



**BROBO GROUP®**

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## **PRODUCT AND MAINTENANCE MANUAL** **3M PRECISION DRILLING MACHINE**



YOUR BROBO DISTRIBUTOR IS:

- 
- Precision Drilling Machines • Tapping Machines • Multi-Head Drills • Tool Grinders •
  - Tool Post Grinders • Machine Vices • Special Production Equipment •
  - Accessories • Riveting Machines • Pedestal Grinders • Metal cutting Saws • Linishers •

# OPERATING MANUAL FOR **BROBO GROUP** 3M PRECISION DRILLING MACHINE

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## TECHNICAL SPECIFICATION

|   | 3M SERIES (BENCH MOUNTED)   | 3M SERIES (FLOOR MOUNTED)   |
|---|---|---|
| DRILLING CAPACITY   | 32mm  | 32mm  |
| SIZE OF TABLE <ul style="list-style-type: none"> <li>• Standard Square</li> <li>• Optional Round</li> <li>• Optional T-Slots</li> </ul> | -<br>-<br>305 × 305   | -<br>350<br>305 × 305   |
| SPINDLE TRAVEL  | 101   | 101   |
| COLUMN DIAMETER   | 74.6  | 74.6  |
| MAXIMUM DISTANCE SPINDLE TO TABLE   | 340   | 714   |
| MAXIMUM DISTANCE SPINDLE TO BASE  | 530   | 1208  |
| THROAT DEPTH  | 191   | 191   |
| MOTOR kW  | 0.75  | 0.75  |
| SPINDLE SPEEDS (NOMINAL)<br>STRAIGHT DRIVE<br><br>INTERMEDIATE DRIVE  | 480, 850, 1450, 2500<br><br>150, 280, 320, 480, 570, 650, 1800,<br>2000, 3000 | 480, 850, 1450, 2500<br><br>150, 280, 320, 480, 570, 650, 1800,<br>2000, 3000 |
| WEIGHT UNPACKED   | 130kg   | 145kg   |
| WEIGHT PACKED   | 149kg   | 164kg   |
| HEIGHT PACKED (mm)  | 985   | 1390  |
| HEIGHT INSTALLED (mm)   | 985   | 1700  |
| BASE AREA (mm)  | 368 × 600   | 368 × 600   |



# CHAPTER 1 - Installation of the Machine

## 1.1. Unpacking & Handling the Machine



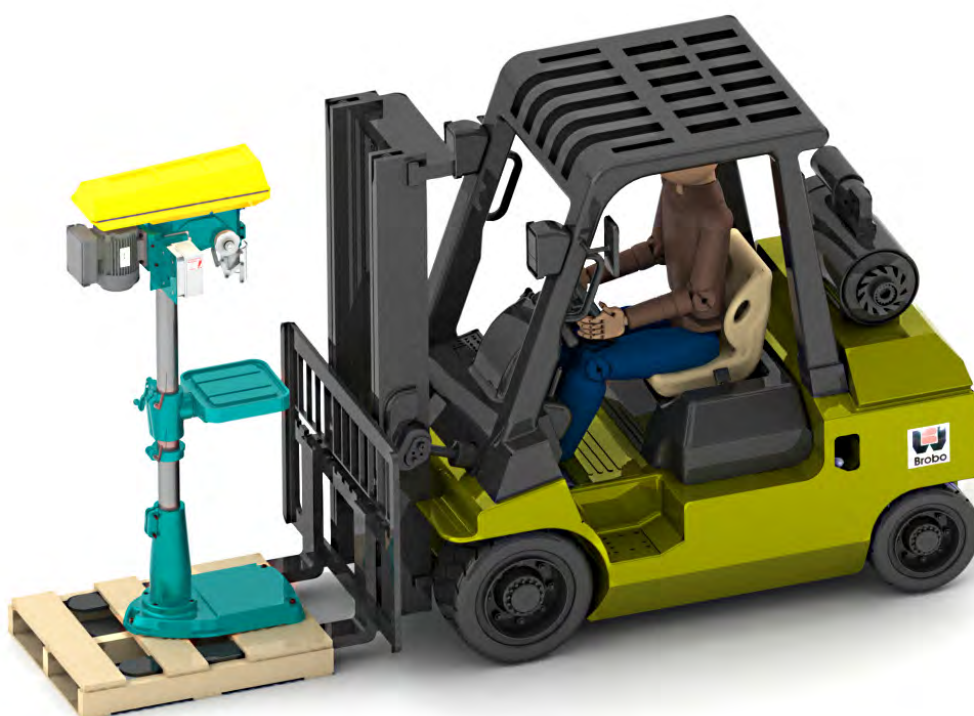
### **WARNING – HEAD HEAVY MACHINES**

*The metal drilling machines are heaviest where the drill heads are fitted & as such, care must be taken while relocating or moving the machines.*

Upon receiving the **Brobo Group 3M Drill**, the machine should be standing upright & positioned centrally on top of a wooden pallet. While the machine is situated on the pallet, position the forklift arms under the pallet between the runners, keeping in mind that the machine is **head heavy** & minimal force should be exerted on the electrical box located beneath the machine. Move the entire unit to an accessible area as close as possible to the final location.

Carefully remove the wooden frame surrounding the drill unit (*Figure 1*). Once completed, proceed by elevating the machine away from the pallet base using a sling harness wrapped around the entire unit ensuring that it is *equally supported*. Ensure that the floor is as level as possible before finally positioning the machine to the desired location.

Once in position, verify that the electrical supply is connected. Attached the 3MT arbour & chuck set (*not provided*) into the quill housing, while ensuring that the arbour steps correctly mates into the quill housing slot.



**Figure 1.** Handling of 3M Drill

**PLEASE OBSERVE & FOLLOW THE INSTALLATION INSTRUCTIONS ON PAGE 5**

## 1.2. Parts Checklist

Along with the drill unit, check that the following accessories, packed "loose", are included as follows:

### A. STANDARD ACCESSORIES

- 1) 1 × Operation Manual

## 1.3. Minimum Requirements

For the machine to function correctly, the room in which the drill unit is to be installed must be in the vicinity of, & satisfy the following conditions:

- 415/240V Power Supply
- Ambient Temperature - From -10 °C to +50 °C.
- Relative Humidity: Not more than 90%.
- Lighting: More than 500 LUX.



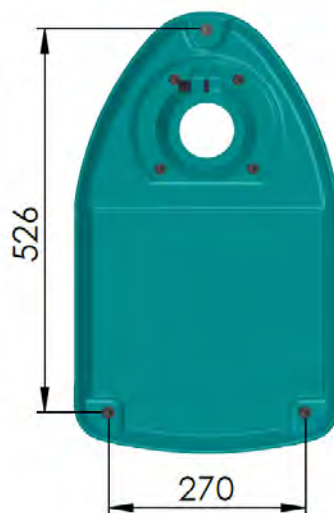
### **WARNING – OPERATING VOLTAGE VARIATION**

*Each drill model has an inbuilt safety system to protect it against voltage variations. However, for the machine to perform efficiently, ensure that the drill unit operates within  $\pm 10\%$  limits of the recommended voltage of the motor.*

## 1.4. Anchoring the Drill

Prior to anchoring the drill unit, take into considerations the requirements mentioned in *Section 1.3* & *Section 2.2*, & other aspects regarding the usage of the machine such as accessibility to drilled parts & safe access for the operator.

The drill unit arrives fastened to the shipping pallet using 3 × M16 bolts provided. When positioning & fastening the drill, please refer to the hole locations shown in *Figure 2*.



**Figure 2.** Anchoring Hole Locations



### **WARNING – EXCEEDING MAXIMUM HEIGHT**

*Do not extend the height of the machine past the maximum 'height installed' indicated. Exceeding past this limit will cause the column to extend out of the column support, which might subsequently cause damage to the machine, as well as causing injury to any person in the vicinity.*

## 1.5. Connection to Power Source

Before connecting the machine to the power supply, check that the socket is not connected in series with other machines. This condition is critical for the ideal operation of the drill unit.

### Single & Three Phase

- a) **Single phase machines** are provided with three pins, **15 amps** rated plugs & leads for connection to **240V**, **50Hz** power supply in **Australia**.

Active = Brown  
Neutral = Light Blue  
Earth = Green/Yellow

VOLTAGE  
240V/1 PH

MAIN VOLTAGE  
240V



Figure 3.1 Connection 3 pins – 1 Phase

- b) **Three phase machines** should be fitted with a suitable, approved **four pin plugs** (i.e. three phase & earthing - **not provided**)

Active = Brown, White, Dark Blue  
Earth = Green/Yellow

VOLTAGE  
415V/3PH

MAIN VOLTAGE  
415V/3PH



Figure 3.2 Connection for "4-CORE" Wire System with Neutral – 3 Phase

- c) Check the power supplied & motor specifications before plugging in the machine. Check the terminal connection on dual voltage motor terminal box & connect it accordingly to the corresponding voltage supply.

**To connect the machine to the power supply, proceed as follows:**

- 1) Ensure that all electrical leads & cables (including supply leads) are maintained in a good condition & away from sharp objects. All leads should be replaced if cut, sliced or damaged in any way.
- 2) Insert the power plug into the socket, while ensuring that the **mains voltage is compatible** for which the drill unit is operating at.
- 3) Inspect that the power switch on the main box is closed & set to **OFF** position
- 4) To prepare the machine for operation, release the **STOP/EMERGENCY STOP** button by twisting the red mushroom button. To activate the drill, engage the green **START** button.
- 5) Check that the spindle rotary direction & change the phasing if required; clockwise rotation observing top-down on top of the motor pulley
- 6) If all of the above procedures have been carried out correctly, the drill should now be operational

**Brobo Group 3M Drill** is now ready for use.

*Chapter 3 provides a detailed description of the various features of the drill & its operating cycles*





## CHAPTER 2 - Safety & Accident Prevention

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The **Brobo Group 3M Drill** has been designed & manufactured in accordance with **Australian Standards**. It is **HIGHLY RECOMMENDED** that the instructions & warnings contained in this chapter be carefully followed for correct usage of the machine.

### 2.1. Operation of the Machine

The **Brobo Group 3M Drill** is specifically designed to drill through ferrous & metal cross sections with thin-walled or "plate" profiles. Other types of material & machining are not compatible for use with the specifications of the drill. ***This machine involves a high-speed revolution; therefore extreme caution is required when operating the device.***

The employer is responsible for instructing the personnel who, in turn, are obliged to inform the operator of any accident risks, safety devices, noise emission & accident prevention regulations provided for by national & international laws governing the use of the machine. ***The operator must be fully aware of the position & functions of all the machine's controls.***

***All those concerned must strictly adhere to ALL instructions, warnings, & accident prevention standards in this manual.***

The following definitions are those provided for by the **EEC DIRECTIVE ON MACHINERY No. 98/37/CE**:

- **Danger Zone** - any zone in and/or around a machine in which the presence of a person constitutes a risk to the safety & health of that person.
- **Person Exposed** - any person finding him or herself, either completely or partly in a danger zone.
- **Operator** - the person or persons are given the responsibility of installing, operating, adjusting, maintaining, cleaning, repairing, & transporting the machine.



#### **WARNING – UNAUTHORISED MODIFICATIONS/REPLACEMENTS/USE**

*The manufacturer declines any responsibility whatsoever, either civil or criminal, in the case of unauthorised interference or replacement of one or more parts or assemblies on the machine, or if accessories, tools & consumable materials used are different from those recommended by the manufacturer, or if the machine is inserted in a plant system & its proper function is altered.*

#### 2.1.1. Noise Level

The noise level of an idling drill has been measured to be **below 85 dBA**. This complies with the **Australian Occupational Health & Safety (Noise) Regulations 1992**.

Please note that peak impulse noise levels will be experienced due to variables including drill characteristics, type, & condition. This will also vary accordingly depending on the size & type of sample being drilled. Under these circumstances, management should make available to the operator(s) the appropriate hearing protection equipment as prescribed under the above-stated act.





### 2.1.2. Power Supply

The 415/240V power supply requirements for this machine are of a high level & unauthorised interference and or inadequate maintenance could result in a situation that could put the operator at risk. A **qualified** electrical engineer should always be assigned to maintain & repair the system.



## 2.2. General Requirements

### Lighting

Insufficient lighting during the operation of the drill unit would constitute a safety hazard for the people concerned. For this reason, the user of the machine must provide adequate lighting in the working area to eliminate areas of shadow, whilst also preventing dazzling illumination sources  
(Reference standard **ISO 8995 - 2002 'Lighting of Indoor Workplaces'**).

### Connection

Check that the power supply cables, compressed air supply (if applicable) and/or coolant system complies with, & are operating within the acceptable range of the drill capabilities.

***Faulty, damaged or worn components must be replaced immediately.***

### Earthing Systems

The installation of the earthing system must comply with the requirements stated in the:  
***IEC Standards Part 195: Earthing & Protection Against Electric Shocks 1998.***

### The position of the Operator

The user controlling the machine drill operations must be positioned as shown in *figure 4* below.



**Figure 4.** *Correct Position for Operating Drill Unit*



### 2.3. Advice for the Operator



**Protective eyewear or goggles must be worn at all times** while attending & operating the drill.



**Do not attempt to operate the machine unless all safety guards are in operation.**



Ensure that **hands & arms are kept clear of the drilling zone** when the machine is operating.



**Do not wear loose clothing** with long sleeves & oversized gloves, bracelets, necklaces or any other loose object that may become entangled in the machine's tooling bit during drilling. Long hair must be tied back or placed in a hair net.



**Always disconnect the power supply to the machine before carrying out any maintenance work or adjustments.** This includes cases of abnormal operations of the machine.



Any maintenance work performed on the hydraulic, pneumatic or coolant systems must be carried out only after the pressure in the system has been released.



The operator **MUST NOT** conduct any risky operations or those not required for the drilling in course (e.g. remove swarf shavings from the machine while drilling).  
**Never move the drill while the machine is operating.**



**Always keep the workplace as clean as possible.**  
Remove equipment, tools or any other objects from the drilling zone.



**Support the workpiece** to prevent it falling or jamming during the drilling cycle.



**If the drill bit is jammed during a drill, activate the emergency stop function immediately.** Do not continue forcing the drill bit through. This could damage the drill, the specimen or be a cause for potential injury to the operator.



**Always turn off the machine before carrying out any repair work.** Consult the **Brobo Group** Engineering Department in the country in which the machine was initially purchased.

## **2.4. Machine Safety Devices**

This product & maintenance manual is not purely intended as a guide for the usage, operation, & maintenance of the drill unit in a strict production environment; it is instead an instrument to providing information on how to use the machine correctly & safely. The following standards listed in section 2.4.1, which are applicable to the **Brobo Group 3M Drill**, are those specified by the EEC Committee that governs the safety of machinery, health & safety at work, personal protection & safeguarding of the work environment. In addition, the drill also complies with the **Australian Standards** regarding the safeguarding & general requirements for electrical equipment.

### **2.4.1. Reference Standards**

#### **MACHINE SAFETY**



- *EEC Directive No. 98/37/CE - Machines Directive*
- *EEC Directive No. 91/368 - 94/68 - Amends sections of EEC Directive No. 98/37/CE relating to machine safety*
- *EEC Directive No. 73/23 - Low Voltage Directive*
- *AS4024.1 - 1996 - Safeguarding of Machinery*

#### **HEALTH & SAFETY AT WORK**

- *AS3100 - 2002 - General Requirements for Electrical Equipment*
- *OH. & S. 1995.81/1995 - Compliance References*
- *EEC Directive No. 80/1107; 83/477; 86/188; 88/188; 88/642 - Protection of workers against risks caused by exposure to physical, chemical & biological agents in the workplace*
- *EEC Directive No. 73/23 & Special EEC Directives No. 89/654; 89/655 - Improvements in health & safety at work*



## CHAPTER 3 - Main Functions & Operation of the Machine

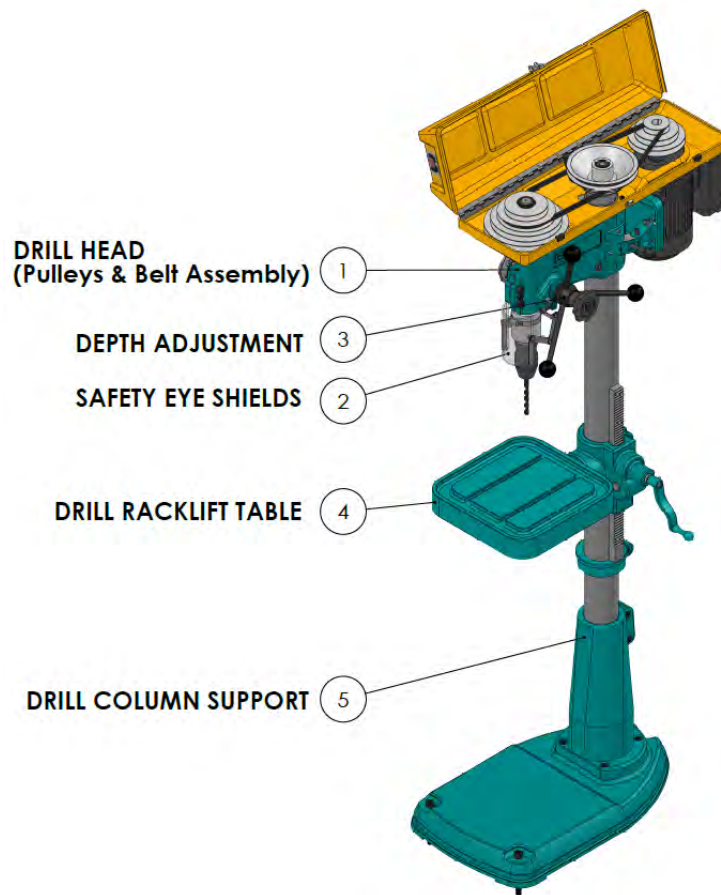


Figure 5. 3M Drill Main Figures

### 3.1.1. Drill Head (Pulley & Belt Assembly)

The full set of the motor drive, intermediate & quill pulleys are all housed within the protective drill guard cover. Facing the front of the drill unit, the spindle speed setting is located on the right-hand side of the cover, beneath the locking mechanism. To change the spindle speed settings, the user must manually change the V-belt positions as shown in the black panel.



