

TT 1200

Rolling Mill



Operating Instruction Manual

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1. INTRODUCTION

The *TT 1200* rolling mill has been designed and built to laminate metal materials, and specifically precious metals from a maximum starting thickness of 3 mm, down to 0.030mm or less, dependant upon material structure and ambient conditions.

To guarantee the correct use of the machine, and to ensure maximum reliability over a full extended life time, the machine must be used in accordance with the instructions, guidelines and general recommendations outlined in all documentation supplied with the machine.

We advise that you read thoroughly the contents of all documentation and retain these with the specific machine.

The machine is equipped with both passive and active security devices, to minimise when ever possible damage to the machine resultant from incorrect use.

1.1. Guarantee

The guarantee covers a period of 12 months from the purchase of the machine on every mechanical, electrical and electronically components of the rolling mill excluding damages due to the use of parts as rollers, bronze bushings, roller bearings ect..



ATTENTION! The guarantee expires immediately whenever intervention on the machine is performed by non-authorized personnel.

1.2. Authorised personnel

Repair and/or extraordinary maintenance should be performed exclusively by authorized personnel only.

If required, *L. CAVALLIN srl* can supply upon further request information regarding the location of authorized personnel.

1.3. Rules and reference documentation

The *TT 1200* rolling mills comply the prescriptions contained in the following documents :

- 📖 UNI EN 294 (July 1993): Security of the equipment - Security distances to prevent approaching dangerous area with the hands.
- 📖 UNI EN 292/1 (November 1992): Security of the equipment - Base concepts, general design principles - Glossary, base method.
- 📖 UNI EN 292/2 (November 1992): Security of the equipment - Base concepts, general design principles - Technical specifications and times.
- 📖 CEI EN 60204-1 (September 1993): Security of the equipment - Electrical equipment of the machines - Part 1: general rules.
- 📖 89/392/CEE rule modified by rule 91/368/CEE, by rule 93/44/CEE and by rule 93/68/CEE ("machine regulation")

2. GENERAL CHARACTERISTICS

The machines general functional characteristics are outlined in the following table:

Model	Table size (mm)	Working Cylinder diameter (mm)	Material rolling Thickness (mm)	Coiling units
TT1200T45C	120	48	3 - 0.03	Electronically Adjustable tension

3. INSTALLATION AND LOCATION

The sizes and the weights are detailed as follows:

Model	Depth (mm)	Width (mm)	Height Max (mm)	Weight (kg)
TT1200T45C	1435	1750	1850	1200

3.1. Transport and moving

The Rolling mill should be raised and lowered using ropes of sufficient capacity to support the weight of the machine (as indicated on the identification plate and in the table below).

For a correct rising of the machine use two belts, passing through 4 eyebolts, as shown in the *Fig.1*.

Before raising the machine and during the entire process, check the weight distribution is balanced.



Fig. 1-TT 1200 Rising



ATTENTION! Don't walk underneath suspended loads.

3.2. Electrical supply

The *TT 1200* rolling mill is supplied complete with all cabling required for direct connection to the mains supply. All installation must be carried out by an appropriately qualified electrician.



ATTENTION! The connection of the rolling mill to a socket complying the rules in force and adapted to the current absorbed by the machine, is compulsory. In case the rolling mill is directly connected to the electrical supply without using a plug, the operator must use a sectioning device of the supply, complying the rules in force, which switches off all conductors (included the neutral) and with a fit interruption power.

The electrical supply plant must have tension and frequency equal to the nominal tension and frequency of the machine supply and must be fit to the machine consumption, as it can be detected on the identification label of the machine.



ATTENTION! Check nominal data of the electrical plant of the machine on the identification label before performing the connection with the electrical supply.

3.2.1. Identification colours of the supply conductors

The supply conductors are identified by the following colours:

- *yellow/green*: equipotential protection conductor (grounding)
- *light blue*: neutral
- *Other colours*: phases.

3.3. Section of the external supply conductors

The section of the external supply conductors must be such to enable the passage of the maximum current level without causing damages or causing an excessive heating.

In calculating the section the intervention current of the protection devices against over-currents, must be taken into consideration: in fact, in case of faulty device - e.g. in case of a short circuit - the maximum current which can pass into the conductors is the one switching the protection devices to which they are connected, that, therefore, must be supported by the conductors without causing any damage.

The minimum section of the conductors must be established according to the maximum admitted current using as reference, the table herewith illustrated (taken from the CEI EN 60204-1 rule).

Section of conductors [mm ²]	Max allowable current [A]
1	9,6
1,5	12,2
2,5	16,5
4	23
6	29
10	40
16	53
25	67
35	83

The section of the equipotential protection conductor (grounding) must not be lower than the one of the phase conductors.

3.4. Protection against over-currents

The electrical supply must be equipped by a line protected against over currents by means of automatic switches (magneto-thermal maximum 32A) or delayed fusers.

The protections intervention current must be as low as possible taking into consideration the maximum power consumption level of the machine.



ATTENTION! The protection against over currents must be part of the supply plant of the TT 1200 Rolling Mills and is not supplied by L.CAVALLIN srl

3.4.1. Nominal current

The protections against over-currents must not activate, as a consequence of the pick-up currents of the motors indicated in the table.

Model	Supply	Nominal current [A]	Over current protection "A" type (A)
TT 1200T45C	Three-phase 400 V 50Hz	25.9	32

3.5. Protection against insulation faults

It is advisable to equip the supply plant with a device, sensitive to the insulating

defects (differential).

This device must be set downstream the protection device against over-currents (or be integrated with it).



ATTENTION! The protection against insulating defects must be part of the supply plant in the TT 1200 rolling mills, and it is not supplied by L.CAVALLIN srl.

3.6. Protection circuit

The TT 1200 rolling mills must be connected to an external equipotential protection circuit (grounding).

The connection of the equipotential protection circuit has to occur connecting the protection conductor - identified by green/yellow - to the grounding terminal of the socket or directly to the equipotential protection circuit of the supply plant.



ATTENTION! The connection of the external equipotential protection conductor is fundamental for the correct performance of the machine and for the operators' security (protection against electrical shocks).

