OTO MILLS S.p.A.
42022 BORETTO (RE) - ITALY

INSTRUCTIONS MANUAL FOR CUTOFF UNIT TAL 200 7,5 kW ELECTRIC COLD SAW

PRELIMINARY

Customer: RAUTARUUKKI

Order Nr.: N° 5286

Shipment date: …/…/…

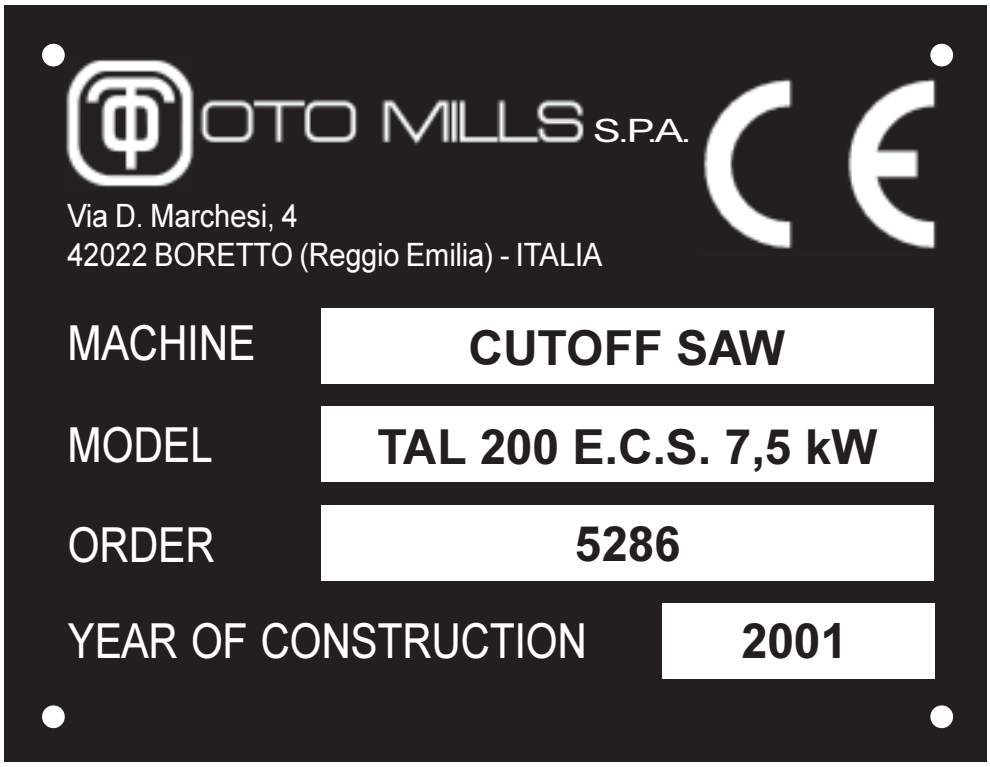
CE

TABLE OF CONTENTS

I MACHINE IDENTIFICATION DATA

1 MACHINE IDENTIFICATION DATA

The nameplate illustrated below is mounted on the base of the cutoff saw:



The plate specifies the machine's main identification data which must be quoted in all communications with the Manufacturer.

II SCOPE OF MANUAL

1 SCOPE OF MANUAL

This instructions manual has been compiled to in compliance with the Machine Directive prescriptions (89/392 EEC) point 1.7.4 - enclosure 1.
It contains instructions for the machine's safe and correct:
- installation
- putting into service and adjustment
- operation
- maintenance.

This instructions manual must be read and fully understood by all personnel responsible for carrying out the above operations prior to their execution.
This manual constitutes an integral part of the machine and must therefore be conserved in its entirety for use by operators and maintenance personnel.
Do not hesitate to contact our Service Centre if in doubt about any aspect of the contents of this manual or in the case of serious malfunctions and faults or complex repairs not covered by routine maintenance procedures.
The manufacturer declines all responsibility for injury to persons and damage to property caused by:
- improper use of the machine or any other use not specified in this manual
- failure to comply with safety requirements and accident prevention standards
- negligent maintenance
- modifications to machine
- use of non-original or unsuitable spare parts.

In accordance with EN 60204-1/84, CEI 44-5/85 and IEC 204-1/81 Standards, the purchaser is required to use the machine in compliance with the instructions supplied by the manufacturer.

III INTENDED CONDITIONS OF USE

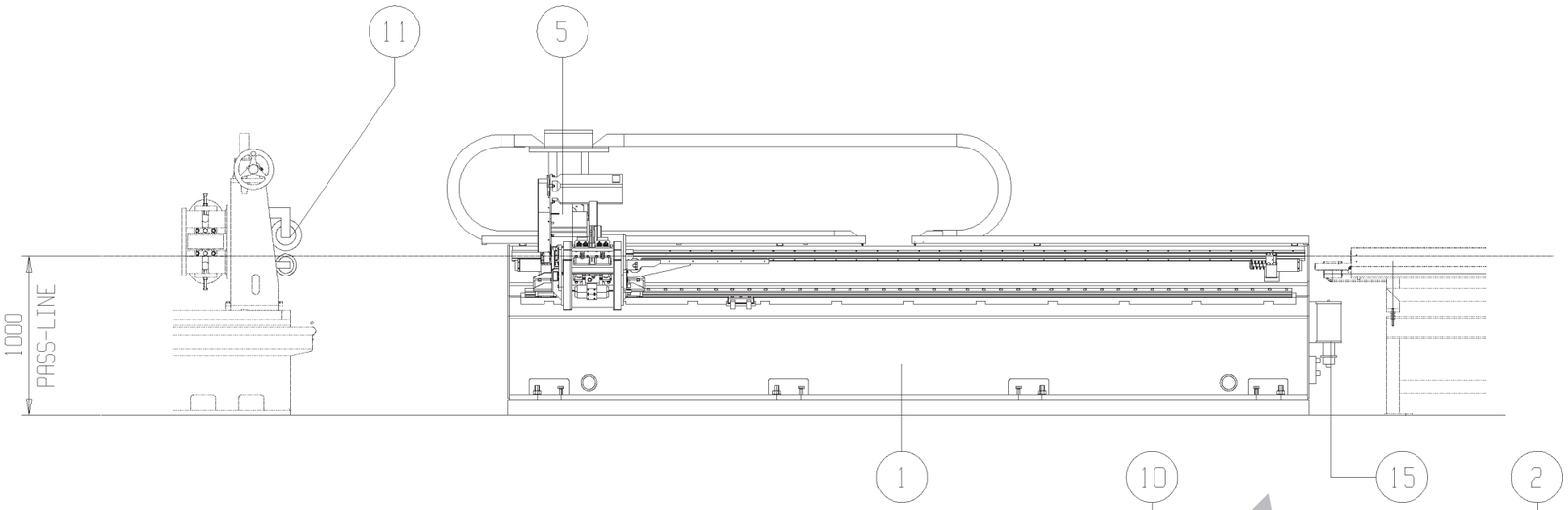
1 INTENDED CONDITIONS OF USE

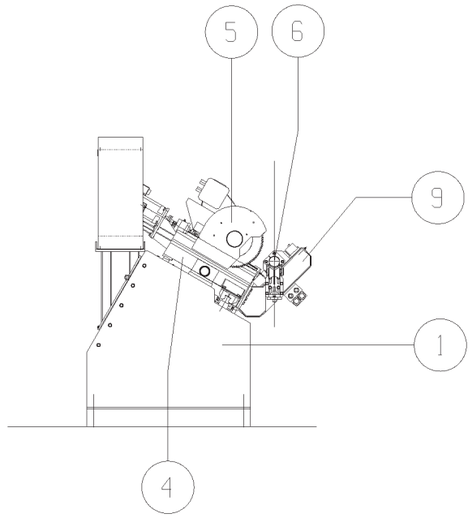
This machine is designed to cut steel tubular sections.
It is therefore intended for industrial applications whereby the expertise and professionalism of the user together with the instructions given in this manual are vital to the safe execution of all handling, running and maintenance operations.
The machine must be mechanically and electronically interfaced with the tube production line.
ONE OPERATOR ONLY IS REQUIRED to operate the machine.
The presence of two or more persons (operators or otherwise) is quite safe provided the instructions in this manual and on the machine are rigorously observed.
It is strictly prohibited therefore to deliberately occupy the danger zone and instruct a second person outside said zone to activate the controls on the main control console.
Always contact our Technical Office before carrying out any operation on the machine not specified in this manual.
It is also forbidden to run the machine tampering the protections or deactivating all the safety devices.
Before installing the machine, carefully read this manual and strictly follow the instructions contained herein.
Machine operator and maintenance personnel must wear the personal safety clothing stipulated by national regulations for safety in the work place (safety footwear, gloves and ear plugs or defenders).
A detailed description of the operations and positions assumed by the operator to perform a normal machine cycle in complete safety is given in the chapter entitled “INSTRUCTIONS FOR SAFE USE”.
It is in any case essential to ensure that the danger zone is clear of all personnel before activating any machine function.

IV DESCRIPTION OF MACHINE

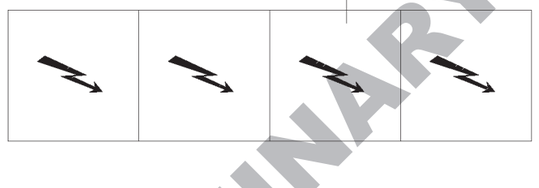
1 GENERAL INFORMATION

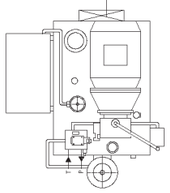
The TAL 200 is the pioneer cut-off unit for the welded tube production, in which we can find the most important technological innovations available today worldwide.
The TAL 200 is one of the first applications of the linear motor for flying cut-off unit.
This new technology let the transmission of the motion directly to the carriage (pos. 4) that houses the cut-off unit (pos. 5), without the use of belts, racks or other organs related to the motor.
As a result of this, the vibrations have strongly decreased and it has been improved the capacity of controlling the motion.
Those characteristics mean a better performance of the cut quality, more accuracy of the bar length with a longer life of the rotary blade.
It is also new the use of a brushless motor for the blade rotation that gives more stability to the speed and the forces during the cutting process.
The penetration movement of the blade inside the tube is given in charge to another brushless motor connected to a screw of high precision spheres movement, that gives also in this case a outstanding control.
Even with all the innovations, the cut-off unit is extremely reliable and it has been widely tested before the delivery.
The machine needs little maintenance, because it is provided with a centralized lubrication system, and can be completely programmed, so does not need the constant surveillance from the control console.

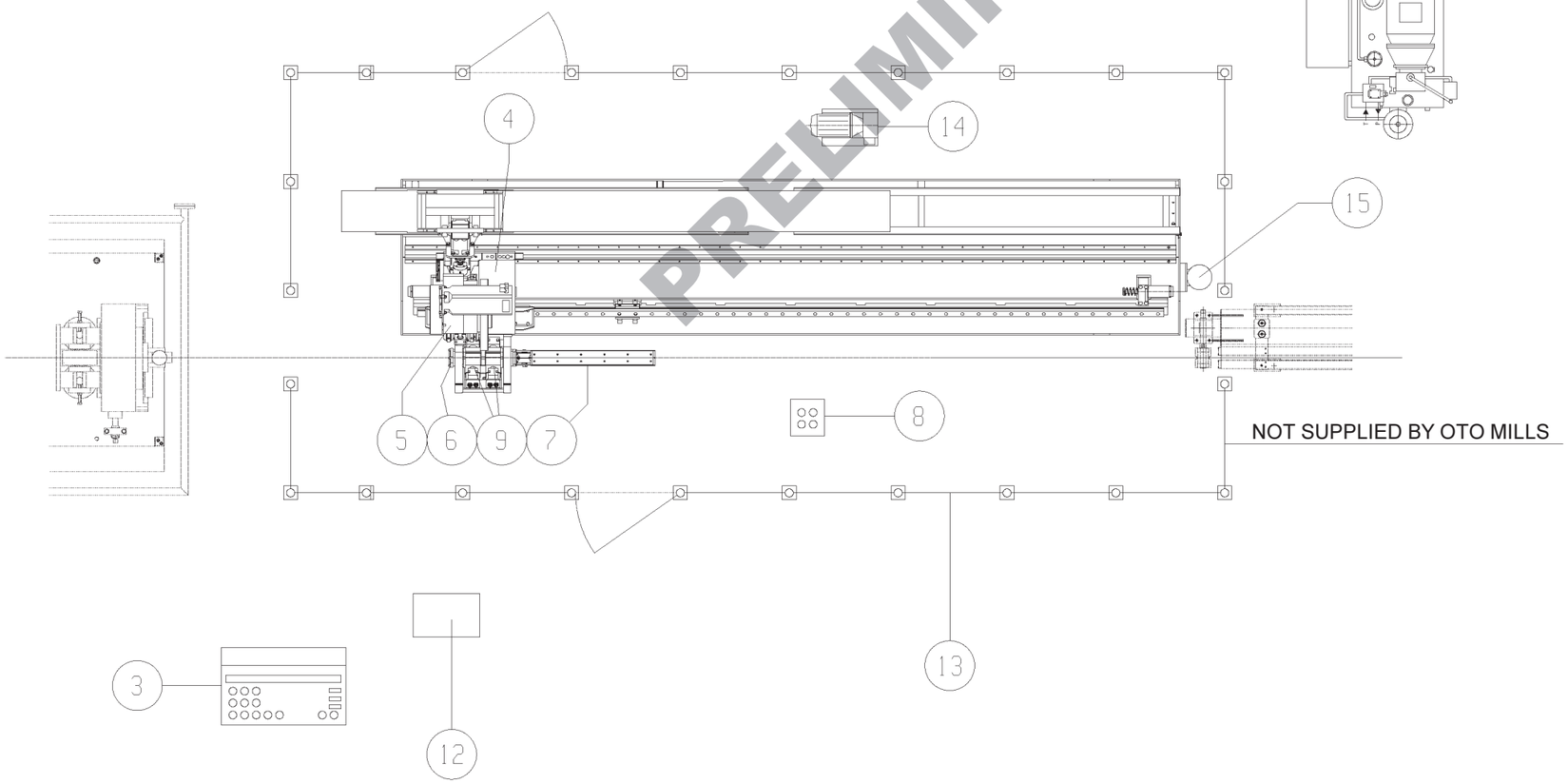




LH-RH





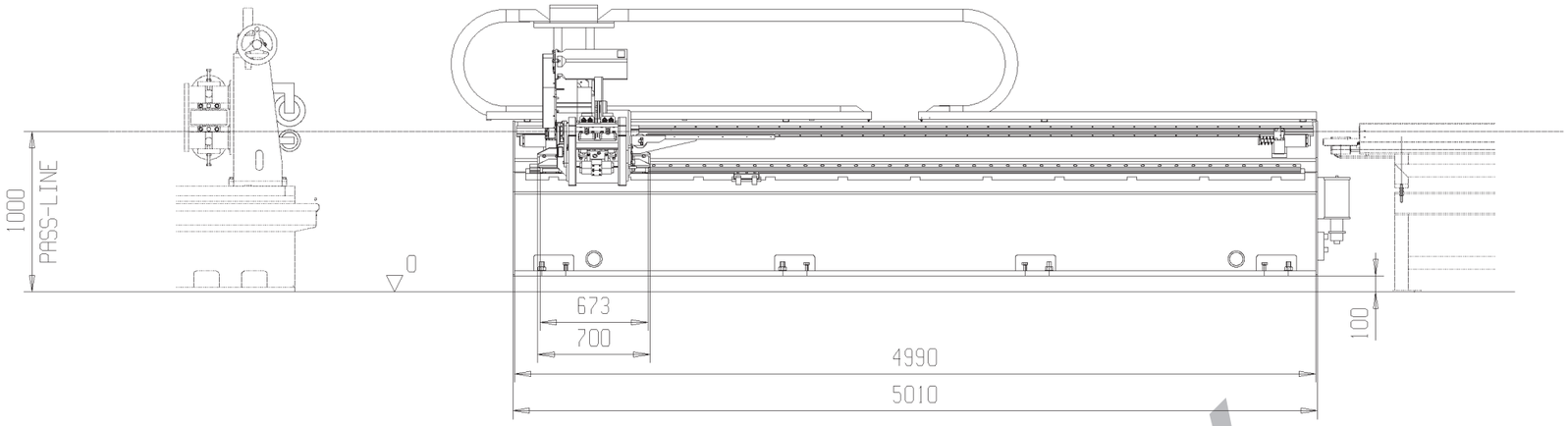


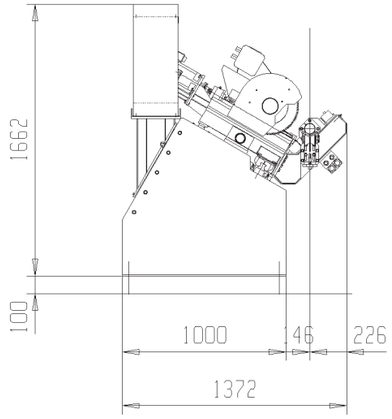
NOT SUPPLIED BY OTO MILLS

MACHINE LAYOUT	DRWNG. IV-1

KEY TO DRWNG. IV-1

1) Cutting bed
2) Feeding power unit for clamps cylinders
3) Main control console
4) Cold saw carriage
5) Shear
6) Output tube support
7) Input tube support
8) Local push button blade command
9) Clamps
10) Electrical cabinet
11) Tube speed sensor
12) Local control console
13) Perimeter protections (not supplied by OTO MILLS)
14) Blade cleaning pump
15) Greasing pneumatic pump





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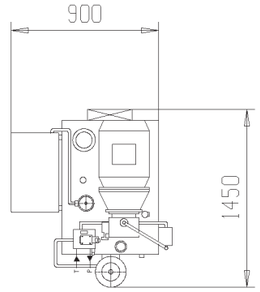
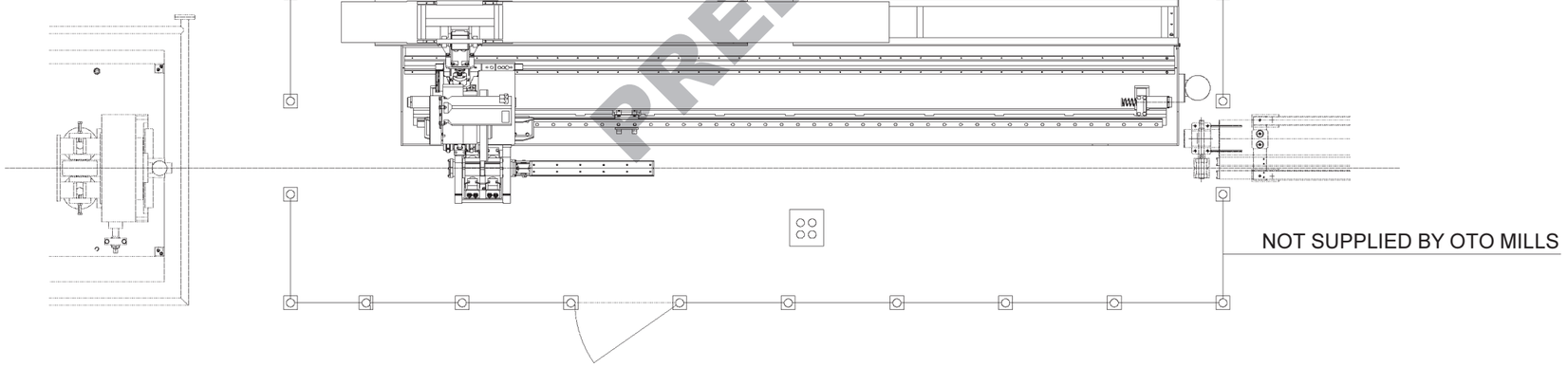
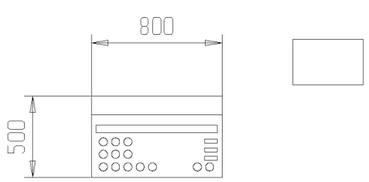






NOT SUPPLIED BY OTO MILLS

OVERALL DIMENSIONS	DRWNG. IV-2

4 TECHNICAL SPECIFICATIONS

TECHNICAL SPECIFICATIONS		TABLE IV-3
Kind of equipment used		Electric cold saw
Round tube diameter	mm	min. 19 max. 60
Square tube	mm mm	min. 15x15 max. 50x50
Rectangular tube	mm mm	min. 20x10 max. 20x75
Tube or profile thickness	mm	min. 0,8 max. 3
Maximum speed of tube mill	m.p.m.	200
Tolerance for cut length of	6 m	± 2,5 mm
Carriage weight (approx.)	kg	420
Saw blade (diameter)	mm	max. 350
Saw blade thickness	mm	max. 3
Noise level	dB(A)	Only definable following installation (*)

(*) The peak noise level generated by the cutting operation is about 85 to 90 dB (A) when measured 1 metre from the machine without soundproofed cabin or safety panels. During production, sound emissions are also determined by the noise generated by the tubes being processed and noise sources immediately upstream and downstream of the cutoff saw. Sound levels therefore depend on a number of factors: operating conditions, factory layout and product loading/unloading machines upstream and downstream of the unit.

When measuring sound pressure levels, use instruments conforming to I.E.C. 651 and I.E.C. 804 Class 1 standards, and take measurements from the points shown in figure IV-4 at the prescribed height from ground level (1.6 m) and distance (1 m) from the machine base.

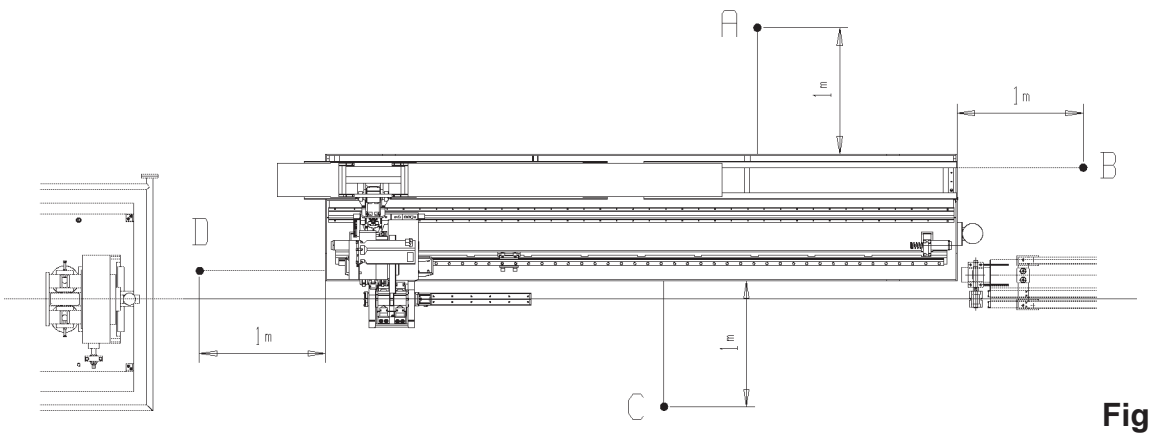


Fig. IV-4

5 ELECTRICAL SPECIFICATIONS

ELECTRICAL SPECIFICATIONS	TABLE IV- 5
Three-phase power supply voltage	380 V ± 10%
Mains frequency	50 Hz ± 0,5 Hz
Mains type TN -S	Neutral not required
Panel installed power	112 kVA
Accelerator motor rated power	15 kW
Average power factor (cos φ)	0,77
Operating temperature range	-7 °C ÷ +40 °C
Humidity (non-condensing)	30% ÷ 80%
Electric panel protection class	IP 54
Control console protection class	IP 54
Max. altitude above sea level	1000 m
Auxiliary voltages inside electric panel	110 V-50 Hz/24 V c.c. 220 V-50 Hz/24 V c.a.
Console controls voltage	24 V c.c.
Asynchronous motors voltage	330 V/50 Hz

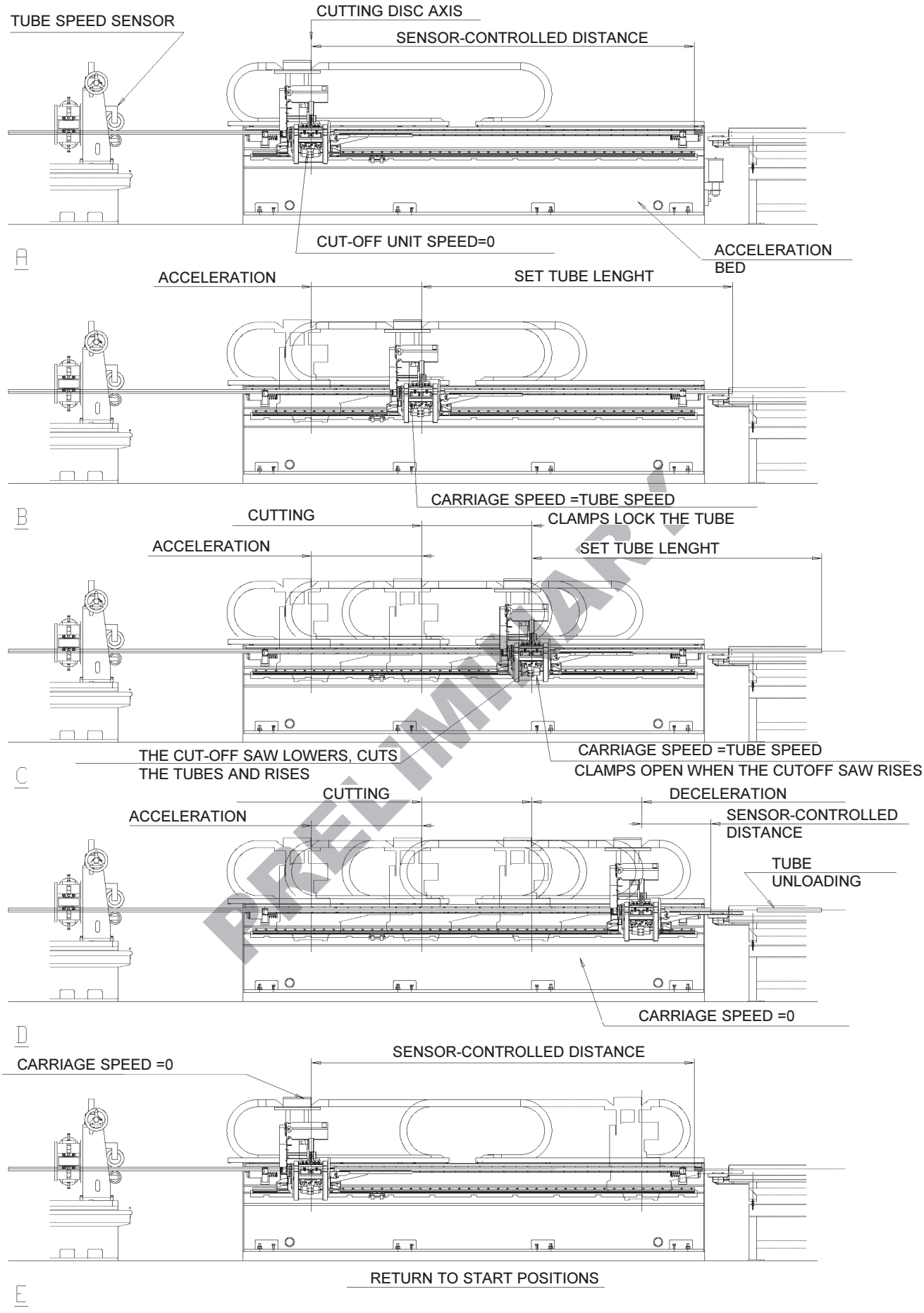
6 SPECIFICATIONS OF HYDRAULIC POWER UNIT FOR CYLINDERS AND CLAMPS

SPECIFICATIONS OF HYDRAULIC POWER UNIT FOR CYLINDERS AND CLAMPS TABLE IV- 6	
Actuators: tube locking unit	
Power	3 kW
Reservoir capacity	75 l
Flow rate	18 l/min.
Pressure	80 bar

V MACHINE OPERATING CYCLE

1 DESCRIPTION OF CYCLE

The cutoff saw cuts the continuous tubular profile section arriving from the tube mill into sections of the required length for sale and transport. The carriage must be positioned as close as possible to the run-out table to provide the necessary support to the cut tube during movement. Figure A illustrates the carriage position after a manual tube cutting operation prior to mill start-up. The initial cut supplies the position of the tube head to the electronic control system which processes the entire cycle. When production starts, the tube speed sensor instantaneously detects tube movement so that the microprocessor control can start processing all the work cycle parameters (acceleration, speed, carriage distance etc.) in relation to the set tube length.
Figure B illustrates how the carriage starts to cut the tube after first accelerating away to allow the tube to be fed through a distance equal to the length required.
Figure C illustrates the synchronism phase whereby the carriage and tube move at the same speed and the saw head lowers to cut the tube.
Figures D and E illustrate the carriage acceleration and return phases back to the start position which are controlled by the microprocessor in relation to the tube length.
The cutoff unit operates continuously, optimising acceleration, speed and travel instant by instant in relation to the tube speed, while at the same time performing the acceleration, synchronism, deceleration and return phases with the minimum possible friction.



MACHINE OPERATING CYCLE

DRWNG.V-1

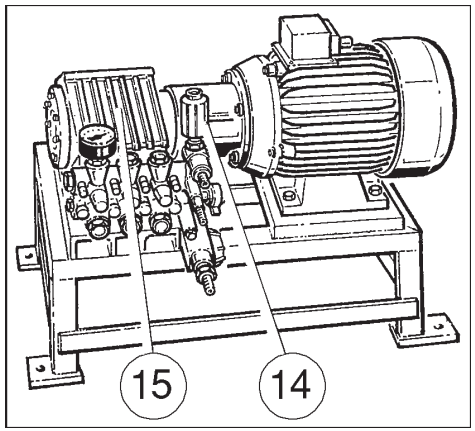
VI DESCRIPTION OF INDIVIDUAL UNITS

1 CUTTING BED

The cutting bed serves to operate, support and guide the carriage; it is composed by the following elements. A basement (pos. 1), in fabricated steel plate which has undergone a stress-relieving heat treatment, to which are bolted a lower linear guide (pos. 2) made of special profile stroke rods. On those guides are coupled the balls sliding block with big load capacity that support the carriage.
On the upper basement side there has been placed two rubber gaskets (pos. 3) to protect the inner organs during the carriage sliding. A linear motor at magnetic sliding placed inside the cutting bed, operates the carriage.
At the end of the basement there have been placed two transoms (pos. 10) with the duty of supporting the shock absorbers (pos. 5); those disposals go into action only if the linear motor loses the control of the carriage. In that case, the shock absorbers (pos. 5) cushion the carriage kinetic energy.
Inside the cutting bed there have been placed a linear encoder (pos. 12) to constantly check the carriage position; a reading verification (pos. 13) sends the data to the machine P.L.C. that displays them on the screen at the control panel. As an extra protection, always inside the basement (pos. 1), there are two guides (pos. 6) with the relative inductive sensors (pos. 7 and 8) placed in correspondence of the maximum carriage amplitude.
A cable conveyor chain (pos. 9), which is mounted on a support, fixed to the basement (pos. 1), guides the electrical cables and hydraulic hoses of the carriage as it traverses back and forth.
Close to the bed there is the local bush button panel (pos. 11) that allows the operator to regulate the blade stroke after it has come into the space delimited by the protections.

KEY TO DRWNG. VI-1

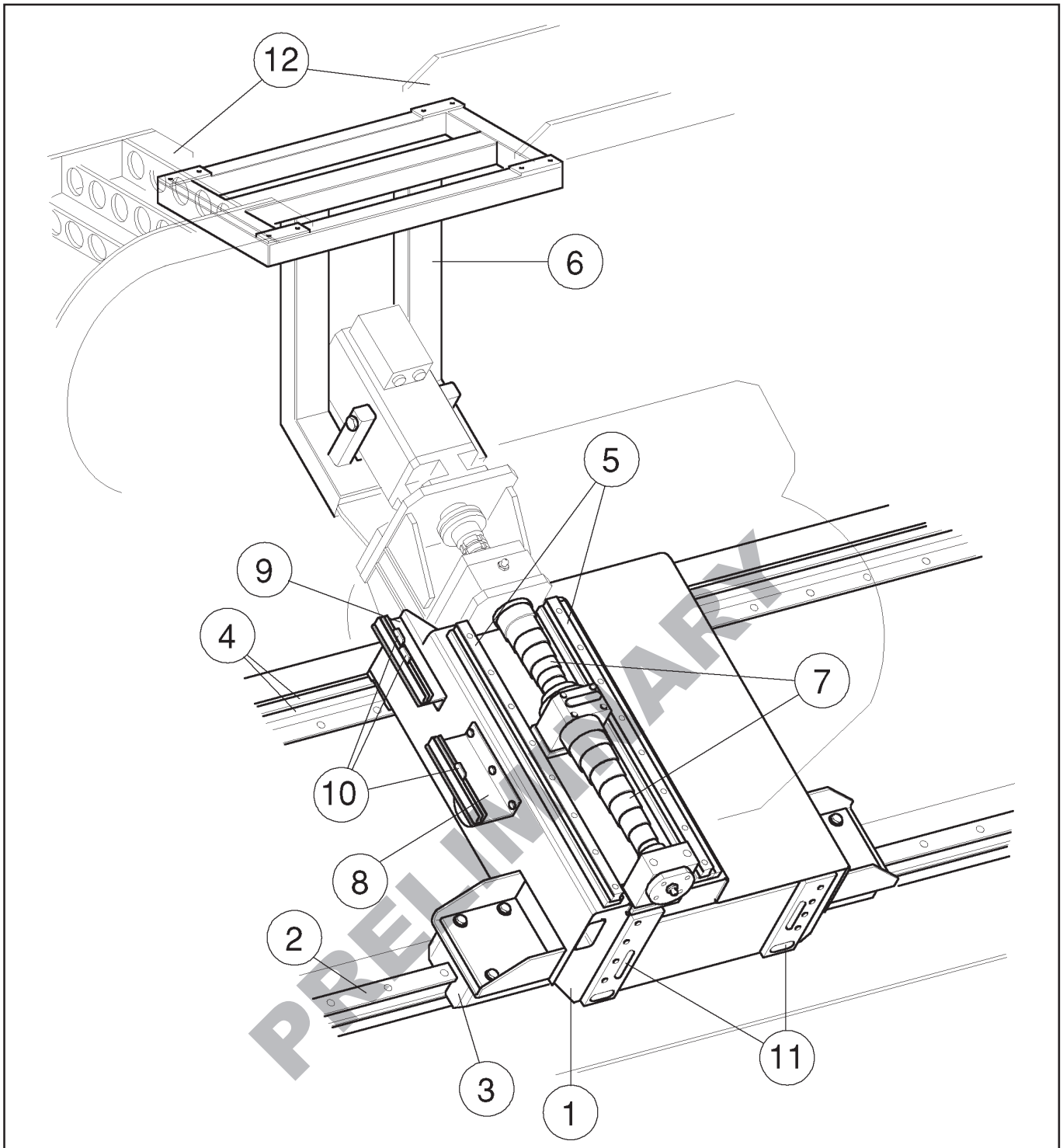
1) Basement
2) Sliding guide and carriage guide
3) Rubber gaskets for protection
4) Anchor bolts
5) Shock absorber
6) Inductive sensor guide
7) Forward emergency stop inductive sensor
8) Backward emergency stop inductive sensor
9) Cable conveyor chain
10) Transom
11) Local pushbutton blade regulation
12) Linear encoder
13) Reading verification
14) Water pressure valve
15) High pressure pump for blade cleaning



CUTTING BED	DRWNG. VI-1

2 CARRIAGE

The carriage comprises a fabricated steel frame (pos. 1). All the cutting and guide components are bolted to the machined surfaces of this frame, such as supporting arms (pos. 11) for the clamps, tube guides and sliding guides (pos. 5).
The carriage slides on the lower guide (pos. 2) of the cut-of unit by means of two sliding blocks (pos. 3) integral to the left and right carriage end. On the upper side the carrige has been connected to the linear motor support of the longitudinal motion.
The cable conveyor chain (pos. 12) guides the electrical cables and hydraulic hoses which supply the carriage components when the carriage traverses back and forth.
The cut-off unit, during the cutting operations, slides transversally to the carriage stroke on the proper guides (pos. 5). That stroke is controlled and stopped by the adjustable cams (pos. 10).



CARRIAGE	DRWNG. VI-2

KEY TO DRWNG. VI-2

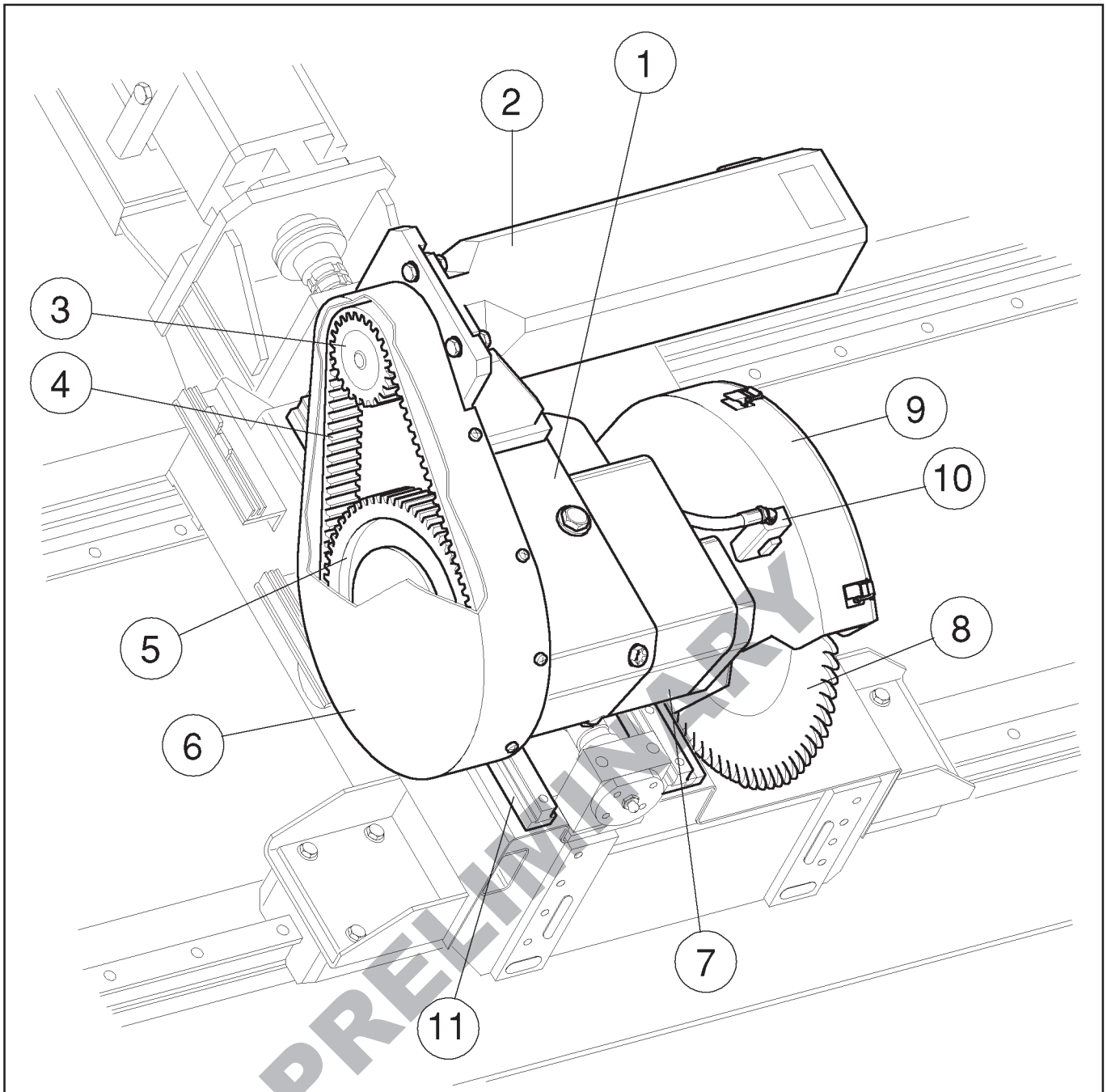
1) Frame
2) Carriage sliding track
3) Sliding block
4) Rubber gasket
5) Sliding guides cut-off unit
6) Cables conveyor support
7) Cut-off unit translation screw with spiral spring
8) Cam sliding guides
9) Cam sliding guides
10) Cams
11) Supporting arms for clamps and tube guides
12) Cable conveyor chain

3 ELECTRIC COLD SAW CUTOFF UNIT

The cut-of unit is placed on the carriage guides (pos. 11) , the transmission organs connected to the cut-off unit blade (pos. 8).
The cut-off unit is drag by the mandrel connected to the D.C. motor (pos. 2) by means of the reduction gear (pos. 7).
The guard (pos. 9), in case of blade breakage, contains the possible splints and it is also easily opened for quick blade changeover operations (pos. 8). Drive is transmitted from the electric motor (pos. 2) to the reduction box (pos. 7) by means of a timing belt (pos. 4) protected by the guard (pos. 6).

ELECTRIC MOTOR SPECIFICATIONS **TABLE VI-3**

Power kW	Speed rpm	Supply voltage
7,5	3000	380 V/50 Hz



ELECTRIC COLD SAW CUTOFF UNIT	DRWNG. **VI**-4

KEY TO DRWNG. VI-4

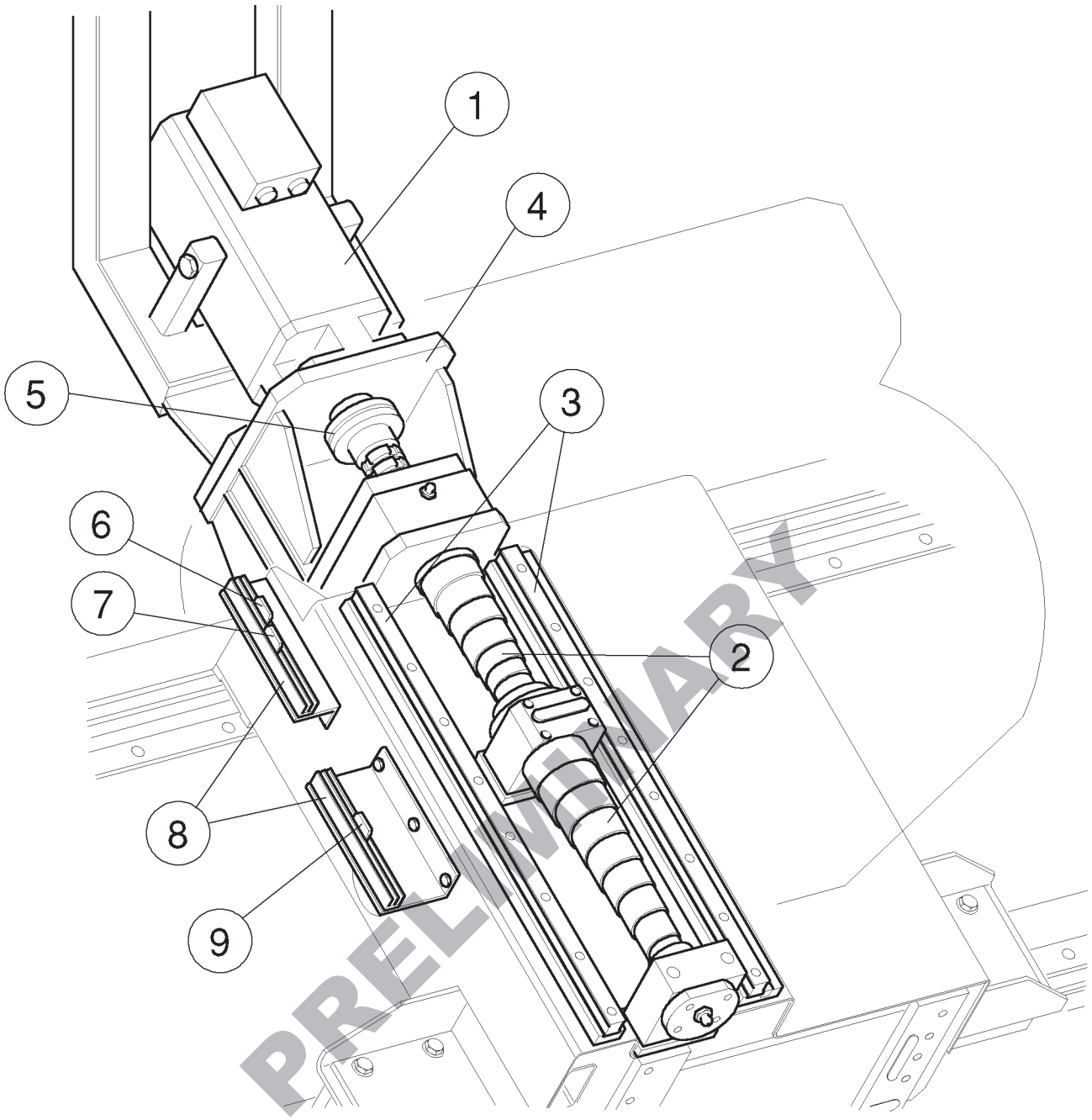
1) Reduction gear
2) Electrical motor in d.c.
3) Driving pulley
4) Timing belt
5) Driven pulley
6) Transmission belt
7) Reduction unit
8) Blade or cutting disc
9) Blade guard
10) Cleaning nozzles
11) Carriage guide

4 SLIDING MOTORIZATION FOR THE CUTOFF UNIT

The translation (pos. 2) screw moves the cutoff unit, which stroke, necessary for the cutting, is determined by the cams positioned on the cutoff unit (pos. 6-7-9).
A 4 tracer point limit stop note the position of the cams that determine the different passages necessary to execute the cutting operation: acceleration, slowing down, cutting execution and return of the cutoff unit to the departure point.
Also the encoder located inside the D.C. motor (pos. 1), delimits the high and low blade position depending on the positions set and memorised on the internal pushbutton.
The electrical motor (pos. 1) permits the translation of the threaded screw (pos. 2) and so the cutoff unit.
Two guides (pos. 3) placed on the carriage and that are coupled to the balls sliding rods, keep the cutoff unit on guide during the sliding.

ELECTRIC MOTOR SPECIFICATIONS **TABLE VI-5**

Power kW	Speed rpm	Supply voltage
2,6	3000	380 V/50 Hz



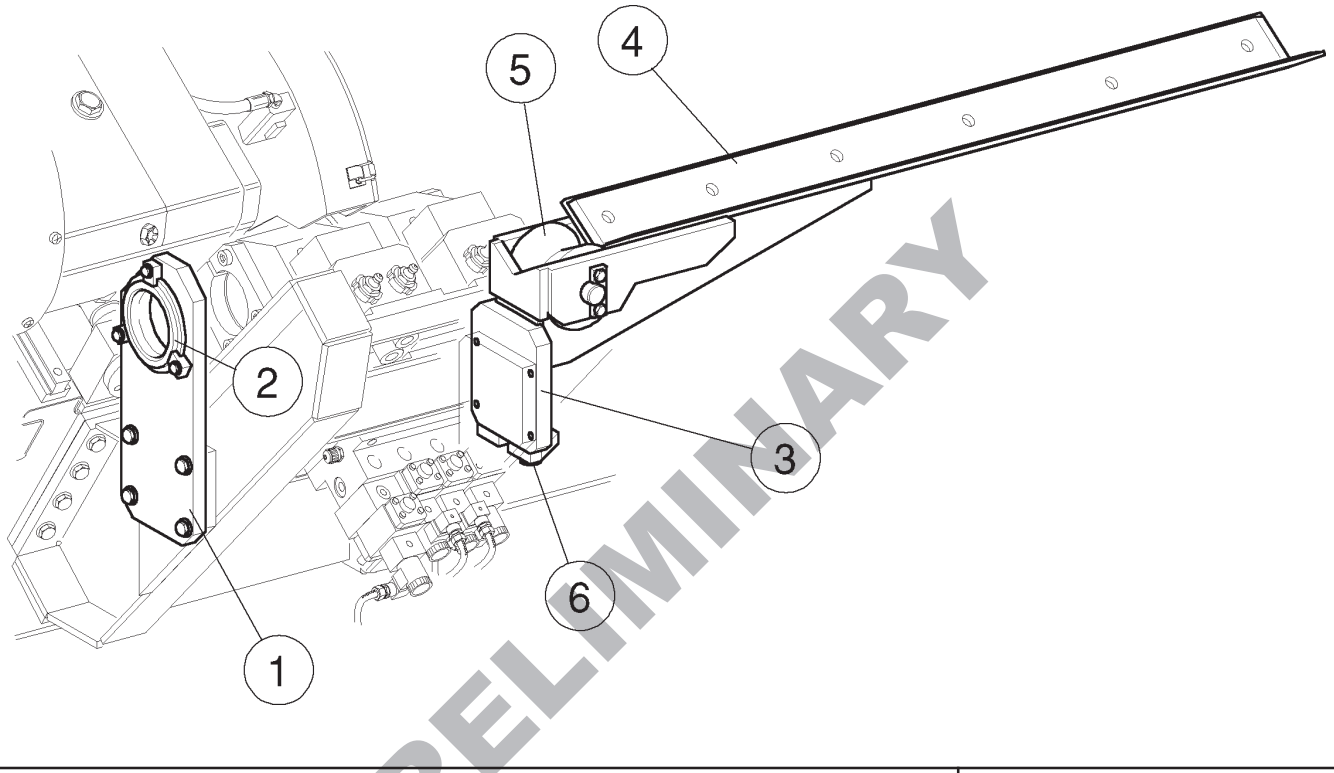
SLIDING MOTORIZATION FOR THE CUTOFF UNIT	DRWNG. **VI**-6

KEY TO DRWNG. VI-6

1) Electrical motor in d.c.
2) Translation screw with spiral spring
3) Sliding guides
4) Motor support
5) Connecting joint
6) Cam for fast carriage translation
7) Cam for carriage deceleration
8) Cam sliding guides
9) Cam for cut execution and return to the initial position

5 TUBE GUIDE

The tube guide (pos. 1 and 3) support and guide the tube or profile during the alternative stroke of the carriage.The entry one is made of a bronze flange (pos. 2) with variable dimensions depending on the tube/ profile size.
One exit a “V” shaped supporting profile (pos. 4) that can be adjusted, conveys the cut tube to the run-out table.That profile is coupled to a supporting horizontal roll (pos. 5).
The entry/exit tube guides must be regulated depending on the pass-line height.



