

I.T.S. by Tecnodue

PT 630

Edition 1208

Operating Manual

The technical data and information contained on this manual can be changed without any notice

PT 630

The machine has been designed and constructed for the welding of PE, PP, PVDF and other thermoplastics pipes and fittings.

I.T.S. Ital Trade Services S.r.l.

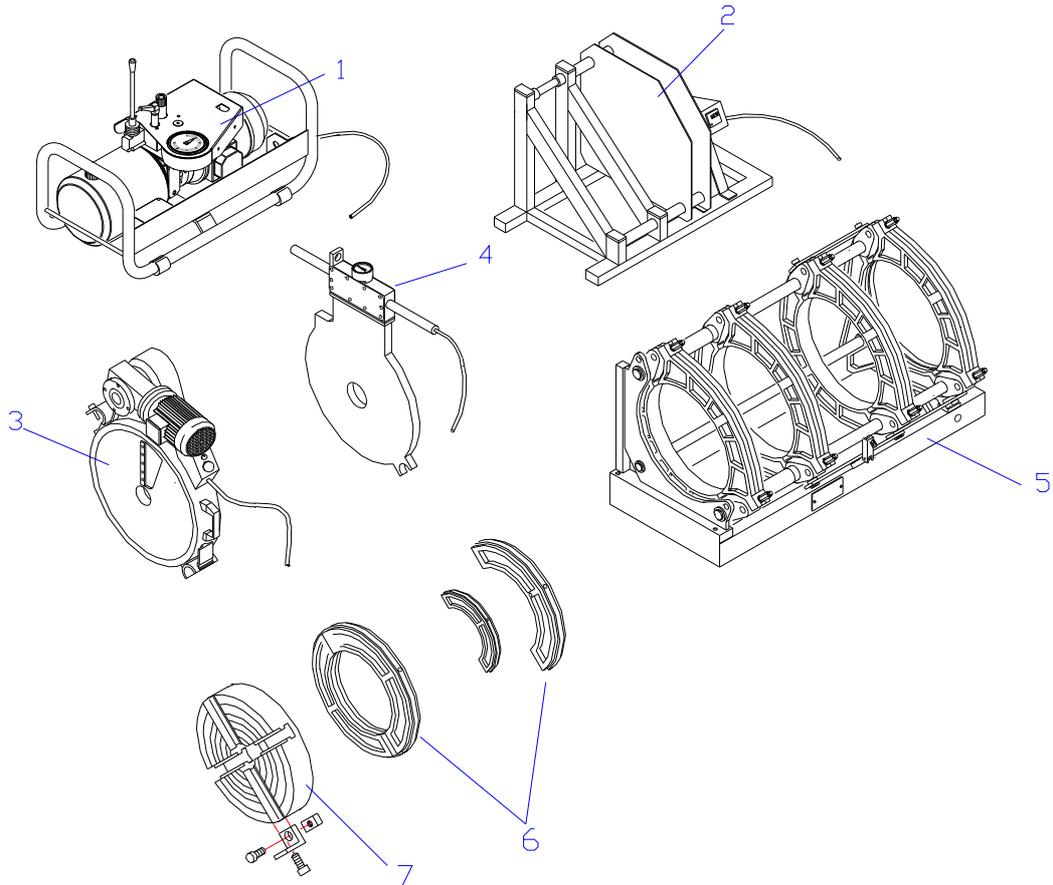
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Standard Components

1. Hydraulic Unit
2. Support for facing tool and heating mirror
3. Facing Tool
4. Heating Mirror
5. Basic machine

On request can be supplied:

6. Light weight alloy reducing rings for pipes and fittings d. 315,355,400,450,500,560mm
7. Stub End Device

- Wooden transport box according to ISPM 15
- LDU (printing and storing data machine)
- Electric board with automatic circuit breaker
- Rollers
- Crane with electric hoist

SAFETY RULES ACCORDING TO DIRECTIVES CEE

(To be read carefully and apply while utilizing the PT 630)

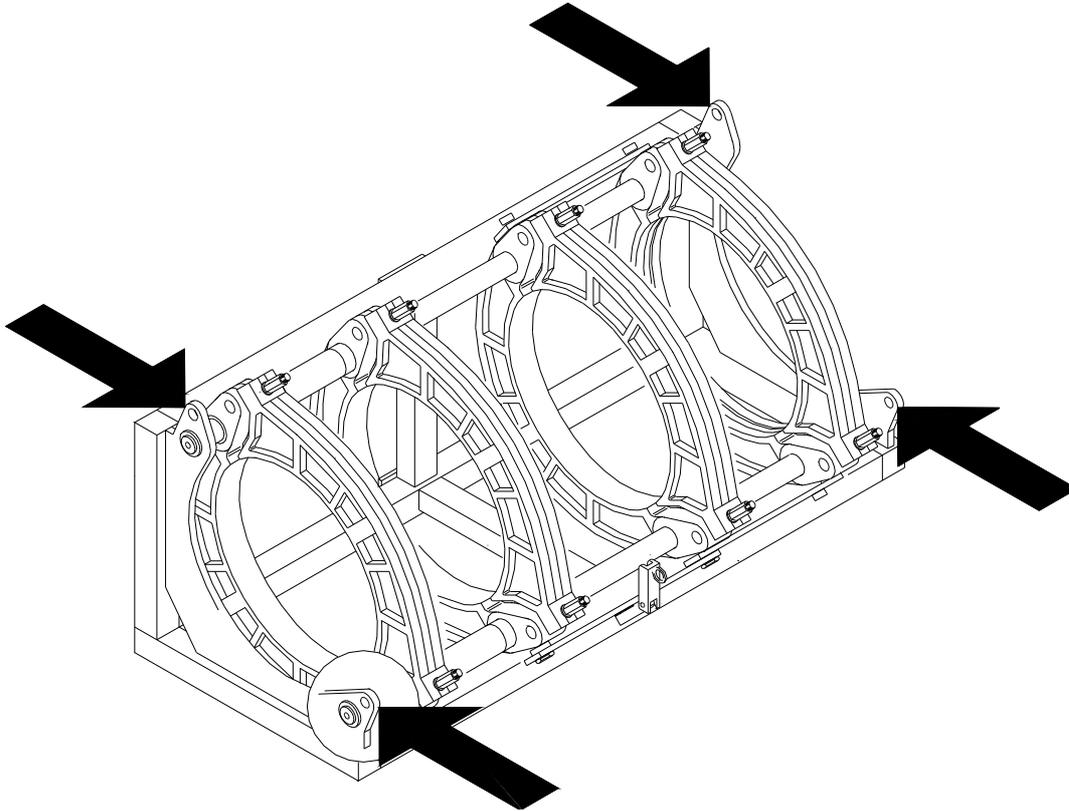
Due to the specific use, this machine cannot be supplied with all kind of fix and removable protections suitable to avoid any risk of accident. The machine, therefore, must be utilized, adjusted and keep in the perfect functioning conditions by skill operators.

Warning - Rules – Obligations

The use of machines composed by electrical components and movable parts, it's always a potential danger. In order to avoid any kind of accident caused by electrical or mechanical sources it' strongly suggested to read and follow carefully the following safety rules before operating the machine.

TRANSPORT/MOVEMENT

-Basic Machine , Keep the maximum care while moving and it's suggested to utilize mechanical aids. **ONLY MOVE THE BASIC MACHINE BY UTILIZING THE HOOKS SHOWN IN THE FIGURE BELOW. IT IS COMPULSORY TO USE THE SAME HOOKS DURING THE STANDARD USE OF THE MACHINE. DO NOT MOVE THE MACHINE BY HOOKING IT IN CLAMPS OR CYLINDERS. WHILE THE PIPES ARE FIT IN THE CLAMPS DO NOT MOVE THE MACHINE**



-Facing Tool ,supplied with transport's hook.

Keep the maximum care while moving it and it's compulsory to utilize the handle also take care about the blades mounted in, it's compulsory use gloves.

-Heating Mirror ,supplied with transport's handles

Keep the maximum care while moving it also keep the maximum care while utilizing it due to the high temperature involved always more than 200°C , it's strongly suggested to use suitable gloves.

In order to move from one working place to the other , the facing tool and the mirror must located into the special support , this support is heavy therefore it's necessary to utilize the maximum care to move it

-Hydraulic unit, supplied with transport's frame.

Keep the maximum care while moving it and in case utilize two person.

Avoid to transport the components by holding from the cable and remember to use suitable gloves.

ELECTRIC CONNECTIONS

The machine is operated by 400 Volts therefore be sure that the power supply plug is supplied with the safety devices according to the standard requirements , also check that the power supply will be on the range of maximum 10% of the machine's nominal tension.

While the facing tool is connected to the power supply do not leave it into the basic machine but place it into the special support. In this position, even if the start bottom is pushed the engine does not start.

Check regularly the cables and the plug and in case substitute by qualify personnel.

In case the heating mirror cable must be substitute the cable must be H07RN-F

Before carry out a reparation or maintenance all the plugs must with plug out from the power supply

ENVIRONMENTAL CONDITIONS

The working area must be clean and duly lighted. It's very dangerous to utilize the machine in case of rain or in wheat conditions or close to flammable agents.

CLOTHES

Keep the maximum care while utilizing the machine due to the high temperature involved on the heating mirror always more than 200°C , it's strongly suggested to use suitable gloves. Avoid long clothes and avoid bracelets , necklaces that might be hooked into the machine.

CORRECT MACHINE'S OPERATION

Remember to check and read carefully the operating manual before utilizing the machine and the accessories.

KEEP ALWAYS THE MAXIMUM ATTENTION

After the heating mirror has been disconnected temperature will be hot for some minutes.

Keep the maximum care while utilizing the facing tool. Be careful to the blades , it's strongly suggested to use suitable gloves. During the facing operation

(facing tool in movement) it's forbidden to take out the shavings

Avoid utilizing the machine after drinking or drugs use

Take care that all the people around the machine are at safety distance

While starting operating take care to avoid leave arms between the movable and fix trolleys.

SQUASHING DANGER

While starting operating take care to avoid leave legs or arms between the movable and fix trolleys. It's compulsory to be far from the basic machine

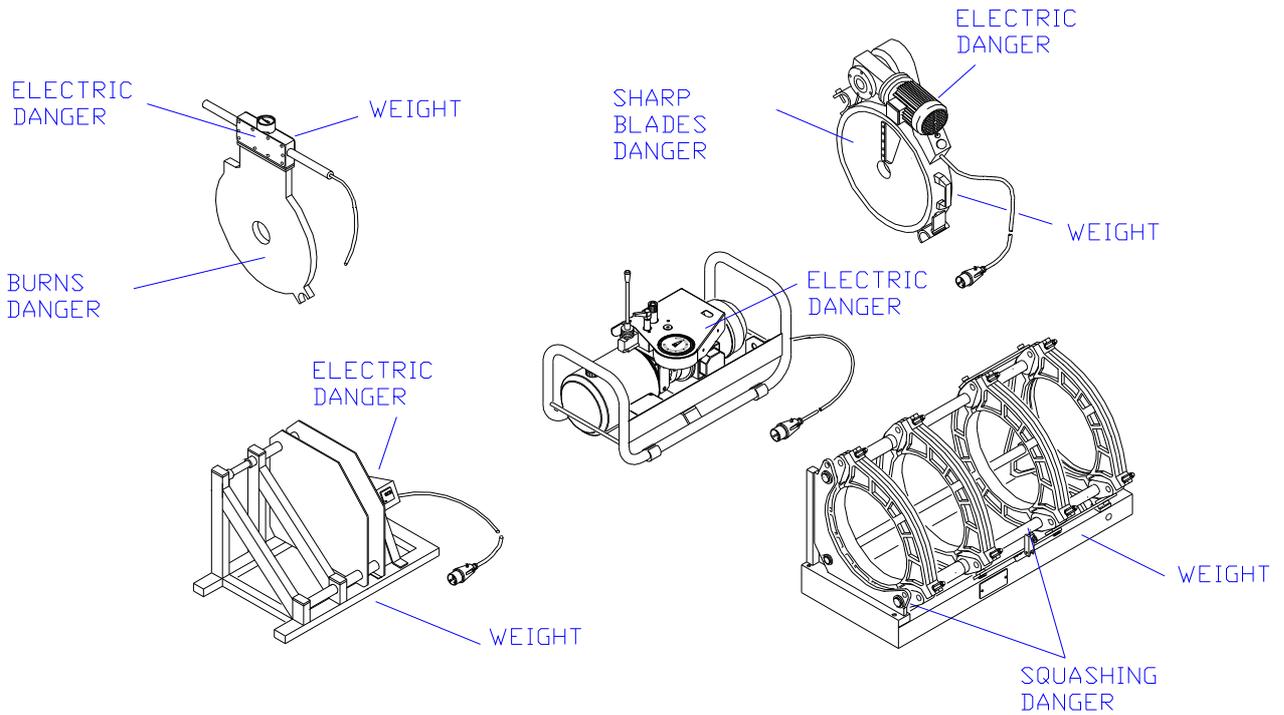
ACOUSTIC POLLUTION

The acoustic pollution of the drill engine is less than 85 dB (value measured at 1 meter distance from the operator)

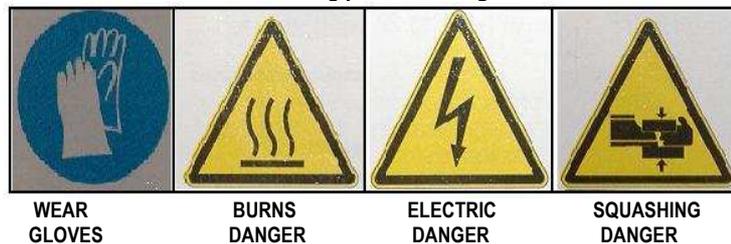
Due to some particular cases such as too much pressure during the facing the noise should be increased , therefore it's suggested to utilize some protections.

