK
6	1	#91702 - SERVO MOTOR, 1.5KW, 200VAC, FOR 200 - 230VAC	MITSUBISHI	HG-SR152BK
5	1	MILL JUNCTION BOX	AUTOMATION SOLUTIONS	B00083
4	1	MILL TETHER	AUTOMATION SOLUTIONS	B00070
3	1	#52738 - PENDANT CABLE, 19-PIN, 50FT	TUROL	CMSOXM-19-191-33
2	1	#90858 - TOUCH SCREEN PENDANT	AUTOMATION SOLUTIONS	B00110
1	1	#90281 - CONTROL ENCLOSURE, CM6200, 575VAC	AUTOMATION SOLUTIONS	B00394
1	1	#90269 - CONTROL ENCLOSURE, CM6200, 460VAC	AUTOMATION SOLUTIONS	B00394
1	1	#90267 - CONTROL ENCLOSURE, CM6200, 380 - 415VAC	AUTOMATION SOLUTIONS	B00394
1	1	#90296 - CONTROL ENCLOSURE, CM6200, 208 - 230VAC	AUTOMATION SOLUTIONS	B00394

BILL OF MATERIALS

PLC PROGRAM #Z00493
HMI PROGRAM #Z00494

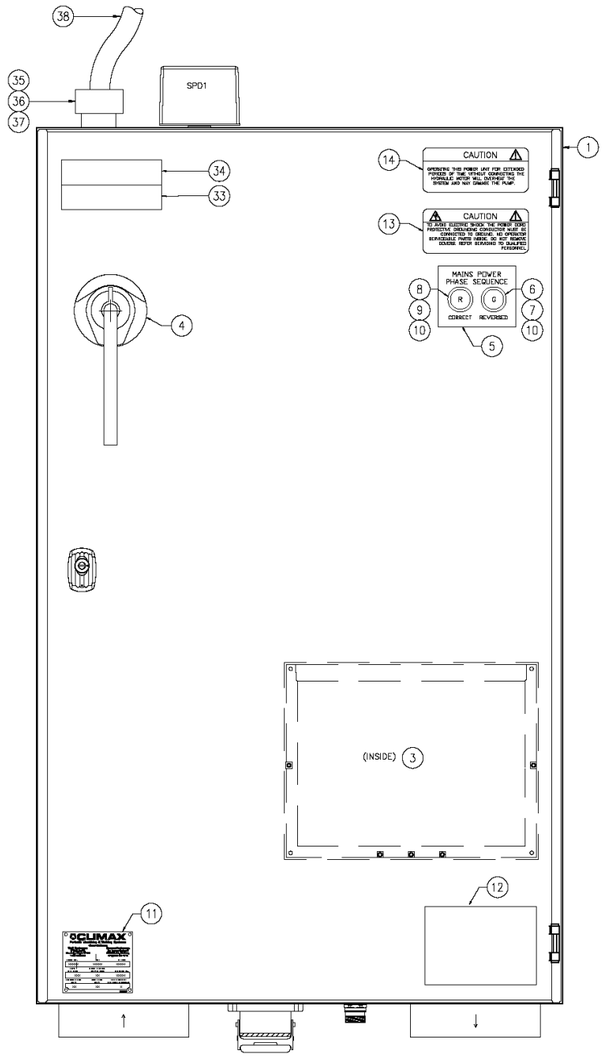
PROJECT DRAWINGS	DRAWING #	CLIMAX PART #	NOTES
TOP LEVEL ASSEMBLY	A00093	SEE CHART	*
SCHEMATIC	C00526	SEE CHART	*
LAYOUT: CONTROL PANEL	B00394	SEE CHART	*
LAYOUT: PENDANT	B00110	90858	*
LAYOUT: MISC	B00083	*	J-BOX ASSY
CABLE ASSY 1	B00070	55608	MILL TETHER ASSY
CABLE ASSY 2	*	*	*

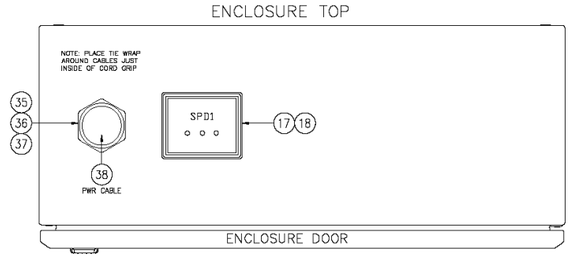
CLIMAX
Portable Machining & Welding Systems

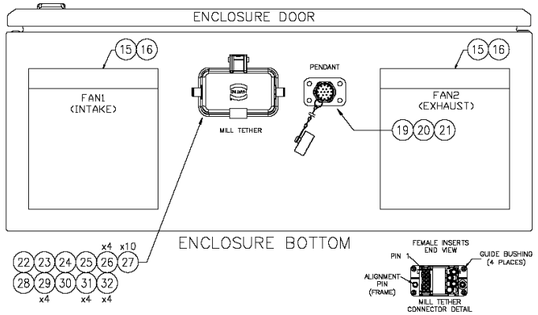
CM6200, IQAN PUMP CONTROL
MULTI VOLTAGES

SIZE	CAGE CODE	DWG NO.	REVISION
B	15509	A00093	A

FIGURE B-11. MR-J4 LAYOUT (P/N A00093)







ITEM	QTY	DESCRIPTION	MFG	P/N
		BILL OF MATERIALS		
38	1	FT, PORTABLE POWER CORD, 8/4, TYPE W FOR 460-575VAC	AMXTER	SB-0804C
38	1	FT, PORTABLE POWER CORD, 4/4, TYPE W FOR 208-240VAC	AMXTER	SB-0404C
37	1	SEALING GASKET, 1-1/4", FOR 380-460VAC	APPLETON	STG-125
37	1	SEALING GASKET, 1-1/2", FOR 208-240VAC	APPLETON	STG-150
36	1	LOCKNUT, 1-1/4", FOR 380-460VAC	APPLETON	EL125
36	1	LOCKNUT, 1-1/2", FOR 208-240VAC	APPLETON	EL150
35	1	CORD GRIP, 1-1/4", MAIN POWER, FOR 380-460VAC	APPLETON	CG-1001258
35	1	CORD GRIP, 1-1/2", MAIN POWER, FOR 208-240VAC	APPLETON	CG-1281508
34	1	575V LABEL - 4.5 X 1.125	MCMASTER	5894T922
34	1	460V LABEL - 4.5 X 1.125	MCMASTER	5894T862
34	1	380V LABEL - 4.5 X 1.125	MCMASTER	5894T912
34	1	230V LABEL - 4.5 X 1.125	MCMASTER	5894T832
34	1	208V LABEL - 4.5 X 1.125	MCMASTER	5894T842
33	1	THREE PHASE LABEL - 4.5 X 1.125	MCMASTER	5894T4
32	4	GUIDE BUSHINGS	HARTING	09 14 000 9909
31	4	HAN MODULAR CONNECTOR, CONTACT, FEMALE, AWG 18	HARTING	09 15 000 6202
30	1	HAN MODULAR CONNECTOR, FEMALE INSERT, 7 PIN	HARTING	09 14 007 3101
29	4	HAN MODULAR CONNECTOR, CONTACT, FEMALE, AWG 14	HARTING	09 32 000 6205
28	1	HAN MODULAR CONNECTOR, HOUSING, BULKHEAD MOUNT	HARTING	09 30 010 0318
27	10	HAN MODULAR CONNECTOR, CONTACT, FEMALE AWG 26-22	HARTING	09 15 000 6224
26	4	HAN MODULAR CONNECTOR, CONTACT, FEMALE AWG 16	HARTING	09 15 000 6201
25	1	HAN MODULAR CONNECTOR, FEMALE INSERT, 12 PIN	HARTING	09 14 012 3101
24	1	HAN MODULAR CONECTOR, FRAME FOR 3 MODULES	HARTING	09 14 010 0303
23	1	HAN MODULAR CONNECTOR, FEMALE INSERT, 4 PINS	HARTING	09 14 004 3141
22	1	HAN MODULAR CONNECTOR, DUMMY MODULE	HARTING	09 14 000 9950
21	1	CLOSURE CAP, PENDANT CONNECTOR	TURCK	CK-CC
20	1	SUPPORT PLATE FOR CKM CMS SUPPORT PLATE	AUTOMATION SOLUTIONS	H00052
19	1	CONNECTOR, PENDANT, 19 PIN, FEMALE	TURCK	CKFD 19-19-1
18	1	NEOPRENE SEALING GASKET, 1/2"	APPLETON	STG-50
17	1	SURGE ARRESTER & POWER CONDITIONER	SCHNEIDER	SDSA3 650
16	2	EXHAUST	HARWA	3142-0148-00-67
15	2	FANS, 24VDC	ORION	OD1238-24HB
14	1	15396 - LABEL, CAUTION HYDRAULIC OVERHEAT	CLIMAX	15396
13	1	37576 - CAUTION LABEL	CLIMAX	N00042
12	1	ARC FLASH WARNING LABEL	SAFETYSIGN	JS543-JF
11	1	39125 - NAMEPLATE FOR ELECTRICAL PANELS	AUTOMATION SOLUTIONS	N00002
10	2	MOUNTING BASE	TELEMECANIQUE	ZB4BZ009
9	1	LIGHT MODULE, RED, 24V-120V	SCHNEIDER	ZBVBG4
8	1	PILOT LIGHT HEAD, RED	SCHNEIDER	ZB4BV043
7	1	LIGHT MODULE, GREEN, 24V-120V	SCHNEIDER	ZBVBG3
6	1	PILOT LIGHT HEAD, GREEN	SCHNEIDER	ZB4BV033
5	1	PHASE SEQUENCE LEGEND PLATE	AUTOMATION SOLUTIONS	P00011
4	1	MAIN DISCONNECT NEMA4 HANDLE ASSY	SCHNEIDER	9421LH4GRY
3	1	PRINT POCKET, A4 (INSIDE FRONT DOOR)	SCHNEIDER	NSYDPA4
2	1	DOOR RETAINER	SCHNEIDER	NSYAEDRGST
1	1	ENCLOSURE, 36" X 24" X 12"	SCHNEIDER	NSYS3DC13625

Climax P/N CHART		
VOLTAGE	Control Panel	Ref#
575V	90281	60-03000
380-460V	90267/90269	60-02993
208-230V	90296	60-02995

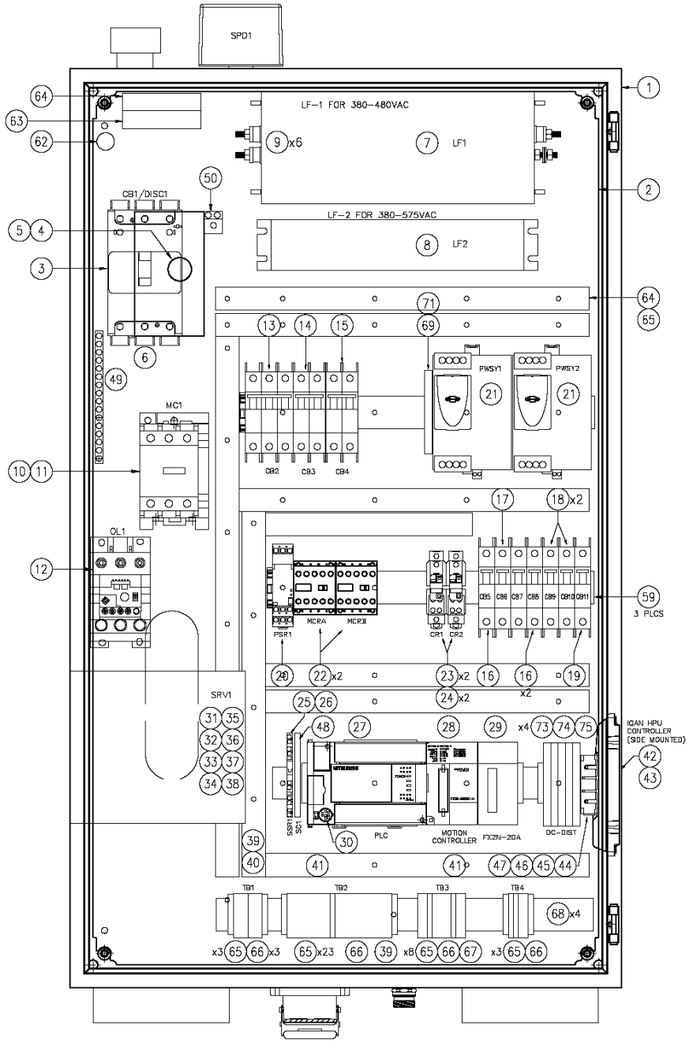
PROJECT DRAWINGS	DRAWING #	CLIMAX PART #	NOTES
TOP LEVEL ASSEMBLY	A00093	*	*
SCHEMATIC	C00526	*	*
LAYOUT: CONTROL PANEL	B00394	SEE CHART	*
LAYOUT: PENDANT	B00110	90858	*
LAYOUT: MISC	B00083	*	J-BOX ASSY
CABLE ASSY 1	B00070	55608	MILL TETHER ASSY
CABLE ASSY 2	*	*	*
ENCLOSURE TEMPLATE			*

EXCEPT AS NOTED, DIMENSIONS ARE IN INCHES PER ASME Y14.5
.X ± .010
.XX ± .010
.XXX ± .005
ANGLES ± 5°
MATERIAL
COSMETIC CLASS EXCEPT AS NOTED A

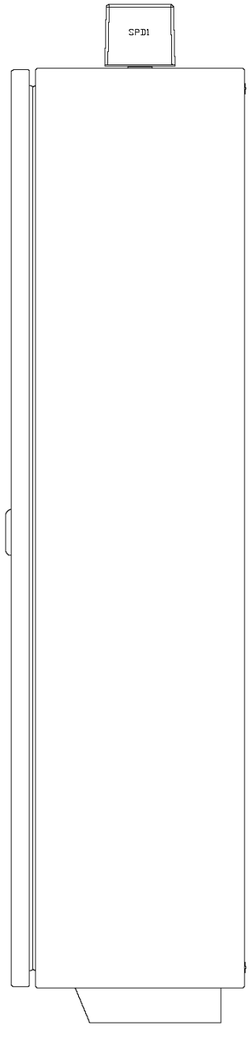
ADDITIONAL INFORMATION AND SPECIFICATIONS REQUIRED TO MANUFACTURE THIS PART ARE PROVIDED IN CLIMAX SPEC. P100
DRAWN RG DATE 5/26/18
CHECKED DATE
APPROVED DATE
CAD/CAM STD 4

CLIMAX Portable Machining & Welding Systems
CM6200 w/ IQAN PUMP CONTROL MULTI VOLTAGES
SIZE B | CAGE CODE 15509 | DWG NO. B00394 | REVISION A
SCALE 1:1 | P/N SEE CHART | SHEET 1 OF 2

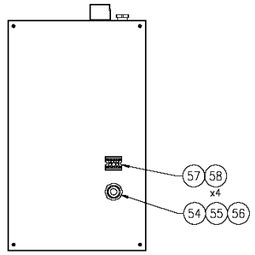
FIGURE B-12. MR-J4 CONTROL PANEL ASSEMBLY EXTERIOR (P/N B000394)



CONTROLS ENCLOSURE
(INSIDE VIEW)



RIGHT SIDE VIEW



BACK VIEW
(¼ SCALE)

ITEM	QTY	DESCRIPTION	MFG	P/N
78	4	1/4-20 HEX NUT	McMASTER	90473A029
77	4	1/4-20 KEPS NUT	McMASTER	90675A029
76	2	1/4-20 x 3/4" GND BOLT	McMASTER	91309A540
75	1	JUMPER, 4 PIN	WAGO	2002-404
74	1	JUMPER, 3 PIN	WAGO	2002-403
73	3	JUMPER, 2 PIN	WAGO	2002-402
72	18	T-BLOCK END STOPS	WAGO	249-116
71	3	END PLATE, ORANGE	WAGO	2002-1492
70	1	T-BLOCK, 4 CONDR, GRN/YE	WAGO	2002-1407
69	5	T-BLOCK, 4 CONDR, GRAY	WAGO	2002-1401
68	4	END PLATE, ORN	WAGO	2002-1292
67	1	TERM BLOCK, 5mm, GREEN/YELLOW, GROUND	WAGO	2002-1207
66	6	TERM BLOCK, 5mm, GRAY	WAGO	2002-1201
65	37	TERM BLOCK, 5mm, BLUE	WAGO	2002-1204
64	1	460V LABEL - 2.25 X 5	MCMASTER	5894TB63
64	1	380V LABEL - 2.25 X 5	MCMASTER	5894T913
64	1	230V LABEL - 2.25 X 5	MCMASTER	5894TB33
64	1	208V LABEL - 2.25 X 5	MCMASTER	5894TB43
63	1	THREE PHASE LABEL - 2.25 X 5	MCMASTER	5894T6
62	1	PROTECTIVE EARTH LABEL	PANDUIT	PRESS-A-PE
61	1	WIRE DUCT COVER	MULTIPLE	MULTIPLE
60	1	WIRE DUCT	MULTIPLE	MULTIPLE
59	1	DINRAIL	MULTIPLE	MULTIPLE

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	MFG	P/N
58	4	10-32 x5/8" BHCS, GLAND MOUNTINGSCREW	McMASTER	92949A247
57	1	CABLE GLAND	ICOTEK	KEL-DPZ-817 GY
56	1	SEALING GASKET, 1-1/4"	APPLETON	STG125
55	1	LOCKNUT, 1-1/4"	APPLETON	EL125
54	1	PVC CONNECTOR, 1-1/4", BLACK	HEYCO	8638
53	1	GROUND LUG	MULTIPLE	MULTIPLE
52	1	GROUND BAR	EATON	GBK14
48	1	SIGNAL CONDITIONER	WAGO	857-412
47	2	TERMINAL, 14AWG	Yazaki	7116-4152-02
46	23	TERMINAL	MOLEX	37467-0024
45	1	CONNECTOR COVER	MOLEX	34506-0003
44	1	DUAL ROW RT ANGLE HEADER	MOLEX	34822-0013
43	1	IQAN HPU CONTROLLER ID TAG	PARKER	20085116
42	1	IQAN HPU CONTROLLER	PARKER	MC41
41	2	FERRITE, 122 OHMS 100MHz	LAIRD	28B0870-100
40	1	SMALL FERRITE, SPLIT/SNAP-ON, 240 OHMS 100MHZ	LAIRD	28A0640-0A2
39	2	LARGE FERRITE, SPLIT/SNAP-ON, 260 OHMS 100MHz	LAIRD	28A3851-0A2
38	1	CN3 CONNECTOR	3M	10120-3000PE
37	1	CN3 CONNECTOR	3M	10320-52F0-008
36	1	SERVO SAFETY CABLE PIGTAIL	MITSUBISHI	MR-D05UDL3M-B
35	3	FT, ENCODER CABLE	TURCK	RFS1616
34	1	ENCODER CONNECTOR KIT	MITSUBISHI	MR-J3SCNS
33	1	SSCNET III CABLE, 1 METER	MITSUBISHI	MR-J3BUS1M
32	1	SERVO AMP, 2KW, 400V FOR 380 - 575VAC	MITSUBISHI	MR-J4-20GB4-RJ
31	1	SERVO AMP, 2KW, 200V FOR 200 - 230VAC	MITSUBISHI	MR-J4-20GB-RJ
30	1	8 PIN MINI-DIN 8 CABLE	L-COM	DX238MM-15
29	1	DIGITAL TO ANALOG MODULE	MITSUBISHI	FX2N-2DA
28	1	FX3U SSCNET 2 AXIS POSITIONING MODULE	MITSUBISHI	FX3U-20SSC-H
27	1	PLC BASE, 8 IN/ 8 OUT	MITSUBISHI	FX3U-16MT/DS
26	1	SSR1: SOLID STATE RELAY	SCHNEIDER	SSL1D038D
25	1	SSR1: RELAY BASE	SCHNEIDER	SSL2BA1
24	2	CR1, CR2: RELAY SOCKET	SCHNEIDER	RPZF1
23	2	CR1, CR2: RELAY, 1 C/O	SCHNEIDER	RPM12BD
22	2	MCRA, MCRB: RELAY, 3NO, 1NC, 24VDC COIL	SCHNEIDER	CA3KN40BD
21	2	POWER SUPPLY, 24VDC, 10A	SCHNEIDER	ABL8RPS24100
20	1	PSR1: PHASE SEQUENCE RELAY	SCHNEIDER	RM22TG20
19	1	CB11, CIRCUIT BREAKER, 1A, 1 POLE	SCHNEIDER	60101
18	2	CB9, CB10: CIRCUIT BREAKER, 10A, 1 POLE	SCHNEIDER	60110
17	1	CB8, CIRCUIT BREAKER, 8A, 1 POLE	SCHNEIDER	60109
16	3	CB5, CB7, CB8: CIRCUIT BREAKER, 2A, 1 POLE	SCHNEIDER	60103
15	1	CB4: CIRCUIT BREAKER, 10A, 2 POLE, FOR 460VAC	SCHNEIDER	MGN61319
14	1	CB3: CIRCUIT BREAKER, 15A, 3 POLE, FOR 380-575VAC	SCHNEIDER	MGN61331
14	1	CB3: CIRCUIT BREAKER, 20A, 3 POLE, FOR 200-230VAC	SCHNEIDER	60180
13	1	CB2: CIRCUIT BREAKER, 1A, 3 POLE	SCHNEIDER	MGN61323
12	1	OL1: ELECTRONIC OVERLOAD RELAY	SCHNEIDER	LR9D1105
11	1	MC1: AUX CONTACTS	SCHNEIDER	LADN20
10	1	MC1: CONTACTOR, 40A 24VDC, FOR 380-575VAC	SCHNEIDER	LC1D40BD
10	1	MC1: CONTACTOR, 80A 24VDC, FOR 208-240VAC	SCHNEIDER	LC1D80BD
9	6	TERMINAL INSULATORS, BLACK	VTE	800NSV14
8	1	LF2, LINE FILTER, 15A, FOR 575VAC	SCHAFFNER	FN258L-16-29
8	1	LF2, LINE FILTER, 15A, FOR 380 - 460VAC	SCHAFFNER	FN258L-16-29
7A	1	LF1, MOUNTING KIT, FOR 380 - 460VAC	CORCOM	AA465
7	1	LF1, LINE FILTER, 60A, FOR 380 - 460VAC	CORCOM	60AVTQFF477
7	1	LF1, LINE FILTER, 75A FOR 200 - 230VAC	SCHAFFNER	FN258L-75-34
6	1	DISTRIBUTION SET, 3/6, 14-6AWG	SCHNEIDER	PDC6BD6
5	1	DISC1: DISCONNECT SHAFT	SCHNEIDER	9421LS8
4	1	DISC1: MAIN DISCONNECT OPERATING MECHANISM	SCHNEIDER	9421LB7
3	1	CB1: CIRCUIT BREAKER, 35A, 3 POLE, FOR 575VAC	SCHNEIDER	BDL36035
3	1	CB1: CIRCUIT BREAKER, 60A, 3 POLE, FOR 380-460VAC	SCHNEIDER	BDL36060
3	1	CB1: CIRCUIT BREAKER, 90A, 3 POLE, FOR 230-240VAC	SCHNEIDER	BDL36090
3	1	CB1: CIRCUIT BREAKER, 110A, 3 POLE, FOR 208VAC	SCHNEIDER	BDL36110
2	1	BACK PANEL	AUTOMATION SOLUTIONS	H96603
1	1	ENCLOSURE, 36" X 24" X12"	SCHNEIDER	NSYS3DC10625

BILL OF MATERIALS

PLC PROGRAM #Z00493
HMI PROGRAM #Z00494

Climax P/N CHART		
VOLTAGE	Control Panel	Ref#
575V	90281	60-03000
380-460V	90267/90269	60-02993
208-230V	90296	60-02995

PROJECT DRAWINGS	DRAWING #	CLIMAX PART #	NOTES
TOP LEVEL ASSEMBLY	A00093	"	"
SCHEMATIC	C00526	"	"
LAYOUT: CONTROL PANEL	B00394	SEE CHART	"
LAYOUT: PENDANT	B00110	90858	"
LAYOUT: MISC	B00083	"	J-BOX ASSY
CABLE ASSY 1	B00070	55608	MILL TETHER ASSY
CABLE ASSY 2	"	"	"

EXCEPT AS NOTED DIMENSIONS ARE IN INCHES PER ASME Y14.5
.X ±.020
.XX ±.010
.XXX ±.005
ANGLES ±.5°
MATERIAL

ADDITIONAL INFORMATION AND SPECIFICATIONS REQUIRED TO MANUFACTURE THIS PART ARE PROVIDED IN CLIMAX SPEC. P100
DRAWN RG DATE 5/26/18
CHECKED DATE
APPROVED DATE

CLIMAX
Portable Machining & Welding Systems
CM6200 w/ IQAN PUMP CONTROL
MULTI VOLTAGES
SIZE B | CAGE CODE 15509 | DWG NO. B00394 | REVISION A

FIGURE B-13. MR-J4 CONTROL PANEL ASSEMBLY INTERIOR (P/N B00394)

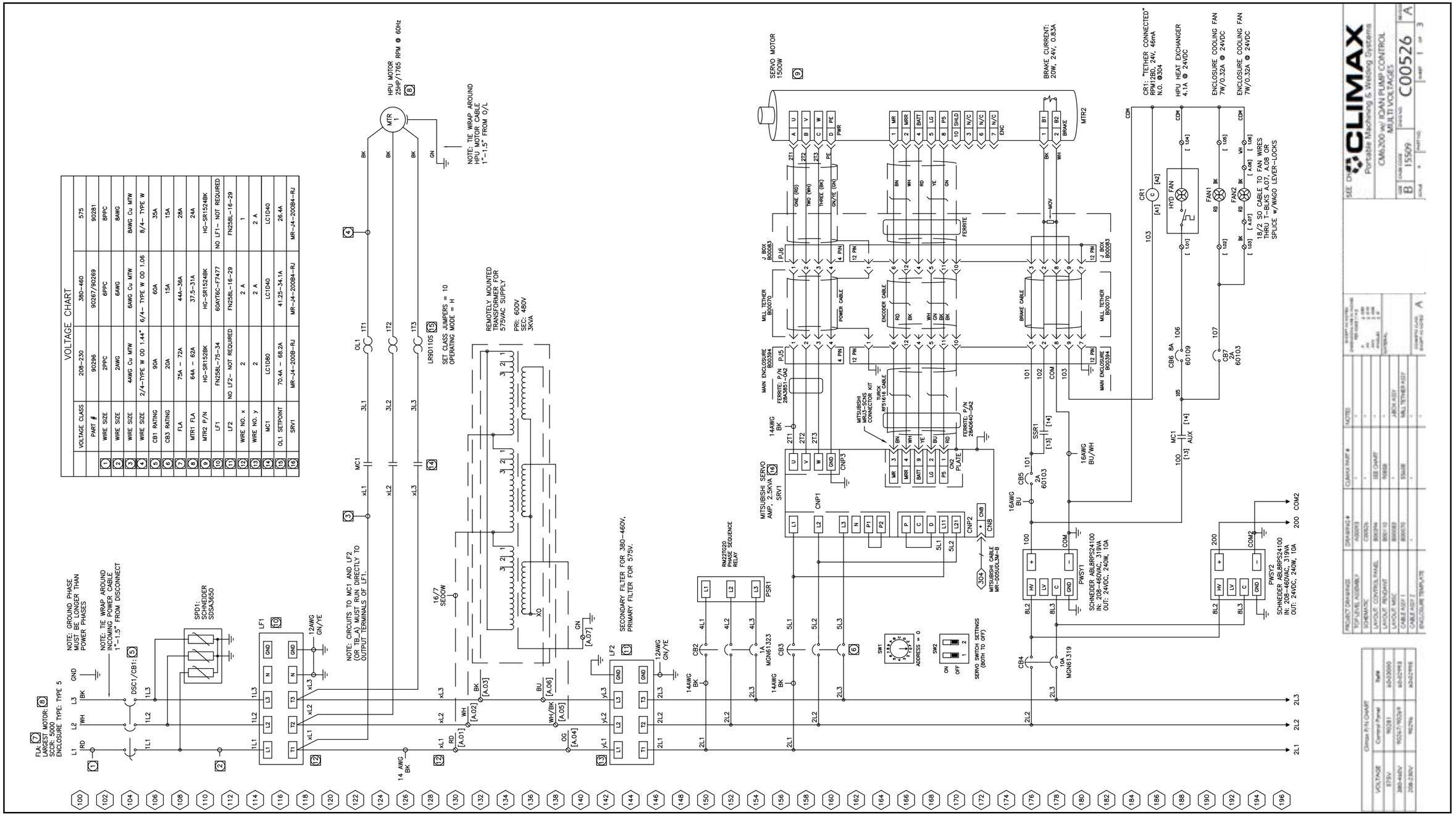


FIGURE B-14. MR-J4 SCHEMATIC SHEET 1 (P/N C00526)

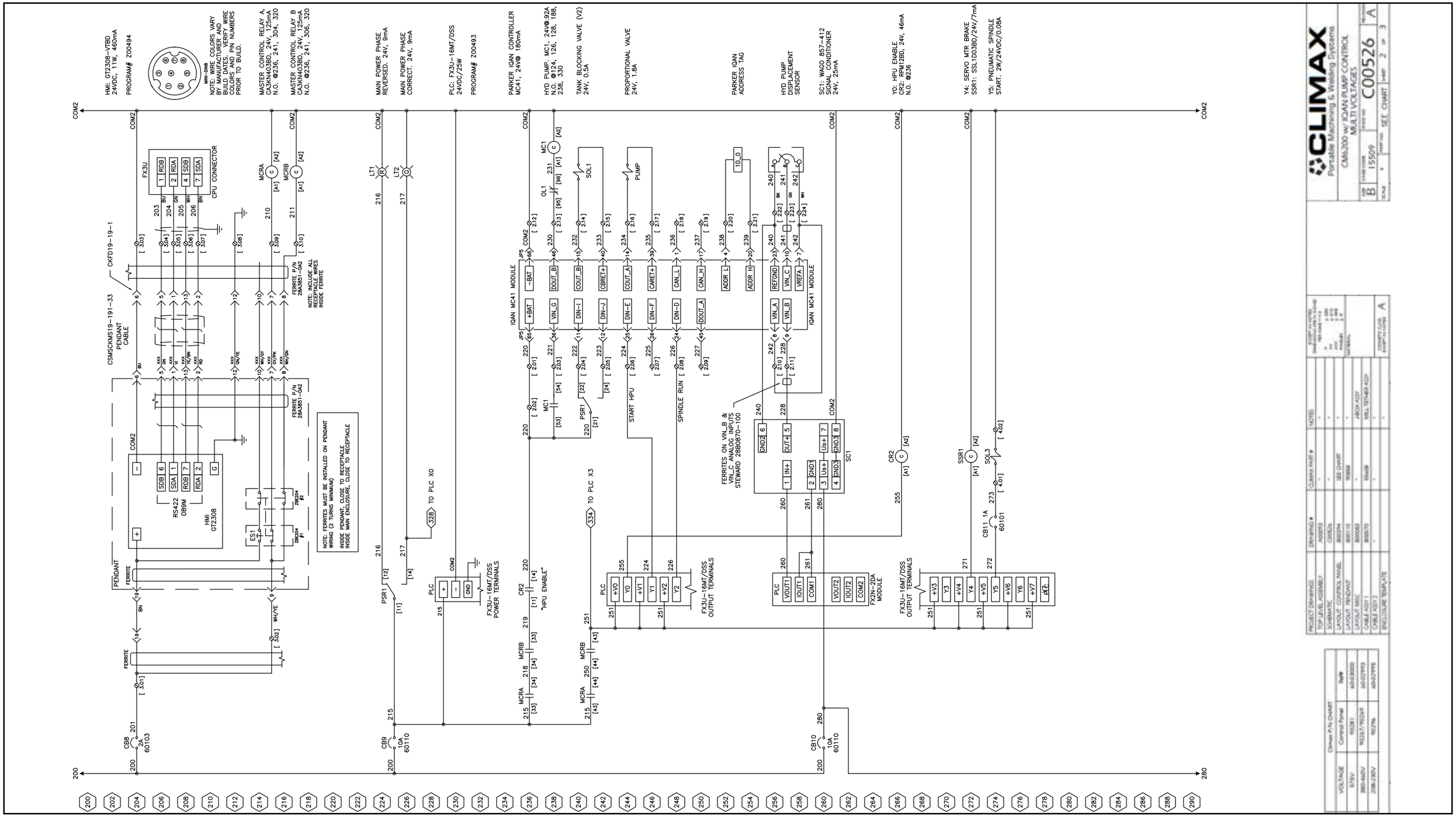


FIGURE B-15. MR-J4 SCHEMATIC SHEET 2 (P/N C00526)

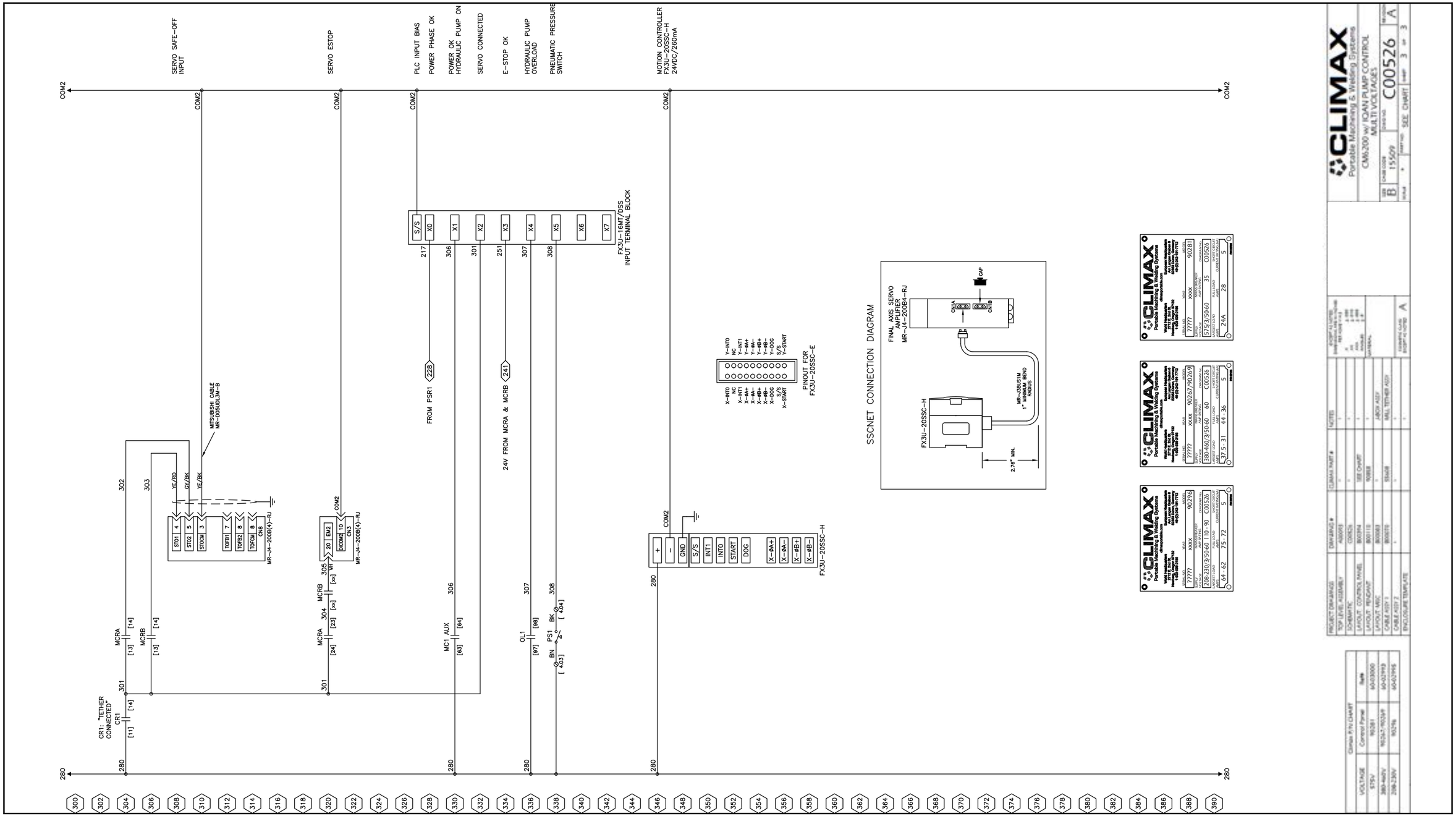


FIGURE B-16. MR-J4 SCHEMATIC SHEET 3 (P/N C00526)

This page intentionally left blank

APPENDIX C SDS

Contact CLIMAX for the current list of safety data sheets.

This page intentionally left blank

APPENDIX D MR-J4 SERVO AMPLIFIER MANUAL

For any issues with the MR-J4 servo motor junction box, see the following pages.

This page intentionally left blank

1 TROUBLESHOOTING FOR SERVO AMPLIFIER (DRIVE UNIT)

Point

- As soon as an alarm occurs, turn SON (Servo-on) off and interrupt the power.
- [AL. 37 Parameter error] and warnings (except [AL. F0 Tough drive warning]) are not recorded in the alarm history.
- [AL. 8D.1 CC-Link IE communication error 1] and [AL. 8D.2 CC-Link IE communication error 2] are not recorded in the alarm history. For MR-J4-_GF_(-RJ), these alarms are recorded by setting [Pr. PN06] to "_ _ _ 1".

When an error occurs during operation, the corresponding alarm or warning is displayed.
When an alarm occurs, ALM will turn off. Refer to the following and take the appropriate action.
☞ Page 30 Remedies for alarms
When an warning is displayed, refer to the following and take the appropriate action.
☞ Page 103 Remedies for warnings

1.1 Explanation for the lists

No./Name/Detail No./Detail name

Indicates each No./Name/Detail No./Detail name of alarms or warnings.

Stop method

For the alarms and warnings in which "SD" is written in the stop method column, the servo motor stops with the dynamic brake after forced stop deceleration. For the alarms and warnings in which "DB" or "EDB" is written in the stop method column, the servo motor stops with the dynamic brake without forced stop deceleration.

Alarm deactivation

After its cause has been removed, the alarm can be deactivated in any of the methods marked ○ in the alarm deactivation column. Warnings are automatically canceled after the cause of occurrence is removed. Alarms are deactivated with alarm reset, CPU reset, or cycling the power.

■MR-J4-_A_(-RJ)/MR-J4-DU_A_(-RJ)

Alarm deactivation	Explanation
Alarm reset	1. Turning on RES (Reset) with input device 2. Pushing the "SET" button while the display of the servo amplifier is the current alarm display status 3. Click "Occurring Alarm Reset" in the "Alarm Display" window of MR Configurator2
Cycling the power	Turning the power off and then turning it on again.