TUBE GUIDES | DRWNG. **VI-7**

KEY TO DRWNG. VI-7

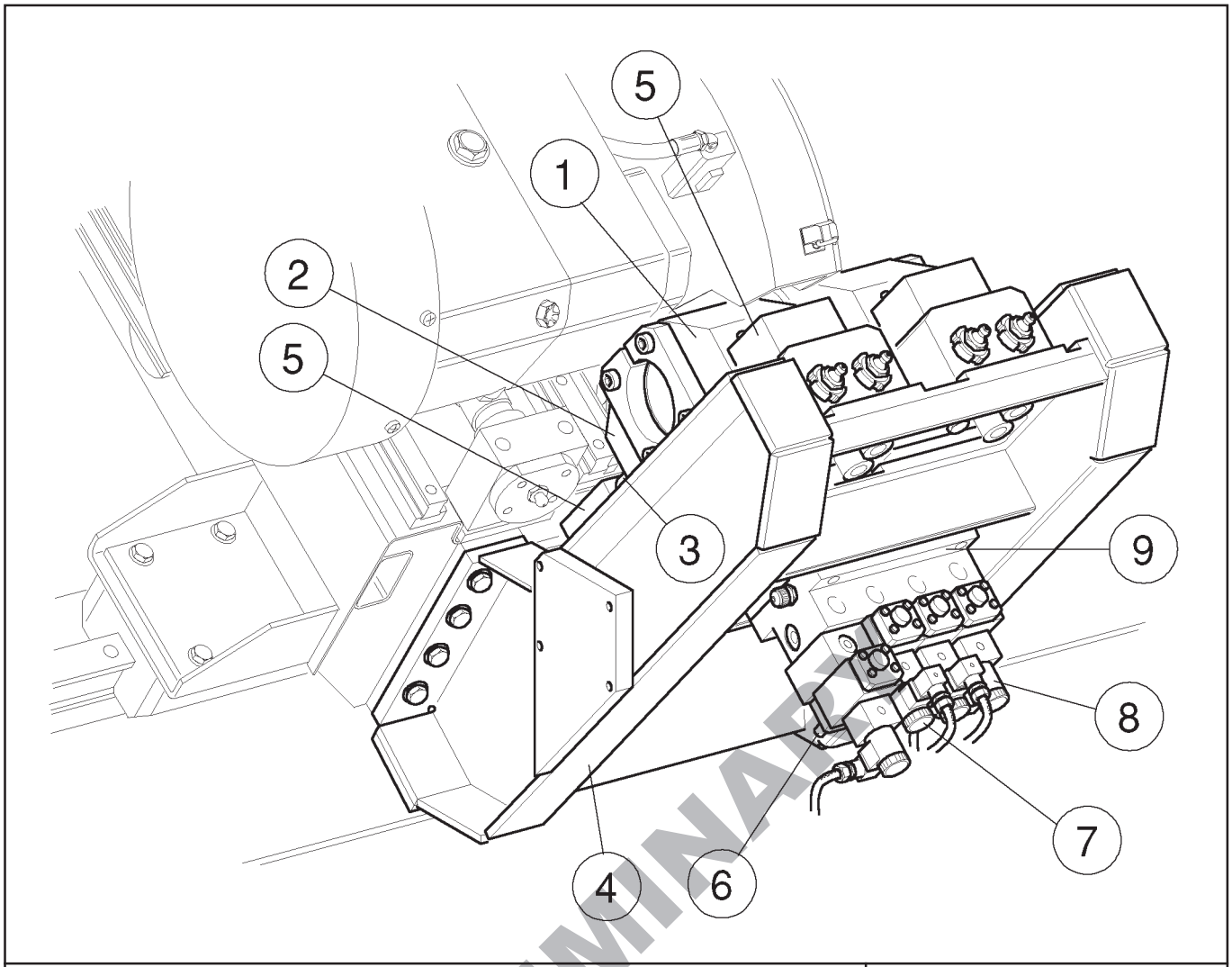
1) Entry tube guide
2) Bronze flange
3) Exit tube guide
4) "V" shaped profile tube supporting
5) Tube supporting roll
6) Block for tube guide regulation

6 CLAMPS UNIT

This is the apparatus that prevents the tube or profile from turning during cutting. There is absolutely no need for the clamps to immobilise the tube or profile preventing them from making longitudinal movements since the carriage should be travelling at exactly the same speed as the tube before the cutting operation is started. For this reason only relatively low clamping pressures are required.
The clamp jaws, which must be constructed as per the drawing supplied with the machine's technical literature, are fitted on clamps mountings (pos. 1and 2) that traverse along four guide rods (pos. 3).
Each clamp mounting (pos. 1 and 2) is operated by a pneumatic cylinder (pos. 5).
On the clams and tube guide support (pos. 4) it is mounted the block for the clamps control. This unit controls the hydraulic cylinders (pos. 5), and it is composed by the subbase (pos. 9), the piloted nonreturn valve (pos. 8) and the pressure reducer valve. Both solenoid valves (pos. 7) commands the piloted nonreturn valve (pos. 8), while the pressure reducer valve (pos. 6) allows the regulation of the clamps tightening pressure depending on the tube to be cut.

CLAMPING HYDRAULIC CYLINDER SPECIFICATIONS **TABLE VI-8**

UPPER CYLINDERS		
1"	5/8"	20
LOWER CYLINDERS		
1 5/8"	1"	25



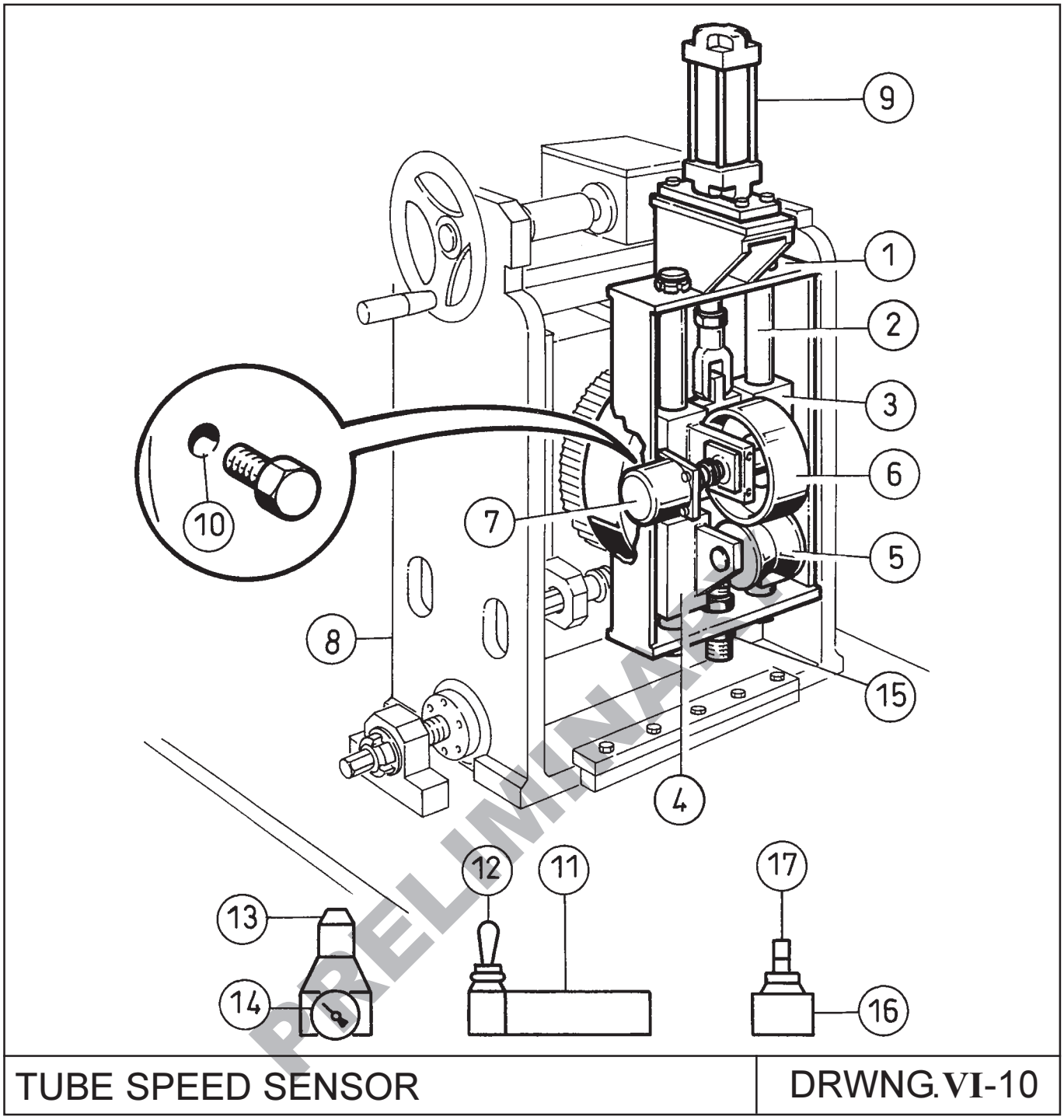
CLAMPS UNIT	DRWNG. VI-9

KEY TO DRWNG. VI-9

1) Upper clamp bearigns
2) Lower clamp bearigns
3) Sliding plugs
4) Clamps and tube guides support
5) Hydraulic cylinders
6) Pressure regulator valve with ring nut
7) Solenoid valves
8) Piloted non return valve
9) Subbase

7 TUBE SPEED SENSOR

This unit provides a reading of the tube mill speed by measuring the speed directly on the tube.
The sensor is fixed between the last two turksheads or, in the absence of sufficient space, on the last turkshead.
The sensor comprises a mounting (pos. 1) fitted to the turkshead roll support.
The guide rods (pos. 2) fitted to the mounting (pos. 1) guide the reading roll slideway (pos. 3) and contrast roll slideway (pos. 4). The contrast roll is adjusted by way of an adjuster screw (pos. 15). The reading roll (pos. 6) rides directly on the tube or profile. An encoder (pos. 7) is mounted on this roll by means of a flexible coupling so that it can convert rotary movement into electrical signals which are then relayed to the control panel where the microprocessor of position control processes them to calculate the mill speed and tube length.
The reading roll must be pressed against the tube to prevent slippage. This is achieved by a pneumatic cylinder (pos. 9) which operates the slideway (pos. 3) to press the reading roll against the tube. The pressure of the pneumatic cylinder is adjusted by a ring nut (pos. 13) and displayed on the relative pressure gauge (pos. 14).
The positioning valve (pos. 11) enables the operator to raise or lower the reading roll (pos. 6) using the relative lever (pos. 12). A flow control valve (pos. 16) with adjuster ring nut (pos. 17) controls the oil flow to prevent the reading roll from making violent impact with the tube when lowered.



TUBE SPEED SENSOR | DRWNG.**VI**-10

KEY TO DRAWING VI-10

1) Mounting
2) Guide rods
3) Reading roll slideway
4) Contrast roll slideway
5) Contrast roll
6) Reading roll
7) Encoder
8) Turkshead casing
9) Pneumatic cylinder
10) Mounting holes
11) Positioning valve
12) Positioning lever
13) Adjustment ring nut
14) Pressure gauge
15) Adjustment screw
16) Flow control valve
17) Adjustment ring nut

8 PERIMETER PROTECTIONS AND SAFETY DEVICES

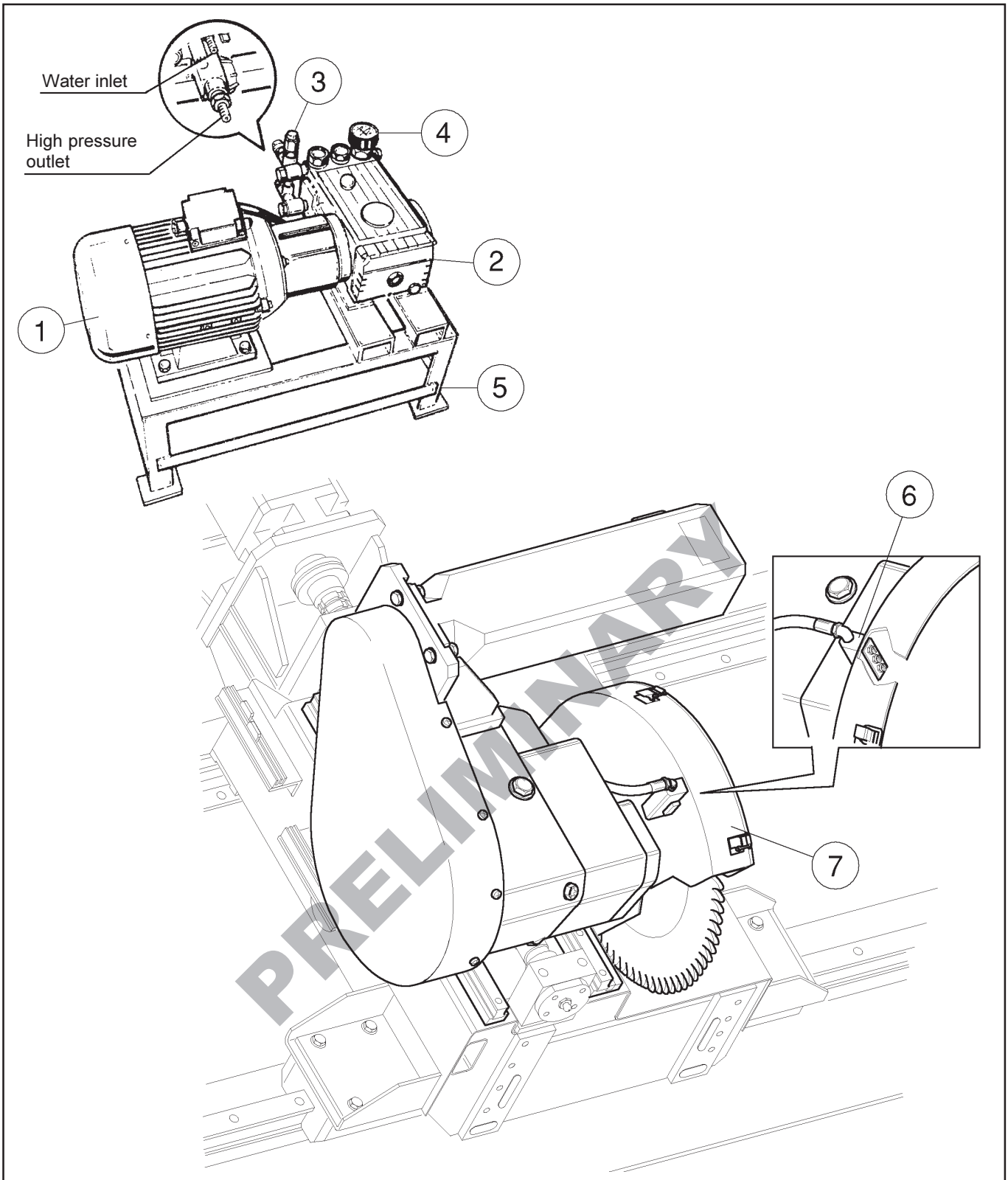
N.B.: NOT SUPPLIED BY OTO MILLS.

9 HIGH PRESSURE WATER PUMP

The pump unit delivers pressurised water to the nozzles (pos. 6) inside the blade guard (pos. 7). This efficient system both cools and removes the incandescent chips generated by the saw in order to keep the cutting zone clean.
The pump unit comprises a base (pos. 5) which mounts the high pressure monobloc motor-pump unit (pos. 1 and 2), complete with pressure control valve (pos. 3) and pressure gauge (pos. 4).

HIGH PRESSURE WATER PUMP SPECIFICATIONS
TABLE VI-11

motor power	5,5 kW
pump output	11 l/min
max. pressure	150 bar
nozzle	Ø 1,2 mm



HIGH PRESSURE WATER PUMP	DRWNG. VI-12

KEY TO DRAWING VI-12

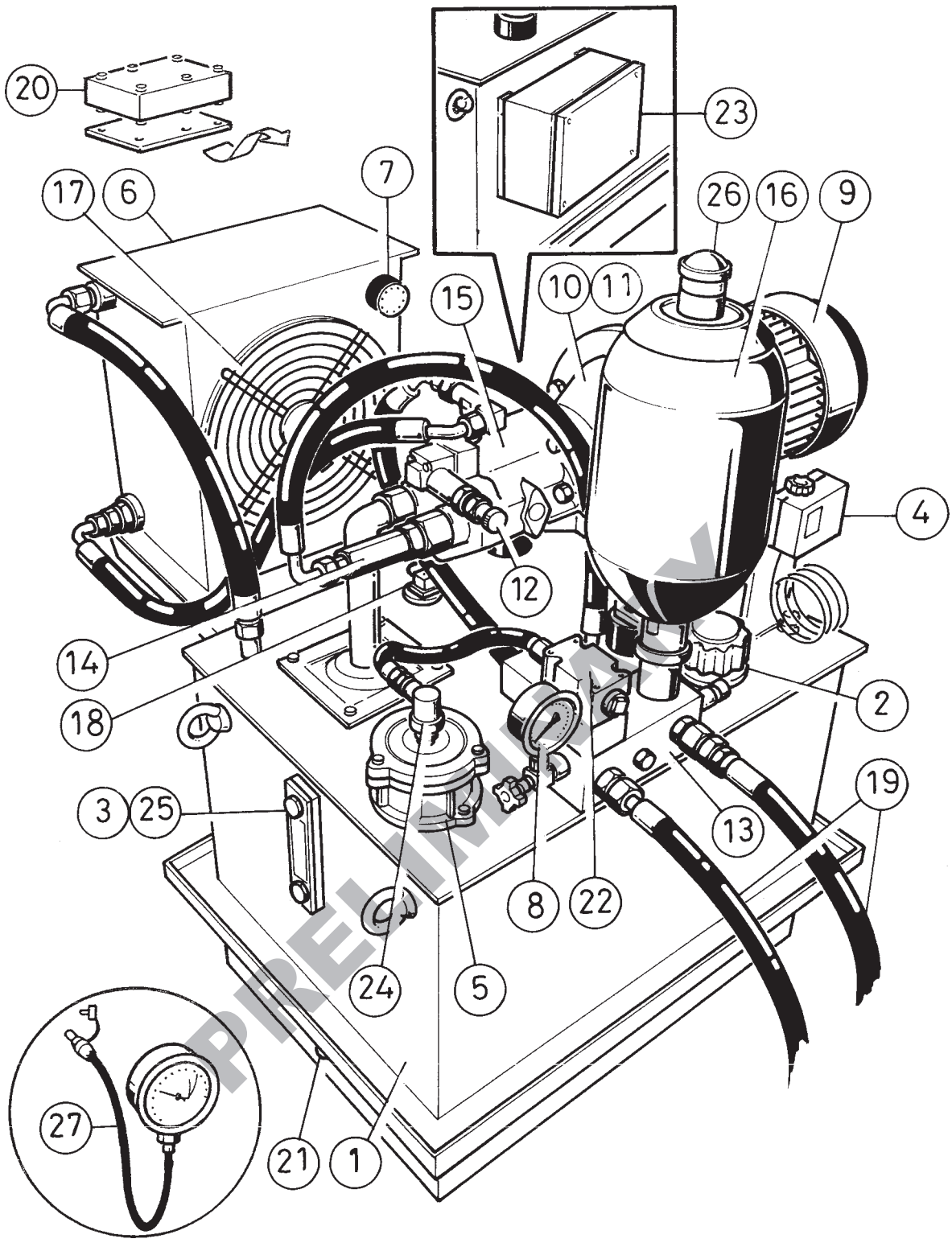
1) Motor
2) Pump
3) Pressure control valve
4) Pressure gauge
5) Base
6) Spray nozzles
7) Blade guard

VII CONTROL AND POWER UNITS

1 HYDRAULIC POWER UNIT FOR CYLINDER AND CLAMPS

The hydraulic power unit is responsible for pumping oil to the hydraulic cylinders during the various operating stages. The motor-pump unit comprises an electric motor (pos. 9), bell housing (pos. 10), coupling (pos. 11) and vane pump (pos. 15).
The reservoir (pos. 1) is equipped with a filler cap with filter (pos. 2), drain plug (pos. 21) and oil level sightglass (pos. 25) with termometer (pos. 3).
Oil is drawn from the reservoir (pos. 1) by the motor-pump unit (pos. 9-10-11-15) is delivered under pressure to the various users. The operating pressure is regulated by a control valve (pos. 12) and displayed on the corresponding pressure gauge (pos. 8) supplied with exclusion cock. The oil, back from the users, passes through the heat exchanger (pos. 6) and the filter (pos. 5) before arriving to the tank. On standby position the variable flow pump is cancelled and the circuit is under pressure.
When the actuators (hydraulic cylinders) are operated the pump delivers oil at a sufficient rate to effect the normal operating cycles.
The nitrogen-filled accumulator (pos. 16) serves to keep the oil at a uniform pressure in the hydraulic circuits when the actuators draw large quantities of pressurised oil. The pressure gauge (pos. 8) displays the actual pressure in the hydraulic circuits, which is available to the users.
A thermostat (pos. 4) controls the oil temperature in the reservoir, stopping the pump (pos. 15) when the oil reaches the maximum temperature; the other thermostat (pos. 7) controls activation of the cooling fan (pos. 17) inside the heat exchanger (pos. 6).
The oil circulating filter (pos. 5) is equipped with a clogging detection sensor (pos. 24) that advices the operator of the filter inefficiency by showing a message on the operator panel.
A sensor (pos. 18) checks that the oil keeps over the minimum level.
The electrical connections are housed in a junction box (pos. 23).

SPECIFICATIONS OF HYDRAULIC POWER UNIT FOR CYLINDER AND CLAMPS	TABLE VII-1
Motor power	3 kW
Flow rate	18 l/1'
Rated pressure	80 bar
Motor voltage	24 V c.c.
Solenoid voltage	380 V/50 Hz
Hydraulic circuit diagram	8706701-5286



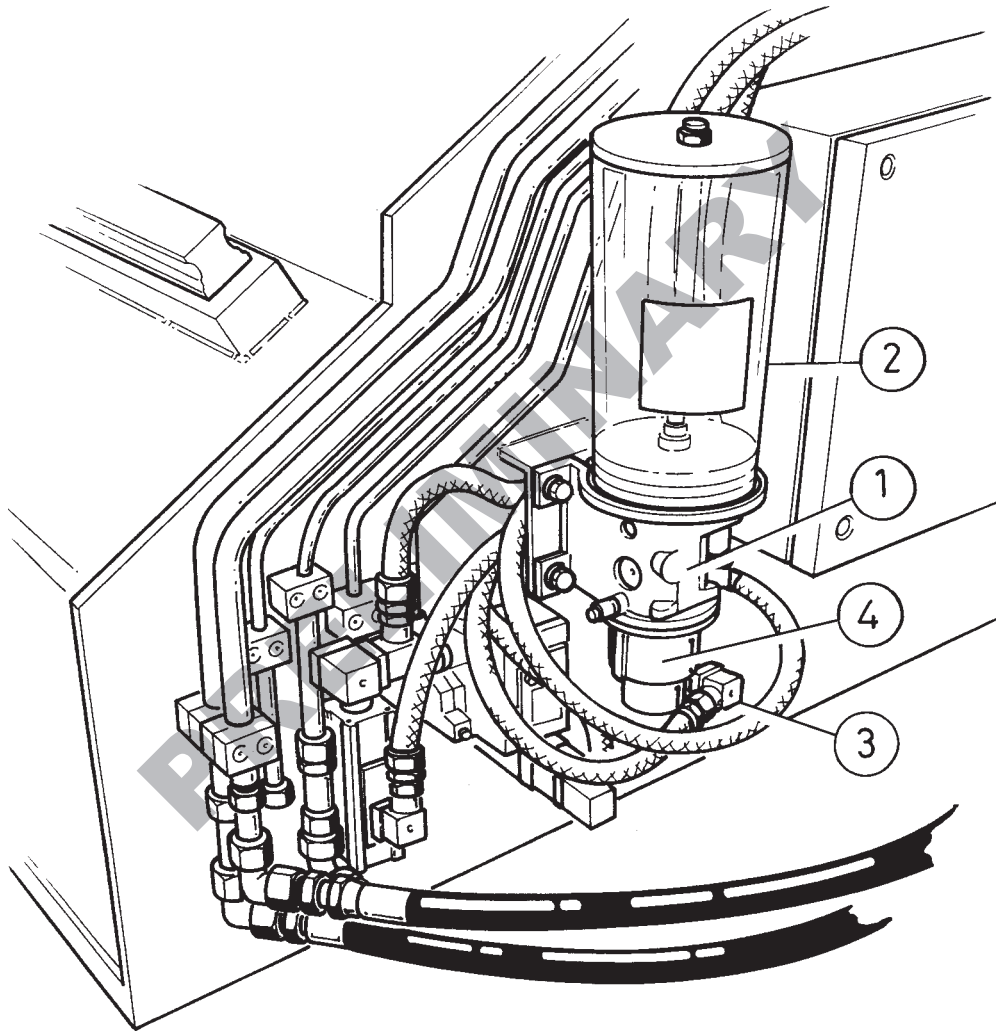
HYDRAULIC POWER UNIT FOR CYLINDER AND CLAMPS	DRWNG. **VII-2**

KEY TO DRWNG. VII-2

1) Reservoir
2) Oil load plug
3) Thermometer
4) Maximum temperature thermostat
5) Oil circulating filter
6) Air-oil exchanger
7) Fan activation thermostat
8) Pump pressure gauge
9) Electric motor
10) Bell housing
11) Joint
12) Pressure control valve
13) Base block
14) Non return valve
15) Vane pump
16) Accumulator
17) Cooling fan
18) Minimum oil level sensor
19) Delivery/return ports
20) Wash plate
21) Drain plug
22) Bypass solenoid valve
23) Junction box
24) Clogging detection sensor on oil circulating filter
25) Oil level sightglass
26) Accumulator cap
27) Pressure gauge with cable

2 GREASE LUBRICATION SYSTEM

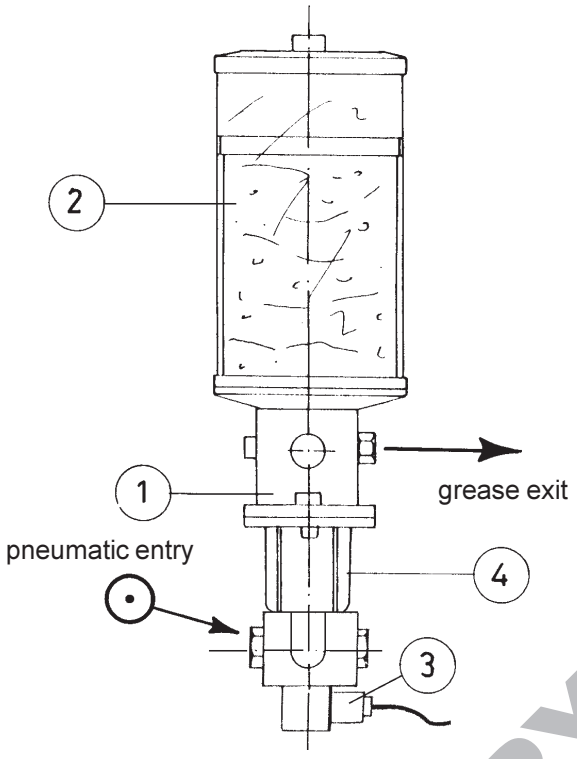
A grease lubrication circuit provides to the machine lubrication. This system is fed by a pneumatic pump (pos. 1) placed at one side of the cut-off unit.
The pneumatic pump (pos. 1) develops a pressure similar to 20 times the air command pressure. The flow is 2,5 cc at shot. The pump unit is composed by a steel casing with temperated and lapped piston.
The command unit is composed by a cylinder, on which slides a piston made of light alloy with special rubber gasket; the springs assures the return on the piston to the depart position.
Air command pressure : min. 4 bar - max. 8 bar.
The 1,5 kg container (pos. 2) is transparent and visualizes the grease level.
The command pneumatic unit is composed by the cylinder (pos. 4) operated by the solenoid valve (pos.3).
The distributor placed on the carriage at the lubrication pipes provides to divide the exit grease flow.



GREASE LUBRICATION SYSTEM | DRWNG. VII-3

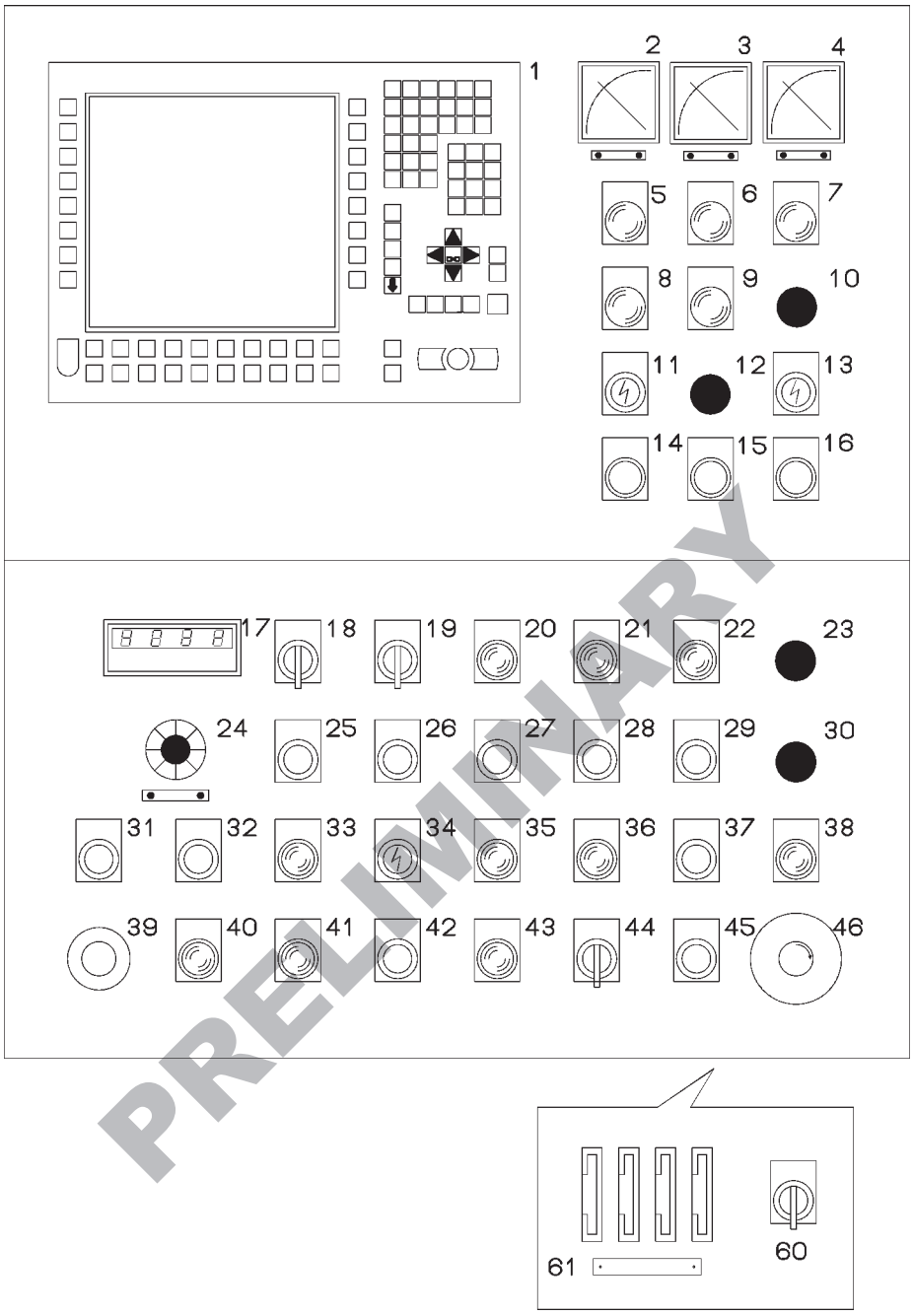
KEY TO DRWNG. VII-3

1) Greasing pump
2) Tank
3) Command solenoid valve
4) Greasing cylinder



GREASING PUMP | DRWNG. VII-4

3 CONTROL CONSOLE



CONTROL CONSOLE | DRWNG. VII-5

The devices required to program and control the machine are located on the control console and accessed by way of the operator control panel.

1. Operator panel: all the machine operating parameters are set using the keypad and displayed on the LCD screen.

2. Ammeter **"..."** (CORRENTE MOTORE TRASL. CARRO): instantaneous current read-out instrument with % scale of maximum current.

3. Ammeter **"..."** (CORRENTE MOTORE MOVIM. PIANO): instrument for the instant current reading of the motor in a.c. for the movement of the supporting plate cut-off unit, with % scale of maximum current.

4. Ammeter **"SAW MOTOR CURRENT"** (CORRENTE MOTORE FRESA): instantaneous current read-out instrument with % scale of maximum current.

5. White indicator lamp **"VOLTAGE ON"** (PRESENZA TENSIONE): this lamp illuminates when the panel is powered up by the masterswitch.

6. Yellow indicator lamp **"ALARMS ON"** (PRESENZA ALLARMI): this lamp illuminates to notify the operator of a fault, for which the corresponding alarm message is displayed on the screen.

7. Red indicator lamp **"GENERAL EMERGENCY"** (EMERGENZA GENERALE): if illuminated, this lamp indicates an emergency condition requesting shutdown of the mill or cutoff unit.

8. Yellow indicator lamp **"P.L.C. STOP"** (**P.L.C. STOP**): if on, the programmed controller (P.L.C.) does not work properly. or the auxiliaries have just been inserted, and the controller is carrying out the initial tests.

9. Yellow indicator lamp **"GEOMETRY PROCESSING"** (ELABORAZIONE GEOMETRIE): this lamp illuminates for a few seconds when the microprocessor is processing data. During this interval all manual commands are disabled.

10. Blank.

11. Key selector **"LOCAL COMMAND OFF-ON"** (COMANDI LOCALI OFF-ON): enables the commands of the local case.

12. Blank.

13. Key selector **"CONTROLS 0-1"** (SERVIZI OFF-ON): activation of the auxiliary circuits enables the machine control circuits. After activating the auxiliary circuits,wait until the lamp "PCL STOP" (pos. 6) is off, and press the reset button.

14. White indicator lamp**"CONTROLS ON"** (SERVIZI INSERITI): turns on when the key selector (pos. 13) enables the auxiliary circuits of the electrical panel.

15. White indicator lamp **"FRONT DOOR OPEN"** (PORTA ANTERIORE APERTA):it turns on if the operator opens the front door of the perimeter protections. That provokes the fast stop of the carriage, and can be temporally excluded with the selector (pos. 13), to regulate the blade stroke.

16. White indicator lamp **"REAR DOOR OPEN"** (PORTA POSTERIORE APERTA): it turns on if the operator opens the back door of the perimeter protections. That provokes the fast stop of the carriage.

17. Instrument **"BLADE SPEED"** (VELOCITÀ LAMA): indicates the blade speed in rev. per minute.

18. Three positions selector with return to center **"BLADE DOWN-0-UP"** (LAMA DISCESA-0-SALITA): controls manual blade descent if the saw head and main hydraulic power unit are running and the clamps are closed.

19. Three positions selector with return to center **"VICES OPEN-0-CLOSED"** (MORSE APRE-0-CHIUDE): controls manual tube locking operations if the main hydraulic power unit is running and the machine is not set to automatic mode.

20. White illuminated pushbutton **"MAIN HYDR. UNIT START"** (MARCIA CENTR. PRINCIPALE): starts the hydraulic power unit motor which actuates the clamps and blade cylinder on the carriage.

21. White illuminated pushbutton **"SAW START"** (MARCIA FRESA):commands the starting of the cold saw motor and the descent of the blade if the main unit is working and the clamps are closed.

22. White illuminated pushbutton **"ROLLER TABLE H.U. START"** (MARCIA CENTR. VIA RULLI): commands the start of run-out base.

23. Blank

24.Potentiometer **"BLADE SPEED ADJ."** (REGOL. VELOCITÀ LAMA): sets the blade rotation speed, can be checked on the instrument (pos. 17).

25. Black pushbutton **"INMEDIATE CUT"** (TAGLIO IMMEDIATO): controls a fixed length cut for scrapping, different to that set in the batch, which is programmed in the “Settings” page.

26. Black pushbutton **"INCREASED CUT"** (TAGLIO MAGGIORATO): requests a tube cut at a greater length according to the parameter set in the “Settings” page, in order to check tube quality without creating scrap.

27. Black pushbutton **"MAIN HYDR. UNIT STOP"** (ARRESTO CENTR. PRINCIPALE): stops the hydraulic power unit motor for the carriage.

28. Black pushbutton **"SAW STOP"** (ARRESTO FRESA): stops the saw head motor and raises the blade to the top of its stroke ready for substitution.

29. Black pushbutton **"ROLLER TABLE H.U. STOP"** (ARRESTO CENTR. VIA RULLI):for this commands description make reference to the run-out base instructions manual.

30. Blank

31/32. Black pushbuttons **"SPEED DOWN BLADE +/-"** (VELOCITÀ DISCESA LAMA +/-):

+ Increases cutting speed;
- Decreases cutting speed.

These buttons alter the speed with which the saw blade is lowered from 0 to 100%. The effective cutting

time also depends on the blade stroke setting and is displayed in the “Values page” in thousandths of a second, and also in the “Blade positioning page”.

33. White illuminated pushbutton.

34. Key selector.

35. White illuminated pushbutton **"LEFT DISCHARGE"** (SCARICO SX): select the left side for the intermediate tube discharge, both in automatic and manual mode. The selection is ignored if the C.N.D. is inserted.

36. White illuminated pushbutton **"RIGHT DISCHARGE"** (SCARICO DX): select the right side for the intermediate tube discharge, both in automatic and manual mode. The selection is ignored if the C.N.D. is inserted.

37. Black pushbutton **"MANUAL DISCHARGE"** (SCARICO MANUALE): Commands the tube discharge on the side choosen. Only with the run-out base standstill.

38. Blue illuminated button **"RESET"** (RIPRISTINO): resets machine operation after an emergency or during start-up. When the machine has been reset the illuminated button switches off. This button clears the alarm message from the display once the cause has been eliminated. If pressed for more than three seconds, the button also activates the indicator lamp test.

39. Yellow mushroom shaped pushbutton **"FAST STOP"** (ARRESTO RAPIDO): when pressed, this button immediately shuts down the cutoff saw and also the mill if running, when an emergency occurs in the cutting zone. It does not however shut down the entire plant and interlocked machines. Once the danger has been removed, reset and restart the machine.

40. Yellow illuminated pushbutton **"MANUAL CUT"** (TAGLIO MANUALE): controls stationary tube cutting with simultaneous clamp and blade activation. The lamp flashes to remind the operator to perform a manual cut in order to activate the automatic cycle. The lamp also illuminates during the cutting cycle.

41 White illuminated pushbutton.

42. Black pushbutton **"CARRIAGE STOP"** (ARRESTO CARRO): stops the carriage automatic cycle.This button interrupts automatic cutting mode and stops the mill; it can also be used to raise the blade and open the tube locking clamps in the event of a cutting cycle error.

43. White illuminated pushbutton **"CARRIAGE START"** (MARCIA CARRO): locates the starting point and activates the automatic cutting cycle. If the carriage is already at the start of the bed the button flashes. When the button is pressed, the carriage will move to the required position along the bed. After a manual cut, press the button again to start the automatic cycle, during which the button light is permanently illuminated.

44. Three positions selector with return o center **"JOG REVERSE-0-FORWARD"** (IMPULSI INDIETRO-0-AVANTI): Enables slow carriage translation in manual mode. The carriage translates back to the reference proximity switch (pos. 8, drwng. VI-1) and forward to the forward emergency stop proximity switch (pos. 7, drwng. VI-1).

45. Black pushbutton **"MILL STOP"** (ARRESTO PROFILA): Brings the mill to a gradual stop, but without disabling automatic cutting mode. The carriage motor is therefore still running.

46. Red mushroom shaped pushbutton **"EMERGENCY"** (EMERGENZA): Immediately shuts down the cutoff unit and interlocked machines in an emergency. To resume operation, first make sure the danger has been eliminated and then turn the button to release it and press the reset button (pos. 38). This done, reset the other interlocked machines in the line and start up.

The following controls are located inside the control console base and are only used as a contingency measure when the operator panel malfunctions in order to ensure uninterrupted production until the fault is remedied.

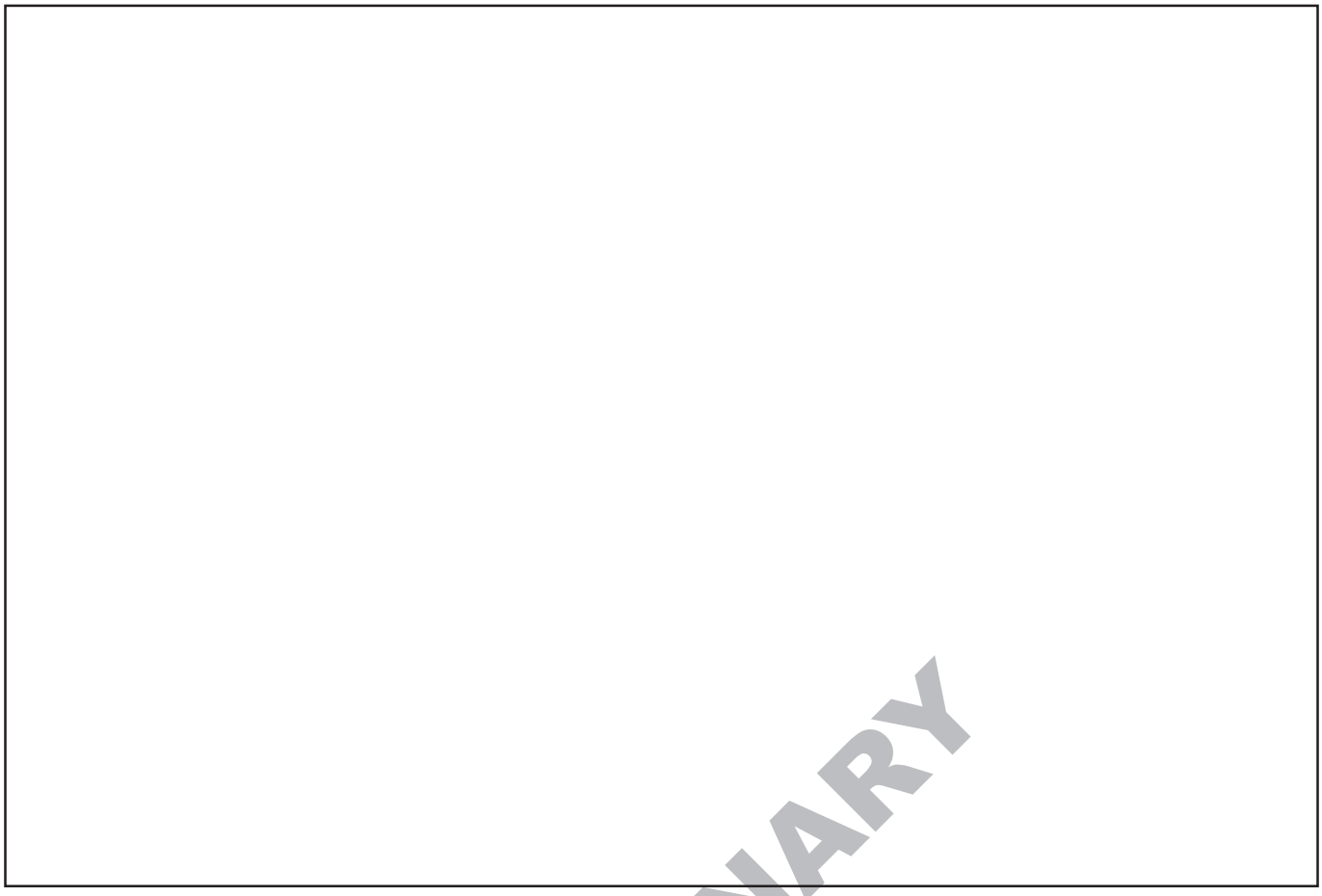
60. Two positions modal selector **"LENGHT SETTING/MONITOR-CONTRAVES"** (IMPOST. LUNGHEZZA MONITOR-CONTRAVES): when set to MONITOR, parameters are programmed as normal using the operator panel. Instead when set to CONTRAVES, the digital selectors (pos. 61) are enabled to set the tube length only.

61. Digital selectors **"LENGHT TUBE"** (LUNGHEZZA TUBO): These selectors set the tube length in mm when selector (pos. 60) is set to CONTRAVES mode.

4 SIEMENS OPERATOR PANEL

The cutoff unit control console is equipped with a Siemens operator panel from which the operator can display and program the machine's main functions.

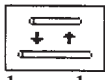
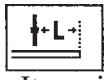
SIEMENS OPERATOR PANEL	DRWNG. **VII**-6



When switched on the logo “L3” is displayed as illustrated above. To select the required language press the FUNCTION KEY corresponding to the language “Icon” displayed.
Once you have selected the required language the "Values page" page (No. 2) is opened.

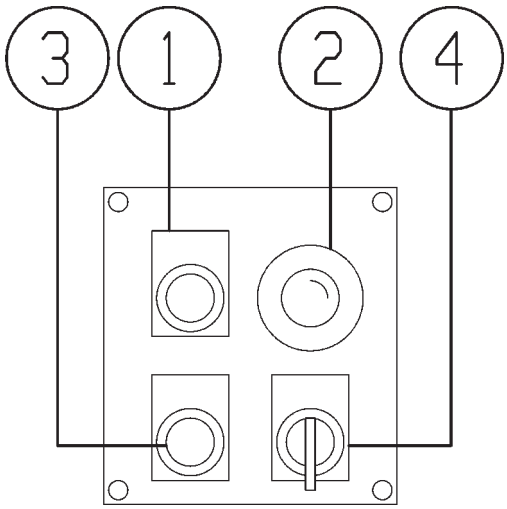
5 SERVICE MESSAGES

The service messages indicate the machine's operating status during a normal production cycle.
These messages are displayed at the top of the OP37 operator panel display.

3) **PRESS "ENTER" BUTTON TO CONFIRM** (PREMERE IL TASTO ENTER PER CONFERMARE)	This message is   displayed each time you press one of the above keys. It reminds the operator to press ENTER within 3 seconds to confirm the operation selected.
4) **GEOMETRY PROCESSING AND ORDER CHANGE ON** (ELABORAZIONE DELLA GEOMETRIA IN CORSO)	The microprocessor is processing the new geometry. The batch cannot be changed during this interval.
5) **SIMULATION ON** (SIMULAZIONE ATTIVA)	This message indicates that one or more simulation functions (tube, carriage or blade) is enabled in the SIMULATION page.
6) **MILL STOP FOR ORDER COMPLETED** (ARRESTO DELLA LINEA PER FINE PRODUZIONE)	In automatic batch management mode this message indicates completion of all 10 batches in the queue. Program a new batch list, press reset and load the first batch to be processed.
14) **LENGTH TUBE TO CONTRAVES TUMBWHEELS** (LUNGHEZZA DEL TUBO IMPOSTATA SU CONTRAVES)	This message indicates that the tube length preselector underneath the cutoff unit control console has been enabled. This selector is used to manually set the tube length if the OP37 monitor malfunctions.
16) **EMULSION WATER LOSS** (MANCANZA ACQUA EMULSIVA)	This message is displayed if the blade wash pump is disabled or does not work when connected to the mains water supply. This message also disables the cutoff saw.
15) **SECURITY SUSPENDED** (SOSPENSIONE DELLE SICUREZZE)	This message is displayed when the LOCAL CONTROLS selector on the local control panel has been enabled to access the perimeter protections.
26) **MOVE THE CARRIAGE ON START LIMIT SWITCH** (PORTARE IL CARRO SUL FINECORSA DI PARTENZA)	In manual carriage mode, this message reminds the operator to return the carriage to the start position before setting the carriage to automatic.
27) **START POSITION SEARCHING** (FASATURA DEL CARRO IN CORSO)	This message indicates that the microprocessor is optimising the first tube or is tracking the start position before starting the automatic cycle.
28) **PRESS "MANUAL CUT" BUTTON** (INTESTARE IL TUBO PREMENDO IL TASTO DI TAGLIO MANUALE)	This message is displayed when tracking is not possible and it is therefore necessary to manually cut the excess tube at any point along the cutting bed.

31) **MILL SPEED TOO HIGH** (VELOCITÀ DI LINEA TROPPO ALTA PER L'ORDINE IN ATTESA)	In automatic batch management mode this message indicates that the mill speed is too fast for the next batch length. The speed must therefore be reduced before the batch changes to prevent tripping the relative cutting cycle alarm.
32) **ORDER CHANGING** (CAMBIO DELL'ORDINE IN CORSO)	This message indicates that the microprocessor is changing batch. Batch changeovers are performed immediately when the carriage is stationary, but only after a further two cutting cycles when the carriage is already operating.

6 LOCAL PUSHBUTTONS



LOCAL PUSHBUTTON L1 | DRWNG. **VII**-7

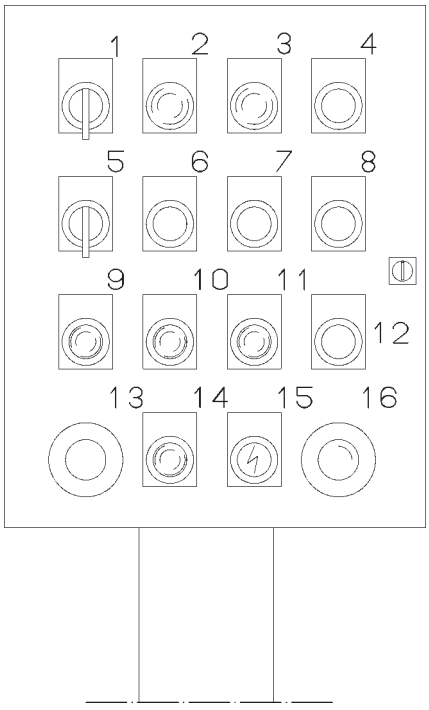
During cutting cycle set-up operations, the operator is required to enter the cabin to make a number of adjustments. This presents no danger to the operator insofar that the service door limitswitches and key-operated selector on the control console disable the cutoff saw and accelerator motors.
The **LOCAL PUSHBUTTON L1** is mounted on the cutting bed inside the perimeter protections. It controls the following blade stroke positioning and checking functions:

1) Black pushbutton **"BLADE UP MEMORY"** (MEMORIZZAZIONE POSIZ. LAMA ALTA): Press this button to save the blade top stroke position at the end of the cutting cycle.
This function is only enabled when the LOCAL CONTROLS are activated.

2) Red mushroom shaped pushbutton with stop button (positive safety type) **"EMERGENCY"** (EMERGENZA): Immediately shuts down the cutoff unit and interlocked machines in an emergency. To resume operation, first make sure the danger has been eliminated and then turn the button to release it and press the reset button (pos. 38 drwng. VII-5). This done, reset the other interlocked machines in the line and start up.

3) Black pushbutton **"BLADE DOWN MEMORY"** (MEMORIZZAZIONE POSIZ. LAMA BASSA): by pushing this button, the blade position is memorised as blade descent position during the cutting cycle. Memorization is possible only when are enabled the LOCAL COMMANDS.

4) 3-position selector with centre return **"BLADE DOWN-0-UP"** (LAMA DISCESA-0-SALITA): This selector controls slow blade adjustments to locate the exact blade position to be memorised, and to check whether the blade stroke is sufficient to cut through the entire tube.



LOCAL PUSHBUTTON | DRWNG. **VII**-8

The LOCAL PUHBUTTON is fixed outside the perimeter protections and it is close to the cut-off unit. It has the following functions:

1) Three-positions selector with return to center **"JOG REVERSE-0-FORWARD"** (IMPULSI INDIETRO-0-AVANTI): Enables slow carriage translation in manual mode. The carriage translates back to the reference proximity switch (pos. 8, drwng. VI-1) and forward to the forward emergency stop proximity switch (pos. 7, drwng. VI-1).

2) White illuminated lamp **"LOCAL COMMAND"** (COMANDI LOCALI): is enabled by the OFF-ON local command selector when it is positioned in ON.

3) White illuminated lamp **"VOLTAGE ON"** (PRESENZA TENSIONE):illuminates when the pushbutton in normally fed.

4) Black pushbutton **"MILL STOP"** (ARRESTO PROFILA): push it to stop the profile.

5) Three-positions selector with return to center **"VICES OPEN-0-CLOSED"** (MORSE APRE-0-CHIUDE): controls manual tube locking operations if the main hydraulic power unit is running and the machine is not set to automatic mode.

6) Black pushbutton **"INMEDIATE CUT"** (TAGLIO INMEDIATO): controls a fixed length cut for scrapping, different to that set in the "Settings" page.

7) Black pushbutton **"INCREASED CUT"** (TAGLIO MAGGIORATO): requests a tube cut at a greater length according to the parameter set in the "Settings" page, in order to check tube quality without creating scrap.

