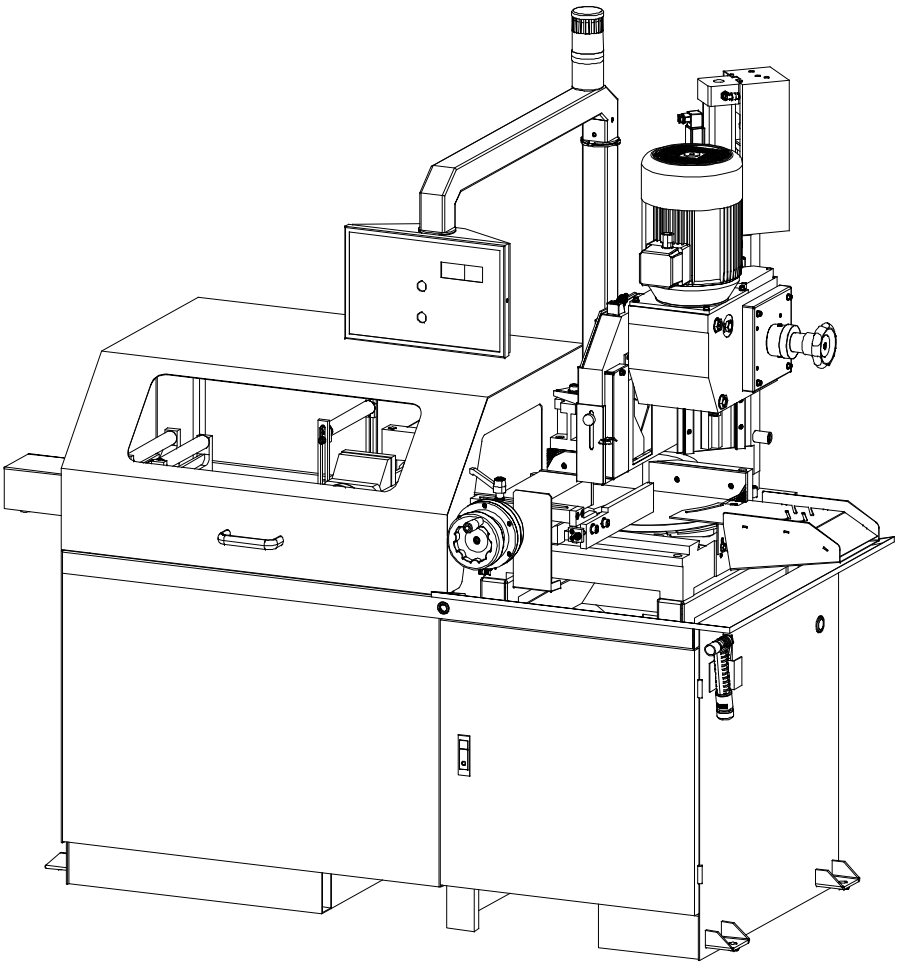

USE AND MAINTENANCE MANUAL

EN C 350-2 CNC

YEAR OF MANUFACTURE: _____

EN

"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 circular sawing machine:

Machine Type:	**SAWING MACHINE**
Machine model:	**350-2 CNC**
Serial number:	
Year of manufacture:	

is in specification with the following directives:

- **DIRECTIVE EEC MACHINES DIRECTIVE 2006/42/CE**
- **DIRECTIVE /CE "LVD"**
- **DIRECTIVE 2004/108/CE "EMC"**
- **D. L. 17/2010**

Responsible of Technical File
(Walter Di Giovanni)

c/o MEP SPA
Via Enzo Magnani, 1
61045 - Pergola - PU - ITALY

Managing Director
(William Giacometti)

Pergola, lì _____

FACSIMILE

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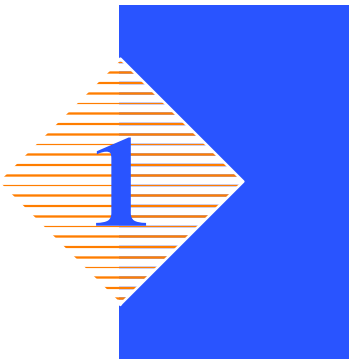
Introduction and technical specifications



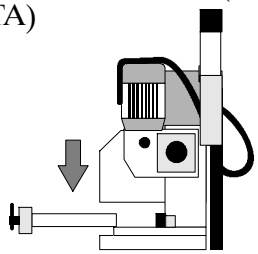
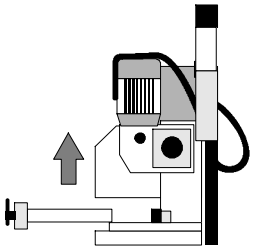
Foreword

We have decades of experience in the construction of the best metal- cutting machines. Our experience, our knowledge of our customers and constant technological development of design and production equipment allow us to offer a specific solution for every type of cutting need. This work tool has been designed as a simple and reliable answer to the wide range of cutting needs of the modern workshop. **C350- 2 CNC** is rugged, quiet and safe. It cuts various kinds of material, with very little scrap and great applicative flexibility.
Congratulations for having chosen this product which, by following the instructions contained in this user and maintenance handbook, will guarantee you years of dependable service.

Warning This band saw has been exclusively designed to cut metals.

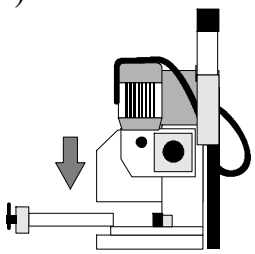
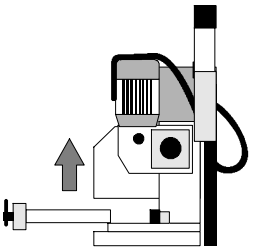
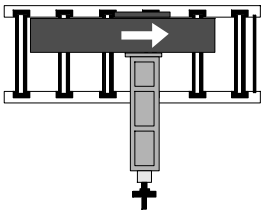
Machine presentation

C350- 2 CNC is an electromechanical pneumatic saw, which cuts metal profiles and solids. It can operate in SEMIAUTOMATIC or AUTOMATIC mode. In Semiautomatic mode, after setting the cutting head stroke and the head down-stroke speed on the control panel, position the vice 2÷3 mm from the material being processed and press the start button on the control panel to activate the disk (or foot pedal if supplied);

1. The cutter vice closes	2. The head lowers until the cut is made (FC-TA)	3. The head returns to start position (FCTI)	4. The cutter vice opens
			

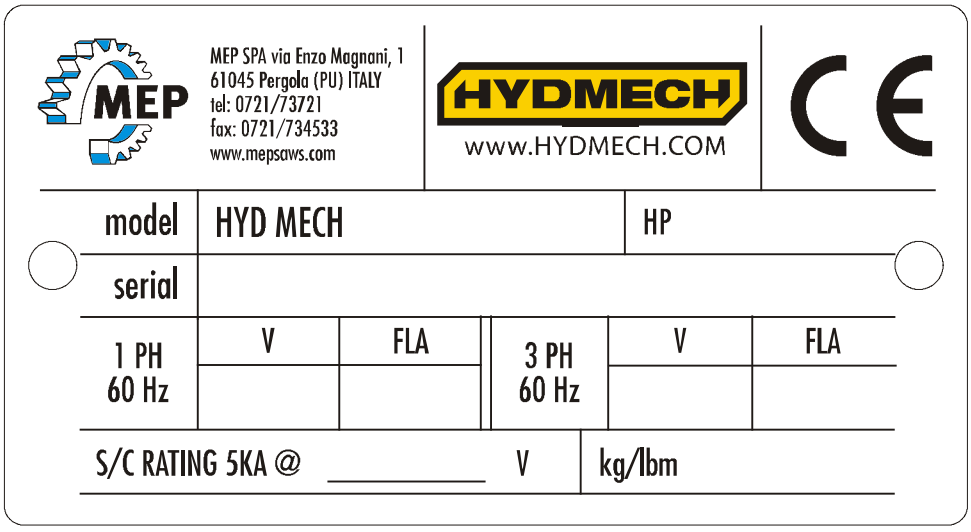
In Automatic mode, after setting the cutting head stroke and the head down-stroke speed on the control panel, position the vice 2÷3 mm from the material

being processed and press the start button on the control panel to activate the disk (or foot pedal if supplied):

1. The cutter vice closes	2. The head lowers until the cut is made (FCTA) 	3. The head returns to start position (FCTI) 	4. The feed vice closes
5. The cutter vice opens	6. The cutting material is fed 	7. The cutting vice closes	8. The feed vice opens and the cutting cycle starts up

Machine specification

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 manual.



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

Technical Data

WORKING PRESSURE		
Max. working pressure for opening/closing vice	Bar psi	6 87
Air consumption for a complete cycle	Nl/min	2

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.

ELECTROPUMP MOTOR					
Voltage (Volts)	**Absorption (Amps)**	**Power (Kw) Hp**	**rpm**	**Delivery rate lt/ min**	**Head (mt.) Ft**
230	0.30	0.09 0.12	2,800	24	1.5 4.92
400	0.18	0.09 0.12	2,800	24	1.5 4.92
Conforming to CEI norms, publication: IEC 34 of 01/07/1985.					
IP 55.					

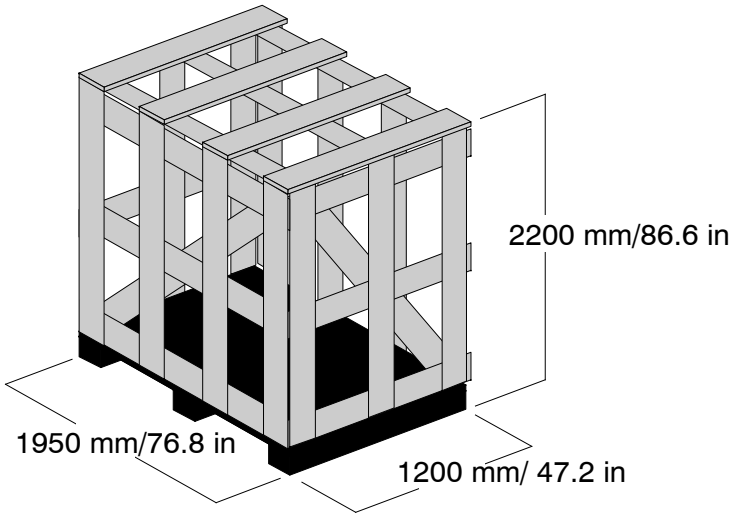
LUBRICANT/COOLANT FLUID AND OIL		
Lubricant/coolant fluid (oil concentration 5- 6%)	capacità Lt.	20
Oil for transmission box	capacità Lt.	4.8

VICE		
Vice max. opening	mm in	190 7.5

CUTTING CAPABILITY			
Section			
0°	90 mm 3.5 in	90 mm 3.5 in	
45° ◗	64 mm 2.5 in	64 mm 2.5 in	64 x 90 mm 2.5 x 3.5 in
45° ◖	64 mm 2.5 in	64 mm 2.5 in	64 x 90 mm 2.5 x 3.5 in
60° ◖	45 mm 1.8 in	45 mm 1.8 in	45 x 90 mm 1.8 x 3.5 in

CUTTING CAPABILITY				
Section				
0°	115 mm 4.5 in	95 mm 3.8 in	180 x 95 mm 7.1 x 3.8 in	
45° ◗	110 mm 4.3 in	95 mm 3.8 in	125 x 95 mm 4.9 x 3.8 in	
45° ◖	110 mm 4.3 in	95 mm 3.8 in	125 x 95 mm 4.9 x 3.8 in	
60° ◖	90 mm	90 mm 3.5 in	90 x 90 mm 3.5 x 3.5 in	90 x 95 mm 3.5 x 3.8 in

PACKED WEIGHT		
Wooden cage and pallet	kg lbs	250 550
Wooden pallet	kg lbs	100 220



Technical Data

CUTTING SPEEDS		
Speed 1/2 Optional	rpm	15÷90 30÷150

Disk blade (HSS type)		
External disc diameter	mm in	350 13.8
Internal hole diameter	mm in	32 1.3
Blade thickness	mm in	2,5 0.1

RATED ELECTRICAL POWER		
Head spindle motor	kw hp	2.5 3.35
Electric coolant pump motor	kw hp	0.1 0.13
Feed step motor	kw hp	0.315 0.42
Step head motor	kw hp	0.09 0.12
Max installed power	kw hp	3.005 4.02

SPINDLE MOTOR

No.of poles	Current (Volts)	Absorption (Amps)	Power (Kw) hp	rpm
4	230/400	14.5/8	2.6 3.5	1440
8	230/400	10/5.7	1.8 2.4	715

Stator wound with enamelled copper wire, class H 200° C.

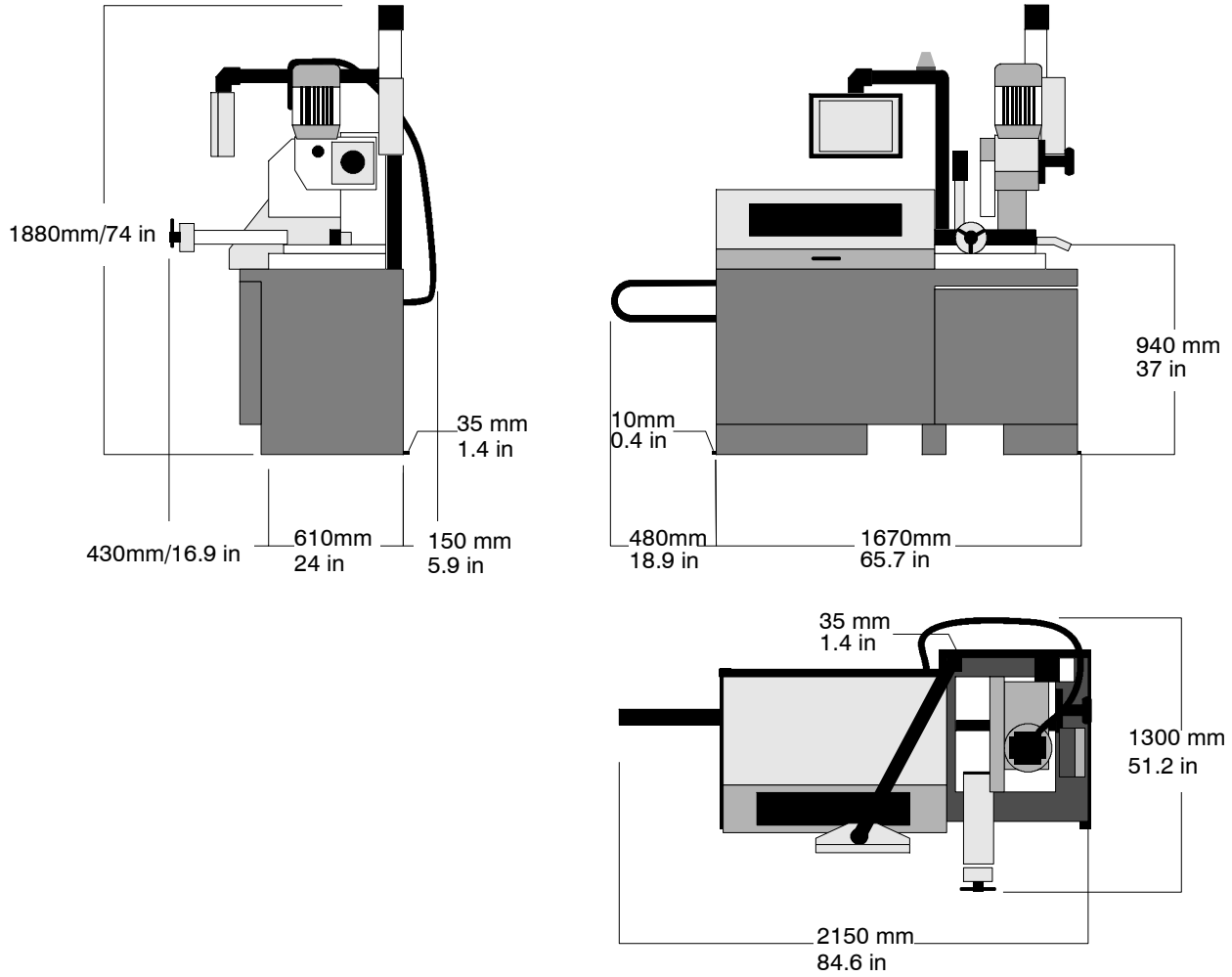
Class F insulation (limit temperature TL 155° C).

IP 54 protection rating (total against contact with live parts, water sprayed from all directions, with shaft oil seal).

Conforming to CEI norms, publication: IEC 34 of 01/07/1985.

Dimensions

MACHINE INSTALLED		
Work table height	mm in	950 37.4
Weight	kg lbs	680 1496

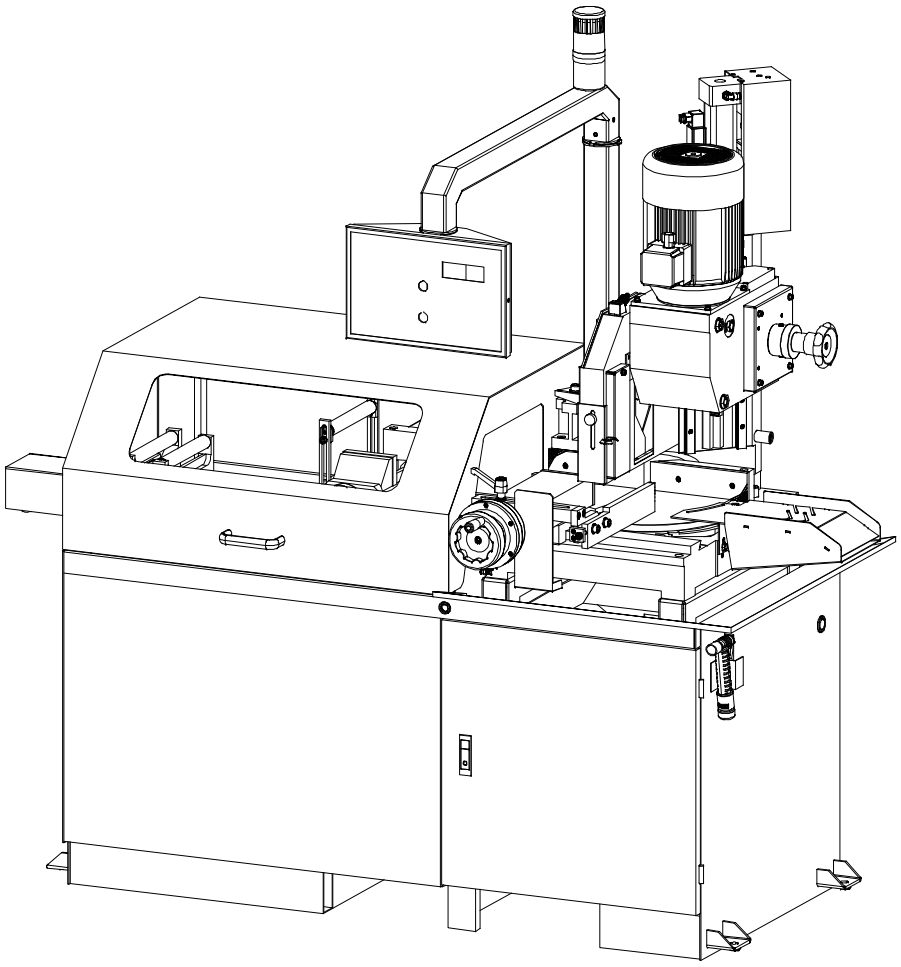


Functional parts

2

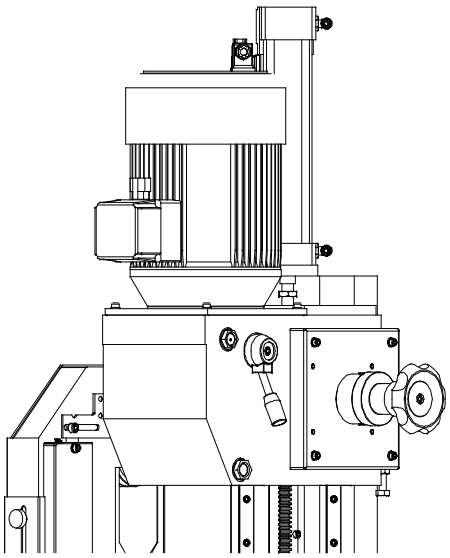
C350-2 CNC model

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.



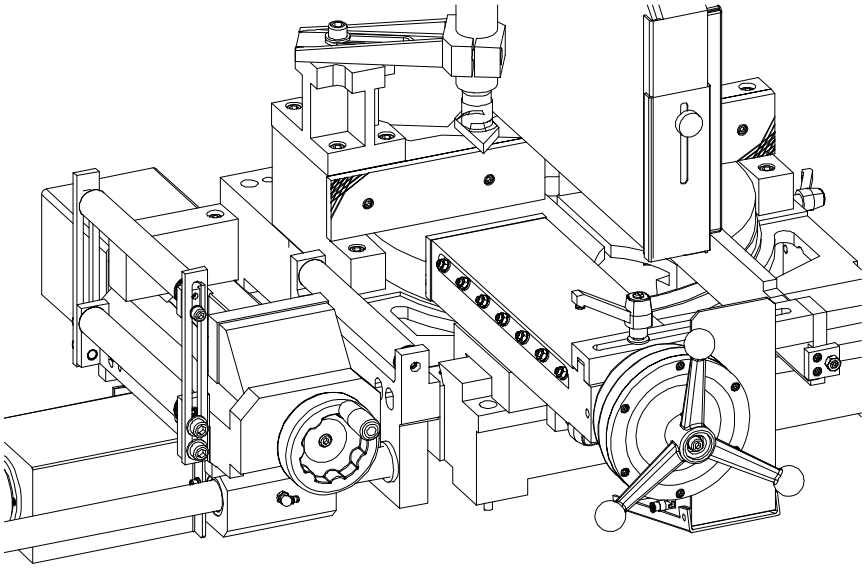
Cutting head

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 operating head runs on linear guides with ball- recirculating pre- charged slides and makes a vertical stroke from the up position to the down one; this stroke can be programmed through the control board.



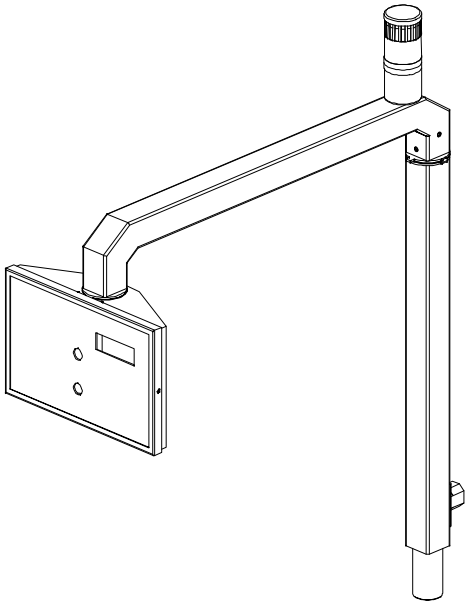
Cutting and feeding vice

The cutting vice clamps the stock during the cut, while the feeding vice clamps the stock for feeding purposes. Both vices are controlled by pushbuttons on the control panel; the vices approach movement is manual, while vice clamping is performed by a pneumatic cylinder.



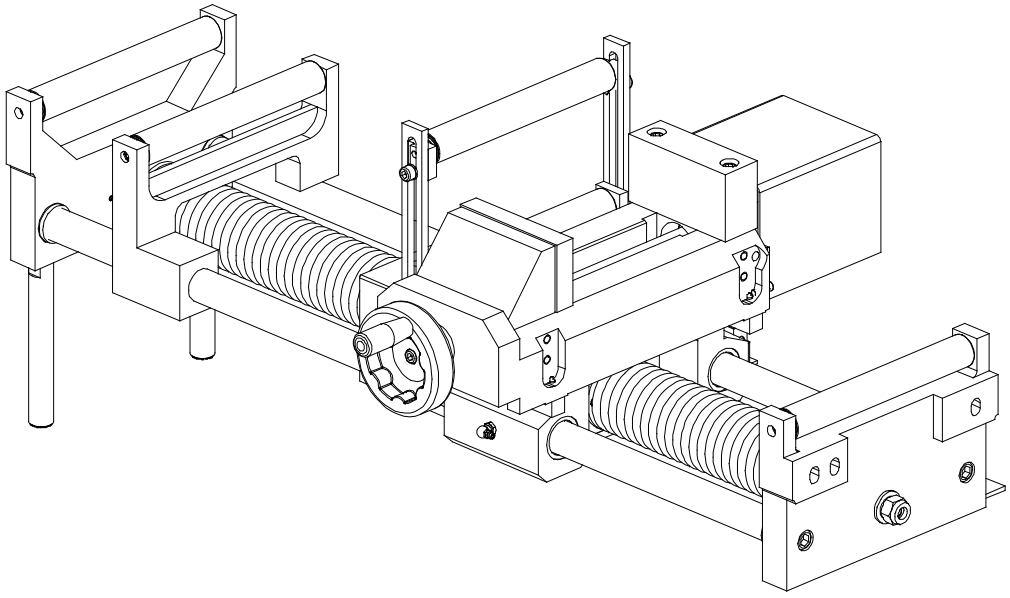
Control Panel

The control panel has a protection rating of IP 54 and contains the electronic equipment. Access to the control panel is protected by a safety panel mounted on hinges and fastened with screws, specially designed to prevent tampering. The control panel swivels on two articulated joints so that it can be positioned by the operator for greater ease- of- use and safety.



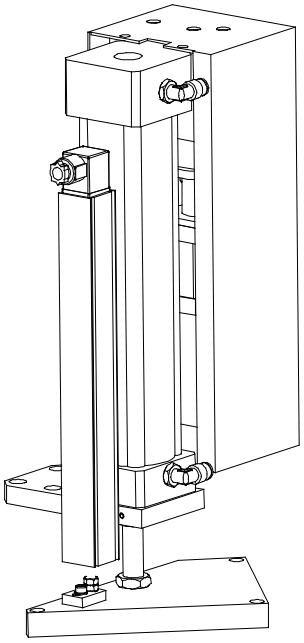
Feeder

The material, locked by means of the pneumatic vice, is delivered by a carriage which conveys it along ground guides. The numeric check controls, with great precision, the step motor of the infeed carriage, enabling the operator to set, on the same bar, 32 batches of pieces to be cut, each with different amounts and lengths.The material, locked by means of the pneumatic vice, is delivered by a carriage which conveys it along ground guides. The numeric check controls, with great precision, the step motor of the infeed carriage, enabling the operator to set, on the same bar, 32 batches of pieces to be cut, each with different amounts and lengths.



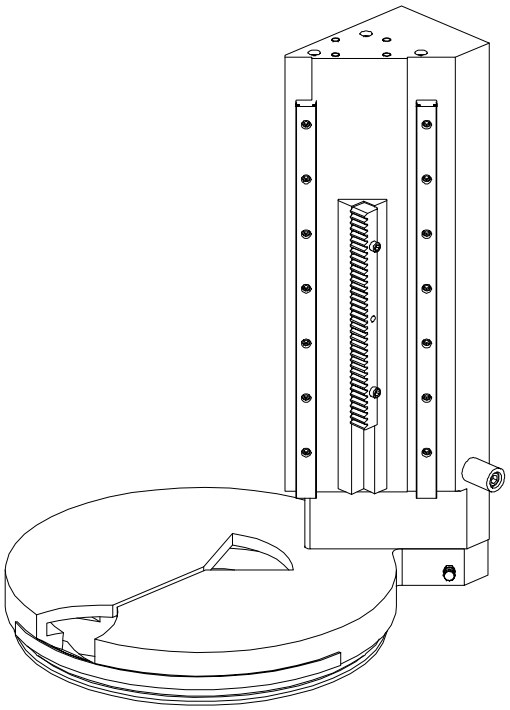
Hydropneumatic unit

This unit drives and regulates the upward and downward movement of the cutting head and consists of a hydro- pneumatic cylinder and recovery electro- valves. The head descent regulator on the control panel can be used to regulate the quantity of oil that flows into the cylinder and naturally the downward movement speed of the cutting head. To facilitate the upward movement of the head, the **C350- 2 CNC** has a spring located in the cutting head.

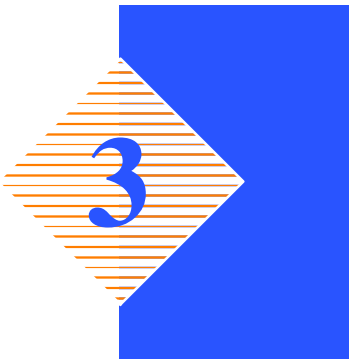


Turntable

A cast iron casting forms the fulcrum for the cutting head, and the support for the work table and the control panel. Releasing the locking lever on the slideway allows the cutting head to be rotated to the right and to the left.



Safety and accident prevention



The **C350- 2 CNC** 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 **C350- 2 CNC** circular saw is designed to cut exclusively ferrous and non- ferrous profiles and solid metal sections. 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 **EEC 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 ISO 8995- 89 "Lighting in work environments").

CONNECTIONS

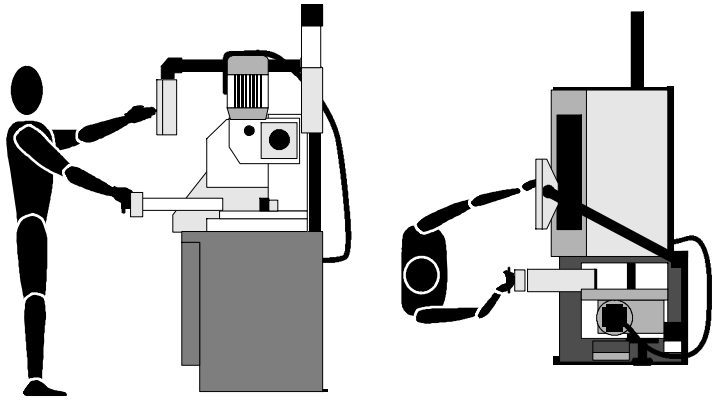
Check that the power supply cables and pneumatic feed systems comply with the maximum machine absorption values listed in the "Machine Specification" tables; replace if necessary.

EARTHING

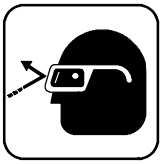
The installation of the earthing system must comply with the requirements set out in EN STANDARD 60204- 1:2010.

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.

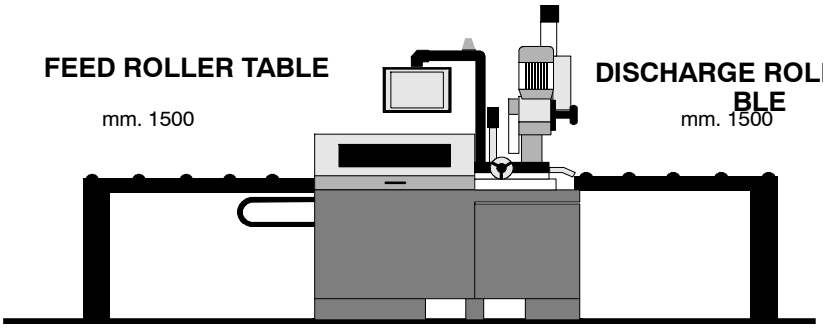
Do not use the machine without the guards in position. Replace the polycarbonate windows , if subject to corrosion.

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.



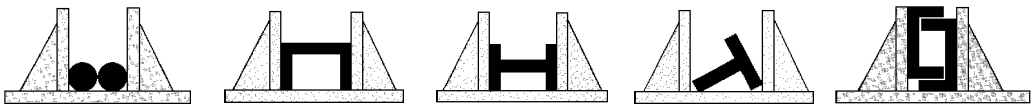
Any maintenance work on the hydraulic or pneumatic systems must be carried out only after the pressure in the system has been released.

The operator MUST NOT perform any risky operations or those not required for the machining in course (e.g. remove swarf or metal shavings form the machine while cutting).

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

Do not use the machine for cutting pieces which exceed the cutting capacity described in the technical specifications or are less than 5 mm (0.2 in)

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 the different profiles correctly in our machines are shown below.



Never move the machine while it is cutting.

Do not use blades of different sizes to those recommended in the machine's 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 (version MA) check that the jaws actually move right up to and effectively block the piece, as the maximum travel in only 6 mm (0.24 in), and check that the clamping pressure is correct.

When working on the bandsaw, only wear gloves when handling materials and tool change or adjustment operations. Only carry out 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 pushbutton immediately. If this does not free the blade, slowly release the vice, remove the piece and check that the blade or its teeth for damage, if need be replace the blade.

Before carrying out any repair works on the machine, consult the Hyd-Mech Technical Service; this can also be done through an agency in the country in which the machine is being used.

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 **C350- 2 CNC** band saw.

Reference standards

MACHINE SAFETY

- EEC MACHINES DIRECTIVE 2006/42/CE ;
- EEC directive no. 2004/108/CE “EMC - Electromagnetic Compatibility”;
- EEC Directive No. 2006/95/CE known as “Low voltage directive”.
- EN 13898:2003+A1:2009 Machine tools - Safety - Sawing machines for cold metal

HEALTH AND SAFETY AT WORK

- EEC Directive No. 80/1107; 83/477;86/188;88/188; 88/642 for the protection of workers against risks caused by exposure to physical, chemical and biological agents during working;
- EEC Directive No. 89/391 and Special EEC Directives No. 89/654 and No. 89/655 for improvements in health and safety at work;
- EEC Directive No. 90/394 for the protection of workers against risks deriving from exposure at work to carcinogenic substances;
- EEC Directive No. 77/576 and No. 79/640 on safety signs at work.

PERSONAL PROTECTION

- EEC Directive No. 89/656 and No. 89/686 on the use of personal protection devices.

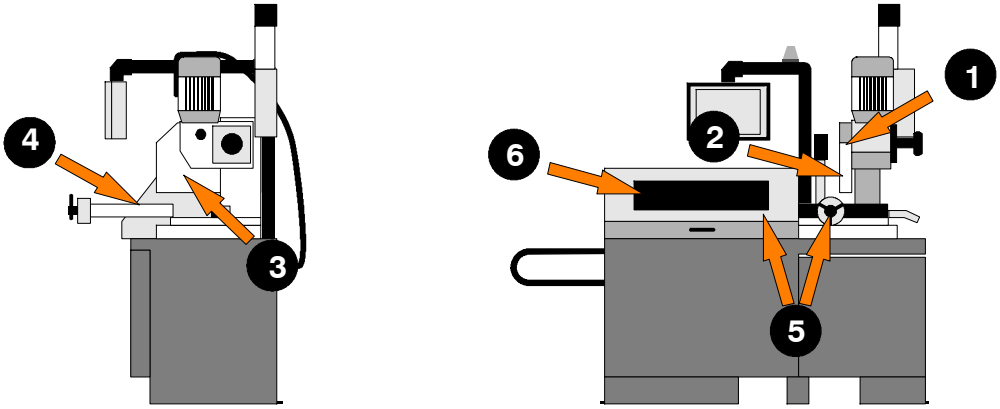
ENVIRONMENTAL PROTECTION

- EEC Directive No. 75/442 on waste disposal;

- EEC Directive No. 75/439 on the disposal of used oil.
- Directive 2002/95/EC 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 disc cover fixed to the cutting head;
2. Steel sheet guard of adjustable height located on the part of the blade guard between the operator and disc and used as splash guard;
3. mobile protection of the disc attached to the guard, in order to guarantee cover of the blade and to leave only the part of the disc used for cutting free as required by President's Decree 547/55 article 108;
4. vice with double- blocking anti- burr device to securely grip the workpiece;
5. the cutting and infeed vice is controlled by pneumatic devices, with maximum 6 mm (0.24 in) stroke; the jaw which clamps the piece must be aligned to the part to be processed at a distance of 2÷3 mm (0.08÷0.12 in);
6. the cutting material supply is protected by a sheet- metal casing, which can be opened, that is fitted with a Perspex window to check the cutting operations.



Electrical equipment

In accordance with Italian standard CEI EN 60204- 1:2010, derived from European Standard EN 60204- 1:2010:

- 24 Vac Control voltage for actuators, in accordance with chapter 6 of European Standard "Control and indication circuits" paragraph 2 "Control Circuits" sub-section 1 "Preferential voltage values for control circuits";
- plant protected against short circuits by quick blowing fuses and earthing of all work and accidental contact parts;
- Protection from accidental start-up by a minimum voltage relay in the case of power failure.

Emergency devices

In accordance with Standard EN 60204-1:2010:

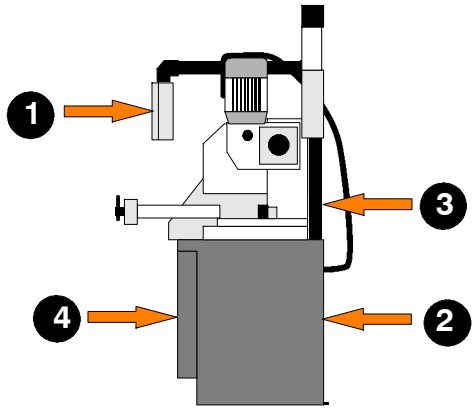
- **Chapter 5 Section 6 Sub-section 1 "Emergency stop device"**: "the emergency stop device immediately stops all the dangerous and other functions of the machine".
- **Chapter 6 Section 2 Subsection 4 point 7 "Safety guards":** "the removal of safety guards protecting dangerous parts or zones of the machine causes the machine to shut down immediately. When the guards are returned to their original position the machine must be reset in order to resume work".

...Emergency devices applicable to the C350- 2 CNC:

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. **Thermal- magnetic circuit breaker**: this device incorporates two power failure protection systems. In fact, in the event of a power failure, it disconnects all the electrical components, causing the machine to shut down immediately and prevents it from automatically starting up again when power is restored. The device also resets the thermal relay fitted to protect against current overloads.
3. **Feeder casing safety switch**: to access the cutting material feeder, it is necessary to open the casing, with a safety limit switch that stops all machine operations that must be reset to continue processing.
4. **Pressure contact (pressure switch):** this device inhibits all functions of the machine immediately, when pressure in the compressed air system drops below 3 Bar.



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 **EEC 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 13898:2003 + A1:2009, EN ISO 12001:2010 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		**C350- 2 CNC**
Reference standard		ISO 3746

Results		
Test 1st	**Description**	Ø 100 mm (3.9 in) pipe in FE37 steel Disc blade HSS- DMO5 0 350 mm T6 (13.8 in)
	Results	**Mean sound level (Leq) 99,42 dB (A)** Environmental correction (K) 2,97 dB(A) Peak sound power (Lw) 102,76 dB(A)
Test 2nd	**Descriprion**	Ø 80 mm (3.1 in) solid tube in C40 steel. Disc blade HSS- DMO5 0 350 mm T6 (13.8 in)
	Results	**Mean sound level (Leq) 84,46 dB(A)** Environmental correction (K) 2,97 dB(A) Peak sound power (Lw) 95,12 dB(A)
Test 3rd	**Description**	40x70 mm (1.6x2.7 in) solid tube in C40 steel. Disc blade HSS- DMO5 0 350 mm T6 (13.8 in)
	Results	**Mean sound level (Leq) 85,00 dB(A)** Environmental correction (K) 2,97 dB(A) Peak sound power (Lw) 97,15 dB(A)

Vibration emission

This sawing machine complies with the norms EN1299 and EN1033, 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 2004/108/CE e 2006/95/CE and 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 **C350- 2 CNC**; Test report no. 120101.

Emissions

- CEI EN 61000- 6- 4 (2002) Electromagnetic Compatibility (EMC) - Generic standard regarding emissions. Part 6- 4: Industrial Environment.
- EN 55011 (1999) Industrial, scientific, and medical radio frequency appliances (ISM). Characteristics of radio frequency disturbance - Limits and methods of measurement.
- EN 55014- 1 (2002) Electromagnetic Compatibility - Prescriptions for domestic appliances, electric power tools, and similar equipment. Part 1: Standard Emission in relation to product family.

CONDUCTED EMISSIONS				
Gate A	**Freq. (MHz)**	**Q- peak limit (dBuV)**	**Mean value limit (dBuV)**	**Result**
A.C. power supply input	0.15 - 0.5 0.5 - 5 5 - 30	79 - 73 (linear reduction with log of frequency) 73 73	66 - 60 (linear reduction with log of frequency) 60 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 - 230 230 - 1000	40 47	Complies

Immunity

- CEI EN 61000-6-2 (2000) Electromagnetic Compatibility (EMC) - Generic standard on immunity. Part 6-2: Industrial Environment.
- EN 61000-4-2 + A1 (1996-1999) Electromagnetic Compatibility (EMC) - Part 4: Test and measurement techniques - Section 2: Electrostatic discharge immunity tests - Basic publication.
- EN 61000-4-3 Electromagnetic Compatibility (EMC) - Part 4: Test and measurement techniques - Section 3: Radiated radio-frequency electromagnetic field immunity tests.
- EN 61000-4-4 (1996) Electromagnetic Compatibility (EMC) - Part 4: Test and measurement techniques - Section 4: Fast transients/bursts immunity tests - Basic publication.
- EN 61000-4-5 (1997) Electromagnetic Compatibility (EMC) - Part 4: Test and measurement techniques - Section 5: Pulse magnetic field immunity tests.
- EN 61000-4-6 (1995) Electromagnetic Compatibility (EMC) - Part 4: Test and measurement techniques - Section 6: Immunity to conducted interference, induced by radio frequency fields.
- EN 61000-4-11 (1977) Electromagnetic Compatibility (EMC) - Part 4: Test and measurement techniques - Section 11: Voltage dips, short interruptions and voltage variations immunity tests.

IMMUNITY TO ELECTROSTATIC DISCHARGES			
Gate	**Test levels**	**Evaluation criterion**	**Result**
Enclosure	contact 4 kV steel plate 4 kV in air 8 kV	B	Complies

IMMUNITY TO VOLTAGE (BURSTS)			
Gate	**Test levels**	**Evaluation criterion**	**Result**
A.C. power supply input	2 kV	B	Complies

IMMUNITY TO CONDUCTED ELECTROMAGNETIC FIELDS			
Gate	**Test levels**	**Evaluation criterion**	**Result**
A.C. power supply input	10V	A	Complies

IMMUNITY TO IRRADIATED ELECTROMAGNETIC FIELDS			
Gate	**Test levels**	**Evaluation criterion**	**Result**
Enclosure	10 V/m	A	Complies

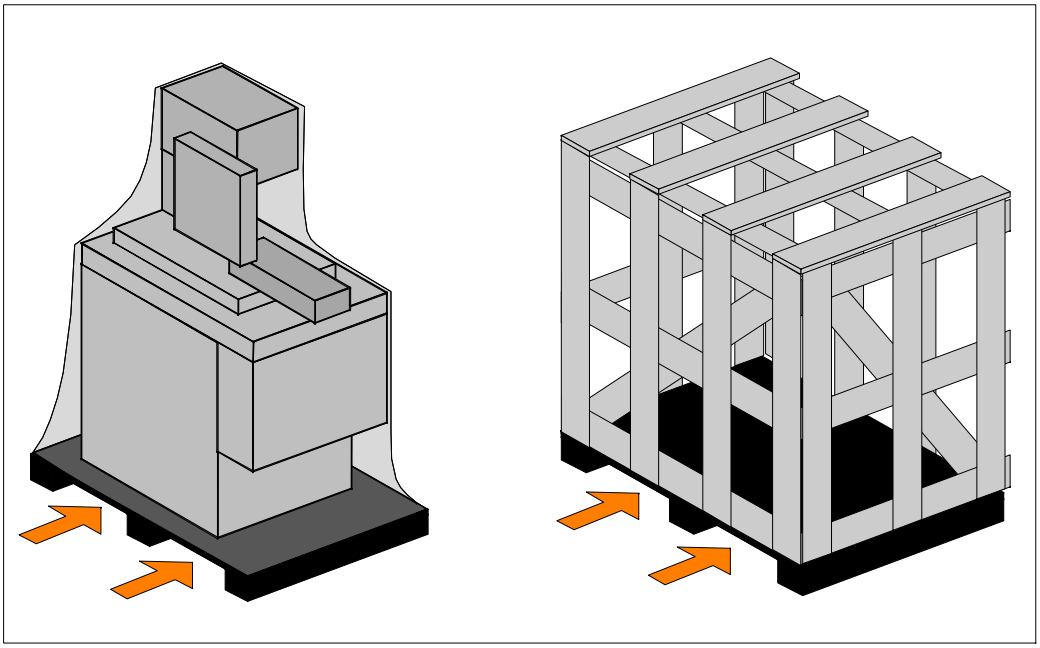
Machine installation

4

Packaging and storage

Hyd- Mech 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:

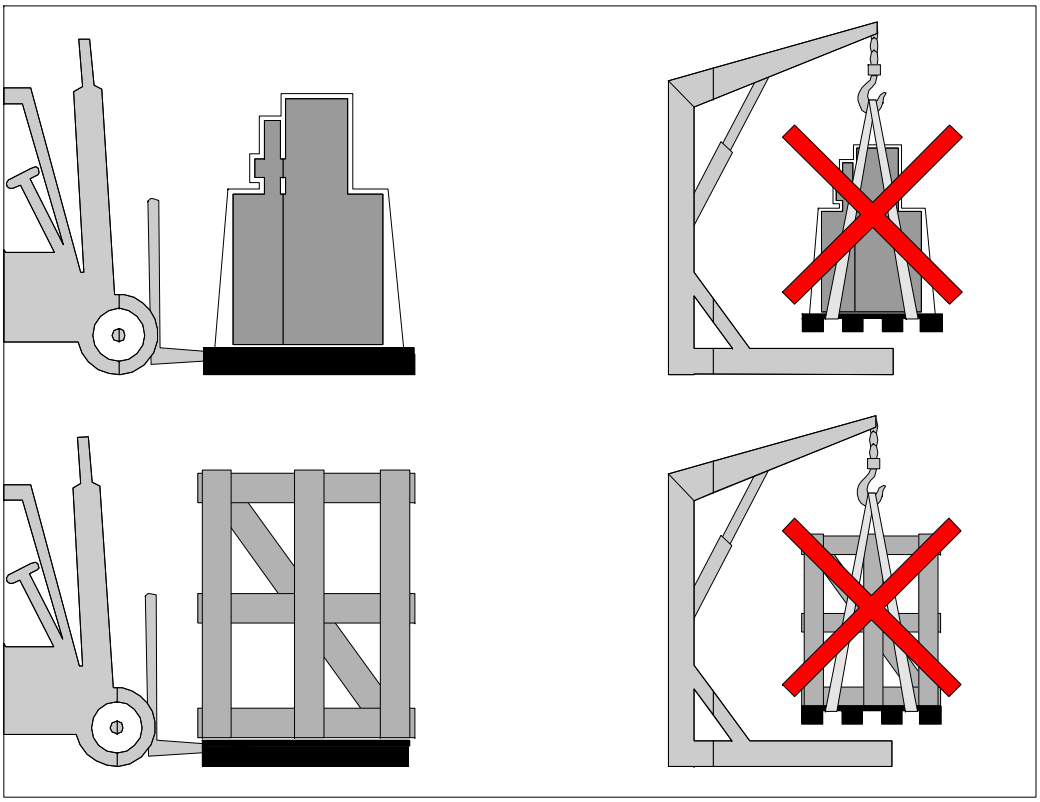


1. on a pallet with straps and heat- shrink plastic;
2. on a pallet with straps, heat- shrink plastic and a wooden crate.

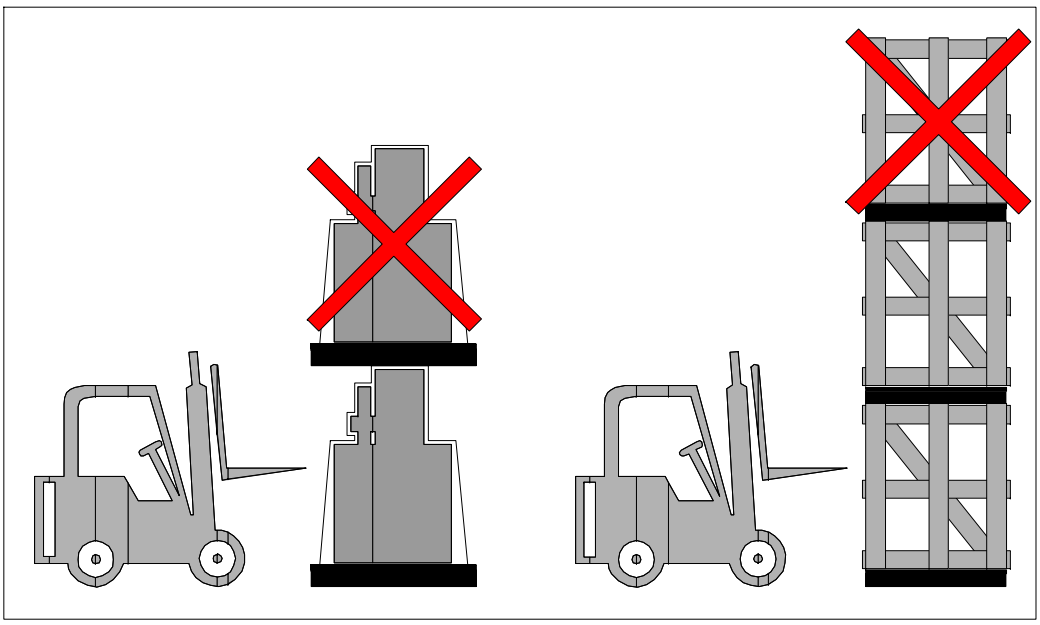
Warning In both cases, for correct balancing the machine must be handled using a fork- lift truck, inserting the tines at the points indicated by the arrows, using the reference marks on the crate itself.

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.

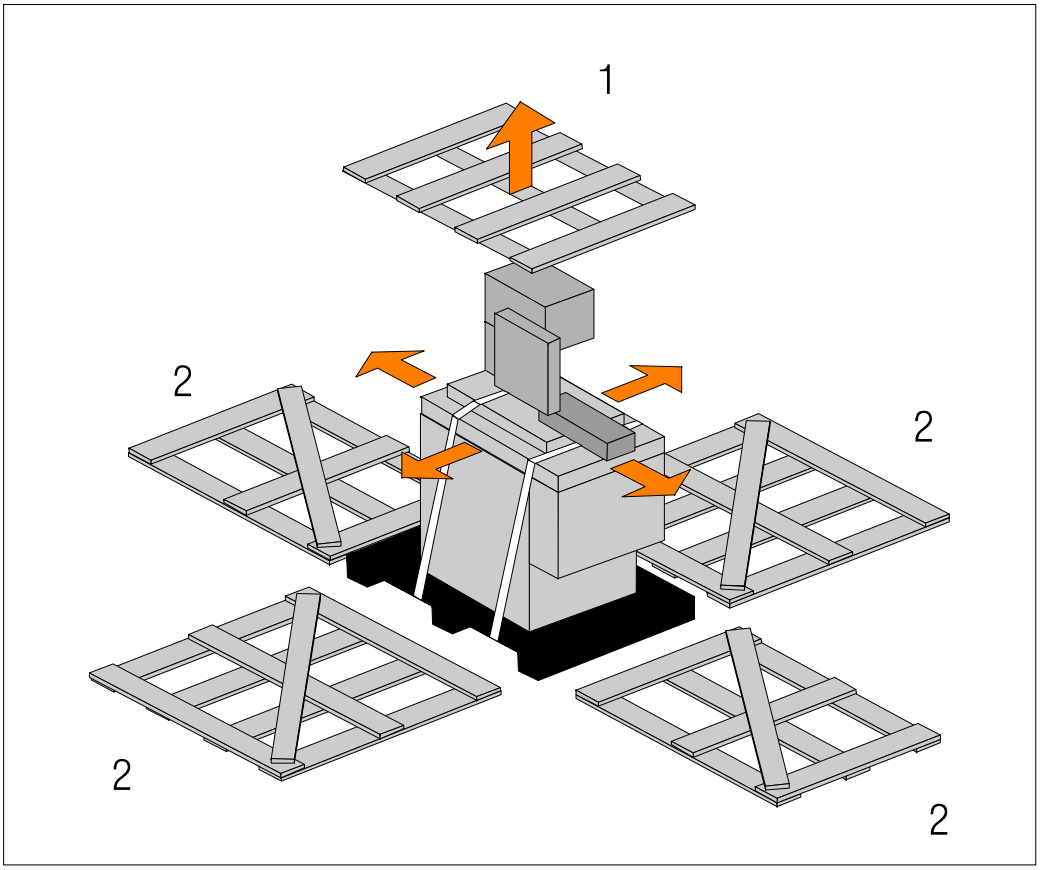


Attention When storing, machines palletized and shrink- wrapped must not be stacked two high, and machines pallettized and crated must not be stacked three high.

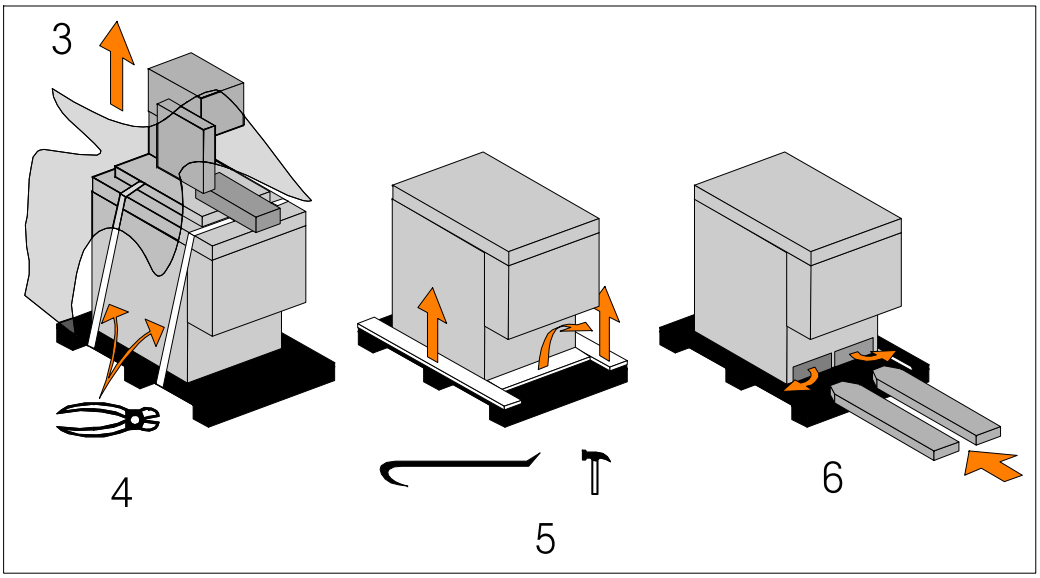


To install the machine, first remove the packing, paying particular attention not to cut any electric wires or hydraulic hoses; if necessary use pliers, a hammer and a cutter.
Open crate in the illustrated order:

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



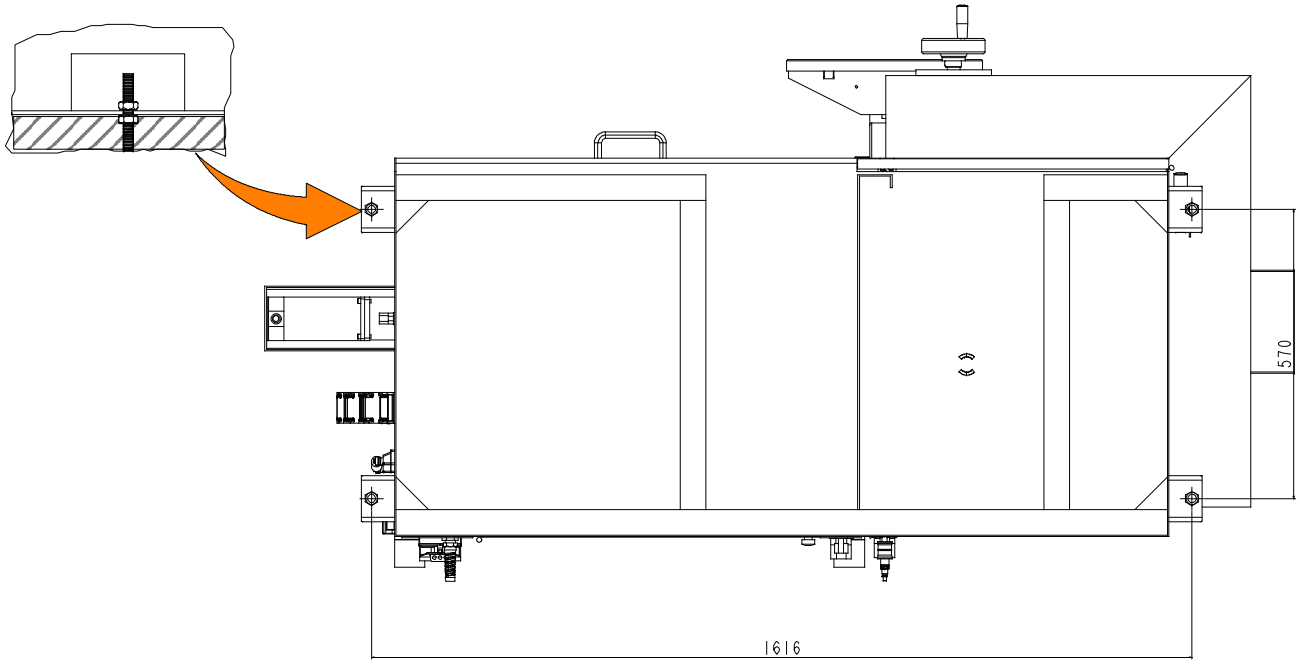
3. remove heat- shrink covering;
4. remove the straps;
5. remove nails from pallet securing planks and remove planks;
6. remove the front panel and insert fork tines.



