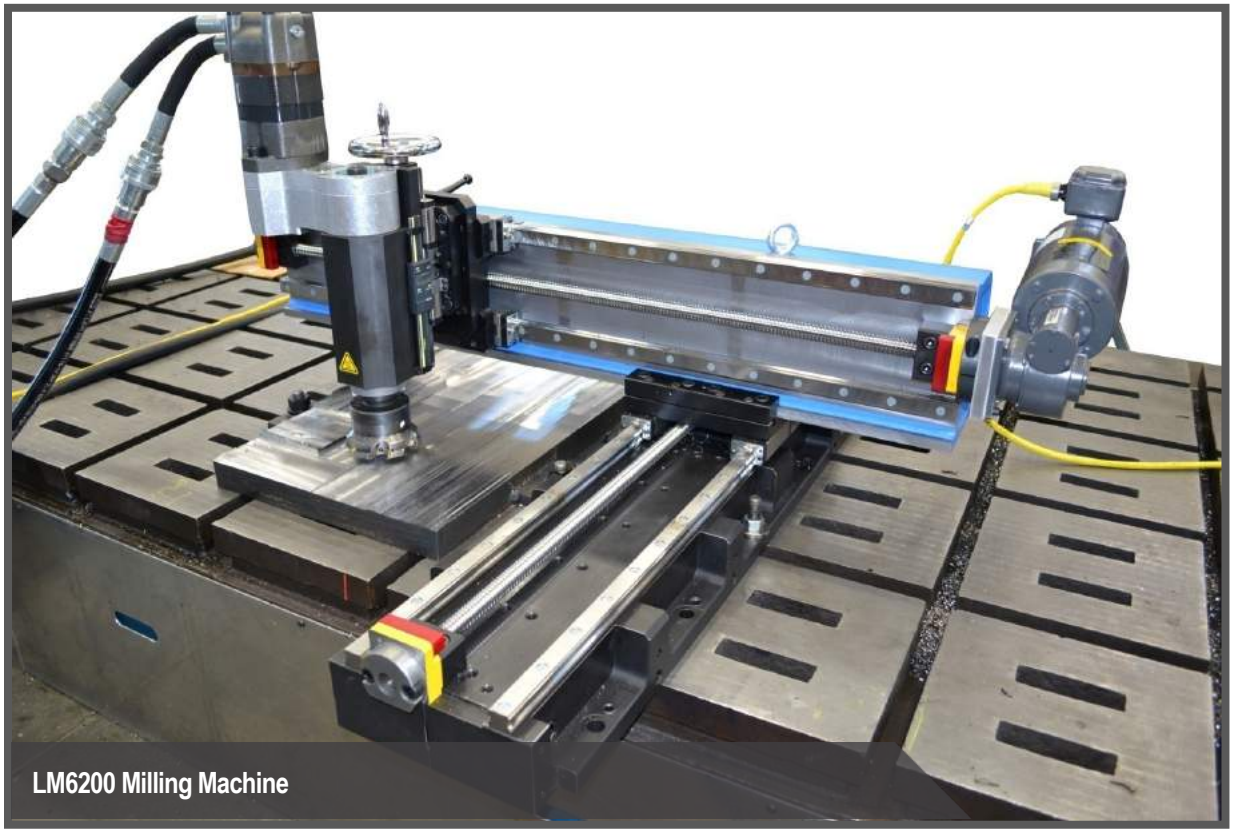
CE

LM6200

LINEAR MILLING MACHINE

OPERATION MANUAL

ORIGINAL INSTRUCTIONS



LM6200 Milling Machine

P/N 66447
July 2019
Revision 10

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

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 (Asia Pacific Headquarters)

316 Tanglin Road #02-01
Singapore 247978

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

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 (European Headquarters)

Am Langen
Graben 8 52353
Düren, Germany

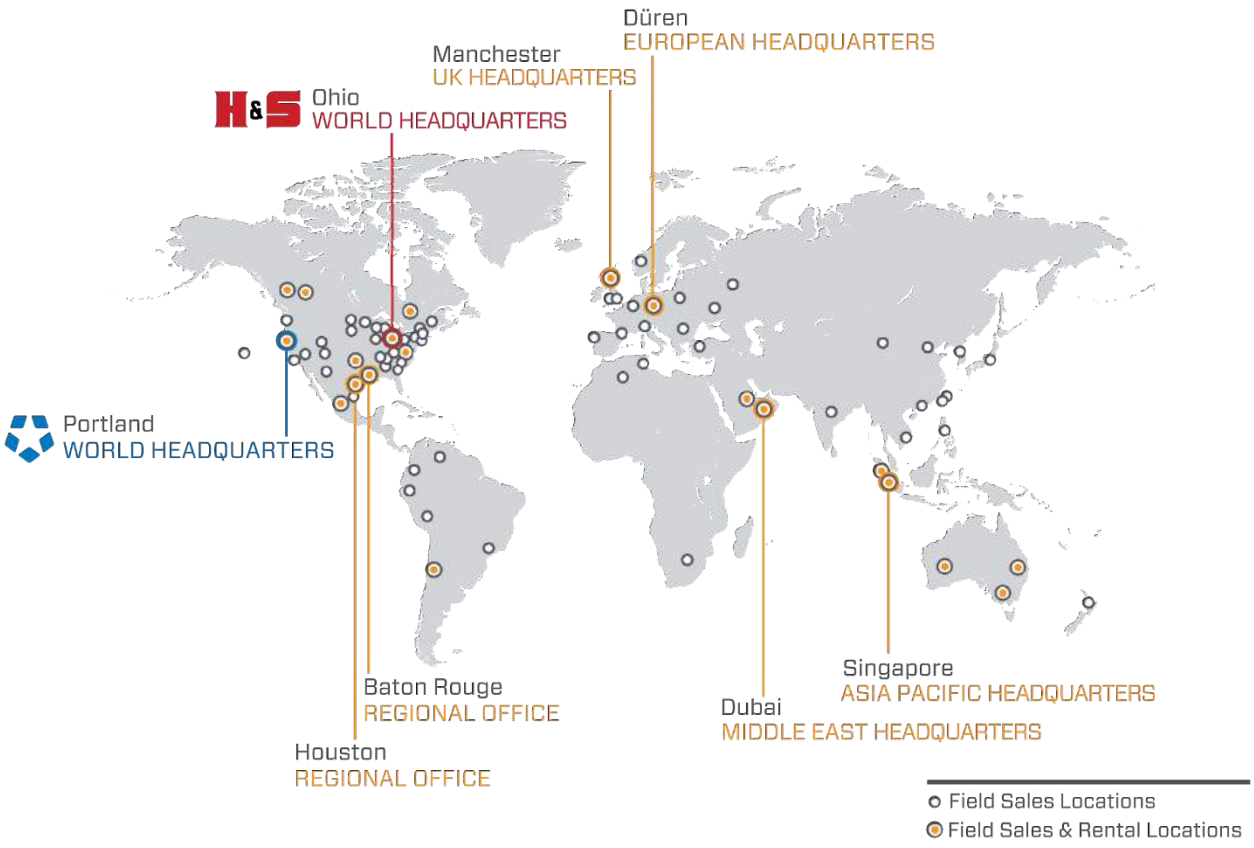
Telephone: +49 24-219-1770
E-mail: CLIMAXEurope@cpmt.com

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



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 pre- paid, 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.

CE DOCUMENTATION

DECLARATION OF CONFORMITY

2006/42/EC Machinery Directive

Name of manufacturer or supplier
Climax GmBH

Full postal address including country of origin
2712 E. Second St., Newberg, OR 97132, USA

Description of product
LM6200 Linear Mill

Name, type or model, batch or serial number
LM6200; 111016661 thru 19000240

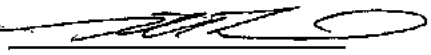
Standards used, including number, title, issue date and other relative documents
2006/42/EC – Machinery, 2004/108/EC – EMC; EN349, EN3744, EN11201-1, EN12100-2, EN13128+A2, EN13849-1, EN14121-1, EN60204-1, EN61000-6-2, EN61000-6-4

Name of Responsible Person within the EU Tom Cunningham

Full postal address if different from manufacturers
Climax GmBH
Am Langen Graben 8
52353 Duren, Germany

Declaration

I declare that as the Manufacturer, the above information in relation to the supply / manufacture of this product, is in conformity with the stated standards and other related documents following the provisions of the above Directives and their amendments.

Signature of Manufacturer: 

Position Held: VP of Engineering, R&D

Date: May 10, 2019

CE

TABLE OF CONTENTS

WARNING

For maximum safety and performance, read and understand the entire manual and all related safety instructions before using this equipment. Failure to follow the instructions and guidelines in this manual could cause personal injury, fatalities or property damage.

This page intentionally left blank

About this Manual

Climax machines are highly configurable with many options and accessories. This manual covers the use and operation of all of those possible options. The machine configuration purchased by a customer may not contain all of the options and accessories in this manual. If a specific machine application requires additional options or accessories, please contact CLIMAX for assistance in obtaining the needed components.

This manual describes the operation and maintenance of your linear and gantry milling machine. The machine is designed for milling and drilling operations in linear and gantry modes.

All parts meet CLIMAX's strict quality standards. For maximum safety and performance you must read and understand the entire manual before operating the machine.

Safety Precautions

The primary challenge for most on-site maintenance is that repairs are often done under difficult conditions.

Climax Portable Machining and Welding Systems, Inc. leads the way in promoting the safe use of portable machine tools. Safety is a joint effort. As the operator of this machine, you are expected to do your part by scrutinizing the job site and closely following the operating procedures outlined in this manual, your own company rules, and local regulations.

General Safety Practices

QUALIFIED PERSONNEL

Before operating this machine, you must receive training specific to this machine from a qualified trainer. If you are not familiar with the proper and safe operation, do not use the machine.

OBEY WARNING LABELS

Obey all warnings and warning labels. Failure to follow instructions or heed warnings could result in injury, or even be fatal. Proper care is your responsibility. Contact CLIMAX immediately for replacement of damaged or lost manuals or safety decals.

INTENDED USE

Only use the machine according to the instructions in this operating manual. Do not use this machine for any purpose other than the intended use as described in this manual. When using the tools, machine, accessories and/or tool bits, you must determine the proper working conditions and the work to be performed.

STAY CLEAR OF MOVING PARTS

Keep clear of the machine during operation. Never lean toward or reach into the machine to remove chips or to adjust the machine while it is running. Keep bystanders away while operating this machinery.

ROTATING MACHINERY

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

KEEP YOUR WORK AREA CLEAN AND TIDY

Keep all cords and hoses away from moving parts during operation. Do not clutter the area around the machine. Keep the work area clean and well lit.

AMBIENT LIGHTING

Do not operate this machine in ambient lighting that is less than normal intensity.

SECURE LOOSE CLOTHING AND LONG HAIR

Rotating machinery can seriously injure an operator as well as others close by. Don’t wear loose fitting clothing or jewelry. Tie back long hair or wear a hat.

HAZARDOUS ENVIRONMENTS

Do not use the machine in a hazardous environment, such as near explosive chemicals, flammable liquids, gasses, toxic fumes, or radiation hazards.

HOSES, PENDANT AND ELECTRICAL CABLES

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. 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.

REPETITIVE MOTION

Individuals can be susceptible to disorders of the hands and arms when exposed to tasks that involve highly repetitive motions and/or vibration.

STAY ALERT

Stay alert, watch what you are doing and use common sense when operating machinery. Do not operate machinery while you are tired or under the influence of drugs, alcohol or medication.

Machine Specific Safety Practices

All aspects of the machine have been designed with safety in mind. Rotating parts are not always shielded by machine components or by the work piece. Do not force the machine.

PERSONAL PROTECTIVE EQUIPMENT

Eye and hearing protection must be worn while using the machine. These safety items do not impose constraints to the safe operation of the machine.

OPERATING CONDITIONS

Do not operate the machine if it is not mounted to the work piece as described in this manual.

TOOLING

The machine is provided with all the tools for the setup and operation of the machine. Remove all adjustment tools before starting the machine.

LIFTING

Most of the machine components are heavy and must be moved or lifted with approved rigging and practices. Climax accepts no responsibility for the selection of lifting equipment. Always follow your plant's procedures for lifting heavy objects. Do not lift heavy objects by yourself as serious injury can result.

CUTTING TOOLS AND FLUIDS

There are no cutting or cooling fluids supplied with this machine. Keep cutting tools sharp and clean.

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 hydraulic power supply failure occurs, be sure to turn off the supply before leaving the machine.

DANGER ZONE

The operator and other persons can be anywhere in the vicinity of the machine. The operator must ensure there are no other persons in danger from the machine.

METAL FRAGMENT HAZARD

The machine produces metallic fragments during normal operation. You should wear eye protection at all times when working with the machine. Only remove fragments with a brush after the machine has stopped completely.

RADIATION HAZARDS

There are no systems or components on this machine that are capable of producing hazardous EMC, UV or other radiation hazards. The machine does not use lasers nor does it create hazardous materials such as gasses or dust.

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 valves should be locked and tagged out before performing any maintenance. Do not operate the machine if moving parts are misaligned, binding or broken. If the machine or parts are damaged, have the machine repaired before use.

WARNING LABELS

Warning labels are already attached to your machine. Contact Climax immediately if replacements are required.

MAINTENANCE

Be sure the machine components are free of debris and properly lubricated prior to use. Have your machine serviced by a qualified repair person using only identical replacement parts.

NOISE LEVEL

85 dB(A) or higher – Hearing Protection is required.

STORED ENERGY

Hydraulic fluids could still be under pressure! Make sure the HPU is shut off and locked out properly.

MSDS

Material Data Safety Sheets are included in the maintenance manual.

UNINTENTIONAL STARTING

Prevent unintentional starting. The machine must be properly locked out and/or shut down before maintenance.

Safety Sign and Symbol Guidelines

The purpose of product safety signs and symbols is to increase the level of awareness to possible dangers.

Safety alert symbols indicate **DANGER**, **WARNING** or **CAUTION**. These symbols may be used in conjunction with other symbols or pictographs. Failure to obey safety warnings can result in serious injury or death. Always follow safety precautions to reduce the risk of hazards and serious injury.

	**DANGER**
	Indicates a hazardous situation that could be fatal or cause serious injury.

	**WARNING**
	Indicates a potentially hazardous situation that could be fatal or cause serious injury.

	**CAUTION**
	Indicates a potentially hazardous situation that could result in minor to moderate injury, damage to the machine or interruption of an important process.

	**IMPORTANT**
	Provides critical information for the completion of a task. There is no associated hazard to people or the machine.

	**INFORMATION**
	Provides important information regarding the machine.

Risk assessment and hazard mitigation

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

Stationary 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. Stationary Machine Tools achieve the rigidity needed to accomplish material-removal operations from the structure that is an integral part of the machine tool.

In contrast, 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 attached to it 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.

Risk assessment checklist

Use these checklists as part of your on-site risk assessment and include any additional considerations that may pertain to your specific application.

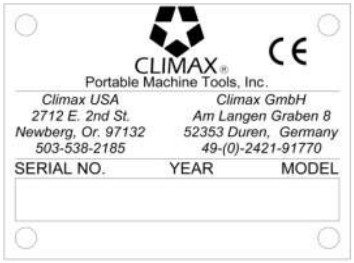
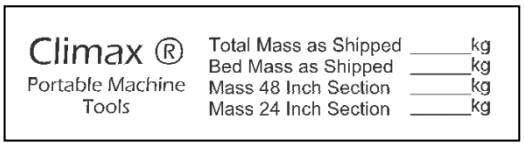
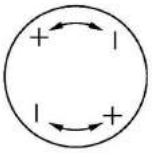
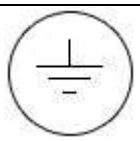
TABLE 1. RISK ASSESSMENT CHECKLIST BEFORE SET-UP

	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 Machine Setup instructions.
☐	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 the best placement for the controls, cabling, and the operator.
☐	I evaluated and mitigated any other potential risks specific to my work area.

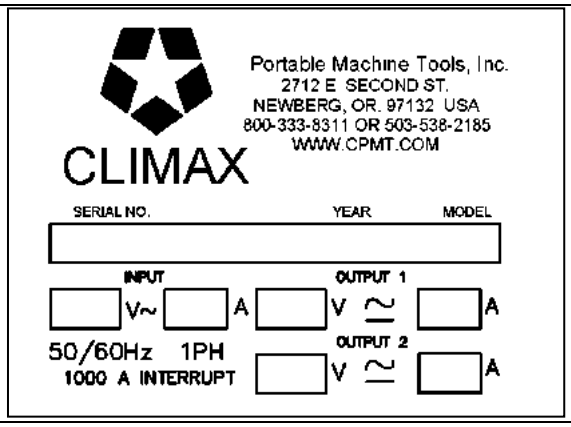
TABLE 2. RISK ASSESSMENT CHECKLIST AFTER SET-UP

	After Set-up
☐	I checked that the machine is safely installed (according to the Machine Setup section) and the potential fall path is clear. If the machine is elevated, 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 Maintenance section with the recommended lubricants.
☐	I checked that all affected personnel have the recommended personal protective equipment, as well as any equipment required by the site or other regulations.
☐	I checked that all affected personnel understand the danger zone and are clear of it.
☐	I evaluated and mitigated any other potential risks specific to my work area.

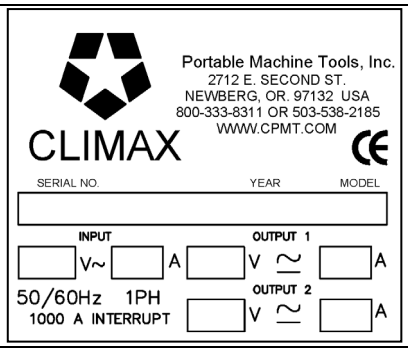
Labels

	
Part Number 35828 – Machine Nameplate	Part Number 29152 – Mass Tag displays the weight of a group of components or the assembly in Kilos
	
Part Number 59039 – Designated Lift Point	Part Number 65487 – Mass Tag
	
Part Number 35772 – Ball Valve Handle	Part Number 27307 – Warning Label
	
Part Number 70229 – Climax Logo	Part Number 37572 – PE Ground
	
Part Number 46902 – Warning Hot Surface	Part Number 62888 – Lift Point Only

Part Number 37576 – Electrical Warning



Part Number 36094 – Speed Controller Nameplate

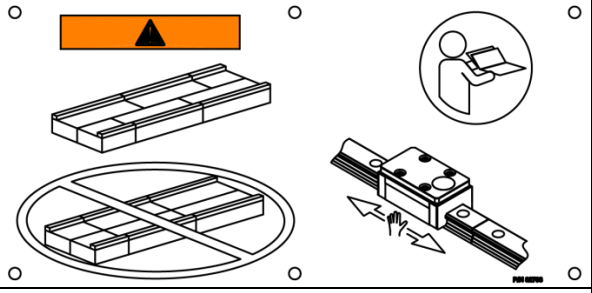


Part Number 41949 – Speed Controller Nameplate CE

Part Number 30081 – 230V

Part Number 32585 – 120V

Part Number 34734 – Warning Label



Part Number 82798 – LM6200 bed sections and rails tag

CE Information

This machine has been tested for European Conformity, and has been designed to strict engineering standards. Risk assessments and safety have been evaluated and adhered to during the design and manufacture of this machine.

Risks and hazards associated with the use of this equipment are clearly marked on the machine or referenced in the operating manual in accordance with International Standards.

If you have any questions or concerns, contact CLIMAX before operating this equipment.

The Declared **Sound Power** Level is: L_{WA} = 73.9 dB(A)

The Declared ***Operator*** **Sound Pressure** Level is: L_{pA} = 76.5 dB(A)

The Declared ***Bystander*** **Sound Pressure** Level is: L_{pA} = 76.1 dB(A)

General Information

The LM6200 Milling Machine revolutionizes both the capabilities and functionality of portable mills.

- The machine is extremely rigid, with modular bed design
- Innovative configuration options allow setup for both conventional milling and gantry milling in one machine
- Powerful, precise machining

Rigid, Modular Design

- Modular bed design allows the machine to be lengthened to machine a variety of work piece sizes without losing rigidity
- Bed may be shortened to fit into tight workspaces
- Bed connection system provides the ultimate in rigidity, even when bed is extended by 2 or 3 times the original length

Flexible Configuration & Operation

- The innovative new design of these milling machines allow them to be configured for traditional linear milling, or simply split the rails lengthwise to configure for gantry milling
- Electric feeds can be mounted on the X, Y and Z-axes
- Machining capabilities include milling, drilling and boring

Powerful, Precise Machining

- Features heavy duty spindle design and a choice of hydraulic power units
- Milling can be done in any axis, with a milling head that can rotate 90°. An optional attachment allows for 360° rotation.
- Fast, aggressive milling in horizontal, vertical, or inverted applications
- Provides reliable, precise milling to meet tight machining tolerances in both conventional and gantry mill configurations

Rigging and Lifting

WARNING

Falling or uncontrolled swinging of machinery can cause serious injury or be fatal to the operator and bystanders. Lift the machine only by the properly designated lifting eyes. **Do not lift the assembled machine by the machining arm.**

Weights and Dimensions

Bed

Bed Length	Ram Travel on Bed	Bed Weight
48" (1219mm)	32" (813 mm)	796 lb (361 kg)
72" (1829mm)	56" (1422mm)	1100 lb (499 kg)
96" (2438mm)	80" (2032mm)	1406 lb (638 kg)
120" (3048mm)	104" (2642mm)	1707 lb (774 kg)
144" (3658mm)	128" (3251mm)	2015 lb (914 kg)
168" (4267mm)	152" (3861mm)	2318 lb (1051 kg)
192" (4877mm)	176" (4470mm)	3184 lb (1444 kg)

Ram

Ram Length	Milling Head Travel on Ram	Ram Weight
36" (914mm)	26" (660mm)	443 lb (202 kg)
48" (1219mm)	38" (965mm)	569 lb (259 kg)
82" (2083mm)	72" (1829mm)	932 lb (424 kg)
116" (2946mm)	106" (2692mm)	1452 lb (659 kg)

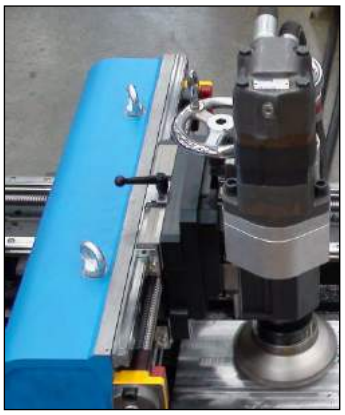
Milling Head

Milling Head Description	Milling Head weight
#50 Taper	118 lb (54 kg)

Overall Dimensions

Length	Bed length + 2.5" (+ 63.5 mm)	
Width	Ram Length + 3.7" (+ 93.9 mm)	
Height	With handwheel:	24" (609.6 mm)
	Without handwheel:	32.1" (815.3 mm)

Lifting Eyes

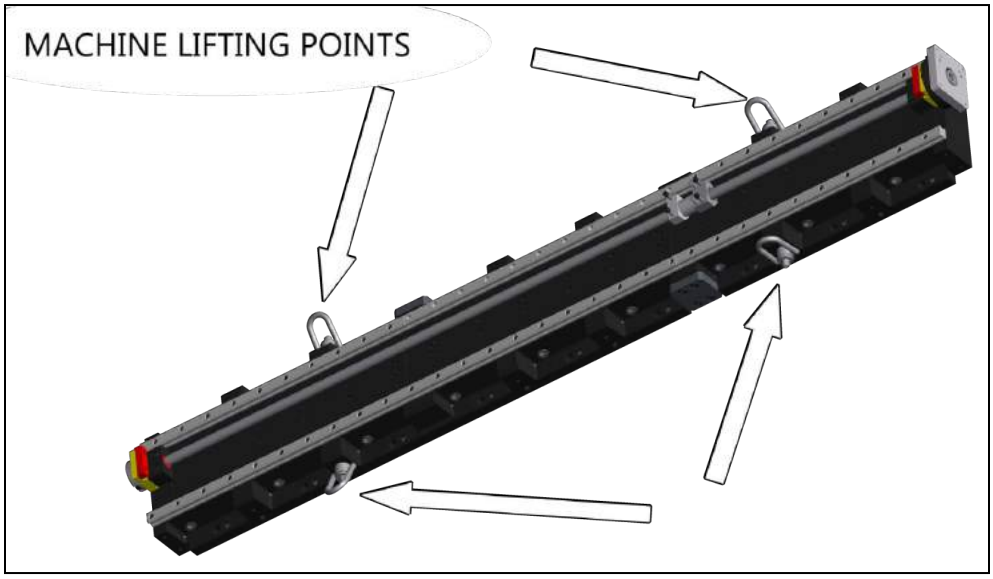


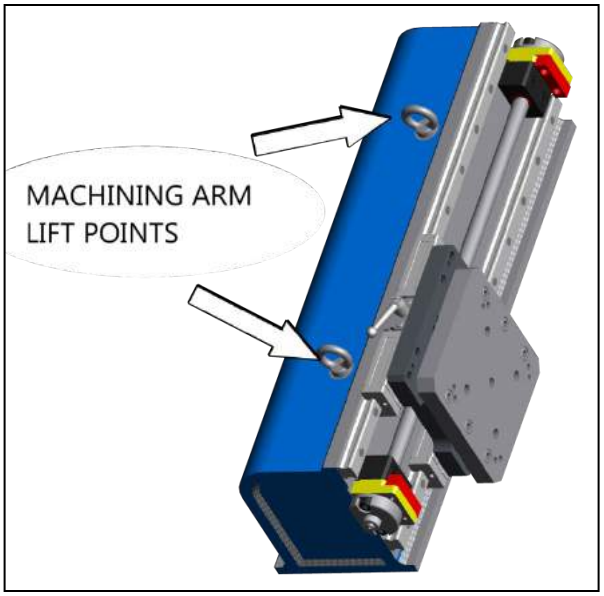
Ram ONLY Lift Points

Bed Lifting Eye

Example of Vertical Lifting

Lifting Points

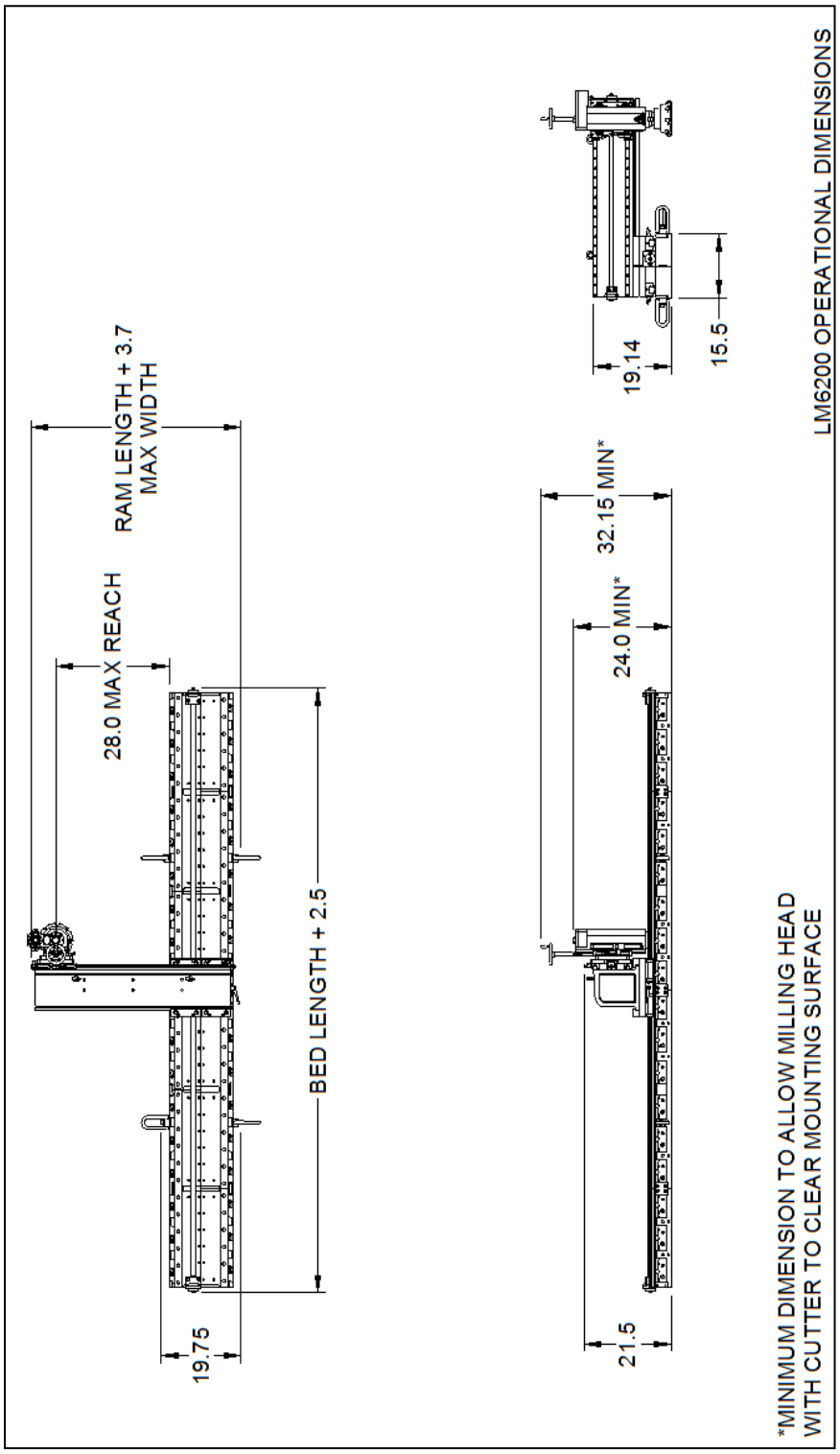




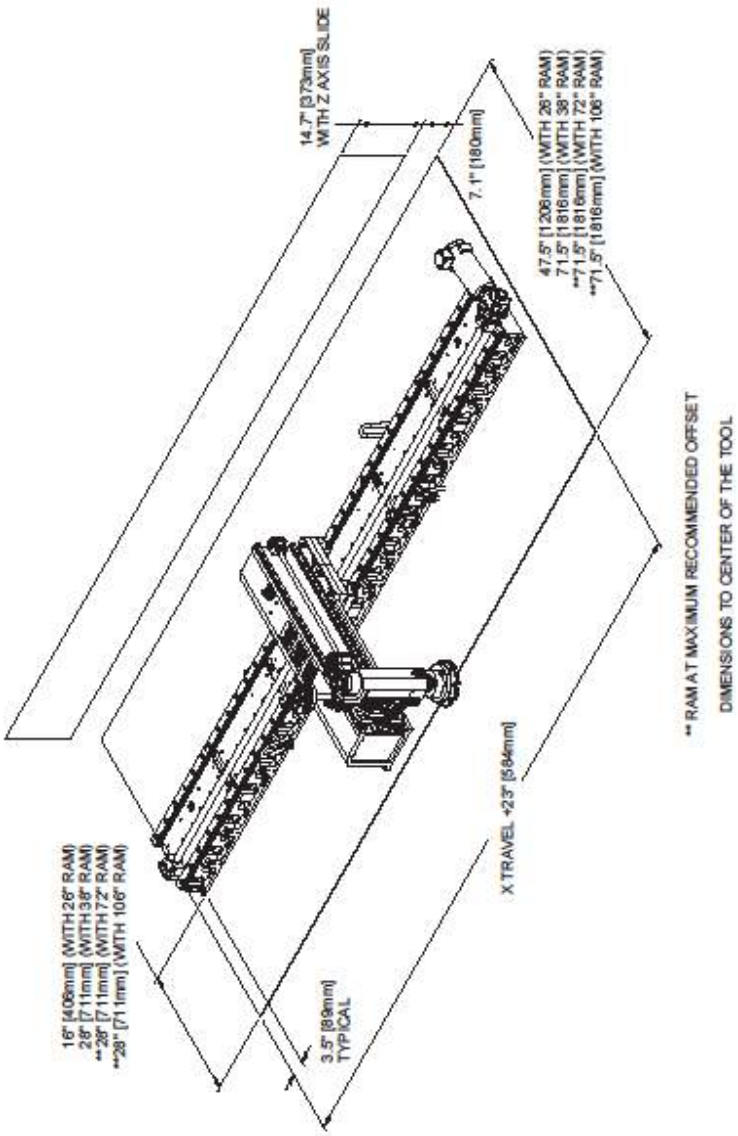
1. To prevent damage to the milling head, carefully remove the milling head with a sling before lifting the ram.
2. Center the machining arm (ram) over the beds before lifting.
3. Test lift slowly and adjust the center of gravity as necessary for controlled lifting.
4. Only lift the entire assembled machine from the bed lifting eyes. Do not lift the entire machine from the machining arm (ram) lift points.
5. Use a sling to install the milling head when the complete machine is mounted in position.

	WARNING
	Parts can shift and loosen during shipment causing components to fall and drop during rigging causing serious injury or death. Before removing the tool from the shipping container make sure that all tool fasteners / components are tight and secure.

