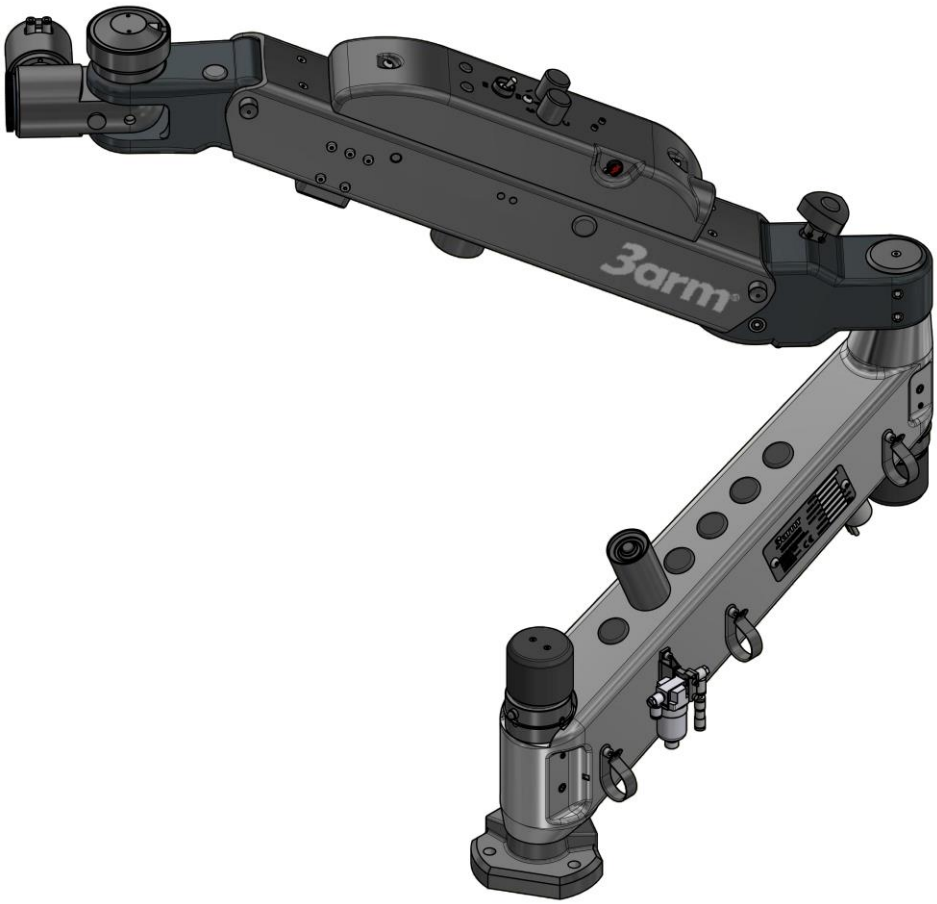
# INSTRUCTION MANUAL

3arm®

## SERIES 3




**TECNOSPIRO MACHINE TOOL, S.L.U.**
P.I Pla dels Vinyats I, s/n nau 1
08250 - Sant Joan de Vilatorrada. Barcelona - España
Telf. +34 938 76 43 59
E-mail: 3arm@3arm.net

ISO 9001
BUREAU VERITAS
Certification

TECNOSPIRO
MACHINE TOOL SLU

DESIGN & QUALITY
3arm
Made in Barcelona

www.3arm.net

## TABLE OF CONTENTS


**1 INTRODUCTION ..... 4**

**2 ABOUT THIS MANUAL ..... 5**

2.1 CONSIDERATIONS ..... 5

2.2 DOCUMENT VERSION ..... 6

**3 SAFETY INFORMATION ..... 6**

3.1 SCOPE OF APPLICATION ..... 6

3.2 WARNINGS AND GENERAL CONSIDERATIONS ..... 6

3.3 EXCLUSIONS ..... 8

3.4 SYSTEM INTEGRATOR ..... 8

3.5 SYMBOLOGY AND ICONS ..... 8

3.6 PERSONAL PROTECTIVE EQUIPMENT (PPE) ..... 9

3.7 TRAINING LEVEL OF THE STAFF INVOLVED ..... 9

**4 GENERAL DESCRIPTION AND TECHNICAL INFORMATION ..... 10**

4.1 MAIN PARTS ..... 10

4.2 CONFIGURATIONS ..... 11

4.3 DIMENSIONS ..... 12

4.4 MOVEMENTS ..... 15

4.5 REACTION TORQUE ..... 16

4.6 TECHNICAL SPECIFICATIONS ..... 18

4.7 IDENTIFICATION ..... 18

**5 INSTALLATION ..... 19**

5.1 INSTALLING AND CHANGING TOOLS ..... 21

**6 ADJUSTMENTS ..... 22**

6.1 BALANCING THE ARM ..... 22

6.2 REGULATION OF THE RESISTANCE TO ROTATION. ..... 23

6.3 RADIAL ARM HEIGHT ADJUSTMENT ..... 24

6.4 HOW TO SECURE TOOLS WITH A SQUARE SECTION ..... 25

**7 OPERATION ..... 26**

7.1 L11 MANUAL LOCK ..... 26

7.2 L22 PNEUMATIC LOCK ..... 27

7.3 L92 PNEUMATIC LOCK ..... 30

7.4 LIFTER / PNEUMATIC COLUMN ..... 37

**8 MAINTENANCE ..... 39**

8.1 COMPRESSED AIR MAINTENANCE UNIT ..... 39

8.2 PNEUMATIC LOCKING BRAKES ..... 39

8.3 TIGHTENING THE SCREWS ..... 39

8.4 GENERAL CLEANING ..... 39
8.5 REPLACING THE GAS SPRING AND CYLINDER ..... 40
8.6 ADJUSTING THE SPRING REGULATION SYSTEM ..... 41
8.7 REPLACING THE HEAD ..... 42
8.8 REPLACING RADIAL PADS L11 ..... 43
8.9 REPLACING TILTING PADS L11 ..... 44
8.10 MAINTENANCE TABLE ..... 45
**9 PNEUMATIC LOCKS ..... 46**
9.1 PNEUMATIC LOCKS: IDENTIFICATION ..... 46
9.2 CHECKING CONNECTIONS: BETWEEN DEVICE CONTROL AND 3arm® ..... 46
9.3 CHECKING THE AIR SUPPLY ..... 47
9.4 CHECKING CYLINDER ADJUSTMENT ..... 48
9.5 REPLACING THE CYLINDER and/or RADIAL PADS ..... 49
9.6 REPLACING THE CYLINDER AND/OR SWIVEL PADS ..... 51
**10 SPARE PARTS ..... 52**
**11 ACCESSORIES ..... 56**
11.1 COMPATIBILITY OF ACCESSORIES ..... 60
**12 WARRANTY ..... 60**
**13 GUIDELINES FOR PACKAGING, TRANSPORT AND DISMANTLING ..... 61**
13.1 PACKAGING ..... 61
13.2 TRANSPORT ..... 61
13.3 DISMANTLING ..... 61
**CE STATEMENT OF COMPLIANCE ..... 63**

# 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 would advise you to 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 3 instruction manual.

- ORIGINAL MANUAL –

Intellectual/Industrial Property Information:

Tecnospiro Machine Tool, S.L.U. (the Company) informs that all content in this document including, for example, the text, images, graphic designs, brands, trading and company names (hereinafter, the Intellectual/Industrial Property), belong to the Company and that the Company is the exclusive owner of their use. Copying, reproduction, distribution, public communication and total or partial use of the Intellectual/Industrial Property, in any form or manner, even quoting the sources, is prohibited, unless expressly agreed in writing by the Company. The use of any content that due to its characteristics is similar to the Industrial/Intellectual Property is also considered an infringement of the Company's Industrial/Intellectual Property rights.

## 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. to provide a new one.
- ✓ Reproducing or sharing this documentation – or part of it – to third parties is only permitted with express written authorisation from TECNOSPIRO MACHINE TOOL, S.L.U.
- ✓ The illustrations shown in this manual may differ in some details from its 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 3 | 26/10/2023 |

# 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 WARNINGS AND GENERAL CONSIDERATIONS

- ✓ The equipment described in this document has been built in accordance with the current technological level and in accordance with 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 this. 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 as well as in the identification on the structure of the equipment.
- ✓ It is advisable 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 remain outside of the vertical path of the swivel arm.

- ✓ 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. The work areas must be kept clear of obstacles, columns, etc. that could hinder the work of the operators.

- ✓ 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.

- ✓ For tasks of maintenance, adjustment, cleaning, etc. there must be the spaces necessary for these 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 EC statement of compliance.
- ✓ Placement of the CE marking.
- ✓ Preparing the machine's service instructions.

### 3.5 SYMBOLOGY 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 hazard symbol. This symbol is usually accompanied by another symbol, or a more detailed description of the danger. |
|  | Trapping hazard |

### 3.6 PERSONAL PROTECTIVE 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 should not wear loose clothing, rings or bracelets that may fall within the mechanism of the equipment.

It is also mandatory to wear the 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 of the documentation.

The minimum training level required to use the equipment is:

- Production workers: occupational risk prevention course, full training on work stations and residual risks of the equipment. Minimum of one year's experience in similar facilities.

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

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

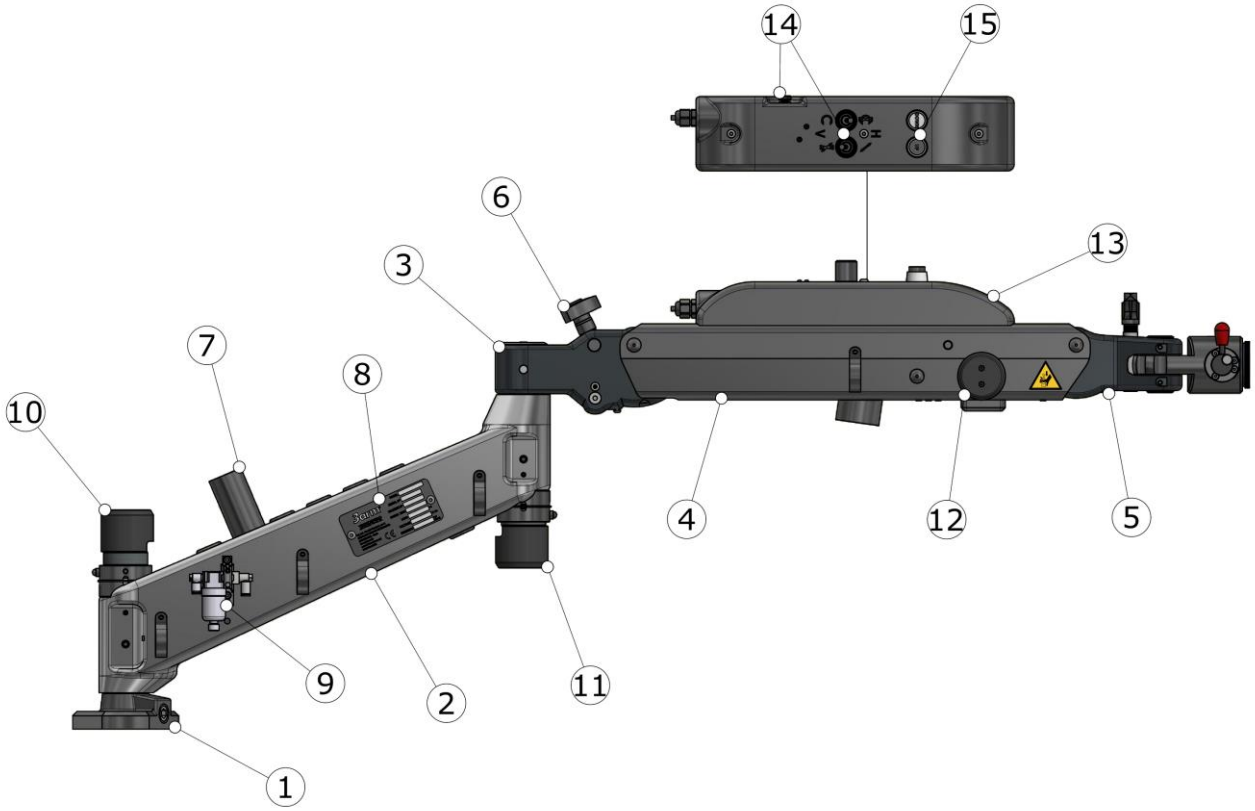
- Apprentices/students: They may only work on the equipment if supervised at all times by one of the facility's suitably qualified employees.

- Public (non-workers): 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 pendular parallelogram balanced by a gas spring, and a radial arm. The assembly of both secures the clamping head and keeps it in a perpendicular position to the work area. In addition, locks (manual or pneumatic) can be incorporated that lock rotation in the base axis, the cross axis and the tilting movement of the arm.

## 4.1 MAIN PARTS




**1.-** Base
**2.-** Radial arm
**3.-** Cross
**4.-** Tilting arm
**5.-** Head
**6.-** Regulation assembly
**7.-** Parking
**8.-** Identification plate
**9.-** Air filter and connection
**10.-** Base radial lock
**11.-** Cross radial lock
**12.-** Tilting lock
**13.-** Control panel cover
**14.-** Lock controls
**15.-** Lifter control

**INFORMATION**

The equipment in the image is a PS + BS + R3 + L92E arm

## 4.2 CONFIGURATIONS

### 4.2.1 CONFIGURATION TABLE

[ ] + [ ] + [ ] + [ ]

Radial arm:

| | |
|---|---|
| PS | Bench-top 450 mm *(17.7")* |
| PL | Bench-top 800 mm *(31.8")* |
| PE | Lifter 500mm *(19.7")* |
| AS | Ceiling 450 mm *(17.7")* |
| AL | Ceiling 800 mm *(31.8")* |

Arm:

| | |
|---|---|
| BS | Arm 500 mm *(19.7")* |
| BM | Arm 800 mm *(31.8")* |

Locking:

| | |
|---|---|
| No locks | L00 |
| Manual locks | L11 |
| Pneumatic locks | L22 |
| Base with manual lock | L50 |
| Base and arm with manual lock | L51 |
| Manual base and pneumatic locking arm | L52 |
| Encoders | L80 |
| Tool-operated pneumatic lock | L92 |

Head:

| | | | |
|---|---|---|---|
| A3 | Vertical | N3 | Multi-position with quick change |
| B3 | Flat vertical | P3 | Double articulated flat rotative |
| BA3 | Flat vertical + Bush | PA3 | Double articulated flat rotative + Bush |
| C3 | Vertical V-block | Q3 | Multi-position reinforced with quick change |
| D3 | Articulated rotative | QA3 | Multi-position reinf. security with quick change |
| E3 | Articulated flat rotative | QB3 | Multi-position reinforced with manual brake |
| EA3 | Articulated flat rotative + Bush | R3 | Manual revolving + Bush |
| EB3 | Articulated flat rotative reinforced | RA3 | Manual revolving + Bush |
| EC3 | Articulated flat rotative reinforced + Bush | RAS3 | Automatic revolving + Bush |
| ED3 | Articulated flat automatic rotative | RB3 | Manual revolving + Bush |
| EE3 | Articulated flat automatic rotative + Bush | RBS3 | Automatic revolving + Bush |
| F3 | Articulated rotative V-block | RC3 | Manual revolving 4x90º + Bush |
| GA3 | Multi-turn | RS3 | Automatic double revolving + Bush |
| HA3 | Multi-turn reinforced | SN3 | Giraffe multi-position |
| I3 | Flat electromagnet | SQ3 | Giraffe multi-position reinforced |
| J3 | Articulated rotative electromagnet | SQA3 | Giraffe multi-position reinforced security |
| K3 | Adjustable strap | SR3 | Giraffe revolving + Bush |
| L3 | Adjustable ball joint with vertical adjustment | T3 | Multi-position with quick change |
| LA3 | Adjustable auto ball joint with vertical adjustment | U3 | Multi-position reinforced with quick change |
| LB3 | Adjustable ball joint horizontal | UA3 | Multi-position reinf. security with quick change |
| LC3 | Adjustable automatic ball joint horizontal | W3 | Vertical extension |
| LD3 | Adjustable ball joint vertical | WA3 | Automatic vertical extension (high torque) |
| LE3 | Adjustable automatic ball joint vertical | WB3 | Automatic vertical extension (low torque) |
| LH3 | Reinforced manual ball joint vertical | Z3 | Fork |
| M3 | Pressure support | ZA3 | Reinforced fork |

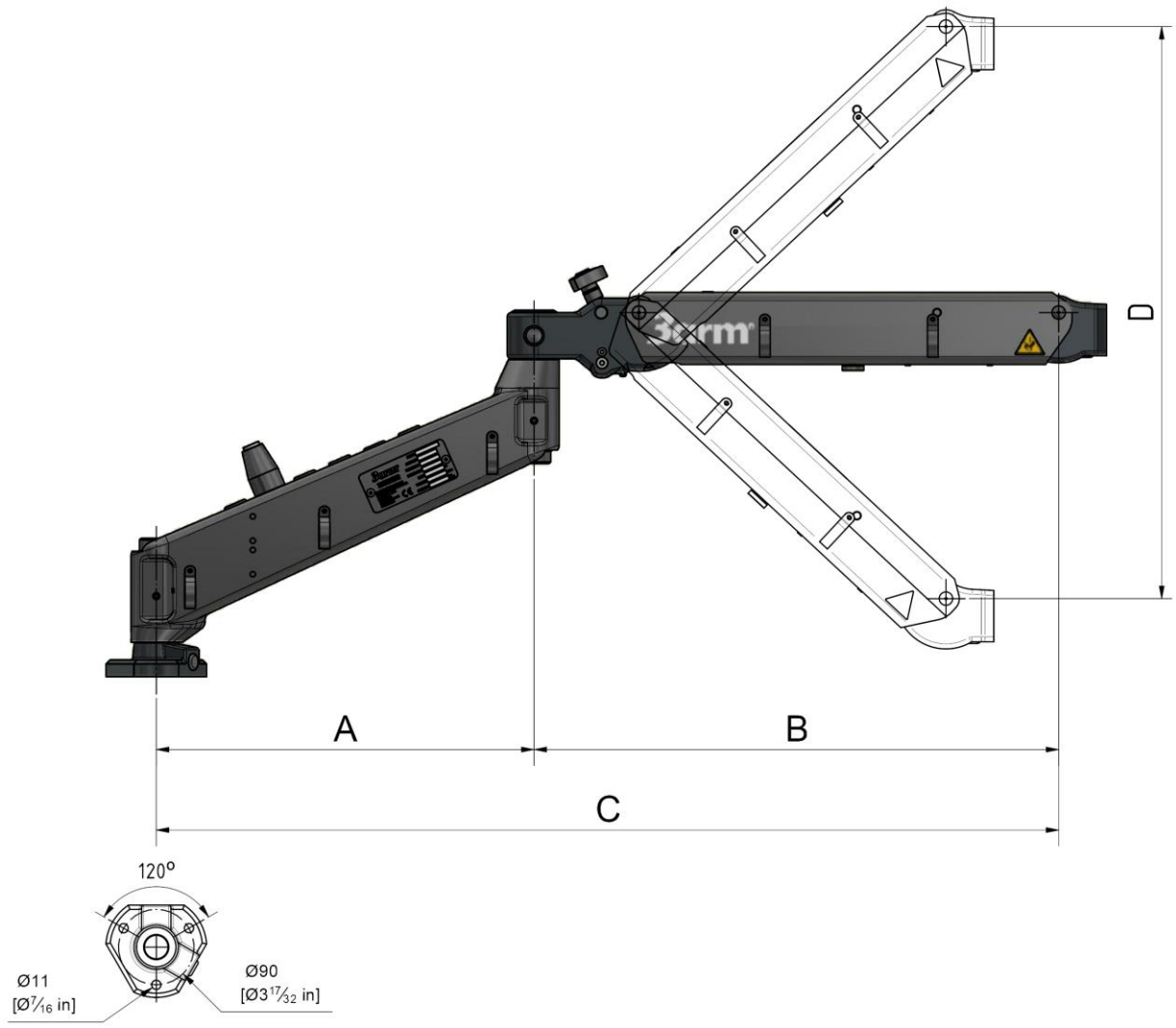
Note: See dimensions of the heads and functional applications in the ***Appendix of S0-S3-S4 heads.***
Note: For dangerous environments consider the HARD version with stainless steel handles. (e.g. PS + BS + BA3 + L22**H**).
Note III: To complement its use with a pneumatic LIFT, switches are included to control it (e.g. PS + BS + BA3 + L22**E**).
Note IV: See encoder operation in manual ***Appendix 3Arm Smartcontrol.***

