

MACHINING AND CUTTING LINE

02 - 10



USER MANUAL
SPARES CATALOGUE



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1 GENERAL WARNINGS

Before putting the machine into service all the technical instructions given in this manual must be observed and all the indications shown must be scrupulously followed.

This manual and all the literature enclosed with it must be kept in an easily accessible place known to all operators and staff entrusted with maintenance operations.

1.1 INTRODUCTION

The MACHINING AND CUTTING LINE has been designed to automatically machine and cut to size pieces obtained from aluminium bars.

Milling / drilling is possible on all 4 sides of the bar by means of suitably positioned electrospindles.

Cuts can be made at 90° or at angles from 45° right to 45° left.

The maximum bar working length is 7 m. The minimum bar working length is 3.5 m.

1.2 WARRANTY

The company guarantees that this machine has been tested under peak running conditions with excellent results. This warranty is valid for a period of **12 months** and covers construction materials and defects only. The customer has only the right to claim for replacement of faulty parts, excluding the cost of carriage and packaging and complete machine replacement. This warranty does not therefore cover any damage caused by dropping, tampering or improper machine operation, by disregard of maintenance instructions given in the instruction manual, or by faulty handling by the operator. No compensation may be claimed for any periods of machine inactivity. This warranty is not binding unless all payment conditions have been met.

The cost of service assistance, together with the cost of spares used which are not covered by the warranty, must be paid directly to the service technician who will issue a maintenance slip to be later followed by a regular invoice.

Maintenance charges and the cost of the spares used are taken from the Price List in force at the time.

2 GENERAL NOTES

2.1 FOREWORD

This manual contains the instructions for using the **MACHINING AND CUTTING LINE** plant manufactured by **FOM INDUSTRIE**. The manual contains a description of how the machine works.

CAUTION

- All transport, installation, use, routine and periodic machine maintenance must be carried out solely by skilled personnel.
- The term "OPERATOR" refers to the person or persons entrusted with installing, operating, adjusting, performing maintenance, cleaning, repairing and handling the machine.

2.2 IDENTIFICATION AND CERTIFICATION PLATE FOR THE LINE (Fig. 02-01)

The line ID plate is located at the front of the Spring 55 Theta SL sawing machine.

	
 FomIndustrie Aluminium Working Machinery	
F.O.M. INDUSTRIE s.r.l. Via Mercadante, 85 47841 CATTOLICA (RN) - Italy Tel. 0541832611 - Fax 0541832615 - www.fomindustrie.com	
Tipo	
Codice	
Matricola	
Velocità rotazione utensile/i	giri/min
Ø max utensile/i	mm
Tipo motore/i	
Caratteristiche elettriche	
Anno di fabbricazione	
Massa	kg

Fig. 02-01

N.B. The type, code (where present) and the serial number stamped on the plates of the machines that make up the line, must be must be quoted any time the Manufacturer is contacted for information or when ordering spare parts.

3 DESCRIPTION OF THE LINE

The machining and cutting line comprises the following machines:

1. **Automatic bar loading magazine 'STEP IN' (Fig. 03-01):** motor driven infeed conveyor, consisting of belts on which the bars to be cut are placed. The belt stops when the bar reaches the correct position for being fed into the cutting line: the position is monitored by 3 bar detection photocells. On the middle of the STEP IN, at the second shield, there is a "Vision system for profile recognition" 'A' (camera) to monitor the visual correspondence between the type of profile loaded and the one in the program archive.
2. **Numerically controlled bar feeder 'PUSH PLUS 8000' (Fig. 03-02):** pusher complete with a gripper that grasps the bar and feeds it in, resting on a roller table, into the cutting area. On the Push rollers there is a profile marker with 2 printer heads.
3. **'MULTIMANDRINO_ALL' (Fig. 03-03):** CNC machining centre with 3 controlled axes, suitable for machining bars on all 4 sides.
4. **Numerically controlled bar feeder 'PUSH PLUS 7000' (Fig. 03-04):** pusher complete with a gripper on exiting the multispindle that grasps the bar and feeds it in, resting on a roller table, into the cutting area.
5. **'SPRING 55 THETA SL' sawing machine (Fig. 03-05):** sawing machine with front blade, equipped with devices for piece clamping during cutting. The sawing machine has one translating worktable on the Right and one motor driven roller table on the Left of the worktable.
6. **Automatic stacker for cut pieces 'IMPILATORE' (Fig. 03-06):** Magazine for offloading profiles automatically, positioned at the exit of the sawing machine, which offloads the cut pieces and places them on carriages, each of which has 80 available to take profiles.
7. **Central mobile exhauster 'TURBO L' (Fig. 03-07):** exhauster for fumes and flying chips connected to the rear of the sawing machine: if in 'automatic' mode, it works when the blade is running; if in 'manual' mode, it works independently of the sawing machine.

All devices for conveying pieces in and out, feeding, cutting and extraction, are motor driven and programmable.

The automatic line operation is controlled from the control console (Fig. 03-08) equipped with FOMCAM software and POWER C control.