■MR-J4-_B_(-RJ010)/MR-J4W_-_B/MR-J4-DU_B_(-RJ)/MR-J4-_GF_(-RJ)

Alarm deactivation	Explanation
Alarm reset	1. Reset command from controller 2. Click "Occurring Alarm Reset" in the "Alarm Display" window of MR Configurator2
CPU reset	Resetting the controller itself
Cycling the power	Turning the power off and then turning it on again.

Processing system (only for MR-J4W_-_B_)

Processing system of alarms is as follows.
Each axis: Alarm is detected for each axis.
Common: Alarm is detected as the whole servo amplifier.

Stop system (only for MR-J4W_-_B_)

This means target axis to stop when the alarm occurs.

Each axis: Only alarming axis will stop.

All axes: All axes will stop.

Alarm code (only MR-J4-_A_(-RJ)/MR-J4-DU_A_(-RJ))

To output alarm codes, set [Pr. PD34] to "_ _ _ 1" when using an MR-J4-_A_(-RJ)/MR-J4-DU_A_(-RJ). Alarm codes are outputted by on/off of bit 0 to bit 2. Warnings ([AL. 90] to [AL. F3]) do not have alarm codes. The alarm codes in the following table will be outputted when they occur. The alarm codes will not be outputted in normal condition.

When using an MR-D01 extension IO unit, you can output alarm codes by setting [Pr. Po12] to "_ _ _ 1". Alarm codes are outputted by on/off of bit 0 to bit 3.

1.2 Alarm list

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
10	Undervoltage	10.1	Voltage drop in the control circuit power	EDB	○	○	○	Common	All axes	0	0	1	0
		10.2	Voltage drop in the main circuit power	SD	○	○	○	Common	All axes				
11	Switch setting error	11.1	Axis number setting error/ Station number setting error	DB	—	—	○	Common	All axes	—	—	—	—
		11.2	Disabling control axis setting error	DB	—	—	○	Common	All axes	—	—	—	—
12	Memory error 1 (RAM)	12.1	RAM error 1	DB	—	—	○	Common	All axes	0	0	0	0
		12.2	RAM error 2	DB	—	—	○	Common	All axes				
		12.3	RAM error 3	DB	—	—	○	Common	All axes				
		12.4	RAM error 4	DB	—	—	○	Common	All axes				
		12.5	RAM error 5	DB	—	—	○	Common	All axes				
		12.6	RAM error 6	DB	—	—	○	—	—	—	—	—	—
13	Clock error	13.1	Clock error 1	DB	—	—	○	Common	All axes	0	0	0	0
		13.2	Clock error 2	DB	—	—	○	Common	All axes				
		13.3	Clock error 3	DB	—	—	○	—	—	—	—	—	—
14	Control process error	14.1	Control process error 1	DB	—	—	○	Common	All axes	0	0	0	0
		14.2	Control process error 2	DB	—	—	○	Common	All axes				
		14.3	Control process error 3	DB	—	—	○	Common	All axes				
		14.4	Control process error 4	DB	—	—	○	Common	All axes				
		14.5	Control process error 5	DB	—	—	○	Common	All axes				
		14.6	Control process error 6	DB	—	—	○	Common	All axes				
		14.7	Control process error 7	DB	—	—	○	Common	All axes				
		14.8	Control process error 8	DB	—	—	○	Common	All axes				
		14.9	Control process error 9	DB	—	—	○	Common	All axes				
		14.A	Control process error 10	DB	—	—	○	Common	All axes				
		14.B	Control process error 11	DB	—	—	○	—	—	—	—	—	—
		14.C	Control process error 12	DB	—	—	○	—	—	—	—	—	—
		14.D	Control process error 13	DB	—	—	○	—	—	—	—	—	—

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *3	Stop system *3	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
15	Memory error 2 (EEP-ROM)	15.1	EEP-ROM error at power on	DB	—	—	○	Common	All axes	0	0	0	0
		15.2	EEP-ROM error during operation	DB	—	—	○	Common	All axes				
		15.4	Home position information read error	DB	—	—	○	—	—				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
16	Encoder initial communication error 1	16.1	Encoder initial communication - Receive data error 1	DB	—	—	○	Each axis	Each axis	0	1	1	0
		16.2	Encoder initial communication - Receive data error 2	DB	—	—	○	Each axis	Each axis				
		16.3	Encoder initial communication - Receive data error 3	DB	—	—	○	Each axis	Each axis				
		16.4	Encoder initial communication - Encoder malfunction *6	DB	—	—	○	Each axis	Each axis				
		16.5	Encoder initial communication - Transmission data error 1	DB	—	—	○	Each axis	Each axis				
		16.6	Encoder initial communication - Transmission data error 2	DB	—	—	○	Each axis	Each axis				
		16.7	Encoder initial communication - Transmission data error 3	DB	—	—	○	Each axis	Each axis				
		16.8	Encoder initial communication - Incompatible encoder *6	DB	—	—	○	Each axis	Each axis				
		16.A	Encoder initial communication - Process error 1	DB	—	—	○	Each axis	Each axis				
		16.B	Encoder initial communication - Process error 2	DB	—	—	○	Each axis	Each axis				
		16.C	Encoder initial communication - Process error 3	DB	—	—	○	Each axis	Each axis				
		16.D	Encoder initial communication - Process error 4	DB	—	—	○	Each axis	Each axis				
		16.E	Encoder initial communication - Process error 5	DB	—	—	○	Each axis	Each axis				
		16.F	Encoder initial communication - Process error 6	DB	—	—	○	Each axis	Each axis				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
17	Board error	17.1	Board error 1	DB	—	—	○	Common	All axes	0	0	0	0
		17.3	Board error 2	DB	—	—	○	Common	All axes				
		17.4	Board error 3	DB	—	—	○	Common	All axes				
		17.5	Board error 4	DB	—	—	○	Common	All axes				
		17.6	Board error 5	DB	—	—	○	Common	All axes				
		17.7	Board error 7	DB	—	—	○	—	—				
		17.8	Board error 6 *5	EDB	—	—	○	Common	All axes				
		17.9	Board error 8	DB	—	—	○	—	—	—	—	—	—
19	Memory error 3 (Flash-ROM)	19.1	Flash-ROM error 1	DB	—	—	○	Common	All axes	0	0	0	0
		19.2	Flash-ROM error 2	DB	—	—	○	Common	All axes				
		19.3	Flash-ROM error 3	DB	—	—	○	—	—	—	—	—	—
1A	Servo motor combination error	1A.1	Servo motor combination error 1	DB	—	—	○	Each axis	Each axis	0	1	1	0
		1A.2	Servo motor control mode combination error	DB	—	—	○	Each axis	Each axis				
		1A.4	Servo motor combination error 2	DB	—	—	○	Each axis	Each axis				
1B	Converter error	1B.1	Converter unit error	DB	—	—	○	—	—	0	0	1	0
1E	Encoder initial communication error 2	1E.1	Encoder malfunction	DB	—	—	○	Each axis	Each axis	0	1	1	0
		1E.2	Load-side encoder malfunction	DB	—	—	○	Each axis	Each axis				
1F	Encoder initial communication error 3	1F.1	Incompatible encoder	DB	—	—	○	Each axis	Each axis	0	1	1	0
		1F.2	Incompatible load-side encoder	DB	—	—	○	Each axis	Each axis				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *3	Stop system *3	Alarm code *4			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
20	Encoder normal communication error 1	20.1	Encoder normal communication - Receive data error 1	EDB	—	—	○	Each axis	Each axis	0	1	1	0
		20.2	Encoder normal communication - Receive data error 2	EDB	—	—	○	Each axis	Each axis				
		20.3	Encoder normal communication - Receive data error 3	EDB	—	—	○	Each axis	Each axis				
		20.5	Encoder normal communication - Transmission data error 1	EDB	—	—	○	Each axis	Each axis				
		20.6	Encoder normal communication - Transmission data error 2	EDB	—	—	○	Each axis	Each axis				
		20.7	Encoder normal communication - Transmission data error 3	EDB	—	—	○	Each axis	Each axis				
		20.9	Encoder normal communication - Receive data error 4	EDB	—	—	○	Each axis	Each axis				
		20.A	Encoder normal communication - Receive data error 5	EDB	—	—	○	Each axis	Each axis				
21	Encoder normal communication error 2	21.1	Encoder data error 1	EDB	—	—	○	Each axis	Each axis	0	1	1	0
		21.2	Encoder data update error	EDB	—	—	○	Each axis	Each axis				
		21.3	Encoder data waveform error	EDB	—	—	○	Each axis	Each axis				
		21.4	Encoder non-signal error	EDB	—	—	○	Each axis	Each axis				
		21.5	Encoder hardware error 1	EDB	—	—	○	Each axis	Each axis				
		21.6	Encoder hardware error 2	EDB	—	—	○	Each axis	Each axis				
		21.9	Encoder data error 2	EDB	—	—	○	Each axis	Each axis				
24	Main circuit error	24.1	Ground fault detected by hardware detection circuit	DB	—	—	○	Each axis	All axes	1	1	0	0
		24.2	Ground fault detected by software detection function	DB	○	○	○	Each axis	All axes				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
25	Absolute position erased	25.1	Servo motor encoder - Absolute position erased	DB	—	—	○	Each axis	Each axis	1	1	1	0
		25.2	Scale measurement encoder - Absolute position erased	DB	—	—	○	Each axis	Each axis				
27	Initial magnetic pole detection error	27.1	Initial magnetic pole detection - Abnormal termination	DB	○	—	○	Each axis	Each axis	1	1	1	0
		27.2	Initial magnetic pole detection - Time out error	DB	○	—	○	Each axis	Each axis				
		27.3	Initial magnetic pole detection - Limit switch error	DB	○	—	○	Each axis	Each axis				
		27.4	Initial magnetic pole detection - Estimated error	DB	○	—	○	Each axis	Each axis				
		27.5	Initial magnetic pole detection - Position deviation error	DB	○	—	○	Each axis	Each axis				
		27.6	Initial magnetic pole detection - Speed deviation error	DB	○	—	○	Each axis	Each axis				
		27.7	Initial magnetic pole detection - Current error	DB	○	—	○	Each axis	Each axis				
28	Linear encoder error 2	28.1	Linear encoder - Environment error	EDB	—	—	○	Each axis	Each axis	0	1	1	0
2A	Linear encoder error 1	2A.1	Linear encoder error 1-1	EDB	—	—	○	Each axis	Each axis	0	1	1	0
		2A.2	Linear encoder error 1-2	EDB	—	—	○	Each axis	Each axis				
		2A.3	Linear encoder error 1-3	EDB	—	—	○	Each axis	Each axis				
		2A.4	Linear encoder error 1-4	EDB	—	—	○	Each axis	Each axis				
		2A.5	Linear encoder error 1-5	EDB	—	—	○	Each axis	Each axis				
		2A.6	Linear encoder error 1-6	EDB	—	—	○	Each axis	Each axis				
		2A.7	Linear encoder error 1-7	EDB	—	—	○	Each axis	Each axis				
		2A.8	Linear encoder error 1-8	EDB	—	—	○	Each axis	Each axis				
2B	Encoder counter error	2B.1	Encoder counter error 1	EDB	—	—	○	Each axis	Each axis	1	1	1	0
		2B.2	Encoder counter error 2	EDB	—	—	○	Each axis	Each axis				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
30	Regenerative error	30.1	Regeneration heat error	DB	○*1	○*1	○*1	Common	All axes	0	0	0	1
		30.2	Regeneration signal error	DB	○*1	○*1	○*1	Common	All axes				
		30.3	Regeneration feedback signal error	DB	○*1	○*1	○*1	Common	All axes				
31	Overspeed	31.1	Abnormal motor speed	SD	○	○	○	Each axis	Each axis	0	1	0	1
32	Overcurrent	32.1	Overcurrent detected at hardware detection circuit (during operation)	DB	—	—	○	Each axis	All axes	0	1	0	0
		32.2	Overcurrent detected at software detection function (during operation)	DB	○	○	○	Each axis	All axes				
		32.3	Overcurrent detected at hardware detection circuit (during a stop)	DB	—	—	○	Each axis	All axes				
		32.4	Overcurrent detected at software detection function (during a stop)	DB	○	○	○	Each axis	All axes				
33	Overvoltage	33.1	Main circuit voltage error	EDB	○	○	○	Common	All axes	1	0	0	1
34	SSCNET receive error 1	34.1	SSCNET receive data error	SD*10	○	○*9	○	Common	All axes	—	—	—	—
		34.2	SSCNET connector connection error	SD*10	○	○	○	Common	All axes	—	—	—	—
		34.3	SSCNET communication data error	SD*10	○	○	○	Each axis	Each axis	—	—	—	—
		34.4	Hardware error signal detection	SD*10	○	○	○	Common	All axes	—	—	—	—
		34.5	SSCNET receive data error (safety observation function)	SD*10	○	○	○	—	—	—	—	—	—
		34.6	SSCNET communication data error (safety observation function)	SD*10	○	○	○	—	—	—	—	—	—
35	Command frequency error	35.1	Command frequency error	SD	○	○	○	Each axis	Each axis	1	1	0	1

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *5	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
36	SSCNET receive error 2	36.1	Continuous communication data error	SD*10	○	○	○	Each axis	Each axis	—	—	—	—
		36.2	Continuous communication data error (safety observation function)	SD*10	○	○	○	—	—	—	—	—	—
37	Parameter error	37.1	Parameter setting range error	DB	—	○	○	Each axis	Each axis	1	0	0	0
		37.2	Parameter combination error	DB	—	○	○	Each axis	Each axis				
		37.3	Point table setting error	DB	—	—	○	—	—				
39	Program error	39.1	Program error	DB	—	—	○	—	—	0	0	0	0
		39.2	Instruction argument external error	DB	—	—	○	—	—				
		39.3	Register No. error	DB	—	—	○	—	—				
		39.4	Non-correspondence instruction error	DB	—	—	○	—	—				
3A	Inrush current suppression circuit error	3A.1	Inrush current suppression circuit error	EDB	—	—	○	Common	All axes	0	0	0	0
3D	Parameter setting error for driver communication	3D.1	Parameter combination error for driver communication on slave	DB	—	—	○	—	—	—	—	—	—
		3D.2	Parameter combination error for driver communication on master	DB	—	—	○	—	—	—	—	—	—
3E	Operation mode error	3E.1	Operation mode error	DB	—	○	○	Each axis	Each axis	—	—	—	—
		3E.6	Operation mode switch error	DB	—	—	○	—	—	1	0	0	0
		3E.8	MR-D30 combination error	DB	—	○	○	—	—	—	—	—	—

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
42	Servo control error (for linear servo motor and direct drive motor)	42.1	Servo control error by position deviation	EDB	*4	*4	○	Each axis	Each axis	0	1	1	0
		42.2	Servo control error by speed deviation	EDB	*4	*4	○	Each axis	Each axis				
		42.3	Servo control error by torque/ thrust deviation	EDB	*4	*4	○	Each axis	Each axis				
	Fully closed loop control error (for fully closed loop control)	42.8	Fully closed loop control error by position deviation	EDB	*4	*4	○	Each axis	Each axis				
		42.9	Fully closed loop control error by speed deviation	EDB	*4	*4	○	Each axis	Each axis				
		42.A	Fully closed loop control error by position deviation during command stop	EDB	*4	*4	○	Each axis	Each axis				
45	Main circuit device overheat	45.1	Main circuit device overheat error 1	SD	○*1	○*1	○*1	Common	All axes	0	0	1	1
		45.2	Main circuit device overheat error 2	SD	○*1	○*1	○*1	Common	All axes				
46	Servo motor overheat	46.1	Abnormal temperature of servo motor 1	SD	○*1	○*1	○*1	Each axis	Each axis	0	0	1	1
		46.2	Abnormal temperature of servo motor 2	SD	○*1	○*1	○*1	Each axis	Each axis				
		46.3	Thermistor disconnected error	SD	○*1	○*1	○*1	Each axis	Each axis				
		46.4	Thermistor circuit error	SD	○*1	○*1	○*1	Each axis	Each axis				
		46.5	Abnormal temperature of servo motor 3	DB	○*1	○*1	○*1	Each axis	Each axis				
		46.6	Abnormal temperature of servo motor 4	DB	○*1	○*1	○*1	Each axis	Each axis				
47	Cooling fan error	47.1	Cooling fan stop error	SD	—	—	○	Common	All axes	0	0	1	1
		47.2	Cooling fan speed reduction error	SD	—	—	○	Common	All axes				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
50	Overload 1	50.1	Thermal overload error 1 during operation	SD	○*1	○*1	○*1	Each axis	Each axis	0	0	1	1
		50.2	Thermal overload error 2 during operation	SD	○*1	○*1	○*1	Each axis	Each axis				
		50.3	Thermal overload error 4 during operation	SD	○*1	○*1	○*1	Each axis	Each axis				
		50.4	Thermal overload error 1 during a stop	SD	○*1	○*1	○*1	Each axis	Each axis				
		50.5	Thermal overload error 2 during a stop	SD	○*1	○*1	○*1	Each axis	Each axis				
		50.6	Thermal overload error 4 during a stop	SD	○*1	○*1	○*1	Each axis	Each axis				
51	Overload 2	51.1	Thermal overload error 3 during operation	DB	○*1	○*1	○*1	Each axis	Each axis	0	0	1	1
		51.2	Thermal overload error 3 during a stop	DB	○*1	○*1	○*1	Each axis	Each axis				
52	Error excessive	52.1	Excess droop pulse 1	SD	○	○	○	Each axis	Each axis	0	1	0	1
		52.3	Excess droop pulse 2	SD	○	○	○	Each axis	Each axis				
		52.4	Error excessive during 0 torque limit	SD	○	○	○	Each axis	Each axis				
		52.5	Excess droop pulse 3	EDB	○	○	○	Each axis	Each axis				
54	Oscillation detection	54.1	Oscillation detection error	EDB	○	○	○	Each axis	Each axis	0	0	1	1
56	Forced stop error	56.2	Over speed during forced stop	EDB	○	○	○	Each axis	Each axis	0	1	1	0
		56.3	Estimated distance over during forced stop	EDB	○	○	○	Each axis	Each axis				
		56.4	Forced stop start error	EDB	○	○	○	Each axis	Each axis				
61	Operation error	61.1	Point table setting range error	DB	○	—	○	—	—	0	1	0	1
63	STO timing error	63.1	STO1 off	DB	○	○	○	Common	All axes	0	1	1	0
		63.2	STO2 off	DB	○	○	○	Common	All axes				
		63.5	STO by functional safety unit	DB	○	○	○	—	—				
64	Functional safety unit setting error	64.1	STO input error	DB	—	—	○	—	—	1	0	0	0
		64.2	Compatibility mode setting error	DB	—	—	○	—	—				
		64.3	Operation mode setting error	DB	—	—	○	—	—				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
65	Functional safety unit connection error	65.1	Functional safety unit communication error 1	SD	—	—	○	—	—	0	0	0	0
		65.2	Functional safety unit communication error 2	SD	—	—	○	—	—				
		65.3	Functional safety unit communication error 3	SD	—	—	○	—	—				
		65.4	Functional safety unit communication error 4	SD	—	—	○	—	—				
		65.5	Functional safety unit communication error 5	SD	—	—	○	—	—				
		65.6	Functional safety unit communication error 6	SD	—	—	○	—	—				
		65.7	Functional safety unit communication error 7	SD	—	—	○	—	—				
		65.8	Functional safety unit shut-off signal error 1	DB	—	—	○	—	—				
		65.9	Functional safety unit shut-off signal error 2	DB	—	—	○	—	—				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *3	Stop system *3	Alarm code *4			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
66	Encoder initial communication error (safety observation function)	66.1	Encoder initial communication - Receive data error 1 (safety observation function)	DB	—	—	○	—	—	0	1	1	0
		66.2	Encoder initial communication - Receive data error 2 (safety observation function)	DB	—	—	○	—	—				
		66.3	Encoder initial communication - Receive data error 3 (safety observation function)	DB	—	—	○	—	—				
		66.7	Encoder initial communication - Transmission data error 1 (safety observation function)	DB	—	—	○	—	—				
		66.9	Encoder initial communication - Process error 1 (safety observation function)	DB	—	—	○	—	—				
67	Encoder normal communication error 1 (safety observation function)	67.1	Encoder normal communication - Receive data error 1 (safety observation function)	DB	—	—	○	—	—	0	1	1	0
		67.2	Encoder normal communication - Receive data error 2 (safety observation function)	DB	—	—	○	—	—				
		67.3	Encoder normal communication - Receive data error 3 (safety observation function)	DB	—	—	○	—	—				
		67.4	Encoder normal communication - Receive data error 4 (safety observation function)	DB	—	—	○	—	—				
		67.7	Encoder normal communication - Transmission data error 1 (safety observation function)	DB	—	—	○	—	—				
68	STO diagnosis error	68.1	Mismatched STO signal error	DB	—	—	○	Common	Common	0	0	0	0

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
69	Command error	69.1	Forward rotation-side software limit detection - Command excess error	SD	○	○	○	—	—	—	—	—	—
		69.2	Reverse rotation-side software limit detection - Command excess error	SD	○	○	○	—	—	—	—	—	—
		69.3	Forward rotation stroke end detection - Command excess error	SD	○	○	○	—	—	—	—	—	—
		69.4	Reverse rotation stroke end detection - Command excess error	SD	○	○	○	—	—	—	—	—	—
		69.5	Upper stroke limit detection - Command excess error	SD	○	○	○	—	—	—	—	—	—
		69.6	Lower stroke limit detection - Command excess error	SD	○	○	○	—	—	—	—	—	—
70	Load-side encoder initial communication error 1	70.1	Load-side encoder initial communication - Receive data error 1	DB	—	—	○	Each axis	Each axis	0	1	1	0
		70.2	Load-side encoder initial communication - Receive data error 2	DB	—	—	○	Each axis	Each axis				
		70.3	Load-side encoder initial communication - Receive data error 3	DB	—	—	○	Each axis	Each axis				
		70.4	Load-side encoder initial communication - Encoder malfunction *6	DB	—	—	○	Each axis	Each axis				
		70.5	Load-side encoder initial communication - Transmission data error 1	DB	—	—	○	Each axis	Each axis				
		70.6	Load-side encoder initial communication - Transmission data error 2	DB	—	—	○	Each axis	Each axis				

Alarm		Detail		Stop method *2*5	Alarm deactivation			Processing system *8	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
70	Load-side encoder initial communication error 1	70.7	Load-side encoder initial communication - Transmission data error 3	DB	—	—	○	Each axis	Each axis	0	1	1	0
		70.8	Load-side encoder initial communication - Incompatible encoder *6	DB	—	—	○	Each axis	Each axis				
		70.A	Load-side encoder initial communication - Process error 1	DB	—	—	○	Each axis	Each axis				
		70.B	Load-side encoder initial communication - Process error 2	DB	—	—	○	Each axis	Each axis				
		70.C	Load-side encoder initial communication - Process error 3	DB	—	—	○	Each axis	Each axis				
		70.D	Load-side encoder initial communication - Process error 4	DB	—	—	○	Each axis	Each axis				
		70.E	Load-side encoder initial communication - Process error 5	DB	—	—	○	Each axis	Each axis				
		70.F	Load-side encoder initial communication - Process error 6	DB	—	—	○	Each axis	Each axis				
71	Load-side encoder normal communication error 1	71.1	Load-side encoder normal communication - Receive data error 1	EDB	—	—	○	Each axis	Each axis	0	1	1	0
		71.2	Load-side encoder normal communication - Receive data error 2	EDB	—	—	○	Each axis	Each axis				
		71.3	Load-side encoder normal communication - Receive data error 3	EDB	—	—	○	Each axis	Each axis				
		71.5	Load-side encoder normal communication - Transmission data error 1	EDB	—	—	○	Each axis	Each axis				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
71	Load-side encoder normal communication error 1	71.6	Load-side encoder normal communication - Transmission data error 2	EDB	—	—	○	Each axis	Each axis	0	1	1	0
		71.7	Load-side encoder normal communication - Transmission data error 3	EDB	—	—	○	Each axis	Each axis				
		71.9	Load-side encoder normal communication - Receive data error 4	EDB	—	—	○	Each axis	Each axis				
		71.A	Load-side encoder normal communication - Receive data error 5	EDB	—	—	○	Each axis	Each axis				
72	Load-side encoder normal communication error 2	72.1	Load-side encoder data error 1	EDB	—	—	○	Each axis	Each axis	0	1	1	0
		72.2	Load-side encoder data update error	EDB	—	—	○	Each axis	Each axis				
		72.3	Load-side encoder data waveform error	EDB	—	—	○	Each axis	Each axis				
		72.4	Load-side encoder non-signal error	EDB	—	—	○	Each axis	Each axis				
		72.5	Load-side encoder hardware error 1	EDB	—	—	○	Each axis	Each axis				
		72.6	Load-side encoder hardware error 2	EDB	—	—	○	Each axis	Each axis				
		72.9	Load-side encoder data error 2	EDB	—	—	○	Each axis	Each axis				
74	Option card error 1	74.1	Option card error 1	DB	—	—	○	—	—	—	—	—	—
		74.2	Option card error 2	DB	—	—	○	—	—	—	—	—	—
		74.3	Option card error 3	DB	—	—	○	—	—	—	—	—	—
		74.4	Option card error 4	DB	—	—	○	—	—	—	—	—	—
		74.5	Option card error 5	DB	—	—	○	—	—	—	—	—	—
75	Option card error 2	75.3	Option card connection error	EDB	—	—	○	—	—	—	—	—	—
		75.4	Option card disconnected	DB	—	—	○	—	—	—	—	—	—

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
79	Functional safety unit diagnosis error	79.1	Functional safety unit power voltage error	DB	○*7	—	○	—	—	1	1	1	1
		79.2	Functional safety unit internal error	DB	—	—	○	—	—				
		79.3	Abnormal temperature of functional safety unit	SD	○*7	—	○	—	—				
		79.4	Servo amplifier error	SD	—	—	○	—	—				
		79.5	Input device error	SD	—	—	○	—	—				
		79.6	Output device error	SD	—	—	○	—	—				
		79.7	Mismatched input signal error	SD	—	—	○	—	—				
		79.8	Position feedback fixing error	DB	—	—	○	—	—				
7A	Parameter setting error (safety observation function)	7A.1	Parameter verification error (safety observation function)	DB	—	—	○	—	—	1	0	0	0
		7A.2	Parameter setting range error (safety observation function)	DB	—	—	○	—	—				
		7A.3	Parameter combination error (safety observation function)	DB	—	—	○	—	—				
		7A.4	Functional safety unit combination error (safety observation function)	DB	—	—	○	—	—				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
7B	Encoder diagnosis error (safety observation function)	7B.1	Encoder diagnosis error 1 (safety observation function)	DB	—	—	○	—	—	0	1	1	0
		7B.2	Encoder diagnosis error 2 (safety observation function)	DB	—	—	○	—	—				
		7B.3	Encoder diagnosis error 3 (safety observation function)	DB	—	—	○	—	—				
		7B.4	Encoder diagnosis error 4 (safety observation function)	DB	—	—	○	—	—				
7C	Functional safety unit communication diagnosis error (safety observation function)	7C.1	Functional safety unit communication setting error (safety observation function)	SD	○*7	○	○	—	—	0	0	0	0
		7C.2	Functional safety unit communication data error (safety observation function)	SD	○*7	○	○	—	—				
7D	Safety observation error	7D.1	Stop observation error	DB	○*5	—	○	—	—	1	1	1	1
		7D.2	Speed observation error	DB	○*7	—	○	—	—				
82	Master-slave operation error 1	82.1	Master-slave operation error 1	EDB	○	○	○	—	—	—	—	—	—
84	Network module initialization error	84.1	Network module undetected error	DB	—	—	○	—	—	—	—	—	—
		84.2	Network module initialization error 1	DB	—	—	○	—	—	—	—	—	—
		84.3	Network module initialization error 2	DB	—	—	○	—	—	—	—	—	—
85	Network module error	85.1	Network module error 1	SD	—	—	○	—	—	—	—	—	—
		85.2	Network module error 2	SD	—	—	○	—	—	—	—	—	—
		85.3	Network module error 3	SD	—	—	○	—	—	—	—	—	—

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
86	Network communication error	86.1	Network communication error 1	SD	○	—	○	—	—	—	—	—	—
		86.2	Network communication error 2	SD	○	—	○	—	—	—	—	—	—
		86.3	Network communication error 3	SD	○	—	○	—	—	—	—	—	—
		86.4	Network communication error 4	SD	○	—	○	—	—	—	—	—	—
8A	USB communication time-out error/ serial communication time-out error/ Modbus RTU communication time-out error	8A.1	USB communication time-out error/ serial communication time-out error	SD	○	○	○	Common	All axes	0	0	0	0
		8A.2	Modbus RTU communication time-out error	SD	○	○	○	—	—				
8D	CC-Link IE communication error	8D.1	CC-Link IE communication error 1	SD	○	—	○	—	—	—	—	—	—
		8D.2	CC-Link IE communication error 2	SD	○	—	○	—	—	—	—	—	—
		8D.3	Master station setting error 1	DB	○	—	○	—	—	—	—	—	—
		8D.5	Master station setting error 2	DB	—	—	○	—	—	—	—	—	—
		8D.6	CC-Link IE communication error 3	SD	○	—	○	—	—	—	—	—	—
		8D.7	CC-Link IE communication error 4	SD	○	—	○	—	—	—	—	—	—
		8D.8	CC-Link IE communication error 5	SD	○	—	○	—	—	—	—	—	—
		8D.9	Synchronization error 1	SD	—	—	○	—	—	—	—	—	—
		8D.A	Synchronization error 2	SD	—	—	○	—	—	—	—	—	—
8E	USB communication error/serial communication error/Modbus RTU communication error	8E.1	USB communication receive error/ serial communication receive error	SD	○	○	○	Common	All axes	0	0	0	0
		8E.2	USB communication checksum error/ serial communication checksum error	SD	○	○	○	Common	All axes				
		8E.3	USB communication character error/ serial communication character error	SD	○	○	○	Common	All axes				

Alarm		Detail		Stop method *2*3	Alarm deactivation			Processing system *9	Stop system *9	Alarm code *8			
No.	Name	No.	Name		Alarm reset	CPU reset	Cycling the power			ACD3 (Bit 3)	ACD2 (Bit 2)	ACD1 (Bit 1)	ACD0 (Bit 0)
8E	USB communication error/serial communication error/Modbus RTU communication error	8E.4	USB communication command error/ serial communication command error	SD	○	○	○	Common	All axes	0	0	0	0
		8E.5	USB communication data number error/serial communication data number error	SD	○	○	○	Common	All axes				
		8E.6	Modbus RTU communication receive error	SD	○	○	○	—	—				
		8E.7	Modbus RTU communication message frame error	SD	○	○	○	—	—				
		8E.8	Modbus RTU communication CRC error	SD	○	○	○	—	—				
888 88	Watchdog	8888	Watchdog	DB	—	—	○	Common	All axes	—	—	—	—

*1 After resolving the source of trouble, cool the equipment for approximately 30 minutes.

*2 The following shows three stop methods of DB, EDB, and SD.
DB: Stops with dynamic brake. (Coasts for the servo amplifier without dynamic brake.)
Coasts for MR-J4-03A6(-RJ) and MR-J4W2-0303B6. Note that EDB is applied when an alarm below occurs:
[AL. 30.1], [AL. 32.2], [AL. 32.4], [AL. 51.1], [AL. 51.2], [AL. 888]
SD: Forced stop deceleration
EDB: Electronic dynamic brake stop (available with specified servo motors)
Refer to the following table for the specified servo motors. The stop method for other than the specified servo motors will be DB.

Series	Servo motor
HG-KR	HG-KR053/HG-KR13/HG-KR23/HG-KR43
HG-MR	HG-MR053/HG-MR13/HG-MR23/HG-MR43
HG-SR	HG-SR51/HG-SR52
HG-AK	HG-AK0136/HG-AK0236/HG-AK0336

*3 This is applicable when [Pr. PA04] is set to the initial value. The stop system of SD can be changed to DB using [Pr. PA04].

*4 The alarm can be canceled by setting as follows:
For the fully closed loop control: set [Pr. PE03] to "1 _ _ _".
When a linear servo motor or direct drive motor is used: set [Pr. PL04] to "1 _ _ _".

*5 In some controller communication status, the alarm factor may not be removed.

*6 This alarm will occur only in the J3 compatibility mode.

*7 Reset this while all the safety observation functions are stopped.

*8 Alarm codes are outputted only from MR-J4-_A_(-RJ)/MR-J4-DU_A_(-RJ). Refer to the following for details.
☞ Page 6 Explanation for the lists

*9 The processing and stop systems are applicable only for the multi-axis servo amplifiers (MR-J4W_-_B_). Refer to the following for details.
☞ Page 6 Explanation for the lists

*10 In the parallel drive system, the stop method is DB.

1.3 Warning list

Warning		Detail		Stop method *2*3	Processing system *5	Stop system *5
No.	Name	No.	Name			
90	Home position return incomplete warning	90.1	Home position return incomplete	—	—	—
		90.2	Home position return abnormal termination	—	—	—
		90.5	Z-phase unpassed	—	—	—
91	Servo amplifier overheat warning*1	91.1	Main circuit device overheat warning	—	Common	—
92	Battery cable disconnection warning	92.1	Encoder battery cable disconnection warning	—	Each axis	—
		92.3	Battery degradation	—	Each axis	—
93	ABS data transfer warning	93.1	ABS data transfer requirement warning during magnetic pole detection	—	—	—
95	STO warning	95.1	STO1 off detection	DB	Common	All axes
		95.2	STO2 off detection	DB	Common	All axes
		95.3	STO warning 1 (safety observation function)	DB	—	—
		95.4	STO warning 2 (safety observation function)	DB	—	—
		95.5	STO warning 3 (safety observation function)	DB	—	—
96	Home position setting warning	96.1	In-position warning at home positioning	—	Each axis	—
		96.2	Command input warning at home positioning	—	Each axis	—
		96.3	Servo off warning at home positioning	—	—	—
		96.4	Home positioning warning during magnetic pole detection	—	—	—
97	Positioning specification warning	97.1	Program operation disabled warning	—	—	—
		97.2	Next station position warning	—	—	—
98	Software limit warning	98.1	Forward rotation-side software stroke limit reached	—	—	—
		98.2	Reverse rotation-side software stroke limit reached	—	—	—
99	Stroke limit warning	99.1	Forward rotation stroke end off	*4*7	—	—
		99.2	Reverse rotation stroke end off	*4*7	—	—
		99.4	Upper stroke limit off	*7	Each axis	—
		99.5	Lower stroke limit off	*7	Each axis	—
9A	Optional unit input data error warning	9A.1	Optional unit input data sign error	—	—	—
		9A.2	Optional unit BCD input data error	—	—	—
9B	Error excessive warning	9B.1	Excess droop pulse 1 warning	—	Each axis	—
		9B.3	Excess droop pulse 2 warning	—	Each axis	—
		9B.4	Error excessive warning during 0 torque limit	—	Each axis	—
9C	Converter error	9C.1	Converter unit error	—	—	—
9D	CC-Link IE warning 1	9D.1	Station number switch change warning	—	—	—
		9D.2	Master station setting warning	—	—	—
		9D.3	Overlapping station number warning	—	—	—
		9D.4	Mismatched station number warning	—	—	—
9E	CC-Link IE warning 2	9E.1	CC-Link IE communication warning	—	—	—
9F	Battery warning	9F.1	Low battery	—	Each axis	—
		9F.2	Battery degradation warning	—	Each axis	—
E0	Excessive regeneration warning	E0.1	Excessive regeneration warning	—	Common	—

Warning		Detail		Stop method *2*3	Processing system *5	Stop system *5
No.	Name	No.	Name			
E1	Overload warning 1	E1.1	Thermal overload warning 1 during operation	—	Each axis	—
		E1.2	Thermal overload warning 2 during operation	—	Each axis	—
		E1.3	Thermal overload warning 3 during operation	—	Each axis	—
		E1.4	Thermal overload warning 4 during operation	—	Each axis	—
		E1.5	Thermal overload error 1 during a stop	—	Each axis	—
		E1.6	Thermal overload error 2 during a stop	—	Each axis	—
		E1.7	Thermal overload error 3 during a stop	—	Each axis	—
		E1.8	Thermal overload error 4 during a stop	—	Each axis	—
E2	Servo motor overheat warning	E2.1	Servo motor temperature warning	—	Each axis	—
E3	Absolute position counter warning	E3.1	Multi-revolution counter travel distance excess warning	—	—	—
		E3.2	Absolute position counter warning	—	Each axis	—
		E3.4	Absolute positioning counter EEP-ROM writing frequency warning	—	—	—
		E3.5	Encoder absolute positioning counter warning	—	Each axis	—
E4	Parameter warning	E4.1	Parameter setting range error warning	—	Each axis	—
E5	ABS time-out warning	E5.1	Time-out during ABS data transfer	—	—	—
		E5.2	ABSM off during ABS data transfer	—	—	—
		E5.3	SON off during ABS data transfer	—	—	—
E6	Servo forced stop warning	E6.1	Forced stop warning	SD	Common	All axes
		E6.2	SS1 forced stop warning 1 (safety observation function)	SD	—	—
		E6.3	SS1 forced stop warning 2 (safety observation function)	SD	—	—
E7	Controller forced stop warning	E7.1	Controller forced stop input warning	SD	Common	All axes
E8	Cooling fan speed reduction warning	E8.1	Decreased cooling fan speed warning	—	Common	—
		E8.2	Cooling fan stop	—	Common	—
E9	Main circuit off warning	E9.1	Servo-on signal on during main circuit off	DB	Common	All axes
		E9.2	Bus voltage drop during low speed operation	DB	Common	All axes
		E9.3	Ready-on signal on during main circuit off	DB	Common	All axes
		E9.4	Converter unit forced stop	DB	—	—
EA	ABS servo-on warning	EA.1	ABS servo-on warning	—	—	—
EB	The other axis error warning	EB.1	The other axis error warning	DB	Each axis	*6
EC	Overload warning 2	EC.1	Overload warning 2	—	Each axis	—
ED	Output watt excess warning	ED.1	Output watt excess warning	—	Each axis	—
F0	Tough drive warning	F0.1	Instantaneous power failure tough drive warning	—	Each axis	—
		F0.3	Vibration tough drive warning	—	Each axis	—
F2	Drive recorder - Miswriting warning	F2.1	Drive recorder - Area writing time-out warning	—	Common	—
		F2.2	Drive recorder - Data miswriting warning	—	Common	—
F3	Oscillation detection warning	F3.1	Oscillation detection warning	—	Each axis	—
F4	Positioning warning	F4.4	Target position setting range error warning	—	—	—
		F4.6	Acceleration time constant setting range error warning	—	—	—
		F4.7	Deceleration time constant setting range error warning	—	—	—
		F4.9	Home position return type error warning	—	—	—

Warning		Detail		Stop method *2*3	Processing system *5	Stop system *5
No.	Name	No.	Name			
F5	Simple cam function - Cam data miswriting warning	F5.1	Cam data - Area writing time-out warning	—	—	—
		F5.2	Cam data - Area miswriting warning	—	—	—
		F5.3	Cam data checksum error	—	—	—
F6	Simple cam function - Cam control warning	F6.1	Cam axis one cycle current value restoration failed	—	—	—
		F6.2	Cam axis feed current value restoration failed	—	—	—
		F6.3	Cam unregistered error	—	—	—
		F6.4	Cam control data setting range error	—	—	—
		F6.5	Cam No. external error	—	—	—
		F6.6	Cam control inactive	—	—	—
F7	Machine diagnosis warning	F7.1	Vibration failure prediction warning	—	Each axis	—
		F7.2	Friction failure prediction warning	—	Each axis	—
		F7.3	Total travel distance failure prediction warning	—	Each axis	—

*1 After resolving the source of trouble, cool the equipment for approximately 30 minutes.

