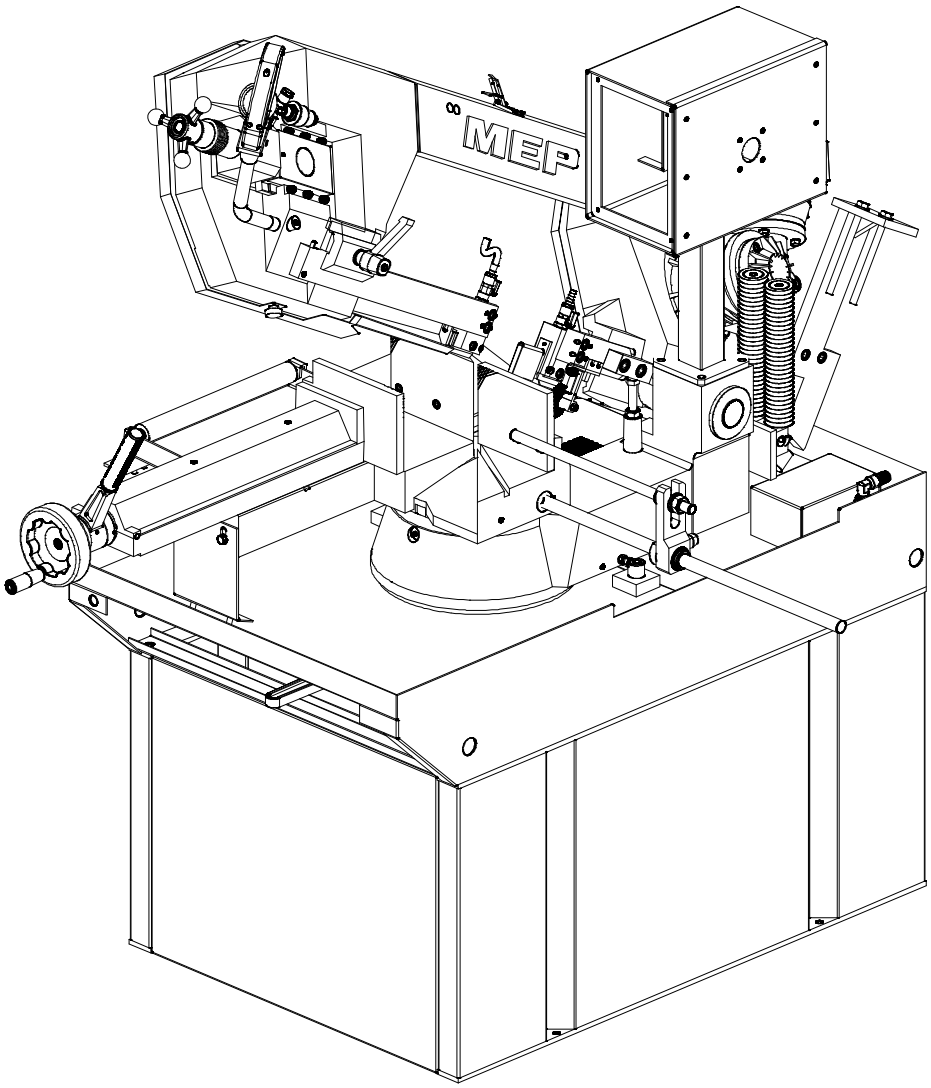



USE AND MAINTENANCE MANUAL

# EN SHARK 281

YEAR OF MANUFACTURE: _____

Translation of the original instructions

# "CE" CONFORMITY DECLARATION
## (according to EEC MACHINES DIRECTIVE 2006/42/CE annex II A)

The manufacturer:

MEP S.p.A.
Via Enzo Magnani, 1
61045 Pergola (PU) ITALIA
Tel. 072173721–Fax 0721734533

Hereby declares that the bandsawing machine:

| | |
|---|---|
| **Machine Type:** | **SAWING MACHINE** |
| **Machine model:** | **SHARK 281** |
| **Serial number:** | |
| **Year of manufacture:** | |

is in specification with the following directives:

- **EEC MACHINES DIRECTIVE 2006/42/CE**
  - **EN 16093:2017**
- **DIRECTIVE 2014/30/UE EMC**
  - **EN 50370–1:2006 Emission**
  - **EN 50370–2:2003 Immunity**

**Responsible of a Technical File**
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**c/o MEP SPA**
**Via Enzo Magnani, 1**
**61045 – Pergola – PU – ITALY**

**Managing Director**
**(William Giacchetti)**

Pergola, lì _____

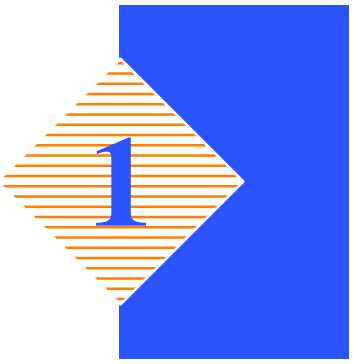
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# Introduction and technical specifications




## Foreword

MEP S.p.A.,in response to modern production techniques, has developed the new **SHARK 281**.

This work tool has been designed to satisfy the wide range of cutting needs of a modern workshop with simplicity and reliability, while at the same time complying with all EEC safety standards.

The **SHARK 281** is structurally rigid, silent and safe: it produces a minimum of waste (1.2 mm) while its great versatility makes it suitable for cutting various materials such as stainless steel light alloys, aluminium, copper and bronze at high speed and with high precision.

Its high cutting capacity, combined with the possibility of making inclined cuts from 0° to 60° left, make this model the ideal solution for satisfying the wide strange of cutting needs of machine shops, turneries, structural steel shops and engineering workshops.

We congratulate our clients on having chosen this product, which will give effective and faithful service for many years, especially if the instructions contained in this use and maintenance manual are carefully followed.

**Warning** This cutting machine has been designed and made specifically for cutting metallic materials.

## Machine presentation

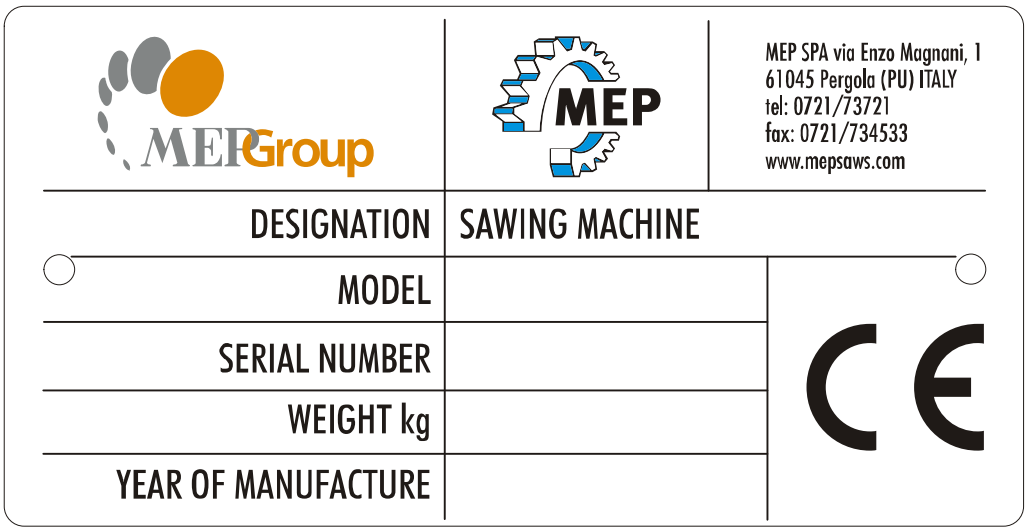
Functioning is completely manual: the operator, after having checked the workpiece in the vice, grips the control lever and presses the bandsaw start microswitch; with a downwards movement, the material is cut to the preset length; the cutting head returns up at the end of the cutting operation, ready to start a new work cycle.
In the **MA** version (Automatic Vice), a pneumatic cylinder applied on the vice blocks the material between the jaws: the open/close control is located on the base of the machine.
With the **CCS** accessory (Cut Control System), the machine can also perform a semi–automatic work cycle. The operator, after using the selector located on the control panel to choose the semi–automatic work cycle, clamps the material in the vice and presses the button on the cutting head handgrip to start up the bandsaw; the saw begins turning and the head commences its downstroke, the speed of which can be adjusted using the control valve (head downstroke speed regulator) located on the control panel. The head performs the cutting operation; once the cut has been made, a limiter stops the cutting cycle, after which the head is manually returned to its upper position so that, when a new workpiece is in place, a new cycle can be started using once more the handgrip button.

**Warning** Both the **Automatic Vice** and the **Cut Control System** are **optional** for the **SHARK 281** model; they can be factory installed on request made during the ordering procedure, or may be installed by the user after the machine has been bought.

## Machine specification

### Name plate

The anodised aluminium name plate is riveted on the side of the machine; the same data are reproduced on the declaration of conformity included with this use and maintenance manu-
al.




**N.B.** When communicating with the Technical Service department, the model, serial number and year of manufacture of the machine must be quoted.

| CUTTING SPEEDS | | |
|---|---|---|
| 1st Slow Speed | mt/min | 36 |
| 2nd Fast Speed | mt/min | 72 |

**Warning** All models can be equipped with the Inverter, an optional device, which offers a range of speeds comprised between **20 and 90 mt/min** As the machine is predisposed for the Inverter, it can be installed by the client or factory pre–installed on request made during the ordering procedure.

| BAND SAW | | |
|---|---|---|
| Rated size | mm | 2950 x 27 x 0,9 |
| Max/min blade length | mm | 2960÷2940 |
| Blade height | mm | 27 |
| Blade width | mm | 0,9 |
| Band saw tension | bar/kg | 70 / 900 |

**Attention** When choosing the cutting tool, if its dimensions do not correspond to those included in the “Rated size” section, check that the dimensions at least fall within the admissible max/min specifications.

| RATED ELECTRICAL POWER | | |
|---|---|---|
| Head spindle motor | kW | 1,8/1,5 |
| Electric coolant pump motor | kW | 0,06 |
| Max installed power | kW | 1,86 |

| WORKING PRESSURE MODEL MA (Automatic Vice) | | |
|---|---|---|
| Max. working pressure for opening/closing vice | Bar | 6 |
| Air consumption for a complete cycle | Nl/min | 1,34 |

**N.B.** The “air consumption” value refers to standard conditions (temperature 0° and pressure 1.013 bar, i.e. density 1.3 x $10^{-3}$ Kg/l) where 1 Kg/min. = 772 Nl/min.

| LUBRICANT/COOLANT FLUID AND OIL | | |
|---|---|---|
| Oil for blade tensioner unit | volt Lt | 0,5 |
| Oil for transmission box | capacita Kg | 0,32 |
| Oil for optional Cut Control System cylinder | capacita Lt. | 0,7 |
| Lubricant/coolant fluid (oil concentration 5–6%) | capacita Lt. | 13 |

| VICE | | |
|---|---|---|
| Vice max. opening | mm | 285 |

| SPINDLE MOTOR | | | | | |
|---|---|---|---|---|---|
| **No.of poles** | **Current (Volts)** | **Absorption (Amps)** | **Power (Kw)** | **rpm** | **Band saw speed** |
| 2/4 | 400 | 5,6/4 | 1,8/1,5 | 2.860/1400 | 72/36 mt/min |
| 4/8 optional | 400 | 3,1/2,7 | 1,1/0,55 | 680/1330 | 36/18 mt/min |
| Stator wound with enamelled copper wire, class H 200°C. | | | | | |
| Class F insulation (limit temperature TL 155°C). | | | | | |
| IP 55 protection rating (total against contact with live parts, water sprayed from all directions, with shaft oil seal). | | | | | |
| Conforming to CEI–EN 60034–1:2011 | | | | | |

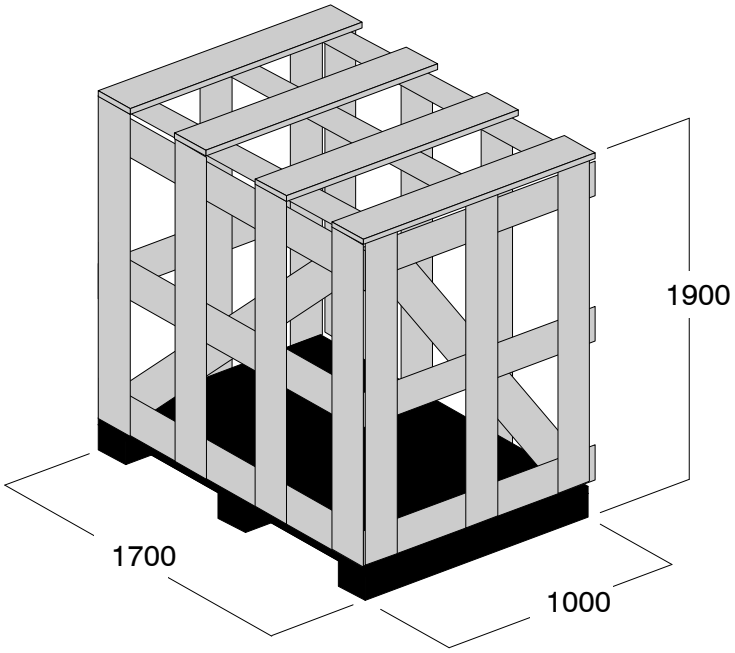
**N.B.** Example of class F insulation: in air–cooled machines at an ambient temperature of 40° C, the allowable overtemperature is 100° C (where 100¿C represents the allowable DT).

**Warning** The machine is supplied with a 2/4 pole three phase motor giving 2 band saw speeds:
– 1ª speed (4 poles) = 36 mt/min
– 2ª speed (2 poles)= 72 mt/min;
The OPTIONAL 4/8 pole motor gives speeds of 36/18 mt./min.

| ELECTROPUMP MOTOR<br>Single phase; Frequency 50 Hz. | | | | | |
|---|---|---|---|---|---|
| **Voltage (Volts)** | **Absorption (Amps)** | **Power (Kw)** | **rpm** | **Delivery rate lt/min** | **Head (mt.)** |
| 230 | 0,40 | 0,06 | 2800 | 11 | 1,5 |
| 400 | 0,20 | 0,06 | 2800 | 11 | 1,5 |
| Protection rating IP 55. | | | | | |
| Conforming to CEI–EN 60034–1:2011 | | | | | |

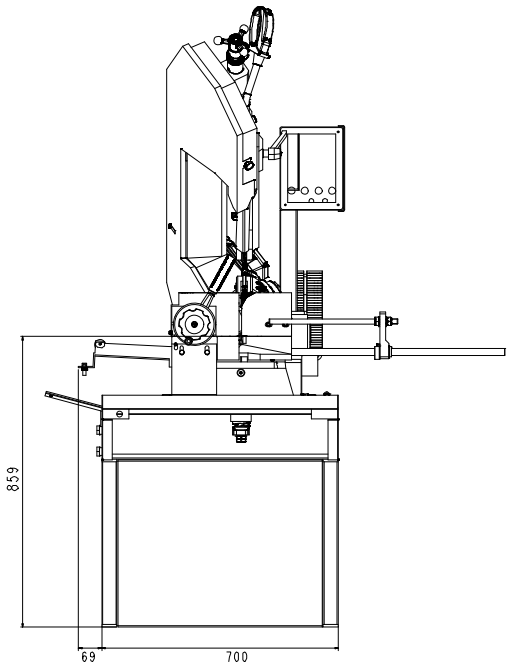
| CUTTING CAPACITY | | | |
|---|---|---|---|
| **Section** |  |  |  |
| 0° | 250 | 230 | 280 x 200 |
| 45° | 190 | 180 | 180 x 180 |
| 60° | 120 | 110 | 110 x 110 |

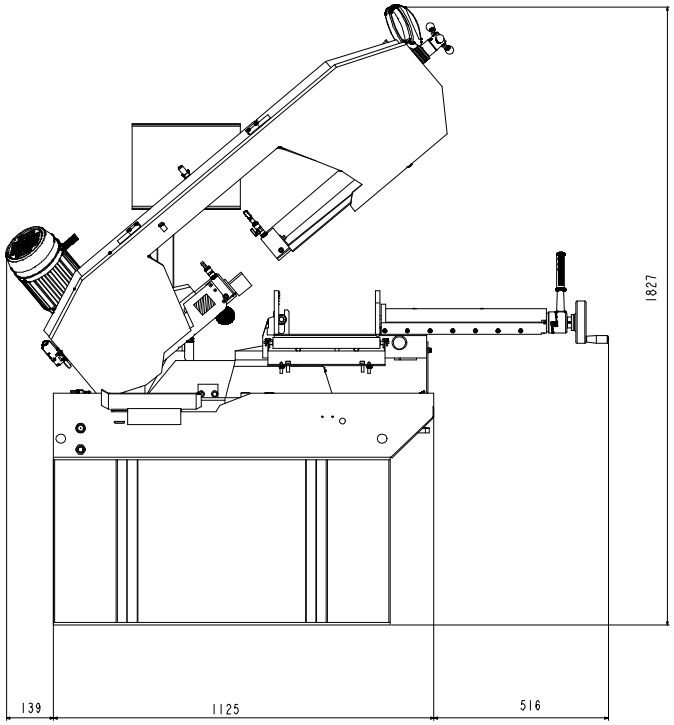
| **PACKED WEIGHT** | | |
|---|---|---|
| Wooden cage and pallet | kg | 70 |
| Wooden pallet | kg | 20 |

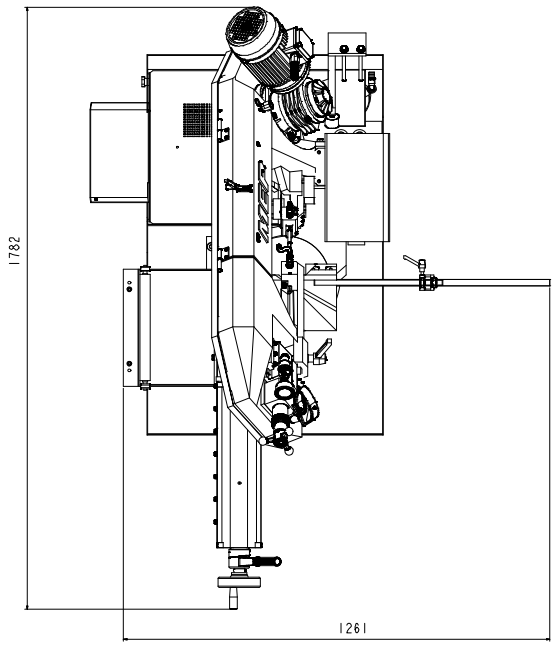


## Dimensions

| MACHINE INSTALLED | | |
|---|---|---|
| Work table height | mm | 870 |
| Weight | kg | 370 |



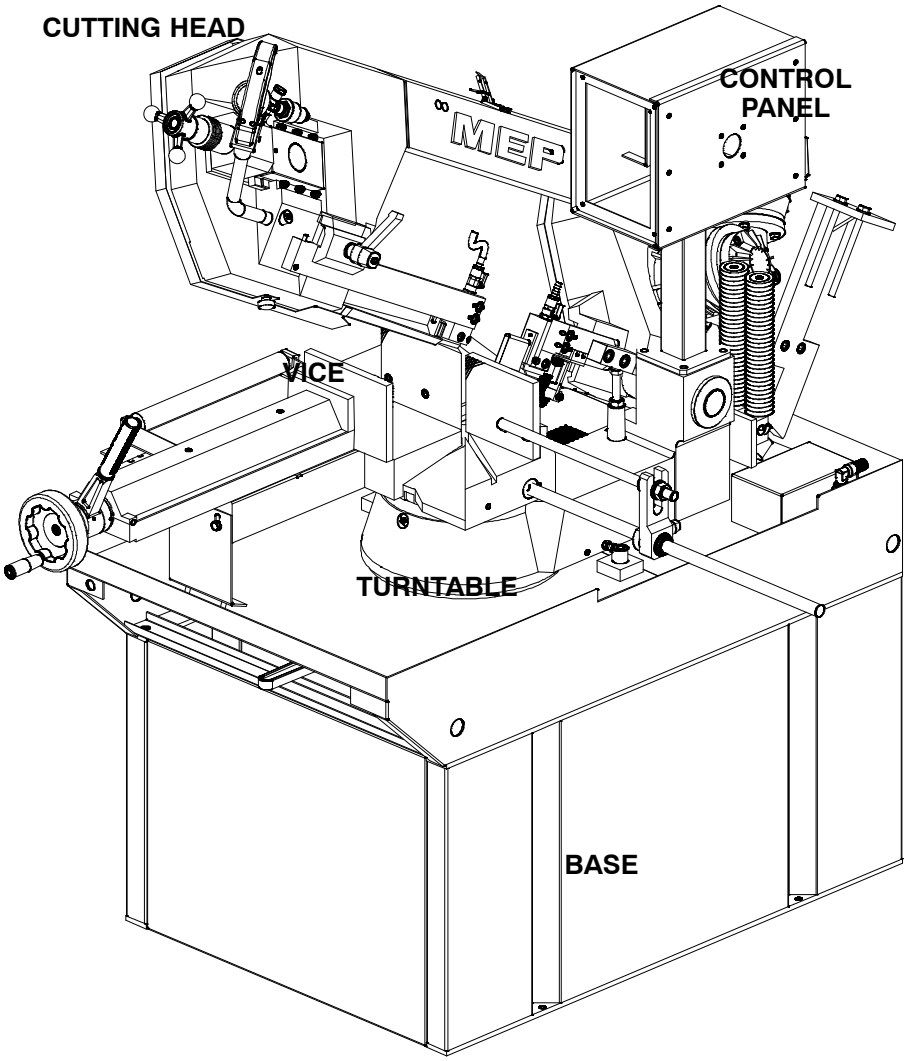



# Functional parts

2

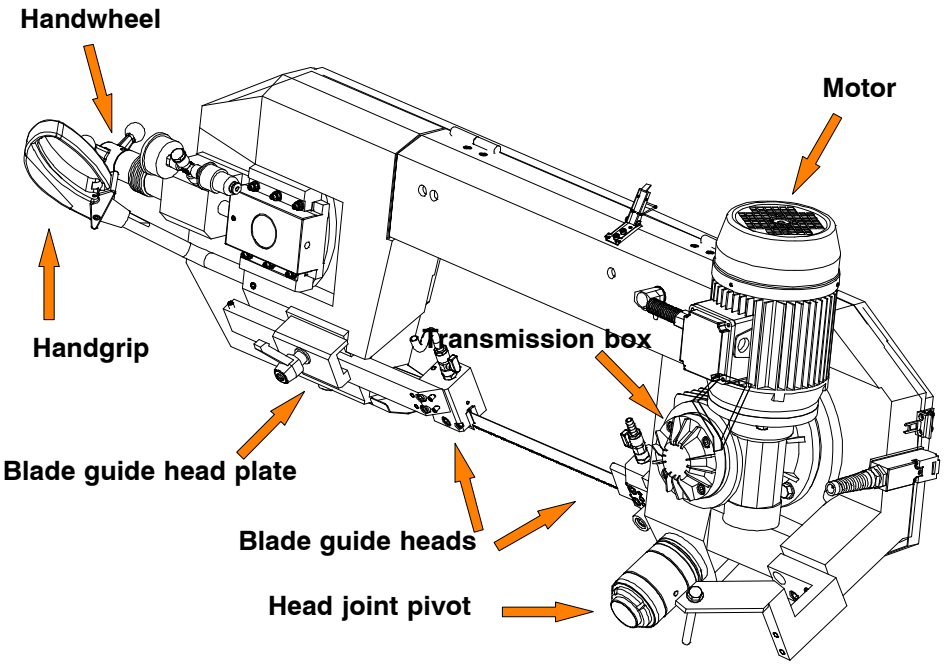
## SHARK 281 model

In order for the user to move towards a full understanding of how the machine works, which is described in detail in the chapter 5, this chapter deals with the main units and their locations.



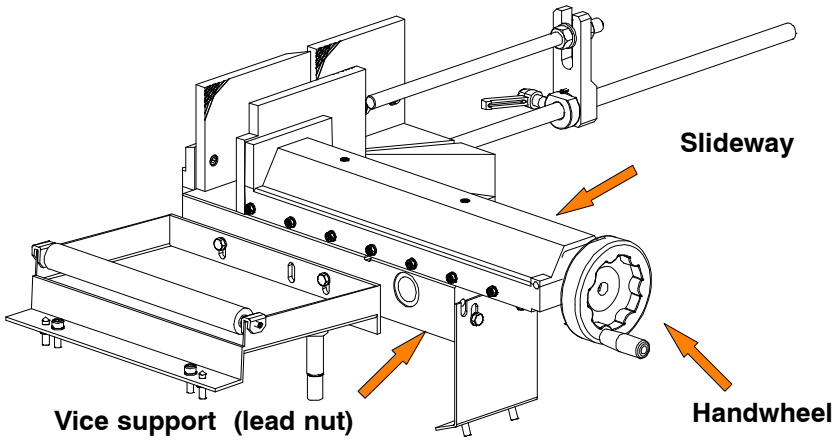
## Cutting head

The cutting head is the unit that cuts the material. It consists of a cast iron head on which the following are mounted: the band saw, the blade guide components, the blade tensioner components, the transmission box and the spindle motor. The cutting head is limited in its movements by the joint on the work table, and its cutting stroke is manually guided by the operator.



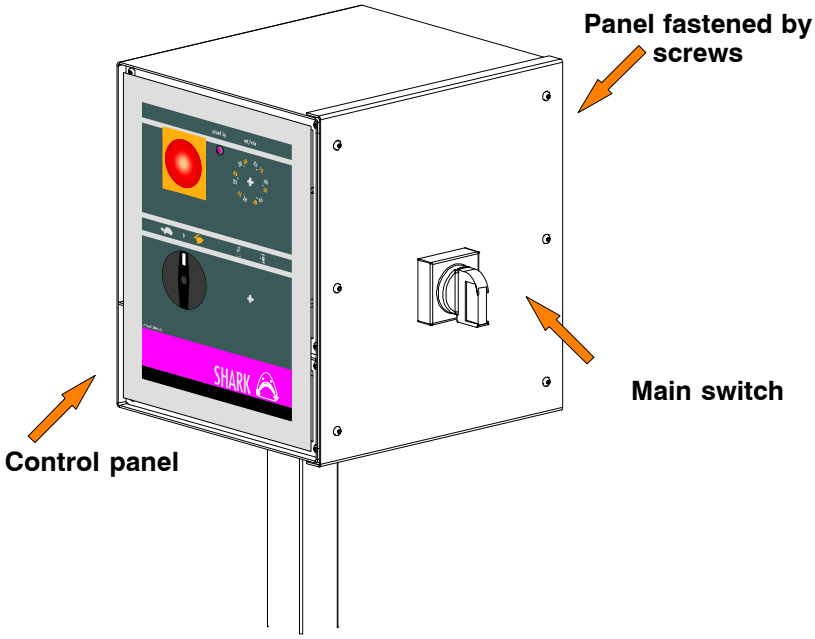

## Vice

The vice is the unit that clamps the workpiece in place during cutting; it consists of a vice support, commonly known as a lead nut, fixed to the work table, and a lead screw with a slideway on which the mobile jaw is mounted. The vice is operated manually by a handwheel, or by a pneumatic cylinder in the MA version (optional).



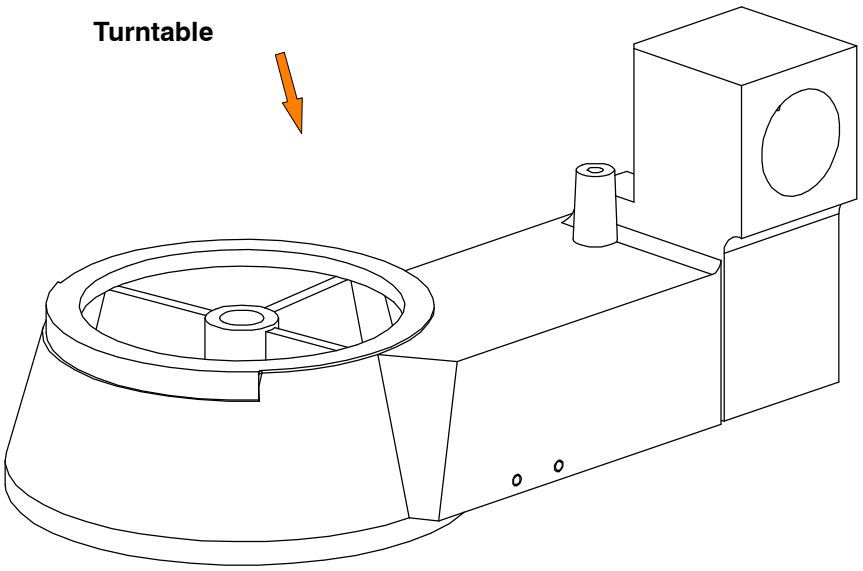
## Control Panel

The control panel has a protection rating of IP 54 and contains the electrical equipment. Access is gained by removing the screws fastening a safety panel, while the operator's safety is guaranteed by a key−operated safety switch, designed to prevent any intentional interference with the unit. In order to remove the panel from its mounting, the main switch has to be shifted to 0 (OFF), which automatically cuts off the electrical supply.

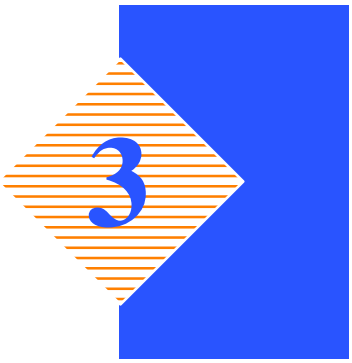


## Turntable

The cast−iron turntable constitutes the fulcrum of the cutting head and the support for the cutting surface. Loosening the locking lever on the base, it enables to rotate the bow for cuts sloped to the left.



# Safety and accident prevention




The **SHARK 281** has been designed and produced in accordance with European standards. For the correct use of the machine we recommend that the instructions contained in this chapter are carefully followed.

## Use of the machine

The **SHARK 281** band saw cutting machine is intended exclusively for cutting metallic materials, ferrous or non−ferrous, in section or solid.
Other types of material and machining are not compatible with the specific characteristics of the saw.
The employer is responsible for instructing the personnel who, in turn, are obliged to inform the operator of any accident risks, safety devices, noise emission and accident prevention regulations provided for by international standards and national laws regarding the use of the machine. The operator must be perfectly aware of the position and function of all the machine's controls.The instructions, warnings and accident prevention standards in this manual must be respected without question by all those concerned.The following definitions are those provided for by **MACHINES DIRECTIVE 2006/42/CE**

- "Danger zone": any zone in and/or around a machine in which the presence of a person constitutes a risk for the safety and health of that person.
- "Person exposed": any person finding himself either completely or partly in a danger zone.
- "Operator": the person or persons given the responsibility of installing, operating, adjusting, maintaining, cleaning, repairing or transporting the machine.

**Attention**

The manufacturer declines any responsibility whatsoever, either civil or criminal, should there be unauthorised interference or replacement of one or more parts or assemblies on the machine, or if accessories, tools and consumable materials are used that are different from those recommended by the manufacturer itself or if the machine is employed in a plant system and its proper function is thereby altered.

## General recommendations

### *LIGHTING*

Insufficient lighting for the types of operation envisaged could constitute a safety hazard for the persons concerned. For this reason, the machine user must provide lighting in the working area sufficient to eliminate all shadowy areas while also avoiding any blinding light concentrations. (Reference standard EN 12464−1:2011“Lighting in work environments”).

### *CONNECTIONS*

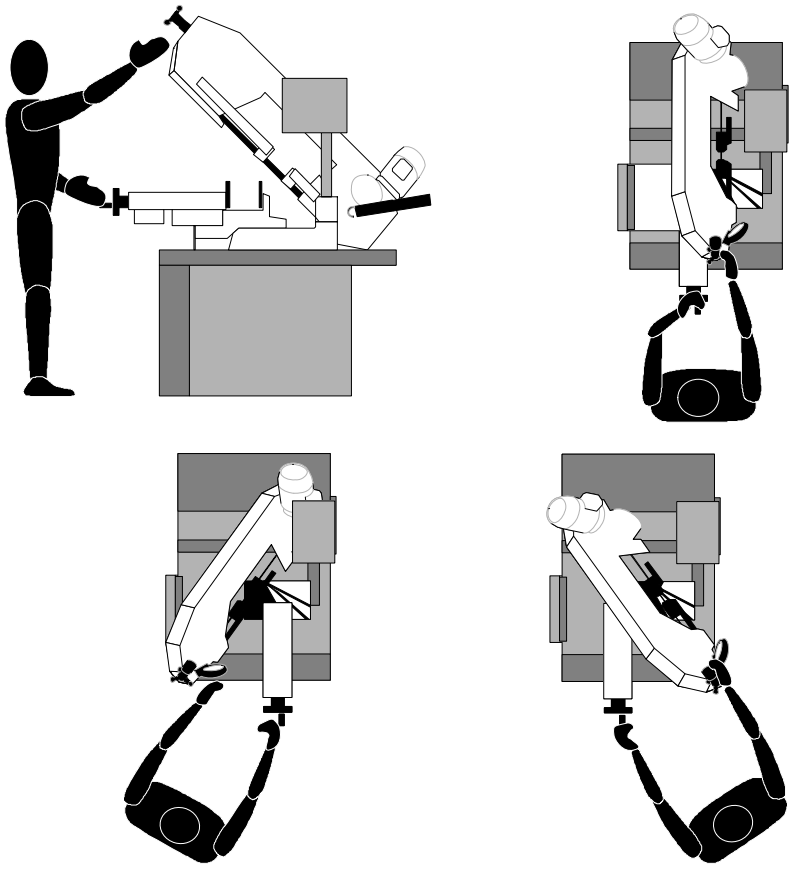
Check that the power supply cables and pneumatic feed systems comply with the maximum machine absorption values listed in the “Machine Specification” tables; replace if necessary.

### *EARTHING*

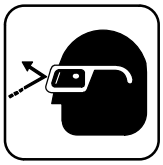
The installation of the earthing system must comply with the requirements set out in EN 60204−1:2006/AC:2010.

### *OPERATOR POSITION*

The position of the operator controlling machine operations must be as shown in the diagram below.



## Recommendations to the operator



Always wear proper goggles or protective glasses.



Do not use the machine without the guards in position. Replace the polycarbonate windows, if subject to corrosion.



Do not allow hands or arms to encroach on the cutting zone while the machine is in operation.



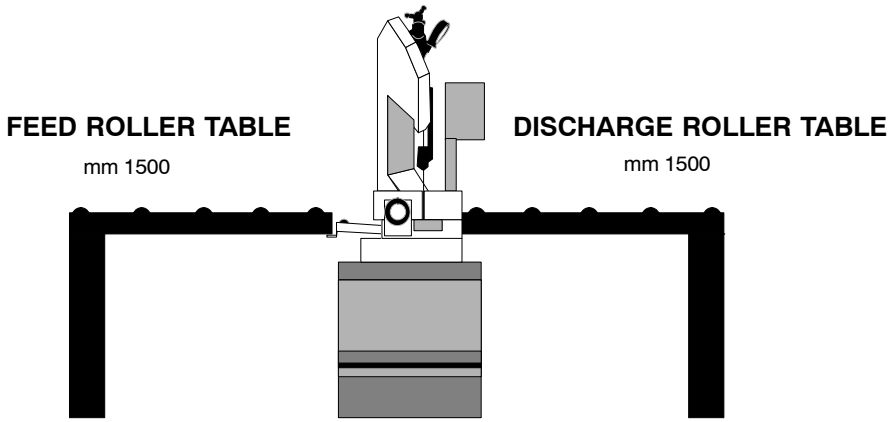
Do not wear oversize clothing with long sleeves, oversize gloves, bracelets, necklaces or any other object that may become entangled in the machine during working; long hair must be tied back and bunched.



Always disconnect the power supply to the machine before carrying out any maintenance work whatsoever, including in the case of abnormal operation of the machine.



Before starting cutting operations, support the material at both ends of the machine using the support arm – standard, or OPTIONAL accessories such as the feed and discharge roller tables shown in the diagram below. Before removing the devices supporting and moving the material, fasten the latter in place using the machine's clamping devices or other suitable equipment.



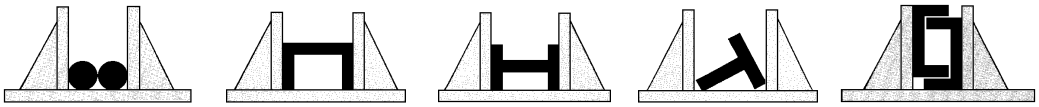



Any maintenance work on the hydraulic or pneumatic systems must be carried out only after the pressure in the system has been released.

The operator must not perform any risky operations or operations not required for the machining operation under way (e.g. remove swarf or metal shavings from the machine while cutting).

Remove equipment, tools or any other objects from the cutting zone; always keep the working area as clean as possible.

Before starting any cutting operations, ensure that the workpiece is securely held in the vice and the machine has been set correctly. A number of examples of how to clamp different profiles correctly in our machines are shown below.



Do not use the machine to cut pieces that exceed the capacity of the machine as listed in the machine specifications.

Never move the machine while it is cutting.

Do not use blades of different sizes to those recommended in the machine specifications.

When cutting very short pieces, make sure that they are not dragged behind the support shoulder, where they could jam in the blade.

When using the pneumatic vice (MA version) check that the jaws move right up to and effectively clamp the workpiece, as the maximum travel is only 8 mm, and check that the clamping procedure is correct.

When working on the band saw, wear gloves only when handling materials and for tool changing or adjustment operations. Only perform one operation at a time and do not hold more than one item or operate more than one device simultaneously. Keep hands as clean as possible.

Warning: if the blade jams in the cut, press the emergency stop push–button immediately. If this does not free the blade, slowly loosen the vice, remove the piece and check the blade or blade teeth for breakage. Replace the blade if necessary.



Warning: if the blade jams in the cut, press the emergency stop push–button immediately. If this does not free the blade, slowly loosen the vice, remove the piece and check the blade or blade teeth for breakage. Replace the blade if necessary.



Adjustment of the blade–guide head must only be carried out with the machine at a standstill.

## Machine safety devices

This use and maintenance manual is not intended as purely a guide for the use of the machine in a strictly productive environment, it is instead an instrument providing information on how to use the machine correctly and safely. The following standards are those specified by the EEC Committee in the directives regarding safety of machinery, health and safety at work, personal protection and safeguarding of the environment. These standards have been applied to the **SHARK 281** band saw.

### Reference standards

#### *MACHINE SAFETY*

- MACHINES DIRECTIVE 2006/42/CE;
- Directive 2014/30/UE "EMC – Electromagnetic Compatibility";
- Directive 2014/35/UE known as "Low voltage directive".
- EN 16093:2017 Machine tools - Safety - Sawing machines for cold metal
- EN ISO 12100:2010 "Safety of machinery - General principles for design - Risk assessment and risk reduction".

#### *HEALTH AND SAFETY AT WORK*

- D.lgs 81/08 and subsequent amendment D.lgs 106/09 ;Directive 91/382/CE;2003/10/CE for the protection of workers against risks caused by exposure to physical, chemical and biological agents during working;
- Directive89/391/CE and Special EEC Directives No. 89/654/CE 2009/104/CE for improvements in health and safety at work;
- Directive 2004/37/CE for the protection of workers against risks deriving from exposure at work to carcinogenic substances;
- Directive 92/58/CE and No. 79/640/CE on safety signs at work.

#### *PERSONAL PROTECTION*

- Directive89/656/CE and Regulation 2016/425/UE on the use of personal protection devices.

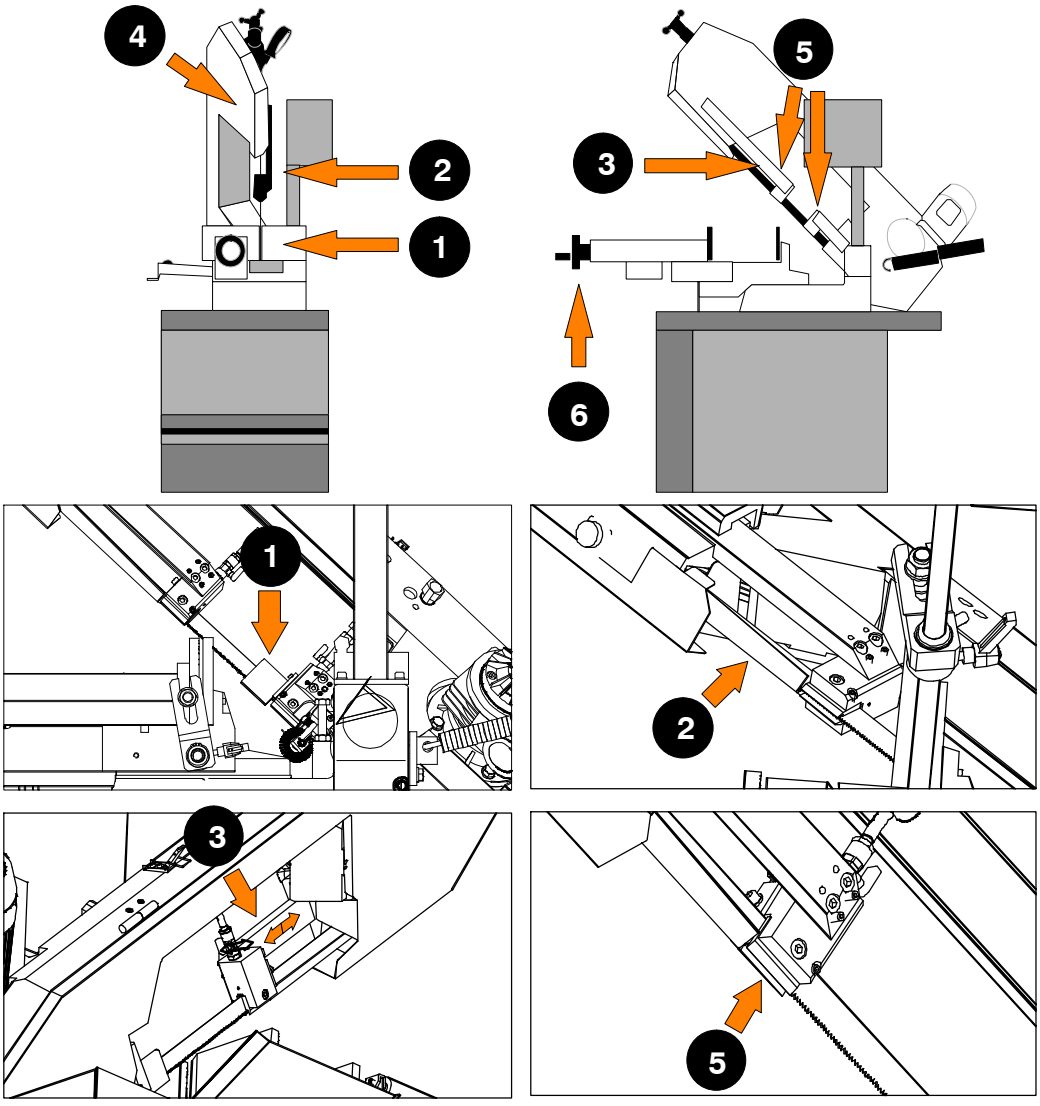
#### *ENVIRONMENTAL PROTECTION*

- Directive 2006/12/CE on waste disposal;
- Directive 2008/98/CE on the disposal of used oil.

- Directive 2011/65/CE on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

## Protection against accidental contact with the blade

1. Metal guard screwed to the rear blade guide head (machine side);
2. metal guard screwed to the front blade guide head (operator side);
3. front head sliding support: when the head is at maximum aperture, the support ensures that the blade is covered, leaving free only the part of the blade engaged in the actual cutting, in accordance EN 16093:2017 ;
4. hinged protective cover over blade, fitted with “removable” closing devices;Annex V, Part II, point 5.5.2 of D.lgs 81/08 and Subsequent amendment D.lgs 106/09.
5. blade guide plates completely covering the blade teeth;
6. the cutting vice is activated by pneumatic devices, with a maximum stroke of 8 mm. The jaw that locks the workpiece in position, must be brought to within 2÷3 mm of the workpiece.



## Electrical equipment

In accordance with Italian standard EN 60204−1:2006/AC:2010.

- Access to electrical control panel limited by screws and panel−lock device, allowing panel to be opened only after the electricity supply has been turned off;
- 24 Vac Control voltage for actuators, in accordance with chapter 6 or European Standard “Control and indication circuits”, paragraph 2 “Control Circuits” sub−section 1 “Preferential voltage values for control circuits”;
- plant short−circuit protection by means of rapid fuses, earthing of all plant parts connected with work as well as all foreseeable accidental contact; a thermal−magnetic overload cutout switch shuts down the motor;
- protection from accidental start−up by a minimum voltage relay in case of power failure.

## Emergency devices

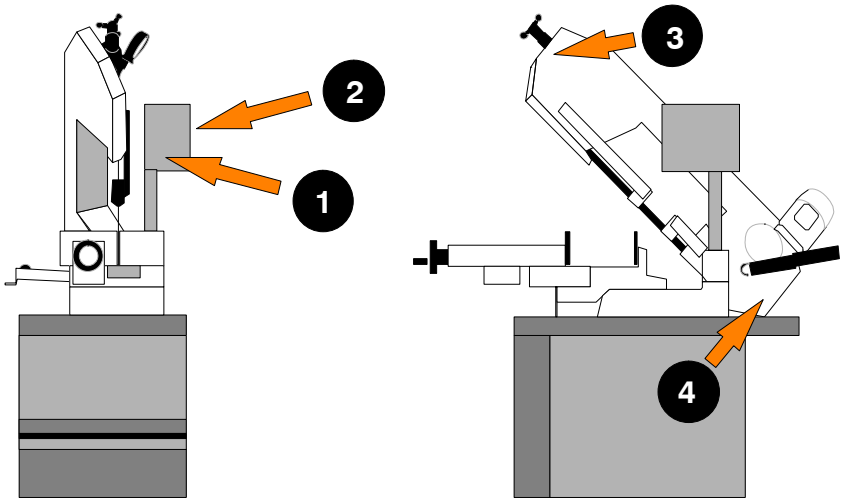
In accordance with Standard EN 60204−1:2006/AC:2010:

- **Chapter 5 Section 6 Sub−section 1 “Emergency stop device”**: «the emergency stop device immediately stops all the dangerous and other functions of the machine»;
- **chapter 6 Section 2 Sub−section 4 Point 7 “Protective guards”:** «the removal of protective guards designed to prevent access to dangerous parts or zones causes the machine to stop immediately; replacing the guards does not restart the functions, which must be reset».

**...Emergency devices applicable to the SHARK 281:**

1. **Emergency stop**: a non−return mushroom−head pushbutton, colour red on yellow background, is located on the control panel of the machine. To release the pushbutton, the actuator must be rotated 45°. After the emergency situation has been resolved, the machine must be reset.
2. **Automatic thermal−magnetic cutout switch with thermal−magnetic relay:** the machine auto switch, located on the control panel, has two protection systems against voltage drops. In the case of a voltage drop, all electrical components are disengaged, the machine stops immediately, and automatic restart when the power supply returns is inhibited. Another function is that of resetting the thermal relay provided to protect against overcurrents.
3. **Pressure contact for monitoring blade tension:** the machine stops immediately if the blade breaks or if the tensioner cylinder pressure drops.

4. **Protective guard for blade:** a coded key microswitch is operated if the blade cover is accidentally or intentionally opened during the machine operating cycle, immediately shutting down all functions.




## Noise level of the machine

Noise can cause hearing damage and represents one the problems faced by many countries who adopt their own standards. In accordance with the**MACHINES DIRECTIVE 2006/42/CE** , we are listing the standards that specify noise levels for machine tools.
The following paragraph explains the modes and the detected sound power and pressure values released by the sawing machine.
These values comply with norm EN 16093:2017, EN ISO 12100:2010 and EN ISO 4871:2009,concerning the rules for drawing and presenting a procedure for noise tests and the declaration and check of sound emission values by machines and equipment.

### Noise level measurement

Noise levels are measured using an instrument known as an Integrator noise–meter which registers the equivalent continuous acoustic pressure level at the work station.The damage caused by noise depends on three parameters: level, frequency and duration. The equivalent level concept Leq combines the three parameters and supplies just one indication. The Leq is based on the principle of equal energy, and represents the continuous stationary level containing the same amount of energy, expressed in dBA, as that actually fluctuating over the same period of time.This calculation is made automatically by the integrator noise–meter. The measurements are taken every 60 seconds, in order to obtain a stabilised value. The reading stays on the display for a sufficient time to enable a reading to be taken by the operator.Measurements are taken by holding the instrument at approximately 1 metre from the machine at a height of 1.60 metres above the platform at the operator's work station.
Two measurements are taken: the first while the machine operates without cutting anything, the second while cutting in manual mode.

### Noise level values

| Identification | |
|---|---|
| **Machine type** | Band saw for metal applications |
| **Model** | **SHARK 281** |
| **Reference standard** | EN ISO 3746:2010 |

| Results | | |
|---|---|---|
| **Test 1st** | **Description** | C 40 steel cut – pipe 50x82 mm<br>Bimetal band 2950x27x09 S.GLB Z 5/7 |
| | **Results** | **Mean sound level (Leq) 79,65 dB (A)**<br>Environmental correction (K) 3,71 dB(A)<br>Peak sound power (Lw) 91,27 dB(A) |
| **Test 2nd** | **Descriprion** | C 40 steel cut – solid rod 150 mm dia. Ø<br>Bimetal band 2950x27x09 M42 Z 3/4 |
| | **Results** | **Mean sound level (Leq) 78,43 dB(A)**<br>Environmental correction (K) 3,71 dB(A)<br>Peak sound power (Lw) 88,64 dB(A) |
| **Test 3rd** | **Description** | 34CND6 material cut –pipe 140x130 mm<br>Bimetal band 2950x27x09 S.GLB Z 10/14 |
| | **Results** | **Mean sound level (Leq) 78,57 dB(A)**<br>Environmental correction (K) 3,71 dB(A)<br>Peak sound power (Lw) 89,32 dB(A) |

## Vibration emission

This sawing machine complies with the norms EN 1299:1997 + A1:2008 and EN ISO 20643:2008/A1:2012, as the machine vibration emission on the devices controlled by the operator does not exceed the threshold of 2.5 $m/s^2$

## Electromagnetic compatibility

As from 1 January 1996 all electrical and electronic appliances bearing the CE marking that are sold on the European market must conform to Directive 2014/30/UE e 2014/35/UE and **MACHINES DIRECTIVE 2006/42/CE**. The prescriptions regard two specific aspects in particular:

1. “EMISSIONS: during its operation, the appliance or system must not emit spurious electromagnetic signals of such magnitude as to contaminate the surrounding electromagnetic environment beyond clearly prescribed limits”;
2. “IMMUNITY: the appliance or system must be able to operate correctly even when it is placed in an electromagnetic environment that is contaminated by disturbances of defined magnitude”.

The following text contains a list of the applied standards and the results of the electromagnetic compatibility testing of machine model **SHARK 281**.

### *Emissions*

- EN 61000−6−4:2007 + A1:2011 Electromagnetic Compatibility (EMC) – Generic standard regarding emissions. Part 6–4: Industrial Environment.
- EN 55011:2009 + A1:2010 Industrial, scientific, and medical radio frequency appliances (ISM). Characteristics of radio frequency disturbance – Limits and methods of measurement.
- EN 50370−1:2005 Electromagnetic compatibility (EMC) – Product family standard for machine tools – Part 1: Emission

| CONDUCTED EMISSIONS | | | | |
|---|---|---|---|---|
| **Gate A** | **Freq. (MHz)** | **Q−peak limit (dBuV)** | **Mean value limit (dBuV)** | **Result** |
| A.C. power supply input | 0.15 – 0.5<br><br><br>0.5 – 5<br>5 – 30 | 79 – 73<br>(linear reduction with log of frequency)<br><br>73<br>73 | 66 – 60<br>(linear reduction with log of frequency)<br><br>60<br>60 | Complies |

| CONDUCTED EMISSIONS – ANALYSIS OF INTERMITTENT DISTURBANCES | |
|---|---|
| **Gate** | **Result** |
| A.C. power supply input | Not applicable |

| IRRADIATED EMISSIONS | | | |
|---|---|---|---|
| **Gate** | **Freq. (MHz)** | **Q−peak limit (10 m) (dBuV/m)** | **Result** |
| Enclosure | 30 – 230<br>230 – 1000 | 40<br>47 | Complies |

### *Immunity*

- CEI EN 61000−6−2:2005 + AC:2005 Electromagnetic Compatibility (EMC) – Generic standard on immunity. Part 6–2: Industrial Environment.
- EN 50370−2:2003 Electromagnetic compatibility (EMC) – Product family standard for machine tools – Part 2: Immunity

The EUT is deemed to fulfil the immunity requirements without testing, because it contains no electonic control circuitry.