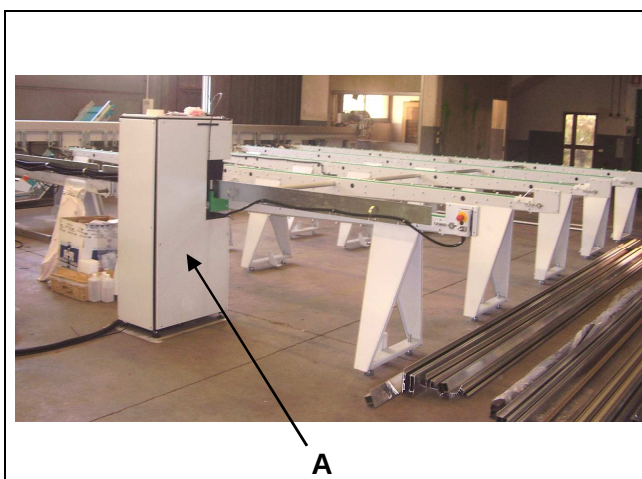


Fig. 03-01

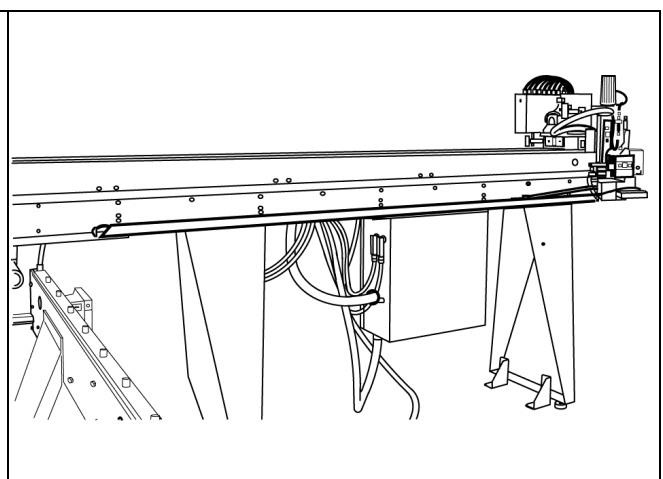


Fig. 03-02

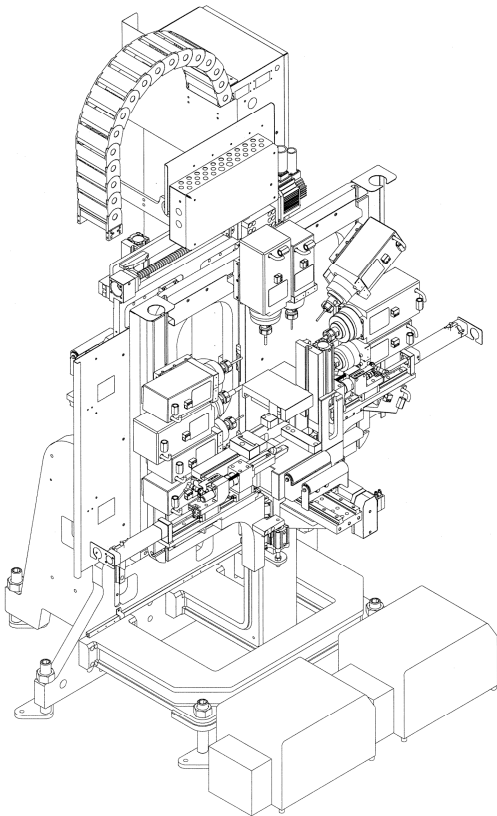


Fig. 03-03

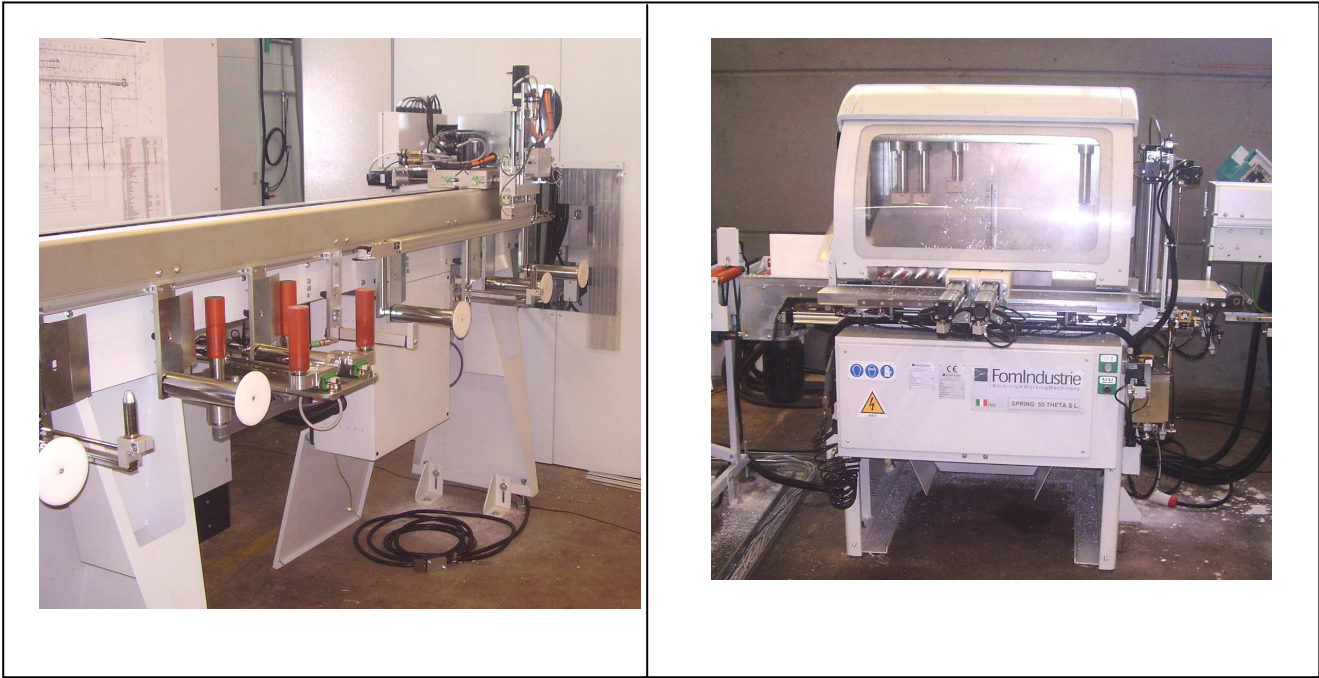


Fig. 03-04

Fig. 03-05

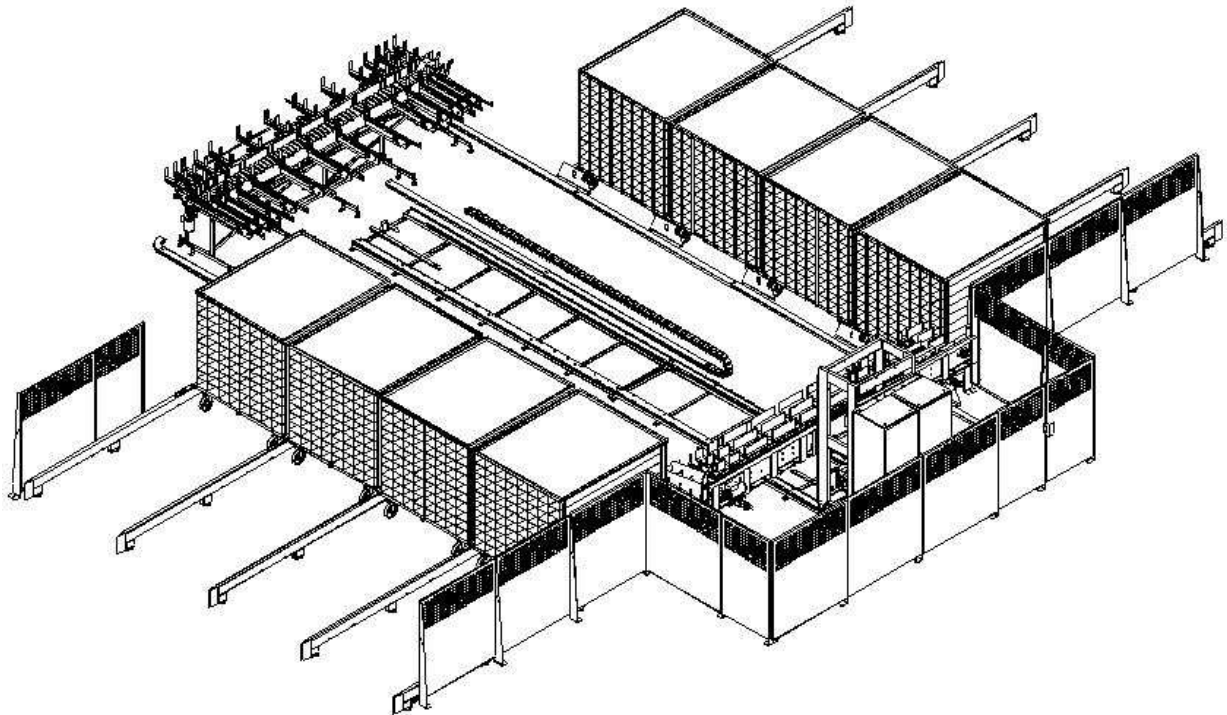


Fig. 03-06

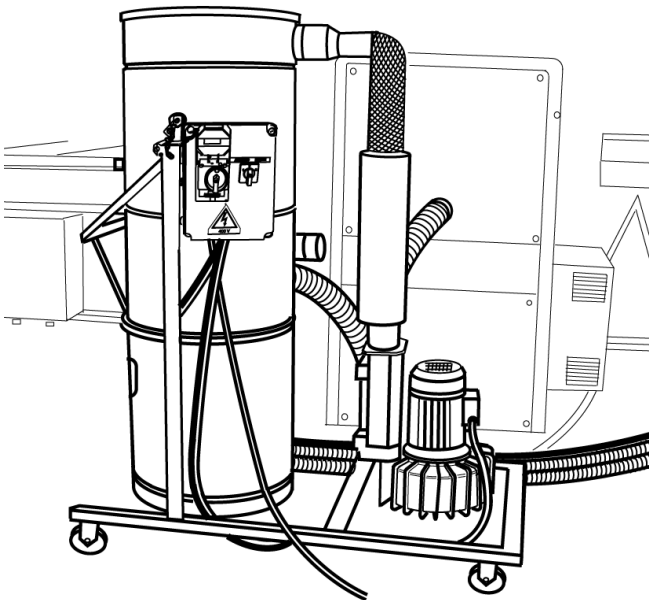


Fig. 03-07

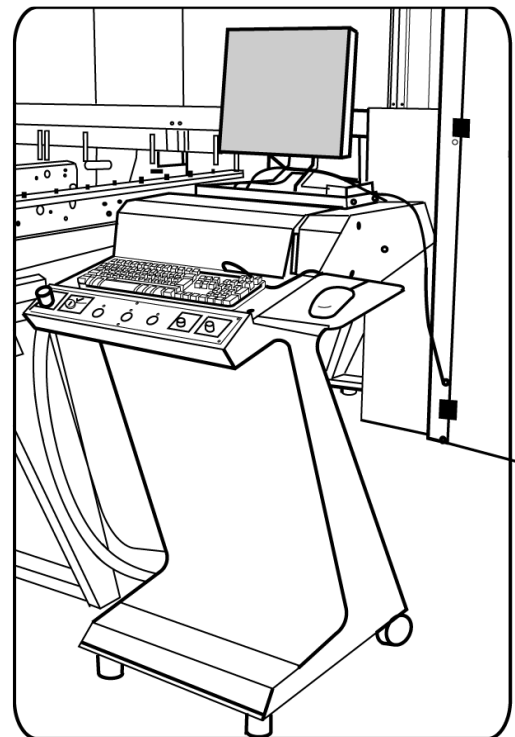


Fig. 03-08

IMPORTANT

The working operation of the SPRING 55 THETA SL and MULTIMANDRINO_ALL and IMPILATORE MAG+ machines is described in the relative use and maintenance manual supplied with the machine.
The FOMCAM software is described in the relative instructions manual.

4 HEALTH AND SAFETY STANDARDS

4.1 FOREWORD

Each machine operator should have a perfect knowledge of the location and working operation of all controls as well as the machine characteristics. It is therefore essential that they read this manual fully. Furthermore, the instruction manual must be kept near the machine.

Unauthorised tampering or replacement of machine parts, the use of accessories, tools and consumable materials other than those recommended by the Manufacturer can lead to accidents for which the Manufacturer declines responsibility for all penal or civil liabilities.

4.2 INTENDED MACHINE USE

The machine is suitable for machining materials in aluminium.

Any materials other than these are not compatible with the specific machine characteristics.

CAUTION

The machine is not suitable for use in environments where there is the risk of fire or explosion. All combustible and/or flammable materials should be kept as far away from the machine as possible.

The machine has been specifically designed to be used by a single operator.

4.3 SAFETY WARNINGS

The term "**OPERATOR**" specifically refers to the person or persons entrusted with installing, operating, adjusting, carrying out maintenance, cleaning, repairing and handling the machine; "**DANGEROUS AREAS**" refers to any area inside and/or near the machine in which the presence of an exposed individual constitutes a risk to the health and safety of that person; "**EXPOSED INDIVIDUAL**" refers to any person standing fully or partially in a dangerous area.

Working conditions

- According to the provisions of "lighting in work areas", the place where the machine is used must have no areas in shadow, glaring lights, or dangerous strobe effects caused by the lighting in the workshop. The selected area must be well lit (minimum 300 lux).
- Furthermore, efficient ventilation must be guaranteed in the workplace with the use of a suitable extraction system where necessary.
- The areas where the operator works should always be kept clear and clean from any oil residue.

INTENDED MACHINE USE

- The machine must be operated by skilled staff only and is designed for machining "**NON-TOXIC**", "**NON AGGRESSIVE**" and "**NON EXPLOSIVE**" materials"; the use of any products other than these absolves FOM INDUSTRIE from any responsibility for damage caused to the machine, persons or property.
- The machine can work at ambient temperatures from 10°C to +40°C. During storage periods or when the machine is not working, the ambient temperature must be between -10°C and + 60°C.
- Before setting to work, the operator must have a perfect knowledge of the location and working operations of all controls as well as the machine characteristics.
- The machining commands must be given by just one operator; the assistance of more than one operator is only allowed in the workpiece loading phase.
- If long pieces that protrude significantly beyond the machine are milled, the areas must be made off limits and marked as such (e.g. floor markings) and if necessary access limited by mobile barriers.

- When using any cooling-lubricating liquids (which may contain active chemical additives harmful to health) the regulations that govern the treatment and disposal must be observed (see the technical safety sheet enclosed with this manual).
- Routine and periodic maintenance operations must take place with the machine stopped and disconnected from the mains and pneumatic power supply. To cut off the power supplies to the machine a padlock must be put on the main switch and the pneumatic supply quick connector has to be detached, or, if present, fit a padlock to the pneumatic master switch. If the machine is out of service for any reason make this known by putting up a sign.
- Any work on the pneumatic systems must only be performed after having discharged the pressure inside the circuit.
- Removal of the safety guards and tampering with the safety devices is absolutely forbidden. Furthermore, if it is noticed that one or more of the safety devices are not working, the machine must be stopped immediately.
- It is absolutely forbidden to climb onto the machine to carry out any type of operation when it is being supplied with electrical and pneumatic power.
- Electrical connections should be made according to the general installation rules for the preparation and operation of electrical systems.

Operators

- Use only skilled and competent personnel. Establish clearly personnel duties for manoeuvring, setting up, use, maintenance and repair of the machine.
- Electrical installation and connections must only be made by a qualified technician.

N.B: A qualified technician is defined as anyone who has completed a specialised training course and has experience in the field of installation, putting into service and maintenance of systems.

- The qualified technician must also be familiar with first-aid techniques in the event of accident.
- Staff involved in operating, maintenance, cleaning, inspection etc. will in any case have to carefully observe the safety rules in force in the country where the machine is to be used.
- All operators should dress in a suitable manner for the work place and for the job to be carried out. For example: wear clothes that are not too loose (which could be caught in the moving machine parts), wear safety shoes, gloves and, where necessary, other safety wear such as sound insulating ear plugs, goggles and a mask.
The machine operator or maintenance technician must not wear neck chains, bracelets or rings, and long hair should be tied back.

4.4 SAFETY DEVICES

1. The multispindle is entirely enclosed within a safety **cabin (Fig. 04-01)** equipped with a polycarbonate inspection window and 2 interlocked entry points with positive opening.
2. **Emergency buttons 'A - B'** located on the control panel and at the piece loading and unloading areas (**Fig. 04-02**).
3. On the belts of the unloading magazine there are, for each sector, **fixed stops 'C' - Fig. 04-03** that stop the bar to prevent it from dropping onto the ground when it arrives at the end of the belt.
4. The machining-cutting line (in particular, the sawing machine and the 2 Push Plus) is protected along the sides, at the front and at the back by a fence fitted with an interlocking gate as shown in the layout enclosed with this manual.
Opening the gate will cut off power to the machine due to an interlocked microswitch being triggered '**F' - Fig. 04-04** (positive opening). When the operator moves inside the fences to carry out maintenance, he must safeguard himself by inserting the 6 position key '**G' - Fig. 04-04** into the hole provided on the microswitch, securing it with his own personal padlock '**H' - Fig. 04-04**.
5. The automatic stacker for cut pieces is protected by a fence equipped with an interlocked gate '**L'**', while front access to the carriages is protected by two pairs of horizontal photocells '**M' / 'N'** (**Fig. 04-05**).

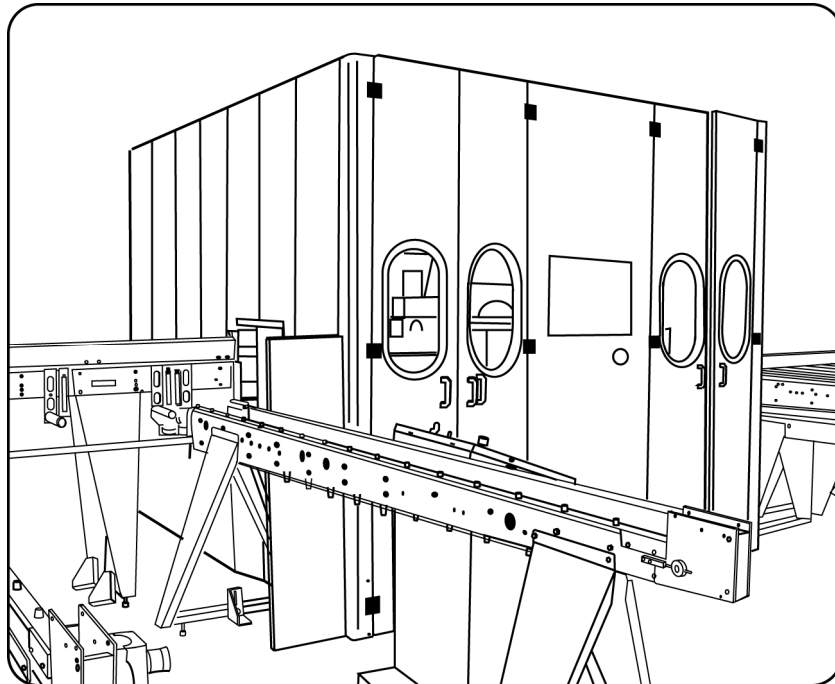
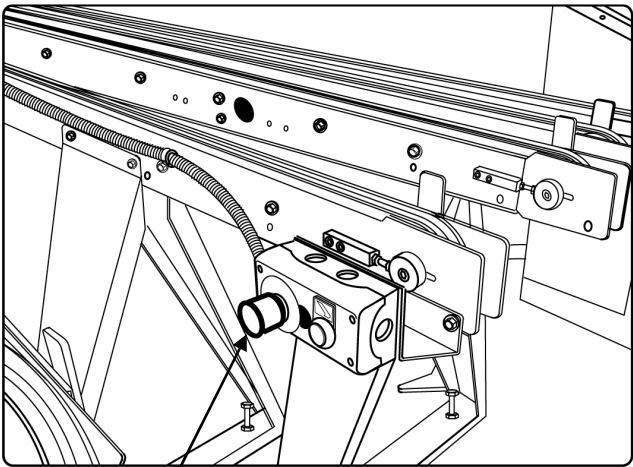