*2 The following shows two stop methods of DB and SD.
DB: Stops with dynamic brake. (Coasts for the servo amplifier without dynamic brake.)
Coasts for MR-J4-03A6(-RJ) and MR-J4W2-0303B6.
SD: Forced stop deceleration

*3 This is applicable when [Pr. PA04] is set to the initial value. The stop system of SD can be changed to DB using [Pr. PA04].

*4 For MR-J4-_A_ servo amplifier, quick stop or slow stop can be selected using [Pr. PD30].

*5 The processing and stop systems are applicable only for the multi-axis servo amplifiers (MR-J4W_-_B_). Refer to the following for details.
☞ Page 6 Explanation for the lists

*6 As the initial value, it is applicable only for [AL. 24] and [AL. 32]. All-axis stop can be selected using [Pr. PF02].

*7 For MR-J4-_GF_ servo amplifier, quick stop or slow stop can be selected using [Pr. PD12]. (I/O mode only)

1.4 Remedies for alarms

⚠CAUTION

- When any alarm has occurred, eliminate its cause, ensure safety, and deactivate the alarm before restarting operation. Otherwise, it may cause injury.
- If [AL. 25 Absolute position erased] occurs, always make home position setting again. Otherwise, it may cause an unexpected operation.
- As soon as an alarm occurs, make the Servo-off status and interrupt the main circuit power.

Point

When any of the following alarms has occurred, do not cycle the power repeatedly to restart. Doing so will cause a malfunction of the servo amplifier and servo motor. Remove its cause and allow about 30 minutes for cooling before resuming the operation.

- [AL. 30 Regenerative error]
- [AL. 45 Main circuit device overheat]
- [AL. 46 Servo motor overheat]
- [AL. 50 Overload 1]
- [AL. 51 Overload 2]

[AL. 37 Parameter error] is not recorded in the alarm history.

Remove the cause of the alarm in accordance with this section. Use MR Configurator2 to refer to the cause of alarm occurrence.

Alarm No.: 10		Name: Undervoltage					
Alarm content		· The voltage of the control circuit power supply has dropped. · The voltage of the main circuit power supply has dropped.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
10.1	Voltage drop in the control circuit power	(1)	The control circuit power supply connection is incorrect.	Check the connection of the control circuit power supply.	It has a failure.	Connect it correctly.	[A] [B] [WB] [RJ010] [GF]
					It has no failure.	Check (2).	
		(2)	The voltage of the control circuit power supply is low.	Check if the voltage of the control circuit power supply is lower than prescribed value. 200 V class: 160 V AC 400 V class: 280 V AC 100 V class: 83 V AC 24 V DC input: 17 V DC	The voltage is the prescribed value or lower.	Review the voltage of the control circuit power supply.	
					The voltage is higher than the prescribed value.	Check (3).	
		(3)	The power was cycled before the internal control circuit power supply stopped.	Check the power-on method if it has a problem.	It has a problem.	Cycle the power after the seven-segment LED of the servo amplifier is turned off.	
					It has no problem.	Check (4).	
		(4)	An instantaneous power failure has occurred for longer time than the specified time. The time will be 60 ms when [Pr. PA20] is "_ 0 _ _". The time will be the value set in [Pr. PF25] when [Pr. PA20] is "_ 1 _ _". The time will be 60 ms when [Pr. PX25] is "_ 0 _ _" and the J3 extension function is used. The time will be the value set in [Pr. PX28] when [Pr. PX25] is "_ 1 _ _". An instantaneous power failure of 15 ms or longer has occurred on MR-J4-03A6(-RJ) or MR-J4W2-0303B6.	Check if the power has a problem.	It has a problem.	Review the power.	
					It has no problem.	Check (5).	
		(5)	When a power regeneration converter is used, the voltage of the control circuit power supply is distorted.	Check if the power has a problem. When power supply impedance is high, power supply voltage will be distorted due to current at power regeneration, and it may be recognized as undervoltage.	It has a problem.	Review the setting of "[AL. 10 Undervoltage] detection method selection" with the following parameters. [A]: [Pr. PC27] [B] [WB] [RJ010] [GF]: [Pr. PC20] Review the power.	

Alarm No.: 10		Name: Undervoltage					
Alarm content		· The voltage of the control circuit power supply has dropped. · The voltage of the main circuit power supply has dropped.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
10.2	Voltage drop in the main circuit power	(1)	The main circuit power supply wiring was disconnected. For the drive unit, the main circuit power supply wiring of the converter unit was disconnected.	Check the main circuit power supply wiring. Check the main circuit power supply wiring of the converter unit.	It is disconnected.	Connect it correctly.	[A] [B] [WB] [RJ010] [GF]
					It is connected.	Check (2).	
		(2)	The wiring between P3 and P4 was disconnected. For the drive unit, the wiring between P1 and P2 of the converter unit was disconnected.	Check the wiring between P3 and P4. Check the wiring between P1 and P2 of the converter unit.	It is disconnected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	For the drive unit, the magnetic contactor control connector of the converter unit was disconnected.	Check the magnetic contactor control connector of the converter unit.	It is disconnected.	Connect it correctly.	
					It has no failure.	Check (4).	
		(4)	For the drive unit, the bus bar between the converter unit and drive unit was disconnected.	Check the bus bar between the converter unit and drive unit.	It is disconnected.	Connect it correctly.	
					It has no failure.	Check (5).	
		(5)	The voltage of the main circuit power supply is low.	Check if the voltage of the main circuit power supply is the prescribed value or lower. 200 V class: 160 V AC 400 V class: 280 V AC 100 V class: 83 V AC 48 V DC setting: 35 V DC 24 V DC setting: 15 V DC	The voltage is the prescribed value or lower.	Increase the voltage of the main circuit power supply.	
					The voltage is higher than the prescribed value.	Check (6).	
		(6)	The alarm has occurred during acceleration.	Check if the bus voltage during acceleration is lower than the prescribed value. 200 V class: 200 V DC 400 V class: 380 V DC 100 V class: 158 V DC 48 V DC setting: 35 V DC 24 V DC setting: 15 V DC	The voltage is lower than the prescribed value.	Increase the acceleration time constant. Or increase the power supply capacity.	
					The voltage is equal to or higher than the prescribed value.	Check (7).	
		(7)	The servo amplifier is malfunctioning.	Check the bus voltage value.	The bus voltage is less than the prescribed value although the voltage of the main circuit power supply is within specifications. 200 V class: 200 V DC 400 V class: 380 V DC 100 V class: 158 V DC 48 V DC setting: 35 V DC 24 V DC setting: 15 V DC	Replace the servo amplifier.	
		(8)	For the drive unit, the converter unit is malfunctioning.	Replace the converter unit, and then check the repeatability.	It is not repeatable.	Replace the converter unit.	

Alarm No.: 11		Name: Switch setting error					
Alarm content		· The setting of the axis selection rotary switch or auxiliary axis number setting switch is incorrect. · The setting of the disabling control axis switch is incorrect. · The setting of the station number selection rotary switch is incorrect.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
11.1	Axis number setting error	(1)	The setting of the axis No. is incorrect.	Check the settings of the auxiliary axis number setting switches (SW2-5/SW2-6) and axis selection rotary switch (SW1).	When both of the auxiliary axis number setting switches are on, check the axis selection rotary switch if "F" is selected for MR-J4W2, ("E" or "F" is selected for MR-J4W3).	Set the axis No. correctly.	[WB]
					Both of the auxiliary axis number setting switches are off.	Replace the servo amplifier.	
	Station number setting error	(2)	The station number is set to a value other than "1" to "120" with the station number selection rotary switch.	Check the settings of the station number selection rotary switches (SW2/SW3).	The setting of the station number selection rotary switch is set to "0" or "121" or more.	Set the station number correctly.	[GF]
					The station number is set to a value from "1" to "120" with the station number selection rotary switch.	Replace the servo amplifier.	
11.2	Disabling control axis setting error	(1)	The setting of the disabling control axis switch is incorrect.	Check the setting of the disabling control axis switch.	Check if the setting is as follows. 1) Only A-axis is disabled. 2) Only B-axis is disabled. 3) A-axis and B-axis are disabled. 4) A-axis and C-axis are disabled. 5) All axes are disabled.	Set it correctly.	[WB]
					The setting is other than above.	Replace the servo amplifier.	

Alarm No.: 12		Name: Memory error 1 (RAM)					
Alarm content		· A part (RAM) in the servo amplifier is failure.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
12.1	RAM error 1	(1)	A part in the servo amplifier is failure.	Disconnect the cables except for the control circuit power supply, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It is not repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the power supply for noise.	There is a problem in the surrounding.	Take countermeasures against its cause.	
12.2	RAM error 2	Check it with the check method for [AL. 12.1].					
12.3	RAM error 3						
12.4	RAM error 4						
12.5	RAM error 5						
12.6	RAM error 6						

Alarm No.: 13		Name: Clock error					
Alarm content		· A part in the servo amplifier is failure. · A clock error transmitted from the controller occurred. · [RJ010]: MR-J3-T10 came off.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
13.1	Clock error 1	(1)	The MR-J3-T10 came off during the CC-Link IE communication.	Check if [AL. 74 Option card error 1] occurred with alarm history.	It is occurring.	Check it with the check method for [AL. 74].	[RJ010]
					It did not occur.	Check (2).	
		(2)	A part in the servo amplifier is failure.	Disconnect the cables except for the control circuit power supply, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It is not repeatable.	Check (3).	
		(3)	A clock error transmitted from the controller occurred.	Check if the alarm occurs when you connect the amplifier to the controller.	It occurs.	Replace the controller.	[B] [WB]
					It does not occur.	Check (4).	
		(4)	The servo amplifier of the next axis is malfunctioning.	Check if the servo amplifier of the next axis is malfunctioning.	It is malfunctioning.	Replace the servo amplifier of the next axis.	
					It is not malfunctioning.	Check (5).	
		(5)	Something near the device caused it.	Check the power supply for noise. Check if the connector is shorted.	There is a problem in the surrounding.	Take countermeasures against its cause.	[A] [B] [WB] [RJ010] [GF]
13.2	Clock error 2	Check it with the check method for [AL. 13.1].					
13.3	Clock error 3						

Alarm No.: 14		Name: Control process error					
Alarm content		The process did not complete within the specified time. [RJ010]: MR-J3-T10 came off. [GF]: A part (communication IC) in the servo amplifier is failure.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
14.1	Control process error 1	(1)	The MR-J3-T10 came off during the CC-Link IE communication.	Check if [AL. 74 Option card error 1] occurred with alarm history.	It is occurring.	Check it with the check method for [AL. 74].	[RJ010]
					It did not occur.	Check (2).	
		(2)	The parameter setting is incorrect.	Check if the parameter setting is incorrect.	It is incorrect.	Set it correctly.	[A] [B] [WB] [RJ010] [GF]
					It is correct.	Check (3).	
		(3)	Something near the device caused it.	Check the power supply for noise. Check if the connector is shorted.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (4).	
		(4)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
14.2	Control process error 2	(1)	The MR-J3-T10 came off during the CC-Link IE communication.	Check if [AL. 74 Option card error 1] occurred with alarm history.	It is occurring.	Check it with the check method for [AL. 74].	[RJ010]
					It did not occur.	Check (2).	
		(2)	A synchronous signal error transmitted from the controller occurred.	Replace the controller, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[B] [WB]
					It is not repeatable.	Check (3).	
		(3)	Adaptive tuning mode or vibration suppression control tuning mode has been executed for multiple axes simultaneously.	Check the setting of [Pr. PB01] or [Pr. PB02]. With the J3 extension function, Check the setting of [Pr. PB01], [Pr. PB02], or [Pr. PX03].	It has been executed for multiple axes simultaneously.	Execute it for each axis.	[WB]
					It has not been executed for multiple axes simultaneously.	Check (4).	
		(4)	The parameter setting is incorrect.	Check if the parameter setting is incorrect.	It is incorrect.	Set it correctly.	[A] [B] [WB] [RJ010] [GF]
					It is correct.	Check (5).	
		(5)	Something near the device caused it.	Check the power supply for noise. Check if the connector is shorted.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (6).	
		(6)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
14.3	Control process error 3	Check it with the check method for [AL. 14.1].					
14.4	Control process error 4						
14.5	Control process error 5						
14.6	Control process error 6						
14.7	Control process error 7						
14.8	Control process error 8						
14.9	Control process error 9						
14.A	Control process error 10						

Alarm No.: 14		Name: Control process error					
Alarm content		· The process did not complete within the specified time. · [RJ010]: MR-J3-T10 came off. · [GF]: A part (communication IC) in the servo amplifier is failure.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
14.B	Control process error 11	(1)	The MR-J3-T10 came off during the CC-Link IE communication.	Check if [AL. 74 Option card error 1] occurred with alarm history.	It is occurring.	Check it with the check method for [AL. 74].	[RJ010]
					It did not occur.	Check (2).	
		(2)	The parameter setting is incorrect.	Check if the parameter setting is incorrect.	It is incorrect.	Set it correctly.	[A] [B] [WB] [RJ010]
					It is correct.	Check (3).	
		(3)	Something near the device caused it.	Check the power supply for noise. Check if the connector is shorted.	It has a failure.	Take countermeasures against its cause.	[A] [B] [WB] [RJ010] [GF]
					It has no failure.	Check (4).	
		(4)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
14.C	Control process error 12	Check it with the check method for [AL. 14.B].					
14.D	Control process error 13						

Alarm No.: 15		Name: Memory error 2 (EEP-ROM)					
Alarm content		· A part (EEP-ROM) in the servo amplifier is failure. · [RJ010]: MR-J3-T10 came off.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
15.1	EEP-ROM error at power on	(1)	EEP-ROM is malfunctioning at power on.	Disconnect the cables except for the control circuit power supply, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It is not repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the power supply for noise. Check if the connector is shorted.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (3).	
		(3)	The number of write times exceeded 100,000.	Check if parameters, point tables, or programs are changed very frequently.	It was changed.	Replace the servo amplifier. Change the process to use parameters, point tables, and programs less frequently after replacement.	
15.2	EEP-ROM error during operation	(1)	The MR-J3-T10 came off during the CC-Link IE communication.	Check if [AL. 74 Option card error 1] occurred with alarm history.	It is occurring.	Check it with the check method for [AL. 74].	[RJ010]
					It did not occur.	Check (2).	
		(2)	EEP-ROM is malfunctioning during normal operation.	Check if the error occurs when you change parameters during normal operation.	It occurs.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It does not occur.	Check (3).	
		(3)	A write error occurred while adjustment results were processed.	Check if the alarm occurs after an hour from power on.	It takes an hour or more.	Replace the servo amplifier.	
					It takes less than an hour.	Check (4).	
		(4)	Something near the device caused it.	Check the power supply for noise. Check if the connector is shorted.	There is a problem in the surrounding.	Take countermeasures against its cause.	
15.4	Home position information read error	(1)	EEP-ROM is malfunctioning at power on.	Disconnect the cables except for the control circuit power supply, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[A] [GF]
					It is not repeatable.	Check (2).	
		(2)	Multiple rotation data saved as a home position and read from EEP-ROM were failure.	Check if the home position was set correctly.	It has a failure.	Make home position setting again.	
					It has no failure.	Check (3).	
		(3)	Something near the device caused it.	Check the power supply for noise. Check if the connector is shorted.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (4).	
		(4)	The number of write times exceeded 100,000.	Check if parameters has been used very frequently.	It was changed.	Replace the servo amplifier. Change the process to use parameters less frequently after replacement.	

Alarm No.: 16		Name: Encoder initial communication error 1					
Alarm content		An error occurred in the communication between an encoder and servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
16.1	Encoder initial communication - Receive data error 1	(1)	An encoder cable is malfunctioning.	Check if the encoder cable is disconnected or shorted.	It has a failure.	Replace or repair the cable.	[A] [B] [WB] [RJ010] [GF]
					It has no failure.	Check (2).	
		(2)	When you use a linear servo motor with an A/B/Z-phase differential output linear encoder, the servo amplifier is not compatible with the linear encoder.	Check if the servo amplifier (MR-J4-_-RJ) is compatible with the A/B/Z-phase differential output linear encoder.	The servo amplifier is not compatible with it.	Use a servo amplifier which is compatible with it.	[A] [B] [GF]
					The servo amplifier is compatible with it.	Check (3).	
		(3)	When you use a linear servo motor with an A/B/Z-phase differential output linear encoder, the connection with the linear encoder is incorrect.	Check if the wiring of the linear encoder is correct. (Check if it is wired to PSEL.)	The wiring is incorrect.	Wire it correctly.	
					The wiring is correct.	Check (4).	
		(4)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It is repeatable.	Check (5).	
		(5)	An encoder is malfunctioning.	Replace the servo motor or linear encoder, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (6).	
		(6)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
16.2	Encoder initial communication - Receive data error 2	Check it with the check method for [AL. 16.1].					

Alarm No.: 16		Name: Encoder initial communication error 1					
Alarm content		· An error occurred in the communication between an encoder and servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
16.3	Encoder initial communication - Receive data error 3	(1)	An axis not used is not set as disabled-axis.	Check the setting of the disabling control axis switches (SW2-2/SW2-3/SW2-4).	It is not set as disabled-axis.	Set it as disabled-axis.	[WB]
					It is set as disabled-axis.	Check (2).	
		(2)	An encoder cable was disconnected.	Check if the encoder cable is connected correctly.	It is not connected.	Connect it correctly.	[A] [B] [WB] [RJ010] [GF]
					It is connected.	Check (3).	
		(3)	The parameter setting of communication method is incorrect. [A]: [Pr. PC22] [B] [WB] [RJ010] [GF]: [Pr. PC04]	Check the parameter setting.	The setting is incorrect.	Set it correctly.	
					The setting is correct.	Check (4).	
		(4)	In the parallel drive system, the setting of [Pr. PF40] is incorrect.	Check the parameter setting.	The setting is incorrect.	Set it correctly.	[B]
					The setting is correct.	Check (5).	
		(5)	An encoder cable is malfunctioning.	Check if the encoder cable is disconnected or shorted.	It has a failure.	Replace or repair the cable.	[A] [B] [WB] [RJ010] [GF]
					It has no failure.	Check (6).	
		(6)	When you use a linear servo motor with an A/B/Z-phase differential output linear encoder, the connection with the linear encoder is incorrect.	Check if the wiring of the linear encoder is correct. (Check if it is wired to PSEL.)	The wiring is incorrect.	Wire it correctly.	[A] [B] [GF]
					The wiring is correct.	Check (7).	
		(7)	The voltage of the control circuit power supply has been unstable.	Check the voltage of the control circuit power supply.	An instantaneous power failure is occurring at the control circuit power supply.	Review the power and related parts.	[A] [B] [WB] [RJ010] [GF]
					It has no failure.	Check (8).	
		(8)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (9).	
		(9)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (10).	
		(10)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
16.4	Encoder initial communication - Encoder malfunction	(1)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	[B] [WB]
					It is repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
16.5	Encoder initial communication - Transmission data error 1	Check it with the check method for [AL. 16.1].					
16.6	Encoder initial communication - Transmission data error 2						
16.7	Encoder initial communication - Transmission data error 3						

Alarm No.: 16		Name: Encoder initial communication error 1					
Alarm content		· An error occurred in the communication between an encoder and servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
16.8	Encoder initial communication - Incompatible encoder	(1)	A servo motor or linear encoder, which is not compatible with the servo amplifier, was connected.	Check the model of the servo motor/linear encoder.	It is not compatible with the servo amplifier.	Replace it with a compatible one.	[B] [WB]
					It is compatible with the servo amplifier.	Check (2).	
		(2)	The software version of the servo amplifier does not support the servo motor or linear encoder.	Check if the software version supports the servo motor/linear encoder.	It is not compatible.	Replace the servo amplifier to one which software version supports the servo motor/linear encoder.	
					It is compatible.	Check (3).	
		(3)	An encoder is malfunctioning.	Replace the servo motor or linear encoder, and then check the repeatability.	It is not repeatable.	Replace the servo motor or linear encoder.	
					It is repeatable.	Replace the servo amplifier.	
16.A	Encoder initial communication - Process error 1	(1)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It is repeatable.	Check (2).	
		(2)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
16.B	Encoder initial communication - Process error 2	Check it with the check method for [AL. 16.A].					
16.C	Encoder initial communication - Process error 3						
16.D	Encoder initial communication - Process error 4						
16.E	Encoder initial communication - Process error 5						
16.F	Encoder initial communication - Process error 6						

Alarm No.: 17		Name: Board error					
Alarm content		· A part in the servo amplifier is malfunctioning.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
17.1	Board error 1	(1)	A current detection circuit is malfunctioning.	Check if the alarm occurs during the servo-on status.	It occurs.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It does not occur.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
17.3	Board error 2	Check it with the check method for [AL. 17.1].					

Alarm No.: 17		Name: Board error					
Alarm content		· A part in the servo amplifier is malfunctioning.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
17.4	Board error 3	(1)	The servo amplifier recognition signal was not read properly.	Disconnect the cables except for the control circuit power supply, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It is not repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
17.5	Board error 4	(1)	The setting value of the axis selection rotary switch (SW1) was not read properly.	Disconnect the cables except for the control circuit power supply, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[B] [WB]
					It is not repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
17.6	Board error 5	(1)	The setting value of the control axis setting switch (SW2) was not read properly.	Disconnect the cables except for the control circuit power supply, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[B] [WB]
					It is not repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
17.7	Board error 7	Check it with the check method for [AL. 17.4].					
17.8	Board error 6	(1)	Inrush current suppressor circuit is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[B] [WB]
17.9	Board error 8	(1)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	[GF]
					There is no problem in the surrounding.	Check (2).	
		(2)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	

Alarm No.: 19		Name: Memory error 3 (Flash-ROM)					
Alarm content		· A part (Flash-ROM) in the servo amplifier is failure.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
19.1	Flash-ROM error 1	(1)	The Flash-ROM is malfunctioning.	Disconnect the cables except for the control circuit power supply, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It is not repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
19.2	Flash-ROM error 2	Check it with the check method for [AL. 19.1].					
19.3	Flash-ROM error 3						

Alarm No.: 1A		Name: Servo motor combination error					
Alarm content		· The combination of servo amplifier and servo motor is incorrect.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
1A.1	Servo motor combination error 1	(1)	The servo amplifier and the servo motor was connected incorrectly.	Check the model name of the servo motor and corresponding servo amplifier.	The combination is incorrect.	Use them in the correct combination.	[A] [B] [WB] [RJ010] [GF]
					The combination is correct.	Check (2).	
		(2)	The setting of [Pr. PA01] is not corresponding to the connected servo motor.	Check the [Pr. PA01] setting. Rotary servo motor: "_ _ 0 _" Linear servo motor: "_ _ 4 _" Direct drive motor: "_ _ 6 _"	The combination is incorrect.	Set [Pr. PA01] correctly. When using a linear servo motor, also check (3).	[A] [B] [WB] [GF]
					The combination is correct.	Check (4).	
		(3)	[Pr. PA17] and [Pr. PA18] were not set according to the linear servo motor to be used.	Check if [Pr. PA17] and [Pr. PA18] are set correctly.	It is not set correctly.	Set them correctly according to the linear servo motor to be used.	
		(4)	The software version of the servo amplifier does not support the TM-RG2M/TM-RU2M series direct drive motor.	Check if the software version of the servo amplifier supports the TM-RG2M/TM-RU2M series.	It is C7 or earlier.	Replace the servo amplifier with a one whose software version supports the TM-RG2M/ TM-RU2M series.	
					It is C8 or later.	Check (5).	
		(5)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	[A] [B] [WB] [RJ010] [GF]
1A.2	Servo motor control mode combination error	(1)	The setting of [Pr. PA01] is not corresponding to the connected servo motor.	Check the [Pr. PA01] setting. Rotary servo motor: "_ _ 0 _" Linear servo motor: "_ _ 4 _" Direct drive motor: "_ _ 6 _"	The combination is incorrect.	Set [Pr. PA01] correctly.	[A] [B] [WB] [GF]
		(2)	When the fully closed loop control mode is selected, encoders of the servo motor side and the machine side are connected reversely.	Check the connection destination of the encoder.	The connection destination of the encoder is incorrect.	Connect it correctly.	
1A.4	Servo motor combination error 2	(1)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	

Alarm No.: 1B		Name: Converter alarm					
Alarm content		· An alarm occurred in the converter unit during the servo-on.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
1B.1	Converter unit error	(1)	The protection coordination cable is not correctly connected.	Check the protection coordination cable connection.	It is not connected.	Connect it correctly.	[A] [B]
					It is connected.	Check (2).	
		(2)	An alarm occurred in the converter unit during the servo-on.	Check the alarm of the converter unit, and take the action following the remedies for alarms of the converter unit.			

Alarm No.: 1E		Name: Encoder initial communication error 2					
Alarm content		· An encoder is malfunctioning.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
1E.1	Encoder malfunction	(1)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	[A] [B] [WB] [RJ010] [GF]
					It is repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
1E.2	Load-side encoder malfunction	(1)	A load-side encoder is malfunctioning.	Replace the load-side encoder, and then check the repeatability.	It is not repeatable.	Replace the load-side encoder.	[A] [B] [WB] [GF]
					It is repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 1F		Name: Encoder initial communication error 3					
Alarm content		· The connected encoder is not compatible with the servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
1F.1	Incompatible encoder	(1)	A servo motor or linear encoder, which is not compatible with the servo amplifier, was connected.	Check the model of the servo motor/linear encoder.	It is not compatible with the servo amplifier.	Replace it with a compatible one.	[A] [B] [WB] [RJ010] [GF]
					It is compatible with the servo amplifier.	Check (2).	
		(2)	The software version of the servo amplifier does not support the servo motor or linear encoder.	Check if the software version supports the servo motor/linear encoder.	It is not compatible.	Replace the servo amplifier to one which software version supports the servo motor/linear encoder.	
					It is compatible.	Check (3).	
		(3)	An encoder is malfunctioning.	Replace the servo motor or linear encoder, and then check the repeatability.	It is not repeatable.	Replace the servo motor or linear encoder.	
					It is repeatable.	Replace the servo amplifier.	
1F.2	Incompatible load-side encoder	(1)	A load-side encoder, which is not compatible with the servo amplifier, was connected.	Check the model of the load-side encoder.	It is not compatible with the servo amplifier.	Use a load-side encoder which is compatible with the servo amplifier.	[A] [B] [WB] [GF]
					It is compatible with the servo amplifier.	Check (2).	
		(2)	The software version of the servo amplifier does not support the load-side encoder.	Check if the software version of the servo amplifier supports the load-side encoder.	It is not compatible.	Replace the servo amplifier to one which software version supports the load-side encoder.	
					It is compatible.	Check (3).	
		(3)	A load-side encoder is malfunctioning.	Replace the load-side encoder, and then check the repeatability.	It is not repeatable.	Replace the load-side encoder.	
					It is repeatable.	Replace the servo amplifier.	

Alarm No.: 20		Name: Encoder normal communication error 1					
Alarm content		An error occurred in the communication between an encoder and servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
20.1	Encoder normal communication - Receive data error 1	(1)	An encoder cable is malfunctioning.	Check if the encoder cable is disconnected or shorted. When you use an A/B/Z-phase differential output linear encoder, check the wiring of the linear encoder.	It has a failure.	Repair or replace the cable.	[A] [B] [WB] [RJ010] [GF]
					It has no failure.	Check (2).	
		(2)	The external conductor of the encoder cable is not connected to the ground plate of the connector.	Check if it is connected.	It is not connected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	The parameter setting of communication method is incorrect. [A]: [Pr. PC22] [B] [WB] [RJ010] [GF]: [Pr. PC04]	Check the parameter setting.	The setting is incorrect.	Set it correctly.	
					The setting is correct.	Check (4).	
		(4)	In the parallel drive system, the setting of [Pr. PF40] is incorrect.	Check the parameter setting.	The setting is incorrect.	Set it correctly.	
					The setting is correct.	Check (5).	
		(5)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (6).	
		(6)	An encoder is malfunctioning.	Replace the servo motor or linear encoder, and then check the repeatability.	It is not repeatable.	Replace the servo motor or linear encoder.	
					It is repeatable.	Check (7).	
		(7)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
20.2	Encoder normal communication - Receive data error 2	Check it with the check method for [AL. 20.1].					
20.3	Encoder normal communication - Receive data error 3						

Alarm No.: 20		Name: Encoder normal communication error 1					
Alarm content		An error occurred in the communication between an encoder and servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
20.5	Encoder normal communication - Transmission data error 1	(1)	When you use an A/B/Z-phase differential output linear encoder, the wiring of the linear encoder is incorrect.	Check if the A/B-phase pulse signals (PA, PAR, PB, and PBR) of the encoder cable are disconnected or shorted.	It is disconnected or shorted.	Repair the encoder cable.	[A] [B] [GF]
					It is not disconnected or shorted.	Check (2).	
		(2)	An encoder cable is malfunctioning.	Check it with the check method for [AL. 20.1].			[A] [B] [WB] [RJ010] [GF]
		(3)	The external conductor of the encoder cable is not connected to the ground plate of the connector.				
		(4)	When you use an A/B/Z-phase differential output linear encoder, the parameter setting is incorrect.				
		(5)	The servo amplifier is malfunctioning.				
		(6)	An encoder is malfunctioning.				
		(7)	Something near the device caused it.				
20.6	Encoder normal communication - Transmission data error 2	(1)	When you use an A/B/Z-phase differential output linear encoder, the wiring of the linear encoder is incorrect.	Check if the Z-phase pulse signals (PZ/PZR) of the encoder cable are disconnected or shorted.	It is disconnected or shorted.	Repair the encoder cable.	[A] [B] [GF]
					It is not disconnected or shorted.	Check (2).	
		(2)	An encoder cable is malfunctioning.	Check it with the check method for [AL. 20.1].			[A] [B] [WB] [RJ010] [GF]
		(3)	The external conductor of the encoder cable is not connected to the ground plate of the connector.				
		(4)	When you use an A/B/Z-phase differential output linear encoder, the parameter setting is incorrect.				
		(5)	The servo amplifier is malfunctioning.				
		(6)	An encoder is malfunctioning.				
		(7)	Something near the device caused it.				
20.7	Encoder normal communication - Transmission data error 3	Check it with the check method for [AL. 20.1].					
20.9	Encoder normal communication - Receive data error 4						
20.A	Encoder normal communication - Receive data error 5						

Alarm No.: 21		Name: Encoder normal communication error 2					
Alarm content		· The encoder detected an error signal.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
21.1	Encoder data error 1	(1)	The encoder detected a high speed/ acceleration rate due to an oscillation or other factors.	Decrease the loop gain, and then check the repeatability.	It is not repeatable.	Use the encoder with low loop gain.	[A] [B] [WB] [RJ010] [GF]
					It is repeatable.	Check (2).	
		(2)	The external conductor of the encoder cable is not connected to the ground plate of the connector.	Check if it is connected.	It is not connected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (4).	
		(4)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
21.2	Encoder data update error	(1)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	[A] [B] [WB] [RJ010] [GF]
					It is repeatable.	Check (2).	
		(2)	The external conductor of the encoder cable is not connected to the ground plate of the connector.	Check if it is connected.	It is not connected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
21.3	Encoder data waveform error	Check it with the check method for [AL. 21.2].					
21.4	Encoder non-signal error	(1)	A signal of the encoder has not been inputted.	Check if the encoder cable is wired correctly.	It has a failure.	Review the wiring.	[A] [B] [WB] [GF]
					It has no failure.	Check (2).	
		(2)	The external conductor of the encoder cable is not connected to the ground plate of the connector.	Check if it is connected.	It is not connected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
21.5	Encoder hardware error 1	Check it with the check method for [AL. 21.2].					
21.6	Encoder hardware error 2						
21.9	Encoder data error 2	Check it with the check method for [AL. 21.1].					

Alarm No.: 24		Name: Main circuit error					
Alarm content		· A ground fault occurred on the servo motor power lines. · A ground fault occurred at the servo motor. · Power supply voltage for inverter circuit control is low. (Only for MR-J4W2-0303B6)					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
24.1	Ground fault detected by hardware detection circuit	(1)	The servo amplifier is malfunctioning.	Disconnect the servo motor power cables (U/V/W) and check if the alarm occurs.	It occurs.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It does not occur.	Check (2).	
		(2)	A ground fault or short occurred at the servo motor power cable.	Check if only the servo motor power cable is shorted.	It is shorted.	Replace the servo motor power cable.	
					It is not shorted.	Check (3).	
		(3)	A ground fault occurred at the servo motor.	Disconnect the servo motor power cables on motor side, and check insulation of the motor (between U/V/W/⏚).	It is shorted.	Replace the servo motor.	
					It is not shorted.	Check (4).	
		(4)	The main circuit power supply cable and servo motor power cable were shorted.	Shut off the power, and check if the main circuit power supply cable and servo motor power cable are in contact.	They are in contact.	Correct the wiring.	
					They are not in contact.	Check (5).	
		(5)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
24.2	Ground fault detected by software detection function	(1)	For MR-J4W2-0303B6, the servo-on command was inputted when the control circuit power supply voltage was below 20 V.	Check the control circuit power supply voltage when the servo-on command was inputted.	The control circuit power supply voltage was below 20 V.	Input the servo-on command after the control circuit power supply voltage reaches 20 V or higher.	[WB]
					The control circuit power supply voltage was 20 V or higher.	Check (2).	
		(2)	The servo amplifier is malfunctioning.	Disconnect the servo motor power cable (U/V/W), and check if the alarm occurs.	It occurs.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It does not occur.	Check (3).	
		(3)	A ground fault or short occurred at the servo motor power cable.	Check if only the servo motor power cable is shorted.	It is shorted.	Replace the servo motor power cable.	
					It is not shorted.	Check (4).	
		(4)	A ground fault occurred at the servo motor.	Disconnect the servo motor power cables on motor side, and check insulation between phases (U/V/W/⏚).	It is shorted.	Replace the servo motor.	
					It is not shorted.	Check (5).	
		(5)	The main circuit power supply cable and servo motor power cable were shorted.	Shut off the power, and check if the main circuit power supply cable and servo motor power cable are in contact.	They are in contact.	Correct the wiring.	
					They are not in contact.	Check (6).	
		(6)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 25		Name: Absolute position erased					
Alarm content		· The absolute position data is faulty. · Power was switched on for the first time in the absolute position detection system. · After the scale measurement encoder was set to the absolute position detection system, the power was switched on for the first time.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
25.1	Servo motor encoder - Absolute position erased	(1)	Power was switched on for the first time in the absolute position detection system.	Check if this is the first time you switched on the power in the absolute position detection system.	This is the first time.	Check that the battery is mounted correctly, and make home position return.	[A] [B] [WB] [RJ010] [GF]
					This is not the first time.	Check (2).	
		(2)	1) When an MR-BAT6V1SET(-A) battery or MR-BT6VCASE battery case was used, CN4 of the servo amplifier was disconnected during control circuit power supply off. 2) When an MR-BAT6V1BJ battery for junction battery cable was used, both CN4 of the servo amplifier and MR-BAT6V1BJ battery for junction battery cable were disconnected from the MR-BT6VCBL03M junction battery cable.	Check if the battery was removed in this way when the control circuit power supply was off.	It was removed.	Check that the battery is mounted correctly, and make home position return.	
					It was not removed.	Check (3).	
		(3)	1) When an MR-BAT6V1SET(-A) battery or MR-BT6VCASE battery case was used, the power was turned off with the battery disconnected from CN4. 2) When an MR-BAT6V1BJ battery for junction battery cable was used, the power was turned off with the battery disconnected from CN4 and MR-BT6VCBL03M junction battery cable.	Check if the power was turned off in this state.	It was turned off.	Check that the battery is mounted correctly, and make home position return.	
					It was not turned off.	MR-BAT6V1BJ battery for junction battery cable: Refer to (4). MR-BAT6V1SET(-A) battery or MR-BT6VCASE battery case: Refer to (6).	
		(4)	The encoder cable was disconnected with the MR-BAT6V1BJ battery disconnected from MR-BT6VCBL03M junction battery cable.	Check if the encoder cable was disconnected in this state.	It was disconnected.	Check that the MR-BAT6V1BJ battery is connected to CN4 and MR-BT6VCBL03M junction battery cable, and execute a home position return.	[A] [B] [RJ010] [GF]
					It was not disconnected.	Check (5).	

