INSTRUCTION MANUAL

SHARK

ROSCAMAT®

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ISO 9001
BUREAU VERITAS
Certification

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MACHINE TOOL SLU

DESIGN & QUALITY
ROSCAMAT
Made in Barcelona

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1 ABOUT THIS MANUAL

This is the instruction manual for the ROSCAMAT® SHARK tapping machine.

-ORIGINAL MANUAL-

Intellectual/Industrial Property:

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1.1 CONSIDERATIONS

- ✓ Before using the equipment, make sure you read this instruction manual and follow the safety and operating instructions fully.
- ✓ All the instructions contained in this manual refer to the individual device; the end user is responsible for analysing and applying all the necessary safety measures required for the intended use.
- ✓ This manual must be kept near the device for consultation throughout its working life.
- ✓ If any part of this manual seems unclear, confusing or imprecise, please do not hesitate to contact your 3arm® and/or Roscamat® distributor.
- ✓ The contents of this manual may be subject to change without prior notice.
- ✓ If the manual is lost or damaged, contact TECNOSPIRO MACHINE TOOL, S.L.U. so we can provide you with a new one.
- ✓ This document, or any part thereof, may only be reproduced or provided to third parties with the express written authorisation of TECNOSPIRO MACHINE TOOL, S.L.U.
- ✓ Some illustration details in this manual may differ from specific device configuration and should be understood as being representative of the standard product.

Paragraphs indicating assembly, adjustment, installation and maintenance steps are indicated by brown shading.

Paragraphs containing important information are indicated by grey shading.

1.2 VERSION

Document	Revision date
Instruction Manual	16/02/2024

2 SAFETY INFORMATION

2.1 SCOPE OF APPLICATION

This section contains extremely important information on the safe operation of the device and is intended for anyone involved in any stage of the life cycle of this device (transport, assembly and installation, commissioning, adjustment–training, operation, cleaning, maintenance, troubleshooting and disassembly/decommissioning).

2.2 WARNINGS AND GENERAL CONSIDERATIONS

- ✓ The device described in this document has been built using current technology and in accordance with applicable technical standards on safety. However, misuse or incorrect installation by the end user may create a risk of injury.
- ✓ The device must only be used if it is proper working order, and all safety rules and instructions in this document must be obeyed.
- ✓ Any problem that could affect the safety of the device must be corrected immediately.
- ✓ No modifications must be made to the device without due authorisation from TECNOSPIRO MACHINE TOOL, S.L.U.
- ✓ The device must only be used for the intended purpose; any other use is strictly prohibited. All use other than that indicated here will be considered misuse and is prohibited. The manufacturer assumes no liability for damage that may result from such misuse.
- ✓ The installer, owner and/or end user are responsible for determining whether the product is appropriate for each specific use, as well as determining the installation site and concretely defining the task to be performed with this product, within the limits set forth in this manual.
- ✓ Do not use it for any purpose not covered in this manual.
- ✓ The operator may only operate the device after having received applicable instructions for its use.
- ✓ It is recommended that only one operator use the device at one time; any other use must be evaluated by the installer / end user.
- ✓ Manipulating the device's moving parts and joints whilst the device is in use is strictly prohibited.
- ✓ When the manipulator is not in use, it must be left in the folded, or parked, position.
- ✓ Workpieces (parts for tapping) must be correctly secured.
- ✓ Tapping materials must comply with the manufacturer's instructions.
- ✓ The operator must only use the device to perform safe movements, moving together with the device at all times to reduce the risk of uncontrolled or

involuntary movement of the equipment.

- ✓ Even though the parts that present the greatest risk of possible shearing or pinching are protected and enclosed, moving and jointed parts must not be handled during use.

- ✓ The work area of the device and areas where it has the greatest impact must comply with conditions of workplace safety, health and hygiene; the installer/end user is responsible for conducting a study to ensure safety.

- ✓ The operator must remain outside the vertical path of the swing arm.

- ✓ The presence of others in the device's working area must be restricted as much as possible in order to avoid any risk to safety; if any other use is intended, a supplementary study of the risks arising from the working mode must be conducted.

- ✓ It is important for operators of this device to be familiar with and have sufficient training in the use of this product or similar equipment.

- ✓ The operator must always read and understand this manual before using the device, regardless of any prior knowledge, training or experience with similar equipment, especially the sections on installation, operation and safety.

- ✓ If unsure about device usage or maintenance procedures, please contact your 3arm® and/or Roscamat® distributor.

2.3 EXCLUSIONS

The device is not intended for the following uses:

- ✓ Manipulation of any components or functions of the device aside from those specified in this manual.
- ✓ Use by persons with any type of disability, or by animals.
- ✓ Use by staff who have not completed occupational risk prevention training.

Do not install:

- ✓ Installation in corrosive areas.
- ✓ Installation in dusty areas.
- ✓ Installation in areas with high electromagnetic emissions.
- ✓ Installation in areas with extreme temperatures (very high or very low).
- ✓ Installation in areas with high humidity.
- ✓ Outdoors installation.

2.4 SYMBOLS AND ICONS

Throughout this manual and on the structure of the machine itself, you may see various symbols and icons whose meaning is summarised below:

	Hazard. General hazard symbol, usually accompanied by another symbol or a detailed description of the hazard.
	Risk of pinching
	Electrical hazard

2.5 SYSTEM INSTALLER

The system installer or end user is responsible for installing the machinery in accordance with all applicable safety measures.

The installer / end user is responsible for the following tasks:

- ✓ Location and proper installation.
- ✓ Connections.
- ✓ Risk assessment.
- ✓ Installation of mandatory safety and protectives features.

2.6 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The following personal protective equipment should be used with this machine: **safety boots, hardhat, safety goggles and safety gloves** for transport, assembly and installation, commissioning and dismantling.

Safety footwear, safety gloves and safety goggles for adjustment, training, operation and troubleshooting.

The installer or end user is responsible for specifying the required personal protective equipment for the intended application of the machinery and to meet essential health, safety and hygiene requirements.

Operators must not wear loose clothing, rings, bracelets or watches since these may become caught in the workings of the machinery.

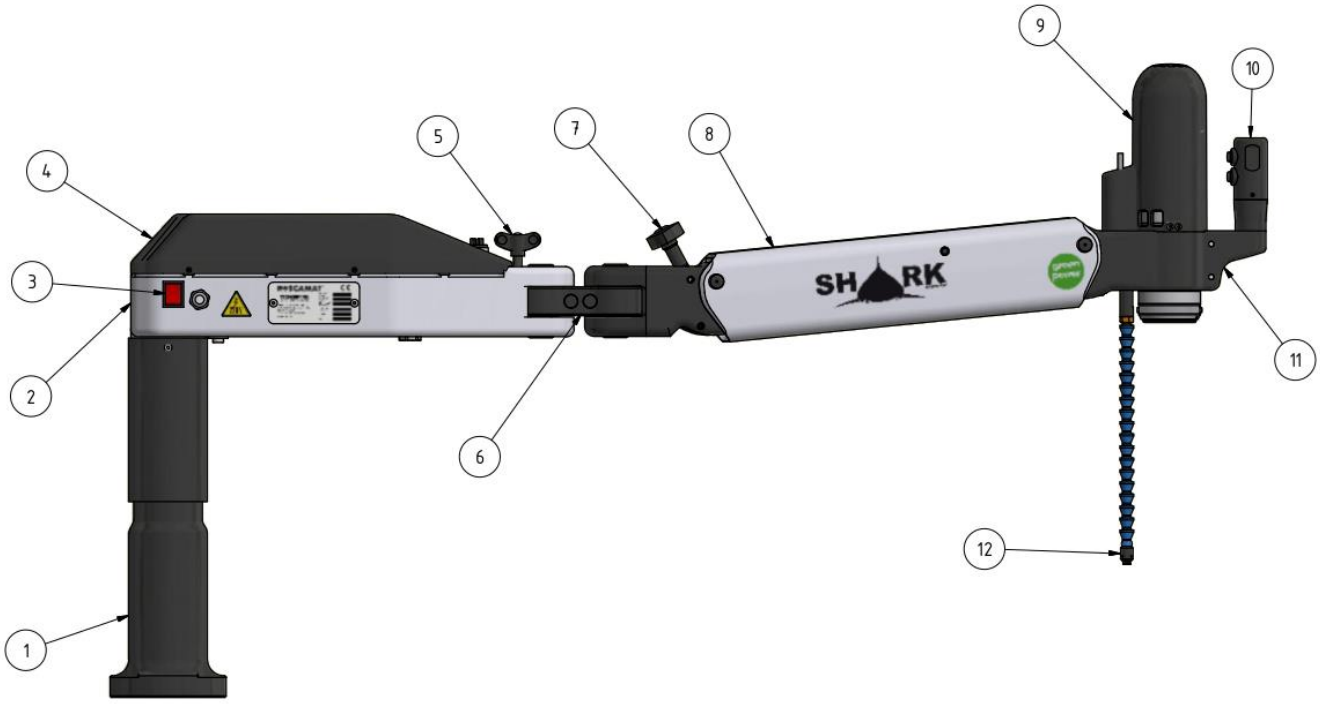
Hair must be tied up to prevent it getting caught in the moving parts of the machinery.

2.7 LEVEL OF TRAINING FOR PERSONNEL WHO WORK WITH THE DEVICE

Anyone who works with the machinery must have read and understood the information in the chapter on safety.

3 GENERAL DESCRIPTION AND TECHNICAL INFORMATION

3.1 MAIN PARTS



1. Base
2. Radial arm
3. Main power switch
4. Electrical compartment cover
5. Brake lever
6.- Connection
7. Adjustment knob
8.- Tilting arm
9.- Motor
10.- Grip
11. Head assembly (V or VH)
12. Articulated lubrication tube

3.2 DESCRIPTION AND OPERATING PRINCIPLES

The device consists of a swinging parallelogram balanced by a pneumatic spring, and a radial arm. Together, the two hold the motor head, keeping it perpendicular to the work area.

The high-frequency electrical motor is connected to a variable frequency drive and a control panel, operated using a simple keypad on the radial arm to set the depth of the thread. A unit of six modular gears is attached to the motor output via a quick-change system for adjusting the tap speed and torque depending on the size.

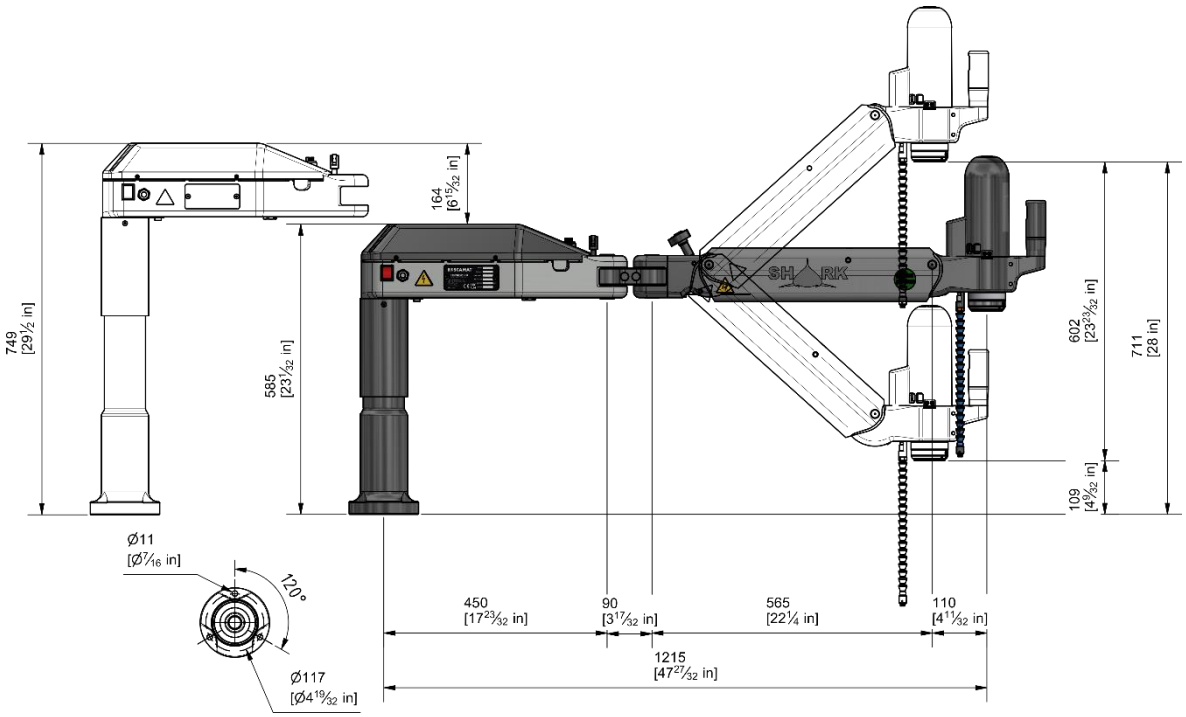
These modules also include a quick-change system to fit the tap holder, with or without safety clutch.

3.3 CONFIGURATIONS

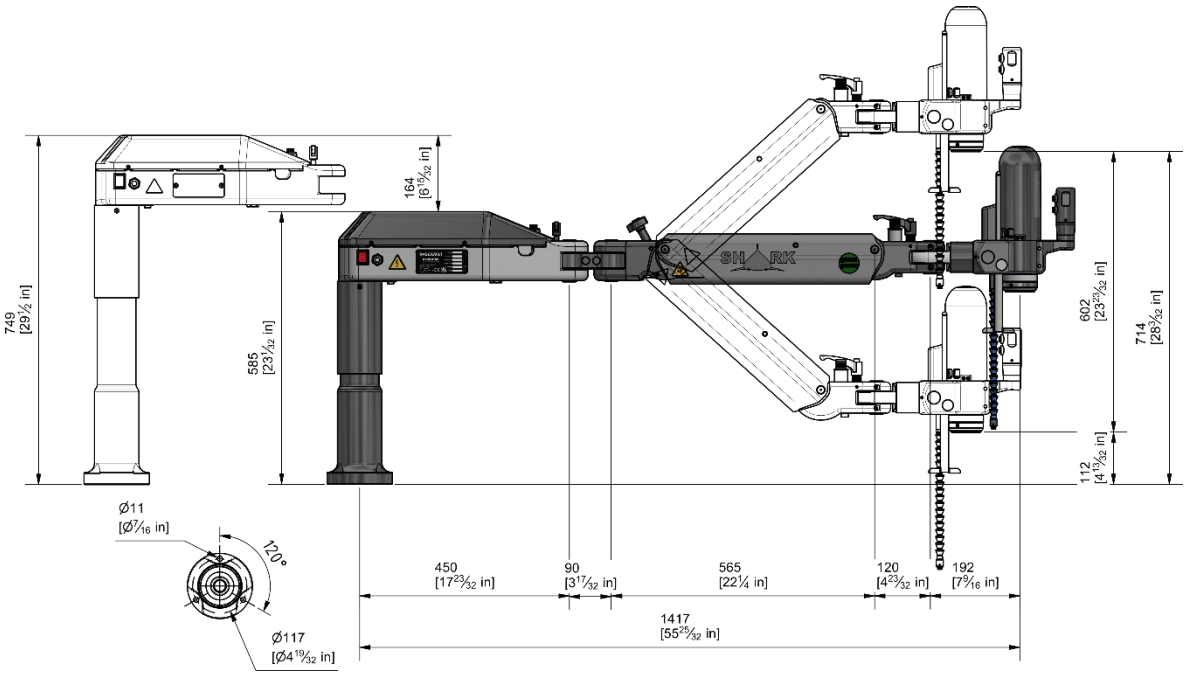
All machine configurations include:

- Two heads: vertical (V) or articulated (VH, 4x90°)
- Power supply: 230V or 120V (230V + Trafo 120V)

