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SF1400 - SERIES
SURFACING MACHINE

MACHINE SERIAL NUMBER

OPERATIONS AND MAINTENANCE
MANUAL



MANUFACTURED BY:

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NOTE: WHEN ORDERING REPLACEMENT PARTS,
PLEASE GIVE THE MODEL AND SERIAL NUMBER.

ORDER BY PART NUMBER.
THERE IS A MINIMUM ORDER OF \$25.00

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Chapter 1 Introduction:

This manual is divided into sections as listed in the table of contents.

It is required that the new user of the SF1400 read this manual, in particular the sections concerning safety, before operating the machine.

Description:

The model SF1400 surfacing machine is a precision, high speed surfacing unit.

The model SF1400 can be equipped with tooling and accessories for surfacing most American passenger car and truck, inline, 90 and 60 degree V-type blocks as well as cylinder heads.

SF1400 machines may be readily tooled to resurface a wide variety of engines, including European and Asian models, as well as perform various other surfacing operations.

This machine is designed for two purposes:

1. The alignment of the deck surface to the pan rails and main bearing locations, as have been done in the original factory surfacing.
2. A considerable savings in surfacing time and operator involvement as a result of fast block clamping, and convenient controls.

Change over or resetting time required to set up V-type or in-line engines is a minimum, making this machine highly suited to the jobber shop where engines cannot be run through, in model lots.

All feeds and rapid travels are power operated and controlled from the conveniently located control panel.

Power required is 230 volt, single phase. This provides power to the variable speed AC motor controller, the horizontal S.C.R. drive, and various relays and solenoid valves that actuate mechanical controls on the machine to engage feeds and travels. **See *electrical section for proper electrical connection.***

Limited Warranty:

Rottler Manufacturing Company Model SF1400 parts and equipment is warranted as to materials and workmanship. This limited warranty remains in effect for one year from the date of delivery, provided the machine is owned and operated by the original purchaser and is operated and maintained as per the instructions in the manual.

Tools proven to be defective within the warranty period will be repaired or replaced at the factory's option.

We accept no responsibility for defects caused by external damage, wear, abuse, or misuse, nor do we accept any obligation to provide compensation for direct or indirect costs in connection with cases covered by the warranty.

Freight charges on warranty items (non-air shipment only) will be paid by Rottler Manufacturing for a period of 60 days only from the date of installation or set-up by a qualified service technician or sales representative.

Freight charges after the 60 day period are the customer's responsibility.

Safety Information:

CAUTION: *This machine is capable of causing severe bodily injury!*

The operator of the SF1400 should be a skilled machinist craftsman who is well versed in the caution, care, and knowledge required to safely operate metal cutting tools. ***Eye protection must be worn at all times by the operator and all other personnel in the area of the machine.***

The operator should be extremely cautious when working around the cutting tool area.

When boring the machine is capable of throwing metal chips over 10- feet from the cutting area. **Always use the guards.**

The SF1400 operates under computerized control and, as is all computerized equipment, is susceptible to extraneous electrical impulses internally for externally produced. The machine may make moves out of the operator control at any time. The operator should work in and around the machine with caution at all times.

The operator and nearby personnel should be familiar with the location and operation of the Emergency Stop Button.

Electrical Power:

Make sure all electrical equipment has the proper overload protection. The SF1400 should have **a fully isolated** power supply to prevent damage and uncontrolled movement of the machine. If the SF1400 is on the same power lines that are running to other electrical equipment (grinders, welders, and other AC motors) electrical noise can be induced into the SF1400 electrical system. Electrical noise can cause the controller to see false signals to move. Not supplying a fully isolated supply to the machine may void factory warranty. Refer to the Power supply section later in this chapter for voltage and amperage requirements of the SF1400.

Machine Operator:

Operator of this surfacing machine should be a skilled machinist craftsman who is well versed in the caution, care, and knowledge required to safely operate a metal cutting tool.

If the operator is not a skilled machinist, the operator must pay strict attention to the operating procedure outlined in this manual, and must get instruction from a qualified machinist in both the productive and safe operation of this surfacing machine.

Rottler surfacing equipment has the following areas of exposed moving parts, that you must train yourself to respect and stay away from when they are in motion:

1. **Cutting Tool Area:** Any operation involving hands in the cutter head area, such as inspection or alignment of the cutterhead or cutting tools requires the power be turned off to the machine.
2. **Surfacing:** *Eye protection must be worn:* during this operation and hands must be kept completely away from cutter head. All chip guards must be kept in their normal operating positions.
3. **Operator panel controls:** Learn to identify and independently operate these controls by habit, while developing an awareness of keeping fingers and hands clear of moving machinery.
4. **Work Loading and Unloading:** Carefully develop handling methods of loading and unloading work pieces, so that no injury can result if hoist equipment or lift connection should fail. Periodically Check lift components for damage that may cause failure of Block Handler Assembly. Lifting eye can eventually fail if the eye is reset in line with the 502-1-80 lift channel. **Eye must be at right angle to this channel.**
5. **Machine maintenance:** Any machine adjustment, maintenance or parts replacement absolutely requires a complete power disconnect to the machine. THIS IS AN ABSOLUTE RULE.
- 6.

Emergency Procedure:

Assuming one of the following has occurred: Vertical height set completely off or work piece is not clamped, these mistakes will become obvious the minute the cut starts

PRESS THE EMERGENCY STOP BUTTON (on the front control panel) IMMEDIATELY!

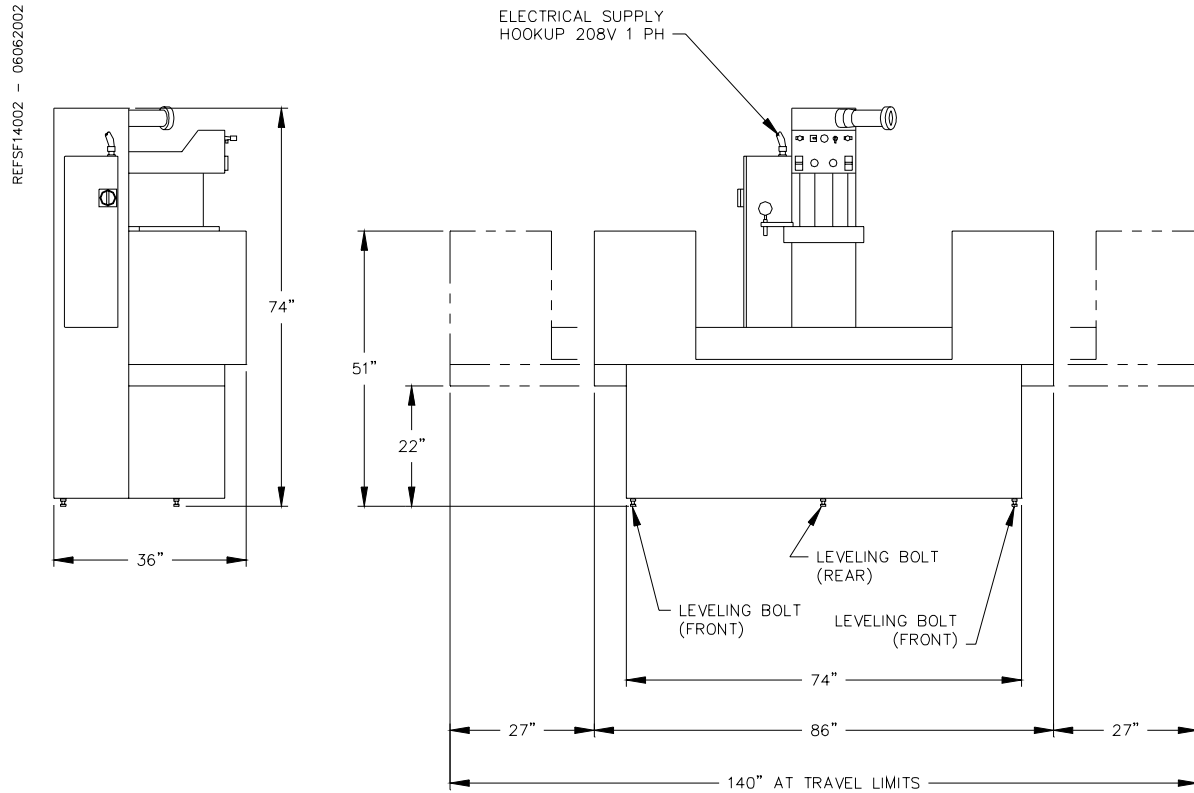
Find out what the problem is; return the spindle to its up position without causing more damage. To restart the machine, turn the Emergency Stop Button CW until the button pops out. Make sure the button

has been depressed for at least 1 ½ minutes or the drives will not have time to reset and they will not function.

Be alert to quickly stop the machine in the event of a serious disruption of the surfacing process.

“REMEMBER” metal cutting tools have the speed and torque to severely injure any part of the human body exposed to them.

Machine Installation:



Location:

The productivity of this machine will depend a great deal on its proper initial installation, particularly the means by which cylinder blocks/heads are lifted into the machine as well as the material handling to and from other operations in your shop.

The proper loading arrangement and location for your SF1400 machine is extremely important.

A slow travel (6 to 10 feet / min.) power hoist, operated from either a bridge crane or a jib crane arrangement works very well. A 1000-lb. hoist is generally adequate for lifting the engine block. An air hoist with speed control makes an ideal method for fast, convenient loading.

If some production surfacing with this machine is anticipated, and the cylinder blocks/heads are not directly loaded and unloaded from a conveyor, we recommend considerable attention be given to the crane so that it covers an adequate area to allow the operator to back up and remove cylinder blocks/heads without cluttering up his own area. If two machines are to be operated by one operator, we recommend that the open faces be placed at right angles to each other, with the machines about three feet apart.

Unpacking:

Use care in removing the crate from the SF1400 machine, do not use force on any part of the machine.

Rust inhibitor is applied to the machine at the time of shipment, any of this inhibitor left on the machine will result in considerable collecting of cast iron dirt.

Lifting:

CAUTION: *Do not lift the SF1400 by the Horizontal table. It will cause sever damage to the Linear Way bearings.*

Insert a 3 foot by 1 inch diameter solid steal or cast iron rod through the hole in either the left or right hand side of the lower main base as shown below.

Using a forklift, with the forks one fork on either side of the bar, lift until the center of the machine is at least 4 inches off the ground. Slide a 4 X 4 under the machine base (front to back) in the middle of the base. Set the machine down onto the 4 X 4. This will leave enough room on both sides of the 4 X 4 to slide the forks in. At this point you can pick the machine up from the front or the back.

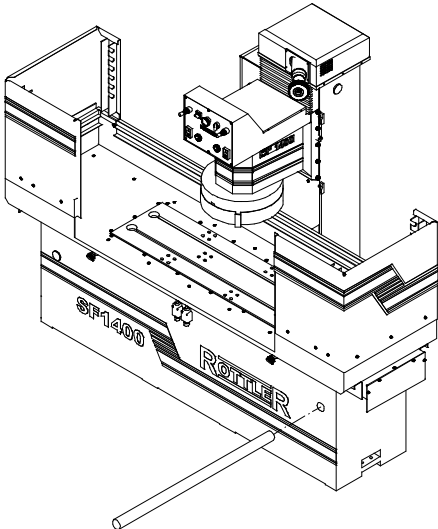
Leveling:

There are three leveling locations on the SF1400. One at each end on the outside and one in the rear inside the machine base. You will need to remove a cover to get to this location.

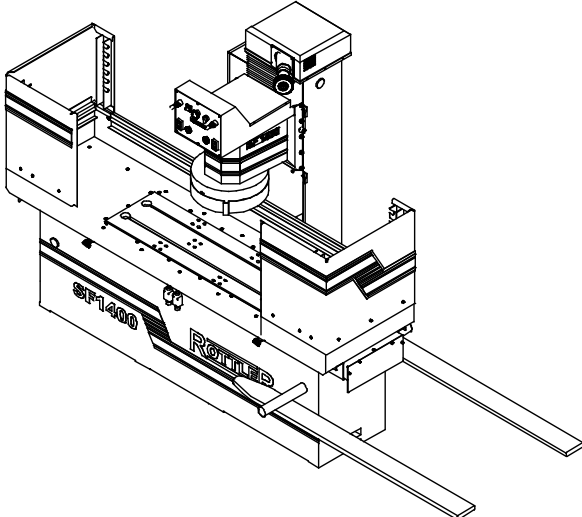
Use a precision level and level the upper table within .0005" per foot in both directions and make sure that the machine weight is equally supported at the support points of the base.

MACHINE POSITIONING

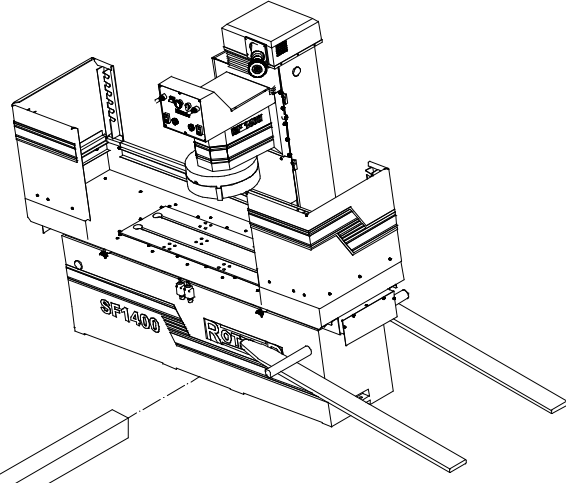
Picture 1



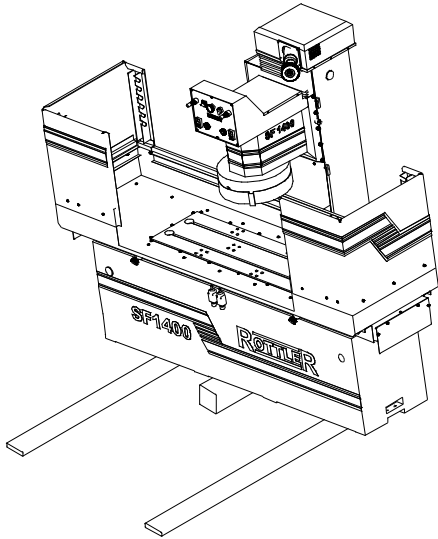
Picture 2



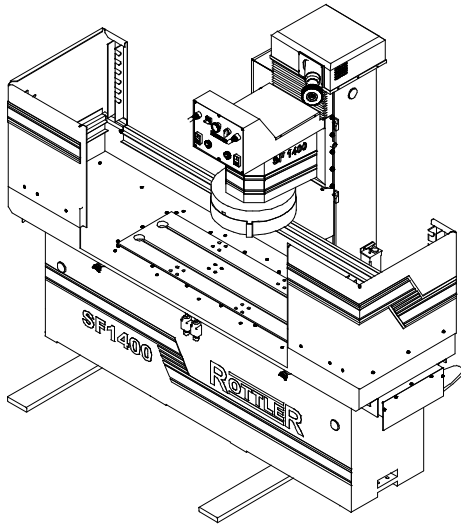
Picture 3



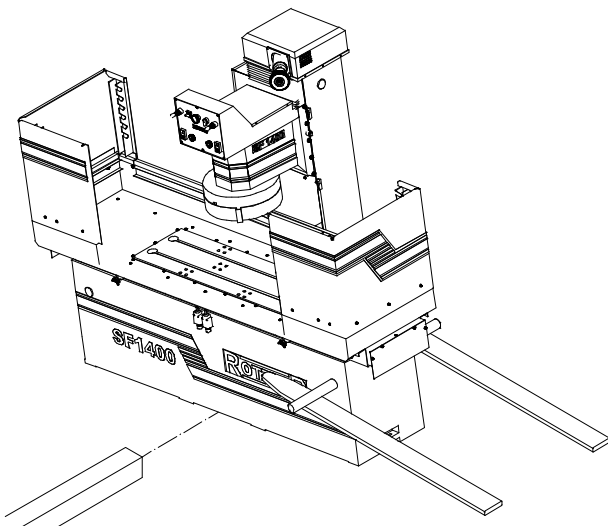
Picture 4



Picture 5



Picture 6



Power Supply:

This machine requires 208 to 240 VAC single phase, 50/60 Hz, (measured between L1 and L2). Current required is 15 amps. When using two legs of a three phase supply the voltage from each leg to ground must be between 100-120 VAC. Connect per following electrical hook-up instructions. ***If the voltage is outside this range the machine will not operate properly and may be damaged.***

CAUTION: *Do not attempt to attach three phase. The three phase motors receive power from three phase variable frequency inverters located in the main electrical enclosure. The frequency inverter must be single phase powered.*

Connect single phase wiring to the three wires coming out of the top of the electrical enclosure. The machine is not sensitive to neutral/hot leg phasing. Two legs of a 208-240 VAC 3 phase supply can be used.