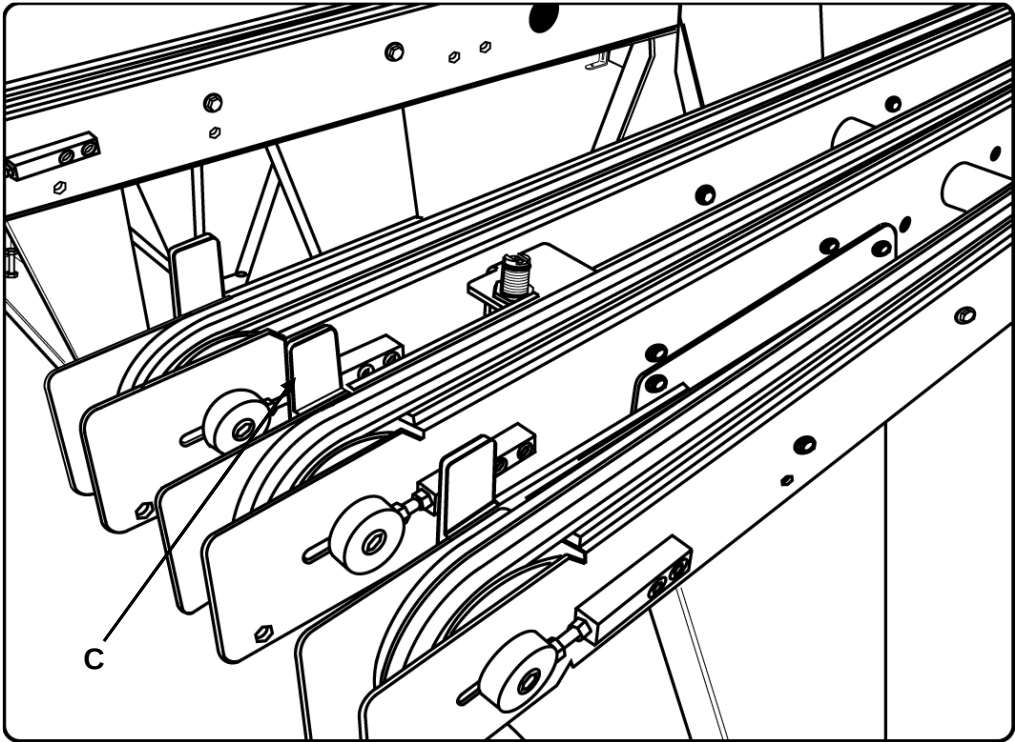
Fig. 04-01



B

A

Fig. 04-02



C

Fig. 04-03

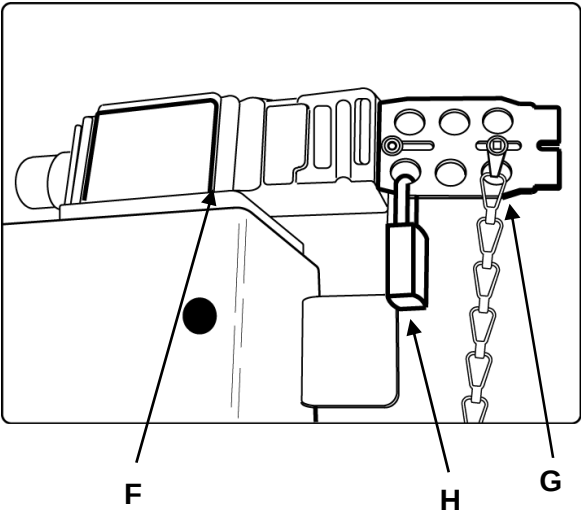


Fig. 04-04

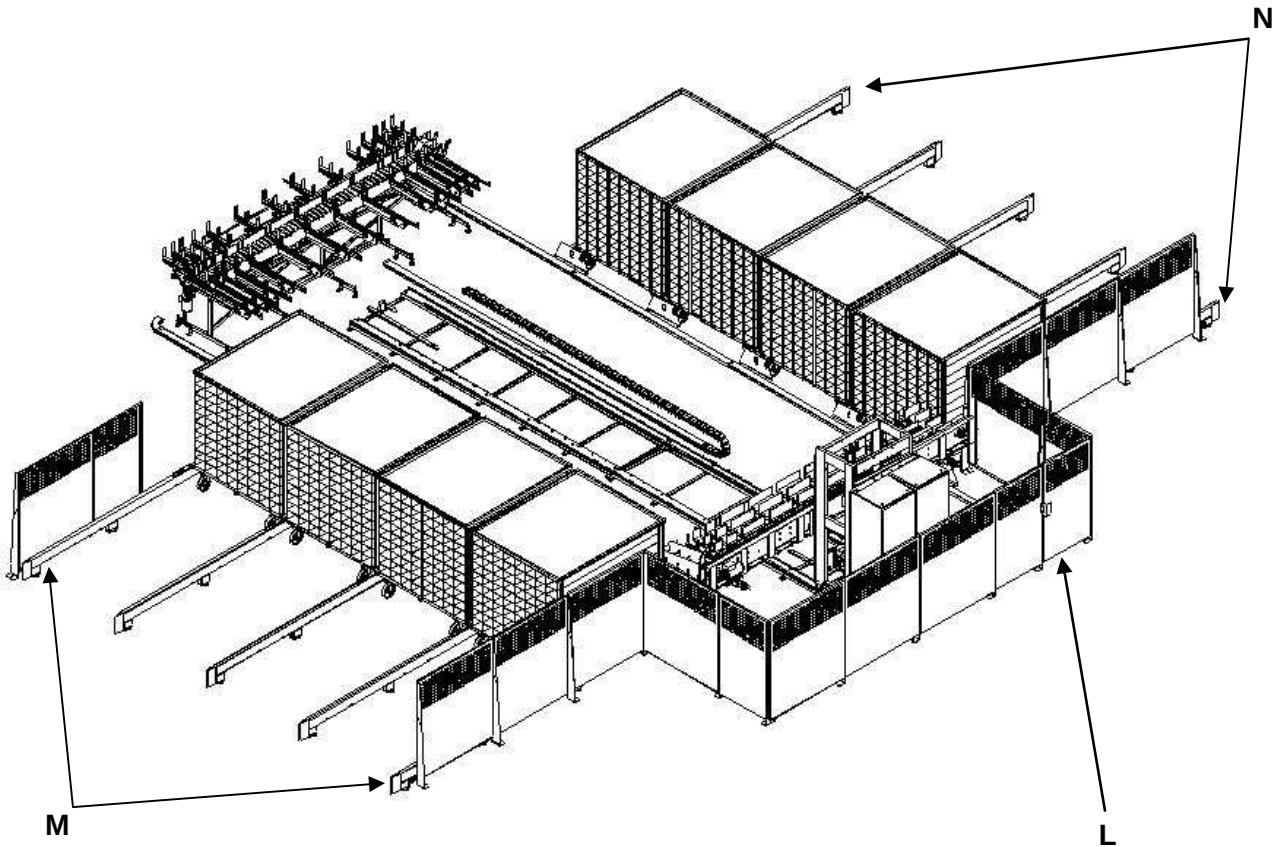


Fig. 04-05

5 CONTROLS

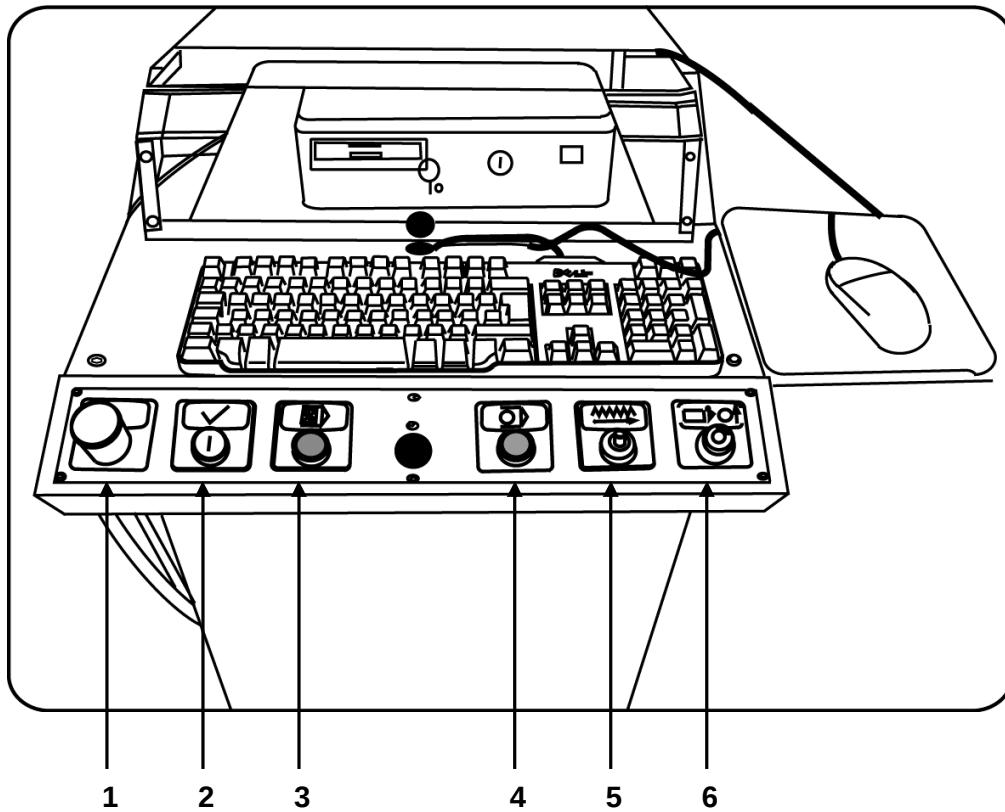


Fig. 05-01

1. EMERGENCY STOP
2. Enable machining
3. START program
4. HOLD program (if pressed once) - STOP program (if pressed twice)
5. OVERFEED (to vary the positioning speed of the machine axes)
6. Automatic cutting cycle / blade inspection key selector

Piece advance backwards and forwards selector in loading phase (only active in the magazine tooling up phase)

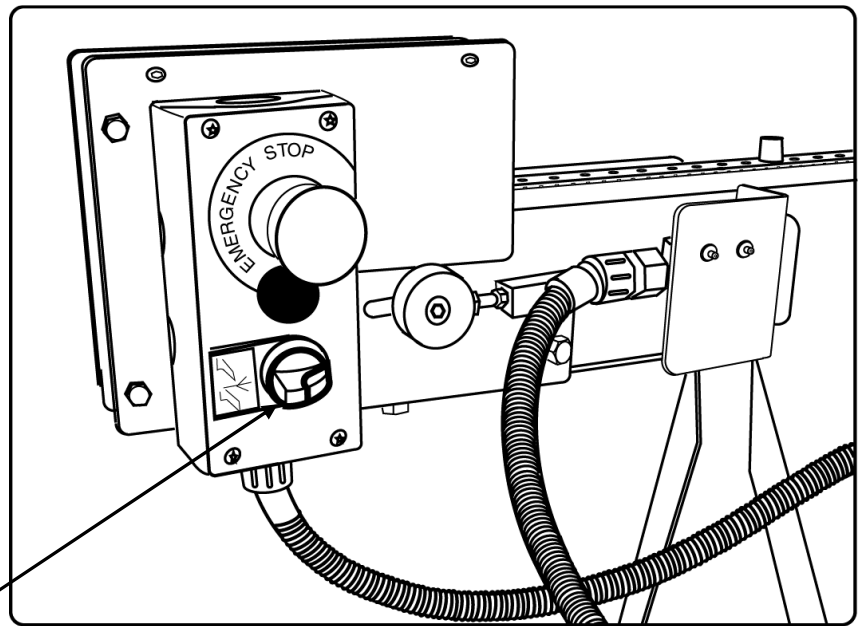
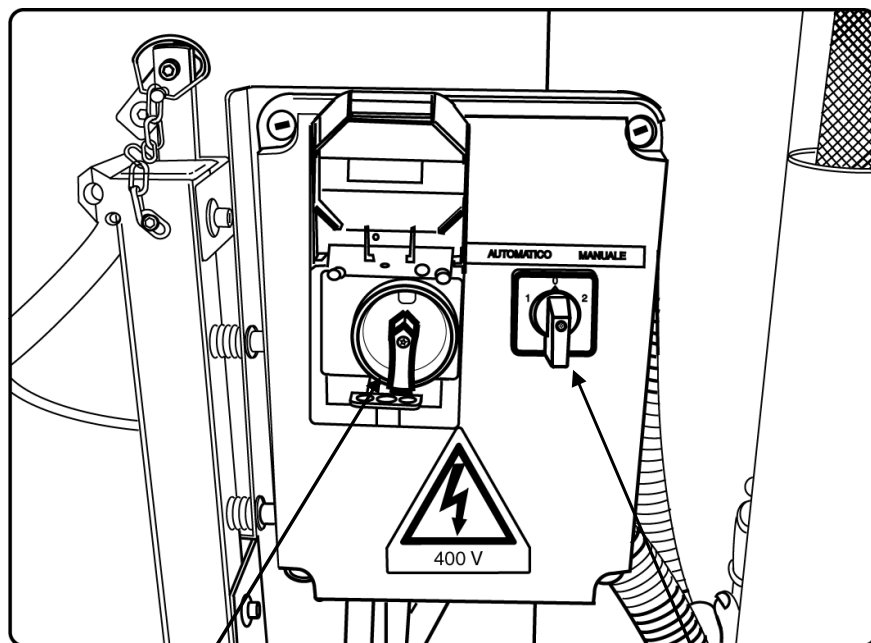


Fig. 05-02



Exhauster electrical supply isolator

Position selector:
 0 = exhauster not running
 1 = 'automatic' operating mode (with the sawing machine blade in motion)
 2 = 'manual' operating mode (independent of the sawing machine)

Fig. 05-05

6 MACHINING SEQUENCES

1. The motor driven infeed conveyor only advances when the pusher arm is in the 'up' position and there are no bars on the cutting line – The sawing machine blade must be running up to speed, in the rest position and the vices must be released.
2. When the piece reaches the end of the motor driven conveyor, it is aligned on the bar pusher roller table (if required the profile can be first rotated using the tilting system if enabled by the program) and clamped by pins '**A**' - **Fig. 06-01** in order for the gripper to grasp it perfectly. The pivoting motion of the pins is activated by the piece present detection photocell.
3. The purpose of the retractable stop '**B**' - **Fig. 06-01** is to hold the bar still during the gripper pick-up phase and then retract with some of the pins '**A**' when the operation is complete. Other pins remain on the bar to guide its forward movement. Once the bar has been transferred to the multispindle, it is clamped by the vice units located on the Right and Left of the electrospindles so that the required machining operations can take place.
4. On exiting the multispindle the bar is taken to the alignment position on the bar pusher roller table by means of the vertical motorised rollers '**C**' - **Fig. 06-02** and is then blocked by the pins '**A**' - **Fig. 06-01** so that it can be grasped perfectly by the gripper. Movement of the motorised rollers is activated by the piece presence detection photocell '**C1**' - **Fig. 06-02**.
5. When the bar, having left the multispindle, is transferred onto the sawing machine, it is held by a system of rollers '**D1 / D2**' - **Fig. 06-03** located at the entry to the sawing machine which allow perfect alignment with the work table, after which the bar is also clamped by the sawing machine vice; the saw blade then trims the bar after which the vices release the piece.
6. The sawing machine is equipped with a translating work table on the Right '**E**' and a motor driven roller table (shuttle) '**F**' on the Left which sends the bar out and at the same time allows the waste pieces to drop inside the table (**Fig. 06-04**). The final bar waste is sent out automatically by the ejector inside the gripper (under the work table or on the unloading roller table, depending on the length).
7. The bar pusher moves forward lengthways up to the programmed measurement, the piece is again clamped by the vices, the blade carries out the cutting cycle and the vices are released.
8. The cut piece is transferred by the motor driven roller table to the unloading areas.
9. Cut pieces below 4500 in length are automatically offloaded in the automatic stacker. Pieces greater than 4500 in length and/or higher than 140 mm. must instead be offloaded manually.
10. To process the next bar we start again from sequence 1.