### 4.2.2 ORDER EXAMPLE

Example order: PS+BM+N3+L22

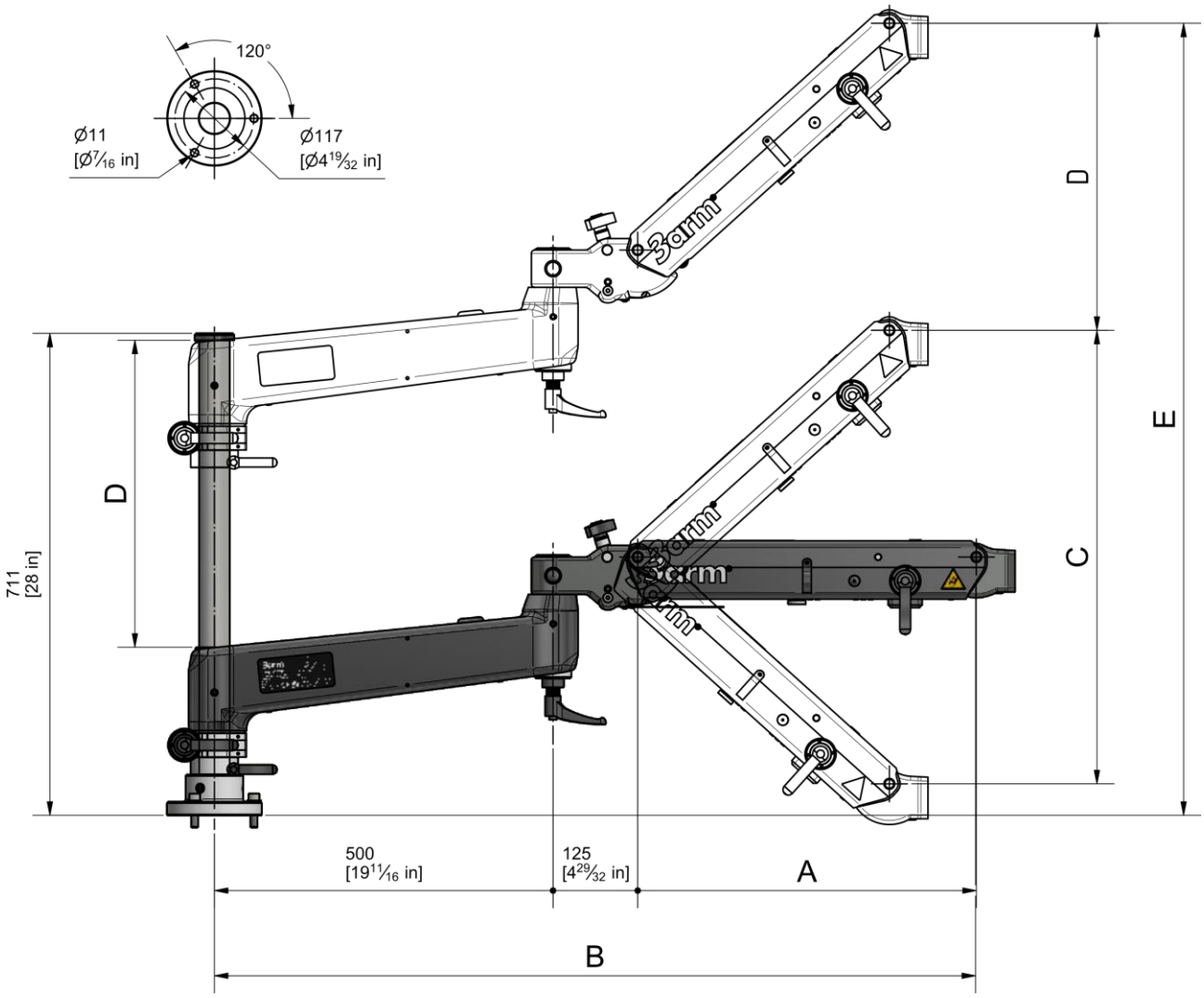
[PS] + [BM] + [N3] + [L22]

## 4.3 DIMENSIONS



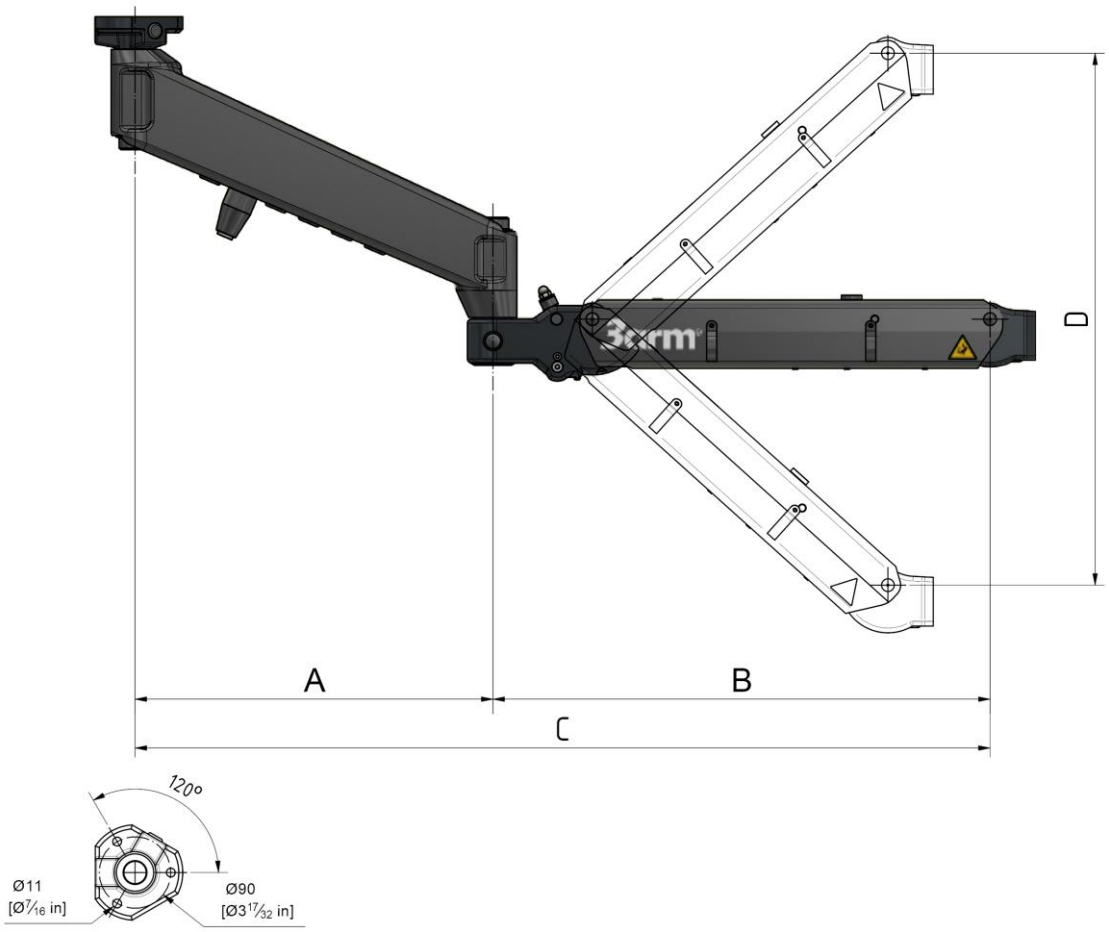

3Arm® Series 3 – Bench-top

| Configuration | | Dimensions | | | |
|---|---|---|---|---|---|
| Parallel | Arm | *A* *(mm/in)* | *B* *(mm/in)* | *C* *(mm/in)* | *D* *(mm/in)* |
| PS | BS | 450/*17.7"* | 625/*24.6"* | 1075/*43.2"* | 670/*26.3"* |
| | BM | | 925/*36.4"* | 1375/*54.1"* | 1070/*42.1"* |
| PL | BS | 808/*31.8"* | 625/*24.6"* | 1433/*56.4"* | 670/*26.3"* |
| | BM | | 925/*36.4"* | 1733/*68.2"* | 1070/*42.1"* |




3Arm® Series 3 - Lifter

| Configuration | | | Dimensions | | | | |
|---|---|---|---|---|---|---|---|
| Parallel | Locking | Arm | *A* *(mm/in)* | *B* *(mm/in)* | *C* *(mm/in)* | *D* *(mm/in)* | *E* *(mm/in)* |
| PE | L00 | BS | 500/*19.7″* | 1124/*44.3″* | 669/*26.3″* | 488/*19.2″* | 1122/*44.2″* |
| | | BM | 800/*31.5″* | 1425/*56.1″* | 1071/*42.2″* | 488/*19.2″* | 1369/*53.9″* |
| | L11<br>L22<br>L92 | BS | 500/*19.7″* | 1124/*44.3″* | 669/*26.3″* | 453/*17.8″* | 1122/*44.2″* |
| | | BM | 800/*31.5″* | 1425/*56.1″* | 1071/*42.2″* | 453/*17.8″* | 1369/*53.9″* |

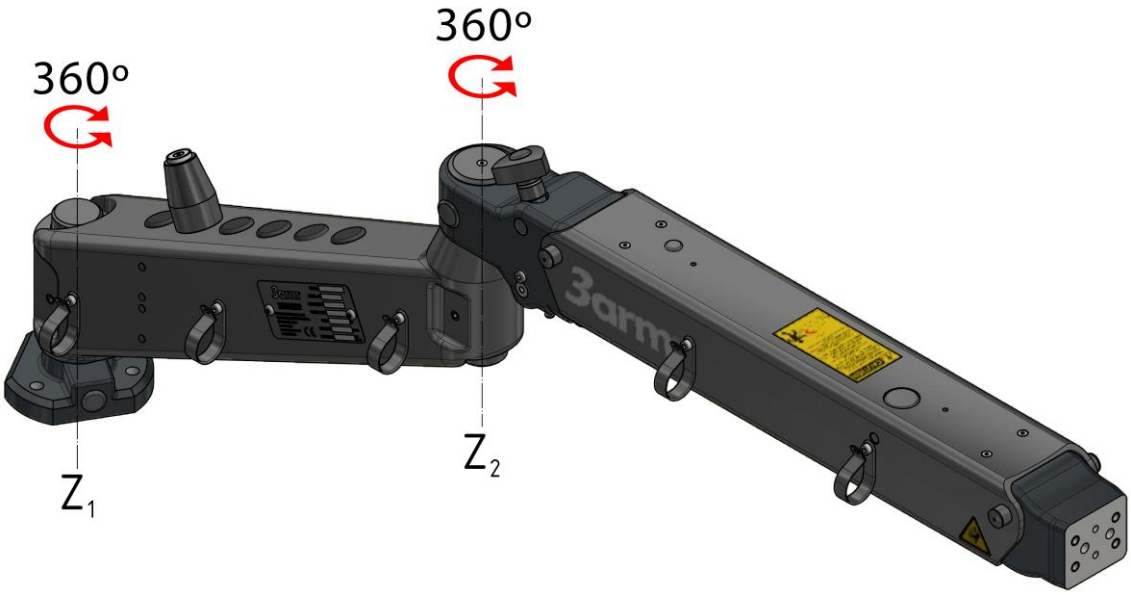



3arm® Series 3 - Ceiling

| Configuration | | Dimensions | | | |
|---|---|---|---|---|---|
| Parallel | Arm | *A (mm/in)* | *B (mm/in)* | *C (mm/in)* | *D (mm/in)* |
| AS | BS | 450/*17.7"* | 625/*24.6"* | 1075/*43.2"* | 670/*26.3"* |
| | BM | | 925/*36.4"* | 1375/*54.1"* | 1070/*42.1"* |
| AL | BS | 808/*31.8"* | 625/*24.6"* | 1433/*56.4"* | 670/*26.3"* |
| | BM | | 925/*36.4"* | 1733/*68.2"* | 1070/*42.1"* |

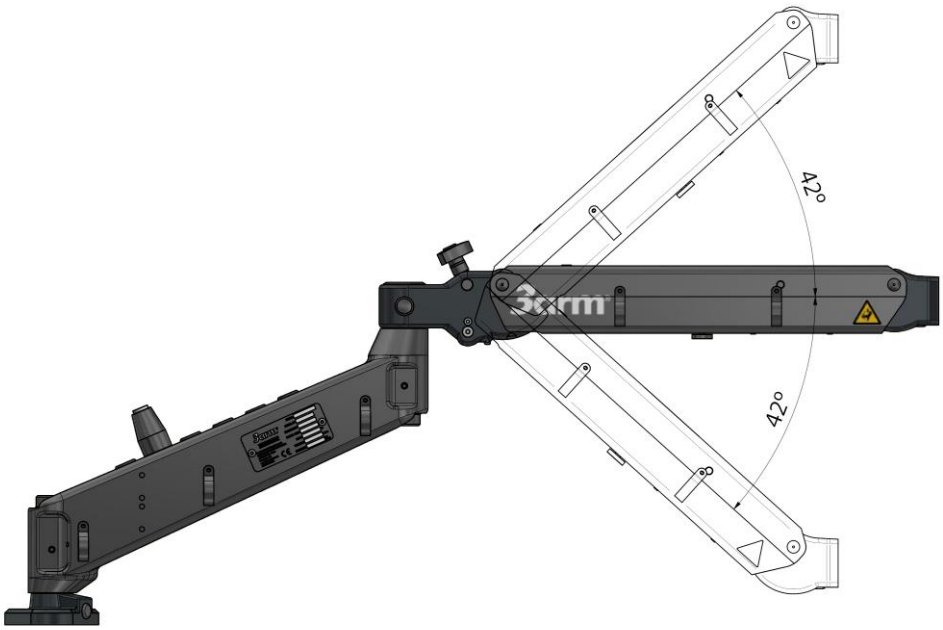
## 4.4 MOVEMENTS

### 4.4.1 ROTATION MOVEMENTS




- Parallel-base rotation movement: 360º (Axis $Z_1$)
- Arm rotation movement: 360º (Axis $Z_2$)

### 4.4.2 ASCENDING AND DESCENDING MOVEMENTS



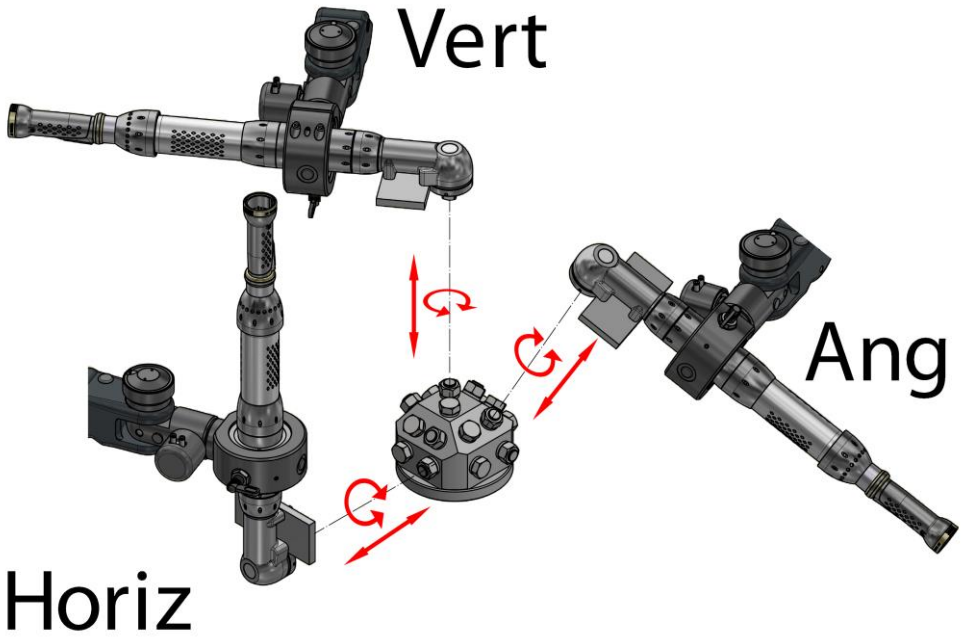

The tilting movement in the ZX plane ranges from -42º to +42º, obtaining a total vertical stroke of 670 mm with the short arm (BS) and 1070 mm with the long arm (BM).

## 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) |
| A | 150 *(111 ft lb)* | 150 *(111 ft lb)* | X |
| BA | 650 *(479 ft lb)* | 250 *(184 ft lb)* | X |
| D/EA/EC | 120 *(89 ft lb)* | 120 *(89 ft lb)* | 120 *(89 ft lb)* |
| EE/PA | 100 *(74 ft lb)* | 100 *(74 ft lb)* | 100 *(74 ft lb)* |
| R/RA/RB/SR | 300 *(221 ft lb)* | 250 *(184 ft lb)* | 200 *(148 ft lb)* |
| RAS/RBS/RS | 300 *(221 ft lb)* | 250 *(184 ft lb)* | 250 *(184 ft lb)* |




**For further information, please refer to the annexed manual for heads S0-S3-S4.**

**TORQUE TOOLS**

- ✓ The use of tools with a torque reaction that must be absorbed by the arm requires L92 configurations. (Pneumatic locks).
- ✓ For L92 configurations, telescopic compensators must also be used [See L92 PNEUMATIC LOCK: USE WITH COMPENSATORS page 31]

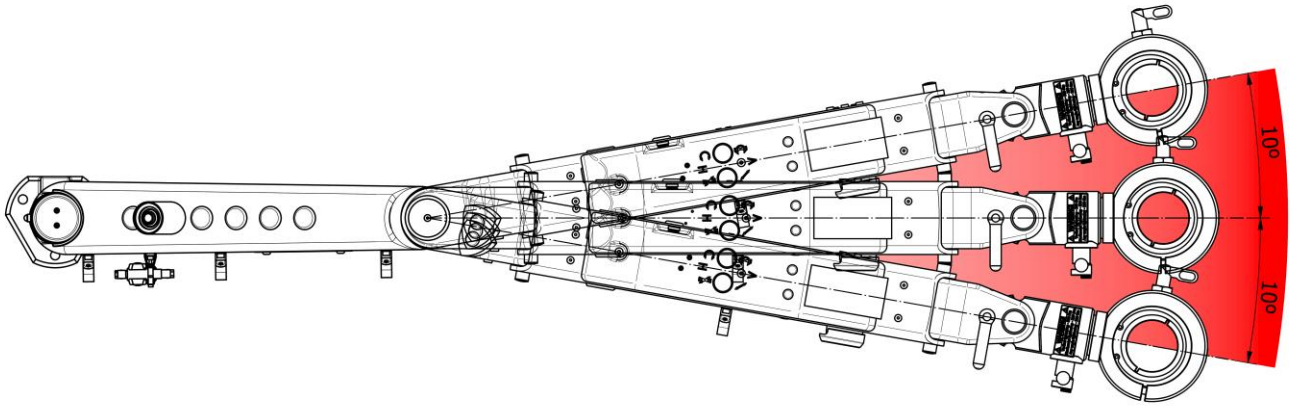
### 4.5.1 TORQUE TOOLS

Only if reaction tools are used.