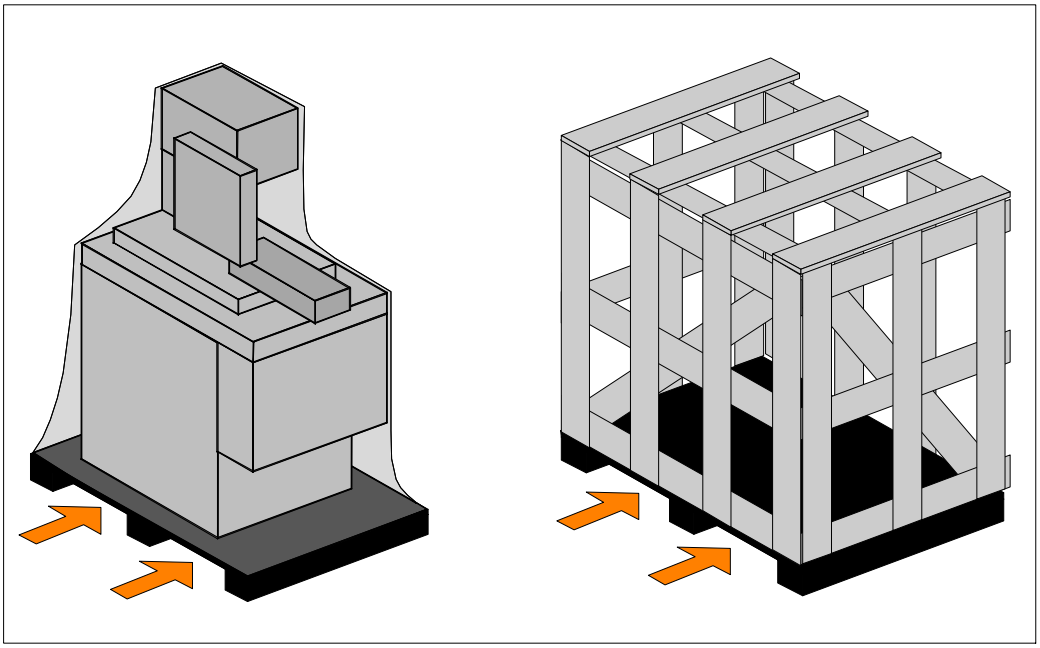
# Machine installation

4

## Packaging and storage

MEP S.p.A. use packing materials that guarantee the integrity and protection of the machine during its transport to the customer.

The type of packing differs according to the size, weight and destination. Therefore the customer will receive the machine in one of two following ways:

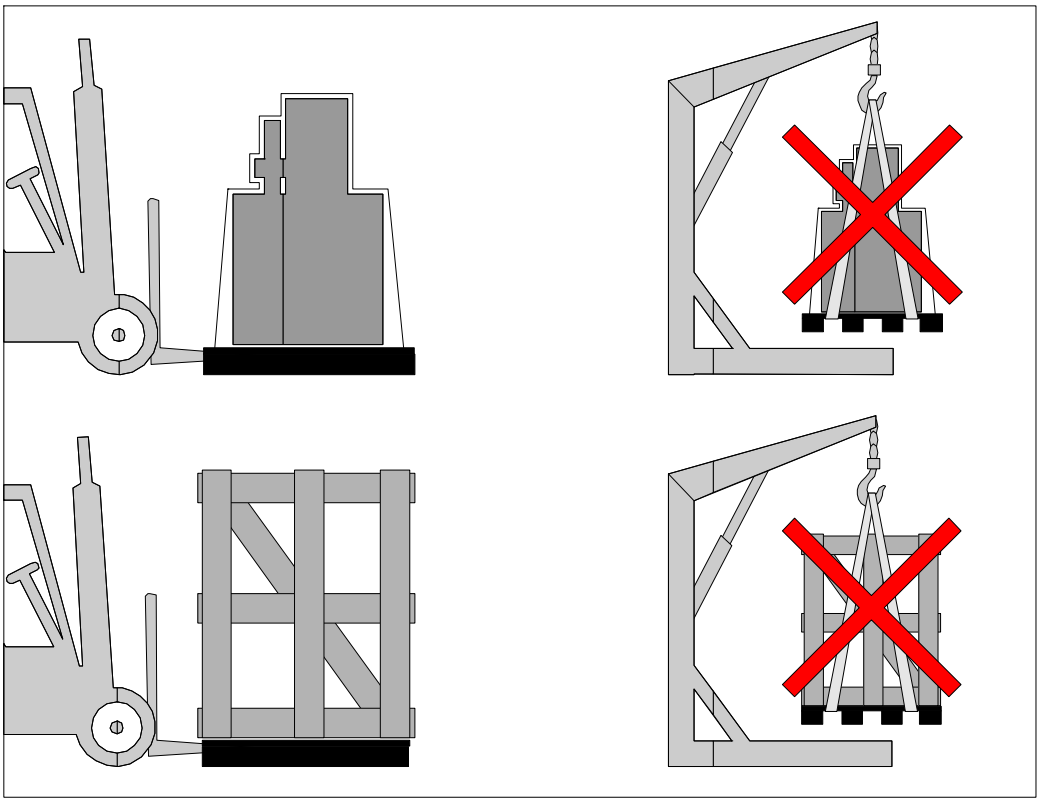


1. on a pallet with straps and heat−shrink plastic;
2. on a pallet with straps, heat−shrink plastic and a wooden crate.

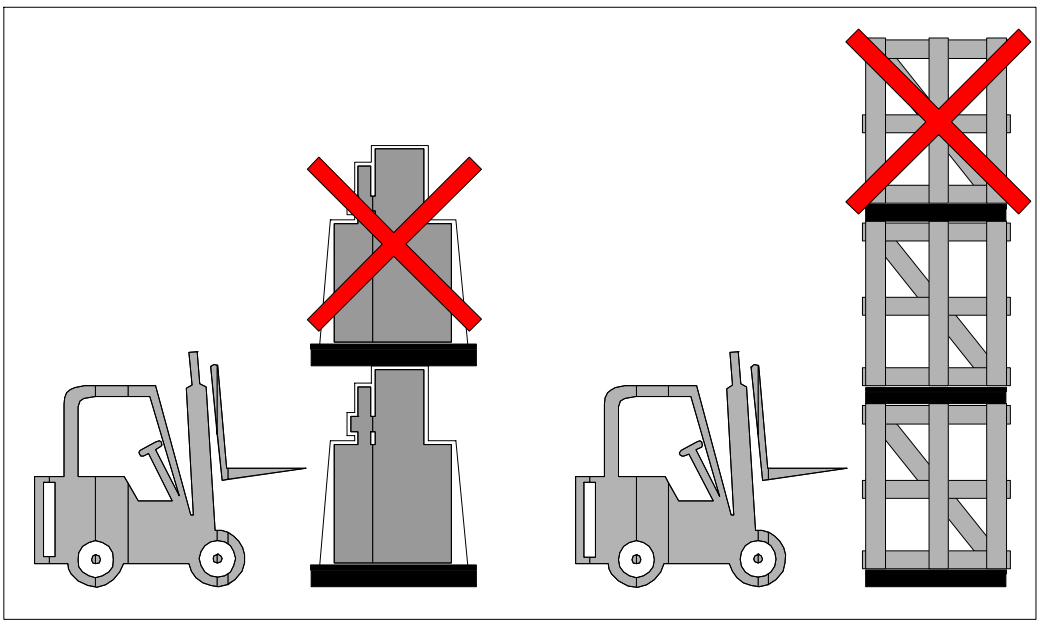
**Warning** In both cases, for correct balancing the machine must be handled using a fork−lift truck, inserting the tines at the points indicated by the arrows, using the reference marks on the crate itself.

**Attention** Before carrying out lifting operations, make sure that the weight of the machine, as indicated on the crating or other packaging, is within the forklift truck load limit.

**Attention** Do not handle the packed machine using slings.

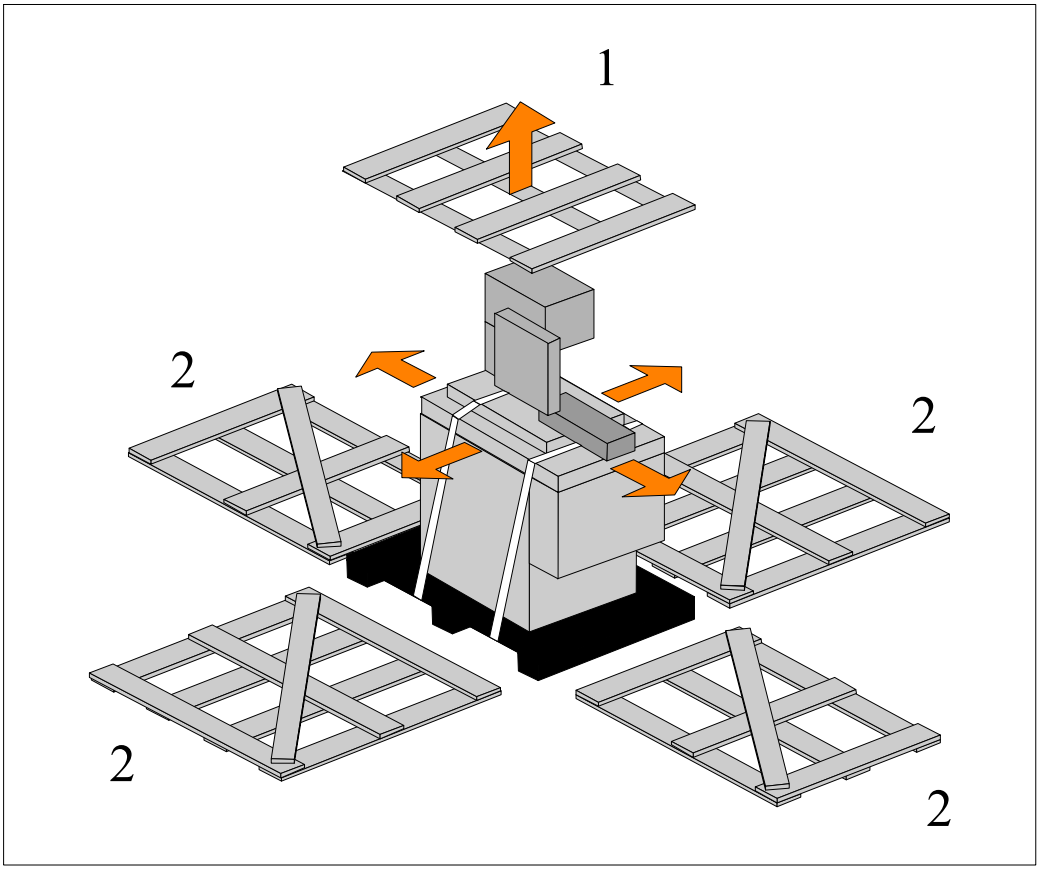


**Attention** When storing, machines palletized and shrink–wrapped must not be stacked two high, and machines pallettized and crated must not be stacked three high.

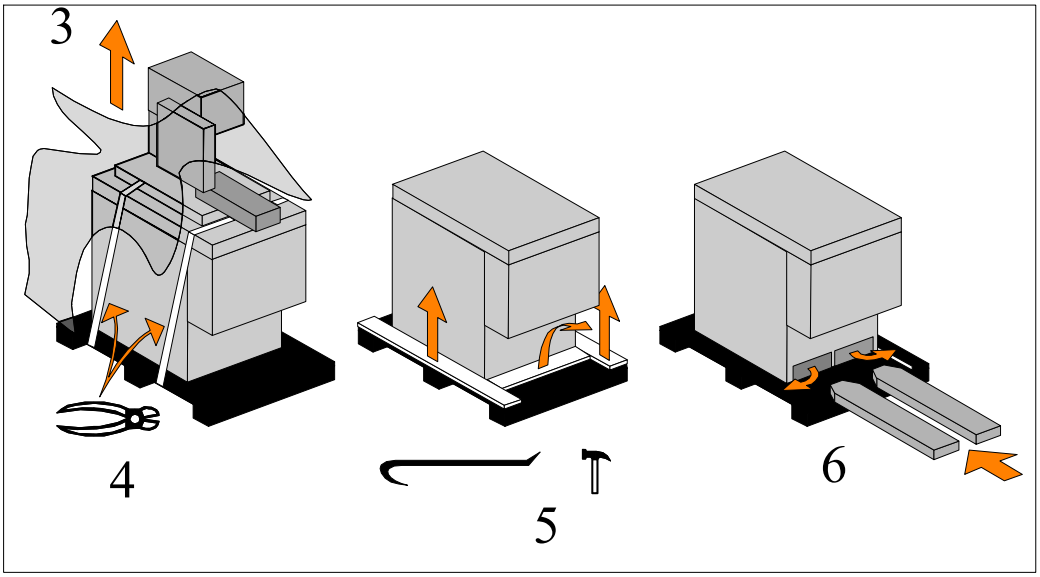


To install the machine, first remove the packing, paying particular attention not to cut any electric wires or hydraulic hoses; if necessary use pliers, a hammer and a cutter.
Open crate in the illustrated order:

1. remove nails and lift the top of the cage;
2. remove nails and lower walls;




3. remove heat−shrink covering;
4. remove the straps;
5. remove nails from pallet securing planks and remove planks;
6. remove the front panel and insert fork tines.

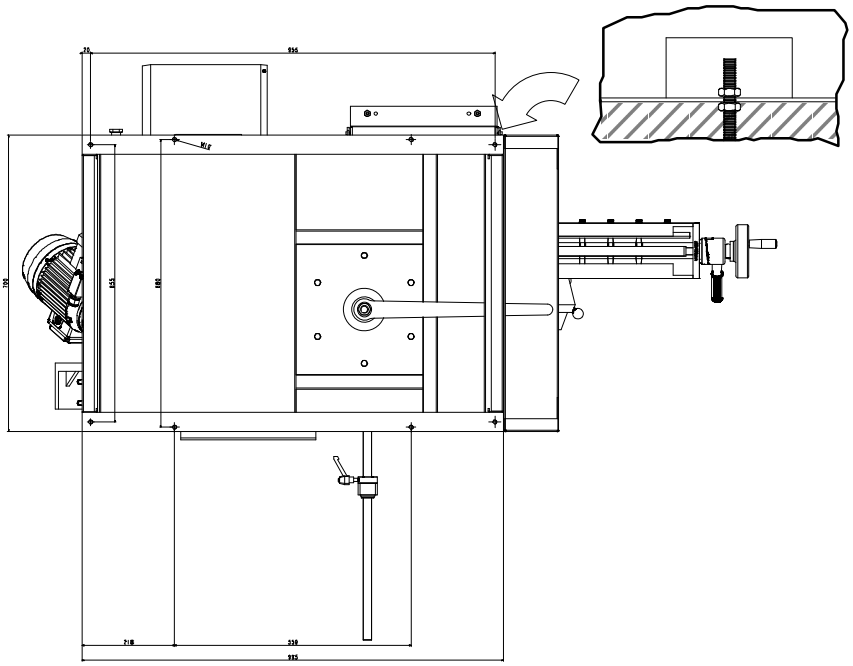



To locate the machine in the workplace, **the machine dimensions** and necessary operator working space, including **the spaces laid** down in safety standards, **must be taken into account.**

## Anchoring the machine

The base of the machine is anchored to the floor by two permanent studs located on the sides of the base. The studs are screwed into nuts previously sunk into the concrete, and tightened from above with lock nuts. The schematic specifications set out in Chapter 1 should be taken into account when positioning the machine.

BASE



## Minimum requirements

For the machine to function correctly, the room in which it is to be installed must satisfy the following requirements:

- power supply voltage/frequency: refer to the values on the rating plate;
- working pressure (MA version) not less than 6 Bar and not greater than 8 Bar;
- temperature of machine location: from – 10 to + 50° C;
- relative humidity: not more than 90%;
- lighting: not less than 500 Lux.

**Warning** The machine is already protected against voltage variations, but will only run trouble–free if the variations do not exceed ± 10%.

## Check list

Before starting installation, check that all the accessories, whether standard or optional, supplied with the machine are present. The basic version of the **SHARK 281** 2–SPEED machine is supplied complete with:

| CHARACTERISTICS | STANDARD | OPTIONAL |
|---|---|---|
| Double return spring for head upstroke | ✓ | |
| Hydraulic transducer for blade tension display | ✓ | |
| 2.950x27x0.9 bimetal blade for solid and section materials | ✓ | |
| Blade cleaning brush | ✓ | |
| Vice with rapid jaw positioning | ✓ | |
| Electric control panel (totally identifiable cabling, stand–by, main switch with lockable panel–closing device, speed switch, emergency device, thermal–magnetic overload cutout, minimum voltage relay, voltage drop protection, 24 V low–voltage plant) | ✓ | |
| Blade protection behind and below blade guide heads | ✓ | |
| IP 55 handgrip | ✓ | |
| Precision stops for cuts at 0°, 45° , 60° left | ✓ | |
| Accessory kit | ✓ | |
| Vice control pedal (only with MA version)* | | ✓ |
| 4/8 pole motor for 36/18 mt./min. speed* | | ✓ |
| Automatic Vice kit (MA) | | ✓ |
| 2.950x27x0.9 M2/M42 bimetal band saw | | ✓ |
| Cut Control System (CCS) | | ✓ |
| Ø 20 mm measuring rod for cuts to measure with ratchet wrench and lever | | ✓ |
| K110 R1/R2/R3 roller table on supply side – kit 1500 mm | | ✓ |
| Feed side roller table support | | ✓ |
| Discharge side roller table adaptor | | ✓ |
| K110 R1/R2/R3 roller table for discharge side, 1500÷6000 mm | | ✓ |
| 5 l can of emulsible oil | | ✓ |

***ACCESSORIES AVAILABLE ON REQUEST**

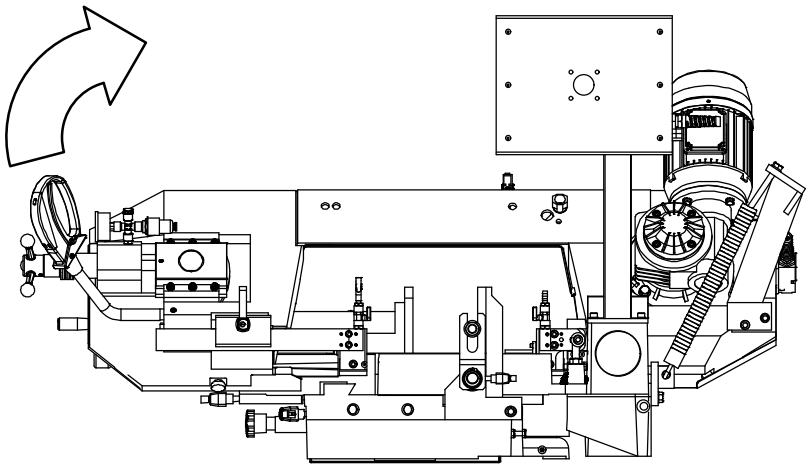
The bag of accessories is enclosed in the machine before being packed and contains:

- 4 and 10 mm Allen keys;
- pipe wrench 10 mm;
- measuring rod for cuts–to–measure;
- arm with roller on which the bars to be cut rest and for fitting the feed side roller tables;
- manual pump for topping up the oil in the pneumatic cylinder;
- Use and Maintenance manual, including order form for parts in relevant user language.

## Balancing the cutting head

Before making the electrical and pneumatic connections (MA version), the head return springs must be tensioned to balance the cutting head weight. Using a 10

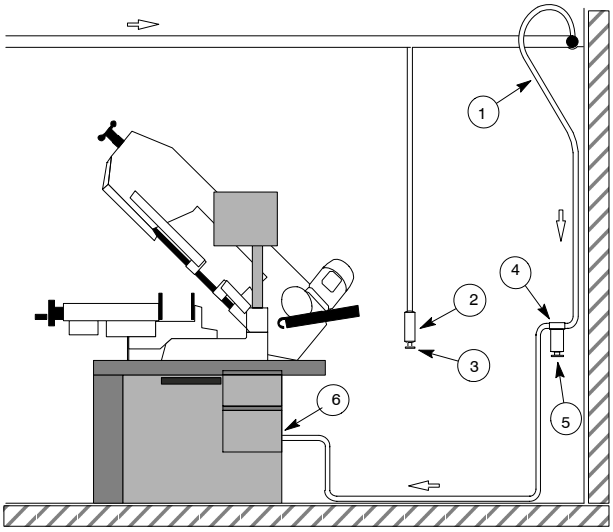
mm. wrench, tighten the screws until the distance between the first coil of the spring and the bracket is 8 mm.



## Connection to the compressed–air supply (MA version)

The MA version (automatic vice) is supplied with an air treatment unit for the vice closing system, controlled by a pneumatic cylinder. To ensure perfect performance and long service life we advise that the machine be connected to a compressed air system having the characteristics illustrated in the following diagram.

KEY
1 – DOWN PIPE
2 – CONDENSATE COLLECTOR
3 – DRAIN COCK
4 – AIR FILTER
5 – DRAIN COCK
6 – CONNECTING HOSE



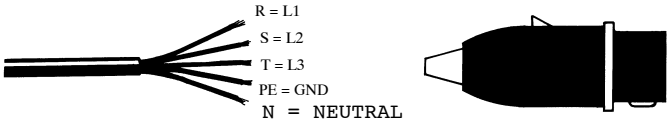

## Connection to the power supply

Before connecting the machine to the power supply, check that the socket is not connected in series with other machines. This requirement is fundamental for the good operation of the machine.

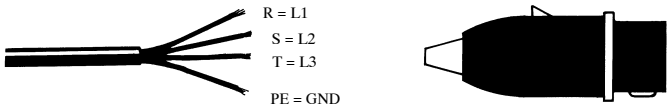
To connect the machine to the power supply, proceed as follows:

▶ connect the power supply cable of the machine to a plug which matches the socket to be used. (EN 60204−1; par. 5.3.2)

CONNECTION FOR **"5−CORE"** WIRE SYSTEMS WITH NEUTRAL



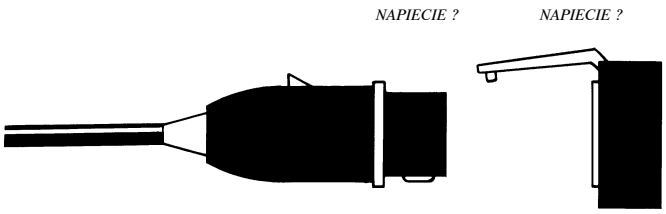

CONNECTION FOR **"4−CORE"** WIRE SYSTEMS WITH NEUTRAL



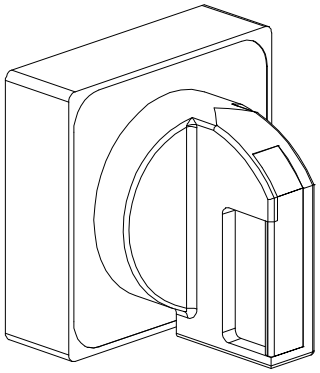

**Attention**

When using systems with a neutral wire, special care must be taken when connecting the **blue** neutral wire, in that if it is connected to a phase wire it will discharge the **phase voltage** to the equipment connected for **voltage: phase–neutral.**

▶ Insert the plug in the socket, ensuring that the mains voltage is the same as that for which the machine has been setup.




▶ Power up machine by rotating the main switch located on the right side of the control panel (The STAND BY LED lights up).

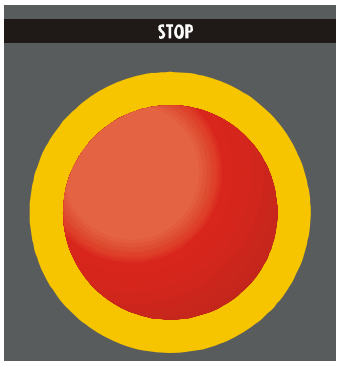


Check that the motor is rotating in the correct direction. For this check the following operations must be carried out:

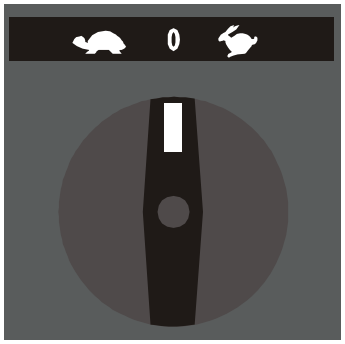
▶ set the blade tension to 70 BAR;

▶ make sure the cover is properly closed: at the back of the cutting head there is a bayonet limiter for correct cover closure;

▶ make sure that the machine is not in an emergency condition (red mushroom−head pushbutton released);



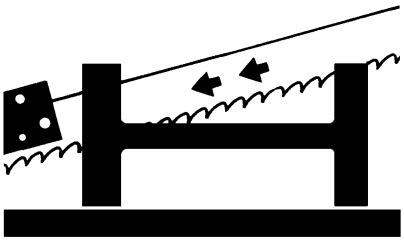

▶ select a cutting speed using the polarity change switch;




▶ operate the jog button on the manual head control lever;



▶ if all the above operations have been carried out correctly, the blade motor will start up and the blade will start rotating.



**Attention** **Ensure that the blade moves in the correct direction as shown in the above figure.** If it does not, simply reverse two of the phase wires on the machine power supply input.

The sawing machine is now ready to start the work for which it was designed. Chapter 5 provides a detailed description of the various functions of the machine and its operating cycles.

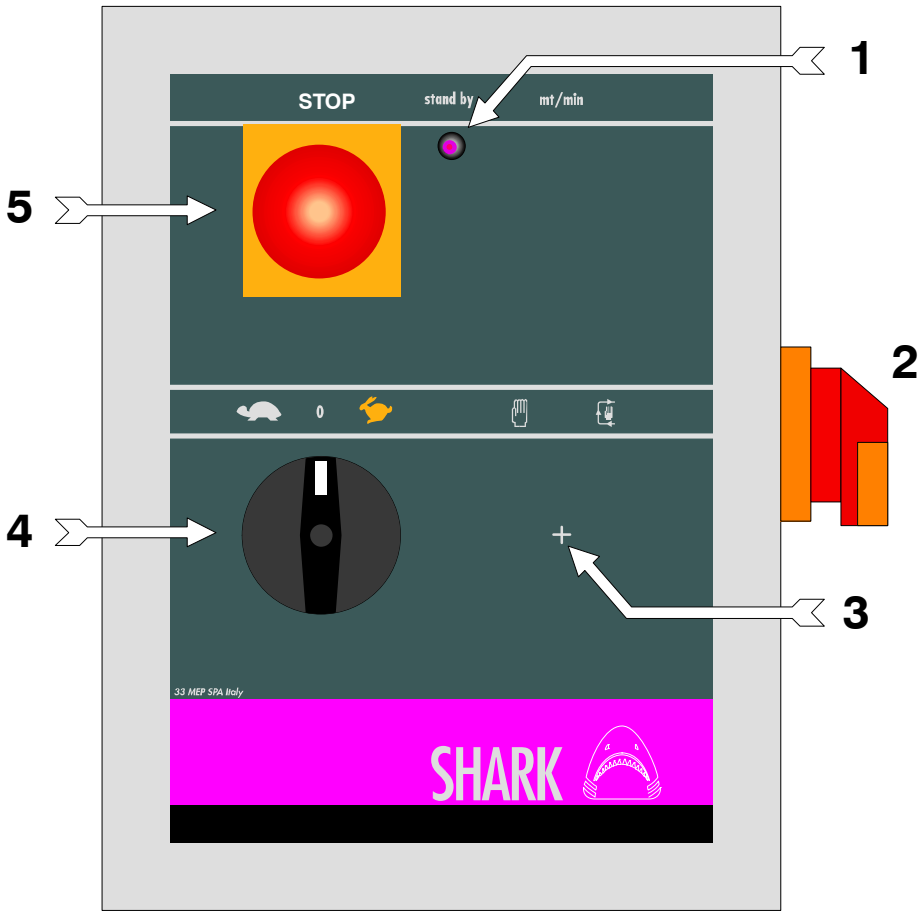
# Description of machine operation




This chapter analyses all the machine functions. We begin with a description of the pushbuttons and other components on the control panel.

## Description of the control panel

The components of the **SHARK 281** control panel are shown in the diagram below. Each arrow has a number which corresponds to the descriptions that follow.



**1 – LED STAND BY**

This either confirms machine start up or indicates an emergency state to the operator.

**2 – AUTOMATIC THERMAL–MAGNET CUTOUT WITH MINIMUM VOLTAGE RELAY AND HATCH LOCKING DEVICE**

The machine is provided on the right of the control panel with a main switch with a locking device which, when set in the ON position (1), powers up the machine by resetting the minimum–voltage relay and the blade motor thermal magnet cutout. This device has three protection systems against power failure. When there is a power failure the electrical devices are all shut down, instantly shutting down the machine and preventing automatic restoring of power on power return. A further function is to reset the thermal relay, which protects against overcurrents.

**3 – PREDISPOSITION FOR CUT CONTROL SYSTEM (OPTIONAL)**

This model is set up for CCS (Cut Control System) installation – an accessory which enables a semiautomatic/dynamic work cycle to be carried out.

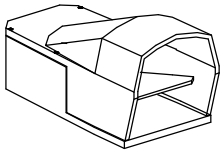
**4 – POLARITY CHANGE SWITCH**

This selects the blade cutting speed, 36/72 mt/min. on the standard 2–speed machine.

**5₆ – EMERGENCY STOP MUSHROOM BUTTON**

Pressing this button immediately stops machine operation. The emergency button, designed to conform to all safety standards, is positioned so that it is easily accessible at any time and is clearly visible – being a red button on a yellow background. To reset the emergency button, rotate actuator by 45°.

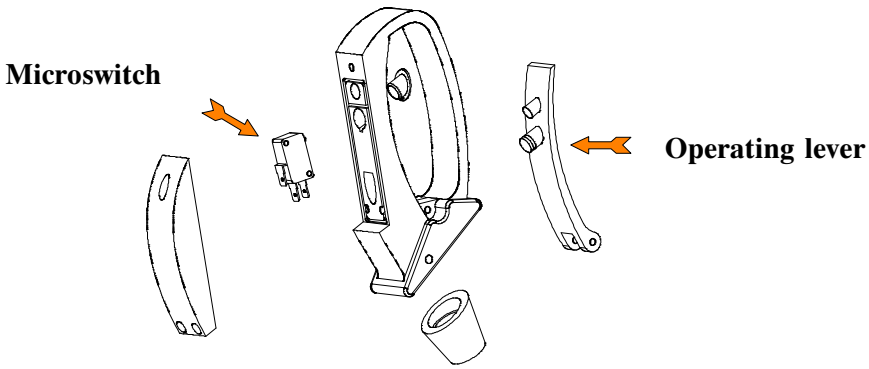
**OPTIONAL PEDAL FOR VERSION WITH AUTOMATIC VICE (MA)**



The foot pedal opens and closes the vice during normal machine operation.

## *HEAD CONTROL LEVER MICROSWITCH*

The grip of the manual head control lever incorporates a microswitch for manual control of the blade motor.

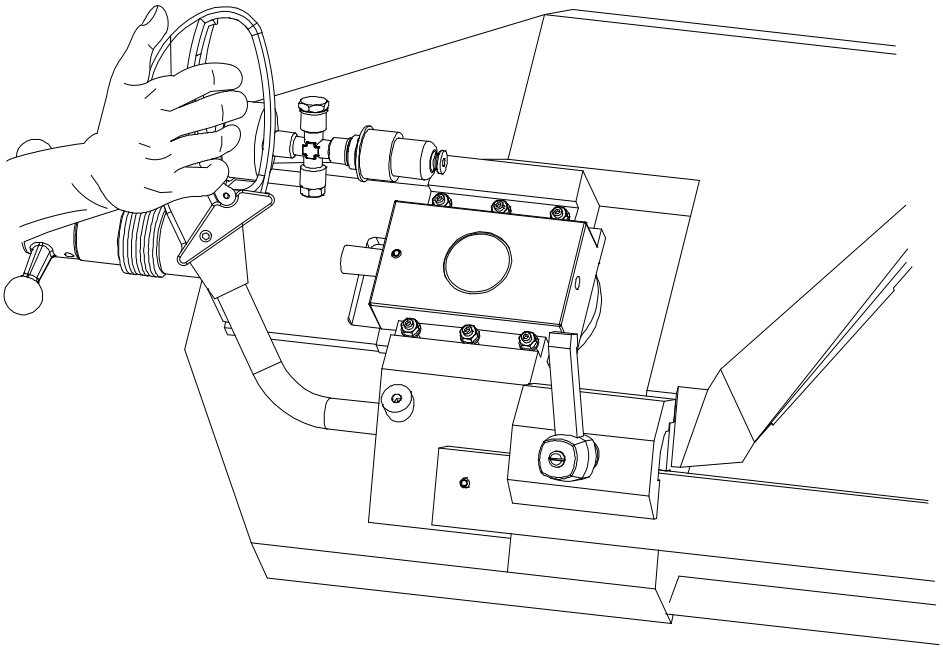



The microswitch is enabled when the machine is not in emergency state. In compliance with the relevant existing standards, voltage is 24V and the microswitch is installed in a housing (blue knob) sealed against external agents such as dust or moisture, with a protection rating of IP 55.

# Basic instructions for carrying out a cutting operation cycle

## Manoeuvring the cutting head

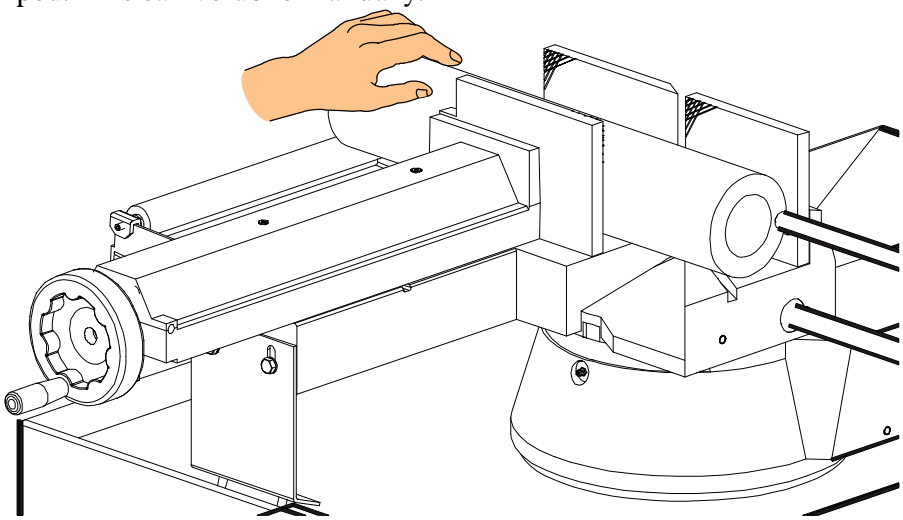
Cutting head movement is facilitated by perfect balancing of the head weight, thanks to the traction force exerted by the two return springs located at the back of the machine. Also, the grip on the head control lever enables the operator to achieve a firm grip in order to start up band saw rotation by pressing the microswitch start lever, located in the handle itself.



## Clamping the work piece in the vice

In the basic version, the work piece is clamped in the vice by rotating the opening/closing handwheel (in a clockwise/anticlockwise direction), as shown:

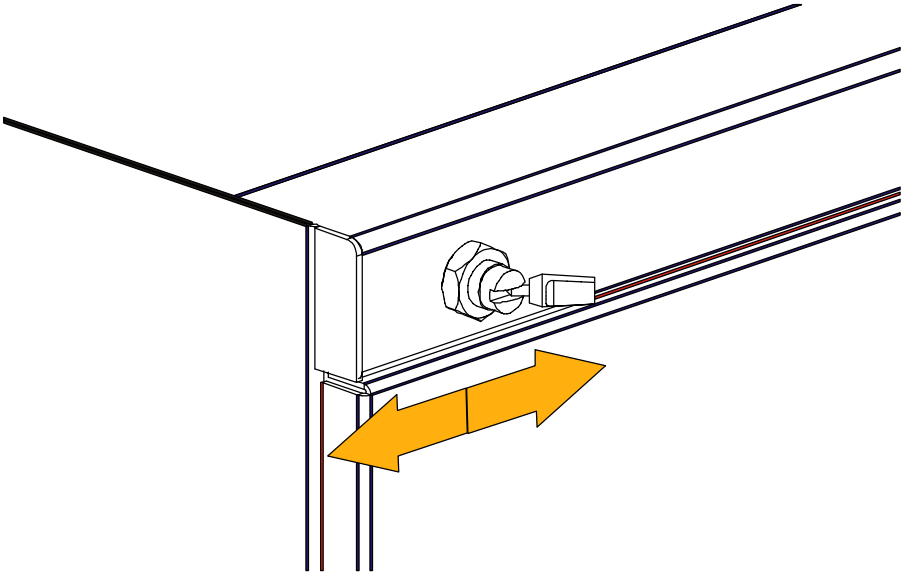
▶ each time the vice is closed make certain that the work piece is solidly clamped. This can be done manually.



## Clamping the work piece in the Automatic Vice (MA version)

If the machine is equipped with the Automatic Vice optional device (MA), the opening and closing of the vice is performed by means of the manual valve switch located on the base, which activates the vice pneumatic cylinder device. An optional pedal unit is available as an alternative to the manual valve.

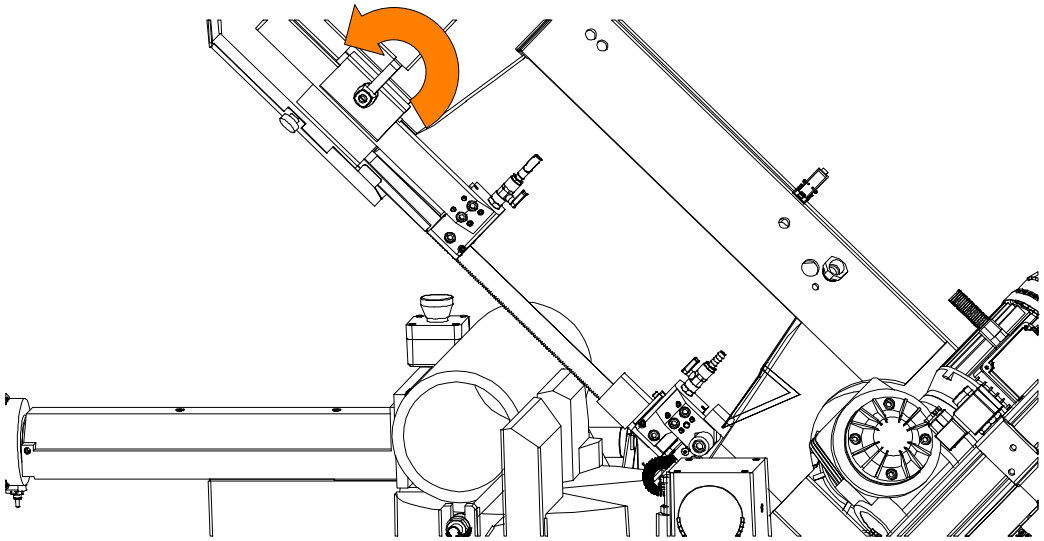
- ▶ Near the vice to within 2−3 mm from the work piece;
- ▶ close the vice using the manual valve situated on the base and make certain that the piece is tightly blocked. This can be done manually.



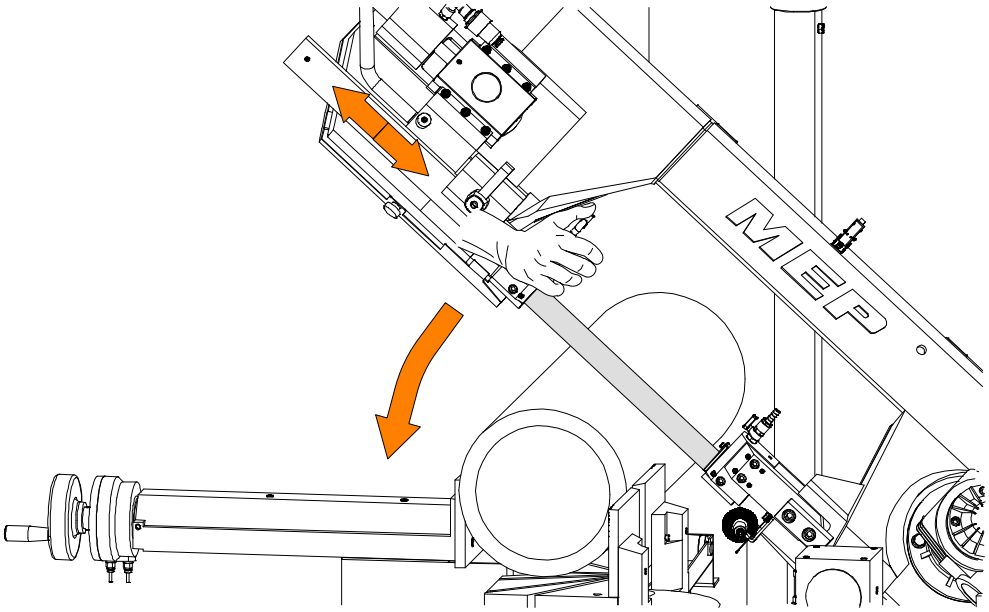
## Width of cut

The machine is fitted with protections which protect the entire blade stroke, leaving exposed only the part of the blade required to make the cut itself as specified by current standards. The width of the cut is determined by the longitudinal section of the workpiece, so that only the part of the blade required to make the cut is actually exposed.

- ▶ Position the workpiece on the work table in proximity to the blade down-stroke trajectory and clamp it in the vice.
- ▶ loosen the ratchet lever on the sliding shaft of the front blade guide head;



▶ the mobile front guide head must be positioned near to the material, leaving the downstroke trajectory free to reach beyond the sliding vice jaw;




▶ Tighten the ratchet lever to lock the head slide.

## Preliminary check list for cutting operation

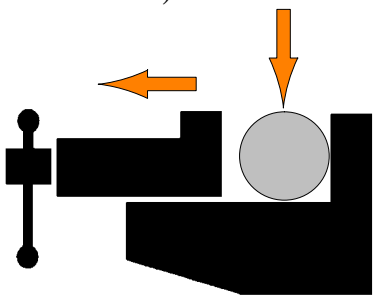
To guarantee complete safety during cutting cycles, the operator should work through a check list of the entire apparatus, checking:

- blade tension;
- that the blade guide head bracket is locked in the correct position;
- that the cutting angle is correct and the cutting head is locked;
- that the work piece is properly clamped in place;
- that the blade teeth are correct for the job to be begun;
- that the speed selected is right for the kind of piece to be cut;
- that all protections are in place and correctly locked;
- the level of lubricant/coolant and that the electropump is activated;
- that the blade downstroke speed and the cutting pressure are correct.

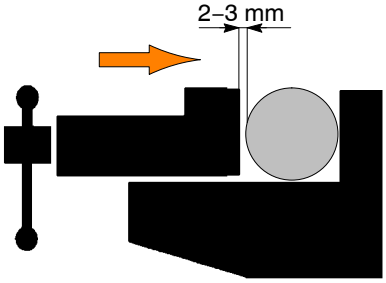
## Manual operating cycle

Sequence of operations for performing a cut:

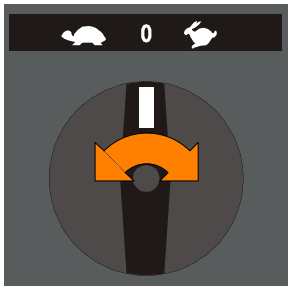
- power up the machine by pressing the reset button.
- Position the workpiece in the vice and calculate the length of cut (using the measuring rod for cuts to measure).



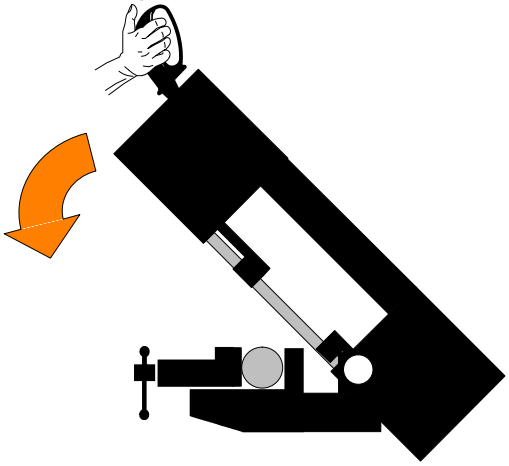
- Clamp the workpiece in the vice; **If the machine is the MA version,** bring the vice manually to within 2–3 mm. of the workpiece ; tighten the vice using the special open/close button on the base or using the foot–pedal if equipped.



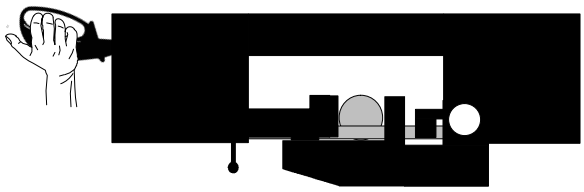
▶ Select the cut using the **polarity change switch** according to the type of the material to be cut (shape, thickness, hardness, etc.).



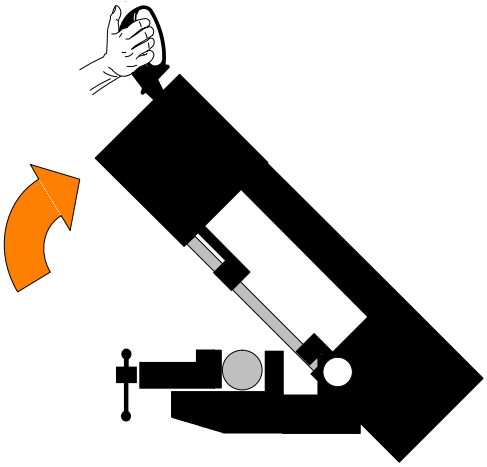

▶ Grip the head control lever and start the blade rotating by pressing the microswitch on the handgrip; the downstroke speed of the head is manually controlled by the operator.



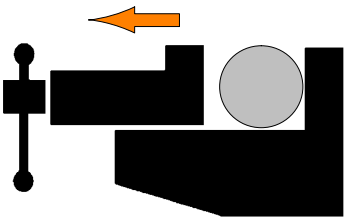
▶ The motor starts up and sets the blade in rotary motion; the lubricant/coolant pump starts up at the same time.



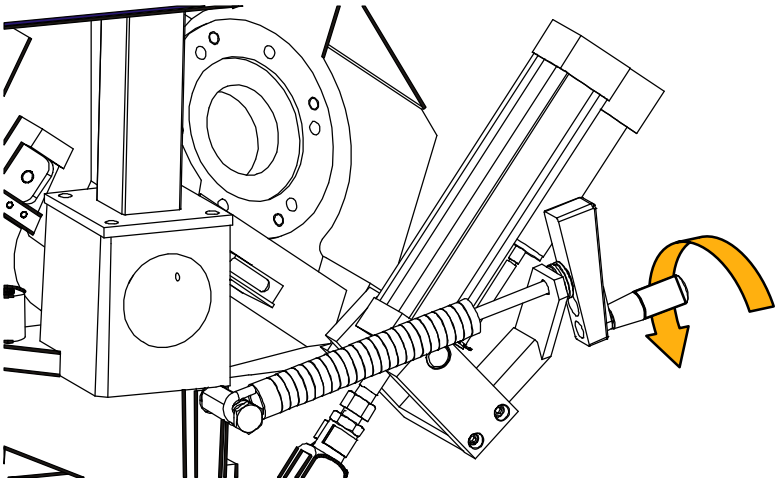
▶ At the end of the cutting operation, the head can be raised.



▶ Remove the piece from the vice; in the MA version the vice is opened using the open/close button, or by manually turning the vice handwheel.



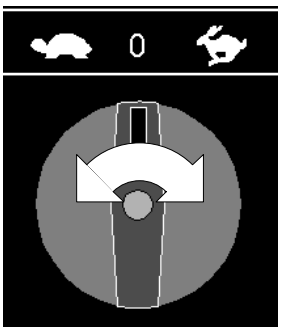
**Warning** If the machine is equipped with the Cut Control System, make sure that the function selector switch is positioned on Manual and that the head return spring is tensioned in the Manual position.



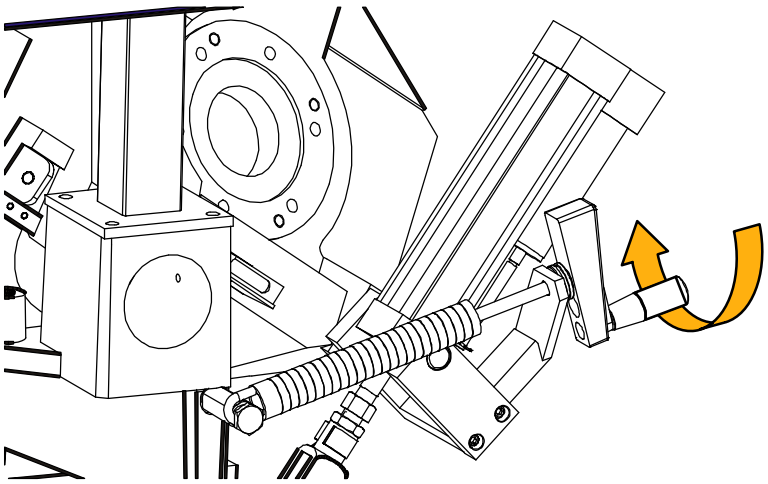
## CCS (Cut Control System) functioning cycle

The Cut Control System is an optional enabling both a Manual and a Semiautomatic/Dynamic work cycle to be performed. Sequence of operations for carrying out a cut in Semiautomatic/Dynamic mode:

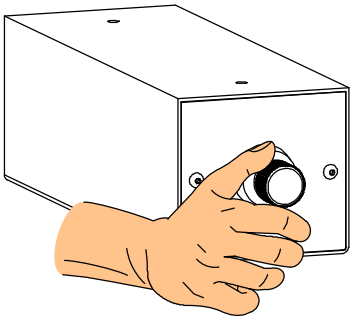
- power up the machine by turning the main switch;
- Position the material in the vice and calculate the cut lengths (using the measuring rod).
- Clamp the piece in the vice; **if the machine is the MA version,** bring the vice manually to within 2−3 mm. of the workpiece; close the vice using the special open/close button on the base of the machine or using the footpedal if equipped on the machine.
- Select the cut speed using the Polarity change switch.




- Set the tension on the head return spring using the appropriate crank so that the first turn is aligned with the Semi.automatic/Dynamic cycle notch.



- Set the head downstroke speed on the hydraulic panel. located below the machine control panel, according to the characteristics of the material to be cut.



▶ Grip the head control lever and move the blade in the proximity of the material to be cut: when you reach a distance of approx. 10 mm select function type: Semi−automatic or Dynamic and then press microswitch on the handgrip to start up blade rotation.



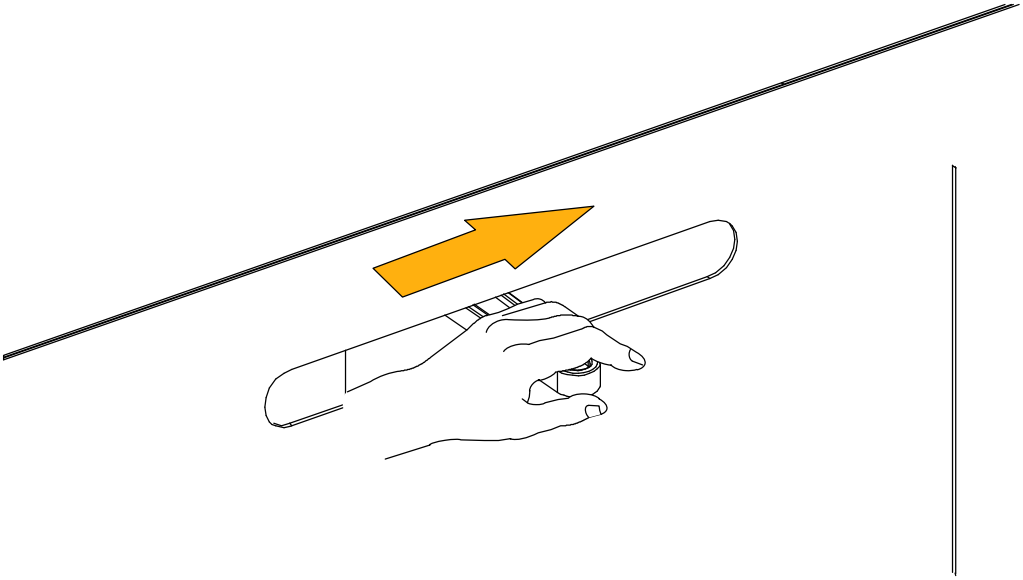
▶ The operating head will now perform cutting until it reaches HDL (Head Downstroke Limit) at which point the motor will stop.