Figure 6. Drill Head

### 3.1.2. Safety Eye Shields

As the name suggests, the safety eye shield should be lowered into position prior to drilling to prevent any swarf dislodging in the direction of the user.



Figure 7. Safety Eye Shields

### 3.1.3. Depth Adjustment

Situated beneath the 3-pronged handle boss is the depth adjustment gauge. Using the gauge & the scale indicator shown on the left-hand side of the drill, the operator can manually set the desired depth for a drill hole & lock its position.



Figure 8. Depth Adjustment

### 3.1.4. Drill Rack lift Table

Available in round or rectangular profile, all workpiece is fastened to the rack lift table using a standard mechanical vie (not provided). The rack lift can be adjusted up or down via the rack handle, to obtain optimum user working height.

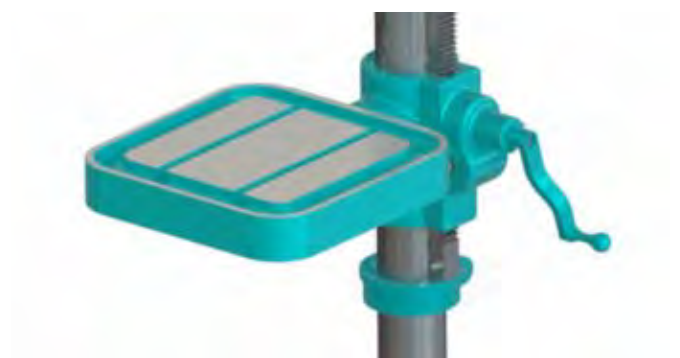


Figure 9. Racklift Table

### 3.1.5. Drill Column Support

Prior to usage, ensure that the column support is securely fastened to the ground using the 3 x M16 bolt holes provided.

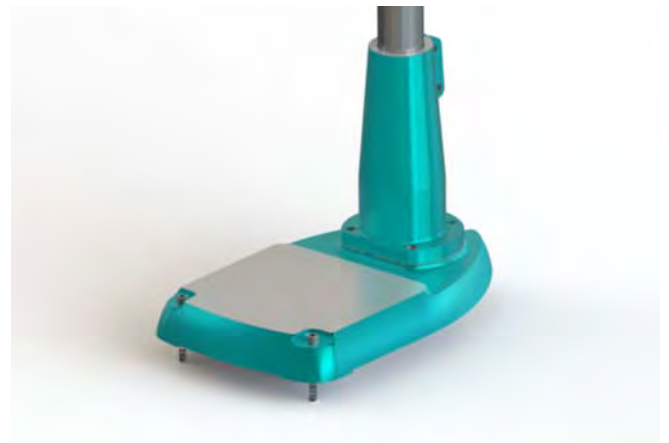


Figure 10. Drill Column Support  
(Floor Mounts)



### **3.2. Preparation for Operation**

The following procedure is recommended for the correct drilling using the **Brobo Group 3M Drill**



#### **WARNING – SAFETY GEAR**

*Protective clothing, safety glasses and gloves should **always** be worn while loading parts, operating the machine, or undertaking any maintenance work on the machine.*

### **PROCEDURE**

- 1) Clean the workpiece to ensure it is free of any grit, swarf or flammable substances. It is highly recommended that a solvent is used to remove any residue while ensuring the solvent is inflammable and non-toxic.
- 2) Prior to drilling, clear the drill & the work area around the workpiece of any swarf or/and tools to minimise the likelihood of the user getting injured during the drilling operation.
- 3) Load the workpiece into the mechanical vice (sold separately), located on the rack lift, & fastened workpiece securely. Loosen the rack lift & adjust the height & horizontal position. Once you have positioned the workpiece into the desired location, relock the rack lift assembly.
- 4) Check that the correct speed drill speed setting is selected, & the safety eye shield is directly positioned to deflect swarf & any dislodged particles.
- 5) Turn the machine on. Proceed by slowly drilling into the workpiece until a guide indent is created. Steadily increase the feed rate of drilling by applying a constant yet steady force on the feed handle until the desired hole depth is reached.
- 6) Reverse the direction of the drill feed until it comes to rest in its start position & turn the drill machine off.

### **3.3. Operation Recommendations**

- To reduce the amount of frictional contact between the drill bit & workpiece, a light coating of oil or lubricant can be applied to the drill bit prior to drilling.
- Do not force the drill bit through the workpiece as this significantly reduces the lifespan of the bit, as well as increasing the risk of the bit bending and/or breaking & injuring the operator.
- When drilling through larger hole diameters through thick materials, it is advisable to split the drilling operation into two or three stages, starting from drilling a smaller hole size & increasing it until the desired final hole size.



#### **WARNING - JAMMING**

*If the drill jams during a drill, engage the **EMERGENCY STOP** immediately. Remove the part, check that the drill bit is not damaged and if need be, replace the drill bit.*

## CHAPTER 4 - Drawings, Layouts, Assembly & Spare Parts

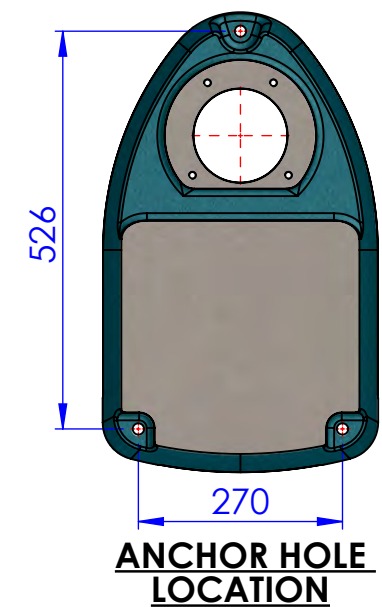
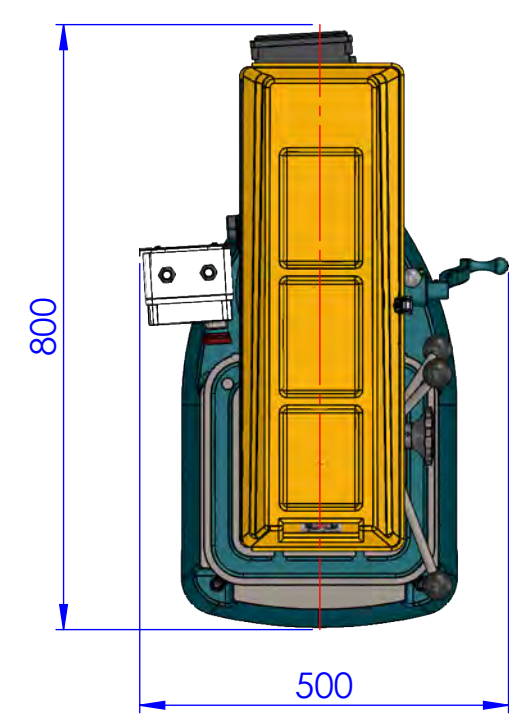
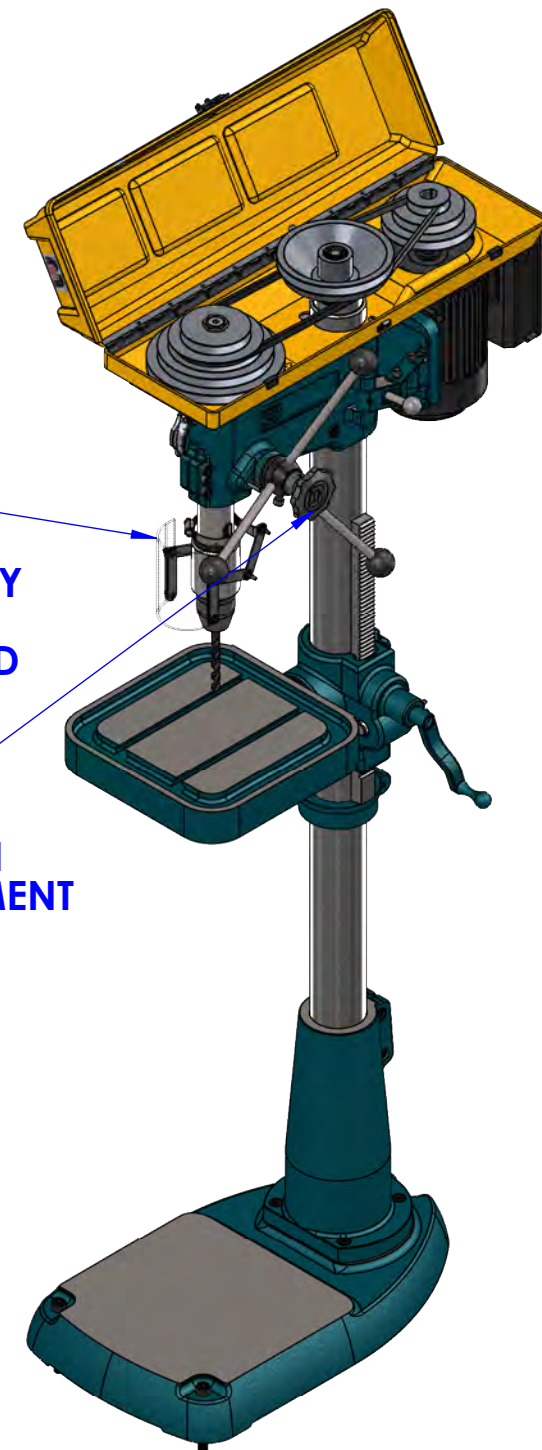
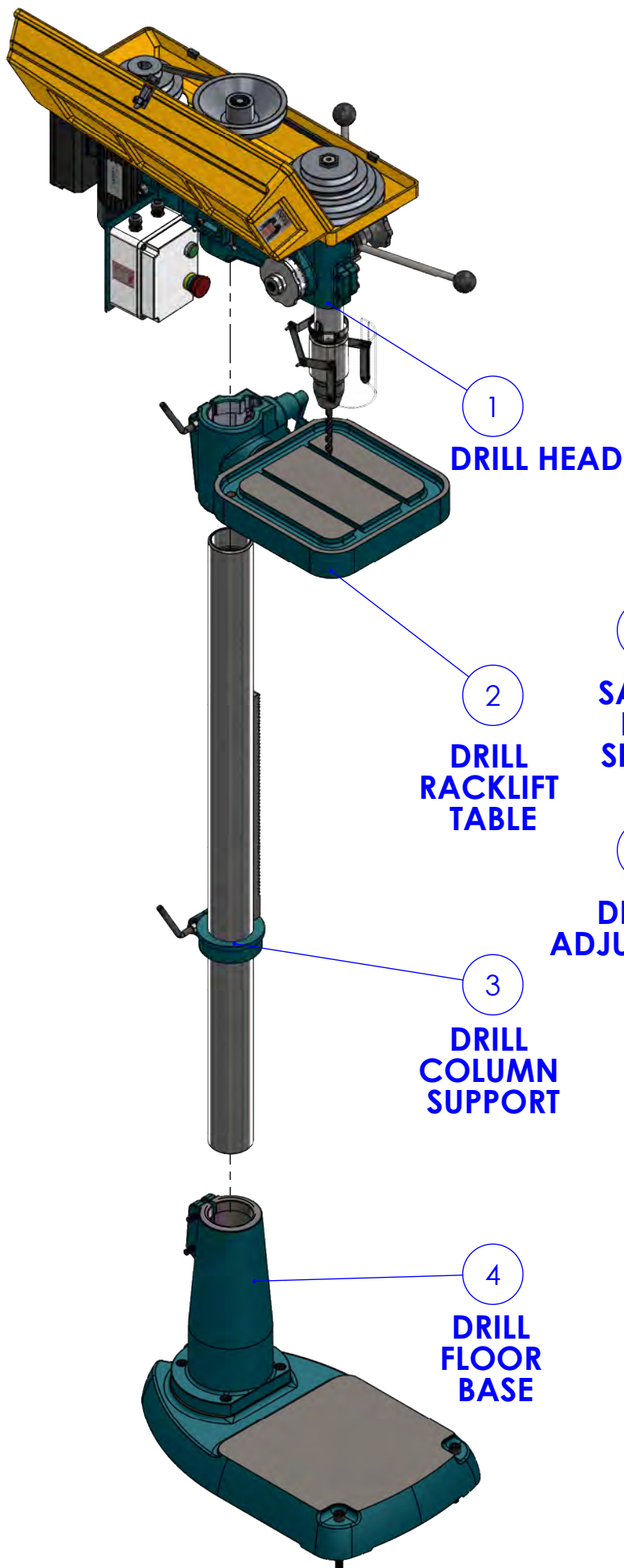
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### 4.1. Spare Parts

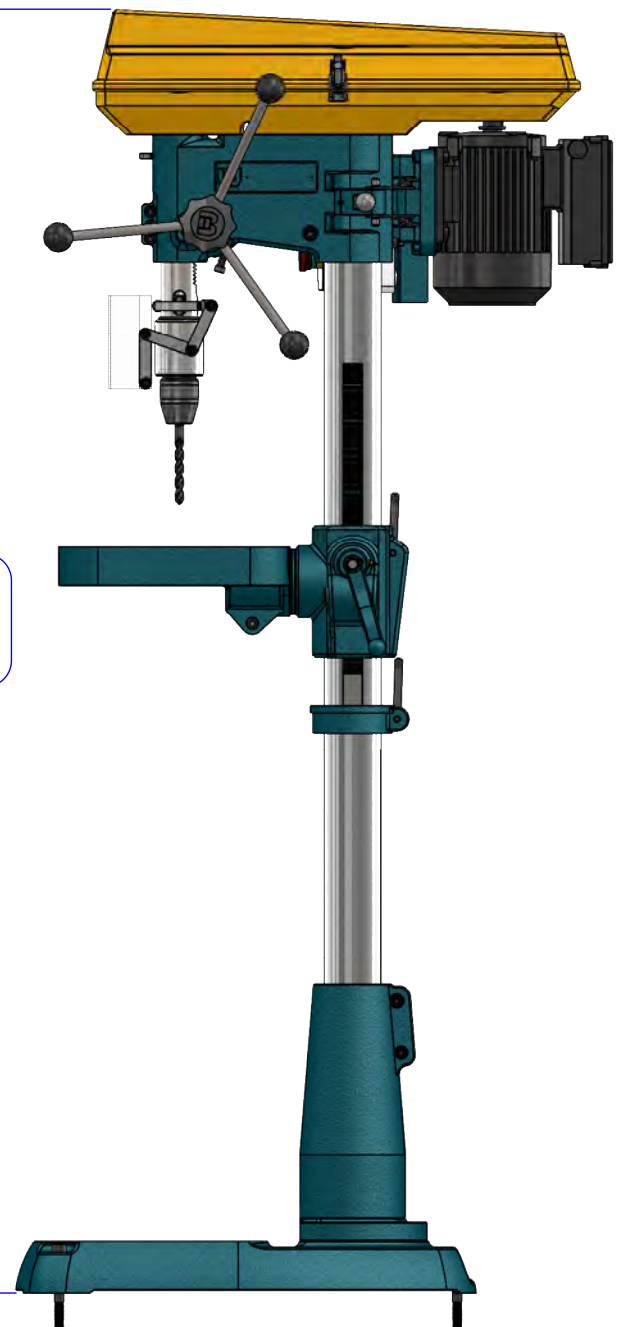
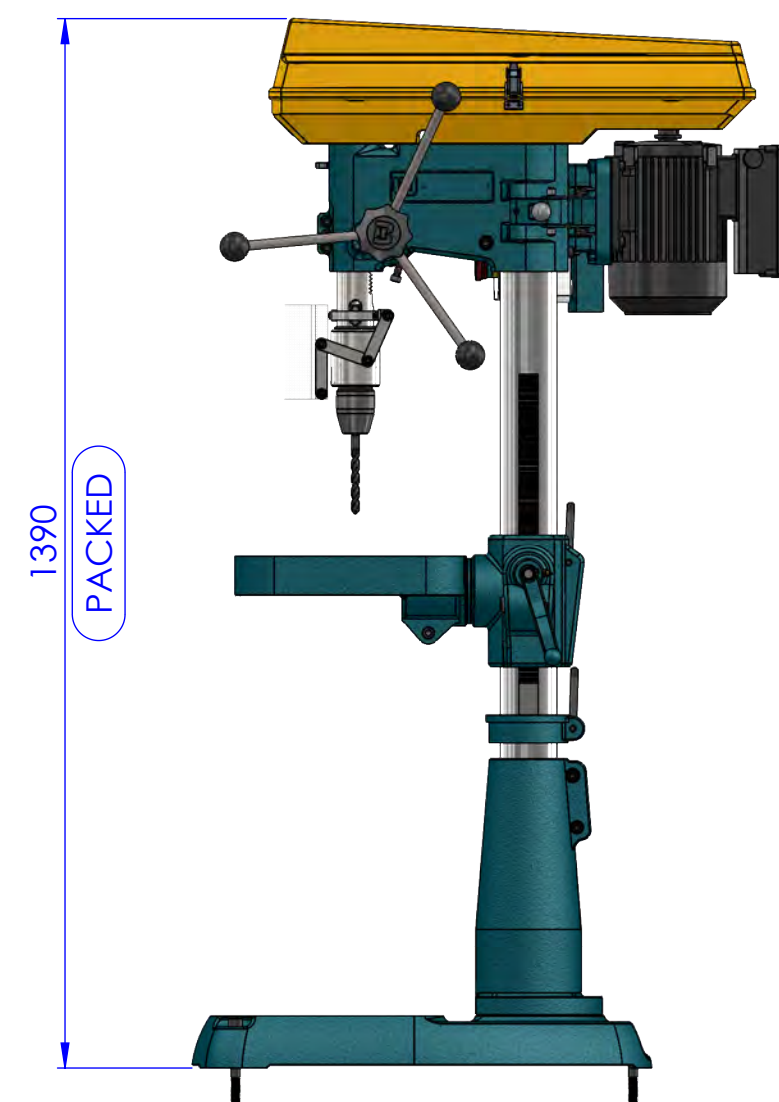
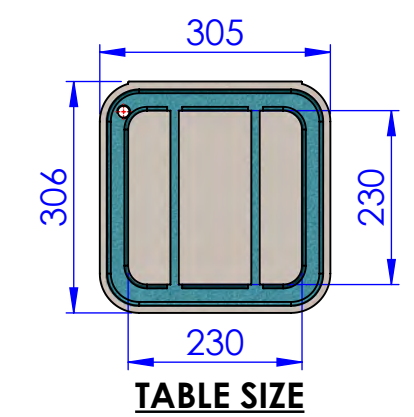
Please find below for most commonly replaced spare parts. These listed parts draw reference to components found predominantly on the rack lift assembly & drill column support. Should you require a spare part that you are not familiar with, or not shown in Chapter 4, please contact **Brobo Group Engineering** department.