3.7. Lubricants

For the lubrication of the machines main gearbox we recommend **ROTO EP320**; for the lubrications of the bearings we recommend **ROTO EP680**; the equivalent lubricants are shows in the table

Brand	Gearbox	Buschings
Agip	Blasia 320	Blasia 680
Aral	Degol BG 320	Degol BG 680
BP	Energol GRXP 320	Energol GRXP 680
Esso	Spartan EP 320	Spartan EP 680
IP	Mellana Oil 320	Mellana Oil 680
Klüber	Lamora 320	Lamora 680
Mobil	Mobilgear 632	Mobilgear 636
Oleotecnica	ROTO EP 320	ROTO EP680.
Shell	Omala Oil 320	Omala Oil 680
Texaco	Meropa 320	Meropa 680

3.8. Cooling water support cylinders

The TT 1200 rolling mill is equipped with water cooling circuit to keep controlled the temperature of the support cylinders

The rolling mill must be connected to the water net - or to a closed plant equipped with recycling pump – by connections E (water inlet) and U (water outlet); both connections have G1/2 threading (Fig 2)

The water supply must have a capacity of at least 30 l/min at a temperature between 14° and 20°C and pressure of 2,5bar

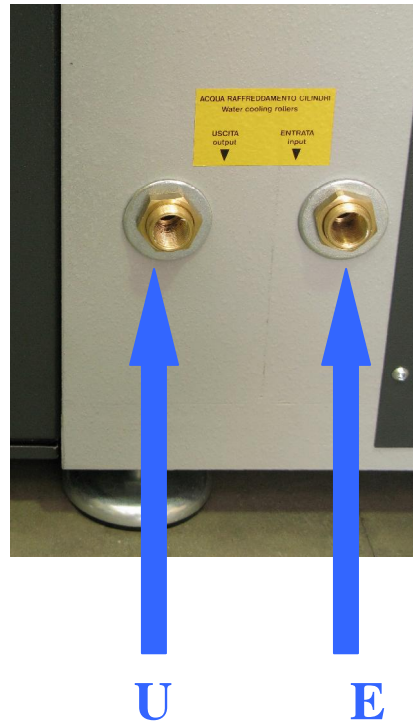


Fig. 2-Water cooling

Water flow is regulated by a solenoid valve to ensure water circulation only when the rolling mill is in operation.



ATTENTION! The connection to the mains water cooling of the cylinders must be done during the installation of the rolling mill. Do not use the rolling mill without water to cool the cylinders.

4. ENVIRONMENTAL WORKING CONDITIONS

The TT 1200 rolling mills and all electrical equipment have been built and projected to work correctly in the following environmental conditions:

- Ambient temperature: +5 ÷ +40 °C;
- Relative humidity: lower than 50% at maximum 40°C (more relative humidity is possible to lower temperature, for example 90% at 20°C).
- Storage temperature: -25°C ÷ +55°C (seldom maximum +70°C for a period lower than 24 hours)
- The machine IS NOT suitable to the working with acids, corrosive acids, and

sale.

- The machine IS NOT suitable to the working with ionised radiations for example X rays, laser, microwave, ultraviolet rays.

Whenever the working conditions are particularly critical, it is advisable to equip the room with a fit conditioning plant in order to reset the humidity values and the temperature within acceptable limits

5. AIR NOISE PRODUCED BY THE MACHINE

The continuous acoustical pressure level, equivalent pondered A, issued by the machine, is lower then 70 db (A).

The non-pondered peak value of the acoustical pressure is 90 dB and is detected in the nearby of the engine housing.

The measurement is performed on a type L250 rolling mill, with vacuum operating winding reels, according to ISO 11202 (1st ed., 1995-12-15).

6. IDENTIFICATION PLATE

The identification plate of the machine indicates the following information:

- manufacturer's identification;
- model;
- serial number;
- production date;
- weight of the machine;
- number of phases.
- nominal voltage;
- nominal frequency;
- nominal current;
- electric diagram number;

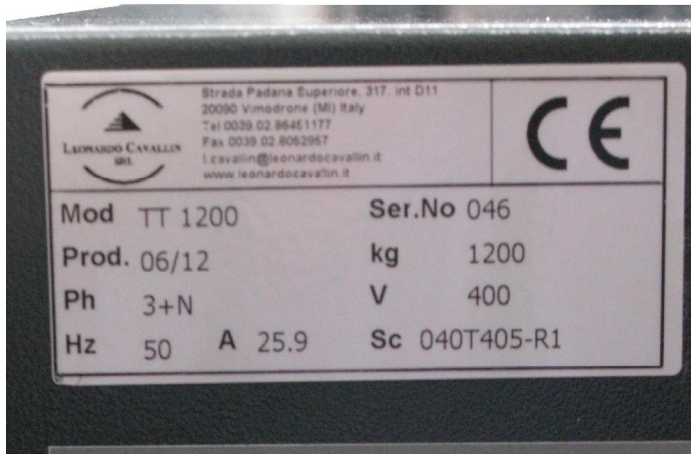


Fig. 3-Identification plate

7. INSTRUCTIONS FOR USE



ATTENTION! The machine must only be used by well trained personnel informed on the usage procedures and on the function of the security devices.

7.1. Materials that can be rolled

The *TT 1200* rolling mills has been designed and built in order to roll all metal material with a hardness value lower than 150 HB.

It is recommended, and obviously dependant upon material types, physical properties and reduction requirements, to establish a process of annealing in sequence with the reduction process.

7.1.1. Plates rolling

As concerns the working procedure on the plate, the maximum input width must not be higher than 50mm.

Once the rolling of a plate has started, it is important that this one is fed in a linear direction.

The maximum rolling thickness and the minimum thickness that can be obtained (which value is purely indicative), are indicated in the table in paragraph 2 .

7.1.2. Thickness reduction

In order to obtain the optimum results from the advanced *TT 1200* rolling mill we recommend a maximum reduction of material thickness of 0.2mm with a sheet of width equal to 50mm.

Excessive thickness reduction uselessly solicits the rolling mill, and can compromise the final quality of the plates. Should it be necessary to calibrate the plate thickness, it is advisable to repeat the passage without changing the distance between the cylinders (every two passes).

7.1.3. Coiling and uncoiling spooling reels

The *TT 1200* rolling mill is equipped with two coiling units, each of which is equipped with a spool that can be removed by unscrewing its respective the fixing gear.

The coiling units are independently controlled by means of electronic system such that each will act as either a brake, to maintain the material taught whilst uncoiling to the machine, or tension, to maintain the material under load coiled after rolling.

The function each coiling unit changes dependant upon the direction of machine direction.

