INSTRUCTION MANUAL

3arm®

SERIES 2

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ISO 9001
BUREAU VERITAS
Certification

TECNOSPIRO
MACHINE TOOL SL

DESIGN QUALITY
3arm
Made in Barcelona

www.roscamat.com

TABLE OF CONTENTS

1 INTRODUCTION

Dear customer,

We would like to congratulate you on your purchase and thank you for enabling us to continue in our work of offering our customers an easy, reliable and versatile way to improve ergonomics on the job.

We hope these easy instructions help you in starting up and using the arm you have chosen. Please pay close attention to the installation, maintenance and safety instructions detailed in these pages.

We hope you use your arm for many years and come to view your purchase of your 3arm® arm as an excellent investment.

2 ABOUT THIS MANUAL

2.1 CONSIDERATIONS

- ✓ Before using the equipment, make sure you read this instruction manual and follow the safety and operating instructions fully.
- ✓ All the instructions contained in this manual refer to the individual device; the end user is responsible for analysing and applying all the necessary safety measures required for the intended use.
- ✓ This manual must be kept near the device throughout its working life so it can be consulted in the future.
- ✓ If any part of this manual seems unclear, confusing or imprecise, please do not hesitate to contact us.
- ✓ The contents of this manual may be subject to change without prior notice.
- ✓ If the manual is lost or damaged, contact TECNOSPIRO MACHINE TOOL, S.L. so we can provide you with a new one.
- ✓ This document, or any part thereof, may only be reproduced or provided to third parties with the express written authorisation of TECNOSPIRO MACHINE TOOL, S.L.

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

- ✓ Paragraphs containing important information are indicated by grey shading.

2.2 VERSION

Document	Revision date
Instruction Manual	29/04/2019

3 SAFETY INFORMATION

3.1 SCOPE OF APPLICATION

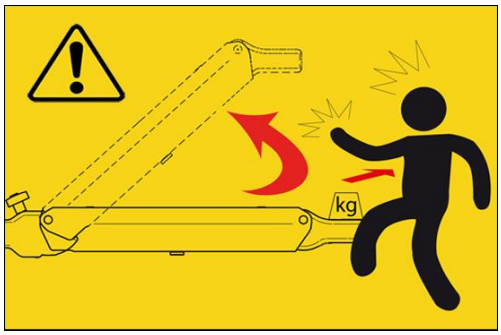
This section contains very important safety information on the arm for anyone involved at any of the stages in the life cycle of this device (transport, assembly and installation, commissioning, adjustment, training, operation, cleaning, maintenance, troubleshooting and disassembly/decommissioning).

3.2 WARNINGS AND GENERAL CONSIDERATIONS

- ✓ The device described in this document has been built using current technology and in accordance with applicable technical standards on safety. However, misuse or improper set-up by the end user may result in a risk of injury.

- ✓ The device must only be used if it is proper working order, and all safety rules and instructions in this document must be obeyed.
- ✓ Any problem that could affect the safety of the device must be corrected immediately.
- ✓ No modifications must be made to the device without due authorisation from TECNOSPIRO MACHINE TOOL, S.L.
- ✓ The device must only be used for the intended purpose; any other use is strictly prohibited. Any use other than what is indicated here will be considered misuse and is prohibited. The manufacturer assumes no liability for damage that could result from such misuse. The user shall be solely liable for all such risk incurred.
- ✓ The installer, owner and/or end user are responsible for determining whether the product is appropriate for each specific use, as well as determining the installation site and concretely defining the task to be performed with this product, within the limits set forth in this manual.
- ✓ Do not use it for any purpose not covered in this manual.
- ✓ The operator may only operate the device after having received applicable instructions for its use.
- ✓ Do not exceed the working load limits indicated in this manual, as well as those listed on the identification plate on the structure of the device.
- ✓ It is recommended that only one operator use the device at one time; any other use must be evaluated by the installer / end user.
- ✓ The operator must only use the device to perform safe movements, moving together with the device at all times and thus reducing the risk of uncontrolled or involuntary movement.
- ✓ Even though the parts that present the greatest risk of possible shearing or pinching are protected and enclosed, moving and jointed parts must not be handled during use.
- ✓ The operator must remain outside the vertical path of the swing arm.
- ✓ The work area of the device and areas where it has the greatest impact must comply with conditions of workplace safety, health and hygiene; the installer/end user is responsible for conducting a study to ensure safety.
- ✓ The presence of others in the device's working area must be restricted as much as possible in order to avoid any risk to safety; if any other use is intended, a supplementary study of the risks arising from the working mode must be conducted.
- ✓ Before adjusting or maintaining the device, the personnel and/or operators responsible for those tasks must be aware that the 3arm® arm is designed to work with a pre-established load range.

- ✓ If during handling, adjustment or maintenance, or for any other reason, the load is released from the arm (e.g. when changing tool), the arm may swing up suddenly and cause injury or damage. Thoroughly reading the section *SAFETY CONSIDERATIONS DURING MAINTENANCE AND ADJUSTMENT* will help operators to avoid this hazard.



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

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

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

- ✓ If you have questions about operation or maintenance procedures, please contact your authorised technical service.

Protective equipment must be used according to the instructions issued by the manufacturer of the tool attached to the arm.

3.3 EXCLUSIONS

The arm is not intended for the following uses:

- ✓ Operation in severe conditions (for example, extreme environmental conditions such as applications involving freezing, high temperatures, corrosive environments or strong magnetic fields).
- ✓ Loads above the working load limit.
- ✓ Use in explosion hazard areas.
- ✓ Outdoors installation.
- ✓ Manipulation of any components or functions of the device aside from those specified in this manual.
- ✓ Use by persons with disabilities, or by animals.

3.4 SYMBOLS AND ICONS

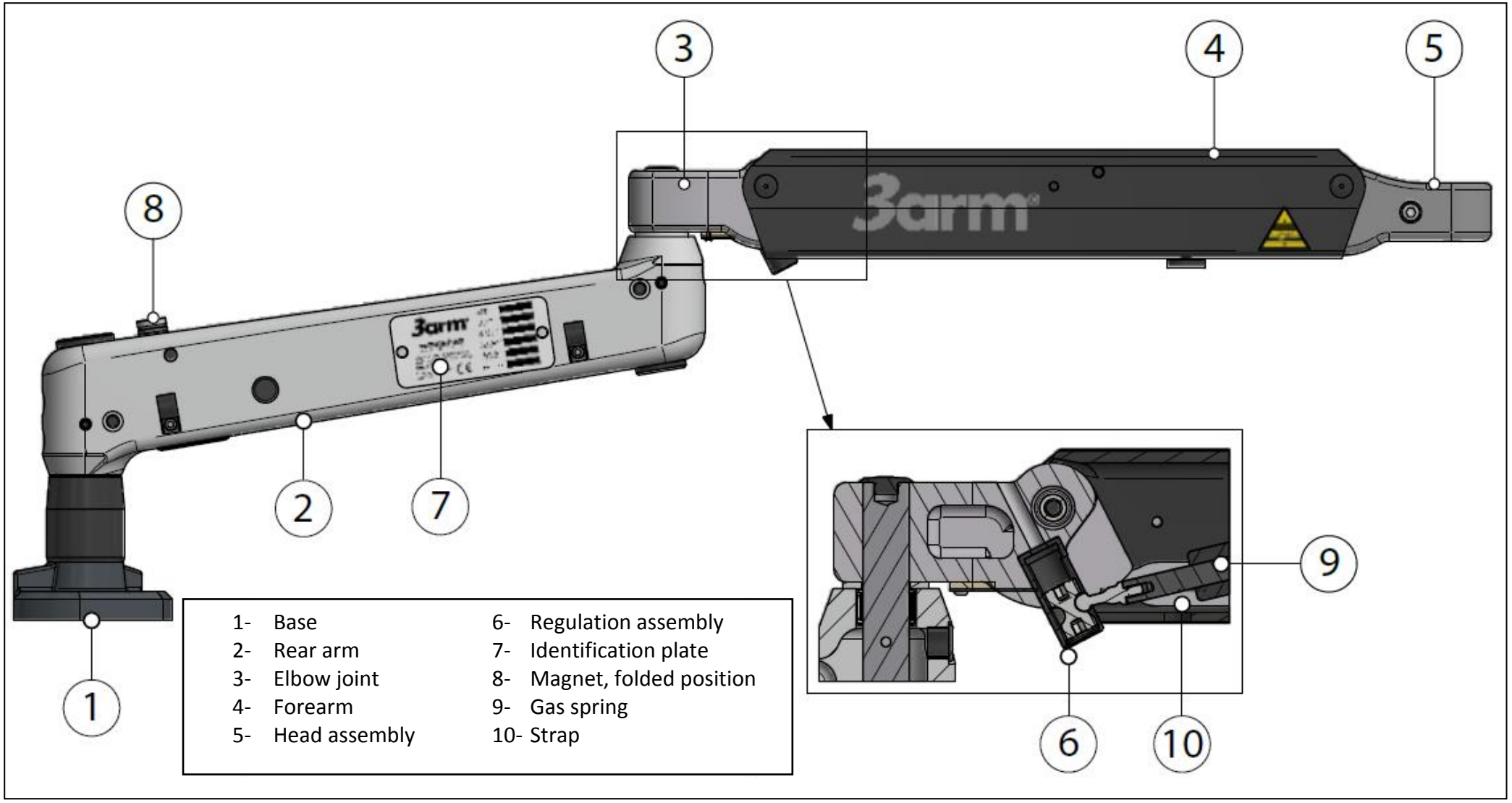
- ✓ Throughout this manual, and on the device itself, you may note various symbols and icons. Their meaning is summarised below.