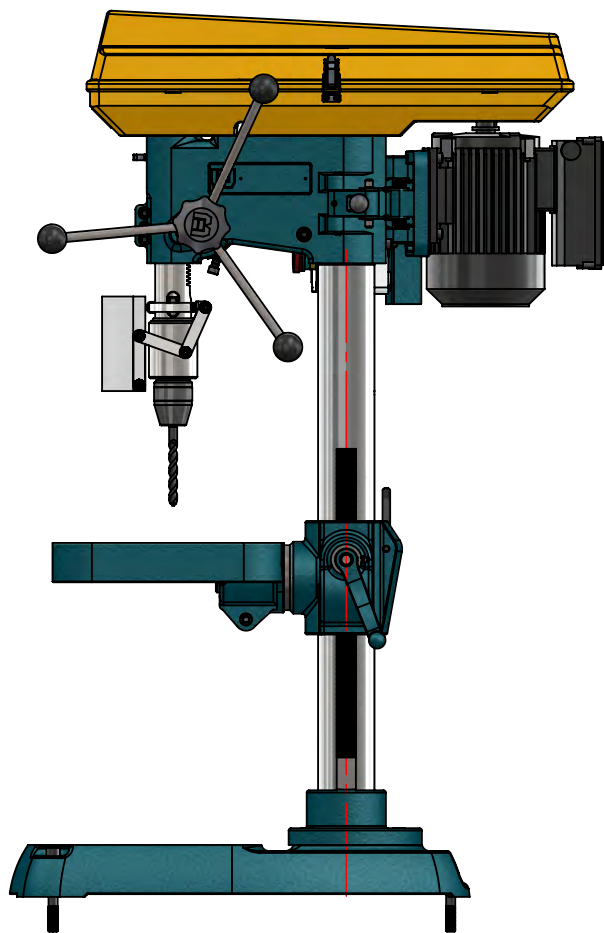
| PART NUMBER | SPARE PART DESCRIPTION                    |
|-------------|---|
| 1132010     | BASE, FLOOR TYPE                          |
| 2112010     | COLUMN SUPPORT ( use with Floor Base)     |
| 2114060     | COLUMN, FLOOR (Solid, 1220mm)             |
| 2114310     | COLUMN, BENCH (Solid, 767mm)              |
| 2122020     | COLUMN CLAMP (includes 1042000 & 2124050) |
| 2121310     | RACKLIFT ASSEMBLY, COMPLETE (Floor Type)  |
| 1041080     | RACKLIFT ASSEMBLY, COMPLETE (Bench Type)  |
| 2114010     | RACK                                      |
| 2114020     | SPINDLE WORM                              |
| 2114040     | WORMWHEEL SPINDLE (Shaft)                 |
| 2111170     | SPINDLE & EXTENSION ASSEMBLY              |
| 2121230     | QUILL ASSEMBLY                            |
| 2125200     | MOTOR (0.75kW, 1HP, 1PH, TEFC)            |
| 2125180     | MOTOR (0.75kW, 1HP, 3PH, TEFC)            |



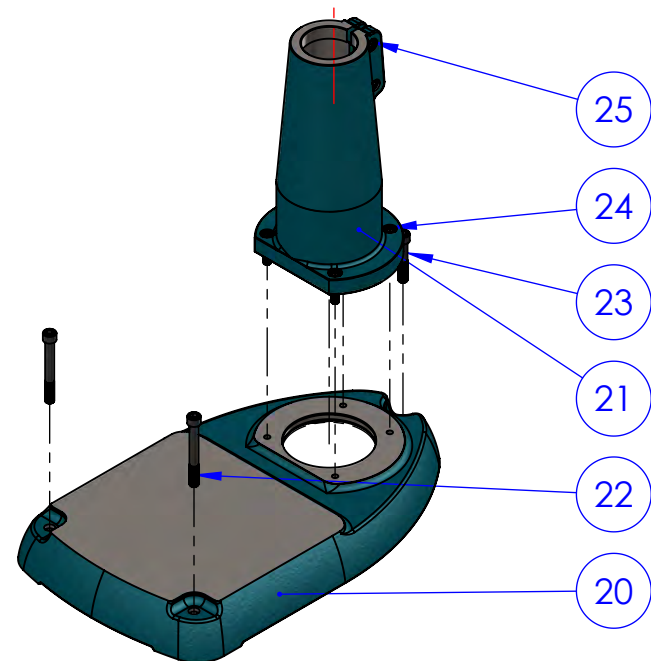
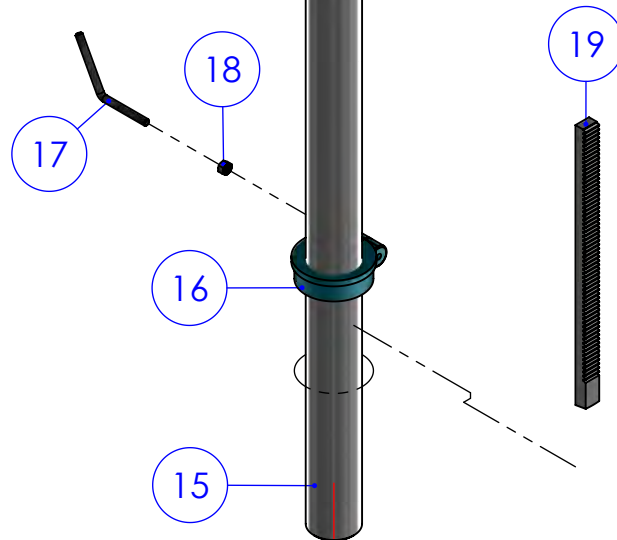
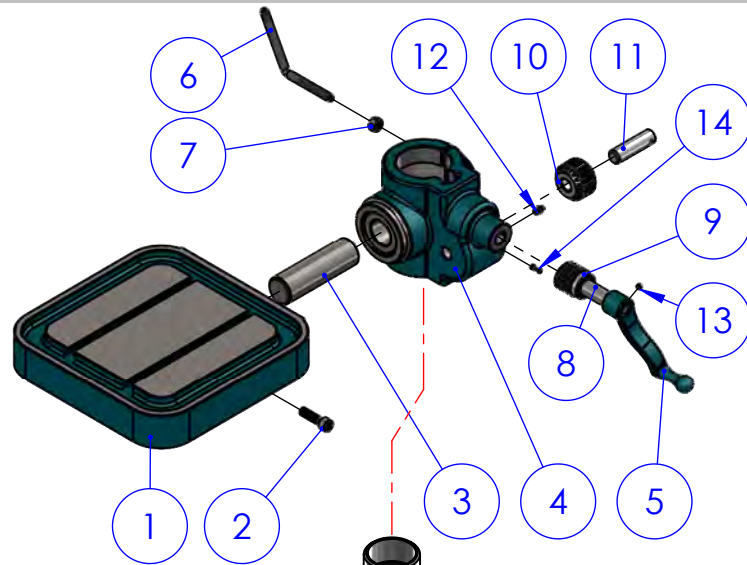
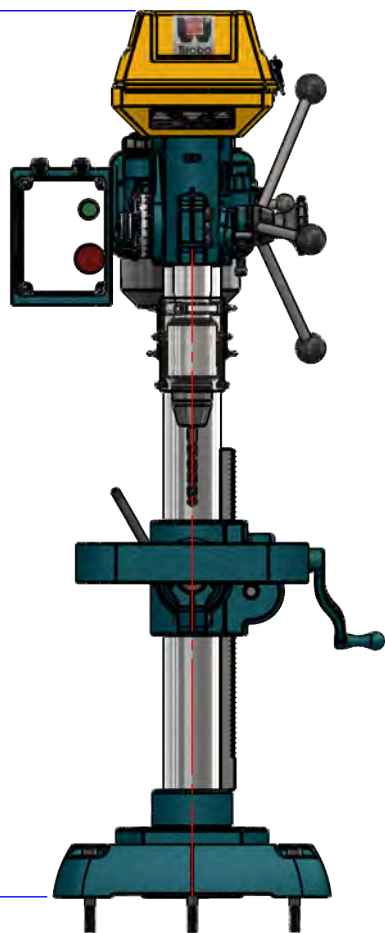


MINIMUM 600MM ALL AROUND SAFE SPACE FOR OPERATING ZONE





1172



DRILL RACKLIFT TABLE (2121310)

| ITEM NO. | PART NUMBER | Drill Spindle                | QTY. |
|----------|-------------|------------------------------|------|
| 1        | 2122040     | Drill Table                  | 1    |
| 2        | 8725960     | Socket Head Cap Screw M10x40 | 1    |
| 3        | 1044180     | Drill Table Support Pin      | 1    |
| 4        | 2122030     | Drill Table Support          | 1    |
| 5        | 2122160     | Drill Crank Handle           | 1    |
| 6        | 2124050     | Drill Clamp Handle           | 1    |
| 7        | 1042000     | Hex Nut M10                  | 1    |
| 8        | 2114020     | Drill Spindle                | 1    |
| 9        | 2035020     | 51104 NTN Bearing 20x35x10   | 1    |
| 10       | 2114030     | Drill Wormwheel              | 1    |
| 11       | 2114040     | Wormwheel Spindle (Shaft)    | 1    |
| 12       | 9305110     | Grease Nipple M8x1.25        | 1    |
| 13       | 8705450     | Set Screw M6x6               | 1    |
| 14       | 8705470     | Set Screw M6x16              | 1    |

DRILL COLUMN SUPPORT

| ITEM NO. | PART NUMBER | DESCRIPTION           | QTY. |
|----------|-------------|-----------------------|------|
| 15       | 2114060     | Drill Column (1220mm) | 1    |
| 16       | 2122020     | Drill Column Clamp    | 1    |
| 17       | 2124050     | Drill Clamp Handle    | 1    |
| 18       | 1042000     | Hex Nut M10           | 1    |
| 19       | 2114010     | DRILL Table Racklift  | 1    |

DRILL FLOOR BASE

| ITEM NO. | PART NUMBER | DESCRIPTION                   | QTY. |
|----------|-------------|-------------------------------|------|
| 20       | 1132010     | Drill Floor Base              | 1    |
| 21       | 2112010     | Drill Column Support          | 1    |
| 22       | 8705300     | Socket Head Cap Screw M12x100 | 2    |
| 23       | 8705280     | Socket Head Cap Screw M12x65  | 1    |
| 24       | 8725500     | Socket Head Cap Screw M10x35  | 4    |
| 25       | 8705190     | Socket Head Cap Screw M10x50  | 2    |

3M BENCH DRILL COLUMN ASSEMBLY

3M DRILL COLUMN ASSEMBLY

DRILL COLUMN ASSEMBLY

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MATERIAL:  
WEIGHT:

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
SURFACE FINISH:  
TOLERANCES:  
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ANGULAR:



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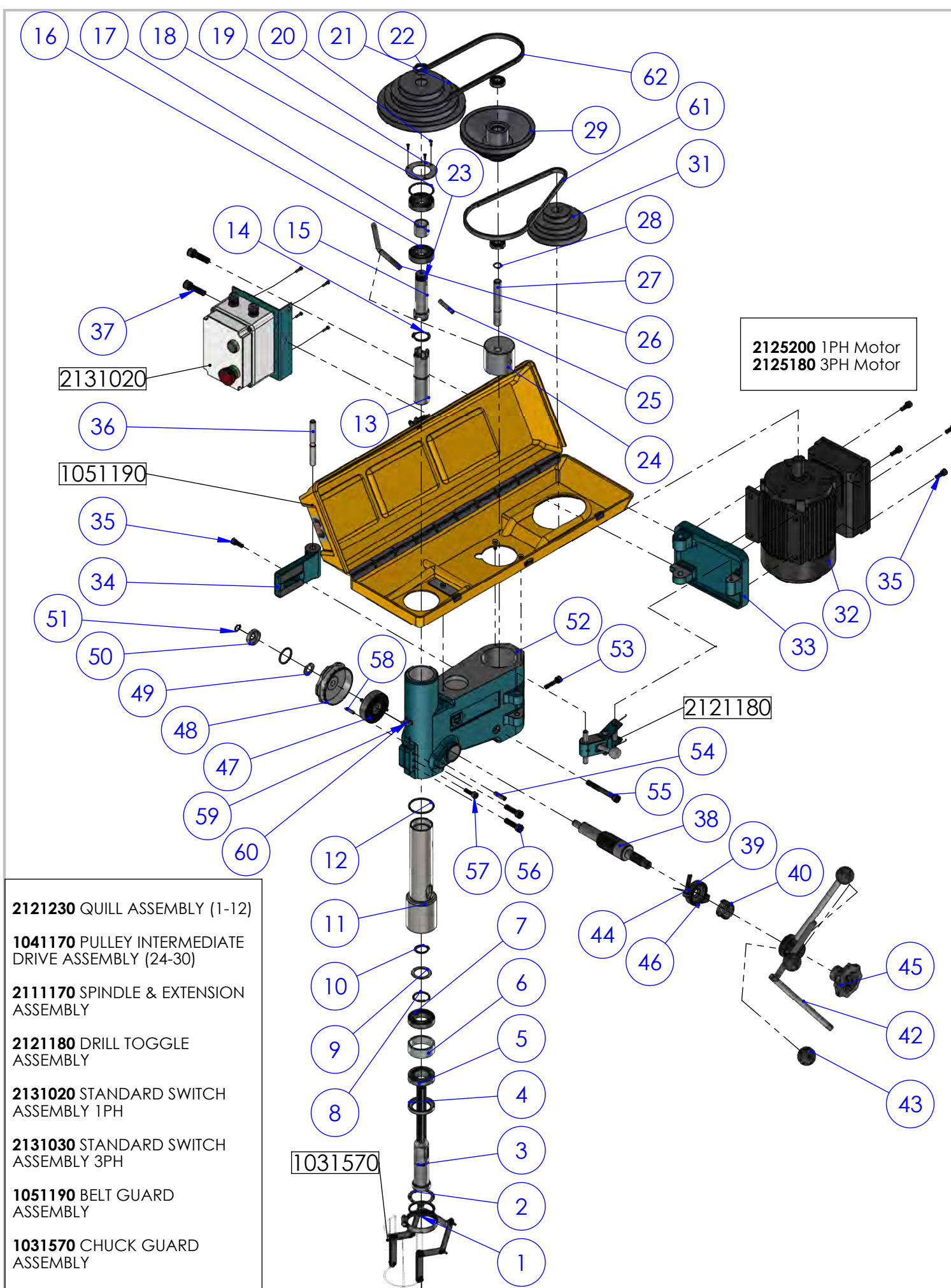
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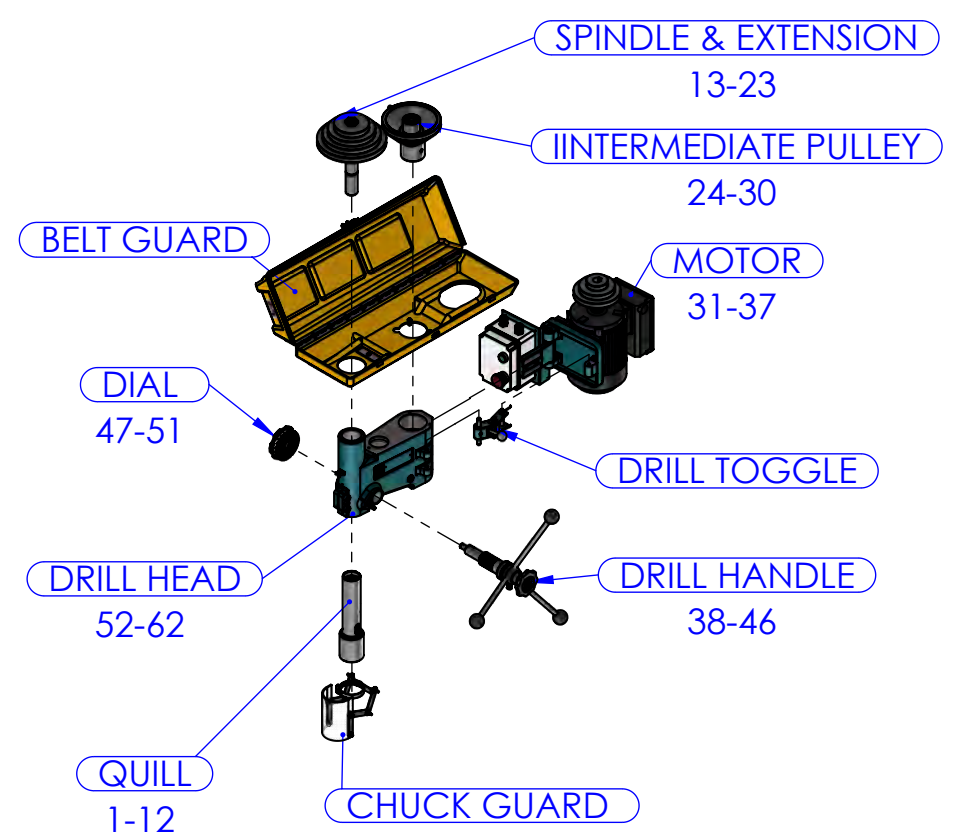
SHEET 1 OF 1 A3