Alarm No.: 25		Name: Absolute position erased					
Alarm content		· The absolute position data is faulty. · Power was switched on for the first time in the absolute position detection system. · After the scale measurement encoder was set to the absolute position detection system, the power was switched on for the first time.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
25.1	Servo motor encoder - Absolute position erased	(5)	The MR-BT6VCBL03M junction battery cable is not connected to the encoder cable.	Check if the MR-BT6VCBL03M junction battery cable is connected to the encoder cable.	It is not connected.	Connect the MR-BT6VCBL03M junction battery cable to the encoder cable	[A] [B] [RJ010] [GF]
					It is connected.	Check (6).	
		(6)	The battery voltage is low. The battery is consumed.	Check the battery voltage with a tester. When an MR-BAT6V1BJ battery for junction battery cable was used, check the voltage of the connector (orange) for servo amplifier.	It is less than 3 V DC.	Replace the battery.	[A] [B] [WB] [RJ010] [GF]
					It is 3 V DC or more.	Check (7).	
		(7)	The voltage has dropped greatly in the encoder cable wired to the battery.	Check if a recommended cable is used for the encoder cable.	It is not used.	Use a recommended wire.	
					It is used.	Check (8).	
		(8)	A battery cable is malfunctioning.	Check for the loose connection with a tester.	It has a failure.	Replace the battery cable.	
					It has no failure.	Check (9).	
		(9)	There is a loose connection of the encoder cable on the servo motor side.	Check for the loose connection with a tester. Measure the voltage on the servo motor side.	It has a failure.	Repair or replace the encoder cable.	
					It has no failure.	Check (10).	
		(10)	The absolute position storage unit was not connected for using a direct drive motor.	Check if the absolute position storage unit is connected correctly.	It is not connected.	Connect the absolute position storage unit correctly.	[A] [B] [WB] [GF]
					It is connected.	Check (11).	
		(11)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It is repeatable.	Check (12).	
		(12)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	

Alarm No.: 25		Name: Absolute position erased					
Alarm content		· The absolute position data is faulty. · Power was switched on for the first time in the absolute position detection system. · After the scale measurement encoder was set to the absolute position detection system, the power was switched on for the first time.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
25.2	Scale measurement encoder - Absolute position erased	(1)	After the scale measurement encoder was set to the absolute position detection system, the power was switched on for the first time.	Check if this is the first time to switch on the power after the scale measurement encoder was set to the absolute position detection system.	This is the first time.	Check that the battery is mounted correctly, and make home position return.	[B] [WB] [GF]
					This is not the first time.	Check (2).	
		(2)	The battery was removed (replaced) when the control circuit power supply was off.	Check if the battery was removed when the control circuit power supply was off.	It was removed.	Check that the battery is mounted correctly, and make home position return.	
					It was not removed.	Check (3).	
		(3)	The power was turned off with the battery disconnected from CN4.	Check if the power was turned off in this state.	It was turned off.	Check that the battery is mounted correctly, and make home position return.	
					It was not turned off.	Check (4).	
		(4)	The battery voltage is low. The battery is consumed.	Check the battery voltage with a tester.	It is less than 3 V DC.	Replace the battery.	
					It is 3 V DC or more.	Check (5).	
		(5)	The voltage has dropped greatly in the encoder cable wired to the battery.	Check if a recommended cable is used for the encoder cable.	It is not used.	Use a recommended wire.	
					It is used.	Check (6).	
		(6)	A battery cable is malfunctioning.	Check for the loose connection with a tester.	It has a failure.	Replace the battery cable.	
					It has no failure.	Check (7).	
		(7)	There is a loose connection of the encoder cable on the scale measurement encoder side.	Check for the loose connection with a tester. Measure the voltage on the scale measurement encoder side.	It has a failure.	Repair or replace the encoder cable.	
					It has no failure.	Check (8).	
		(8)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (9).	
		(9)	The scale measurement encoder is malfunctioning.	Replace the scale measurement encoder, and then check the repeatability.	It is not repeatable.	Replace the scale measurement encoder.	

Alarm No.: 27		Name: Initial magnetic pole detection error						
Alarm content		· The initial magnetic pole detection was not completed properly.						
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
27.1	Magnetic pole detection - Abnormal termination	(1)	A moving part collided against the machine.	Check if it collided.	It collided.	Move the start position of the magnetic pole detection.	[A] [B] [WB] [GF]
					It did not collided.	Check (2).	
		(2)	The wiring of the servo motor power cable is incorrect.	Check if the wiring of the servo motor power cable is correct.	It has a failure.	Correct the wiring.	
					It has no failure.	Check (3).	
		(3)	The linear encoder resolution setting differs from the setting value.	Check the setting of [Pr. PL02] and [Pr. PL03].	The setting is incorrect.	Set it correctly.	
					The setting is correct.	Check (4).	
		(4)	The direction of mounting linear encoder is incorrect.	Check polarities of the linear encoder and the linear servo motor.	The mounting direction is incorrect.	Mount it correctly. Review the "encoder pulse count polarity selection" setting of the parameter as required. [A]: [Pr. PC45] [B] [WB] [GF]: [Pr. PC27]	
					The mounting direction is correct.	Check (5).	
		(5)	An excitation level of the magnetic pole detection voltage level is small.	Check if the travel distance during the magnetic pole detection is too short (for a position detection method).	It is too short.	Increase it with the [Pr. PL09] setting.	
				Check if the travel distance during the magnetic pole detection is too long or if a vibration is occurring (for a minute position detection method).	The travel distance is too long or a vibration is occurring.	Review the [Pr. PL17] setting.	
27.2	Magnetic pole detection - Time out error	(1)	Servo-on was enabled when the primary side of linear servo motor or rotor of direct drive motor did not stop.	Check if servo-on was enabled when the motor did not stop.	Servo-on was enabled when the motor did not stop.	Stop the linear servo motor and the direct drive motor, and enable servo-on again.	
					Servo-on was enabled when the motor stopped.	Check (2).	
		(2)	Only one of the limit switches is on during magnetic pole detection.	Check the limit switches.	It has a failure.	Remove the cause. Move the start position of the magnetic pole detection.	
					It has no failure.	Check (3).	
		(3)	The magnetic pole detection voltage level is small.	Check if the travel distance during the magnetic pole detection is too short (for a position detection method).	It is too short.	Increase it with the [Pr. PL09] setting.	

Alarm No.: 27		Name: Initial magnetic pole detection error					
Alarm content		· The initial magnetic pole detection was not completed properly.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
27.3	Magnetic pole detection - Limit switch error	(1)	Both of the limit switches are off during the magnetic pole detection.	Check the limit switches.	Both of them are off.	Turn on the limit switches. When using a direct drive motor, also check (2).	[A] [B] [WB] [GF]
		(2)	When using a direct drive motor in a system where the motor rotates one revolution or more, the following stroke limit signals are not enabled with a parameter. [A]: LSP and LSN [B] [WB]: FLS and RLS [GF]: LSP and LSN (FLS and RLS from the controller)	Check the [Pr. PL08] setting.	The [Pr. PL08] setting is "_ 0 _ _".	Set the [Pr. PL08] setting to "_ 1 _ _".	
27.4	Magnetic pole detection - Estimated error	Check it with the check method for [AL. 27.1].					
27.5	Magnetic pole detection - Position deviation error						
27.6	Magnetic pole detection - Speed deviation error						
27.7	Magnetic pole detection - Current error						

Alarm No.: 28		Name: Linear encoder error 2					
Alarm content		· Working environment of linear encoder is not normal.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
28.1	Linear encoder - Environment error	(1)	The ambient temperature of the linear encoder is out of specifications.	Check the ambient temperature of the linear encoder.	It is out of specifications.	Lower the temperature. Contact the linear encoder manufacturer.	[A] [B] [WB] [GF]
					It is within specifications.	Check (2).	
		(2)	The signal level of the linear encoder has dropped.	Check the mounting condition of the linear encoder.	It has a failure.	Correct the mounting method of the linear encoder.	

Alarm No.: 2A		Name: Linear encoder error 1					
Alarm content		· An error of the linear encoder was detected. (The details vary depending on the linear encoder manufacturer.)					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
2A.1	Linear encoder error 1-1	(1)	Mounting condition of the linear encoder and head is failure.	Adjust the positions of the scale and head, and then check the repeatability.	It is not repeatable.	Use the equipment at the adjusted position.	[A] [B] [WB] [GF]
					It is repeatable.	Check (2).	
		(2)	The external conductor of the encoder cable is not connected to the ground plate of the connector.	Check if it is connected.	It is not connected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (4).	
		(4)	An alarm of the linear encoder was detected.	Check the content of the alarm detail list of the Linear Encoder Instruction Manual.	Remove its cause described in the instruction manual.	Contact each encoder manufacturer for how to deal with it.	
2A.2	Linear encoder error 1-2	Check it with the check method for [AL. 2A.1].					
2A.3	Linear encoder error 1-3						
2A.4	Linear encoder error 1-4						
2A.5	Linear encoder error 1-5						
2A.6	Linear encoder error 1-6						
2A.7	Linear encoder error 1-7						
2A.8	Linear encoder error 1-8						

Alarm No.: 2B		Name: Encoder counter error					
Alarm content		· Data which encoder created is failure.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
2B.1	Encoder counter error 1	(1)	An encoder cable is malfunctioning.	Check if the encoder cable is disconnected or shorted.	It has a failure.	Repair or replace the cable.	[A] [B] [WB] [GF]
					It has no failure.	Check (2).	
		(2)	The external conductor of the encoder cable is not connected to the ground plate of the connector.	Check if it is connected.	It is not connected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (4).	
		(4)	An encoder is malfunctioning.	Replace the direct drive motor, and then check the repeatability.	It is not repeatable.	Replace the direct drive motor.	
2B.2	Encoder counter error 2	Check it with the check method for [AL. 2B.1].					

Alarm No.: 30		Name: Regenerative error					
Alarm content		· Permissible regenerative power of the built-in regenerative resistor or regenerative option is exceeded. · A regenerative transistor in the servo amplifier is malfunctioning.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
30.1	Regeneration heat error	(1)	The setting of the regenerative resistor (regenerative option) is incorrect.	Check the regenerative resistor (regenerative option) and [Pr. PA02] setting.	The setting value is incorrect.	Set it correctly.	[A] [B] [WB] [RJ010] [GF]
					It is set correctly.	Check (2).	
		(2)	The regenerative resistor (regenerative option) is not connected.	Check if the regenerative resistor (regenerative option) is connected correctly.	It is not connected correctly.	Connect it correctly.	
					It is connected correctly.	Check (3).	
		(3)	The combination of regenerative resistor (regenerative option) and servo amplifier is incorrect.	Check if the regenerative resistor (regenerative option) and the servo amplifier are connected in the specified combination.	The combination is incorrect.	Use them in the correct combination.	
					The combination is correct.	Check (4).	
		(4)	The power supply voltage is high.	Check if the voltage of the input power supply is over the prescribed value. 200 V class: 264 V AC 400 V class: 528 V AC 100 V class: 132 V AC 48 V DC setting: 70 V DC 24 V DC setting: 50 V DC	It is higher than the prescribed value.	Reduce the power supply voltage.	
					It is at the prescribed value or lower.	Check (5).	
		(5)	The regenerative load ratio exceeded 100%.	Check the regenerative load ratio when alarm occurs.	It is 100% or more.	Reduce the frequency of positioning. Increase the deceleration time constant. Reduce the load. Use a regenerative option if it is not being used. Review the regenerative option capacity. For MR-J4-03A6(-RJ) and MR-J4W2-0303B6, check if the main circuit power supply voltage is 48 V DC even though the setting is 24 V DC.	
30.2	Regeneration signal error	(1)	A detection circuit of the servo amplifier is malfunctioning.	Check if the regenerative resistor (regenerative option) is overheating.	It is overheating abnormally.	Replace the servo amplifier.	
30.3	Regeneration feedback signal error	(1)	A detection circuit of the servo amplifier is malfunctioning.	Remove the regenerative option or built-in regenerative resistor, and then check if the alarm occurs at power on. For MR-J4-03A6(-RJ) and MR-J4W2-0303B, check if the alarm occurs at power on.	The alarm occurs.	Replace the servo amplifier.	
					The alarm does not occur.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ground fault, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 31		Name: Overspeed					
Alarm content		· The servo motor speed has exceeded the instantaneous permissible speed. · The linear servo motor speed has exceeded the instantaneous permissible speed.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
31.1	Abnormal motor speed	(1)	The command pulse frequency is high.	Check the command pulse frequency.	The command pulse frequency is high.	Check operation pattern.	[A]
					The command pulse frequency is low.	Check (2).	
		(2)	The settings of the electronic gear are incorrect.	Check the setting value of the electronic gear.	The setting value is incorrect.	Review the settings.	
					The setting value is correct.	Check (5).	
		(3)	The command from the controller is excessive.	Check if the command from the controller is over the permissible speed.	It is over the permissible speed.	Check operation pattern.	[B] [WB] [RJ010] [GF]
					It is less than the permissible speed.	Check (4).	
		(4)	A larger speed command than the overspeed alarm level was inputted.	Check that the actual servo motor speed is higher than the setting value of [Pr. PC08 Overspeed alarm detection level].	The servo motor speed is higher than the overspeed alarm detection level.	Review the [Pr. PC08] setting.	
					The servo motor speed is lower than the overspeed alarm detection level.	Check (5).	
		(5)	The servo motor was at the maximum torque (maximum thrust) at the time of acceleration.	Check if the torque (thrust) at the time of acceleration is the maximum torque (maximum thrust).	It is the maximum torque (maximum thrust).	Increase the acceleration/deceleration time constant. Or reduce the load.	[A] [B] [WB] [RJ010] [GF]
					It is less than the maximum torque (maximum thrust).	Check (6).	
		(6)	The servo system is unstable and oscillating.	Check if the servo motor is oscillating.	It is oscillating.	Adjust the servo gain. Or reduce the load.	
					It is not oscillating.	Check (7).	
		(7)	The velocity waveform has overshot.	Check if it is overshooting because the acceleration time constant is too short.	It is overshooting.	Increase the acceleration/deceleration time constant.	
					It is not overshooting.	Check (8).	
		(8)	For MR-J4-03A6(-RJ) and MR-J4W2-0303B6, the speed has overshot when the power was restored from a temporary bus voltage drop during an operation.	Check if a bus voltage drops temporarily during an operation.	The bus voltage has dropped.	Review the capacity of the 24 V DC main circuit power supply. Increase the voltage of the 24 V DC main circuit power supply within the permissible voltage fluctuation range. Change the main circuit input voltage to 48 V DC. Check operation pattern.	[A] [WB]
					The bus voltage has not dropped.	Check (9).	
		(9)	The connection destination of the encoder cable is incorrect.	Check the connection destinations of CN2A, CN2B, and CN2C.	It is not correct.	Wire it correctly.	[WB]
					It is correct.	Check (10).	
		(10)	The connection of the servo motor is incorrect.	Check the wiring of U/V/W.	It is incorrect.	Set it correctly.	[A] [B] [WB] [RJ010] [GF]
					It is correct.	Check (11).	
		(11)	The encoder or linear encoder is malfunctioning.	Check if the alarm is occurring during less than instantaneous permissible speed.	It is occurring during less than instantaneous permissible speed.	Replace the servo motor or linear encoder.	

Alarm No.: 32		Name: Overcurrent					
Alarm content		· A current higher than the permissible current was applied to the servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
32.1	Overcurrent detected at hardware detection circuit (during operation)	(1)	The servo amplifier is malfunctioning.	Disconnect the servo motor power cables (U/V/W) and check if the alarm occurs.	It occurs.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It does not occur.	Check (2).	
		(2)	A ground fault or short occurred at the servo motor power cable.	Check if only the servo motor power cable is shorted.	It is shorted.	Replace the servo motor power cable.	
					It is not shorted.	Check (3).	
		(3)	The servo motor is malfunctioning.	Disconnect the servo motor power cables on motor side, and check insulation of the motor (between U/V/W/⏚/⏚).	A ground fault is occurring.	Replace the servo motor.	
					A ground fault is not occurring.	Check (4).	
		(4)	The dynamic brake is malfunctioning.	Check if the alarm occurs when you turn on the servo-on command.	It occurs.	Replace the servo amplifier.	
					It does not occur.	[WB]: Check (5). [A] [B] [RJ010] [GF]: Check (7).	
		(5)	The connection destination of the encoder cable is incorrect.	Check the connection destinations of CN2A, CN2B, and CN2C.	It is not correct.	Wire it correctly.	[WB]
					It is correct.	Check (6).	
		(6)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
		(7)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	[A] [B] [RJ010] [GF]
					There is no problem in the surrounding.	Check it with the check method for [AL. 45.1].	
32.2	Overcurrent detected at software detection function (during operation)	(1)	The servo gain is high.	Check if an oscillation is occurring.	An oscillation is occurring.	Reduce the speed loop gain ([Pr. PB09]). For MR-J4-03A6(-RJ) and MR-J4W2-0303B6, check if the main circuit power supply voltage is 48 V DC even though the setting is 24 V DC.	[A] [B] [WB] [RJ010] [GF]
					An oscillation is not occurring.	Check (2).	
		(2)	The servo amplifier is malfunctioning.	Disconnect the servo motor power cables (U/V/W) and check if the alarm occurs.	It occurs.	Replace the servo amplifier.	
					It does not occur.	Check (3).	
		(3)	A ground fault or short occurred at the servo motor power cable.	Check if only the servo motor power cable is shorted.	It is shorted.	Replace the servo motor power cable.	
					It is not shorted.	Check (4).	
		(4)	The servo motor is malfunctioning.	Disconnect the servo motor power cables on motor side, and check insulation of the motor (between U/V/W/⏚/⏚).	A ground fault is occurring.	Replace the servo motor.	
					A ground fault is not occurring.	Check (5).	
		(5)	The connection destination of the encoder cable is incorrect.	Check the connection destinations of CN2A, CN2B, and CN2C.	It is not correct.	Connect it correctly.	[WB]
					It is correct.	Check (6).	
		(6)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	[A] [B] [WB] [RJ010] [GF]

Alarm No.: 32		Name: Overcurrent				
Alarm content		· A current higher than the permissible current was applied to the servo amplifier.				
Detail No.	Detail name	Cause	Check method	Check result	Action	Target
32.3	Overcurrent detected at hardware detection circuit (during a stop)	Check it with the check method for [AL. 32.1].				
32.4	Overcurrent detected at software detection function (during a stop)	Check it with the check method for [AL. 32.2].				

Alarm No.: 33		Name: Overvoltage				
Alarm content		· The value of the bus voltage exceeded the prescribed value. 200 V class: 400 V DC 400 V class: 800 V DC 100 V class: 400 V DC 48 V DC setting: 75 V DC 24 V DC setting: 55 V DC				
Detail No.	Detail name	Cause	Check method	Check result	Action	Target
33.1	Main circuit voltage error	(1) The setting of the regenerative resistor (regenerative option) is incorrect.	Check the regenerative resistor (regenerative option) and [Pr. PA02] setting.	The setting value is incorrect.	Set it correctly.	[A] [B] [WB] [RJ010] [GF]
				It is set correctly.	Check (2).	
		(2) The regenerative resistor (regenerative option) is not connected.	Check if the regenerative resistor (regenerative option) is connected correctly.	It is not connected correctly.	Connect it correctly.	
				It is connected correctly.	Check (3).	
		(3) Wire breakage of built-in regenerative resistor or regenerative option	Measure the resistance of the built-in regenerative resistor or regenerative option.	The resistance is abnormal.	When using a built-in regenerative resistor, replace the servo amplifier. When using a regenerative option, replace the regenerative option.	
				The resistance is normal.	Check (4).	
		(4) The regeneration capacity is insufficient.	Set a longer deceleration time constant, and then check the repeatability.	It is not repeatable.	When using a built-in regenerative resistor, use a regenerative option. When using a regenerative option, use a larger capacity one.	
				It is repeatable.	Check (5).	
		(5) Power supply voltage high.	Check if the voltage of the input power supply is over the prescribed value. 200 V class: 264 V AC 400 V class: 528 V AC 100 V class: 132 V AC 48 V DC setting: 75 V DC 24 V DC setting: 55 V DC	It is higher than the prescribed value.	Reduce the power supply voltage.	
				It is at the prescribed value or lower.	Check (6).	
		(6) Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 34		Name: SSCNET receive error 1					
Alarm content		· An error occurred in SSCNET III/H communication. (continuous communication error with 3.5 ms interval)					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
34.1	SSCNET receive data error	(1)	The SSCNET III cable was disconnected.	Check the SSCNET III cable connection.	It is disconnected.	Turn off the control circuit power supply of the servo amplifier, and then connect the SSCNET III cable.	[B] [WB]
					It is connected.	Check (2).	
		(2)	The surface at the end of SSCNET III cable got dirty.	Wipe off the dirt from the cable tip, and then check the repeatability.	It is not repeatable.	Take measure to keep the cable tip clean.	
					It is repeatable.	Check (3).	
		(3)	The SSCNET III cable is broken or severed.	Check if the SSCNET III cable is malfunctioning.	It has a failure.	Replace the SSCNET III cable.	
					It has no failure.	Check (4).	
		(4)	A vinyl tape is stacked to the SSCNET III cable. Or a wire insulator containing migrating plasticizer is adhered to the cable.	Check if a vinyl tape is used. Check if the cable is contacting with other cables.	It is used. They are in contact.	Take countermeasures against its cause.	
					It is not used. They are not in contact.	Check (5).	
		(5)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (6).	
		(6)	The previous or next axis servo amplifier of the alarm occurred is malfunctioning.	Replace the previous and next servo amplifier of the axis alarm occurred, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (7).	
		(7)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	
					It is repeatable.	Check (8).	
		(8)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
34.2	SSCNET connector connection error	Check it with the check method for [AL. 34.1].					
34.3	SSCNET communication data error						
34.4	Hardware error signal detection						
34.5	SSCNET receive data error (safety observation function)						
34.6	SSCNET communication data error (safety observation function)						

Alarm No.: 35		Name: Command frequency error					
Alarm content		· Input pulse frequency of command pulse is too high.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
35.1	Command frequency error	(1)	The command pulse frequency is high.	Check the command pulse frequency.	The command pulse frequency is high.	Check operation pattern.	[A]
					The command pulse frequency is low.	Check (2).	
		(2)	The setting of "Command input pulse train filter selection" in [Pr. PA13] is not correct.	Check if the command pulse frequency is within the setting range of the filter.	It is out of setting range.	Review the filter setting.	
					It is within the setting range.	Check (6).	
		(3)	Inputted frequency with a manual pulse generator is high.	Check the inputted frequency of the manual pulse generator.	The command pulse frequency is high.	Reduce the inputted frequency of the manual pulse generator.	
					The command pulse frequency is low.	Check (6).	
		(4)	The command from the controller is excessive.	Check if the command from the controller is the permissible speed or higher.	It is the permissible speed or higher.	Check operation pattern.	[B] [WB] [RJ010] [GF]
					It is lower than the permissible speed.	Check (5).	
		(5)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	
					It is repeatable.	Check (6).	
		(6)	The command pulse frequency is high when the synchronous encoder axis is selected.	Check the command pulse frequency.	The command pulse frequency is high.	Check operation pattern.	[GF]
					The command pulse frequency is low.	Check (7).	
		(7)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	[A] [B] [WB] [RJ010] [GF]

Alarm No.: 36		Name: SSCNET receive error 2					
Alarm content		· An error occurred in SSCNET III/H communication. (intermittent communication error with about 70 ms interval)					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
36.1	Continuous communication data error	(1)	The SSCNET III cable was disconnected.	Check the SSCNET III cable connection.	It is disconnected.	Turn off the control circuit power supply of the servo amplifier, and then connect the SSCNET III cable.	[B] [WB]
					It is connected.	Check (2).	
		(2)	The surface at the end of SSCNET III cable got dirty.	Wipe off the dirt from the cable tip, and then check the repeatability.	It is not repeatable.	Take measure to keep the cable tip clean.	
					It is repeatable.	Check (3).	
		(3)	The SSCNET III cable is broken or severed.	Check if the SSCNET III cable is malfunctioning.	It has a failure.	Replace the SSCNET III cable.	
					It has no failure.	Check (4).	
		(4)	A vinyl tape is stacked to the SSCNET III cable. Or a wire insulator containing migrating plasticizer is adhered to the cable.	Check if a vinyl tape is used. Check if the cable is contacting with other cables.	It is used. They are in contact.	Take countermeasures against its cause.	
					It is not used. They are not in contact.	Check (5).	
		(5)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (6).	
		(6)	The previous or next axis servo amplifier of the alarm occurred is malfunctioning.	Replace the previous and next servo amplifier of the axis alarm occurred, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (7).	
		(7)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	
					It is repeatable.	Check (8).	
		(8)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
36.2	Continuous communication data error (safety observation function)	Check it with the check method for [AL. 36.1].					

Alarm No.: 37		Name: Parameter error					
Alarm content		· Parameter setting is incorrect. · Point table setting is incorrect.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
37.1	Parameter setting range error	(1)	A parameter was set out of setting range.	Check the parameter error No. and setting value.	It is out of setting range.	Set it within the range.	[A] [B] [WB] [RJ010] [GF]
					It is within the setting range.	Check (2).	
		(2)	A parameter setting contradicts another.	Check the parameter error No. and setting value.	A setting value is incorrect.	Correct the setting value.	
					A setting value is correct.	Check (3).	
		(3)	The parameter setting has changed due to a servo amplifier malfunction.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
37.2	Parameter combination error	(1)	A parameter setting contradicts another.	Check the parameter error No. and setting value.	A setting value is incorrect.	Correct the setting value. (When the master-slave function is set, also check (2).)	
		(2)	[Pr. PA01] on the master side was set to other than "standard control mode" or "fully closed loop control mode".	Check the parameter setting.	[Pr. PA01] is set to other than "standard control mode" or "fully closed loop control mode".	Set [Pr. PA01] to "standard control mode" or "fully closed loop control mode".	[B] (master)
					[Pr. PA01] is set to "standard control mode" or "fully closed loop control mode".	Check (4).	
		(3)	[Pr. PA01] on the slave side was set to other than "standard control mode".	Check the parameter setting.	[Pr. PA01] is set to other than "standard control mode".	Set [Pr. PA01] to "standard control mode".	[B] (slave)
					[Pr. PA01] is set to "standard control mode".	Check (4).	
		(4)	"Forced stop deceleration function selection" in [Pr. PA04] is enabled.	Check the parameter setting.	"Forced stop deceleration function selection" setting in [Pr. PA04] is enabled.	Disable "forced stop deceleration function selection" in [Pr. PA04].	[B] (master) (slave)
37.3	Point table setting error	(1)	The setting of point tables is incorrect.	Check if the setting of point tables is within the setting range. Check the parameter error No. and point table error No. with the point table error No. display on the display of the servo amplifier. Or check the setting value with the point table display of MR Configurator2.	A setting value is incorrect.	Correct the setting value.	[A] [GF]
					A setting value is correct.	Check (2).	
		(2)	A point table setting has changed due to a servo amplifier malfunction.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	

Alarm No.: 39		Name: Program error					
Alarm content		· A program used for the program operation is incorrect.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
39.1	Program error	(1)	A checksum of the program did not match at power-on. (The program has an error.)	Check if an error occurred (such as entered noise, power-off) at program write.	It has a failure.	Rewrite the program.	[A]
					It has no failure.	Check (2).	
		(2)	A program has changed due to a servo amplifier malfunction.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
39.2	Instruction argument external error	(1)	A program has never been written since program initialization.	Check if a program was written.	It was not executed.	Write the program.	
					It was executed.	Check (2).	
		(2)	A command argument is using a value out of specifications.	Check if the command description has a failure.	It has a failure.	Correct the command description.	
					It has no failure.	Check (3).	
		(3)	A program has changed due to a servo amplifier malfunction.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
39.3	Register No. error	(1)	A specified number of the general purpose register used for a command is a value out of specifications.	Check if the command description has a failure.	It has a failure.	Correct the command description.	
					It has no failure.	Check (2).	
		(2)	A program has changed due to a servo amplifier malfunction.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
39.4	Non-correspondence instruction error	(1)	A used command is not correspondent to the program.	Check if the command description has a failure.	It has a failure.	Correct the command description.	
					It has no failure.	Check (2).	
		(2)	A program has changed due to a servo amplifier malfunction.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	

Alarm No.: 3A		Name: Inrush current suppression circuit error					
Alarm content		· The inrush current suppression circuit error was detected.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
3A.1	Inrush current suppression circuit error	(1)	Inrush current suppressor circuit is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]

Alarm No.: 3D		Name: Parameter setting error for driver communication					
Alarm content		· The control parameter setting value for driver communication is incorrect.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
3D.1	Parameter combination error for driver communication on slave	(1)	The master transmit data selection for driver communication is not set correctly.	Check the settings of [Pr. PD16] and [Pr. PD17] on the master side.	The setting is incorrect.	Set it correctly.	[B] (slave)
3D.2	Parameter combination error for driver communication on master	Check it with the check method for [AL. 3D.1].					[B] (master)

Alarm No.: 3E		Name: Operation mode error					
Alarm content		· The operation mode setting was changed.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
3E.1	Operation mode error	(1)	The MR-J4 servo amplifier used in J3 compatibility mode was connected to the other SSCNET Ⅲ/H controller. Or an MR-J4 servo amplifier which was connected to SSCNET Ⅲ/H controller was connected to another SSCNET Ⅲ controller.	Check if the connection was changed to like these.	The connection was changed.	Initialize the servo amplifier with the built-in application software "MR-J4(W)-B mode selection" of MR Configurator2, and then connect the amplifier to the controller.	[B] [WB]
		(2)	The [Pr. PA01] setting value was changed.	Check if [Pr. PA01] was changed.	It was changed.	Set [Pr. PA01] correctly.	
3E.6	Operation mode switch error	(1)	A method of positioning data memorized in the servo amplifier (point table method/program method) is different from the actual positioning mode (point table method/program method).	Check if the positioning mode (point table method/program method) was changed. Positioning mode: [Pr. PA01] "_ _ _ x"	It was changed. (with a purpose)	After changing the positioning mode, initialize the point table method/ program method. (Refer to section 7.2.8 [Pr. PT34] of "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Positioning Mode)")	[A]
					It was changed by mistake.	Set the positioning mode back to the correct setting.	
3E.8	MR-D30 combination error	(1)	With CC-Link IE Field Network Basic communication selected, MR-D30 functional safety unit was connected.	Check if MR-D30 is connected.	It is connected.	Disconnect MR-D30.	[GF]

Alarm No.: 42		Name: Servo control error (for linear servo motor and direct drive motor)					
Alarm content		· A servo control error occurred.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
42.1	Servo control error by position deviation	(1)	The linear encoder resolution setting differs from the setting value.	Check the setting of [Pr. PL02] and [Pr. PL03].	The setting is incorrect.	Set it correctly.	[A] [B] [WB] [GF]
					The setting is correct.	Check (2).	
		(2)	The direction of mounting linear encoder is incorrect.	Check polarities of the linear encoder and the linear servo motor.	The mounting direction is incorrect.	Mount it correctly. Review the "encoder pulse count polarity selection" setting of the parameter as required. [A]: [Pr. PC45] [B] [WB] [GF]: [Pr. PC27]	
					The mounting direction is correct.	Check (3).	
		(3)	The connection of the servo motor is incorrect.	Check the wiring.	The wiring is incorrect.	Connect it correctly.	
					The wiring is correct.	Check (4).	
		(4)	The initial magnetic pole detection was not executed.	Execute the magnetic pole detection, and then check the repeatability.	It is not repeatable.	Execute the magnetic pole detection.	
					It is repeatable.	Check (5).	
		(5)	The position deviation exceeded the detection level.	Check the value of droop pulses.	The deviation is large.	Review the operation status. Review the [Pr. PL05] setting depending on circumstances.	

Alarm No.: 42		Name: Servo control error (for linear servo motor and direct drive motor)					
Alarm content		· A servo control error occurred.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
42.2	Servo control error by speed deviation	(1)	The linear encoder resolution setting differs from the setting value.	Check the setting of [Pr. PL02] and [Pr. PL03].	The setting is incorrect.	Set it correctly.	[A] [B] [WB] [GF]
					The setting is correct.	Check (2).	
		(2)	The direction of mounting linear encoder is incorrect.	Check polarities of the linear encoder and the linear servo motor.	The mounting direction is incorrect.	Mount it correctly. Review the "encoder pulse count polarity selection" setting of the parameter as required. [A]: [Pr. PC45] [B] [WB] [GF]: [Pr. PC27]	
					The mounting direction is correct.	Check (3).	
		(3)	The connection of the servo motor is incorrect.	Check the wiring.	The wiring is incorrect.	Connect it correctly.	
					The wiring is correct.	Check (4).	
		(4)	The initial magnetic pole detection was not executed.	Execute the magnetic pole detection, and then check the repeatability.	It is not repeatable.	Execute the magnetic pole detection.	
					It is repeatable.	Check (5).	
		(5)	The speed deviation exceeded the detection level.	Calculate the deviation between the speed command and actual speed.	The deviation is large.	Review the operation status. Review the [Pr. PL06] setting depending on circumstances.	
42.3	Servo control error by torque/ thrust deviation	(1)	The linear encoder resolution setting differs from the setting value.	Check the setting of [Pr. PL02] and [Pr. PL03].	The setting is incorrect.	Set it correctly.	
					The setting is correct.	Check (2).	
		(2)	The direction of mounting linear encoder is incorrect.	Check polarities of the linear encoder and the linear servo motor.	The mounting direction is incorrect.	Mount it correctly. Review the "encoder pulse count polarity selection" setting of the parameter as required. [A]: [Pr. PC45] [B] [WB] [GF]: [Pr. PC27]	
					The mounting direction is correct.	Check (3).	
		(3)	The connection of the servo motor is incorrect.	Check the wiring.	The wiring is incorrect.	Connect it correctly.	
					The wiring is correct.	Check (4).	
		(4)	The initial magnetic pole detection was not executed.	Execute the magnetic pole detection, and then check the repeatability.	It is not repeatable.	Execute the magnetic pole detection.	
					It is repeatable.	Check (5).	
		(5)	The torque/thrust deviation exceeded the detection level.	Calculate the deviation between the current command and torque/ thrust.	The deviation is large.	Review the operation status. Review the [Pr. PL07] setting depending on circumstances.	

Alarm No.: 42		Name: Fully closed loop control error detection (during fully closed loop control)					
Alarm content		· A fully closed loop control error has occurred.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
42.8	Fully closed loop control error by position deviation	(1)	The resolution of the load-side encoder setting differs from the setting value.	Check the setting of [Pr. PE04] and [Pr. PE05].	The setting is incorrect.	Set it correctly.	[A] [B] [WB] [GF]
					The setting is correct.	Check (2).	
		(2)	The direction of mounting load-side encoder is incorrect.	Check the mounting direction of the load-side encoder.	The mounting direction is incorrect.	Mount it correctly. Review the "encoder pulse count polarity selection" setting of the parameter as required. [A]: [Pr. PC45] [B] [WB] [GF]: [Pr. PC27]	
					The mounting direction is correct.	Check (3).	
		(3)	The position deviation exceeded the detection level.	Check the value of droop pulses.	The deviation is large.	Review the operation status. Review the [Pr. PE07] setting depending on circumstances.	
42.9	Fully closed loop control error by speed deviation	(1)	The resolution of the load-side encoder setting differs from the setting value.	Check the setting of [Pr. PE04] and [Pr. PE05].	The setting is incorrect.	Set it correctly.	
					The setting is correct.	Check (2).	
		(2)	The direction of mounting load-side encoder is incorrect.	Check the mounting direction of the load-side encoder.	The mounting direction is incorrect.	Mount it correctly. Review the "encoder pulse count polarity selection" setting of the parameter as required. [A]: [Pr. PC45] [B] [WB] [GF]: [Pr. PC27]	
					The mounting direction is correct.	Check (3).	
		(3)	The speed deviation exceeded the detection level.	Calculate the deviation between the speed command and actual speed.	The deviation is large.	Review the operation status. Review the [Pr. PE06] setting depending on circumstances.	
42.A	Fully closed loop control error by position deviation during command stop	Check it with the check method for [AL. 42.8].					

Alarm No.: 45		Name: Main circuit device overheat					
Alarm content		· Inside of the servo amplifier overheated.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
45.1	Main circuit device overheat error 1	(1)	Ambient temperature has exceeded 55 °C.	Check the ambient temperature.	It is over 55 °C.	Lower the ambient temperature.	[A] [B] [WB] [RJ010] [GF]
					It is less than 55 °C.	Check (2).	
		(2)	The close mounting is out of specifications.	Check the specifications of close mounting.	It is out of specifications.	Use within the range of specifications.	
					It is within specifications.	Check (3).	
		(3)	Turning on and off were repeated under the overload status.	Check if the overload status occurred many times.	It occurred.	Check operation pattern.	
					It did not occur.	Check (4).	
		(4)	A cooling fan, heat sink, or openings is clogged with foreign matter.	Clean the cooling fan, heat sink, or openings, and then check the repeatability.	It is not repeatable.	Clean it periodically.	
					It is repeatable.	Check (5).	
		(5)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
45.2	Main circuit device overheat error 2	(1)	Check it with the check method for [AL. 45.1].				

Alarm No.: 46		Name: Servo motor overheat					
Alarm content		· The servo motor overheated.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
46.1	Abnormal temperature of servo motor 1	(1)	Ambient temperature of the servo motor has exceeded 40 °C.	Check the ambient temperature of the servo motor.	It is over 40 °C.	Lower the ambient temperature.	[A] [B] [WB] [RJ010] [GF]
					It is less than 40 °C.	Check (2).	
		(2)	Servo motor is overloaded.	Check the effective load ratio.	The effective load ratio is high.	Reduce the load or review the operation pattern.	
					The effective load ratio is small.	Check (3).	
		(3)	The thermal sensor in the encoder is malfunctioning.	Check the servo motor temperature when the alarm occurs.	The servo motor temperature is low.	Replace the servo motor.	

Alarm No.: 46		Name: Servo motor overheat					
Alarm content		The servo motor overheated.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
46.2	Abnormal temperature of servo motor 2	(1)	Ambient temperature of the linear servo motor or direct drive motor has exceeded 40 °C.	Check the ambient temperature of the linear servo motor or direct drive motor.	It is over 40 °C.	Lower the ambient temperature.	[A] [B] [WB] [GF]
					It is less than 40 °C.	Check (2).	
		(2)	The linear servo motor or direct drive motor has been under overload status.	Check the effective load ratio.	The effective load ratio is high.	Reduce the load or review the operation pattern.	
					The effective load ratio is small.	Replace the servo motor.	
46.3	Thermistor disconnected error	(1)	In the parallel drive system, the parameter settings and the axis number settings are incorrect.	Check the settings of [Pr. PF37 Parallel drive - Encoder ID setting 1]. Check if the setting of [Pr. PF40 Parallel drive - Servo motor side system setting] matches the setting of the axis number set with the combination of SW2-3, SW2-4, and SW1.	It is not set correctly.	Set the parameter and the axis number correctly.	
					It is set correctly.	Check (2).	
		(2)	In the parallel drive system, the encoder cable from the servo motor is not connected to the encoder master servo amplifier.	Check if the encoder cable from the servo motor is connected to the encoder master servo amplifier.	It is not connected.	Connect the encoder cable of the servo motor to the encoder master servo amplifier. Connect the encoder master servo amplifier and the encoder slave servo amplifier in the order of the axis number.	
					It is connected.	Check (3).	
		(3)	A thermistor wire is not connected.	Check the thermistor wire.	It is not connected.	Connect it correctly.	
					It is connected.	Check (4).	
		(4)	The encoder cable MR-ENECBL_M-H for HF-JP series servo motors is used for the HG-JR22K1M(4) servo motor.	Check the model of the encoder cable.	MR-ENECBL_M-H is used.	Change it to MR-ENECBL_M-H-MTH.	
					MR-ENECBL_M-H-MTH is used.	Check (5).	
		(5)	The thermistor wire is disconnected.	Check the thermistor wire.	It is disconnected.	Repair the lead wire.	
					It is not disconnected.	Replace the servo motor.	
46.4	Thermistor circuit error	(1)	A thermistor circuit of the servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [GF]
46.5	Abnormal temperature of servo motor 3	Check it with the check method for [AL. 46.1].					
46.6	Abnormal temperature of servo motor 4	(1)	A current was applied to the servo amplifier in excess of its continuous output current.	Check the effective load ratio.	The effective load ratio is high.	Reduce the load or review the operation pattern. Or use a larger capacity motor.	[A] [B] [WB] [RJ010] [GF]

Alarm No.: 47		Name: Cooling fan error					
Alarm content		· The speed of the servo amplifier cooling fan decreased. · Or the fan speed decreased to the alarm occurrence level or less.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
47.1	Cooling fan stop error	(1)	Foreign matter was caught in the cooling fan.	Check if a foreign matter is caught in the cooling fan.	Something has been caught.	Remove the foreign matter.	[A] [B] [WB] [RJ010] [GF]
					Nothing has been caught.	Check (2).	
		(2)	Cooling fan life expired.	Check if the cooling fan is stopping.	It is stopping.	Replace the servo amplifier.	
47.2	Cooling fan speed reduction error	(1)	Foreign matter was caught in the cooling fan.	Check if a foreign matter is caught in the cooling fan.	Something has been caught.	Remove the foreign matter.	
					Nothing has been caught.	Check (2).	
		(2)	Cooling fan life expired.	Check the cooling fan speed.	The fan speed is less than the alarm occurrence level.	Replace the servo amplifier.	