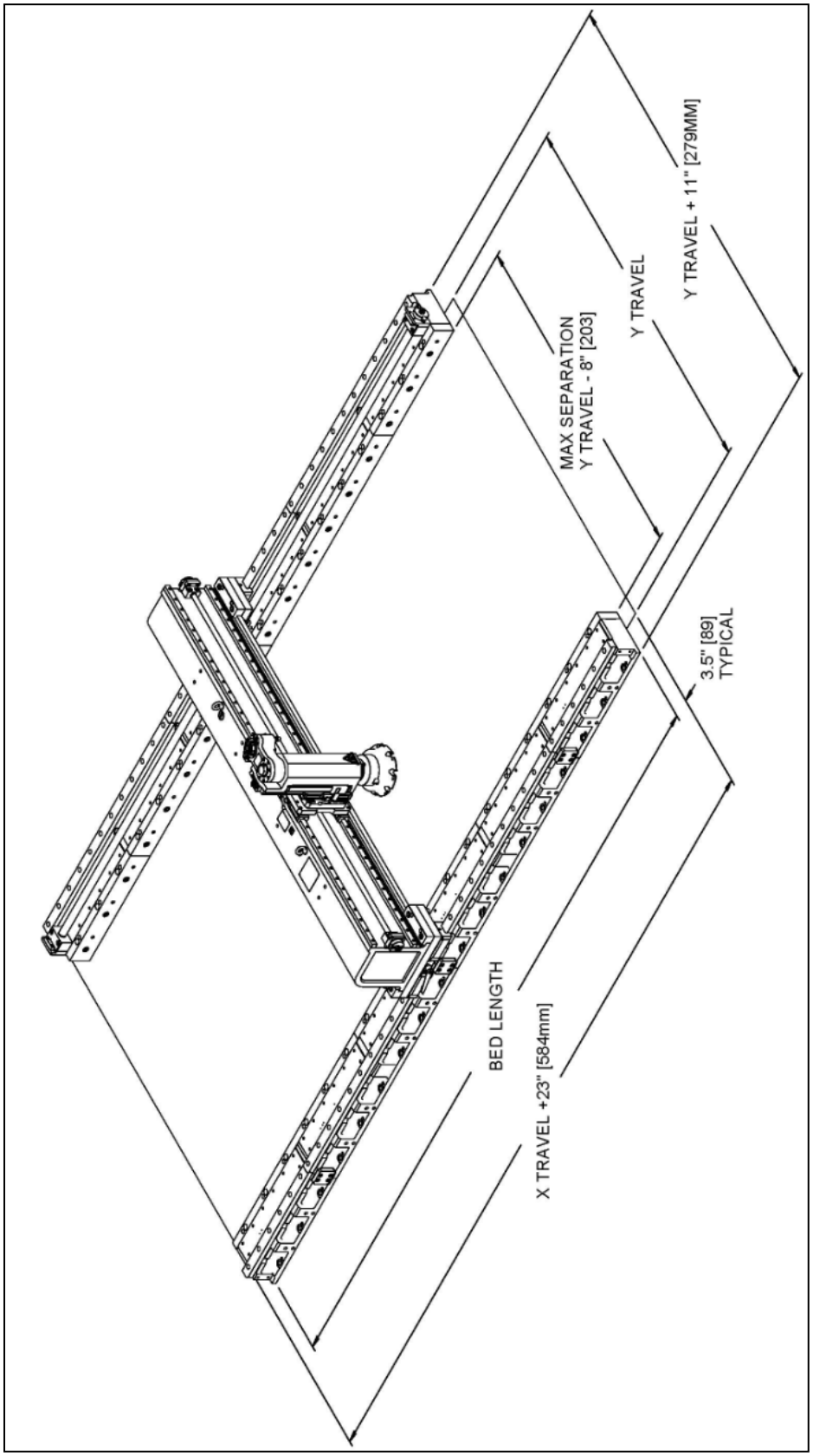
Operational Dimensions



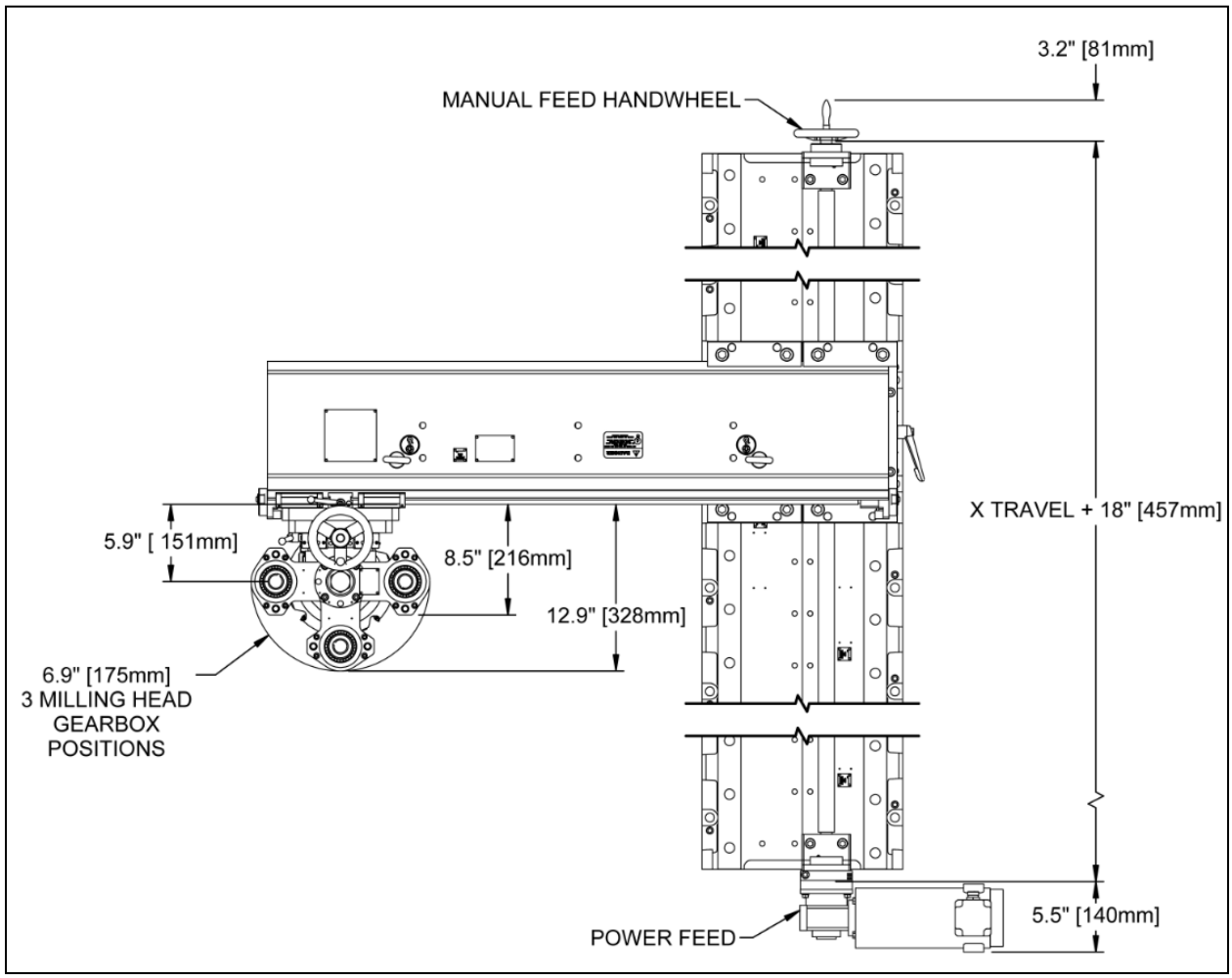
Conventional Machining Area



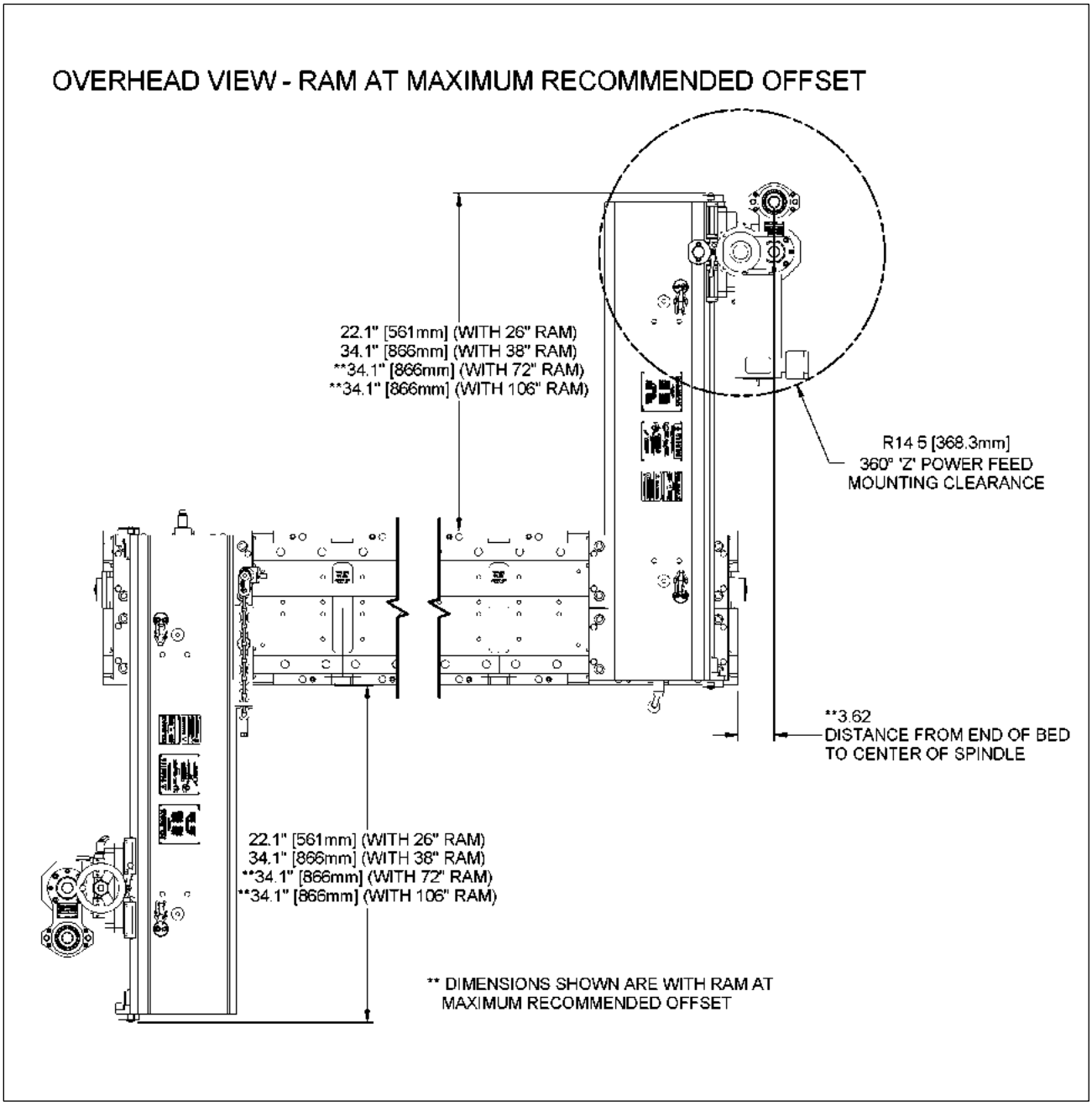
Gantry Machining Area



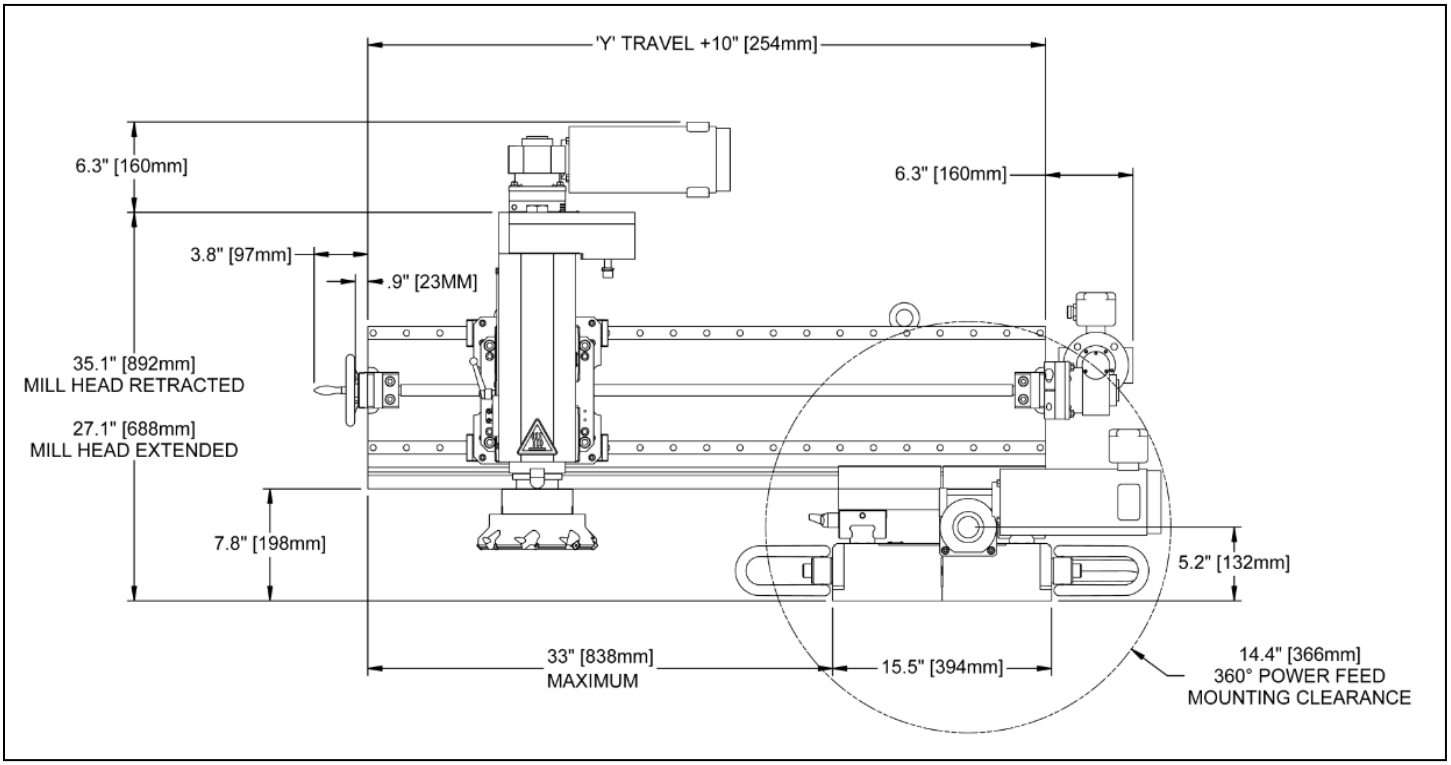
Overhead View



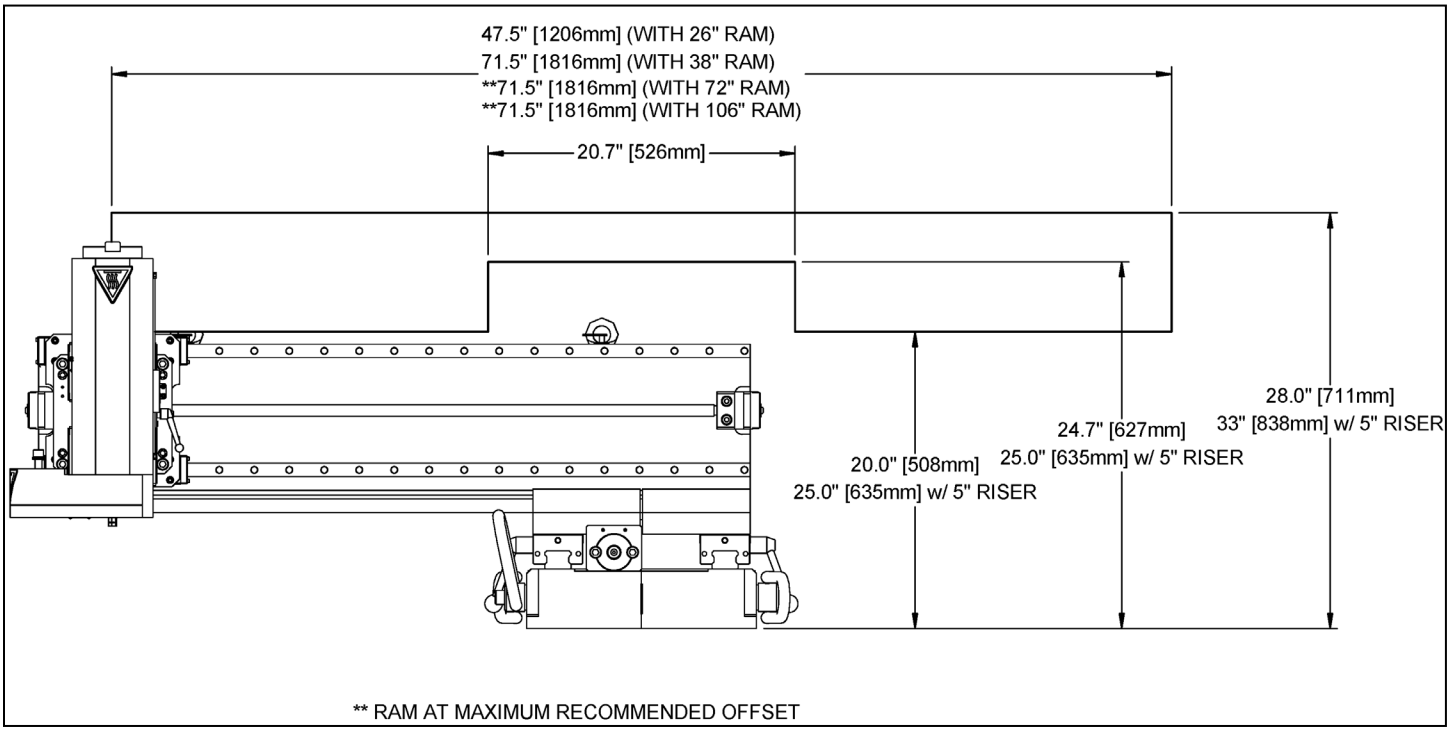
Overhead View



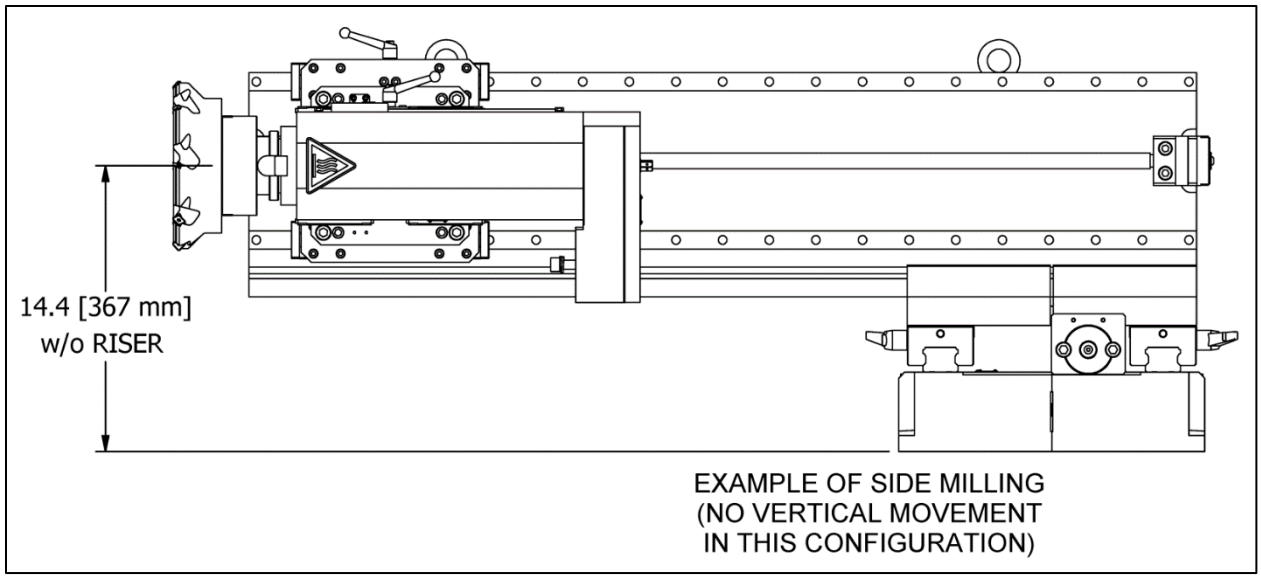
End View



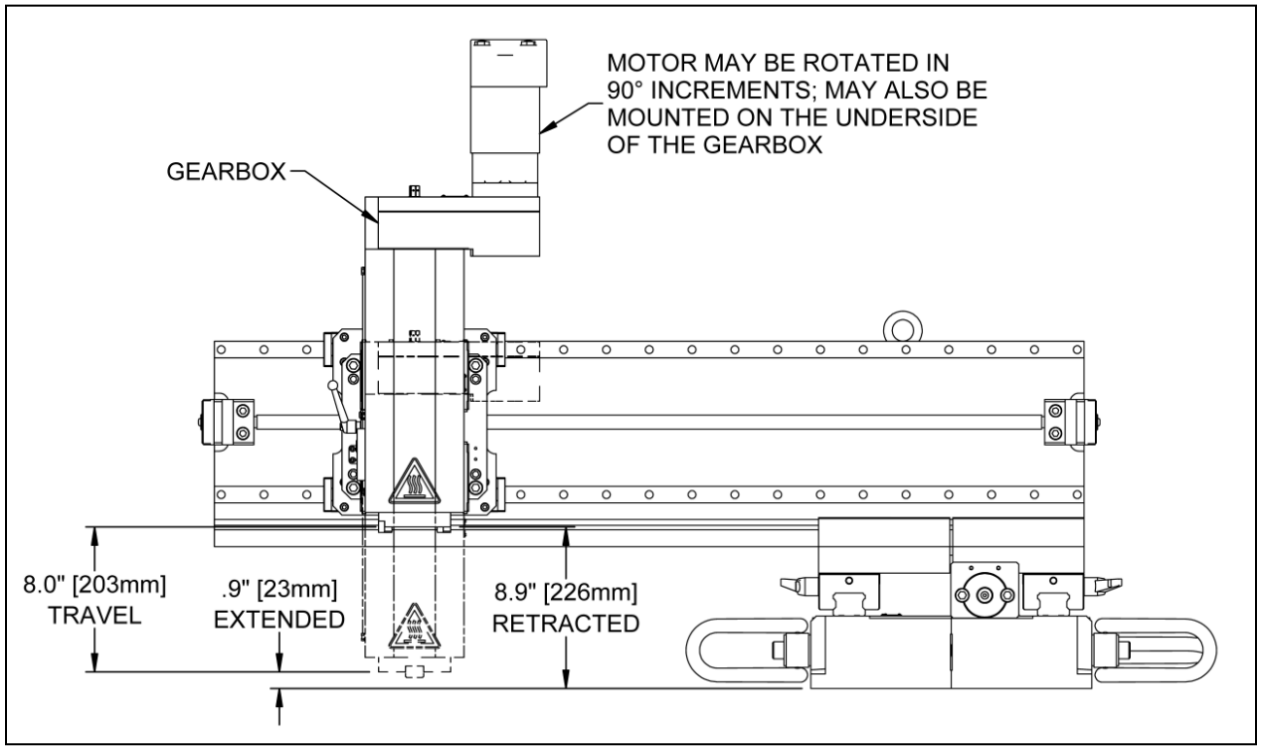
Overhead Milling



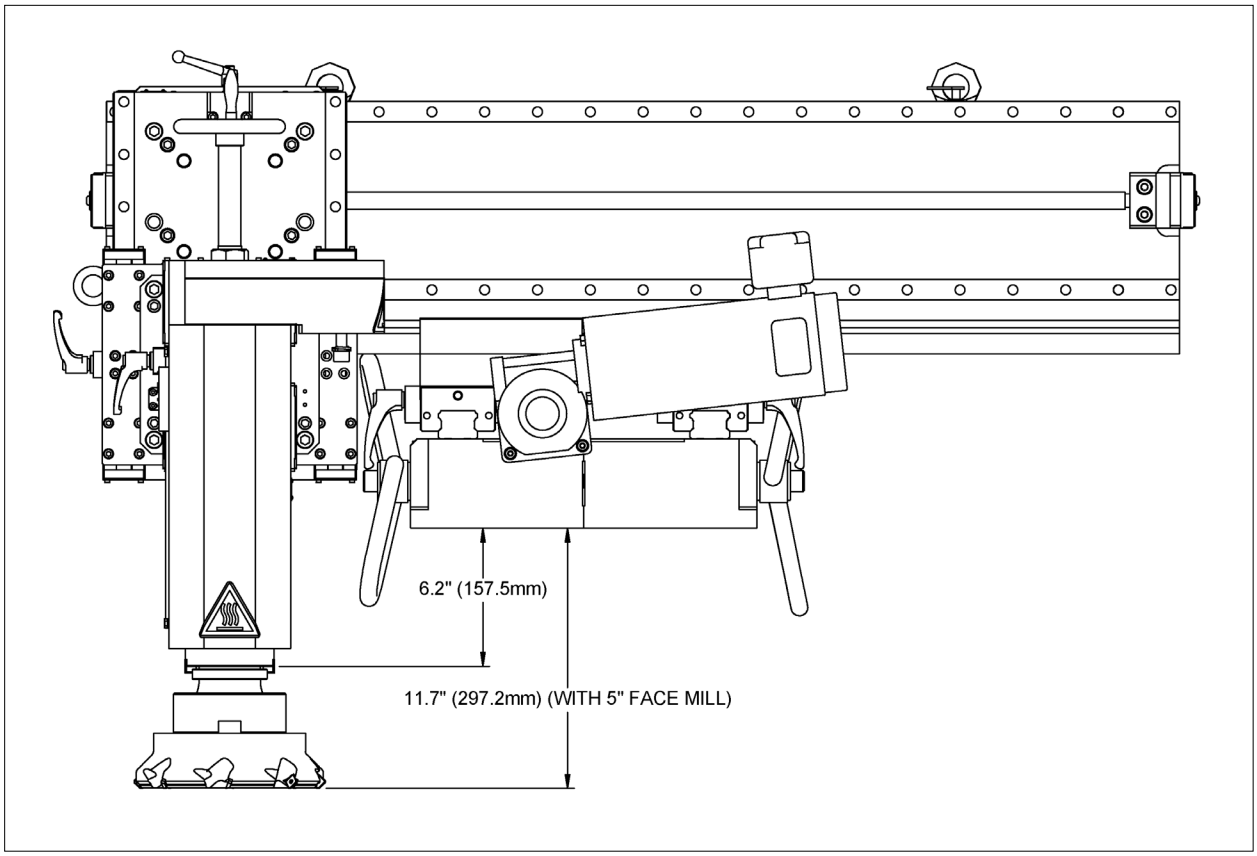
Side Milling



Spindle Travel

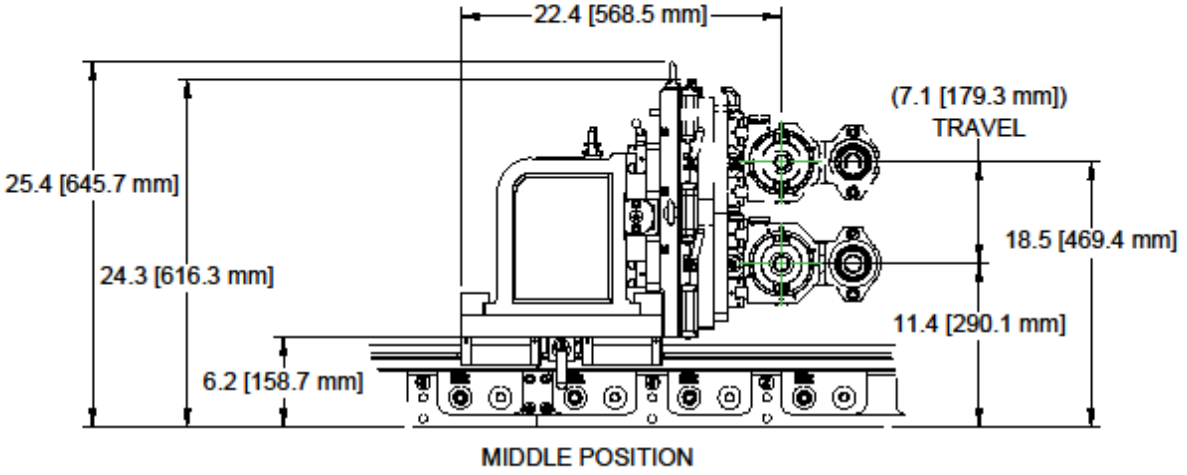


Milling with Z-axis in Lowest Position

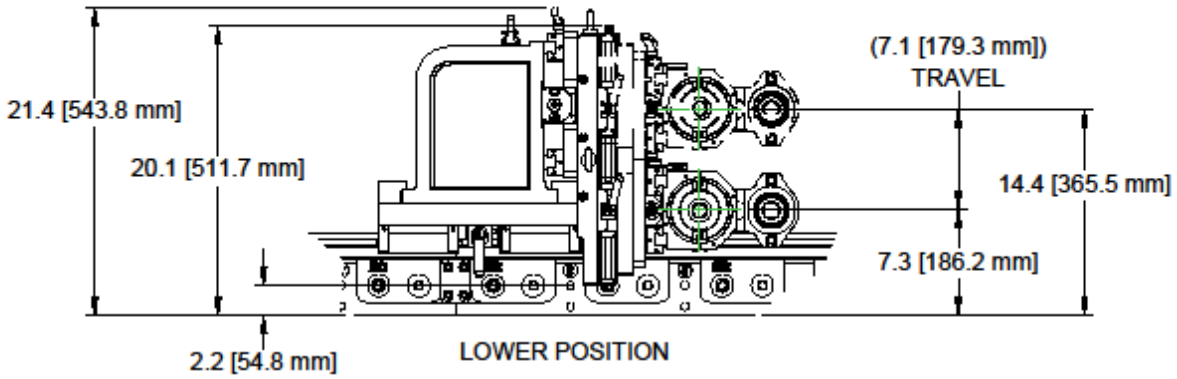


MACHINING RANGES

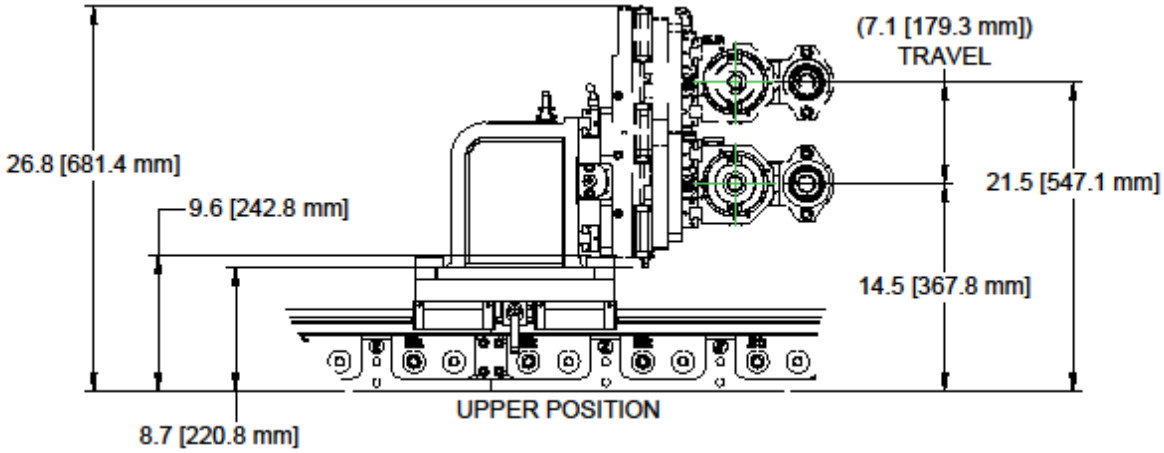
TOOL CENTER TRAVEL WITH OPTIONAL Z-AXIS SLIDE