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.



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 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 **C350-2 CNC** is supplied complete with:

CHARACTERISTICS	STANDARD	OPTIONAL
Multi- microprocessor with two controlled axes that permits programming 1000 batches of workpieces with different lengths and quantities on the same bar	✓	
Strong monobloc structure with electro- welded frame. Can be transported with lifting device or transpallet.	✓	
Head with vertical sliding on double linear guide and ball- recirculating pre- charged slides	✓	
Electronic inverter for the continuous adjustment of the blade speed from 15 to 90 rpm.	✓	
Electronic inverter for the continuous adjustment of the blade speed from 30 to 150 rpm.		✓

CHARACTERISTICS	STANDARD	OPTIONAL
7” touch screen display and mechanical buttons for the operating functions of the sawing machine	✓	
Positioning of the feeder shuttle and of the cutting head by means of joystick	✓	
Supplementary pedal control, with emergency device*		✓
HSS disk ø 350 x 32 x 2.5 for fulls and profiled	✓	
Double series of gears to obtain a higher cutting performance		✓
Cabinet for electric and electronic equipment with fully identifiable wiring, door-locking switch with padlockable device, emergency device, motor overload cut- out, minimum voltage coil and protection against a missing phase	✓	
Activation and control systems protected by input and output electric and electronic devices	✓	
Low tension control panel: softkey polyester keypad with thermo- moulded touch sensitive buttons and acoustic signal when the machine is started	✓	
Four controls to program the cutting head stroke limits, according to the dimensions of the bars to be cut	✓	
Blade rotation with 4 speeds: 2 with electric motor and 2 with mechanical change	✓	
Cutting force additional control	✓	
Spray gun to wash the work surfaces	✓	
Acoustic and flashing light signal in case of machine stop	✓	
Feeder with stepper motor, 600 mm (23.6 in), with screw system/nut with recirculating ball screws	✓	
Vice with rag prevention device and double workpiece clamping feature	✓	
Swing feeder vice to deliver even deformed bars	✓	
Discharge side roller table K40 adapter		✓
Chip drawer	✓	
Electric pump to lubricate and cool the disk	✓	
Blade cleaning brush	✓	
Vertical pneumatic vice	✓	
Series of comb jaws max 70 x 70 mm (2.7 in)*		✓
Special wastage reduction vice*		✓
Rotating pin with pre- loaded thrust bearing to ensure precision and reliability	✓	
Keys, user manual and manual for ordering spare parts in the language used	✓	
Series of comb jaws to apply to the special wastage reduction vice max 70 x 70 mm (2.7 in)*		✓
Prepared for the application of charge and discharge side roller tables		✓
Emulsifiable oil 5 l		✓
Spindle with 30/60/90/180 revs/min replacing the current production 15/30/45/90*		✓
Additional pedal control with emergency device*		✓
Additional pneumatic vice		✓
Charge side roller tables for comb jaws, 1500 mm (59 in) modules		✓
Minimal lubrication system		✓
K4110 roller table on supply side - kit 1500 mm (59 in)		✓

* ACCESSORIES AVAILABLE ON REQUEST

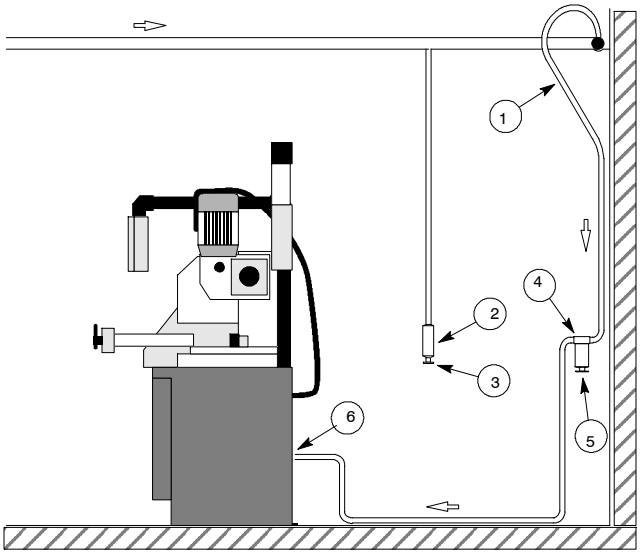
Accessory kit is placed before the packaging inside the machine; it contains the following items:

- 3, 4, 5, 6, 8 and 10 mm (0.12/0.16/0.20/0.24/0.39 in) Allen keys;
- open 19 mm (0.75 in) wrench;
- this Use and Maintenance Manual.

Connection to the compressed air supply

To ensure perfect operation and a long service life, it is recommended that the machine is connected to a compressed air system having the characteristics reported in the diagram below.

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

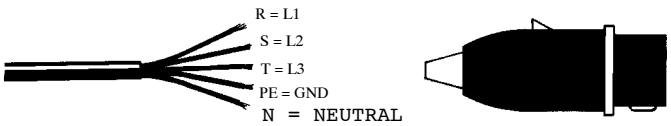


Connection to the power supply

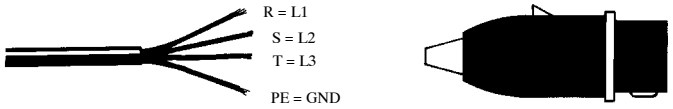
Before connecting the machine to the power supply, check that the socket is not connected in series with other machines. This requirement is fundamental for the good operation of the machine.To connect the machine to the power supply, proceed as follows:

▶ 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



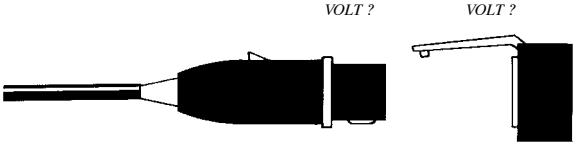
CONNECTION FOR **"4-CORE"** WIRE SYSTEMS WITH NEUTRAL



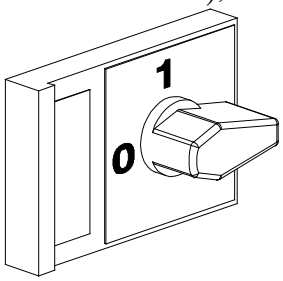
Attention

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.**

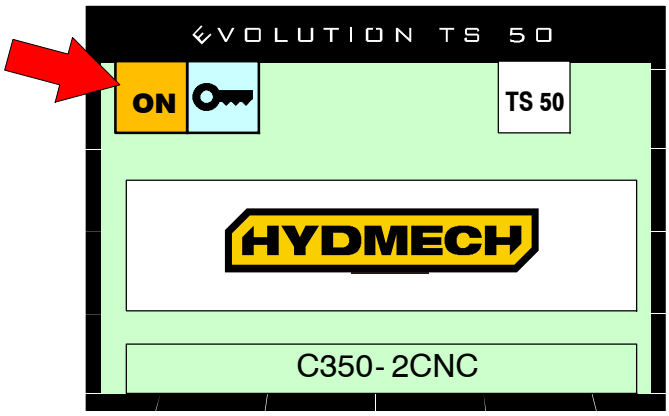
▶ Insert the plug in the socket, ensuring that the mains voltage is the same as that for which the machine has been setup.



▶ Power up the machine by turning the main switch on the left hand side of the base (the control console should illuminate);



▶ press the ON button on the control console;



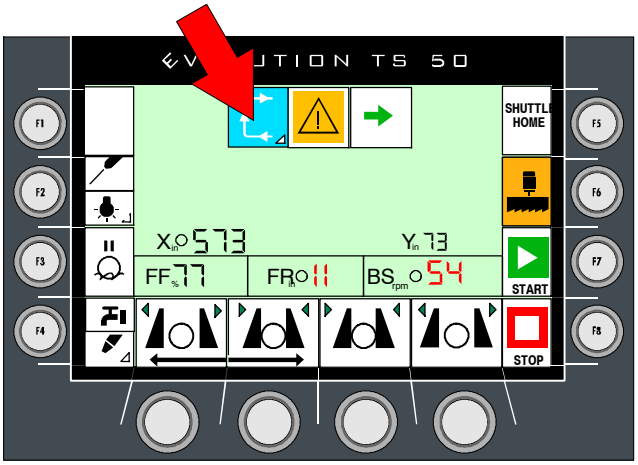
▶ press RESET.

The above sequence (ON and RESET buttons) must be performed each time the machine is switched on and before tensioning the saw band during a normal production cycle.

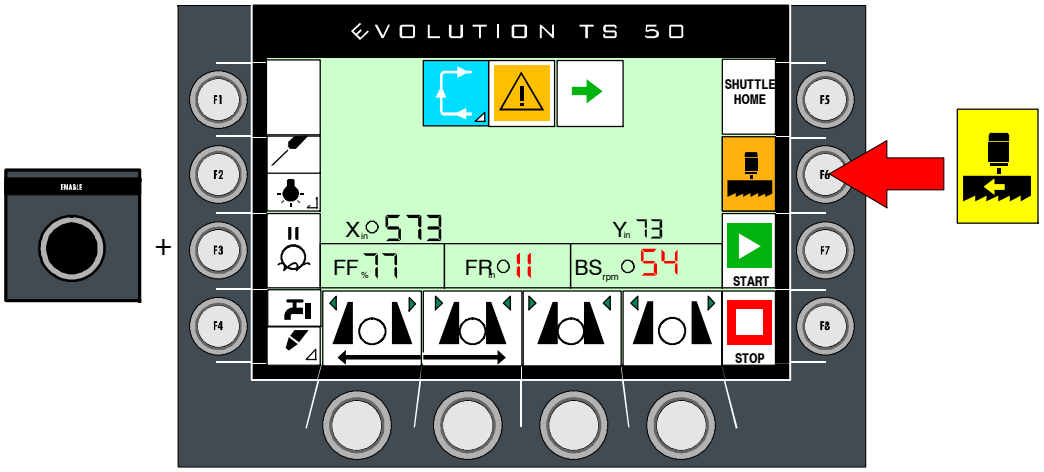
Ensure that the hydraulic power pack rotation is correct. To do this, proceed as follows:

▶ make sure the machine is not in emergency status (red mushroom head button released); otherwise, release the emergency stop button and press RESET.

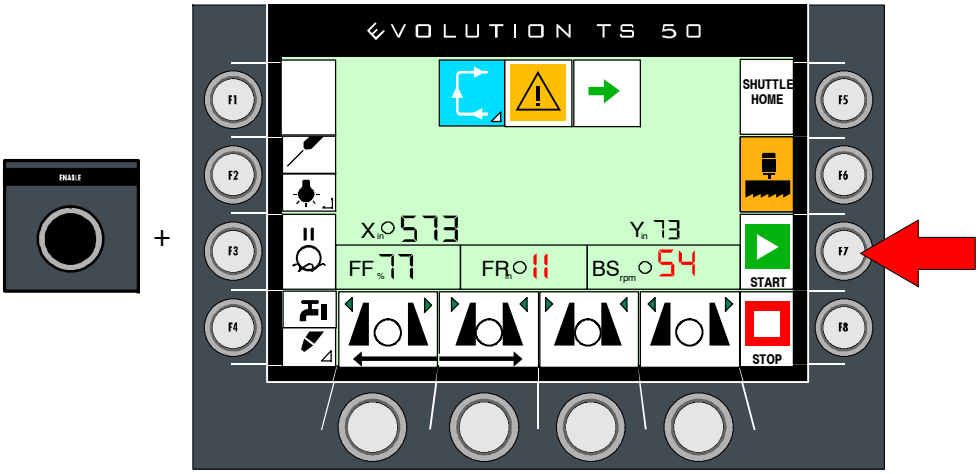
▶ Select the semiautomatic machining mode, pressing the box shown in the figure on the touch screen.



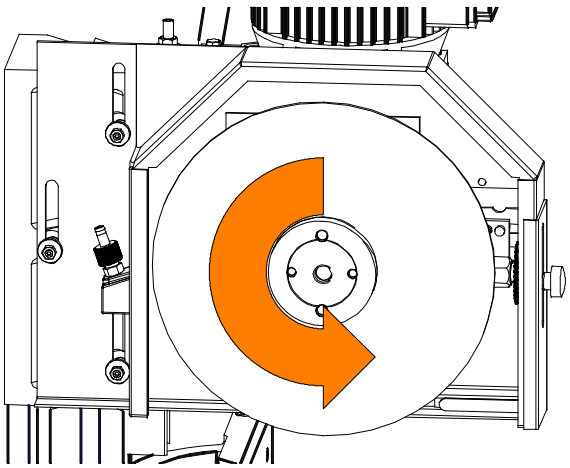
▶ Enable the blade rotation by holding the control enabling key and the key shown in the figure (F6) pressed; the box lights on to indicate it has been selected.



▶ Start the cutting cycle holding the control enabling key and the key shown in the figure (F7) pressed; the disc starts turning and the machine cuts. At the cut end the head goes up again, ready to make a new working cycle.



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's power supply input.



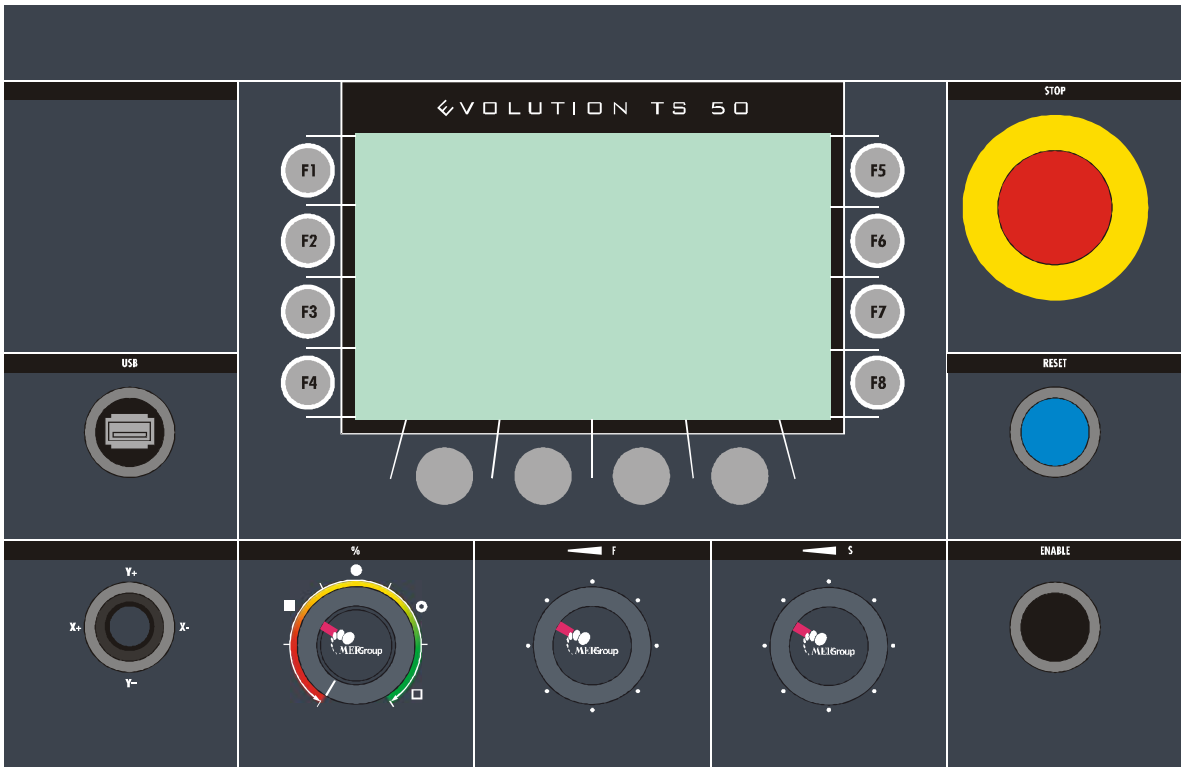
The sawing machine is now ready to start the work for which it was designed. Chapter 5 provides a detailed description of the various functions of the machine and its operating cycles.

Description of machine operation

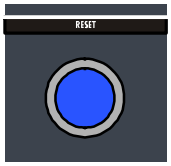
This chapter analyses all the machine functions. We begin with a description of the pushbuttons and other components on the control panel.

Description of the control panel

The control console is housed inside the control panel in an IP 54 rated housing which is tamperproof and resistant to dust and moisture. The control panel swivels on two articulated joints so that it can be positioned by the operator for greater ease of use and safety. The control console for the **C350- 2 CNC** is illustrated below.

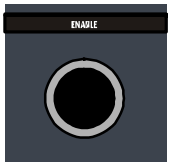


Key for control console keyboard

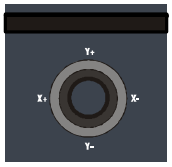


RESET:
Press to reactivate machine functions after an alarm.

EMERGENCY STOP:
This button will stop both the hydraulic and blade motors. The head motion will cease. The vises remain as they are, but if closed, they will lose gripping force. For this reason all long stock should be supported so that it will not fall.
To reset the button, simply rotate through 45°.



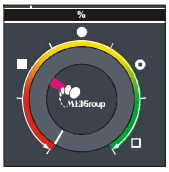
ENABLE COMMANDS:
Hold pressed to enable machine commands.



JOYSTICK:
This moves the head upwards- downwards and the forward and backward movement the feeder while the enable commands button is pressed.

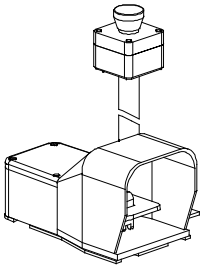
Not used

KNOB F:
This adjusts the head descent speed.



KNOB A%:
Adjusts the current absorption depending on the machine cutting force

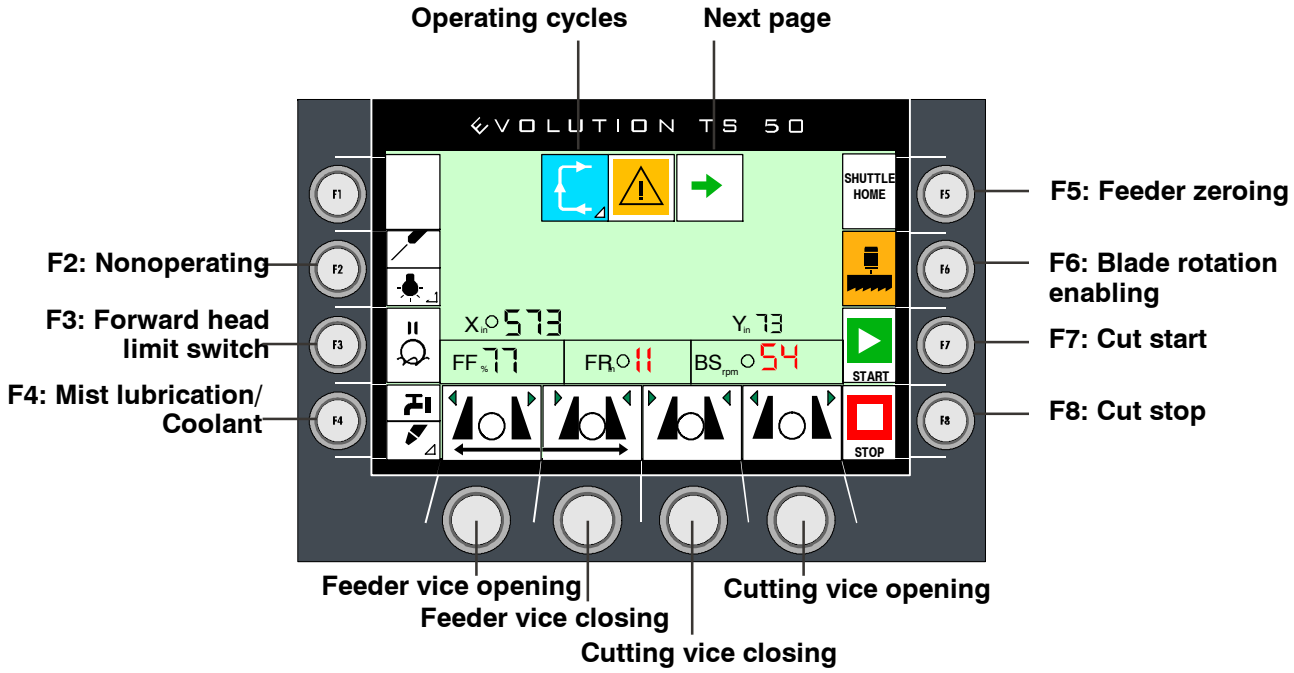
USB PORT:
Communication port for the software update and the machine diagnostics



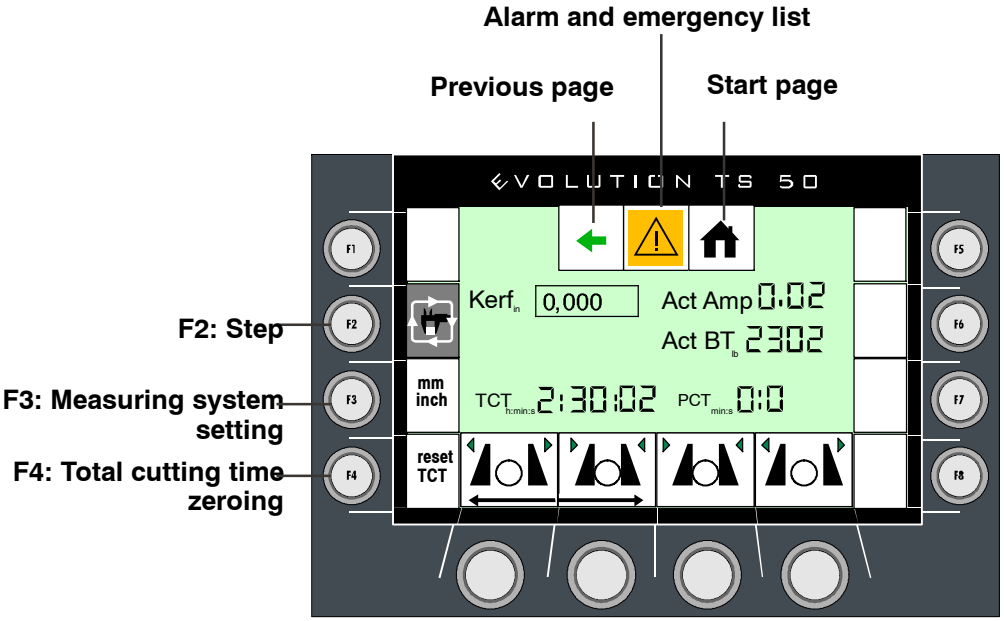
MOBILE START - EMERGENCY DEVICE. The machine is equipped with a remote control device which controls start- up of the semi- automatic cycle by the foot pedal and emergency shut- down by the red mushroom head button.

Symbol key

The key for the symbols used on the display follows.



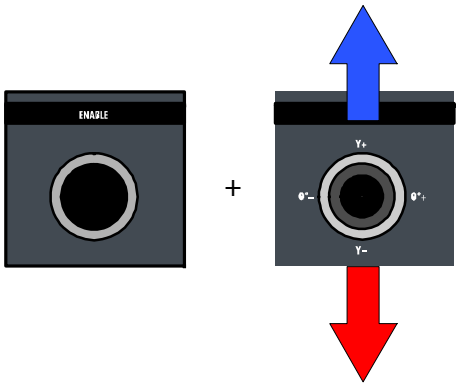
Pressing the “Next page” key, you can display the second machining screen:



Basic instructions for carrying out a cutting operation cycle

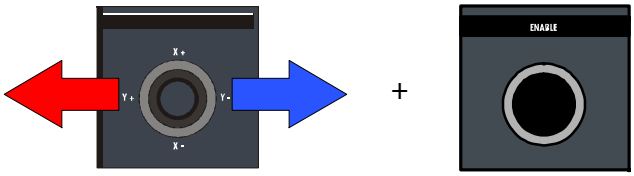
Moving the cutting head up and down

The cutting head can be moved up and down by pressing the enable commands button and using the joystick at the same time. Refer to the control console keyboard description in this chapter.



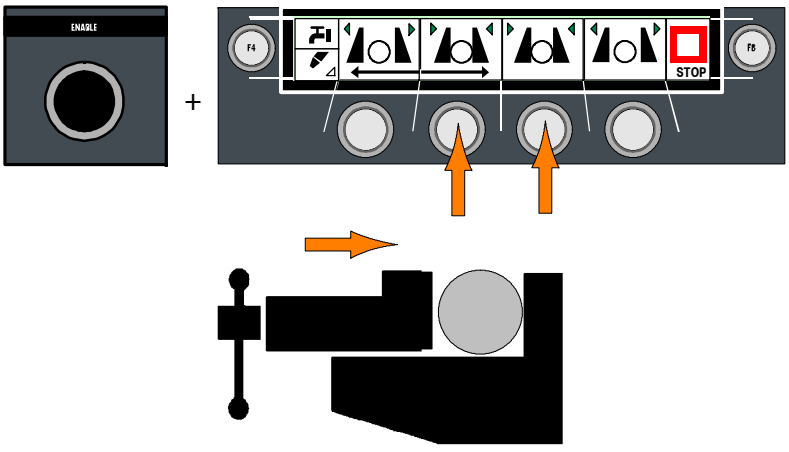
Manoeuvring the feeder

The feeder can be moved using the joystick, holding the control enabling key pressed at the same time. Due to safety reasons, the movement is enabled only if the head is completely up.



Clamping the work piece in the vice

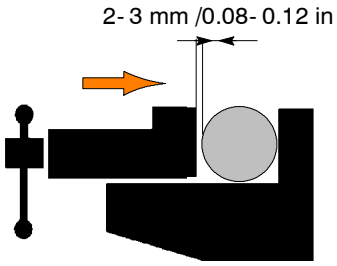
Vice opening and closure, for the cutting vice and the feeder vice, are controlled by the corresponding buttons on the control console.



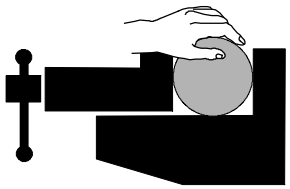
However, to ensure that the workpiece is securely clamped in the vice, proceed as follows:

- ▶ make sure the workpiece dimensions do not exceed the machine's cutting capacity;
- ▶ make sure the piece is correctly supported on both sides of the machine;

- move the vice to within 2÷3 mm (0.08÷0.12 in) of the workpiece using the handwheel.



- Close the cutting vice by holding the control enabling button and the vice closing button pressed at the same time.
- make sure that the material is well blocked by trying to move it manually, as the vice cylinder has a stroke of 6 mm (0.24 in) only.



Preliminary check list for cutting operation

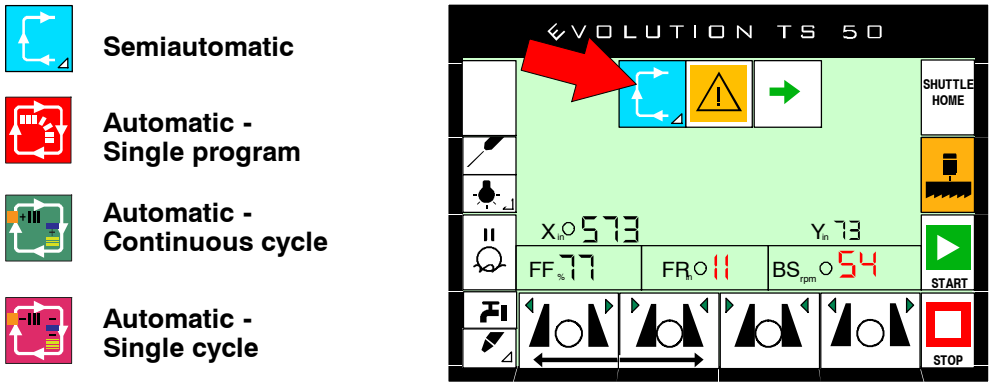
To guarantee complete safety during cutting cycles, the operator should work through a check list of the entire apparatus, checking:

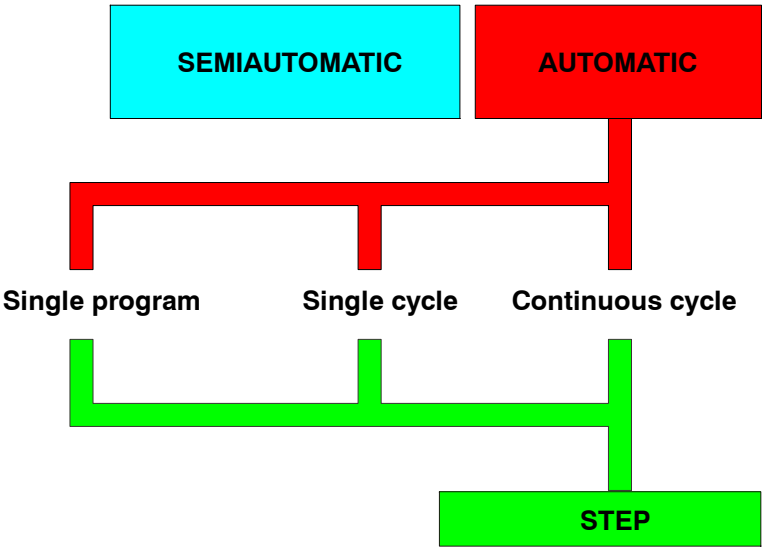
- ensure that the disk guard completely surrounds the tool when it is not in use;
- that the work piece is properly clamped in place;
- ensure that the blade teeth are appropriate for the material being cut;
- that the speed selected is right for the kind of piece to be cut;
- that all protections are in place and correctly locked;
- lubricant/coolant level and activation of the electropump;
- the blade downstroke speed must be correct.

Cutting cycles

This sawing machine can cut in Semiautomatic and Automatic cycles. In automatic mode, it can carry out single or series cuts stored in max. 10 programs that can run individually or in sequence.

▶ after initializing the sawing machine, the display shows ”main menu”





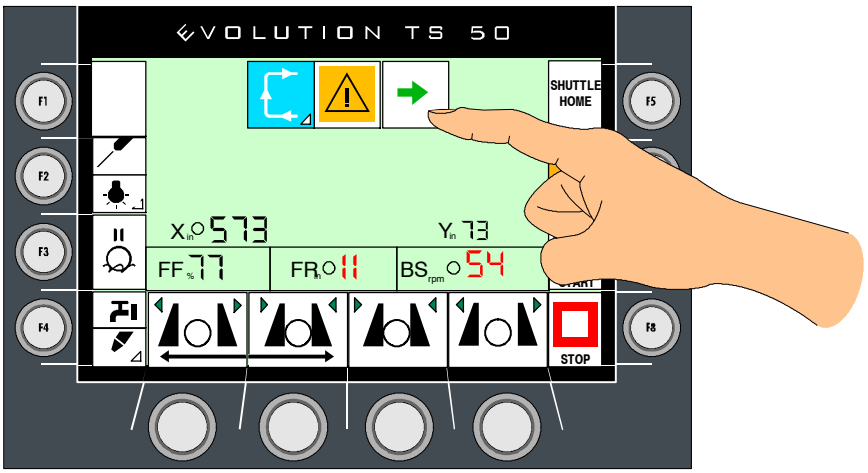
AUTOMATIC CYCLE

- Single program: it carries out exclusively the programmed cycle directly on the working video page. After setting the length and the number of necessary pieces, it runs the program stopping the cycle and giving a light and sound alarm.
- Single cycle: it carries out the stored programs one at a time and stops waiting for the consent before the next program.
- Continuous cycle: it carries out the stored programs like in the single cycle but at the end of each program it AUTOMATICALLY goes to the next program.

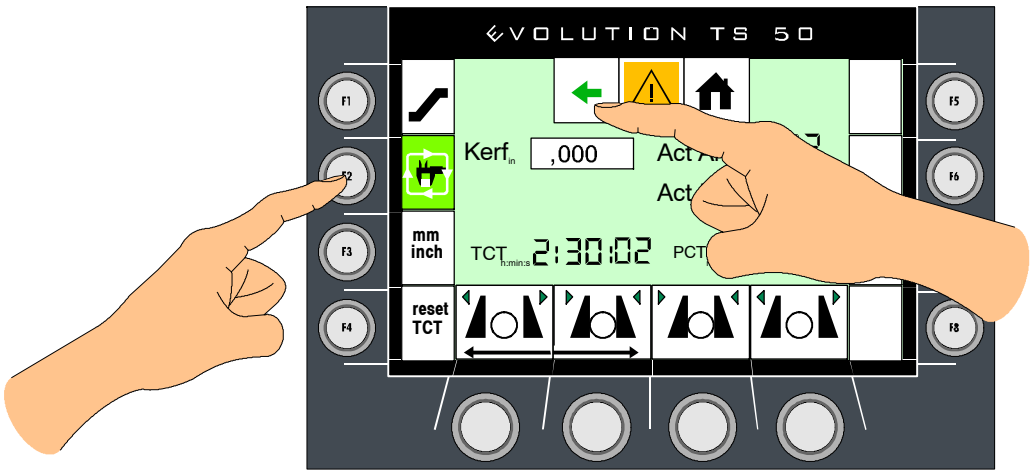
UTILITY STEP

- STEP: accessible from any cycle. In the automatic cycle it makes the bar facing cut, the first piece cut and then stops so that the piece can be measured.

▶ Press the box shown in the figure to access the second video page;



▶ Press the “Step” box to activate this function and return to the working page by pressing the previous page box: the activated Step signal will be displayed on the upper left.

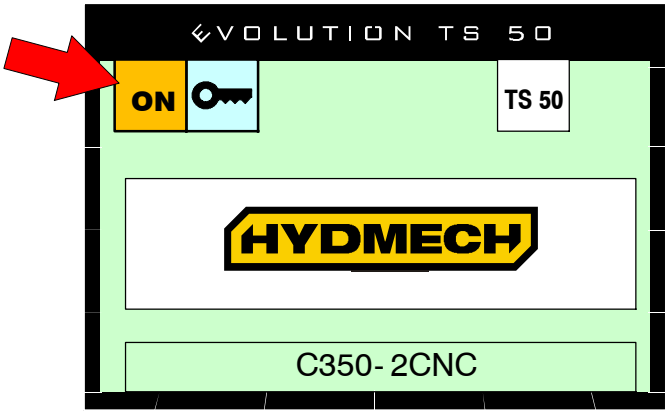


▶ Proceed like a standard automatic working cycle, restarting it at every cut made by the machine, pressing simultaneously the Control enabling button and the key F7 (Start).

Starting up the machine

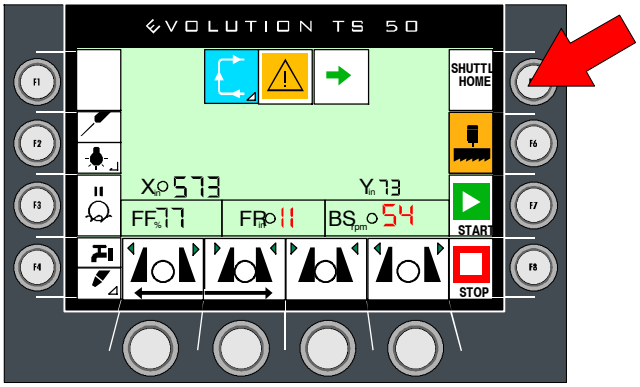
The presentation and start- up display appears when the machine is switched on.

▶ Tap on the box with the on symbol on the touchscreen.



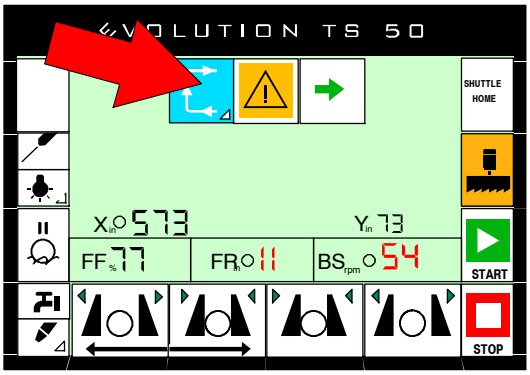
▶ press reset and release the emergency mushroom button if pressed, the head rises completely.

▶ Zero the feeder by pressing holding down the key enabling command and the key shown in figure (F5).



This sawing machine can carry out single or series cuts stored in max. 10 programs, that can even be repeated, to be ordered in a preset sequence.

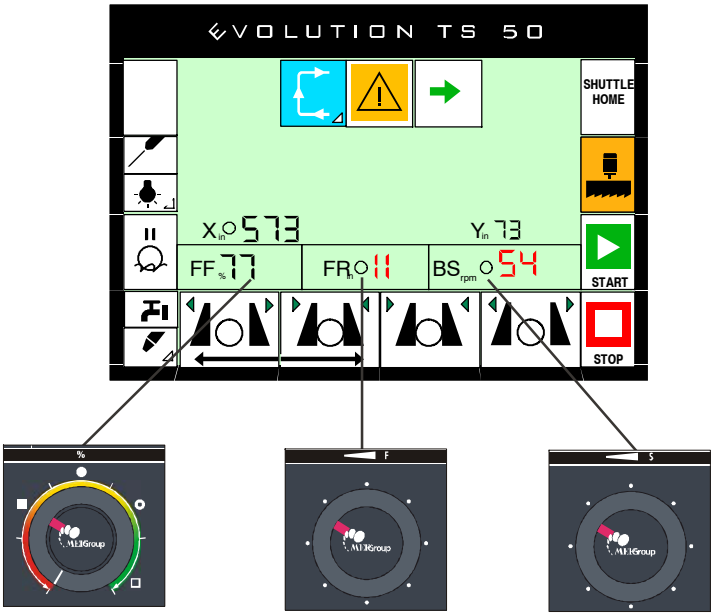
▶ After the initialization of the sawing machine the display shows the following screen. Press the box shown in the figure until the symbol of the wished cycle is displayed.



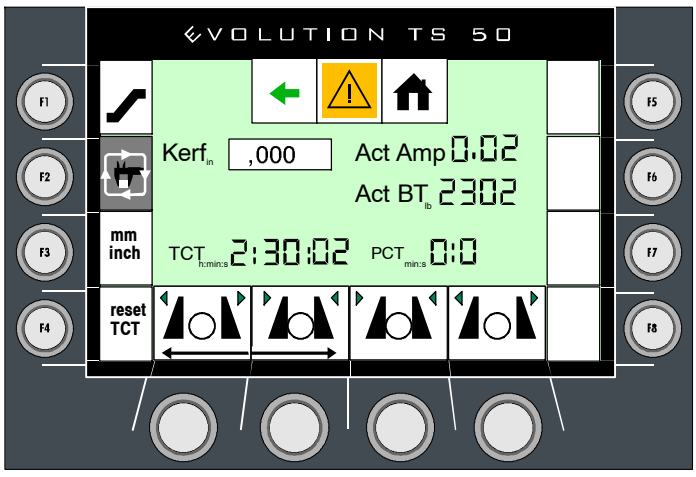
The available machining cycles are: manual, automatic with single program and automatic with continuous program.
In the manual cycle the cutting only involves the setting of the rear head limit switches (RHLS) and forward head limit switches (FHLS); then, after having

positioned the material at the wished cutting length, start by the Cut start key (F7).
As for the automatic cycle, it can operate with single or automatic program.

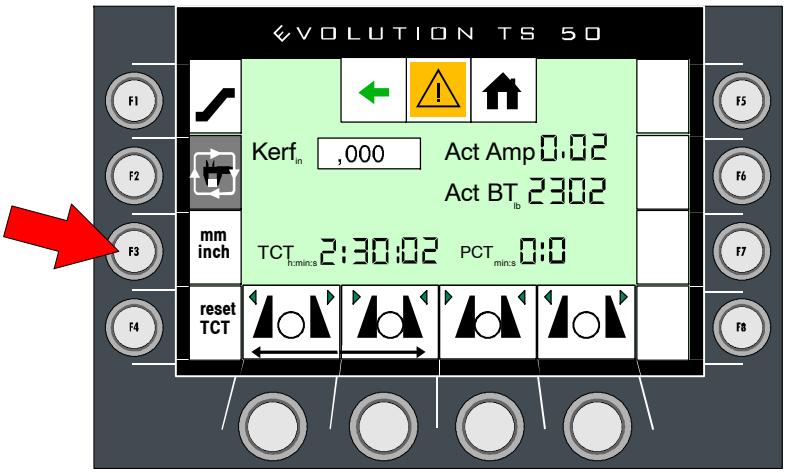
During the machining cycle, by pressing the box in the figure, it is possible to check the machine operating parameters:
FF = Feed Force, value of the cutting force that can be set through the potentiometer from the control board.
FR = Feed Rate, value of the cutting head lowering speed that can be set through the potentiometer from the control board.
BS = Blade Speed, value of the disk rotation speed that can be set through the potentiometer from the control board.



Pressing the arrow key shown in the figure the second page of the operating parameters can be displayed:
Kerf = blade thickness
Blade deviation = deviation blade
Act BT = Actual Blade Tension, current value of blade tension;
Act AMP = Actual Ampere, current value of motor absorption;
PCT = Partial Cutting Time;
TCT = Total Cutting Time.



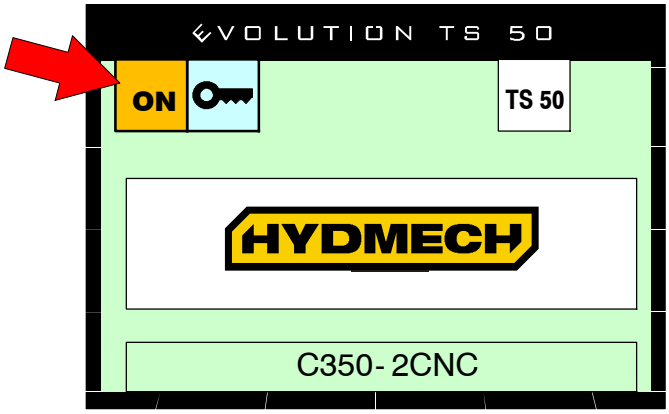
N.B. Pressing the key shown in the figure the decimal metric measuring system or the Imperial measuring system can be set.



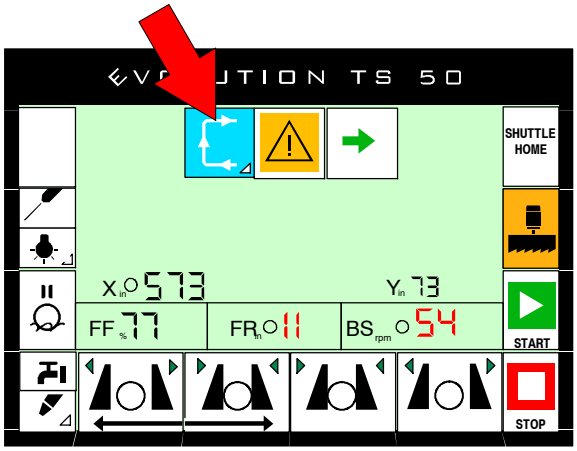
Semi- automatic operating cycle

The operation sequence for running a semiautomatic cutting cycle:

- power up the machine by turning the main switch;
- Tap on the box with the on symbol on the touchscreen.

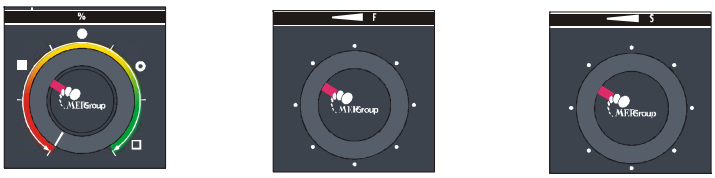


- Select the semiautomatic machining mode, pressing the box shown in the figure on the touch screen.

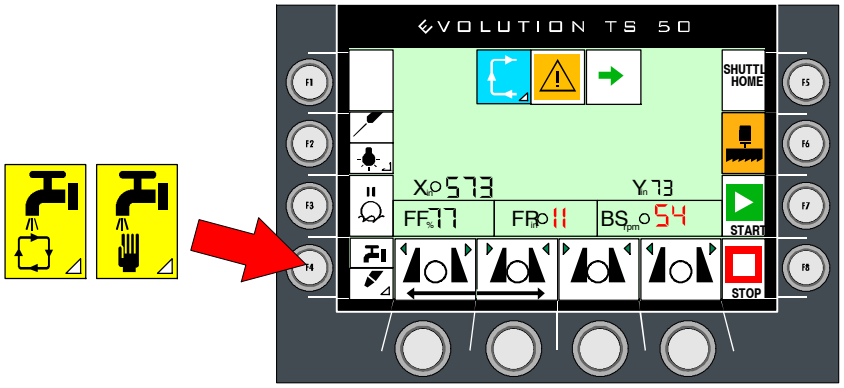


- Set the cutting parameters, previously shown, using the following adjusters.

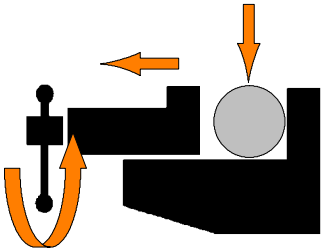
Warning In this step it is recommended to set the head lower adjuster at the min. value, to prevent the head from lowering too fast breaking the blade.



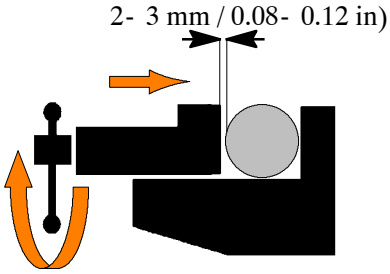
▶ Set the fluid jet by pressing the button shown in the figure (F4). The box will light up to indicate that it is selected. Adjust the amount using the valves on the blade guide head. Press the button repeatedly to select the dispensing mode (automatic or manual).



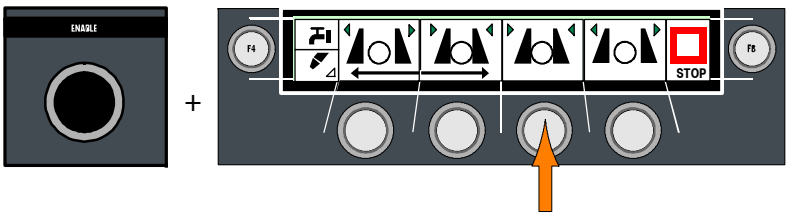
▶ Open the vice by rotating the handwheel anti- clockwise and position the workpiece between the jaws.



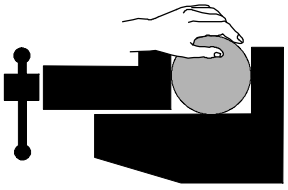
▶ Bring the moveable jaw to within 2÷3 mm (0.08÷0.12 in) of the workpiece by rotating the handwheel clockwise.



▶ Close the cutting vice by holding the control enabling button and the vice closing button pressed at the same time.

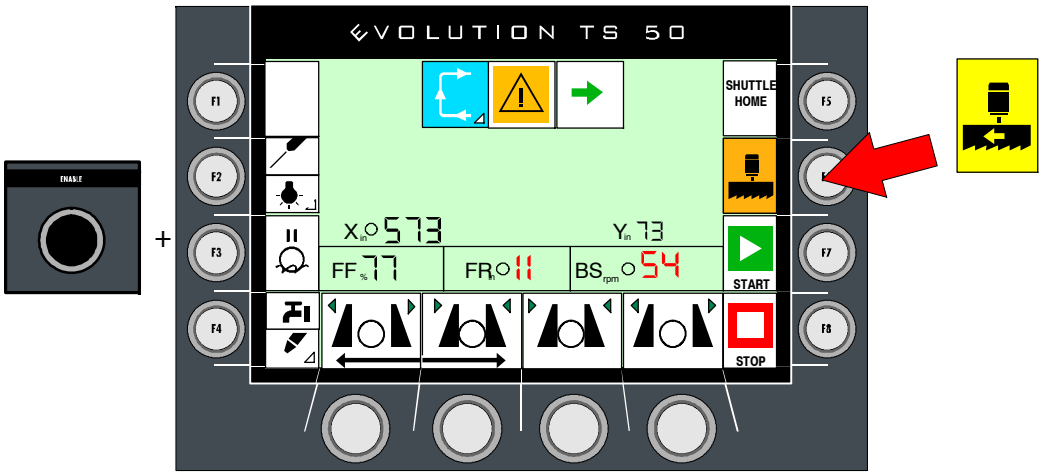


▶ Check that the workpiece is effectively locked in positon!

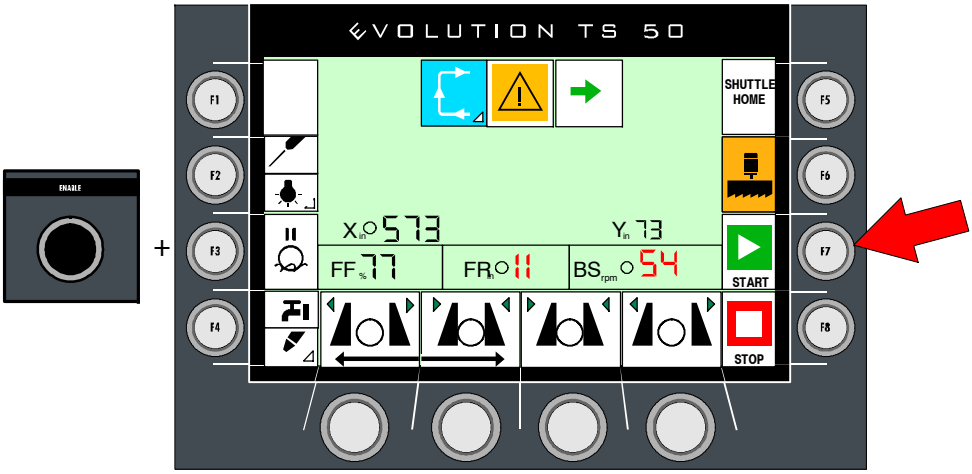


N.B. If the vice was already closed by the pneumatic piston, it may not block the piece. In this case it is necessary to repeat the operation, i.e.: open the vice by pressing the specific button, bring the moving jaw near to the piece and block it again with the closing button, bearing in mind that the stroke of the pneumatic piston is approx. 6 mm (0.24 in).

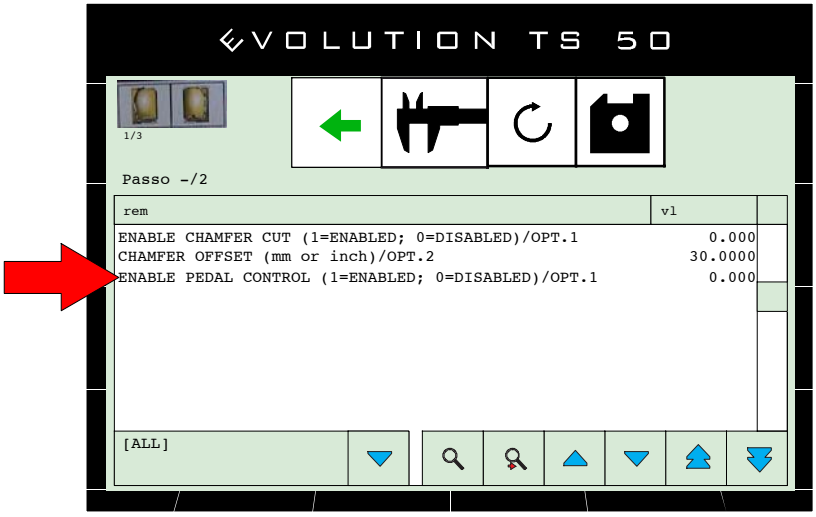
- ▶ Position the head at approximately 10 mm (0.4 in) from the workpiece.
- ▶ Hold the control enabling key and the blade rotation enabling key (F6) pressed at the same time.



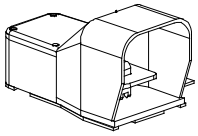
- ▶ Hold the control enabling key and the cycle start key (F7) pressed at the same time to start the disk rotation and the head lowering at the set speeds. The RHLS point is automatically stored in this way.



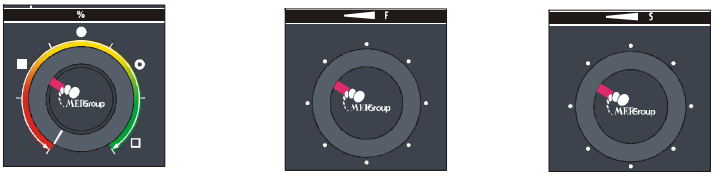
N.B. If the sawing machine is equipped with optional pedal control the cycle start control can be made from remote station. In this case it is necessary to enable the operation of the pedals, by selecting the appropriate entry in the list of options.



▶ Press the pedal control to start the working cycle.

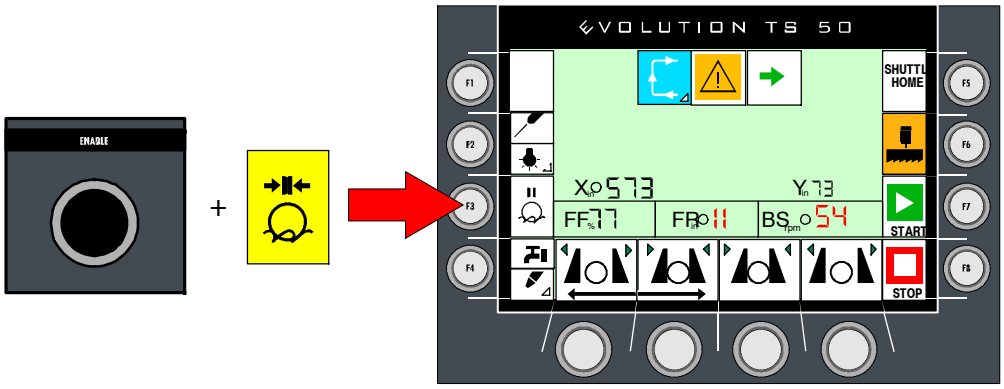


▶ Set the cutting parameters, previously shown, using the following adjusters.

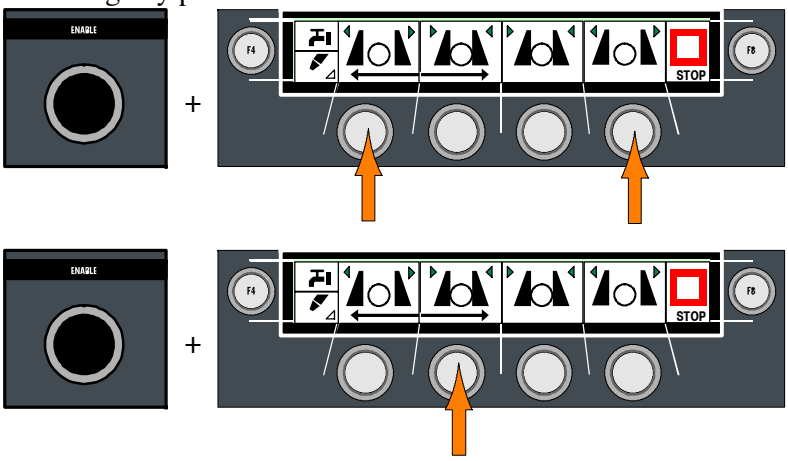


Now the blade starts, the cutting cylinder is under pressure and the lubricant/ coolant supply starts.

