KBM®-28

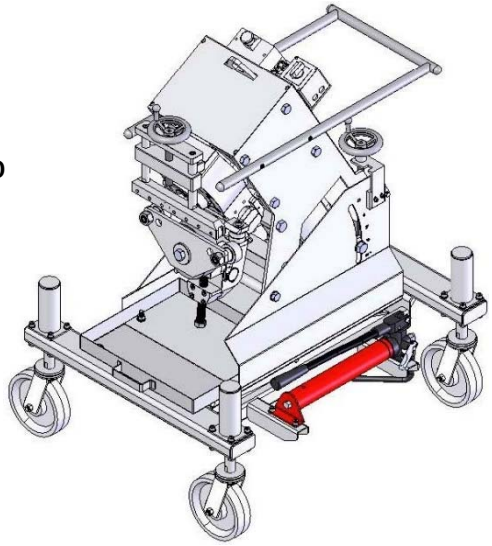
PORTABLE PLATE EDGE BEVELLING MACHINE

Adjustable bevel head produces bevel angles from 22.5º through 55º

Supplied with angle bevel pin for 30º

Other bevel angle pins are available upon request.

NOTE: Machine shipped with the 30º bevel pin in place.



PARTS LIST
&
OPERATING INSTRUCTIONS

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READ BEFORE USING THE KBM®-28 BEVELLER

IMPORTANT NOTES:

All machine operators must be familiar with the Safety Instructions on pages 1 & 2 of this manual before attempting to use the KBM®-28 Beveller.

The machine must be set in accordance with the "Bevel Setting" section of this manual (pages 11 - 16) prior to bevelling or machine / cutter damage will occur.

Bevelling should always be done conservatively. No more than 70% of the machines total bevelling capacity may be bevelled in a single pass. Multi-pass bevelling is required in such instances.

As the bevelling capacity of the machine is reduced on higher tensile materials, no more than 50% of the machines total bevelling capacity should be bevelled in a single pass when bevelling high tensile steel and stainless steel.

TABLE OF CONTENTS

SAFETY INSTRUCTIONS

Although the KBM®-28 bevelling machine is manufactured for safe and dependable operation, it is impossible to anticipate those combinations of circumstances which could result in an accident. An operator of the bevelling machine is cautioned to always practice "**Safety First**" during each phase of operation, setup and maintenance.

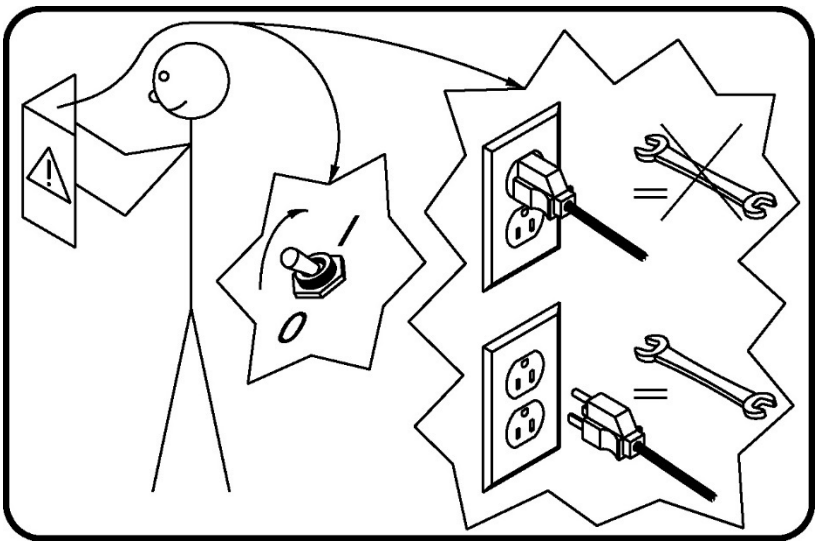
Read and understand the whole operating instruction manual before operating or performing service of this equipment. Become familiar with the machines operation, applications and limitations. Keep the operation manual clean and in a readily available location.

The material feed and cutting areas of this machine are guarded for operator safety as much as the functionality of the equipment will allow. However, it is important to keep hands, clothing, tools etc. away from the feeding and cutting area when there is the slightest possibility of the machine operating. The guards and guarded areas should only be accessed after the power has been positively disconnected.

Each KBM®-28 bevelling machine is equipped with a manual motor starter and protective switch assembly, that features short-circuit and motor load protection. There is also an under-voltage release device that will reset the switch to an off state and will not allow it to be switched on until the power has been re-established and the Start push button is manually activated. This provides protection against unwanted restart after a power failure etc. The Stop push button is the red, raised mushroom button. The start push button is the flush (green or black) push button labelled "**I**". Become familiar with the start/stop switch and its use prior to operating the machine.

It is important to maintain proper balance and footing when feeding plate/material into the machine. Use additional work tables to support the weight when feeding unbalanced or heavy plate material into the machine. It is recommended that work tables have free moving rollers on top and levelled to the proper cutting position. The start/stop switch should always be accessible to the operator.

This machine must not be operated in highly explosive environments.



This label is attached to the Gullco bevelling machine and its intent is to instruct all those concerned to read the manual before operating the unit and before performing service, as well as to positively disconnect the unit from all power supplies before servicing.

SAFETY INSTRUCTIONS CONTINUED

A careless operator invites troubles, and failure to follow safety practices may cause serious injury or even death. Additional important safety precautions are given in the following:

Electrical Shock Prevention

- Do not use this equipment in damp or wet locations.
- Do not expose this equipment to rain.
- Never carry or tow this equipment by the cables or pull the cables to disconnect from the receptacle.
- Keep all cables from heat, oil and sharp edges.
- Inspect all cables periodically and replace if damaged.
- Inspect the security of all cables periodically and repair if loose.
- Disconnect the power cord when not in use.
- Disconnect the power cord **positively** to prevent electrical shock before repair and service of the equipment.
- Report any unsafe condition for immediate correction.

Bodily Injury Prevention

- Only operate this equipment in a well-illuminated environment.
- Do not operate this machine if ill or drowsy from medication or fatigue.
- Avoid horseplay around this machine.
- Keep positioning handles dry, clean and free from oil and grease.
- Do not try to lift the machine by the positioning handle bars or wheel handles; refer to the appropriate section of the manual for correct lifting technique.
- Keep hands away from the cutting area and any possible pinch points when there is the slightest possibility of operation.
- Keep bystanders at a safe distance from the operation area.
- Always wear protective gloves when handling the material and or swarf cuttings, to prevent injury from sharp edges & heat. The swarf is usually very hot immediately after removal.
- Keep the work area clean and clear from clutter.
- Remove all oil and coolant spills.
- Do not wear loose clothing, jewellery and loose, long hair, which may get caught in moving parts.
- As a minimum, safety glasses, safety shoes and leather gloves should be worn.
- Always keep the bevelling machine clean and in good working order.
- Report any unsafe condition for immediate correction.

ALL THE SAFE PRACTICES AND PRECAUTIONS MAY NOT BE GIVEN IN WRITING. SOME ARE BASED ON COMMON SENSE, BUT OTHERS MAY REQUIRE TECHNICAL BACKGROUND TO EXPLAIN.

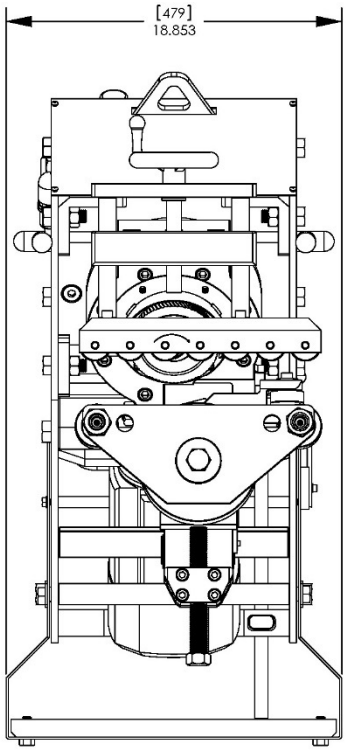
KBM®-28 PLATE EDGE BEVELLING MACHINE DETAILS

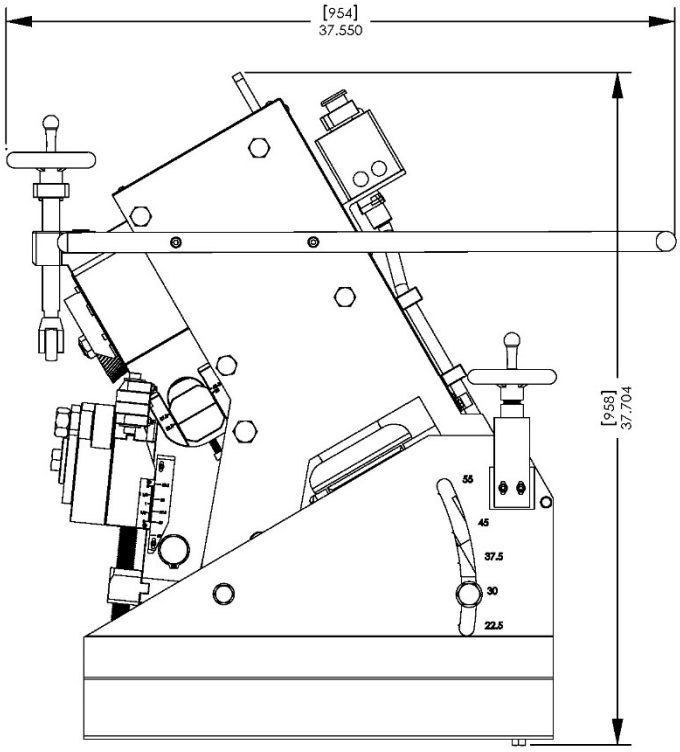
This manual covers the operation instructions, maintenance requirements and provides parts lists for the **Gullco Plate Edge Bevelling Machine**, part number: **KBM®-28-100.**

DECLARATION OF CONFORMITY - CE - designed and manufactured in compliance with 2006/42/EC provisions and further amendments.

MACHINE SPECIFICATIONS

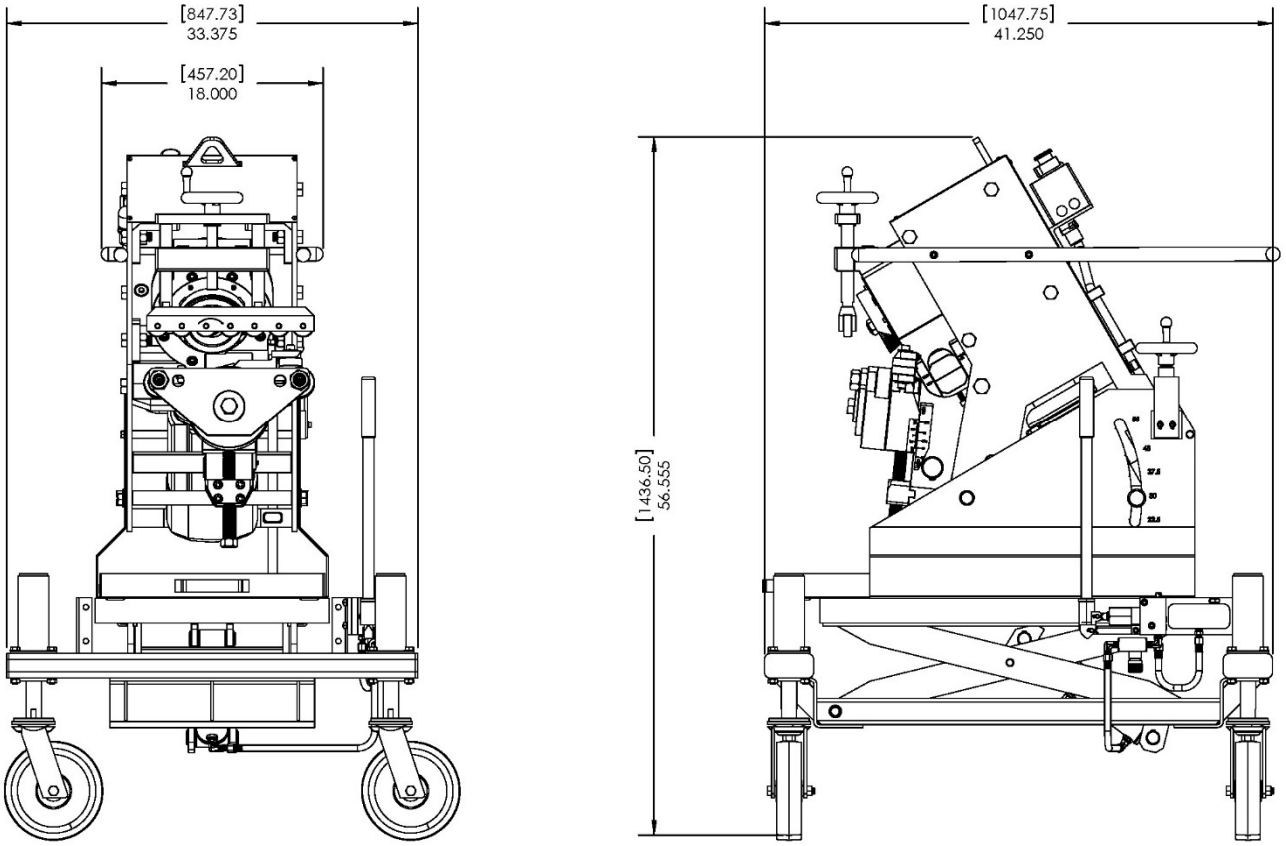
Maximum Bevel Width:	1.10" [28 mm] at standard 30° bevel angle on material with a tensile strength of 64,000 lb/in² [45 Kg/mm²] (multiple passes)
Maximum Bevel Depth:	0.95" [24.2 mm] at standard 30° bevel angle on material with a tensile strength of 64,000 lb/in² [45 Kg/mm²] (multiple passes)
Minimum Plate Thickness:	5/16" (8.0 mm)
Maximum Plate Thickness:	2" (50 mm)
Bevel Speed:	10' [3 m] per minute†
Motor:	3 H.p., 3 phase, available for 230, 460 and 575 V at 60 Hz. and also 380 and 400/415 V at 50 Hz. supply
Gearbox Oil:	4 US Gallons (15 Litres) of Shell Tivela S 320 (See section "Periodic Inspection & Maintenance" for further details)
Weight:	704 lb [319 Kg] without an undercarriage assembly; 979 lb [444 Kg] with KBM®-28-080 undercarriage assembly





† Top speed can vary depending on variations of bevel depth, voltage and frequency.

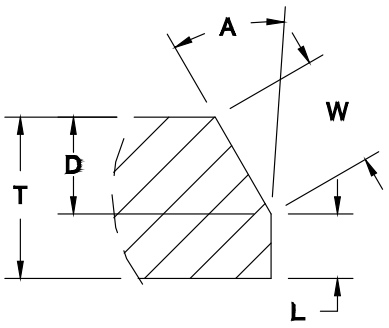
KBM®-28-100 MACHINE + KBM®-28-080 UNDERCARRIAGE



Note: Hydraulic undercarriage may not be as shown.

BEVELLING CAPACITY

The adjacent diagram, indicates the root face (also referred to as nose or land), identified as "L"; the bevel width identified as "W"; the bevel depth identified as "D"; the plate thickness identified as "T"; and the bevel angle identified as "A".



The bevelling capacity of the Gullco KBM®-28 is governed by the following factors:

- Tensile strength of the material.
- Material thickness.
- The bevel angle selected.
- The cutter and operating conditions.
- The operator's skill and experience.

The maximum recommended multiple pass bevelling capacity is provided in the table below.

BEVEL ANGLE	TENSILE STRENGTH 64,000 lbs/in² (45 kg/mm²)		71,000 lbs/in² (50 kg/mm²)		85,000 lbs/in² (60 kg/mm²)	
A	W	D	W	D	W	D
22.5º	1.10” [28.0 mm]	1.02” [25.9 mm]	1.02” [26.0 mm]	0.95” [24.0 mm]	0.91” [23.0 mm]	0.84” [21.3 mm]
30º	1.10” [28.0 mm]	0.95” [24.2 mm]	0.98” [25.0 mm]	0.85” [21.6 mm]	0.89” [22.5 mm]	0.77” [19.5 mm]
37.5º	1.06” [27.0 mm]	0.84” [21.4 mm]	0.98” [25.0 mm]	0.78” [19.8 mm]	0.83” [21.0 mm]	0.66” [16.7 mm]
45º	1.02” [26.0 mm]	0.72” [18.4 mm]	0.95” [24.0 mm]	0.67” [17.0 mm]	0.83” [21.0 mm]	0.58” [14.9 mm]
55º	0.98” [25.0 mm]	0.56” [14.3 mm]	0.91” [23.0 mm]	0.52” [13.2 mm]	0.83” [21.0 mm]	0.47” [12.0 mm]

The bevelling capacity is based on the bevel width "W", which corresponds to the amount of material removed by the cutter. If the maximum bevel width is exceeded, overloading of the machine and cutter may result.

In general, as the tensile strength of the material increases, the bevelling capacity is reduced.

Whenever there is any doubt about the required bevel verses the capacity of the machine, the operator is always urged to bevel conservatively. It is recommended that no more than 70% of the machines total bevelling capacity be bevelled in a single pass, or no more than 50% when bevelling high tensile or stainless steel. If the desired finished bevel is greater than 70% (50% for high tensile and stainless steels) than the capacities shown in the above table, then multi-pass bevelling is required. In order to perform multi-pass bevelling, the bevel depth for the first pass (cut) is performed conservatively (less than 70% or 50% of maximum capacity), and then the bevel depth is re-adjusted to provide the finished depth required for the following pass/passes.

GENERAL DESCRIPTION

The Gullco KBM®-28 Portable Plate Edge Bevelling Machine is an electrically powered rotary shear. It is used to bevel a wide variety of plate edges, usually for the purpose of a weld joint preparation.

It is designed for one-man operation and is capable of bevelling straight or circular plate sections at a speed of approximately 10' [3 m] per minute‡. It is capable of performing multi pass bevelling for larger bevels that cannot be accomplished in a single pass. Easy adjustment is provided for altering the depth and angle of bevel.

A push button, mechanical starter complete with short circuit, motor overload and also under-voltage protection, is used in conjunction with a directional selector switch, to start and stop a 3 H.p., 3 phase motor, which in turn uses a heavy duty industrial type gearbox assembly to drive a serrated cutter. This cutter provides the "Rotary Shearing" as well the tractive effort to propel either the plate through the machine, or the machine along the plate, depending on the application.

The KBM®-28 is typically equipped with an optional undercarriage assembly with individual spring loaded casters that allow the machine to roll along the floor, or runway, during the bevelling operation. Alternatively, the KBM®-28 machine could be bench mounted for applications where the plate sections are small enough to manually feed through the cutter. The adjustable bevelling head enables the bevelling of angles 22.5° through 55°.

The KBM®-28 is available for use with the following power supplies; 230, 460 and 575 V at 60 Hz. and also 380 and 400/415 V at 50 Hz. The supply to be used must be specified at the time of order. Gullco can also provide machines for use with supplies that are not listed above, please consult Gullco for more details.

The KBM®-28 machine comes complete with a tool box which includes the bevel angle pins 22.5°, 30°, 37.5°, 45°, and 55° as well as all of the necessary wrenches and hexagonal keys that are required to make adjustments to the machine.

Note: The machine is shipped from the factory with the 30° bevel angle pin in place.

INTENDED / FORESEEN USAGE

The Gullco KBM®-28 Portable Plate Edge Bevelling machine is used throughout the world to automate and improve the quality and efficiency of the weld preparation required for manual, semiautomatic and fully automatic welding operations.

It provides industry with a highly efficient, practical and truly portable method of producing straight machined bevels on a wide variety of plate materials, including mild steel, stainless steel and aluminum..... effectively meeting V, X or K weld joint preparation requirements.

Loss of production through operators suffering from skeletal, muscular and hearing loss injuries normally associated with pneumatic and hand held milling type bevelling equipment is greatly reduced and detrimental factors such as operator fatigue, or inconsistent workmanship are eliminated. Required quality levels are consistently attained and productivity and profitability increased.

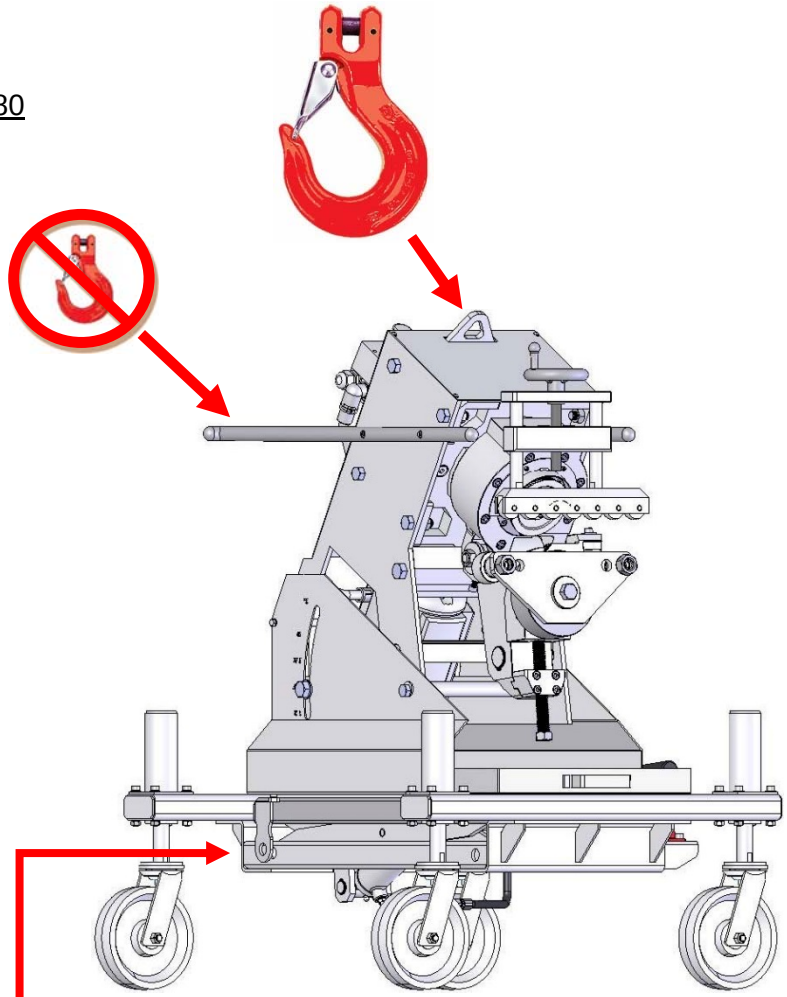
‡ Top speed can vary depending on variations of bevel depth, voltage and frequency.