	Danger: General danger symbol. This symbol is generally accompanied by an additional symbol or a more detailed description of the danger.

4 GENERAL DESCRIPTION AND TECHNICAL INFORMATION

4.1 MAIN PARTS

The device consists of a swinging parallelogram balanced by a gas spring, plus a radial arm. The two parallelograms hold the gripper head and keep it perpendicular to the work area. ↳


3
4
5
8
2
7
9
6
10
1
1- Base
2- Rear arm
3- Elbow joint
4- Forearm
5- Head assembly
6- Regulation assembly
7- Identification plate
8- Magnet, folded position
9- Gas spring
10- Strap

4.2 CONFIGURATIONS

4.2.1 CONFIGURATION TABLE

	+		+	L	+	(KG/LB)

Parallel:

B	Tabletop 400 mm *(15.8")*
BS	Ceiling 400 mm *(15.8")*
BE	Tabletop lifting 400 mm *(15.8")*
BT	Ceiling lifting 400 mm *(15.8")*
BR	Rail support 400 mm *(15.8")*

Load:

(KG/LB)	Weight to support, in kilograms or pounds

L	Rotational movement	Swinging movement	
0	No lock	0	No lock
8	Encoders		

Head assembly:

B2	Vertical flat head assembly
BA2	Vertical flat head assembly + bush
C2	Adjustable vertical head assembly
D2	Orientable articulated head assembly
E2	Flat articulated head assembly
EA2	Flat articulated head assembly + bush
F2	Adjustable articulated head assembly
G2	Quick-change head assembly
H2	Quick-change multi turn head assembly
K2	Universal strap head assembly
LA2	Adjustable ball head assembly
LB2	Adjustable ball head assembly
N2	Articulated multi-position head assembly
Q2	Reinforced articulated multi-position head assembly
T2	Articulated multi-position head assembly
U2	Reinforced articulated multi-position head assembly
Z2	Head–fork assembly

Note: See head assembly dimensions and functional applications in the S1/S2 Head Assembly Annex.

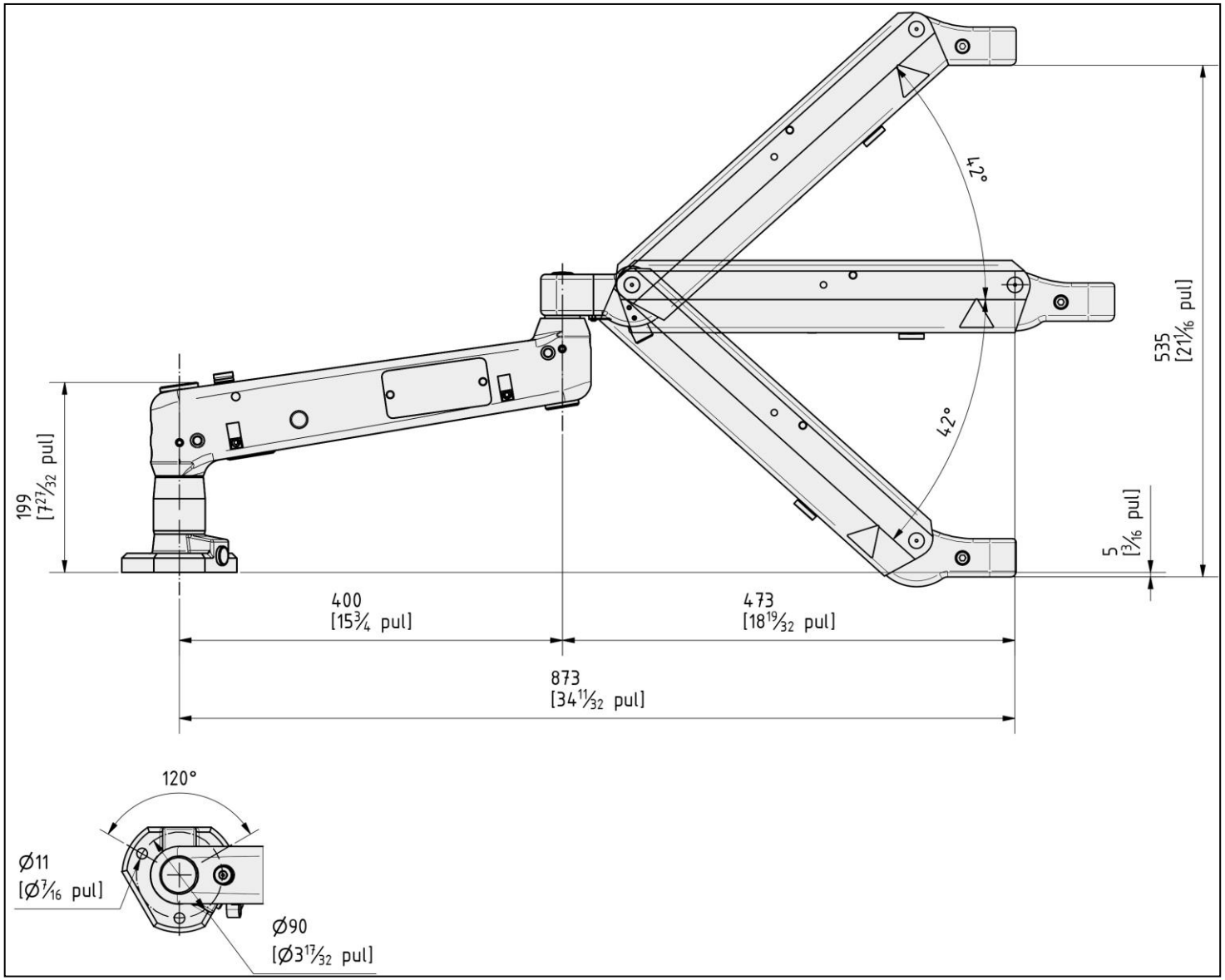
4.2.2 ORDER EXAMPLE

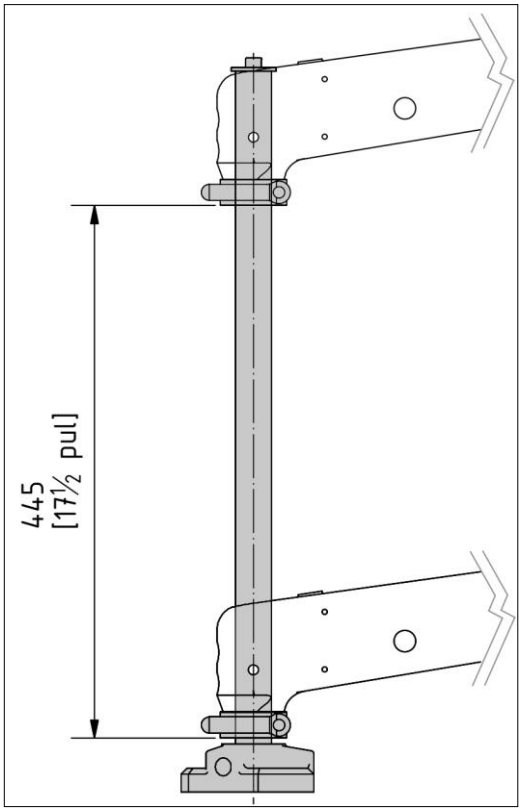
Order example: B+B2 + L00 + (1.7–3.3 kg)

B	+	B2	+	L00	+	(1.7–3.3 kg)

