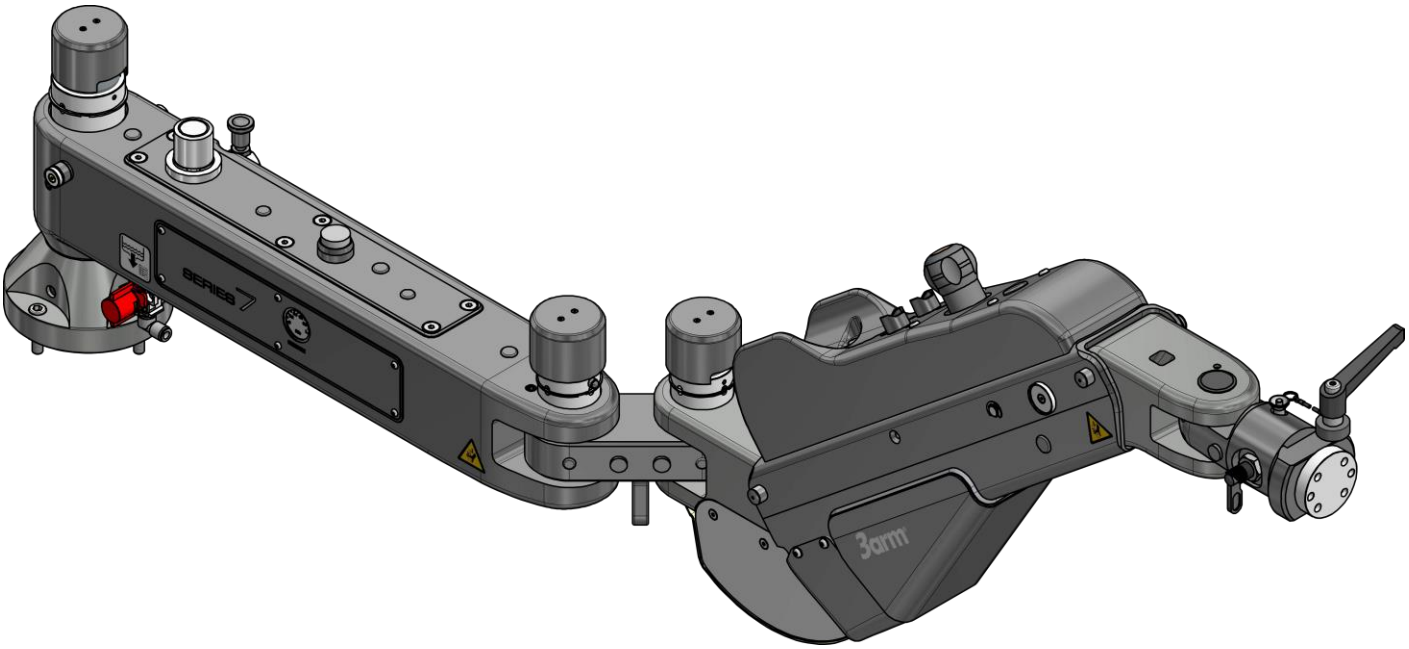
INSTRUCTION MANUAL

3arm®

SERIES 7



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ISO 9001
BUREAU VERITAS
Certification

TECNOSPIRO
MACHINE TOOL SLU

DESIGN & QUALITY
3arm
Made in Barcelona

www.3arm.net

TABLE OF CONTENTS

1. INTRODUCTION

Dear Customer,

We would like to congratulate you on your choice and we are pleased to continue our constant work to provide our customers with a simple, reliable and versatile way to improve ergonomics in the workplace.

We hope these simple instructions will help you commission and operate the arm you have selected. We suggest you pay special attention to the pages on the concepts of installation, maintenance and safety.

We hope your arm will have a long life and that you can reaffirm the very good investment you have made in acquiring a 3arm® arm.

2. ABOUT THIS MANUAL

This document corresponds to the Series 7 instruction manual.

- ORIGINAL MANUAL –

Intellectual/Industrial Property Information:

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2.1. CONSIDERATIONS

- ✓ Before using the equipment, be sure to read this instruction manual and follow the instructions for use and safety correctly.
- ✓ All the instructions listed in this manual refer to the individual unit. It is the end user's responsibility to analyse and apply all the necessary safety measures required for the end use.
- ✓ This manual must be kept for the entire life of the equipment, in a place close to it for future consultations.
- ✓ If any part of this manual is unclear, confusing or inaccurate, please do not hesitate to contact us.
- ✓ The content 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. for a replacement.
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- ✓ The illustrations shown in this manual may differ in some details with respect to their specific configuration and should be understood as a standard representation.

Paragraphs indicating assembly, adjustment, installation or maintenance steps are framed with a brown background.

Paragraphs with highlighted information are framed with a grey background.

2.2. DOCUMENT VERSION

Document	Date - version
Instruction manual Series 7	08/02/2024

3. SAFETY INFORMATION

3.1. SCOPE OF APPLICATION

This chapter contains very important information related to the safety of your arm; it is aimed at all staff involved in any of the stages of the life of this equipment (transport, assembly, installation, commissioning, adjustment, learning, operation, cleaning, maintenance, troubleshooting, dismantling/removal from service.

3.2. ALERTS AND GENERAL CONSIDERATIONS

- ✓ The equipment described in this document has been built in accordance with the current technological level and pursuant to the applicable technical standards in terms of safety. However, improper use, or incorrect integration by the end user can generate risk of injury.

- ✓ The equipment must only be used in perfect technical condition, respecting the safety regulations and the instructions provided in this document.

- ✓ Any breakdown that may affect safety must be corrected immediately.

- ✓ Without the proper authorisation of TECNOSPIRO MACHINE TOOL, S.L.U. No modification of equipment should be made.

- ✓ The equipment must only be operated for its intended use. Any other use is strictly prohibited. Any use other than that indicated is considered misuse and is prohibited. The manufacturer assumes no responsibility for any damage that may arise from it. This is solely at the user's own risk.

- ✓ It is the responsibility of the integrator, owner and/or end user to determine the suitability of the product for each use, as well as its place of installation and the specific definition of the task to be carried out with this product within the limits stated in this manual.

- ✓ Do not use the equipment in any way that is not considered in this manual and pay special attention to the uses mentioned in section 3.3 EXCLUSIONS, which must not be carried out.

- ✓ The operator must only use the equipment after having received the instructions for its use.

- ✓ The integrator/end user must ensure that the gripping device is suitable for the end application.

- ✓ Do not exceed the maximum working loads indicated in this manual and in the identification on the structure of the equipment.

- ✓ It is recommended that only one operator use the equipment at a time, any other use must be evaluated by the integrator/end user.

- ✓ When it is not in use, it must be left in the retracted or parking position. Ensure the air supply to the equipment has been cut off at the end of the working day.

- ✓ The operator may only use the equipment for safe movements, accompanying the movement of the equipment at all times, and thus reducing the risk of uncontrolled or involuntary movements.

- ✓ Although the parts with a higher risk of possible shearing or mechanical gripping are protected and have guards, it is forbidden to manipulate the moving components and joints when it is in use.

- ✓ The operator must stay out of the swivel arm's vertical travel.

- ✓ The work area of the equipment and its surrounding area must respect conditions of safety, health and hygiene at work. It is the integrator/end user's responsibility to conduct a study to guarantee safety.
- ✓ The presence of third parties in the work area of the equipment should be restricted as much as possible, thus avoiding any impact on safety. For any other use, an additional study of the hazards derived from this way of working must be carried out.

- ✓ Only authorised personnel may be present in this area while the equipment is in use.

- ✓ It is important that the users who operate this equipment are familiar with and sufficiently trained to use this product or similar products.

- ✓ It is recommended that the operator have basic knowledge of: Safety procedures, precautions and safe working habits.

- ✓ In any case, the operator must read and understand this manual before use regardless of their knowledge, training or experience with similar equipment, especially the sections dedicated to installation, operation and safety.

- ✓ The appropriate distances that allow people to circulate safely must be added around the perimeter of the equipment. Work areas must remain free from obstacles, columns, etc. that may hinder the operators' work.
- ✓ Before any type of adjustment or maintenance task, the staff and/or operators responsible for these tasks must bear in mind that the 3arm© arm is configured to work with a certain range of loads.

- ✓ Suitable spaces must be available to carry out maintenance, adjustment, cleaning, etc. tasks.

- ✓ If you have questions about handling or maintenance procedures, please

contact the authorised technical service.

- ✓ Protective equipment must be used pursuant to the manufacturer's instructions for the tool attached to the arm.

- ✓ If for any manipulation, adjustment or maintenance task, or for any other reason, the load is released from the arm (for example, when changing the tool), the arm may suddenly ascend sharply and could cause harm. Carefully read the section *Safety considerations in maintenance and adjustment tasks* to avoid such accidents.

- ✓ Lifting devices are subject to different regulations in each country. These regulations may not be specified in this manual.

3.3. EXCLUSIONS

The following is beyond the scope of use of this arm:

- ✓ Operation in severe conditions (e.g. extreme environmental conditions such as freezing, high temperatures, corrosive environment, strong magnetic fields).
- ✓ Loads greater than the maximum working load limits (WLL).
- ✓ Use in areas with risk of explosion.
- ✓ Installation in outdoor areas.
- ✓ Handling of any component or functions of the equipment outside of those specified in this manual.
- ✓ Use by people with some type of disability or by animals.

3.4. SYSTEM INTEGRATOR

The system's integrator or end user is responsible for integrating the machine in the installation, respecting all the relevant safety measures.

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

- ✓ Siting the equipment.
- ✓ Connecting the equipment.
- ✓ Risk assessment.
- ✓ Facilities with the necessary safety and protection functions.
- ✓ Issue of the CE statement of compliance.
- ✓ Placement of the CE marking.
- ✓ Preparing the machine's service instructions.

3.5. SYMBOLS AND ICONS

Throughout this manual and in the structure of the machine, different symbols and pictograms can be observed, the meaning of which is summarised below.

	General danger symbol. It is usually accompanied by another symbol, or a more detailed description of the danger.
	Trapping hazard

3.6. PERSONAL PROTECTION EQUIPMENT (PPE)

The personal protection equipment for this arm is merely safety footwear for all stages of the life of the equipment.

It is the integrator/end user's responsibility to define the personal protection equipment derived from the final application of the equipment in order to comply with the essential health, safety and hygiene requirements.

Operators must not wear loose clothing, rings or bracelets that may fall within the equipment's mechanism.

It is also mandatory to wear hair tied back to avoid snags with the moving parts of the equipment.

3.7. TRAINING LEVEL OF THE STAFF INVOLVED

All people working with the equipment must have read and understood the safety chapter in the documentation.

The minimum training level required to use the equipment is:

- Production workers: a course on workplace hazard prevention, complete training on the equipment's tasks and residual risks. Minimum of one year's experience in similar facilities.

- Maintenance workers: workplace hazard prevention course, complete training on the handling, operation, maintainability and conservation of the equipment and residual risks. Minimum of two years' experience in similar facilities and with the technical level necessary to perform tasks without problems.

- Cleaning operators: course on workplace hazard prevention, training on products and procedures for carrying out cleaning tasks.

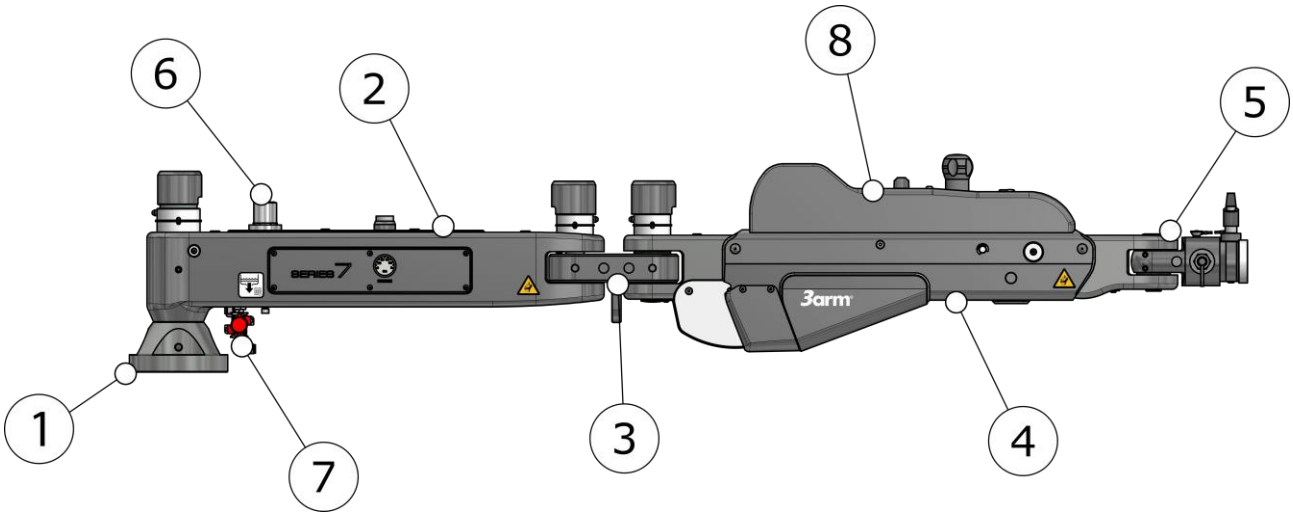
- Apprentices/students: may only work on the equipment if supervised at all times by one of the facility's suitably qualified employees.

- Public (non-operators): visitors or passers-by must maintain a minimum safety distance of two metres from the edges of the perimeter of the equipment.

4. GENERAL DESCRIPTION AND TECHNICAL INFORMATION

The equipment consists of a pendulum parallelogram balanced by a gas spring and a pneumatic cylinder, plus a radial arm. The assembly of both secures the clamping head and keeps it in a perpendicular position to the work area. The arm is equipped with a handle for easy manipulation and different command consoles with push buttons, depending on the characteristics of each model. In addition, locks (manual or pneumatic) can be incorporated that block rotation in the base axis, in the joint axes, in the head and the tilting movement of the arm.

4.1. MAIN PARTS



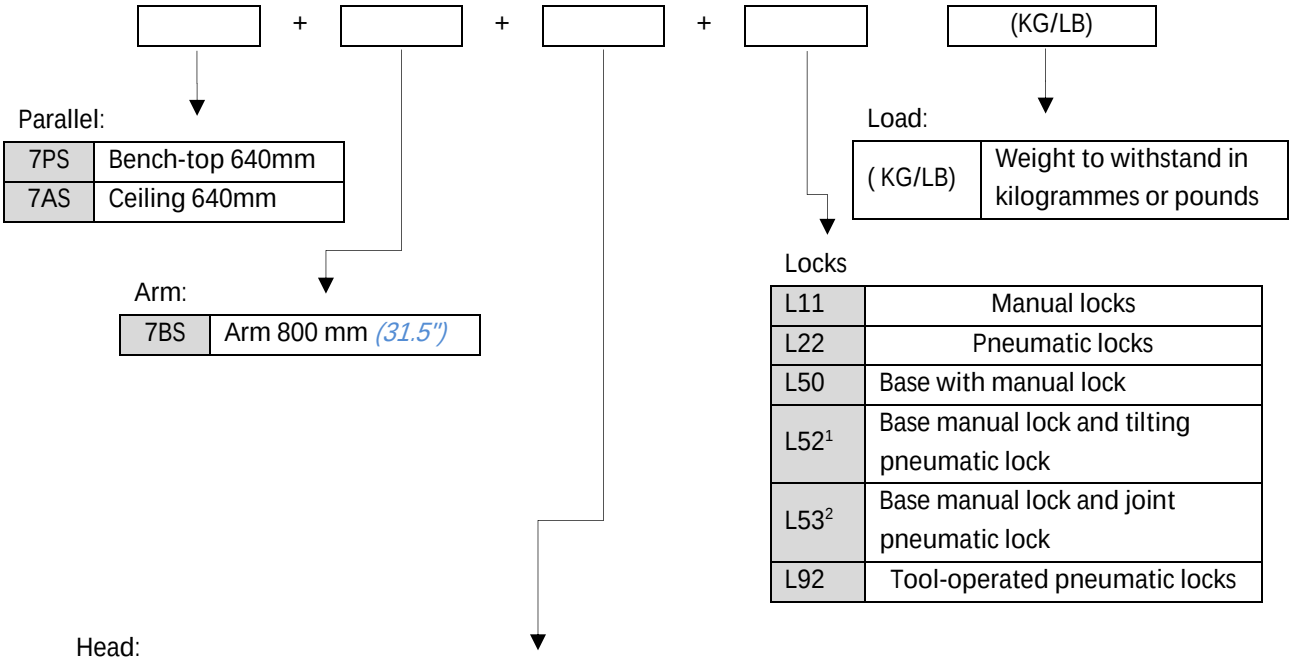
1.- Base
2.- Radial arm
3.- Joint
4.- Tilting arm
5.- Head
6.- Filter regulator
7.- Air supply connection
8.- Control cover

INFORMATION

The equipment in the image is a 7PS + 7BS + E7 + L22 arm

4.2. CONFIGURATIONS

4.2.1. CONFIGURATION TABLE



B7	Flat	RAS7	Automatic revolver + Bush
BA7	Flat + Bush	RS7	Automatic double revolving
E7	Rotative	U7	Multiposition
E17	Rotative with manual lock	U17	Multiposition with manual lock
E27	Rotative with pneumatic lock	U27	Multiposition with pneumatic lock
Q7	Multiposition	UA7	Multiposition security
Q17	Multiposition manual lock	UA17	Multiposition security manual lock
Q27	Multiposition pneumatic lock	UA27	Multiposition security pneumatic lock
QA7	Multiposition security	W7	Vertical extension
QA17	Multiposition security	W17	Vertical extension with manual lock
QA27	Multiposition security pneumatic lock	W27	Vertical extension with pneumatic lock
R7	Revolving	X7	Custom
RA7	Revolving + Bush		

Note: See dimensions of the heads and functional applications in the ***Appendix of S7 heads.***
Note II: To complement its use with a pneumatic LIFT, switches are included to control it (e.g. 7PS + 7BS + B7 + L22**E**).