LIFTING (HOISTING)

When it is necessary to lift (hoist) the Gullco KBM®-28 Portable Plate Edge Bevelling machine, use the Lifting Plate as shown below. All lifting (hoisting) equipment must be suitably rated and clearly identified to be of a greater capacity than the weight of the machine (as detailed **on page 3**). Never raise the machine any higher than necessary and never transport it over the top of people!

WARNING! Do not lift the machine by the positioning handles and handle bars, or any other such component(s) that could result in machine damage and/or bodily injury due to mechanical failure during the lifting (hoisting) process.

KBM-28-100 WITH KBM-28-080 UNDERCARRIAGE



IMPORTANT!

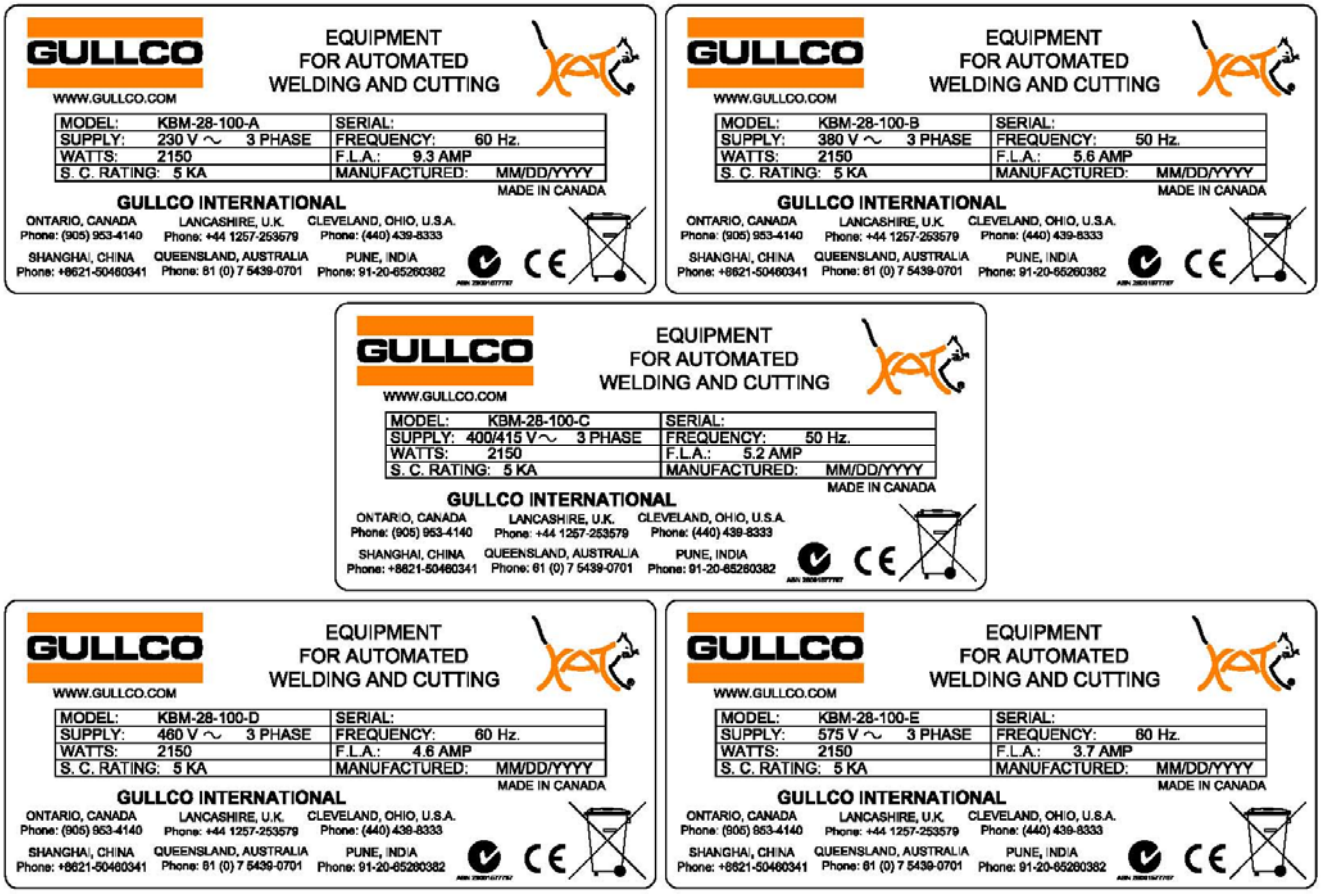
To prevent air from entering the hydraulic system it is important that the scissor mechanism is not allowed to open during lifting of the KBM-28 equipped with the hydraulic undercarriage. Holes are provided to accept a ¾" or 19 mm dia steel rod (not provided) that will prevent the mechanism from opening. Otherwise use suitable strapping on the scissor frame. It is equally important that the rod or strapping be removed before attempting to use the hydraulic pump to raise the machine when in use, otherwise the machine can be damaged.

INSTALLATION

ELECTRICAL CONNECTION

WARNING! Ensure proper AC earth grounding of the KBM®-28 before applying power. Failure to do so may invalidate the Gullco Warranty.

WARNING! Before connecting the KBM®-28 to a power source (receptacle, outlet, etc.,) be sure that the voltage supplied is the same as that specified on the product label. If in doubt, **DO NOT SUPPLY POWER TO THE MACHINE**. Copies of the possible product labels are listed below:



The fuse ratings referenced in the above labels represent the maximum values to which the adjustable overload setting of the starter switch must be set to and are based on the Full Load Amp rating of the motor for the voltage being used.

This equipment must be installed in accordance with CEC, NEC or other applicable electrical code.

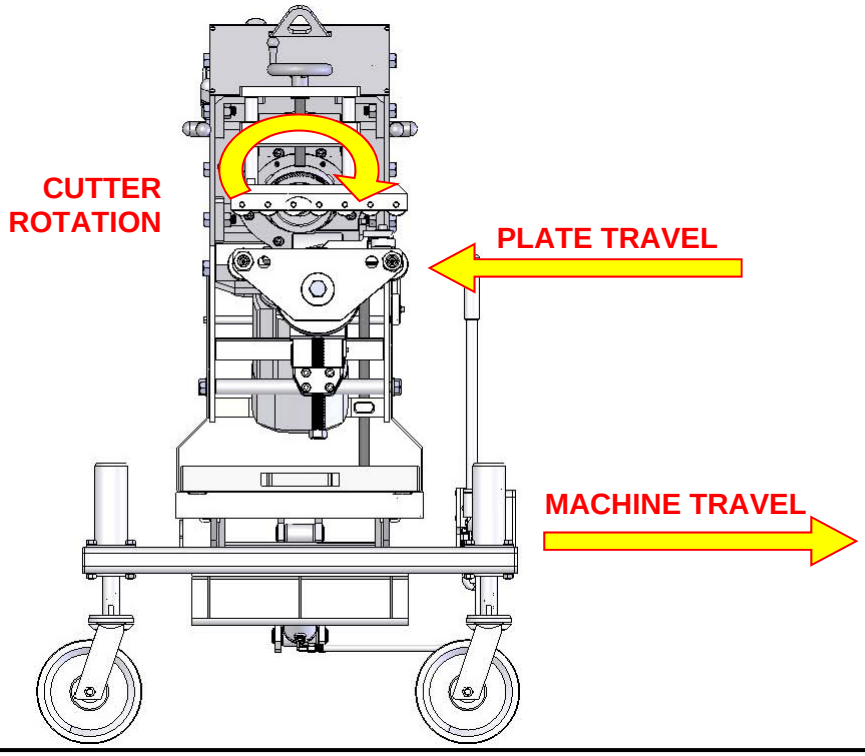
As the colours of the wires in the mains lead of this equipment may not correspond with the coloured markings identifying the terminals in your plug/receptacle, proceed as follows:

- The Green wire must be connected to the terminal in the plug which is allocated for “Earth” / “Ground”.
- The Black, Red and White wires must be connected to individual terminals in the plug which are allocated for; “Live 1” (“L1”); “Live 2” (“L2”); and “Live 3” (“L3”). Before feeding any material into the beveller, check the cutter rotation as described below, and swap two of these wire terminations at the plug if the rotation is incorrect.

Note: The mechanical starter is equipped with a low voltage protection device which de-latches (resets) the Start button whenever the voltage to the machine falls below an acceptable level. This protects against the machine from accidentally starting up when power is re-applied.

Note: The Emergency stop push button latches when activated and requires a counter-clockwise twist to release.

WARNING! As shown in the accompanying drawing, the cutter rotation MUST be clockwise (as viewed from the front) when the direction selector switch is set to forward (“FOR”). **IT IS IMPORTANT THAT THIS ROTATION DIRECTION BE CORRECT OTHERWISE DAMAGE TO THE MACHINE MAY OCCUR AND WARRANTY WILL BE VOID.** Be certain to check the cutter rotation before operating the machine. The plate should be fed in the direction shown if the machine is static and the material is being manually fed, alternatively, the bevelling machine should travel in the direction shown if the plate is static and the machine is running along the plate. If the cutter rotation is incorrect, it means that the 3 phase AC connection is incorrect and two out of the three Live wires must be swapped. The correct cutter rotation direction is shown on the clamp roller block.

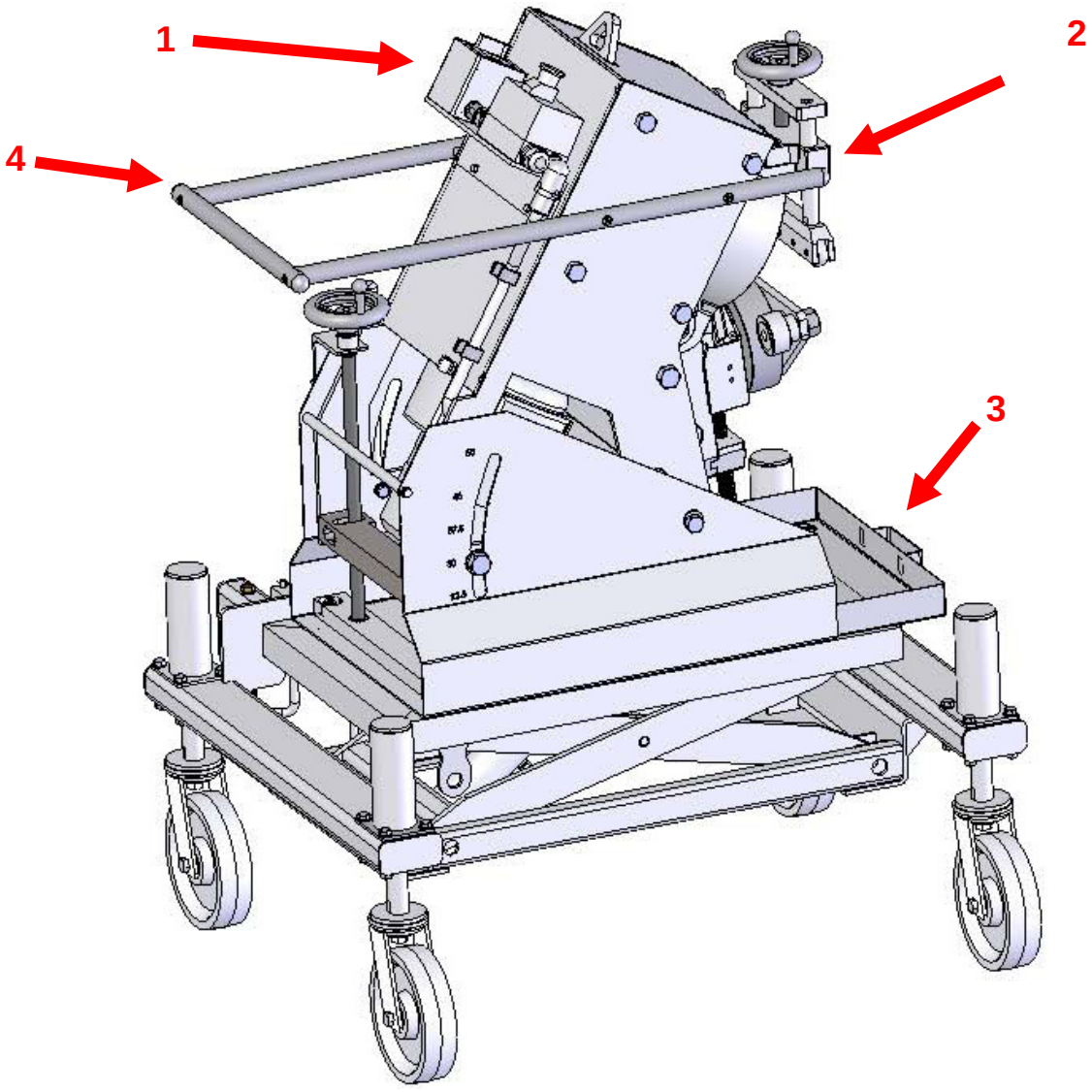


MECHANICAL INSTALLATION

WARNING! Check to ensure that no parts have become loose during transportation.

Depending upon the shipping location, the final destination and the method of shipment, various degrees of re-assembly may be required before initial operation. All of the necessary hardware will be provided with the machine. Refer to the parts list drawings later in this manual for more assembly details.

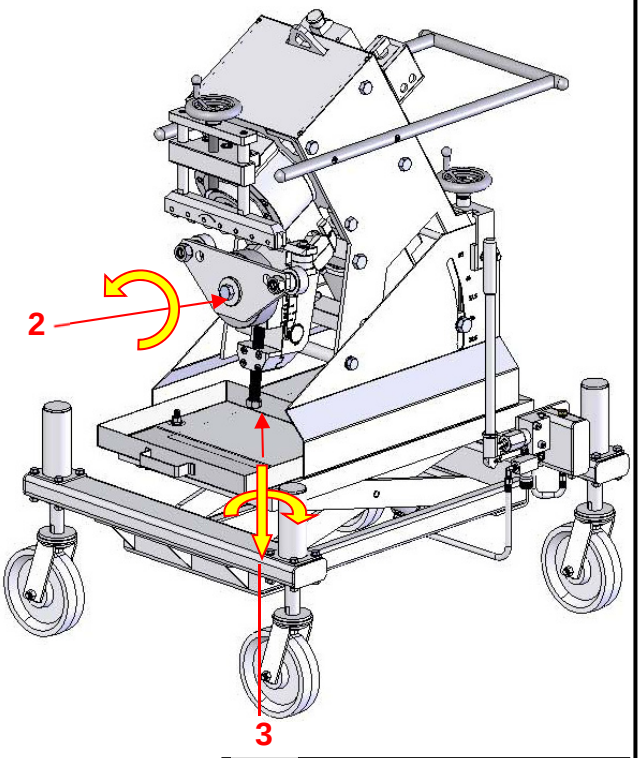
1. The Starter Switch Assembly may need to be re-orientated or re-attached;
2. The Clamp Roller Assembly may need re-attaching;
3. The Chip Pan may need re-inserting into the optional undercarriage assembly.
4. The handle may need re-attaching.
5. The anti-rust grease will need to be wiped off prior to use.



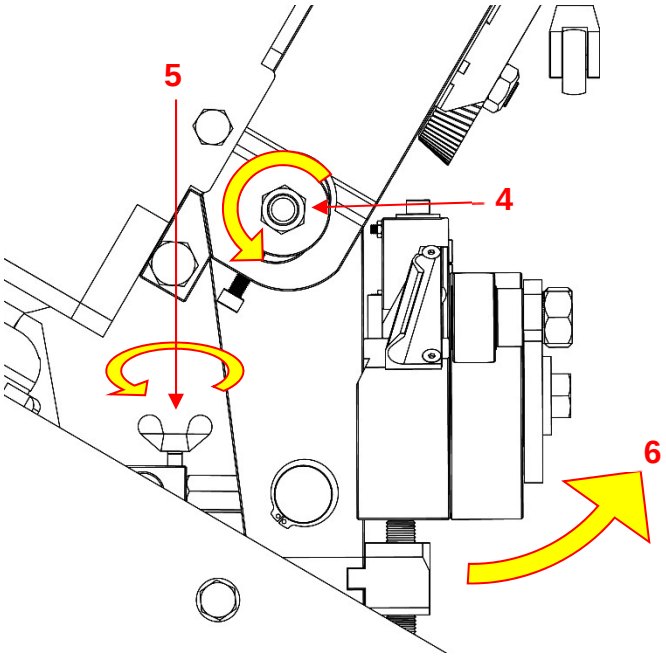
OPERATION

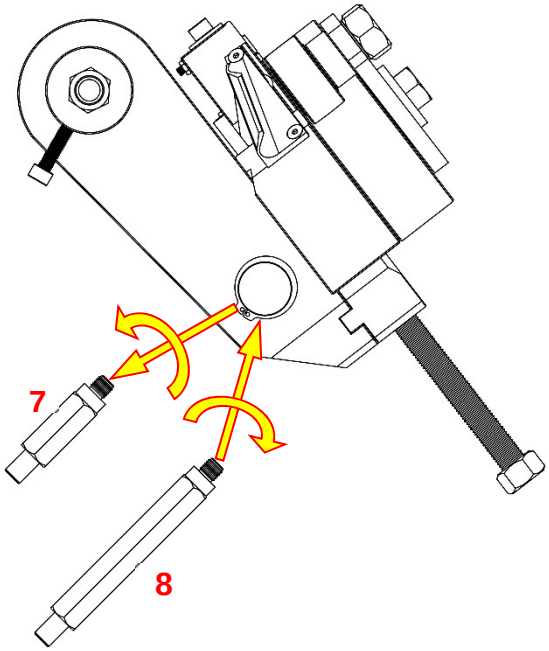
BEVEL SETTINGS

1. Positively isolate/disconnect the AC power supply.
2. Clean the area around the Main Roller and Slide Base Assembly, then loosen the Slide Base Clamping Bolt.
3. Lower the Slide Base Assembly by turning the Slide Base Adjusting Bolt counter-clockwise.
4. Loosen the nut of the Angle Alignment Bolt.
5. Loosen the Wing Screw.
6. Tilt the Pivot Arm Assembly upward.
7. Unscrew and remove the Angle Pin.
8. Screw in the correct Angle Pin to match the desired bevel angle to be produced.



Note: Hydraulic undercarriage may not be as shown.

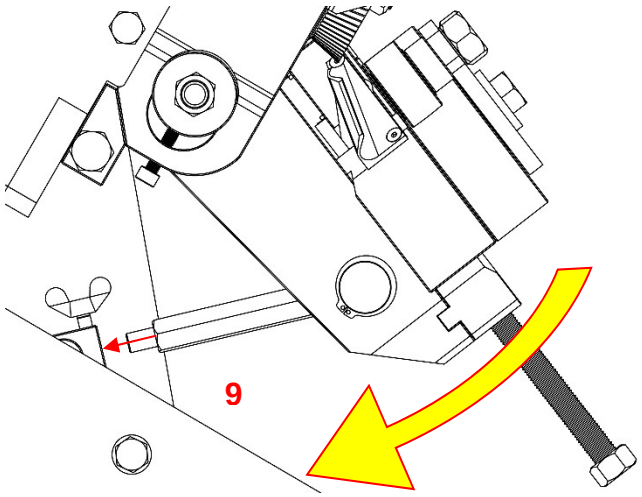


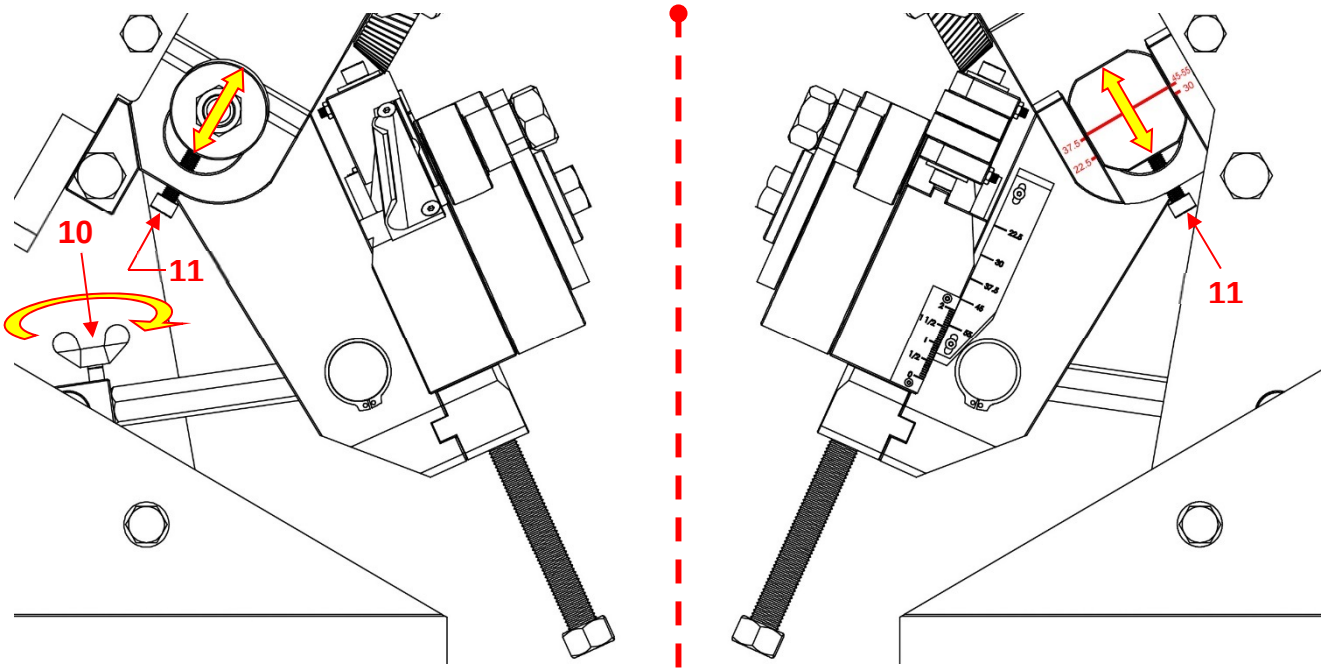


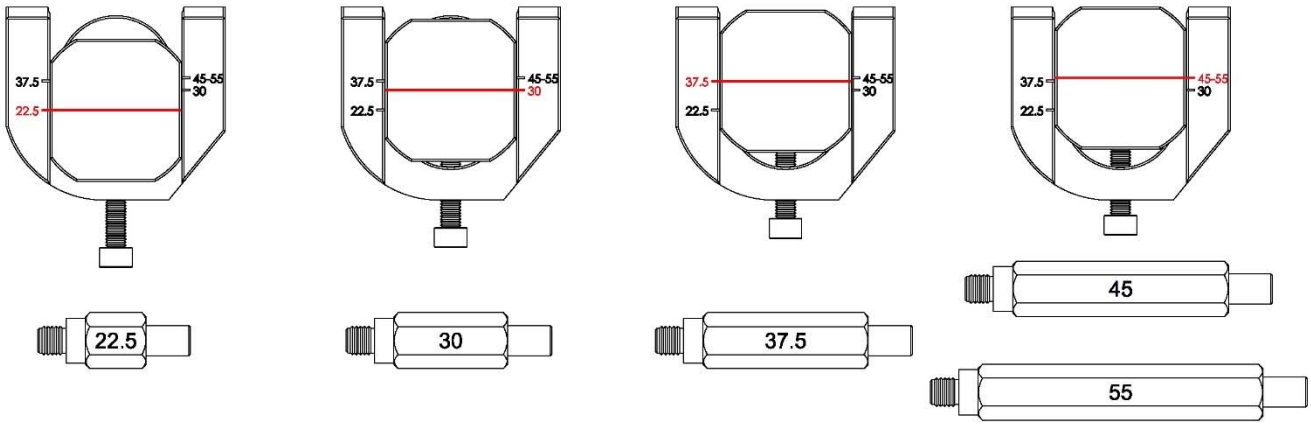
9. Lower the Pivot Arm Assembly downward while guiding the end of the Angle Pin into its mating hole in the Angle Support Bar.

