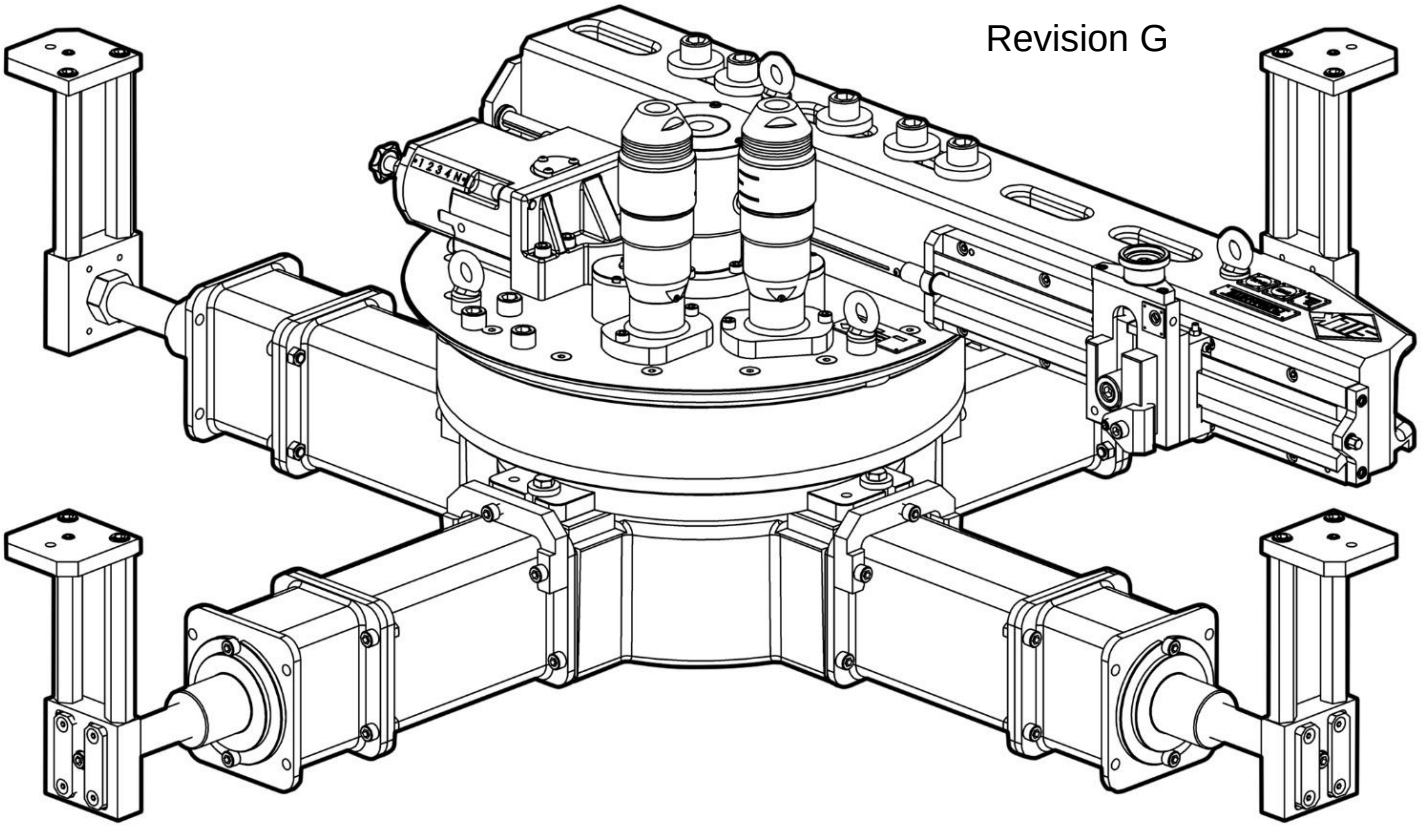
INSTRUCTION MANUAL
SX28-72 FLANGE FACING MACHINE

Revision G



TEAM
Shap Road
Kendal
Cumbria
LA9 6RU
United Kingdom
Tel: +44 (0) 1539 729009

THIS INSTRUCTION MANUAL

This Instruction Manual describes how to safely install, operate and maintain the SX28-72 Flange Facing Machine. It is an essential part of the equipment and it is important that you take the time to read it thoroughly.

Additional copies are available for purchase from TEAM® or from an authorised agent.

HEALTH AND SAFETY AT WORK

This document should be read carefully and fully understood before proceeding to install, use, maintain or service the equipment.

DO NOT USE THE EQUIPMENT UNTIL YOU ARE SURE YOU KNOW HOW IT WORKS AND WHAT ITS INTENDED FUNCTION IS.

The equipment described in this document is intended to be used by professional personnel in an industrial environment.

Installation, operation, maintenance and servicing should only be carried out by suitably qualified and experienced personnel.

The following symbols are used to highlight important areas of this document which relate to potential hazards and residual risks:

Important statements regarding the use, handling or operation of the equipment.

Warnings to prevent injury to operator and or local personnel.

Cautions to prevent misuse and damage to the equipment.

IMPORTANT NOTICE

TEAM® has made every effort to ensure that the information given in this document is as accurate and as up-to-date as possible at the time of publication.

TEAM® will not be held responsible for any accident or equipment failure that may occur due to misuse, unauthorised modification, inadequate maintenance, use of non-genuine parts or use by unsuitable personnel.

TEAM® reserves the right to update, correct or otherwise change any information relating to this equipment, at any time and without obligation.

TEAM® also reserves the right not to provide updated, corrected or amended versions of this publication.

The specification and design of the SX28-72 Flange Facing Machine (including the copyright, design right or other intellectual property in them) shall, at all times, remain the property of TEAM®. Where any designs or specifications have been supplied by the client for manufacture by TEAM® or to the order of the client then the client warrants that the use of those designs or specifications for the manufacture, processing, assembly or supply of the SX28-72 Flange Facing Machine shall not infringe the rights of any third party.

WARRANTY, SPARES AND AFTER SALES SERVICE

Subject to the provisions of any bespoke terms and conditions of sale, this SX28-72 Flange Facing Machine is guaranteed for twelve (12) months from the date of purchase against faulty materials and/or workmanship. During this period it will be repaired or have parts replaced free of charge provided that:

1 it is returned immediately to TEAM® with evidence of the purchase date;

2 it has been purchased by the user and has not been used for hire purposes;

3 it has not been misused or handled carelessly and has been stored and maintained in accordance with any instructions provided by TEAM®;

4 repairs have not been attempted other than by a member of TEAM® service team or by a service provider duly authorised by TEAM® to carry out such repairs; and

5 the cost of such repair or replacement does not exceed the original purchase value.

A full spare parts service is available from TEAM® or from an authorised agent. Additionally, TEAM® can supply a recommended spare parts kit suitable for a specified period of normal service life.

Also offered is a Factory Service, in which the equipment can be returned to TEAM® for inspection. A quotation may then be given for the overhaul, repair or replacement of the equipment.

TEAM® warrants that the SX28-72 Flange Facing Machine supplied will at the time of delivery correspond to the description given by TEAM®. All other warranties, conditions or terms relating to fitness for purpose, quality or condition of the SX28-72 Flange Facing Machine, whether express or implied by statute or common law or otherwise are excluded to the fullest extent permitted by law.

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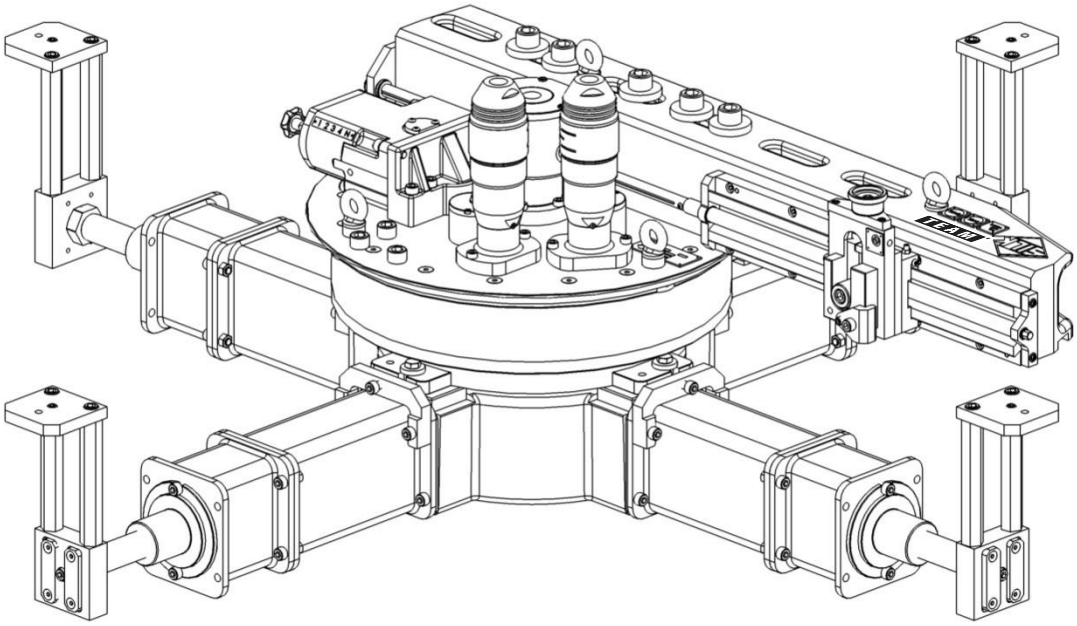


Fig. 1 SX28-72 Flange Facing Machine – main assemblies

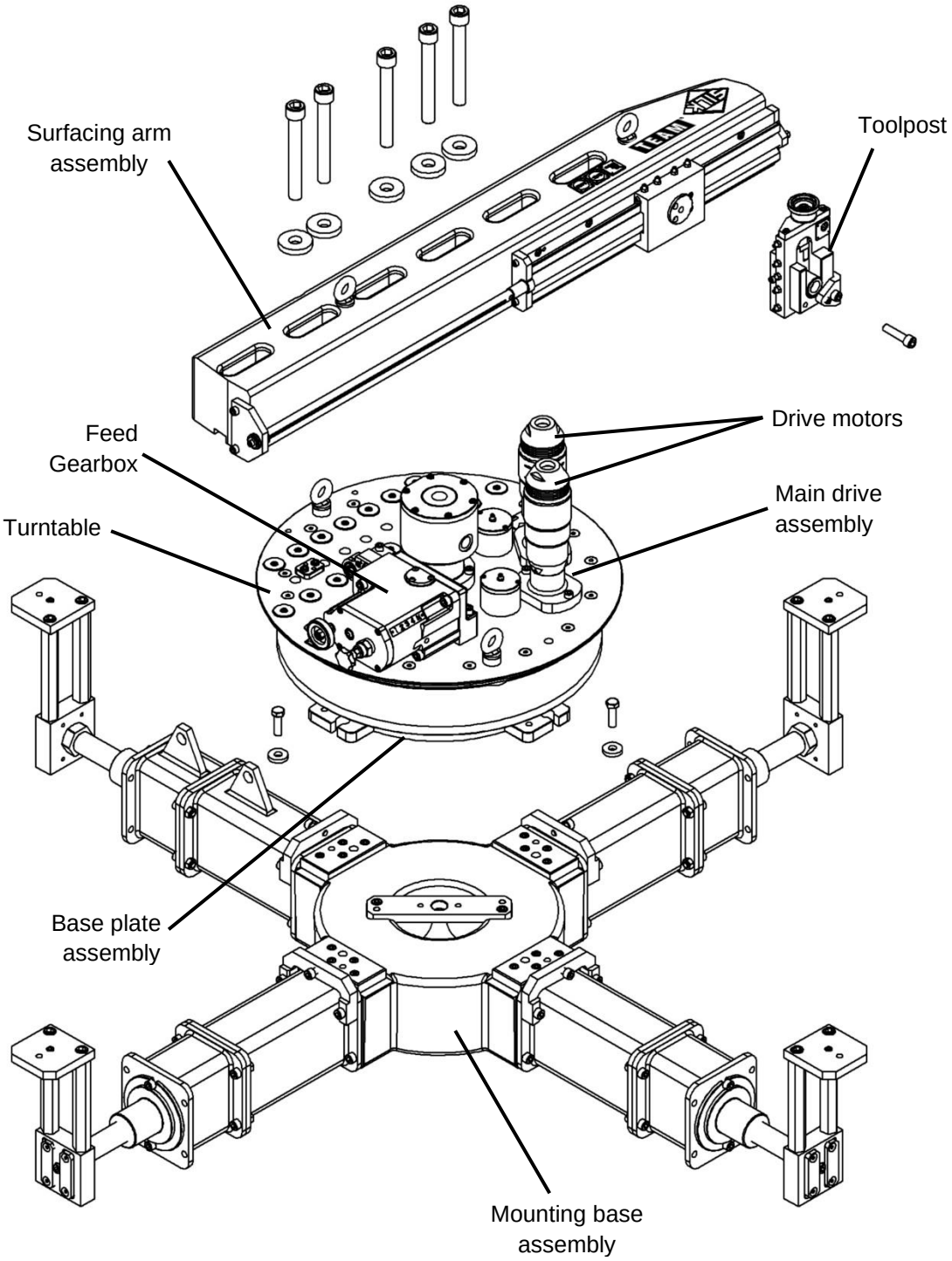


Fig. 2 SX28-72 Flange Facing Machine – exploded view

SECTION 1 TECHNICAL DESCRIPTION

1.1 INTRODUCTION

The TEAM® SX28-72 Flange Facing Machine is constructed from the highest quality materials and great care has been taken in its design and manufacture. Its design will give every satisfaction provided that it is properly installed, operated and maintained in accordance with the information contained within this manual.

Take care of this manual; it is an essential source of information.

1.2 EQUIPMENT DESCRIPTION

The SX28-72 Flange Facing Machine is designed to machine full face, raised face and grooved flanges from 711mm to 1829mm (28" to 72") in diameter at any location having a minimum pneumatic air supply of 1.8 m^3/m at 6 bar (64 cfm, 87 psi).

The machine can achieve a variety of surface finishes from 6.3µm RA to 1.6µm RA when turning and 1.6µm RA to 0.8µm RA when polishing. The machine can also produce a 'gramophone' finish, 'O' ring grooves, and 'V' grooves.

The machine consists of 3 main assemblies:

1. Main drive assembly
2. Surfacing arm assembly and toolpost
3. Mounting base assembly

1.2.1 Main drive assembly

The main drive assembly consists of 3 sub-assemblies:

1. Turntable
2. Base plate assembly
3. Feed gearbox

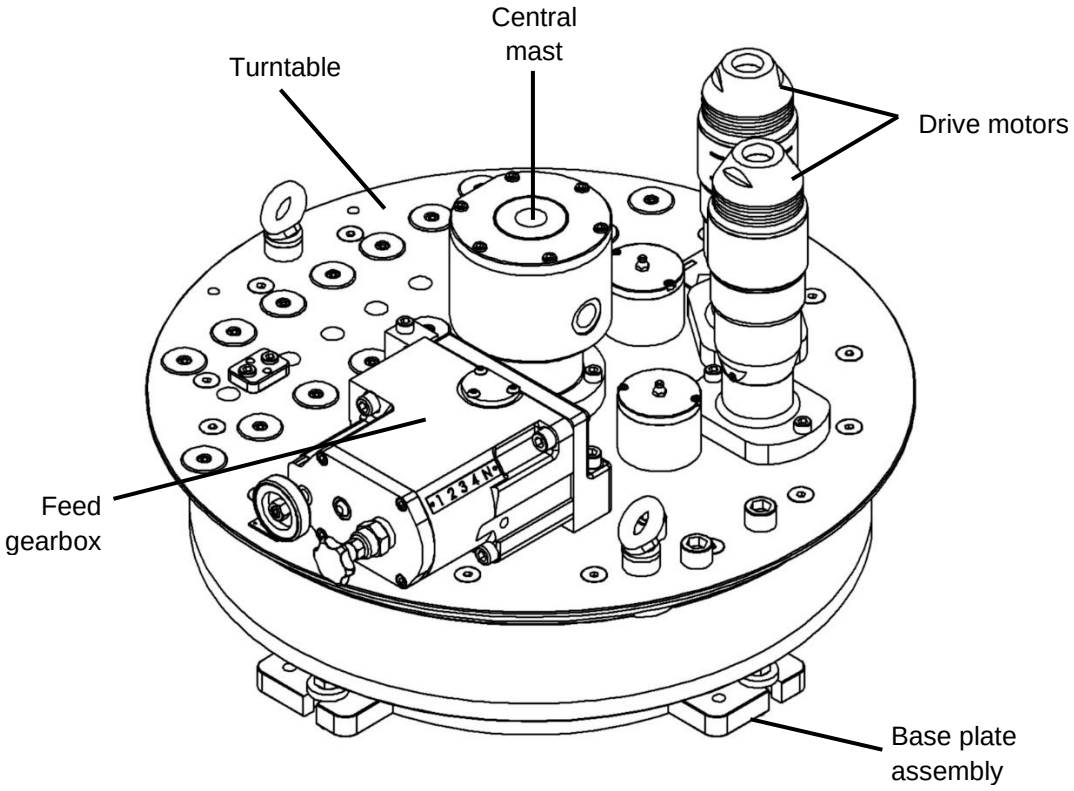


Fig. 3 Main drive assembly

1. Turntable

The turntable is the rotating part of the machine providing a rigid support for the gearbox, motors and surfacing arm assembly.

The turntable is driven by two air motors attached to its top face. The drive from the motors is passed through two intermediate gears to a drive gear on the main bearing under the turntable. Air for the motors is fed from the central mast through a rotary seal.

2. Base plate assembly

The base plate assembly is the fixed part of the machine and comprises of a base plate which is clamped to the mounting base assembly, a mast gear used for the gearbox drive, and a centre mast.

3. Feed gearbox

The feed gearbox is mounted on the turntable and provides a variety of cutting feeds for different machine applications. Drive from the feed gearbox to the toolpost is via the surfacing arm leadscrew.

Drive input to the feed gearbox is transmitted via the mast transfer gear. The gearbox provides four different tool feed rates, selected via the cutting feed rate push/pull selector. Traverse direction is selected via the traverse direction push/pull selector, which selects traverse IN, traverse OUT and neutral N position. The neutral (N) position can be used for manually positioning of the toolpost and tool. An additional neutral (N) position is also available by pushing the cutting feed rate selector fully inwards past the No.4 feed position. This enables the operator to easily disengage the feed gearbox from any feed.

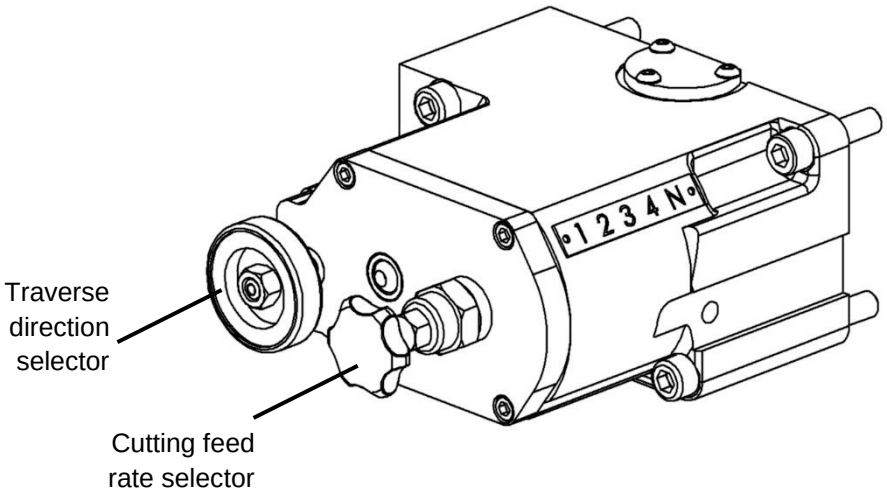


Fig. 4 Feed gearbox

1.2.2 Surfacing arm assembly and toolpost

The surfacing arm assembly is mounted on the turntable assembly and provides a rigid structure to which the tool post is secured. The arm can be positioned at any diameter within the recommended facing range.

Toolpost feed in and out is provided by a leadscrew which is driven by the gearbox output gear. The surfacing arm assembly can achieve cuts to a maximum depth of 1.0mm (0.040in) in flanges without bolt holes and 0.5mm (0.02in.) with bolt holes.

Alternative tools can be fitted to the tool post depending on the finish and cut required.

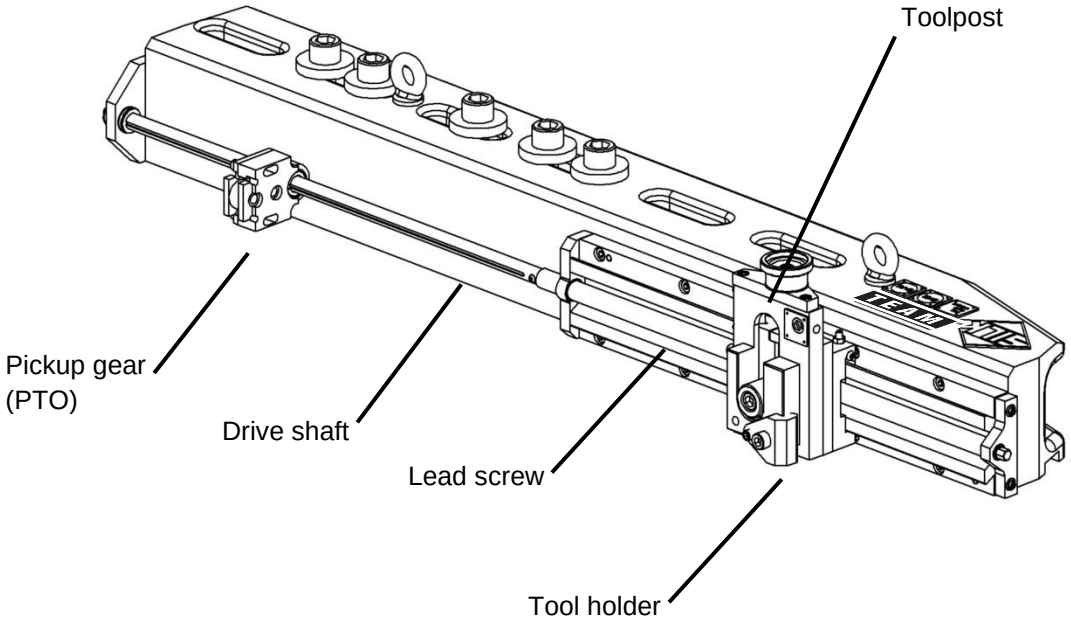


Fig. 5 Surfacing arm assembly and toolpost

1.2.3 Mounting base assembly

The mounting base assembly is provided to enable the machine to be installed in the centre of any bore from 711mm (28") to 1727mm (68") in diameter.

The mounting base assembly consists of a central hub with four radial location bosses. The bosses allow extension legs, collars and the clamping jaw assemblies to be fitted to the base to suit the internal diameter of the flange to be machined. The extension legs and collars are precision manufactured with locating flanges to ensure perfect alignment when fitted correctly.

The design and manufacture of the base and extension legs ensures a rigid machine mounting structure.

The mounting base is usually installed in the flange bore prior to the machine installation.