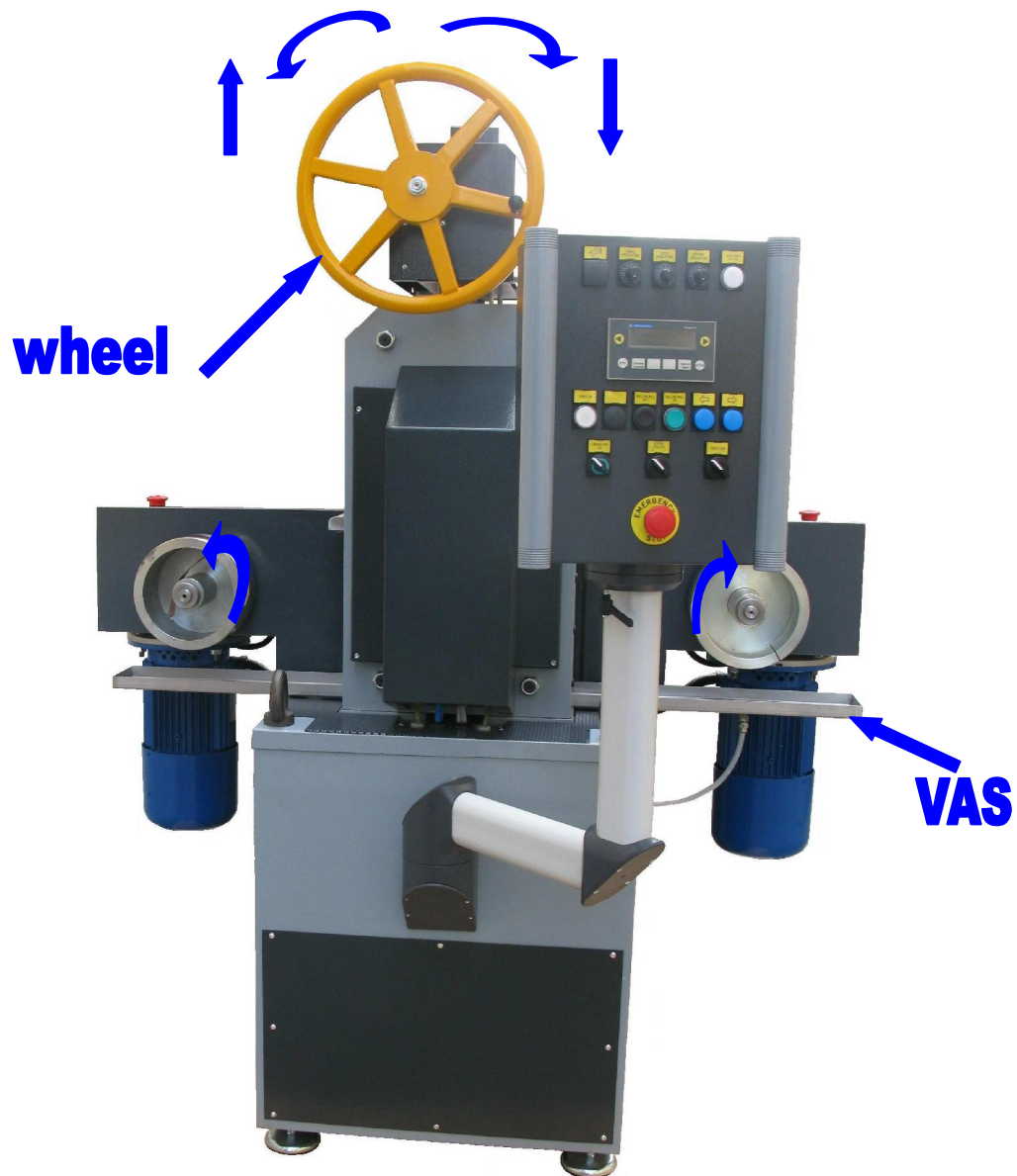


Fig. 4 - Coiling-Uncoiling spooling reels

7.2. Theoretical production speed

The speed of the machine is variable between 0 and 31m/min (cylinder diameter 48mm and frequency 50Hz).

8. DESCRIPTION OF THE COMMANDS



ATTENTION! The letters and the numbers used to identify the controls and the indicators are used only in the text, so they are not on the panel control of the machines.



Fig. 5 – Main control Panel.

8.1. Description of the user controls

The function of each of the user controls is described as follows:

- (IG) main switch on the Electrical panel
- (AUX) indicator lamp. Light indicates the presence of voltage in the main electrical panel.
- (PWR) push button. Machine power on.
- (OFF) push button .Rolling mill stop.
- (ON) push button. Rolling mill start.
- (VEC) potentiometer. Rolling mill speed regulation
- (COL) selector button. Engage both coiling units.
- (DR) selector switch. Select machine laminating direction.
- (FWD) indicator lamp. Forward rolling direction, left to right.
- (REV) indicator lamp. Reverse rolling direction, right to left.
- (BRK) potentiometer. Regulation of uncoiling braking tension.
- (BUZ) audio alarm.
- (LOIL) selector button. Laminating oil pump On/Off.
- (EM) emergency button.
- (SP) Small Panel. User interface and display.

8.1.1. Main switch

The machine is equipped with a main switch (IG) with rotating command set on rolling mill electrical panel, which enables to stop the electrical supply, stopping all active conductors.

The open and close positions are indicated by symbols O and I set on the current limit switch.



ATTENTION! Do not disconnect the supply by means of the limit switch without switching off the machine before as described at section 9.4.2. The limit switch is not an emergency switch.



Fig. 6 – Main switch.

8.1.2. User information and display

The main control panel is fitted with user interface display that shown:

- Leonardo Cavallin address.

- Cylinder height. It display the distance between the cylinders and the value changes by acting on the wheel. If you press for a few seconds the button “zeroise” is resets the setting of reference height.
- Machine “Velocity”. The speed value shown changes acting on the potentiometer (VEC)
- Alarm status.
- ESC to silence audio alarm (BUZ)
- Right and Left scroll buttons to switch between views.

8.1.3. Alarm messages

Alarm messages that can displayed are:

1. “**Thermal cut out**”. Intervened to protect against thermal overload of some of the electrical components. Turn (IG) on out. Check wich termal device is tripped, and restore.
2. “**Low laminating oil**”. Indicates the low level of oil in the pump lamination. Add oil type LP74 to be requested to L. Cavallin.
3. “**Low Machine oil**”. The machines lubricating circuit oil level is low, and should be topped
4. “**Machine Stop, Low oil Level**”. The machines lubricating circuit oil level is low, and has not been topped up within 10 minutes of the previous alarm.
5. “**Incorrect Supply Phase**”. This message may appear when you first turn the machine. Indicates the need to change the order of connection of the phases and the neutral if necessary. Subsequently its appearance indicates the absence of a phase in the electricity supply. In this case, check the status of electrical network without intervening on the machine.

9. USE OF TT 1200 ROLLING MILLS

9.1. Lamination

The following notes provide a general overview as to how to use the TT1200 rolling mill. *Leonardo Cavallin srl* advises an introduction period with the new machine to experiment and develop a ”best practice” procedure for each material type, thus striving to obtain the very best results from this machine.