10. Re-tighten the Wing Screw.

11. Using the screws on each side of the Cutter Shaft Housing, adjust the Angle Alignment Bolt, up or down, so that the notched mark on the end of the Angle Alignment Bolt lines-up with the appropriate mark engraved on the side of the Cutter Shaft Housing. The Alignment Bolt must be adjusted equally from both sides of the Cutter Shaft Housing to prevent the bolt from twisting. *Note: the alignment is the same for the 45º & 55º bevel angles.*



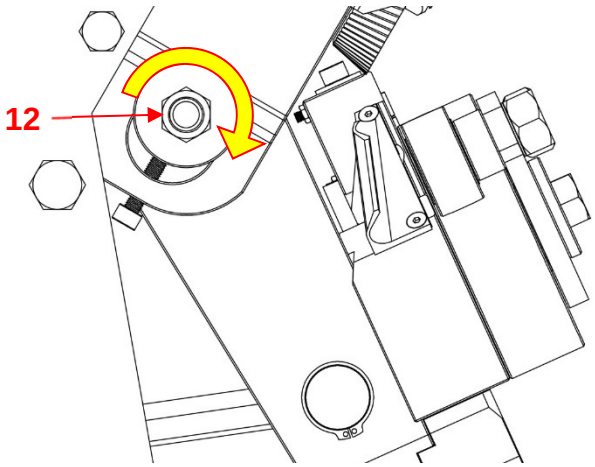


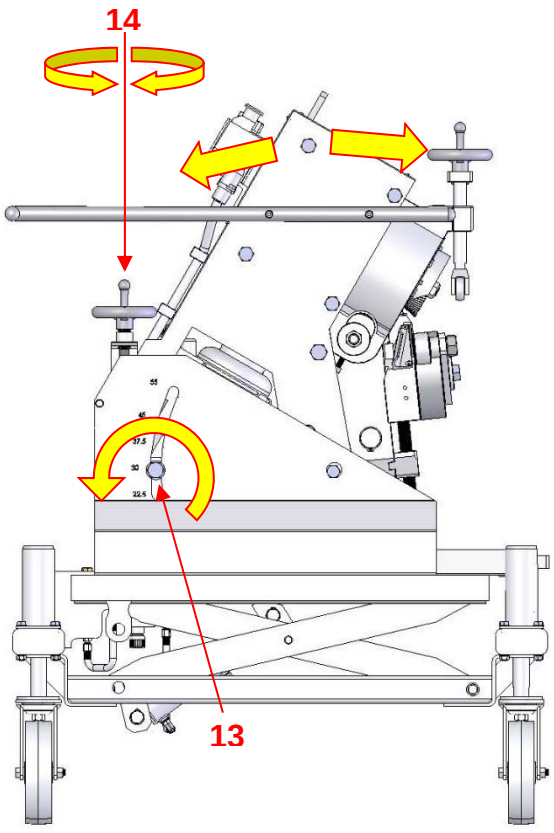


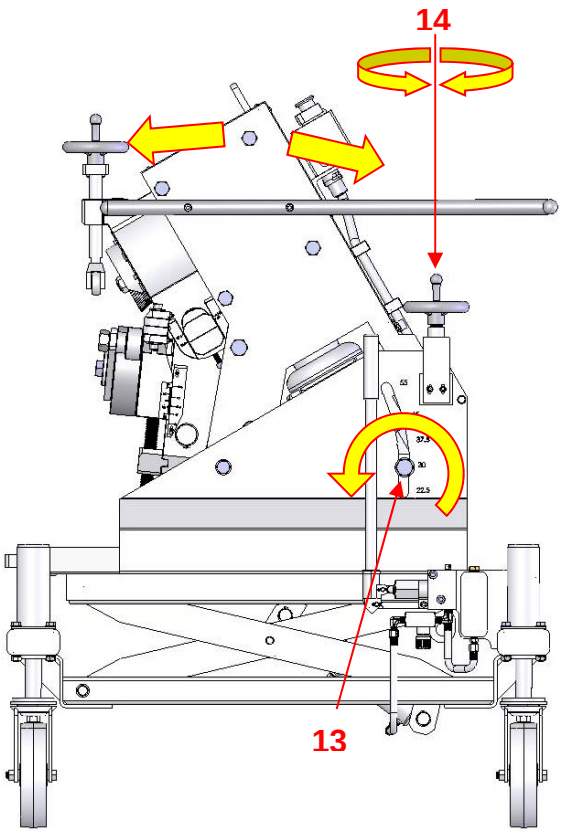
12. Re-tighten the nut of the Angle Alignment Bolt.

13. In order to tilt the main body of the machine to the desired bevel angle, two (2) clamping bolts must be loosened, allowing the machine to pivot around an axis at the front of the Tilting Base Frame. Loosen the two (2) bolts, one (1) on each side of the Tilting Frame Base.

14. Turn the tilt Hand Wheel, located at the rear, to tilt the main body of the machine so that the centre of the rear clamping bolts (referred to in step 13) line-up with the appropriate marks engraved on each side of the Tilting Base Frame.

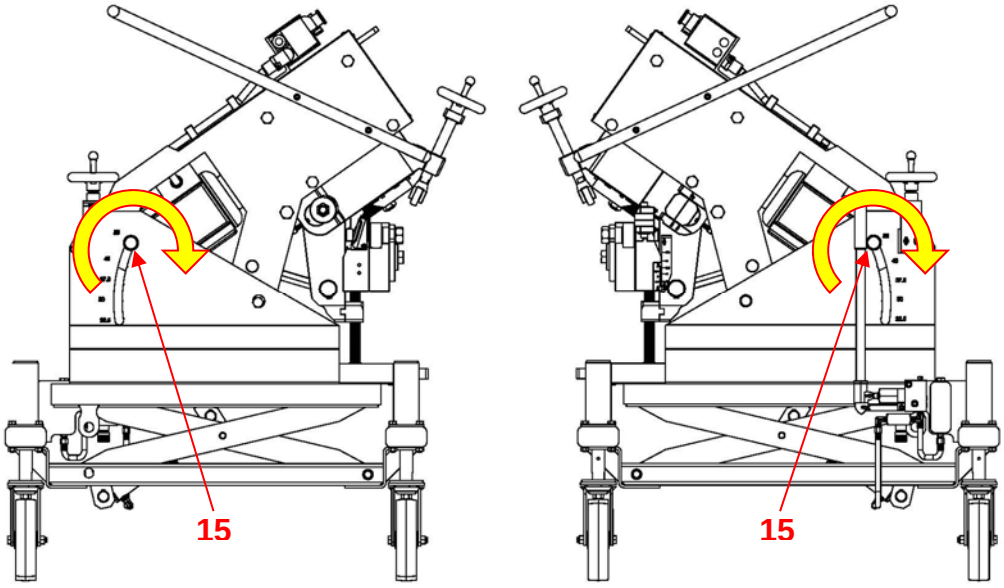






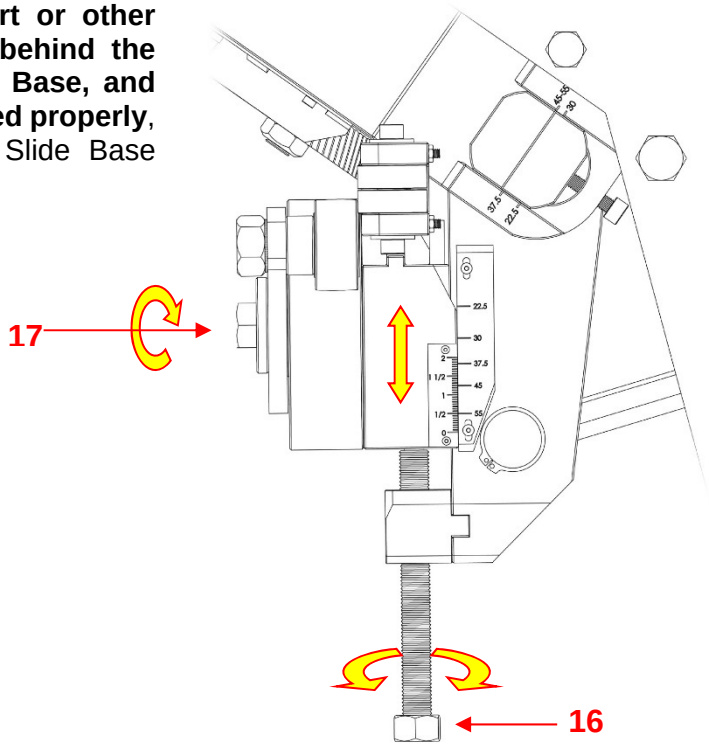
Note: Hydraulic undercarriage may not be as shown.

15. Re-tighten the two (2) bolts, one (1) on each side of the Tilting Frame Base.

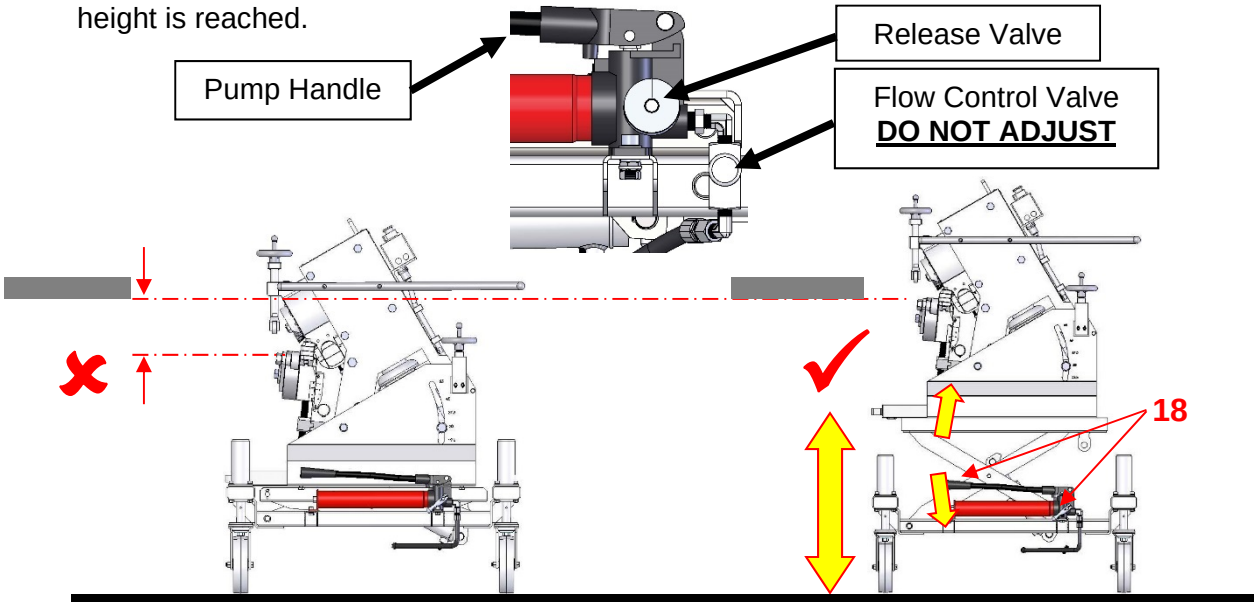


16. Using the Slide Base Adjusting Bolt, adjust the Slide Base Assembly, up or down, to the desired depth of bevel cut, using the appropriate Angle Reference Scale attached to the Pivot Arm Block and the fixed Root Face (land) Scale attached to the Slide Base Assembly as a reference. **Note: several set-up and operational elements can affect the accuracy of the Root Face / Angle Reference Scales. Therefore these scales should only be used as approximate reference guides and a test run is recommended to check the actual root face setting.** The Angle Reference Scale is slotted to allow the operator to recalibrate based on an actual bevel. The Root Face Scale is reversible, with inch markings on one side and millimetres on the other side.

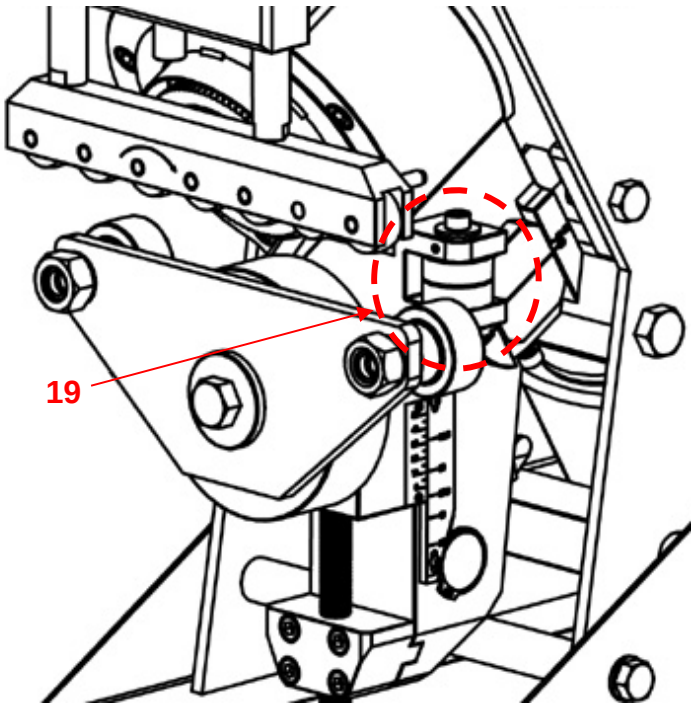
17. **IMPORTANT: Ensure that no dirt or other contaminant has been trapped behind the Main Roller, or behind the Slide Base, and ensure that the slide base is seated properly**, and then **FIRMLY** re-tighten the Slide Base Clamping Bolt.



18. Using the hydraulic pump on the optional hydraulic lift undercarriage, adjust the working height of the machine to suit the height of the work table (the top of the Main Roller, after adjusting to desired bevel depth, is to be the same height as the underside of the plate to be bevelled). To lower the working height of the machine, slowly turn the release valve (located on the pump body) counter clockwise. Turn the valve clockwise once the desired height is reached.



19. Check that the Guide Rollers are correctly adjusted. The intent of the Guide Rollers is to reduce drag caused by the plate feeding through the machine. This is achieved by the plate running against these free moving bearings which are slightly in front of the Guide Roller Bracket, and thereby reducing the surface contact with the face of the Guide Roller Bracket.



For plates with straight edges, the Guide Rollers should be slightly in front of the face of the Guide Roller Bracket, by approximately 0.020” [0.5 mm].

For plates with concave edges (i.e. bevelling the inside diameter of a large disk) the Guide Rollers will need to be set further back (in towards the machine).

For plates with convex edges (i.e. bevelling the outside diameter of a large disk) the Guide Rollers will need to be set further forward (out from the machine).

To adjust the Guide Rollers, follow the procedure on the following page.

19a) To adjust the Guide Rollers, loosen one of the socket head cap screws (1).

19b) Loosen the 2 set screw jam nuts (2).

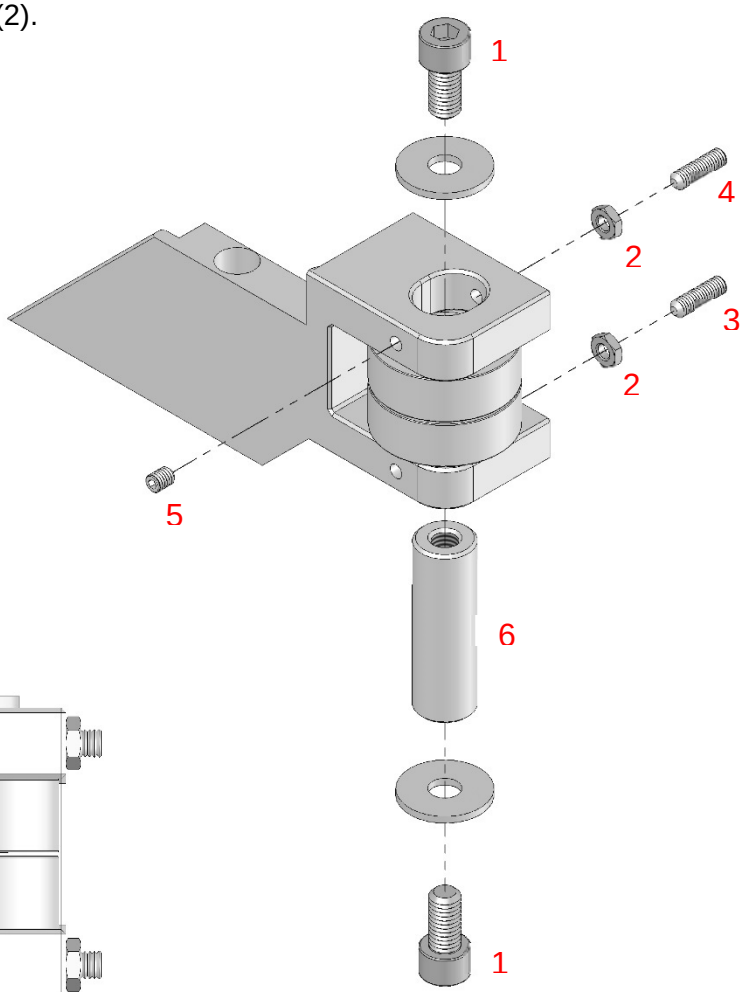
19c) Back the lower rear set screw (3) away from the guide roller Track Spacer (6) so that the set screw will not interfere with the adjustment of the Track Spacer.

19d) Use the upper rear set screw (4) and the upper front set screw (5) to position and pinch the guide roller Track Spacer (6) so that the Guide Rollers are in the desired position. Both of the upper set screws (4 & 5) should be applying captive pressure to the guide roller Track Spacer (6).

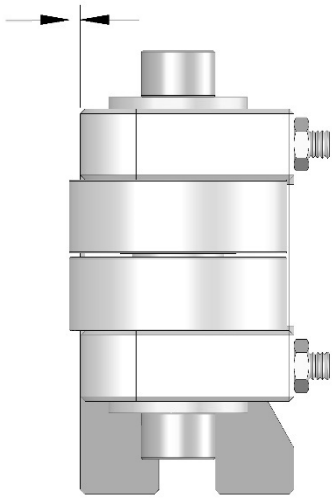
19e) Re-tighten both of the socket head cap screws (1).

19f) Screw in the lower set screw (3) so that it rests against the guide roller Track Spacer (6) (thus providing extra support against the forces acting on the guide roller assembly during bevelling operation).

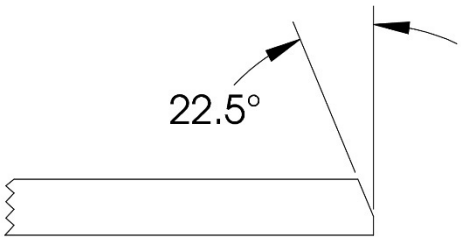
19g) Re-tighten the jam nuts (2).