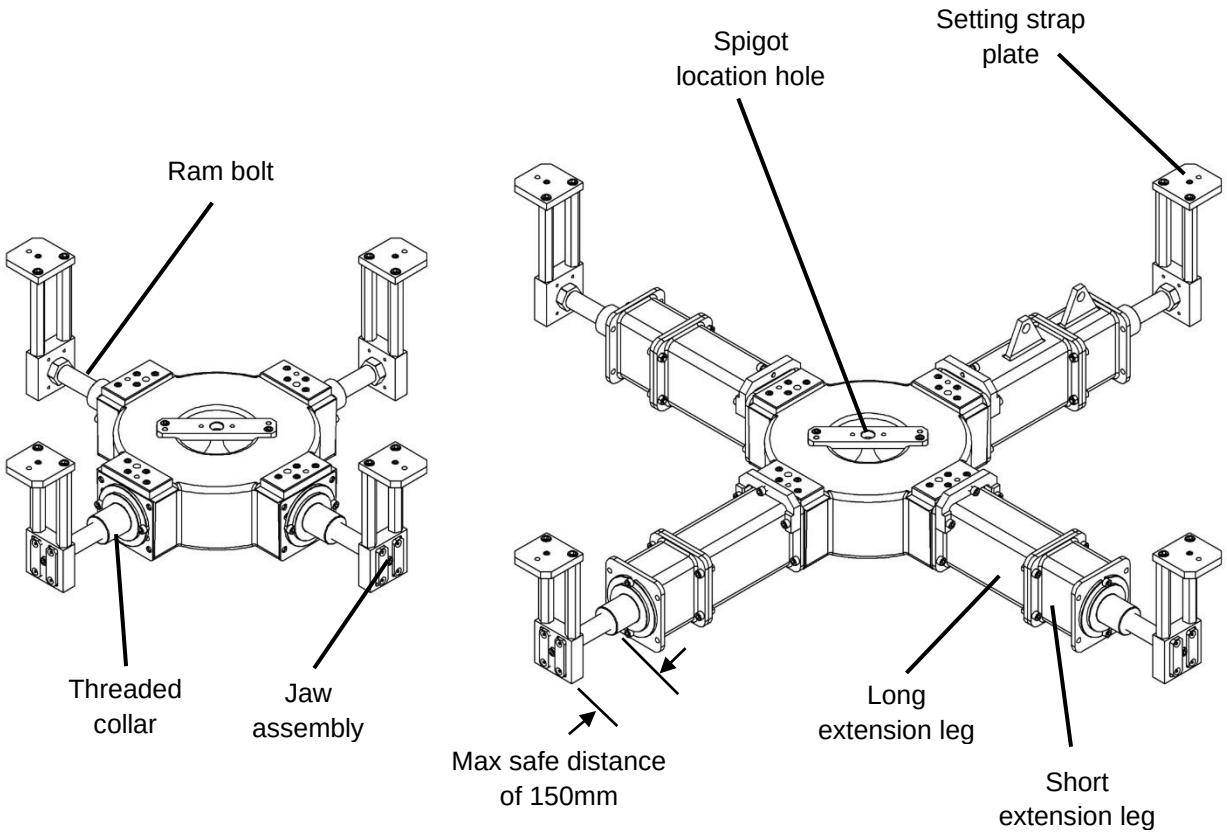


Fig. 6 Mounting base assembly

1.2.4 Optional accessories

The following optional accessories are available upon request:

- V-Groove machining kit
- V-Groove measuring kit
- Tube sheet machining kit
- Tube sheet measuring kit
- Lens ring machining kit
- Fall stop kit

SECTION 2 SPECIFICATIONS

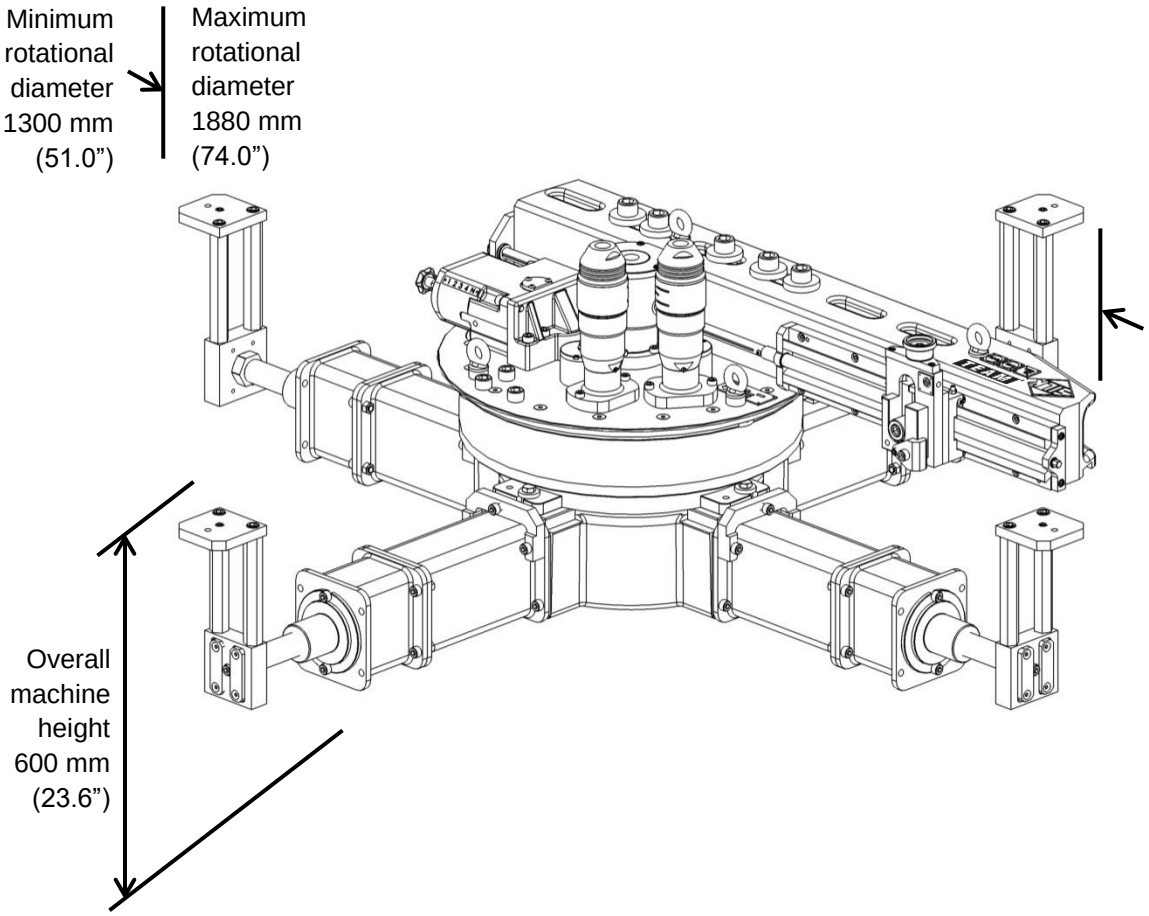


Fig. 7 Principal dimensions

PRINCIPAL DIMENSIONS:

Overall machine height	600 mm	23.6"
Mounting base thickness	167 mm	6.6”
Minimum mounting base diameter	660 mm	26.0”
Minimum rotational diameter	1300 mm	51.0”
Depth of flange required to set the base using standard parts	259 mm	10.0”

WEIGHTS:

Machine weight	62 kg	136.7 lbs
Base weight (minimum diameter)	82 kg	180 lbs
Base weight (maximum diameter)	135 kg	298 lbs
Counterbalance total weight	82 kg	180 lbs

TRANSPORTATION DIMENSIONS:

Net weight (without transport case)	454 kg	999 lbs
Gross weight (including transport case)	516 kg	1135 lbs
Length	1140 mm	44.9"
Height	830 mm	32.7"
Width	660 mm	26.0"

OPERATIONAL DIMENSIONS:

Facing range:		
Minimum diameter – flange mounting	609 mm	24.0”
Minimum diameter – bore mounting	660 mm	26.0”
Recommended maximum diameter	1829 mm	72.0"
Toolpost travel	40 mm	1.6"
Base gripping range:		
Minimum recommended bore	711 mm	28.0"
Maximum recommended bore	1727 mm	68.0"
Gearbox feed rate (per revolution):		
Position 1	0.18 mm	0.007"
Position 2	0.25 mm	0.010"
Position 3	0.46 mm	0.018"
Position 4	0.84 mm	0.033"
Position ‘N’	neutral	

NOISE EMISSION:

Emission sound pressure level	89 dB(A)
Instantaneous sound pressure value. Indicate either less than 63 Pa (130 dB) or actual value if above.	<130 dB
Emission sound power level. Indicate either less than 80 dB (A) or actual value if above.	95 dB(A)

MOTOR INFORMATION:

Type: MODEC	MT20RT0208HCL3F	
Maximum power output at 208 rpm	1.7 kW	2.2 hp
Maximum speed free running	486 rpm	
Minimum recommended air supply	1.8 m^3/min	64 cfm
	6.0 bar	87 psi
Air inlet thread	3/4" BSP	

SECTION 3 SAFETY INFORMATION

3.1 WARNINGS AND CAUTIONS

GENERAL:

ALL SAFETY PROCEDURES MUST BE OBSERVED AND STRICTLY ADHERED TO WHEN INSTALLING, USING, MAINTAINING AND SERVICING THIS EQUIPMENT.

ONLY TRAINED AND COMPETENT PERSONNEL SHOULD INSTALL, USE, MAINTAIN AND SERVICE THIS EQUIPMENT.

ENSURE AN EMERGENCY STOP IS ALWAYS WITHIN REACH OF THE OPERATOR.

INTENDED USE OF THIS EQUIPMENT:

THIS EQUIPMENT IS FOR USE BY PROFESSIONAL, TRAINED PERSONNEL WORKING IN AN INDUSTRIAL ENVIRONMENT.

THIS EQUIPMENT IS INTENDED FOR USE ON METALS AND ANALOGOUS SUBSTANCES.

THIS EQUIPMENT IS NOT INTENDED FOR USE ON WOOD, PLASTIC OR SIMILAR ANALOGOUS SUBSTANCES.

USE OUTDOORS:

THIS EQUIPMENT SHOULD NOT BE USED DURING SEVERE WEATHER CONDITIONS.

PERSONNEL SHOULD NOT OPERATE THIS EQUIPMENT IN WEATHER CONDITIONS WHICH MAY GIVE RISE TO THE FOLLOWING:

- **INADEQUATE VISIBILITY**
- **THE BUILD-UP OF ICE, SNOW, WATER, SAND OR DUST ON PLATFORMS, LADDERS, CONTROLS, VISUAL INDICATORS, MOVING PARTS, ETC.**
- **RISK OF INJURY DUE TO STRONG OR GUSTING WINDS**

THIS EQUIPMENT SHOULD BE SUITABLY PROTECTED FROM ALL SEVERE WEATHER CONDITIONS.

PERSONAL PROTECTIVE EQUIPMENT:

THE USE OF PERSONAL PROTECTIVE EQUIPMENT IS RECOMMENDED WHEN WORKING WITH THIS EQUIPMENT.

SUGGESTIONS INCLUDE SAFETY HAT, GAUNTLET GLOVES, SAFETY GOGGLES, SAFETY SHOES, AND FLAME RETARDANT COVERALLS.

BREATHING APPARATUS MAY BE NECESSARY WHEN A TOXIC ATMOSPHERE EXISTS.

OTHER PROTECTIVE EQUIPMENT MAY BE REQUIRED AS PER THE PLANT OPERATOR'S REQUIREMENTS.

PERSONNEL WORKING ABOVE GROUND LEVEL MUST ALSO WEAR A SAFETY HARNESS CONNECTED TO A SUITABLE ANCHOR POINT OR FALL ARRESTOR.

LIFTING:

ENSURE LIFTING IS CARRIED OUT IN A SAFE AND PROPER MANNER, IN ACCORDANCE WITH APPLICABLE HEALTH AND SAFETY REGULATIONS.

ALWAYS KNOW THE WEIGHT OF THE EQUIPMENT AND THE COMPONENT PARTS. REFER TO THE SPECIFICATION PAGE IN THIS MANUAL OR THE MARKING PLATE ON THE EQUIPMENT.

THE USE OF MECHANICAL LIFTING DEVICES MAY BE A MANDATORY REQUIREMENT FOR LIFTING THIS EQUIPMENT.

INSTALLATION AND REMOVAL:

THIS EQUIPMENT IS INTENDED TO BE PORTABLE AND MAY BE USED IN A VARIETY OF LOCATIONS AND ORIENTATIONS. ALWAYS ENSURE THAT THIS EQUIPMENT IS PROPERLY SUPPORTED AND RESTRAINED DURING THE INSTALLATION AND REMOVAL PROCESS.

IF THE INSTALLATION, REMOVAL OR MACHING ACTIVITY IS TAKING PLACE OVER AN OPEN HOLE, A FLANGE BORE FOR EXAMPLE, AND THERE IS A RISK OF THE EQUIPMENT FALLING INTO THE OPENING. THE MACHINE MUST BE FITTED WITH THE FALL-STOP ACCESORY KIT SUPPLIED TO PREVENT INJURY OR DAMAGE - SEE APPENDIX 'E' FOR DETAILS.

PNEUMATICS:

ENSURE THE CORRECT HOSES, VALVES AND FITTINGS ARE USED.

DO NOT PRESSURISE THIS EQUIPMENT IF ANY OF THE HOSES, VALVES OR FITTINGS ARE LEAKING OR DAMAGED.

DO NOT PRESSURISE THIS EQUIPMENT UNTIL YOU ARE SURE THE EQUIPMENT HAS BEEN CORRECTLY INSTALLED AND THE CONTROL VALVES ARE CLOSED.

DO NOT USE AIR MOTORS WITH DEFECTIVE SILENCERS. THIS MAY CAUSE UNNECESSARY NOISE AND IMPAIR THE PERFORMANCE OF THE EQUIPMENT.

NEVER PLACE ANY BODY PARTS ADJACENT TO AN AIR EXHAUST. COMPRESSED AIR FORCED INTO THE SKIN IS DANGEROUS AND MAY RESULT IN A SERIOUS SKIN DISORDER.

ENSURE THE PNEUMATIC SYSTEM IS ISOLATED AND DE-PRESSURISED BEFORE MAKING ANY ADJUSTMENTS TO THIS EQUIPMENT.

ENSURE THE PNEUMATIC SYSTEM IS ISOLATED AND DE-PRESSURISED BEFORE DISCONNECTING ANY HOSES.

DO NOT ALLOW THE LUBRICATOR TO SUPPLY EXCESSIVE AMOUNTS OF OIL TO THE PNEUMATIC SYSTEM. 5 TO 6 DROPS PER MINUTE AT FULL MOTOR SPEED IS RECOMMENDED.

NEVER LEAVE THE PNEUMATIC SYSTEM PRESSURISED WHILE UNATTENDED.

SECTION 4 CONTROLS AND BASIC OPERATION

4.1 LOCATION AND FUNCTION OF THE CONTROLS

The following controls are incorporated into the machine:

4.1.1 Machine controls

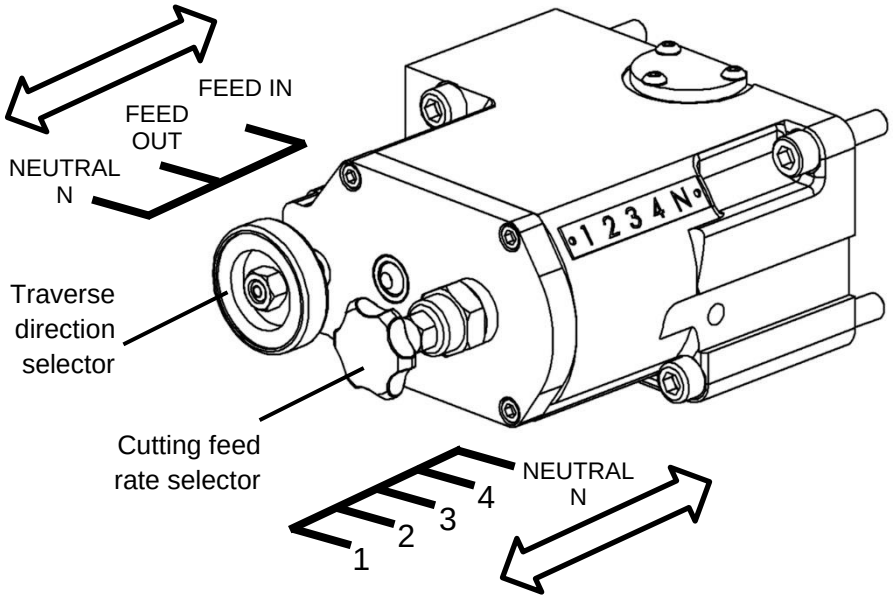


Fig. 8 Machine controls

Traverse direction selector

Selects the direction of the toolpost as it traverses across the work piece. The fully pulled out position ‘N’ disengages the traverse feed.

TRAVERSE DIRECTION SELECTOR POSTION	TOOL DIRECTION
FEED IN (Selector fully pushed in)	Towards centre of work piece
FEED OUT (Selector in central position)	Away from centre of work piece
NEUTRAL (N) (Selector fully pulled out)	No movement

Cutting feed rate selector

Selects the rate at which the toolpost traverses across the work piece per machine revolution. The fully pushed in position ‘N’ disengages the traverse feed.

The feed rate depends on which leadscrew is fitted. Standard TEAM® machines are supplied with a 6 TPI leadscrew unless requested at time of manufacture.

CUTTING FEED RATE SELECTOR POSTION	FEED (mm per revolution)	
1	0.18 mm	0.007”
2	0.25 mm	0.010”
3	0.46 mm	0.018”
4	0.84 mm	0.033”
N	Neutral	

Toolpost vertical movement feed knob

The toolpost movement feed knob determines the vertical position of the tool and the corresponding depth of cut. Turn the hand wheel anti-clockwise (when looking at the end of the handle) to move the tool towards the work piece.

TOOLPOST HANDWHEEL ROTATION	TOOL DIRECTION
TURN CLOCKWISE	Towards work piece
TURN ANTICLOCKWISE	Away from work piece

4.1.2 Filter/lubricator pack controls

A gate valve on the pack is used to set the machine speed at the desired RPM when the control valve is fully open. To set the speed refer to the instructions in section 5.3.1.

The filter/lubricator oil regulator control is adjusted to provide a lubrication rate of 5 to 6 drops every 1 minute at full motor speed.

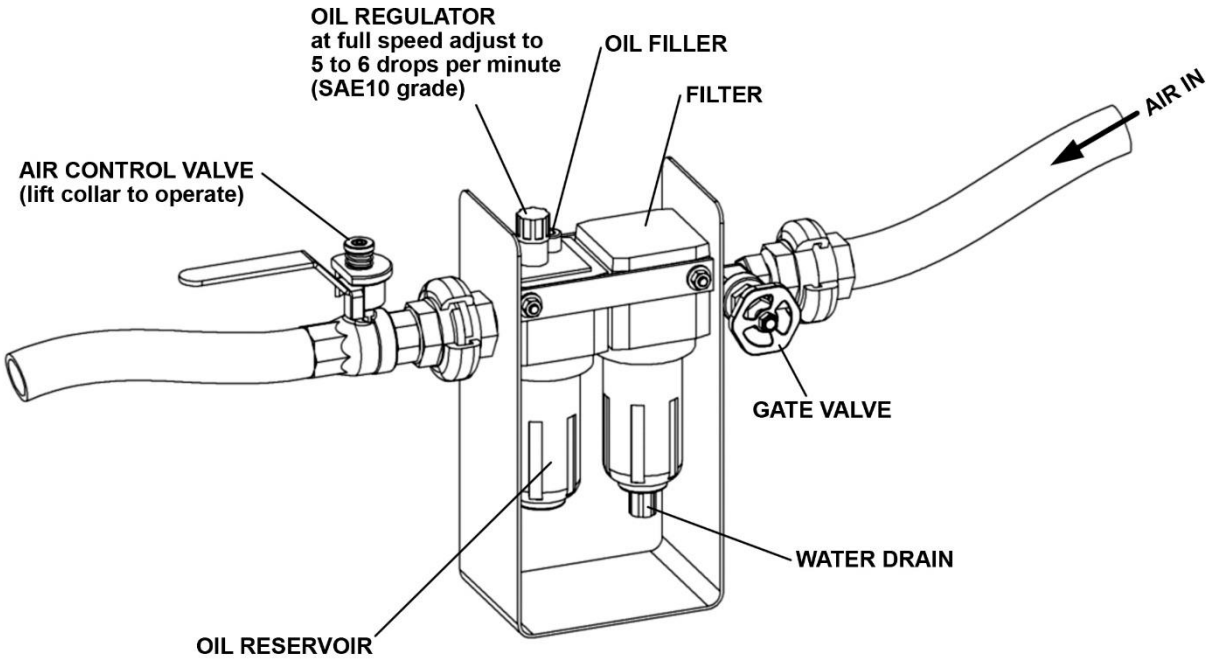


Fig. 9 Filter/lubricator pack controls

4.2 BASIC OPERATION OF THE EQUIPMENT

The basic operation of the machine follows the routine:

1. Lifting the machine from its packing case.
2. Checking the machine for completeness and condition.
3. Fitting the appropriate base assembly to the work piece.
4. Lifting and positioning the machine on the base assembly.
5. Adjusting the machine so the surfacing arm is parallel with the work piece.
6. Balancing the machine if being used in a vertical orientation.
7. Connecting the air supply and setting the rotational speed.
8. Setting the tool for facing and grooving.
9. Performing the machining operation.
10. Removal of the machine on completion and preservation and packing.

4.3 LIFTING AND SLINGING ARRANGEMENTS

The SX28-72 machine when complete and, in its packing, box weighs 516 kg.

DO NOT ATTEMPT TO MANUALLY MOVE THE MACHINE IN ITS PACKING BOX. ALWAYS USE A MECHANICAL LIFTING DEVICE.

DO NOT ATTEMPT TO MANUALLY LIFT THE SX28-72 MACHINE OR BASE OUT OF THE PACKING CASE. ALWAYS USE A MECHANICAL LIFTING DEVICE.

WHEN SETTING UP THE MACHINE ON A VERTICAL FLANGE THE LIFTING CHAIN SHOULD BE LEFT IN PLACE UNTIL THE MACHINE IS FULLY SECURED.

Before machine installation, as a secondary precaution, it is recommended that a framework is constructed inside the vessel to support or restrain the base to prevent injury to the operator and possible damage to the equipment should the machine slip or move within the bore.

When working on vertical vessels it is advisable to erect staging under machine base to aid with installation and positioning, and to prevent base from falling into vessel.

SECTION 5 SITE OPERATION

5.1 WARNINGS AND CAUTIONS

When operating this equipment observe all warning and cautions detailed below and in Section 3.

IN ADDITION TO THE CONTENT OF THIS PUBLICATION, JOB SPECIFIC AND SITE-SPECIFIC SAFETY PROCEDURES MUST BE ADHERED TO AT ALL TIMES.

BEFORE OPERATING THIS EQUIPMENT A SAFE WORKING "NO GO" AREA MUST BE CORDONED OFF AROUND THE WORK AREA TO ELIMINATE ACCIDENTAL INTRUSION BY UNAUTHORISED PERSONNEL.

THIS EQUIPMENT HAS DANGEROUS MOVING PARTS, KEEP WELL CLEAR AT ALL TIMES.

DO NOT ATTEMPT TO MAKE ADJUSTMENTS WHILE THE EQUIPMENT IS OPERATING. ALWAYS STOP AND ISOLATE FIRST.

THIS EQUIPMENT MAY BE USED IN CONJUNCTION WITH OTHER JOB SPECIFIC EQUIPMENT SUCH AS LIFTING ACCESSORIES AND CUTTING TOOLS. SUCH EQUIPMENT MUST BE INSPECTED FOR SUITABILITY PRIOR TO USE.

DO NOT ATTEMPT TO FEED OR RETRACT THE TOOLPOST IF THE TOOLPOST IS LOCKED IN POSITION.

ON COMPLETION OF A JOB THE MACHINE MUST BE CLEANED AND PRESERVED IN ACCORDANCE WITH THE INFORMATION CONTAINED IN THE PRESERVATION AND PACKAGING SECTION OF THIS MANUAL (SECTION 5.5).

5.2 SETTING UP THE EQUIPMENT

The following instructions are for installing the flange facing and grooving machine in position prior to operating the equipment. It is assumed that an appropriate air supply is available for connection to the machine (1.8 m^3/min, 6.0 bar, 64 cfm, 87 psi).

5.2.1 Unpacking the machine

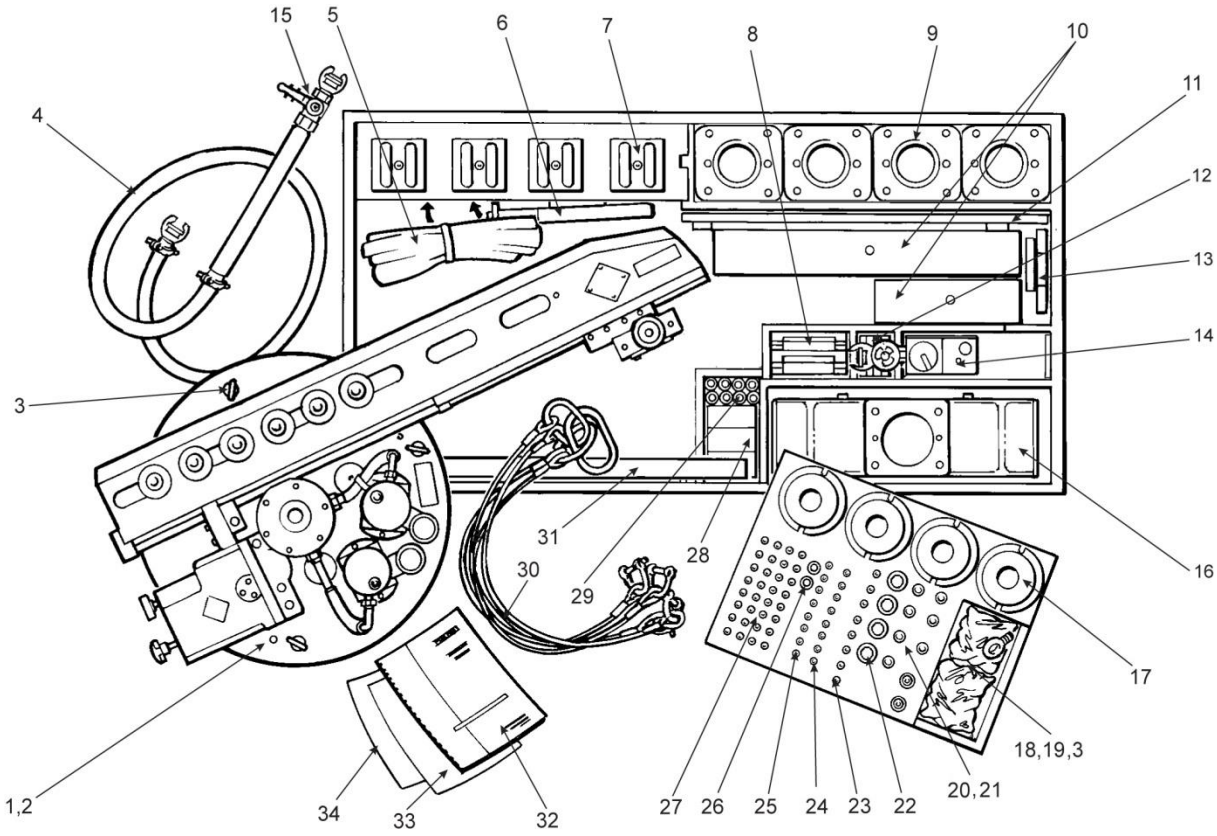


Fig. 10 Packing case contents

PACKING CASE CONTENTS

The machine and its associated equipment are housed in a transportable wooden case. This case contains the following:

1. The TEAM® SX2872 machine
2. Centre spigot
3. M16 eyebolt (4 off)
4. Air pipe and air control valve

5. Tool kit consisting of:

   Metric Allen key set, tipped tool holder, set of tips,
   19mm AF spanner, 46mm AF spanner, 10mm AF spanner,
   10" adjustable spanner, 17mm Allen key, 14mm Allen key,
   clocking mount, spike and knuckle, cranked 'T' spanner

6. Base centraliser
7. Ram bolts and jaw assemblies (4 off)
8. Pusher plates with adjustment screws (4 off)
9. Extension legs with location boss: large (4 off), small (4 off)
10. Main counterbalance weights (2 off)
11. Main counterbalance plate
12. Setting strap plates with grub screws (4 off)
13. Secondary counterbalance plate
14. Air filter lubricator and gate valve
15. Air control valve
16. Base assembly
17. Threaded collar (4 off)
18. Extension leg nuts (16 off)
19. Pack of spare bolts / screws etc.
20. Balance weight screws (8 off)
21. Vertical lifting lug (FY 0168)
22. Machine to base securing bolts and washers (4 off)
23. Setting strap plate screws (8 off)
24. Threaded collar screws (8 off)
25. Pusher plate screws (8 off)
26. Secondary balance plate screws and washers (2 off)
27. Extension leg screws (32 off)
28. Secondary counterbalance weights (3 off)
29. Setting strap legs (8 off)
30. Lifting cables and test certificate
31. Sighting bar
32. Instruction manual
33. C.E. certificate
34. Q.A. certificate

SCREW LIST & DETAILS

1.	Extension leg screws M10 x 30 cap head	32 off
2.	Extension leg nuts M10 nut	16 off
3.	Pusher plate screws M10 x 55 cap head	8 off
4.	Pusher plate screws – M10 x 40 cap head	4 off
5.	Threaded collar screws M10 x 20 cap head	8 off
6.	Setting strap plate screws M12 x 25 cap head	8 off
7.	Machine to base securing bolts M12 x 40 hex head	4 off
8.	Machine to base thick washers CP 0123	4 off
9.	Secondary balance plate screws M10 x 30 cap head	2 off
10.	Secondary balance weights screws M16 x 70 cap head	4 off
11.	Secondary balance weights screws M16 x 120 cap head	2 off
12.	Main balance weight screws M16 x 125 cap head	2 off
13.	Main balance weight M16 washer	2 off
14.	Main balance weight plates NFY 0704 Washer	2 off
15.	Clocking mast screws M10 x 30 cap head	2 off
16.	Clocking arm end M10 x 35 cap head	1 off
17.	Vertical lifting lug screw M16 x 40 cap head	1 off

SPARE BOLTS/SCREWS PACK:

1.	Toolpost M6 x 35 grub screw	2 off
2.	Toolpost M6 x 25 grub screw	2 off
3.	Backing rail - Anderton fastener M1645 - 006	4 off
4.	Backing rail CP 0323 Stud	2 off
5.	Balance weights M16 x 125 cap head	2 off
6.	Balance weights M16 x 70 cap head	2 off
7.	Balance weights M16 washer	4 off
8.	Extension legs M10 x 30 cap head	4 off
9.	Extension legs M10 nut	4 off
10.	Setting strap plate - dog point grub screw M12 x 16	2 off
11.	Setting strap plate M12 x 30 cap head	2 off
12.	Machine to base securing bolts M12 x 40 hex head	2 off
13.	Machine to base thick washers CP 0123	2 off
14.	Gearbox 3/8" UNC Nut	2 off

The machine and its associated equipment should be removed from the case and visually inspected for signs of wear, damage or corrosion.