## Angled cuts

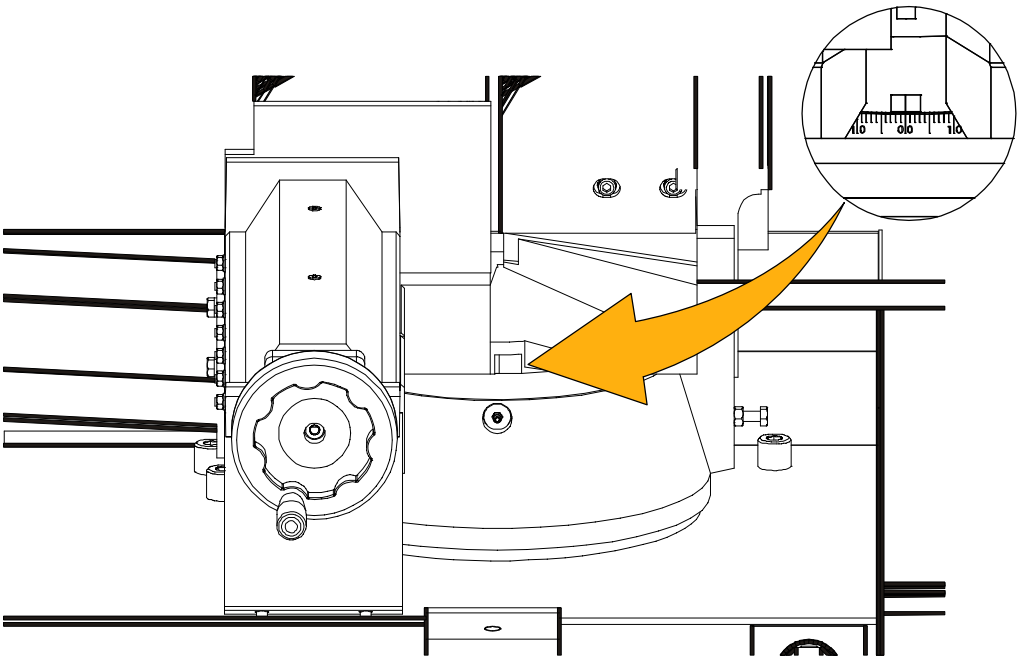
Sloped cuts with angles between 0° and 60° on the left can be made. The rotating platform has preset reference strokes for the fast performance of cuts of 0° and 45°, 60° on the left.

### Angled cuts (left)

- ▶ Make sure the vice is positioned to the left of the 0° cutting slot;
- ▶ slacken the head lock/release lever;

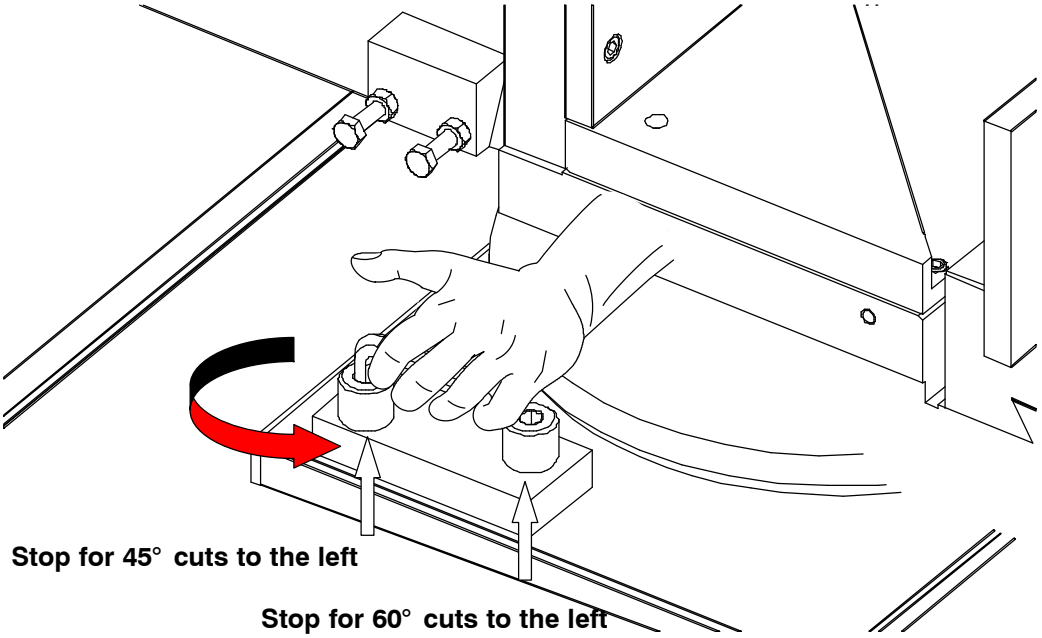


- ▶ swing the head from left to right until it is positioned at the required angle, as indicated by the graduated scale on the turntable.

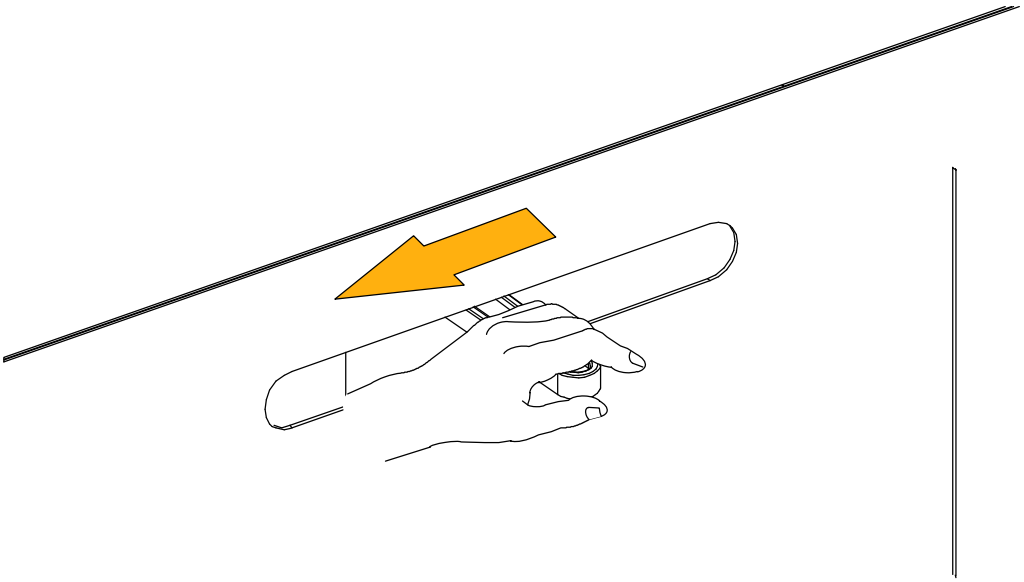


**Attention** Always swing the head when raised to avoid any risk of collision between the blade and fixed vice jaw.

▶ For angled cuts to the left exceeding 45°, remove the stop with an Allen key.

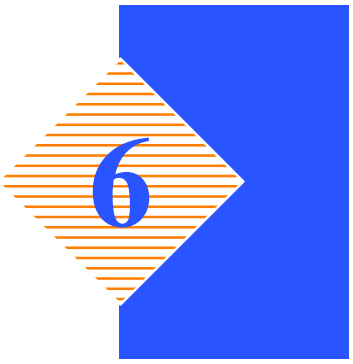



▶ Once the required angle is obtained, relock the lock/release lever.



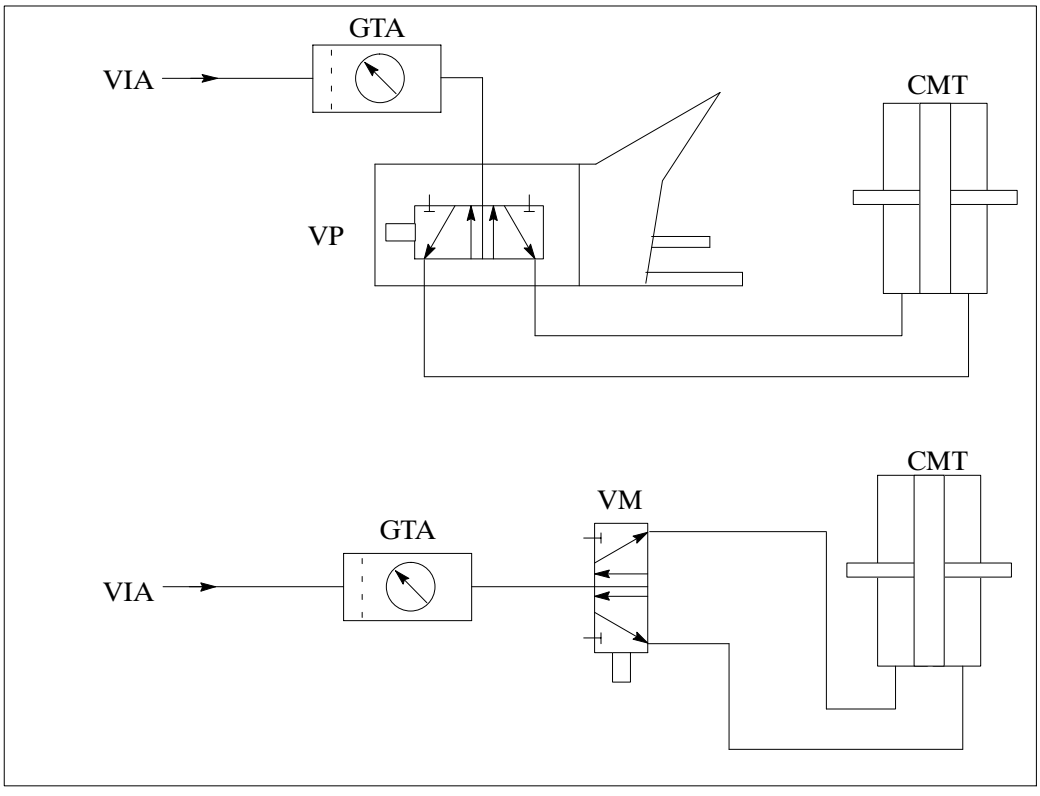
▶ Make the cut in the required operating mode, following the preliminary safety instructions set out in this chapter.

# Diagrams, exploded views and replace–ment parts




This chapter contains functional diagrams and exploded views of the **SHARK 281**, including the MA version. This document is intended to help in identifying the location of the various components making up the machine, giving information useful in carrying out repair and maintenance operations; This chapter will also enable the user to order replacement parts with no risk of misunderstanding, as all parts are given codes.

### Pneumatic diagram (MA version)



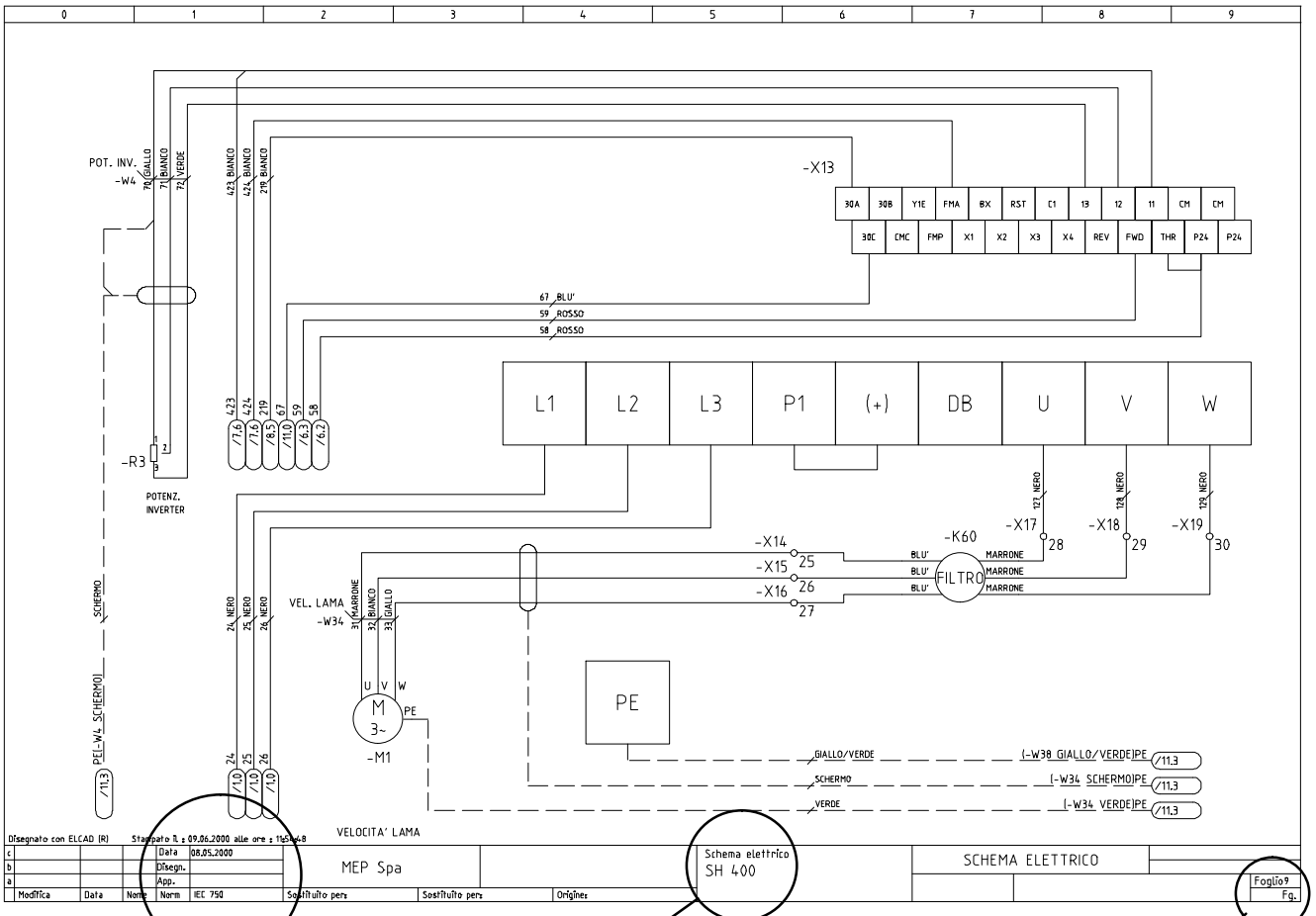

| Pneumatic components key | | | | | |
|---|---|---|---|---|---|
| VIA | Air inlet valve | VP | Pedal valve | CMT | Cutter vice cylinder |
| GTA | Air treatment unit | VM | Manual valve | CPT | Head holder cylinder |

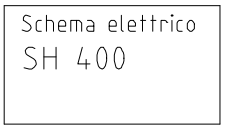
## How to read the wiring diagrams

With the introduction of the new standardised wiring diagrams, the following gives an illustration of the way in which they have been drawn up.

Each sheet of the project contains a box which gives the following information:

The numbers indicate the columns into which the entire drawing is divided



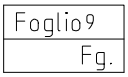

Indications of the model of machine

| | |
|---|---|
| Data | 08.05.2000 |
| Disegn. | MARIO ROSSI |
| App. | |
| Norm | IEC 750 |

Indications of the date production started

Identification of the designer

Identification of the Reference Standard

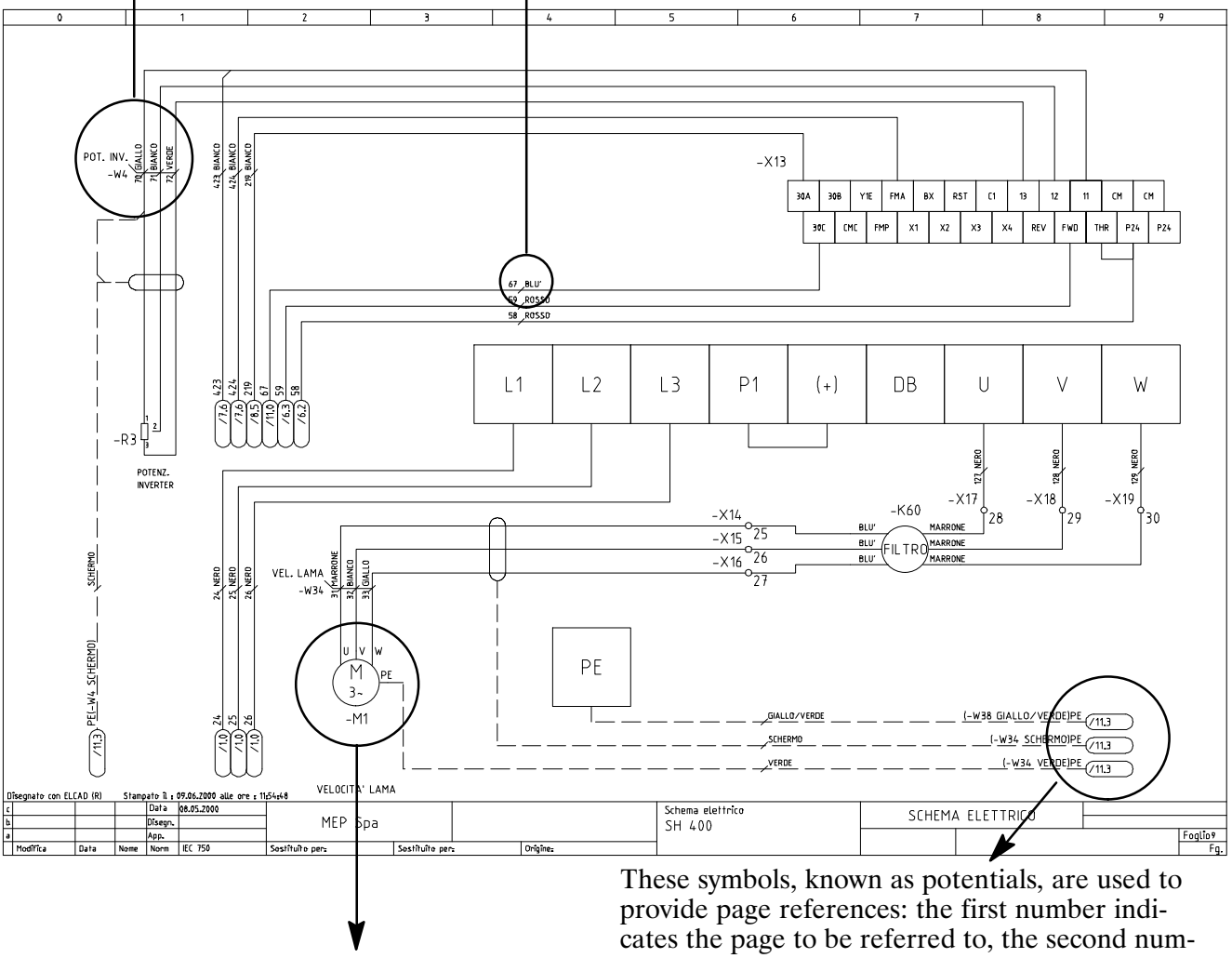



Indication of the page number

Each component in the wiring diagram is identified by a unique alphanumeric identification code, in compliance with regulations:

The wire is identified by the code –W4

This symbol identifies the wire with its relative number and colour




The motor is identified by the code –M1

These symbols, known as potentials, are used to provide page references: the first number indicates the page to be referred to, the second number, after the dot, identifies the column on that page; example /11.8 indicates that the wire continues on page no. 11 in column 8

The pages following the wiring diagrams contain the following lists:

1. components list (list of all components) and terminals list (list of all the terminals) with the following information:
   - in–house article code;
   - identification code;
   - reference, no. of the page and column on which it can be found;
   - description;
   - manufacturer.

| ART. COD. | ID | PRES. REF | DESCRIPTION | MANUFACTURER |
|---|---|---|---|---|
| 022.2151 | –B1 | /5.2 | STRAIN GAUGE | DELTATEC |

2. wires list (list of all wires) with the following information:
   - in−house article code;
   - identification code;
   - description;
   - section of wire (mm2);
   - colour of wire;
   - start: indicates the component (identification code and contact number) at which the wire starts;
   - end: indicates the component (identification code and contact number) at which the wire ends; e.g.

| CODE | CABLE | DESCRIPTION | SECTION | NO. | COLOUR | START | | END | |
|---|---|---|---|---|---|---|---|---|---|
| 022.0141 | −W7 | RESET+EMER-GENZA | 0.50 | 317 | BIANCO | −S3 | 4 | −K10 | 14 |

In this example, wire no. 317 white, identified as −W7, starts from contact no. 4 on component −S3, and ends at contact no. 14 on component −K10.
Enclosed below is Appendix D2 to European Standard EN 60204−1

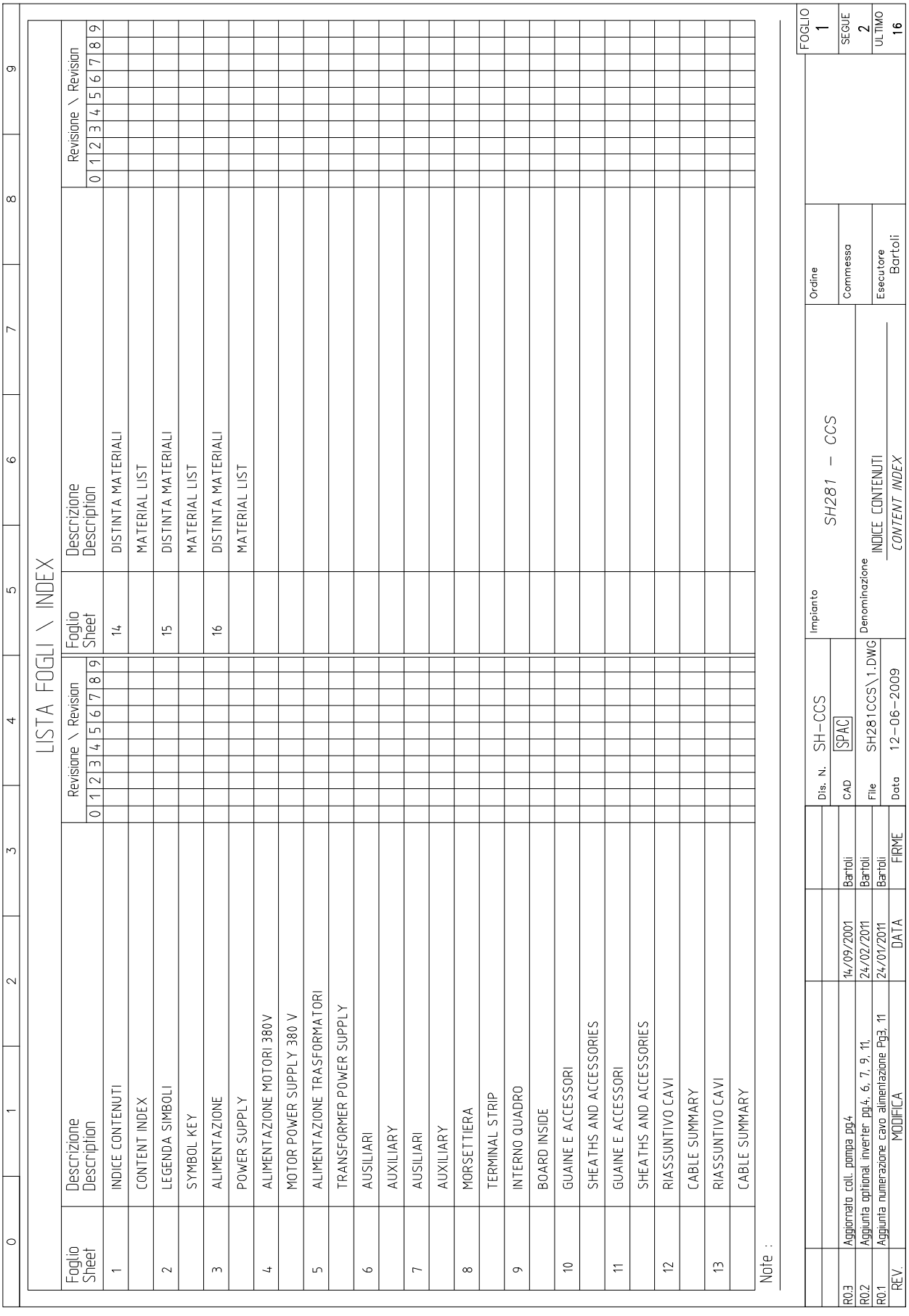
## D2−Letter codes used to designate the type of component

| LETTER | TYPE OF COMPONENT | EXAMPLES | IDENTIFICATION OF THE APPLIANCE |
|---|---|---|---|
| A | Complex units | Laser<br>Maser<br>Regulator | A |
| B | Transducers converting a non electrical signal to an electrical signal and vice versa | Transistor amplifier<br>IC amplifier<br>Magnetic amplifier<br>Valve amplifier<br>Printed circuit board<br>Drawer<br>Rack | AD<br><br>AJ<br>AM<br>AV<br>AP<br>AT<br>AR |
| C | Capacitors | | C |
| D | Binary operators, timing devices, storage devices | Digital integrated circuits and devices:<br>Delay line<br>Bistable element<br>Monostable element<br>Recorder<br>Magnetic memory<br>Tape or disk recorder | D |
| E | Various materials | Devices not specified in this table | E |
| F | Protective Devices | Lightning protectors<br>Arrestors | F |
| | | Instant action current threshold protector<br>Delayed action current threshold protector<br>Instant and delayed action current threshold protector<br>Fuse<br>Voltage threshold protector | FA<br>FR<br>FS<br>FU<br>FV |

| LETTER | TYPE OF COMPONENT | EXAMPLES | IDENTIFICATION OF THE APPLIANCE |
|---|---|---|---|
| G | Generators, feeders | Rotating generators<br>Crystal oscillators | G |
| | | Accumulator battery<br>Rotating or static frequency converter<br>Power feeder | GB<br>GF<br>GS |
| H | Signaling Devices | Buzzer<br>Optical signal, indicator light device | HA<br>HL |
| J | | | |
| K | Relays, Contactors | Instant all or nothing relays or instant contactors<br>Bistable relays or interdependent contactors<br>(All or nothing contactors with mechanical contact or permanent magnet etc.)<br>Contactors<br>Polarised relays<br>Reed relays<br>All or nothing timed relays (timers) | KA<br>KL<br>KM<br>KP<br>KR<br>KT |
| L | Inductors, reactors | Inductor<br>Stop coil<br>Reactor | I |
| M | Motors | | M |
| N | Analogue intgrated circuits | Operational amplifiers<br>Hybrid analog/digital appliances | N |
| P | Measurement equipment, test devices | Indicator, recorder and integrator measurement devices<br>Signal generators | P |
| Q | Power circuit switching appliances | Automatic switch<br>Engine saver switch<br>Knife switch | QF<br>QM<br>QS |
| R | Resistors | Fixed or variable resistor (rheostat) | R |
| S | Command or control devices | Selector or switch<br>Button (including electronic proximity switch)<br>Numerical all or nothing sensors (single step) of mechanical and electronic type:<br>– Liquid level sensor<br>–Pressure sensor<br>Position sensor (including proximity)<br>–Rotation sensor<br>–Temperature probe | SA<br>SB<br>SL<br>SP<br>SQ<br>SR<br>ST |
| T | Transformers | Current transformer<br>Control circuit supply transformer<br>Power transformer<br>Magnetic stabiliser<br>Voltage transformer | TA<br>TC<br>TM<br>TS<br>TV |

| LETTER | TYPE OF COMPONENT | EXAMPLES | IDENTIFICATION OF THE APPLIANCE |
|---|---|---|---|
| U | Modulators, converters | Discriminator<br>Demodulator<br>Frequency converter<br>Coder<br>Converter<br>Inverter<br>Telegraphic repeater | U |
| V | Electronic pipes, semiconductors | Electronic pipe<br>Gas discharge pipe<br>Diode<br>Transistor<br>Thyristor | V |
| W | Transmission lines, wave guides, antennas | Conductor<br>Cable<br>Bar<br>Wave guide<br>Wave guide directional coupler<br>Dipole<br>Parabolic antenna | W |
| X | Terminals, sockets, plugs | Connector bar<br>Test plug<br>Plug<br>Socket<br>Terminal connector band | XB<br>XJ<br>XP<br>XS<br>XT |
| Y | Electrically operated mechanical appliances | Electromagnet<br>Electromagnetic brake<br>Electromagnetic clutch<br>Magnetic table spindle<br>Electromagnetic valve | YA<br>YB<br>YC<br>YH<br>YV |
| Z | Transformers, impedence adapters, equalizers, band limiters | Line equalizer<br>Compresser<br>Crystal filter | Z |

# Standardised Wiring Diagrams



| Sim.\Sym. | File | Descrizione\Description |
|---|---|---|
|  | H12 | LED con resistenza<br>*LED WITH RESISTOR* |
|  | M2 | Motore asincrono trifase<br>*THREE PHASE INDUCTION MOTOR* |
|  | Q1360 | Int. automatico magnetotermico sezionatore tripolare<br>*THREE PHASE AUTOMATIC SWITCH* |
|  | S2 | Comando a Pulsante NO<br>*PUSH BUTTON NO* |
|  | S4C | Pulsante di emergenza NC<br>*EMERGENCY PUSH BUTTON NC* |
|  | S8 | Pressostato NO<br>*PRESSURE SWITCH NO* |
|  | S13C | Fine corsa NC<br>*LIMIT SWITCH NC* |
|  | S104C | Selettore a due posizioni stabili NC<br>*SELECTOR TWO STABLE POSITION* |
|  | Y1 | Elettrovalvola<br>*SOLENOID VALVE* |
|  | KA1 | Bobina rele' Aux<br>*AUXILIARY RELAY COIL* |
|  | KM1 | Bobina contattore<br>*CONTACTOR COIL* |

| Sim.\Sym. | File | Descrizione\Description |
|---|---|---|
|  | BLK5 | Motore asincrono trifase 6 poli<br>*SIX PHASE INDUCTION MOTOR* |
|  | BLK10 | Trasformatore per ausiliari<br>*TRANSFORMER FOR AUXILIARY* |
|  | SEL__VEL | Selettore a tre posizioni stabili NO riposo 0<br>*SELECTOR THREE STABLE ZERO CENTRAL POSITION* |
|  | BLK41 | Raccordo SX<br>*CONNECTOR SX* |
|  | BLK42 | Raccordo DX<br>*CONNECTOR DX* |
|  | BLK43 | Tubo corrugato<br>*CORRUGATED PIPE* |
|  | BLK45 | Riduzione PG<br>*PG ADAPTER* |
|  | BLK49 | Pressacordone<br>*FAIRLEAD* |
|  | BLK51 | Dado PG<br>*NUT PG* |
|  | BLK56 | Capicorda a puntale<br>*TERMINAL* |
|  | BLK57 | Filo unipolare<br>*WIRE* |

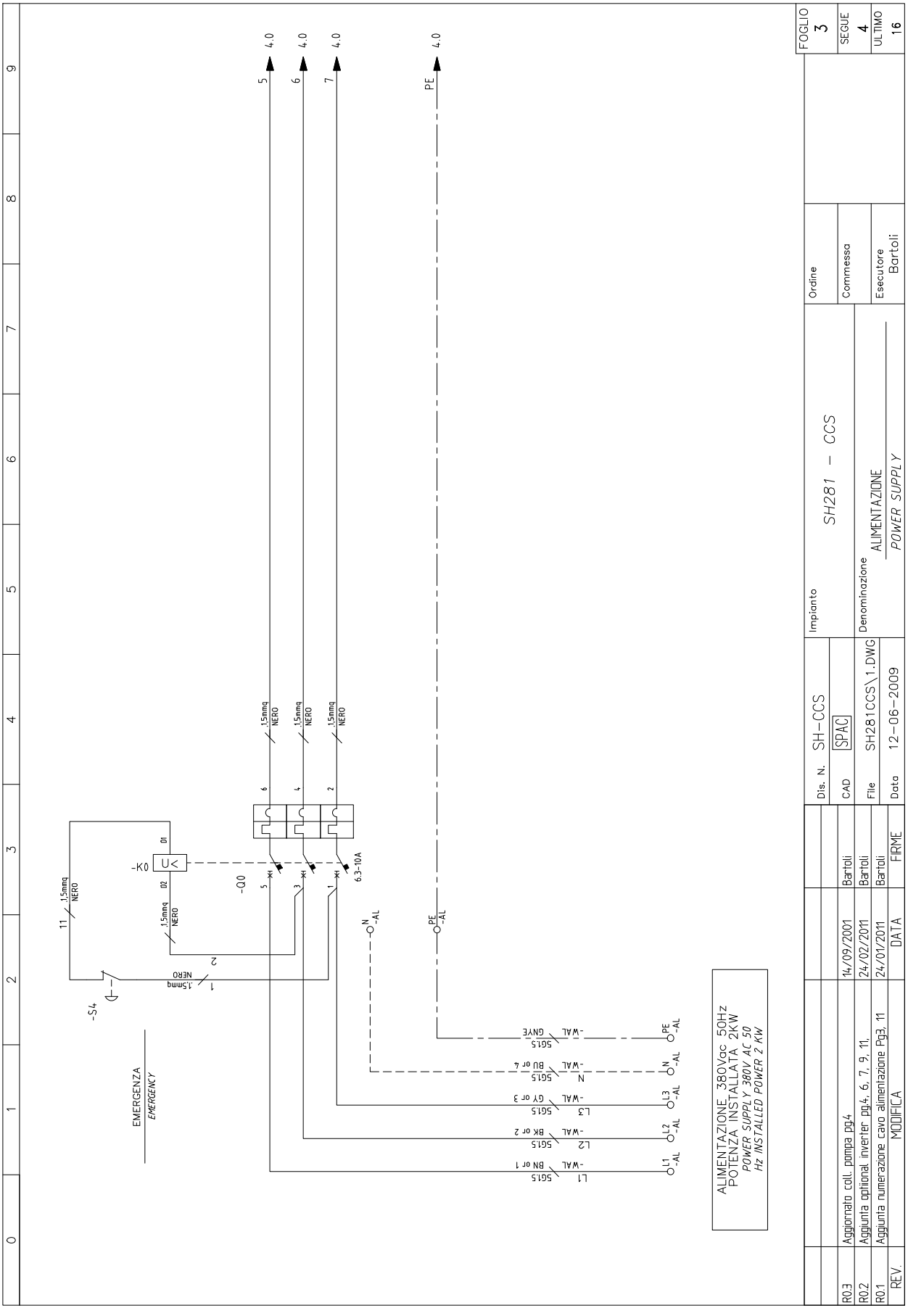
| Sim.\Sym. | File | Descrizione\Description |
|---|---|---|
|  | BLK58 | Fascette plastiche di fissaggio<br>*CLAMP* |
|  | BLK60 | Capicorda a occhiello<br>*TERMINAL* |
|  | BLK66 | Sacchetto portafusibile<br>*BAG FUSE* |

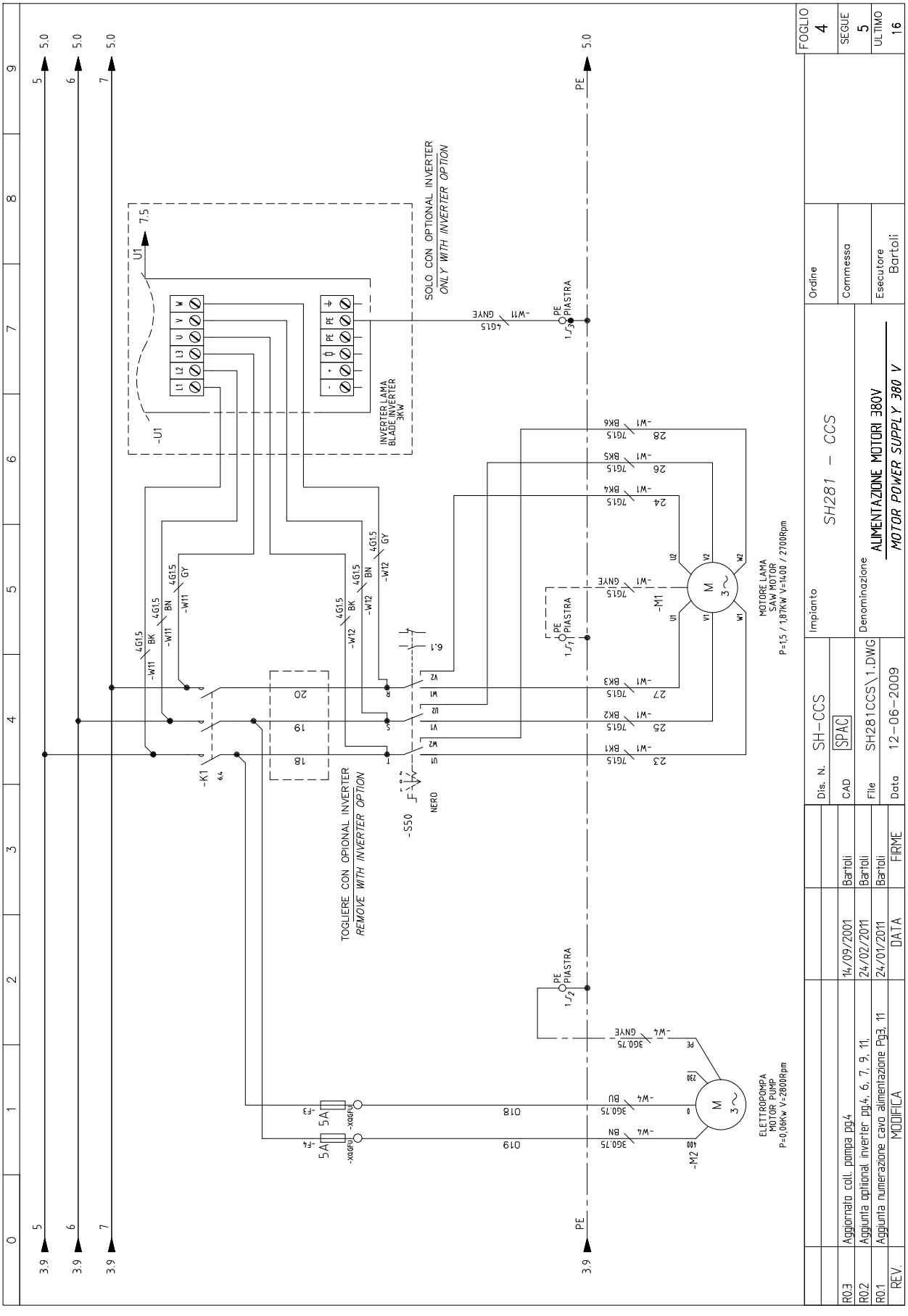
| REV. | MODIFICA | DATA | FIRME |
|---|---|---|---|
| | | | |
| | | | |
| R0.3 | Aggiornato coll. pompa pg.4 | 14/09/2001 | Bartoli |
| R0.2 | Aggiunta optiional inverter pg.4, 6, 7, 9, 11, | 24/02/2011 | Bartoli |
| R0.1 | Aggiunta numerazione cavo alimentazione Pg3, 11 | 24/01/2011 | Bartoli |

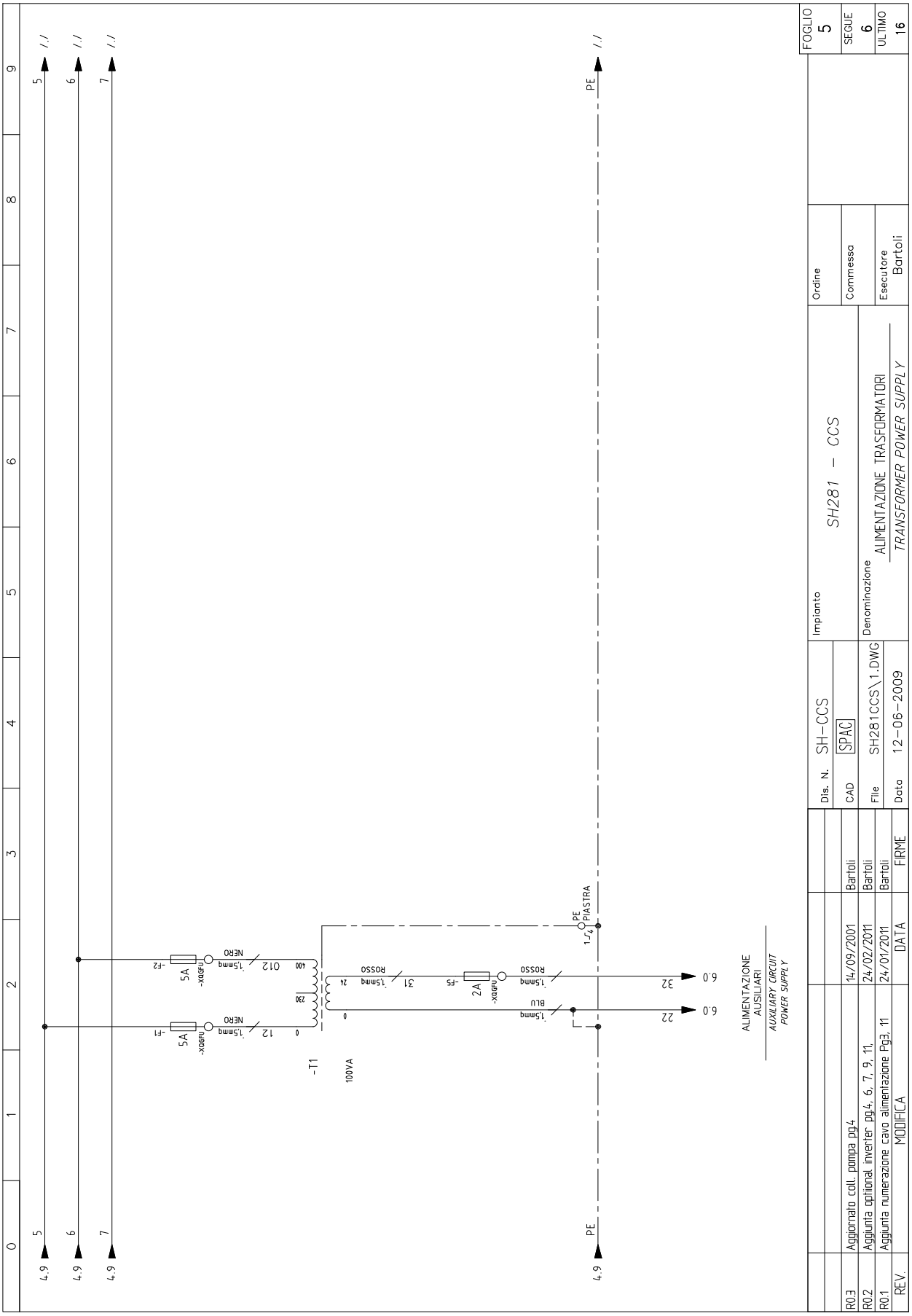
Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009

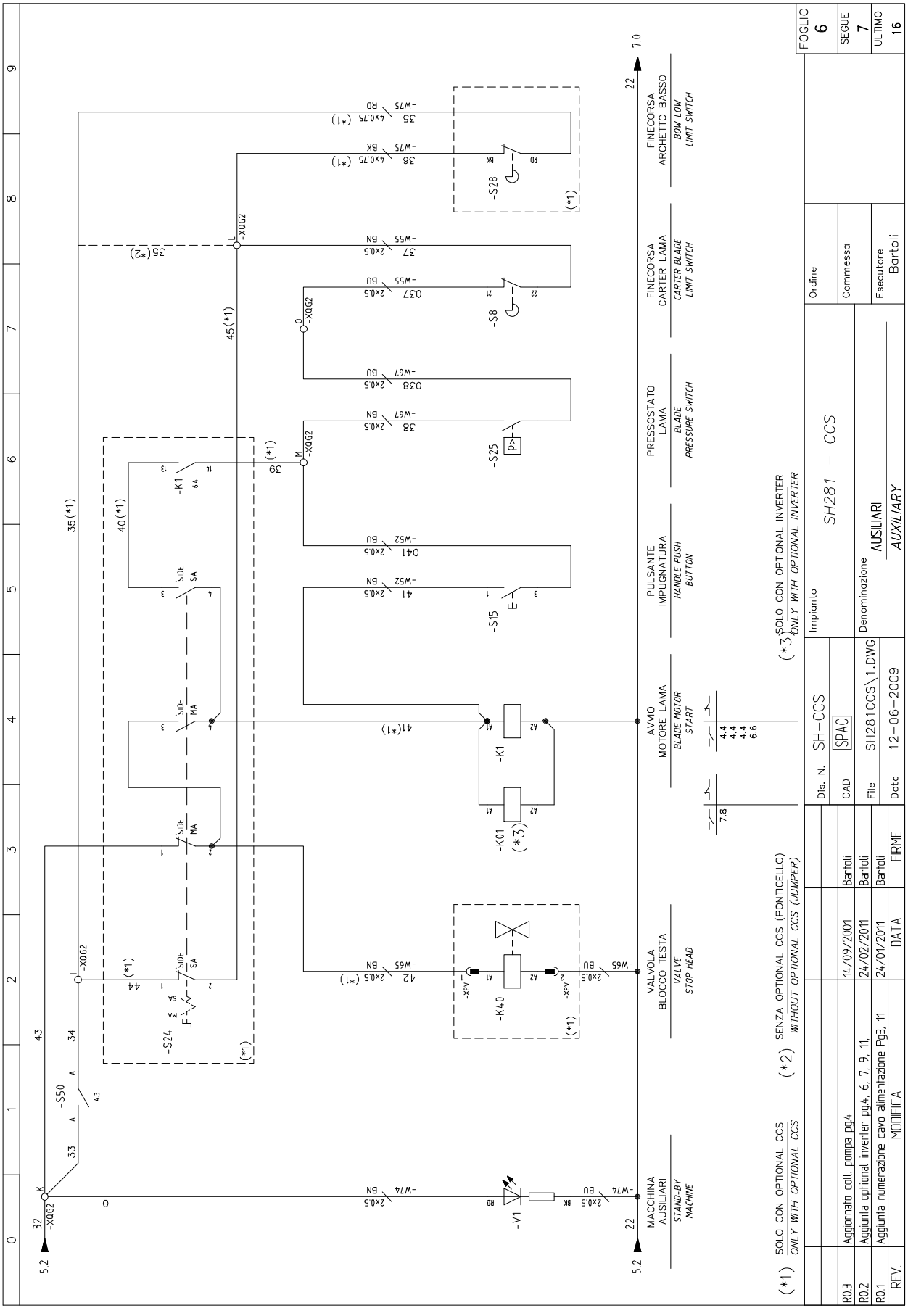
Impianto: *SH281 - CCS*
Denominazione: LEGENDA SIMBOLI / *SYMBOL KEY*
Ordine
Commessa
Esecutore: Bartoli

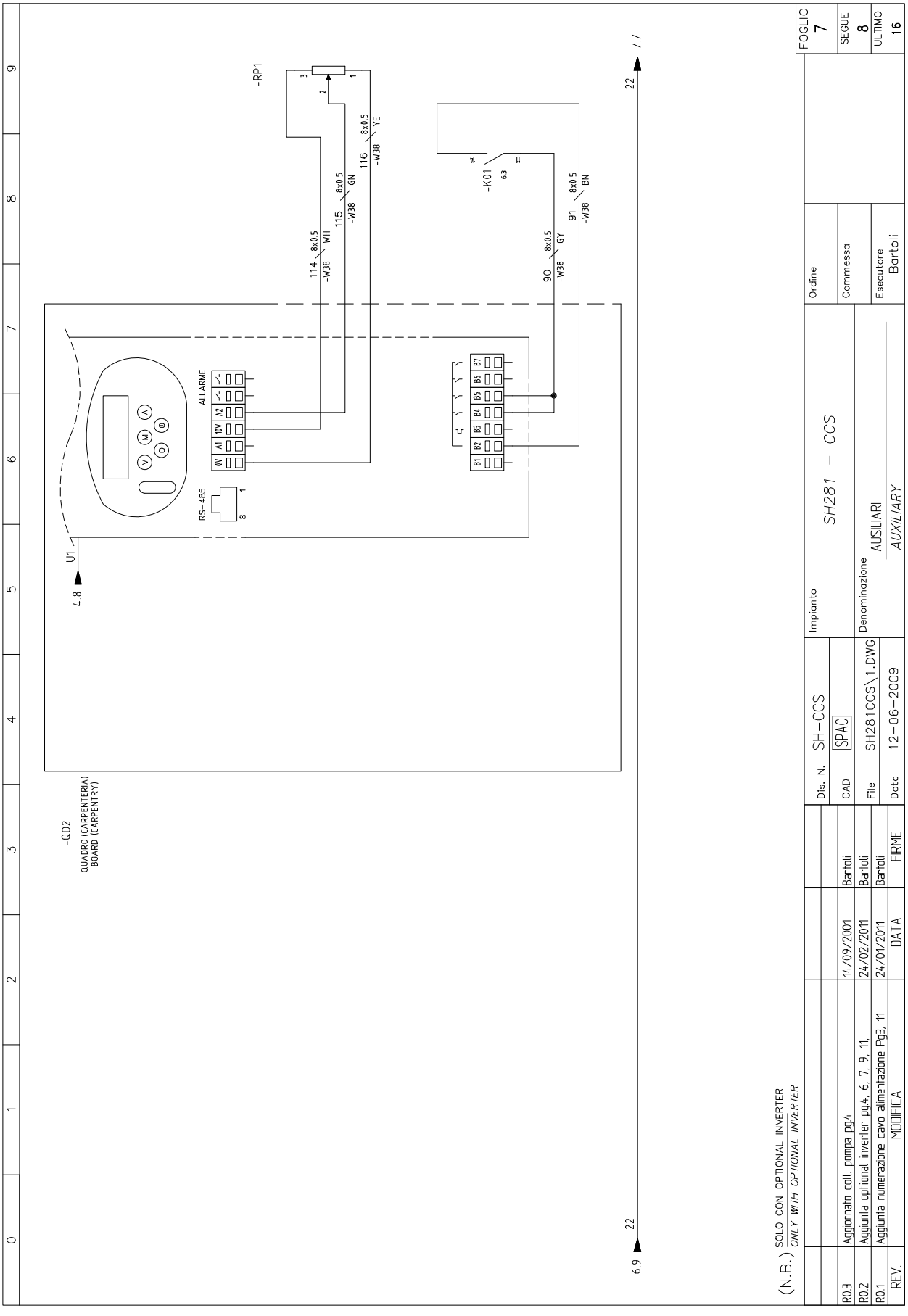
FOGLIO 2
SEGUE 3
ULTIMO 16

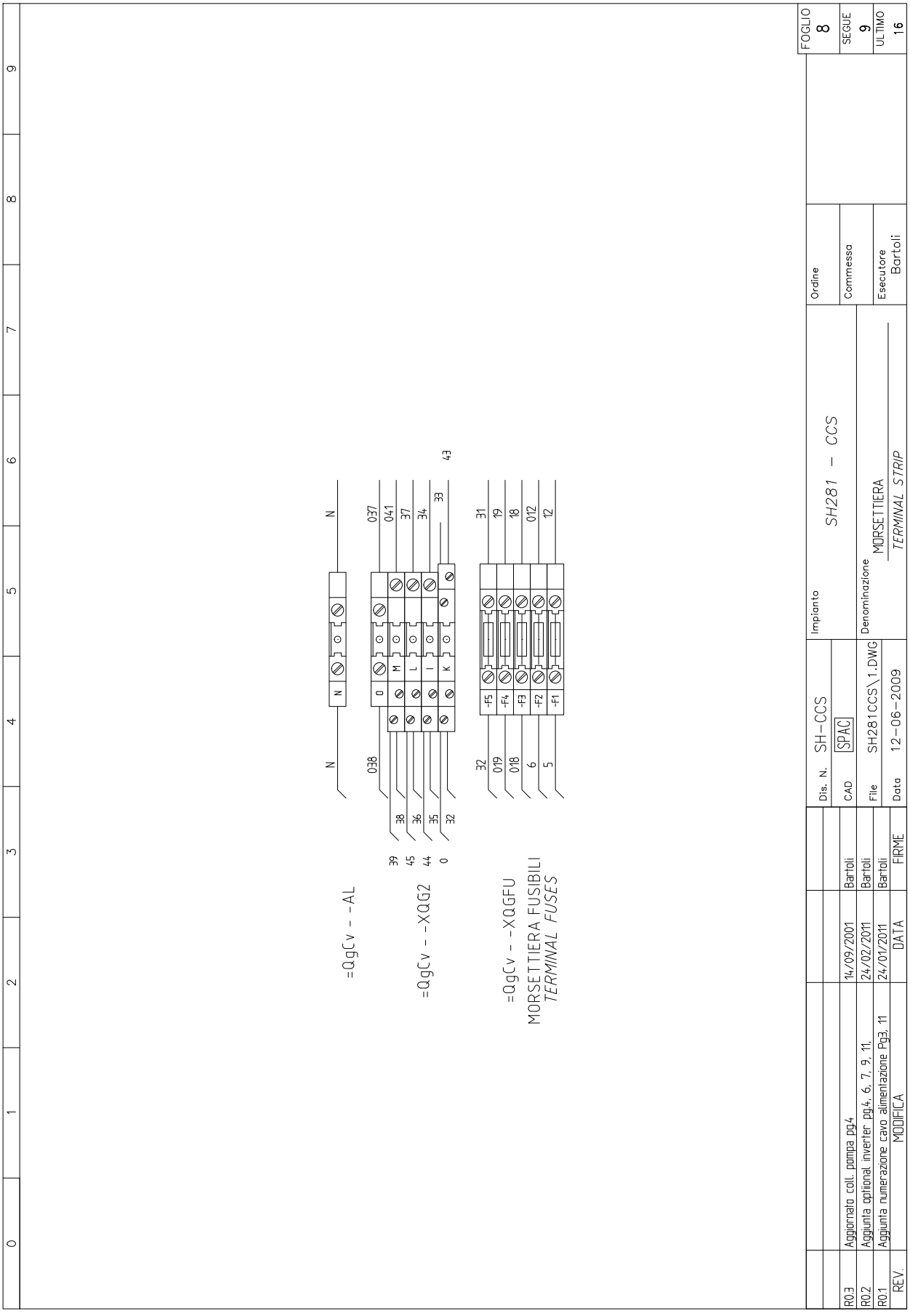

ALIMENTAZIONE 380Vac 50Hz
POTENZA INSTALLATA 2KW
POWER SUPPLY 380V AC 50
Hz INSTALLED POWER 2 KW
EMERGENZA
EMERGENCY
-S4
-K0
-Q0
6.3-10A
1,5mmq NERO
4.0
PE
N -AL
PE -AL
L1 -AL
L2 -AL
L3 -AL
N -AL
PE -AL
SG1S -WAL BN or 1
SG1S -WAL BK or 2
SG1S -WAL GY or 3
SG1S -WAL BU or 4
SG1S -WAL GNYE
FOGLIO 3
SEGUE 4
ULTIMO 16
Ordine
Commessa
Esecutore Bartoli
Impianto SH281 - CCS
Denominazione ALIMENTAZIONE
POWER SUPPLY
Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009
REV. MODIFICA DATA FIRME
R0.3 Aggiornato coll. pompa pg4 14/09/2001 Bartoli
R0.2 Aggiunta optional inverter pg4, 6, 7, 9, 11, 24/02/2011 Bartoli
R0.1 Aggiunta numerazione cavo alimentazione Pg3, 11 24/01/2011 Bartoli