CAUTION: *This machine must be connected to a good earth ground. Connect the earth ground wire to the terminal with the green grounding wire attached to it, on the terminal strip mounted in the upper right side of the electrical enclosure.*



Chapter 2 Control Definitions :

This chapter is intended to familiarize the operator with the function of all the controls.



Vertical Rapid:

This is a three position momentary contact lever. Press, and hold, the lever up and the machine will rapid travel up until the lever is released or a limit switch is hit. Press and hold, the lever down and the machine will rapid travel down until the lever is released or a limit switch is hit. When the lever is not being pressed it will return to the center position, which is no movement.

Horizontal Rapid:

This is a three position momentary contact lever. Press, and hold, the lever right and the machine will rapid travel right until the lever is released or a limit switch is hit. Press and hold, the lever left and the machine will rapid travel left until the lever is released or a limit switch is hit. When the lever is not being pressed it will return to the center position, which is no movement.

Spindle Start/Stop:

This control has two buttons. Pressing the Green button will turn the spindle on at the set speed and pressing the Red will turn the spindle off.

Feed Start/Stop:

This control has two buttons. Pressing the Green button will turn the horizontal feed on at the set rate and pressing the Red will turn the horizontal feed off.

Auto/Manual:

This is a two position selector switch. It will select between Automatic and Manual modes of operation. See the Operating Instructions section of this manual for using the Auto and Manual Modes.

Preset / Variable:

This will select between three preset spindle speeds or the use of the variable Spindle RPM knob when in the Automatic Mode. The spindle speed options are 600, 900 and 1100 RPMs.

Variable Spindle RPM:

This knob is used to set the spindle RPM when the spindle start has been pressed. The RPM is displayed on a digital read out to the left of the control. It is mounted on the electrical enclosure.

Variable Horizontal Speed:

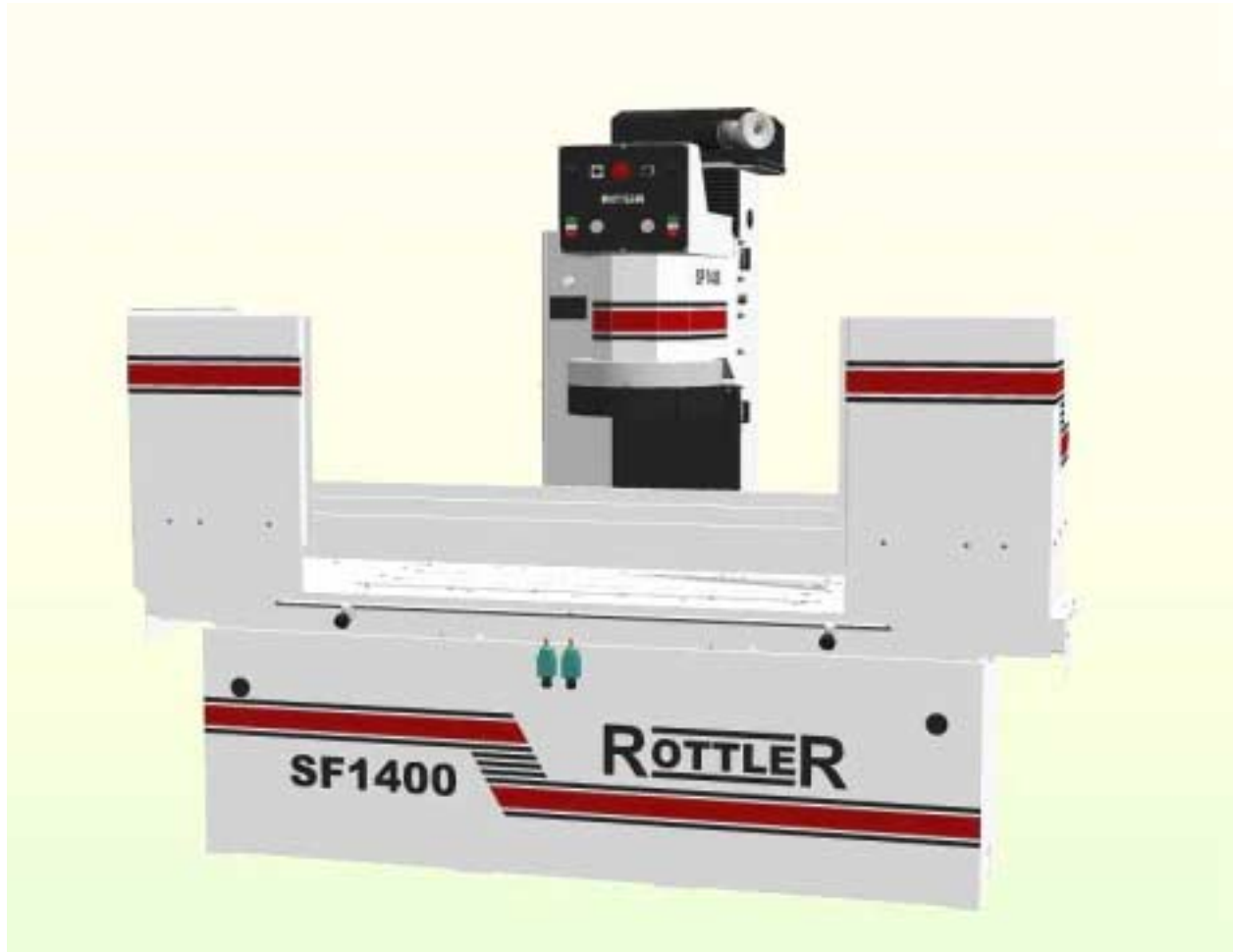
This knob is used to set the horizontal feed rate.

Vertical Manual Knob:

This knob, located to the upper right of the control panel, is used to manually move the vertical position.

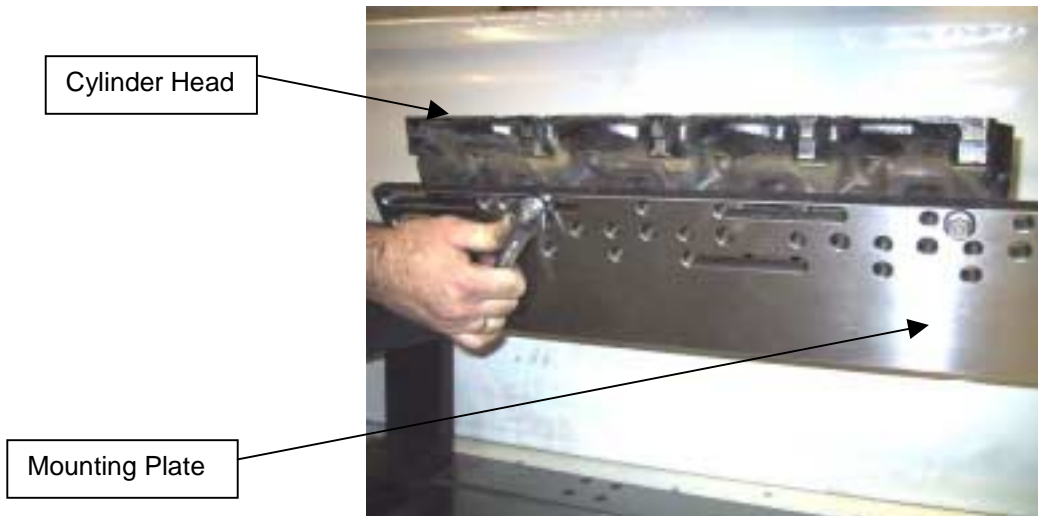
Chapter 3 Operating Instructions:

Included in this chapter is a general description of how to use the basic machine for surfacing, whether it is a cylinder block, head or other type of job. For details of operating the specific fixtures available for this machine refer to the Optional Surfacing Fixtures and Tooling section of this manual.

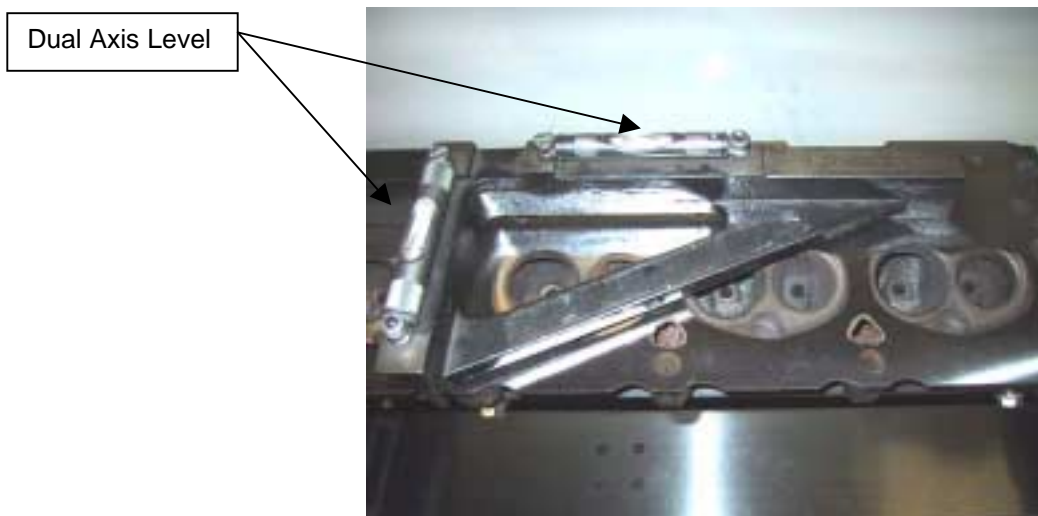


Mounting a Cylinder Head on the Universal fixture:

Locate suitable threaded holes and bolts on one side of the cylinder. Fit the cylinder head to the Mounting plate. Level the head as close as possible without using a level. Tighten down the mounting bolts.



Place the Dual Axis level on the head gasket face for precision leveling.



Loosen the left and right hand clamps on the fixture.

Left



Right



Level the front to back first by turning the fine adjusting Hex screw on the lower right hand side of the fixture. Do not attempt to adjust the level exact at this point.



Loosen the Lock screw on the right hand side of the universal mounting plate.



Left Right Lock Screw

Adjust the Left Right by turning the eccentric studon on the left end of the universal mounting place.



Eccentric Studon

Once the head is level, tighten the left and right locks back up along with the locking screw on the universal mounting plate.

Fit the Jack screw and engage under the head to support it during surfacing. Be sure to check the level while fitting the jacking device.



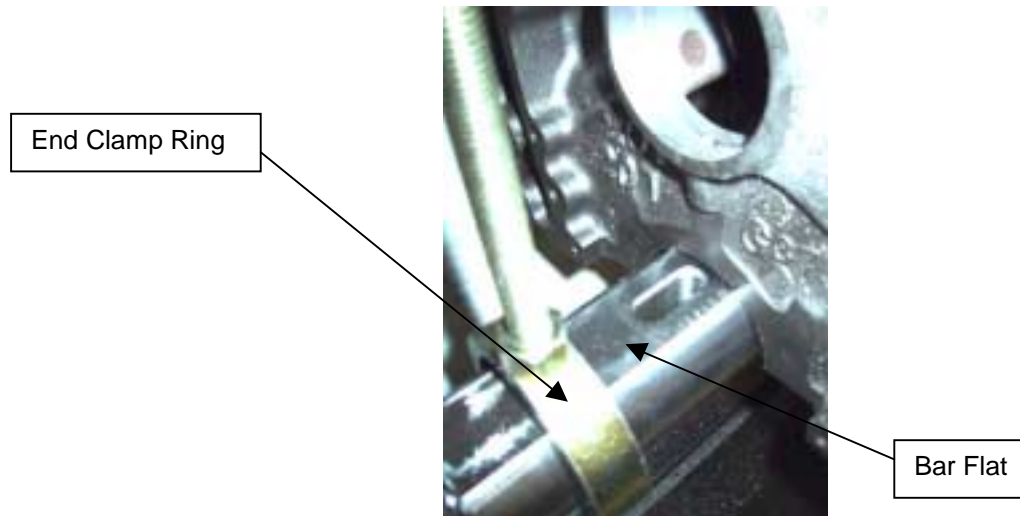
Some people recommend mounting the cylinder head in front of the universal mounting plate as shown below. Rottler has tested both methods and determined that the best method is what ever the operator is comfortable with.



Mounting a V Block on the Universal Fixture:

Remove the Cylinder Head Mounting plate from the universal fixture.

If the two (2) end clamp rings are not in place on the bar, remove the bar and fit the two rings.

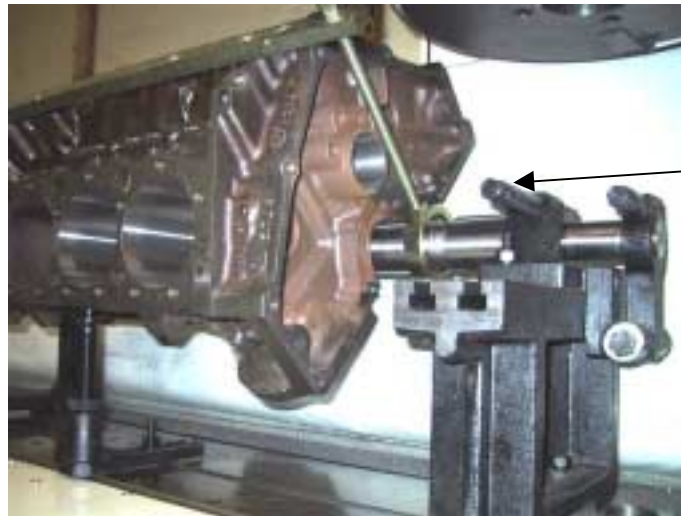


Make sure the jacking devices and the T slot studs are in the front and rear T slots of the table between the left and right support parallels.



Rotate the bar so that the flat face is upwards (shown above).

Lock the left and right end clamps so the bar cannot rotate.