The installation procedure detailed sets up the SX28-72 in a horizontal position. If the machine is to set up in the vertical or inverted position follow the set up procedure but extreme care must be taken due to the greater risk of the machine falling off the flange during the setting and adjusting procedure.

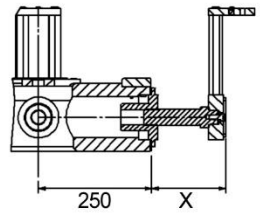
5.2.2 Mounting base installation

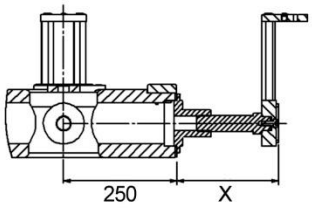
The mounting base assembly consists of a central aluminium hub, short and long extension legs, collars, ram bolts and jaw assemblies with setting straps. When using the correct configuration of extension legs the base can be located in the flange bore and locked in position by tightening the jaws against the wall of the bore. The base is fitted to the flange as follows:

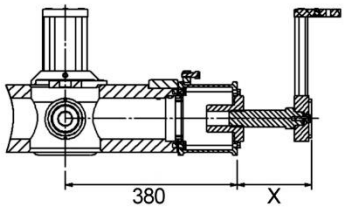
THE BASE CASTING WEIGHS 46KG. DO NOT ATTEMPT TO MANUALLY LIFT THE BASE ASSEMBLY ALWAYS USE A MECHANICAL LIFTING DEVICE.

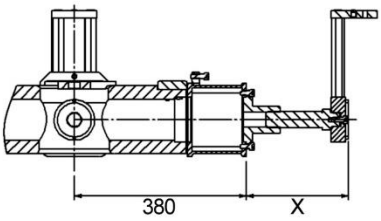
ALWAYS USE SETTING STRAPS WHEN INSTALLING THE MOUNTING BASE.

1. Observe all Warnings and Cautions, refer to Sections 3 and 5.1.
2. Measure the diameter of the flange face to be machined. Ensure that the diameter falls within the operating parameters of the machine.
3. Measure the flange bore and select the correct base / extension configuration to suit the flange bore diameter (refer to table Fig. 11). Before assembly ensure that the mating faces between the base and extensions are clean. When assembled make sure all securing screws are tight and the assembly is firmly locked together to ensure rigidity during the machining operation.







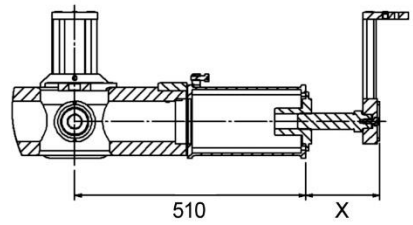


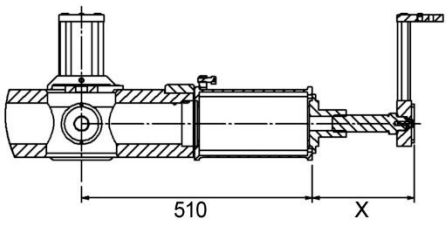
BORE RANGE minimum diameter - maximum diameter	BASE ASSEMBLY CONFIGURATION
25.9" - 32.6" 658mm - 828mm	Base unit + collar (internal) + jaw assembly
30.7" - 37.4" 780mm - 950mm	Base unit + collar (external) + jaw assembly
36.1" - 42.8" 918mm - 1088mm	Base unit + short external leg + collar (internal) + jaw assembly
40.9" - 47.6" 1040mm - 1210mm	Base unit + short external leg + collar (external) + jaw assembly

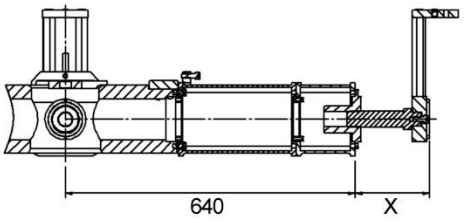
Maximum distance X = 150mm

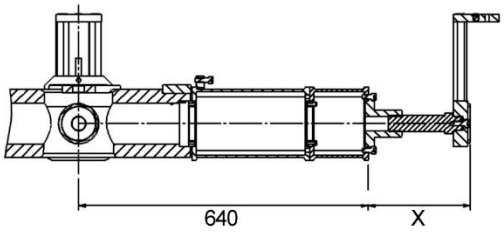
Fig.11 Base configuration and mounting bore ranges

(Continued on next page)









46.4" - 53.1" 1178mm - 1348mm	Base unit + long ext. leg + collar (internal) + jaw assembly
51.2" - 57.9" 1300mm - 1470mm	Base unit + long external leg + collar (external) + jaw assembly
56.6" - 63.3" 1438mm - 1608mm	Base unit + long external leg + short external leg + collar (internal) + jaw assembly
61.4" - 68.1" 1560mm - 1730mm	Base unit + long external leg + short external leg + collar (external) + jaw assembly

Maximum distance X = 150mm

Fig.11 Base configuration and mounting bore ranges

CAUTION: WHEN LOCATING THE BASE IN A FABRICATED PIPING SYSTEM CHECK FOR ANY WELD BEADS AND FLANGE-TO-PIPE MISALIGNMENTS WITHIN THE PIPE AND FLANGE BORES THAT COULD PREVENT THE BASE FROM CLAMPING SECURELY.

4. Fit the four jaw assemblies into the threaded collars and screw each ram bolt (Fig. 12) to the desired distance. Do not exceed the maximum distance X.

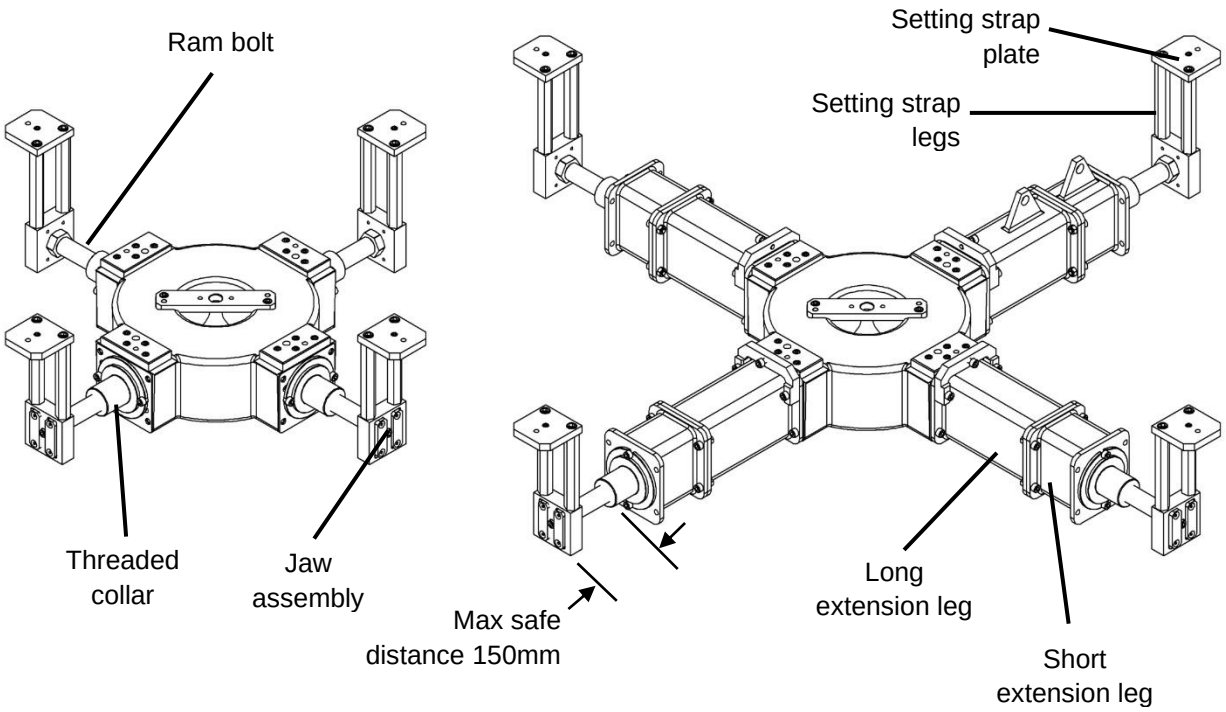


Fig. 12 Mounting base assembly

5. Measure from the end face of the base or extension and, using the 46mm open ended spanner on the ram bolt hexagons, position the jaw pad face 5mm (0.25") less than the radius of the flange bore. Repeat on all four legs.

DO NOT SCREW THE JAW ASSEMBLY OUT MORE THAN THE MAXIMUM SAFE DISTANCE OF 150MM FROM THE FACE OF THE COLLAR TO THE OUTER FACE OF THE JAW PAD.

6. Screw two 25mm AF hexagon section setting strap legs to each jaw unit and attach the setting strap plate, secure with two cap head screws. Partially screw out the grub screw in the centre of the plate to ensure it does not protrude below the plate.
7. Fit the four M16 eyebolts supplied to the base unit and using the lifting cables carefully position the base assembly within the flange bore allowing the setting strap plates to rest on the flange and take the weight of the assembly.

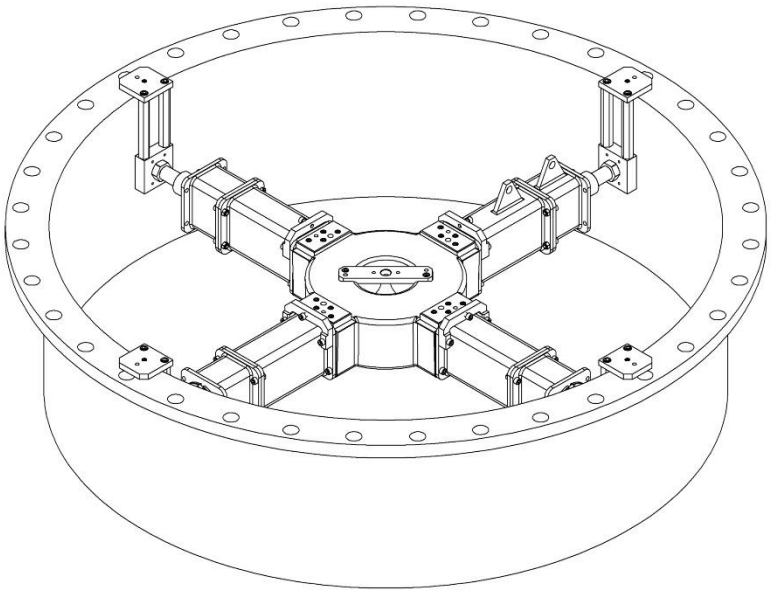


Fig. 13 Mounting base assembly positioned in the flange bore

DO NOT LIFT THE BASE USING THE BAR IN THE CENTRE OF THE UNIT. THE BAR IS FITTED TO LOCATE THE MACHINE CENTRE SPIGOT AND IS NOT INTENDED TO TAKE THE WEIGHT OF THE BASE ASSEMBLY. ALWAYS USE THE LIFTING EYES SUPPLIED.

NOTE

If the machine is to be used on a vertical flange, then follow the lifting instructions in section 5.2.7.

8. When the base assembly is correctly positioned within the bore, secure in position by tightening the ram bolts equally to maintain position.

5.2.3 Centralising the base within the bore

1. Locate the central tie bar onto the mounting base assembly, secure with the cap head screws and use the dowels for location.
2. Position the central mast into the spigot hole in the centre of the central tie bar (Fig. 14), secure with two screws and slide the sighting bar into the pivoted bracket. Adjust the position of the sighting bar to suit the flange diameter and clamp in position. Fit the knuckle bar, knuckle and spike to the outer end of the sighting bar.
3. Using the spike select the datum diameter (i.e., raised face, 'V' groove or bolt holes) and rotate the unit. Check the spike follows the datum and adjust if necessary. To adjust the base, tighten and slacken opposite sets of ram bolts (similar to a four-jaw chuck operation) securing the unit progressively in the flange until the desired accuracy has been achieved.

NOTE

During centralising ensure that the setting straps are fitted. When centralised, the base should be tight enough within the bore to support its own weight and that of the turntable assembly.

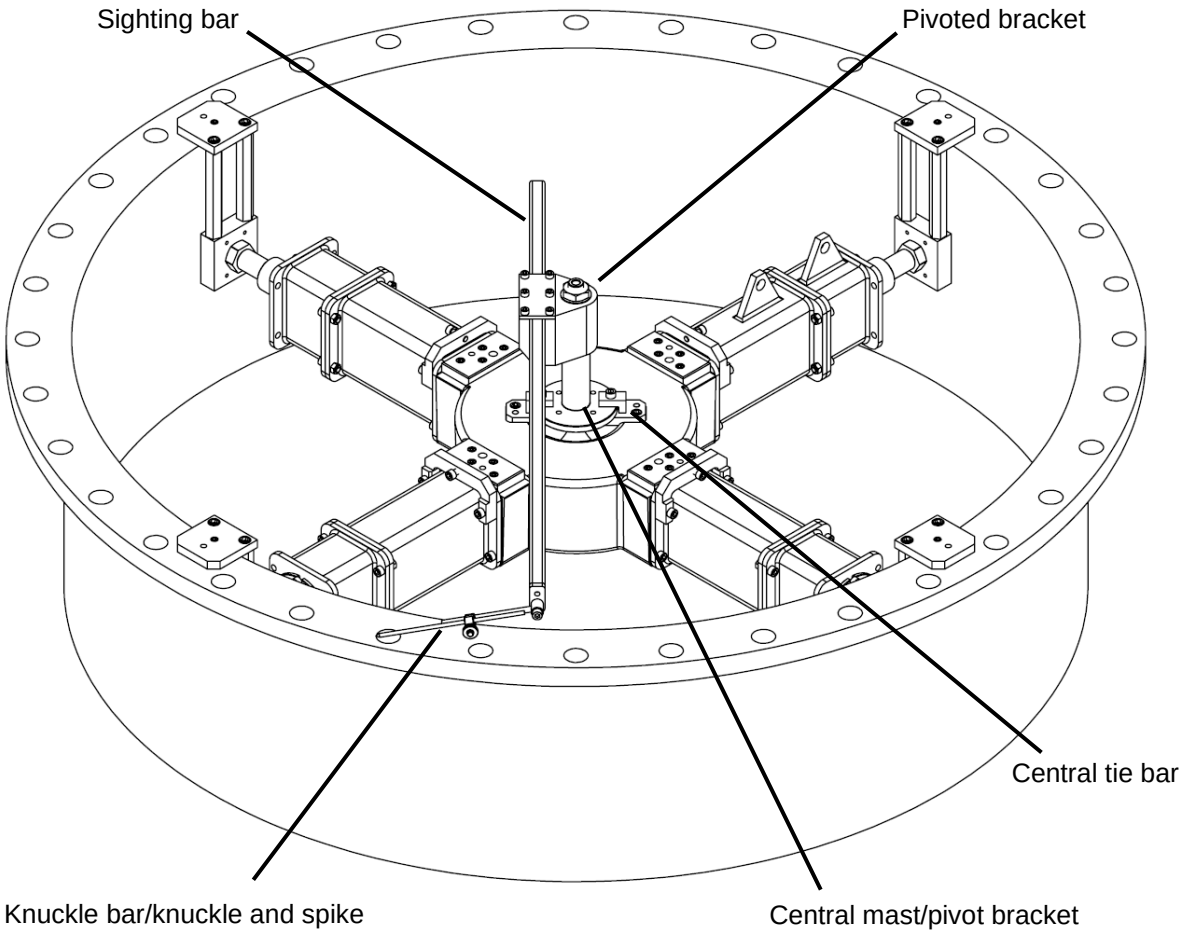


Fig. 14 Base centraliser fitted to spigot hole

5.2.4 Machine installation

1. Determine if the fall-stop kit is needed (refer to Appendix E). If deemed necessary, it is available as an optional extra from TEAM® (FMG55-599-002552).

WARNING: FAILURE TO FIT THE FALL-STOP KIT MAY RESULT IN SERIOUS INJURY OR DAMAGE TO THE MACHINE.

2. Fit the location spigot to the bottom of the turntable base.
3. Ensure that the toolpost is fully retracted and the tool has been removed.
4. Carefully position the machine onto the base and locate the centre spigot into the centering hole. Secure with the four M12 hex screws and thick washers (Fig. 15).

NOTE

If the bore diameter is 760mm (30") or less, it will be necessary to use the cranked 'T' spanner supplied with the machine to tighten the securing screws.

WARNING: THE AIR CONTROL VALVE MUST ALWAYS BE POSITIONED WITHIN REACH OF THE OPERATOR IN CASE OF EMERGENCY.

WARNING: WHEN SETTING UP THE MACHINE WHILE THE DRIVE UNIT IS BEING POWERED AROUND, THE AIR FLOW MUST BE REDUCED BY THE GATE VALVE TO RESTRICT THE SPEED OF THE MACHINE.

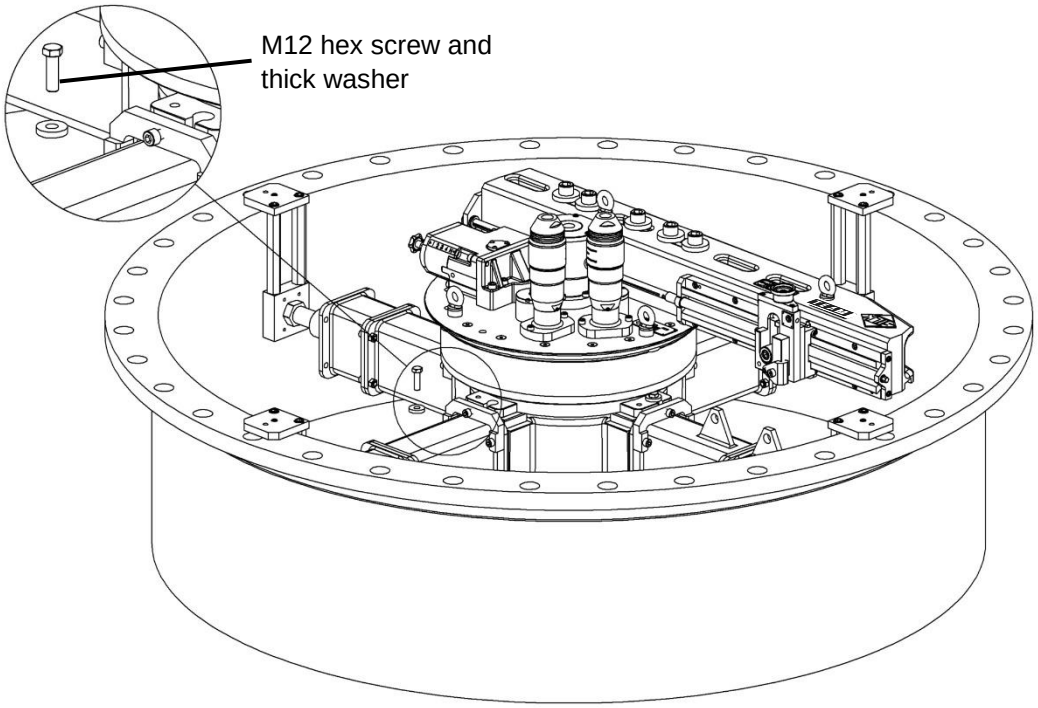


Fig. 15 Securing machine to base assembly

5. When locating the base assembly into the flange bore, the need will arise to level the base to check the machine is parallel to the flange. To check, attach and secure a dial test indicator (DTI) to the toolpost, connect the machine to the air supply (refer to section 5.3.1 and observe all Warnings and Cautions) and set the gearbox traverse selector to neutral (N). Open the air control valve and slowly move the surfacing arm around the flange. Check the DTI for variations and adjust the swash of the machine, if necessary, by tightening the grub screw in the centre of each setting strap plate against the flange face thus pulling the base up the bore. Recheck the base for rigidity.

NOTE

6. Should the degree of accuracy required be greater than that achievable by location of the machine's spigot in the base unit, the machine can be centred relative to the base by unscrewing the centre spigot from the machine base plate and fitting a pusher plate to each of the bosses on the base unit (Fig. 15). The machine can then be adjusted as required, by nipping the M12 hexagon head screws to hold the position but allowing the machine to be pushed by turning the adjusting screw on each of the pusher plates. Using the DTI for comparison against the datum feature, check the base for alignment when the desired accuracy is achieved, secure the machine and check again.

WARNING: DO NOT REMOVE THE SETTING PLATES UNTIL THE MACHINE IS SECURE AND ALL ADJUSTMENTS ARE COMPLETE.

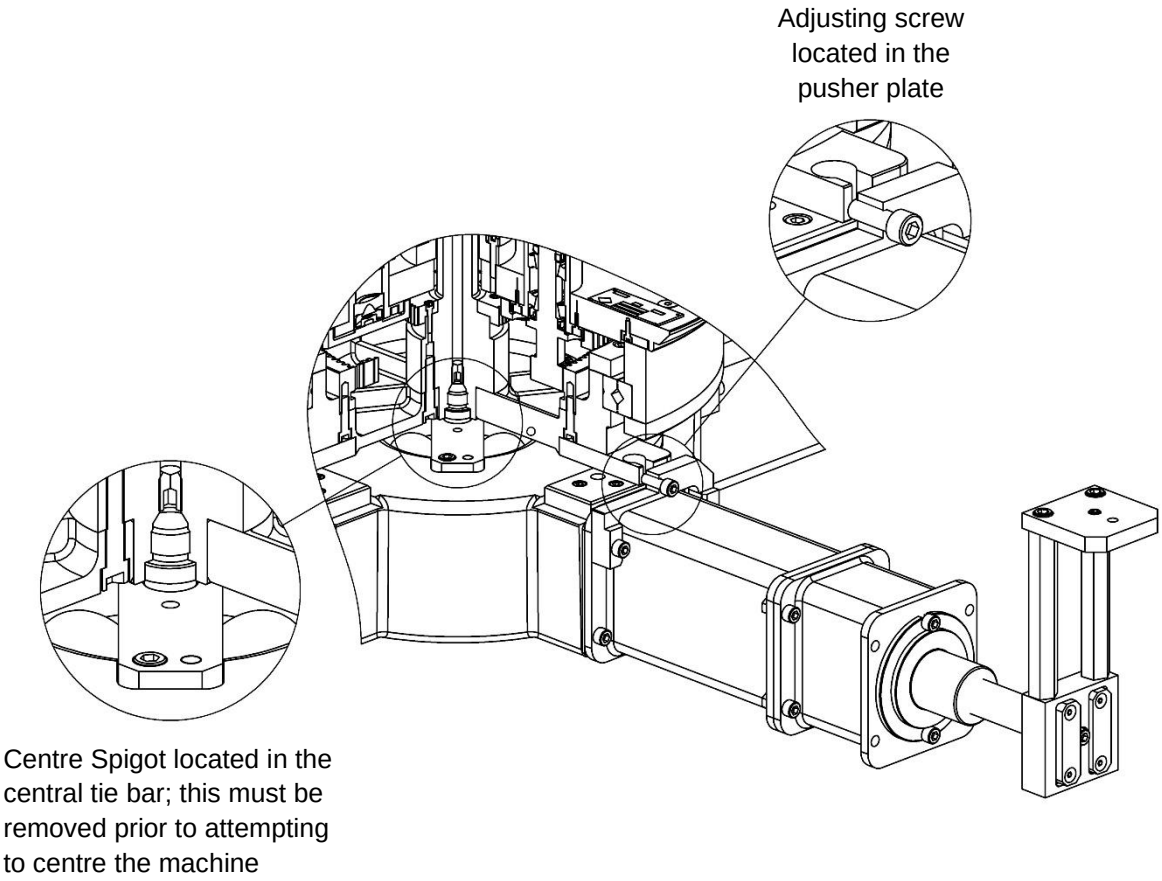


Fig. 16 Centralising the machine using the pusher plates

5.2.5 Setting up the tool

As the TEAM® flange facing machine is portable and thus lighter and less rigid than its workshop counterpart, the choice of tooling and the rate at which metal can be removed will differ from that used in a workshop.

When the tool has been selected it can be installed in the toolpost and secured by the clamp. Tool feed is achieved via the toolpost feed knob which is fitted with a graduated scale divided into metric and imperial increments.

5.2.6 Toolpost overrun and gearbox protection device

The Toolpost Overrun and Gearbox Protection Device are designed to stop the toolpost leadscrew nut jamming against a fixed surfacing arm end plate and thus damaging the feed gearbox. When the feed nut comes into contact with the end plate it will push the plate along its mounting studs. Should the operator fail to notice his error eventually the plate will fall off.

The toolpost and machine will still operate correctly without the end plate but if it is not replaced the cast iron dovetail slideway may be damaged. To replace the end plate, see paragraph 7.4.5 in the Maintenance section.

5.2.7 Installing and machine balancing - (vertical flange)

When mounting the machine on a vertical flange the machine must be balanced. Failure to balance the machine correctly will result in poor surface finishes, damaged tool bits, and premature wear on the drive system.