Alarm No.: 50		Name: Overload 1					
Alarm content		Load exceeded overload protection characteristic of servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
50.1	Thermal overload error 1 during operation	(1)	The servo motor power cable was disconnected.	Check the servo motor power cable.	It is disconnected.	Repair or replace the servo motor power cable.	[A] [B] [WB] [RJ010] [GF]
					It is not disconnected.	Check (2).	
		(2)	The connection of the servo motor is incorrect.	Check the wiring of U/V/W.	It is incorrect.	Connect it correctly.	
					It is correct.	Check (3).	
		(3)	The electromagnetic brake has not released. (The electromagnetic brake has been activated.)	Check if the electromagnetic brake is released during operation.	It is not released.	Release the electromagnetic brake.	
					It is released.	Check (4).	
		(4)	The direction of mounting linear encoder is incorrect.	Check polarities of the linear encoder and the linear servo motor.	The mounting direction is incorrect.	Mount it correctly. Review the "encoder pulse count polarity selection" setting of the parameter as required. [A]: [Pr. PC45] [B] [WB] [GF]: [Pr. PC27]	[A] [B] [WB] [GF]
					The mounting direction is correct.	Check (5).	
		(5)	A current was applied to the servo amplifier in excess of its continuous output current.	Check the effective load ratio.	The effective load ratio is high.	Reduce the load. Or use a larger capacity motor.	[A] [B] [WB] [RJ010] [GF]
					The effective load ratio is small.	Check (6).	
		(6)	The connection destination of the encoder cable is incorrect.	Check the connection destinations of CN2A, CN2B, and CN2C.	It is not correct.	Connect it correctly.	[WB]
					It is correct.	Check (7).	
		(7)	The servo system is unstable and resonating.	Check if it is resonating.	It is resonating.	Adjust gains. For MR-J4-03A6(-RJ) and MR-J4W2-0303B6, check if the main circuit power supply voltage is 48 V DC even though the setting is 24 V DC.	[A] [B] [WB] [RJ010] [GF]
					It is not resonating.	Check (8).	
		(8)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (9).	
		(9)	The encoder or linear encoder is malfunctioning.	Replace the servo motor or linear encoder, and then check the repeatability.	It is not repeatable.	Replace the servo motor or linear encoder.	
50.2	Thermal overload error 2 during operation	Check it with the check method for [AL. 50.1].					
50.3	Thermal overload error 4 during operation						

Alarm No.: 50		Name: Overload 1					
Alarm content		· Load exceeded overload protection characteristic of servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
50.4	Thermal overload error 1 during a stop	(1)	A moving part collided against the machine.	Check if it collided.	It collided.	Check operation pattern.	[A] [B] [WB] [RJ010] [GF]
					It did not collide.	Check (2).	
		(2)	The servo motor power cable was disconnected.	Check the servo motor power cable.	It is disconnected.	Repair or replace the servo motor power cable.	
					It is not disconnected.	Check (3).	
		(3)	Hunting occurs during servo-lock.	Check if the hunting is occurring.	The hunting is occurring.	Adjust gains.	
					The hunting is not occurring.	Check (4).	
		(4)	The electromagnetic brake has not released. (The electromagnetic brake has been activated.)	Check if the electromagnetic brake is released.	It is not released.	Release the electromagnetic brake.	
					It is released.	Check (5).	
		(5)	The direction of mounting linear encoder is incorrect.	Check polarities of the linear encoder and the linear servo motor.	The mounting direction is incorrect.	Mount it correctly. Review the "encoder pulse count polarity selection" setting of the parameter as required. [A]: [Pr. PC45] [B] [WB] [GF]: [Pr. PC27]	[A] [B] [WB] [GF]
					The mounting direction is correct.	Check (6).	
		(6)	A current was applied to the servo amplifier in excess of its continuous output current.	Check the effective load ratio.	The effective load ratio is high.	Reduce the load. Or use a larger capacity motor.	[A] [B] [WB] [RJ010] [GF]
					The effective load ratio is small.	Check (7).	
		(7)	The connection destination of the encoder cable is incorrect.	Check the connection destinations of CN2A, CN2B, and CN2C.	It is not correct.	Connect it correctly.	[WB]
					It is correct.	Check (8).	
		(8)	The servo system is unstable and resonating.	Check if it is resonating.	It is resonating.	Adjust gains.	[A] [B] [WB] [RJ010] [GF]
					It is not resonating.	Check (9).	
		(9)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (10).	
		(10)	The encoder, servo motor, or linear encoder is malfunctioning.	Replace the servo motor or linear encoder, and then check the repeatability.	It is not repeatable.	Replace the servo motor or linear encoder.	
50.5	Thermal overload error 2 during a stop	Check it with the check method for [AL. 50.4].					
50.6	Thermal overload error 4 during a stop						

Alarm No.: 51		Name: Overload 2					
Alarm content		· Maximum output current flowed continuously due to machine collision or the like.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
51.1	Thermal overload error 3 during operation	(1)	The servo motor power cable was disconnected.	Check the servo motor power cable.	It is disconnected.	Repair or replace the servo motor power cable.	[A] [B] [WB] [RJ010] [GF]
					It is not disconnected.	Check (2).	
		(2)	The connection of the servo motor is incorrect.	Check the wiring of U/V/W.	It is incorrect.	Connect it correctly.	
					It is correct.	Check (3).	
		(3)	The connection of the encoder cable is incorrect.	Check if the encoder cable is connected correctly.	It is incorrect.	Connect it correctly.	
					It is correct.	Check (4).	
		(4)	The direction of mounting linear encoder is incorrect.	Check polarities of the linear encoder and the linear servo motor.	The mounting direction is incorrect.	Mount it correctly. Review the "encoder pulse count polarity selection" setting of the parameter as required. [A]: [Pr. PC45] [B] [WB] [GF]: [Pr. PC27]	[A] [B] [WB] [GF]
					The mounting direction is correct.	Check (5).	
		(5)	The torque is insufficient.	Check the peak load ratio.	The torque is saturated.	Reduce the load or review the operation pattern. Or use a larger capacity motor.	[A] [B] [WB] [RJ010] [GF]
					The torque is not saturated.	Check (6).	
		(6)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (7).	
		(7)	An encoder or servo motor is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
51.2	Thermal overload error 3 during a stop	(1)	A moving part collided against the machine.	Check if it collided.	It collided.	Check operation pattern.	
					It did not collide.	Refer to (2).	
		(2)	The servo motor power cable was disconnected.	Check it with the check method for [AL. 51.1].			
		(3)	The connection of the servo motor is incorrect.				
		(4)	The connection of the encoder cable is incorrect.				
		(5)	The direction of mounting linear encoder is incorrect.				
		(6)	The torque is saturated.				
		(7)	The servo amplifier is malfunctioning.				
		(8)	An encoder is malfunctioning.				

Alarm No.: 52		Name: Error excessive					
Alarm content		· Droop pulses have exceeded the alarm occurrence level.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
52.1	Excess droop pulse 1	(1)	The servo motor power cable was disconnected.	Check the servo motor power cable.	It is disconnected.	Repair or replace the servo motor power cable.	[A] [B] [WB] [RJ010] [GF]
					It is not disconnected.	Check (2).	
		(2)	The connection of the servo motor is incorrect.	Check the wiring of U/V/W.	It is incorrect.	Connect it correctly.	
					It is correct.	Check (3).	
		(3)	The connection of the encoder cable is incorrect.	Check if the encoder cable is connected correctly.	It is incorrect.	Connect it correctly.	
					It is correct.	Check (4).	
		(4)	The torque limit has been enabled.	Check if the limiting torque is in progress.	The limiting torque is in progress.	Increase the torque limit value.	
					The limiting torque is not in progress.	Check (5).	
		(5)	A moving part collided against the machine.	Check if it collided.	It collided.	Check operation pattern.	
					It did not collide.	Check (6).	
		(6)	The electromagnetic brake has not released. (The electromagnetic brake has been activated.)	Check if electromagnetic brake is released.	It is not released.	Release the electromagnetic brake.	
					It is released.	Check (7).	
		(7)	The torque is insufficient.	Check the peak load ratio.	The torque is saturated.	Reduce the load or review the operation pattern. Or use a larger capacity motor.	
					The torque is not saturated.	Check (8).	
		(8)	Power supply voltage dropped.	Check the bus voltage value.	The bus voltage is low.	Check the power supply voltage and power supply capacity.	
					The bus voltage is high.	Check (9).	
		(9)	Acceleration/ deceleration time constant is too short.	Set a longer deceleration time constant, and then check the repeatability.	It is not repeatable.	Increase the acceleration/deceleration time constant.	
					It is repeatable.	Check (10).	
		(10)	The position loop gain is small.	Increase the position loop gain, and then check the repeatability.	It is not repeatable.	Increase the position loop gain ([Pr. PB08]).	
					It is repeatable.	Check (11).	
		(11)	The error excessive alarm level was not set correctly.	Check the setting of the error excessive alarm level. [A]: [Pr. PC24], [Pr. PC43] [B] [WB] [RJ010] [GF]: [Pr. PC01], [Pr. PC06]	It is not set correctly.	Set it correctly.	
					It is set correctly.	Check (12).	
		(12)	Servo motor shaft was rotated by external force./ The moving part of the linear servo motor was moved by external force.	Measure the actual position under the servo-lock status.	It is rotated by external force./ It was moved by external force.	Review the machine.	
					It is not rotated by external force./ It was not moved by external force.	Check (13).	
		(13)	The encoder or the servo motor is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (14).	
		(14)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
52.3	Excess droop pulse 2	Check it with the check method for [AL. 52.1].					

Alarm No.: 52		Name: Error excessive					
Alarm content		· Droop pulses have exceeded the alarm occurrence level.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
52.4	Error excessive during 0 torque limit	(1)	The torque limit has been 0.	Check the torque limit value.	The torque limit has been 0.	Do not input a command while the torque limit value is 0.	[A] [B] [WB] [RJ010] [GF]
52.5	Excess droop pulse 3	Check it with the check method for [AL. 52.1].					

Alarm No.: 54		Name: Oscillation detection					
Alarm content		· An oscillation of the servo motor was detected.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
54.1	Oscillation detection error	(1)	The servo system is unstable and oscillating.	Check if the servo motor is oscillating. Check the torque ripple with MR Configurator2.	The torque ripple is vibrating.	Adjust the servo gain with the auto tuning. Set the machine resonance suppression filter.	[A] [B] [WB] [RJ010] [GF]
					The torque ripple is not vibrating.	Check (2).	
		(2)	The resonance frequency has changed due to deterioration.	Measure the resonance frequency of the equipment and compare it with the setting value of the machine resonance suppression filter.	The resonance frequency of the equipment is different from the filter setting value.	Change the setting value of the machine resonance suppression filter.	
					The resonance frequency of the equipment is the same as the filter setting value.	Check (3).	
		(3)	The encoder or linear encoder is malfunctioning.	Replace the servo motor or linear encoder, and then check the repeatability.	It is not repeatable.	Replace the servo motor or linear encoder.	

Alarm No.: 56		Name: Forced stop error					
Alarm content		· The servo motor does not decelerate normally during forced stop deceleration.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
56.2	Over speed during forced stop	(1)	The forced stop deceleration time constant is short. [A]: [Pr. PC51] [B] [WB] [RJ010] [GF]: [Pr. PC24]	Increase the parameter setting value, and then check the repeatability.	It is not repeatable.	Adjust the deceleration time constant.	[A] [B] [WB] [RJ010] [GF]
					It is repeatable.	Check (2).	
		(2)	The torque limit has been enabled.	Check if the limiting torque is in progress.	The limiting torque is in progress.	Review the torque limit value.	
					The limiting torque is not in progress.	Check (3).	
		(3)	The servo system is unstable and oscillating.	Check if the servo motor is oscillating. Check the torque ripple with MR Configurator2.	The torque ripple is vibrating.	Adjust the servo gain. Set the machine resonance suppression filter.	
					The torque ripple is not vibrating.	Check (4).	
		(4)	The encoder or linear encoder is malfunctioning.	Replace the servo motor or linear encoder, and then check the repeatability.	It is not repeatable.	Replace the servo motor or linear encoder.	
56.3	Estimated distance over during forced stop	(1)	The forced stop deceleration time constant is short. [A]: [Pr. PC51] [B] [WB] [RJ010] [GF]: [Pr. PC24]	Increase the parameter setting value, and then check the repeatability.	It is not repeatable.	Adjust the deceleration time constant.	
					It is repeatable.	Check (2).	
		(2)	The torque limit has been enabled.	Check if the limiting torque is in progress.	The limiting torque is in progress.	Review the torque limit value.	
					The limiting torque is not in progress.	Check (3).	
		(3)	The encoder or linear encoder is malfunctioning.	Replace the servo motor or linear encoder, and then check the repeatability.	It is not repeatable.	Replace the servo motor or linear encoder.	
56.4	Forced stop start error	(1)	The SSCNET III cable is disconnected.	Check if the SSCNET III cable is connected correctly.	It is not connected.	Connect it correctly.	[B]
					It is connected.	Check (2).	
		(2)	The SSCNET III cable is malfunctioning.	Check if the SSCNET III cable is disconnected or shorted.	It has a failure.	Replace or repair the cable.	
					It has no failure.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (4).	
		(4)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (5).	
		(5)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	

Alarm No.: 61		Name: Operation error					
Alarm content		· An operation of the positioning function failed.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
61.1	Point table setting range error	(1)	"1" or "3" was set to the sub function of the last point table (255).	Check if "1" or "3" was set.	It was set.	Review the settings.	[A] [GF]

Alarm No.: 63		Name: STO timing error					
Alarm content		· STO input signal turns off while the servo motor is rotating.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
63.1	STO1 off	(1)	STO1 was turned off (enabled) under the following speed conditions. 1) Servo motor speed: 50 r/min or more 2) Linear servo motor speed: 50 mm/s or more 3) Direct drive motor speed: 5 r/min or more	Check if STO1 is off (enabled).	It is off (enabled).	Turn on STO1 (disabled).	[A] [B] [WB] [RJ010] [GF]
63.2	STO2 off	(1)	STO2 was turned off (enabled) under the following speed conditions. 1) Servo motor speed: 50 r/min or more 2) Linear servo motor speed: 50 mm/s or more 3) Direct drive motor speed: 5 r/min or more	Check if STO2 is off (enabled).	It is off (enabled).	Turn on STO2 (disabled).	
63.5	STO by functional safety unit	(1)	STO of the functional safety unit was turned off (enabled) under the following speed conditions. 1) Servo motor speed: 50 r/min or more 2) Linear servo motor speed: 50 mm/s or more 3) Direct drive motor speed: 5 r/min or more	Check if STO of the functional safety unit is off (enabled).	It is off (enabled).	Turn on STO (disabled).	[A] [B] [GF]

Alarm No.: 64		Name: Functional safety unit setting error					
Alarm content		· A setting of the servo amplifier or functional safety unit was incorrect.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
64.1	STO input error	(1)	When a functional safety unit is used, a connector is connected to CN8 of the servo amplifier.	Check the connection of the CN8 connector.	It is connected.	Turn off the control circuit power supply of the servo amplifier, and then remove the connector of CN8.	[A] [B] [GF]
64.2	Compatibility mode setting error	(1)	When a functional safety unit is used, the J3 compatibility mode is set.	Check the parameter setting.	The J3 compatibility mode is set.	The J3 compatibility mode is not supported with the functional safety unit. Set it correctly.	[B]

Alarm No.: 64		Name: Functional safety unit setting error					
Alarm content		· A setting of the servo amplifier or functional safety unit was incorrect.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
64.3	Operation mode setting error	(1)	The speed observation function turned to be enabled in the fully closed loop control mode, linear servo motor control mode, or DD motor control mode.	Check if the parameter setting is correct.	The setting is incorrect.	Set it correctly.	[A] [B] [GF]

Alarm No.: 65		Name: Functional safety unit connection error					
Alarm content		· Communication or signal between a functional safety unit and servo amplifier failed.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
65.1	Functional safety unit communication error 1	(1)	The functional safety unit came off.	Check the installation of the functional safety unit.	It is disconnected.	Turn off the control circuit power supply of the servo amplifier, and then connect the functional safety unit.	[A] [B] [GF]
					It is connected.	Check (2).	
		(2)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (4).	
		(4)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
65.2	Functional safety unit communication error 2	Check it with the check method for [AL. 65.1].					
65.3	Functional safety unit communication error 3						
65.4	Functional safety unit communication error 4						
65.5	Functional safety unit communication error 5						
65.6	Functional safety unit communication error 6						
65.7	Functional safety unit communication error 7						
65.8	Functional safety unit shut-off signal error 1						
65.9	Functional safety unit shut-off signal error 2						

Alarm No.: 66		Name: Encoder initial communication error (safety observation function)						
Alarm content		· The connected encoder is not compatible with the servo amplifier. · An error has occurred in the communication between an encoder and servo amplifier.						
Detail No.	Detail name	Cause		Check method	Check result	Action	Target	
66.1	Encoder initial communication - Receive data error 1 (safety observation function)	(1)	An encoder cable is malfunctioning.	Check if the encoder cable is disconnected or shorted.	It has a failure.	Replace or repair the cable.	[A] [B] [GF]	
					It has no failure.	Check (2).		
		(2)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.		
					It is repeatable.	Check (3).		
		(3)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.		
					It is repeatable.	Check (4).		
		(4)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.		
66.2	Encoder initial communication - Receive data error 2 (safety observation function)	Check it with the check method for [AL. 66.1].						
66.3	Encoder initial communication - Receive data error 3 (safety observation function)							
66.7	Encoder initial communication - Transmission data error 1 (safety observation function)							
66.9	Encoder initial communication - Process error 1 (safety observation function)	(1)	A servo motor with functional safety is not connected.	Check if a servo motor with functional safety is connected.	It is not a servo motor with functional safety.	Connect a servo motor with functional safety.	[A] [B] [GF]	
					It is a servo motor with functional safety.	Check (2).		
		(2)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.		
					It is repeatable.	Check (3).		
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.		
					It is repeatable.	Check (4).		
		(4)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.		
					It is repeatable.	Check (5).		
		(5)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.		

Alarm No.: 67		Name: Encoder normal communication error 1 (safety observation function)					
Alarm content		· An error has occurred in the communication between an encoder and servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
67.1	Encoder normal communication - Receive data error 1 (safety observation function)	(1)	An encoder cable is malfunctioning.	Check if the encoder cable is disconnected or shorted.	It has a failure.	Repair or replace the cable.	[A] [B] [GF]
					It has no failure.	Check (2).	
		(2)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (3).	
		(3)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (4).	
		(4)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
67.2	Encoder normal communication - Receive data error 2 (safety observation function)	Check it with the check method for [AL. 67.1].					
67.3	Encoder normal communication - Receive data error 3 (safety observation function)						
67.4	Encoder normal communication - Receive data error 4 (safety observation function)						
67.7	Encoder normal communication - Transmission data error 1 (safety observation function)						

Alarm No.: 68		Name: STO diagnosis error					
Alarm content		· An error of STO input signal was detected.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
68.1	Mismatched STO signal error	(1)	STO1 and STO2 are not inputted correctly.	Check if the STO1 and STO2 of CN8 connector are wired correctly.	It is not wired correctly.	Wire it correctly.	[A] [B] [WB] [GF]
					It is wired correctly.	Check (2).	
		(2)	The input states of STO1 and STO2 are different.	Check the on/off states of STO1 and STO2.	The on/off states of STO1 and STO2 are different.	Set STO1 and STO2 to the same input states.	
					The on/off states of STO1 and STO2 are the same.	Check (3).	
		(3)	The setting of [Pr. PF18 STO diagnosis error detection time] ([Pr. PX43] for when the J3 extension function is used) is incorrect.	Set a longer time in the parameter, and then check the repeatability.	It is not repeatable.	Review the parameter setting.	
					It is repeatable.	Check (4).	
		(4)	The STO circuit is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (5).	
		(5)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 69		Name: Command error					
Alarm content		· The command position exceeded 32 bits (-2147483648 to 2147483647) when the software limit is activated. · The command position exceeded 30 bits (-536870912 to 536870911) from the value that was set when the software limit was activated. · After the detection of LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end), the command position exceeded 30 bits (-536870912 to 536870911) from the detected position. · After the detection of FLS (Upper stroke limit) or RLS (Lower stroke limit), the command position exceeded 30 bits (-536870912 to 536870911) from the detected position.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
69.1	Forward rotation-side software limit detection - Command excess error	(1)	The command position exceeded 32 bits when the software limit is activated.	Check if the command position is correct.	The command position was set to 32 bits or more.	Set the command position correctly.	[GF]
					The command position was set correctly.	Check (2).	
		(2)	The command position exceeded 30 bits from the value that was set when the software limit was activated.	Check if the parameter settings of the software limit ([Pr. PT15] to [Pr. PT18]) to the command position are correct.	It was set within the command position.	Set [Pr. PT15] to [Pr. PT18] correctly.	
					It was set correctly.	Check (3).	
		(3)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	
					It is repeatable.	Check (4).	
		(4)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
69.2	Reverse rotation-side software limit detection - Command excess error	Check it with the check method for [AL. 69.1].					

Alarm No.: 69		Name: Command error					
Alarm content		· The command position exceeded 32 bits (-2147483648 to 2147483647) when the software limit is activated. · The command position exceeded 30 bits (-536870912 to 536870911) from the value that was set when the software limit was activated. · After the detection of LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end), the command position exceeded 30 bits (-536870912 to 536870911) from the detected position. · After the detection of FLS (Upper stroke limit) or RLS (Lower stroke limit), the command position exceeded 30 bits (-536870912 to 536870911) from the detected position.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
69.3	Forward rotation stroke end detection - Command excess error	(1)	The command position exceeded 30 bits from the detected position after the detection of LSP (Forward rotation stroke end).	Check the command position.	The command position was set to 30 bits or more.	Check operation pattern.	[GF]
					It was set correctly.	Check (2).	
		(2)	The forward rotation stroke limit switch is not connected to LSP (Forward rotation stroke end).	Check if the limit switch is connected correctly.	It is not connected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	
					It is repeatable.	Check (4).	
		(4)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
69.4	Reverse rotation stroke end detection - Command excess error	(1)	The command position exceeded 30 bits from the detected position after the detection of LSN (Reverse rotation stroke end).	Check the command position.	The command position was set to 30 bits or more.	Check operation pattern.	
					It was set correctly.	Check (2).	
		(2)	The reverse rotation stroke limit switch is not connected to LSN (Reverse rotation stroke end).	Check if the limit switch is connected correctly.	It is not connected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	
					It is repeatable.	Check (4).	
		(4)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
69.5	Upper stroke limit detection - Command excess error	(1)	The command position exceeded 30 bits from the detected position after the detection of FLS (Upper stroke limit).	Check the command position.	The command position was set to 30 bits or more.	Check operation pattern.	
					It was set correctly.	Check (2).	
		(2)	The upper stroke limit switch is not wired. Or the switch is incorrectly positioned.	Check if the limit switch is wired correctly. Or check if the switch is incorrectly positioned.	It has a failure.	Take countermeasures against its cause.	
					It has no failure.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (4).	
		(4)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	

Alarm No.: 69		Name: Command error					
Alarm content		· The command position exceeded 32 bits (-2147483648 to 2147483647) when the software limit is activated. · The command position exceeded 30 bits (-536870912 to 536870911) from the value that was set when the software limit was activated. · After the detection of LSP (Forward rotation stroke end) or LSN (Reverse rotation stroke end), the command position exceeded 30 bits (-536870912 to 536870911) from the detected position. · After the detection of FLS (Upper stroke limit) or RLS (Lower stroke limit), the command position exceeded 30 bits (-536870912 to 536870911) from the detected position.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
69.6	Lower stroke limit detection - Command excess error	(1)	The command position exceeded 30 bits from the detected position after the detection of RLS (Lower stroke limit).	Check the command position.	The command position was set to 30 bits or more.	Check operation pattern.	[GF]
					It was set correctly.	Check (2).	
		(2)	The lower stroke limit switch is not wired. Or the switch is incorrectly positioned.	Check if the limit switch is wired correctly. Or check if the switch is incorrectly positioned.	It has a failure.	Take countermeasures against its cause.	
					It has no failure.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (4).	
		(4)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	

Alarm No.: 70		Name: Load-side encoder initial communication error 1					
Alarm content		· An error occurred in the initial communication between the load-side encoder and servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
70.1	Load-side encoder initial communication - Receive data error 1	(1)	A load-side encoder cable is malfunctioning.	Check if the load-side encoder cable is disconnected or shorted.	It has a failure.	Replace or repair the cable.	[A] [B] [WB] [GF]
					It has no failure.	Check (2).	
		(2)	When you use an A/B/Z-phase differential output linear encoder, the servo amplifier is not compatible with the linear encoder.	Check if the servo amplifier (MR-J4-_-RJ) is compatible with the A/B/Z-phase differential output linear encoder.	The servo amplifier is not compatible with it.	Use a servo amplifier which is compatible with it.	[A] [B] [GF]
					The servo amplifier is compatible with it.	Check (3).	
		(3)	When you use an A/B/Z-phase differential output linear encoder, the connection with the linear encoder is incorrect.	Check if the wiring of the linear encoder is correct. (Check if it is wired to PSEL.)	The wiring is incorrect.	Wire it correctly.	
					The wiring is correct.	Check (4).	
		(4)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [GF]
					It is repeatable.	Check (5).	
		(5)	A load-side encoder is malfunctioning.	Replace the load-side encoder, and then check the repeatability.	It is not repeatable.	Replace the load-side encoder.	
					It is repeatable.	Check (6).	
		(6)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
70.2	Load-side encoder initial communication - Receive data error 2	Check it with the check method for [AL. 70.1].					

Alarm No.: 70		Name: Load-side encoder initial communication error 1					
Alarm content		· An error occurred in the initial communication between the load-side encoder and servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
70.3	Load-side encoder initial communication - Receive data error 3	(1)	An axis not used is not set as disabled-axis.	Check the setting of the disabling control axis switches (SW2-2/SW2-3/SW2-4).	It is not set as disabled-axis.	Set it as disabled-axis.	[WB]
					It is set as disabled-axis.	Check (2).	
		(2)	The load-side encoder cable was disconnected.	Check if the load-side encoder cable is connected correctly.	It is not connected.	Connect it correctly.	[A] [B] [WB] [GF]
					It is connected.	Check (3).	
		(3)	A load-side encoder cable is malfunctioning.	Check if the load-side encoder cable is disconnected or shorted.	It has a failure.	Replace or repair the cable.	
					It has no failure.	Check (4).	
		(4)	The power voltage has been unstable. (For the load-side encoder with the external power supply input)	Check the power capacity and voltage.	It has a failure.	Review the power and related parts.	
					It has no failure.	Check (5).	
		(5)	The parameter setting of communication method is incorrect. [A]: [Pr. PC44] [B] [GF]: [Pr. PC26]	Check the parameter setting.	The setting is incorrect.	Set it correctly.	[A] [B] [GF]
					The setting is correct.	Check (6).	
		(6)	When you use an A/B/Z-phase differential output linear encoder, the connection with the linear encoder is incorrect.	Check if the wiring of the linear encoder is correct. (Check if it is wired to PSEL.)	The wiring is incorrect.	Wire it correctly.	
					The wiring is correct.	Check (7).	
		(7)	When you use a four-wire type linear encoder, the servo amplifier is not compatible with the four-wire type linear encoder.	Check if the servo amplifier is compatible with the four-wire type linear encoder. (MR-J4-_-RJ)	It is not compatible.	Use a servo amplifier which is compatible with it.	
					It is compatible.	Check (8).	
		(8)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [GF]
					It is repeatable.	Check (9).	
		(9)	A load-side encoder is malfunctioning.	Replace the load-side encoder, and then check the repeatability.	It is not repeatable.	Replace the load-side encoder.	
					It is repeatable.	Check (10).	
		(10)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
70.4	Load-side encoder initial communication - Encoder malfunction	(1)	A load-side encoder is malfunctioning.	Replace the load-side encoder, and then check the repeatability.	It is not repeatable.	Replace the load-side encoder.	[B] [WB]
					It is repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 70		Name: Load-side encoder initial communication error 1					
Alarm content		· An error occurred in the initial communication between the load-side encoder and servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
70.5	Load-side encoder initial communication - Transmission data error 1	(1)	When you use an A/B/Z-phase differential output linear encoder, the wiring of the linear encoder is incorrect.	Check if the A/B-phase pulse signals (PA, PAR, PB, and PBR) of the encoder cable are disconnected or shorted.	It is disconnected or shorted.	Repair the encoder cable.	[A] [B] [GF]
					It is not disconnected or shorted.	Check (2).	
		(2)	A load-side encoder cable is malfunctioning.	Check it with the check method for [AL. 70.1].			[A] [B] [WB] [GF]
		(3)	The servo amplifier is malfunctioning.				
		(4)	A load-side encoder is malfunctioning.				
		(5)	Something near the device caused it.				
70.6	Load-side encoder initial communication - Transmission data error 2	(1)	When you use an A/B/Z-phase differential output linear encoder, the wiring of the linear encoder is incorrect.	Check if the Z-phase pulse signals (PZ/PZR) of the encoder cable are disconnected or shorted.	It is disconnected or shorted.	Repair the encoder cable.	[A] [B] [GF]
					It is not disconnected or shorted.	Check (2).	
		(2)	A load-side encoder cable is malfunctioning.	Check it with the check method for [AL. 70.1].			[A] [B] [WB] [GF]
		(3)	The servo amplifier is malfunctioning.				
		(4)	A load-side encoder is malfunctioning.				
		(5)	Something near the device caused it.				
70.7	Load-side encoder initial communication - Transmission data error 3	Check it with the check method for [AL. 70.1].					
70.8	Load-side encoder initial communication - Incompatible encoder	(1)	A load-side encoder, which is not compatible with the servo amplifier, was connected.	Check the model of the load-side encoder.	It is not compatible with the servo amplifier.	Use a load-side encoder which is compatible with the servo amplifier.	[B] [WB]
					It is compatible with the servo amplifier.	Check (2).	
		(2)	The software version of the servo amplifier does not support the load-side encoder.	Check if the software version of the servo amplifier supports the load-side encoder.	It is not compatible.	Replace the servo amplifier to one which software version supports the load-side encoder.	
					It is compatible.	Check (3).	
		(3)	A load-side encoder is malfunctioning.	Replace the load-side encoder, and then check the repeatability.	It is not repeatable.	Replace the load-side encoder.	
					It is repeatable.	Replace the servo amplifier.	
70.A	Load-side encoder initial communication - Process error 1	(1)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [GF]
					It is repeatable.	Check (2).	
		(2)	A load-side encoder is malfunctioning.	Replace the load-side encoder, and then check the repeatability.	It is not repeatable.	Replace the load-side encoder.	
					It is repeatable.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 70		Name: Load-side encoder initial communication error 1				
Alarm content		· An error occurred in the initial communication between the load-side encoder and servo amplifier.				
Detail No.	Detail name	Cause	Check method	Check result	Action	Target
70.B	Load-side encoder initial communication - Process error 2	Check it with the check method for [AL. 70.A].				
70.C	Load-side encoder initial communication - Process error 3					
70.D	Load-side encoder initial communication - Process error 4					
70.E	Load-side encoder initial communication - Process error 5					
70.F	Load-side encoder initial communication - Process error 6					

Alarm No.: 71		Name: Load-side encoder normal communication error 1					
Alarm content		· An error occurred in the communication between the load-side encoder and servo amplifier.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
71.1	Load-side encoder normal communication - Receive data error 1	(1)	A load-side encoder cable is malfunctioning.	Check if the load-side encoder cable is disconnected or shorted.	It has a failure.	Repair or replace the cable.	[A] [B] [WB] [GF]
					It has no failure.	Check (2).	
		(2)	The external conductor of the encoder cable is not connected to the ground plate of the connector.	Check if it is connected.	It is not connected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	The parameter setting of communication method is incorrect. [A]: [Pr. PC44] [B] [GF]: [Pr. PC26]	Check the parameter setting.	The setting is incorrect.	Set it correctly.	[A] [B] [GF]
					The setting is correct.	Check (4).	
		(4)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [GF]
					It is repeatable.	Check (5).	
		(5)	A load-side encoder is malfunctioning.	Replace the load-side encoder, and then check the repeatability.	It is not repeatable.	Replace the load-side encoder.	
					It is repeatable.	Check (6).	
		(6)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 71		Name: Load-side encoder normal communication error 1				
Alarm content		· An error occurred in the communication between the load-side encoder and servo amplifier.				
Detail No.	Detail name	Cause	Check method	Check result	Action	Target
71.2	Load-side encoder normal communication - Receive data error 2	Check it with the check method for [AL. 71.1].				
71.3	Load-side encoder normal communication - Receive data error 3					
71.5	Load-side encoder normal communication - Transmission data error 1					
71.6	Load-side encoder normal communication - Transmission data error 2					
71.7	Load-side encoder normal communication - Transmission data error 3					
71.9	Load-side encoder normal communication - Receive data error 4					
71.A	Load-side encoder normal communication - Receive data error 5					

Alarm No.: 72		Name: Load-side encoder normal communication error 2					
Alarm content		· The load-side encoder detected an error signal.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
72.1	Load-side encoder data error 1	(1)	The encoder detected a high speed/acceleration rate due to an oscillation or other factors.	Decrease the loop gain, and then check the repeatability.	It is not repeatable.	Use the encoder with low loop gain.	[A] [B] [WB] [GF]
					It is repeatable.	Check (2).	
		(2)	A load-side encoder is malfunctioning.	Replace the load-side encoder, and then check the repeatability.	It is not repeatable.	Replace the load-side encoder.	
					It is repeatable.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
72.2	Load-side encoder data update error	(1)	A load-side encoder is malfunctioning.	Replace the load-side encoder, and then check the repeatability.	It is not repeatable.	Replace the load-side encoder.	
					It is repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
72.3	Load-side encoder data waveform error	Check it with the check method for [AL. 72.2].					
72.4	Load-side encoder non-signal error	(1)	A signal of the load-side encoder has not been inputted.	Check if the load-side encoder cable is wired correctly.	It has a failure.	Review the wiring.	[A] [B] [WB] [GF]
					It has no failure.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
72.5	Load-side encoder hardware error 1	Check it with the check method for [AL. 72.2].					
72.6	Load-side encoder hardware error 2						
72.9	Load-side encoder data error 2	Check it with the check method for [AL. 72.1].					