8) Black pushbutton **"AUTOMATIC STOP"** (ARRESTO AUTOMATICO):stops the carriage automatic cycle.This button interrupts automatic cutting mode and stops the mill; it can also be used to raise the blade and open the tube locking clamps in the event of a cutting cycle error.

9) White illuminated pushbutton .

10) White illuminated pushbutton **"MANUAL CUT"** (TAGLIO MANUALE):controls stationary tube cutting with simultaneous clamp and blade activation. The lamp flashes to remind the operator to perform a manual cut in order to activate the automatic cycle. The lamp also illuminates during the cutting cycle.

11) White illuminated pushbutton **"SAW START"** (FRESA IN MARCIA): command the starting of the motor cold saw.

12) Black pushbutton **"SAW STOP"** (ARRESTO FRESA): stops the saw head motor and raises the blade to the top of its stroke ready for substitution.

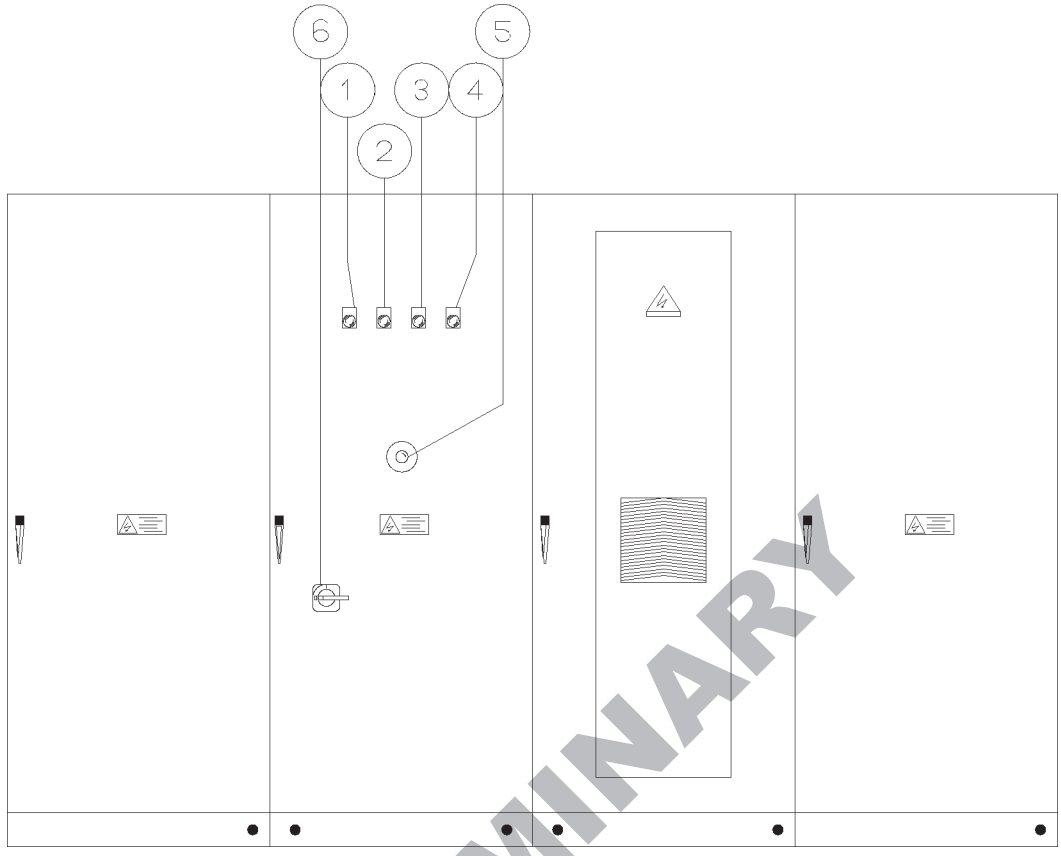
13) Yellow mushroom shaped pushbutton **" FAST STOP"** (ARRESTO RAPIDO): when pressed, this button immediately shuts down the cutoff saw and also the mill if running, when an emergency occurs in the cutting zone. It does not however shut down the entire plant and interlocked machines. Once the danger has been removed, reset and restart the machine.

14) Blue illuminated button **"RESET"** (RIPRISTINO): resets machine operation after an emergency or during start-up. When the machine has been reset the illuminated button switches off. This button clears the alarm message from the display once the cause has been eliminated. If pressed for more than three seconds, the button also activates the indicator lamp test.

15) Key selector **"SECURITY RESET"** (RIPRISTINO SICUREZZE): this selector is user with the reset blue illuminated button. That operation brings the machine into working conditions.

16) Red mushroom shaped pushbutton with stop button (positive safety type) **"EMERGENCY"** (EMERGENZA): Immediately shuts down the cutoff unit and interlocked machines in an emergency. To resume operation, first make sure the danger has been eliminated and then turn the button to release it and press the reset button (pos. 14 and 15). This done, reset the other interlocked machines in the line and start up.

7 ELECTRICAL CABINET



ELECTRICAL CABINET	DRWNG. VII-9

The electric panel contains all the control and power circuits controlled by the PLC in accordance with the program sequence and controls on the cutting unit console. All checking, maintenance and adjustment operations must ONLY be performed by the technician in charge or by specialist technicians totally familiar with the risks associated with “live” power circuit boards.

1) White illuminated lamp **"110 V a.c."** (110 V c.a.): illuminates when the 110 Vac auxiliary circuits inside the cutting control panel are correctly powered up.

2) White illuminated lamp **"24 V d.c."** (24 V c.c.):illuminates when the 24 Vdc auxiliary circuits inside the cutting control panel are correctly powered up.

3) Red illuminated lamp **"P.L.C. STOP"** (P.L.C. STOP): illuminates when the PLC controlling the machine malfunctions and shuts down. The machine cannot perform any operation in this status. To restore normal operating conditions consult the PLC technical handbook.

4) Red lamp **"GENERAL EMERGENCY"** (EMERGENZA GENERALE): illuminates when there is an emergency stop request from the mill or the same cut.

5) Red mushroom shaped pushbutton with stop button (positive safety type)**"EMERGENCY"** (EMERGENZA):when pressed, this button immediately shuts down the machine and all other interlocked machines in an emergency. The resetting sequence is described in point 38 on page VII-3.

6) **Rotary MASTERSWITCH:** If the masterswitch is tripped by a power failure, overload or opening of the electric panel doors, the lever shifts to the intermediate position (TRIP). To reset the masterswitch, set it to OFF (RESET) and switch it back on again after first identifying and eliminating the cause of the alarm.

*) **Air conditioner:** Air cooling system installed inside the electrical cabinet which activates a few minutes after the cabinet doors are closed. The air filter must be cleaned at regular intervals.

VIII MACHINE INSTALLATION AND CHECKS

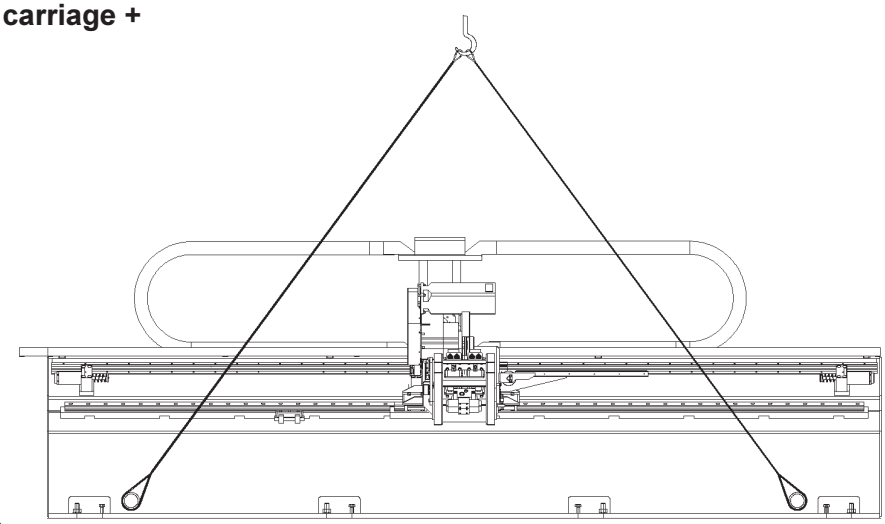
1 INSTALLATION

The main organs of the machine are supplied completely assembled.
To facilitate shipment the machine is normally delivered in the following separate units:

Cutting bed + carriage + cut-off unit	pos. A
Hydraulic power unit for cylinder and clamps	pos. B
Control console	pos. C
Electrical cabinet	pos. D
Local pushbutton	pos. E
Blade washing pump	pos. F

The machine units must be lifted and handled as illustrated in drawings VIII-1 and VIII-2. The load bearing capacity of the lifting equipment used must be capable of withstanding the weight indicated on the plastic plates mounted on each unit. The weight of components which can be easily moved without the use of lifting equipment is not marked.

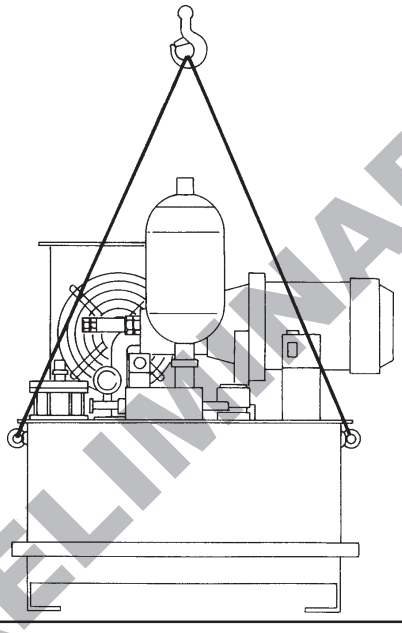
Cutting bed + carriage +
+ cut-off unit



Weight kg 9700 ~
Cable length mm 4000

POS. A

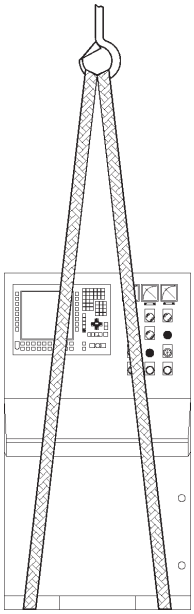
Hydraulic power unit for
cylinder and clamps



Weight kg …

POS. B

Control panel

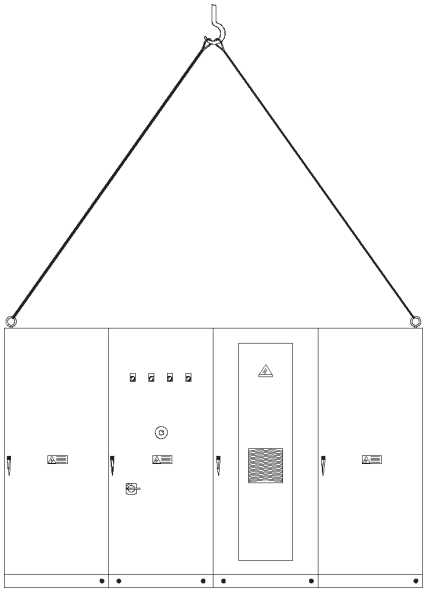


Weight kg 130

POS. C

UNIT HANDLING	DRWNG. VIII-1

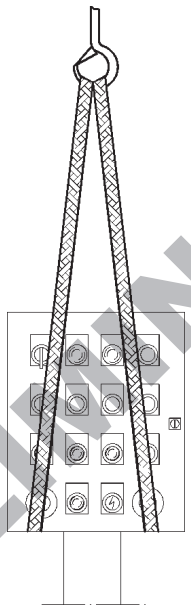
Electrical cabinet



Weight kg 1135

POS. D

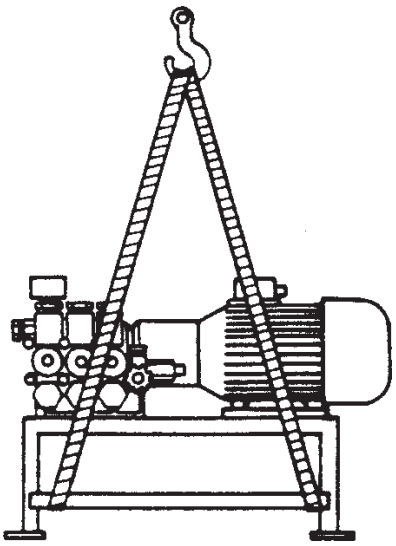
Local pushbutton



Weight kg ~ 40

POS. E

Blade
washing pump



Weight kg 70

POS. F

UNIT HANDLING	DRWNG. VIII-2

2 POSITIONING IN LINE

Insert the anchor bolts in the holes drilled in the bases and position the various machine units as illustrated in the foundation layout.
The transparent amber-coloured waxy film (TECTYL 506 EH) which covers most of the machine may be removed with petroleum-based or chlorine-based solvents (e.g. diesel oil).

IMPORTANT: The carriage is bound prior to delivery to prevent inadvertent movement. The cutoff unit is also secured in the "down" position.
Before the installation make sure that the foundation correspond to the "Foundation plan" supplied with the machine documentation.

1) Insert the "bed" + "carriage" on the tube mill spacing it properly from the units that precede and follow them. It is necessary for those distances to be the minimum required.
   The run-out unit (run-out table) placed after the machine must be as close as possible to the bed, so that the tube bar can be evacuated when it comes out of the carriage. To easy these operations and to avoid the bar from going into the run-out table, we recommend the construction of a mouthpiece at the run-out unit that arrives until the accelerator transom.

2) For the height and axis positioning of the "bed" + "carriage" use as reference a bottom line or the tube center of the clamps applied on the cold saw vices
   That reference is indicated on the clamps construction drawings supplied with the equipment documentation. We recommend the use of a wire stretched at the bottom line or tube center height (depending on the reference in use at the mill line where the machine is inserted) and in axis with the rest of the line. Once that reference has been created, proceed to the right positioning of the machine.
   Check that positioning by manually shifting the carriage to different positions. These done, sink the anchor bolts (fig. VIII-3 and fig. VIII-4) in the cement and tighten the "bed" + "carriage" once the cement has fully set.

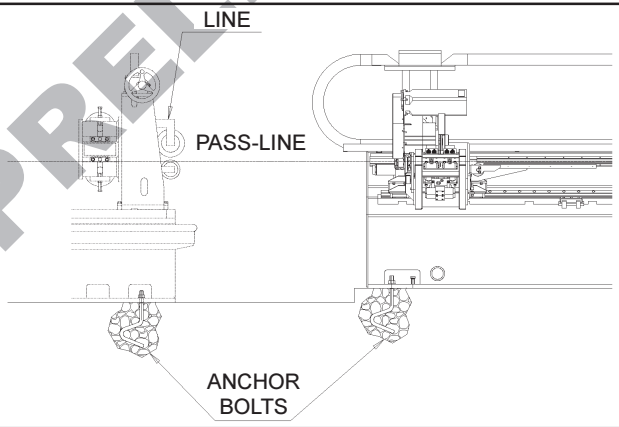


Fig. VIII-3

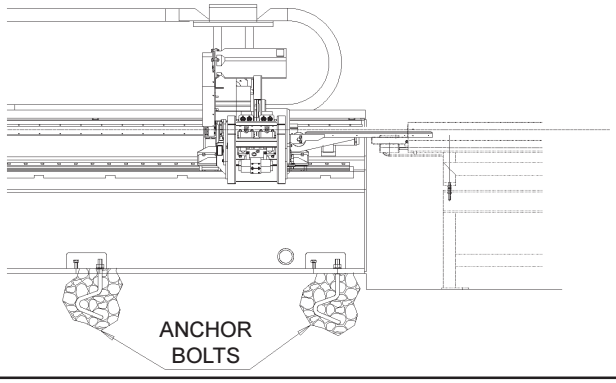


Fig. VIII-4

4) The electrical cabinet and hydraulic power unit need not necessarily be located in the position shown in the “Foundation layout”. They should, however, be located out of the reach of any swarf produced by the machine in a position that affords easy access for routine checks and maintenance.

5) The “tube speed sensor” is mounted using the holes (pos. 1) drilled in the mounting flange (pos. 2). This flange features a centring ring to facilitate correct positioning of the sensor on the last turkshead. If there is sufficient space, mount the sensor between the last two turksheads since the carriage causes the tube to vibrate during operation, which, if transmitted to the sensor, may cause incorrect readings. In the absence of sufficient space, the sensor can be fitted to the outfeed side of the last turkshead.

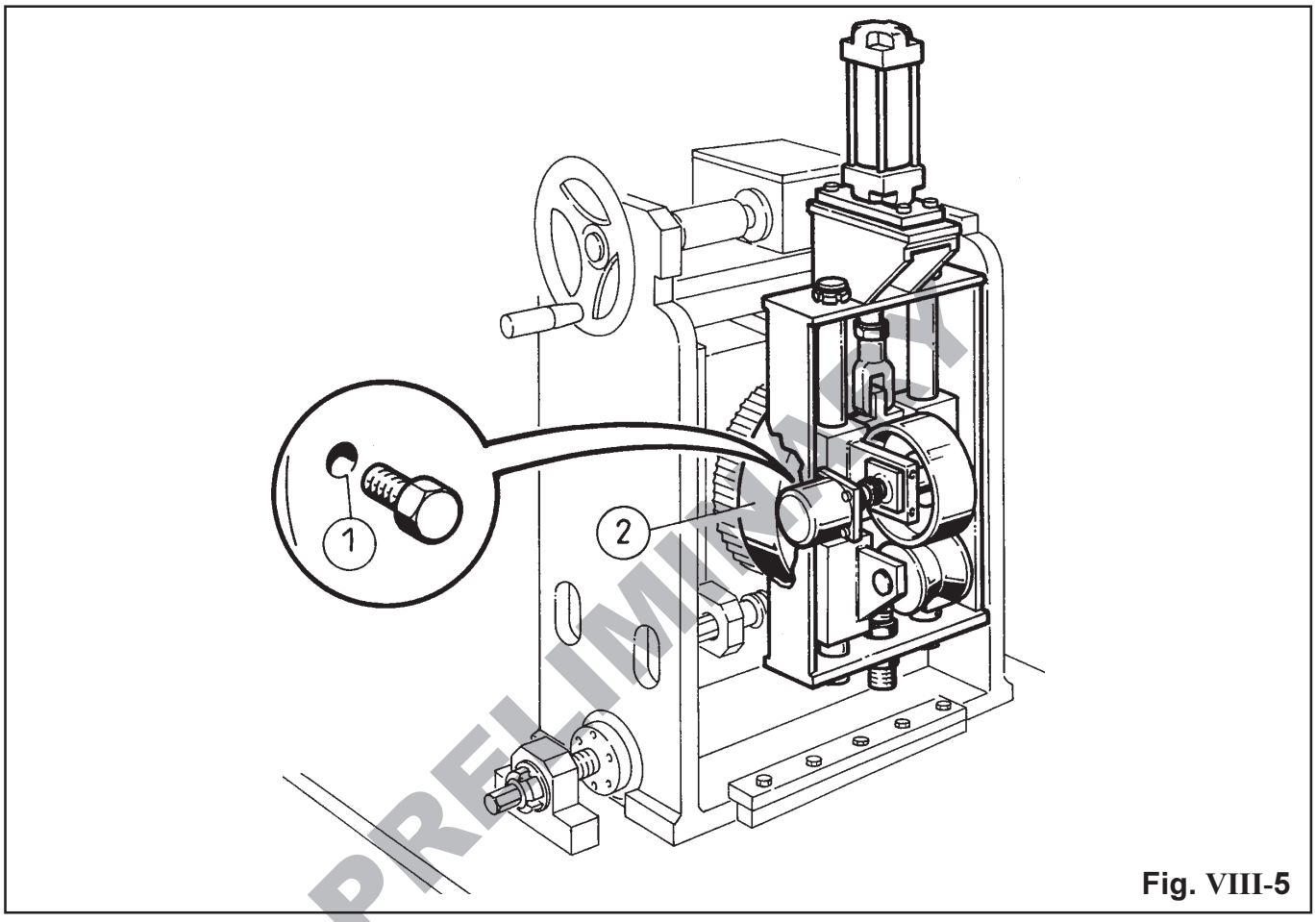


Fig. VIII-5

3 HYDRAULIC CONNECTIONS

Connections between the hydraulic power unit and various machine components must be made following the instructions on the hydraulic circuit diagram.
To facilitate this operation, each delivery/return line on the hydraulic power unit and various machine units is stamped with a mark identifying the corresponding position on the hydraulic circuit diagram.
Only use seamless bonderised steel pipes rated to withstand pressures of at least twice the normal duty pressure.Use the shortest possible lengths of pipe to make the required connections.
Only bend piping in such a way as to avoid choking off the internal bore. Do not heat pipes using flame cutting equipment as this will remove the internal phosphate coating applied by bonderisation.
Once the pipe fittings have been welded, pickle using special acid-based products and then neutralise with a saline solution.
On completion of the above operations fill the reservoir with the type of mineral oil specified in the MECHANICAL MAINTENANCE section, using the amount indicated in the enclosed hydraulic circuit diagram.

4 ELECTRICAL CONNECTIONS

The electrical connections are located as follows:
- The electrical cabinet and control console feature a slotted base through which the terminals may be accessed (terminal boards).
- The connections for the hydraulic power unit are also housed in a junction box.
- The tube speed sensor must only be connected to the encoder (pos. 1) using the connector supplied.

Follow the instructions on the “wiring diagrams” supplied with the machine's technical literature when making the electrical connections. Pay particular attention when connecting the interlocks to and from the tube mill and unloading unit.

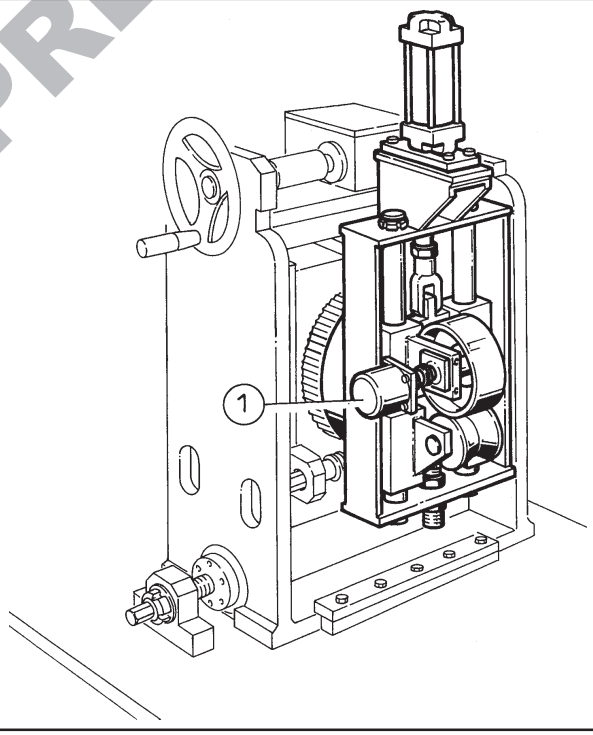


Fig. VIII-6

5 PNEUMATIC CONNECTION - TUBE SPEED SENSOR

To connect the sensor's pneumatic cylinder (pos. 2), install the positioning valve (pos. 3), pressure reducing valve (pos. 1) and flow control valve (pos. 4) on the base of the sizing station in a protected and easily accessible location. Next, make the pneumatic connections between the following components:
pneumatic cylinder (pos. 2) - flow control valve (pos. 4) - pressure reducing valve (pos. 1) - positioning valve (pos. 3) and compressed air supply.
The supply pressure is normally 6 bar, but may vary between a minimum of 2 bar and maximum of 10 bar.
The pneumatic cylinder, positioning valve and flow control valve are fitted with 1/4" Gas connectors.

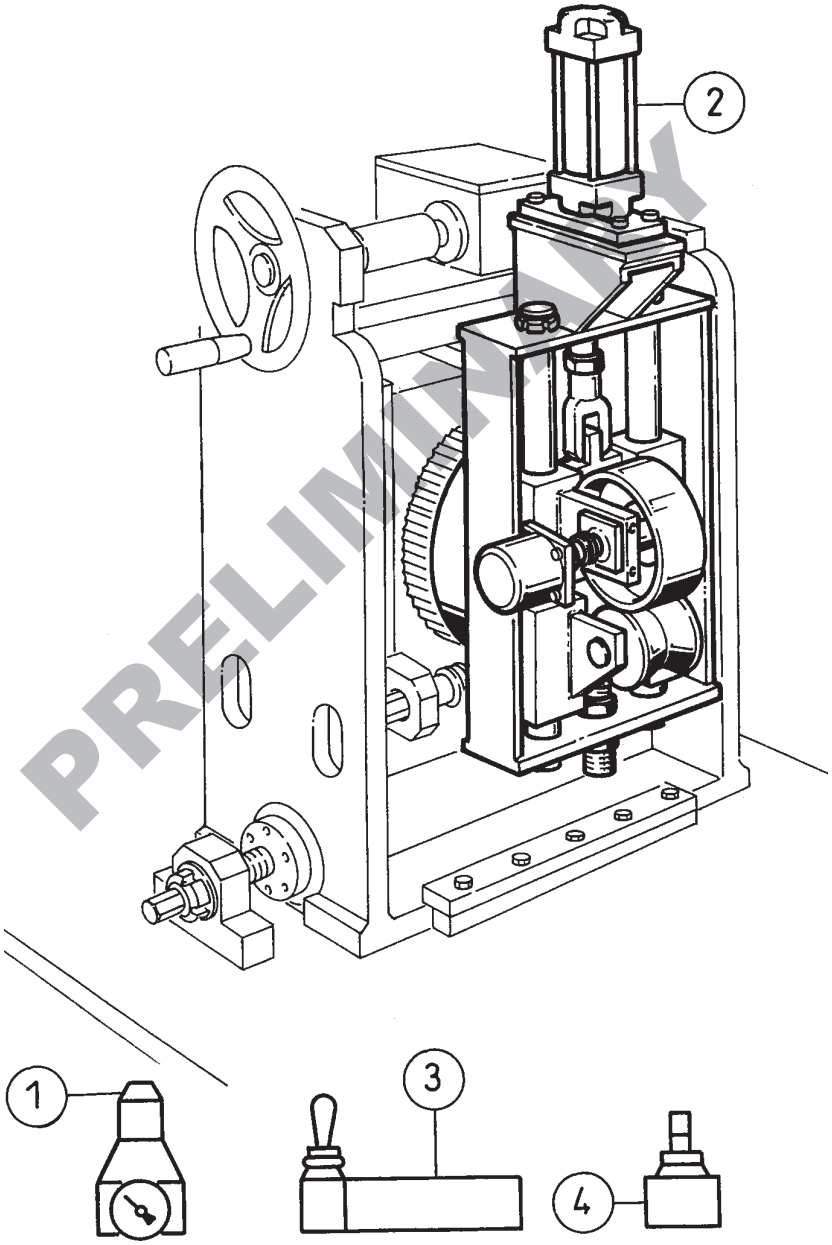


Fig. VIII-7

6 POSITIONING THE PERIMETER PROTECTIONS

N.B.: POSITIONING NOT PROVIDED BY OTO MILLS.

7 INITIAL START-UP PROCEDURE

Grease all the points indicated in the lubrication drawings of the “Mechanical maintenance” section.
Fill the accelerator planetary gearbox with oil, or check the oil level if already filled.
Power up the electrical cabinet using the masterswitch, press the “Reset” button and check that activation of the EMERGENCY stop button effectively shuts down mill operation; also check the operation of the various “Start” and “Stop” commands and interlocks with the entire tube mill.
The electronic system is precision calibrated and tested at the OTO MILLS factory.
After checking all the connections, electricians are only authorised to check correct rotation of the three-phase motors.
Make sure that the fan inside the electrical cabinet intakes the air from the grate with filter, to check it lay a sheet against the grate. If the sheet keeps up the rotation is correct.
Simulate the arrival of a tube on the run-out table to check correct rotation of the pull-out stars.
Follow the instructions below to start up the hydraulic power unit:

A) Check the overall condition of the system and all its components, bearing in mind that any impact sustained during shipment could lead to oil leaks or faulty operation.

B) The hydraulic circuits must be filtered before starting the machine for the first time. For this purpose, substitute the servovalve with the special wash plate (pos. 2) supplied with the machine so that the hydraulic system oil can circulate freely.

C) Check the hydraulic system oil selected and fill the reservoir (pos. 3) to the “maximum” mark since the level will drop once the hydraulic system pipes have filled. Do not remove the filter mesh in the filler inlet.

D) Completely slacken off the pressure regulator and pressure control valve (pos. 5) to reduce the operating pressure to almost zero.

E) Make sure the accumulator pre-charge pressure (pos. 6) conforms to the value shown on the hydraulic circuit diagram, which is about 90 bar and, if necessary, recharge following the instructions in the Maintenance section under the heading "Maintenance of the hydraulic power unit for blade cylinder and clamps".

F) Open the shut-off cocks on the pressure gauges (pos. 7).

G) Switch on the electric motor (pos. 4) by pressing the “Main hydraulic power unit Start” button. Make sure the motor turns in the direction indicated by the arrow marked on the motor casing. Always switch on the motor for an instant only. Although the motor will not reach its full operating speed, it should be sufficient to check the direction of rotation, and hence avoid damaging the pump in the event of incorrect rotation. Once you are sure the motor is turning in the right direction, start it up several times for a few seconds until the pump is primed; (a drop in the noise level indicates when the pump is correctly primed).

H) Adjust the pressure regulators referred to in point (D) until pressure in the various circuit lines is about 40 bar. This done, adjust the thermostats following the instructions indicated in point (A) of the Machine adjustments section under the heading "Adjusting the hydraulic power unit for blade cylinder and clamps".

I) Leave the hydraulic power unit running for at least 6 hours so that all the hydraulic system oil in the reservoir passes through the filters (pos. 1). A cleaning cartridge (pos. 2) should be fitted in the filter during this phase. Check for leaks along the entire hydraulic circuit.

L) After this period switch off the hydraulic power unit by pressing the “Main hydraulic power unit Stop” button, replace the wash cartridge (pos. 2) inside the filter (pos. 1) with the standard one supplied.

M) Switch on the hydraulic power unit again and activate the hydraulic cylinders to expel any air inside them. Press the “Manual cut” button on the control console to operate the hydraulic cylinders for the clamps and saw.
Repeat this operation about 6 to 8 times.

If you only wish to operate the clamping hydraulic cylinders, use the corresponding selector.

N) Gradually increase pressure, using the regulators described in points D and G above until the required operating pressure is obtained.

O) Check the oil level in the reservoir and, if necessary, top up to the maximum level.

P) Make sure all the unions, fixing bolts and screws securing the various components are tightened home and check the hydraulic circuit for leaks.

Fit the blade and make all the adjustments described in the “MACHINE ADJUSTMENTS” section.

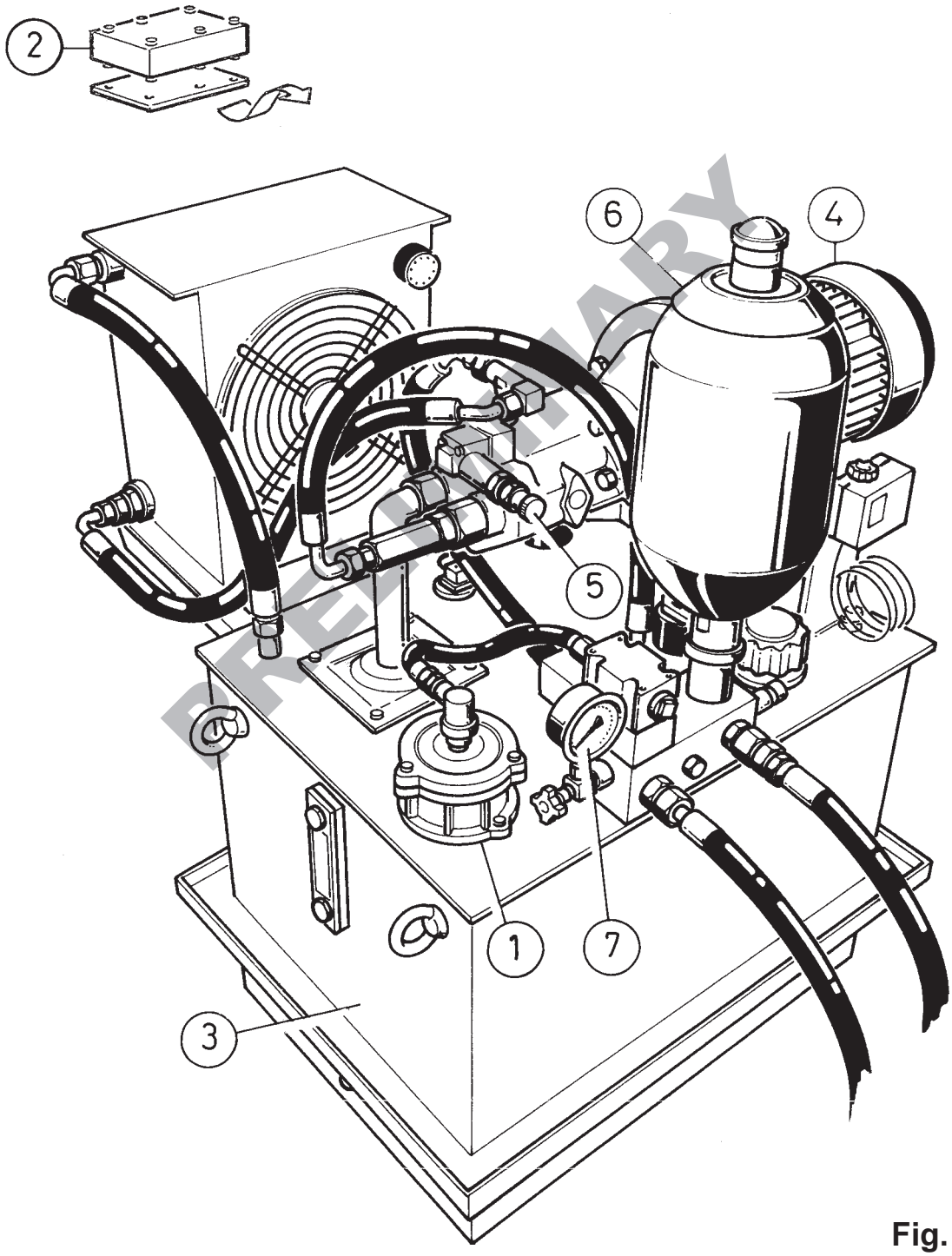


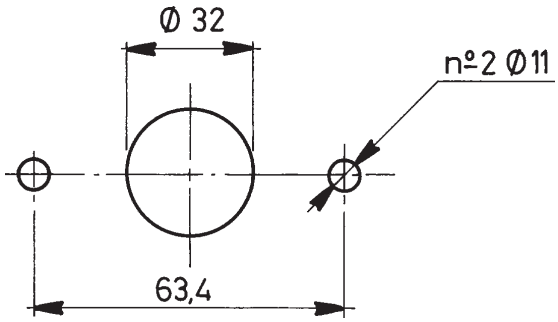
Fig. VIII-8

IX BLADE ASSEMBLY AND REPLACEMENT

1 BLADE SPECIFICATIONS

ELECTRIC COLD SAW BLADE SPECIFICATIONS

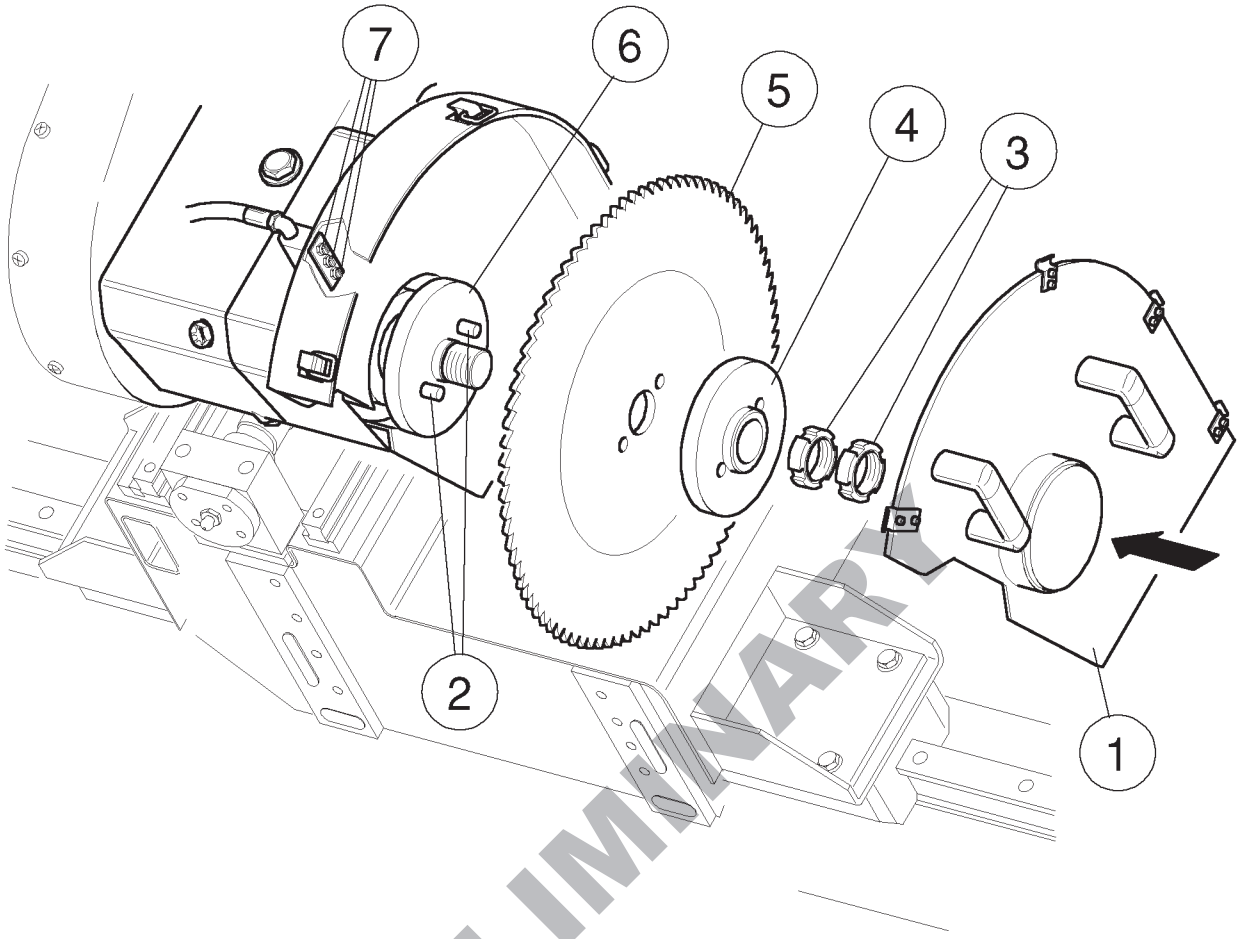
TABLE IX-1

maximum diameter = 350 mm	
maximum thickness = 3 mm	

2 BLADE REPLACING

Before replacing the blade, shut down the machine by pressing the following buttons on the control console:
1) Press the carriage stop button;
2) Press the main hydraulic power unit stop button and the saw stop button: the blade automatically returns to its “overtravel” position.
3) Wait until the blade has stopped and press the Emergency stop button.

For the blade substitution, proceed as follows:
A) Open the guard (pos. 1).
B) Loosen the nut (pos. 3).
C) Slide off the flange plate (pos. 4).
D) Remove the worn blade (pos. 5).
E) Carefully clean the blade mounting spindle (pos. 6), particularly around the thread ring for centring the blade on and the flange plate (pos. 4).
F) Make sure the blade centring and locking components, and in particular the locating pins (pos. 2) are in good working conditions.
G) Fit the blade on the flange (pos. 6) and locating pins (pos. 2).
H) Slide on the flange plate (pos. 4) taking care to position it correctly against the blade.
I) Refit the nut (pos. 3).
L) Align the nozzle (pos. 7) with the blade teeth grooves to ensure correct cleaning.
M) Close the guard (pos. 1) and lock with the hand wheels.
N) Disable the local commands.
O) Reset the control panel and start the hydraulic unit and the saw: the blade goes into “High position”.
P) Once the assembly is finished it might me necessary to check the blade stroke, especially if the new blade has a different diameter from the old one. The control operations are described on par. X-6. The checking is always recommended.



REPLACING THE BLADE	DRWNG. **IX**-2

KEY TO DRWNG. IX-2

1) Guard
2) Pins
3) Blade tightening ring nuts
4) Counterflange
5) Blade
6) Flange
7) Blade washing nozzles

X MACHINE ADJUSTMENTS

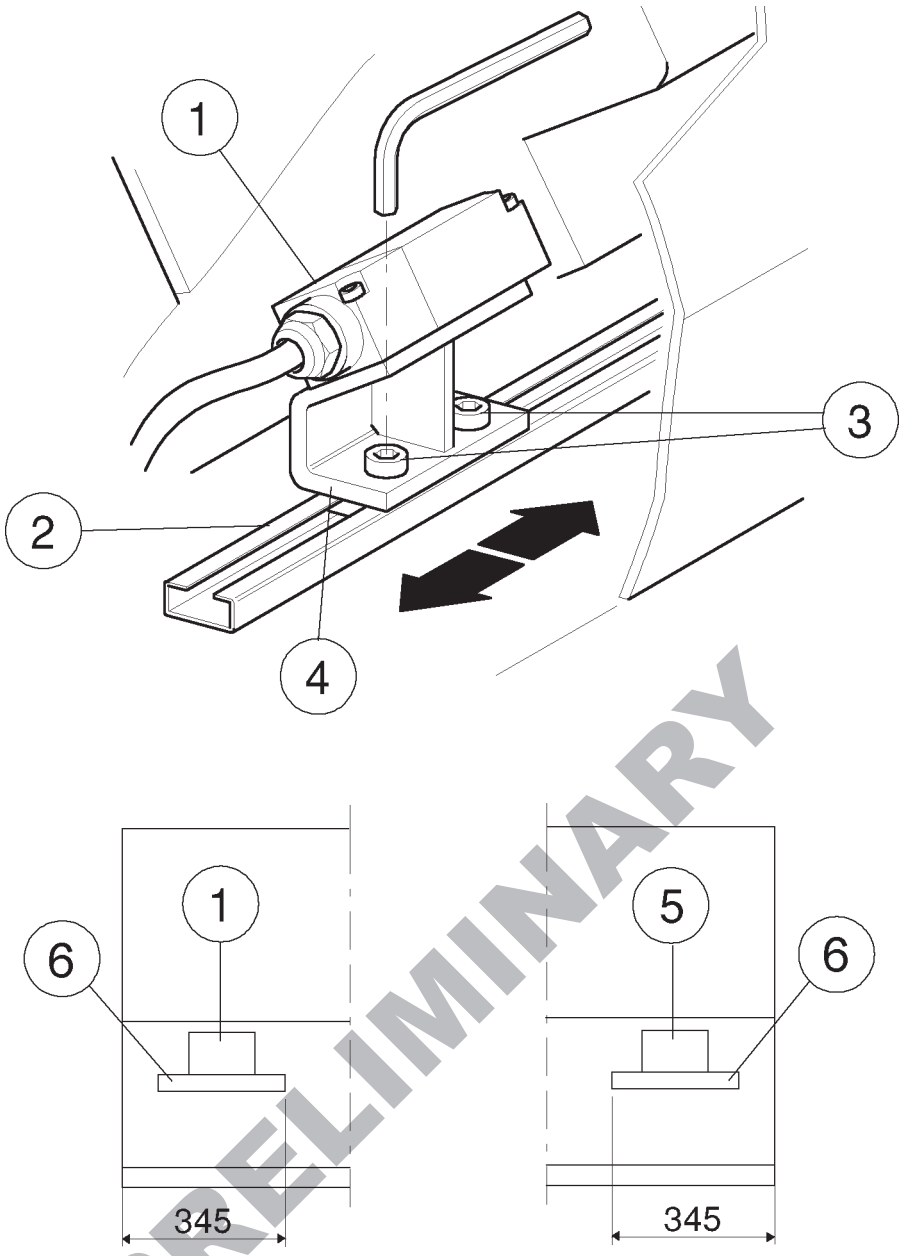
1 MACHINE ADJUSTMENTS

This chapter describes all the routine and profile changeover adjustments required to ensure correct operation of the cutoff saw.
The adjustment schedule specified (i.e. inductive sensors positioning of the cutting unit, bar supports adjustments etc.) is intended as a guideline only. It goes without saying however that regular maintenance facilitates the prompt identification and elimination of possible faults, thereby minimising production downtime.

N.B.: ALWAYS SWITCH OFF THE MACHINE before making any adjustments. Only switch the machine back on to check the accuracy of adjustments made and switch off again before making any further corrections.

2 POSITIONING THE INDUCTIVE SENSORS ON THE CUTTING BED

To position the inductive sensors (pos. 1 and 5) slacken the two locking screws (pos. 3) of the supporting sensor (pos. 4), move the inductive sensor to the position required by sliding it along its guide (pos. 2) and lock in place by re-tightening the screws (pos. 3).
Inductive sensors (pos. 1 and 5) placed inside the cutting bed are an extra safety and determine maximum carriage travel. When the sensor trigger on the carriage triggers one of these sensors the d.c. motor stops the carriage immediately.
Drawing X-2 shows the maximum permissible distance between sensors (pos. 1 and 5).
To get these positions, move the carriage with the selector (pos. 40 drwng. VII-3) to the distances as indicated on drwng. X-2. This done, move the sensors so that they are excited by the sensor trigger (pos. 6) when the carriage arrives to that position.



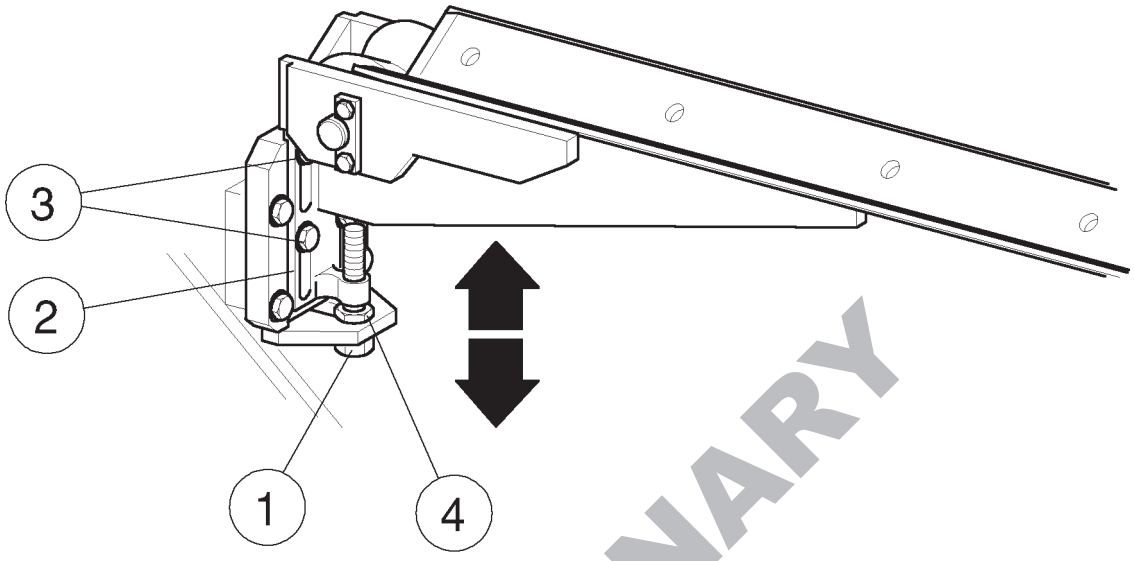
POSITIONING THE INDUCTIVE SENSORS ON THE CUTTING BED	DRWNG. **X**-2

KEY TO DRWNG. X-2

1) Inductive sensor backward emergency
2) Sliding guide
3) Locking screws
4) Sensor support
5) Inductive sensor forward emergency
6) Sensor trigger

3 ADJUSTING THE EXIT TUBE GUIDE

The out feed tube guide can be adjusted by slaking the locking nuts (pos. 3) of the tube supporting profile (pos. 2), slaking the lock nut (pos. 4) and operating on the screw (pos. 1) until it is positioned at the required position. This done, tighten down the lock nut (pos. 4) and the screws (pos. 3).



ADJUSTING THE EXIT TUBE GUIDE	DRWNG **X**-3

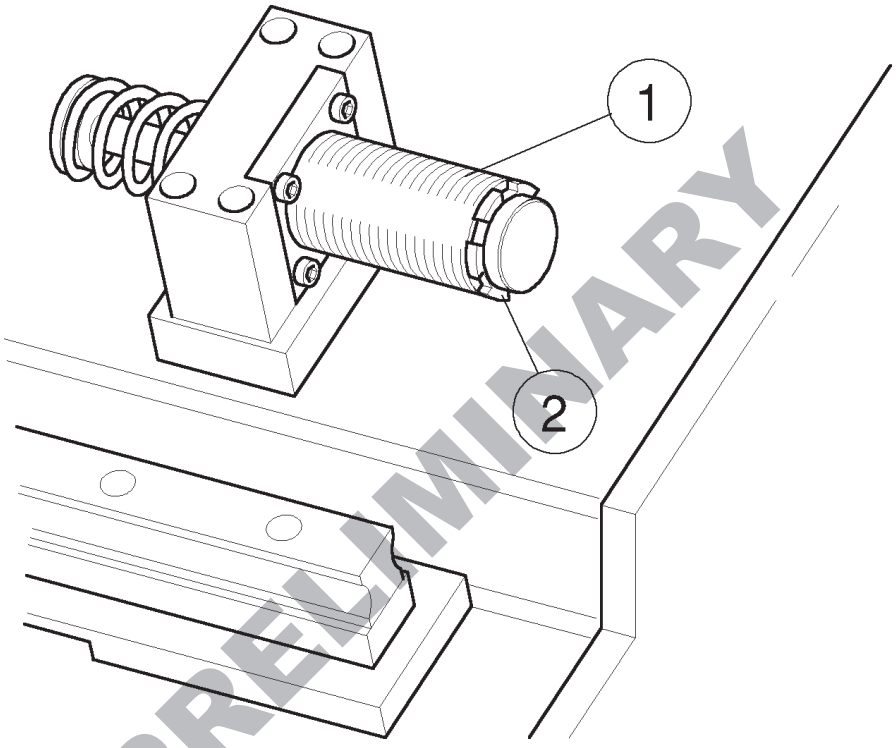
KEY TO DRWNG. X-3

1) Adjusting screw
2) Bar support
3) Locking screw
4) Lock nut

4 ADJUSTING THE SHOCK ABSORBERS

The shock absorbers (pos. 1) are adjusted by turning the adjuster ring nut (pos. 2) until the pointer is aligned with the value required. For shock absorber settings refer to the table below.