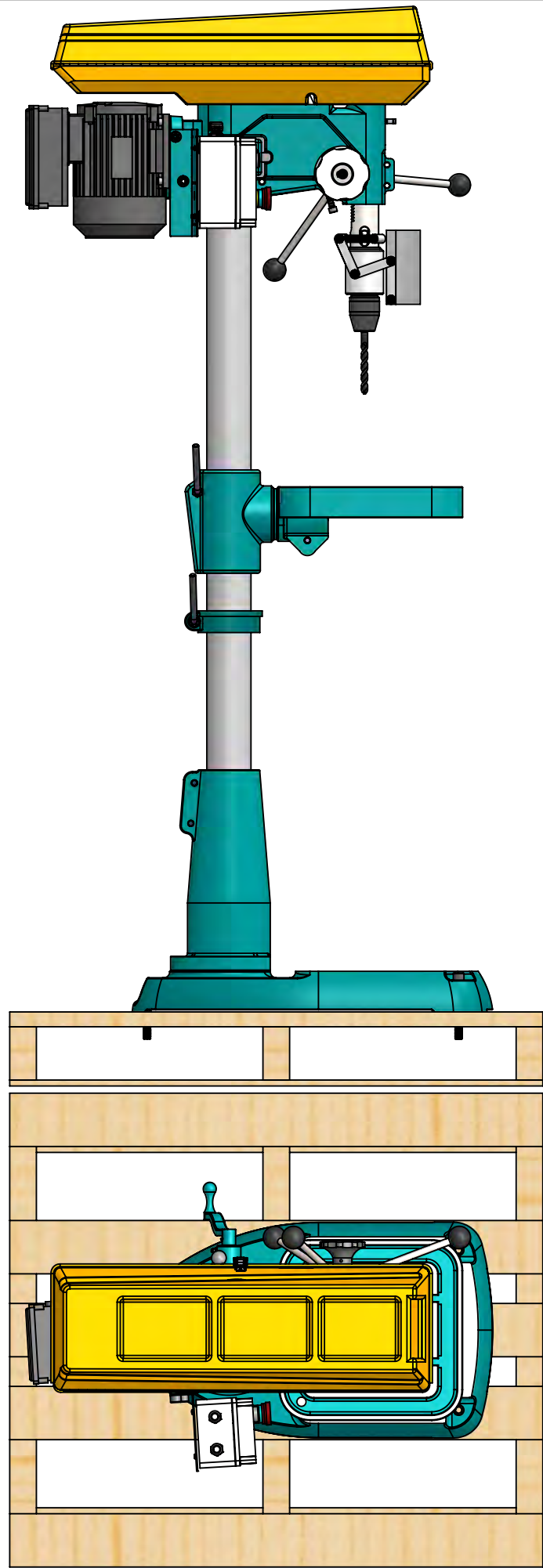


| ITEM NO. | PART NUMBER | DESCRIPTION                   | QTY. |
|----------|-------------|-------------------------------|------|
| 47       | 2115010     | Drill Return Spring           | 1    |
| 48       | 2122190     | Dial (Spring Cover)           | 1    |
| 49       | 9305350     | Shim 50x62x0.1                | 1    |
| 50       | 2114080     | Dial Pressure Cap             | 1    |
| 51       | 1035070     | External Clip                 | 1    |
| 52       | 2122050     | Drill Head 3M                 | 1    |
| 53       | 8705140     | Socket Head Cap Screw M8x35   | 1    |
| 54       | 1034060     | Roll Pin 8x30                 | 1    |
| 55       | 8705210     | Socket Head Cap Screw M10x80  | 1    |
| 56       | 8725500     | Socket Head Cap Screw M10x35  | 2    |
| 57       | 8705130     | Socket Head Cap Screw M8x25   | 1    |
| 58       | 8705990     | Roll Pin 6x24 (Return Spring) | 2    |
| 59       | 1035110     | Chuck Key Holder              | 1    |
| 60       | 8725020     | Pan Head Philip M3x6          | 1    |
| 61       | 2115160     | Belt Motor, A27               | 1    |
| 62       | 2115150     | Belt Inter. Head A32          | 1    |

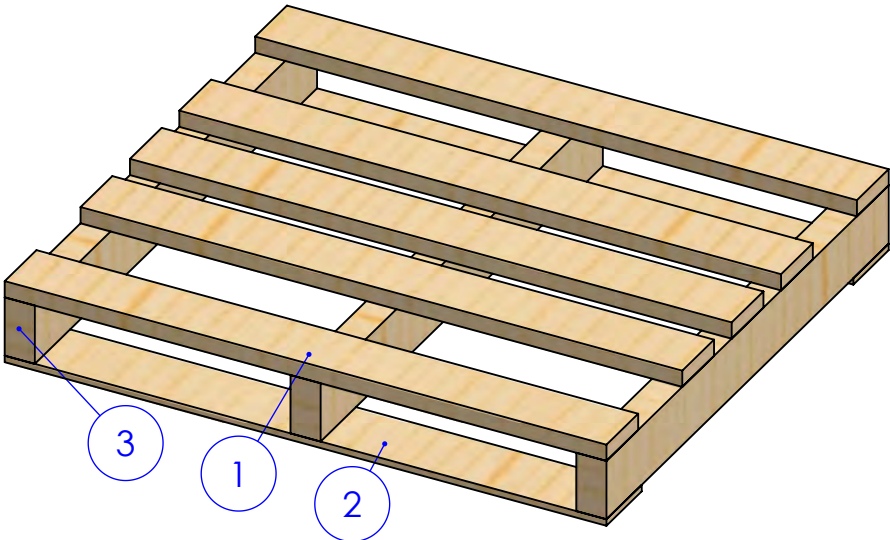
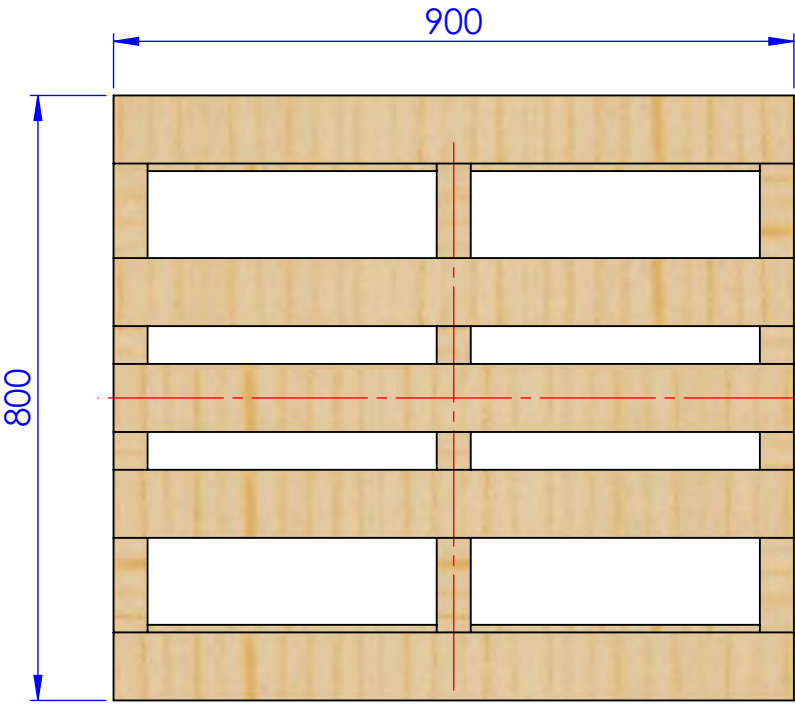
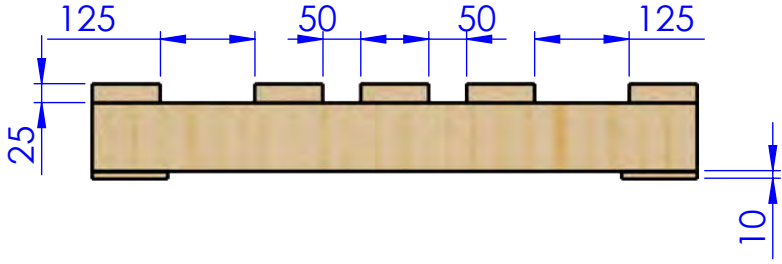
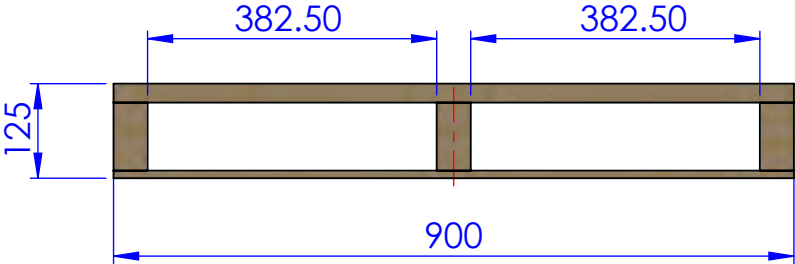
| ITEM NO. | PART NUMBER | DESCRIPTION                           | QTY. |
|----------|-------------|---------------------------------------|------|
| 1        | 2115330     | Internal Circlip (55mm)               | 1    |
| 2        | 2113030     | Shim Quill OD=55 ID=41 x 0.03         | 1    |
| 3        | 2124330     | Drill Spindle 3M                      | 1    |
| 4        | 2114150     | Bearing Spacer                        | 1    |
| 5        | 2115080     | Taper Roller Bearing 55x30x17 HR32006 | 1    |
| 6        | 2114160     | Bearing Spacer Sleeve 55x48x20.2      | 1    |
| 7        | 8115030     | Bearing 6006 55x30x13                 | 1    |
| 8        | 2115290     | O-Ring (ID=30mm)                      | 2    |
| 9        | 1043200     | Spindle Washer                        | 1    |
| 10       | 8115070     | External Circlip 30mm                 | 1    |
| 11       | 2124340     | Drill Quill Sleeve                    | 1    |
| 12       | 2115060     | O-Ring ID 47.6mm                      | 1    |
| 13       | 2124110     | Drill Drive Sleeve 3M                 | 1    |
| 14       | 2125070     | External Circlip 35.6x30.3            | 1    |
| 15       | 2124120     | Drill Castellated Pulley Spindle      | 1    |
| 16       | 2115230     | Bearing 6205                          | 2    |
| 17       | 2124130     | Bearing Spacer 30x25x26               | 1    |
| 18       | 5125340     | O-Ring 50x3.5                         | 1    |
| 19       | 2123040     | Bearing Cap                           | 1    |
| 20       | 8735020     | Pan Head Screw M3x10                  | 3    |
| 21       | 2122060     | Drill Head Pulley 4 Step              | 1    |
| 22       | 1044120     | Thin Hex Nut M25x1                    | 1    |
| 23       | 1035130     | Woodruff Key No.3                     | 1    |
| 24       | 1044190     | Intermediate Drive Block              | 1    |
| 25       | 1034230     | Drill Plunger                         | 1    |
| 26       | 1044210     | Locking Handle                        | 1    |
| 27       | 1044200     | Intermediate Drive Spindle            | 1    |
| 28       | 1045810     | External Circlip 15mm                 | 1    |
| 29       | 1045290     | Intermediate Drive Pulley             | 1    |
| 30       | 1045280     | Intermediate Bearing (6002-2Z)        | 2    |
| 31       | 1045270     | Drill Motor Pulley 3 stepx19mm        | 1    |
| 32       | 2125200     | 2125200 (1PH) - 2125180 (3PH)         | 1    |
| 33       | 2122070     | Motor Plate                           | 1    |
| 34       | 2122080     | Motor Plate Hinge                     | 1    |
| 35       | 8705120     | Socket Head Cap Screw M8x20           | 5    |
| 36       | 2124210     | Pivot Pin                             | 1    |
| 37       | 2131020     | Switch Assembly 1PH                   | 1    |
| 38       | 2114070     | Drill Pinion                          | 1    |
| 39       | 1034020     | Drill Handle Stop                     | 1    |
| 40       | 1035010     | Spring                                | 1    |
| 41       | 1044030     | Drill Handle Boss                     | 1    |
| 42       | 2124350     | Drill Capstan Spoke (3M)              | 3    |
| 43       | 1045020     | Knob 38mm                             | 3    |
| 44       | 8726130     | Socket Head Cap Screw M8 x 40         | 1    |
| 45       | 1031360     | Handnut                               | 1    |
| 46       | 1035030     | Drill Stop Screw Spring               | 1    |



## DRILL HEAD SUB-ASSEMBLY



| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-------------|-------------|------|
| 1        | W80x25x900  | 80x25x900   | 5    |
| 2        | W100x10x900 | 100x10x900  | 2    |
| 3        | W90x45x800  | 90x45x800   | 3    |



AS:4068-1993 Flat pallets for materials handling

|                                     |         |          |       |       |         |       |         |
|-------------------------------------|---------|----------|-------|-------|---------|-------|---------|
| TOLERANCES ON DIMENSIONS ARE METRIC | SIZE    | TO MATCH | CAST* | GRADE | RA (µm) | GRADE | RA (µm) |
| DIMENSIONS ARE IN MILLIMETERS       | 6 mm    | ±0.1     | ±0.5  | N1    | 0.025   | N7    | 1.6     |
| ANGULARITY TOLERANCE < ±0°10'       | 30 mm   | ±0.2     | ±0.5  | N2    | 0.05    | N8    | 3.2     |
| CONCENTRICITY 0.1 mm                | 100 mm  | ±0.3     | ±1.5  | N3    | 0.1     | N9    | 6.3     |
| REMOVE ALL BURRS & SHARP EDGES      | 300 mm  | ±0.5     | ±2.0  | N4    | 0.2     | N10   | 12.5    |
| BY 0.3 x 45°                        | 1000 mm | ±0.6     | ±3.0  | N5    | 0.4     | N11   | 25.0    |
| UNLESS OTHERWISE STATED             | 2000 mm | ±1.2     | ±5.0  | N6    | 0.8     | N12   | 50.0    |

|           |            |
|-----------|------------|
| DRAWN BY  | ANH        |
| DATE      | 29.10.2020 |
| MATERIAL: | -          |
| WEIGHT:   | -          |