If you use tools that produce a torque that the arm must absorb, you should **NOT** work with the arm fully extended (in the range shown in the picture).

We recommend working with the arm at maximum ±10º of the total extension, so as not to shorten the life of the locking brakes.

Do not work in the red zone if there are no locking brakes.




**CAUTION!**

**Incorrect use of the arm could lead to malfunctioning or premature wear of the pneumatic locking system.**

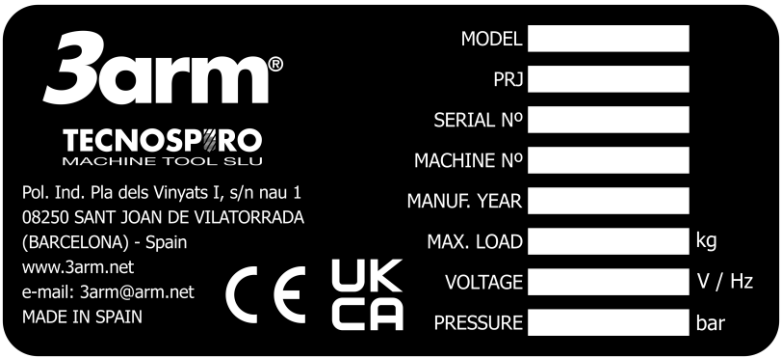
## 4.6 TECHNICAL SPECIFICATIONS

| *GENERAL TECHNICAL SPECIFICATIONS* | | |
|---|---|---|
| **Load capacity**[1] | | |
| (Gross load: Tool + head) | Gross load range[2] (BS) | 0-35 kg *(77 lbs)* |
| | Gross load range[2] (BM) | 0-19Kg *(41 lbs)* |
| **Reaction torque**[3] | | |
| Maximum torque | Max. vertical work | 650 Nm *(479 ft lb)* |
| | Horizontal work Max. | 250 Nm *(184 ft lb)* |
| | Work at any angle Max. | 250 Nm *(184 ft lb)* |
| **Others** | | |
| | Resistance to manipulation | 0.5 kg *(1.1 lb)* |
| **Pneumatic specifications**[4] | | |
| | Power fluid | Pressurised air |
| | Operating pressure | 0.5 to 0.7 MPa *(5 to 7 bar)* |
| **Operating conditions** | | |
| | Temperature | -10ºC to + 50ºC |
| | Relative humidity | Max. 70% |
| | Environment | Industrial environments |

## 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, maximum working pressure (for versions with pneumatic lock L22 and L92) and voltage (for versions with pneumatic lock L92).



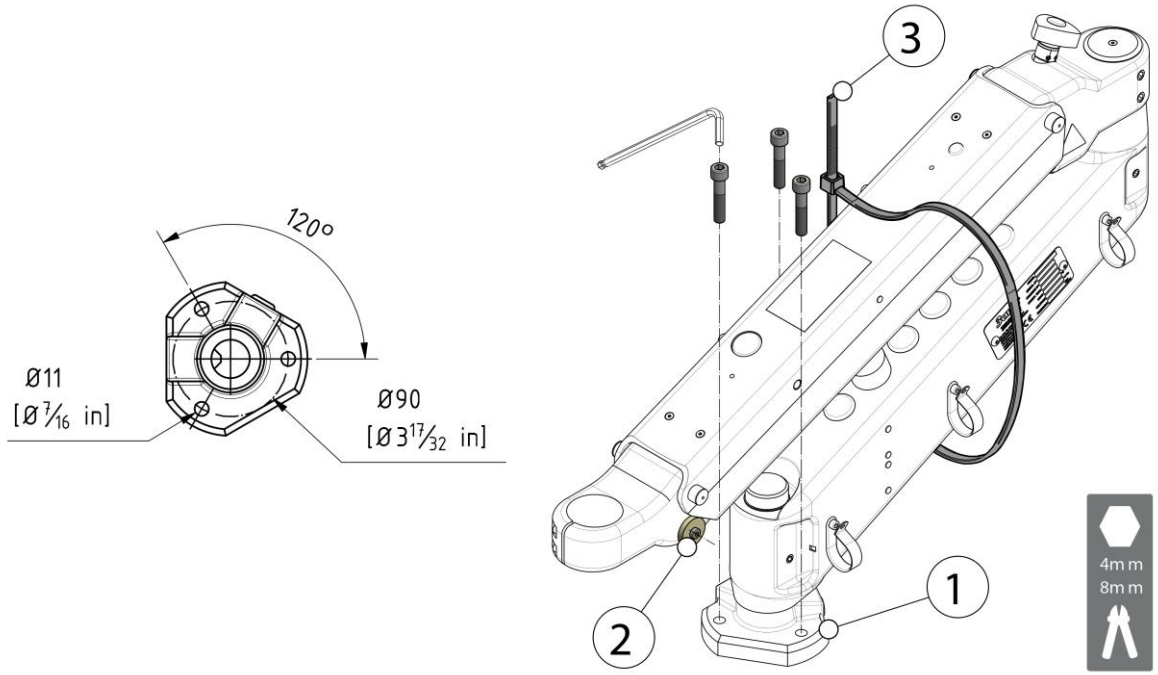

[1]The load shown is the maximum value for a Series 3 arm. Your arm may support a lower maximum load. Consult the maximum load of your arm on the identification plate riveted to the structure of the arm.
[2] Series 3 load range.
[3] The data shown corresponds to the maximum torque that the arm can absorb. You may be able to reduce these values depending on which head you are working with [See REACTION TORQUE page16]
[4] For versions with pneumatic locks.

# 5 INSTALLATION

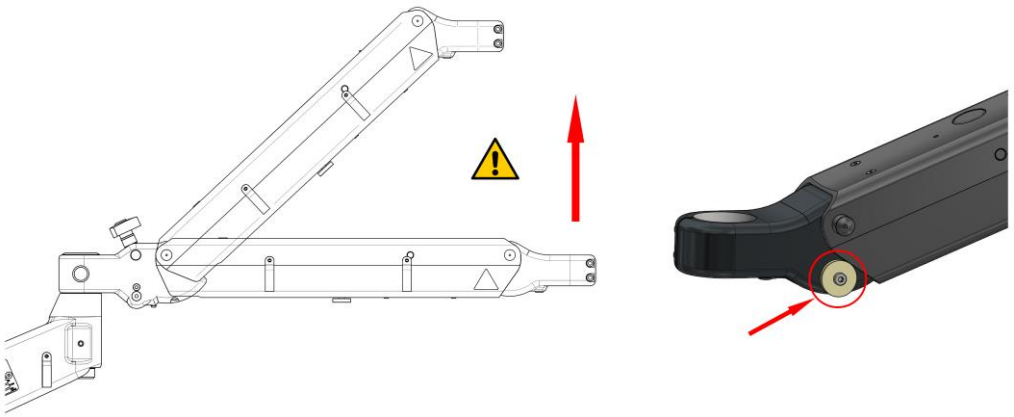
**INSTALLATION**

- ✓ The work bench or installation location must be a horizontal surface, thus avoiding shifts and deviations.
- ✓ When using the small 3arm® fastening flange the maximum weight is 10 kg.
- ✓ **WARNING!** Do not remove the washer before you have finished installing the tool. Otherwise the arm could start a sharp upward movement that could cause harm.

1. **Fasten the base of the arm** (1) **to the work bench with the three M10 screws supplied** (Recommended torque 45 Nm) or with the fastening flange (3arm® accessory).
2. **Fasten the tool to the head**. (See details in the ***Appendix of S0-S3-S4 heads***).

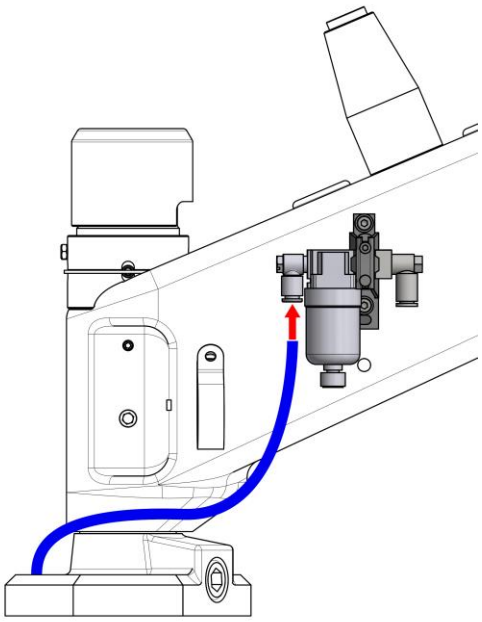



3. **Remove the screw and nylon washer** (2) that stops the tilting arm being in a raised position. Take care as the arm could start a sharp upward movement.
4. **Cut the plastic ties** (3) that keep the arm parallel.



5. **Air connection** (Only for versions L22 or L92 with pneumatic locks).

Requires suitable piping tube for use with compressed air. ($Ø_{exterior}$= 6 mm and working pressure 0.5 - 0.7 MPa/ 5 - 7 bar).



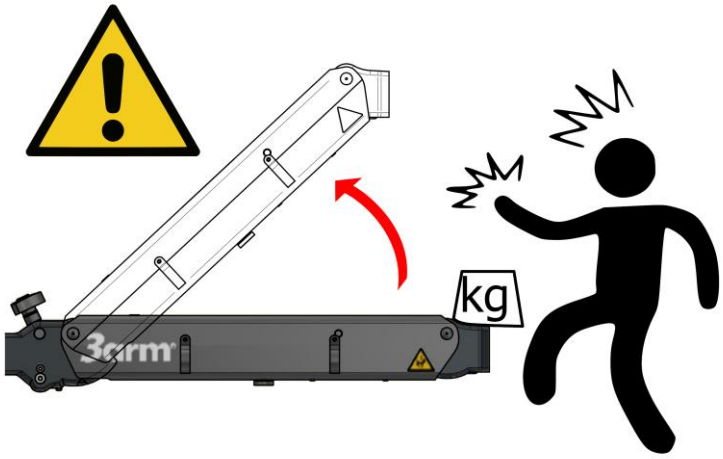
6. **Wiring connection** (for versions L92 only). To connect your 3arm® arm to the controller of your tool [See ELECTRO-PNEUMATIC SYSTEM page 36]

## 5.1 INSTALLING AND CHANGING TOOLS

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.

**SUDDEN SHARP UPWARD MOVEMENT**

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.**




Follow these guidelines to minimise the risks and/or possible damage:

| **In tool replacement tasks** |
| --- |
| **Take the tilting arm to its highest position and secure it in that position at all times**. If necessary, have two operators to carry out this task with total safety. |

# 6 ADJUSTMENTS

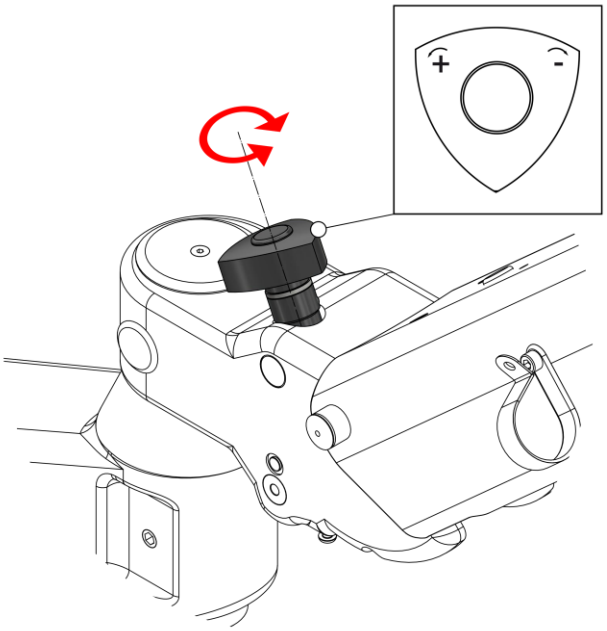
## 6.1 BALANCING THE ARM

**Regulate the tension of internal shock absorber if the arm drops or has a lot of upward force.**

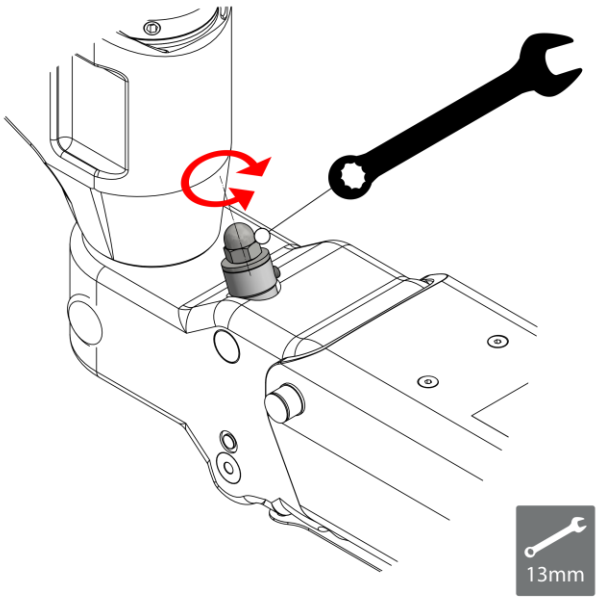
**1-** Maintain the tilting arm in an approximately horizontal position to facilitate the task.
**2-** Using the adjusting screw/nut installed for this purpose, in the upper part of the cross, rotate it as necessary.

- **Anti-clockwise rotation:** Increases the tension in the shock absorber.
- **Clockwise rotation**: Reduces the tension in the shock absorber.

Bench-top arm



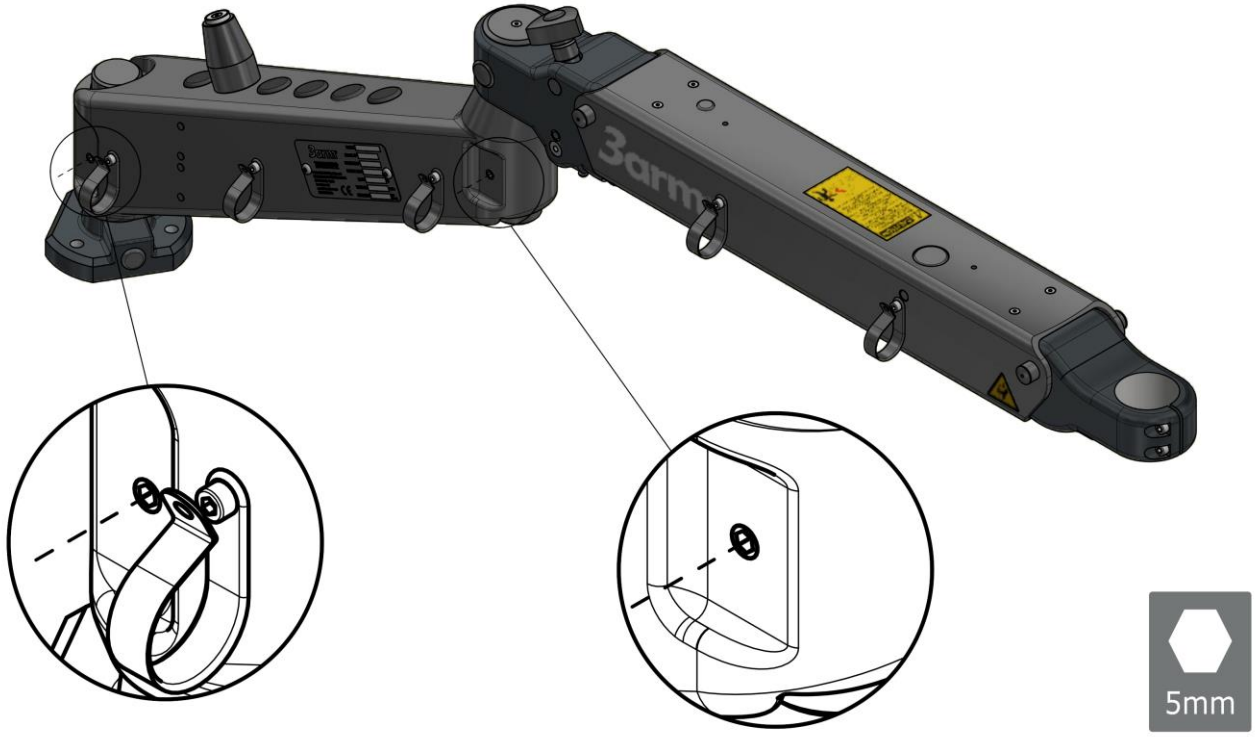

Ceiling arm



## 6.2 REGULATION OF THE RESISTANCE TO ROTATION.

Studs located at the junction of the base with the parallel and at the junction of the parallel with the cross allow the rotation resistance of the different axes of movement of the arm to be adjusted. 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.




**SHIFTING AND DEVIATIONS**

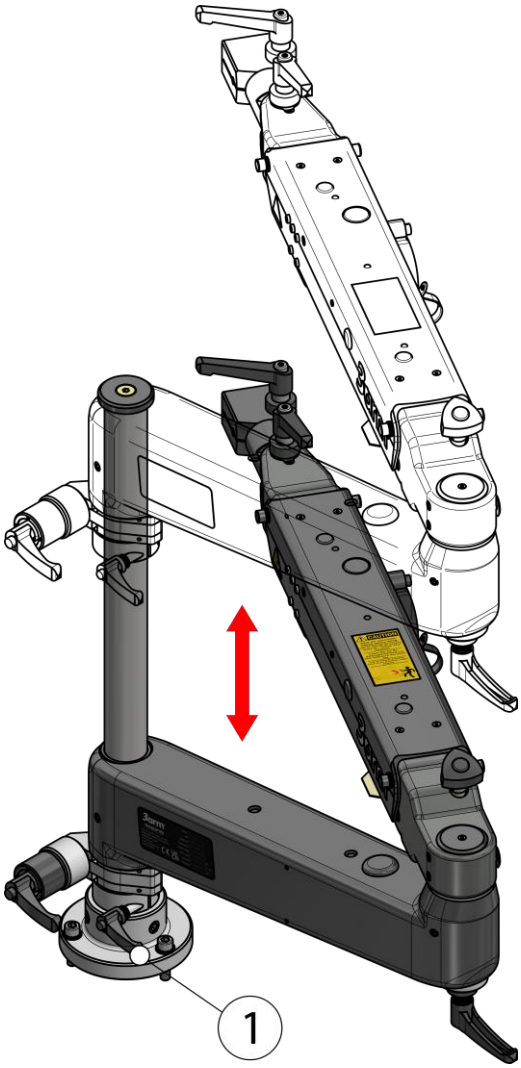
Correctly adjusting the regulation of the turning resistance prevents the risk of shifting and deviations during the operation of the arm.