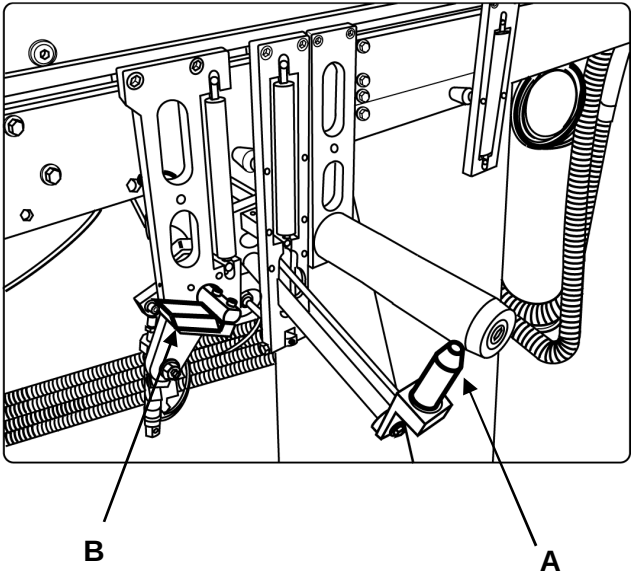


Fig. 06-01

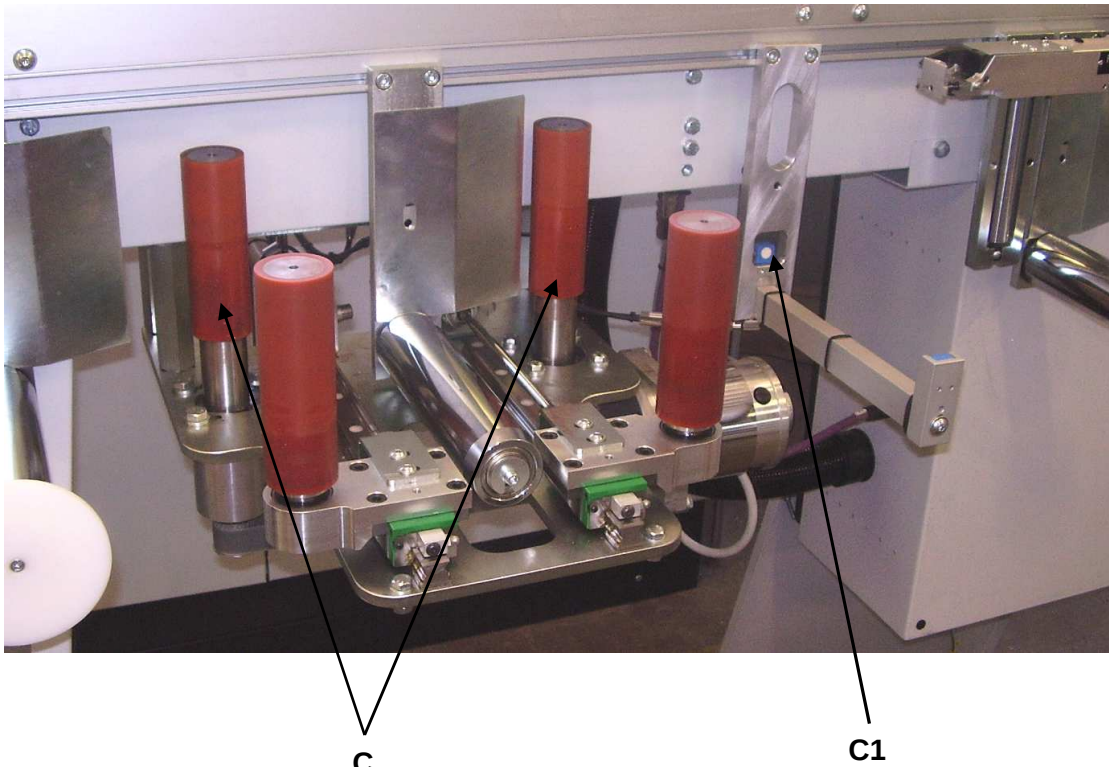


Fig. 06-02

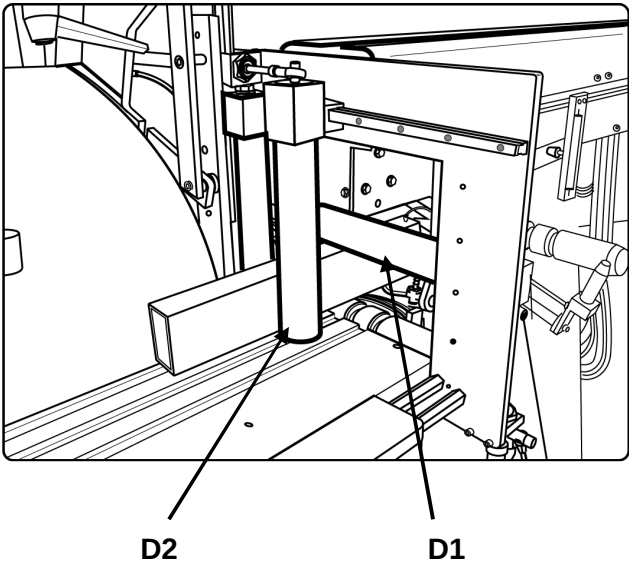


Fig. 06-03

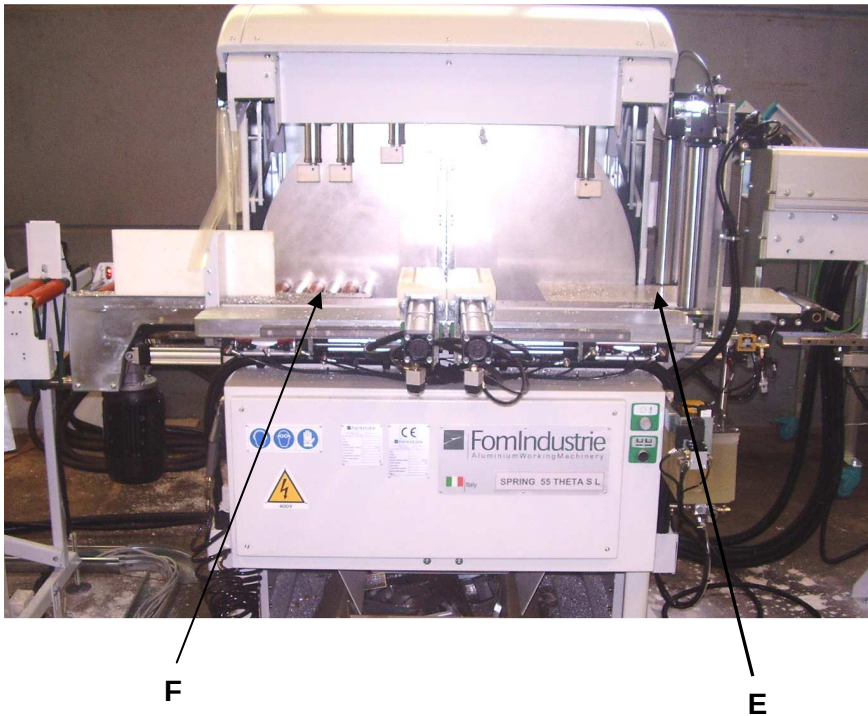


Fig. 06-04

7 ADJUSTMENTS

7.1 ADJUSTING AND CHANGING THE GRIPPER UNIT

Horizontal and vertical adjustment of the Push Plus gripper unit is carried out in a controlled way by POWER C.

The height of the gripper unit is adjusted according to the height and thickness of the profile. The gripper height **Offset Z** (to be entered in the relative Vision parameter) refers to the bottom of the gripper and is equal to the height **h** of the profile resting on the rollers **less** the profile thickness **s** (relating to the part of the profile which is clamped by the gripper) (see **Fig. 07-01**).

Offset Z = h - s

N.B. The gripper is set to a height where it will not touch the sawing machine worktable and rollers.

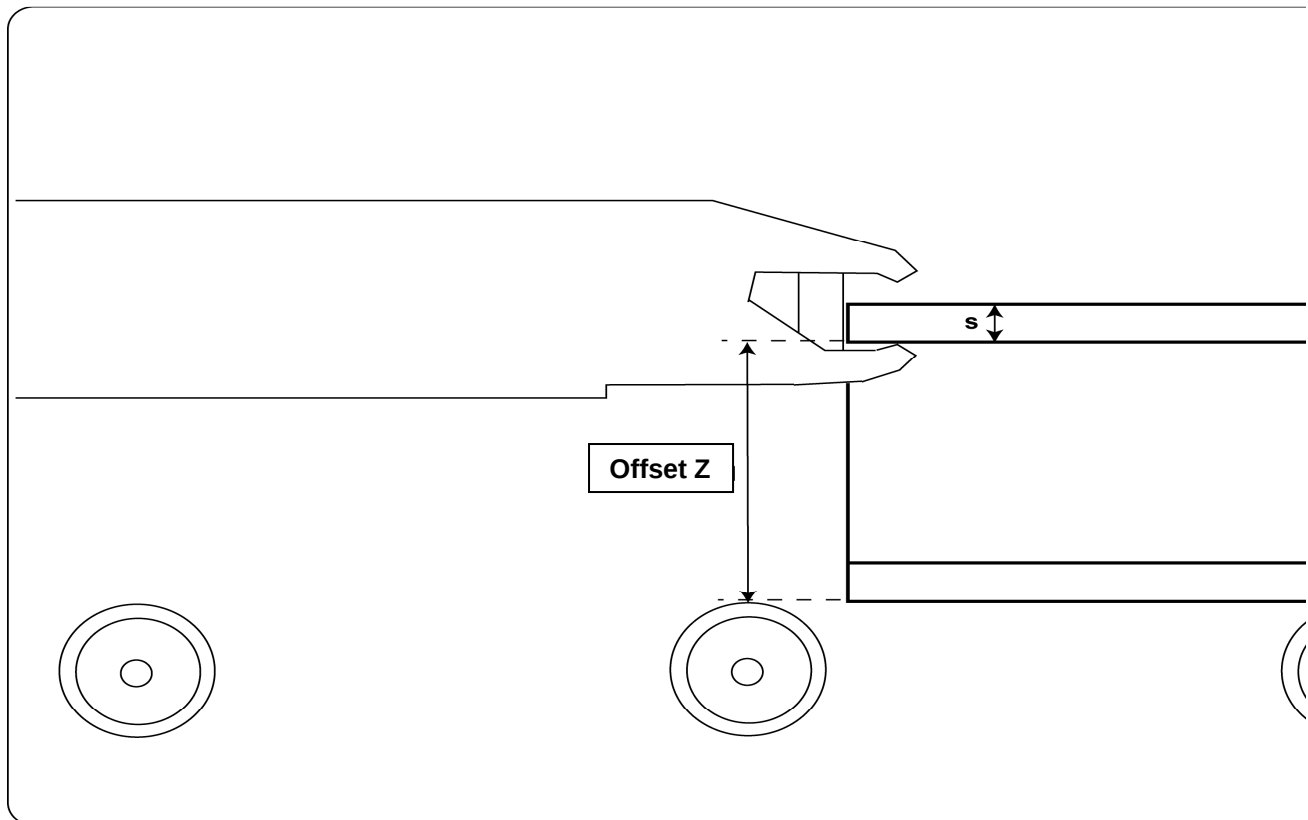


Fig. 07-01

7.2 ADJUSTING THE INCOMING AIR PRESSURE (Fig. 07-02)

Push Plus is fitted with 2 incoming air pressure regulators.

Filter 'A' must be adjusted in such a way that the machine working pressure (7 bar) is read on the relative gauge.

Filter 'B' is adjusted according to the type of profile in such a way that the bar is pushed optimally and so that there is no deformation by the piece clamping pins: the gauge shows the value of the pin pressures (adjustable, recommended pressure **3 bar**).

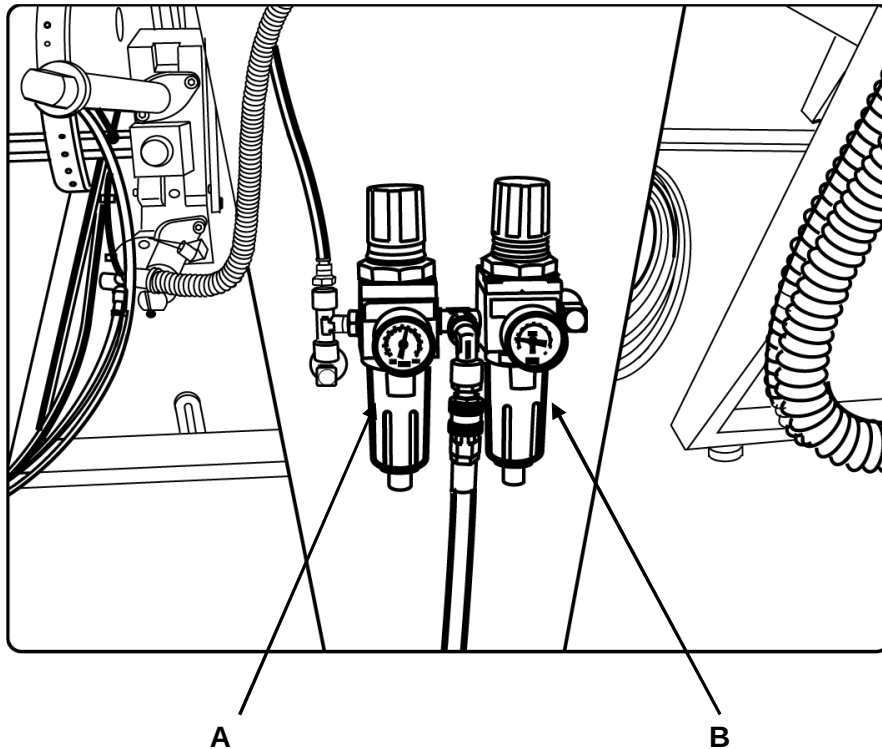


Fig. 07-02

8 MAINTENANCE

Clean the machines inside the cabin every day.

To make cleaning operations easier on the machines inside the cabin, the following have been provided.

There are motor driver evacuation belts under the machine work tables that take the chips and machining waste out of the cabin on another motor driven belt set at an angle (**Fig. 08-01**).

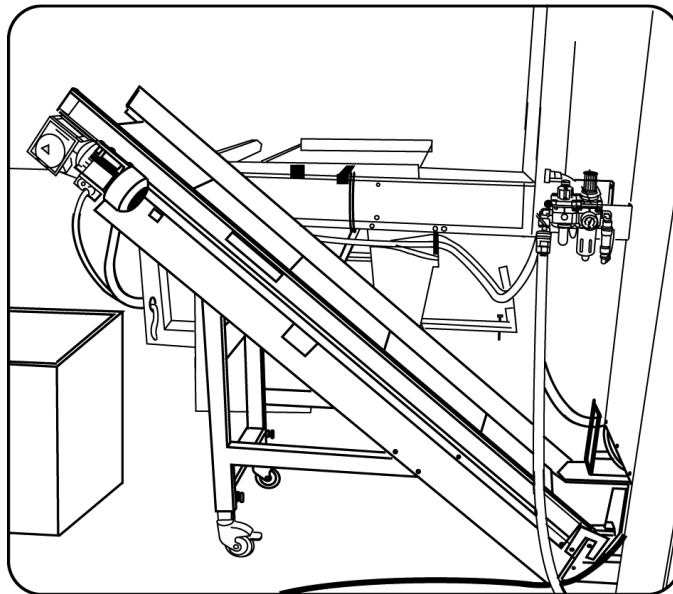


Fig. 08-01

Every **100** working hours approximately grease the X axis sliding blocks of the 2 Push through the relative lubricators "**A**" - **Fig. 08-02**".