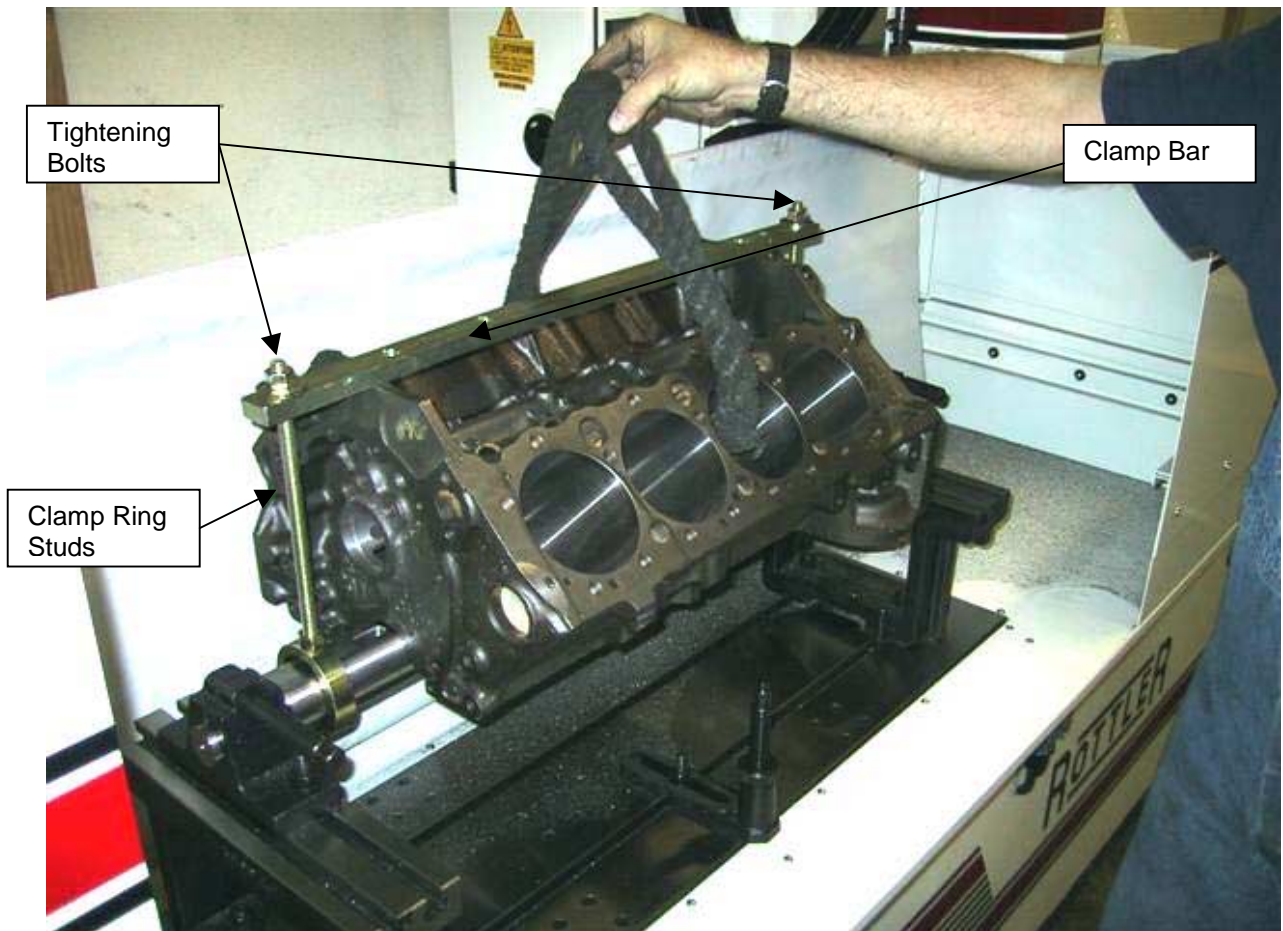


Right Lock

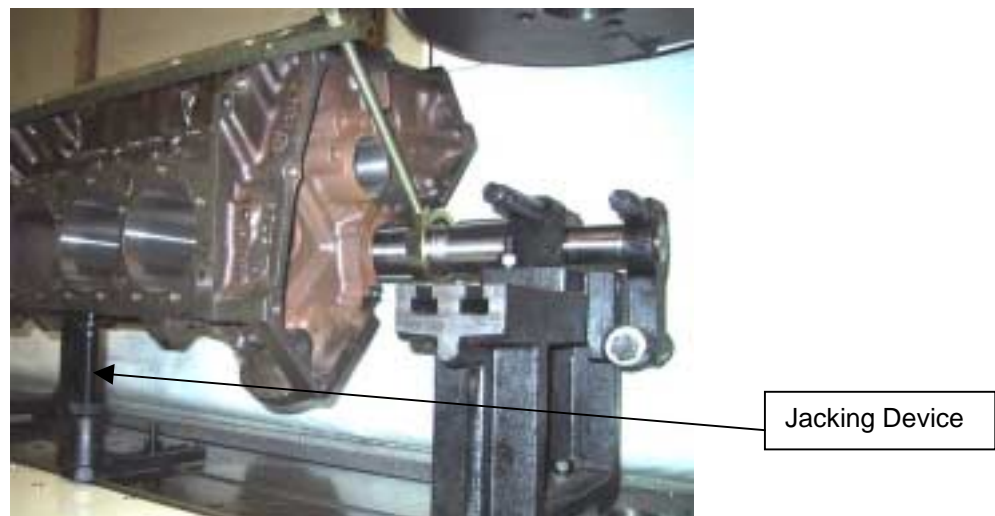
Left Lock



Gently Lower the V block so that the Mains locate on the two edges of the flat. Fit the Studs to the clamp Rings, then the Clamp Bar to the Studs. Evenly tighten both ends of the Clamp Bar as not to misalign the block on the bar.



Once the block is firmly clamped to the bar, it is ready to be rolled in either direction for surfacing. Make sure to put the jacking devices under the block to support its weight.



Manual Operation:

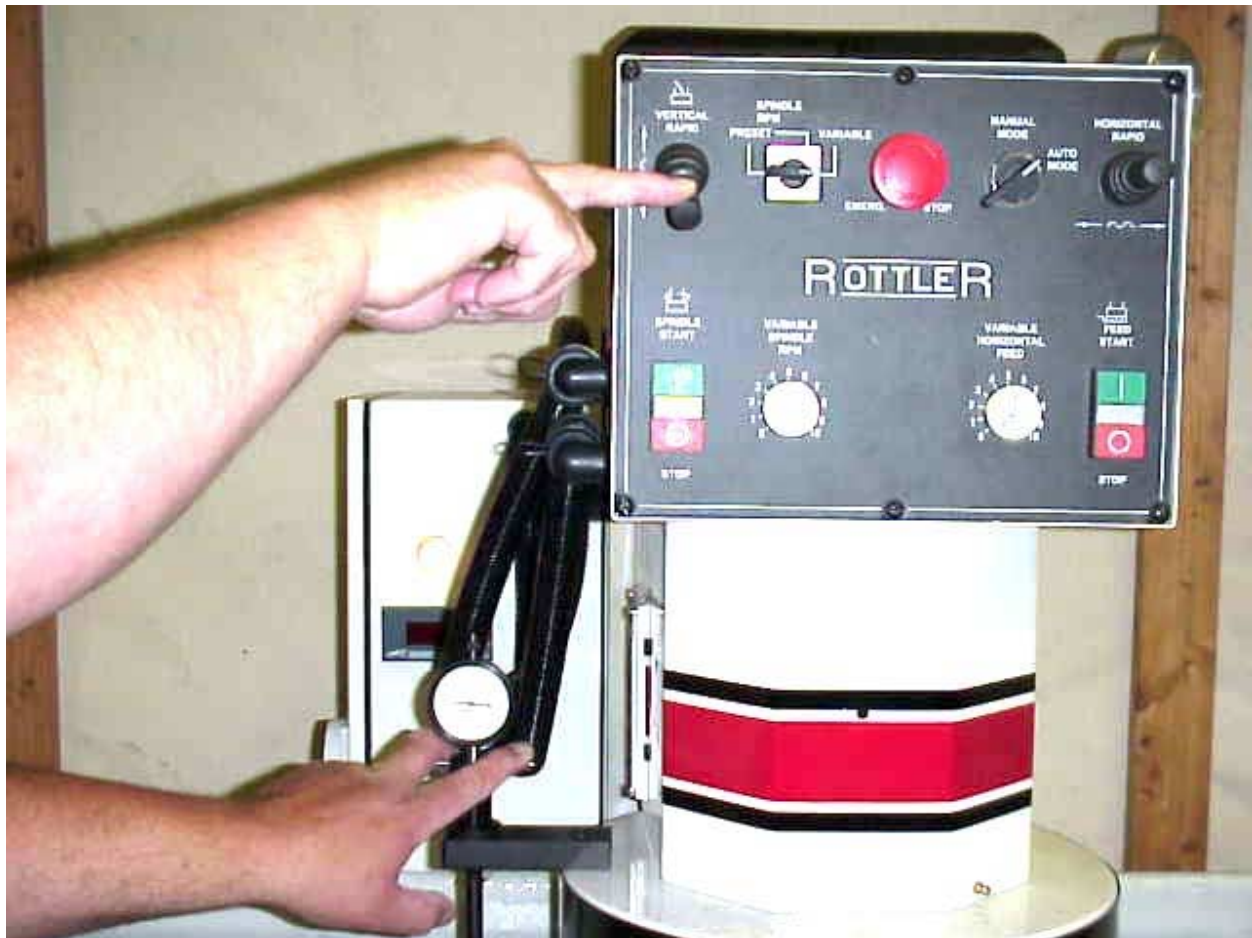
Select the Manual Mode of operation from the front control panel.

This mode is used to move the machine around using the joysticks. If the Spindle is started the Vertical joystick and the Feed button will not operate. The Horizontal joystick will operate while the Spindle is on.

Automatic Operation:

For the following description to work correctly, we are assuming that the Depth Dial indicator has been calibrated correctly (see the maintenance section of this manual for proper setting description).

Press left travel Joystick, rapid left to the desired starting position. The starting position is just before the cutterhead guard starts to pass over the workpiece. Slide and lock the right limit switch actuator so that the limit switch is depressed. The Depth Dial indicator should be over the workpiece at this time. With two fingers on the Horizontal pins, push the depth dial indicator on the guard down until the travel stops. Operate the Up/Down Joystick and jog the workhead down until the depth dial probe just touches the workpiece.



While still holding the Depth Dial down, slowly rotate the fine feed manual handwheel down until the desired amount of stock removal is seen on the Depth Dial Indicator.



Select Manual on the control panel.



Dial in the desired Spindle RPM and start the spindle rotation, the light will turn on when the spindle is rotating.

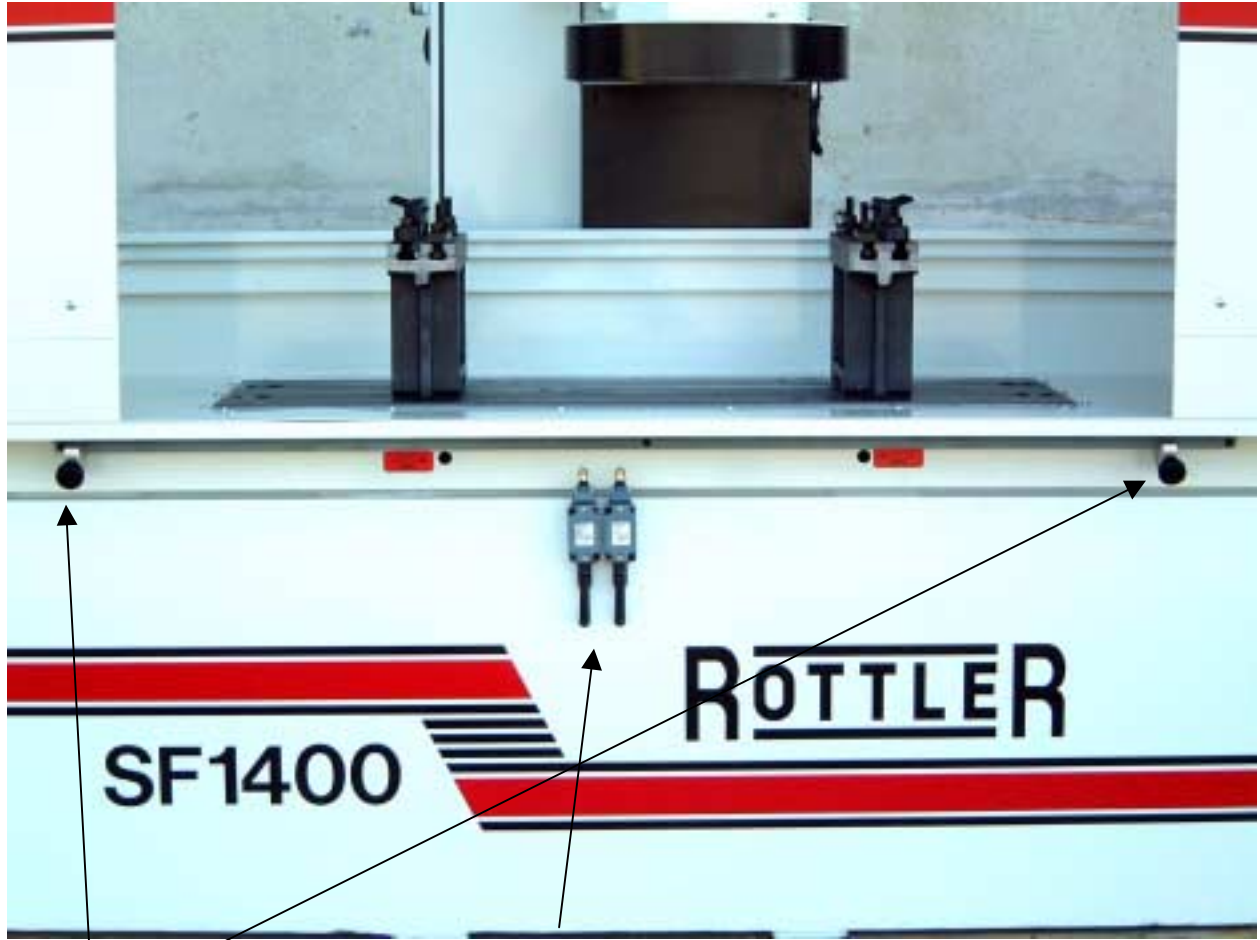


Dial in the desired Feed Rate and start the horizontal feed, the light will turn on when the feed is started.



When the cutter has passed the left end of the workpiece and completed the surfacing, slide and lock the limit switch actuator so that the limit switch is depressed. This will then cause the spindle to stop, workhead to lift up and the table to return to the right hand limit switch setting.

See limit switch positions and adjustors on the following page.



Actuators

Limit Switches

Cutting Inserts

Rottler offers several different 3/8" I.C. Negative Rake cutting inserts for the SFOE machine. Below is a description of each.

Carbide (uncoated) :

(R8 Round: #6301G)

This is an economical general purpose insert.

CBN - Cubic Boron Nitride:

(Round: #6303B)

(Square: #6301J)

These are very high performance inserts used for cutting cast iron. Using the 14 inch diameter cutterhead of the SFOE machine the RPM can be run between 500 and 1250. The lower end of the speed range is used primarily for cutting diesel blocks and heads since they are usually harder.

The upper end of the speed range is used primarily for automotive blocks and heads. The optimum RPM for automotive work is about 950 RPM. This will give tool life resulting in an approximate insert cost per head of 5 to 15 cents. If a higher RPM is used tool life will be reduced, increasing tool cost per head to between 30 and 50 cents.

CBN can be used for cutting aluminum and usually is, when you are cutting a few aluminum heads among a lot of cast iron heads. When the quantity of aluminum heads is higher it is more economical to change to an insert designed for aluminum. When cutting aluminum with CBN use some type of lubricant (WD40, Pam, or any type of oil) otherwise the aluminum will build up on the edge of the insert. The tool life of a CBN insert is no greater than a coated carbide insert when machining aluminum so it is much more cost effective to use coated carbide when machining quantities of aluminum.

CBN does not cut cylinder heads with pre-combustion chambers. CBN can be used to cut heads with exposed hard seats such as some Cummins heads but a slower RPM should be used and tool life will be reduced. Some shops dress the seats down with a seat and guide machine before surfacing.

CBN can be used to cut soft weld material. Set the RPM between 500 and 800.