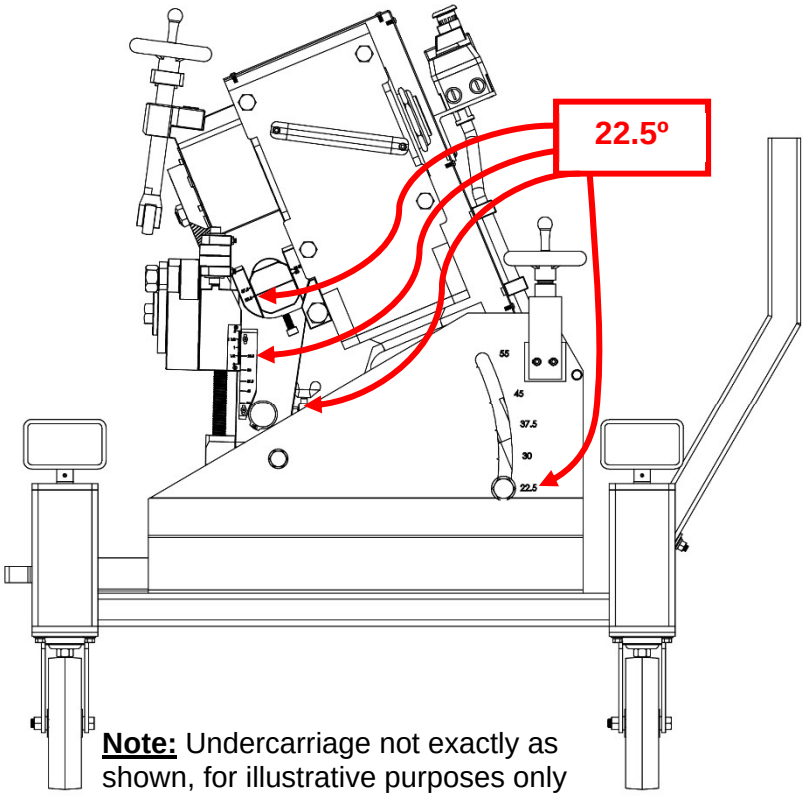


Desirable Setting for Straight Edge Plate: Approximately 0.020” [0.5 mm]



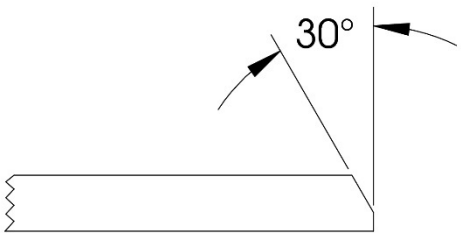
22.5º BEVEL ARRANGEMENT

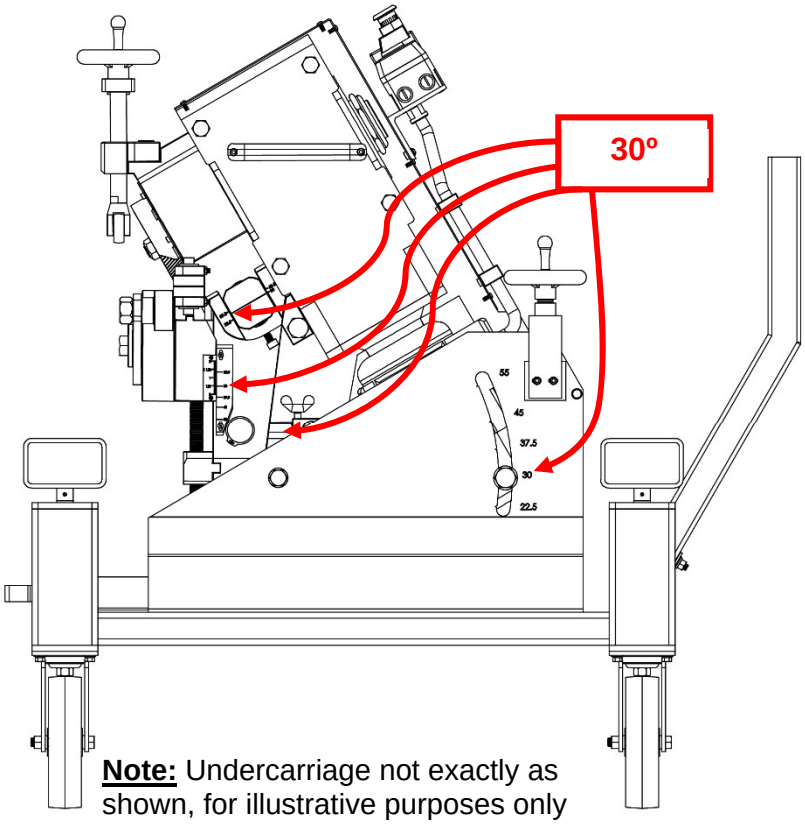




Note: Undercarriage not exactly as shown, for illustrative purposes only

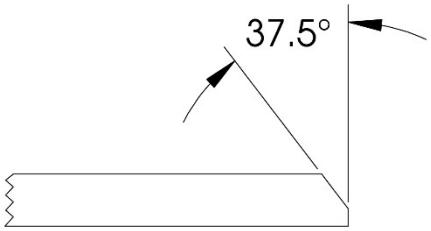
30º BEVEL ARRANGEMENT

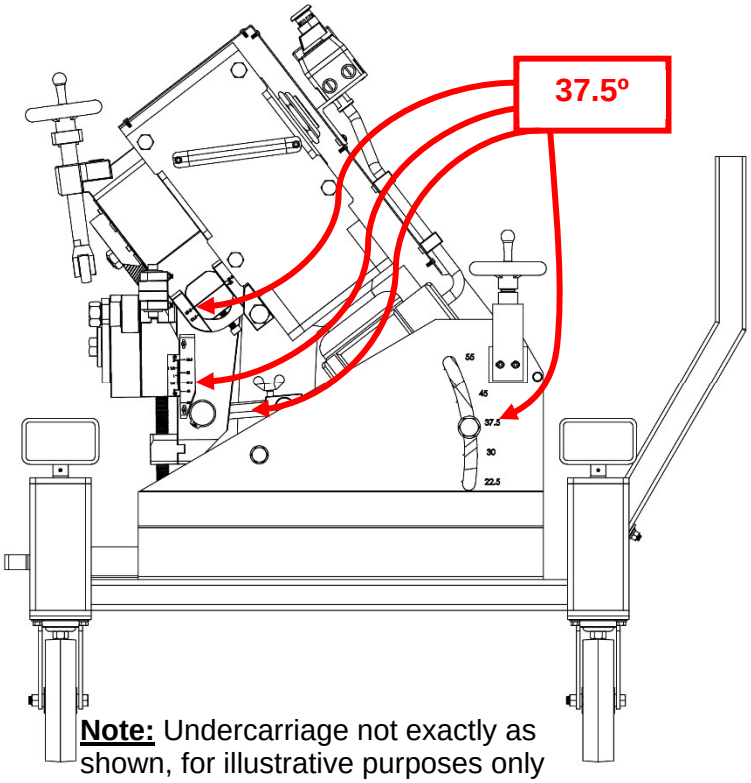




Note: Undercarriage not exactly as shown, for illustrative purposes only

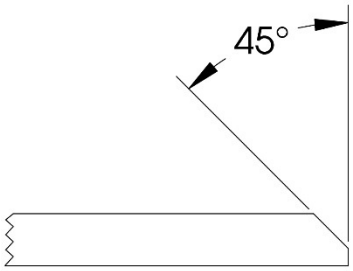
37.5º BEVEL ARRANGEMENT

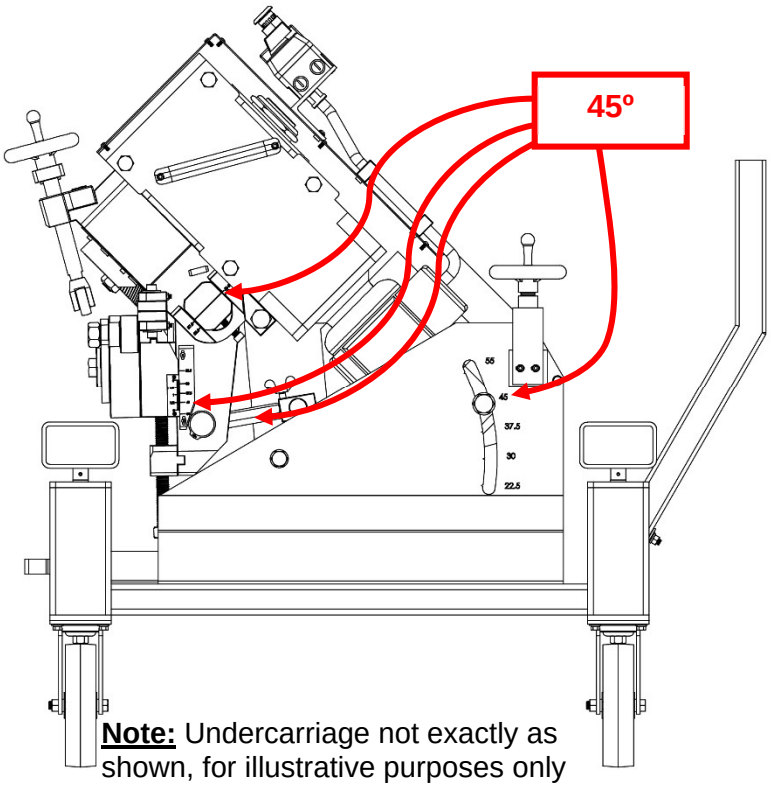




Note: Undercarriage not exactly as shown, for illustrative purposes only

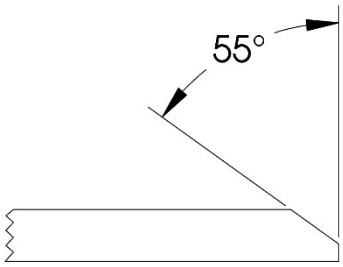
45º BEVEL ARRANGEMENT

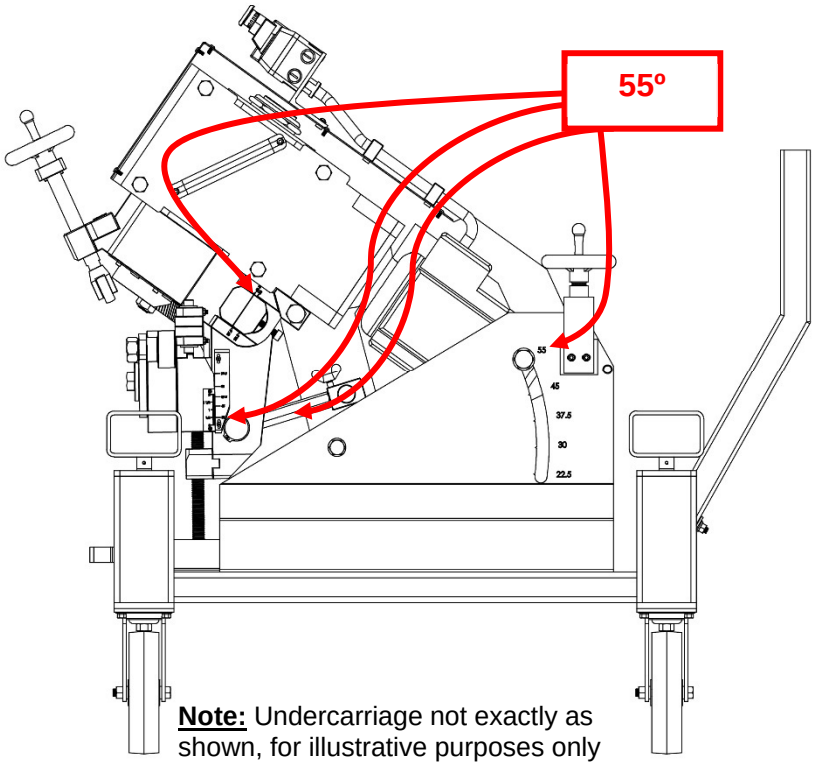




Note: Undercarriage not exactly as shown, for illustrative purposes only

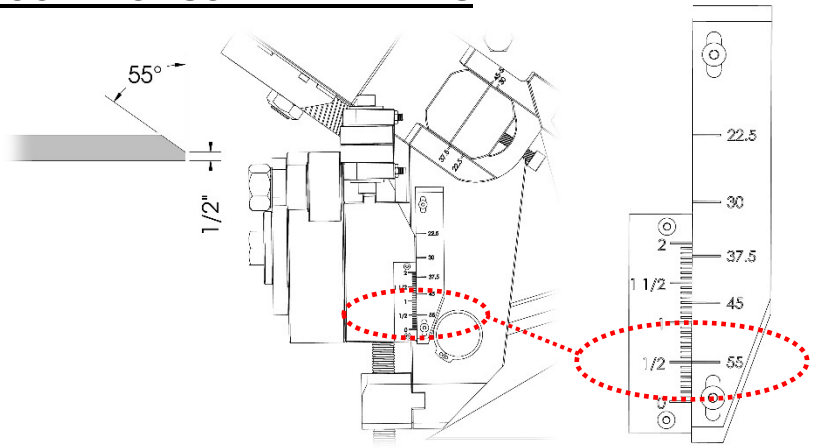
55º BEVEL ARRANGEMENT

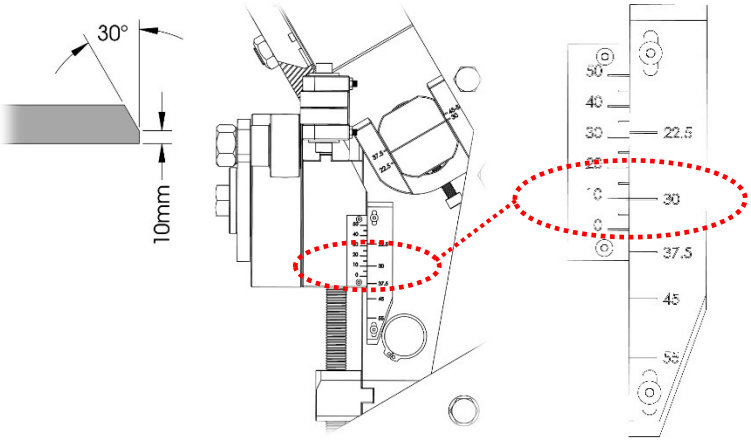




Note: Undercarriage not exactly as shown, for illustrative purposes only

ROOT FACE SCALE EXAMPLES





PREPARATION FOR SELF PROPELLED OPERATION

The Gullco KBM®-28 Plate Edge Bevelling Machine is typically used with an optional hydraulic adjustable lift undercarriage with self-aligning spring loaded caster wheel assemblies for self-propelled operation. I.e. the material stays stationary while the bevelling machine propels itself down its edge. This system is employed for bevelling large and heavy plate materials which cannot be fed through the machine. When both the machine and material are properly set up, as described below, the cutter will drive the machine on its caster mount, along a floor or runway.

Plate materials should be secured on a work table/platform that is of an appropriate height above the floor, or runway, for the angle of bevel to be performed. See the table below for minimum plate heights.

KBM®-28 MINIMUM WORKING HEIGHT when used with KBM-28-080 Undercarriage Assembly

DEGREES	*TABLE HEIGHT
22.5º	35” [889 mm]
30º	
37.5º	
45º	
55º	

* This is an absolute minimum height and should be used as a guide only. Most bevelling will be 1/2” [12.7 mm] to 1” [25.4 mm] higher than above.

IMPORTANT: **KBM®-28 Undercarriage Assembly is equipped with spring loaded casters designed to accommodate slight floor to work table height variances, however, if the table height (work-piece) becomes too low (springs unable to compress any more), machine damage will likely occur.**

PREPARATION FOR BENCH OPERATION

The Gullco KBM®-28 Plate Edge Bevelling Machine may be used as a bench/floor mounted rotary shear for bevelling small, light and manually manageable work pieces. For bench/floor mounted applications, the optional Base Frame and spring loaded caster assemblies can be removed from the machine (if applicable). To establish an efficient, safe working position, mount the bevelling machine to a levelled bench, or work table, capable of handling the load involved, or to the floor. It is always advisable to tilt the mounting of the bevelling machine to allow the work pieces to remain in a flat, horizontal plane. It is not recommended to bevel heavy or large work pieces that are difficult to manually handle, with bench/floor mounted machines. If a heavy or large piece must be bevelled with a bench/floor mounted machine, support the material with a suitable arrangement of rollers or casters to allow free movement of the material. Ensure that the work piece is level with, and sits flat on, the Main Roller and Support Rollers.

IMPORTANT: **Heavy work pieces being bevelled on bench / floor mounted machines can cause a twisting force on the cutter and may lead to cutter / machine damage.**

IMPORTANT: **Make sure all plates are started square to the cutter, or damage could result.**

BEVEL OPERATION

1. Before performing a bevel, always check the following:
    a. The machine has been set-up in accordance with the previous section of this manual, entitled “Bevel Settings” (I.e. correct bevel angle settings; initial Slide Base setting; machine height adjustment; and correct Guide Roller adjustment).
    b. IMPORTANT: The Main Roller and two Support Rollers must run free and smooth.
    c. IMPORTANT: The Slide Base must be seated correctly, with no contamination between it and the Pivot Arm Block, and the Slide Base Bolt must be firmly tightened.
    d. IMPORTANT: The cutter nut must be firmly tightened and the cutter teeth must be in good condition.

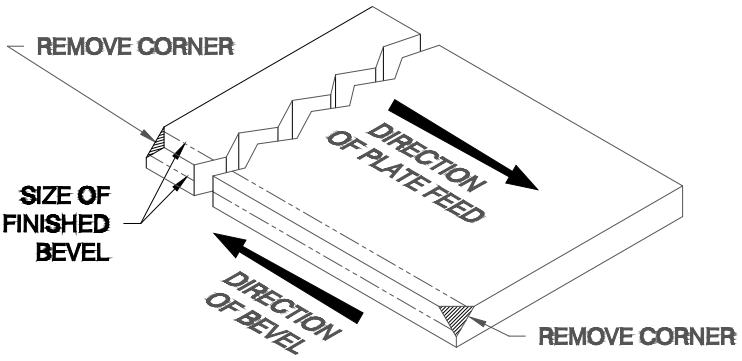
2. Raise the Clamp Rollers so that the clearance between the Clamp Rollers and the Main Roller is greater than the thickness of the plate to be bevelled.

3. Place the material, or an off-cut of the material, on the Main and Support Rollers.

4. Then screw the fluted handle, clockwise until the clamp rollers have lightly pinched the material. **Note: The clamp rollers should not be screwed down too tightly on the plate material. This will cause feeding difficulties. The material should be able to move freely under the clamp rollers and sit flat on the Main Roller.**

5. Remove the material.

6. It is recommended that the corners of the leading and trailing edges of the plate material be ground prior to bevelling. The notched corners should be at least the depth of the final bevel depth. This procedure will reduce the initial and the final stresses applied to the cutter and will improve the initial grip of the material for feeding.



7. Connect electrical power, release the Emergency Stop Mushroom button (if latched), select forward (“FOR”) on the directional selector switch and start the cutter rotation by pressing the start (“**I**”) push button. **Check for correct cutter rotation!**

8. Feed the machine/material straight in and out. Try to minimize the external forces applied to the cutter. Avoid applying twisting forces to the machine or plate. Do not shake the machine or twist the plate when the cutter is engaged with the plate. Do not attempt to readjust the machine settings such as root face or Guide Roller alignment during bevelling operations. Always stop the machine and disengage from the material before adjustment of these settings.

INTERRUPTED MATERIAL FEED

Material feed may be interrupted when the cutter slips due to several possibilities, such as worn cutters, excessive external forces etc.. Should interruption of the material feed occur, **do not try to move the machine with the cutter engaged in the cutting position, or shake the machine or plate, as this is likely to break the cutter.** Proceed as follows:

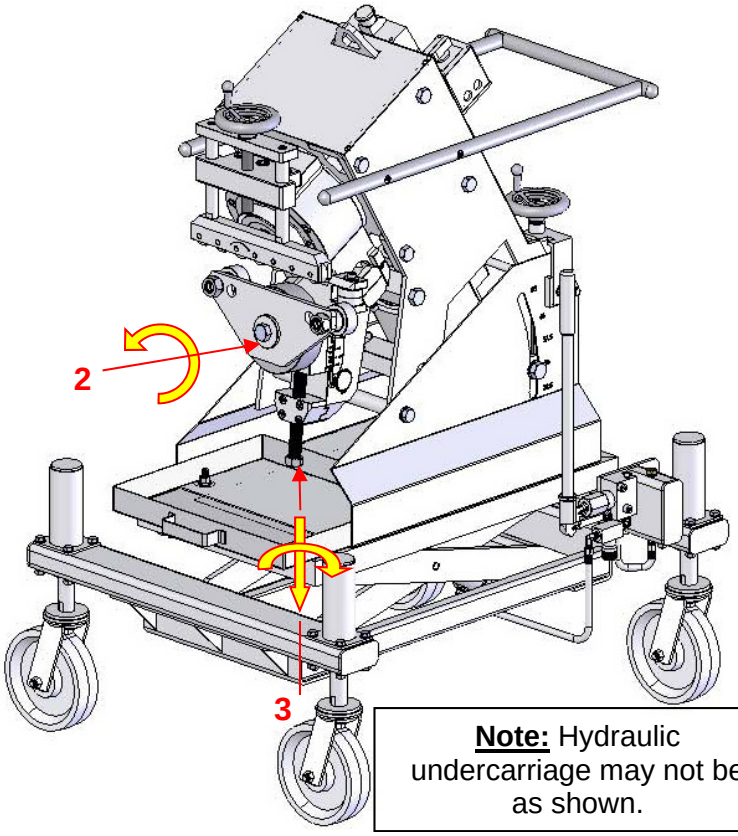
1. Positively isolate/disconnect the AC power supply.

2. Clean the area around the Main Roller and Slide Base Assembly, then loosen the Slide Base Clamping Bolt.

3. Lower the Slide Base Assembly by turning the Slide Base Adjusting Bolt counter-clockwise.

4. Disengage the cutter from the plate being bevelled. Note: It may be necessary to temporarily reconnect the AC power supply and use the directional selector switch to **BRIEFLY** run the machine in the reverse ("REV") direction.

5. Draw the machine back from the plate and grind off any projections from the bevelled surface.



Note: Hydraulic undercarriage may not be as shown.

6. Rectify the problem that caused the interruption (i.e. worn cutter; too large of a cut; incorrect height adjustment; etc.).

7. Readjust the machine settings. **IMPORTANT: Ensure that no dirt or other contaminant has been trapped behind the Main Roller, or behind the Slide Base, and ensure that the Slide Base is seated properly**, before **FIRMLY** re-tightening the Slide Base Clamping Bolt.

8. Reconnect the AC power supply.

9. Restart the machine and bevel operation.

BEVELLING FLAME CUT STEEL PLATES

Flame cut steel plates may be work hardened and have slag on the edges. Flame cut **mild steel** can be bevelled with the KBM®-28, but all slag should first be removed from the edge to be bevelled. Flame cut **high tensile steel**, however, may be difficult to bevel with the KBM®-28. This material is subject to hardening by rapid cooling after flame cutting. Check to see if the material is capable of being machined before attempting to bevel it with the KBM®-28.

BEVELLING OF TOUGHER MATERIALS

Because materials such as stainless steel and high grade steels tend to be tougher and generally posses a higher tensile strength than mild steels, it is more difficult to bevel these materials with the KBM®-28 machine.

The amount of metal to be removed in one pass by the KBM®-28, is adjusted by the Slide Base mechanism (as previously described in the manual), to give a bevel cut setting suited to the tensile strength of the material. The maximum recommended bevel widths for various tensile strengths at various degrees of bevel angles are shown in the table located earlier in this manual, under a section entitled "Bevelling Capacity".

The following are recommendations for bevelling high tensile plate;

1. Bevelling tougher materials should always be performed on the conservative side in terms of smaller bevel cuts and increased number of passes.

2. Always use a sharp cutter. The need for re-grinding/replacing cutters depends on the amount of use and work involved, however, it is always advisable to closely monitor the cutter, as worn cutters may produce detrimental factors such as loss of performance due to feeding problems, poor quality and consistency of bevel as well as the possibility that the cutter might break before it can be re-ground.

3. When a heavy work load is involved, time and operating costs can be reduced by using two or more KBM®-28 machines, each adjusted to provide a different bevel depth for multi pass bevelling, allowing the operator/operators to use one machine for each pass without having to make adjustments to the machine in-between.