3.4 DIMENSIONS

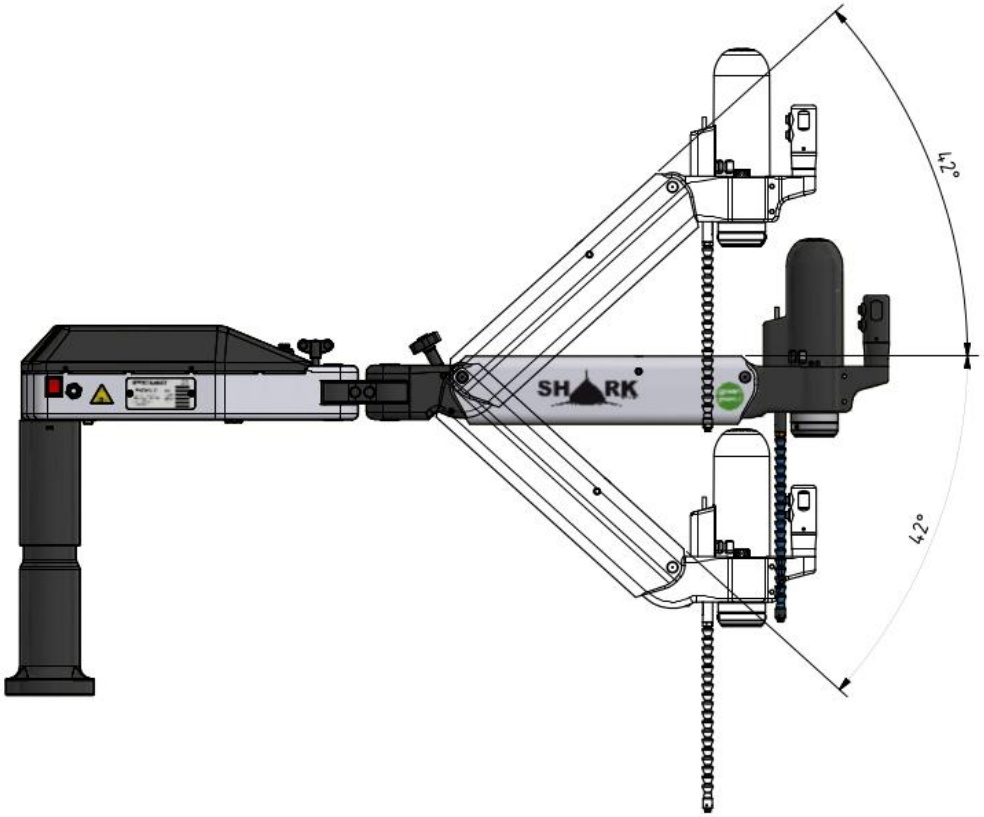


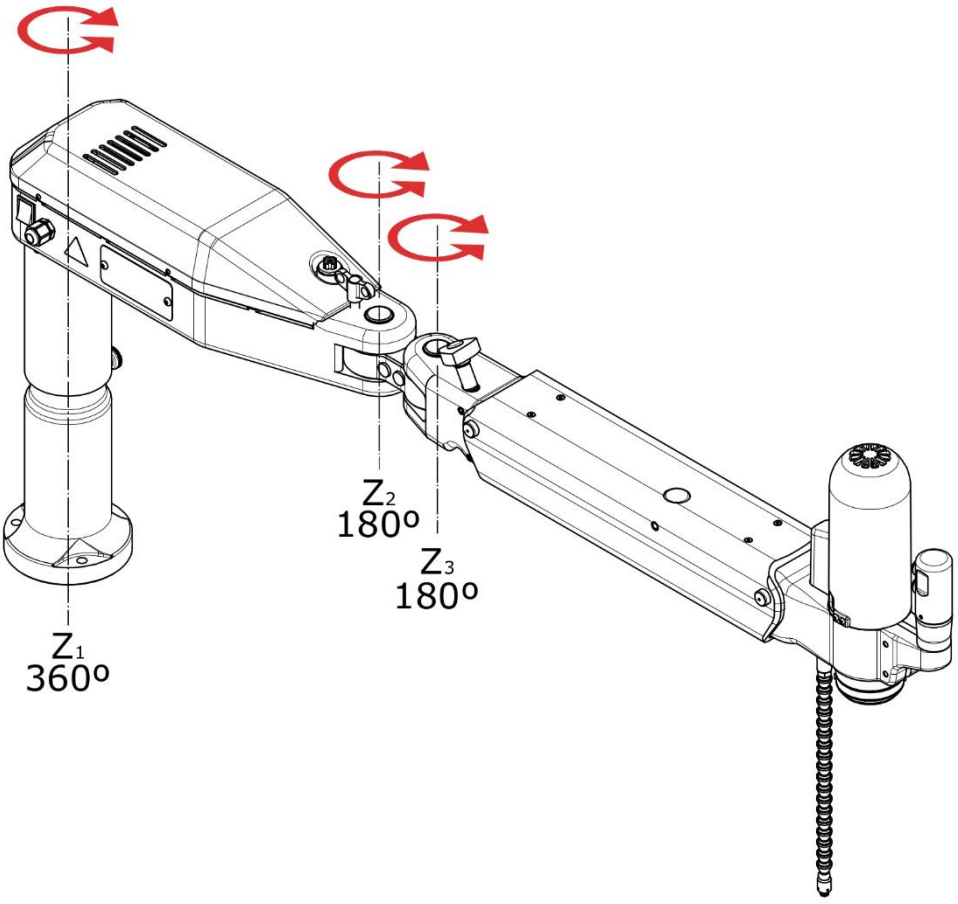
Roscamat Shark – Vertical head (V)



Roscamat Shark – Articulated head (VH, 4x90º)

3.5 MOVEMENTS





3.6 TECHNICAL SPECIFICATIONS

GENERAL TECHNICAL SPECIFICATIONS		
Tapping capacity[1]		M3-M36
Suitable materials for tapping[2]		Metals and metal and plastic materials
Speed range		40-900 rpm
Weight	*Vertical*	36 kg *(79 lb)*
	Articulated	38 kg *(83 lb)*
Electrical specifications		
	Power supply voltage and frequency	220–240 V 50 Hz
	Motor power	0,8 KW
	Protection class	IP 54
	Power supply voltage and frequency	100–120 V 60 Hz
	Motor power	0,8 kW
	Protection class	IP 54
Working conditions		
	Temperature	-10 to +50 °C *(14–122 °F)*
	Relative humidity	Max. 70%
	Environment	Industrial environments

3.7 IDENTIFICATION PLATE

A metal plate on the radial arm of the machine provides details of the following:

Manufacturer (name, address and company name), manufacture date, serial number, model, power supply voltage and frequency, motor power and CE and UKCA mark.

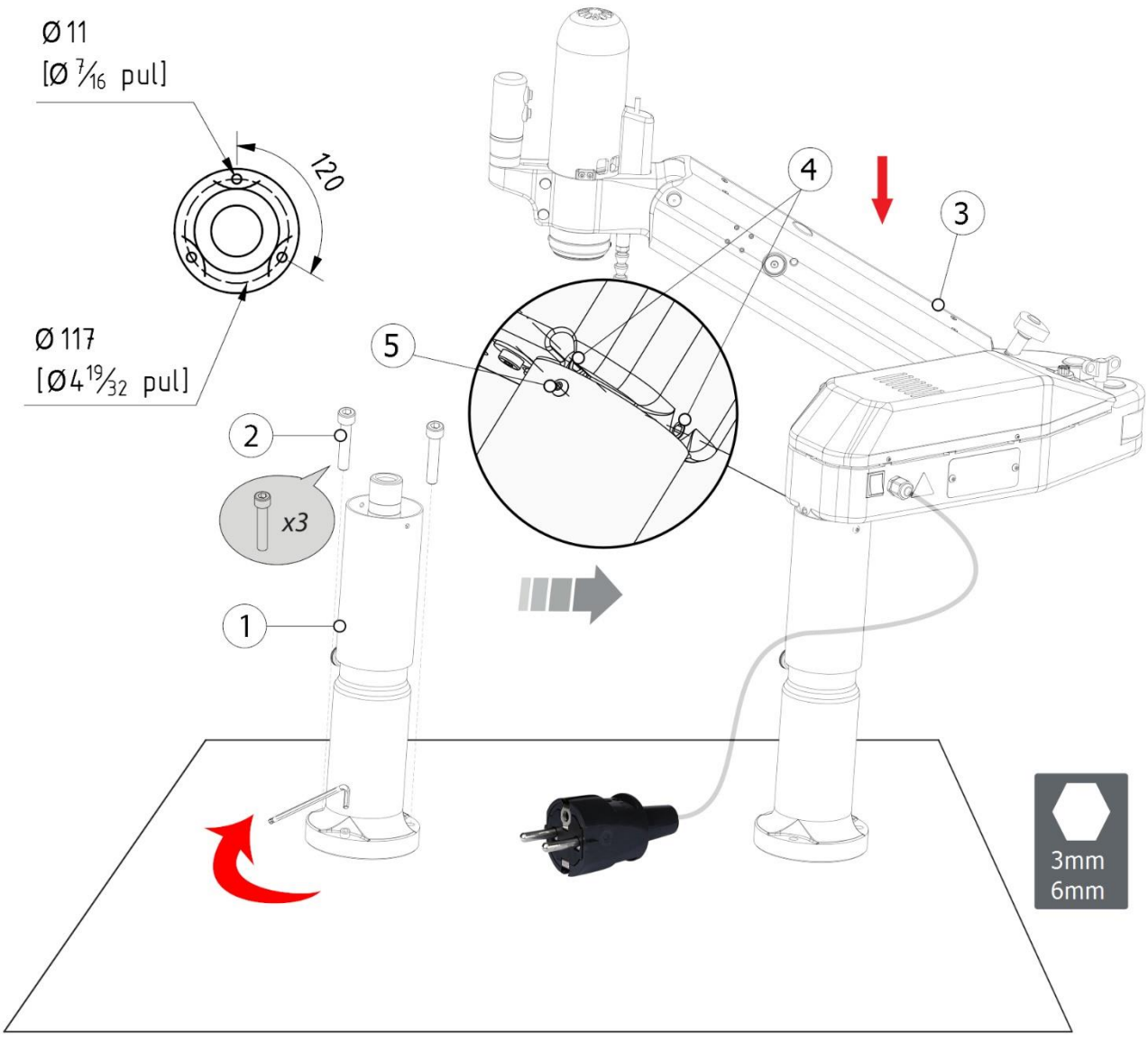
[1] Minimum and maximum tapping values for tapping with 90 kg/mm² steel.

[2] In general, all types of metals and plastics can be used. Special care must be taken with materials such as magnesium (highly flammable) and certain plastics. Any other type of material must be subject to an additional study to identify risks by the installer or end user.

4 INSTALLATION, ADJUSTMENTS AND OPERATION

4.1 INSTALLATION

1. Remove the equipment from the original packing.
2. Attach the base of the machine (1) using the three M10 bolts (2) (Recommended torque 45Nm) suited to the chosen installation site (alternative methods may be used if approved by the installer).
3. Raise the base shaft to its highest position.
4. Fit the machine (3) to the base shaft until it is fully supported on the shaft Seeger ring then use a 6 mm Allen key to tighten the M12 threaded rods (4) (6 mm Allen key).
5. Raise the cover of the lift and attach the machine using the two M5 bolts (5) (3 mm Allen key).
6. Plug the power cable into the mains supply and turn on the main switch.



INSTALLATION

✓ The installation site must be horizontal to prevent drifting or shifting.

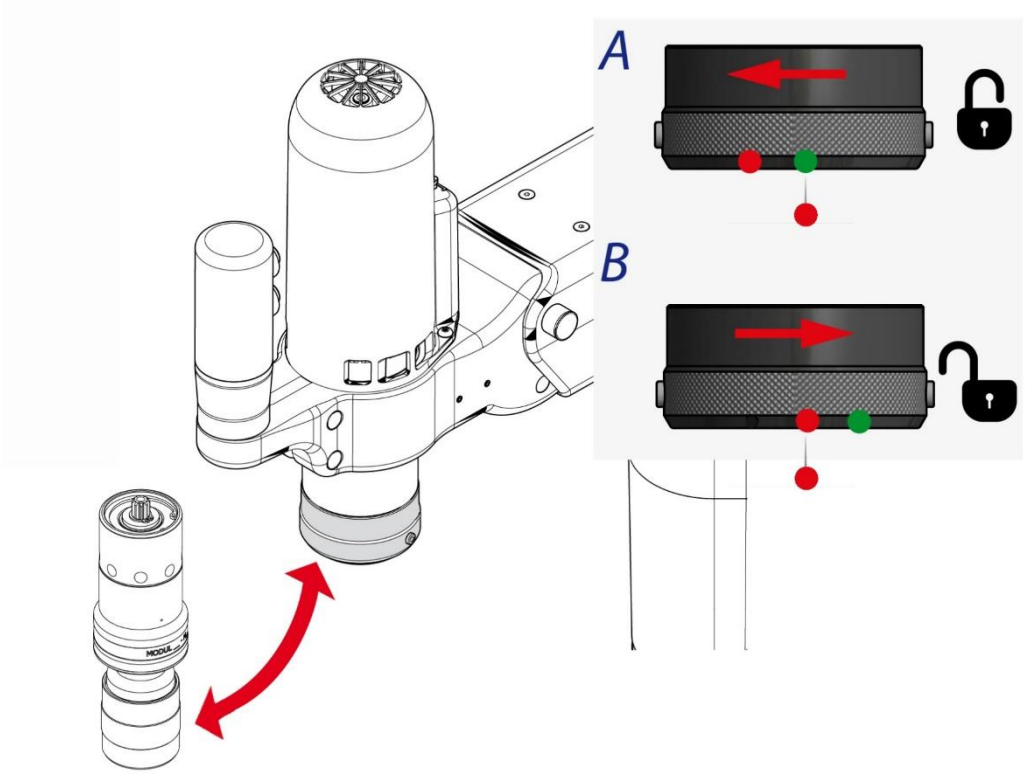
INSTALLATION SITE

Do not install the device in areas such as:

- ✓ *Explosion or fire hazard zones*
- ✓ *Outdoor areas*
- ✓ *Areas with corrosive atmospheres*
- ✓ *Areas with extreme temperatures (very high or very low)*
- ✓ *Areas with high humidity*
- ✓ *Dusty areas*
- ✓ *Areas with high electromagnetic emissions*

4.2 MODULE CHANGEOVER

1. Place the machine in the folded or parked position.
2. To remove the module:
   - Rotate the chuck to the right **(B)** (align the red dots).
   - Remove the module.
3. To insert the module:
   - Insert the module (align the red dots).
   - Rotate the chuck to the left **(A)** (lock: align the green and red dots).
   - Check that the module is held securely in place.
4. Readjust the arms *[See BALANCING THE ARM p. 19]*.



PLEASE NOTE

✓ When removing the module, the arm may jerk upward.

4.3 ADJUSTMENTS

4.3.1 ADJUSTING MOTOR TURNING SPEED

Adjust the tap speed in each direction of turn depending on the properties of the material to be threaded using the control keypad on the cover of the radial arm.

A value of 100% means the motor will turn at the rated speed for the module.

It is recommended to reduce the cutting speed to 70% for machining hardened steels with the modules 75 and 140 in taps close to their maximum capacities.

4.3.2 ADJUSTMENT OF LUBRICATION TIME

Depending on the tap properties (material, tap, diameter), adjust the tool lubrication time using the button attached to the speed controls. The maximum lubrication time is one second, counted in intervals of 0.1 seconds.

4.4 DEPTH CONTROL

By means of an internal encoder, the machine controls the position of the arm vertically downwards (Z-axis) in mm so that the desired tapping depth can be controlled.

ADDITIONAL INFORMATION

- ✓ The depth control system only operates when working vertically. It is not possible to use the depth control horizontally.
- ✓ The depth control system can only thread clockwise.

4.4.1 Free mode (00)

This is the default program, used to work in free mode, without depth control.

The 2-point light signal on the display indicates that the programmed depth is 0 and therefore that it is in free mode.

4.4.2 End-of-thread stop (P1)

This program automatically stops the motor when the pre-programmed depth is reached [See Programming thread depth page 18]. The operator is responsible for manually reversing the direction of rotation once the threading process is completed.

This program is suitable for continuous work cycles.

4.4.3 Semi-automatic cycle (P2)

This program automatically stops the motor and reverses the direction of rotation when the previously programmed depth is reached [See Programming thread depth page 18].

A sustained press of the activation button is required to complete the entire cycle.

4.4.4 Automatic cycle (P3)

This program allows fully automatic work cycles. With a 1-second press by the operator, the equipment will perform a complete threading cycle (threading, stop and inversion) at the previously programmed depth [See Programming thread depth page 18].

ADDITIONAL INFORMATION

This program is not enabled as standard. It must be ordered from the factory.
The manufacturer informs the user that, in order to continue to comply with the Machinery Directive **2006/42/EC**, a protective guard must be installed in the threading area when working with this program.

4.4.5 How to change program

To change program, both buttons on the display must be pressed for about 6 seconds until the selection menu is activated. Then use the (+) or (-) buttons until the desired program is found. Once the program has been selected, wait 2 seconds for it to be activated.

4.4.6 Define point of origin "0"

To program the thread depth, hold the tap in contact with the surface of the workpiece and simultaneously press the +/- keys on the depth regulator to identify the origin point or "0" at which the machine will begin to monitor its depth. The display will show a 2-point light signal.

4.4.7 Programming thread depth

In any working mode, press the (+) or (-) keys until the desired depth (in mm) is reached.

CAUTION

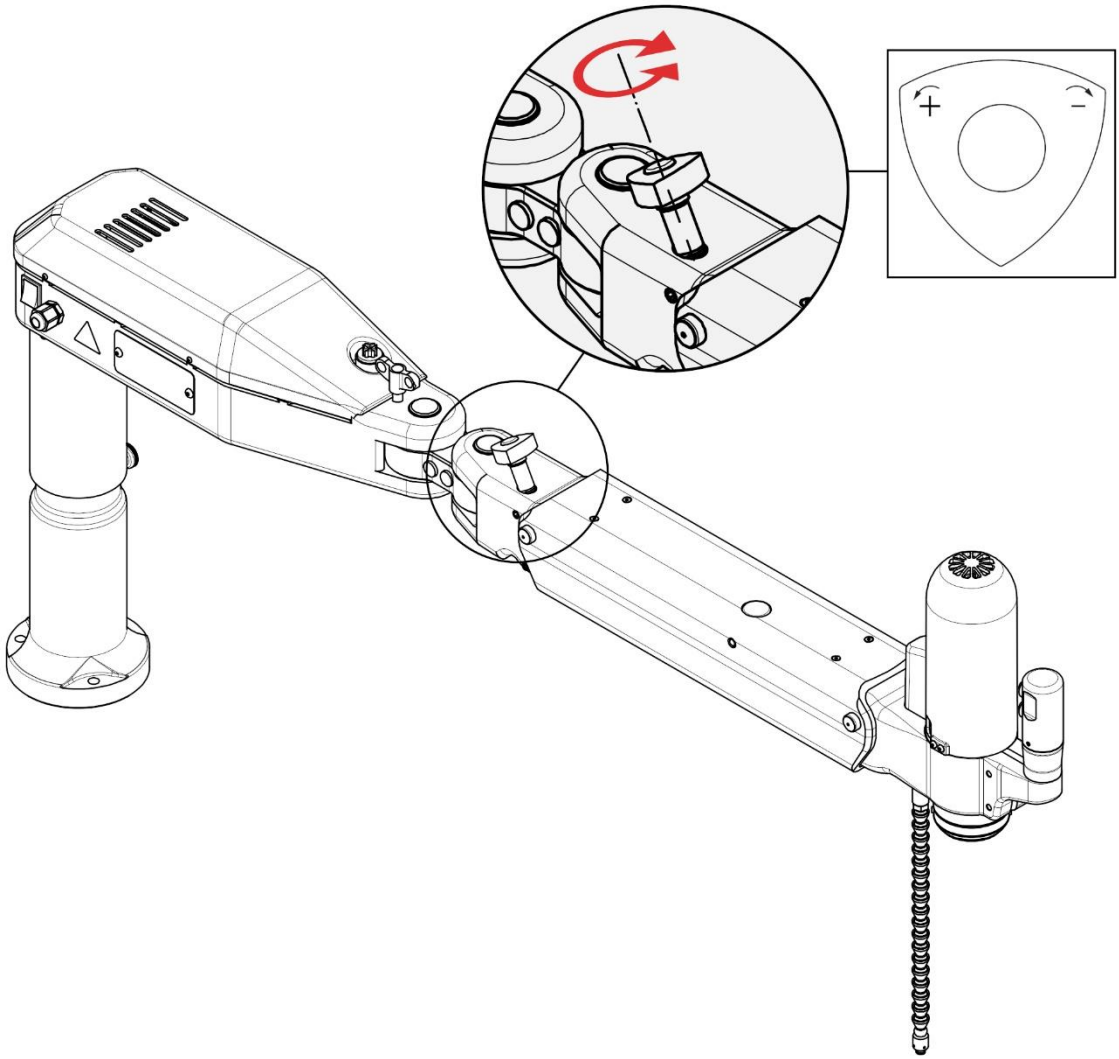
✓ **Take into account the thread tap inlet.**

4.5 BALANCING THE ARM

Adjust the tension on the inner damper if the arm drops down or has too much upward force.