IMPORTANT !!!!

Keep the maximum care reading and following the above Warning - Rules - Obligations the Ital Trade Services S.r.l. decline all responsibilities if are not followed totally



Label on machine's components showing potential dangers



1. Technical data

Operating data	
Ambient temperature	0...50°C
Humidity (without condensation)	95 RH%
Transport and storing Temperature	-10...60°C
Electrical data	
Voltage	400 V 3 ph.
Frequency	50 Hz
Total power installed	11.5 KW 17 A
Heating mirror	IP 54 9.3 KW
Facing tool	IP 44 1.1 KW
Hydraulic unit	IP 44 1.1 KW
Hydraulic data	
Maximum working pressure	160 bar
Cylinder's section	17,27 cm ²
Pressure gauge	0 - 160 bar
Pressure gauge precision class	Cl. 1.0
Hydraulic unit engine revolutions	2800 rpm
Volumetric pump's capacity	2 cc/rev.
Pump's capacity	5.6 l/min
Hydraulic oil	ISO 46
Oil tank's capacity	7 liters
Mechanical Data	
Facing tool transmission system	Chain
Trolley maximum stroke	240 mm
Trolley slide bar diameter	50 mm
Distance between the cylinders centre	840 mm
Dimensions	
Basic machine	1460 x 1050 x 1040 mm
Facing tool	850 x 240 x 1050 mm
Heating mirror	1040 x 50 x 1050 mm
Hydraulic unit	700 x 360 x 400 mm
Support for facing tool and heating mirror	650 x 720 x 810 mm
Weights	
Basic machine	229 Kg
Facing tool	107 Kg
Heating mirror	47 Kg
Hydraulic unit	41 Kg
Support for facing tool and heating mirror	36 Kg
Wooden transport box	154 Kg
Stub end device	41 Kg
Reducing inserts complete set	210 Kg

2. General description and application field

Hydraulic operated butt welding machines suitable for PE,PP,PVDF and other thermoplastics pipes and fittings.

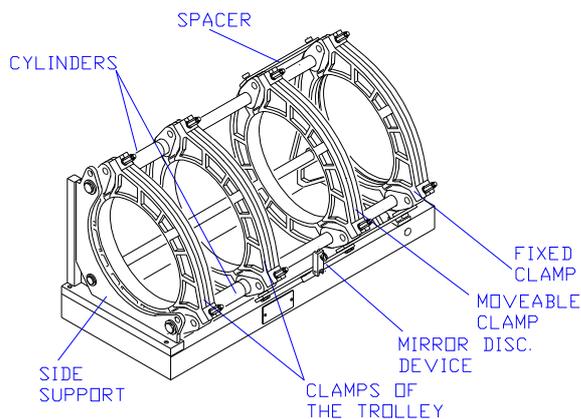
The self aligning frame and the compact dimensions make the machines highly suited for working in road constructions, ditches , aqueducts, gas ducts , sewers and irrigation systems.

Warning: The machine has been equipped with one mobile trolley and one fixed trolley. Place the pipe to be welded on the mobile trolley and and the pipeline end on the fixed trolley! Carefully check the pipes alignment before beginning to weld!

The machine is supplied complete of:

- 1) Basic machine d. 630 mm complete with a tools blue bag
- 2) Removable electric facing tool with safety switch
- 3) Removable PTFE coated heating mirror with a temperature control box.
- 4) Electro-hydraulic unit with accumulator and flexible hoses with quick couplings.
- 5) Support for facing tool and heating mirror

2.1 Basic machine



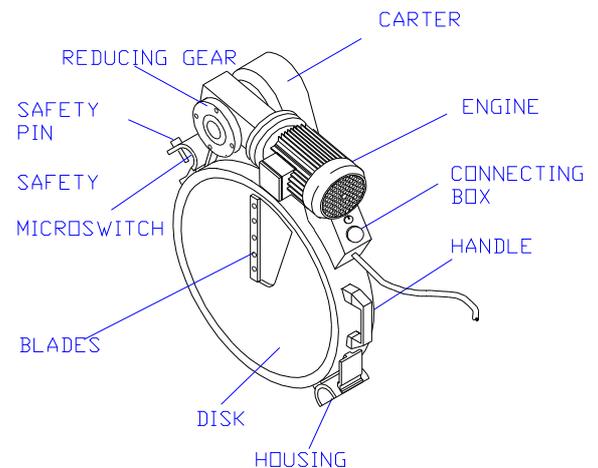
The basic machine is composed by:

- Two cylinders on which heads are mounted two complete clamps d. 630 mm
- One movable clamp or d.630 mm sliding on cylinder's stem and fixable in different positions by means of using the clamps spacers
- A stiffening bar
- Two side supports clamp d.630 mm
- A frame including the hydraulic circuit with the anti-drop quick couplings.
- A heating mirror disconnecting device

2.2 Facing Tool

The electric facing tool is composed by:

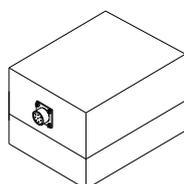
- The facing tool body
- Two disks where are mounted the blades
- An engine with a reducing gear supplied with a safety pin that , while connected keep the facing tool hooked to the machine.
- A safety micro-switch allowing the engine starts only when the facing tool is fit into the machine ,avoiding the start of the engine out of this position.



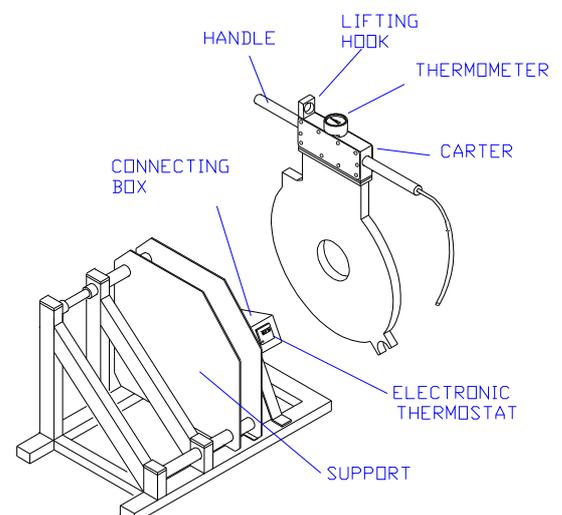
2.3 Heating Mirror

The heating mirror is composed by:

- The heating mirror coated with green color PTFE complete with thermometer (the thermometer does not depend upon the power supply and always survey the real temperature of the heating plate) and connecting box
- The support suitable for the heating mirror and the facing tool where is located the connecting box
- The electronic thermostat located on the connecting box .
- LDU connector. (The below figure shows where the LDU connector is located).

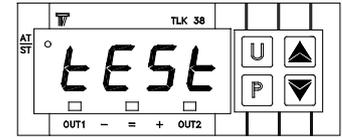


LDU Connector

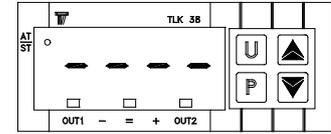


2.3.1 Electronic thermostat – different functions

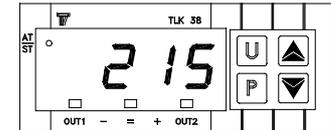
At each startup on the display will blink the writing 'TEST'. This means that the thermostat is testing the connection between the probe and the heating mirror.



If the test fails, the display will show 4 blinking upper scores (as per figure aside), in this case the probe or the connection between the thermostat and the heating mirror could be interrupted.



If the test success, the display will show the real temperature of the heating mirror and the heating mirror warms up (the OUT1 red led is switched on) until the set point value (the selected temperature) has been achieved (central green light led).



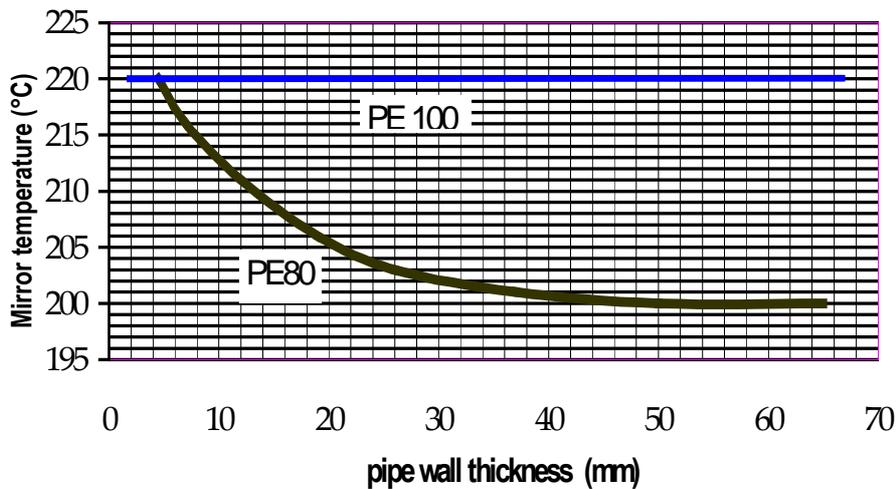
To display the actual set point value of the temperature stored by the thermostat, push the key P. The display will show alternately the writing 'SP1' and the set point value of the temperature. After 5 seconds the display will show again the real value of the heating mirror temperature

To select a new value for the thermostat set point value (default value = 220°C):

1. Push the key P (The display will show alternately the writing 'SP1' and the set point value of the temperature)
2. By acting on the arrow keys UP and DOWN it is possible to increase or decrease the set point value.
3. When you reach the desired value push the key P to confirm.
4. The display will show again the real value of the heating mirror temperature
5. When the heating mirror will reach the set point value on the display the central green light led will be switched on.

Warning: On the thermostat display is always shown the actual value of the heating mirror temperature (and never the set point value!)