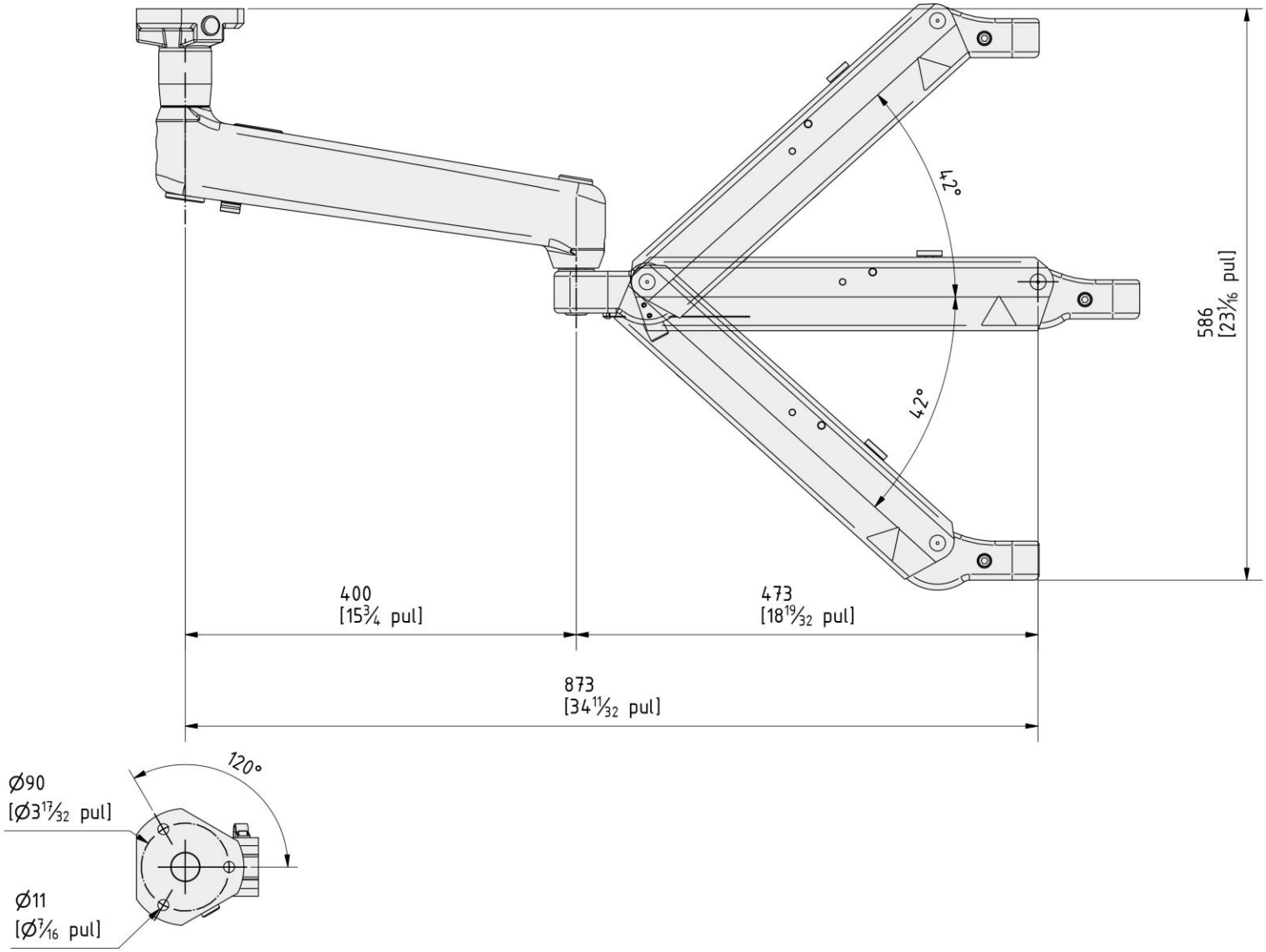
4.3 DIMENSIONS

4.3.1 Extended position

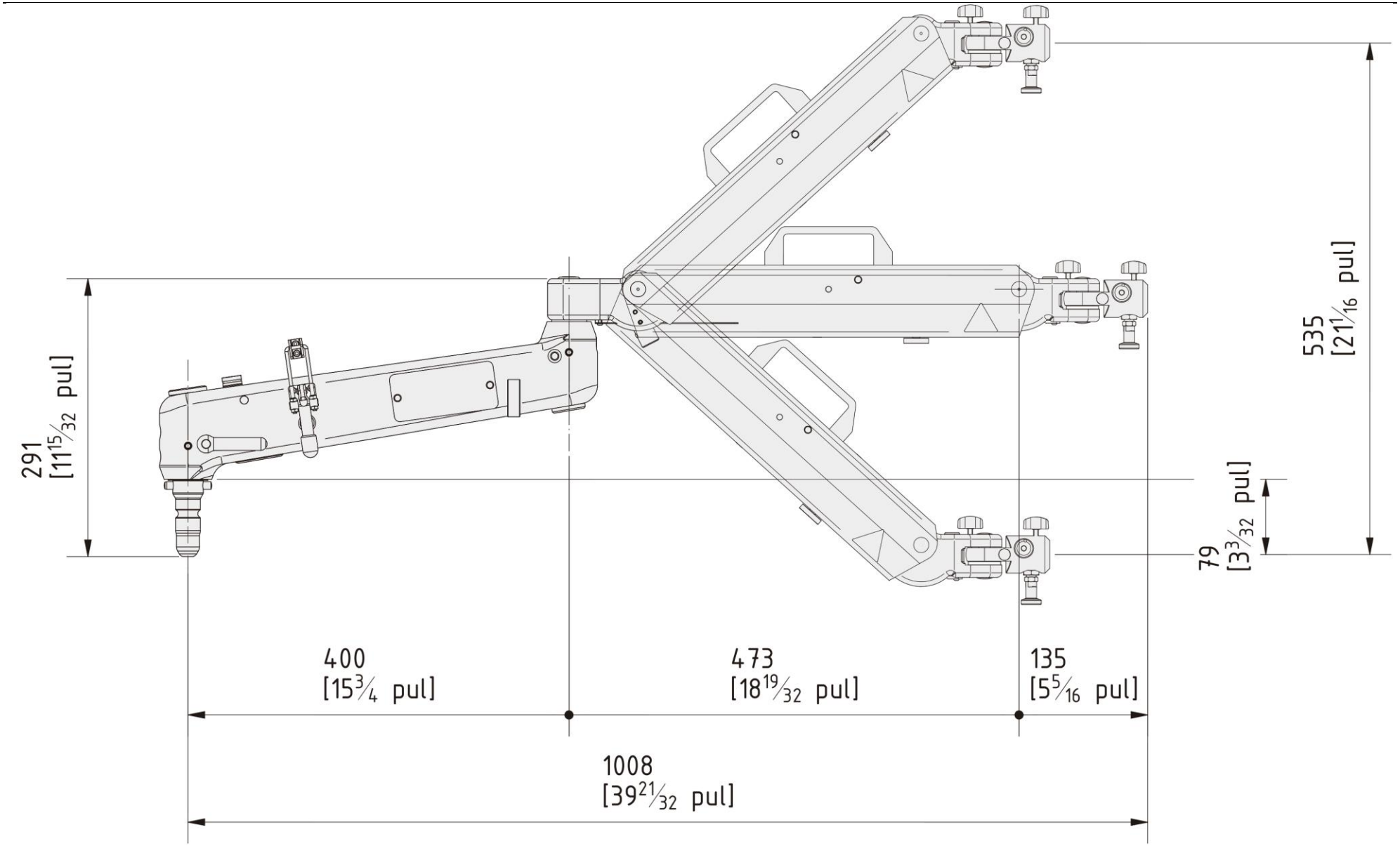




In ***BE-type*** configurations, the arm is attached to an adjustable-height base with travel of 445 mm.

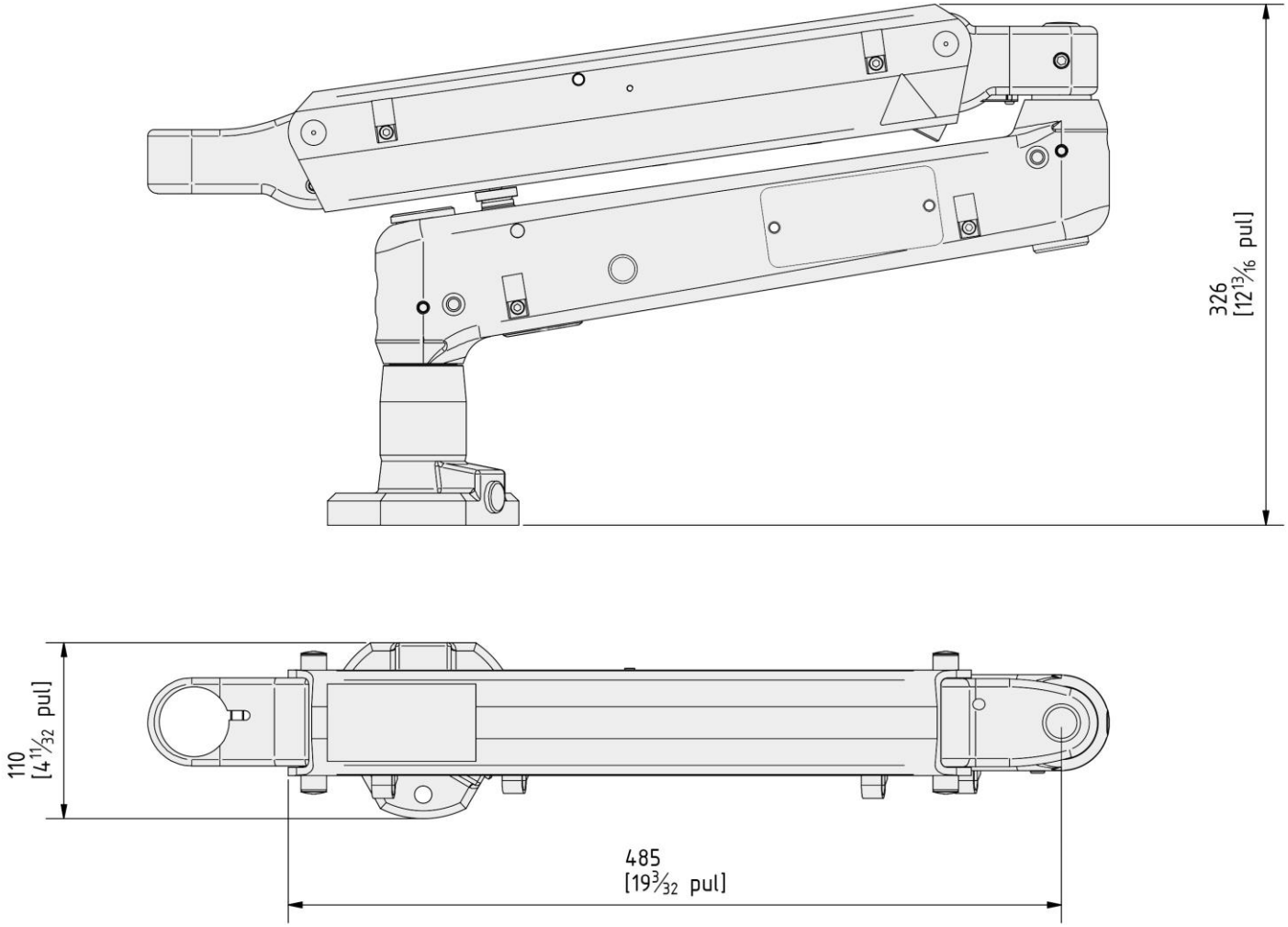


Extended position forBS-typeceiling-mounted configurations.