1- Keep the swing arm in an approximately horizontal position to facilitate operation.
2- Turn the knob provided for this purpose as required.

- **Anti-clockwise rotation:** more tension is applied to the spring.
- **Clockwise rotation**: releases tension in the spring.



BALANCING THE ARM

✓ The arm must be balanced each time the module is changed.

4.6 LUBRICATION

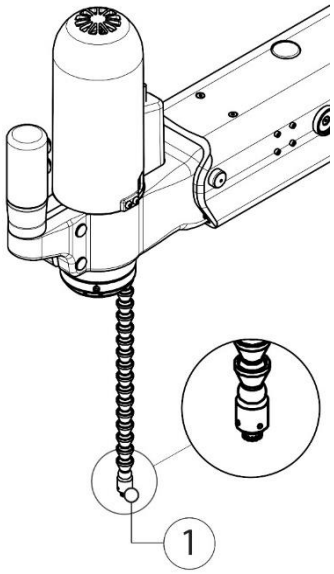
The oil pump and, therefore, the oil supply are activated simultaneously when the buttons that control the motor are pressed.

The cutting oil tank is inside the radial arm to lubricate the tool during the tapping operation.

The lubrication time is counted in seconds and can be adjusted using the buttons on the control panel of the radial arm.

If the tank is empty, the pipes may fill with air. In this case, they must be bled after the tank is refilled.

1. Loosen the end (1) by rotating it 2 turns anticlockwise.
2. Increase the lubrication time to maximum and turn the motor several times until the pipes have been bled.
3. Tighten the end (1) by rotating it 2 turns clockwise.



The tank filler cap is located on top of the radial arm. To remove it, use a 21-mm spanner.

OIL SPECIFICATIONS

- ✓ Oil type: Viscosity of 20–40 cSt; EP (extreme pressure) additives (sulphur, phosphorus and inactive chlorides).
- ✓ ONLY USE PURE CUTTING OIL WITHOUT SOLVENTS. Certain types of trichlor or alcohol lubricants can seriously damage some system components.

MAINTENANCE

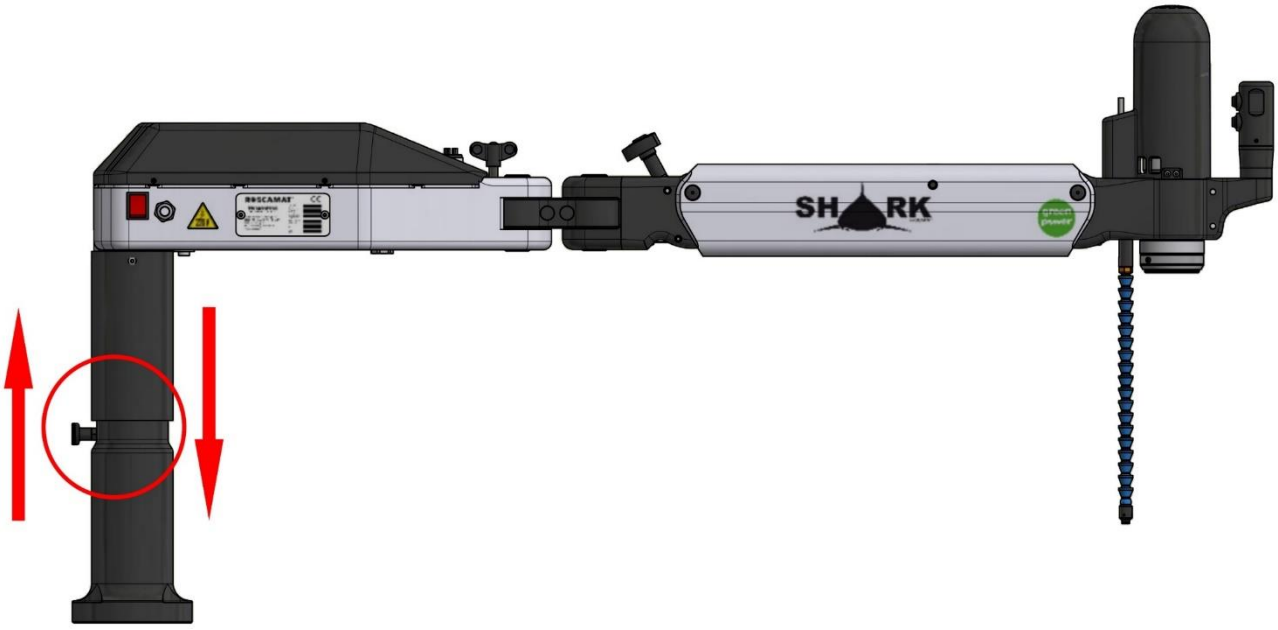
- ✓ Clean the oil tank regularly to remove metal shavings.

Lubrication tank capacity: approx. 400 cc

LEDS	TIME (SECS)	OIL CONSUMPTION (cc)	APPROXIMATE TANK DURATION (OPERATIONS)
1	0.1	0.12	3330
2	0.2	0.15	2660
3	0.3	0.17	2350
4	0.4	0.2	2000
5	0.5	0.22	1810

4.7 LIFT BASE

The machine can be raised 170 mm, allowing the operator to work at different heights. Follow the steps below:



Raising the arm:

1. Set the machine to the folded or parking position.
2. Raise the machine assembly as far as it will go.

Lowering the arm:

1. Set the machine to the folded or parking position.
2. Pull the lift control out and lower the assembly.

PLEASE NOTE

- ✓ Do not allow the machine to descend under its own weight. Support the assembly to stop it descending abruptly.
- ✓ Do not place your hands below the bottom of the cover.

5 OPERATION

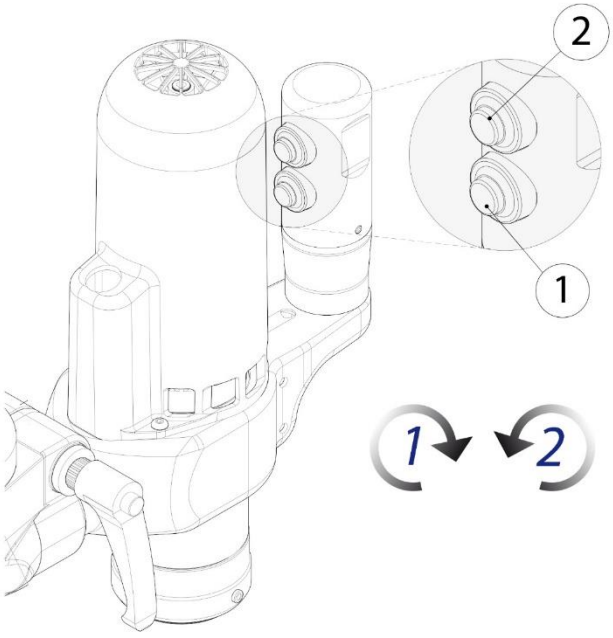
WARNING

- ✓ The sequence described below is for information purposes only and assumes the installation, adjustments such as balancing the arm and installing the module, gears (where applicable), tap holder (with or without clutch) and tap have been previously completed.
- ✓ Use the required personal protective equipment described in *[see PERSONAL PROTECTIVE EQUIPMENT (PPE) p. - 7].*
- ✓ Ensure the machine configuration is suitable for the characteristics of the tapping operation.
- ✓ Ensure the necessary adjustments have been made to adapt the equipment to the characteristics of the work to be carried out.
- ✓ Ensure the materials for tapping meet the requirements described *[See TECHNICAL SPECIFICATIONS p. -12-].*
- ✓ The parts to be worked must be secured correctly.
- ✓ Upon completion of the task or during periods of prolonged inactivity, set the machine to folded or parking position.

5.1 TAPPING

Follow the steps below for a correct and safe sequence for the tapping operation.

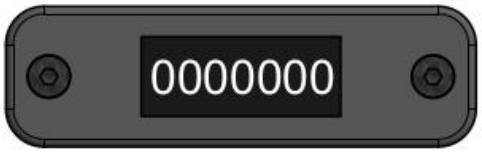
1- Switch on the main switch.
2- To perform tapping (clockwise rotation), hold down button[3] 1.
3- Hold button 2 to release the tap (turning to the left).
4- Move the machine to its folded or parking condition and switch off at the main switch.



[3] Holding down buttons 1 and 2 prevents the machine operating without the intervention/supervision of an operator.

INFORMATION

The machine incorporates a screen with a cycle counter.



When you turn on the equipment, appears the total cycle counter.

Once you start to work, on the screen will appear a partial counter during the working session.

To view the total counter, you have to turn off the equipment, wait for 5 seconds and turn on the equipment again.

6 HEAD ASSEMBLIES

6.1 ARTICULATED HEAD ASSEMBLY

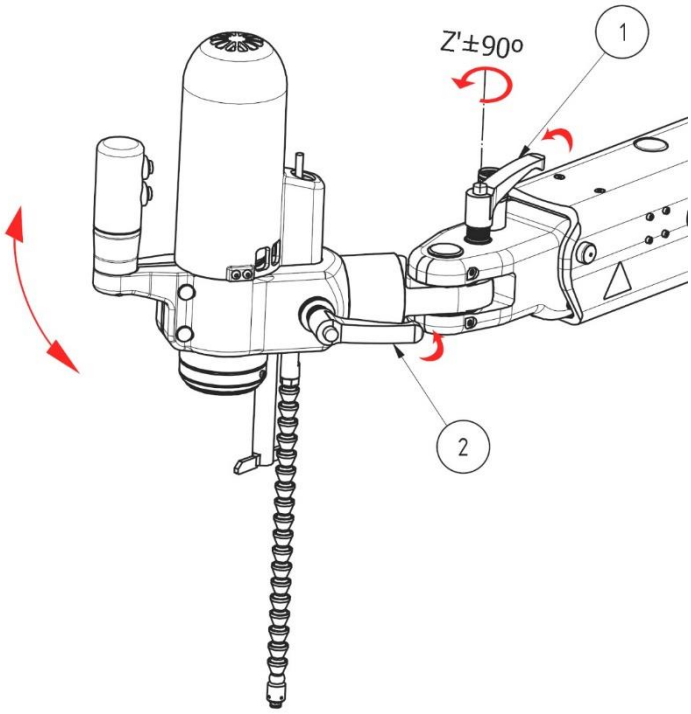
The articulated head assembly allows the motor to be used in 4 positions (at 90° intervals) to perform both vertical and horizontal tapping.

Vertical operations:

1- Place the motor in the vertical position and firmly lock the lever (1) and (2).

PLEASE NOTE

✓ If necessary, loosen and remove the rod–stylus unit.



Horizontal operations:

1- Loosen the lever (2) on the left of the head.
2- Rotate the head until it locks and firmly re-tighten the lever (2).
3- Release the lever (1).
4- Align the stylus with the part to be tapped and perform the tapping, always keeping the stylus correctly aligned with the part.

PLEASE NOTE

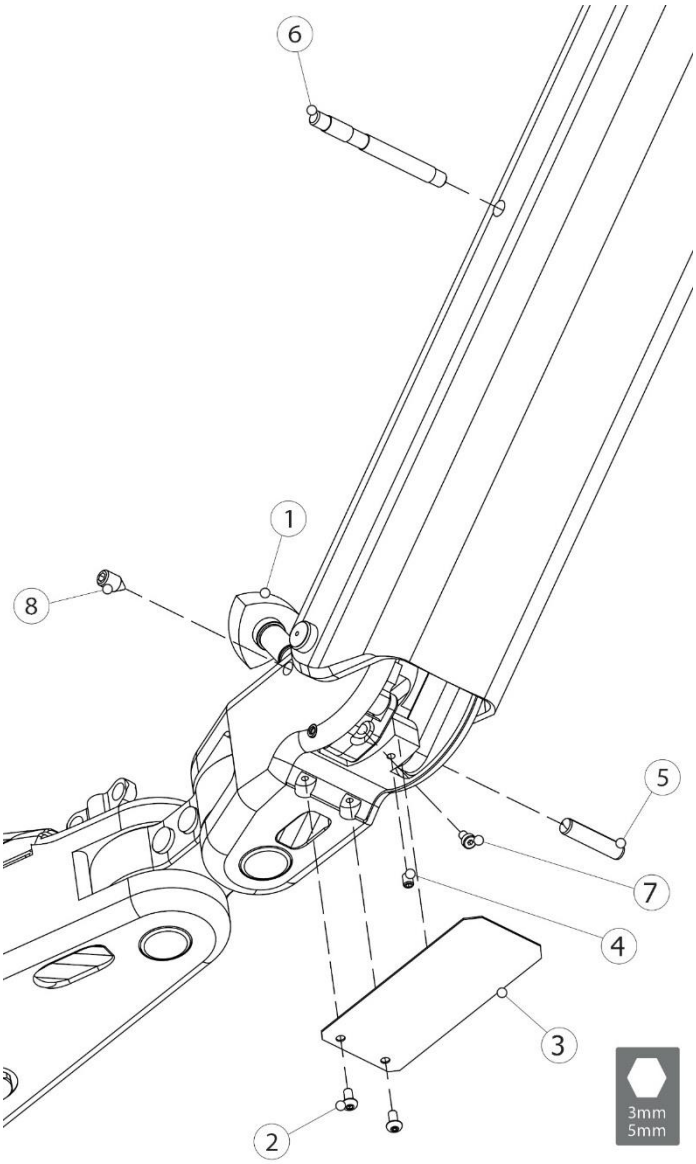
✓ Do not block the handle (1) for horizontal operation.
✓ Maximum tap in horizontal position M27
✓ The depth control only works vertically. It is not possible to control depth horizontally.
✓ Maximum module in horizontal module 75 (module 40 cannot be used horizontally).

7 MAINTENANCE

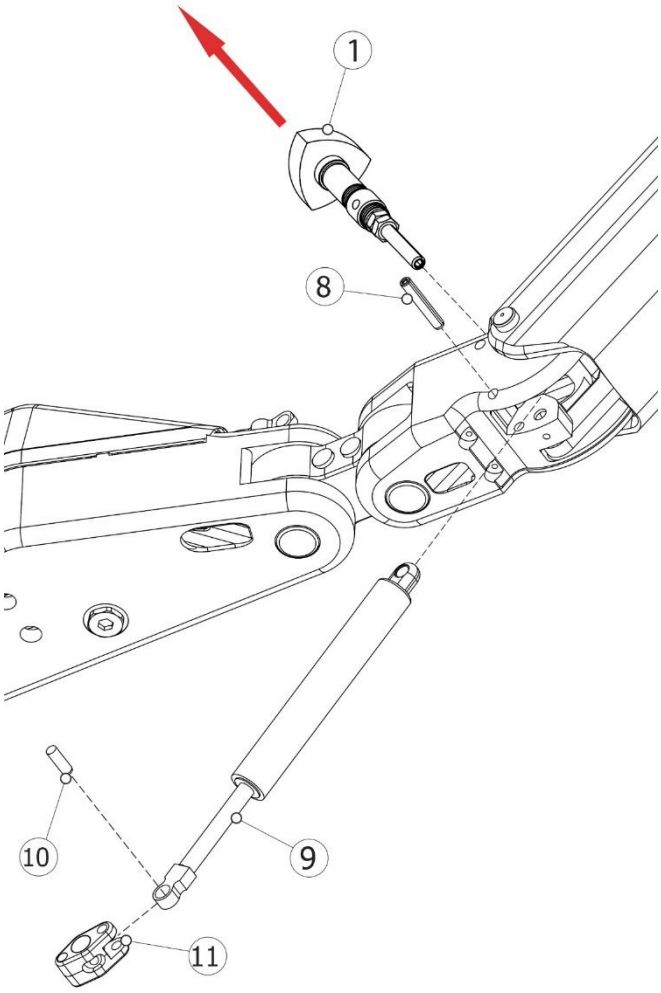
7.1 REPLACING THE GAS SPRING

BEFORE REPLACING THE GAS SPRING

- ✓ The equipment must be correctly installed and set-up.
- ✓ Switch off the equipment at the main switch and disconnect from the power supply.
- ✓ If necessary, assign two operators to this operation to ensure it is performed safely.



1- Turn the regulator knob (1) clockwise as far as it will go to release all tension from the arm.
2- Remove the bolts (2) (3 mm Allen key) and cover (3).
3- Remove the stud (4) (3-mm Allen key) and spindle (5) (M5 extractor).
4- Remove the shaft (6).
5- Remove the screw (7) (3 mm Allen key).
6- Remove the stud (8) (5 mm Allen key) and lower the adjustment knob (1).



7- Using an M5 extractor, remove the spindle (8).
8- Separate the adjustment knob (1) from the yoke (11) and remove the yoke and the damper (9).
9- Remove the pin (10).
10- Remove the damper (9) and replace it with a new one.
11- Reverse the process for assembly. When fitting the stop cable, it must be above the pin (6).