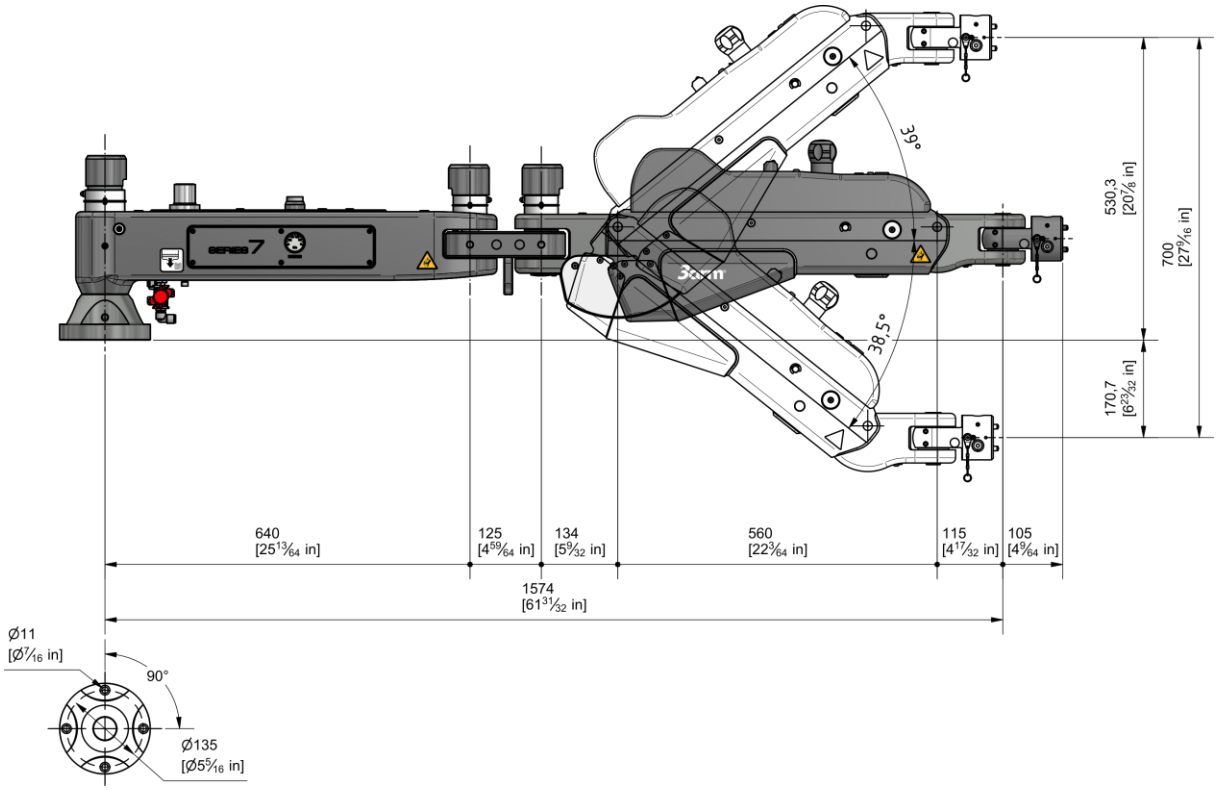
4.2.2. EXAMPLE ORDER

Example order: 7PS + 7BS + E7 + L50 (50kg)

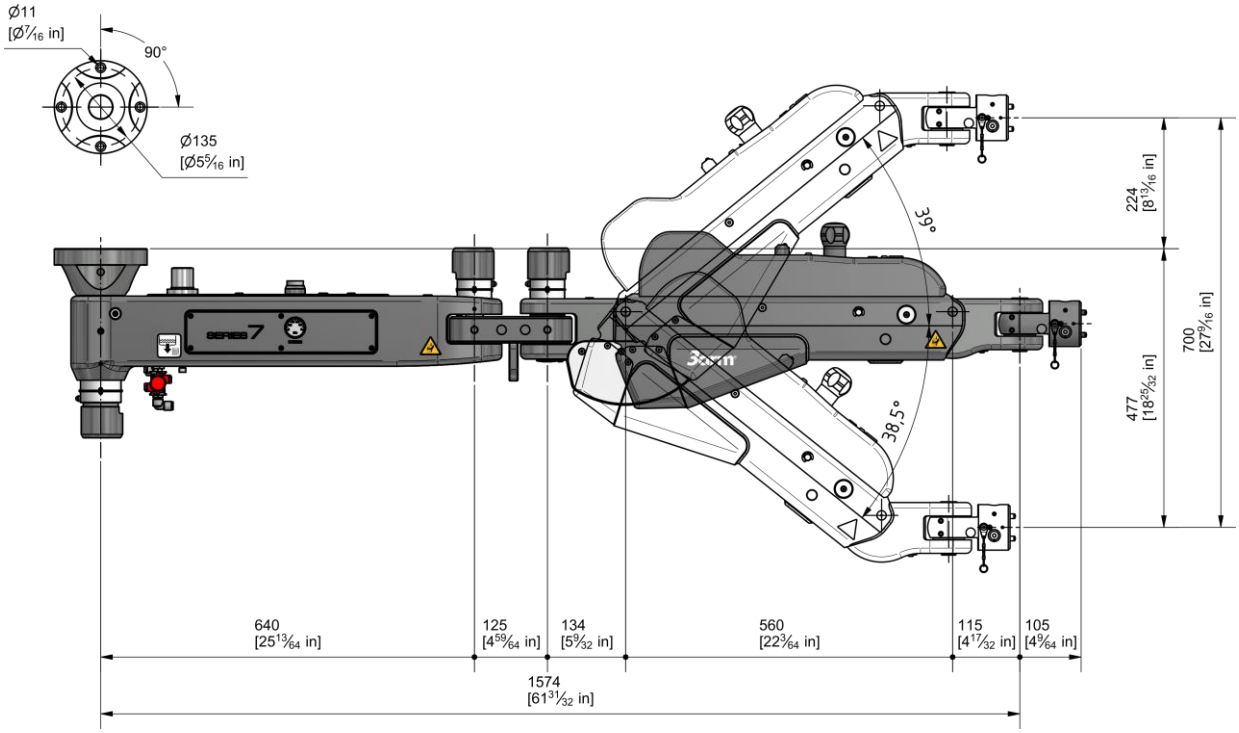
7PS + 7BS + E7 + L50 (50) KG

[1] L52 locks only with headmembers QA7 / QA17 / UA7 / UA17 / W7 and W17
[2] L53 Locks only with headmembers B7 / BA7 / R7 / RA7 / W7 and W17

4.3. DIMENSIONS



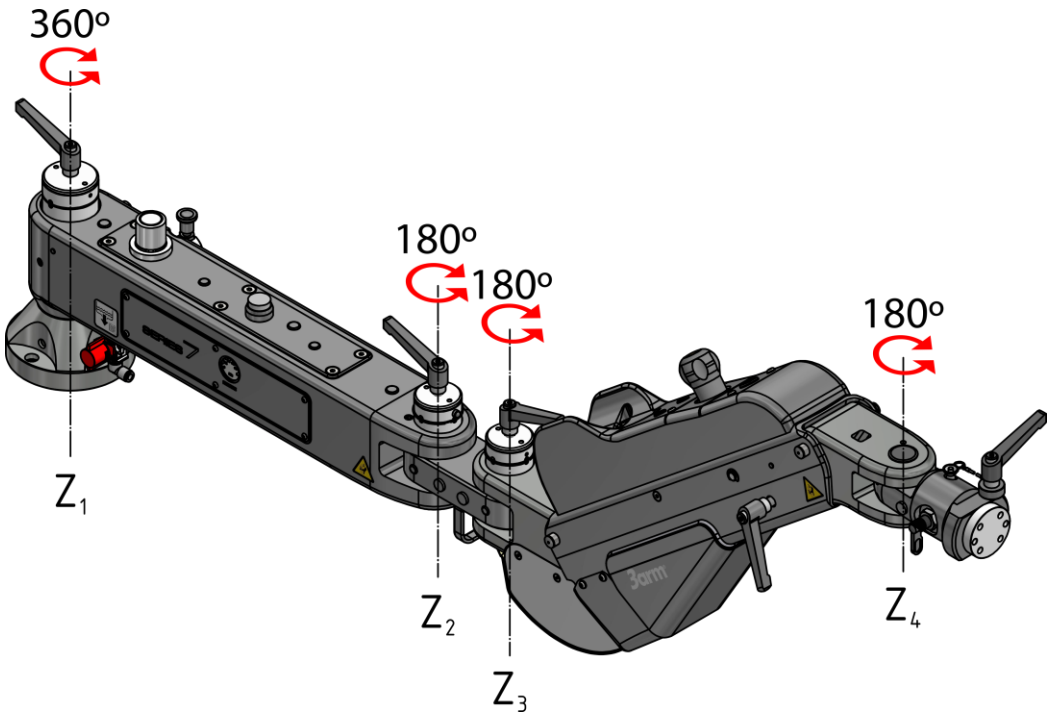
3arm© Series 7 bench-top



3arm© Series 7 Ceiling

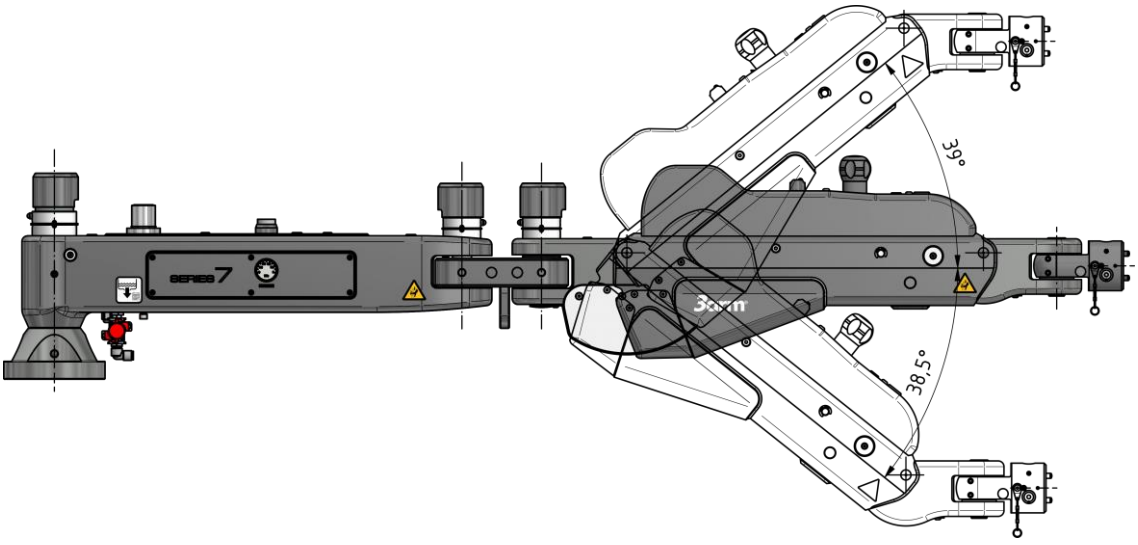
4.4. MOVEMENTS

4.4.1. MOVEMENTS OF ROTATION AND EXTENSION



- Radial base-arm rotation movement: 360º (Z axis$_1$)
- Radial arm rotation movement – joint 180º (Z axis$_2$)
- Arm-joint rotation movement: 180º (Z axis$_3$)
- Head rotation movement: 180º (Z axis$_4$)

4.4.2. ASCENDING AND DESCENDING MOVEMENTS



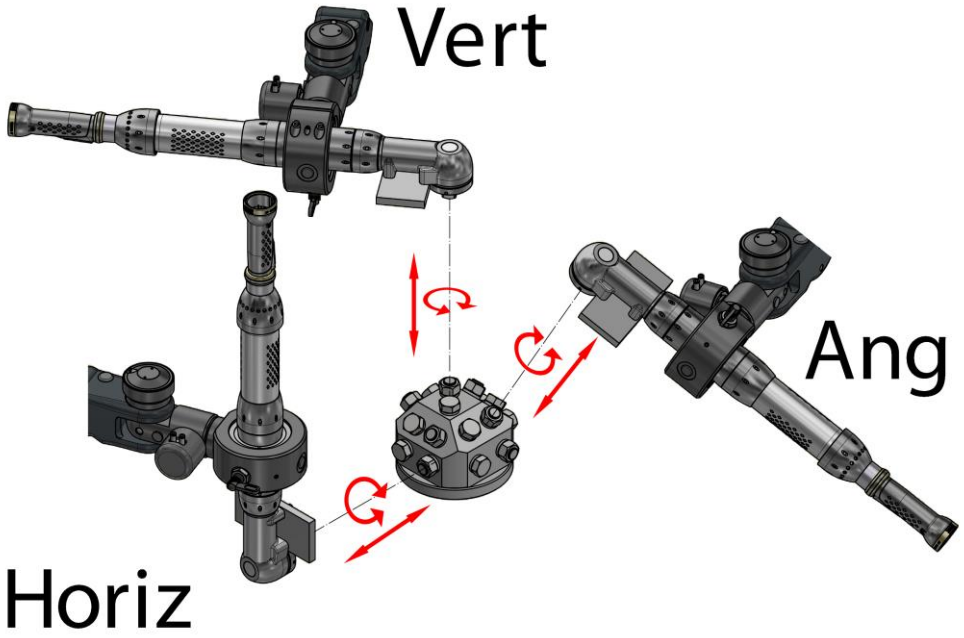
The tilting movement In the ZX plane goes from -38.5º to +39º, obtaining a complete vertical travel of 700 mm (*27.5"*).

4.5. REACTION TORQUE

If you use reaction tools, ensure that the maximum torque is NOT exceeded.

The maximum torque your 3arm® can absorb is limited by the type of head used and the working position. The maximum torque is detailed in the table below:

HEAD	MAXIMUM TORQUE (Nm)		
	VERTICAL (Vert)	HORIZONTAL (Horiz)	ANGLE (Ang)
BA	1000 *(738 ft lb)*	500 *(369 ft lb)*	X
R / RA / RB	600 *(443 ft lb)*	500 *(369 ft lb)*	400 *(295 ft lb)*
RS / RAS / RBS	600 *(443 ft lb)*	500 *(369 ft lb)*	500 *(369 ft lb)*



For further information, please refer to the annexed manual for heads S7.

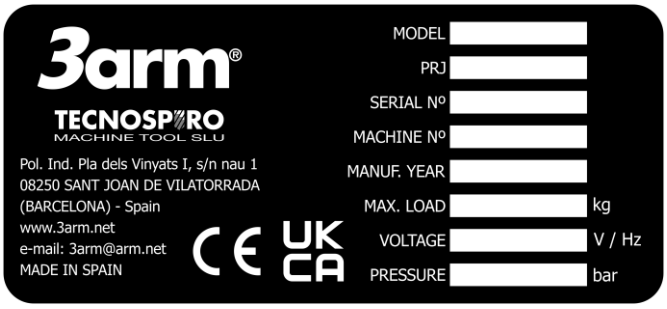
4.6. TECHNICAL SPECIFICATIONS

GENERAL TECHNICAL SPECIFICATIONS		
Load capacity[3]		
	Maximum net load range	0-50Kg *(0-110 lb)*
	Maximum net load	50 kg *(110 lb)*
	Maximum gross load *(load securing device + load to be handled)*	70 kg *(154 lb)*
Others		
	Resistance to manipulation	0.5 kg *(1.1 lb)*
Reaction torque[4]		
Maximum torque	Max. vertical work	1000 Nm *(738 ft lb)*
	Horizontal work Max.	600 Nm *(443 ft lb)*
	Work at any angle Max.	500 Nm *(369 ft lb)*
Pneumatic specifications		
	Power fluid	Pressurised air
	Max. working pressure	0.65 MPa *(6.5 bar)*
	Min. working pressure	0.45 MPa *(4.5 bar)*
Operating conditions		
	Temperature	-5ºC to + 50ºC
	Relative humidity	Max. 70%
	Environment	Industrial environments
	Noise	<70 dB(A)
	Min. illumination at workstation	500 lux

4.7. IDENTIFICATION

A sticker on the radial arm identifies the arm and indicates the following features.

CE and UKCA marking, manufacturer (name, address and business name), date of manufacture, serial number, model, maximum working load and maximum working pressure.