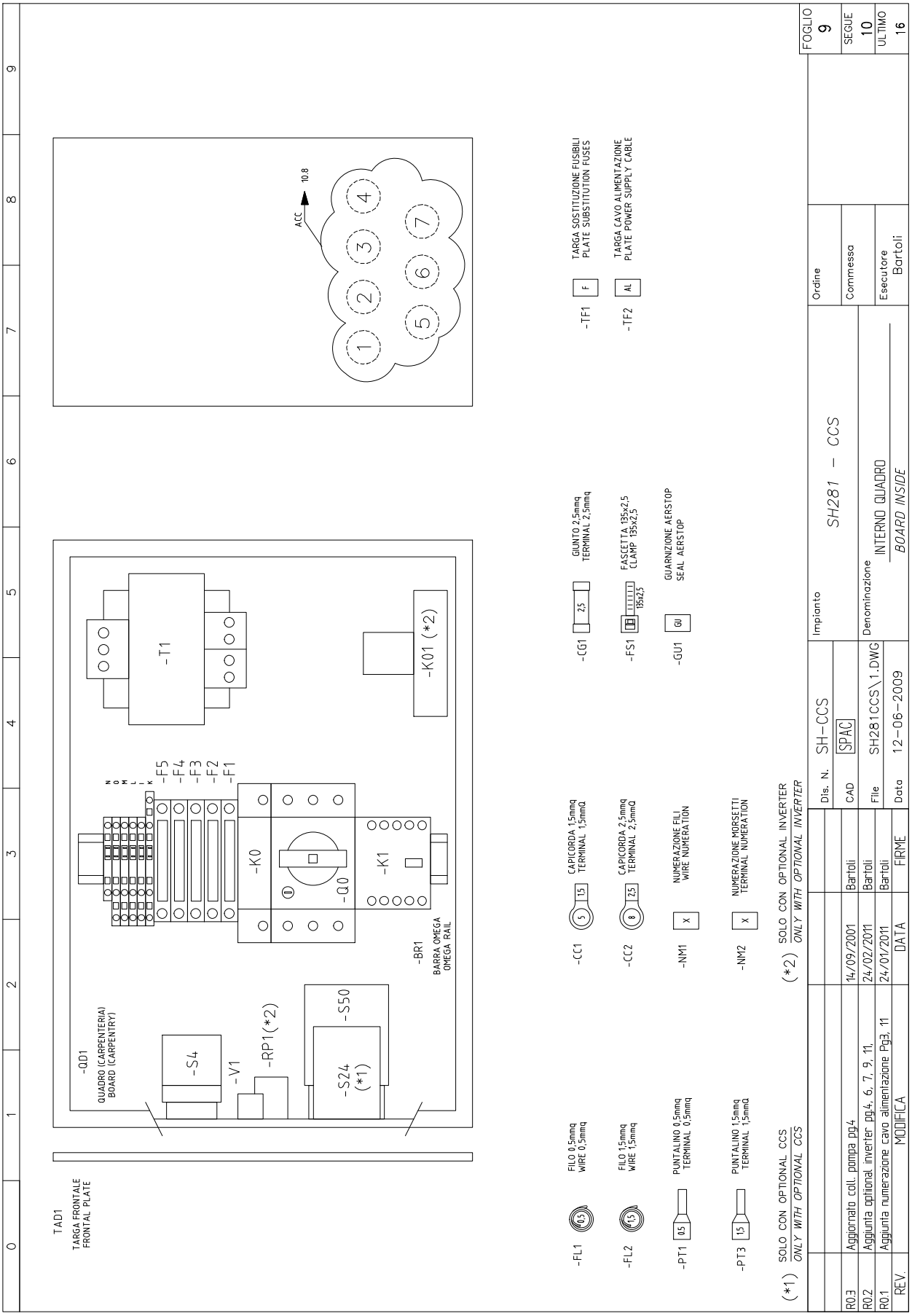

ALIMENTAZIONE MOTORI 380V
MOTOR POWER SUPPLY 380 V
SH281 - CCS
SH-CCS
SH281CCS\1.DWG
12-06-2009
SOLO CON OPTIONAL INVERTER
ONLY WITH INVERTER OPTION
TOGLIERE CON OPIONAL INVERTER
REMOVE WITH INVERTER OPTION
INVERTER LAMA
BLADE INVERTER
3KW
MOTORE LAMA
SAW MOTOR
P=1,5 / 1,87KW V=1400 / 2700Rpm
ELETTROPOMPA
MOTOR PUMP
P=0,06Kw V=2800Rpm
PIASTRA
NERO
FOGLIO 4
SEGUE 5
ULTIMO 16
Esecutore Bartoli
Commessa
Ordine
Impianto
Denominazione
Dis. N.
CAD
File
Data
R0.3 Aggiornato coll. pompa pg4 14/09/2001 Bartoli
R0.2 Aggiunta optional inverter pg4, 6, 7, 9, 11. 24/02/2011 Bartoli
R0.1 Aggiunta numerazione cavo alimentazione Pg3, 11 24/01/2011 Bartoli
REV. MODIFICA DATA FIRME

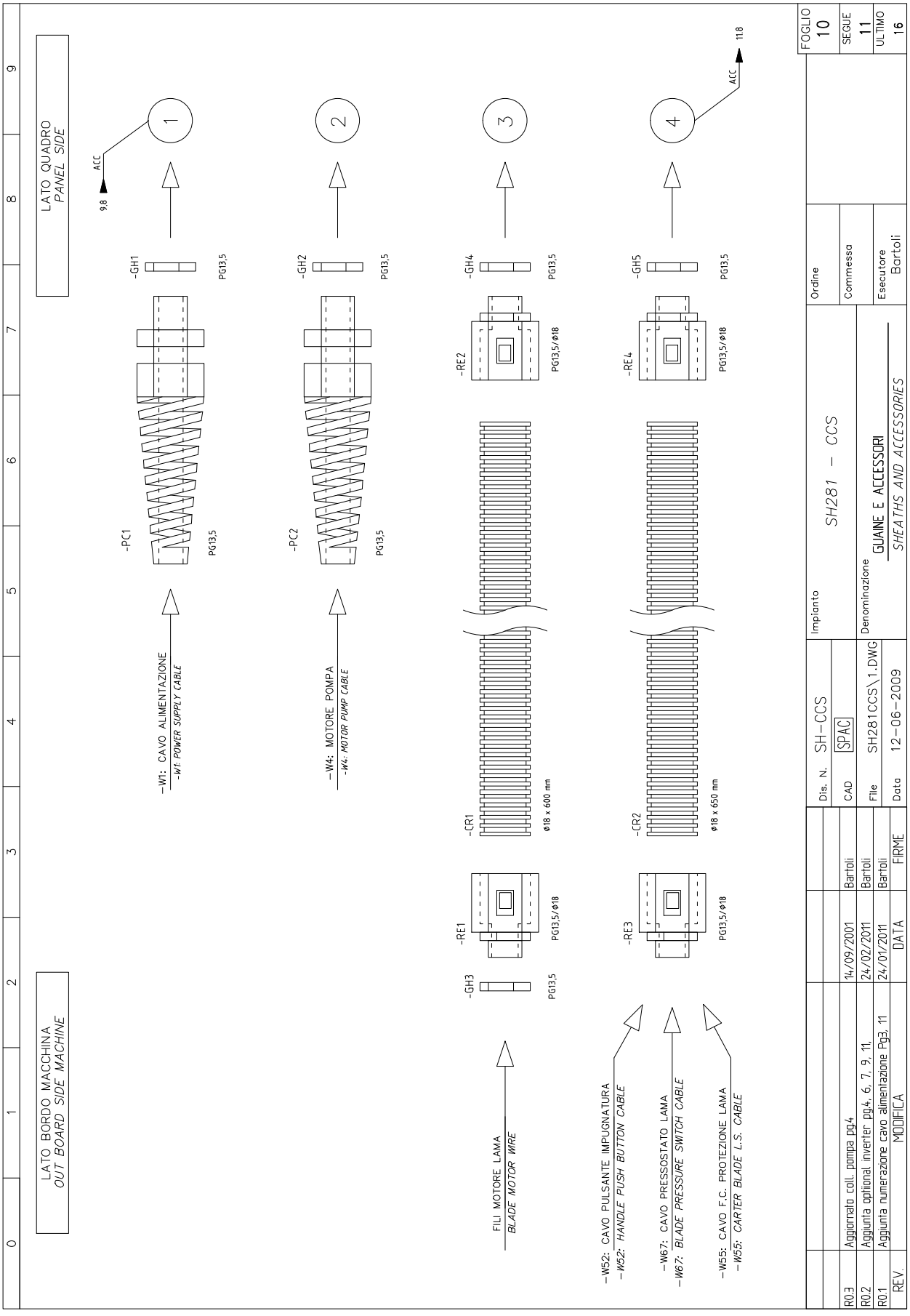

FOGLIO 5
SEGUE 6
ULTIMO 16
Ordine
Commessa
Esecutore Bartoli
Impianto
SH281 – CCS
Denominazione
ALIMENTAZIONE TRASFORMATORI
TRANSFORMER POWER SUPPLY
Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009
ALIMENTAZIONE AUSILIARI
AUXILIARY CIRCUIT POWER SUPPLY
-T1
100VA
-F1
-F2
-F5
5A
2A
NERO
ROSSO
BLU
PIASTRA
PE
R0.3 Aggiornato coll. pompa pg4 14/09/2001 Bartoli
R0.2 Aggiunta optional inverter pg4, 6, 7, 9, 11, 24/02/2011 Bartoli
R0.1 Aggiunta numerazione cavo alimentazione Pg3, 11 24/01/2011 Bartoli
REV. MODIFICA DATA FIRME

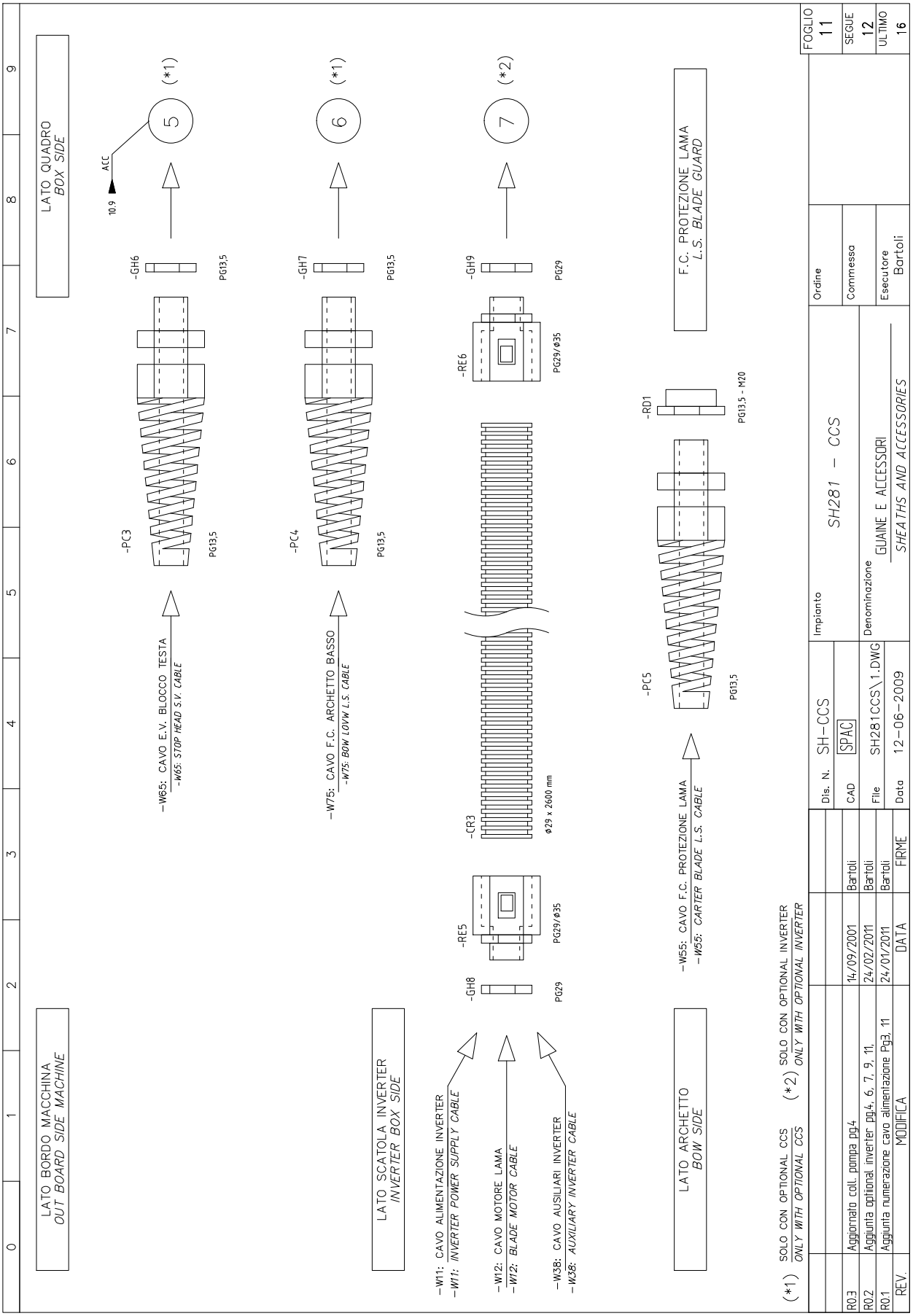

SH281 – CCS
AUSILIARI
AUXILIARY
SH-CCS
SH281CCS\1.DWG
12-06-2009
FOGLIO 6
SEGUE 7
ULTIMO 16
(*1) SOLO CON OPTIONAL CCS
ONLY WITH OPTIONAL CCS
(*2) SENZA OPTIONAL CCS (PONTICELLO)
WITHOUT OPTIONAL CCS (JUMPER)
(*3) SOLO CON OPTIONAL INVERTER
ONLY WITH OPTIONAL INVERTER
-S50
-S24
-S15
-S25
-S8
-S28
-K1
-K01
-K40
-V1
-XAG2
-W74
-W65
-W52
-W67
-W55
-W75
PULSANTE IMPUGNATURA
HANDLE PUSH BUTTON
PRESSOSTATO LAMA
BLADE PRESSURE SWITCH
FINECORSA CARTER LAMA
CARTER BLADE LIMIT SWITCH
FINECORSA ARCHETTO BASSO
BOW LOW LIMIT SWITCH
AVVIO MOTORE LAMA
BLADE MOTOR START
VALVOLA BLOCCO TESTA
VALVE STOP HEAD
MACCHINA AUSILIARI
STAND-BY MACHINE
REV. MODIFICA DATA FIRME
R0.3 Aggiornato coll. pompa pg4 14/09/2001 Bartoli
R0.2 Aggiunta optional inverter pg4, 6, 7, 9, 11. 24/02/2011 Bartoli
R0.1 Aggiunta numerazione cavo alimentazione Pg3, 11 24/01/2011 Bartoli
Dis. N. CAD File Data
Impianto SPAC
Denominazione
Ordine
Commessa
Esecutore Bartoli

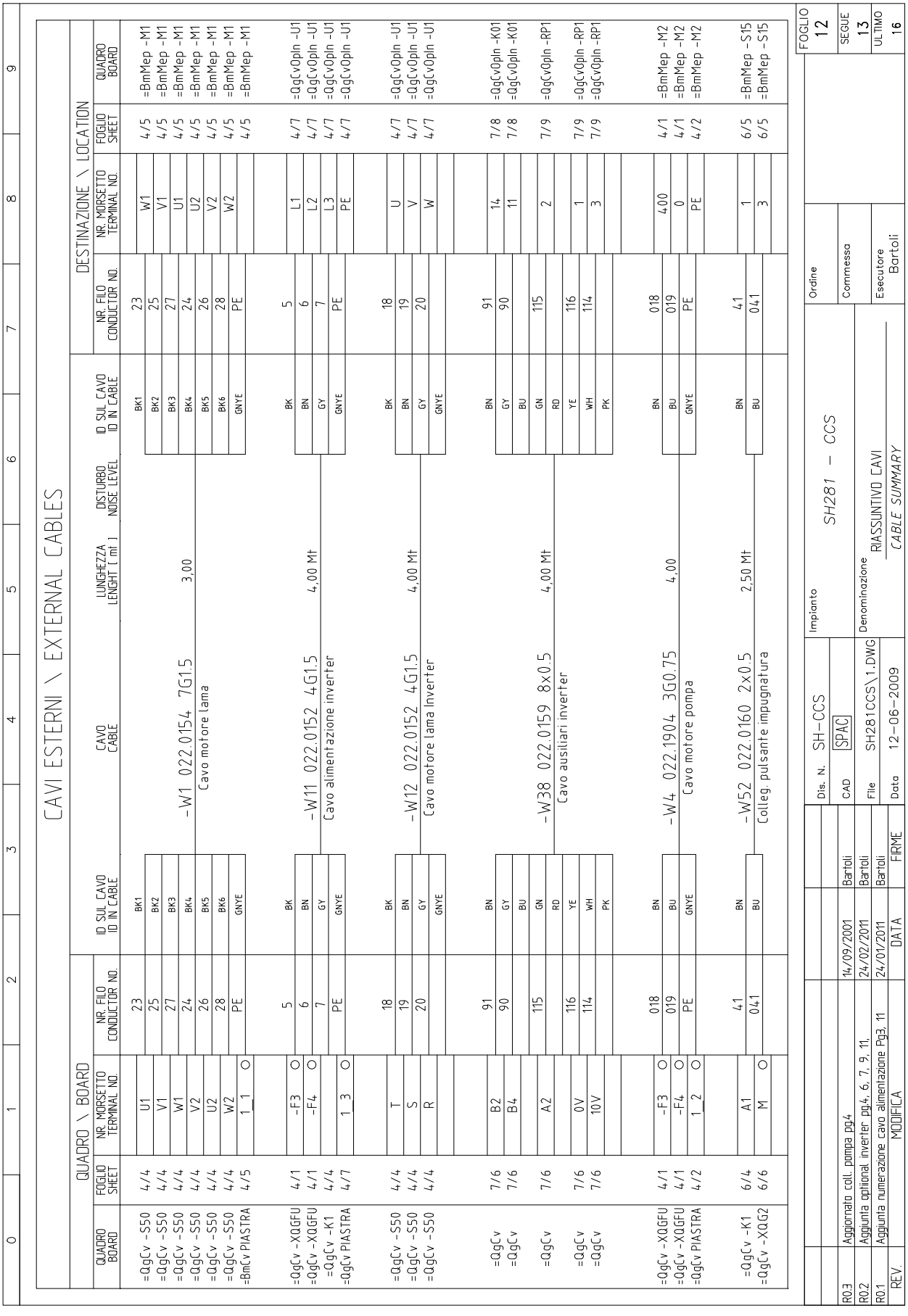

-QD2
QUADRO (CARPENTERIA)
BOARD (CARPENTRY)
U1
4.8
-RP1
ALLARME
RS-485
-K01
114 8x0.5 WH -W38
115 8x0.5 GN -W38
116 8x0.5 YE -W38
90 8x0.5 GY -W38
91 8x0.5 BN -W38
22
6.9
(N.B.) SOLO CON OPTIONAL INVERTER
ONLY WITH OPTIONAL INVERTER
REV. MODIFICA DATA FIRME
R0.3 Aggiornato coll. pompa pg4 14/09/2001 Bartoli
R0.2 Aggiunta optional inverter pg4, 6, 7, 9, 11, 24/02/2011 Bartoli
R0.1 Aggiunta numerazione cavo alimentazione Pg3, 11 24/01/2011 Bartoli
Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009
Impianto
SH281 - CCS
Denominazione
AUSILIARI
AUXILIARY
Ordine
Commessa
Esecutore Bartoli
FOGLIO 7
SEGUE 8
ULTIMO 16


=QgCv - -AL
=QgCv - -XQG2
=QgCv - -XQGFU
MORSETTIERA FUSIBILI
TERMINAL FUSES
SH281 - CCS
MORSETTIERA
TERMINAL STRIP
SH-CCS
SH281CCS\1.DWG
12-06-2009
SPAC
Bartoli
FOGLIO 8
SEGUE 9
ULTIMO 16
R0.3 Aggiornato coll. pompa pg4 14/09/2001
R0.2 Aggiunta optional inverter pg4, 6, 7, 9, 11. 24/02/2011
R0.1 Aggiunta numerazione cavo alimentazione Pg3, 11 24/01/2011
MODIFICA DATA FIRME


TAD1
TARGA FRONTALE
FRONTAL PLATE
-QD1
QUADRO (CARPENTERIA)
BOARD (CARPENTRY)
-S4
-V1
-RP1(*2)
-S24
(*1)
-S50
-BR1
BARRA OMEGA
OMEGA RAIL
-K0
-Q0
-K1
-T1
-K01 (*2)
-F5
-F4
-F3
-F2
-F1
ACC
10.8
-FL1
FILO 0,5mmq
WIRE 0,5mmq
-FL2
FILO 1,5mmq
WIRE 1,5mmq
-PT1
PUNTALINO 0,5mmq
TERMINAL 0,5mmq
-PT3
PUNTALINO 1,5mmq
TERMINAL 1,5mmq
-CC1
CAPICORDA 1,5mmq
TERMINAL 1,5mmQ
-CC2
CAPICORDA 2,5mmq
TERMINAL 2,5mmQ
-NM1
NUMERAZIONE FILI
WIRE NUMERATION
-NM2
NUMERAZIONE MORSETTI
TERMINAL NUMERATION
-CG1
GIUNTO 2,5mmq
TERMINAL 2,5mmq
-FS1
FASCETTA 135x2,5
CLAMP 135x2,5
-GU1
GUARNIZIONE AERSTOP
SEAL AERSTOP
-TF1
TARGA SOSTITUZIONE FUSIBILI
PLATE SUBSTITUTION FUSES
-TF2
TARGA CAVO ALIMENTAZIONE
PLATE POWER SUPPLY CABLE
(*1) SOLO CON OPTIONAL CCS
ONLY WITH OPTIONAL CCS
(*2) SOLO CON OPTIONAL INVERTER
ONLY WITH OPTIONAL INVERTER
REV.
R0.3
R0.2
R0.1
Aggiornato coll. pompa pg4
Aggiunta optional inverter pg4, 6, 7, 9, 11,
Aggiunta numerazione cavo alimentazione Pg3, 11
MODIFICA
DATA
14/09/2001
24/02/2011
24/01/2011
FIRME
Bartoli
Bartoli
Bartoli
Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009
Impianto
SH281 - CCS
Denominazione
INTERNO QUADRO
BOARD INSIDE
Ordine
Commessa
Esecutore
Bartoli
FOGLIO 9
SEGUE 10
ULTIMO 16


LATO BORDO MACCHINA
OUT BOARD SIDE MACHINE
LATO QUADRO
PANEL SIDE
ACC
9.8
-GH1
PG13,5
-PC1
-W1: CAVO ALIMENTAZIONE
-W1: POWER SUPPLY CABLE
-GH2
-PC2
-W4: MOTORE POMPA
-W4: MOTOR PUMP CABLE
-GH4
-RE2
PG13,5/Φ18
-GH5
-RE4
ACC
11.8
-GH3
-RE1
-CR1
Φ18 x 600 mm
FILI MOTORE LAMA
BLADE MOTOR WIRE
-RE3
-CR2
Φ18 x 650 mm
-W52: CAVO PULSANTE IMPUGNATURA
-W52: HANDLE PUSH BUTTON CABLE
-W67: CAVO PRESSOSTATO LAMA
-W67: BLADE PRESSURE SWITCH CABLE
-W55: CAVO F.C. PROTEZIONE LAMA
-W55: CARTER BLADE L.S. CABLE
REV.
MODIFICA
DATA
FIRME
R0.3 Aggiornato coll. pompa pg4 14/09/2001 Bartoli
R0.2 Aggiunta optional inverter pg4, 6, 7, 9, 11. 24/02/2011 Bartoli
R0.1 Aggiunta numerazione cavo alimentazione Pg3, 11 24/01/2011 Bartoli
Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009
Impianto
SH281 - CCS
Denominazione
GUAINE E ACCESSORI
SHEATHS AND ACCESSORIES
Ordine
Commessa
Esecutore Bartoli
FOGLIO 10
SEGUE 11
ULTIMO 16


LATO BORDO MACCHINA
OUT BOARD SIDE MACHINE
LATO QUADRO
BOX SIDE
LATO SCATOLA INVERTER
INVERTER BOX SIDE
LATO ARCHETTO
BOW SIDE
-W65: CAVO E.V. BLOCCO TESTA
-W65: STOP HEAD S.V. CABLE
-W75: CAVO F.C. ARCHETTO BASSO
-W75: BOW LOVW L.S. CABLE
-W55: CAVO F.C. PROTEZIONE LAMA
-W55: CARTER BLADE L.S. CABLE
-W11: CAVO ALIMENTAZIONE INVERTER
-W11: INVERTER POWER SUPPLY CABLE
-W12: CAVO MOTORE LAMA
-W12: BLADE MOTOR CABLE
-W38: CAVO AUSILIARI INVERTER
-W38: AUXILIARY INVERTER CABLE
-PC3
-PC4
-PC5
-CR3
Ø29 x 2600 mm
-GH6
-GH7
-GH8
-GH9
-RE5
-RE6
-RD1
PG13,5
PG29
PG29/Ø35
PG13,5 - M20
ACC
10.9
5
6
7
(*1)
(*2)
F.C. PROTEZIONE LAMA
L.S. BLADE GUARD
(*1) SOLO CON OPTIONAL CCS
ONLY WITH OPTIONAL CCS
(*2) SOLO CON OPTIONAL INVERTER
ONLY WITH OPTIONAL INVERTER
REV.
MODIFICA
DATA
FIRME
R0.3 Aggiornato coll. pompa pg4 14/09/2001 Bartoli
R0.2 Aggiunta optional inverter pg4, 6, 7, 9, 11, 24/02/2011 Bartoli
R0.1 Aggiunta numerazione cavo alimentazione Pg3, 11 24/01/2011 Bartoli
Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009
Impianto
SH281 - CCS
Denominazione
GUAINE E ACCESSORI
SHEATHS AND ACCESSORIES
Ordine
Commessa
Esecutore Bartoli
FOGLIO 11
SEGUE 12
ULTIMO 16



# CAVI ESTERNI \ EXTERNAL CABLES

| QUADRO \ BOARD | | | | | | | | DESTINAZIONE \ LOCATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| QUADRO BOARD | FOGLIO SHEET | NR. MORSETTO TERMINAL NO. | NR. FILO CONDUCTOR NO. | ID SUL CAVO ID IN CABLE | CAVO CABLE | LUNGHEZZA LENGHT [ mt ] | DISTURBO NOISE LEVEL | ID SUL CAVO ID IN CABLE | NR. FILO CONDUCTOR NO. | NR. MORSETTO TERMINAL NO. | FOGLIO SHEET | QUADRO BOARD |
| =QgCv -S50 | 4/4 | U1 | 23 | BK1 | -W1 022.0154 7G1.5 | 3,00 | | BK1 | 23 | W1 | 4/5 | =BmMep -M1 |
| =QgCv -S50 | 4/4 | V1 | 25 | BK2 | | | | BK2 | 25 | V1 | 4/5 | =BmMep -M1 |
| =QgCv -S50 | 4/4 | W1 | 27 | BK3 | | | | BK3 | 27 | U1 | 4/5 | =BmMep -M1 |
| =QgCv -S50 | 4/4 | V2 | 24 | BK4 | | | | BK4 | 24 | U2 | 4/5 | =BmMep -M1 |
| =QgCv -S50 | 4/4 | U2 | 26 | BK5 | | | | BK5 | 26 | V2 | 4/5 | =BmMep -M1 |
| =QgCv -S50 | 4/4 | W2 | 28 | BK6 | | | | BK6 | 28 | W2 | 4/5 | =BmMep -M1 |
| =BmCv PIASTRA | 4/5 | 1_1 O | PE | GNYE | Cavo motore lama | | | GNYE | PE | | 4/5 | =BmMep -M1 |
| =QgCv -XQGFU | 4/1 | -F3 O | 5 | BK | -W11 022.0152 4G1.5 | 4,00 Mt | | BK | 5 | L1 | 4/7 | =QgCvOpln -U1 |
| =QgCv -XQGFU | 4/1 | -F4 O | 6 | BN | | | | BN | 6 | L2 | 4/7 | =QgCvOpln -U1 |
| =QgCv -K1 | 4/4 | | 7 | GY | | | | GY | 7 | L3 | 4/7 | =QgCvOpln -U1 |
| =QgCv PIASTRA | 4/7 | 1_3 O | PE | GNYE | Cavo alimentazione inverter | | | GNYE | PE | PE | 4/7 | =QgCvOpln -U1 |
| =QgCv -S50 | 4/4 | T | 18 | BK | -W12 022.0152 4G1.5 | 4,00 Mt | | BK | 18 | U | 4/7 | =QgCvOpln -U1 |
| =QgCv -S50 | 4/4 | S | 19 | BN | | | | BN | 19 | V | 4/7 | =QgCvOpln -U1 |
| =QgCv -S50 | 4/4 | R | 20 | GY | | | | GY | 20 | W | 4/7 | =QgCvOpln -U1 |
| | | | | GNYE | Cavo motore lama inverter | | | GNYE | | | | |
| =QgCv | 7/6 | B2 | 91 | BN | -W38 022.0159 8x0.5 | 4,00 Mt | | BN | 91 | 14 | 7/8 | =QgCvOpln -K01 |
| =QgCv | 7/6 | B4 | 90 | GY | | | | GY | 90 | 11 | 7/8 | =QgCvOpln -K01 |
| | | | | BU | | | | BU | | | | |
| =QgCv | 7/6 | A2 | 115 | GN | | | | GN | 115 | 2 | 7/9 | =QgCvOpln -RP1 |
| | | | | RD | Cavo ausiliari inverter | | | RD | | | | |
| =QgCv | 7/6 | 0V | 116 | YE | | | | YE | 116 | 1 | 7/9 | =QgCvOpln -RP1 |
| =QgCv | 7/6 | 10V | 114 | WH | | | | WH | 114 | 3 | 7/9 | =QgCvOpln -RP1 |
| | | | | PK | | | | PK | | | | |
| =QgCv -XQGFU | 4/1 | -F3 O | 018 | BN | -W4 022.1904 3G0.75 | 4,00 | | BN | 018 | 4.00 | 4/1 | =BmMep -M2 |
| =QgCv -XQGFU | 4/1 | -F4 O | 019 | BU | | | | BU | 019 | 0 | 4/1 | =BmMep -M2 |
| =QgCv PIASTRA | 4/2 | 1_2 O | PE | GNYE | Cavo motore pompa | | | GNYE | PE | PE | 4/2 | =BmMep -M2 |
| =QgCv -K1 | 6/4 | A1 | 41 | BN | -W52 022.0160 2x0.5 | 2,50 Mt | | BN | 41 | 1 | 6/5 | =BmMep -S15 |
| =QgCv -XQG2 | 6/6 | M O | 041 | BU | Colleg. pulsante impugnatura | | | BU | 041 | 3 | 6/5 | =BmMep -S15 |

| REV. | | | |
|---|---|---|---|
| R0.3 | Aggiornato coll. pompa pg4 | 14/09/2001 | Bartoli |
| R0.2 | Aggiunta optional inverter pg4, 6, 7, 9, 11. | 24/02/2011 | Bartoli |
| R0.1 | Aggiunta numerazione cavo alimentazione Pg3, 11 | 24/01/2011 | Bartoli |
| | MODIFICA | DATA | FIRME |

Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009

Impianto
SH281 - CCS
Denominazione
RIASSUNTIVO CAVI
CABLE SUMMARY

Ordine
Commessa
Esecutore Bartoli

FOGLIO 12
SEGUE 13
ULTIMO 16

# CAVI ESTERNI \ EXTERNAL CABLES

| QUADRO \ BOARD | | | | | | | | DESTINAZIONE \ LOCATION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| QUADRO BOARD | FOGLIO SHEET | NR. MORSETTO TERMINAL NO. | NR. FILO CONDUCTOR NO. | ID SUL CAVO ID IN CABLE | CAVO CABLE | LUNGHEZZA LENGHT ( mt ) | DISTURBO NOISE LEVEL | ID SUL CAVO ID IN CABLE | NR. FILO CONDUCTOR NO. | NR. MORSETTO TERMINAL NO. | FOGLIO SHEET | QUADRO BOARD |
| =QgCv -XQG2 | 6/8 | L | 37 | BN | -W55 022.0160 2x0.5 | 2,80 Mt | | BN | 37 | 22 | 6/7 | =BmMep -S8 |
| =QgCv -XQG2 | 6/7 | O | 037 | BU | Colleg. FC carter lama | | | BU | 037 | 21 | 6/7 | =BmMep -S8 |
| | 6/3 | 2 | 42 | BN | -W65 022.0160 2x0.5 | 1,00 Mt | | BN | 42 | ⟵ 1 | 6/2 | =BmCv -XPV |
| =QgCv -T1 | 5/2 | 19 | 22 | BU | Colleg. valvola blocco | | | BU | 22 | ⟵ 2 | 6/2 | =BmCv -XPV |
| =QgCv -XQG2 | 6/6 | M | 38 | BN | -W67 022.0160 2x0.5 | 2,50 Mt | | BN | 38 | | 6/6 | =BmMep -S25 |
| =QgCv -XQG2 | 6/7 | O | 038 | BU | Colleg. pressostato tensioname | | | BU | 038 | | 6/6 | =BmMep -S25 |
| =QgCv -XQG2 | 6/0 | K | 0 | BN | -W74 CAVO PROPRIO V1 2x0.5 | 0,50 Mt | | BN | 0 | RD | 6/0 | =QgCv -V1 |
| =QgCv -T1 | 5/2 | 19 | 22 | BU | Colleg. presenza tensione | | | BU | 22 | BK | 6/0 | =QgCv -V1 |
| =QgCv -XQG2 | 6/8 | L | 36 | BK | -W75 CAVO FINECORSA 4x0.75 | 1,50 Mt | | BK | 36 | BK | 6/8 | =BmCvCcs -S28 |
| =QgCv -XQG2 | 6/2 | I | 35 | RD | Colleg. FCTA | | | RD | 35 | RD | 6/8 | =BmCvCcs -S28 |
| | | | | WH | | | | WH | | | | |
| | | | | GN | | | | GN | | | | |
| =QgCv -AL | 3/2 | L1 | L1 | BN or 1 | -WAL 022.0158 5G1.5 | 3.00 Mt | | BN or 1 | L1 | 5 | 3/2 | =QgCv -Q0 |
| =QgCv -AL | 3/2 | L2 | L2 | BK or 2 | Cavo alimentazione | | | BK or 2 | L2 | 3 | 3/2 | =QgCv -Q0 |
| =QgCv -AL | 3/2 | L3 | L3 | BU or 3 | | | | BU or 3 | L3 | 1 | 3/2 | =QgCv -Q0 |
| =QgCv -AL | 3/2 | N | N | GY or 4 | | | | GY or 4 | N | ○ PE | 3/2 | =QgCv -AL |
| =QgCv -AL | 3/2 | PE | PE | GNYE | | | | GNYE | PE | ○ PE | 3/2 | =QgCv -AL |

| REV. | MODIFICA | DATA | FIRME |
|---|---|---|---|
| R0.3 | Aggiornato coll. pompa pg.4 | 14/09/2001 | Bartoli |
| R0.2 | Aggiunta optiional inverter pg.4, 6, 7, 9, 11, | 24/02/2011 | Bartoli |
| R0.1 | Aggiunta numerazione cavo alimentazione Pg3, 11 | 24/01/2011 | Bartoli |

Dis. N. SH–CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12–06–2009

Impianto: SH281 – CCS
Denominazione: RIASSUNTIVO CAVI / CABLE SUMMARY
Ordine:
Commessa:
Esecutore: Bartoli

FOGLIO 13
SEGUE 14
ULTIMO 16

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|

| NOME/ITEM | TIPO/TYPE | DESCRIZIONE/DESCRIPTION | COSTRUTTORE/MARKE | QUADRO/BOARD | FG/SH | Q.TA/Q.TY |
|---|---|---|---|---|---|---|
| '-CR1 | '022.2602 | Guaina POLIFLEX NW 14-1200143 (corrugato diam. 18) | Mep | '=BmCv | 10 | 0,6 |
| '-CR2 | '022.2602 | Guaina POLIFLEX NW 14-1200143 (corrugato diam. 18) | Mep | '=BmCv | 10 | 0,65 |
| '-GH1 | '022.0244 | Dado grigio PG13,5 | Mep | '=BmCv | 10 | 1 |
| '-GH2 | '022.0244 | Dado grigio PG13,5 | Mep | '=BmCv | 10 | 1 |
| '-GH3 | '022.0244 | Dado grigio PG13,5 | Mep | '=BmCv | 10 | 1 |
| '-GH4 | '022.0244 | Dado grigio PG13,5 | Mep | '=BmCv | 10 | 1 |
| '-GH5 | '022.0244 | Dado grigio PG13,5 | Mep | '=BmCv | 10 | 1 |
| '-PC1 | '022.0234 | Pressacordone 3246 nero PG13,5 | Mep | '=BmCv | 10 | 1 |
| '-PC2 | '022.0234 | Pressacordone 3246 nero PG13,5 | Mep | '=BmCv | 10 | 1 |
| '-QD1 | '016.0708 | Quadro comandi TI 260-280 LVD | Mep | '=BmCv | 9 | 1 |
| '-RE1 | '022.0211 | Raccordo rapido dritto SEM PG13,5/Ø19 | Mep | '=BmCv | 10 | 1 |
| '-RE2 | '022.0211 | Raccordo rapido dritto SEM PG13,5/Ø19 | Mep | '=BmCv | 10 | 1 |
| '-RE3 | '022.0211 | Raccordo rapido dritto SEM PG13,5/Ø19 | Mep | '=BmCv | 10 | 1 |
| '-RE4 | '022.0211 | Raccordo rapido dritto SEM PG13,5/Ø19 | Mep | '=BmCv | 10 | 1 |
| '-XPV | '022.0369 | Connettore 3 poli per tensionatore elettronico | Mep | '=BmCv | | 1 |
| PIASTRA | '022.0377 | Morsetto PE da 2.5 mm singolo per 2 fili a molla WK4 SLU | Mep | '=BmCv | | 1 |
| '-K40 | V.d.P. | Vedi distinta pneumatica | Mep | '=BmCvCcs | 6 | 1 |
| '-S28 | '022.0506 | Finecorsa D4C-1901 2M ALIM. AX-AXI | Mep | '=BmCvCcs | 6 | 1 |
| '-M1 | '019.1706 | Motore KW 1,5/1,87 2/4P B14 FC90L V400.50 | Mep | '=BmMep | 4 | 1 |
| '-M2 | '028.0271 | Elettropompa EZ/C monofase SAP SA FH2 230/400V 50/60Hz | Mep | '=BmMep | 4 | 1 |
| '-PC5 | '022.0234 | Pressacordone 3246 nero PG13,5 | Mep | '=BmMep | 11 | 1 |
| '-RD1 | '022.0349 | Riduzione M/F M20/PG13,5 | Mep | '=BmMep | 11 | 1 |
| '-S8 | '022.0037 | Finecorsa di sicurezza con chiave 1NO + 1NC | Mep | '=BmMep | 6 | 1 |
| '-S15 | '010.0928 | Molla per impugnatura MEP dis.1189559 | Mep | '=BmMep | 6 | 1 |
| '-S15 | '022.0515 | Microinteruttore V-21-1C6 | Mep | '=BmMep | 6 | 1 |
| '-S15 | '025.0691 | Serie guernizioni per impugnatura | Mep | '=BmMep | 6 | 1 |
| '-S15 | '034.1221 | Impugnatura MEP | Mep | '=BmMep | 6 | 1 |
| '-S25 | '043.0142 | Pressostato idraulico montag. linea 20-50bar | Mep | '=BmMep | 6 | 1 |
| '-BR1 | '022.0900 | Barra omega | Mep | '=QgCv | 9 | 1 |
| '-CC1 | '022.0308 | Terminale a occhiello Ø5 da 1,5mmq (Rosso) | Mep | '=QgCv | 9 | 3 |
| '-CC2 | '022.0303 | Terminale a occhiello Ø8 da 2,5mmq (Blu) | Mep | '=QgCv | 9 | 1 |

| REV. | MODIFICA | DATA | FIRME |
|---|---|---|---|
| R0.3 | Aggiornato coll. pompa pg.4 | 14/09/2001 | Bartoli |
| R0.2 | Aggiunta optiional inverter pg.4, 6, 7, 9, 11, | 24/02/2011 | Bartoli |
| R0.1 | Aggiunta numerazione cavo alimentazione Pg3, 11 | 24/01/2011 | Bartoli |

Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009

Impianto: SH281 - CCS
Denominazione: DISTINTA MATERIALI / MATERIAL LIST

Ordine
Commessa
Esecutore: Bartoli

FOGLIO 14
SEGUE 15
ULTIMO 16

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|

| NOME/ITEM | TIPO/TYPE | DESCRIZIONE/DESCRIPTION | COSTRUTTORE/MARKE | QUADRO/BOARD | FG/SH | Q.TA/Q.TY |
|---|---|---|---|---|---|---|
| '-CG1 | '022.0297 | Terminale a giunto da 2,5mmq (Blu) | Mep | '=QgCv | 9 | 1 |
| '-FL1 | '022.0171 | Cordicella unipolare 1 X 0,5 | Mep | '=QgCv | 9 | 1,5 |
| '-FL2 | '022.0172 | Cordicella unipolare 1x1,50 | Mep | '=QgCv | 9 | 8,5 |
| '-FS1 | '019.5353 | Fascetta in plastica 135x2,5 | Mep | '=QgCv | 9 | 30 |
| '-GU1 | '025.0604 | Guarnizione aerstop | Mep | '=QgCv | 9 | 1 |
| '-K0 | '022.0626 | Bobina minima V380-400 50 /440-460 60 EP107.5.UA1-400 ABB | Mep | '=QgCv | 3 | 1 |
| '-K1 | '022.0087 | Contattore 3TF3010-0AC2 (24 V. 50.60 HZ) | Mep | '=QgCv | 6 | 1 |
| '-NM1 | '022.0290 | Etichetta segnafilo | Mep | '=QgCv | 9 | 115 |
| '-NM2 | '022.0290 | Etichetta per morsettiera | Mep | '=QgCv | 9 | 12 |
| '-PT1 | '022.0311 | Terminale a puntale da 0,5mmq (Bianco) | Mep | '=QgCv | 9 | 10 |
| '-PT3 | '022.0312 | Terminale a puntale da 1,5mmq (Nero) | Mep | '=QgCv | 9 | 44 |
| '-Q0 | '022.1264 | Magnetotermico 6,3-10A EP-090 3-MS116-10 ABB | Mep | '=QgCv | 3 | 1 |
| '-Q0 | '022.0118 | Blocco porta luch. EP898 9-OHY2AJM +EO 0714-OXS5X85+EP 894 8 - ADAT ABB | Mep | '=QgCv | 3 | 1 |
| '-QD1 | '016.0708 | Quadro comandi TI 260-280 LVD | Mep | '=QgCv | 9 | 1 |
| '-S4 | '022.1244 | Emergenza RT065RV40 Breter | Mep | '=QgCv | 3 | 1 |
| '-S50 | '022.0023 | Selettore 2 velocita 16A SC 40871 | Mep | '=QgCv | 4 | 1 |
| '-T1 | '022.0453 | Trasformatore 100VA V.230-400 S0.24 50/60Hz | Mep | '=QgCv | 5 | 1 |
| '-TF1 | '031.2622 | Targa sostituzione fusibili | Mep | '=QgCv | 9 | 1 |
| '-TF2 | '031.2648 | Targa cavo alimentazione 5 fili | Mep | '=QgCv | 9 | 1 |
| '-V1 | '022.0862 | Scheda mono led 24V Ø8 | Mep | '=QgCv | 6 | 1 |
| '-W74 | §2x0.5 | Fili propri di V1 | MEP | '=QgCv | 6 | 0.50 |
| '-WAL | 022.0158§5G1.5 | Cavo 5x1,5mmq | MEP | '=QgCv | 3 | 3.00 |
| -W1 | 022.0154§7G1.5 | Cavo 7x1,5mmq | MEP | '=QgCv | 4 | 3.00 |
| -W4 | 022.1904§3G0,75 | Cavo 3x0,75mmq | MEP | '=QgCv | 3 | 4.00 |
| -W52 | 022.0160§2x0.5 | Cavo 2x0,5mmq | MEP | '=QgCv | 3 | 2.50 |
| -W55 | 022.0160§2x0.5 | Cavo 2x0,5mmq | MEP | '=QgCv | 3 | 2,80 |
| -W65 | 022.0160§2x0.5 | Cavo 2x0,5mmq | MEP | '=QgCv | 3 | 1.00 |
| -W67 | 022.0160§2x0.5 | Cavo 2x0,5mmq | MEP | '=QgCv | 3 | 2,50 |
| TAD1 | '031.3328 | Targa frontale quadro SH260.280 LVD | Mep | '=QgCv | 9 | 1 |
| '-XQG2 | '022.2258 | Morsetto da 2.5 mm singolo per 4 fili a molla 56.703.5155.0 | Mep | '=QgCv | | 1 |
| '-XQG2 | '022.2257 | Morsetto da 2.5 mm singolo per 3 fili a molla 56.703.5055.0 | Mep | '=QgCv | | 3 |

| REV. | MODIFICA | DATA | FIRME |
|---|---|---|---|
| | | | |
| R0.3 | Aggiornato coll. pompa pg.4 | 14/09/2001 | Bartoli |
| R0.2 | Aggiunta optiional inverter pg.4, 6, 7, 9, 11, | 24/02/2011 | Bartoli |
| R0.1 | Aggiunta numerazione cavo alimentazione Pg3, 11 | 24/01/2011 | Bartoli |

Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009

Impianto: *SH281 - CCS*
Denominazione: DISTINTA MATERIALI / *MATERIAL LIST*
Ordine
Commessa
Esecutore: Bartoli

FOGLIO 15
SEGUE 16
ULTIMO 16

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|

| NOME/ITEM | TIPO/TYPE | DESCRIZIONE/DESCRIPTION | COSTRUTTORE/MARKE | QUADRO/BOARD | FG/SH | Q.TA/Q.TY |
|---|---|---|---|---|---|---|
| '-XQG2 | '022.2256 | Morsetto da 2.5 mm singolo per 2 fili a molla 56.703.0055.0 | Mep | '=QgCv | | 1 |
| '-XQG2 | '022.2288 | Piastra di chiusura x morsetto a 4 fili 07.312.7155.0 | Mep | '=QgCv | | 1 |
| '-XQG2 | '022.2287 | Piastra di chiusura x morsetto a 3 fili 07.312.6955.0 | Mep | '=QgCv | | 1 |
| '-XQGFU | 022.2246 + 022.1128 + 022.1128 | Morsetto portafusibile 5x20 a molla + N° 2 fusibili da 500V 5A | Mep | '=QgCv | | 1 |
| '-XQGFU | 022.2260 + 022.1136 + 022.1136 | Morsetto portafusibile 6,3x32 a molla + N° 2 fusibili da 500V 5A | Mep | '=QgCv | | 4 |
| PIASTRA | '022.2321 | Barra da 15x15mm con 10 fori 6mm | Mep | '=QgCv | | 1 |
| '-GH6 | '022.0244 | Dado grigio PG13,5 | Mep | '=QgCvCcs | 11 | 1 |
| '-GH7 | '022.0244 | Dado grigio PG13,5 | Mep | '=QgCvCcs | 11 | 1 |
| '-PC3 | '022.0234 | Pressacordone 3246 nero PG13,5 | Mep | '=QgCvCcs | 11 | 1 |
| '-PC4 | '022.0234 | Pressacordone 3246 nero PG13,5 | Mep | '=QgCvCcs | 11 | 1 |
| '-S24 | '022.1226 | Selettore stabile 2 pos. M22-WKV cod.216874 + portacontatti M22-A cod 216374 | Mep | '=QgCvCcs | 6 | 1 |
| '-S24 | '022.0937 | Blocchetto NA M22-K10 cod. 216376 | Mep | '=QgCvCcs | 6 | 1 |
| '-S24 | '022.0937 | Blocchetto NA M22-K10 cod. 216376 | Mep | '=QgCvCcs | 6 | 1 |
| '-S24 | '022.0936 | Blocchetto NC M22-K01 cod. 216678 | Mep | '=QgCvCcs | 6 | 1 |
| '-S24 | '022.0936 | Blocchetto NC M22-K01 cod. 216678 | Mep | '=QgCvCcs | 6 | 1 |
| '-CR3 | '022.2604 | Guaina POLIFLEX NW 23-1200232 (corrugato diam. 29) | Mep | '=QgCvOpIn | 11 | 1 |
| '-GH8 | '022.0247 | Dado poliammide PG29 | Mep | '=QgCvOpIn | 11 | 1 |
| '-GH9 | '022.0247 | Dado poliammide PG29 | Mep | '=QgCvOpIn | 11 | 1 |
| '-K01 | 022.0994 + 022.2391 | Rele 24VAC - 2 contatti scambio + zoccolo | Mep | '=QgCvOpIn | 6 | 1 |
| '-QD2 | '016.1203 | Scatola metallica per Inverter | Mep | '=QgCvOpIn | 7 | 1 |
| '-RE5 | '022.0209 | Raccordo rapido dritto SEM PG29/Ø35 | Mep | '=QgCvOpIn | 11 | 1 |
| '-RE6 | '022.0209 | Raccordo rapido dritto SEM PG29/Ø35 | Mep | '=QgCvOpIn | 11 | 1 |
| '-RP1 | '022.0045 | Potenziometro 10K | Mep | '=QgCvOpIn | 7 | 1 |
| '-RP1 | '034.1166 | Manopola per comando potenziometro 22mm | Mep | '=QgCvOpIn | 7 | 1 |
| '-U1 | '022.0724 | Inverter KW3 SKC 03400300 completo di porta modbus V380-480.50.60 | Mep | '=QgCvOpIn | 4 | 1 |
| -W11 | 022.0152§4G1.5 | Cavo 4x1,5mmq | MEP | '=QgCvOpIn | 4 | 4.00 |
| -W12 | 022.0152§4G1.5 | Cavo 4x1,5mmq | MEP | '=QgCvOpIn | 4 | 4.00 |
| -W38 | 022.0159§8sh0.5 | Cavo schermato 8x0,5mmq | MEP | '=QgCvOpIn | 4 | 4.00 |

| REV. | MODIFICA | DATA | FIRME |
|---|---|---|---|
| | | | |
| | | | |
| R0.3 | Aggiornato coll. pompa pg.4 | 14/09/2001 | Bartoli |
| R0.2 | Aggiunta optiional inverter pg.4, 6, 7, 9, 11, | 24/02/2011 | Bartoli |
| R0.1 | Aggiunta numerazione cavo alimentazione Pg3, 11 | 24/01/2011 | Bartoli |