Extended position for rail support configurations ***BR***

4.3.2 Folded position

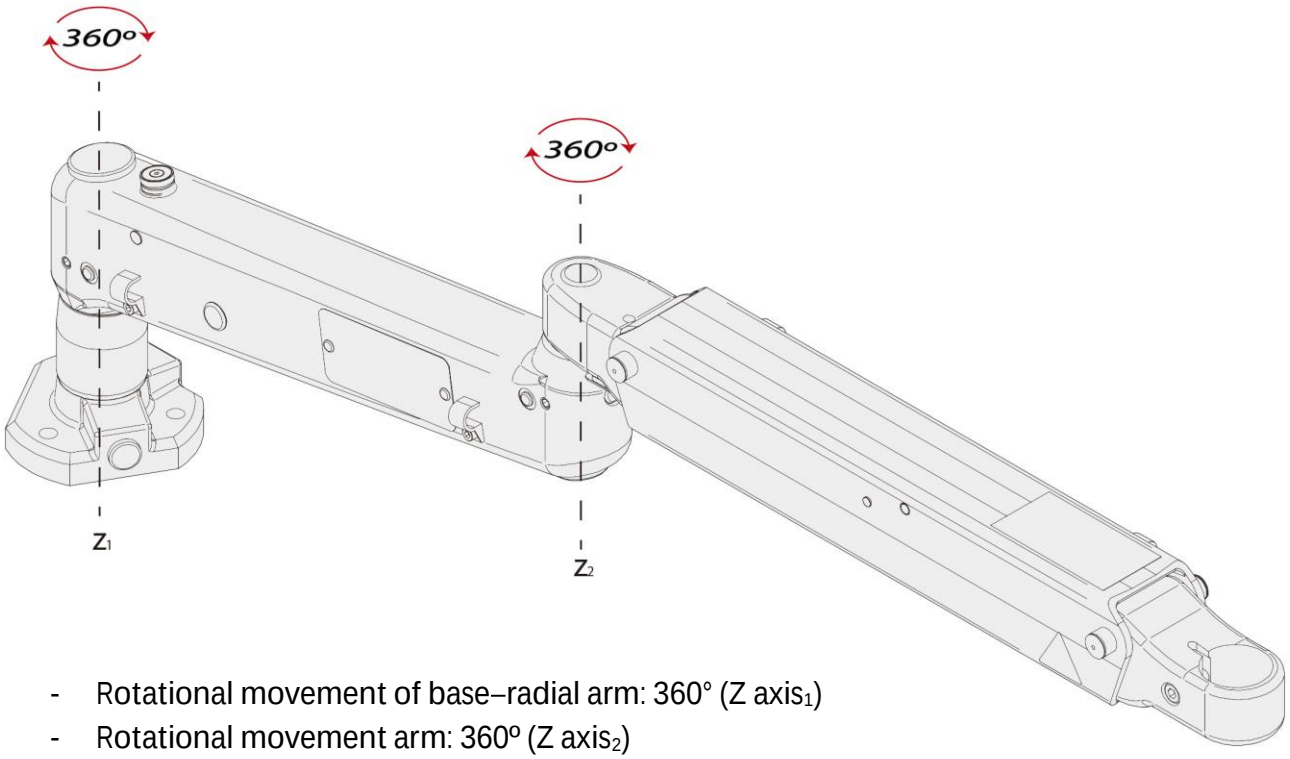


FOLDED POSITION

The equipment must be folded away when not in use.

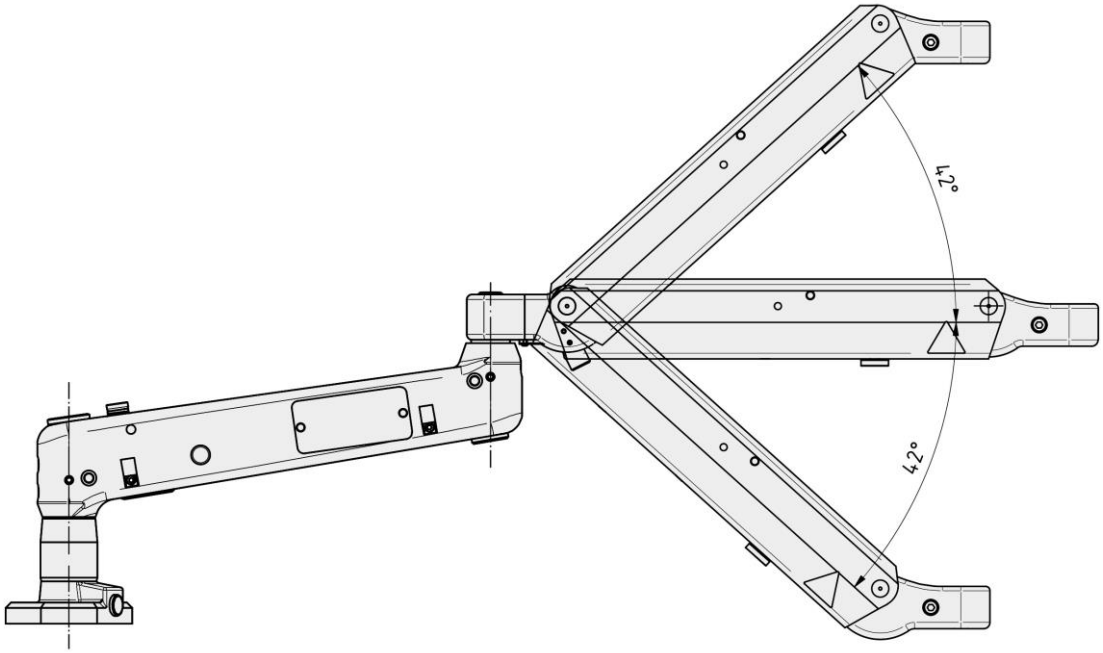
4.4 MOVEMENTS

4.4.1 ROTATIONAL MOVEMENTS



- Rotational movement of base–radial arm: 360° (Z axis$_1$)
- Rotational movement arm: 360º (Z axis$_2$)

4.4.2 UP AND DOWN MOVEMENTS



The swing movement on the ZX plane goes from -42° to +42°, producing total vertical travel of 535 mm.

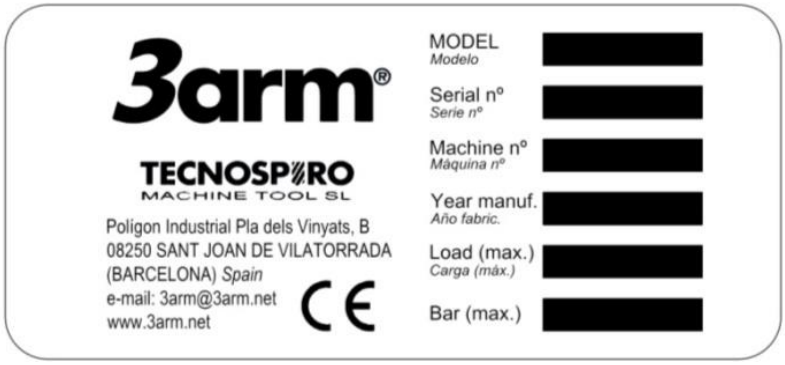
4.5 TECHNICAL SPECIFICATIONS

GENERAL TECHNICAL SPECIFICATIONS		
Load capacity[1]		
(Gross load: Tool + head assembly)	*Gross load range*	0–10 kg *(22.74 lbs)*
Counter torque[2]		
Maximum torque	*Vertical work, MAX*	120 Nm
	Horizontal work MAX. (angle/straight tool)	60/90 Nm
	Work at any angle, MAX	60 Nm
Other		
	Manipulation strength	0.2 kg *(0.44 lbs)*
Working conditions		
	Temperature	+15 to +45 °C
	Relative humidity	Max. 70%
	Environment	Industrial environments

4.6 IDENTIFICATION PLATE

Your arm is identified by a metal plate riveted to the support structure; this plate indicates the following characteristics.

CE marking, manufacturer (name, address and company name), date of manufacture, serial number, model, model name, working load limit.



[1]The load shown reflects the load limit for a Series 2 arm. Your arm may have a lower load limit. Consult the load limit for your arm on the identification plate riveted to the arm structure.