PCD - Polycrystalline Diamond:

(Round: #6303M)

This is a very high performance insert used for cutting aluminum. When used on the 14 inch cutter head the machine can be run at 1000 to 1200 rpm, .005 to .010 deep and produce a very smooth finish.

Coated Carbide:

(Round #6303K)

This is an economical, high positive rake insert for cutting aluminum. In applications where a high percentage of the work is aluminum, this insert will surface heads economically, with a smooth finish, without oil, and it is designed for chip removal. Considering the price of the insert and the tool life the coated carbide insert is roughly 1/10 the cost of a CBN or PCD. When cutting aluminum the spindle RPM can be run at its maximum speed. Coated carbide can be used to cut cast iron but the RPM must be reduced to between 500 and 1000.

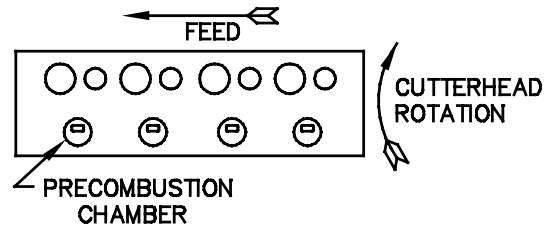
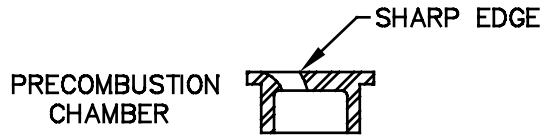
Composite Ceramic:

(Square: 6301I)

This insert is used to cut the pre-combustion chambers on the Ford / International 6.9, 7.3, and GM 6.2 heads. The insert has eight cutting edges. Each edge typically makes three passes at 500 rpm, .004 deep, and 7-inches per minute feed rate.

It is critical that the head be mounted in the fixture correctly.

If the head is not mounted this way, the inserts will chip when they contact the sharp edge of the pre-combustion chamber.



Note: There are at least two different materials used in the manufacture of the pre-combustion chambers. Rottler Manufacturing has experimented with only one material. Rottler cannot guarantee cutting all materials.

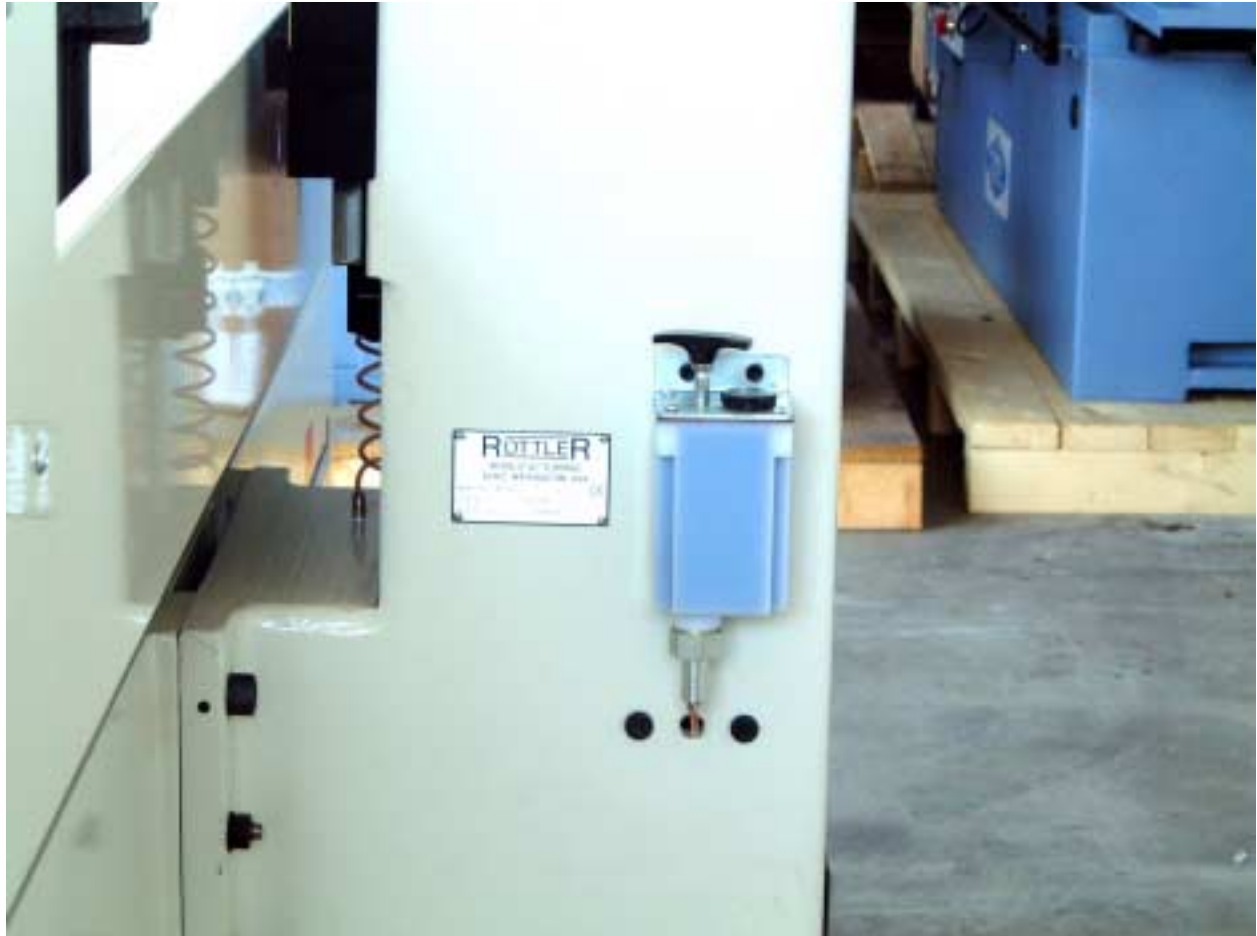
CAUTION: The precombustion chambers in some heads have very loose fits and may come loose during the machining process resulting in insert damage.

Feed and Speed	1 Insert
RPM 1000 F.R. 2"/min.	12 rms.
RPM 1000 F.R. 5"/min.	20 rms.
RPM 1000 F.R. 10"/min.	30 rms.
RPM 1000 F.R. 20"/min.	60 rms.
RPM 1000 F.R. 30"/min.	90 rms.

Chapter 4 Maintenance:

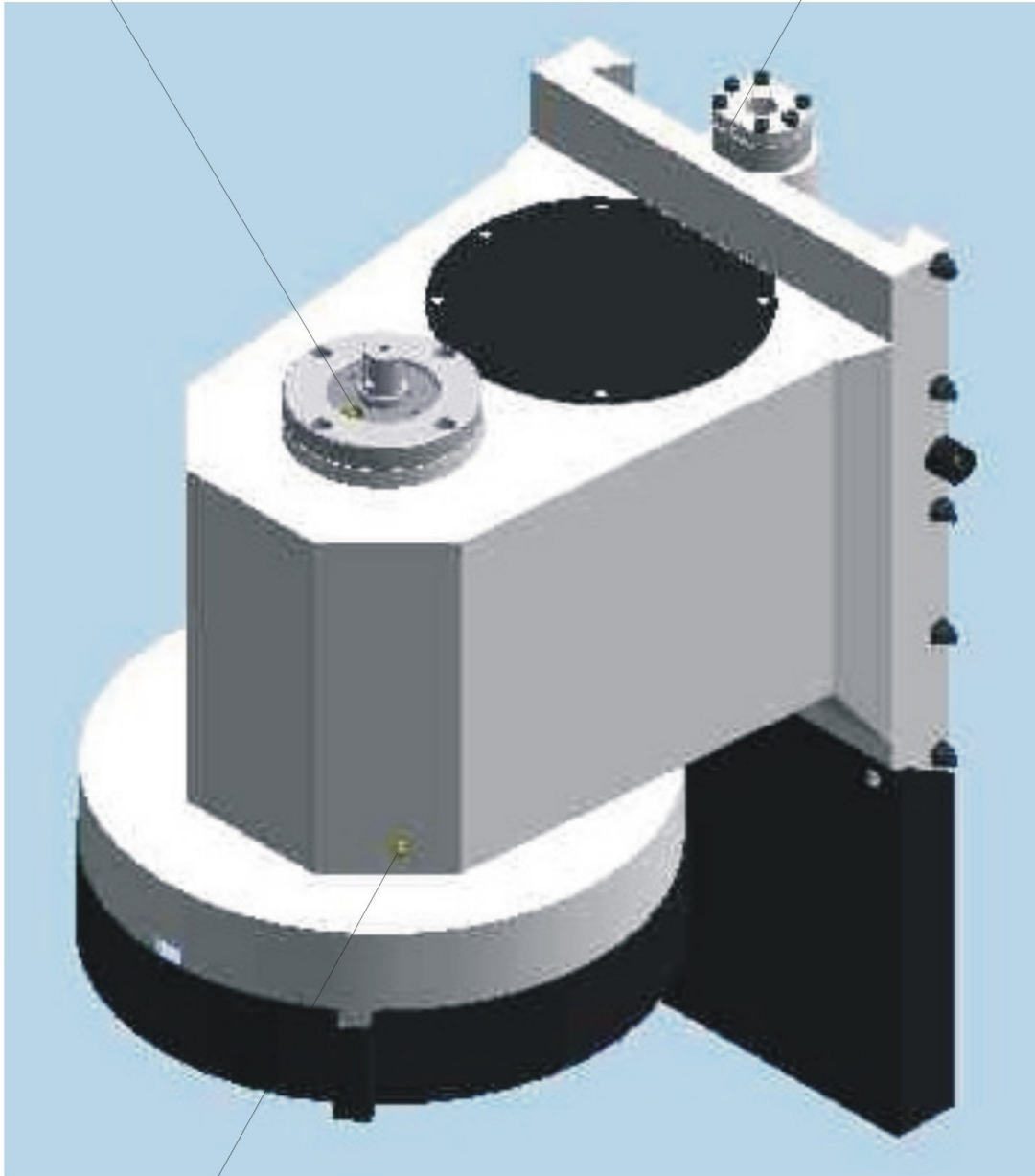
Oiler:

The oiler on the SF1400 is a manual oiler. The operator will need to go to the oiler several times a day to oil the machine. The oiler is located on the rear column of the machine on the right hand side.

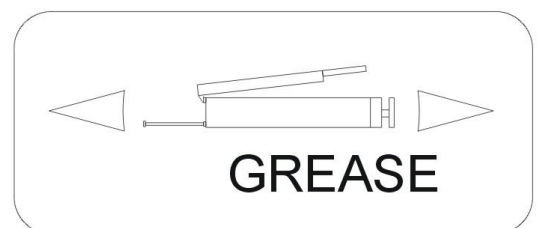


BEARING 7306

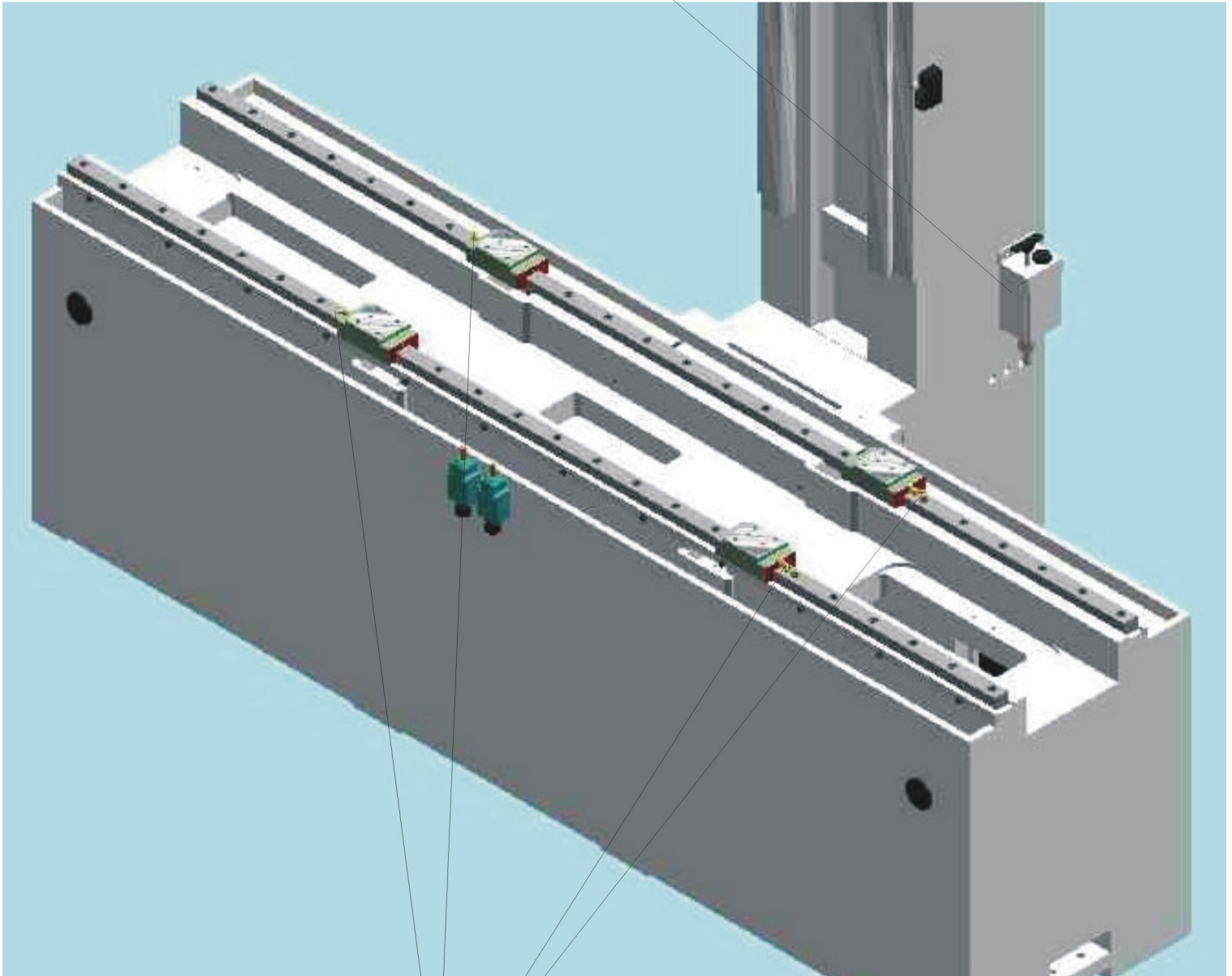
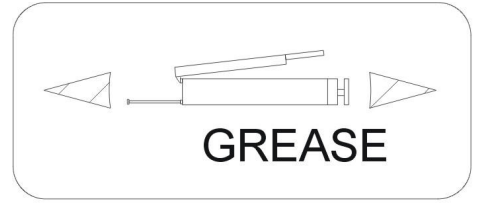
FEED NUT - HEAD SCREW