It is generally agreed throughout the steel fabrication industry that machining bevels on tough, heavy, steel plates such as stainless steel, is both difficult and costly, as is plasma cutting, which requires additional hand grinding. If properly planned and carefully performed, bevelling tough plate with the Gullco KBM®-28 Portable Plate Edge Bevelling machine remains the most economical method in terms of total cost.

CUTTER

The circular cutter on the Gullco KBM®-28 bevelling machine is made from special, high strength and abrasion resistant tool steel and is designed to withstand the heavy stresses applied during normal bevelling operations. All cutters are heat treated to provide maximum cutter life. The specifically designed serrated cutting edge provides a firm grip on the material for both feeding and cutting purposes.

Three (3) types of cutters are available for use with the KBM®-28. The table below shows the basic features of each cutter. It is important to note that the properties of different materials will respond differently to each other with respect to rotary shearing. Therefore the following is only intended as a guideline. It is Gullco's recommendation that the best cutter for the project be found by trial and experimentation.

AVAILABLE CUTTERS	CUTTER PROPERTIES			
	FEEDABILITY	BEVEL FINISH	IMPACT/HARD SPOT RESISTANCE	FEATURES
KBM®-28-X1C	GOOD	EXCELLENT	GOOD	TOUGHER, MORE DURABLE, MORE FORGIVING OF MINOR IMPROPER SETUP/OPERATION
KBM®-28-X1H	GOOD	GOOD	FAIR	HARDER, BETTER WEAR RESISTANCE
KBM®-28-X1A	EXCELLENT	FAIR	LOW	HARD, AGGRESSIVE CUTTER PERFORMS WELL UNDER PERFECT CONDITIONS, BUT WILL FAIL IF NOT PROPERLY SETUP/OPERATED

CUTTER LIFE

KBM®-28 cutters are subject to wear under normal working conditions and should be re-ground at regular intervals, as per the procedure described later in this manual. The service life of the cutter, before resurfacing or replacement is necessary, depends on a number of factors. The tougher the plate material, the shorter the expected service life. It is also shortened by heavier cuts and greater bevelling angles. However, the most important factor contributing to premature failure of the cutter is misapplication of heavy stress to the cutter. How and why this occurs is described later in this manual. Generally, it involves errors relative to the proper setup and use of the machine. A well experienced operator will obtain a much longer service life from the cutter than indicated in the “guide” below. An inexperienced operator may experience cutter failure after only a few feet [meters] of cut. The following re-grinding schedule is provided as a guide:

- Mild Steel - Re-grind after bevelling 600 feet (182 meters)
- Stainless Steel - Re-grind after bevelling 300 feet (91 meters)

The most effective way to obtain maximum cutter life is:

1. All operators of the KBM®-28 machine must have a thorough understanding of how the machine and material are set up for proper operation and that proper operational procedures are followed.

2. Perform trial runs before the actual application. This is particularly important. **Most cutter troubles are encountered at the start or finish of the operation.**

3. Remember that the misapplication of stress to the cutter will damage or break it. Plates should be fed square to the cutter. Twisting forces should not be applied to the cutter. Large and unbalanced pieces should be properly supported so that the material is always positioned square to the cutter. This is particularly true when bevelling circular discs or curved plates.

Worn and dull cutters may produce a coarse bevelled surface, create feeding problems and tend to be broken more easily. It is recommended that the cutters be re-sharpened or replaced **before** these conditions occur. If a few extra cutters were kept on-hand, it would allow a frequent rotation or replacement of the cutters without delays and significant down time, which would ultimately reduce the total bevelling costs.

SHARPENING INSTRUCTIONS FOR KBM®-28 CUTTERS

Normally up to 10 re-grinds can be performed before the cutters 0.10" [2.5 mm] recess is ground flat. When resurfacing KBM®-28 cutters, the following instructions will help to provide the maximum cutter life:

1. The cutter should be surface ground until all of the burred and dulled edges of the flutes are removed.

2. The recommended grinding wheel is a "Carborundum, S.G. Medalist, 461 Grit" or equivalent.

3. The manufacturers recommended cutting oil, if any, for the grinding medium to be used, should be applied when grinding (the above recommended grinding wheel performs best with no cutting oil).

4. Never allow the cutter to overheat when grinding.

5. The last pass/passes of the resurfacing process should be light enough to ensure that all the burrs that have been produced due to the grinding process, are removed. This is important, as large burrs around the cutting edges may dull or possibly deform the cutter immediately on reuse.

6. Ensure that the back face of the cutter is smooth and clean before grinding and that the front face of the cutter is parallel to within 0.001" [0.03mm] of the back face after grinding.

7. Demagnetize the cutter before reuse.

IMPORTANT: If the Gullco KBM®-28 cutter is resurfaced below the original recess, or if cutters other than those approved by Gullco International are used on the Gullco KBM®-28 Portable Plate Edge Bevelling Machine, the warranty will be void.

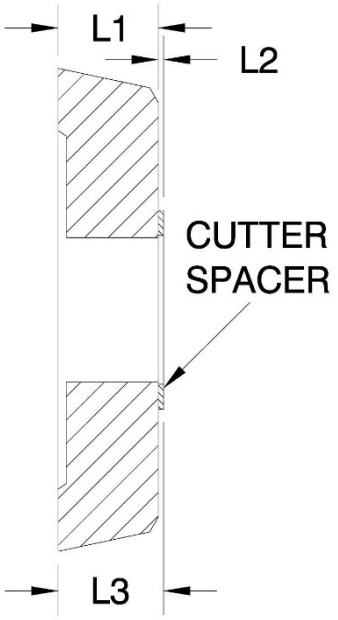
The thickness of the original cutter is 1.1" [28 mm] and must be kept in its original proximity after sharpening, by using cutter spacers. It is recommended that after sharpening, measurement of the cutter thickness be made and appropriate spacers installed behind the cutter to bring the total thickness as close as possible to the 1.1" [28 mm]. **NOTE: Cutter spacers are available in two (2) nominal thicknesses: 0.02" [0.5 mm] thick and 0.04" [1.0 mm] thick.**

For Example:

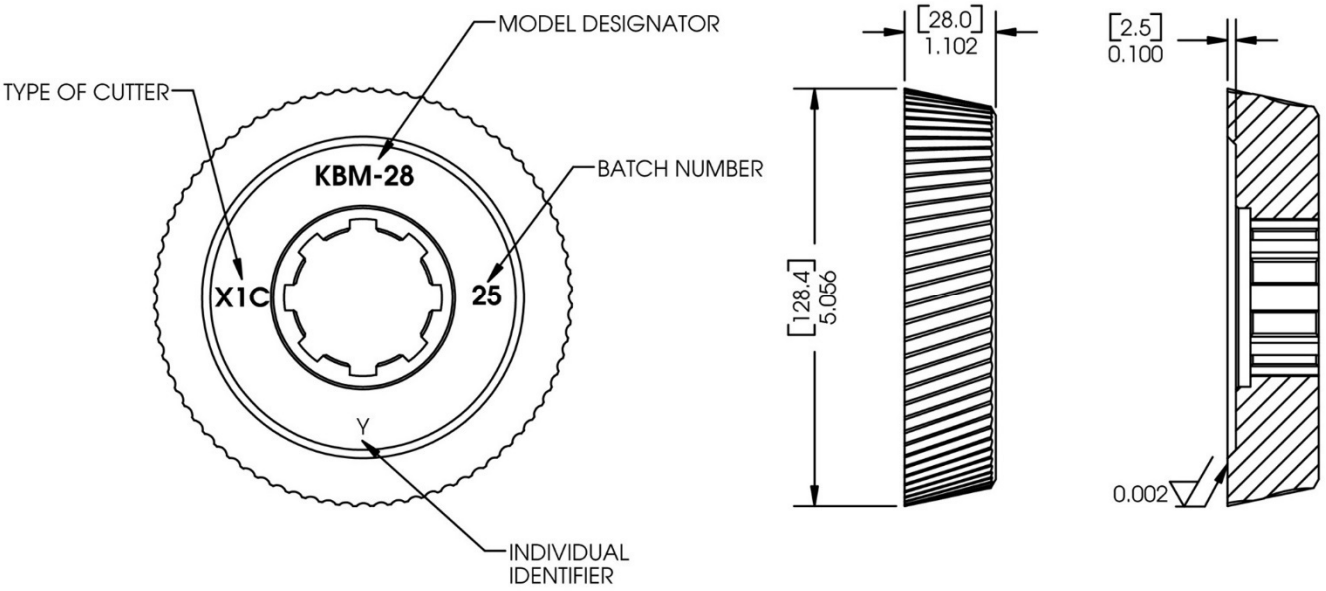
Cutter thickness after several sharpenings - L1 = 1.074" [27.3 mm]

Add one spacer - L2 = 0.020" [0.5 mm]

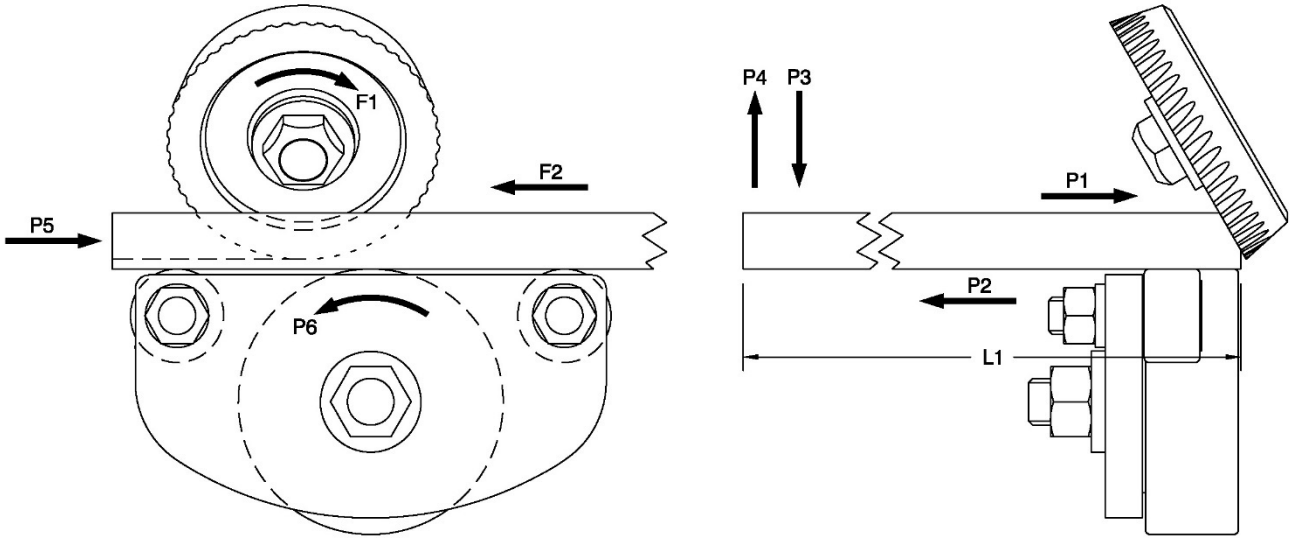
Total Thickness - L3 = 1.094" [27.8 mm]



CUTTER DETAILS



FORCES ACTING ON THE CUTTER



The rotary shearing cutter on the KBM®-28 Portable Plate Edge Bevelling Machine is subjected to considerable stress under load. The drawings above outline the dynamic forces that may be applied to a cutter in operation.

F1 = Cutter rotation shearing force.

F2 = Material feeding force generated by the cutter serrations.

P1 = Material pulling force generated by F1 and F2 as the material is drawn against the cutter during operation.

P2 = External force pulling material away from the cutter.

P3 = Downward moment onto material.

P4 = Upward moment onto material.

P5 = External force interfering with feeding force F2.

P6 = Poor Main Roller rotation.

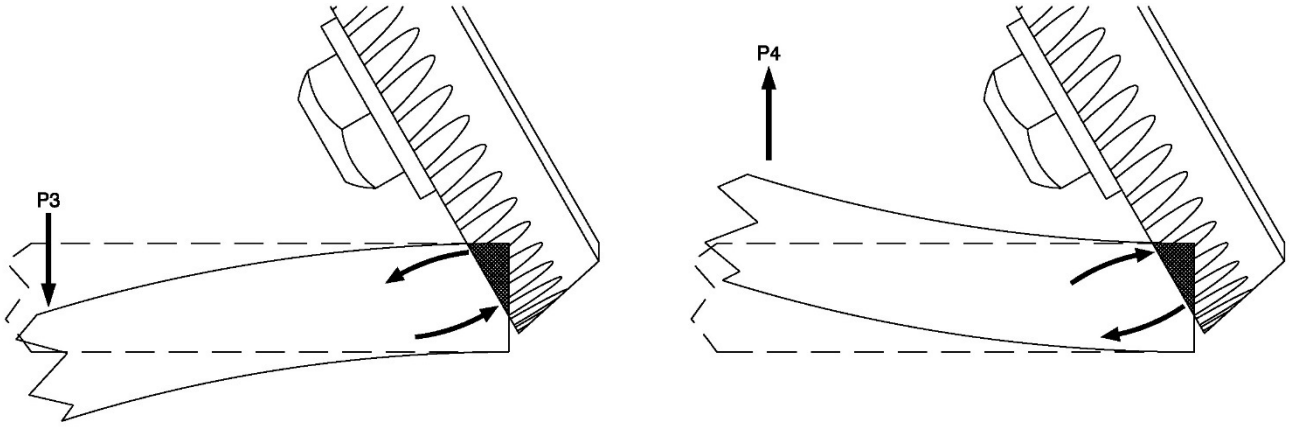
L1 = Material extension from the cutter.

The cutter rotation F1, material feeding force F2 and the material pulling force to the cutter P1 are generated by the KBM®-28 machine itself. Under normal circumstances and correct operating procedures, the machine is capable of withstanding these self generated forces. There are, however, a number of factors that will cause the cutter to break, as described in the following section.

CUTTER BREAKAGE CAUSED BY EXTERNAL FORCES

In most cases the cutter will break when one or a combination of the external forces, P2 through to P6 described on the previous page, is applied beyond the limit of the cutter.

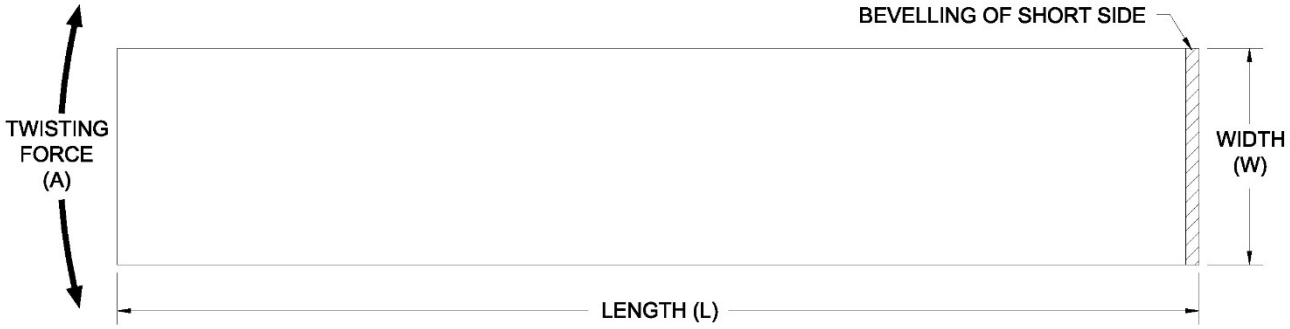
Exceptionally heavy stress may be applied to the cutter by moments P3 and P4. These moments apply a lever action upon the cutter as shown below. The extent of these moments are dependent on the length of the plate extension, indicated as L1 on the drawing on the previous page.



To avoid situations that will cause external forces to break the cutter, the following recommendations are made:

1. Use a support table and conveyor system when moment P3 or P4 is great (bench mounted operation with large, heavy plates, or plates with a long extension L1).
2. Use a pinch roller and roller conveyor to improve the feeding force F2 and minimize the interference force P5 (bench mounted operation with large, heavy plate).
3. Use a caster assembly to minimize the pulling force P2 away from the cutter (self propelled operation).

When the KBM®-28 is used as a bench/floor mounted unit to bevel the short sides of rectangular plates such as that shown in the diagram below, the plates should be supported on additional work tables. Otherwise, a twisting force (A) will give a heavy side stress to the cutter and cause breakage. Always feed the material square to the machine. As previously mentioned, the greater the unsupported length L1, the greater the moment P3 or possibly P4, creating an undue load to the cutter. Therefore it is important that even narrow width plates with a length of 20" [508mm] or more, be supported by some form of work table and, or, clamp roller system.



INSPECTION & MAINTENANCE

The Gullco KBM®-28 Portable Plate Edge Bevelling Machine is a heavy duty, robust piece of equipment and under normal conditions, it will provide years of trouble free service if it is operated within the limits of its expected use and if the following inspection and maintenance points are adhered to.

DAILY INSPECTIONS

Check for smooth and free movement of the Main and secondary Support Rollers.

IMPORTANT: The Main Roller should always run free. Cutting chips, dust, dirt etc. can restrict the free movement of the Main Roller, which, in turn creates feeding drag. This will result in undesirable stress and will likely damage the feed/guidance components and possibly the cutter and drive line components. To avoid this problem, check that the Main Roller runs smoothly before each use. If necessary clean or replace the bearing and roller. It is also recommended that the Main Roller be demagnetized on a regular basis. This will help reduce the build up of cutting chips etc. from around the roller.

Check the security of the Cutter Nut; the Slide Base Clamping Bolt; and the nut of the Angle Alignment Bolt.

IMPORTANT: The Slide Base Clamping Bolt must be tightened firmly. If it is loose during use, damage to Pivot Arm Assembly components, and possibly cutter and drive-line components, will result.

IMPORTANT: Ensure that no contamination has been trapped behind the Slide Base before retightening. It is essential that the clearance between the Slide Base and the Pivot Arm Block be zero. If even a slight clearance is present, due to chips etc., it could result in significant damage to Pivot Arm Assembly components, and possibly cutter and drive-line components.

NOTE: In order to clean contamination from behind the Slide Base, the Support Roller Assembly, the Main Roller Assembly and the Slide Base Assembly must first be removed.

Check for smooth and free movement of the Clamp Rollers. Inspect the condition of the clamp roller wheels. Replace the pins and roller wheels if play is present, or if there is any damage.

Check the condition of the cutter.

Check the set-up of the machine for conformity to that described earlier in this manual.

Check that the Guide Rollers are adjusted correctly.

IMPORTANT: The Guide Rollers must be adjusted so that the plate being fed into the machine contacts the Guide Rollers prior to contacting the face of the Guide Roller Bracket, however, the Guide Rollers must not be too far out to significantly twist the plate as it is being bevelled (resulting in component damage). For straight edged plate the Guide Rollers should be in front of the face of the Guide Roller Bracket by approximately 0.02" [0.5 mm]. Curved plate will require the rollers to

be further extended (convex edge plate) or recessed (concave edge plate). This is necessary to prevent feeding problems during bevelling. Regularly check to make sure that the plate is running against the Guide Rollers as it is being bevelled and that there is only a minimal gap between the edge of the plate and the face of the Guide Roller Bracket (directly next to the Guide Rollers), especially when changing setups between straight edged plates and curved edged plates or disks. **See page 15 for further details.**

MONTHLY INSPECTIONS

NOTE: The following inspections should be performed with greater frequency if conditions and usage requires.

Inspect the security of all fasteners.

Inspect the condition of the Slide Base; Guide Roller Bracket; and Chip Deflector, and replace them if damaged or gouged from wear, or if the cutting chips have worn a pocket that affects smooth chip flow.

Inspect the condition of the optional undercarriage casters and the spring loaded height adjustment assemblies and replace worn/damaged parts as necessary. Apply general purpose grease to lubricate the spring loaded mechanisms as needed.

On each caster wheel shaft on the KBM-28-080 undercarriage there is a ¼" diameter hole where grease can be applied to lubricate the shaft and steel bushing. This should be done periodically or as required using a manual grease gun fitted with a "Bare" type coupler.

All cables and conduits should be inspected for breaks, abrasions and security.

PERIODIC INSPECTION & MAINTENANCE

NOTE: The following inspection & maintenance should be performed with greater frequency if conditions and usage requires.

Periodically clean the machine with compressed air.

IMPORTANT: The gearbox oil must be changed after the first 300 hours of operation (approximately 2 months of single shift usage) and then every 12,500 hours thereafter.

The Gearbox is typically shipped from the factory with "Shell Tivera S320" - a synthetic, ISO VG 320 oil. When replacing the gearbox oil, refer to the following chart for the best Viscosity Grade (VG) oil to suit the operating environment of the machine. The gearbox requires 4 Gallon (US) [15 Litres] of oil.

NOTE: Do not mix mineral oils with synthetic oils! If necessary to change from one type of oil to the other, carefully wash the internal parts of the unit using suitable detergents.

32 – 70ºF [0 - 20ºC]		70 - 104ºF [20 - 40ºC]	
Mineral Oil ISO VG	Synthetic Oil ISO VG	Mineral Oil ISO VG	Synthetic Oil ISO VG
220	220	460	320

It is recommended that the machine be taken out of service once a year, stripped down and all moving parts be cleaned, lubricated and inspected for wear and damage. All damaged and worn parts should be replaced.

STORAGE

The KBM®-28 Portable Plate Edge Bevelling Machine should be kept in a dry environment with no possibility of impact or damage due to stacking of objects on top of the equipment.

It is also recommended that due to the susceptibility of the Clamp Roller Hand Wheel and Revolving Handle to damage, the Clamp Roller Assembly should be removed for storage.

The machine should be stored with a cutter in place to avoid losing the Cutter Shaft Collar.

When the equipment is brought out of storage, always inspect the condition of the machine prior to use. Pay particular attention to the condition of the oil.

For storage periods of over 60 days, all machined surfaces should be protected with a suitable anti-oxidation product.

For storage periods of over 6 months, it is recommended that in addition to the points above, the gearbox should be filled with extra oil (requiring draining to the correct amount before re-use). It is also recommended that the rotor be turned every 1 to 2 months and to take adequate measures against corrosion and humidity.

SHIPPING

When shipping the KBM®-28 bevelling machine without the optional undercarriage, lag bolt the tilting frame to the skid. If the unit is being shipped with the undercarriage, it is recommended that the machine be secured to a skid that raises the four (4) casters off the floor.

The Clamp Roller Assembly should be removed from the Cutter Shaft Housing to protect it from damage.