The type of grease to be used is shown on the sticker next to the lubricators (see also **Table 08-01**).

Grease also the pneumatic pushers of the Push through the relative lubricators "**B**" - **Fig. 08-03**.

To grease the mechanical parts of the Multispindle and the Spring refer to the relative instruction manuals.

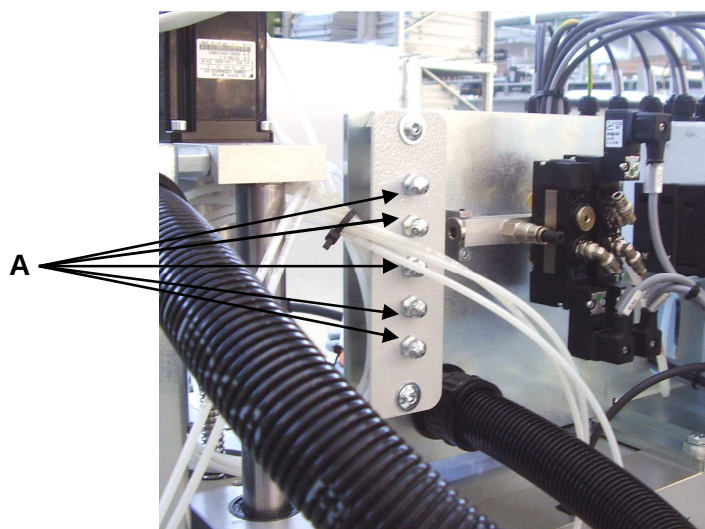


Fig. 08-02

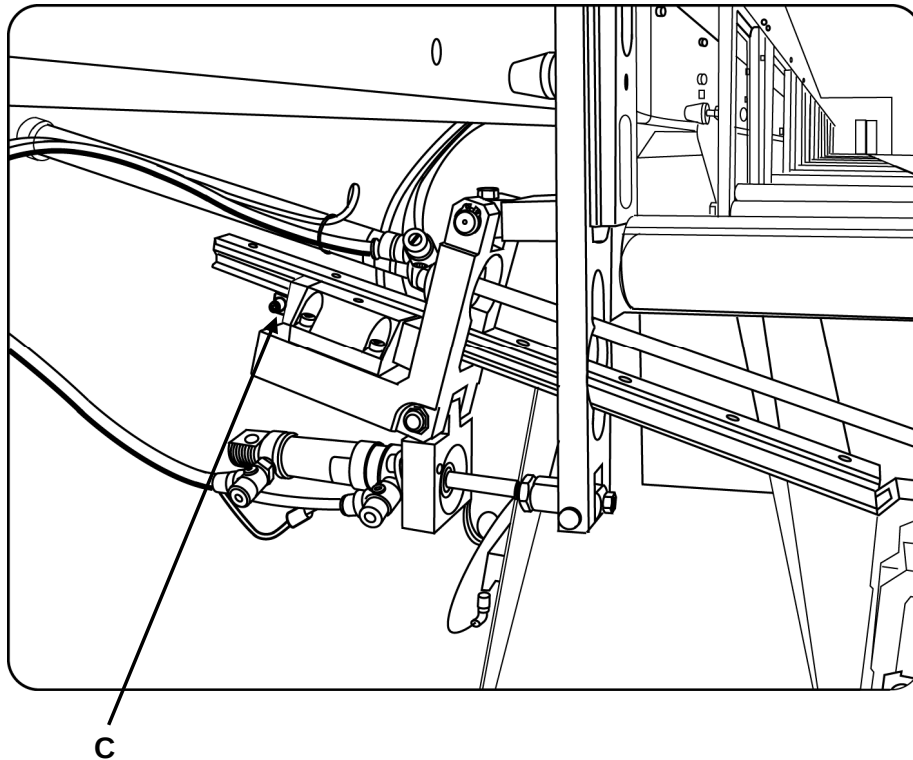


Fig. 08-03

GREASE SPECIFICATIONS

Type of soap	Lithium - calcium
Work penetration 60 double strikes (ASTM D 217)	400 – 430 mm/10
Drop point (ASTM D 566)	165°C
Corrosive to copper (IP 112 b 5)	Negative
Emcor test	Passed

Table 08-01

FOM spare part code for grease: **ET-77906** in 1 Kg. packs.

N.B.
Periodically make a backup of all machining programs

TABLE OF TOOL LENGTHS

SPINDLE No.	Length (mm.) Fomcam	Tool code
1/1	60	115201160000
1/2	65	HZ304980
1/3	50	115201150000
2/1	60	115201160000
2/2	60	HZ302415
2/3	46	115201150000
3/1	60	115201160000
3/2	60	HZ302415
3/3	57	HZ304792
4/1	45	HZ309097
4/2	60	HZ304980
4/3	45	115201150000

The table shows the theoretical values of the tool lengths.

The first Spindle No. digit indicates the side of the plate where the spindle is found (1=top side, 2=front side, 3=rear side, 4=bottom side). The second digit of the Spindle No. indicates the spindle position on the relative side of the plate.

N.B.

Each tool length refers to the external part of the relative ring (see chap. 10.3 of the MULTIMANDRINO_ALL instruction manual).

9 RECOMMENDED SPARE PARTS

Step In

Code	Description	Q.ty
PK301994	Piece dragging pin	20
FK-79702	Brass insert	20
DW-79208	Piece feed belt for feeding in bars	2
CN-79195	Pneumatic cylinder - stroke 250	2
CN-79198	Pneumatic cylinder - stroke 35	2
AO-79203	Magnetic switch for horizontal cylinder	1
AO-79204	Magnetic switch for vertical cylinder	1
AN710573	Limit switch	1
AO-79193	Photocell	1
AN710573	Adjustable lever-type limit switch	1
ZA-79595	Power module CAN BUS	1
ZA-79596	8-output module CAN BUS	1

Push Plus

Code	Description	Q.ty
CN-79197	Pneumatic cylinder - stroke 50	1
CN-79196	Pneumatic cylinder - stroke 80 on bar gripper	1
PI302022	Gripper lower lh tong	1
AN-77230	Limit switch on gripper	1
AO-78943	Inductive sensor	1
AO-79203	Magnetic switch	2
BR-78940	Monostable solenoid valve 5/2	1
BR-78941	Bistable solenoid valve 5/2	1
BR-77872	Bistable solenoid valve 5/2	1
AO-77677	Miniaturised magnetic switch	1
BS710749	Movable male connector 3 poles	1
BS710750	Movable male connector 4 poles	1
OP302081	Press roller	1
EB308160	Rubber guide roller	1
PK308159	Cap for rubber roller	1

Profile guideway unit

Code	Description	Q.ty
CN-79760	Pneumatic cylinder - stroke 350	1
CN-79195	Pneumatic cylinder - stroke 250	1

Multispindle

Code	Description	Q.ty
HZ304980	Single-cutter milling tool in tungsten carbide Ø8 L100	2
HZ302415	Single-cutter milling tool in tungsten carbide Ø10 L110	2

115201150000	Single-cutter milling tool in tungsten carbide Ø3	3
115201160000	Single-cutter milling tool in tungsten carbide Ø5	3
HZ304792	Milling tool in tungsten carbide Ø8 – Ø3	1
HZ309097	Milling tool Ø8 5x90	1
104303790000	Spindle	1
CH-77379	Microdrop pump	1
QN-26560	Vice pad	2
AO710965	Vice magnetic sensor	4
AO-76029	Transfer magnetic sensor	2

Spring 55 Theta SL

Code	Description	Q.ty
CN304590	Pneumatic cylinder for horizontal vice	1
PK302626	Horizontal vice pad	2
CN307707	Telescopic press for vertical vice	2
LX-26029	Vertical vice pad	2
OU-43319	Vertical vice pad bush	2
GP300457	Ø550 blade	1
PA-37403	Vertical vice cylinder support	2
AN-77230	Limit switch	1
AO-79204	Magnetic switch	1
BR-79683	Bistable servo-assisted solenoid valve 5/2	1

Motor driven extraction roller table (PR-26679)

Code	Description	Q.ty
OP303934	Extraction roller	2
OP308045	Extraction roller	2
DW710013	Transmission belt	1

Line general electrical cabinet

Code	Description	Q.ty
AO-78656	Relay	1
ZD-75474	Mini relay	1
ZD-75475	Relay base	1
AG-75742	Remote control switch	1
AG-76885	Remote control switch	1
AH-74144	Auxiliary remote control switch	1

General fittings

Code	Description	Q.ty
BT-75142	Stop valve	1
CA-71219	Flow regulator 1/8 narrowed at outlet for D6 hose	2
CA-70233	Male-female 1/8 curve	4
CZ-70751	1/8 tap	2
CA-71026	1/8 rotating union for D6 hose	2

10 RULES FOR ORDERING SPARE PARTS

SPARE PARTS

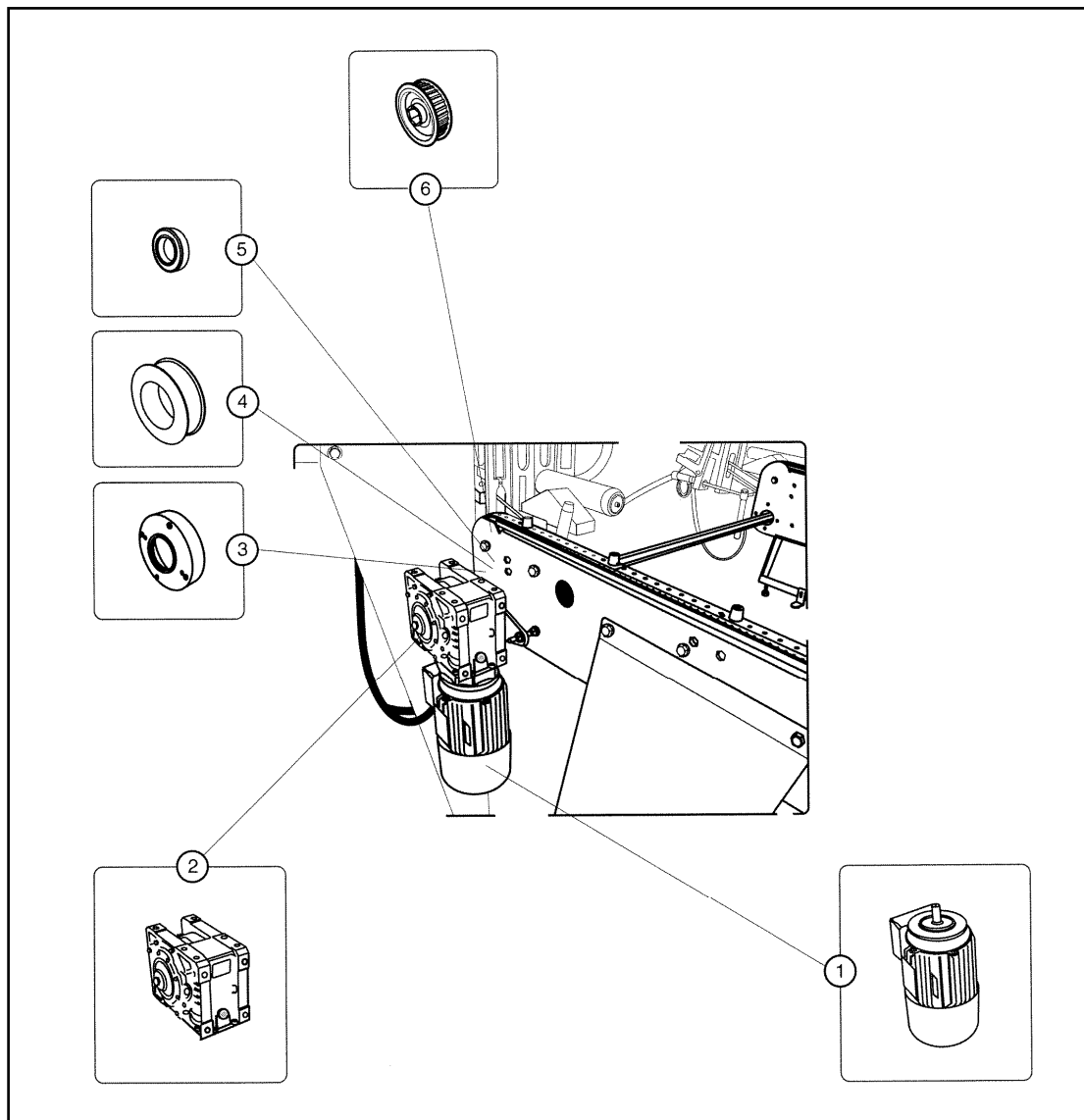
WHEN ORDERING SPARE PARTS ALWAYS QUOTE:

ON THE MACHINE ID PLATE:

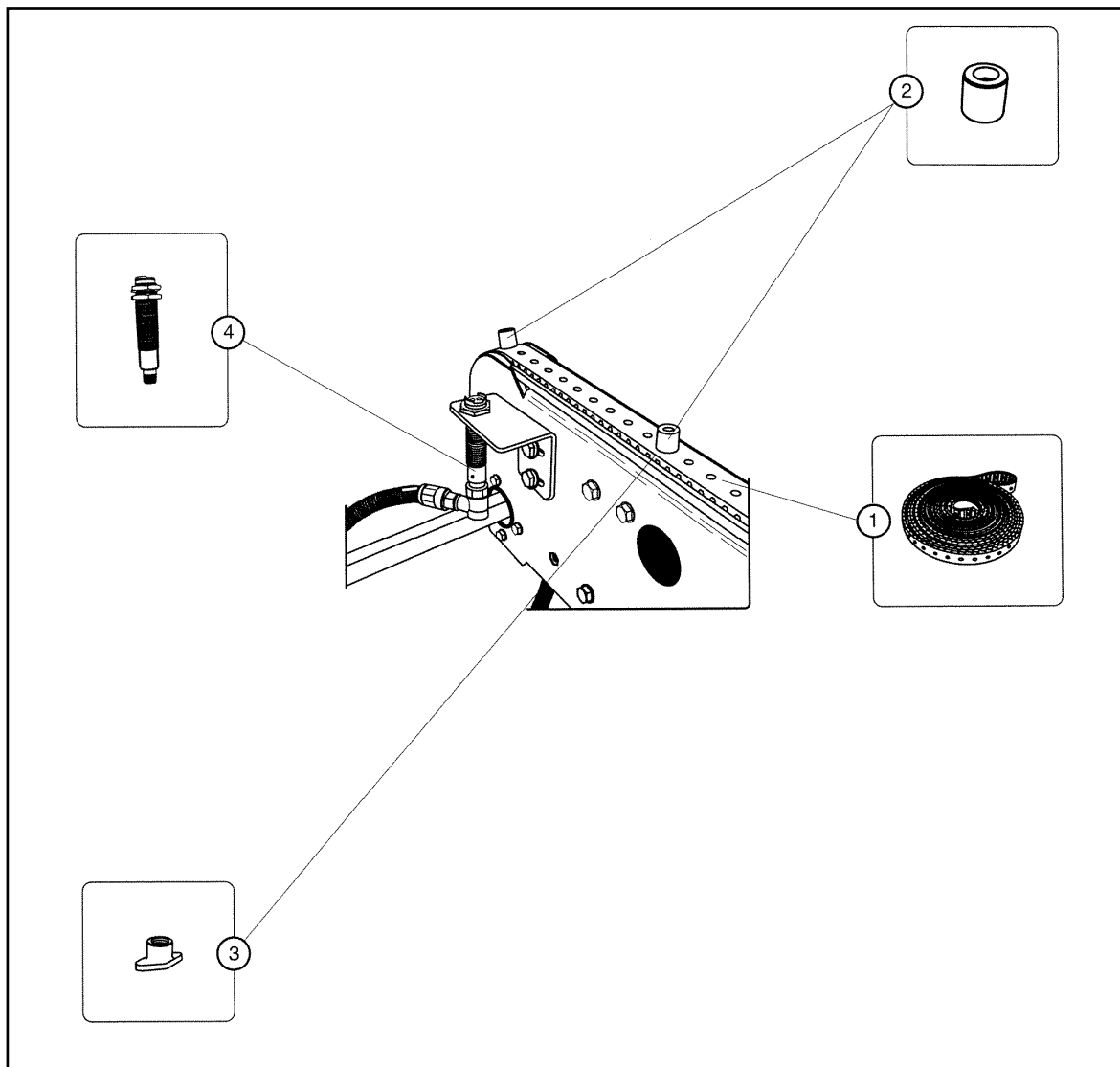
- MACHINE TYPE
- NR. CODE
- NR. SERIAL NUMBER

ON THE ILLUSTRATIVE TABLES:

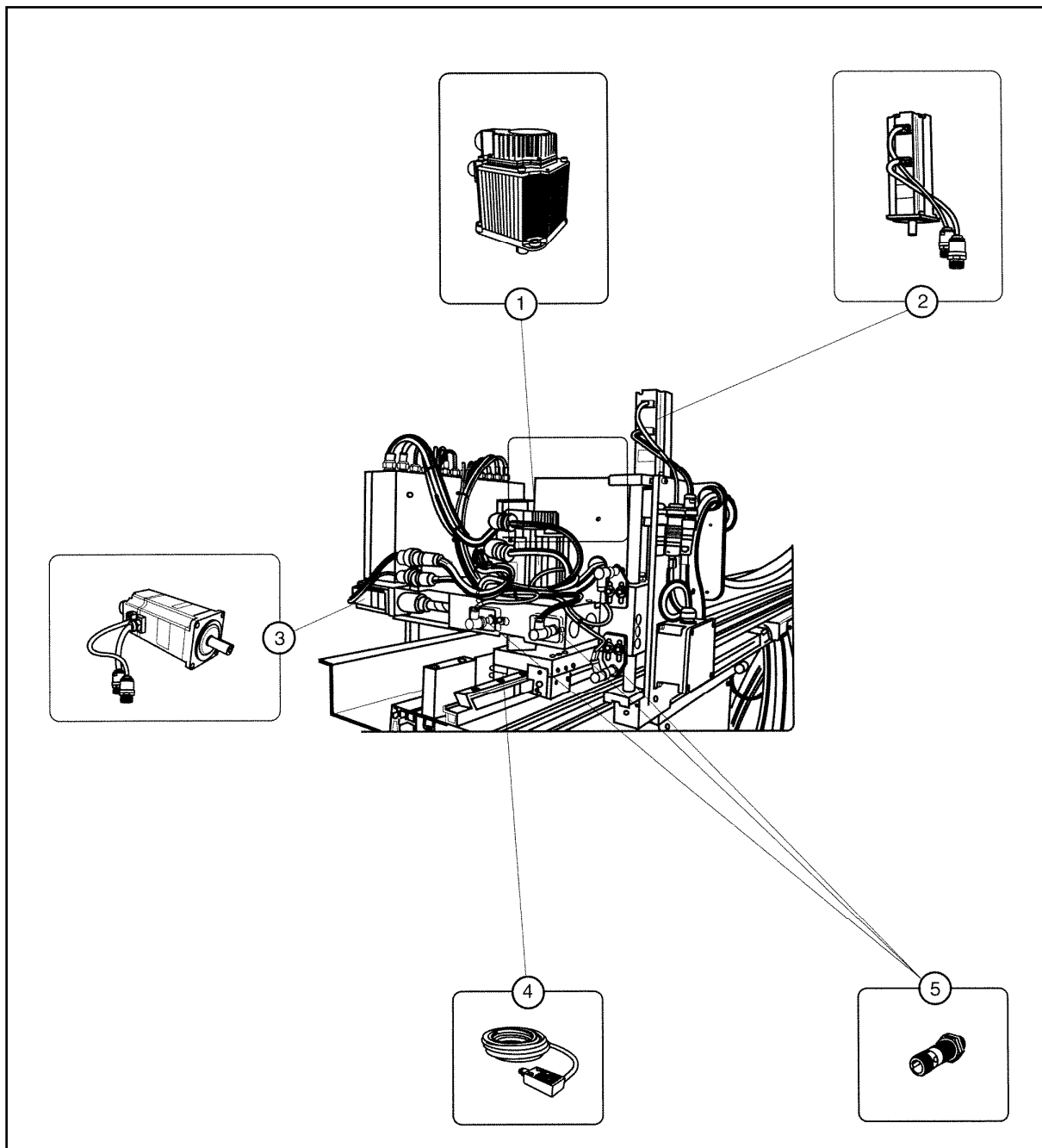
- NR. TABLE
- NR. REFERENCE
- NR. CODE

TAB. 1 - STEP IN

Pos.	Code	Description	Q.ty
1	BK-78189	Motor - CEG M71A B14 0.37KW 4p 230/400-50 FHC	1
2	BK-79191	Gearbox - Bonfiglioli W 63 U 80 P71 B14 V5	1
3	OP301999	Bearing support	8
4	DV301986	Driven pulley	8
5	DD-70954	Ball bearing 6007 - 2RS	24

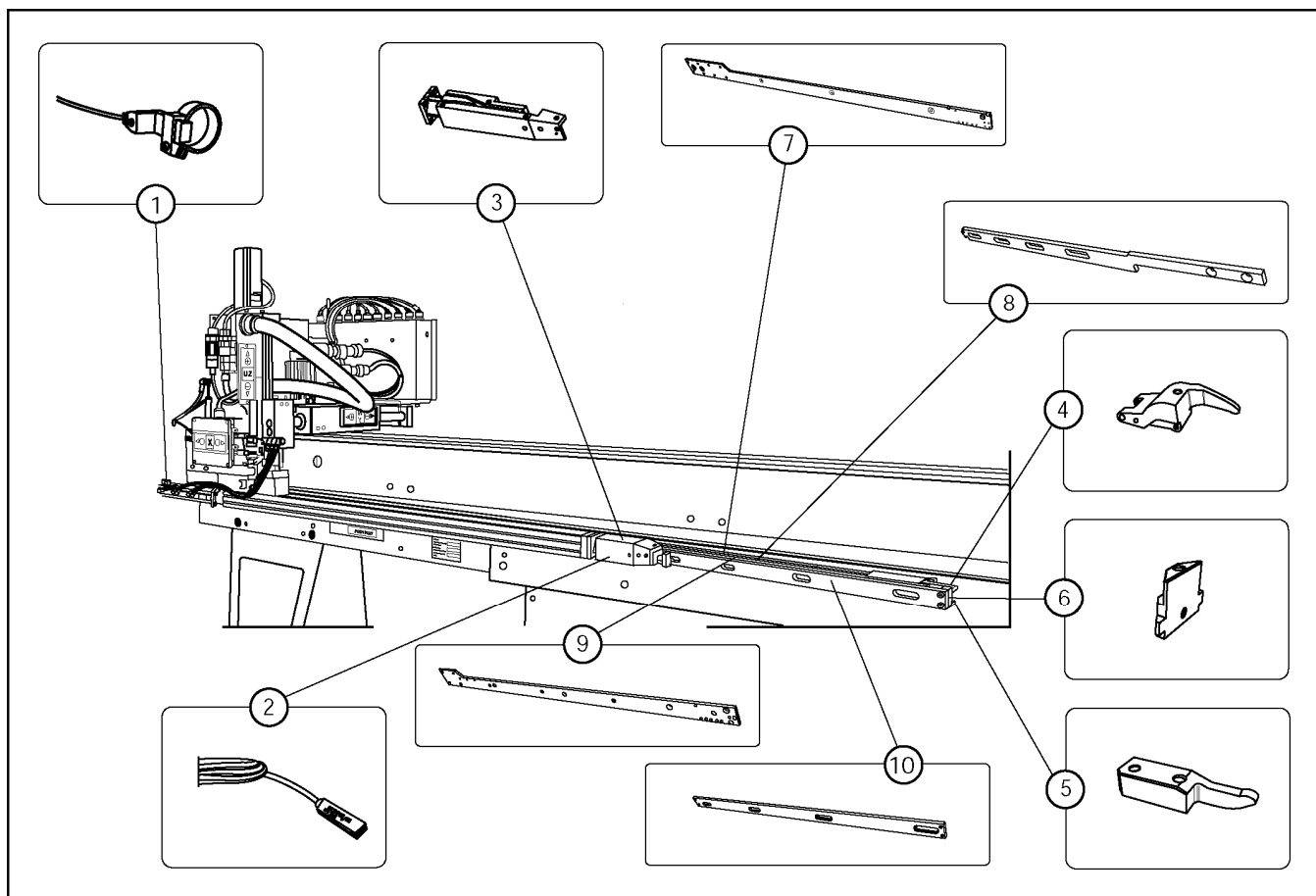
TAB. 2 - STEP IN

Pos.	Code	Description	Q.ty
1	DW-79208	Belt 25 ATN 10/7000	4
2	PK301994	Dragging pin	140
3	FK-79702	Brass insert M4	136
4	AO-79193	Microswitch photocell - DIELL MS 1/100 -1H	1

TAB. 3 - PUSH PLUS

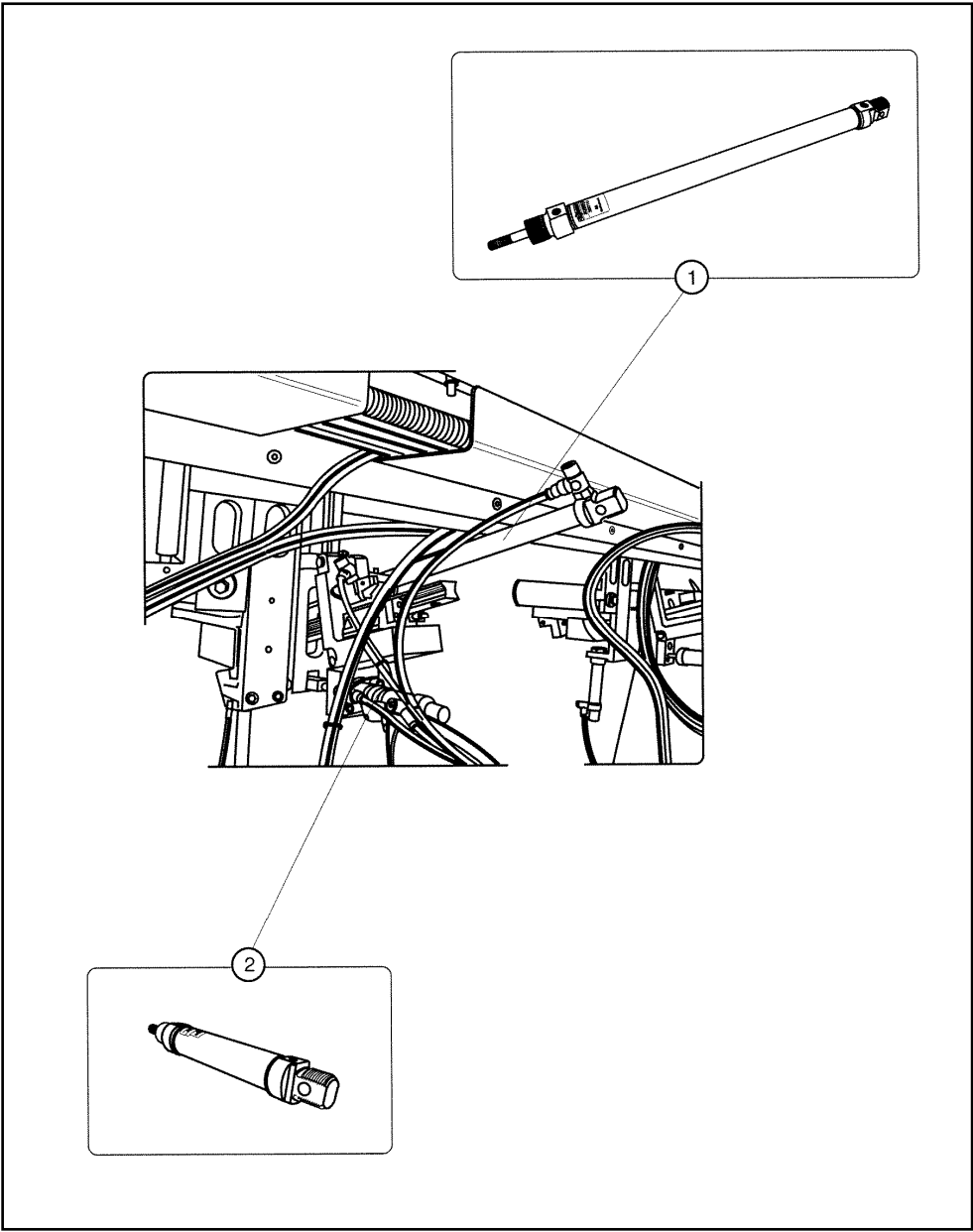
Pos.	Code	Description	Q.ty
1a		Motor - Yaskawa SGMGH 30 3Kw (1° PUSH)	1
1b	BK-78002	Motor - Yaskawa SGMGH 09DCA6 (2° PUSH)	1
2	BK-79719	Motor - Yaskawa SGMAH 03DAA6C	1
3	BK-79201	Motor - Yaskawa SGMAH 030AA61	1
4	AN-77230	Limit switch FA 4615, 4m wire	1
5	AN-76040	Limit switch FA 4615, 2m wire	1