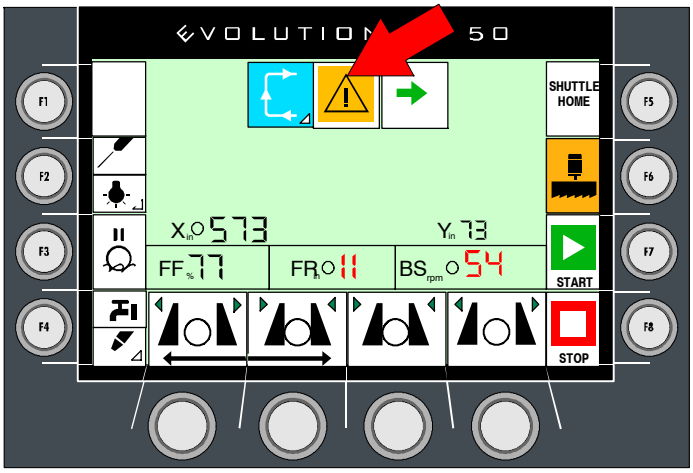
N.B. At this point, hold the enable commands button pressed and move the head down using the joystick to delete the existing FHLS point: the FHLS setup box will start blinking to indicate that the FHLS point was deleted. When the head reaches the required end of cutting point, press the FHLS setup button shown in the figure together with the enable commands button. The corresponding box will light up to indicate that it was selected.



- When the head reaches the FHLS point the band stops and the head returns to the set RHLS point, ready to make a new cutting cycle.
- Open both vices holding the control enabling key and the vice opening key pressed at the same time. Feed the material to be machined, as explained above, and then close the cutting vice by holding the control enabling key and the vice closing key pressed.



N.B. Tap on the touchscreen box shown in the figure to see problems during operation. The box will turn blue to indicate caution and red to indicate a machine alarm. See chapter 10 for a complete list of alarms.



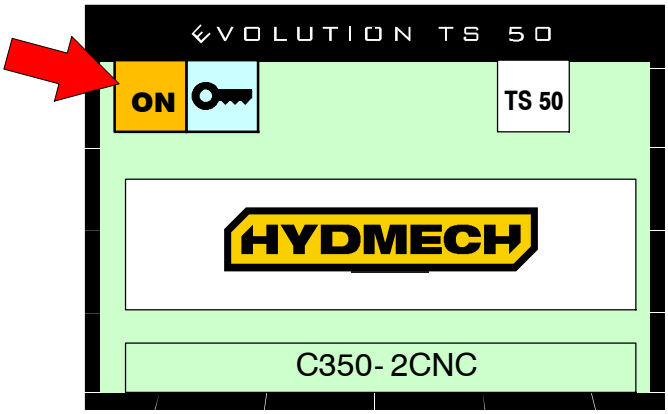
Automatic mode single job

- Single program: it carries out exclusively the programmed cycle directly on the working video page. After setting the length and the number of necessary pieces, it runs the program stopping the cycle and giving a light and sound alarm.

The operation sequence for running in automatic mode and single job:

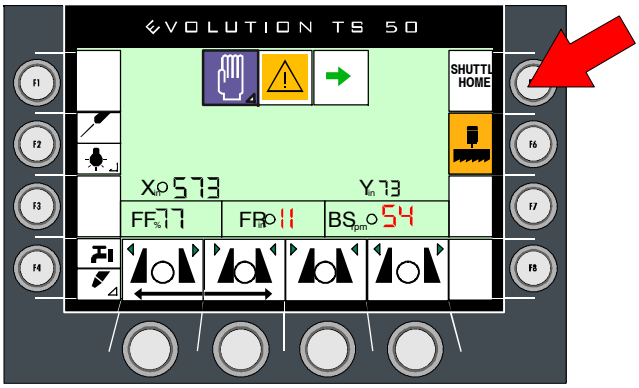
▶ power up the machine by turning the main switch;

▶ tap on the box with the on symbol on the touchscreen;



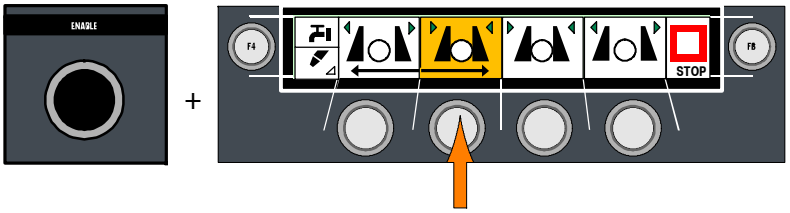
▶ press reset and release the emergency mushroom button if pressed, the head rises completely.

▶ Zero the feeder by holding the control enabling key and the key shown in figure (F5) pressed at the same time. In this operation the sawing machine closes the cutting vice, opens the feeder vice and transfers the shuttle till reaching the zero value.

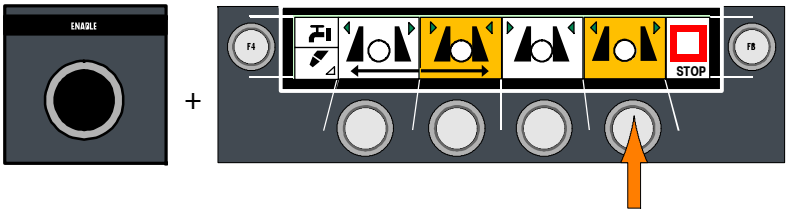


▶ Position the material inside the feeding vice.

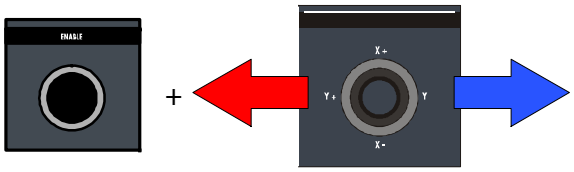
▶ Close the feeding vice by holding the control enabling button and the vice closing button pressed at the same time.



▶ Open the cutting vice by manually adapting the opening with the flywheel and using the button

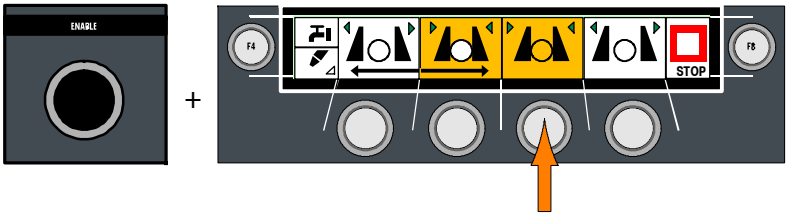


▶ Feed the material to be machined, to align it on the cutting line in the working table, by moving it using the joystick and holding the control enabling key pressed.

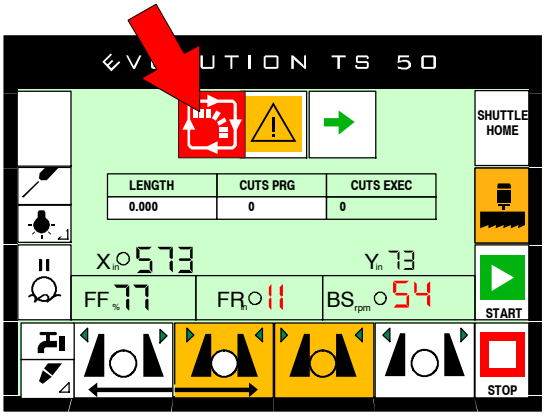


Warning Before handling the material in the feeder, take the cutting head totally up so that it does not interfere with the tool.

▶ Close the cutting vice by holding the control enabling button and the vice closing button pressed at the same time.

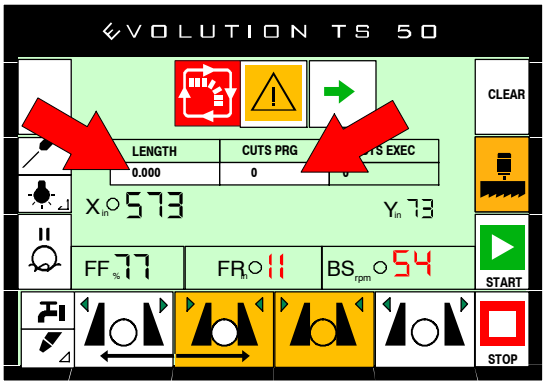


▶ Select the automatic machining mode with single program, pressing repeatedly the box shown in the figure on the touch screen.



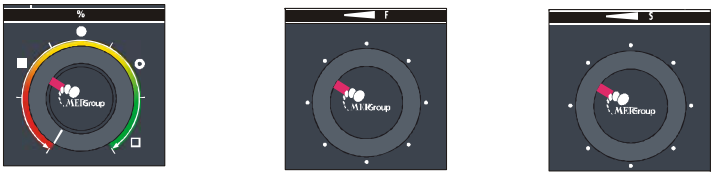
▶ Press CLEAR (F5) to set the number of pieces cut in the previous machining to zero.

▶ Set the wished length and the wished number of cuts pressing the boxes shown in the figure and entering the values on the keypad that pops up automatically.

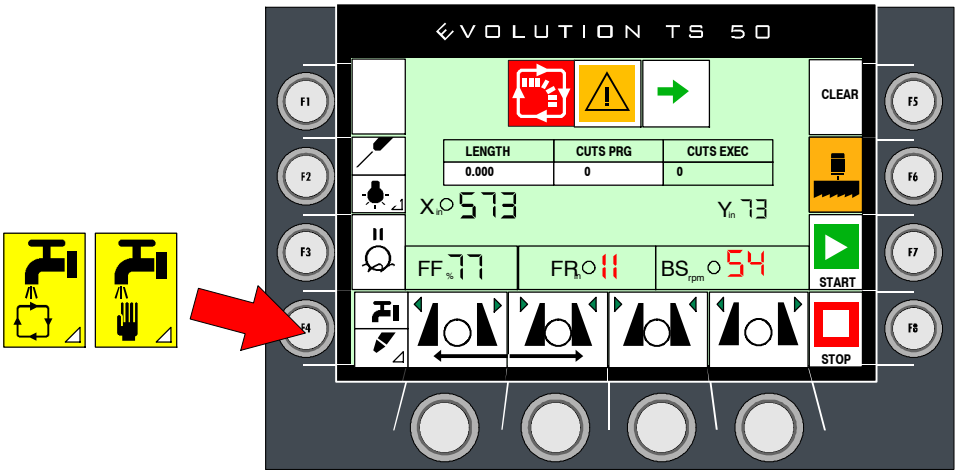


▶ Set the cutting parameters, previously shown, using the following adjusters.

Warning In this step it is recommended to set the head lower adjuster at the min. value, to prevent the head from lowering too fast breaking the blade.

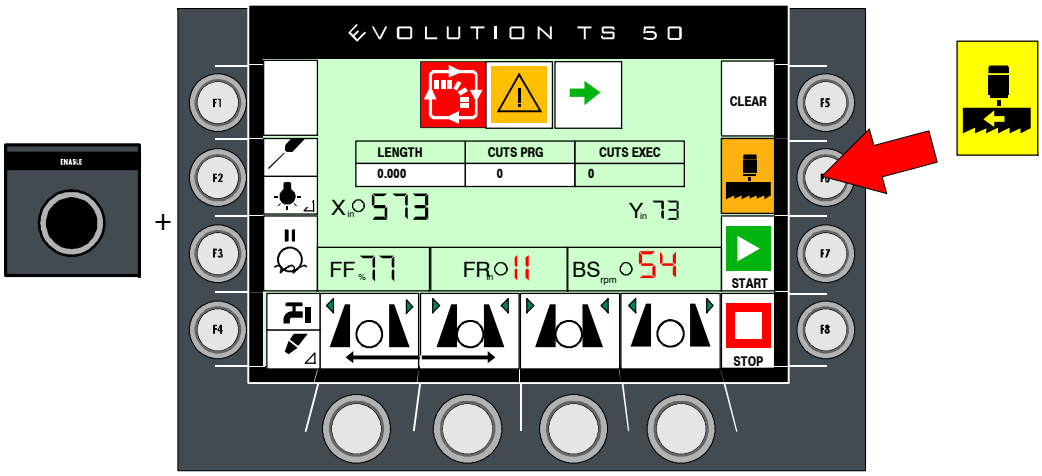


▶ Set the fluid jet by pressing the button shown in the figure (F4). The box will light up to indicate that it is selected. Adjust the amount using the valves on the blade guide head. Press the button repeatedly to select the dispensing mode (automatic or manual).

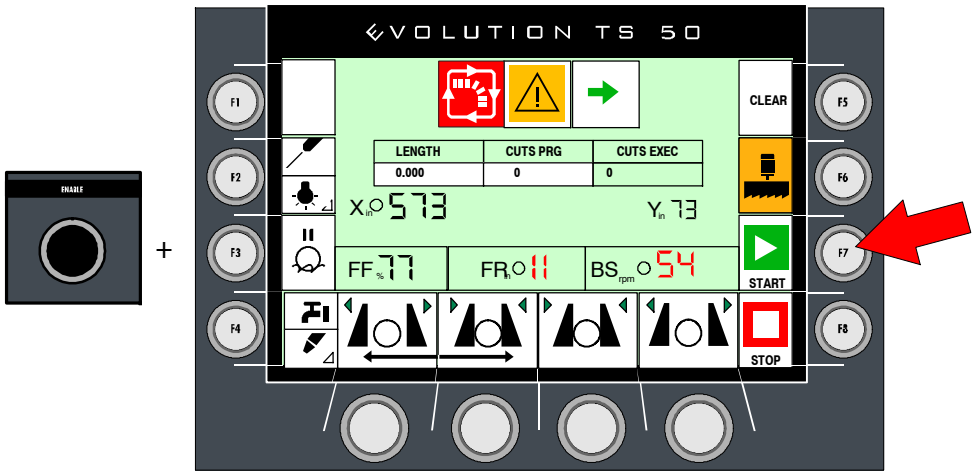


▶ Position the head at approximately 10 mm (0.4 in) from the workpiece.

▶ Hold the control enabling key and the disk rotation enabling key (F6) pressed at the same time.

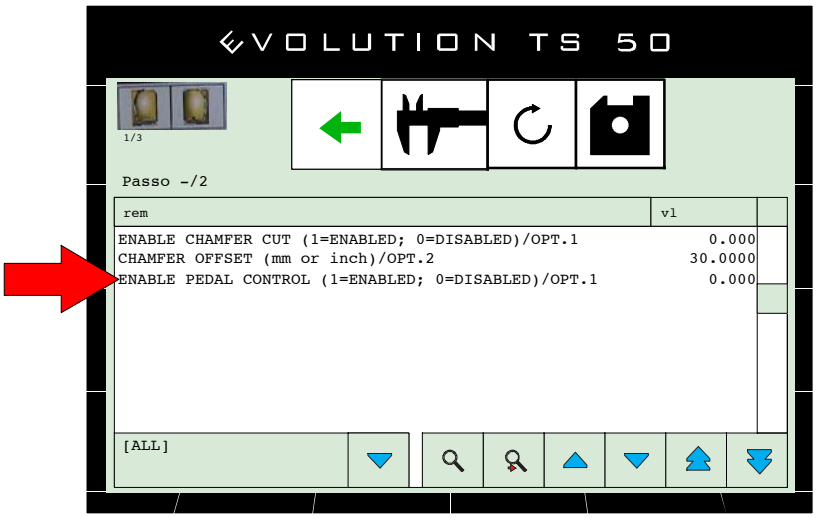


▶ Hold the control enabling key and the cycle start key (F7) pressed at the same time to start the diskrotation and the head lowering at the set speeds. The RHLS point is automatically stored in this way.

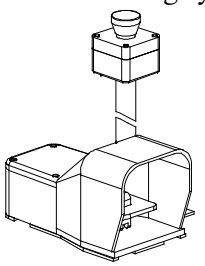


N.B. If the sawing machine is equipped with optional pedal control the cycle start control can be made from remote station. In this case it is necessary to enable

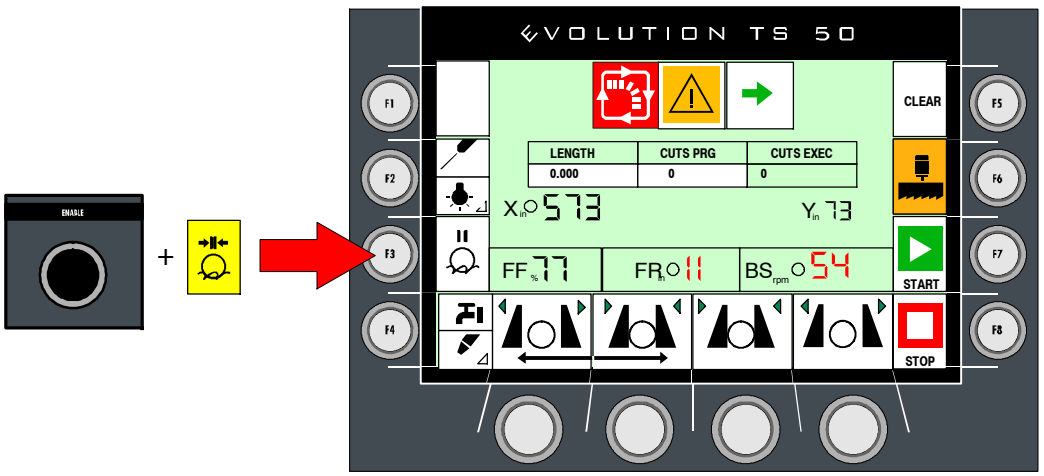
the operation of the pedals, by selecting the appropriate entry in the list of options.



▶ Press the pedal control to start the working cycle.



N.B. Then, if the existing FHLS point is to be deleted, follow the operations previously described in the semiautomatic cycle for deleting and setting again the head stroke limits.



The sawing machine is running before cutting and then trimming the planned cuts. At the end of the top and head disk motor stops. If you intend to repeat the cycle or start a new job, press CLEAR (F5) to clear the cut pieces.

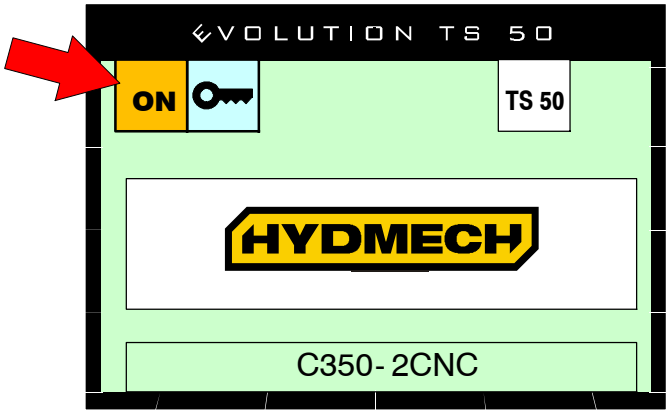
Automatic operating cycle with single cycle

- Single cycle: it carries out the stored programs one at a time and stops waiting for the consent before the next program.

Sequence of the operations for an automatic cutting with single cycle:

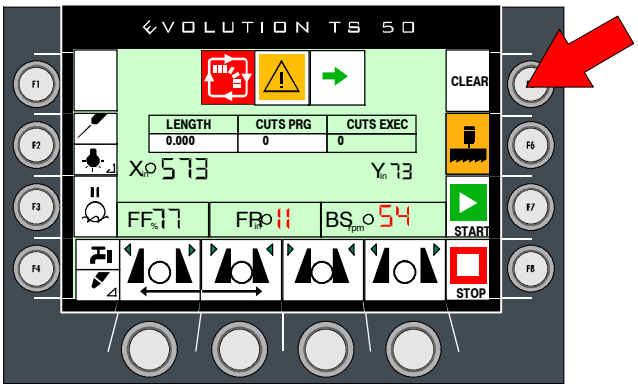
▶ power up the machine by turning the main switch;

▶ tap on the box with the on symbol on the touchscreen;



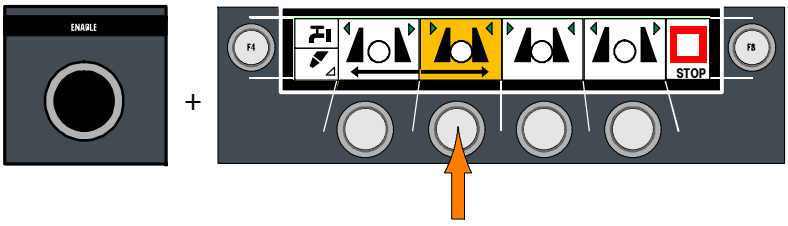
▶ press reset and release the emergency mushroom button if pressed, the head rises completely.

N.B. The sawing machine zeroes the feeder shuttle when the automatic cycles are started. If the feeder must be zeroed before the cycle start, select the semi-automatic working cycle and zero by pressing the control enabling key and the F5 key shown in the figure at the same time.

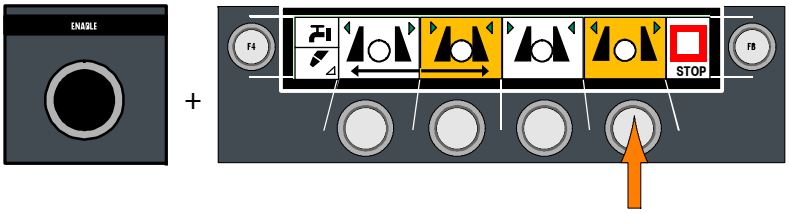


▶ Position the material inside the feeding vice.

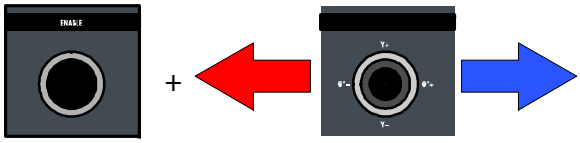
▶ Close the feeding vice by holding the control enabling button and the vice closing button pressed at the same time.



▶ Open the cutting vice by manually adapting the opening with the flywheel and using the button.

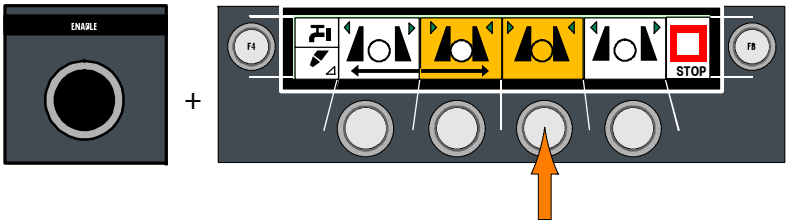


▶ Feed the material to be machined, to align it on the cutting line in the working table, by moving it using the joystick and holding the control enabling key pressed.

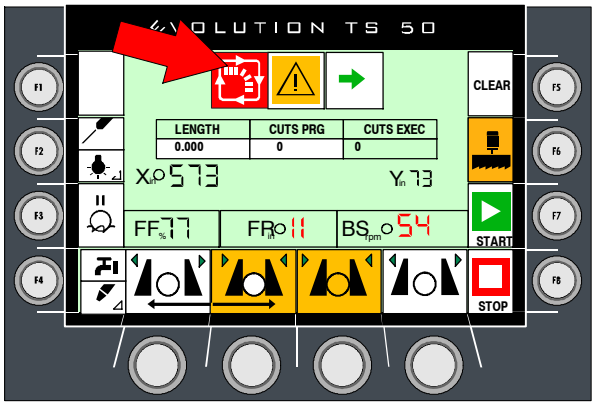


Warning Before handling the material in the feeder, take the cutting head totally up so that it does not interfere with the tool.

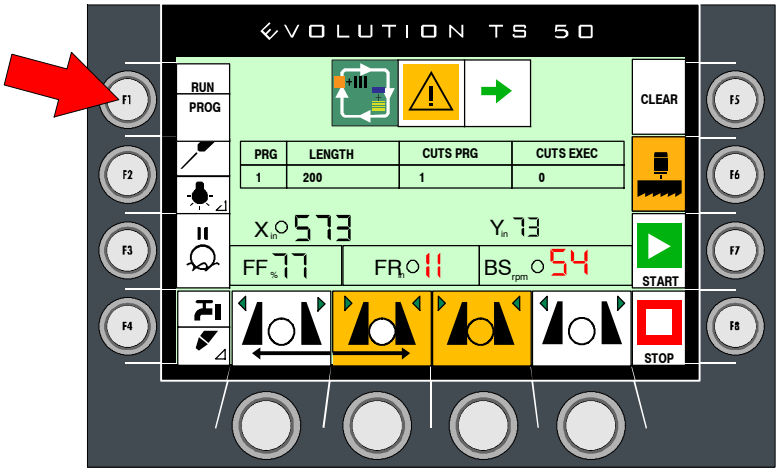
▶ Close the cutting vice by holding the control enabling button and the vice closing button pressed at the same time.



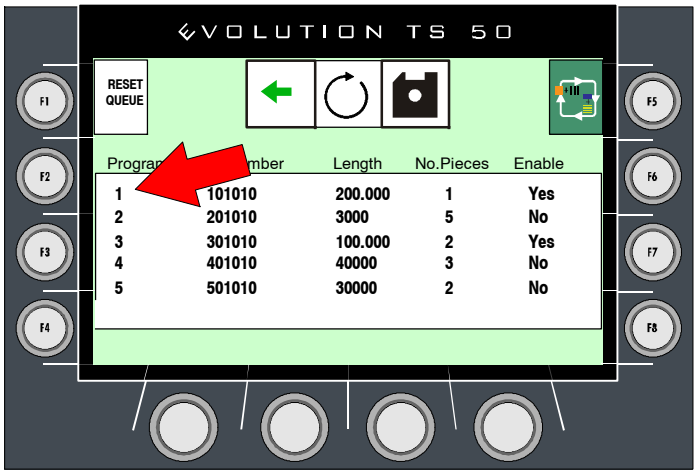
▶ Select the automatic machining mode with continuous cycle, pressing the box shown in the figure on the touch screen.



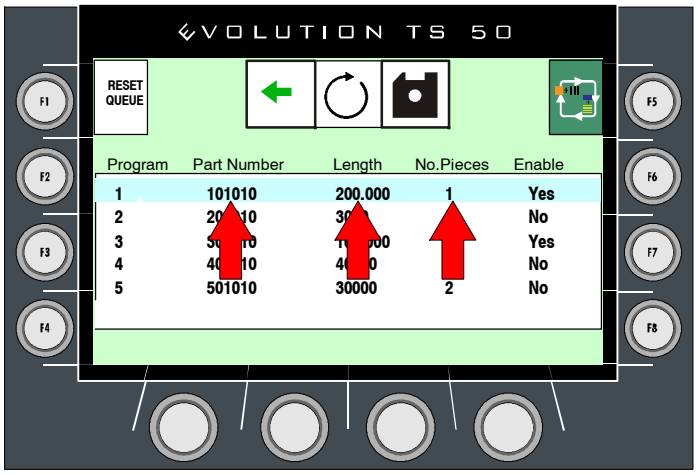
▶ Press the RUN/PROG key to access the programming page for the automatic operation with single cycle.



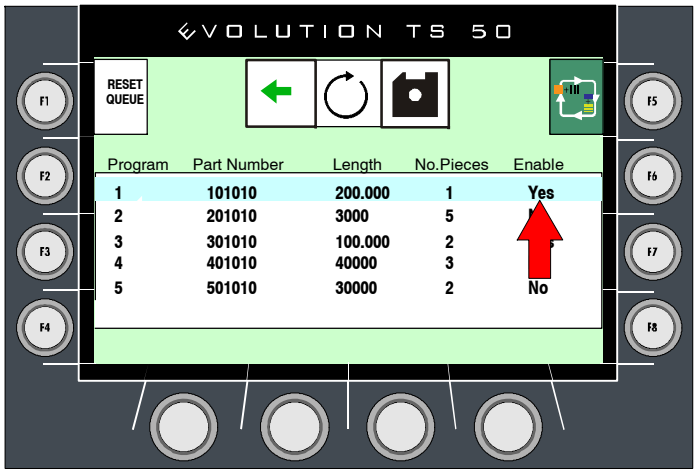
▶ The display shows the following screen listing all programs (max. 10). Press the program number to select the one to be set.



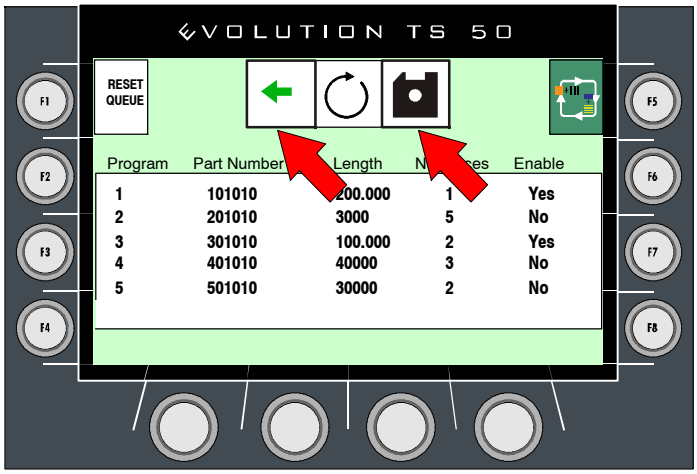
▶ Press to edit all values of “Part Number” (company identification code), “Length” (piece length), and “Nr. Piece” (number of pieces) using the key-pad.



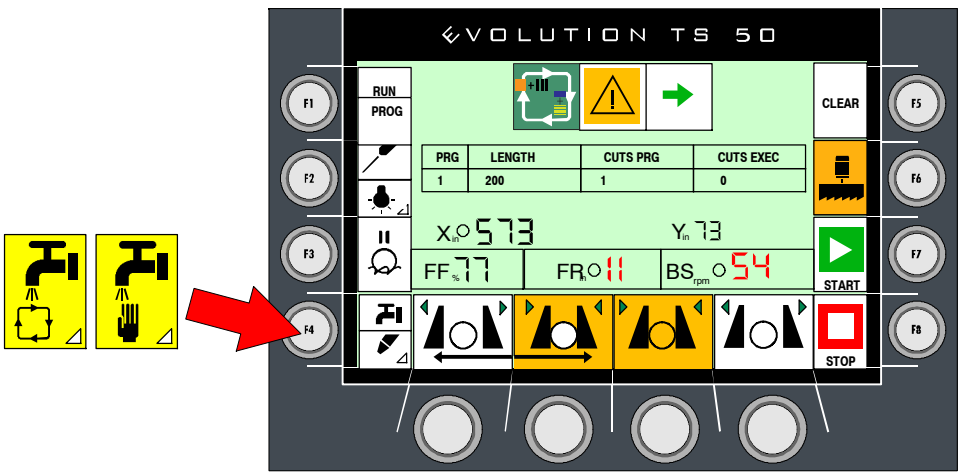
▶ In the end choose to activate or deactivate the selected by “Enable” (Yes / No).



N.B. Press the F1 key to zero the program queue.
Press the F5 key to zero the piece number.
Before returning to the machining screen, press the data saving key and then the green arrow shown in the figure.

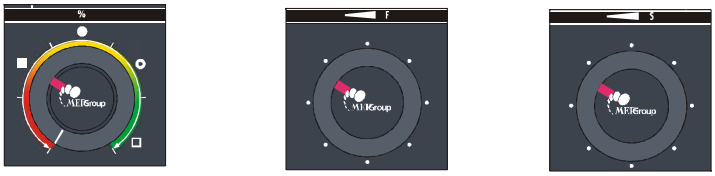


▶ Set the fluid jet by pressing the button shown in the figure. The box will light up to indicate that it is selected. Adjust the amount using the valves on the blade guide head. Press the button repeatedly to select the dispensing mode (automatic or manual).



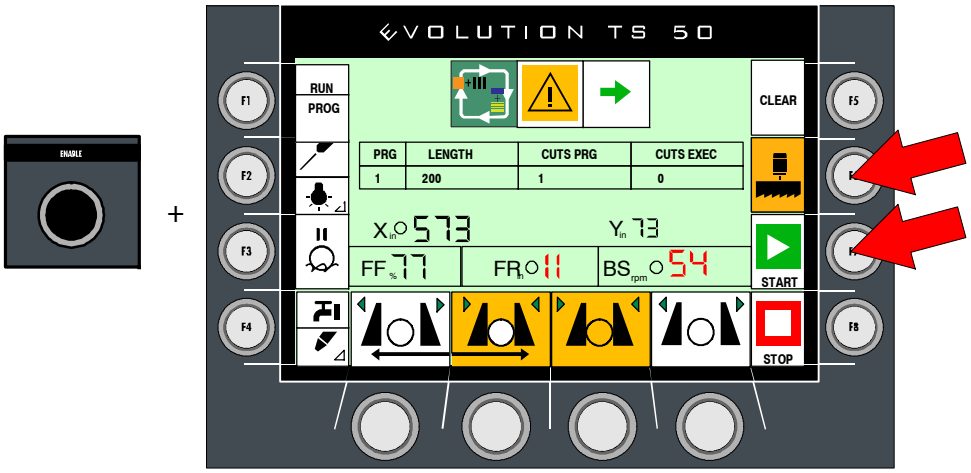
▶ Set the cutting parameters, previously shown, using the following adjusters.

Warning In this step it is recommended to set the head lower adjuster at the min. Value F, to prevent the head from lowering too fast breaking the blade.



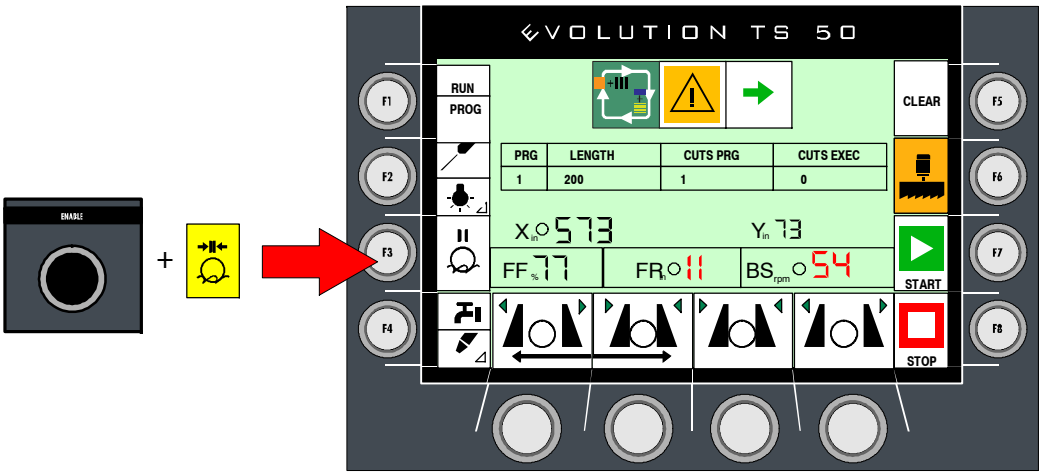
▶ Position the head at approximately 10 mm (0.4 in) from the workpiece.

▶ Press the disk rotation enabling key (F6).



▶ Press the F7 cycle start key to start the disk rotation and the head lowering. The RHLS point is automatically stored in this way, as explained before. At the end, the disk stops and the head rises again.

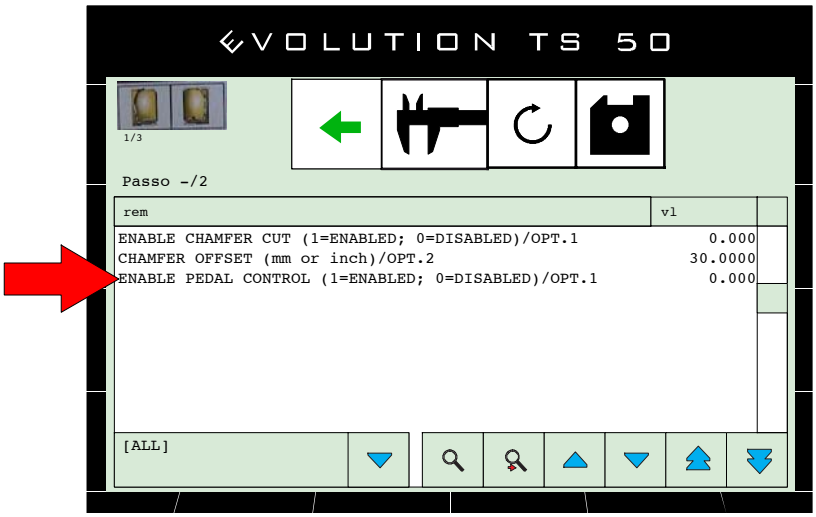
N.B. If the existing FHLS point is to be deleted now, follow the operations described above.



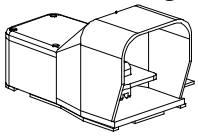
The sawing machine then feeds new material performing all the program cuts and continues with the set sequence. If the machining cycle must be stopped, press F8 Cycle Stop. To start it again, press an uold down the enabling command key and F7 Cycle Start key.

▶ If the sawing machine is equipped with optional pedal control the cycle start control can be made from remote station. In this case it is necessary to enable

the operation of the pedals, by selecting the appropriate entry in the list of options.



▶ Press the pedal control to start the working cycle.



N.B. If the existing FHLS point is to be deleted now, follow the operations described above.

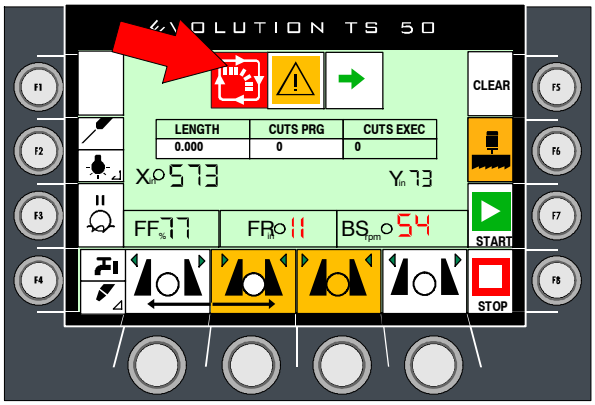
The sawing machine first makes the facing cut and then the previously stored programs, stopping at the end of each performed program, waiting for the start by the operator before going to the next program. At the end, the head rises again and the disk motor stops. To repeat the cycle or to start a new machining press CLEAR (F5) to set the cut pieces to zero.

Automatic operating cycle with continuous cycle

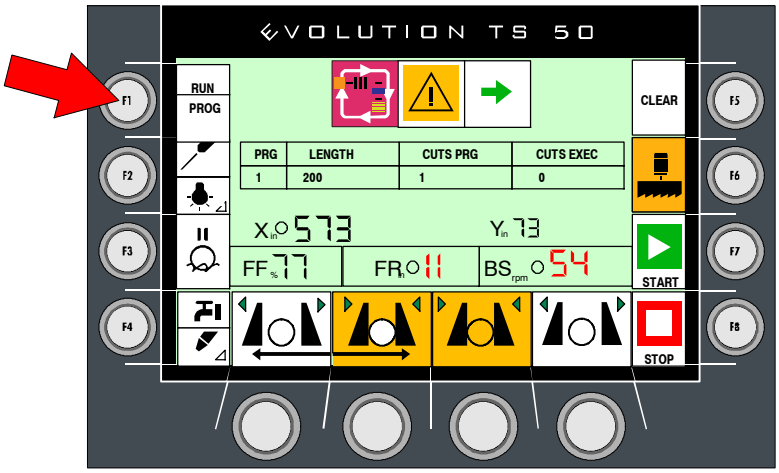
- Continuous cycle: it carries out the stored programs like in the single cycle but at the end of each program it AUTOMATICALLY goes to the next program.

The machine programming to carry out this type of automatic operation is the same as the one for the single cycle explained in the previous paragraph:

▶ After having initialized the machine, prepared the material to be machined and set the functional parameters, select the automatic machining mode with continuous cycle, pressing the box shown in the figure on the touch screen.



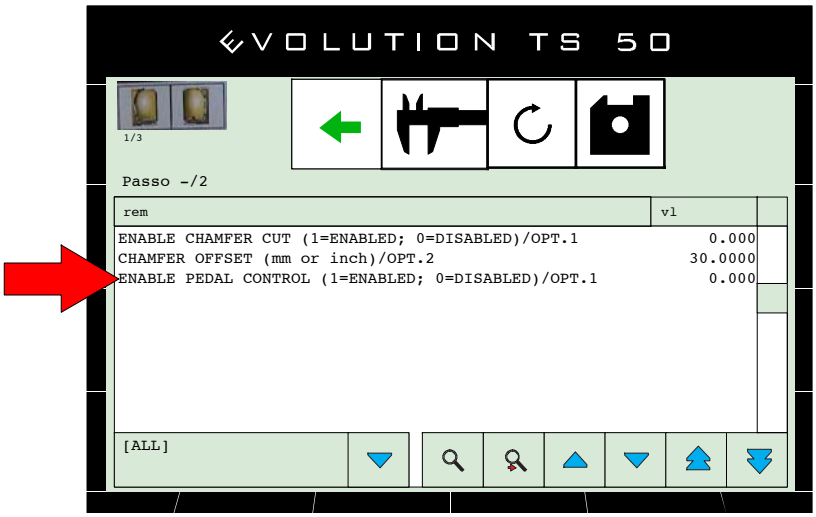
▶ Press the RUN/PROG key to program the cuts and lengths to be made as explained in the previous paragraph.



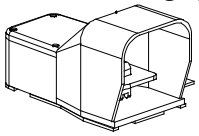
The sawing machine then feeds new material performing all the program cuts and continues automatically with the next ones according to the set sequence. If the machining cycle must be stopped, press F8 Cycle Stop. To restart it, hold the control enabling key and the Cycle Start key F7 pressed.

▶ If the sawing machine is equipped with optional pedal control the cycle start control can be made from remote station. In this case it is necessary to enable

the operation of the pedals, by selecting the appropriate entry in the list of options.



▶ Press the pedal control to start the working cycle.

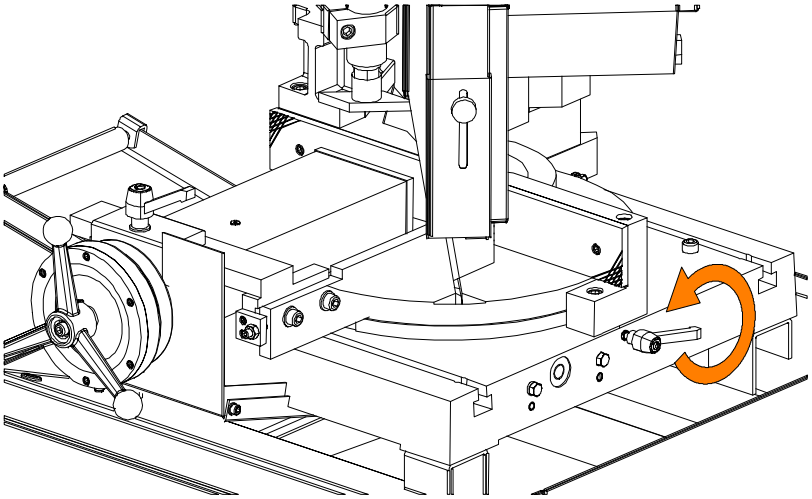


Angled cuts

The machine can make angled cuts from 60° left to 45° right. Reference stops are mounted on the sides of the turntable to facilitate rapid 0°, 45° and 60° cuts to the left and 45° cuts to the right.

Angled cuts 45° and 60° to the left

▶ Loosen the ratchet lever located at the right of the slideway;

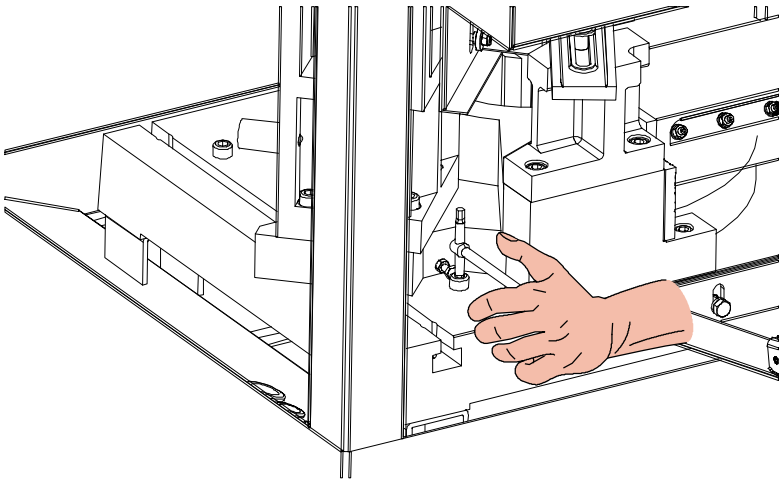


▶ rotate the tool head until it's tight against the stop, and check that it's at 455 on the scale on the slideway;

▶ tighten the ratchet lever and cut the part.

If the cut has to be done at an angle of 60° left, the stop on the back of the slideway must be removed:

▶ remove the stop at 45° left;

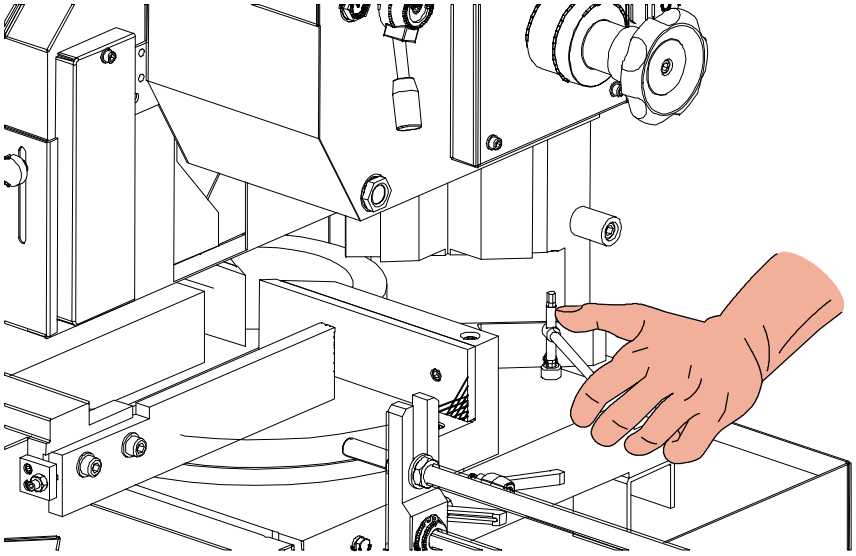


▶ rotate the tool head to 60° left, clamp the turntable and cut the part.

Angled cuts 45° to the right

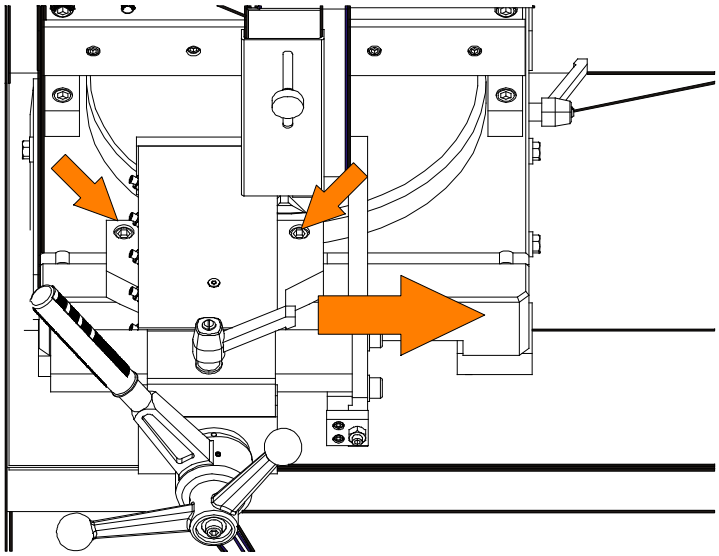
▶ Loosen the ratchet lever located at the right of the slideway;

▶ Remove the cutting stop at 0° ;

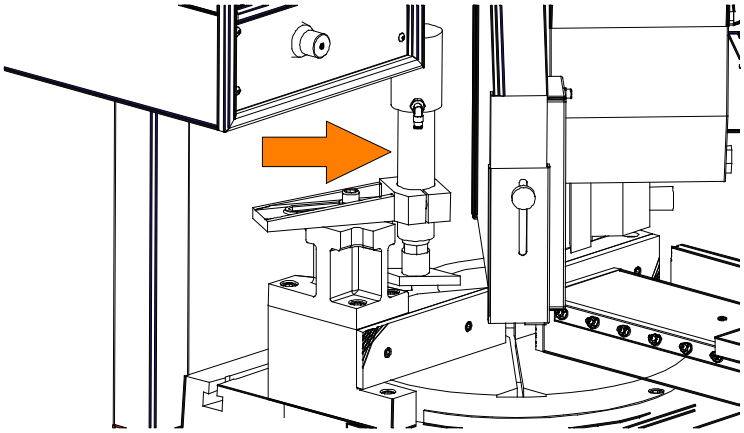


▶ lift the tool head up and rotate it, making sure that the cutter disk does not collide with the vice;

▶ move the vice from left position to right position;

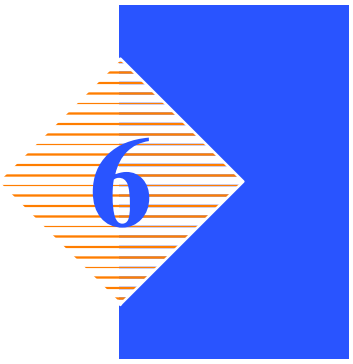


▶ if necessary, adjust the position of the vertical pneumatic vice;



▶ Lock the turntable and cut the part.

Diagrams, exploded views and replacement parts



This chapter contains functional diagrams and exploded views of the **C350- 2 CNC**. 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.

APS/P drive for step motors

FOREWORD

This drive allows you to control a step motor, using the RS485.
When the ENABLE input is connected to +12 Vdc/+24 Vdc the drive is disabled (current on motor = 0) resulting in the rotation of the motor being interrupted. When it is disconnected, or connected to 0 V, the drive will be re- enabled and the motor will be energised after at least 1 step is started.
The rate of acceleration/deceleration, the current, and the step division, can be adjusted using the dip- switches and trimmers on the card (see tables).
The two outputs allow the machine to display if the drive is protected (READY_OUT) and if positioning in progress has finished (BUSY).

CHARACTERISTICS

CUT	APS3/P
VDC NOM. [V]	40- 80
VDC MAX. [V]	90
VDC MIN. [V]	30
I MAX. [A]	10
I MIN. [A]	1
I PASSO [A]	0.5
Operating temperature [°C]	0- 45

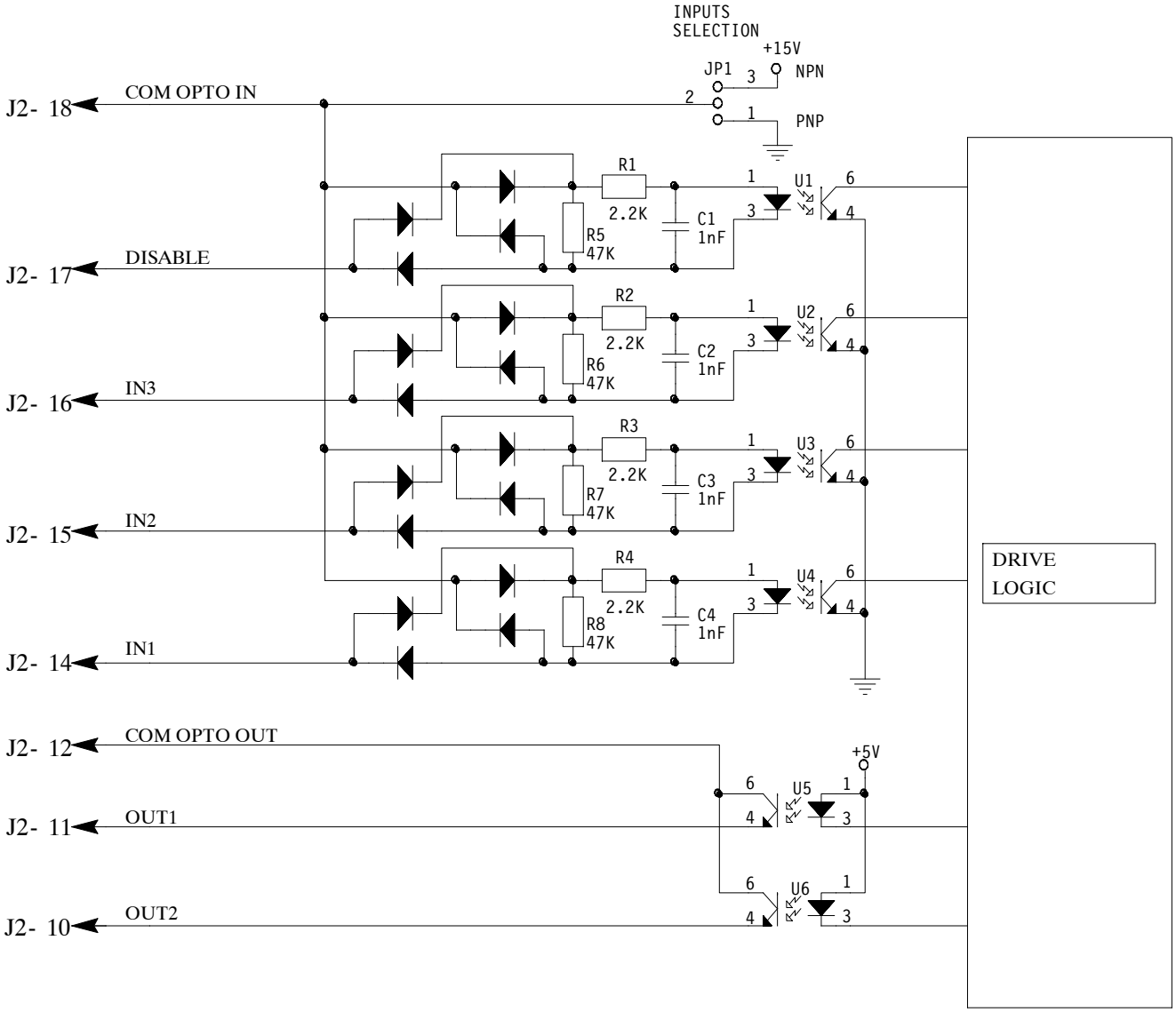
MEANING OF THE PARAMETERS IN THE TABLE

- **Vdc nom:** Nominal voltage at which the drive can be powered.
- **Vdc max:** Maximum voltage at which the drive can operate, where this limit is exceeded the protection intervenes, inhibiting the operation of the drive itself.
- **Vdc min:** Minimum voltage at which the drive can operate. When the voltage drops below this limit, the protection intervenes, inhibiting the operation of the drive itself.
- **I max:** Maximum value for the phase current.
- **I min:** Minimum value for the phase current.
- **I step:** Difference between the settable current values.
- **Operating temperature:** Forced ventilation is necessary for currents exceeding 6A.