SHOCK ABSORBER ADJUSTMENT	TABLE X-4
shock absorber position	setting
tube entry side	5
tube exit side	6



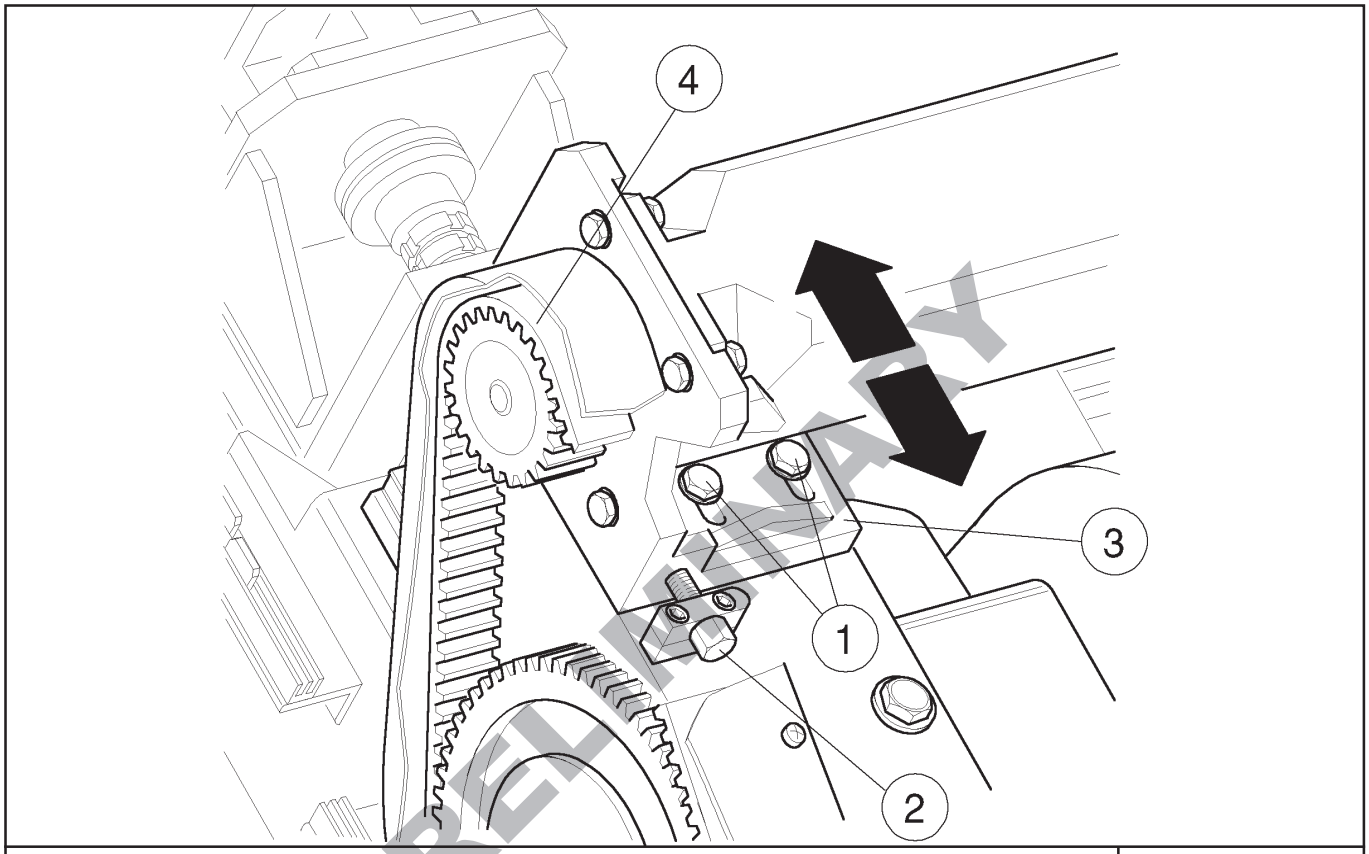
ADJUSTING THE SHOCK ABSORBERS | DRWNG. X-5

KEY TO DRWNG. X-5

1) Shock absorber
2) Adjustment ring nut

5 TIMING BELT TENSIONING FOR CUTOFF UNIT MOTORIZATION

To execute the belt tensioning (pos. 4), slake the locking screws (pos. 1) of the supporting slide (pos. 3) on the driven pulley in which runs the belt. Done this, operate on the nut (pos. 2) in clockwise or counter clockwise sense until the belt is properly positioned; remember that an excessive tensioning could cause a breakage (See scheme Fig. X-7).
At the end of the adjusting operation tighten the locking screws (pos. 1).



TIMING BELT TENSIONING FOR CUTOFF UNIT MOTORIZATION | DRWNG. **X**-6

KEY TO DRWNG. X-6

1) Locking screws
2) Adjusting nut
3) Pulley supporting slide
4) Timing belt

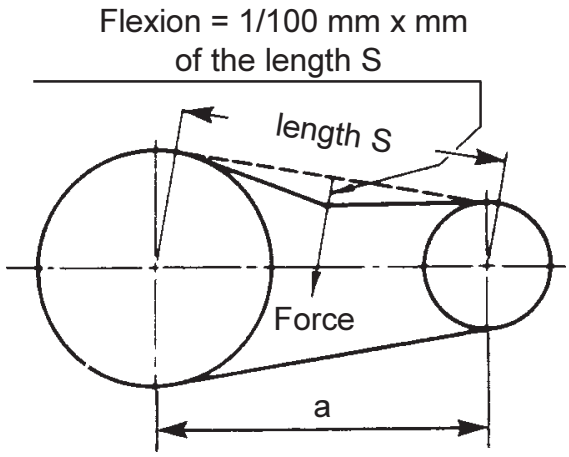
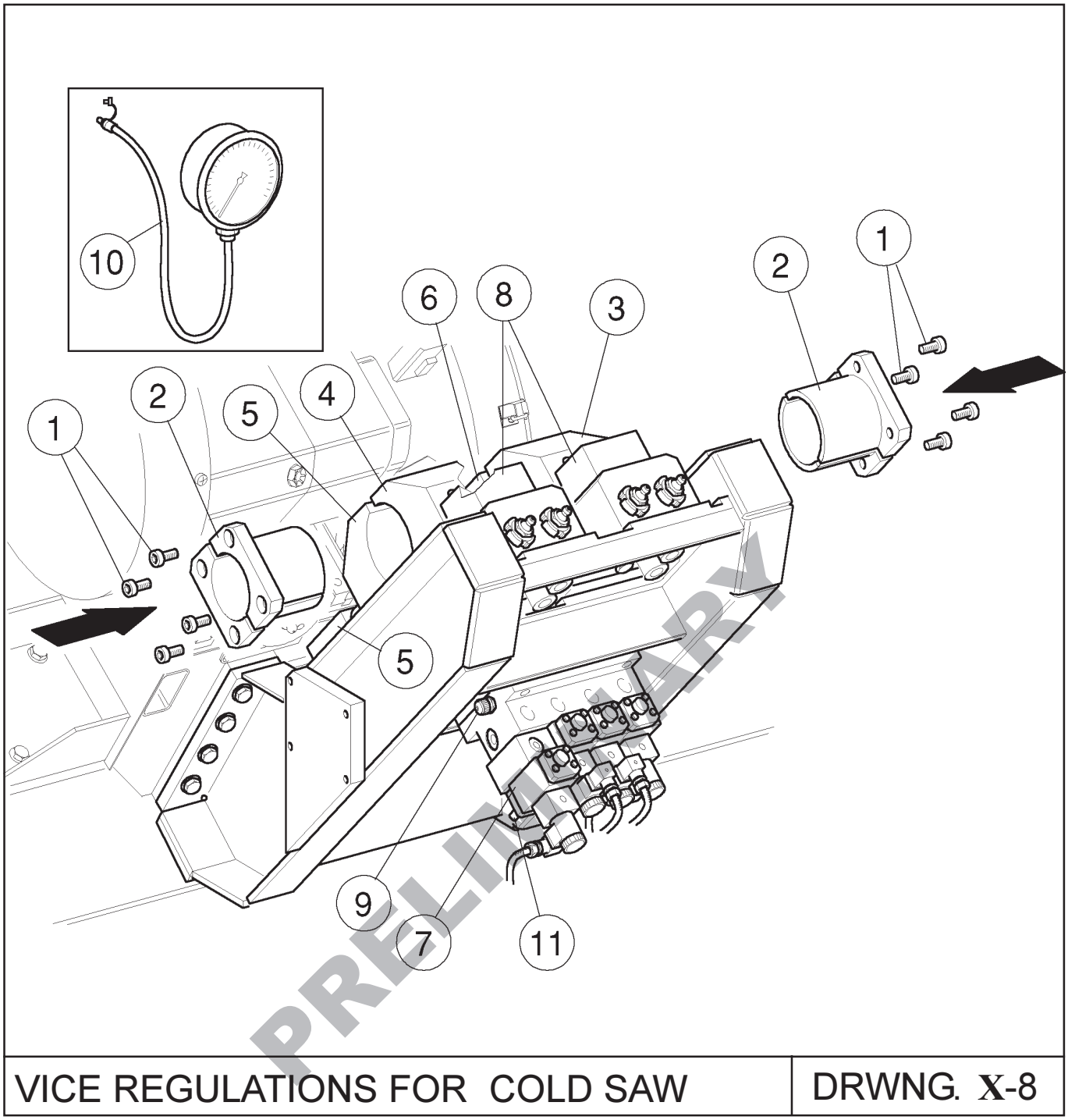


Fig. X-7

6 ADJUSTMENT OF THE CLOSING CLAMPS FOR THE COLD SAW

Assemble the clamps (pos. 2) locking them on the clamps supporters (pos. 3, 4, 5 and 6) with the locking screws (pos. 1). The clamps do not have the task of blocking the tube but only of avoid its radial movement during cutting operations.
For that reason it is not necessary the use of all the available pressure to pinch the tube. The pressure can be adjusted by means of the pressure gauge (pos. 11). To proceed with the operations just slacken the ring nut of the valve adjusting screw. Normally 30 bar should be enough (just an indicative value because the pressure depends on the dimensions and thickness of the tube to be cut).
This done, lock the ring nut of the pressure gauge.
The tightening pressure of the hydraulic cylinders (pos. 8) can be displayed using a manometer with wire (pos. 10) supplied with the hydraulic unit. Insert the wire attachment on the minimess attachment (pos. 9), operate the hydraulic unit and move the clamps selector (pos. 19 drwng. VII-5) on the control console to “closed clamps” position.



VICE REGULATIONS FOR COLD SAW	DRWNG. X-8

KEY TO DRWNG. X-8

1) Locking screws
2) Clamps
3) Upper rh clamp supporter
4) Upper lh clamp supporter
5) Lower rh clamp supporter
6) Lower lh clamp supporter
7) Solenoid valves for clamps
8) Hydraulic cylinders
9) Minimess connection
10) Manometer with cable
11) Pressure gauge

7 ADJUSTING THE HYDRAULIC POWER UNIT FOR CYLINDER AND CLAMPS

The hydraulic power unit is adjusted as follows:

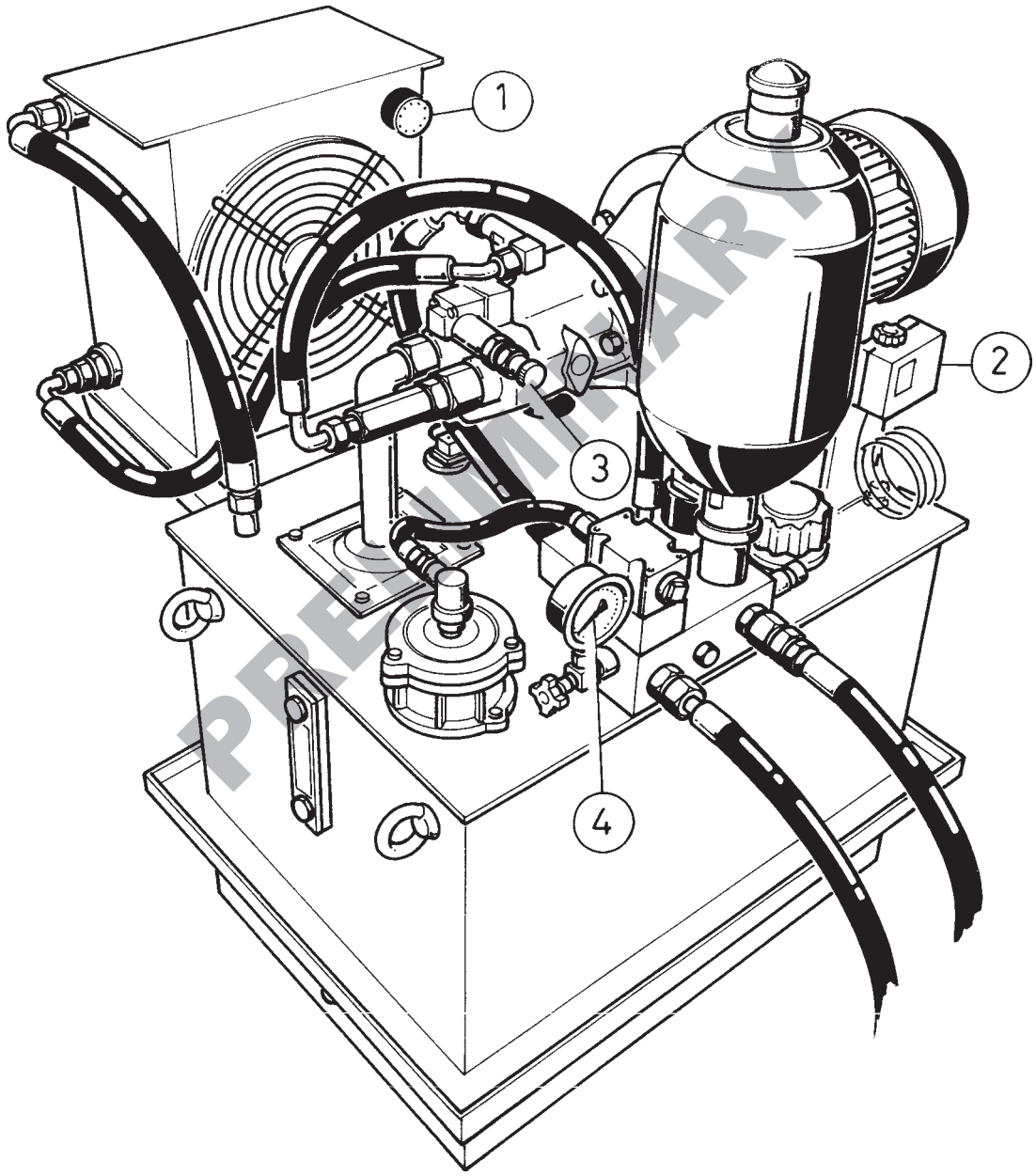
A) Thermostats (pos. 1 and 2).

The thermostat controlling fan operation (pos. 1) should be set between 45 and 50 degrees C (113 and 122 degrees F).

The maximum temperature thermostat (pos. 2) which relays a warning signal to the control console should be set to 70 degrees C (158 degrees F).

B) Operating pressure.

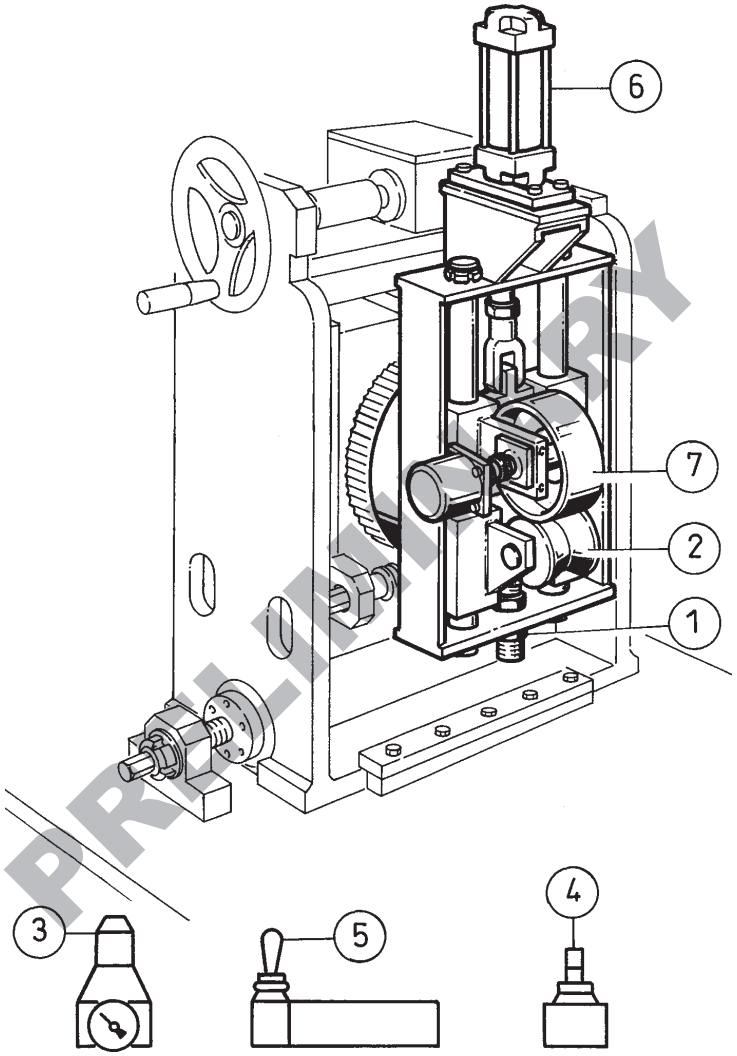
The operating pressure is regulated by a ring nut (pos. 3) and displayed on the corresponding pressure gauge (pos. 4). The operating pressure should be set to approximately 100 bar.



ADJUSTING THE HYDRAULIC POWER UNIT FOR CYLINDER AND CLAMPS	DRWNG. X-9

8 ADJUSTING THE TUBE SPEED SENSOR

Turn the screw (pos. 1) until the contrast roll (pos. 2) is positioned against the tube or profile section. Adjust the pressure with which the reading roll (pos. 7) presses against the tube by turning the ring nut (pos. 3) on the pressure reducing valve. Adjust the descent speed of the pneumatic cylinder (pos. 6) using the ring nut (pos. 4) on the flow control valve. Using the lever (pos. 5), raise the reading roll (pos. 7), feed the tube or profile forwards and lower the reading roll to rest on the tube or profile, again using the lever (pos. 5). Finally, make sure the pneumatic cylinder (pos. 6) does not reach the end of its stroke.



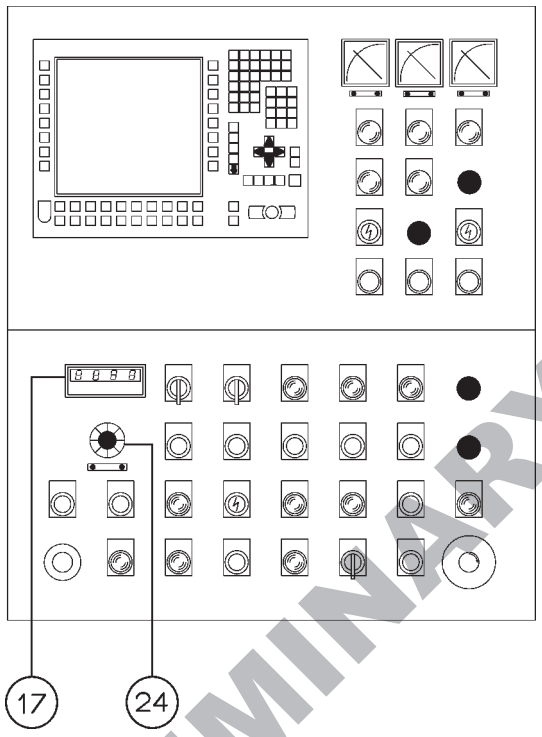
ADJUSTING THE TUBE SPEED SENSOR	DRWNG. X-10

KEY TO DRAWING X-10

1) Contrast roll adjustment screw
2) Contrast roll
3) Ring nut for plate regulation
4) Ring nut cylinder speed
5) Positioning lever
6) Pneumatic cylinder
7) Reading roll

9 ADJUSTING THE BLADE ROTATION SPEED

Using the potentiometer (pos. 24) that acts on the inverter for blade gear speed regulation it is possible to change the blade rotation speed displayed on the instrument (pos. 17).
Before cutting, the speed must be adjusted in accordance with the type of material to be cut, the blade diameter and size of the tube. The amount of blade revolutions depends on the position indicated at the numerical index of the potentiometer.



ADJUSTING THE BLADE ROTATION SPEED | DRWNG. X-11

CUTTING SPEED FOR COLD SAW Ø ... BLADE
TABLE X-12

SPINDLE REVS.	CUTTING SPEED
min. revs. ~ …	… m/1'
max. revs.~ …	… m/1'

XI INSTRUCTIONS FOR SAFE USE

1 IMPORTANT INFORMATION

This chapter operates on the assumption that the machine has been installed in compliance with the procedures stipulated in the “INSTALLATION” chapter.
Machine operators must always wear the personal safety clothing stipulated in the chapter on “INTENDED CONDITIONS OF USE”.
To avoid repeatedly referring back to previous chapters (i.e. CONTROL CONSOLE AND MACHINE ADJUSTMENTS), it is a good idea to reread those parts you do not fully remember before continuing any further.

IMPORTANT: Always press the emergency stop button and power down the electric panel before performing operations on the machine’s moving or dangerous parts which do not comply with the normal production cycle procedure described in this chapter.

IMPORTANT: OTO MILLS technicians are responsible for placing the machine into service and offering their technical expertise to operators to ensure their complete understanding of the machine and its operation.

2 START-UP

This term defines the sequence of operations required to start the machine.
- Switch on the master switch on the electrical cabinet to power up the control console and machine.
- Make sure NO-ONE is in inside the perimeter protections.
- If pressed, release the emergency stop button (positive safety type).
- Turn the key for the ENABLE CONTROLS on the control console.
- Press the RESET button.
- Once the control panel has finished the checking operations, go to “Machine general data” page or to “Predispositions” or “Encoder blade position” page to control the conditions in which the former operator has left the machine.
- Press the MAIN HYDRAULIC POWER UNIT START BUTTON to start the hydraulic power unit.

3 ADJUSTMENTS PRIOR TO START-UP

Before starting up the cutoff saw it must be configured to suit the type of tube or profile section being processed.
This involves mounting the blade and 4 clamps most suitable for production requirements, checking all the tube support components and making any necessary adjustments (see “Machine adjustments”) i.e.
- adjustment of the translation screw stroke for the carriage table;
- bar supports adjustment.

On completion of the above adjustments, the machine is ready to receive the profile section which is fed through the horizontal and vertical infeed rolls, on into the clamps and out through the horizontal outfeed roll. When the tube is correctly loaded it is possible to set to automatic.

4 DUMMY RUN TEST

NOTE: When starting up the machine for both automatic operation and dummy run tests, the oil in the hydraulic power unit may be COLD. In winter months it is therefore best to operate the machine at low speed for a short time while the oil warms up, and only then run the machine at full operating speed. The time required for the oil to heat up depends on the ambient temperature.
After adjusting the hydraulic power unit, shut off the pressure gauge (pos. 8, drwng. VII-2) by way of the relative shut-off cock.

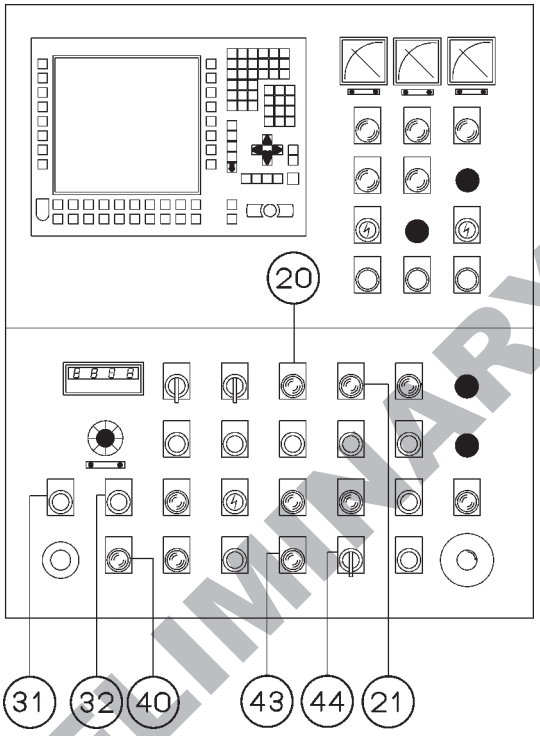


Fig. XI-1

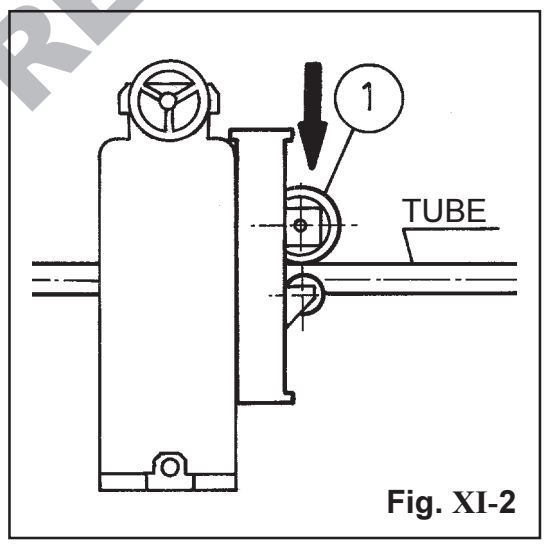


Fig. XI-2

Dummy run tests enable you to check correct operation of the machine by simulating tube delivery.
To run a dummy test, proceed as follows:

1) Switch on the main control panel.

2) Turn the "SERVICES ON-OFF" key to "ON" and press the "RESET" button as for a normal production cycle.All the buttons on the control panel are off at the moment.

3) Enter the simulated tube length (manual tube length) in the "MAIN MACHINE DATA" screen and press ENTER to confirm.

4) Press F14 (batch changeover) and press ENTER to confirm.

5) Press F13 to open the MENU page and then F3 to open the SIMULATION PAGE. This page is reserved to authorised personnel only and is password-protected. Once you have entered the correct password press F3 again.

6) In the SIMULATION page, position the cursor on the TUBE SIMULATION box and press ENTER. This done, position the cursor on the "ON" box and press ENTER again to confirm.

7) Enter the tube simulation speed and press ENTER. Do not change any other parameter in this page and make sure that:
   a)Carriage simulation is set to OFF;
   b)Blade simulation is set to OFF;

8) Press F20 to exit the simulation page.

The SIMULATION function is now ENABLED.

9) Press the "MAIN HYDRAULIC POWER UNIT START" button (pos. 20, Fig. XI-1) and the "SAW HEAD START" button (pos. 21, Fig. XI-1).

10) Using the "JOG FORWARD-0-BACK" selector (pos. 44, Fig. XI-1), translate the carriage to the start L.S.(pos. 2 fig. XI-1) and perform 2 or 3 cuts using the illuminated yellow "MANUAL CUT" button (pos. 40, Fig. XI-1). The cutting speed is shown in the main page. If necessary, modify the cutting speed using the corresponding buttons (pos. 31-32, Fig. XI-1) and perform a further manual cut to check the speed.

11) Press the "CARRIAGE START" button (pos. 43, Fig. XI-1): the carriage will gradually accelerate to the set simulation speed. Using keys K15 and K16 you can then increase or reduce the set speed in increments/decrements of 10 m/min.

12) Check and, if necessary, modify the cutting speed.

NOTE: On completion of the simulation test remember to reset the “Tube simulation” setting to “OFF”.

5 PRODUCTION: OPERATING SEQUENCES AND POSITIONS

A)Enter the required length (see the “Machine general data” page).

B)Press the “Main power unit start” button (pos. 20, Fig. XI-1) and “Saw head start” button (pos. 21, Fig. XI-1).

C) Make sure the carriage start position symbol is illuminated . Otherwise move the carriage using the “Jog forward-0-reverse” selector (pos. 44, Fig. XI-1) until the sensor trigger energises the inductive sensor (pos. 12, Fig. VI-1).

D) Make sure the “tube simulation” setting is “OFF” on the monitor.

E) Make sure the reading roll (pos. 1, Fig. XI-2) of the tube speed sensor rests correctly on the tube or profile section.

F) Feed the tube or profile forwards, sliding it through the tube support unit.

G) press once the button “carriage start “(pos. 43, Fig. XI-1); the carriage will move slowly to a certain point on the basement; the illuminated button flashes and then turns off.

H) The button “manual cut” (pos. 40 fig. XI-1)flashes; press it to have the tube cut. The button turns off.

NOTE: These operations must ONLY be performed when the tube or profile section is stationary.

I) Check or modify the cutting speed using buttons 31 and 32 (Fig. XI-1). The cutting speed is displayed on the display.

L) Press again the illuminated “ carriage start “ button (pos. 43 fig. XI-1) the button illuminates and the carriage is ready to cut on automatic mode at the length set.

M) Start up the tube mill

6 SHUTDOWN

If the tube mill is shut down during continuous production or the “Carriage stop” button (pos. 42) is pressed, automatic cutting is interrupted.
To stop automatic operation during dummy run tests or tube mill production, press the “Carriage stop” button (pos. 42). Under this condition the machine is standstill.
To shut down the machine completely, press the following buttons:
A)“Saw head stop” button (pos. 28).
B)“Main hydraulic power unit stop” button (pos. 27).
C) If connected, press the "Run-out unit stop" button (pos. 29).
Finally, shut off the mains power supply to the electrical cabinet using the masterswitch.

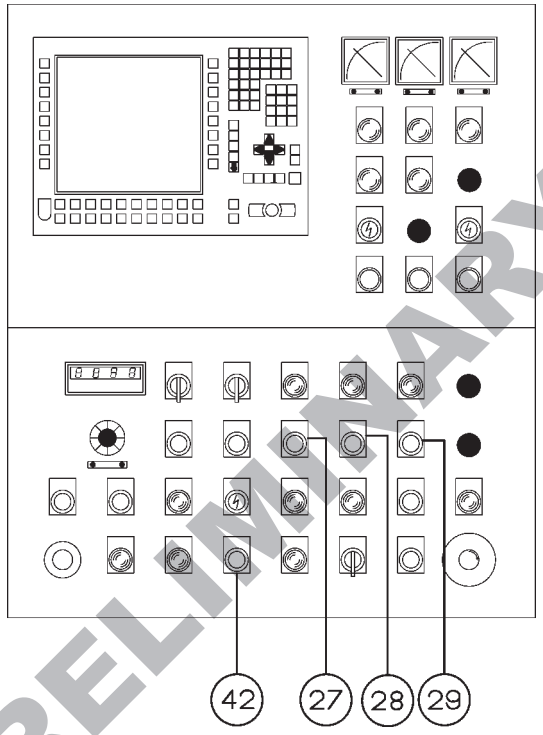


Fig. XI-3

XII TROUBLESHOOTING

1 ALARM LIST

ALARM DISPLAY:

When an alarm is tripped the OP37 operator panel on the console displays a window containing the alarm message, number, time, date, acknowledgement group and number of alarms not yet acknowledged.

Alarm messages must be acknowledged by the operator using the ACK (acknowledge) key.
Following acknowledgement, any other alarm message not yet acknowledged is also displayed.

If several alarms are tripped simultaneously, they are displayed in order of priority from 1 to 5:
- Priority A1: Alarm message only.
- Priority A2: Synchronised stoppage of cutoff unit and interlocked machines. Automatic cutting still enabled.
- Priority A3: Stoppage of cutoff unit with braking and stoppage of interlocked machines. Automatic cutting disabled.
- Priority A4: Carriage coast stoppage and rapid shutdown of interlocked machines. Cutoff unit stationary in emergency status.
- Priority A5: Rapid or emergency stoppage of cutoff unit and interlocked machines.

If the danger symbol is displayed in the top right hand corner of the screen and the red led on key K1 is illuminated, at least one alarm has been tripped.
To display the tripped alarms press key K1.
If all the tripped alarms cannot be displayed together on the screen, scroll to the top or bottom of the page using the arrow keys  .

To exit the alarm page press 

(red)

A list of the alarms detected by the PLC's diagnostics system, complete with their description and remedy, now follows.

Those messages marked by the letter "E" must only be dealt with by qualified electronics engineers.

D.C. motor drive, microprocessor positioner and inverter checks are described in detail in the corresponding handbooks supplied with the machine.

25) **GENERAL EMERGENCY** (EMERGENZA GENERALE)	The machine comes to an emergency stop:check the cause of stoppage and reset once the cause has been eliminated.
26) **LOCAL EMERGENCY ON** (ARRESTO DI EMERGENZA PREMUTO)	The machine is on General Emergency due to the activation of the button "EMERGENCY".
27) **FAST STOP ON** (ARRESTO RAPIDO PREMUTO)	The machine has stopped in fast stop due to one of the yellow fast stop pushbuttons.
28) **CUT-OFF FRONT DOOR OPEN** (PORTA ANT. PROTEZIONI APERTA)	The message appears when the front protections door is open, check that there is nobody left inside the protections and close it.
30) **CUT-OFF REAR DOOR OPEN** (PORTA POST. PROTEZIONI APERTA)	The message appears when the back protections door is open, causing the instant mill stop; check that there is nobody left inside the protections and reset.
32) **FAST STOP FROM MILL** (ARRESTO DA PROFILA)	The message appears when for emergency reasons, (i.e. the mill stop button is pressed) or for technical problems the profile is standstill.
49) **D.C. CONVERTER FAULT (A4) (E)** (GUASTO CONVERTITORE)	CHECK: - the protection on the driver card power supply; - the cause of the fault using the driver diagnostics system as a guide. After the fault has been remedied, switch off the electric panel and switch back on again.
50) **D.C. CONVERTER CONTROL SWITCH OPEN(A4) (E)** (CONTROLLO TELERUTTORE POTENZA CONVERTITORE)	CHECK: - the efficiency of the energising coil on the driver power relay.
51) **D.C. CONTRAVES FUSES BLOWN(A4)** (INTERVENTO FUSIBILI CONVERTITORE)**(E)**	Alarms tripped by blown driver fuses. Refer to the driver manual to locate the fault.
52) **D.C. CONVERTER THERMAL PROTECTION(A3) (E)** (ALLARME SONDE TERMICHE CONVERTITORE)	Indicates overheating of the driver. CHECK: - the efficiency of the driver cooling fan; - wait for the driver to cool before restoring normal operating conditions.
53) **D.C. CONVERTER FAN PROTECTION (A2) (E)** (PROTEZIONE VENTILATORE CONVERTITORE)	Alarm tripped by internal fan overload. CHECK: - the condition of the winding.

54) **D.C. CONVERTER CURRENT CONTROL(A2) (E)** (INTERVENTO TERMICO CONVERTITORE)	Alarm tripped by carriage motor overload. CHECK: - d.c. motor current consumption; - for excessive carriage friction.
57) **D.C. MOTOR THERMAL SENSOR(A2) (E)** (INTERVENTO SONDE TERMICHE MOTORE)	Indicates overheating of the electric motor. CHECK: - motor current consumption; - the ventilation system and, if necessary, replace the filter.
58) **FAN D.C. MOTOR PROTECTION(A2) (E)** (PROTEZIONE VENTILATORE MOTORE C.C.)	CHECK: - fan motor current consumption; - the impedance of the motor windings; - that fan rotation is not impeded in any way.
59) **D.C. MOTOR AIR FLOW (A2) (E)** (INTERVENTO ANEMOSTATO MOTORE C.C.)	This alarm indicates insufficient d.c. motor cooling. CHECK: - that the fan motor rotates in the correct direction; - the condition of the air filter and, if necessary, clean or replace.
65) **MOTOR ERROR POSITION ALARM(A3) (E)** (ERRORE DI INSEGUIMENTO)	This alarm indicates that the carriage has not reached the exact cutting position. CHECK: - the encoder on the turkshead; - the motor encoder; - the drive settings.
66) **CUT CYDE ERROR(A3) (E)** (ALLARME CICLO DI TAGLIO)	This alarm indicates a cutting cycle malfunction caused by a synchronisation error between the carriage and tube. CHECK: - that the tacho generator commutator on the d.c. motor is clean and that the brushes are not worn; - the synchronisation circuit setting.
67) **…(A4) (E)** (SETUP CP524 FALLITO)	Defect on the connection between the PLC and the microprocessor: CHECK: - fault on the CP524 card; - power supply on the ELO49 card.
68) **P.L.C. BATTERY LOW (A1) (E)** (BATTERIA P.L.C. SCARICA)	Check and replace the PLC battery following the instructions given in the Siemens PLC manual.
69) **P.L.C.-MICROPOCESSOR TRASMISSION ERROR(A3) (E)** (ERRORE TRASMISSIONE P.L.C. E POSIZIONATORE)	Communication error caused by a disconnected serial cable or interface fault.

70) **...** (ALLARME POSIZIONATORE LAMA WF)	This message indicates that on the VALUES PAGE there is an alarm, at the WF field appears a failure code (number). The solution to this problem is on the Siemens WF instruction s manual.
73) **CARRIAGE FORWARD LIMIT SWITCH(A5)** (FINECORSA AVANTI CARRO ATTIVO)	This message indicates that the carriage has exceeded the forward travel limit. In this situation, the automatic cycle is brought to an **EMERGENCY** stop, the blade rises and the clamps open. To reset the automatic cycle, use the "JOG REVERSE" selector (pos. 40, drwng. VII-5) to return the carriage to the start position. This done, start up the pump and saw head and press first the "MANUAL CUT" button (pos. 37, drwng. VII-5) and then the "SAW HEAD START" button (pos. 20, drwng. VII -5).
74) **CARRIAGE BACK LIMIT SWITCH (A5)** (FINECORSA INDIETRO CARRO ATTIVO)	This message indicates that the carriage has exceeded the return travel limit. In this situation, the automatic cycle is brought to an **EMERGENCY** stop. To reset the automatic cycle, use the "JOG FORWARD" selector (pos. 40, drwng. VII-5) to bring the carriage to the start position. This done, start up the pump and saw head and press first the "MANUAL CUT" button (pos. 37, drwng. VII-5) and then the "SAW HEAD START" button (pos. 20, drwng. VII-5).
75) **CABINET MAX. TEMPERATURE (A2) (E)** (MASSIMA TEMPERATURA INTERNO QUADRO)	This alarm is caused by insufficient cooling inside the electrical cabinet. CHECK: - that the air conditioner functions correctly; - the condition of the filter; - that the fans function correctly; - that the cabinet doors are closed.
76) **ELECTRICAL CABINET AIR CONDITIONER FILTER DOGGED (A1) (E)** (INTASAMENTO FILTRO COND.)	Alarm caused by clogged filter. Wash or replace the filter accordingly.
77) **AIR CONDITIONER PROTECTION(A1) (E)**(PROTEZIONE CONDIZIONATORE)	CHECK: - the current consumption of the air conditioner; - the condition of the air suction filters.
81) **SAW MOTOR PROTECTION/FUSES BLOWN (A3) (E)** (INTERVENTO PROTEZIONE MOTORE FRESA)	Alarm caused by saw motor overload. CHECK: - motor current consumption; - the impedance of the motor windings; - that the cutting cycle complies with the machine's operating limits and that the cutting blade is sharp.

82) **SAW RELAY FAULT (A3)** (CONTROLLO TELERUTTORE MOTORE FRESA)	See point 18) with reference to the cold saw motor.
89) **…(A3) (E)** (TERMICO MOTORE CENTRALINA IDRAULICA PRINCIPALE)	The protection on the a.c. motor of the main hydraulic power unit pump has tripped. CHECK: - pump motor current consumption; - that the pump is not blocked or faulty; - the motor windings or connection cables; - that the three power phases are balanced; - the pressure settings of the hydraulic circuit.
90) **… (A2) (E)** (CONTROLLO TELERUTTORE CENTRALINA IDRAULICA PRINCIPALE)	Delayed or no response to command. CHECK: - the condition of the coil; - the auxiliary circuit voltage.
91)**SAW HYDR. UNIT COOLER PROTECTION** (PROTEZIONE SCAMBIATORE CENTRALINA PRINCIPALE)	This message is displayed on the operator panel. Check the protection refereed to the motor.
92) **SAW HYDRAULIC UNIT MAX. OIL TEMPERATURE (A2)** (MAX. TEMPERATURA OLIO CENTRALINA PRINCIPALE)	CHECK: - that the heat exchanger thermostat setting is between 50° C and 30° C; - the operating pressure settings of the hydraulic power unit.
93)**SAW HYDRAULIC UNIT MIN. OIL LEVEL (A1)** (MINIMO LIVELLO OLIO CENTRALINA PRINCIPALE)	CHECK: - for leaks along the hydraulic circuit; - top up.
95) **SAW HYDR. UNIT HIGH PRESSURE DOGGED FILTER(A2)** (FILTRO INTASATO CENTRALINA PRINCIPALE)	Check the delivery filter and, if necessary, replace.
96) **MAIN HYDR. UNIT OIL RECIRCUL PROTECTION (A2) (E)** (PROTEZIONE MOTORE RICIRCOLO OLIO CENTRALINA)	See point 41) with reference to the oil recirculationg motor of the main hid. unit.
126) **N.D.T. NOT READY** (CONTROLLO N.D.T. NON PRONTO)	This alarm is only tripped: - if the N.D.T. unit is selected in the "Machine settings" page; - if the N.D.T. unit malfunctions or is switched off.

2 GUIDE TO MAINTENANCE OF HYDRAULIC SYSTEMS

FAULT	CAUSE	REMEDY
INSUFFICIENT PRESSURE circuit pressure below rated level	1) pressure relief valve partly open	1 a) valve pressure setting too low b) worn seal seats c) foreign bodies under seats d) broken spring
	2) pump malfunction	2 see points 5 to 11
	3) internal leaks	3 a) worn seals in hydraulic cylinders or motors. b) worn valves and directional control valves c) oil viscosity too low
	4) excessive pressure drop	4 a) oil viscosity too high b) oil ways too small c) oil ways partially obstructed
PUMP MALFUNCTION no or insufficient oil flow	5) intake restricted	5 a) intake filter too small or clogged b) intake pipe clogged c) intake pipe too small or poorly routed
	6) air entering system	6 a) through reservoir oil suction port b) through intake unions c) through seal on pump shaft d) through foam in oil
	7) reservoir hermetically sealed	7 a) air breather in reservoir
	8) defective pump drive	8 a) check mechanical couplings b) pump speed too high or too low
	9) oil viscosity too high	9 a) see pump oil specifications
	10) pump damaged internally	10 a) internal seals broken b) vanes, swash-plates or pistons stuck c) pump head not tightened down d) replace broken internal parts
	11) pump worn	11) replace pump

NOISY PUMP Abnormally noisy pump (N.B. some gear pumps are always rather noisy)	12) cavitation	12 a) intake restricted: see point 5 b) oil viscosity too high: see point 9
	13) air entering system	13 see point 6
	14) worn internal components	14 a) excessive play in supports and swash-plates
	15) vibrations	15 a) incorrect pump installation, resonance etc.
OVERHEATING Oil temperature above recommended limit of 50 to 60 °C	16) maximum pressure setting too high	16 a) pressure relief valve setting too high
	17) inefficient use of power	17 a) inefficient shut-off valve b) end-of-cycle short circuit not functioning c) modify hydraulic circuit
	18) internal leaks	18 see point 3
	19) excessive pressure drop	19 see point 4
	20) insufficient oil capacity	20 a) increase oil reservoir capacity
	21) insufficient cooling	21 a) supplementary cooling system required b) inefficient coolant (if any)
	22) excessive friction	22 a) incorrect internal assembly of pump b) insufficient lubrication at prescribed points c) oil with poor lubricating qualities
INCORRECT MOVEMENTS Hydraulically operated parts do not follow the prescribed cycle of movements	23) air in circuit	23 a) bleed air bubbles from high points of circuit b) seal points at which air is entering the system (see point 6)
	24) valves stuck	24 a) valves not closing correctly due to seals etc. b) valves half-open due to foreign bodies.
	25) cylinders stuck	25 a) incorrect internal assembly of cylinder b) inadmissible axial loads c) connecting pins seized
	26) excessive pressure drop	26 see point 4
	27) pressure fluctuations in accumulators	27 a) insufficient accumulator capacity b) greater demand on circuit due to internal leaks

EXCESSIVE WEAR rapid wear of system in relation to effective operating time and type of duty	28) abrasive particles in oil	28 a) spent oil b) inefficient filters
	29) insufficient lubrication	29 a) poor quality oil b) oil too thin at operating temperature
	30) operating pressure too high	30 a) in relation to maximum operating pressure limits for pump and valves
	31) defective mechanical couplings	31 a) shafts or rods subjected to abnormal loads

XIII ELECTRICAL MAINTENANCE

1 GENERAL INFORMATION

Machine operation is controlled by the PLC, electronic cards and electro-mechanical circuits. Any modifications made following final testing may therefore limit or disable the safety measures adopted and hence render the guarantee null and void.

Persons authorised to carry out work on the machine must first make sure it is powered down and disconnected from the mains power supply.

Particular attention must be given to voltages from other units which may still be "live" even when the electric panel is switched off.

Personnel responsible for electrical maintenance and inspections of the “live” circuit boards inside the electric panel must be fully aware of the risks and cautionary measures to be adopted.

2 ROUTINE MAINTENANCE

Consult qualified technicians and/or OTO MILLS about maintenance operations not covered in this chapter.

ELECTRIC PANEL AIR FILTER

The filter inside the grille (pos. 1) pressure-fitted in the air conditioner mounted on the electrical cabinet may be manually removed for inspection or replacement purposes without the need of special tools.

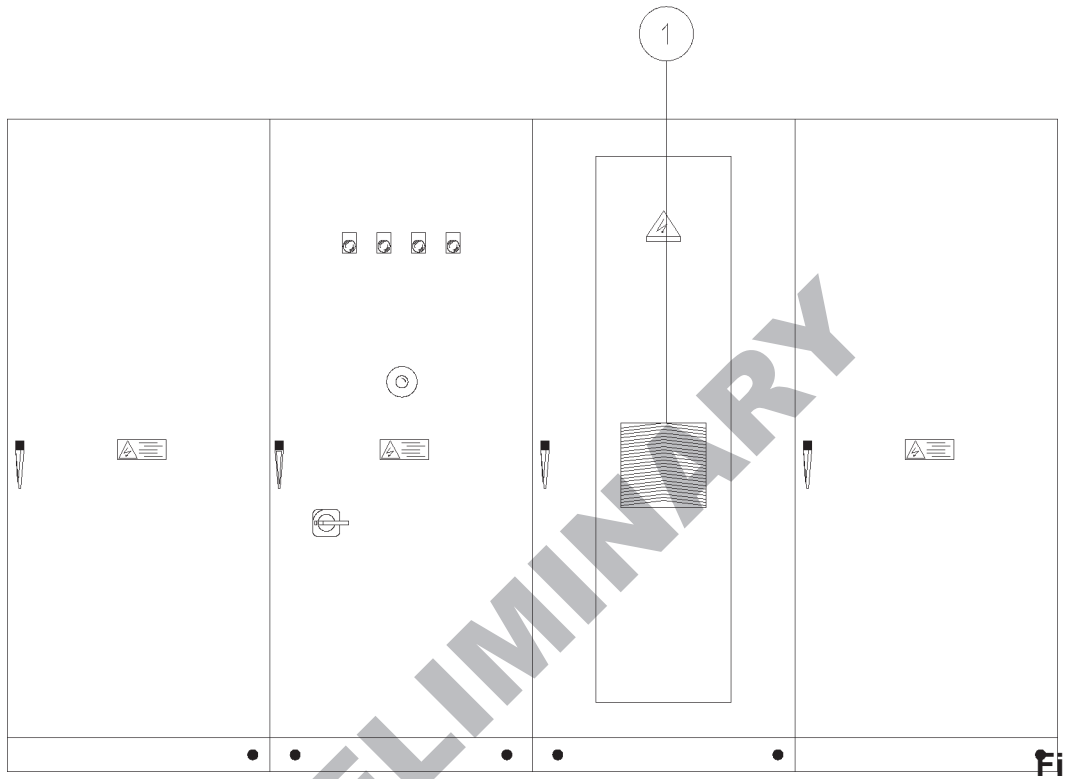


Fig. XIII-1

3 SCHEDULED CHECKS AND MAINTENANCE

The table below provides a rough maintenance schedule for the machine's electrical equipment. Other information is collected on the specific maintenance manuals, supplied with the machine.

COMPONENT OR UNIT	DESCRIPTION OF INTERVENTION	INTERVAL IN WORKING HOURS
ELECTRIC PANEL	Check and, if necessary, replace the electric panel air filter. Tighten down the connection cable terminals.	150 2000
CONTROL CONSOLE + PUSHBUTTON PANEL	Tighten down the connection cable terminals.	2000
JUNCTION BOXES ASSEMBLED ON MACHINE	Tighten down the connection cable terminals.	2000
SAFETY DISPOSALS FOR PERIMETER PROTECTIONS	Check the intervention efficiency for the doors safety limit stop.	each working shift
D.C. ELECTRICAL MOTORS	Carry out general checks and maintenance work.	see motor manual
COUPLINGS	Check the condition of the couplings.	1000
ENCODER-TUBE READING ROLL	Check and, if necessary, tighten down the coupling screws.	1000
TUBE READING ROLL	Check the roll for signs of wear, paying particular attention to the roll diameter. Make sure the roll rides correctly on the tube which must pass centrally underneath.	1000
AIR CONDITIONER FILTER	Replace or clean the filter element.	1000

XIV MECHANICAL MAINTENANCE

1 GENERAL INFORMATION

The required personal safety clothing (safety gloves, footwear and hard hat) must always be worn when servicing the machine.

It is good practice to clean the machine once a week as this facilitates the identification of any hydraulic leaks or mechanical faults.

Before working on the machine, authorised maintenance personnel must first make sure the electrical system is powered down and disconnected from the mains supply.

Always contact our Service Centre before carrying out any operation on the machine not specified in this chapter.

Before reactivating any machine function, make sure no-one is inside the perimeter protections.

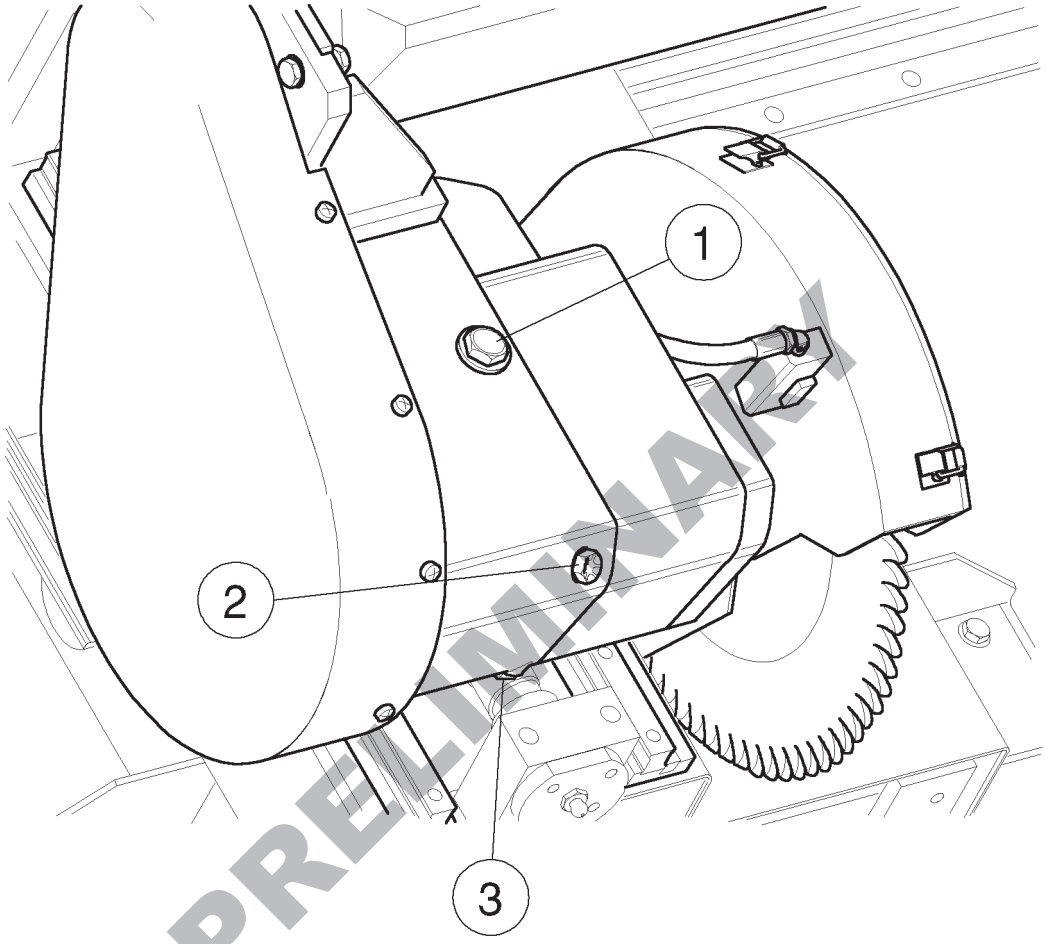
Some machine components are prone to normal wear and must therefore be replaced more frequently than others.