9.2. Raising and lowering the cylinders.

The hand wheel is used to raise and lower the upper support cylinder, which in turn adjust also the position of the upper working cylinder. The larger cylinders being referred to as support cylinders, and used to precisely maintain the position of the

smaller working, or laminating, cylinders.

Rotating anti-clockwise (Fig.4) raises the upper cylinders, thus increasing the laminating distance, and conversely this gap is reduced by rotating the wheel clockwise.

One complete turn of hand wheel represents a change in the cylinder gap of 0.2mm.

9.3. Laminating without using the coiler units

Referred as basic lamination process, using the machine without using the coiling units, the machine can be operated as follows:

- The main interrupter switch (IG) is set to ON position (I), the lamp (AUX) will illuminate; apply power to the machine by pressing the power button (PWR).
- Rotate the lamination direction (DR) to select the direction of lamination, which will be confirmed by the direction lamps (FWD) or (REV)
- Set rotary controls (BRK) (TEN) (VEC) and selector button (COL) to the zero position.
- Adjust the cylinder gap as required, using the hand adjustment wheel.
- Depress the button (ON) , to start the machine
- Carefully place the material to be rolled between the cylinders,(with the maximum attention to avoid hazards for operators) and gradually increase the machine velocity using the rotary control (VEC). (the machine velocity and cylinder distance are visible on display (SP) using the scroll buttons)
- Repeat this process continuously until a material thickness of less than 1mm is obtained, which can then be attached to the coiling units. Note that a material strip length of 3m is also required.
- Stop the machine by depressing the rolling mill stop button (OFF)

9.3.1. Removing the material jammed between the cylinders

If the user attempts to over reduce the material thickness in a single pass, the material can become jammed between the cylinders.

To remove jammed material it is necessary to reverse the lamination direction.



ATTENTION! Removing material jammed between is extremely dangerous as requires the user to work near the rolling cylinder surfaces. We suggest that at least two additional persons are always present to supervise such operation.

9.4. Laminating with the coiler units

Once a material strip of less than 1mm thickness can be presented to the machine, the coiling units can be used to greatly improve the speed and efficiency of

the process.

We suggest that the most practical way to use the TT1200 rolling mill is to prepare from previous processing, 1mm thick strips of between 3m and 7m length, and annealed immediately prior to reduction using the TT1200.

Note that using the coiling units will result two 0.5m length strips that will remain on the coiling units, and need to be re-formed and/or re-smelted as original material.

Laminating with coiling strips is described as follows:

- Rotate (IG) in position I (ON), the auxiliary supply lamp (AUX) will illuminate
- Set rotary controls (BRK) (TEN) (VEC) to the zero position.
- Ensure that rotary selector (COL) is set to the off position (0)
- Open the cylinder gap to allow the material to pass freely between the working cylinders, and pass one end of the working strip between the cylinders, which now determines the direction of lamination for the first pass
- close the cylinder by adjusting the opening to lock the tape,
- Engage the coilers with (COL) connect this end of the strip to the coiling unit using the slotted provided, which will be controlled by the Rotary control "Coiling Tension" (TEN) (until the desired tension).
- in order to accumulate on the tape spool already hooked boot using the selector switch (DR) carefully that the selected rolling direction is correct which will be confirmed by the direction lamps (FWD) or (REV), and depress the button (ON) to start the machine
- Stop the machine by pressing (OFF) even when the tail of the tape to be laminated reaches a length of about 0.5m
- connect the other end of the material strip to the opposite coiling unit using the slotted provided, which will be controlled by the Rotary control "Brake Tension" (BRK), and wind the slack material onto this coiler until it is tensioned between the two units, (adjust the Brake and Coiling tensions using the Rotary controls for "Brake Tension" and "Coiling Tension" (BRK) and (TEN) until the material is seen to be held under an appropriate tension, typically the breaking tension is lower than the coiling tension)
- stop the machine by pressing the OFF button
- decrease the cylinder gap (see SP for a new quote), in preparation for subsequent rolling
- After have rotate selector switch (DR) in opposite direction press button (ON)
- controlling the residual material on the stopping the unwinding machine with the OFF button before it is torn off the spool
- continue reducing the material following this sequence until the final

lamination thickness is achieved.

Note that the Rotary controls for “Brake Tension” and “Coiling Tension” (BRK) and (TEN) refer to the function of the coiling units, which changes as the direction of lamination is changed.

The coiling unit on a first pass in a given direction, will be controlled by the “coiling Tension”, but will become the de-coiling unit on the next subsequent pass in the opposite direction, and controlled by the “Brake Tension” rotary control.



ATTENTION! The operations of the entrance of the tapes require, despite the presence of security systems, a great attention on the part of operators who must absolutely avoid behavior that could compromise their safety

9.4.1. Laminating oil

The rolling mill TT1200 is equipped with an oil supply pump for the rolling operations (PO) set in the right side of the rolling mill base. The operator can choose to use or not this pump according to the kind of work to be performed. The rolling pump can be switched off only through the light selector (LOIL). The oil quantity sprayed on the product to be rolled is set by the operator through a sphere tap (RU). The outgoing oil is collected in a basin (VAS) (Fig.4) under the rollers and conveyed again to the pump.

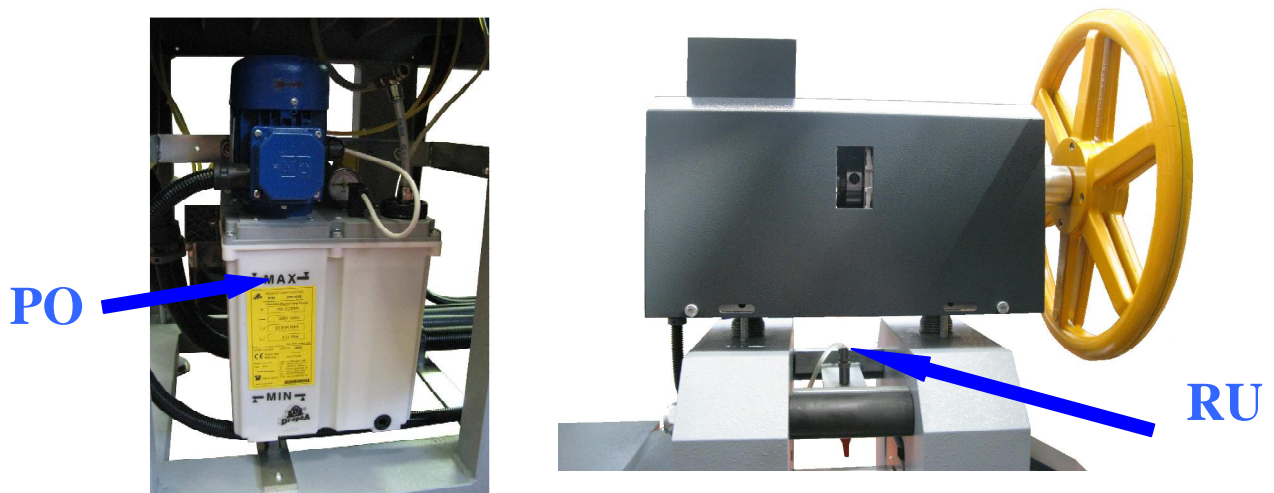


Fig. 7 – Laminating oil pump.