MIDDLE POSITION

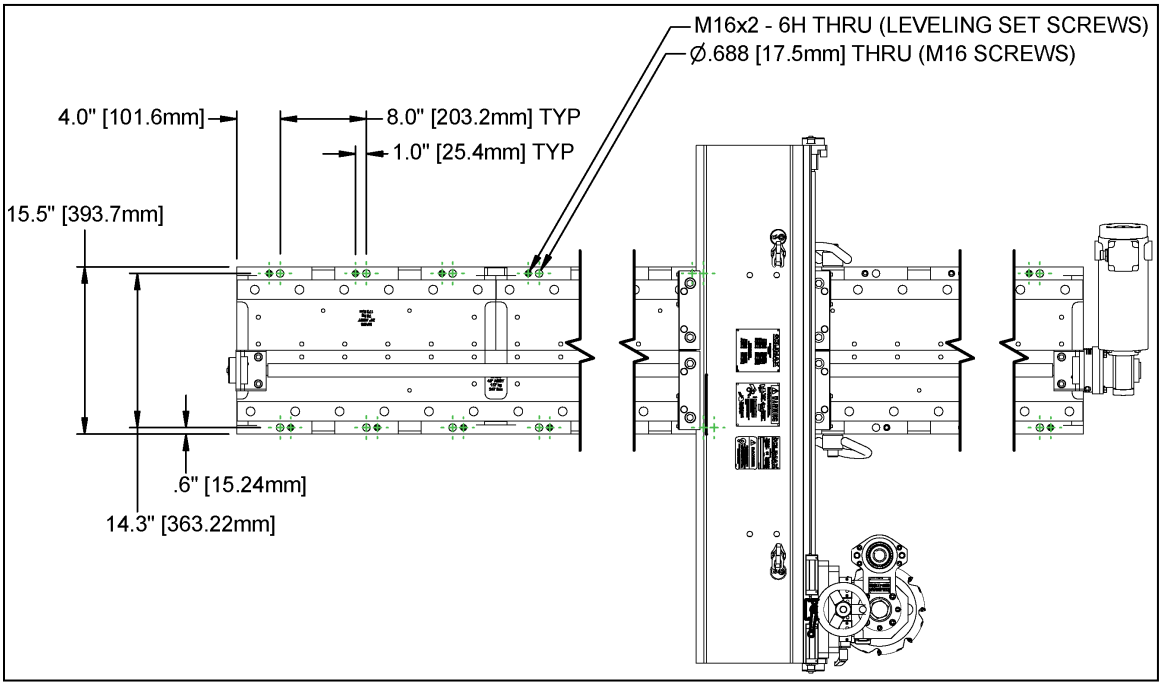


LOWER POSITION

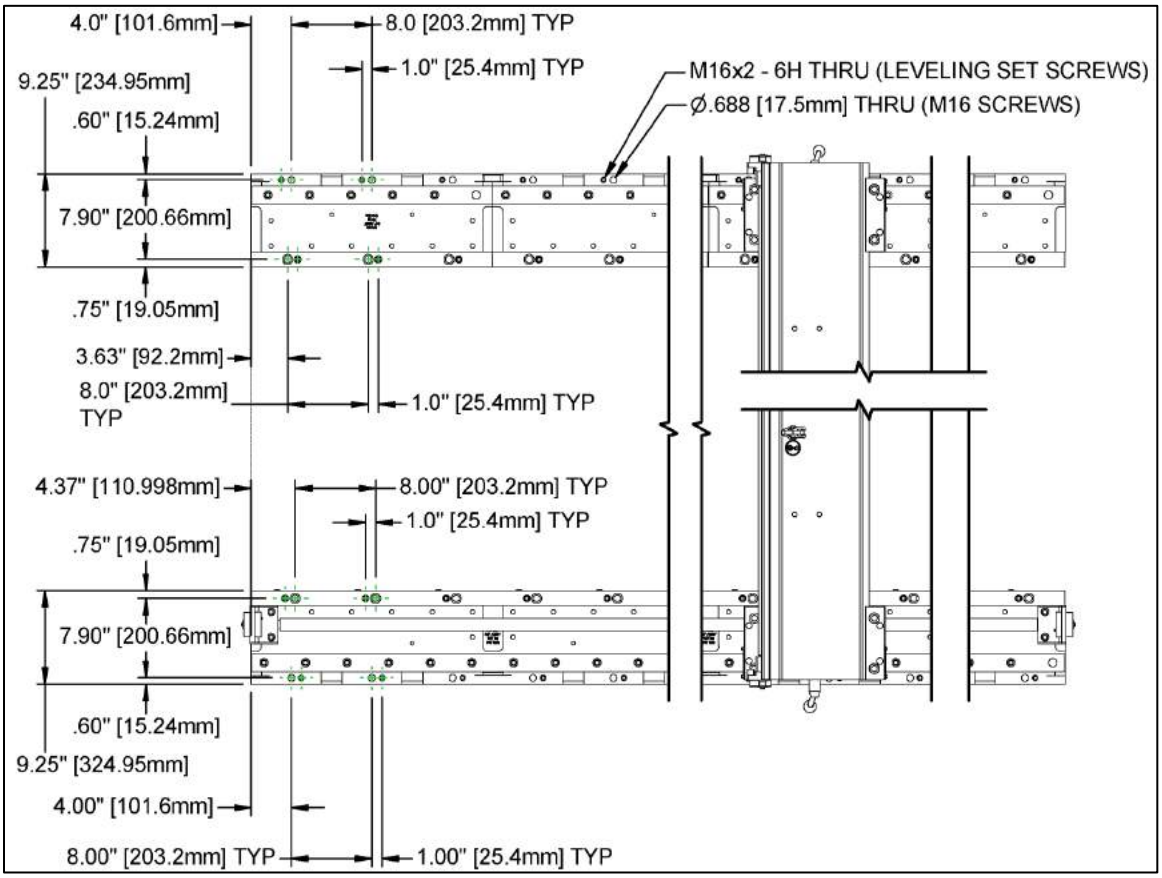


UPPER POSITION

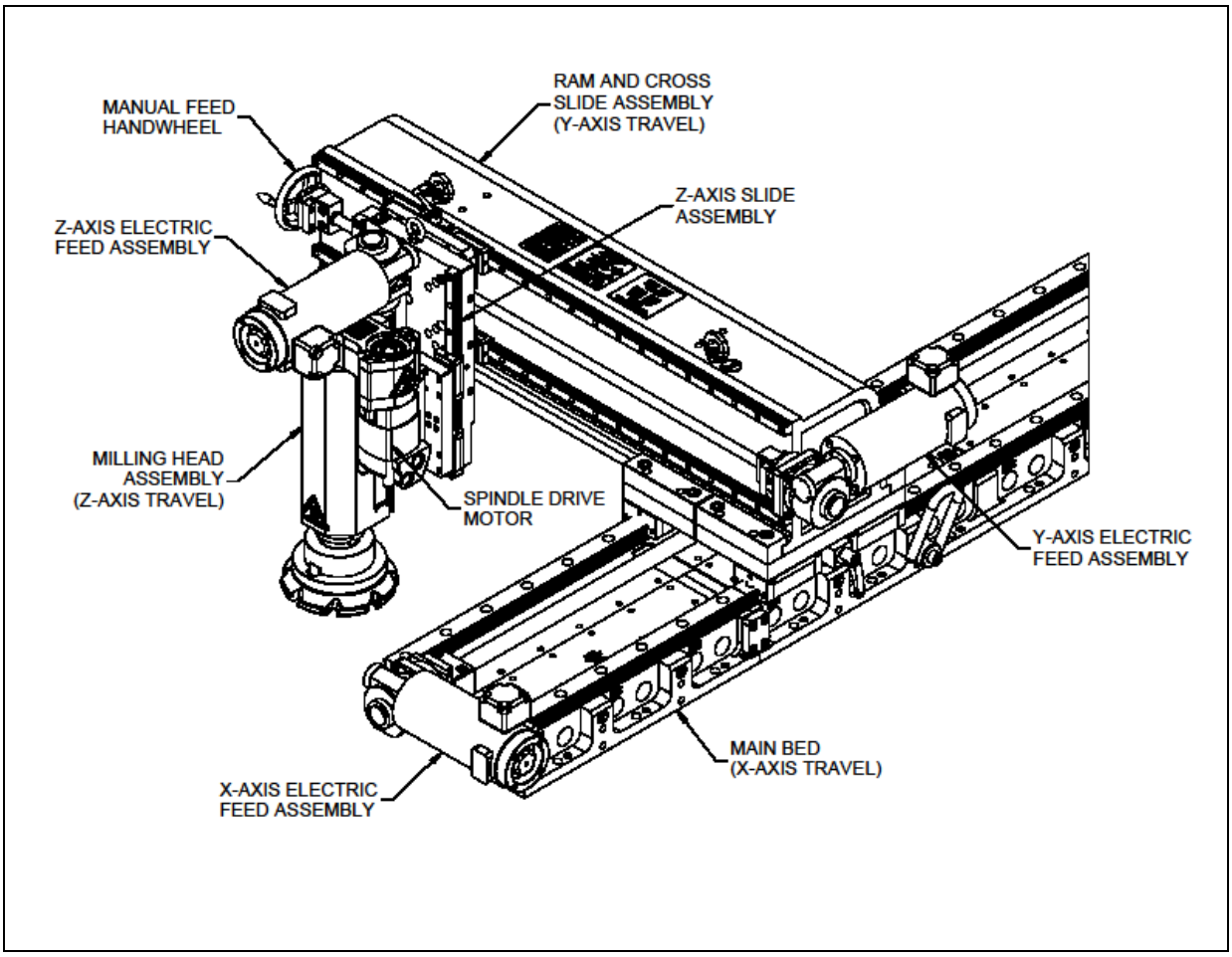
Standard Mounting Pattern



Gantry Mounting Pattern



Components



Control cables are available in 10, 20 or 30 meter lengths

Accessories

Item ID	Item Name
Additional Ball Screw Assemblies	
66471	ASSY BALLSCREW 32" TRAVEL 48" LONG LM6200
66472	ASSY BALLSCREW 56" TRAVEL 72" LONG LM6200
66473	ASSY BALLSCREW 80" TRAVEL 96" LONG LM6200
66474	ASSY BALLSCREW 104" TRAVEL 120" LONG LM6200
66475	ASSY BALLSCREW 128" TRAVEL 144" LONG LM6200
66476	ASSY BALLSCREW 152" TRAVEL 168" LONG LM6200
66477	ASSY BALLSCREW 176" TRAVEL 192" LONG LM6200
Conventional Milling Sub Plates	
66613	ASSY SUB PLATE 48 INCH CONVENTIONAL LM6200
66614	ASSY SUB PLATE 72 INCH CONVENTIONAL LM6200
66615	ASSY SUB PLATE 96 INCH CONVENTIONAL LM6200
66616	ASSY SUB PLATE 120 INCH CONVENTIONAL LM6200
66617	ASSY SUB PLATE 144 INCH CONVENTIONAL LM6200
66618	ASSY SUB PLATE 168 INCH CONVENTIONAL LM6200
66619	ASSY SUB PLATE 192 INCH CONVENTIONAL LM6200
Gantry Milling Sub Plates	
66620	ASSY SET SUB PLATE 48 INCH GANTRY LM6200
66621	ASSY SET SUB PLATE 72 INCH GANTRY LM6200
66622	ASSY SET SUB PLATE 96 INCH GANTRY LM6200
66623	ASSY SET SUB PLATE 120 INCH GANTRY LM6200
66624	ASSY SET SUB PLATE 144 INCH GANTRY LM6200
66625	ASSY SET SUB PLATE 168 INCH GANTRY LM6200
66626	ASSY SET SUB PLATE 192 INCH GANTRY LM6200
Bed Lengthening Kits*	
66666	KIT BED LENGTHEN BY 24" LM6200
66668	KIT BED LENGTHEN BY 24" FOR 48" BED ONLY LM6200
Gantry Kits for Bed Lengthening**	
66689	KIT GANTRY PLATE LENGTHEN BY 24" LM6200
66690	KIT GANTRY PLATES LENGTHEN BY 24" FOR 48" BED ONLY LM6200
Additional Bed Section Alignment Tools	
64744	TOOL ALIGNMENT BED SECTION LM LINE

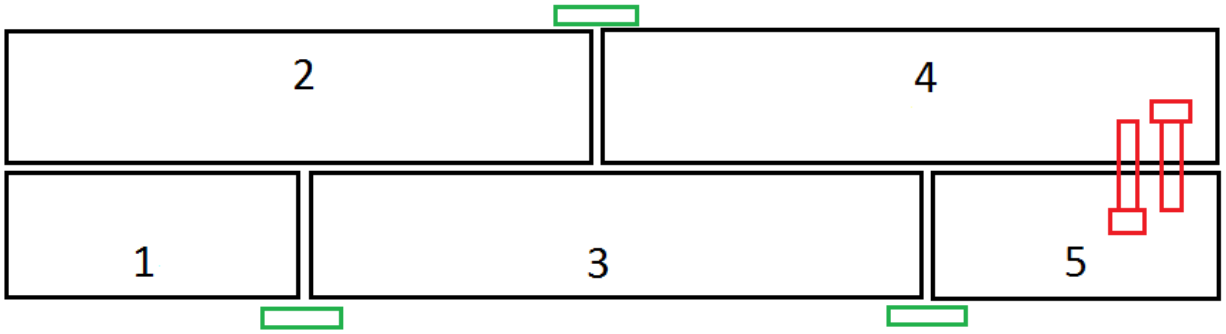
*Use qty 1 of kit 66666 for every 24" inches that you would like to increase the bed length. If the customer has a 48" bed they must get kit 66668 for the first 24" added to the bed, then kit 66666 for each additional increment of 24".

**Purchase in addition to the bed lengthening kits to be able to use the gantry capability with the extensions.

Frequently Asked Questions

LM5200/6200 FAQ

Why is the bed segmented? Segmented beds allow for the mill to be shortened or lengthened easily as well as setup into gantry configuration without a loss in machining ability. The bed sections are staggered as in the diagram below to get maximum rigidity. Only one of the four linear rail blocks passes over a joined section at any given time. The bed segments are either 2 feet (609.6 mm) or 4 feet (1219.2 mm) long. There are bolts that rigidly hold the bed sections together down the whole length of the bed (two of these are shown in red as an example). There are also bolted side plates (green in the diagram) that connect the bed sections lengthwise.



I don't need the gantry setup or to change the length of the bed, I just want to mill. Is this the right product? Right out of the box this product comes ready to do linear milling without any bed section alignment required. Just level it to the workpiece and go. The good news is, now that you have such a versatile machine, it can be lengthened, shortened, or go gantry to satisfy a future need you may not have yet. You are now ready for anything that comes your way.

What is the accuracy of the ballscrew?

LM5200 ram/bed/spindle – Pitch accuracy of +/- .0004 per foot (33 µm/m)

LM6200 bed – Pitch accuracy of +/- .001 per foot (83 µm/m)

LM6200 ram/spindle – Pitch accuracy of +/- .0004 per foot (33 µm/m)

Is DRO available? The 40 taper and 50 taper spindles have a DRO for the z-axis travel. There is not a standard DRO option for the bed or ram axis. If a customer has DRO requirements this capability can be explored through the specials process.

Is air power available? The LM5200 has air power available as direct drive or right-angle for the HSK spindle, but the LM6200 does not.

Is an electric spindle available? The LM5200 has a 1.5 Hp electric option for the HSK spindle, but the LM6200 does not.

What is the recommended length the bed can be unsupported? The beds are very rigid and can machine with the bed unsupported but performance will be affected. The use of an optional subplate can increase the rigidity for unsupported distances. As a general recommendation, keep the unsupported distance less than or equal to 1 foot (304.8 mm) without a subplate, and less than or equal to 1.5 feet (457.2 mm) with a subplate.

What is the maximum length and travel of bed? The length of bed available varies in 2 feet (609.6 mm) increments. The maximum bed length is based on the maximum ballscrew length available. A

shorter ballscrew can be positioned at multiple points down the length of the bed but one end of the ballscrew must be at one end of the bed in order to use the electric feed. The travel available takes into account the width of the saddle and is 12 inches (304.8 mm) less than the bed length for the LM5200, and is 16 inches (406.4 mm) less than the bed length for the LM6200. The max bed length and travel based on the ballscrew and in increments of 2 feet (609.6 mm) is as follows:

LM5200 bed – Max bed length of 96” (2438.4 mm) with 84” (2133.6 mm) travel, longer lengths may be available at additional cost

LM6200 bed – Max bed length of 264” (6705.6 mm) with 248” (6299.2 mm) travel, longer lengths up to 384” (9753.6 mm) may be available at additional cost

What is the maximum length of ram? The standard maximum ram lengths of 44 inches (1117.6 mm) for the LM5200 and 116 inches (2946.4 mm) for the LM6200 are based on ballscrew length and machining rigidity. Ram travel for both the LM5200 and LM6200 are 10 inches (254 mm) less than the ram length. If different ram lengths are desired this can be explored through the specials process.

Can I use a gantry ram for conventional linear milling? Yes, though there is a point at which the distance the ram hangs out will greatly affect the machining performance. For maximum rigidity the LM5200 can machine to 12” (304.8 mm) from the side of the bed to the center of the spindle, and the LM6200 can machine to 28” (711.2 mm) from the side of the bed to the center of the spindle.

What is the maximum metal removal rate and how does this compare to the LM6000? Metal removable rates of 10 in^3/min (163.9 cm^3/min) and potentially greater are possible with the LM5200/6200 and are equal to or greater than what is possible with the LM6000.

Is the width the gantry can be spread a set distance? No, the gantry rails are infinitely adjustable and can be spread to any width desired up to the max width appropriate for the length of ram you would like to use.

Is it ok to only drive the ballscrew on one gantry bed while machining near the other gantry bed? During testing we were able to machine with acceptable rigidity and performance at the extreme gantry dimensions. Proper alignment, leveling, and setup are very important when machining to the limits of the gantry rams. Maximum metal removal rates will most likely not be possible when pushing the machine to its dimensional limits. Positional accuracy will be greatly reduced as well in the +/- 0.010” (0.25 mm) range.

Can I tap with the milling head? Yes, by adding a floating tap head.

What are the side plates for? These plates lock the outside of the bed sections together to provide extra rigidity.

Are the bed sections going to shift if the leveling screws are overtorqued? Measures have been taken to prevent shifting of the beds under unusual loads. There are button head cap screws that overlap onto the mating bed section and prevent shifting from one bed section to another. These scenarios have been thoroughly tested.

I am afraid that my linear rails may have shifted, is my machine okay? Extensive testing was done to ensure that the rails will not shift under normal usage or even under significant abusive loads. If you still have concerns contact Climax Engineering. The benefit of the sectioned bed is that in the case that the rail is damaged a single bed section can be sent back for repair or replacement.

Do I need any additional components to shorten my bed? Yes, you will need to purchase a shorter ballscrew assembly that is the correct length. You may use a ballscrew shorter than the bed as long as one of the ballscrew ends is mounted at the end of the bed, but you cannot use a ballscrew longer than the bed.

How do I lengthen my bed? Contact Climax to purchase a bed lengthening kit and a longer ballscrew if necessary. Be sure to let us know if you will need the additional length in Gantry configuration as well. Detailed bed lengthening instructions are available.

Will the machine clear the bed while overhead milling? The LM5200 will clear the machine in overhead milling right out of the box. The LM6200 will clear with limited travel in the Z-axis over the bed. Purchase the 5” (127 mm) riser to achieve full travel in overhead configuration.

Can I power down feed with the milling head? Yes, with the #40 taper and #50 taper spindles you can use the same feed motor as the X and Y-axes with the addition of the Z-axis feed adapter. Power down feed is not currently available with the HSK spindle for the LM5200.

Can my LM6000 be converted to gantry? By using two LM6000 bed assemblies a gantry configuration may be possible. The ballscrew would need to be disconnected and the gibs loosened on one of the bed assemblies. Testing would need to be done to verify performance.

Receiving the Machine

The machine was run tested and thoroughly inspected before leaving the factory. When leaving the factory, the machine is packaged well for the demands of normal transportation. Climax cannot, however, guarantee the condition upon arrival of the machine.

Inspecting the Shipment

- Upon receiving your machine inspect the containers for shipping damage.
- Open the containers and inspect the machine for shipping damage.
- Check the items you received against the items listed on the invoice.

IMPORTANT

Contact Climax immediately concerning damaged or missing components.

Unpacking instructions

- When unpacking the machine, take care not to drop or damage the components.
- Use lifting eyes or slings to lift the components out of the shipping crate.
- Save the shipping crate to store the machine when not in use.

Shipping and Handling Precautions

CAUTION

The containers are designed to be lifted only with the provided lifting points and with the container fully closed. **Do Not** lift with the container covers removed.

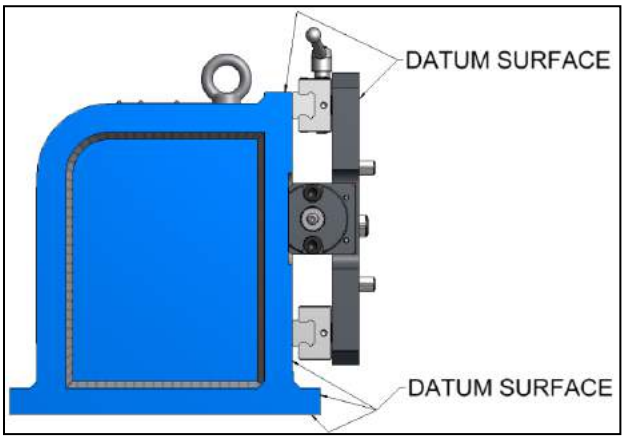
INFORMATION

Surfaces subject to corrosion were sprayed with a rust preventative prior to shipment (and possibly wrapped in oil impregnated paper). The user should exercise caution while handling the components provided since they may be greasy and/or slippery.

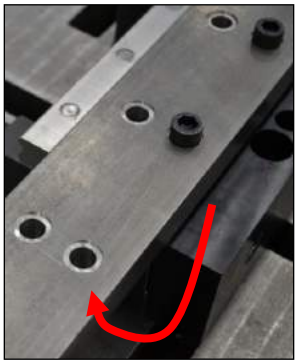
Datum Surfaces

The machine has specially ground surfaces that are available for alignment and setup purposes.

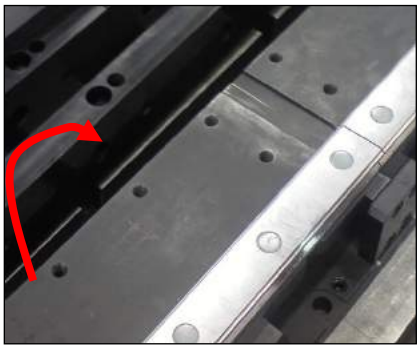
The inside edge of the ram mounting brackets are ground surfaces. This allows precise alignment by pushing the front edge of the ram against the inside edge of the bracket during mounting.



The bottom surfaces of the bed alignment tools are ground surfaces.



The sides of the bed sections are ground surfaces.



Bed Assembly

When you receive your machine it will be set up as a standard linear mill in the length which was purchased. The following instructions describe how to assemble and add sections to increase the length of the standard or gantry style beds. The following standard and gantry bed assembly instructions depict a 72 inch long bed assembly, actual bed length may vary.

IMPORTANT

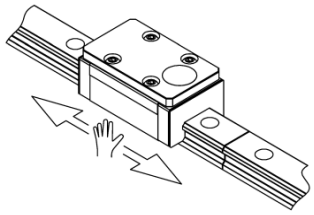
Many of the components are precision ground and must be handled with care.

Inspect the mating surfaces for nicks, rust, dings, and debris. Stone the surfaces to remove burrs if necessary. Clean thoroughly and apply LPS2 to prevent rust.

CAUTION

Improper alignment of the bed sections will result in machine damage. Follow the setup procedure in this section carefully. Perform the rail alignment check for each row of the rails after the bed has been assembled.

Refer back to this Rail Alignment Check throughout the following procedure:



RAIL ALIGNMENT CHECK

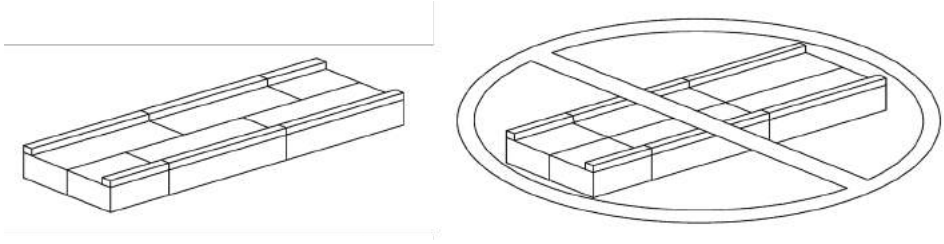
Remove the plastic retainer from the tool, P/N 82768, and slide the tool onto one of the rails. Move the tool by hand along the length of the rail and across all the end-to-end joints.

The tool should slide easily over the joints. A small clicking sound is acceptable, but if the tool is stopped on a joint or runs into an edge that significant alters the smooth sliding, do not force it. This indicates that the rails are not aligned. Repeat the bed assembly procedure and check the rail alignment again.

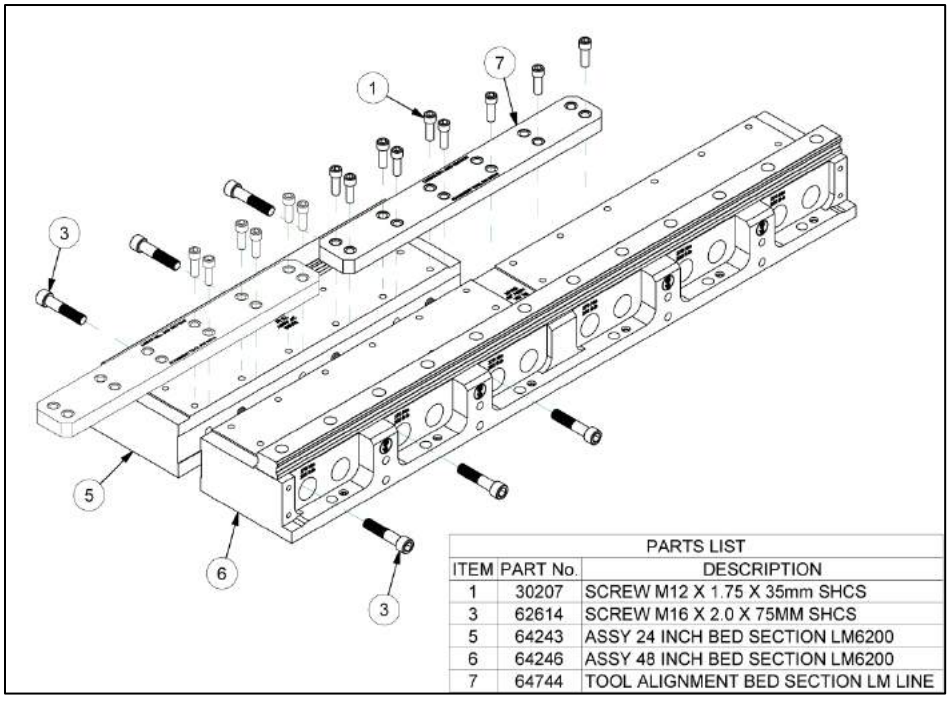
Standard Bed Assembly

WARNING

The machine bed sections must be staggered for machine strength, rigidity, and alignment. **Do not place bed sections such that end-to-end joints are next to each other.** Failure to follow these instructions will result in machine damage and could result in serious injury or death.



1. Set up one 24 inch (Item 5) and one 48 inch bed section (Item 6) as shown in Figure 1.
2. Push the two sections together, and install six M16 fasteners (Item 3) to hold the sections together. Tighten the fasteners to 10 ft-lb.
3. Place both bed alignment tools (Item 7) on the sections as shown in Figure 1.
4. First, tighten the fasteners (Item 1) on the side with the 48 inch section to 65 ft lb.
5. After tightening the fasteners on the 48 inch section, tighten the fasteners (Item 1) on the 24 inch section to 65 ft-lb.



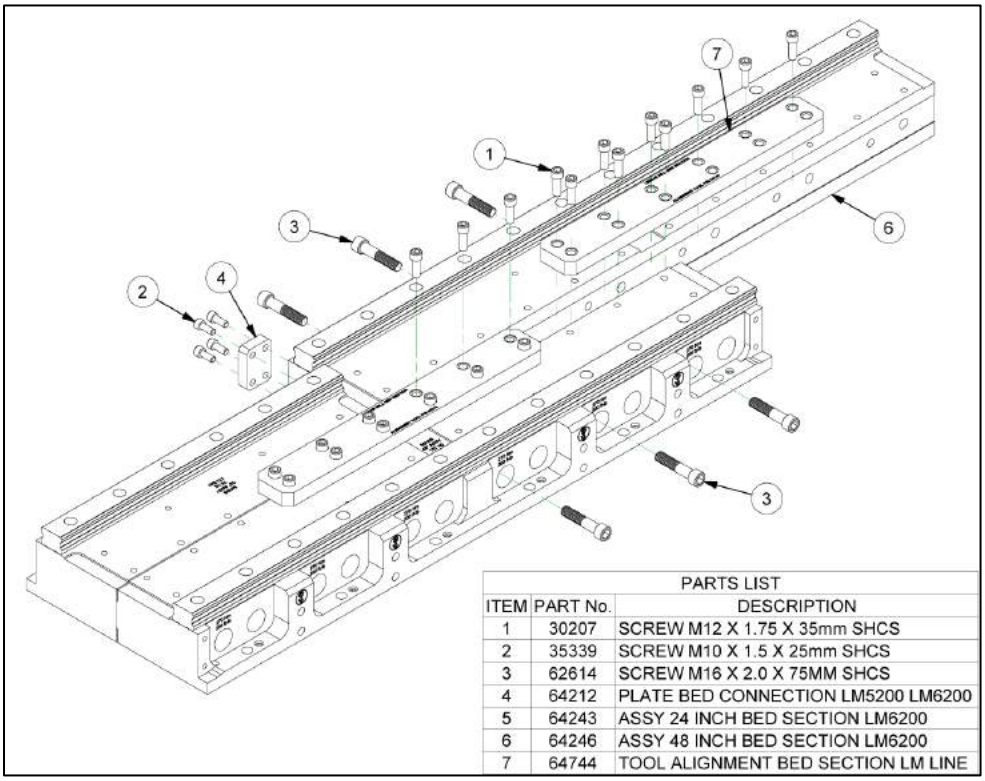
PARTS LIST

ITEM	PART No.	DESCRIPTION
1	30207	SCREW M12 X 1.75 X 35mm SHCS
3	62614	SCREW M16 X 2.0 X 75MM SHCS
5	64243	ASSY 24 INCH BED SECTION LM6200
6	64246	ASSY 48 INCH BED SECTION LM6200
7	64744	TOOL ALIGNMENT BED SECTION LM LINE

Figure 1

6. Tighten the six M16 fasteners (Item 3) to 200 ft-lb to hold the sections together.

7. Place the next 48 inch section in position and push it against the other sections as shown in Figure 2. Install six M16 fasteners (Item 3) and tighten them to 10 ft-lb.



PARTS LIST

ITEM	PART No.	DESCRIPTION
1	30207	SCREW M12 X 1.75 X 35mm SHCS
2	35339	SCREW M10 X 1.5 X 25mm SHCS
3	62614	SCREW M16 X 2.0 X 75MM SHCS
4	64212	PLATE BED CONNECTION LM5200 LM6200
5	64243	ASSY 24 INCH BED SECTION LM6200
6	64246	ASSY 48 INCH BED SECTION LM6200
7	64744	TOOL ALIGNMENT BED SECTION LM LINE

Figure 2

8. Place the second bed alignment tool (Item 7) on the sections as shown in Figure 2. Tighten the fasteners (Item 1) on the assembled sections first to 65 ft lb. Then tighten the fasteners on the new section to 65 ft-lb.
9. Tighten the six M16 fasteners (Item 3) to 200 ft-lb to hold the sections together.
10. Install a bed connection plate (Item 4) as shown in Figure 2, and tighten the fasteners (Item 2) to 40 ft-lb.
11. Check that end-to-end clearances of bed sections are less than .004 inch.
12. Attach a dial indicator with a magnetic base to one of the linear rails and check the alignment of the two “A” points, and the two “B” points as shown in Figure 3. The “A” points should be within 0.001 inch of each other, and the “B” points should also be within 0.001 inch of each other. If they are not, loosen all the bolts and repeat steps 2-11.

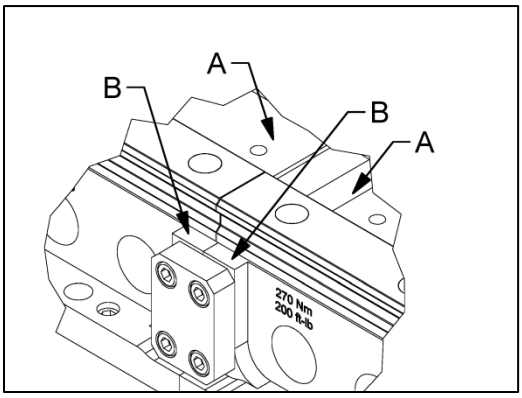
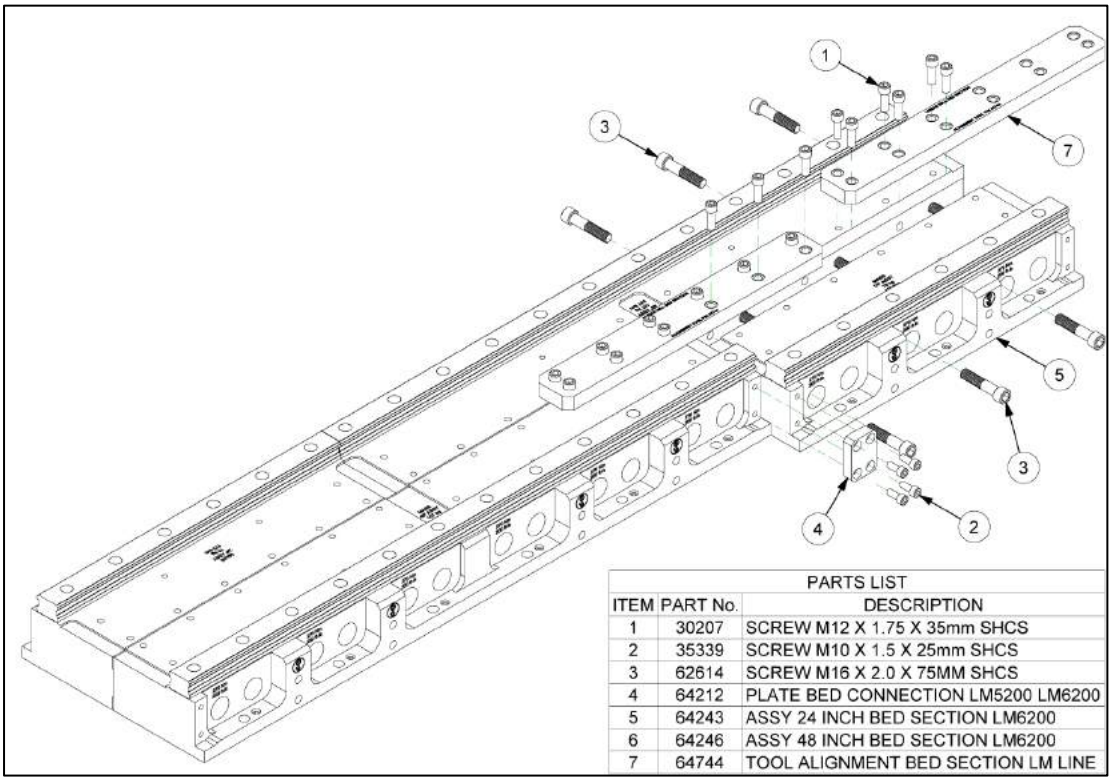


Figure 3

13. Check rail alignment according to the rail block alignment instructions above. Correct misaligned rails as required.
14. Place the next 24 inch section (Item 5) in position and push it against the other sections as shown in Figure 4. Install six M16 fasteners (Item 3) and tighten them to 10 ft-lb.
15. Place the first bed alignment tool (Item 7) on the sections as shown in Figure 4. Tighten the fasteners (Item 1) on the assembled sections first to 65 ft lb. Then tighten the fasteners on the new section to 65 ft-lb.
16. Tighten the six M16 fasteners (Item 3) to 200 ft-lb to hold the sections together.



PARTS LIST

ITEM	PART No.	DESCRIPTION
1	30207	SCREW M12 X 1.75 X 35mm SHCS
2	35339	SCREW M10 X 1.5 X 25mm SHCS
3	62614	SCREW M16 X 2.0 X 75MM SHCS
4	64212	PLATE BED CONNECTION LM5200 LM6200
5	64243	ASSY 24 INCH BED SECTION LM6200
6	64246	ASSY 48 INCH BED SECTION LM6200
7	64744	TOOL ALIGNMENT BED SECTION LM LINE

Figure 4

17. Install a bed connection plate (Item 4) as shown in Figure 4, and tighten the fasteners (Item 2) to 40 ft-lb.

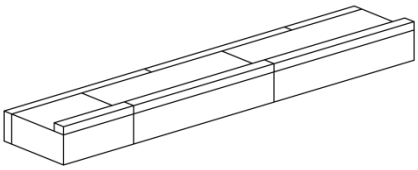
18. Check that end-to-end clearances of bed sections are less than .004" inch.
19. Attach a dial indicator with a magnetic base to one of the linear rails and check the alignment of the two “A” points, and the two “B” points as shown in Figure 3. The “A” points should be within 0.001 inch of each other, and the “B” points should also be within 0.001 inch of each other. If they are not, repeat steps 14-18.
20. Check rail alignment according to the rail alignment check instructions above. Correct misaligned rails as required.

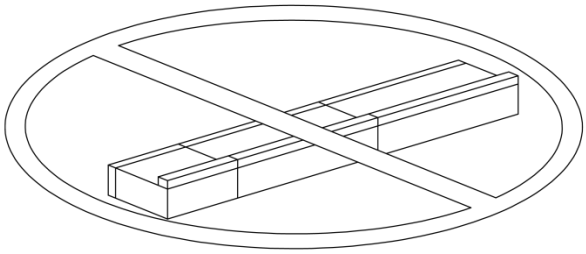
For longer standard bed assemblies, repeat the previous steps adding 48 inch bed sections until the desired bed length is obtained, and then finish with a 24 inch bed section. Remove all the bed alignment tools after making necessary adjustments.