The procedure for correct and safe replacement of worn parts is described in this chapter.

Always consult qualified technicians and/or OTO MILLS about non-routine maintenance operations.

2	PLANETARY BOX MAINTENANCE OF BLADE MOTORIZATION

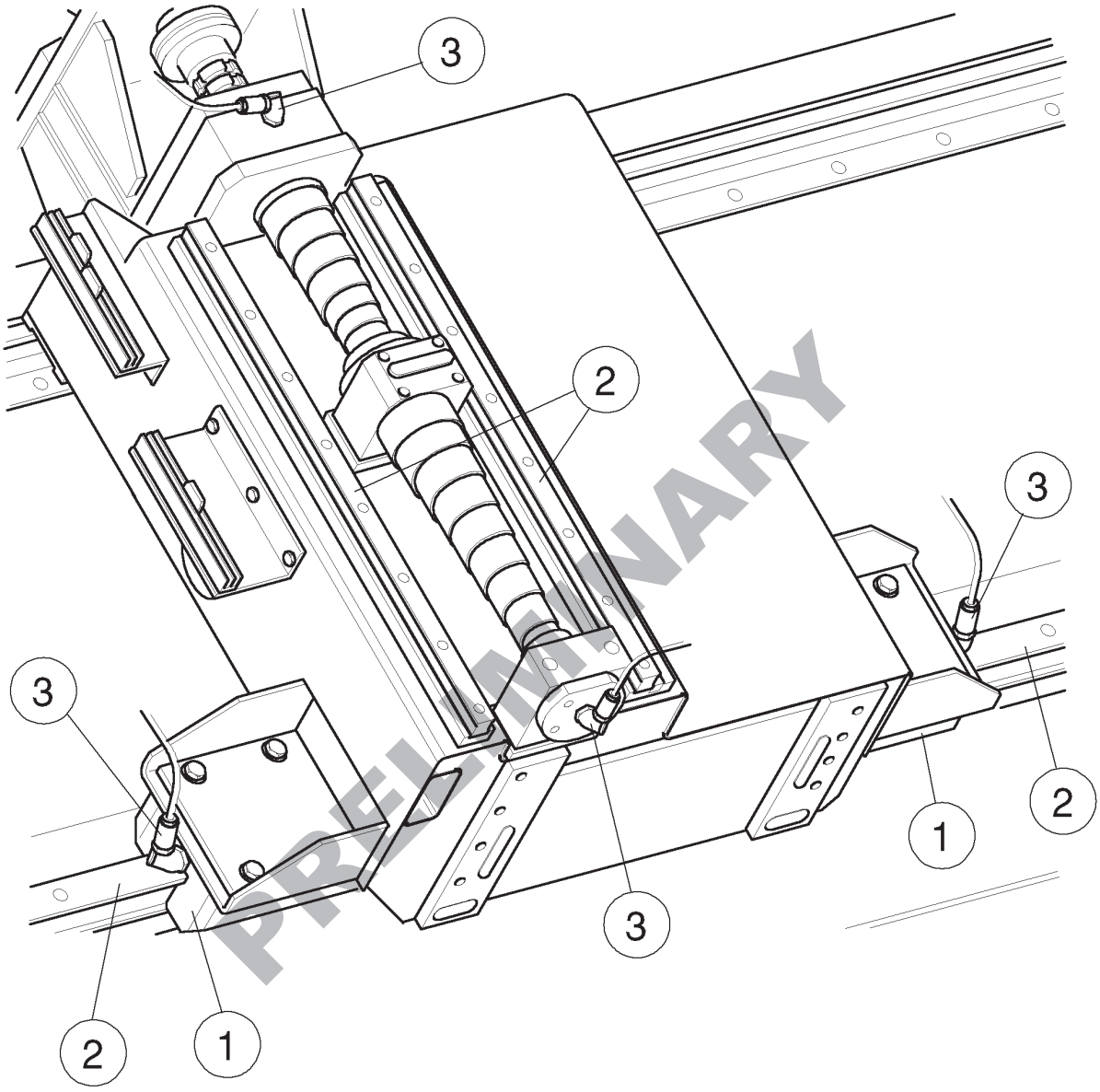
Every 400 hours the oil level must be controlled and also OILconditions by means of the pilot light (pos. 2).
If necessary change the oil using the load (pos. 1) and drain (pos. 3) plugs.
Oil characteristics and some denominations are included on the chapters to them dedicated.



REDUCTION BOX MAINTENANCE OF BLADE MOTORIZATION	DRWNG. XIV-1

3 CARRIAGE MAINTENANCE

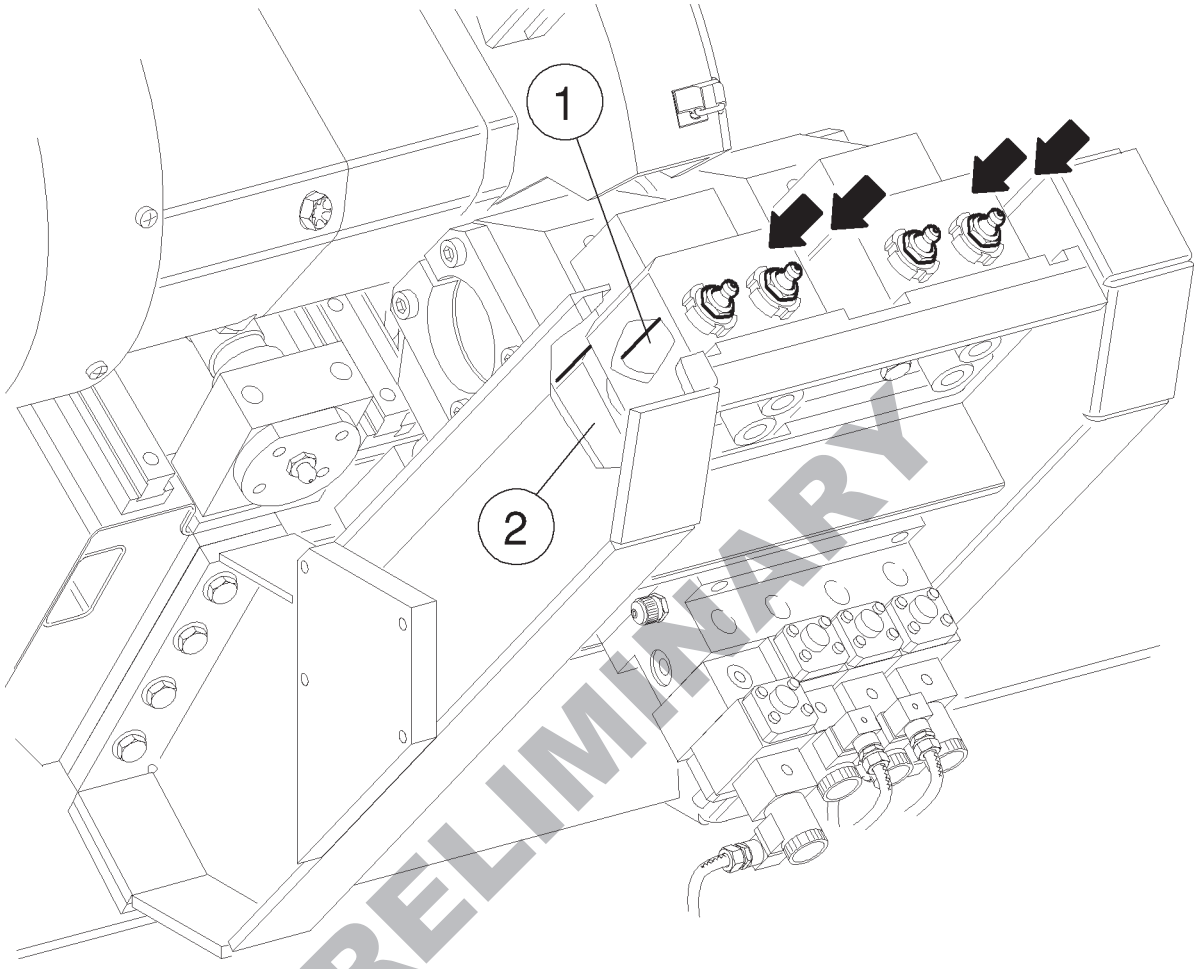
The carriage is provided with an automatic lubrication device taht at regular intervals (can be programmed from the control console) lubricates the sliding guides (pos. 2) and the supports of the translation screws by means of the grease nipples (pos. 3).



CARRIAGE MAINTENANCE	DRWNG. XIV-2

4 COLD SAW CLAMSP MAINTENANCE

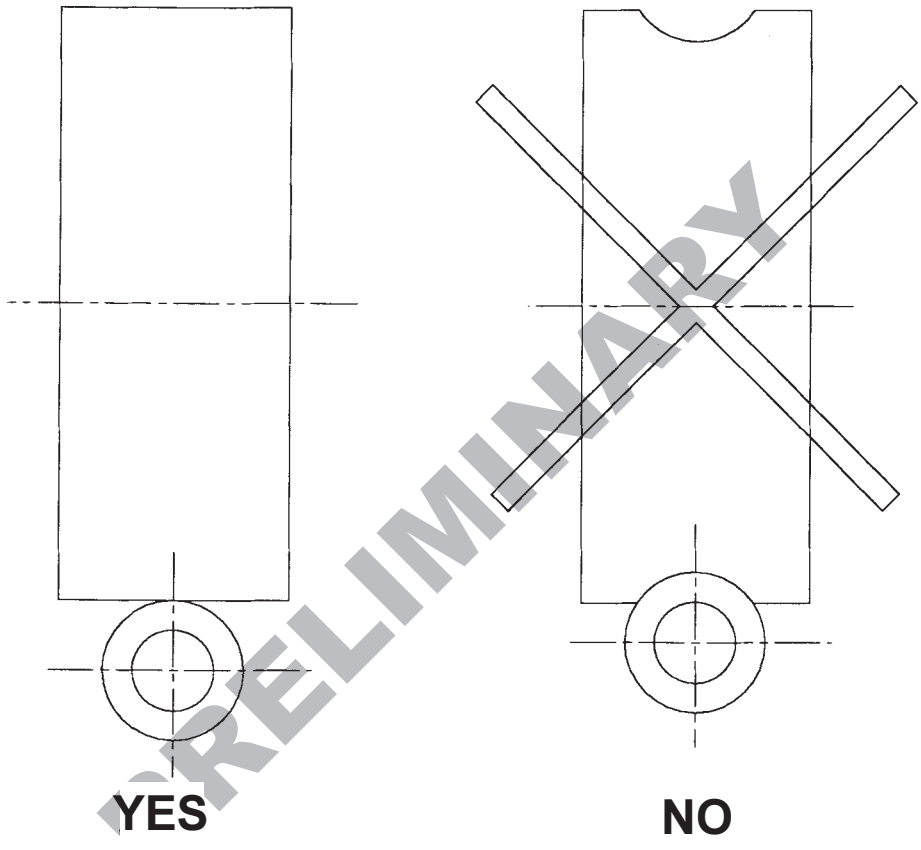
Every 30 to 40 working hours pump grease in the points indicated in the figure and check the amount of play between the guide rods (pos. 1), clamp mounts (pos. 2) and the hydraulic connections.



COLD SAW CLAMPS MAINTENANCE	DRWNG. XIV-3

5 TUBE SPEED READING ROLL MAINTENANCE

Periodically check the condition of the tube speed reading roll to ensure correct operation of the cutoff unit. The circumference of the roll which is equivalent to 500 mm measures the length and speed of the tube (by means of an electronic counter) so that even the slightest error caused by wear to the diameter, may result in notable tolerance errors in relation to the final tube length.
It is also important to check the roll profile section for wear caused by contact with the tube since the cavity formed may lead to variations in the final tube length. This frequent problem is illustrated in the figure below.

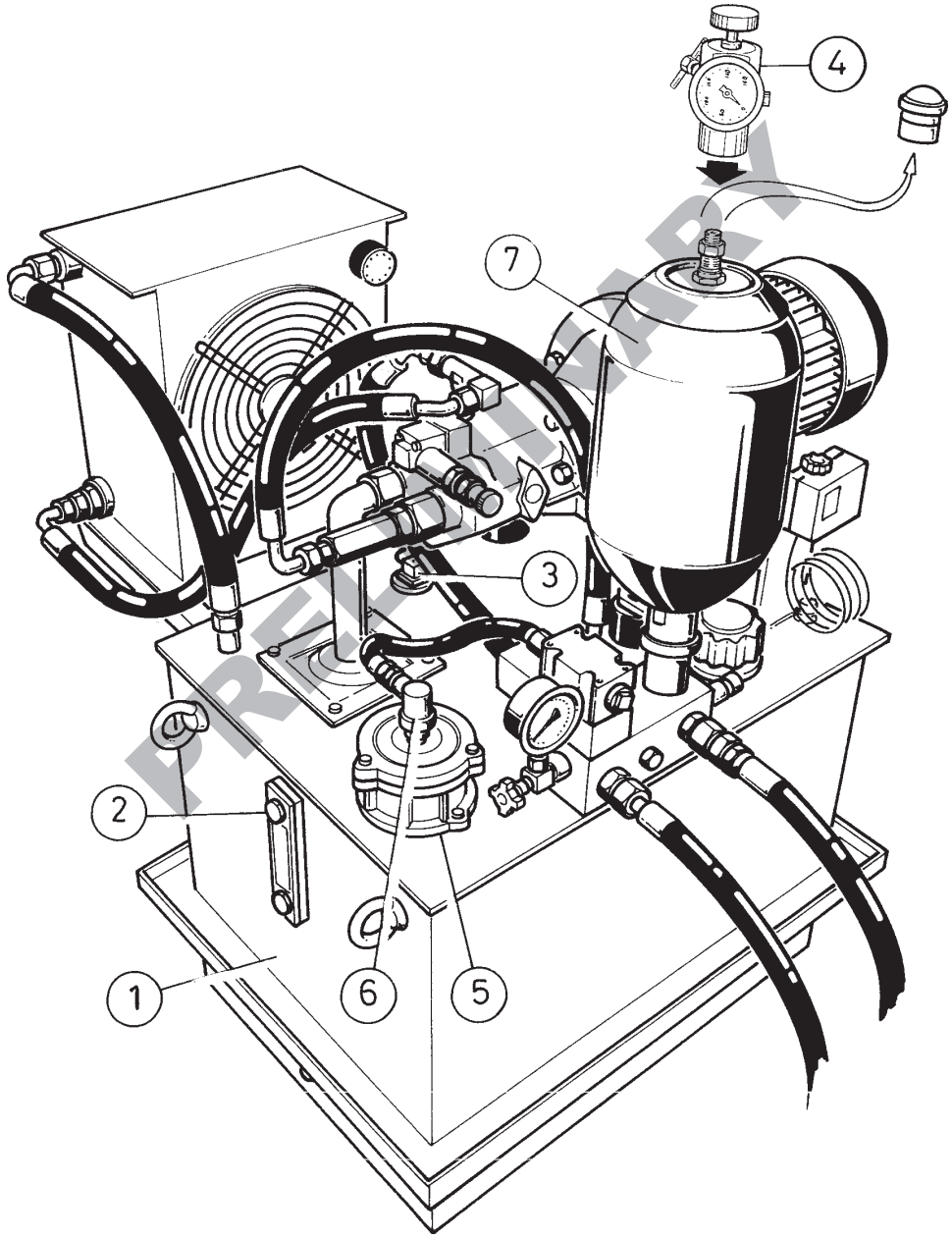


TUBE SPEED READING ROLL MAINTENANCE	DRWNG. XIV-4

If the reading roll shows signs of wear as illustrated above, replace immediately to prevent damage to the blade or tolerance errors with regard to the final tube length.

6 MAINTENANCE OF HYDRAULIC POWER UNIT FOR CYLINDER AND CLAMPS

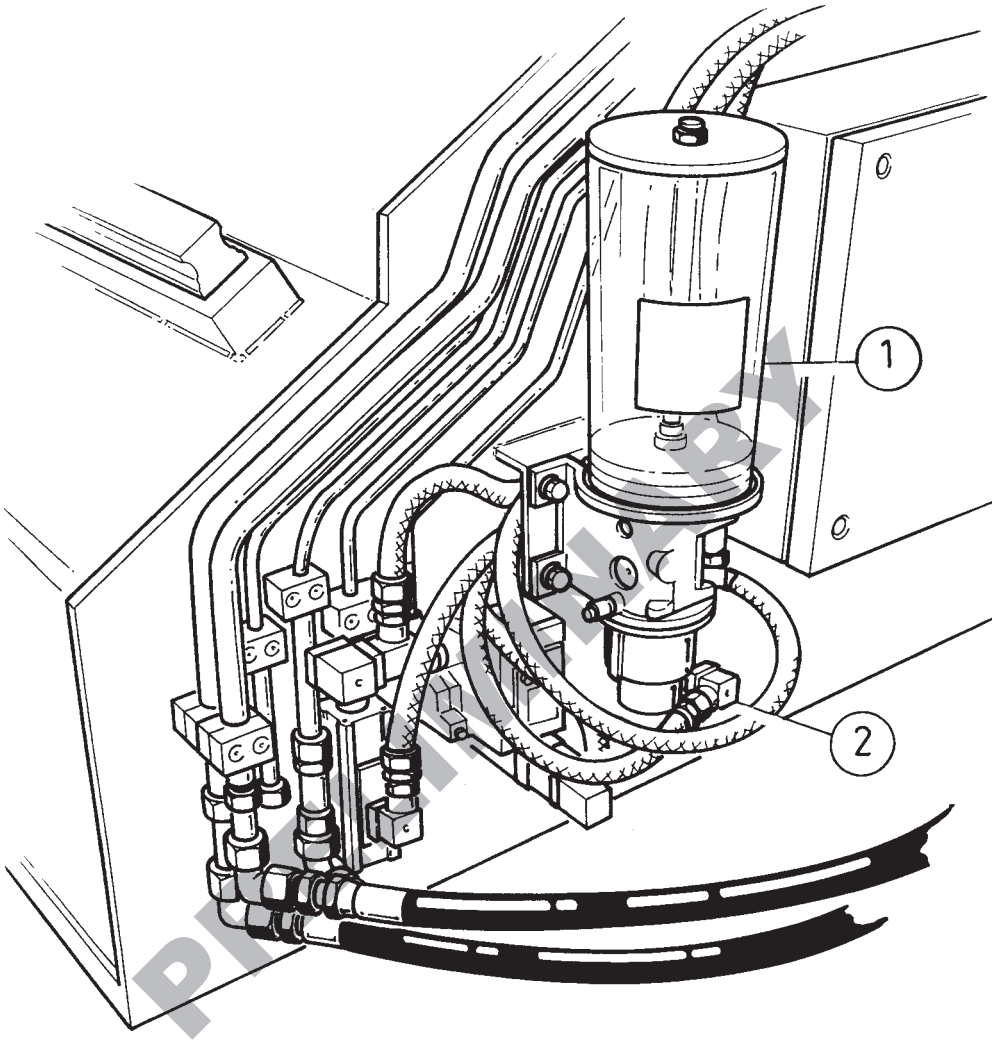
Every 30 to 40 working hours check the oil level in the reservoir (pos. 1) by way of the oil level indicator (pos. 2) and, if necessary, top up. The minimum oil level controller (pos. 3) also relays a warning signal to the control console when the reservoir requires topping up. The filter cartridge (pos. 5) must be replaced about every 200 working hours or whenever the pressure switch (pos. 6) indicates low circuit pressure or the sensor (pos. 6) indicates a clogging. Every 1000 working hours check the accumulator pressure (pos. 7) using the relative pressure gauge (pos. 4) and, if necessary, recharge to a pressure of 90 bar.
Every 5000 working hours change the oil in the hydraulic power unit and wash the system as instructed in the section “Initial start-up procedure”.



MAINTENANCE OF HYDRAULIC POWER UNIT FOR CYLINDER AND CLAMPS	DRWNG. XIV-5

7	GREASING SYSTEM MAINTENANCE

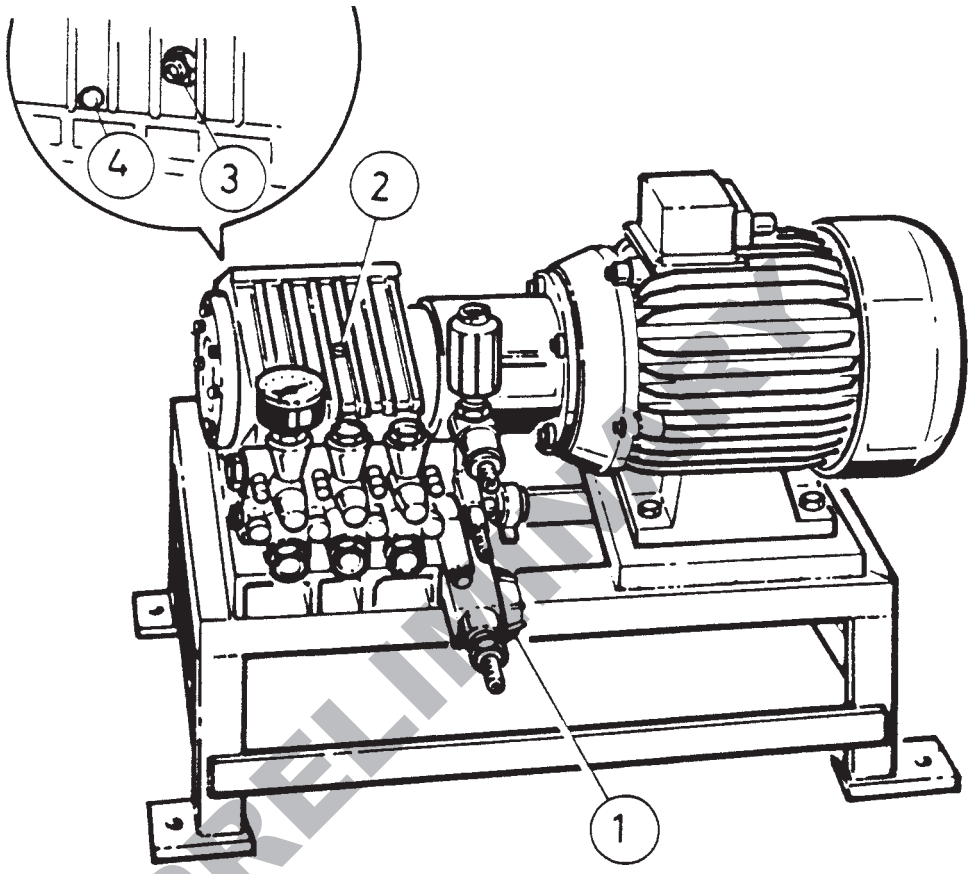
Check the oil level on the tank (pos. 1).
When the pressure sensor (pos. 2) indicates the excess of pressure on the circuit and inside the distributor, it becomes necessary to disassemble the distributor and execute an accurate equipment cleaning.



GREASING SYSTEM MAINTENANCE	DRWNG. **XIV**-6

8 HIGH PRESSURE PUMP MAINTENANCE

Every 30 to 40 hours of duty check the oil level in the tank by way of the oil level indicator (pos. 3) and, if necessary, top up using an oil brand with the same characteristics.
Every 40 hours of duty, disassemble the water filter (pos. 1) and clean.
Every 1000 hours of duty change the filter.
Every 5000 hours of duty change the oil by way of the drain plug (pos. 4) and filler cap (pos. 2).



HIGH PRESSURE PUMP MAINTENANCE	DRWNG. XIV-7

KEY TO DRAWING XIV-7

1) Water filter
2) Filler cap
3) Oil level indicator
4) Drain plug

9 OIL SPECIFICATIONS OF HYDRAULIC POWER UNIT FOR CYLINDER + CLAMPS

This system is designed to operate in ambient temperatures of between 4 and 45 degrees C (40 and 113 degrees F). Use a leading oil brand with the characteristics shown in Table XIV-8 below.

OIL SPECIFICATIONS OF HYDRAULIC POWER UNIT FOR CYLINDER + CLAMPS **TABLE XIV-8**

- Mineral oil for hydraulic systems
- Viscosity: 3.5 to 4.5 degrees E at 50 degrees C (122 degrees F)
- Viscosity index: 120 to 150
- Pour point: approx. -30 degrees C (-86 degrees F)
- ISO classification: ISO VG 46
- Recommended oil: MOBIL D.T.E. 25

MAKE	BRAND
AGIP	OSO 46
IP	HYDRUS 46
BP	ENERGOL HLP 46
CASTROL	HYSPIN AWS 46
ESSO	NUTO H 46
MOBIL	DTE 25
SHELL	TELLUS OIL 46
CHEVRON	EP HYDRAULIC OIL 46

Hydraulic power unit oil capacity = 250 litres

10 OIL SPECIFICATIONS FOR PLANETARY BOX BLADE MOTORIZATION

MAKE	OPERATING TEMPERATURE		
	-20°C / +5°C	+5°C / +30°C	+30°C / +65°C
	VG 100	ISO 3448 VG 150	ISO 3448 VG 150-200
AGIP	Blasia 100	Blasia 150	Blasia S 220
ARAL	Degol BG 100	Degol BG 150	Degol BG 220
BP MACH	GR XP 100	GR XP 150	SGR XP 220
CASTROL	Alpha SP 100	Alpha SP 150	Alpha SN 6
CHEVRON	non leaded gear compound 100	non leaded gear compound 150	
ESSO	Spartan EP 100	Spartan EP 150	Compressor oil LG 150
GULF		EP lubrificant HD 150	
I.P.	Mellana 100	Mellana 150	Telesia oil 150
MOBIL		Mobilgear 629	Glygoyle 22 Glygoyle 30 SHC 630
SHELL	Omala oil 100	Omala oil 150	
TOTAL	Carter EP 100 N	Carter EP 150 N	
KLUBER	Lamora 100	Lamora 150	
ELF	Reductelf SP 100	Reductelf SP 150	Elf ORTIS 125 MS Elf Syntherma P 30

11 RECOMMENDED GREASE TYPES FOR PRESCRIBED POINTS

RECOMMENDED GREASE TYPES FOR PRESCRIBED POINTS TABLE XIV-10	
MAKE	**BRAND**
AGIP	GR MU EP 1 GR MU EP 2
BP	GREASE LI EP 1 GREASE LI EP 2
CHEVRON	DURALITH GREASE EP 1 DURALITH GREASE EP 2
ESSO	BEACON EP 1 BEACON EP 2
TOTAL	MULTIS EP 1 MULTIS EP 2
MOBIL	MOBILPLEX 46 MOBILPLEX 47
SHELL	ALVANIA EP GREASE 1 SUPER GREASE EP 1 ALVANIA GREASE R2 SUPER GREASE R2
TOTAL	CARTER EP 200 TORRILIS 200
SYNECO	PACEMAKER RODE 24

12 OIL SPECIFICATIONS FOR AUTOMATIC LUBRICATION SYSTEM

N.B.: the same type of grease can be used on the greasing system and on the manual greasing. The main characteristic to be checked is the "NLGI number" that must be "NLGI2".

Grease tank capacity = 1,5 kg (disposable)

XV REFERENCE DOCUMENTATION

1 ELECTRICAL DIAGRAMS, HYDRAULIC CIRCUIT DIAGRAMS AND ASSEMBLY DRAWINGS

The machine is delivered complete with two copies of all the assembly drawings in their original size to facilitate the user's understanding and reading of the references contained therein. Similarly two original sized copies of the electrical and hydraulic diagrams are also supplied with the machine illustrating the correct connection procedure.
A list of the machine unit assembly drawings is given below.

Foundation plan:
8209067-0

Protections diagram
…

Electrical wiring diagram:

…

Pneumatic diagrams:
76061 P MANCHINE SENSOR D12:D76 PNE

Hydraulic circuit diagrams:
8706701-5286, 8706712-5286

List of machine unit assembly drawings:

09048 M	CUTTING BED FOR TAL 200 MEC
09048 P	CUTTING BED FOR TAL 200 PNE
20122 M	CARRIAGE FOR TCCG COLD SAWTAL 200 MEC
50058 M	CLAMPS FOR CUTTING BED TAL 200 MEC
76061 M	MACHINE SENSOR D12:D76 MEC
76061 P	MACHINE SENSOR D12:D76 PNE
76061 VC	ENCODER VERSION ELCIS 115
77035 M	BAR SUPPORT FOR CUTTING BED TAL 200 MEC
87059 M	CUTTING BED TAL 200 MEC
87059 VB	PULLEY RATIO VERSION 1:3.73
87059 VC	HIGH PRESSURE BLADE WASHING VERSION

2 SPARE PARTS: PART NUMBERS AND QUANTITIES

The following table indicates the components installed on the machine complete with the corresponding part number, description and recommended ordering priority.

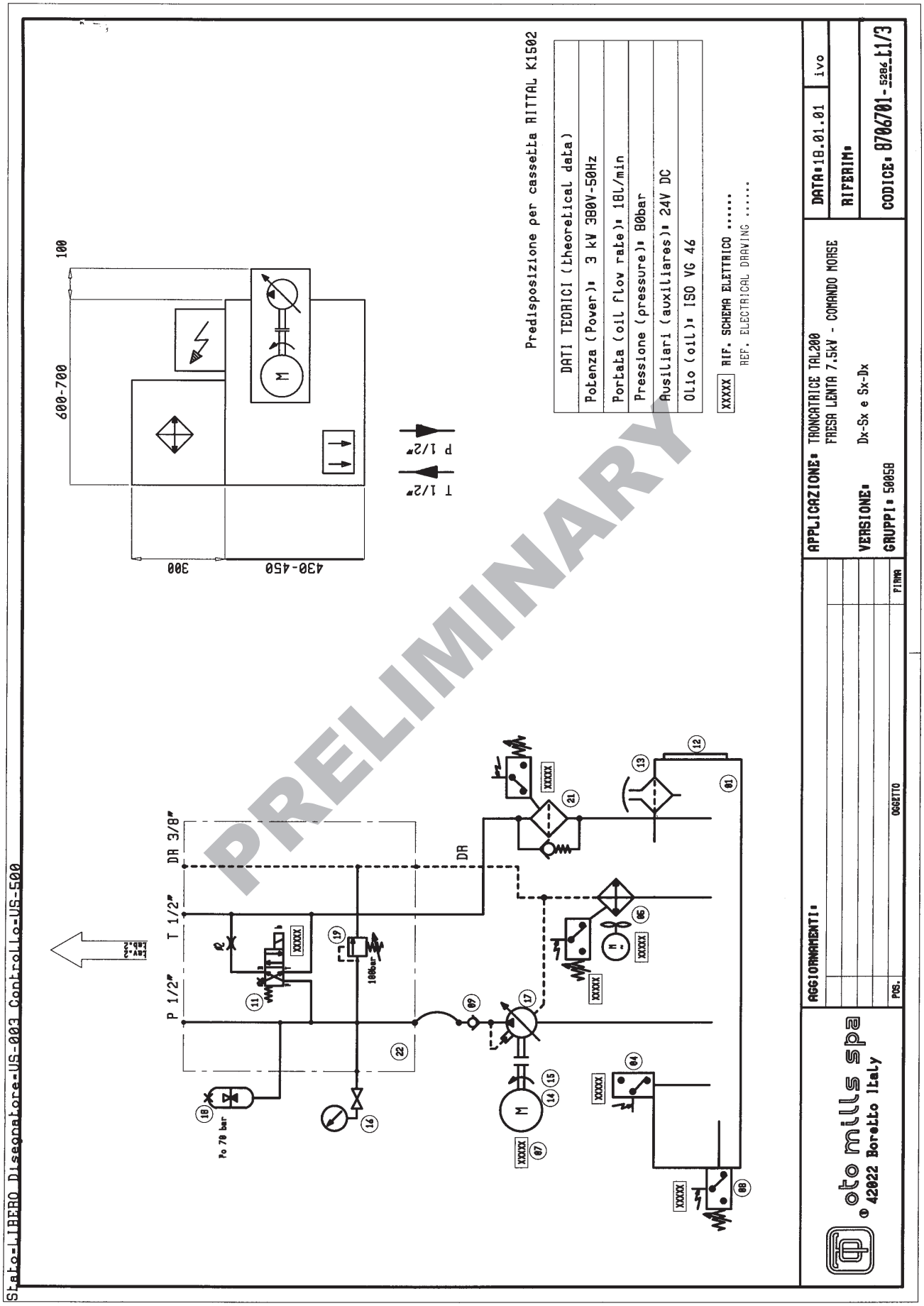
PART	DESCRIPTION	ORDER. PRIORITY	QTY. INSTALLED
TAL200D1/5286	***CUT WITH LINEAR ACCEL. TAL200 -FL 7,5 MOT.BRUSH.***		***1***
09048A1/5286	***BED FOR CUTOFF UNIT TAL 200***		***1***
09048 M /5286	***BED FOR CUTOFF UNIT TAL 200 MEC***		***1***
2600062	TAPE TRANSILON 70X3L4970	A	2
9910735	CABLEN HOLDER CHAIN 0900 KABEL SHLEPP K0900.232-RR-300-3240	B	2
421161	SLIDE 1651-413-10 STAR	B	6
421254	RAIL 1605-403-31,4801-38/45X105/ 38 STAR	C	3
20122A1/5286	***CARRIAGE FOR CUTOFF UNIT TAL 200***		***1***
20122 M /5286	***CARRIAGE FOR CUTOFF UNIT TAL 200 MEC***		***1***
9800479	COUPLING HBX 3/4 660335	A	1
350004	RING NUT GUK M20X1	B	2
350314	SEEGER FOR /EST.d17	A	1
390002	ROLL BEARING CYL.17X40X16 NU-2203EC	B	1
391929	COMBINED BEARING ZARN 2052 TN INA	B	1
421161	SLIDE 1651-413-10 STAR	B	2
510055	GAS RING DPSM 25357	A	1
510067	GAS RING DPSM 30407	A	2
510216	OR 2068	A	1
510242	OR RING 3081	A	2
570003	LUBRICATOR M10X1 DIR. ART. 90.25	B	2
50058A1/5286	***CLAMP FOR CUTOFF UNIT TAL 200***		***1***
50058 H /5286	***CLAMP FOR CUTOFF UNIT TAL 200 OLE***		***1***
500200	CYLINDER BLOCKTYPE BMD-40252 D40 STROKE 25 ENERPAC	C	2
500201	CYLINDER BLOCKTYPE BMD-18202 D25 STROKE 20 ENERPAC	C	2
50058 M /5286	***CLAMP FOR CUTOFF UNIT TAL 200 MEC***		***1***
370186	INSERTED THREAD M8X1.25 L=16	B	20
421249	CYLINDRIC BUSHING L-A 25X35X30 S.I .BO	B	16
510209	OR 108	A	8
510215	OR 2062	A	2
510221	OR 2100	A	2
510287	OR 4125	A	2
510368	OR 6162	A	2
521863	SCRAPPER RING WRM 098137-1/C POLYPAC	A	16
76061A1/5286	***SENSOR MACHINE (H of T) D12,7-D76 FOR/REVOLVING APPL.***		***1***
76061 M /5286	***SENSOR MACHINE (H of T) D12-D76 MEC***		***1***
5801740	ROLL Fe510 D76,1Sp20L78	B	1
5805240	ROLL X210Cr13 D165L73	A	1

PART	DESCRIPTION	ORDER. PRIORITY	QTY. INSTALLED
7401031	ROLL 18NCM5 D95L78	B	1
9802262	THREADED BAR M16 360109	B	1
400213	BALLS SLEVE LBE25UU IKO d25D40B58 025 STAR	B	4
420017	METALLIC CAP 0901-077-00 STAR	B	4
76061 P /5286	***SENSOR MACHINE (H of T) D12-D76 PNE***		***1***
460302	**CYLINDER 167/50/100 MECMAN**		**1**
570188	BEARINGS SET FOR CYL.167-AL50 MECMAN (CIL.46.3.02)	A	1
76061 VC/5286	***ENCODER APPLICATION VERSION ELCIS 115***		***1***
9902644	REED COUPLING 128.73 11-10	B	1
77035A1/5286	***BAR SUPPORT FOR CUTOFF UNIT TAL 200***		***1***
77035 M /5286	***BAR SUPPORT FOR CUTOFF UNIT TAL 200 MEC***		***1***
380323	RAD.BEARINGS RIG.20X42X12 6004-2RS	B	2
87059A1/5286	***CUTOFF UNIT TAL 200***		***1***
87059 E /5286	***CUTOFF UNIT TAL 200 ELE***		***1***
AG0042	MULTIPLE LIMIT STOP 4 ACTUATORS A WHEEL FMV4R12-100	A	1
87059 M /5286	***CUTOFF UNIT TAL 200 MEC***		***1***
5904033	PINION 18NCM5 D70L221	C	1
5904034	WHEEL18NCM5 D105L43	C	1
9910715	CIRCULATING SCREW 25X10Rx3-4 DIN69051 STAR	C	1
370767	SPIRAL SPRING 030-0550-050	B	2
390403	HOR. RAD.BEARINGS 30X62X20 22206C	B	1
390624	CON.RAD.BEARINGS 35X62X18 32007X	B	1
390631	CON.ROLL BEARINGS 40X68X19 32008X	B	3
421247	SLIDE 1653-223-10 TAGLIA 25 STAR	B	4
421248	RAIL 1605-203-31,480 30/7X60/30 STAR	C	2
510086	GAS RING DPSM 38557	A	1
510268	OR 3225	A	1
510272	OR RING 3250	A	1
511138	GAS RING AS 48628 A+P	A	1
511416	OR 3300	A	2
520790	V-RING VR50A	A	1
521952	ROPE OR D1,78 A+P	A	200
570003	LUBRICATOR M10X1 DIR. ART. 90.25	A	5
571112	DIR.EXTREMITY FITTING 1/8"T.d4 TN93-4LLR	A	5
571199	OIL LOAD CAP TCF/F3G 1/2"G MINTOR	A	1
571244	OIL DISCHARGE CAP TCEM1G 1/4"G MINTOR	A	1
571245	OIL LEVEL CAP TLA1G 1/4"G MINTOR	A	1
651770	PULLEY 8M-30S-36 GATES	B	1
751147	LEVER CLOSING 18-613 Ms-Zn PROTEX	B	4
751148	COUPLER PLAQUE 03-613 Ms-Zn PROTEX	B	4
752195	HANDLE M643/100 B-M6 ELESA	B	2
87059 VB/5286	***PULLEY RATIO VERSION 1:3.73***		***1***

PART	DESCRIPTION	ORDER. PRIORITY	QTY. INSTALLED
9810540	PULLEY 8M-1125-36 651755	B	1
651755	PULLEY 8M-112S-36	B	1
651307	BELT POLY-CHAIN 8M1120-36 GATES FLENDER	A	1
87059 VC/5286	***HIGH PRESSURE BLADE WASHING VERSION***		***1***
780007	**RIGHT MOTOPUMP 7,5HP 150bar CON VALVE-MAN-FILTER**		**1**
780077	BEARING KIT 28 FOR PUMP WS202	A	1
780078	WASHER COD.96.7514.00 PUMP WS202	A	1
780079	PISTON COD.47.0404.09 PUMP WS202	A	3
780082	KIT 1 FOR PUMP WS 202	A	6
780083	KIT 2 FOR PUMP WS 202	A	3
780084	BUSHING COD.90.9126.00 PUMP WS 202	A	3
780087	HIGH PRESSURE PUMP WS202 150bar 21l/1'(RIF.780007)	C	1
QTMA0QA/5286	***DESK+PANEL+2 PUSHBUTTON TAL200 +ELTAV4+COLD SAW INDRAMAT PLC5***		***1***
682336	ENCODER Z115-2000-8245 BN-CMR ELCIS + TMF LINE DRIVER TRD38071	A	1
730260	PENDANT OUTLET 7 POLES MS3106F 16S-1S	B	1

Spare part types:

A = Absolutely essential B = Essential C = Normal wear

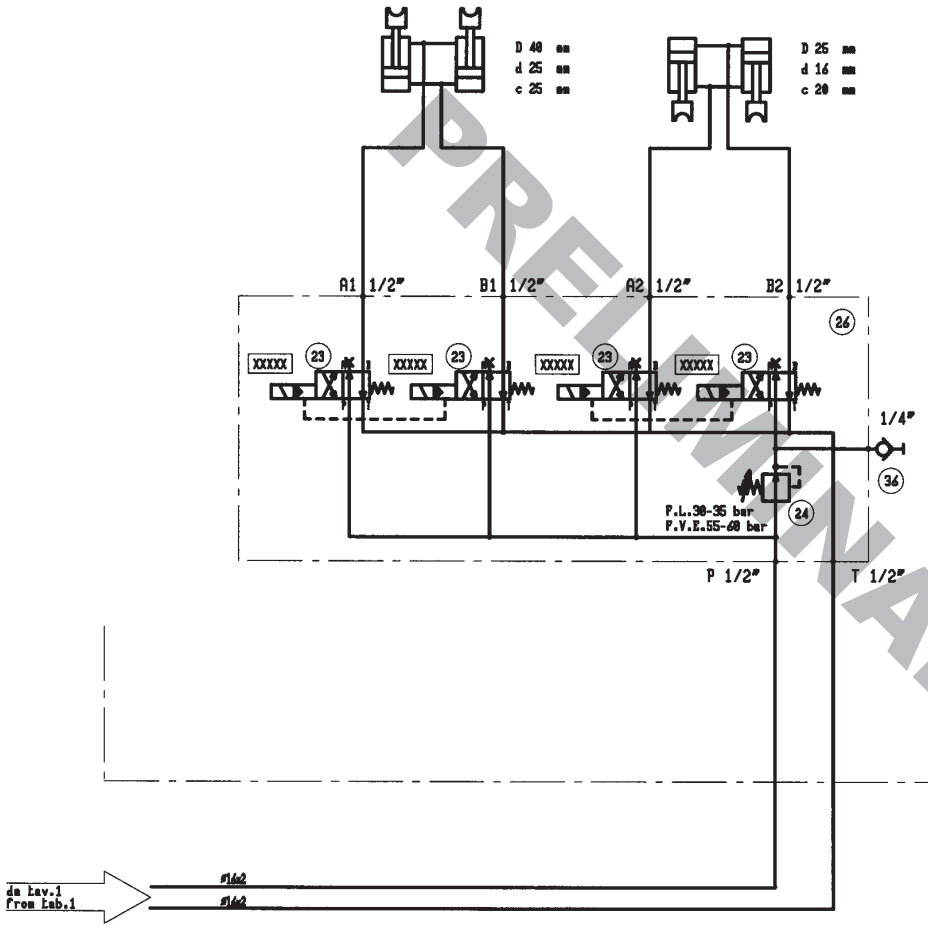

Stato=LIBERO Disegnatore=US-003 Controllo=US-500
Predisposizione per cassetta RITTAL K1502
DATI TEORICI (theoretical data)
Potenza (Power)= 3 kW 380V-50Hz
Portata (oil flow rate)= 18L/min
Pressione (pressure)= 80bar
Ausiliari (auxiliares)= 24V DC
Olio (oil)= ISO VG 46
XXXXX RIF. SCHEMA ELETTRICO .....
REF. ELECTRICAL DRAWING .....
100
600-700
300
430-450
P 1/2"
T 1/2"
DR 3/8"
DR
P 1/2"
T 1/2"
100bar
Po 70 bar
APPLICAZIONE= TRONCATRICE TAL200
FRESA LAMA 7.5kW - COMANDO MORSE
VERSIONE= Dx-Sx e Sx-Dx
GRUPPI= 50058
DATA=18.01.01 ivo
RIFERIM=
CODICE= 870701-5286_1/3
AGGIORNAMENTI=
POS. OGGETTO FIRMA
oto mills spa
42022 Boretto Italy
PRELIMINARY

APERTURA/CHIUSURA
MORSE POSTERIORI

OPENING/CLOSING
REAR CLAMPS

APERTURA/CHIUSURA
MORSE ANTERIORI

OPENING/CLOSING
FRONT CLAMPS



I valori di taratura della riduttrice sono indicativi.
Verificare che siano compatibili con le caratteristiche del tubo

Pressure reducing valve settings are for reference only.
Verify they are consistent with pipe strenght

TUBI NON QUOTATI: ø 12 x 1.5 mm
PIPES NOT SPECIFIED: ø 12 x 1.5 mm

TUBI FLESSIBILI NON QUOTATI: 3/8" SAE 100 R1A DIN 20022
HOSES NOT SPECIFIED: 3/8" SAE 100 R1A DIN 20022

oto mills spa
42022 Boretto Italy

AGGIORNAMENTI:

POS.	OGGETTO	FIRMA

APPLICAZIONE: TRONCATRICE TAL200
FRESA LENTA 7.5kW - COMANDO MORSE

VERSIONE: Dx-Sx e Sx-Dx

GRUPPI: 50058

DATA: 18.01.01 | ivo

RIFERIM:

CODICE: 8706701-5286_t2/3

OTO MILLS S.p.A.

Stato-LIBERO Diseqnatore-US-003 Controllo-US-500

POS.	DESCRIZIONE	CARATTERISTICA	COSTRUTTORE	Q.TA'
01	SERBATOIO Tank	DS/OT/75	C.D.S.	1
02				
03				
04	LIVELLOSTATO Level indicator	LEF-mm	C.D.S.	1
05	SCAMBIATORE ARIA-OLIO Air-oil cooler	AP300-E 220V 50/60HZ monof.	SESINO	1
06				
07	MOTORE ELETTRICO Motor	3KW-400V-50HZ-4POLI IEC38-FORMA B5	ABB	1
08	TERMOSTATO Temperature switch	KP-79	DANFOSS	1
09	VALVOLA DI RITEGNO IN LINEA NON RETURN VALVE	FT257/6-38-0.25	TOGNELLA	1
10				
11	ELETTRODISTRIBUTORE CETOP 03 CETOP 03 DIRECTIONAL CONTROL VALVE	4WE6-Y-5X/AMGB4-N	REXROTH	1
12	INDICATORE DI LIVELLO Level indicator	ILT-127	C.D.S.	1
13	BOCCA DI CARICO Filler plug	TR/83/78	C.D.S.	1
14	CAMPANA Bell housing	A10VSO18/4/L	C.D.S.	1
15	GIUNTO Coupling	A10VSO18/4/G	C.D.S.	1
16	MANOMETRO CON ESCLUSORE Fs 250 bar D=63 Pressure gauge	0 - 160 bar	C.D.S.	1
17	POMPA A PORTATA VARIABILE 50 bar Q=18L/min Variable capacity pump	1PV2V7-1X/10-14-RE01MC0-14A	REXROTH	1
18	ACCUMULATORE 4 lt. 50 bar ACCUMULATOR	SB330-4-A1/112	HYDAC	1

POS.	DESCRIZIONE	CARATTERISTICA	COSTRUTTORE	Q.TA'
19	VALVOLA DI SICUREZZA Safety valve	RV8-10-S-0-50	VICKERS	1
20				
21	FILTRO SUL RITORNO Return filter	MPF100-2AG3-P25-NB + 3.1.610 + 3.1.600	MP	1
22	PIASTRA Manifold	06-502-101	C.D.S.	1
23	ELETTROVALVOLA CETOP 03 Solenoid valve	VE02-6P-100-4X-E24	HARTMANN LAMMLE	4
24	RIDUTTRICE CETOP 03 Reducing valve	D40-6601-POHX	HARTMANN LAMMLE	1
25				
26	PIASTRA Manifold	B25-101/4P (16.02.326)	C.D.S.	1
27				
28				
29				
30				
31				
32				
33				
34				
35				
36	PRESA PER TEST PRESSIONE Pressure test point	# 1/4" BSPP	C.D.S.	1

oto mills spa
42022 Boretto Italy

AGGIORNAMENTI:

POS.	OGGETTO	FIRMA

APPLICAZIONE: TRONCATRICE TAL200
FRESA LENTA 7.5kW - COMANDO MORSE

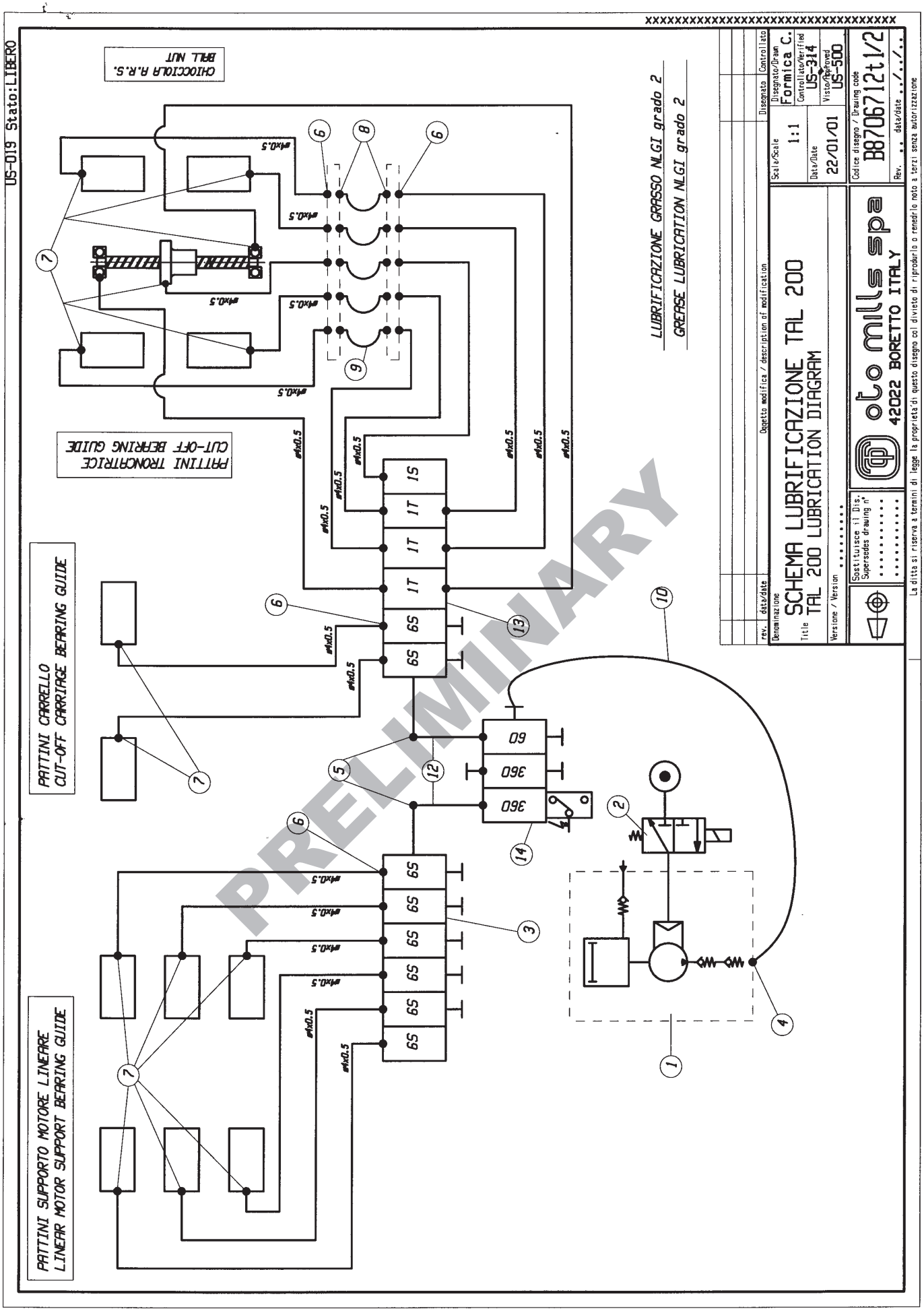
VERSIONE: Dx-Sx e Sx-Dx

GRUPPI: 50058

DATA: 18.01.01 ivo

RIFERIM:

CODICE: 8706701-5206_t3/3


US-019 Stato:LIBERO
CHIOCCIOLA R.R.S.
BALL NUT
PATTINI TRONCATRICE
CUT-OFF BEARING GUIDE
PATTINI CARRELLO
CUT-OFF CARRIAGE BEARING GUIDE
PATTINI SUPPORTO MOTORE LINEARE
LINEAR MOTOR SUPPORT BEARING GUIDE
LUBRIFICAZIONE GRASSO NLGI grado 2
GREASE LUBRICATION NLGI grado 2
SCHEMA LUBRIFICAZIONE TAL 200
TAL 200 LUBRICATION DIAGRAM
oto mills spa
42022 BORETTO ITALY
B87067121/2
Formica C.
US-314
US-500
22/01/01
1:1
PRELIMINARY

POS.	DESCRIZIONE	CODICE	COSTRUTTORE	Q.TA'
01	Pompa tipo PFP 23-2 con indicatore		IMP.OPIELLE	1
02	E/Valvola TEV/6 V=24 DC		IMP.OPIELLE	1
03	Distr.VPM 6 6S-6S-6S-6S-6S-6S		IMP.OPIELLE	1
04	Raccordo tipo RVD 615K		IMP.OPIELLE	1
	Raccordo tipo RB 63		IMP.OPIELLE	1
	Bicono tipo B 60		IMP.OPIELLE	1
05	Raccordo a 90° tipo 8094006		IMP.OPIELLE	2
	Raccordo tipo RB 63		IMP.OPIELLE	2
	Bicono tipo B 60		IMP.OPIELLE	2
06	Raccordo tipo RK 425		IMP.OPIELLE	23
	Raccordo tipo RB 40		IMP.OPIELLE	23
	Bicono tipo B 40		IMP.OPIELLE	23
07	Raccordo tipo 504161		IMP.OPIELLE	13
	Raccordo tipo RB 40		IMP.OPIELLE	13
	Bicono tipo B 40		IMP.OPIELLE	13
08	Raccordo tipo RK 618		IMP.OPIELLE	10

POS.	DESCRIZIONE	CODICE	COSTRUTTORE	Q.TA'
	Raccordo tipo RB 63		IMP.OPIELLE	10
	Bicono tipo B 60		IMP.OPIELLE	10
09	Tubo flex 98275009 L=500		IMP.OPIELLE	5
	Codolo diritto tipo 853380002		IMP.OPIELLE	10
	Boccola tipo 853540010		IMP.OPIELLE	10
10	Tubo flex 982750091 L=4000		IMP.OPIELLE	1
	Codolo tipo 853380002		IMP.OPIELLE	2
	Boccola tipo 853540010		IMP.OPIELLE	2
12	Tubo flex 982750091 L=1500		IMP.OPIELLE	2
	Codolo tipo 853380002		IMP.OPIELLE	4
	Boccola tipo 853540010		IMP.OPIELLE	4
13	Distr.VPM 6 6S-6S-1T-1T-1T-1S		IMP.OPIELLE	1
14	Master tipo PSG2/0302B/00A1-60R-360-960L		IMP.OPIELLE	1

rev.	data/date	Oggetto modifica / description of modification	Disegnato	Controllato

Denominazione
Title SCHEMA LUBRIFICAZIONE TAL 200
TAL 200 LUBRICATION DIAGRAM

Versione / Version .....