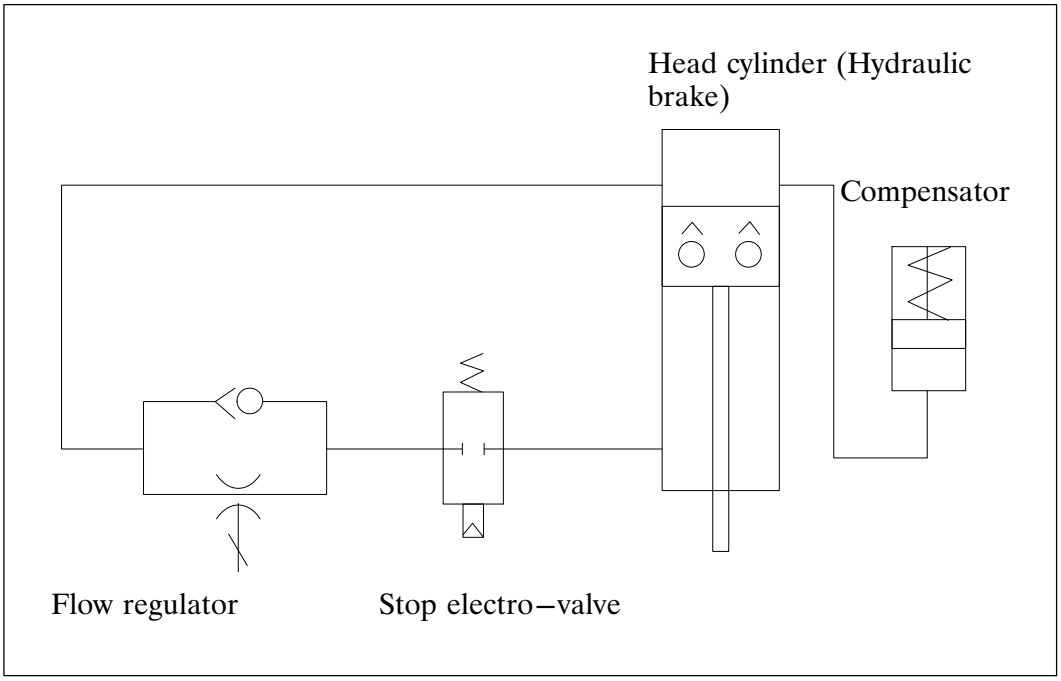
Dis. N. SH-CCS
CAD SPAC
File SH281CCS\1.DWG
Data 12-06-2009

Impianto: SH281 - CCS
Denominazione: DISTINTA MATERIALI / MATERIAL LIST

Ordine
Commessa
Esecutore: Bartoli

FOGLIO 16
SEGUE /
ULTIMO 16

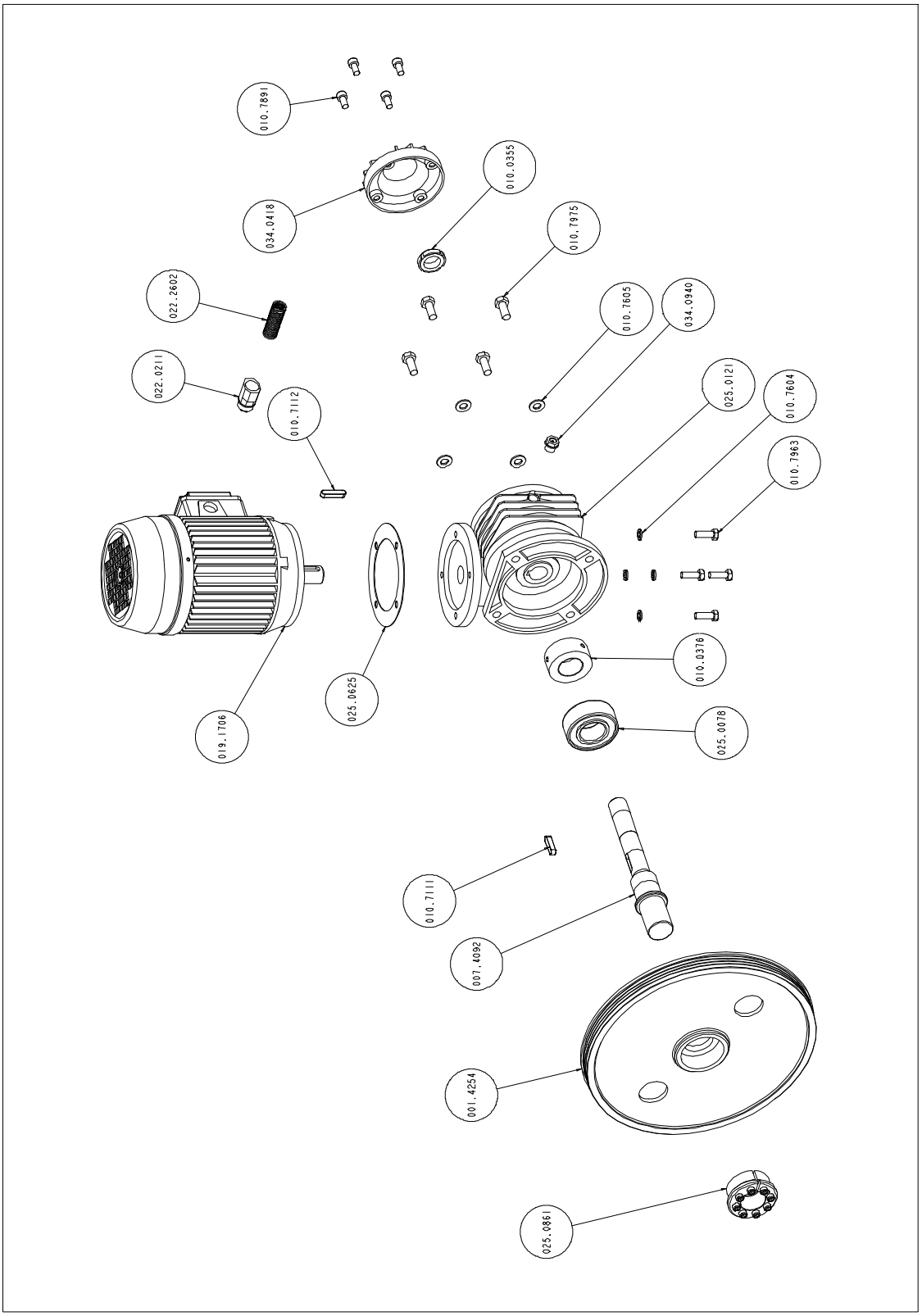
## Hydraulic circuit diagram (Cut Control System version)



# Exploded views

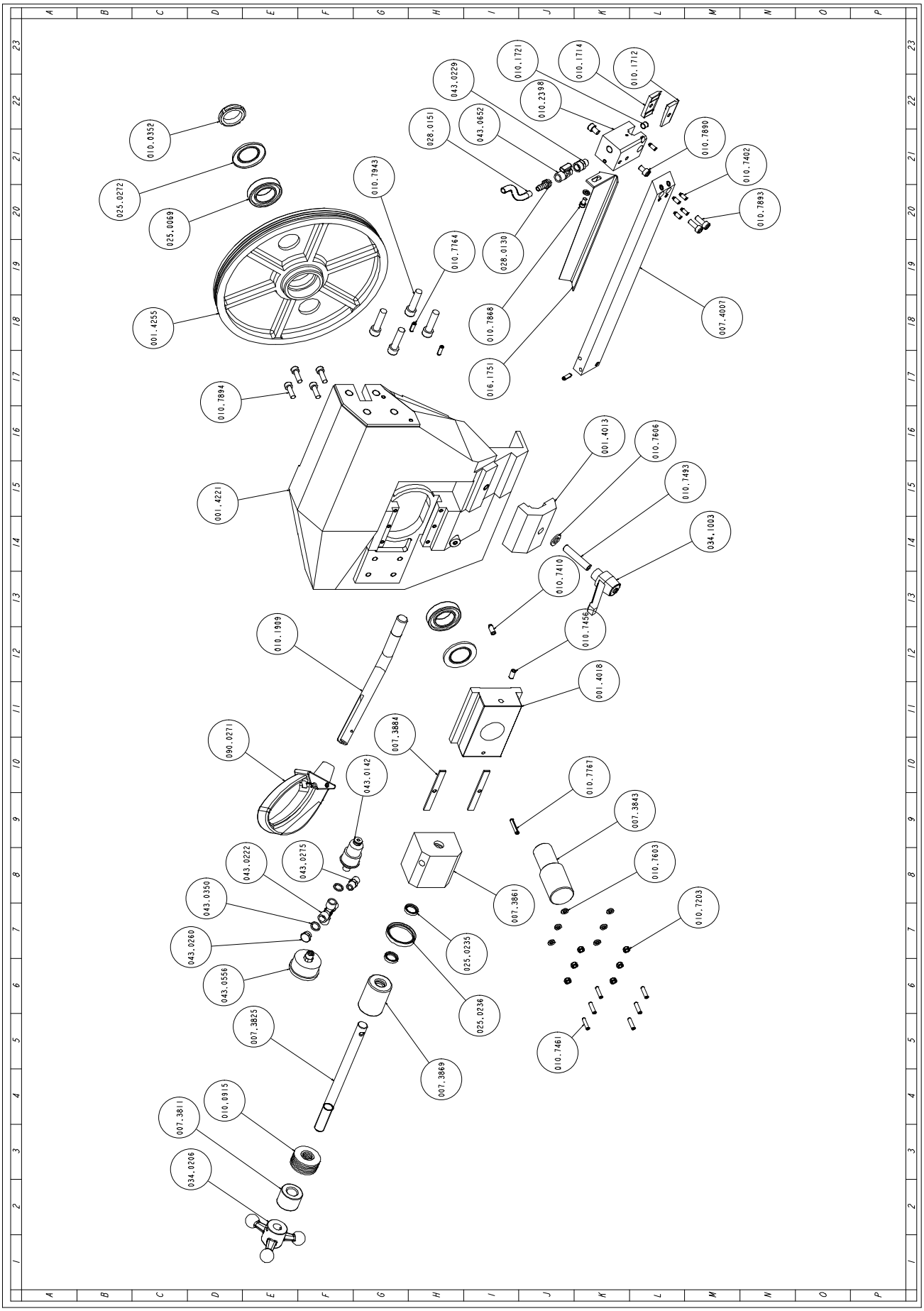
This part of the manual contains detailed exploded views of the machine which can help to gain a deeper knowledge of how it is made.

## Motor assembly



| Code | Description | Description | Quantity |
|---|---|---|---|
| 001.4254 | PULEGGIA MOTRICE | DRIVING PULLEY | 1,000 |
| 007.4092 | ALBERO RIDUTTORE CEMENTATO | HARDENED GEARBOX SHAFT | 1,000 |
| 010.0355 | GHIERA AUTOBLOCCANTE 25X1,5 | SELF–LOCKING RING NUT 25X1,5 | 1,000 |
| 010.0376 | GHIERA X ALBERO RIDUTTORE | GEARBOX SHAFT RING NUT | 1,000 |
| 010.7111 | CHIAVETTA 8 X 7 X 32 (010.7111) | 8 X 7 X 32 KEY | 1,000 |
| 010.7604 | RONDELLA 0 8 (010.7604) | 0 8 WASHER (010.7604) | 4,000 |
| 010.7605 | RONDELLA 0 10 (010.7605) | 0 10 WASHER (010.7605) | 4,000 |
| 010.7891 | VITE TCEI 8 X 16 (010.7891) | TCEI 8 X 16 SCREW (010.7891) | 4,000 |
| 010.7963 | VITE TE 8 X 25 (010.7963) | TE 8 X 25 SCREW (010.7963) | 4,000 |
| 010.7975 | VITE TE 10 X 25 (010.7975) | TE 10 X 25 SCREW (010.7975) | 4,000 |
| 022.0211 | RACCORDO RAPIDO SEM PG 13,5 | RAPID JOINT SEM PG 13,5 | 1,000 |
| 022.2602 | GUAINA POLIFLEX NW 14–1200143 | POLIFLEX COVERING NW 14–1200143 | 1,000 |
| 025.0078 | CUSCINETTO 3207A–2RS1TN9 | BEARING 3207A–2RS1TN9 | 1,000 |
| 025.0121 | RIDUTTORE MVF 63 FCO 1A38 90 B14 | GEARBOX MVF 63 FCO 1A38 90 B14 | 1,000 |
| 025.0625 | GUARNIZIONE MOTORE | MOTOR GASKET SH 310–320–330 | 1,000 |
| 025.0861 | CALETTATORE 0 35X60 | CONNECTOR 0 35X60 | 1,000 |
| 034.0418 | COPERCHIO RIDUTTORE | REDUCTOR COVER SH 260 | 1,000 |
| 034.0940 | TAPPO LIVELLO OLIO RIDUTTORE MVF 63 –C– | OIL LEVEL CAP | 1,000 |
| 019.1706 | HP 2/2,5 2/4P V.380 B14 FC90L | MOTOR HP 2/2,5 2/4P V.380 B14 FC90L | 1,000 |
| 010.7112 | CHIAVETTA 8 X 7 X 35 | 8 X 7 X 35 KEY | 1,000 |

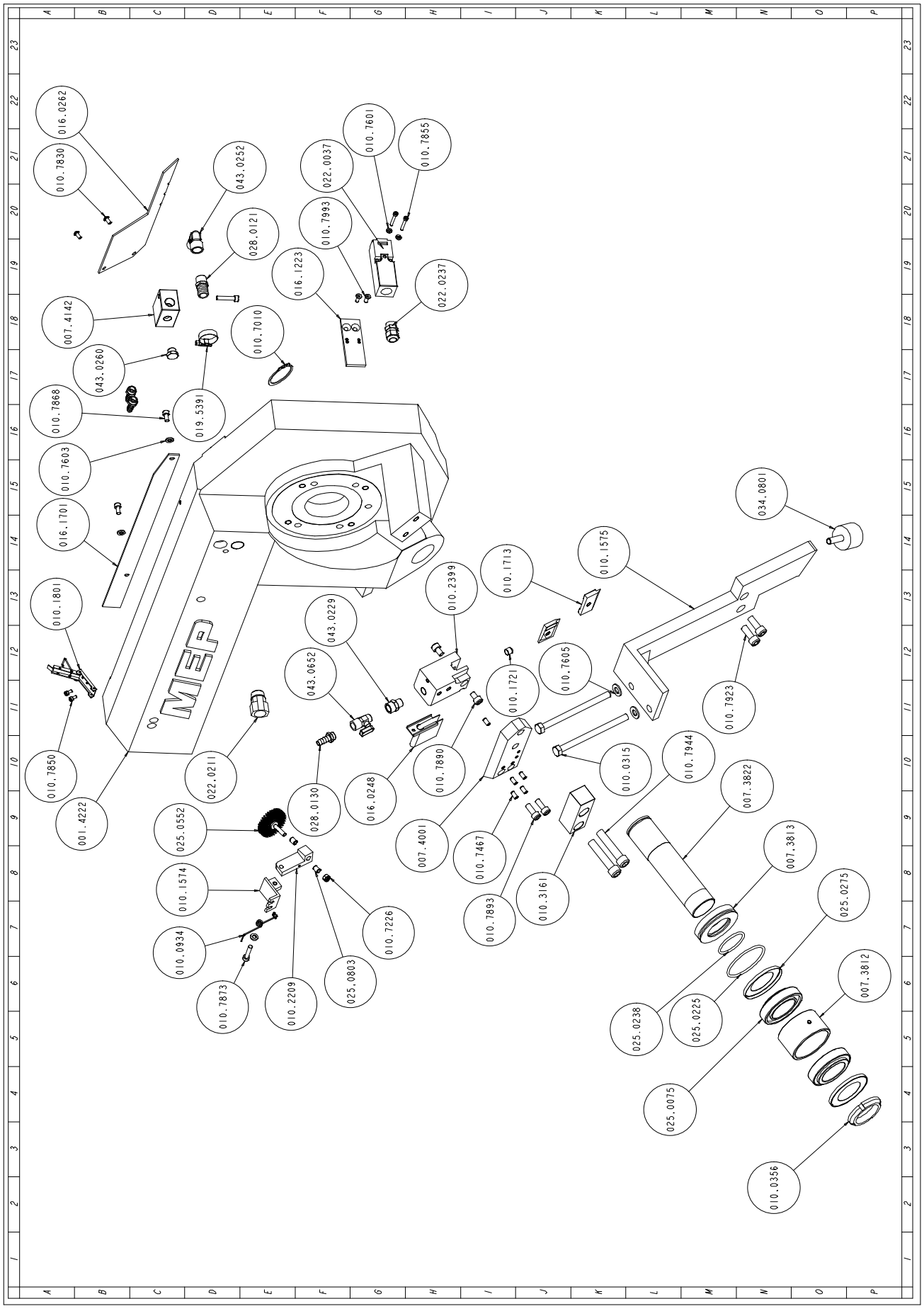
## Front flywheel assembly



| Code | Description | Description | Quantity |
|---|---|---|---|
| 001.4013 | STAFFA BLOCCAGGIO GUIDA TESTINA SHARK 280–282–292 | BRACKET SH 280–282–292 | 1,000 |
| 001.4018 | SLITTA TENDILAMA SH 260–280–282–292 | BAND TENSIONING SLIDE SH 260–280 | 1,000 |
| 001.4221 | ARCHETTO SEZIONE PULEGGIA FOLLE SH 280–282–292 | IDLER WHEEL BOW SH 280–282–292 | 1,000 |
| 001.4255 | PULEGGIA FOLLE SH 260–270–280–281282 292 | IDLER WHEEL SH 260–270–280 –281–282–292 | 1,000 |
| 007.3811 | DISTANZIALE VOLANTINO SH | WHEEL SPACER SH | 1,000 |
| 007.3825 | PERNO REGISTRO TENSIONAMENTO LAMA SH | BAND TENSION REGISTER PIN SHARK | 1,000 |
| 007.3843 | ALBERO VOLANO LIBERO SH N.T. | IDLER WHEEL SHAFT SH N.S. | 1,000 |
| 007.3861 | CILINDRO TENSIONAMENTO SH | TENSIONING CYLINDER SHARK | 1,000 |
| 007.3869 | PISTONE TENSIONAMENTO LAMA SH | BAND TENSIONING PISTON SH | 1,000 |
| 007.3884 | LARDONE SLITTA TENDILAMA SH 260–280 282–292 | BAND GUIDE SLIDE GIB SH 260–280 | 2,000 |
| 007.4007 | STAFFA TEST.GUIDALAMA ANTER.SH 282 MA–SX | FRONT GUIDE ARM FOR SHA 282 MA–SX | 1,000 |
| 010.0352 | GHIERA AUTOBLOCCANTE 35X1,5 CN–TI– SH–FC | SELF–LOCKING RING NUT 35X1,5 CN–TI–SH–FC | 1,000 |
| 010.0915 | MOLLA A TAZZA 50X18,4X3 SH | BELLEVILLE SPRING WASHERS 50X18,4X3 SH | 6,000 |
| 010.1712 | GUIDALAMA 1 INSERTO ANTERIORE SH260 | 1 INSERT FRONT BAND GUIDE SH 260 | 1,000 |
| 010.1714 | GUIDALAMA 2 INSERTI ANTERIORE SH260 | 2 INSERTS FRONT BAND GUIDE SH 260 | 1,000 |
| 010.1712 | GUIDALAMA 1 INSERTO ANTERIORE SH260 | 1 INSERT FRONT BAND GUIDE SH 260 | 1,000 |
| 010.1909 | LEVA COMANDO TESTA BT/NOT–AUS SH 260–280 | BT/NOT–AUS LEVER SH 260–280 | 1,000 |
| 010.2398 | TESTINA GUIDALAMA ANTERIORE SH 281– 282 | REAR HEAD BLADE GUIDE SH 281–282 | 1,000 |
| 010.7203 | DADO M6 | M6 SCREW NUT | 6,000 |
| 010.7402 | GRANO VCE P.CILINDRICA 6X12 | 6 X 12 CYLIND.POINT VCE GRUB SCREW | 5,000 |
| 010.7410 | GRANO VCE PUNTA CILINDRICA 8X16 | 8 X 16 CYLIND.POINT VCE GRUB SCREW | 1,000 |
| 010.7456 | GRANO VCE PUNTA CONICA 8 X 16 | 8 X 16 CONICAL POINT VCE GRUB SC-REW | 1,000 |
| 010.7461 | GRANO VCE PUNTA PIANA 6 X 25 | 6 X 25 FLAT POINT VCE GRUB SCREW | 6,000 |
| 010.7493 | GRANO VCE PUNTA PIANA 12 X 60 | 12 X 60 FLAT POINT VCE GRUB SCREW | 1,000 |
| 010.7603 | RONDELLA 0 6 | 0 6 WASHER | 7,000 |
| 010.7606 | RONDELLA 0 12 | 0 12 WASHER | 1,000 |
| 010.7764 | SPINA ELASTICA DIAM. 6 X 20 | ELASTIC PIN DIAM. 6 X 20 | 3,000 |
| 010.7767 | SPINA ELASTICA DIAM. 6 X 35 A SPIRALE | ELASTIC PIN DIAM. 6 X 35 | 1,000 |
| 010.7868 | VITE TCEI 6 X 12 | TCEI 6 X 12 SCREW | 1,000 |
| 010.7890 | VITE TCEI 8 X 12 | TCEI 8 X 12 SCREW | 2,000 |
| 010.7893 | VITE TCEI 8 X 20 | TCEI 8 X 20 SCREW | 2,000 |
| 010.7894 | VITE TCEI 8 X 25 | TCEI 8 X 25 SCREW | 4,000 |
| 010.7943 | VITE TCEI 12 X 45 | TCEI 12 X 45 SCREW | 4,000 |
| 016.1751 | PROTEZIONE LAMA ANTERIORE SH 280 VT 292–281–282 | FRONT BLADE COVER SHARK 292–OLD SH 280 | 1,000 |
| 025.0069 | CUSCINETTO 32007X | BEARING 32007X | 2,000 |
| 025.0235 | ANELLO TENUTA NI 150 18–25–4,5 | SEAL NI 150 18–25–4,5 | 2,000 |
| 025.0236 | ANELLO DI TENUTA NI 150 45–55–7 | SEAL NI 150 45–55–7 | 1,000 |
| 025.0272 | ANELLO DI PROTEZIONE NILOS 32007 | NILOS SEAL RING 32007 | 2,000 |
| 028.0130 | RACCORDO 1/4–9 CL 2601 | JOINT 1/4–9 CL 2601 | 1,000 |
| 028.0151 | TUBO PLASTIFICATO 07–11 | PLASTIC HOSE 07–11 | 1,000 |
| 034.0206 | VOLANTINO TENSIONAMENTO LAMA SH | BAND TENSIONING HANDWHEEL SH | 1,000 |
| 034.1003 | LEVA A SCATTO 12 MA | LEVER 12 MA | 1,000 |
| 043.0142 | PRESSOSTATO OLIO | OIL PRESSURE SWITCH | 1,000 |
| 043.0222 | RACCORDO A CROCE CL 2033 1/4 | CL 2033 1/4 CROSS JOINT | 1,000 |
| 043.0229 | RIDUZIONE MF 1/4 – CL 2520 | MF 1/4 – CL 2520 REDUCTION | 1,000 |
| 043.0260 | TAPPO TTE4 1/4 – CL 2611 | 1/4 TAP TTE4 | 1,000 |
| 043.0275 | NIPPLO CONICO A2–1/4 – CL 2500 | A2–1/4 – CL 2500 CONICAL NIPPLE | 1,000 |

| Code | Description | Description | Quantity |
|---|---|---|---|
| 043.0350 | GUARNIZIONE GFV 1/4 | GFV 1/4 GASKET | 2,000 |
| 043.0556 | MANOMETRO O50 0–100 X TENSIONAMENTO LAMA | MANOMETER 0 50 0–100 F.BAND TENSIONING | 1,000 |
| 043.0652 | RUBINETTO 1/4 F.M. | 1/4 F. M. TAP | 1,000 |
| 090.0271 | IMPUGNATURA COMPLETA TIPO MEP | COMPLETE MEP HANDLE | 1,000 |

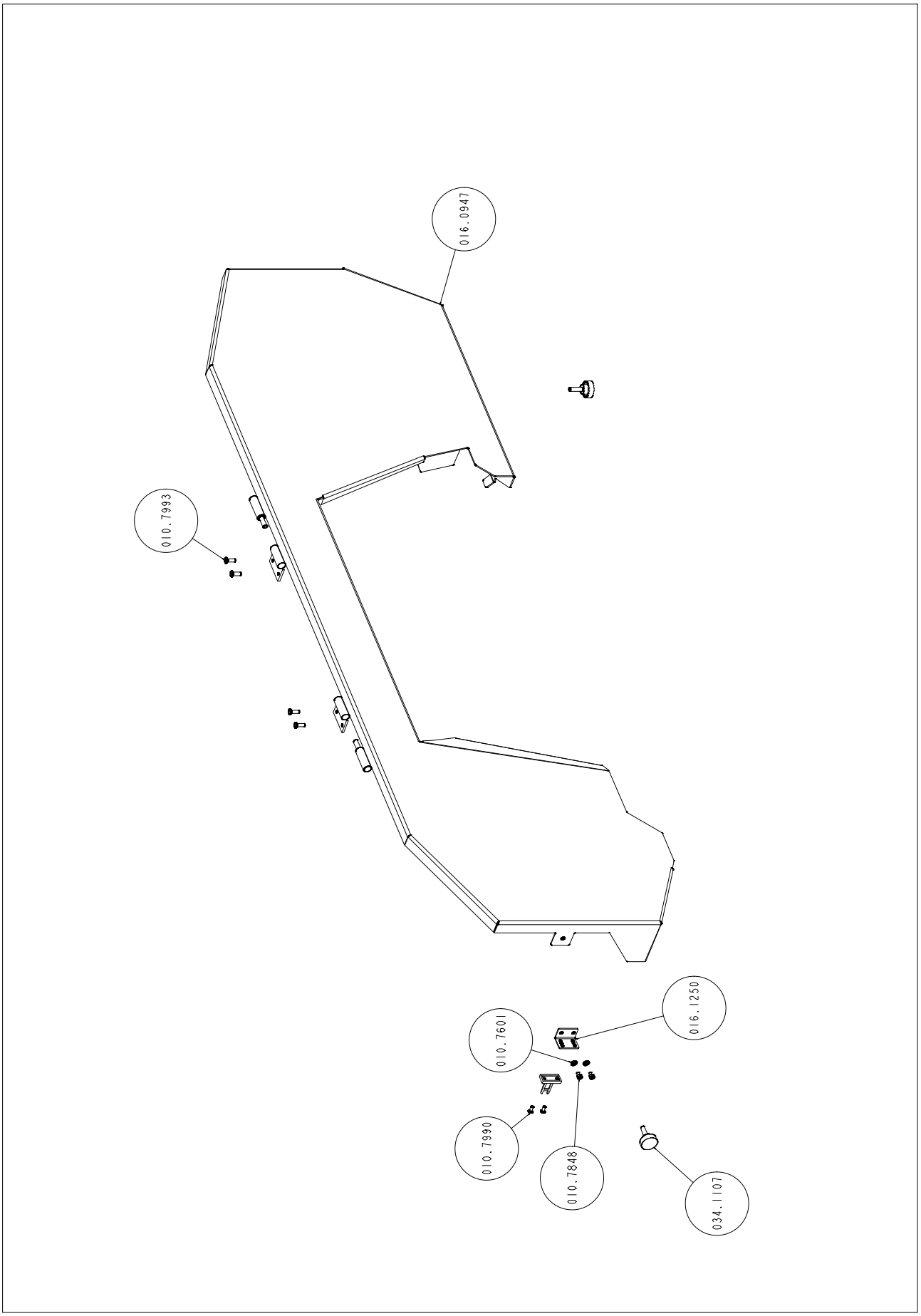
## Motor flywheel assembly



| Code | Description | Description | Quantity |
|---|---|---|---|
| 001.4222 | ARCHETTO SEZIONE PULEGGIA MOTRI-CERIDUTTORE SH 280/292/281 MOD. 1314 | MOTOR WHEEL BOW SH 280/292/281 MOD.1314 | 1,000 |
| 007.3812 | DISTANZIALE CUSCINETTO SNODO TE-STA SHARK | BEARING SPACER SHARK | 1,000 |
| 007.3813 | DISTANZIALE ARCHETTO SH | BOW SPACER SH | 1,000 |
| 007.3822 | PERNO SUPPORTO SNODO TESTA SH 260–280–282–292–320–332 | HEAD PIVOT SUPPORT PIN SH 260–280–320 | 1,000 |
| 007.4001 | STAFFA TESTINA GUIDALAMA POSTE-RIORE SH 281 SXI | REAR BAND GUIDE HEAD BRACKET SH 281 SX | 1,000 |
| 007.4142 | SQUADRETTO PER LIQUIDO SH 282–292– 320–330–332–H–14A | PLATE SH 320–330–H–14A | 1,000 |
| 010.0315 | VITE 8.8 TESTA ESAGONALE 10X140 TUTTOFILETTO ZINCATA 282–292–320–332 | SCREW 8.8 10X140 SH 320 | 1,000 |
| 010.0356 | GHIERA AUTOBLOCCANTE 45X1,5 SH | SELF–LOCKING RING NUT 45X1,5 SH | 1,000 |
| 010.0934 | MOLLA X PULILAMA SH N.T. | BAND BRUSHES SPRING SH N.T. | 1,000 |
| 010.1574 | STAFFA FIX SPAZZOLA PULILAMA SH 281 | CHIP BRUSH FIXING PLATE | 1,000 |
| 010.1575 | STAFFA AGGANCIO DOPPIA MOLLA SH 282 | DOUBLE SPRING HOOK BRACKET SH 282 | 1,000 |
| 010.1711 | GUIDALAMA 1 INSERTO POSTERIORE SH 260 | 1 INSERT REAR BAND GUIDE SH 260 | 1,000 |
| 010.1713 | GUIDALAMA 2 INSERTI POSTERIORE SH 260 | 2 INSERTS REAR BAND GUIDE SH 260 | 1,000 |
| 010.1721 | PREMILAMA SHARK | TOP CARBIDE SHARK | 1,000 |
| 010.1801 | CHIUSURA LEVA –D– ZINCATA SH | –D– ZINC LEVER CLOSURE SH | 1,000 |
| 010.2209 | PORTASPAZZOLA PULILAMA SH 280 NT SH 292–SH 281 | BAND BRUSH HOLDER SH 280 N.S.– SH 281 | 1,000 |
| 010.2399 | TESTINA GUIDALAMA POSTERIORE SH 281 282 | HINDER HEAD BLADE GUIDE SH 281–282 | 1,000 |
| 010.3161 | BATTUTA FINE CORSA TESTA SH 280–292 330 | BOW LIMIT SWITCH STOP SH 280–330 | 1,000 |
| 010.7010 | ANELLO SEEGER 0 45 (010.7010) | 0 45 SEEGER RING | 1,000 |
| 010.7226 | DADO AUTOBLOCCANTE M6 (010.7226) | M6 SELF–LOCKING SCREW NUT | 1,000 |
| 010.7467 | GRANO VCE PUNTA PIANA 6 X 12 (010.7467) | 6 X 12 FLAT POINT VCE GRUB SCREW | 5,000 |
| 010.7601 | RONDELLA 0 4 (010.7601) | 0 4 WASHER (010.7601) | 2,000 |
| 010.7603 | RONDELLA 0 6 (010.7603) | 0 6 WASHER (010.7603) | 3,000 |
| 010.7605 | RONDELLA 0 10 (010.7605) | 0 10 WASHER (010.7605) | 2,000 |
| 010.7830 | VITE BUTON 5 X 10 (010.7830) | 5 X 10 BUTON SCREW (010.7830) | 2,000 |
| 010.7850 | VITE TCEI 4 X 8 (010.7850) | TCEI 4 X 8 SCREW | 2,000 |
| 010.7855 | VITE TCEI 4 X 30 (010.7855) | TCEI 4 X 30 SCREW (010.7855) | 2,000 |
| 010.7868 | VITE TCEI 6 X 12 (010.7868) | TCEI 6 X 12 SCREW | 2,000 |
| 010.7873 | VITE TCEI 6 X 30 (010.7873) | TCEI 6 X 30 SCREW (010.7873) | 2,000 |
| 010.7890 | VITE TCEI 8 X 12 (010.7890) | TCEI 8 X 12 SCREW (010.7890) | 2,000 |
| 010.7893 | VITE TCEI 8 X 20 (010.7893) | TCEI 8 X 20 SCREW (010.7893) | 2,000 |
| 010.7923 | VITE TCEI 10 X 25 (010.7923) | TCEI 10 X 25 SCREW (010.7923) | 2,000 |
| 010.7944 | VITE TCEI 12 X 60 | TCEI 12 X 60 SCREW | 2,000 |
| 010.7993 | VITE TSPEI 5 X 12 (010.7993) | TSPEI 5 X 12 SCREW (010.7993) | 2,000 |
| 016.0248 | PROTEZIONE NASTRO SH 260 60–282 | BAND GUARD SH 260 60 | 1,000 |
| 016.0262 | PROTEZIONE LAMA POSTERIORE SH 281 | REAR BAND GUARD SH 281 | 1,000 |
| 016.1223 | PIASTRINO FIX INTERRUTTORE SICU-REZZAARCHETTO SH | BOW SAFETY SWITCH FIX PLATE SH | 1,000 |
| 016.1701 | PROTEZIONE CAVI SH 280 N.T.–282–292 | CABLES GUARD SH 280 N.S. | 1,000 |
| 019.5391 | FASCETTA MINUS GT 0 16X25 | MINUS GT CLAMP 16X25 | 1,000 |
| 022.0037 | INTERRUTTORE DI SICUREZZA FR 690 SH | FR 690 SH SAFETY SWITCH | 1,000 |
| 022.0211 | RACCORDO RAPIDO SEM PG 13,5 | RAPID JOINT SEM PG 13,5 | 1,000 |
| 022.0237 | PRESSACAVO PG 11 BS03 | CABLE PRESSER PG 11 BS03 | 1,000 |
| 025.0075 | CUSCINETTO 32009X | BEARING 32009X | 2,000 |
| 025.0225 | ANELLO TENUTA OR 171–68,26 | O RING 171–68,26 | 1,000 |
| 025.0238 | ANELLO DI TENUTA OR 149–44,45X3,53 | O RING 149–44,45X3,53 | 1,000 |

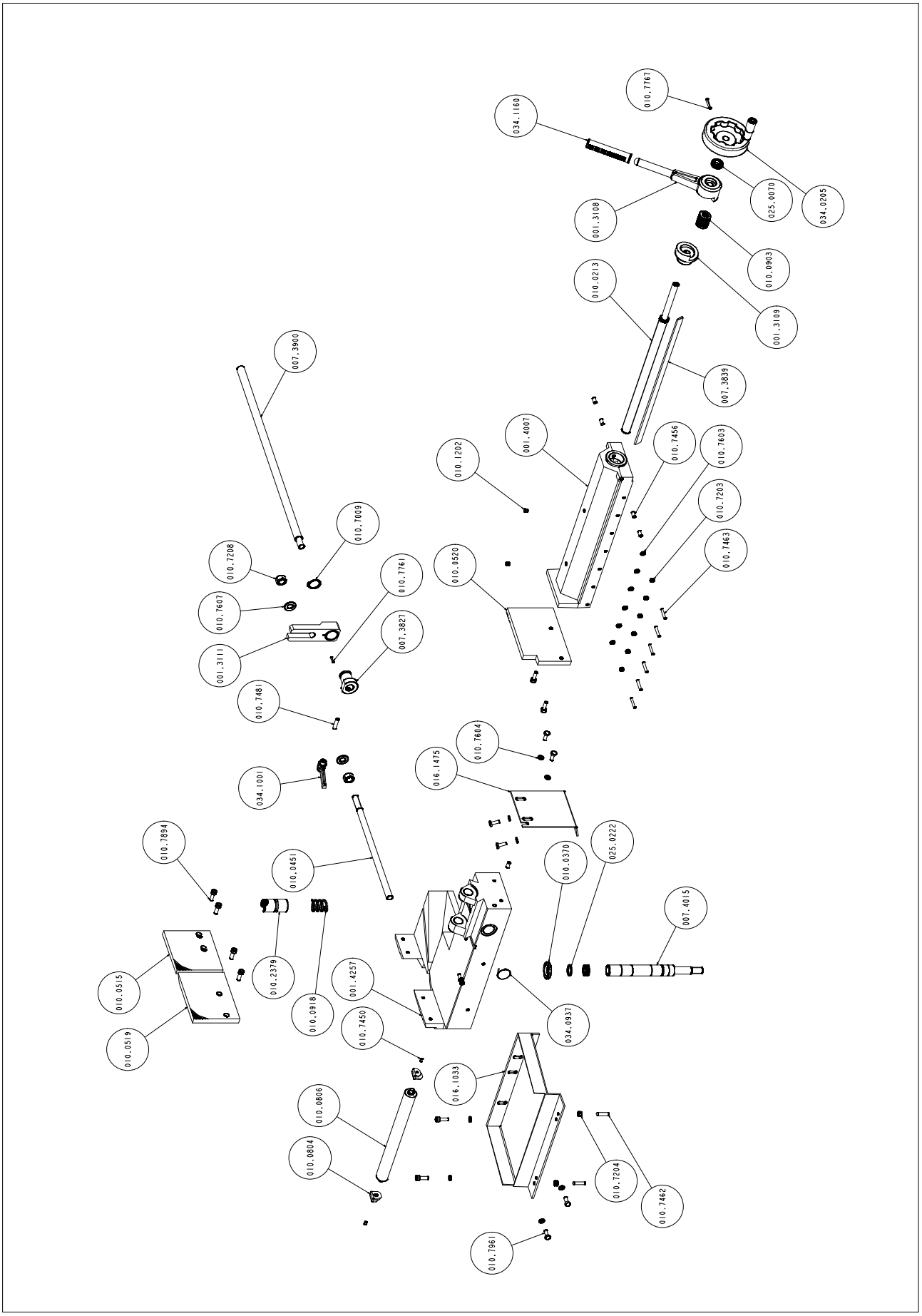
| Code | Description | Description | Quantity |
|---|---|---|---|
| 025.0275 | ANELLO DI PROTEZIONE NILOS 32009X | NILOS GUARD RING 32009X | 2,000 |
| 025.0552 | SPAZZOLA PULILAMA 6X25 030 SHARK | BAND BRUSH 6X25 030 SHARK | 1,000 |
| 025.0803 | BOCCOLA GRAFITATA L. 10 DIAM. 6 | GRAPHITIZED BUSHING L. 10 DIA M. 6 | 2,000 |
| 028.0121 | RACCORDO 3/8–17 CL 2601 | JOINT 3/8–17 CL 2601 | 1,000 |
| 028.0130 | RACCORDO 1/4–9 CL 2601 | JOINT 1/4–9 CL 2601 | 3,000 |
| 034.0801 | ARRESTO ELASTICO P 40/30 CB–RA 350SH 260–270–282 | ELASTIC STOP P 40/30 CB–RA350 SH 260–270 | 1,000 |
| 043.0229 | RIDUZIONE MF 1/4 – CL 2520 | MF 1/4 – CL 2520 REDUCTION | 1,000 |
| 043.0252 | GOMITO MF 3/8 CL 2020 | MF 3/8 CL 2020 ELBOW | 1,000 |
| 043.0260 | TAPPO TTE4 1/4 – CL 2611 | 1/4 TAP TTE4 | 1,000 |
| 043.0652 | RUBINETTO 1/4 F.M. | 1/4 F. M. TAP | 1,000 |

## Cutting head cover



| Code | Description | Description | Quantity |
|---|---|---|---|
| 010.7601 | RONDELLA 0 4 | 0 4 WASHER | 2,000 |
| 010.7850 | VITE TCEI 4 X 8 | TCEI 4 X 8 SCREW | 2,000 |
| 010.7990 | VITE TSPEI 4 X 8 | TSPEI 4 X 8 SCREW | 2,000 |
| 010.7993 | VITE TSPEI 5 X 12 | TSPEI 5 X 12 SCREW | 4,000 |
| 016.0947 | COPERCHIO ARCHETTO SH 280–281 | BOW COVER SH 280–281 | 1,000 |
| 016.1224 | PIASTRINO FIX INTERRUTTORE SICUREZZA | COVER SAFETY SWITCH FIX PLATE SH | 1,000 |
| 034.1107 | VOLANTINO O 30 M6 X 20 | O 30 M6 X 20 HANDWHEEL | 2,000 |

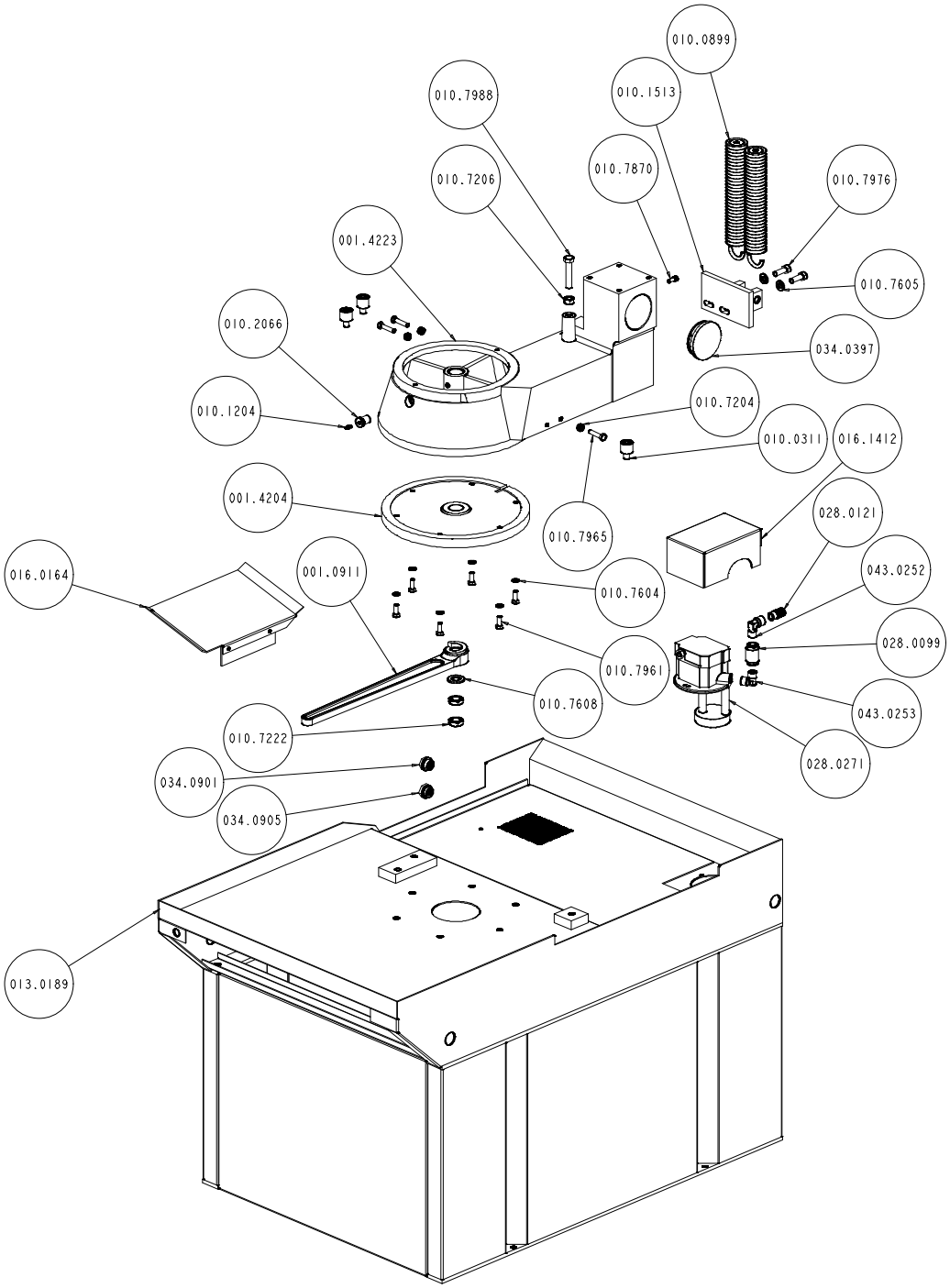
## Vice assembly



| Code | Description | Description | Quantity |
|---|---|---|---|
| 001.3108 | LEVA BLOCCAGGIO MORSA RAPIDA M. 665 | CLAMPING LEVER MOD.665 | 1,000 |
| 001.3109 | BOCCOLA A CAMME TI–SC–RA–CN–FCM.666 | BUSHING TI–SC–RA–CN–FC MOD.666 | 1,000 |
| 001.3111 | DISTANZIALE BATTUTA TI–CN 350–SH MOD. 7 | STOP SPACER TI–CN 350–SH | 1,000 |
| 001.4007 | SCORREVOLE MORSA SH 260–280–282–292–320–332 MOD. 1207 | UPPER VICE SH 260–280–320 | 1,000 |
| 001.4257 | MORSA SH 260 60¿ – 281 | LOWER VICE SH 260 60¿ | 1,000 |
| 007.3827 | BOCCOLA PER BATTUTA SH 260–280–282– 292–320–332 | STOP BUSHING SH 260–280–320 | 1,000 |
| 007.3839 | LARDONE MORSA SH 260–270–280–282–292–320–332 | VICE GIB SH 260–270–280–320 | 1,000 |
| 007.3900 | ASTA TAGLI A MISURA SH 260–280–282_ 292 | CUT TO MEASURE ROD SH 260–280 | 1,000 |
| 007.4015 | PERNO DI CENTRO SH 280 MORSA SER-RAGGIORAPIDO – SH 260–292 | CENTRE PIN SH 280 | 1,000 |
| 010.0213 | VITE MORSA 550X24TPN SH260 MORSA RAPIDA | VICE SCREW 550X24 SH 260 | 1,000 |
| 010.0370 | GHIERA 5S 30X1,5 SH 200–260–280–282 292–332 | RING NUT 5S 30X1,5 SH200–260–280 | 1,000 |
| 010.0451 | TIRANTE BATTUTA TAGLI A MISURA TI–CN–SH | CUT TO MEASURE STOP TIE ROD TI–CN–SH | 1,000 |
| 010.0515 | GANASCIA MORSA FISSA DESTRA SH 260 | RIGHT FIXED VICE JAW SH 260 | 1,000 |
| 010.0519 | GANASCIA MORSA SINISTRA SH 260 60¿ | LEFT VICE JAW SH 260 60¿ | 1,000 |
| 010.0520 | GANASCIA MORSA MOBILE SH 260 60¿ | MOVABLE VICE JAW SH 260 60¿ | 1,000 |
| 010.0804 | SUPPORTO PER RULLO D.10 SH | ROLLER SUPPORT D.10 SH | 2,000 |
| 010.0806 | RULLO GT02 L.323 X 32 X 10 SH | ROLLER GT02 L.323 X 32 X 10 SH | 1,000 |
| 010.0903 | MOLLA MORSA RAPIDA M.96 SC–TI–CN–RA | RAPID VICE SPRING SC–TI–CN | 1,000 |
| 010.0918 | MOLLA RICHIAMO CHIOCCIOLA VITE MORSA SH | VICE SCREW NUT RETURN SPRING SH | 1,000 |
| 010.1202 | OLIATORE A SFERA DIAM. 8 | OIL FILLER DIAM.8 | 2,000 |
| 010.2379 | CHIOCCIOLA BRONZO 45¿ SH 281–MA | BRONZE SCREW NUT SH 281.MA | 1,000 |
| 010.7009 | ANELLO SEEGER 0 30 (010.7009) | 0 30 SEEGER RING (010.7009) | 1,000 |
| 010.7203 | DADO M6 (010.7203) | M6 SCREW NUT (010.7203) | 7,000 |
| 010.7204 | DADO M8 (010.7204) | M8 SCREW NUT (010.7204) | 2,000 |
| 010.7208 | DADO M16 (010.7208) | M16 SCREW NUT (010.7208) | 2,000 |
| 010.7450 | GRANO VCE PUNTA CONICA 6 X 6 | 6 X 6 CYLINDRICAL POINT VCE GRUB | 2,000 |
| 010.7456 | GRANO VCE PUNTA CONICA 8 X 16 (010.7456) | 8 X 16 CONICAL POINT VCE GRUB SC-REW | 5,000 |
| 010.7462 | GRANO VCE PUNTA CONICA 8 X 30 | 8 X 30 CONICAL POINT VCE GRUB SC-REW | 2,000 |
| 010.7463 | GRANO VCE PUNTA CONICA 6 X 35 (010.7463) | 6 X 35 CONICAL POINT VCE GRUB SC-REW | 7,000 |
| 010.7481 | GRANO VCE PUNTA PIANA 8 X 35 (010.7481) | 8X35 FLAT POINT VCE GRUB SCREW (010.7481 | 1,000 |
| 010.7603 | RONDELLA 0 6 (010.7603) | 0 6 WASHER (010.7603) | 7,000 |
| 010.7604 | RONDELLA 0 8 (010.7604) | 0 8 WASHER (010.7604) | 8,000 |
| 010.7607 | RONDELLA 0 16 (010.7607) | 0 16 WASHER (010.7607) | 2,000 |
| 010.7761 | SPINA ELASTICA DIAM. 4 X 20 (010.7761) | ELASTIC PIN DIAM. 4 X 20 (010.7761) | 1,000 |
| 010.7767 | SPINA ELASTICA DIAM. 6 X 35 (010.7767) | ELASTIC PIN DIAM. 6 X 35 | 1,000 |
| 010.7894 | VITE TCEI 8 X 25 (010.7894) | TCEI 8 X 25 SCREW (010.7894) | 8,000 |
| 010.7961 | VITE TE 8 X 20 (010.7961) | TE 8 X 20 SCREW (010.7961) | 6,000 |
| 016.1033 | BRACCETTO APPOGGIA BARRA SH 260 | BAR SUPPORT ARM SH 260 | 1,000 |
| 016.1475 | STAFFA FISSAGGIO MORSA SH 260–281 | VICE FIXING BRACKET SH260–281 | 1,000 |
| 025.0070 | CUSCINETTO 51103 | BEARING 51103 | 2,000 |
| 025.0222 | ANELLO TENUTA OR 3100 | O RING 3100 | 1,000 |
| 034.0205 | VOLANTINO VPRA/125 MR SH 282–292–320–330PH 211–1/261–1 | VPRA/125 HANDWHEEL SH + PH | 1,000 |