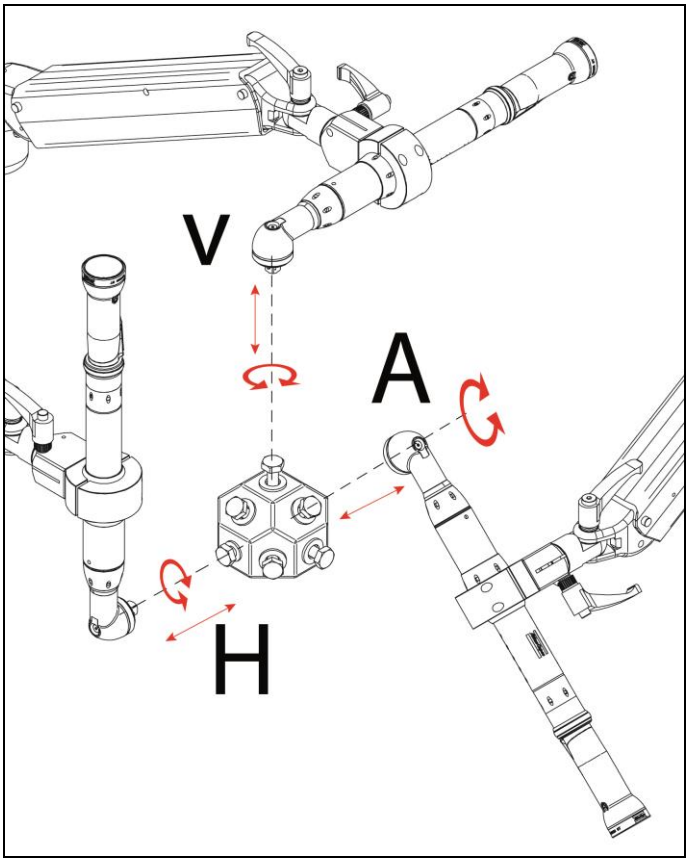
[2] The data shown indicate the maximum torque that the arm can absorb. These values may be reduced depending on the head assembly being used. *[See COUNTER TORQUES (USE OF TOOLS THAT GENERATE COUNTER TORQUE) p. - 16 -]*

4.7 COUNTER TORQUES (USE OF TOOLS THAT GENERATE COUNTER TORQUE)

If you use tools that generate counter torque, make sure you do NOT exceed the maximum torque.

The maximum torques for the 3arm® Series 2 arm are defined below, depending on the head assembly and the working position.

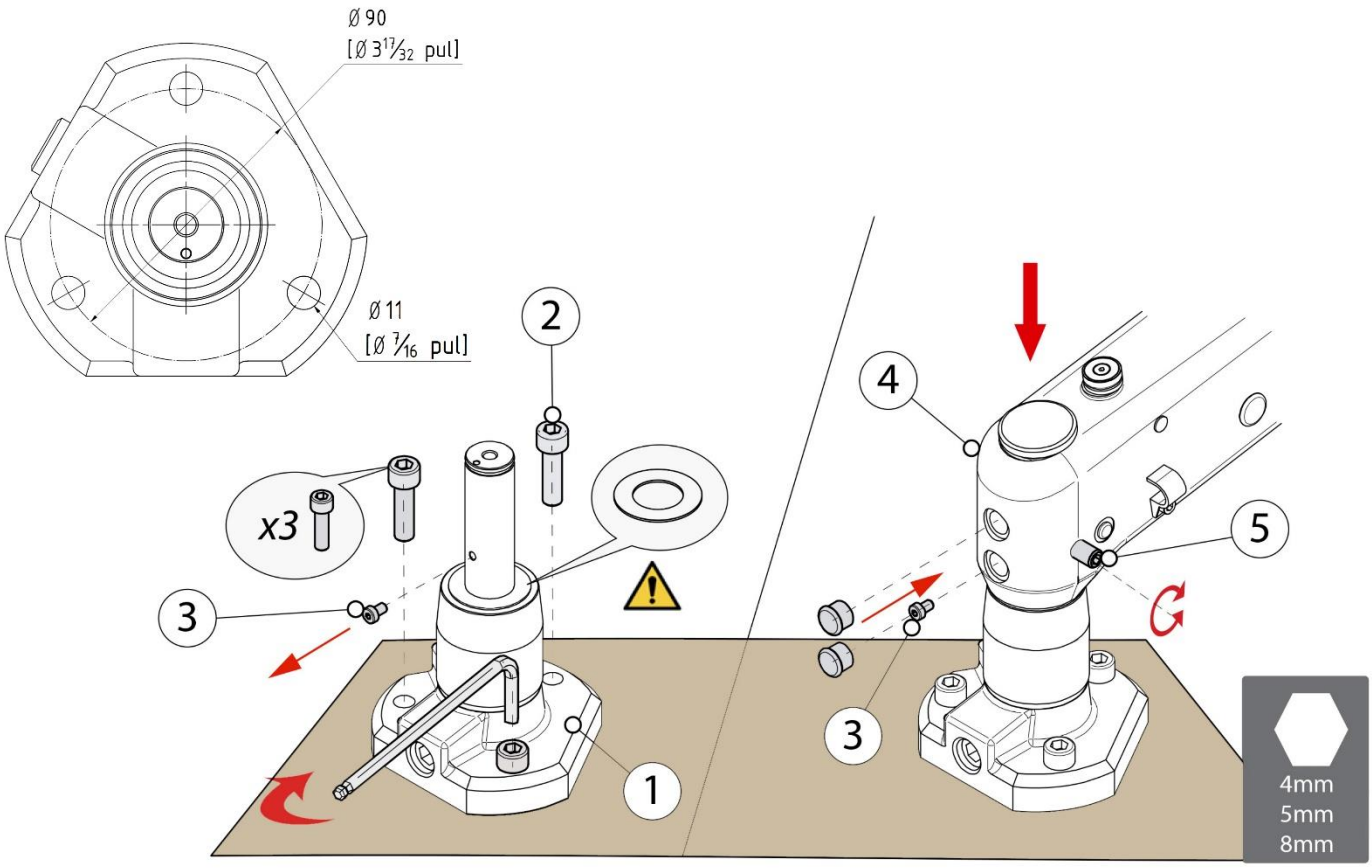
WORKING POSITION	HEAD ASSEMBLY	MAX. TORQUE (Nm)
Vertical (V)	B: *20105604 + RING*	120
	E: *MV201104 + RING*	60
Horizontal (H)		
	B: *20105604 + RING*	90
	E: *MV201104 + RING*	60
Angle (A)		
	E: *MV201104 + RING*	60



5 INSTALLATION, ADJUSTMENTS AND OPERATION

5.1 INSTALLATION

1. Attach the base to the workbench using the three M10 bolts supplied. *8 mm Allen key*
2. Remove the screw (3). *4 mm Allen key.*
3. Mount the rest of the arm on the base shaft.
Note: Make sure the friction disc is in place between the base and the radial arm.
4. Secure the arm tightening the screw (3). Attach the caps supplied.
5. Screw/unscrew the nylon stud (5) to adjust the radial arm's rotational resistance.

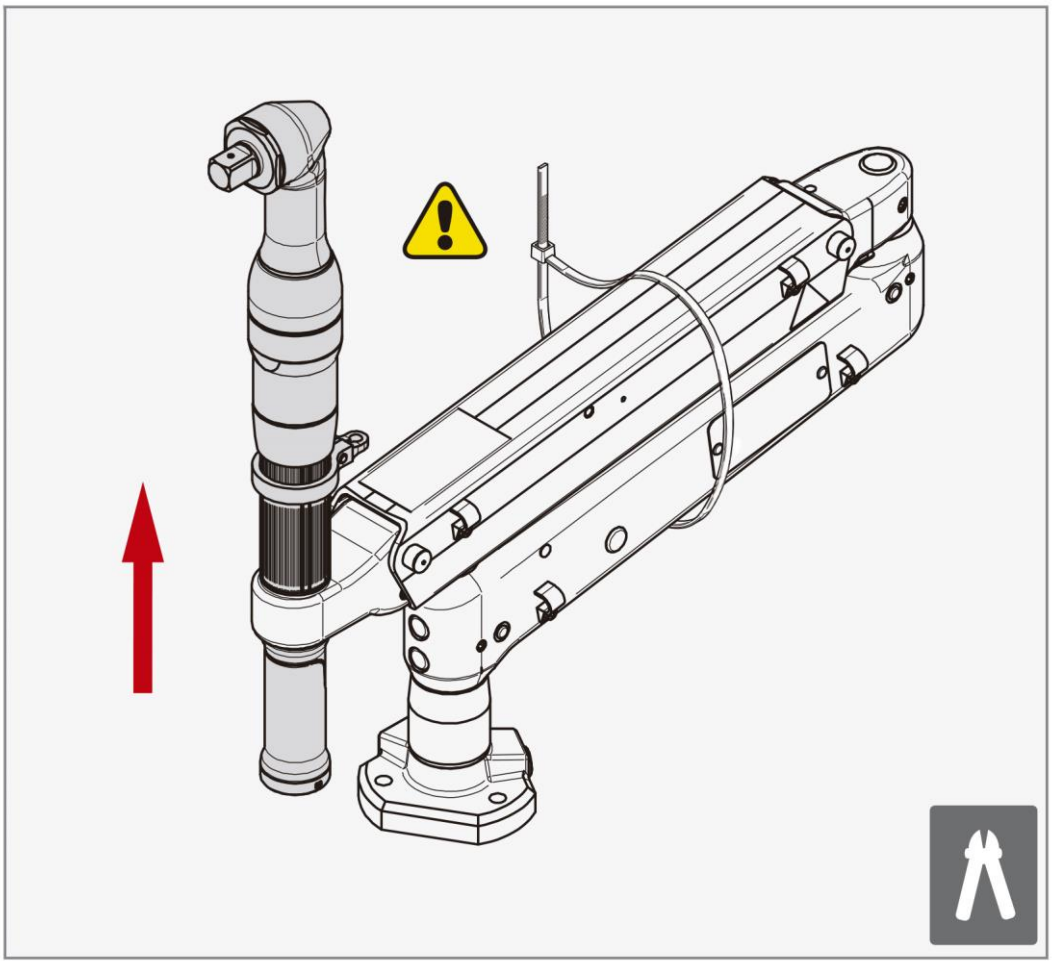


INSTALLATION

✓ *The work bench or location for installation must be a horizontal surface, which prevents drifting and shifting.*

6. **Install the head assembly and attach the tool to the head assembly**. (See details in the appendix for the chosen head assembly).
7. **Cut the plastic** straps that fasten the radial arm to the swing arm**.**

ATTENTION: Do not cut the straps that hold the arm in place until you have completed installation of the head assembly and tool (step 6); otherwise, the arm could swing **up abruptly and** cause injury or damage.