Temperature of the welding mirror for welding PE DVS 2207-1 norm



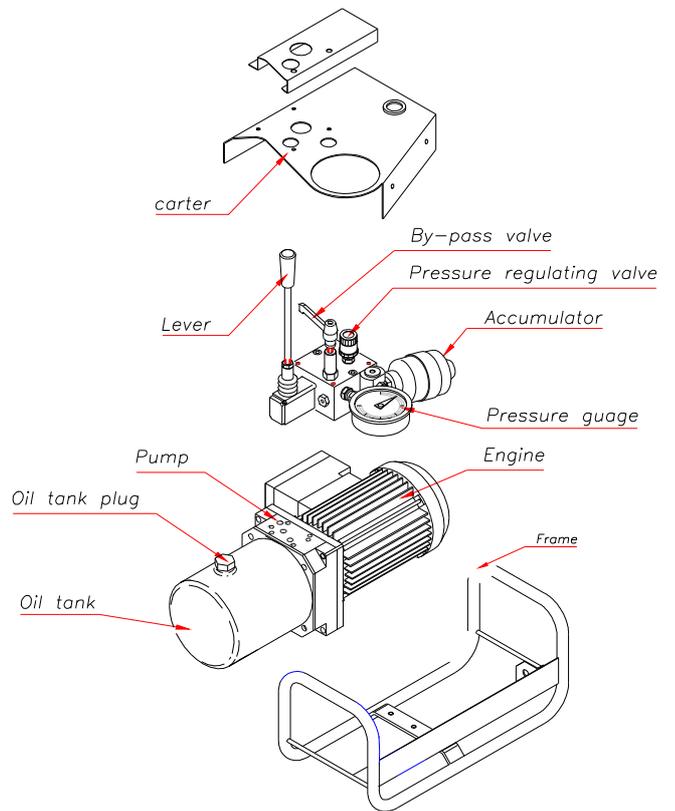
Remember

When welding PVDF, the temperature of the welding mirror should be adjusted for every wall thickness at 240°C +/- 8°C
 When welding PP, the temperature of the welding mirror should be adjusted for every wall thickness at 210°C +/- 10°C

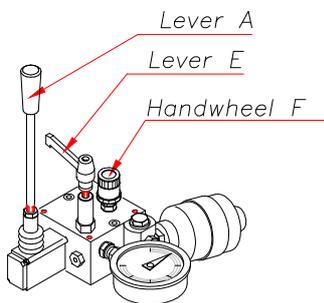
2.4 Hydraulic Unit

The basic components of the hydraulic unit are the following:

- Electric engine
- Hydraulic pump
- Oil tank
- Hydraulic unit controls
- Pressure accumulator
- Pressure gauge
- Metal frame



2.4.1 Hydraulic Unit Controls

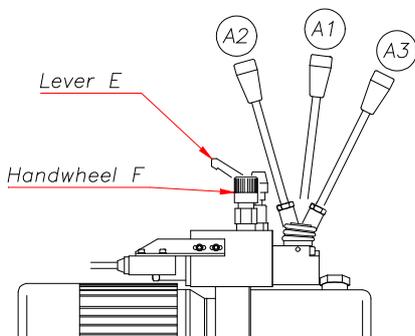


The control lever **A** open and close the machine's trolley according to the position selected.

Bring the lever **A** into position **A2** (position with automatic return) the trolley is opening with the maximum pressure set up into the hydraulic unit

In position **A1** the lever shut down automatically the engine (release position).

Bring the lever **A** into the position **A3** (position with hooking) the trolley is closing, the hooking of such position allow the operator handling.



The hand wheel **F** of the pressure control allow the setting up of the pressure at the requested values by turning anti clockwise the pressure release , while turning clockwise the pressure increase .

The pressure by pass lever **E** allow ,by turning anti clockwise the pressure releasing , while turning clockwise allow the pressure increasing by means of using the hand wheel **F** and fixing. If you completely clockwise turn the by pass valve, the pressure will be blocked and the hydraulic unit will maintain the same pressure in case of engine switched off.

2.4.2 How to use the hydraulic unit

Operating Instructions

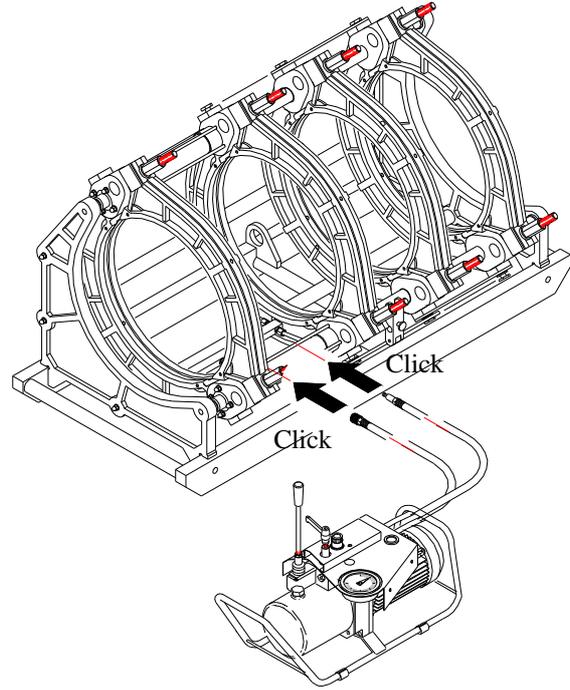
In order to make easy the learning we shall proceed to the description step by step of all operations need in order to complete a welding according to the following description:

Important !

Before begin the following operation be sure that:

- The lever **A** is fixed into the special housing
- Substitute the metal plug with the plastic black and red plug the plastic plug is supplied with the machine into a plastic bag.

01. Fit the two pipes to be weld (see relative instructions)
02. By turning the lever **E** anticlockwise bring the pressure to zero, checking the pressure gauge **D**
03. Turn clockwise the lever **E** until closing (please avoid using an excessive strength)
04. Bring the lever **A** into position **A3**
05. By turning clockwise the hand wheel **F** achieve the inertial pressure value (value of pressure need in order to allow the trolley moving) note the value of inertial pressure read into the pressure gauge **D**, then by still operating the hand wheel **F**, increase the inertial pressure value by the welding theoretical pressure value as per attached table.
06. Achieved the true welding pressure value (inertial pressure plus theoretical welding pressure) bring the lever **A** into position **A2**.
07. Fit the facing tool (see relative instructions)
08. By acting on lever **E** anticlockwise achieve a pressure value of approx 5 bar more than the inertial pressure value checked and then proceed to the facing tool operation (taking care that the engine's overloading).
09. At the end of the facing operation bring the lever **A** into position **A3** and remove the facing tool.
10. Fit the heating mirror taking care that the temperature of the surfaces is the one selected (see relative instructions)
11. Bring the lever **A** into **A3** in order to have the bead formation as per attached table, this operation must be done with the true welding pressure value.
12. After bead formation act on lever **E** anticlockwise in order to bring the pressure to zero and proceed to the heating time as per attached table.
13. Elapsed the heating time at pressure zero bring the lever **A** into position **A2** and remove the heating mirror and immediately bring the lever **A** into position **A3** and acting on lever **E** clockwise put in contact the two pipes until achieving the true welding pressure value by checking the pressure gauge **D**. These operations must be done according to the time indicated into the attached table.
14. Bring the lever **A** into position **A1** and keep such situation for all the cooling time indicated into the attached table, taking care that the pressure will not decrease too much, in case bring for a little while the lever **A** into position **A3** and put back into position **A1**
15. Elapsed the cooling time by acting on lever **E** anticlockwise bring the pressure to zero.
16. Take away the pipes welded



WE STRONGLY SUGGEST TO TRY MANY TIMES AND GET FAMILIAR TO THE UNIT BEFORE CARRYING ON WITH COMPLETE WELDING. A WRONG USE OF THE HYDRAULIC UNIT COULD COMPROMISE YOUR WELDINGS..

3. Heating mirror disconnecting device

You can configure the machine according to the kind of welding to be executed as per the following different ways:

- Two fixed clamps and two moveable clamps Fig. 1
- One fixed clamp and three moveable clamps Fig. 2

You can change from a configuration to another in a quick way by simply acting on the two spacers and on the disconnecting device.

In the first configuration of the machine the disconnecting devices is between the two moveable clamps and the two fixed clamps.

The spacers are between the two fixed clamps.

In the second configuration of the machine the disconnecting devices is between the three moveable clamps and the fixed clamp.

The spacers are between the second and third moveable clamps.

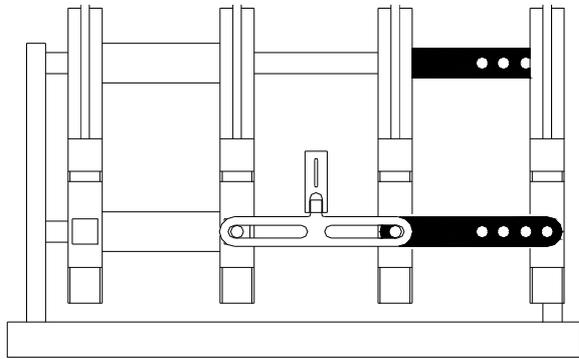


Figure 1.Configuration 2 moveable clamps + 2 fixed clamps

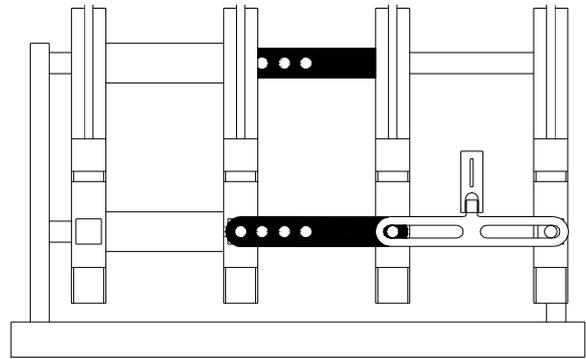


Figure 2.Configuration 3 moveable clamps + 1 fixed clamp

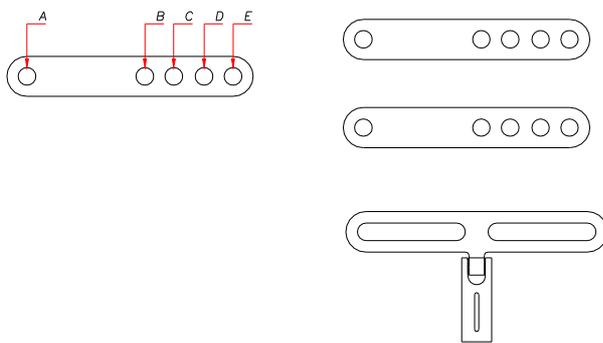


Figure 3.

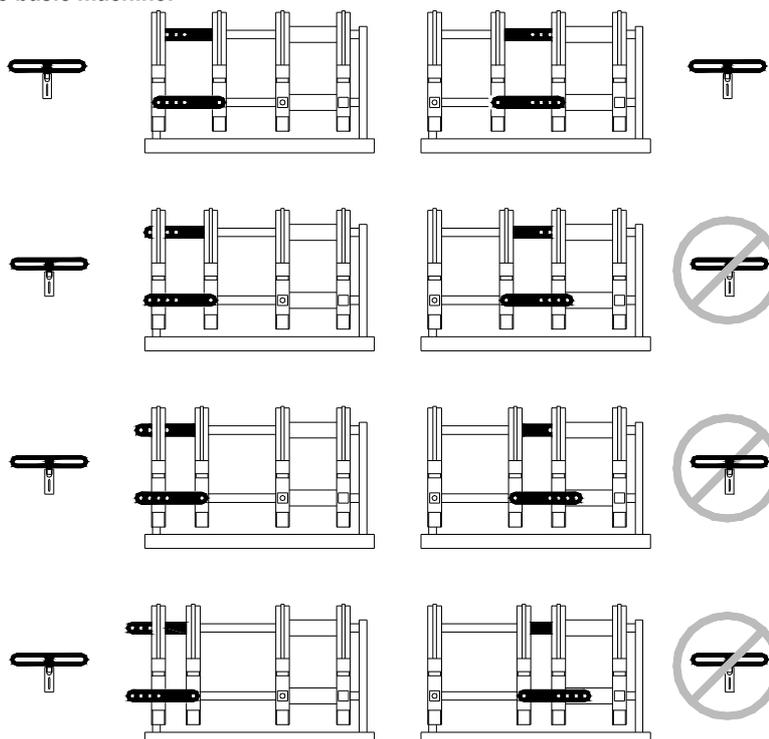
On the left: You can modify the distance between the clamps connected by the spacers.

Fix the first clamp to the hole A and the second clamp in one of the holes B,C,D,E

On the right (from above) Upper and lower spacer (interchangeable) and disconnecting device

WARNING !

Only in two configurations you can use the disconnecting device with spacer! In the other configuration use only the spacer to avoid serious damages to the basic machine!