Gantry Bed Assembly

WARNING

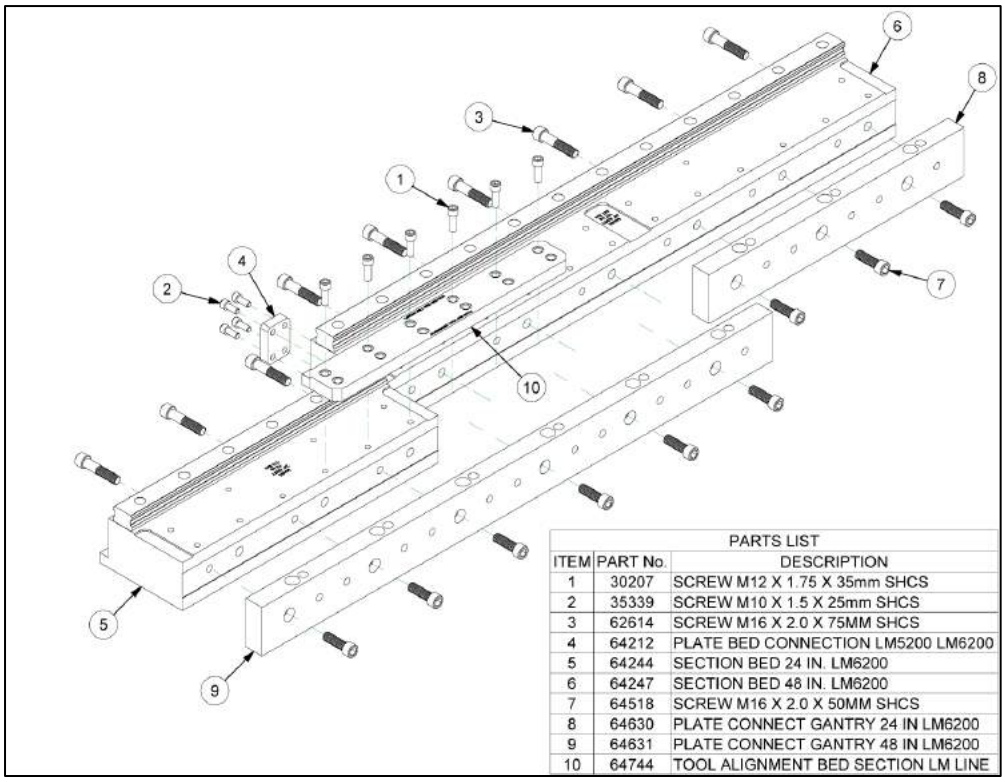
The machine bed sections and connect plates must be staggered for machine strength, rigidity, and alignment. **Do not place bed sections such that end-to-end joints are next to each other.** Failure to follow these instructions will result in machine damage and could result in serious injury or death.





First Half

1. Position one 24 inch bed section (Item 5), one 48 inch bed section (Item 6), one 48 inch gantry connect plate (Item 9), and one 24 inch gantry connect plate (Item 8) as shown in Figure 5.
2. Install three M16 fasteners (Item 7) through the 48 inch gantry connect plate (Item 9) and into the 24 inch bed section (Item 5). Then, install three M16 fasteners (Item 3) through the 24 inch bed section and into the 48 inch gantry connect plate. Tighten the fasteners to 200 ft-lb.
3. Install three M16 fasteners (Item 7) through the 24 inch gantry connect plate (Item 8) and into the 48 inch bed section (Item 6). Then, install three M16 fasteners (Item 3) through the 48 inch bed section and into the 24 inch gantry connect plate. Tighten the fasteners to 200 ft-lb.



PARTS LIST		
ITEM	PART No.	DESCRIPTION
1	30207	SCREW M12 X 1.75 X 35mm SHCS
2	35339	SCREW M10 X 1.5 X 25mm SHCS
3	62614	SCREW M16 X 2.0 X 75MM SHCS
4	64212	PLATE BED CONNECTION LM5200 LM6200
5	64244	SECTION BED 24 IN. LM6200
6	64247	SECTION BED 48 IN. LM6200
7	64518	SCREW M16 X 2.0 X 50MM SHCS
8	64630	PLATE CONNECT GANTRY 24 IN LM6200
9	64631	PLATE CONNECT GANTRY 48 IN LM6200
10	64744	TOOL ALIGNMENT BED SECTION LM LINE

Figure 5

4. Push the bed sections together and install three M16 fasteners (item 3), and three M16 fasteners (Item 7) into the 48 inch bed section (item 6), and 48 inch gantry plate(item 9). Tighten the fasteners to 10 ft-lb.
5. Place a bed alignment tool (Item 10) on the sections as shown in Figure 5, and tighten the fasteners (item 1) to 65 ft-lb.
6. Tighten the six M16 fasteners installed in step 4 to 200 ft-lb to hold the sections together.
7. Install a bed connection plate (Item 4) as shown in Figure 5, and tighten the fasteners (item 2) to 40 ft-lbs.
8. Check that end-to-end clearances of bed sections are less than .004 inch.
9. Attach a dial indicator with a magnetic base to one of the linear rails and check the alignment of the two "A" points, and the two "B" points as shown in Figure 6. The A points should be within 0.001 inch of each other, and the B points should also be within 0.001 inch of each other. If they are not, repeat steps 2 through 8.
10. Check rail alignment according to the rail alignment check instructions above. Correct misaligned rails as required.

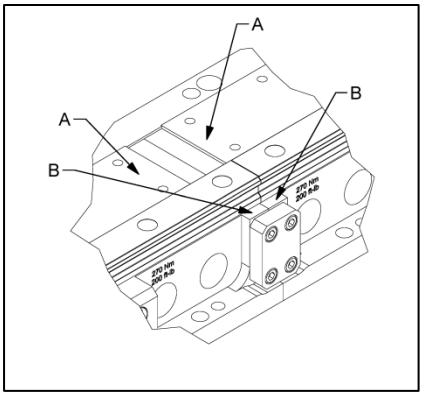
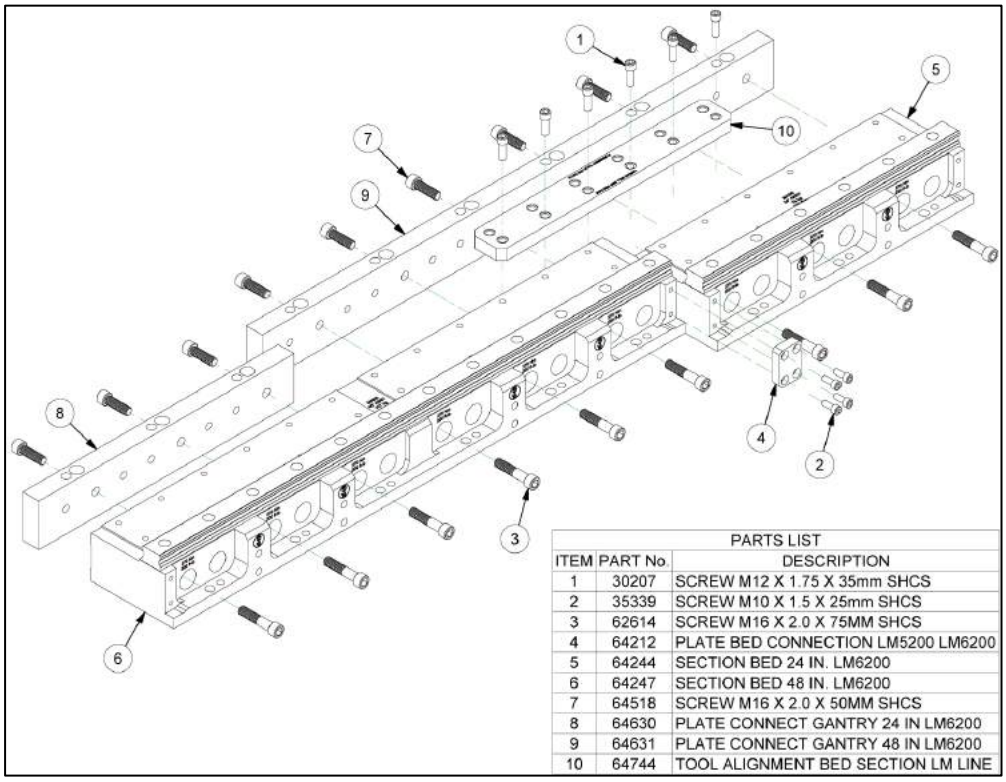


Figure 6

Second Half

1. Position one 48 inch bed section (Item 6), one 24 inch bed section (Item 5), one 24 inch gantry connect plate (Item 8), and one 48 inch gantry connect plate (Item 9) as shown in Figure 7.
2. Install three M16 fasteners (Item 7) through the 24 inch gantry connect plate and into the 48 inch bed section. Then, install three M16 fasteners (Item 3) through the 48 inch bed section and into the 24 inch gantry connect plate. Tighten the fasteners to 200 ft-lb.
3. Install three M16 fasteners (Item 7) through the 48 inch gantry connect plate and into the 24 inch bed section. Then, install three M16 fasteners (Item 3) through the 24 inch bed section and into the 48 inch gantry connect plate. Tighten the fasteners to 200 ft-lb.



PARTS LIST

ITEM	PART No.	DESCRIPTION
1	30207	SCREW M12 X 1.75 X 35mm SHCS
2	35339	SCREW M10 X 1.5 X 25mm SHCS
3	62614	SCREW M16 X 2.0 X 75MM SHCS
4	64212	PLATE BED CONNECTION LM5200 LM6200
5	64244	SECTION BED 24 IN. LM6200
6	64247	SECTION BED 48 IN. LM6200
7	64518	SCREW M16 X 2.0 X 50MM SHCS
8	64630	PLATE CONNECT GANTRY 24 IN LM6200
9	64631	PLATE CONNECT GANTRY 48 IN LM6200
10	64744	TOOL ALIGNMENT BED SECTION LM LINE

Figure 7

4. Push the bed sections together and install three M16 fasteners (item 3), and three M16 fasteners (Item 7) into the 48 inch bed section and 48 inch gantry plate. Tighten the fasteners to 10 ft-lb.
5. Place a bed alignment tool (Item 10) on the sections as shown in Figure 7, and tighten the fasteners to 65 ft-lb.
6. Tighten the six M16 fasteners installed in step 4 to 200 ft-lb to hold the sections together.
7. Install a bed connection plate (Item 4) as shown in Figure 7, and tighten the fasteners (item 2) to 40 ft-lbs.
8. Check that end-to-end clearances of bed sections are less than .004 inch.
9. Attach a dial indicator with a magnetic base to one of the linear rails and check the alignment of the two "A" points, and the two "B" points as shown in Figure 6. The “A” points should be within 0.001 inch of each other, and the “B” points should also be within 0.001 inch of each other. If they are not, repeat steps 10 through 15.
10. Check rail alignment according to the rail alignment check instructions above. Correct misaligned rails as required.

For longer gantry bed assemblies, repeat the previous steps adding 48 inch bed sections until the desired length is obtained, and then finish with a 24 inch bed section. Make sure to always use a 48 inch gantry plate (Item 9) to connect two bed sections. Remove the bed alignment tools after making necessary adjustments.

Ballscrew Assembly

The ballscrew assembly can be placed on either bed half. The following procedure can be used on either end of the ballscrew. Tightening the bearing preload nut on either end of the ballscrew will remove all slack. Once the ballscrew is adjusted, the hex on both ends should be protruding about the same amount. If they are different by more than 1/4 inch, loosen one bearing preload nut and tighten the other to center the ballscrew.

1. Remove the ballscrew lock assembly.
2. Remove the setscrew to gain access to the bearing preload nut locking screw.
3. Loosen the locking screw, and remove the bearing preload nut.
4. Install the ballscrew into the bearing block assembly.
5. Hand tighten the bearing preload nut on the end of the ballscrew, and lock into place using the locking screw.
6. Replace the setscrew.
7. Bolt on the ballscrew lock assembly

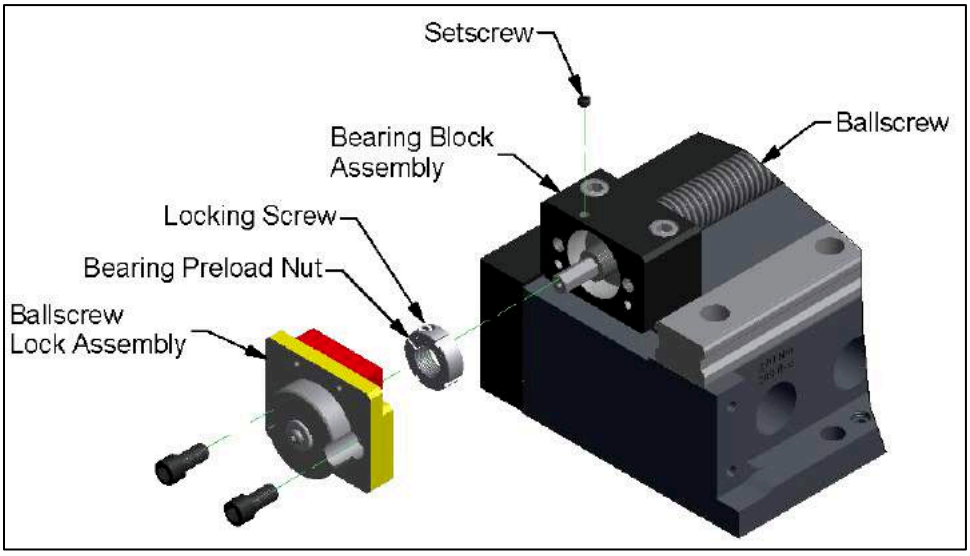


Figure 8

The operational length of the bed can be increased by adding bed sections and a longer ballscrew. See the Accessories section for more information. The ballscrew will be the same length as the bed for normal configurations. In cases where the bed is longer than the ballscrew, the ballscrew will need to be positioned to one end of the bed.

This page intentionally left blank

Machine Setup

Quick Setup

- Determine the surface to be machined.
- Determine a level plane to use for mounting the machine.
- Mount and level the bed to the work piece.
- Attach the machining arm.
- Attach the milling head.
- Adjust for flatness.
- Begin machining.

Standard Linear Mill Setup

Proper setup of the machine will require that you know the plane to be machined in relation to the position the machine will be setup. See the Specifications section of this manual for the applicable range of this machine. Also see the Dimensions section of this manual for the machine dimensions. Since the machine can be setup in sections of varying length, this setup will cover the basics of a short bed setup.

If you have any questions or concerns, please contact Climax.

Determine the level plane for attaching the machine next to the work piece. There are a number of precision surfaces to use as a datum. See the Datum Surfaces section for more information. Take into consideration the vertical travel of the milling assembly, the horizontal travel of the ram, and the bed travel when positioning the machine. See the Operational Dimensions section for more information.

The milling head can be positioned in 90 degree increments, with slight adjustments to the angle of the milling head possible. There is also an optional swivel head available for this machine that increases the flexibility for milling or drilling to 360 degrees.

Once the position for mounting the machine has been determined, survey the mounting position for high spots or other irregularities. Make corrections where necessary.

The bed is equipped with leveling screws for minor adjustments. To use a leveling screw, make sure the bed's fasteners are loose before applying force.

CAUTION

Be very careful not to over tighten any leveling screws! This could cause the bed to warp. Warping becomes obvious when the saddle binds at the warped point of the rail. Contact Climax immediately if you suspect the bed is warped. **Do not** attempt to straighten the bed or the rails.

Shims can also be used under the bed to assist in leveling. If the setup area is not level, you may need to prepare special mounts that fit your application. There are numerous ways to set up the bed next to the work piece. Rigidity is the most important factor to take into consideration. When securing and leveling the bed to the work piece, use a precision leveling tool on the datum surfaces to verify the bed remains level. Refer to the Standard Bed Assembly section for the procedure on assembling the bed.

Attaching the Saddle

1. Attach the saddle plate to the rail blocks as shown in Figure 9. The outside edge should be flush with the rail blocks. This aligns the saddle to the bed and in turn aligns the ram to the bed.
2. Check for free movement of the saddle up and down the entire length of the bed. If the saddle shows resistance at any point, stop and check the bed and rails to be sure they are level and straight.

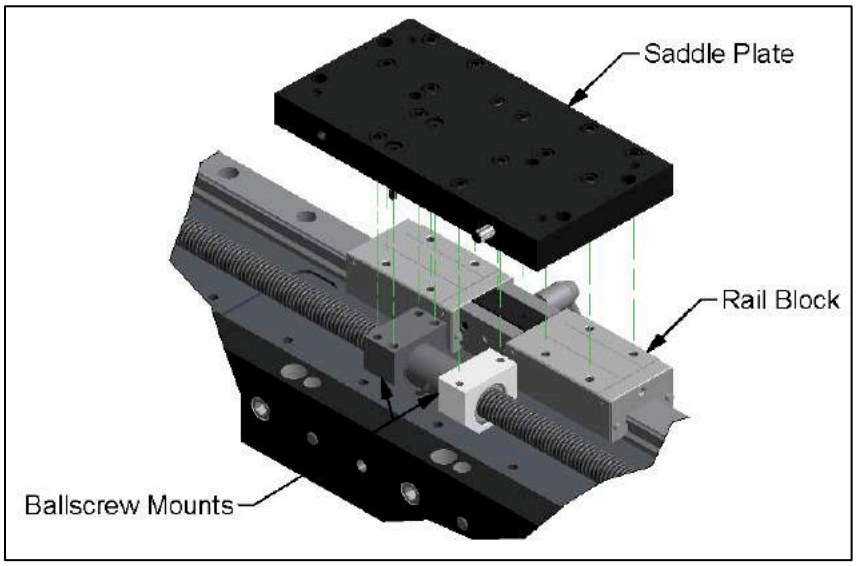


Figure 9. Ballscrew mounts (left) and saddle plate (top) and rail block (right)

3. Attach the saddle to the ballscrew mounts.

Repeat the previous steps to attach the other half of the saddle to the other side of the bed assembly. Align the second half of the saddle with the first one prior to fastening it down.

	INFORMATION
	The saddle can be moved up and down the rail quickly by using a standard electric hand drill with a socket attachment when the ballscrew is installed.

Attaching the Ram

1. To attach the ram, use the lifting eyes provided on the ram to position it in place.
2. Press the front edge of the ram against the inside of the ram clamp. This aligns the ram perpendicular to the bed. Then attach the ram as shown in Figure 10.

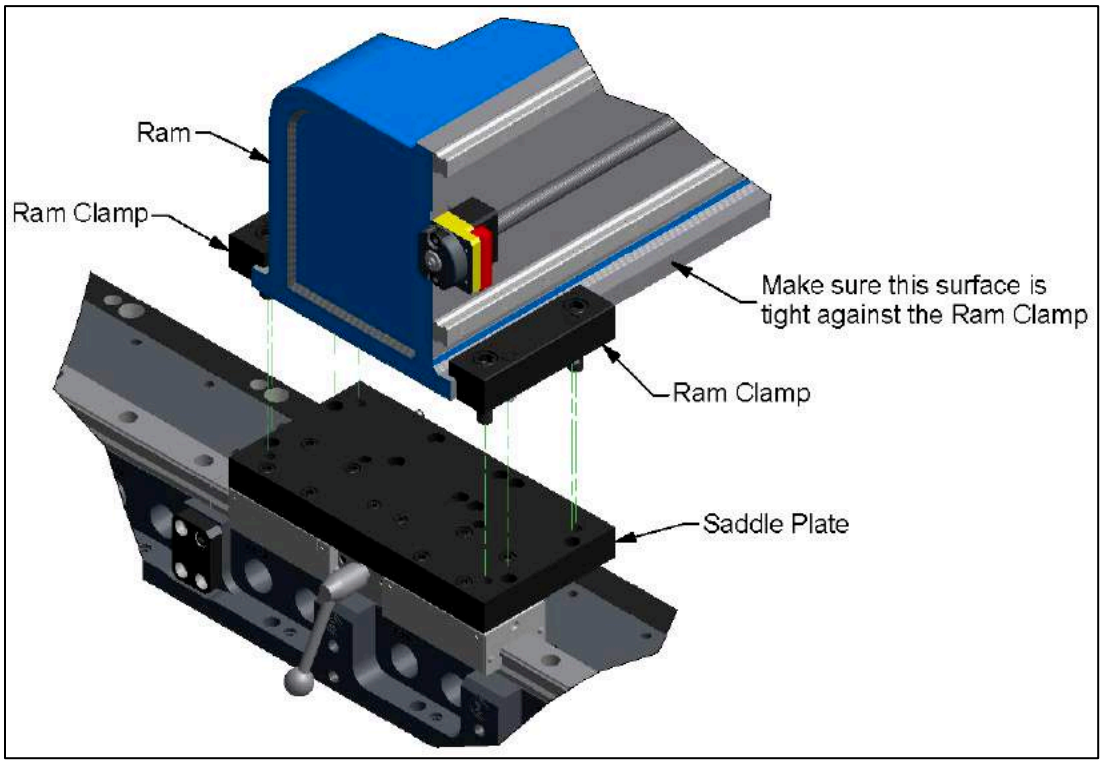


Figure 10

3. Repeat the previous step for the opposite end of the ram.

Attaching the Ram Tether Kit

Ram Tether Kit Installation Overview

This section contains information necessary for installation of the linear mill ram tether kit on the LM5200/6200 linear mill. The ram tether kit should be installed on the Linear Mill whenever the machine is configured with the ram oriented vertically.

A vertical orientation is one in which the long axis of the ram is oriented so that it is perpendicular to the surface of the earth, as shown in Figure 11.

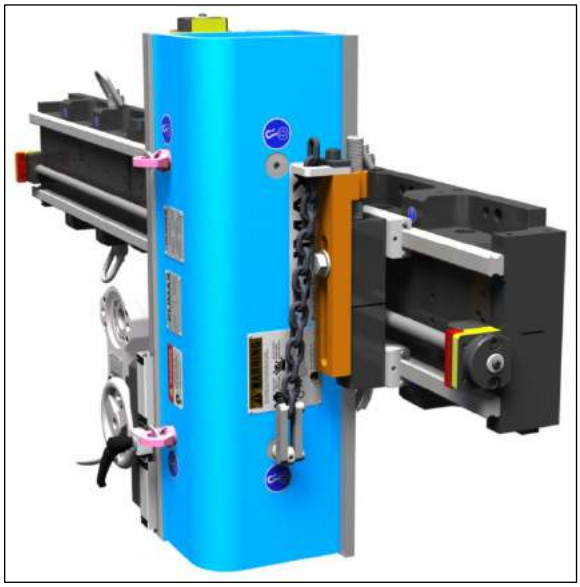


Figure 11. Ram tether kit in a vertically oriented linear mill

	WARNING
	Do not orient the ram of the linear mill vertically (Figure 11) without the ram tether kit installed. If the linear mill is used with the ram in a vertical orientation without the ram tether kit properly installed, the ram could slip or shift and potentially cause death or severe crushing injuries.

	IMPORTANT
	If installation of the linear mill ram tether kit cannot be completed on your machine for any reason, contact Climax before operating the machine with the ram in a vertical orientation.

Ram Hazard Warning Label

Check that the two ram hazard warning labels (P/N 78937, Figure 12) are applied to the ram in the locations identified in Figure 12. Refer to the instructions accompanying the label for application instructions.

Figure 12. Ram hazard warning label and placement

Installing the Ram Tether Kit

To install the ram tether kit on the linear mill, do the following steps:

1. Support the linear mill ram with rigging.
2. Remove the upper ram clamp block that is located in both of the following positions:
    a. On the opposite side of the ram from the milling head (see Figure 13 on page 45).
    b. The upper clamp block, when the ram is oriented vertically.

3. Attach the ram tether kit clamp block in the position of the removed (upper) ram clamp block. Use Table 3 for the fasteners and minimum torque settings of the clamp block for each model.

Table 3. Clamp block screw torque values

Model	Screw Type	Screw Torque
LM5200	M12	93 ft-lb (126 Nm)
LM6200	M16	230 ft-lb (312 Nm)

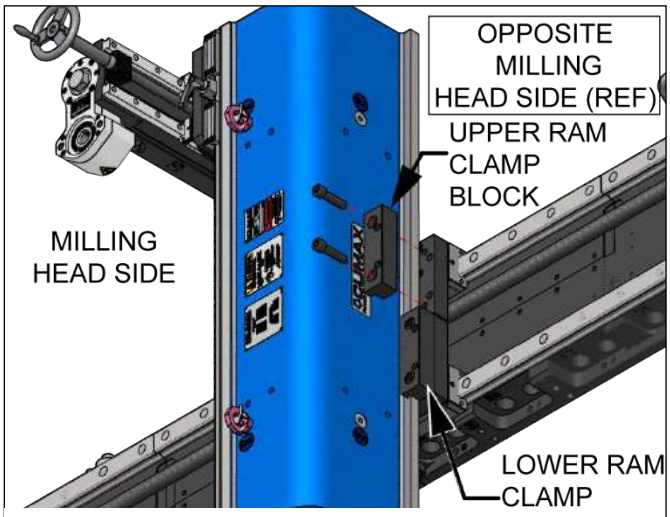


Figure 13. Upper ram clamp block removal

4. On the ram tether kit slide block, turn the setscrew until it is flush with the block inside surface (see Figure 14).
5. Install the slide block assembly on the tether kit clamp block with the supplied M16 hex head screw and washer so that the setscrew will point up when the ram of the linear mill is oriented vertically (Figure 15). Leave the M16 hex head screw loose in the clamp block hole.
6. Install the swivel base lifting eye in the threaded hole on the side of the ram that will be below the elevation of the tether kit clamp block when the ram of the machine is oriented vertically (Figure 15). Use Table 4 for the torque settings of the swivel base lifting eye for each model.
7. Select a tether chain length that will span from the hoist ring to the chain support plate.

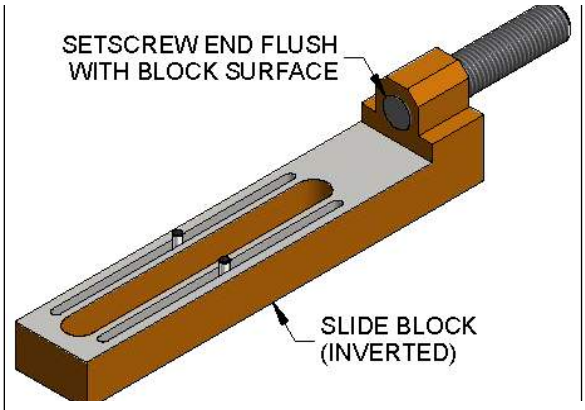


Figure 14. Slide block assembly

Table 4. Swivel base lifting eye torque values

Model	Swivel Base Lifting Eye Torque
LM5200	7 ft-lb (10 Nm)
LM6200	20 ft-lb (27 Nm)

8. Connect the chain end to the hoist ring shackle on the ram (Figure 17 on page 4746).

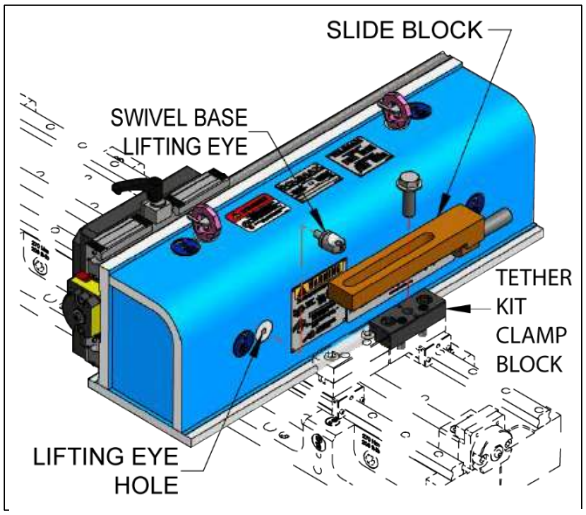


Figure 15. Slide block and swivel base lifting eye installation

9. Install the hoist ring shackle on the swivel base lifting eye (Figure 17 on page 47).
10. Attach one end link of the chain to the shackle (Figure 17 on page 47). Thread both shoulder screws into the hoist ring shackle until the shoulder is seated (Figure 16).

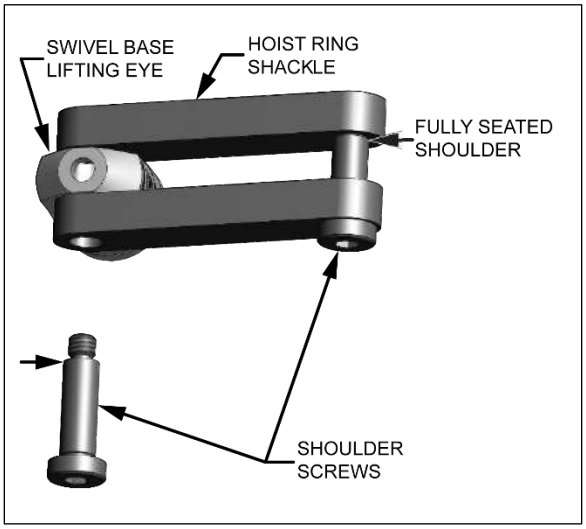


Figure 16. Seated shoulder screws

	WARNING
	When connecting the chain to the swivel base lifting eye, thread the shoulder screws completely into the hoist ring shackle. Failure to do so may cause the shackle/chain connection to fail and allow the ram to slip or shift, potentially causing death or serious crushing injury.

11. Thread the other end of the chain through the chain support plate (Figure 17 on page 47).
12. Attach the Chain Support Plate to the Slide Block with the supplied rectangle washer and M12 socket head cap screw (Figure 17 on page 47). Torque to 65 ft-lb (88 Nm).

13. Tighten the slide block setscrew against the clamp block until all detectable slack (i.e., clearance between chain links) is removed from the chain.

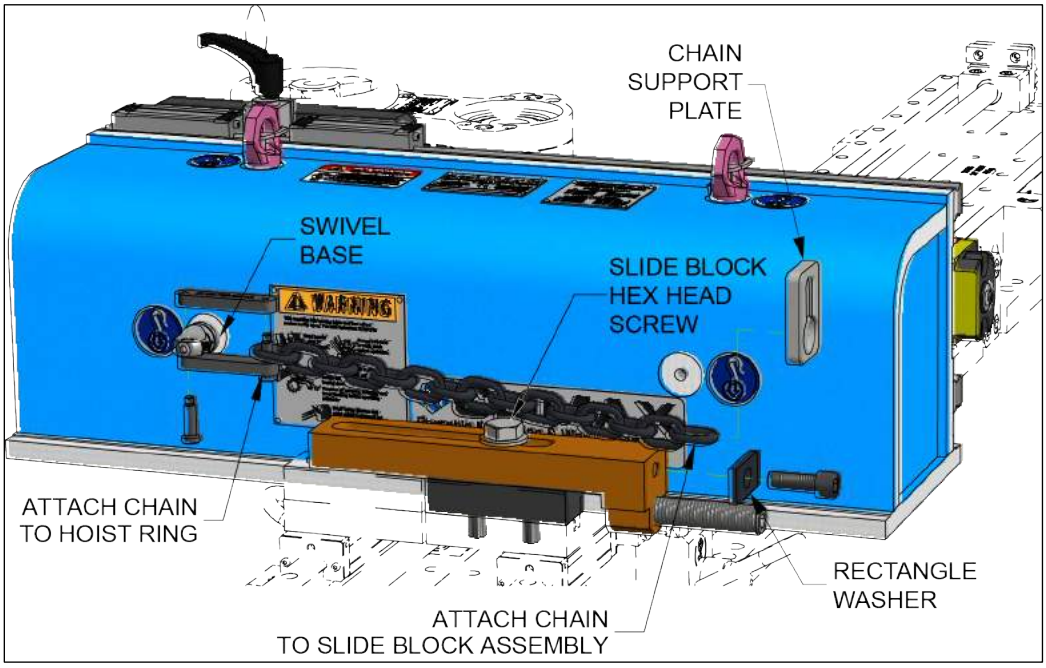


Figure 17. Safety tether chain installation

	WARNING
	If any slack remains in the chain, the ram could slip, shift, or fall during machine operation. Even a very short drop may cause the chain shackle to fail, potentially resulting in death or serious crushing injury.

14. Torque the slide block hex head screw to 150 ft-lb (200 Nm).

Removing the Ram Tether Kit

	WARNING
	If the ram of the linear mill is oriented vertically, do not remove the ram tether kit without first supporting the ram with rigging. Attempting to do so may cause the ram to slip or fall, potentially causing death or serious crushing injury.

To remove the Ram Tether Kit from the linear mill, complete the following tasks.

1. Do the installation tasks in Section Installing the Ram Tether Kit on page 44 in reverse order.
2. Install the original clamp block on the linear mill bed.

	INFORMATION
	Unless a new machine configuration requires its removal, the ram safety kit clamp block that was installed in Section Installing the Ram Tether Kit on page 44 can remain in place on the machine and function as a regular clamp block. Unless a new machine configuration requires its removal, the swivel base lifting eye that was installed in Section Installing the Ram Tether Kit on page 44 can remain installed on the ram.

	WARNING
	If the ram of the linear mill is oriented vertically, do not remove the supporting rigging from the ram until the ram is removed from the machine or the ram tether kit is reinstalled on the machine. Attempting to do so may cause the ram to slip or fall, causing death or serious crushing injury.

Attaching the Milling Assembly

1. Attach the milling head to the tramming plate on the ram using the mounting screws in each corner of the milling head mounting plate as shown in Figure 18.
2. Attach the tooling to the milling head by using the drawbolt to secure it in position. Use the gearbox locking tool, or the hydraulic motor, to hold the gearbox in place while tightening the drawbolt.

For safety reasons, the gearbox locking tool cannot be used when the hydraulic motor is installed.

	IMPORTANT
	Line up the keys on the milling head with the keyways on the tooling before tightening the drawbolt. Check that the mating surfaces of the milling head and tooling are clean before installation.