[3]The load shown corresponds to the upper limit for a Series 7 arm. This arm may have a lower maximum load. Consult the maximum load of your arm on the identification plate in the structure of the arm.

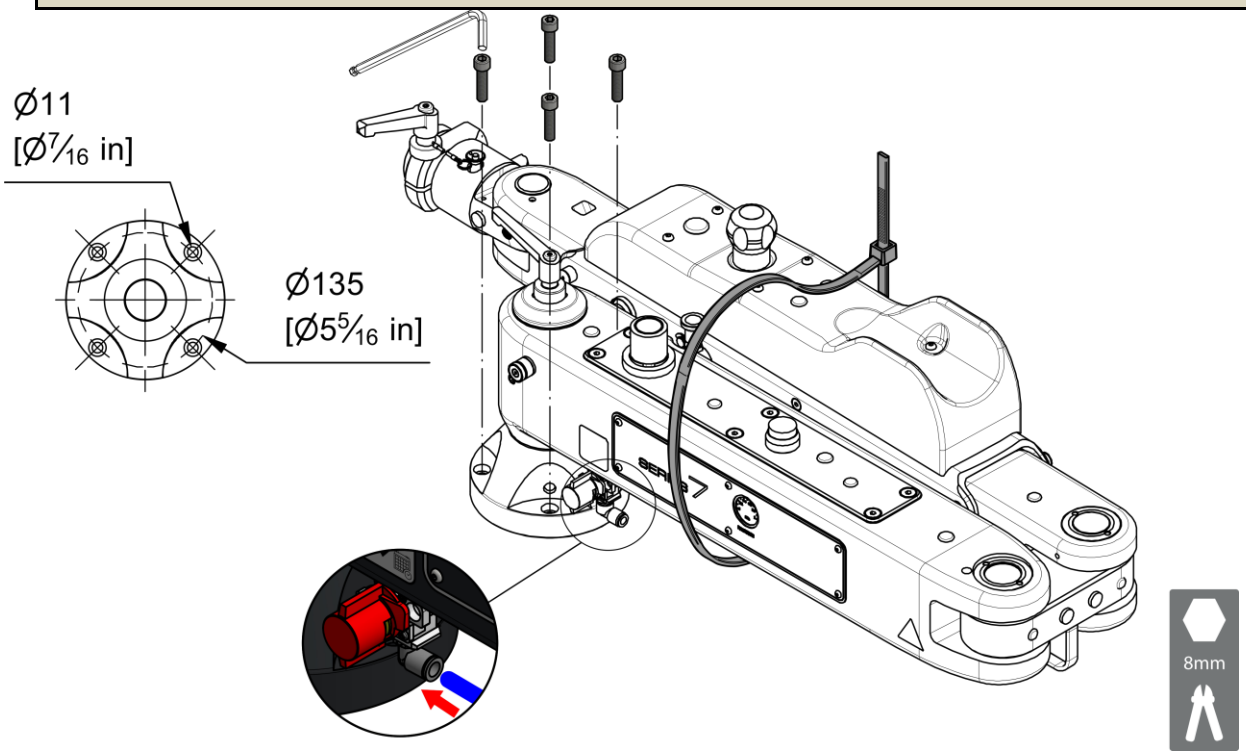
[4] The data shown corresponds to the maximum torque that the arm can absorb. You may be able to reduce these values depending on which head you are working with [See REACTION TORQUE page16].

5. INSTALLATION

GENERAL CONSIDERATIONS ABOUT THE INSTALLATION

- ✓ The work bench or installation location must be a horizontal surface, thus avoiding shifts and deviations.
- ✓ The steps to follow for the installation depend on the securing method and the alternatives available in the selected location. In any case, the integrator, owner and/or end user is responsible for determining the product's suitability for each use, the installation location, specifically defining the task to be performed within the limits set forth in this manual and the issue of the statement of compliance.
- ✓ ATTENTION! Do not cut the ties, unlock the arm or connect the air intake until the installation of the tool is complete, otherwise the arm could begin a violent upward movement that could cause damage.

1. Fix the base of the arm to the workbench using the four M10 screws supplied (Recommended torque 45 Nm) (8mm Allen key).
2. **Fix the tool to the head** and make the necessary connections (See details in the Appendix of S7 heads).



3. Air connection. Requires suitable piping tube for use with compressed air. ($Ø_{exterior}$= 8 mm and maximum supply pressure 0.65 MPa (6.5 bar).
4. **Open the main valve** [See OPENING AND CLOSING THE MAIN VALVE page 18] and set the pressure to minimum.
5. **Cut the plastic ties** connecting the radial arm and the tilting arm, and unlock the arm [See PARKING POSITION - WORKING POSITION page 19].

INSTALLATION LOCATION

Do not install the equipment in environments such as:

- ✓ Areas with explosion or fire hazards
- ✓ Exterior areas
- ✓ Corrosive areas
- ✓ Areas with extreme temperatures (very high or very low)
- ✓ Areas with high humidity
- ✓ Dusty areas
- ✓ Areas with high electromagnetic emissions

SUPPLY AIR

- ✓ The supply air must meet the specifications shown in [See TECHNICAL SPECIFICATIONS page 15].
- ✓ Use clean air. If the compressed air contains chemicals, organic solvents, synthetic oil or corrosive gases, the parts may be damaged or may cause malfunction. [SEE COMPRESSED AIR MAINTENANCE UNIT page 37].
- ✓ When there is excessive condensation, install a device that removes water, for example, a dryer or water dryer (condensate collector), on the inlet side of the air filter.

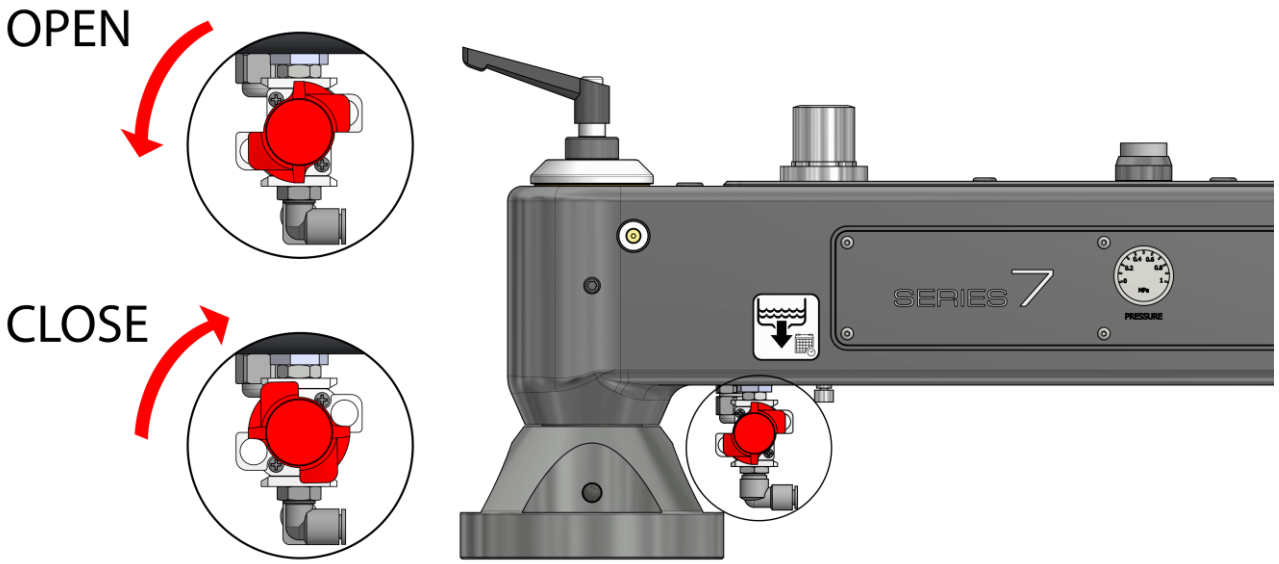
6. OPERATION

GENERAL CONSIDERATIONS ABOUT THE SETTINGS

The adjustments described in this section assume that the arm is properly installed and integrated, following the guidelines laid out in this manual.

6.1. OPENING AND CLOSING THE MAIN VALVE

The main valve enables (OPEN position) or restricts (CLOSED position) the passage of compressed air to the equipment.



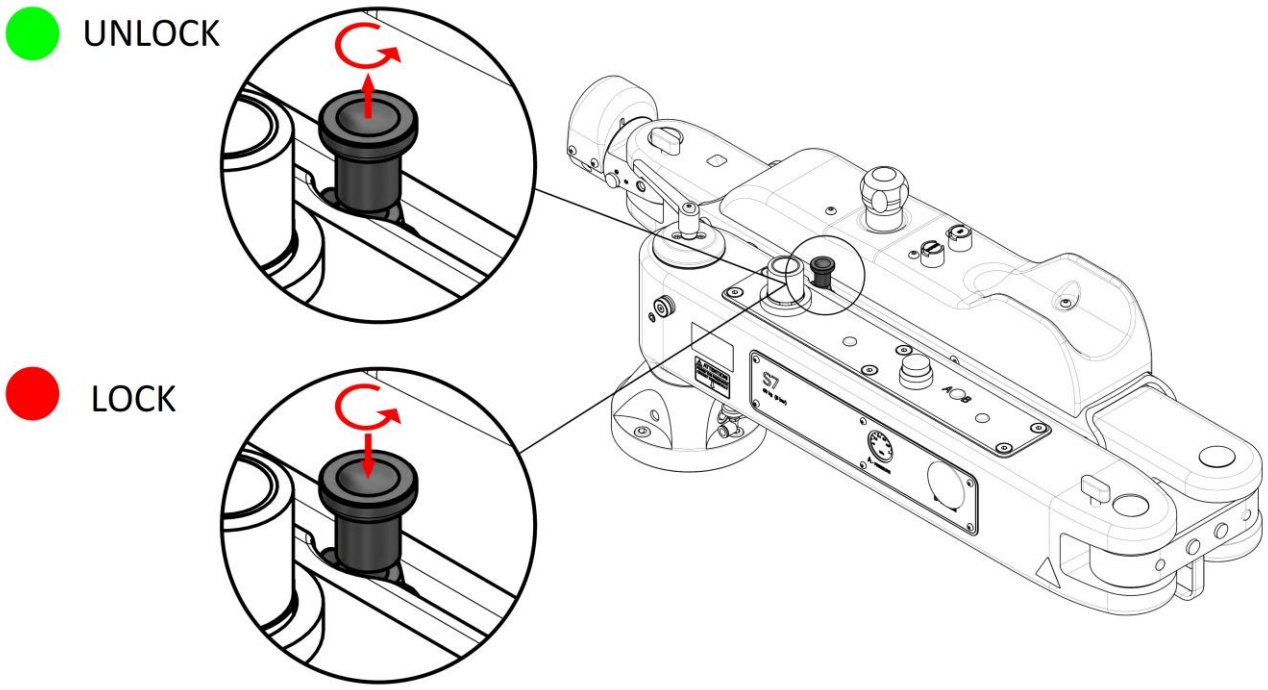
PERIODS OF INACTIVITY

The main valve must restrict the passage of air, closed position (CLOSED), when the equipment is not in use.

6.2. PARKING POSITION - WORKING POSITION

Follow these steps to lift the arm into the working position:

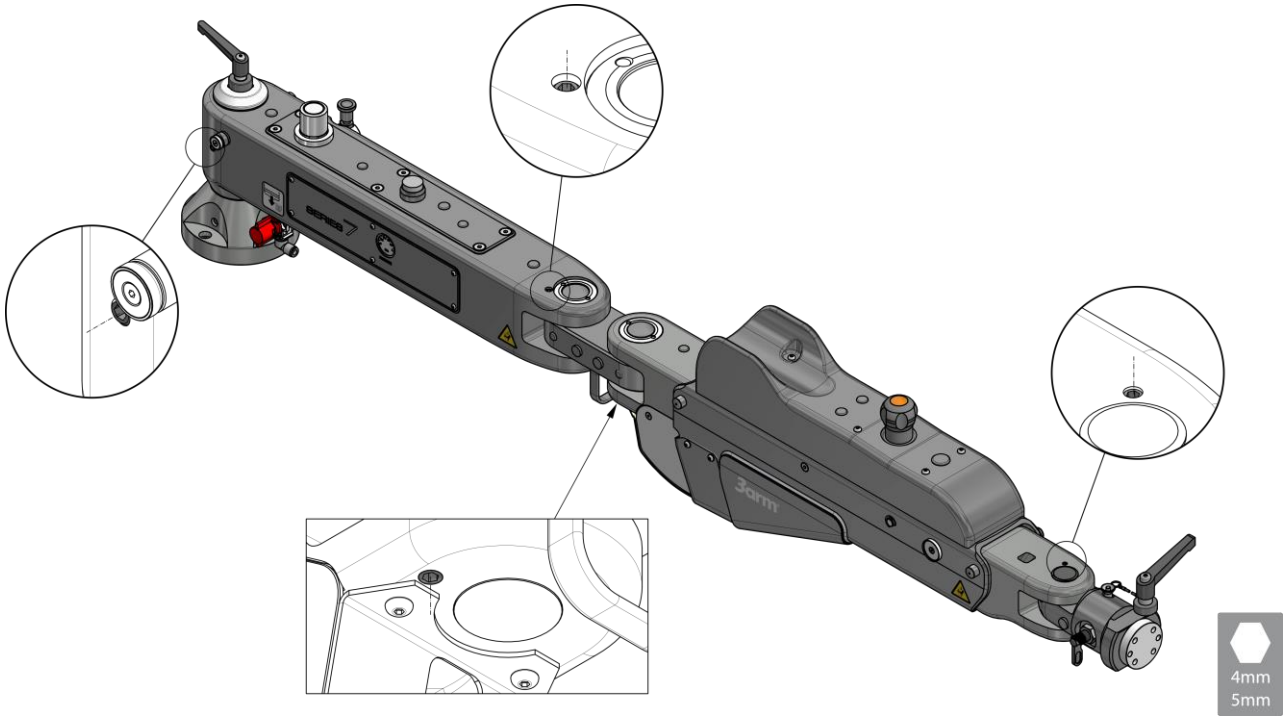
1. Unlock the locking device: pull the knob upwards and, without letting go, turn slightly.
2. Accompany the arm away from its initial position.
3. Proceed in reverse order to interlock the locking device.



6.3. REGULATION OF THE RESISTANCE TO ROTATION.

A stud and three handles on the Base - Radial Arm, Radial Arm - Joint, Joint - Arm and Head allow adjustment of the rotational resistance of the different axes of movement of the arm. The studs can be tightened or loosened with a Nylon tip to regulate this turning resistance (5 mm Allen key).

Regulating the turning resistance is especially useful in situations where the base of the arm is not completely horizontal or on poorly levelled floors.



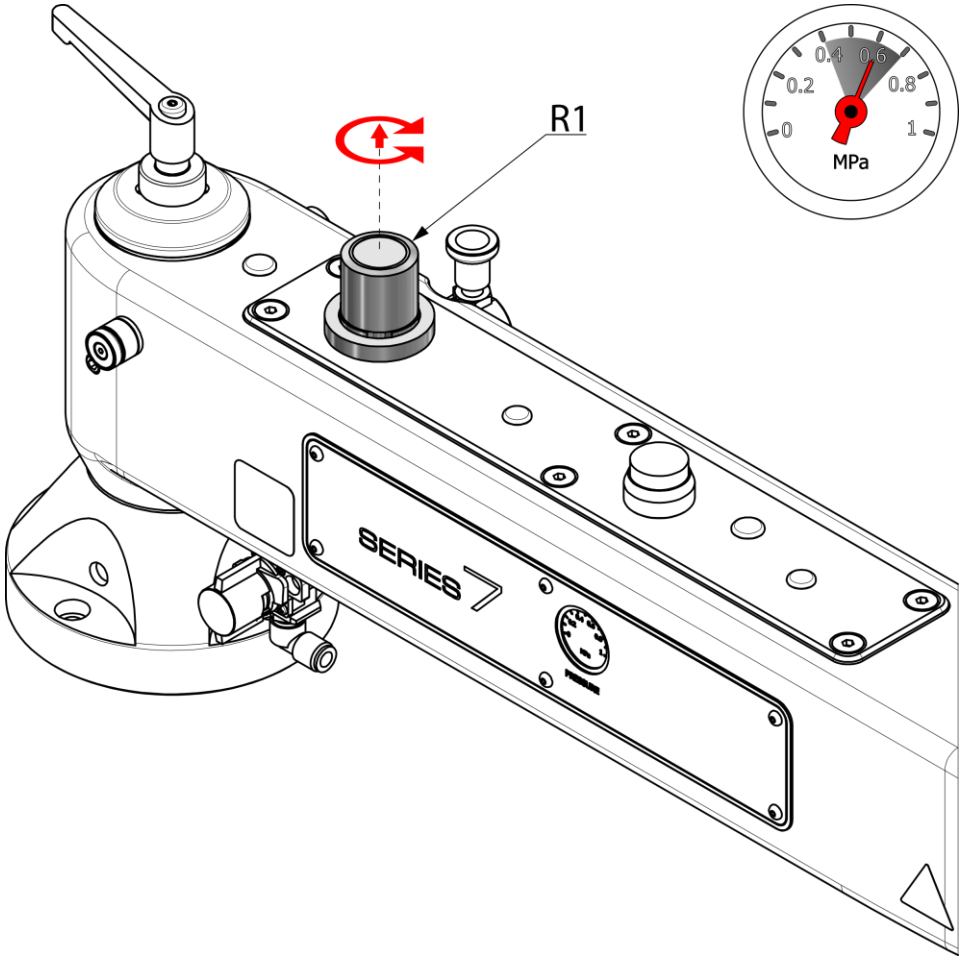
SHIFTING AND DEVIATIONS

Correctly adjusting the regulation of the turning resistance prevents the risk of shifting and deviations during the operation of the arm.