TAV. 4 - PUSH PLUS

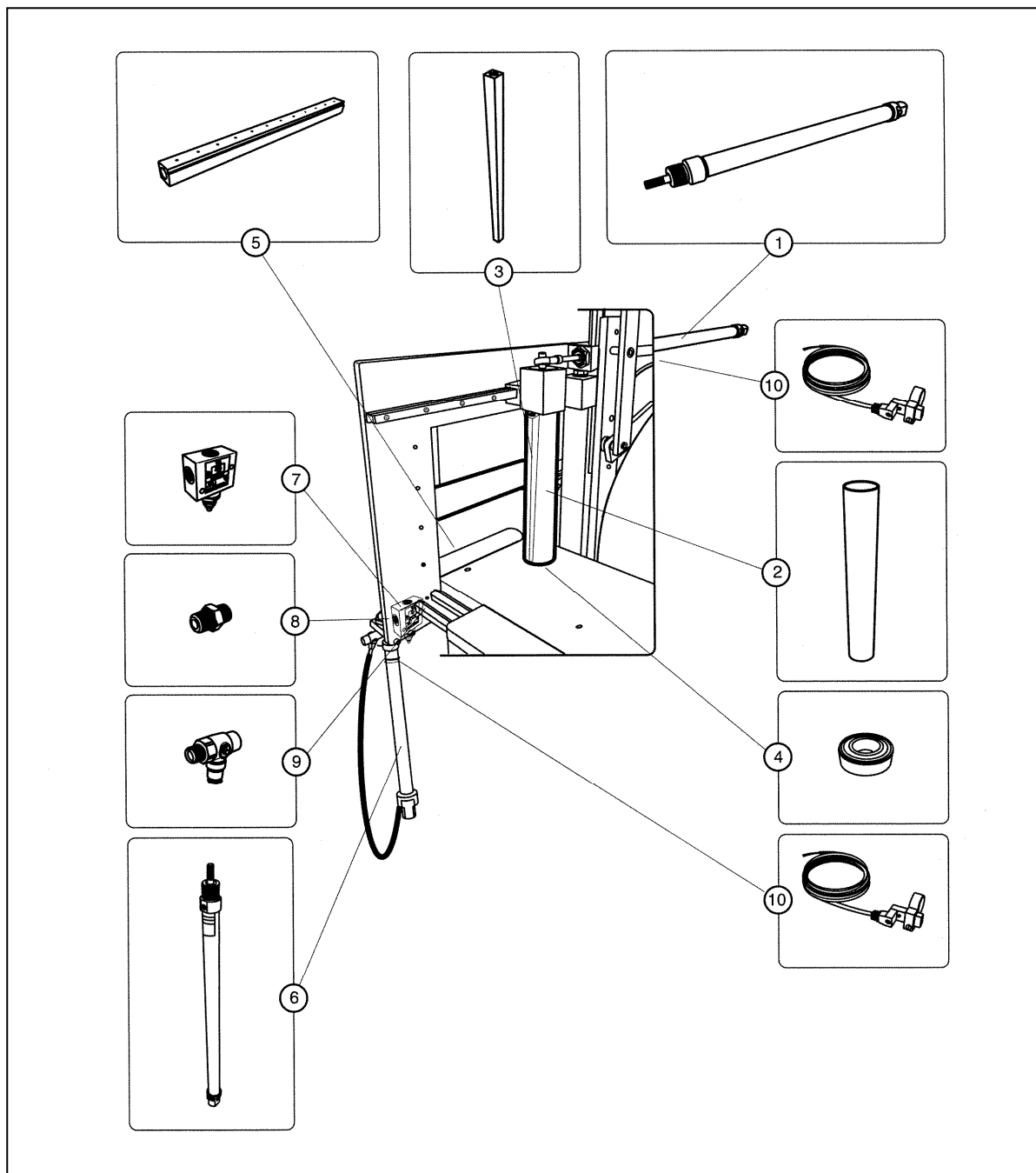


Pos.	Codice	Descrizione	Q.tà
1	AO710965	Magnetic switch	1
2	AO-77677	Magnetic switch	1
3	OW308960	Gripper middle support	1
4	OP308993	Presser finger	1
5	OP308992	Fixed finger	1
6	OW308964	Ejector	1
7	OW308961	Rear plate	1
8	PI308980	Pince support	1
9	OW308963	Front plate	1
10	OW308962	Ejector support	1

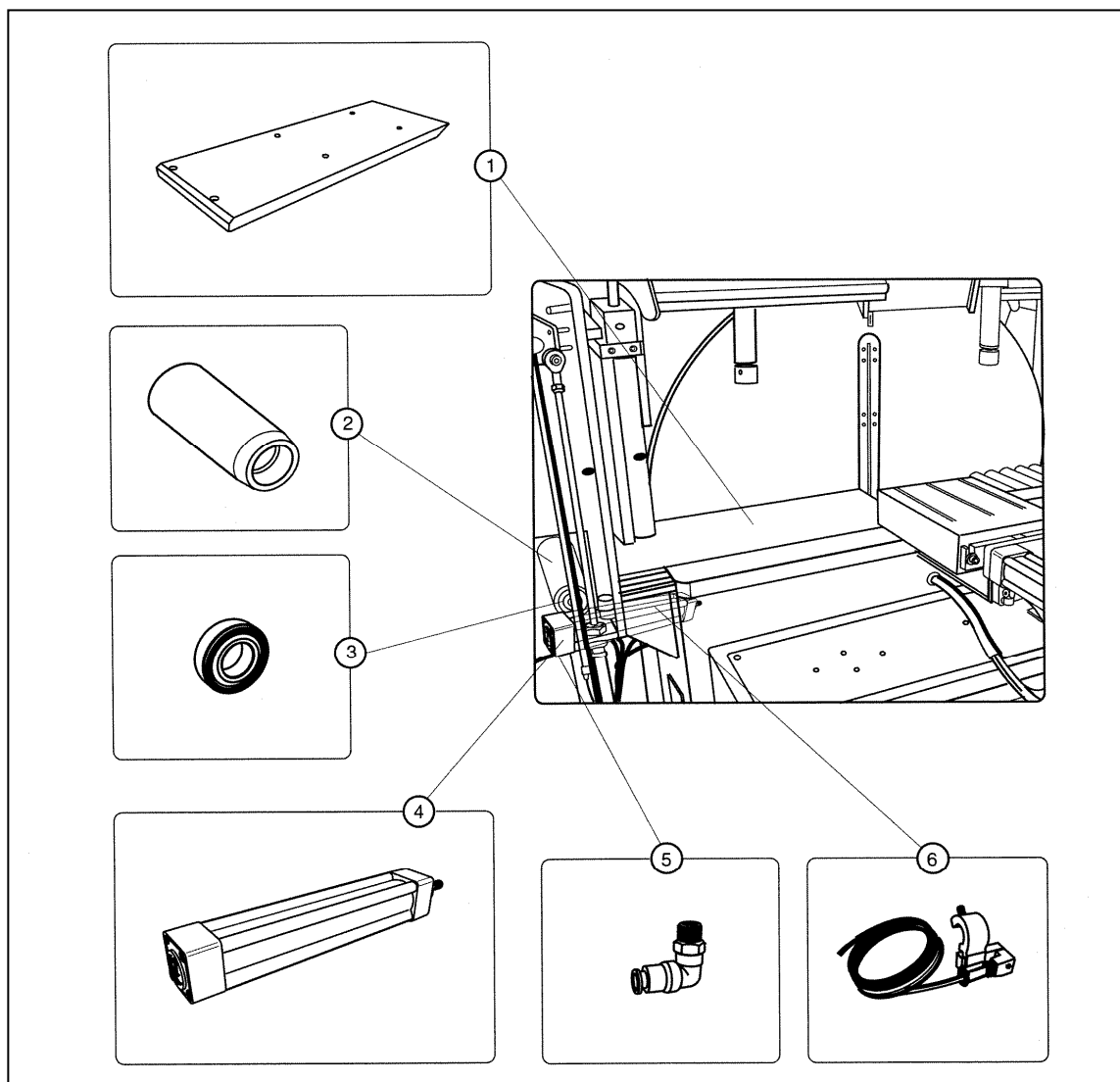
TAB. 5 - PUSH PLUS



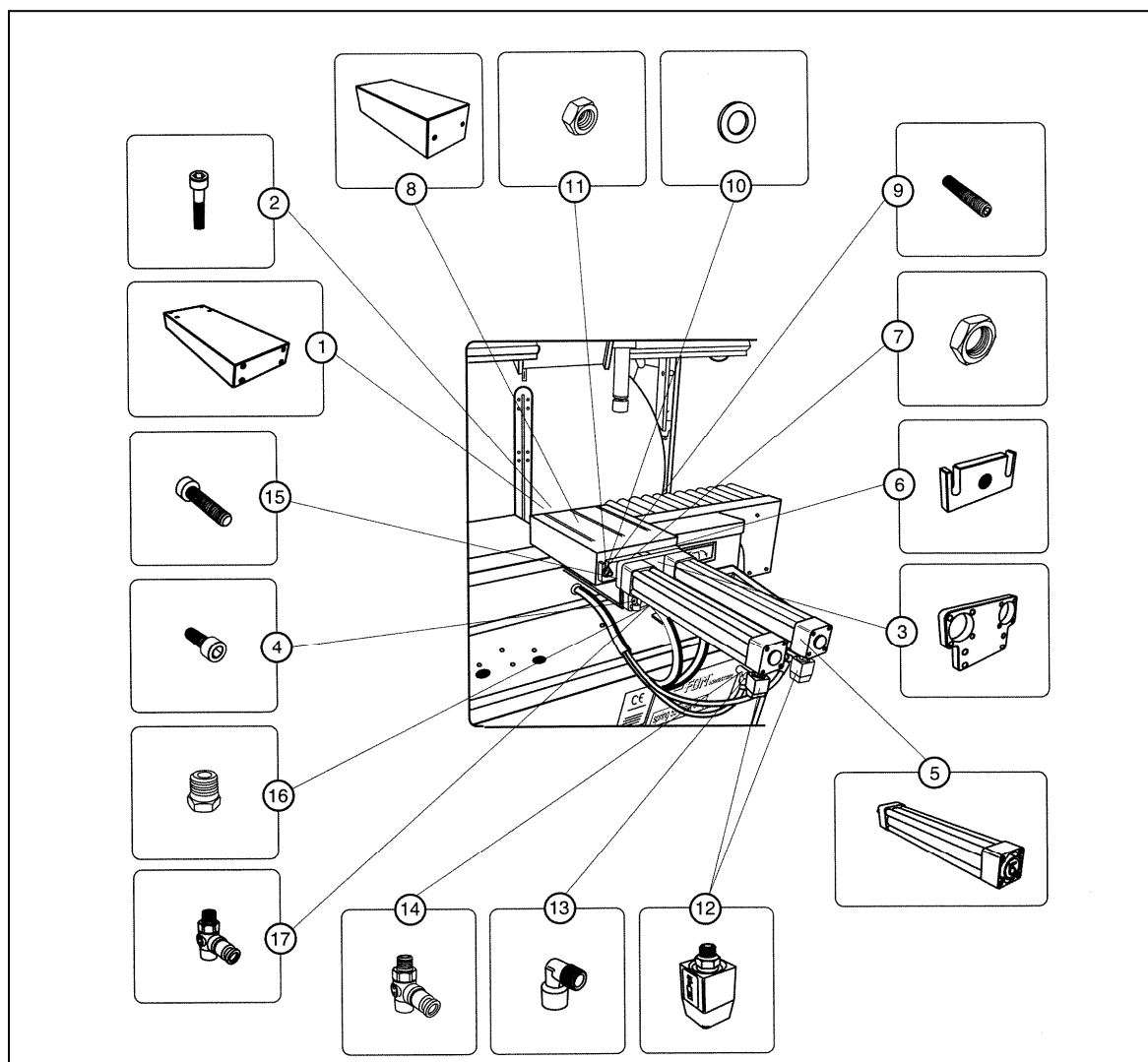
Pos.	Code	Description	Q.ty
1	CN-79195	Cylinder 350.1.0.20.250	1
2	CN-79196	Cylinder 350.1.0.25.80	1