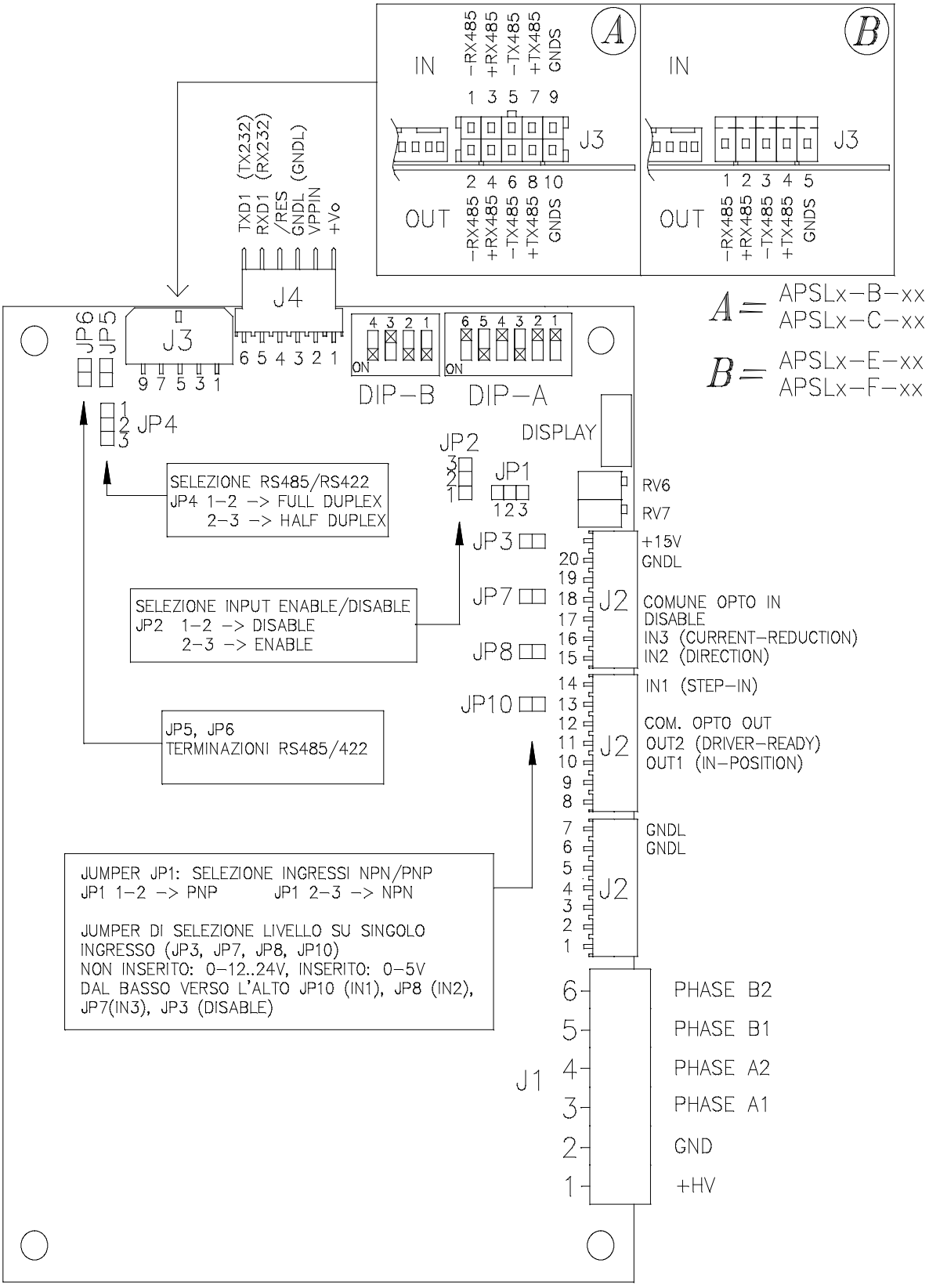
TECHNICAL CHARACTERISTICS - APS/P DRIVE	
Power supply	Terminal Name: + HV (Positive power supply) GND (0 V)
Engine connection	PHASE A1 = Phase A1 of the step motor PHASE A2 = Phase A2 of the step motor PHASE B1 = Phase B1 of the step motor PHASE B2 = Phase B2 of the step motor
Outputs	Of a PNP optoinsulated type “open collector” (10 mA max)
	Also optoinsulated, so an external power supply (+12V/+24V) must be connected to the terminal common to the optoinsulators (Pin 12 connector J2). Maximum current for each output (10 mA).
Inputs	Of a PNP type (from 12 Vdc to 24 Vdc)
	Not optoinsulated: jumper JP1 - inserted Pin 12 of connector J2 - connected to +15V auxiliary (pin 21 connector J2) (common input optoinsulators)
	Optoinsulated: jumper JP1- not inserted Pin 18 on connector J2 - connected to GND of outside power supply (common input optoinsulators)

TECHNICAL CHARACTERISTICS - APS/P DRIVE	
Protections and safety devices	Protections against short circuits: - between outputs - between outputs and the positive power supply terminal If one of the conditions above occurs, the drive will disable the power bridge, and display the error conditions on the screen: “u” = wrong power supply voltage value “t” = thermal protector intervention “c” = max. current protector intervention. due to a short circuit across the phases, or excess current. If the drive is not disabled by a protective device, the display will indicate the letter “r” (ready).
	Thermal protection against overheating
	Mains undervoltage and overvoltage safety devices

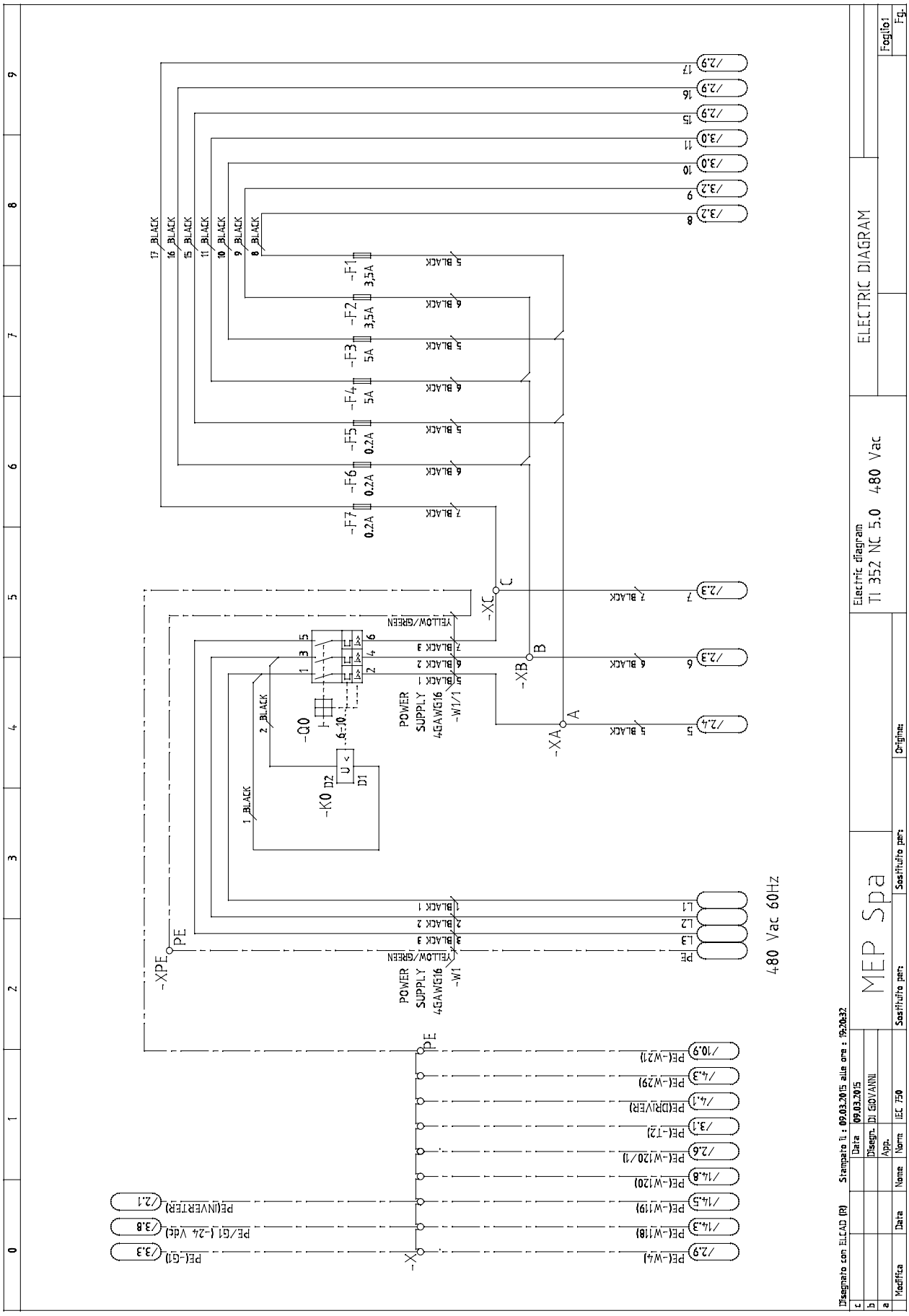
SCHEMATIC CONFIGURATION OF INPUTS / OUTPUTS

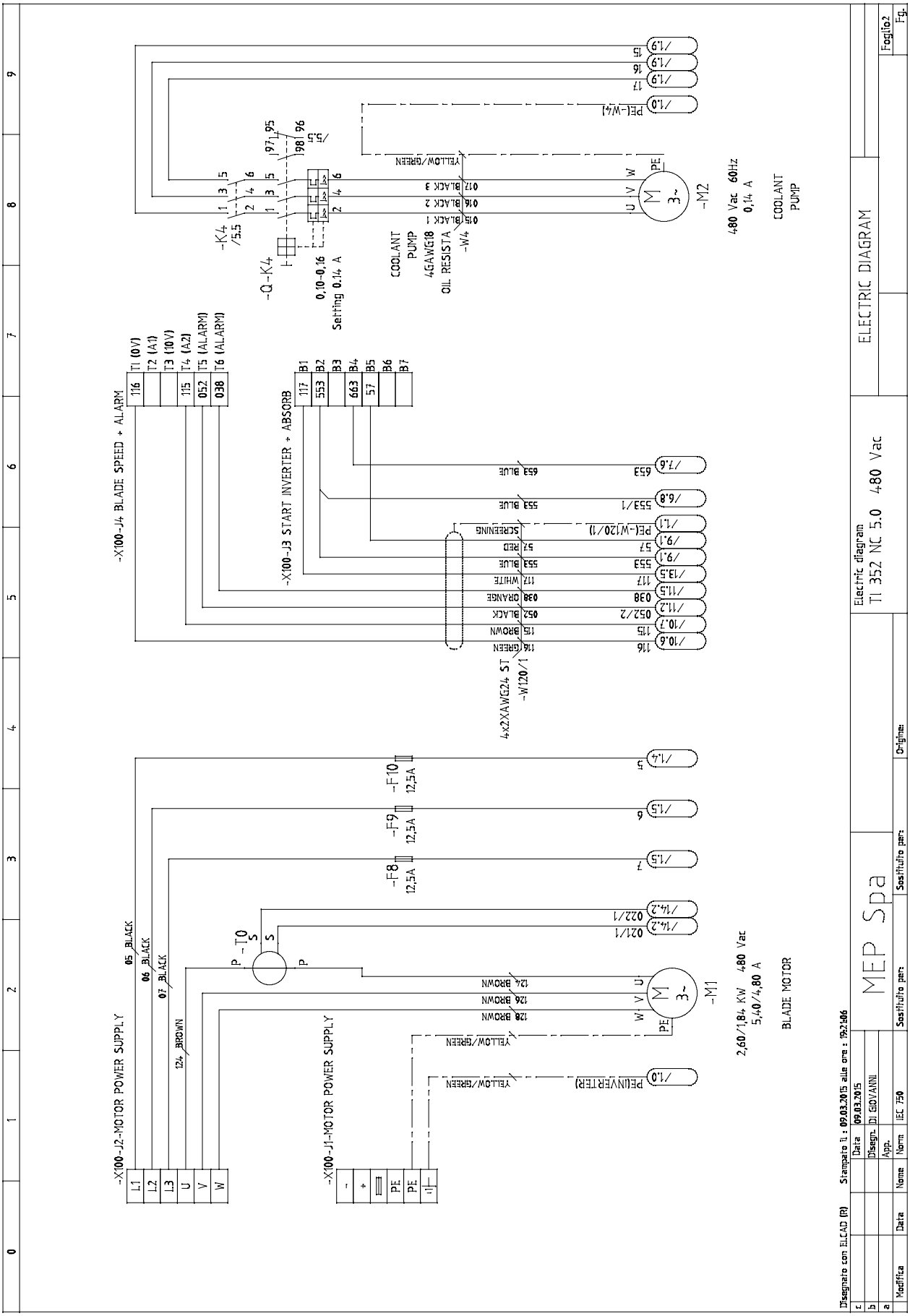


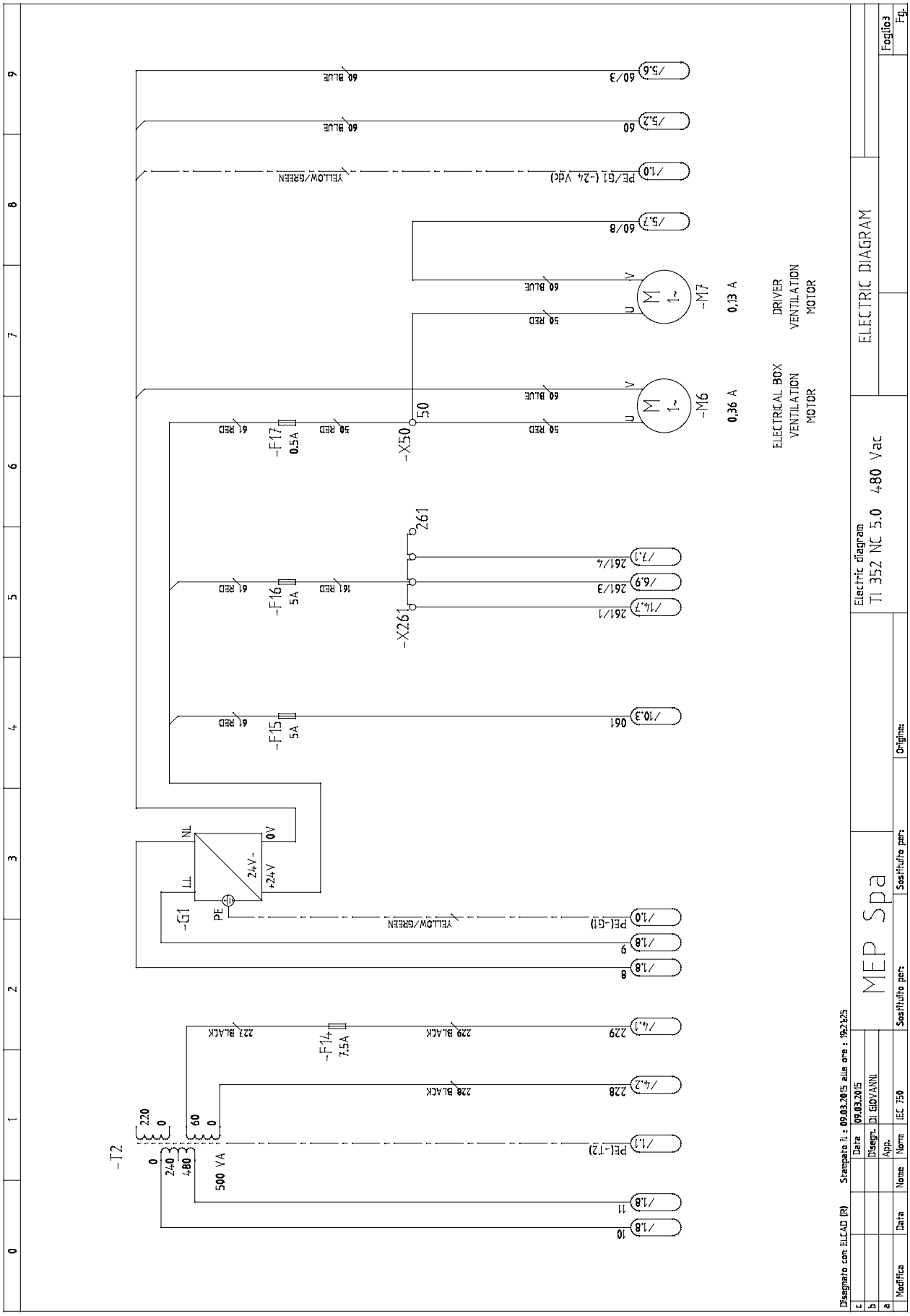
LAYOUT OF APS/P DRIVE COMPONENTS

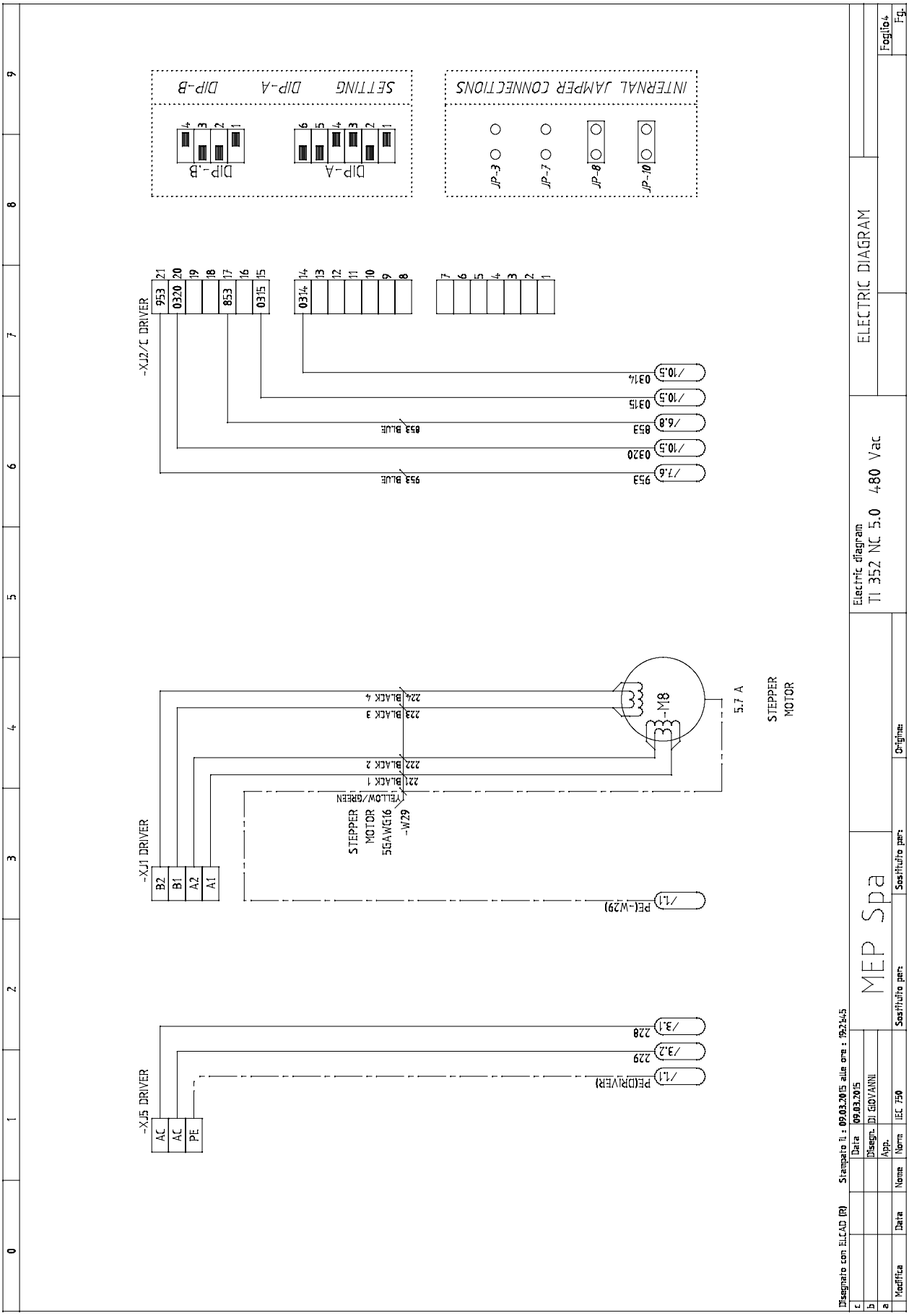


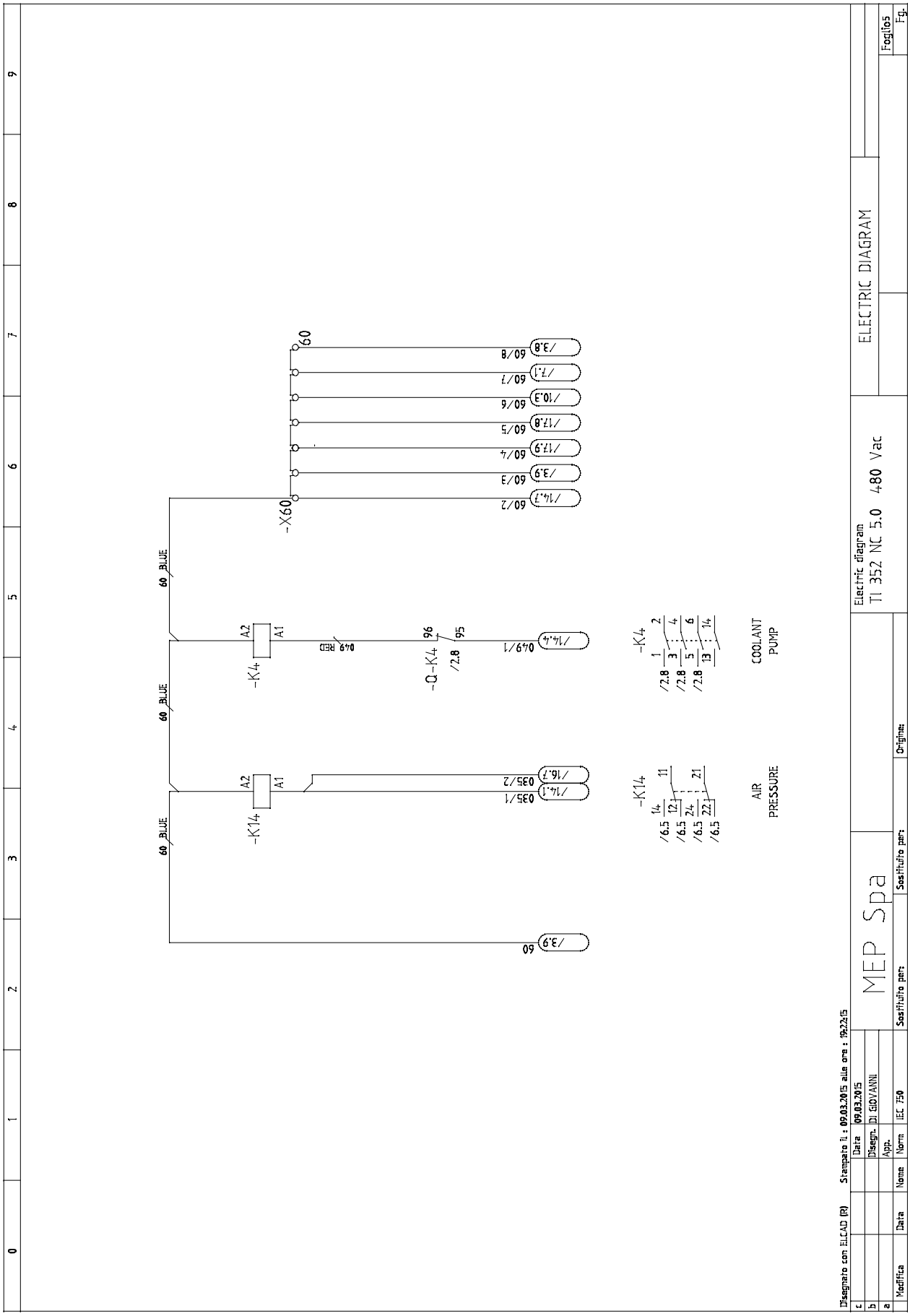
Standardised Wiring Diagrams (IEC 750 EN 60204-1 Standard)

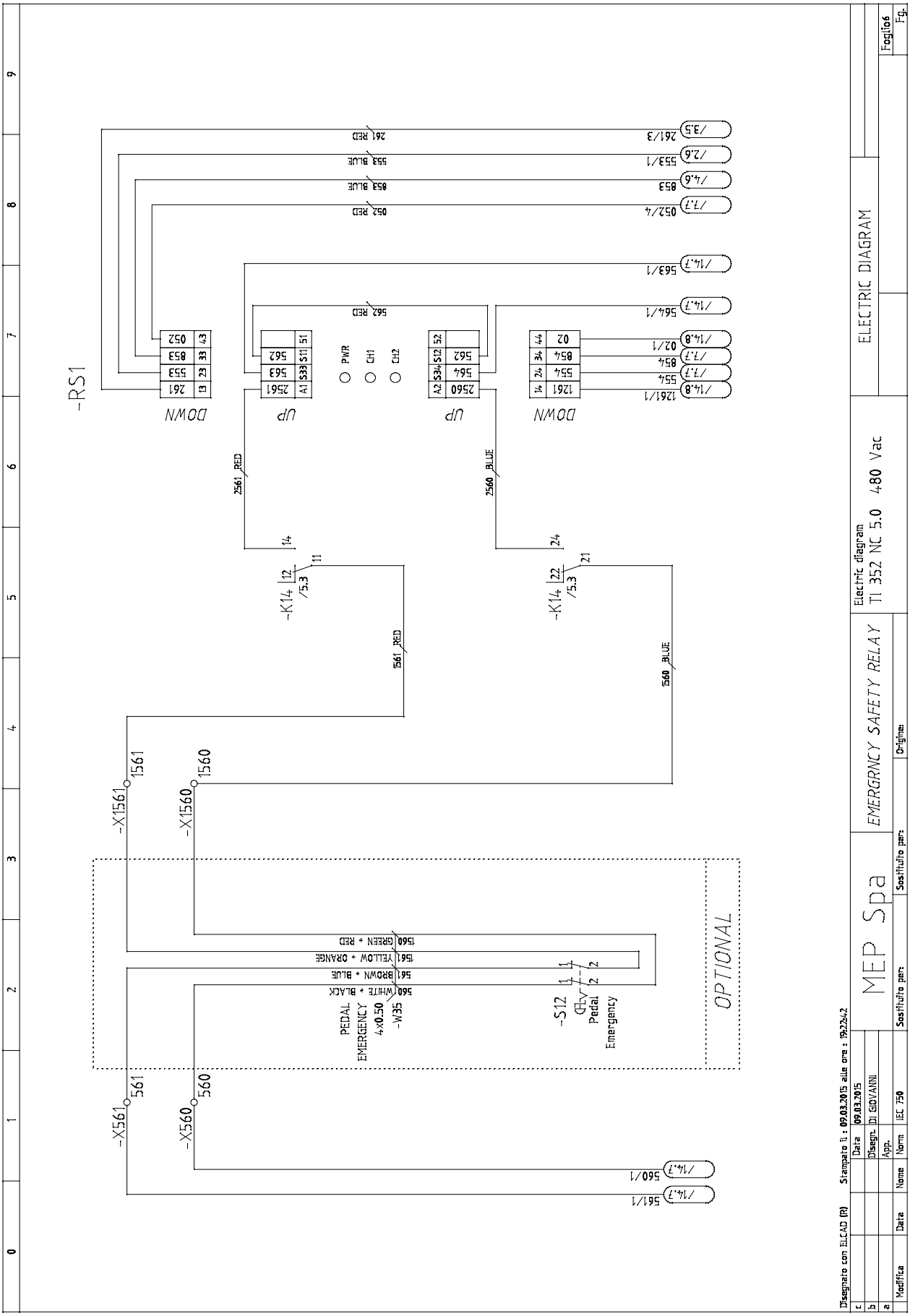


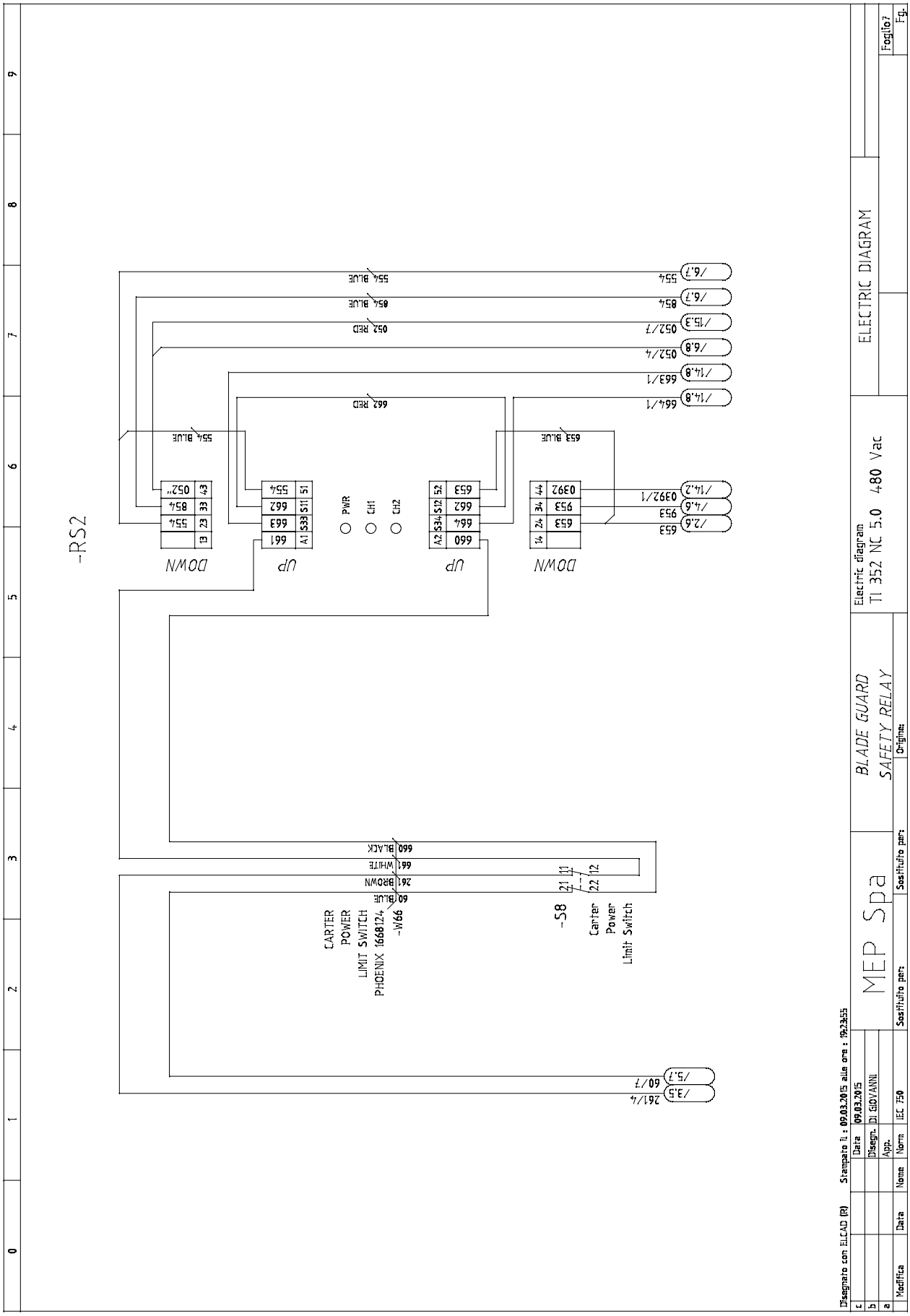

ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP Spa
-X100-J2-MOTOR POWER SUPPLY
-X100-J1-MOTOR POWER SUPPLY
-X100-J4 BLADE SPEED + ALARM
-X100-J3 START INVERTER + ABSORB
-M1
-M2
-K4
-Q-K4
-F8
-F9
-F10
-T0
-W4
-W120/1
BLADE MOTOR
COOLANT PUMP
OIL RESISTA
4GAWG18
4x2XAWG24 ST
2,60/1,84 KW 480 Vac
5,40/4,80 A
480 Vac 60Hz
0,14 A
Setting 0,14 A
0,10-0,16
Stampato il : 09.03.2015 alle ore : 19:21:06
Disegnato con ELCAD (R)
Foglio 2
Fg.

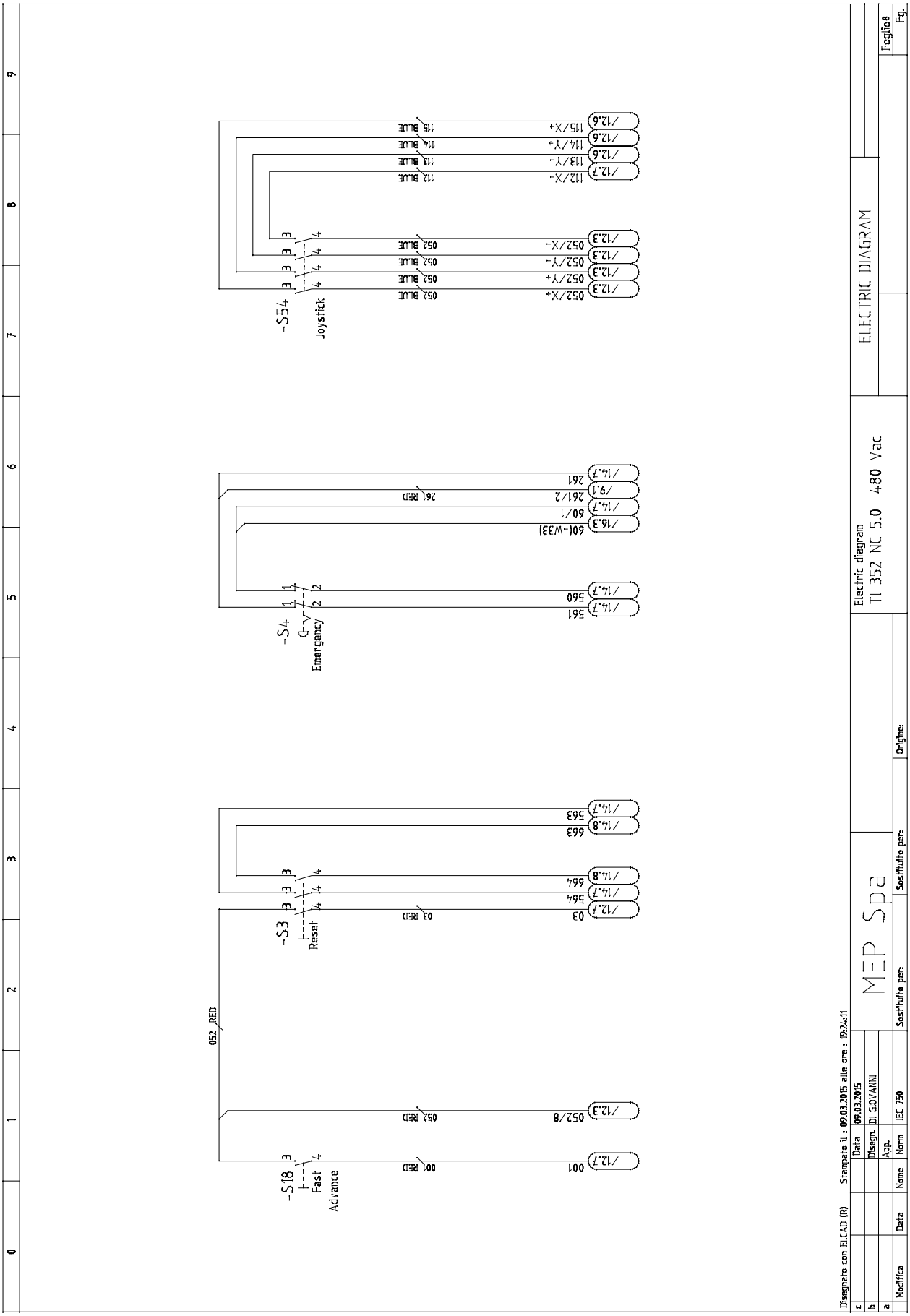

ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP Spa
-T2
-G1
-F14
-F15
-F16
-F17
-X261
-X50
-M6
-M7
ELECTRICAL BOX VENTILATION MOTOR
DRIVER VENTILATION MOTOR
0,36 A
0,13 A
500 VA
PE/G1 (-24 Vdc)
PE(-T2)
PE(-G1)
YELLOW/GREEN
Disegnato con ELCAD (R)
Stampato il : 09.03.2015 alle ore : 19:21:25
Data 09.03.2015
DSegn. DI GIOVANNI
Norm IEC 750
Foglio 3

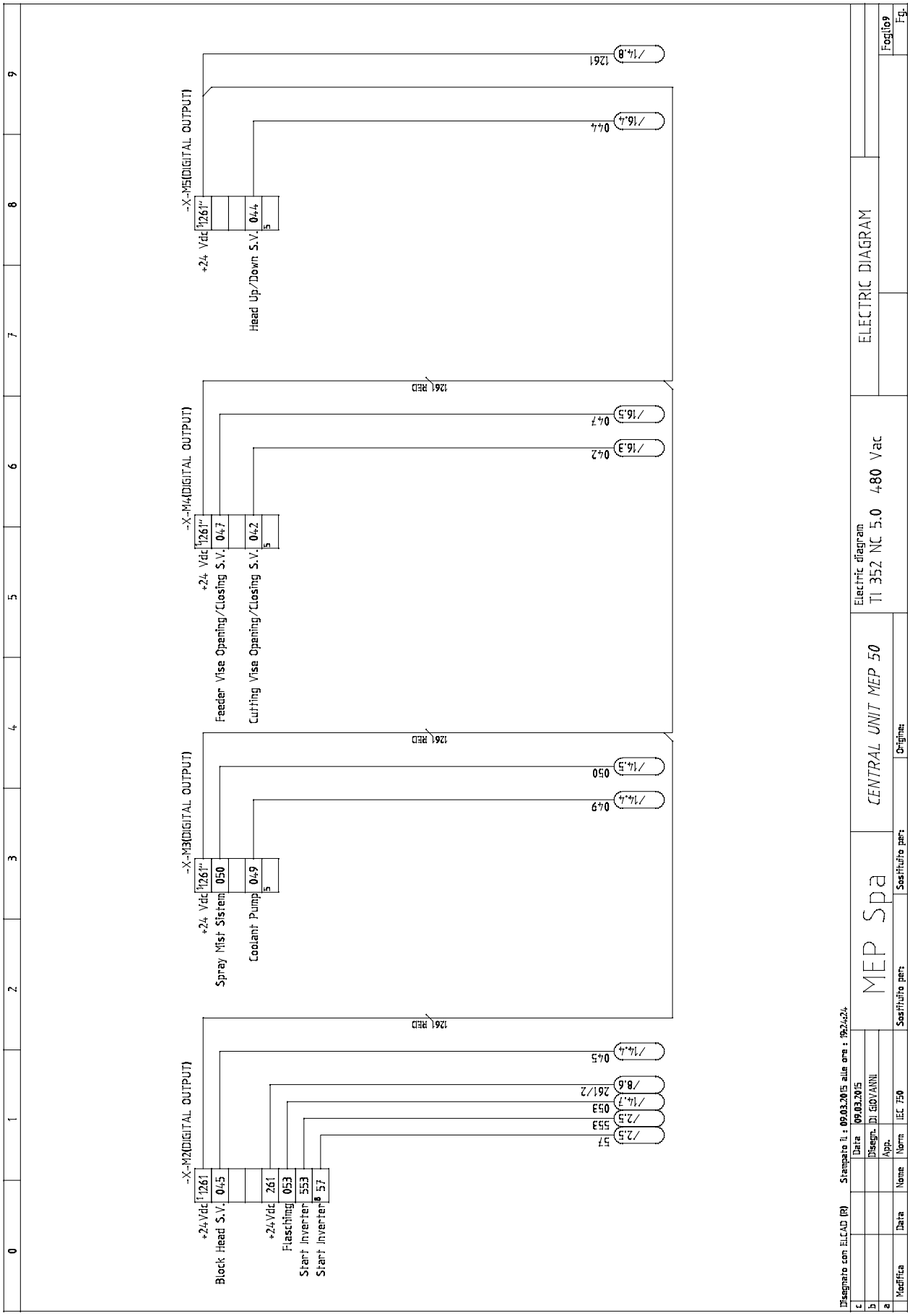

ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP SpA
-XJ2/C DRIVER
-XJ1 DRIVER
-XJ5 DRIVER
-M8
STEPPER MOTOR
5.7 A
STEPPER MOTOR 5GAWG16 -W29
PE(-W29)
PE(DRIVER)
INTERNAL JAMPER CONNECTIONS
SETTING DIP-A DIP-B
DIP-A
DIP-B
953 BLUE
853 BLUE
BLACK 1
BLACK 2
BLACK 3
BLACK 4
YELLOW/GREEN

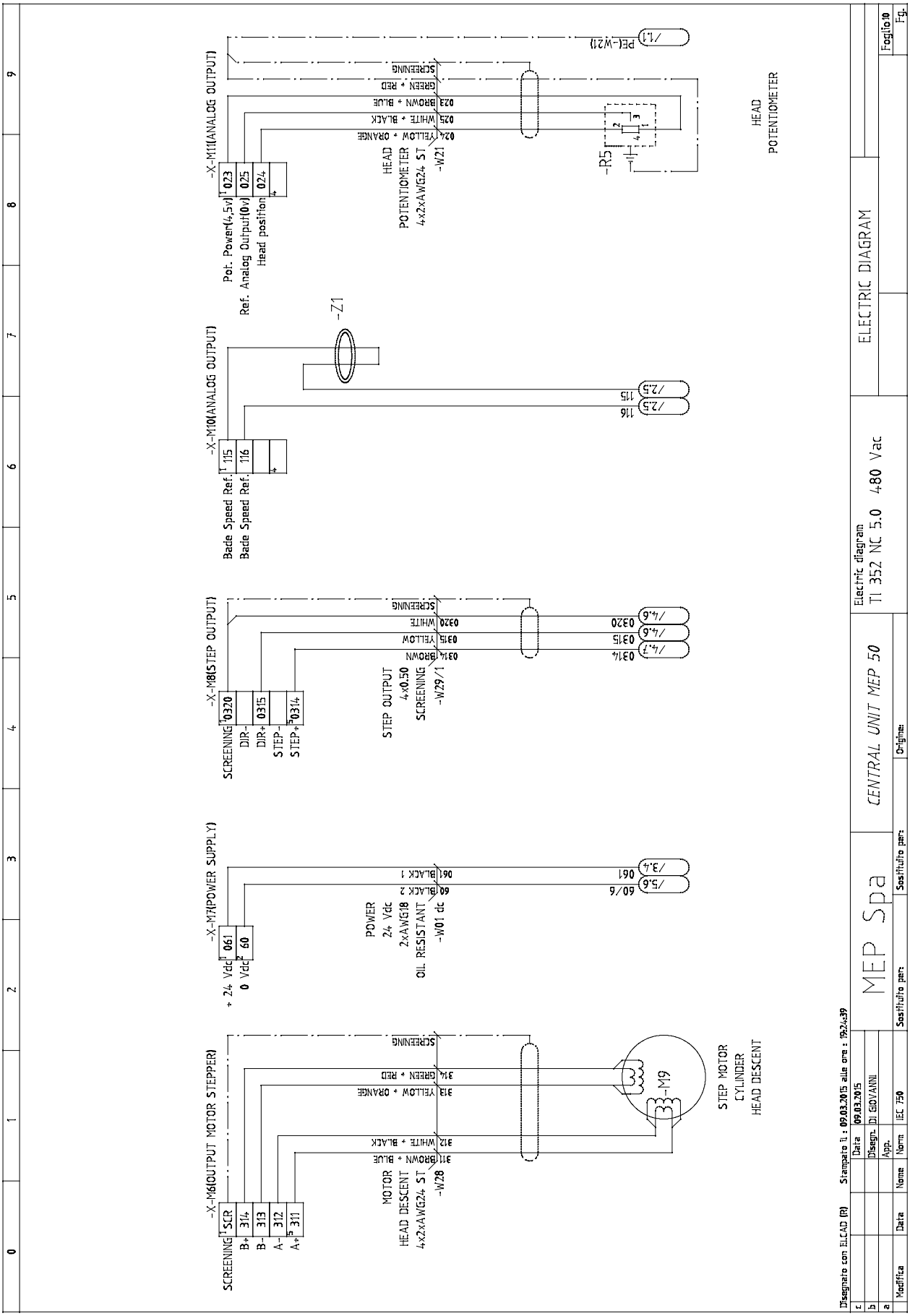

ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP Spa
-X60
-K4
-K14
-Q-K4
COOLANT PUMP
AIR PRESSURE
60 BLUE
049 RED

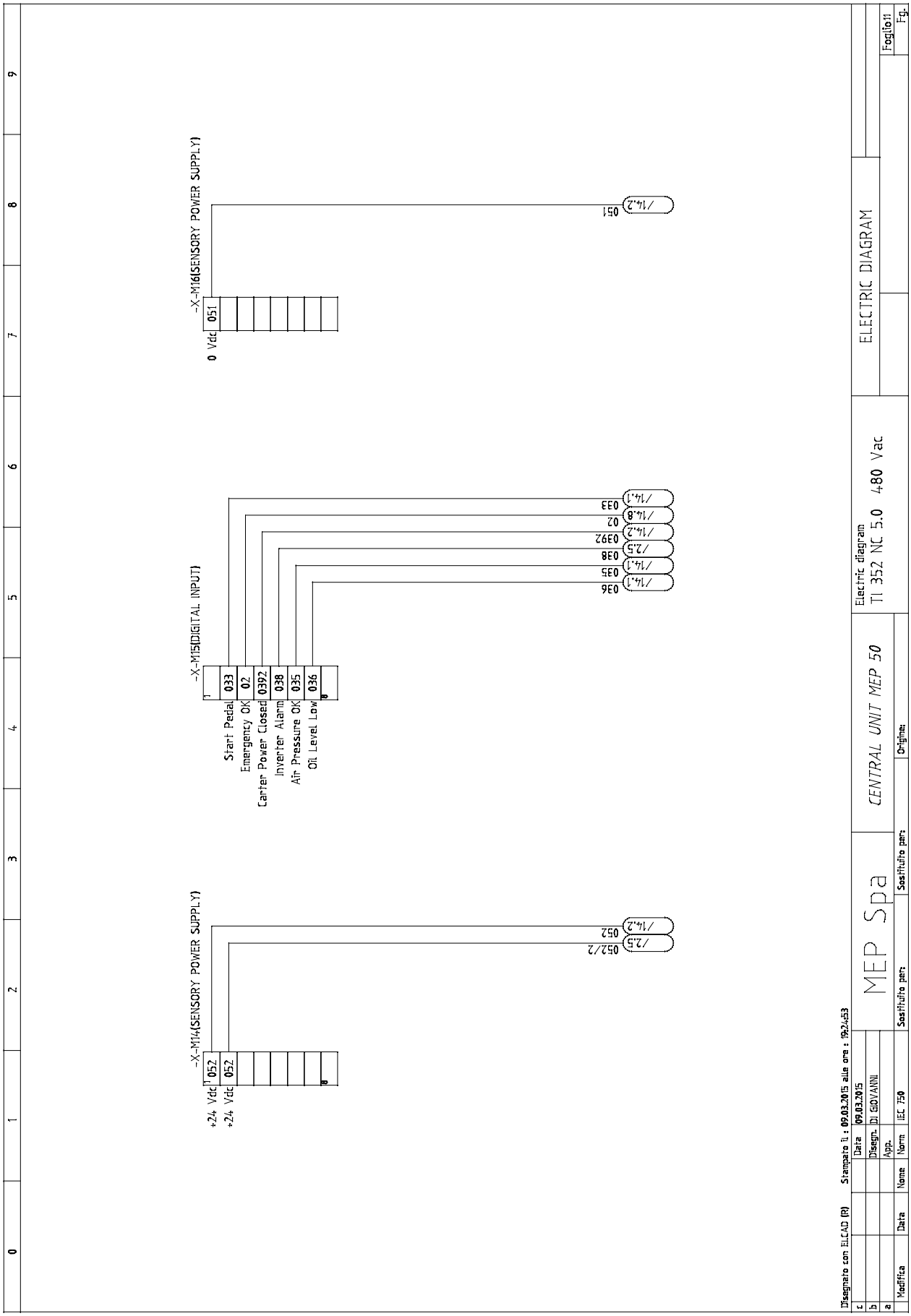

-RS1
DOWN
UP
UP
DOWN
PWR
CH1
CH2
-K14
-K14
-X1561
-X1560
-X561
-X560
-S12
Pedal
Emergency
PEDAL
EMERGENCY
4x0.50
-W35
OPTIONAL
MEP Spa
EMERGENCY SAFETY RELAY
Electric diagram
TI 352 NC 5.0 480 Vac
ELECTRIC DIAGRAM

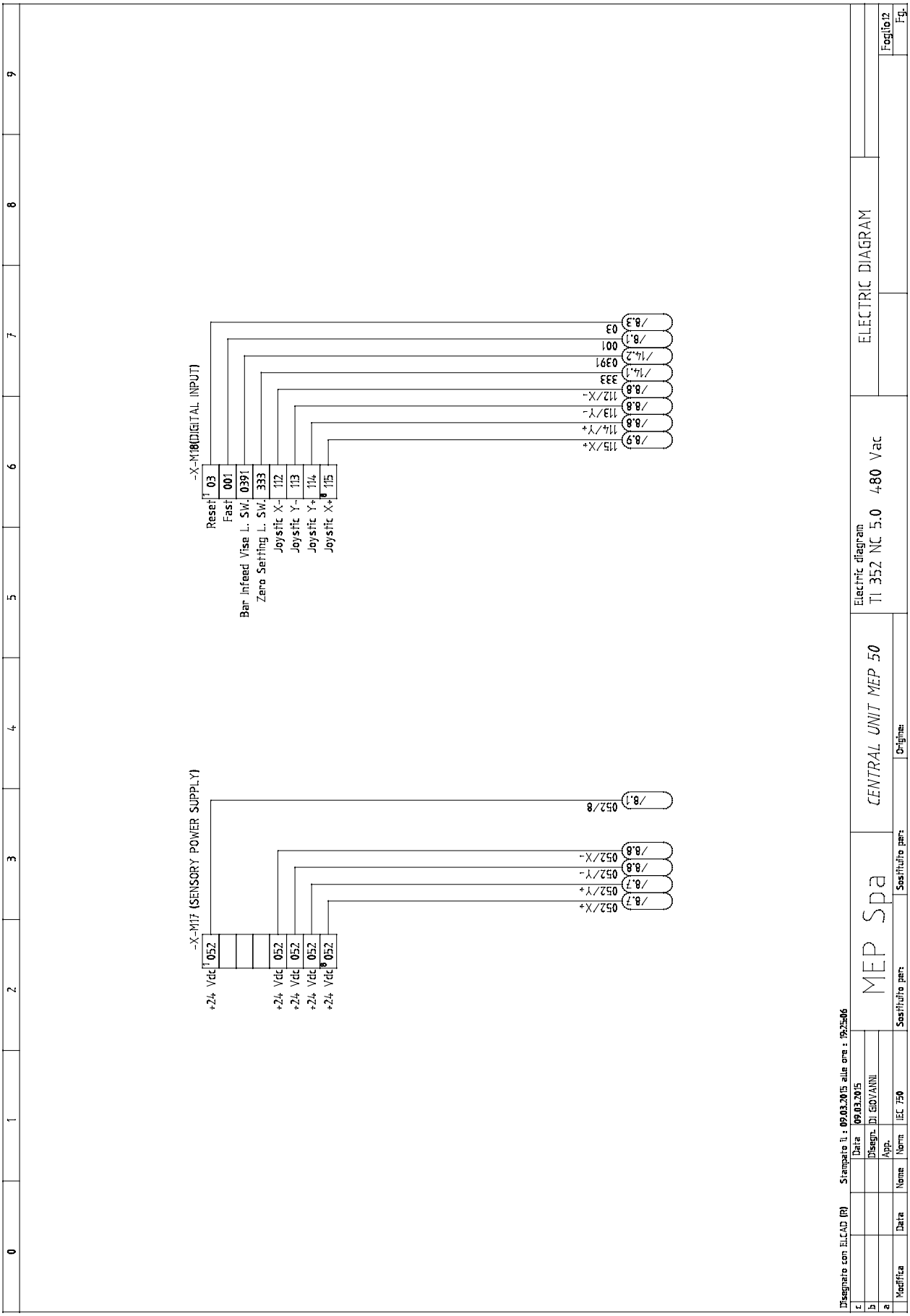

-RS2
DOWN
UP
UP
DOWN
PWR
CH1
CH2
CARTER POWER LIMIT SWITCH PHOENIX 1668124 -W66
-S8
Carter Power Limit Switch
BLADE GUARD SAFETY RELAY
MEP Spa
ELECTRIC DIAGRAM
Electric diagram TI 352 NC 5.0 480 Vac

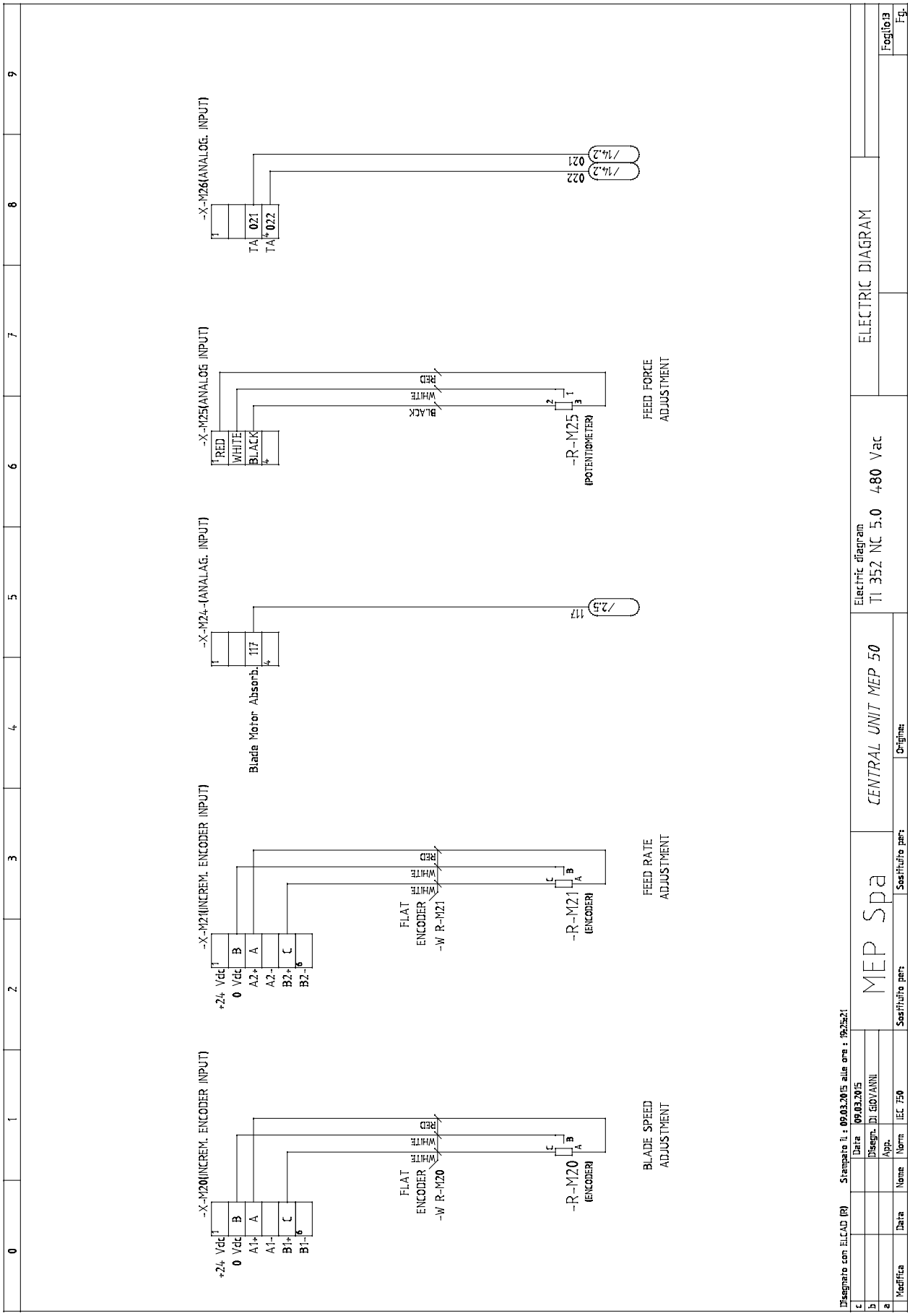

ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP Spa
Foglio8
Fg.
Disegnato con ELCAD (R) Stampato il : 09.03.2015 alle ore : 19:24:11
Data 09.03.2015
DSegn. DI GIOVANNI
App.
Norma IEC 750
Sostituito per:
Origine:
Modifica Data Nome
-S18 Fast Advance
-S3 Reset
-S4 Emergency
-S54 Joystick
052 RED
001 RED
052 RED
03 RED
261 RED
052 BLUE
112 BLUE
113 BLUE
114 BLUE
115 BLUE
001
052/8
03
564
663
563
561
560
261
261/2
60/1
60(-W33)
052/X+
052/Y+
052/Y-
052/X-
112/X-
113/Y-
114/Y+
115/X+