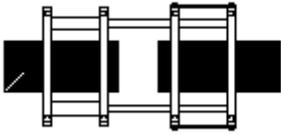


3. Butt welding in brief

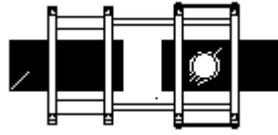
3.1 Introduction

Stated that the basic machine it's suitable for all kinds of pipe, fittings and stub end available on the nowadays market. Here follows all the different welding configurations of the machine:

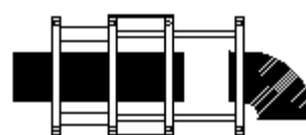
- 1) Pipe with Pipe, standard configuration of the machine
- 2) Pipe with long spigot fitting, standard configuration of the machine
- 3) Pipe with short spigot fitting, to achieve this kind of welding it is strongly suggested to configure the machine with three moveable clamps and 1 fixed clamp. Furthermore you must use the upper fittings clamp to fix better the fittings to the fixed clamp
- 4) Fitting with short spigot stub end, to achieve this kind of welding it is strongly suggested to configure the machine with three moveable clamps and 1 fixed clamp. To fix the stub end you must use a special accessory called stub end device. Place the 4 brackets at the appropriate size punched on the stub end device. Fix the stub end by tighten the bolt of each bracket. The stub end device is supplied with a fixing ring and you can install it on each clamp of the machine.
- 5) Pipe with short spigot stub end, to achieve this kind of welding you can use two different configuration of the machine (5 or 6)
- 6) Pipe with short spigot stub end, to achieve this kind of welding you can use two different configuration of the machine (5 or 6)



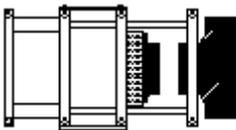
1. PIPE WITH PIPE



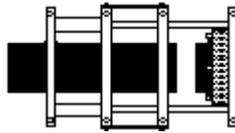
2. PIPE WITH LONG SPIGOT FITTING



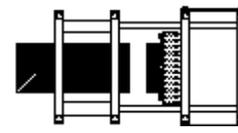
3. PIPE WITH SHORT SPIGOT FITTING



4. FITTING WITH SHORT SPIGOT STUB END



5. PIPE WITH SHORT SPIGOT STUB END

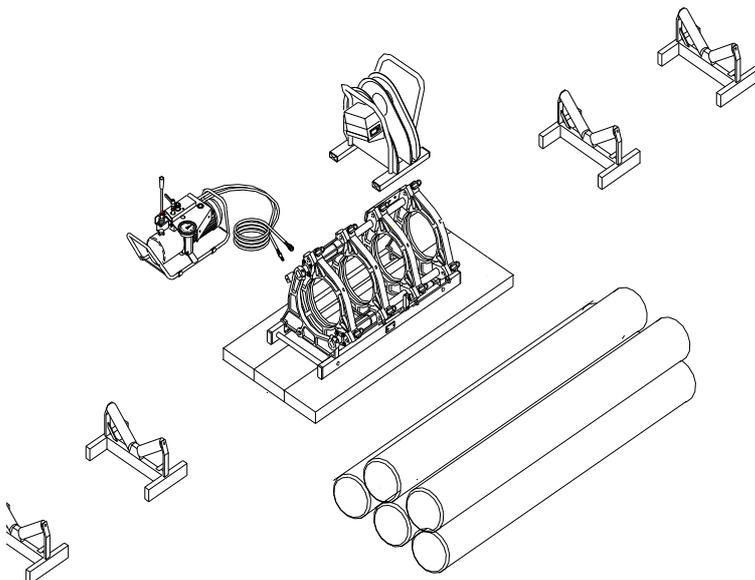


6. PIPE WITH SHORT SPIGOT STUB END

3.2 Machine's preparation

It's strongly suggested to use pipe rollers for the sliding of the pipes to be welded and if it's possible positioning the machine with wooden table below, such cares will avoid additional efforts to the machine.

- a) Set up the working area so that welding is protected from the weather. Position the machine's components as per following figure and eventually utilize wooden panels

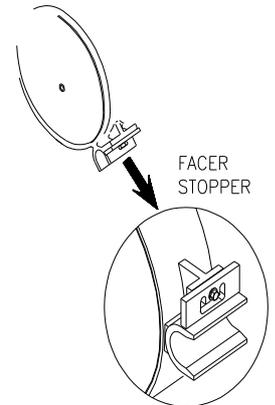


- b) Connect the flexible hoses of the hydraulic unit to the machine

- c) Connect the plugs to the power supply (Hydraulic unit, Facing tool and Heating mirror) after checking that the main power supply is within a 10% of the specified one “ **Warning Heating Mirror start to warm up !** “
- d) Select the correct temperature on the heating mirror
- e) In case fit the inserts of the diameter to be welded into the machine

3.3 Pipes positioning into the machine and facing operation

- a) Open the movable trolley of the machine by means of acting the lever **A (hyd. Unit)** and take it in position **A2**
- b) Position the pipes into the machine taking care to leave enough space for the facing tool inserting
- c) Check the pipes alignment, in case adjust it by means of tighten or loosing the clamps bolts. The maximum misalignment could be lesser than 10% of the pipe or fittings wall thickness. In any case the misalignment cannot be over than 2mm.
- d) Clean the pipe ends
- e) Fit in the facing tool between the two pipe's ends to be faced, by means of connecting the facing tool into the special supports. Connect the safety pin and start the facing tool engine
- f) On the facing tool there is a facer stopper (see the figure aside). In case of one of the pipe ends has a small projection; the facer stopper let you select the only pipe to face. Put the facer stopper in the left or in the right hole to prevent the right or left facing. To face all the pipes put the facer stopper in the central hole.



Warning!!!: Always check that the speed selector of the drill engine is in position 1 (lower speed)

- g) Slowly approach the pipes ends towards the facing tool by means of acting on the hydraulic control unit (lever **A Table V**) keeping a value of pressure allowing the facing of the surfaces and avoiding an overload of the drill engine (a too much high pressure could burnt out the drill engine). When shavings from both sides will appear continuous and homogeneous, the facing operation is completed.
- h) Put in contact the two pipes ends to be welded and check if the eventual disjunction is within the values of the following table:

Outside diameter mm	Port mm
< 400	0,5
> 400	1,0

In case the above values cannot be fulfilled the facing operation must be repeat.

3.4 Inertial pressure measurement

Before begin a welding cycle it is necessary to measure the inertial pressure. This value must be added to the pressure value shown in our welding tables. The inertial pressure value depends on welding operating conditions (ex.: length and weight of the pipe to drag, general condition of the machine, ambient temperature, etc.). To measure the inertial pressure follow these steps:

- a) Completely open the movable trolley of the machine by means of acting the lever **A** and take it in position **A2**
- b) By turning the lever **F (Hyd. Unit)** anticlockwise bring the pressure to zero, checking the pressure gauge
- c) Turn clockwise the lever **E (Hyd. Unit)** until closing
- d) Bring the lever **A (Hyd. Unit)** into position **A3** (the trolleys do not move because there is no pressure)
- e) By turning clockwise the hand wheel **F** note the inertial pressure value (value of pressure need in order to allow the trolley moving) by reading it into the pressure gauge

3.5 Welding cycle

To obtain the best result we strongly suggest allowing the use of the machine only to experienced operators

The welding phase is composed by 5 phases with 5 different times:

PHASE 1 = t_1 = Time requested for the bead formation with the specified wall thickness

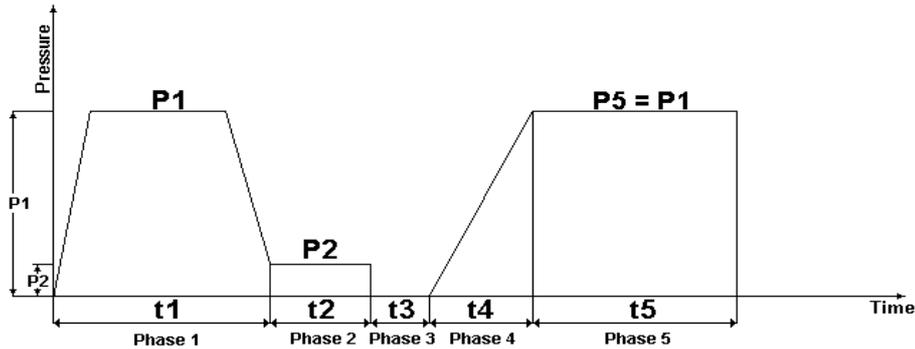
PHASE 2 = t_2 = Time requested for the continual heating

PHASE 3 = t_3 = Time requested for the change over

PHASE 4 = t_4 = Time requested for bringing up the pressure

PHASE 5 = t_5 = time requested for cooling down

Pressure-Time diagram for butt welding



PHASE 1 = Heating up t_1

- Fit the heating mirror taking care that the temperature of the surfaces is the one selected
- Bring the lever **A (Hyd. Unit)** into position **A3** in order to have the bead formation as per attached table, this operation must be done with the true welding pressure value: (Inertial pressure + P_1).
- Check the Bead formation wall thickness according to the attached welding table

PHASE 2 = Heating up t_2

- After bead formation act on lever **E (Hyd. Unit)** anticlockwise in order to bring the pressure nearly to zero and proceed to the heating time t_2 at pressure P_2

PHASE 3 = Change over t_3

- Elapsed the heating time at pressure P_2 bring the lever **A (Hyd. unit)** into position **A2** and remove the heating mirror and immediately bring the lever **A** into position **A3** and acting on lever **E** clockwise put in contact the two pipes

PHASE 4 = Bringing up pressure t_4

- Achieve the true welding pressure value: (Inertial pressure + $P_1 = P_5$) by checking the pressure gauge, This operation must be done according to the time indicated into the attached welding table.

PHASE 5 = Cooling Down t_5

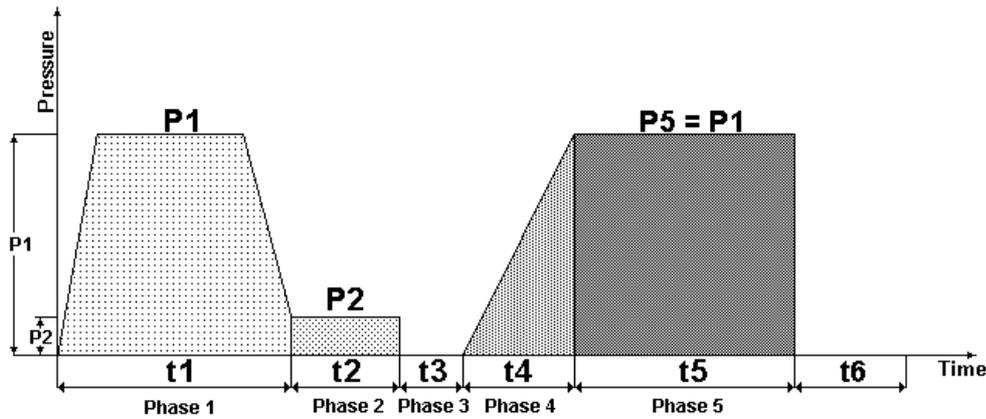
- Bring the lever **A** into position **A1** and keep such situation for all the cooling time indicated into the attached welding table, taking care that the pressure will not decrease too much
- Elapsed the cooling time by acting on lever **E** anticlockwise bring the pressure to zero.
- Take away the pipes welded

Important !!!

In case of any doubt please refer to the specific instructions

4. Welding Parameters for PE pipes & fittings DVS norm version 2207-1

Pressure-Time diagram for butt welding



- t_1 = Time requested for the bead formation with the specified wall thickness
- t_2 = Time requested for the continual heating
- t_3 = Time requested for the change over
- t_4 = Time requested for bringing up the pressure
- t_5 = time requested for cooling down
- P_1 = Pressure during the bead formation and the cooling down, this value is the result of the formula:

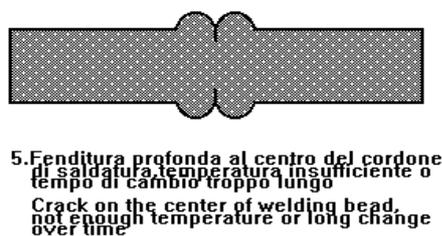
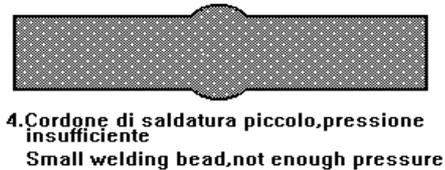
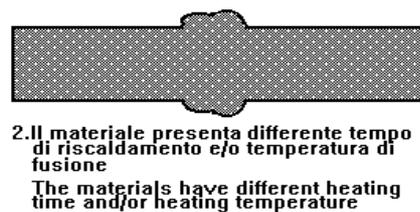
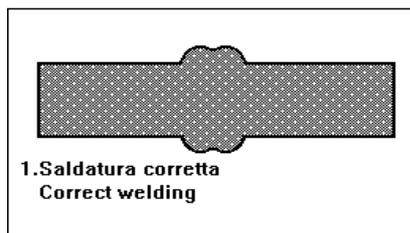
$$\frac{\text{Pipe section(cm}^2\text{)} \times \text{Material thrust coefficient(Kg./cm}^2\text{)}}{\text{Total machine cylinders section(cm}^2\text{)}} = \text{bar}$$

Total machine cylinders section(cm^2)

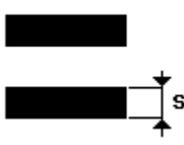
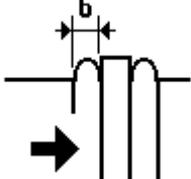
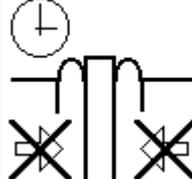
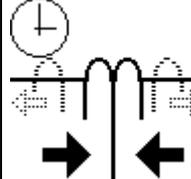
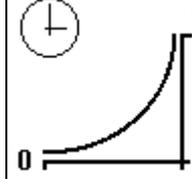
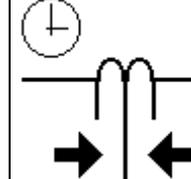
Material thrust coefficient for PE s 63	1,5 Kg./ cm^2
Material thrust coefficient for PP	1,0 Kg./ cm^2
Total PT 160 cylinders section	4,32 cm^2

P_2 = Pressure during the continual heating, this value either for HDPE and PP is 0,1 Kg./ cm^2 .