PLEASE NOTE

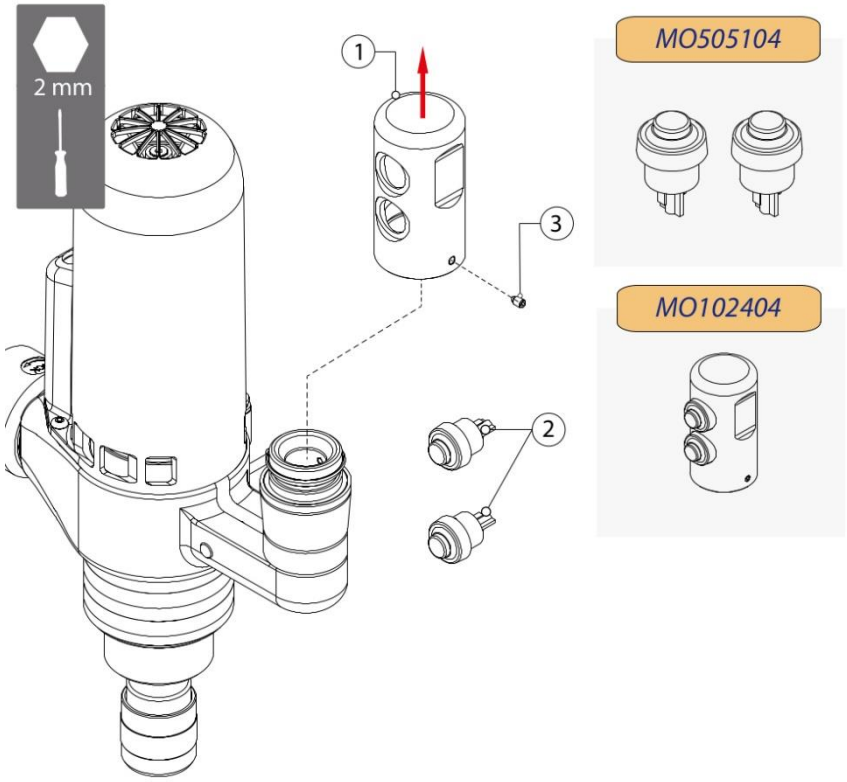
✓ Always keep the arm in its highest position.

7.2 REPLACING THE GRIP AND BUTTONS

BEFORE REPLACING THE GRIP

- ✓ The equipment must be correctly installed and set-up.
- ✓ Switch off the equipment at the main switch and disconnect from the power supply.

1- Place the machine in the folded or parked position.
2- Switch off at the main switch and unplug from the power supply.
3- Remove the motor control buttons (2) and disconnect them from their FASTON connector *(use a small screwdriver to lift out the buttons).*
4- Remove the bolt (3) (2-mm Allen key) and slide the grip (1) upwards as show in the diagram.
5- For assembly, follow the procedure in reverse, making sure none of the cables are trapped.

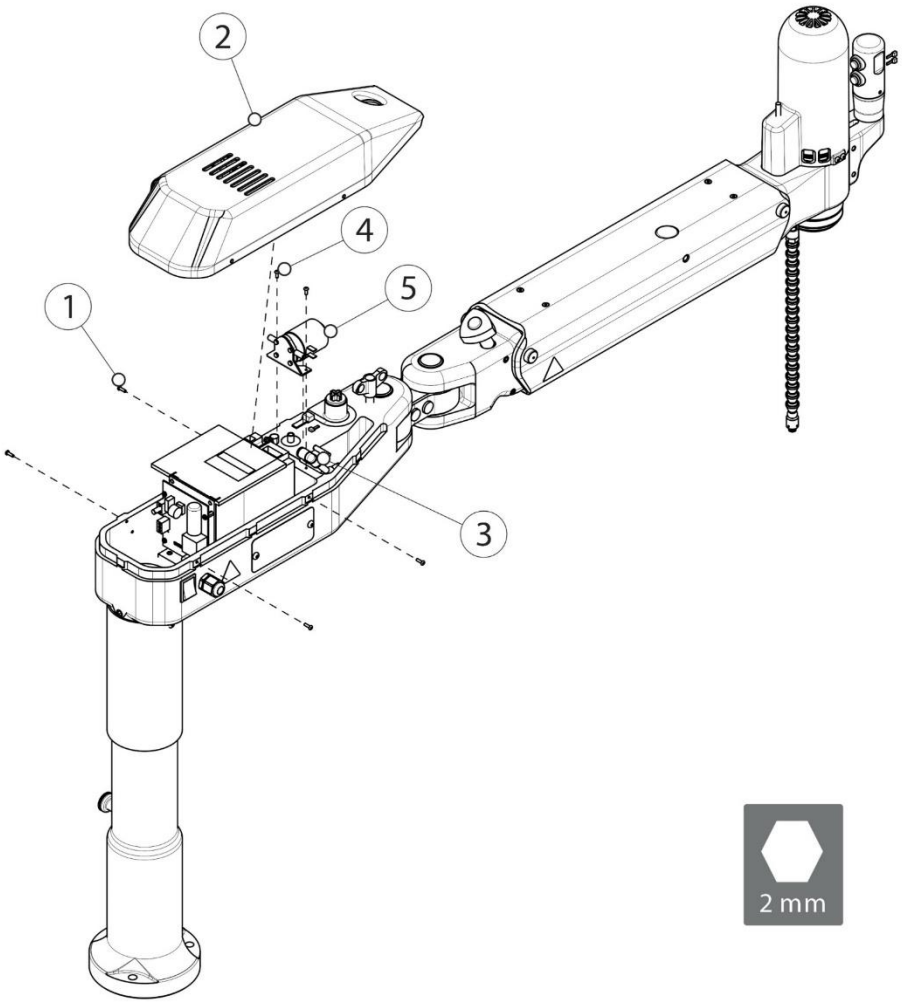


7.3 REPLACING THE OIL PUMP

BEFORE REPLACING THE OIL PUMP

- ✓ The equipment must be correctly installed and set-up.
- ✓ Switch off the equipment at the main switch and disconnect from the power supply.

1. Raise the machine *[See LIFT BASE p.22]*.
2. Remove the four bolts (1) (2 mm Allen key) from the cover of the electrical box (2) located on the radial arm and remove the cover.
3. Disconnect the two FASTON terminals and the two oil pump entry and exit tubes. (3)
4. Loosen the two bolts (4) (2 mm Allen key) that hold the oil pump (5) in place and replace it.
5. For assembly, follow the procedure in reverse.

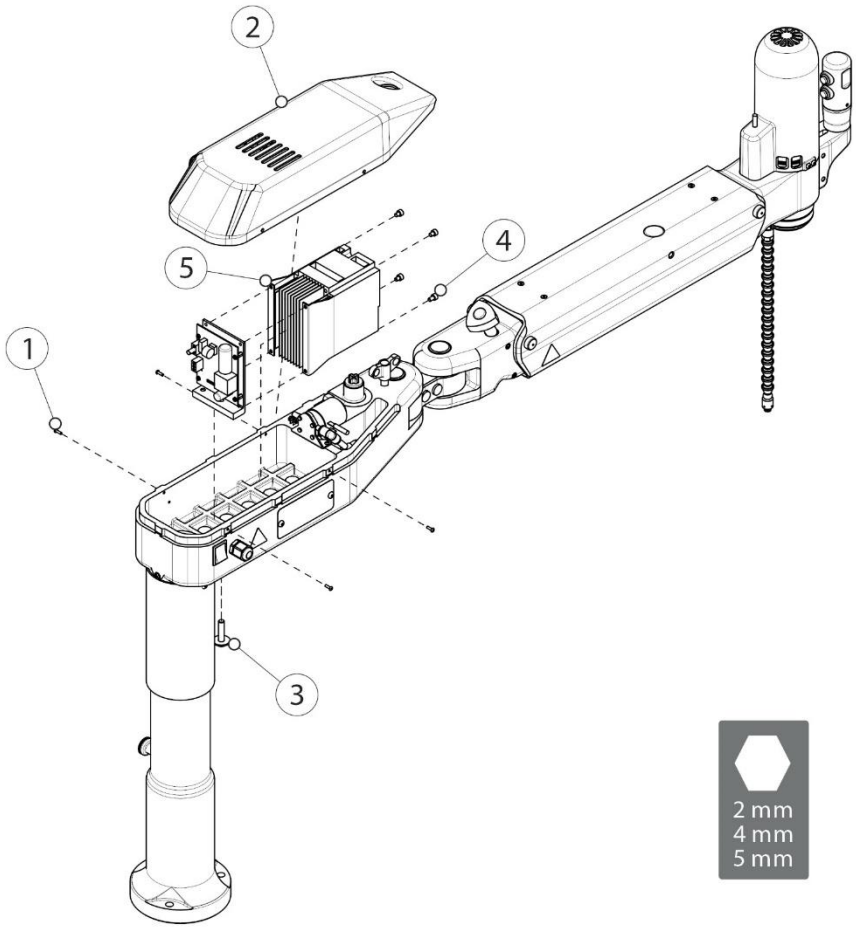


7.4 REPLACING THE VARIABLE-SPEED DRIVE

BEFORE REPLACING THE VARIABLE-SPEED DRIVE

- ✓ The equipment must be correctly installed and set-up.
- ✓ Switch off the equipment at the main switch and disconnect from the power supply.

1. Raise the machine *[see LIFT BASE p.22].*
2. Remove the four bolts (1) (2 mm Allen key) from the cover of the electrical compartment (2) located on the radial arm and remove the cover.
3. Remove the top cover protecting the variator connections.
4. Disconnect the variator connection board.
5. Remove the variator side protection.
6. Disconnect the remaining cables.
7. Remove the two screws (3) (5 mm Allen key) on the bottom of the radial arm that hold the variable drive in place.
8. Remove the variable drive unit and the power supply.
9. Remove the screws (4) (4 mm Allen key) to release the variable drive (5).
10. Attach the new variable-speed drive and connect all the cables to their corresponding connections *[see ELECTRICAL DIAGRAM p. 37]*.
11. Finally, replace the radial arm cover.



7.5 REPLACEMENT OF THE CONTROL OR DEPTH PANEL

BEFORE REPLACING THE CONTROL OR DEPTH PANEL

- ✓ The equipment must be correctly installed and set-up.
- ✓ Switch off the equipment at the main switch and disconnect from the power supply.

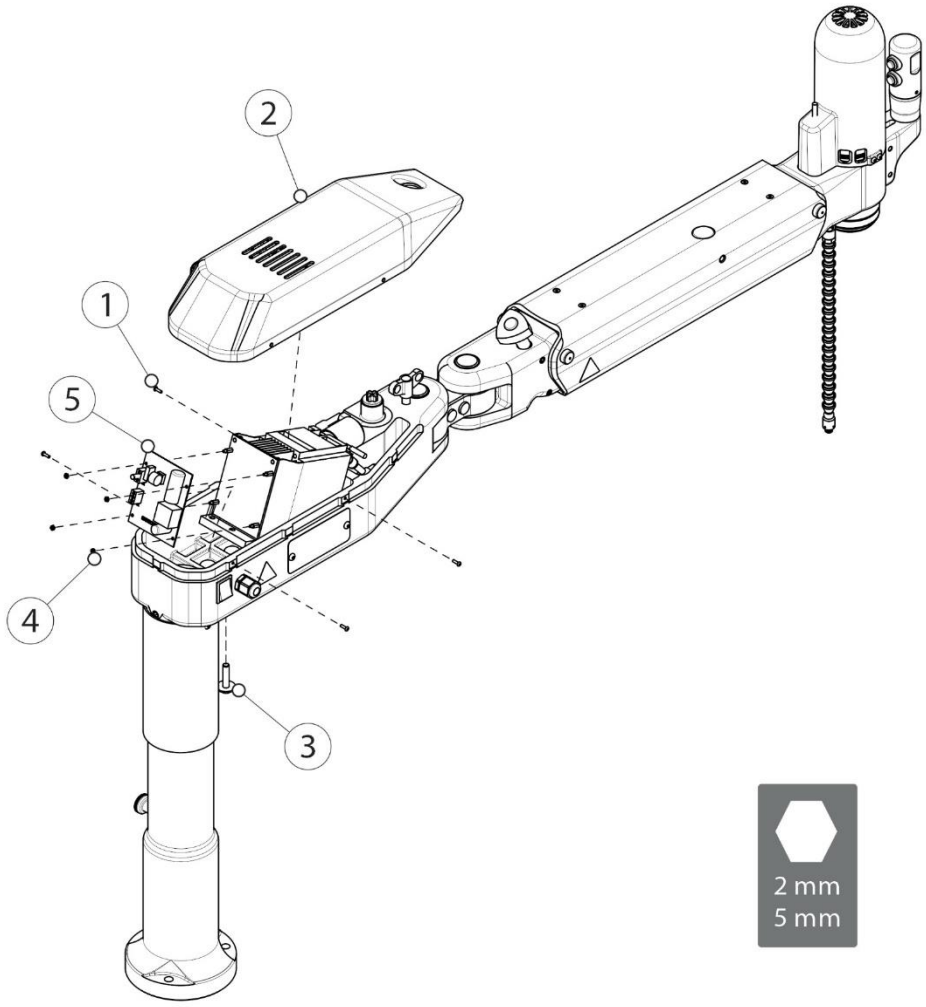
1. Remove the four bolts (2 mm Allen key) from the cover of the electrical unit located on the radial arm and remove the cover.
2. Disconnect all the connectors plugged into the control panel.
3. Remove the nuts that attach the panel to the housing cover (radial arm) of the electronic unit.
4. Fit the new panel and connector, ensuring they are fitted the right way and work correctly.

7.6 REPLACING THE POWER SUPPLY

BEFORE REPLACING THE POWER SUPPLY

- ✓ The equipment must be correctly installed and set-up.
- ✓ Switch off the equipment at the main switch and disconnect from the power supply.

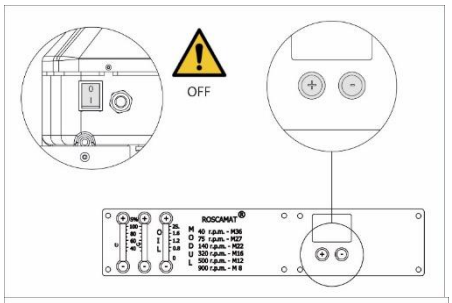
1. Remove the four Allen bolts (1) (2 mm Allen key) from the cover (2) of the electrical housing and remove it.
2. Disconnect the two power connectors (220 V) and the connection to the variable drive.
3. Remove the two screws (3) (5 mm Allen key) on the bottom of the radial arm that hold the variable drive in place.
4. Unscrew the four screws (4) M3 that attach the variable drive and fit the new power supply (5).
5. Connect the cables and replace the protective cover for the equipment.



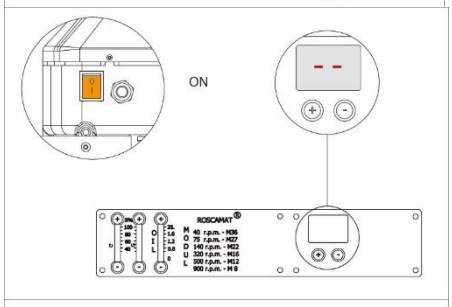
7.7 VERIFICATION AND REPLACEMENT OF THE DEPTH CONTROL DEVICE

7.7.1 Steps to check

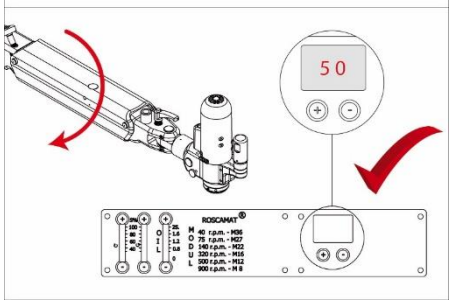
1- Ensure the main power switch is off then press the two buttons (+ and -) on the panel at the same time.



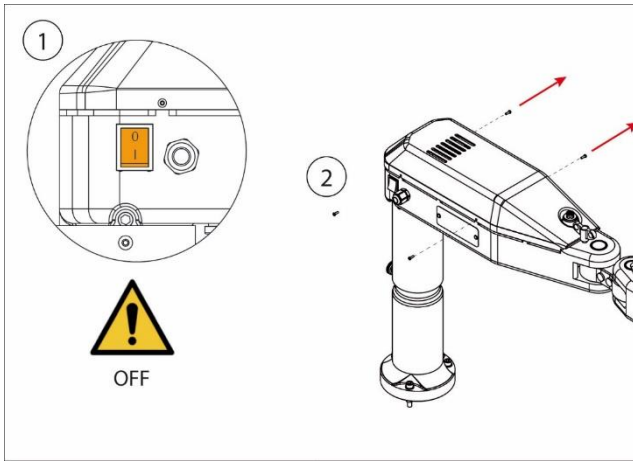
2- Switch the machine on and check that two dashes appear on the display on the panel.



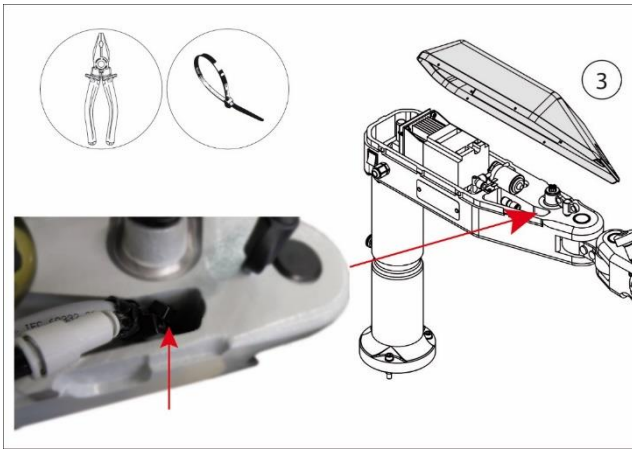
3- Check that the display reads “50” when the arm is raised to its horizontal position. If this is the case, the stop device is working correctly. Otherwise there could be a fault and it should be replaced.