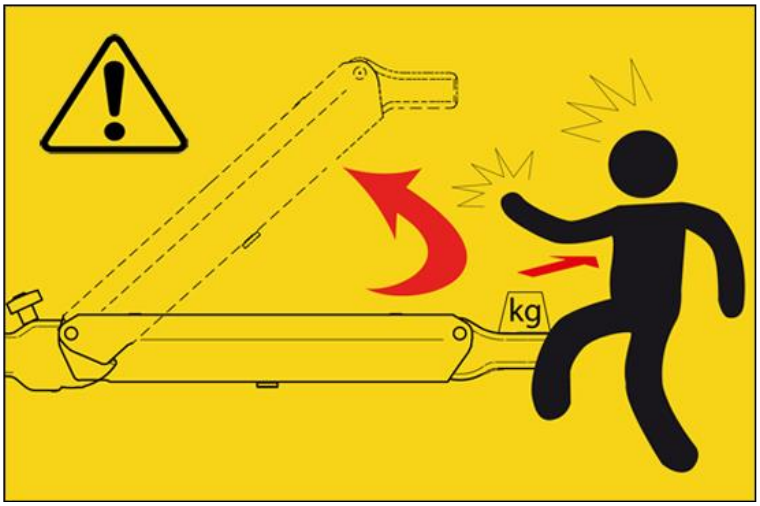


5.2 TOOL INSTALLATION AND CHANGEOVER: SAFETY CONSIDERATIONS DURING MAINTENANCE AND ADJUSTMENT

Before adjusting or maintaining the device, the personnel and/or operators responsible for those tasks must be aware that the 3arm® arm is designed to work with a pre-established load range.

SUDDEN UPWARD SWING

If during handling, adjustment or maintenance, or for any other reason, the load is released from the arm (e.g. when changing the tool), **the arm may swing up suddenly and cause injury or damage.**



Follow the instructions below to minimise risk of potential injury or damage:

When changing tools

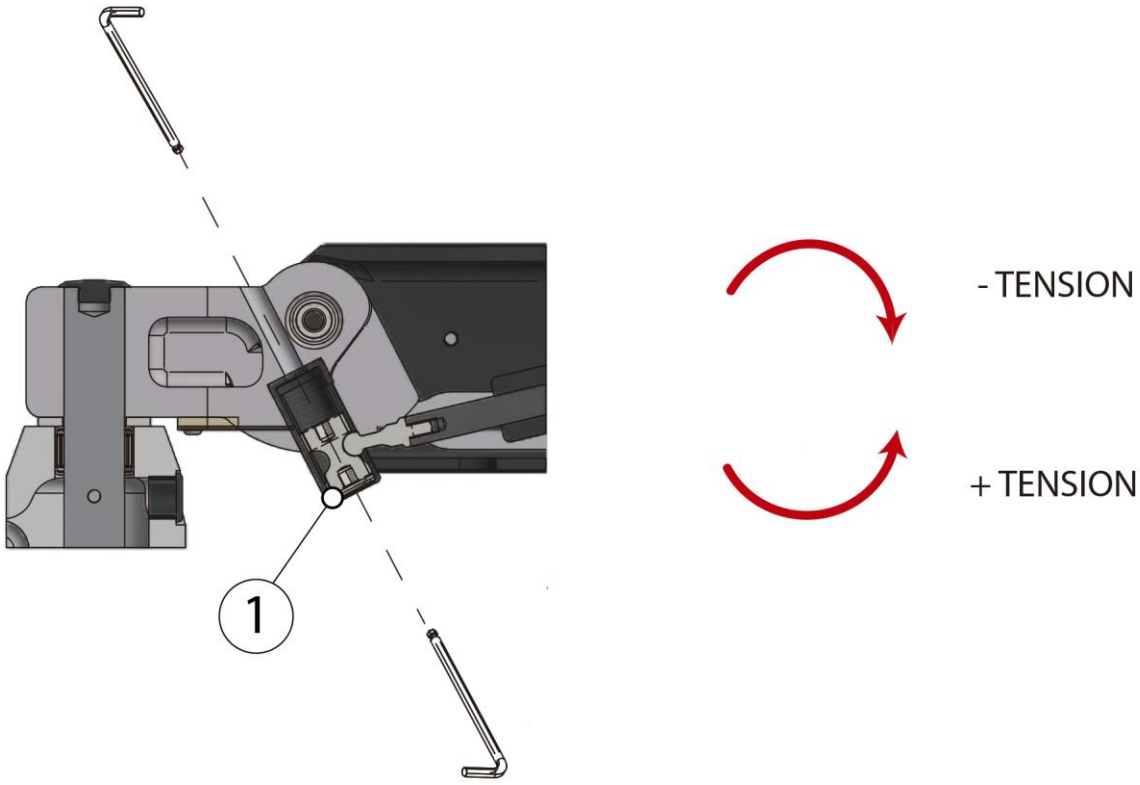
Move the swing arm to its uppermost position and hold it there throughout the task. If necessary, ask another operator for help to make sure the task is performed safely.

5.3 BALANCING THE ARM

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

1- Keep the swing arm in an approximately horizontal position to facilitate operation.
2- Screw/unscrew the tension regulator as required. *5 mm Allen key.*

- **Anti-clockwise rotation:** More tension is applied to the damper.
- **Clockwise rotation**: Reduces tension on the damper.



BALANCING THE ARM

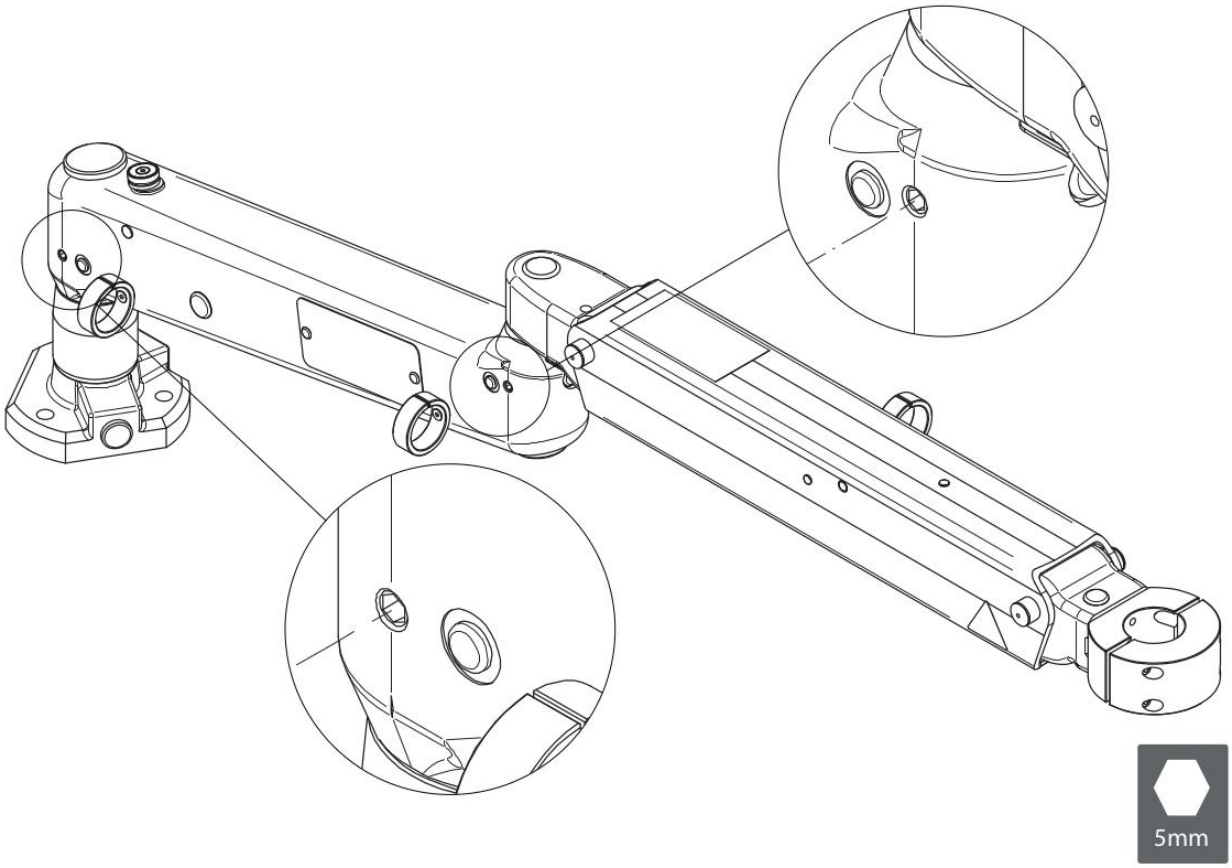
- Ensure the right head assembly and tool are installed before balancing the swing arm.
- When fine-tuning arm balance, take into account tool and head assembly type and the operations performed by the arm.