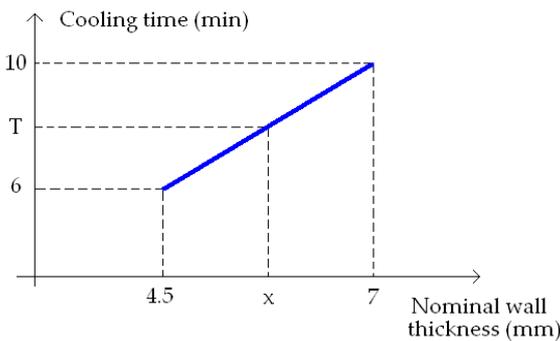
Optical checking of butt welding result



4.1 Welding Parameters for PE & PP sheets, pipes & fittings according to DVS 2207-1 – 2207-11

					
Nominal Wall thickness mm	Alignment Bead height on heater plate at the end of the alignment time (alignment under 0.15 N/mm ²) mm (minimum values)	Heating-up Heating-up time= 10 x wallthickness (heating-up 0.02 N/mm ²) s	Changeover time S (maximum time)	Joining pressure s	Cooling time under joining pressure p=0.15 N/mm ² 0.01 Min (minimum values)
MATERIAL PE					
Until 4.5	0.5	45	5	5	6
4.5 ... 7	1.0	45 ... 70	5 ... 6	5 ... 6	6 ... 10
7 ... 12	1.5	70 ... 120	6 ... 8	6 ... 8	10 ... 16
12 ... 19	2.0	120 ... 190	8 ... 10	8 ... 11	16 ... 24
19 ... 26	2.5	190 ... 260	10 ... 12	11 ... 14	24 ... 32
26 ... 37	3.0	260 ... 370	12 ... 16	14 ... 19	32 ... 45
37 ... 50	3.5	370 ... 500	16 ... 20	19 ... 25	45 ... 60
50 ... 70	4.0	500 ... 700	20 ... 25	25 ... 35	60 ... 80
MATERIAL PP					
Until 4.5	0.5	135	5	6	6
4.5 ... 7	0.5	135 ... 175	5 ... 6	6 ... 7	6 ... 12
7 ... 12	1.0	175 ... 245	6 ... 7	6 ... 11	12 ... 20
12 ... 19	1.0	245 ... 330	7 ... 9	11 ... 17	20 ... 30
19 ... 26	1.5	330 ... 400	9 ... 11	17 ... 22	30 ... 40
26 ... 37	2.0	400 ... 485	11 ... 14	22 ... 32	40 ... 55
37 ... 50	2.5	485 ... 560	14 ... 17	32 ... 43	55 ... 70

Example on how to calculate the cooling down (t5) time following the DVS NORM



As per drawing above the time T corresponds to wall thickness value X in mm. To calculate this time (t5 in minutes) please follow the formula below:

$$T = 6 + \frac{10 - 6}{7 - 4,5} \cdot (x - 4,5)$$

Example:

If you want to calculate the cooling down time for a 6mm wall thickness pipe, you must simply substitute the variable X with the value 6:

$$T = 6 + \frac{10 - 6}{7 - 4,5} \cdot (6 - 4,5) = 8,4 \text{ min}$$

To calculate the other times (t3 and t4) you must use the same principle of linear interpolation.

To obtain the t2 (in seconds) value use the formula below where the variable wt corresponds to the nominal wall thickness

$$T_2(\text{sec}) = 10 \cdot \text{wt}(\text{mm})$$

5. Welding Table for PE pipes DVS norm version 2207-1

The following tables show the values to be applied during the welding cycle as per previous instructions and graph. However in order to clarify once again the meaning of these values please kindly note:

- t1** = Time requested for the bead formation to be done with pressure value = **P1** + inertial pressure
t2 = Time requested for the continual heating to be done with pressure value = **P2** + inertial pressure
t3 = Time requested for the change over
t4 = Time requested for bringing up the pressure at the value of pressure = **P1** + inertial pressure
t5 = time requested for cooling down to be done with pressure value = **P1** + inertial pressure

Important

Remember always to add the value checked of inertial pressure to the P1 and P2 values !!!!!!!

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm				
material PE80-100			SDR 41								
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5		
DIAMETER	WALL THICK.	TEMP.	BEAD FORMATION		HEATING UP		CHANGE OV.	RAMP	COOLING		
mm	mm	°C	bar	mm	bar	sec	sec	sec	bar	min	
315	7,7	215	6,4	1,5	0.. 0,4	77	0.. 6	6	6,4	11	
355	8,7	214	8,2	1,5	0.. 0,5	87	0.. 7	7	8,2	12	
400	9,8	213	10,4	1,5	0.. 0,7	98	0.. 7	7	10,4	13	
450	11,0	212	13,1	1,5	0.. 0,9	110	0.. 8	8	13,1	15	
500	12,2	211	16,2	2,0	0.. 1,1	122	0.. 8	8	16,2	16	
560	13,7	210	20,3	2,0	0.. 1,4	137	0.. 8	9	20,3	18	
630	15,4	209	25,7	2,0	0.. 1,7	154	0.. 9	9	25,7	20	

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm				
material PE80-100			SDR 33								
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5		
DIAMETER	WALL THICK.	TEMP.	BEAD FORMATION		HEATING UP		CHANGE OV.	RAMP	COOLING		
mm	mm	°C	bar	mm	bar	sec	sec	sec	bar	min	
315	9,5	213	7,9	1,5	0.. 0,5	95	0.. 7	7	7,9	13	
355	10,8	212	10,1	1,5	0.. 0,7	108	0.. 8	8	10,1	15	
400	12,1	211	12,8	2,0	0.. 0,9	121	0.. 8	8	12,8	16	
450	13,6	210	16,2	2,0	0.. 1,1	136	0.. 8	9	16,2	18	
500	15,2	209	20,	2,0	0.. 1,3	152	0.. 9	9	20,	20	
560	17,0	207	25,1	2,0	0.. 1,7	170	0.. 9	10	25,1	22	
630	19,1	206	31,8	2,5	0.. 2,1	191	0.. 10	11	31,8	24	

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm				
material PE80-100			SDR 27,6								
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5		
DIAMETER	WALL THICK.	TEMP.	BEAD FORMATION		HEATING UP		CHANGE OV.	RAMP	COOLING		
mm	mm	°C	bar	mm	bar	sec	sec	sec	bar	min	
315	11,4	212	9,4	1,5	0.. 0,6	114	0.. 8	8	9,4	15	
355	12,9	210	12,	2,0	0.. 0,8	129	0.. 8	8	12,	17	
400	14,5	209	15,2	2,0	0.. 1,0	145	0.. 9	9	15,2	19	
450	16,3	208	19,3	2,0	0.. 1,3	163	0.. 9	10	19,3	21	
500	18,1	207	23,8	2,0	0.. 1,6	181	0.. 10	11	23,8	23	
560	20,3	205	29,8	2,5	0.. 2,0	203	0.. 10	12	29,8	25	
630	22,8	204	37,7	2,5	0.. 2,5	228	0.. 11	13	37,7	28	

Warning!: in case of PE100 welding, temperature T must be increased to 220°C

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm					
material PE80-100			SDR 26									
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5			
DIAMETER mm	WALL THICK. mm	TEMP. °C	BEAD FORMATION bar mm		HEATING UP bar sec		CHANGE OV. sec	RAMP sec	COOLING bar min			
315	12,1	211	10,	2	0..	0,7	121	0..	8	8	10,	16
355	13,7	210	12,7	2	0..	0,8	137	0..	8	9	12,7	18
400	15,4	209	16,1	2	0..	1,1	154	0..	9	9	16,1	20
450	17,3	207	20,4	2	0..	1,4	173	0..	9	10	20,4	22
500	19,2	206	25,2	2,5	0..	1,7	192	0..	10	11	25,2	24
560	21,5	205	31,6	2,5	0..	2,1	215	0..	11	12	31,6	27
630	24,2	204	40,	2,5	0..	2,7	242	0..	11	13	40,	30

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm					
material PE80-100			SDR 22									
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5			
DIAMETER mm	WALL THICK. mm	TEMP. °C	BEAD FORMATION bar mm		HEATING UP bar sec		CHANGE OV. sec	RAMP sec	COOLING bar min			
315	14,3	209	11,7	2,0	0..	0,8	143	0..	9	9	11,7	19
355	16,1	208	14,9	2,0	0..	1,0	161	0..	9	10	14,9	21
400	18,2	207	18,9	2,0	0..	1,3	182	0..	10	11	18,9	23
450	20,5	205	23,9	2,5	0..	1,6	205	0..	10	12	23,9	26
500	22,7	204	29,5	2,5	0..	2,0	227	0..	11	13	29,5	28
560	25,5	203	37,	2,5	0..	2,5	255	0..	12	14	37,	31
630	28,6	203	46,9	3,0	0..	3,1	286	0..	13	15	46,9	35

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm					
material PE80-100			SDR 21									
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5			
DIAMETER mm	WALL THICK. mm	TEMP. °C	BEAD FORMATION bar mm		HEATING UP bar sec		CHANGE OV. sec	RAMP sec	COOLING bar min			
315	15,0	209	12,3	2,0	0..	0,8	150	0..	9	9	12,3	19
355	16,9	208	15,6	2,0	0..	1,0	169	0..	9	10	15,6	22
400	19,0	206	19,8	2,5	0..	1,3	190	0..	10	11	19,8	24
450	21,4	205	25,	2,5	0..	1,7	214	0..	11	12	25,	27
500	23,8	204	30,9	2,5	0..	2,1	238	0..	11	13	30,9	29
560	26,7	203	38,7	3,0	0..	2,6	267	0..	12	14	38,7	33
630	30,0	202	49,	3,0	0..	3,3	300	0..	13	16	49,	37

Warning!: in case of PE100 welding, temperature T must be increased to 220°C

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm			
material PE80-100			SDR 17,6							
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5	
DIAMETER mm	WALL THICK. mm	TEMP. °C	BEAD FORMATION bar mm		HEATING UP bar sec		CHANGE OV. sec	RAMP sec	COOLING bar min	
315	17,9	207	14,5	2,0	0.. 1,0	179	0.. 10	11	14,5	23
355	20,2	206	18,4	2,5	0.. 1,2	202	0.. 10	12	18,4	25
400	22,7	204	23,3	2,5	0.. 1,6	227	0.. 11	13	23,3	28
450	25,6	203	29,5	2,5	0.. 2,0	256	0.. 12	14	29,5	32
500	28,4	203	36,5	3,0	0.. 2,4	284	0.. 13	15	36,5	35
560	31,8	202	45,8	3,0	0.. 3,1	318	0.. 14	17	45,8	39
630	35,8	201	57,9	3,0	0.. 3,9	358	0.. 16	18	57,9	44

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm			
material PE80-100			SDR 17							
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5	
DIAMETER mm	WALL THICK. mm	TEMP. °C	BEAD FORMATION bar mm		HEATING UP bar sec		CHANGE OV. sec	RAMP sec	COOLING bar min	
315	18,5	206	15,	2	0.. 1,0	185	0.. 10	11	15,	23
355	20,9	205	19,	2,5	0.. 1,3	209	0.. 10	12	19,	26
400	23,5	204	24,1	2,5	0.. 1,6	235	0.. 11	13	24,1	29
450	26,5	203	30,5	3	0.. 2,0	265	0.. 12	14	30,5	33
500	29,4	202	37,7	3	0.. 2,5	294	0.. 13	16	37,7	36
560	32,9	202	47,3	3	0.. 3,2	329	0.. 14	17	47,3	40
630	37,1	201	59,8	3,5	0.. 4,0	371	0.. 16	19	59,8	45