6.4. REGULATION OF SUPPLY PRESSURE

Adjust the air supply pressure according to the working conditions, using the **pressure regulator R1.**

1. Push up on the knob edge to unlock the anti-rotation mechanism.
2. Turn the handle (R1) to the left or right to adjust the pressure (max. 0.65 MPa).



INFORMATION

The supply pressure will always be equal to or greater than the working pressure.

6.5. WORKING PRESSURES

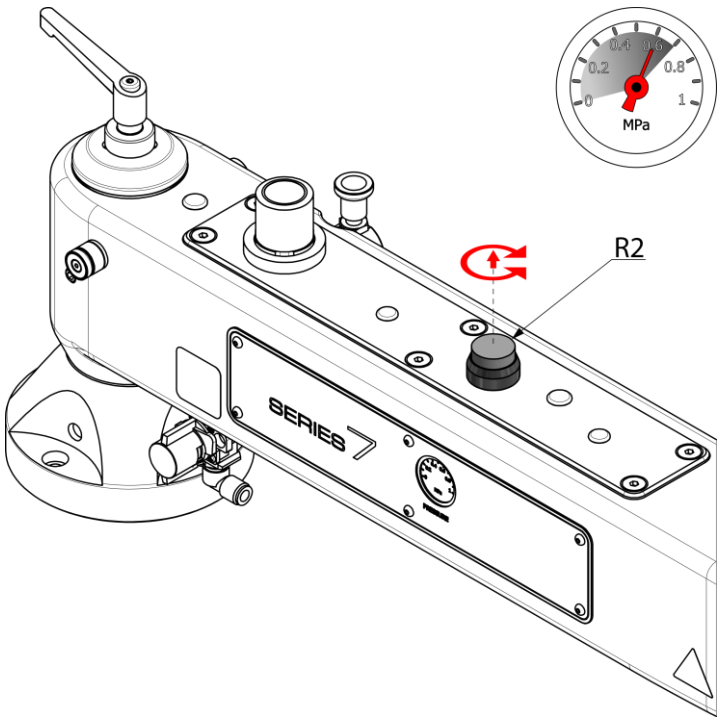
Depending on the working conditions and the weight of the load with which you wish to work, you must adjust the supply and/or feed pressure according to the following table.

WORKING PRESSURES		
Pressure (bar)	Pressure (MPa)	Maximum net load (kg)
6	0,6	50 (110 lb)
5	0,5	41.6 (92 lb)
4	0,4	33.3 (73 lb)
3	0,3	25 (55 lb)
2	0,2	16.6 (37 lb)
1	0,1	8.3 (18 lb)
0	0	0 (0 lb)

6.6. REGULATION OF WORKING PRESSURE

The objective of this regulation is to keep the tilting arm balanced and therefore achieve the weightlessness of the system adapted to the load and working conditions. To do this, operate the **R2 regulator**.

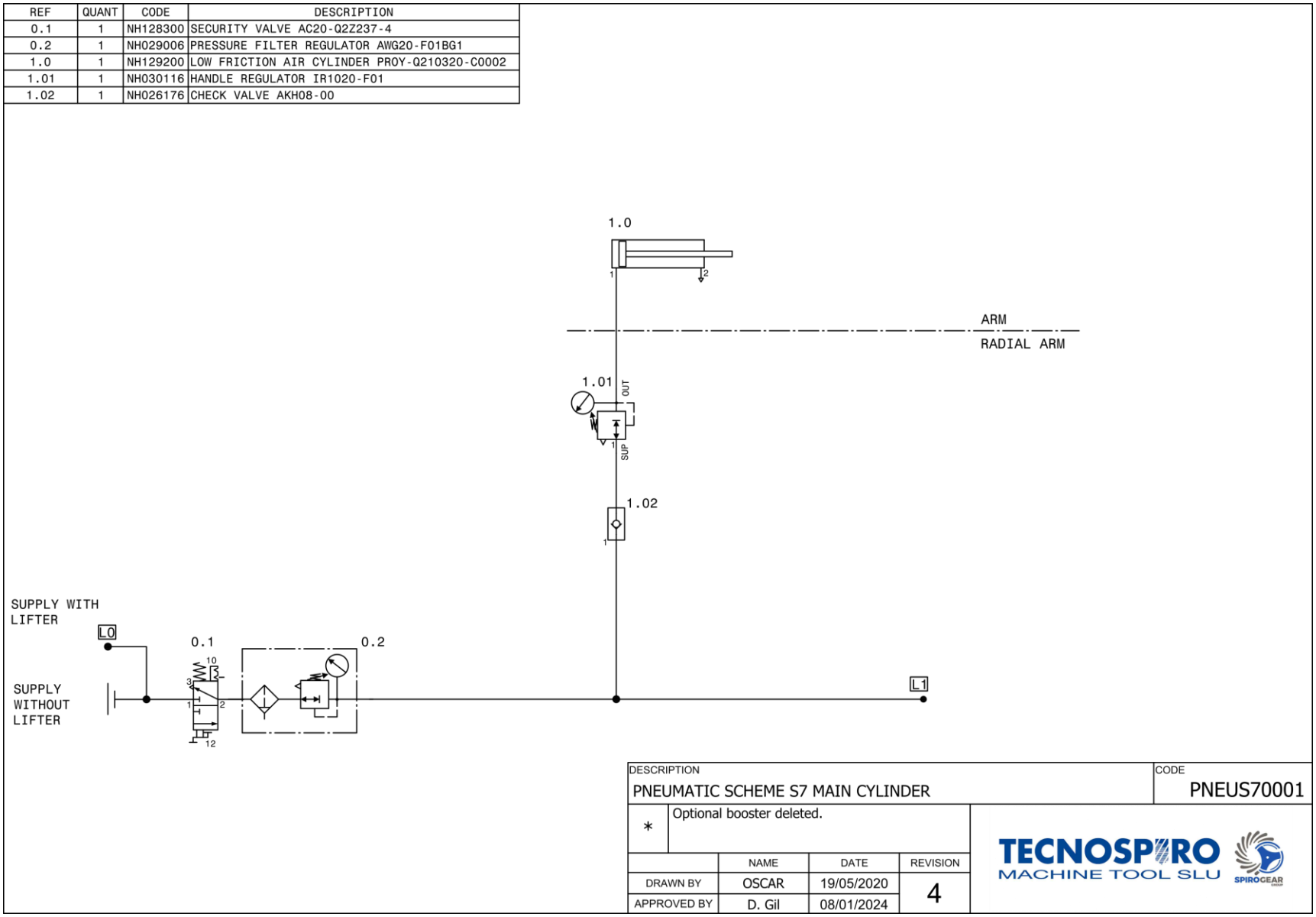
1. Turn the knob (R2) to the left or right to adjust the pressure, taking as reference [See WORKING PRESSURES page 22].



For optimum performance it is recommended that the regulator **R1** always be between 0.5 and 1 bar higher than **R2**.

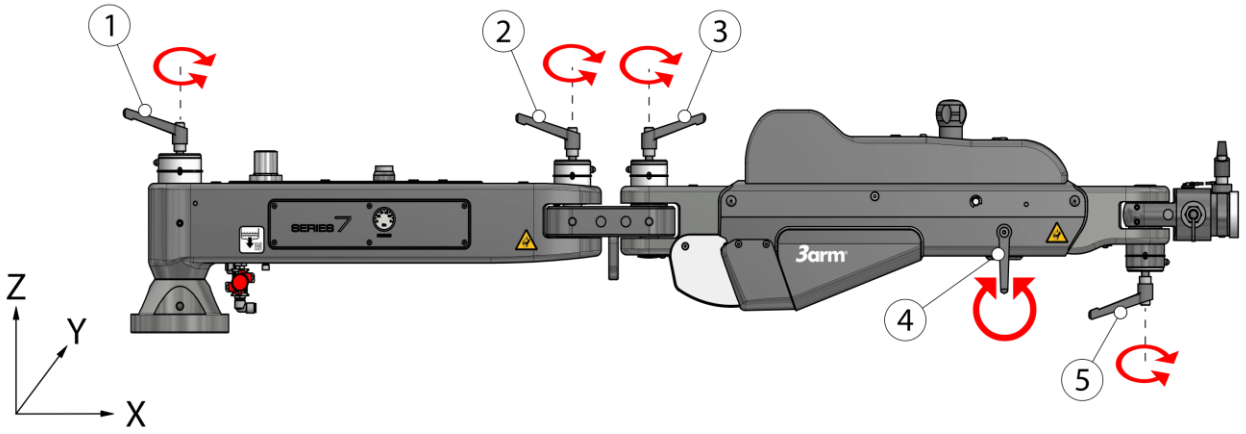
6.6.1. PNEUMATIC DIAGRAM

REF	QUANT	CODE	DESCRIPTION
0.1	1	NH128300	SECURITY VALVE AC20-Q2Z237-4
0.2	1	NH029006	PRESSURE FILTER REGULATOR AWG20-F01BG1
1.0	1	NH129200	LOW FRICTION AIR CYLINDER PROY-Q210320-C0002
1.01	1	NH030116	HANDLE REGULATOR IR1020-F01
1.02	1	NH026176	CHECK VALVE AKH08-00



6.7. MANUAL LOCK L11

The L11 configuration allows manual locking of different arm movements by means of adjustable handles.



1- Base radial lock
2- Joint radial lock
3- Arm radial lock
4- Arm tilting lock
5- Head lock[5]

To lock the movement, turn the handle (1, 2, 3, 4 or 5) clockwise.

To unlock the movement, turn the handle (1, 2, 3, 4 or 5) anticlockwise.

Handles	Control movement
1, 2, 3, 5	**Radial movement (X-Y plane)**
4	**Tilting movement (ZX plane)**

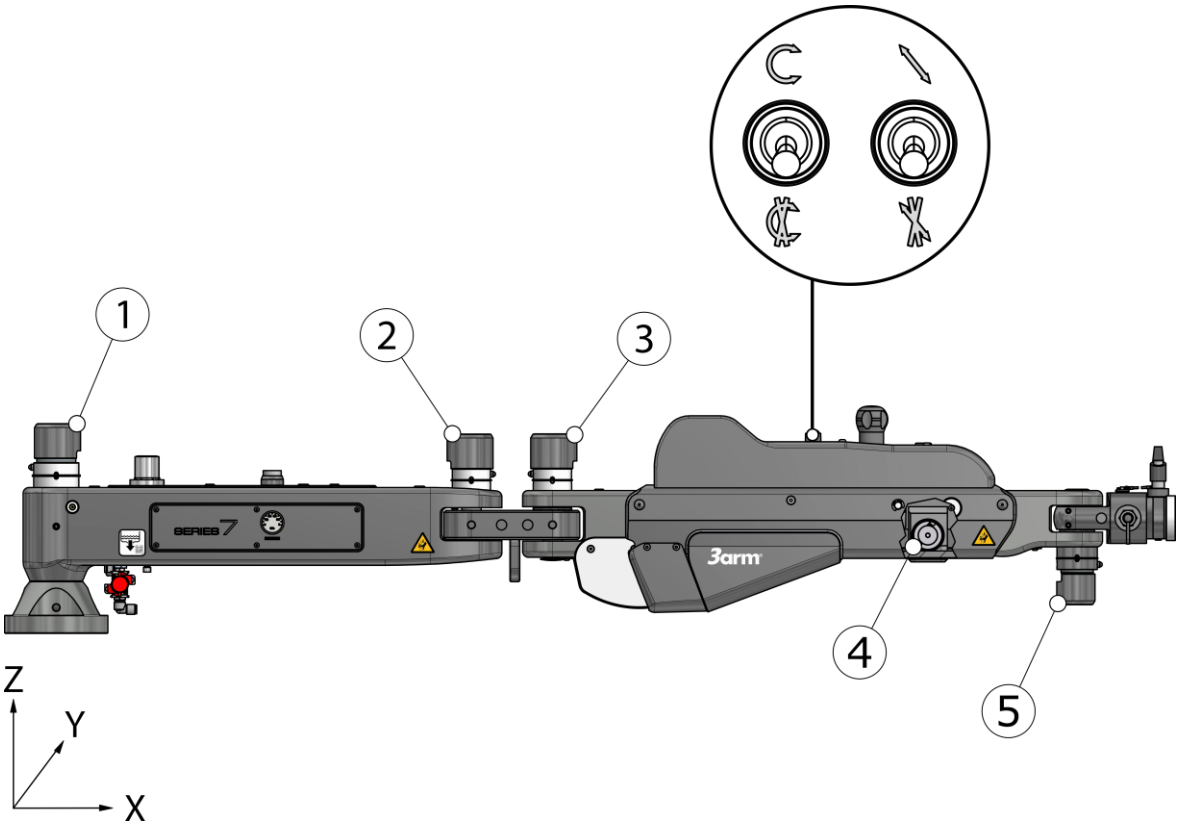
CAUTION

If the locking handles are not tightened firmly, they will not lock the equipment properly, acting as a friction brake and causing premature wear of the pads.

[5] Optional, depending on the head. See ***Appendix of S7 heads***

6.8. PNEUMATIC LOCK L22

The L22 configuration allows you to pneumatically lock different arm movements using switches.



1- Base radial lock
2- Joint radial lock
3- Arm radial lock
4- Arm tilting lock
5- Head lock[6]

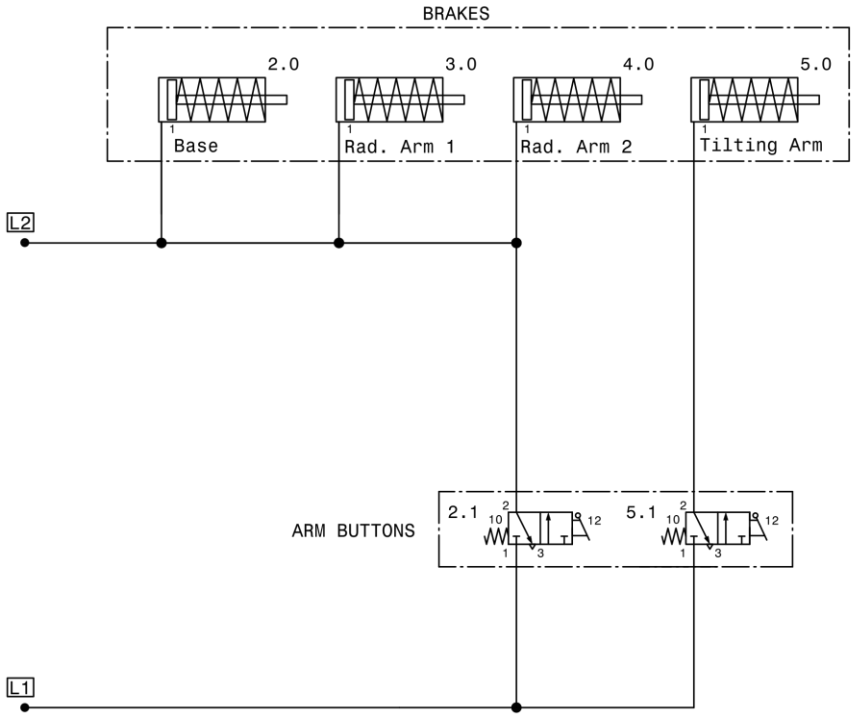
Position of the switches to obtain one lock or another.

Movements	Selectors	Cylinder control
Radial movement (X-Y plane)		1, 2, 3, 5
Tilting movement (ZX plane)		4

[6] Optional, depending on the head. See ***Appendix of S7 heads***

6.8.1. PNEUMATIC DIAGRAM L22

REF	QUANT	CODE	DESCRIPTION
2.0	1	W5178900	50 CYLINDER ARM BRAKE
2.1-5.1	2	NH121136	MICRO VALVE VM1000-4NU-08
3.0-4.0	2	W5179000	48 CYLINDER ARM BRAKE
5.0	1	W5179400	TILT LOCK CYLINDER



DESCRIPTION	CODE
PNEUMATIC SCHEME BRAKES S7	PNEUS70002

*	Optional headmember brake replaced by L2.

	NAME	DATE	REVISION
DRAWN BY	OSCAR	19/05/2020	6
APPROVED BY	D. Gil	08/01/2024	

TECNOSPIRO MACHINE TOOL SLU SPIROGEAR

6.9. L92 PNEUMATIC LOCK

L92 PNEUMATIC LOCK

Failing to use telescopic compensators could cause malfunction or premature wear of the pneumatic locking system.

- For the L92 configuration, the use of telescopic compensators is recommended [See L92 PNEUMATIC LOCK: USE WITH COMPENSATORS page 28].