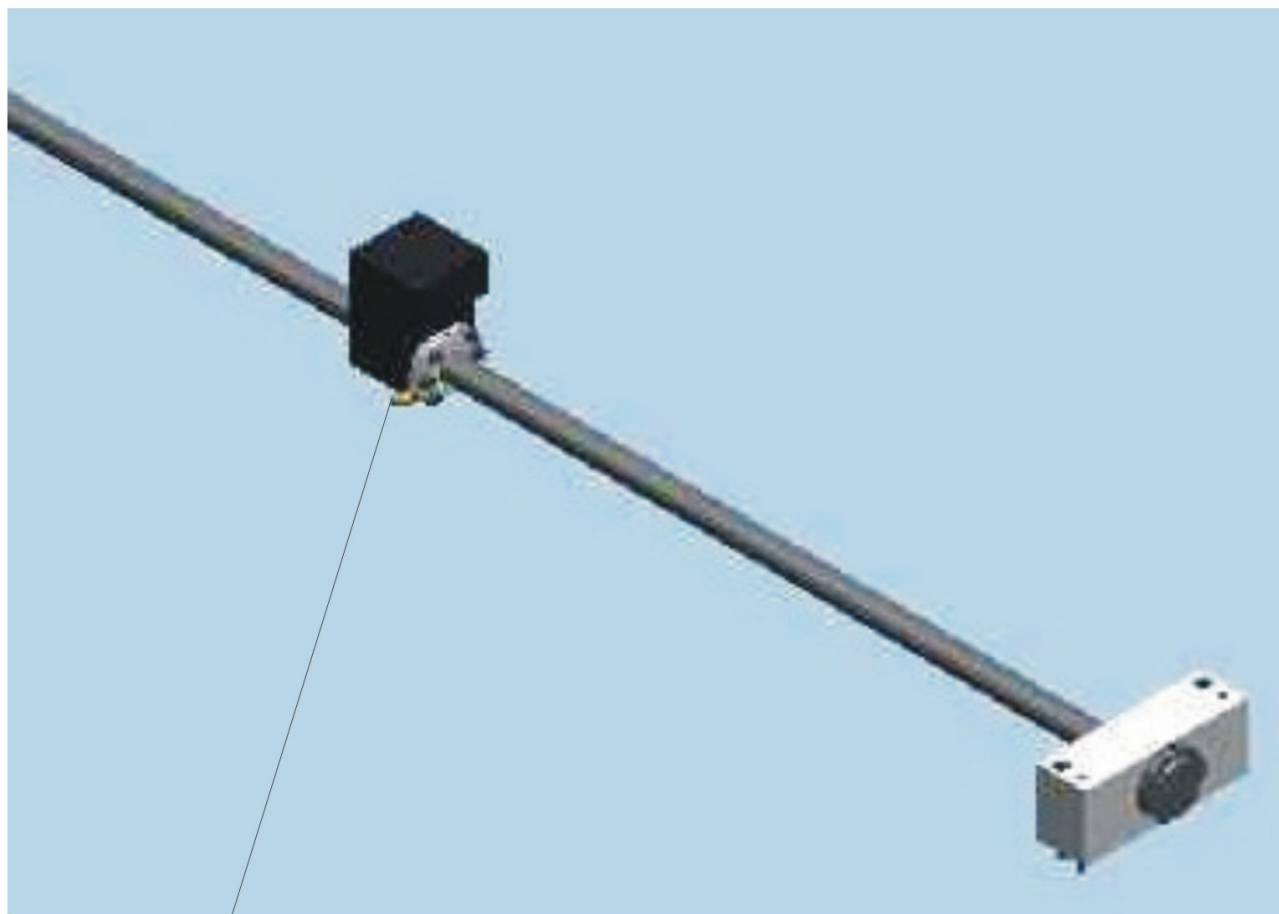
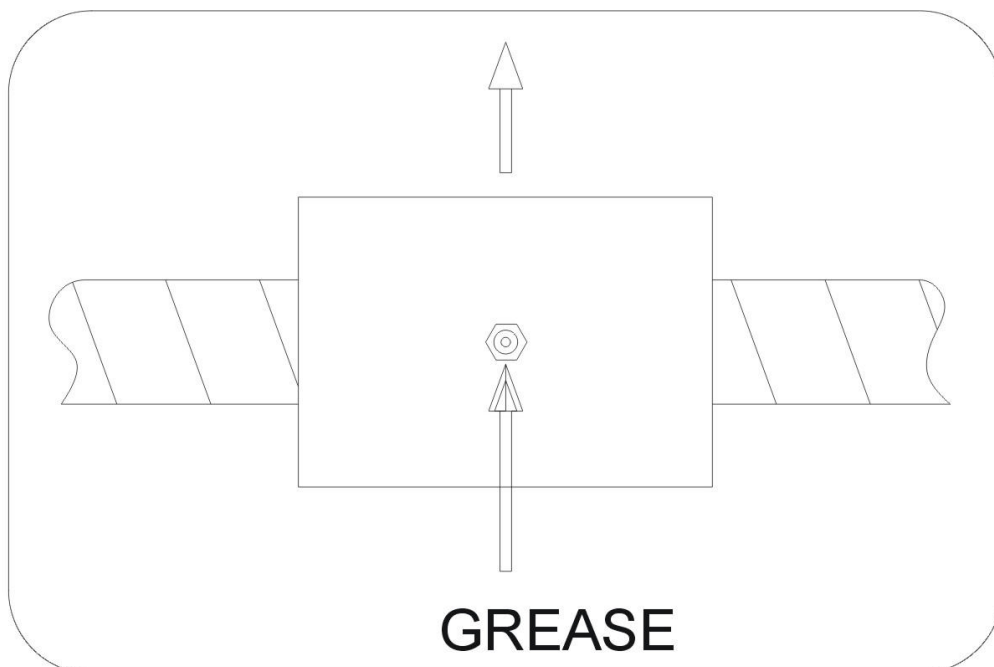
BEARING 7209



OIL PUMP



SLIDES



FEED NUT - TABLE SCREW

DESCRIPTION	TYPE OF LUBRICANT	INTERVAL
Feed nut - head screw	Bergoline grease RULTEN 900 NGLI 2 or other stearate hydroxid litthium grease of high quality	500 working hours; replace every 6 month.
Bearing 7306		
Bearing 7209		
Oil pump	Mobil VACTRA oil n° 4 Castrol Magna CFX 220 Esso FEBIS K220 Shell TONNA oil T220	4 working hours actuate the pump; refill when necessary.
Slides	Bergoline grease RULTEN 900 NGLI 2 or other stearate hydroxid litthium grease of high quality	500 working hours; replace every 6 month.
Feed nut - table screw		

Dial Indicator Setting:

If chip shield, cutting insert, or dial indicator have been moved, the dial indicator should be reset.

Install a test piece into the SF1400. With surfacing cutter installed into the cutterhead, use the Horizontal Joystick to move the cutterhead until it overlaps the test piece by about $\frac{1}{2}$ ".

CAUTION: Turn the power off machine before handling the cutterhead.

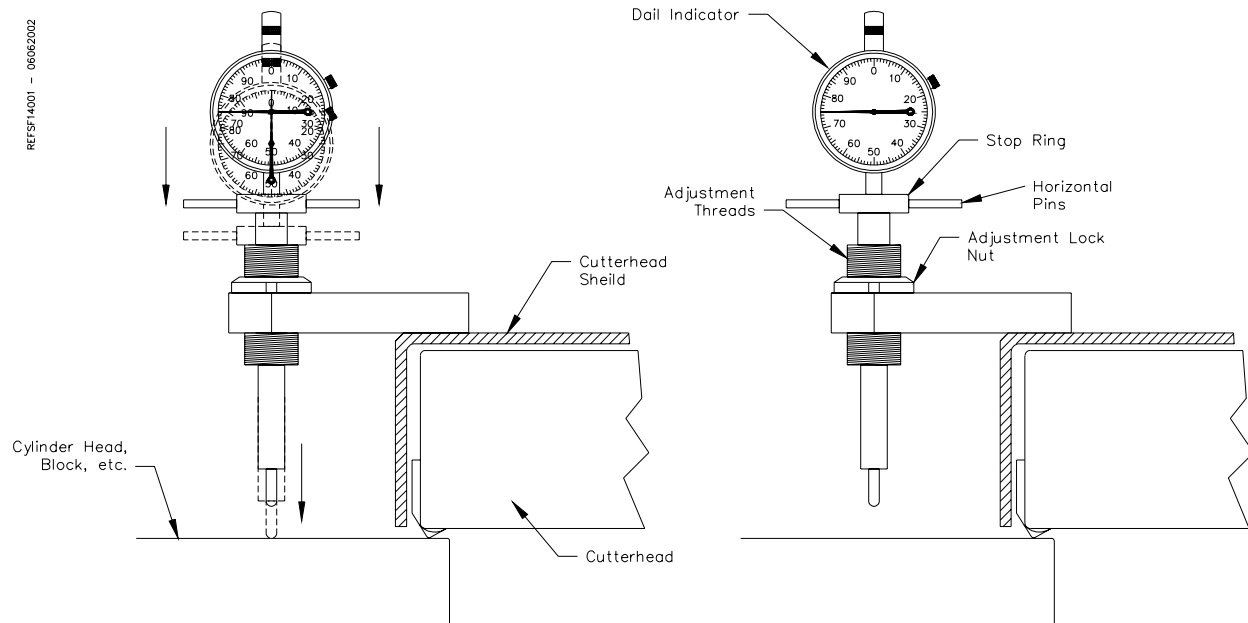
Touch off the surface of the test piece by turning the vertical hand feed until the cutting insert just touches a piece of paper on the test piece when rotated back and forth.

Note: Do not lower the cutterhead directly onto surface, it may chip the cutting insert.

Make a very light cut on your test piece about 1" in. Back out of the cut without adjusting the vertical height. Press the dial indicator down using two fingers on the horizontal pins until the stop ring is reached.

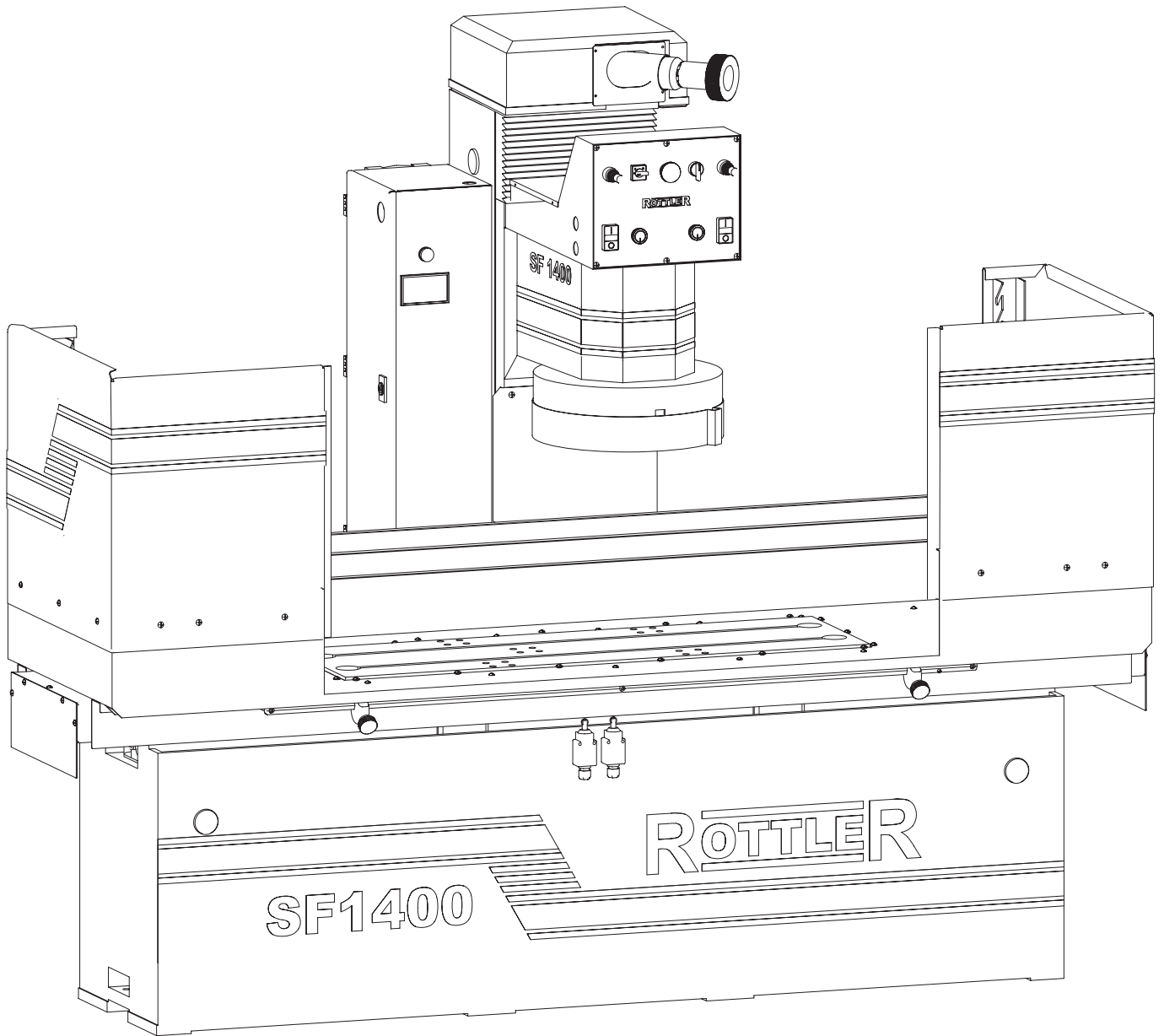
Turn the indicator dial face so that the "0" is in the 12 o'clock position.

To adjust, loosen the locking ring, turn the adjusting threads up or down until the probe is half way between it's minimum and maximum range. Fine tune the setting by adjusting the threads up or down until the needle on the dial indicator face is on "0". Tighten the Locking Nut.