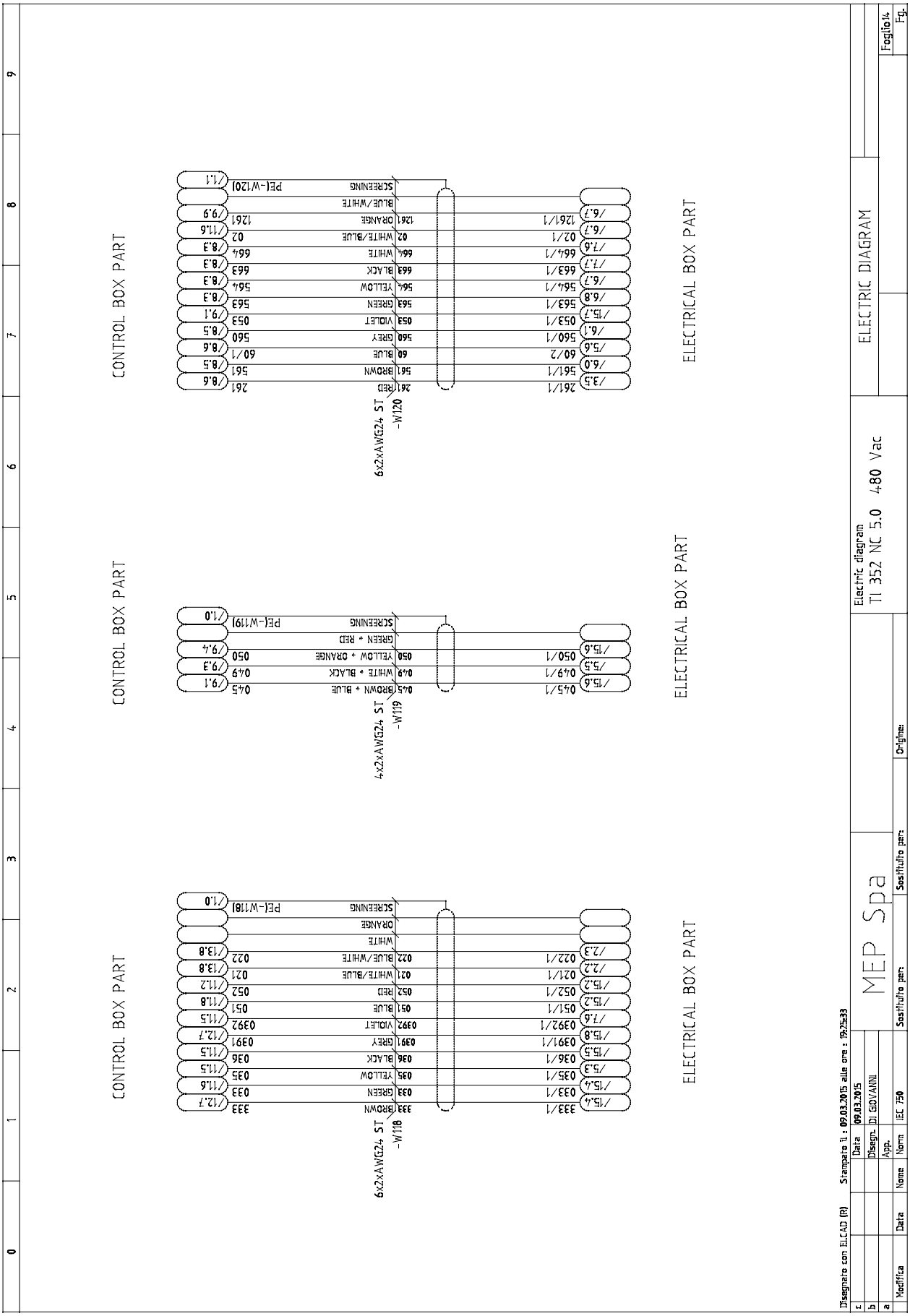

-X-M5(DIGITAL OUTPUT)
+24 Vdc
1261
Head Up/Down S.V.
044
5
/14.8
1261
/16.4
044
-X-M4(DIGITAL OUTPUT)
+24 Vdc
1261
Feeder Vise Opening/Closing S.V.
047
Cutting Vise Opening/Closing S.V.
042
5
261 RED
/16.5
047
/16.3
042
-X-M3(DIGITAL OUTPUT)
+24 Vdc
1261
Spray Mist Sistem
050
Coolant Pump
049
5
261 RED
/14.5
050
/14.4
049
-X-M2(DIGITAL OUTPUT)
+24Vdc
1261
Block Head S.V.
045
+24Vdc
261
Flashing
053
Start Inverter
553
Start Inverter
57
261 RED
/14.4
045
/8.6
261/2
/14.3
053
/2.5
553
/2.5
57
MEP Spa
CENTRAL UNIT MEP 50
Electric diagram
TI 352 NC 5.0 480 Vac
ELECTRIC DIAGRAM
Foglio9
Fg.
Disegnato con ELCAD (R)
Stampato il : 09.03.2015 alle ore : 19:24:24
Data 09.03.2015
DSegn. DI GIOVANNI
App.
Norm IEC 750
Sostituito per:
Origine:
Modifica
Data
Nome

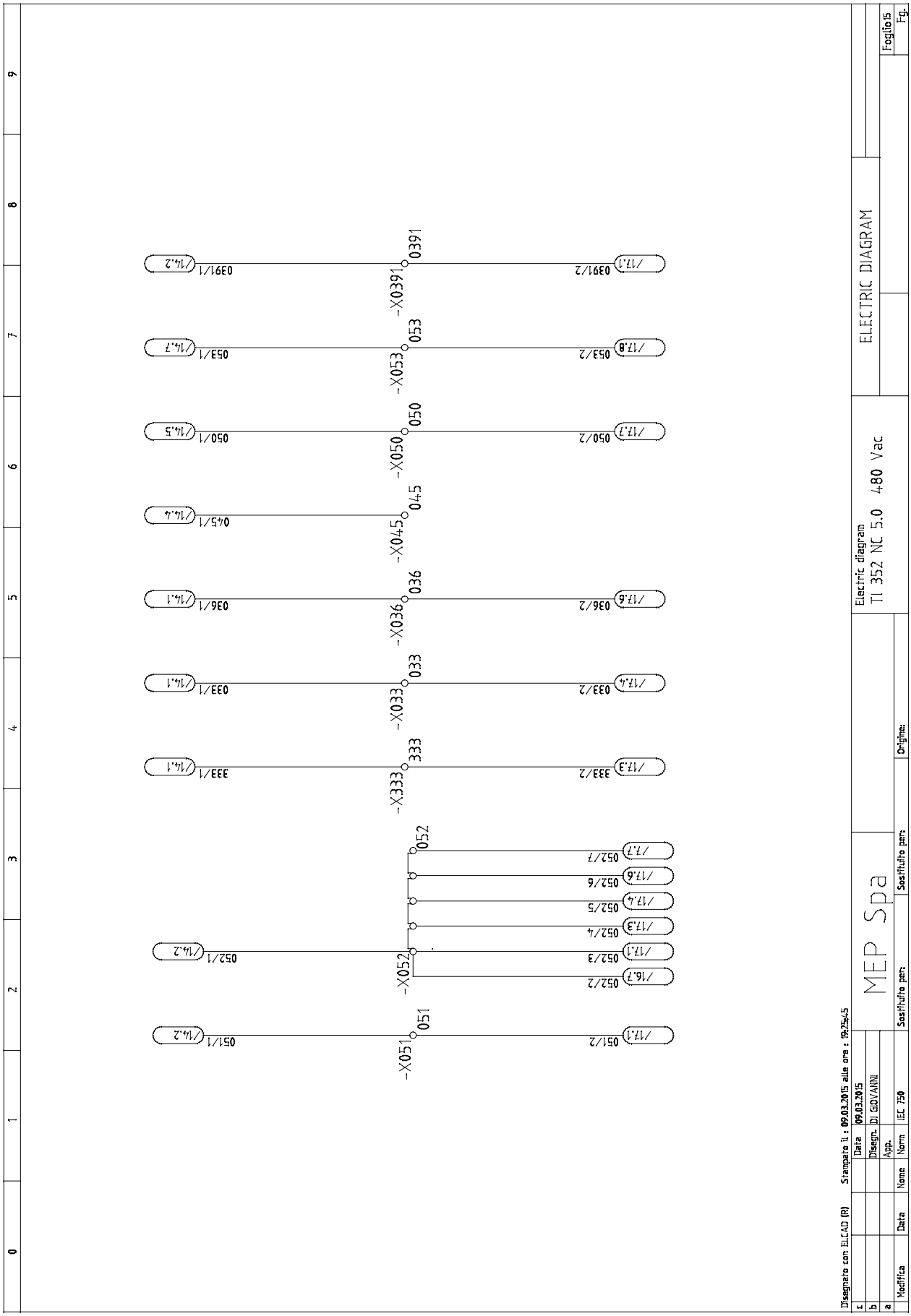

-X-M11(ANALOG OUTPUT)
Pot. Power(4,5v) 023
Ref. Analog Output(10v) 025
Head position 024
SCREENING
GREEN + RED
BROWN + BLUE
WHITE + BLACK
YELLOW + ORANGE
HEAD POTENTIOMETER 4x2xAWG24 ST -W21
PE(-W21)
-R5
HEAD POTENTIOMETER
-X-M10(ANALOG OUTPUT)
Bade Speed Ref. 115
Bade Speed Ref. 116
-Z1
-X-M8(STEP OUTPUT)
SCREENING 0320
DIR- 0315
DIR+
STEP- 0314
STEP+
STEP OUTPUT 4x0.50 SCREENING -W29/1
-X-M7(POWER SUPPLY)
+ 24 Vdc 061
0 Vdc 60
POWER 24 Vdc 2xAWG18 OIL RESISTANT -W01 dc
BLACK 1
BLACK 2
-X-M6(OUTPUT MOTOR STEPPER)
SCREENING SCR
B+ 314
B- 313
A- 312
A+ 311
MOTOR HEAD DESCENT 4x2xAWG24 ST -W28
-M9
STEP MOTOR CYLINDER HEAD DESCENT
Disegnato con ELCAD (R)
Stampato il : 09.03.2015 alle ore : 19.24.39
Data 09.03.2015
DSegn. DI GIOVANNI
App.
Norma IEC 750
Sostituito per:
Origine:
MEP SPA
CENTRAL UNIT MEP 50
Electric diagram
TI 352 NC 5.0 480 Vac
ELECTRIC DIAGRAM
Foglio 10
Fg.
Modifica
Data
Nome

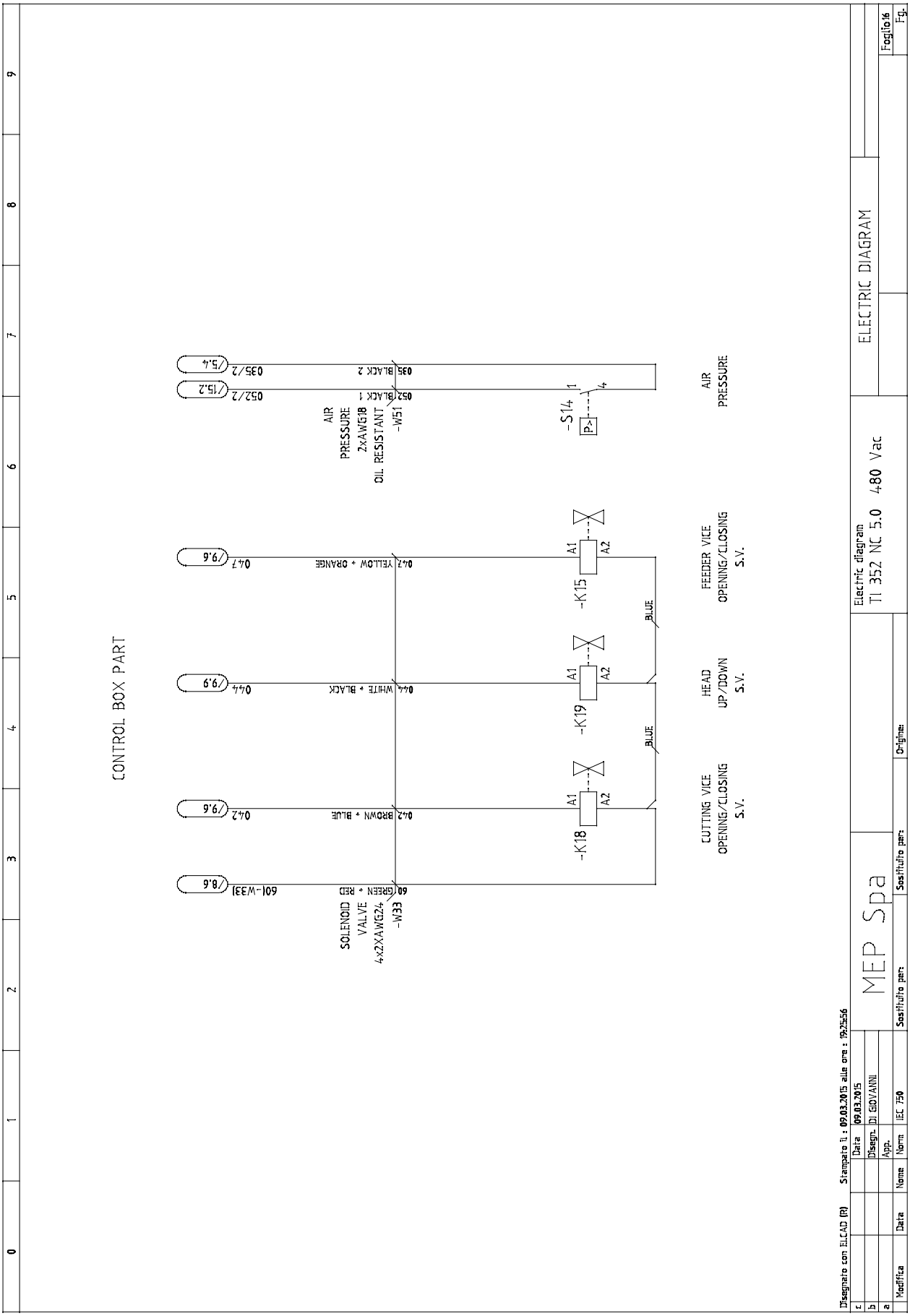

-X-M16(SENSORY POWER SUPPLY)
0 Vdc 051
/14.2
051
-X-M15(DIGITAL INPUT)
Start Pedal 033
Emergency OK 02
Carter Power Closed 0392
Inverter Alarm 038
Air Pressure OK 035
Oil Level Low 036
/14.1
033
/14.8
02
/14.2
0392
/2.5
038
/14.1
035
/14.1
036
-X-M14(SENSORY POWER SUPPLY)
+24 Vdc 052
+24 Vdc 052
052/2
/2.5
052
/14.2
MEP Spa
CENTRAL UNIT MEP 50
Electric diagram
TI 352 NC 5.0 480 Vac
ELECTRIC DIAGRAM
Foglio:11
Fg.
Disegnato con ELCAD (R)
Stampato il : 09.03.2015 alle ore : 09:24:53
Modifica
Data
Nome
Norm IEC 750
Sostituito da:
Origine:

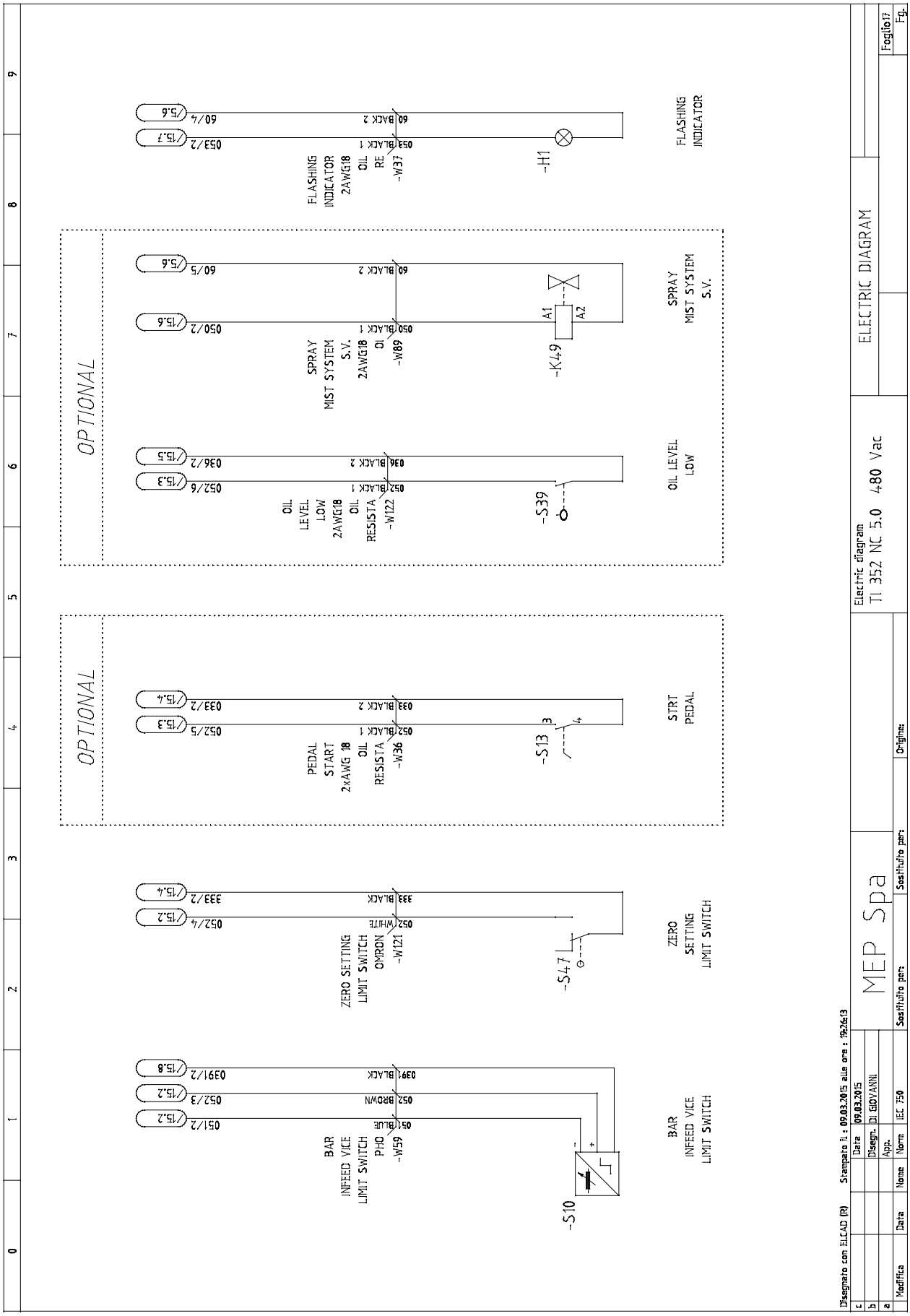

-X-M18(DIGITAL INPUT)
Reset 03
Fast 001
Bar Infeed Vise L. SW. 0391
Zero Setting L. SW. 333
Joystic X- 112
Joystic Y- 113
Joystic Y+ 114
Joystic X+ 115
/8.3 03
/8.1 001
/14.2 0391
/14.1 333
/8.8 112/X-
/8.8 113/Y-
/8.8 114/Y+
/8.9 115/X+
-X-M17 (SENSORY POWER SUPPLY)
+24 Vdc 052
+24 Vdc 052
+24 Vdc 052
+24 Vdc 052
/8.1 052/8
/8.8 052/X-
/8.8 052/Y-
/8.7 052/Y+
/8.7 052/X+
Disegnato con ELCAD (R) Stampato il : 09.03.2015 alle ore : 19:25:06
Data 09.03.2015
DSegn. DI GIOVANNI
App.
Norma IEC 750
Sostituito per:
Origine:
MEP Spa
CENTRAL UNIT MEP 50
Electric diagram
TI 352 NC 5.0 480 Vac
ELECTRIC DIAGRAM
Foglio 12
Fg.
Modifica
Data
Nome

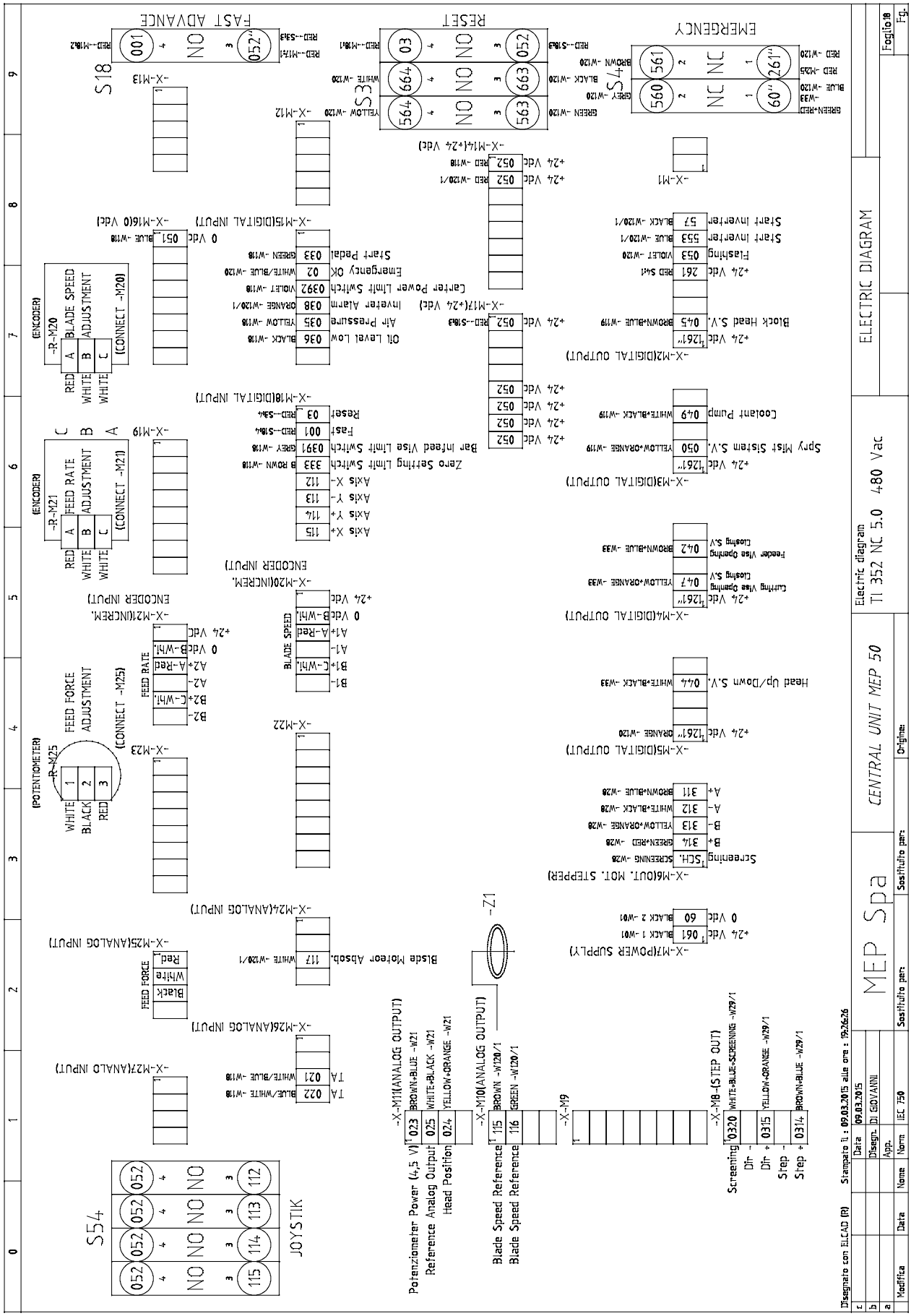

-X-M20(INCREM. ENCODER INPUT)
+24 Vdc
0 Vdc
A1+
A1-
B1+
B1-
FLAT ENCODER -W R-M20
-R-M20 (ENCODER)
BLADE SPEED ADJUSTMENT
-X-M21(INCREM. ENCODER INPUT)
+24 Vdc
0 Vdc
A2+
A2-
B2+
B2-
FLAT ENCODER -W R-M21
-R-M21 (ENCODER)
FEED RATE ADJUSTMENT
-X-M24-(ANALAG. INPUT)
Blade Motor Absorb.
117
/2.5
-X-M25(ANALOG INPUT)
RED
WHITE
BLACK
-R-M25 (POTENTIOMETER)
FEED FORCE ADJUSTMENT
-X-M26(ANALOG. INPUT)
TA 021
TA 022
/14.2
/14.2
MEP Spa
CENTRAL UNIT MEP 50
Electric diagram
TI 352 NC 5.0 480 Vac
ELECTRIC DIAGRAM
Foglio 13
Fg.

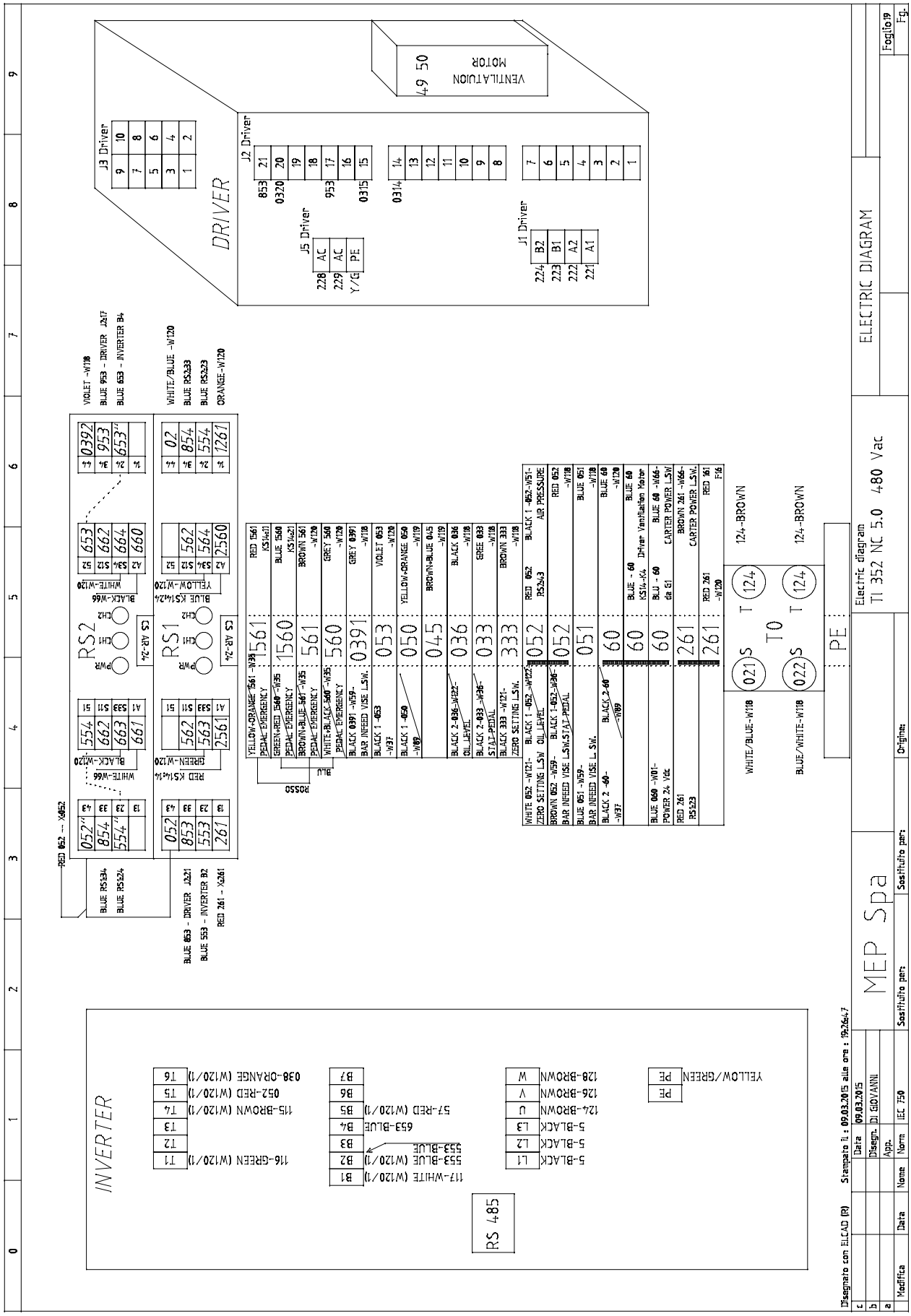

CONTROL BOX PART
CONTROL BOX PART
CONTROL BOX PART
ELECTRICAL BOX PART
ELECTRICAL BOX PART
ELECTRICAL BOX PART
6x2xAWG24 ST
-W120
4x2xAWG24 ST
-W119
6x2xAWG24 ST
-W118
ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP Spa
Disegnato con ELCAD (R)
Stampato il : 09.03.2015 alle ore : 19:25:33
Data 09.03.2015
DSegn. DI GIOVANNI
App.
Norma IEC 750
Sostituito per:
Origine:
Modifica
Foglio 14
Fg.

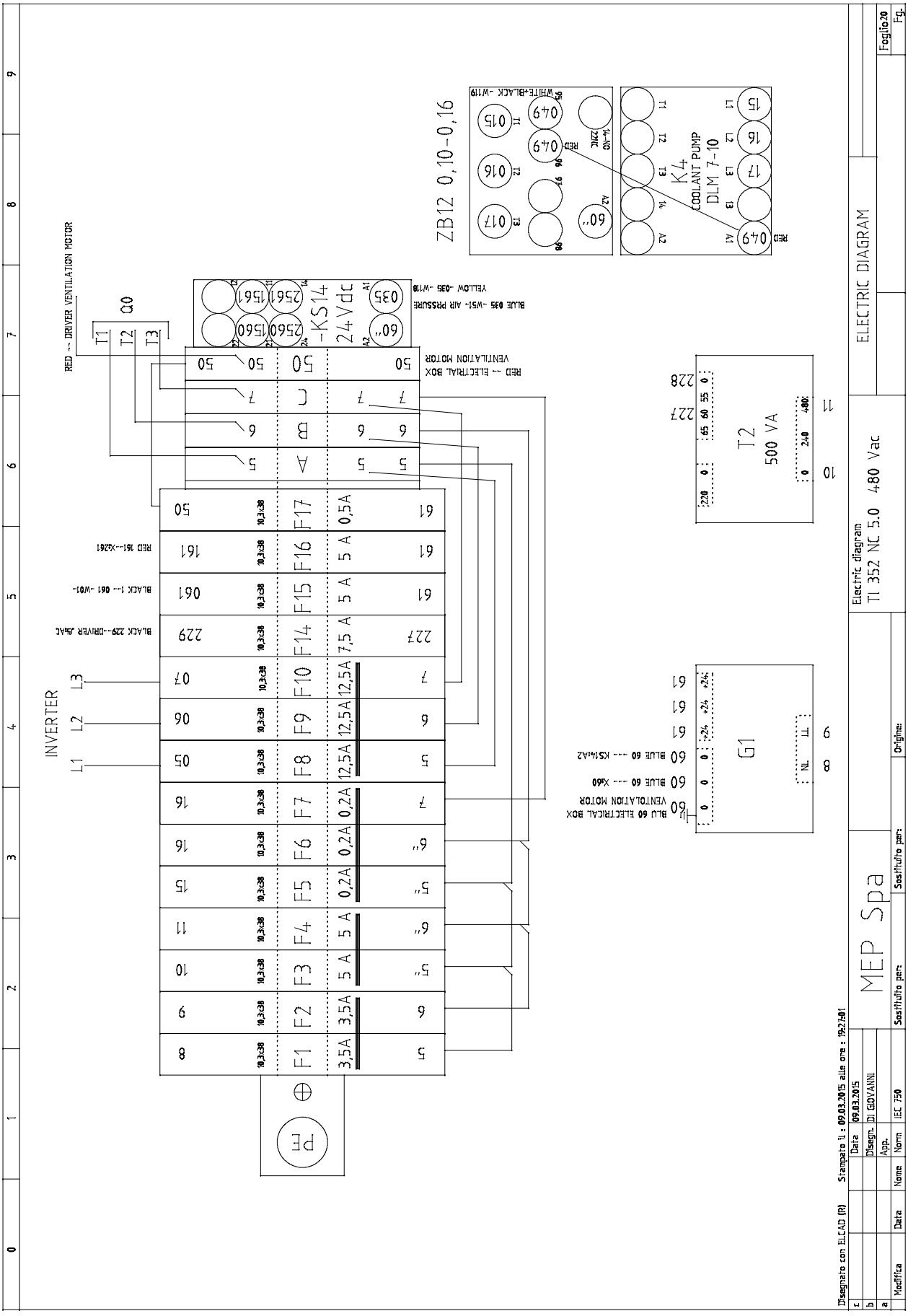

ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP Spa
Foglio 15
Fg.
Disegnato con ELCAD (R)
Stampato il : 09.03.2015 alle ore : 19:25:45
Modifica
Data
Nome
Norm IEC 750
Disegn. DI GIOVANNI
Data 09.03.2015
Sostituito per:
Origine:
-X0391
-X053
-X050
-X045
-X036
-X033
-X333
-X052
-X051
0391
053
050
045
036
033
333
052
051


CONTROL BOX PART
ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP SpA
-S14
-K15
-K19
-K18
AIR PRESSURE
FEEDER VICE OPENING/CLOSING S.V.
HEAD UP/DOWN S.V.
CUTTING VICE OPENING/CLOSING S.V.
SOLENOID VALVE 4x2XAWG24 -W33
AIR PRESSURE 2xAWG18 OIL RESISTANT -W51
YELLOW + ORANGE
WHITE + BLACK
BROWN + BLUE
GREEN + RED
BLUE
BLACK 1
BLACK 2

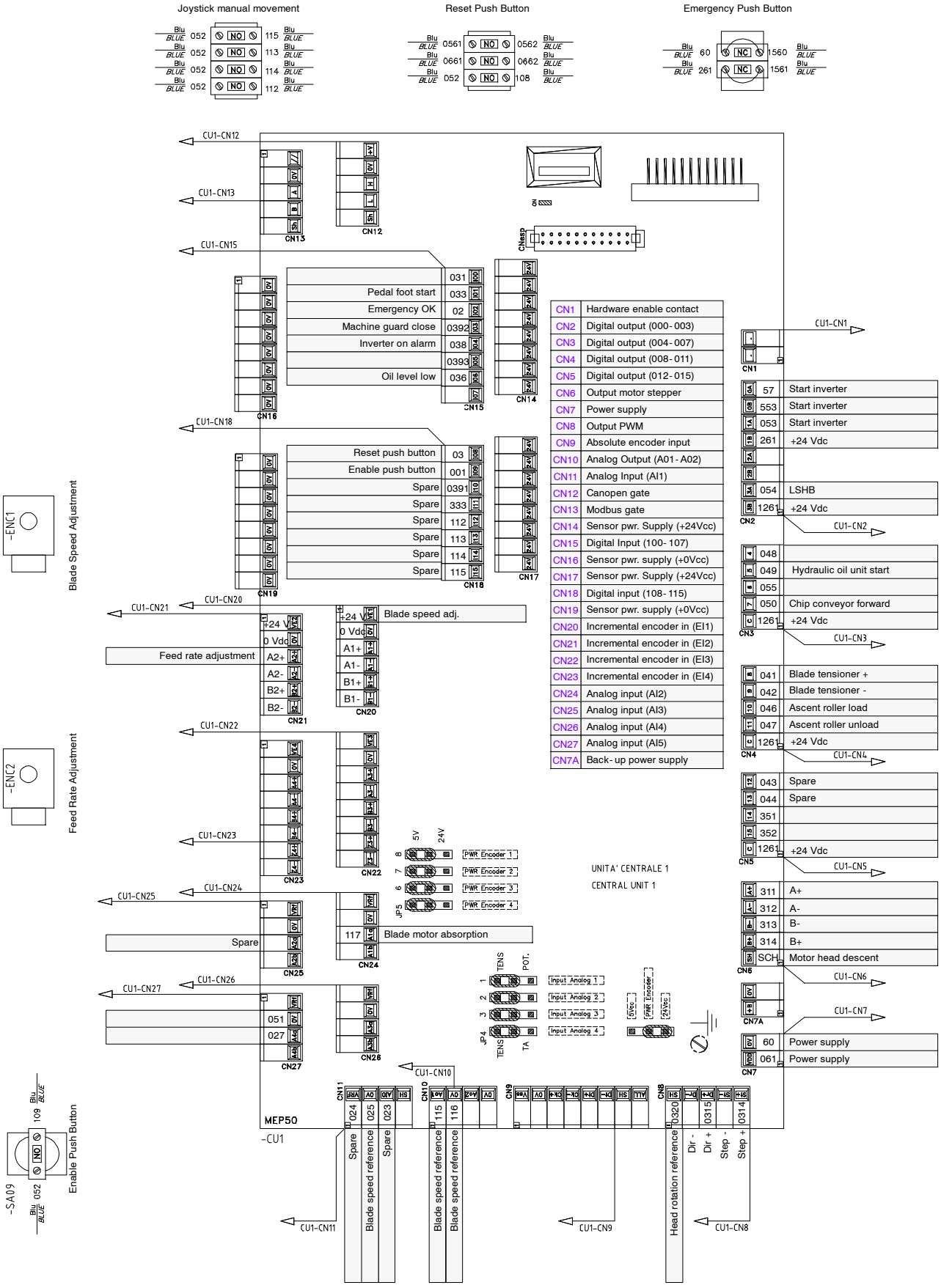

OPTIONAL
OPTIONAL
-S10
BAR
INFEED VICE
LIMIT SWITCH
-S47
ZERO
SETTING
LIMIT SWITCH
-S13
STRT
PEDAL
-S39
OIL LEVEL
LOW
-K49
SPRAY
MIST SYSTEM
S.V.
-H1
FLASHING
INDICATOR
ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP Spa


MEP SPA
CENTRAL UNIT MEP 50
ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
EMERGENCY
RESET
FAST ADVANCE
JOYSTIK
Screening
Dir -
Dir +
Step -
Step +
Blade Speed Reference
Head Position
Reference Analog Output
Potenziometer Power (4,5 V)
Spry Mist System S.V.
Coolant Pump
Block Head S.V.
Start Inverter
Flashing
Emergency OK
Alarm
Fast
Reset
Axis X-
Axis Y-
Axis X+
Axis Y+
Head Up/Down S.V.
Screening
Feed Force
Feed Rate
Blade Speed
Encoder
Potentiometer
Connect -M20
Connect -M21
Connect -M25
Connect -M23
Connect -M22
Connect -M19
Connect -M1
Connect -M2
Connect -M3
Connect -M4
Connect -M5
Connect -M6
Connect -M7
Connect -M8
Connect -M10
Connect -M11
Connect -M12
Connect -M13
Connect -M14
Connect -M15
Connect -M16
Connect -M17
Connect -M18
Connect -M24
Connect -M26
Connect -M27
Connect -M20
Connect -M21
Stampato il : 09.03.2015 alle ore : 19:26:26
Disegnato con ELCAD (R)
Data 09.03.2015
Disegn. DI GIOVANNI
App.
Norma IEC 750
Sostituito per:
Origine:
Foglio 18
Fg.
Modifica
Data
Nome


DRIVER
J3 Driver
J2 Driver
J5 Driver
J1 Driver
VENTILATUION MOTOR
INVERTER
RS 485
RS1
RS2
ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP Spa
WHITE/BLUE-W118
BLUE/WHITE-W118
124-BROWN
124-BROWN
PE
YELLOW/GREEN
Disegnato con ELCAD (R)
Stampato il : 09.03.2015 alle ore : 09:26:47
Data
Disegn. DI GIOVANNI
App.
Norm IEC 750
Sostituito per:
Origine:
Foglio 19
Fg.
Modifica
Data
Nome


ELECTRIC DIAGRAM
Electric diagram
TI 352 NC 5.0 480 Vac
MEP Spa
Foglio:20
Fg.
Disegnato con ELCAD (R)
Stampato il : 09.03.2015 alle ore : 19:21:01
Data 09.03.2015
DSegn. DI GIOVANNI
App.
Norma IEC 750
Sostituito per:
Origine:
Modifica
Nome
ZB12 0,10-0,16
K4
COOLANT PUMP
DLM 7-10
T2
500 VA
G1
-KS14
24 Vdc
INVERTER
RED -- DRIVER VENTILATION MOTOR
RED -- ELECTRICAL BOX
VENTILATION MOTOR
BLUE 035 -WS1- AIR PRESSURE
YELLOW -035 -W19
WHITE+BLACK -W19
BLACK 229--DRIVER 15VAC
BLACK 1-- 061 -W01-
RED 161--X261
F1
F2
F3
F4
F5
F6
F7
F8
F9
F10
F14
F15
F16
F17
3,5A
5 A
0,2A
12,5A
7,5 A
0,5A
BLU 60 ELECTRICAL BOX
VENTOLATION MOTOR
BLUE 60 --- X60
BLUE 60 --- KS14:A2
480 Vac

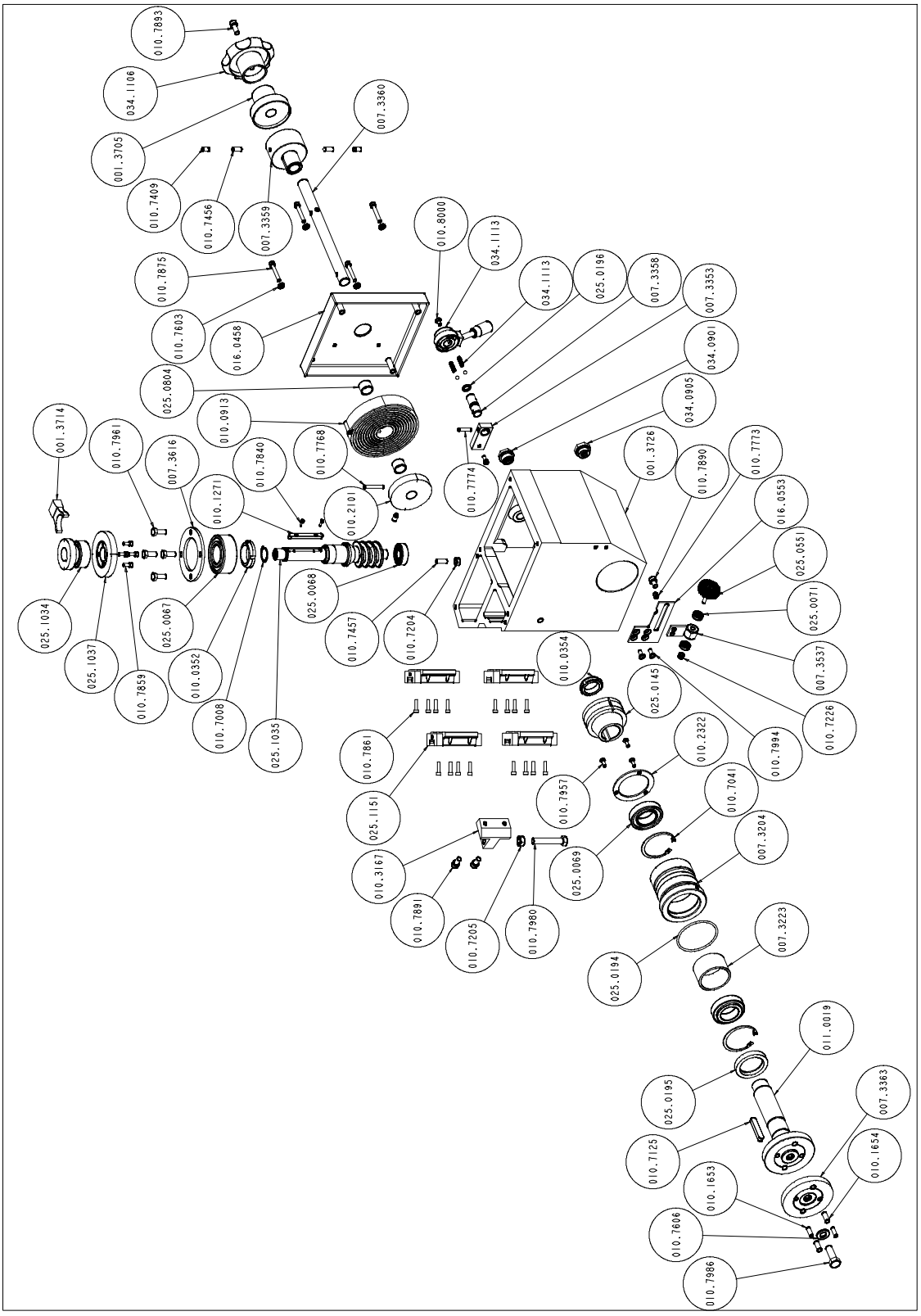
M50 central unit



Exploded views

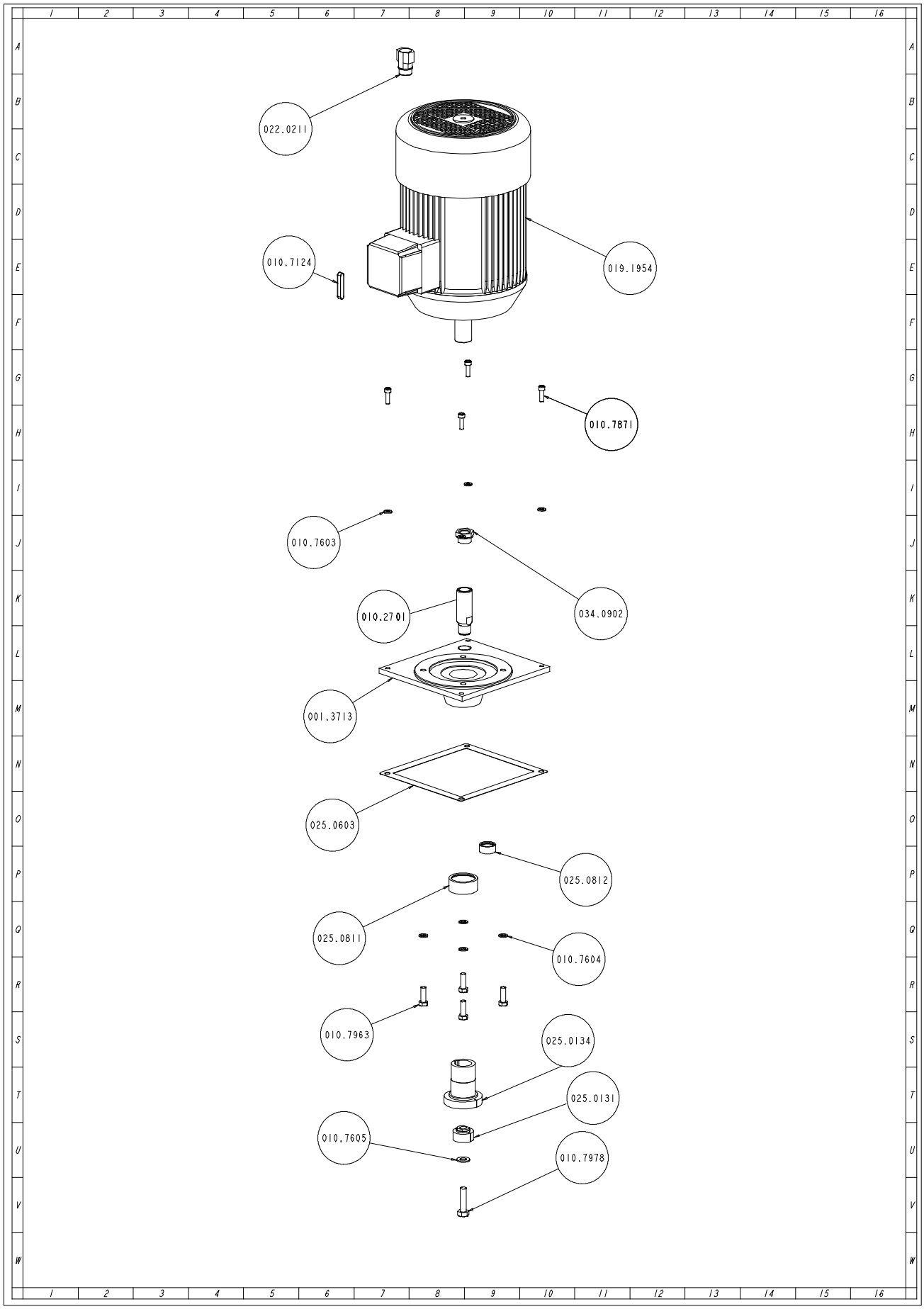
This part of the manual contains detailed exploded views of the machine which can help to gain a deeper knowledge of how it is made.

Head unit



Code	Description	U. of M.	Quantity
001.3705	SUPPORTO VOLANTINO	NR	1,000
001.3714	FORCELLA CAMBIO	NR	1,000
001.3726	.TESTA OPERATRICE TI 352 4 VEL	NR	1,000
007.3204	TAMPONE CUSCINETTI	NR	1,000
007.3223	ANELLO DISTANZIALE CUSCINETTO	NR	1,000
007.3353	PIASTRINO COMANDO CAMBIO	NR	1,000
007.3358	PERNO LEVA CAMBIO	NR	1,000
007.3359	BOCCOLA RIPRESA CORSA	NR	1,000
007.3360	ALBERO MOVIMENTO TESTA	NR	1,000
007.3363	FLANGIA ESTERNA TI 350 - 370	NR	1,000
007.3537	PIASTRINO PULILAMA TI	NR	1,000
007.3616	GHIERA FIX CUSCINETTO	NR	1,000
010.0352	GHIERA AUTOBLOCCANTE 35X1,5	NR	1,000
010.0354	GHIERA AUTOBLOCCANTE 30X1,5	NR	1,000
010.0913	MOLLA SOLLEVAMENTO TESTA	NR	1,000
010.1271	LINGUETTA 8X7X70 FORATA TI 350	NR	1,000
010.1653	PERNO FLANGIA	NR	2,000
010.1654	PERNO FLANGIA	NR	2,000
010.2101	RUOTA SOLLEVAMENTO TESTA	NR	1,000
010.2322	FLANGIA BLOCCAGGIO CUSCINETTI	NR	1,000
010.3167	BATTUTA FINE CORSA TESTA IN BA	NR	1,000
010.7008	ANELLO SEEGER DIAM. 25	NR	1,000
010.7041	ANELLO SEEGER PER FORI DIAM. 6	NR	2,000
010.7125	CHIAVETTA 10 X 8 X 56	NR	1,000
010.7204	DADO M8	NR	1,000
010.7205	DADO M10	NR	1,000
010.7226	DADO AUTOBLOCCANTE M6	NR	1,000
010.7409	GRANO VCE P.CIL. 8 X 10	NR	3,000
010.7456	GRANO VCE P.CON. 8 X 16	NR	2,000
010.7457	GRANO VCE P.CON. 8 X 20	NR	1,000
010.7603	RONDELLA DIAM. 6	NR	4,000
010.7606	RONDELLA DIAM. 12	NR	1,000
010.7768	SPINA ELASTICA DIAM. 6 X 40	NR	1,000
010.7773	SPINA ELASTICA DIAM. 8 X 10	NR	1,000
010.7774	SPINA ELASTICA DIAM. 6 X 26	NR	1,000
010.7859	VITE TCEI 5 X 12	NR	5,000
010.7861	VITE TCEI 5 X 20	NR	16,000
010.7875	VITE TCEI 6 X 40	NR	4,000
010.7890	VITE TCEI 8 X 12	NR	1,000
010.7891	VITE TCEI 8 X 16	NR	2,000
010.7893	VITE TCEI 8 X 20	NR	1,000
010.7957	VITE TE 5 X 12	NR	3,000
010.7961	VITE TE 8 X 20	NR	4,000
010.7980	VITE TE 10 X 60	NR	1,000
010.7986	VITE TE 12 X 35	NR	1,000
010.7994	VITE TSPEI 6 X 12	NR	2,000
010.8000	VITE TSPEI 6 X 8	NR	1,000
011.0019	.ALBERO PORTADISCO TI 350 CEME	NR	1,000
016.0458	COPERCHIO MOLLA	NR	1,000
016.0553	GUIDA SPAZZOLA PULILAMA	NR	1,000
025.0067	CUSCINETTO 3207	NR	1,000
025.0068	CUSCINETTO 6203	NR	1,000
025.0069	CUSCINETTO 32007X	NR	2,000
025.0071	CUSCINETTO 626 2RS	NR	2,000
025.0145	CORONA ELICOIDALE DIS. 86.06.0	NR	1,000
025.0194	ANELLO DI TENUTA OR 176 VITON	NR	1,000
025.0195	ANELLO DI TENUTA 45X62X10 G VI	NR	1,000
025.0196	ANELLO DI TENUTA OR 3043 VITON	NR	1,000
025.0551	SPAZZOLA PULILAMA 6X25 030 GG4	NR	1,000
025.0804	BOCCOLA GRAFITATA L. 15 DIAM.	NR	2,000
025.1034	RUOTA DENTATA 43007/53 ALBERO	NR	1,000
025.1035	ALBERO VITE SENZA FINE 43003/5	NR	1,000
025.1037	RUOTA DENTATA 43005/53 ALBERO	NR	1,000
025.1151	PATTINO LGW20HAZ1C	NR	4,000
034.0901	TAPPO LIVELLO OLIO 1/2 "GAS.	NR	1,000
034.0905	TAPPO OLIO TAO/3 1/2" NERO	NR	1,000
034.1106	VOLANTINO DIAM.100 A 6 LOBI	NR	1,000
010.7840	VITE TCEI 3 X 10	NR	2,000
034.1113	VOLANTINO DI MANOVRA X TI350 4 VEL.	NR	2,000

Motor unit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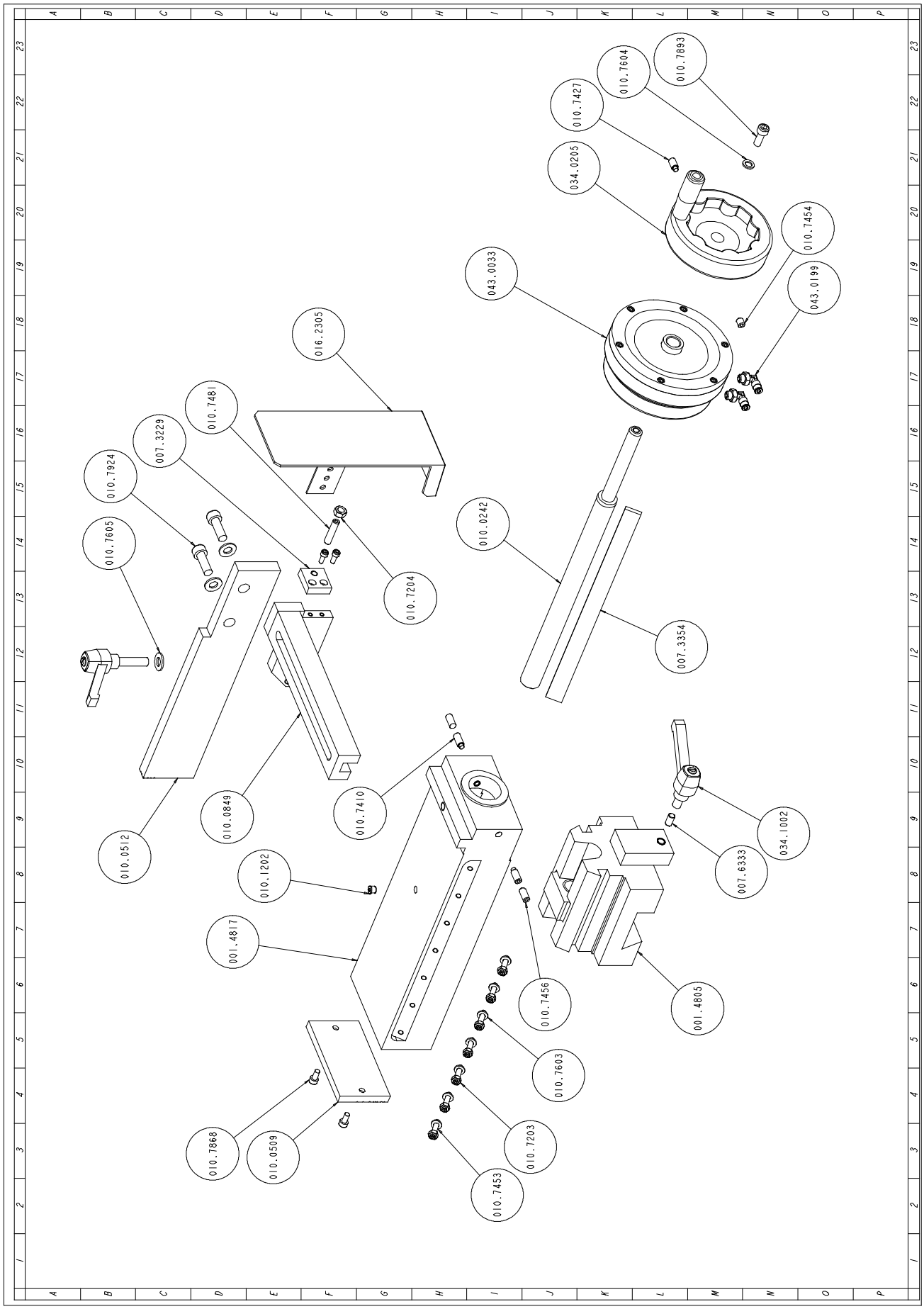
010.7604
010.7963
025.0134
025.0131
010.7605
010.7978