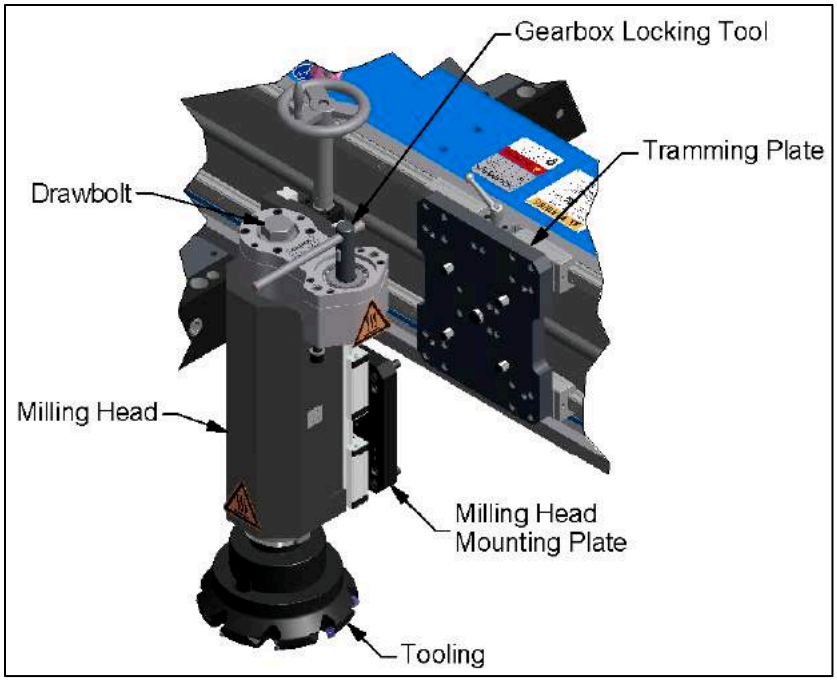
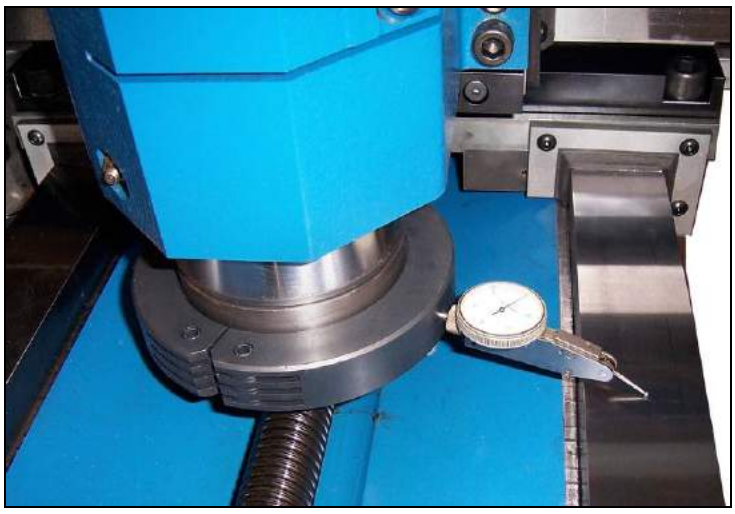


Figure 18

Tramming the Milling Assembly

The tramming plate is precision machined to be parallel to the ram and perpendicular to the bed. In many cases the default X-axis alignment of the milling assembly will be sufficient. If more precision is needed, the milling head mounting plate has been supplied with tramming screws. This allows the mounting plate to be jacked away from the tramming plate to adjust X-axis orientation, and rotated on the tramming plate to adjust Y-axis orientation of the milling assembly.

1. Attach a dial indicator with a magnetic base to the end of the spindle.



Example from the LM6000

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

3. Position the milling assembly over the bed using the ram feed system.
4. Sweep the top datum surface of the bed with the indicator by rotating the spindle.

	INFORMATION
	The bottom datum surface of the ram can also be used for indicating.

5. Tram the direction along the X-axis by adjusting the tramming screws on the milling head mounting plate as shown in Figure 12. The mounting screws will have to be loosened slightly to make these adjustments.

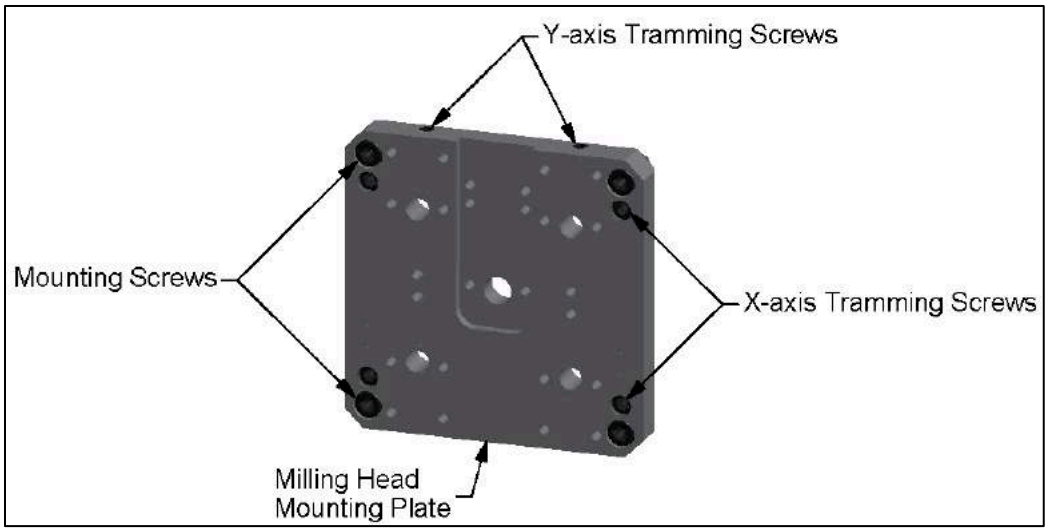


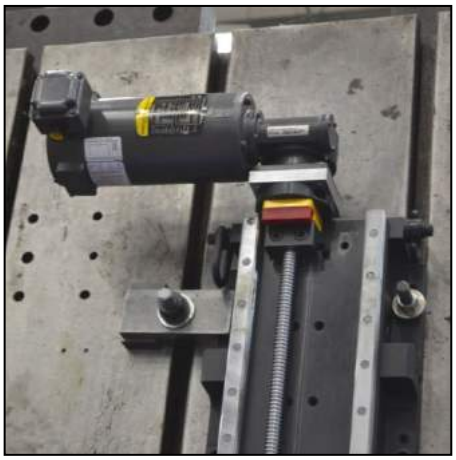
Figure 19

6. Tram the direction along the Y-axis by adjusting the top tramming screws.
7. When both directions are adjusted, tighten the mounting screws.

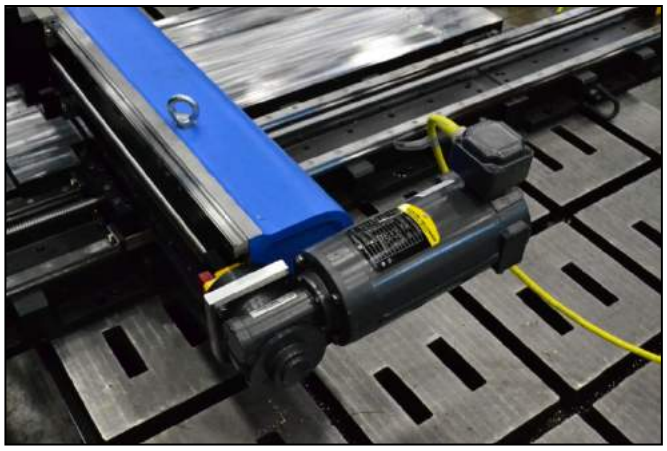
	IMPORTANT
	Watch the dial indicator while tightening the mounting screws to make sure that the milling assembly does not move. Make adjustments as necessary.

8. Remove the magnetic base and dial indicator, and reinstall the drive motor.

Attaching the Feed Motors



Motor attached to ballscrew on bed



Motor attached to ballscrew on ram

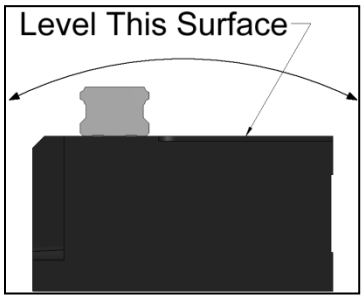
The feed motors are attached by aligning the hex and sliding the feed motor in place then tightening the clamp collar to secure it. Attach the feed motor(s) to the desired ballscrew and connect the control cables. The feed is controlled using the pendant attached to the HPU or stand-alone feed control.

Gantry Linear Mill Setup

The following is a suggested method of mounting and aligning the gantry style bed. What method is used varies greatly depending on the work piece and the equipment available to assist with setup. The setup described assumes a horizontal work piece. This setup would also work for a vertical work piece with the machine mounted horizontal, and the milling assembly turned 90°. Setting up the machine on a vertical work piece with the bed mounted vertically can be done but it requires more extensive equipment such as a laser plane to ensure the bed sections are co-planar. Refer to the Gantry Bed Assembly section for the procedure on assembling the bed. This procedure assumes the ballscrew and saddle plates are installed.

Coplanar Setup

1. Position the drive side of the bed. Ensure that when the drive side is leveled, the gantry side is capable of being made coplanar with it.
2. Level the drive side of the bed using a precision leveling tool, and tighten it down.



3. Position the gantry side of the bed, and rough align it using a tape measure.
4. Place the ram on the saddle plates, and tighten the ram clamps on the drive side as shown in Figure 13. Leave the ram clamps loose on the gantry side.

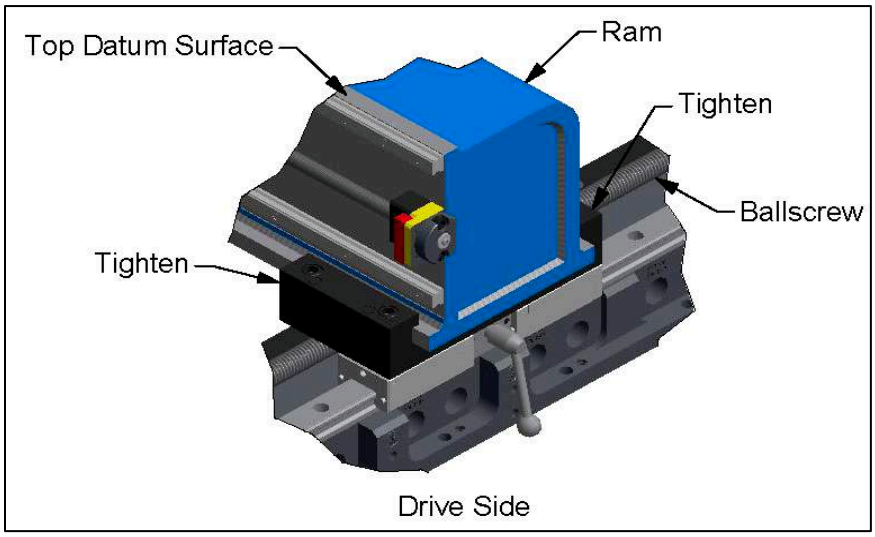
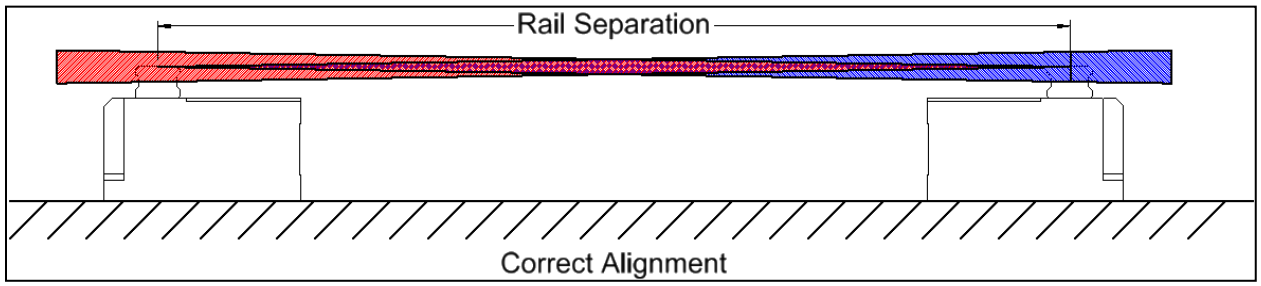
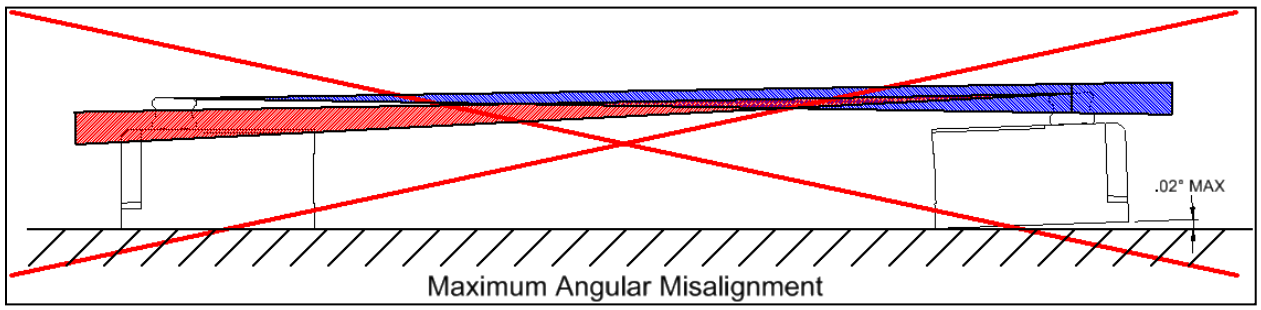
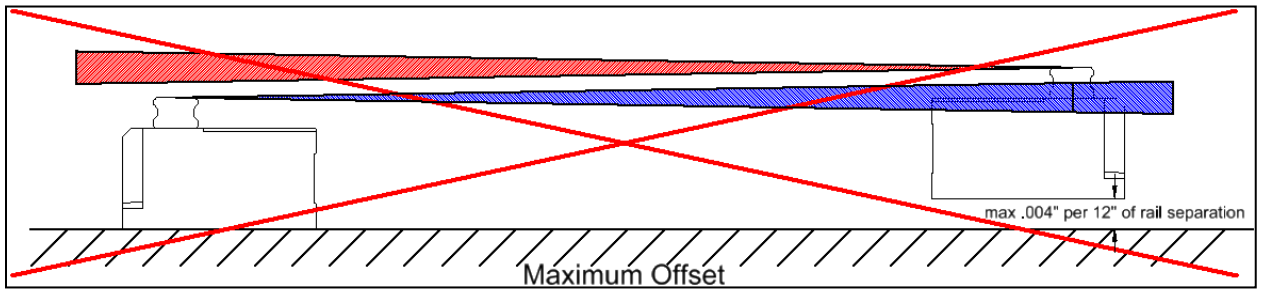


Figure 20

5. Use a precision leveling tool on the top datum surface of the ram to adjust the gantry side of the bed until it is coplanar with the drive side. The beds must be within 0.004 inch for every 12 inches the rails are separated. The following diagrams show the correct alignment, maximum angular misalignment, and maximum offset allowed.







Parallel Setup

Option 1

1. Move the ram to one end of the bed, and mount a dial indicator between the ram and the gantry rail as shown in Figure 14.

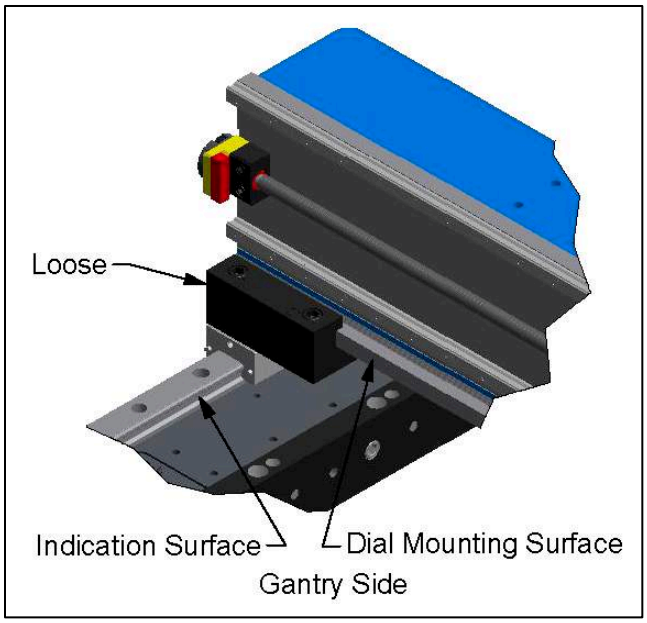


Figure 21

2. Use the feed motor on the bed to drive the ram from one end of the bed to the other. Adjust the gantry side of the bed as you go and align with the drive side so that the rails are parallel within 0.002 inch.
3. Repeat until there is no more adjustment needed, and then tighten down the bed and ram clamps on the gantry side.

	IMPORTANT
	When changing direction there may be significant movement of the indicator as the machine loads to move in the opposite direction.

Option 2

1. Remove the feed motor from the drive side of the bed.
2. Manually push the ram along the full length of the bed several times while tightening down the gantry side as you go.
3. Use a precision leveling tool and a dial indicator, as described previously, to check for spots that are out of alignment. Make adjustments as necessary.
4. Tighten down the ram clamps on the gantry side when no more adjustment is needed.

When complete, the ram should glide smoothly along the full length of the bed. A tight spot indicates an area that is out of alignment.

LM6200 Z-Axis Slide Attachment

Many milling applications require the milling head to be positioned parallel to the ram. An example is when milling an adjacent wall. The Z-axis slide attachment for the LM6200 bolts between the ram and the milling head and provides seven inches (178 mm) of travel in the z-axis. It can be mounted on the ram in three different positions – lower, middle, and upper. The milling head can be attached to the Z-axis slide at 0°, 90°, 180°, or 270°. A hand wheel, ratchet, or electric power feed can be used to turn the ballscrew which advances the slide back and forth. This allows precise positioning or travel during side machining operations, or additional travel for drilling.

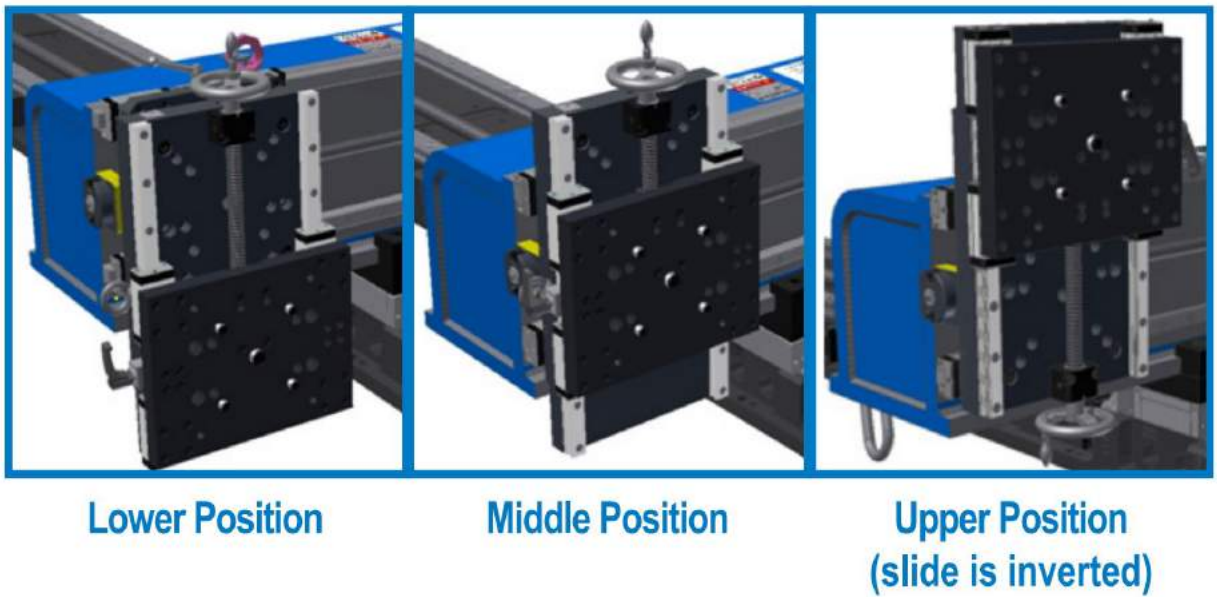


Figure 22 - Z-Axis Slide Position Options

Z-Axis Slide Mounting

To mount the Z-axis slide onto the ram, complete the following procedure. Once the Z-axis slide is mounted, regular milling head assembly and tramming instructions apply.

1. Remove the milling head from ram mounting plate (if already mounted).

	TIP
	In confined spaces, move the milling head to the end of the ram before removing the milling head from the ram.

2. Ensure that all Z-axis slide tramming screws are retracted. X-axis tramming screws are located on the face of the Z-axis slide just inside the four mounting screws, as shown in Figure 16. Y-axis tramming screws are located on the edge of the Z-axis slide bed, as shown in Figure 17.
3. On the Z-axis slide, move the milling head mounting plate to gain access to the appropriate mounting screw holes, as shown in Figure 16.

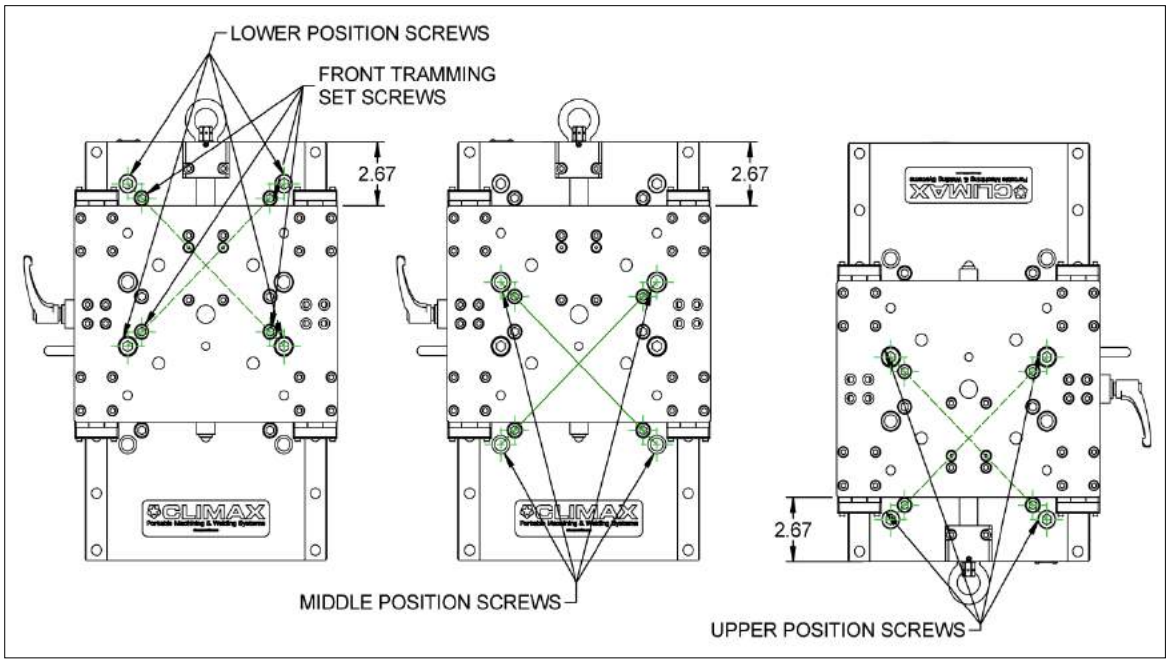


Figure 23 - Z-Axis Slide Mounting Screw Holes

IMPORTANT

If the Z-axis slide will be mounted in the middle position on the ram AND positioned over the bed, ensure that the bed skate Zerk fittings are pointing BELOW HORIZONTAL or they will interfere with movement of the milling head mounting plate.

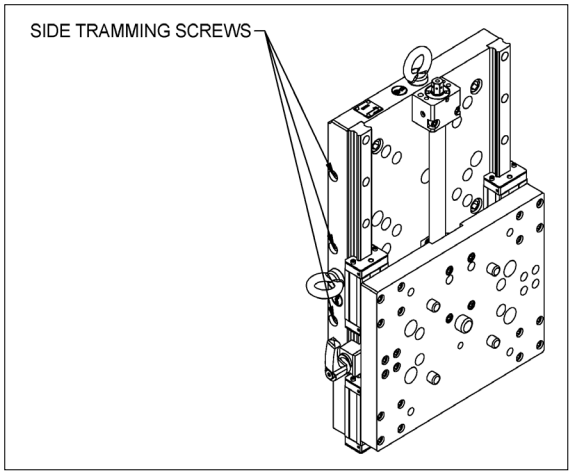


Figure 24 - Z-Axis Slide Side Tramming Screws

4. Using a crane and only the designated lifting points, align the Z-axis slide with the ram mounting plate alignment pins.
5. Insert the mounting screws and tighten.
6. Tram the Z-axis slide along the X-axis and Y-axis using the tramming screws shown in Figure 16 and Figure 17, respectively.

IMPORTANT

Tram the Z-axis slide before mounting the milling head to the slide mounting plate.

Z-Axis Slide Operation Checks

Attach the milling head to the Z-axis slide mounting plate. Refer to the views shown at the end of the manual to arrange the machine correctly and ensure correct position, enough travel and access.

The total travel range of the Z-axis slide installed in any orientation is 7.1 inches between hard stops, which coincides with the skates being flush with the ends of the rails at either end of travel.

IMPORTANT

Running the machine to hard stops is not recommended. Be especially careful when the skates are moving close to the rail ends to avoid contact with the Z-axis slide hard stop.

If the milling head tends to creep downward on the Z-axis slide when the Zimmer brake is not tight, retighten the two set screws on the ballscrew block of the Z-axis slide, just enough to avoid undesired movement; excessive pressure on the ball screw will result in unnecessary resistance to ballscrew rotation and accelerated wear of the drag tip. If the milling head is not meant to move along the Z-axis, lock the Zimmer brake before machining.

IMPORTANT

Do not move the milling head along the Z-axis with the Zimmer brake tightened.

Operation

	**WARNING**
	To avoid serious personal injury, do not reach inside the machine, and keep clear of moving parts while it is operating.

	**CAUTION**
	For machines with air motors, if the machine stops moving unexpectedly, lock out the pneumatic safety valve located at the filter lubricator assembly before performing any troubleshooting.

HPU (Hydraulic Power Unit)

Each HPU will have a control pendant and an E-Stop (Emergency Stop) button on the control panel cover. Read the manual included with your HPU, and follow the instructions before operating.

Pre-Start Checks

Before starting the machine always check for the following items:

- All energy supplies are OFF.
- Lines are properly connected.
- All machine parts are secure.
- The machine is securely mounted to the work piece.
- All handles and tools are removed from the machine.
- Cables and hoses are away from moving machine parts.
- Hydraulic fluid reservoir is full. (Consult the HPU manual for capacity and specification.)

Quick Steps for Operating

- Extend the spindle to touch the surface.
- Take a skim cut to test the settings.
- Check the finish.
- Adjust as necessary.

Controls

Main Power

Power on (1): Turns main power on to the HPU

E-Stop (2): Push to stop everything, twist to release and enable the system reset.

Spindle Controls

Spindle Start (3)

Spindle Stop (4)

Flow Control (5): Faster/Slower momentary selector: controls hydraulic spindle speed.

Feed Controls

Axis Selector Switch (6): Selects which feed axis is active. Bed (X-axis), Ram (Y-axis), or the Milling Head (Z-axis).

Rapid Traverse (8): Momentary Override of the feed speed selector and increases feed speed to maximum while the button is pressed. When released feed speed will return to that indicated on the feed speed selector knob.

Feed Speed Control Knob (7): Increases and decreases feed speed.

Feed Stop (9)

Feed Start Reverse (10)

Feed Start Forward (11)

WARNING

Rotating machinery can cause serious injury to the operator and bystanders. Turn off and lock out the machine before making the pre-start checks. When operating the machine, always be aware of the location of all people in the vicinity of the machine.

Before Machining

- Be sure the machine is secured to the work piece or fixture, and that it has been leveled or aligned to the job's requirements.
- Verify that the rigging has been removed from the machine. Do not remove the lifting eyes.
- Ensure setup tools are removed.
- Verify that the machine can move the full length without collisions.
- Ensure the milling head is properly setup.
- Ensure the milling cutter is securely mounted.
- Verify the feed direction and milling rate are set correctly.
- Check that all fasteners are tight.
- Verify that any turning or other movable parts are clear of obstructions.
- Ensure that all cables and hoses are secure and not in the path of moving parts.
- Test the E-Stop button before operation.

Machining

- Connect electrical power to the HPU.
- Ensure the system reset button is released.
- Turn on the main power.
- Turn the feed to minimum.
- Before putting the cutter near the work piece, test the travel direction of all axes to ensure that the settings match the direction you want to machine.
- Turn on the spindle. Verify the rotation direction of the cutter. If it is rotating in the incorrect direction, turn off the spindle. Press the E-Stop button. Lock out the HPU. Switch the hydraulic hoses at either the motor end or at the HPU to correct the rotation.
- Move the machine axes to the desired starting location.
- Advance the cutter to the desired cutting depth, and lock in place.
- Turn on the spindle and adjust the speed to the desired cutting rate.
- Turn the feed to minimum.
- Engage the feed and adjust the feed speed for the desired cut.
- Keep chips clear of moving parts.
- Do not step on hoses or cables. Metal chips can be forced through the cable jacket and damage cabling causing machine malfunction and unwanted down-time.

INFORMATION

A pair of drag brakes are located on opposite sides of the milling head leadscrew bearing block. See Figure 15. This applies drag to the rotation of the leadscrew in conjunction with the brake to prevent the milling head from settling due to the influence of gravity. A 4mm hex wrench is required to adjust the drag brakes.

Adjusting the Drag Brakes

The drag brakes should be tightened until the torque required to turn the leadscrew clockwise (downward feed) is 25 in-lb.

1. Remove the hand wheel and place a torque wrench equipped with a 1/2” socket on the end of the leadscrew.
2. Using a 4mm hex wrench, tighten the drag brakes in an alternating pattern while checking the leadscrew resistance between each adjustment. Continue to tighten the drag brakes until the torque resistance is 25 in-lb.

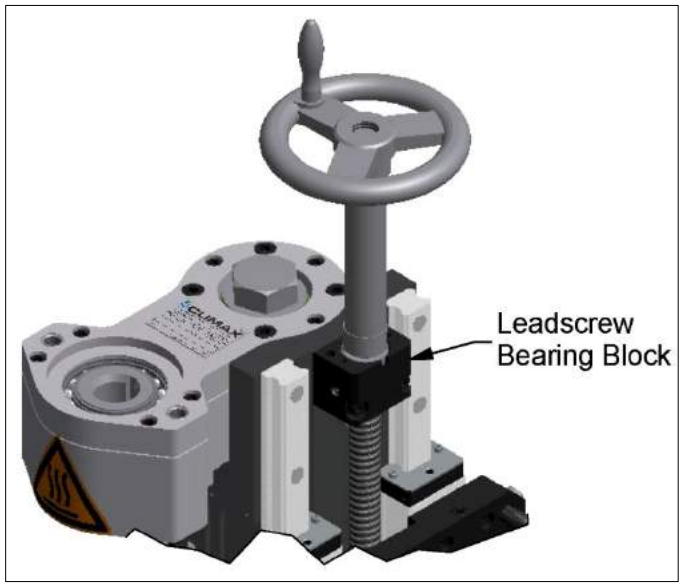


Figure 25. Leadscrew bearing block

After Machining

1. When the milling is complete, reduce the feed speed to minimum and stop the feed.
2. Retract the milling head from the work piece, and stop the spindle.
3. Press the E-stop button.
4. Lockout the HPU before removing the cutter, replacing inserts, or performing maintenance.

	CAUTION
	Do not stop the spindle when the feed is running or broken inserts will result.

Maintenance

	**CAUTION**
	Failure to properly maintain the machine will result in premature wear or damage to the machine. Damaged caused by improper or inadequate machine maintenance is not covered by the machine limited warranty.

Cleaning and Lubrication

- Clean the machine after each use to remove dirt, grease, metal chips, and moisture.
- Wipe dry with clean materials.

Proper lubrication accomplishes the following:

- Minimizes friction to prevent seizure and reduce wear.
- Forms an oil film on metal surfaces to decrease friction and pressure acting on the surface.
- Prevents oxidation and corrosion of metal surfaces.

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

Approved Lubricants

Application	Lubricant	Biodegradable Lubricant	Viscosity (cSt)	Quantity	Frequency
Rectangular & Dovetail Ways[1]	ExxonMobil Vactra No. 2S	N/A	67.78 @ 40C 8.6 @ 100C	Light coating applied by hand	Daily during machine use
Gearboxes and mechanisms lubricated with grease[2]	CONOCO PolyTac EP 2	CASTROL BioTac EP 2	129 @ 40C 11.6 @ 100C	2 cc	Monthly during machine use. Replace grease every 2 years.
Gearboxes using oil	CASTROL Tribol 800/220	CASTROL BioTrans	220 @ 40C 34 @ 100C	Fill to fill plug or mid-sight glass	Refill every use. Replace oil every 2 years[3].
Lead screws	-NOOK E-100 spray lube	CASTROL BioTac EP 2	96 @ 40C 11.3 @ 100C	Light coating applied by hand	Weekly during machine use

[1] 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.
[2] 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).
[3] Never assume that oil in drums is clean. Always filter oil before filling gearbox (filter paper or 5 micron filter).

Application	Lubricant	Biodegradable Lubricant	Viscosity (cSt)	Quantity	Frequency
	-NOOK PAG-1 grease				
Ball screws	THK ball screws – THK AFG Grease	N/A	Not Available	Sizes < 32 mm use 0.16 cc per nut Sizes >=32 mm use 0.24 cc per nut	1x per use or weekly for continued use
	NOOK ball screws – NOOK E-900L	CASTROL BioTac EP 2	Not Available		
Linear & curved rail	THK Rail – THK AFA Grease[4]	N/A	32 @ 40C	Sizes <35 use 0.16 cc per bearing block Sizes >=35 use 0.24 cc per bearing block	1x per use or weekly for continued use
	CONOCO PolyTac EP 2	CASTROL BioTac EP 2	129 @ 40C 11.6 @ 100C		
Hydraulic power units	CASTROL Hyspin AWS-46 (summer)	CASTROL BioBar 46 (summer); 32 (winter)	46 @ 40C 6.82 @ 100C	As required to fill reservoir to mid-sight glass level	Refill every use. Replace oil every 2 years[5]
	AWS-32 (winter)		32 @ 40C 5.44 @ 100C		
Electric motors	See vendor literature	N/A	N/A	See vendor literature	See vendor literature
Tapping & Drilling	STECO Tap Magic XTRA-FOAMY	-STECO Tap Magic Protap -Chesterton 388	Not Available	As required	Per hole tapped or drilled
Cutting Oil	CONOCO AW 32	CONOCO Ecoterra 32	32 @ 40C 5.44 @ 100C	As required	Continued use while cutting

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

Lubrication for THK Railing

THK, manufacturer of the rail assembly, recommends the rail block be lubricated every **65 hours** of operating time with 2.6cc of AFA grease.

IMPORTANT

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

[4] Use of other lubricants on THK products will void manufacturer's warranty.
[5] 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.

Disassembly and Storage

- Retract the milling head from the work piece.
- Remove the tooling.
- Remove hoses.
- Remove the milling head using a sling. (Not required, the milling head and ram can be stored assembled if required.)
- Remove the ram from the bed and place in storage container.
- Remove the feed motor and install brakes on the ends of the ballscrews.
- Attach lifting equipment to the beds using the supplied hoist rings.
- Remove the machine from the work piece.
- Clean the machine to remove dirt, grease, metal chips, and moisture.
- Apply LPS lubricant to unpainted surfaces to prevent corrosion.
- Store in the container provided.
- Place desiccant bags or vapor wrap around the machine to absorb moisture.