The machine should be shipped with a cutter in place to avoid losing the Cutter Shaft Collar.

The starter switch assembly should either be removed or protected against damage.

TROUBLESHOOTING GUIDE

PROBLEM	CAUSE	REMEDY
Difficult to Feed Plate.	Slight Overload.	Push plate forward to help feeding.
	Overload.	Check bevel width relative to the plate tensile strength. Take smaller cuts per pass. Refer to "Bevelling Capacity" earlier in the manual.
	Guide Roller not functioning.	Check the guide roller for correct set-up. Refer to the appropriate section under "Bevel Settings" earlier in the manual.
	Clamp Roller is too tight.	Check if plate is in true (flat) contact with the Main Roller. Re-adjust Clamp Roller Assembly if necessary. Refer to the appropriate section under "Bevel Operation" earlier in the manual.
	Main Roller not functioning.	Free-up the rotation of the main roller replacing the bearing if necessary.
Uneven Bevel Measurement.	Burrs on the plate make the edge uneven.	Grind off all burrs and irregularities before bevelling.
	Guide roller extends beyond the slide base surface.	Check the guide roller for correct set-up. Refer to the appropriate section under "Bevel Settings" earlier in the manual.
	Loose setting of the Slide Base Locking Bolt.	Clean mating surfaces of the Slide Base and Pivot Arm Block, check for true seating of the Slide Base, and firmly tighten the Slide Base Locking Bolt.
Cutter Slips and does not feed the plate through the machine.	Overload.	Check bevel width relative to the plate tensile strength. Take smaller cuts per pass. Refer to "Bevelling Capacity" earlier in the manual.
	Burrs in sheared edge of plate interfere with feeding.	Grind off all burrs and irregularities before bevelling.
Chips are not sheared off at the root.	The cutter edge extension is not far enough beyond the edge of the plate.	The bottom dead-centre of the cutter must be at least 0.025" [0.6 mm] recessed from the front face of the Guide Roller Bracket (I.e cutter is shimmed too far out).
	The cutting chips are too heavy	The depth of cut is too heavy. Take smaller cuts per pass. Refer to "Bevelling Capacity" earlier in the manual.
Cutter Damage.	Wrong machine settings.	Check.
	Overload.	Check bevel width relative to the plate tensile strength. Take smaller cuts per pass. Refer to "Bevelling Capacity" earlier in the manual.
	Main roller not functioning.	Free-up the rotation of the Main Roller, replacing the bearing if necessary.
	Too much external force applied to the cutter.	Relieve all external forces. Refer to "Forces Acting on the Cutter" and "Cutter Breakage Caused by External Forces" earlier in this manual.

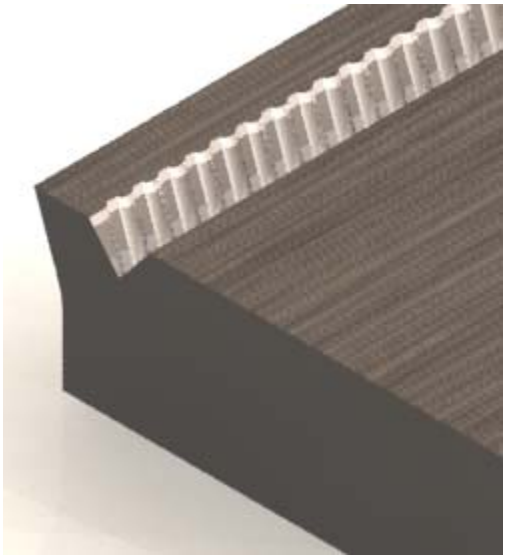
TROUBLESHOOTING GUIDE, CONTINUED….

If the bevelled plate looks similar to the adjacent image:

- Check that the cutter thickness and spacers are not too great (as described **on page 26**).
- Check that the correct angle pin is installed and that the Angle Alignment Bolt setting is correct (as described **on page 12**).
- If the above checks do not find the problem, try adjusting the Angle Alignment Bolt so that it is slightly higher than the appropriate mark engraved on the side of the Cutter Shaft Housing.

If the bevelled plate looks similar to the adjacent image;

- ***Stop bevelling with the machine immediately!***
- ***Serious component damage will result after a very short period of use under these conditions.***
- Perform the same checks as listed next to the image above.

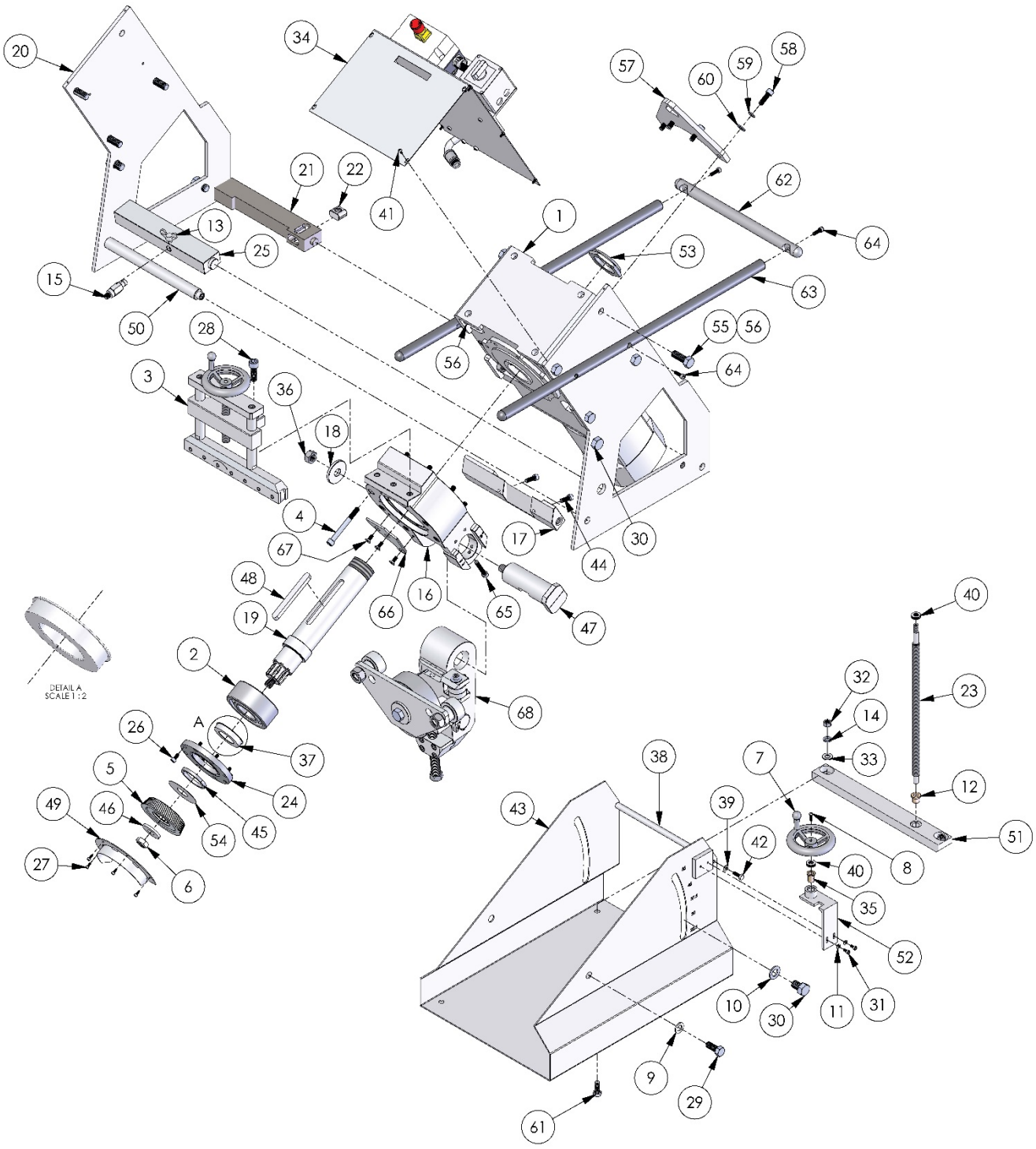


If the bevelled plate looks similar to the adjacent image:

- Lower the slide base assembly (as described **on page 14**).
- It may be necessary to perform a bevel, leaving a small root face (land), measuring the root face, and then adjusting the Angle Reference Scale accordingly.

KBM®-28-100 GENERAL ASSEMBLY BREAKDOWN

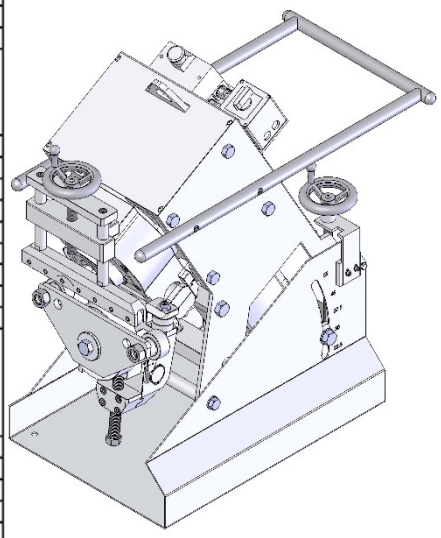
Drawing Number: KBM-28-100



KBM®-28-100 GENERAL ASSEMBLY BREAKDOWN

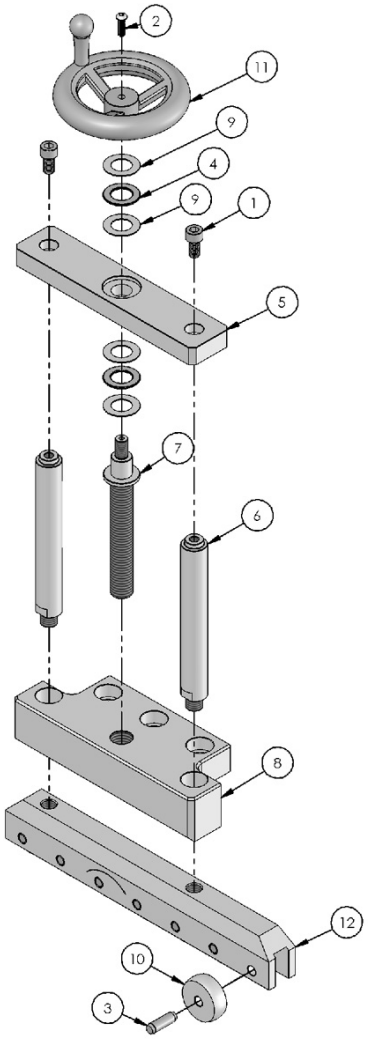
ITEM	PART NO.	DESCRIPTION	QTY.
1	KBM-28-120-A	230/460V GEARMOTOR (KBM-28-100-A,B,C&D)	1
	KBM-28-120-B	575V GEARMOTOR (KBM-28-E)	
2	KBM-28-038	CUTTER SHAFT BEARING	1
3	KBM-28-006	CLAMP ROLLER ASSEMBLY	1
4	GK-107-142	M12-1.75 x 110mm SHCS	7
5	KBM-28-X1C	MEDIUM TOOTH CUTTER (SOLD SEPARATELY)	1
	KBM-28-X1H	HIGH TENSILE MATERIAL CUTTER (SOLD SEPARATELY)	
	KBM-28-X1A	DEEP TOOTH CUTTER (SOLD SEPARATELY)	
	GBM-28-FXS	FINE TOOTH CUTTER (SOLD SEPARATELY)	
6	GBM-28-07779	CUTTER NUT	1
7	KBM-28-039	5" HAND WHEEL	1
8	GK-112-131	M6-1.0 x 20mm BHCS	1
9	GK-111-099	WASHER 16mm BOLT x 30 OD x 3.0	2
10	GK-111-100	WASHER 20mm BOLT x 37 OD x 3.0	2
11	GK-111-094	WASHER 6mm BOLT x 12 OD x 1.6	2
12	GK-118-052	IDLER GEAR BUSHING	1
13	GK-161-003	M10x16 WING SCREW	1
14	GK-136-065	LOCK WASHER 1/2 BOLT	2
15	GBM-28-040-225	22.5 DEGREE ANGLE PIN (OPTIONAL)	1
	GBM-28-040-30	30 DEGREE ANGLE PIN	
	GBM-28-040-375	37.5 DEGREE ANGLE PIN (OPTIONAL)	
	GBM-28-040-45	45 DEGREE ANGLE PIN (OPTIONAL)	
	GBM-28-040-55	55 DEGREE ANGLE PIN (OPTIONAL)	
16	KBM-28-015	CUTTER SHAFT HOUSING	1
17	KBM-28-019	MAIN SUPPORT BAR	1
18	KBM-28-049	WASHER	1
19	KBM-28-022	CUTTER SHAFT	1
20	KBM-28-024	BODY SIDE	2
21	KBM-28-030	LIFT BAR	1
22	KBM-28-031	LIFT NUT	1
23	KBM-28-045	LIFTING SCREW	1
24	KBM-28-042	STOP DISC	1
25	KBM-28-021	ANGLE SUPPORT BAR	1
26	GK-107-123	M8-1.25 x 16mm SHCS	8
27	GK-107-131	M5-0.8 x 12mm SHCS	4
28	GK-107-143	M16-2.0 x 45mm SHCS	3
29	GK-108-147	M16-2 x 40mm HEX BOLT	2
30	GK-108-145	M20-2.5 x 30mm HEX BOLT	4
31	GK-107-094	M6-1.0 x 12mm SHCS	2
32	GK-109-059	1/2-13UNC HEX NUT	2
33	GK-111-075	WASHER 17/32 ID x 1-1/16 OD x 0.117	2
34	KBM-28-223	STARTER ASSEMBLY	1
35	GK-118-062	BRONZE BUSHING	1
36	GK-135-062	M20-2.5 NYLOK HEX NUT	1
37	KBM-28-065	CUTTER SHAFT COLLAR	1
38	KBM-28-004	BASE FRAME BAR	1
39	GK-111-101	WASHER 8mm BOLT x 16 OD x 1.6	2
40	KBM-28-040	THRUST BEARING	2
41	GK-112-134	M5-0.8 x 12mm BHCS	10
42	GK-108-112	M8-1.25 x 25mm HEX BOLT	2
43	KBM-28-025	TILTING FRAME	1
44	GK-107-083	M10-1.5 x 30mm SHCS	2
45	GBM-18-094	CUTTER FELT INSERT	1
46	KBM-28-058	CUTTER NUT WASHER	1
47	KBM-28-054	ANGLE ALIGNMENT BOLT	1
48	KBM-28-023	CUTTER SHAFT KEY	1
49	KBM-28-020	CUTTER GUARD	1
50	KBM-28-051	TILT BAR	1
51	KBM-28-029	LIFTING BAR MOUNT	1
52	KBM-28-033	CRANK BRACKET	1
53	KBM-28-007	65MM SELF-LOCKING NUT	1
54	GBM-28-015-B	1.0mm CUTTER SHIM	INCLUDES (1) OF EACH - USE AS NEEDED
	GBM-28-015-A	0.5mm CUTTER SHIM	
55	GK-108-155	M18-2.5 x 50mm HEX BOLT	8
56	GK-109-082	M18-2.5 HEX NUT	8
57	KBM-28-071	LIFTING PLATE	1
58	GK-107-137	M12-1.75 x 35mm SHCS	4
59	GK-136-070	LOCK WASHER 12mm BOLT	4
60	GK-111-095	WASHER 12mm BOLT x 24 OD x 2.5	4
61	GK-108-098	1/2-13UNC x 1-1/4 HEX BOLT	2
62	KBM-28-123	HANDLE SUPPORT	1
63	KBM-28-122	HANDLE	2
64	GK-107-121	M8-1.25 x 25mm SHCS	6
65	GK-107-102	M10-1.5 x 60mm SHCS FULL THREAD	2
66	KBM-28-210	CUTTER SHAFT HOUSING WEAR PLATE	1
67	GK-105-075	M8 x 20mm FHSCS	3
68	KBM-28-214	PIVOT ARM ASSEMBLY	1

Drawing Number: KBM-28-100



CLAMP ROLLER ASSEMBLY BREAKDOWN

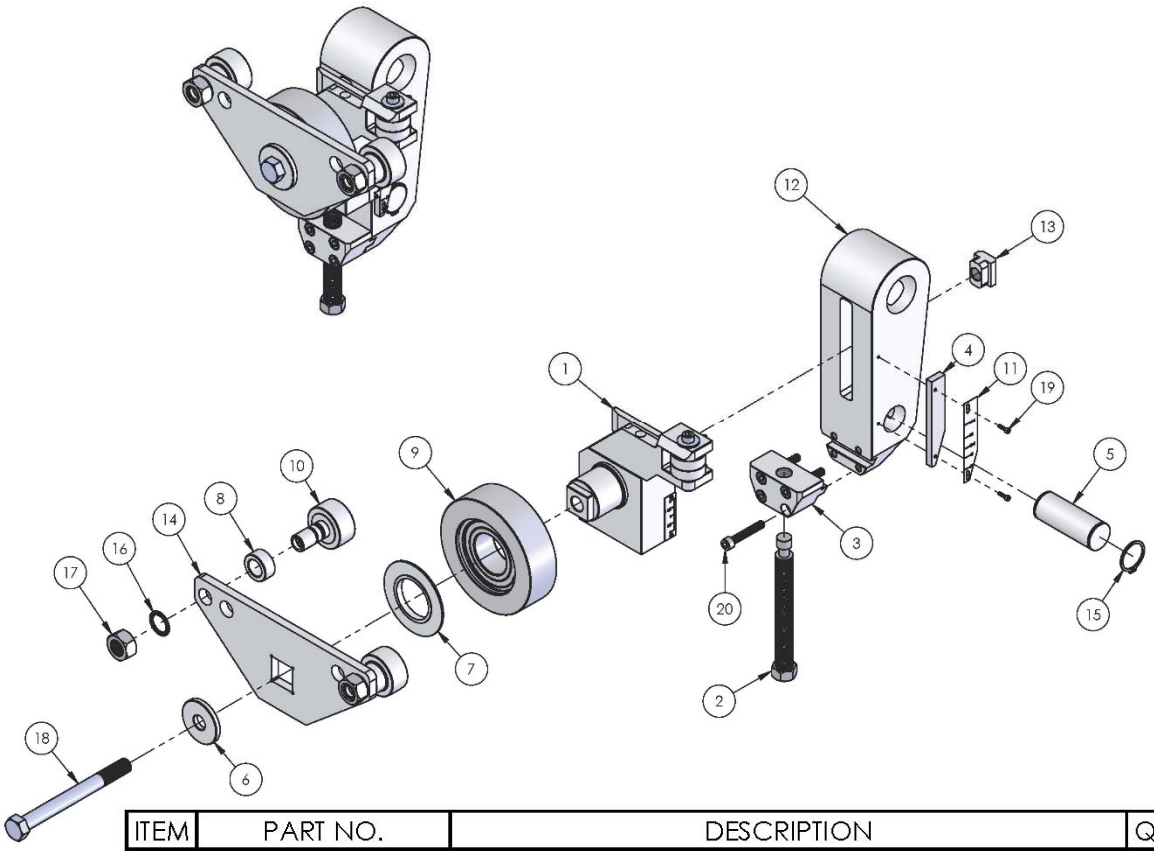
Part Number: KBM-28-006



ITEM	PART NUMBER	DESCRIPTION	QTY
1	GK-107-126	M10-1.5 x 20mm SHCS	2
2	GK-112-131	M6-1.0 x 20mm BHCS	1
3	GK-115-089	10mm x32mm DOWEL PIN	7
4	KBM-28-035	THRUST BEARING	2
5	KBM-28-009	SLIDE SHAFT RETAINING PLATE	1
6	KBM-28-055	SLIDE SHAFT	2
7	KBM-28-053	SCREW SHAFT	1
8	KBM-28-008	SLIDE SHAFT SUPPORT PLATE	1
9	KBM-28-036	THRUST WASHER	4
10	KBM-28-050	CLAMP ROLLER	7
11	KBM-28-039	5" HAND WHEEL	1
12	KBM-28-010	CLAMP ROLLER HOLDER	1