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm			
material PE80-100			SDR 13,6							
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5	
DIAMETER mm	WALL THICK. mm	TEMP. °C	BEAD FORMATION bar mm		HEATING UP bar sec		CHANGE OV. sec	RAMP sec	COOLING bar min	
315	23,2	204	18,4	2,5	0.. 1,2	232	0.. 11	13	18,4	29
355	26,1	203	23,4	3,0	0.. 1,6	261	0.. 12	14	23,4	32
400	29,4	202	29,7	3,0	0.. 2,0	294	0.. 13	16	29,7	36
450	33,1	202	37,6	3,0	0.. 2,5	331	0.. 15	17	37,6	40
500	36,8	201	46,4	3,0	0.. 3,1	368	0.. 16	19	46,4	45
560	41,2	201	58,2	3,5	0.. 3,9	412	0.. 17	21	58,2	50
630	46,3	200	73,6	3,5	0.. 4,9	463	0.. 19	23	73,6	56

Warning!: in case of PE100 welding, temperature T must be increased to 220°C

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm				
material PE80-100			SDR 11								
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5		
DIAMETER	WALL THICK.	TEMP.	BEAD FORMATION		HEATING UP		CHANGE OV.	RAMP	COOLING		
mm	mm	°C	bar	mm	bar	sec	sec	sec	bar	min	
315	28,6	203	22,3	3,0	0.. 1,5	286	0.. 13	15	22,3	35	
355	32,3	202	28,4	3,0	0.. 1,9	323	0.. 14	17	28,4	39	
400	36,4	201	36,	3,0	0.. 2,4	364	0.. 16	19	36,	44	
450	40,9	201	45,6	3,5	0.. 3,0	409	0.. 17	21	45,6	50	
500	45,5	200	56,3	3,5	0.. 3,8	455	0.. 19	23	56,3	55	
560	50,9	200	70,6	4,0	0.. 4,7	509	0.. 20	25	70,6	61	
630	57,3	200	89,3	4,0	0.. 6,0	573	0.. 22	29	89,3	67	

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-630 mm				
material PE80-100			SDR 9								
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5		
DIAMETER	WALL THICK.	TEMP.	BEAD FORMATION		HEATING UP		CHANGE OV.	RAMP	COOLING		
mm	mm	°C	bar	mm	bar	sec	sec	sec	bar	min	
315	35,0	201	26,7	3,0	0.. 1,8	350	0.. 15	18	26,7	43	
355	39,4	201	33,9	3,5	0.. 2,3	394	0.. 17	20	33,9	48	
400	44,4	200	43,	3,5	0.. 2,9	444	0.. 18	22	43,	54	
450	50,0	200	54,5	3,5	0.. 3,6	500	0.. 20	25	54,5	60	
500	55,6	200	67,2	4,0	0.. 4,5	556	0.. 21	28	67,2	66	
560	62,2	200	84,3	4,0	0.. 5,6	622	0.. 23	31	84,3	72	
630	70,0	200	106,7	4,0	0.. 7,1	700	0.. 25	35	106,7	80	

PT 630 - DVS 2207-1			Cyl. section cm ² 17,3				Welding range 315-450 mm				
material PE80-100			SDR 7,4								
D	S	T	P1 bead		P2 t 2		t 3	t 4	P5 t 5		
DIAMETER	WALL THICK.	TEMP.	BEAD FORMATION		HEATING UP		CHANGE OV.	RAMP	COOLING		
mm	mm	°C	bar	mm	bar	sec	sec	sec	bar	min	
315	42,6	201	31,6	3,5	0.. 2,1	426	0.. 18	22	31,6	51	
355	48,0	200	40,1	3,5	0.. 2,7	480	0.. 19	24	40,1	58	
400	54,1	200	50,9	4,0	0.. 3,4	541	0.. 21	27	50,9	64	
450	60,8	200	64,4	4,0	0.. 4,3	608	0.. 23	30	64,4	71	

Warning!: in case of PE100 welding, temperature T must be increased to 220°C

6. Welding Parameters for PP pipes & fittings DVS norm version 2207-11

material PP		SDR 41		PP		Cylinder section cm ² 17,3				
D	S	Temp.	P1	bead	P2	t 2	t 3	t 4	P5	t 5
mm	mm	° C	bar	mm	bar	sec	sec	sec	bar	sec
315	7,7	210°	4,3	1	0,4	185	6	8	4,3	787
355	8,7	210°	5,5	1	0,5	199	6	8	5,5	883
400	9,8	210°	6,9	1	0,7	214	7	9	6,9	989
450	11	210°	8,8	1	0,9	231	7	10	8,8	1104
500	12,2	210°	10,8	1	1,1	247	7	11	10,8	1217
560	13,7	210°	13,6	1	1,4	265	7	12	13,6	1346
630	15,4	210°	17,2	1	1,7	286	8	14	17,2	1491
material PP		SDR 33		PP		Cylinder section cm ² 17,3				
D	S	Temp.	P1	bead	P2	t 2	t 3	t 4	P5	t 5
mm	mm	° C	bar	mm	bar	sec	sec	sec	bar	sec
315	9,8	210°	5,4	1	0,5	214	7	9	5,4	989
355	11,1	210°	6,9	1	0,7	232	7	10	6,9	1114
400	12,4	210°	8,7	1	0,9	250	7	11	8,7	1234
450	14	210°	11,1	1	1,1	269	8	13	11,1	1371
500	15,5	210°	13,6	1	1,4	287	8	14	13,6	1500
560	17,4	210°	17,1	1	1,7	310	9	16	17,1	1663
630	19,6	210°	21,7	1,5	2,2	336	9	17	21,7	1851
material PP		SDR 26		PP		Cylinder section cm ² 17,3				
D	S	Temp.	P1	bead	P2	t 2	t 3	t 4	P5	t 5
mm	mm	° C	bar	mm	bar	sec	sec	sec	bar	sec
315	12,2	210°	6,7	1	0,7	247	7	11	6,7	1217
355	13,7	210°	8,5	1	0,8	265	7	12	8,5	1346
400	15,4	210°	10,8	1	1,1	286	8	14	10,8	1491
450	17,4	210°	13,7	1	1,4	310	9	16	13,7	1663
500	19,3	210°	16,8	1,5	1,7	333	9	17	16,8	1826
560	21,6	210°	21,1	1,5	2,1	356	10	19	21,1	2023
630	24,3	210°	26,7	1,5	2,7	383	11	21	26,7	2254
material PP		SDR 17.6		PP		Cylinder section cm ² 17,3				
D	S	Temp.	P1	bead	P2	t 2	t 3	t 4	P5	t 5
mm	mm	° C	bar	mm	bar	sec	sec	sec	bar	sec
315	17,9	210°	9,7	1	1,0	316	9	16	9,7	1706
355	20,1	210°	12,2	1,5	1,2	341	9	18	12,2	1894
400	22,7	210°	15,5	1,5	1,6	367	10	20	15,5	2117
450	25,5	210°	19,6	1,5	2,0	395	11	22	19,6	2357
500	28,3	210°	24,2	2	2,4	418	12	24	24,2	2588
560	31,7	210°	30,4	2	3,0	446	13	27	30,4	2866
630	35,7	210°	38,5	2	3,9	478	14	31	38,5	3194
material PP		SDR 11		PP		Cylinder section cm ² 17,3				
D	S	Temp.	P1	bead	P2	t 2	t 3	t 4	P5	t 5
mm	mm	° C	bar	mm	bar	sec	sec	sec	bar	sec
315	28,7	210°	14,9	2	1,5	422	12	24	14,9	2621
355	32,3	210°	18,9	2	1,9	450	13	28	18,9	2915
400	36,4	210°	24,0	2	2,4	483	14	31	24,0	3251
450	41	210°	30,4	2,5	3,0	509	15	35	30,4	3577
500	45,5	210°	37,5	2,5	3,8	536	16	39	37,5	3888

7. Maintenance

7.1 Basic machine

It's strongly suggested to keep always the machine clean with particular care of the bolts and the cylinder's heads .
Keep attention while insert the electric facing tool and the PTFE coated heating mirror avoiding to damage the machine's slide bars.

7.2 Facing tool

It's strongly suggested to keep always clean the blades and wash the pulleys by using a detergent.

At regular intervals carry out a complete cleaning operation with a internal lubrication as well , as per following instructions:

- Remove the carter by enlighten the screws
- Take out the shavings might be present
- Enlighthent the screws and remove the pulley and carry out the cleaning and the lubrication of the bearing .

7.3 Heating mirror

Please take care on handling the heating mirror in order to avoid damages to the PTFE coating.

Keep always clean the PTFE coated surfaces, cleaning must be done with surface still warm by using a soft cloth or paper, avoiding abrasive materials in that might damage the PTFE coated surfaces. To achieve this operation you must wear protective gloves

At regular intervals we suggest you to:

- Clean the surfaces by a quick evaporation detergent (alcohol)
- Check the tightening of the screws and the cable and plug condition
 - Verify the temperature differences on the heating mirror surfaces according to the following table DVS norm 2208-1 here following table:

WELDING SURFACE OF THE MIRROR	ΔT_1	ΔT_2	ΔT_{TOT}
< 250 cm ²	5 °C	3 °C	8 °C
250 2000 cm ²	7 °C	3 °C	10 °C
2000 5000 cm ²	11 °C	3 °C	14 °C
5000 12000 cm ²	13 °C	3 °C	16 °C
> 12000	14 °C	3 °C	17 °C

ΔT_1 Maximum temperature difference on the mirror surface

ΔT_2 Temperature deviation for the adjustment

ΔT_{TOT} Maximum accepted difference on the mirror surface

7.4 Hydraulic unit

The hydraulic unit does not need particular maintenance nevertheless the following instructions must be followed:

1. Check periodically the oil level and in case add with oil type:
ESSO NUTO H 68,SHELL TELLUS 68,MOBIL DTE 26,AGIP OSO 46
The level should not be lower than 5 cm from the tank maximum level.
A checking every 15 working days it's strongly suggested.
2. Replace totally the oil every 6 months or after 500 working hours.
3. Keep clean the hydraulic unit with particular care on the tank and quick couplings.
4. Avoid to operate with rain or high humidity (95 RH %) value and temperatures below 0°C or above + 50°C.
5. During the transport it's suggested to put the metal plug instead of the plastic one.

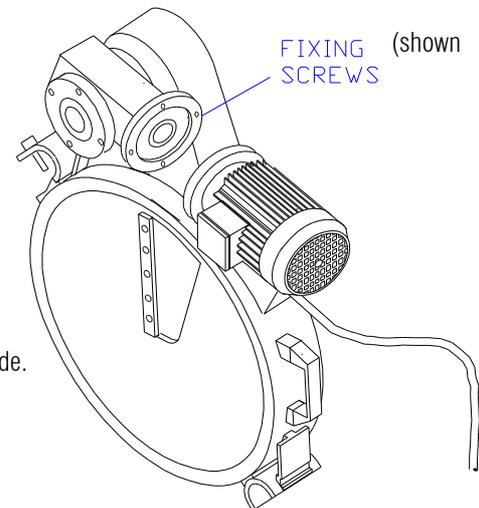
8. Troubleshooting and relative solutions

8.1 Basic machine

- a) **The quick couplings can't be connected:**
Check if there's pressure on the hoses in case bring the pressure to zero (see relative instructions)
Check if the quick couplings are clean
- b) **The machine does not move in linear way:**
The above mentioned situation could happen in case of clash or in case the machine with the pipe assembled in has been fiercely moved. If the damaged part can be located proceed to the substitution, however if the trouble still remain, kindly contact the Customer Service
- c) **The nut/s is/are seizure:**
Replace the complete tie rod bolt
- d) **Oil leakage in the cylinders:**
Consult the **Customer Service Dept.** verify if it's necessary to replace the cylinders or just the gasket

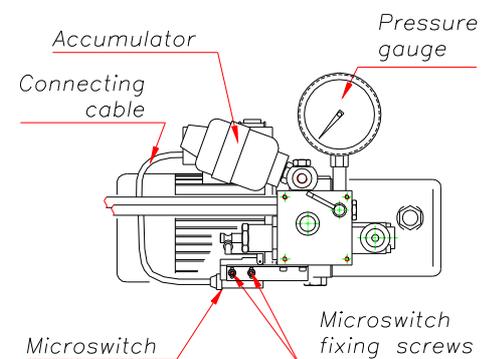
8.2 Facing tool

- a) **The engine does not start:**
Unplug the facing tool and check the electric connections and the safety micro-switch by the arrow)
- b) **The engine is burnt out:**
In case it's need to replace the engine the following operations must be done:
- Unplug the facing tool
 - Unscrew the fixing screws
 - Disconnect the safety microswitch
 - Remove the engine by means of pulling in upper direction. In case of difficulties, you can use a thin blade to detach the two flanges.
- c) **The blades do not remove material:**
Wear and tear of one cutting side enlighten the screws and turn the blades using the other side.
Wear and tear of both cutting side of the blades replace with original spare parts.