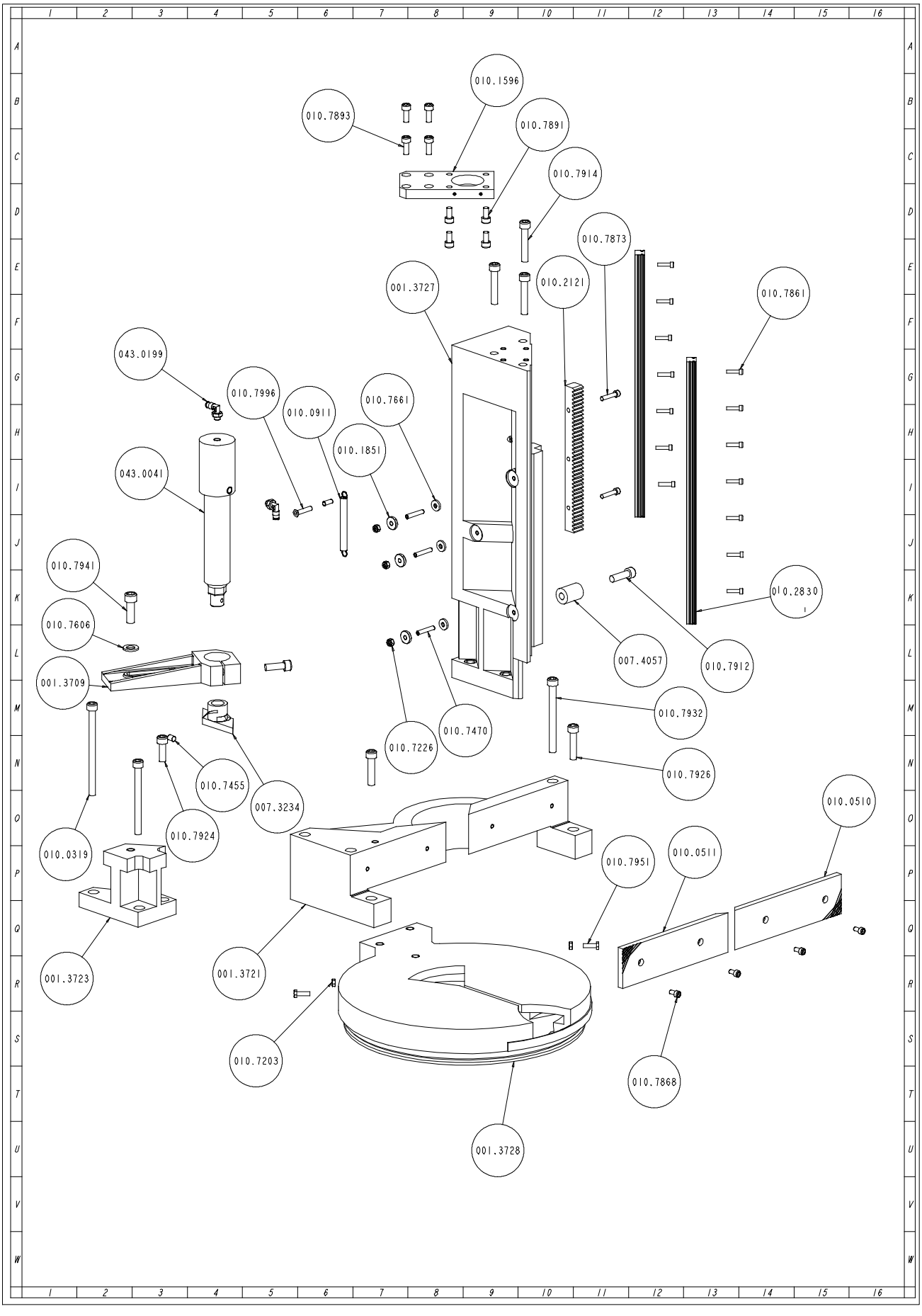
Code	Description	U. of M.	Quantity
001.3713	COPERCHIO SUPERIORE TESTA	NR	1,000
010.2701	PROLUNGA TAPPO OLIO	NR	1,000
010.7124	CHIAVETTA 8 X 7 X 45	NR	1,000
010.7603	RONDELLA DIAM. 6	NR	4,000
010.7604	RONDELLA DIAM. 8	NR	4,000
010.7605	RONDELLA DIAM. 10	NR	1,000
010.7871	VITE TCEI 6 X 20	NR	4,000
010.7963	VITE TE 8 X 25	NR	4,000
010.7978	VITE TE 10 X 40	NR	1,000
019.1954	KW 2,6/1,84 8/4P.C112 B.14 V.3	NR	1,000
022.0211	RACCORDO RAPIDO SEM PG 13,5	NR	1,000
025.0131	RUOTA DENTATA 43004/53 ALB. MO	NR	1,000
025.0134	RUOTA DENTATA 43006/53 ALB.MOT	NR	1,000
025.0603	GUARNIZIONE TESTA 4 VEL.	NR	1,000
025.0811	BOCCOLA A RULLINI DHK 4020 HK	NR	1,000
025.0812	BOCCOLA A RULLINI DHK 2012 HK	NR	1,000
034.0902	TAPPO OLIO SFP 1/2” ROSSO	NR	1,000

Vice assembly



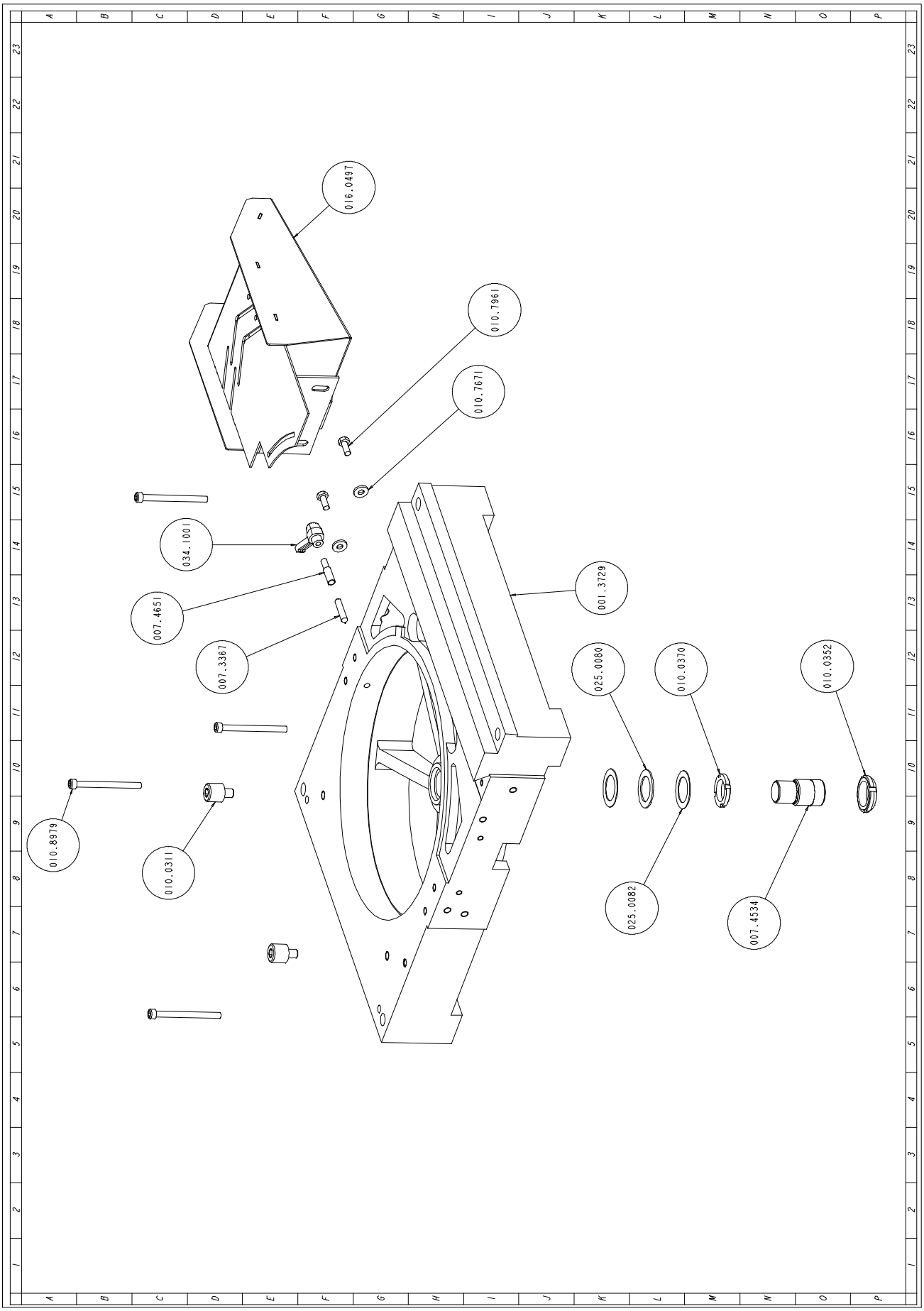
Code	Description	U. of M.	Quantity
001.4805	SUPPORTO MORSA M	NR	1,000
001.4817	.SCORREVOLE MORSA TI 370 SX	NR	1,000
007.3229	TASSELLO X BATTUTA SCORR. ANTI	NR	1,000
007.3354	LARDONE MORSA	NR	1,000
007.6333	PERNO BLOCCAGGIO MORSA TI 370	NR	1,000
010.0242	VITE MORSA	NR	1,000
010.0509	GANASCIA MORSA	NR	1,000
010.0512	GANASCIA ANTIBAVA	NR	1,000
010.0849	SUPPORTO SCORREVOLE GANASCIA A	NR	1,000
010.1202	OLIATORE A SFERA DIAM. 8	NR	1,000
010.7203	DADO M6	NR	7,000
010.7204	DADO M8	NR	1,000
010.7410	GRANO VCE P.CIL. 8 X 16	NR	2,000
010.7427	GRANO VCE P.CIL. 8 X 12	NR	1,000
010.7453	GRANO VCE P.CON. 6 X 30	NR	7,000
010.7454	GRANO VCE P.CON. 8 X 8	NR	1,000
010.7456	GRANO VCE P.CON. 8 X 16	NR	2,000
010.7481	GRANO VCE PUNTA PIANA 8 X 35	NR	1,000
010.7491	GRANO VCE PUNTA PIANA 10 X 60	NR	1,000
010.7603	RONDELLA DIAM. 6	NR	7,000
010.7604	RONDELLA DIAM. 8	NR	1,000
010.7605	RONDELLA DIAM. 10	NR	3,000
010.7859	VITE TCEI 5 X 12	NR	6,000
010.7860	VITE TCEI 5 X 15	NR	6,000
010.7868	VITE TCEI 6 X 12	NR	2,000
010.7893	VITE TCEI 8 X 20	NR	3,000
010.7924	VITE TCEI 10 X 30	NR	2,000
010.9074	GRANO VCE PUNTA PIANA 10 X 20	NR	1,000
016.2305	RACCOGLITORE ACQUA MORSA	NR	1,000
025.0203	ANELLO TENUTA 35X25X7	NR	1,000
025.0452	RULLI 6X6 AISI 420	NR	1,000
034.0205	VOLANTINO MORSA	NR	1,000
034.1002	LEVA A SCATTO 10 MA	NR	2,000
043.0033	CILINDRO VOLAMPRESS 125- 8	NR	1,000
043.0199	ATTACCO A GOMITO GIREV.4X1/8 C	NR	2,000

Turntable unit



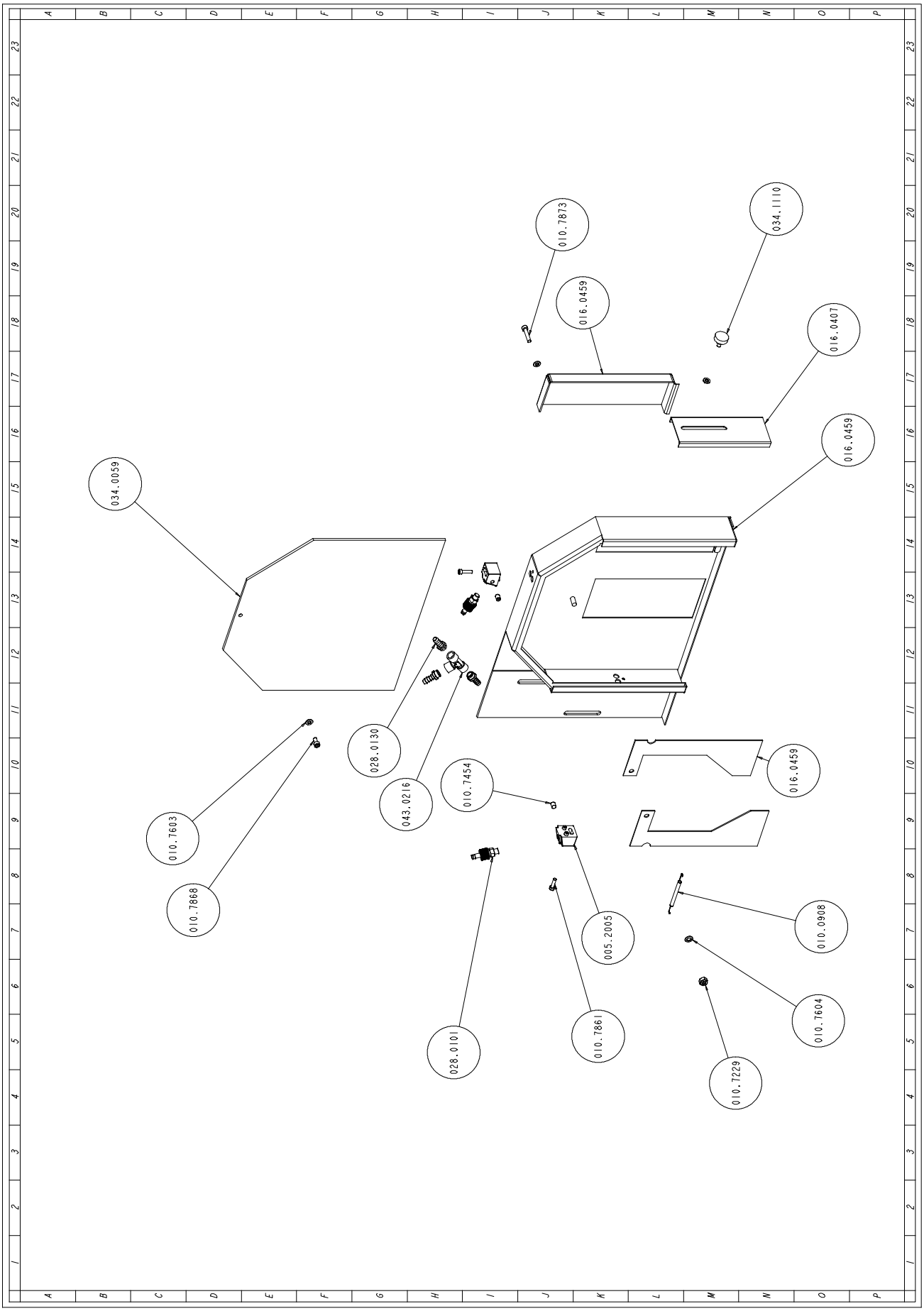
Code	Description	U. of M.	Quantity
001.3709	STAFFA BLOCCAGGIO CILINDRO SUP	NR	1,000
001.3721	SQUADRO MORSA	NR	1,000
001.3723	SUPPORTO CILINDRO SUPPLEMENTAR	NR	1,000
001.3727	.COLONNA PORTANTE TI 352	NR	1,000
001.3728	PIATTAFORMA GIREVOLE TI 350 N.	NR	1,000
007.3234	BOCCOLA/GANASCIA X CILIN.SUPPL	NR	1,000
007.4057	BOCCOLA BATTUTA FINE CORSA	NR	1,000
010.0319	VITE 8.8 TCEI 10X140 TI	NR	1,000
010.0510	GANASCIA MORSA DESTRA	NR	1,000
010.0511	GANASCIA MORSA SINISTRA	NR	1,000
010.0911	MOLLA RICHIAMO CARTER DISCO	NR	1,000
010.1596	STAFFA FISSAGGIO CILINDRO TI 3	NR	1,000
010.1851	BOCCOLA PER CARTER DISCO - DIAM	NR	3,000
010.2121	CREMAGLIERA	NR	1,000
010.2830	GUIDA PATTINO HGW 20 HC 2 RO 430 E20 ZB- H	NR	2,000
010.7203	DADO M6	NR	2,000
010.7226	DADO AUTOBLOCCANTE M6	NR	3,000
010.7455	GRANO VCE P.CON. 8 X 10	NR	1,000
010.7470	GRANO VCE PUNTA PIANA 6 X 35	NR	3,000
010.7606	RONDELLA DIAM. 12	NR	1,000
010.7661	RONDELLA SPESSORE DIAM. 6 X 3	NR	3,000
010.7861	VITE TCEI 5 X 20	NR	14,000
010.7868	VITE TCEI 6 X 12	NR	4,000
010.7873	VITE TCEI 6 X 30	NR	2,000
010.7891	VITE TCEI 8 X 16	NR	4,000
010.7893	VITE TCEI 8 X 20	NR	4,000
010.7912	VITE TCEI 10 X 35	NR	1,000
010.7914	VITE TCEI 10 X 55	NR	3,000
010.7924	VITE TCEI 10 X 30	NR	2,000
010.7926	VITE TCEI 10 X 45	NR	2,000
010.7932	VITE TCEI 10 X 110	NR	2,000
010.7941	VITE TCEI 12 X 35	NR	1,000
010.7951	VITE TE 6 X 20	NR	2,000
010.7996	VITE TSPEI 6 X 30	NR	1,000
043.0041	CILINDRO MORSE 50X10 0 40 L.15	NR	1,000
043.0199	ATTACCO A GOMITO GIREV.4X1/8 C	NR	2,000

Fixed worktable unit



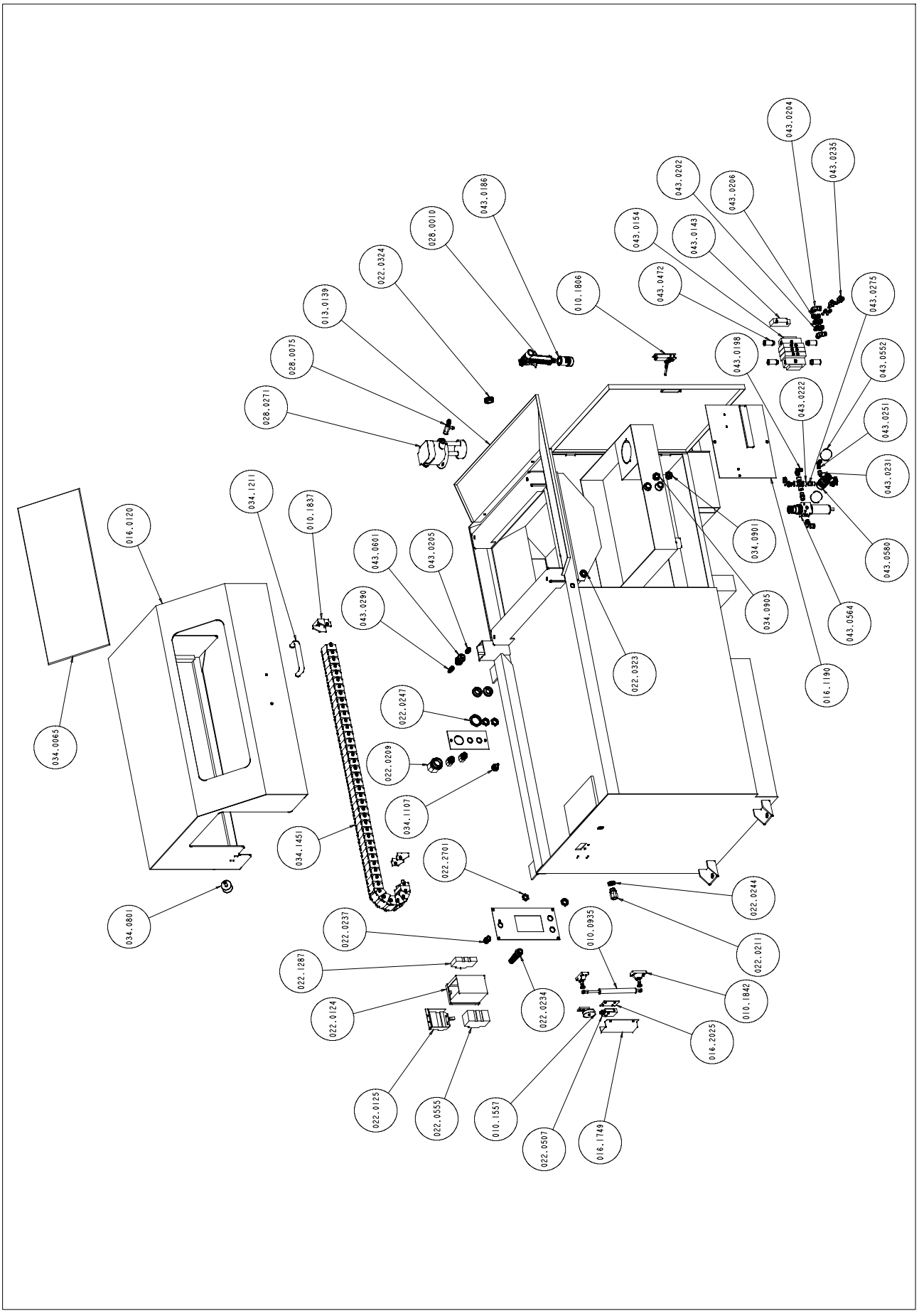
Code	Description	U. of M.	Quantity
001.3729	PIATTAFORMA FISSA	NR	1,000
007.3356	PERNO BLOCCAGGIO PIANO GIREVOL	NR	1,000
007.4534	PERNO DI CENTRO	NR	1,000
007.4651	GRANO BLOCCAGGIO PIANO ROTANTE	NR	1,000
010.0311	VITE TCEI M12X16 BATT.PIANO GI	NR	2,000
010.0352	GHIERA AUTOBLOCCANTE 35X1,5	NR	1,000
010.0370	GHIERA 5S 30X1,5	NR	1,000
010.7671	RONDELLA SPESSORE DIAM. 8 X 3	NR	2,000
010.7961	VITE TE 8 X 20	NR	2,000
010.8979	VITE TCEI 8 X 95	NR	4,000
016.0497	GUIDA SCARICAPEZZI	NR	1,000
025.0080	GABBIA ASSIALE A RULLINI AXK 3	NR	1,000
025.0082	RALLA AS 3552	NR	2,000
034.1001	LEVA A SCATTO 8 MA PK55	NR	1,000

Blade guard unit



Code	Description	U. of M.	Quantity
005.2005	SPRUZZATORE RUBINETTO	NR	2,000
010.0908	MOLLA CARTER DISCO	NR	1,000
010.7229	DADO AUTOBLOCCANTE M8	NR	1,000
010.7454	GRANO VCE P.CON. 8 X 8	NR	2,000
010.7603	RONDELLA DIAM. 6	NR	3,000
010.7604	RONDELLA DIAM. 8	NR	1,000
010.7861	VITE TCEI 5 X 20	NR	2,000
010.7868	VITE TCEI 6 X 12	NR	1,000
010.7873	VITE TCEI 6 X 30	NR	1,000
016.0407	PARASCHIZZI ANTERIORE	NR	1,000
016.0459	CARTER DISCO	NR	1,000
028.0101	REGOLATORE PER RUBINETTO 8 X 1	NR	2,000
028.0130	RACCORDO 1/4- 9 CL 2601	NR	3,000
034.0059	PROTEZ.LEXAN TI 350 + AD.SCELT	NR	1,000
034.1110	VOLANTINO DIAM.30 M6 X 10	NR	1,000
043.0216	RACCORDO A T FFF 1/4 CL 2003	NR	1,000

Base unit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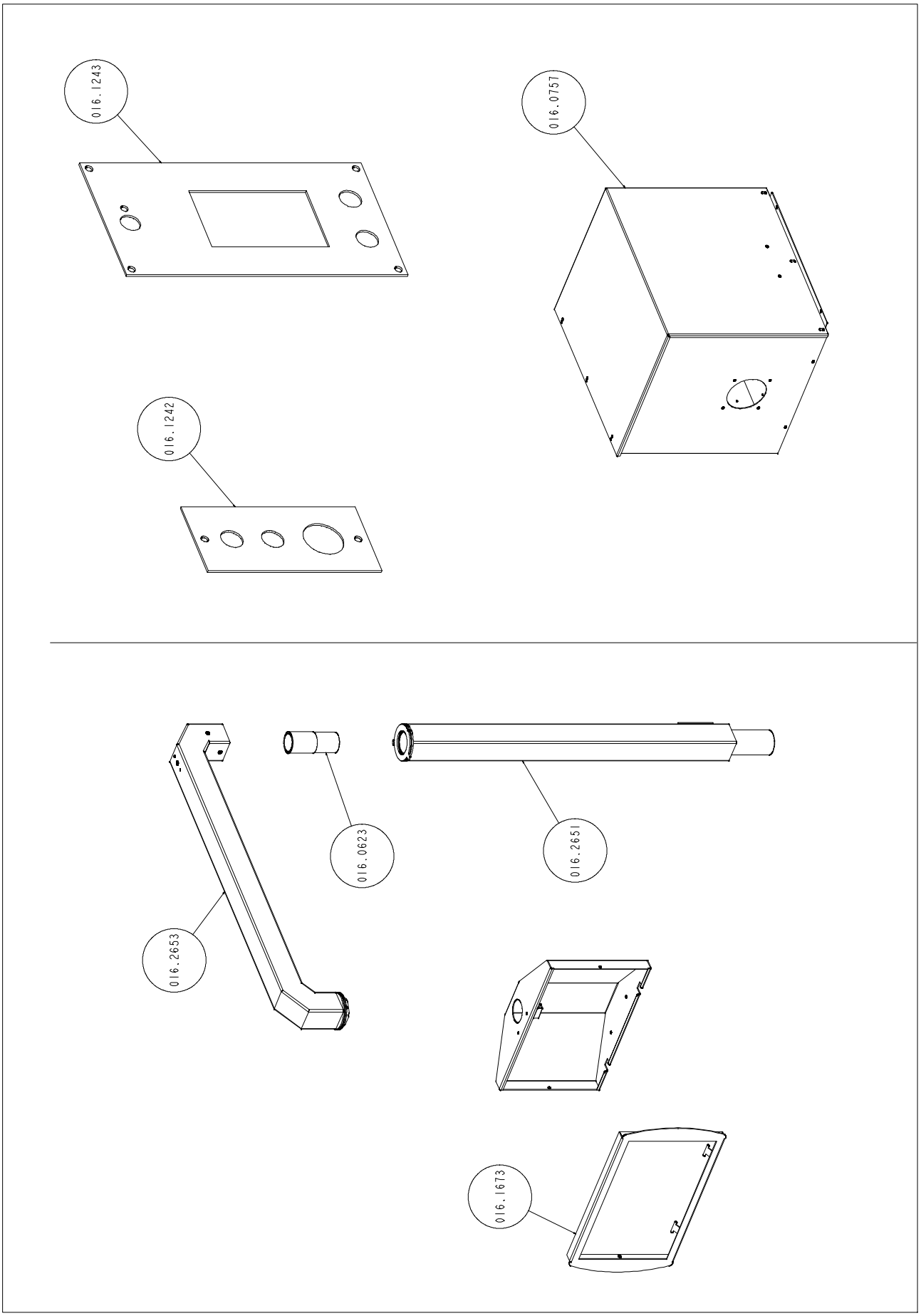
022.0507
016.1749

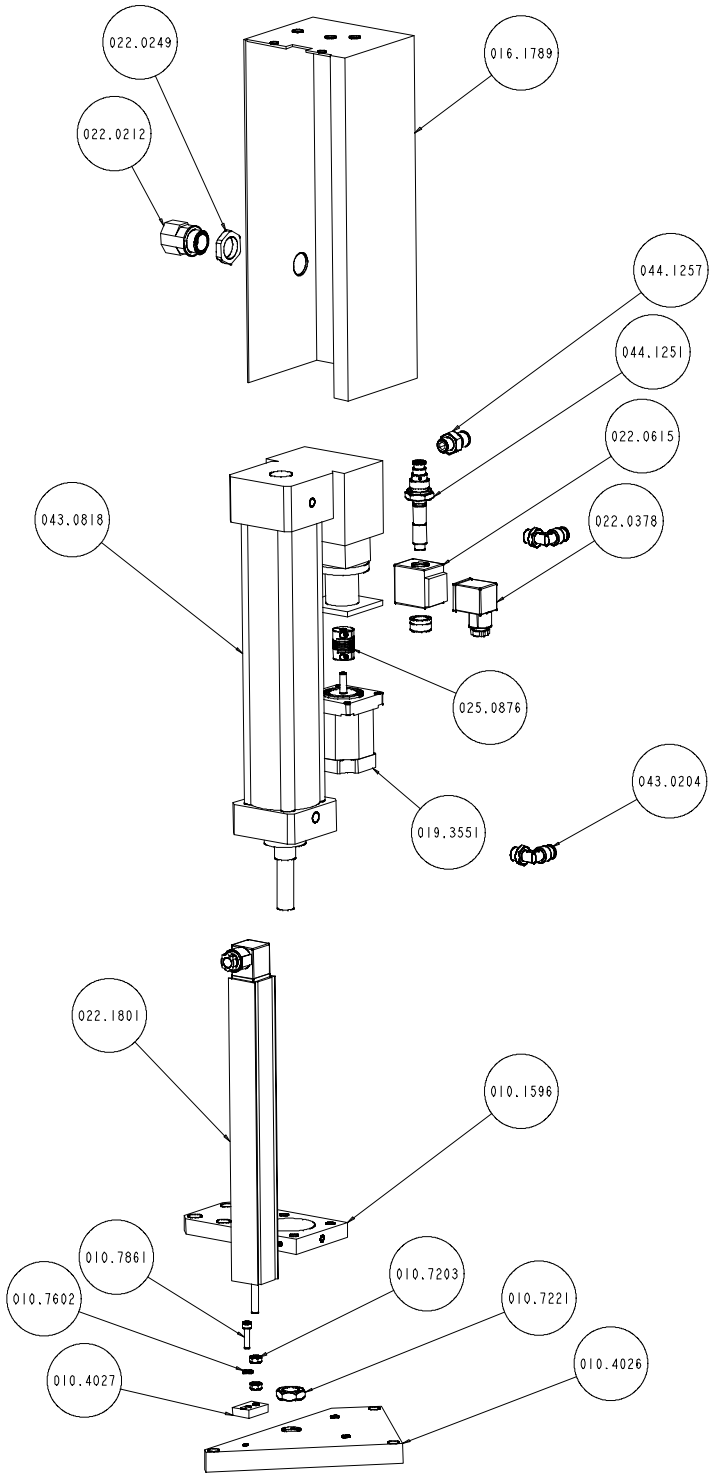
Code	Description	U. of M.	Quantity
010.0935	MOLLA A GAS 125 MM.400N CB AX- CNC	NR	1
010.1557	STAFFA COMADO FINE CORSA PROTEZIONE	NR	1
010.1806	CHIUSURA SPORTELLO	NR	1
010.1837	SET ATTACCHI 905.010- 905.011 AX- CNC	NR	1
010.1842	SUPPORTO MASCHIO MOLLA A GAS	NR	2
010.7221	DADO M16 BASSO	NR	4
013.0139	PIEDISTALLO TIGER 352 NC	NR	1
016.0120	CARTER ALIMENTATORE TIGER 352 NC	NR	1
016.1190	PANNELLO PNEUMATICO	NR	1
016.1749	PROTEZIONE FINE CORSA ALIMENTATORE	NR	1
016.2025	PIASTRA FIX FC CARTER ALIMENTATORE	NR	1
022.0124	INTERRUTTORE PKZ0	NR	1
022.0125	BLOCCO LUCCHETTABILE PKZ0	NR	1
022.0209	RACCORDO RAPIDO PG 29	NR	1
022.0211	RACCORDO RAPIDO PG 13,5	NR	3
022.0234	PASSACAVO PG 13,5	NR	1
022.0237	PRESSACAVO PG 11	NR	1
022.0244	DADO PASSACAVO PG 13,5	NR	4
022.0247	DADO POLIAMIDE HUMMEL 1-262-2900-11	NR	1
022.0323	PASSACAVO 18INC MM2,5	NR	1
022.0324	PASSACAVO 24INC MM2,5	NR	3
022.0507	FINECORSA D4C1092	NR	1
022.0555	SGANCIATORE U-PKZ0	NR	1
022.1287	INTERRUTTORE PKZM0 TERMICA	NR	1
022.2701	DADO PG 11 BL03	NR	1
028.0010	PISTOLA	NR	1
028.0075	RACCORDO T 3/8X17X9	NR	1
028.0271	ELETTROPOMPA EZ_C V220-380	NR	1
034.0801	ARRESTO ELASTICO	NR	2
034.0901	TAPPO LIVELLO OLIO 1/2GAS	NR	1
034.0905	TAPPO OLIO TAO 3-1/2NERO	NR	1
034.1107	VOLANTINO DIAM30	NR	1
034.1211	MANIGLIA	NR	1
034.1451	CATENA PORTACAVI	NR	1,3
043.0143	PRESSOSTATO PNEUMATICO	NR	1
043.0154	BLOCCO 3 VALVOLE	NR	1
043.0186	RACCORDO FEMMINA 1/2 AQUASTOP	NR	1
043.0198	ATTACCO GOMITO 4X1/4 CL6521	NR	1
043.0202	ATTACCO ESAGONO 8X1/8 CL6511	NR	2
043.0204	ATTACCO GOMITO 8X1/4 CL6521	NR	5
043.0205	ATTACCO ESAGONO 8X1/4 CL6510	NR	1
043.0206	ATTACCO ESAGONO 4X1/4 CL6511	NR	4
043.0222	RACCORDO A CROCE CL2033 1/4	NR	1
043.0231	RIDUZIONE MF 1/8CL2520	NR	1
043.0235	BIFORCAZIONE Y 4MM	NR	2
043.0251	GOMITO MF1/8 CL2020	NR	1
043.0275	NIPPLO CONICO A2-1/4	NR	2
043.0290	INNESTO RAPIDO 1/4 GHIOTTO 13A	NR	1
043.0472	SILENZIATORE 1/4 PLASTICA	NR	4
043.0552	MANOMETRO DIAM40	NR	2
043.0564	FR 1/4 20-08	NR	1
043.0580	REGOLATORE PRESSIONE	NR	1
043.0601	VALVOLA VSM 114 1/4 08	NR	1
034.0065	PROTEZIONE ALIMENTATORE STAMPATO TI- SH AX	NR	1

Programming and control console



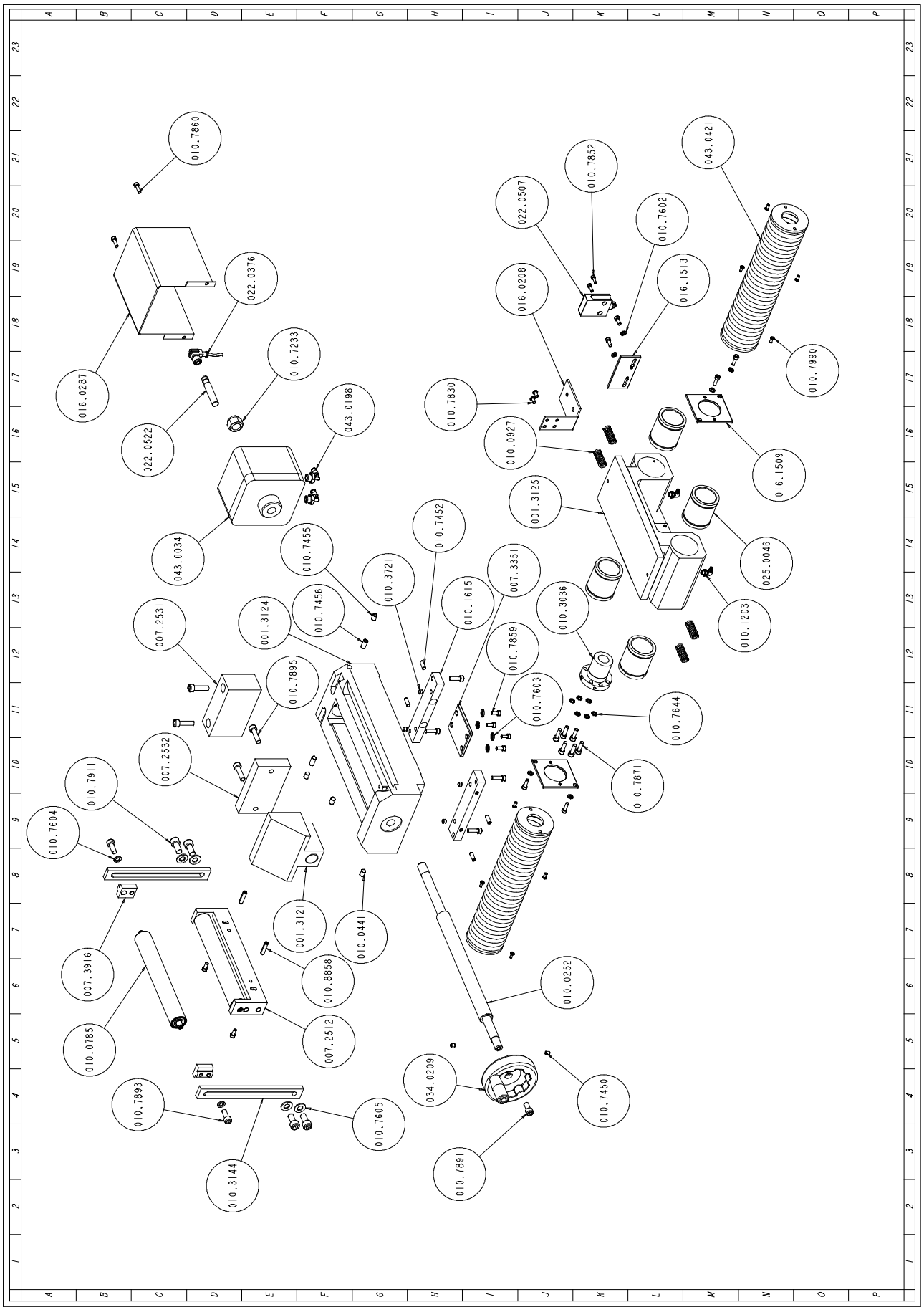
Code	Description	U. of M.	Quantity
016.1673	CORNICE QUADRO COMANDI X SHARK NC 5.0	NR	1
016.2651	ASTA VERTICALE COMPLETA DI PIASTRA X QUADRO COMANDI TI 352 NC- EVO	NR	1
016.0623	SUPPORTO X SNODO QUADRO COMANDI CB- TI352	NR	1
016.2653	ASTA ORIZZONTALE X QUADRO COMANDI TI- CB	NR	1
016.1242	PIASTRA PASSACAVI CB- TI 352 NC- EVO	NR	1
016.1243	PIASTRA FIX INTERRUTTORE CB- TI 352 NC- EVO	NR	1
016.0757	QUADRO ELETTRICO TI- CB 352 NC- EVO	NR	1

Hydraulic cylinder



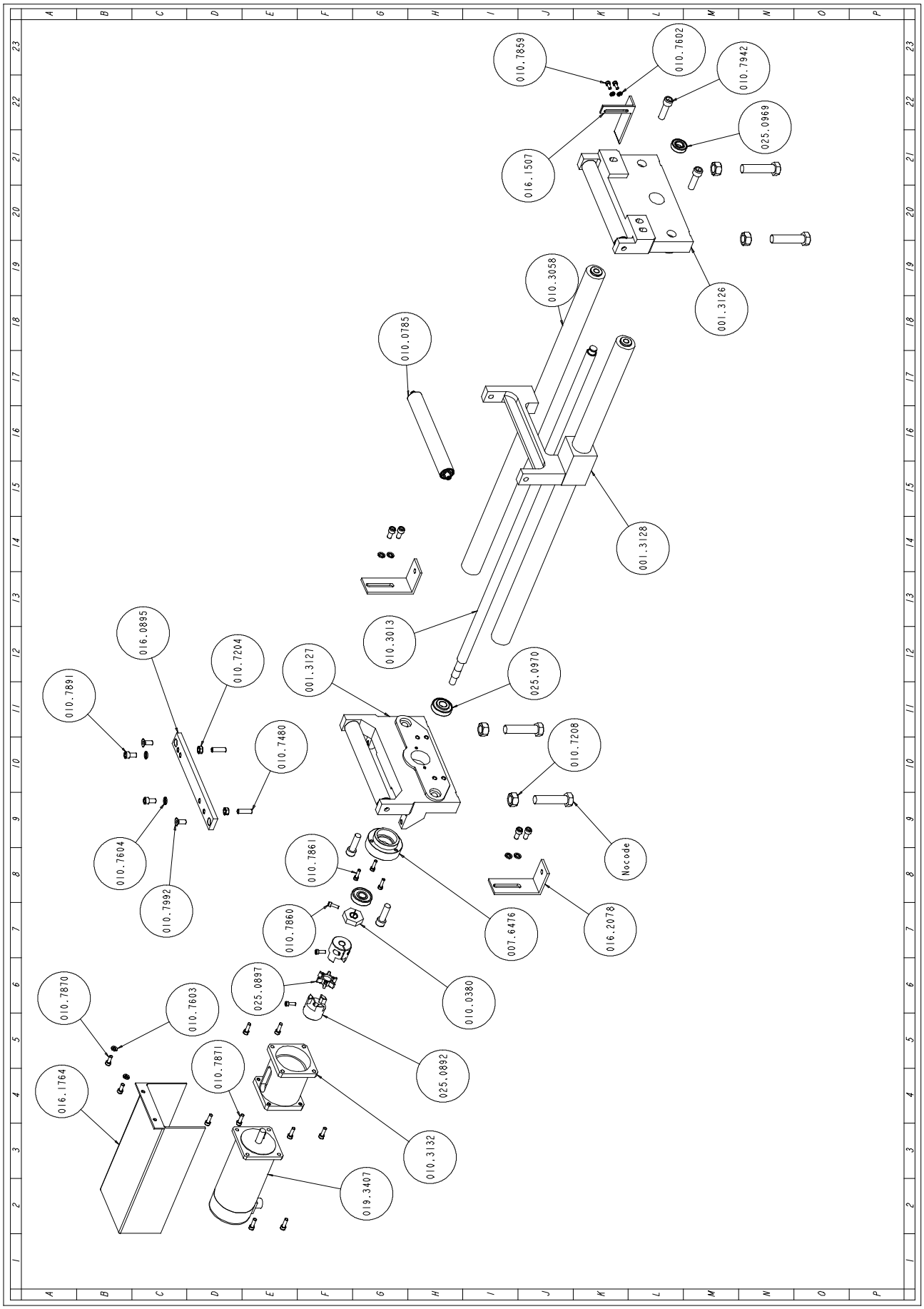
Code	Description	U. of M.	Quantity
010.1596	STAFFA FISSAGGIO CILINDRO TI 3	NR	1,000
010.4026	PIASTRA FISSAGGIO STELO CILIND	NR	1,000
010.4027	PIASTRA FISSAGGIO POTENZIOMETR	NR	1,000
010.7203	DADO M6	NR	2,000
010.7221	DADO M16 BASSO	NR	1,000
010.7602	RONDELLA DIAM. 5	NR	1,000
010.7861	VITE TCEI 5 X 20	NR	1,000
016.1789	PROTEZIONE CILINDRO TI 352 AX-	NR	1,000
019.3555	MOTORE FL57STH76- 2804A- 12 X CILINDRO NC	NR	1,000
022.0212	RACCORDO RAPIDO SEM PG 16	NR	1,000
022.0249	DADO POLIAM.HUMMEL 1.262.1600.	NR	1,000
022.0378	CONNETT.BOBINA VALV. RIGENERAT	NR	2,000
022.0615	BOBINA X VALVOLA RIGENERATRICE	NR	1,000
022.1801	POTENZIOMETRO LINEARE LWH225- 0	NR	1,000
043.0204	ATTACCO A GOMITO 8X1/4 - CL 65	NR	2,000
043.0818	UNITA' IDROPNEUMATICA 63RBXRSM	NR	1,000
044.1251	VALVOLA RIGENERATRICE CILINDRO	NR	1,000
025.0876	GIUNTO WA 6- 6 MM.28 X CILINDRO	NR	1,000
044.1257	VALVOLA CARICO CILINDRO TI- CB CNC	NR	1,000

Feeder


010.7860
016.0287
022.0376
022.0522
010.7233
043.0198
043.0034
010.7455
010.7456
001.3124
007.2531
010.7895
007.2532
010.7911
010.7604
007.3916
010.0785
001.3121
010.0441
010.8858
007.2512
010.7893
010.7605
010.3144
010.7452
010.3721
010.1615
007.3351
010.7859
010.7603
010.7871
010.7644
010.3036
010.0252
034.0209
010.7450
010.7891
010.7830
010.0927
001.3125
010.7852
022.0507
016.0208
010.7602
016.1513
043.0421
010.7990
016.1509
025.0046
010.1203

Code	Description	U. of M.	Quantity
001.3121	CHIOCCIOLAALIMENTATORE	NR	1
001.3124	MORSA ALIMENTATORE	NR	1
001.3125	CARRELLO ALIMENTATORE	NR	1
007.2512	SUPPORTO MORSA ALIMENTATORE	NR	1
007.2531	GANASCIA FIX ALIMENTATORE	NR	1
007.2532	GANASCIA MOB ALIMENTATORE	NR	1
007.3351	PIASTRA FIX SCORREVOLE	NR	1
007.3916	TASSELLO FIX RULLO SUPPLEMENTARE	NR	2
010.0252	VITE MORSA ALIMENTATORE	NR	1
010.0441	GRANO M8X12	NR	2
010.0785	RULLO ALIM DIAM30 220MM	NR	2
010.0927	MOLLA CARRELLO ALIMENTATORE	NR	4
010.1203	OLIATORE A SFERA DIA6 GOMITO	NR	2
010.1615	TASSELLO MORSA BASCULANTE	NR	2
010.1666	PERNO RULLO ALIMENTATORE	NR	4
010.3036	CHIOCCIOLA R20	NR	1
010.3144	SUPPORTO PREMIBARRA ALIMENTATORE	NR	2
010.3721	PERNO MORSA BASCULANTE ALIMENTATORE	NR	4
010.7233	DADO AUTOBLOCCANTE M16	NR	1
010.7450	GRANO M6X6 VCEI PC	NR	2
010.7452	GRANO M6X16 VCEI PC	NR	4
010.7455	GRANO M8X10 VCEI PC	NR	2
010.7456	GRANO M8X16 VCEI PC	NR	2
010.7602	ROSETTA 5_3X10	NR	6
010.7603	ROSETTA 6_4X12_5	NR	4
010.7604	ROSETTA 8_4X14	NR	2
010.7605	ROSETTA 10_5X21	NR	4
010.7644	ROSETTA GR M6	NR	6
010.7830	M5X10 BUTON	NR	2
010.7852	M4X12 TCEI	NR	2
010.7859	M5X12 TCEI	NR	8
010.7860	M5X16 TCEI	NR	6
010.7871	M6X20 TCEI	NR	10
010.7891	M8X16 TCEI	NR	1
010.7893	M8X20 TCEI	NR	2
010.7895	M8X30 TCEI	NR	4
010.7911	M10X20 TCEI	NR	4
010.7990	M4X8 TSPEI	NR	8
010.8858	SPINA ELASTICA 6X28	NR	2
016.0208	SUPPORTO CATENA	NR	1
016.0287	PROTEZIONE CILINDRO MORSA	NR	1
016.1509	PIASTRA FIX SOFFIETTO	NR	2
016.1513	STAFFA FIX FC ALIMENTATORE	NR	1
022.0376	CONNETTORE F303N5000 PROXIMITY	NR	1
022.0507	FINECORSA D4C1092 2M ALIMENTATORE	NR	1
022.0522	PROXIMITY	NR	1
025.0046	MANICOTTO DIAM 40	NR	4
025.0060	CUSCINETTO 6000 2Z	NR	4
034.0209	VOLANTINO MORSA DIAM 100	NR	1
043.0034	CILINDRO VOLAMPRESS 100_8	NR	1
043.0198	ATTACCO A GOMITO 4X1_4CL6521	NR	2
043.0421	SOFFIETTO CIRCOLARE	NR	2

Supply roller unit



Code	Description	U. of M.	Quantity
001.3126	STAFFA ANTERIORE ALIMENTATORE	NR	1
001.3127	STAFFA POSTERIORE ALIMENTATORE	NR	1
001.3128	SUPPORTO SCORREVOLE ALIMENTATORE	NR	1
007.6476	MANICOTTO VITE RICIRCOLO	NR	1
010.0380	GHIERA FIX VITE ALIMENTATORE	NR	1
010.0785	RULLO ALIMENTATORE DIAM30 220MM	NR	3
010.1666	PERNO RULLO ALIMENTATORE	NR	6
010.3013	VITE A RICIRCOLO	NR	1
010.3058	GUIDA CARRELLO ALIMENTATORE	NR	2
010.3132	SUPPORTO MOTORE P_P ALIMENTATORE	NR	1
010.7204	DADO M8	NR	2
010.7208	DADO M16	NR	4
010.7480	GRANO M8X30 VCEI	NR	2
010.7602	ROSETTA 5_3X10	NR	2
010.7603	ROSETTA 6_4X12_5	NR	2
010.7604	ROSETTA 8_4X14	NR	6
010.7859	M5X12 TCEI	NR	2
010.7860	M5X16 TCEI	NR	3
010.7861	M5X20 TCEI	NR	3
010.7870	M6X16 TCEI	NR	2
010.7871	M6X20 TCEI	NR	8
010.7891	M8X16 TCEI	NR	6
010.7942	M12X40 TCEI	NR	4
010.7992	M8X16 TSPEI	NR	2
016.0895	ADATTATORE K40 ALIMENTATORE	NR	1
016.1507	STAFFA COMANDO MICROINTERRUTORE	NR	1
016.1764	PROTEZIONE MOTORE ALIMENTATORE	NR	1
016.2078	STAFFA FIX ALIMENTATORE TI- CB NC- EVO	NR	2
019.3407	MOTORE PP	NR	1
025.0060	CUSCINETTO 6000 2Z	NR	6
025.0892	MOZZO 1A RTX 19	NR	2
025.0897	STELLA 1A RTX 19	NR	1
025.0969	CUSCINETTO 6002 2Z	NR	1
025.0970	CUSCINETTO 30302J2	NR	2

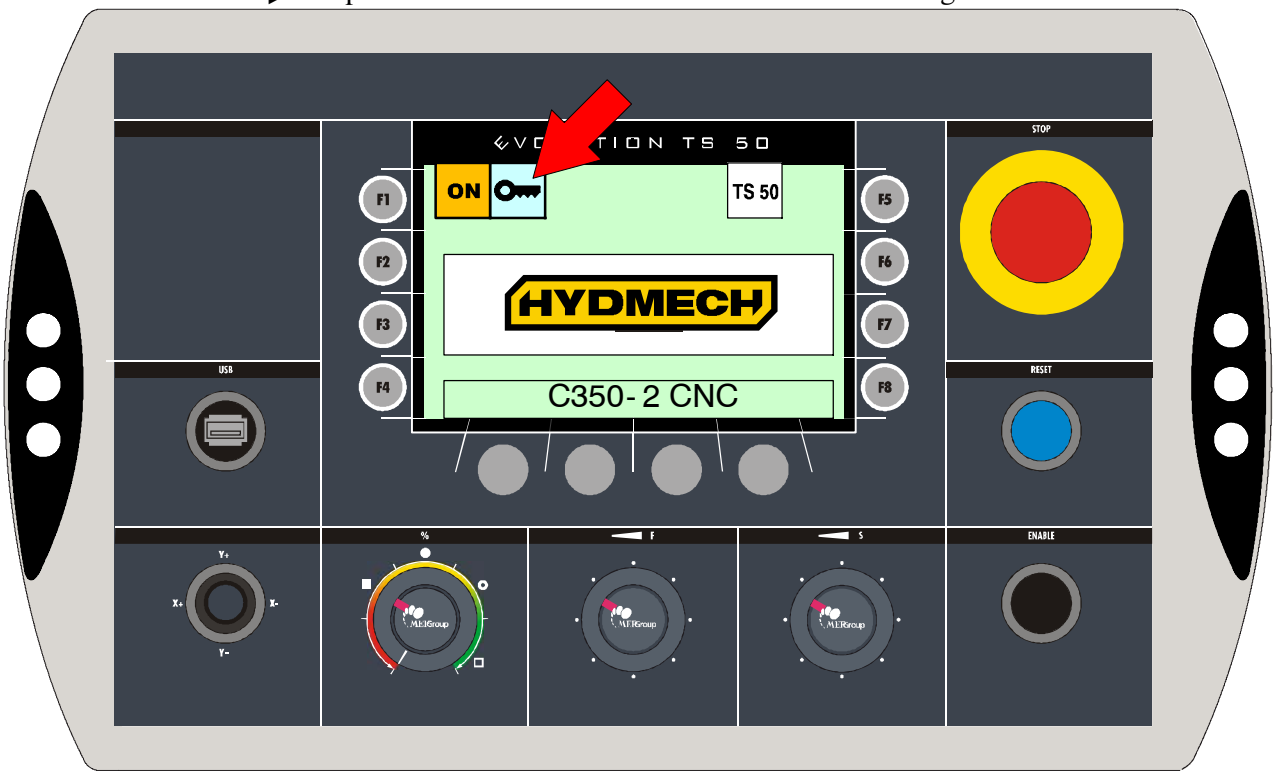
Adjustments

This chapter describes the operations required to adjust the electronic, mechanical and the hydraulic systems. By following these instructions, you can “customise” your machine to suit the type of cut required, thereby optimising cutting times.

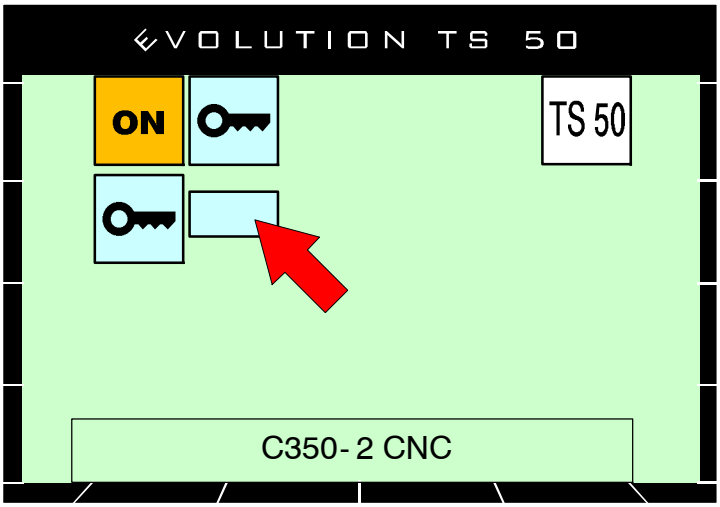
Displaying and editing the set- up parameters

The machine set- up parameters may be programmed directly from the control console.

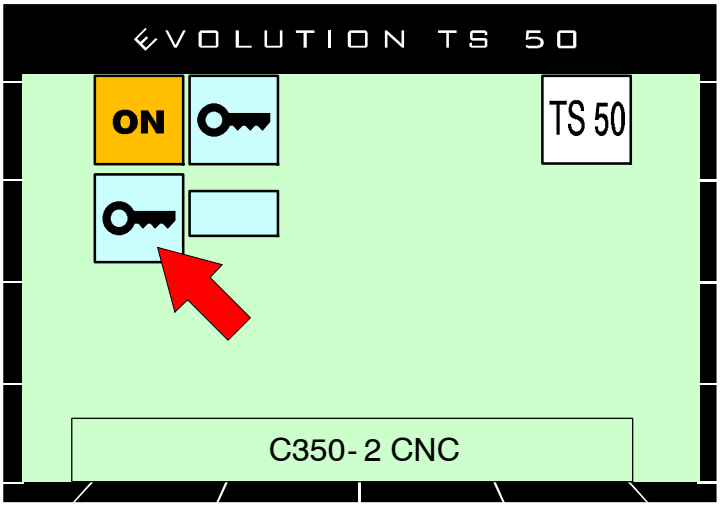
- ▶ Power the machine by turning the main switch on the left of the control board.
- ▶ Tap on the box on the touchscreen shown in the figure.