CAUTION: WHEN LIFTING ANY EQUIPMENT FROM THE HORIZONTAL POSITION INTO THE VERTICAL POSITION, SAFE AND SUITABLE LIFTING TECHNIQUES MUST BE APPLIED TO AVOID ANY SHOCK LOADING THAT MAY BE APPLIED TO THE MACHINE AND LIFTING EQUIPMENT.

CAUTION: WHEN LIFTING THE BASE ASSEMBLY IN POSITION ON A VERTICAL FLANGE ALWAYS ATTACH THE LIFTING CABLE TO THE LUGS PROVIDED (ON EXTENSION LEGS) OR WHEN USING THE BASE UNIT WITHOUT EXTENSIONS ATTACH LIFTING EYES.

WARNING: WHEN POSITIONING THE BASE WITHIN THE BORE TAKE CARE TO AVOID TRAPPING HANDS OR FINGERS.

1. Before lifting the base assembly into the bore adjust the 6 and 9 o'clock legs (looking down on the base, the leg with lifting lugs is at 12 o'clock, see Fig 17) to the exact radius of the flange bore. Attach the lifting cables and lift the base into position. Due to the offset centre of gravity of the unit when lifting the base the lower legs will protrude outwards toward the operator. Offer the base up to the bore and locate the 12 o'clock setting strap onto the flange face, then carefully manoeuvre the 6 o'clock leg into the bore at the same time slightly lowering the base to allow the bottom leg to be positioned in the bore.

Apply force and while holding the base fully in make sure all four setting plates are flush against the flange. Wind out the jaw assembly ram bolts on the 12 and 3 o'clock legs until the base assembly is secure within the bore.

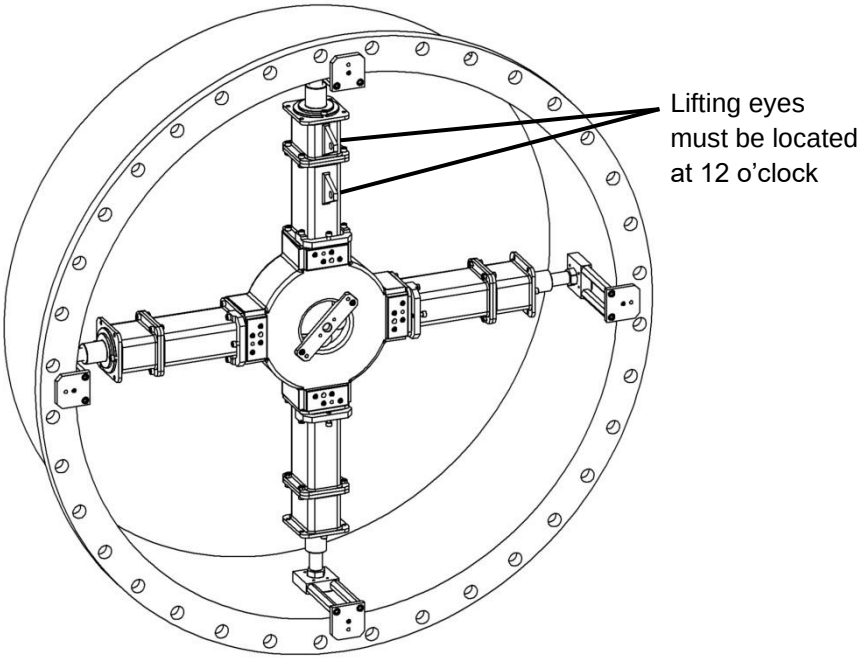


Fig. 17 Vertical lift - mounting base assembly positioned in the flange bore

2. Centralise the base within the bore - refer to section 5.2.3.

WARNING: DO NOT ATTEMPT TO LIFT THE MACHINE VERTICALLY WITHOUT FITTING THE VERTICAL LIFTING LUG. THIS MUST BE FITTED OVER THE TURNTABLE LIFTING EYE BOSS AND THE CAP SCREW FULLY TIGHTENED

CAUTION: ENSURE THE BASE ASSEMBLY IS TIGHT ENOUGH WITHIN THE BORE TO SUPPORT THE MACHINE DURING OPERATION.

3. To enable a more balanced lift, the surfacing arm assembly should be positioned centrally on the drive assembly turntable. Install the M20 cap screws from the surfacing arm, and lock down securely in place.

4. Using suitable lifting equipment and techniques manoeuvre the machine assembly to the work location and lower carefully and stably to the lay down area to enable work to commence on the assembly.

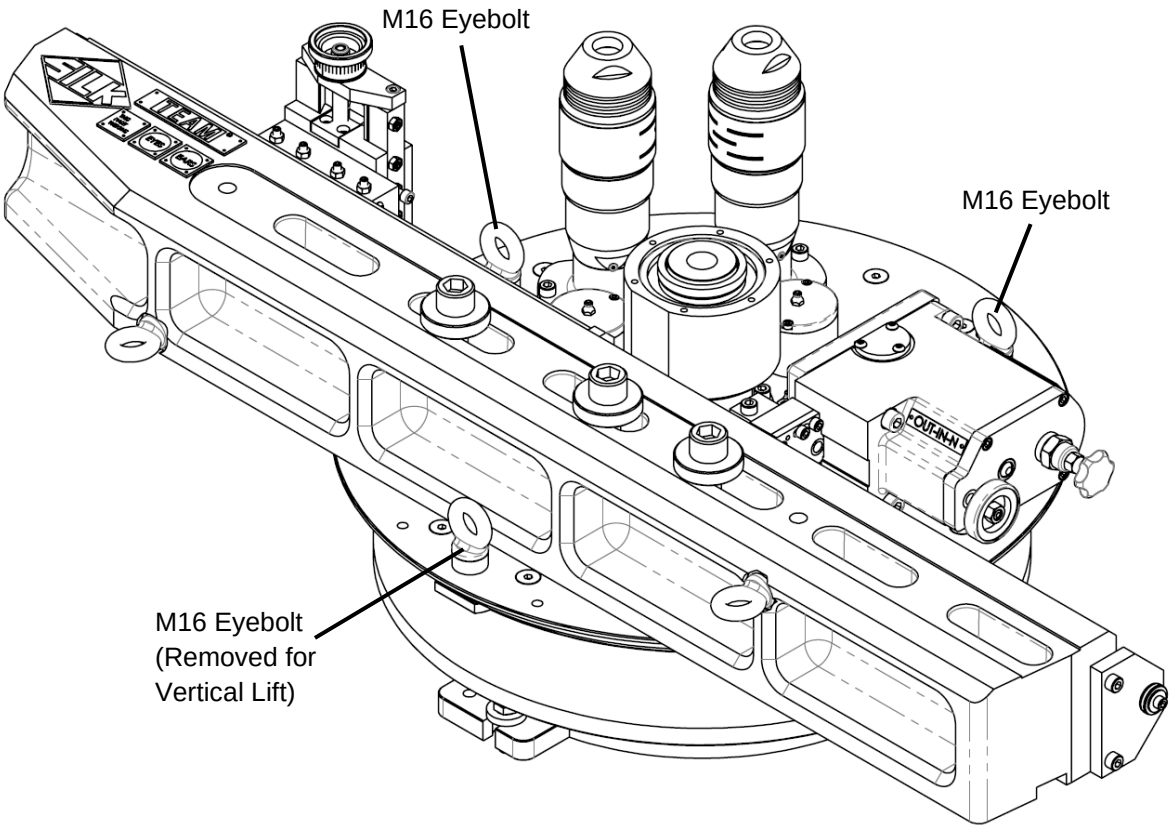


Fig. 18 Horizontal Lift – Main Drive Assembly and Sufacing Arm Assembly

5. With the assembly now at the work location remove the M16 eyebolt from the lifting boss adjacent to the surfacing arm location. Fit the vertical lifting bracket over the lifting boss and secure with supplied M16 x 40mm Cap Head Screw (see Fig. 19). The drive assembly can now be lifted into position and secured onto the base assembly by use of the four hexagon head screws and washers (See section 5.2.4, Fig. 15).

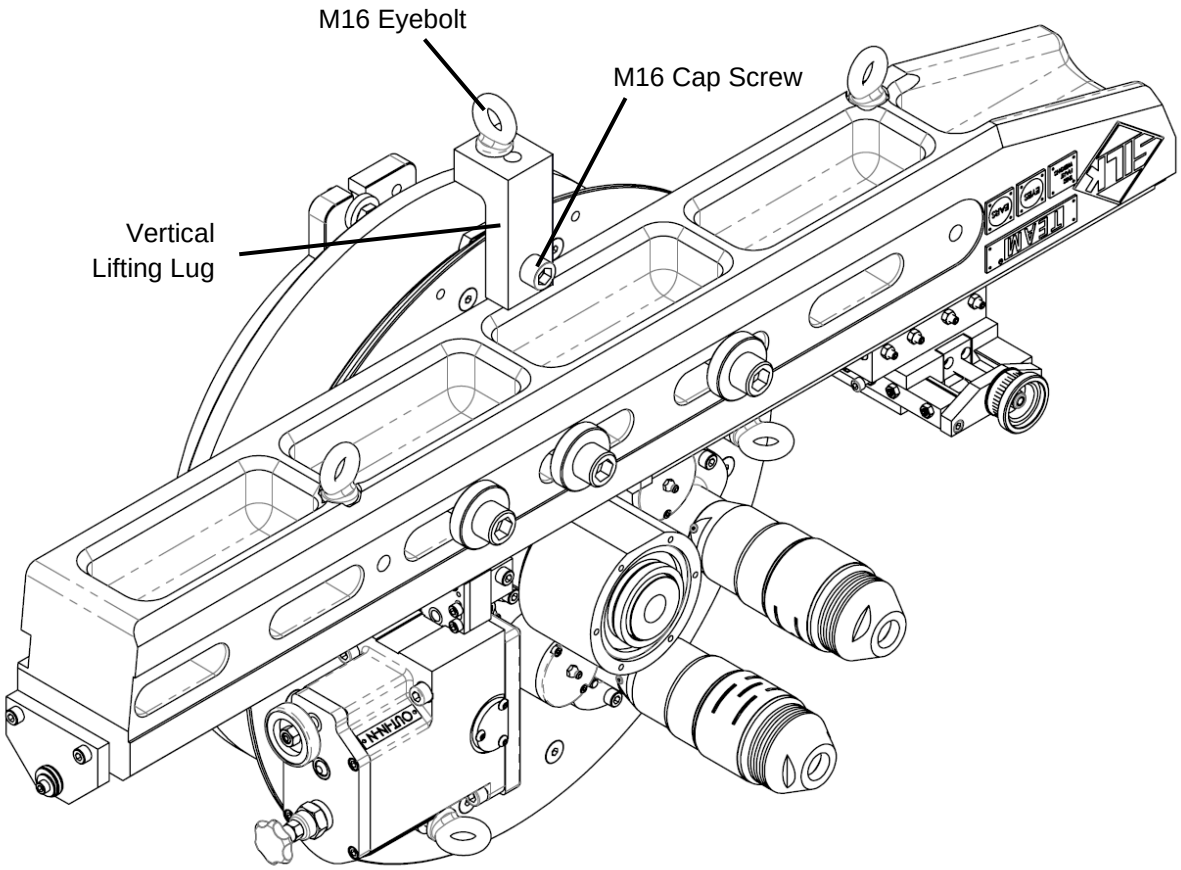


Fig. 19 Vertical lift – Main Drive Assembly and Surfacing Arm Assembly

6. Install the toolpost taking care to not damage it during this operation. Using suitable lifting techniques manoeuvre the surfacing arm to the desired extension at a diameter that will allow the complete flange to be machined, set the tool post to the mid-point of the area and ensure that all accessories are fitted (cutting tool, etc.). Secure with M20 cap screws locating through the surfacing arm.

7. The balancing procedure is used to estimate the weight required to balance the surfacing arm, toolpost and accessories. The toolpost should be located at the mid-cut position, this should average out the out-of-balance effect as the toolpost moves across the flange.

To balance the flange facing machine, proceed as follows:

8. Remove the eyebolt from the lifting boss located near to the feed gearbox and place in a secure position for later use. Fit the main counterbalance plate by locating the larger diameter hole over the lifting boss (see Fig. 20). Secure into position with the balance weight washer and eyebolt previously removed. Locate M16 cap screw through the counterbalance weight and tighten to secure onto drive assembly. Ensure the plate is securely located on the drive assembly before proceeding.

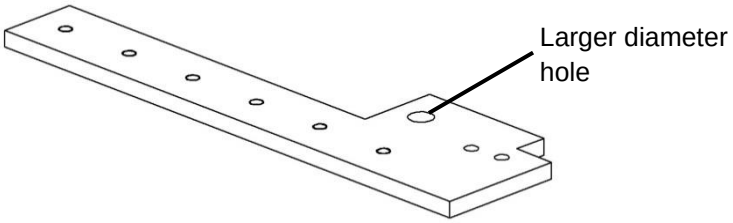


Fig. 20 Main counter balance plate

9. Attach a weight (large or small dependant on position of the arm) to the main counterbalance plate and secure with the M16 screws and washers. The further out the weight is positioned the greater counterbalance effect it has.
10. Remove the M16 cap head screw from the lifting boss located adjacent to the surface arm and place in a secure position for later use. Fit the secondary counterbalance plate (see Fig. 21). As above, attach a weight (large or small dependant on position of the arm. To the plate and adjust as required to achieve balance.

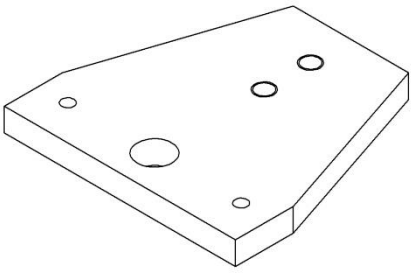


Fig. 21 Secondary counter balance plate

11. Once the plate and weights are attached slowly rotate the machine under power (refer to 5.3.1 - Connection to the air supply) and observe the speed of rotation is constant. If it is not the balance weights must be adjusted. An indication of a balanced machine is to listen for any uneven motor tone as the arm passes 12 o'clock and 6 o'clock, a constant tone indicates the machine is in balance. If

required reposition the weights or add additional weights as necessary. Keep checking until satisfied with the balance.

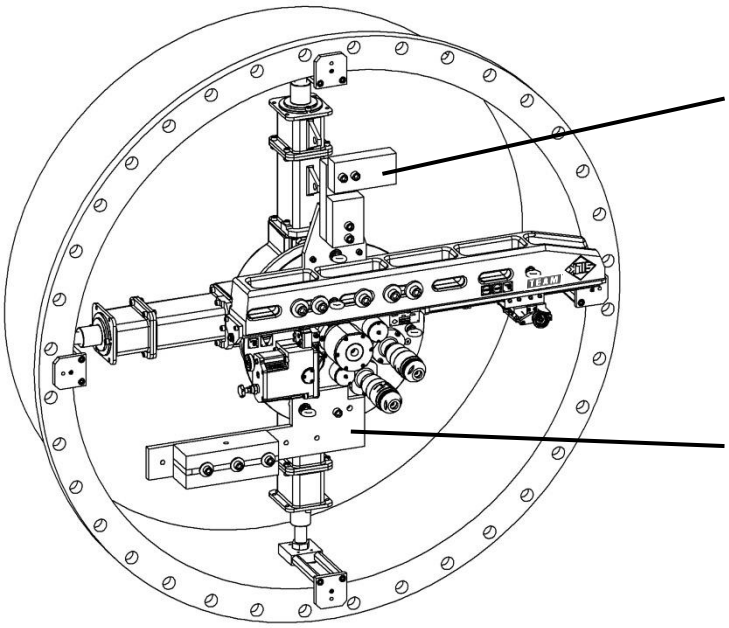


Fig. 22 Main and secondary counter balance plates with weights

WARNING: WHEN SETTING UP THE MACHINE ON A VERTICAL FLANGE THE LIFTING CHAIN SHOULD BE LEFT ON UNTIL THE MACHINE IS FULLY SECURED.

CAUTION: CARE MUST BE TAKEN TO ENSURE THAT THE LIFTING CHAIN DOES NOT OBSTRUCT THE ROTATION OF THE MACHINE DURING THE INSTALLATION.

12. Level the machine if necessary - i.e., parallel to the flange (refer to section 5.2.4, paragraph 4).

NOTE

When running, the following symptoms indicate that the machine is out of balance:

- Uneven arm rotation (erratic movement) this must be rectified immediately as this may cause damage to the drive system.
- The arm or balance weights make the machine race as it goes past the 12 o'clock position i.e., the tone of the motors will change.

CAUTIONS: TO PREVENT DAMAGE TO THE MACHINE IT IS ESSENTIAL THAT IT IS ACCURATELY BALANCED.

WHEN LIFTING AND POSITIONING THE MAIN COUNTERBALANCE WEIGHT ATTACH THE SUPPLIED LIFTING LUG TO THE THREADED HOLE IN THE WEIGHT AND USE A MECHANICAL LIFT.

BEFORE OPERATING RECHECK THAT THE BALANCING WEIGHTS AND PLATES ARE FULLY SECURE ON THE MACHINE.

The flange facing machine is now installed and ready for operation (see 5.3).

5.2.8 Setting up the tool - facing and grooving

As the TEAM® flange facing machine is portable and thus lighter and less rigid than its workshop counterpart, the choice of tooling and the rate at which metal can be removed will differ from that used in a workshop.

The following procedure is for setting up the tool for facing full and raised face flanges and grooving:

1. Observe all Warnings and Cautions, refer to Sections 3 and 5.1.
2. Using the standard toolpost (see Fig. 23) select the appropriate tool for the job (see Appendix A).
3. Install the tool in one of the two positions on the toolpost. Tool feed is achieved via the toolpost feed knob.
4. With the tool in position check that there are no obstructions to the tool and saddle. Determine the point at which the tool touches the flange, this is achieved by slowly rotating the machine, and advancing the tool by turning the toolpost feed knob until it just touches the surface of the flange. Traverse the tool to an edge and stop the machine.

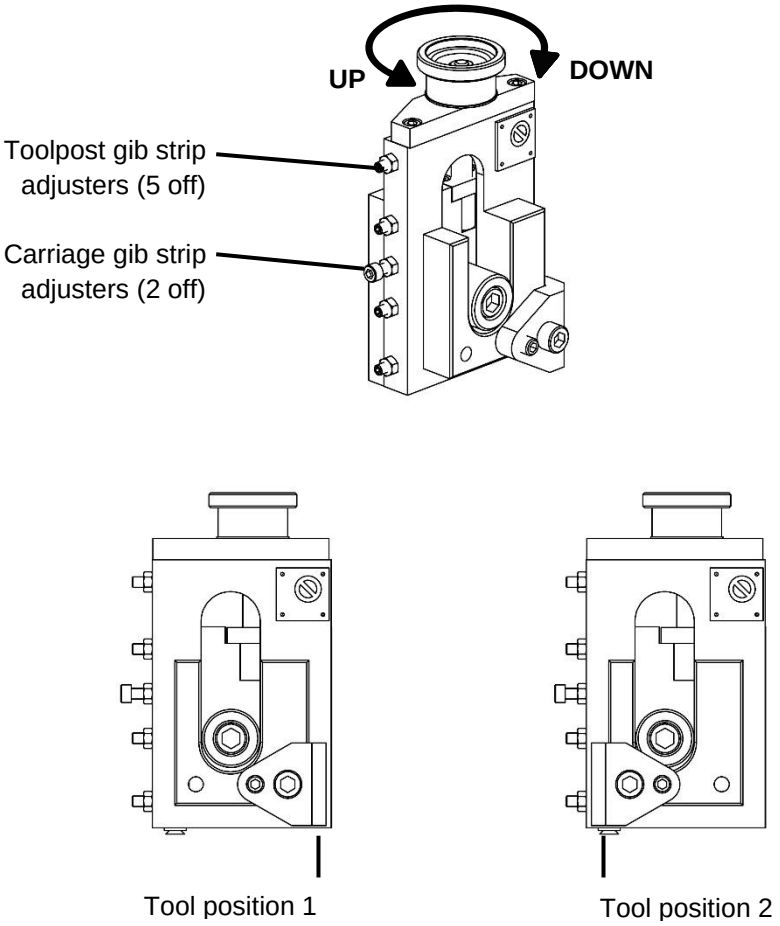


Fig. 23 Tool positions and toolpost movement

5.3 USING THE EQUIPMENT

The following instructions are for operating the flange facing machine correctly once installed on a flange (see Section 5.2 Setting up the Equipment).

5.3.1 Connection to Air Supply

The air supply must always be connected to the machine using the Filter Lubricator Pack supplied (Fig. 24). Use of the machine without the Filter Lubricator Pack will result in premature motor failure.

A gate valve on the pack is used to set the machine speed at the desired RPM when the control valve is fully open. To set the speed proceed as follows:

1. Observe all Warnings and Cautions; refer to Sections 3 and 5.1.
2. Set traverse direction selector to 'N' (feed disengaged).
3. Connect the air lines
4. Close the gate valve and open the control valve.
5. Turn on the main air supply.
6. Open the gate valve until the desired rotational speed is obtained.
7. Close the control valve.

The optimum speed may vary with different applications.

NOTE

Check the filter is venting by unscrewing the water drain. Leave a small amount of air always escaping, this will keep the filter clear of water.

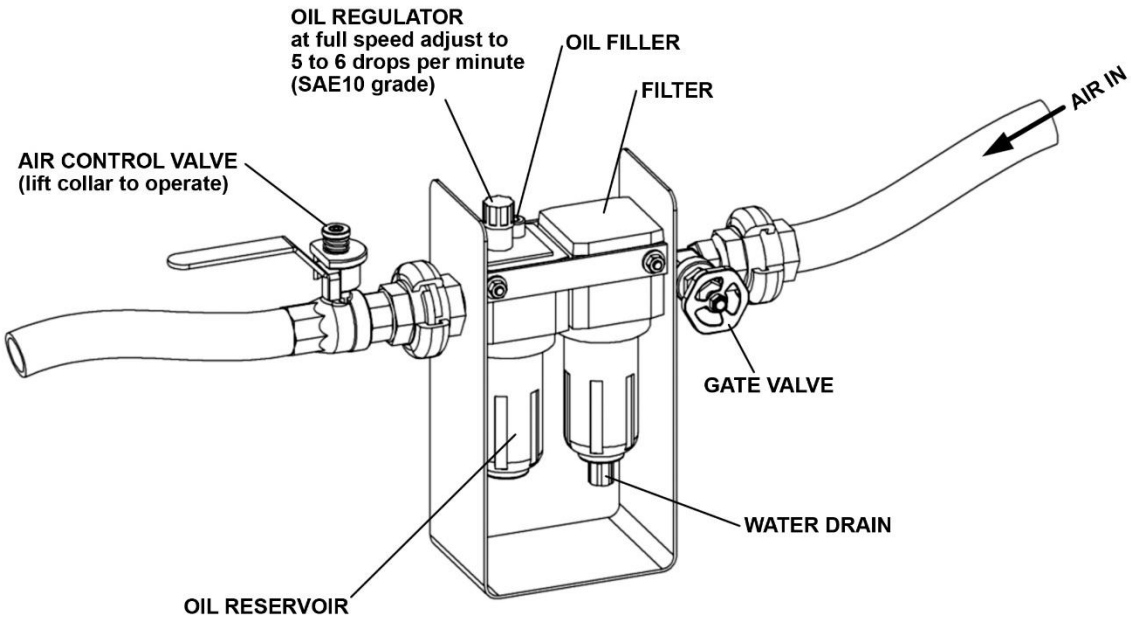


Fig. 24 Filter/lubricator pack

5.3.2 Starting the machine - Facing and Grooving

1. Remove the base assembly setting plates.
2. Set up the tool, as per Section 5.2.8.
3. Select the cutting feed on the cutting feed rate selector, as per Section 4.1.1.
4. Make sure the traverse directional selector is set to neutral 'N', as per Section 4.1.1.
5. Using either, the Hex (male) machine on the end of the leadscrew or the Hex (female) located on the leadscrew drive shaft (socket head cap screw); position the tool away from the cutting area.
6. Set depth of cut on the toolpost feed knob.
7. Engage the traverse directional indicator to the required position.

WARNING: THE MACHINE HAS DANGEROUS MOVING PARTS WHEN OPERATED, THEREFORE KEEP WELL CLEAR.

WARNING: SHOULD THE AIR SUPPLY FAIL FOR ANY REASON, THE OPERATOR MUST SHUT THE AIR CONTROL VALVE SO THAT IT LOCKS IN THE CLOSED POSITION UNTIL THE AIR SUPPLY HAS BEEN RESTORED.

8. Start the machine by opening the air supply, refer to Section 5.3.1.

WARNING: DO NOT ATTEMPT TO MAKE ADJUSTMENTS WHILE THE MACHINE IS OPERATING. ALWAYS STOP THE MACHINE FIRST.

If the cutting feed or direction of the machine is to be changed, the machine must be stopped, and the appropriate feed/direction selected. The machine can then be restarted.

Now the machine is ready to use the operator can adjust any one of the following variables:

a. depth of cut
b. tool profile
c. manual or automatic traverse
d. rate and direction of feed

5.4 REMOVING THE EQUIPMENT

1. Observe all warnings and cautions, refer to Sections 3 and 5.1.
2. Isolate the machine from the air supply and disconnect.
3. Ensure that the cutting tool has been removed from the toolpost.
4. Refit the base assembly setting plates.
5. Remove all swarf and thoroughly clean the machine.
6. If the machine has been installed vertically with the secondary counterbalance in place, ensure this is removed and replaced with the vertical lifting bracket.
7. Remove the machine from the mounting base assembly by unscrewing the securing bolts.
8. Remove the mounting base assembly from the bore.

ALWAYS USE A MECHANICAL LIFT TO REMOVE THE MACHINE FROM THE FLANGE. REMOVE THE MACHINE FROM THE BASE BEFORE LOOSENING THE JAW BOLTS.

5.5 STORING THE EQUIPMENT

After removing the equipment from the job site, the equipment should be thoroughly cleaned and inspected. Any faults should be rectified before the equipment is re-used or returned to storage.

After cleaning and inspecting the equipment, the unprotected parts must be protected from corrosion by smearing them with a thin coat of oil.

The equipment should finally be returned to the transportation box and an inventory made of the parts to ensure that all components are present.

SECTION 6 FAULT DIAGNOSIS

6.1 INTRODUCTION

A fault diagnosis chart is provided to assist the user to identify basic faults. The chart is not exhaustive, and the recommended action may not be the only solution to a fault.

In order to prevent possible injury to personnel or damage to equipment it is recommended that faults are corrected as soon as they arise.