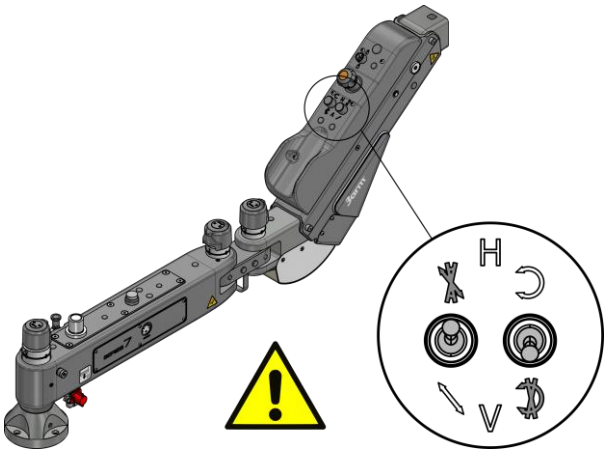
- If you decide to work without compensators, carefully read the following chapter about their operation [See L92 PNEUMATIC LOCK: USE WITHOUT COMPENSATORS page 29].

6.9.1. L92 PNEUMATIC LOCK: USE WITH COMPENSATORS

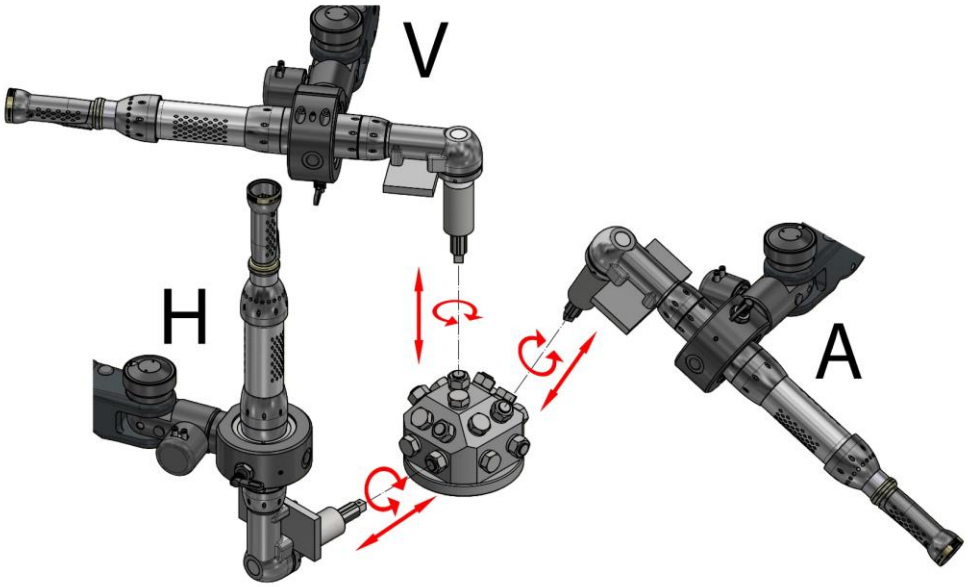
The use of telescopic compensators allows screw-mounting or tightening in any position (V-Vertical, H-Horizontal, A-Angle) with the arm completely blocked.

For the use of compensators in your 3arm arm, follow these instructions.

1. Remove the guards and verify that the switches are in the locked position. Put them back immediately.

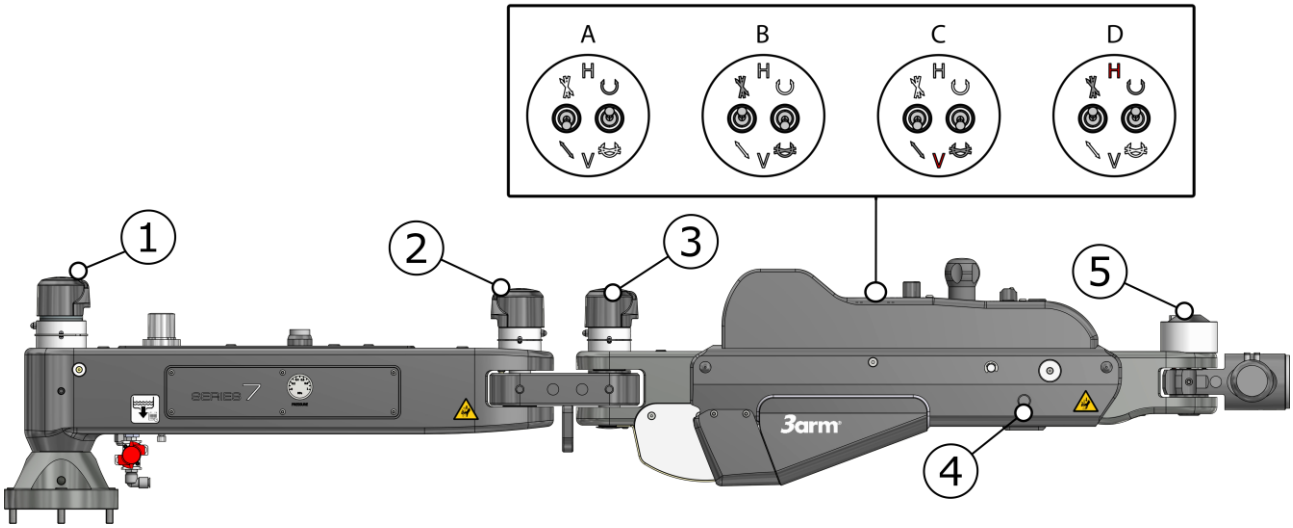


2. Install the compensator that you have acquired with the tool according to the needs of torque and size of the panel (Consult your distributor regarding the characteristics of the compensators).
3. Connect the tool along with your control device following the manufacturer's recommendations [See ELECTRO-PNEUMATIC SYSTEM page 33].
4. Compress the regulator into its position (V-Vertical, H-Horizontal or A- Angle) as necessary and actuate the tool.



6.9.2. L92 PNEUMATIC LOCK: USE WITHOUT COMPENSATORS

The configuration L92 allows different arm movements to be locked **through the activation of the tool or, failing that, the electrovalve.**



1- Base radial lock
2- Joint radial lock
3- Arm radial lock
4- Arm tilting lock
5- Head lock[7]

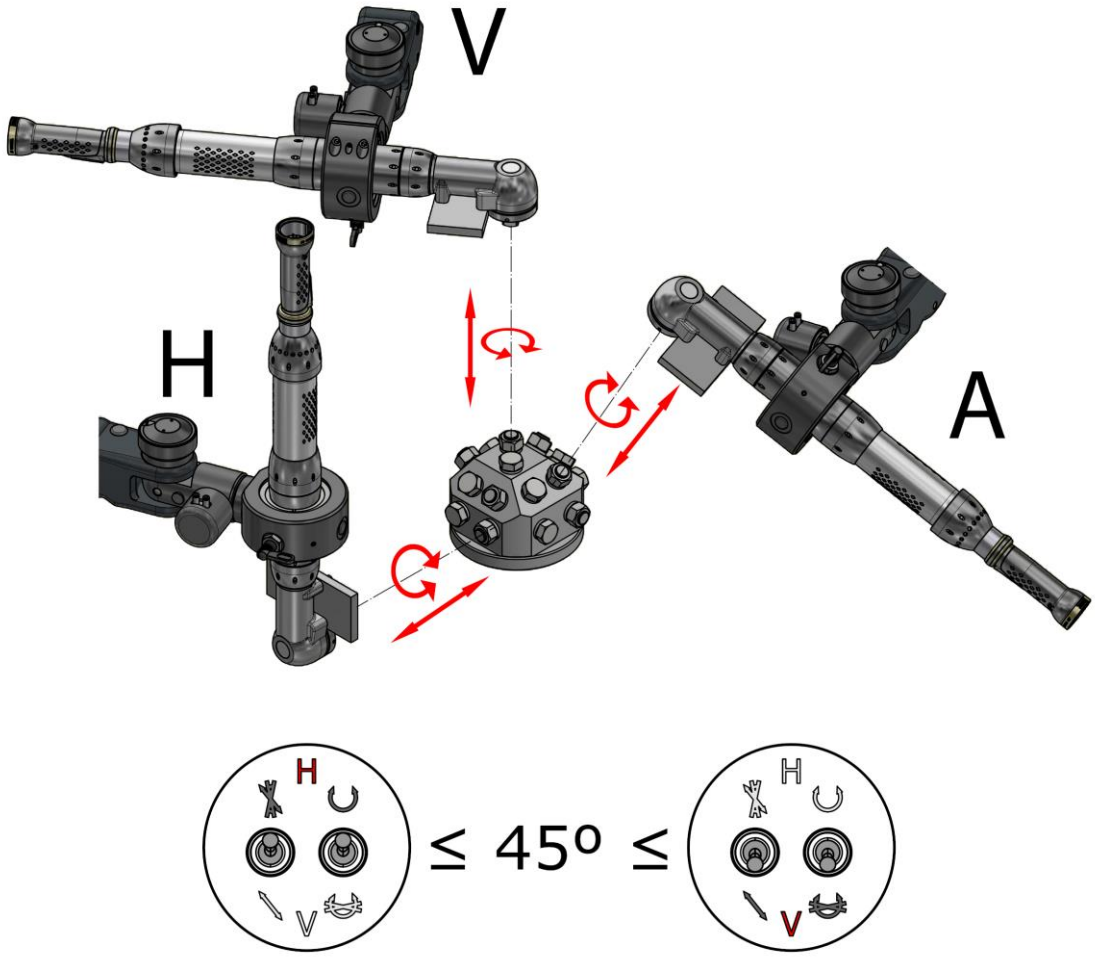
Below, the movements that are locked and unlocked depending on the **position of the switch when the tool is operated**. (The switches are on the cover of the arm).

Movements	Position of selectors	Cylinders blocked
All the movements are free (except cross radial)	A	2, 3, 5
All the movements are locked	B	1, 2, 3, 4, 5
Vertical work. V The movements are locked, except tilting.	C	1, 2, 3, 5
Horizontal work. H The movements are locked, except the radial of the base.	D	2, 3, 4, 5

If you decide to work with compensators, you should position the selectors of the cover in the blocking position ***(B)***. Place the ***MV432405*** protectors at the base of each selector, after removing the existing covers. [See L92 PNEUMATIC LOCK: USE WITH COMPENSATORS page28]

[7] Optional, depending on the head. See ***Appendix of S7 heads***

Depending on the Vertical (V) or Horizontal (H) work that is going to be carried out, you must position the switch as shown in the image.



If working in A (angle), the switches must be positioned at V (vertical) if a more vertical than horizontal position prevails, or otherwise H (horizontal).

In other words, taking 0º as a reference, the surface where the base of arm has been installed:

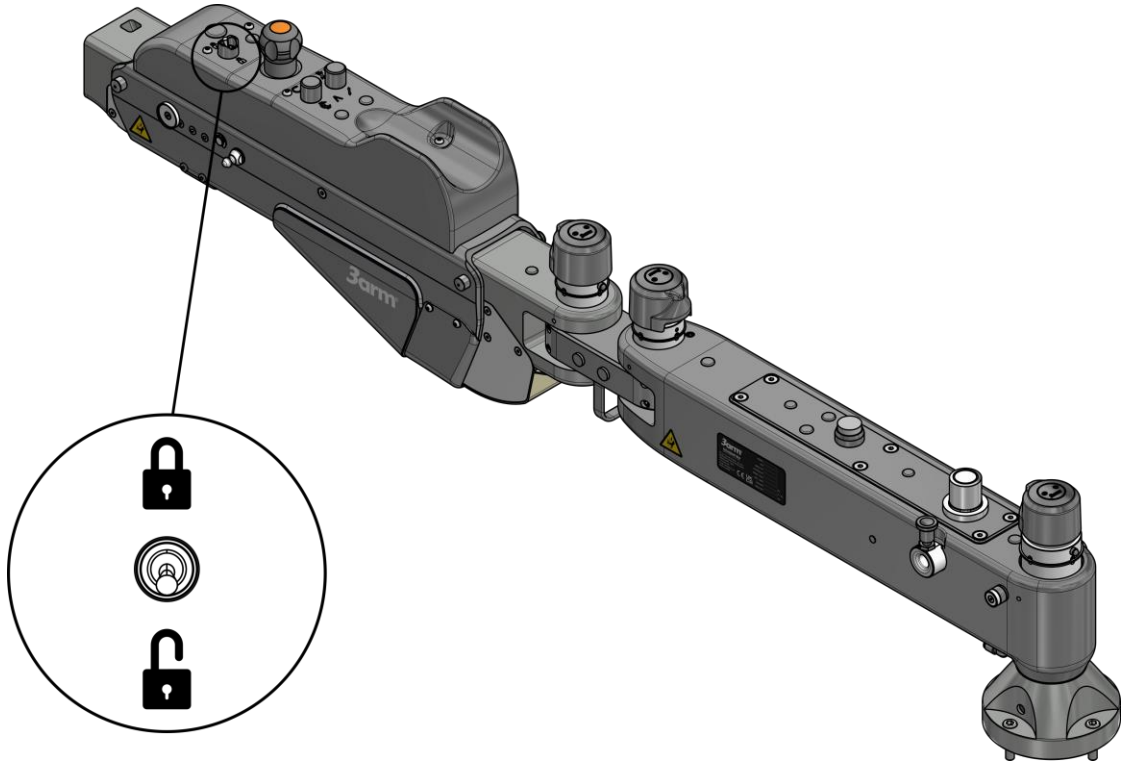
- ≤ 45º → H
- ≥ 45º → V

6.9.3. L92 PNEUMATIC LOCK: MANUAL ACTIVATION

In addition, the L92 pneumatic lock has a switch to activate all the arm pneumatic locks.

-> Normal operation through the tool.

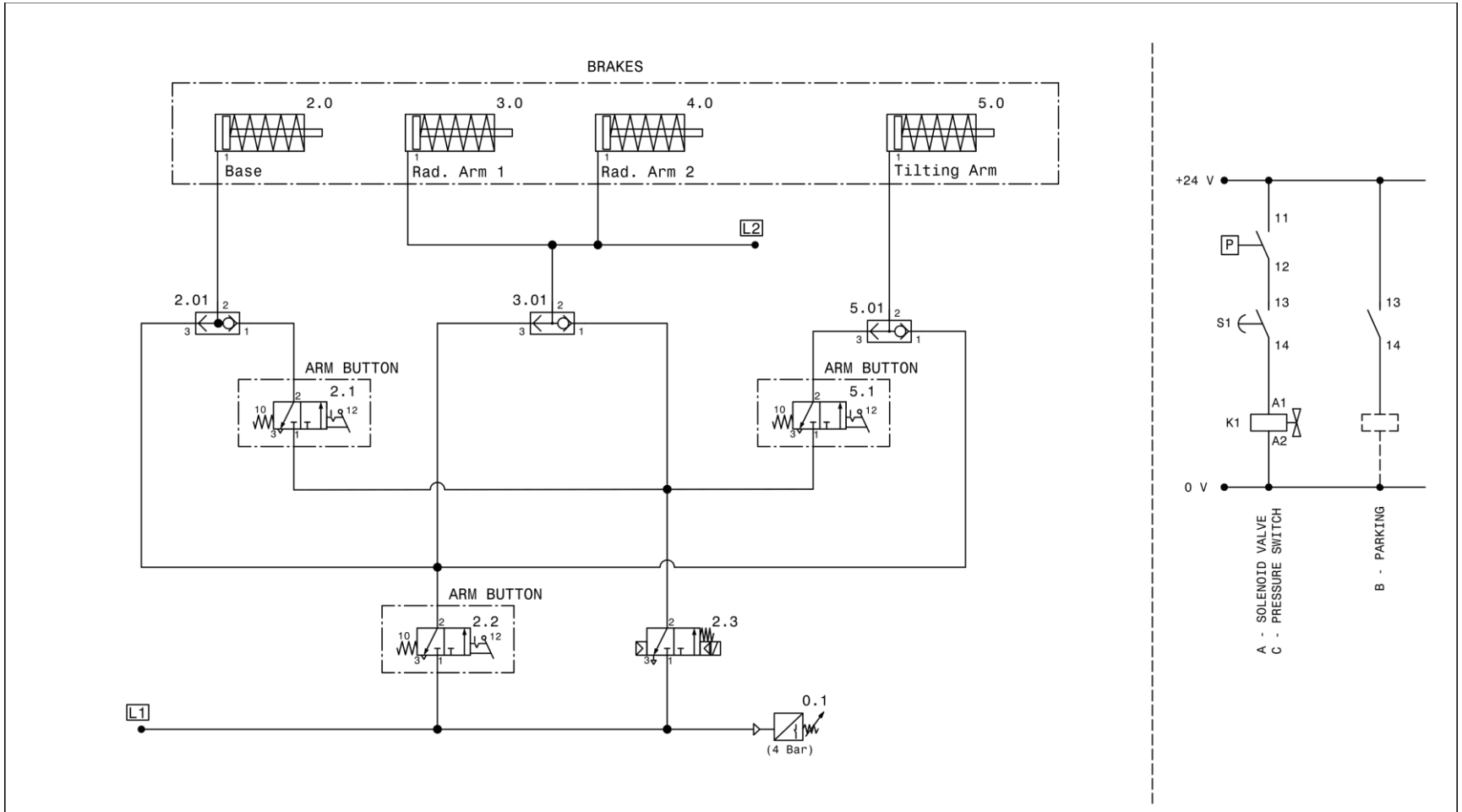
-> Arm totally locked.