SF 1400

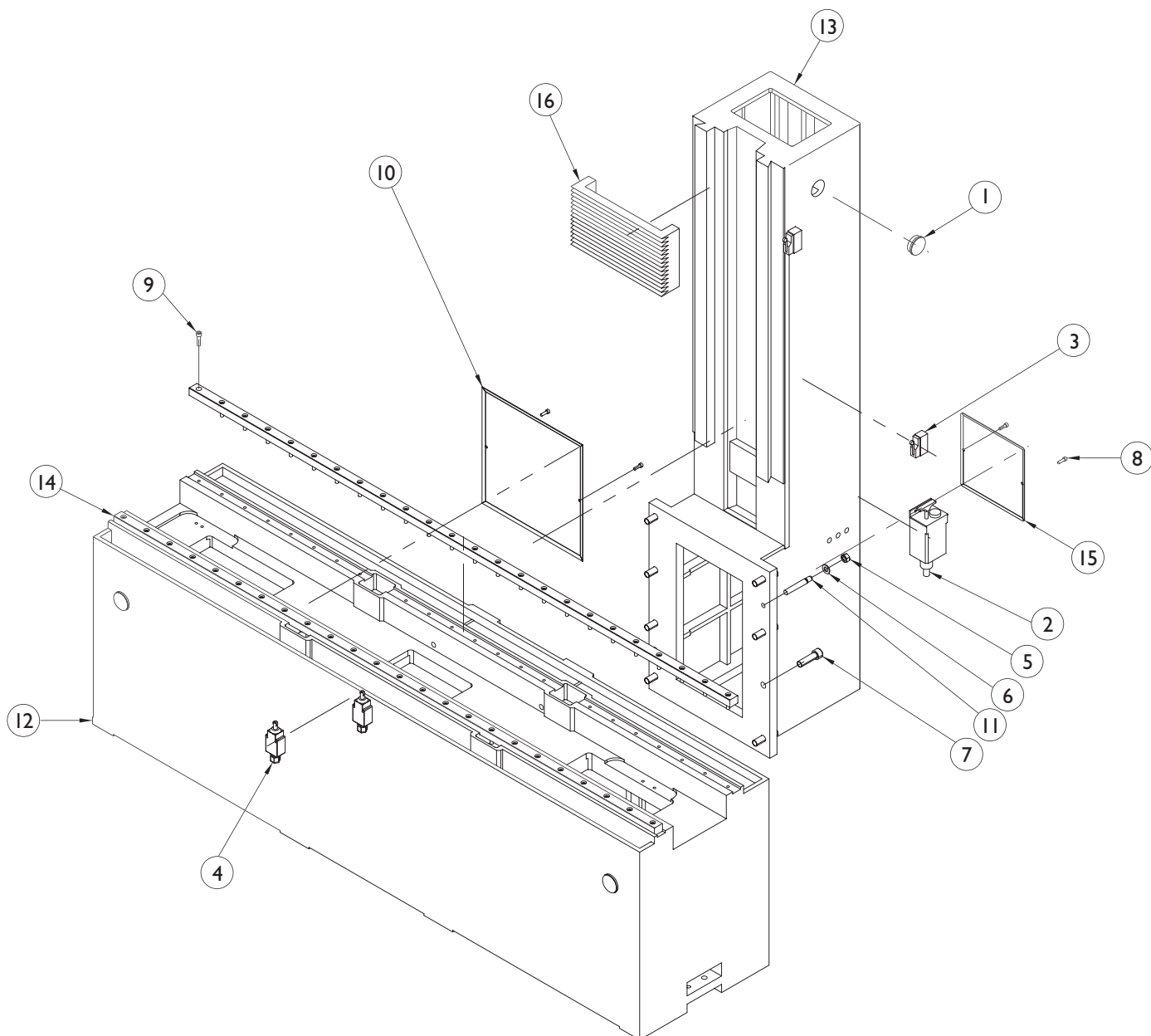
ROTTLER



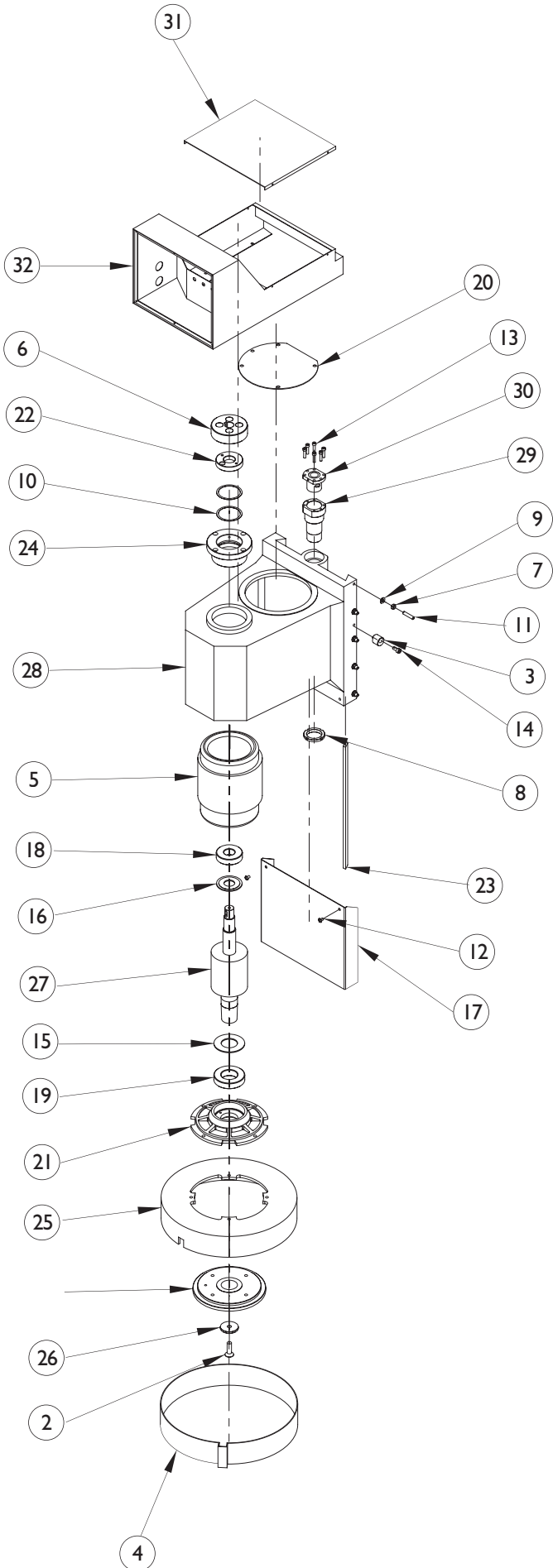
PARTS LIST

SF 1400

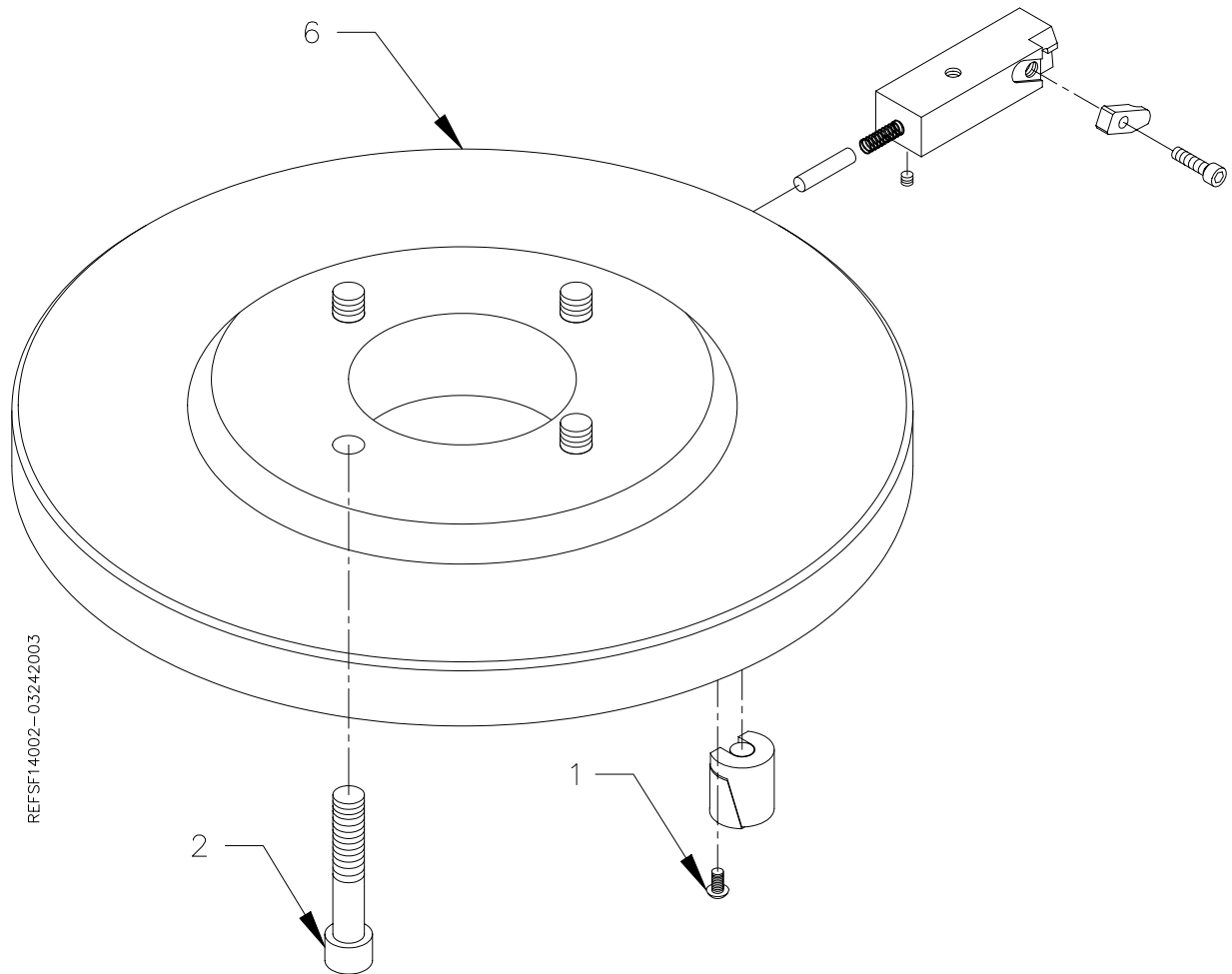
BASE - COLUMN ASSEMBLY



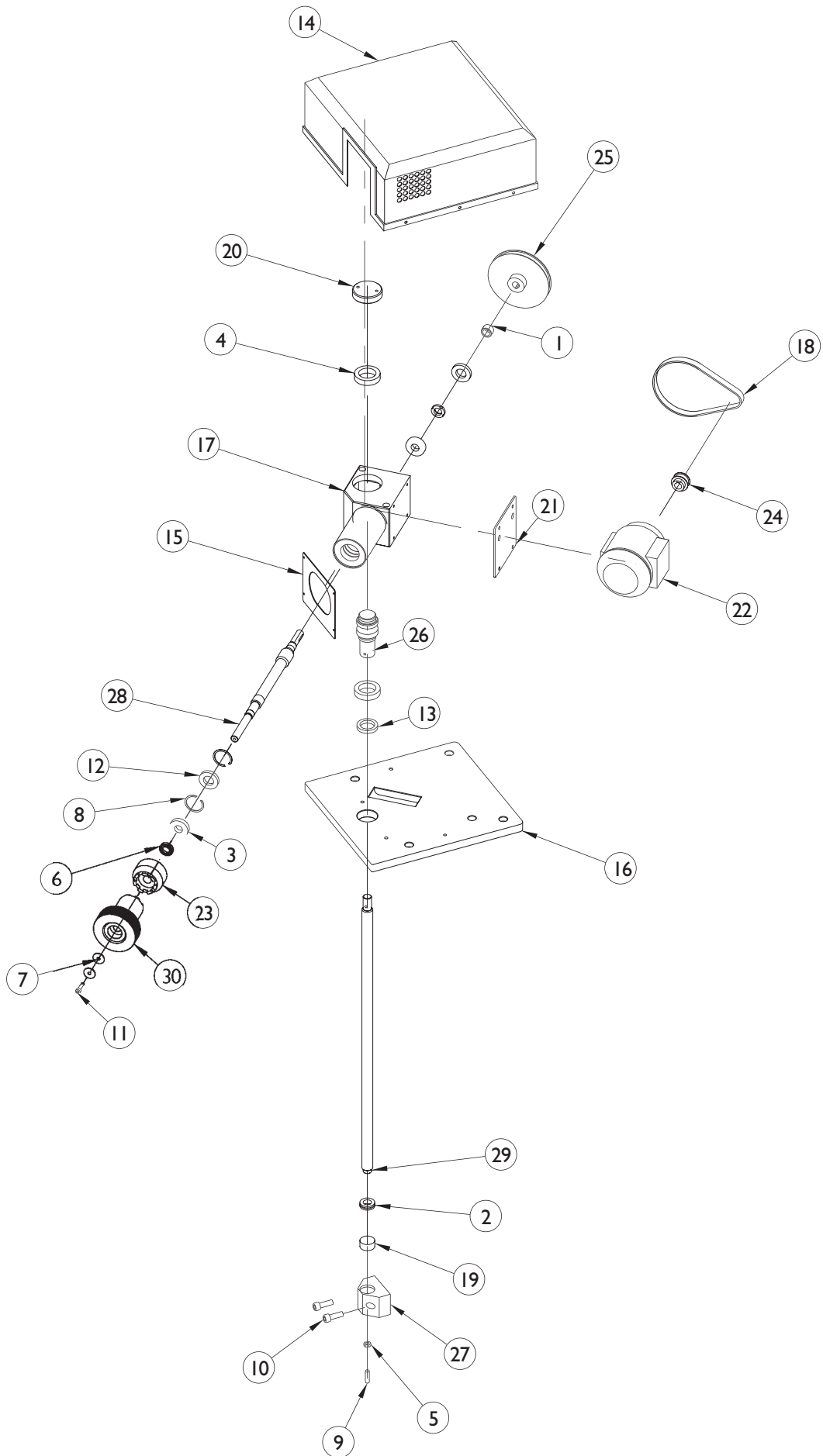
Ref.	Code	Q	Part name
①	547 090 050	6	plastic plug TT50
②	543 001 010	1	oil pump C6/C5 00.129.0
③	541 100 117	2	limit switch PI22 MS45
④	541 100 111	2	limit switch PI22 FC215
⑤	555 751 012	2	nut M12
⑥	555 701 224	2	washer 12x24
⑦	555 116 055	8	screw TCEI 16x55
⑧	555 106 020	6	screw TCEI 6x20
⑨	555 108 030	48	screw TCEI 8x30
⑩	213 008 640	2	rear cover - 350x350mm
⑪	213 002 080	2	conical pin - column
⑫	214 000 040	1	machine base
⑬	214 000 080	1	column
⑭	214 000 780	2	table guide
⑮	213 008 600	1	rear cover - 220x220mm
⑯	213 008 480	1	bellows - column



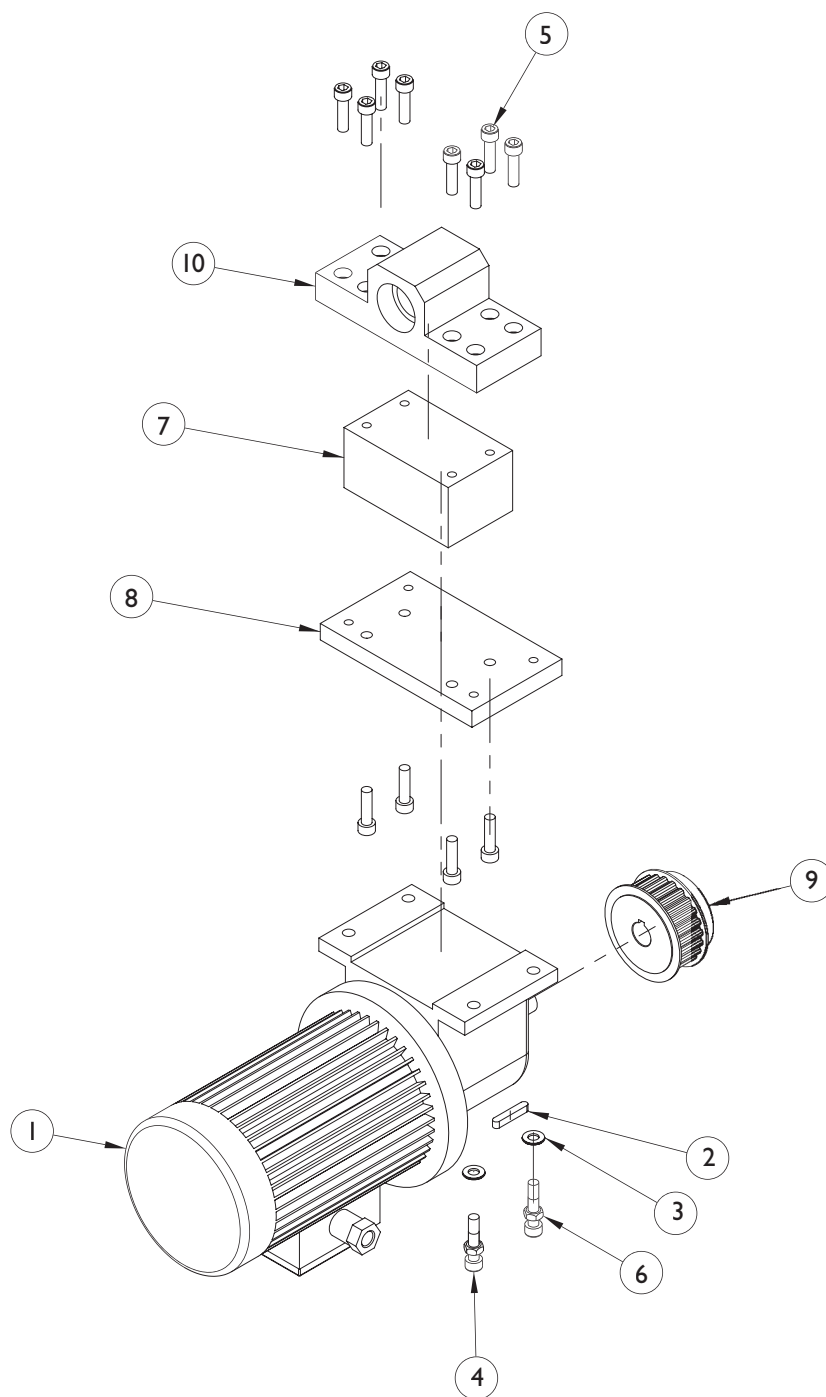
Ref.	Code	Q	Part name
①	213 004 440	1	supporting flange
②	213 102 780	1	stroke-end pind
③	213 008 020	1	splash guard - D.374
④	510 000 187	1	motor windings 2.2Kw 6P
⑤	213 004 340	1	retainer - rotor
⑥	555 751 008	5	nut M8
⑦	550 040 150	1	nut KM8 40x1.5
⑧	555 700 817	5	washer 8x17
⑨	551 610 715	2	spring washer 61x71x3.5
⑩	555 508 040	5	screw STEI 8x40 est. cnc
⑪	555 750 610	2	screw TCB 6x10
⑫	555 106 025	6	screw TCEI 6x25
⑬	555 108 016	1	screw TCEI 8x16
⑭	555 312 035	1	screw TSPEI 12x35
⑮	290 004 400	1	lower grease retaining ring
⑯	290 004 360	1	upper grease retaining ring
⑰	213 008 440	1	cover - column ways
⑱	527 300 720	1	bearing 7306
⑲	527 450 850	1	bearing 7209
⑳	213 008 420	1	cover - D.218
㉑	290 004 440	1	lower bearing support
㉒	290 004 140	1	nut - head hub tightening
㉓	213 004 080	1	head gib
㉔	290 004 160	1	hub - head registering
㉕	213 004 400	1	guard-motor D374
㉖	213 004 460	1	washer - supporting flange
㉗	213 004 361	1	motor armature 2.2Kw 6P
㉘	213 004 040	1	head
㉙	214 002 160	1	housing - head female screw
㉚	214 000 500	1	feed nut - table screw
㉛	214 001 080	1	cover - control panel
㉜	214 001 040	1	control panel - head