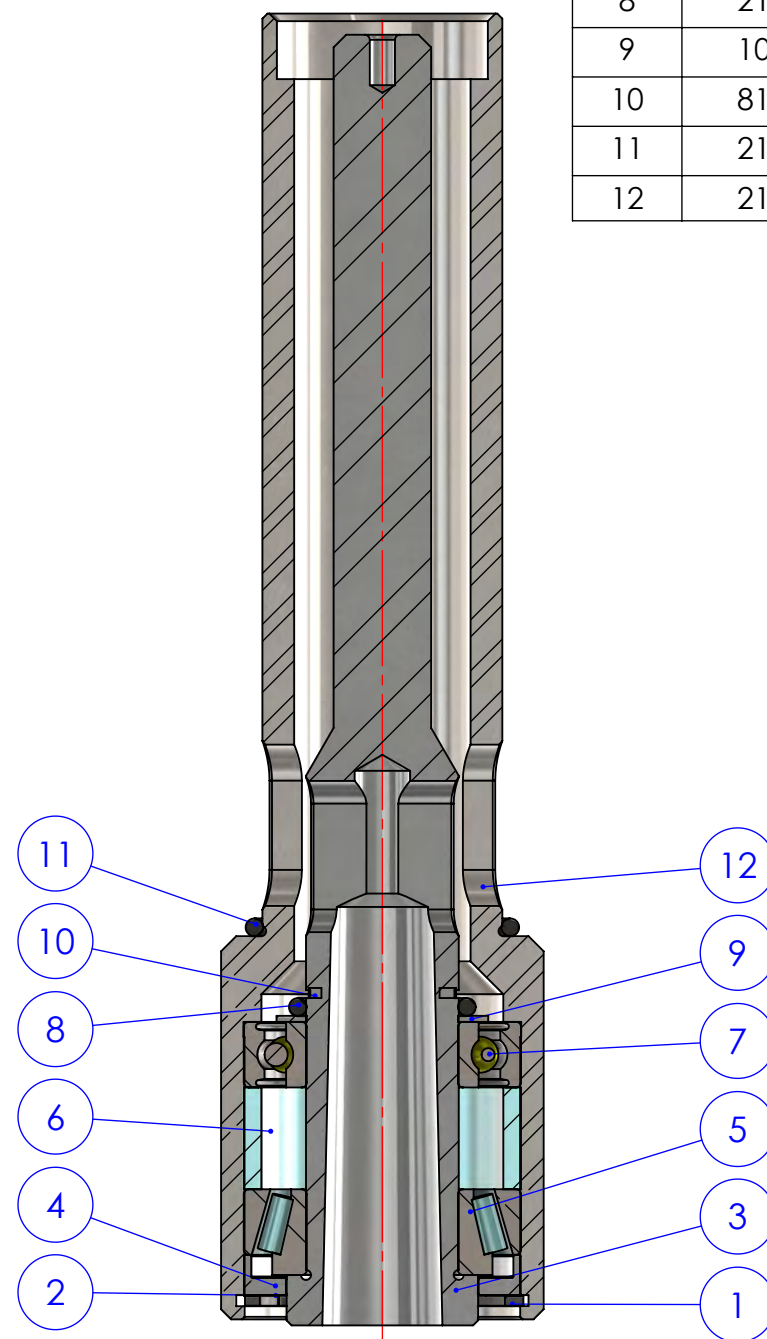
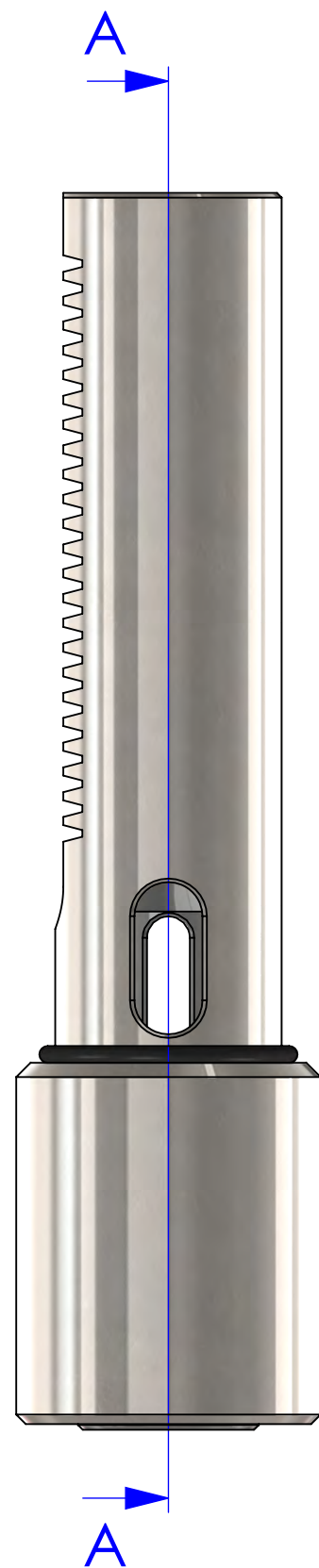
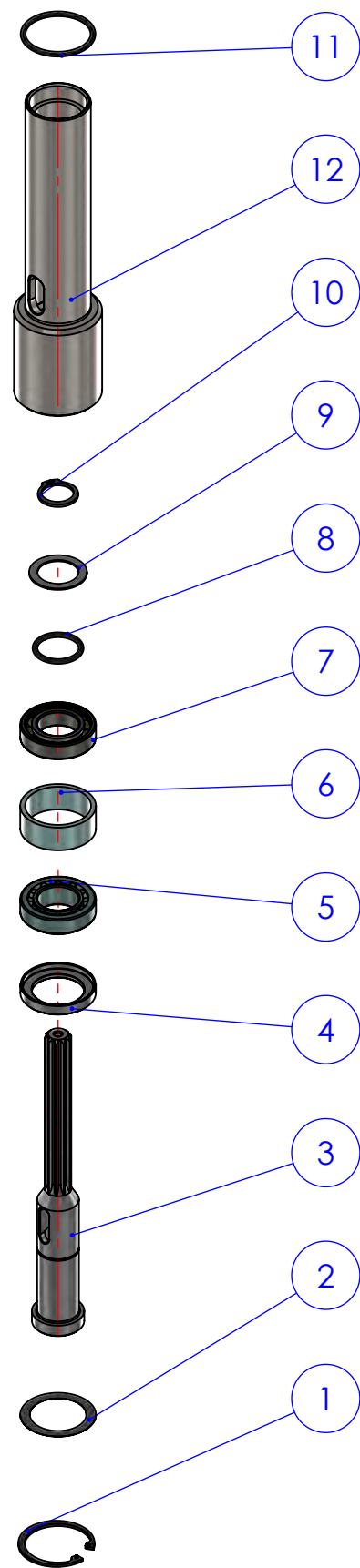
**BROBO GROUP**  
Address : 8 Fowler Rd, Dandenong VIC 3175  
<https://brobo.com.au/>

TITLE:

**PALLET ASSEMBLY  
FOR 3M DRILL**

|                      |                |          |   |
|----------------------|----------------|----------|---|
| DO NOT SCALE DRAWING | SCALE:1:10     | REVISION | 0 |
| DWG NO.              | <b>8815040</b> |          |   |
| SHEET 1 OF 1         | A3             |          |   |





**SECTION A-A**



| ITEM NO. | PART NUMBER | DESCRIPTION                           | QTY |
|----------|-------------|---------------------------------------|-----|
| 1        | 2115330     | Internal Circlip (55mm)               | 1   |
| 2        | 2113030     | Shim Quill OD=ø55 ID=ø41 x 0.03       | 1   |
| 3        | 2124330     | Drill Spindle 3M                      | 1   |
| 4        | 2114150     | Bearing Spacer                        | 1   |
| 5        | 2115080     | Taper Roller Bearing 55x30x17 HR32006 | 1   |
| 6        | 2114160     | Bearing Spacer Sleeve ø55xø48x20.2    | 1   |
| 7        | 8115030     | Bearing 6006 55x30x13                 | 1   |
| 8        | 2115290     | O-Ring (ID=ø30mm)                     | 1   |
| 9        | 1043200     | Spindle Washer                        | 1   |
| 10       | 8115070     | External Circlip 30mm                 | 1   |
| 11       | 2115060     | O-Ring ID 47.6mm                      | 1   |
| 12       | 2124340     | Drill Quill Sleeve                    | 1   |

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DRAWN ANH  
DATE 04.07.2019  
MATERIAL:  
WEIGHT:

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
SURFACE FINISH:  
TOLERANCES:  
LINEAR:  
ANGULAR:



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Address : 8 Fowler Rd, Dandenong VIC 3175  
<https://brobo.com.au/>

TITLE:

**3M DRILL QUILL ASSEMBLY**

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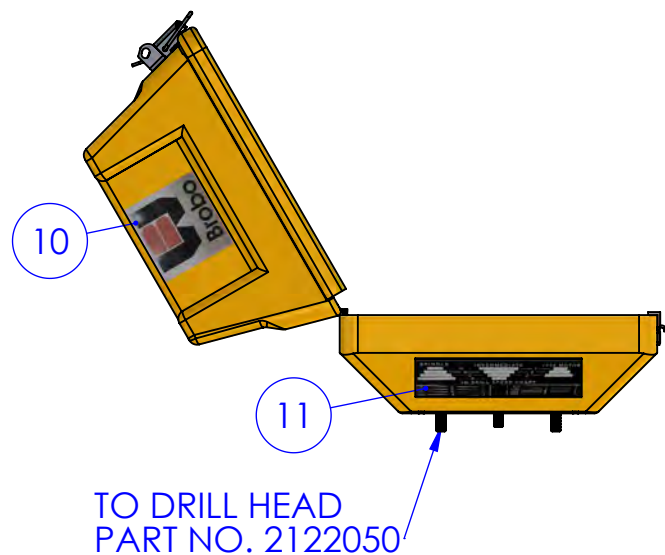
REVISION 0

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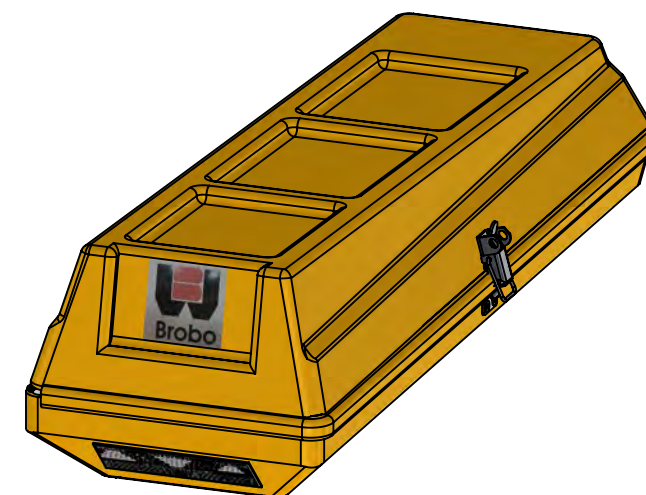
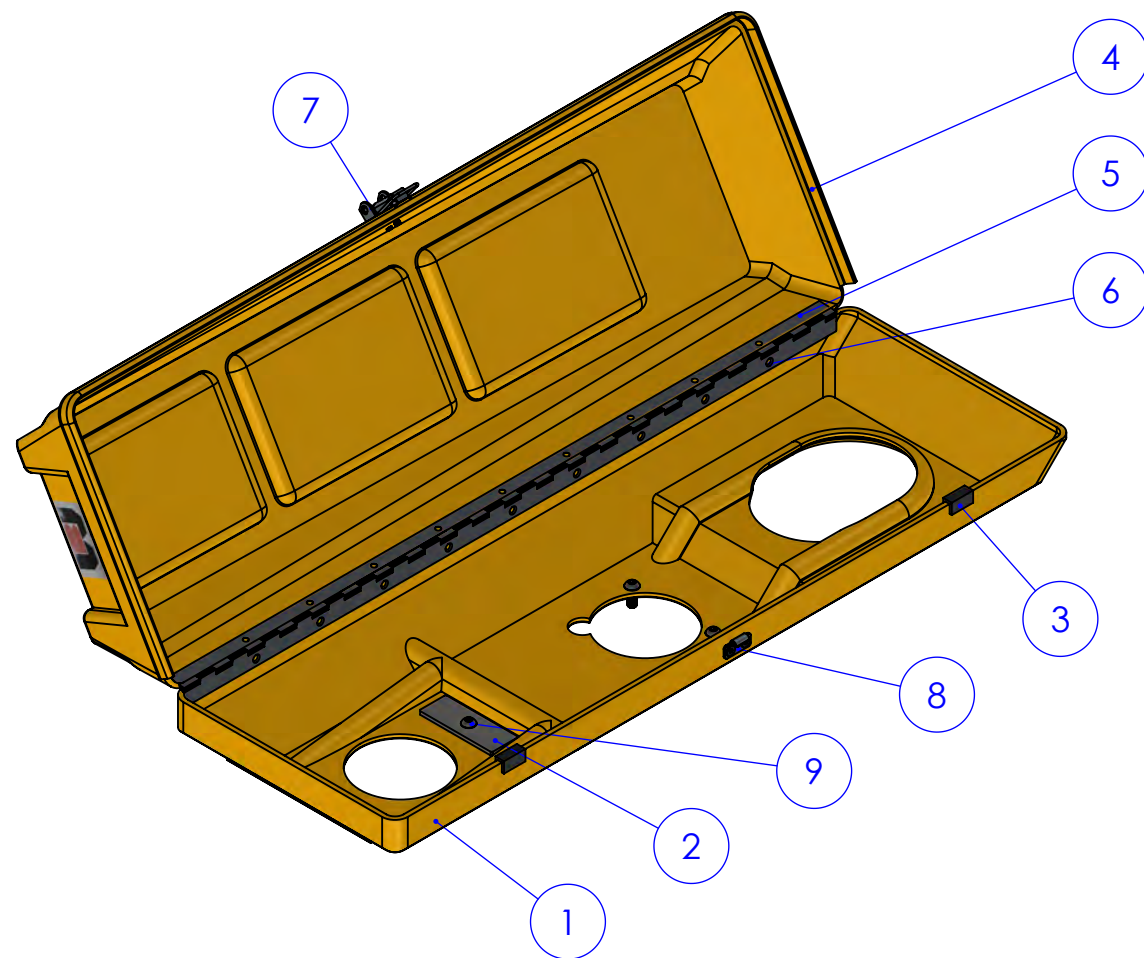
**2121230**



SHEET 1 OF 1 **A3**



| DRILL BELT GUARD ASSEMBLY |             |                                |      |
|---------------------------|-------------|--------------------------------|------|
| ITEM NO.                  | PART NUMBER | DESCRIPTION                    | QTY. |
| 1                         | 1035370     | Drill Belt Guard Bottom        | 1    |
| 2                         | 1604100     | Plate Clamp                    | 1    |
| 3                         | 1034250     | Rubber Buffer                  | 2    |
| 4                         | 1035360     | Drill Belt Guard Cover         | 1    |
| 5                         | 1034340     | Piano Hinge                    | 1    |
| 6                         | 8715930     | Rivet                          | -    |
| 7                         | 1015240     | Latch                          | 1    |
| 8                         | 1105050     | Catch Plate                    | 1    |
| 9                         | 8726100     | Button Head Socket Screw M6x16 | 3    |
| 10                        | 8115090     | Brobo Logo                     | 1    |
| 11                        | 2125140     | Drill Speed Chart              | 1    |



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DRAWN ANH  
DATE 08.07.2020  
MATERIAL:  
WEIGHT:

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
SURFACE FINISH:  
TOLERANCES:  
LINEAR:  
ANGULAR:



**BROBO GROUP**  
Address : 8 Fowler Rd, Dandenong VIC 3175  
<https://brobo.com.au/>

TITLE:

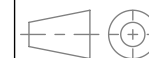
**BELT GUARD ASSEMBLY**

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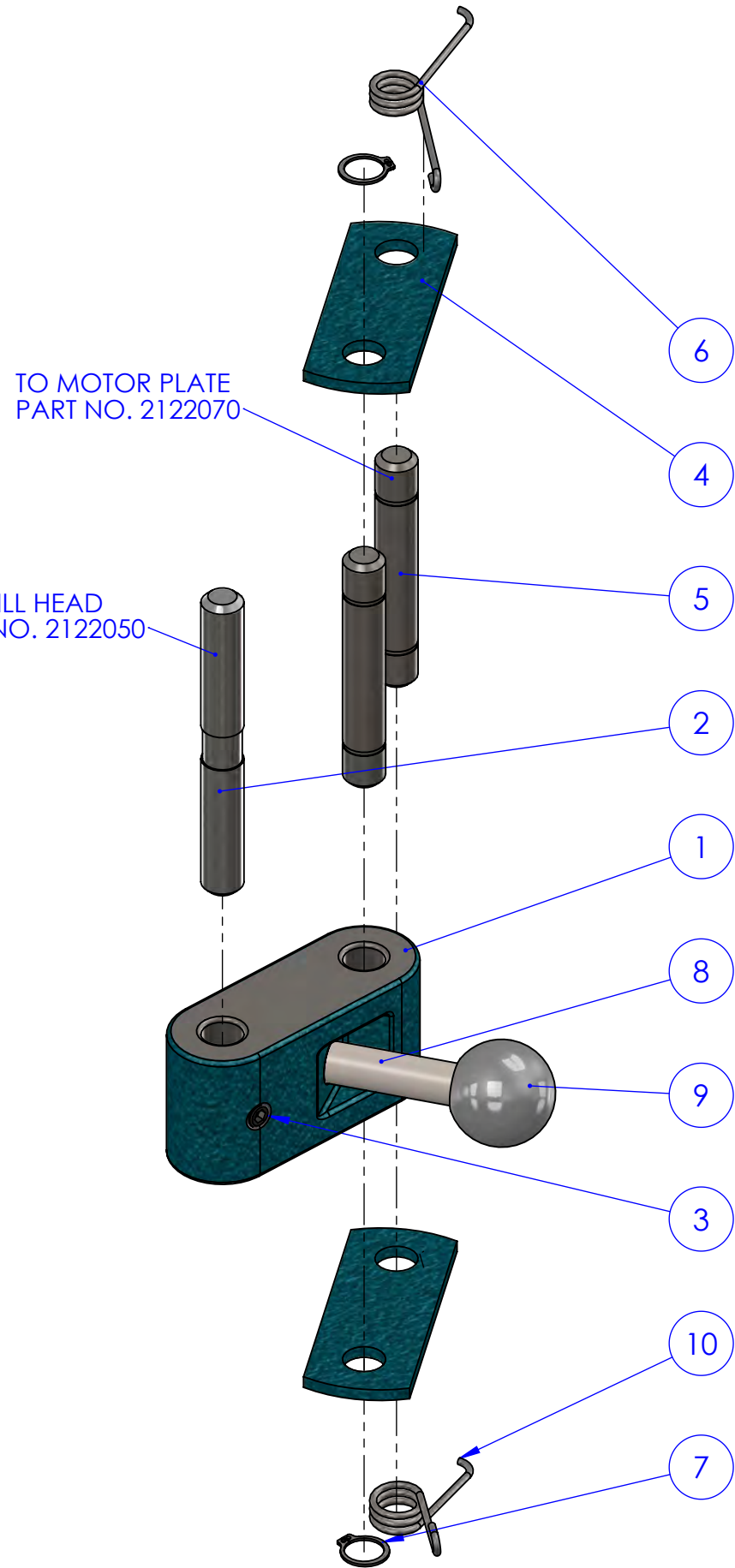
REVISION 0

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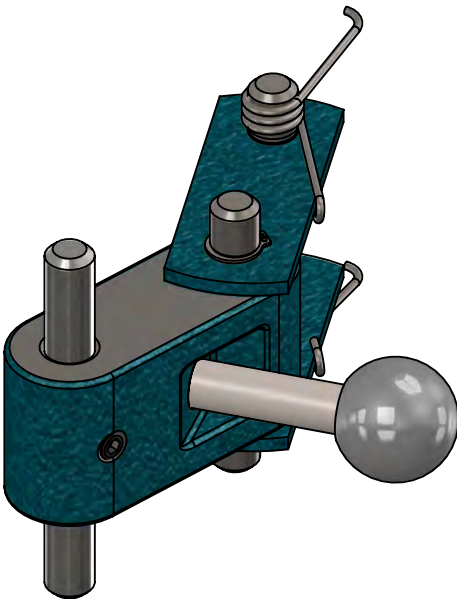
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SHEET 1 OF 1 A3

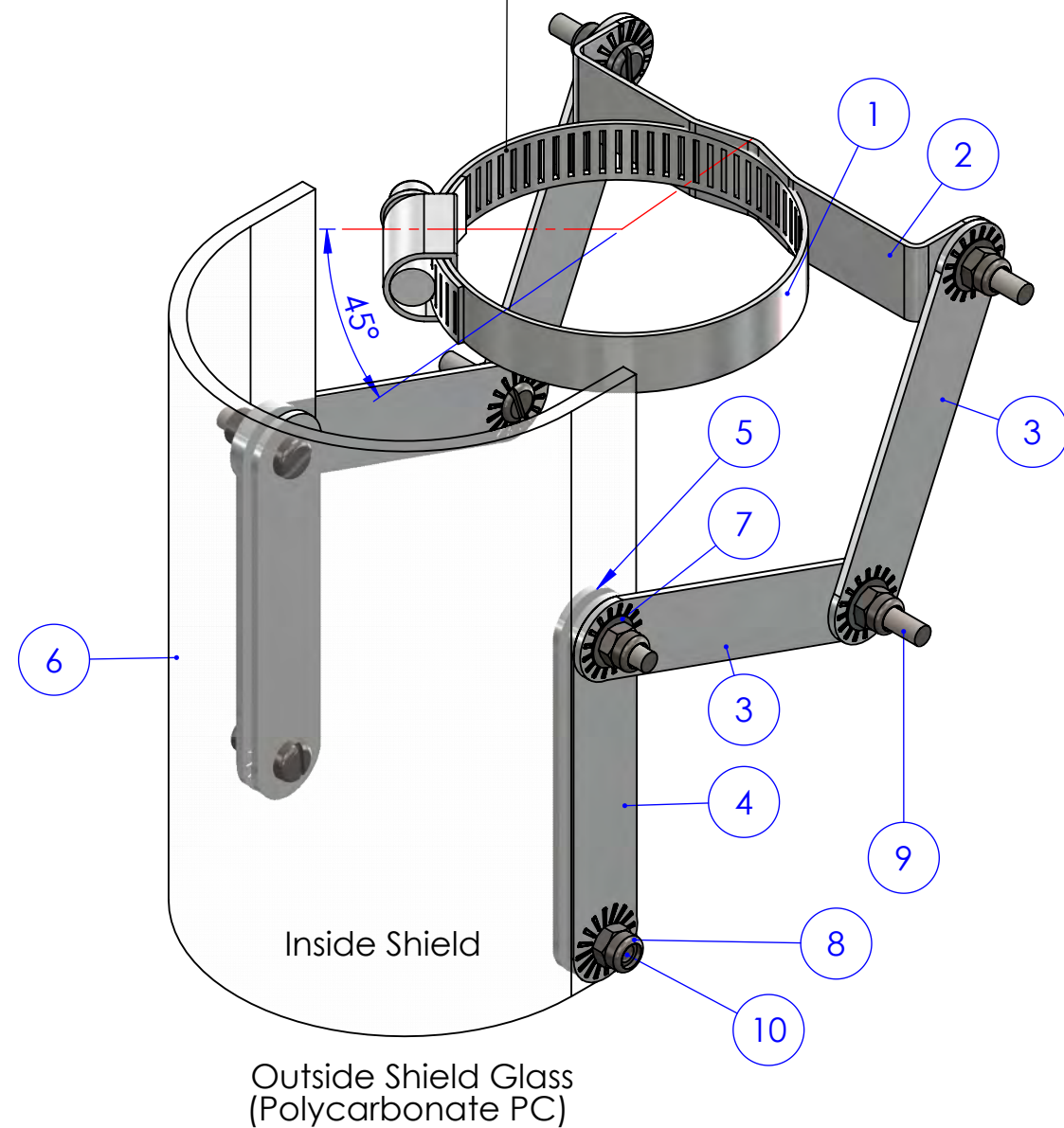


| TOGGLE ASSEMBLY |             |  |      |
|-----------------|-------------|--|------|
| ITEM NO.        | PART NUMBER | DESCRIPTION                                | QTY. |
| 1               | 2122090     | Motor Plate Toggle                         | 1    |
| 2               | 2124170     | Drill Toggle Head Pivot Pin                | 1    |
| 3               | 8705460     | Set Screw Cup Point M6x8                   | 1    |
| 4               | 2134200     | Drill Toggle Link                          | 2    |
| 5               | 2124180     | Drill Toggle Link Pin                      | 2    |
| 6               | 2115100     | Drill Toggle Top Spring                    | 1    |
| 7               | 2125090     | Toggle Link External External Circlip 10mm | 2    |
| 8               | 2124190     | Drill Toggle Handle                        | 1    |
| 9               | 1045200     | Knob 25mm                                  | 1    |
| 10              | 2115110     | Drill Toggle Bottom Spring                 | 1    |

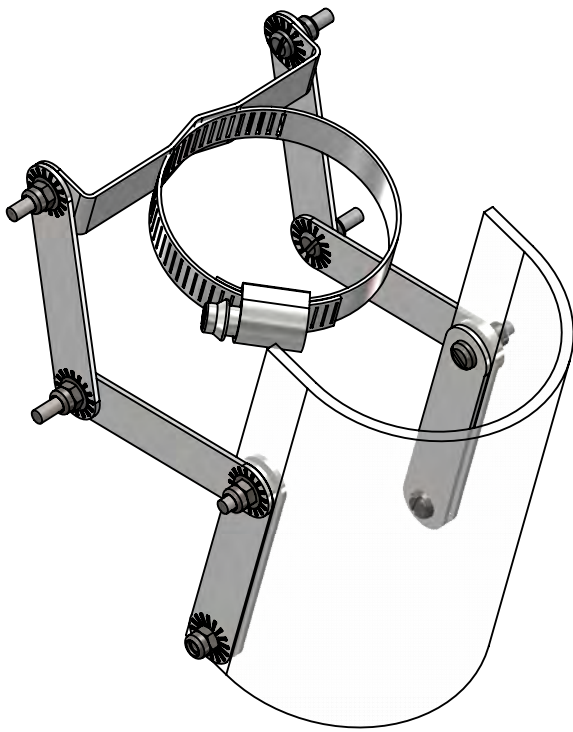




TO DRILL QUILL ASSEMBLY  
PART NO. 2111300  
Range 51-70mm  
Suit 2M/3M Series



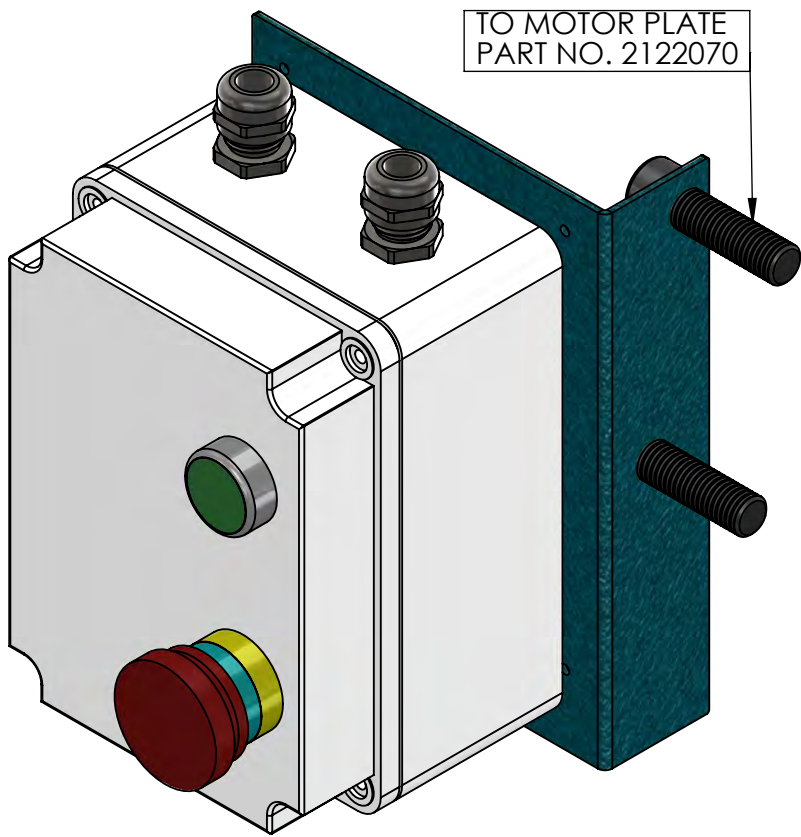
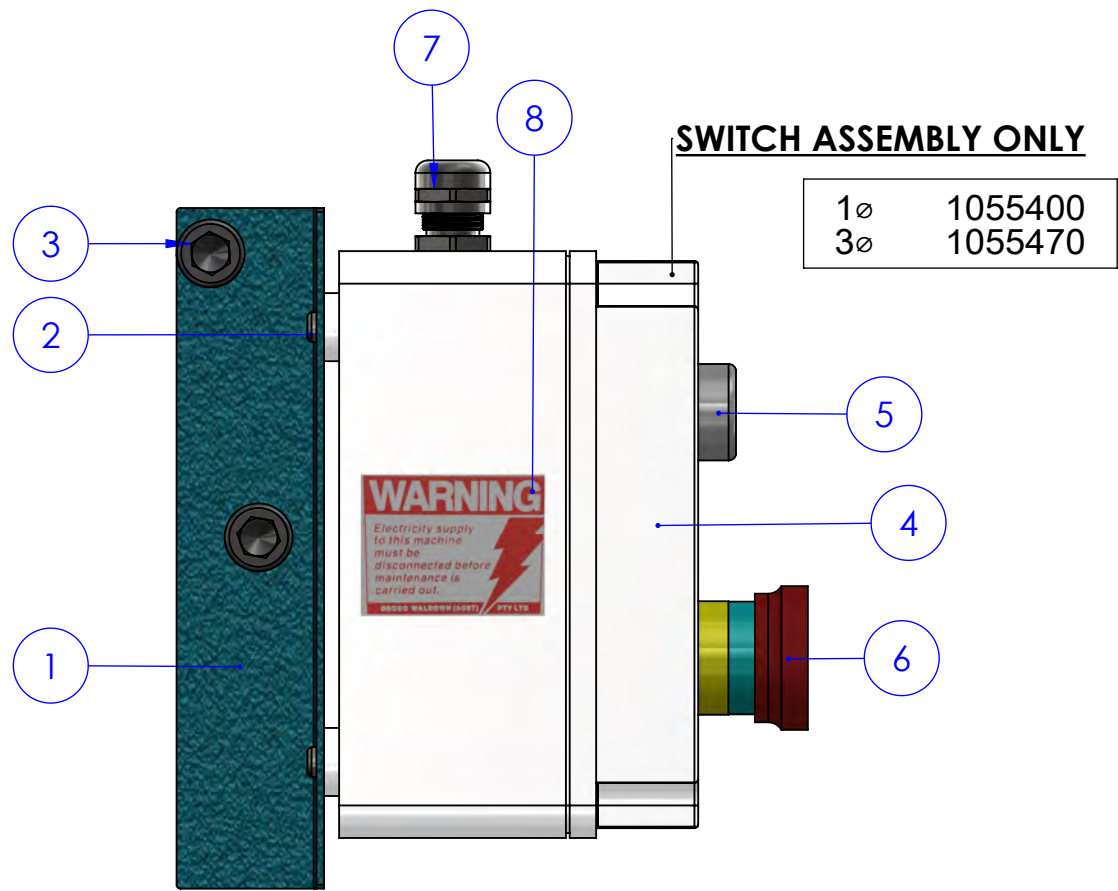
| ITEM NO. | PART NUMBER | DESCRIPTION  | QTY. |
|----------|-------------|--|------|
| 1        | 1035870     | Worm Gear Clamp, Range 51-70mm BandWidth 12mm                  | 1    |
| 2        | 1033190     | Link Arm U Shape   | 1    |
| 3        | 1033250     | Link 2 (Both End Serated)                                      | 4    |
| 4        | 1033260     | Link 3 (One End Serated)                                       | 2    |
| 5        | 1033270     | Link 4 (Plain Ends)  | 2    |
| 6        | 1035850     | Shield, Polycarbonate (PC)                                     | 1    |
| 7        | 8735480     | Disc Spring $\varnothing 10 \times \varnothing 4.2 \times 0.4$ | 6    |
| 8        | 8725050     | Nylon Lock Nut M4  | 8    |
| 9        | 8725040     | Slotted Pan Head Screw M4x16                                   | 6    |
| 10       | 8725030     | Slotted Pan Head Screw M4x10                                   | 2    |