Scala/Scale 1:1
Data/Date 22/01/01
Disegnato/Drawn Formica C.
Controllato/Verified US-314
Visto/Approved US-500

Sostituisce il Dis. Supersedes drawing n° ....

oto mills spa
42022 BORETTO ITALY

Codice disegno / Drawing code B8706712t2/2
Rev. .. data/date ../../..

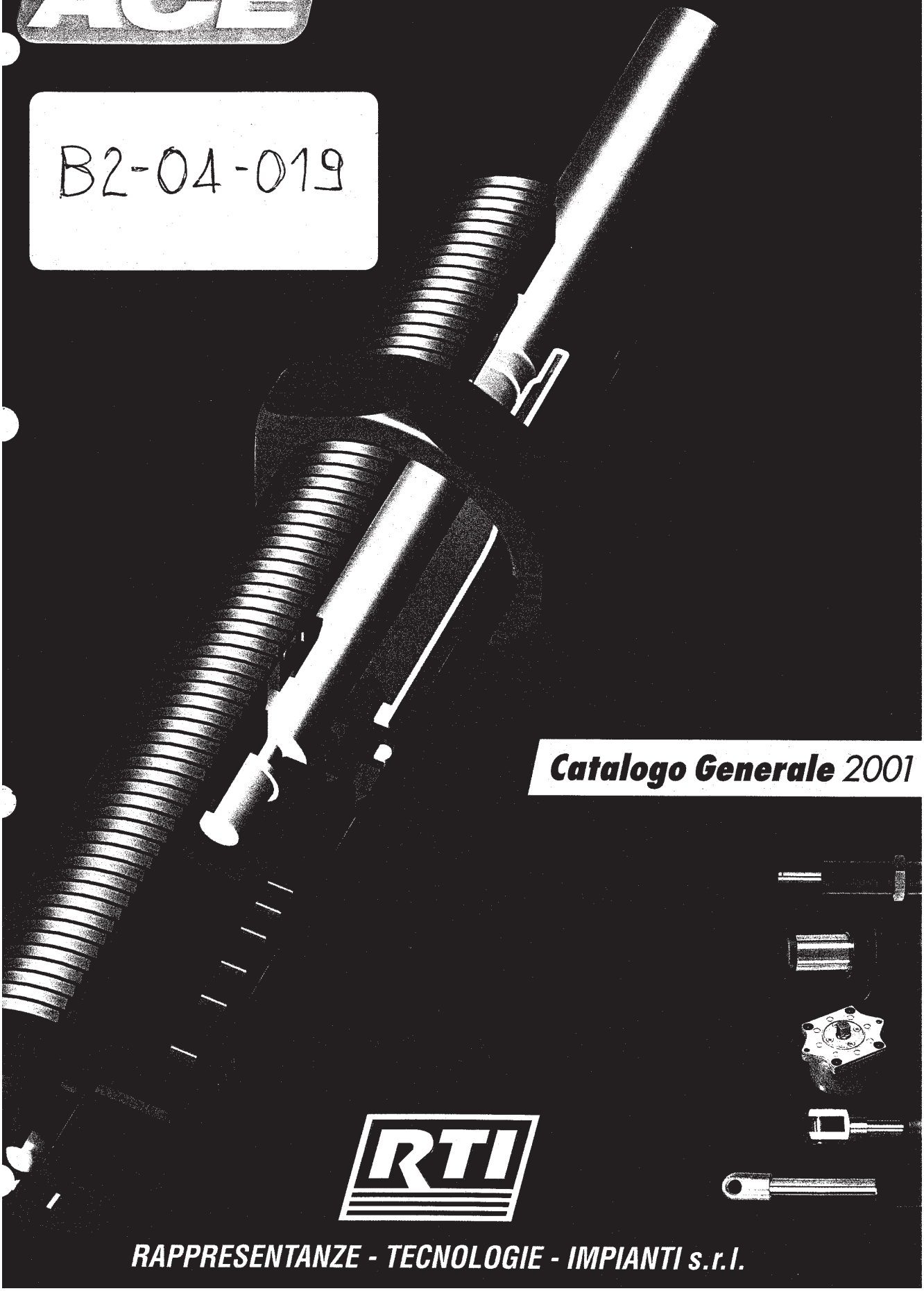
4 COMMERCIAL SUPPLIES DOCUMENTATION

This section contains commercial catalogue pages illustrating products not manufactured by Oto Mills.

ACE

Deceleratori Industriali

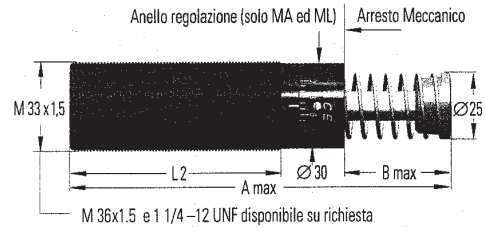
B2-04-019



Catalogo Generale 2001

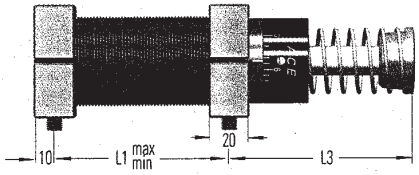
RTI

RAPPRESENTANZE - TECNOLOGIE - IMPIANTI s.r.l.



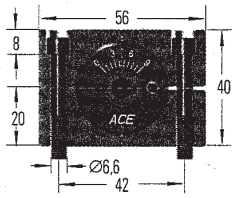
Regolazione (solo MA ed ML)

S 33



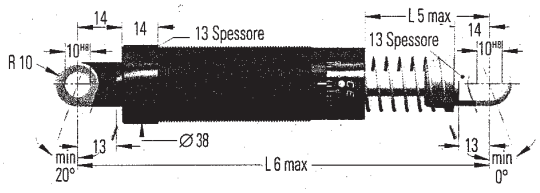
Montaggio a piedini

S 33 = 2 Flange + 4 Viti M 6x40, DIN 912
Nota: Per mantenere l'intercambiabilità con i vecchi modelli usare cod. 250-0294



Coppia serraggio viti 11 Nm
Coppia di tenuta > 90 Nm

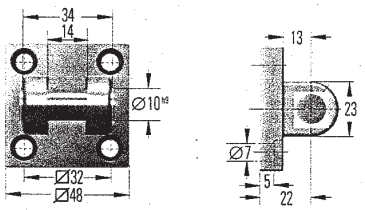
C 33



Montaggio oscillante

C 33 = 2 Occhielli maschio - forniti montati
Nota: Per mantenere l'intercambiabilità con i vecchi modelli usare cod. 250-0323

SF 33



Controcerniera

(Accoppiabile agli occhielli di C 33)
Conforme a: Audi + VW 39D1307/2/032, VDMA 24562 part 2
Daimler Chr. B801520023647, Opel-GM M13911673

Dimensioni mm

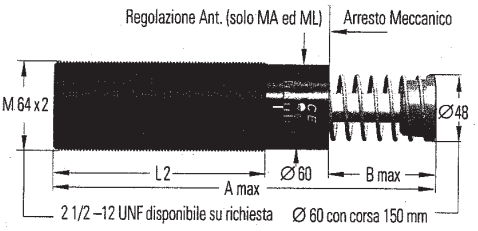
Modello	Corsa	A max	B max	L1 min	L1 max	L2	L3	L5 max	L6 max
MC, MA, ML 3325 M	25	138	23	25	60	83	68	39	168
MC, MA, ML 3350 M	50	189	48.5	32	86	108	93	64	218

Tabella delle Capacità

Modello	**per ciclo W_3	Energia Max. Nm W_4 per ora con acc. int.	con acc. est.	con ricircolo	+ morbido * Misura d'Efficienza kg -0 min max	-1 min max	-2 min max	-3 min max	-4 + duro min max	Forza molla di riarmo N min max	Tempo di riarmo s	Max. Disassamento o	Peso kg
MC 3325 M	155	75 000	124 000	169 000	3 - 11	9 - 40	30 - 120	100 - 420	350 - 1 420	45 - 90	0.03	4	0.45
MC 3350 M	310	85 000	135 000	180 000	5 - 22	18 - 70	60 - 250	210 - 840	710 - 2 830	45 - 135	0.06	3	0.54

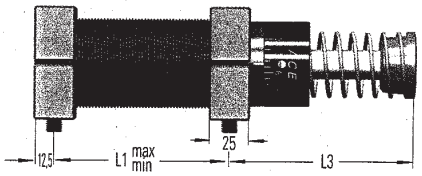
					modelli MA min max	modelli ML min max			
MA, ML 3325 M	170	75 000	124 000	169 000	9 - 1 700	300 - 50 000	45 - 90	0.03	4	0.45
MA, ML 3350 M	340	85 000	135 000	180 000	13 - 2 500	500 - 80 000	45 - 135	0.06	3	0.54

* = su richiesta è possibile avere limiti del campo di misura d'efficienza più alti o bassi.
** = solo per applicazioni in emergenza a volte è possibile superare i valori indicati. Consultateci.



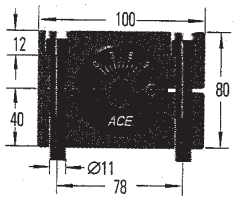
Regolazione Post. (solo MA ed ML)

S 64



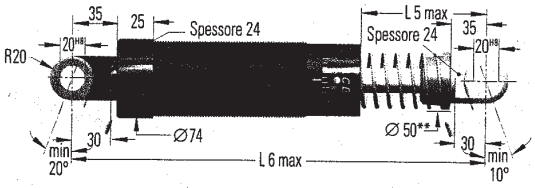
Montaggio a piedini

S 64 = 2 Flange + 4 Viti M10x80, DIN 912



Coppia serraggio viti = 50 Nm
Coppia di bloccaggio dec. > 350 Nm

C 64

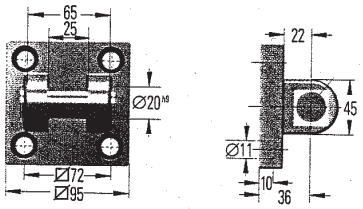


Montaggio oscillante

C 64 = 2 Occhielli maschio. Fornito montato

** = Ø 60 mm con corsa 150 mm. Ordinare C 64/150.

SF 64



Controcerniera

Conforme a: Audi + VW 39D1307/2/050, VDMA 24562 parte 2
Daimler Chr. B801520023647, Opel-GM M13911675

Dimensioni mm

Modello	Corsa	A max	B max	L1 min	L1 max	L2	L3	L5 max	L6 max
ML 6425 M	25	174	25	40	86	114	75.5	60	260
MC, MA, ML 6450 M	50	225	50	50	112	140	100	85	310
MC, MA 64100 M	100	326	100	64	162	191	152	136	410
MC, MA 64150 M	150	450	150	80	212	241	226	187	530

Tabella delle Capacità

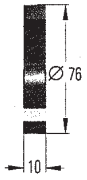
Modello	**per ciclo W_3	Energia Max. Nm W_4 per hour con acc. int.	con acc. est.	con ricircolo	+ morbido *Misura d'Efficienza kg + duro -0 min max	-1 min max	-2 min max	-3 min max	-4 min max	Forza molla di riarmo N min max	Tempo di riarmo s	Max. disas-samento o	Peso kg
MC 6450 M	1 700	146 000	293 000	384 000	35 - 140	140 - 540	460 - 1 850	1 600- 6 300	5 300-21 200	90 - 155	0.12	4	2.90
MC 64100 M	3 400	192 000	384 000	497 000	70 - 280	270 - 1 100	930 - 3 700	3 150-12 600	10 600-42 500	105 - 270	0.34	3	3.70
MC 64150 M	5 100	248 000	497 000	644 000	100 - 460	410 - 1 640	1 390 - 5 600	4 700-18 800	16 000-63 700	75 - 365	0.48	2	5.10

					modelli MA min max	modelli ML min max				
ML 6425 M	1 020	124 000	248 000	332 000		7 000 - 300 000	120 - 155	0.06	5	2.50
MA, ML 6450 M	2 040	146 000	293 000	384 000	220 - 50 000	11 000 - 500 000	90 - 155	0.12	4	2.90
MA 64100 M	4 080	192 000	384 000	497 000	270 - 52 000		105 - 270	0.34	3	3.70
MA 64150 M	6 120	248 000	497 000	644 000	330 - 80 000		75 - 365	0.48	2	5.10

* = su richiesta è possibile avere limiti del campo di misura d'efficienza più alti o più bassi.
** = solo per applicazioni in emergenza a volte è possibile superare i valori indicati. Consultateci.

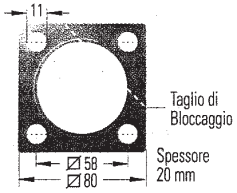
M 64x2 Per Nuove Installazioni:

NM 64



Ghiera

QF 64

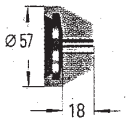


Flangia quadra

Coppia serraggio viti = 50 Nm
Coppia di bloccaggio dec. > 210 Nm

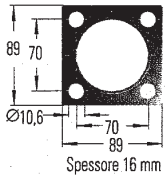
Accessori Intercambiabili con i Precedenti **MC 160..., A 1 1/8 x..., LVA 1 1/8 x...**

PP 1600 (1 1/8)



PolyPad 250-0002
È necessario smontare la ghiera anteriore

QFL 1600 (1 1/8)

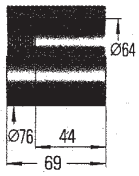


Flangia quadra 250-0302
È necessaria anche la ghiera Nm 64

AH 1600 (1 1/8)

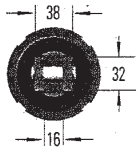
Ghiera d'arresto 250-0336

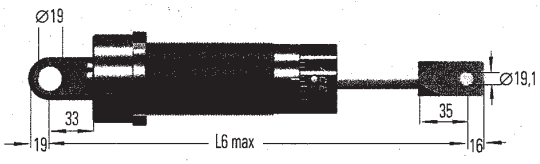
AHP 1600 (1 1/8)

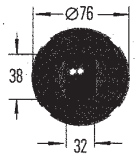


Ghiera d'arresto per PolyPad 250-0336P
È necessario smontare la ghiera anteriore

C 1600 (1 1/8)

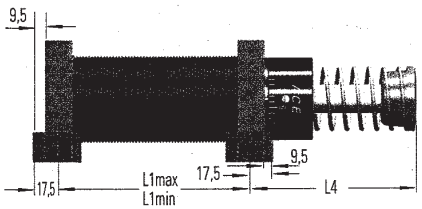


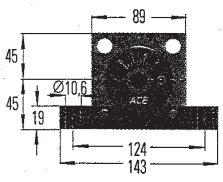




Montaggio oscillante
C 1600 (250-0327) fornito montato

S 1600 (1 1/8)





Montaggio a piedini
S 1600 (250-0304)

Dimensioni

Corsa	L_1**	L_4	$L_{6\ max.}$
25	102	64	257
50	127	90	309
100	178	140	410
150	229	214	530

** = Quota che può essere variata

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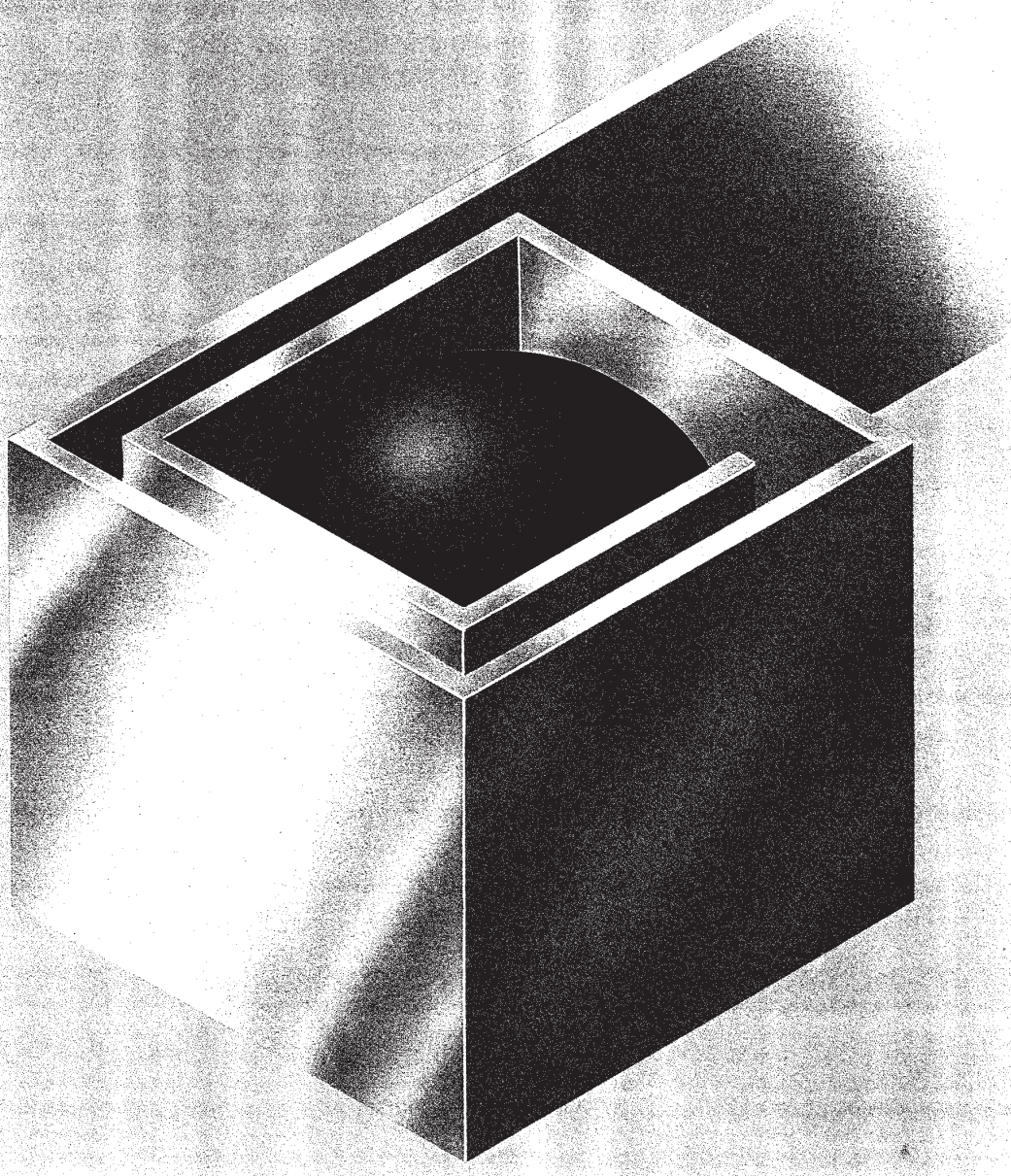
ALDIGO

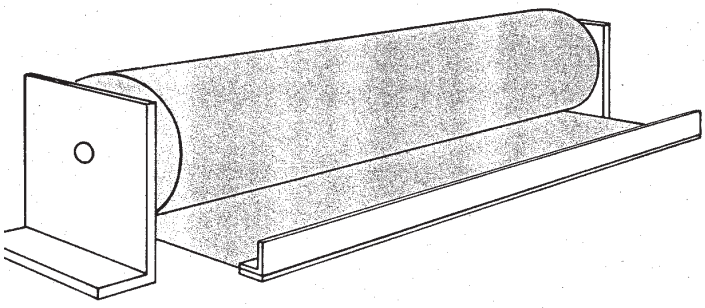
TECNIMETAL

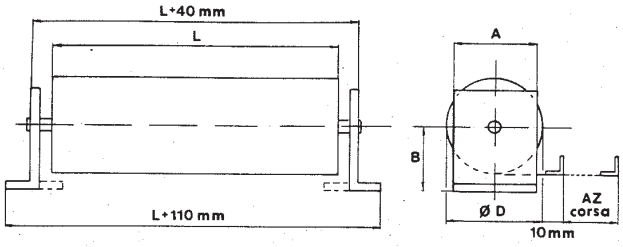


PROTEZIONI A NASTRO

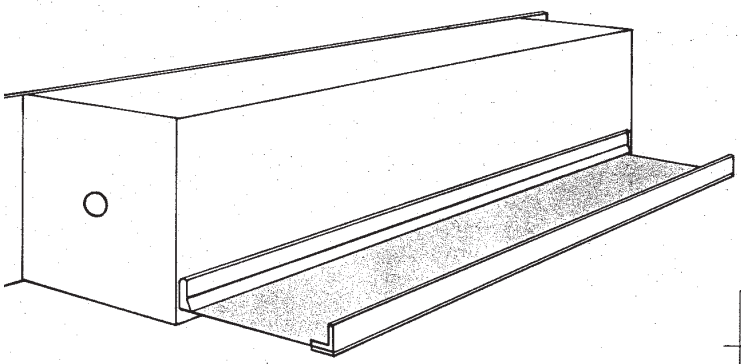
crimetal realizza questo prodotto in 3 versioni:

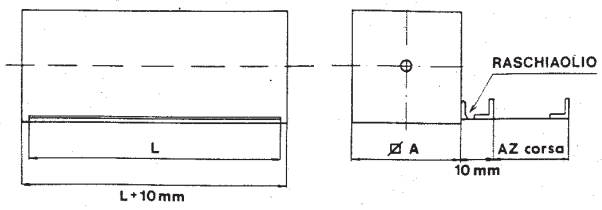
LLO TIPO 01 (senza cassonetto)



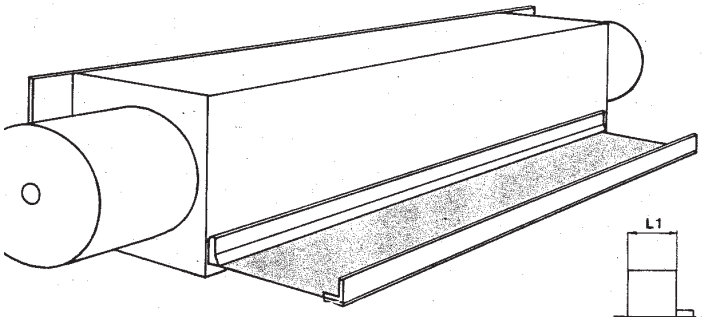


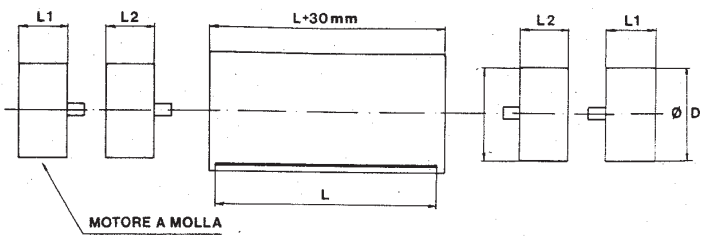
LLO TIPO 02 (con cassonetto)

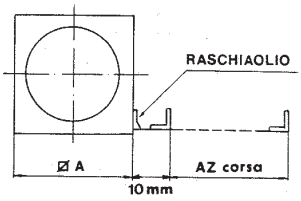




LO TIPO 03 (con cassonetto + motore esterno)







DIMENSIONI DEL ROLLO IN FUNZIONE DELLA CORSA E DEL MATERIALE IMPIEGATO

LARGHEZZA MASSIMA NASTRO

NASTRO ACCIAIO

SPESSORE	0,25	LARGHEZZA MAX	250 MM.	NASTRO TESSILE		LARGHEZZA MAX	2000 MM.
SPESSORE	0,30	LARGHEZZA MAX	150 MM.	NASTRO TESSILE +			
SPESSORE	0,40	LARGHEZZA MAX	300 MM.	NASTRO ACCIAIO INOX		LARGHEZZA MAX	2000 MM.

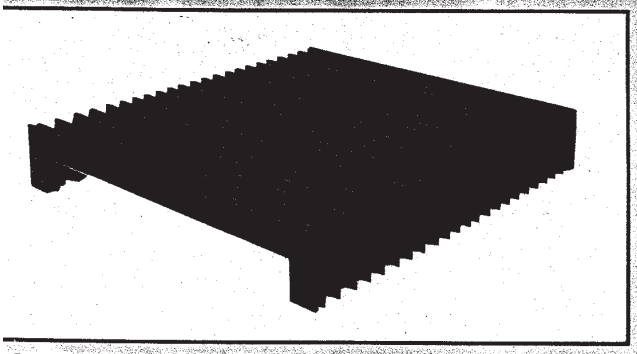
DIMENSIONI SEZIONE ROLLO 01

CORSA AZ	DIAMETRO MAX ESTERNO ∅ D							
	NASTRO ACCIAIO SP. 0,25	NASTRO TESSILE SP. 0,4	NASTRO TESSILE SP. 0,5	NASTRO TESSILE SP. 0,8	NASTRO TESSILE SP. 1	NASTRO TESSILE + ACCIAIO SP. 0,6	NASTRO TESSILE + ACCIAIO SP. 0,8	NASTRO TESSILE + ACCIAIO SP. 1
1000	69	72	73	76	78	74	76	78
1500	80	84	85	88	91	86	88	91
2000	81	86	87	92	95	89	92	95
2500	91	96	98	103	107	100	103	107
3000	92	98	100	106	110	102	106	110
4000	104	110	113	120	124	115	120	124
5000	106	112	117	125	131	119	126	131
6000	116	125	128	137	144	131	137	144
7000	117	127	132	142	150	134	142	150
8000	119	130	135	146	155	138	146	155
10000	140	151	156	169	178	160	165	178

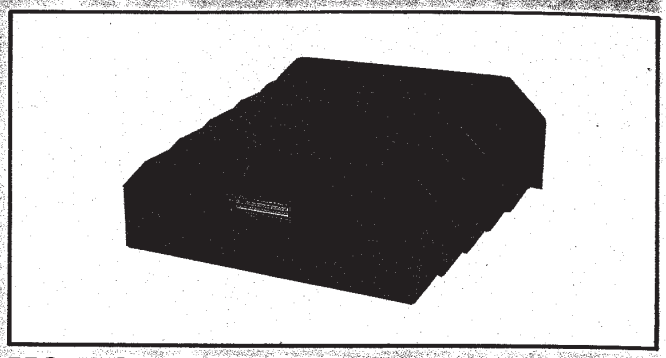
DIMENSIONI SEZIONE ROLLO 02 E 03

CORSA AZ	SEZIONE ESTERNA CASSONETTO ⊠ A			
	NASTRO ACCIAIO SP. 0,25	NASTRO ACCIAIO SP. 0,3	NASTRO ACCIAIO SP. 0,4	NASTRO TESSILE O NASTRO TESSILE + ACCIAIO
1000	50	60	70	VEDI QUOTE ROLLO 01 ∅ D (ROLLO 01) + 20 mm = ⊠ A ROLLO 02
1500	60	70	80	
2000	70	80	90	
2500	80	90	100	
3000	90	100	110	
4000	130	140	120	
5000	135	145	130	
6000	140	150		
7000	145	155		
8000	150	160		
10000	160	170		N.B.: PER MONTAGGIO TRASVERSALE LARGHEZZA CASSONETTO = L+10+45

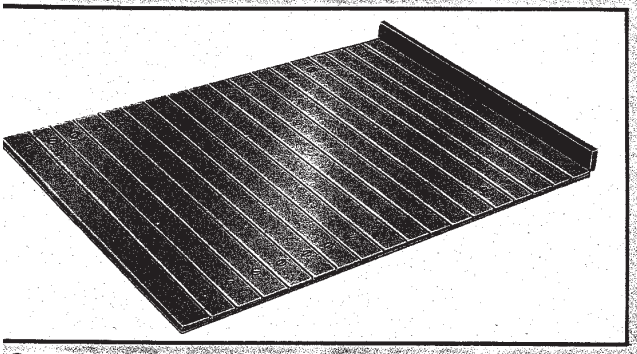
ROGRAMMA DI VENDITA



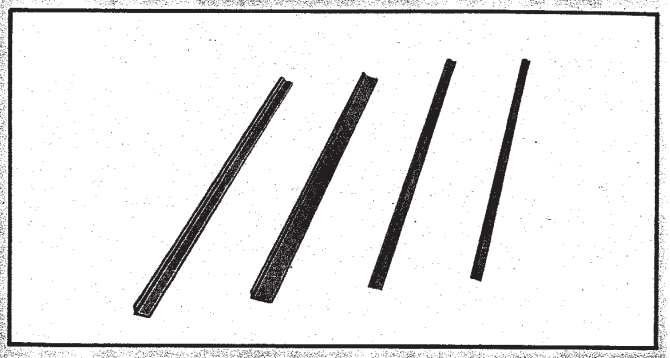
OTEZIONI A SOFFIETTO



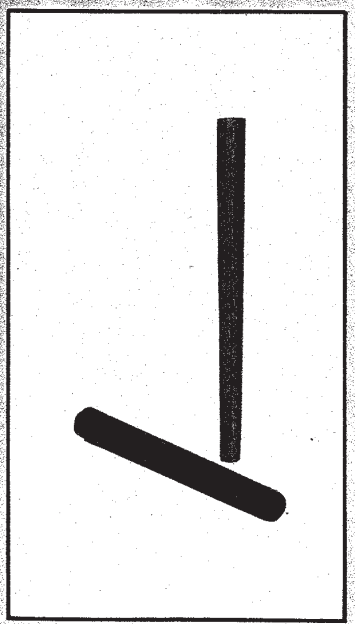
PROTEZIONI TELESCOPICHE
IN LAMIERA D'ACCIAIO SPECIALE



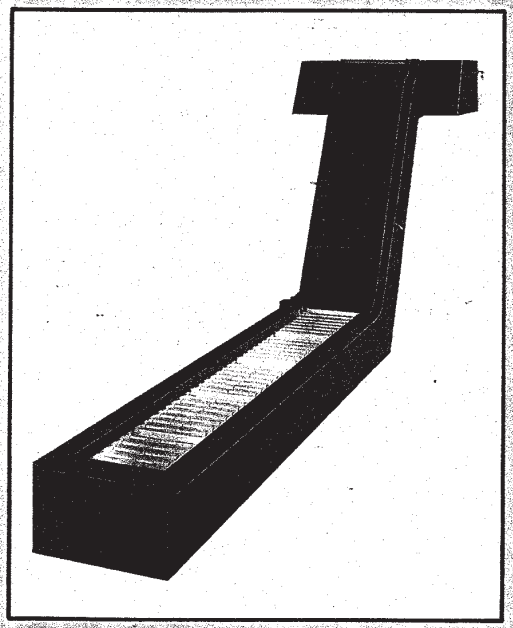
OTEZIONI A TAPPARELLA «MATTEUS»



RASCHIAOLIO IN BARRE E SAGOMATI



PROTEZIONI TELESCOPICHE A SPIRALE
PER VITI, ALBERI, COLONNE



CONVOGLIATORI DI TRUCIOLI A TAPPETO
O RASCHIANTI

RAVAIOLI
RAPPRESENTANZE
di RAVAIOLI E. & C. s.a.s.
via Brizzi 4 - tel. (051) 402266
40068 S. Lazzaro di Savena BO

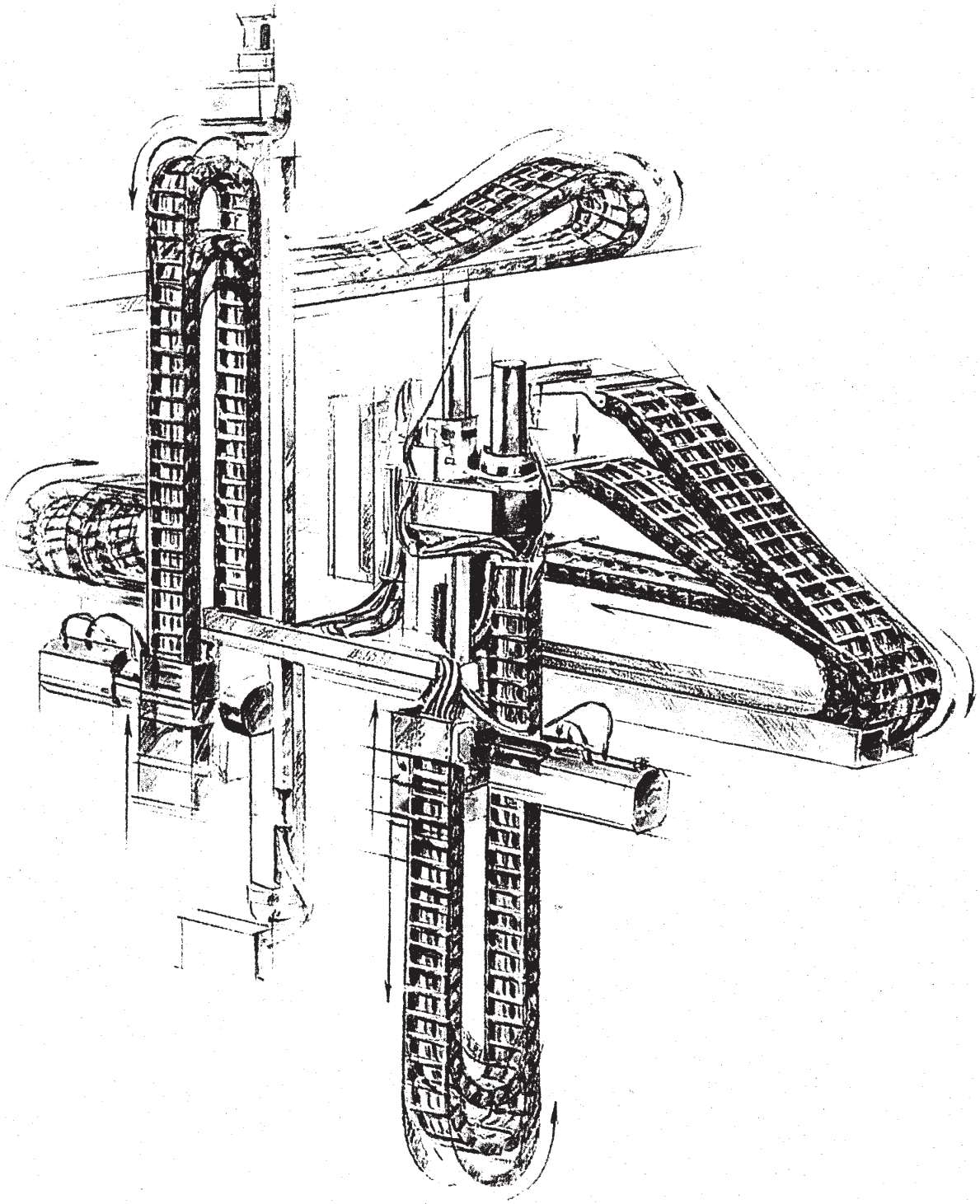
TECNIMETAL s.r.l.

Produzione di articoli tecnici per macchine utensili

5037 S. Giovanni in Croce (CR) - Via Giuseppina, 85 - Tel. 0375/91045-91037 - Telex 312819 ATT. TECNIMETAL - Telefax 0375/91538 ITALIA

Catene e guaine portacavi

MANUALE TECNICO



01-97

KABELSCHLEPP

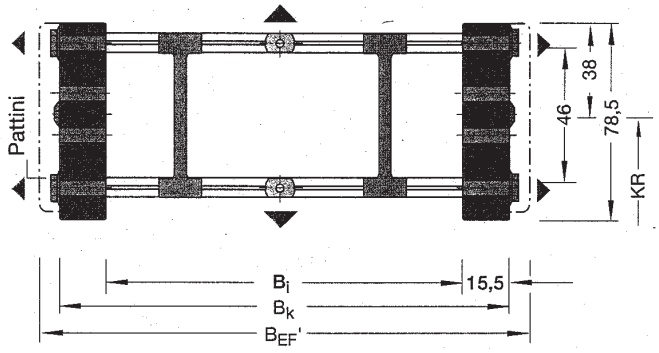
OTO MILLS S.p.A.

Sezione della catena Tipo K 0900

in conformità alle indicazioni nello schema di svolgimento

Variante del traversino "RR"

Traversino a telaio con profili in alluminio ancorati tramite viti



Determinazione della larghezza della catena:

$B_k = B_i + 31$ mm

Larghezza totale con raccordo:

$B_{EF} = B_i + 41$

Larghezza totale con pattini:

$B_{EF}' = B_i + 45$

Larghezze standard/Peso

Dimensioni in mm

Disponibili larghezze dei profili diversi dallo standard a richiesta

$B_{i\,min}$ = 63 mm
$B_{i\,max}$ = 600 mm

Montaggio standard dei traversini ogni due maglie!
Possibile il montaggio ogni maglia
Possibile il montaggio di protezione in acciaio inox

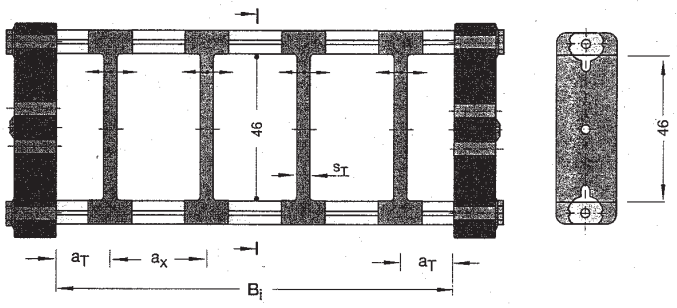
Catena Tipo	B_i	Larghezza catena B_k	Larghezza totale B_{EF}	B_{EF}'	Peso in kg/m
K 0900.082-RR	82	113	123	127	2.55
K 0900.107-RR	107	138	148	152	2.87
K 0900.132-RR	132	163	173	177	3.12
K 0900.157-RR	157	188	198	202	3.37
K 0900.182-RR	182	213	223	227	3.62
K 0900.207-RR	207	238	248	252	3.87
K 0900.232-RR	232	263	273	277	4.12
K 0900.257-RR	257	288	298	302	4.31
K 0900.282-RR	282	313	323	327	4.62
K 0900.307-RR	307	338	348	352	4.87
K 0900.332-RR	332	363	373	377	5.10
K 0900.357-RR	357	388	398	402	5.31
K 0900.382-RR	382	473	423	427	5.62
K 0900.432-RR	432	463	473	477	6.04
K 0900.482-RR	482	513	523	527	6.65

Separatori per variante del traversino "RR"

Per la suddivisione del conduttori possono essere installati separatori mobili. Montaggio standard su ogni traversino.

s_T = 4 mm
$a_{T\,min}$ = 7 mm
$a_{x\,min}$ = 14 mm

Indicare nell' ordine il numero dei separatori per traversino.



Pattini di scorrimenti

Per l' applicazione in un canale di guida la catena portacavi può essere dotata inoltre di pattini di scorrimento laterali alle maglie esterne.

(attenzione alla larghezza B_{EF}')

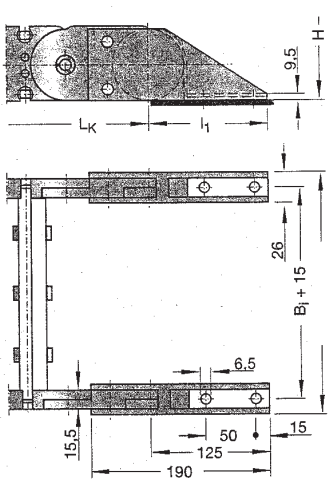
Si ottiene così un miglioramento del rapporto attrito-usura del portacavo.

Dimensione dei raccordi Tipo K 0900

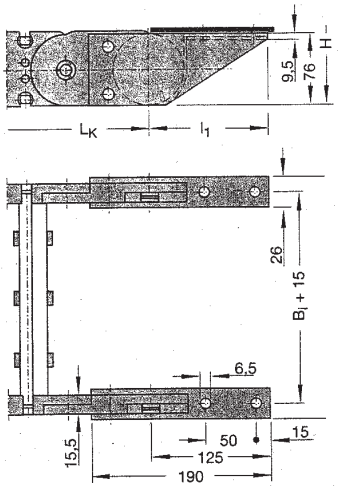
Il punto fisso della catena portacavi deve essere previsto possibilmente al centro della corsa.

Si ottiene cosi' la distanza piu' breve tra punto fisso e attacco all' utente mobile.
(vedi pag. 1.13)

Raccordo punto fisso



Raccordo **FA**
(standard)



Raccordo **FI**
per montaggio del raccordo > l_1
→ necessario distanziale

Dati relativi al tipo di raccordo
da indicare all' emissione dell' ordine

X.X

Raccordo
F - Punto fisso
M - Punto mobile

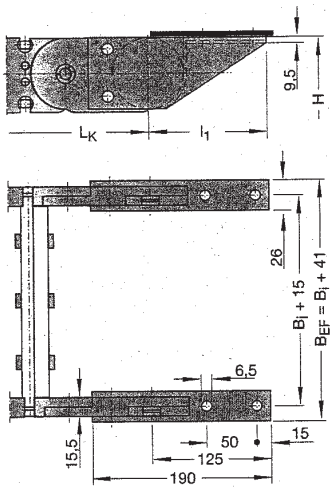
Variante di fissaggio
A - Lato foratura esterno (standard)
I - Lato foratura interno (al KR)

E' possibile realizzare combinazioni nelle varianti del raccordo al punto fisso e al punto mobile.

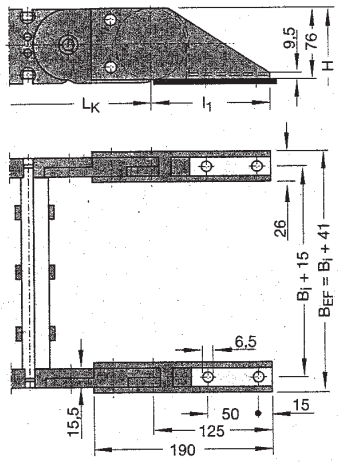
Esempio: FA/MI oppure **FI/MA**

La variante deve essere specificata alla formulazione dell' ordine!

Raccordo punto mobile



Raccordo **MA**
(standard)



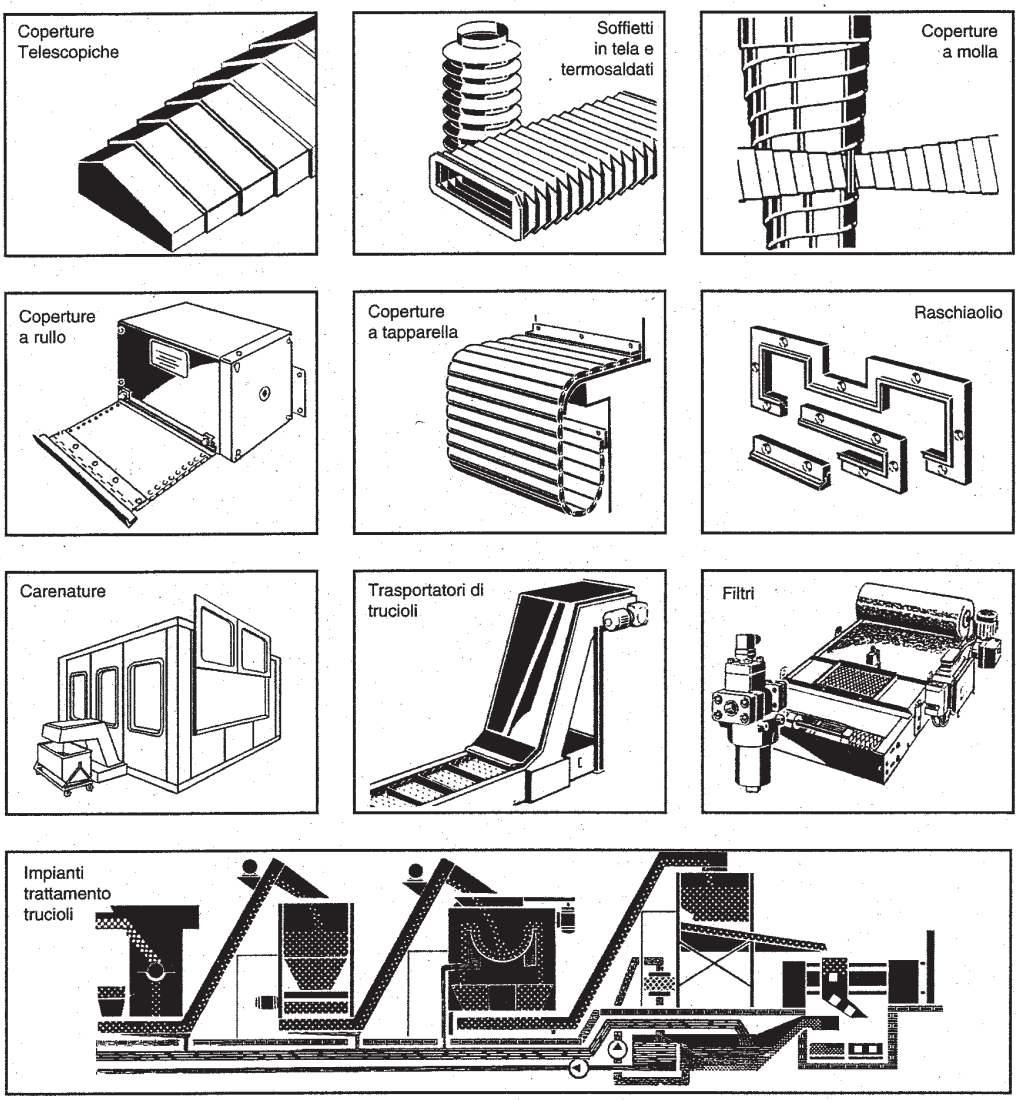
Raccordo **MI**
per montaggio del raccordo > l_1
→ necessario distanziale

Dati per l' ordinazione della catena portacavi:

K0900.225 - RV - 150 - 1890

Esempio:
Catena portacavi Tipo K 0900, larghezza interna B_i 225 mm, con traversini rinforzati, con raggio di curvatura Kr 150 mm e Lunghezza L_k = 1890 mm.