## 6.3 RADIAL ARM HEIGHT ADJUSTMENT

Only for models with PE radial arm (elevator).

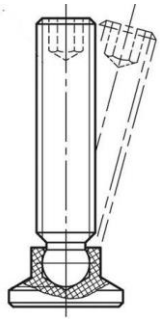
**For more convenience, it is recommended to adjust the height with the arm retracted**

1. Loosen the handle (1).
2. Raise or lower the arm to the desired height.
3. Tighten the handle (1).

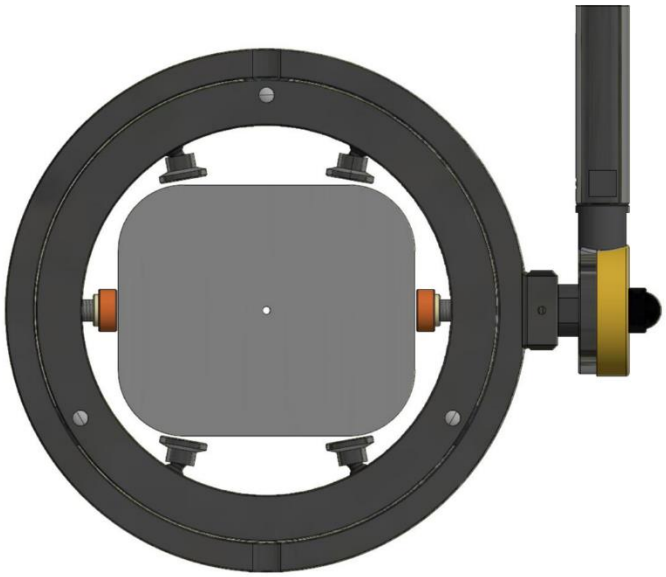


## 6.4 HOW TO SECURE TOOLS WITH A SQUARE SECTION

To secure the tool correctly, Tecnospiro recommends using ball-tip headless Allen studs for thrust pads. This component allows you to adjust the tool from all sides, adapting the pads to the surface of the tool.



Example of securing a square tool:

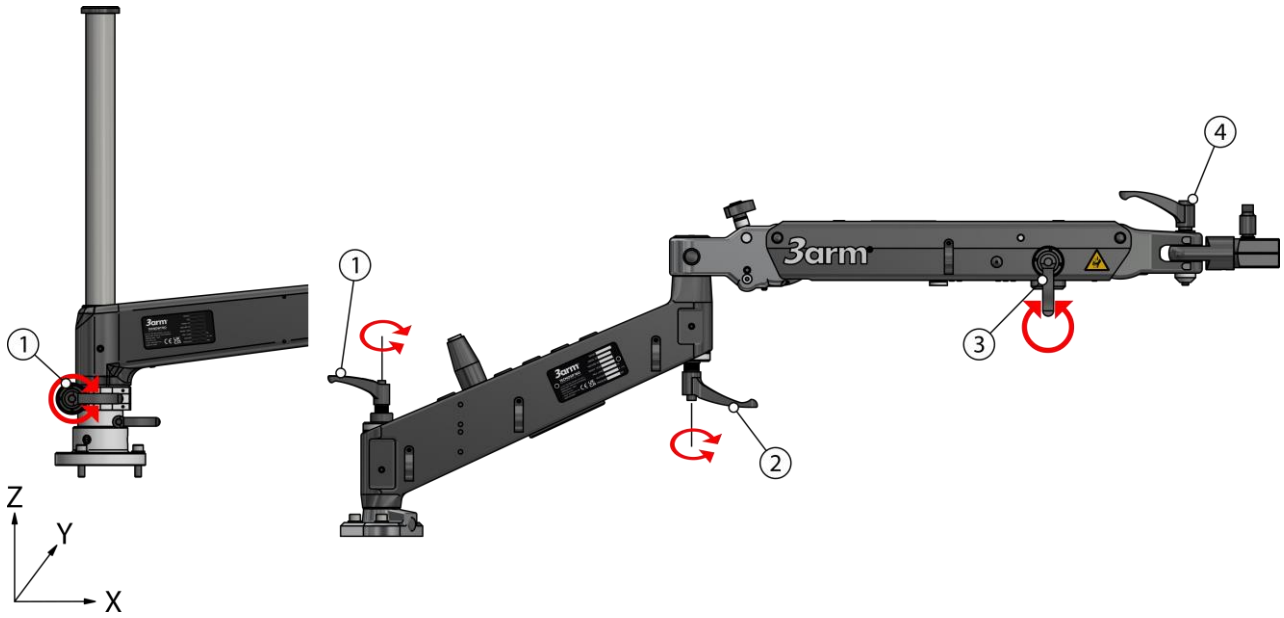


Optional adapters are available for tools with a square cross-section

# 7 OPERATION

## 7.1 L11 MANUAL LOCK

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




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

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

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

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

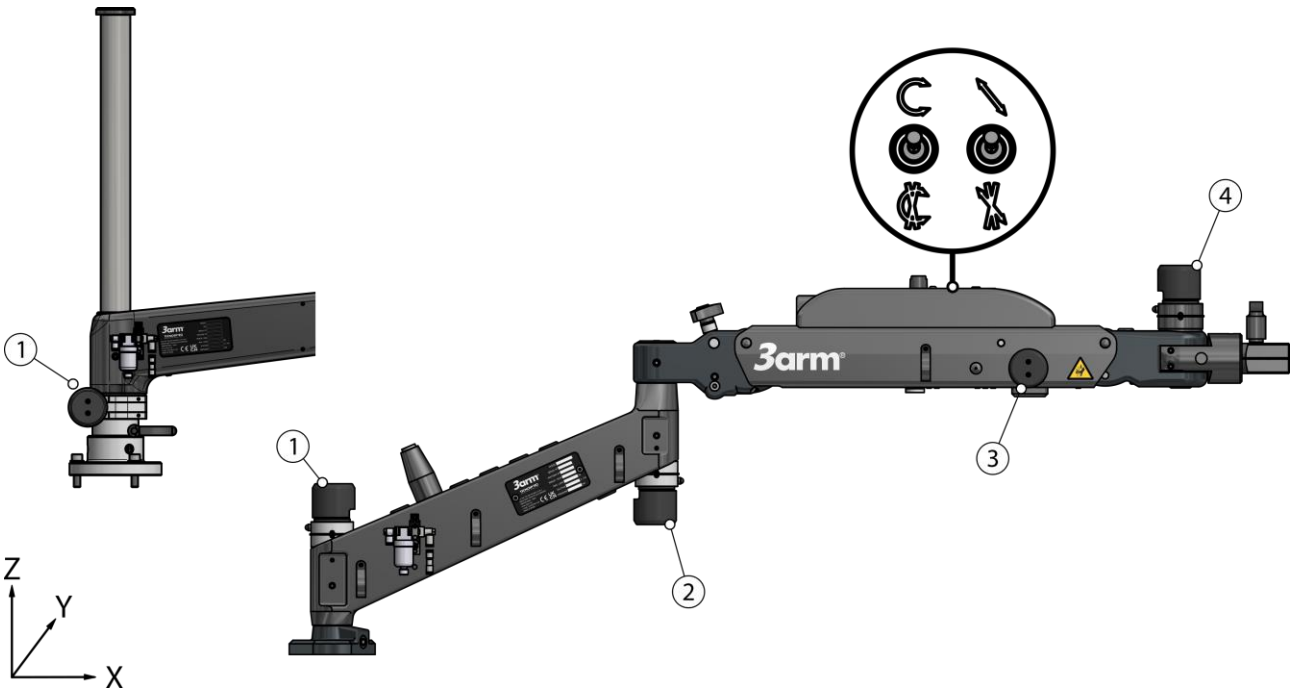
**CAUTION**

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 S0-S3-S4 heads***

## 7.2 L22 PNEUMATIC LOCK

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




**1-** Base radial lock
**2-** Cross radial lock
**3-** Arm tilting lock
**4-** Head lock[6]

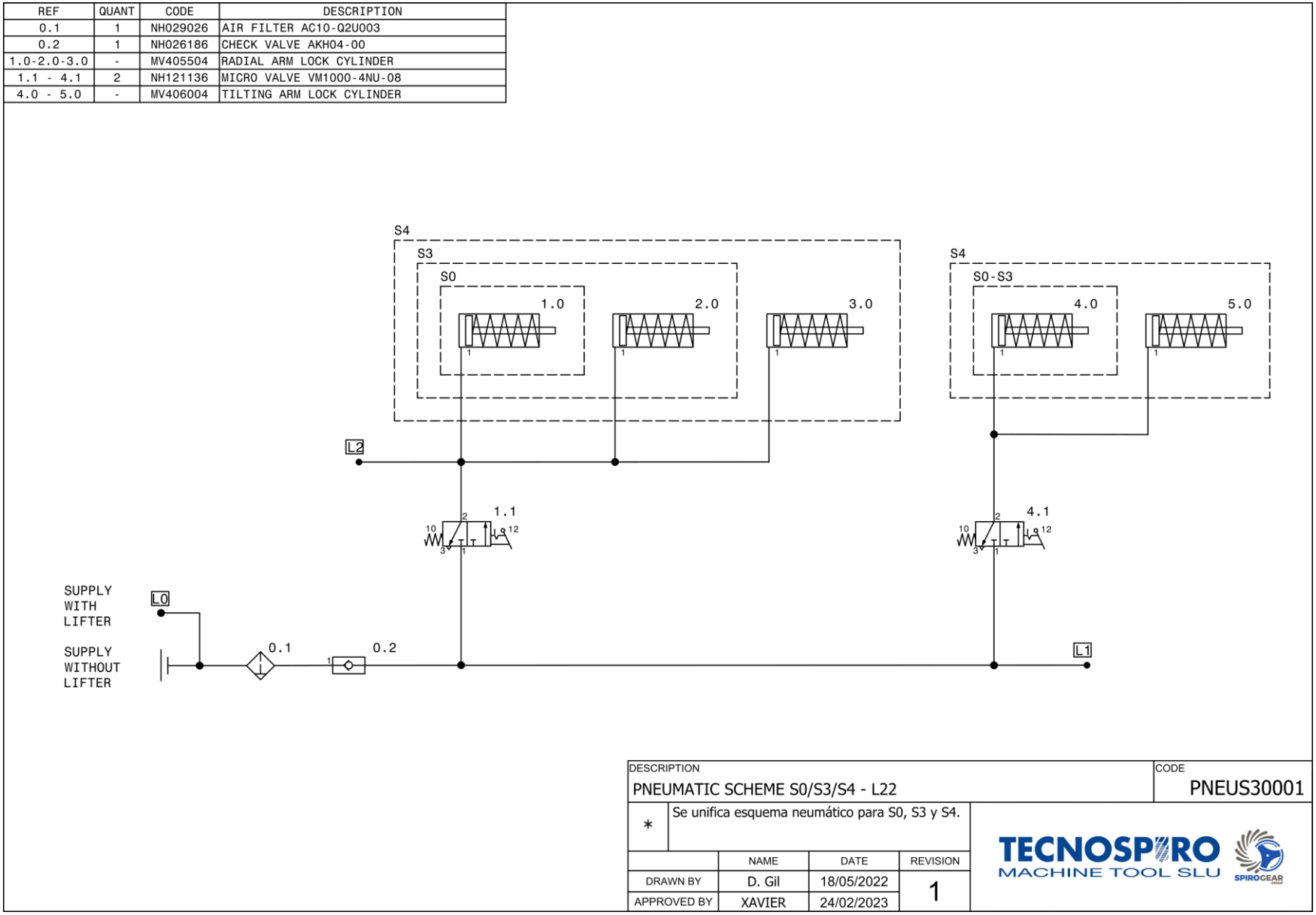
**Position of the switches** to obtain one lock or another.

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

[6] Optional, depending on the head. See operation at ***Appendix of S0-S3-S4 heads***

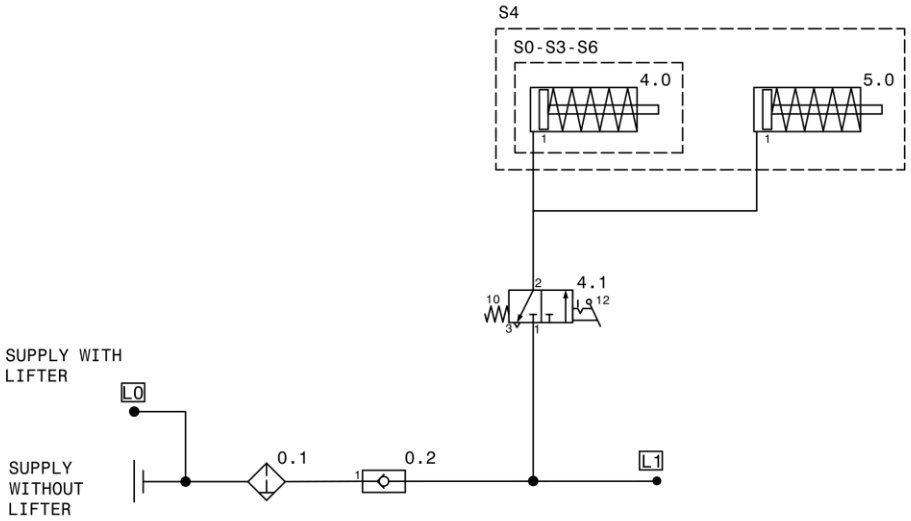
## 7.2.1 L22 pneumatic diagram

| REF | QUANT | CODE | DESCRIPTION |
|---|---|---|---|
| 0.1 | 1 | NH029026 | AIR FILTER AC10-Q2U003 |
| 0.2 | 1 | NH026186 | CHECK VALVE AKH04-00 |
| 1.0-2.0-3.0 | - | MV405504 | RADIAL ARM LOCK CYLINDER |
| 1.1 - 4.1 | 2 | NH121136 | MICRO VALVE VM1000-4NU-08 |
| 4.0 - 5.0 | - | MV406004 | TILTING ARM LOCK CYLINDER |



## 7.2.2 L02/L52 pneumatic diagram

| REF | QUANT | CODE | DESCRIPTION |
|---|---|---|---|
| 0.1 | 1 | NH029026 | AIR FILTER AC10-Q2U003 |
| 0.2 | 1 | NH026186 | CHECK VALVE AKH04-00 |
| 4.0-5.0 | 1 | MV406004 | TILTING ARM LOCK CYLINDER |
| 4.1 | 1 | NH121136 | MICRO VALVE VM1000-4NU-08 |




| DESCRIPTION | CODE |
|---|---|
| PNEUMATIC SCHEME S0/S3/S4/S6 - L02/L52 | PNEUS30005 |

| | |
|---|---|
| * | Standardization of the scheme for S0/S3/S4/S6 |

| | NAME | DATE | REVISION |
|---|---|---|---|
| DRAWN BY | D. Gil | 18/05/2022 | 1 |
| APPROVED BY | P.Punti | 14/03/2023 | |

TECNOSPIRO MACHINE TOOL SLU

## 7.3 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 31].

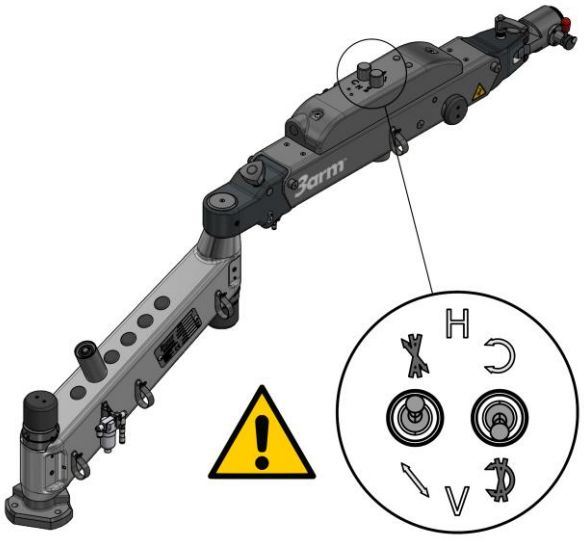
- If you decide to work without compensators, carefully read the following chapter about their operation [See L92 PNEUMATIC LOCK: USE WITHOUT COMPENSATORS page 32].

### 7.3.1 L92 PNEUMATIC LOCK: USE WITH COMPENSATORS

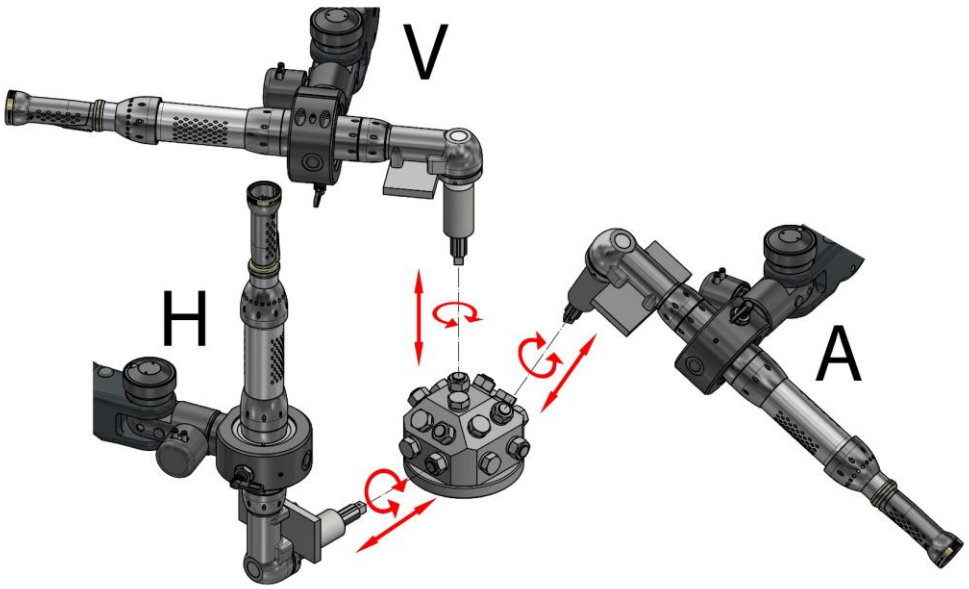
The use of telescopic compensators allows screw-mounting or tightening in any position (V-Vertical, H-Horizontal, A-Angle) with the arm completely blocked.

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.