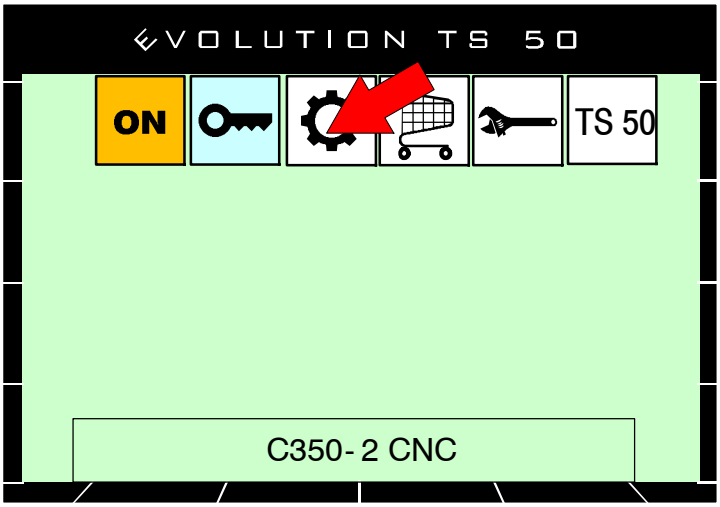
▶ The password entry box will open. Tap the box to open the keypad. Enter 734533.



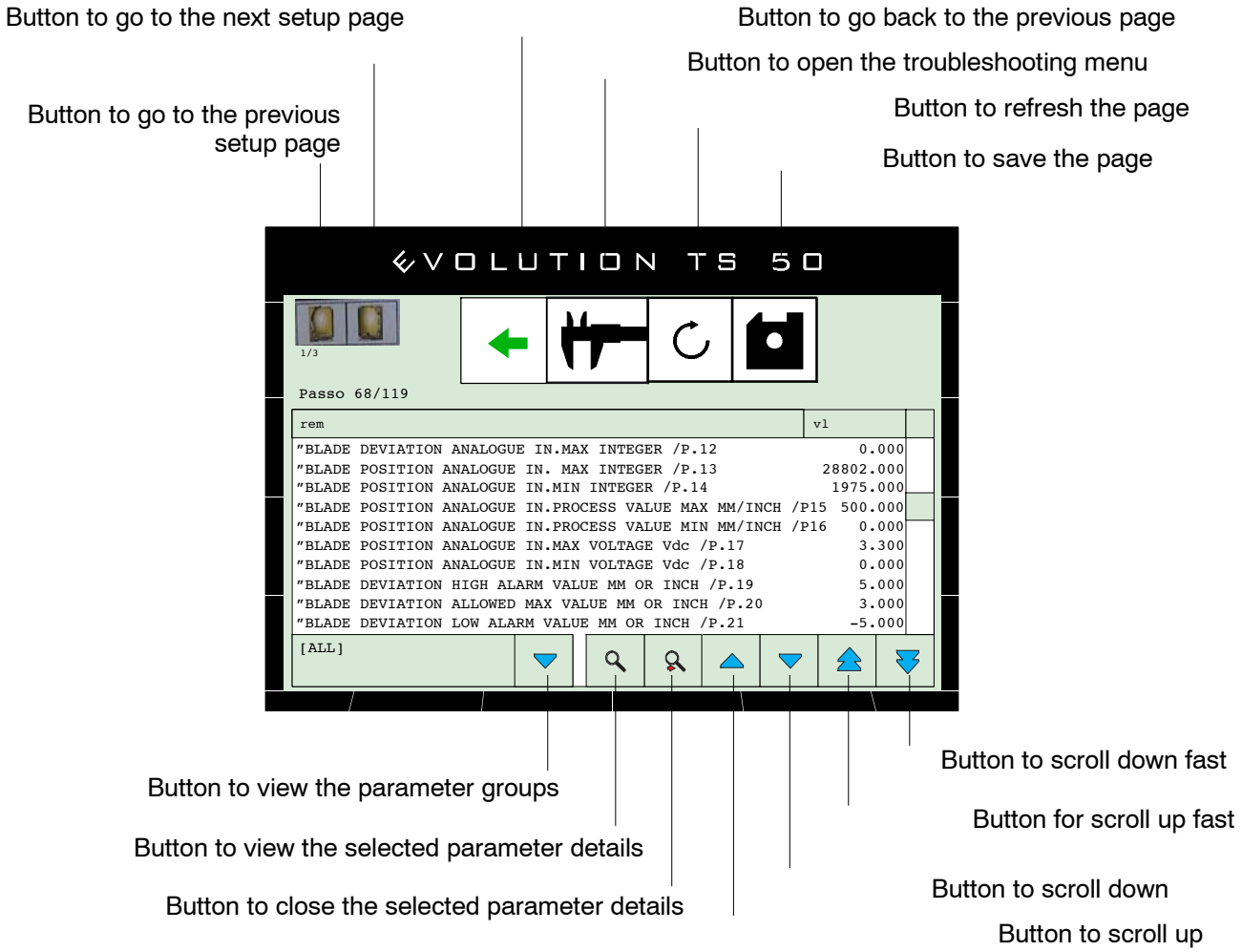
▶ Tap on the box shown in the figure.



▶ Tap on the box shown in the figure.



▶ Once inside the SET- UP menu, use the following three keys to navigate through the different menu screens:



Setup parameters

The machine setup parameters divided by topic are shown below.

BLADE MOTOR:

- **BLADE AMPERE ANALOGUE IN. MAX INTEGER /P.0:** Analogue input counter value corresponding to the maximum ampere **(12723,0000).**
- **BLADE AMPERE ANALOGUE IN. MIN INTEGER /P1:** Analogue input counter value corresponding to the minimum ampere **(0,0000).**
- **BLADE AMPERE ANALOGUE IN. PROGRESS VALUE MAX AMPERE /P2:** Ampere corresponding to maximum analogue input value **(12,9000).**
- **BLADE AMPERE ANALOGUE IN. PROGRESS VALUE MIN AMPERE /P3:** Ampere corresponding to minimum analogue input value **(0.0000).**
- **BLADE AMPERE ANALOGUE IN. MAX VOLTAGE /P4:** Voltage corresponding to maximum analogue input value **(10.0000).**
- **BLADE AMPERE ANALOGUE IN. MIN VOLTAGE /P5:** Voltage corresponding to minimum analogue input value **(0.0000).**
- **BLADE AMPERE CONTROL CHECK TIME PERIOD SEC /P23:** Control execution time (sec) **(0,5000).**
- **BLADE AMPERE CONTROL BEFORE ENABLING ON DELAY SEC /P24:** Activation delay in seconds (if 0 is off) **(3,0000).**

- **BLADE AMPERE CONTROL FEED REDUCTION STEP M/MIN /P25:** Correction step **(25,0000).**
- **BLADE AMPERE CONTROL MAX ALLOWED AMPERE /P26:** Maximum allowed current **(20,0000).**
- **BLADE AMPERE CONTROL MAX AMPERE ALARM ON DELAY SEC /P27:** Maximum motor current alarm filter (sec) **(1.0000).**
- **BLADE SPEED CONTROL MAX ALLOWED M/MIN /P29:** Speed set point maximum value **(120.000).**
- **BLADE SPEED CONTROL MIN ALLOWED M/MIN /P30:** Speed set point minimum value **(5.0000).**
- **BLADE SPEED CONTROL AN. IN. MAX INTEGER VALUE /P31:** Speed reference maximum value (analogue input maximum value) **(32767.0000).**
- **BLADE SPEED CONTROL AN. IN. MIN INTEGER VALUE /P32:** Speed reference minimum value (analogue input minimum value) **(0.0000).**
- **BLADE SPEED CONTROL BEFORE STOPPING ON DELAY SEC /P33:** Stop delay for cleaning cut (sec) **(1.0000).**
- **BLADE SPEED ENCODER COUNTING DIRECTION INVERTING:** Blade speed encoder counter inversion **(1,0000).**
- **BLADE SPEED ENCODER MAX COUNTER VALUE M/MIN /P35:** Blade speed maximum value **(150,0000).**
- **BLADE SPEED ENCODER MIN COUNTER VALUE M/MIN /P36:** Blade speed minimum value **(5,0000).**
- **BLADE SPEED ENCODER PULSE SCALING RESOLUTION MM OR INCH/PULSE /P37:** Blade speed encoder resolution scale factor **(1.0000).**
- **BLADE MOTOR STATUS ON MAX CYCLE END MOTOR ON = 1,0 /P97:** Blade motor on time at end of manual cycle **(1.0000).**
- **CURRENT TRESHOLD FOR MAX FEED CORRECTION /P113:** Max. correction threshold when the blade motor overcurrent intervenes during the cut.
- **SPEED ENCODER TYPE (0 = LINEAR; 1 = LOGARITHMIC) /P139**: Setting the encoder speed as linear or logarithmic (0 = linear; 1 = logarithmic).
- **SPEED ENCODER LOGARITHMIC X1 THRESHOLD (COUNT) /P140:** X1 correction factor for managing the disk speed encoder in logarithmic mode.
- **SPEED ENCODER LOGARITHMIC X2 THRESHOLD (COUNT) /P141:** X2 correction factor for managing the disk speed encoder in logarithmic mode.
- **SPEED ENCODER LOGARITHMIC X1 MULTIPLIER /P142:** X1 correction multiplier for managing the disk speed encoder in logarithmic mode.
- **SPEED ENCODER LOGARITHMIC X2 MULTIPLIER /P143:** X2 correction multiplier for managing the disk speed encoder in logarithmic mode.

BLADE DEVIATION:

- **BLADE DEVIATION ENABLE (1 = ENABLED) /P9**: Blade deviation enabling (1 = enabled). **(0,0000)**
- **BLADE DEVIATION COUNT AT ZERO POSITION (COUNT) /P10:** Levels at zero blade deviation. **(16416,0000)**
- **BLADE DEVIATION COUNT FOR DIVISION (COUNT) /P11:** Levels for dividing the blade deviation bar. **(500,0000)**
- **BLADE DEVIATION FOR SCAN TIME (SEC) /P12:** Blade deviation reading time. **(0,5000)**

HEAD ENCODER:

- **BLADE POSITION ANALOGUE IN. MAX INTEGER /P13:** Maximum counter value **(28008,000).**
- **BLADE POSITION ANALOGUE IN. MIN INTEGER /P14:** Minimum counter value **(2106,0000).**
- **BLADE POSITION ANALOGUE IN. PROCESS VALUE MAX MM OR INCH /P15:** Maximum value in mm or inch **(500,0000).**
- **BLADE POSITION ANALOGUE IN. PROCESS VALUE MIN MM OR INCH /P16:** Minimum value in mm or inch **(0.0000).**
- **BLADE POSITION ANALOGUE IN. MAX VOLTAGE VDC /P17:** Voltage value corresponding to maximum counter value **(3,3000).**
- **BLADE POSITION ANALOGUE IN. MIN VOLTAGE VDC /P18:** Voltage value corresponding to minimum counter value **(0,0000).**

SHUTTLE AXIS:

- **BLADE SPEED MONITORING BEFORE ENABLING ON DELAY SEC /P43:** Delay in controlling the min. speed. **(8.0000)**
- **BLADE SPEED MONITORING WHEEL DIAMETER MM OR INCH /P44:** Pulley diameter. **(347,0000)**
- **BLADE SPEED MONITORING NUMBER OF PICK- UP PULSES PER ROUND /P45:** Number of impulses/pulley turn. **(4.0000)**
- **BLADE SPEED MONITORING WATCH DOG ON DELAY SEC /P46:** Delay in controlling single impulses. **(0,5000)**
- **BLADE SPEED MONITORING MIN SPEED WATCH DOG VALUE M OR FT/MIN /P47:** Min. speed in m/min or ft/min. **(10,0000)**
- **X POSITIVE SOFTWARE LIMIT (MM - INCH) /P116:** Feeder max. stroke. **(605,0000)**
- **X NEGATIVE SOFTWARE LIMIT (MM - INCH) /P117:** Feeder min. stroke. **(0,0000)**
- **X JOYSTICK FEED SLOW (MM/MIN OR INCH/MIN) /P118:** Slow feeding. **(500,0000)**
- **X JOYSTICK FEED FAST (MM/MIN OR INCH/MIN) /P119:** Fast feeding. **(1500,0000)**
- **OVER STROKE X MM OR IN /P120:** Zeroing offset. **(1,0000)**
- **MICRO ENGAGEMENT SPEED MM OR IN/MIN /P121:** Speed of search for microswitch while the trolley is zeroed. **(2000,0000)**
- **MICRO DISENGAGEMENT SPEED HOME MM OR IN/MIN /P122:** Speed of release from the search while the trolley is zeroed. **(300,0000)**
- **SPEED X ON CYCLE MM/MIN OR INCH/MIN /P133:** Feeder speed in cutting cycle. **(4000,0000)**

BLADE TENSION:

- **BLADE TENSION CONTROL MAX ALARM TENSION KN /P51:** Maximum voltage allowed to apply adjustment **(3000,0000).**
- **BLADE TENSION CONTROL MIN ALARM TENSION KN /P52:** Minimum voltage allowed to apply adjustment **(600.0000).**
- **BLADE TENSION CONTROL AN. IN. LOAD CELL MAX INTEGER VALUE /P57:** Maximum counter value from load cell analogue input **(4912.0000).**
- **BLADE TENSION CONTROL AN. IN. LOAD CELL MIN INTEGER VALUE /P58:** Minimum counter value from load cell analogue input **(0.0000).**

- **BLADE TENSION CONTROL AN. IN. LOAD CELL PROCESS VALUE MAX KN /P59:** Load cell analogue input maximum value allowed for acquisition **(1050,0000).**
- **BLADE TENSION CONTROL AN. IN. LOAD CELL PROCESS VALUE MIN KN /P60:** Load cell analogue input minimum value allowed for acquisition **(0.0000).**
- **BLADE TENSION CONTROL ENABLING /P61:** Automatic blade tension adjustment enable **(1.0000).**
- **BLADE TENSION CONTROL AN. IN. LOAD CELL VOLTAGE VALUE MAX VDC /P62:** Load cell analogue input voltage maximum value **(10.0000).**
- **BLADE TENSION CONTROL AN. IN. LOAD CELL VOLTAGE VALUE MIN VDC /P63:** Load cell analogue input voltage minimum value **(0.0000).**

CLAMPS ENCODER:

- **CLAMPS LOCKING STATUS RISES AFTER SPECIFIED SECS FROM COMMAND /P64:** Time needed to allow clamp closed **(3.0000).**
- **CLAMPS UNLOCKING STATUS RISES AFTER SPECIFIED SECS FROM COMMAND /P65:** Time needed to allow clamp open **(3,0000).**
- **CLAMPS OPENING TIME WITH MANUAL COMMAND PULSE (SEC) /P148:** Time needed to consider the vice open after a manual command **(3,0000).**

CUT HEAD:

- **FEED ENCODER COUNTING DIRECTION INVERTING = 1.0 /P67: (0,0000).**
- **FEED ENCODER MAX COUNTER VALUE M/MIN OR INCH/MIN /P68: (480,0000).**
- **FEED ENCODER MIN COUNTER VALUE M/MIN OR INCH/MIN /P69: (0,0000).**
- **FEED ENCODER PULSE SCALING RESOLUTION MM OR INCH/PULSE /P70: (1,0000).**
- **FEED ENCODER COUNTER RETENTION ENABLING = 1.0 /P75: (1,0000).**
- **UY FEED AXIS FULL STROKE WIDTH MM OR INCH /P82:** U axis maximum stroke (mm or inch) **(300.0000).**
- **Y CUTTING AXIS MAXIMUN POSITION MM OR INCH /P86:** Y axis maximum limit switch (mm or inch) **(500,0000).**
- **Y CUTTING AXIS MINIMUN POSITION MM OR INCH /P87:** Y axis minimum limit switch (mm or inch) **(0.0000).**
- **Y CUTTING AXIS AUTO CYCLING SLOW DOWN FROM TARGET MM OR INCH /P89:** Deceleration space (mm or inch): distance from target position at which slow descent is set **(10.0000).**
- **Y CUTTING AXIS CUTTTING FEED PID CONTROL ERROR MM OR INCH: (2,0000).**
- **Y CUTTING AXIS MODE DOWNGOING FEED MM OR INCH/MIN /P92:** Y descent speed in jog mode (mm/min or inch/min) **(2000.0000).**
- **Y CUTTING AXIS AUTO CYCLING SLOW DOWN FEED MM OR INCH/MIN /P93:** Slow Y position speed (mm/min or inch/min) **(120,0000).**
- **Y CUTTING AXIS ALL MODE UPGOING FEED MM OR INCH /P94:** Y upward speed (mm/min or inch/min) **(2500,0000).**
- **Y CUTTING AXIS U OPENING @Y FEED CURVE BYPASS = 1.0 /P95:** Descent speed linearizing curve enable (F) **(0,0000).**

- **Y CUTTING AXIS CUTTTING FEED PID CONTROL INCREASE CORRECTION (DEGREES) /P113** F correction factor **(1.0000).**
- **Y CUTTING AXIS CUTTTING FEED PID CONTROL TIME (SEC) /P114:** Time between one correction and the next **(0.3000).**
- **H ENCODER MAX COUNTER VALUE % /P123:** Max. displayed value of H. **(100,0000)**
- **H ENCODER MIN COUNTER VALUE % /P124:** Min. displayed value of H. **(0,0000)**
- **H POTENTIOMETER ANALOGUE INPUT FS MAX /P125:** Max. levels of the H potentiometer. **(32704,0000)**
- **H POTENTIOMETER ANALOGUE INPUT FS MIN /P126:** Min. levels of the H potentiometer. **(16,0000)**
- **FEED FORCE CURRENT CONTROL MAX (AMPERE) /P127:** Max. set current of blade motor. **(7,0000)**
- **FEED FORCE CURRENT CONTROL MIN (AMPERE) /P128:** Min. set current of blade motor. **(2,0000)**
- **Y JOYSTICK FEED SLOW (MM/MIN OR INCH/MIN) /P130:** Slow manual head lowering. **(850,0000)**
- **Y JOYSTICK FEED FAST (MM/MIN OR INCH/MIN) /P131:** Fast manual head lowering. **(2032,0000)**
- **OFFSET FCTI MM OR INCH /P132:** Offset for rear head limit switch. **(0,5000)**
- **FEED ENCODER TYPE (0 = LINEAR; 1 = LOGARITHMIC) /P134**: Setting the encoder feeding as linear or logarithmic (0 = linear; 1 = logarithmic). **(0,0000)**
- **FEED ENCODER LOGARITHMIC X1 THRESHOLD (COUNT) /P135:** X1 correction factor for managing the head lowering speed encoder in logarithmic mode. **(4,0000)**
- **FEED ENCODER LOGARITHMIC X2 THRESHOLD (COUNT) /P136:** X2 correction factor for managing the head lowering speed encoder in logarithmic mode. **(8,0000)**
- **FEED ENCODER LOGARITHMIC X1 MULITPLIER /P137:** X1 correction multiplier for managing the head lowering speed encoder in logarithmic mode. **(10,0000)**
- **FEED ENCODER LOGARITHMIC X2 MULITPLIER /P138:** X2 correction multiplier for managing the head lowering speed encoder in logarithmic mode. **(1000,0000)**
- **DISPLAY CYCLE FEED FILTERED (1=ENABLED) /P150:** Accuracy filter for the blade lowering value **(1,0000)**

OPTIONAL:

- **MINIMAL LUBRIFICATION ENABLING = 1.0 /P78:** Minimum lubrication enable **(1.0000).**
- **Y RAISE UP ON MANUAL CYCLE (1=ENABLED) /P103:** Y axis upward stroke enabled at end of manual cycle (1=enabled; 0=disabled). Y axis returns to RHLS at the end of the manual cycle **(1.0000).**
- **ENABLED BLADE MINIMUM SPEED CONTROL (1=ENABLED) /P104:** Blade speed proximity enable **(1.0000).**
- **CHIP CONVEYOR ENABLED (1=ENABLED) /P105:** Chip ejector enable **(1.0000).**
- **XB ROTATION EXTERN HANDLING ENABLING (1 = ENABLED) /P106:** Enabling the head manual rotation (1 + enabled) **(1,0000)**

- **TYPE OF BLADE TENSIONING (1 = AUTOMATIC, 0 = MANUAL) /P129:** Setting the automatic or manual blade tensioning (1= automatic; 0 = manual). **(0,0000)**
- **OPEN FRONT VISE AT MANUAL CYCLE END (1 = ENABLED) /P144:** Setting the vice opening at cutting cycle end (1 = enabled). **(1,0000)**
- **TYPE ANGLE SYSTEM (0 = SEXAGESIMAL\; 1=CENTESIMAL) /P146:** Measurement unit of the angle width (1 + centesimal) **(1,0000)**
- **BLADE STOP ON SEMIAUTOMATIC CYCLE** (0=ON FCTI; 1=ON FCTA; 2=NEVER) /P147: .Setting the blade stop at the semiautomatic cycle cut end **(1,0000)**
- **ENABLING DEBUG VIEW (1=ENABLED):** Enabling the program debug function **(0,0000).**

VARIOUS:

- **MKS IMPERIAL UNIT SYSTEM SWITCHOVER ENABLING /P80:** Imperial = 0.0: sets measuring system MKS (0) or IMPERIAL (1) **(1.0000).**
- **TYPE MACHINE (0=SHARK230 1=SHARK331 2=SHARK332 3=SHARK281 4=SHARK282 5=SHARK330 6=TIGER352 7=COBRA352 /P101):** Defines the machine type (set automatically by loading the machine .cns file) **(1,0000)**.
- **ABSOLUTE TRASDUCER ENCODER OFFSET /P102:** Offset value for absolute encoder **(240,0073).**

TIMER:

- **HYDRAULIC PUMP OFF DELAY AWAITED BEFORE STOPPING SEC /P96:** Hydraulic pump off delay before stopping (seconds) **(50.0000).**
- **CHIP CONVEYOR TIME ON IN AUTO (min) /P107: (0,5000).**
- **CHIP CONVEYOR TIME OFF IN AUTO (min) /P108: (0,5000).**
- **TIME OFF SIREN (min) /P149: (2,0000).**

PASSWORD:

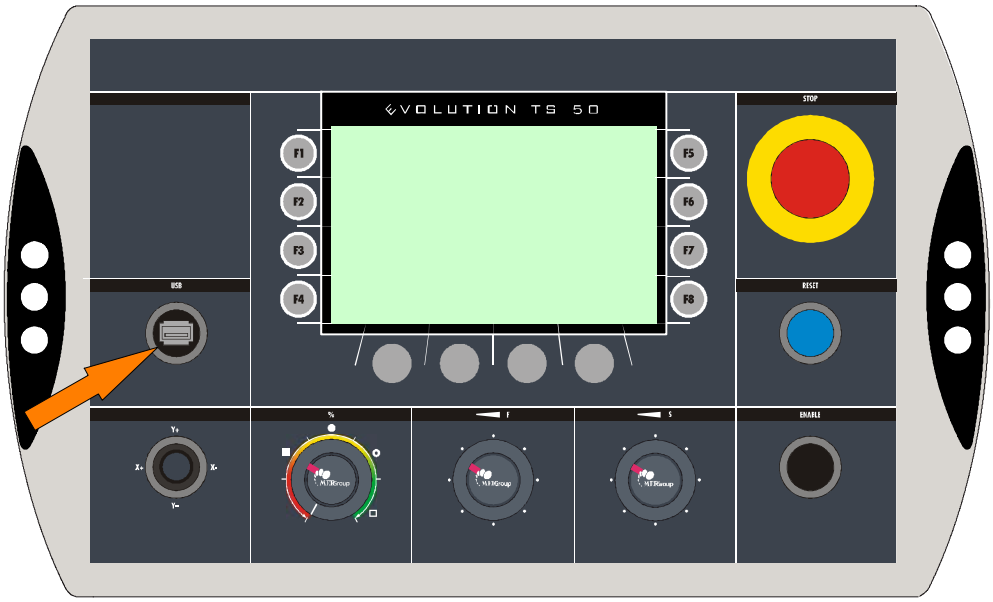
- **USER PASSWORD VALUE /P99:** Password value setting. **(7210721.0000)**

Software update procedure through USB - C350-2 CNC

The operations to update the software through a memory card are described here below.

Attention The operations described below will delete all data of the cutting programs and of the customized settings.

▶ Take the sawing machine off and insert the USB stick containing the update in the port shown in the figure.

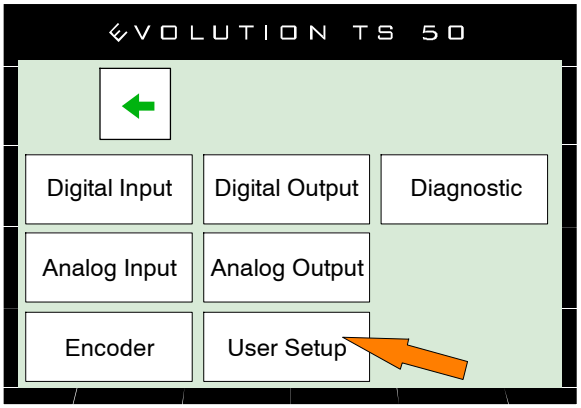


▶ Switch the machine on and wait for the message informing that the update has been completed. Then switch the machine off and on again to run the update.

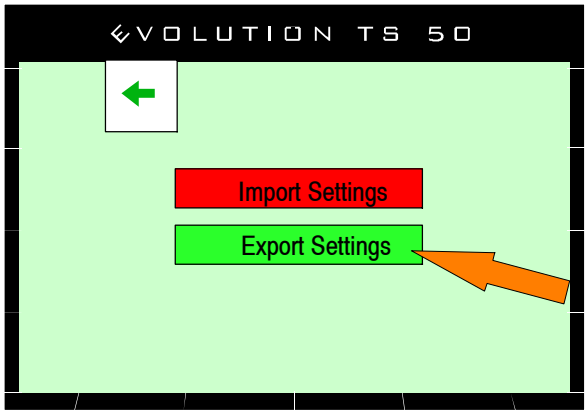
N.B. If the operator wants to keep the customized settings, he needs to make a backup following the operations described below before running the update.

The operations needed for the backup are listed below.

▶ From the Set- Up main menu select the box “User Setup” shown in the figure.

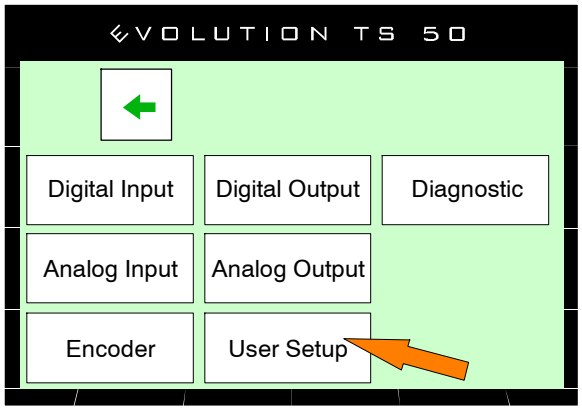


▶ Then, insert an empty USB stick in the suitable port: the box “Export settings” becomes green, press to save the settings.

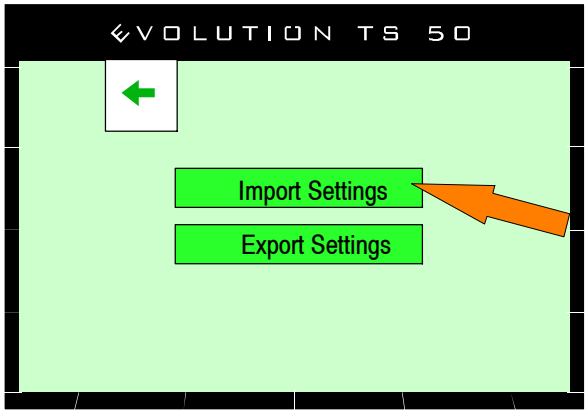


The operations needed for the restore are listed below.

▶ To restore the settings saved in the backup, after the update access the screen “User Set- Up” from the Set- up menu.



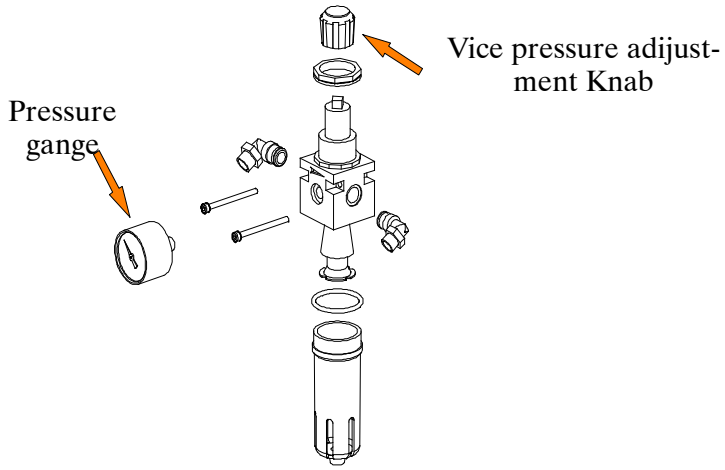
▶ Insert the USB stick in the suitable port, the boxes “Import Settings” and “Export Settings” become green. Press the box “Import Settings” to import the previously saved settings.



Now the customized settings and the data are again available and the machine is operational.

Air treatment unit

The machine pneumatic circuit operates the shearing vice and the feeding vice by their own pneumatic cylinders, and the machine cutting head by the oleo- pneumatic cylinder.
The compressed air is conditioned and purified as it enters by a treatment unit that, when regulated, stabilises the pressure at around 6 Bar, depending on the pressure in use in the factory.
In any case, the pressure can be set where material may be deformed or may prove to be unstable during cutting, and the vice is positioned at 2÷3 mm (0.08÷0.12 in) from the workpiece before it is closed.
One requirement is for the the user of this machine to provide a plant in his factory with the characteristics shown in Chapter 4.
The figure below shows an exploded view of the air treatment unit. The operating pressure of the vice shown on the pressure gauge is set by rotating the handle indicated by the arrow.

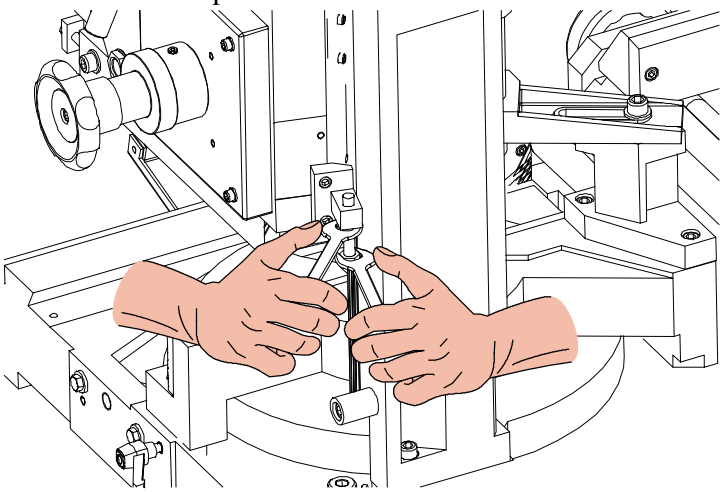


Mechanical systems

Cutting head stroke

The head cutting stroke is defined by the cut start position (Head Upstroke Limit) and cut end position (Head Downstroke Limit) which are electronically programmed by the control console. The cutting head is also equipped with a mechanical stop which defines the bottom limit of its stroke:

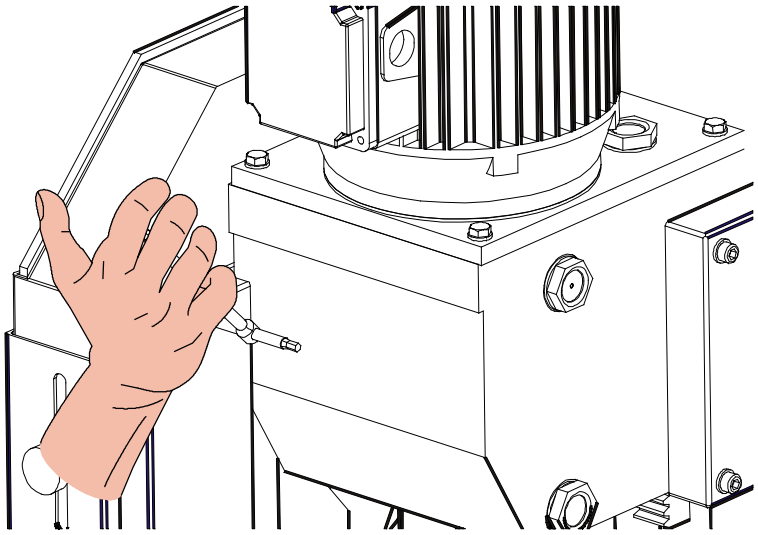
▶ to adjust this stop, use two hex wrenches, one to lock the nut and the other to tighten or slacken the stop screw.



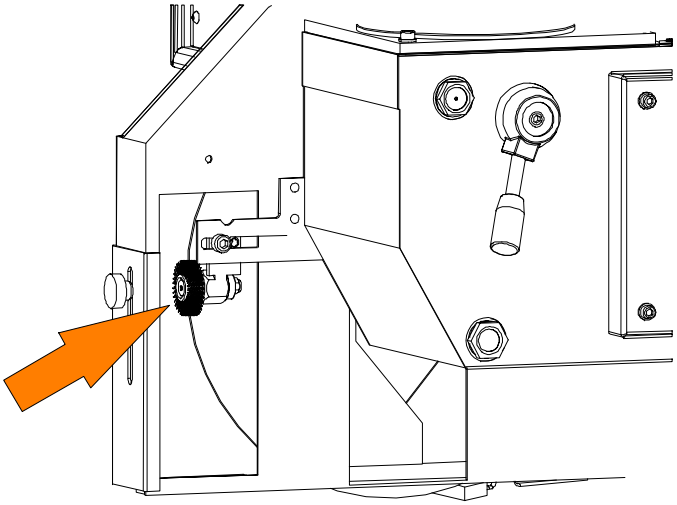
Adjusting the position of the blade- cleaning brush

When the cutter disk is not clean enough, check the blade- cleaning brush for wear and if it's working correctly. The figure below illustrates how the brush should be adjusted if need be.

▶ Loosen the screw highlighted in the drawing, and remove the protection;



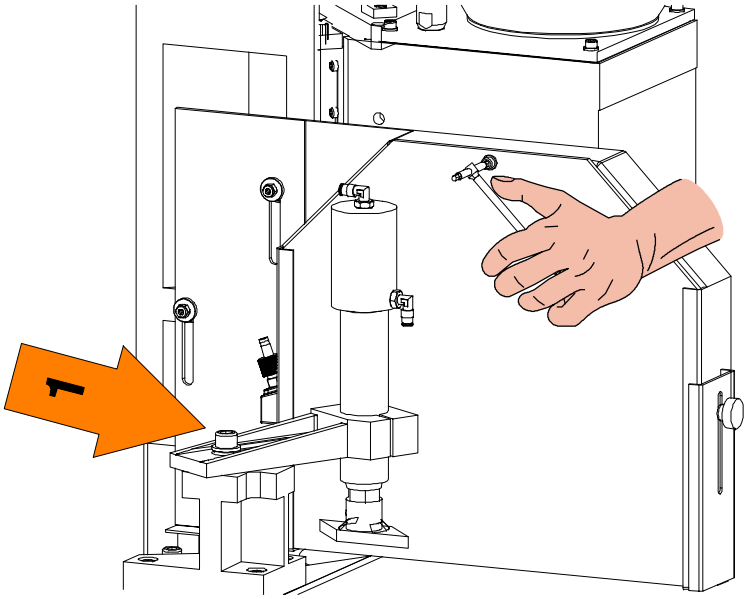
▶ adjust the position of the blade in relation to the teeth, as shown;



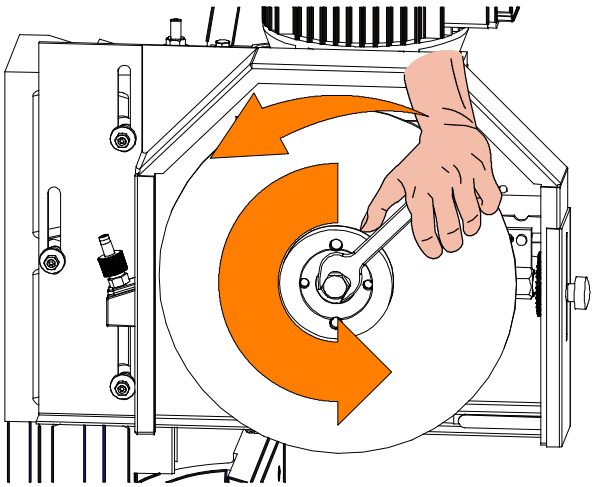
Replacing tool

As we have already said, this machine uses different kinds of blades according to the material to be cut. The procedures described below, however, also apply in the event of wear or breakage of the blade. To replace the blade, proceed as follows:

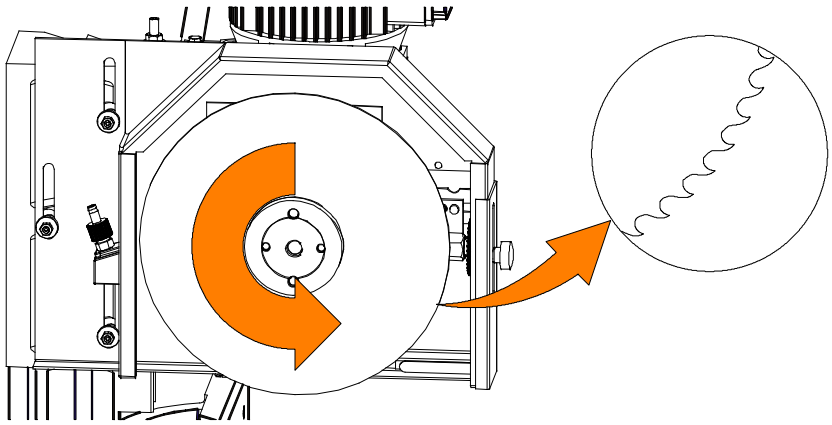
- switch off the machine and position the head so that the disc is easily accessible;
- the machine is equipped with a vertical pneumatic vice that can be moved away from the guard by unfastening the screw fixing it to the support (1);
- remove the screw with knob to free the plexiglass guard cover and lift it off in a vertical direction;



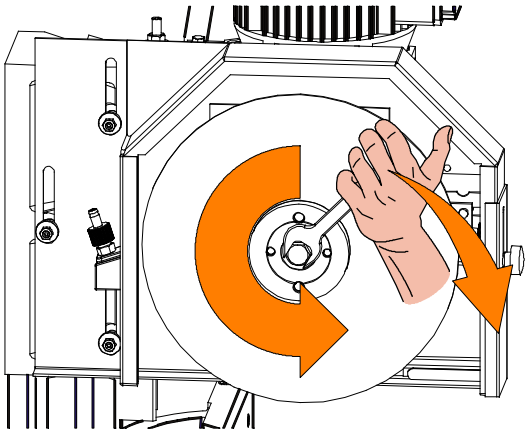
- use a 19 mm (0.75 in) spanner to slacken the hexagonal screw that locks the disc, turning the spanner in the direction of rotation of the disc; remove the old disc and insert the new one, making sure that the centering pins fit correctly into the holes in the disc.



Attention Make sure that the teeth on the cutter blade are facing in the direction of rotation. When changing the tool, turn the cutter blade until drive is engaged to eliminate any backlash in the drive pins.



▶ Tighten the lock nut and refit all guards and any other components you may have removed to facilitate installation.



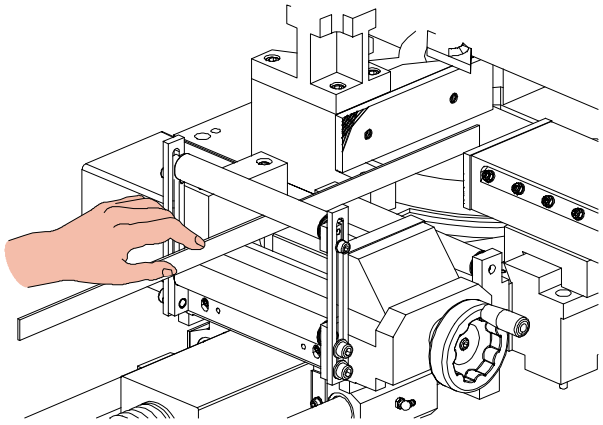
N.B. Adjust the position of the blade- cleaning brush, or replace it when worn.

Feeder

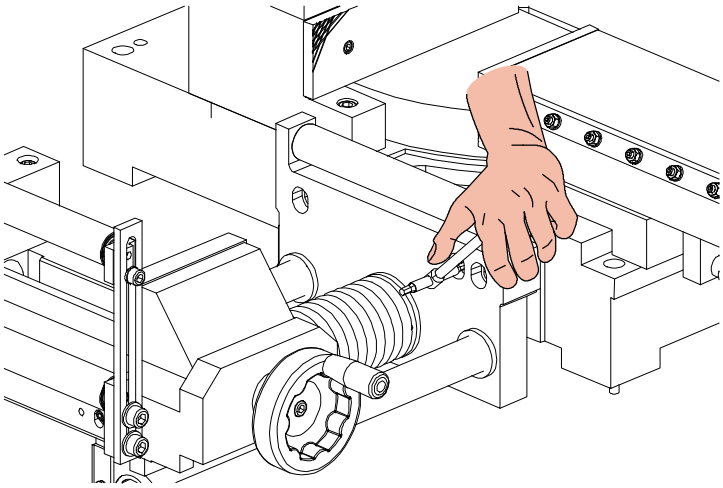
Should the feeder at a later stage in time become misaligned with the cutting table, then use the levelling devices located on the side of the machine and the loading table to restore. Misalignment can be measured using a workshop standard ruler or a straight bar section.

▶ Raise the feeder sump;

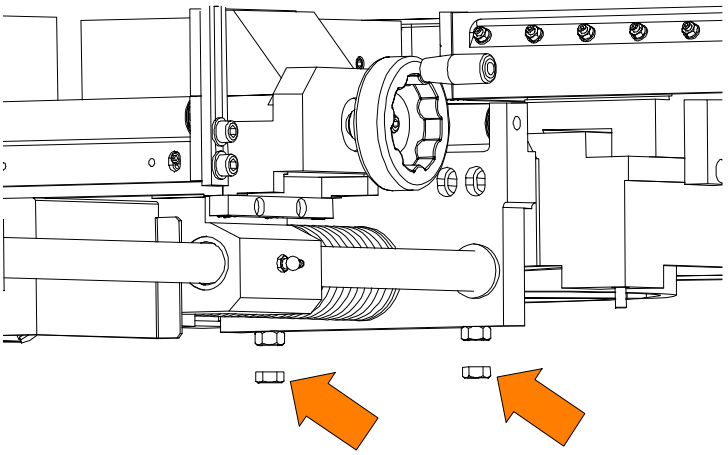
▶ Lay the rule on the feeder to determine the feeder planarity with the cutting plane.



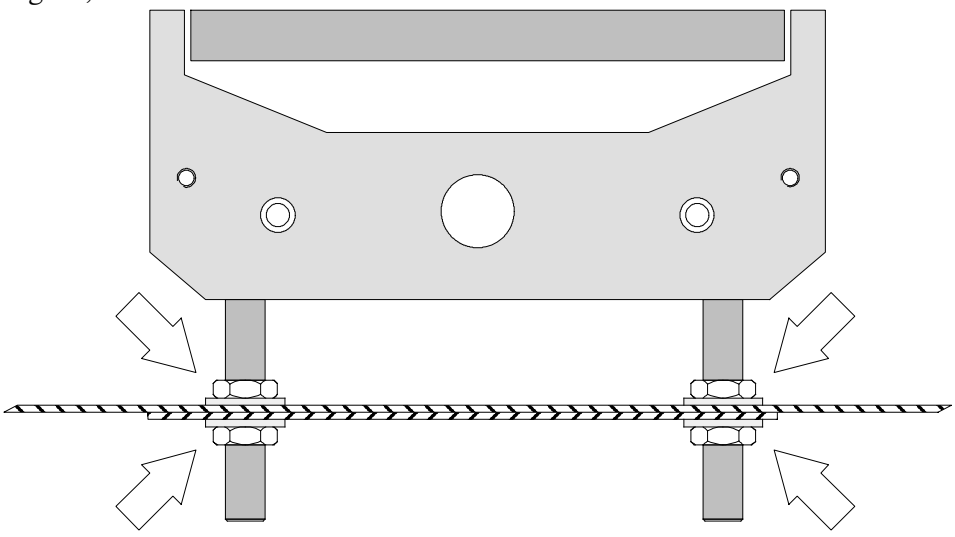
▶ If the feeder plane is not coplanar with the cutting plane, remove the feeding shuttle from the platform, then loosen the two socket head screws fastening the feeder.



▶ Considering that the feeder plane must be higher than the cutting plane, to avoid interference with the passage of the cutting material adjust the feet height according to the dimension detected with the rule on the cutting plane, trying to get a height difference of 0.5 mm (0.02 in) between the two planes.



▶ Once the height has been set with a standard ruler near the fixed platform, line up the rest of the feeder using the support pins to adjust as shown in the figure;



▶ open the left door panel on the base to access the adjustment nuts and the 4 support pins;

Vice

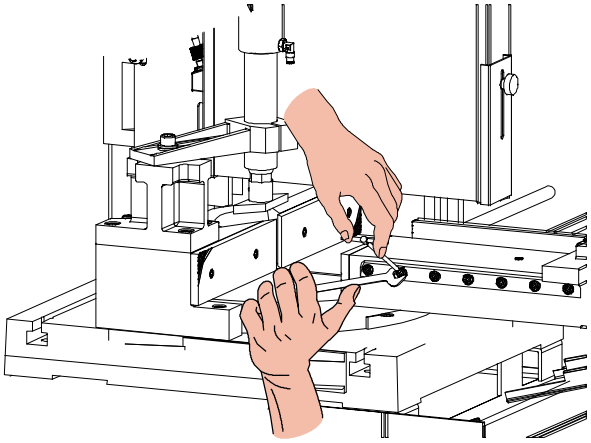
The shearing vice, which is a standard fitting on the **C350- 2 CNC**, is equipped with an anti- chip device, adjustable cross positioning, and is driven by a pneumatic cylinder known as the volampress. These elements will be dealt with one by one in the following.

Adjusting the vice play

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

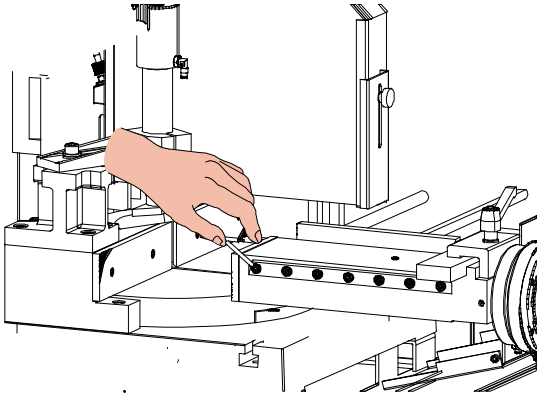
▶ slacken all the locknuts on the grub screws in the slide, holding the screws still using an Allen key.

▶ move the vice to its fully open position.



▶ adjust the slight pressure exerted by the grub screws on the gib, starting with the first two in contact with the lead screw.

▶ adjust these two grub screws and tighten the relative lock nuts, keeping the screws still with an Allen key.



▶ close the vice until the other two grub screws coincide with the lead screw.

▶ repeat this adjustment on the gib grub screws for the entire length of the slideway

▶ at the end of the operation, use the handwheel to move the slide backwards and forwards, identifying the zones where the grub screws exert greater pressure on the gib.

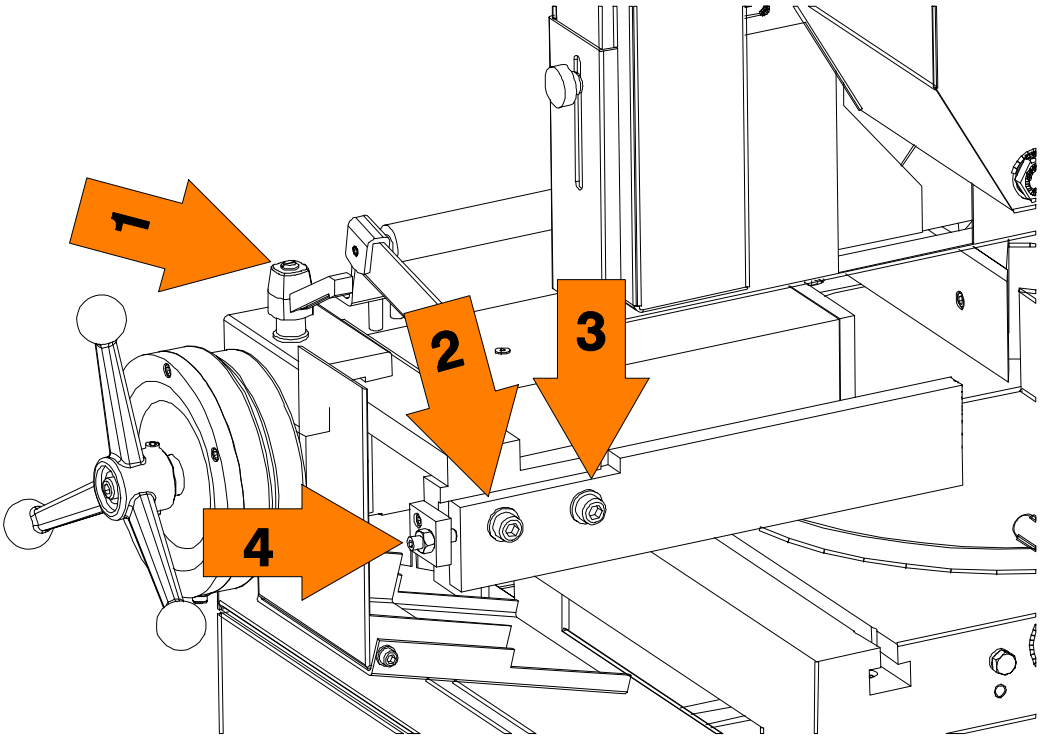
▶ repeat the adjustments if necessary.

- tighten or loosen the upper nuts on the supports according to the reading obtained with the standard ruler on the machine work table.

Adjusting the anti-chip device

The vice is fitted as standard with a rag prevention device that serves to support the material and prevent the formation of ragged edges at the end of the cut. To adjust the rag prevention device transversely:

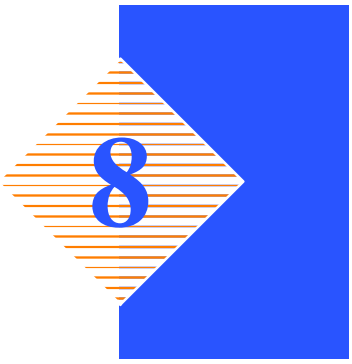
- loosen the release lever (1) located above the vice slide;
- movement the rag prevention device arm to the right or left;
- tighten the release lever.



To adjust the longitudinal position of the vice jaw, proceed as follows:

- tighten the cutting vice completely;
- slacken the two screws located to the side of the rag prevention device (2- 3);
- slacken the nut that locks the grub screw;
- adjust the longitudinal position of the rag prevention vice jaw by slackening or tightening the grub screw (4) until the position of the rag prevention jaw is aligned with that of the cutting jaw;
- hold the bolt still using the hexagonal key and tighten the blocking nut.

Maintenance and choice of consumables



C350- 2 CNC 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 Hyd- Mech 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 (using compressed air or preferably thread- free cloth;
- top up the lubricant/coolant fluid level;
- check the wear of the blade and change if necessary;

Weekly

The weekly maintenance operations are as follows:

- remove all swarf from the machine;
- empty the chip drawer on the side of the pedestal;
- clean the vice and lubricate all the joints and sliding surfaces using a good quality oil;
- check the oil level in the drive box: if necessary top up through the filler cap;
- Check the cutting clamp slide, if it is not precise or there is sideways movement, regulate as indicated in chapter 7.

Monthly

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

- clean thoroughly the water tank and the electric pump filter;

Maintenance of working parts

During maintenance work on the **C350- 2 CNC**, special attention should be paid to operating units such as the transmission box.

Transmission box

After 100 work hours, empty the drive box using the following procedure:

- remove the outlet plug, collect oil in a container for used oils; to speed up the operation remove the inlet plug positioned on the top of the head;
- once the operation is complete, replace the outlet plug and fill with AGIP BLASIA 320 S oil, or equivalent, up to the point indicated by the level plug positioned on the right- hand side of the head;
- after every 2000 working hours repeat the oil change operation.

Consumable materials

It is essential to use specific oils for the pneumatic and lubricant/coolant circuits. The oils suitable for each of these circuits are listed below.

Oils for transmission box

The machine is supplied with SHELL Omala Oil 460 oil, ISO and UNI symbol 460. However the following oils can be regarded as compatible or with equivalent characteristics:

SHELL Omala Oil 460 - AGIP Blasia 460 - API DT 460 - BP Energol GR XP 460 - CASTROL Alpha SP 460 - FIAT EPZ 460 - MOBIL Mobilgear 634 - Q8 Goya 460

Transmission box:
- capacity lt. 4,8

Oils for lubrication/coolant liquid

The oil used for the lubrication/coolant fluid in the machine is CASTROL Syntolin TFX. Though there are no specific standards for these types of oils, Hyd- Mech considers that CASTROL Syntolin
TFX is the best product available with regard to quality:price ratio. Nevertheless, the following oils of similar characteristics can be said to be compatible:

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

Finally, one particular blade manufacturer (LENOX) recommends and supplies a coolant under the name of LENOX BAND- ADE SAWING FLUID.

Coolant tank:
- tank capacity 20 litres
- oil concentration 5- 6%

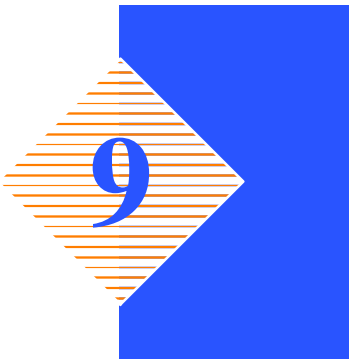
Oils for spray mist system (optional)

The used oil type for the optional spray mist system is BLASER Vascomill 22. The following oils can also be said to have similar characteristics and are therefore compatible:

UNIST Coolube 2210 - FUCHS Plantocut Micro Plus 27

- tank capacity Lt. 1

Cutting speed and choice of tools



The cutting speed depends on the disk rotation speed and supply speed. This chapter illustrates the speed tolerance of the basic version of the machine.

Cutting speed

Standard machine

The basic version, with 4- pole motor and revolution electronic variator (inverter) features a speed range from 15 to 90 rpm or from 30 to 150 rpm in the optional version. The inverter aids special machinings, suiting the disc rotation speed to the material being processed so as to optimize the blade use.

Inverter technical specifications	
Protection rating	IP 31
Vibration and shock resistance (EN50178)	0.6 gn from 10 to 50 Hz 2 gn from 50 to 150 Hz
Max. relative humidity	93% without condensation or drop- forming
Acceptable Temperature Range (EN 50178)	For warehouse storing: from - 25° C to +65° C For operating purposes: from - 10° C to +40° C
Max. altitude	1000mt. (328 ft) with no derating
Supply	- single phase: 200V - 15% to 240V + 10%
	- three phase: 200V - 15% to 230V + 10% 380V - 15% to 460V + 10%
Frequency	50/60 Hz ± 5%
Output voltage	Maximum voltage equal to the supply voltage
Output frequency range	0,5 a 320 Hz
Max. transients	150% of electronic speed control rated current for 60 secs.
Frequency resolution	- Display: 0.1 Hz - Analog inputs: 0.1 Hz per 100 Hz max.
Switching frequency	Adjustable from 2.2 to 12 Hz max.

Inverter technical specifications	
Electronic speed control protection and safety devices	Galvanic insulation between power and control panel
	Short circuit protection: - of available internal supplies; - between U- V- W output phases between phase and earth for calibres from 5.5 to 15Kw
Motor protections	Thermal protection against overheating and overcurrents
Motor protections	Protection integrated in the electronic speed control with 1^2t calculation
	Protection integrated in the electronic speed control with 1^2t calculation
Motor protections	Protection integrated in the electronic speed control with 1^2t calculation

Choice of blade

The different types of blade that can be used for the **C350- 2 CNC** must in any case respect the following general characteristics:

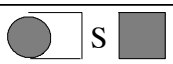
- "Fine tooth pitch": for thin wall materials such as sheet steel, tubes and profiles;
- "Coarse tooth pitch": for large cross- sections; for soft materials (aluminium alloys and soft alloys in general).

Tooth pitch

The choice of the most suitable tooth pitch depends on various factors:

- the size of the section;
- the hardness of the material;
- wall thickness.