- Tipo catena
- Larghezza interna B_i in mm (traversini a telaio)
  Larghezza del traversino B_{St} in mm (traversini forati)
- Variante del traversino
- Raggio di curvatura Kr in mm
- Lunghezza catena L_k in mm (senza raccordo)



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D-57006 Sigen · Postfach 100654

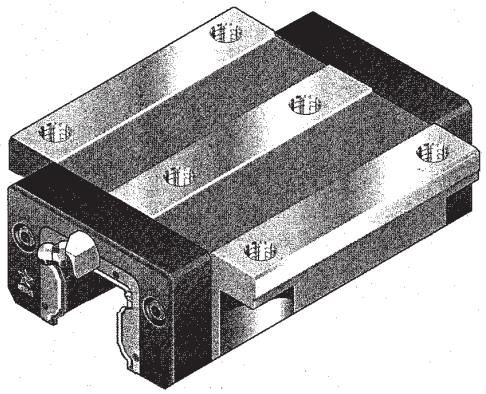
Telefon 02 71/58 01-0 · Telex 8 72 621 · Telefax 02 71/58 01-2 20

STAR – Guide a sfere su rotaia
Pattini in acciaio

Pattini 1651-

Standard

Versione speciale:
rivestimento zinco-ferro con cromatura gialla, in classe di precisione N (gioco o precarico 0,02 C).
Numero di identificazione:
1651-..4-30

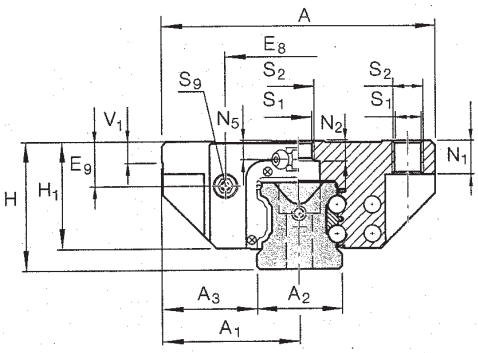


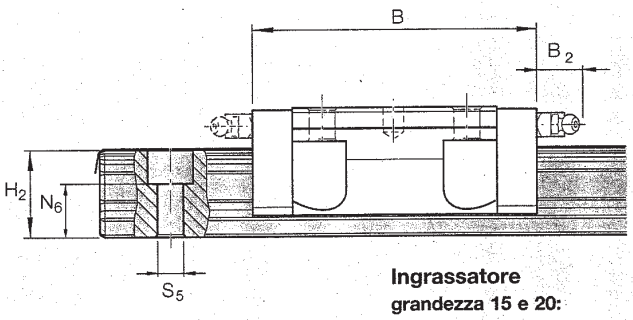
Numeri di identificazione

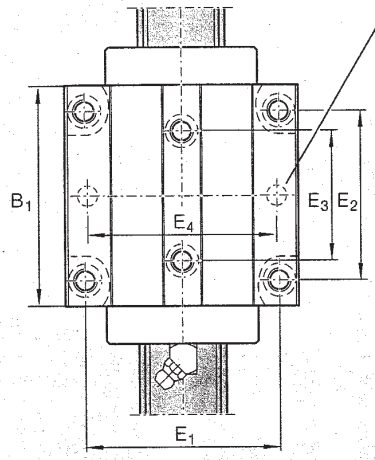
Grandezza	Classe di precisione	Numero di identificazione - Pattini per classi di precarico			
		Gioco fino a 10 µm circa	Precarico 0,02 C	Precarico 0,08 C	Precarico 0,13 C
15	UP		1651-119-10	1651-129-10	1651-139-10
	SP		1651-111-10	1651-121-10	1651-131-10
	P		1651-112-10	1651-122-10	1651-132-10
	H	1651-193-10	1651-113-10	1651-123-10	
	N	1651-194-10	1651-114-10	1651-124-10	
20	UP		1651-819-10	1651-829-10	1651-839-10
	SP		1651-811-10	1651-821-10	1651-831-10
	P		1651-812-10	1651-822-10	1651-832-10
	H	1651-893-10	1651-813-10	1651-823-10	
	N	1651-894-10	1651-814-10	1651-824-10	
25	UP		1651-219-10	1651-229-10	1651-239-10
	SP		1651-211-10	1651-221-10	1651-231-10
	P		1651-212-10	1651-222-10	1651-232-10
	H	1651-293-10	1651-213-10	1651-223-10	
	N	1651-294-10	1651-214-10	1651-224-10	
30	UP		1651-719-10	1651-729-10	1651-739-10
	SP		1651-711-10	1651-721-10	1651-731-10
	P		1651-712-10	1651-722-10	1651-732-10
	H	1651-793-10	1651-713-10	1651-723-10	
	N	1651-794-10	1651-714-10	1651-724-10	
35	UP		1651-319-10	1651-329-10	1651-339-10
	SP		1651-311-10	1651-321-10	1651-331-10
	P		1651-312-10	1651-322-10	1651-332-10
	H	1651-393-10	1651-313-10	1651-323-10	
	N	1651-394-10	1651-314-10	1651-324-10	
45	UP		1651-419-10	1651-429-10	1651-439-10
	SP		1651-411-10	1651-421-10	1651-431-10
	P		1651-412-10	1651-422-10	1651-432-10
	H	1651-493-10	1651-413-10	1651-423-10	
	N	1651-494-10	1651-414-10	1651-424-10	
55	UP		1651-519-10	1651-529-10	1651-539-10
	SP		1651-511-10	1651-521-10	1651-531-10
	P		1651-512-10	1651-522-10	1651-532-10
	H	1651-593-10	1651-513-10	1651-523-10	
	N	1651-594-10	1651-514-10	1651-524-10	
65	UP		1651-619-10	1651-629-10	1651-639-10
	SP		1651-611-10	1651-621-10	1651-631-10
	P		1651-612-10	1651-622-10	1651-632-10
	H	1651-693-10	1651-613-10	1651-623-10	
	N	1651-694-10	1651-614-10	1651-624-10	

Avvertenze per momenti e carichi massimi ammissibili (vedere tabella)

I fattori di carico dinamico e i fattori di momento dinamico dei pattini STAR sono calcolati sulla base di una percorrenza di 100 000 m.
Tuttavia, alcuni costruttori riferiscono i fattori di carico e i momenti a 50 000 m di corsa. Per poter fare una comparazione occorre moltiplicare per il coefficiente 1,26 i valori **C** e $\mathbf{M_t}$ indicati nella tabella STAR.







Posizione raccomandata per il foro di spinatura (per la dimensione E_4 vedere "Istruzioni di montaggio", paragrafo "Spinatura").

Avvertenze

In questa posizione possono essere lavorati dei prefori adatti per la successiva alesatura.

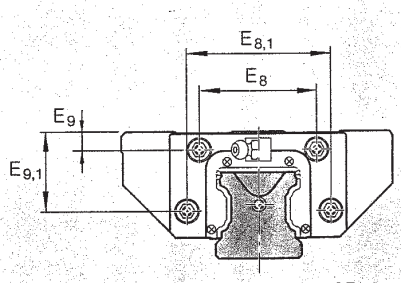
Ingrassatore

grandezza 15 e 20:
Ingrassatore a imbuto forma B – foro filettato M3
B_2 = 8 mm

grandezza 25 bis 55:
BM 6 DIN 71412
B_2 = 16 mm

grandezza 65:
BM 8 x 1 DIN 71412
B_2 = 16 mm

Attacco possibile su entrambi i lati.



Grandezza 65

Grandezza	Dimensioni (mm) $E_{8.1}$	$E_{9.1}$
65	100	53,5

Grandezza	A	A_1	A_2	A_3	B	B_1	H	H_1	H_2 [1]	H_2 [2]	V_1	E_1	E_2	E_3	E_8	E_9	N_1	N_2
	Dimensioni (mm)																	
15	47	23,5	15	16,0	54	39,2	24	19,8	16,3	16,20	5,0	38	30	26	24,55	6,7	5,0	4,4
20	63	31,5	20	21,5	70	49,6	30	25,4	20,7	20,55	6,0	53	40	35	32,4	7,3	7,5	5,2
25	70	35,0	23	23,5	81	57,8	36	29,5	24,4	24,25	7,5	57	45	40	38,2	11,5	9,0	7,0
30	90	45,0	28	31,0	94	67,4	42	35,0	28,5	28,35	7,0	72	52	44	48,4	14,6	11,0	8,0
35	100	50,0	34	33,0	105	77,0	48	40,0	32,0	31,85	8,0	82	62	52	58,0	17,5	12,0	10,2
45	120	60,0	45	37,5	133	97,0	60	50,0	40,0	39,85	10,0	100	80	60	70,0	21,0	15,0	12,4
55	140	70,0	53	43,5	159	115,5	70	57,0	48,0	47,85	12,0	116	95	70	80,0	22,3	18,0	13,5
65	170	85,0	63	53,5	188	139,6	90	76,0	60,0	59,85	15,0	142	110	82	76,0	11,0	23,0	14,0

[1] Dimensione H_2 con nastro di protezione.

[2] Dimensione H_2 senza nastro di protezione.

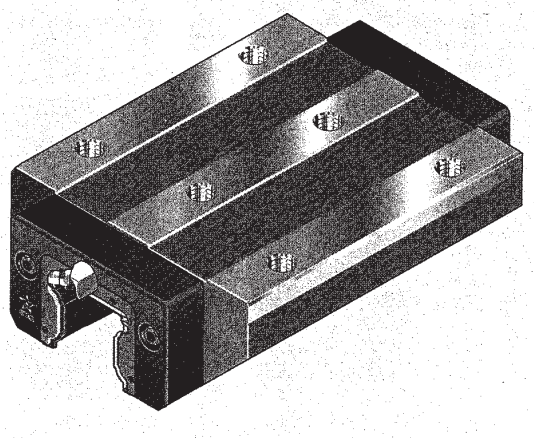
Grandezza	Dimensioni (mm) N_5	$N_6^{\pm 0,5}$	S_1	S_2	S_5	S_9	Peso (kg)	Fattori di carico (N) C din.	C_0 stat.	Fattori di momento (Nm) M_t din.	M_{t0} stat.	M_L din.	M_{L0} stat.
15	4,0	10,3	4,4	M5	4,4	M2,5-3,5prof.	0,23	6.000	13.500	57	130	31	71
20	4,7	13,2	5,4	M6	6,0	M3-5prof.	0,55	14.500	24.400	190	310	100	165
25	5,5	15,2	6,8	M8	7,0	M3-5prof.	0,70	17.600	30.400	250	430	140	240
30	6,0	17,0	8,6	M10	9,0	M3-5prof.	1,10	24.400	41.300	420	720	225	380
35	7,0	20,5	8,6	M10	9,0	M3-5prof.	1,75	32.300	54.000	690	1.160	340	565
45	8,0	23,7	10,5	M12	14,0	M4-7prof.	3,15	52.400	85.700	1.410	2.310	690	1.130
55	9,0	29,2	12,5	M14	16,0	M5-8prof.	5,20	75.600	121.400	2.400	3.860	1.185	1.905
65	16,0	38,8	14,5	M16	18,0	M4-7prof.	10,25	123.000	192.700	4.850	7.610	2.430	3.815

STAR – Guide a sfere su rotaia
Pattini in acciaio

Pattini 1653-

Standard, lunghi

Versione speciale:
rivestimento zinco-ferro con cromatura gialla, in classe di precisione N (gioco o precarico 0,02 C).
Numero di identificazione:
1653-..4-30



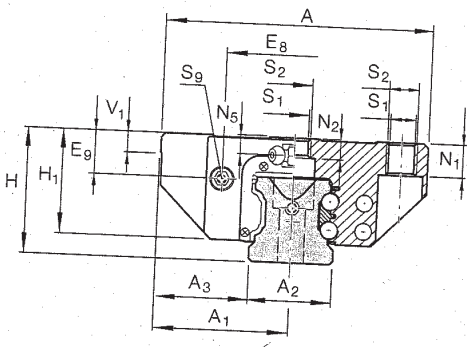
Numeri di identificazione

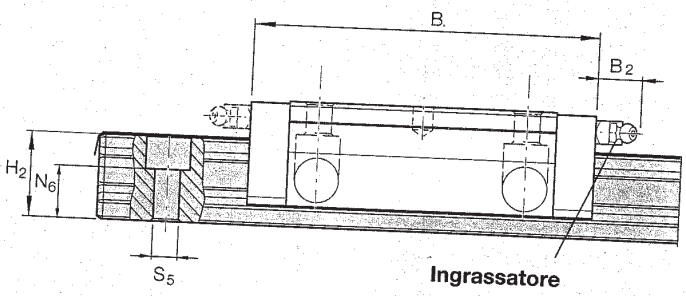
Grandezza	Classe di precisione	Numero di identificazione - Pattini per classi di precarico			
		Gioco fino a 10 µm circa	Precarico 0,02 C	Precarico 0,08 C	Precarico 0,13 C
15*	N	1653-194-10	1653-114-10		
20	UP		1653-819-10	1653-829-10	1653-839-10
	SP		1653-811-10	1653-821-10	1653-831-10
	P		1653-812-10	1653-822-10	1653-832-10
	H	1653-893-10	1653-813-10	1653-823-10	
	N	1653-894-10	1653-814-10	1653-824-10	
25	UP		1653-219-10	1653-229-10	1653-239-10
	SP		1653-211-10	1653-221-10	1653-231-10
	P		1653-212-10	1653-222-10	1653-232-10
	H	1653-293-10	1653-213-10	1653-223-10	
	N	1653-294-10	1653-214-10	1653-224-10	
30	UP		1653-719-10	1653-729-10	1653-739-10
	SP		1653-711-10	1653-721-10	1653-731-10
	P		1653-712-10	1653-722-10	1653-732-10
	H	1653-793-10	1653-713-10	1653-723-10	
	N	1653-794-10	1653-714-10	1653-724-10	
35	UP		1653-319-10	1653-329-10	1653-339-10
	SP		1653-311-10	1653-321-10	1653-331-10
	P		1653-312-10	1653-322-10	1653-332-10
	H	1653-393-10	1653-313-10	1653-323-10	
	N	1653-394-10	1653-314-10	1653-324-10	
45	UP		1653-419-10	1653-429-10	1653-439-10
	SP		1653-411-10	1653-421-10	1653-431-10
	P		1653-412-10	1653-422-10	1653-432-10
	H	1653-493-10	1653-413-10	1653-423-10	
	N	1653-494-10	1653-414-10	1653-424-10	
55	UP		1653-519-10	1653-529-10	1653-539-10
	SP		1653-511-10	1653-521-10	1653-531-10
	P		1653-512-10	1653-522-10	1653-532-10
	H	1653-593-10	1653-513-10	1653-523-10	
	N	1653-594-10	1653-514-10	1653-524-10	
65	UP		1653-619-10	1653-629-10	1653-639-10
	SP		1653-611-10	1653-621-10	1653-631-10
	P		1653-612-10	1653-622-10	1653-632-10
	H	1653-693-10	1653-613-10	1653-623-10	
	N	1653-694-10	1653-614-10	1653-624-10	

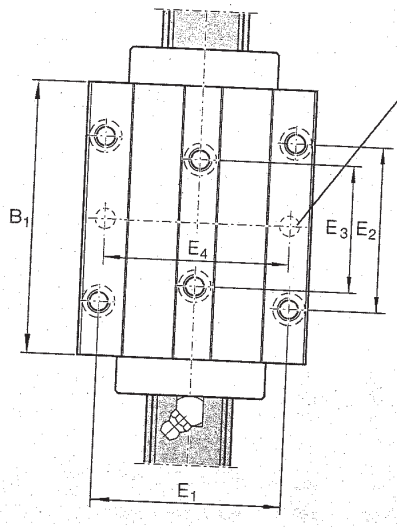
* in preparazione

Avvertenze per momenti e carichi massimi ammissibili (vedere tabella)

I fattori di carico dinamico e i fattori di momento dinamico dei pattini STAR sono calcolati sulla base di una percorrenza di 100 000 m.
Tuttavia, alcuni costruttori riferiscono i fattori di carico e i momenti a 50 000 m di corsa. Per poter fare una comparazione occorre moltiplicare per il coefficiente 1,26 i valori **C** e $\mathbf{M_t}$ indicati nella tabella STAR.







Posizione raccomandata per il foro di spinatura (per la dimensione E_4 vedere "Istruzioni di montaggio", paragrafo "Spinatura").

Avvertenze

In questa posizione possono essere lavorati dei prefori adatti per la successiva alesatura.

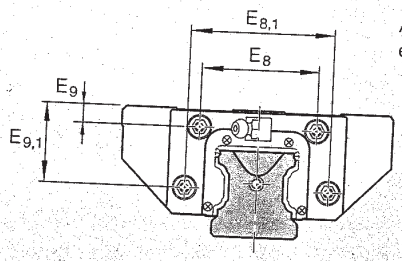
Ingrassatore

grandezza 20:
Ingrassatore a imbuto forma B – foro filettato M3
B_2 = 8 mm

grandezza da 25 a 55:
BM 6 DIN 71412
B_2 = 16 mm

grandezza 65:
BM 8 x 1 DIN 71412
B_2 = 16 mm

Attacco possibile su entrambi i lati.



Grandezza 65

Grandezza	Dimensioni (mm) $E_{8.1}$	$E_{9.1}$
65	100	53,5

Grandezza	A	A_1	A_2	A_3	B	B_1	H	H_1	H_2 [1]	H_2 [2]	V_1	E_1	E_2	E_3	E_8	E_9	N_1	N_2
15	47	23,5	15	16,0	68,5	53,6	24	19,8	16,3	16,20	5,0	38	30	26	24,55	6,7	5,0	4,4
20	63	31,5	20	21,5	86,0	65,6	30	25,4	20,7	20,55	6,0	53	40	35	32,4	7,3	7,5	5,2
25	70	35,0	23	23,5	103,0	79,5	36	29,5	24,4	24,25	7,5	57	45	40	38,2	11,5	9,0	7,0
30	90	45,0	28	31,0	116,0	89,4	42	35,0	28,5	28,35	7,0	72	52	44	48,4	14,6	11,0	8,0
35	100	50,0	34	33,0	133,0	105,5	48	40,0	32,0	31,85	8,0	82	62	52	58,0	17,5	12,0	10,2
45	120	60,0	45	37,5	170,0	133,5	60	50,0	40,0	39,85	10,0	100	80	60	70,0	21,0	15,0	12,4
55	140	70,0	53	43,5	200,0	155,5	70	57,0	48,0	47,85	12,0	116	95	70	80,0	22,3	18,0	13,5
65	170	85,0	63	53,5	243,0	194,6	90	76,0	60,0	59,85	15,0	142	110	82	76,0	11,0	23,0	14,0

[1] Dimensione H_2 con nastro di protezione.

[2] Dimensione H_2 senza nastro di protezione.

Grandezza	Dimensioni (mm) N_5	$N_6^{\pm 0,5}$	S_1	S_2	S_5	S_9	Peso (kg)	Fattori di carico (N) C din.	C_0 stat.	Fattori di momento (Nm) M_t din.	M_{t0} stat.	M_L din.	M_{L0} stat.
15	4,0	10,3	4,4	M5	4,4	M2,5-8,5prof.	0,32	10 000	20 200	100	190	75	150
20	4,7	13,2	5,4	M6	6	M3-5prof.	0,80	18 800	35 200	240	450	175	330
25	5,5	15,2	6,8	M8	7	M3-5prof.	1,00	23 400	45 500	330	650	265	510
30	6,0	17,0	8,6	M10	9	M3-5prof.	1,60	30 800	57 800	530	1 000	380	715
35	7,0	20,5	8,6	M10	9	M3-5prof.	2,45	42 800	81 000	920	1 740	640	1 215
45	8,0	23,7	10,5	M12	14	M4-7prof.	4,50	69 600	128 500	1 880	3 470	1 315	2 425
55	9,0	29,2	12,5	M14	16	M5-8prof.	7,50	95 600	170 000	3 040	5 400	2 025	3 600
65	16,0	38,8	14,5	M16	18	M4-7prof.	14,15						

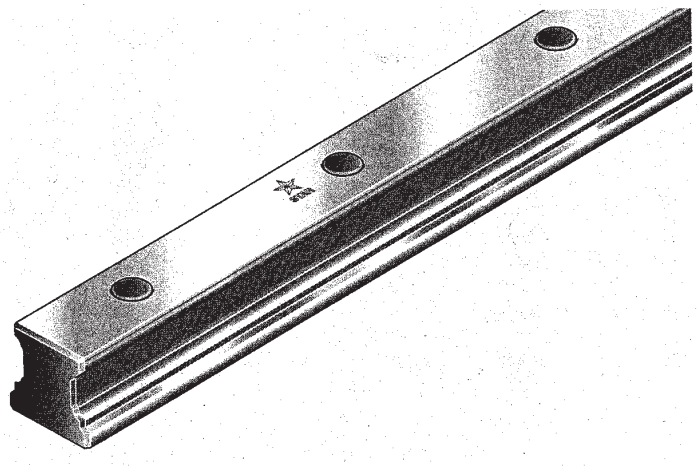
STAR – Guide a sfere su rotaia
Rotaie con tappi di chiusura fori

Rotaie 1605- . 0 . -

Avvitabili dall'alto,
con tappi di chisura fori in plastica
(compresi nella fornitura)

Per applicazioni speciali:
- Rotaie con tappi di chiusura fori in acciaio per le grandezze dalla 25 alla 65 nelle classi di precisione SP, P, H, N
  Numeri di identificazione: **1606- . 5 .-**

I tappi di chiusura fori in acciaio devono essere ordinati separatamente.
Osservare le istruzioni di montaggio per i tappi di chiusura in acciaio.



Numeri di identificazione e lunghezze rotaie

Grandezza	Classe di precisione	Rotaie singole n. di identificazione, lunghezza rotaia L (mm)	Rotaie composte n. di identificazione, numero dei tratti, lunghezza rotaia L (mm)
15	UP	1605-109-31,...	1605-109-3...,...
	SP	1605-101-31,...	1605-101-3...,...
	P	1605-102-31,...	1605-102-3...,...
	H	1605-103-31,...	1605-103-3...,...
	N	1605-104-31,...	1605-104-3...,...
20	UP	1605-809-31,...	1605-809-3...,...
	SP	1605-801-31,...	1605-801-3...,...
	P	1605-802-31,...	1605-802-3...,...
	H	1605-803-31,...	1605-803-3...,...
	N	1605-804-31,...	1605-804-3...,...
25	UP	1605-209-31,...	1605-209-3...,...
	SP	1605-201-31,...	1605-201-3...,...
	P	1605-202-31,...	1605-202-3...,...
	H	1605-203-31,...	1605-203-3...,...
	N	1605-204-31,...	1605-204-3...,...
30	UP	1605-709-31,...	1605-709-3...,...
	SP	1605-701-31,...	1605-701-3...,...
	P	1605-702-31,...	1605-702-3...,...
	H	1605-703-31,...	1605-703-3...,...
	N	1605-704-31,...	1605-704-3...,...
35	UP	1605-309-31,...	1605-309-3...,...
	SP	1605-301-31,...	1605-301-3...,...
	P	1605-302-31,...	1605-302-3...,...
	H	1605-303-31,...	1605-303-3...,...
	N	1605-304-31,...	1605-304-3...,...
45	UP	1605-409-31,...	1605-409-3...,...
	SP	1605-401-31,...	1605-401-3...,...
	P	1605-402-31,...	1605-402-3...,...
	H	1605-403-31,...	1605-403-3...,...
	N	1605-404-31,...	1605-404-3...,...
55	UP	1605-509-31,...	1605-509-3...,...
	SP	1605-501-31,...	1605-501-3...,...
	P	1605-502-31,...	1605-502-3...,...
	H	1605-503-31,...	1605-503-3...,...
	N	1605-504-31,...	1605-504-3...,...
65	UP	1605-609-31,...	1605-609-3...,...
	SP	1605-601-31,...	1605-601-3...,...
	P	1605-602-31,...	1605-602-3...,...
	H	1605-603-31,...	1605-603-3...,...
	N	1605-604-31,...	1605-604-3...,...

Lunghezze rotaie raccomandate

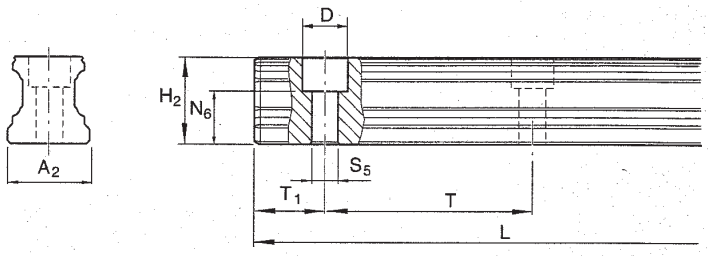
Interasse T (mm)	Numero dei fori$_B$ / Lunghezza rotaia L (mm)				
60	2 / 116	7 / 416	12 / 716	20 / 1196	40 / 2396
	3 / 176	8 / 476	13 / 776	22 / 1316	50 / 2996
	4 / 236	9 / 536	14 / 836	25 / 1496	60 / 3596
	5 / 296	10 / 596	16 / 956	30 / 1796	66 / 3956
	6 / 356	11 / 656	18 / 1076	35 / 2096	

Per grandezza 15: massimo 50/2996

80	2 / 156	7 / 556	12 / 956	20 / 1596	40 / 3196
	3 / 236	8 / 636	13 / 1036	22 / 1756	50 / 3996
	4 / 316	9 / 716	14 / 1116	25 / 1996	
	5 / 396	10 / 796	16 / 1276	30 / 2396	
	6 / 476	11 / 876	18 / 1436	35 / 2796	
105	2 / 206	7 / 731	12 / 1256	20 / 2096	38 / 3986
	3 / 311	8 / 836	13 / 1361	22 / 2306	
	4 / 416	9 / 941	14 / 1466	25 / 2621	
	5 / 521	10 / 1046	16 / 1676	30 / 3146	
	6 / 626	11 / 1151	18 / 1886	35 / 3671	
120	2 / 236	7 / 836	12 / 1436	20 / 2396	
	3 / 356	8 / 956	13 / 1556	22 / 2636	
	4 / 476	9 / 1076	14 / 1676	25 / 2996	
	5 / 596	10 / 1196	16 / 1916	30 / 3596	
	6 / 716	11 / 1316	18 / 2156	33 / 3956	
150	2 / 296	7 / 1046	12 / 1796	20 / 2996	
	3 / 446	8 / 1196	13 / 1946	22 / 3296	
	4 / 596	9 / 1346	14 / 2096	25 / 3746	
	5 / 746	10 / 1496	16 / 2396	26 / 3896	
	6 / 896	11 / 1646	18 / 2696		

⚠ Non utilizzare pattini con vecchie guarnizioni (nere) su nuove rotaie!

⚠ Non collegare rotaie di nuovo profilo con quelle vecchie!



Versione speciale:
rivestimento zinco-ferro con cromatura gialla, in classe di precisione N.
Numeri di identificazione:
1646-.14-3. (parti frontali non rivestite)
1646-.14-4. (parti frontali rivestite)

[2] Quota H_2 senza nastro di protezione
[3] Per le grandezze da 25 a 45, per applicazioni speciali, sono disponibili su richiesta rotaie in un solo pezzo con lunghezza fino a 6000 mm circa.

	Dimensioni (mm)									Peso
Grandezza	A_2	H_2 [2]	$N_6^{\pm 0,5}$	D	S_5	$T_{1S}^{\pm 0,5}$	$T_{1\,min}$	T	L_{max} [3]	kg/m
15	15	16,20	10,3	7,4	4,4	28,0	10	60	3000	1,4
20	20	20,55	13,2	9,4	6,0	28,0	10	60	4000	2,4
25	28	24,25	15,2	11,0	7,0	28,0	10	60	4000	3,2
30	28	28,35	17,0	15,0	9,0	38,0	12	80	4000	5,0
35	34	31,85	20,5	15,0	9,0	38,0	12	80	4000	6,8
45	45	39,85	23,5	20,0	14,0	50,5	16	105	4000	10,5
55	53	47,85	29,0	24,0	16,0	58,0	18	120	4000	16,2
65	63	59,85	38,6	26,0	18,0	73,0	20	150	4000	22,4

Ordinazione di una rotaia

- Utilizzare preferibilmente le lunghezze delle rotaie raccomandate secondo tabella.

Esempio d'ordine 1:
Rotaia Gr. 35, classe di precisione H, lunghezza rotaia 1756 mm,
(21 · T, numero dei fori $n_B = 22$)
Indicazione per l'ordine:
1605-303-31, 1756 mm

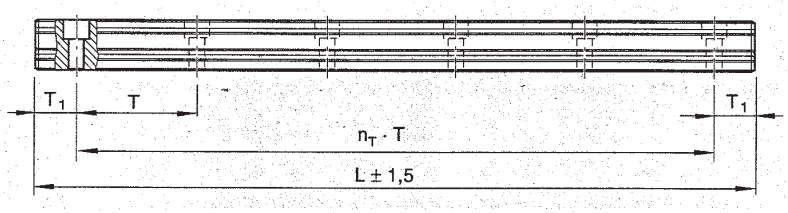
Lunghezze intermedie

Calcolo della lunghezza rotaia L ed esempio d'ordine:

- scegliere, se possibile, la dimensione preferenziale T_{1S} .
- se la dimensione preferenziale T_{1S} non può essere utilizzata:
  - scegliere la distanza definitiva T_1 tra T_{1S} e $T_{1\,min}$.
  - attenzione alla distanza minima $T_{1\,min}$!

Avvertenze

- T_1, $T_{1\,min}$, T_{1S} devono essere uguali per ambedue le estremità della rotaia.



$L = n_B \cdot T - 4$
oppure
$L = n_T \cdot T + 2 \cdot T_{1S}$

L = lunghezza rotaia (mm)
T = interasse*) (mm)
T_{1S} = quota preferenziale*) (mm)
n_B = numero dei fori
n_T = numero dei tratti di interasse T
*) per i valori vedere la tabella

Esempio d'ordine 2 (fino a L_{max}):
Rotaia Gr. 35 ,
classe di precisione H,
lunghezza rotaia 1676 mm,
(20 · T, dimensione preferenziale T_{1S} = 38 mm;
Numero dei fori $n_B = 21$)

Indicazione per l'ordine:
Numero di identificazione, lunghezza (mm)
T_1 / $n_T \cdot T$ / T_1 (mm)
1605-303-31, 1676 mm
38 / 20 · 80 / 38 mm

Le rotaie con lunghezza superiore a L_{max} vengono composte in fabbrica in tratti di lunghezza parziale e le superfici di giunzione adeguatamente lavorate.

Esempio d'ordine 3 (superiore a L_{max}):
Rotaia Gr. 35, classe di precisione H, lunghezza rotaia 5036 mm, **2** tratti
(62 · T, quota preferenziale T_{1S} = 38 mm; numero dei fori $n_B = 63$)
Indicazioni per l'ordine:
Numero di identificazione e numero dei tratti, lunghezza (mm)
T_1 / $n_T \cdot T$ / T_1 (mm)
1605-303-32, 5036 mm
38 / 62 · 80 / 38 mm

A3.04.021

FLENDER - CIGALA S.p.A.

QUALITY POWER TRANSMISSION

Gates®

Poly Chain® GT®

Design Manual

8mm PITCH BELTS

Table No. 5
Power Rating in kW for 36mm Wide

RPM of Faster Shaft	Rated Kilowatt for Small Sprocket (Number of Grooves and Pitch Diameter, Millimetres)																
	22 56.02	25 63.66	28 71.30	30 76.39	32 81.49	34 86.58	36 91.67	38 96.77	40 101.86	45 114.59	48 122.23	50 127.32	56 142.60	60 152.79	64 162.97	75 190.99	80 203.72
10	0.15	0.17	0.19	0.21	0.23	0.24	0.26	0.27	0.28	0.32	0.34	0.36	0.40	0.43	0.46	0.53	0.57
20	0.28	0.32	0.36	0.39	0.42	0.45	0.48	0.50	0.53	0.60	0.64	0.67	0.75	0.80	0.85	0.99	1.06
40	0.51	0.59	0.67	0.72	0.78	0.83	0.88	0.93	0.98	1.11	1.19	1.24	1.39	1.48	1.58	1.85	1.96
60	0.73	0.85	0.96	1.04	1.11	1.19	1.26	1.34	1.41	1.59	1.70	1.77	1.98	2.12	2.26	2.64	2.81
100	1.14	1.32	1.50	1.62	1.74	1.86	1.98	2.09	2.21	2.49	2.66	2.77	3.11	3.33	3.55	4.14	4.40
200	2.06	2.40	2.74	2.95	3.17	3.39	3.60	3.82	4.03	4.55	4.86	5.07	5.68	6.08	6.48	7.55	8.03
300	2.91	3.39	3.87	4.18	4.49	4.80	5.10	5.41	5.71	6.45	6.89	7.18	8.04	8.61	9.17	10.7	11.4
400	3.70	4.32	4.93	5.33	5.73	6.12	6.51	6.90	7.29	8.24	8.80	9.17	10.3	11.0	11.7	13.7	14.5
500	4.46	5.21	5.95	6.43	6.91	7.39	7.86	8.33	8.80	9.95	10.6	11.1	12.4	13.3	14.1	16.5	17.5
600	5.18	6.06	6.92	7.49	8.05	8.61	9.16	9.71	10.3	11.6	12.4	12.9	14.5	15.5	16.5	19.2	20.4
700	5.88	6.88	7.87	8.51	9.16	9.79	10.4	11.0	11.7	13.2	14.1	14.7	16.4	17.6	18.7	21.8	23.2
730	6.09	7.12	8.14	8.81	9.48	10.1	10.8	11.4	12.1	13.7	14.6	15.2	17.0	18.2	19.4	22.6	24.0
800	6.56	7.68	8.78	9.51	10.2	10.9	11.6	12.3	13.0	14.7	15.7	16.4	18.4	19.7	20.9	24.4	25.9
900	7.21	8.46	9.67	10.5	11.3	12.0	12.8	13.6	14.4	16.2	17.3	18.1	20.2	21.7	23.1	26.8	28.5
1000	7.85	9.21	10.5	11.4	12.3	13.1	14.0	14.8	15.7	17.7	18.9	19.7	22.1	23.6	25.1	29.2	31.0
1200	9.09	10.7	12.2	13.2	14.2	15.2	16.2	17.2	18.2	20.5	21.9	22.9	25.6	27.4	29.1	33.8	35.9
1400	10.3	12.1	13.8	15.0	16.1	17.3	18.4	19.5	20.6	23.3	24.8	25.9	29.0	31.0	33.0	38.2	40.6
1460	10.6	12.5	14.3	15.5	16.7	17.9	19.0	20.2	21.3	24.1	25.7	26.8	30.0	32.0	34.1	39.5	41.9
1600	11.4	13.4	15.4	16.7	17.9	19.2	20.4	21.7	22.9	25.9	27.6	28.8	32.2	34.4	36.6	42.4	45.0
1800	12.5	14.7	16.9	18.3	19.7	21.1	22.5	23.8	25.1	28.4	30.3	31.6	35.3	37.7	40.1	46.4	49.2
2000	13.6	16.0	18.3	19.9	21.4	22.9	24.4	25.9	27.3	30.9	32.9	34.3	38.3	40.9	43.5	50.2	53.2
2400	15.6	18.4	21.1	22.9	24.7	26.4	28.1	29.8	31.5	35.5	37.9	39.4	44.0	46.9	49.8	57.3	60.5
2800	17.5	20.7	23.8	25.8	27.7	29.7	31.6	33.5	35.3	39.9	42.5	44.2	49.3	52.5	55.6	63.6	67.0
2880	17.9	21.1	24.3	26.3	28.3	30.3	32.3	34.2	36.1	40.7	43.4	45.2	50.3	53.5	56.7	64.8	68.2
3200	19.3	22.8	26.2	28.5	30.7	32.8	34.9	37.0	39.0	44.0	46.8	48.7	54.1	57.5	60.8	69.2	
3500	20.6	24.4	28.0	30.4	32.7	35.0	37.3	39.5	41.6	46.8	49.9	51.8	57.5	61.0	64.4		
4000	22.7	26.9	30.9	33.5	36.0	38.5	41.0	43.4	45.7	51.3	54.5	56.6	62.5	66.2			
4500	24.7	29.2	33.5	36.4	39.1	41.8	44.4	47.0	49.5	55.4	58.8	60.9					
5000	26.5	31.4	36.0	39.0	42.0	44.8	47.6	50.3	52.9	59.0	62.5	64.7					
5500	28.2	33.4	38.4	41.6	44.6	47.6	50.5	53.3	56.0	62.3							

RPM of Faster Shaft	Additional Power per Belt for Speed Ratio of Reduction Drives									
	1.00 to 1.04	1.05 to 1.11	1.12 to 1.19	1.20 to 1.30	1.31 to 1.45	1.46 to 1.65	1.66 to 1.99	2.00 to 2.63	2.64 to 4.47	4.48 and Over
10	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01
20	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02
40	0.00	0.00	0.01	0.01	0.02	0.02	0.03	0.03	0.03	0.04
60	0.00	0.01	0.01	0.02	0.03	0.03	0.04	0.04	0.05	0.06
100	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
200	0.00	0.02	0.04	0.06	0.08	0.11	0.13	0.15	0.17	0.19
300	0.00	0.03	0.06	0.09	0.13	0.16	0.19	0.22	0.25	0.28
400	0.00	0.04	0.08	0.13	0.17	0.21	0.25	0.29	0.34	0.38
500	0.00	0.05	0.11	0.16	0.21	0.26	0.32	0.37	0.42	0.47
600	0.00	0.06	0.13	0.19	0.25	0.32	0.38	0.44	0.50	0.57
700	0.00	0.07	0.15	0.22	0.29	0.37	0.44	0.51	0.59	0.66
730	0.00	0.08	0.15	0.23	0.31	0.38	0.46	0.54	0.61	0.69
800	0.00	0.08	0.17	0.25	0.34	0.42	0.50	0.59	0.67	0.76
900	0.00	0.09	0.19	0.28	0.38	0.47	0.57	0.66	0.76	0.85
1000	0.00	0.11	0.21	0.32	0.42	0.53	0.63	0.74	0.84	0.95
1200	0.00	0.13	0.25	0.38	0.50	0.63	0.76	0.88	1.01	1.13
1400	0.00	0.15	0.29	0.44	0.59	0.74	0.88	1.03	1.18	1.32
1460	0.00	0.15	0.31	0.46	0.61	0.77	0.92	1.07	1.23	1.38
1600	0.00	0.17	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51
1800	0.00	0.19	0.38	0.57	0.76	0.95	1.13	1.32	1.51	1.70
2000	0.00	0.21	0.42	0.63	0.84	1.05	1.26	1.47	1.68	1.89
2400	0.00	0.25	0.50	0.76	1.01	1.26	1.51	1.77	2.02	2.27
2800	0.00	0.29	0.59	0.88	1.18	1.47	1.77	2.06	2.35	2.65
2880	0.00	0.30	0.61	0.91	1.21	1.51	1.82	2.12	2.42	2.72
3200	0.00	0.34	0.67	1.01	1.34	1.68	2.02	2.35	2.69	3.03
3500	0.00	0.37	0.74	1.10	1.47	1.84	2.21	2.57	2.94	3.31
4000	0.00	0.42	0.84	1.26	1.68	2.10	2.52	2.94	3.36	3.78
4500	0.00	0.47	0.95	1.42	1.89	2.36	2.84	3.31	3.78	4.26
5000	0.00	0.53	1.05	1.58	2.10	2.63	3.15	3.68	4.20	4.73
5500	0.00	0.58	1.16	1.73	2.31	2.89	3.47	4.05	4.62	5.20

Service Rating = (Power Rating + Additional Factor) × Length Correction Factor.

NB: Sprockets shown in this table that are not stock items are available on a MTO basis.

Poly Chain® GT® Belt Length Correction Factor Table

Pitch/Length Designation	No. of Teeth	Correction Factor	Pitch/Length Designation	No. of Teeth	Correction Factor
8M-640	80	0.79	8M-1792	224	1.18
8M-720	90	0.83	8M-2000	250	1.22
8M-800	100	0.87	8M-2240	280	1.26
8M-896	112	0.91	8M-2400	300	1.29
8M-1000	125	0.96	8M-2520	315	1.31
8M-1120	140	1.00	8M-2840	355	1.36
8M-1200	150	1.03	8M-3200	400	1.40
8M-1280	160	1.05	8M-3600	450	1.45
8M-1440	180	1.10	8M-4000	500	1.49
8M-1600	200	1.14	8M-4480	560	1.53

Sprocket Specifications—continued

Sprocket Designation	No. of Teeth	Sprocket Type	Bush No.	Max. Bore		Diameters			A	B	E	F	K	L	M	Material Specification (see note)	Weight (kg)	Moment of inertia 10^{-4} (kgm²)
				Metric	Inch	Pitch	Outside	Flange										
8M-25S-36	25	1F	PB	32	1¼"	63.66	62.06	70	—	49	10	45	—	55	—		1.02	4.65
8M-28S-36	28	3F	1210	32	1¼"	71.30	69.70	75	—	—	—	45	—	—	—		1.11	6.92
8M-30S-36	30	3F	1610	42	1⅝"	76.39	74.79	82.5	—	—	—	45	—	—	—		1.22	9.26
8M-32S-36	32	3F	1610	42	1⅝"	81.49	79.89	87	—	—	—	45	—	—	—		1.45	12.37
8M-34S-36	34	3F	1610	42	1⅝"	86.58	84.98	91	—	—	—	45	—	—	—		1.66	15.77
8M-36S-36	36	3F	1610	42	1⅝"	91.67	90.07	97	—	—	—	45	—	—	—		1.90	20.28
8M-38S-36	38	3F	1610	42	1⅝"	96.77	95.17	102	—	—	—	45	—	—	—		2.21	26.28
8M-40S-36	40	3F	2012	50	2"	101.86	100.26	106	—	—	—	45	—	—	—		2.36	31.19
8M-45S-36	45	3F	2012	50	2"	114.59	112.99	120	—	—	—	45	—	—	—		3.07	50.15
8M-48S-36	48	3F	2012	50	2"	122.23	120.63	128	—	—	—	45	—	—	—		3.30	62.31
8M-50S-36	50	3F	2012	50	2"	127.32	125.72	135	—	—	—	45	—	—	—		3.58	72.25
8M-56S-36	56	3F	2517	60	2½"	142.60	141.00	150	—	—	—	45	—	—	—		4.48	115.19
8M-60S-36	60	3F	2517	60	2½"	152.79	151.19	158	—	—	—	45	—	—	—		5.30	157.20
8M-64S-36	64	3F	2517	60	2½"	162.97	161.37	168	—	—	—	45	—	—	—		6.19	191.32
8M-75S-36	75	2	3020	75	3"	190.99	189.39	—	—	150	6	45	—	51	—		8.72	392.22
8M-80S-36	80	2	3020	75	3"	203.72	202.12	—	—	150	6	45	—	51	—		9.96	505.75
8M-90S-36	90	9	3020	75	3"	229.18	227.58	—	197	150	—	45	3	51	3		10.41	636.42
8M-112S-36	112	9	3020	75	3"	285.21	283.61	—	253	150	—	45	3	51	3		14.01	1326.76
8M-140S-36	140	10	3020	75	3"	356.51	354.91	—	324	150	—	45	3	51	3		11.98	1747.45
8M-168S-36	168	10	3525	100	4"	427.81	426.21	—	396	198	—	45	10	65	10		23.91	4693.42
8M-192S-36	192	10	3525	100	4"	488.92	487.32	—	457	198	—	45	10	65	10		26.53	7055.91

Sprocket Designation	No. of Teeth	Sprocket Type	Bush No.	Max. Bore		Diameters			A	B	E	F	K	L	M	Material Specification (see note)	Weight (kg)	Moment of inertia 10^{-4} (kgm²)
				Metric	Inch	Pitch	Outside	Flange										
8M-30S-62	30	1F	PB	42	1⅝"	76.39	74.79	82.5	—	63	12	72	—	84	—		2.45	16.25
8M-32S-62	32	1F	PB	50*	2"	81.49	79.89	87	—	68	12	72	—	84	—		2.82	21.31
8M-34S-62	34	1F	PB	55*	2¼"	86.58	84.98	91	—	69	12	72	—	84	—		3.17	28.47
8M-36S-62	36	1F	PB	60*	2½"	91.67	90.07	97	—	76	12	72	—	84	—		3.52	34.89
8M-38S-62	38	1F	PB	60	2½"	96.77	95.17	102	—	78	12	72	—	84	—		3.91	44.51
8M-40S-62	40	3F	2012	50	2"	101.86	100.26	106	—	—	—	72	—	—	—		3.76	49.43
8M-45S-62	45	3F	2012	50	2"	114.59	112.99	120	—	—	—	72	—	—	—		4.88	79.37
8M-48S-62	48	3F	2517	60	2½"	122.23	120.63	128	—	—	—	72	—	—	—		5.52	105.81
8M-50S-62	50	3F	2517	60	2½"	127.32	125.72	135	—	—	—	72	—	—	—		6.03	123.91
8M-56S-62	56	6F	2517	60	2½"	142.60	141.00	150	111	—	—	72	13.5	45	13.5		5.43	152.66
8M-60S-62	60	6F	2517	60	2½"	152.79	151.19	158	121	—	—	72	13.5	45	13.5		6.33	204.79
8M-64S-62	64	6F	2517	60	2½"	162.97	161.37	168	131	—	—	72	13.5	45	13.5		7.11	258.10
8M-75S-62	75	6	3020	75	3"	190.99	189.39	—	159	—	—	72	10.5	51	10.5		9.99	485.34
8M-80S-62	80	6	3020	75	3"	203.72	202.12	—	172	—	—	72	10.5	51	10.5		11.44	628.73
8M-90S-62	90	6	3020	75	3"	229.18	227.58	—	197	—	—	72	10.5	51	10.5		14.94	1045.29
8M-112S-62	112	7	3020	75	3"	285.21	283.61	—	253	150	—	72	10.5	51	10.5		14.94	1540.46
8M-140S-62	140	7	3525	100	4"	356.51	354.91	—	324	198	—	72	3.5	65	3.5		24.77	3953.51
8M-168S-62	168	8	3525	100	4"	427.81	426.21	—	396	198	—	72	3.5	65	3.5		28.39	5812.58
8M-192S-62	192	8	3525	100	4"	488.92	487.32	—	457	198	—	72	3.5	65	3.5		32.18	8880.82

* Max. Bore to be fitted with shallow keys PB=Plain Bored Bush

Notes:

Pulleys of cast iron or steel material are supplied. Pulleys of either material provide required durability and service life. Gates reserves the right to supply pulleys of either material against orders for standard pulleys.

Specification:
cast iron 220 N/mm²
steel 220 M07

For peripheral speeds greater than 40 m/sec consult Gates.

Taper Lock® Bushes

BORES AND KEYWAYS IN MILLIMETRES

Table No. 12

Bore Diam.	Keyway		Shallow Keyway Depth	Bush Reference						
	Width	Depth		1008	1108	1210	1610	2012	2517	3020
9	3	1.4	—	029A009	029B009					
10	3	1.4	—	010	010					
11	4	1.8	—	011	011	029C0011				
12	4	1.8	—	012	012	012				
14	5	2.3	—	014	014	014	029G0014	029K0014		
15	5	2.3	—	015	015	015	015	015		
16	5	2.3	—	016	016	016	016	016	029M0016	
18	6	2.8	—	018	018	018	018	018	018	
19	6	2.8	—	019	019	019	019	019	019	
20	6	2.8	—	020	020	020	020	020	020	
22	6	2.8	—	022	022	022	022	022	022	
24	8	3.3	1.3	024*	024	024	024	024	024	
25	8	3.3	1.3	025*	025	025	025	025	025	029P0025
28	8	3.3	1.3		028*	028	028	028	028	028
30	8	3.3	—			030	030	030	030	030
32	10	3.3	—			032	032	032	032	032
35	10	3.3	—				035	035	035	035
38	10	3.3	—				038	038	038	038
40	12	3.3	1.3				040	040	040	040
42	12	3.3	1.3				042	042	042	042
45	14	3.8	—					045	045	045
48	14	3.8	—					048	048	048
50	14	3.8	—					050	050	050
55	16	4.3	—						055	055
60	18	4.4	—						060	060
65	18	4.4	—							065
70	20	4.9	—							070
75	20	4.9	—							075

BORES AND KEYWAYS IN MILLIMETRES

Bore Diam.	Keyway		Shallow Keyway Depth	Bush Reference			
	Width	Depth		3525	4030	4535	5040
35	10	3.3	—	029J0035			
38	10	3.3	—	038			
40	12	3.3	—	040	029X0040		
42	12	3.3	—	042	042		
45	14	3.8	—	045	045		
48	14	3.8	—	048	048		
50	14	3.8	—	050	050		
55	16	4.3	—	055	055	029Y0055	
60	18	4.4	—	060	060	060	
65	18	4.4	—	065	065	065	
70	20	4.9	—	070	070	070	029Z0070
75	20	4.9	—	075	075	075	075
80	22	5.4	—	080	080	080	080
85	22	5.4	—	085	085	085	085
90	25	5.4	—	090	090	090	090
95	25	5.4	—	095	095	095	095
100	28	6.4	4.4	100*	100	100	100
105	28	6.4	—		105	105	105
110	28	6.4	—		110	110	110
115	32	7.4	5.4		115*	115	115
120	32	7.4	—			120	120
125	32	7.4	—			125	125

Keyways conform to European standard.
* Shallower bore sizes.

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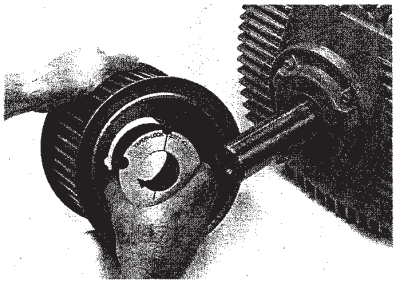
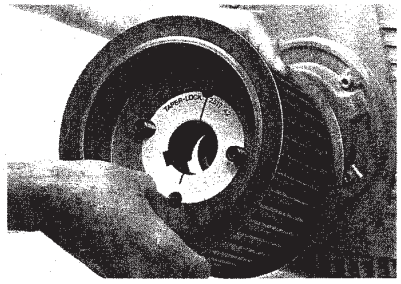
Taper Lock® Bushes

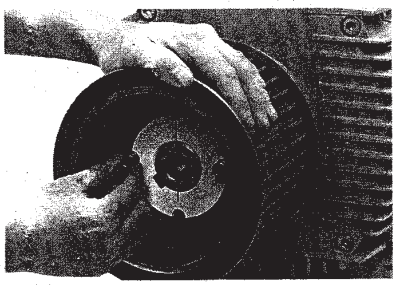
INSTALLATION INSTRUCTIONS



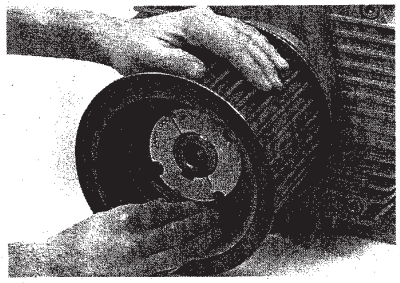
INSERT BUSH INTO PULLEY



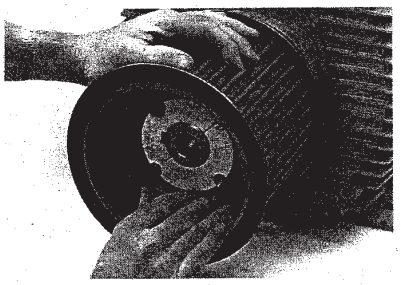
INSERT SCREWS and LOCATE ON SHAFT

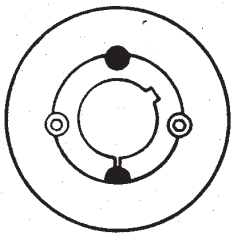


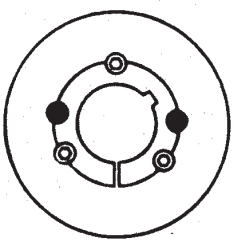
TIGHTEN SCREWS FINGER TIGHT



TIGHTEN SCREWS ALTERNATELY







TO INSTALL

1. Remove the protective coating from the bore and outside of bush, and bore of hub. After ensuring that the mating tapered surfaces are completely clean and free from oil or dirt, insert bush in hub so that holes line up.
2. Sparingly oil thread and point of grub screws, or thread and under head of caps screws. Place screws loosely in holes threaded in hub, shown thus ◎ in diagram.
3. Clean shaft and fit hub to shaft as one unit and locate in position desired, remembering that bush will nip the shaft first and then hub will be slightly drawn on to the bush.
4. Using a hexagon wrench tighten screws gradually and alternately until to torque shown in table below.
5. Hammer against large-end of bush, using a block or sleeve to prevent damage. (This will ensure that the bush is seated squarely in the bore.) Screws will now turn a little more. Repeat this alternate hammering and screw tightening once or twice to achieve maximum grip on the shaft.
6. If a key is to be fitted place it in the shaft keyway before fitting the bush. It is essential that it is a parallel key and side fitting only and has TOP CLEARANCE.
7. After drive has been running under load for a short time stop and check tightness of screws.
8. Fill empty holes with grease to exclude dirt.

TO REMOVE

1. Slacken all screws by several turns, remove one or two according to number of jacking off holes shown thus ● in diagram. Insert screws in jacking off holes after oiling thread and point of grub screws or thread and under head of cap screws.
2. Tighten screws alternately until bush is loosened in hub and assembly is free on the shaft.
3. Remove assembly from shaft.