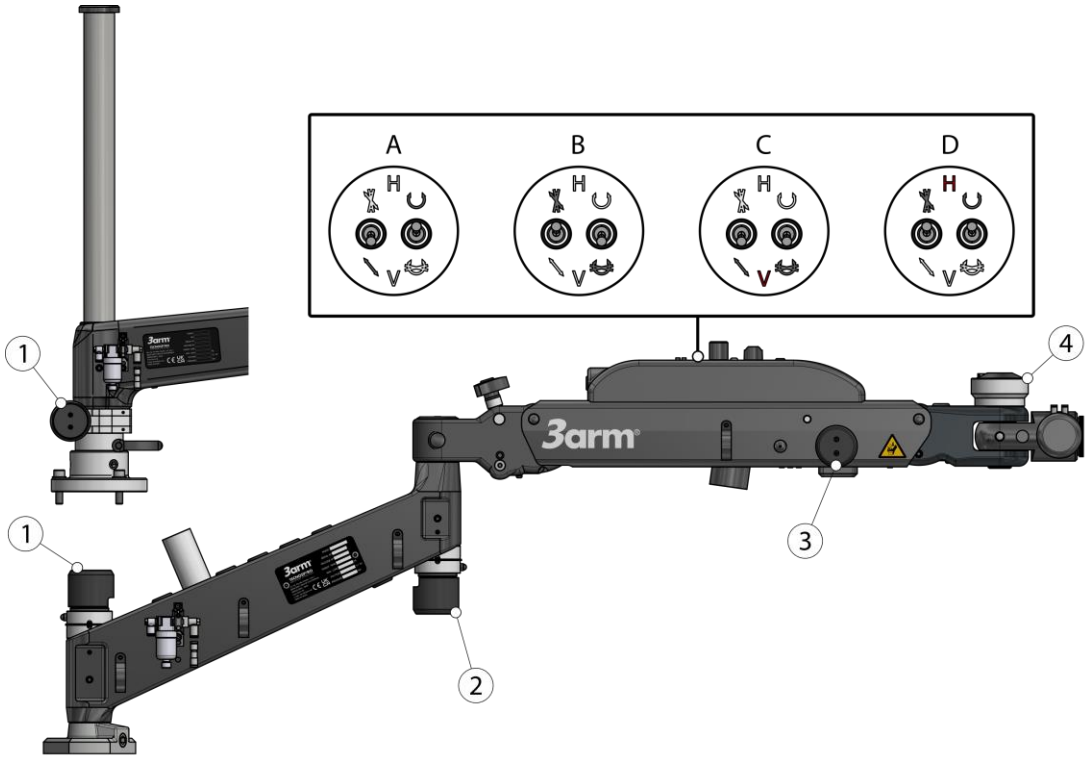



2. Install the compensator that you have acquired with the tool according to the needs of torque and size of the panel (Consult your distributor regarding the characteristics of the compensators).
3. Connect the tool along with your control device following the manufacturer's recommendations [See ELECTRO-PNEUMATIC SYSTEM page 36].
4. Compress the regulator into its position (V-Vertical, H-Horizontal or A- Angle) as necessary and actuate the tool.



### 7.3.2 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-** Cross radial lock
**3-** Arm tilting lock
**4-** Head lock[7]

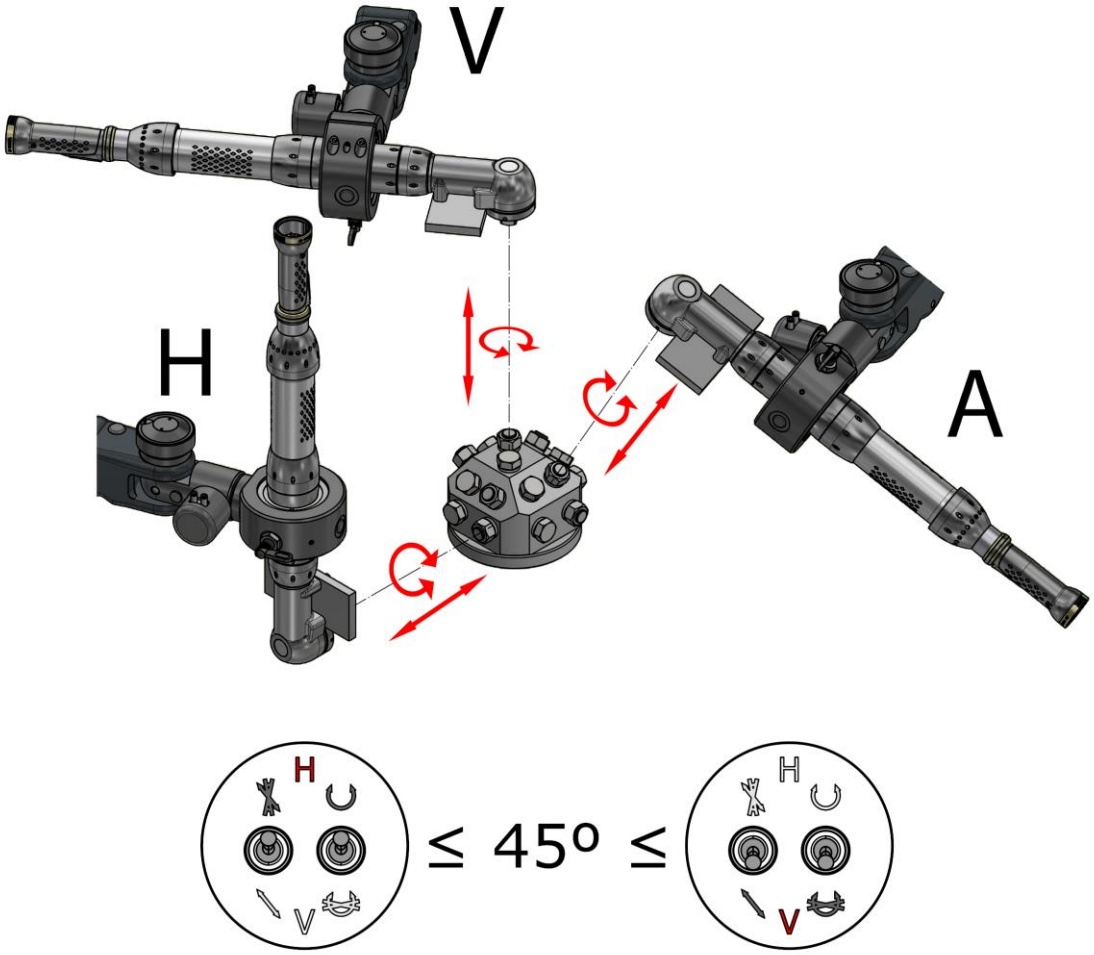
Below, the movements that are locked and unlocked depending on the **position of the switch when the tool is operated**. (The switches are on the cover of the arm).

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

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 page31]

[7] Optional, depending on the head. See operation at ***Appendix of S0-S3-S4 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:

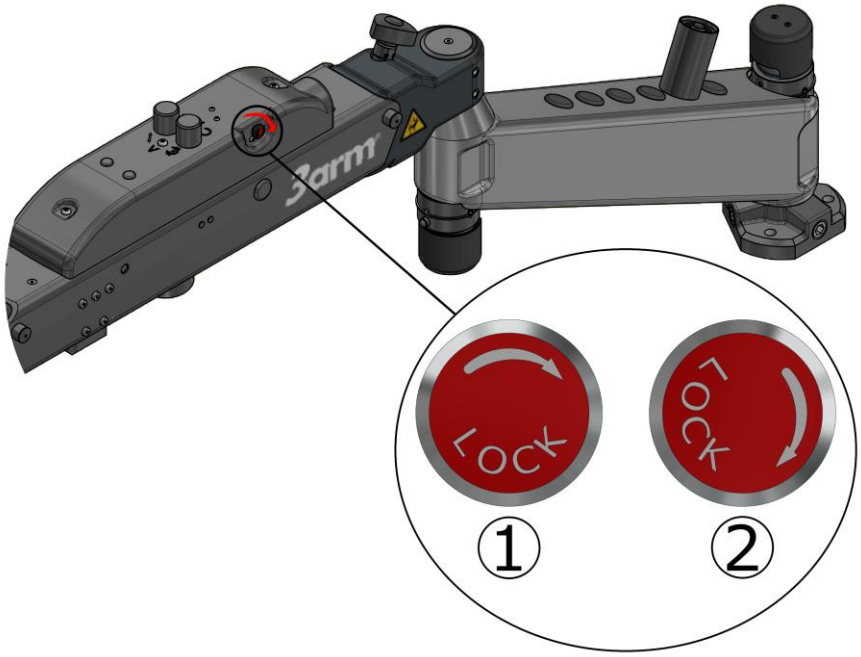
- ≤ 45º → H
- ≥ 45º → V

### 7.3.3 L92 PNEUMATIC LOCK: MANUAL ACTIVATION

When the wheel on the cover is operated (Versions L92), **the arm's pneumatic lock is activated.**

The wheel has to move from position 1 to 2.
To do this, apply a slight rotation, with your hand, as indicated in the diagram.

**1- Wheel extended, arm free.**
**2- Retracted wheel, lock activated** [See L92 PNEUMATIC LOCK page 30].



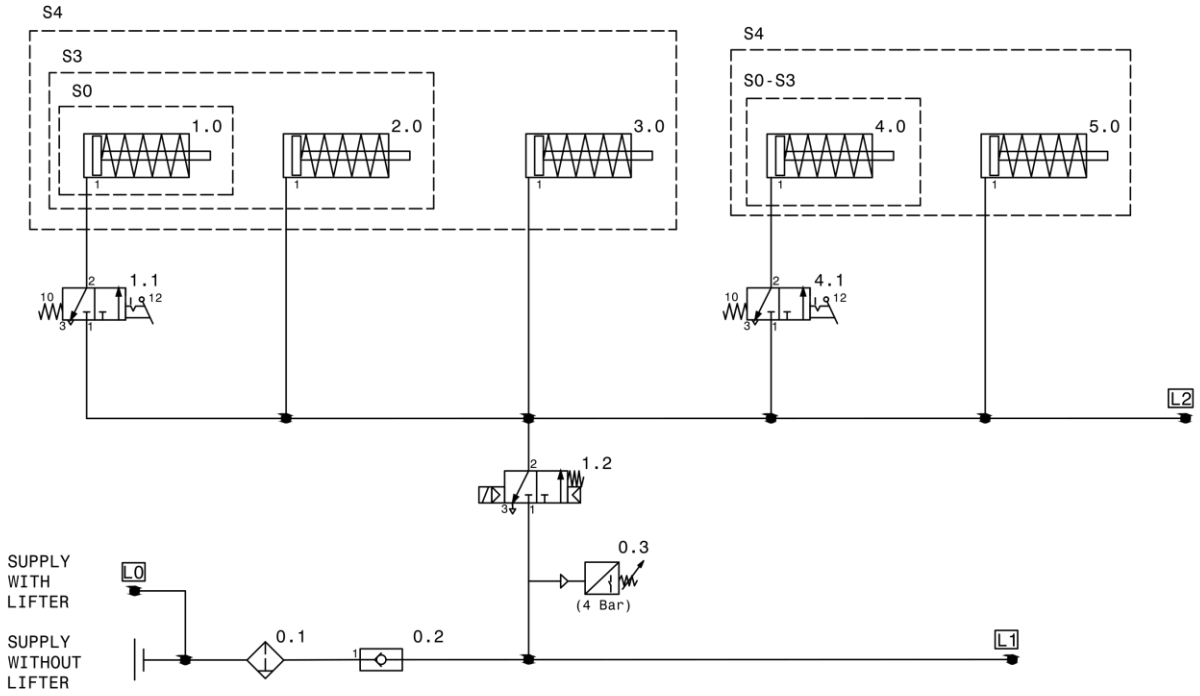

To disable the lock, proceed in reverse order (from 2 to 1), rotating it the opposite direction.

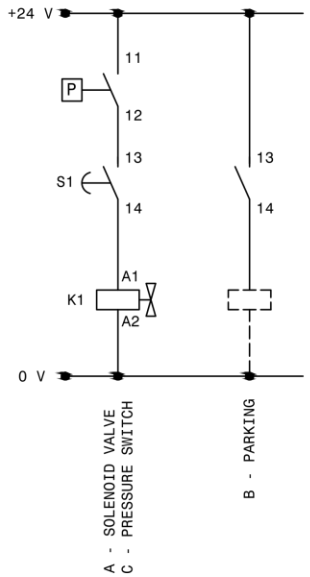
**- Keep it in position 2 during maintenance tasks, periods when not in use, and when changing the tool and/or head.**

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

## 7.3.4 L92 pneumatic diagram

| REF | QUANT | CODE | DESCRIPTION |
|---|---|---|---|
| 0.1 | 1 | NH029026 | AIR FILTER AC10-Q2U003 |
| 0.2 | 1 | NH026186 | CHECK VALVE AKH04-00 |
| 0.3 | 1 | EL101500 | PRESSURE SWITCH 1/8" NO 6B P311802 |
| 1.0-2.0-3.0 | - | MV405504 | RADIAL ARM LOCK CYLINDER |
| 1.1-4.1 | 2 | NH121136 | MICRO VALVE VM1000-4NU-08 |
| 1.2 | 1 | NH026026 | ELECTROVALVE 3 PORTS SYJ512-5LOU-M5-Q |
| 4.0-5.0 | - | MV406004 | TILTING ARM LOCK CYLINDER |



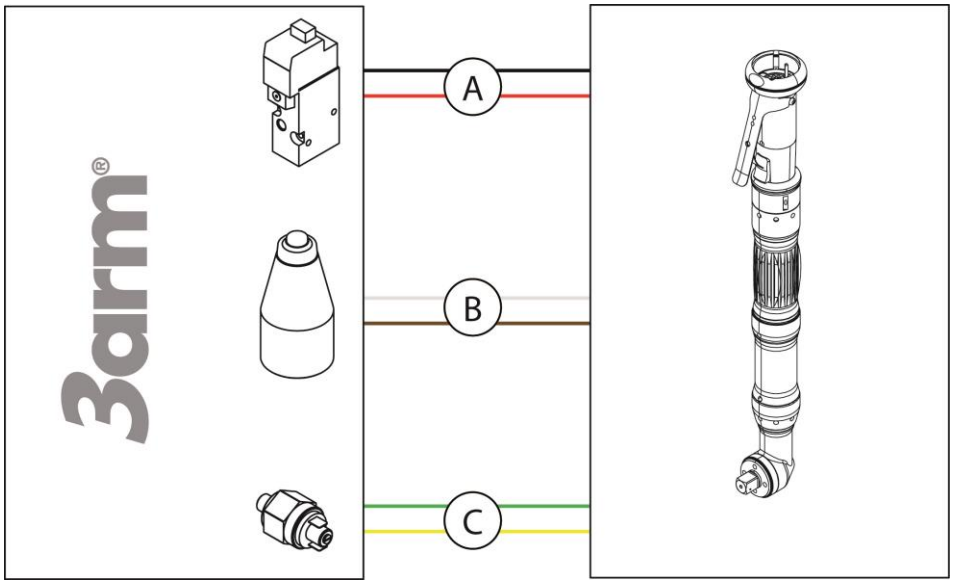




| DESCRIPTION | | | CODE |
|---|---|---|---|
| PNEUMATIC SCHEME S0/S3/S4 - L92 | | | PNEUS30002 |
| * | Naming mistake solved | | |
| | NAME | DATE | REVISION |
| DRAWN BY | D. Gil | 18/05/2022 | 2 |
| APPROVED BY | D. Gil | 20/10/2023 | |

TECNOSPIRO MACHINE TOOL SLU — SPIROGEAR

### 7.3.5 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) Electrovalve. Cables labelled A (red and black cables).***
The electrovalve is responsible for operating the arm locks when the tool is functioning.

***b) Parking. Cables labelled B (white and brown cables)***
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) Pressure switch Cables labelled C (green and yellow cables)***
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.**

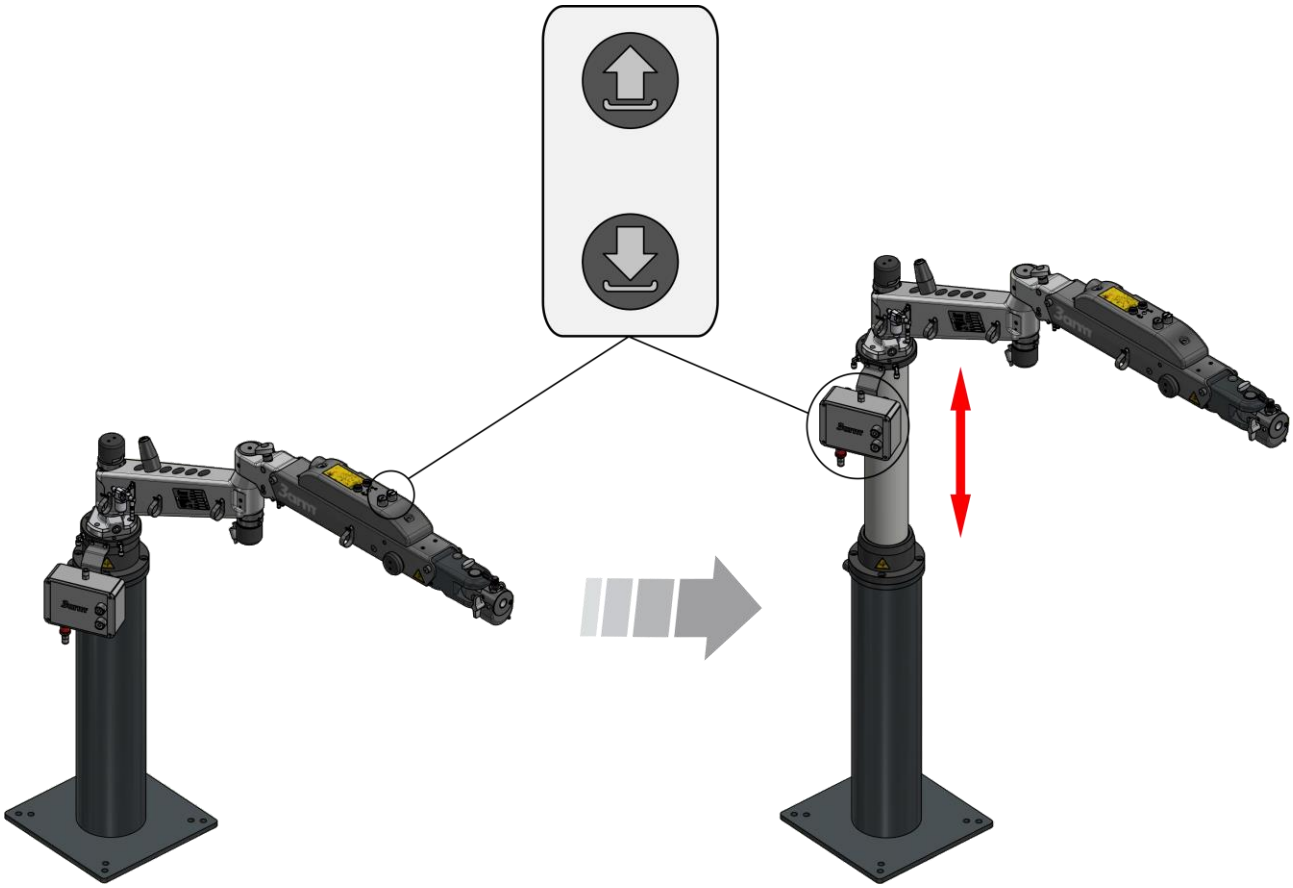
## 7.4 LIFTER / PNEUMATIC COLUMN

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.**

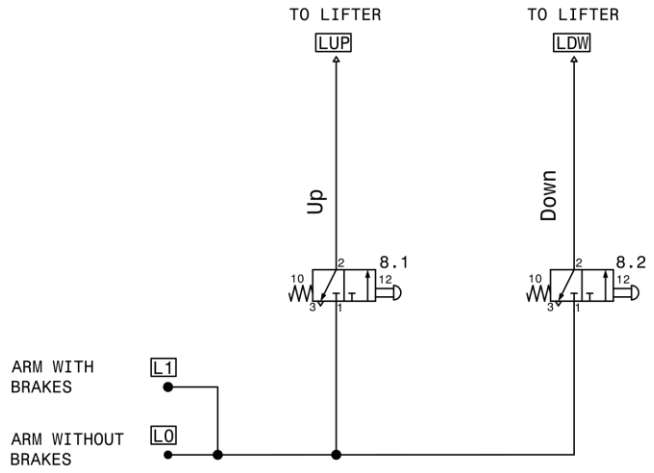


**CAUTION**

- ✓ 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.