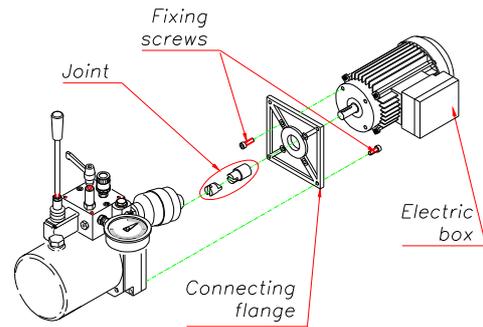
8.3 Hydraulic unit

- a) **The engine does not start:**
Check that the hydraulic unit engine is switched on
The microswitch is damaged or wrongly adjusted
- To adjust the microswitch you must enlighten the screws show in the figure below and bring the lever A to position A3.
 - Move the microswitch towards the internal of the hydraulic until the engine start and tighten the fixing screw.
 - Check that in position A1 the engine is switched off.
 - In different case adjust the microswitch position again.



b) The engine replacement:

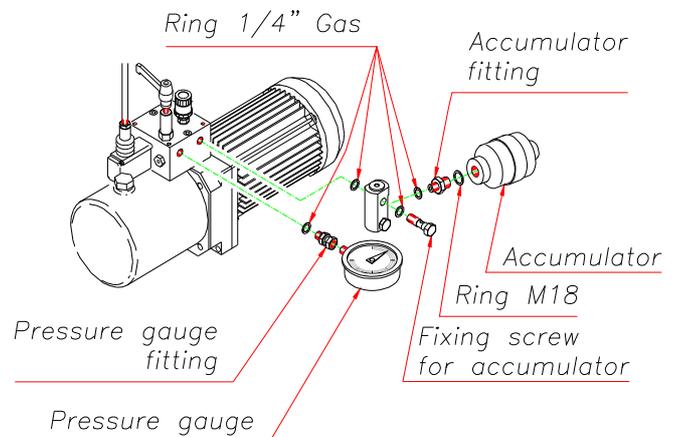
Check that the electric plug is disconnected
 Open the electric connections box and disconnect the micro-switch cable
 Enliven the screws and take out the engine
 Take out the joints and insert them on the new engine
 Reassemble the engine taking care that the joints are perfectly located on the own housings
 Check the anti clockwise rotation of the electric fan

**c) If the hydraulic unit cannot increase the pressure reasons could be :**

- Check the oil level
- The lever **E** is not closed.
- Check if they are some leakage on hydraulic circuit.

d) If the hydraulic unit cannot maintain a constant pressure reasons could be :

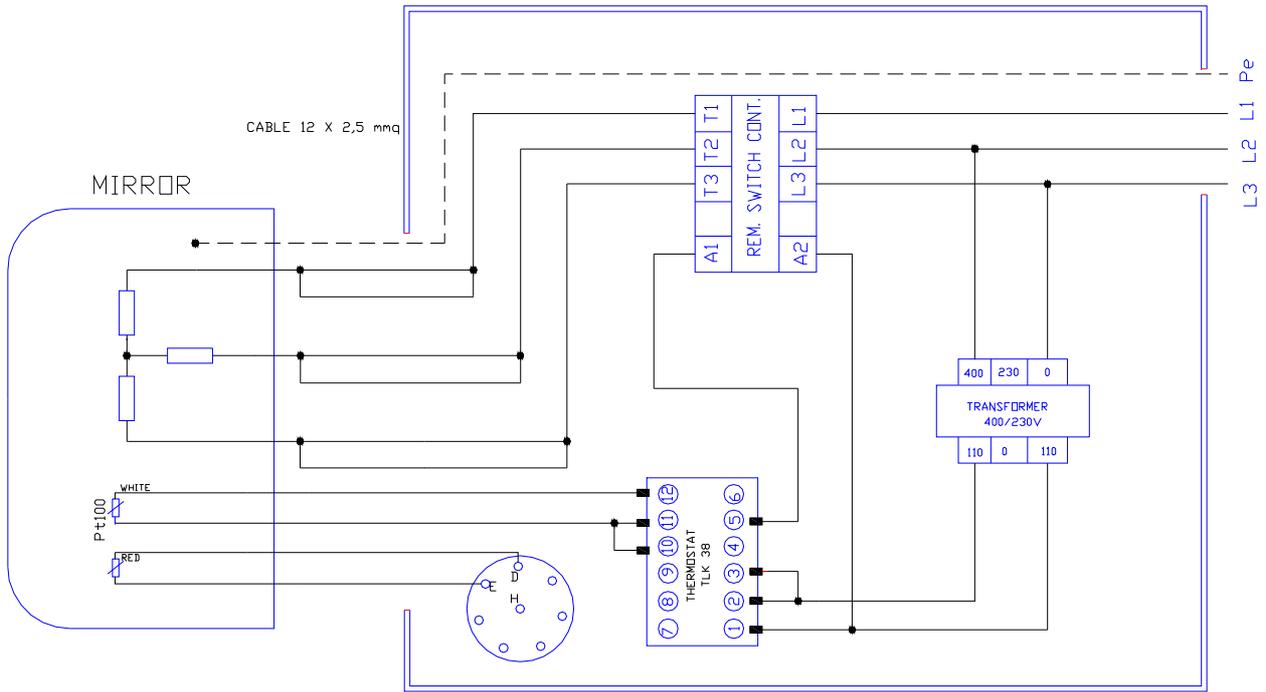
- The lever **E** is not closed.
- The accumulator is down or damaged. To replace the pressure gauge follows the below steps:
 1. Bring the pressure to zero and enlighten the bolt
 2. Take out the fitting and replace the damaged accumulator with the new one
 3. Tighten the bolt

**8.4 Heating mirror****a) The heating mirror does not warm up:**

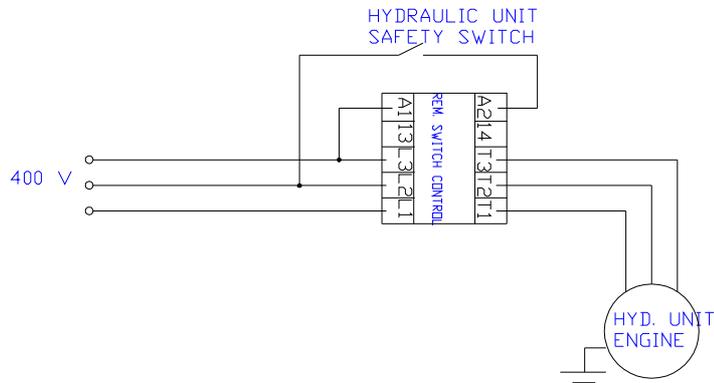
1. Check if the light is switched off , in case check the plug
2. The light is switched on, probably a wire disconnected , check the contacts as follows:
 - Take off the plug from the power
 - Unscrew the nuts and take out the thermostat support
 - Unscrew the screws and remove the cap
 - Check all the electric connections and reassemble
 - Unscrew the screws and take out the cover
 - Check all the electric connections and reassemble
3. By utilizing a Tester check if all the resistances are in good condition ,if one or more are broken the heating mirror must be changed
4. By utilizing a tester check the working of the thermostat, in case substitute
5. For additional information on electric components, please refer to our **Technical Dept.**