Alarm No.: 74		Name: Option card error 1					
Alarm content		· MR-J3-T10 came off. · MR-J3-T10 is not properly recognized.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
74.1	Option card error 1	(1)	The MR-J3-T10 came off during the CC-Link IE communication.	Check if the MR-J3-T10 is mounted correctly.	It is not mounted correctly.	Install it correctly.	[RJ010]
					It is mounted correctly.	Check (2).	
		(2)	MR-J3-T10 is malfunctioning.	Replace the MR-J3-T10, and then check the repeatability.	It is not repeatable.	Replace the MR-J3-T10.	
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	

Alarm No.: 74		Name: Option card error 1					
Alarm content		· MR-J3-T10 came off. · MR-J3-T10 is not properly recognized.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
74.2	Option card error 2	Check it with the check method for [AL. 74.1].					
74.3	Option card error 3						
74.4	Option card error 4						
74.5	Option card error 5						

Alarm No.: 75		Name: Option card error 2					
Alarm content		· MR-J3-T10 came off.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
75.3	Option card connection error	(1)	MR-J3-T10 came off.	Check if the MR-J3-T10 is mounted correctly.	It is not mounted correctly.	Install it correctly.	[RJ010]
					It is mounted correctly.	Check (2).	
		(2)	MR-J3-T10 is malfunctioning.	Replace the MR-J3-T10, and then check the repeatability.	It is not repeatable.	Replace the MR-J3-T10.	
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
75.4	Option card disconnected	(1)	MR-J3-T10 was not connected correctly.	Check if the MR-J3-T10 is mounted correctly.	It is not mounted correctly.	Install it correctly.	
					It is mounted correctly.	Check (2).	
		(2)	MR-J3-T10 is malfunctioning.	Replace the MR-J3-T10, and then check the repeatability.	It is not repeatable.	Replace the MR-J3-T10.	
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	

Alarm No.: 79		Name: Functional safety unit diagnosis error					
Alarm content		· A diagnosis of the functional safety unit failed.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
79.1	Functional safety unit power voltage error	(1)	The power supply of the functional safety unit is failure.	Check the installation of the functional safety unit.	It has a failure.	Install it correctly.	[A] [B] [GF]
					It has no failure.	Check (2).	
		(2)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (4).	
		(4)	Something near the device caused it.	Check the power supply for noise.	There is a problem in the surrounding.	Take countermeasures against its cause.	
79.2	Functional safety unit internal error	(1)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (2).	
		(2)	Something near the device caused it.	Check the power supply for noise.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 79		Name: Functional safety unit diagnosis error					
Alarm content		· A diagnosis of the functional safety unit failed.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
79.3	Abnormal temperature of functional safety unit	(1)	Ambient temperature has exceeded 55 ℃.	Check the ambient temperature.	It is over 55 ℃.	Lower the ambient temperature.	[A] [B] [GF]
					It is less than 55 ℃.	Check (2).	
		(2)	Ambient temperature is less than 0 ℃.	Check the ambient temperature.	It is less than 0 ℃.	Increase the ambient temperature.	
					It is 0 ℃ or more.	Check (3).	
		(3)	The close mounting is out of specifications.	Check the specifications of close mounting.	It is out of specifications.	Mount it correctly.	
					It is within specifications.	Check (4).	
		(4)	An opening is clogged up.	Clean the opening and check the repeatability.	It is not repeatable.	Clean it periodically.	
					It is repeatable.	Check (5).	
		(5)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (6).	
		(6)	Something near the device caused it.	Check the power supply for noise.	There is a problem in the surrounding.	Take countermeasures against its cause.	
79.4	Servo amplifier error	(1)	The functional safety unit came off.	Check the installation of the functional safety unit.	It has a failure.	Install it correctly.	
					It has no failure.	Check (2).	
		(2)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (4).	
		(4)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
79.5	Input device error	(1)	A signal of input device is not inputted correctly.	Check if the input device cable is wired correctly.	It has a failure.	Review the wiring.	
					It has no failure.	Check (2).	
		(2)	The input device setting parameter is not set correctly.	Check if the parameter is set correctly.	It is not set correctly.	Review the parameter.	
					It is set correctly.	Check (3).	
		(3)	The test pulse time was not set correctly.	Check the setting of [Pr. PSD26 Input device - Test pulse off time].	The test pulse width is longer than the set value.	Set the value longer.	
					The test pulse width is shorter than the set value.	Check (4).	
		(4)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (5).	
		(5)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 79		Name: Functional safety unit diagnosis error					
Alarm content		- A diagnosis of the functional safety unit failed.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
79.6	Output device error	(1)	A signal of an output device has not been outputted correctly.	Check if the output device cable is wired correctly. Or check if the load of the output device is within the specifications.	It has a failure.	Review the wiring or load.	[A] [B] [GF]
					It has no failure.	Check (2).	
		(2)	The test pulse time was not set correctly.	Check the setting of [Pr. PSD30 Output device - Test pulse off time].	The test pulse width is longer than the set value.	Set the value longer.	
					The test pulse width is shorter than the set value.	Check (3).	
		(3)	Current of the output device is excessive.	Check if the current is used within prescribed.	Not within prescribed.	Reduce the output current.	
					Within prescribed.	Check (4).	
		(4)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (5).	
		(5)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
79.7	Mismatched input signal error	(1)	A mismatch of input signal DI_A and DI_B continued for a fixed time ([Pr. PSD18] to [Pr. PSD23]).	Check if the input device cable is wired correctly.	It has a failure.	Review the wiring.	
					It has no failure.	Check (2).	
		(2)	An input mismatch time was not set correctly.	Check the settings of [Pr. PSD18 Mismatch permissible time DI1] to [Pr. PSD23 Mismatch permissible time DI6].	The mismatched time is longer than the set value.	Set the value longer.	
					The mismatched time is shorter than the set value.	Check (3).	
		(3)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (4).	
		(4)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
79.8	Position feedback fixing error	(1)	The position feedback data do not change within the position feedback fixing error detection time [Pr. PSA22].	Check the [Pr. PSA22] setting.	It is not set correctly.	Review the parameter.	
					It is set correctly.	Check (2).	
		(2)	The position feedback data do not change.	Check the feedback data by rotating the servo motor.	The position feedback data changes.	Perform an operation which rotates the servo motor within the position feedback fixing error detection time [Pr. PSA22].	
					The position feedback data do not change.	Check (3).	
		(3)	The servo motor is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (4).	
		(4)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	

Alarm No.: 7A		Name: Parameter setting error (safety observation function)					
Alarm content		· A parameter of the functional safety unit failed.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
7A.1	Parameter verification error (safety observation function)	(1)	A parameter of the functional safety unit is incorrect.	Review the parameter.	It is not repeatable.	Set the parameter correctly.	[A] [B] [GF]
					It is repeatable.	Check (2).	
		(2)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (3).	
		(3)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
7A.2	Parameter setting range error (safety observation function)	(1)	The initial settings for the functional safety unit have not been finished.	Check the [Pr. PSA01] setting.	It is not enabled.	Enable the setting with checking parameter contents.	
					It is enabled.	Check (2).	
		(2)	A parameter of the functional safety unit was set out of range.	Check the value of set parameters.	It is out of setting range.	Set it within the range.	
7A.3	Parameter combination error (safety observation function)	(1)	A parameter of the functional safety unit or servo amplifier is incorrect.	Check the parameter settings of the functional safety unit and servo amplifier. Functional safety unit: [Pr. PSA02], [Pr. PSA18] to [Pr. PSA21], [Pr. PSC03], [Pr. PSD01] to [Pr. PSD17], [Pr. PSD26] Servo amplifier: [Pr. PA14]	It is not set correctly.	Set the parameter correctly.	
7A.4	Functional safety unit combination error (safety observation function)	(1)	A combination of functional safety unit and servo amplifier is incorrect.	Check if correct combination of servo amplifier is connected.	A different servo amplifier is connected.	Return to the servo amplifier which was combined with the functional safety unit and was set the safety observation function, or initialize the setting.	

Alarm No.: 7B		Name: Encoder diagnosis error (safety observation function)					
Alarm content		· Error occurred in encoder.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
7B.1	Encoder diagnosis error 1 (safety observation function)	(1)	An encoder cable is malfunctioning.	Check if the encoder cable is disconnected or shorted.	It has a failure.	Repair or replace the cable.	[A] [B] [GF]
					It has no failure.	Check (2).	
		(2)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (3).	
		(3)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (4).	
		(4)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (5).	
		(5)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 7B		Name: Encoder diagnosis error (safety observation function)					
Alarm content		· Error occurred in encoder.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
7B.2	Encoder diagnosis error 2 (safety observation function)	Check it with the check method for [AL. 7B.1].					
7B.3	Encoder diagnosis error 3 (safety observation function)						
7B.4	Encoder diagnosis error 4 (safety observation function)	(1)	Ambient temperature of the encoder has exceeded 40 °C.	Check the ambient temperature of the encoder.	It is over 40 °C.	Lower the ambient temperature.	[A] [B] [GF]
					It is 40 °C or less.	Check (2).	
		(2)	Ambient temperature of the encoder is less than 0 °C.	Check the ambient temperature of the encoder.	It is 0 °C or less.	Increase the ambient temperature.	
					It is 0 °C or more.	Check (3).	
		(3)	Servo motor is overloaded.	Check the effective load ratio.	The effective load ratio is high.	Reduce the load or review the operation pattern.	
					The effective load ratio is small.	Check (4).	
		(4)	The thermal sensor in the encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (5).	
		(5)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	

Alarm No.: 7C		Name: Functional safety unit communication diagnosis error (safety observation function)					
Alarm content		· The network communication had an error in the functional safety unit.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
7C.1	Functional safety unit communication setting error (safety observation function)	(1)	Communication cycle does not match.	Check the communication cycle setting ([Pr. PSC01]) of the servo system controller and the functional safety unit.	Communication cycle setting is incorrect.	Set it correctly.	[B] [GF]
					Communication cycle setting is correct.	Check (2).	
		(2)	The time taken for the detection of safety communication errors is not set correctly.	Refer to "MR-D30 Instruction Manual" and check the setting.	It is not set correctly.	Set it correctly.	[GF]
					It is set correctly.	Check (3).	
		(3)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	[B] [GF]
					It is repeatable.	Check (4).	
		(4)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 7C		Name: Functional safety unit communication diagnosis error (safety observation function)					
Alarm content		The network communication had an error in the functional safety unit.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
7C.2	Functional safety unit communication data error (safety observation function)	(1)	The time taken for the detection of safety communication errors is not set correctly.	Refer to "MR-D30 Instruction Manual" and check the setting.	It is not set correctly.	Set it correctly.	[GF]
					It is set correctly.	Check (2).	
		(2)	An error occurred at the safety master station side.	Check if an alarm occurs at the safety master station.	It is occurring.	Refer to the troubleshooting for the master station and take countermeasures.	
					It did not occur.	Check (3).	
		(3)	An error occurred at the servo system controller side.	Check if the settings of the servo system controller side are correct.	It has a failure.	Set it correctly.	[B]
					It has no failure.	Check (4).	
		(4)	[B]: Check it with the check method for [AL. 34.1]. [GF]: Check it with the check method for [AL. 6D.1].				[B] [GF]

Alarm No.: 7D		Name: Safety observation error					
Alarm content		: The safety observation function detected an error.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
7D.1	Stop observation error	(1)	During activation of SOS function, the position of the servo motor has changed by more than the SOS allowance value set by parameter.	Check that the actual servo motor position is higher than the setting value of [Pr. PSA05].	The travel distance of the servo motor is larger than the setting value in [Pr. PSA05].	Review the alarm level.	[A] [B] [GF]
					The travel distance of the servo motor is smaller than the alarm detection level.	Check (2).	
		(2)	During activation of SOS function, the servo motor speed has changed by larger than the SOS allowance value set by parameter, and that state has continued for longer than the set time (specified by [Pr. PSA15]).	The actual servo motor speed is higher than the setting value of [Pr. PSA04].	The servo motor speed is higher than the setting value in [Pr. PSA04].	Review the parameter setting.	
					The servo motor speed is higher than the setting value in [Pr. PSA15] and equal to or lower than that in [Pr. PSA04].	Check (3).	
		(3)	During activation of SOS function, the speed command has changed by larger than the SOS allowance value set by parameter, and that state has continued for longer than the set time (specified by [Pr. PSA15]).	Check if the command from the controller is over the standstill speed set in [Pr. PSA04].	The command from the controller is over the setting valued in [Pr. PSA04].	Check the operation pattern.	
					The command from controller is higher than the setting value in [Pr. PSA15] and equal to or lower than that in [Pr. PSA04].	Check (4).	
		(4)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (5).	
		(5)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (6).	
		(6)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (7).	
		(7)	Something near the device caused it.	Check the noise, ambient temperature, vibration, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 7D		Name: Safety observation error					
Alarm content		· The safety observation function detected an error.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
7D.2	Speed observation error	(1)	The command pulse frequency is high.	Check the command pulse frequency.	The command pulse frequency is high.	Check operation pattern.	[A] [B] [GF]
					The command pulse frequency is low.	Check (2).	
		(2)	The settings of the electronic gear are incorrect.	Check the setting value of the electronic gear.	The setting value is incorrect.	Review the settings.	
					The setting value is correct.	Check (3).	
		(3)	The command from the controller is excessive.	Check if the command from the controller is the SLS speed ([Pr. PSA11] to [Pr. PSA14]) or more.	It is over the permissible speed.	Check operation pattern.	
					It is less than the permissible speed.	Check (4).	
		(4)	A larger speed command than the SLS speed ([Pr. PSA11] to [Pr. PSA14]) was inputted.	Check that the actual servo motor speed is higher than the setting value of the SLS speed.	The servo motor speed is higher than the SLS speed.	Review the setting value of the SLS speed.	
					The servo motor speed is lower than the SLS speed.	Check (5).	
		(5)	The servo system is unstable and oscillating.	Check if the servo motor is oscillating.	It is oscillating.	Adjust the servo gain. Or reduce the load.	
					It is not oscillating.	Check (6).	
		(6)	The velocity waveform has overshot.	Check if it is overshooting because the acceleration time constant is too short.	It is overshooting.	Increase the acceleration/deceleration time constant.	
					It is not overshooting.	Check (7).	
		(7)	The connection destination of the encoder cable is incorrect.	Check the connection destination of the encoder.	It is not correct.	Wire it correctly.	
					It is correct.	Check (8).	
		(8)	The encoder or linear encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
					It is repeatable.	Check (9).	
		(9)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (10).	
		(10)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (11).	
		(11)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 82		Name: Master-slave operation error 1				
Alarm content		· Driver communication error was detected.				
Detail No.	Detail name	Cause	Check method	Check result	Action	Target
82.1	Master-slave operation error 1	Check it with the check method for [AL. 34.1].				[B] (slave)

Alarm No.: 84		Name: Network module initialization error					
Alarm content		The network module is not connected. An error occurred at initialization of the network module.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
84.1	Network module undetected error	(1)	The network module was disconnected.	Check if the network module is connected correctly.	It is not connected correctly.	Connect it correctly.	[Other]
					It is connected correctly.	Check (2).	
		(2)	Something near the device caused it.	Check the noise, ambient temperature, etc. Refer to "Noise reduction techniques" section in each servo amplifier instruction manual for the noise reduction techniques.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (3).	
		(3)	The network module is malfunctioning.	Replace the network module, and then check the repeatability.	It is not repeatable.	Replace the network module.	
					It is repeatable.	Check (4).	
		(4)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
84.2	Network module initialization error 1	(1)	The network module was disconnected.	Check if the network module is connected correctly.	It is not connected correctly.	Connect it correctly.	
					It is connected correctly.	Check (2).	
		(2)	A network module, which is not compatible with the servo amplifier, has been connected.	Check if the network module is compatible with the servo amplifier.	It is not compatible.	Replace with a network module compatible with the servo amplifier.	
					It is compatible.	Check (3).	
		(3)	A network cable was disconnected.	Check if the network cable is connected correctly.	It is not connected.	Connect it correctly.	
					It is connected.	Check (4).	
		(4)	The wiring of the network cable was incorrect.	Check if the wiring of network cable is correct.	The wiring is incorrect.	Wire it correctly.	
					The wiring is correct.	Check (5).	
		(5)	A network cable was disconnected.	Check if the network cable is malfunctioning.	It has a failure.	Replace the network cable.	
					It has no failure.	Check (6).	
		(6)	Something near the device caused it.	Check the noise, ambient temperature, etc. Refer to "Noise reduction techniques" section in each servo amplifier instruction manual for the noise reduction techniques.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (7).	
		(7)	The network module is malfunctioning.	Replace the network module, and then check the repeatability.	It is not repeatable.	Replace the network module.	
					It is repeatable.	Check (8).	
		(8)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
84.3	Network module initialization error 2	Check it with the check method for [AL. 84.2].					

Alarm No.: 85		Name: Network module error					
Alarm content		· The network module was disconnected. · An error occurred in the network module. (Refer to section 1.7.)					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
85.1	Network module error 1	(1)	The network module was disconnected.	Check if the network module is connected correctly.	It is not connected correctly.	Connect it correctly.	[Other]
					It is connected correctly.	Check (2).	
		(2)	A network cable was disconnected.	Check if the network cable is connected correctly.	It is not connected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	The wiring of the network cable was incorrect.	Check if the wiring of network cable is correct.	The wiring is incorrect.	Wire it correctly.	
					The wiring is correct.	Check (4).	
		(4)	A network cable was disconnected.	Check if the network cable is malfunctioning.	It has a failure.	Replace the network cable.	
					It has no failure.	Check (5).	
		(5)	The setting of the controller is incorrect.	Check the controller setting.	It is incorrect.	Review the settings.	
					It is correct.	Check (6).	
		(6)	Something near the device caused it.	Check the noise, ambient temperature, etc. Refer to "Noise reduction techniques" section in each servo amplifier instruction manual for the noise reduction techniques.	There is a problem in the surrounding.	Take countermeasures against its cause.	
					There is no problem in the surrounding.	Check (7).	
		(7)	The network module is malfunctioning.	Replace the network module, and then check the repeatability.	It is not repeatable.	Replace the network module.	
					It is repeatable.	Check (8).	
		(8)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (9).	
		(9)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	
85.2	Network module error 2	Check it with the check method for [AL. 85.1].					
85.3	Network module error 3						

Alarm No.: 86		Name: Network communication error					
Alarm content		· An error occurred in the network module. · An error occurred in the network communication.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
86.1	Network communication error 1	(1)	The network module was disconnected.	Check if the network module is connected correctly.	It is not connected correctly.	Connect it correctly.	[Other]
					It is connected correctly.	Check (2).	
		(2)	A network cable was disconnected.	Check if the network cable is connected correctly.	It is not connected.	Turn off the control circuit power supply of the servo amplifier, and then connect the network cable correctly.	[GF] [Other]
					It is connected.	Check (3).	
		(3)	The wiring of the network cable was incorrect.	Check if the wiring of network cable is correct.	The wiring is incorrect.	Wire it correctly.	
					The wiring is correct.	Check (4).	
		(4)	A network cable was disconnected.	Check if the network cable is malfunctioning.	It has a failure.	Replace the network cable.	
					It has no failure.	Check (5).	
		(5)	The network was disconnected by a wrong procedure.	Check if the network was disconnected according to the kind of network.	It was not performed.	Perform it.	
					It was performed.	Check (6).	
		(6)	Data transmission from the controller was interrupted for a certain period of time.	Check if data transmission from the controller is not interrupted.	It is interrupted.	Review the controller communication setting.	
					It is not interrupted.	Check (7).	
		(7)	The setting of the controller is incorrect.	Check the controller setting.	It is incorrect.	Review the settings.	
					It is correct.	Check (8).	
		(8)	Something near the device caused it.	Check the noise, ambient temperature, etc. Refer to "Noise reduction techniques" section in each servo amplifier instruction manual for the noise reduction techniques.	There is a problem in the surrounding.	Take Countermeasures against its cause.	
					There is no problem in the surrounding.	Check (9).	
		(9)	The network module is malfunctioning.	Replace the network module, and then check the repeatability.	It is not repeatable.	Replace the network module.	[Other]
					It is repeatable.	Check (10).	
		(10)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[GF] [Other]
					It is repeatable.	Check (11).	
		(11)	The controller is malfunctioning.	Replace the controller, and then check the repeatability.	It is not repeatable.	Replace the controller.	
86.2	Network communication error 2	Check it with the check method for [AL. 86.1].					
86.3	Network communication error 3						
86.4	Network communication error 4						

Alarm No.: 8A		Name: USB communication time-out error/serial communication time-out error/Modbus RTU communication time-out error					
Alarm content		· Communication between the servo amplifier and a personal computer/controller stopped for the specified time or longer. · An error occurred in USB communication, serial communication (Mitsubishi Electric general-purpose AC servo protocol), or Modbus RTU communication.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
8A.1	USB communication time-out error/ serial communication time-out error	(1)	Communication commands have not been transmitted.	Check if a command was transmitted from the personal computer, etc.	It was not transmitted.	Transmit a command.	[A] [B] [WB] [RJ010] [GF]
					It was transmitted.	Check (2).	
		(2)	A communication cable was disconnected.	Replace the communication cable, and then check the repeatability.	It is not repeatable.	Replace the communication cable.	
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
8A.2	Modbus RTU communication time-out error	(1)	Communication commands have not been transmitted.	Check if a command was transmitted from the controller, etc.	It was not transmitted.	Transmit a command.	[A]
					It was transmitted.	Check (2).	
		(2)	A communication cable was disconnected.	Replace the communication cable, and then check the repeatability.	It is not repeatable.	Replace the communication cable.	
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	

Alarm No.: 8D		Name: CC-Link IE communication error					
Alarm content		MR-J3-T10 came off. An error occurred in CC-Link IE communication.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
8D.1	CC-Link IE communication error 1	(1)	The MR-J3-T10 came off during the CC-Link IE communication.	Check if [AL. 74 Option card error 1] occurred with alarm history.	It is occurring.	Check it with the check method for [AL. 74].	[RJ010]
					It did not occur.	Check (2).	
		(2)	The Ethernet cable was disconnected.	Check the Ethernet cable connection.	It is disconnected.	Turn off the control circuit power supply of the servo amplifier, and then connect the Ethernet cable.	[RJ010] [GF]
					It is connected.	Check (3).	
		(3)	The CC-Link IE communication was disconnected by using a wrong procedure.	Check if the communication was disconnected by using the correct procedure.	The communication was disconnected by using a wrong procedure.	Follow the correct procedure for disconnecting the communication.	
					The communication was disconnected by using the correct procedure.	Check (4).	
		(4)	The wiring of the Ethernet cable was incorrect.	Check if the wiring of Ethernet cable is correct.	The wiring is incorrect.	Wire it correctly.	
					The wiring is correct.	Check (5).	
		(5)	An Ethernet cable was disconnected.	Check if the Ethernet cable is malfunctioning.	It has a failure.	Replace the Ethernet cable.	
					It has no failure.	Check (6).	
		(6)	The transmission status of the CC-Link IE communication is abnormal.	Check the noise, ambient temperature, etc.	It has a failure.	Take countermeasures against its cause.	
					It has no failure.	Check (7).	
		(7)	MR-J3-T10 is malfunctioning.	Replace the MR-J3-T10, and then check the repeatability.	It is not repeatable.	Replace the MR-J3-T10.	
					It is repeatable.	Check (8).	
		(8)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[RJ010]
					It is repeatable.	Check (9).	
		(9)	The master station is malfunctioning.	Check if the master station is malfunctioning.	It has a failure.	Replace the master station.	[RJ010] [GF]
8D.2	CC-Link IE communication error 2	Check it with the check method for [AL. 8D.1].					
8D.3	Master station setting error 1	(1)	The station No. is set to a value other than 1 to 120 with the master station.	Check the [Pr. Po02] setting.	The setting value is incorrect.	Set it correctly.	[RJ010]
					The setting value is correct.	Check (2).	
		(2)	The network number is set to a value other than 1 to 239 with the master station.	Check the [Pr. Po03] setting.	The setting value is incorrect.	Set it correctly.	
					The setting value is correct.	Check (3).	
		(3)	MR-J3-T10 is malfunctioning.	Replace the MR-J3-T10, and then check the repeatability.	It is not repeatable.	Replace the MR-J3-T10.	
					It is repeatable.	Check (4).	
		(4)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
					It is repeatable.	Check (5).	
		(5)	The master station is malfunctioning.	Check if the master station is malfunctioning.	It has a failure.	Replace the master station.	

Alarm No.: 8D		Name: CC-Link IE communication error					
Alarm content		· MR-J3-T10 came off. · An error occurred in CC-Link IE communication.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
8D.5	Master station setting error 2	(1)	A reserved station has been selected by the master station, and the cyclic communication has stopped.	Check if a reserved station is selected.	It is selected.	Cancel the reserved station.	[RJ010]
8D.6	CC-Link IE communication error 3	Check it with the check method for [AL. 8D.1].					
8D.7	CC-Link IE communication error 4	(1)	The transmission status of the CC-Link IE communication is abnormal.	Check the noise, ambient temperature, etc.	It has a failure.	Take countermeasures against its cause.	[RJ010] [GF]
					It has no failure.	Check (2).	
		(2)	MR-J3-T10 is malfunctioning.	Replace the MR-J3-T10, and then check the repeatability.	It is not repeatable.	Replace the MR-J3-T10.	[RJ010]
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[RJ010] [GF]
					It is repeatable.	Check (4).	
		(4)	The master station is malfunctioning.	Check if the master station is malfunctioning.	It has a failure.	Replace the master station.	
8D.8	CC-Link IE communication error 5	Check it with the check method for [AL. 8D.7].					
8D.9	Synchronization error 1	Check it with the check method for [AL. 8D.1].					
8D.A	Synchronization error 2						

Alarm No.: 8E		Name: USB communication error/serial communication error/Modbus RTU communication error					
Alarm content		· A communication error occurred between the servo amplifier and a personal computer/controller. · An error occurred in USB communication, serial communication (Mitsubishi Electric general-purpose AC servo protocol), or Modbus RTU communication.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
8E.1	USB communication receive error/ serial communication receive error	(1)	The setting of the personal computer, etc. is incorrect.	Check the setting of the personal computer, etc.	It is incorrect.	Review the settings.	[A] [B] [WB] [RJ010] [GF]
					It is correct.	Check (2).	
		(2)	A communication cable is malfunctioning.	Check the communication cable, and then check the repeatability.	It is not repeatable.	Replace the communication cable.	
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
8E.2	USB communication checksum error/ serial communication checksum error	(1)	The setting of the personal computer, etc. is incorrect.	Check the setting of the personal computer, etc.	It is incorrect.	Review the settings.	
8E.3	USB communication character error/ serial communication character error	(1)	The transmitted character is out of specifications.	Check the character code at the time of transmission.	The transmitted character is out of specifications.	Correct the transmission data.	[A] [B] [WB] [RJ010]
					The transmitted character is within specifications.	Check (2).	
		(2)	The communication protocol is failure.	Check if transmission data supports the communication protocol.	It is not conforming.	Modify the transmission data according to the communication protocol.	
					It is conforming.	Check (3).	
		(3)	The setting of the personal computer, etc. is incorrect.	Check the setting of the personal computer, etc.	It is incorrect.	Review the settings.	
8E.4	USB communication command error/ serial communication command error	(1)	The transmitted command is out of specifications.	Check the command at the time of transmission.	The transmitted command is out of specifications.	Correct the transmission data.	
					The transmitted command is within specifications.	Check (2).	
		(2)	The communication protocol is failure.	Check if transmission data supports the communication protocol.	It is not conforming.	Modify the transmission data according to the communication protocol.	
					It is conforming.	Check (3).	
		(3)	The setting of the personal computer, etc. is incorrect.	Check the setting of the personal computer, etc.	It is incorrect.	Review the settings.	
8E.5	USB communication data number error/serial communication data number error	(1)	The transmitted data number is out of specifications.	Check the data number at the time of transmission.	The transmitted data number is out of specifications.	Correct the transmission data.	
					The transmitted data number is within specifications.	Check (2).	
		(2)	The communication protocol is failure.	Check if transmission data supports the communication protocol.	It is not conforming.	Modify the transmission data according to the communication protocol.	
					It is conforming.	Check (3).	
		(3)	The setting of the personal computer, etc. is incorrect.	Check the setting of the personal computer, etc.	It is incorrect.	Review the settings.	

Alarm No.: 8E		Name: USB communication error/serial communication error/Modbus RTU communication error					
Alarm content		· A communication error occurred between the servo amplifier and a personal computer/controller. · An error occurred in USB communication, serial communication (Mitsubishi Electric general-purpose AC servo protocol), or Modbus RTU communication.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
8E.6	Modbus RTU communication receive error	(1)	The setting of the controller, servo amplifier, etc. is incorrect.	Check the setting of the controller, servo amplifier, etc. (such as communication protocol selection, baud rate, parity).	It is incorrect.	Review the settings.	[A]
					It is correct.	Check (2).	
		(2)	A communication cable is malfunctioning.	Check the communication cable, and then check the repeatability.	It is not repeatable.	Replace the communication cable.	
					It is repeatable.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
8E.7	Modbus RTU communication message frame error	(1)	The communication protocol is failure.	Check if transmission data conforms the communication protocol.	It is not conforming.	Modify the transmission data according to the communication protocol.	
					It is conforming.	Check (2).	
		(2)	The setting of the controller, servo amplifier, etc. is incorrect.	Check the setting of the controller, servo amplifier, etc. (such as communication protocol selection, baud rate, parity).	It is incorrect.	Review the settings.	
8E.8	Modbus RTU communication CRC error	Check it with the check method for [AL. 8E.7].					

Alarm No.: 88888		Name: Watchdog					
Alarm content		· [RJ010]: MR-J3-T10 came off. · A part such as CPU is malfunctioning.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
88_/ 8888_	Watchdog	(1)	The MR-J3-T10 came off during the CC-Link IE communication.	Check if [AL. 74 Option card error 1] occurred with alarm history.	It is occurring.	Check it with the check method for [AL. 74].	[RJ010]
					It did not occur.	Check (2).	
		(2)	A part in the servo amplifier is failure.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]

1.5 Remedies for warnings

⚠CAUTION

If [AL. E3 Absolute position counter warning] occurs, remove the cause of the warning, and always make home position setting again. Otherwise, it may cause an unexpected operation.

Point

When any of the following alarms has occurred, do not cycle the power of the servo amplifier repeatedly to restart. Doing so will cause a malfunction of the servo amplifier and servo motor. If the power of the servo amplifier is switched off/on during the alarms, allow more than 30 minutes for cooling before resuming operation.

- [AL. 91 Servo amplifier overheat warning]
- [AL. E0 Excessive regeneration warning]
- [AL. E1 Overload warning 1]
- [AL. E2 Servo motor overheat warning]
- [AL. EC Overload warning 2]

Warnings (except [AL. F0 Tough drive warning]) are not recorded in the alarm history.

If [AL. E6], [AL. E7], [AL. E9], [AL. EA], or [AL. EB] occurs, the amplifier will be the servo-off status. If any other warning occurs, operation can be continued but an alarm may take place or proper operation may not be performed.
Remove the cause of warning according to this section. Use MR Configurator2 to refer to the cause of warning occurrence.

Alarm No.: 90		Name: Home position return incomplete warning					
Alarm content		- A home position return did not complete normally with the positioning function.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
90.1	Home position return incomplete	(1)	An automatic operation was executed at home position return incompletion.	Check if the home position return was not executed (the following devices are not off.). [A]: ZP (Home position return completion) [GF]: ZP2 (Home position return completion 2)	A home position return was not executed.	Execute a home position return.	[A] [GF]
					A home position return was executed.	Check (2).	
		(2)	A positioning operation was executed without home position setting with absolute position after [AL. 25 Absolute position erased] occurred.	Check if [AL. 25 Absolute position erased] occurred using alarm history.	[AL. 25 Absolute position erased] occurred.	Check the battery voltage and battery cable if they have a failure and execute a home position return after remove the failure.	
					[AL. 25 Absolute position erased] did not occur.	Check (3).	
		(3)	With the indexer method, [AL. E3 Absolute position counter warning] occurred simultaneously with the alarm.	Check if [AL. 90.1] occurred simultaneously with start of the positioning operation.	[AL. 90.1] did not occur simultaneously with start of the positioning operation but occurred during positioning operation.	Remove the cause of [AL. E3], and perform home position return. (Check it with the check method for [AL. E3].)	
					[AL. 90.1] occurred simultaneously with start of the positioning operation.	Check (4).	
		(4)	ZP (Home position return completion) turned off after the home position return was executed.	Check if ZP (Home position return completion) is off.	ZP (Home position return completion) is off.	Check the conditions if ZP (Home position return completion) can be off. (Refer to section 2.3 of "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Positioning Mode)")	[A]
		(5)	A software stroke limit/ stroke limit was detected.	In the I/O mode, check if [AL. 99 Stroke limit warning] occurred when "_ _ _ 1" is set to [Pr. PD12], or [AL. 98 Software stroke limit warning] occurred when "_ 1 _ _" is set to [Pr. PD12].	[AL. 98 Software stroke limit warning] or [AL. 99 Stroke limit warning] occurred in the I/O mode.	Move the machine to within the limit range, and then make a home position return. When the home position is fixed, enable servo-on again.	[GF]
					[AL. 98 Software stroke limit warning] or [AL 99 Stroke limit warning] did not occur. Or the motion mode is set.	Check (6).	
		(6)	ZP2 (Home position return completion 2) turned off after the home position return was executed.	Check if ZP2 (Home position return completion 2) is off.	ZP2 (Home position return completion 2) is off.	Check the conditions in which ZP2 (Home position return completion 2) is off. (□MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (I/O Mode))	

Alarm No.: 90		Name: Home position return incomplete warning					
Alarm content		· A home position return did not complete normally with the positioning function.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
90.2	Home position return abnormal termination	(1)	The proximity dog is not connected to DOG.	Check if the proximity dog is connected correctly.	It is not connected.	Connect it correctly.	[A] [GF]
					It is connected.	Check (2).	
		(2)	The stroke limit was detected after the home position return start.	Check if the stroke limit is connected correctly. Or check if the stroke limit is not reached.	The stroke limit is not connected. Or the stroke limit is reached.	Connect the stroke limit correctly. Review the stroke limit position.	
					The stroke limit is connected. Or the stroke limit is not reached.	Check (3).	
		(3)	A home position return speed did not decelerate to a creep speed.	Check if the proximity dog turned off before a home position return completed deceleration to a creep speed.	The proximity dog turned off before the deceleration to a creep speed.	Review the dog position. Or review the parameter values of the home position return speed, creep speed, and travel distance after proximity dog.	
		(4)	Deceleration from the home position return speed/creep speed to the home position failed at the indexer method.	Check if the home position was turned on before the deceleration from the home position return speed/creep speed to the home position was complete.	It was not turned on before the deceleration was complete.	Review the positional relationship of the stroke limit and home position. Or review the parameter values of the home position return speed, creep speed, deceleration time constant, and home position shift distance.	
90.5	Z-phase unpassed	(1)	The Z-phase signal was not detected normally.	Check if the Z-phase signal of the servo motor/ linear servo motor was detected normally.	The Z-phase signal was not detected.	Review the Z-phase signal and wirings.	
					The Z-phase signal was detected.	Check (2).	
		(2)	A home position return was executed while the servo motor did not pass the Z-phase.	Check if the motor passed the Z-phase signal until the proximity dog turned off after the home position return started.	The Z-phase was not turned on.	Review the setting position of the home position return start and proximity dog.	

Alarm No.: 91		Name: Servo amplifier overheat warning					
Alarm content		· The temperature inside of the servo amplifier reached a warning level.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
91.1	Main circuit device overheat warning	(1)	Ambient temperature of the servo amplifier has exceeded 55 °C.	Check the ambient temperature.	It is over 55 °C.	Lower the ambient temperature.	[A] [B] [WB] [RJ010] [GF]
					It is less than 55 °C.	Check (2).	
		(2)	The close mounting is out of specifications.	Check the specifications of close mounting.	It is out of specifications.	Use within the range of specifications.	

Alarm No.: 92		Name: Battery cable disconnection warning					
Alarm content		· Battery voltage for absolute position detection system decreased.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
92.1	Encoder battery cable disconnection warning	(1)	1) When an MR-BAT6V1SET(-A) battery or MR-BT6VCASE battery case was used, the battery was not connected to CN4. 2) When an MR-BAT6V1BJ battery for junction battery cable was used, the battery was not connected to both CN4 and MR-BT6VCBL03M junction battery cable.	Check if the battery is connected correctly.	It is not connected.	Connect it correctly.	[A] [B] [WB] [RJ010] [GF]
					It is connected.	Check (2).	
		(2)	A battery cable was disconnected.	Check if the battery cable is malfunctioning.	It has a failure.	Replace or repair the cable.	
					It has no failure.	Check (3).	
		(3)	The battery voltage is low. The battery is consumed.	Check the battery voltage with a tester. When an MR-BAT6V1BJ battery for junction battery cable was used, check the voltage of the connector (orange) for servo amplifier.	It is less than 3.1 V DC.	Replace the battery.	
					It is 3.1 V DC or more.	Check (4).	
		(4)	An encoder cable was disconnected.	Check if the encoder cable is disconnected.	It is disconnected.	Replace or repair the cable.	
92.3	Battery degradation	(1)	The battery voltage is low. The battery is consumed.	Check the battery voltage with a tester.	It is less than 3.0 V DC.	Replace the battery.	
					It is 3.0 V DC or more.	Check (2).	
		(2)	The battery has deteriorated.	Replace the battery, and then check the repeatability.	It is not repeatable.	Replace the battery.	

Alarm No.: 93		Name: ABS data transfer warning					
Alarm content		· ABS data were not transferred.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
93.1	ABS data transfer requirement warning during magnetic pole detection	(1)	The Z-phase was not turned on at servo-on.	Check if the position within one-revolution is "0".	It is "0". (The Z-phase was not turned on.)	Turn on the Z-phase and disable the magnetic pole detection. Always make home position setting again.	[A]
					It is other than "0". (The Z-phase was turned on.)	Check (2).	
		(2)	The magnetic pole detection was executed.	Check if the ABS data is transferred during the magnetic pole detection.	The ABS data is transferred.	Disable the magnetic pole detection. After that, cycle SON (Servo-on) and transfer the ABS data.	

Alarm No.: 95		Name: STO warning					
Alarm content		· STO input signal turns off while the servo motor stops. · A diagnosis of input devices was not executed. · The safety observation function was enabled in the test mode.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
95.1	STO1 off detection	(1)	STO1 is not inputted correctly.	Check if the STO1 of CN8 connector is wired correctly.	It is not wired correctly.	Wire it correctly. (When not using the STO function, attach the short-circuit connector came with the servo amplifier to CN8.)	[A] [B] [WB] [RJ010] [GF]
					It is wired correctly.	Check (2).	
		(2)	STO1 was turned off (enabled) under the following speed conditions. 1) Servo motor speed: 50 r/min or less 2) Linear servo motor speed: 50 mm/s or less 3) Direct drive motor speed: 5 r/min or less	Check if STO1 is off (enabled).	It is off (enabled).	Turn on STO1 (disabled).	
95.2	STO2 off detection	(1)	STO2 is not inputted correctly.	Check if the STO2 of CN8 connector is wired correctly.	It is not wired correctly.	Wire it correctly. (When not using the STO function, attach the short-circuit connector came with the servo amplifier to CN8.)	
					It is wired correctly.	Check (2).	
		(2)	STO2 was turned off (enabled) under the following speed conditions. 1) Servo motor speed: 50 r/min or less 2) Linear servo motor speed: 50 mm/s or less 3) Direct drive motor speed: 5 r/min or less	Check if STO2 is off (enabled).	It is off (enabled).	Turn on STO2.	
95.3	STO warning 1 (safety observation function)	(1)	"Input device - Fixing-diagnosis execution selection at start-up" was not executed.	Check if "Input device - Fixing-diagnosis execution selection at start-up" was executed.	It was not executed.	Execute it.	[A] [B] [GF]
					It was executed.	Check (2).	
		(2)	Set "Input device - Fixing-diagnosis execution selection at start-up" correctly using parameters.	Check if [Pr. PSD27] and [Pr. PSD28] are set correctly.	It is not set correctly.	Review the parameter.	
					It is set correctly.	Check (3).	
		(3)	The wiring is incorrect.	Check if the wiring has a failure.	It has a failure.	Review the wiring.	
					It has no failure.	Check (4).	
		(4)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (5).	
		(5)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	

Alarm No.: 95		Name: STO warning					
Alarm content		· STO input signal turns off while the servo motor stops. · A diagnosis of input devices was not executed. · The safety observation function was enabled in the test mode.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
95.4	STO warning 2 (safety observation function)	(1)	The test operation mode was not set correctly.	Check if the servo amplifier and functional safety unit are set to the test operation mode.	It is not set.	Set it correctly.	[A] [B] [WB] [RJ010] [GF]
					It is set.	Check (2).	
		(2)	An error occurred in the safety communication. Or the network is disconnected.	Check the description "The display shows "Ab"." ☞ Page 126 Trouble which does not trigger alarm/warning	It is not repeatable.	Take countermeasures against its cause.	
					It is repeatable.	Check (3).	
		(3)	"Input mode selection" in [Pr. PSA02 Functional safety unit setting] is not set correctly.	Set [Pr. PSA02] correctly and check the repeatability.	It is not repeatable.	Review the parameter.	
					It is repeatable.	Check (4).	
		(4)	A functional safety unit which is not compatible with the safety communication is connected.	Check the software version of the functional safety unit.	It is A1 or earlier.	Replace the functional safety unit with a one with software version A2 or later.	[GF]
					It is A2 or later.	Check (5).	
		(5)	The setting of [Pr. PSC04 Safety communication - Network communication selection] is incorrect.	Correct the setting of [Pr. PSC04] and check the repeatability.	It is not repeatable.	Review the parameter setting.	[B] [GF]
					It is repeatable.	Check (6).	
		(6)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
					It is repeatable.	Check (7).	
		(7)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
					It is repeatable.	Check (8).	
		(8)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause.	
95.5	STO warning 3 (safety observation function)	(1)	STO command/SS1 command of the functional safety unit was turned off (enabled) under the following speed conditions. 1) Servo motor speed: 50 r/min or less 2) Linear servo motor speed: 50 mm/s or less 3) Direct drive motor speed: 5 r/min or less	Check if STO command/ SS1 command of the functional safety unit is off (enabled).	It is off (enabled).	Turn on (disabled) STO command/SS1 command of the functional safety unit.	