Ref.	Code	Q	Part Name
1	555 570 512	1	Screw TCB 5x12
2	555 112 050	1	Screw TCEI 12x50
3	214 003 120	4	Mill - D 355.6



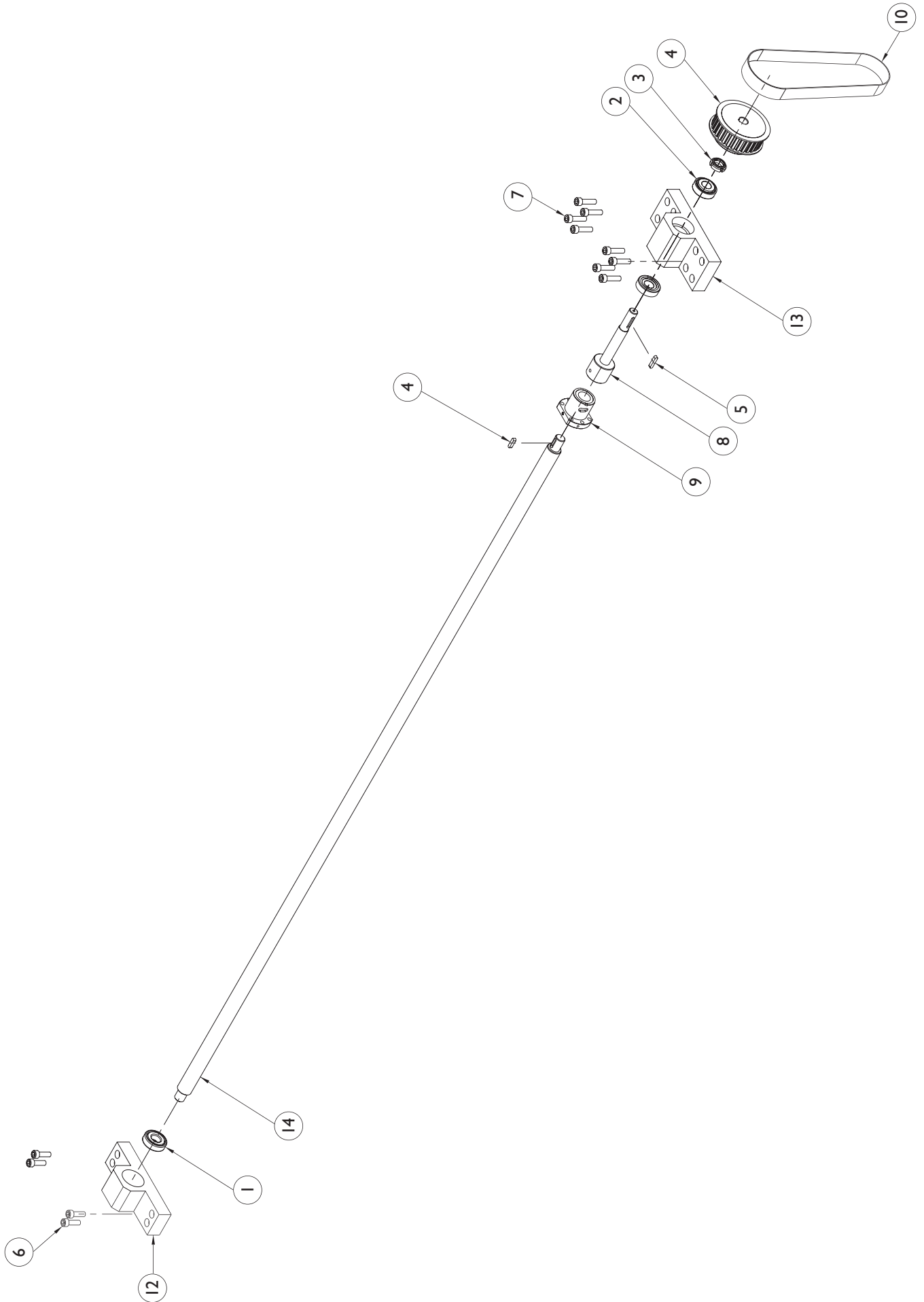
Ref.	Code	Q	Part name
①	290 091 240	1	spacer - HPF
②	522 170 300	1	bearing 51103 (17-30-9)
③	521 170 400	2	bearing 30203
④	522 350 520	2	bearing 51107 (35-52-12)
⑤	555 751 008	1	nut M8
⑥	550 117 100	2	self-locking nut 17x1
⑦	555 700 624	2	washer 6x24
⑧	5 5150 104 0	2	circlip I40
⑨	555 508 035	1	screw STEI 8x35 est. cnc
⑩	555 110 030	2	screw TCEI 10x30
⑪	555 106 025	1	screw TCEI 6x25
⑫	544 220 401	2	oil seal 22-40-7
⑬	544 300 421	1	oil seal 30-42-7
⑭	213 102 860	1	plastic cover - column
⑮	213 102 901	1	handwheel cover - HPF
⑯	213 002 242	1	column plate
⑰	290 091 040	1	casting - HPF
⑱	546 718 705	1	belt 187L050 - HPF
⑲	213 002 160	1	bearing spacer - HPF
⑳	290 091 360	1	nut Ø60 - HPF
㉑	290 091 480	1	supporting plate - motor HPF
㉒	512 000 220	1	motor - HPF
㉓	290 091 200	1	vernier - HPF
㉔	290 091 440	1	motor pulley - HPF
㉕	290 091 320	1	Z40 driven pulley



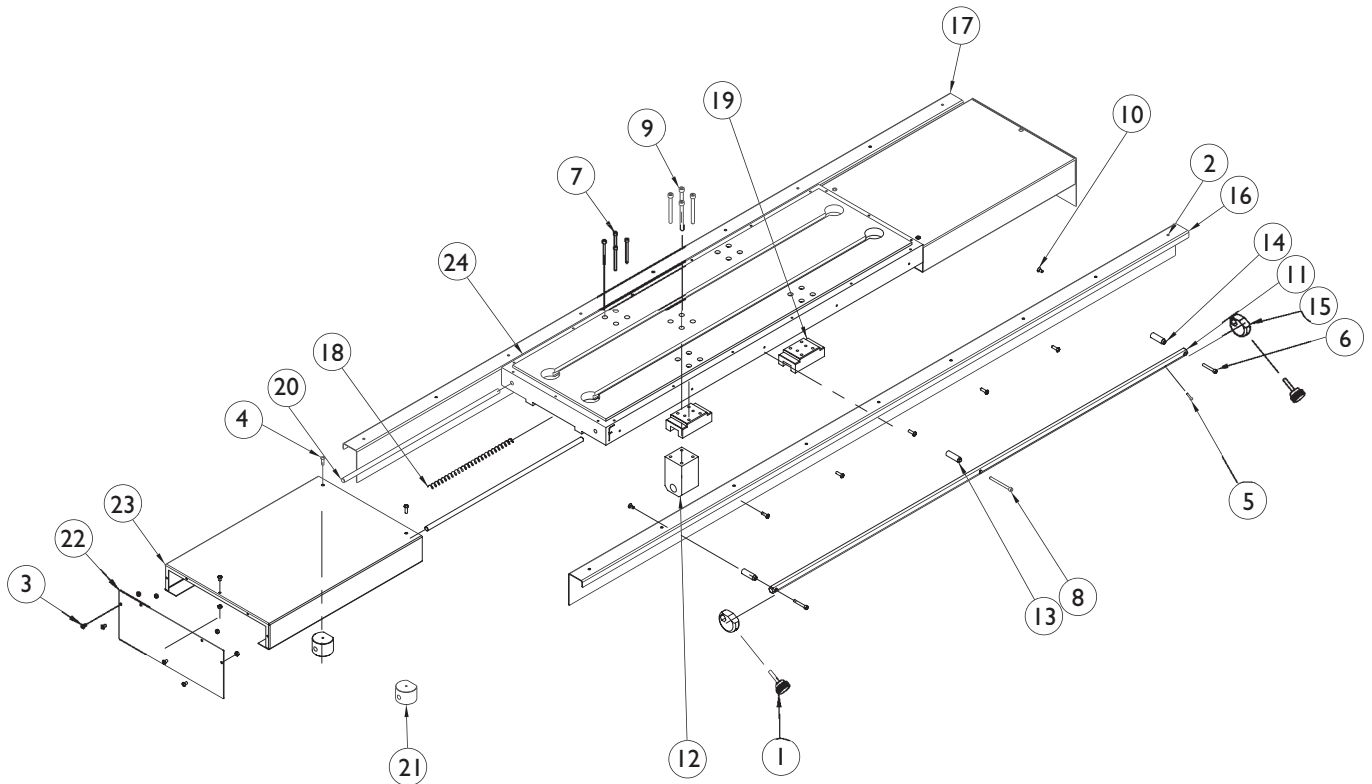
Ref.	Code	Q	Part name
①	214 000 660	1	motoreducer ROSSI MR 2I PCIA I=11.8
②	551 106 035	1	key A type 6x6x35
③	555 700 817	4	washer 8x17
④	555 108 025	4	screw TCEI 8x25
⑤	555 108 030	12	screw TCEI 8x30
⑥	555 208 025	4	screw TE 8x30
⑦	214 000 740	1	supporting block - motoreducer
⑧	214 000 700	1	supporting plate - motoreducer
⑨	214 000 620	1	pulley - motoreducer
⑩	214 000 540	1	right support - table screw