PIVOT ARM ASSEMBLY BREAKDOWN

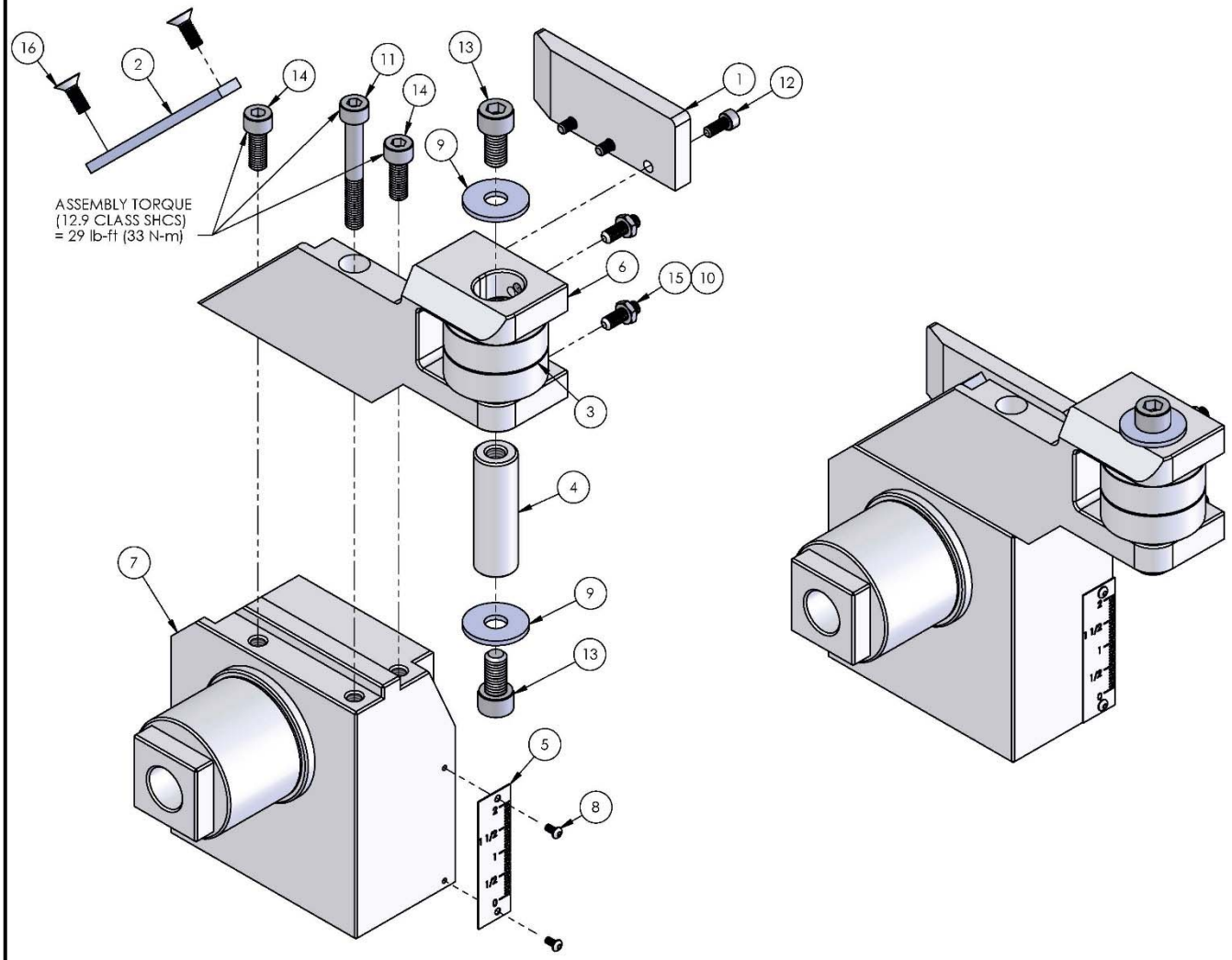
Part Number: KBM-28-214



ITEM	PART NO.	DESCRIPTION	QTY.
1	KBM-28-213	SLIDE BASE ASSEMBLY	1
2	KBM-28-070	SLIDE BASE ADJUSTING BOLT	1
3	KBM-28-069	ADJUSTING BOLT SUPPORT	1
4	KBM-28-067	ANGLE REFERENCE SCALE SPACER	1
5	KBM-28-052	ANGLE PIVOT PIN	1
6	KBM-28-049	WASHER	1
7	KBM-28-048	COVER PLATE	1
8	KBM-28-046	SUPPORT ROLLER SPACER	2
9	KBM-28-041	MAIN ROLLER ASSEMBLY	1
10	KBM-28-037	INK KR 62 PP STUD TRACK SUPPORT ROLLER	2
11	KBM-28-027	ANGLE REFERENCE SCALE	1
12	KBM-28-017	PIVOT ARM BLOCK	1
13	KBM-28-016	"T" NUT	1
14	KBM-28-014	SUPPORT ROLLER PLATE	1
15	GK-119-068	40MM EXTERNAL RETAINING RING	2
16	GK-111-102	M24 SCHNORR WASHER	2
17	GK-109-080	M24-1.5 HEX NUT	2
18	GK-108-135	M20-2.5 x 200mm HEX BOLT	1
19	GK-107-105	M4-0.7 x 14mm SHCS	2
20	GK-107-102	M10-1.5 x 60mm SHCS FULL THREAD	4

SLIDE BASE ASSEMBLY BREAKDOWN

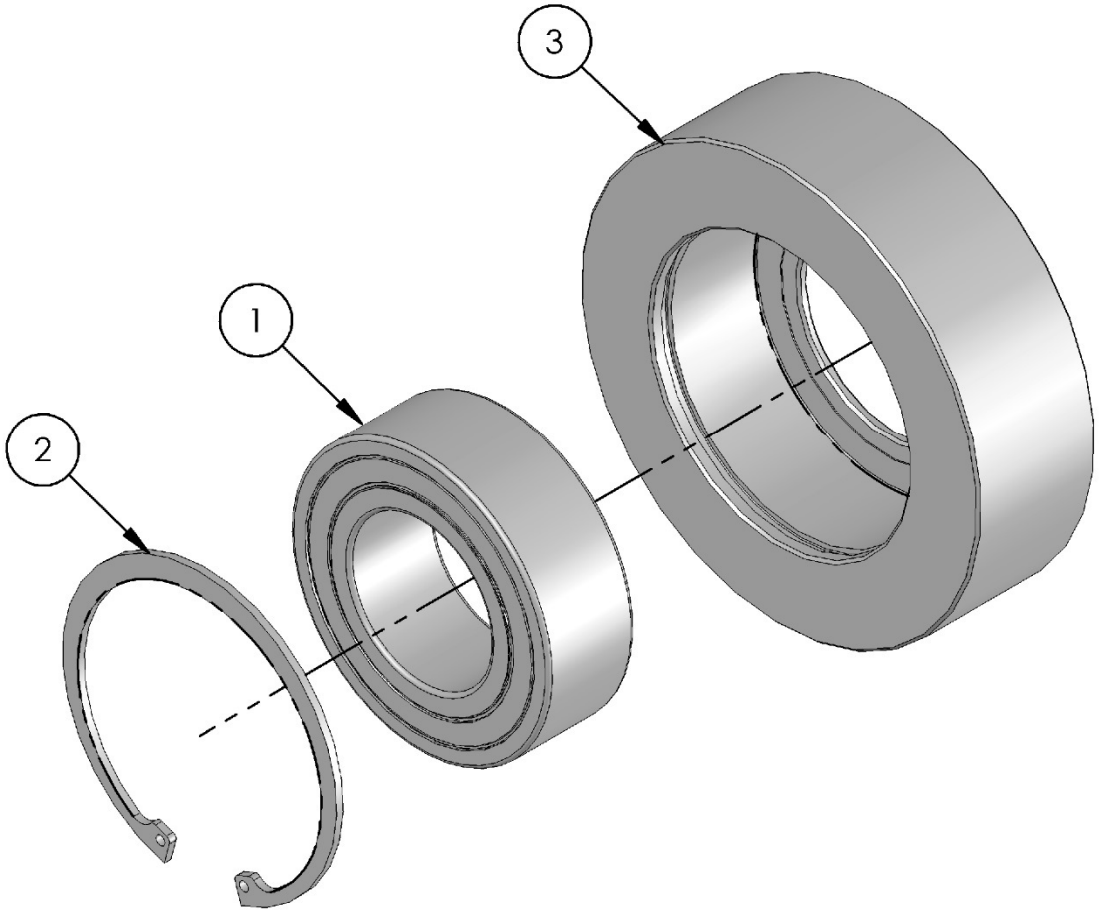
Part Number: KBM-28-213



ITEM	PART NO.	DESCRIPTION	QTY.
1	KBM-28-212	REAR CHIP DEFLECTOR	1
2	KBM-28-211	SLIDE BASE WEAR PLATE	1
3	KBM-28-059	GUIDE ROLLER BEARING	2
4	KBM-28-047	TRACK SPACER	1
5	KBM-28-026	ROOT FACE SCALE	1
6	KBM-28-012	GUIDE ROLLER BRACKET	1
7	KBM-28-011	SLIDE BASE	1
8	GK-112-132	M3 x 6mm BHCS	2
9	GK-111-098	FENDER WASHER 10mm BOLT x 30 OD x 2.5	2
10	GK-110-071	M6 x 1.0 HEX HEAD JAM NUT	2
11	GK-107-141	M8-1.25 x 60mm SHCS	1
12	GK-107-131	M5-0.8 x 12mm SHCS	3
13	GK-107-126	M10-1.5 x 20mm SHCS	2
14	GK-107-124	M8-1.25 x 22mm SHCS	2
15	GK-106-086	M6-1.0 x 20mm SET SCREW	2
16	GK-105-092	M6 x 16mm FHSCS	2

MAIN ROLLER ASSEMBLY BREAKDOWN

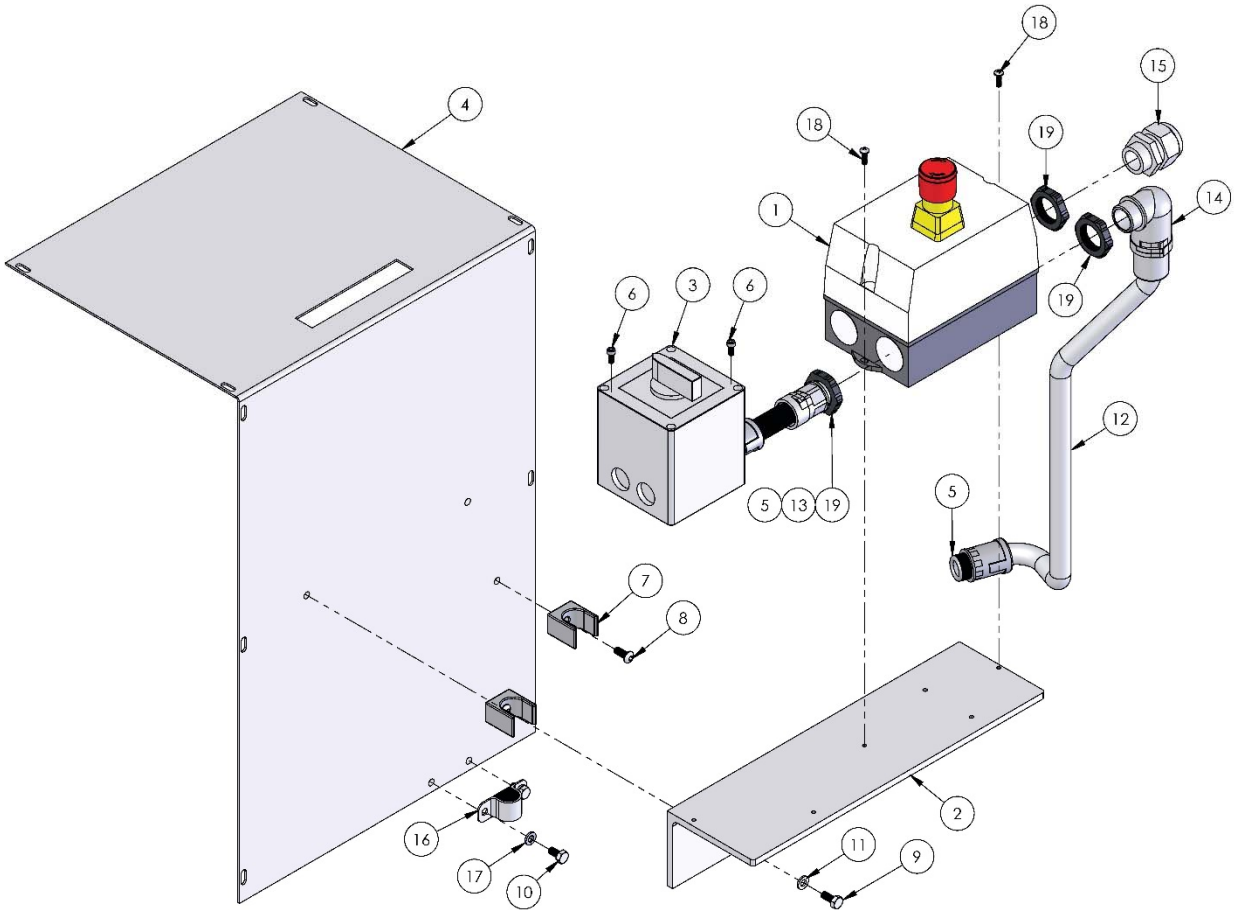
Part Number: KBM-28-041



ITEM	PART NUMBER	DESCRIPTION	QTY
1	KBM-28-060	MAIN ROLLER BEARING	1
2	KBM-28-061	INTERNAL RETAINING CLIP	1
3	KBM-28-057	MAIN ROLLER	1

STARTER ASSEMBLY BREAKDOWN

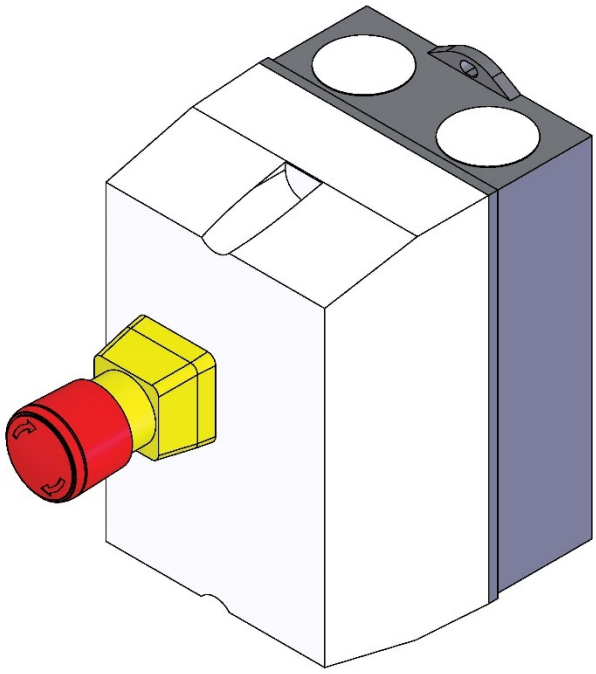
Drawing Number: KBM-28-223



ITEM	PART NO.	DESCRIPTION	QTY.
1	KBM-28-225-1	MANUAL STARTER ASSEMBLY (230V)	1
	KBM-28-225-2	MANUAL STARTER ASSEMBLY (380V, 415V & 460V)	
	KBM-28-225-3	MANUAL STARTER ASSEMBLY (575V)	
2	KBM-28-064	MOTOR STARTER MOUNTING BRACKET	1
3	KBM-28-072	ROTARY DIRECTION SWITCH	1
4	KBM-28-028	GEAR BOX COVER	1
5	GK-148-025	PG16 STRAIGHT CONNECTOR	2
6	GK-107-065	#8-32UNC x 3/8 SHCS	2
7	GK-156-082	CO-FIX SYSTEM SUPPORT	2
8	GK-112-130	M6-1.0 x 14mm BHCS	2
9	GK-108-115	M6-1.0 x 14mm HEX BOLT	2
10	GK-108-159	M6-1.0 x 12mm HEX BOLT	2
11	GK-111-094	WASHER 6mm BOLT x 12 OD x 1.6	2
12	RM-114-111	FLEX CONDUIT (1pc @ 2-1/2 LONG) (1pc @ 22 LONG)	1
13	GK-148-030	M25 STRAIGHT CONNECTOR	1
14	GK-148-031	M25-1.5MM 90 DEG. CONNECTOR	1
15	GK-148-032	M25 CABLE GLAND	1
16	GK-156-093	CABLE CLAMP	1
17	GK-136-072	LOCK WASHER 6mm BOLT	2
18	GK-112-050	#8-32UNC x 1/2 RND HEAD SCREW	2
19	KBM-28-224	M25 X 1.5 LOCK NUT	3

MANUAL STARTER ASSEMBLY BREAKDOWN

Drawing Number: KBM-28-225-1/2/3



KBM-28-225-1 (230V)

PART NO.	DESCRIPTION	QTY.
KBM-28-215	SURFACE MOUNT ENCLOSURE WITH E-STOP	1
KBM-28-216	MANUAL MOTOR STARTER 6.3-10A	1
KBM-28-219	UNDERVOLTAGE TRIP RELEASE 230V	1

KBM-28-225-2 (380V, 415V & 460V)

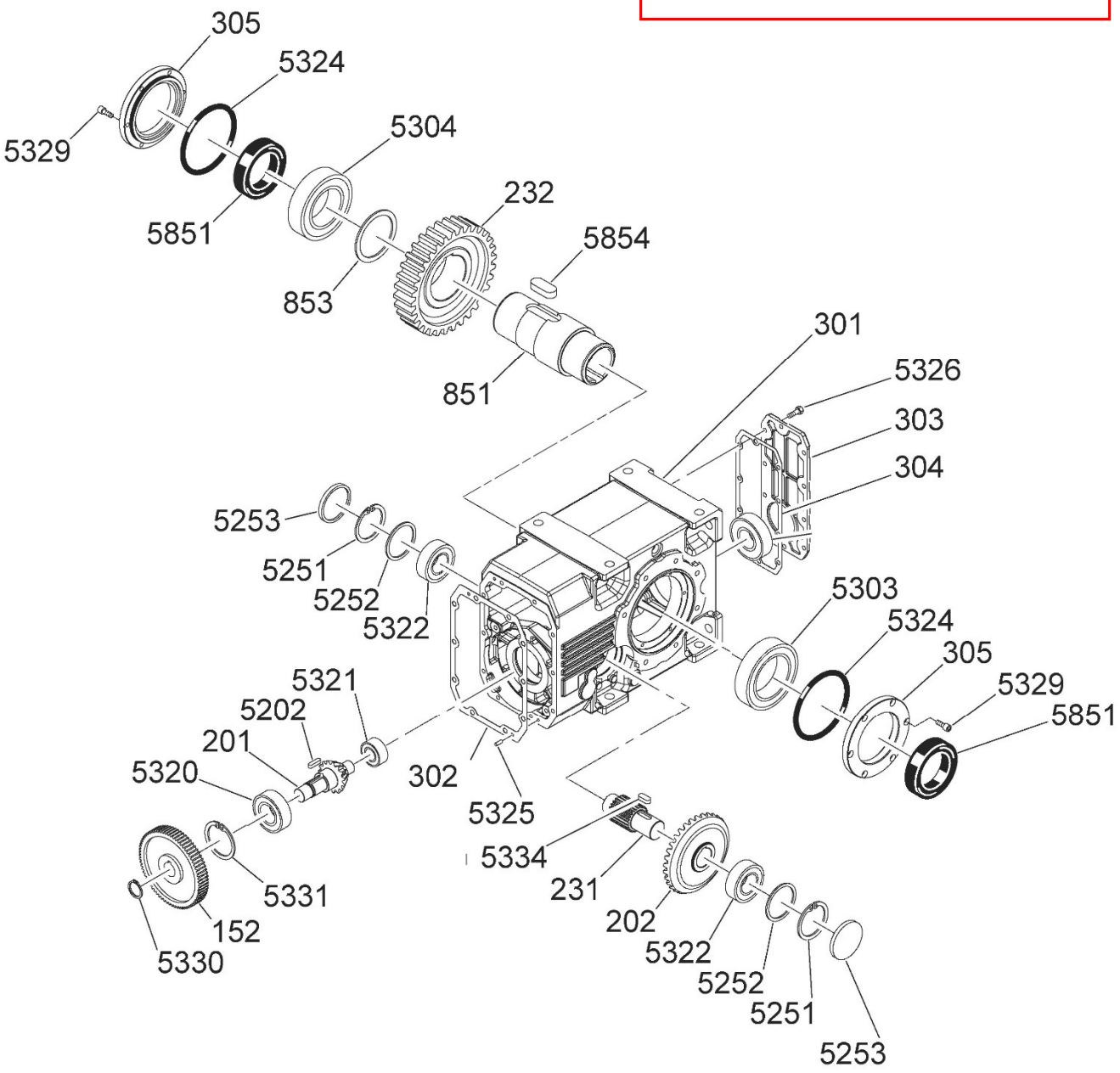
PART NO.	DESCRIPTION	QTY.
KBM-28-215	SURFACE MOUNT ENCLOSURE WITH E-STOP	1
KBM-28-218	MANUAL MOTOR STARTER 4-6.3A	1
KBM-28-220	UNDERVOLTAGE TRIP RELEASE 380V TO 460V	1

KBM-28-225-3 (575V)

PART NO.	DESCRIPTION	QTY.
KBM-28-215	SURFACE MOUNT ENCLOSURE WITH E-STOP	1
KBM-28-217	MANUAL MOTOR STARTER 2.5-4A	1
KBM-28-221	UNDERVOLTAGE TRIP RELEASE 575V	1

KBM®-28 MAIN GEARBOX BREAKDOWN

Note:
Provide all nameplate details from gear box label when ordering spare parts.



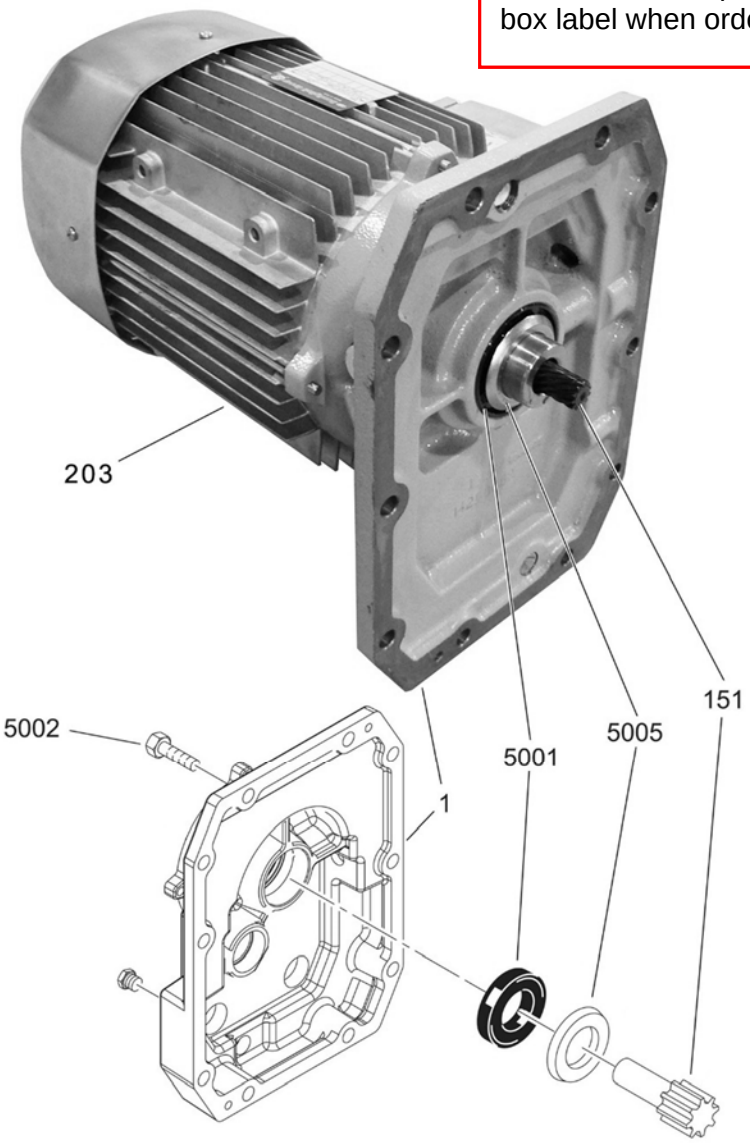
KBM®-28 MAIN GEARBOX BREAKDOWN

If component damage occurs, Gullco strongly recommends replacing the KBM-28-300 Gearbox Sub Assembly, as it is more readily available and has been precision assembled & adjusted. Special tooling and procedures are required to rebuild these gearboxes and therefore not recommended.