- Keep it locked during maintenance tasks, periods when not in use, and when changing the tool and/or head.

-Manual actuation, together with the switches, enables you to lock the arm without the tool connected.

6.9.4. L92 pneumatic diagram



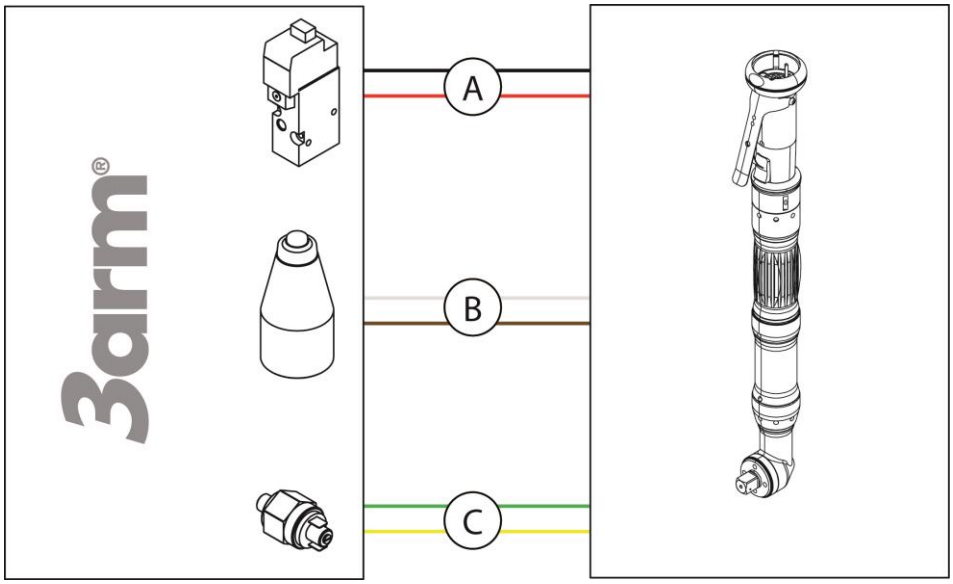
REF	QUANT	CODE	DESCRIPTION
0.1	1	EL101500	PRESSURE SWITCH 1/8" NO 6B P311802
2.01-3.01 -5.01	3	NH026196	FUNCTION "O" VALVE VR1210F-04
2.0	1	W5178900	50 CYLINDER ARM BRAKE
2.1-2.2 -5.1	3	NH121136	MICRO VALVE VM1000-4NU-08
2.3	1	NH026026	ELECTROVALVE 3 PORTS SYJ512-5L0U-M5-Q
3.0-4.0	2	W5179000	48 CYLINDER ARM BRAKE
5.0	1	W5179400	TILT LOCK CYLINDER

DESCRIPTION				CODE
PNEUMATIC SCHEME S7 - L92				PNEUS70005
*	Valve 2.2 has control over all brakes.			
	NAME	DATE	REVISION	
DRAWN BY	XAVIER	09/11/2023	1	
APPROVED BY	D. Gil	10/01/2024		

TECNOSPIRO MACHINE TOOL SLU

6.9.5. ELECTRO-PNEUMATIC SYSTEM

This system links the 3arm® L92 arm with the tool using a suitable controller or control device (DC) following the diagram below.



The left of the diagram represents the 3arm® arm while the right shows the tool that will be used, controlled by the control device (DC).

The connecting cables that you will find with the 3arm® arm are identified with the following correlation.

a) ***<u>Electrovalve. Cables labelled A (red and black cables).</u>***
The electrovalve is responsible for operating the arm locks when the tool is functioning.

b) ***<u>Parking. Cables labelled B (white and brown cables)</u>***
Provides a potential free signal when the arm is retracted. This signal can be used to enable other components such as a light, activate other processes, etc.

c) ***<u>Pressure switch Cables labelled C (green and yellow cables)</u>***
This component disables the tool when there is insufficient supply pressure (below 4.5 bar).

See further details on the connections between the control device (DC) and the distributor of the tool.

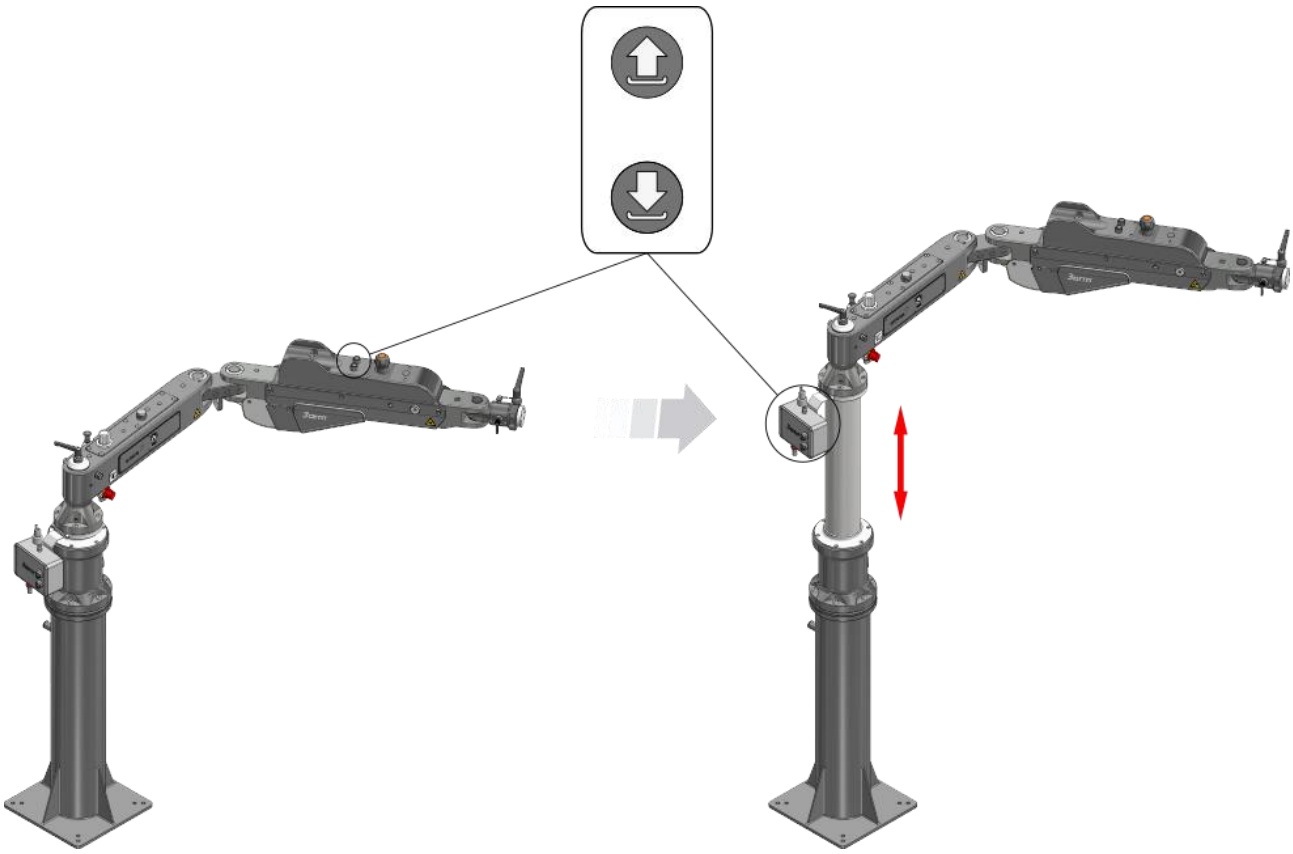
6.10. LIFTER / PNEUMATIC COLUMN

If you complement your 3Arm® equipment with a pneumatic lift or a lifting column, you can control the up and down movement from the control panel of your 3Arm® equipment and/or the control panel of the lift.

Press and hold the button until the appropriate position is reached:

-> Upward movement.

-> Downward movement.

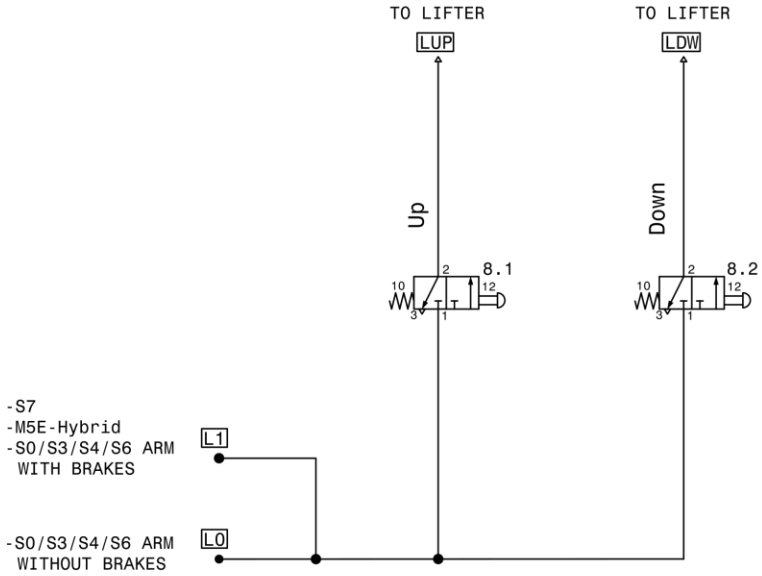


CAUTION

- ✓ The pneumatic lifter should only be operated when the tool supported by the 3arm® equipment is not in use. (they cannot be used at the same time)
- ✓ During periods of inactivity the pneumatic lift should be positioned in its lowest possible position.

6.10.1. Lifter pneumatic diagram

REF	QUANT	CODE	DESCRIPTION
8.1	1	M3153100	BUTTON VALVE VM1000-4NU-32B UP
8.2	1	M3171800	BUTTON VALVE VM1000-4NU-32B DOWN



DESCRIPTION	CODE
PNEUMATIC SCHEME - ELEVATOR CONTROL	PNEUS30006

		NAME	DATE	REVISION
*	Standardization of the scheme			
	DRAWN BY	D. Gil	18/05/2022	2
	APPROVED BY	D. Gil	08/01/2024	

TECNOSPIRO MACHINE TOOL SLU

7. MAINTENANCE

The arm does not require maintenance and, when used properly, anomalies are unlikely to occur. Even so, the main, simple repairs that you can do are set out.

7.1. MAINTENANCE PROGRAMME

DESCRIPTION ELEMENT	ACTION / PERIOD	PERIOD
Filter regulator (Air unit)	Look for breaks, scratches or any deterioration of the transparent resin vessel on the air filter, regulator.	Periodically
	Replace the filter cartridge.	Every two years or when the pressure drop is 0.1 MPa, whichever comes first.
	Purge the air filter belonging to the filter regulator assembly.	Periodically
Pneumatic circuit	Check that it is working correctly, especially the safety systems according to [See PNEUMATIC DIAGRAM page 23].	Prior to every use
Screws and fasteners	Check tightening and functionality of the securing elements.	Periodically
General cleaning	When dirty, clean with a mild household product. Do not use other cleaning agents, as they may cause damage.	Periodically
General check of the pneumatic connections	Perform a general check of the pneumatic connections [See PNEUMATIC DIAGRAM page 23].	Periodically
Gas spring	Checking its correct operation and, if necessary, replacing it [See REPLACING THE CYLINDER AND THE GAS SPRING page 38].	Prior to every use

7.2. COMPRESSED AIR MAINTENANCE UNIT

For good functioning of the compressed air unit, an air quality level of class 1.4.1 is recommended, according to the table attached. ISO 8573-1 2010.

ISO8573-1:2010 CLASE	Partículas sólidas				Agua		Aceite
	Número máximo de partículas por m^3			Concentración másica mg/m^3	Punto de rocío a presión de vapor	Líquida g/m^3	Concentración total de aceite (líquido, aerosol y vapor) mg/m^3
	0,1 - 0,5 micras	0,5 - 1 micras	1 - 5 micras				
0	Tal como especifique el usuario o el proveedor del equipo y más estrictos que los de la Clase 1.						
1	≤ 20 000	≤ 400	≤ 10	-	≤ -70 °C	-	0,01
2	≤ 400 000	≤ 6000	≤ 100	-	≤ -40 °C	-	0,1
3	-	≤ 90 000	≤ 1000	-	≤ -20 °C	-	1
4	-	-	≤ 10 000	-	≤ +3 °C	-	5
5	-	-	≤ 100 000	-	≤ +7 °C	-	-
6	-	-	-	≤ 5	≤ +10 °C	-	-
7	-	-	-	5 - 10	-	≤ 0,5	-
8	-	-	-	-	-	0,5 - 5	-
9	-	-	-	-	-	5 - 10	-
X	-	-	-	> 10	-	> 10	> 10

Periodically check the water level accumulated in the reservoir, and bleed if it has reached the limit.

7.3. PNEUMATIC LOCKING BRAKES

It is advisable to revise the functioning of the locking brakes periodically.
The frequency of this revision will, in each case, depend on the number of cycles carried out with them. It is recommended that correct operation is checked every 6 months. To check, adjust or replace them [See PNEUMATIC LOCKS page 40].
The stroke of the locking brake actuators is 1.2 mm.

CAUTION

Do not operate the oleo-pneumatic brakes at no load (with the sub-assemblies removed), as this would damage the mechanism.

7.4. TIGHTENING THE SCREWS

To ensure the equipment functions correctly, it is advisable to check the tightness of all the screws periodically. The recommended period is every 6 months. The recommended torque for the 4 screws of the arm is 60 Nm.

7.5. GENERAL CLEANING

It is advisable to carry out a general clean of the arm and accessories every week to keep the whole unit in good condition and prolong its useful life.

7.6. REPLACING THE CYLINDER AND THE GAS SPRING

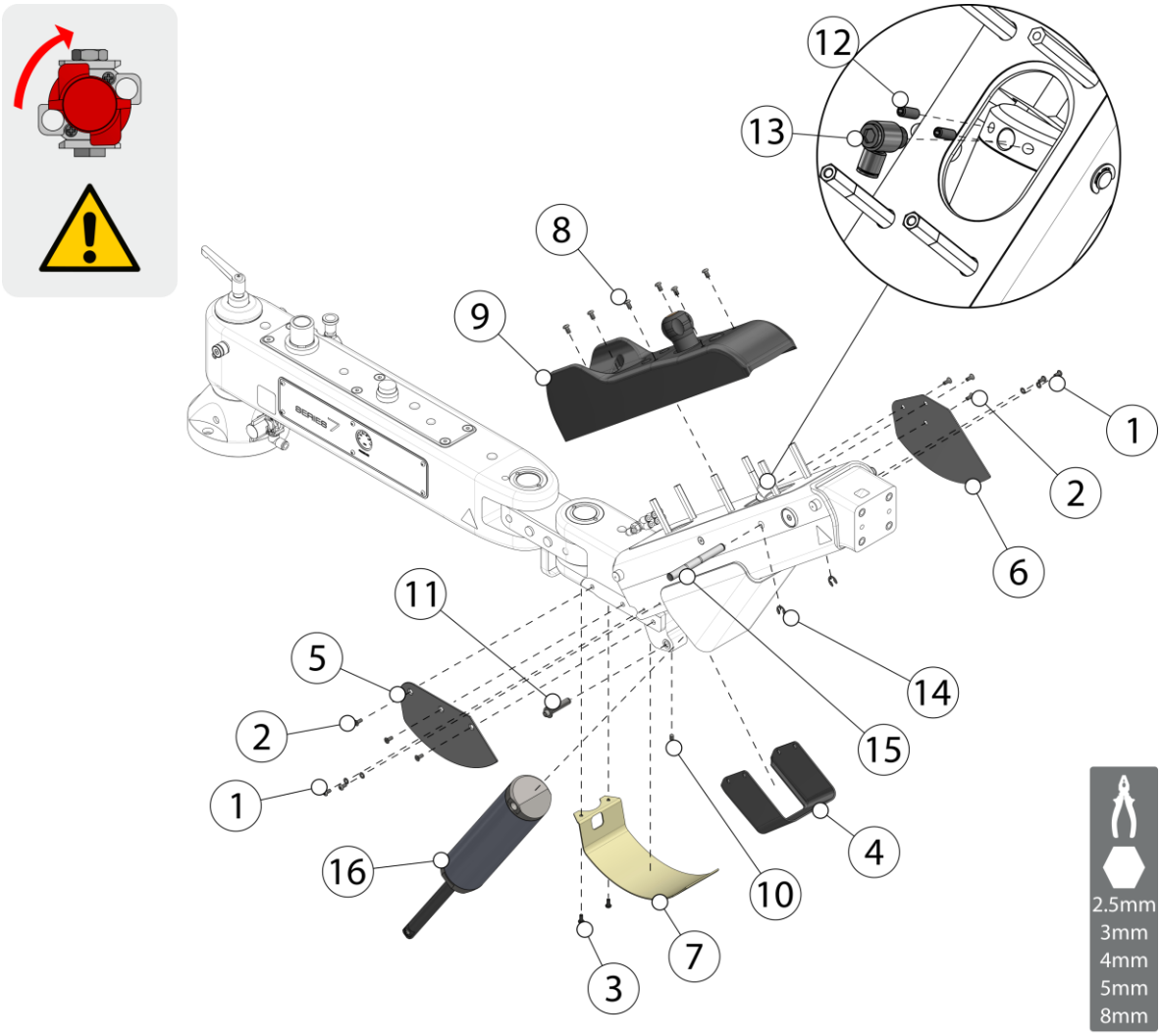
BEFORE REPLACING THE GAS SPRING

- ✓ The equipment must be duly installed and integrated.
- ✓ Disconnect the pneumatic supply from the equipment [See OPENING AND CLOSING THE MAIN VALVE page 18].
- ✓ It is advisable to dedicate two operators to this task.