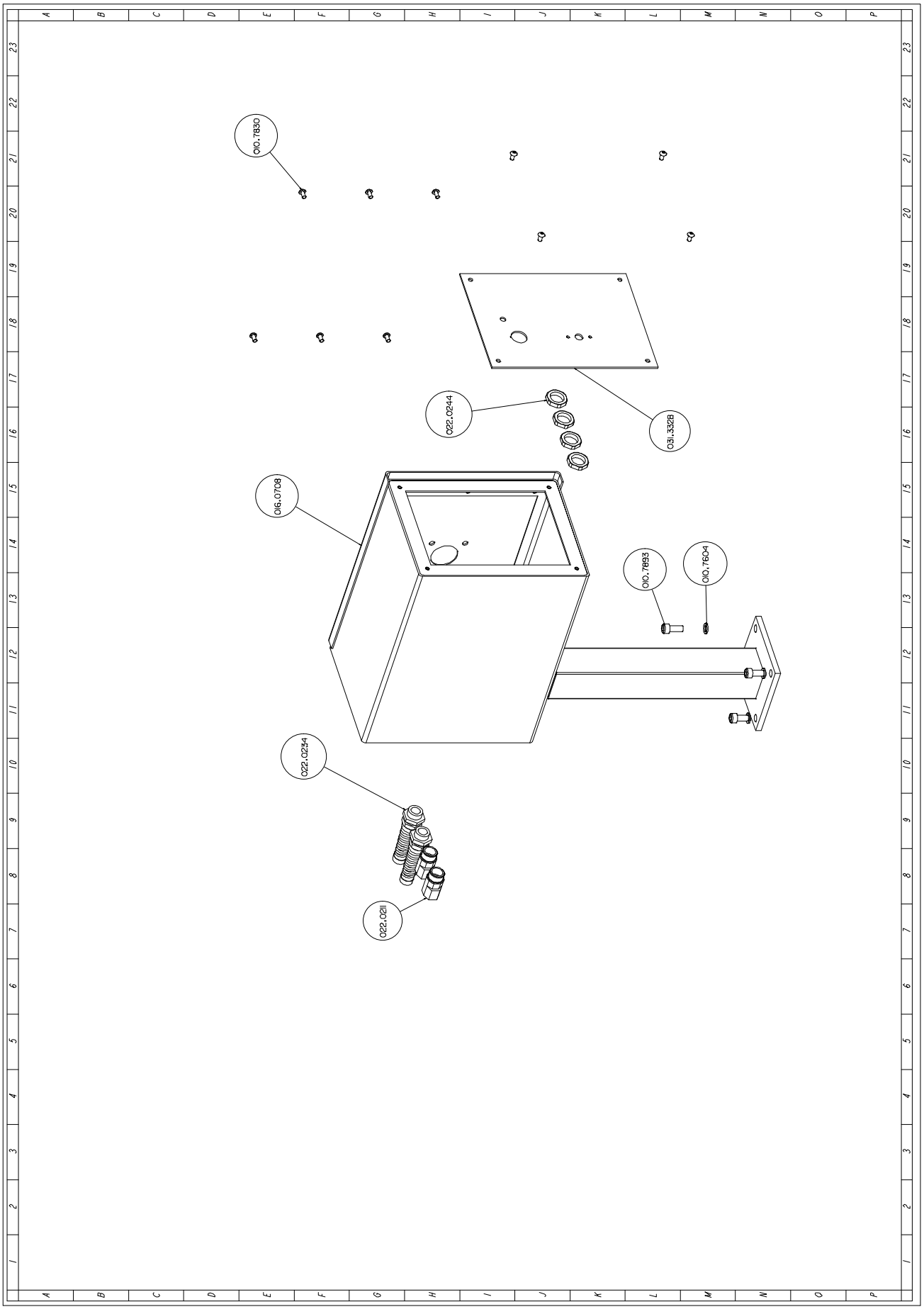
| Code | Description | Description | Quantity |
|---|---|---|---|
| 034.0937 | TAPPO COPRIFORO UNIPRESS DA 22–30 | UNIPRESS HOLE COVER CAP FROM 22–30 | 1,000 |
| 034.1001 | LEVA A SCATTO 8 MA PK55 | LEVER 8 MA PK55 | 1,000 |
| 034.1160 | MANOPOLA MOD. 1014 0 20 | KNOB MOD. 1014 0 20 | 1,000 |

## Base assembly



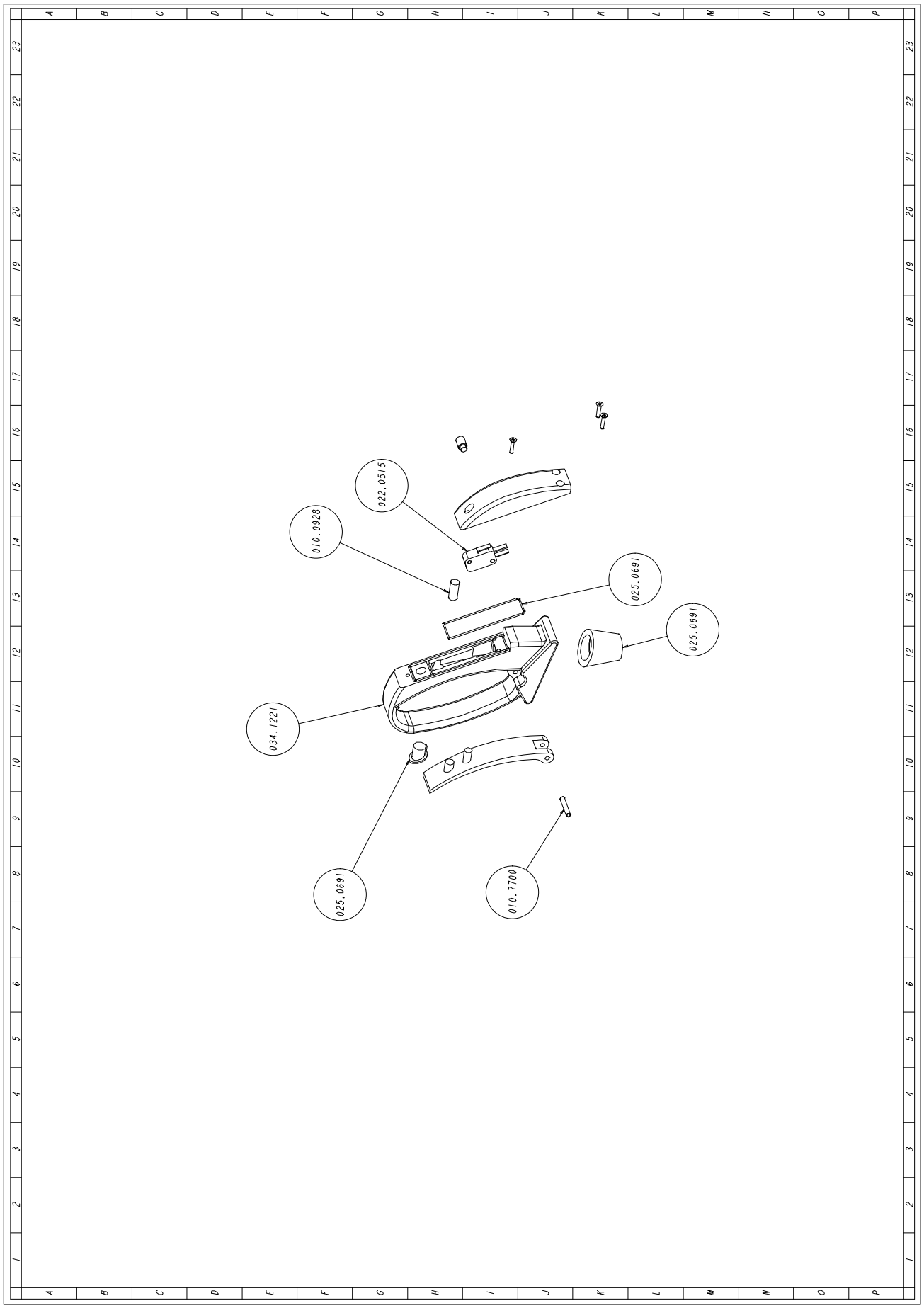
| Code | Description | Description | Quantity |
|---|---|---|---|
| 001.0911 | LEVA BLOCCAGGIO MORSA SC 315–SH 260 SH 280–292 –PH 211–261–1 MOD. 164 | VICE CLAMPING LEVER SC315–SH260–280 | 1,000 |
| 001.4204 | DISCO BASAMENTO SH 260–280–292–330 281 | BASE PLATE SH 260–280–330 MOD.1304 | 1,000 |
| 001.4223 | PIANO GIREVOLE MORSA SERRAGGIO RAPIDO SH280–292 MOD. 1311 | ROTATING TABLE SH 280 MOD.1311 | 1,000 |
| 010.0311 | VITE TESTA CILINDRICA ESAGONO IN-CASSATOM12X16BATTUTA PIANO GIRE-VOLE | SCREW M12X16 ROTATING TABLE STOP | 3,000 |
| 010.0899 | MOLLA RICHIAMO TESTA SH 260–280 NT 282292 | HEAD RETURN SPRING SH 260–280 NT | 2,000 |
| 010.1204 | INGRASSATORE M 6 | M 6 LUBRICATOR | 1,000 |
| 010.1513 | STAFFA AGGANCIO DOPPIA MOLLA PIANO GIREVOLE SH 280 N.T.–282–292 | ROT.TABLE DB.SPRING BRACKET SH280 N.S. | 1,000 |
| 010.2066 | BOCCOLA FISSAGGIO INGRASSATORE SH 260–280–292 | FIXING BUSHING SH 260–280 | 1,000 |
| 010.7204 | DADO M8 (010.7204) | M8 SCREW NUT (010.7204) | 3,000 |
| 010.7206 | DADO M12 (010.7206) | M12 SCREW NUT (010.7206) | 1,000 |
| 010.7222 | DADO M18 BASSO | M18 LOW SCREW NUT | 2,000 |
| 010.7604 | RONDELLA 0 8 (010.7604) | 0 8 WASHER (010.7604) | 6,000 |
| 010.7605 | RONDELLA 0 10 (010.7605) | 0 10 WASHER (010.7605) | 2,000 |
| 010.7608 | RONDELLA 0 18 | 0 18 WASHER | 1,000 |
| 010.7870 | VITE TCEI 6 X 16 (010.7870) | TCEI 6 X 16 SCREW (010.7870) | 1,000 |
| 010.7961 | VITE TE 8 X 20 (010.7961) | TE 8 X 20 SCREW (010.7961) | 6,000 |
| 010.7965 | VITE TE 8 X 35 (010.7965) | TE 8 X 35 SCREW (010.7965) | 3,000 |
| 010.7976 | VITE TE 10 X 30 (010.7976) | TE 10 X 30 SCREW (010.7976) | 2,000 |
| 010.7988 | VITE TE 12 X 60 | TE 12 X 60 SCREW | 1,000 |
| 013.0189 | PIEDISTALLO COMPONIBILE SH 281 | MODULAR BASE SH 281 | 1,000 |
| 016.0164 | RACCOGLITORE ACQUA ARCHETTO SHARK | BOW WATER COLLECTOR SHARK | 1,000 |
| 016.1412 | COPERTURA ELETTROPOMPA SH 281 | ELECTROPUMP COVER SH 281 | 1,000 |
| 028.0099 | VALVOLA DI NON RITORNO 3/8’ | ”NON RETURN VALVE 3/8”””” | 1,000 |
| 028.0121 | RACCORDO 3/8–17 CL 2601 | JOINT 3/8–17 CL 2601 | 1,000 |
| 028.0271 | ELETTROPOMPA EZ/C V. 220–380 SA/85 | ELECTROPUMP EZ/C V. 220–380 | 1,000 |
| 034.0397 | COPERCHIO SNODO TESTA SH MM.30 | HEAD PIVOT COVER SH N.S. | 1,000 |
| 034.0901 | TAPPO LIVELLO OLIO 1/2 ’GAS. | 1/2” GAS. OIL LEVEL CAP | 1,000 |
| 034.0905 | TAPPO OLIO TAO/3 1/2’ NERO | TAO/3 1/2” BLACK OIL CAP | 1,000 |
| 043.0252 | GOMITO MF 3/8 CL 2020 | MF 3/8 CL 2020 ELBOW | 1,000 |
| 043.0253 | GOMITO M.M.3/8 CL 2010 | M. M.3/8 CL 2010 ELBOW | 1,000 |

## Control panel



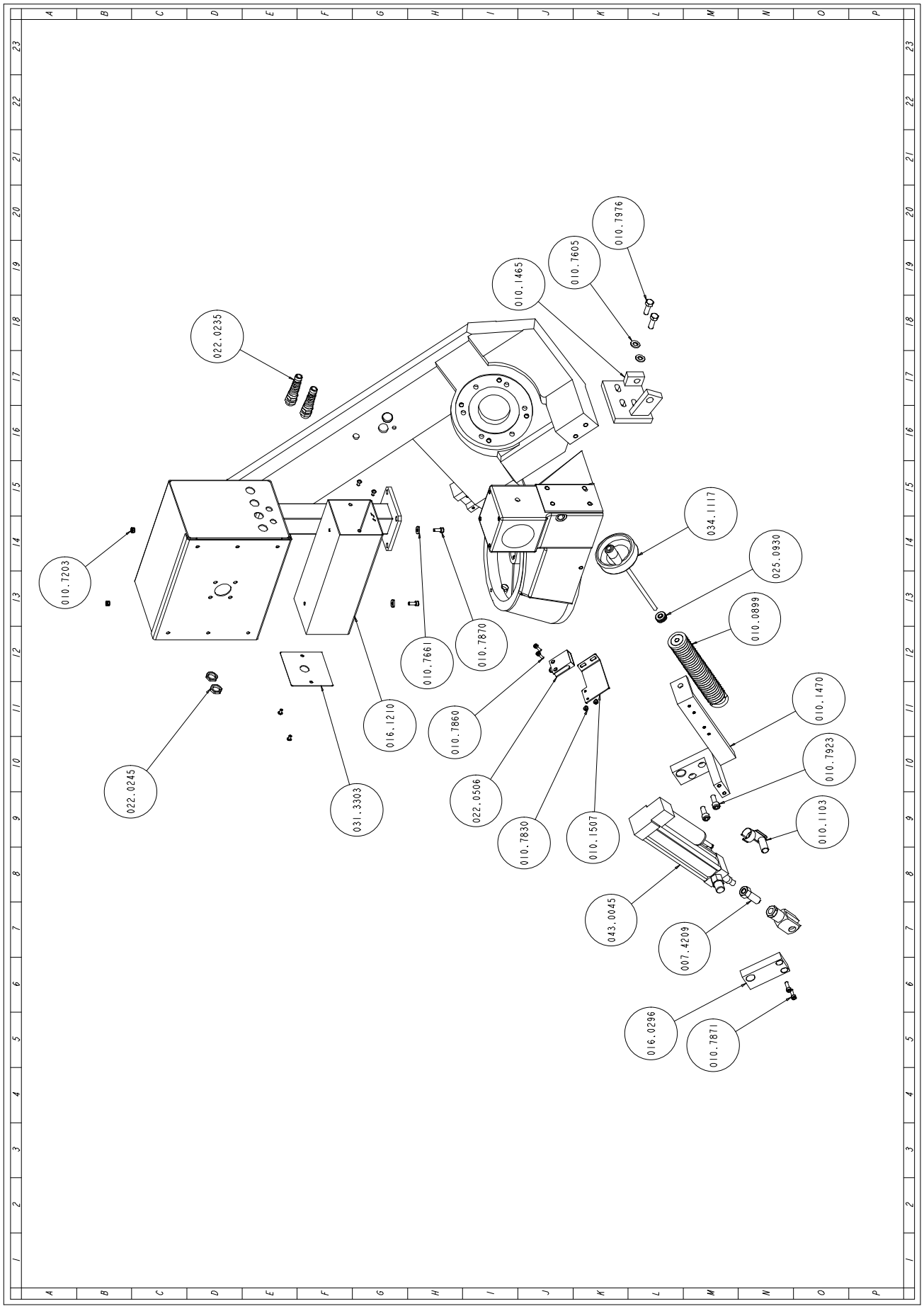
| Code | Description | Description | Quantity |
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| 010.7604 | RONDELLA 0 8 (010.7604) | 0 8 WASHER (010.7604) | 4,000 |
| 010.7830 | VITE BUTON 5 X 10 (010.7830) | 5 X 10 BUTON SCREW (010.7830) | 10,000 |
| 010.7893 | VITE TCEI 8 X 20 (010.7893) | TCEI 8 X 20 SCREW (010.7893) | 4,000 |
| 016.0708 | QUADRO COMANDI SH 260–280 LVD | LVD CONTROL PANEL SH 260–280 | 1,000 |
| 022.0211 | RACCORDO RAPIDO SEM PG 13,5 | RAPID JOINT SEM PG 13,5 | 2,000 |
| 022.0234 | PRESSACORDONE 3246 NERO PG 13,5 | CORD PRESSER | 2,000 |
| 022.0244 | CONTRODADO 3217B GRIGIO PG 13,5 | LOCK NUT 3217B GREY PG 13,5 | 4,000 |
| 031.3328 | TARGA INTERRUTTORE SH 260–280 –LVD– | –LVD– SWITCH PLATE SH 260–280 | 1,000 |

## Handgrip



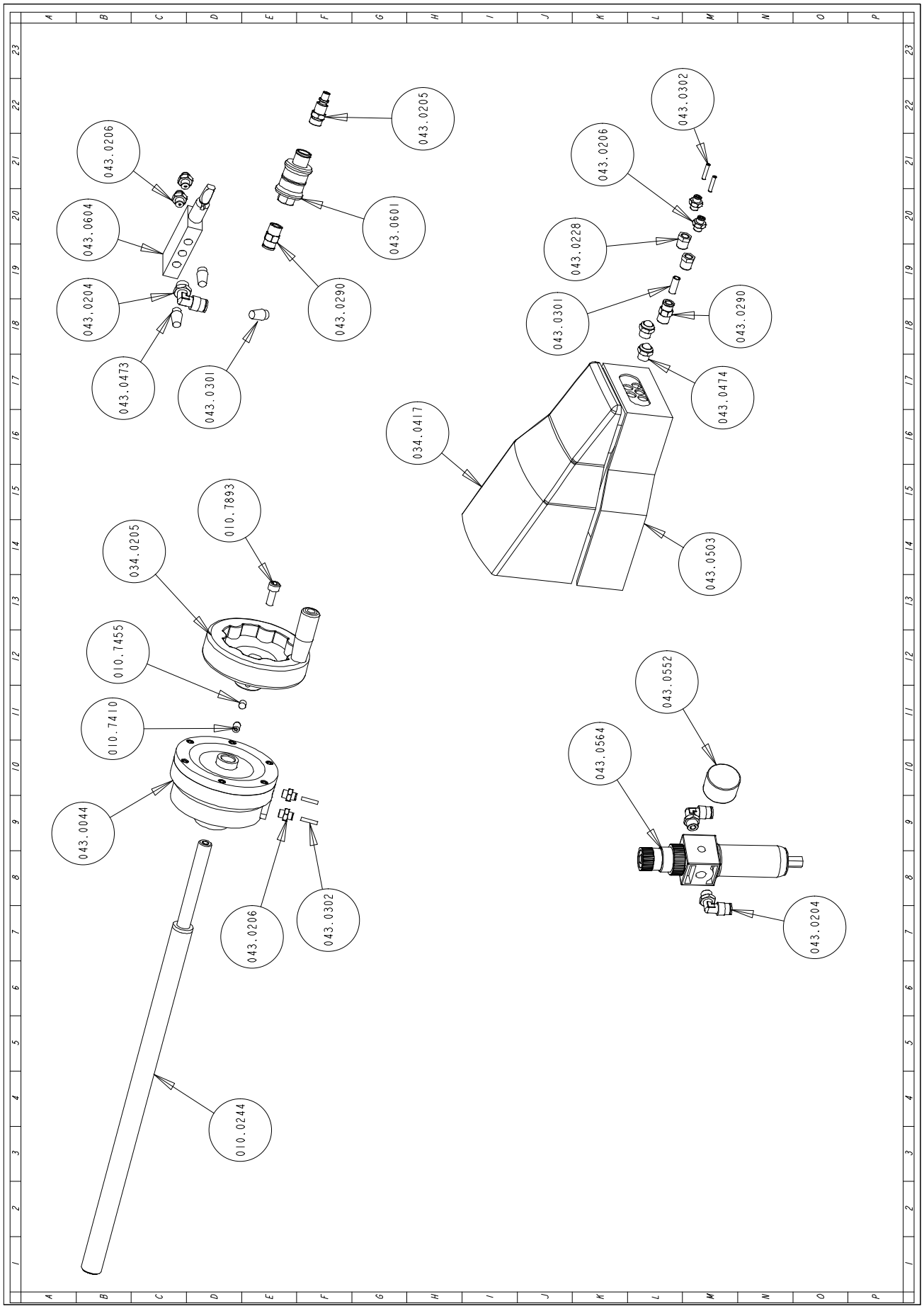
| Code | Description | Description | Quantity |
|---|---|---|---|
| 010.0928 | MOLLA X IMPUGNATURA MEP DIS.1189559 | MEP HANDLE SPRING | 1,000 |
| 010.7409 | GRANO VCE PUNTA CILINDRICA 8 X 10 | 8 X 10 CYLIND.POINT VCE GRUB SCREW | 1,000 |
| 010.7700 | SPINA CILINDRICA DIAM. 4 X 24 | CYLINDRICAL PIN DIAM. 4 X 24 | 1,000 |
| 010.7800 | VITE AUTOFILETTANTE 2,9 X 15 | 2,9 X 15 SELF−THREADING SCREW | 3,000 |
| 022.0515 | MICROINTERRUTTORE V−21−1C6 | MICROSWITCH V−21−1C6 | 1,000 |
| 025.0691 | SERIE GUARNIZIONI X IMPUGNATURA MEP | GASKETS FOR MEP HANDLE | 1,000 |
| 034.1221 | IMPUGNATURA DISEGNO MEP | MEP HANDLE | 1,000 |

## Cut Control System (Optional)



| Code | Description | Description | Quantity |
|---|---|---|---|
| 007.4209 | PROLUNGA CILINDRO SH | CYLINDER EXTENSION SH 330 HH | 1,000 |
| 010.0899 | MOLLA RICHIAMO TESTA SH 260–280 NT 282292 | HEAD RETURN SPRING SH 260–280 NT | 1,000 |
| 010.1103 | FORCELLA 16 X 1,5 | 16 X 1,5 FORK | 1,000 |
| 010.1470 | STAFFA SUPPORTO CILINDRO SH280/292 SX–SXI–SH 282 SX–CNC–SH 282 SXI–NC EVO | CYLINDER SUPPORT BRACKET SH 280 SX–SXI | 1,000 |
| 010.1465 | STAFFA AGGANCIO MOLLA SH 280 SX–SXI–330–282–292 | SPRING BRACKET SH 280 | 1,000 |
| 010.1507 | STAFFA FIX FINE CORSA CCS SH280N.T. SH 282–SH 292–332 | CCS LIMIT SWITCH FIX BRACKET SH280N.S. | 1,000 |
| 010.7203 | DADO M6 (010.7203) | M6 SCREW NUT (010.7203) | 2,000 |
| 010.7605 | RONDELLA 0 10 (010.7605) | 0 10 WASHER (010.7605) | 2,000 |
| 010.7661 | RONDELLA SPESSORE DIAM. 6X3 (010.7661) | THICKNESS WASHER DIAM. 6X3 (010.7661) | 2,000 |
| 010.7830 | VITE BUTON 5 X 10 (010.7830) | 5 X 10 BUTON SCREW (010.7830) | 6,000 |
| 010.7860 | VITE TCEI 5 X 15 (010.7860) | TCEI 5 X 15 SCREW (010.7860) | 2,000 |
| 010.7870 | VITE TCEI 6 X 16 (010.7870) | TCEI 6 X 16 SCREW (010.7870) | 2,000 |
| 010.7871 | VITE TCEI 6 X 20 (010.7871) | TCEI 6 X 20 SCREW (010.7871) | 2,000 |
| 010.7923 | VITE TCEI 10 X 25 (010.7923) | TCEI 10 X 25 SCREW (010.7923) | 2,000 |
| 010.7976 | VITE TE 10 X 30 (010.7976) | TE 10 X 30 SCREW (010.7976) | 2,000 |
| 016.0296 | STAFFA ESTERNA CILINDRO SH | OUTER CYLINDER BRACKET SH | 1,000 |
| 016.1210 | SCATOLA FIX REGOLATORE DISCESA TESTA SH260–280 | REGULATOR FIX. BOX SH 260–280 | 1,000 |
| 022.0236 | PRESSACORDONE 3240 NERO PG 9 | CORD PRESSER | 2,000 |
| 022.0246 | CONTRODADO 3210B GRIGIO PG 9 | LOCK NUT 3210B GREY PG 9 | 2,000 |
| 022.0506 | FINECORSA D4C–1901 2M ALIMEN.AX–AXI | LIMIT SWITCH F.FEEDER AX–AXI | 1,000 |
| 025.0930 | CUSCINETTO 51100 | BEARING 51100 | 1,000 |
| 034.1117 | VOLANTINO DSH D.100+MANIGLIA RI-BALT. +BARRA FILETT.M10X185 X CCS | HANDWHEEL DSH M10X185 CCS | 1,000 |
| 043.0045 | CILINDRO REGOLATORE DISCESA TE-STA SH 260–280–282–292–332 CCS | HEAD DOWN STROKE CYLINDER SH260–280 | 2,000 |

## Supplementary pneumatic vice



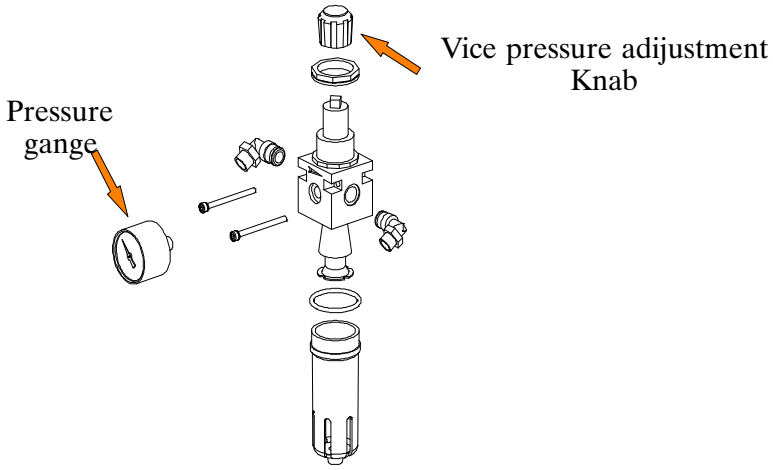
| Code | Description | Description | Quantity |
|---|---|---|---|
| 010.0244 | VITE MORSA 576X24 SH MA–SX–AX D.0696–08 | VICE SCREW 576X24 SH MA–SX–AX | 1,000 |
| 010.7410 | GRANO VCE PUNTA CILINDRICA 8X16(010.7410 | 8 X 16 CYLIND.POINT VCE GRUB SCREW | 1,000 |
| 010.7455 | GRANO VCE PUNTA CONICA 8 X 10 (010.7455) | 8 X 10 CONICAL POINT VCE GRUB SC-REW | 1,000 |
| 010.7893 | VITE TCEI 8 X 20 (010.7893) | TCEI 8 X 20 SCREW (010.7893) | 1,000 |
| 034.0205 | VOLANTINO VPRA/125 MR SH 282–292–320–330PH 211–1/261–1 | VPRA/125 HANDWHEEL SH + PH | 1,000 |
| 034.0417 | COPERCHIO X PEDALIERA PNEUMATICA 354–925 | PNEUMATIC FOOT–PEDAL COVER | 1,000 |
| 043.0044 | CILINDRO VOLAMPRESS 100–8 CIRCO-LARE SH–FC | AIR CYLINDER 100–8 SH–FC | 1,000 |
| 043.0204 | ATTACCO A GOMITO 8X1/4 GIREVOLECL 6521 | 8X1/4 – CL 6521 ELBOW COUPLING | 2,000 |
| 043.0205 | ATTACCO A ESAGONO 8X1/4 – CL 6510 | 8X1/4 – CL 6510 HEXAGONAL COUPLING | 1,000 |
| 043.0206 | ATTACCO A ESAGONO 4X1/8 – CL 6511 | 4X1/8 – CL 6511 HEXAGONAL COUPLING | 6,000 |
| 043.0228 | RIDUZIONE 1/4–1/8 – CL 2531 | 1/4–1/8 – CL 2531 REDUCTION | 2,000 |
| 043.0290 | INNESTO RAPIDO 1/4 GHIOTTO 13/A | 1/4 QUICK COUPLING | 2,000 |
| 043.0301 | TUBO RILSAN 8X6 NERO COD.17257181 | 8X6 BLACK RILSAN HOSE | 2,000 |
| 043.0302 | TUBO RILSAN 4X2.7 NERO C.17257162 | 4X2.7 BLACK RILSAN HOSE | 4,000 |
| 043.0473 | SILENZIATORE IN OTTONE 1/8’ CL 2921 | ”1/8”” CL 2921 BRASS SILENCER” | 2,000 |
| 043.0474 | SILENZIATORE IN OTTONE 1/4’ | ”1/4”” BRASS SILENCER” | 2,000 |
| 043.0503 | PEDALIERA 5 VIE 354–925 X MA | 5 WAY 354–925 X MA FOOT PEDAL | 1,000 |
| 043.0552 | MANOMETRO O 40 | MANOMETER 0 40 | 1,000 |
| 043.0564 | FR 1/4 20–08 | FR 1/4 20–08 | 1,000 |
| 043.0601 | VALVOLA VMS 114–1/4 08 | VMS 114–1/4 08 VALVE | 1,000 |
| 043.0604 | VALVOLA 358/990 | 358/990 VALVE | 1,000 |

# Adjustments

This chapter illustrates the regulations and adjustments of the mechanical systems (pneumatic systems in the MA version) for correct use of **SHARK 281**. These instructions will enable you to “customise” your machine to suit the type of cuts you want, optimising the time required to complete them.

## Air treatment unit (MA version)

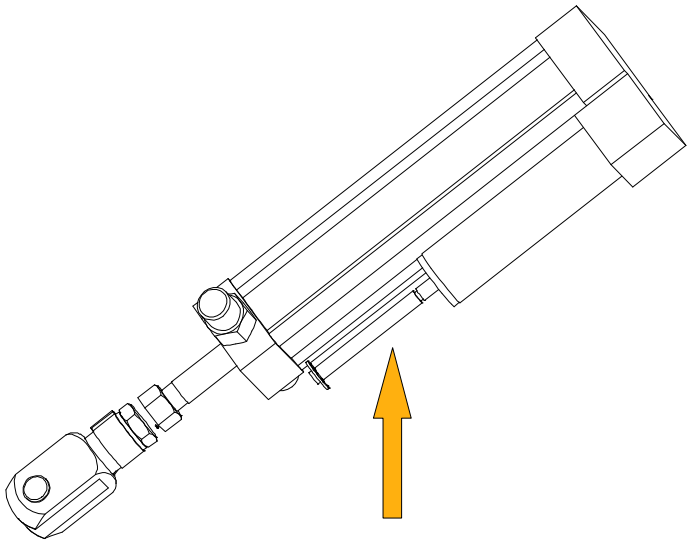
In the MA version of the **SHARK 281**, the machine’s pneumatic circuit actuates the vice by means of a pneumatic cylinder.
The compressed air is treated and purified at the inlet to the system by an air treatment unit, which, if so calibrated, regulates the pressure at about 6 Bar, irrespective of the pressure in use in the factory circuit.
The pressure can in any case be set should the workpiece be subject to deforming stress or is unstable during the cutting process; the vice should be positioned at 2÷3 mm from the piece before final clamping.
The user is requested to have available in the workshop a plant having the characteristics described in CHAPTER 4.
The diagram below shows an exploded view of the air treatment unit: the working pressure is regulated by rotating the knob indicated by the arrow, and is displayed on the pressure gauge.



# Topping up and bleeding the cylinder (Cut Control System optional)

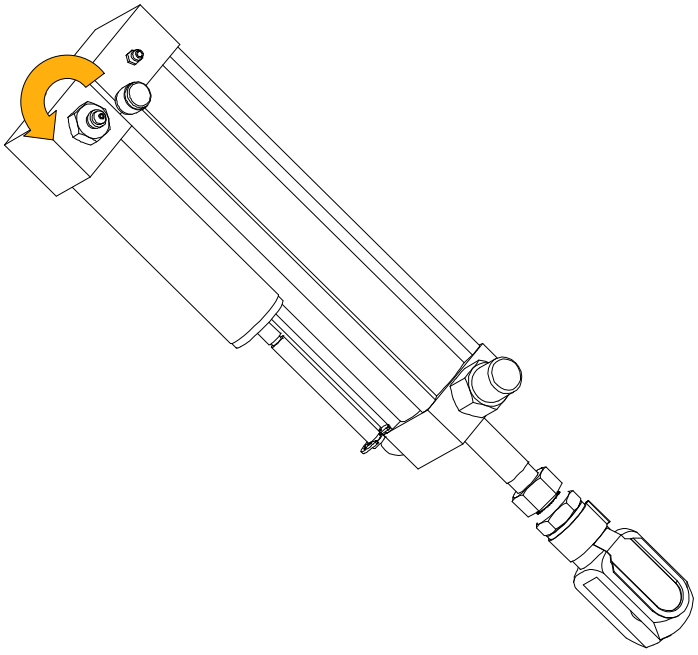
## Topping up the head cylinder

This operation is done when the oil in the hydraulic cylinder compensator tank is low. First the cylinder head is brought to the FCTI (Head Up Limiter) position so that the oil level in the compensation tank (see photograph below) can be checked using the rod. If the rod upper ring location is not visible, the oil level is insufficient.

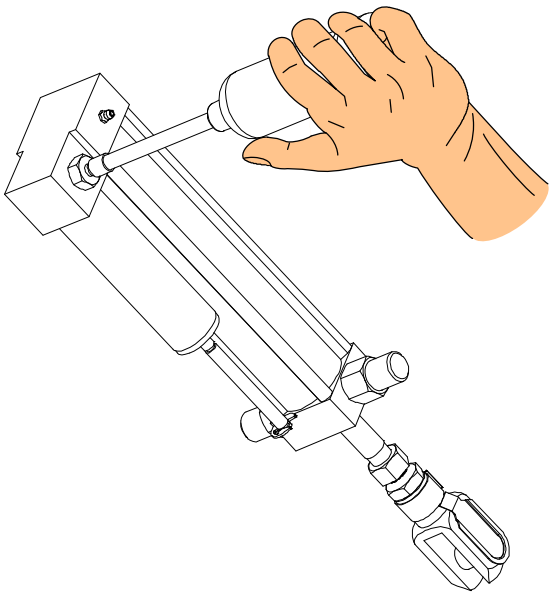


To top up the oil in the tank, the instructions are as follows:

- keep the head in the HUL position (fully up) by closing the head descent regulator;
- unscrew the filler valve cap;



▶ using a manual pump, loaded with MOBIL DTE 11 oil (or equivalent – see table in Chapter 8), top up until the upper rod groove exits, as illustrated above.

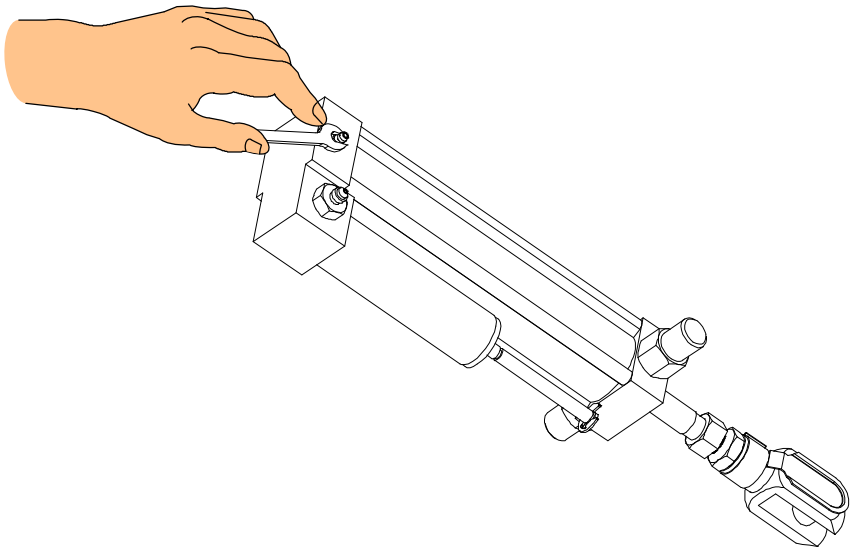


## Bleeding the head cylinder

Accumulations of air inside the hydraulic circuit cause the head to stutter in down phase. When this happens, bleed the circuit as follows:

▶ position the head at FCTI;

▶ using a 10 mm open wrench, slacken the bleed valve until oil exits;



▶ close the valve and perform a number of empty work cycles; if necessary, top up the compensation tank.

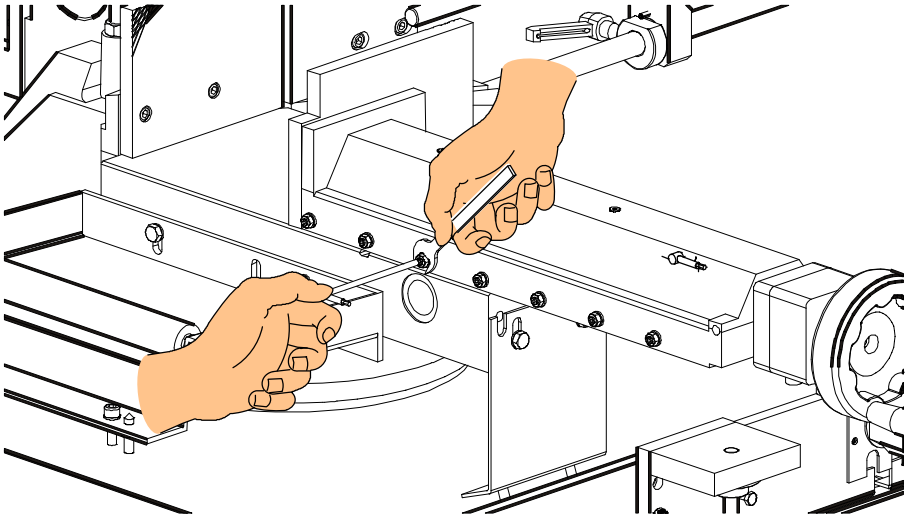
**N.B.** The oil which spills out during the above operation can be collected using a pipe inserted on the valve, and re–used.

# Vice

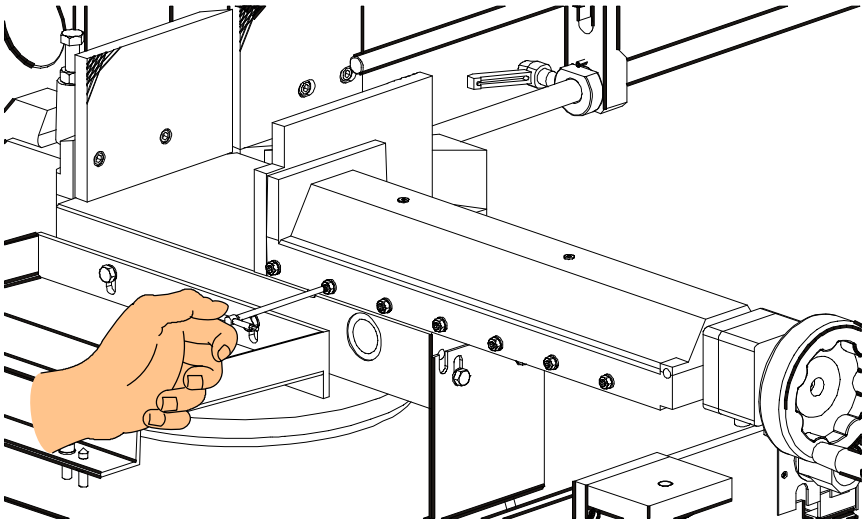
## Vice play adjustment

Any play that develops between the slideway and the slide gib on the vice must be compensated by adjusting the grub screws regulating the distance between the gib and the lead screw, proceeding as follows:

- slacken all the locknuts on the grub screws, using a hexagonal key to hold the screws still;
- open the vice to its full extension;

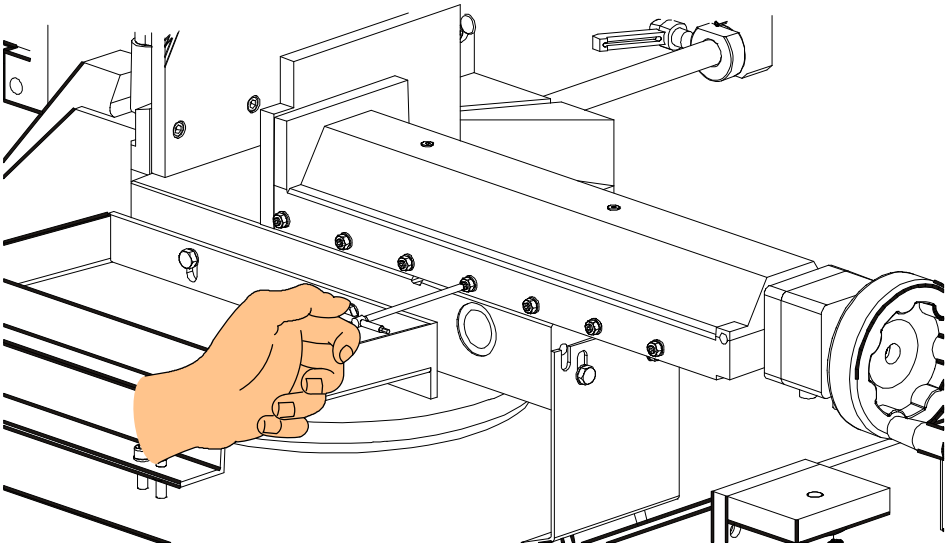


- adjust the slight pressure exerted by the grub screws on the gib, starting with the first two in contact with the lead screw;
- after adjusting the two grub screws, tighten the locknut, holding the grub screws with the hexagonal key;



- close the vice until two more grub screws are in the same position as the first two previously;
- repeat the operation on the gib grub screws on all the slideway grub screws;

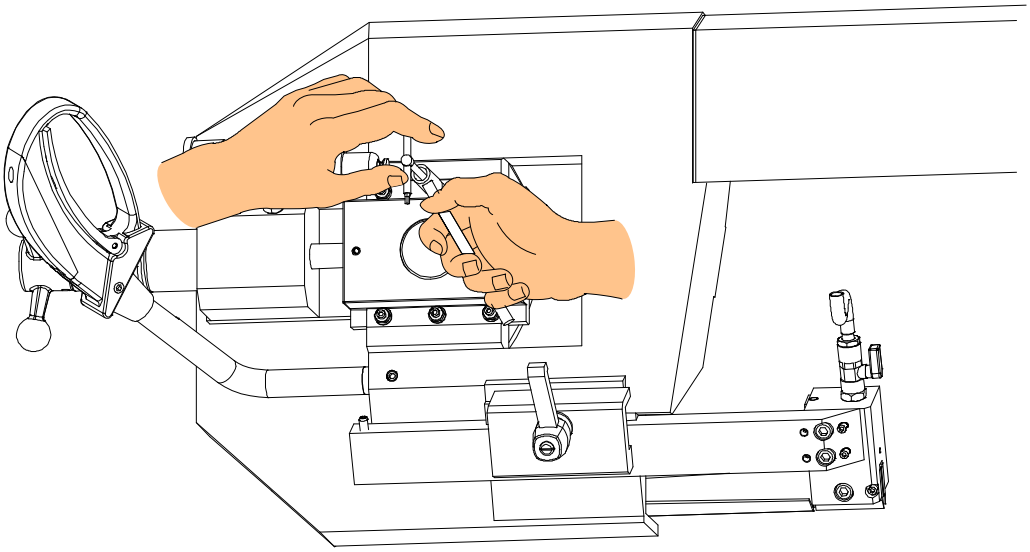
- at the end of the operation, use the handwheel to move the slideway back and forth, identifying the zones where the grub screws exert greater pressure on the gib.



## Cutting head

### Blade tensioner slide play adjustment

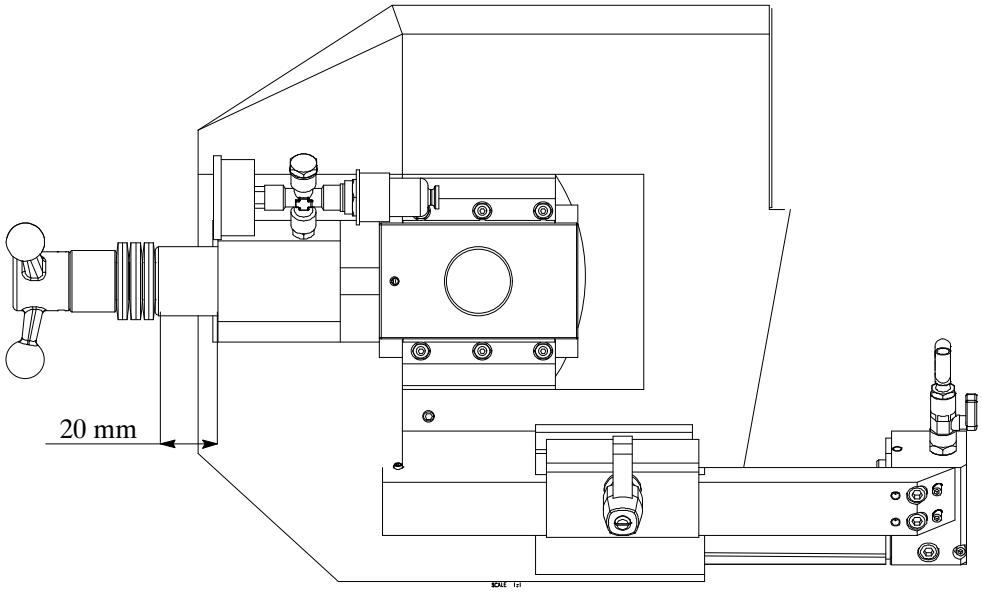
To reduce the play which develops over a period of time between the blade tensioner slide and the slide gibs, the grub screws separating the gibs from the slide must be adjusted as follows:



- remove the blade from the flywheels;
- move the slide backwards and forwards to locate any friction or play;
- slacken the nuts, holding the grub screws with a hexagonal pipe wrench;
- if there is play, tighten the grub screws; if there is friction rubbing, loosen the grub screws.

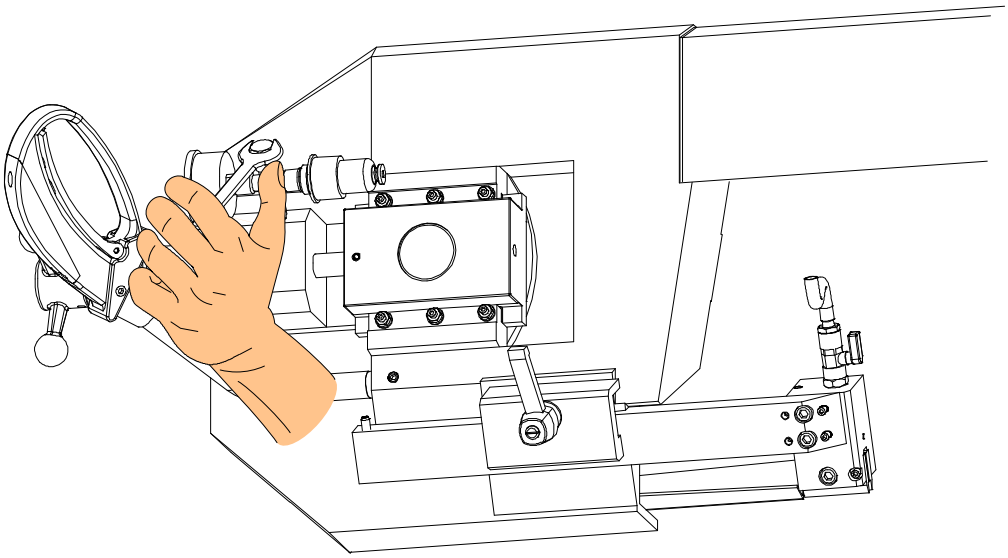
## Blade tensioning unit

The blade tensioning unit on these models is hydraulic. This means that the oil level in the tensioning cylinder must be replenished whenever needed to ensure correct operation of the unit. To replenish the blade tensioning cylinder, follow the steps illustrated in the figures below.
When the piston protrudes from the blade tensioning cylinder by just 20 mm as illustrated below, the cylinder must be topped up.

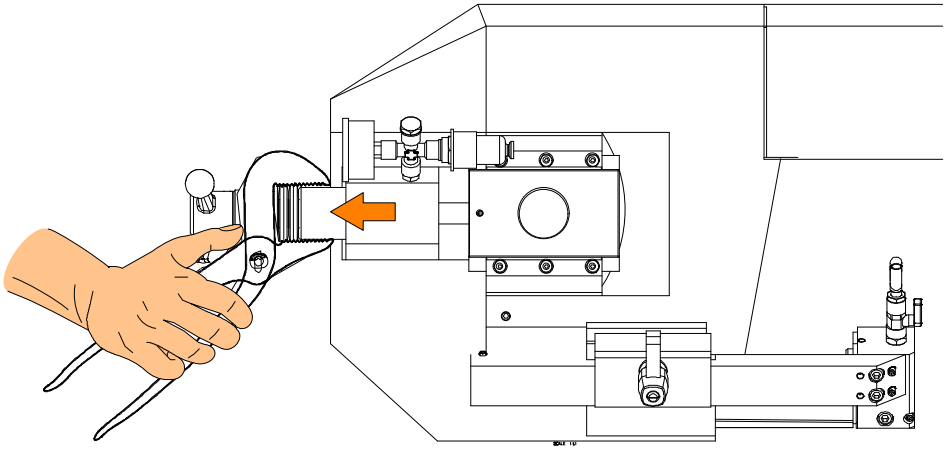



Topping up sequence:

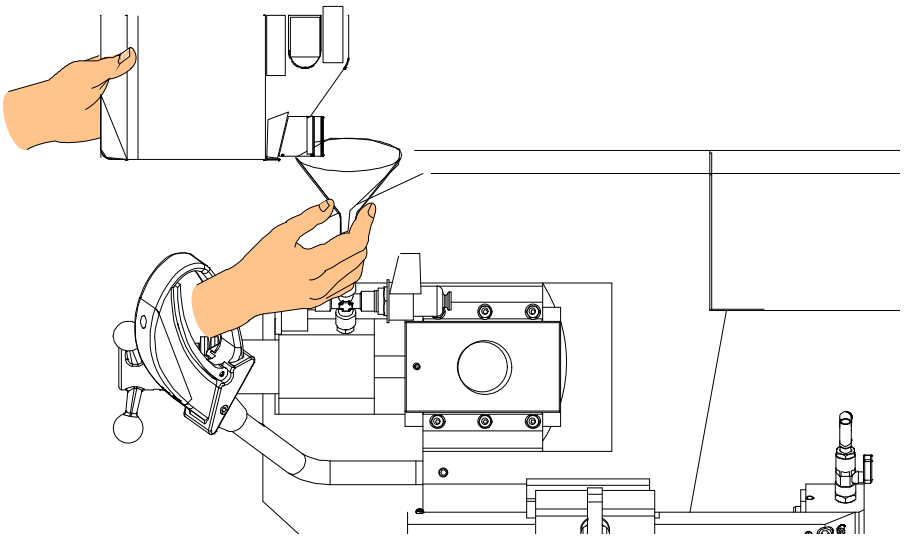
- lower the head;
- slacken the blade tensioning handwheel;
- remove the filler cap using a hex wrench;



▶ pull out the piston, if necessary, using a pair of pliers, until it protrudes 44 mm from the cylinder;

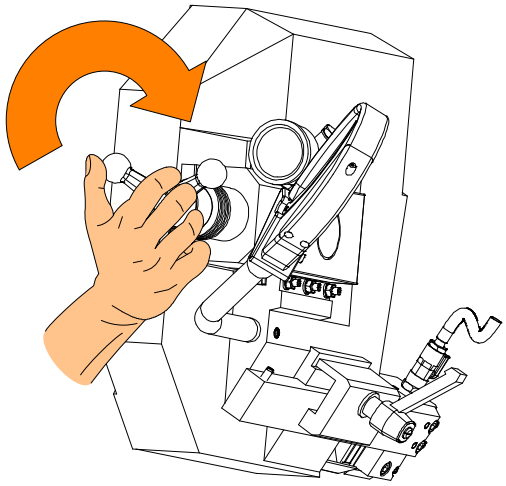


▶ top up with AGIP ATF DEXRON oil or one with similar characteristics using a funnel.



▶ screw on the filler cap;

▶ using the handwheel, tension the blade to 70 Bar = 900 Kg.

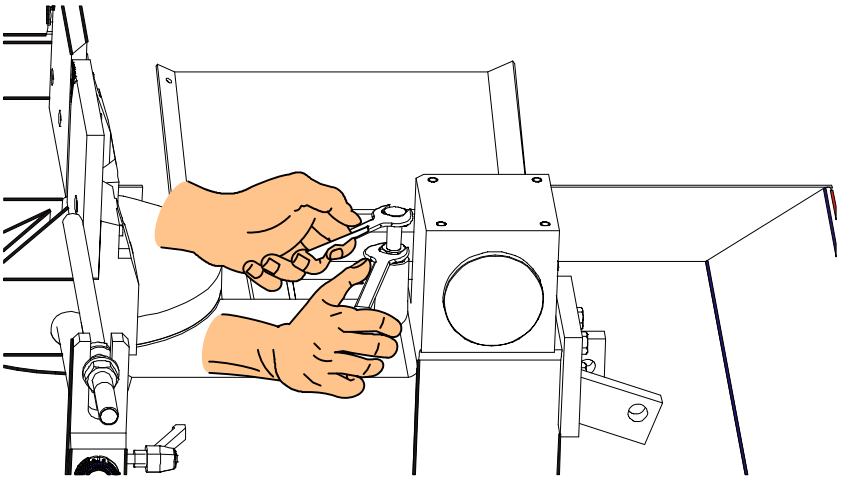


**Attention** The machine enters emergency status if the blade tension is too slack. A pressure contact (pressure switch) disables blade start–up if the blade is not correctly tensioned, since it might otherwise slip off the wheels, cut poorly or wear prematurely. This should always be born in mind when using the machine.