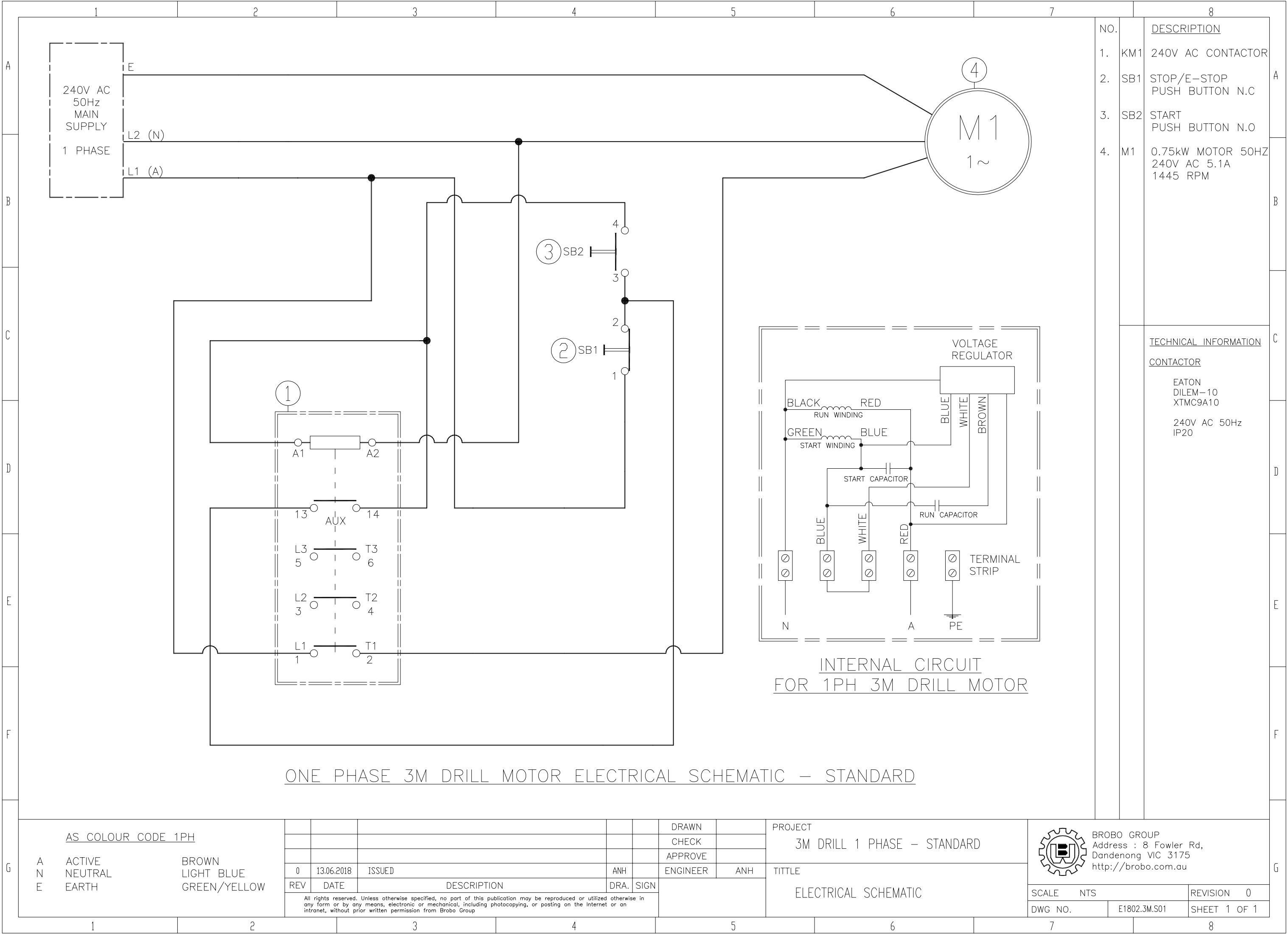
**Note**

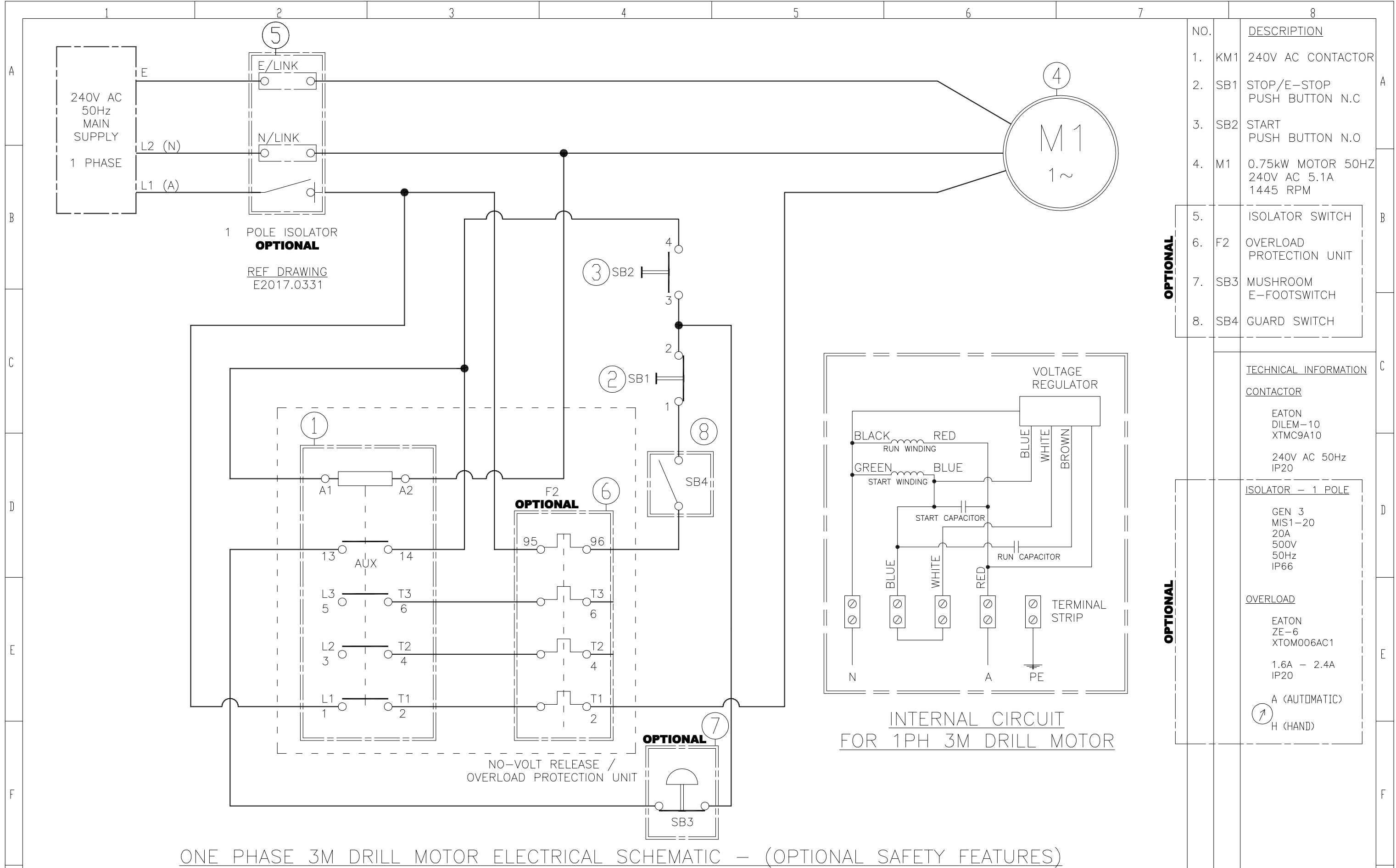
Nut & Disc Spring are outside the shield  
Material: Mild Steel Zinc Plated for Item (1) (2) (3) (4) (5)

| ITEM NO. | PART NO.      | DESCRIPTION                   | QTY. |
|----------|---------------|-------------------------------|------|
| 1        | 1033350       | Switch Plate                  | 1    |
| 2        | 8725040       | Slotted Pan Head Screw M4x16  | 4    |
| 3        | 8705250       | Socket Head Cap Screw M12x40  | 2    |
| 4        | 1055480       | ENCLOSURE                     | 1    |
| 5        | TN2BF-1A      | Start Button                  | 1    |
| 6        | Button Red    | Emergency/Stop                | 1    |
| 7        | 1045750       | Cable Gland M16               | 2    |
| 8        | WARNING LABEL | Electrical Hazard Safety Sign | 1    |




3M SWITCH ASSEMBLY 3Ø: 2131030

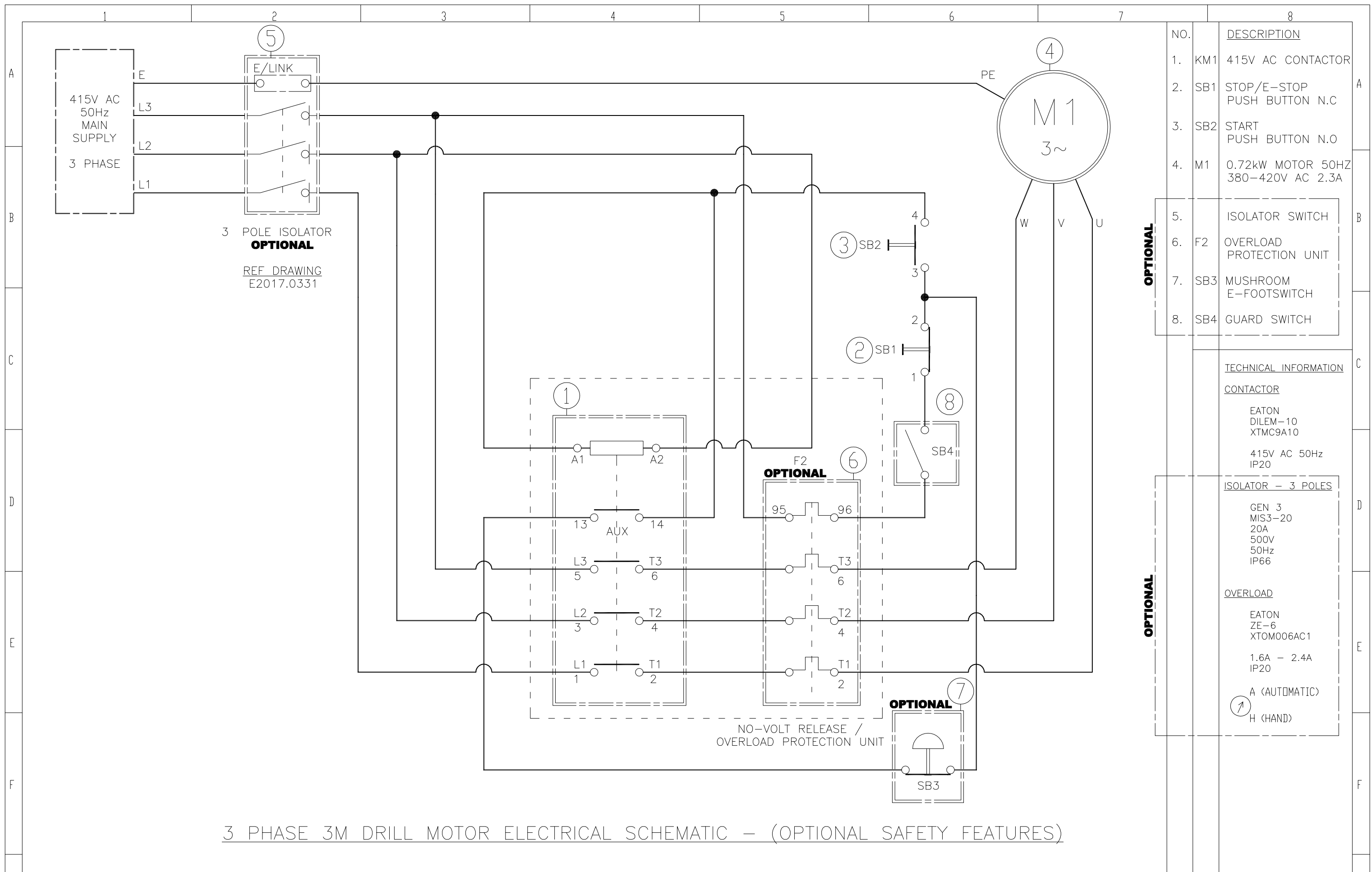




## ONE PHASE 3M DRILL MOTOR ELECTRICAL SCHEMATIC – (OPTIONAL SAFETY FEATURES)

|  |                    |                            |                                     |       |            |             |  |   |      |                      |  |  |  |          |   |  |
|--|--------------------|----------------------------|-------------------------------------|-------|------------|-------------|--|---|------|----------------------|--|--|--|----------|---|--|
| G  | AS COLOUR CODE 1PH |                            |                                     |       |            |             |  |   |      |                      |  | PROJECT<br>3M DRILL 1 PHASE – OPTIONAL |  BROBO GROUP<br>Address : 8 Fowler Rd,<br>Dandenong VIC 3175<br><a href="http://brobo.com.au">http://brobo.com.au</a> | G        |   |  |
|  | A<br>N<br>E        | ACTIVE<br>NEUTRAL<br>EARTH | BROWN<br>LIGHT BLUE<br>GREEN/YELLOW |       |            |             |  |   |      |                      |  |  |  |          |   |  |
|  |                    |                            |                                     |       |            |             |  |   |      |                      |  |  |  |          |   |  |
|  |                    |                            |                                     |       |            |             |  |   |      |                      |  |  |  |          |   |  |
|  |                    |                            |                                     | 0     | 13.06.2018 | ISSUED      |  |   | ANH  |                      |  |  |  |          |   |  |
|  |                    |                            |                                     | REV   | DATE       | DESCRIPTION |  |   | DRA. | SIGN                 |  |  |  |          |   |  |
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| DWG NO.  |                    | E1802.3M.S01.OPT           |                                     | SHEET |            | 1 OF 1      |  |   |      |                      |  |  |  |          |   |  |
| 1  |                    | 2                          |                                     | 3     |            | 4           |  | 5 |      | 6                    |  | 7                                      |  | 8        |   |  |

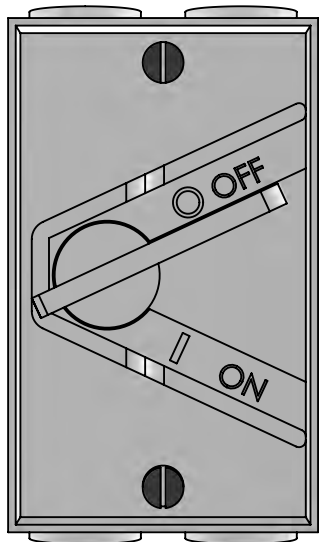




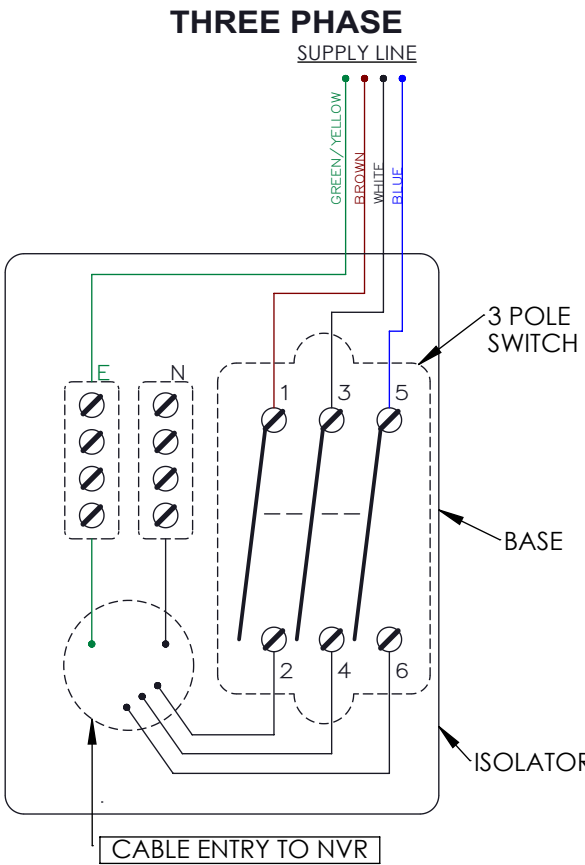
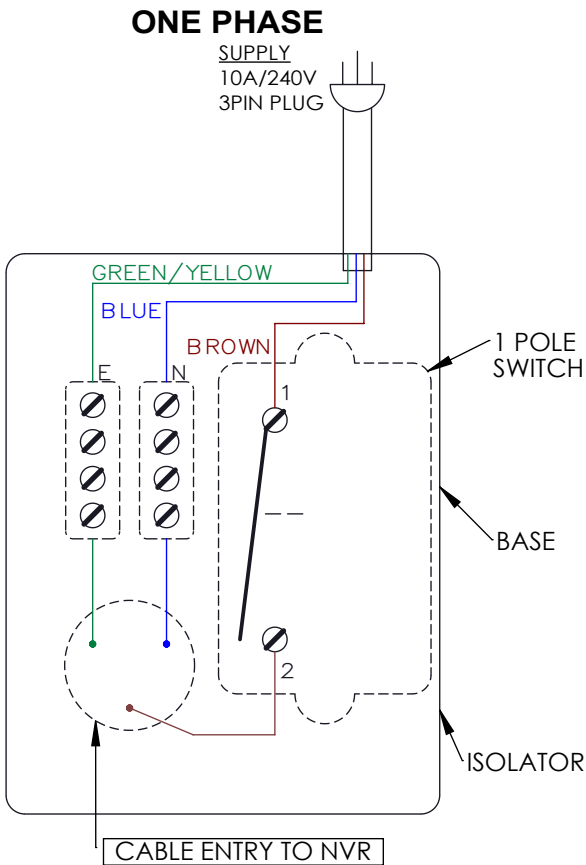
OPTIONAL