CLIMAX advises changing the desiccant bags in the storage crate every 18 months.

Specifications

Machine Performance Ranges	English	Metric
Bed Length	48.0 - 168.0 Inches in 24 Inch Increments	(1219.2 - 4267.2 mm in 609.6mm increments)
Bed Travel (X Travel)	32.0 - 152.0 inches	(812.8 - 3860.8 mm)
Ram Lengths	36, 48, or 82 Inch	(914.4, 1219.2, or 2082.8 mm)
Axial Tool Head Travel	8 inches	(203 mm)
Milling Head Gearbox Ratio	1 : 1	1 : 1
Tool Head Tramming Swivel	0.17°	
Gearbox Position Adjustment	180° in 90° increments (3 positions)	
Electric Feed		
Drive Power	Modified Baldor GP3303 1/2 HP DC Gear motor	
Gearbox Reduction	20 : 1	
Speed Range:	1-24 in/min	(25.4-609.6 mm/min)
Power input requirements	0.37kW @ 120V or 230V	
Manual Feed		
Feed Per Revolution of Motor	0.01 in/rev	(.254 mm/rev)
X Travel		
Drive Type	Nook 1-1/4" x 0.2 LH Lead XPR Series Driving Linear Rails	
Drive Power	Manual or DC Electric Motor (Modified Baldor GP3303)	
Linear Rails	THK SHS45 Rails	
Y Travel		
Drive Type	Eichenberger 20 mm x 5 mm Ball Screw Driving Linear Rails	
Drive Power	Manual or DC Electric Motor (Modified Baldor GP3303)	
Linear Rails	THK SHS25 Rails	
Z Travel		
Drive Type	Eichenberger 20 mm x 5mm Ball Screw Driving Linear Rails	
Drive Power	Manual or DC Electric Motor (Modified Baldor GP3303 w/ Z-axis feed adapter)	
Linear Rails	THK SHS25 Rails	
Tool Holder	Inch #50 Taper NMTB, Inch #50 Taper CATV, Metric #50 Taper NMTB, Metric #50 Taper CATV	

Tooling Recommendations	
47383: 4 inch (101.6 mm) #50 Taper w/ Inserts	Max RPM: 382 Max Depth of Cut: 0.060 inches (1.524 mm)
47384: 5 inch (127.0 mm) #50 Taper w/ Inserts	Max RPM: 306 Max Depth of Cut: 0.060 inches (1.524 mm)
47385: 6 inch (152.4 mm) #50 Taper w/ Inserts	Max RPM: 255 Max Depth of Cut: 0.050 inches (1.270 mm)
47386: 8 inch (203.2 mm) #50 Taper w/ Inserts	Max RPM: 191 Max Depth of Cut: 0.040 inches (1.016 mm)
56175: 10 inch (254.0 mm) #50 Taper w/ Inserts	Max RPM: 153 Max Depth of Cut: 0.035 inches (0.889 mm)
47229: Carbide Inserts	

*Maximum Material removal rate is 12 in^3/min (196.6 cm^3/min). When using an aggressive feed rate, it is recommended that the spindle RPM be increased to reduce the chip load. Depth of cut may vary depending on rigidity of setup.

Exploded Views and Parts Lists

The following diagrams and parts lists are for your reference purposes only. The machine Limited Warranty is void if the machine has been tampered with by anyone who has not been authorized in writing by Climax Portable Machining and Welding Systems to perform service on the machine.

Tool Kit P/N 64239

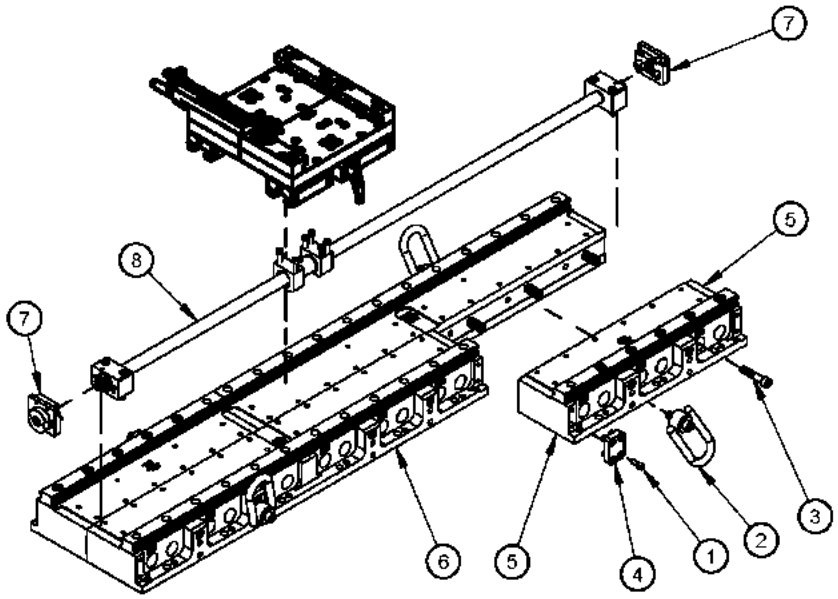
PART NO.	DESCRIPTION	QTY	UoM
14818	WRENCH RATCHET 1/2 DRIVE	1	Piece
19700	CONTAINER SHIPPING FLAT ROOF 20 X 8.75 X 10.5	1	Piece
30207	SCREW M12 X 1.75 X 35MM SHCS GRADE 8.8	24	Piece
30265	EXTENSION SOCKET WRENCH 1/2 DRIVE X 6 CHROME	1	Piece
35516	HAMMER DEAD BLOW 1-3/4 DIA HEAD (KB)	1	Piece
37691	WRENCH HEX 8MM X 11.2 T-HANDLE BALL END	1	Piece
38678	WRENCH HEX SET 1.5 - 10MM BONDHUS BALL END (KB)	1	Piece
46249	WRENCH HEX BIT SOCKET 14MM X 1/2	1	Piece
64744	TOOL ALIGNMENT BED SECTION LM LINE	2	Piece
65284	HANDWHEEL 5 IN. DIA 1/2" HEX CAST IRON DISHED W/ REVOLVING HANDLE	1	Piece
66447	MANUAL INSTRUCTION LM6200	1	Piece
82768	RAIL CHECK TOOL	1	Piece

Drawing List

81586 – Bed & Saddle Assembly
64406 – Ballscrew Lock Assembly
84314 – Saddle Assembly
81628 – Gantry Kit Assembly
72584 – Ram Assembly
64405 – Ballscrew Lock Assembly
64513 – Bearing Block Assembly
73354 – Milling Head Assembly
72277 – Milling Head
64684 – Feed Assembly, 120V
92945 – Feed Motor Assembly, 120V
64743 – Feed Assembly, 230V
95803 – Feed Motor Assembly, 230
81492 – Mill Face Assembly
53508 – Hydraulic Motor Assembly

Optional Parts Drawings

63250 – Milling Head Swivel Plate Assembly
64720 – Riser Assembly, 1 & 3 inch
64722 – Riser Assembly, 5 & 7 inch
64856 – Milling Head Z-Axis Mount Assembly
66472 – Ballscrew Assembly
64556 – Bearing Block Assembly
74110 – Z-axis assembly 7” travel



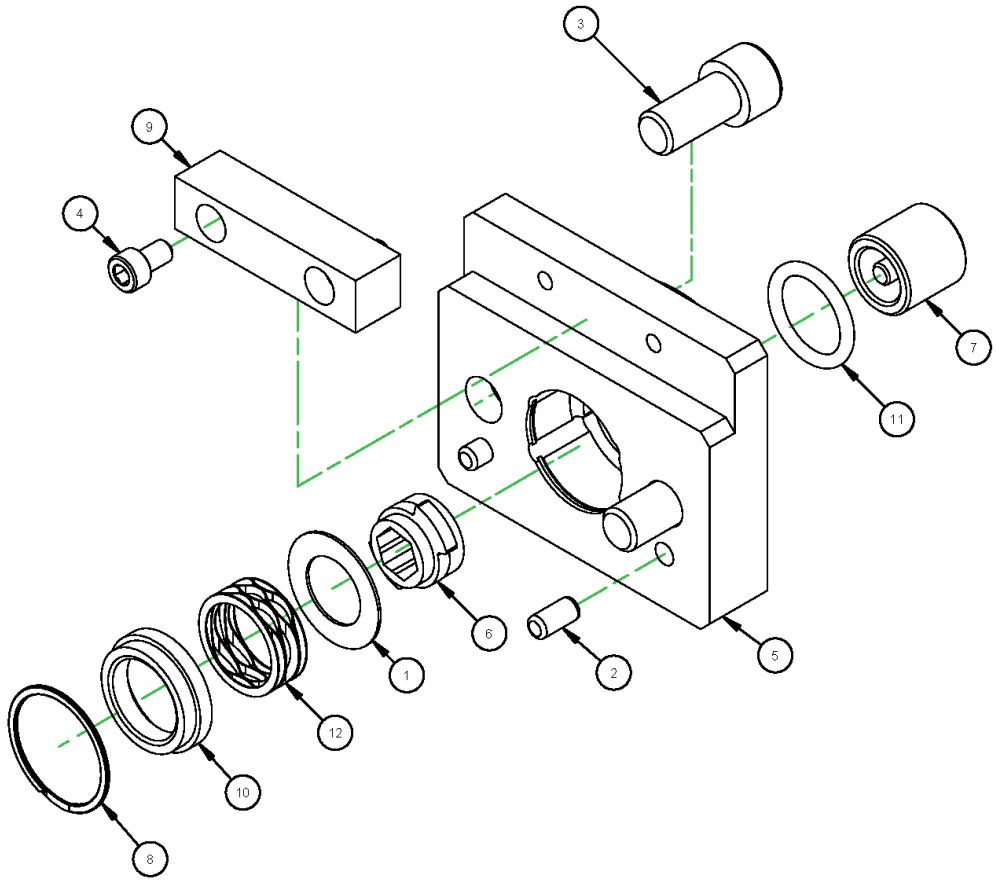
AVAILABLE CONFIGURATIONS	
Column 1	Column 2
ASSY BED & SADDLE 32" TRAVEL (48" LONG) LM6200	64948
ASSY BED & SADDLE 56" TRAVEL (72" LONG) LM6200 (SHOWN)	64949
ASSY BED & SADDLE 80" TRAVEL (96" LONG) LM6200	64950
ASSY BED & SADDLE 104" TRAVEL (120" LONG) LM6200	64951
ASSY BED & SADDLE 128" TRAVEL (144" LONG) LM6200	64241
ASSY BED & SADDLE 152" TRAVEL (168" LONG) LM6200	64952
ASSY BED & SADDLE 176" TRAVEL (192" LONG) LM6200	64953

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	VARIES	35339	SCREW M10 X 1.5 X 25mm SHCS
2	4	58154	RING HOIST M16 X 2.0 X 175MM 1900kg (4180lbs)
3	VARIES	62614	SCREW M16 X 2.0 X 75MM SHCS
4	VARIES	64212	PLATE BED CONNECTION LM5200 LM6200
5	VARIES	64243	ASSY 24 INCH BED SECTION LM6200
6	VARIES	64246	ASSY 48 INCH BED SECTION LM6200
7	2	64406	ASSY BALLSCREW LOCK 1-1/4
8	1	66471	ASSY BALLSCREW 32" TRAVEL 48" LONG LM6200 (FOR 64948)
		66472	ASSY BALLSCREW 56" TRAVEL 72" LONG LM6200 (FOR 64949)
		66473	ASSY BALLSCREW 80" TRAVEL 96" LONG LM6200 (FOR 64950)
		66474	ASSY BALLSCREW 104" TRAVEL 120" LONG LM6200 (FOR 64951)
		66475	ASSY BALLSCREW 128" TRAVEL 144" LONG LM6200 (FOR 64241)
		66476	ASSY BALLSCREW 152" TRAVEL 168" LONG LM6200 (FOR 64952)
		66477	ASSY BALLSCREW 176" TRAVEL 192" LONG LM6200 (FOR 64953)
9	1	84314	ASSY SADDLE LM6200 W / ZIMMER BRAKES AND RAM TETHER

81586-CHART ASSY BED & SADDLE LM6200- REV B

FOR REFERENCE ONLY

Figure 26. Bed and saddle assembly (P/N 81586)

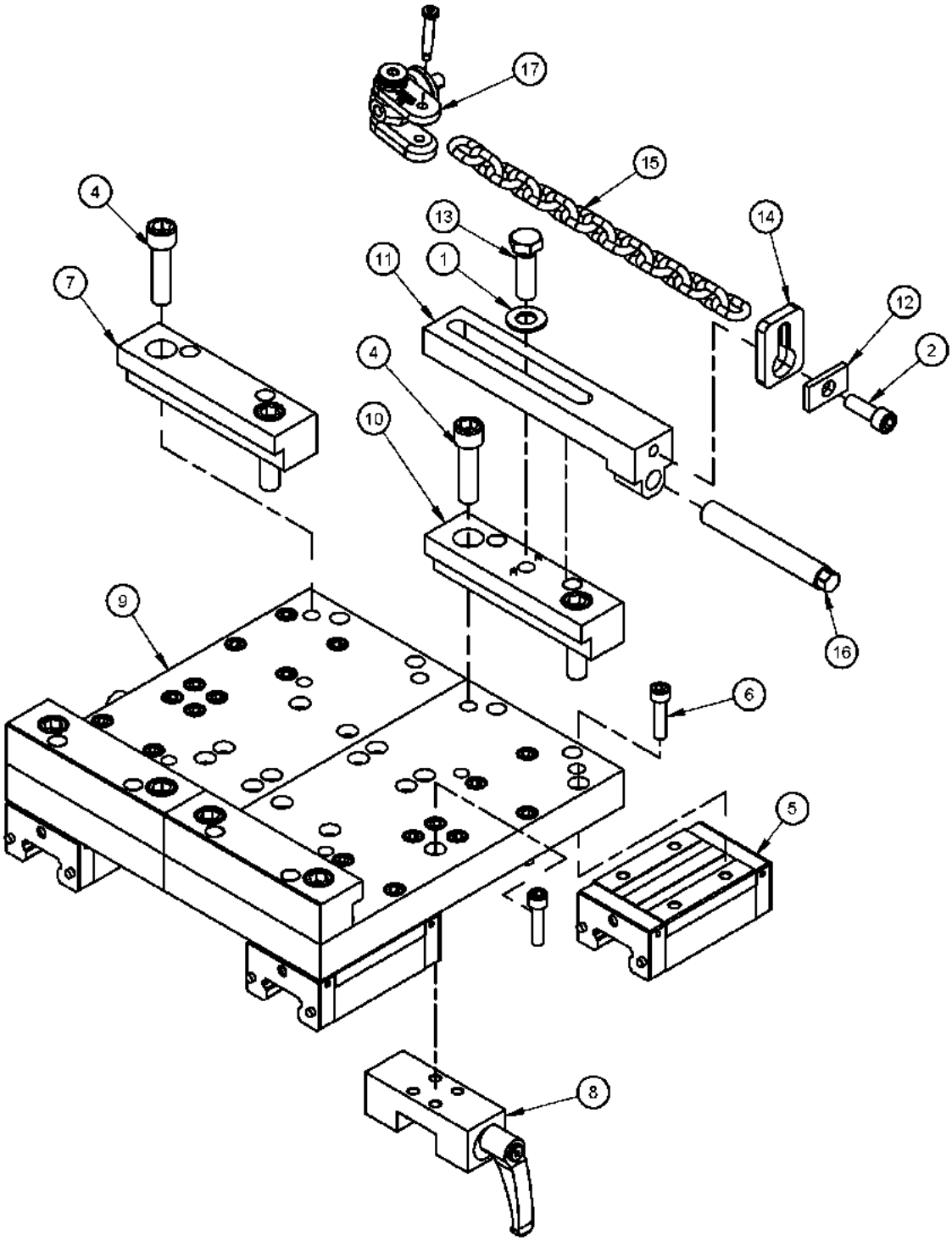


PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	1	11739	WASHER THRUST .750 ID X 1.250 OD X .0312
2	2	20166	PIN DOWEL 1/4 DIA X 1/2
3	2	42094	SCREW M12 X 1.75 X 25mm SHCS
4	2	57281	SCREW M6 X 1.0 X 10MM SHCS
5	1	64408	HOUSING BALLSCREW LOCK 1-1/4
6	1	64409	SLEEVE ENGAGEMENT BALLSCREW LOCK
7	1	64410	CAP OVERRIDE BALLSCREW LOCK
8	1	64412	RING SNAP 1-5/16 ID SPIRAL MEDIUM DUTY .085 THICK
9	1	64416	BUMPER 2-1/2 X 5/8 X 5/8 POLYURETHANE 80A RED
10	1	66712	RETAINER SPRING LM6200
11	1	66728	RING O 1/8 X 7/8 ID X 1-1/8 OD
12	1	69397	SPRING WAVE 1.125 OD X .094 FLAT WIRE X .400

64406 - ASSY BALLSCREW LOCK 1-1/4 - REV A

FOR REFERENCE ONLY

Figure 27. Ballscrew lock assembly (P/N 64406)



84314 - ASSY SADDLE LM6200 W / ZIMMER BRAKES AND RAM TETHER - REV -

FOR REFERENCE ONLY

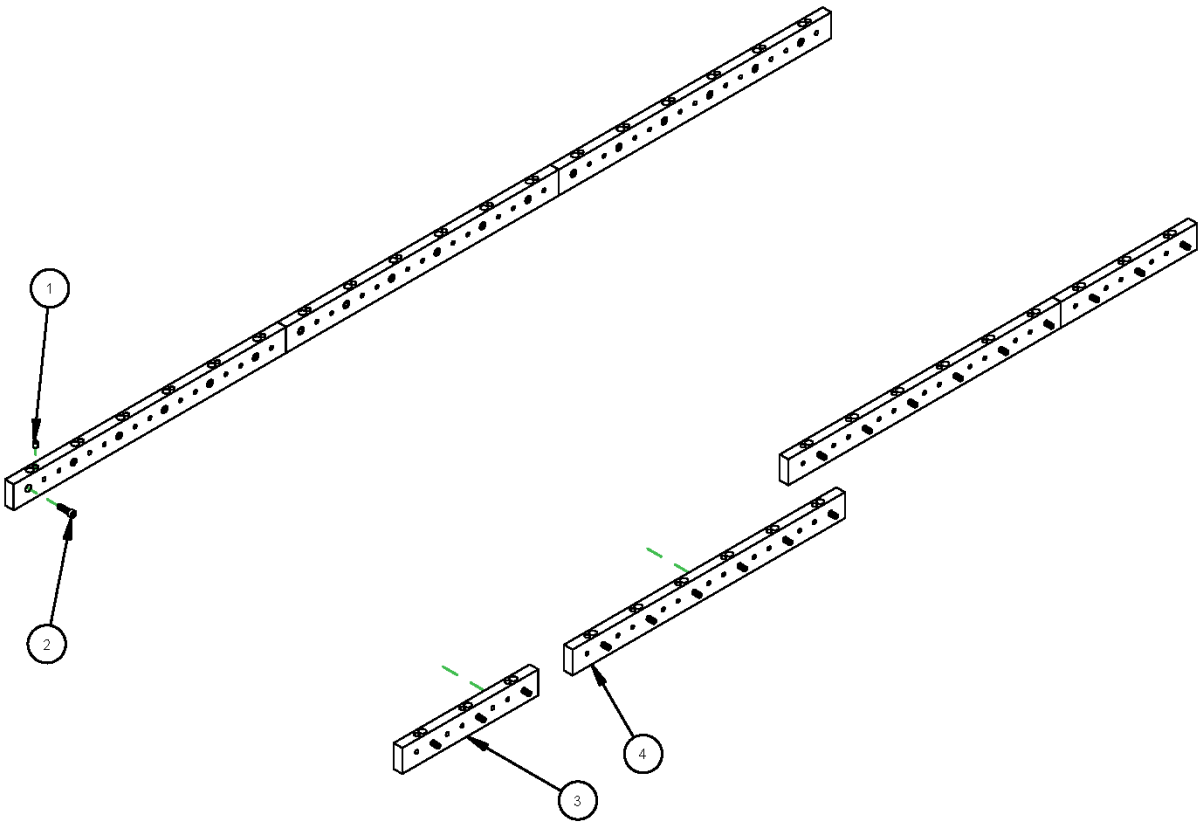
Figure 28. Saddle with Zimmer brakes and ram tether assembly (P/N 84314)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	15208	WASHER 5/8 SAE FLTW HARDENED
2	1	30207	SCREW M12 X 1.75 X 35mm SHCS
3	4	37749	(NOT SHOWN) WIRE TIE VELCRO 11 LONG
4	8	57422	SCREW M16 X 2.0 X 60mm SHCS
5	4	64277	BLOCK THK SHS45V PRELOADED METAL SCRAPERS FOR JOINING
6	24	64339	SCREW M10 X 1.5 X 40MM SHCS
7	3	64580	ASSY CLAMP RAM LM5200
8	2	72610	ZIMMER BRAKE 45mm RAIL
9	1	72611	SET PLATE SADDLE LM6200
10	1	78877	CLAMP RAM TETHER LM6200
11	1	78879	BLOCK SLIDE RAM TETHER LM
12	1	79905	WASHER RECTANGLE 14 MM ID X 45MM W X 25MM H X 6MM T
13	1	80530	SCREW M16 X 2.0 X 50MM HHCS
14	1	80533	PLATE CHAIN SUPPORT
15	1	80567	CHAIN 1/4 X 12 IN 3500 LBS LOAD
18	1	80744	(NOT SHOWN) CHAIN 1/4 X 36 IN 3500 LBS LOAD
19	1	80745	(NOT SHOWN) CHAIN 1/4 X 48 IN 3500 LBS LOAD
16	1	80748	SCREW M20 X 2.5 X 5.71 IN SMALL HEX
17	1	80751	HOIST RING M12 X 1.75 2314 LBS SWIVEL ASSY

84314 - ASSY SADDLE LM6200 W / ZIMMER BRAKES AND RAM TETHER - REV -

FOR REFERENCE ONLY

Figure 29. Saddle with Zimmer brakes and ram tether assembly parts list (P/N 84314)



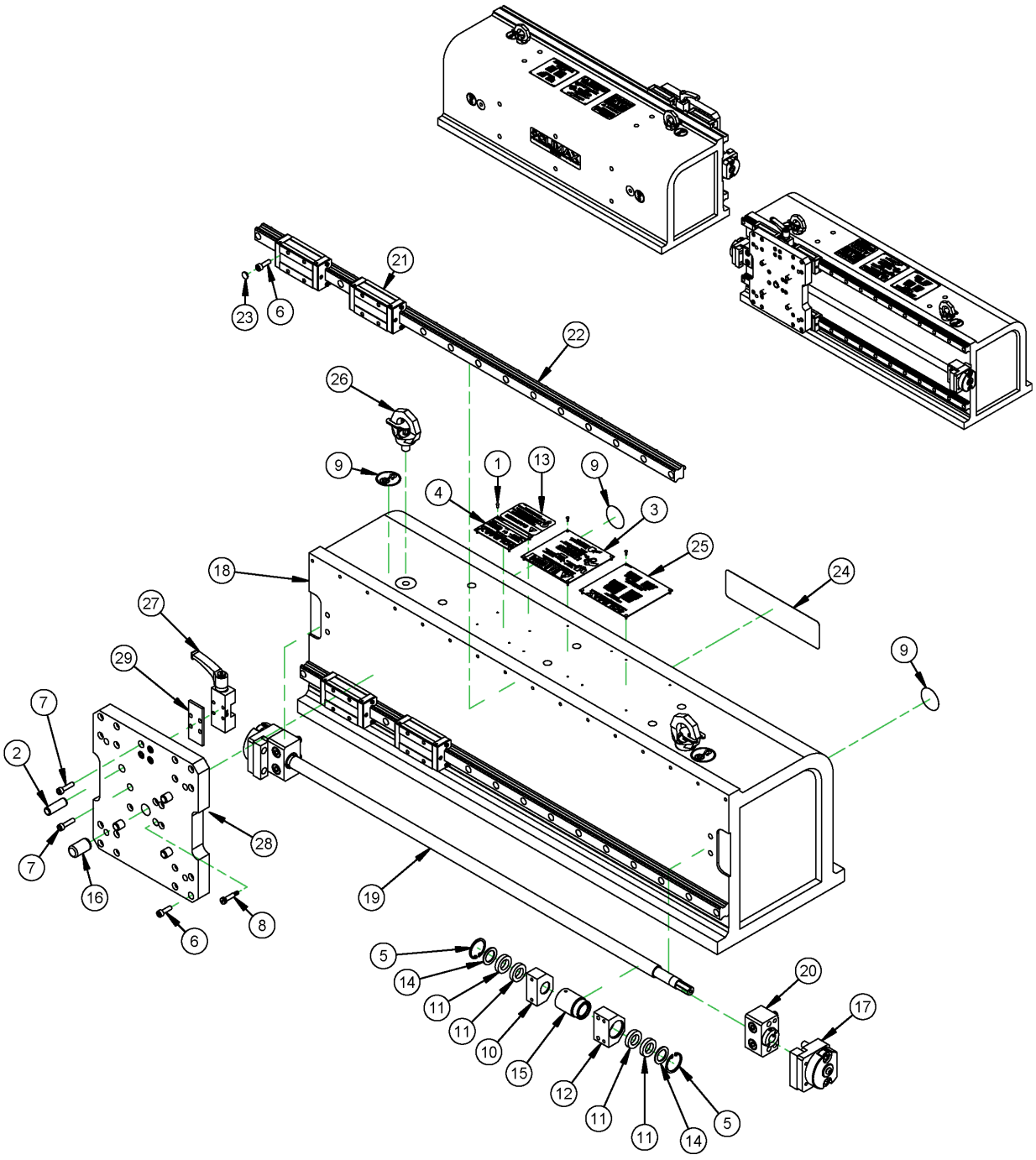
AVAILABLE CONFIGURATIONS	
DESCRIPTION	PART NUMBER
ASSY GRANTRY KIT 48 INCH LM6200	64973
ASSY GANTRY KIT 72 INCH LM6200	64974
ASSY GANTRY KIG 96 INCH LM6200	64975
ASSY GANTRY KIT 120 INCH LM6200	64976
ASSY GANTRY KIT 144 INC H LM6200	64831
ASSY GANTRY KIT 168 INCH LM6200	64977

PARTS LIST								
ITEM	PART No.	DESCRIPTION	64973	64974	64975	64976	64831	64977
1	46212	SCREW M16 X 2 X 20mm SSSFP	12X	18X	24X	30X	36X	42X
2	64518	SCREW M16 X 2.0 X 50MM SHCS	12X	18X	24X	30X	36X	42X
3	64630	PLATE CONNECT GANTRY 24 IN LM6200	0X	2X	2X	2X	2X	2X
4	64631	PLATE CONNECT GANTRY 48 IN LM6200	2X	2X	3X	4X	5X	6X

81628-CHART KIT GANTRY LM6200 - REV A

FOR REFERENCE ONLY

Figure 30. Gantry kit chart assembly (P/N 81628)



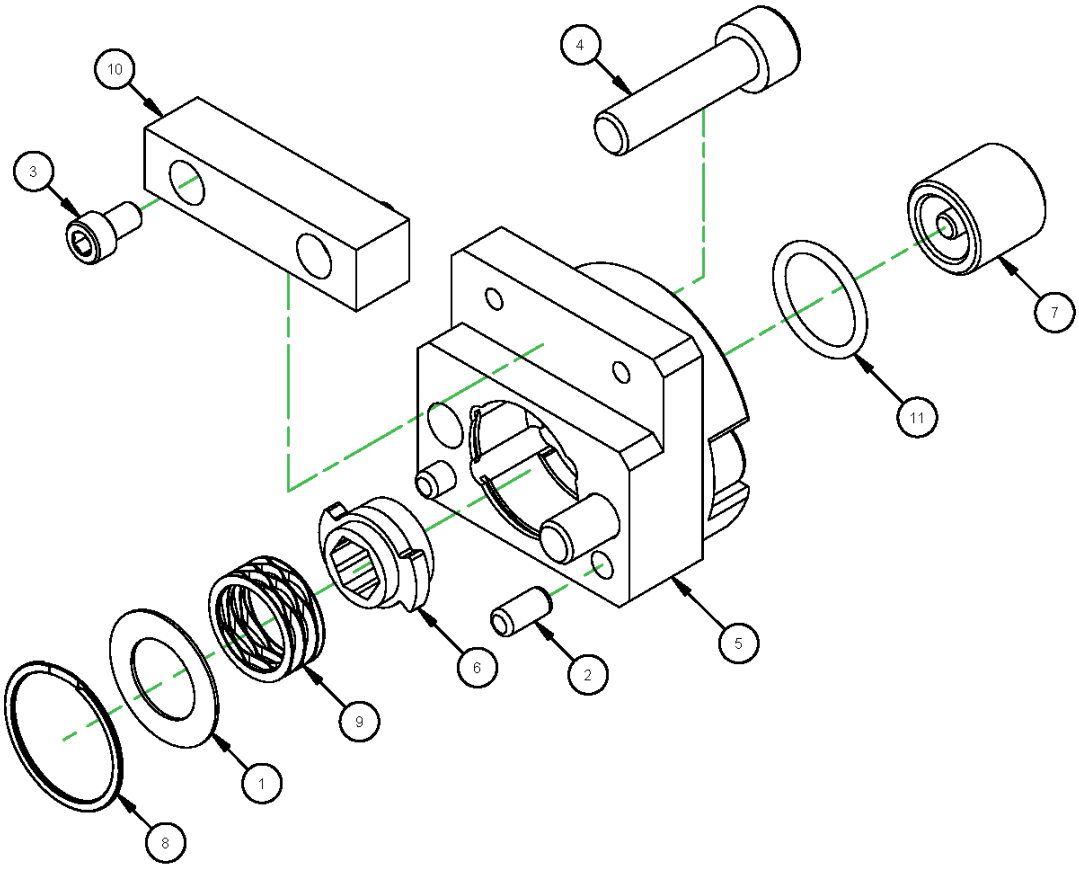
ASSY RAM 36 INCH LENGTH 26 INCH TRAVEL LM6200 (SHOWN)	72584
ASSY RAM 48 INCH LENGTH 38 INCH TRAVEL LM6200	72585
ASSY RAM 82 INCH LENGTH 72 INCH TRAVEL LM6200	72586
ASSY RAM 116 INCH LENGTH 106 INCH TRAVEL LM6200	72587

Figure 31. Ram assembly (P/N 72584)

AVAILABLE CONFIGURATIONS	
DESCRIPTION	PART NUMBER
ASSY RAM 36 INCH LENGTH 26 INCH TRAVEL LM6200 (SHOWN)	72584
ASSY RAM 48 INCH LENGTH 38 INCH TRAVEL LM6200	72585
ASSY RAM 82 INCH LENGTH 72 INCH TRAVEL	72586
ASSY RAM 116 INCH LENGTH 106 INCH TRAVEL	72587

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	12	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
2	4	11832	PIN DOWEL 1/2 DIA X 1-1/2
3	1	27307	LABEL WARNING FACE MILL MACHINES
4	1	29154	PLATE SERIAL YEAR MODEL CE 2.0 X 3.0
5	2	33777	RING SNAP 1-3/16 ID (30MM)
6	VARIES	35009	SCREW M6 X 1.0 X 20 SHCS
7	8	35652	SCREW M6 X 1.0 X 25 SHCS
8	2	58588	SCREW 6MM DIA X 20MM X M5 X 0.8 SHLDCS
9	4	59039	LABEL WARNING LIFT POINT ROUND 1.5"
10	1	62321	HOLDER FELT WIPER MILLING HEAD
11	4	62379	SEAL FELT 16MM BALL SCREW 1.015 OD MILLING HEAD
12	1	62423	MOUNT BALL NUT MILLING HEAD
13	1	62888	LABEL DANGER PART LIFT POINT ONLY 2 X 3
14	2	62903	WASHER SHIM .75 ID 1.125 OD .062 THICK STEEL
15	1	62960	BALL SCREW NUT 20MM X 5MM LEAD LEFT HAND 33 MM OD EICHENBERGER ROUND
16	1	63557	PIN DOWEL 3/4 DIA X 1-1/4
17	2	64405	ASSY BALLSCREW LOCK 20MM
18	1	64453	RAM MACHINED 36 INCH LENGTH 26 INCH TRAVEL LM6200 (72584)
		64436	RAM MACHINED 48 INCH LENGTH 38 INCH TRAVEL LM6200 (72585)
		64437	RAM MACHINED 82 INCH LENGTH 72 INCH TRAVEL LM6200 (72586)
		66576	RAM MACHINED 116 INCH LENGTH 106 INCH TRAVEL LM6200 (72587)
19	1	64501	BALLSCREW 20MM X 5 LM 36" LENGTH (72584)
		64457	BALLSCREW 20MM X 5 LM 48" LENGTH (72585)
		64504	BALLSCREW 20MM X 5 LM 82" LENGTH (72586)
		66578	BALLSCREW 20MM X 5 LM 116" LENGTH (72587)
20	2	64513	ASSY BRG BLOCK 20MM
21	4	64542	BLOCK THK SHS25V PRELOADED METAL SCRAPERS
22	2	64587	RAIL THK SHS25 914MM LG (72584)
		64588	RAIL THK SHS25 1219MM LG (72585)
		64589	RAIL THK SHS25 2082MM LG (72586)
		66577	RAIL THK SHS25 2946MM LG (72587)
23	VARIES	68501	CAP RAIL 25MM METAL THK SHS
24	1	70229	LABEL CLIMAX LOGO 4.75 X 18
25	1	70774	TAG MASS LM6200 CONFIGURATIONS
26	2	71145	LIFTING EYE SWIVEL M12 X 1.75 X 18MM 30 ID 56 OD 73 OAL 1650 LBS 750 KG
27	1	72262	ZIMMER BRAKE 25mm RAIL
28	1	72589	PLATE RADIAL TRAVEL LM6200
29	1	72869	ADAPTER BRAKE 25mm RAIL 4mm THICK