6.2 FAULT DIAGNOSIS CHART

Symptom	Possible cause	Action
The machine will not rotate when the air supply valve is opened.	1. Air supply not available	Check air supply
	2. Air supply is below the minimum required to operate the machine	Check air supply
	3. Faulty air filter lubrication pack	Check operation of gate valve and air control valve
	4. Faulty air motor	Check operation. Refer to manufacturer's literature. Replace the motor
	5. Faulty gearbox	Check operation
The machine will not traverse.	1. Feed selector incorrectly positioned (gear not engaged)	Check position and ensure selector is correctly engaged
	2. Traverse selector incorrectly positioned (gear not engaged) or in N neutral position	Check position and ensure selector is correctly engaged
	3. Shear pin sheared (refer to Section 7.4.2)	Remove gearbox and replace shear pins

Fault diagnosis chart continued…

Symptom	Possible cause	Action
	4. Drive key in IN/OUT plunger displaced	Remove gearbox, locate key and springs, and replace
Excessive vibration and/or chatter	1. Machine out of balance	Balance machine
	2. Machine assembly loose on mounting plate	Check and tighten the four M12 securing screws
	3. Mounting plate not secure in flange bore	Tighten ram bolts and recheck machine is central
	4. Depth of cut too deep	Reduce cut
	5. Feed rate too high, (chip thickness too great)	Reduce tool feed rate
	6. Poor tool profile or worn tool	Check tool and regrind, if necessary
	7. Tool and/or toolpost not locked in position	Check and tighten, if required
	8. Play in toolpost carriage is too great	Check and adjust gib. Nil play but free moving.
	9. Surface arm clamp screws loose	Check and tighten, if required
	10. Worn leadscrew thrust bearings	Check and replace, if required
	11. Badly maintained machine	Overhaul and replace worn or damaged parts
	12. Worn dovetail slides	Replace dovetail slides
	13. Faulty main bearing	Refer to TEAM®

SECTION 7 MAINTENANCE INSTRUCTIONS

7.1 INTRODUCTION

The following information sets out recommendations for the maintenance of this equipment. Periodic maintenance, when carried out as specified, will help to prevent premature failure of the equipment. Should a component fail or its operation become suspect the equipment should not be used until the fault has been rectified.

7.2 PERIODIC MAINTENANCE

The following maintenance tasks are those required to help prevent premature failure of the equipment. It is recommended that all the tasks should be carried out when specified.

PERIOD	TASK
Daily when in use or on completion of a job	Clean the equipment.
	Check all components are present (refer to packing list in Section 5.2.1) and in good working order.
	Check for correct operation of all the control devices.
	Check all fasteners are properly tight.
	Check and adjust gib strips, (toolpost and carriage). Nil play but free moving.
	Grind the cutting tools
	Wipe all components with a small amount of light machine oil
	Check the condition of all lifting equipment/ features
Weekly when in use	Complete the daily tasks.
	Check bearings. Grease and adjust. Adjust or renew as required. Grease with general purpose molybdenum grease.
	Check main bearing. Refer to manufacturer's literature.
	Check the drive motor, bearings, gears and vanes for wear/damage, see manufacturer’s literature in Appendix D

Periodic maintenance chart continued…

PERIOD	TASK
Returning to storage	Complete the daily and weekly tasks.
	Protect all the exposed areas of the machine from corrosion.
Annually when in storage	Un-pack the equipment and check for signs of corrosion or other deterioration.
	Check that all the components are present and in good working order.
	Check main bearing – remove turntable and grease main bearing

7.3 RECOMMENDED LUBRICANTS

These are the recommended lubricants for the SX28-72 Flange Facing and Grooving Machine.

Component	Lubricant type	Product name or specification
Air motors	Oil	Light machine oil
Bearings	Grease	Molybdenum-based general purpose grease

7.4 REMOVAL AND REFIT PROCEDURES

TO PREVENT DAMAGE TO THE MACHINE ALWAYS USE GENUINE SPARES AVAILABLE FROM TEAM® OR ONE OF ITS AGENTS.

The following procedures are given for the removal and refitting of the main assemblies so that repair work can be carried out.

WARNING: ENSURE ALL AIR SUPPLIES ARE REMOVED/ISOLATED PRIOR TO WORK COMMENCING.

7.4.1 Removal of gearbox

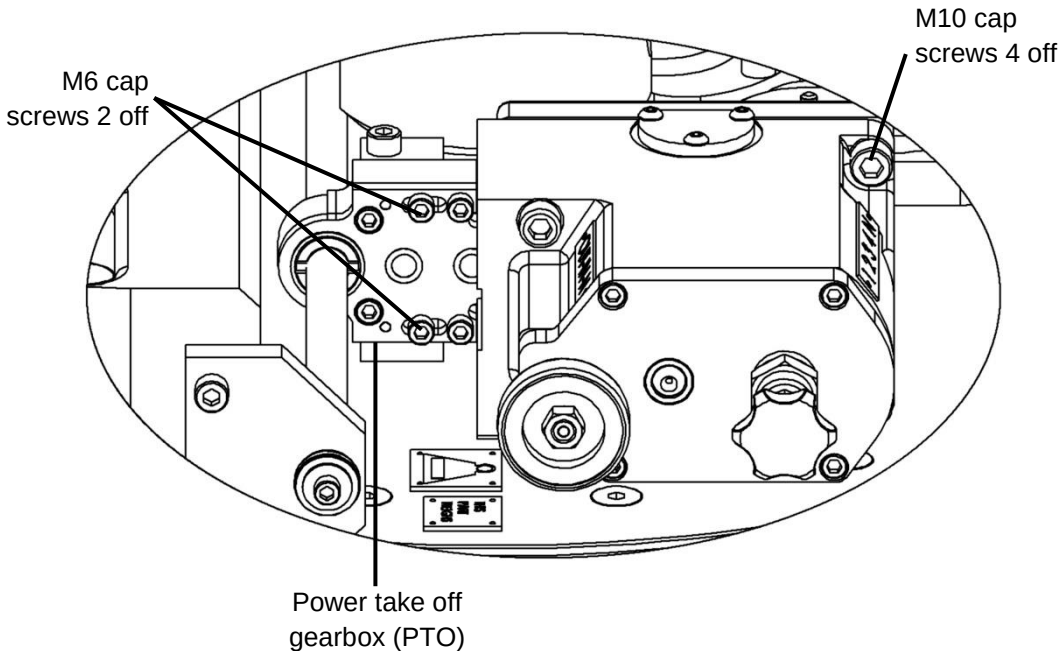


Fig. 25 Gearbox

NOTE

Removing the gearbox can be made easier with the surfacing arm removed (see section 7.4.3) but it is not essential to the operation

To remove:

1. Observe all Warnings and Cautions; refer to sections 3.1 and 7.4.
2. Push both selectors on the gearbox fully in i.e. the direction selector to the 'IN' position and the feed selector to the 'N' position (see Fig. 8).
3. Position the surfacing arm so that equal amounts extend from the turntable.

4. Remove 2 off M6 cap head screws from the PTO box (power take off); the screws located in the slots of the PTO box lid (see Fig. 25) and the 4 off M10 cap head screws from the gearbox.
5. Firmly grip the gearbox in your right hand and with your left hand hold the PTO box, ensuring the keeper plate is secured into the gearbox as this prevents the output shaft from pulling out of the gearbox as it is eased away from the hub. Do not allow the traverse direction selector to pull out of its position or this may result in the spring loaded drive key being lost or displaced. Pull both assemblies away from the mounting bracket. When the gearbox is clear of the mounting plate it can be detached from the PTO box assembly.
6. Draw the gearbox assembly off the location dowels and clear of the input and output support bushes.
7. Place in a clean safe location.
8. If the drive key becomes displaced it will be necessary to remove the selector shaft and gears. To do this remove the black anodised handle and securing nuts, remove the keeper plate and securing screw before withdrawing the shaft from the gearbox (consult the gearbox drawing in parts list) and locate the drive key. Inspect the springs and replace if any damage is visible.

To refit

To refit follow the removal procedure above in reverse. Do not forget the gear selector shaft stop sleeve. When inserting the sub-assembly into the gearbox rotate the gears on the shaft to allow them to mesh more easily. Refit the keeper plate and securing screw.

Do not over tighten the M6 screws securing the PTO box.

7.4.2 Replacement of shearpins

To replace either shear pin follow the procedure:

1. Remove the gearbox as described in section 7.4.1. The shear pins will be found in the worm shaft and in the output shaft.
2. To replace a broken shear pin in the worm shaft unscrew the three retaining screws and remove the bearing cap.
3. Withdraw the worm shaft, drift out the broken pin and refit a new shear pin. Ensure the broken sections of the original shear pin are removed from the gearbox and check grease for contamination and foreign elements.
4. Align the pin in the worm shaft with the slot in the input gear collar and refit the worm shaft. Ensure the worm shaft is correctly seated and refit the bearing cap.
5. To replace the shear pin in the output shaft remove the 'Feed Direction' black anodised handle by removing the hex locking nut. Slide the output shaft with gear out of the gearbox and drift out the broken pin as above.
6. Refit the gear and reassemble.
7. Check the action of all gear selections and shafts. Replace the gearbox and recheck the operation.

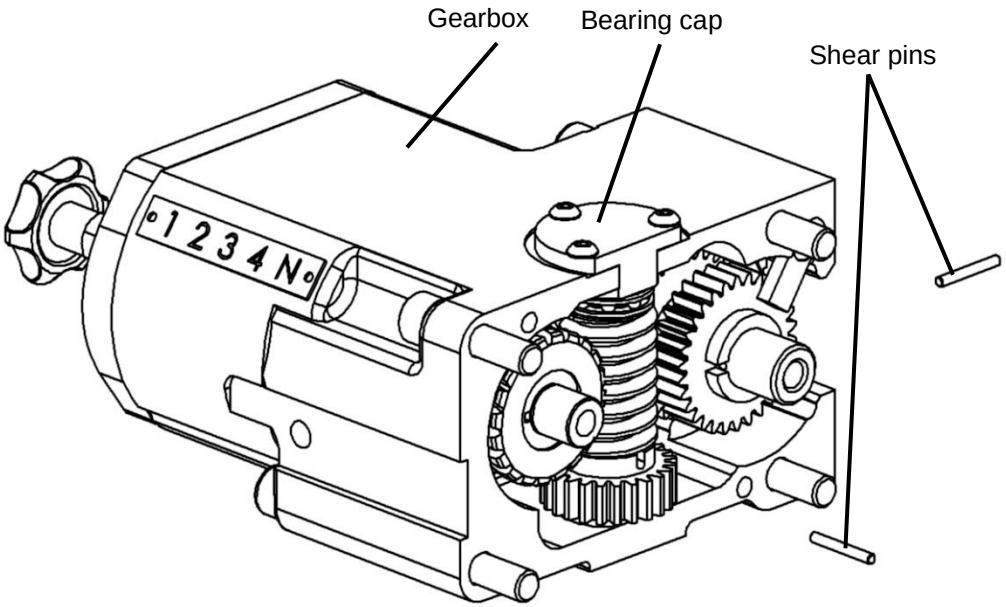


Fig. 26 Gearbox shear pins

7.4.3 Surfacing arm

To remove:

1. Observe all Warnings and Cautions; refer to sections 3.1 and 7.4.
2. Remove the Gearbox and PTO; refer to section 7.4.1.
3. Remove the M20 cap head screws from the surfacing arm. Using suitable lifting equipment; lift the surfacing arm off the drive ring assembly and place in a secure location for later use.

To refit:

The procedure for fitting the surfacing arm to the turntable and gearbox assemblies is the reverse of the removal procedure. You may have to rotate the gearbox in neutral to allow the PTO box gears to drop in mesh with the output gear in the gearbox.

7.4.4 Toolpost

To remove:

1. Observe all Warnings and Cautions; refer to sections 3.1 and 7.4.
2. Support the tool post and remove the toolpost stop screw.

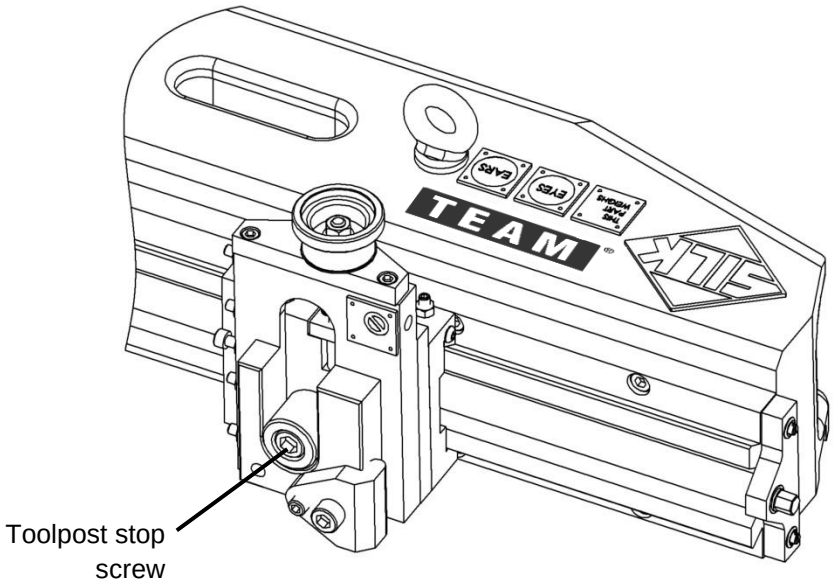


Fig. 27 Toolpost

3. Carefully remove the toolpost assembly from the surfacing arm and place in a safe location.
4. If required, the toolpost carriage can be removed from the surfacing arm as follows:
    a. Slacken gib strip screws.
    b. Remove the four screws from the carriage nut.
    c. Slide off the carriage and remove from the surfacing arm.

To refit:

The procedure for fitting the toolpost to the surfacing arm is the reverse of the removal procedure.

7.4.5 Toolpost overrun/gearbox protection device

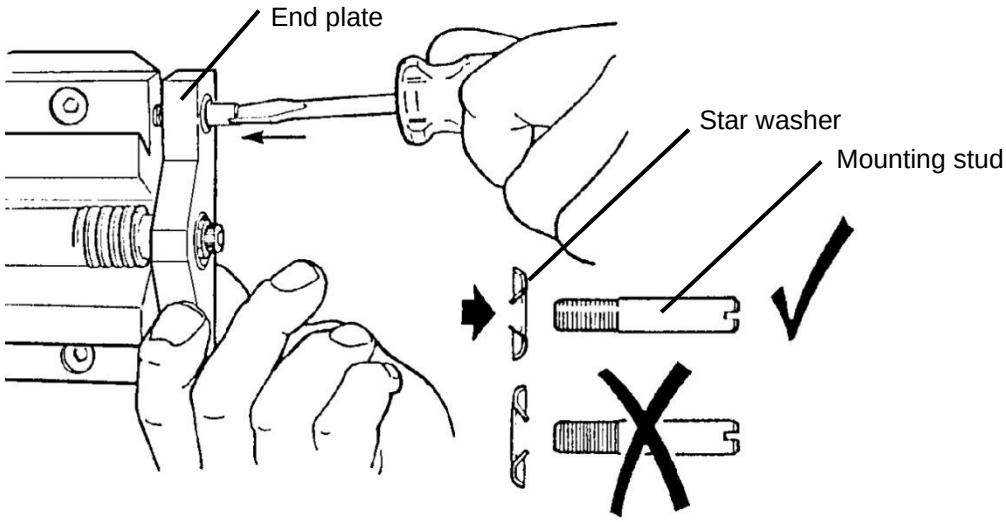


Fig. 28

The toolpost overrun and gearbox protection device is designed to stop the toolpost leadscrew nut jamming against a fixed surfacing arm end plate and thus damaging the feed gearbox. When the feed nut comes into contact with the end plate it will push the plate along its mounting studs. Should the operator fail to notice his error eventually the plate will fall off.

NOTE

The toolpost and machine will still operate correctly without the end plate but if it is not replaced the cast iron dovetail slideway may be damaged.

To replace the end plate:

8. Remove the two end plate mounting studs from the end of the surfacing arm.
9. Push the mounting stud through the star washer with the concave side facing the thread.
10. Position the end plate and screw the studs back into the slideway.

POSITION THE ENDPLATE SUCH THAT THAT THE STAR WASHERS WILL LOCATE AGAINST THE FLAT SURFACE OF THE ENDPLATE – NOT INTO THE COUNTER BORED HOLES.

11. The toolpost and gearbox protection device is now correctly assembled.

FAILURE TO FIT THE STAR WASHER THE CORRECT WAY AROUND WILL RESULT IN DAMAGE TO THE FEED GEARBOX.

SECTION 8 PARTS LISTS

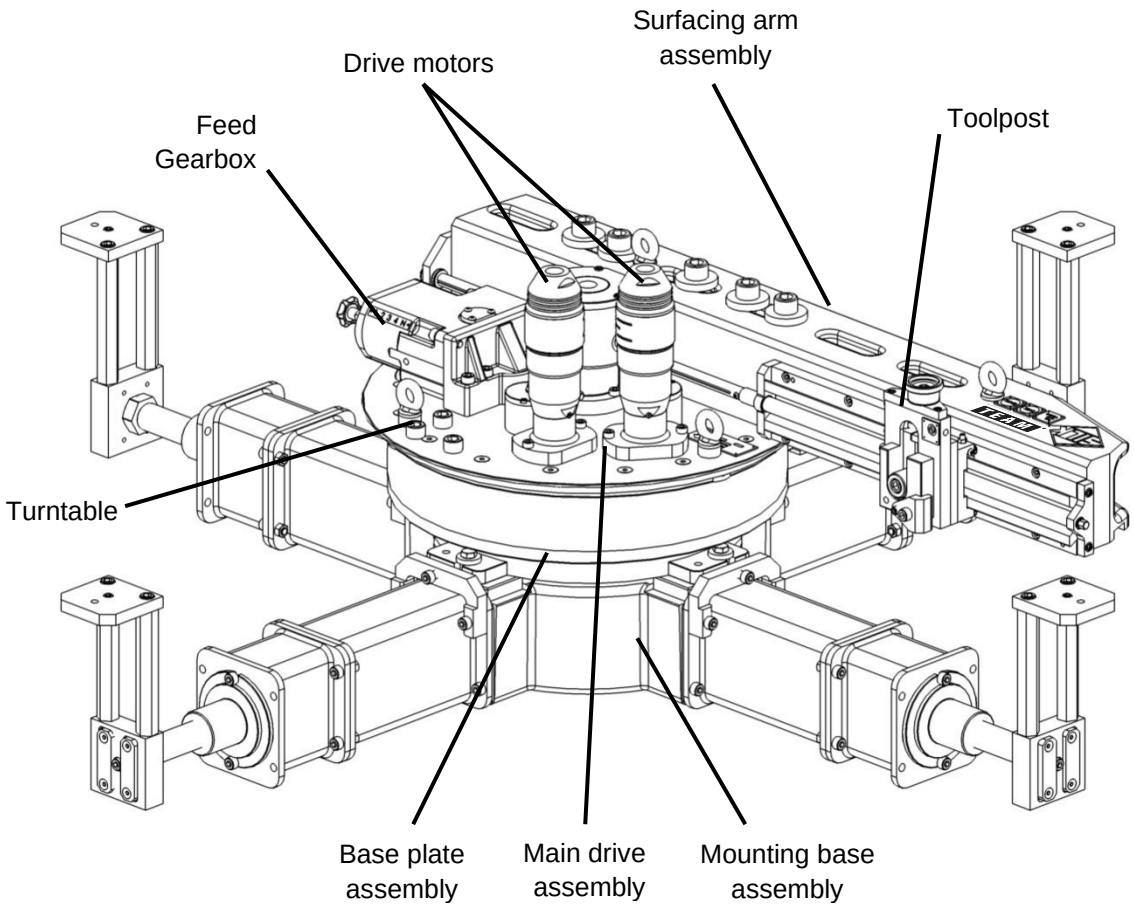


Fig. 29 SX28-72 Flange Facing Machine – main assemblies

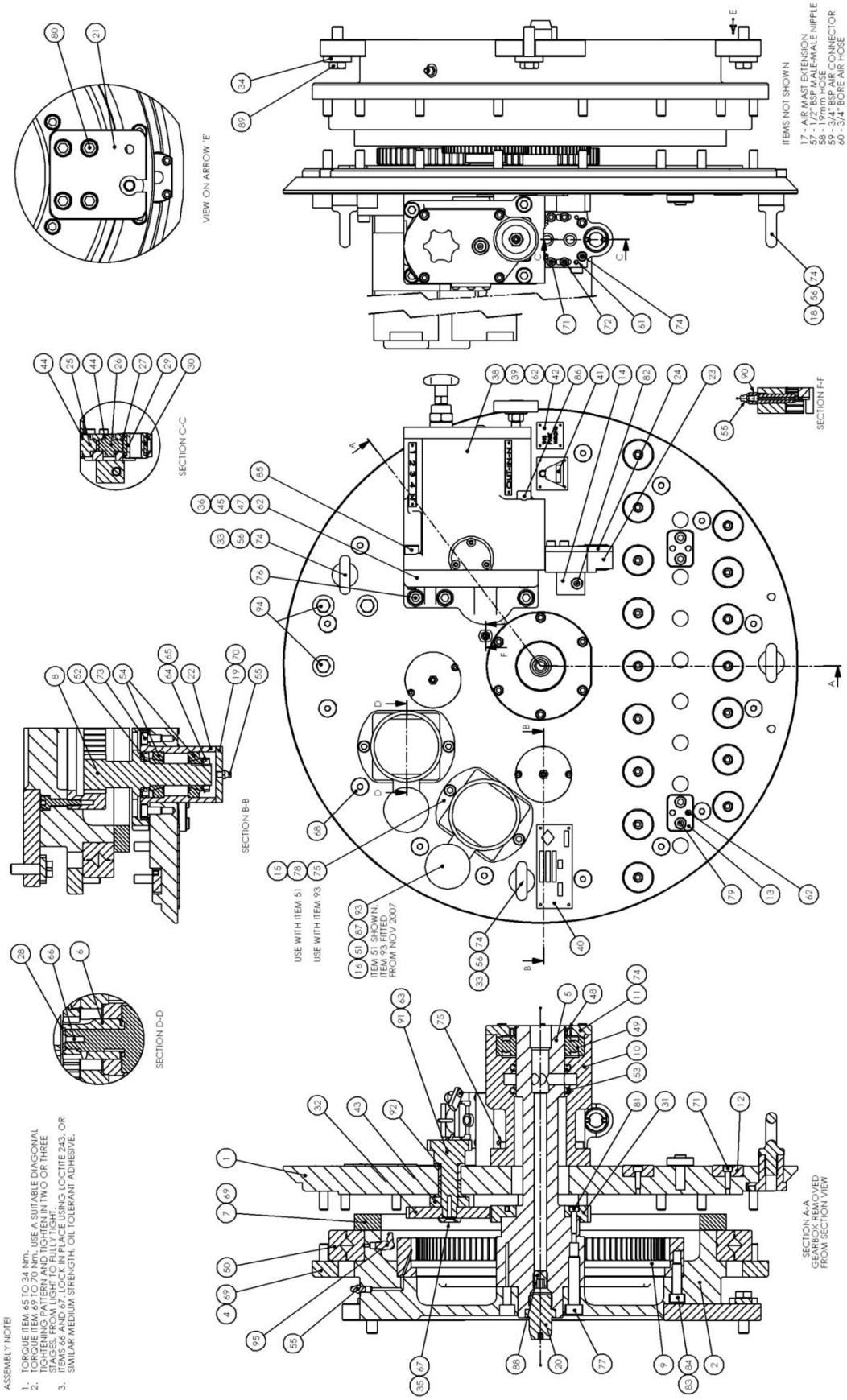


Fig. 30 Main drive assembly

8.1 MAIN DRIVE ASSEMBLY

Refer to Fig. 30.