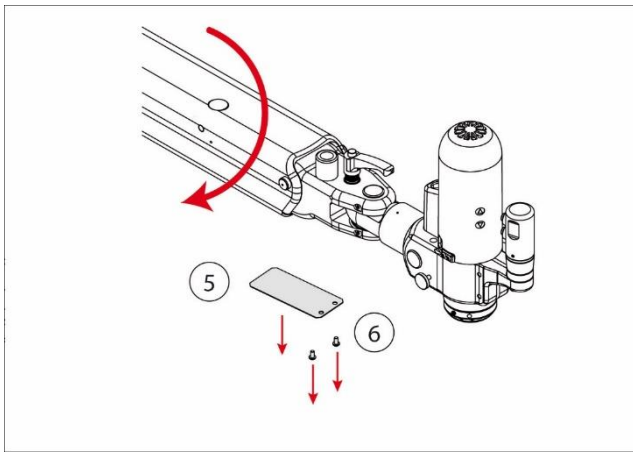
7.7.2 Steps to replace with a new kit



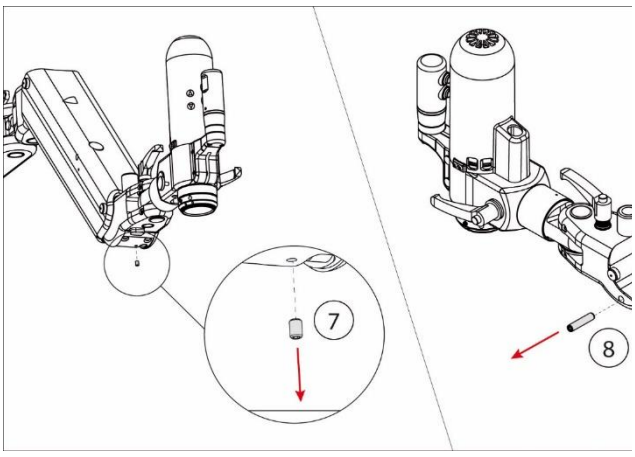
1- Ensure the main power switch is off (1) or disconnect the equipment from the mains. Remove the four screws (2) that attach the cover (2 mm Allen key)



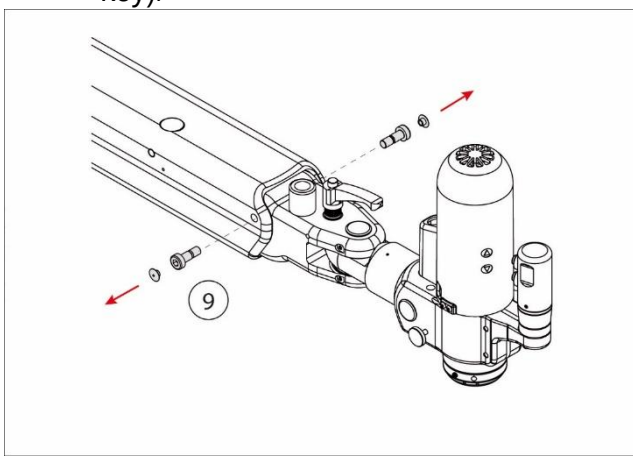
2- Remove the cover (3), securing it to prevent damage to the connections between the cover (3) and the rest of the equipment. Gently tug on the indicated cables and connectors to cut the ties that hold them.



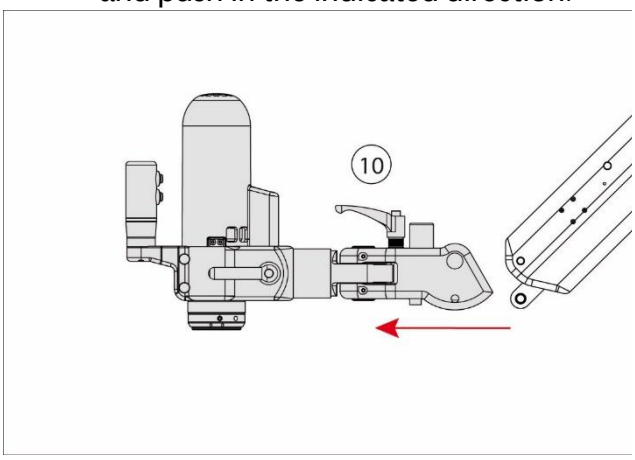
3- Move the arm to its lowest position to remove the protective cover (5), first removing the screws (6) (3 mm Allen key).



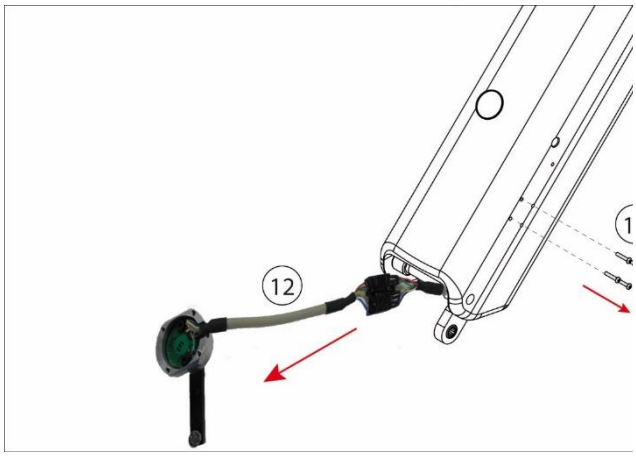
4- Remove the stud (7) (3 mm Allen key). Next, remove the beam shaft (8). To do so, screw an M5 bolt into the shaft (8) and push in the indicated direction.



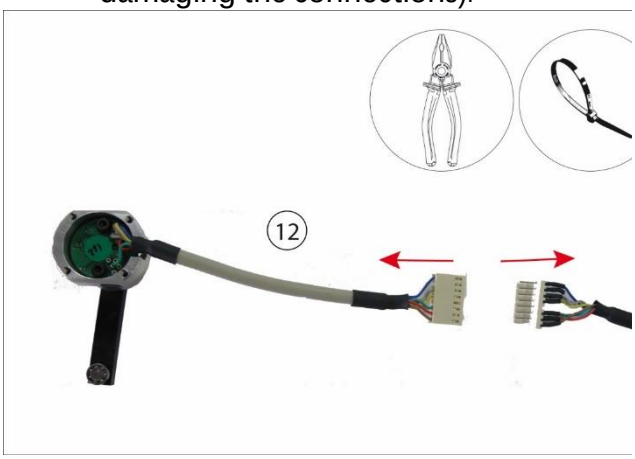
5- Remove the caps and the bolts (9) that hold the head in place (8 mm Allen key).



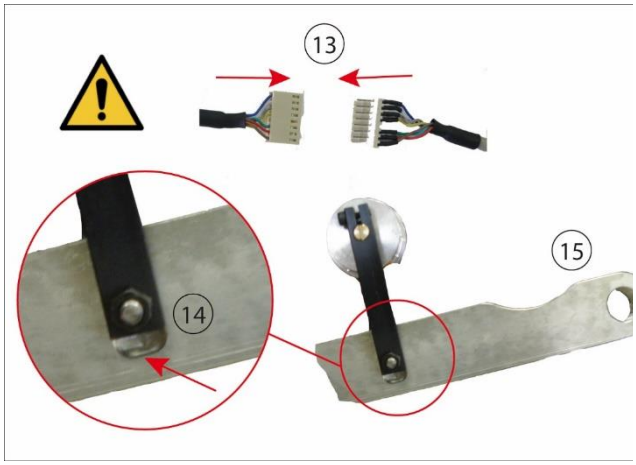
6- The head (10) will be left loose and can be removed. (The head is still connected to the rest of the machine and must be supported to avoid damaging the connections).



7- Remove the four screws (11) (2 mm Allen key). The stop unit (12) will be left loose and should be gently removed (without tugging) from the arm to provide access to the connection.



8- Cut the tie and remove the insulating tape on the fast connector for the stop unit (12) and disconnect.



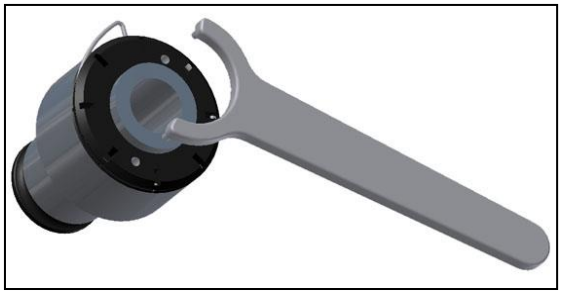
9- Follow these instructions in reverse to install the new kit.
The connector join (13) must be reinforced with insulating tape and a tie.

When installing the kit, it is important to ensure that the bearing at the end of the lever (14) fits in the groove on the beam (15) at all times.

The tie cut in step number two must also be replaced.

7.8 ADJUSTING THE CLUTCH

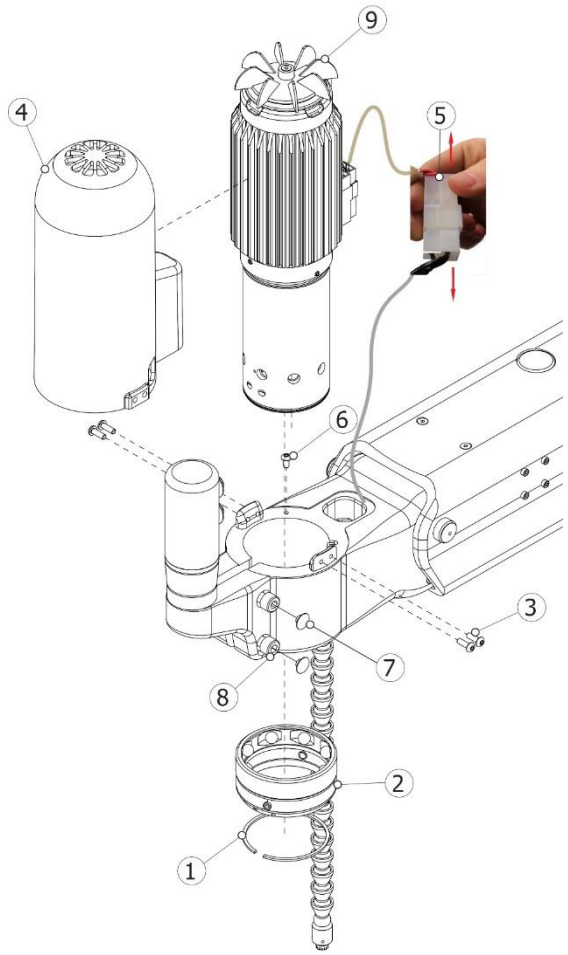
1. Remove the locking ring.
2. Turn the slotted nut clockwise to increase clutch tension and anticlockwise to decrease it.
3. Re-insert the ring in the slot.



7.9 REPLACING THE MOTOR

BEFORE REPLACING THE MOTOR

- ✓ The equipment must be correctly installed and set-up.
- ✓ Switch off the equipment at the main switch and disconnect from the power supply.



1- Switch off at the main switch and unplug from the power supply.
2- Remove the Seeger ring (1) and remove the chuck (2).

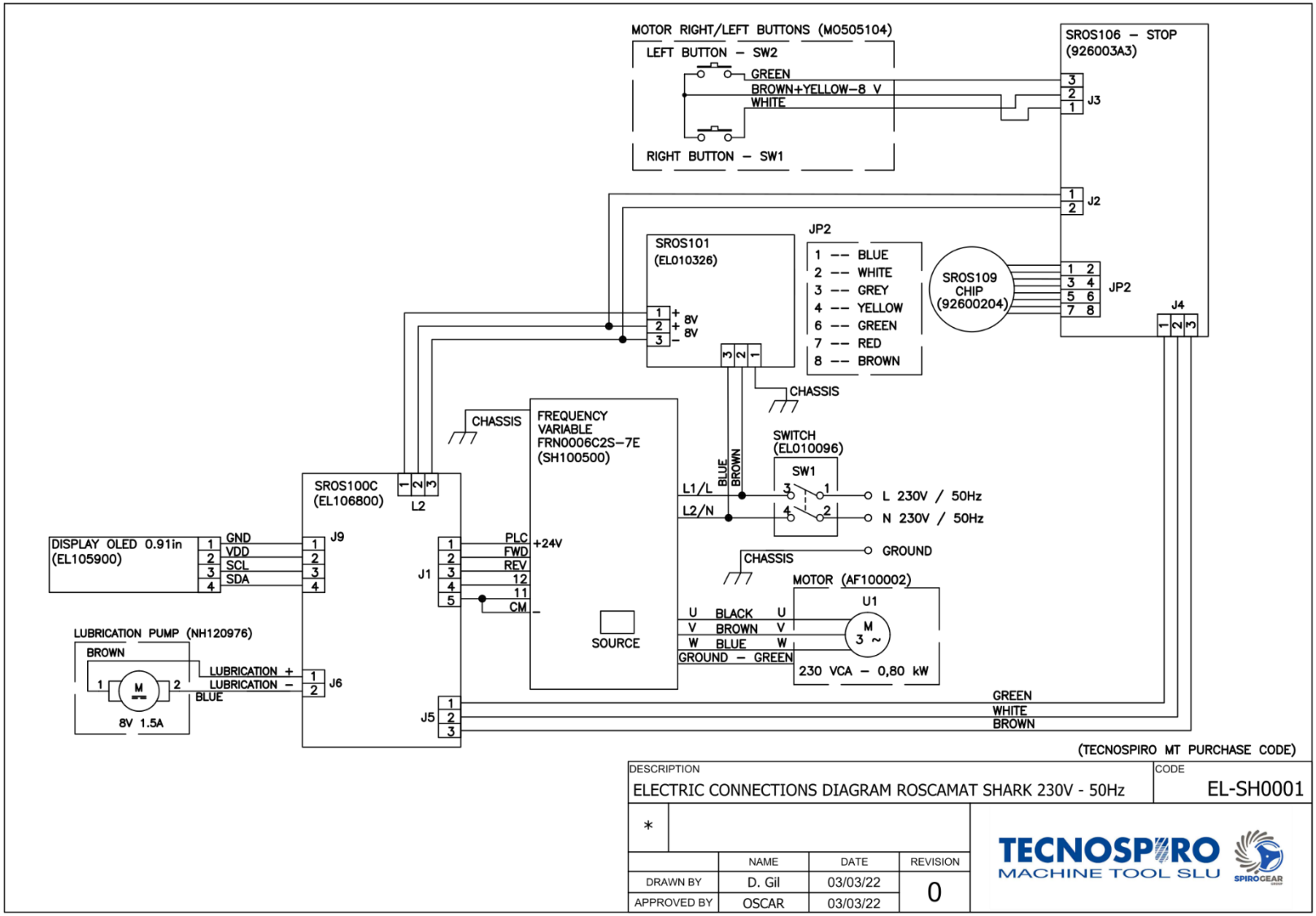
PLEASE NOTE

- ✓ Take care not to lose the Ø9-mm ball bearings inside the chuck

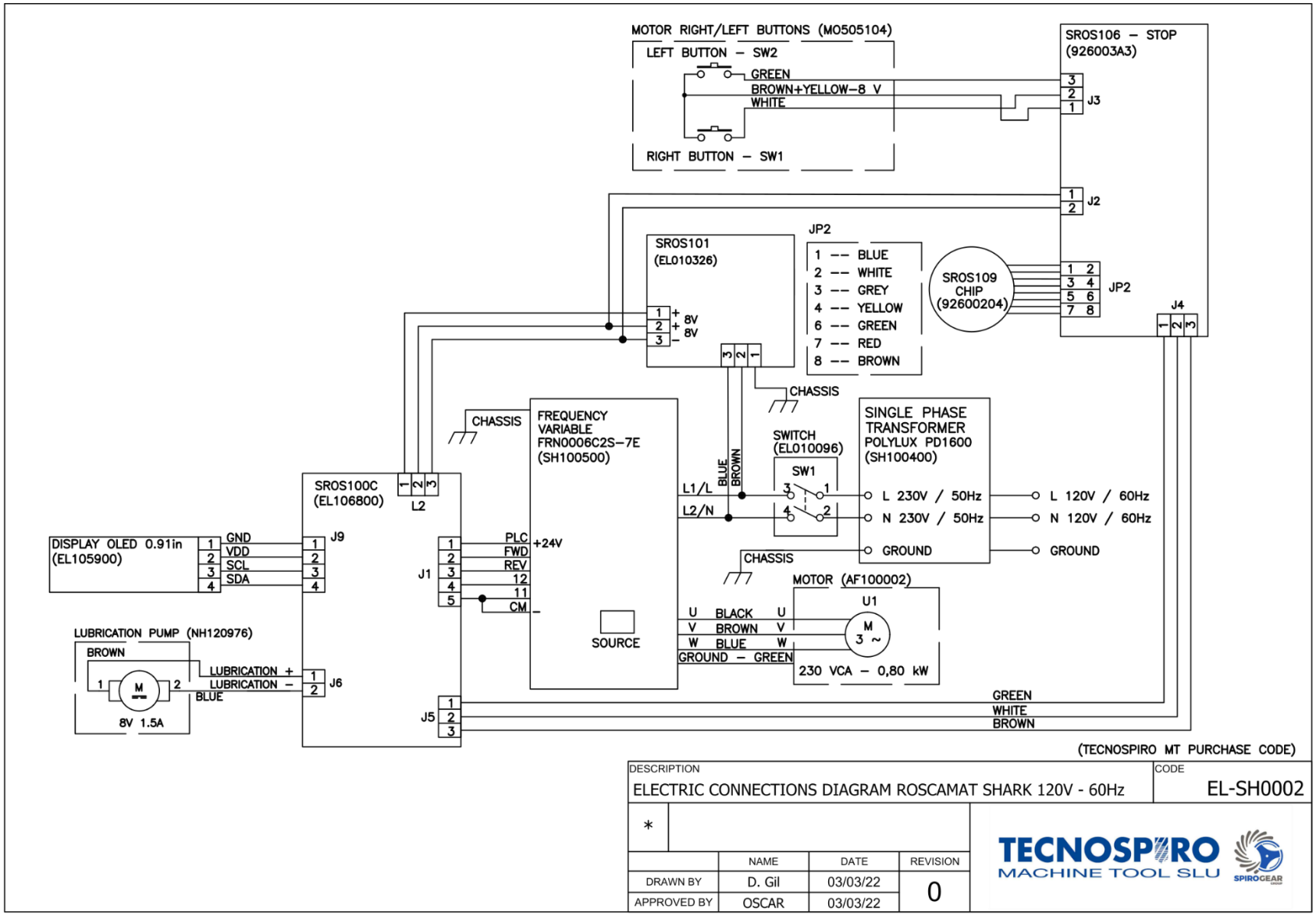
3- Remove the bolts (3) *(2.5-mm Allen key).*
4- Slide the housing (4) up until the connector (5) is visible. Disconnect the connector as shown in the diagram and fully remove the housing (4).
5- Disconnect the earth connection (6) *(2.5-mm Allen key).*
6- Remove the caps (7) and loosen the bolts (8) (6 mm Allen key).
7- Remove the motor (9) and replace if necessary.
8- Reverse the process for assembly. Tighten the screws (8) to 15 Nm.