ISOLATOR: ONE PHASE



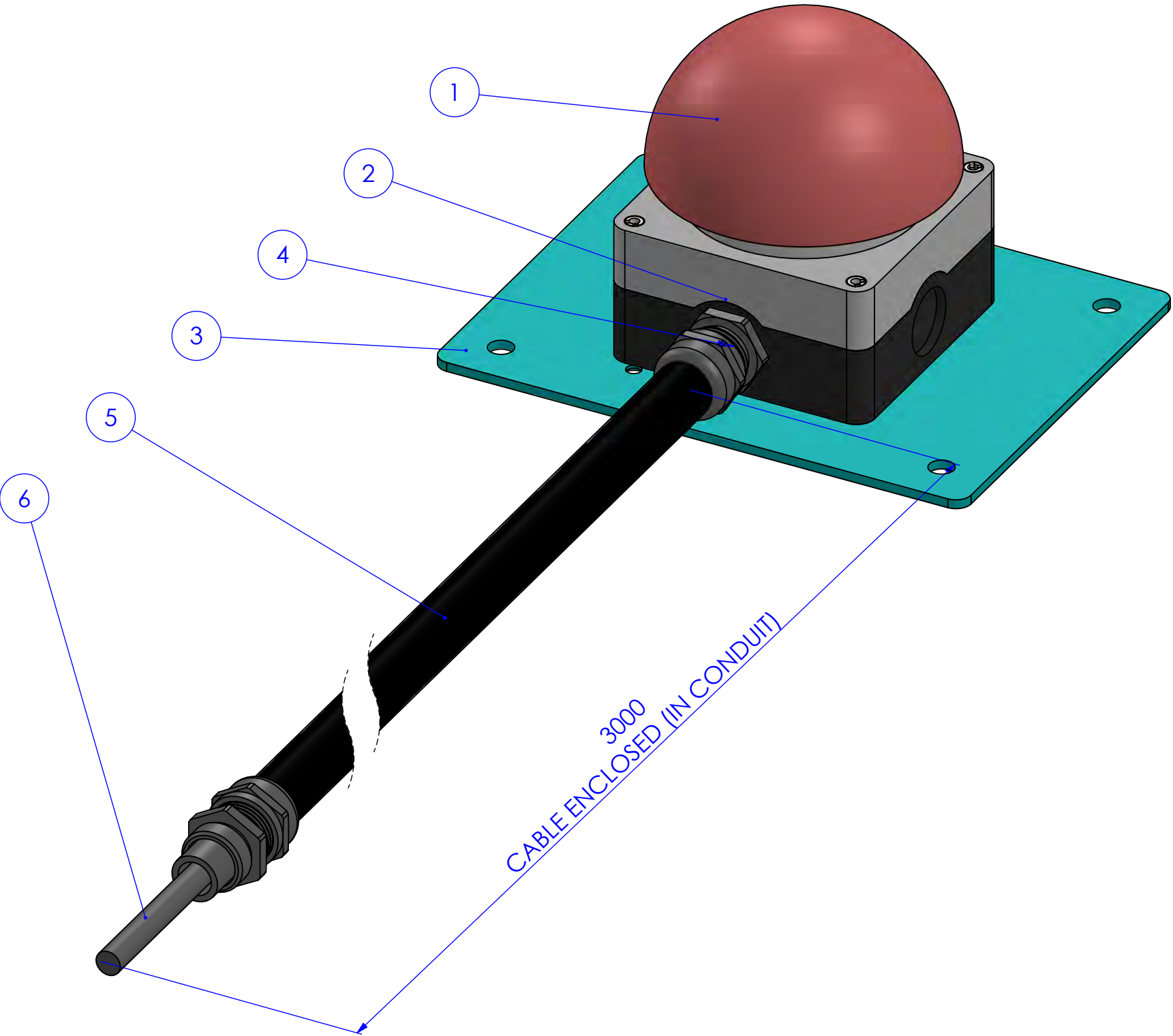
ISOLATOR: FRONT



**COMPONENT / SCHEMATIC / WIRING DIAGRAMS FOR  
CONNECTION FOR 1 PHASE OR 3 PHASE CIRCUIT ISOLATOR**



| ITEM NO. | PART NUMBER | DESCRIPTION                      | QTY. |
|----------|-------------|----------------------------------|------|
| 1        | 1305040     | Mushroom Footswitch Momentary    | 1    |
| 2        | 874573      | Reducer M20/16                   | 1    |
| 3        | 1041660     | Mounting Plate                   | 1    |
| 4        | 8745300     | Straigh Adaptor Sp16/M16 B       | 2    |
| 5        | 8745290     | SP 16 Conduit x 2.6 Meter        | 1    |
| 6        | 874510      | Footswitch Lead 32/020 x 3 Meter | 1    |



**OPTIONAL**



## CHAPTER 5 – Maintenance & Selection of Consumables

---

### 5.1. Role of the Operator

The person operating & maintaining the **Brobo Group 3M Drill** must familiarise themselves with these instructions for their own safety & that of the others, in addition to safeguarding the production of the machine. Responsibility must be taken by the user on the general maintenance & up keeping of the unit as specified in this chapter, with particular emphasis on:

- Check to ensure that other operators of the machine always aware of & comply with the relevant safety instructions & standards as specified in *Chapter 2 - Safety & Accident Prevention*. Therefore, check that the safety devices are operational & work perfectly & personal safety requirements are complied with.
- Ensure that the working cycle is efficient & guarantees maximum productivity, inspect the:
  - Functions of the main components of the machine
  - The sharpness of the drill bit & lubricating fluid
  - Correct working parameters for the type of material being drilled
- Verify that the quality of each drilled hole meets the requirements & that the final product is free from any machining defects.

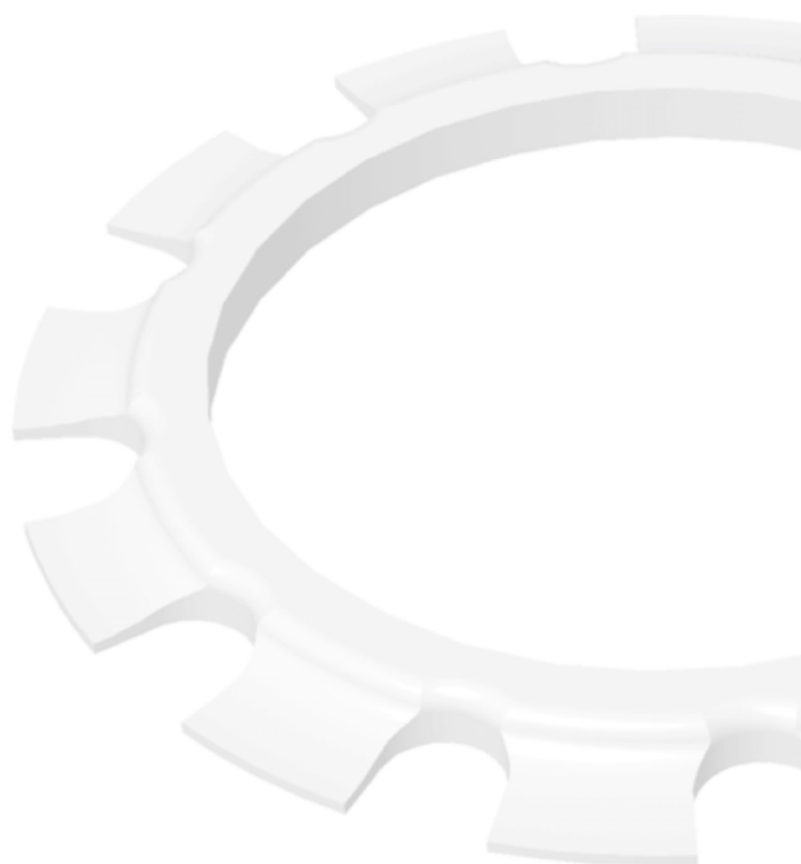
### 5.2. Maintenance Requirements

- All maintenance must be carried out with the power switched off & the machine in emergency stop condition.
- To guarantee for optimum operation, all spare parts must be **Brobo Group** originals.
- On completion of maintenance works, ensure that the replaced parts or any tools used have been removed from the machines before starting it up.
- Any behaviour not in accordance with the instructions for using the machine specified in this manual may create hazards and/or safety risks for the operator.
- Therefore, read & follow all the instructions for use & maintenance of the machine & those on the product itself.

### **5.3. General Maintenance of Functioning Components**

The general maintenance operations that should be carried out regularly are as follows:

- 1) Keep the rack lift table, overall machine, & path of the drilling free of any offcuts, accumulated swarf & lubricants by using compressed air or preferably thread-free cloth.
- 2) Lubricate the drill shaft & rotary chuck regularly with an *NLGI 2 extreme pressure grease, Shell Alvania No. 1 grease* or equivalent.
- 3) Check the belt condition & tension regularly. ***Do not over tighten belts***, as this will inadvertently exert tension on the spindle & motor bearings. To provide the right tension, follow the belt manufacturer's recommendations & specifications.
- 4) Clean & lubricate any moving joints or sliding surfaces with good quality oil.
- 5) Clean the drill machine regularly & keep any unpainted surfaces lightly oiled to protect from rust & corrosion.
- 6) Ensure that the machine performs drill perpendicular to the work surface. If not, contact **Brobo Group** engineering department.

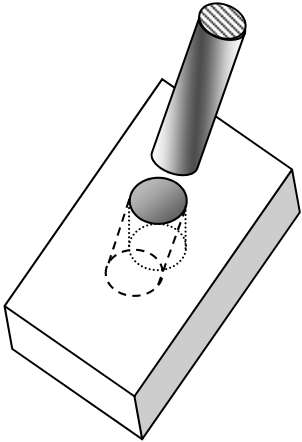
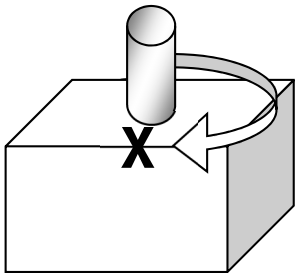




## CHAPTER 6 - Troubleshoot

### 6.1. General Troubleshooting

Below lists of some of the most common problems associated with the **Brobo Group 3M Drill** & the recommended troubleshooting procedures to undertake to rectify the situation. If the solutions provided do not resolve the problems, or the problem identified differs from those listed, immediately contact **Brobo Group** engineering department.

| PROBLEM IDENTIFIED  | DIAGNOSIS   | SOLUTIONS  |
|---|---|--|
| <p><i>Drilling is not at 90° or is angled to the rack lift table</i></p>  | <p>Workpiece not held firmly in vice clamp</p> <p>Excessively fast feed rate forcing the drill bit through the material</p> <p>The drill bit is not locked properly inside the chuck unit</p> | <p>Ensure that the vice clamps are securely fastened to the workpiece prior to drilling.</p> <p>Slow down the drill feed rate, else it might cause the drill bit to break &amp; cause harm to the operator.</p> <p>Check that no swarf is lodged in the chuck unit. Remove aggregate using an air gun. Also, check that the chuck teeth are not worn. If so, the chuck unit might need to be replaced.</p>   |
| <p><i>Drill bit not turning penetrating the material</i></p>             | <p>Workpiece exceeds the recommended drilling capacity V-Belt slipping</p> <p>Blunt drill bit</p> <p>Excessive swarf trapped in the drill hole</p>  | <p>Please ensure that the workpiece required drilling area does not exceed the recommended drilling capacity.</p> <p>Check that the motor/pulley belts are not worn &amp; if so, promptly replace them. The V-belts are available for purchase from <b>Brobo Group</b>.</p> <p>Replace or sharpen the drill bit to continue with the drilling process. To reduce the amount of friction between the drill bit &amp; parent material, apply a light coating or grease/lubricant onto the drill bit prior to drilling.</p> |

Worn bearings/seal in quill housing

Back off the feed rate on the drill. Use an air gun to clean out any remaining swarf in the hole. Reapply lubricant on the drill bit & continue with the drilling process.

The bearing & seal components can be purchased directly from your nearest **Brobo distributor**. For more information, please check [www.brobo.com.au](http://www.brobo.com.au)

*Worn/broken component*

Replace component

worn/broken

All component of the 3M drill is sold as spare parts (pending availability). Please contact your nearest **Brobo distributor** or our **Brobo Group** head office. Please visit [www.brobo.com.au](http://www.brobo.com.au) for more details.





**BROBO GROUP®**

**BROBO GROUP (AUST) PTY. LTD.**

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Quality  
Endorsed  
Company

ISO 9001 Lic. 10292  
Standards Australia



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## **APPENDIX - RISK/HAZARD ASSESSMENT**

| <b>Hazard Type</b>        | <b>Hazard Identification</b> | <b>Hazard Assessment</b> | <b>Hazard Management Strategies</b><br>(Recommended for the Purchasing / Buyer / User)   |
|---------------------------|------------------------------|--------------------------|--|
| <b>Mechanical</b>         | Cutting/Severing             | Low/Med                  | Keep machine correctly guarded & operational at all times.<br>Keep hands clear of rotating the drill bit.  |
|                           | Entanglement                 | Low                      | Do not wear loose jewellery, clothing or items that might get caught in the drill.<br>Always keep the work area free of unnecessary objects or tools.  |
|                           | Impact                       | Low                      | Wear protective safety glasses when utilising the drilling machine.<br>Strongly encouraged that steel-capped safety boots be worn during operation of drill machine.                               |
| <b>Electrical</b>         | Electrocution                | Low                      | Remove the power supply when any maintenance and/or repairs are to be undertaken.<br>The power source is to be isolated prior to opening electrical enclosures.                                    |
| <b>Noise</b>              | -                            | Low                      | Under no load testing, the noise level measured is below 80db (A).<br>If the noise level becomes too high during a drilling cycle, stop the process & inspect for the problem, if any are present. |
| <b>Substance</b>          | -                            | Low                      | Keep the work area clean & regularly remove excess coolant, oils, & another aggregate.   |
| <b>Hazardous Events</b>   | Unexpected Start-Up          | Low                      | During a power failure, turn the machine off.<br>If the problem persists, please contact <b>Brobo Group engineering</b> department.  |
| <b>Additional Hazards</b> | Operator Error               | Low                      | Ensure blades, clamps & materials are correctly secured.   |

**MACHINE TYPE:** \_\_\_\_\_

**SERIAL NO.:** \_\_\_\_\_

**RECEIVING COMPANY:** \_\_\_\_\_ **(SAFETY OFFICER)**

## **Brobo Group Warranty**

- 1.1 The supplier warrants that all goods supplied by it shall be free from defects in materials & workmanship for a period of twenty-four (24) months from the date of delivery to the Customer. ("The Warranty Period"), on the following terms & conditions.
- 1.2 The Customer shall promptly provide written particulars to the supplier on becoming aware of any defect in the goods during the Warranty Period, & shall provide the Supplier with all necessary access, facilities & information to enable the Supplier to ascertain or verify the nature & the cause of the defect & to carry out its obligations under this warranty.
- 1.3 The Supplier's obligation under this warranty is limited to repairs of the defect goods & the Supplier is under no obligation to replace the goods or refund the value of the goods to the Customer.
- 1.4 If the goods are, in the opinion of the Supplier, not defective or if any defect is attributable to any one or more of the following circumstances then the Supplier is under no obligation whatsoever to the Customer:
- 1.4.1 The use of the goods for a purpose other than that for which they were intended to be used;
  - 1.4.2 The repair, modification or alteration of the goods by any person other than the Supplier;
  - 1.4.3 Where the defect has arisen due to misuse, neglect or accident, howsoever arising;
  - 1.4.4 Where the defect has arisen due to the installation of the goods which were, in the reasonable opinion of the Supplier, incorrectly carried out
  - 1.4.5 Where the goods have not been correctly stored or maintained
  - 1.4.6 Where the defect has arisen due to normal wear & tear on the goods
- 1.5 The Supplier is under no obligation under this warranty where the Customer has failed to observe the terms of payment for the goods or any other obligation imposed by the terms & conditions of this warranty.
- 1.6 In the event that the Supplier is supplying goods, which have been manufactured by third parties, the Customer shall be entitled to the benefit of any Manufacturer's Warranty in respect of such goods. The Customer acknowledges that the Supplier accepts no responsibility whatsoever for any Manufacturer's Warranty or any claim howsoever arising from the use of the goods, whether singularly or in combination with other products.
- 1.7 The Supplier shall not be liable for any indirect or consequential losses or expenses suffered by the Customer, howsoever caused.
- 1.8 Except as specifically set out herein, or in writing by way of catalogue or pamphlet or otherwise provided by the Supplier to the Customer any term, representation, condition or warranty in respect of the quality, condition or description of the goods, whether implied by statute, common law, trade usage, custom or otherwise, is hereby expressly excluded.

This warranty is given by **Brobo Group Pty Ltd**, ABN: 42 098 264 316

Address: 8 Fowler Rd, Dandenong South, VIC 3175



03 9794 8751



03 9794 8792



[info@brobo.com.au](mailto:info@brobo.com.au)

This warranty is provided in addition to other rights & remedies you have under the law: Our goods come with guarantees which cannot be excluded under the Australian Consumer Law. You are entitled to replacement or refund for a major failure & to compensation for other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality & the failure does not amount to a major failure.