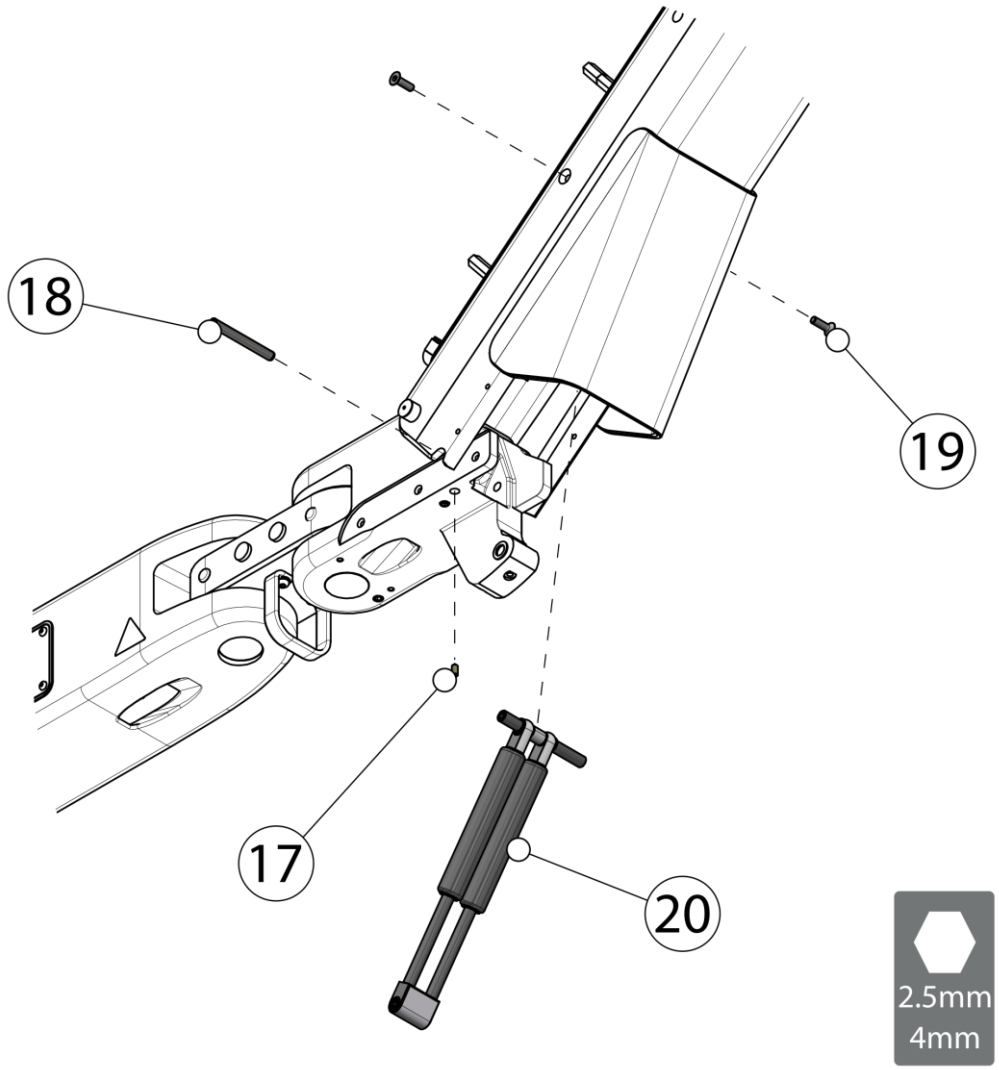
1. Swivel the arm to its highest position.

KEEP THE ARM IN THAT POSITION

2. Remove the screws (1, 2, 3) (3mm Allen key) and remove the covers (4, 5, 6, 7).
3. Remove the screws (8) (4mm Allen key) and remove the control cover (9).
4. Loosen the stud (10) (4mm Allen key) and remove the shaft from the tie (11).
5. Remove the studs (12) (3mm Allen key) and the coupling (13) (8mm Allen key).
6. Remove the circlips (14) and extract the shaft from the cylinder (15).
7. The cylinder (15) will be free, you can remove and replace it with the new one.



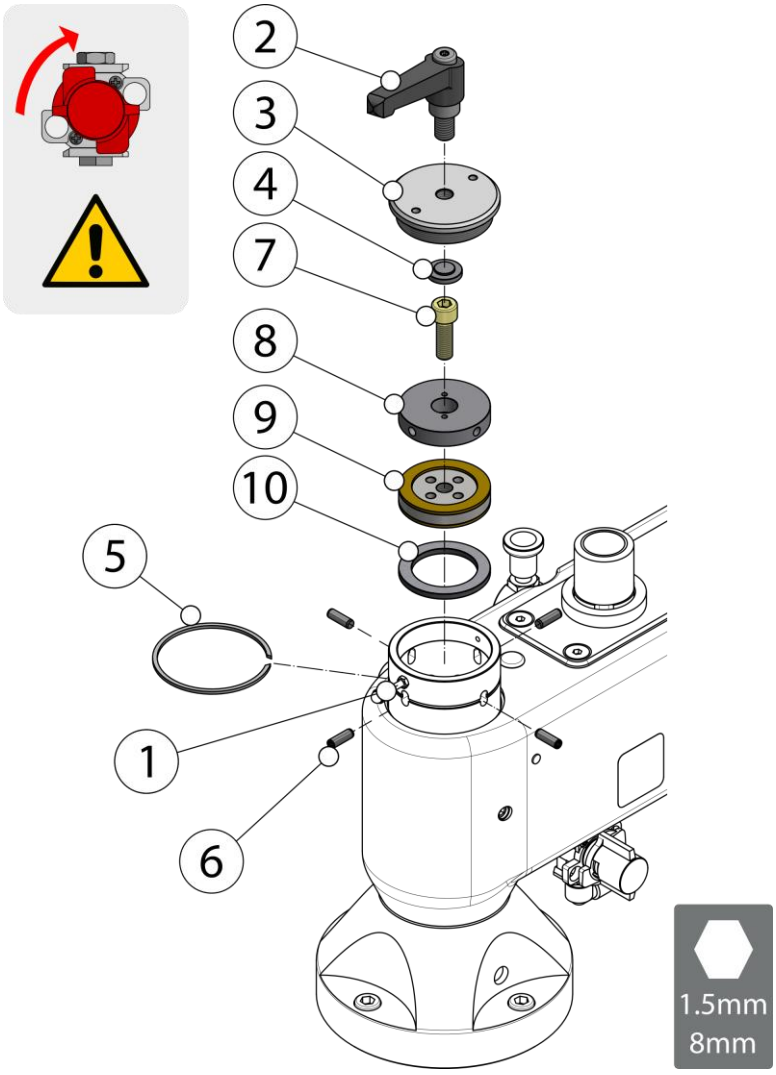
8. Loosen the stud (17) (2.5mm Allen key) and remove the shaft (18) (M5 extractor).
9. Remove the screws (19) (4 mm Allen key) the damper (20) will be free, you can remove and replace it with the new one.
10. Proceed in reverse for assembly.



7.7. REPLACING RADIAL PADS L11

Operation valid for any manual locking (except tilting).

1- Release the air pressure of the arm.
2- Loosen the stud (1) (1.5mm Allen key).
3- Remove the handle (2), the cover (3) and the pusher (4).
4- Remove the safety ring (5) and use an M4 extractor to remove the pins (6).
5- Remove the screw (7)[8] (8 mm Allen key) remove the cylindrical pusher (8) and use an M12[9] extractor to take out the brake assembly with the pads (9) and remove the brake disc (10).
6- Replace pieces (8) (9) and (10).
7- Proceed in reverse order for assembly and verify the functioning of the lock again.



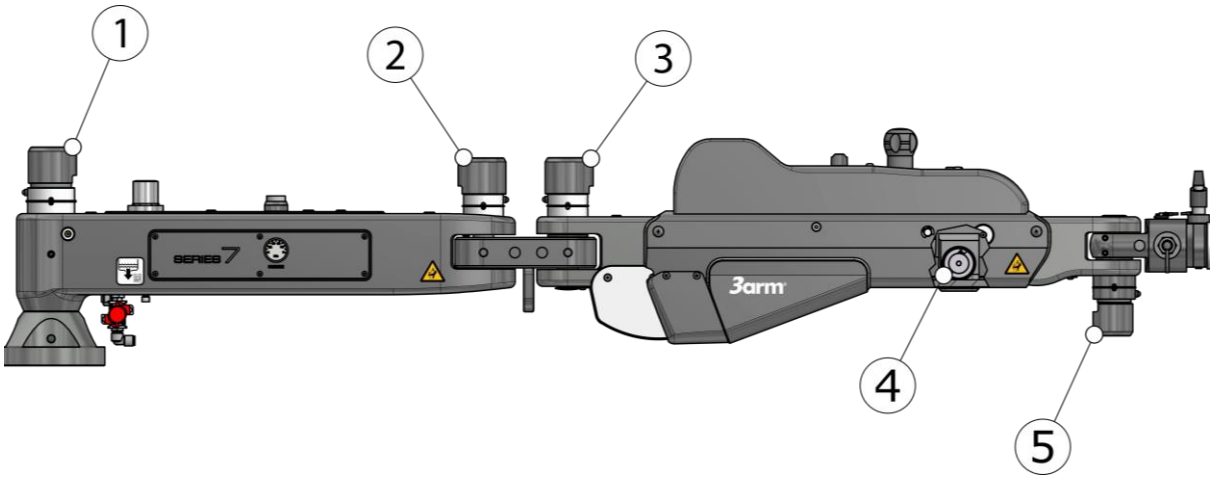
[8] For the joint locks will need a 7mm Allen Key and for the headmember a 6mm
[9] For the joint locks will need an M10 extractor and for the headmember a M8.

8. PNEUMATIC LOCKS

In case of malfunction of the pneumatic locks of your 3arm® arm

Supplement this information with that shown in section [See PNEUMATIC LOCK L22 page 24].

8.1. IDENTIFYING PNEUMATIC LOCKS



1- Base radial lock
2- Joint radial lock
3- Arm radial lock
4- Arm tilting lock
5- Head lock[10]

[10] Optional, depending on the head. See ***Appendix of S7 heads***

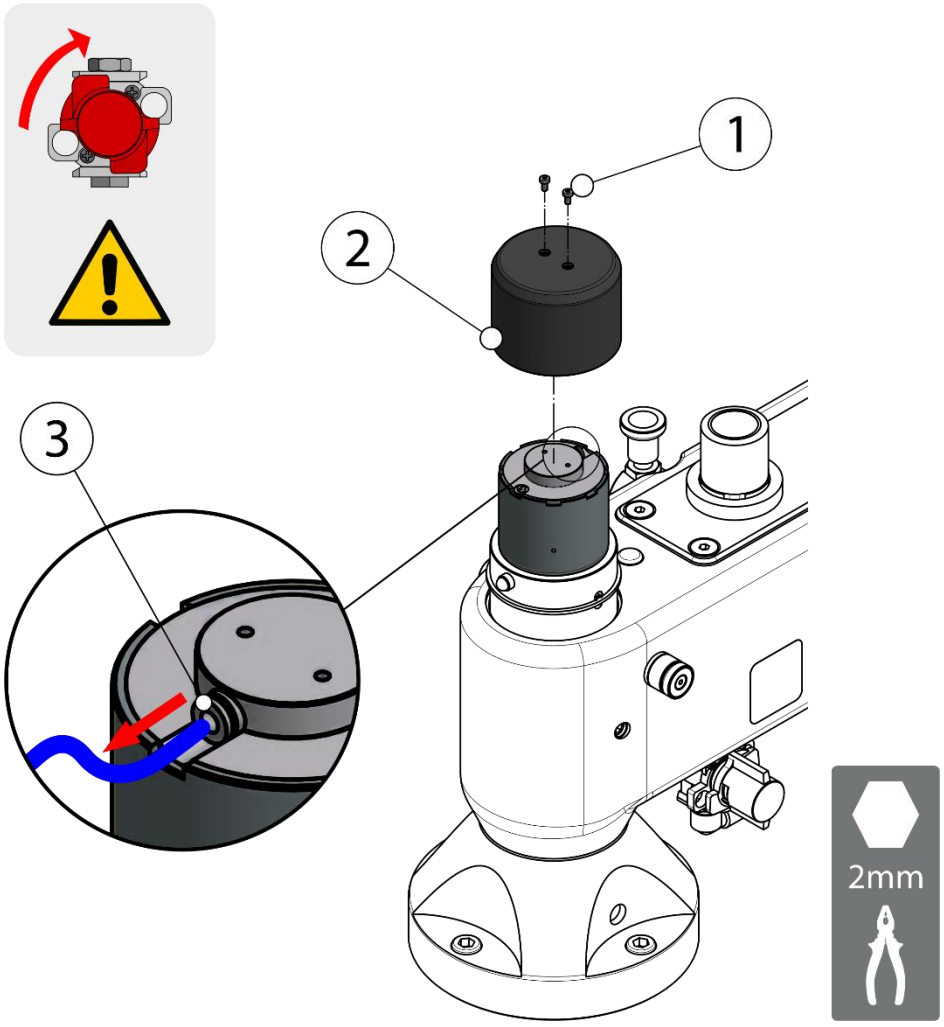
8.2. CHECKING THE AIR SUPPLY

Operation valid for any locking cylinder (except tilting).

To perform this check:

1. Release the air pressure of the arm.
2. Remove the screws (1) (2mm Allen key) and remove the cap (2).
3. Disconnect the air supply tube from the coupling (3) that supplies the cylinder.
4. Allow the air to pass and activate the lock in question, checking that air flows through the tube.
5. Proceed in reverse order for assembly and verify the functioning of the lock again.

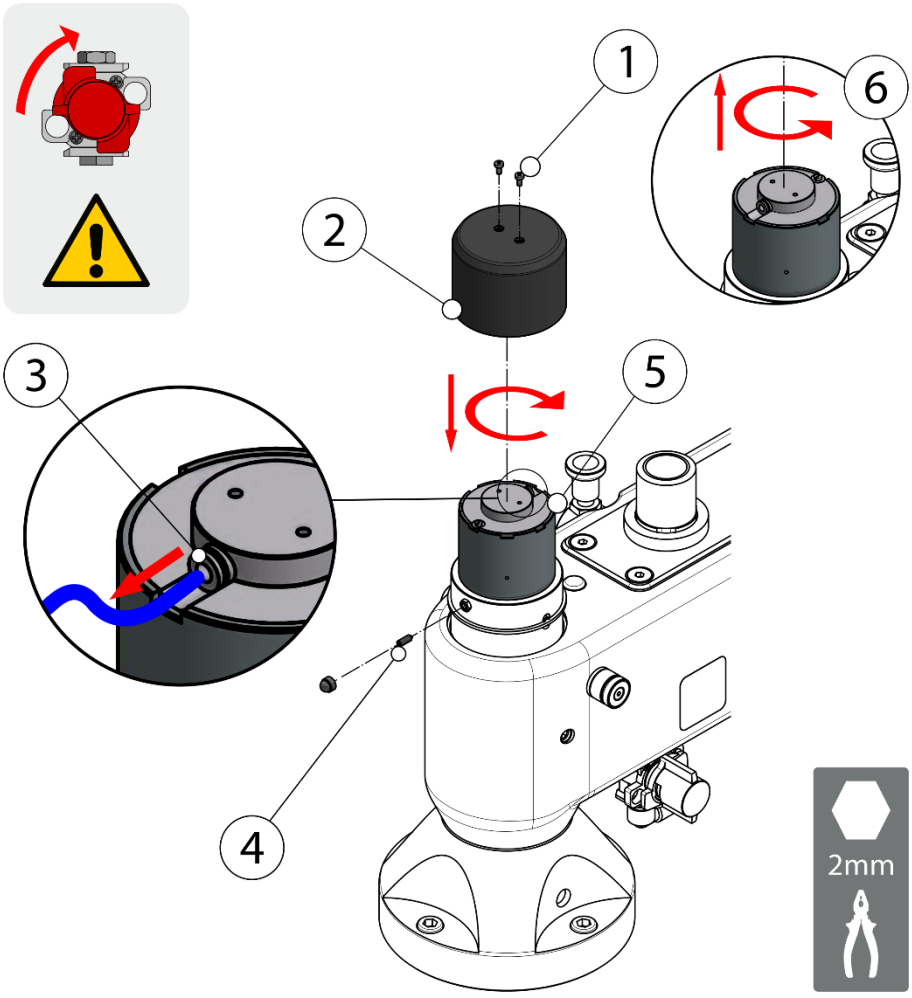
If the check is not satisfactory, the pneumatic diagram must be checked paying special attention to clamps and the connection between tubes and taps. [See PNEUMATIC DIAGRAM L22 p. 26].