NOTE: When assembling the motor, make sure none of the cables are trapped.

8 ELECTRICAL DIAGRAM



Roscamat Shark electrical diagram – 230V



Roscamat Shark electrical diagram– 120V (230V + Trafo 120V)

9 TROUBLESHOOTING

9.1 ISSUE: THE MACHINE DOES NOT WORK - THE MOTOR WILL NOT START OR HAS STOPPED

Remove the electrical box housing, leaving the electrical equipment uncovered and **read the fault shown on the drive display.**

Nominal dimensions			Technical Specifications
indicator	Emergency stop	**Stop cause indicator**	
		Overcurrent protection	OC 1: Overcurrent during acceleration
			OC2: Overcurrent during deceleration
			OC 3: Overcurrent during operation at constant rpm
		Network phase fault protection	L in: Entry phase fault
		Insufficient voltage protection	LU: Insufficient voltage
		Exit phase fault protection	OPL: Loss of output phase; problems in output cables of variator
		Overvoltage protection	OU1: Overvoltage during acceleration
			OU2: Overvoltage during deceleration
			OU3: Overvoltage during constant revolutions operation
		Protection against overheating	OH1: Excess temperature on heat sink; excess load or fault.
			dbH: DB circuit overheating
		External fault entry	OH2: External faults
		Motor protection	OH4: Motor protection (PTC resistance)
			OL1: Motor overload; electrothermal motor protection relay.
		Overload protection	OLU: Variator overload
		Safety stop	Er1: Memory fault
			Er2: External control panel communications fault
			Er3: CPU fault
			Er6: Operational sequence fault
			Er8: RS485 communications fault
			ErF: Memorisation fault due to insufficient voltage
	Operation, safety stop		Data from the last four faults are memorised and can be displayed. Data stays memorised upon disconnecting the power

In any event, the machine must be reset to restart process. Switch the machine off and wait about 25 seconds before turning on the equipment. If the problem is due to an external current or voltage fault, please wait until the current is stabilised. If the problem persists, contact your distributor or manufacturer.

9.2 ISSUE: TILTING ARM FALLS

Possible causes		Solution
1. Arm not balanced	=	Balance the arm according to the weight to be supported. *[See BALANCING THE ARM page 19]*
2.- Defective damper	=	Replace it with a new one *[see REPLACING THE GAS SPRING p. 26]*

9.3 PROBLEM: THE CLUTCH SLIPS AND THE TAP FAILS TO TURN WHILE THE MOTOR IS RUNNING

Possible causes		Solution
1.- Clutch loose	=	Adjust the clutch *[see REPLACING THE GAS SPRING ADJUSTING THE CLUTCH p. 35]*
2.- Insufficient tool lubrication	=	Use a suitable oil or emulsion for the material
3.- Tap not suited to the material	=	Use taps according to the material, following the manufacturer's instructions
4.- Tap in poor state (blunt)		
5.- Hole misaligned		
6.- Small hole diameter		

9.4 PROBLEM: THE LUBRICATION SYSTEM DOES NOT WORK

Possible causes		Solution
1. Oil tank empty	=	Fill tank *[see LUBRICATION p. 2026]*
2.- Grease stem blocked	=	Unscrew the end of the nozzle and clean it. (Please note: do not lose the spring and ball found inside the nozzle).

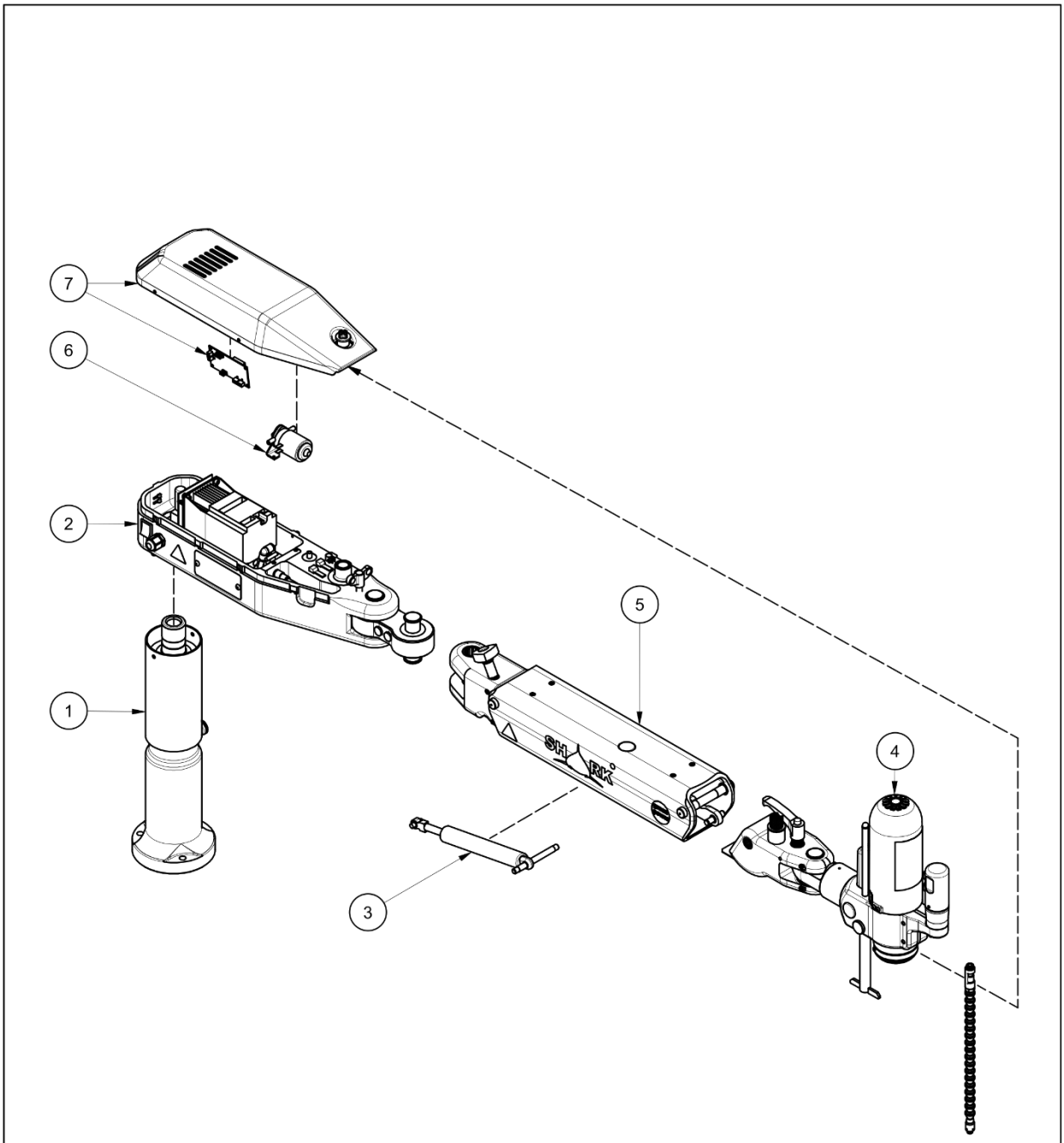
9.5 PROBLEM: THE STOP DEVICE DOES NOT WORK

Possible causes		Solution
1. Faulty programming	=	Re-programme *[See VERIFICATION AND REPLACEMENT OF THE DEPTH CONTROL DEVICE p. 33]*
2. Fault in the device	=	Check the fault and replace the stop device kit *[See VERIFICATION AND REPLACEMENT OF THE DEPTH CONTROL DEVICE p. 33]*

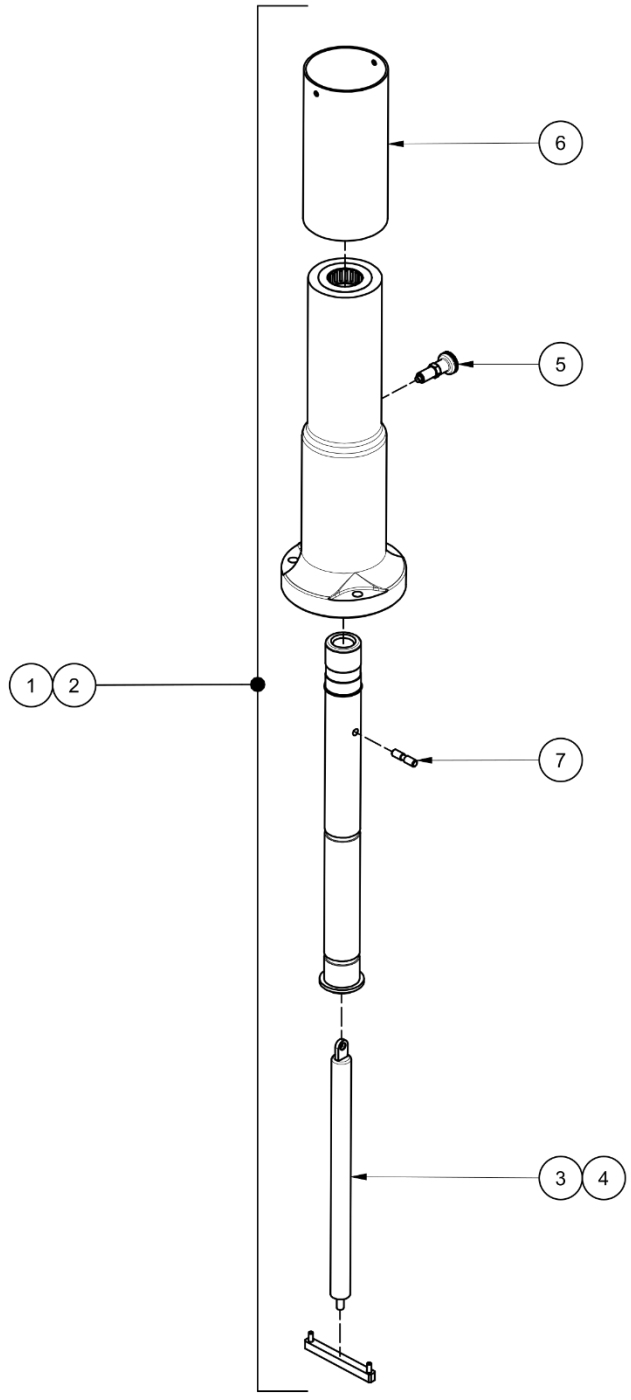
10 WARRANTY

See attached warranty document.

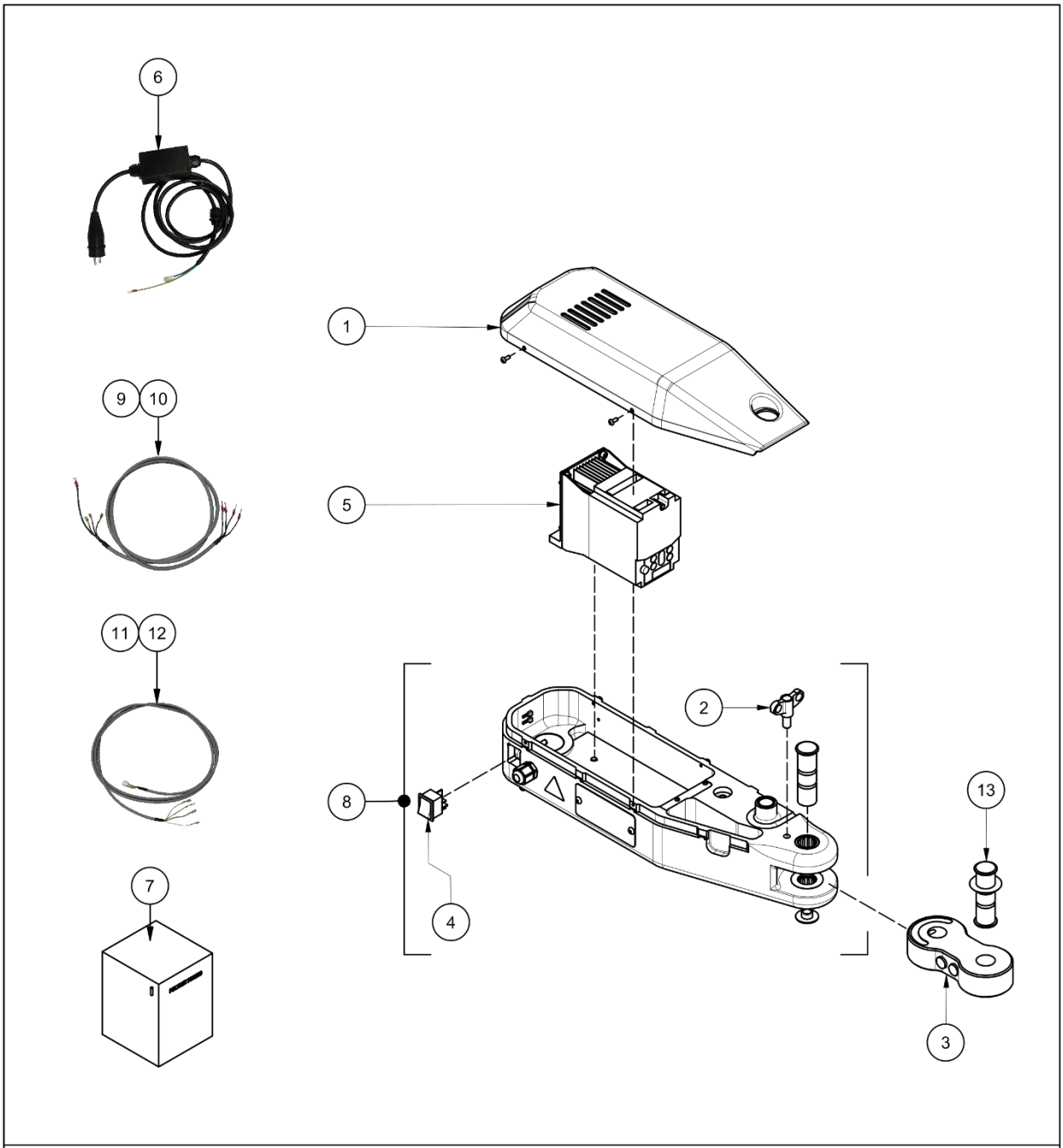
11 SPARE PARTS



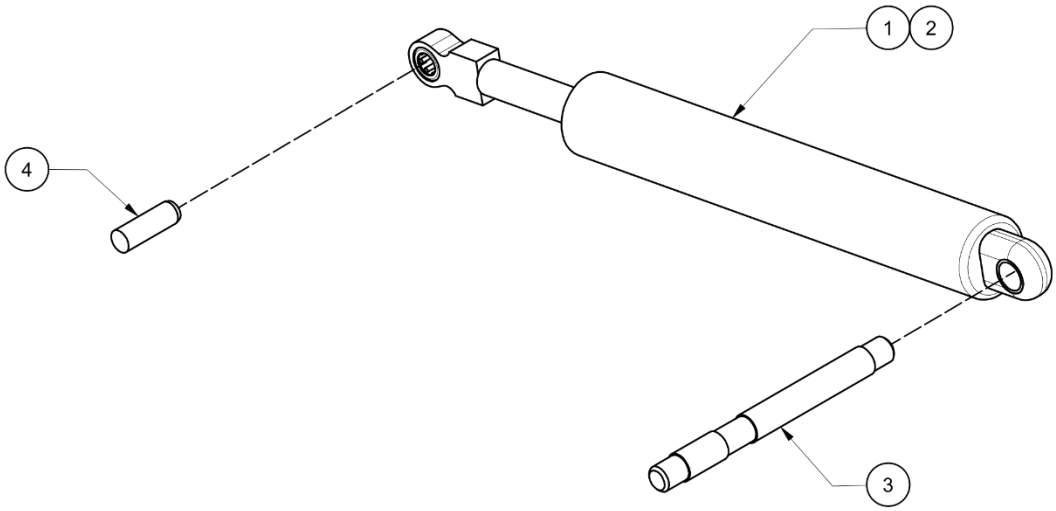
SHARK MODEL V / MODEL VH	
POS	DESCRIPTION
1	BASE
2	RADIAL ARM
3	DAMPER
4	HEADMEMBER
5	ARM
6	LUBRICATION
7	DEPTH CONTROL