Solid sections call for discs with a coarse tooth pitch, while small cross- sections require blades with finer teeth. This is because when cutting walls of small cross- section (1÷7 mm/0.04÷0.27 in) profiles, it is important that the number of teeth actually making the cut should not be too small, otherwise the effect obtained will be one of tearing rather than of swarf removal, leading to a large increase in shearing stress. On the other hand, when cutting thick materials or solid sections using an excessively fine tooth pitch, the swarf collects as a spiral inside the gullet, and since fine tooth pitches have small gullets, the accumulated swarf will exceed the gullet capacity and press against the walls of the workpieces, resulting in poor cutting (same situation with soft materials), greater shearing stress and hence breakage of the blade.

Choice of tooth pitch T as a function of cross- section to be cut for light alloy solid pieces and profiles			
			
S in mm./in	Pitch T	S and sp in mm./in	Pitch T
10 (0.39 in)	4	S = 10 - sp = 0,5 S = 0.39 - sp = 0.02 in	3
30 (1.18 in)	6	S = 30 - sp = 1,5 S = 1.18 - sp = 0.06 in	4 - 5
50 (1.97 in)	8	S = 50 - sp = 2,5 S = 1.97 - sp = 0.1 in	5 - 6
70 (2.75 in)	10	S = 70 - sp = 3,5 S = 2.75 - sp = 0.14 in	6- 7

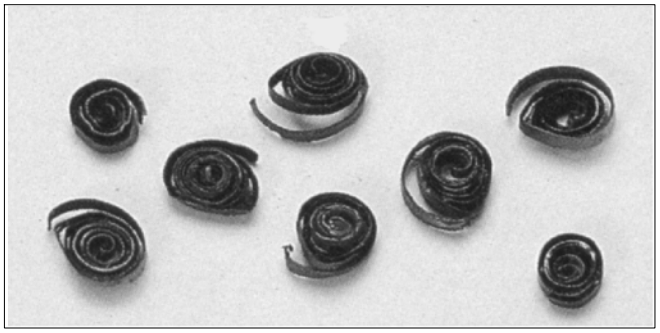
Choice of tooth pitch T as a function of cross- section to be cut for light alloy solid pieces and profiles			
90 (3.54 in)	12	S = 90 - sp = 4,5 S = 3.54 - sp = 0.18 in	7 - 8
130 (5.12 in)	16	S = 130 - sp = 6,5 S = 5.12 - sp = 0.25 in	8

KEY:
S = diameter or width of the solid piece to be cut in mm or in;
sp = thickness of the wall to be cut in mm or in;
T = tooth pitch in mm or in.
A larger pitch should be chosen when, as a result of the shape of the piece to be cut, the cross- section at any given point exceeds the average cross- section given above.

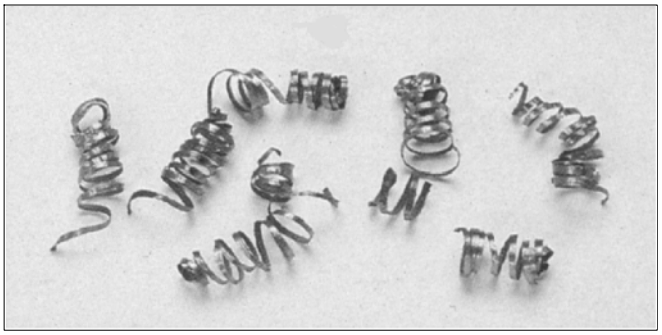
Types of swarf:

- 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.



Cutting and feeding speed

The cutting speed, in (m/min or ft/min), and the head feeding speed, in (cm^2/min or in^2/min), are limited by the amount of heat generated near to the points of the teeth. If the head feeding speed is too high, the cut will not be straight in either the vertical or the horizontal plane. As we have already said, the cutting speed

depends on the strength (kg/mm^2) and hardness (HRC) of the material and the dimensions of the thickest section. The feeding speed depends on the cross- section of the material. Solid or thick- walled materials (thickness > 5 mm or 0.20 in), can therefore be cut at high speed providing there is sufficient swarf removal by the blade, while thin- walled materials such as tubes or thin profiles must be cut with a low feeding speed. A new blade requires a wearing- in period, during which time a feeding speed of about half normal speed should be used.

Lubricant/coolant

The lubricating/cooling fluid must ensure that the blade teeth and material in the area of the cut do not overheat. Furthermore, the quantity and pressure must be sufficient to remove the swarf from the cutting zone. The fluid must be an excellent lubricant, such that prevents abrasion of the teeth and welding of the swarf to the teeth themselves (seizing).

Blade structure

The circular blades most frequently used for cutting- off machines are HSS-DMo5/M2 consisting of a single piece and characterised by a high level of toughness and a good cutting resistance. With non- ferrous materials it is normal to use circular blades with brazed hard metal (HM) cutting edges, which offer excellent resistance to wear but low resistance to impact, which in any case is not generally a problem with non- ferrous materials.
They consist in a disk made of alloy steel (71 Cr 1) with teeth and places for the plates, made of Widia K10.

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

TYPE OF BLADE	*C*	*Cr*	*W*	*Mo*	*V*	*Co*	*HRC*
HSS- DMO 5/M2	0,47	1,00	6,37	1,00	0,12		45- 50

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

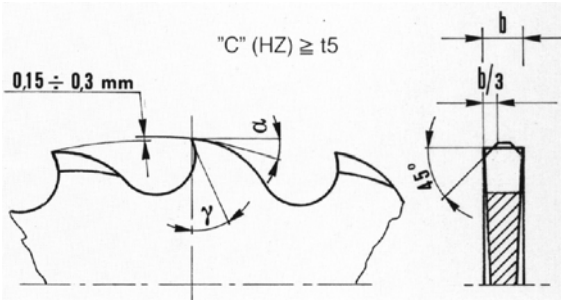
Types of blades

The blades fitted to the **C350- 2 CNC** have dimensions 350x32x2.5 mm (13.78x1.26x0.10 in) and are of HSS DMo5 hard steel type since the machine is to be used for cutting non- ferrous materials. In addition to the size and pitch of the teeth, however, the blades also have different geometric characteristics in accordance with their particular use:

- tooth sharpening, which in this case may be BW with alternate raked tooth or C with roughing tooth raked on both sides and non- raked finishing tooth;
- tooth pitch, the distance between the crests of two subsequent teeth (tooth pitch = T).

Tooth shape

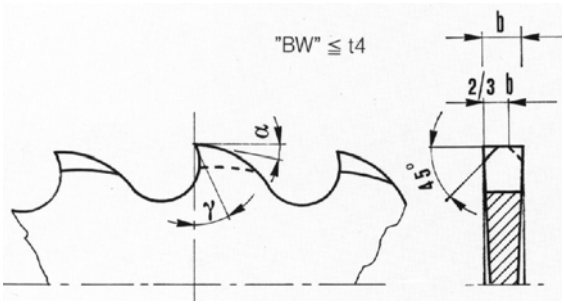
“C” TYPE SHARPENING (HZ)
Coarse toothing with roughing tooth raked on both sides and non- raked finishing tooth. The roughing tooth is about 0.3 mm (0.01 in) higher.



Coarse toothing with roughing tooth and finishing tooth. Used in saws with pitch greater than or equal to 5 mm (0.20 in) for cutting ferrous and non- ferrous materials with solid or solid- profiled sections.

“BW” TYPE SHARPENING DIN 1838- UNI 4014

Coarse toothing with teeth alternately raked to the right and left.



Toothing generally used on cutting- off machines for cutting ferrous and alloy materials with tubular and profiled sections.

The disks for the **C350- 2 CNC** are ∅ 350x32x2.5 mm (13.78x0.10x1.26 in) with C- type sharpness; however, also the tooth pitch is important, as indicated in the table below.

C MODEL	○ □			○ □			● ■		
	D.	T	Z	D.	T	Z	D.	T	Z
352	350	5	220	350	8	140	350	12	90

This table can be used to facilitate the choice of toothing since it takes into account both the size of the material to be cut and the diameter of the disc to be used.

Solid section

Hollow section

D	200		225		250		275		300		315		350		370		400		425		450		500	
S	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z	t z
10	5 130	6 100	5 140	6 120	5 160	6 128	5 180	6 140																
30	6 100	8 80	6 120	8 80	6 128	8 100	6 140	8 110	6 160	8 120	7 140	8 120												
50			8 90	10 70	8 100	10 80	8 110	10 90	8 120	10 90	8 120	10 100	9 120	10 110	10 110	11 100								
70							10 90	12 70	10 90	12 80	10 100	12 80	11 100	12 90	11 100	12 90	10 120	12 100	10 130	12 110	10 140	12 120	10 150	12 130
90									12 80	14 70	12 80	14 70	12 90	14 80	12 90	14 80	12 100	14 90	12 110	14 94	12 120	14 100	12 130	14 110
110											12 80	14 70	12 80	14 70	12 90	14 80	12 100	14 90	12 110	14 94	12 120	14 100	12 130	14 110
130													12 80	16 70	14 80	16 70	14 90	16 80	14 94	16 84	14 100	16 90	14 110	16 100
150																	14 90	16 80	14 94	16 84	14 100	16 90	14 110	16 100
D																								
10	3 200	3 200	3 220	3 220	3 250	3 250	3 280	3 280																
30	4 160	5 130	4 180	5 140	4 200	5 160	4 220	5 180	4 220	5 180	4 240	5 200												
50			5 140	6 120	5 160	6 128	5 180	6 140	5 180	6 160	5 200	6 160	5 200	6 180	5 220	7 160								
70							6 140	8 110	6 160	8 120	6 160	7 140	6 180	7 160	7 160	8 140	6 200	7 180	6 220	7 190	6 230	7 200	6 260	7 220
90									8 120	10 100	7 140	8 120	7 160	8 140	7 160	8 140	7 180	8 160	7 190	8 160	7 200	8 180	7 220	8 200
110											8 120	10 100	8 140	9 120	8 140	9 120	8 160	9 140	8 160	9 150	8 180	9 160	8 200	9 170
130													9 120	10 110	9 120	10 110	9 140	10 120	9 150	10 130	9 160	10 140	9 170	10 150
150															9 120	10 110	9 140	10 120	9 150	10 130	9 160	10 140	9 170	10 150

Blade selection table with respect to cutting speed and downstroke speed

	α	γ	10-20 T mm	10-20 Vt rpm	10-20 Av mm/1'	20-40 T mm	20-40 Vt rpm	20-40 Av rpm	40-60 T mm	40-60 Vt rpm	40-60 Av rpm	60-90 T mm	60-90 Vt rpm	60-90 Av rpm	90-110 T mm	90-110 Vt rpm	90-110 Av rpm	110-130 T mm	110-130 Vt rpm	110-130 Av rpm	130-150 T mm	130-150 Vt rpm	130-150 Av rpm
Mild steel R = 350- 500 N/mmq	20	8	5	50	160	7	45	150	10	45	140	12	40	130	14	40	110	16	35	100	18	30	90
Medium steel R = 500- 700 N/mmq	18	8	4	30	130	6	30	120	9	25	110	12	25	110	14	20	100	16	20	90	16	15	80
Hard steel R = 750- 950N/mmq	15	8	4	20	110	6	20	110	8	18	100	11	17	50	14	15	80	16	14	70	16	12	60
Super hard steel R = 950- 1000 N/mmq	12	6	3	15	60	4	15	60	6	14	50	9	14	50	12	13	45	14	13	45	14	12	40
Hardened and tempered steel R = 950- 1300 N/mmq	10	6	2	9	35	3	9	33	4	9	30	6	8	28	8	8	25	10	7	25	12	7	22
Austenitic stainless steel R = 500- 800 N/mmq	12	8	4	20	50	6	19	45	8	18	45	11	17	40	14	15	40	16	14	35	16	12	35
Martensiticstainless R = 500- 800 N/mmq	15	6	4	20	50	6	19	45	8	18	45	11	17	40	14	15	40	16	14	35	16	12	35
Grey iron	12	8	4	25	100	6	23	100	8	22	90	11	20	80	14	19	880	16	17	70	16	16	60
Aluminium and alloys R = 200- 400 N/mmq	22	10	6	1100	1800	8	1000	1700	12	900	1600	16	800	1400	18	700	1300	20	600	1100	20	500	900
Aluminium and alloys R = 300- 500 N/mmq	20	8	5	200	400	7	180	400	10	160	350	12	160	300	14	140	300	16	130	250	16	130	250
Copper R = 200- 350 N/mmq	20	10	6	400	600	8	350	600	11	300	550	14	250	550	17	200	500	18	150	500	20	120	400
Hard bronze R = 600- 900 N/mmq	15	8	5	400	800	7	400	700	10	350	700	12	300	600	14	250	600	16	200	500	18	150	400
Phosphor bronze R = 400- 600 N/mmq	12	8	4	120	160	8	110	150	8	100	140	10	90	130	12	70	110	14	60	500	16	50	90
Brass R = 200- 400 N/mmq	16	16	5	600	1100	6	600	1100	10	550	1000	12	550	900	16	500	900	18	500	450	18	450	800
Alloyed brass R = 400- 700 N/mmq	12	16	5	500	700	7	400	600	10	350	600	12	350	500	16	300	500	18	300	200	18	200	400
Titanium and alloys R = 300- 800 N/mmq	18	8	4	50	160	4	45	150	6	45	140	10	45	130	12	40	110	14	35	100	16	30	90
Profiles and tubes with wall thickness 0.05 D R = 300- 600 N/mmq	18	8	3	19	130	4	18	120	5	18	110	8	17	110	12	16	100	18	16	90	18	15	80
Profiles and tubes with wall thickness 0.25 D R = 300- 600 N/mmq	15	8	2	35	130	3	33	120	4	30	120	6	30	110	8	30	110	12	30	100	16	24	80

Classification of steels

The tables on this page provide users with information on materials to cut, enabling their classification with respect to hardness and consequently the correct blade to use.

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 A - 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

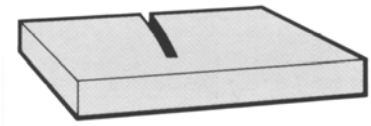
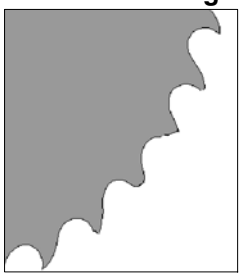
Material	SS Sweden	AISI U.S.A.	DIN Germany	BS Great Britain	UNI Italy	AFNOR France
Carbon steels	1311 1572	1015 - 1035	C 22 - C 35 20 Mn 5 - 28 Mn 6 CK 22 - CK 50	050 A 20 080 M 46 - 50 120 M 19 150 M 28	C 15 - C 35 C 22 Mn C 28 Mn	XC 18 XC 38 H 1 20 M 5
Carbon steels	1650 1880	1040 - 1064 1770 - 1880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

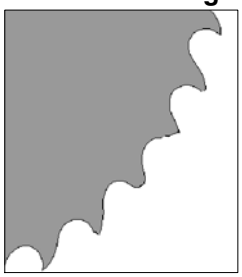
Troubleshooting

10

This chapter describes the inspection and troubleshooting procedures for the **C350- 2 CNC**. 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
Cuts not at 90 degrees or angled 	◗ Head speed too high	☞Reduce head speed
	◗ Disc with worn teeth	☞Replace disc
	◗ Perpendicularity of disc to work surface	☞If this is not the case, contact our technical service department
	◗ Cutting speed too low	☞Increase cutting speed.
	◗ Broken teeth	☞Check the hardness of the material being cut.
Teeth breaking 	◗ Incorrect lubricant/coolant fluid	☞Check the water and oil emulsion; check that the holes and hoses are not blocked; direct the nozzles correctly.
	◗ Material too hard	☞Check the cutting speed, feed speed and disc pressure parameters and the type of disc you are using.

PROBLEM	PROBABLE CAUSE	SOLUTION
Teeth breaking 	◗ Disc not worn- in correctly	☞With a new disc it is necessary to start cutting at half feeding speed. After the wearing- in period (a cutting surface of about 300 cm2 for hard materials and about 1000 cm^2 for soft materials) the cutting and feed speeds can be brought up to normal values.
	◗ Disc with excessively fine tooth pitch	☞The swarf wedges into the bottom of the teeth causing excessive pressure on the teeth themselves.
	◗ New blade inserted in a partially completed cut.	☞The surface of the cut may have undergone local thermal alteration, making it harder: when starting work again, use a lower cutting speed and head feed speed. A tooth from the old blade may be left in the cut: check and remove before starting work again.
	◗ Workpiece not clamped firmly in place	☞Any movement of the workpiece during cutting can cause broken teeth: check the vice, jaws and clamping pressure.
	◗ Vibration	☞Workpiece vibrates in the vice: check that the slide has been adjusted correctly; check the clamping pressure and if necessary increase.
Rapid tooth wear	◗ Head speed too slow	☞The blade runs over the material without removing it: increase head speed.
	◗ Cutting pressure too high	☞Reduce cutting pressure.
	◗ Cutting speed too high	☞The teeth slide over the material without cutting it: reduce the cutting speed.
	◗ Insufficient coolant	☞Check the coolant level and clean piping and nozzles.
	◗ Incorrect fluid concentration	☞Check and use the correct concentration.

PROBLEM	PROBABLE CAUSE	SOLUTION
Rapid tooth wear	◗ Material defective	☞The materials may present altered zones either on the surface, such as oxides or sand, or in section, such as under- cooled inclusions. These zones, which are much harder than the blade, cause the teeth to break: discard or clean these materials.
Broken blade	◗ Head speed too high	☞Reduce head speed.
	◗ Teeth in contact with material before starting the cut	☞Always check the position of the blade before starting a new job.
	◗ Insufficient coolant	☞Check the coolant level and clean piping and nozzles.
	◗ Vibrations	☞Workpiece vibrates in the vice: check that the slide is regulated correctly; check the clamping pressure and if necessary increase.

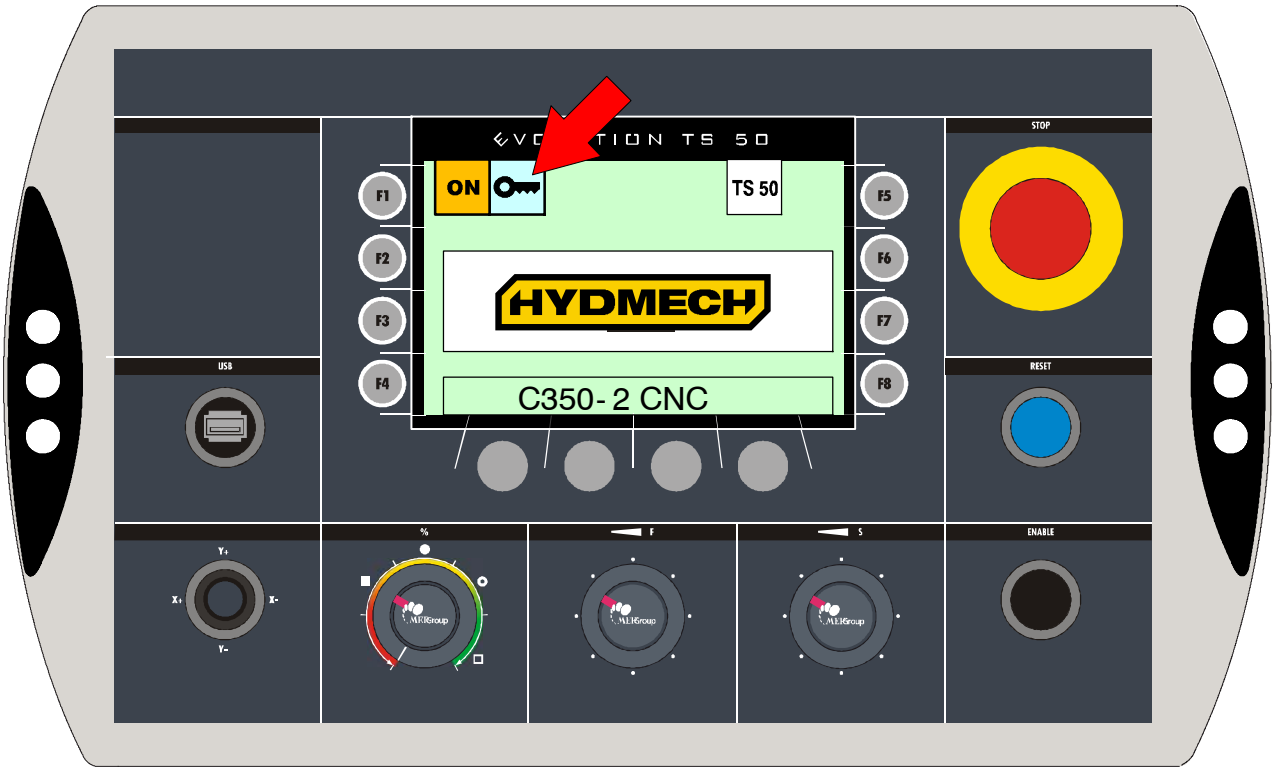
Troubleshooting

This section deals with the problems which may occur during machine operation. The M50 controller allows you to test all the machine's electric and electronic devices by checking the status of the input and output signals on the IUD/IUV card (see Chapter 5).

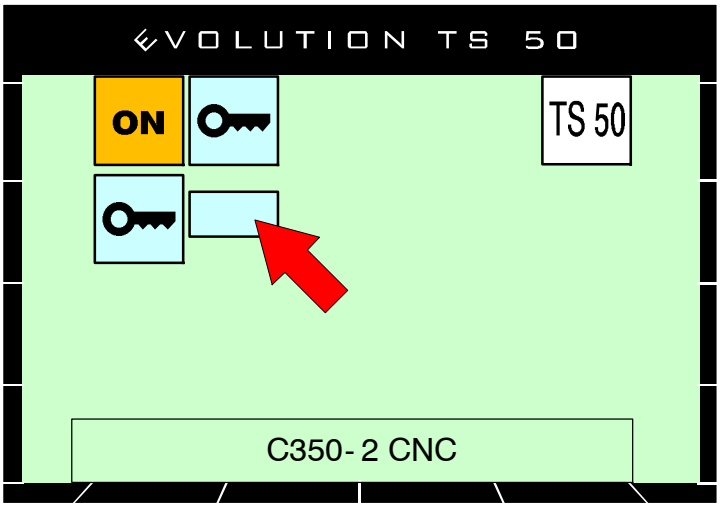
The board IUD/IUV is inside the electric board.

Displaying the diagnostics menu

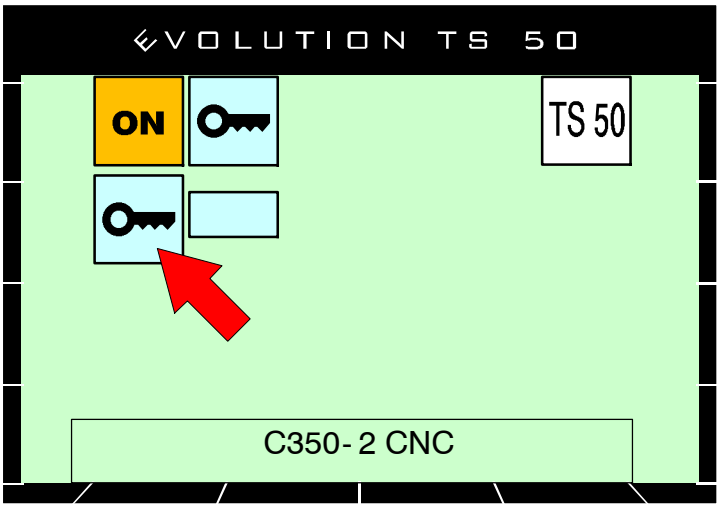
- ▶ Power the machine by turning the main switch on the left of the control board.
- ▶ Tap on the box on the touchscreen shown in the figure.



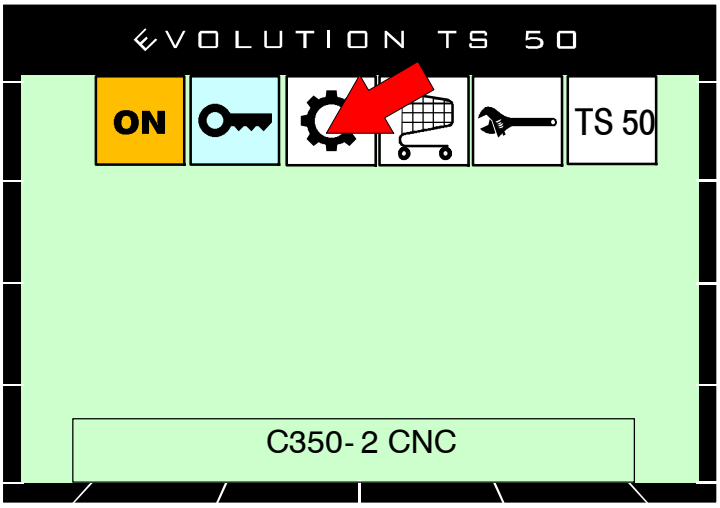
- ▶ The password entry box will open. Tap the box to open the keypad. Enter 734533.



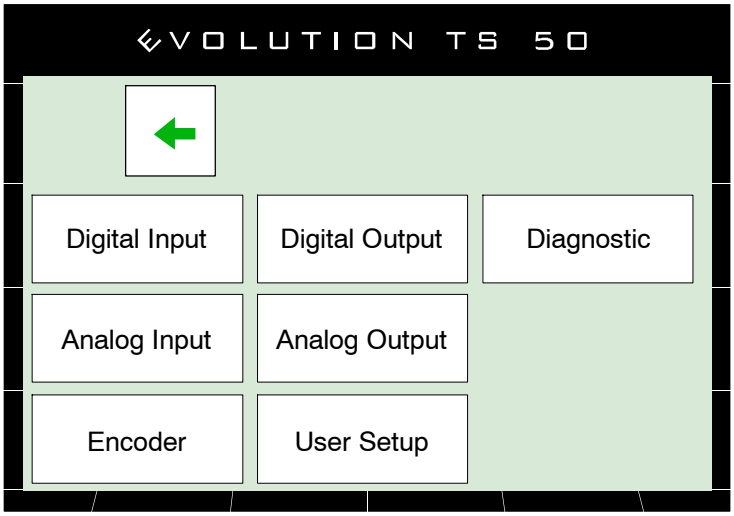
▶ Tap on the box shown in the figure.



▶ Tap on the box shown in the figure.



▶ In the Troubleshooting menu, select the type of input/output to be checked by tapping on the corresponding box:

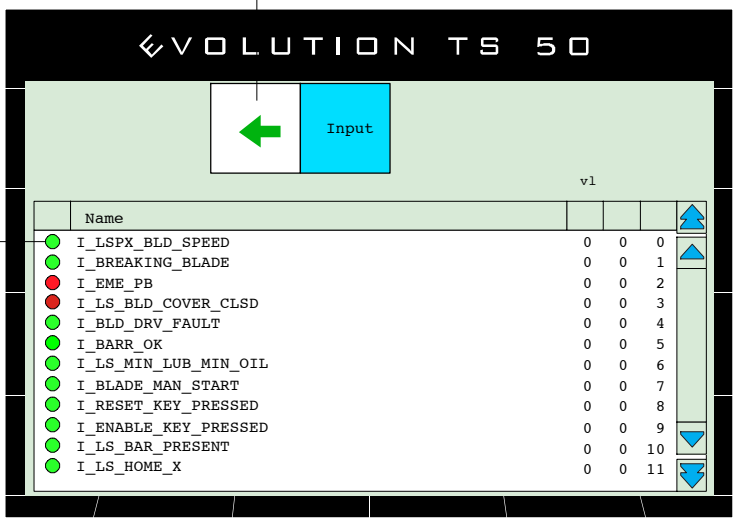


Digital Input

This page can be used to check the state of digital inputs. Information is organised in a table:

Box to go back to the initial list of all inputs and outputs

The icon indicates whether the respective output is on (green) or off (red)



Digital INPUT list

CN13- ALL	**+ 24 VDC**
CN15- ALL	**0 VDC**
CN14- 1 INP 0	**Blade speed proximity switch**
CN14- 2 INP 1	**Blade breakage**
CN14- 3 INP 2	**EMERGENCY STOP BUTTON OK**
CN14- 4 INP 3	**BLADE GUARD CLOSED LIMIT SWITCH**
CN14- 5 INP 4	**ALARM INVERTER**
CN14- 6 INP 5	**START FROM PEDAL BOARD**
CN14- 7 INP 6	**LOW OIL LEVEL**
CN14- 8 INP 7	**Manual start of the disk rotation**
CN16- ALL	**+ 24 VDC**

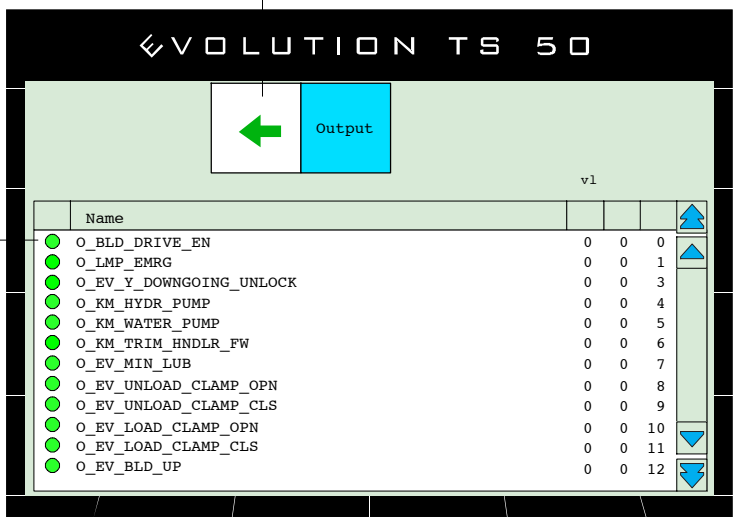
CN19- ALL	**0 VDC**
CN17- 1 INP 8	**RESET BUTTON**
CN17- 2 INP 9	**ENABLE BUTTON**
CN17- 3 INP 10	**Bar presence limit switch**
CN17- 4 INP 11	**Zero- setting limit switch**
CN17- 5 INP 12	**JOYSTICK X-**
CN17- 6 INP 13	**JOYSTICK Y-**
CN17- 7 INP 14	**JOYSTICK Y+**
CN17- 8 INP 15	**OYSTICK Y+**

Digital Output

This page can be used to check the state of digital outputs. Information is organised in a table:

Box to go back to the initial list of all inputs and outputs

The icon indicates whether the respective output is on (green) or off (red)



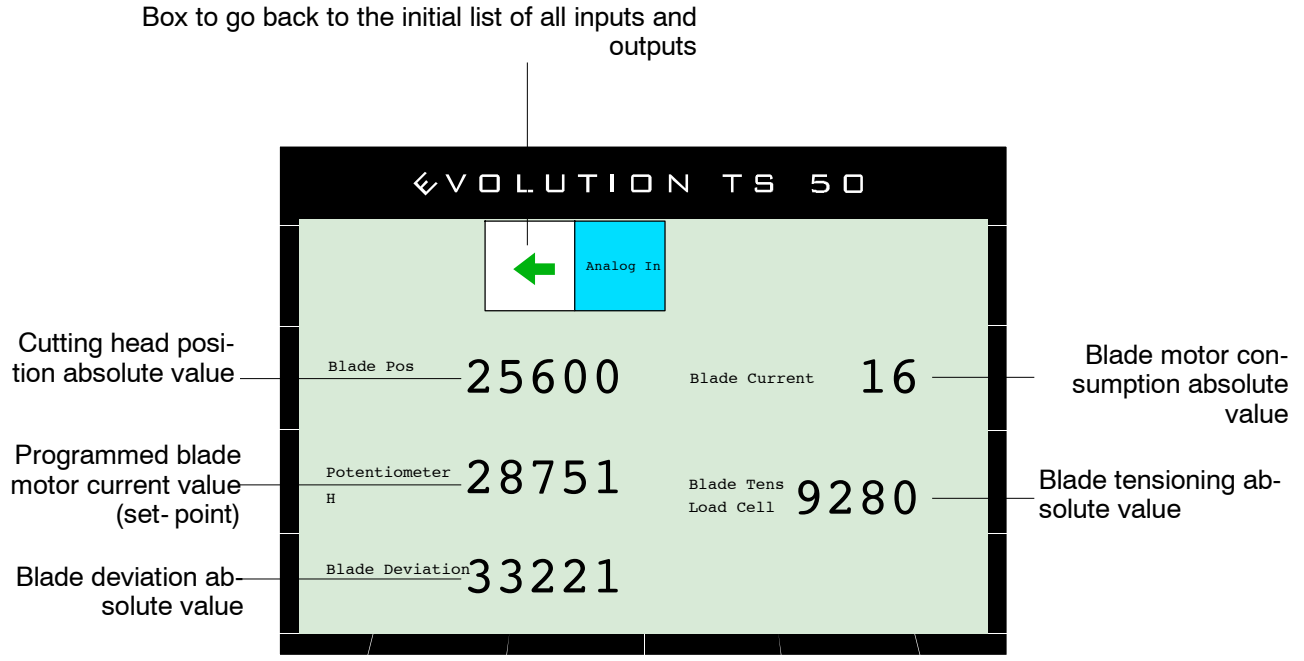
Digital OUTPUT list

CN21- 1 OUT 0	**START INVERTER**
CN21- 2 COM	**+24 VDC**
CN21- 3 OUT 1	**FLASHING**
CN21- 4 COM	**+24 VDC**
CN21- 5 OUT 2	**SPARE**
CN21- 6 COM	**+24 VDC**
CN21- 7 OUT 3	**HEAD LOCK/RELEASE SOLENOID VALVE**
CN21- 8 COM	**+24 VDC**
CN22- 1 OUT 4	**UNIT START KM**
CN22- 2 OUT 5	**WATER PUMP START KM**
CN22- 3 OUT 6	
CN22- 4 OUT 7	**LOW LUBRICATION SOLENOID VALVE**
CN22- 5 COM	**+24 VDC**
CN23- 1 OUT 8	**CHIP EJECTOR Km**
CN23- 2 OUT 9	**CUTTING VICE OPENING Km**
CN23- 3 OUT 10	**CUTTING VICE CLOSING Km**
CN23- 4 OUT 11	**FEEDER VICE OPENING Km**

CN23- 5 COM	+24 VDC
CN24- 1 OUT 12	HEAD LIFTING SOLENOID VALVE
CN24- 2 OUT 13	HEAD LOWERING SOLENOID VALVE
CN24- 3 OUT 14	LASER PROJECTOR
CN24- 4 OUT 15	CUTTING ZONE LIGHT
CN24- 5 COM	+24 VDC

Analog Input

This page can be used to check the state of analogue inputs. Information is organised in a table:

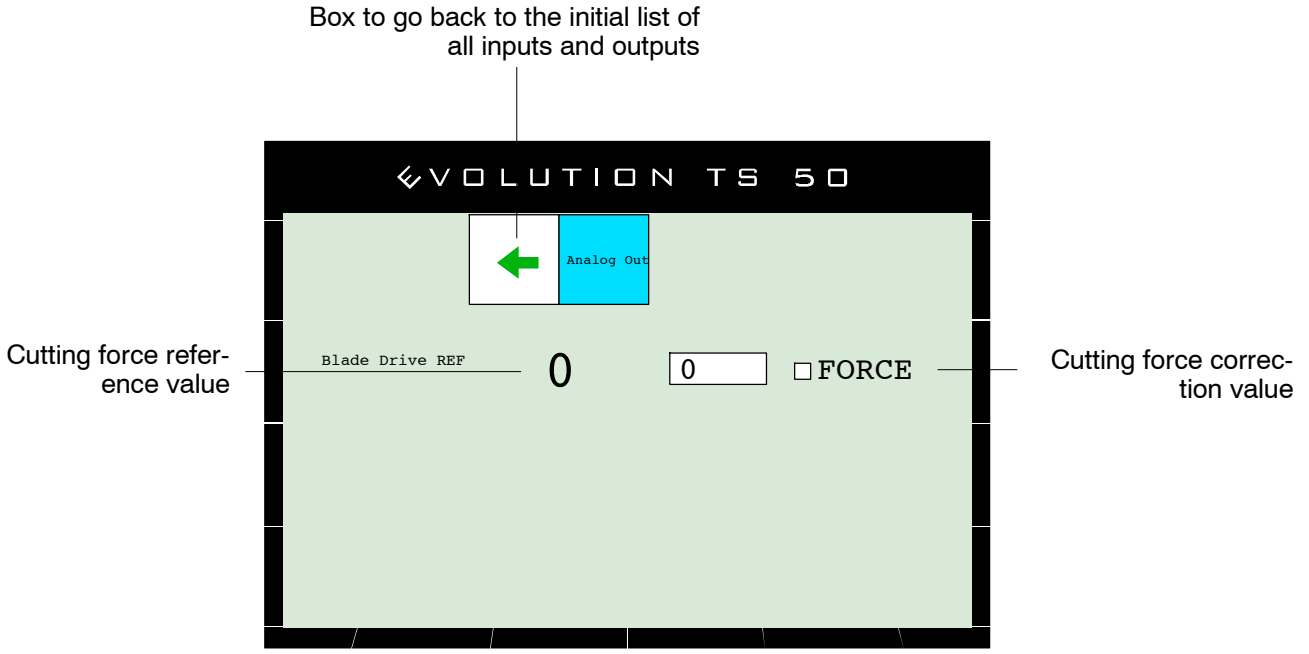


Analog INPUT list

CN26 INP 1 (16B)	HEAD POSITIONING POTENTIOMETER
CN27 INP 2	BLADE MOTOR CONSUMPTION
CN28 INP 3	SPARE
CN29 INP 4	SPARE
CN30 INP 5	SPARE

Analog Output

This page can be used to check the state of analogue outputs. Information is organised in a table:



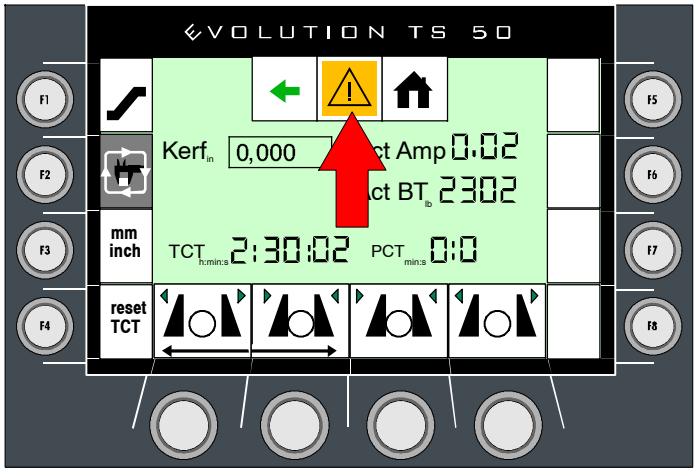
Analogue output list

CN25 OUT 1	**BLADE SPEED REFERENCE**
CN25 OUT 2	**SPARE**

Machine alarms and warning messages

Alarms

The machine's controller notifies the operator of any alarm or emergency condition which may occur during production by way of acoustic and visual signals. This section lists the messages shown on the display.



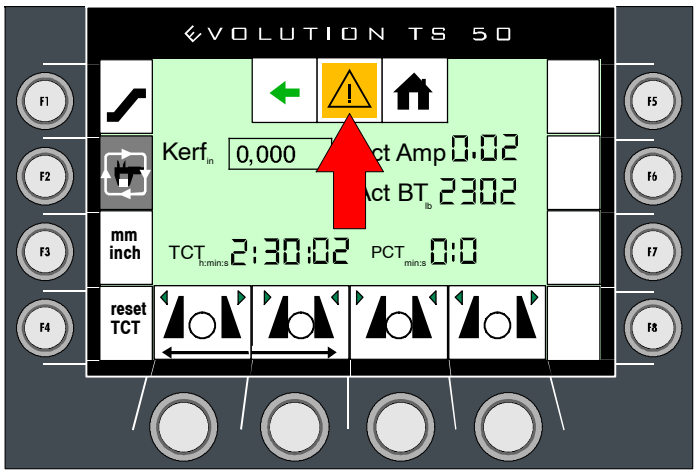
AL1: EMERGENCY: ONE OR MORE ALARMS HAVE TRIPPED	This appears in case of a generic emergency. A specific message follows
AL2: BLADE TENSIONING OUT OF MIN-MAX LIMITS	It is displayed when a mechanical problem occurs in the blade tensioning
AL3: BLADE MOTOR OVERCURRENT	It is displayed during the cutting when the value of the motor absorption is too high
AL4: INSUFFICIENT BLADE REVOLUTION SPEED	This appears when the blade jams in the cut or breaks ▶ Check blade integrity ▶ Check cutting parameters
AL5: HMI EMERGENCY - LOGO OR RESERVED PAGE	This appears in case of controller malfunction
AL6: EMERGENCY STOP BUTTON OR UNIT OPERATED	It is displayed when the emergency mushroom button is pressed
AL7: U AXIS NOT AVAILABLE OR FAULTY OR NOT REFERENCED: CLOSE THE LOGO PAGE AND GO BACK TO THE OPERATIVE PAGE	This appears when the head descent speed adjustment valve is not reset
AL8: XB AXIS NOT AVAILABLE OR FAULTY	This is shown when the pop- up rollers interfere with head revolution ▶ Position the pop- up rollers correctly as shown in Chapter 5
AL9: U AXIS DRIVE FAULTY	This appears in case of head descent adjustment valve malfunction

AL10: XB AXIS DRIVE FAULTY	This appears when there is a head revolution drive malfunction
AL11: LOW MINIMUM LUBRICATION	It is displayed when the oil level in the min. lubrication system lowers. ▶ Top the oil up in the tray till restoring the level.
AL12: BLADE GUARD OPEN @ BLADE CHANGE SEQUENCE DEACTIVATED	This message is displayed if the blade guard is opened, for example, to change the disk. ▶ Make sure the blade guard is closed. ▶ Check the safety limit switch. ▶ Check the connections.
AL13: XB AXIS ENCODER REVOLUTION BLOCKED	This appears in case of head revolution problem
AL14: BLADE DRIVE OR MOTOR FAULTY	This is shown when the blade motor inverter does not work correctly
AL15: CUTTING HEAD VICE VERTICAL INTERFERENCE LIMIT SWITCH	This appears when an attempt is made to close the vice must be head is not all up ▶ Take the head all up This appears when an attempt is made to move the head down and the vice is not all up ▶ Open the vices completely
AL16: FORWARD SOFTWARE LIMIT SWITCH UNDER STARTING POSITION (RHLS < YPOS)	This message is displayed when the cutting start position is lower than the previous position saved for the cutting end position. ▶ Save both the RHLS and FHLS positions again.
AL17: PARAMETER LOADING FAILED: RESTART THE MACHINE	This appears when the parameter reading procedure is not successful
AL18: BLADE POSITION ERROR: CHECK ANALOGUE INPUT	This appears when the potentiometer is broken or sends a message which is not compatible with the machine
AL19: LASER ENGAGED AT START OF CYCLE	This is shown when the cutting cycle is started and the fast approach laser is busy
AL20: JOG X NOT POSSIBLE WITH BOTH CLAMPS CLOSED	It is displayed when trying to move the feeder shuttle using the joystick without having opened both vices.
AL21: OUT OF STOCK	It is displayed when the cutting material being fed runs out
AL22: CALCULATING LENGHT ERROR	It is displayed when a calculation error of the length to be fed occurs

AL23: X AXIS HOMING NOT COMPLETED PERFORM THE HOME AXIS MANUALLY	It is displayed when a feeder shuttle position error occurs
AL24: BLADE BROKEN	It is displayed when the blade breaks
AL25: CYCLE STARTING WITH BLADE NOT A FCTI	It is displayed when a cutting cycle is started with head not at RHLS (rear head limit switch)
AL26: BLADE DEVIATION MAX	It is displayed when an excessive blade deviation occurs while machining
AL26: BLADE DEVIATION MIN	It is displayed when a limited blade deviation occurs while machining
AL28: PERIMETRAL PROTECTION OPEN	It is displayed when opening any perimeter guard
AL29: AIR PRESSURE KO	It is displayed when the working pressure is below the min. operating threshold

Warning messages

Tap on the box shown on the figure to see warning messages:

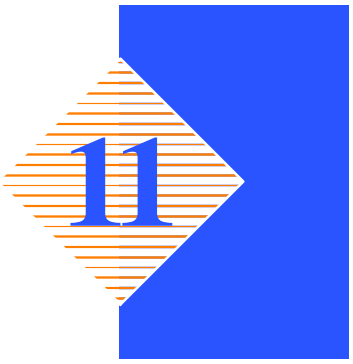


WR1: CHECK MANUAL CUT START CONDITIONS: NO ALARMS, BLADE ENABLED, BLADE ON FCTI, FRONT VISE CLOSED	It is displayed when the manual cycle is started
WR2: SEMIAUTO CUT IN PROGRESS	This appears when the semi- automatic cycle is underway
WR3: POSITIONING IN PROGRESS	This appears when the head positioning is underway

WR4: MINIMUM LUBRICATION: OIL REACHED THE MINIMUM LEVEL	This appears when there is no oil for minimum lubrication
WR5: FORWARD SOFTWARE LIMIT SWITCH ABOVE BACKWARD ONE (FCTA > FCTI)	This appears when the RHLS and RHLS are not coherent
WR6: HYDRAULIC OIL PUMP SELF TURNING OFF TRIGGER	This appears when the machine switches to power save mode after a given time
WR7: INHIBITED COMMAND	This appears when an incorrect operation is attempted
WR8: CHECK CUT START CONDITIONS: NO ALARMS, BLADE ENABLED, BLADE ON FCTI, NUMBER PIECES PROGRAMMED TERMINATED (RESET COUNTER)	This appears when an attempt is made to start the cutting cycle without having checked that the cutting conditions are correct
WR9: AUTO FEED REDUCING CORRECTION TRIGGERED BY AN OVERCURRENT	This appears when the blade motor current exceeds the setting and correction is applied
WR10: BLADE AT ZERO CUTTING FEED SPEED: CANNOT CUT	This appears when the blade setting is too low
WR11: THERMAL SWITCHES NOK	This appears when a thermal switch trips in the control panel
WR12: CHIP CONVEYOR BLOCKED	This appears when the chip ejector is blocked
WR13: JOG WITHOUT HOMING	It is displayed when attempting to move the feeder using the joystick without having set to zero
WR14: WAIT BLADE SPEED REACHED	It is displayed after changing the disk rotation speed
WR15: END OF CUTS	It is displayed at the end of the programmed cuts
WR16: END OF QUEUE	It is displayed at the end of the programmed cut sequence
WR17: BLADE DEVIATION WARNING LEVEL	It is displayed when the blade deviation value has reached the caution level

WR18: PRESS BLADE ENABLED BUTTON	It is displayed when trying to start the cycle without having enabled the blade motor before
WR18: COMMAND INHIBITED	It is displayed when the given command does not have the necessary conditions

Optional



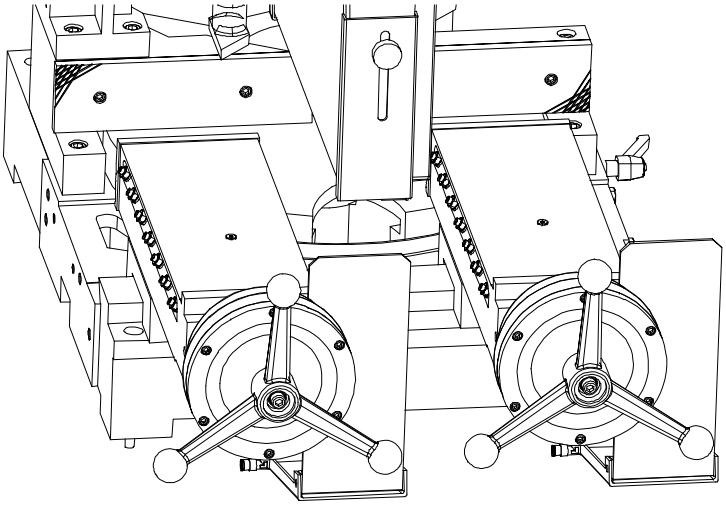
This chapter provides a list of the available accessories that can be fitted to this machine, along with assembly instructions.

Additional pneumatic vise

It is possible to assemble an additional pneumatic vice as well as the current production vice. Assembly procedures are illustrated below.

To fit the second pneumatic clamp proceed as follows.

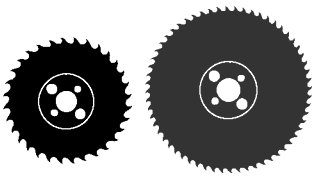
- Position the clamp to the right of the blade guard and tighten the feed screw locking plate.
- Connect the pneumatic hoses to the opening and closing unions on the pneumatic cylinder of the main pneumatic clamp using Y connectors.



Blade

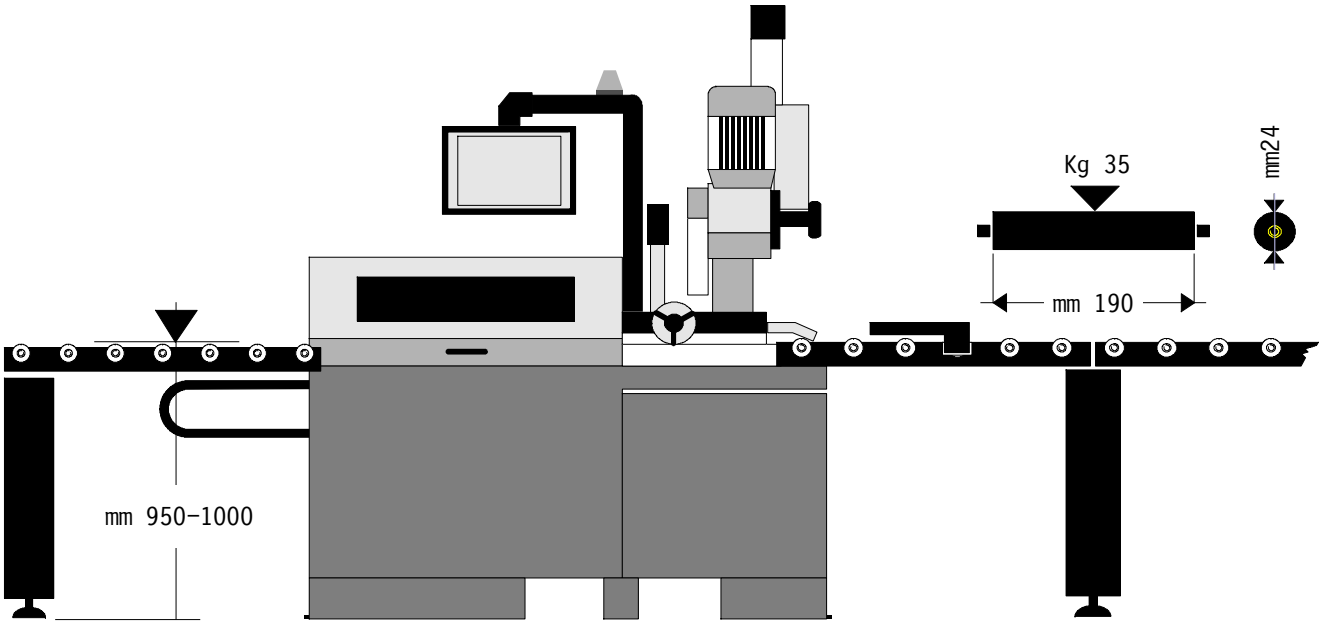
The disk for the **C350- 2 CNC** is:

- circular blade HSS DMo5/M2 D. 350x32x2.5 mm (13.78x1.26x0.10 in).



Roller table

- K40 roller table module for feed side, 1500 mm (59 in);



- K40 roller table module for discharge side, 1500 mm (59 in).

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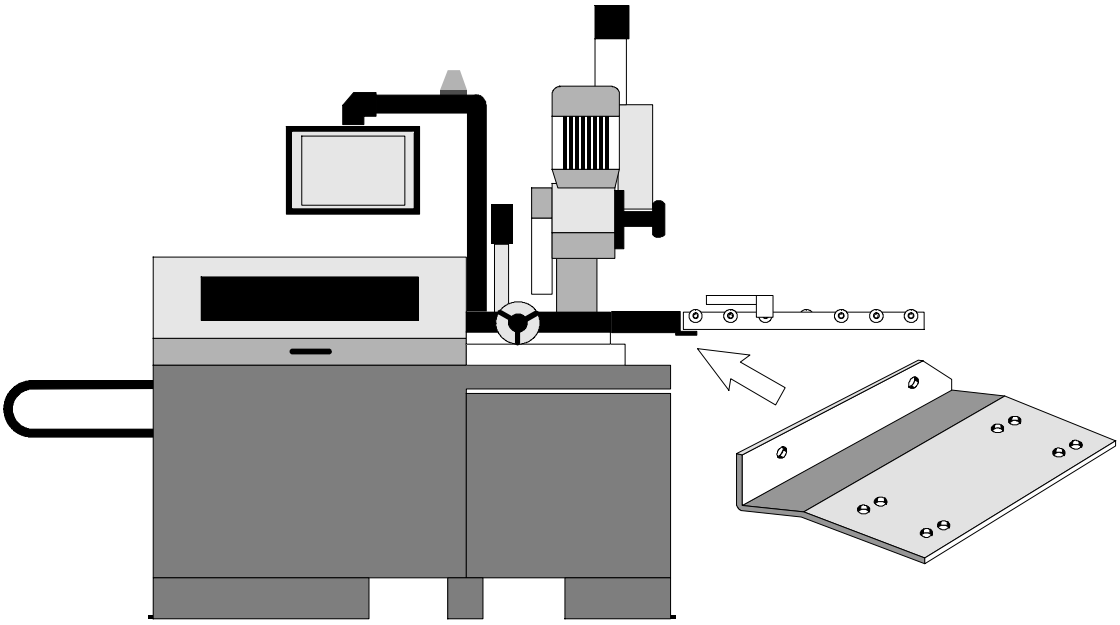
This device is used to attach the discharge roller table to the machine, and instructions are supplied below for how to assemble it:

- ▶ remove the two TE screws from the right side of the slideway;
- ▶ attach the adapter and secure it in place with the screws removed previously.

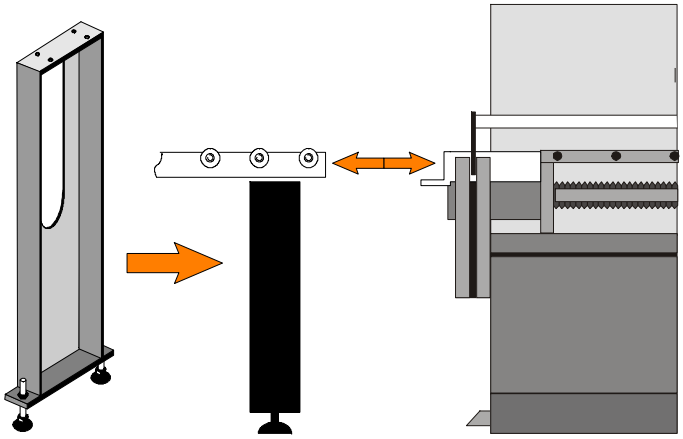


- ▶ Attach the outfeed rolling deck by fixing it with the screws supplied.

Feed side roller table support

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.

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.

Warranty

Hyd- Mech Group warrants each new sawing machine to be free from failure resulting from defective material and workmanship under proper use and service for a period of one year following the date of shipment to the user.
Hyd- Mech's sole obligation under this warranty is limited to the repair or replacement without charge, at Hyd- Mech's factory, warehouse, or approved repair shop, of any part or parts which Hyd- Mech's inspection shall disclose to be defective. Return freight must be prepaid by the user.

This warranty, in its entirety, does not cover maintenaince items, including but not limited to lubricating grease and oils, filters, V- belts, saw blades, etc, nor any items herein which show sign of neglect, overloading, abuse, accident, inadequate maintenance or unauthorized altering.

Liability or obligation on the part of Hyd- Mech for damages, whether general, special or for negligence and expressly including any incidental and consequential damages is hereby disclaimed. Hyd- Mech's obligation to repair or replace shall be the limit of its liability under this warranty and the sole and exclusive right and remedy of the user.

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HYD- MECH GROUP LIMITED
1079 Parkinson Road
P.O. BOX 1030
Woodstock, Ontario
N4S 8A4

Sales Toll Free: 1- 877- 276- SAWS (7297)
Phone: (519) 539- 6341
Fax: (519) 539- 5126
Website: www.hydmech.com
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1079 Parkinson Road, P.O. BOX 1030
Woodstock, Ontario, Canada N4S 8A4
Sales toll free: 1-877-276-SAWS (7297)
Telephone: (519) 539-6341
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