Alarm No.: 96		Name: Home position setting warning					
Alarm content		· Home position setting could not be made.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
96.1	In-position warning at home positioning	(1)	INP (In-position) did not turn on within the specified time during home positioning.	Check the droop pulses during home positioning.	It is in-position range or more.	Adjust gains to set droop pulses within the in-position range. Remove the cause of droop pulse occurrence, and make home position setting.	[A] [B] [WB] [RJ010] [GF]
96.2	Command input warning at home positioning	(1)	A command has already inputted at the time of home positioning.	Check if a command is inputted at home positioning.	A command is inputted.	Set it after home positioning.	
					A command is not inputted.	Check (2).	
		(2)	Creep speed is high.	Decrease the creep speed, and then check the repeatability.	It is not repeatable.	Decelerate the creep speed, and make home position setting.	
96.3	Servo off warning at home positioning	(1)	A home positioning was executed during servo-off.	Check if the status is servo-off at home positioning.	It is servo-off.	Turn to servo-on, and then execute the home positioning.	[A]
96.4	Home positioning warning during magnetic pole detection	(1)	Z-phase was not turned on after servo-on.	Check if the Z-phase was turned on.	The Z-phase was not turned on.	Rotate the direct drive motor to turn on the Z-phase, and make home position setting.	[A] [GF]

Alarm No.: 97		Name: Positioning specification warning					
Alarm content		· How to specify a positioning is incorrect for the positioning function.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
97.1	Program operation disabled warning	(1)	When using the positioning function, start a program with the program operation disabled.	Check if the power of the servo amplifier was cycled after the program was changed.	The power of the servo amplifier was not cycled.	Cycle the power of the servo amplifier.	[A]
97.2	Next station position warning	(1)	An abnormal value was specified to a signal input of the next station position specification and automatic operation was started.	Check if a number of stations per rotation ([Pr. PT28]) or more value was not specified to the next station position.	The number of stations per rotation ([Pr. PT28]) or more value was specified.	Review the parameter setting or next station position input signal.	
					The number of stations per rotation ([Pr. PT28]) or more value was not specified.	Check (2).	
		(2)	The power of the servo amplifier was not cycled after the number of stations per rotation ([Pr. PT28]) was changed.	Check if the power of the servo amplifier was cycled after the number of stations per rotation ([Pr. PT28]) was changed.	The power was not cycled.	Cycle the power of the servo amplifier.	

Alarm No.: 98		Name: Software limit warning					
Alarm content		· A software limit set with the parameter was reached for the positioning function.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
98.1	Forward rotation-side software stroke limit reached	(1)	A software limit was set within the actual operation range.	Check if the parameter settings ([Pr. PT15] to [Pr. PT18]) to the operation range are correct.	The setting was out of operation range.	Set [Pr. PT15] to [Pr. PT18] correctly.	[A] [GF]
					The setting was within operation range.	Check (2).	
		(2)	A point table of the position data which exceeds the software limit was executed.	Check if the target position of the point data to the operation range was correct.	The setting was out of operation range.	Set the point table correctly.	
					The setting was within operation range.	Check (3).	
		(3)	A software limit was reached by using the JOG operation or manual pulse generator operation.	Check if the JOG operation or manual pulse generator operation was executed properly to the operation range.	It reached to the out of operation range.	Operate within the software limit. Adjust properly the parameters such as JOG speed and multiplication of the manual pulse as necessary.	
98.2	Reverse rotation-side software stroke limit reached	Check it with the check method for [AL. 98.1].					

Alarm No.: 99		Name: Stroke limit warning					
Alarm content		· The stroke limit signal is off.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
99.1	Forward rotation stroke end off	(1)	The forward rotation stroke limit switch is connected to LSP.	Check if the limit switch is connected correctly.	It is not connected.	Connect it correctly.	[A] [GF]
					It is connected.	Check (2).	
		(2)	The forward rotation stroke end was exceeded during driving.	Check if the forward rotation stroke limit switch turned off.	It turned off.	Check operation pattern.	
99.2	Reverse rotation stroke end off	(1)	The reverse rotation stroke limit switch is connected to LSN.	Check if the limit switch is connected correctly.	It is not connected.	Connect it correctly.	
					It is connected.	Check (2).	
		(2)	The reverse rotation stroke end was exceeded during driving.	Check if the reverse rotation stroke limit switch turned off.	It turned off.	Check operation pattern.	
99.4	Upper stroke limit off	(1)	The upper stroke limit switch is not connected to FLS of the controller.	Check if the limit switch is connected correctly.	It is not connected.	Connect it correctly.	[GF]
					It is connected.	Check (2).	
		(2)	The upper stroke limit was exceeded during driving.	Check if the upper stroke limit switch turned off.	It turned off.	Check operation pattern.	
99.5	Lower stroke limit off	(1)	The lower stroke limit switch is not connected to RLS of the controller.	Check if the limit switch is connected correctly.	It is not connected.	Connect it correctly.	
					It is connected.	Check (2).	
		(2)	The lower stroke limit was exceeded during driving.	Check if the lower stroke limit switch turned off.	It turned off.	Check operation pattern.	

Alarm No.: 9A		Name: Optional unit input data error warning					
Alarm content		· The BCD input data setting is incorrect when MR-D01 extension IO unit is connected.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
9A.1	Optional unit input data sign error	(1)	The MR-D01 extension IO unit is not connected.	Check if MR-D01 is connected correctly.	It is not connected.	Connect it correctly.	[A]
					It is connected.	Check (2).	
		(2)	Both of + and - signs are on or off.	Check the sign of the optional unit input data.	Both are on or both are off.	Turn on one of the signs only.	
					Only one of the signs is on.	Check (3).	
		(3)	The - sign is set at incremental value command.	Check the sign of the optional unit input data.	The - sign is set.	Set it to +.	
					The + sign is set.	Check (4).	
		(4)	The MR-D01 extension IO unit is malfunctioning.	Replace the MR-D01, and then check the repeatability.	It is not repeatable.	Replace the MR-D01.	
9A.2	Optional unit BCD input data error	(1)	Other than "0" to "9" is set in a digit.	Check the BCD input data.	A value out of range is set.	Set a value from "0" to "9".	

Alarm No.: 9B		Name: Error excessive warning					
Alarm content		· Droop pulses have exceeded the warning occurrence level.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
9B.1	Excess droop pulse 1 warning	(1)	The servo motor power cable was disconnected.	Check the servo motor power cable.	It is disconnected.	Repair or replace the servo motor power cable.	[A] [B] [WB] [GF]
					It is not disconnected.	Check (2).	
		(2)	The connection of the servo motor is incorrect.	Check the wiring of U/V/W.	It is incorrect.	Connect it correctly.	
					It is correct.	Check (3).	
		(3)	The connection of the encoder cable is incorrect.	Check if the encoder cable is connected correctly.	It is incorrect.	Connect it correctly.	
					It is correct.	Check (4).	
		(4)	The torque limit has been enabled.	Check if the limiting torque is in progress.	The limiting torque is in progress.	Increase the torque limit value.	
					The limiting torque is not in progress.	Check (5).	
		(5)	A moving part collided against the machine.	Check if it collided.	It collided.	Check operation pattern.	
					It did not collide.	Check (6).	
		(6)	The torque is insufficient.	Check the peak load ratio.	The torque is saturated.	Reduce the load or review the operation pattern. Or use a larger capacity motor.	
					The torque is not saturated.	Check (7).	
		(7)	Power supply voltage dropped.	Check the bus voltage value.	The bus voltage is low.	Check the power supply voltage and power supply capacity.	
					The bus voltage is high.	Check (8).	
		(8)	Acceleration/ deceleration time constant is too short.	Set a longer deceleration time constant, and then check the repeatability.	It is not repeatable.	Increase the acceleration/deceleration time constant.	
					It is repeatable.	Check (9).	

Alarm No.: 9B		Name: Error excessive warning					
Alarm content		· Droop pulses have exceeded the warning occurrence level.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
9B.1	Excess droop pulse 1 warning	(9)	The position loop gain is small.	Increase the position loop gain, and then check the repeatability.	It is not repeatable.	Increase the position loop gain ([Pr. PB08]).	[A] [B] [WB] [GF]
					It is repeatable.	Check (10).	
		(10)	Servo motor shaft was rotated by external force./The moving part of the linear servo motor was moved by external force.	Measure the actual position under the servo-lock status.	It is rotated by external force./It was moved by external force.	Review the machine.	
					It is not rotated by external force./It was not moved by external force.	Check (11).	
		(11)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
9B.3	Excess droop pulse 2 warning	Check it with the check method for [AL. 9B.1].					
9B.4	Error excessive warning during 0 torque limit	(1)	The torque limit has been 0.	Check the torque limit value.	The torque limit has been 0.	Do not input a command while the torque limit value is 0.	[A] [B] [WB] [GF]

Alarm No.: 9C		Name: Converter warning					
Alarm content		· A warning occurred in the converter unit during the servo-on.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
9C.1	Converter unit warning	(1)	A warning occurred in the converter unit during the servo-on.	Check the warning of the converter unit, and take the action following the remedies for warnings of the converter unit.			[A] [B]

Alarm No.: 9D		Name: CC-Link IE warning 1					
Alarm content		· The station No. switch setting was changed after power-on. · The station No. setting differs from that of master station.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
9D.1	Station number switch change warning	(1)	The station No. switch setting was changed after power-on.	Check if the switch was changed.	It was changed.	Restore the setting. Do not change the station No. switch after power-on.	[RJ010]
					It was not changed.	Check (2).	
		(2)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	

Alarm No.: 9D		Name: CC-Link IE warning 1					
Alarm content		· The station No. switch setting was changed after power-on. · The station No. setting differs from that of master station.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
9D.2	Master station setting warning	(1)	When MR-D30 is used to perform safety communication, the servo amplifier and MR-D30 are not connected correctly.	Check the connection of the servo amplifier to MR-D30.	It is not connected.	Connect it correctly.	[GF]
					Safety communication is not performed. Or the servo amplifier is connected to MR-D30 correctly.	Check (2).	
		(2)	The settings of the station type or cyclic points on the master station side do not match those on the servo amplifier side.	Check the setting of the master station and the servo amplifier.	The setting is incorrect.	Review the setting on the master station side.	[RJ010] [GF]
9D.3	Overlapping station number warning	(1)	The same station No. as other station was set.	Check devices on the network if station Nos. are overlapped.	They are overlapped.	Review the settings of the station Nos.	
9D.4	Mismatched station number warning	(1)	The station No. controlled on master side differs from that set on slave side.	Check the station No. on master side and slave side if they are matched together.	They are not matched.	Review the settings of the station Nos.	

Alarm No.: 9E		Name: CC-Link IE warning 2					
Alarm content		· The receive data of the CC-Link IE communication is abnormal.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
9E.1	CC-Link IE warning	(1)	MR-J4-_GF_(-RJ) servo amplifier set for CC-Link IE Field Network is connected to the network of CC-Link IE Field Network Basic.	Check the combination of the slide switches of the servo amplifier.	The combination of the slide switches (SW1-1/SW1-2) are set for CC-Link IE Field Network. SW1-1: OFF (down) SW1-2: OFF (down)	Set the combination of the slide switches (SW1-1/SW1-2) for CC-Link IE Field Network Basic. SW1-1: OFF (down) SW1-2: ON (up)	[GF]
		(2)	The transmission status of the CC-Link IE communication is abnormal.	Check the noise, ambient temperature, etc.	It has a failure.	Take countermeasures against its cause.	[RJ010] [GF]
					It has no failure.	Check (3).	
		(3)	The Ethernet cable was disconnected.	Check the Ethernet cable connection.	It is disconnected.	Turn off the control circuit power supply of the servo amplifier, and then connect the Ethernet cable.	
					It is connected.	Check (4).	
		(4)	The wiring of the Ethernet cable was incorrect.	Check if the wiring of Ethernet cable is correct.	The wiring is incorrect.	Wire it correctly.	
					The wiring is correct.	Check (5).	
		(5)	An Ethernet cable was disconnected.	Check if the Ethernet cable is malfunctioning.	It has a failure.	Replace the Ethernet cable.	
					It has no failure.	Check (6).	
		(6)	Communication with the master station is abnormal.	Check the setting of [Pr. Po02] and [Pr. Po03].	The setting value is incorrect.	Review the communication settings.	[RJ010]
					The setting value is correct.	Check (7).	
		(7)	The master station is malfunctioning.	Check if the master station is malfunctioning.	It has a failure.	Replace the master station.	[RJ010] [GF]

Alarm No.: 9F		Name: Battery warning					
Alarm content		· Battery voltage for absolute position detection system decreased.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
9F.1	Low battery	(1)	The battery is not connected to CN4.	Check if the battery is connected correctly.	It is not connected.	Connect it correctly.	[A] [B] [WB] [RJ010] [GF]
					It is connected.	Check (2).	
		(2)	The battery voltage is low. The battery is consumed.	Check the battery voltage with a tester. When an MR-BAT6V1BJ battery for junction battery cable was used, check the voltage of the connector (orange) for servo amplifier.	It is less than 4.9 V DC.	Replace the battery.	
9F.2	Battery degradation warning	(1)	The absolute position storage unit has not connected.	Check if the absolute position storage unit is connected correctly.	It is not connected.	Connect it correctly.	[A] [B] [WB] [GF]

Alarm No.: E0		Name: Excessive regeneration warning					
Alarm content		· There is a possibility that regenerative power may exceed permissible regenerative power of built-in regenerative resistor or regenerative option.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E0.1	Excessive regeneration warning	(1)	The regenerative power exceeded 85% of the permissible regenerative power of the built-in regenerative resistor or regenerative option.	Check the effective load ratio.	It is 85% or more.	Reduce the frequency of positioning. Increase the deceleration time constant. Reduce the load. Use a regenerative option if it is not being used.	[A] [B] [WB] [RJ010] [GF]

Alarm No.: E1		Name: Overload warning 1					
Alarm content		[AL. 50 Overload 1] or [AL. 51 Overload 2] can occur.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E1.1	Thermal overload warning 1 during operation	(1)	The load was over 85% to the alarm level of [AL. 50.1 Thermal overload error 1 during operation].	Check it with the check method for [AL. 50.1].			[A] [B] [WB] [RJ010] [GF]
E1.2	Thermal overload warning 2 during operation	(1)	The load was over 85% to the alarm level of [AL. 50.2 Thermal overload error 2 during operation].	Check it with the check method for [AL. 50.2].			
E1.3	Thermal overload warning 3 during operation	(1)	The load was over 85% to the alarm level of [AL. 51.1 Thermal overload error 3 during operation].	Check it with the check method for [AL. 51.1].			
E1.4	Thermal overload warning 4 during operation	(1)	The load was over 85% to the alarm level of [AL. 50.3 Thermal overload error 4 during operation].	Check it with the check method for [AL. 50.3].			
E1.5	Thermal overload error 1 during a stop	(1)	The load was over 85% to the alarm level of [AL. 50.4 Thermal overload error 1 during a stop].	Check it with the check method for [AL. 50.4].			
E1.6	Thermal overload error 2 during a stop	(1)	The load was over 85% to the alarm level of [AL. 50.5 Thermal overload error 2 during a stop].	Check it with the check method for [AL. 50.5].			
E1.7	Thermal overload error 3 during a stop	(1)	The load was over 85% to the alarm level of [AL. 51.2 Thermal overload error 3 during operation].	Check it with the check method for [AL. 51.2].			
E1.8	Thermal overload error 4 during a stop	(1)	The load was over 85% to the alarm level of [AL. 50.6 Thermal overload error 4 during a stop].	Check it with the check method for [AL. 50.6].			

Alarm No.: E2		Name: Servo motor overheat warning					
Alarm content		[AL. 46.2 Abnormal temperature of servo motor 2] can occur.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E2.1	Servo motor temperature warning	(1)	The temperature of the linear servo motor or direct drive motor reached 85% of the occurrence level of [AL. 46.2 Abnormal temperature of servo motor 2].	Check it with the check method for [AL. 46.2].			[A] [B] [WB] [GF]

Alarm No.: E3		Name: Absolute position counter warning					
Alarm content		· The multi-revolution counter value of the absolute position encoder exceeded the maximum range. · Absolute position encoder pulses are faulty. · An update cycle is short for writing multi-revolution counter value of the absolute position encoder to EEP-ROM.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E3.1	Multi-revolution counter travel distance excess warning	(1)	The travel distance from the home position is 32768 rev or more in the absolute position system.	Check the value of the multi-revolution counter.	It is 32768 rev or more.	Review operation range. Execute the home position return again. After the power is surely cycled, perform home position return again.	[A] [GF]
E3.2	Absolute position counter warning	(1)	Something near the device caused it.	Check the noise, ambient temperature, etc.	There is a problem in the surrounding.	Take countermeasures against its cause. After the power is surely cycled, perform home position return again.	[A] [B] [WB] [RJ010] [GF]
					There is no problem in the surrounding.	Check (2).	
		(2)	An encoder is malfunctioning.	Replace the servo motor, and then check the repeatability.	It is not repeatable.	Replace the servo motor.	
E3.4	Absolute positioning counter EEP-ROM writing frequency warning	(1)	A home position was renewed (EEP-ROM write) twice or more in 10 minutes in the servo amplifier due to rotation to the same direction in short time in the point table method of the positioning mode, degree setting with the program method, or the indexer method.	Check if the operation was within the following conditions between the number of gear teeth on machine side ([Pr. PA06] CMX) and servo motor speed (N). • When CMX ≤ 2000, N < 3076.7 r/min • When CMX > 2000, N < 3276.7 - (CMX × 0.1) r/min • When (CMX/CDV) is reduced to its lowest terms, CMX ≤ 15900	The operation was out of conditions.	Set the command speed within the conditions. Set the number of gear teeth on machine side within the conditions. After the power is surely cycled, perform home position return again.	[A] [GF]
E3.5	Encoder absolute positioning counter warning	Check it with the check method for [AL. E3.2].					

Alarm No.: E4		Name: Parameter warning					
Alarm content		Out of the setting range was attempted to write during parameter writing.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E4.1	Parameter setting range error warning	(1)	A parameter was set to out of range with the servo system controller.	Check the parameter setting value set with the servo system controller.	It is out of setting range.	Set it within the range.	[B] [WB] [RJ010]

Alarm No.: E5		Name: ABS time-out warning					
Alarm content		· A response from the programmable controller was over 5 s at the absolute position erased data transfer. · ABSM (ABS transfer mode) turned off during the absolute position erased data transfer. · SON (Servo-on), RES (Reset), or EM2/EM1 (Forced stop) turned off during the absolute position erased data transfer.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E5.1	Time-out during ABS data transfer	(1)	The wiring of I/O signals is incorrect.	Check if the I/O signal wire is disconnected or connected loosely.	It has a failure.	Repair or replace the I/O signal wire.	[A]
					It has no failure.	Check (2).	
		(2)	The sequence program is incorrect.	Check the sequence program.	The sequence program is incorrect.	Modify the sequence program.	
E5.2	ABSM off during ABS data transfer	Check it with the check method for [AL. E5.1].					
E5.3	SON off during ABS data transfer						

Alarm No.: E6		Name: Servo forced stop warning					
Alarm content		· EM2/EM1 (Forced stop) turned off. · SS1 command was inputted.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E6.1	Forced stop warning	(1)	EM2/EM1 (Forced stop) turned off.	Check the status of EM2/EM1.	It is off.	Ensure safety and turn on EM2/EM1 (Forced stop).	[A] [B] [WB] [RJ010] [GF]
					It is on.	Check (2).	
		(2)	The external 24 V DC power supply is off.	Check if the external 24 V DC power supply is inputted.	It is not inputted.	Input the 24 V DC power supply.	
					It is inputted.	Check (3).	
		(3)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
E6.2	SS1 forced stop warning 1 (safety observation function)	(1)	The SS1 command is off (enabled).	Check if the SS1 command is off (enabled).	The SS1 command is off (enabled).	Turn on the SS1 input (disabled).	[A] [B] [GF]
		(2)	An external 24 V DC is not inputted to the functional safety unit.	Check if an external 24 V DC is inputted to the functional safety unit.	It is not inputted.	Input the 24 V DC power supply.	
					It is inputted.	Check (3).	
		(3)	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	It is not repeatable.	Replace the functional safety unit.	
E6.3	SS1 forced stop warning 2 (safety observation function)	(1)	An error occurred in the safety communication.	Check the description "The display shows "Ab".". ☞ Page 126 Trouble which does not trigger alarm/warning	It is not repeatable.	Take countermeasures against its cause.	

Alarm No.: E7		Name: Controller forced stop warning					
Alarm content		· The forced stop signal of the servo system controller was enabled.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E7.1	Controller forced stop input warning	(1)	The forced stop signal of the servo system controller was inputted.	Check if the servo system controller is a forced stop status.	It is the forced stop status.	Ensure safety and cancel the forced stop signal of the controller.	[B] [WB] [RJ010]
		(2)	The forced stop signal of the controller was inputted with Modbus RTU communication.	Check if the controller is in a forced stop status.	It is the forced stop status.	Ensure safety and cancel the forced stop signal of the controller.	[A]

Alarm No.: E8		Name: Cooling fan speed reduction warning					
Alarm content		· The cooling fan speed decreased to the warning occurrence level or less.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E8.1	Decreased cooling fan speed warning	(1)	Foreign matter was caught in the cooling fan.	Check if a foreign matter is caught in the cooling fan.	Something has been caught.	Remove the foreign matter.	[A] [B] [WB] [RJ010] [GF]
					Nothing has been caught.	Check (2).	
		(2)	Cooling fan life expired.	Check the total of power on time of the servo amplifier.	It exceed the cooling fan life.	Replace the servo amplifier.	
E8.2	Cooling fan stop	Check it with the check method for [AL. E8.1].					

Alarm No.: E9		Name: Main circuit off warning					
Alarm content		· The servo-on command was inputted with main circuit power supply off. · The bus voltage dropped during the servo motor driving under 50 r/min.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E9.1	Servo-on signal on during main circuit off	(1)	The main circuit power supply is off. For the drive unit, the power supply of the converter unit is off.	Check if the main circuit power supply is inputted. Check if the power supply of the converter unit is inputted.	It is not inputted.	Turn on the main circuit power.	[A] [B] [WB] [RJ010] [GF]
					It is inputted.	Check (2).	
		(2)	The wiring between P3 and P4 was disconnected. For the drive unit, the wiring between P1 and P2 of the converter unit was disconnected.	Check the wiring between P3 and P4. Check the wiring between P1 and P2 of the converter unit.	It is disconnected.	Connect it correctly.	
					It is connected.	Check (3).	
		(3)	The main circuit power supply wiring was disconnected. For the drive unit, the main circuit power supply wiring of the converter unit was disconnected.	Check the main circuit power supply wiring. Check the main circuit power supply wiring of the converter unit.	It is disconnected.	Connect it correctly.	
					It has no failure.	Check (4).	
		(4)	For the drive unit, the magnetic contactor control connector of the converter unit was disconnected.	Check the magnetic contactor control connector of the converter unit.	It is disconnected.	Connect it correctly.	
					It has no failure.	Check (5).	
		(5)	For the drive unit, the bus bar between the converter unit and drive unit was disconnected.	Check the bus bar between the converter unit and drive unit.	It is disconnected.	Connect it correctly.	
					It has no failure.	Check (6).	

Alarm No.: E9		Name: Main circuit off warning					
Alarm content		· The servo-on command was inputted with main circuit power supply off. · The bus voltage dropped during the servo motor driving under 50 r/min.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
E9.1	Servo-on signal on during main circuit off	(6)	The setting value of [Pr. PA02 Magnetic contactor drive output selection] contradicts the wiring constitution.	Check the [Pr. PA02] setting and the wiring constitution.	The setting or wiring is incorrect.	Review the setting of [Pr. PA02].	[A] [B] [WB] [RJ010] [GF]
					The setting and wiring are correct.	Check (7).	
		(7)	For the MR-J4-03A6(-RJ) or MR-J4W2-0303B6 servo amplifier, 24 V DC input is not selected even though 24 V DC input is used.	Check the parameter setting. MR-J4-03A6(-RJ): [Pr. PC27] MR-J4W2-0303B6: [Pr. PC05]	The setting is incorrect.	Set it correctly.	
					The setting is correct.	Check (8).	
		(8)	The bus voltage is low.	Check if the bus voltage is lower than the prescribed value. 200 V class: 215 V DC 400 V class: 430 V DC 100 V class: 215 V DC 48 V DC setting: 38 V DC 24 V DC setting: 18 V DC	The voltage is lower than the prescribed value.	Review the wiring. Check the power supply capacity.	
					The voltage is equal to or higher than the prescribed value.	Check (9).	
		(9)	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	(10) Replace the servo amplifier.	
		(10)	For the drive unit, the converter unit is malfunctioning.	Replace the converter unit, and then check the repeatability.	It is not repeatable.	Replace the converter unit.	
E9.2	Bus voltage drop during low speed operation	(1)	The bus voltage dropped during the servo motor driving under 50 r/min.	Check the bus voltage.	It is lower than the prescribed value. 200 V class: 200 V DC 400 V class: 430 V DC 100 V class: 200 V DC 48 V DC setting: 35 V DC 24 V DC setting: 15 V DC	Review the power supply capacity. Increase the acceleration time constant.	
E9.3	Ready-on signal on during main circuit off	Check it with the check method for [AL. E9.1].					
E9.4	Converter unit forced stop	(1)	The forced stop of the converter unit is enabled during the servo-on command.	Check if the forced stop of the converter unit is enabled.	It is enabled.	Deactivate the forced stop of the converter unit.	[A] [B]
					It is not enabled.	Check (2).	
		(2)	The protection coordination cable is not correctly connected.	Check the protection coordination cable.	It is not connected.	Connect the protection coordination cable correctly.	

Alarm No.: EA		Name: ABS servo-on warning					
Alarm content		· The servo-on was not enabled within 1 s after ABSM (ABS transfer mode) was turned on.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
EA.1	ABS servo-on warning	(1)	The wiring of I/O signals is incorrect.	Check if the I/O signal wire is disconnected or connected loosely.	It has a failure.	Repair or replace the I/O signal wire.	[A]
					It has no failure.	Check (2).	
		(2)	The sequence program is incorrect.	Check the sequence program.	The sequence program is incorrect.	Modify the sequence program.	

Alarm No.: EB		Name: The other axis error warning					
Alarm content		· An alarm, which stops all axes, such as [AL. 24 Main circuit error] or [AL. 32 Overcurrent] occurred in other axis. "All alarms" of "Target alarm selection of the other axis error warning" is selected in [Pr. PF02].					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
EB.1	The other axis error warning	(1)	[AL. 24] occurred at other axis.	Check if [AL. 24] is occurring at other axis.	It is occurring.	Eliminate the cause of [AL. 24] on the other axis side.	[WB]
					It did not occur.	Check (2).	
		(2)	[AL. 32] occurred at other axis.	Check if [AL. 32] is occurring at other axis.	It is occurring.	Eliminate the cause of [AL. 32] on the other axis side.	
					It did not occur.	Check (3).	
		(3)	"All alarms" of "Target alarm selection of the other axis error warning" is selected in [Pr. PF02].	Check the [Pr. PF02] setting.	"All alarms" is selected.	Remove the cause of the occurring alarm at other axis.	

Alarm No.: EC		Name: Overload warning 2					
Alarm content		· Operations over rated output were repeated while the servo motor shaft was not rotated.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
EC.1	Overload warning 2	(1)	The load is too large or the capacity is not enough.	Check the effective load ratio.	The effective load ratio is high.	Reduce the load. Replace the servo motor with the one of larger capacity.	[A] [B] [WB] [RJ010] [GF]

Alarm No.: ED		Name: Output watt excess warning					
Alarm content		· The status, in which the output wattage (speed × torque) of the servo motor exceeded the rated output, continued steadily.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
ED.1	Output watt excess warning	(1)	The status, in which the output wattage (speed × torque or thrust) of the servo motor exceeded 120% of the rated output (continuous thrust), continued steadily.	Check the servo motor speed and torque, or check the motor speed and thrust.	The output wattage is 120% of rating.	Reduce the servo motor speed. Reduce the load.	[A] [B] [WB] [RJ010] [GF]

Alarm No.: F0		Name: Tough drive warning					
Alarm content		· Tough drive function was activated.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
F0.1	Instantaneous power failure tough drive warning	(1)	The voltage of the control circuit power supply has dropped.	Check it with the check method for [AL. 10.1].			[A] [B] [WB] [RJ010] [GF]
F0.3	Vibration tough drive warning	(1)	The setting value of the machine resonance suppression filter was changed due to a machine resonance.	Check if it was changed frequently.	It was changed frequently.	Set the machine resonance suppression filter. Check the machine status if screws are loose or the like.	

Alarm No.: F2		Name: Drive recorder - Miswriting warning					
Alarm content		· A waveform measured by the drive recorder function was not recorded.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
F2.1	Drive recorder - Area writing time-out warning	(1)	The Flash-ROM is malfunctioning.	Disconnect the cables except for the control circuit power supply, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[A] [B] [WB] [RJ010] [GF]
F2.2	Drive recorder - Data miswriting warning	(1)	Data were not written to the drive recorder area.	Check if clearing alarm history disables this alarm with MR Configurator2.	It is not canceled.	Replace the servo amplifier.	

Alarm No.: F3		Name: Oscillation detection warning				
Alarm content		· [AL. 54 Oscillation detection] can occur.				
Detail No.	Detail name	Cause	Check method	Check result	Action	Target
F3.1	Oscillation detection warning	Check it with the check method for [AL. 54.1].				

Alarm No.: F4		Name: Positioning warning					
Alarm content		· Target position or acceleration time constant/deceleration time constant was set out of setting range.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
F4.4	Target position setting range error warning	(1)	A target position was set out of setting range.	Check the setting value of the target position.	It is out of setting range.	Set the target position correctly, and cancel the warning (turn on C_ORST).	[Others]
F4.6	Acceleration time constant setting range error warning	(1)	The acceleration time constant or the deceleration time constant was set out of setting range.	Check the setting value of the acceleration time constant ([Pr. PT49]) and the deceleration time constant ([Pr. PT50]).	It is out of setting range.	Set the acceleration time constant and the deceleration time constant correctly, and cancel the warning (turn on ORST).	[GF]
F4.7	Deceleration time constant setting range error warning	(1)	Check it with the check method for [AL. F4.6].				
F4.9	Home position return type error warning	(1)	A home position return type was set out of setting range.	Check the setting value ([Pr. PT45]) of the home position return type.	It is not corresponding to a value for the home position return type.	Set the home position return type correctly, and cancel the warning (turn on ORST).	[GF]

Alarm No.: F5		Name: Simple cam function - Cam data miswriting warning					
Alarm content		The cam data written by MR Configurator2 is not written to a Flash-ROM.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
F5.1	Cam data - Area writing time-out warning	(1)	The Flash-ROM is malfunctioning.	Disconnect the cables except for the control circuit power supply, and then check the repeatability.	It is repeatable.	Replace the servo amplifier.	[A] [GF]
F5.2	Cam data - Miswriting warning	(1)	The cam data was not written.	After the power is cycled, perform writing, and check the repeatability again. When the cam data is initialized, perform writing, and check the repeatability again. • Section 7.2.9 [Pr. PT34] of "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Positioning Mode)" [ ]MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (I/O Mode) • Section 7.2.4 [Pr. PT34] of "MR-J4-_GF_(-RJ) SERVO AMPLIFIER INSTRUCTION MANUAL (CC-Link IE Field Network Basic)"	It is repeatable.	Replace the servo amplifier.	
F5.3	Cam data checksum error	(1)	When the power is switched on after the cam data is written, a checksum of the cam data does not match. (Error occurred in cam data.)	Check if an error occurred (such as entered noise, power-off) at cam data write.	It has a failure.	After writing the cam data again, cycle the power.	
					It has no failure.	Check (2).	
		(2)	When the cam control command is turned on after the temporal writing of cam data, a checksum of the cam data does not match. (Error occurred in cam data.)	Check if an error occurred (such as entered noise) at temporal writing of cam data.	It has a failure.	After performing the temporal writing of cam data again, turn on the cam control command.	
					It has no failure.	Check (3).	
		(3)	The Flash-ROM is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	

Alarm No.: F6		Name: Simple cam function - Cam control warning					
Alarm content		· The cam axis position restoration at a time of cam control start was a failure. · The cam control is not normal.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
F6.1	Cam axis one cycle current value restoration failed	(1)	The cam axis one cycle current value corresponding to the feed current value at cam control start cannot be restored. (It occurs in a reciprocating motion pattern of the cam.)	Check if the feed current value is within the stroke in a reciprocating motion pattern of the cam.	The feed current value is the outside of the stroke.	Move the feed current value to within the stroke in a reciprocating motion pattern of the cam. Or set the cam standard position within the stroke in a reciprocating motion pattern of the cam.	[A] [GF]
F6.2	Cam axis feed current value restoration failed	(1)	The difference (command unit) between the restored cam axis feed current value and the command position at cam control start is bigger than "in-position range".	Check if the difference (command unit) between the restored cam axis feed current value and the command position at cam control start is in the "in-position range".	The difference of the command position (command unit) is not within "in-position range".	Calculate the cam axis feed current value to be restored, move the command position to the position, and then start the cam control. (For the calculation method, refer to the following. • Section 12.1.7 (2) of "MR-J4-_A_-RJ Servo Amplifier Instruction Manual (Positioning Mode)" [ ]MR-J4-_GF_(-RJ) Servo Amplifier Instruction Manual (I/O Mode)) • Section 9.5.7 (2) of "MR-J4-_GF_(-RJ) SERVO AMPLIFIER INSTRUCTION MANUAL (CC-Link IE Field Network Basic)" Or set a larger setting value to "in-position range" when the setting value is extremely small, such as 0.	
F6.3	Cam unregistered error	(1)	Cam data has never been written.	Check if the cam data was written.	It was not written.	Write the cam data.	
					It was written.	Check (2).	
		(2)	The cam data of the specified cam No. was not written.	Check if the cam data of the specified cam No. was written.	It was not written.	Write the cam data of the specified cam No.	
					It was written.	Check (3).	
		(3)	Cam data has changed due to a servo amplifier malfunction.	Replace the servo amplifier, and then check the repeatability.	It is not repeatable.	Replace the servo amplifier.	
F6.4	Cam control data setting range error	(1)	An out of range value is set to the cam control data.	Check the setting of the cam control data.	The setting is incorrect.	Set it correctly.	
F6.5	Cam No. external error	(1)	An out of range value is set to the cam No.	Check the setting of the cam No.	The setting is incorrect.	Set it correctly.	

Alarm No.: F6		Name: Simple cam function - Cam control warning					
Alarm content		· The cam axis position restoration at a time of cam control start was a failure. · The cam control is not normal.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
F6.6	Cam control inactive	(1)	After cam data was written, the cam control command was turned on without cycling the power.	Check if the power was cycled after the cam data was written.	The power was not cycled.	Cycle the power.	[A] [GF]
					The power was cycled.	Check (2).	
		(2)	After the cam control command was turned on, the servo-on was turned on.	Check if the cam control command was turned on during servo-on.	The cam control command was not turned on during servo-on.	Turn on the cam control command during servo-on.	
					The cam control command was turned on during servo-on.	Check (3).	
		(3)	The cam control command was turned on during servo motor driving, and the servo motor stopped.	Check if the cam control command was turned on while the travel completion was on.	The cam control command was not turned on while the travel completion was on.	Turn on the cam control command while the travel completion was on.	
					The cam control command was turned on while the travel completion was on.	Check (4).	
		(4)	The cam control command was turned on at the time of incompletion of home position return.	Check if the home position return completion is on.	The home position return completion is off.	Make a home position return, and turn on the cam control command.	
					The home position return completion is on.	Check (5).	
		(5)	It became servo-off during cam control.	Check if it is servo-off.	It is servo-off.	After servo-on, turn on the cam control command again.	
					It is servo-on.	Check (6).	
		(6)	A home position is erased during cam control.	Check if the home position return completion is off.	The home position return completion is off.	After the home position return completion, turn on the cam control command again.	
					The home position return completion is on.	Check (7).	
		(7)	It is stopped at a software limit during cam control.	Check if a software limit is reached.	A software limit is reached.	After it is retracted from the position of a software limit, turn on the cam control command again.	
					A software limit is not reached.	Check (8).	
		(8)	It is stopped at a stroke limit during cam control.	Check if a stroke limit is reached.	A stroke limit is reached.	After it is retracted from the position of a stroke limit, turn on the cam control command again.	

Alarm No.: F7		Name: Machine diagnosis warning					
Alarm content		There is a possibility that the equipment connected with the servo motor is malfunctioning.					
Detail No.	Detail name	Cause		Check method	Check result	Action	Target
F7.1	Vibration failure prediction warning	(1)	The servo system is unstable and oscillating.	Check if the gain is changed after the vibration failure prediction function is enabled.	The gain was changed.	Adjust the servo gain with the auto tuning. Set the machine resonance suppression filter.	[GF]
					The gain was not changed.	Check (2).	
		(2)	The vibration during servo motor operation increased because of deterioration of equipment parts.	Check that the vibration level during servo motor operation increased from that during the initial operation.	The vibration level during servo motor operation increased by 5% or lower from that during the initial operation.	Set a larger threshold multiplication for vibration failure prediction ([Pr. PF40] "_ _ x _") and restart the equipment.	
					The vibration level during servo motor operation increased by 5% or higher from that during the initial operation.	Check and maintain the equipment and replace parts as necessary.	
F7.2	Friction failure prediction warning	(1)	Changes in environment affected equipment friction.	Check that environment conditions such as ambient temperature has been changed from that of the initial operation.	The usage environment has been changed.	Reset the threshold to set a new one.	
					The usage environment is not changed.	Check (2).	
		(2)	Deterioration of equipment parts affected equipment friction.	Check that the friction torque at rated speed has been changed from that of the initial operation.	The friction torque at rated speed is not changed from that of the initial operation.	Set a larger threshold multiplication for friction failure prediction ([Pr. PF40] "_ _ _ x") and restart the equipment.	
					The friction torque at rated speed has been changed from that of the initial operation.	Check and maintain the equipment and replace parts as necessary.	
F7.3	Total travel distance failure prediction warning	(1)	The servo motor total travel distance exceeds the threshold.	Check if the threshold is set correctly.	The threshold is not set correctly.	Set the parameters so that the value of "[Pr. PF34] × [Pr. PF41]" is approximately the same as the rated life and restart the equipment.	
					The threshold is set correctly.	Check the equipment. After replacing the equipment, reset the servo motor total travel distance.	

1.6 Trouble which does not trigger alarm/warning

Point

When the servo amplifier, servo motor, or encoder malfunctions, the following status may occur.

The following example shows causes which do not trigger alarm or warning. Remove each cause referring to this section.