ITEM No.	PART No.	QTY	DESCRIPTION
1	KE5083-00-02-001	1	TURNTABLE
2	KE5083-00-02-002	1	MOUNTING PLATE
3	KE5083-00-02-003	1	OUTER RACE HOUSING
4	KE5083-00-02-004	1	OUTER RACE PRESSER FLANGE
5	KE5083-00-02-005	1	CENTRE MAST
6	KE5083-00-02-006	2	MOTOR SHAFT GEAR
7	KE5083-00-02-007	1	INNER RACE PRESSER FLANGE
8	KE5083-00-02-008	2	DRIVE SHAFT WITH GEAR AND PINION
9	KE5083-00-02-009	1	MAIN GEAR
10	NFY 0502	1	DRIVE HUB
11	NFY 0102	1	DRIVE HUB CAP
12	NFY 0107	16	SEATING PADS
13	NFY 0117	2	LOCATION TENON
14	NFY 0118	1	PTO BOX SUPPORT
15	NFY 0503	2	MOTOR MOUNT FLANGE
16	NFY 0504	2	MODIFIED AIR MOTOR FITTING
17	NFY 0509	1	AIR MAST EXTENSION
18	NFY 0122	1	LIFTING BOSS - FLAT SIDE
19	FY 0210	2	CAP FOR HOUSING
20	FY 0212	1	LOCATION SPIGOT
21	FY 0213A	4	MOUNT PLATE PADS
22	FY 0209	2	BEARING HOUSING
23	CP 0125	1	PTO BOX
24	CP 0126	1	PTO BOX LID
25	CP 0127	1	16T TRANSFER GEAR
26	CP 0128	1	17T TRANSFER GEAR
27	CP 0130	2	TRANSFER BOX BUSH
28	CP 0229	2	CAPTIVE WASHER
29	CP 0304	2	STRADDLE KEY
30	CP 0305	1	PICK UP GEAR
31	CP 0103	1	70T MAST GEAR
32	CP 0105	1	TRANSFER GEAR
33	CP0120	2	LIFTING BOSS
34	CP 0123	4	THICK WASHER
35	CP 0131	1	CAPTIVE WASHER
36	CP 0132	1	GEARBOX MOUNTING BRACKET
37	CP 0133	1	30T TRANSFER GEAR - DELETED
38	CP 2000	1	COMMON GEARBOX

39	CP 0272	1	40T INPUT GEAR WITH BOSS
40	CP 0830	1	MODEL & SERIAL NO. PLATE
41	CP 0839	1	WEIGHT BADGE
42	CP 0840	1	THIS PART WEIGHS BADGE
43	FW 0123	1	SPACER
44	---	4	3/8" ID x 9/16" OD x 1/4" LG BUSH
45	---	1	3/4" ID x 1" OD x 3/4" LG BUSH
46	---	1	3/4" ID x 1" OD x 1 1/4" LG BUSH - DELETED
47	---	1	5/8" ID x 7/8" OD x 3/4" LG BUSH
48	---	1	OIL SEAL
49	---	1	DEEP GROOVE BALL BEARING
50	---	1	MAIN BEARING
51	---	2	AIR MOTOR
52	---	2	OIL SEAL
53	---	2	PTFE SEAL
54	---	4	TAPER ROLLER BEARING
55	---	4	GREASE NIPPLE M8
56	---	3	COLLAR EYE BOLT M16
57	---	2	1/2" BSP MALE/MALE NIPPLE
58	---	2	19mm HOSE
59	---	1	3/4" BSP Q/R AIR CONNECTOR
60	---	1	3/4" BORE x 2m LG FLEXIBLE AIR HOSE
61	---	2	DOWEL PIN 4 x 16 LG
62	---	8	DOWEL PIN 1/4" x 1" LG
63	---	2	1/8" SQ. X 1/2" LG KEY
64	---	2	M25 WASHER
65	---	2	M25 NUT
66	---	2	CSK SOC SCR M6 x 25 LG
67	---	1	CSK SOC SCR M6 x 20 LG
68	---	16	CSK SOC SCR M10 x 50 LG
69	---	32	LOW HEAD SOC CAP SCR M10 x 30 LG
70	---	4	SOC CAP SCR M4 x 12 LG
71	---	18	SOC CAP SCR M6 x 20 LG
72	---	2	SOC CAP SCR M6 x 50 LG
73	---	8	SOC CAP SCR M8 x 16 LG
74	---	17	SOC CAP SCR M6 x 16 LG
75	---	10	SOC CAP SCR M8 x 35 LG
76	---	3	SOC CAP SCR M10 x 60 LG
77	---	6	SOC CAP SCR M12 x 55 LG
78	---	4	SOC CAP SCR M8 x 40 LG
79	---	4	SOC CAP SCR M8 x 20 LG
80	---	16	SOC CAP SCR M12 x 25 LG
81	---	6	SOC CAP SCR M6 x 25 LG
82	---	1	SOC CAP SCR M8 x 90 LG

83	---	12	SOC CAP SCR M10 x 55 LG
84	---	4	SOC CAP SCR M10 x 35 LG
85	---	1	SOC CAP SCR M10 x 40 LG
86	---	3	SOC CAP SCR M10 x 100 LG
87	---	8	SOC CAP SCR 5/16" UNF x 7/8" LG
88	---	1	SOC SET SCR M16 x 20 LG
89	---	4	HEX SCR M10 x 35 LG
90	KE5083-00-02-010	1	LUBRICATION ADAPTOR
91	KE5083-00-02-011	1	30T TRANSFER GEAR
92	---	2	3/4" ID x 1" OD x 3/4" LG BUSH
93	---	2	AIR MOTOR
94	---	3	SOC CAP SCR M16 x 25 LG
95	---	1	90° GREASE NIPPLE M8
96	FY 0168	1	VERTICAL LIFTING BRACKET
97		1	SOC CAP SCR M16 x 40 LG

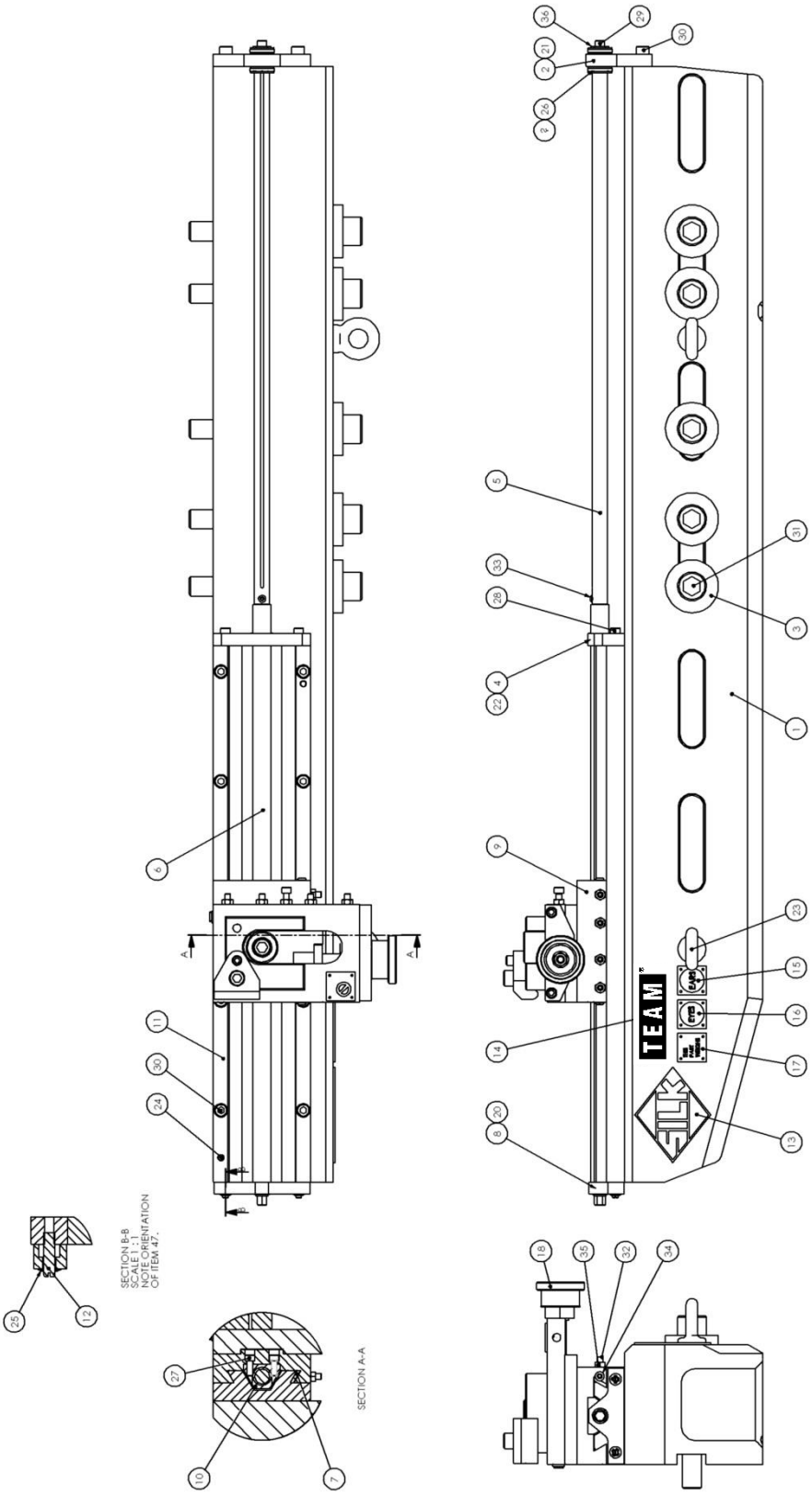


Fig. 31 Surfacing arm assembly

8.2 SURFACING ARM ASSEMBLY

Refer to Fig. 31.

ITEM No.	PART No.	QTY	DESCRIPTION
1	NFY 0104	1	BACKING RAIL
2	NFY 0111	1	END CAP
3	NFY 0114	6	ARM RETAINING WASHER
4	NFY 0121	1	END CAP
5	NFY 0320	1	LEADSCREW DRIVE SHAFT
6	NFY 0321	1	LEADSCREW
7	CP 0145	1	GIB STRIP - CUT TO 5" LENGTH
8	CP 0302	1	DOVETAIL END CAP
9	CP 0306	1	CARRIAGE
10	CP 0317	1	LEADSCREW NUT
11	CP 0321	1	SLIDEWAY
12	CP 0323	2	PUSH OFF STUD
13			DELETED
14	CP 0819	1	TEAM® BADGE
15	CP 0831	1	EAR DEFENDER BADGE
16	CP 0832	1	EYE PROTECTION BADGE
17	CP 0840	1	THIS PART WEIGHS BADGE
18	CP 6000	1	COMMON TOOLPOST
19	FXB 0305	2	THRUST BEARING PROTECTOR RING
20	---	1	OILITE BUSH
21	---	1	OILITE BUSH
22	---	1	GLACIER BUSH
23	---	2	M16 COLLAR EYEBOLT
24	---	2	DOWEL PIN M6 x 24 LG
25	---	2	PUSH-ON FASTENER
26	---	2	THRUST BEARING
27	---	4	SOC CAP SCR M6 x 16 LG
28	---	2	SOC CAP SCR M6 x 20 LG
29	---	1	SOC CAP SCR M6 x 25 LG
30	---	12	SOC CAP SCR M8 x 20 LG
31	---	6	SOC CAP SCR M20 x 160 LG
32	---	4	SOC SET SCR M6 x 25 LG
33	---	1	BUTTON HEAD SOC SCR M4 x 16 LG
34	---	2	BUTTON HEAD SOC SCR M5 x 10 LG
35	---	4	HEX NUT M6
36	---	1	PLAIN WASHER 1/4" x 3/4"

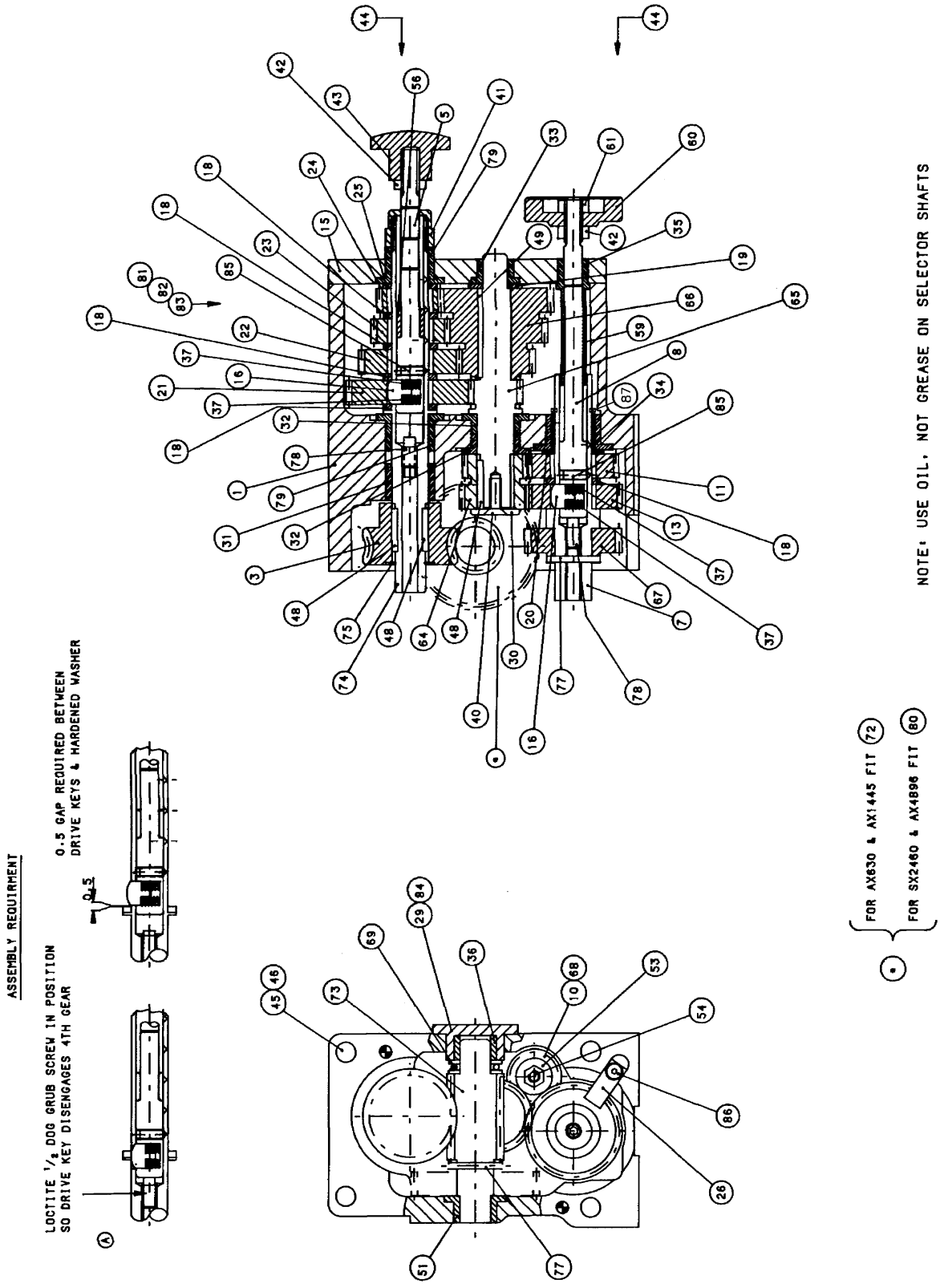


Fig. 32 Gearbox assembly

8.3 GEARBOX ASSEMBLY

Refer to Fig. 32.

ITEM No.	PART No.	QTY	DESCRIPTION
1	CP 0200	1	GEARBOX CASING
3	CP 0202	1	WORMWHEEL
5	CP 0204N	1	INPUT SELECTOR SHAFT (1,2,3,4,N)
7	CP 0206	1	OUTPUT SHAFT
8	CP 0207	1	SELECTOR SHAFT OUTPUT SHAFT IN, OUT,N
10	CP 0209	1	REVERSE GEAR 16T
11	CP 0210	1	REVERSE GEAR 28T
13	CP 0212	1	DRIVE GEARS 30T
15	CP 0214	1	GEARBOX COVER PLATE
16	CP 0215	2	DRIVE KEYS
18	CP 0217	5	THRUST WASHER
19	CP 0218	1	SPACER WASHER
20	CP 0219	1	STRIPPER BUSH
21	CP 0220	1	INPUT GEAR 40T
22	CP 0221	1	INPUT GEAR 32T
23	CP 0222	1	INPUT GEAR 24T
24	CP 0223	1	GEAR 20T IN - OUT
25	CP 0217A	1	THRUST WASHER
26	CP 0230	1	OUTPUT SHAFT RETAINER
29	CP 0228	1	WORMSHAFT HOUSING EBARING
30	CP 0229	1	CAPTIVE WASHER
31	---	1	BUSH 1" OD x 3/4" ID x 3/4" LG
32	CP 0275	2	BUSH 1" OD x 3/4" ID x 3/4" LG
33	---	1	BUSH 3/4" OD x 1/2" ID x 1/2" LG
34	CP 0276	1	BUSH 1-1/8" OD x 7/8" ID x 3/4" LG
35	CP 0277	1	BUSH 5/8" OD x 3/8" ID x 5/8" LG
36	---	1	BUSH 7/8" OD x 5/8" ID x 3/4" LG
37	CP 0215A	4	DRIVE KEY SPRING
40	---	1	HEX SOC HEAD CSK SCREWS M6 x 16
41	CP 0240	1	INPUT SHAFT NUT 3/4" UNF
42	---	2	LOCKNUT 3/8" UNC x 9/16" A/F
43	CP 0242	1	KNOB
44	---	4	GEARBOX COVER SCREWS - HEX SOC HEAD CAP SCREW M6 x 25
45	---	3	GEARBOX FIXING BOLT - HEX SOC HEAD CAP SCREW M10 x 100
46	---	1	GEARBOX FIXING BOLT - HEX SOC HEAD CAP SCREW M10 x 40
48	---	3	KEY 1/8" SQ. x 7/8" LONG
49	---	2	KEY 3/32" x 1/8" x 1.687" LONG

51	CP 0278	1	BUSH 7/8" OD x 5/8" ID x 1/2" LG
52	---	3	WORMSHAFT BEARING HOUSING - HEX SOC HEAD CAP SCREW M5 x 10
53	CP 0252	1	SPINDLE - 16T REVERSE GEAR
54	---	1	HEX SOC HEAD CAP SCREW M6 x 35
56	CP 0255	1	RETAINING SLEEVE
59	CP 0258	1	GEAR SELECTOR SHAFT/STOP SLEEVE
60	CP 0259	1	KNOB
61	---	1	THIN HEX NUT 3/8" UNC
64	CP 0262	1	DOUBLE GEAR 22T/20T
65	CP 0263	1	16T GEAR ON INTERMEDIATE GEAR SHAFT
66	CP 0264	1	GEAR STACK 24T/32T/36T
67	CP 0265	1	30T DRIVE GEAR WITH BOSS
68	---	1	THRUST WASHER
69	---	1	SINGLE DIRECTION THRUST BALL BEARING
72	CP 0272	1	40T INPUT GEAR WITH BOSS
73	CP 0273	1	WORMSHAFT
74	CP 0274N	1	INPUT SHAFT (1,2,3,4,N)
75	---	1	EXTERNAL CIRCLIP 16mm
77	---	2	0.125" DIA ROLL PIN x 1" LG
78	---	2	SKT SETSCREW - DOG POINT M8 x 16
79	---	2	BUSH 1" OD x 3/4" ID x 3/4" LG
80	CP 0271	1	24T INPUT GEAR WITH BOSS
81	CP 0802	1	LABEL FOR FXB630 OUT-IN-N
82	CP 0807	1	LABEL FOR AS48-96/AX24-60/AX12-45
83	CP 0855	1	LABEL 1-2-3-4-N
84	---	3	BUTTON HEAD SKT SCREW M5 x 12
85	---	2	SPRING PLUNGER M5
86	---	1	HEX SOC HEAD CSK SCREWS M4 x 15
87	---	1	EXTERNAL SNAP RING

Items 2, 4, 6, 9, 12, 14, 17, 27, 28, 38, 39, 47, 59, 55, 57, 58, 62, 63, 70, 71 and 76 not used

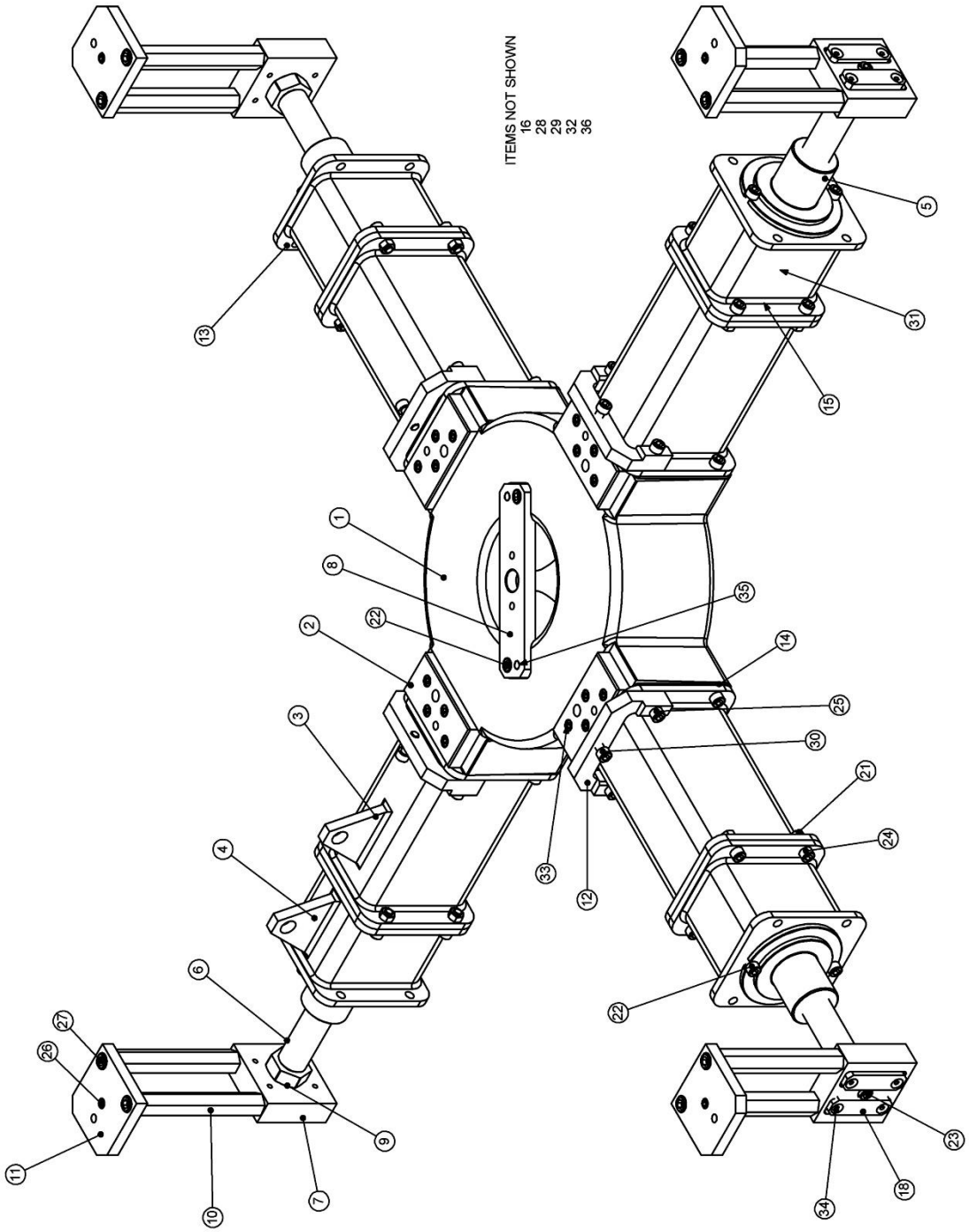


Fig. 33 Base assembly

8.4 BASE ASSEMBLY

Refer to Fig. 33.

ITEM No.	PART No.	QTY	DESCRIPTION
1	NFY 0400	1	CAST BASE
2	NFY 0401	4	BASE PAD
3	NFY 0403	4	LONG EXTENSION LEG
4	NFY 0402	4	SHORT EXTENSION LEG
5	NFY 0404	4	THREADED COLLAR
6	NFY 0408	4	RAM BOLT
7	NFY 0409	4	JAW HEAD
8	NFY 0410	1	CENTRAL TIE BAR
9	NFY 0411	4	SWIVEL WASHER
10	NFY 0412	8	SETTING STRAP LEG
11	NFY 0413	4	SETTING STRAP PLATE
12	NFY 0417	4	PUSHER PLATES
13	NFY 0418	2	LIFTING PLATE (WELDED TO EXT. LEGS)
14	NFY 0419	4	BASE END PROTECTORS
15	NFY 0420	8	LOCATION BOSS
16	NFY 0421	1	19mm TEE SPANNER
17	---		---
18	CP0415	8	MODIFIED VICE JAW
19	---	---	---
20	---	---	---
21	---	16	M10 NUTS
22	---	10	M10 x 20 SHCS
23	---	4	M10 x 25 SHCS
24	---	32	M10 x 30 SHCS
25	---	8	M10 x 55 SHCS
26	---	4	M12 x 16 SHSS (1/2 DOG POINT)
27	---	8	M12 x 30 SHCS
28	---	4	M12 x 40 SHCS
29	---	4	M16 COLLAR EYEBOLTS
30	---	4	M10 x 40 SHCS
31	---	8	M6 x 16 SHCS
32	---	8	M6 x 16 CSK HS
33	---	16	M8 x 30 SHCS