## Adjusting operating head travel

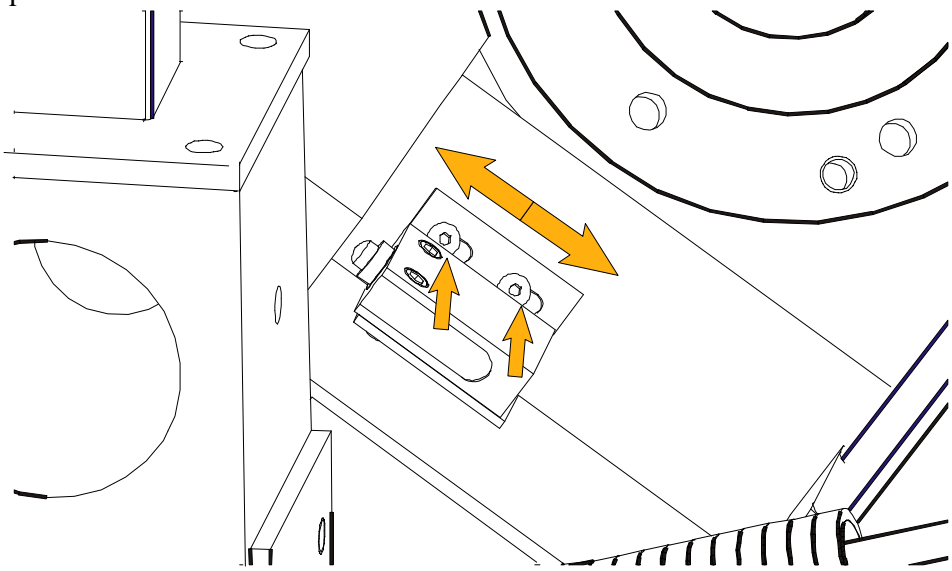
During the cutting cycle the cutting head stroke is limited by the FCTI (Head Upstroke Limit) and FCTA (Head Downstroke Limit), set electronically on the control panel, as described on Page 5. The cutting head has a mechanical limiting switch that determines its downstroke:

▶ to change this setting, two hexagonal spanners must be used, one to keep the nut in position, and the other to tighten and loosen the stop screw.



**Warning** If the machine is equipped with the Cut Control System (CCS), regulation of the FCTA is done as follows.

▶ The CCS has an electrical limiter, functioning as HDL, located on the back of the machine; according to the type of work cycle to be carried out, the distance of the limiter from the striker can be regulated by adjusting the support plate screws.



# Blade guide parts

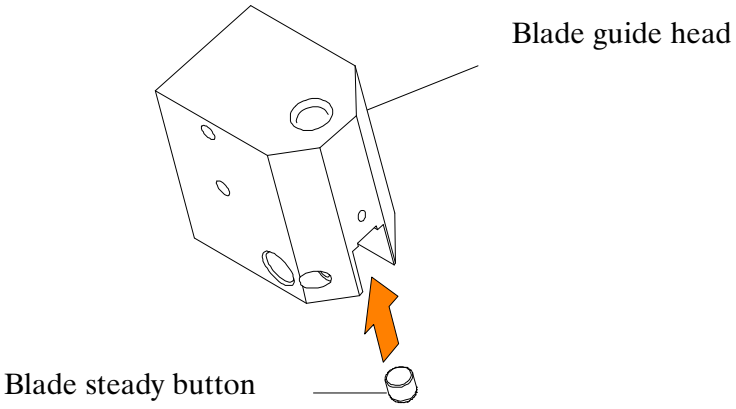
Band saw blades offer enormous advantages to cutting applications, without requiring any special skills by the operator. A description follows of the blade guide adjustments required to ensure correct operation of the saw.

## Blade guide heads

The first blade adjustment involves adjustment of the heads. The blade guide heads comprise the blade guide plates which ensure correct longitudinal alignment, the blade steady buttons which control vertical blade flexure, and the coolant supply cocks.

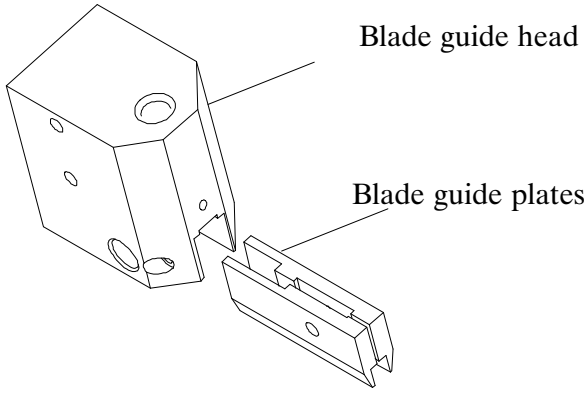
## Blade steady buttons

The blade steady buttons prevent upward blade flexure caused by the vertical action of the cutting force. These buttons are fitted on both the front and rear heads, and need no adjustment.




## Blade guide plates

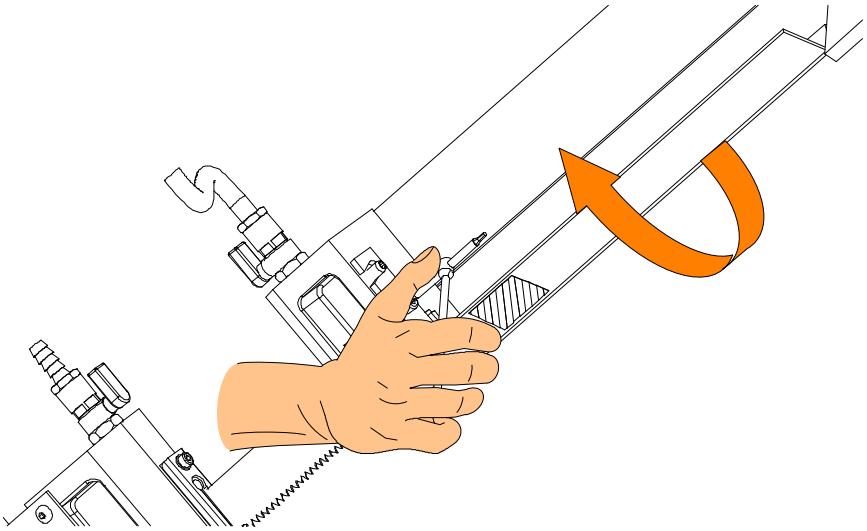
The plate contact points feature widia inserts which guide the blade longitudinally. A small amount of play must exist between the plates and blade to ensure that the blade runs smoothly and perpendicular to the work table.



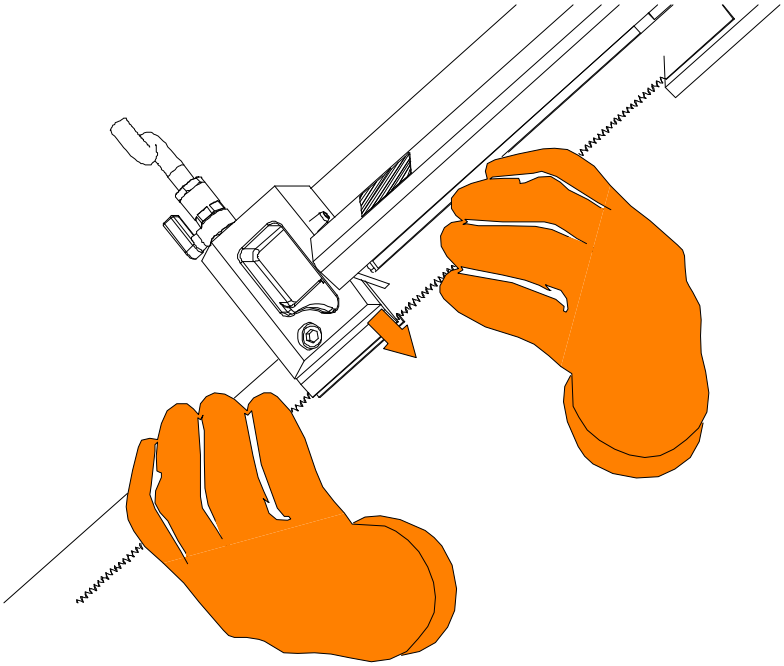

Thanks to the widia inserts, the working life of the guide plates is practically the same as that of the machine itself. However, if due to wear or the assembly of a new blade with a different thickness, the amount of play between the plates and blade changes, the plates must be adjusted as follows:

▶ disconnect the machine from the power supply;

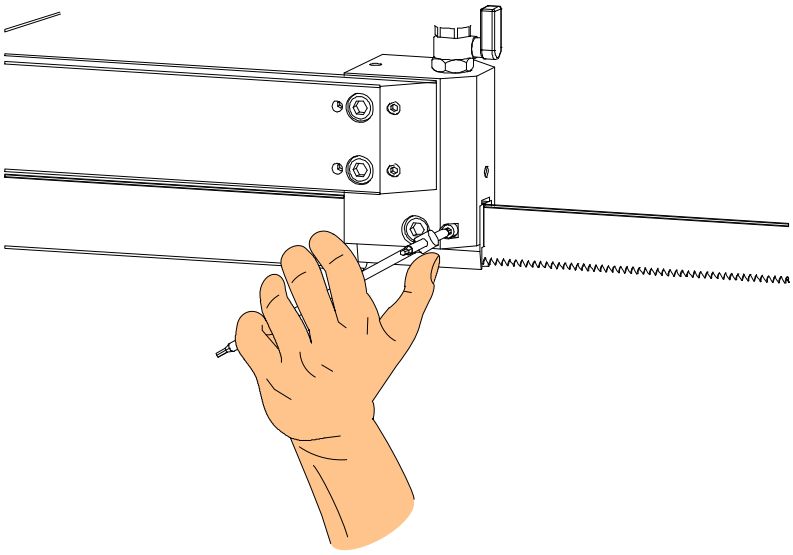
- slacken the blade tension using the handwheel;
- open the front blade guard by undoing the fixing screw and rotating it as illustrated in the figure below;



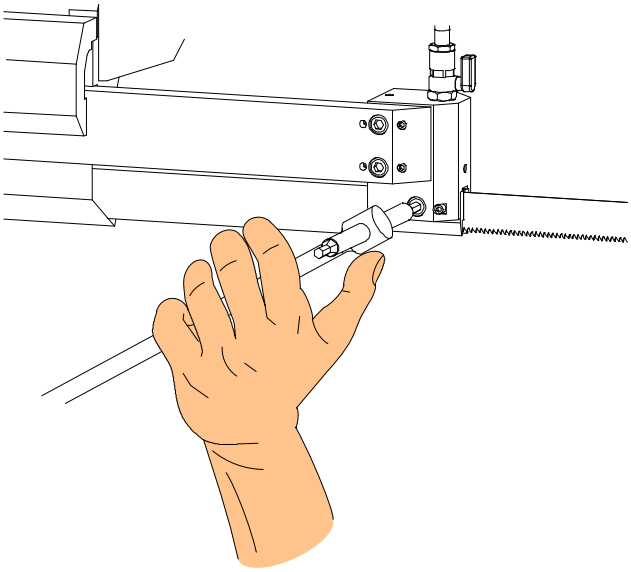
- wear protective gloves when making this adjustment;
- make sure there is a small amount of play between the blade and guide plate inserts;



- if the amount of play is not sufficient for the blade to run smoothly, adjust the locking torque of the two grub screws with an Allen key;



- replace any worn plates by removing the plate fixing screw;



- repeat the above sequence of steps on the rear blade guide head;
- refit the front blade guard;
- tension the blade and power up the machine again.

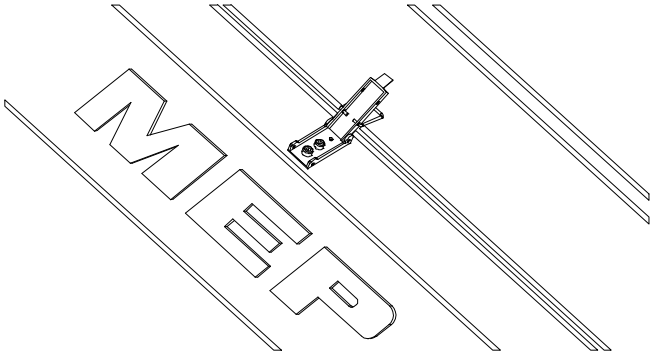
# Blade

The adjustments required to ensure correct operation of the blade are described below. For further information about band saw blades, refer to Chapter 9 which provides a more detailed description of the different types of blade.

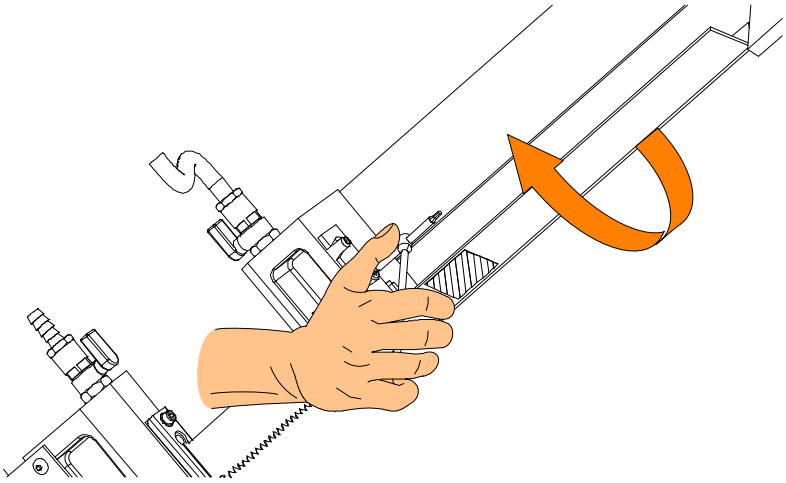
## Tool change

Optimum working conditions both enhance operator safety and extend the tool's service life. The cutting tool should in any case be replaced when poor cutting performance starts to affect productivity. The tool changeover procedure is described as follows:

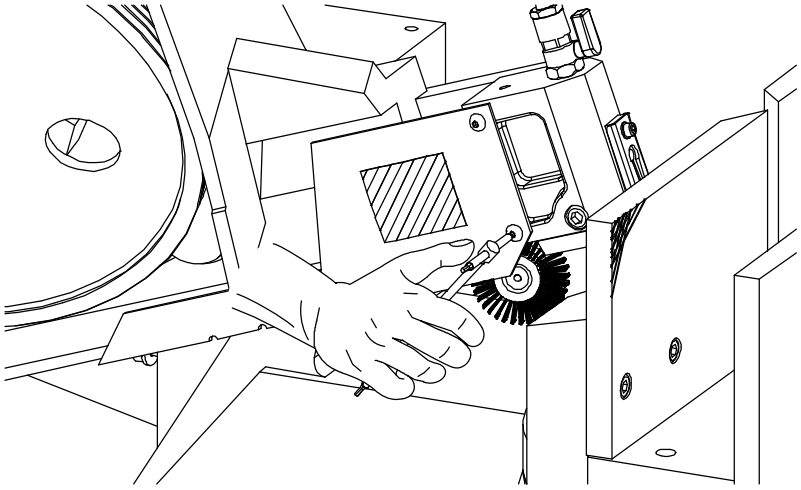
- disconnect the machine from the power supply;
- slacken the blade tension using the handwheel;
- open the cutting head cover by unscrewing the two knobs and hooking it onto the galvanised lever on the back of the head;



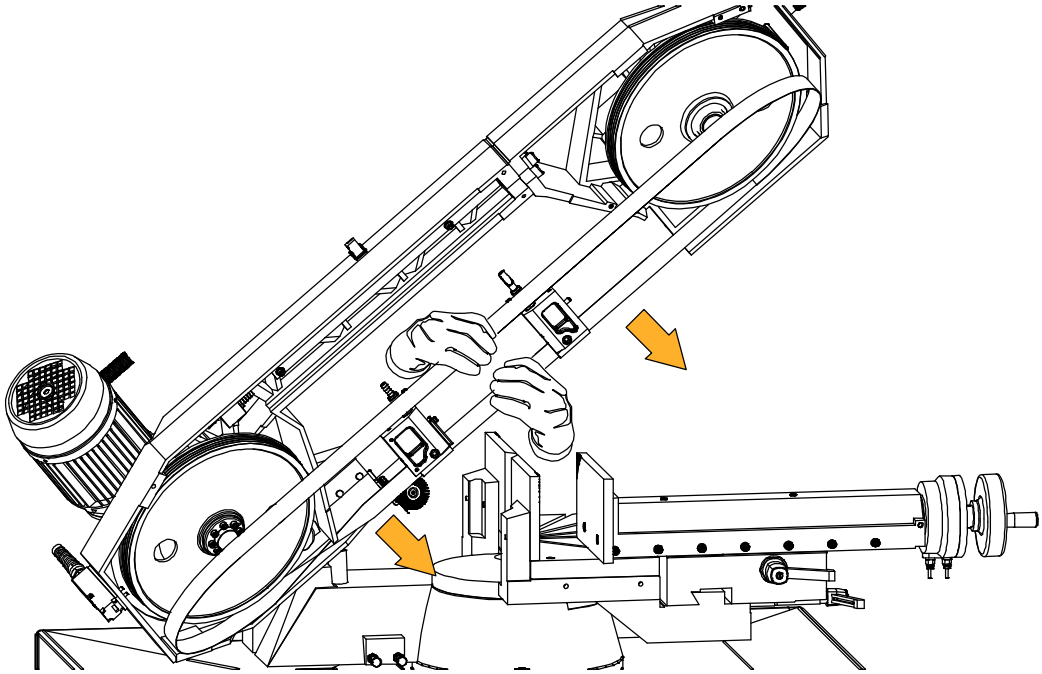

- open the front blade guard by undoing the fixing screw and rotating it as illustrated in the figure below;



- remove the rear blade guard by undoing the two fixing screws using an Allen key;



- wear protective gloves when changing the blade;
- remove the worn blade by sliding it off the flywheels and front and rear heads;
- fit the new blade into the front blade guide head;
- make sure the back of the blade is facing the flywheel stop and that the teeth along the lower part of the blade are inclined towards the head pivot.
- Make sure there is a small amount of play between the blade and guide plate inserts;

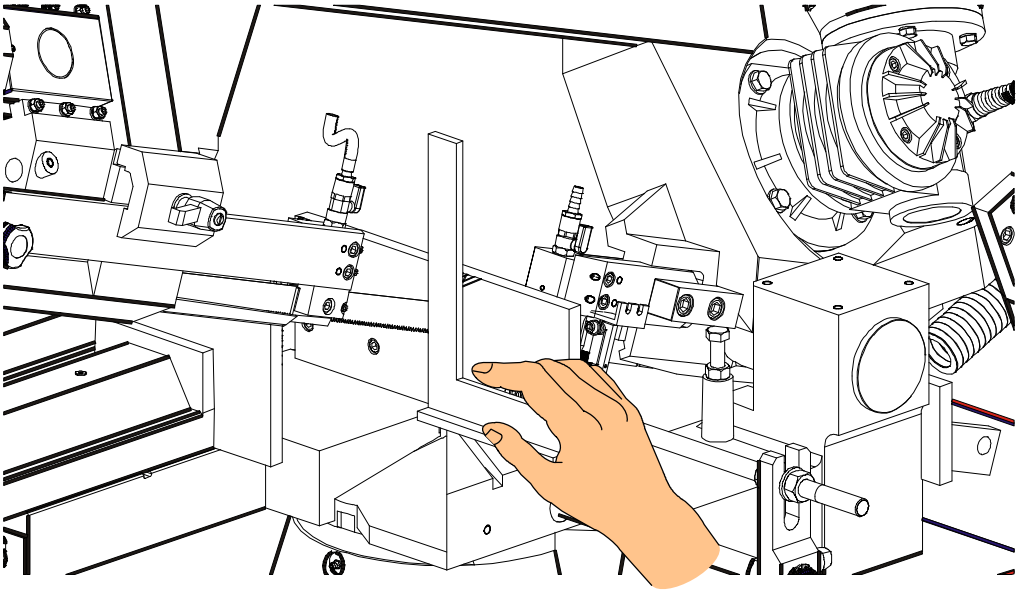


- repeat the above sequence of steps on the rear blade guide head;
- fit the blade on the flywheels and remount the front and rear blade guards;
- close the cutting head cover, correctly tension the blade and power up the machine.

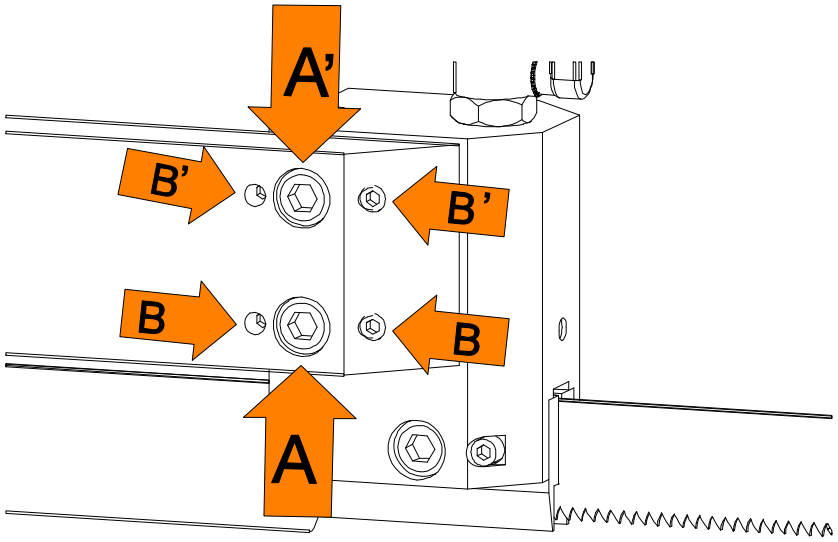
## Blade perpendicularity

The perpendicularity of the blade to the work surface, and also the blade tension, are vital for achieving straight cuts. This adjustment is carried out with the help of a workshop square, which should be placed adjacent to the blade resting on the work surface.

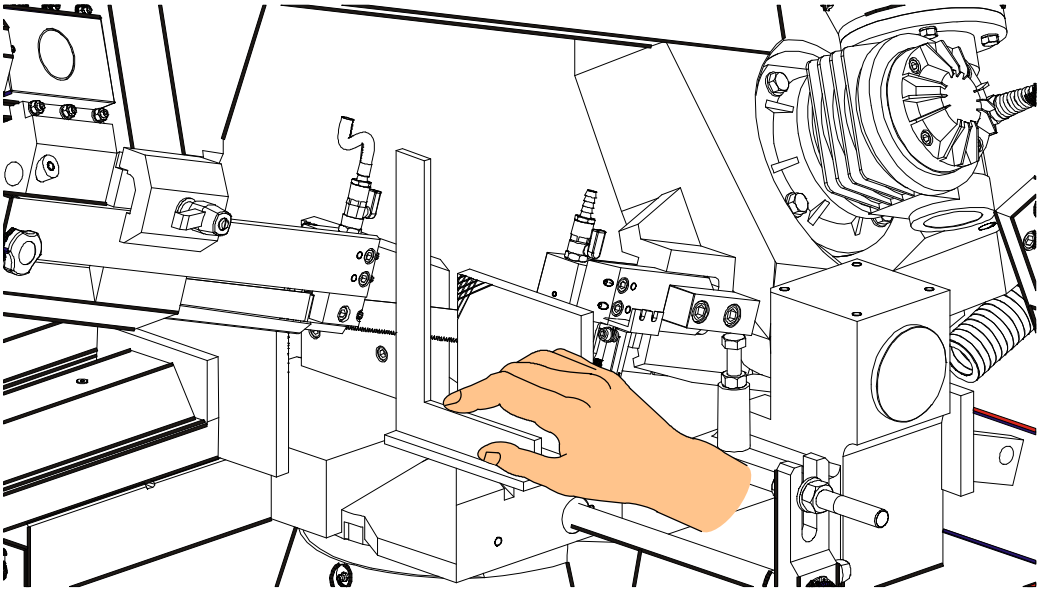
▶ Position the square on the cleaned work surface and rest it against the blade, close to the right vice jaw at a point where the blade teeth do not prevent contact.



▶ Slacken the TCEI head fixing screw (A) and adjust the two grub screws (B) if the blade touches the square at its lower part. If the point of contact is at the upper part, slacken the TCEI screw (A') and tighten grub screws (B') equally until the blade is perpendicular to the square.



▶ Position the square on the work surface close to the front head.

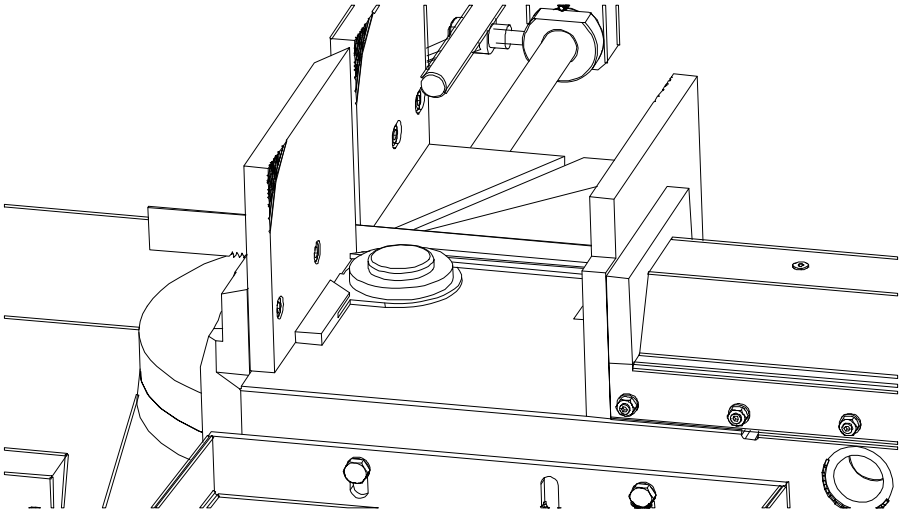


▶ Repeat the squaring operations as for the rear head.

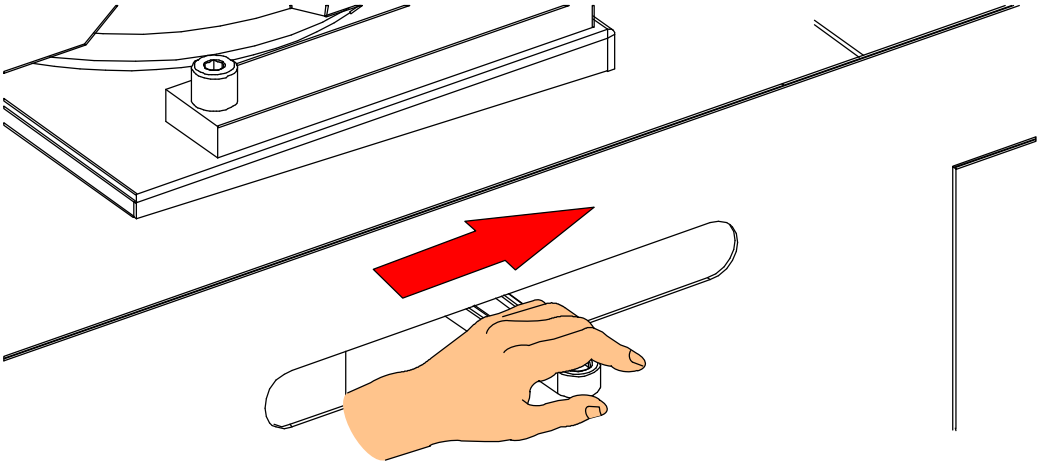
## Orthogonality of the blade

The procedures for correcting and adjusting the band at 0°, 45° and 60° on the left, for cuts orthogonal to the vice square, are described here below.
To **make orthogonal adjustments at 0°**, use a workshop goniometer or a simple 90° square. Operation sequence:

- ▶ lower the head;
- ▶ position the goniometer or square, resting it on the fixed vice jaw adjacent to the blade;

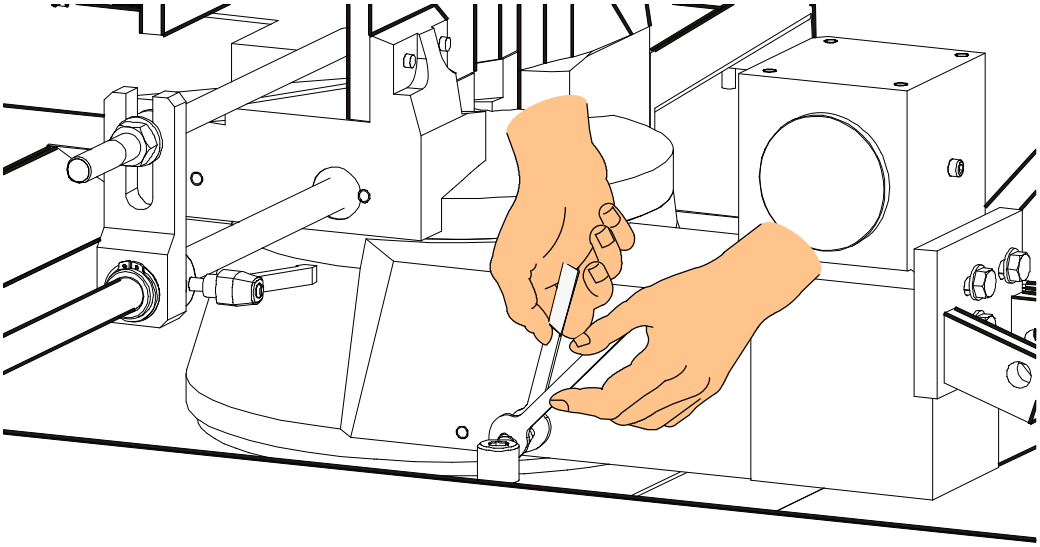


- ▶ Slacken the head locking lever, by gripping it from the operator side and pushing it forwards.



- ▶ Slacken the nut and, holding it firm with a hex wrench, adjust the stop screw

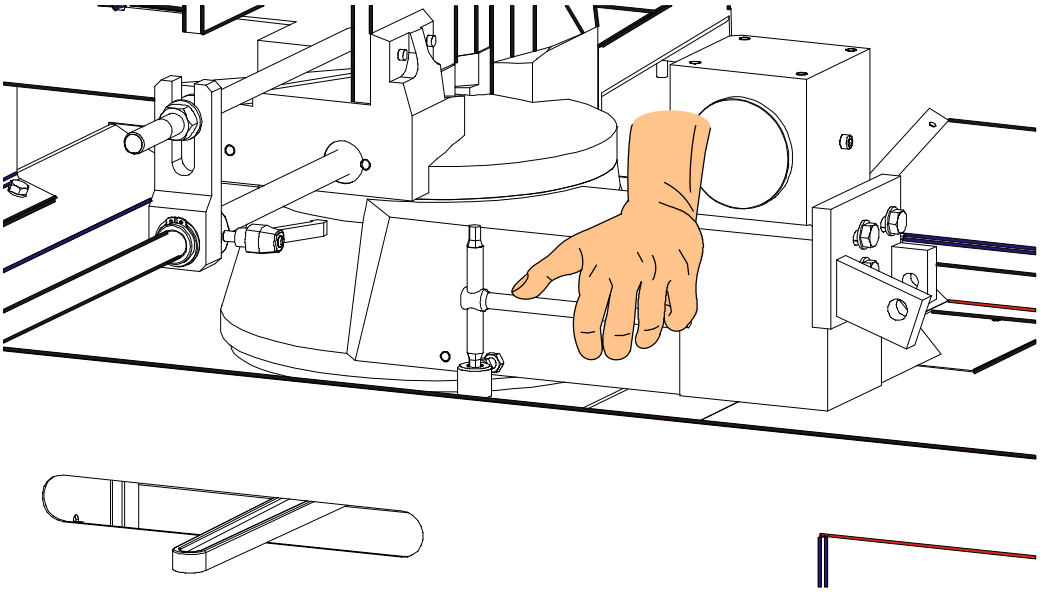
until the right angle error shown on the goniometer is corrected.



- ▶ Retighten the nut to lock the stop screw in the correct position.
- ▶ Finally, lock turntable and head rotation by pulling the locking lever back towards you.

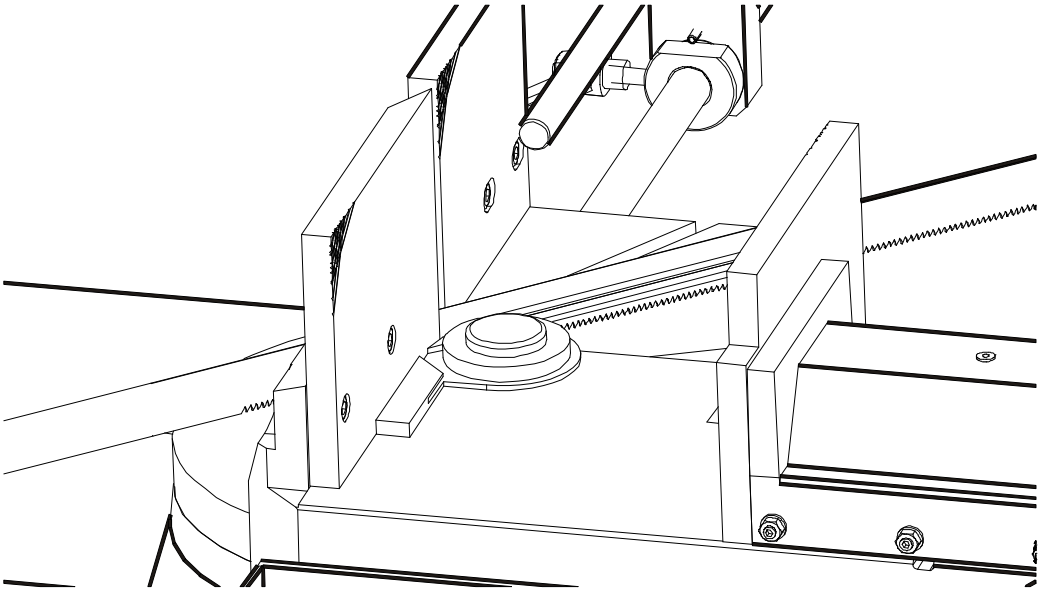
**Warning** To **adjust the 45° and 60°** fixed points, you will need a workshop goniometer or an instrument that can measure the exact angle of the blade.

- ▶ Operation sequence:
- ▶ First remove the 0° stop on the cutting head.

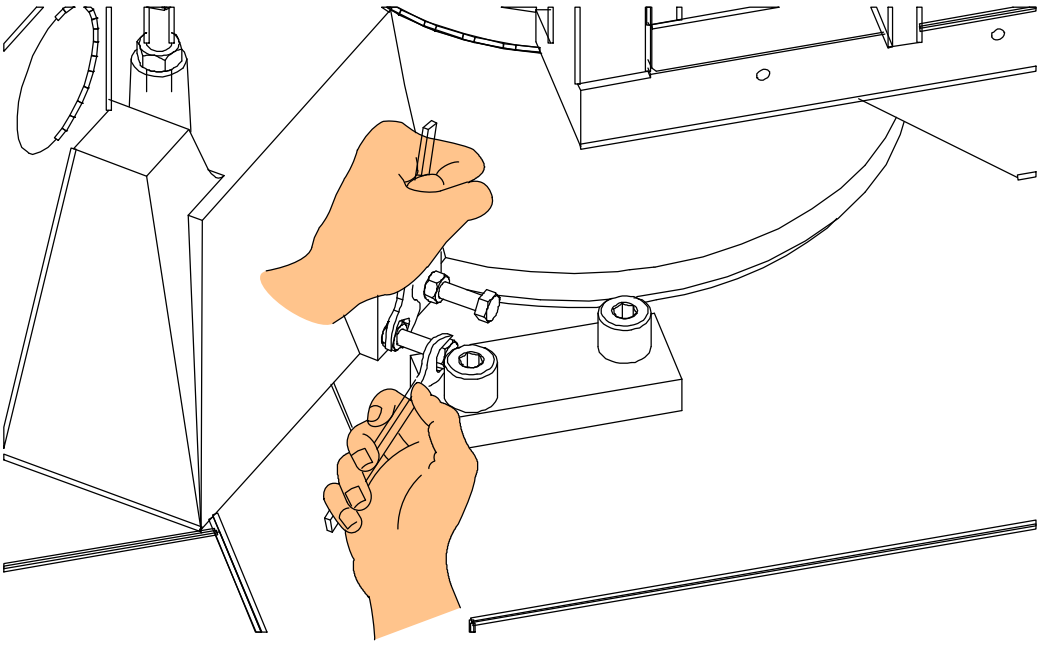


- ▶ Slacken the head locking lever by pushing it forwards.
- ▶ **With the head raised**, rotate the unit to 45° or 60°.
- ▶ Lower the head.
- ▶ Position the goniometer or graduated square against the fixed vice jaw, adja-

cent to the blade.



▶ Slacken the nut (opposite side to previous one) on the stop screw while holding it firm with a hex wrench.



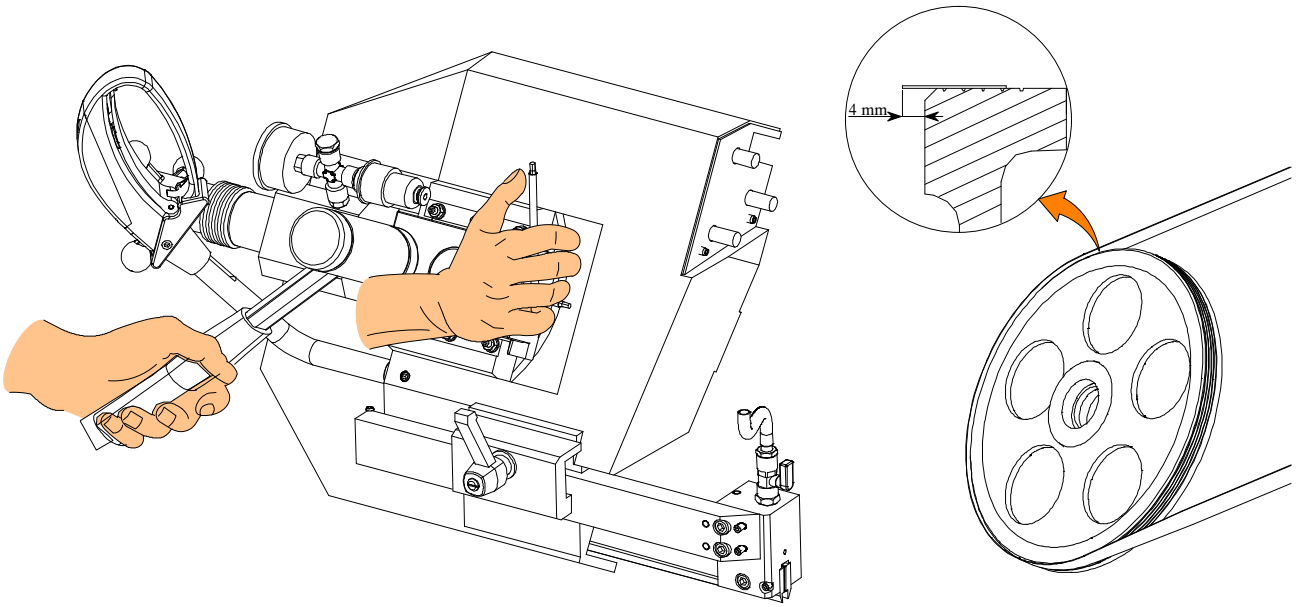
▶ Adjust the stop screw until the angle error registered by the goniometer is corrected. This done, lock the nut while holding the screw steady.

▶ Make sure all the stops are secure and that the locking lever is pulled back (locked).

## Rotation axis control

Pulleys must be adjusted in their coplanarity. The adjustment is aimed at ensuring the belt rotation, keeping approx. 4 mm of distance from the point of the belt teeth to the pulley machined surface. This prevents an early wear of the belt.

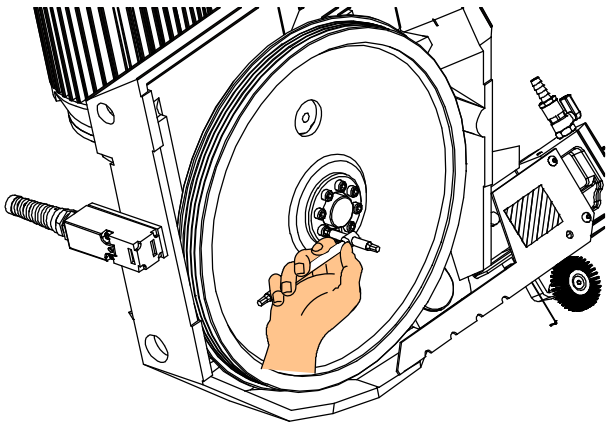
- ▶ Slacken the blade tension and open the cutting head cover;
- ▶ slacken the grub screw and, using a mallet, tap the shaft in or out;
- ▶ finally, close the cover and set the blade in motion;
- ▶ check the distance, as shown in the picture;



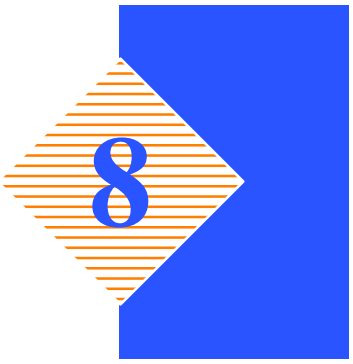

- ▶ if necessary, repeat the operation till getting the correct position.

Rear flywheel alignment is closely linked to adjustment of the front flywheel.

- ▶ Adjust by loosening all pulley locking screws and moving the pulley manually inwards or outwards according to the distance of the blade from the pulley machined surface. Tighten the screws again and check the coplanarity making the belt turn a few times.



# Maintenance and choice of consumables




**SHARK 281** is built to be sturdy and long–lasting It has no need of any special maintenance, though, like all other tools, it needs adjusting from time to time, especially if not regularly looked over or used without due care.

This chapter, therefore, is intended as a guide for those who want to look after the machine and get the most out of it for as long as possible.

## The role of the operator

The person operating and maintaining the machine must follow these instructions for his own safety, as well as for the safety of other personnel, and in the interests of machine productivity:

- check that his own work and that of the other operators of the machine always complies with the relevant safety standards. Therefore, check that the safety devices are in position and work perfectly and that personal safety requirements are complied with.
- Ensure that the working cycle is efficient and guarantees maximum productivity, checking:
  - the functions of the main components of the machine;
  - the sharpness of the blade and coolant flow;
  - the optimum working parameters for the type of material.
- Check that the quality of the cut is that required and that the final product does not have any machining defects.

## Maintenance requirements

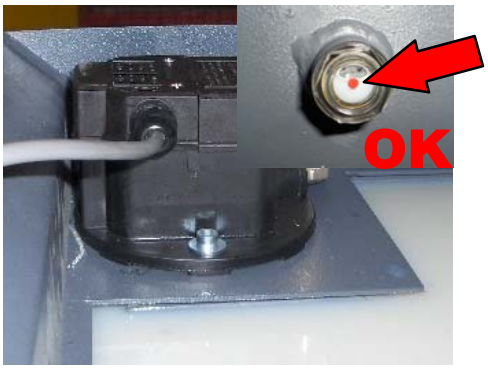
- All ordinary and extraordinary maintenance must be carried out with the power switched off and the machine in emergency condition.
- To guarantee perfect operation, all spare parts must be MEP S.p.A originals.
- On completion of maintenance works, ensure that the replaced parts or any tools used have been removed from the machine before starting it up.
- Any behaviour not in accordance with the instructions for using the machine may create risks for the operator.
- Therefore, read and follow all the instructions for use and maintenance of the machine and those on the product itself.

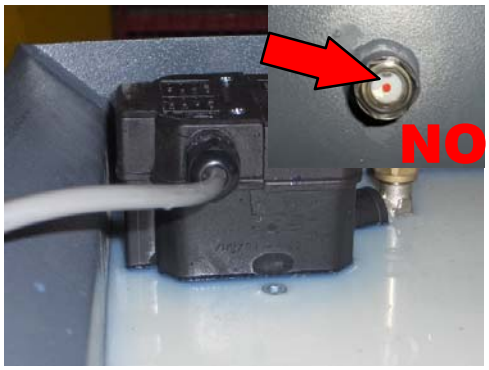
# General maintenance

## Daily

The daily maintenance operations to carry out on the machine are as follows:

- remove all swarf from the machine (preferably with a non−fibrous cloth);
- empty the swarf drawer (this is located on the right side of the base);
- top up the lubricant/coolant level;



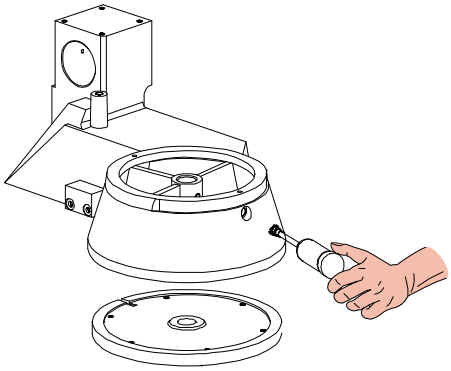




- check state of blade wear and replace if necessary;
- check the blade cleaning brush, clean and relocate; if worn, replace;
- at the end of the working day, slacken the blade to 5 Bar (70 Kg) tension to prevent unnecessary and damaging stress on the machine.

## Weekly

The weekly maintenance operations are as follows:

- remove all swarf;
- clean the vice and lubricate all joints and sliding surfaces with a good quality oil;
- check the position of the blade−tensioning rod, which should project by 44 mm. from the blade tensioning cylinder; if this is not so, proceed to top up the cylinder as described in Chapter 7;
- Top up the lubrication circuit inside the turntable by means of the ball−type lubricator located at the front.



- check vice sliding; if it is not precise and has transversal play, adjust as instructed in Chapter 7.

### Monthly

This section lists the operations to be carried out for the monthly maintenance of the machine:

- check the perpendicularity of the blade to the work surface; if it is necessary to adjust the blade setting, follow the instructions set out in Chapter 7;
- check on blade orthogonality with respect to the workpiece rest shoulder; if adjustment is necessary, proceed as instructed in Chapter 7;
- check that the 0° notch on the work table is in line with the graduation on the turntable; if not, readjust by regulating the 0° stop; then re−check that the blade is perpendicular and orthogonal;
- check the precision of the 45° and 60° left stops and the 45° right stop; if out−of−set, adjust following the steps indicated in Chapter 7;
- check the state of the widia inserts and the blade steady button; replace if worn or chipped; check their positions and adjust if necessary (see Chapter 7);
- thoroughly clean the bottom of the water tank and the electropump filter;
- check oil level in the CCS optional hydraulic cylinder (Chapter 7).

## Maintenance of working parts

In maintenance work on the **SHARK 281**, special attention should be paid to operating units such as the blade tensioning cylinder, already dealt with in Chapter 7, topping up levels, the air treatment unit, the pneumatic vice on the MA version, and the optional CUT CONTROL SYSTEM. The transmission box equipping the machine needs no maintenance.

## Consumable materials

Only specified oils must be used for the hydraulic and pneumatic and for lubricant/coolant devices. Below is a list of compatible oils for each of these circuits.

### Oil for blade tensioner cylinder

The type of oil the machine works with is AGIP OSO 15, class F, ISO and UNI FD 22; The following are compatible or equivalent oils:

API Cis 22 − ARAL Dural SR 22 − CASTROL Hyspin AWS 22 − ESSO Spinesso 22 − IP Hydrus oil 22 − TOTAL Azolla ZS 22 − VALVOLINE ETC 22 − MOBIL Velocite oil D − Mobil DTE 22 − MOBIL ATF 220 − OLIO FIAT HTF 22 − Q8 Haydn 22 − SHELL Tellus oil 22 BP AUTRAN GM−MP;

Blade tensioner unit:

– tank capacity Lt. 0.6
– oil volume Lt. 0.5

### Oils for Cut Control System hydraulic circuit

The type of oil the machine works with is MOBIL DTE 11 oil, ISO and UNI FD 22 symbol. It s application regarding the cylinder head

Cut Control System:
– tank capacity Lt. 0.2

### Oil for transmission box

The machine can be equipped with a worm gear which is permanently lubricated and therefore maintenance–free.
Otherwise, the machine can be equipped with a worm gear having filler cap, level checker and drain to top the oil up if necessary. Below, there is a short list of synthetic oils for permanent lubrication:

BP Energol SG XP220 – KLUBER Syntheso D220EP – ESSO Glycolube Range 220 – IP CT614 – FINA Girans.

– transmission box capacity Lt. 0.320

### Oil for lubricant/coolant fluid

The oil used for the machine lubricant/coolant fluid is CASTROL Syntolin TFX. Though there are no specific standards for these types of oils, MEP considers that the above product has the best price/quality rapport. The following oils can also be said to have similar characteristics and are therefore compatible:

AGIP NB 200 – SHELL Lutem TT – IP Utens Fluid–F

Finally, a lubricant/coolant guaranteed and distributed by a band saw manufacturer (LENOX) is BAND–ADE SAWING FLUID LENOX.

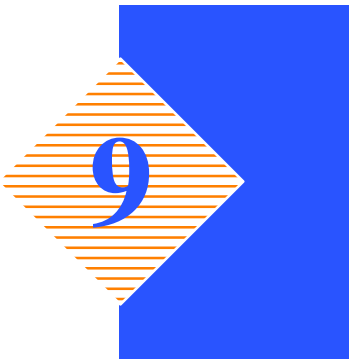
– tank capacity Lt. 113
– oil concentration 5–6 %

### Oils for spray mist system (optional)

The oil type used for the machine spray mist system is the cutting oil: Blaser Vascomill F 22.
Though there are no specific standards for these types of oils, MEP considers that the above product has the best price/quality rapport. The following oils can also be said to have similar characteristics and are therefore compatible:

SHELL MACROM 401 F22 – AGIP ESTRAMET F20

# Cutting speed and choice of tools




The cutting speed is determined by the blade speed and the head feed speed. While the head speed is provided by the downstroke movement of the head, the blade rotation speed can either be fixed or variable.

When using the **SHARK 281**, it is important to select the correct type of blade for the material to be cut. This chapter explains the limitations and specific applications of the different types of blades.

## Cutting speed

### Standard machine

The basic version with 2/4 pole motor, is provided with the following cutting speeds:

- 1st speed = 36m/min. (4 pole)
- 2nd speed = 72 m/min. (2 pole)

These speeds are selected using the polarity change switch situated on the control panel.

### Machine with 4/8 pole motor (optional)

The machine can be provided with the optional 4/8 pole spindle motor, which supplies the following cutting speeds:

- 1st speed = 18 m/min. (8 pole)
- 2nd speed = 36 m/min. (4 pole)

## Choice of blade

When using band saws to cut metals, an important factor is the choice of pitch, i.e. the number of teeth per inch (25.4 mm.), which must be suitable for the workpiece material. The following recommendations may be taken as general guidelines:

- thin−walled materials, such as sheet steel, tubes and profiles require a fine pitch frequency. 3 to 6 teeth should be engaged in the breadth of the material at any one time;

- large section cutting requires a coarse pitch to cope with the higher volume of swarf and optimal tooth penetration;
- soft materials (aluminium alloys, soft bronze etc.) also require a coarse tooth pitch.

### Saw tooth pitch

The choice of teeth per inch, therefore, depends on various factors:

- the size of the section;
- the hardness of the material;
- workpiece wall breadth.

Very large dimensions require coarse teeth, while small dimensions require finer teeth. Whatever the case, ensure that there are always at least six teeth engaged in the cut, with reference to the thinnest vertical walls positioned transversally to the blade.
Concerning the type of Shark machine, a first broad distinction can be made according to the hardness of materials:

| | Mild steels < 61 HRB < 55 kg/mm$^2$ | Hard steels > 65 HRB > 65 kg/mm$^2$ |
|---|---|---|
| | **NR. TEETH/INCH** | **NR. TEETH/INCH** |
| **MINIMUM** | 3 / 4 | 5 / 8 |
| **OPTIMUM** | 4 / 6 | 6 / 10 |
| **MAXIMUM** | 8 / 12 | 10 / 14 |

### Cutting speed and downstroke speed

The cutting speed (m/min) and the downstroke speed (cm$^2$/min) are limited by the heat generated around the points of the teeth. If the downstroke speed is too high, the cut will not be straight, either vertically or horizontally.