## 7.4.1 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 |

| * | Standardization of the scheme |
|---|---|

| | NAME | DATE | REVISION |
|---|---|---|---|
| DRAWN BY | D. Gil | 18/05/2022 | 1 |
| APPROVED BY | P.Punti | 14/03/2023 | |

TECNOSPIRO MACHINE TOOL SLU

# 8 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.

## 8.1 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. ISO8573-1 2010

| ISO 8573-1:2010 CLASS | PARTICLES | | | | WATER | | OIL |
|---|---|---|---|---|---|---|---|
| | Maximum number of particles of the following size [µm]/m³ of compressed air | | | Mass Concentration | Vapour Pressure Dewpoint | Content of liquid | Total content (liquid, aerosol, gas) |
| | 0.1 - 0.5 µm | 0.5 - 1 µm | 1 - 5 µm | [mg/m³] | [°C] | [g/m³] | [mg/m³] |
| 0 | By definition of the user, less contamination than class 1 | | | | | | |
| 1 | ≤ 20000 | ≤ 400 | ≤ 10 | - | ≤ -70 | - | ≤ 0.01 |
| 2 | ≤ 400000 | ≤ 6000 | ≤ 100 | - | ≤ -40 | - | ≤ 0.1 |
| 3 | - | ≤ 90000 | ≤ 1000 | - | ≤ -20 | - | ≤ 1 |
| 4 | - | - | ≤ 10000 | - | ≤ +3 | - | ≤ 5 |
| 5 | - | - | ≤ 100000 | - | ≤ +7 | - | - |
| 6 | - | - | - | ≤ 5 | ≤ +10 | - | - |
| 7 | - | - | - | 5 - 10 | - | ≤ 0.5 | - |
| 8 | - | - | - | - | - | 0.5 - 5 | - |
| 9 | - | - | - | - | - | 5 - 10 | - |
| X | - | - | - | > 10 | - | > 10 | > 5 |

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

## 8.2 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 [See PNEUMATIC LOCKS page 46]
The stroke of the locking brake actuators is 1.2 mm.

**CAUTION**

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

## 8.3 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 40 Nm.

## 8.4 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.

## 8.5 REPLACING THE GAS SPRING AND CYLINDER

**BEFORE REPLACING THE GAS SPRING**

- ✓ The equipment must be duly installed and integrated.
- ✓ Disconnect the pneumatic supply from the equipment (if connected).
- ✓ It is advisable to dedicate two operators to this task.
- ✓ If the arm has a double spring, in the event a fault is detected in one of the two, both springs must be replaced.

**1-** Remove the screws (1) (2.5 mm Allen key) and remove the cover (2).

**2-** Swivel the arm to its highest position.

**WARNING! KEEP THE ARM IN THAT POSITION**

**3-** Rotate the regulation flywheel (3) anticlockwise all the way.

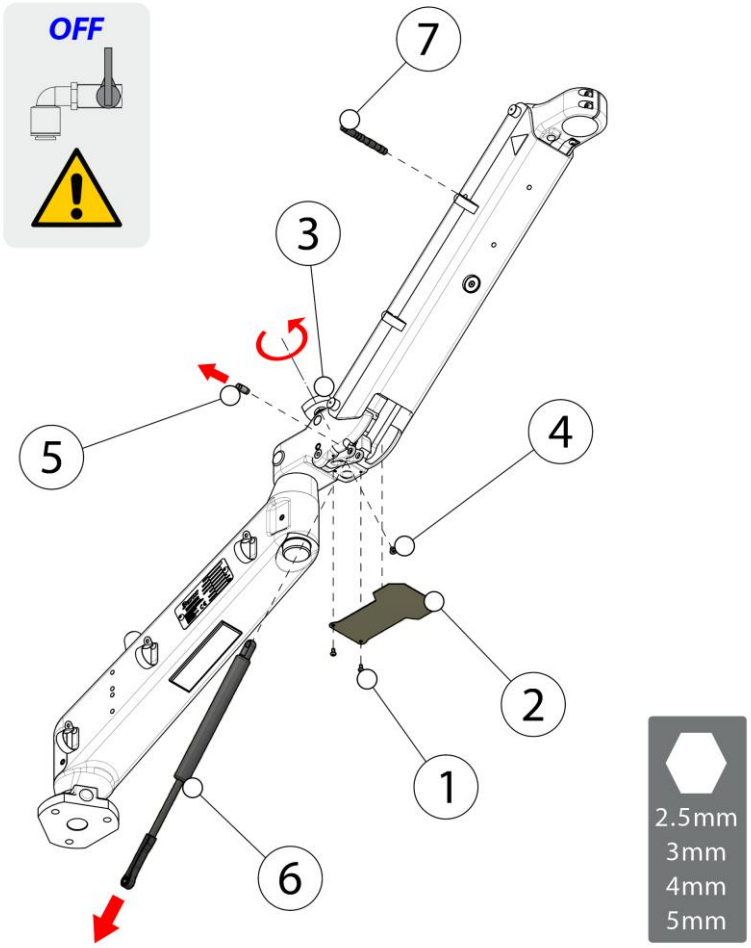
**4-** Remove the screw (4) (3 mm Allen key) from the end of the fork.

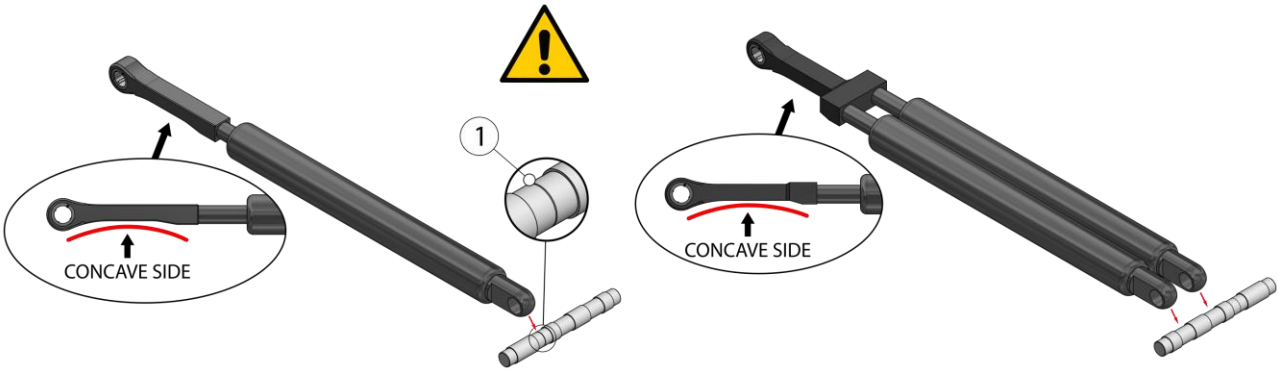
**5-** Turn the regulation flywheel (3) again until the lower shaft of the spring protrudes.

**6-** Remove the lower shaft of the spring (5) in the direction indicated in the image, securing the spring (6).

**7-** Remove the upper shaft of the spring (7) and remove the spring (6) by moving it in the direction indicated.

**8-** Replace the spring (6) and proceed in reverse order for assembly.






**Pay special attention to the position of the shock absorber within the groove of the arm shaft**. If the shock absorber is single, mount it in the groove indicated with the notch (1), however, if the shock absorber is double, mount it in the grooves not marked with the notch (1).
In turn, mount the **"concave" face** of the shock absorber facing **downward.**

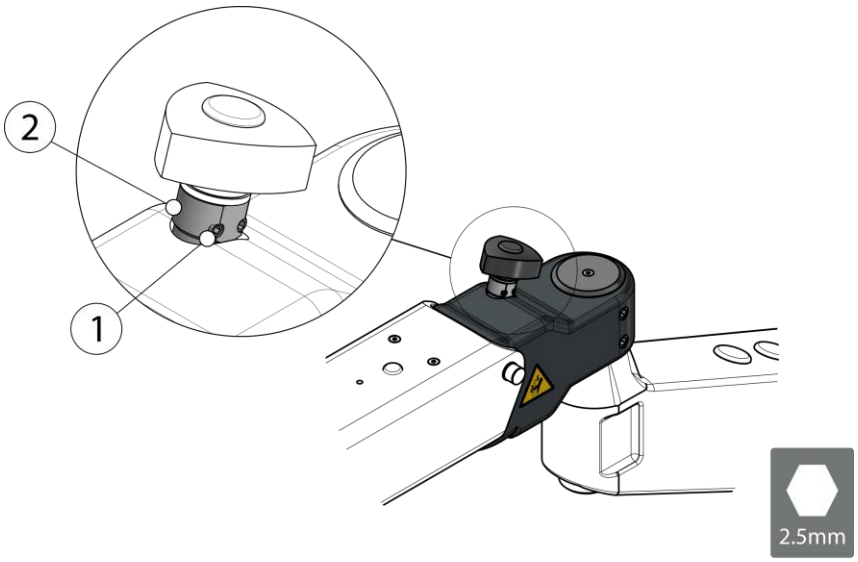
**ARMS WITH DOUBLE SPRING.**

**If the arm has a double spring, in the event a fault is detected in one of the two, both springs must be replaced.**

## 8.6 ADJUSTING THE SPRING REGULATION SYSTEM

**Operation to be carried out as maintenance, in case play should appear in the regulation assembly.**

1. Move the arm to its lowest position.
2. Loosen the studs (1) (2.5 mm Allen key).
3. Adjust the nut (2) until there is no play. The noise must disappear. Do not tighten this nut too much, as it stops the regulation turning gently.
4. Re-tighten the studs (1) (2.5mm Allen key).

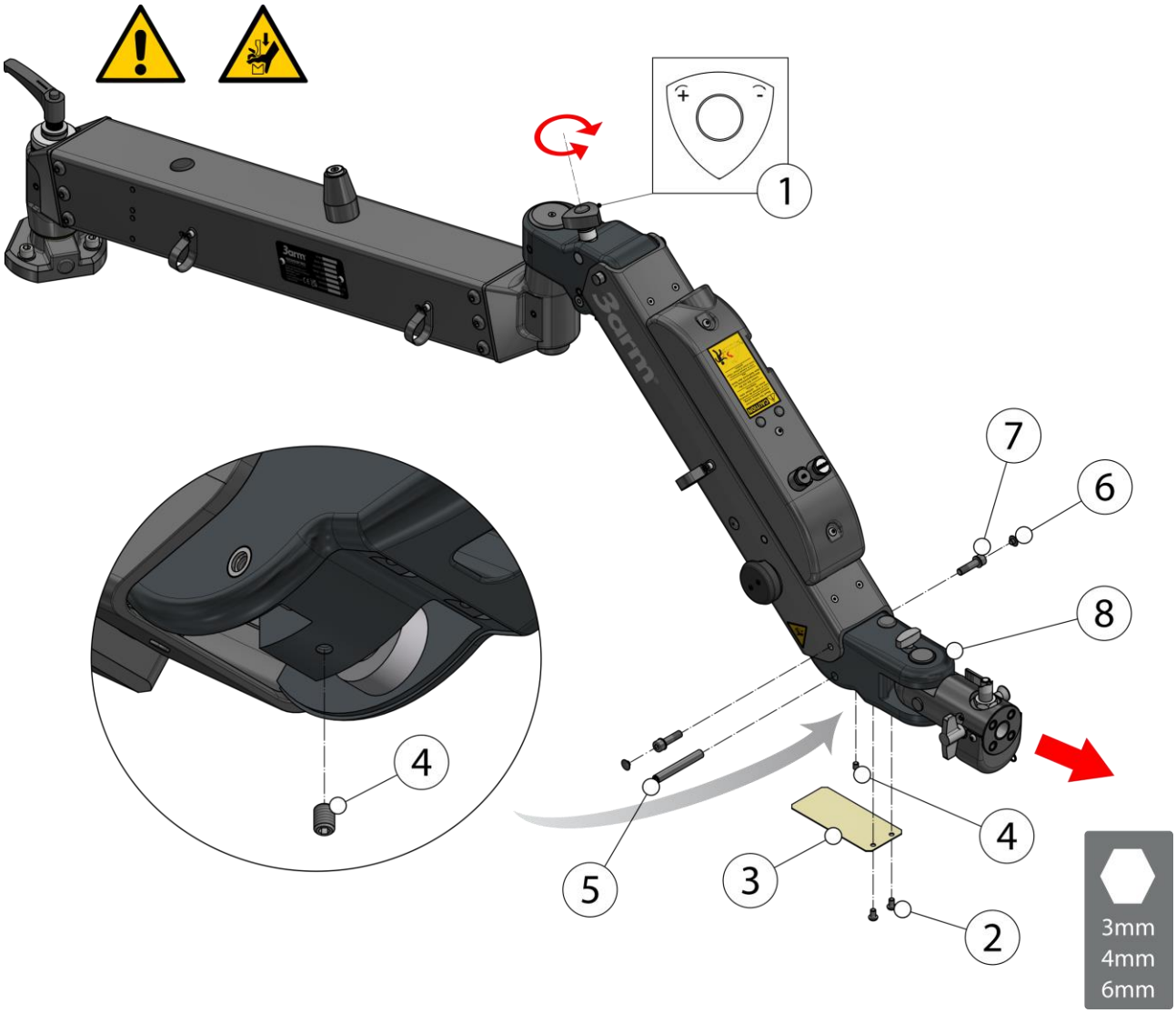


## 8.7 REPLACING THE HEAD

**BEFORE REPLACING THE HEAD**

- ✓ The equipment must be duly installed and integrated.
- ✓ Disconnect the pneumatic supply from the equipment (if connected).
- ✓ It is advisable to dedicate two operators to this task.

1. Remove all tension from the shock absorber (1) [See BALANCING THE ARM page 22].
2. Swivel the arm to its **lowest position**.
3. Remove the screws (2) (4 mm Allen key) and remove the cover (3).
4. Remove the stud (4) (3mm Allen key) and use an M6 extractor to remove the pin (5).
5. Swivel the arm to its **highest position**.
6. Remove the caps (6) and the screws (7) from the arm (6 mm Allen key).
7. The head (8) will be free and can be replaced by a new one. Proceed in reverse order for assembly.



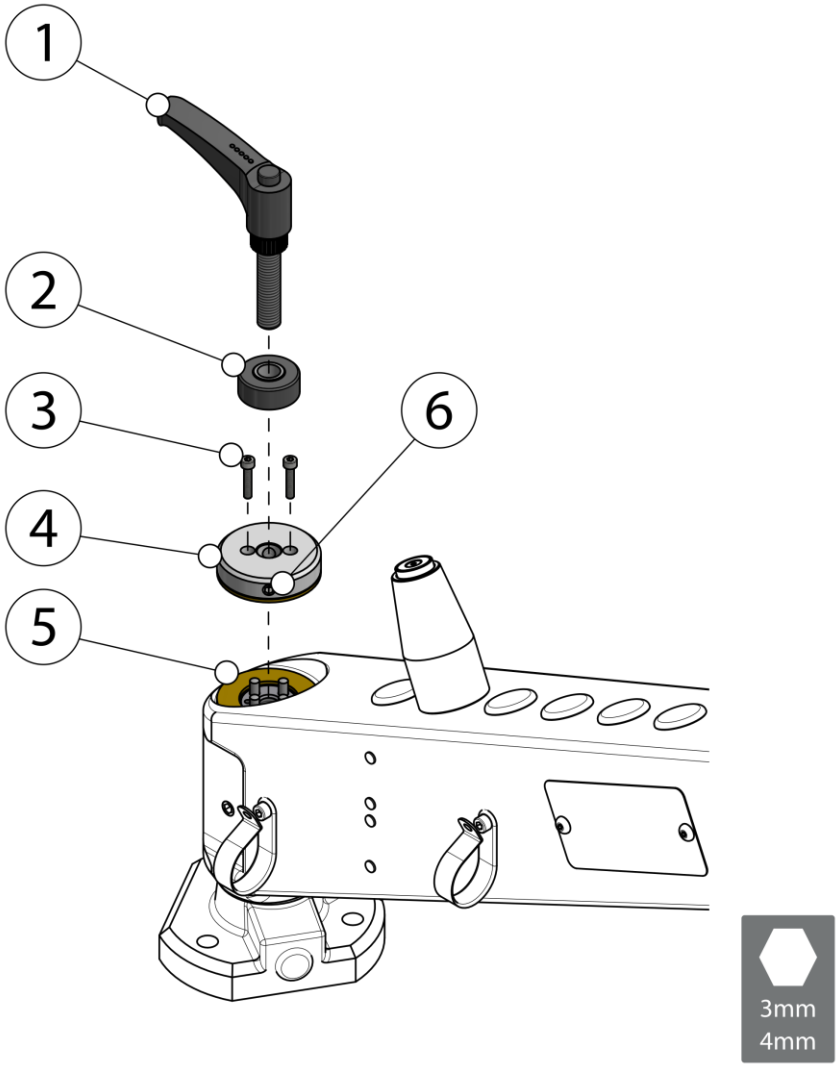
## 8.8 REPLACING RADIAL PADS L11

**BEFORE THE REPLACEMENT**

✓ The equipment must be duly installed and integrated.

**Operation valid for manual locking of the base and cross.**

1. Loosen the handle (1) and remove it together with the ring (2).
2. Remove the screws (3) (3mm Allen key) and remove the pad assembly (4).
3. Check the condition of the pad (5). If it shows no signs of wear, it should not be replaced, otherwise the pad should be removed completely and the surface of the parallel should be thoroughly cleaned until no residue remains. Then glue the new pad to the parallel.
4. Replace the pad assembly (4) with the new one.
5. Tighten the screws (3) (3mm Allen key) and loosen them ¼ turn (until the parallel turns smoothly).
6. Put on the ring (2) and the handle (1).
7. Tighten/loosen the studs (6) (4mm Allen key) to eliminate any play in the handle (1) so that it works comfortably and any unintentional loosening is avoided.