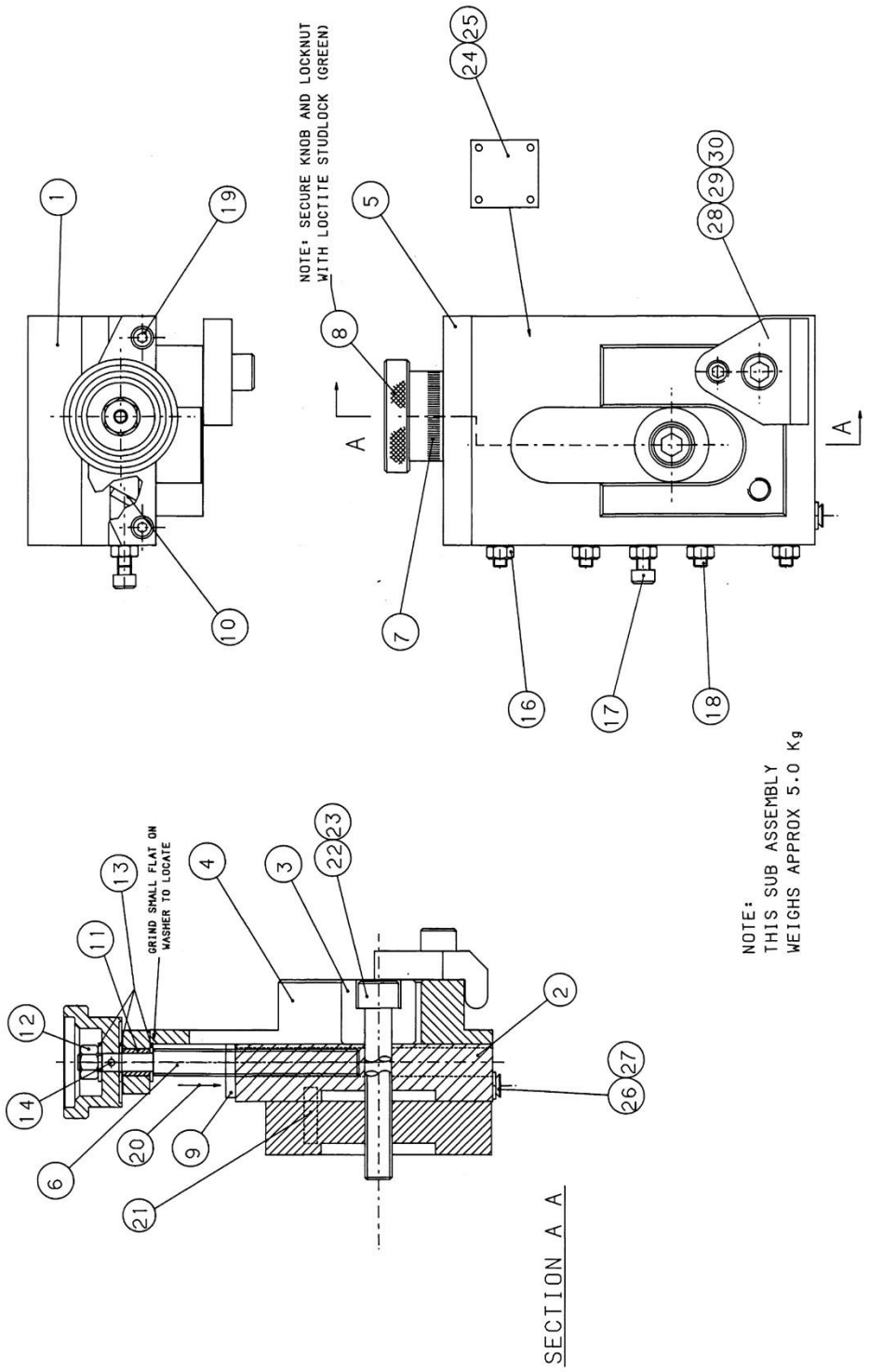
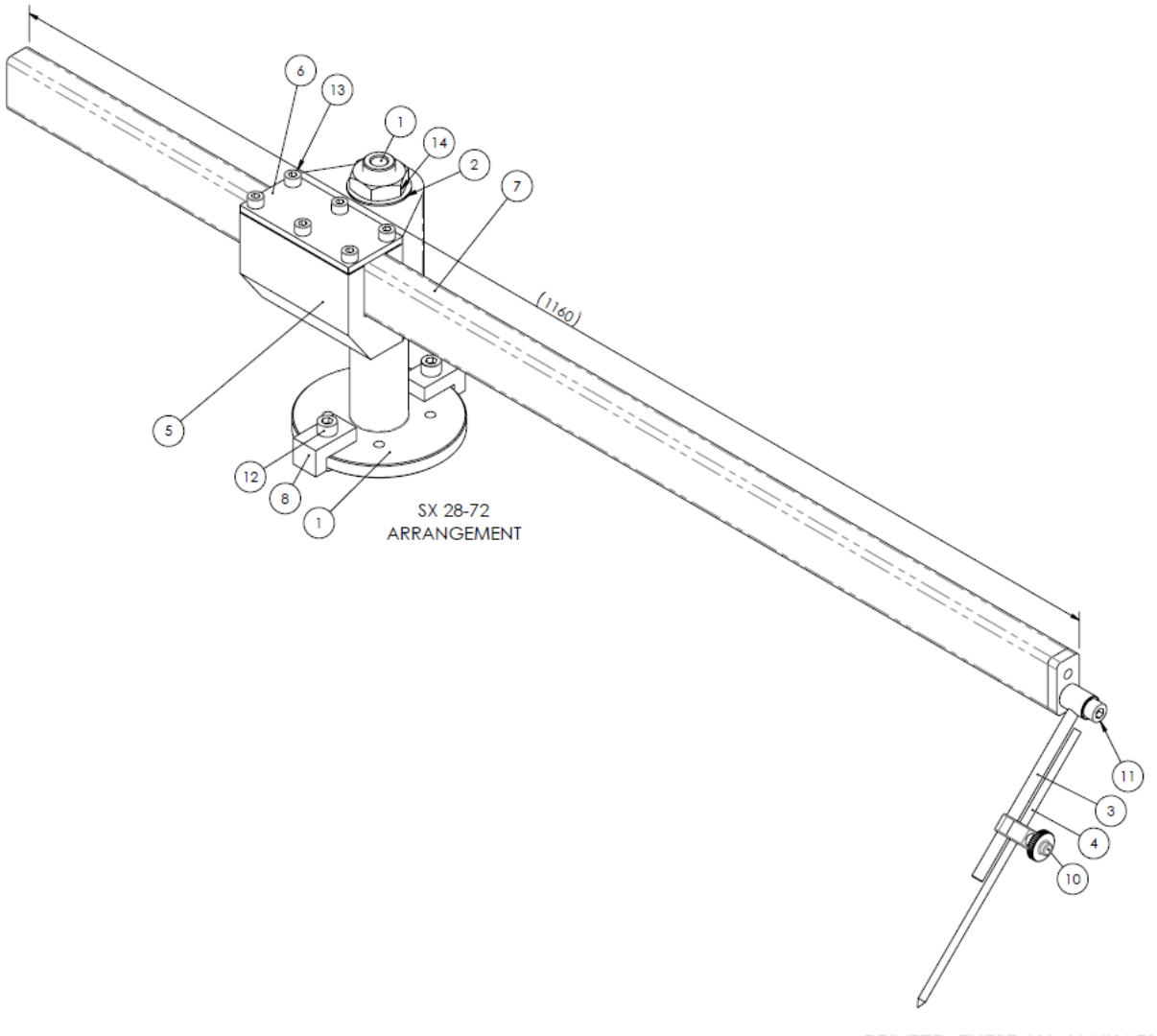


Fig. 34 Toolpost assembly

8.5 TOOLPOST ASSEMBLY

Refer to Fig. 34.

ITEM No.	PART No.	QTY	DESCRIPTION
1	FXB 0313	1	PACKING PLATE
2	CP 0307	1	SWIVEL PLATE
3	CP 0315	1	TOOLPOST STOP
4	CP 0308	1	TOOLPOST
5	FXB 0309	1	TOOLPOST END PLATE
6	FXB 0302	1	TOOLPOST LEADSCREW
7	FXB 0300	1	TOOLPOST GRADUATION
8	FXB 0301	1	TOOLPOST KNOB
9	FXB 0303	1	TOOLPOST NUT
10	FXB 0306	1	GIB STRIP
11	AM0812 X 12	1	TOOLPSOT BUSH
12	---	1	M8 NYLOCK TOOLPOST LOCKNUT
13	---	3	M8 PLAIN WASHER (THRUST)
14	---	1	TOOLPOST DOWEL PIN
15	---	---	---
16	---	5	M6 HEX NUTS
17	---	1	M6 x 30 SOC CAP SCR
18	---	4	M6 x 25 SOC SET SCR
19	---	2	M6 x 25 SOC CAP SCR
20	---	2	M5 x 0.8 PITCH x 15
21	---	2	DIA 6 x 25 DOWEL PINS
22	---	1	M12 x 70 SOC CAP SCR
23	---	1	M12 x 50 SOC CAP SCR
24	CP 0833	1	TOOLPOST WARNING PLATE
25	---	4	BADGE RIVETS
26	---	1	GIB STRIP RETAINING SCREWS
27	---	1	GIB STRIP RETAINING WASHER
28	CP 0162	1	TOOL CLAMP
29	---	1	M10 x 30 SOC CAP SCR
30	---	1	M10 x 20 SOC SET SCR



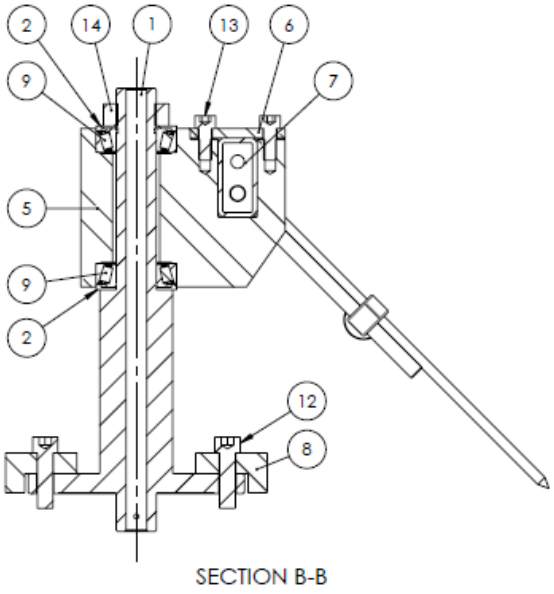


Fig. 35 Base centraliser

8.6 BASE CENTRALISER

Refer to Fig. 35.

ITEM No.	PART No.	QTY	DESCRIPTION
1	FY 0436	1	CLOCKING MAST
2	CP 0136	2	BEARING DUST COVER
3	CP 0416	1	CLOCK MOUNT
4	CP 0417	1	CLOCKING SPIKE
5	CP 0420	1	CLOCKING TOWER BEARING BLOCK
6	CP 0421	1	CLOCKING MAST BEARING BLOCK CLAMP PLATE
7	CP 0422B	1	SX 28-72 CLOCKING ARM
8	BFK 0104	2	CLOCKING TOWER FINGER CLAMP
9	BRG-01000-512-07-X-S	2	TAPERED ROLLER BEARING, Ø1X2X1-0.59"
10	-	1	1/4" X 3/8" KNUCKLE
11	SCRM010-040-01-12-07	1	SCREW HEX SKT HD CAP, M10X40X1.5, ISO 4762 GR12.9, BL OX
12	SCRM010-035-01-12-07	2	SCREW HEX SKT HD CAP, M10X35X1.5, ISO 4762 GR12.9, BL OX
13	SCRM008-020-01-12-07	6	SCREW HEX SKT HD CAP, M8X20X1.25, ISO 4762 GR12.9, BL OX
14	NUT1000-04-01-05	1	HVY HEX JAM NUT, 1" UNF, B18.2.2, ASTM A194 GR 2H ZP

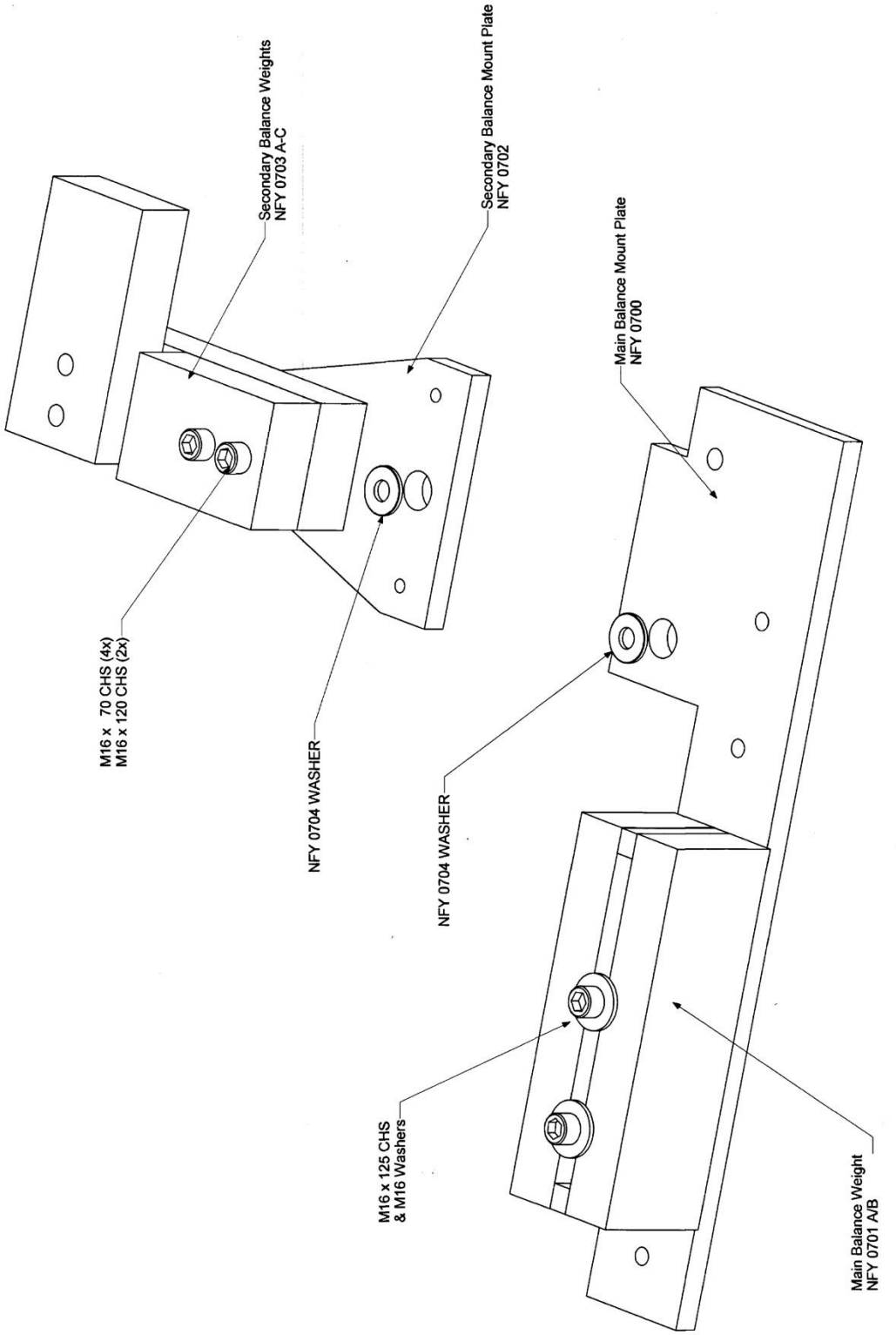

Secondary Balance Weights
NFY 0703 A-C
Secondary Balance Mount Plate
NFY 0702
Main Balance Mount Plate
NFY 0700
M16 x 70 CHS (4x)
M16 x 120 CHS (2x)
NFY 0704 WASHER
NFY 0704 WASHER
M16 x 125 CHS
& M16 Washers
Main Balance Weight
NFY 0701 A/B

Fig. 36 Counter balance

8.7 COUNTERBALANCE

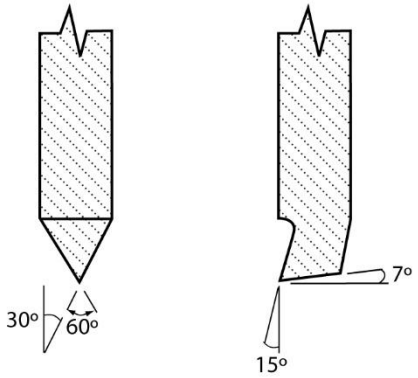
Refer to Fig. 36.

ITEM No.	PART No.	QTY	DESCRIPTION
1	NFY 0700	1	MAIN BALANCE MOUNT PLATE
2	NFY0701A/B	1	MAIN BALANCE WEIGHT
3	NFY 0702	1	SECONDARY BALANCE MOUNT PLATE
4	NFY 0703A-C	1	SECONDARY BALANCE WEIGHT
5	NFY 0704	2	BALANCE WEIGHT WASHER
6	---	3	SOC CAP SCREW M16 x 130 LG
7	---	2	SOC CAP SCREW M16 x 75 LG
8	---	2	SOC CAP SCREW M16 x 120 LG
9	---	1	SOC CAP SCREW M16 x 45 LG
10	---	2	SOC CAP SCREW M10 x 30 LG
11	---	2	FLAT WASHER M16
12	---	1	VERTICAL LIFTING BRACKET
13	---	1	SOC CAP SCREW M16 x 40 LG

APPENDIX A CUTTING TOOLS AS APPLIED TO PORTABLE MACHINES

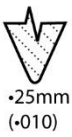
As the flange facing machine is portable and thus lighter and less rigid than its workshop counterpart, the choice of tooling and the rate at which metal can be removed will differ from that used in the workshop. Each operator has his own favourite tool shape, rake and nose radius, etc. The following gives a general guide to tools and their applications when used on a portable machine.

FOR ORDINARY FACING - LARGE OR SMALL CUTS

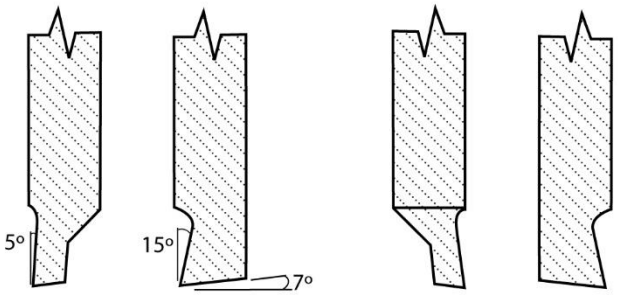


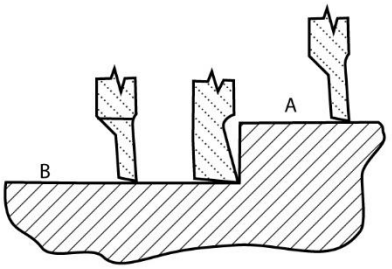
FINE FINISH

DEEP CUTS



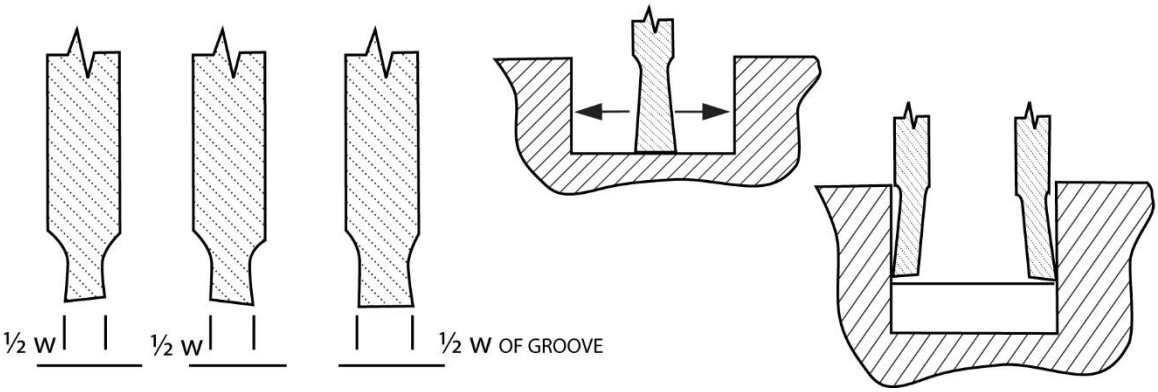
FOR SHOULDER WORK RIGHT AND LEFT HAND





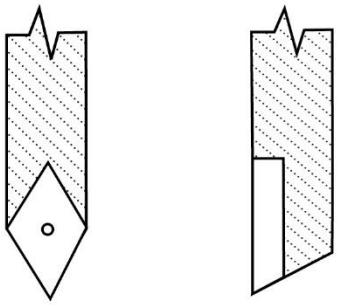
SAME TOOL CAN BE USED TO COMPLETE JOB.
FACES A AND B CAN BE PREVIOUSLY SKIMMED
WITH ORDINARY FACING TOOL.

FOR GROOVING



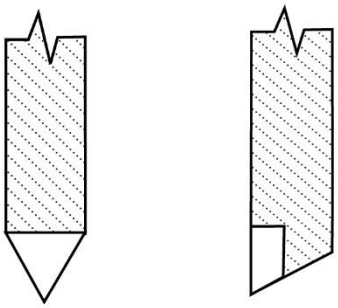
TYPES OF TOOL BIT FOR GENERAL PURPOSE AND FINE FINISH

INDEXABLE TIPS (THROW AWAY)



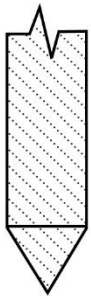
Not good for stock removal as nose diameter is too blunt.

CARBIDE (BRAZED)



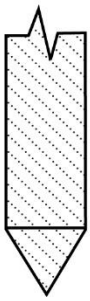
Carbide tools can be ground to stock removal shape but have short life over bolt holes etc.

HIGH SPEED STEEL



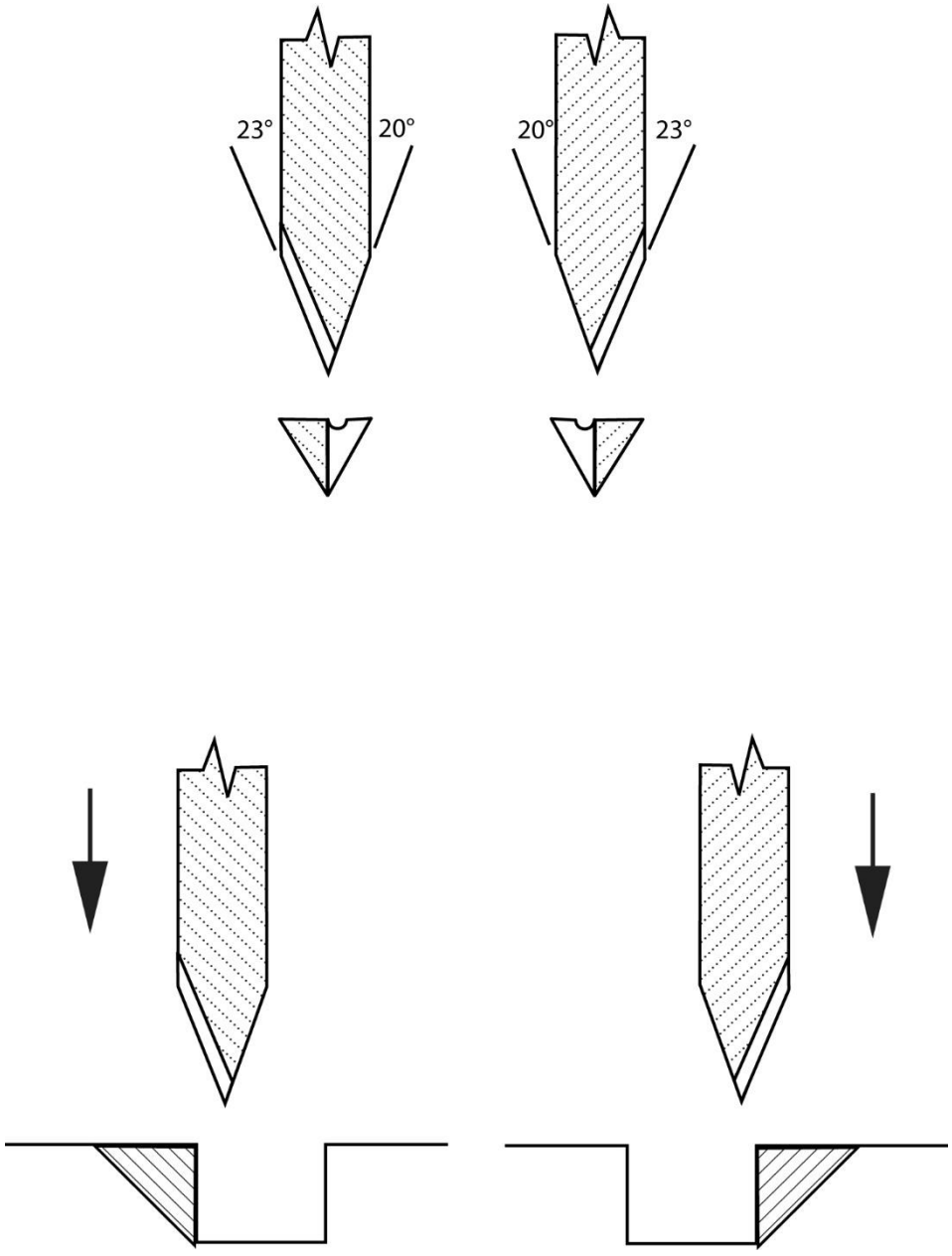
Standard high speed steel has a good life and behaves well on most general purpose work.

A.S.P. 30 (A.S.P. 60)



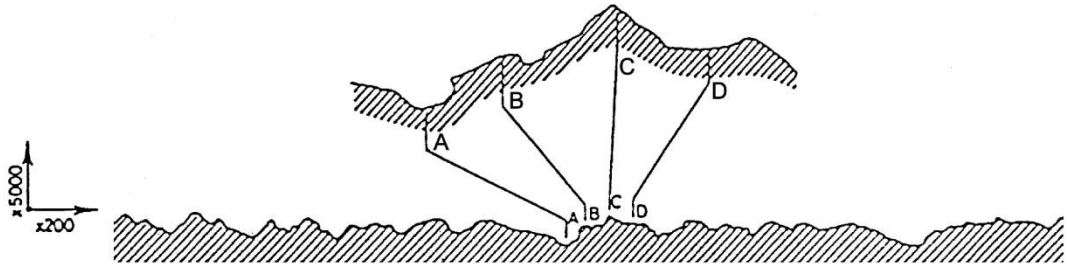
Modern sintered 'high cobalt' tools can be ground as high speed steel but is the only recommended tool material for Inconel and stainlesss steel. Do not use tips.

TOOLS FOR V GROOVE PLUNGE MACHINING

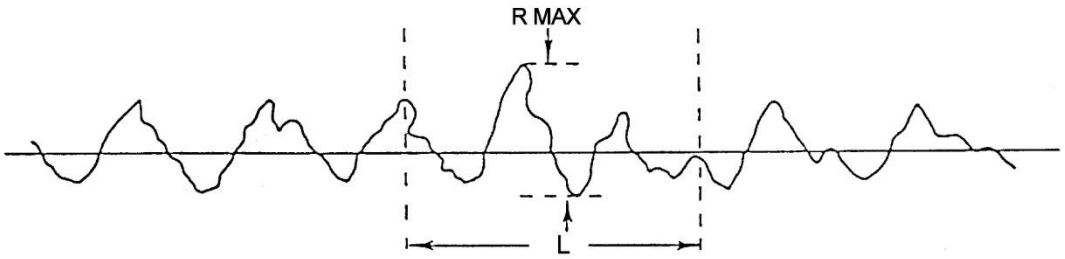


APPENDIX B SURFACE METROLOGY

First profile graphs of roughness texture were produced over fifty years ago by a German Engineer, Gustav Schmalz. His graphs allowed differential magnification of vertical and horizontal axes so that a visual assessment of surface could be made.

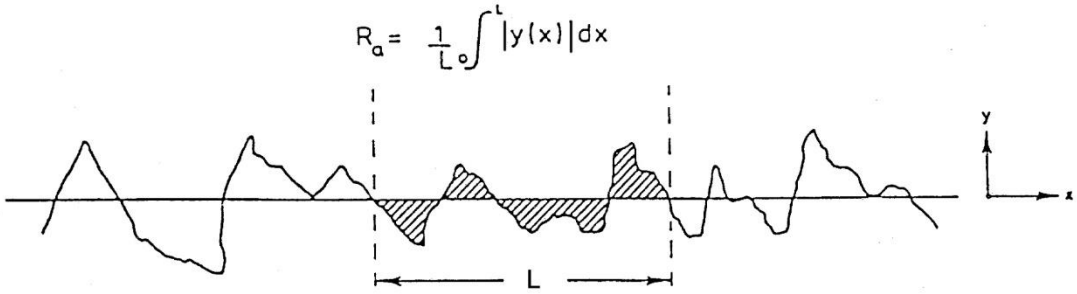


These profile graphs did not provide the direct indications of magnitude required by workshops. Of the usual ways of measuring a wave from the deepest individual roughness depth of surface (R Max) was too dependent on extremes e.g. dirt or scratches.



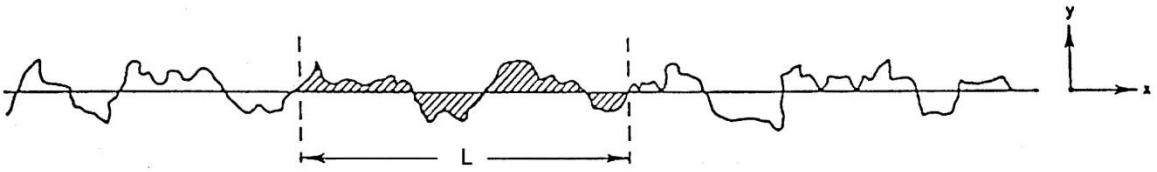
Conventional statistical terms like RMS present instrumental difficulties: The compromise is to use Ra previously known as C.L.A. (Centre Line Average) which can be determined on a purely geometrical basis and easily measured on an electrical instrument.