The pump tank has a capacity of about 6 litres and is equipped with an electrical level indicator which signals, by alarm message on (SP), the lower level.

The topping up can be performed removing the oil charge plug (VAS). The used oil is oil formulated on purpose for the cold lamination of the metals and for their lapping (LP 74).

9.4.2. Switching off of the machine

To switch off the machine press the Stop button (OFF) and set rotary control (BRK) (TEN) (VEC) to the zero position; disengage the coiling units set (COL) on zero and turn main interrupter selector switch (IG) on the electrical cabinet to the "O" position.

10. SAFETY SYSTEMS

The *TT 1200* rolling mill is equipped with a series of active and passive control sensor and security systems, which are provided in order to minimise potential hazards and ensure an acceptable loading on the machines prime components.



ATTENTION! Even if security systems are set on the machine, the operators must in any case be careful avoiding operations that could endanger himself or damage the machine.



ATTENTION! It is absolutely forbidden to tamper, modify or made any attempt to alter the security systems of the machine.

10.1. Emergency stop

The rolling mill has three buttons for emergency stop, mushroom type with mechanical latching. Two are placed on the coiling units and one on the main control panel.

Pressing any button emergency, stop the machine immediately. Once pressed, the button remains locked in its position.

To restart the mill is necessary to unlock the emergency button is pressed, turning as indicated by the arrow engraved and must be repeated the start operation.

The release of the emergency button allows the machine to be restarted without restarting automatically the movement of any component



Fig. 8 –Emergency stop



ATTENTION! It is absolutely forbidden to remove or tamper with the protection of the rolling area.

10.2. Protections of the electrical plant

The electrical plant has been designed and built in order to protect the operators from the risk of electrical shocks and the whole machine against possible overheating or other dangerous conditions.

All accessible metal parts of the machine are connected to the equipotential protection circuit, in order to avoid dangers deriving from damages in any insulating part.

Furthermore all electrical devices with which the operators are in touch - buttons, indicators, etc. are impermeable to the penetration of liquids or vapours which could cause short circuits or wear the insulations.

Protections against over-currents have also been foreseen in order to avoid that possible defect could cause overheating or dangerous conditions: the protection is obtained by fusers set on all the phases near the input point of the external supply cable.

11. WRONG USE

Though the machine is equipped with different security systems, the operators must pay attention to avoid potentially dangerous situation for his safety or other's.

All people operating on the machine must be trained on the correct working methods, and be informed about the nature and function of the security devices.

Furthermore the operators must know well those parts, in the present documentation, related to their job.

11.1. Interventions on the machine

All ordinary and extraordinary maintenance, adjustment, setting and check interventions must be performed when the machine is off and after having detached it from the electrical supply.

Any intervention on the machine must be performed by well trained personnel, informed on the correct operation methods.



ATTENTION! Do not perform any intervention on the working machine and always verify that it is insulated safely from the electrical supply.

11.2. Wrong operations

The *TT 1200* rolling mills have been designed and built in order to roll all metal materials with hardness lower than 150 HB.

Rolling operations on non fit materials could damage the machine or cause unsafe operations.

The cylinders are built to roll plates or threads: avoid rolling threads with cylinders built for plate rolling.

11.3. Operators' position

The operators must perform the operations remaining on the floor level: it is absolutely forbidden to operate standing on objects which rise the operator imposing wrong positions. It is also forbidden to lean over the machine



ATTENTION! Never stand near, or place objects near, the moving parts of the machine.

11.4. Operators' dress

We recommend that operators are encouraged to not wear loose fitting clothing because they can jam in the machine's elements. Use only close-fitting clothes, particularly for the upper limbs.



ATTENTION! Do not approach clothes to the moving elements.

12. MAINTENANCE

The *TT 1200* rolling mills have been designed and built in order to reduce as much as possible the maintenance interventions necessary to ensure a correct and long lasting operation.



ATTENTION! Before performing any maintenance intervention on the machine, it is necessary to switch it off and detach the electrical supply.

12.1. Ordinary maintenance

In order to maintain the *TT 1200* rolling mills in perfect conditions, it is enough to use them correctly and perform the ordinary maintenance intervention herewith described.



ATTENTION! All ordinary maintenance interventions must be performed by well trained personnel, informed on the way to operate correctly and safety on the machine.

12.1.1. Cleaning

For a correct function of the machine it is necessary to clean the cylinders periodically using a soft cloth wet with a fit detergent.

When cleaning the cylinders, avoid performing transversal movements which could scratch the cylinders' surface.

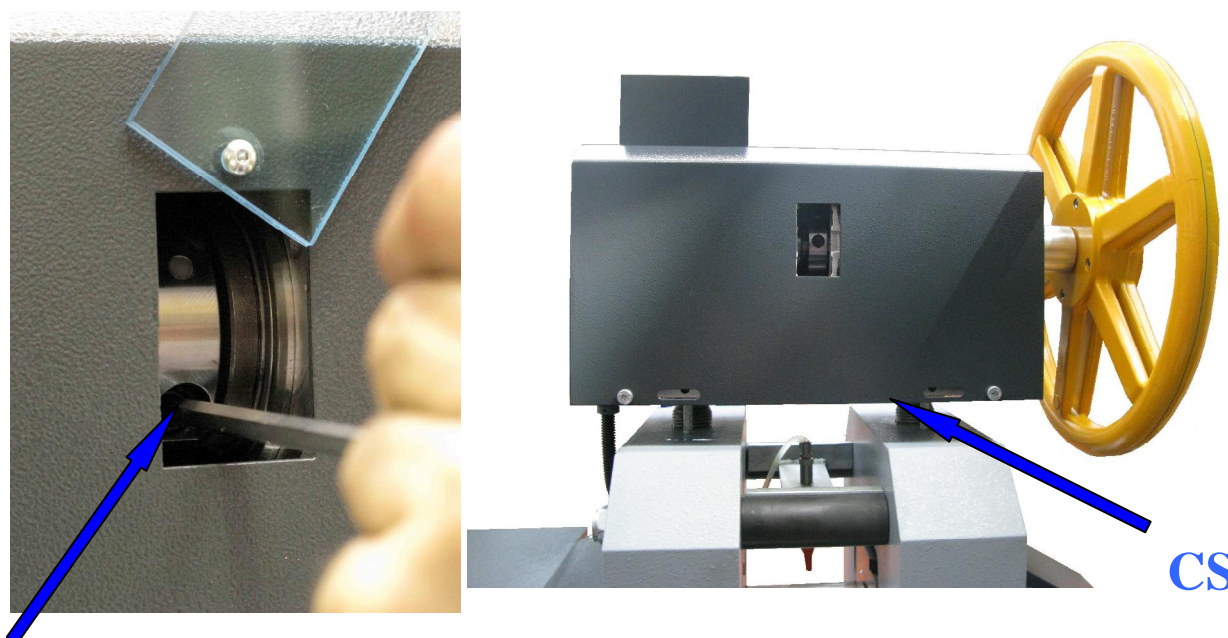
12.1.2. Cylinders protection

Once the rolling operations are over, verify that the cylinders are covered by a veil of oil in order to protect them from oxidation