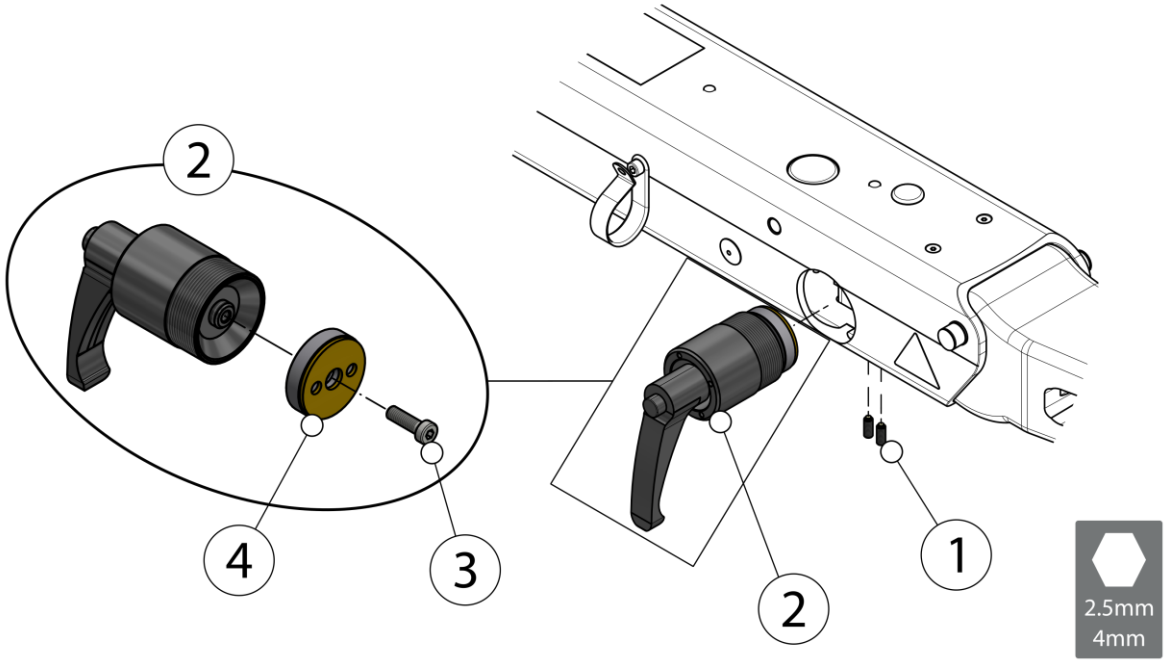


## 8.9 REPLACING TILTING PADS L11

**BEFORE THE REPLACEMENT**

✓ The equipment must be duly installed and integrated.

1. Loosen the studs (1) (2.5 mm Allen key) from the bottom of the arm.
2. Unscrew the brake assembly (2) with a compass wrench.
3. Remove the screw (3) (4 mm Allen key) from the brake assembly (2).
4. Replace the pad (4) with the new one. Apply sealant, tighten screw (3) (4 mm Allen key) and loosen it ¼ turn.
5. Screw in the brake assembly (2) and tighten the studs (1) (2.5 mm Allen key).



## 8.10 MAINTENANCE TABLE

The following table summarises the preventive maintenance tasks that will ensure the proper functioning of the equipment.
The time period detailed in the table corresponds to a normal environment. If your equipment is installed in a dirty environment (foundries, outside, dust, humidity...) you should reduce the interval between maintenance tasks.

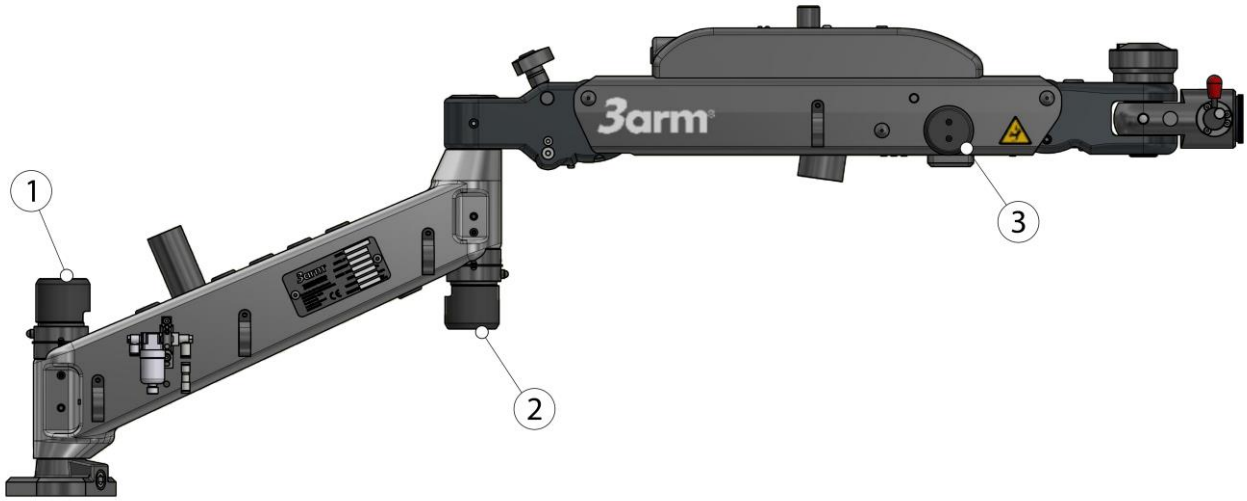
| DESCRIPTION ELEMENT | ACTION | PERIOD |
|---|---|---|
| Regulator filter (air group) | Look for breaks, scratches or any deterioration of the transparent resin vessel on the air filter, regulator. | Every six months |
| | Replace the filter cartridge. | Every two years or when the pressure drop is 0.1 MPa, whichever comes first. |
| | Remove moisture before it reaches maximum capacity. Manually open and close the air filter bleed tap. Using tools can damage the product. | Every six months |
| Screws and fasteners | Check tightening and functionality of the securing elements. | Every six months |
| General cleaning | When dirty, clean with a mild household product. Do not use other cleaning agents, as they may cause damage. | Monthly |
| General check of the pneumatic circuit and pneumatic connections | Carry out a general check of the fixings and housings between tubes. Check there is no air leakage and that the connectors are working correctly. | Monthly |
| Locking brakes | It is advisable to revise the functioning of the locking brakes periodically.<br>The frequency of this revision will, in each case, depend on the number of cycles carried out with them. To check, adjust or replace [See PNEUMATIC LOCKS page 46]. | Every six months |
| Regulation assembly | Clean and grease the threaded rod | Every six months |

# 9 PNEUMATIC LOCKS

In case of malfunction of the pneumatic locks of your 3arm® arm
In versions L22 and L92, follow these checkpoints.

**Supplement this information with that shown in section** [See L22 PNEUMATIC LOCK page 27 and L92 PNEUMATIC LOCK page 30].

## 9.1 PNEUMATIC LOCKS: IDENTIFICATION




**1-** Base radial lock
**2-** Cross radial lock
**3-** Arm tilting lock

## 9.2 CHECKING CONNECTIONS: BETWEEN DEVICE CONTROL AND 3arm®

**For L92 versions only.**

The locks failing to act in L92 versions is often due to a bad connection between the device control and the 3arm®. **To avoid this, it is advisable to activate the pneumatic lock manually** [See L92 PNEUMATIC LOCK: MANUAL ACTIVATION page 34].

**If the check is satisfactory, so that the cylinders are operated manually, make sure that the 3arm® arm - tool controller connection is properly made** [See ELECTRO-PNEUMATIC SYSTEM page 36] Also verify that the checkpoints described below are passed successfully.

## 9.3 CHECKING THE AIR SUPPLY

**BEFORE CARRYING OUT THE CHECKS**

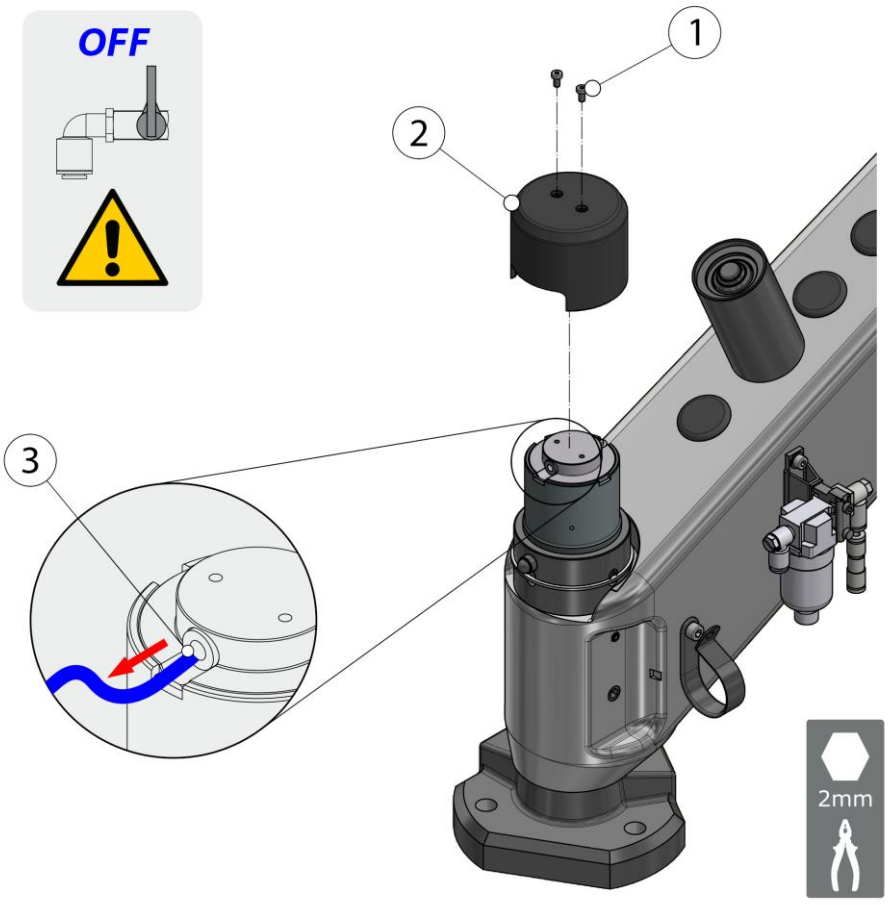
- ✓ The equipment must be duly installed and integrated.
- ✓ Disconnect the pneumatic supply from the equipment.

**Operative valid for any locking cylinder.**

To perform this check:

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

If the check is not satisfactory, review the pneumatic diagram paying special attention to the connection between tubes and derivations, pinching or a failure with the electrovalve (in versions L92).



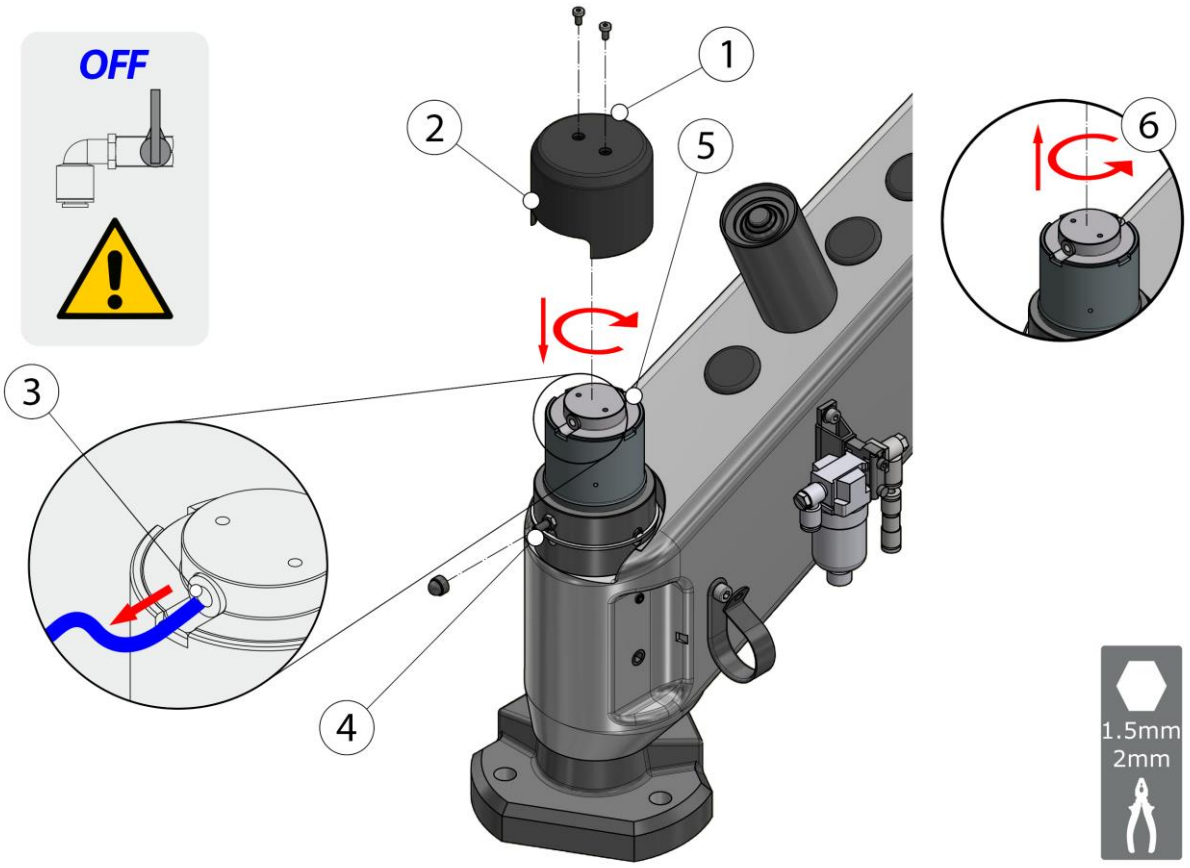
## 9.4 CHECKING CYLINDER ADJUSTMENT

**BEFORE CARRYING OUT THE CHECKS**

- ✓ The equipment must be duly installed and integrated.
- ✓ Disconnect the pneumatic supply from the equipment.

**Operative valid for any locking cylinder.**

1. Release the air pressure of the arm.
2. Remove the cap (2), first removing the screws (1) (2 mm Allen key) and disconnect the air supply tube from the joint (3) that feeds the cylinder.
3. Loosen the stud (4) (1.5 mm Allen key).
4. Screw the cylinder (5) clockwise until it stops.
5. Slightly unscrew (6) the cylinder (5) anticlockwise (approx. 1/12 turn).
6. 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).

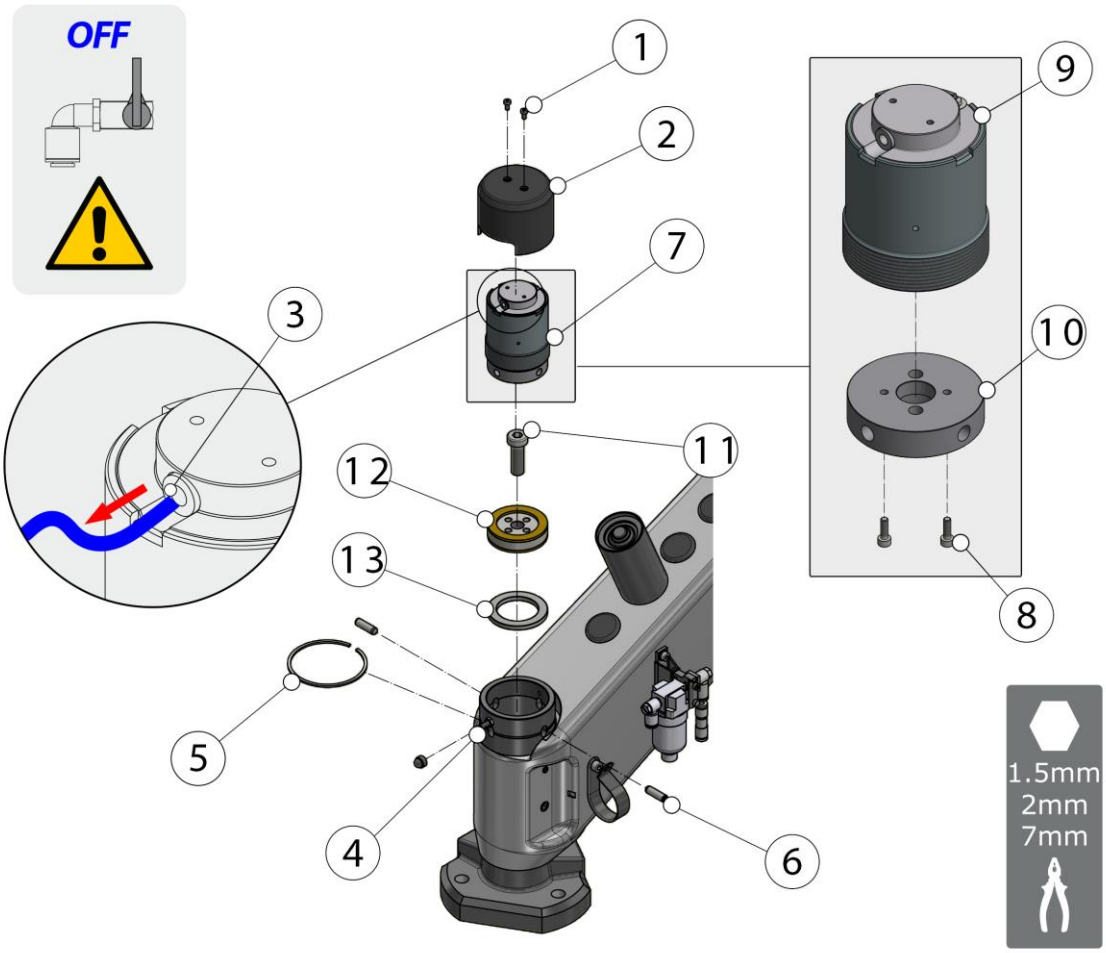
## 9.5 REPLACING THE CYLINDER and/or RADIAL PADS

**BEFORE THE REPLACEMENT**

- ✓ The equipment must be duly installed and integrated.
- ✓ Disconnect the pneumatic supply from the equipment.

**Procedure valid for the cylinders of the base and cross.**
**If you wish to replace the locking cylinder (9) carry out steps 1- 6 and 10-16.**
**If you have the pad replacement kit (12) carry out the full process.**

1. Release the air pressure of the arm.
2. Remove the cap (2), first removing the screws (1) (2 mm Allen key) and disconnect the air supply tube from the joint (3) that feeds the cylinder.
3. Loosen the stud (4) (1.5 mm Allen key).
4. Remove the safety ring (5) and use an M4 extractor to remove the pins (6).
5. Unscrew the cylinder assembly (7) and remove it.
6. Remove the screws (8) (2 mm Allen key) and separate the cylinder (9) from the pushrod (10).
7. Remove the screw (11) (7 mm Allen key) and use an M10 extractor to take out the brake assembly with the pads (12) and remove the brake disc (13).



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

**ⓘ INFORMATION**

The cylinder replacement kit **MV405504** includes part (9).

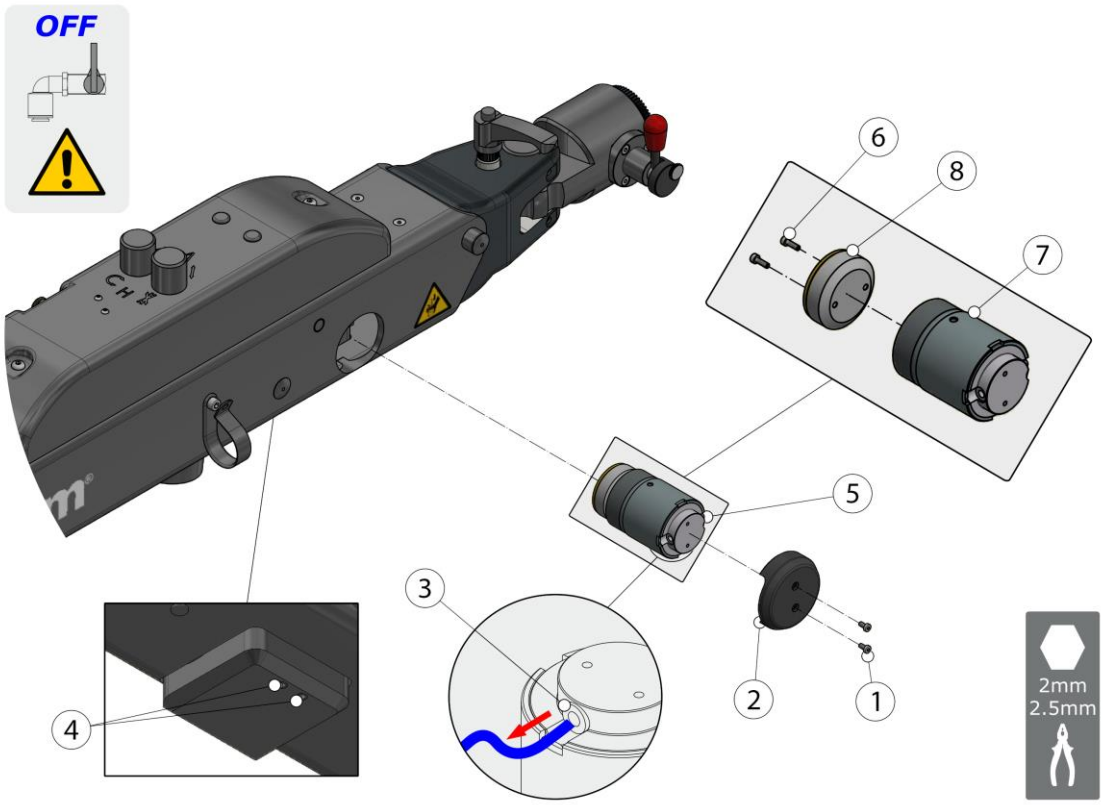
The cylinder replacement kit **MV4062A4** includes part (12).