Ra This is the arithmetic mean of the departure of the profile of the surface from the mean line.



R.M.A. (Rq) Root Mean Square roughness is defined as:

$$R_q = \sqrt{1/2 \int_0^L y^2(x)\, dx}$$

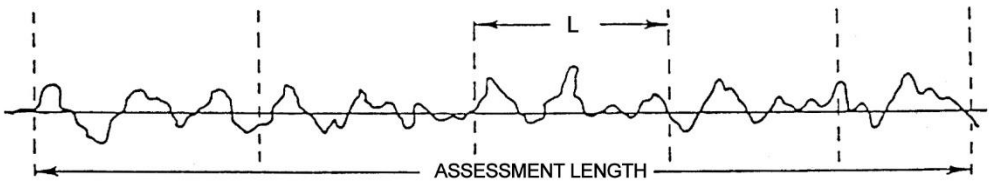


Sampling Lengths (Usually 0.08mrn)

The length over which the mean line is fitted, this allows calculation of some surface parameters.

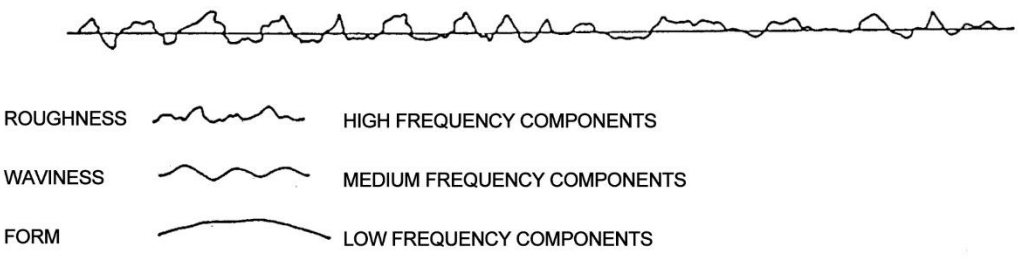
Assessment Length

Assessment length is the total length of surface to be assessed and is the sum of several sampling lengths L.



Surface Form

Most surfaces are made up of three classes of irregularities. These are indicated firstly as a composite surface then as constituent parts.



Micro Roughness

Micro roughness (primary surface) is caused by the cutting action which is a combination of cutting, tearing, and surface fatigue.

Waviness

Waviness (secondary texture) is caused by feed rate of tool, or chatter/vibration.

Form Error

Form error (tertiary texture inaccuracies of machine such as slideway of arm lift.

Components of surface finish are like a ploughed field. Roughness, earth and stones; waviness, ruts left by the plough; form, curve of the field.

The two most common terms now in use are:

Ra, (C.L.A.)	Roughness Average, Centre Line Average
R.M.S. ($\sqrt{}$)	Root Mean Square

The two standards in use today to define these are:

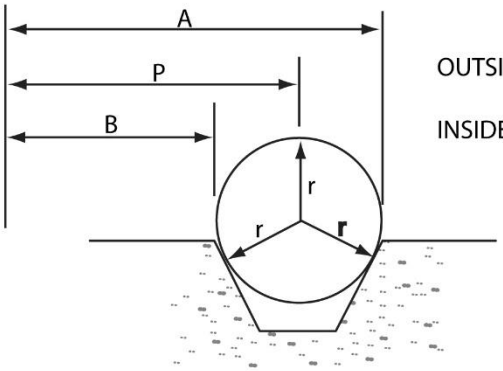
Metric µm	(micro meter)
Imperial 63 $\sqrt{}$	(Root Mean Square)

By either multiplying or dividing the value by 40, conversions between Metric and Imperial can be made.

e.g. $60\sqrt{} = 1.5\ \mu m$

APPENDIX C V-GROOVE MEASUREMENT

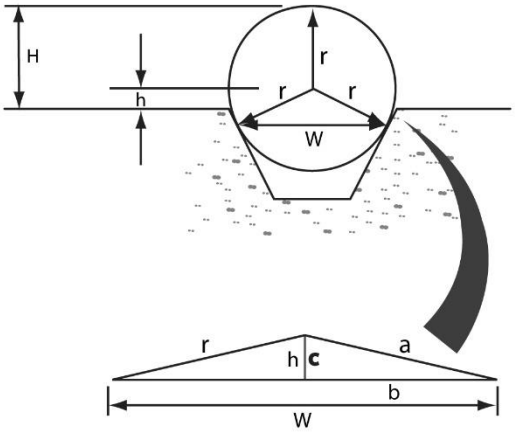
GROOVE DIAMETER (2 x P)



OUTSIDE EDGE OF BALL P = A - r

INSIDE EDGE OF BALL P = B + r

GROOVE WIDTH



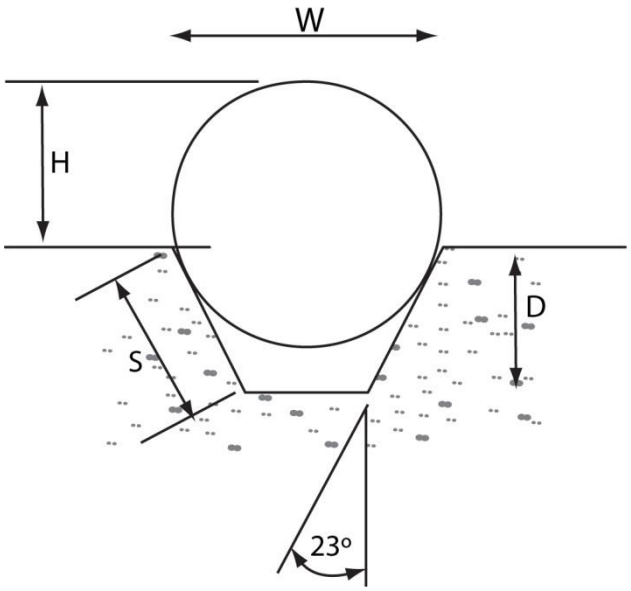
H = r + h
W = REQUIRED WIDTH

∴ TO FIND c
WHERE b = W/2, a = r, c = h

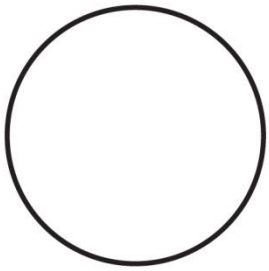
$c = \sqrt{a^2 - b^2}$

∴ H = r + c
∴ FOR KNOWN VALUE W
THERE IS A KNOWN VALUE H

FOR V GROOVE 11.91mm (0.469") WIDTH



$W = 0.468 \pm 0.008$
$D = 0.312^{+0.016}_{-0.000}$
$S = 0.390$ (7.8 TURNS)



MEASURING BALL 0.500"

Height from face to top of ball	Width of groove
H	W
0.350	0.458
0.345	0.462
0.341	0.4633
0.339	0.467
0.3372	0.468

APPENDIX D AIR MOTOR MANUFACTURERS INFORMATION


MT20-PP-RT-15
MT20-PR-15-15-H-CL3
Threadlocker LOCTITE 542
Heat before dismounting
MT20-RT-15-15-H-CL3
Dessiné par: Sylvain Rochette
Date: 05/07/2011
Tolérances générales JS11 js11
Réf. MT20-RT-15-15-H-CL3
Indice: A
Ra. générale 1.6
Désignation: Exploded view for MT20RT0208HCL3F-
Matière:
sauf indication
Traitement:
modec
Ech: 1:1.5
Feuille: A3


MT20-PP-RT-15
MO20-01
SE-MO20-01-RT
MO20-18
Dessiné par: Sylvain Rochette
Date: 16/07/2010
Tolérances générales JS11 js11
Réf. MT20-PP-RT-15
Indice: A
Ra générale 1.6 sauf indication
Désignation: Partie pneumatique RT 15 dts
Matière:
Traitement:
modec
Ech: 1:1
Feuille: A3


SE-MO20-01
MO20-16
MO20-20
MO20-14
MO10-Co13
MO20-12
Cement LOCTITE 603
MO20-Co02
MO20-Co06
Threadlocker LOCTITE 243
Heat before dismounting
SE-MO20-01-RT
Dessiné par: Sylvain Rochette
Date: 16/07/2010
Tolérances générales JS11 js11
Réf. SE-MO20-01-RT
Indice: A
Ra. générale 1.6 sauf indication
Désignation: Bloc pneumatique RT 15 Dts
Matière:
Traitement:
modec
Ech: 1:2
Feuille: A3


MO20-Co14
MO20-26
MO20-35
MO20-36
MO20-Co08
MO20-Co08
MO20-11
MO20-01
Dessiné par: Sylvain Rochette
Date: 16/07/2010
Tolérances générales JS11 js11
Réf. MO20-01
Indice: A
Ra. générale 1.6 sauf indication
Désignation: Corps Pneumatique avec silencieux
Matière:
Traitement:
modec
Ech: 1:2
Feuille: A3


SE-MO20-04
SE-MO20-10
SE-MO20-04
SE-MO20-19
MO10-Co11
MO10-Co09
MO10-Co01
MO20-25-5
LEFT tread
Threadlocker LOCTITE 270
Heat before dismounting
MO20-10
MO10-Co03
MT20-28-6
MT20-PR-15-15-H-CL3
Dessiné par: Sylvain Rochette
Date: 16/072010
Tolérances générales JS11 js11
Réf. MT20-PR-15-15-H-CL3
Indice: A
Ra. générale 1.6 sauf indication
Désignation: Réduction 15-15 Bride H sortie CL3
Matière:
Traitement:
modec
Ech: 1:2
Feuille: A3

APPENDIX E FALL-STOP KIT

1. TECHNICAL DESCRIPTION

Introduction

The TEAM® - Fall-Stop Kit is available as an optional extra to be used with this SX28-72 machine and can be ordered directly from TEAM® or through the distributor. It has been designed using best engineering practice. Its design will give every satisfaction if it is properly installed, operated and maintained in accordance with the information contained within this manual. Take care of this manual; it is an essential source of information for future reference.

Equipment Description

The purpose of this equipment is to prevent the machine it is fitted to from falling inside a vessel, pipe or similar internal opening should the machine and base fixture break loose from the work piece during use.

This equipment is intended for use only as a safety device when machining flanges or similar components over unobstructed, internal openings.

This equipment is intended for use on the following standard TEAM® flange facing machines:

- TEAM® SX28-72

This equipment is not suitable for use in overhead flanges where the machine could fall away from, rather than into the internal opening.

This equipment is not to be used as a lifting attachment or as a counterbalance.

2. SPECIFICATIONS

Principal dimensions

Weight	25kg	55lbs
Length	985mm	38.8”
Width	200mm	7.9”
Height	103mm	4”

3. SAFETY INFORMATION

WARNINGS AND CAUTIONS

GENERAL:

ALL SAFETY PROCEDURES MUST BE OBSERVED AND STRICTLY ADHERED TO WHEN INSTALLING, USING, MAINTAINING AND SERVICING THIS EQUIPMENT.

ONLY TRAINED AND COMPETENT PERSONNEL SHOULD INSTALL, USE, MAINTAIN AND SERVICE THIS EQUIPMENT.

INTENDED USE OF THIS EQUIPMENT:

THIS EQUIPMENT IS FOR USE BY PROFESSIONAL, TRAINED PERSONNEL WORKING IN AN INDUSTRIAL ENVIRONMENT.

THIS EQUIPMENT IS INTENDED FOR USE ONLY ON STANDARD VERSIONS OF THE TEAM® SX28-72 FLANGE FACING MACHINE.

THIS EQUIPMENT IS NOT INTENDED FOR USE ON ANY OTHER MACHINE OR FOR ANY PURPOSE OTHER THAN AS AN FALL-STOP SAFETY DEVICE.

LIFTING:

ENSURE LIFTING IS CARRIED OUT IN A SAFE AND PROPER MANNER, IN ACCORDANCE WITH APPLICABLE HEALTH AND SAFETY REGULATIONS.

ALWAYS KNOW THE WEIGHT OF THE EQUIPMENT AND THE COMPONENT PARTS.

THE USE OF MECHANICAL LIFTING DEVICES MAY BE A MANDATORY REQUIREMENT FOR LIFTING THIS EQUIPMENT.

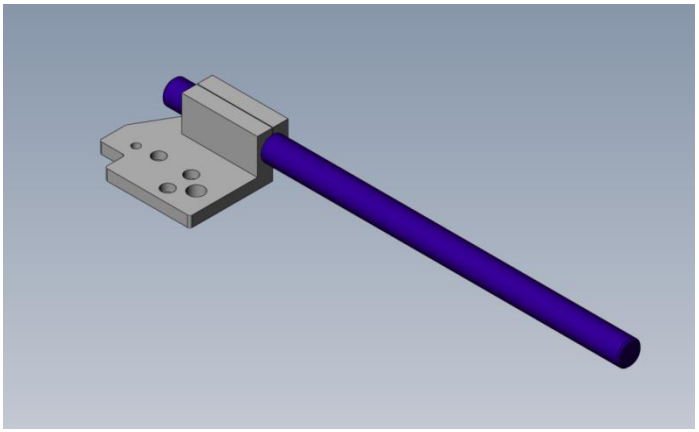
INSTALLATION AND REMOVAL:

THIS EQUIPMENT IS INTENDED TO BE PORTABLE AND MAY BE USED IN A VARIETY OF LOCATIONS AND ORIENTATIONS. ALWAYS ENSURE THAT THIS EQUIPMENT IS PROPERLY SUPPORTED AND RESTRAINED DURING THE INSTALLATION AND REMOVAL PROCESS.

4. INSTALLATION OF THE EQUIPMENT

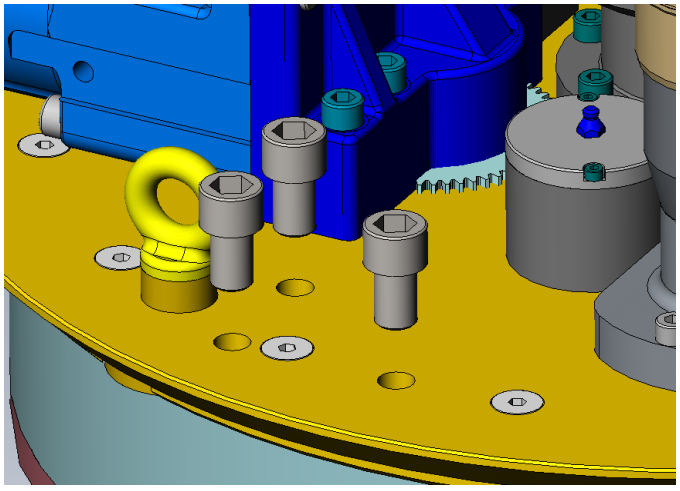
INSTALLATION ONTO THE TEAM® SX28-72 FLANGE FACING MACHINE

Inspect the Fall-Stop Kit and confirm that it is complete and fit for purpose.

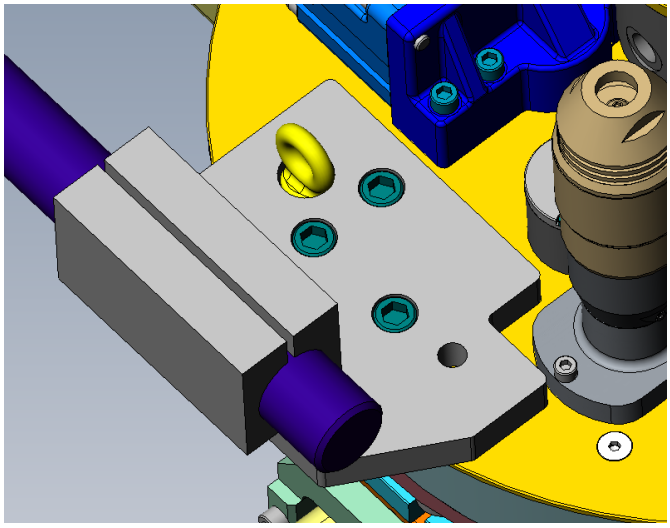


FALL-STOP KIT

Inspect the TEAM® machine turntable in the location where the Fall-Stop Kit will be installed and remove the 3 socket head cap screws that plug the M16 holes (as shown below). To install the Fall-Stop Kit first remove the eye-bolt from the machine turntable.



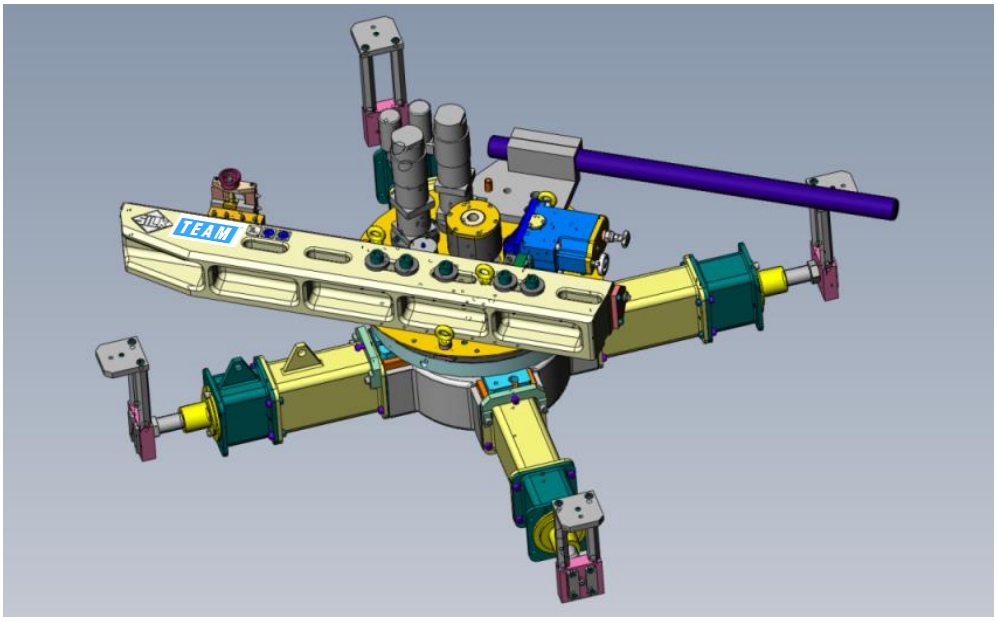
Position the fall-stop kit base plate on the machine turntable and re-fit the eye bolt. Secure the Fall-Stop Kit base plate to the turntable using suitable fasteners and tighten the fasteners and the nut to 60Nm.



NOTE **The fasteners should engage in the threaded hole by at least 25mm.**

Severe damage may result if the fasteners protrude within the body of the machine or are tightened against the main bearing.

Install the bar into the Fall-Stop Kit clamp so it is fully retracted. Lightly nip the clamping screws to prevent the bar from sliding out of the clamp.



5. OPERATION OF THE EQUIPMENT

Proceed to install the machine at the worksite following the procedure in the operator's manual.

DO NOT REMOVE THE MACHINE SETTING PLATES UNTIL THE FALL-STOP KIT HAS BEEN CORRECTLY SET.

Adjust the position of the Fall-Stop Kit bar and the machining arm so that they overhang the work piece sufficiently to prevent the machine from falling into the internal opening should the machine clamping system fail.

When correctly positioned securely tighten the machining arm and Fall-stop Kit clamping screws.

The Fall-Stop Kit is now correctly set.

When the Fall-Stop Kit is not being used the M16 tapped holes in the turntable should be plugged to prevent debris from entering the machine. Failure to do this may result in damage to the internal components of the machine.

Use the fasteners with a thread length of no more than 25mm to plug the M16 holes.

On completion of the work the Fall-Stop Kit must not be removed from the machine turntable until the machine setting plates have been installed.

6. MAINTENANCE INSTRUCTIONS

Introduction

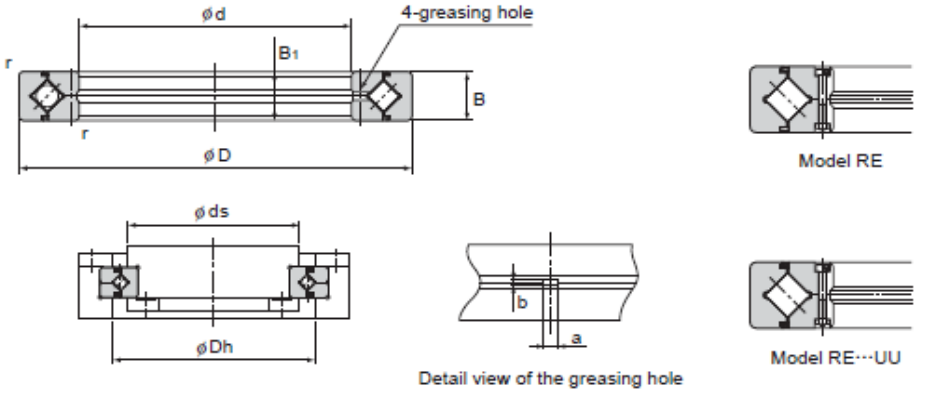
The following information sets out recommendations for the maintenance of this equipment. Periodic maintenance, when carried out as specified, will help to prevent premature failure of the equipment. Should a component fail or its operation become suspect the equipment should not be used until the fault has been rectified.

7. PERIODIC MAINTENANCE

The following maintenance tasks are those required to help prevent premature failure of the equipment. It is recommended that all the tasks should be carried out when specified.

Period	Task
On completion of a job and prior to return to storage	Visual inspection of all components. Replace any worn or damaged parts. Protect parts from corrosion.
Weekly	Visual inspection of all components. Replace any worn or damaged parts.
Yearly, when not in use	Visual inspection of all components.

APPENDIX F BEARING LUBRICATION RU40035UU



Unit: mm

Shaft diameter	Model No.	Main dimensions							Shoulder height		Basic load rating (radial)		Mass
		Inner diameter	Outer diameter	Roller pitch circle diameter	Width	Greasing hole					C	C_0	
		d	D	dp	B B_1	a	b	r_{min}	ds	Dh	kN	kN	kg
400	RE 40035	400	480	440.3	35	5	3	2.5	422	459	156	370	14.5
	RE 40040		510	453.4	40	6	3.5	2.5	428	479	241	531	23.5
450	RE 45025	450	500	476.6	25	3.5	1.6	1	464	484	61.7	182	6.6
500	RE 50025	500	550	526.6	25	3.5	1.6	1	514	534	65.5	201	7.3
	RE 50040		600	548.8	40	6	3	2.5	526	572	239	607	26
	RE 50050		625	561.6	50	6	3.5	2.5	536	587	267	653	41.7
600	RE 60040	600	700	650	40	6	3	3	627	673	264	721	29

Note) The model number of a type with seals attached is RE···UU.
If a certain level of accuracy is required, this model is used for outer ring rotation.

Model number coding

RE50025 UU CC0 P6

- RE50025: Model number
- UU: Seal attached on both ends (seal attached on either end: U)
- CC0: Radial clearance symbol (*1)
- P6: Accuracy symbol (*2)

Detail specifications : RE 40035

Type of guide	Spacer retainer	Type using standard material	Standard grease	Standard lubrication method
Roller	Yes	Iron-based	AFB-LF Grease	Grease Lubrication

Oil hole	General dust prevention measures	Surface Treatment	Radial clearance	Dimensional accuracy
Yes	UU	AP-C, AP-HC, other	CC0, C0, C1	Grade 0(no symbol), grade 6(PE6), grade 5(PE5)

Rotation accuracy	DN value (rough value)	Minimum service temperature Centigrade (°C)	Minimum service temperature Fahrenheit (°F)	Maximum service temperature(Centigrade°C)
Grade 0(no symbol), grade 6(P6), grade 5(P5), grade 4(P4)	80000 (Grease), 100000 (Oil)	-15	5	80

Maximum service temperature(Fahrenheit°F)	Whether it is possible to change to a high temperature type
176	Cannot be supported

APPENDIX G UKCA DECLARATION OF CONFORMITY

SUPPLY OF MACHINERY (SAFETY) REGULATIONS 2008
UKCA DECLARATION OF CONFORMITY

We hereby certify that the machinery stipulated below complies with all the relevant provisions of the Machinery Directive and the National Laws and Regulations adopting this Directive.

Modifications to the machine without prior approval from the undersigned will render this declaration null and void.

Product: Internal Flange Facing and Grooving Machine

Model: AX321 - UKE05828-MTM-06, FXB630 - UKE05828-MTM-03
FP1445 - UKE05828-MTM-05, NFY2872 – UKE05828-MTM-04
FW48120 – UKE05828-MTM-07, FW48180 – UKE06369-MTM-01

Manufacturer: TEAM® Industrial Services Ltd.
Furman House. Shap Road. Kendal. Cumbria. LA9 6RU. England.
Tel No. +44 (0)1539 729009.

Harmonized standards applied, (including parts / clauses of):
EN ISO 12100, EN ISO 13854, EN ISO 14120, EN ISO 4413, EN ISO 4414, EN ISO 7010

National technical standards and specifications applied, (including parts / clauses of):

Non-Harmonized standards applied, (including parts / clauses of):
FMS-9001, FMS-9001-SWI

Signature of responsible person appointed by the manufacturer:

Signature:  Date: 08/11/22

APPENDIX H CE DECLARATION OF CONFORMITY

EC MACHINERY DIRECTIVE 2006/42/EC
CE DECLARATION OF CONFORMITY

We hereby certify that the machinery stipulated below complies with all the relevant provisions of the EC Machinery Directive and the National Laws and Regulations adopting this Directive.

Modifications to the machine without prior approval from the undersigned will render this declaration null and void.

Product: Internal Flange Facing and Grooving Machine

Model: AX321 - UKE05828-MTM-08 , FXB630 - UKE05828-MTM-03
FP1445 - UKE05828-MTM-05, NFY2872 – UKE05828-MTM-04
FW48120 – UKE05828-MTM-07, FW48180 – UKE06369-MTM-01

Manufacturer: TEAM® Industrial Services Ltd.
Furman House. Shap Road. Kendal. Cumbria. LA9 6RU. England.
Tel No. +44 (0)1539 729009.

Authorised Representative; TEAM® Industrial Services NL BV.
Oostsouburgseweg 20, Vlissingen 4380AA, Netherlands.
Tel No. +31 (0)118 485 800.

Harmonized standards applied, (including parts / clauses of):
EN ISO 12100, EN ISO 13854, EN ISO 14120, EN ISO 4413, EN ISO 4414, EN ISO 7010

National technical standards and specifications applied, (including parts / clauses of):

Non-Harmonized standards applied, (including parts / clauses of):
FMS-9001, FMS-9001-SWI

Signature of responsible person appointed by the manufacturer:

Signature: 

Date: 08/11/22