TAB. 6 - PROFILE GUIDEWAY

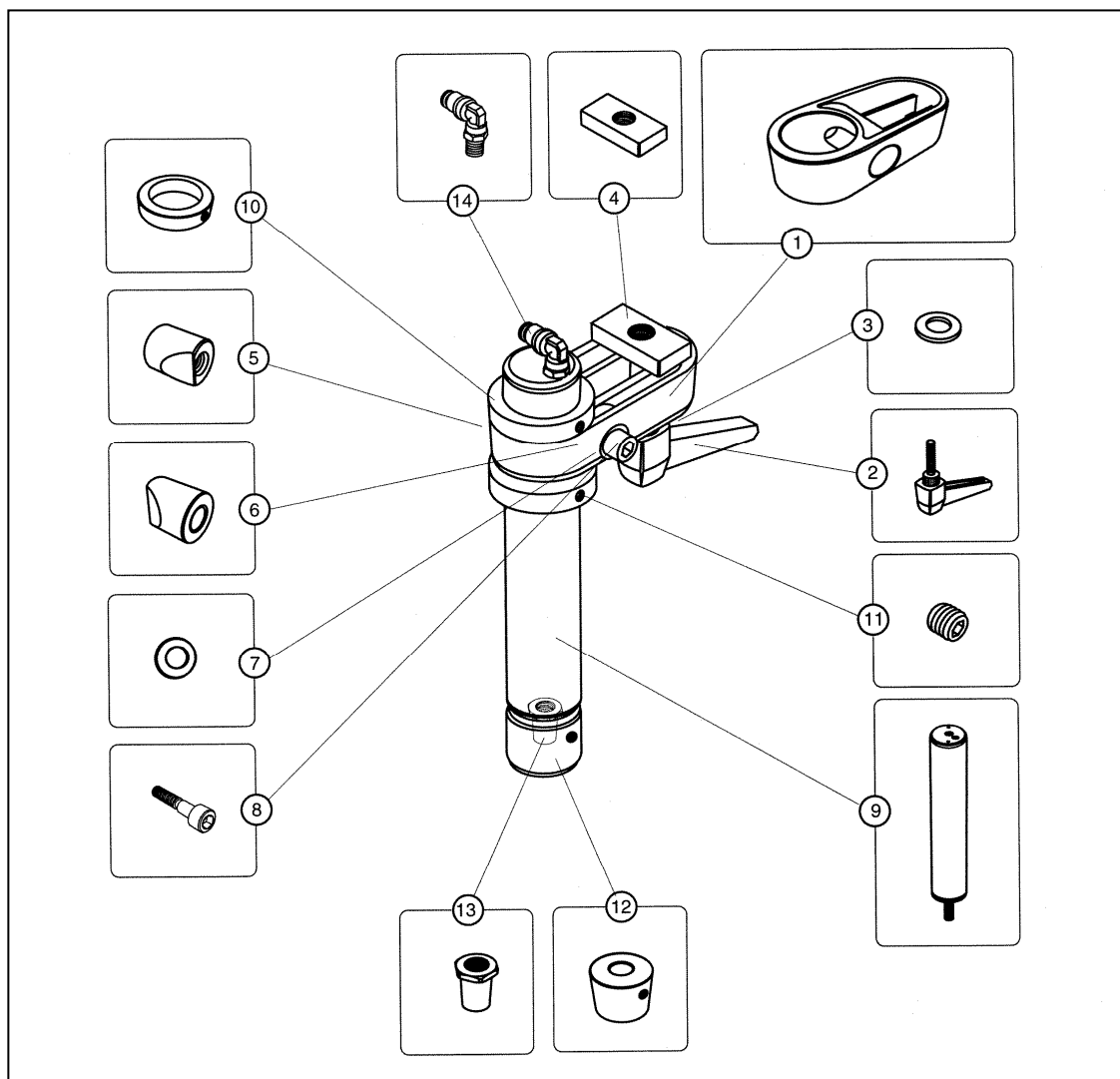
Pos.	Code	Description	Q.ty
1	CN-79195	Pneumatic cylinder	1
2	OQ302969	Roller	3
3	OX303514	Long blower	4
4	DD-71814	Radial ball bearing SKF 6004-2Z 20x42x12	6
5	OX303501	Blower	1
6	CN-79760	Pneumatic cylinder 350.1.0.20.350	1
7	BT-77888	Economizer 1/8	2
8	CA-70962	Union 2500 1/8	7
9	CA-71219	UNIDIR doser 458060 1/8	4
10	AO-79204	Magnetic switch 359.08.20 MT10	2

TAB. 7 - TRANSLATING TABLE

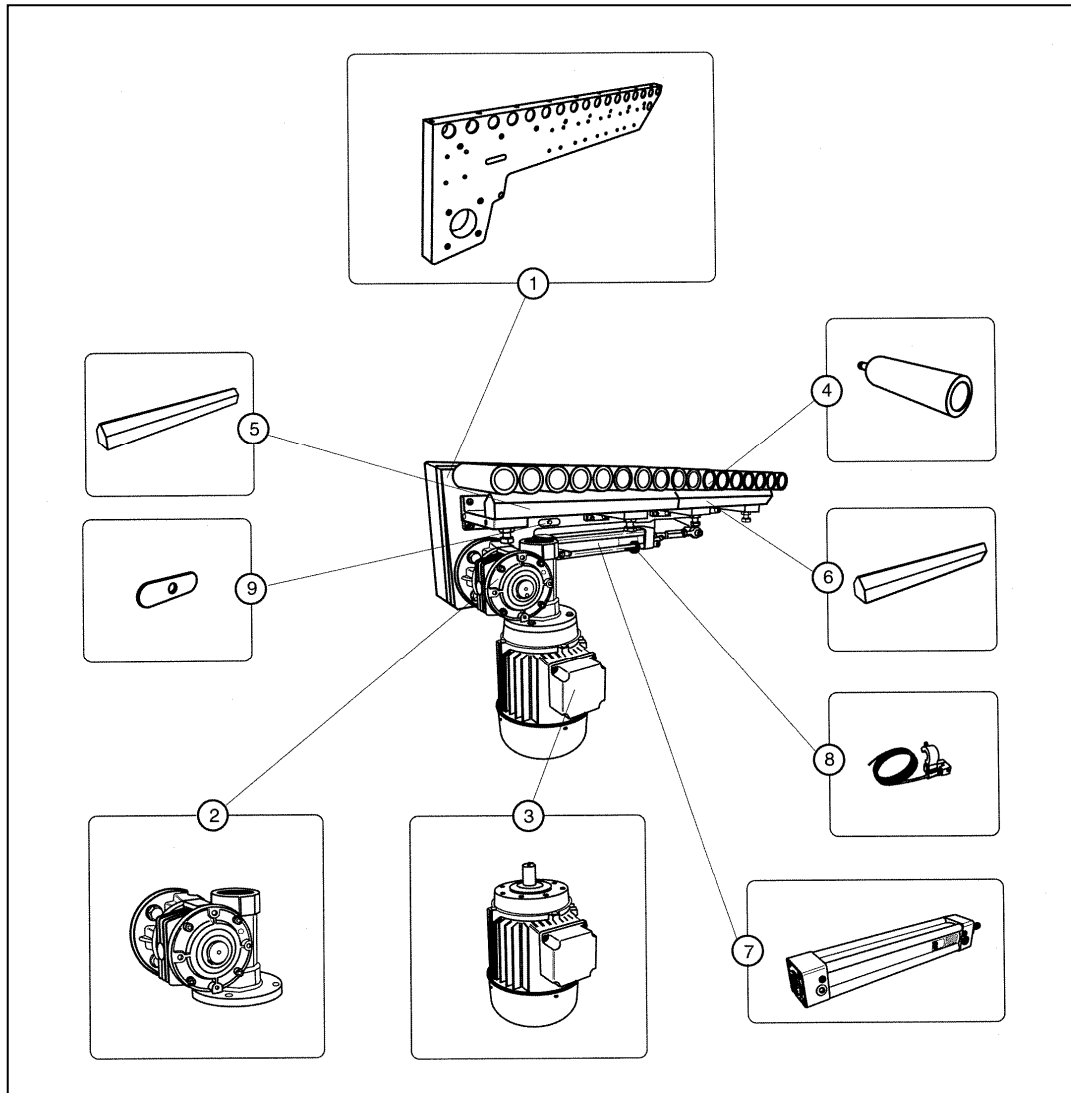
Pos.	Code	Description	Q.ty
1	PK302618	LH mobile worktable	1
2	OQ303487	Support roller	1
3	DD-71814	Ball bearing	2
4	CN-77803	Cylinder, stroke 200	1
5	CA-71026	"L"-shape pivoting union	2
6	AO-76029	Magnetic switch	2

TAB. 8 - HORIZONTAL VICES

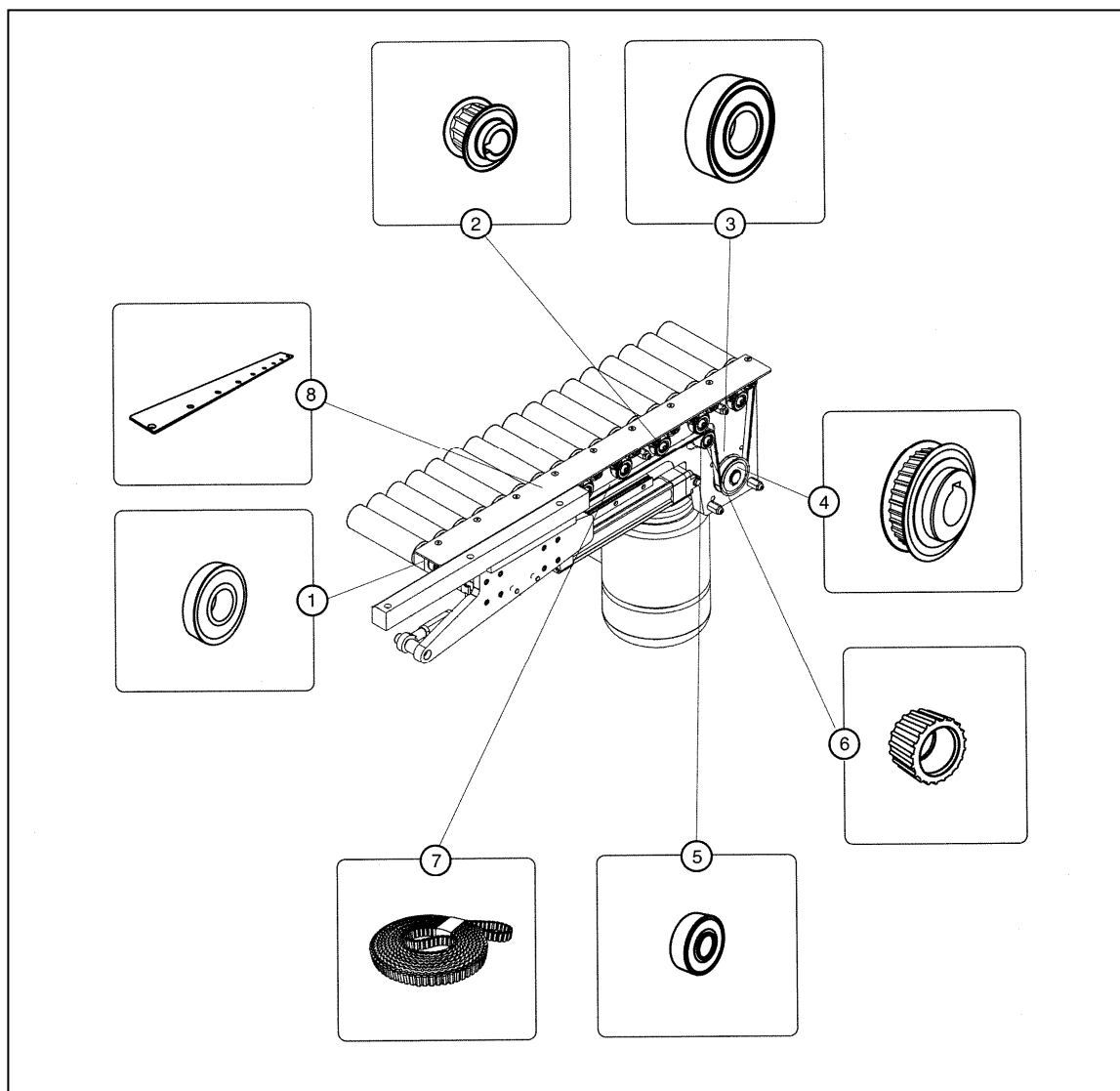
Pos.	Code	Description	Q.ty
1	OR302709	Central vice support	1
2		Socket head cap screw	4
3	PI302707	Vice cylinder support plate	1
4		Socket head cap screw	4
5	CN304590	Pneumatic cylinder	2
6	OR304591	Pad support	2
7		Hexagon nut	2
8	PK302626	Pad	2
9		Flat socket head cap screw	4
10		Washer	4
11		Hexagon nut	4
12	BT-75142	Check valve	2
13	CA-70233	Pneumatic union	2
14	CA-70237	Pneumatic union	2
15		Socket head cap screw	8
16	CA-71221	Pneumatic union	2
17	CA-71232	Pressure regulator	2

TAB. 9 - VERTICAL VICE

Pos.	Code	Description	Q.ty
1	OW305346	Horizontal cylinder support	1
2	FS-71590	Release handle	1
3		Washer	1
4	OR-30508	Vice fixing plate	1
5	OP-37459	Cylinder gib	1
6	OP-37458	Cylinder gib	1
7		Washer	1
8		Socket head cap screw	1
9	CN303689	Telescopic cylinder	1
10	OW303687	Presser blocking ring	2
11		Flat grub screw	2
12	LX-26029	Nylon pad	1
13	OU-43319	Vice pad bush	1
14	CA-71026	"L"-shape pivoting union	1

TAB. 10 - MOTOR DRIVEN ROLLER TABLE (SHUTTLE)

Pos.	Code	Description	Q.ty
1	PI303937	Roller table support	1
2	BK-79649	Gearbox	1
3	BK-72763	Electric motor	1
4	OP303934	Extraction roller	9
4	OP308045	Extraction roller	8
5	OY303936	Roller stop	1
6	OY303935	Roller stop	1
7	CN-79218	Pneumatic cylinder	1
8	AO-76029	Magnetic switch	2
9	OV303939	Protection plate	1

TAB. 11 - MOTOR DRIVEN ROLLER TABLE (SHUTTLE)

Pos.	Code	Description	Q.ty
1	DD-71432	Radial ball bearing	36
2	DV302200	Driven pulley	18
3	DD-71472	Radial ball bearing	1
4	DV302770	Drive pulley	1
5	DD-70973	Radial ball bearing	18
6	DV303940	Driven pulley	9
7	DW710013	Belt	1
8	PI303946	Cover	1