Description	Cause	Checkpoint	Action	Target
The display shows "AA".	The power of the servo system controller was turned off.	Check the power of the servo system controller.	Switch on the power of the servo system controller.	[B] [WB]
	A SSCNET Ⅲ cable was disconnected.	Check if "AA" is displayed in the corresponding axis and following axes.	Replace the SSCNET Ⅲ cable of the corresponding axis.	
		Check if the connectors (CN1A, CN1B) are unplugged.	Connect it correctly.	
	The control circuit power of the previous axis servo amplifier was turned off.	Check if "AA" is displayed in the corresponding axis and following axes.	Check the power of the servo amplifier.	
	The amplifier-less operation function of servo system controller is enabled.	Check if the amplifier-less operation function of servo system controller is enabled.	Disable the amplifier-less operation function.	
	An Ethernet cable was disconnected.	Check if "AA" is displayed in the corresponding axis and following axes.	Replace the Ethernet cable of the corresponding axis.	[RJ010] [GF]
		Check if the connectors (CN10A/CN10B or CN1A/CN1B) are unplugged.	Connect it correctly.	
The display shows "Ab".	A controller, which is not compatible with the servo amplifier, has been connected.	Check if a controller, which is not compatible with the servo amplifier, is connected.	Connect a compatible controller.	[B] [WB]
	The axis is disabled.	Check if the disabling control axis switch is on. [B]: SW2-2 [WB]: SW2-2 to 2-4	Turn off the disabling control axis switch.	
	The setting of the axis No. is incorrect.	Check that the other servo amplifier is not assigned to the same axis No.	Set it correctly.	
	Axis No. does not match with the axis No. set to the servo system controller.	Check the setting and axis No. of the servo system controller.	Set it correctly.	
	Information about the servo series has not set in the simple motion module.	Check the value set in Servo series (Pr.100) in the simple motion module.	Set it correctly.	
	Communication cycle does not match.	Check the communication cycle at the servo system controller side. When using 8 axes or less: 0.222 ms When using 16 axes or less: 0.444 ms When using 32 axes or less: 0.888 ms	Set it correctly.	

Description	Cause	Checkpoint	Action	Target
The display shows "Ab".	Connection to MR-J4W3-_B with software version A2 or earlier was attempted in 0.222 ms communication cycle.	Check if the communication cycle on servo system controller side is 0.222 ms.	Use them with 0.444 ms or more communication cycle.	[WB]
	MR-J4W3-_B was attempted to use in fully closed loop system.	Check if it was attempted to use in fully closed loop system.	MR-J4W3-_B does not support the fully closed loop control system. Use MR-J4-_B_ or MR-J4W2-_B.	
	A SSCNET Ⅲ cable was disconnected.	Check if "Ab" is displayed in the corresponding axis and following axes.	Replace the SSCNET Ⅲ cable of the corresponding axis.	[B] [WB]
		Check if the connectors (CN1A, CN1B) are unplugged.	Connect it correctly.	
	The control circuit power supply of the previous axis servo amplifier is off.	Check if "Ab" is displayed in the corresponding axis and following axes.	Check the power of the servo amplifier.	
	The amplifier-less operation function of servo system controller is enabled.	Check if the amplifier-less operation function of servo system controller is enabled.	Disable the amplifier-less operation function.	
	The servo amplifier is malfunctioning.	Check if "Ab" is displayed in the corresponding axis and following axes.	Replace the servo amplifier of the corresponding axis.	
	An Ethernet cable was disconnected.	Check if "Ab" is displayed in the corresponding axis and following axes.	Replace the Ethernet cable of the corresponding axis.	[RJ010] [GF]
	The servo amplifier power was switched on when the master station was off.	Check the power of the master station.	Turn on the power of the master station.	
	Communication cycle does not match.	Check the communication cycle on the master station side. When using 8 axes or less: 0.888 ms When using 16 axes or less: 1.777 ms	Set it correctly.	[RJ010]
		Check the communication cycle by referring to the controller instruction manual.	Refer to the controller instruction manual.	[GF]
	MR-J3-T10 is malfunctioning.	Replace the MR-J3-T10, and then check the repeatability.	Replace the MR-J3-T10.	[RJ010]
	The servo amplifier is malfunctioning.	Replace the servo amplifier, and then check the repeatability.	Replace the servo amplifier.	[RJ010] [GF]
	The master station is malfunctioning.	Replace the master station, and then check the repeatability.	Replace the master station.	
The display shows "b##".[1]	Test operation mode has been enabled.	Test operation setting switch is turned on.	Turn off the test operation setting switch.	[B] [WB] [RJ010] [GF]
	The system has been in the ready-off state.	Check if the servo ready state is off with the servo system controller.	Turn on the servo-on signals for all axes.	
The display shows "dEF".	Initializing point table/program is in progress.	Initializing of point table/ program was set in the parameter ([Pr. PT34] = 5001) and the power was cycled.	It takes about 20 s for startup the servo amplifier at initializing. Please wait until the display changes.	[A]
The display shows "off".	Operation mode for manufacturer setting is enabled.	Check if all of the control axis setting switches (SW2) are on.	Set the control axis setting switches (SW2) correctly.	[B] [WB] [RJ010] [GF]

Description	Cause	Checkpoint	Action	Target
The display turned off.	The external I/O terminal was shorted.	When the display is on by disconnecting the following connectors, check if the disconnected cable wire is shorted. [A]: CN1, CN2, CN3 [B] [WB] [RJ010] [GF]: CN2, CN3	Review the wiring of I/O signals.	[A] [B] [WB] [RJ010] [GF]
	The control circuit power supply is not applied.	Check if the control circuit power supply of the servo amplifier is off.	Turn on the control circuit power.	
	The voltage of the control circuit power supply has dropped.	Check if the voltage of the control circuit power supply dropped.	Increase the voltage of the control circuit power supply.	
The servo motor does not operate.	The connection of the servo motor is incorrect.	Check the wiring of U/V/W.	Connect it correctly.	[A] [B] [WB] [RJ010] [GF]
	The servo motor power supply cable was connected to a servo amplifier of other axis.	Check if the encoder cable and servo motor power supply cable are connected to the same servo amplifier.	Connect the encoder cable and servo motor power supply cable correctly.	
	An alarm or warning is occurring.	Check if an alarm or warning is occurring.	Check the content of the alarm/ warning and remove its cause.	
	The system has been in the test operation mode.	[A]: Check if the lower right point is blinking. [B] [WB] [RJ010] [GF]: Check if the test operation setting switch is on (up).	Cancel the test operation mode.	
	The motor-less operation has been enabled.	[A]: Check the [Pr. PC60] setting. [B] [WB] [RJ010] [GF]: Check the [Pr. PC05] setting.	Disable the motor-less operation.	
	The torque is insufficient due to large load.	Check instantaneous torque using status display (only [A]) or MR Configurator2 if the load exceeds the maximum torque or torque limit value.	Reduce the load or use a larger capacity servo motor.	
	An unintended torque limit has been enabled.	Check if the torque limit is enabled.	Cancel the torque limit.	
	The setting of the torque limit is incorrect.	Check if the torque limit is "0". [A]: [Pr. PA11] and [Pr. PA12], or analog input [B] [WB] [RJ010]: Setting on controller side [GF]: [Pr. PA11], [Pr. PA12], or setting on controller side	Set it correctly.	
	Machine is interfering with the motor.	Check if machine is interfering.	Remove the interference.	
	For a servo motor with an electromagnetic brake, the brake has not released.	Check the power supply of the electromagnetic brake.	Turn on the electromagnetic brake power.	
	LSP (Forward rotation stroke end) and LSN (Reverse rotation stroke end) are not on.	Check if [AL. 99] is occurring.	Turn on LSP and LSN.	[A] [GF]
	SON (Servo-on) is not on.	Check the SON (Servo-on) state.	Turn on SON (Servo-on).	
	RES (Reset) is on.	Check the RES (Reset) state.	Turn off RES (Reset).	[A]
	The setting of the control mode is incorrect.	Check the [Pr. PA01] setting.	Set it correctly.	

Description	Cause	Checkpoint	Action	Target
The servo motor does not operate.	The command pulse is not inputted in the position control mode.	Check if the pulse train is outputted on the controller side.	Review the setting on the controller side.	[A]
	The wiring of the command pulse train signal is incorrect in the position control mode.	Check the cumulative command pulses using the status display or MR Configurator2. Input the pulse train command and check if the display changes.	Review the wiring. When the signal is used in open-collector type, input 24 V DC to OPC.	
	The setting of the command pulse input form is incorrect in the position control mode.	Check that the pulse train form outputted with the controller and the setting of [Pr. PA13] are matched.	Review the [Pr. PA13] setting.	
	Both of ST1 (Forward rotation start) and ST2 (Reverse rotation start) are on or off in the speed control mode or the positioning mode.	Check the status of ST1 (Forward rotation start) and ST2 (Reverse rotation start).	Turn on ST1 (Forward rotation start) or ST2 (Reverse rotation start).	
	Both of RS1 (Forward rotation selection) and RS2 (Reverse rotation selection) are on or off in the torque control mode.	Check the status of RS1 (Forward rotation selection) and RS2 (Reverse rotation selection).	Turn on RS1 (Forward rotation selection) or RS2 (Reverse rotation selection).	
	The value selected in the speed control mode or the torque control mode is low.	Check SP1 (Speed selection 1), SP2 (Speed selection 2), and SP3 (Speed selection 3), and then check if the selected internal speed is correct.	Review the selections of SP1 (Speed selection 1), SP2 (Speed selection 2), SP3 (Speed selection 3), and setting of internal speed.	
	The value selected in the positioning mode (point table method) with BCD input is low.	Check SPD1 (Speed selection 1), SPD2 (Speed selection 2), SPD3 (Speed selection 3) and SPD4 (Speed selection 4), and then check if the selected internal speed is correct.	Review the wiring. Review the selections of SPD1 (Speed selection 1), SPD2 (Speed selection 2), SPD3 (Speed selection 3), SPD4 (Speed selection 4), and setting of internal speed.	
	An analog signal is not inputted correctly.	Check the values of analog speed command and analog torque command using status display or MR Configurator2.	Input the analog signals correctly.	
	The ABS transfer mode is selected when the absolute position detection system is used.	Check if ABSM is on.	Turn off ABSM.	
	The settings of the electronic gear are incorrect.	Check the setting value of the electronic gear.	Set a proper value of the electronic gear.	[A] [GF]
	The setting of point tables is incorrect.	Check the point table setting.	Review the point table setting.	

Description	Cause	Checkpoint	Action	Target
The servo motor does not operate.	The setting of the point table No. selection is incorrect.	Check the setting of the point table No. selection (CC-Link IE Field Network: RWwn06, CC-Link IE Field Network Basic: RWwn05) .	Review the setting of the point table No. selection.	[GF]
	The setting of the next station No. selection is incorrect.	Check the setting of the next station No. selection (CC-Link IE Field Network: RWwn06, CC-Link IE Field Network Basic: RWwn05).	Review the setting of the next station No. selection.	
	RX (n + 3) F (cyclic communication ready) is off (00h).	Check if the controller does not set RY (n + 3) F (cyclic communication ready) to off (00h).	Set RY (n + 3) F (cyclic communication ready) to on (01h).	
	The control mode was not set with Modes of operation (6060h).	Check if the control mode was not set with Modes of operation (6060h).	Set the control mode with Modes of Operation (6060h).	
	The controller was stopped (STOP status). (CC-Link IE Field Network Basic-compatible controller and protocol version 1 or earlier)	Check if the controller is stopped (STOP status).	Run the controller (RUN status). For the protocol version compatible with the controller, contact the controller manufacturer.	
	An error occurred in the controller. (CC-Link IE Field Network Basic-compatible controller only)	Check if an error occurs in the controller.	Remove the error in accordance with the controller instruction manual.	
	Wiring or the command pulse multiplication setting is incorrect.	When using an MR-HDP01 manual pulse generator, check the wiring and the command pulse multiplication setting (assignment of TP0, TP1 and [Pr. PT03] setting).	Review the wiring and the command pulse multiplication setting.	[A]
	Power is not supplied to the MR-HDP01 manual pulse generator.	A power supply is not connected between +5 V to 12 V and 0 V of MR-HDP01.	Connect a power supply between +5 V to 12 V and 0 V of MR-HDP01.	
	Power is not supplied to OPC (power input for open-collector sink interface).	Between DICOM and OPC of the CN1 connector of the servo amplifier is not connected.	Connect between DICOM and OPC.	
	Power is not supplied to OPC (power input for open-collector sink interface).	Between DICOM and OPC of the CN1 connector of the servo amplifier is not connected.	Connect between DICOM and OPC.	
	The axis is disabled.	Check if the disabling control axis switch is on. [B]: SW2-2 [WB]: SW2-2 to 4	Turn off the disabling control axis switch.	[B] [WB]
	An error is occurring on the servo system controller side.	Check if an error is occurring on the servo system controller side.	Cancel the error of the servo system controller.	
	The setting of a parameter is incorrect on the servo system controller side.	Check the settings of parameters on the servo system controller side.	Review the setting of the parameter on the servo system controller side.	
	The position command is not inputted correctly.	Check cumulative command pulses using MR Configurator2 and check if numerical values are changed by inputting the command.	Review the setting of the servo system controller and the servo program.	
	The connection destination of the encoder cable is incorrect.	Check if the connection destinations of CN2A, CN2B, and CN2C are the same as CNP3A, CNP3B, and CNP3C.	Connect encoder cables correctly.	[WB]

Description	Cause	Checkpoint	Action	Target
The speed of the servo motor or linear servo motor is not increased. Or the speed is increased too much.	The setting of the speed command, speed limit, or electronic gear is not correct.	Check the settings of the speed command, speed limit, and electronic gear.	Review the settings of the speed command, speed limit, and electronic gear.	[A] [B] [WB] [RJ010] [GF]
	The connection of the servo motor is incorrect.	Check the wiring of U/V/W.	Connect it correctly.	
	The voltage of the main circuit power supply has dropped.	Check if the voltage of the main circuit power supply dropped.	Increase the voltage of the main circuit power supply.	
	For a servo motor with an electromagnetic brake, the brake has not released.	Check the power supply of the electromagnetic brake.	Turn on the electromagnetic brake power.	
	The selection of SP1 (Speed selection 1), SP2 (Speed selection 2), or SP3 (Speed selection 3) is incorrect in the speed control mode or the torque control mode.	Check SP1 (Speed selection 1), SP2 (Speed selection 2), and SP3 (Speed selection 3), and then check if the selected internal speed is correct.	Review the settings of SP1 (Speed selection 1), SP2 (Speed selection 2), SP3 (Speed selection 3), and setting of internal speed.	[A]
	An analog signal is not input correctly in the speed control mode or the torque control mode.	Check the values of the analog speed command and the analog torque command using the status display or MR Configurator2.	Input the analog signal correctly.	
	The selection of SPD1 (Speed selection 1), SPD2 (Speed selection 2), SPD3 (Speed selection 3), or SPD4 (Speed selection 4) is incorrect in the positioning mode (point table method) with BCD input.	Check SPD1 (Speed selection 1), SPD2 (Speed selection 2), SPD3 (Speed selection 3) and SPD4 (Speed selection 4), and then check if the selected internal speed is correct.	Review the wiring. Review the settings of SPD1 (Speed selection 1), SPD2 (Speed selection 2), SPD3 (Speed selection 3), SPD4 (Speed selection 4), and setting of internal speed.	
	An analog signal is not input correctly in the positioning mode (point table method and program method).	Check the value of VC (Analog override) using the status display or MR Configurator2.	Set the VC (Analog override) and input the analog signal correctly.	
	The selection of OV0 (Digital override selection 1), OV1 (Digital override selection 2), OV2 (Digital override selection 3), or OV3 (Digital override selection 4) is incorrect in the positioning mode (indexer method).	Check OV0 (Digital override selection 1), OV1 (Digital override selection 2), OV2 (Digital override selection 3) and OV3 (Digital override selection 4), and then check if the selected override level ([%]) is correct.	Review the wiring. Review the settings of OV0 (Digital override selection 1), OV1 (Digital override selection 2), OV2 (Digital override selection 3), and OV3 (Digital override selection 4).	
The servo motor vibrates with low frequency.	The estimated value of the load to motor inertia ratio by auto tuning is incorrect. When the load to motor inertia ratio is set by manual, the setting value is incorrect.	If the servo motor may be driven with safety, repeat acceleration and deceleration several times to complete auto tuning. Check if the load to motor inertia ratio is proper compared with the actual ratio for manual setting.	Execute auto tuning and one-touch tuning to reset the load to motor inertia ratio. Set the load to motor inertia ratio correctly for manual setting.	[A] [B] [WB] [RJ010] [GF]
	The command from the controller is unstable.	Check the command from the controller.	Review the command from the controller. Check the cable for command if there is failure such as disconnection.	
	Torque or thrust during acceleration/deceleration is overshooting exceeding the limit of the servo motor when the motor stops.	Check the effective load ratio during acceleration/deceleration if torque/thrust exceeds the maximum torque/thrust.	Reduce the effective load ratio by increasing acceleration/deceleration time and reducing load.	
	The servo gain is low. Or the response of auto tuning is low.	Check if the trouble is solved by increasing auto tuning response ([Pr. PA09]).	Adjust gains.	

Description	Cause	Checkpoint	Action	Target
An unusual noise is occurring at the servo motor.	The servo gain is low. Or the response of auto tuning is low.	Check if the trouble is solved by increasing auto tuning response ([Pr. PA09]).	Adjust gains.	[A] [B] [WB] [RJ010] [GF]
	Bearing life expired.	If the servo motor may be driven with safety, remove the load and check the noise with the servo motor only. If you can remove the servo motor from machine, remove the servo motor power cable to release the brake and check the noise by rotating the shaft by your hands.	Noising means that the bearing life expired. Replace the servo motor. When not noising, maintain the machine.	
	For a servo motor with an electromagnetic brake, the brake has not released.	Check the power supply of the electromagnetic brake.	Turn on the electromagnetic brake power.	
	For a servo motor with an electromagnetic brake, the brake release timing is not correct.	Check the brake release timing.	Review the brake release timing. Please consider that the electromagnetic brake has release delay time.	
The servo motor vibrates.	The servo gain is too high. Or the response of auto tuning is too high.	Check if the trouble is solved by reducing auto tuning response ([Pr. PA09]).	Adjust gains.	[A] [B] [WB] [RJ010] [GF]
	The machine is vibrating (resonating).	If the servo motor may be driven with safety, check if the trouble is solved by one-touch tuning or adaptive tuning.	Adjust the machine resonance suppression filter.	
	The load side is vibrating.	If the servo motor may be driven with safety, check if the trouble is solved by advanced vibration suppression control Ⅱ.	Execute the advanced vibration suppression control Ⅱ.	
	Feedback pulses are being miscounted due to entered noise into an encoder cable.	Check the cumulative feedback pulses using status display (only [A]) or MR Configurator2 if its numerical value is skipped.	Please take countermeasures against noise by laying the encoder cable apart from power cables, etc.	
	There is a backlash between the servo motor and machine (such as gear, coupling).	Check if there is a backlash on the machine.	Adjust the backlash on the coupling and machine.	
	The rigidity of the servo motor mounting part is low.	Check the mounting part of the servo motor.	Increase the rigidity of the mounting part by such as increasing the board thickness and by reinforcing the part with ribs.	
	The connection of the servo motor is incorrect.	Check the wiring of U/V/W.	Connect it correctly.	
	An unbalanced torque of the machine is large.	Check if the vibration varies depending on the speed.	Adjust balance of the machine.	
	The eccentricity due to core gap is large.	Check the mounting accuracy of the servo motor and machine.	Review the accuracy.	
	A load for the shaft of the servo motor is large.	Check the load for the shaft of the servo motor.	Adjust the load for the shaft to within specifications of the servo motor. For the shaft permissible load, refer to "Servo Motor Instruction Manual (Vol. 3)".	
	An external vibration propagated to the servo motor.	Check the vibration from outside.	Prevent the vibration from the external vibration source.	

Description	Cause	Checkpoint	Action	Target
The rotation accuracy is low. (The speed is unstable.)	The servo gain is low. Or the response of auto tuning is low.	Check if the trouble is solved by increasing auto tuning response ([Pr. PA09]).	Adjust gains.	[A] [B] [WB] [RJ010] [GF]
	The torque is insufficient due to large load.	Check instantaneous torque using status display (only [A]) or MR Configurator2 if the load exceeds the maximum torque or torque limit value.	Reduce the load or use a larger capacity servo motor.	
	An unintended torque limit has been enabled.	Check if TLC (Limiting torque) is on using status display or MR Configurator2.	Cancel the torque limit.	
	The setting of the torque limit is incorrect.	Check if the limiting torque is too low. [A]: [Pr. PA11] and [Pr. PA12], or analog input [B] [WB] [RJ010]: Setting on controller side [GF]: [Pr. PA11], [Pr. PA12], or setting on controller side	Set it correctly.	
	For a servo motor with an electromagnetic brake, the brake has not released.	Check the power supply of the electromagnetic brake.	Turn on the electromagnetic brake power.	
	The command from the controller is unstable.	Check the ripple of the command frequency with MR Configurator2.	Review the command from the controller. Check the cable for command if there is failure such as disconnection.	
The machine vibrates unsteadily when it stops.	The servo gain is low. Or the response of auto tuning is low.	Check if the trouble is solved by increasing auto tuning response ([Pr. PA09]).	Adjust gains.	[A] [B] [WB] [RJ010] [GF]
The servo motor starts to drive immediately after power on of the servo amplifier. The servo motor starts to drive immediately after servo-on.	SON (Servo-on) is on at power on.	Check if SON (Servo-on) and RD (Ready) are on using status display or MR Configurator2.	Review the sequence of SON (Servo-on).	[A]
	An analog signal is inputted from the beginning.	Check the status of analog speed command and analog torque command using status display or MR Configurator2.	Review the timing of inputting analog signals.	
	Zero point of an analog signal deviates.	Check if the servo motor drives while 0 V is inputted to the analog signal.	Execute the VC automatic offset or adjust offset of the analog signal with [Pr. PC37] or [Pr. PC38].	
	For a servo motor with an electromagnetic brake, the brake release timing is not correct.	Check the brake release timing.	Review the brake release timing.	[A] [B] [WB] [RJ010] [GF]
	The connection of the servo motor is incorrect.	Check the wiring of U/V/W.	Connect it correctly.	
Home position deviates at home position return.	For the dog type home position return, the point which the dog turns off and the point which Z-phase pulse is detected (CR input position) are too close.	Check if a fixed amount (in one revolution) deviates.	Adjust the dog position.	[A] [B] [WB] [RJ010] [GF]
	The in-position range is too large.	Check the setting of the in-position range in [Pr. PA10].	Set a narrower in-position range.	
	The proximity dog switch is failure. Or mounting proximity dog switch is incomplete.	Check if the proximity dog signal is inputted correctly.	Repair or replace the proximity dog switch. Adjust the mounting of the proximity dog switch.	
	The program on the controller side is incorrect.	Check the program on the controller side such as home position address settings or sequence programs.	Review the programs on the controller side.	

Description	Cause	Checkpoint	Action	Target
The position deviates during operation after home position return.	The position command and actual machine position are different.	Check that "cumulative feedback pulses × travel distance per pulse" matches the actual machine position. Check if "cumulative feedback pulses × feed length multiplication" matches the actual machine position.	Review the position command and electronic gear setting.	[A] [B] [WB] [RJ010] [GF]
	The position command and actual machine position are different.	Check that "cumulative feedback pulses × travel distance per pulse" matches the actual machine position. Check if "cumulative feedback pulses × feed length multiplication" matches the actual machine position.	Review the position command and electronic gear setting.	
	An alarm or warning is occurring.	Check if an alarm or warning is occurring.	Check the content of the alarm/ warning and remove its cause.	
	The servo gain is low. Or the response of auto tuning is low.	Check if the trouble is solved by increasing auto tuning response ([Pr. PA09]).	Adjust gains.	
	The reduction ratio is not calculated correctly for the geared servo motor.	Check the following settings. [A]: Number of command input pulses per revolution ([Pr. PA05]) or electronic gear ([Pr. PA06] and [Pr. PA07]) [B] [WB] [RJ010]: Number of pulses per revolution, travel distance (setting on the controller side) [GF]: Electronic gear ([Pr. PA06], [Pr. PA07])	Review the calculation of the reduction ratio.	
	The in-position range is too large.	Check the setting of the in-position range in [Pr. PA10].	Set a narrower in-position range.	

Description	Cause	Checkpoint	Action	Target
The position deviates during operation after home position return.	The command pulses were miscounted due to noise.	Check that the command value of the controller and the number of cumulative command pulses are matched.	Please take countermeasures against noise for the command cable. Review the shield procedure of the command cable.	[A]
	The cable for a command is connected loosely or disconnected.	Check that the command value of the controller and the number of cumulative command pulses are matched.	Repair the cable for a command.	
	Frequency of the pulse train command is too high.	Check the pulse train command frequency is within the range of specifications. It is 500 kpulses/s or less for the open-collector type. It is 4 Mpulses/s or less for the differential line driver type.	Review the pulse train command frequency. Select a filter according to the pulse train command frequency from "Command input pulse train filter selection" in [Pr. PA13].	
	A cable for command is too long.	Check the ripple of the command frequency with oscilloscope.	Shorten the wiring length. Cable length must be 10 m or shorter for differential line driver output and 2 m or shorter for open-collector output.	
	SON (Servo-on) turned off during operation.	Check if SON (Servo-on) is off during operation using status display or MR Configurator2.	Review the wiring and sequence not to turn off SON (Servo-on) during operation.	
	CR (Clear) or RES (Reset) turned on during operation.	Check if CR (Clear) or RES (Reset) is on during operation using status display or MR Configurator2.	Review the wiring and sequence not to turn on CR (Clear) or RES (Reset) during operation.	
	The setting of point tables and start timing is incorrect.	Check if a time period from after switching timings of point table setting value and point table No. until a start timing is 3 ms or more.	Review the point table setting. Review the start timing.	
	An input signal to the MR-D01 extension IO unit is incorrect.	Check the selection of the point table No. selection 1 to point table No. selection 8 and check the wiring.	Check the input signal switch to the MR-D01 extension IO unit and check the wiring.	
	The program, start timing, etc. are incorrect.	Check if a time period from after switching timings of BCD input program and point table No. until a start timing is 3 ms or more, etc.	Review the controller programs.	
	The setting of MR-DS60 digital switch is incorrect.	Check the [Pr. Po10] setting.	Review the [Pr. Po10] setting.	
	The wiring between MR-DS60 digital switch and MR-D01 extension IO unit is incorrect.	Check the wiring between MR-DS60 digital switch and MR-D01 extension IO unit.	Review the wiring between MR-DS60 digital switch and MR-D01 extension IO unit.	
	Wiring of the MR-HDP01 manual pulse generator or setting of "manual pulse generator multiplication" ([Pr. PT03], TP0 (manual pulse generator multiplication 1), TP1 (manual pulse generator multiplication 2)) is incorrect.	The input value from the MR-HDP01 manual pulse generator and the command position do not match.	Review the wiring. Set the multiplication setting correctly.	
	A mechanical slip occurred. Or the backlash of the machine part is large.	Check if there is a slip or backlash on the machine part.	Adjust the machine part.	[A] [B] [WB] [RJ010] [GF]

Description	Cause	Checkpoint	Action	Target
A restoration position deviates at restoration of power for the absolute position detection system.	The motor was rotated exceeding the maximum permissible speed at power failure (6000 r/min) by an external force during servo amplifier power off. (Note: The acceleration time is 0.2 s or less.)	Check if the motor was accelerated suddenly to 6000 r/min by an external force.	Extend the acceleration time.	[A] [B] [WB] [RJ010] [GF]
	The servo amplifier power turned on while the servo motor was rotated exceeding 3000 r/min by an external force.	Check if the servo amplifier power turned on while the servo motor was rotated exceeding 3000 r/min by an external force.	Review the power-on timing.	
	Transfer data to the controller is incorrect.	Check the ABS data with MR Configurator2.	Review the controller programs.	[A]
Overshoot/undershoot occurs.	The servo gain is low or too high. The response of auto tuning is low or too high.	Check the velocity waveform with a graph using MR Configurator2 if overshoot/ undershoot is occurring.	Adjust the response of auto tuning and execute the gain adjustment again.	[A] [B] [WB] [RJ010] [GF]
	The setting of [Pr. PB06 Load to motor inertia ratio/ load to motor mass ratio] is incorrect.	Check that the setting value of [Pr. PB06 Load to motor inertia ratio/ load to motor mass ratio] and the actual load moment of inertia or load mass are matched.	Set it correctly.	
	Capacity shortage or shortage of the maximum torque (thrust) due to too large load.	Check the instantaneous torque using status display if the maximum torque (maximum thrust) exceeds the torque limit value (thrust limit value).	Reduce the effective load ratio by increasing acceleration/ deceleration time and reducing load.	
	The setting of the torque limit is incorrect.	Check the instantaneous torque using status display if the maximum torque (maximum thrust) exceeds the torque limit value (thrust limit value).	Review the torque limit setting.	
	Backlash of the machine part is large.	Check if there is a backlash on the machine part.	Adjust the backlash on the coupling and machine part.	
A communication with servo amplifier fails using MR Configurator2. (For details, refer to Help of MR Configurator2.)	The communication setting is incorrect.	Check the communication setting such as baud rate and ports.	Set the communication setting correctly.	[A] [B] [WB] [RJ010] [GF]
	A model is being connected other than the model set in model selection.	Check if the model selection is set correctly.	Set the mode selection correctly.	
	The driver was not set correctly.	Check the bottom of the USB (Universal Serial Bus) controller with the device manager of the personal computer if "MITSUBISHI MELSERVO USB Controller" is being displayed.	Delete an unknown device or other devices, cycle the power of the servo amplifier, and reset according to Found New Hardware Wizard.	
	They are off-line status.	Check if they are off-line.	Set them to on-line.	
	A communication cable is malfunctioning.	Check if the communication cable is malfunctioning.	Replace the communication cable.	
For a servo motor with an electromagnetic brake, the brake went out.	The electromagnetic brake is failure due to its life. For the life of electromagnetic brake, refer to "Servo Motor Instruction Manual (Vol. 3)".	Remove the servo motor and all wirings from the machine and check if the servo motor shaft can be rotated by hands. (If it is rotated by hands, the brake is failure.)	Replace the servo motor.	[A] [B] [WB] [RJ010] [GF]
The coasting distance of the servo motor became longer.	The load was increased and permissible load to motor inertia ratio was exceeded.	Check if the load was increased.	Reduce the load.	[A] [B] [WB] [RJ010] [GF]
	An external relay is malfunctioning. Or the wiring of MBR (Electromagnetic brake interlock) is incorrect.	Check the external relay and wirings connected to MBR (Electromagnetic brake interlock) if they are malfunctioning.	Replace the external relay. Or review the wiring.	
	The electromagnetic brake is failure due to its life. For the life of electromagnetic brake, refer to "Servo Motor Instruction Manual (Vol. 3)".	Remove the servo motor and all wirings from the machine and check if the servo motor shaft can be rotated by hands. (If it is rotated by hands, the brake is failure.)	Replace the servo motor.	

Description	Cause	Checkpoint	Action	Target
The program operation is not in progress.	The command speed of the positioning operation is low.	An abnormal value such as 0 [r/min] was set for specifying the servo motor speed.	Review the program.	[A]
	The program stops at the state of waiting for external signal on.	A program input number set with SYNC command does not match with the actual inputted signal.	Review the program or signal to use.	
A point table was executed but the operation did not start.	A positioning to the same position is repeated.	Multiple operation starts which have the same specified number of point table are in progress.	Review the setting of the point table or procedures of the operation.	[A] [GF]
		Positioning to a same point was endlessly repeated with automatic continuous operation "8, 9, 10, 11" was selected in sub functions of the point table operation.	Review the setting of the point table or procedures of the operation.	
The electromagnetic brake cannot be canceled.	The wiring is incorrect.	Check the SBC output signal.	Review the output signals.	[B]
	A signal of output device is not outputted correctly.	Check if the output device cable is wired correctly. Or check if a load of output device is over specifications.	Review the wiring or load.	
	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	Replace the functional safety unit.	
A vertical axis falls while the SBC output is used.	The STO function is used during servo-on.	Check if the SS1 function is enabled.	Enable the SS1 function.	[B]
	A signal of output device is not outputted correctly.	Check if the output device cable is wired correctly. Or check if a load of output device is over specifications.	Review the wiring or load.	
	The functional safety unit is malfunctioning.	Replace the functional safety unit, and then check the repeatability.	Replace the functional safety unit.	
	The setting of a waiting time of the electromagnetic brake sequence output is incorrect.	Check if [Pr. PC02 Electromagnetic brake sequence output] and [Pr. PSA03 SS1 monitoring deceleration time] are set correctly.	Set it correctly.	
Modbus RTU communication is not established.	The servo amplifier is not set to Modbus RTU communication protocol.	Check if "communication protocol selection" in [Pr. PC71] is correctly set.	Select Modbus RTU protocol.	[A]
	The communication setting is not set correctly.	Check if [Pr. PC70 Modbus RTU communication station number setting] is set correctly.	Check [Pr. PC70 Modbus RTU communication station number setting] and the station No. specified in a Query message from the controller if they are matched together.	
		Check if "Modbus RTU communication baud rate selection" in [Pr. PC71] is set correctly.	Check "Modbus RTU communication baud rate selection" and the communication baud rate setting of the controller if they are matched together.	
		Check if "Modbus RTU communication parity selection" in [Pr. PF45] is set correctly.	Check "Modbus RTU communication parity selection" and the parity setting of the controller if they are matched together.	
	The servo amplifier is not compatible with Modbus RTU communication.	For MR-J4-_A_-RJ 100 W or more servo amplifier, check that the servo amplifier was manufactured in January 2015 or later. Check if MR-J4-_A_ servo amplifier or MR-J4-03A6(-RJ) servo amplifier is being used.	For MR-J4-_A_-RJ 100 W or more servo amplifier, use the one manufactured in January 2015 or later. (MR-J4-_A_ servo amplifier or MR-J4-03A6(-RJ) servo amplifier is not compatible with Modbus RTU communication.)	
	A communication cable is malfunctioning.	Check if the communication cable has any failure such as damage.	Replace the communication cable.	

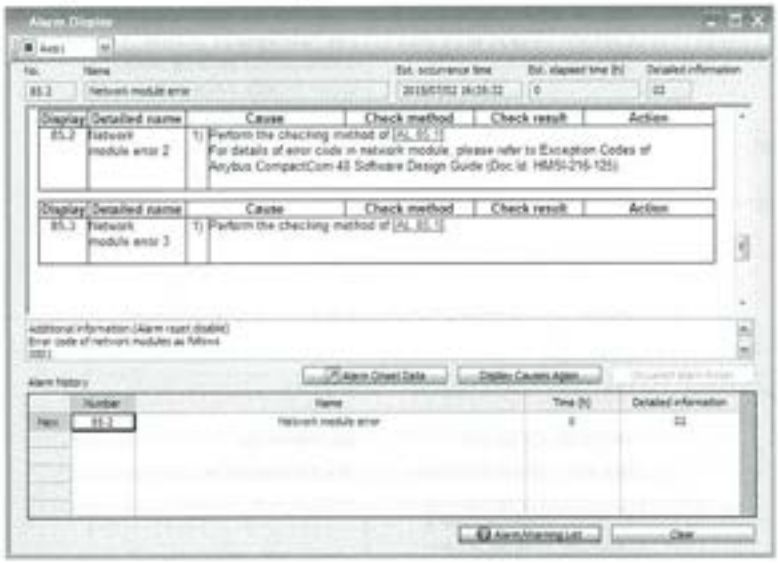
Description	Cause	Checkpoint	Action	Target
RS-422 communication (Mitsubishi Electric general-purpose AC servo protocol) is not established.	The servo amplifier is not set to RS-422 communication protocol.	Check if "communication protocol selection" in [Pr. PC71] is correctly set.	Select RS-422/RS-485 communication (Mitsubishi Electric general-purpose AC servo protocol).	[A]
	The communication setting is not set correctly.	Check if [Pr. PC20 Station number setting] is set correctly.	Check [Pr. PC20 Station number setting] and the station No. specified by the controller if they are matched together.	
		Check if "RS-422 communication baud rate selection" in [Pr. PC21] is set correctly.	Check "RS-422 communication baud rate selection" and the communication baud rate setting of the controller if they are matched together.	
	A communication cable is malfunctioning.	Check if the communication cable has any failure such as damage.	Replace the communication cable.	
CC-Link IE Field Network Basic communication or SLMP is not established.	The IP address is not set correctly.	Check if [Pr. PN11 IP address setting A] and [Pr. PN12 IP address setting B] are set correctly.	Check if the parameter setting values match the designated IP address of the controller.	[GF]
		Check if [Pr. PN13 Subnet mask setting A] and [Pr. PN14 Subnet mask setting B] are set correctly.	Check if the parameter setting values are set correctly.	
	The IP address filter is not set correctly.	Check if [Pr. PN18 IP address filter A] and [Pr. PN19 IP address filter B] are set correctly.	Check if the parameter setting values match the address of external devices.	
		Check if [Pr. PN20 IP address filter A range specification] and [Pr. PN21 IP address filter B range specification] are set correctly.	Check if the parameter setting values are set correctly.	
	The designated operation IP address is not set correctly.	Check if [Pr. PN22 Operation specification IP address A] and [Pr. PN23 Operation specification IP address B] are set correctly.	Check if the parameter setting values match the IP address of the controller that transmits commands.	
		Check if [Pr. PN24 Operation specification IP address range specification] is set correctly.	Check if the parameter setting values are set correctly.	
	TCP is selected.	Check if TCP is selected with the communication setting.	Select UDP.	
	An Ethernet cable is malfunctioning.	Check if the Ethernet cable has any failure such as damage.	Replace the Ethernet cable.	
When CC-Link IE Field Network Basic is used, the servo motor stopped while the control command is on.	An alarm or warning is occurring.	Check if an alarm or warning is occurring.	Check the contents of the alarm/ warning, and remove its cause.	
	The link device (cyclic communication ready) is off.	Check if the controller does not turn off the cyclic communication ready command.	Turn on the cyclic communication ready command.	
	An Ethernet cable was disconnected.	Check if the cable is disconnected from the connector (CN1).	Connect it correctly.	
	An Ethernet cable is malfunctioning.	Check if the Ethernet cable has any failure such as damage.	Replace the Ethernet cable.	

*1 ## indicates axis No.

1.7 Network module error codes

If an error occurs in the network module, a network module error code will be displayed in "Alarm Display" of MR Configurator2.

For details of the network module error codes, refer to "Exception Codes" of "Anybus CompactCom 40 Software Design Guide (Doc.Id. HMSI-216-125)".




CLIMAX
BORTECH
CALDER
H&S TOOL