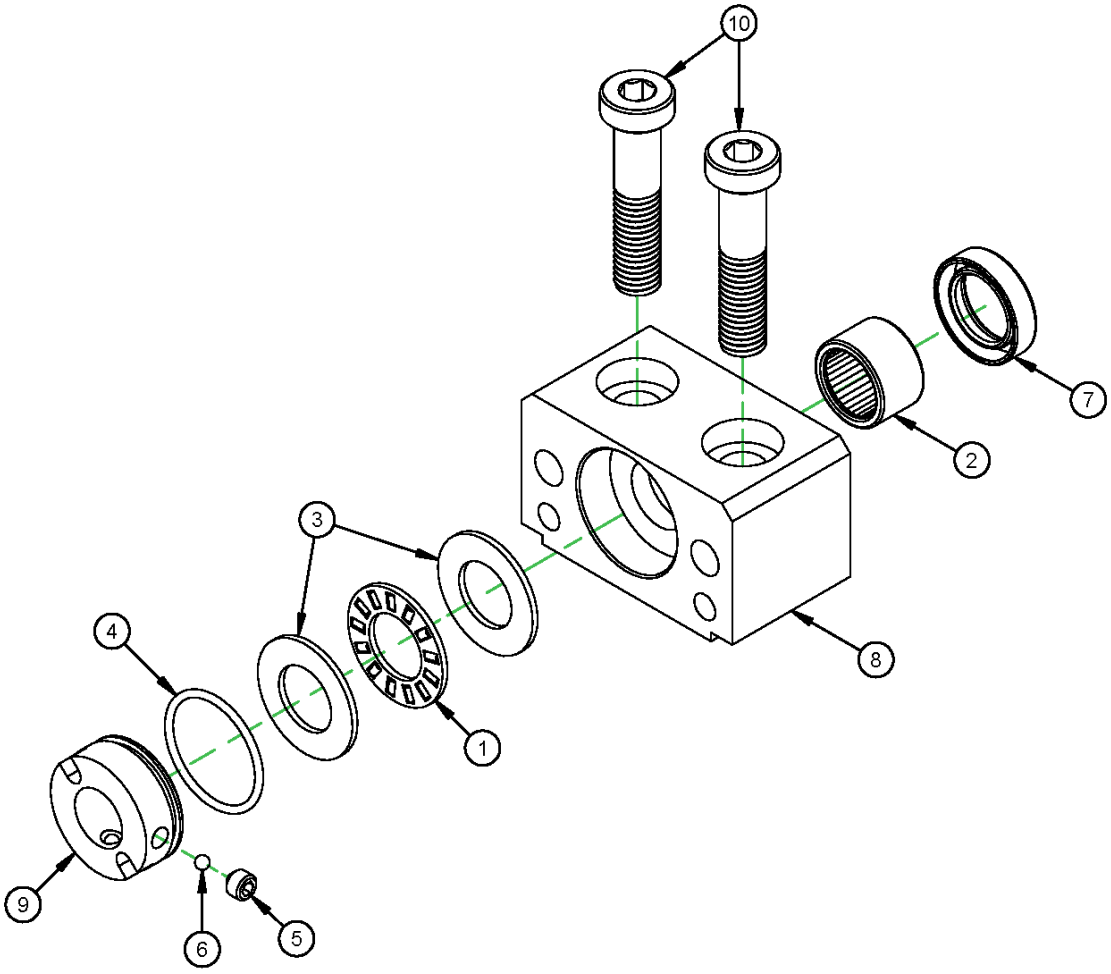
Figure 32. Ram assembly parts list (P/N 72584)



PARTS LIST		
ITEM	PART No.	DESCRIPTION
1	11739	WASHER THRUST .750 ID X 1.250 OD X .0312
2	20166	PIN DOWEL 1/4 DIA X 1/2
3	57281	SCREW M6 X 1.0 X 10MM SHCS
4	64339	SCREW M10 X 1.5 X 40MM SHCS
5	64407	HOUSING BALLSCREW LOCK 20MM
6	64409	SLEEVE ENGAGEMENT BALLSCREW LOCK
7	64410	CAP OVERRIDE BALLSCREW LOCK
8	64412	RING SNAP 1-5/16 ID SPIRAL MEDIUM DUTY .085 THICK
9	64414	SPRING WAVE 1.00 OD X .086 FLAT WIRE X .417
10	64416	BUMPER 2-1/2 X 5/8 X 5/8 POLYURETHANE 80A RED
11	66522	RING O 3/32 X 7/8 ID X 1-1/16 OD

64405 - ASSY BALLSCREW LOCK 20MM - REV A

Figure 33. Ballscrew lock assembly (P/N 64405)

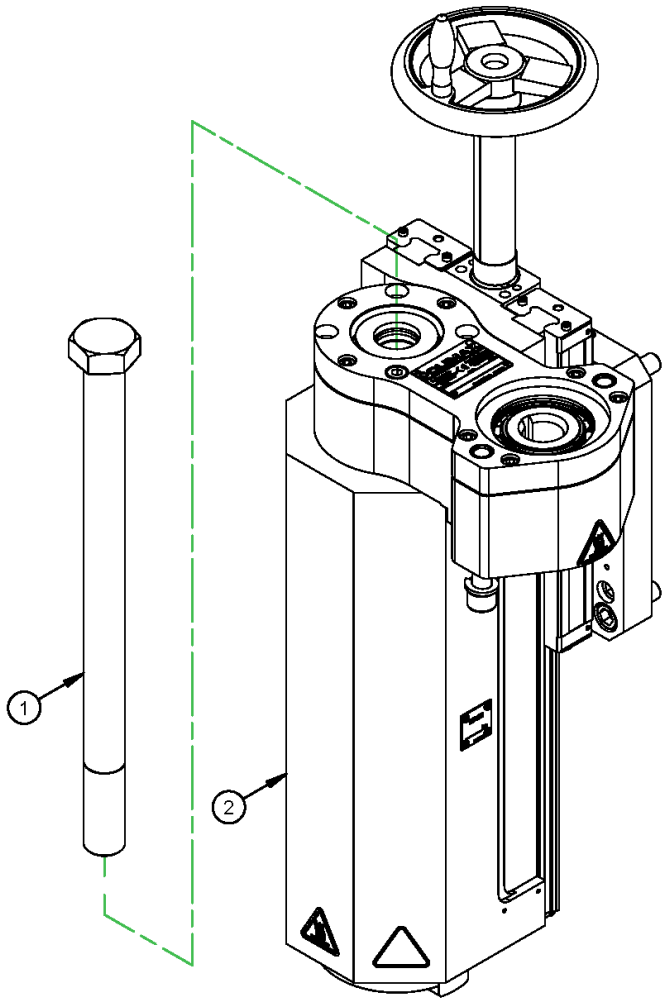


PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	1	10538	BRG THRUST .625 ID X 1.125 OD X .0781
2	1	11026	BRG NEEDLE 5/8 ID X 13/16 OD X .500 OPEN
3	2	11165	WASHER THRUST .625 ID X 1.125 OD X .060
4	1	15731	RING O 1/16 X 1 ID X 1-1/8 OD
5	2	36903	SCREW M6 X 1.0 X 5mm SSSCP
6	2	43489	BALL NYLON 1/8 DIA
7	1	58237	SEAL .625 ID X .987 OD X .250
8	1	64440	BLOCK BEARING BALLSCREW 20MM LM LINE
9	1	66441	BRG RETAINING NUT 5/8-18 O-RING SEAL M6 SETSCREW LOCK
10	2	72441	SCREW M10 X 1.5 X 45MM LHSCS GRADE 10.9 BLACK OXIDE

64513 - ASSY BRG BLOCK 20MM - REV B

FOR REFERENCE ONLY

Figure 34. Block bearing assembly (P/N 64513)



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

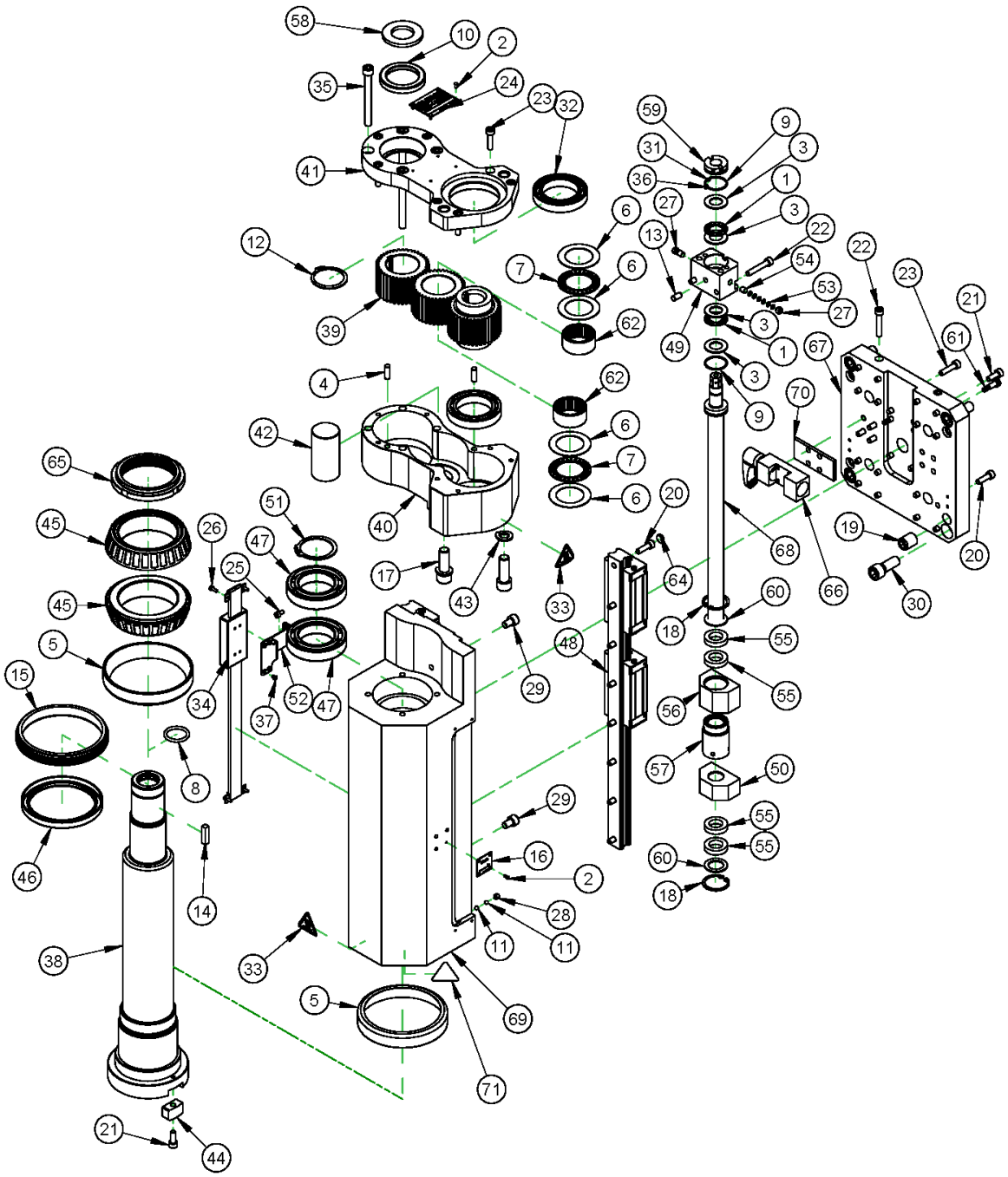
COMPLETE ASSY (MILLING HEAD W/DRAWBOLT)	
P/N	CONFIGURATION
62282	MILLING HEAD 8 STROKE #50 TAPER INCH NMTB
62734	MILLING HEAD 8 STROKE #50 TAPER INCH V-FLANGE
62644	MILLING HEAD 8 STROKE #50 TAPER METRIC NMTB
62735	MILLING HEAD 8 STROKE #50 TAPER METRIC V-FLANGE

73354 - CHART ASSY MILLING HEAD 8 STROKE #50 TAPER - REV A

FOR REFERENCE ONLY

Figure 35. Milling head chart assembly (P/N 73354)

This page intentionally left blank



72277 - MILLING HEAD 2-29/32 BRG 8 STROKE #50 TAPER - REV B

FOR REFERENCE ONLY

Figure 36. Milling head assembly (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

72277 - MILLING HEAD 2-29/32 BRG 8 STROKE #50 TAPER - REV B

FOR REFERENCE ONLY

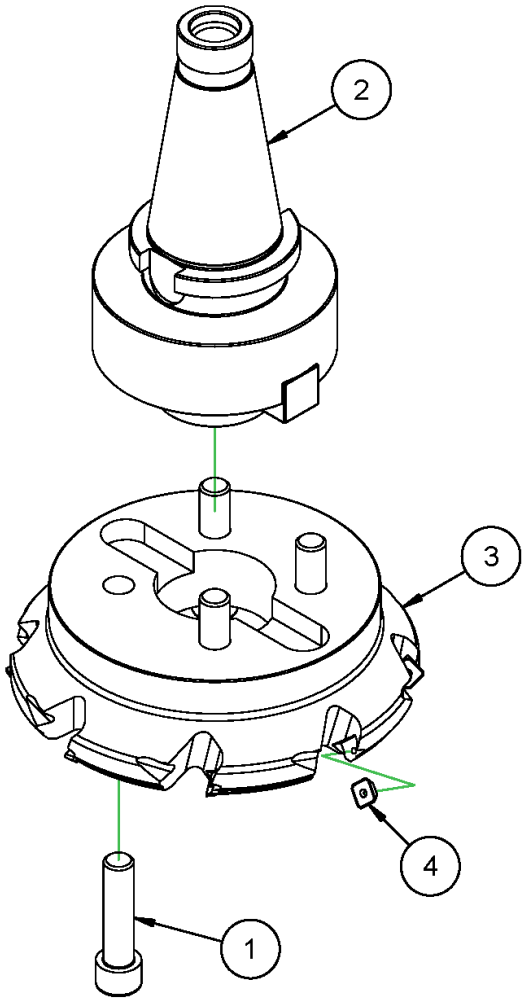
Figure 37. Milling head assembly parts list 1 (P/N 72277)

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

72277 - MILLING HEAD 2-29/32 BRG 8 STROKE #50 TAPER - REV B

FOR REFERENCE ONLY

Figure 38. Milling head assembly parts list 2 (P/N 72277)



AVAILABLE ASSEMBLIES	PART No.
MILL FACE 8 DIA ASSY #50 TAPER W/INSERTS	47386
MILL FACE 10 DIA ASSY #50 TAPER W/INSERTS	56175

PARTS LIST			
ITE	QTY	PART No.	DESCRIPTION
1	4	13356	SCREW 5/8-11 X 2-1/2 SHCS
2	1	47222	HOLDER TOOL FACE MILL NMTB #50 TAPER 2-1/2 INCH PILOT (KB)
3	1	47228 56174	MILL FACE 8 DIA 45 DEG POS POS MITSUBISHI MILL FACE 10 DIA 45 DEG POS POS MITSUBISHI
4	10	47229	INSERT CARBIDE SQUARE .528 IC SEMT13T3AGSN-JM

81492 - CHART MILL FACE ASSY #50 TAPER W/ INSERTS - REV A

FOR REFERENCE ONLY

Figure 39. Mill face chart assembly (P/N 81492)

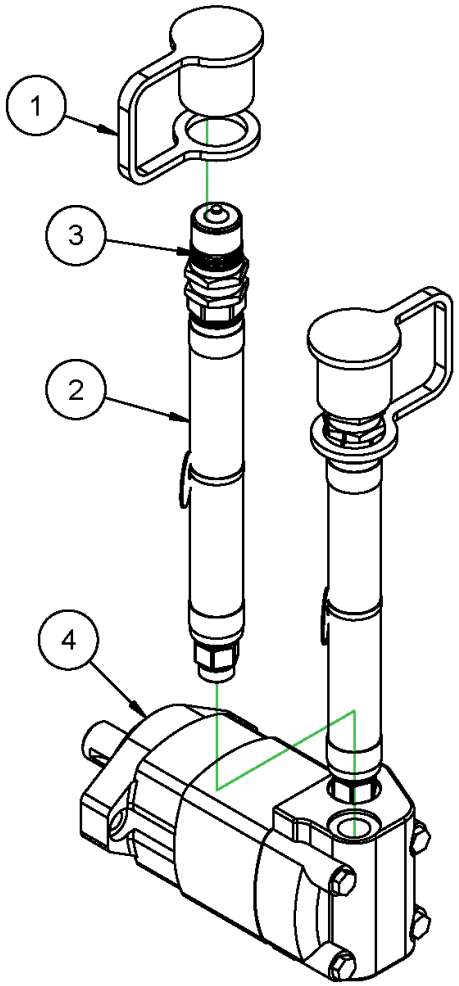


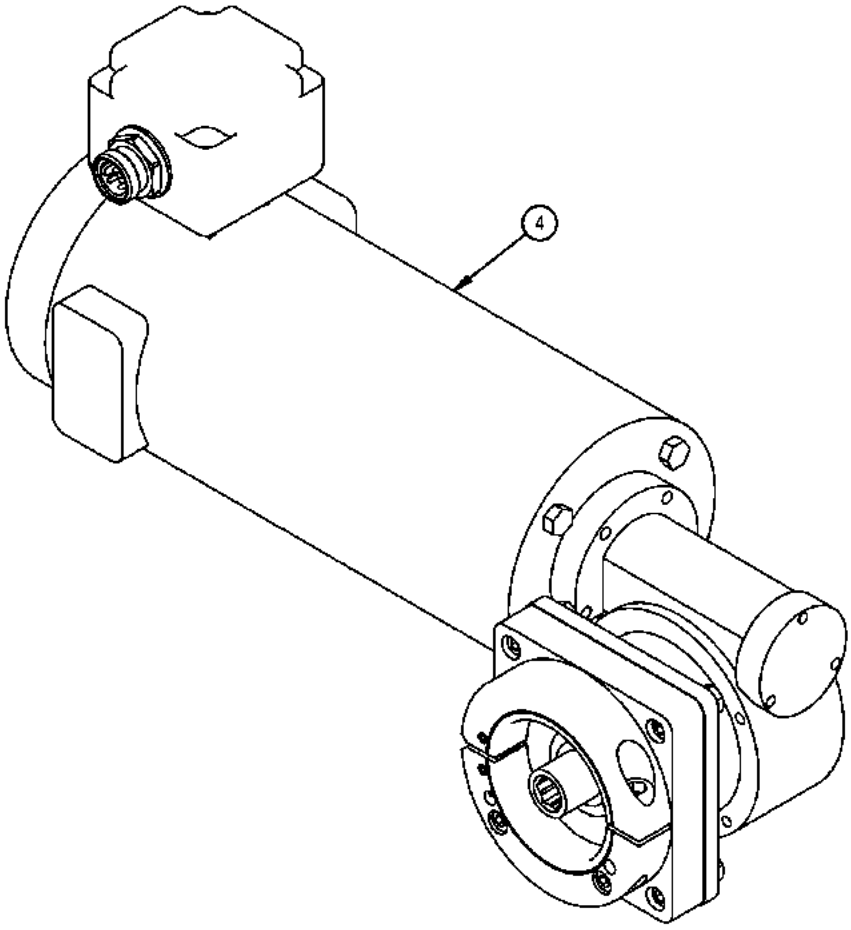
Figure 40. Hydraulic motor assembly (P/N 53508)

AVAILABLE CONFIGURATIONS	
PART NUMBER	DESCRIPTION
63164	MOTOR ASSY HYD 6.2 CU IN KEYED 3/4 FTG 2000
53459	MOTOR ASSY HYD 8.0 CU IN KEYED 3/4 FTG 2000
53458	MOTOR ASSY HYD 9.6 CU IN KEYED 3/4 FTG 2000
46950	MOTOR ASSY HYD 11.9 CU IN KEYED 3/4 FTG 2000
46375	MOTOR ASSY HYD 14.9 CU IN KEYED 3/4 FTG 2000
46549	MOTOR ASSY HYD 18.7 CU IN KEYED 3/4 FTG 2000
46550	MOTOR ASSY HYD 24.0 CU IN KEYED 3/4 FTG 2000
48968	MOTOR ASSY HYD 29.8 CU IN KEYED 3/4 FTG 2000

PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	2	29561	FTG DUST CUP 60 SERIES 3/4 MALE QUICK CONNECT
2	2	39924	ASSY HOSE TYPE 100R17 SAE-10M X SAE 12M 5/8 DIA X 12 INCHES
3	2	40612	FTG QD NIPPLE 3/4B X SAE-12F
4	1	63163	MOTOR HYD 6.2 CU IN KEYED SAE O-RING 2000
		53457	MOTOR HYD 8.0 CU IN KEYED SAE O-RING 2000
		53456	MOTOR HYD 9.6 CU IN KEYED SAE O-RING 2000
		47393	MOTOR HYD 11.9 CU IN KEYED SAE O-RING 2000
		47394	MOTOR HYD 14.9 CU IN KEYED SAE O-RING 2000
		47395	MOTOR HYD 18.7 CU IN KEYED SAE O-RING 2000
		47396	MOTOR HYD 24.0 CU IN KEYED SAE O-RING 2000
		47221	MOTOR HYD 29.8 CU IN KEYED SAE O-RING 2000

53508 - CHART 2000 SERIES MOTOR HYD ASSY 3/4" FITTINGS - REV B

FOR REFERENCE ONLY



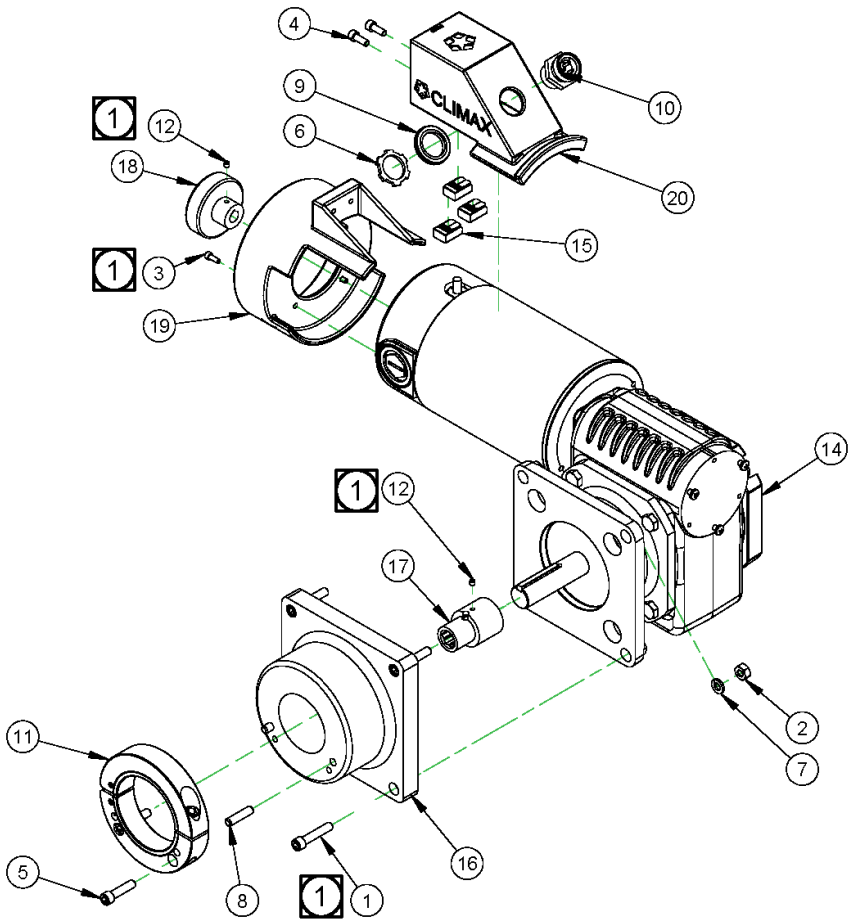
AVAILABLE CONFIGURATIONS	
DESCRIPTION	PART NO.
ASSY ELECTRIC FEED 120V 1/2 HP W/ 20 FT CABLE LM LINE	64684
ASSY ELECTRIC FEED 120V 1/2 HP W/ 50 FT CABLE LM LINE	66310
ASSY ELECTRIC FEED 120V 1/2 HP W/ 100 FT CABLE LM LINE	66311

PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	1	53254	CORDSET 3 COND X 20FT 16AWG 8AMP SOOW 42 OD (USED WITH 64684)
2	1	53255	CORDSET 3 COND X 50FT 16AWG 8AMP SOOW (USED WITH 66310)
3	1	53256	CORDSET 3 COND X 100FT 16AWG 8AMP SOOW (USED WITH 66311)
4	1	66660	ASSY ELECTRIC FEED 120V 1/2 HP LM LINE

64684 - ASSY ELECTRIC FEED 120V 1/2 HP W/ 20 FT CABLE LM LINE - REV A

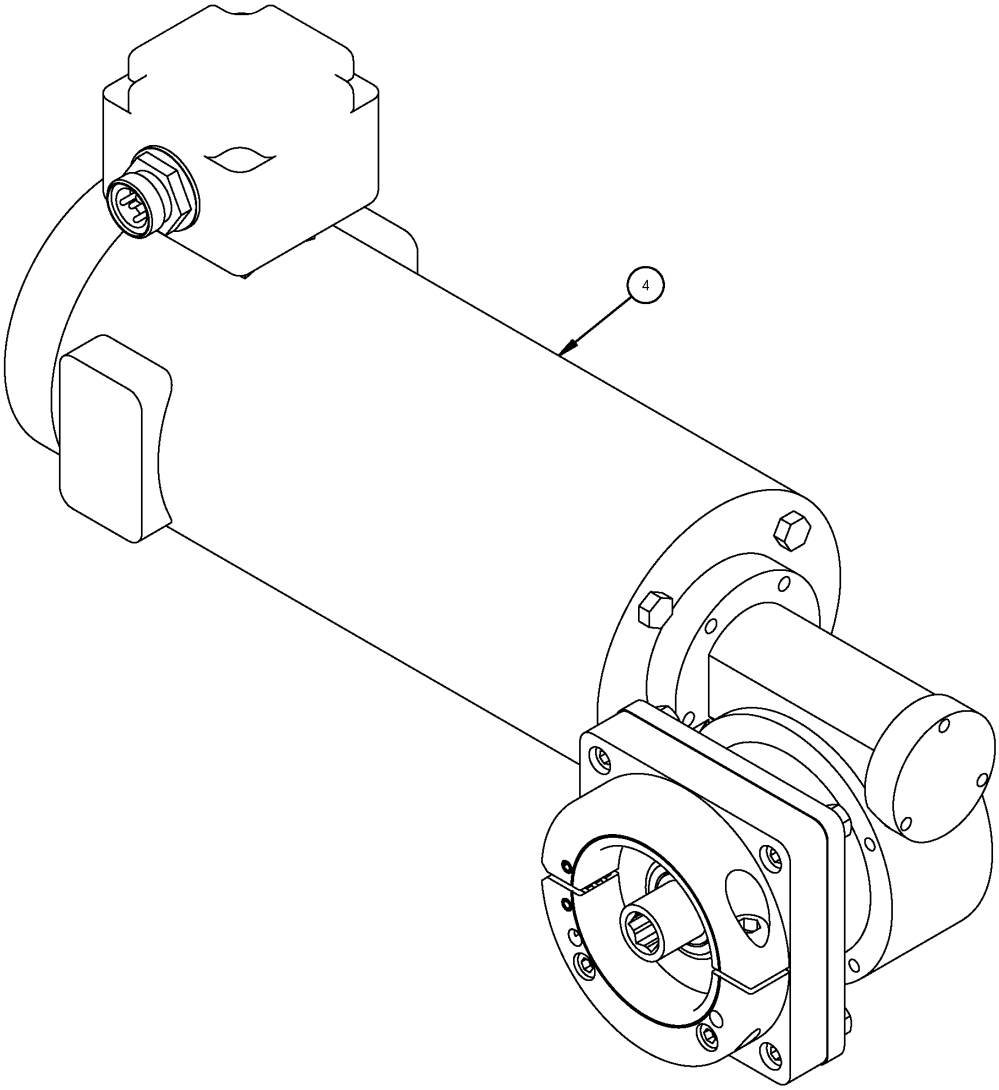
FOR REFERENCE ONLY

Figure 41. Electric feed 120V chart assembly (P/N 64684)



PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	10671	SCREW 1/4-20 X 1-1/4 SHCS
2	4	10716	NUT HEX 1/4 STDN
3	4	10838	SCREW 6-32 X 3/8 SHCS
4	2	10877	SCREW 10-32 X 1/2 SHCS
5	2	11118	SCREW 1/4-20 X 1 SHCS
6	1	12574	CONDUIT NUT 1/2 NPT
7	4	12738	WASHER 1/4 LOCW
8	2	17152	PIN DOWEL 1/4 DIA X 1
9	1	24115	RING SEALING 1/2 CONDUIT
10	1	33929	CONNECTOR 3-POLE 10AMP MALE 1/2 NPT PANEL MT
11	1	46067	CLAMP COLLAR SPLIT HINGED 2-1/2 ID MOD
12	2	53365	SCREW M4 X 0.7 X 4 mm SSSFP
13	1	73776	WIRE TIE 20.5" LONG (NOT SHOWN)
14	1	92142	MOTOR GEARMOTOR 130 VDC 140 RPM OUTPUT 124 IN/LBS TORQUE 7/16 HP FLANGE MOUNT ACCESSORY SHAFT
15	3	92275	LEVER NUT TERMINAL 221 SERIES 2 POLE 28-12 AWG 450V
16	1	92943	PLATE ADAPTER MOTOR FEED LM LINE
17	1	94910	SLEEVE MOTOR FEED LM LINE 7786-S1
18	1	95303	HANDWHEEL 2 IN DIA 1/4 BORE
19	1	95305	GUARD AND COVER FEED MOTOR
20	1	95326	WIRE COVER FEED MOTOR
21	1	95403	(NOT SHOWN) TOOL BOX W/ TRAY, GREY STRUCTURAL FOAM, 20 X 9.75 X 12.75

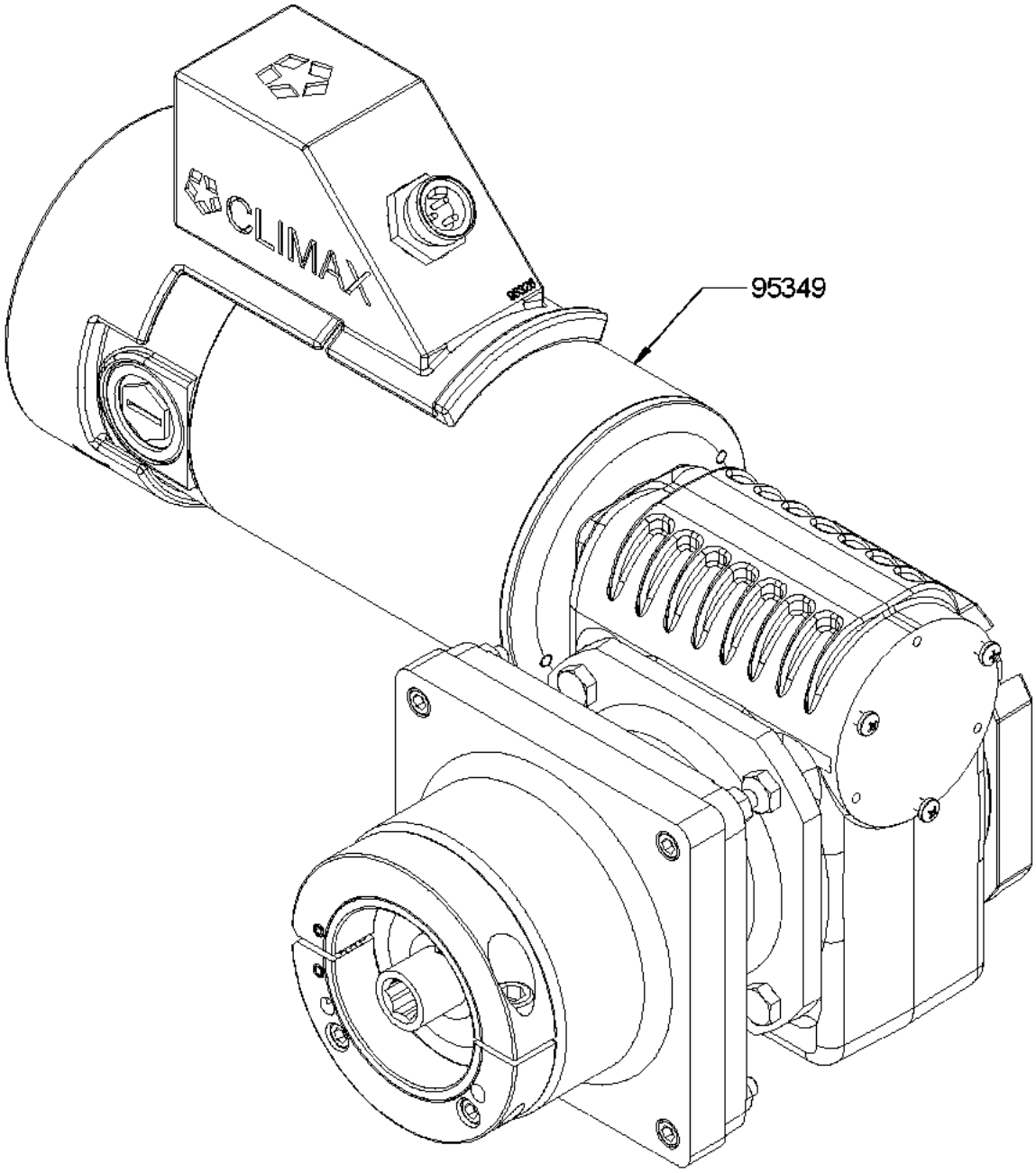
Figure 42. Electric feed 120V motor assembly (P/N 92945)



PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	1	53254	CORDSET 3 COND X 20FT 16AWG 8AMP SOOW .42 OD (USED WITH 64743)
2	1	53255	CORDSET 3 COND X 50FT 16AWG 8AMP SOOW (USED WITH 66312)
3	1	53256	CORDSET 3 COND X 100FT 16AWG 8AMP SOOW (USED WITH 66313)
4	1	66661	ASSY ELECTRIC FEED 230V 1/2 HP LM LINE