5.4 ADJUSTING ROTATIONAL RESISTANCE

The resistance to rotation can be regulated by friction elements. Located in the parallel (on the axis of the base and on the axis of the cross).

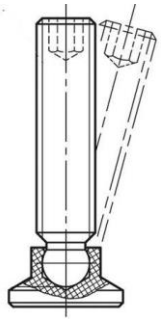
As we adjust the studs with nylon tip through the thread, will increase or decrease rotational resistance.

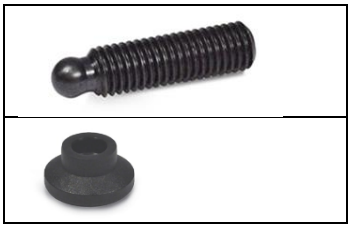
This adjustment is useful in situations where the base of the arm is not completely horizontal.



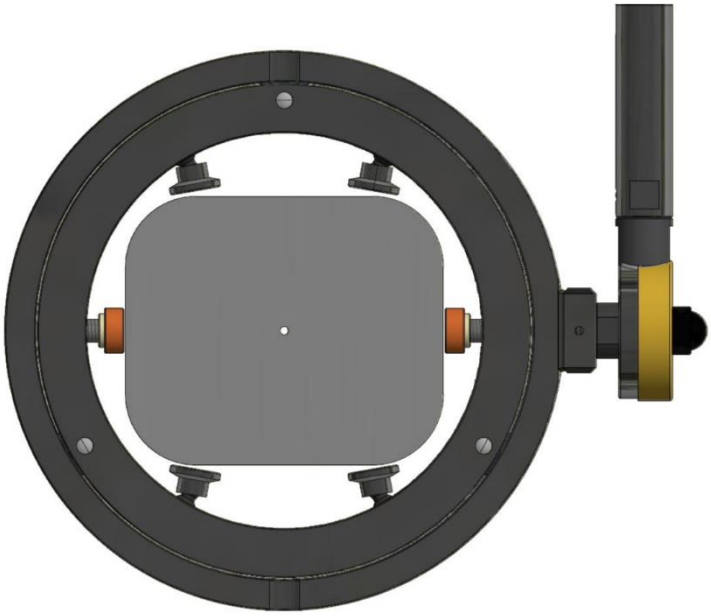
5.5 SPECIAL FIXATION FOR SQUARE TOOLS

In order to fix the tool in the correct way, Tecnospiro recommends using the special Grub screws with ball point for thrust pads. This component allows fixing the tool from all sides adapting the pads to the tool square surface.





This is an example of square tool fixation:



Please check the fixation for square tools set inside the machine package.

6 MAINTENANCE

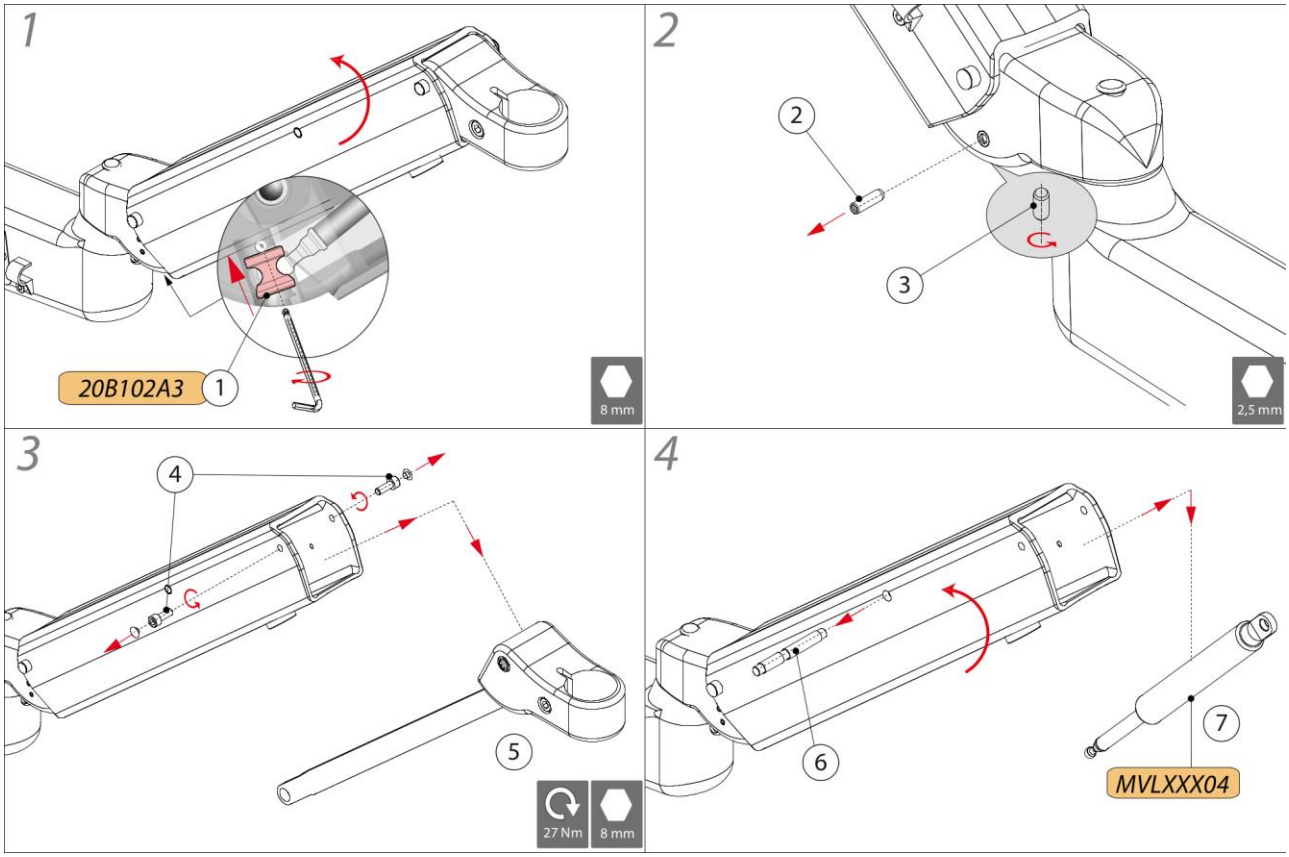
6.1 REPLACING THE GAS SPRING

1- Unscrew the tension regulator (1) as far as it will go. Keep the swing arm in an approximately horizontal position to facilitate operation.

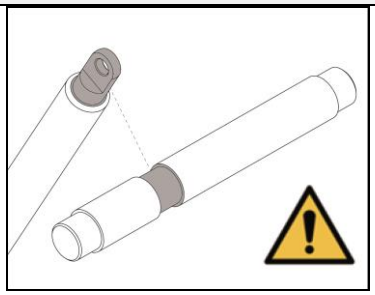
2- Remove the stud (3). 2.5 mm Allen key. Using an M4 bolt, remove the pin (2) from the brace *(the lower end of the brace will be released)*.

3- Remove the plugs and bolts (4). *8 mm Allen key.* Pull out the head assembly and brace (5) in the direction indicated.

4- Raise the arm to its uppermost position *(the lower end of the spring should be released from the tension regulator)*. Remove the spring shaft (6) and pull out the spring (7) in the direction indicated.



When reassembling the parts, make sure that the spring is positioned properly in the shaft slot.



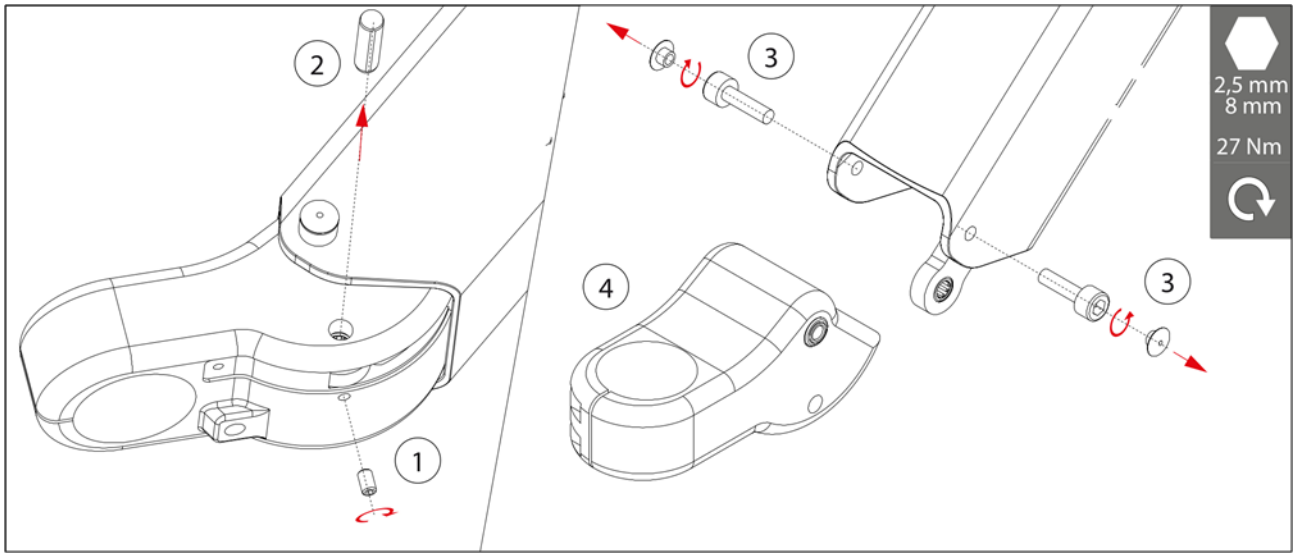
6.2 CHANGING THE HEAD ASSEMBLY

PLEASE NOTE

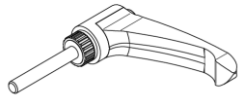
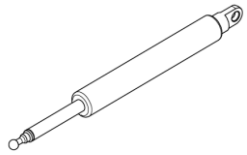
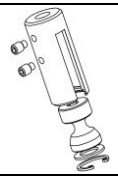
- ✓ *Release all tension in the spring [see BALANCING THE ARM, page -20-].*
- ✓ *Keep the arm in its lower position, securing it firmly to prevent it from abruptly jerking upwards. If necessarily, have two operators on hand to perform this operation safely.*

1. Release all tension in the spring *[see BALANCING THE ARM, page -20-].*
2. Swing the arm to its lowest position.
3. Remove the Allen stud (1) located in the bottom part of the head assembly. *2,5-mm Allen key. Using* an M6 bolt, remove the pin (2) from the brace.
4. Remove the bolts and plugs (3) that join the head assembly to the arm. *8-mm Allen key.*
5. Replace the head assembly (4).
6. To assemble it, reverse the procedure, tightening the bolts (3) to 27 Nm.