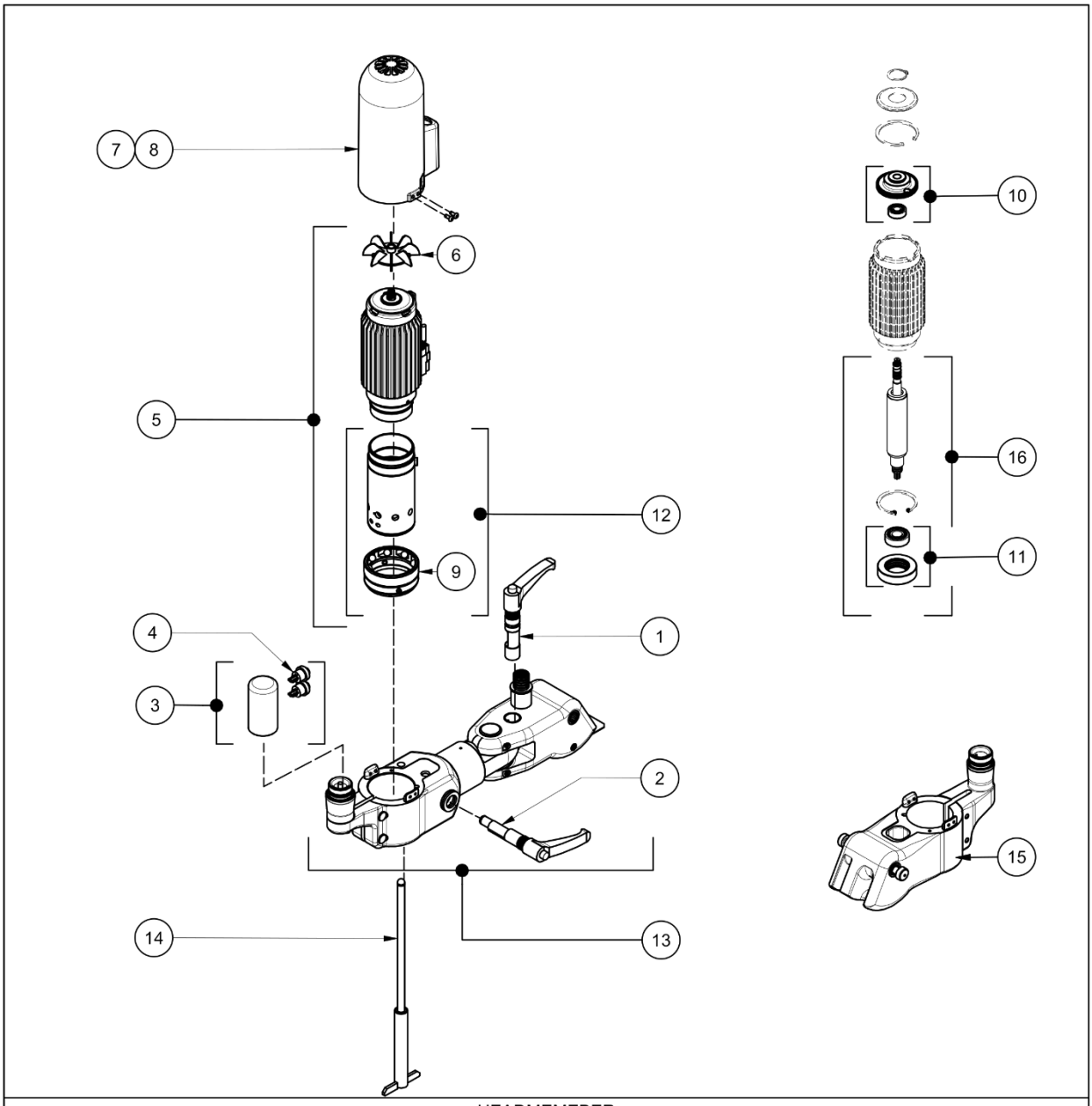
BASE			
POS	CODE	DESCRIPTION	MODEL
1	92101004	BASE ASSEMBLY	V
2	92700304	BASE ASSEMBLY	VH
3	91101903	BASE DAMPER R-SHARK	V
4	917A0303	BASE DAMPER R-SHARK VH	VH
5	92100603	BASE POSITIONER	V / VH
6	92100903	BASE SHAFT COVER	V / VH
7	91102103	SPINDLE OF THE DAMPER, AT THE BASE	V / VH



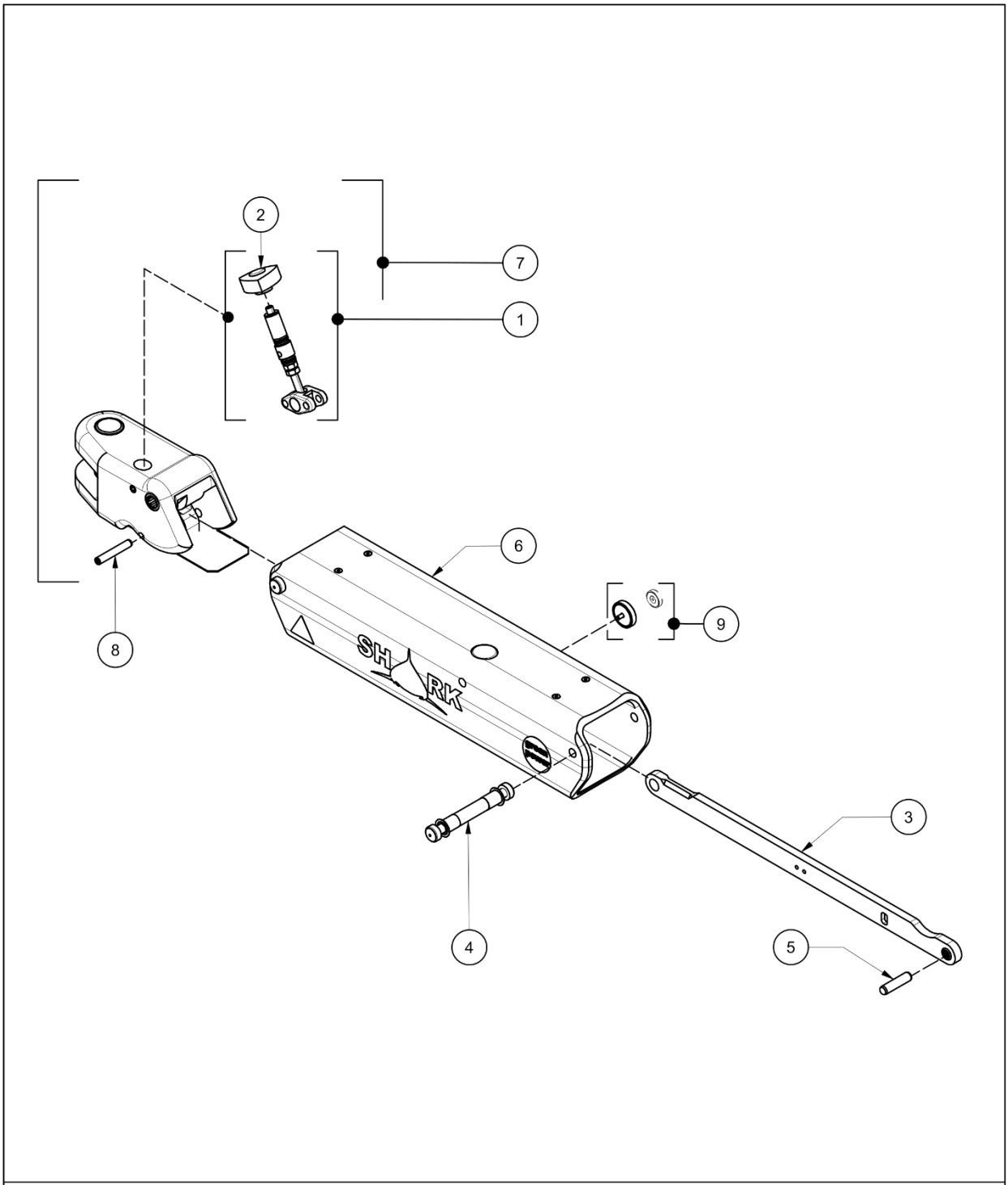
RADIAL ARM			
POS	CODE	DESCRIPTION	MODEL
1	92100304	RADIAL ARM COVER	V / VH
2	AC060426	BRAKE HANDLE	V / VH
3	40100503	UNION	V / VH
4	EL010096	MAIN SWITCH	V / VH
5	SH100500	ELECTRONIC EQUIPMENT - FREQUENCY VARIATOR BOARD (220V.)	V / VH
6	61600104	PLUG WIRE	V / VH
7	SH100400	TRAFO 110V	V / VH
8	SH103400	RADIAL ARM SPARE	V / VH
9	616003A4	MOTOR TO VARIATOR WIRE - SHARK	V
10	DR203703	MOTOR TO VARIATOR WIRE - SHARK	VH
11	616005C4	GRIP TO STOP BOARD - SHARK	V
12	616A02C4	GRIP TO STOP BOARD - SHARK	VH
13	SH103600	TILTING SHAFT ASSEMBLY RADIAL ARM SPARE	V / VH



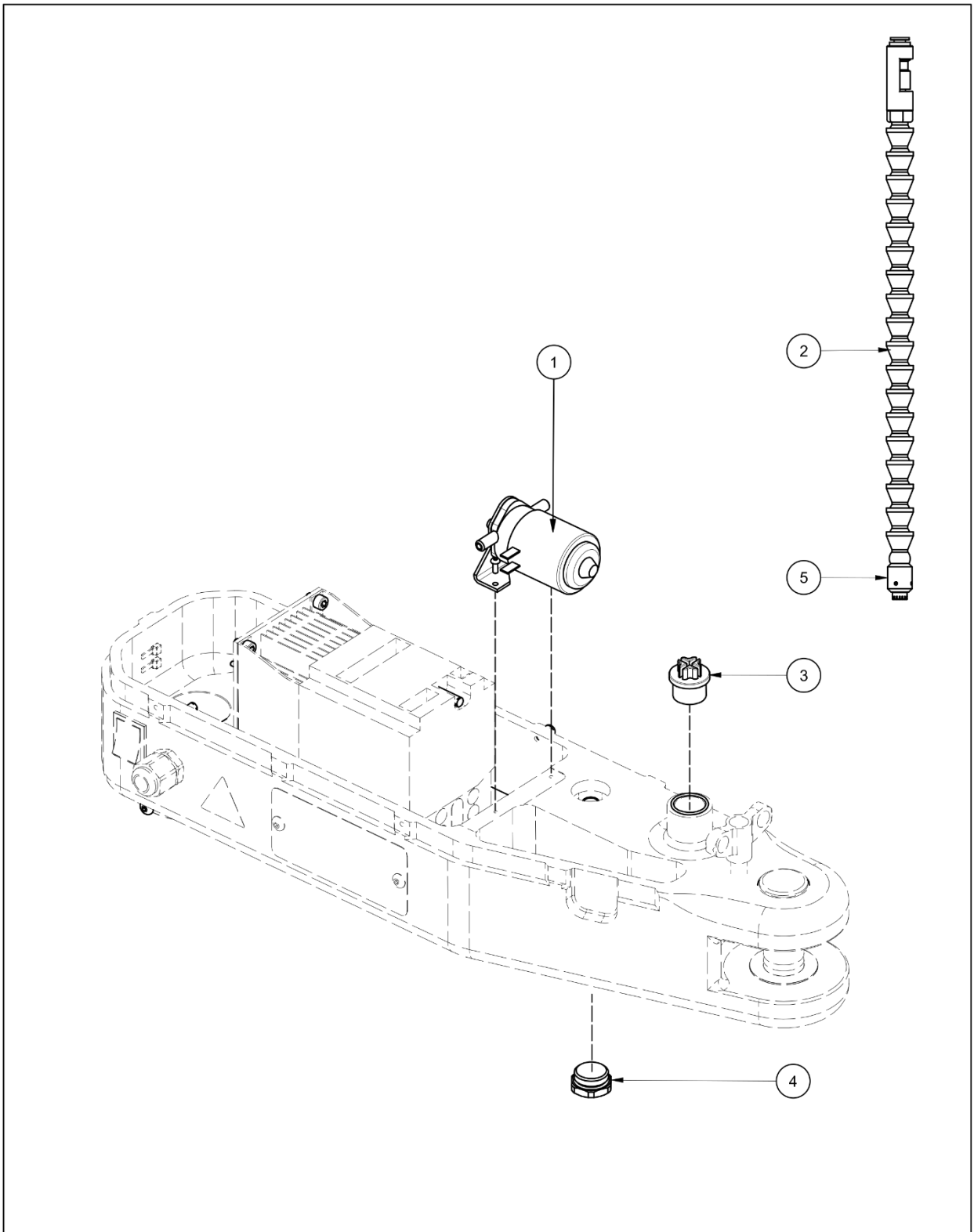
DAMPER			
POS	CODE	DESCRIPTION	MODEL
1	91100704	DAMPER R-SHARK	V
2	917A0204	DAMPER R-SHARK	VH
3	90102403	SPINDLE OF THE ARM DAMPER	V / VH
4	CL020856	SPINDLE OF THE FORK DAMPER	V / VH



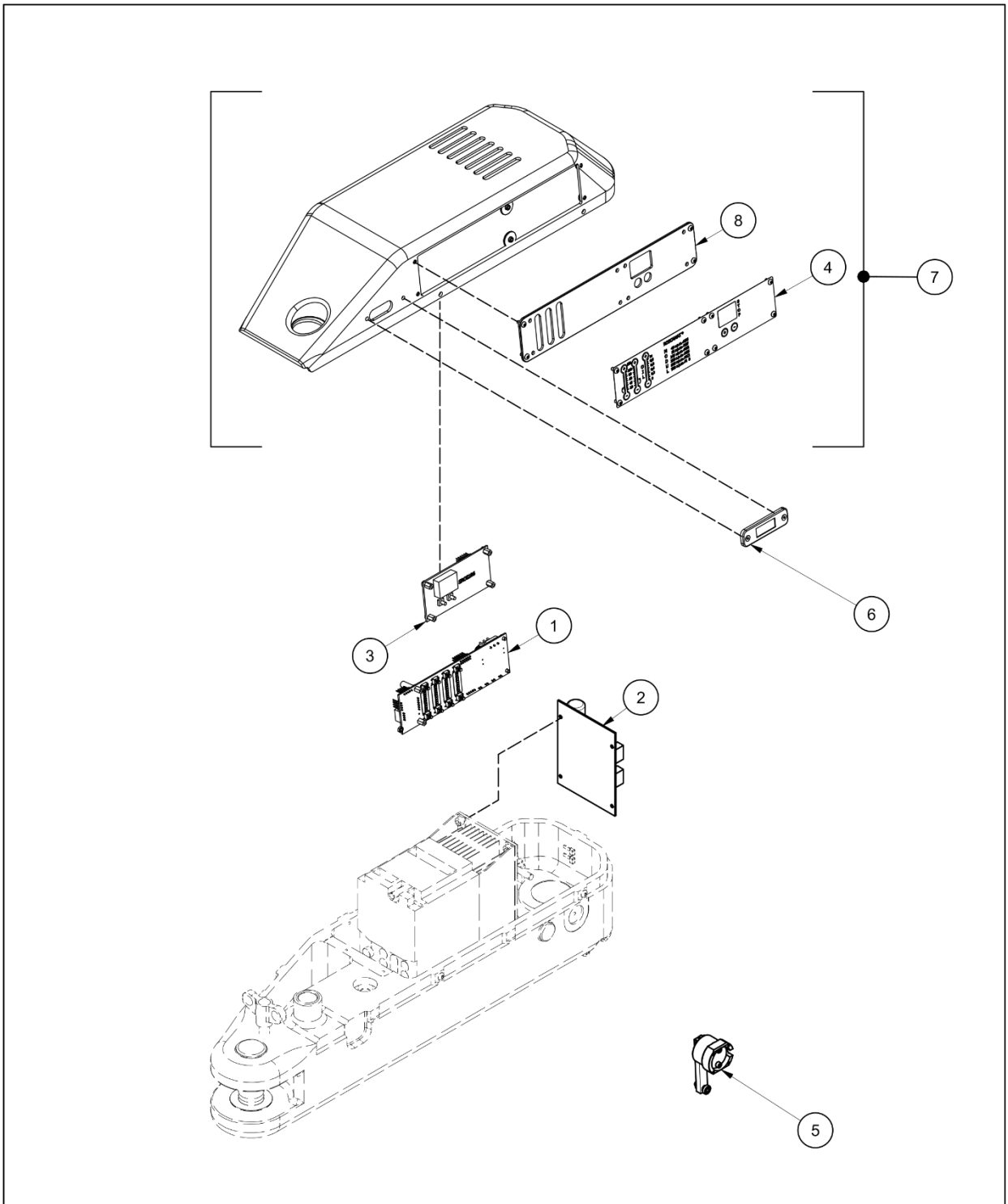
HEADMEMEBER			
POS	CODE	DESCRIPTION	MODEL
1	907A4404R	HANDLE + SPINDLE FOR HEAD VH (Z)	VH
2	907A4304	HANDLE + SPINDLE FOR HEAD VH (Y)	VH
3	MO102404	MOTOR GRIP	V / VH
4	MO505104	PUSH BUTTON (MOTOR GRIP) - KIT 2 UNIT	V / VH
5	AF100002R	HIGH FREQUENCY ELECTRIC MOTOR - MODEL TS-X	V / VH
6	AF101503	COOLING FAN	V / VH
7	92103403	MOTOR FRAMEWORK ROSCAMAT SHARK	V
8	92103903	MOTOR FRAMEWORK ROSCAMAT SHARK VH	VH
9	90103105R	MOTOR SLIDER - MODULE SUPPORT FIXATION	V / VH
10	SH102900	MOTOR BEARING - UPPER COVER	V / VH
11	SH103000	MOTOR BEARING - BOTTOM COVER	V / VH
12	SH103100	GEARBOX + MOTOR SLIDER - MODULE SUPPORT FIXATION	V / VH
13	SH103200	ORIENTABLE HEADMEMBER	VH
14	907A4104	SPARE ALIGNMENT	V / VH
15	SH103700	VERTICAL HEADMEMBER	V
16	AF101704	BODY ROTOR	V / VH



ARM			
POS	CODE	DESCRIPTION	MODEL
1	91101504R	REGULATING HANDWHEEL ASSEMBLY	V / VH
2	AC020056	DAMPER REGULATING HANDWHEEL	V / VH
3	92101504	STAY R-SHARK	V / VH
4	90101404	SPINDLE ARM WITH SCREWS	V / VH
5	CL020596	STAY AXIS	V / VH
6	92101403	TILTING ARM	V / VH
7	SH103300	CROSS UNIT -ARM CONNECTION UNION	V / VH
8	CL020786	REGULATING HANDWHEEL AXIS	V / VH
9	MO107300	MAGNET PARKING	V / VH



LUBRICATION			
POS	CODE	DESCRIPTION	MODEL
1	NH120976	LUBRICATION PUMP	V / VH
2	61400104	ARTICULATED PIPE	V / VH
3	AC090406	FILLING CAP OIL TANK	V / VH
4	NH121096	DRAIN CAP FOR OIL TANK	V / VH
5	61130105	LUBRICATION NIPPLE	V / VH



DEPTH CONTROL			
POS	CODE	DESCRIPTION	MODEL
1	EL106800	CONTROL BOARD	V / VH
2	EL010326	POWER SUPPLY SOURCE	V / VH
3	926003A3	DEPTH CONTROL BOARD	V / VH
4	92600103	KEYPAD OF CONTROL BOARD	V / VH
5	92900405	STOP CHIP MECHANICAL	V / VH
6	MO107100	DISPLAY THREAD COUNTER SPARE	V / VH
7	92100304	RADIAL ARM COVER	V / VH
8	92600803	PLATE MASK SUPPORT SHARK	V / VH

12 GUIDELINES FOR PACKAGING, TRANSPORT AND DISASSEMBLY

12.1 PACKAGING

Follow the instructions below for packaging the device to change location or to ship it for repair and maintenance.