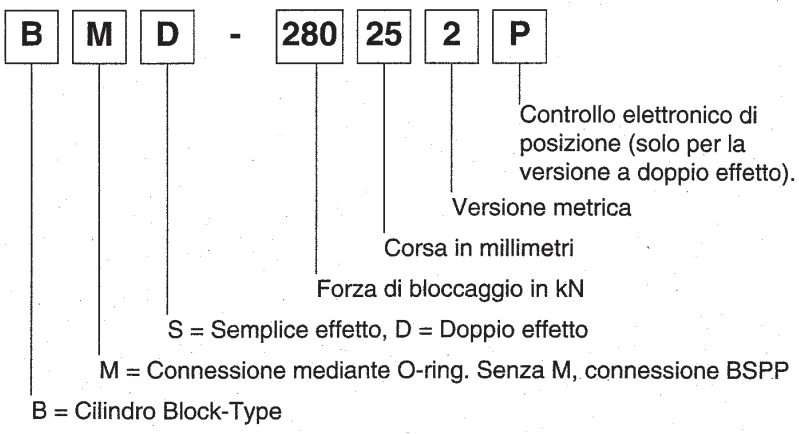
Bush size		1108	1210	1610	2012	2517	3020	3525	4030	4535	5040
Screw tightening torque (Nm)		5.6	20	20	30	50	90	115	170	190	270
Screw details	qty	2	2	2	2	2	2	3	3	3	3
	size (BSW)	$\frac{1}{4}''$	$\frac{3}{8}''$	$\frac{3}{8}''$	$\frac{7}{16}''$	$\frac{1}{2}''$	$\frac{5}{8}''$	$\frac{1}{2}''$	$\frac{5}{8}''$	$\frac{1}{4}''$	$\frac{1}{4}''$
Large end dia. (mm)		38.0	47.5	57.0	70.0	85.5	108	127	146	162	177.5
Approx Mass (kg)		0.1	0.2	0.3	0.7	1.5	2.7	3.8	7.7	7.5	11.1

CILINDRI BLOCK-TYPE

CILINDRI DI BLOCCAGGIO

Forza di bloccaggio: 11 - 275 kN
Pressione massima: 350 bar

Come comporre il modello dei cilindri Block-Type ENERPAC



Versioni speciali: *Se la gamma di prodotti ENERPAC non contempla il cilindro ideale per la Vostra applicazione, possiamo realizzare, a richiesta, versioni speciali.*
Contattate l'ENERPAC.
Sono disponibili disegni in scale 1:1 anche su disco per sistemi CAD.

Modelli disponbili - Cilindro Block-Type a Semplice Effetto

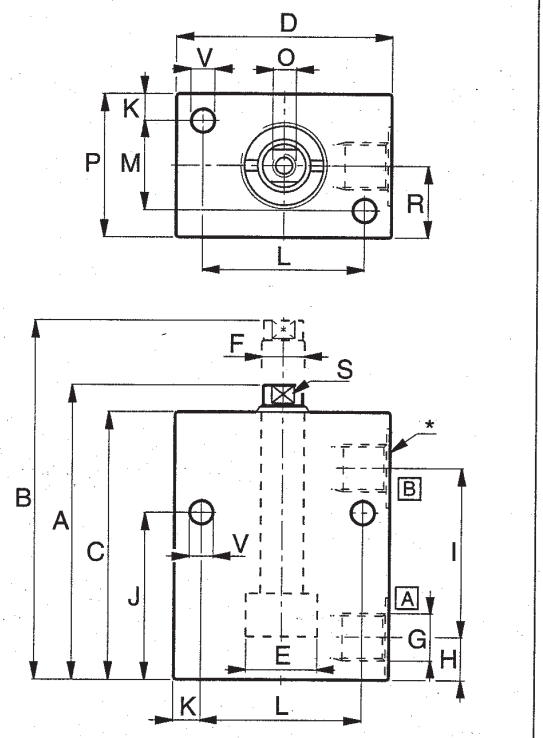
Modello		Forza di bloccagio a 350 bar (kN)		Corsa (mm)	Area Effettiva Cilindro (cm2)		Capacità olio (cm3)		Forza Minima della Molla (N)	Peso (kg)
Connessioni con O-ring	Connessioni filettate BSPP	Spinta	Trazione		Spinta	Trazione	Spinta	Trazione		
BMS-1082	BS-1082	10,9	-	8	3,1	-	2,5	-	93	0,9
BMS-10182	BS-10182	10,9	-	18	3,1	-	5,7	-	108	1,2
BMS-18102	BS-18102	17,0	-	10	4,9	-	4,9	-	168	1,3
BMS-18252	BS-18252	17,0	-	25	4,9	-	12,3	-	157	1,8
BMS-40122	BS-40122	43,6	-	12	12,6	-	15,1	-	378	2,0
BMS-40252	BS-40252	43,6	-	25	12,6	-	31,4	-	381	2,7
BMS-70122	BS-70122	68,2	-	12	19,6	-	23,6	-	471	3,3
BMS-70252	BS-70252	68,2	-	25	19,6	-	49,1	-	425	4,4
BMS-180202	BS-180202	174,9	-	20	50,2	-	100,5	-	917	12,0
BMS-280252	BS-280252	273,4	-	25	78,5	-	196,3	-	1419	19,0

Modelli Disponibili - Cilindri Block-Type a Doppio Effetto

BMD-10162	BD-10162	11,0	7,0	16	3,1	2,0	5,0	3,2	-	0,9
BMD-10362	BD-10362	11,0	7,0	36	3,1	2,0	11,3	7,2	-	1,2
BMD-18202	BD-18202	17,2	10,1	20	4,9	2,9	9,8	5,8	-	1,3
BMD-18502	BD-18502	17,2	10,1	50	4,9	2,9	24,5	14,5	-	1,8
BMD-40252	BD-40252	44,0	26,8	25	12,6	6,3	31,4	15,8	-	1,9
BMD-40502	BD-40502	44,0	26,8	50	12,6	6,3	62,8	31,6	-	2,6
BMD-70252	BD-70252	68,7	40,6	25	19,6	11,6	49,1	29,0	-	3,2
BMD-70502	BD-70502	68,7	40,6	50	19,6	11,6	98,2	58,0	-	4,3
BMD-180252	BD-180252	175,8	107,2	25	50,2	30,6	125,6	76,6	-	9,3
BMD-180502	BD-180502	175,8	107,2	50	50,2	30,6	251,2	153,1	-	11,5
BMD-280282	BD-280282	274,8	165,7	28	78,5	47,3	219,8	132,6	-	14,7
BMD-280562	BD-280562	274,8	165,7	56	78,5	47,3	439,6	265,1	-	18,

Nota: Sono disponibili versioni con le guarnizioni in VITON per impieghi in ambienti con elevata temperatura o in presenza di agenti corrosivi. Per la versione in VITON aggiungere il suffisso V al modello del cilindro.

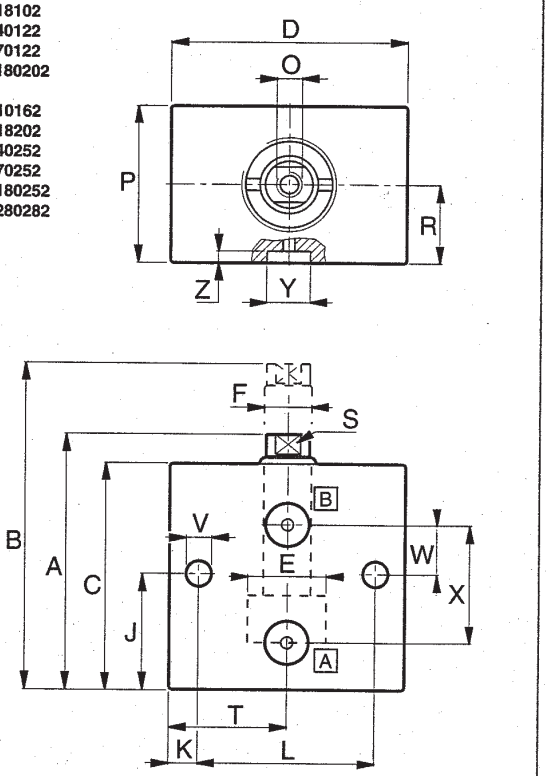
Tutti i cilindri BS e BD



* Tappo di ventilazione, solo per la versione a semplice effetto.

BMS-1082
BMS-18102
BMS-40122
BMS-70122
BMS-180202

BMD-10162
BMD-18202
BMD-40252
BMD-70252
BMD-180252
BMD-280282



Dimensioni - Cilindri Block-Type a Semplice Effetto

Modello		Dimensioni (mm)											
Connessioni con O-ring	Connessioni filettate BSPP	A	B	C	D	E	F	G	H	I	J	K	
BMS-1082	BS-1082	62	70	54,5	60	20	12	G1/4"	12,0	25	24,5	7,5	
BMS-10182	BS-10182	82	100	74,5	60	20	12	G1/4"	12,0	45	44,5	7,5	
BMS-18102	BS-18102	70	80	62,0	65	25	16	G1/4"	12,0	30	27,0	7,5	
BMS-18252	BS-18252	100	125	92,0	65	25	16	G1/4"	12,0	60	57,0	7,5	
BMS-40122	BS-40122	80	92	68,0	80	40	25	G1/4"	12,0	35	32,0	10,0	
BMS-40252	BS-40252	105	130	93,0	80	40	25	G1/4"	12,0	60	57,0	10,0	
BMS-70122	BS-70122	90	102	76,0	100	50	32	G1/4"	14,0	40	36,0	10,0	
BMS-70252	BS-70252	115	140	101,0	100	50	32	G1/4"	14,0	65	61,0	10,0	
BMS-180202	BS-180202	136	156	114,0	140	80	50	G1/4"	15,5	70	66,5	15,0	1
BMS-280252	BS-280252	152	177	132,5	170	100	63	G1/4"	18,0	80	77,5	17,5	1

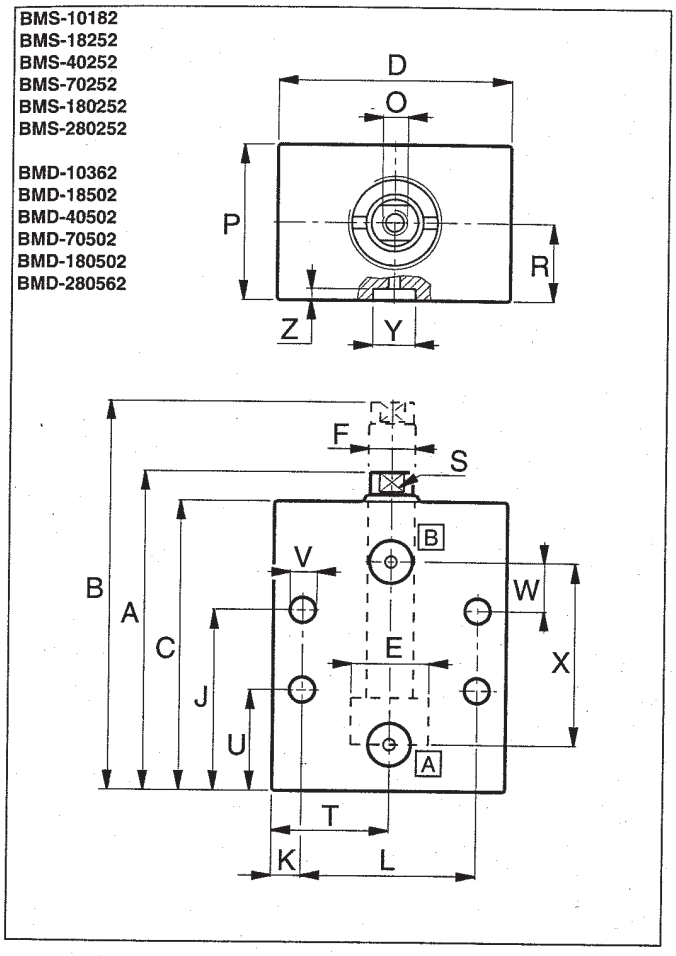
Dimensioni - Cilindri Block-Type a Doppio Effetto

BMD-10162	BD-10162	62	78	54,5	60	20	12	G1/4"	12,0	25	24,5	7,5	
BMD-10362	BD-10362	82	118	74,5	60	20	12	G1/4"	12,0	45	44,5	7,5	
BMD-18202	BD-18202	70	90	62,0	65	25	16	G1/4"	12,0	30	27,0	7,5	
BMD-18502	BD-18502	100	150	92,0	65	25	16	G1/4"	12,0	60	57,0	7,5	
BMD-40252	BD-40252	80	105	68,0	80	40	25	G1/4"	12,0	35	32,0	10,0	
BMD-40502	BD-40502	105	155	93,0	80	40	25	G1/4"	12,0	60	57,0	10,0	
BMD-70252	BD-70252	90	115	76,0	100	50	32	G1/4"	14,0	40	36,0	10,0	
BMD-70502	BD-70502	115	165	101,0	100	50	32	G1/4"	14,0	65	61,0	10,0	
BMD-180252	BD-180252	106	131	89,0	140	80	50	G1/4"	15,5	45	41,5	15,0	1
BMD-180502	BD-180502	136	186	114,0	140	80	50	G1/4"	15,5	70	66,5	15,0	1
BMD-280282	BD-280282	124	152	104,5	170	100	63	G1/4"	18,0	52	49,5	17,5	1
BMD-280562	BD-280562	152	208	132,5	170	100	63	G1/4"	18,0	80	77,5	17,5	1

2 500197	CILINDRO BD-18202 ENERPAC		N	2,000	25/05/00
2 500198	CILINDRO BD-40252 (CORSA 5MM) ENERPAC		N	2,000	25/05/00

BMS-10182
BMS-18252
BMS-40252
BMS-70252
BMS-180252
BMS-280252

BMD-10362
BMD-18502
BMD-40502
BMD-70502
BMD-180502
BMD-280562



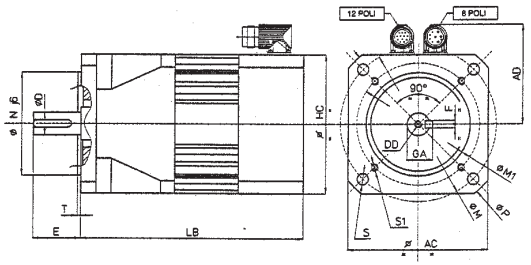
O	P	R	S	T	U	øV	W	X	øY	Z
M6 x 10	40	20,0	9	30,0	-	7,0	12,5	25,0	11,0 - 11,1	2,8 - 2,9
M6 x 10	40	20,0	9	30,0	24,5	7,0	12,5	45,0	11,0 - 11,1	2,8 - 2,9
M8 x 12	45	22,5	13	32,5	-	9,0	15,0	30,0	11,0 - 11,1	2,8 - 2,9
M8 x 12	45	22,5	13	32,5	27,0	9,0	15,0	60,0	11,0 - 11,1	2,8 - 2,9
M16 x 25	55	27,5	22	40,0	-	11,0	15,0	37,5	11,0 - 11,1	2,8 - 2,9
M16 x 25	55	27,5	22	40,0	27,0	11,0	15,0	62,5	11,0 - 11,1	2,8 - 2,9
M20 x 30	65	32,5	27	50,0	-	12,5	16,5	40,0	11,0 - 11,1	2,8 - 2,9
M20 x 30	65	32,5	27	50,0	26,0	12,5	16,5	65,0	11,0 - 11,1	2,8 - 2,9
M30 x 45	110	55,0	41	70,0	26,5	17,0	19,0	70,0	14,1 - 14,2	2,8 - 2,9
M36 x 50	125	62,5	50	85,0	37,5	21,0	20,5	80,0	14,1 - 14,2	2,8 - 2,9

M6 x 10	40	20,0	9	30,0	-	7,0	12,5	25,0	11,0 - 11,1	2,8 - 2,9
M6 x 10	40	20,0	9	30,0	24,5	7,0	12,5	45,0	11,0 - 11,1	2,8 - 2,9
M8 x 12	45	22,5	13	32,5	-	9,0	15,0	30,0	11,0 - 11,1	2,8 - 2,9
M8 x 12	45	22,5	13	32,5	27,0	9,0	15,0	60,0	11,0 - 11,1	2,8 - 2,9
M16 x 25	55	27,5	22	40,0	-	11,0	15,0	37,5	11,0 - 11,1	2,8 - 2,9
M16 x 25	55	27,5	22	40,0	27,0	11,0	15,0	62,5	11,0 - 11,1	2,8 - 2,9
M20 x 30	65	32,5	27	50,0	-	12,5	16,5	40,0	11,0 - 11,1	2,8 - 2,9
M20 x 30	65	32,5	27	50,0	26,0	12,5	16,5	65,0	11,0 - 11,1	2,8 - 2,9
M30 x 45	110	55,0	41	70,0	-	17,0	19,0	45,0	14,1 - 14,2	2,8 - 2,9
M30 x 45	110	55,0	41	70,0	26,5	17,0	19,0	70,0	14,1 - 14,2	2,8 - 2,9
M36 x 50	125	62,5	50	85,0	-	21,0	20,5	52,0	14,1 - 14,2	2,8 - 2,9
M36 x 50	125	62,5	50	85,0	37,5	21,0	20,5	80,0	14,1 - 14,2	2,8 - 2,9

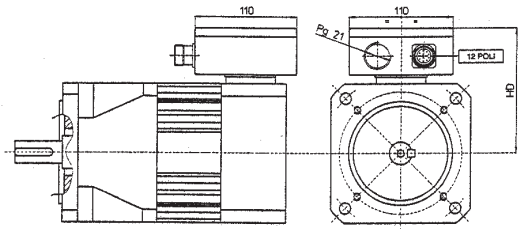
Servomotori 8C4

TIPO	Coppia continuativa a velocità zero M_0 [Nm] (3)	Corrente alla coppia continuativa I_0 [A] (1) (2) (3)	Coppia nominale M_N [Nm] (3)	Corrente nominale I_N [A] (1) (2) (3)	Velocità nominale n_N [giri/min]	Potenza nominale meccanica P_N [kW] (3)	Coppia di picco M_{max} [Nm]	Corrente alla coppia di picco I_{max} [A] (1)	Limite corrente motore I_{limit} [A]	Costante di coppia K_{to} [Nm/A] (4) (5) (2)	f.c.e.m. alla velocità nominale V [V] (4) (5) (2)	Resistenza ai terminali del motore R_{UV} [Ω] (4) (2)	Induttanza ai terminali del motore L_{UV} [mH] (6)	Momento d'inerzia del rotore J_m [kgcm²] (2) (7)	Peso m [kg]
Alimentazione: 3 x 400 Vca															
8C4.0.15... ..M	4	1,5	3,9	1,5	1500	0,61	14	5,8	9,9	3,04	276	29,3	113	5	6,9
8C4.0.30... ..M	4	2,8	3,6	2,6	3000	1,13	14	10,8	18,3	1,83	296	8,51	33	5	6,9
8C4.1.15... ..M	7,5	2,6	7,2	2,6	1500	1,13	26,3	10,3	17,5	3,22	292	10,7	52	9,4	9,2
8C4.1.30... ..M	7,5	4,7	6,5	4,3	3000	2,04	26,3	18,3	31,1	1,81	328	3,22	16	9,4	9,2
8C4.2.15... ..M	10	3,4	9,4	3,4	1500	1,48	35	13,4	22,7	3,30	299	6,76	38	12,8	10,8
8C4.2.30... ..M	10	6,1	8,4	5,4	3000	2,64	35	23,8	40,4	1,85	336	2,12	12	12,8	10,8
8C4.3.15... ..M	12,2	4,1	11,5	4,0	1500	1,81	42,7	15,9	26,9	3,40	308	5,13	30	16	12,4
8C4.3.30... ..M	12,2	7,6	10	6,6	3000	3,14	42,7	29,5	50,0	1,83	332	1,46	8,7	16	12,4
8C4.4.15... ..M	15,1	4,9	14	4,8	1500	2,2	52,9	19,2	32,5	3,48	316	3,76	24	20,5	14,8
8C4.4.30... ..M	15,1	8,5	12,2	7,3	3000	3,83	52,9	33,0	56,1	2,02	366	1,30	8	20,5	14,8
Alimentazione: 3 x 230 Vca															
8C4.0.15... ..E	4	3,0	3,9	3,0	1500	0,61	14	11,7	19,9	1,51	137	7,3	28	5	6,9
8C4.0.30... ..E	4	4,9	3,6	4,6	3000	1,13	14	19,0	32,2	0,93	169	2,7	11	5	6,9
8C4.1.15... ..E	7,5	4,5	7,2	4,5	1500	1,13	26,3	17,3	29,4	1,91	173	3,7	18	9,4	9,2
8C4.1.30... ..E	7,5	7,7	6,5	7,0	3000	2,04	26,3	29,9	50,8	1,11	201	1,25	6	9,4	9,2
8C4.2.15... ..E	10	5,0	9,4	4,9	1500	1,48	35	19,5	33,1	2,3	206	3,2	18	12,8	10,8
8C4.2.30... ..E	10	9,7	8,4	8,6	3000	2,64	35	37,6	64,2	1,17	212	0,84	5	12,8	10,8
8C4.3.15... ..E	12,2	7,2	11,5	7	1500	1,81	42,7	28,1	47,8	1,9	174	1,6	10	16	12,4
8C4.3.30... ..E	12,2	13,3	10	11,5	3000	3,14	42,7	51,6	88	1,05	190	0,48	2,9	16	12,4
8C4.4.15... ..E	15,1	8,0	14	7,8	1500	2,2	52,9	31,3	53,1	2,13	193	1,45	9	25	14,8
8C4.4.30... ..E	15,1	15,3	12,2	13,1	3000	3,83	52,9	59,5	100,9	1,1	204	0,40	2,5	25	14,8

Note: (1) I valori di corrente mostrati in tabella sono valori efficaci. • (2) Tolleranza ±5%. • (3) Servizio S1, temperatura ambiente a 40° C, montaggio [illegible] (dim. 300x300x20 mm), altitudine < 1000 m s.l.m. • (4) Valori riferiti a 20°C. • (5) I valori di corrente ne e di corrente sono valori efficaci. • (6) Tolleranze ±10%. • (7) L'inerzia del rotore può essere aumentata su richiesta.



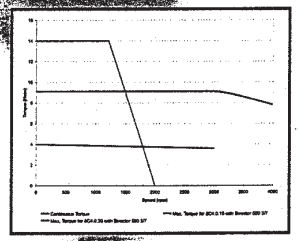
Disegni dimensionali completi dei servomotori della serie 8C4 con connettori



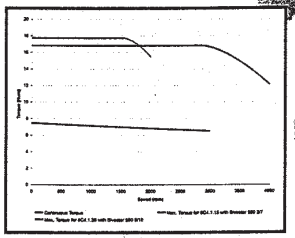
Disegni dimensionali completi dei servomotori della serie 8C4 con scatola morsetti

TIPO		LB	AC	N	T	M	S	M1	S1	P	D	E	DD	F	GA	AD	HC	HD
8C4.0	xx0xxxxxSGE3E	220	118	110	3.5	130	Ø10	/	/	150	19 j6	40	M6x16	6	21.5	91	116	116
8C4.1		251																
8C42		276																
8C4.3		299																
8C4.4		332																
8C4.0	xx1xxAxxSG3E	220	118	95	3	115	Ø10	/	/	150	19 k6	40	M6x16	6	21.5	91	118	116
8C4.1		251																
8C4.2		276																
8C4.3		299																
8C4.4		332																
8C4.0	xx9xxxxxSL3E	220	140	130	3.5	165	Ø12	/	/	190	24 J6	50	M8x19	8	27	91	118	116
8C4.1		251																
8C4.2		276																
8C4.3		299																
8C4.4		332																

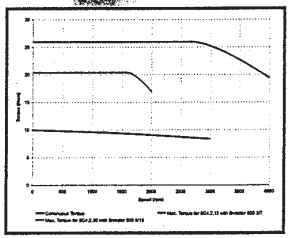
Servomotori 8C4.0



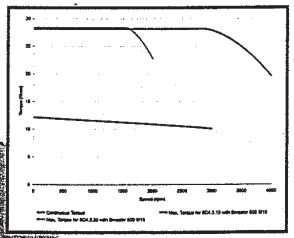
Servomotori 8C4.1



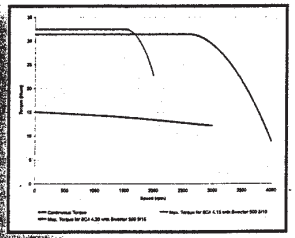
Servomotori 8C4.2



Servomotori 8C4.3



Servomotori 8C4.4

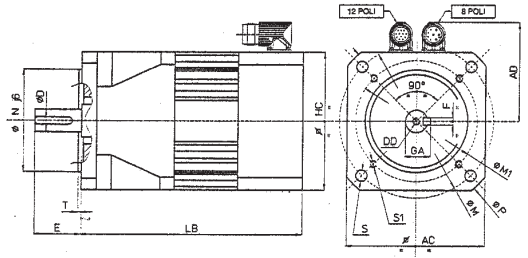


Curve ottenute con tensione del bus in c.c. a 535V

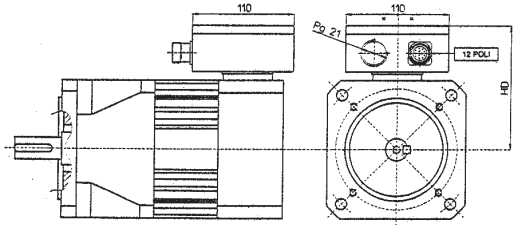
Servomotori 8C5

TIPO	Coppia continuativa a velocità zero M_0 [Nm] (3)	Corrente alla coppia continuativa I_0 [A] (1) (2) (3)	Coppia nominale M_N [Nm] (3)	Corrente nominale I_N [A] (1) (2) (3)	Velocità nominale n_N [giri/min]	Potenza nominale meccanica P_N [kW] (3)	Coppia di picco M_{max} [Nm]	Corrente alla coppia di picco I_{max} [A] (1)	Limite corrente motore I_{limit} [A]	Costante di coppia K_{t0} [Nm/A] (4) (5) (2)	f.c.e.m. alla velocità nominale V [V] (4) (5) (2)	Resistenza ai terminali del motore R_{UV} [W] (4) (2)	Induttanza ai terminali del motore L_{UV} [mH] (6)	Momento d'inerzia del rotore J_m [kgcm^2] (2) (7)	Peso m [kg]
Alimentazione: 3 x 400 Vca															
8C5.0.15... ..M	12,2	4,2	11,6	4,1	1500	1,82	42,7	16,3	27,7	3,30	300	5,71	44	21	15
8C5.0.30... ..M	12,2	8,0	10	6,8	3000	3,14	42,7	21,0	52,6	1,74	315	1,58	12	21	15
8C5.1.15... ..M	16,9	5,3	16	5,1	1500	2,51	59,2	20,5	34,7	3,65	331	3,65	32	30,2	18,3
8C5.1.30... ..M	16,9	11,0	13	6,8	3000	4,08	59,2	43,0	72,9	1,74	315	0,82	7,3	30,2	18,3
8C5.2.15... ..M	21,5	7,5	20	7,1	1500	3,14	75,3	29,3	49,7	3,25	294	1,91	19	40	21,9
8C5.2.30... ..M	21,5	14,1	16	10,9	3000	5,03	75,3	54,6	92,7	1,74	315	0,55	5,3	40	21,9
8C5.3.15... ..M	25,8	8,4	23,5	7,8	1500	3,69	90,3	32,8	55,6	3,48	315	1,59	17	49,2	25,3
8C5.3.30... ..M	25,8	15,6	18,5	11,6	3000	5,81	90,3	60,5	102,7	1,88	342	0,46	4,9	49,2	25,3
8C5.4.15... ..M	30	9,6	27	9,0	1500	4,24	105	38,1	64,7	3,48	315	1,23	13	59	28,6
8C5.4.30... ..M	30	17,8	21	13,0	3000	6,6	105	69,3	117,6	1,91	347	0,38	4,1	59	28,6
8C5.6.15... ..M	38,2	12,5	33	11,0	1500	5,18	134	48,5	82,4	3,48	315	0,86	9,7	78	35,4
8C5.6.30... ..M	38,2	23,4	24	15,5	3000	7,54	134	91,0	154,5	1,85	336	0,24	2,8	78	35,4
Alimentazione: 3 x 230 Vca															
8C5.0.15... ..E	12,2	8,0	11,6	7,7	1500	1,82	42,7	31,0	52,6	1,7	158	1,6	12	21	15
8C5.0.30... ..E	12,2	13	10	11,3	3000	3,14	42,7	52	87,7	1,04	189	0,56	4	21	15
8C5.1.15... ..E	16,9	10,0	16	9,7	1500	2,51	59,2	39,0	66,3	1,91	173	1,00	98	30,2	18,3
8C5.1.30... ..E	16,9	17	13	13,6	3000	4,08	59,2	66	112,1	1,13	205	0,35	3,1	30,2	18,3
8C5.2.15... ..E	21,5	13,2	20	12,5	1500	3,14	75,3	51,2	86,9	1,85	168	0,62	6	40	21,9
8C5.2.30... ..E	21,5	21,1	16	16,3	3000	5,03	75,3	82,0	139,1	1,16	210	0,25	2,4	40	21,9
8C5.3.15... ..E	25,8	16,9	23,5	16	1500	3,69	90,3	65,6	111,3	1,74	158	0,40	4	49,2	25,3
8C5.3.30... ..E	25,8	25,3	18,5	18,9	3000	5,81	90,3	98,4	167	1,16	210	0,18	1,8	49,2	25,3
8C5.4.15... ..E	30	16,3	27	15	1500	4,24	105	63,5	107,8	2,09	189	0,44	5	59	28,6
8C5.4.30... ..E	30	32,7	21	24	3000	6,6	105	127,1	216	1,04	189	0,11	1,2	59	28,6
8C5.6.15... ..E	38,2	18,7	33	16,6	1500	5,18	134	73	123,6	2,32	210	038	4,3	78	35,4
8C5.6.30... ..E	38,2	37,4	24	24,7	3000	7,54	134	146	155	1,16	210	0,09	1,1	78	35,4

Note: (1) I valori di corrente mostrati in tabella sono valori efficaci. • (2) Tolleranza ±5%. • (3) Servizio S1, temperatura ambiente a 40° C, montaggio su flangia in acciaio (dim. 300x300x20 mm), altitudine < 1000 m s.l.m. • (4) Valori riferiti a 20°C. • (5) Valori di tensione e di corrente sono valori efficaci. • (6) Tolleranze ±10%. • (7) L'inerzia del rotore può essere aumentata su richiesta.

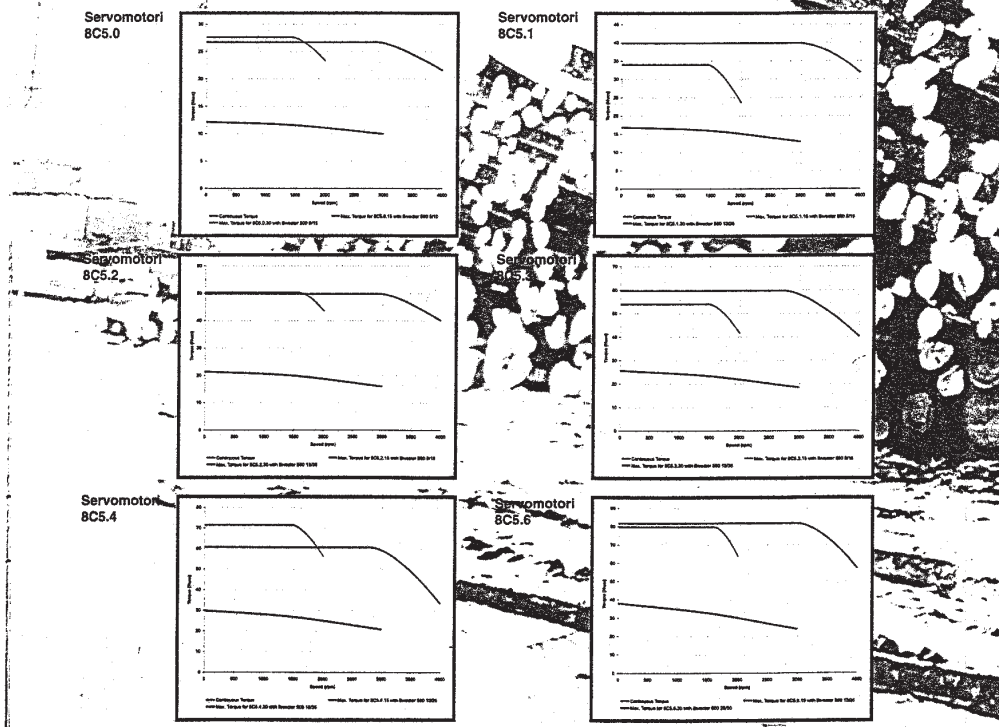


Disegni dimensionali completi dei servomotori della serie 8C5 con connettori



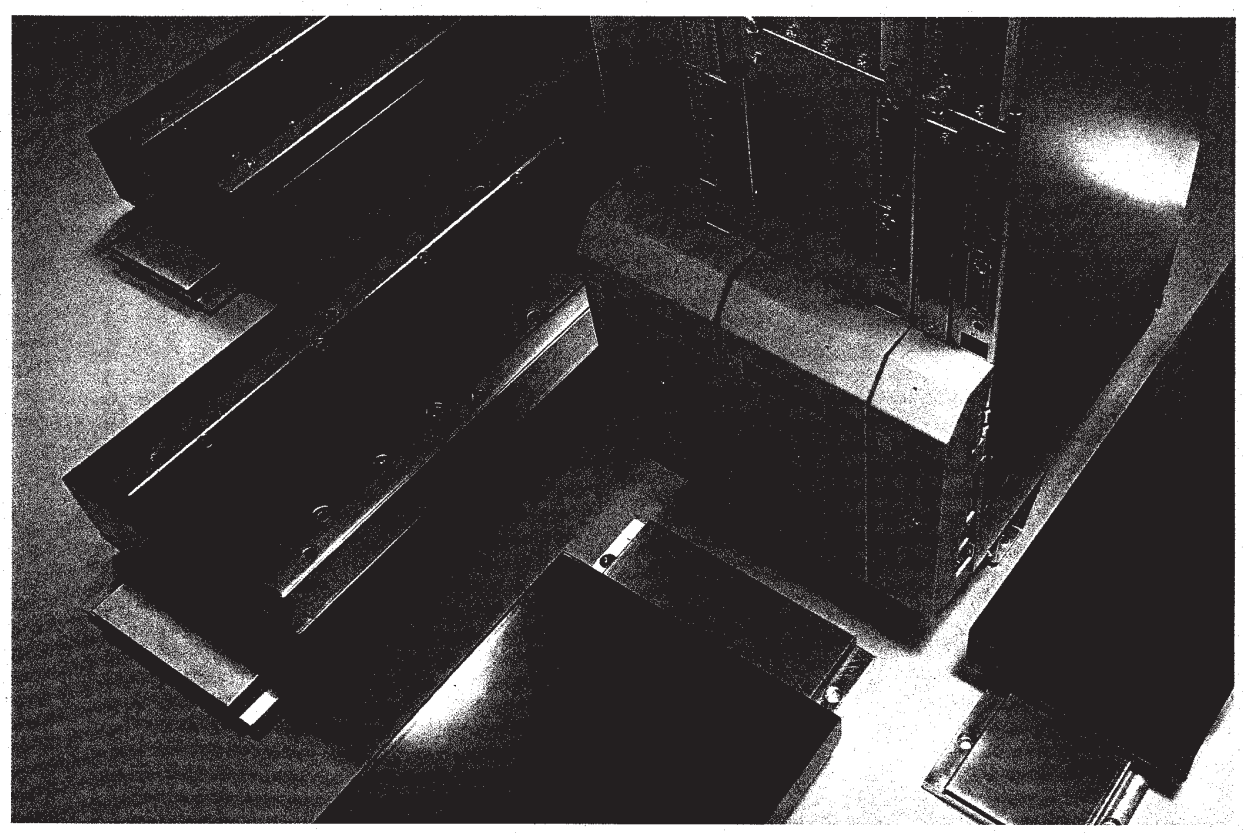
Disegni dimensionali completi dei servomotori della serie 8C5 con scatola morsetti

TIPO		LB	AC	N	T	M	S	M1	S1	P	D	E	DD	F	GA	AD	HC	HD
8C5.0	xx0xxAxxSL3E	266	148	130	3.5	165	Ø12	/	/	190	24 j6	50	M8x19	8	27	106	148	133
8C5.1		296																
8C5.2		326																
8C5.3	xx0xxxxxSN3E	356									32 k6	58	M12x28	10	35			
8C5.4		387																
8C5.6		447																
8C5.0	xx4xxxxxSL3E	266	148	110	4	165	Ø12	130	M 8 x 1 2	190	24 j6	50	M8x19	8	27	106	148	133
8C5.1		296																
8C5.2		326																
8C5.3	xx4xxxxxSN3E	356									32 k6	58	M12x28	10	35			
8C5.4		387																
8C5.6		447																



Curve ottenute con tensione del bus in c.c. a 535V

engineering
mannesmann
Rexroth



LSF
Motori lineari sincroni
Universali, precisi e ad elevata dinamicità

SYSTEM200

71 806 IT/00-07

Rexroth
Indramat

Motori Lineari Sincroni LSF – La Tecnologia d'azionamento per movimenti altamente dinamici

Con i motori lineari gli azionamenti digitali diretti aprono, grazie alle loro elevate prestazioni, nuove vie per soluzioni innovative di macchine ad un alto potenziale di competitività. Velocità ed accelerazioni decisamente più elevate, una maggiore precisione nonché una più elevata accessibilità dell'impianto sono le caratteristiche emergenti di tale tecnologia di azionamento.

I motori lineari sincroni LSF sono motori senza carcassa e consistono in una parte primaria, con avvolgimento trifase, nonché una o più parti secondarie con magnete permanente. Sono caratterizzati dai seguenti dettagli:

- Sistema modulare con differenti taglie e lunghezze del motore per forze di avanzamento fino a 22.000 N e velocità oltre 600 m/min.
- Elevata dinamicità (accelerazione fino a 360m/s^2)
- Robusta tecnologia del motore senza usura meccanica
- Protezione IP65 grazie alla completa incapsulatura di tutti i componenti del motore
- Elevata sicurezza funzionale anche in condizioni ambientali avverse
- Tensioni di circuito intermedio fino a 750 V per la massima dinamicità
- Protezione dell'avvolgimento del motore contro sovraccarico termico grazie a termosensori integrati
- Cavi di potenza schermati ad elevata flessibilità
- Per il potenziamento della forza è possibile l'accoppiamento meccanico di varie parti primarie. Tramite l'accostamento di più parti secondarie è possibile realizzare qualsiasi lunghezza della traversa
- Collegamenti standard per il raffreddamento a liquido

Versioni del motore per ogni esigenza

A seconda delle esigenze specifiche di applicazione, in ordine al raffreddamento ed all'incapsulamento, le parti primarie sono disponibili in due diverse versioni:

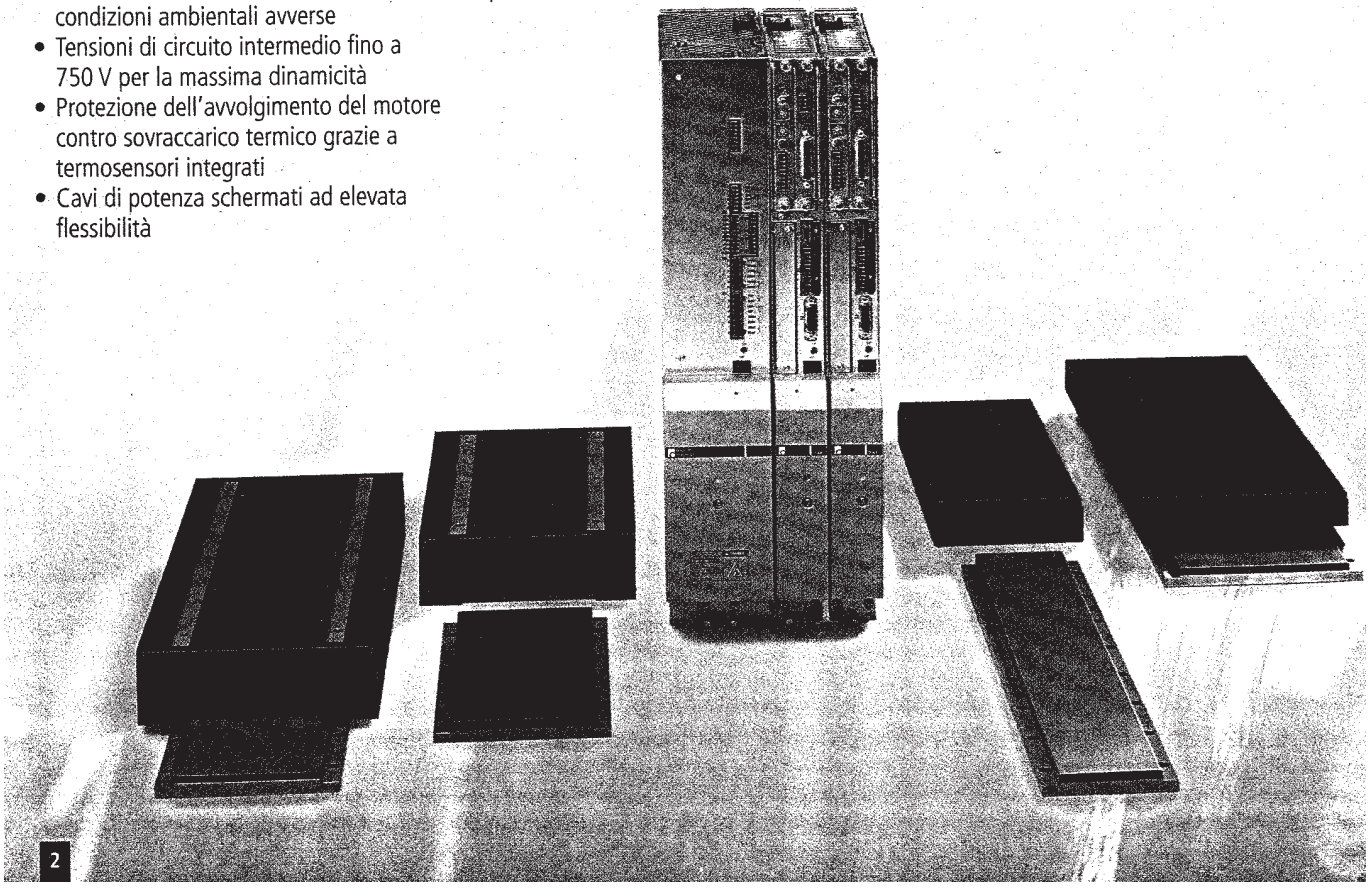
Incapsulamento standard

Questa versione della parte primaria rappresenta una soluzione economica nelle applicazioni dove la precisione di lavorazione della macchina non determina elevati carichi termici, come ad esempio nella automazione generale. Il sistema di raffreddamento di questa versione è integrato nel motore e serve solo alla dissipazione del calore e quindi al mantenimento delle forze di avanzamento continuo specificate.

Incapsulamento termico

Questa versione della parte primaria viene utilizzata soprattutto nelle macchine utensili e nelle applicazioni di precisione. L'ulteriore raffreddamento a liquido sulla parte posteriore del motore nonché sui lati longitudinali e frontali della componente primaria permette al motore un comportamento termico neutro.

La versione della parte secondaria è identica in entrambe le versioni. I magneti permanenti dell'elemento secondario vengono completamente incapsulati già in sede di produzione e prote dal punto di vista meccanico, da una copertura integrata. Ciò assicura un affidabile controllo del motore anche in condizioni ambientali avverse.
In entrambe le versioni della parte primaria nonché di quella secondaria l'utente riceve delle parti già complete senza componenti singoli in aggiunta. In tal modo si riduce notevolmente il dispendio di lavoro nel montaggio e nella logistica.



2

Elettronica degli azionamenti flessibile

Non vi sono limiti per l'impiego in molteplici ambienti di automazione, vista la combinazione data dall'elettronica di azionamento pronta per il collegamento alla rete e alle sue interfacce aperte. La tecnica di azionamento lineare orientata verso il futuro di Rexroth Indramat offre, ad esempio, i seguenti vantaggi fondamentali:

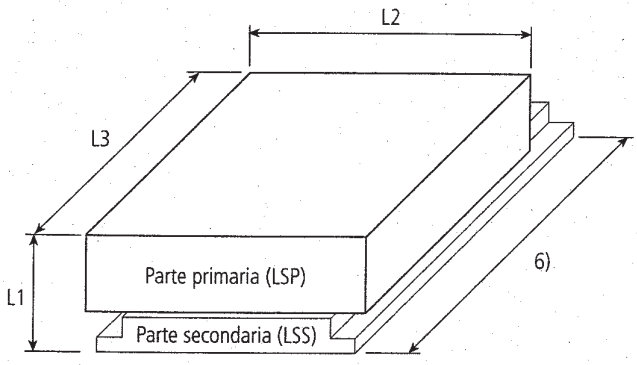
- Elevata qualità di regolazione (Fattori kv fino a 30 m/min/mm)
- Precisioni di contorno e posizionamento inferiore a 1 µm
- Elevata rigidezza statica e dinamica al carico.
- Ottime caratteristiche di sincronismo
- Messa in servizio semplice
- Possibilità di utilizzo di sistemi di misura angolari assoluti e incrementali
- Interfaccia: SERCOS, interfacce analogiche e di posizionamento, PROFIBUS, INTERBUS, CANopen, DeviceNet, PWM

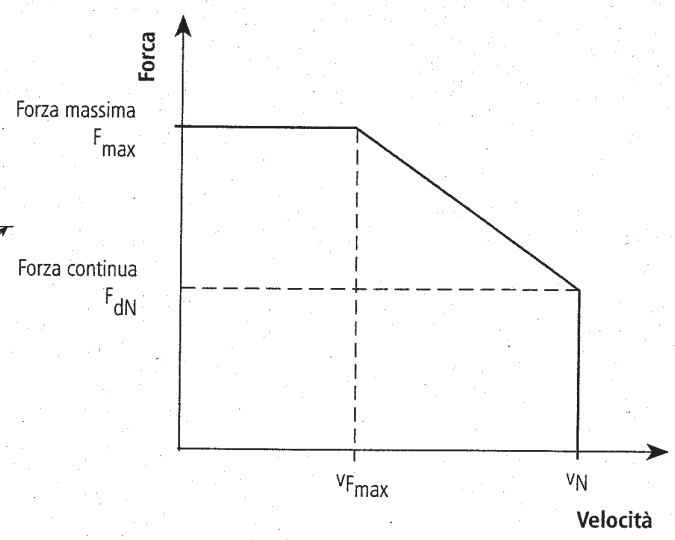
Molteplici campi di impiego

Rexroth Indramat applica oggi con successo gli azionamenti lineari diretti, a titoli di esempio, nei seguenti settori:

- Lavorazione ad elevata velocità nei centri di lavorazione e linee di trasferimento
- Lavorazione di rettifica, in particolare, di alberi a gomiti ed alberi a camme
- Automazione e movimentazione
- Lavorazione di lamiere e lavorazioni laser.
- Macchine tessili e confezionatrici
- Lavorazione del legno
- Costruzione di macchine speciali

Dati tecnici





1) con raffreddamento ad acqua (refrigerante: acqua a temperatura di andata 30°C), temperatura finale di avvolgimento 135°C, traferro e arresto del motore.

2) L'indicazione della velocità fa riferimento una tensione del circuito intermedio di 540 V (vedi figura). In caso di tensioni differenti del circuito intermedio le velocità possono essere convertite in modo lineare.

3) Indicazione per la blindatura termica standard

4) Altezza utile sopra la parte primaria , traferro (1,4mm) e parte secondaria

5) Larghezza utile totale sopra la parte primaria e la parte secondaria

6) Parti secondarie taglie 040:
Lunghezze segmento 150 e 600 mm

Parti secondarie taglie 080-240:
Lunghezze segmento da 150 fino a 1200 in un retino di 150 mm

Parte primaria – tipo di componente e versione		Forza di avanzamento		Velocità [2]		Misure d'ingombro [3]		
Blindatura standard	Blindatura termica	Max	Durata [1]	$V_{Fmax\ 540V}$	$V_{N\ 540V}$	Altezza L1 [4]	Larghezza L2 [5]	Lunghezza Componente primario L3 [6]
		N		m/min		mm		
LSP040K-***-B*	-	800	240	185	345	55 / -	113 / -	197 / -
LSP080K-***-A*	LSP080S-***-A*	2300	1100	290	510	65 / 80,5	150 / 170	395 / 390
LSP080K-***-B*	LSP080S-***-B*			180	330			
LSP080K-***-C*	LSP080S-***-C*			150	290			
LSP080L-***-B*	LSP080T-***-B*	3500	1750	125	245			545 / 540
LSP080L-***-C*	LSP080T-***-C*			65	160			
LSP080M-***-A*	LSP080U-***-A*	4700	2150	165	305			695 / 690
LSP080M-***-B*	LSP080U-***-B*			100	230			
LSP120K-***-A*	LSP120S-***-A*	3800	1550	205	395		190 / 210	395 / 390
LSP120K-***-B*	LSP120S-***-B*			130	260			
LSP120K-***-C*	LSP120S-***-C*			65	165			
LSP120L-***-A*	LSP120T-***-A*	5800	2550	150	295			545 / 540
LSP120L-***-B*	LSP120T-***-B*			120	250			
LSP120L-***-C*	LSP120T-***-C*			80	185			
LSP120M-***-A*	LSP120U-***-A*	7800	3350	40	140			695 / 690
LSP120M-***-B*	LSP120U-***-B*			85	195			
LSP120M-***-C*	LSP120U-***-C*			180	350			
LSP120N-***-A*	LSP120V-***-A*	9800	3900	150	320			845 / 840
LSP140L-***-B*	-	7700	2650	115	225	55 / -	213 / -	567 / -
LSP140N-***-B*	-	11500	4150	60	175			792 / -
LSP160K-***-A*	LSP160S-***-A*	5300	2100	140	290	65 / 80,5	230 / 250	395 / 390
LSP160K-***-B*	LSP160S-***-B*			100	230			
LSP160L-***-A*	LSP160T-***-A*	7800	3700	240	460			545 / 540
LSP160L-***-B*	LSP160T-***-B*			80	180			
LSP160L-***-C*	LSP160T-***-C*			45	135			
LSP160M-***-A*	LSP160U-***-A*	10500	4350	140	275			695 / 690
LSP160M-***-B*	LSP160U-***-B*			100	200			
LSP160M-***-C*	LSP160U-***-C*			45	130			
LSP160N-***-B*	LSP160V-***-B*	13200	5600	75	180			845 / 840
LSP160N-***-C*	LSP160V-***-C*			20	110			
LSP200K-***-C*	LSP200S-***-C*	6500	2600	75	185	69 / 84,5	270 / 290	395 / 390
LSP200L-***-B*	LSP200T-***-B*	9700	3900	60	165			545 / 540
LSP200M-***-A*	LSP200U-***-A*	13200	5300	90	210			695 / 690
LSP200M-***-B*	LSP200U-***-B*			20	115			
LSP200N-***-A*	LSP200V-***-A*	16500	6600	55	165			845 / 840
LSP200N-***-B*	LSP200V-***-B*			50	150			
LSP240L-***-A*	LSP240T-***-A*	11700	4700	115	250	73 / 88,5	310 / 330	545 / 540
LSP240L-***-C*	LSP240T-***-C*			30	130			
LSP240M-***-B*	LSP240U-***-B*	15700	6300	55	165			695 / 690
LSP240N-***-A*	LSP240V-***-A*	20200	8600	50	150			845 / 840
LSP240N-***-B*	LSP240V-***-B*			25	120			
LSP240N-***-C*	LSP240V-***-C*	22000*		**	100			

I dati riportati sono a carattere informativo.
Dati piu' precisi possono essere richiesti presso i nostri uffici di vendita competenti.

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