You must keep the pin (2), Allen stud (1), bolts and plugs (3) for the arm and the arm shaft to mount the new head assembly.



7 S2 SPARE PARTS

CODE	DESCRIPTION	PICT.	CODE	DESCRIPTION	PICT.
MV230205	*MAGNETIC BASE ANCHOR REPLACEMENT KIT*		**AC060446**	*LIFT MECHANISM HANDLE M6x40*	
MV230105	*S2 MAGNET REPLACEMENT KIT*		**MVLXXX04**	*S2 3ARM DAMPER KIT* *(20–135 kg)*	
M2105600	*REGULATION SUB-ASSEMBLY REPLACEMENT KIT*				

8 WARRANTY

See warranty attachment

9 GUIDELINES FOR PACKAGING, TRANSPORT AND DISASSEMBLY

9.1 PACKAGING

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

9.1.1 Preparations

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

9.1.2 Choice of packaging

During long-distance transport, the equipment must be packaged appropriately to protect it against weather damage.

9.1.3 Inscription on packaging

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

9.1.4 Packing procedure

The machine's parts should be placed on manufactured wooden pallets. Using tie-down straps, secure the components to keep them from falling. Attach all technical documentation that must accompany the machine.

9.2 TRANSPORT

The following information must be considered when transporting the device.

External dimensions according to the segment (width x height x depth), approx.

710x480x230 mm

Total weight (according to segment): 11 kg

9.3 DISASSEMBLY

The equipment must be taken out of service by properly trained and authorised personnel.

The equipment must be disassembled taking into account instructions on safety, waste disposal and recycling instructions.

Protect the environment. The equipment must be disposed of following standards and directives in force in the areas of safety, noise prevention, environmental protection and accident prevention.

10 ACCESSORIES

TABLES

(1) (2) (3)

4 wheels (2 with brake)
Slots for securing parts or tools.
Brackets for screw tap or tool holders.

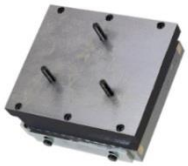
CODE	DESCRIPTION		DIMENSIONS
TP0001A0	Dentist table (1)	500x500x900 mm	19 11/16" x 19 11/16" x 35 7/16"
TF0001A0	Medium table (2)	850x850x850 mm	33 7/16" x 33 7/16" x 33 7/16"
907B00A0	Large table (3)	1100x850x850 mm	43 5/16" x 33 7/16" x 33 7/16"

SUPPORTS

(1)

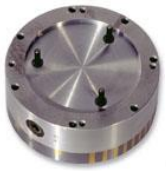
(2)

Brida para fijar la maquina
Soporte magnético para colocar sobre una superficie metálica i fijar la maquina



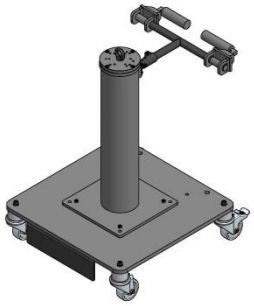
(3)

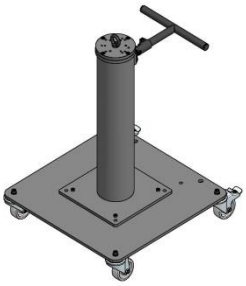
CODE	DESCRIPTION	DIMENSIONS
BR000100	Small clamp (1)	N/A
BR100100	Large clamp (2)	N/A
IA000100	Magnetic support (3)	150x150
IB000100	Magnetic support (4)	Ø200
IC000100	Magnetic support (5)	Ø250



(4)(5)

TROLLEY



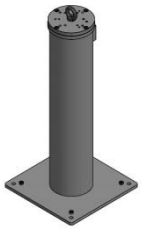


For moving the work unit.
Has 4 steerable wheels.

DESCRIPTION		DIMENSIONS
Trolley 700	500x500x900 mm	19 11/16″ x 19 11/16″ x 35 7/16″
Trolley 900	700x700x850 mm	27 9/16″ x 27 9/16″ x 33 7/16″
Electric trolley	850x850x850 mm	33 7/16″ x 33 7/16″ x 33 7/16″

*Code according to load

FIXED COLUMN



Attach to the ground using 4 metal pins.

CODE	DESCRIPTION / DIMENSIONS	
CL115400	Column 375mm	14 3/4 ″
CL002700	Column 400mm	15 3/4″
CL106800	Column 500mm	19 11/16″
CL101100	Column 630mm	24 13/16″
CL122800	Column 640mm	25 3/16″
CL000100	Column 740mm	29 1/8″
CL005300	Column 850mm	33 7/16″
CL002500	Column 940mm	37″
CL002400	Column 1000mm	39 3/8″
CL002600	Column 1200mm	47 1/4″
CL004500	Column 1500mm	59 1/16″

LIFT MECHANISM

This consists of a telescopic column and a pneumatic cylinder with a rotation lock.

CODE	DESCRIPTION	VERTICAL TRAVEL
EA101500	300 Lift Mechanism	295mm – 11 13/16″
EA0001B0	500 Lift Mechanism	495mm – 19 15/32″
EA103800	750 Lift Mechanism	745mm – 29 1/2″

D63 COLUMN

Pneumatic lift mechanism. The vertical position can be locked at any point; it has a pneumatic cylinder. It can be anchored to the ground, on a cart or on the floor track to provide movement in 2 axes.

CODE	DESCRIPTION	VERTICAL TRAVEL
CL103400	1500 D63 Column	940mm – 37″
CL017500	2000 D63 Column	1440mm – 56 11/16″
CL013500	2500 D63 Column	1940mm – 76 3/8″

EXTENSION

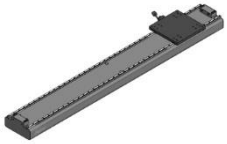
(1)

Extension used to extend the arm's working area. It can be installed with other accessories, such as columns, lift mechanisms, beams, etc.

(2)

CODE	DESCRIPTION	ADDITIONAL WORKING AREA
ER0010C0	Extension 500 (1)	500 mm – 19 11/16″
ER000100	Extension 1000 (2)	1000 mm - 39 3/8″

FLOOR TRACK



Track to be anchored to the floor, which can be used to attach the various columns and lift mechanisms. The 2-m base section can be extended with additional sections. The horizontal position can be locked at any point.

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

LINEAR GUIDE

Guide for horizontal movement of the arm. The 2-m base section can be extended with additional sections. It can be installed on a table or attached to the wall, ceiling or pillars of varying heights. The horizontal position can be locked at any point.

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

RAIL SUPPORT	
	Used to couple the device to elements in the working area, such as rails, structures, etc.

10.1 COMPATIBILITY TABLE

Accessory	SERIES – 3 ARM					
	S0	S1	S2	S3	S4	S6
EXTENSION 500	●	●	●	●	●	●
EXTENSION 1.000	●	●	●	●	●	●
TROLLEY + FIXED COLUMN	●	●	●	●	●	●
FIXED COLUMN	●	●	●	●	●	●
LIFT MECHANISM 500	●	●	●	●	●	●
D63 COLUMN	●	●	●	●	●	●
FLOOR TRACK	●	●	●	●	●	●
LINEAR GUIDE	●	●	●	*	*	*
DENTIST TABLE (500)	*	●	●	⦸	⦸	⦸
MEDIUM TABLE (850x850)	●	●	●	*	*	*
LARGE TABLE (1100x850)	●	●	●	●	●	●
SMALL CLAMP	⦸	●	●	⦸	⦸	⦸
LARGE CLAMP	●	●	●	●	●	●
HAND RAIL BRACKET	●	●	●	●	●	●
MAGNETIC SUPPORT	*	*	*	*	*	*

● = Compatible
⦸ = NOT Compatible
* = Request information

NOTES

DATE	DESCRIPTION

CE DECLARATION OF CONFORMITY

The manufacturer:

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

Declares that this product:

Name:	Series 2
Serial number:	From 2/2 430

Confirms with Machinery Directive 2006/42/EC

Harmonised reference standards. EN ISO 12100:2010

Sant Joan de Vilatorrada, Monday, 29 April 2019

Ramon Jou Parrot, Chief Engineering Officer