12.1.1 Preparations

The device must be taken out of service.
Using straps during transport will prevent movement and possible damage to the equipment.

12.1.2 Choice of packaging

During long-distance transport, the device's component parts must be packaged appropriately to protect them against weather damage.

12.1.3 Inscription on packaging

Follow the specific provisions of the country where transport is taking place. For completely closed packages, a label must be placed on the package indicating which end is up.

12.1.4 Packing procedure

Place the device on manufactured wooden pallets. Using tie-down straps, secure the components to keep them from falling. Attach all accompanying technical documentation required for the device.

12.2 TRANSPORT

The following information must be considered when transporting the device.
External dimensions according to segment (1100 x 500 x 420 mm), approx. In mm
Total weight (according to segment): 38.5 kg.

12.3 DISASSEMBLY

- ✓ The equipment must be taken out of service by properly trained and authorised personnel.
- ✓ The equipment must be disassembled taking into account instructions on safety, waste disposal and recycling instructions.
- ✓ Protect the environment. The equipment must be disposed of following standards and directives in force in the areas of safety, noise prevention, environmental protection and accident prevention.

NOTES

DATE	DESCRIPTION

CE DECLARATION OF CONFORMITY

The manufacturer:

Company:	TECNOSPIRO MACHINE TOOL, S.L.U.
Address:	P.I. Pla dels Vinyats I, s/n nau 1
City:	Sant Joan de Vilatorrada - 08250
County:	Spain - EU

Declares that this product:

Model name:	ROSCAMAT SHARK
Model:	V, VH
Initial series number:	003-051 - Sequential

Conforms with Directive 2006/42/EC on machinery, Directive 2014/35/EU on electrical equipment designed for use within certain voltage limits (low voltage), Directive 2011/65/EU on restriction of the use of certain hazardous substances in electrical and electronic equipment and Directive 2014/30/EU and Directive 2014/30/EU on electromagnetic compatibility, certified by TELPRO CE, Av. Ca n'Enric, 39, 08197 Sant Cugat (Valldoreix), Barcelona.

Authorised for documentation:

Ramon Jou Parrot, TECNOESPIRO MACHINE TOOL, S.L.U.

Sant Joan de Vilatorrada, Friday, 16 February 2024

Ramon Jou Parrot, Chief Engineering Officer

ROSCAMAT®

TECNOSPIRO MACHINE TOOL SLU

ROSCAMAT ANNEX

ROSCAMAT ANNEX

1 TAPPING ACCESSORIES

QUICK-CHANGE TOOL HOLDER

A wide range of tap holders with and without clutch, as well as other tools for quickly attaching different tools, such as drill bits, countersinking bits, die stocks, socket spanners, etc.

•Tap holder with safety clutch
(to ensure it slips when it reaches the bottom of the hole)

•Tap holder without safety clutch
(to attach different tools with a cylindrical handle and drive)

Type 1 – Ø19 mm: capacity M2–M16
(for 300, 550, 750, 1050 modules)

Type 2 – Ø31 mm: capacity M14–M30
(for 90, 170 modules)

Type 3 – Ø 48 mm: capacity M30–M42
(for the 40 modules)

STANDARD MEASUREMENTS

Metric	Ø Coupl.	Ø Shaft	□	Standard
M3	19	3.5	2.7	DIN 371
M4	19	4.5	3.4	DIN 371
M5	19	6	4.9	DIN 371
M6	19	6	4.9	DIN 376
M7	19	7	5.5	DIN 376
M8	19	8	6.2	DIN 376
M10	19	10	8	DIN 376
M12	19	9	7	DIN 376
M14	19/31	11	9	DIN 376
M16	19/31	12	9	DIN 376
M18	31	14	11	DIN 376
M20	31	16	12	DIN 376
M22	31	18	14.5	DIN 376
M24	31	18	14.5	DIN 376
M27	31	20	16	DIN 376
M30	31/48	22	18	DIN 376
M33	48	25	20	DIN 376
M36	48	28	22	DIN 376
M39	48	32	24	DIN 376
M42	48	32	24	DIN 376

STOCK HOLDER

For threading with stocks
Capacity M5–M27

LONG STOCK HOLDER

For stock-guided threads.

Types:
– Long stock holder 19/1 M5–M6
– Long stock holder 19/1 M8
– Long stock holder 19/1 M10
– Long stock holder 19/1 M12–M14
– Long stock holder 31/2 M16–M18–M20

Please enquire about other measurements
Capacities from M6–M27

QUICK-CHANGE EXTENSION

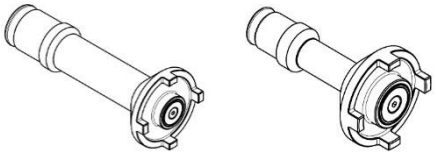
80-mm extension for head assembly tool, allowing access to hard-to-reach areas.
Ø coupling = Ø19 mm

REDUCER BUSHING

To adapt different coupling diameters of tap holders to modules with different output dimensions.

PROBES

Two models available (19 and 31). Angled threading tools.



2 MODULAR SYSTEM

2.1 TIGER AND DRAGON MODULES

MODULE	Max. speed (rpm)	Max. torque		Ø Adaptor	Tapping capacity – steel<90 kg	
		Nm	Ft · lb		Metric	Inches
90	90	150	110	Ø31	M16-M27	$^5/_8" - 1\ ^1/_8$
170	170	79	58	Ø31	M16-M20	$^5/_8" - ^3/_4"$
300	300	44	32	Ø19	M2-M16	$^1/_8 - ^5/_8"$
550	550	24	15	Ø19	M2-M12	$^1/_8 - ^1/_2"$
750	750	17	13	Ø19	M2-M10	$^1/_8 - ^3/_8"$
1050	1050	12,5	9	Ø19	M2-M8	$^1/_8 - ^3/_8"$
2100	2100	6	4	B-16 cone	Drills up to Ø8 aluminium, cast iron, etc.	

2.2 SHARK MODULES

MODULE	Max. speed (rpm)	Max. torque		Ø Adaptor	Tapping capacity – steel<90 kg	
		Nm	Ft · lb		Metric	Inches
40	40	340	251	Ø48/3	M27-M36	$1\ ^1/_8" - 1\ ^3/_8"$
75	75	185	136	Ø31/2	M18-M27	$^3/_4" - 1\ ^1/_8"$
140	140	95	70	Ø31/2	M18-M22	$^3/_4" - ^7/_8"$
320	320	44	32	Ø19/1	M2-M16	$^1/_8 - ^5/_8"$
500	500	28	21	Ø19/1	M2-M12	$^1/_8 - ^1/_2"$
900	900	15	11	Ø19/1	M2-M8	$^1/_8 - ^3/_8"$

3 ACCESSORIES

NOT all the accessories shown below are compatible with your arm, for this see the compatibility table *[See* ROSCAMAT COMPATIBILITY TABLE *p. 59]*

TABLES

(1)

(2)

(3)

Four wheels (two with brake)
Slots for fastening parts or tools.
Supports for tap holder or tools.

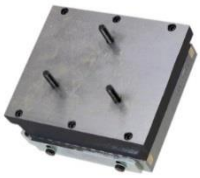
CODE	DESCRIPTION	DIMENSIONS		MAX. LOAD
TP0001A0	Small table (1)	500 x 500 x 900 mm	19 11/16″ x 19 11/16″ x 35 7/16″	100 kg
TF0001A0	Mid-size table (2)	850 x 850 x 850 mm	33 7/16″ x 33 7/16″ x 33 7/16″	200 kg
907B00A0	Large table (3)	1100 x 850 x 850 mm	43 5/16″ x 33 7/16″ x 33 7/16″	500 kg

SUPPORTS

(1)

(2)

Clamp for securing the machine
Magnetic support for placing it on a metal surface and securing the machine

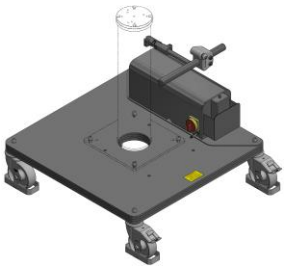


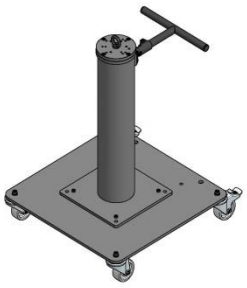
(3)

CODE	DESCRIPTION	DIMENSIONS
BR000100	Small clamp (1)	N/A
BR100100	Large clamp (2)	N/A
IA000100	Magnetic support (3)	150x150
IB000100	Magnetic support (4)	Ø200
IC000100	Magnetic support (5)	Ø250

(4)(5)

TROLLEY



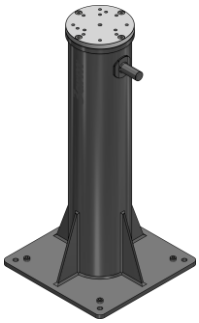


To move the work unit.
It has four orientable wheels.

DESCRIPTION	DIMENSIONS	
Trolley 700	700x700 mm	27 9/16″ x 27 9/16″
Trolley 900	900x900 mm	35 7/16″ x 35 7/16″
Electrical trolley	900x900 mm	35 7/16″ x 35 7/16″
Electrical trolley	800x800 mm	31 1/2″ x 31 1/2″

*Code according to load

FIXED COLUMN



To secure to the floor using four metal studs.

CODE	DESCRIPTION/DIMENSIONS	
CL144000	Column 62mm	2 ½ ″
CL115800	Column 112mm	4 3/8″
CL128900	Column 162mm	6 3/8″
CL140800	Column 275mm	10 7/8″
CL115400	Column 375mm	14 ¾″
CL144800	Column 450mm	17 ¾″
CL145300	Column 635mm	25″
CL007004	Column 740mm	29 1/8″
CL005300	Column 850mm	33 ½″
CL145700	Column 1100mm	43 ¼″
CL145800	Column 1350mm	53 1/8″
CL146100	Column 1600mm	63″

PNEUMATIC LIFTER

It consists of a telescopic column and a pneumatic cylinder with anti-rotation.

DESCRIPTION	VERTICAL STROKE
Pneumatic lifter 300	300 mm – 11 7/8″
Pneumatic lifter 500	500 mm – 19 7/8″
Pneumatic lifter 750	750 mm – 29 17/32″

D63 PNEUMATIC LIFTER

Pneumatic lift. The vertical position can be locked at any point, it has a pneumatic cylinder. It can be secured to the ground, on a trolley or on the ground rail to have movement on two shafts.

DESCRIPTION	VERTICAL STROKE
1500 D63 Pneumatic lifter	940 mm – 37″
2000 D63 Pneumatic lifter	1440 mm – 56 11/16″
2500 D63 Pneumatic lifter	1940 mm – 76 3/8″

RADIAL EXTENSION

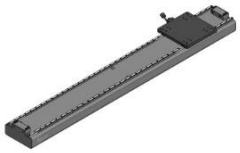
(1)

Extender that enables the arm's working area to be increased. It can also be installed on other accessories, such as column, lift, linear guide, etc.

(2)

CODE	DESCRIPTION	ADDITIONAL WORK AREA
ER0010C0	Radial extension 500 (1)	500 mm – 19 11/16″
ER000100	Radial extension 1000 (2)	1000 mm – 39 3/8″

FLOOR RAIL



Rail to fasten to the floor and on which the different columns and lifts can be fastened. Several sections can be joined from a base section 2 m. The horizontal position can be locked at any point.

CODE	DESCRIPTION	STROKE
CL040000	Floor rail	1520 mm – 59 13/16″

LINEAR GUIDE

Guide for the horizontal movement of the arm. Several sections can be joined from a base section 2 m. This may be table-top, fixed to the wall or ceiling, or on pillars of various heights that can be selected. The horizontal position can be locked at any point.

CODE	DESCRIPTION	STROKE
CL023300	Linear guide 1000	635 mm – 25″
CL020000	Linear guide 2000	1635 mm – 64 3/8″
CL023000	Linear guide 3000	2635 mm – 103 3/4″

4 ROSCAMAT COMPATIBILITY TABLE

ACCESSORY	SERIES – ROSCAMAT						
	200	400	500	Mosquito	Tiger	Shark	Dragon
RADIAL EXTENSION	●	●	●	●	●	●	●
TROLLEY + FIXED COLUMN	●	●	●	□700x20	□700x25	□700x30	□700x35
FIXED COLUMN	●	●	●	●	●	●	●
PNEUMATIC LIFTER	●	●	●	●	●	●	●
D63 PNEUMATIC LIFTER	●	●	●	●	●	●	●
FLOOR RAIL	●	●	●	●	●	●	●
LINEAR GUIDE	●	●	⊘	●	⊘	⊘	⊘
SMALL TABLE (500)	●	●	⊘	●	⊘	⊘	⊘
MID-SIZE TABLE (850 x 850)	●	●	●	●	●	*	*
LARGE TABLE (1110 x 850)	●	●	●	●	●	●	●
SMALL CLAMP	●	●	⊘	●	⊘	⊘	⊘
LARGE CLAMP	●	●	●	●	●	●	●
MAGNETIC SUPPORT	□150	Ø200	Ø250	Ø200	Ø250	Ø250	Ø250

● = Compatible
⊘ = NOT Compatible
* = Request information

5 TECHNICAL INFORMATION

5.1 MOTOR – PROPERTIES

High frequency electric motor

- Power: 800 W
- Frequency: 1-250 Hz
- Single phase; Voltage: 220–240 V
- Noise level: 74 dBA

5.2 ELECTRONIC VARIATOR PROPERTIES

Nominal dimensions			Technical Specifications
Nominal power of motor			0.75 kW
Output properties	Nominal power (kVA)		2.0 kVA
	Nominal voltage (V)		Three-phase, 200 to 240V (with AVR function)
	Nominal current		5.5 A.
	Overload capacity		150% of nominal output current for 1 min. 200% of nominal output current for 0.5 sec.
	Nominal frequency (Hz)		1-400 Hz
Input properties	Phases, voltage, frequency		Single phase, 200 to 240 V 50/60 Hz
	Tolerances		Voltage: +10 to -15% Frequency: +5% to -5%
	Nominal current	(With DC reactance)	6.4 A.
		(Without DC reactance)	9.7 A.
	Power required from the electricity supply (kVA)		1.3 kVA
Brakes	Brake torque (%)		100 (average brake torque with AVR off)
	DC brake injection		Start frequency: 0.0–60.0 Hz Braking time: 0.0–30.0 secs Brake current: 0–100% of nominal current
	Braking transistor		Built-in
Applicable safety standards			UL508C, IEC61800-5-1:2007
Protection type			IP20 (IEC 60529), UL open type (UL50)
Cooling			Natural cooling
Weight			0.9 kg

5.3 TABLE OF TORQUE – THREAD SIZE – MODULES

TORQUE steel<100 kg/mm²	SIZE	WHITWORTH	GAS - BSP	UNC No.	NPT	STEEL > 115	STEEL 90–115 BRONZE >40	STEEL < 90 CAST BRONZE < 40	ALUMINIUM PLASTIC
0.5	M3					500	900	900	900
0.6									
0.8	M3,5	1/8”		nr. 4					
1				nr. 5					
1.2	M4	5/32”		nr. 6					
1.6				nr. 8					
2	M5								
2.5									
3		3/16”		nr. 10					
4	M6	7/32”		nr. 12					
5		1/4”							
6	M7		G 1/8”	1/4”	1/16”		500	500	
8	M8								
10	M9	5/16”		5/16”					
12						320			500
16	M10	3/8”		3/8”					
18	M11		G 1/4”		1/8”				
20									
22	M12	7/16”	G 3/8”	7/16”					
25						140	320	320	
28									
32				1/2”					
36	M14	1/2”							
40	M16	9/16”		9/16”					
45							140	140	140
50		5/8”	G 1/2”	5/8”					
56			G 5/8”		1/4”	75			
63	M18								
70	M20	3/4”	G 3/4”	3/4”	3/8”				
80	M22		G 7/8”						
90						40	75	75	
100		7/8”		7/8”					
110									
125	M24								
140	M27	1”	G 1”	1”					
160			G 1.1/8”		1/2”		40	40	75
180			G1.1/4”						
200			G1.3/8”	1.1/8”	3/4”				
220	M30	1.1/8”	G1.1/2”						
240	M33	1.1/4”	G1.3/4”	1.1/4”					40
260			G 2”						
280	M36								
300									
320	M39			1.3/8”					
340		1.3/8”	G2.1/2”		1”				
360		1.1/2”		1 1/2”					
420	M42		G 3.1/4”						

5.4 TURNING TORQUE CLUTCH ADJUSTMENT FOR TAPPING (Nm)

Metric thread	Steel > 100 kg	Steel 80–100 kg	Steel < 80 kg	Aluminium Grey Iron
3	0.9	0.6	0.5	0.4
4	2	1.3	1.2	0.8
5	3	2	2	1.3
6	5	4	4	2.4
8	11	8	8	5
10	20	15	14	9
12	33	24	23	14
14	50	36	35	22
16	57	42	40	26
18	101	73	70	45
20	112	81	78	50
22	123	90	86	55
24	194	140	135	86
27	218	158	152	97
30	330	240	230	150
33	364	260	252	160
36	-	-	280	230
39	-	-	-	250
42	-	-	-	340

5.5 MACHINE THREAD TAPS

Blind hole	Tap with helical grooves.	Lubrication.
Lubrication	Tap with straight grooves and helical entry.	
Steel > 80 kg	Ang. cutting 8–10.	Cutting fluid with additives.
Steel < 80 kg	Ang. cutting 12–14.	Cutting fluid.
Steel < 50 kg Stainless steel	Ang. cutting 14–16. Treatment of surface	
Soft iron casting	Tap with straight grooves. Treatment of Nitride Surface Ang. cutting 5.	Petroleum, cutting fluid, dry
Duralumin	Ang. cutting 12–15.	Cutting fluid, dry
Aluminium	Ang. cutting 17–25.	Cutting fluid with additives.
Plastic		Cutting fluid, dry