12.1.3. Adjustment of the parallelism of the cylinders

The rolling mill is set up with an already adjusted parallelism between upper and lower cylinder.

Should this parallelism be altered during rolling in, please follow the indicated guidelines to adjust it correctly:



ETP

Fig. 9- 9.1 - Adjustment of the cylinders' parallelism

1. Stop the rolling mill
2. Adjust the cylinders narrow each other.
3. open the transparent window, if present
4. loose manually (rotate anti-clockwise) with the right key (hexagon socket head cap screw) the screw of the ETP hydraulic hub-shaft connection (Fig.9)
5. now the wheel (Fig 9.1 or Fig. 4) is able to **move only** the closest screw (CS); rotate clockwise to rise the screw or anti-clockwise to low it (a complete turn of the wheel corresponds to displacement of 0.2mm)
6. set the cylinders **closing tight** the screw on the ETP hydraulic hub-shaft connection
7. check the correct parallelism of the cylinders with a trial rolling and repeat the adjustment if necessary

12.1.4. Cylinders' supports lubrication

The *TT 1200* rolling mills are equipped with an automatic lubrication system for the cylinders support, through electric pump (DR) set on the back of the left side panel.

The lubrication is applied to 8 points and is a closed cycle type. The oil recovery is automatic, through recovery tubes that conveys it through the net-filter and to the pump tank (TK).

The system intervenes each time the cylinders rotate, and perform and remains in function continuously until the rotating cylinder is arrested.

The tank capacity is about 3 litres; the **ROTO EP680** oil is used. The pump is also equipped with oil level indicator that signals the achievement of the minimum oil level in the tank, on the user information display (SP) (see 8.1.3). At this point, to avoid serious damages, it is necessary to add new oil through the drain plug (J).

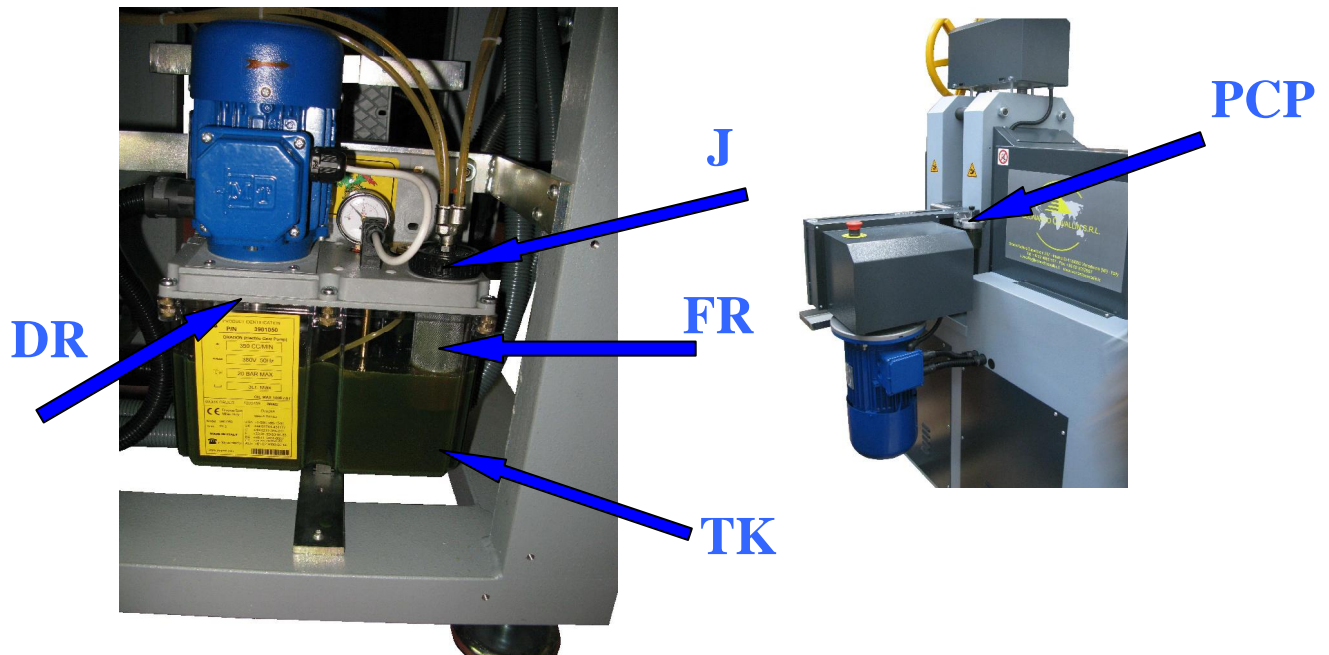


Fig. 10-10.1 – Electric Pump lubrication oil and Manual pump

It should also be run periodically (every 100ore) cleaning the mesh filter (FR) to avoid clogging problems. You do this by loosening the cap (J) taking care to firmly hold the plastic tube attached to it, remove the mesh filter (FR) or wash with paint thinner, trichloroethylene and dry it and then put it back in its position by screwing the cap (J).

Furthermore the mill is equipped with manual pump for lubrication of the case pinions (PCP) with oil ROTO EP 680. Press 1 time per hour.