SF I 400

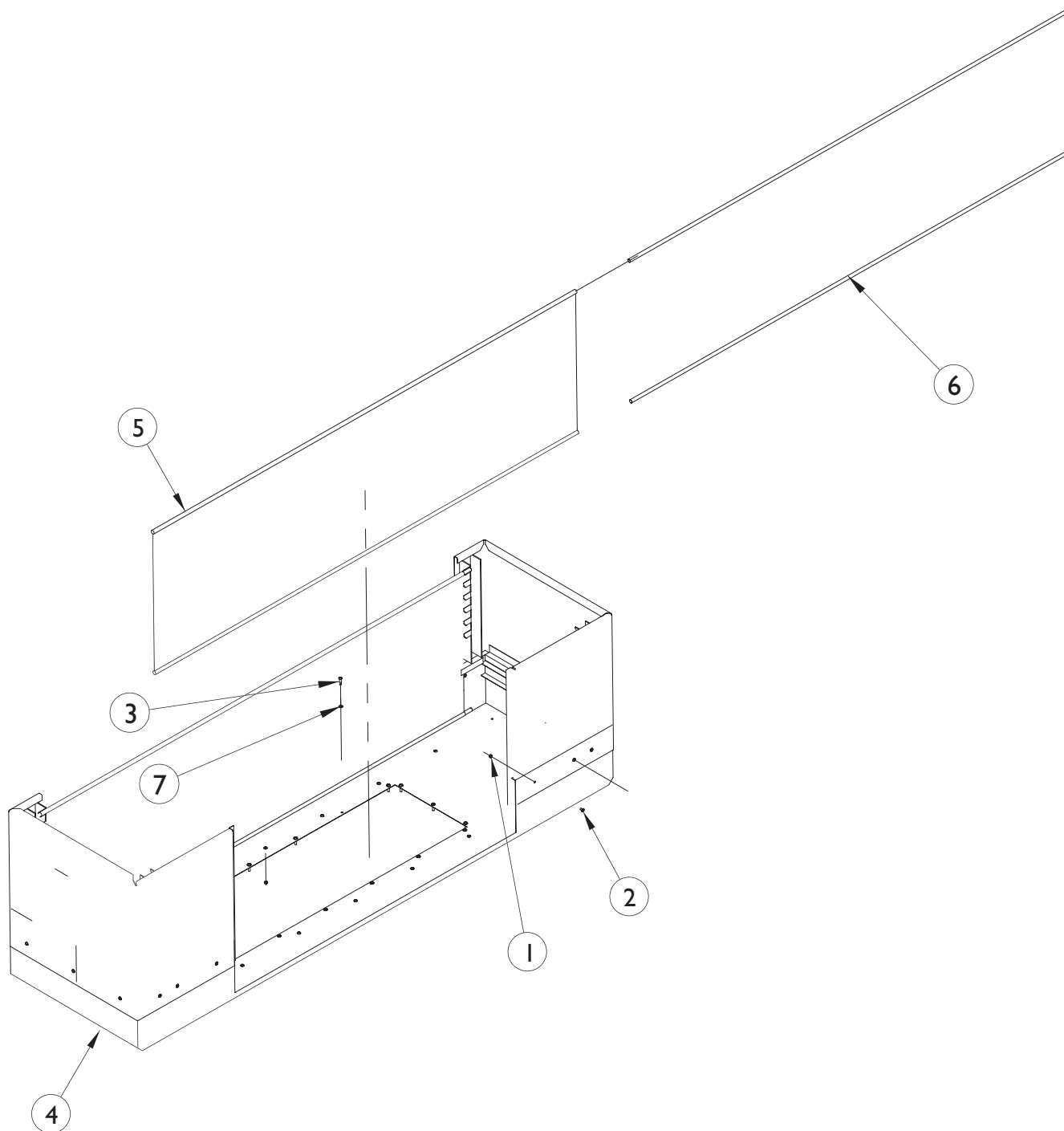
SCREW ASSEMBLY



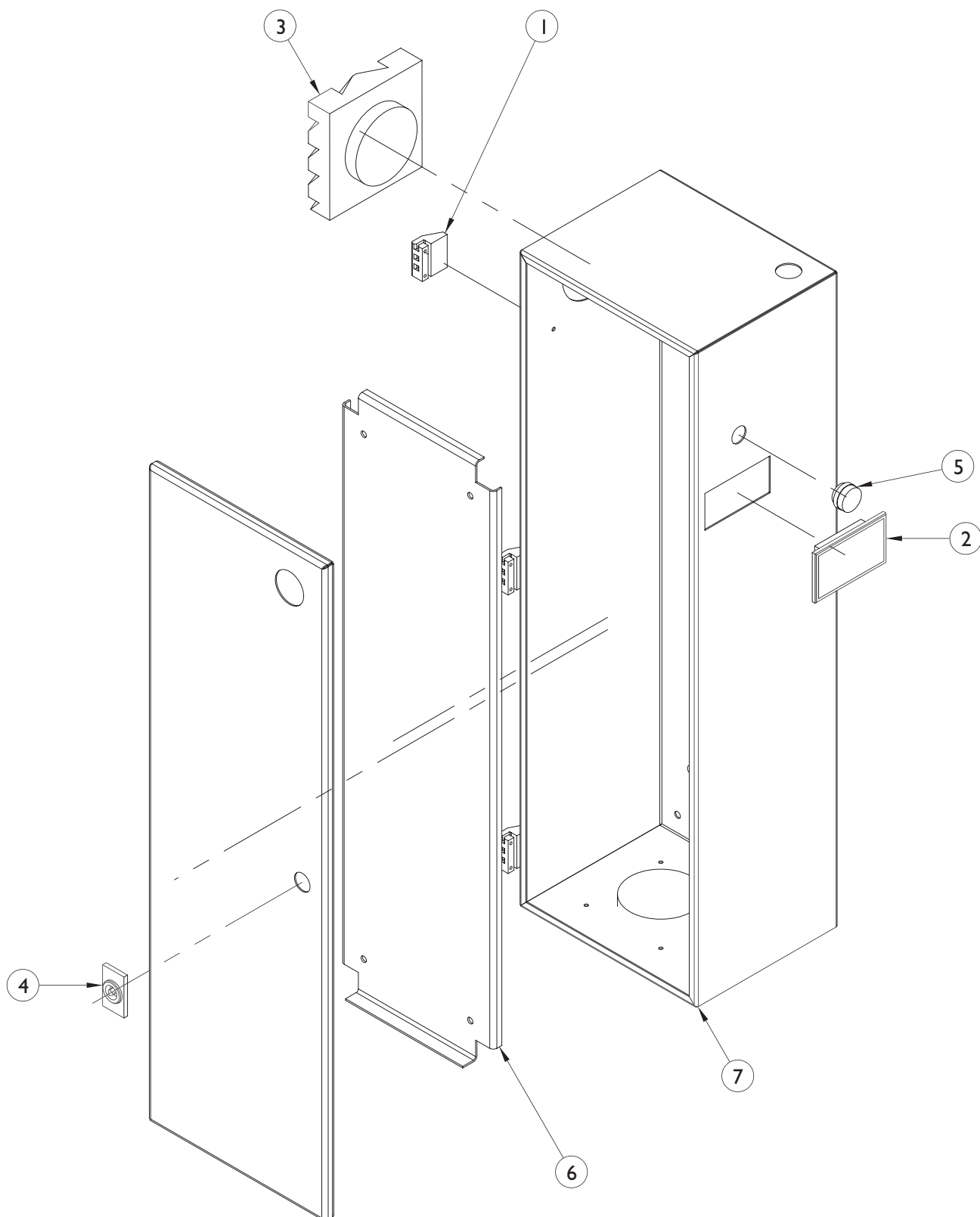
Ref.	Code	Q	Part name
①	520 170 042	1	bearing 6203 2R 17-40-12
②	521 170 400	2	bearing 30203 17-40-13.25
③	550 117 100	1	self-locking nut 17x1
④	551 105 020	1	key A type 5x5x20
⑤	551 105 025	1	key A type 5x5x25
⑥	555 108 025	4	screw TCEI 8x25
⑦	555 108 030	8	screw TCEI 8x30
⑧	214 000 460	1	extension - table screw
⑨	214 000 500	1	feed nut - table screw
⑩	546 725 510	1	drive belt 255L100
⑪	214 000 580	1	driven pulley - table screw
⑫	214 000 360	1	left support - table screw
⑬	214 000 540	1	right support - table screw
⑭	214 000 420	1	table screw



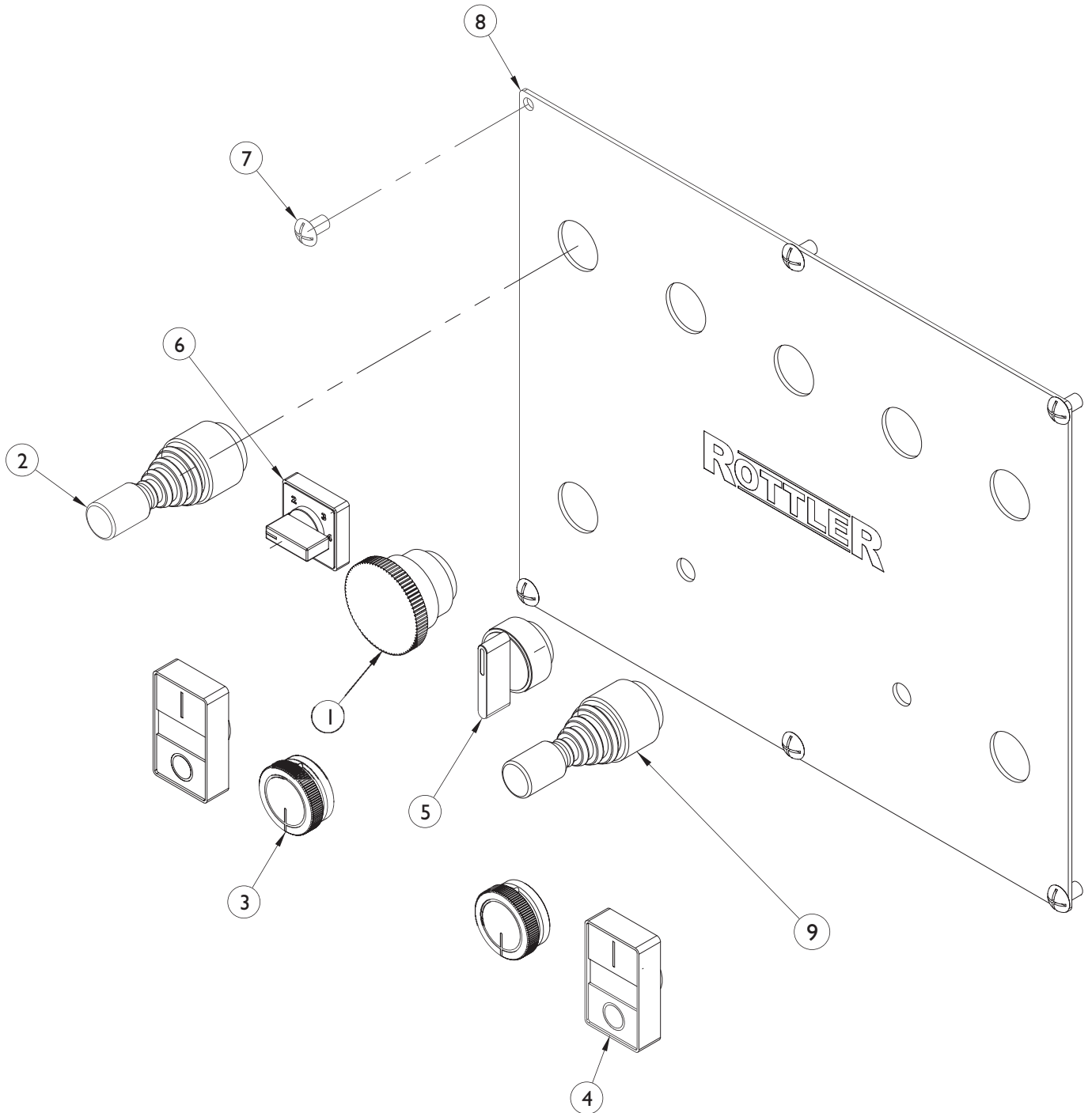
Ref.	Code	Q	Part name
①	547 000 218	2	handwheel B193/359 M8x40
②	555 751 006	44	nut M6
③	555 750 610	41	screw TCB 6x10
④	555 750 620	14	screw TCB 6x20
⑤	555 104 016	1	screw TCEI 4x16
⑥	555 106 040	2	screw TCEI 6x40
⑦	555 106 065	16	screw TCEI 6x65
⑧	555 106 070	1	screw TCEI 6x70
⑨	555 108 080	4	screw TCEI 8x80
⑩	555 306 012	2	screw TSPEI 6x12
⑪	213 101 460	1	stroke-end bar
⑫	214 000 520	1	nut support
⑬	214 001 300	1	central spacer - stroke-end bar
⑭	213 101 500	2	spacer - stroke-end bar
⑮	213 101 540	2	direction stop
⑯	214 001 160	1	front spar
⑰	214 001 180	1	back spar
⑱	214 001 270	2	spring - table
⑲	214 000 860	4	slide
⑳	214 001 250	4	cover pin
㉑	214 001 260	4	pin block
㉒	214 001 240	2	end cover
㉓	214 001 200	2	ways cover - table
㉔	214 000 120	1	table



Ref.	Code	Q	Part name
①	555 751 006	44	nut M6
②	555 750 610	41	screw TCB 6x10
③	555 750 625	18	screw TCB 6x25
④	214 001 130	1	table enclosure
⑤	213 008 160	2	PVC curtain
⑥	213 008 200	4	curtain rods
⑦	555 700 613	18	washer 6x13

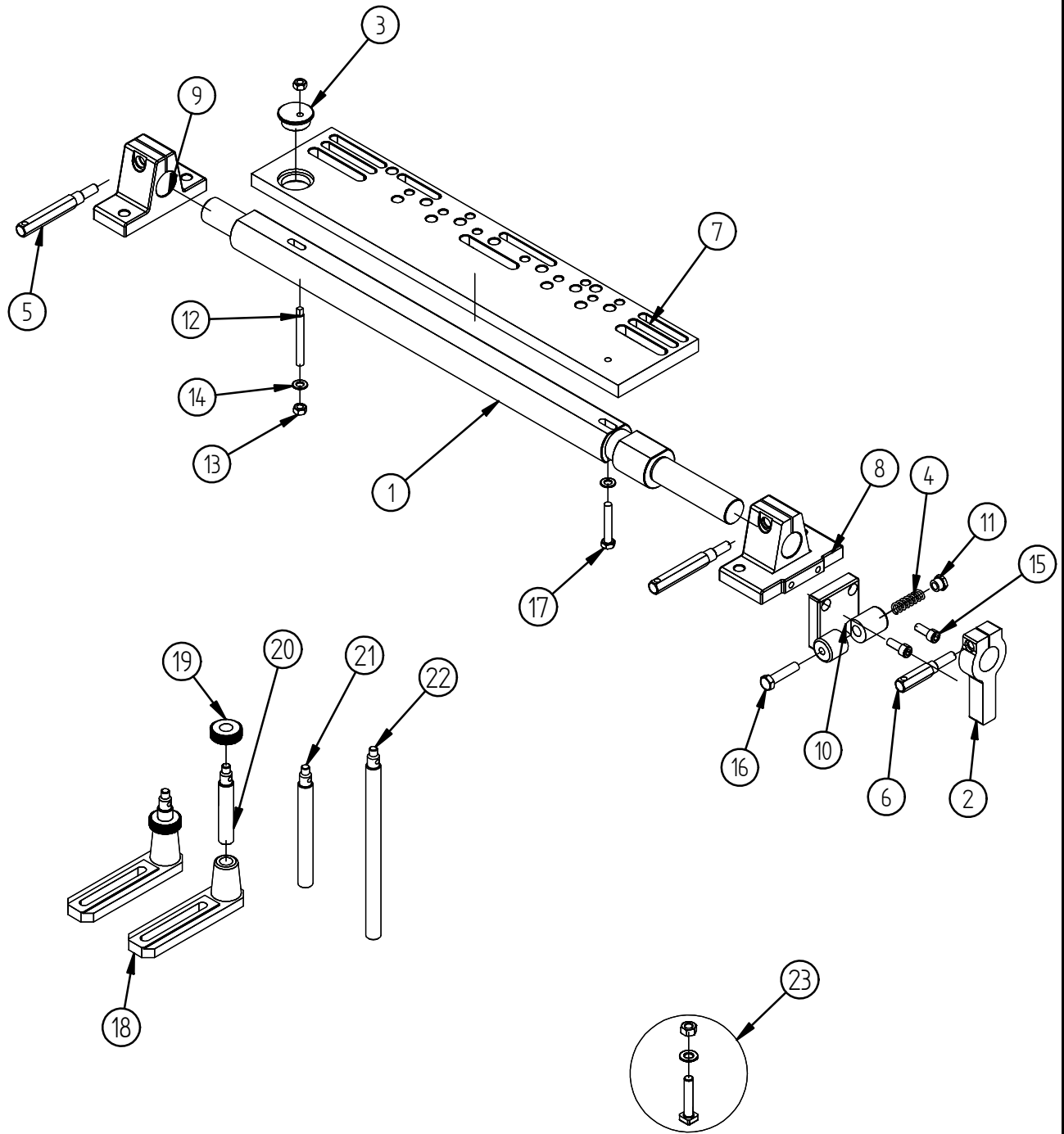


Ref.	Code	Q	Part name
①	547 000 410	3	hinge - 422811 CFD.40 B-M4
②	541 900 067	1	RPM display - EMI 418
③	541 900 067	2	air grating - LUME 17702
④	540 010 900	1	lock - LUME 17800/17804/178026/17850
⑤	542 001 050	1	white light (S6/V - ER 507840)
⑥	213 102 980	1	internal panel
⑦	213 102 952	1	electrical box



Ref.	Code	Q	Part name
①	542 001 030	1	emergency push-button (PFB2-40/V-ER506320)
②	541 100 425	2	unstable manipulator GE P9MMN2t+P9B10VN
③	541 900 029	2	potentiometer 10KΩ with handle
④	542 001 130	2	double push-button (IPL2.2+3/SIM-ER502460)
⑤	542 201 020	1	step switch 0-1 SNLICD/V
⑥	542 201 010	1	step switch w/handle (LFC-A-3-451 + Ic11-045-11)
⑦	555 750 610	6	screw TCB 6x10
⑧	214 001 110	1	control panel SF1400
⑨	541 100 428	1	manipulator GE P9MMN2T+P9B10VN+2p9B20VN

PV0015 RTL - V8 UNIVERSAL FIXTURE



PV0015RTL - V8 UNIVERSAL FIXTURE

Ref	Code	Q	Part name
1	201 500 080	1	bar L=980 mm
2	201 500 240	1	yoke
3	210 500 440	1	eccentric cam
4	538 015 050	1	15x50 spring
5	201 500 280	2	clamp bolt
6	201 500 360	1	yoke bolt
7	201 500 500	1	steel plate
8	201 500 160	1	clamp - right end
9	201 500 040	1	clamp - left end
10	201 500 200	1	fine adjuster
11	543 014 020	1	3/8" plug
12	201 500 400	1	eccentric screw
13	555 751 010	2	nut M10
14	555 701 020	2	10x20 washer
15	555 110 025	2	TCEI M10x25 screw
16	555 212 050	1	TE M12x50 screw
17	555 210 060	1	TE M10x60 screw
18	201 500 520	2	jack base
19	201 500 600	2	regulating nut
20	201 500 560	2	jack bolt L = 122mm PV2312
21	201 591 040	2	jack bolt L = 190mm PV2319
22	201 591 080	2	jack bolt L = 304mm PV2330
23	555 612 060	6	M 12x60 T-bolt

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