8.3. CHECKING THE ADJUSTMENT OF THE RADIAL CYLINDERS

Operation valid for any radial locking cylinder.

1. Release the air pressure of the arm.
2. Remove the screws (1) (2mm Allen key) and remove the cap (2).
3. Disconnect the air supply tube from the coupling (3) that supplies the cylinder.
4. Loosen the studs (4) (2 mm Allen key).
5. Screw the cylinder (5) clockwise until it stops.
6. Slightly unscrew the cylinder (5) anticlockwise (6) (approx. 1/12 turn).
7. Proceed in reverse order for assembly and verify the functioning of the lock again.



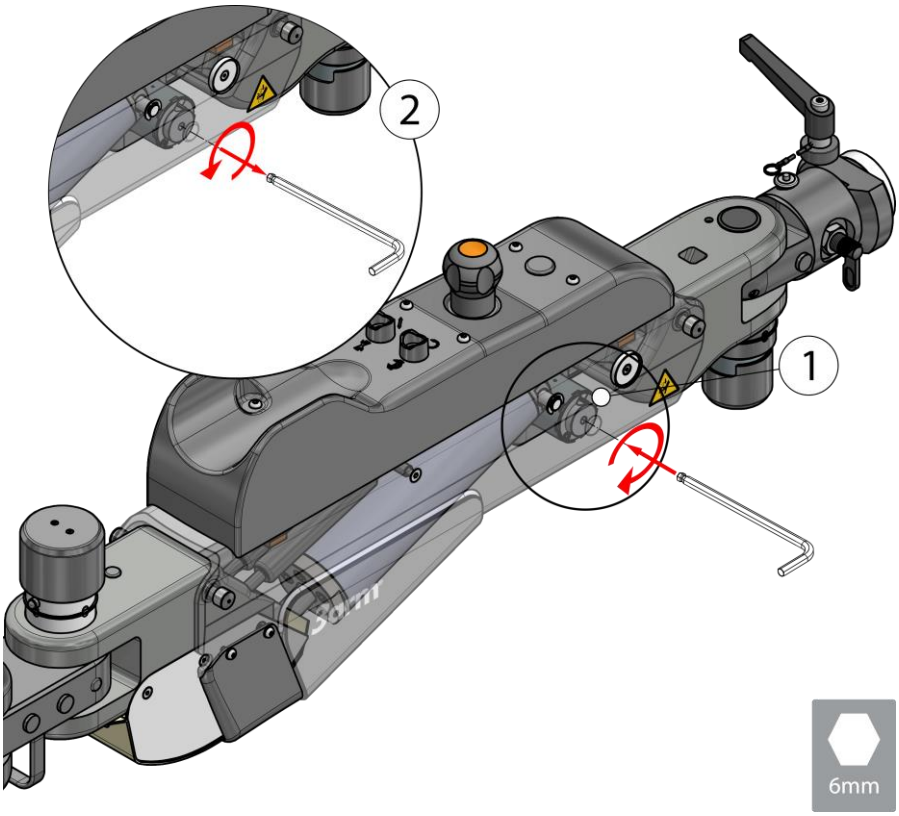
If the problem persists, it is probably due to a fault in the functioning of the cylinder (it must be replaced), or wear of the pads (they must be replaced).

8.4. CHECKING THE ADJUSTMENT OF THE TILTING CYLINDER

GENERAL CONSIDERATIONS ABOUT THE SETTINGS

DO NOT screw or unscrew the cylinder more than ½ turn to avoid pinching the pneumatic tubes.

1. Remove the cap.
2. Screw the cylinder (1) (6mm Allen key) clockwise until tight.
3. Slightly unscrew the cylinder (1) (6mm Allen key) anticlockwise (2) (approx. 1/12 turn).
4. Recheck the operation of the lock and replace the cap.

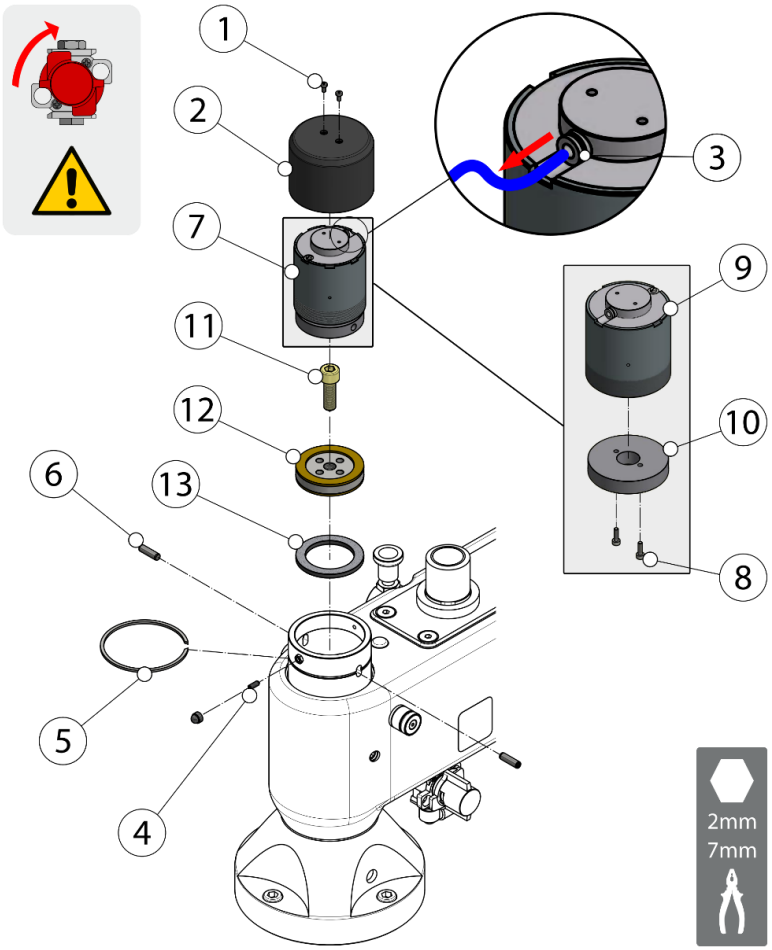


If the problem persists, it is probably due to cylinder malfunction, you should contact your 3arm® dealer for a replacement.

8.5. REPLACING THE CYLINDER AND/OR RADIAL PADS

Operation valid for any locking cylinder (except tilting).
If you wish to replace the locking cylinder (9) carry out steps 1- 6 and 10-16.
If you have the pad replacement kit (parts 10, 12 and 13) carry out the full process.

1. Release the air pressure of the arm.
2. Remove the screws (1) (2mm Allen key) and remove the cap (2).
3. Disconnect the air supply tube from the coupling (3) that supplies the cylinder.
4. Loosen the studs (4) (2 mm Allen key).
5. Remove the safety ring (5) and use an M4 extractor to remove the pins (6).
6. Unscrew the cylinder assembly (7) and remove it.
7. Remove the screws (8)[11] (2 mm Allen key) and separate the cylinder (9) from the pushrod (10).
8. Remove the screw (11)[12] (7 mm Allen key) and use an M10 extractor[13] to take out the brake assembly with the pads (12) and remove the brake disc (13).



[11] A 2.5mm Allen key will be required for the base cylinder.
[12] An 8mm Allen key will be required for the base cylinder and a 6mm for the head cylinder.
[13] An M8 extractor will be required for the head cylinder.

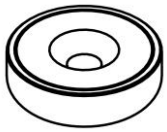
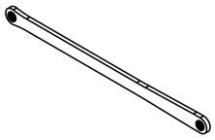
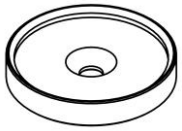
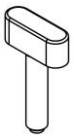
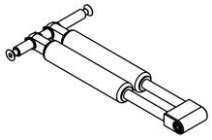
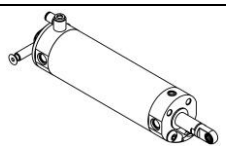
9. Replace the brake assembly (12) and the brake disc (13) and screw them onto the shaft of the base with the screw (11)[14] (7 mm Allen key).
10. Replacing the pushrod (10).
11. Assemble the cylinder (9) and the pushrod (10) with the screws (8)[15] (2 mm Allen key).
12. Position the cylinder assembly (7) and screw it on clockwise until the pushrod holes coincide (10) with the elongated holes of the lug.
13. Fit the pins (6).
14. Screw the cylinder assembly (7) all the way on and unscrew it slightly, anticlockwise (approx. 1/12 turn).
15. Tighten the stud (4), fit the safety ring (5) and connect the supply pipe.
16. Put the cover in place (2) with the screws (1) (2 mm Allen key).
17. Check the lock works correctly.

INFORMATION

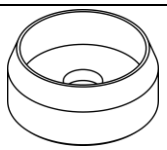
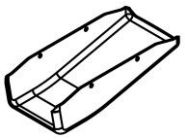
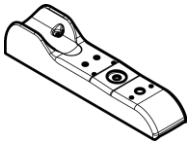
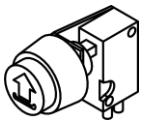
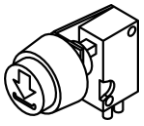
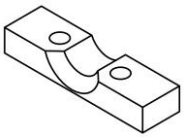
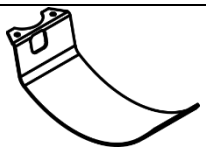
The cylinder replacement kit includes the part (9).
The pad replacement kit includes parts (10), (12) and (13).

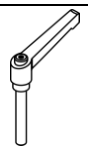
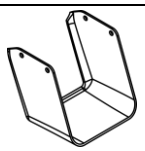
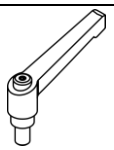
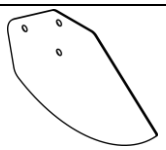
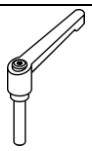
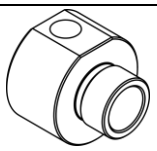
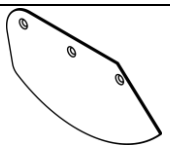
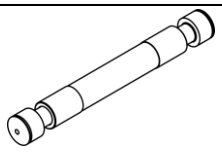
[14] An 8mm Allen key will be required for the base cylinder and a 6mm for the head cylinder.
[15] A 2.5mm Allen key will be required for the base cylinder.

9. SPARE PARTS

CODE	DESCRIPTION	PICTURE
AC004046	POSITIONER	
CL035006	MAGNETIC BASE	
W5160900	NB JOINT CABLE GUIDE	
NH024016	MANOMETER	
NH030116	REGULATOR	
NH128300	SECURITY VALVE ASSY	
W52094A0R	STAY ASSEMBLY	
MV401503	MAGNETIC BASE FIXING	
M7200300R	SECURING HANDLE M10X44	
W5XXXXA4[16]	DAMPING UNIT	
W51596A0R	CYILINDER UNIT	

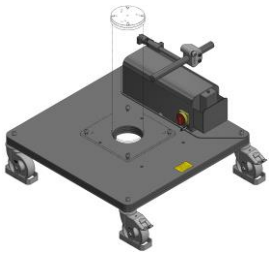
[16] XXXX corresponde a la carga de nitrógeno en Newtons.

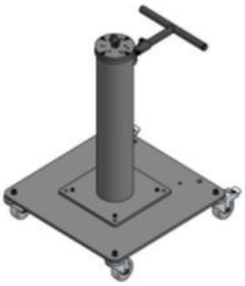
NH029006	FILTER REGULATOR	
W3104100	REGULATING LUG	
W5158200	LOWER COVER	
M72033A0	BUTTON COVER	
W52391A0	HAEAD PROTECTION COVER	
M3153100R	RAISE SWITCH	
M3171800R	LOWER SWITCH	
W5158800	REAR SILICONE BUFFER	
W51584A0	CROSS PROTECTION COVER	
W5178900	BASE CYLINDER	
W5179000	JOINT CYLINDER	
MV405504	HEAD CYLINDER	

W5179400	TILTING ARM CYLINDER	
CM10290C	KNOB	
W5235600R	TILTING LOCK HANDLE - L11	
W51582A0	BOTTOM ARM COVER (FROM S/N: 001-028)	
CM165400	RADIAL LOCK HANDLE - L11	
W51585A0	LEFT CROSS COVER	
CM145000	BASE LOCK HANDLE - L50	
W5160800	BASE CLOTH	
W5234600	RIGHT CROSS COVER	
W5209500R	ARM SHAFT	

10. ACCESSORIES

TROLLEY





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

DESCRIPTION		DIMENSIONS
Trolley 800	800x800 mm	31 1/2" x 31 1/2"
Trolley 900	900x900 mm	35 7/16" x 35 7/16"
Electrical trolley	800x800 mm	31 1/2″ x 31 1/2″
Electrical trolley	900x900 mm	35 7/16" x 35 7/16"

*Code according to load

FIXED COLUMN PR

To secure to the floor using four metal studs.

DESCRIPTION/DIMENSIONS	
Column 275 PR	10 13/16″
Column 375 PR	14 3/4″
Column 450 PR	17 3/4″
Column 635 PR	25″
Column 740 PR	29 1/8″
Column 850 PR	33 7/16″
Column 1100 PR	43 5/16″
Column 1350 PR	53 1/8″
Column 1600 PR	63″

LIFTER PR

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

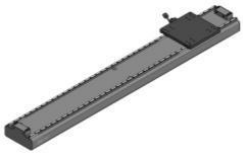
DESCRIPTION	VERTICAL TRAVEL
Lift 300 PR	300 mm – 11 7/8"
Lift 550 PR	550 mm – 21 5/8"
Lift 750 PR	750 mm – 29 1/2"

EXTENSION

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

DESCRIPTION	ADDITIONAL WORK AREA
Extension 600	600 mm – 23 5/8"
Extension 1000	1000 mm – 39 3/8"

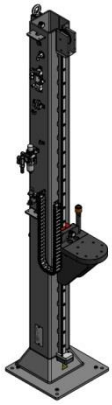
FLOOR RAIL



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	TRAVEL
CL040000	Floor rail	1520 mm – 59 13/16"

COLUMN D100



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 in two axes.

DESCRIPTION	VERTICAL TRAVEL
Column 1500 D100	952 mm – 37 7/16″
Column 2000 D100	1455 mm – 57 5/16"
Column 2500 D100	1952mm - 76 13/16"

10.1. COMPATIBILITY TABLE

ACCESSORY	S7
TROLLEY	●
COLUMN PR	●
LIFT PR	●
EXTENSION	●
FLOOR RAIL	●
COLUMN D100	●

● = Compatible
⦸ = NOT Compatible
* = Please ask

11. WARRANTY

See attached warranty document.

12. GUIDELINES FOR PACKAGING, TRANSPORT AND DISMANTLING

12.1. PACKAGING

Follow the instructions below for packing the equipment for location changes or shipments for repair and maintenance.

12.1.1. Preparatory measures

The equipment must be placed out of service. Assembling the "transport safety elements" will prevent movement during transport and thus possible damage to the installation.

12.1.2. Choice of packaging

For long transport distances, the components of the production installation must be packed in such a way that they are protected from atmospheric conditions.

12.1.3. Inscription on the packaging

Observe the specific provisions of the country in which the equipment is transported. In fully closed packaging, an indication must be placed on the packaging indicating where the top is.

12.1.4. Packaging procedure

Place the components of the machine on manufactured wooden pallets. Use lashing straps to ensure the components are secured against possible falls. Attach all the technical documentation that must accompany the machine.

12.2. TRANSPORT

The following data must be taken into account for transport.

- ✓ Approx. external dimensions (width x height x depth) 1090 x 500 x 350 mm
- ✓ Total weight depending on the segment: maximum approx. 40-45 kg

12.3. DISASSEMBLY

- ✓ The equipment must be taken out of service by duly trained and authorised personnel.
- ✓ The machine must be dismantled taking the safety instructions, waste disposal and recycling into account.
- ✓ Protect the environment. The machine must be disposed of pursuant to current regulations and guidelines on safety, noise prevention, environmental protection and accident prevention.

NOTES

DATE	DESCRIPTION

CE STATEMENT OF COMPLIANCE

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
Country:	Spain - EU

Declares that this product:

Name:	Series 7
Serial number:	From 007/2 - 027

It is classified as a machine according to the Machinery Directive 2006/42/EC and to which this Declaration refers, and complies with the following European EC Directives, and their applicable Essential Health and Safety Requirements (EHSR):

2006/42/EC – Machinery Directive

2014/68/EU – Pressure Equipment Directive

Authorised for documentation:

Mr Ramon Jou Parrot of TECNOSPIRO MACHINE TOOL, S.L.U.

Sant Joan de Vilatorrada, Thursday, 08 February 2024

Ramon Jou Parrot, Technical Director

3arm®

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