The cutting speed depends, as indicated above, on the tensile strength of the material (kg/mm$^2$), its hardness (HRB) and the thickness of largest sections. The downstroke speed depends on the material thickness. Therefore, large−section, solid or thick−walled materials (s > 5 mm), can be cut at high speeds, providing there is sufficient swarf removal from the blade; thin−walled materials, such as slim piping or profiles, must be cut using low and especially constant downstroke speeds.

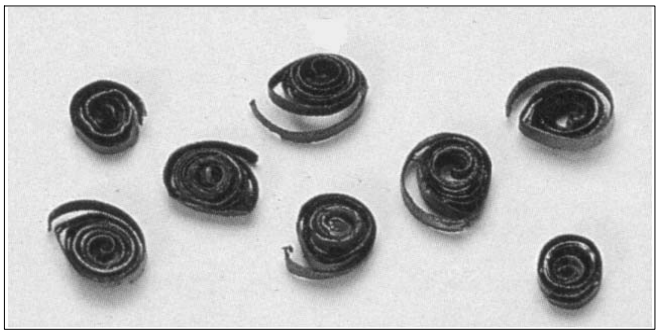
A new blade must be worn in, which in effect means lowering the downstroke speed to about half that of normal (from 60 to 70 cm$^2$/min on normal steels), equal to a removed surface area of about 300 − 600 cm$^2$.

### Types of swarf:

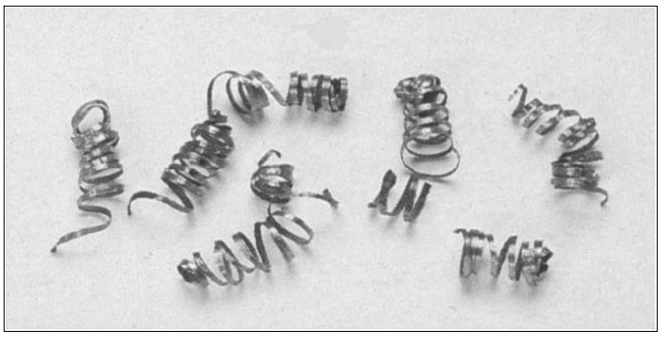
- Very fine or fragmented swarf indicates that the downstroke speed and/or cutting pressure is too low.



- Thick and/or blue swarf indicates that the blade is overloaded.

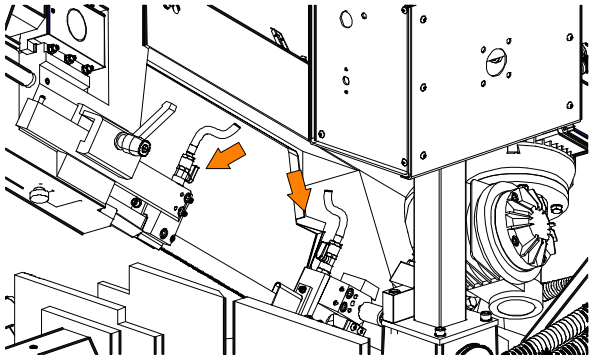


- Long coils of swarf indicate ideal cutting conditions.



## Lubricant/coolant fluid

The lubricant/coolant fluid must ensure so that neither the saw teeth nor the work piece material in the cutting zone overheat. Furthermore, there must be a sufficient quantity and pressure of lubricant/coolant to remove swarf from the cutting zone. The lubricant/coolant fluid must be of the highest quality in order to prevent tooth abrasion and welding of swarf to the teeth themselves (seizing).



## Blade structure

The most commonly used blades are the bimetal types, i.e. manufactured with a silicon steel body and having a high fatigue strength, and super high−speed steel teeth; the two parts are welded by electronic or laser−welding.
Standardised teeth types are termed M2 and M42; the difference being that M42 teeth are harder due to the addition of cobalt to the steel used to make the teeth.

| Key | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Mo | Molybde-num | Ni | Nickel | Si | Silicon | V | Vanadium | W | Tungsten |
| Al | Aluminium | C | Carbon | Co | Cobalt | Cr | Chromium | Mn | Manganese |

| TYPE OF BLADE | *C* | *Mn* | *Si* | *Cr* | *W* | *Mo* | *V* | *Ni* | *Co* | *Al* | *HRC* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0,47 | 0,75 | 0,22 | 1,00 | | 1,00 | 0,12 | 0,52 | | 0,08 | 45–50 |
| ***HSS M2*** HRC 65–66 HRC 45–50 | 0,85 | 0,25 | 0,30 | 4,15 | 6,37 | 5,00 | 1,92 | | | | 64–66 |
| ***HSS M42*** HRC 67–68 HRC 45–50 | 1,07 | 0,25 | 0,20 | 3,75 | 1,50 | 9,50 | 1,15 | | 8,00 | | 67–69 |

**N.B.** The numbers in the columns indicate the % content of the element in the steel.

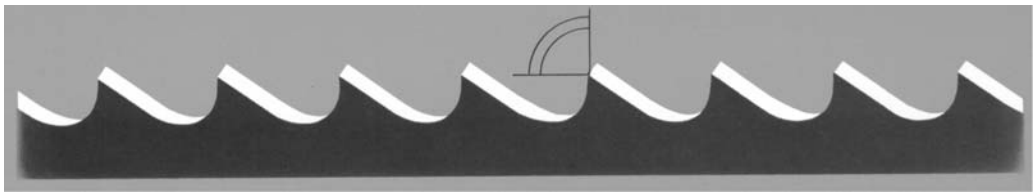
## Blade types

The blades mounted on the **SHARK 281** are 2.950 x 27 x 0.9 mm.; the length can vary between 2.960 mm. and 2.940 mm., thanks to the blade tensioner device. The blades, however, apart from size and tooth pitch, are differentiated by other geometrical characteristics which determine their specialised uses:

- tooth cutting angle (rake), can be 0¿ or positive;
- the tooth pitch can be constant or variable;
- the set, i.e. the various teeth alignments, have many possible configurations.

## Conventional rake

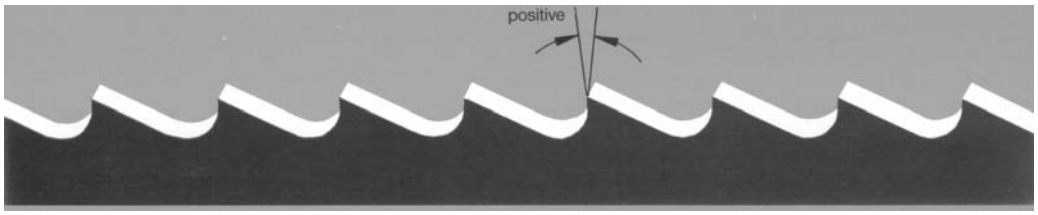
Cutting angle 0°, constant pitch.



In general use, for small or medium section cast iron or steels and rolled materials, for straight or angled cuts.

## Positive rake

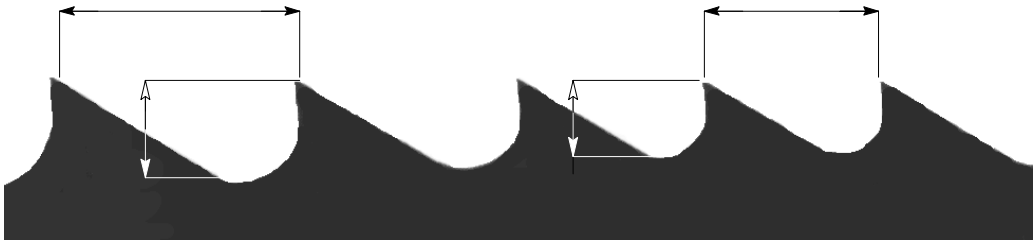
Positive cutting angle 9–10°, constant pitch.




Can be used for cutting all types of materials, and is particularly suited to low–carbon and non–ferrous steels. Used for cutting very large sections and diameters.

## Variable pitch

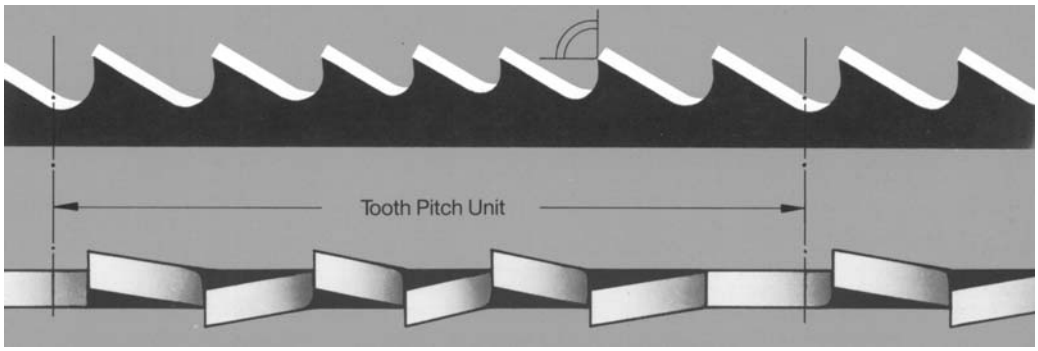
These blades have groups of teeth having different pitches and, as a consequence, have various tooth dimensions and differing relief angles. These are also available in M2 and M42 types with zero and positive rakes. The alternation of the different types of teeth helps to prevent vibration and noise. Elimination of vibration increases the useful life of the tool and improves the cut surface finish.



A further advantage in using these types of blades lies in the fact that a wide range of different material types and dimensions can be cut with the same blade.

### Variable pitch blades with 0° cutting angle

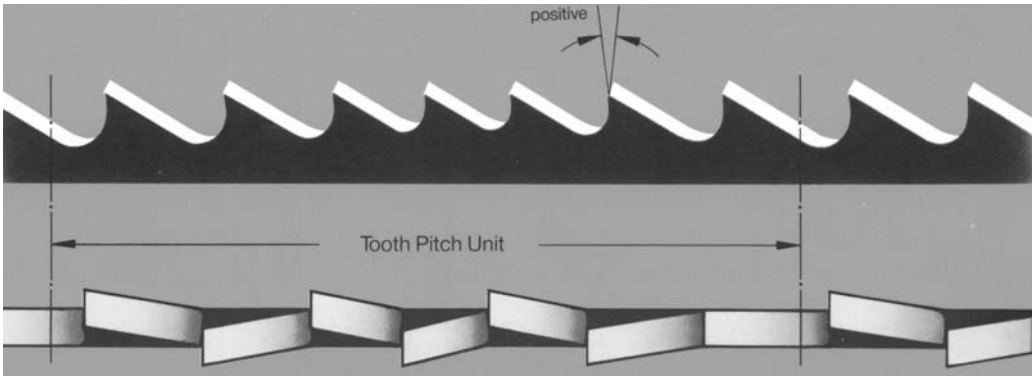
This type of tooth formation is ideal for cutting single pipes or medium size bundles, in accordance with the capacity of the machine.




Pitches available: 3–4 / 4–6 / 5–7 / 5–8 / 6–10 / 8–12 / 10–14.

### Variable pitch with positive rake (from 9 to 10 degrees)

This toothing type is the most suitable for cutting large dimension pipes and profiles, including large sections, as well as for cutting solid sections up to the machine capacity limit.




Pitches available: 3–4 / 4–6.

### Set:

The term set refers to the section of material removed by the blade during the cutting operation, i.e. relating to width of cut and the offset position of the teeth with respect to the blade back.

### Standard or splayed set

This term is used to describe an alternated angling of the teeth: one to the right, one to the left and one straight.



For general use on materials over 5 mm. thick. Suitable for cutting steels, castings and non–ferrous hard materials.

### Undulated set

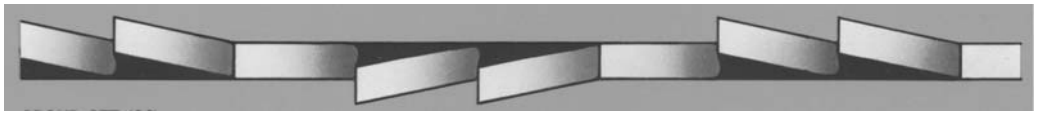
Used to describe groups of teeth undulating alternatively to the right and left.



This type of set is used with very fine teeth for cutting thin pipe walls and small−section profiles (from 1 to 3 mm).

### Alternating grouped sets

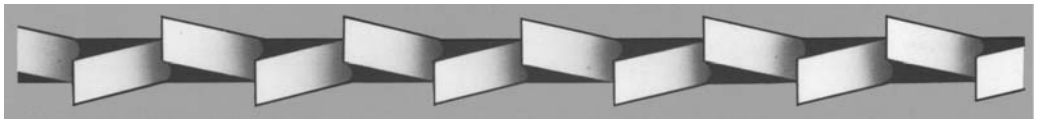
These are groups of teeth angled to the right, one straight tooth, then a further group angled to the left.



This set is used for very fine teeth for cutting very thin sections (less than 1 mm).

### Alternating set

This set is one tooth to the right followed by one to the left.



This set is used for soft non−ferrous materials, plastics and wood.

## Blade selection table relating to cutting speed and downstroke speed

| Cutting material | Cutting speed mt./min | Dimensions of the cutting section S (mm) S10 | 10S30 | 30S50 | 50S80 | 80S120 | 120S230 | Lubrication | sq. mt./min. cut |
|---|---|---|---|---|---|---|---|---|---|
| Structural steel<br>Casehardened steel<br>Steel for turning<br>Mild steel | 50 / 70 | 10 / 14 | 10 / 14 | 6 / 10 | 5 / 8 | 4 / 6 | 3 / 4 | Emulsible oil<br>Cutting fluid | 60 – 70 |
| | | 14 | 10 | 8 | 6 | 4 | 3 | | |
| High–duty cast iron<br>Rolled steel<br>Spring steel | 40 / 50 | 10 / 14 | 10 / 14 | 6 / 10 | 5 / 8 | 4 / 6 | 3 / 4 | Emulsible oil | 50 – 60 |
| | | 14 | 10 | 8 | 6 | 4 | 3 | | |
| Alloy steel<br>Tool steel<br>Valve steel | 30 / 40 | 10 / 14 | 10 / 14 | 6 / 10 | 5 / 8 | 4 / 6 | 3 / 4 | Emulsible oil<br>Cutting fluid | 15 – 20 |
| | | 14 | 10 | 8 | 6 | 4 | 3 | | |
| Stainless steel<br>Nodular cast iron | 30 / 40 | 10 / 14 | 10 / 14 | 6 / 10 | 5 / 8 | 4 / 6 | 3 / 4 | Emulsible oil | 15 – 20 |
| | | 14 | 10 | 8 | 6 | 4 | 3 | | |
| Copper<br>Soft bronze | 90 / 150 | 10 / 14 | 10 / 14 | 5 / 8 | 4 / 6 | 3 / 4 | 3 / 4 | Emulsible oil | 75 – 90 |
| | | 14 | 10 | 6 | 4 | 3 | 3 | | |
| Brass | 90 / 300 | 10 / 14 | 10 / 14 | 5 / 8 | 4 / 6 | 3 / 4 | 3 / 4 | Emulsible oil | 80 – 90 |
| | | 14 | 10 | 6 | 4 | 3 | 3 | | |
| Hard bronze | 20 / 40 | 10 / 14 | 10 / 14 | 5 / 8 | 4 / 6 | 3 / 4 | 3 / 4 | Emulsible oil | 25 – 40 |
| | | 14 | 10 | 6 | 4 | 3 | 3 | | |
| Aluminium | 80 / 800 | 10 / 14 | 6 / 10 / 14 | 4 / 6 | 3 / 4 | 3 / 4 | 3 / 4 | Emulsible oil | 70 – 80 |
| | | 14 | 6 | 4 | 3 | 3 | 3 | | |
| Plastics | 90 / 400 | 10 / 14 | 6 / 10 / 14 | 4 / 6 | 4 / 6 | 3 / 4 | 3 / 4 | Emulsible oil | 80 – 90 |
| | | 14 | 6 | 4 | 4 | 3 | 3 | | |

**Blade pitch** **Number of teeth per inch**

## Classification of steels

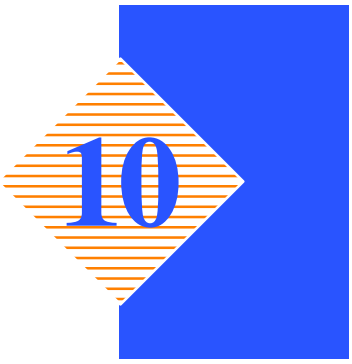
This page provides a table giving the user specific information on the cutting materials, in order that they can be classified on the basis of their hardness, and thus the correct tool can be selected for the task in hand.

| Types of steel | | | | Hardness | | |
|---|---|---|---|---|---|---|
| UNI | DIN | BS | AISI | Brinell HB | HRB | Kg/mmq |
| C 22 – C 35 | CK 22 – CK 3 | En 2 C – En 6 | 1022 – 1035 | 160 – 170 | 34 – 87 | 55 – 59 |
| C 45 | CK 45 | En 8 | 1040 | 160 – 180 | 84 – 89 | 55 – 61 |
| C 10 – C 15 | CK 10 – CK 15 | En 32 C – En 328 | 1010 – 1015 | 150 – 175 | 81 – 87 | 51 – 59 |
| C 60 | CK 60 | En 9 | 1060 | 160 – 180 | 84 – 89 | 55 – 61 |
| | | 4360 – 50 A | | 160 – 180 | 84 – 89 | 55 – 61 |
| | 17100 | 3706 – 1.2.3. | ASTMA – 36/68 | 160 – 180 | 84 – 89 | 55 – 61 |
| 45 Cr Si 9 | 17115 | 4360 | | 160 – 180 | 84 – 89 | 55 – 61 |
| | | En 20 A | | 190 – 215 | 91 – 97 | 64 – 73 |
| 34 Cr Mo 5 | 17221 | 970 – 1955 | 1065 | 180 – 205 | 89 – 94 | 61 – 69 |
| | | En 18 B | 5135 – 5145 | 180 – 200 | 89 – 93 | 61 – 67 |
| 35 Cr Mo 4 | 34 Cr Mo | En 19 B | 4135 | 200 – 230 | 93 – 99 | 67 – 77 |
| | 36 Ni Cr 6 | En 111 | 3135 | 190 – 230 | 91 – 99 | 64 – 77 |
| | | En 36 | 3310 – 3315 | 200 – 230 | 93 – 99 | 67 – 77 |
| 20 Nc Cr Mo 2 | | En 362 | 4315 | 200 – 225 | 93 – 98 | 67 – 75 |
| | | En 100 D | 8645 | 190 – 220 | 91 – 97 | 64 – 74 |
| | 1880 X C 95 | DX | W 1 | 150 – 190 | 80 – 91 | 51 – 64 |
| 100 Cr 6 | 100 Cr 6 | En 31 | 52100 | 210 – 230 | 96 – 99 | 71 – 77 |
| | | B 2 | L 6 | 190 – 230 | 91 – 99 | 64 – 77 |
| 52 Nc Cr Mo KU | 56 Ni Cr Mo V 7 | | | 217 – 248 | 97 – 102 | 73 – 83 |
| | 2750 (280W18) | 18 % W | T 1 | 217 – 248 | 97 – 102 | 73 – 83 |
| | | 1507 – 825 | 1310 | 160 – 220 | 84 – 91 | 55 – 64 |
| | | A 2 | M 13 | 200 – 230 | 93 – 99 | 67 – 77 |
| | 210 Cr 46 | A 1 | D 3 | 215 – 240 | 97 – 101 | 73 – 81 |
| | 4845 | En 58 G | 309 S | 150 – 200 | 80 – 93 | 51 – 67 |
| X 12 Cr 13 | 4001 | En 56 A | 410 | 150 – 200 | 80 – 93 | 51 – 67 |
| X 6 Cr Ni 1810 | 4301 | En 58 E | 304 | 130 – 170 | 74 – 86 | 45 – 58 |
| X Cr Ni 1910 | | | | | | |
| X 8 Cr Ni Mo 1713 | 4401 | 1501 – 845 | 316 | 160 – 200 | 84 – 93 | 55 – 67 |
| Phosphor bronze | | | | 60 – 100 | 56,5 | 36 |
| Aluminium bronze | | | | 70 – 90 | 49 | 32 |
| Manganese bronze | | | | 95 – 120 | 51 – 69 | 34 – 42 |
| Silicon bronze | | | | 70 – 100 | 56,5 | 36 |

## Classification of steels

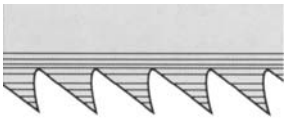
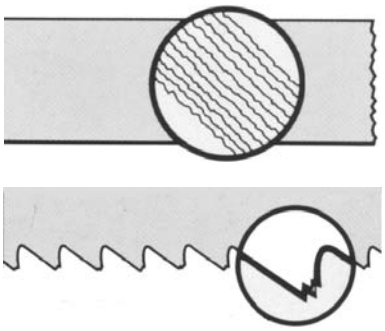
| Material | SS Svezia | AISI U.S.A. | DIN Germania | BS Inghilterra | UNI Italia | AFNOR Francia |
|---|---|---|---|---|---|---|
| Carbon steels | 1311 | 1015 – 1035 | C 22 – C 35 | 050 A 20 | C 15 – C 35 | XC 18 |
| | | | 20 Mn 5 – 28 Mn 6 | 080 M 46 – 50 | C 22 Mn | XC 38 H 1 |
| | 1572 | | CK 22 – CK 50 | 120 M 19 | C 28 Mn | 20 M 5 |
| | | | | 150 M 28 | | |
| Carbon steels | 1650 | 1040 – 1064 | CK 60 – CK 101 | 060 A 40 – 060 A 96 | | XC 60 – XC 75 |
| | | | 36 Mn 5 | 070 M 55 | | 40 M 5 |
| | 1880 | 1770 – 1880 | Cm 45 – Cm 55 | 080 A 40 – 080 A 62 | C 45 – C 60 | XC 42 H 1 |
| | | | | | | XC 55 H 1 |
| Alloy steel | 2120 | 1335 – 1345 | | 1717 CDS 110 | | 25 CD 4 |
| | | | 25 Cr Mo 4 – 42 Cr Mo 4 | 708 A 37 | 25 Cr Mo 4 – 42 Cr Mo 4 | |
| | 2255 | 4130 – 4140 | | 708 M 40 | | 42 CD 4 |
| Alloy steels | 2541 | 4337 – 4340 | 40 Ni Cr Mo 6 | 735 A 50, 534 A 99 | 40 Ni Cr Mo 2 – 40 Ni Cr Mo 7 | 35 NCD 6 |
| | 2230 | 50100 – 52100 | 40 Ni Cr Mo 73 | 817 M 40 | 30 Ni Cr Mo 8 – 35 Ni Cr Mo 6 KB | 50 CV 4 |
| | 2258 | 6145 – 6152 8630 – 8645 | 34 Cr Ni Mo 6, 100 Cr 6 | 311 rodzaj 6, 7 | 50 Cr V 4, 100 Cr 6 | 100 C 6 |
| Tool steels | 2310 – 12 | D – 2, D – 3 | X 210 Cr 12 | BD 2, BD 3 | X 205 Cr 12 KU | Z 160 CVD 12 |
| | 2754 – 55 | | X 155 Cr V Mo 121 | | X 155 Cr V Mo 121 KU | Z 200 C 12 |
| Tool steel | 2550 | S – 1 | 60 W Cr V 7 | BS 1 | 55 W Cr V 8 Ku | 55 NCVD 7 |
| | 2710 | | 55 Ni Cr Mo V 6 | | 55 Ni Cr Mo V 6 | |
| Stainless steels | 2324 | 201, 202 | X 2 Cr Ni 189 | 304 S 15 | X 2 Cr Ni 18.11 | Z 2 CN 18.10 |
| | 2333 | 302, 304 | X 5 Cr Ni 189 | 304 C 12 | X 5 Cr Ni 18.10 | Z 6 CN 18.09 |
| | | | G – X 2 Cr Ni 189 | 304 S 12 | G – X 2 Cr Ni 19.10 | Z 3 CN 19.10 |
| Stainless steel | 2343 | 314, 316 | X 15 Cr Ni Si 2520 | 316 S 16 | X 16 Cr Ni Si 2520 | Z 12 CNS 25.20 |
| | | | X 5 Cr Ni Mo 1812 | | X 5 Cr Ni Mo 1713 | |
| | 2353 | 317 | X 5 Cr Ni Mo 1713 | 317 S 16 | X 5 Cr Ni Mo 1815 | Z 6 CND 17.12 |

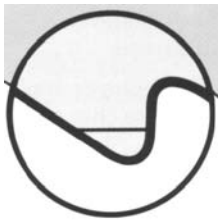
# Troubleshooting

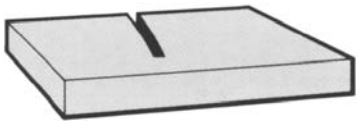
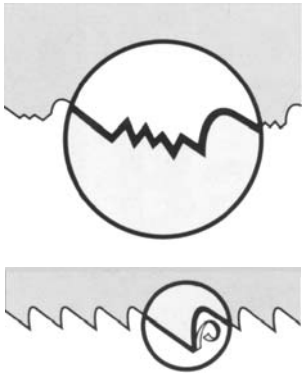


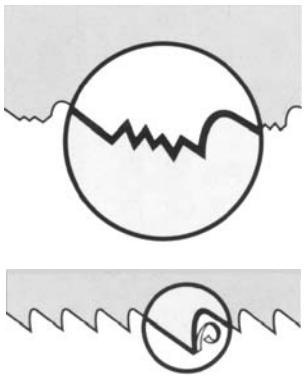

This chapter describes the inspection and troubleshooting procedures for the **SHARK 281**. Regular inspections and efficient maintenance are essential to ensure your machine gives you a long, trouble−free service life. The chapter is divided into two sections: the first being dedicated specifically to TROUBLESHOOTING BLADE AND CUTTING PROBLEMS, while the second TROUBLESHOOTING section concerns troubleshooting general machine operating faults. Taken together they form a comprehensive troubleshooting guide which will enable you to follow a methodical procedure for solving any problem.

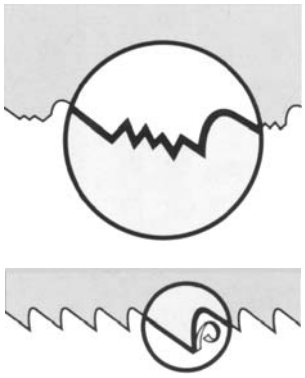
## Troubleshooting blade and cutting problems

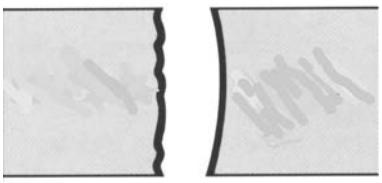
| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| **Blade scored or scratched**  | ◗ Widia inserts chipped or worn | ☞Replace |
| | ◗ Widia inserts loose or tight | ☞Adjust |
| | ◗ Widia inserts dirty | ☞Clean and re−adjust correctly |
| **Cutting surfaces scored**  | ◗ Blade teeth worn | ☞Replace blade |
| | ◗ Head downstroke speed too fast | ☞Reduce downstroke speed |
| | ◗ Cutting speed too slow | ☞Increase cutting speed |
| | ◗ Blade teeth too wide | ☞Change for wider teeth |
| | ◗ Free blade guide head too far away | ☞Move blade guide head closer so as to leave only that part of the blade free which is needed to effect the cut |
| | ◗ Blade tension low | ☞Reset tension to rated tension |
| | ◗ Broken teeth on blade | ☞Check and replace blade |

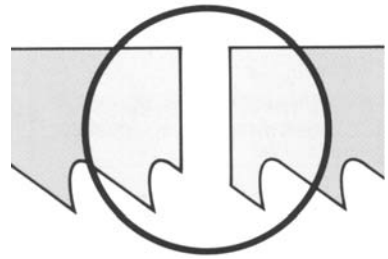
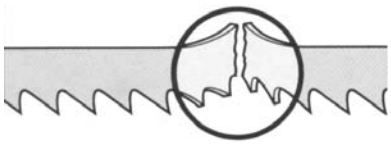
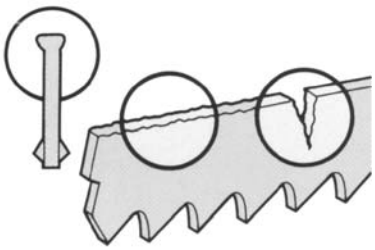
| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| **Rapid tooth wear**  | ◗ Teeth pointing in the wrong direction | ☞Set teeth in correct direction |
| | ◗ Blade worn in wrongly | ☞With a new blade cutting should be done at half–speed and with downstroke speed also at half normal speed. After the blade has been worn in (about 300 $cm^2$ of work for hard cutting materials and about 1000 $cm^2$ for soft cutting materials) the cutting and downstroke speeds can be brought up to rated levels |
| | ◗ Material too hard | ☞Check cutting speed, downstroke speed and blade pressure, as well as type of band saw being used |
| | ◗ Material defective | ☞Surface defects: oxides, sand, surface hardening. Hardened inclusions in section. Reduce cutting and downstroke speeds or clean surface. |
| | ◗ Cutting speed too high | ☞The teeth slide on the material without cutting: reduce cutting speed |
| | ◗ Head downstroke speed too slow | ☞The band saw runs over the material without removing it: increase downstroke speed |
| | ◗ Insufficient coolant | ☞Check coolant level and clean pipes and jets |
| | ◗ Incorrect fluid concentration | ☞Check and use the correct concentration |
| | ◗ New blade inserted into a partially–made cut | ☞The cutting surface might have been subject to a localised heat–induced alteration, making it harder: recommence cut using a slower cutting and downstroke speed. There may be a broken tooth from the old blade lodged in the cut: check and remove before recommencing work |
| | ◗ Flutter | ☞Blade tension too low: tighten. Tooth shape or pitch unacceptable: change type of blade used. Widia blade steady buttons too far from the blade back: adjust guide heads, rotating them slightly to bring them closer to the blade back. |

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| **Cuts not orthogonal or inclined**  | ◗ Head downstroke speed too fast | ☞Reduce head downstroke speed |
| | ◗ Widia inserts worn | ☞Replace |
| | ◗ Inserts loose | ☞Adjust width |
| | ◗ Blade guide head positioned wrongly | ☞Move mobile head up to the workpiece using the guide plate to leave free only that part of the blade actually needed to make the cut |
| | ◗ Orthogonality of blade to workpiece rest shoulder | ☞Check and realign the blade guide heads, then reset the blade orthogonality with the shoulder using the adjustment pin at 0°; then set the stops at 45° right and left by means of the appropriate screws |
| | ◗ Perpendicularity of the blade to the work surface | ☞Check and realign the blade guide heads then adjust the blade using the appropriate screws so that it is perpendicular to the work surface |
| | ◗ Blade tension incorrect | ☞Bring pressure up to 60 Bar |
| | ◗ Blade worn | ☞Replace blade |
| | ◗ Tooth pitch unsuitable | ☞Probably a blade with too many teeth per inch is being used; change for a coarser blade |
| | ◗ Cutting speed too slow | ☞Increase the cutting speed |
| | ◗ Wrong coolant | ☞Check the water and oil emulsion; check that none of the holes or hoses are blocked; direct the jets correctly |
| | ◗ Broken teeth | ☞Check the hardness of the material being cut |
| **Broken teeth**  | ◗ Cutting speed too high | ☞Reduce cutting speed |
| | ◗ Downstroke speed too high | ☞Reduce downstroke speed |

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| **Broken teeth**<br> | ◗ Cutting pressure too high | ☞Check and set to correct pressure |
| | ◗ Tooth pitch unsuitable | ☞Teeth too close together: change blade for one with a coarser tooth pitch |
| | ◗ Swarf welded to teeth and gullets | ☞Check blade–cleaning coolant jets. Check the blade–cleaning brush. If the swarf is not removed from the blade it will be drawn back into the cut and weld to the teeth, causing tooth breakage |
| | ◗ Swarf welded to teeth and gullets | ☞Check blade–cleaning fluid jets. Check blade–cleaning brush. If the swarf is not removed from the blade it will be drawn back into the cut and weld to the teeth, causing the teeth to break. |
| | ◗ Material defects | ☞The material may have altered surface areas, such as oxides or sand, or subcooled inclusions in the section. These areas are much harder than the blade and will cause the teeth to break: scrap or clean these materials. |
| | ◗ Workpiece not clamped | ☞The blade may break if the workpiece moves during cutting: check the vice, jaws and clamping pressure |
| | ◗ The blade stops in the cut | ☞Cutting pressure too high: check and restore to rated pressure. Downstroke speed too fast: reduce speed. Cutting speed too slow: increase. The blade slips on the flywheels: either the wheels are worn and need to be replaced or the blade tension is incorrect (too low) and must be re–adjusted. |
| | ◗ New blade inserted in a partially made cut | ☞The cutting surface may have been subjected to a localised heat–induced alteration, making it harder: recommence cut using a slower cutting and downstroke speed. A tooth from the old blade may be left in the cut: check and remove before restarting work. |

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| **Broken teeth**<br> | ◗ Widia inserts positioned incorrectly | ☞Adjust the position of the inserts, especially the width, since blade thicknesses can exceed the manufacturer's declared tolerance ratings |
| | ◗ Widia blade steady buttons | ☞Two widia blade steady buttons are located in the top of the blade guide heads which press on the back of the blade to transmit cutting pressure. If these buttons are too far from the blade, the blade may be prone to an up and down undulating action or abnormal vibrations, liable to cause the teeth to break: adjust the position of the heads by rotating them downwards so as to bring the blade steady buttons up against the back of the blade |
| | ◗ Sections with large thickness variations | ☞The cutting speed and downstroke speed must be chosen to suit the most critical part of the cut |
| | ◗ Teeth angled in the wrong direction | ☞Fit blade so that teeth point in the right direction |
| | ◗ Blade run in wrongly | ☞When using a new blade, the cutting and downstroke speeds must be reduced to half the normal operating speed. After the blade has been worn in (about 300 cm2 for hard materials and about 1000 cm2 for soft materials) the cutting and downstroke speeds may be returned to their rated levels |
| | ◗ Insufficient coolant | ☞Check coolant level and clean fluid lines and jets |
| | ◗ Incorrect fluid concentration | ☞Check and use the correct concentration |
| | ◗ Blade tension too high or too low | ☞Check and reset to rated tension |

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| **Blade path fault**<br> | ◗ Front flywheel position incorrect | ☞Check that the band saw is correctly positioned on the flywheel. Adjust the position of the flywheel under the blade, moving the shaft of the flywheel |
| | ◗ Flywheels worn | ☞Replace |
| | ◗ Gaps full of swarf | ☞Clean inside machine using blown air. |
| | ◗ Blade guide head alignment | ☞Check and adjust |

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| **Blade broken**<br><br><br><br> | ◗ Cutting speed too high | ☞Reduce cutting speed |
| | ◗ Head downstroke too fast | ☞Reduce head downstroke speed |
| | ◗ Cutting pressure too high | ☞Check and set to correct pressure |
| | ◗ Tooth pitch unsuitable | ☞Teeth too close together: change the blade for one with coarser tooth spacings |
| | ◗ Workpiece not clamped properly | ☞The blade may break if the workpiece moves during cutting: check the vice, jaws and clamping pressure. |
| | ◗ Widia inserts positioned incorrectly | ☞Adjust inserts position, especially the width, since blade thickness can exceed the manufacturer's declared tolerance ratings |
| | ◗ Widia blade steady buttons | ☞Can have a milling action on the back of the blade if worn or chipped, causing cracks from the back towards the teeth. |
| | ◗ Position of blade on flywheels incorrect | ☞The blade may be scraping on the edges of the flywheels: this problem is generally caused by blades which are deformed or wrongly welded (conical) Adjust the position of the front flywheel by moving the pin, or change the blade |
| | ◗ Blade tension incorrect | ☞If the blade tension is too high or too low, the blade will be subjected to abnormal stress: set the tension back to the rated value. |
| | ◗ Blade weld fault | ☞The point at which a blade is welded is its most critical point; problems could be caused by welds which are not aligned perfectly or have inclusions or blowholes |
| | ◗ Free blade guide head | ☞The head is too far away from the workpiece: move the head closer, leaving free only that part of the blade actually needed to make the cut |
| | ◗ Teeth in contact with the material before starting the cut | ☞Always check the position of the blade before starting a new job, especially for the semi–automatic cycle |

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| | ◗ Widia inserts | ☞If worn, the inserts can score the blade, weakening it even to breaking point. If the inserts are too far apart, the blade will whip, striking both the inserts and the material. Replace or adjust |
| | ◗ Insufficient coolant | ☞Check coolant fluid level; clean pipes and jets |
| | ◗ Incorrect fluid concentration | ☞Check and use the correct concentration |
| | ◗ The blade stops in the cut | ☞Cutting pressure too high: check pressure and reset to rated pressure.<br>Head downstroke speed too fast: reduce.<br>Head downstroke speed too slow: increase.<br>The blade slips on the flywheels: incorrect or low blade tension; readjust or increase. |

# Troubleshooting machine faults

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| **The main switch does not work** | ◗ Electrical supply | ☞Check: phases, cables, plug, socket |
| | ◗ Minimum voltage relay | ☞Check that it is correctly supplied and not burnt out |
| **The STAND BY LED does not come on** | ◗ LED burnt out | ☞Replace |
| | ◗ Electrical supply | ☞Check: phases, cables, plug, socket |
| | ◗ Minimum voltage relay | ☞Check that it is correctly supplied and not burnt out |
| | ◗ Transformer supply | ☞Check transformer input fuses 1 and 2.<br>Check transformer 24 V secondary output.<br>Check 24V output fuse. |
| **Spindle motor will not turn** | ◗ Electrical power supply | ☞Check: the phases; the cables; the plug; the socket. Also check that the motor connections are in place. |
| | ◗ Motor contactor | ☞Check input and output phases and check whether when supplying A1 and A2 relay the contactor closes. |
| | ◗ Polarity change switch | ☞Check input and output phases |
| | ◗ Head control lever microswitch | ☞Check that it is functioning; if broken, replace |
| | ◗ Blade tensioning | ☞If the blade is not correctly tensioned to 60 Bar, the pressure contact does not close and the machine is in EMERGENCY state |
| | ◗ Blade protection cover | ☞Check that the closure is correct and the limit stop pressed |
| | ◗ Current drop | ☞Check connections on the handgrip switch, the blade protection limiter and the pressure gauge on the blade tensioner group |

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| **BMT not energised (Minimum Tension Coil)** | ◗ Electrical power supply | ☞Check: the phases; the cables; the plug; the socket. |
| | ◗ BMT Reset switch | ☞Make sure that the minimum tension coil is energised when switch is turned from 0 to 1. If it is not, replace the switch. |
| | ◗ Emergency stop pushbutton in | ☞Make sure the emergency stop button is released: turn it clockwise through 1/4 of a turn to release it. |
| **Electropump is not working** | ◗ Electrical supply | ☞Check: phases, cables, plug, socket and fuse no. 5 in the electrical plant |
| | ◗ No–return valve | ☞Clean, if blocked replace |
| | ◗ Filter | ☞Clean |
| **The pressure gauge does not give blade tension pressure** | ◗ Oil level | ☞Top up oil level in blade tensioner cylinder |
| | ◗ Blocked connection | ☞Check for blockages |
| | ◗ Broken | ☞If damaged, replace |
| **Cutting vice will not close or will not open (MA version)** | ◗ VM: Cutting Vice Valve | ☞Make sure the valve is operating correctly, replace if necessary. |
| | ◗ Vice cylinder | ☞Check that air is not leaking through the cylinder seals, by removing the hose (from the quick connector), where there is no pressurized air, and checking whether air escapes from the joint. If air is escaping, replace the seals or the entire cylinder. |
| | ◗ Compressed air supply hose | ☞Check the hose is not kinked or blocked. Remove the obstruction. |
| | ◗ Air treatment unit | ☞Check that the air treatment group is supplying the pressure shown on the gauge. |

| PROBLEM | PROBABLE CAUSE | SOLUTION |
|---|---|---|
| **The CCS optional is not working** | ◗ Minimum voltage relay | ☞Check that it is correctly supplied and not burnt out |
| | ◗ Selector switch | ☞Check connections. Replace if defective |
| | ◗ Lock valve | ☞Check for impurities preventing correct functioning. Replace if defective. |
| | ◗ Regulator | ☞Check that input and output pipes are free of kinks and obstructions. |
| | ◗ Spring | ☞Check that the spring is correctly tensioned |
| | ◗ Cylinder | ☞Check that hydraulic circuit oil level is sufficient. |
| | ◗ Limiter | ☞Check connections and functioning |
| | ◗ Head control lever microswitch | ☞Check connections and functioning |

# Accessory Installation

11

This chapter provides a list of the available accessories that can be fitted to this machine, along with assembly instructions.

## Blade

The blades that can be used on this machine include:

- 2950x27x0.9 bimetal blade for solid and section materials;
- 2950x27x0.9 bimetal blade for solid and section materials;

See chapter 7 of this manual for belt installation instructions.

## Cut Control System

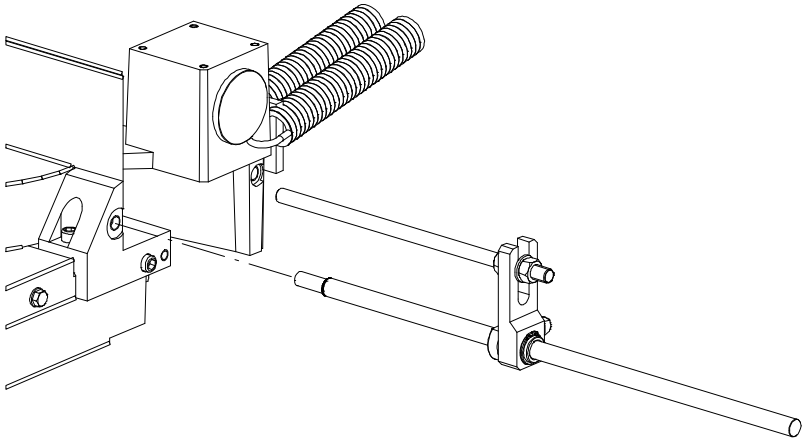
This accessory allows you to run a Semi−automatic / Dynamic work cycle as described in Chapter 5 of this manual.

- An instruction book is supplied with the kit to explain how to install this optional unit.

## Rod marked off in millimetres

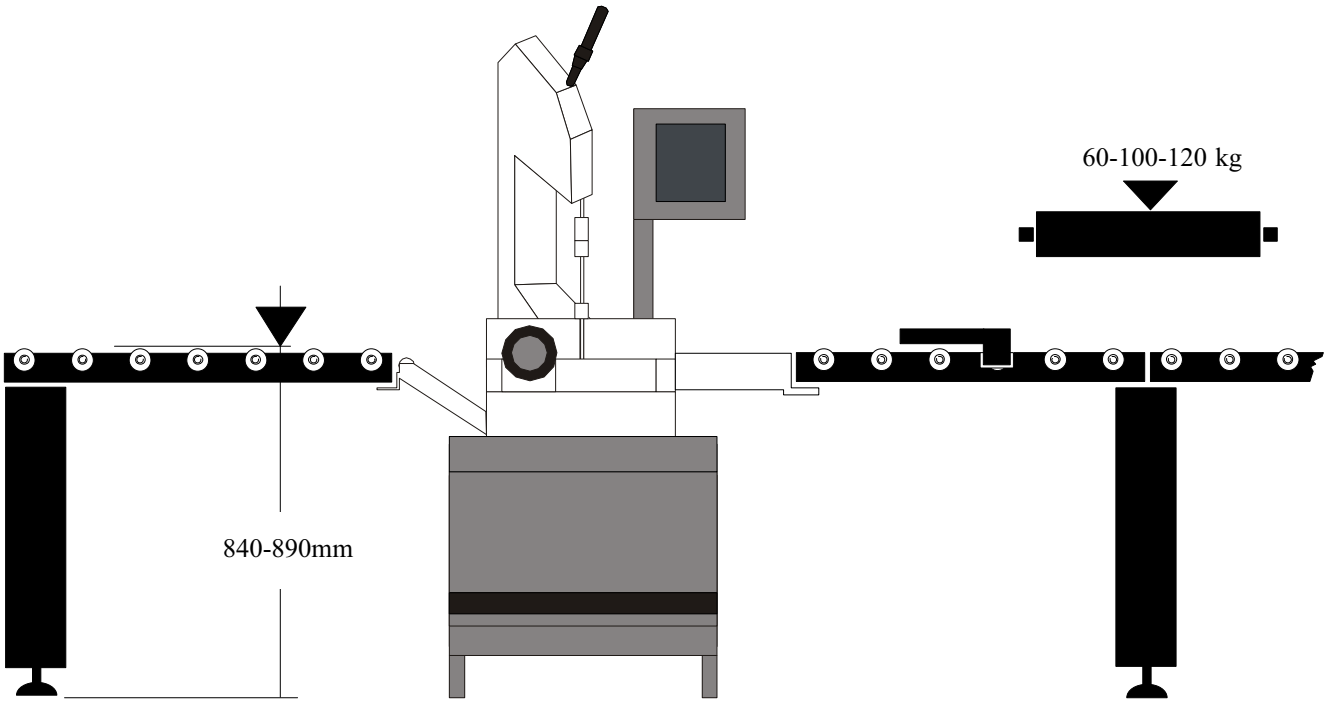
This device is used to measure the length of the pieces to be cut. To fit this accessory on the machine:

- screw the support for the rod marked off in millimetres to the existing seating on the discharge side of the fixed turntable as shown in the figure.



## Roller table

- K60/K100/K120 roller table module for feed side, 1500 mm;

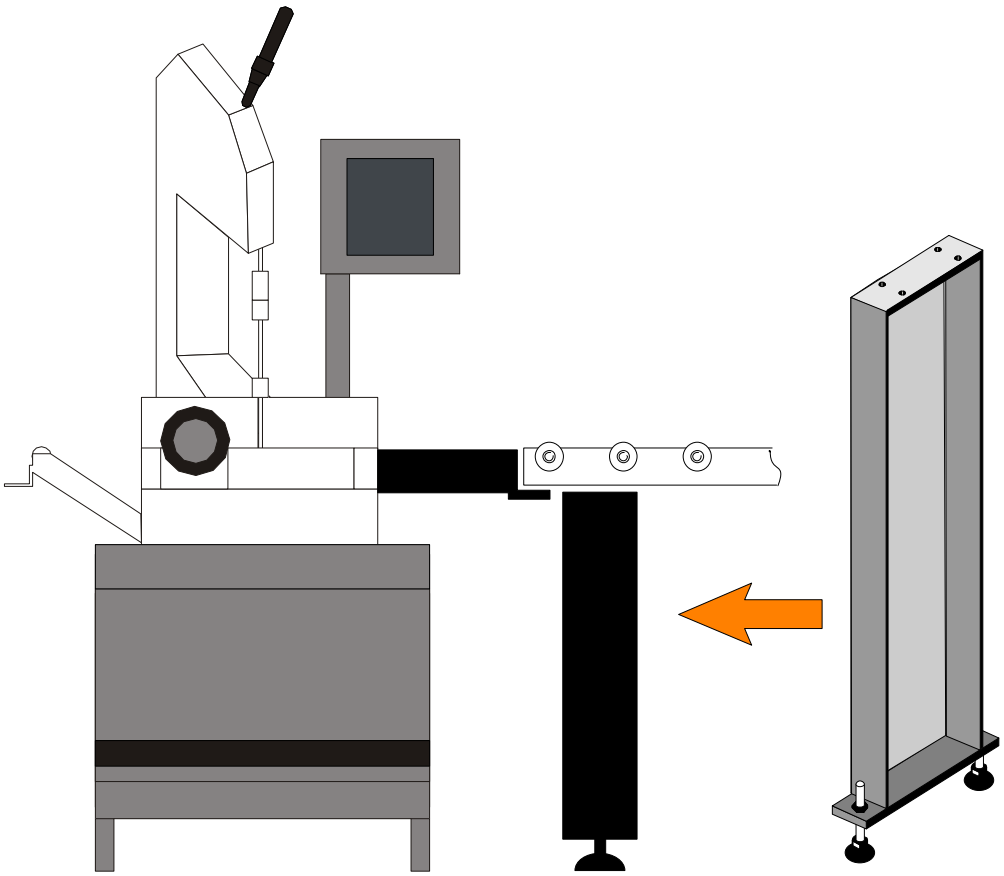



- K60/K100/K120 roller table for discharge side, 1500÷6000 mm;
- K60R/K100R roller table for discharge side, 1500÷6000 mm;
- To fit the roller loading platform on the loading side, the machine has a bar–support arm that one end of the roller–way can be positioned on and then screwed in place.
- To install the roller loading platform on the discharge side an adapter must be used, with or without a support, as explained in the paragraphs that follow.

### Support for the roller platform on the feeding/discharging side

This device is used to increase the load−bearing strength of the roller table, both during feeding and discharge. The steps which should be followed to assemble it are illustrated below.

▶ disconnect the table from the adapter (on the discharge side, for example);

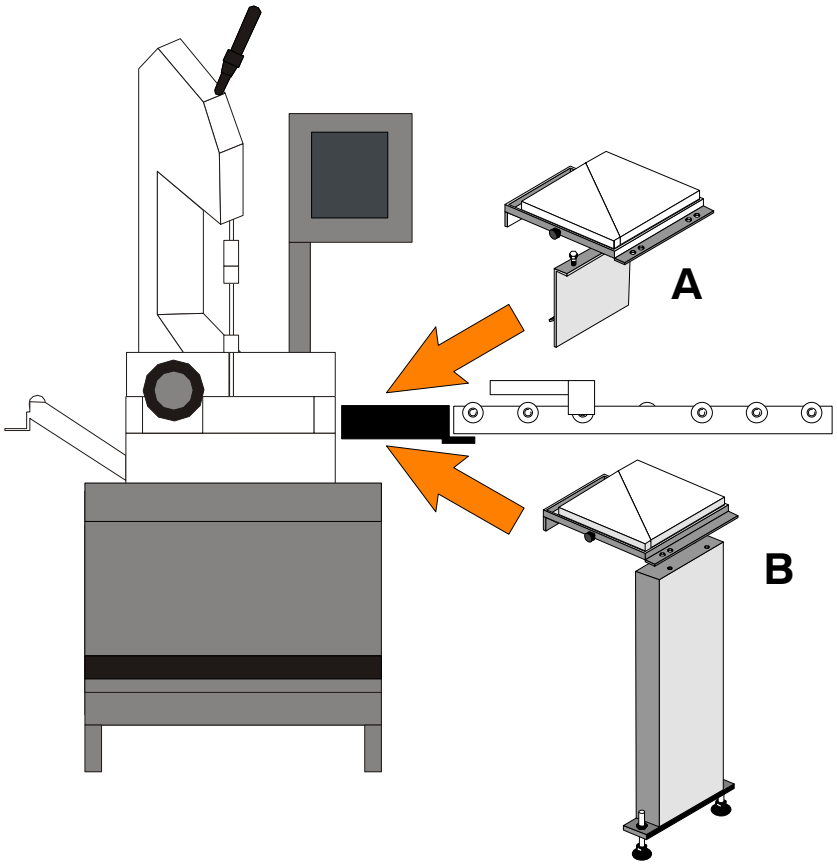


▶ Position the support to correspond with the holes on the base of the trailer and reconnect to the adapter.

### Discharge side roller table adaptor

Two adaptors are available for this model of machine that differ in terms of the load capacity. The installation operations are given below:

- remove the two TE screws from the right side of the slideway;
- install adaptor “A”, fixing the plate to the fixed platform after having removed the bolts, and fit the support under the plate, resting it on the machine base;
- install adaptor “B”, fixing the plate to the fixed platform after having removed the bolts, and fit the support to the end of the plate, using two of the four holes in the upper part of the support, leaving the other two free for attaching the roller−way.



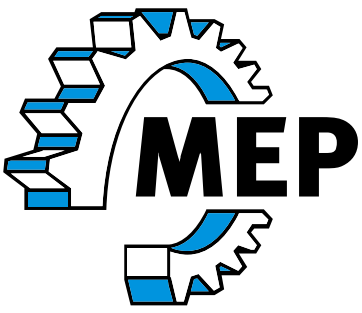

- Attach the outfeed rolling deck by fixing it with the screws supplied.

### Minimal lubrication system

This device was designed to improve lubrication of the tool during cutting.

- An instruction book is supplied with the kit to explain how to install this optional unit.

Mep spa guarantees that the sold product is free from defects making it unsuitable for its intended use or significantly decreasing its value.
The guarantee shall not apply if the buyer was aware of defects in the product when buying it or if defects were clearly recognizable.
Regulations by the Italian law shall apply to this article.


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