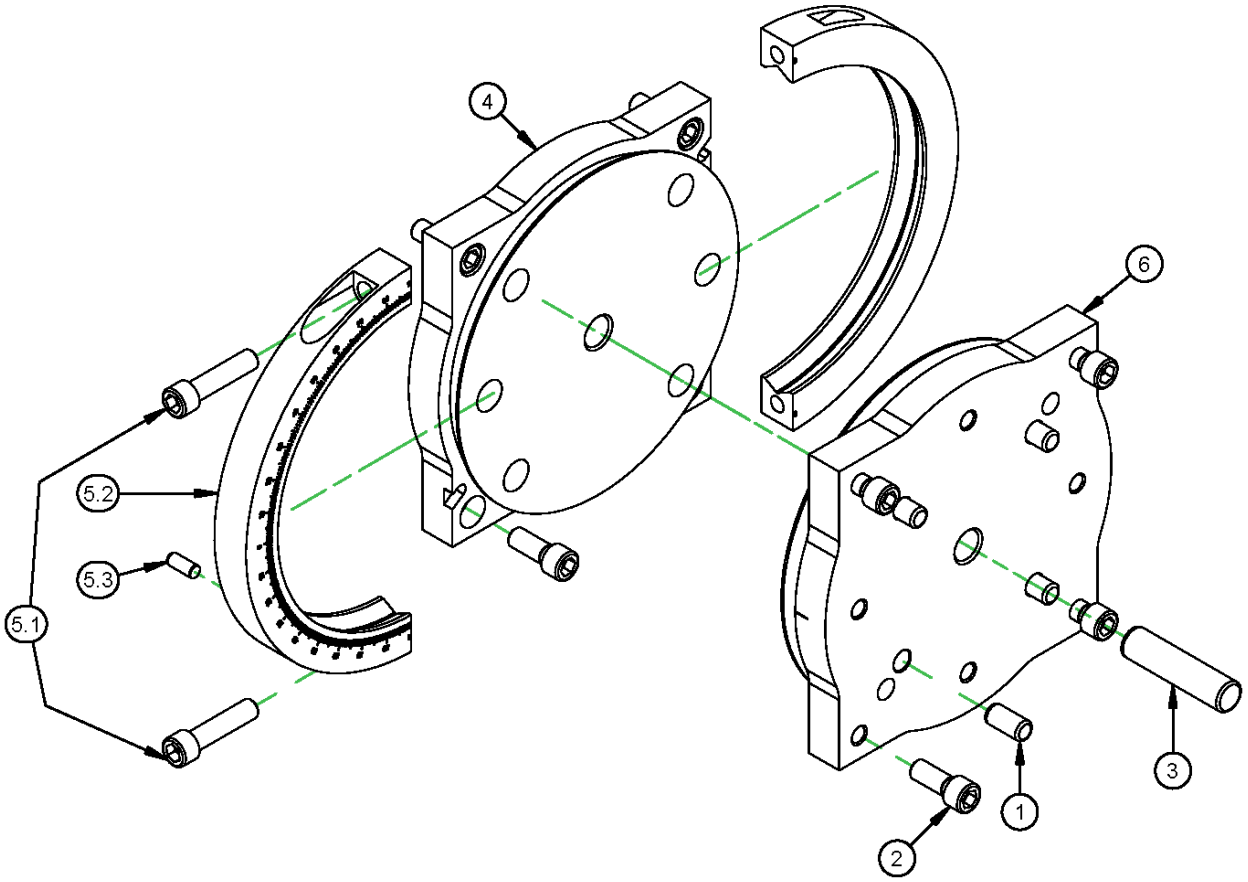
64743 ASSY ELECTRIC FEED 230V 1/2 HP W/ 20 FT CABLE LM LINE
66312 ASSY ELECTRIC FEED 230V 1/2 HP W/ 50 FT CABLE LM LINE
66313 ASSY ELECTRIC FEED 230V 1/2 HP W/ 100 FT CABLE LM LINE

Figure 43. Electric feed 230V chart assembly (P/N 64743)



AVAILABLE CONFIGURATIONS	
PART NO.	DESCRIPTION
64743	ASSY ELECTRIC FEED 230V 1/2 HP (95349) W/ 20 FT CABLE LM LINE (53254)
66312	ASSY ELECTRIC FEED 230V 1/2 HP (95349) W/ 50 FT CABLE LM LINE (53255)
66313	ASSY ELECTRIC FEED 230V 1/2 HP (95349) W/ 100 FT CABLE LM LINE (53256)

Figure 44. Electric feed 230V motor assembly (P/N 95803)

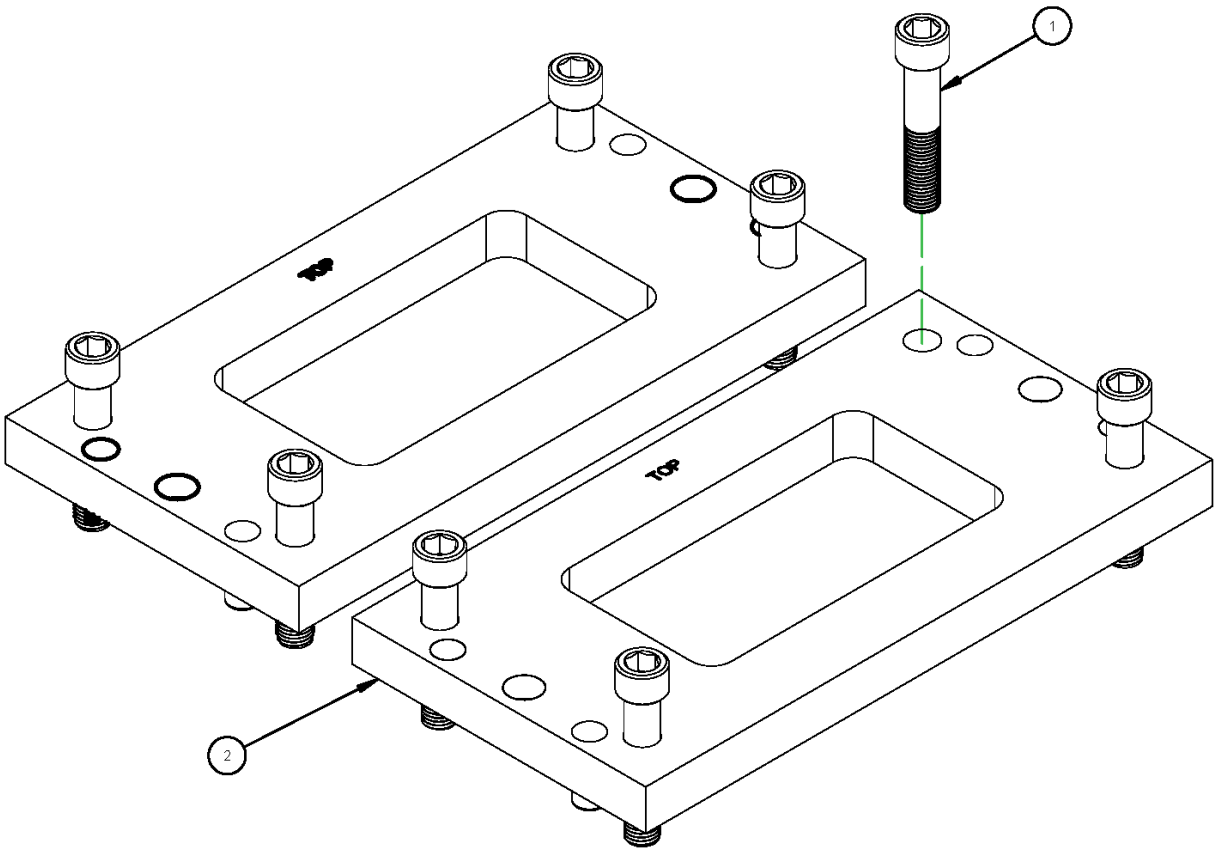


PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	4	20398	PIN DOWEL 1/2 DIA X 1
2	8	40697	SCREW M12 X 1.75 X 30mm SHCS
3	1	46981	PIN DOWEL 3/4 DIA X 3
4	1	53624	PLATE SWIVEL MILLING HEAD RAM SIDE
5.1	2	64281	SCREW M12 X 1.75 X 50MM SHCS
5.2	1	74224	RING CLAMP SWIVEL PLATE MILLING HEAD METRIC
5.3	1	16540	PIN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

63250 - ASSY SWIVEL PLATE MILLING HEAD METRIC - REV C

FOR REFERENCE ONLY

Figure 45. Milling head swivel plate assembly (P/N 63250)



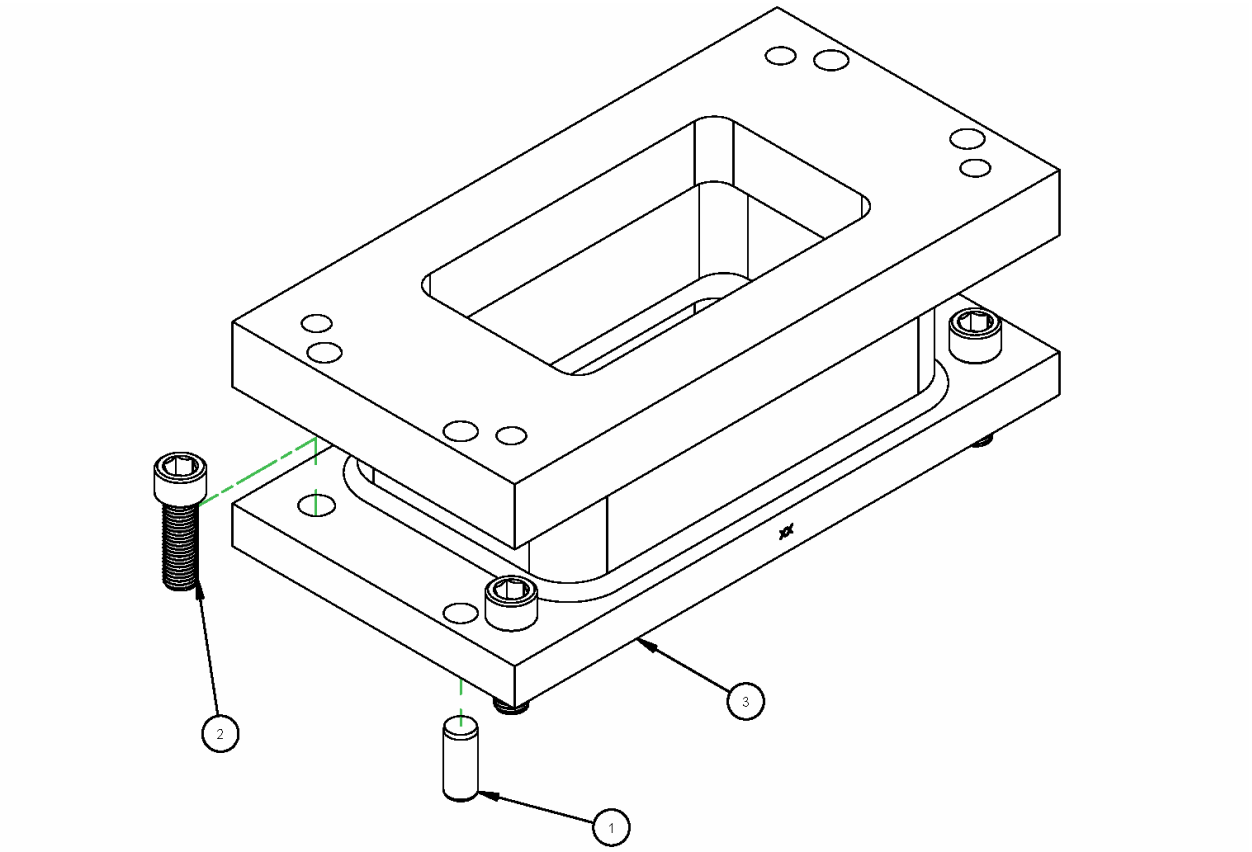
AVAILABLE CONFIGURATIONS	
DESCRIPTION	PART NUMBER
ASSY RISER 1 INCH LM6200	64720
ASSY RISER 3 INCH LM6200	64721

PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	8	58106	SCREW M16 X 2.0 X 80 SHCS (64720)
		44229	SCREW M16 X 2.0 X 130MM SHCS (64721)
2	1	64731	SET RISER PLATE 1 INCH LM6200 (64720)
		64732	SET RISER PLATE 3 INCH LM6200 (64721)

64720 - ASSY RISER 1 INCH LM6200 - REV A

FOR REFERENCE ONLY

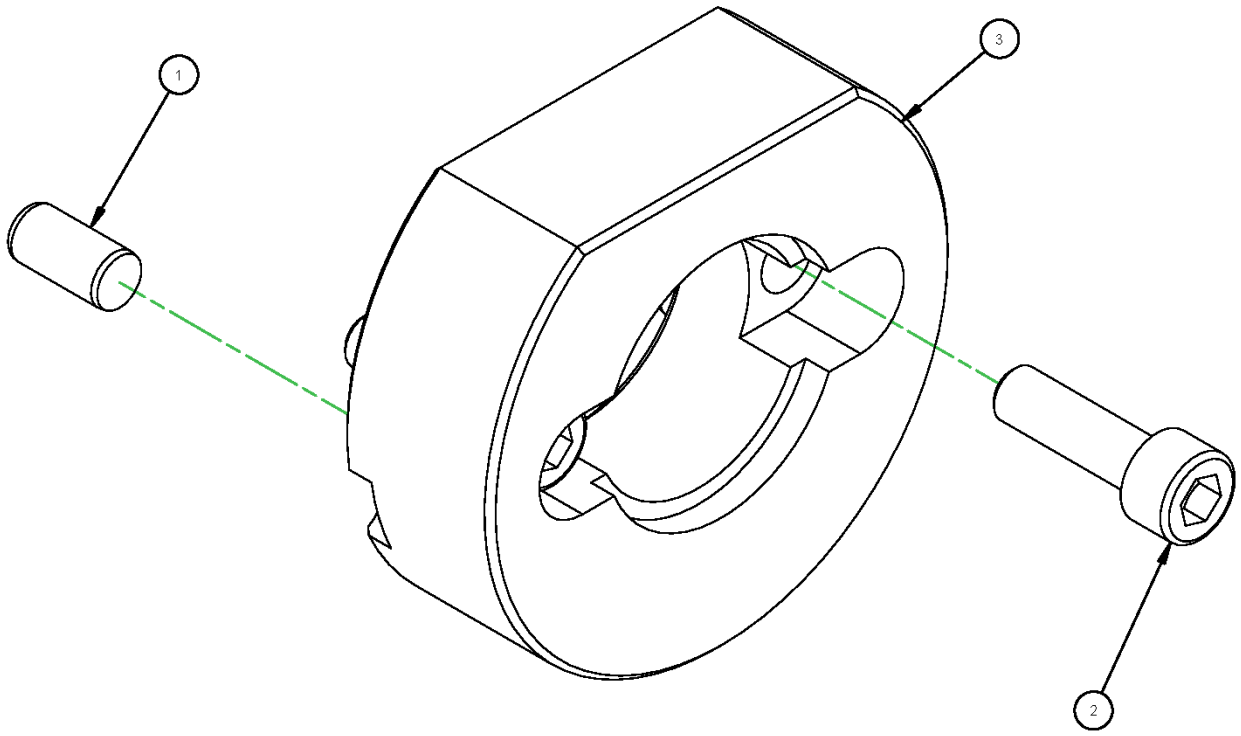
Figure 46. Riser assembly (P/N 64720)



PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	4	12610	PIN DOWEL 5/8 DIA X 1-1/2
2	8	64518	SCREW M16 X 2.0 X 50MM SHCS
3	1	64727	SET RISER MACHINED 5 INCH LM6200 (64722)
		64728	SET RISER MACHINED 7 INCH LM6200 (64723)

ASSY RISER 5 INCH LM6200 64722
ASSY RISER 7 INCH LM6200 64723

Figure 47. Riser assembly chart (P/N 64722)



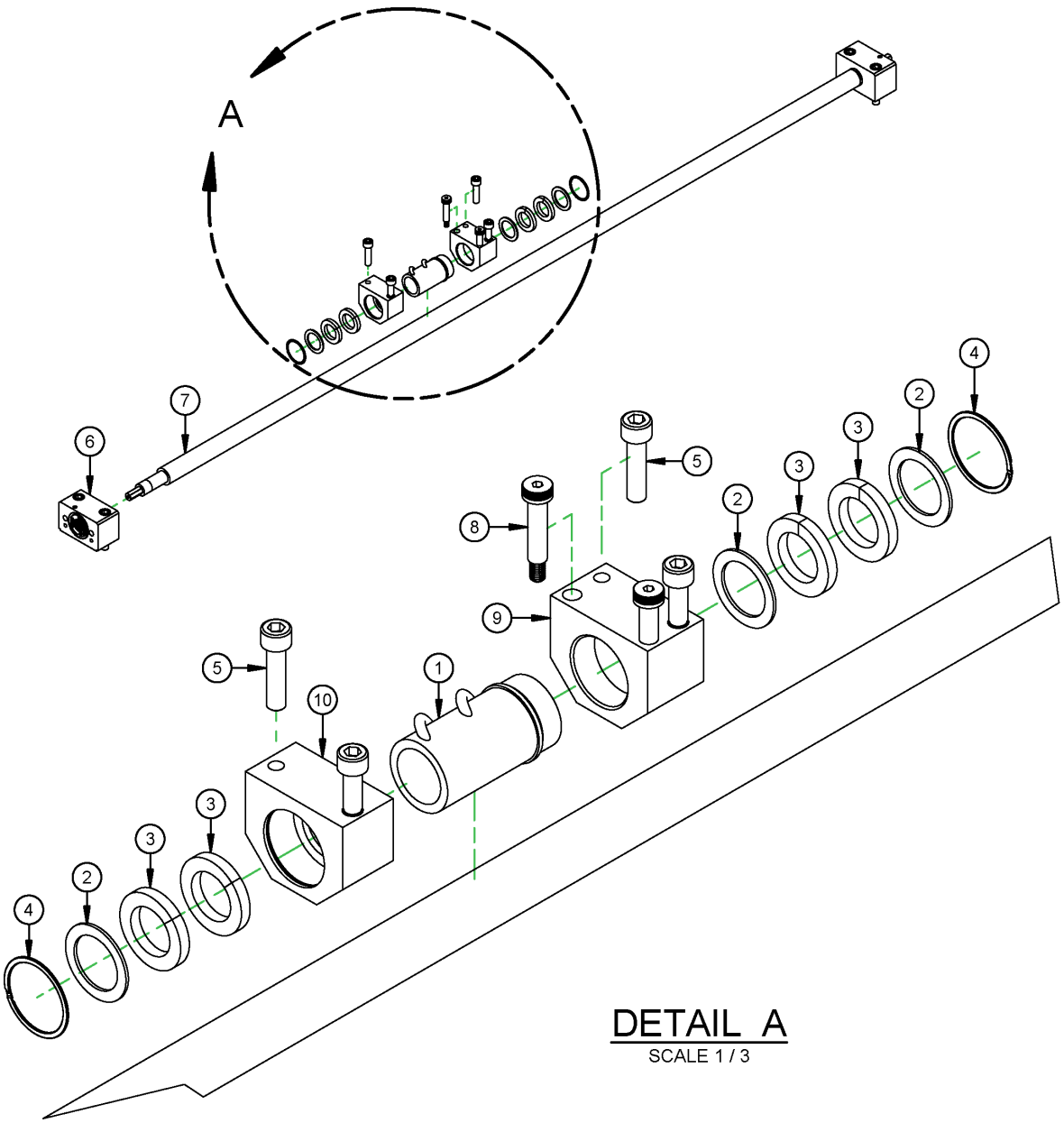
PARTS LIST		
ITEM	PART No.	DESCRIPTION
1	20166	PIN DOWEL 1/4 DIA X 1/2
2	35009	SCREW M6 X 1.0 X 20 SHCS
3	64852	PLATE MOUNT Z AXIS FEED MILLING

64856 - ASSY Z-AXIS MOUNT MILLING HEAD - REV A

FOR REFERENCE ONLY

Figure 48. Milling head mount Z-axis assembly (P/N 64856)

This page intentionally left blank



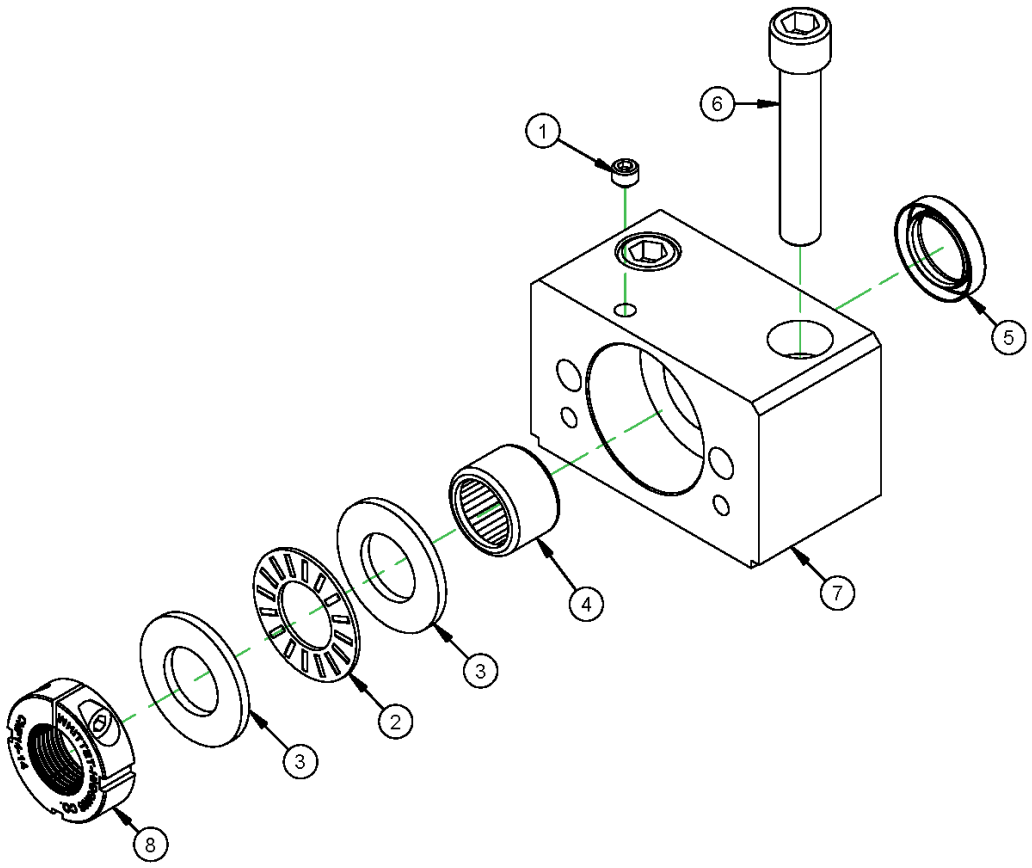
ASSY BALLSCREW 32" TRAVEL (48" LONG) LM6200	66471
ASSY BALLSCREW 56" TRAVEL (72" LONG) LM6200 (SHOWN)	66472
ASSY BALLSCREW 80" TRAVEL (96" LONG) LM6200	66473
ASSY BALLSCREW 104" TRAVEL (120" LONG) LM6200	66474
ASSY BALLSCREW 128" TRAVEL (144" LONG) LM6200	66475
ASSY BALLSCREW 152" TRAVEL (168" LONG) LM6200	66476
ASSY BALLSCREW 176" TRAVEL (192" LONG) LM6200	66477

Figure 49. Ballscrew assembly (P/N 66472)

PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	1	47234	NUT BALL SCREW 1.250 DIA .200 LEAD LH
2	3	46095	WASHER FELT SEAL RETAINER
3	4	46147	SEAL FELT BALL SCREW
4	2	46363	RING SNAP 1.75 ID SPIRAL MEDIUM DUTY
5	4	64339	SCREW M10 X 1.5 X 40MM SHCS
6	2	64556	ASSY BRG BLOCK 1-1/4
7	1	64563	BALLSCREW 1-1/4 X .2 LM 48" LENGTH (FOR 66471)
		64564	BALLSCREW 1-1/4 X .2 LM 72" LENGTH (FOR 66472)
		64565	BALLSCREW 1-1/4 X .2 LM 96" LENGTH (FOR 66473)
		64566	BALLSCREW 1-1/4 X .2 LM 120" LENGTH (FOR 66474)
		64459	BALLSCREW 1-1/4 X .2 LM 144" LENGTH (FOR 66475)
		64567	BALLSCREW 1-1/4 X .2 LM 168" LENGTH (FOR 66476)
		66286	BALLSCREW 1-1/4 X .2 LM 192" LENGTH (FOR 66477)
8	2	64577	SCREW 10MM DIA X 40 X M8 X 1.25 SHLDSC
9	1	64578	MOUNT BALLNUT 1-1/4 LM6200
10	1	64579	HOLDER FELT WIPER 1-1/4 LM6200

ASSY BALLSCREW 32" TRAVEL (48" LONG) LM6200	66471
ASSY BALLSCREW 56" TRAVEL (72" LONG) LM6200 (SHOWN)	66472
ASSY BALLSCREW 80" TRAVEL (96" LONG) LM6200	66473
ASSY BALLSCREW 104" TRAVEL (120" LONG) LM6200	66474
ASSY BALLSCREW 128" TRAVEL (144" LONG) LM6200	66475
ASSY BALLSCREW 152" TRAVEL (168" LONG) LM6200	66476
ASSY BALLSCREW 176" TRAVEL (192" LONG) LM6200	66477

Figure 50. Ballscrew assembly parts list (P/N 66472)



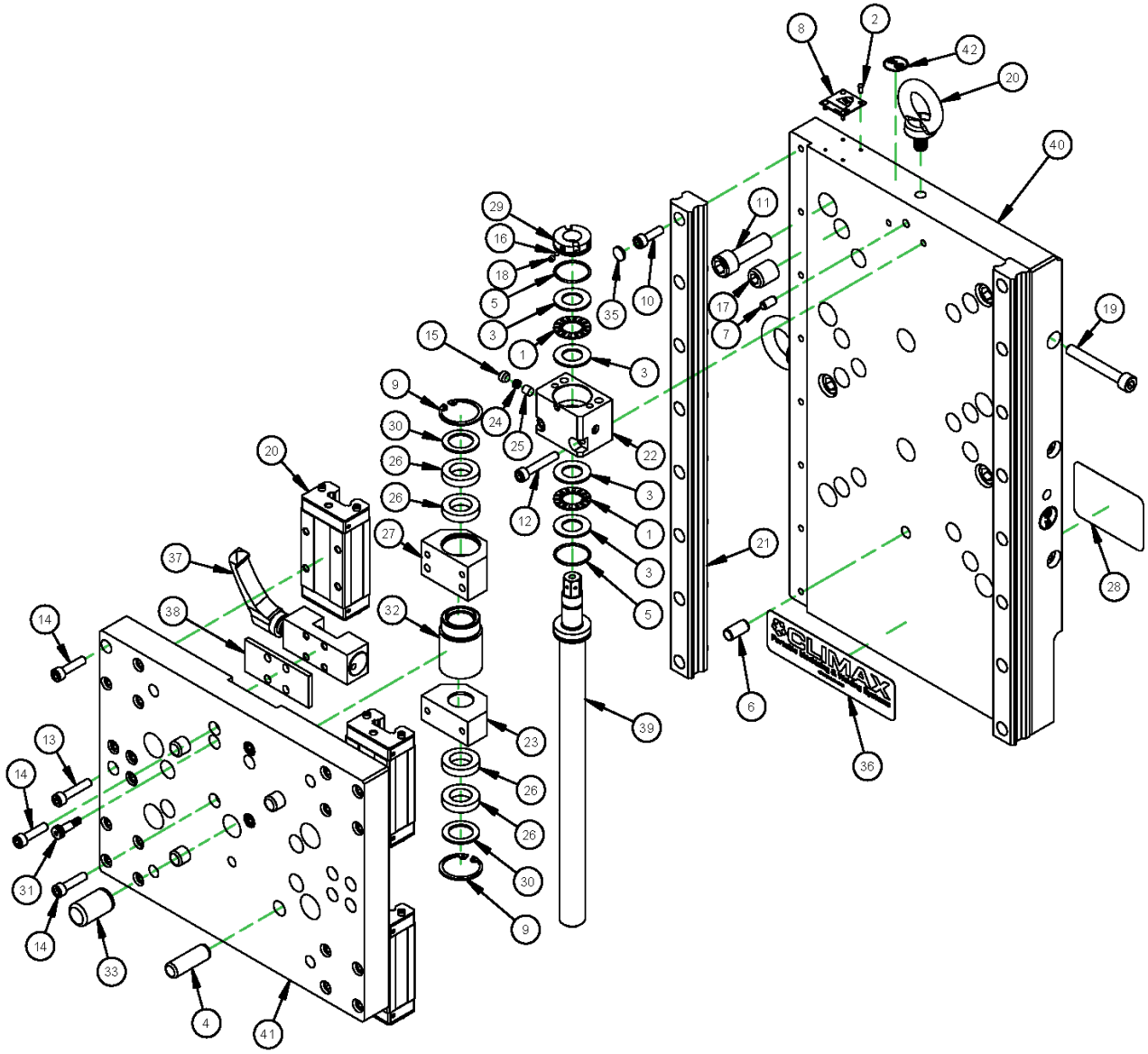
PARTS LIST			
ITEM	QTY	PART No.	DESCRIPTION
1	1	10547	SCREW 5/16-18 X 1/4 SSSCP
2	1	12593	BRG THRUST .875 ID X 1.687 OD X .0781
3	2	12594	WASHER THRUST .875 ID X 1.687 OD X .123
4	1	15305	BRG NEEDLE 7/8 ID X 1-1/8 OD X 3/4 OPEN
5	1	27948	SEAL .875 ID X 1.250 OD X .250
6	2	43182	SCREW M12 X 1.75 X 65mm SHCS
7	1	64441	BLOCK BEARING BALLSCREW 1-1/4 LM LINE
8	1	66731	NUT LOCKING 7/8-14 ID X .500 SPLIT CLAMP STYLE

64556 - ASSY BRG BLOCK 1-1/4 - REV A

FOR REFERENCE ONLY

Figure 51. Bearing block assembly (P/N 64556)

This page intentionally left blank



74100 - ASSY Z AXIS 7 IN TRAVEL FOR LM6200 - REV A

FOR REFERENCE ONLY

Figure 52. Z-axis assembly (P/N 74100)

PARTS LIST			
ITEM	QTY	P/N:	DESCRIPTION
1	2	10538	BRG THRUST .625 ID X 1.125 OD X .0781
2	4	10588	SCREW DRIVE #2 x 1/4 HOLE SIZE .089
3	4	11165	WASHER THRUST .625 ID X 1.125 OD X .060
4	4	11832	PIN DOWEL 1/2 DIA X 1-1/2
5	2	15731	RING O 1/16 X 1 ID X 1-1/8 OD
6	1	16407	DOWEL PIN 3/8 DIA X 3/4
7	1	20166	PIN DOWEL 1/4 DIA X 1/2
8	1	29152	PLATE MASS CE
9	2	33777	RING SNAP 1-3/16 ID (30MM)
10	16	35009	SCREW M6 X 1.0 X 20 SHCS
11	4	35215	SCREW M12 X 1.75 X 40mm SHCS
12	2	35504	SCREW M6 X 1.0 X 35mm SHCS
13	4	35505	SCREW M6 X 1.0 X 30 SHCS
14	20	35652	SCREW M6 X 1.0 X 25 SHCS
15	2	36087	SCREW M8 X 1.25 X 6MM SSSFP
16	2	43489	BALL NYLON 1/8 DIA
17	8	46212	SCREW M16 X 2 X 20mm SSSFP
18	2	53365	SCREW M4 X 0.7 X 4 mm SSSFP
19	6	57874	SCREW M8 X 1.25 X 60MM SHCS
20	2	59625	BOLT EYE M10 X 1.5 X 17MM LG
21	2	62255	SLIDE RAIL THK SHS25 442MM LG PRELOADED METAL SCRAPERS 2 BLOCKS
22	1	62281	BEARING BLOCK BALLSCREW 20MM
23	1	62321	HOLDER FELT WIPER MILLING HEAD
24	12	62376	WASHER SPRING BELLEVILLE 1/8 ID X 1/4 OD X .013 THK
25	2	62378	ROD POLYURETHANE 1/4 DIA X 1/4 LENGTH 95 SHORE A
26	4	62379	SEAL FELT 16MM BALL SCREW 1.015 OD MILLING HEAD
27	1	62423	MOUNT BALL NUT MILLING HEAD
28	1	62888	LABEL DANGER PART LIFT POINT ONLY 2 X 3
29	1	62898	BRG RETAINING NUT 5/8-18 O-RING SEAL SETSCREW LOCK
30	2	62903	WASHER SHIM .75 ID 1.125 OD .062 THICK STEEL
31	2	62909	SCREW 6MM DIA X 12MM X M5 X 0.8 SHLDCS
32	1	62960	BALL SCREW NUT 20MM X 5MM LEAD LEFT HAND 33 MM OD EICHENBERGER ROUND
33	1	63557	PIN DOWEL 3/4 DIA X 1-1/4
34	1	65284	HANDWHEEL 5 IN. DIA 1/2" HEX CAST IRON DISHED W/ REVOLVING HANDLE
35	16	68501	CAP RAIL 25MM METAL THK SHS
36	1	70226	LABEL CLIMAX LOGO 1 5 X 5 5
42	4	70554	LABEL WARNING LIFT POINT ROUND .75"
37	1	72262	ZIMMER BRAKE 25mm RAIL
38	1	72869	ADAPTER BRAKE 25mm RAIL 4mm THICK
39	1	74315	BALL SCREW LH Z-AXIS SLIDE 2.75 BRG 7" STROKE
40	1	74316	PLATE MAIN ARM MOUNT Z-AXIS SLIDE
41	1	74317	PLATE MILLING HEAD MOUNT Z-AXIS SLIDE

74100 - ASSY Z AXIS 7 IN TRAVEL FOR LM6200 - REV A

FOR REFERENCE ONLY

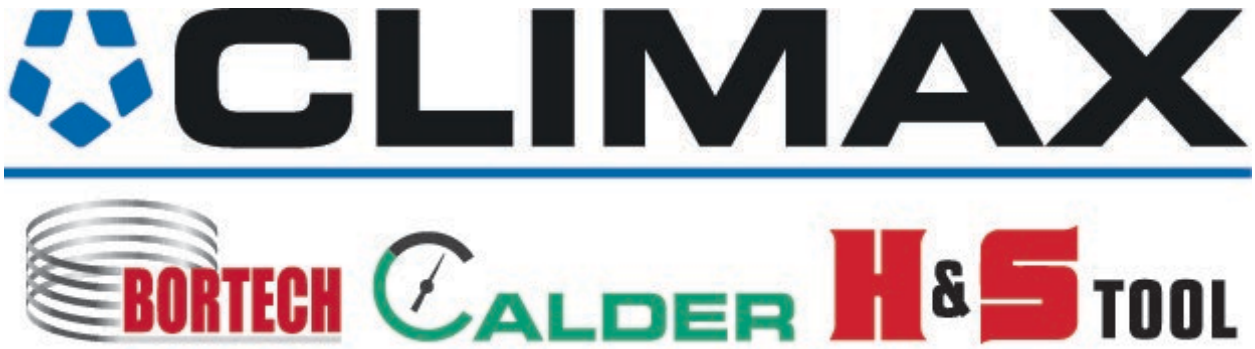
Figure 53. Z-axis assembly parts list (P/N 74100)

This page intentionally left blank

SDS

Contact CLIMAX for the current Safety Data Sheets.

This page intentionally left blank


CLIMAX
BORTECH
CALDER
H&S TOOL