Item	Part Number	Description	Qty
152	KBM-28-152	1st. Red.Gear	1
302	KBM-28-120-GL	Gasket	1
5325	KBM-28-5225	Dowel 6x16	2
	KBM-28-300	**Gearbox Sub Assembly** (All Items Below)	
201	Not Sold Individually	Bevel Pinion	1
202	Not Sold Individually	Bevel Gear	1
231	Not Sold Individually	Output Pinion	1
232	Not Sold Individually	Output Gear	1
301	Not Sold Individually	Gear Housing	1
303	KBM-28-302	Cover	1
304	KBM-28-304	Gasket	1
305	KBM-28-305	Flange	2
851	Not Sold Individually	Output Shaft	1
853	KBM-28-853	Spacer Ring 90x110x3.5 R	1
5202	Not Sold Individually	Key 8x7x30 B	1
5251	KBM-28-5251	Circlip 80	2
5252	KBM-28-5252	Washer 68x80x3 R	2
5253	KBM-28-5253	Rubber Cap 80x8	2
5303	KBM-28-5303	Bearing 32018X	1
5304	KBM-28-5304	Bearing 32216	1
5320	KBM-28-5320	Bearing 32208	1
5321	KBM-28-5321	Bearing 33205	1
5322	KBM-28-5322	Bearing 32208	2
5324	KBM-28-5324	O-Ring Seal133.02x2.62	2
5326	KBM-28-5326	Screw T.E. Mx25	8
5329	KBM-28-5329	Screw T.C.E. M8x22	12
5330	KBM-28-5330	Circlip De30	1
5331	KBM-28-5331	Circlip 80	1
5334	Not Sold Individually	Key 12x8x28 C	1
5851	KBM-28-5851	Oil Seal	2
5854	Not Sold Individually	Key 25x14x60 B	1

KBM®-28 MOTOR ASSEMBLY BREAKDOWN

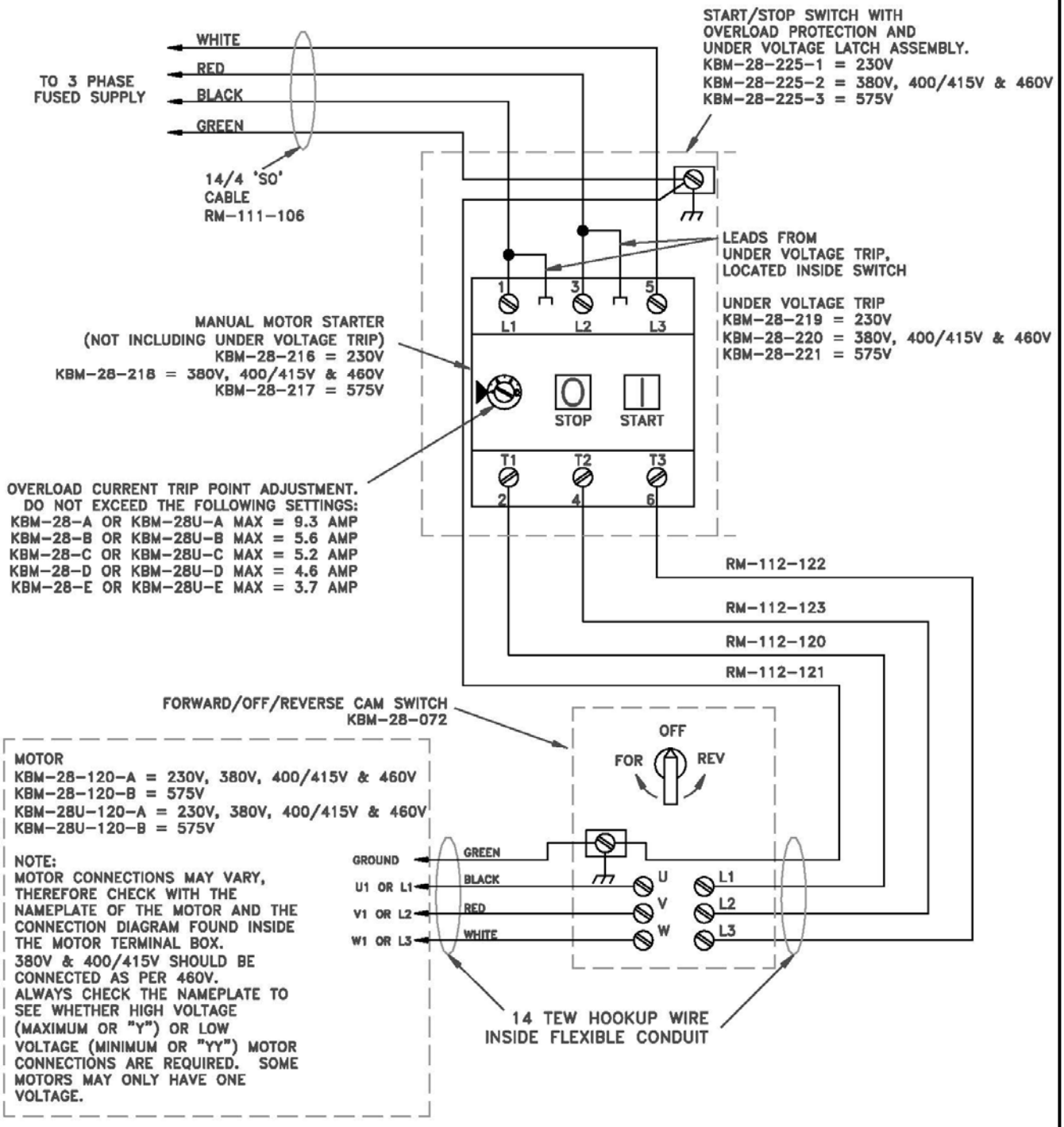
Note:
Provide all nameplate details from gear box label when ordering spare parts.



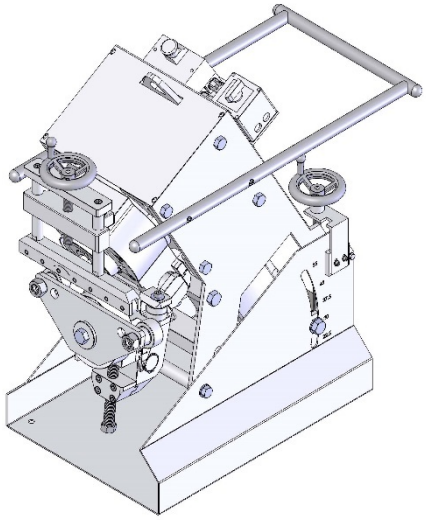
Item	Part Number	Description	Qty
203	KBM-28-203-A	230/460V Motor Assembly (KBM-28-100-A, -B, -C & -D) Includes Items 1, 151, 5001 & 5005	1
	KBM-28-203-B	575V Motor Assembly (KBM-28-100-E) Includes Items 1, 151, 5001 & 5005	
1	KBM-28-207	Cover	1
151	Not Sold Individually	Pinion Gear	1
5001	KBM-28-5001	Seal	1
5002	KBM-28-5002	Bolt	10
5005	KBM-28-5005	Gamma Seal 32x52x4.5	1

KBM®-28 WIRING SCHEMATIC

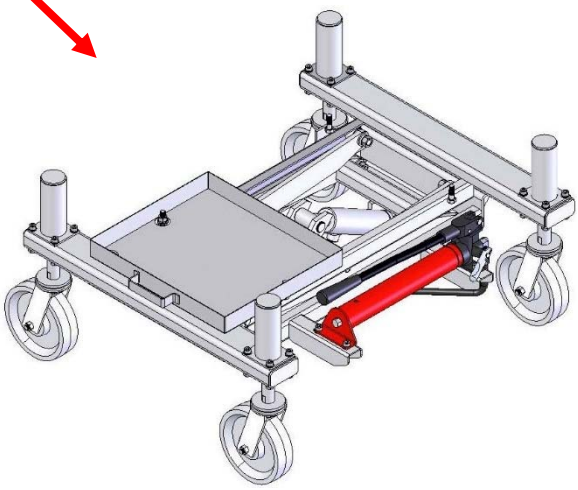
Drawing Number: KBM-28-225-SCH



OPTIONAL UNDERCARRIAGE



KBM-28-100

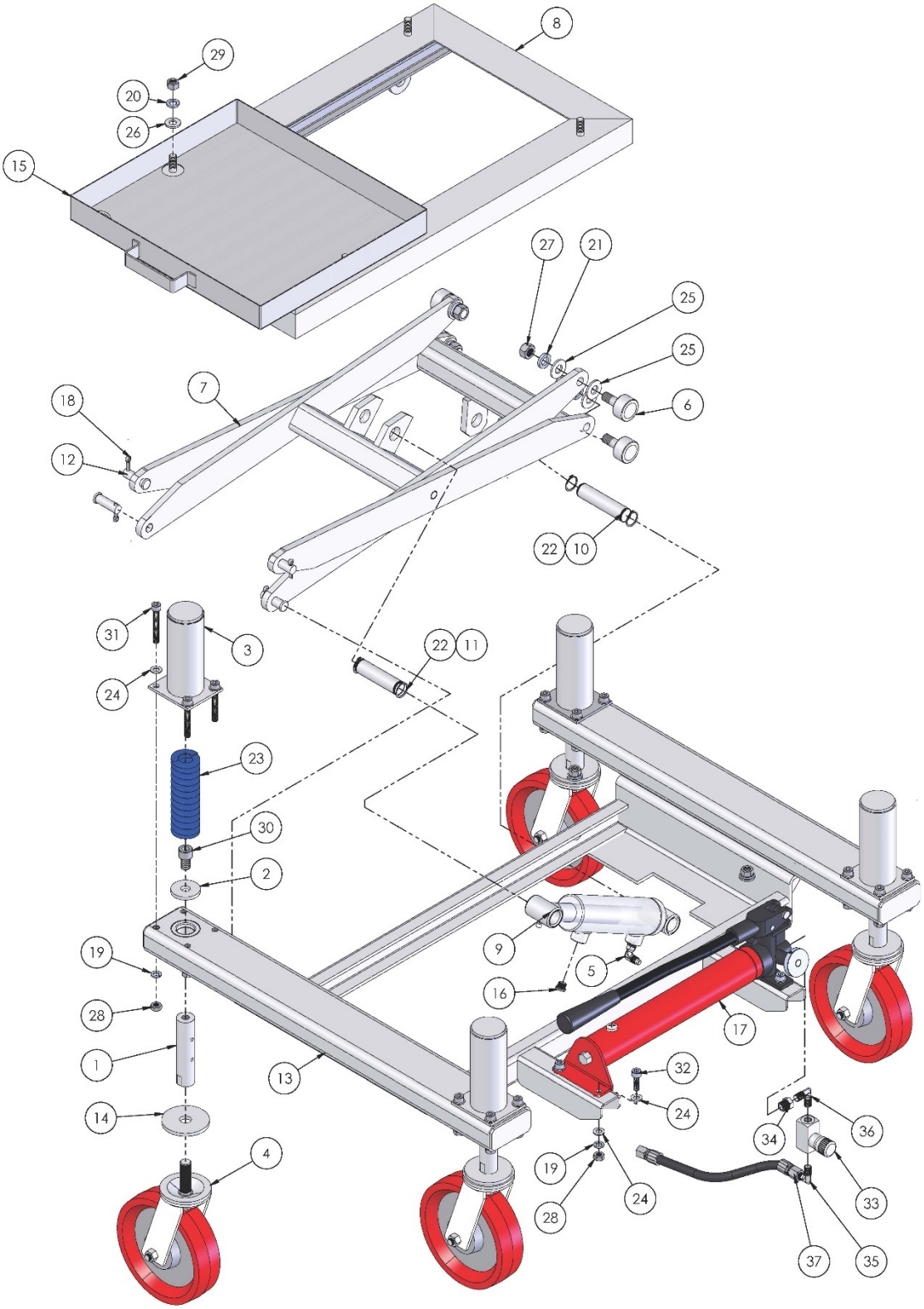


KBM-28-080

Hydraulic height adjustment undercarriage. Ideal for beveling applications that require frequent changes in bevel angles and working heights.

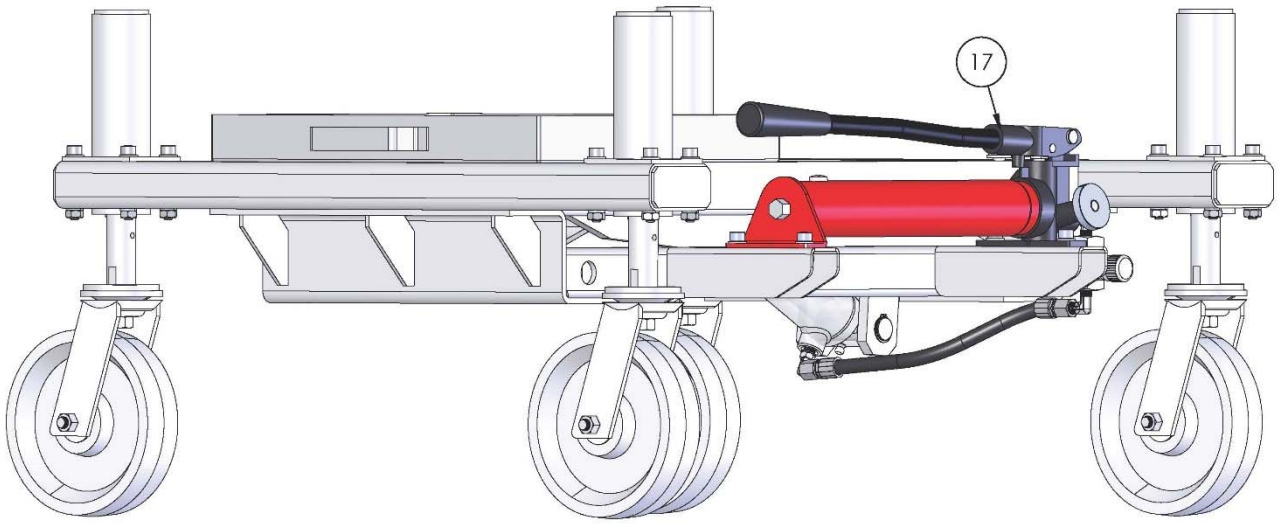
HYDRAULIC UNDERCARRIAGE ASSEMBLY BREAKDOWN

Part Number: KBM-28-080



HYDRAULIC UNDERCARRIAGE ASSEMBLY BREAKDOWN

Part Number: KBM-28-080



HYDRAULIC UNDERCARRIAGE ASSEMBLY BREAKDOWN

Part Number: KBM-28-080

ITEM	PART NO.	DESCRIPTION	QTY.
1	KBM-28-130	WHEEL SHAFT	4
2	KBM-28-129	WHEEL SHAFT WASHER	4
3	KBM-28-128	SPRING CAP	4
4	KBM-28-116	8" SWIVEL CASTER	4
5	KBM-28-114	90°ELBOW ADAPTER MJIC-6 TO MORB-6	1
6	KBM-28-109	CRS-26 CAM FOLLOWER	4
7	KBM-28-104	SCISSOR WELDMENT	1
8	KBM-28-102	TABLE TOP ASSEMBLY	1
9	KBM-28-101	2" BORE X 4" STROKE CYLINDER	1
10	KBM-28-097	HYDRAULIC JACK BASE PIN	1
11	KBM-28-096	HYDRAULIC JACK PISTON PIN	1
12	KBM-28-095	SCISSOR PIN	4
13	KBM-28-092	UNDER CARRIAGE WELDMENT	1
14	KBM-28-091	WHEEL SPACER	4
15	KBM-28-003	CHIP TRAY (OPTIONAL)	1
16	KBM-18-196	VENTED HEX SOCKET PLUG 3/8 ORING	1
17	KBM-18-192	HAND PUMP 3000 PSI	1
18	GK-142-002	COTTER PIN, 1/8 X 3/4	4
19	GK-136-069	LOCK WASHER 10mm BOLT	20
20	GK-136-065	LOCK WASHER 1/2 BOLT	4
21	GK-136-064	LOCK WASHER 5/8 BOLT	4
22	GK-119-076	1" EXTERNAL RETAINING RING	4
23	GK-116-026	SPRING	4
24	GK-111-096	WASHER 10mm BOLT x 20 OD x 2	24
25	GK-111-078	BLACK OX. WASHER 5/8 BOLT x 1-3/8 OD x 0.130	6
26	GK-111-075	WASHER 17/32 ID x 1-1/16 OD x 0.117	4
27	GK-109-085	5/8-18UNF HEX NUT GR.8	4
28	GK-109-075	M10-1.5 HEX NUT	20
29	GK-109-059	1/2-13UNC HEX NUT	4
30	GK-107-156	5/8-11UNC x 1 SHCS	4
31	GK-107-152	M10-1.5 x 70mm SHCS	16
32	GK-107-083	M10-1.5 x 30mm SHCS	4
33	KBM-28-108	FLOW CONTROL VALVE	1
34	KBM-18-197	3/8" NPT TO 1/4" BUSHING ADAPTER	1
35	KBM-28-111	1/4" NPT TO 3/8" TUBE 90 ELBOW MALE	1
36	KBM-28-119	1/4" NPT 90 ELBOW MALE	1
37	KBM-18-191	HYDRAULIC HOSE	1

REVISIONS LIST

Mar, 2006
Title Page Changed Gullco India's e-mail address back to the original.
39, 40 & 42 Changes reflecting use of GBM-28-013-C starter assembly for 415V 50Hz machines.

May, 2006
Page 36 Changed part numbers of items 2 & 4 to reflect 24mm thread sized components.

Aug, 2006
Page 6 Updated lifting (hoisting) instructions.
Page 7 Updated product labels.
Pgs 32 & 33 Added Lifting Plate and hardware.
Pg 39 40 & 42 Updated to reflect new RoHS compliant starter components.

October, 2006
Page 39 Changed 2 x mounting bolts to Hex Bolts & removed starter voltage references.
Page 40 & 42 Updated to reflect common components between 380V & 415V 50Hz machines.

December, 2006
Title Page Updated Gullco Australia's phone and fax numbers.

February, 2007
Title Page Updated Gullco contact details.
Page 7 Updated the product label.
Page 30 Added instruction to store/ship machine with cutter in place to avoid loss of spacer.
Page 36 Updated B.O.M. for KBM-28-044.
Page 42 Updated wiring schematic to reflect new Current Trip Point Values (F.L.A. ratings).
General Changed references of 415V to 400/415V.

January, 2008
Title Page Updated Gullco contact details.
Page 7 Revised the S.C. Rating on the Product labels.
Page 32 Inserted additional Troubleshooting page (resulted in page numbering changes).
General Revised to reflect optional undercarriages.

March, 2008
Page 43 Added Compact Motor Interface Breakdown details.

April, 2008
Pgs 42-44 Updated Motor & Gearbox Breakdown Assy's (resulted in page numbering changes).

May, 2008
Pgs 34 – 35 Updated the KBM-28-100 General Assembly drawing and bill of materials.

ADDITIONAL NOTES

Specifications and products are subject to change without notice.
KAT, Moggy, Sam, KATBAK & KBM are registered trademarks of Gullco International Enterprises Ltd.
Only use genuine/authorized replacement parts.

February, 2013

Title Page	Updated Gullco contact details
Various Pgs	Removed standard undercarriage from manual, KBM-28-002.
Pgs 3 & 30	Gearbox oil changed to Shell Tivela S 320, was Mobil SHC 630
Page 20	Revised table height to reflect the hydraulic undercarriage, KBM-28-080
Page 24	Revised table for available cutters, GBM-28-X1 & GBM-28-FXS removed. Replaced with KBM-28-X1H.
Pgs 34 & 35	Updated drawing and bill of materials for KBM-28-100. Old pull handles removed and replaced with items 64, 65 & 66.
Page 38	Updated drawing and bill of materials for KBM-28-043 to reflect changes in hardware and assembly torque of items 12 & 16. Set screw removed, GK-106-085.
Pgs 47 & 48	Update drawing and bill of material for the hydraulic undercarriage KBM-28-080

December, 2014

Page 24	Revised table for available cutters, added KBM-28-X1A.
Page 31	Added instructions on setting the pressure relief for the hydraulic pump.
Page 48 to 50	Updated drawings and bill of materials to reflect the new hydraulic pump.

February, 2016

Page 36	Revised the length of the Angle Alignment Bolt Adjustment Screws & updated cutter details.

September, 2017

Title Page	Updated Gullco contact details.
Overall	General update to include wear plates, drawings KBM-28-213 (item 2) & KBM-28-100 (item 66).

May, 2018

Pgs. 40, 41 & 45	Updated starter details and part numbers.

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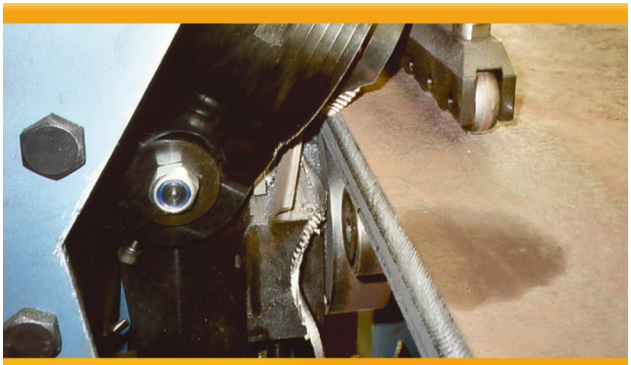
KAT® OSCILLATOR

- Motorized weld center line adjustment
- Motorized stroke width
- Oscillation speed control
- Store up to 10 welding programs



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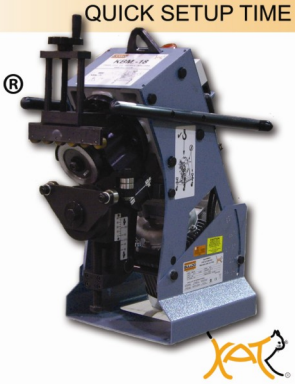
KBM®

- Produce clean bevels with no thermal distortion
- Bevels angles 22° to 55° (other angles available)
- Hydraulic and Adjustable undercarriages available
- Bevels Mild Steel, Stainless Steel, and Aluminium
- Reduce cost and save time by minimising defects and poor fit up



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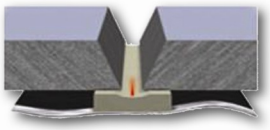
CERAMIC WELD BACKING

- Eliminate Defects And Rework
- Eliminate Costly Unnecessary Gouging And Grinding
- Sizes 1/4" (6.3 mm) to 2" (51 mm)
- Special Sizes And Configurations Available



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