## 9.6 REPLACING THE CYLINDER AND/OR SWIVEL PADS

**BEFORE THE REPLACEMENT**

- ✓ The equipment must be duly installed and integrated.
- ✓ Disconnect the pneumatic supply from the equipment.

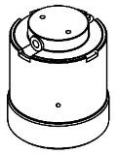
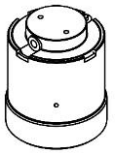
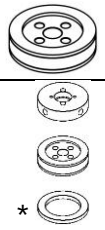
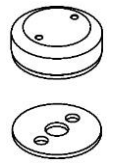
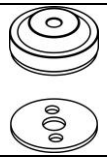
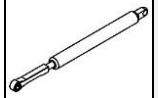
1. Release the air pressure of the arm.
2. Remove the cap (2), first removing the screws (1) (2 mm Allen key) and disconnect the air supply tube from the joint (3) that feeds the cylinder.
3. Loosen the studs (4) (2.5mm Allen key) from the bottom of the arm.
4. Unscrew the cylinder assembly (5) and remove it.
5. Remove the screws (6) (2 mm Allen key) and separate the cylinder (7) from the pushrod (8).
6. Replace the cylinder (7) and/or the pushrod with the pads (8).
7. Assemble the cylinder (7) and the pushrod (8) with the screws (6) (2 mm Allen key).
8. Screw the cylinder assembly (5) all the way on and unscrew it slightly, anticlockwise (approx 1/12 turn).
9. Tighten the studs (4) (Allen key 2.5mm) and connect the supply tube.
10. Put the cover in place (2) with the screws (1) (2 mm Allen key).
11. Check the lock works correctly.



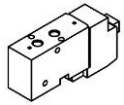
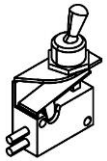
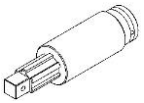
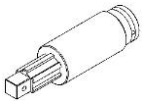
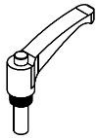
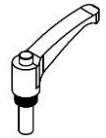
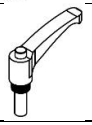
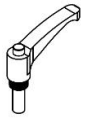
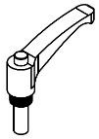
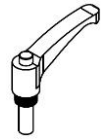

**INFORMATION**

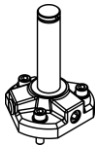
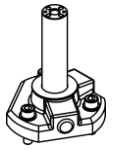
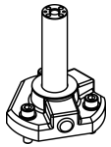
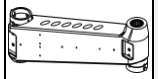
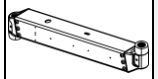
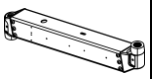
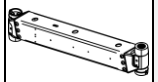
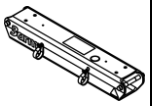
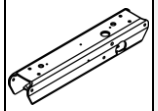
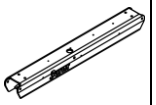
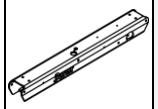
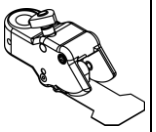
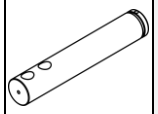
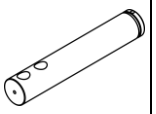
To replace the pad inside the arm, consult your 3arm® distributor.

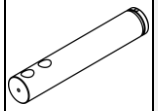
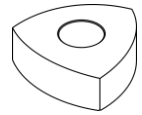
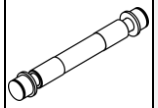
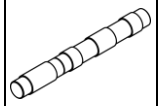
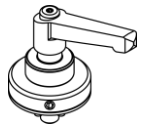
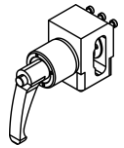
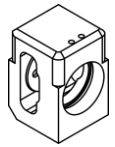
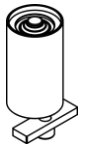
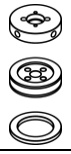
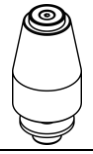
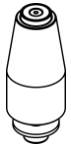
## 10 SPARE PARTS

| CODE | DESCRIPTION | PICT. | CODE | DESCRIPTION | PICT. |
|---|---|---|---|---|---|
| **MV405504** | RADIAL ARM LOCK CYLINDER |  | **MV406004** | SWING ARM LOCK CYLINDER |  |
| **MV405903** | CLAO CAP, CIL 42 |  | **MV406503** | CLAO CAP, CIL 38 |  |
| **MV4062A4** | D33 RADIAL PAD ASSY<br>* (From S/N: 003-631/ 004-95) |  | **MV431805** | SWING ARM PAD REPLACEMENT KIT L22-L92 |  |
| **MV431905** | SWING ARM PAD REPLACEMENT KIT L11 |  | **MV30I505** | RADIAL ARM PAD REPLACEMENT KIT "L11"<br>* (Previous S/N: 003-631 /004-95) |  |
| **MVHXXX04**[8] | DAMPER KIT, 1 UNIT (MAX. 130 kg) |  | **MVHXXX04** | DAMPER KIT, 2 UNITS (140- 260 kg) |  |
| **MV404604R** | SOLENOID VALVE PUNCH ASSEMBLY, NB |  | **MV499104R** | AIR FILTER ASSEMBLY |  |

[8] **XXX** corresponds to the shock absorber load

| | | | | | |
|---|---|---|---|---|---|
| **MV30G1A3** | BUTTON PANEL COVER, L22 |  | **MV4075A3** | BUTTON PANEL COVER, L92 |  |
| **EL101500** | PRESSURE SWITCH 1/8" NO 6 bar |  | **NH026026** | SOLENOID VALVE |  |
| **NH121136** | MECHANICAL MICROVALVE |  | **MV432405** | KIT CAP HOLDERS SELECTORS |  |
| **MV328104** | FLOATING SPINDLE T2140801/00 3/4"<br>(Stroke: 45 mm/ 1.77" - □¾"<br>Max Torque: 300 Nm – 1.5Kg / 0.7 lbs) |  | **MV328204** | FLOATING SPINDLE T2141212/00 1/2"<br>(Stroke: 40 mm/ 1.57"– □½"<br>Max Torque: 150 Nm – 0.9 kg / 0.4 lbs) |  |
| **M31794A0R** | TILTING LOCK HANDLE L11 |  | **CM129200** | BASE LOCK HANDLE L11 |  |
| **AC060516** | CROSS LOCK HANDLE L11 |  | **MV498804R** | STAY - BS |  |
| **MV397204R** | STAY - BM |  | **MV30C704R** | FORK REGULATION ASSEMBLY, Ø15 |  |
| **MV30C704HR** | FORK REGULATION ASSEMBLY,<br>Ø15 - HARD |  | **CM103800** | CROSS LOCK HANDLE L11- HARD |  |
| **M31025A0R** | TILTING LOCK HANDLE L11 - HARD |  | **M3164700R** | BASE LOCK HANDLE L11 - HARD |  |

| | | | | | |
|---|---|---|---|---|---|
| **MV30F405R** | BASE WITHOUT LOCKING - L00 |  | **MV30F305R** | BASE FOR MANUAL LOCKING - L11-L50 |  |
| **MV30F105R** | BASE FOR PNEUMATIC LOCKING - L22-L92 |  | **MV303005R** | RADIAL ARM PS - L00-L11-L50 |  |
| **MV30F205R** | RADIAL ARM PS - L22-L92 |  | **M3310600** | RADIAL ARM PS - L22-L92 - LOCKING SYSTEM & CROSS UNIT |  |
| **MV303105R** | RADIAL ARM PL - L00-L11-L50 |  | **MV399604HR** | RADIAL ARM PL - L11 - HARD |  |
| **MV30F005R** | RADIAL ARM PL - L22-L92 |  | **M3275200** | TILTING ARM BS - L00 |  |
| **MV3012B3** | TILTING ARM BS - L11-L22-L92 |  | **MV3062A3** | TILTING ARM BM - L00 |  |
| **MV3061A3** | TILTING ARM BM - L11-L22-L92 |  | **MV330905** | CROSS UNIT UNION |  |
| **MV308403** | SPINDLE OF THE CROSS UNIT - NO LOCKING |  | **MV3031A3** | SPINDLE OF THE CROSS UNIT - WITH L11 |  |

| | | | | | |
|---|---|---|---|---|---|
| **MV3031B3** | SPINDLE OF THE CROSS UNIT - WITH L22 |  | **AC020056** | REGULATING HANDWHEEL |  |
| **MV498904R** | HEADS & CROSS UNIT AXIS WITH SCREWS |  | **MV301003** | DAMPER AXIS AT THE ARM-1 DAMPER & 2 DAMPERS |  |
| **M3210400R** | KIT L11 MANUAL LOCKING PS-PL |  | **M3163500R** | BASE BRAKE STEEL HANDLE |  |
| **MV3034A5R** | CROSS UNIT LOCKING HANDLE (L11) – STANDARD (PS/PL) |  | **MV330605** | KIT L11 MANUAL LOCKING BS-BM |  |
| **MV305205R** | SWIVEL ARM LOCKING SUPPORT - L11, L22, L92 |  | **MV30M205R** | KIT PARKING SUPLEMENT ASSY |  |
| **MV4315A5** | RADIAL ARM PAD REPLACEMENT KIT - L22, L92 (Previous S/N: 003-631 /004-95) |  | **MV30E905R** | KIT SHORT MAGNETIC SUPPLEMENT |  |
| **MV30E705R** | KIT LONG MAGNETIC SUPPLEMENT |  | | | |

# 11 ACCESSORIES

**Caution: not all the accessories shown below are compatible. Check the compatibility table** [See COMPATIBILITY OF ACCESSORIES page 60].

## BENCHES

(1) (2) (3)



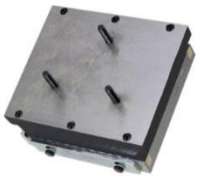
Four wheels (two with brake)
Slots for fastening parts or tools.
Supports for tap holder or tools.

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

## SUPPORTS

(1)

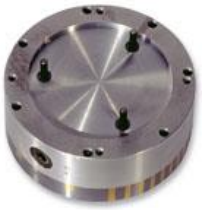
Tie for securing the machine
Magnetic support for placing it on a metal surface and securing the machine



(3)

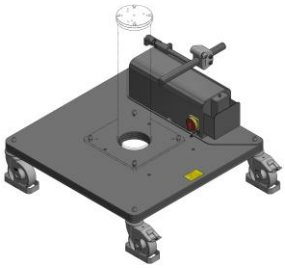
(2)

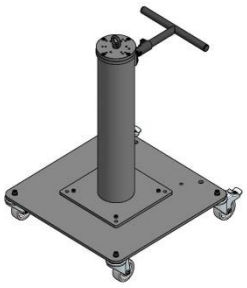
| CODE | DESCRIPTION | DIMENSIONS |
|---|---|---|
| BR000100 | Small tie (1) | N/A |
| BR100100 | Large tie (2) | N/A |
| IA000100 | Magnetic support (3) | 150x150 |
| IB000100 | Magnetic support (4) | Ø200 |
| IC000100 | Magnetic support (5) | Ø250 |



(4)(5)

## TROLLEY



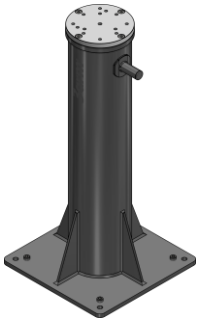


To move the work unit.
It has four orientable wheels.

| DESCRIPTION | DIMENSIONS | |
|---|---|---|
| Carriage 700 | 700x700 mm | 27 9/16" x 27 9/16" |
| Carriage 900 | 900 x 900 mm | 35 7/16" x 35 7/16" |
| Electric carriage | 900 x 900 mm | 35 7/16" x 35 7/16" |
| Electric carriage | 800x800 mm | 31 1/2" x 31 1/2" |

## FIXED COLUMN

To secure to the floor using four metal studs.



| DESCRIPTION/DIMENSIONS | |
|---|---|
| Column 62 mm | 2 ½ " |
| Column 112 mm | 4 3/8″ |
| Column 162 mm | 6 3/8″ |
| Column 275 mm | 10 7/8" |
| Column 375 mm | 14 ¾" |
| Column 450 mm | 17 ¾" |
| Column 635 mm | 25" |
| Column 740 mm | 29 1/8" |
| Column 850 mm | 33 ½" |
| Column 1100 mm | 43 ¼" |
| Column 1350 mm | 53 1/8" |
| Column 1600 mm | 63" |

## LIFTER

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

| DESCRIPTION | VERTICAL TRAVEL |
|---|---|
| Lifter 300 | 300 mm – 11 7/8" |
| Lifter 500 | 500 mm – 19 7/8" |
| Lifter 750 | 750 mm – 29 17/32" |

## COLUMN D63

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 TRAVEL |
|---|---|
| Column 1500 D63 | 940 mm – 37" |
| Column 2000 D63 | 1440 mm – 56 11/16" |
| Column 2500 D63 | 1940 mm – 76 3/8" |

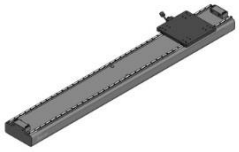
## EXTENSION

(1) (2)

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 500 (1) | 500 mm – 19 11/16" |
| 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.

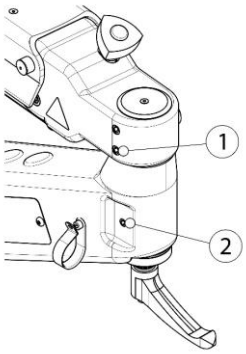
| CODE | DESCRIPTION | TRAVEL |
|---|---|---|
| CL040000 | Floor rail | 1520 mm – 59 13/16" |

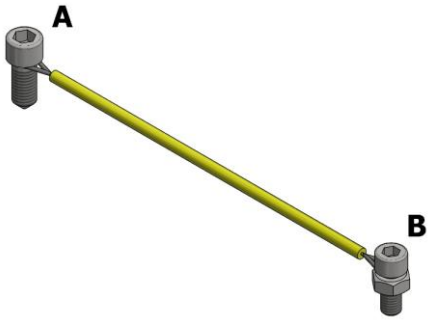
## LINEAR GUIDE

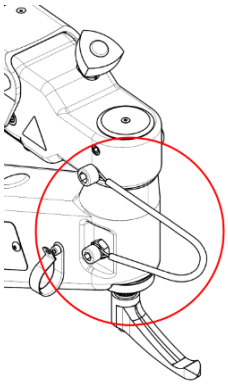
Guide for the horizontal movement of the arm. Several sections can be joined from a base section 2 m. This may be bench-top, fixed to the wall or ceiling, or on pillars of various heights that can be selected. The horizontal position can be locked at any point.

| CODE | DESCRIPTION | TRAVEL |
|---|---|---|
| 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" |

## ROTATION LIMITER



The rotation limiter is a flexible reinforced steel cable that limits the rotational movement of the front arm, to a maximum of 1 turn, with an added margin of 10% in each rotation direction.

To assemble it, unscrew the screws/studs (1) and (2) that come in the arm from the factory, and replace them with screws "A" and "B" in the KIT.

Screw "A" (M12) will go in position 1 and screw "B" (M10) in position 2.

| CODE | DESCRIPTION |
|---|---|
| LG100600 | Rotation limiter assembly |

## BASE ROTATION LIMITER

Support that limits the rotation of the radial arm of the equipment. The stops can be moved to adjust the range of rotation.

| CODE | DESCRIPTION |
|---|---|
| LG000104 | Rotation Limiter |

## HAND RAIL BRACKET

Bracket which enables you to couple your equipment to existing components in the workplace such as handrails, structures, etc.

| CODE | DESCRIPTION |
|---|---|
| CL108500 | Hand rail bracket |

### 11.1 COMPATIBILITY OF ACCESSORIES

| ACCESSORY | SERIES – 3 ARM | | | | | |
|---|---|---|---|---|---|---|
| | S0 | S1 | S2 | S3 | S4 | S6 |
| RADIAL EXTENSION | ● | ● | ● | ● | ● | ● |
| TROLLEY + FIXED COLUMN | ● | ● | ● | ● | ● | ● |
| FIXED COLUMN | ● | ● | ● | ● | ● | ● |
| PNEUMATIC TELESCOPIC LIFT | ● | ● | ● | ● | ● | ● |
| D63 PNEUMATIC LIFTER | ● | ● | ● | ● | ● | ● |
| FLOOR RAIL | ● | ● | ● | ● | ● | ● |
| LINEAR GUIDE | ● | ● | ● | * | * | * |
| SMALL BENCH (500) | * | ● | ● | ⦸ | ⦸ | ⦸ |
| MEDIUM BENCH (850 x 850) | ● | ● | ● | * | * | * |
| LARGE BENCH (1100 x 850) | ● | ● | ● | ● | ● | ● |
| SMALL TIE | ⦸ | ● | ● | * | ⦸ | ⦸ |
| LARGE TIE | ● | ● | ● | ● | ● | ● |
| HAND RAIL BRACKET | ● | ● | ● | ● | ● | ● |
| MAGNETIC SUPPORT | * | * | * | * | * | * |
| ROTATION LIMITER | ⦸ | ⦸ | ⦸ | ● | ⦸ | ⦸ |
| BASE ROTATION LIMITER | ● | ● | ● | ● | ● | ● |

● = Compatible
⦸ = NOT Compatible
* = Please ask

## 12 WARRANTY

See attached guarantee document.

# 13 GUIDELINES FOR PACKAGING, TRANSPORT AND DISMANTLING

## 13.1 PACKAGING

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

### 13.1.1 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.

### 13.1.2 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.

### 13.1.3 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.

### 13.1.4 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.

## 13.2 TRANSPORT

The following data must be taken into account for transport.

- ✓ External dimensions (width x depth x height), approx:
  - Short arm (BS) 1160 x 570 x 360 mm
  - Long arm (BM) 1460 x 580 x 360 mm
- ✓ Total weight depending on the segment: maximum approx. 25 kg

## 13.3 DISMANTLING

- ✓ 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 3 |
| Serial number: | From 003 - 2497 |

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, 26 October 2023

Ramon Jou Parrot, Technical Director

3arm®

TECNOSPIRO
MACHINE TOOL SLU