12.1.5. Changing the working cylinders

To remove from the work roll cage, proceed as follows:

- Remove the main casing (CGI) and the side casing castle (CCA)
- Disconnect the hoses from the oil bearing lubrication fittings (RR) on both sides of the cage
- Disconnect the four pipes of the cooling water from the fittings on the distributors (RA)
- Remove the two plate (PL) rests at the entry of the cylinders
- With the aid of pliers for circlips remove the two rings (AA) and push back the two joints (TT) until releasing the terminals of the two working rolls
- Acting on wheel of registration lift cylinder completely support higher

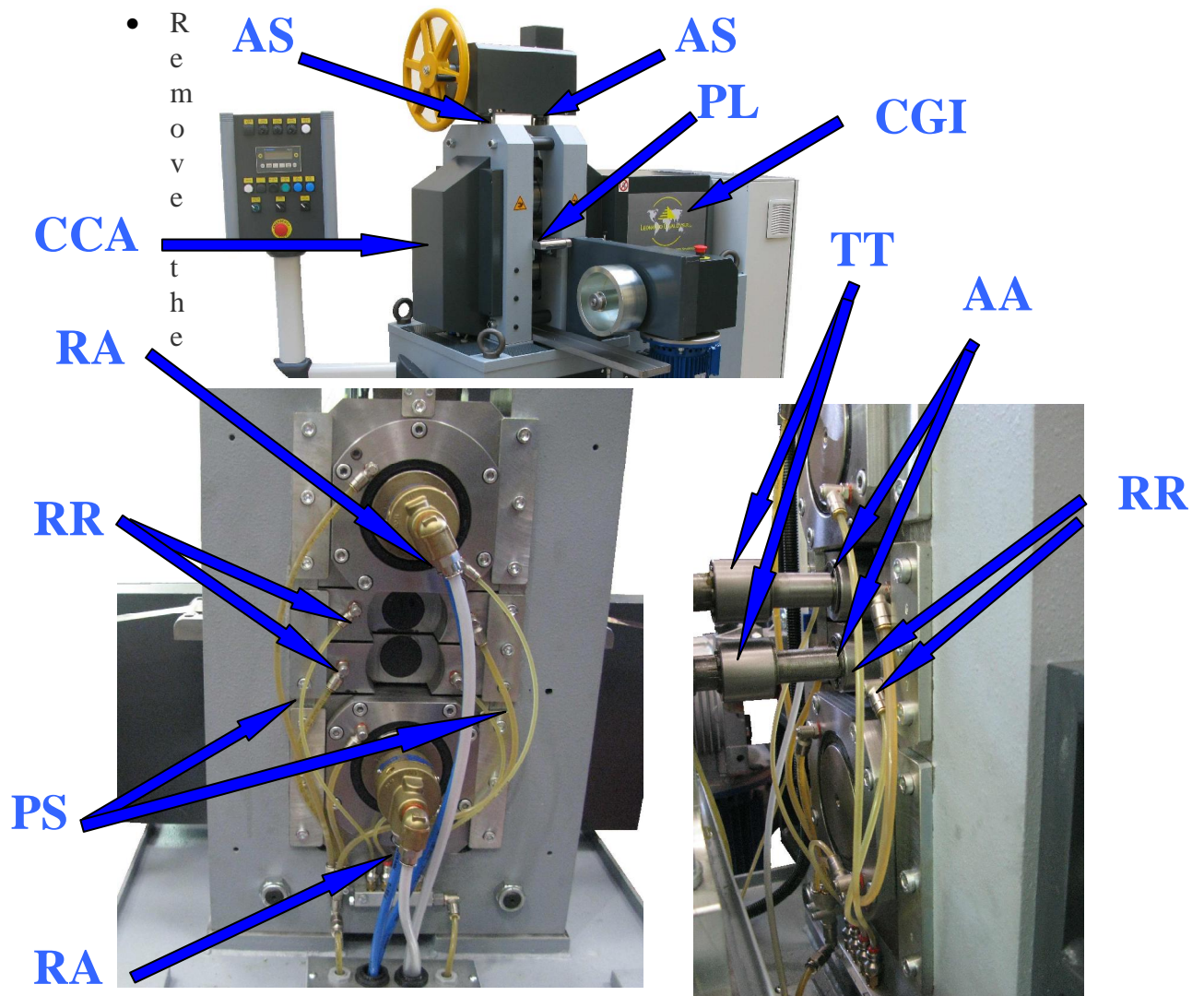


Fig. 11 – Changing working cylinders

shoulder plates (PS) by loosening the screws (remove only two items on the outside pillar)

- Insert the slide (SLI) pushing it under the support of the lower working roll and lock it using the holes in the upright

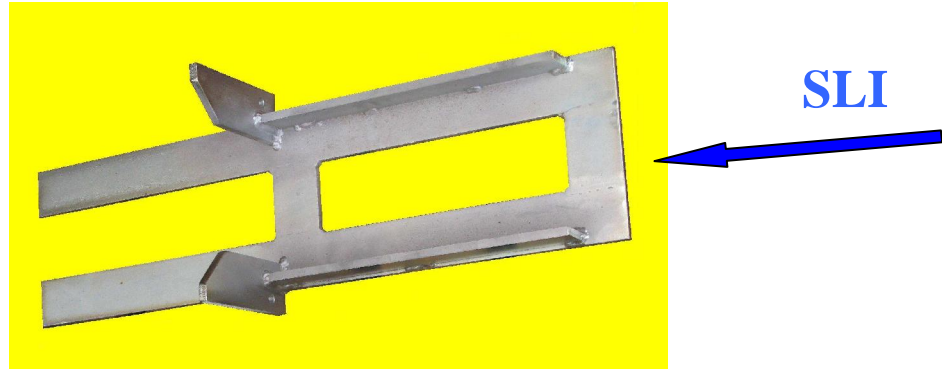


Fig 11.1 –Changing working cylinders-Sled

- Remove the full set of work rolls by sliding on the sled.

To mount a new cylinder group to proceed in the opposite direction as indicated in the preceding paragraphs. It 'important to make sure that the springs interposed between the substrates found to correctly positioned at the end.

12.1.6. Replacing support cylinders

To remove the two support cylinders must proceed as described in section 12.1.5. . Disassembled the work rolls further operations to be carried out are:

- Remove the other four plates shoulder (PS) remained blocking the upper cylinder and the lower cylinder
- Remove the lower cylinder that is free from any impediment-to, but pulling it full of his two media (attention to bearings)
- Insert, under each of the two supports of the upper cylinder, a spacer or any means to prevent the cylinder from falling when it is released from the rods (AS) (see Fig.11).
- Act loosening, the four rods (AS) and, alternatively, on the steering wheel until the media will be released from the rods themselves, at which point the upper cylinder full media can be removed from the cage.

If you wish to replace the complete unit of the four cylinders, you should use the sled with mobile cart inserted under all cylinders then placing under and between the supports of the work rolls the twelve spacers. Connect between them the two support cylinders using the two connections (CON) provided.

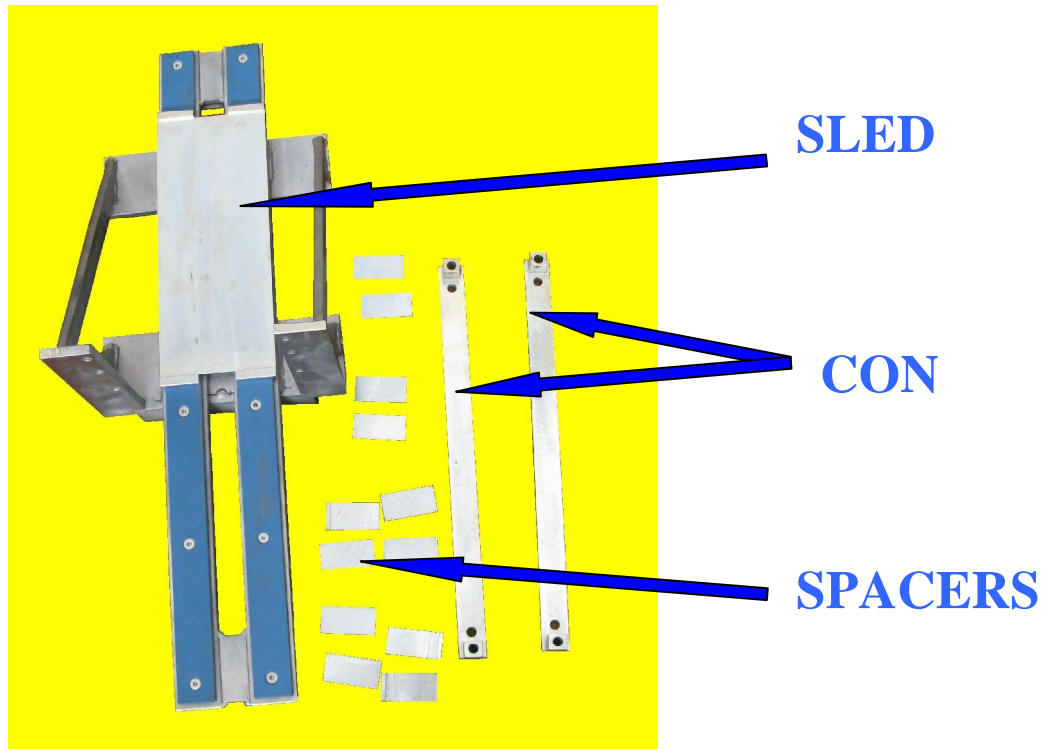


Fig. 12 –Changing four cylinders-Sled spacers and connections

12.1.7. Replacement of the fluid in the reducer

For the proper maintenance of the mill is needed, every 1000 working hours, to inspect the external condition of the gear, to check any losses of lubricating oil, the corresponding level, tightening the screws (VFI), and minimum every 10000 hours of effective work provide for the complete replacement of the oil they contain.

In order to perform the steps and access to interested parties, proceed working in following way:

Make sure that the mill is separated from the power supply

- Remove the main casing (CGI) (Fig.11)
- Loosen the filler cap (TC)
- Place under the drain plug (TS) a container of minimum capacity of 2.5 liters; loosen the drain plug completely and collect all the oil content
- Screw the plug (TS)
- Introduce from the opening load (TC) oil type ROTO EP 320 (approx 1.7liters) until you reach the level on the indicator side (L). For oil equivalent to that indicated see table in paragraph 3.7

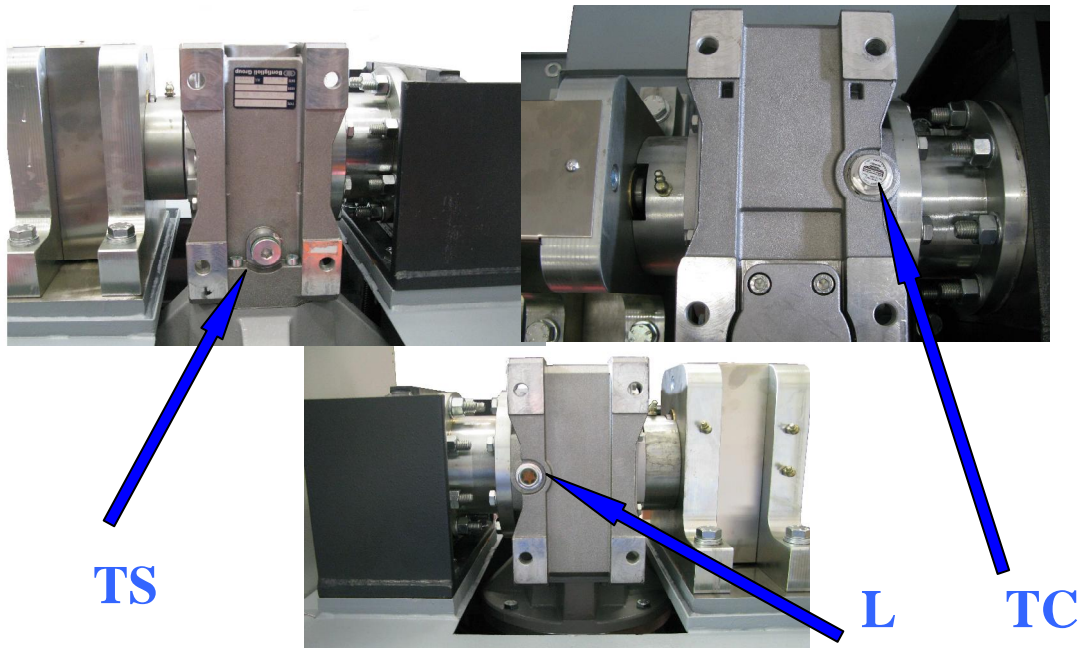


Fig. 13 – Replacing main gearbox oil



ATTENTION! Do not dispose off of the oil: refer to authorized disposal centres.

12.1.8. Security devices efficiency check

The perfect efficiency of the security devices of the machine must be checked at least once a month, checking that the machine stops once the emergency button is pressed.

12.2. Extraordinary maintenance

Any extraordinary maintenance intervention must be performed by *L.CAVALLIN srl* personnel or by personnel authorised by them.

For a correct and fast solution of the problem, it is necessary to communicate the following data to L.CAVALLIN srl (see Section 6):

- type of machine;
- code number;
- installation date;
- the description of the detected defect, or the visible symptoms and in which conditions it occurs



ATTENTION! Any form of guarantee decays whenever interventions on the machine are performed by non-authorised personnel.

13. SETTING OUT OF WORK



Most of the material composing the machine, being ferrous, can be successfully recycled.

All materials with which the machine is built are not toxic or dangerous for the health of the operators, therefore they can be handled without particular precautions.

The fluid contained in the reducer must not be dispersed in the environment and must be disposed according to the rules in force.