9. Drawings

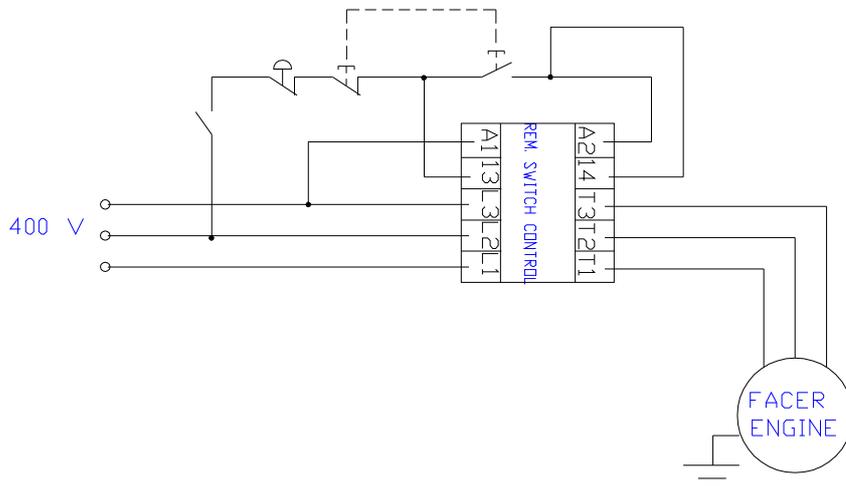
9.1 Heating mirror connections



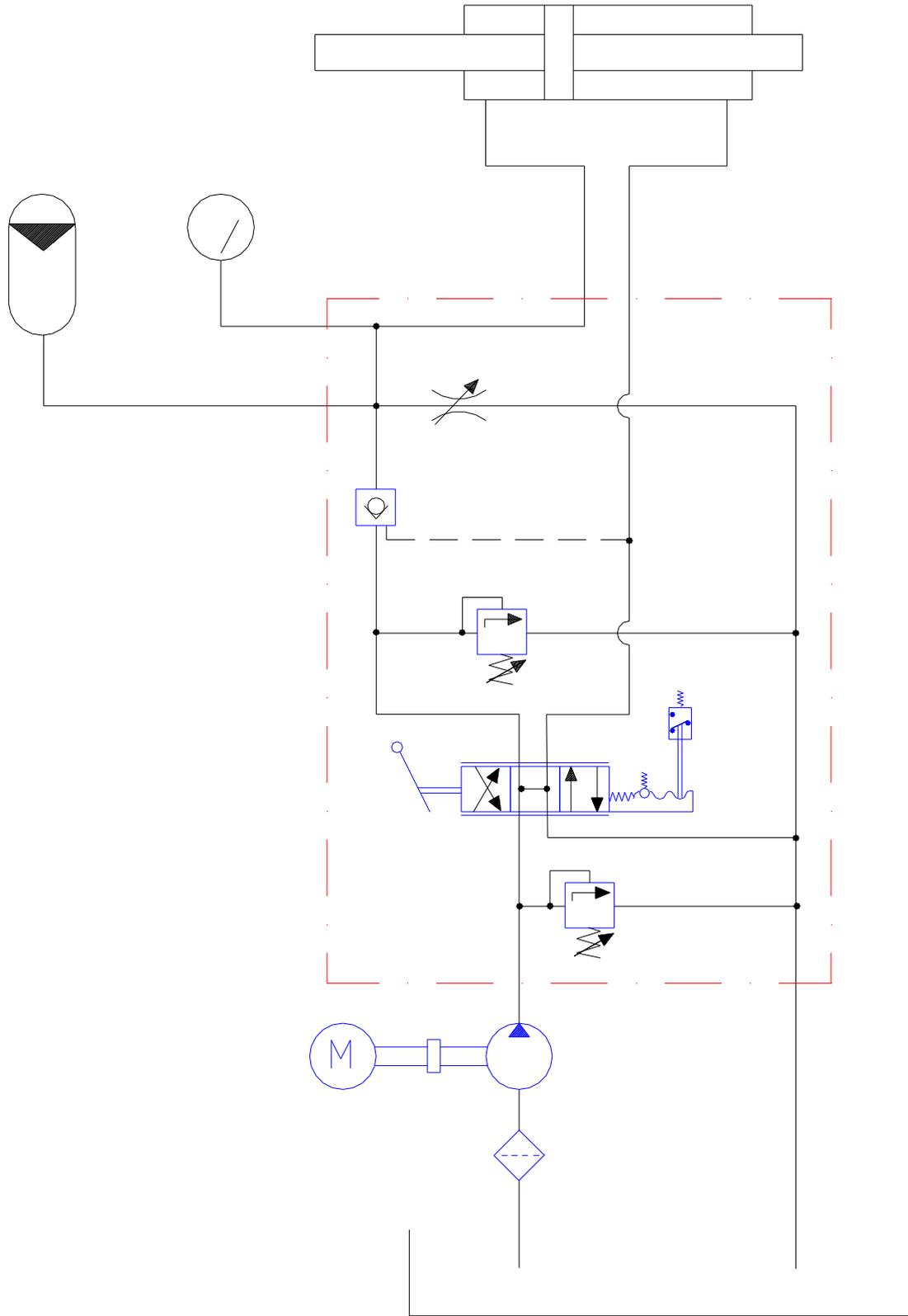
9.2 Hydraulic unit connections



9.3 Hydraulic unit connections

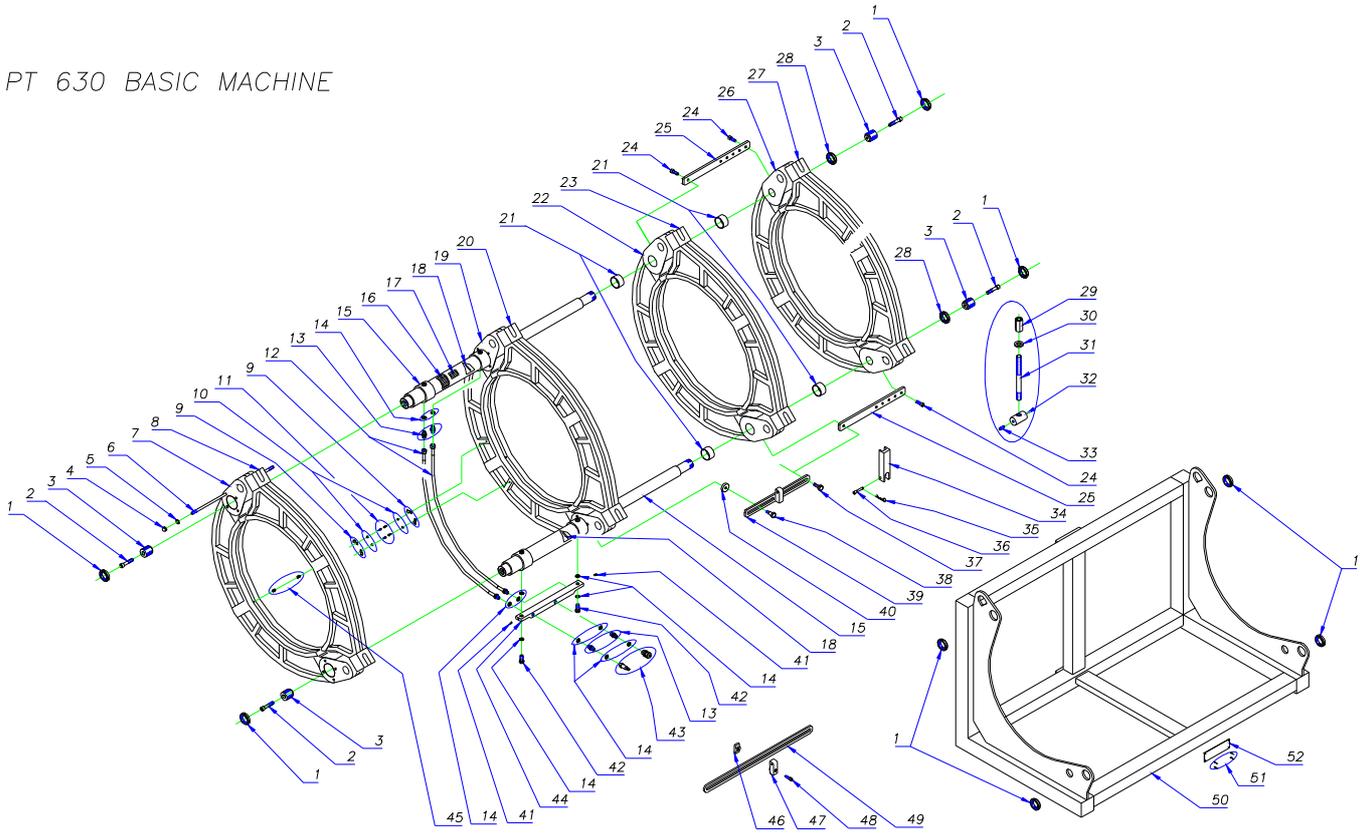


9.4 Hydraulic plan

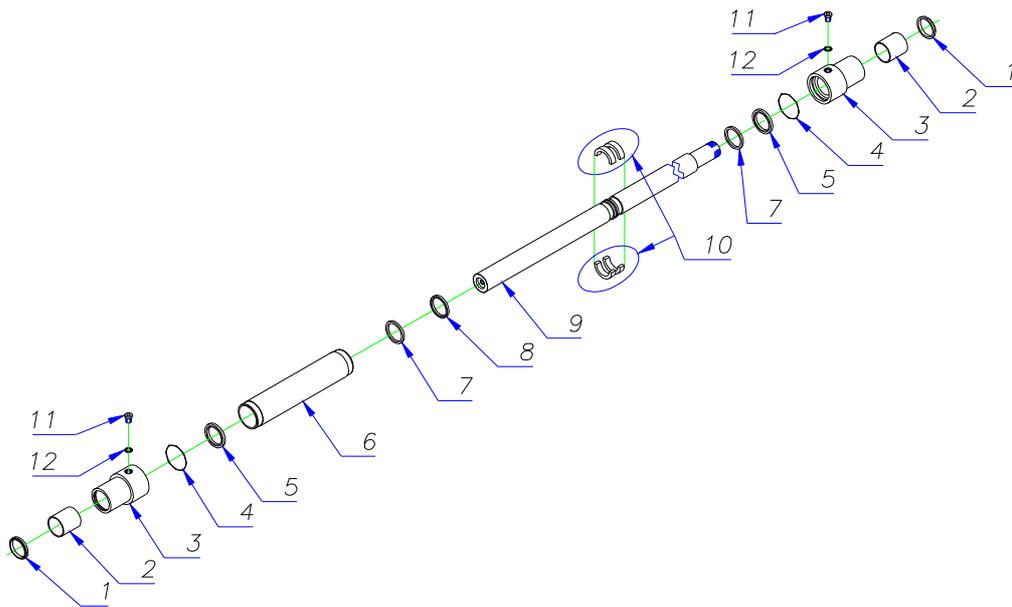
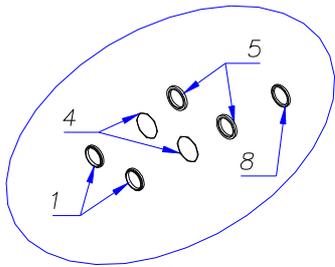


10. Exploded view and spare parts list

PT 630 BASIC MACHINE



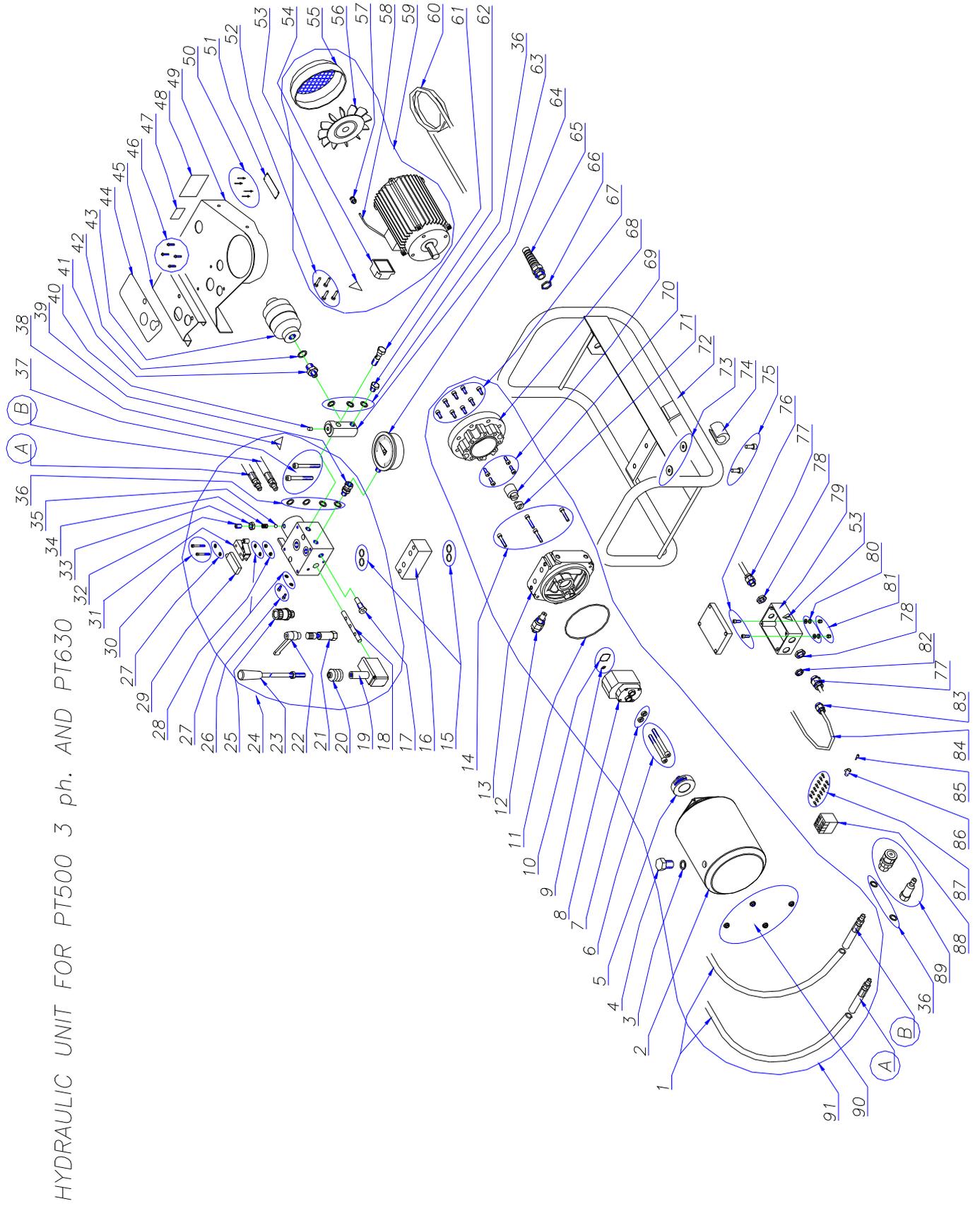
PT 630 GASKET KIT (1 cylinder)



PT 630 CYLINDERS (upper and lower)

PT 630 Basic Machine , Code: PT630B				PT 630 Basic Machine , Code: PT630B			
Pos.	Code	Description	Qty	Pos.	Code	Description	Qty
1	PT630B01	Nut for cylinder's stem	8	29	PT630B29	Nut tie rods	8
2	PT630B02	Screw TCEI UNI 5931 8.8 12x55 z	4	30	PT630B30	Washer for tie rods	8
3	PT630B03	Extension for cylinder's stem	4	31	PT630B31	Tie rod closer	8
4	PT630B04	blind nut UNI 5721 8 m 8 z	8	32	PT630B32	Tie rod pivot	8
5	PT630B05	washer UNI 6592 m 10 z	8	33	PT630B33	Tie rod pin	8
6	PT630B06	Cylinder's tie rod	8	34	PT630B34	H.mirror disconnecting dev. hooker	1
7+8	PT630B07+08	first clamp (07+08)	1	35	PT630B35	H. mirror disconnecting device split pin	1
9	PT630B09	Metal clip 1015/16	4	36	PT630B36	H. mirror disconnecting device pin	1
10	PT630B10	washer UNI 6593 m 5x15x1.5 z	4	37	PT630B37	H.mirror disconnecting dev.short screw	1
11	PT630B11	Screw TCEI UNI 5931 8.8 5x16z	4	38	PT630B38	H.mirror disconnecting dev.lomg screw	1
12	PT630B12	Oil hose R1T M ¼ + FD ¼ L1130.	2	39	PT630B39	H. mirror disconnecting device body	1
13	PT630B13	Double nipple M 1/4	4	40	PT630B40	H. mirror disconnecting device washer	1
14	PT630B14	washer bonded 1/4	12	41	PT630B41	Plug for oil collector d. 8	2
15	PT630B15	Cylinders	2	42	PT630B42	Hollow screw ¼	2
16	PT630B16	Technical data label	1	43	PT630B43	quick couplings M/F 1/4	1
17	PT630B17	Serial no. label	1	44	PT630B44	Oil colelctor	1
18	PT630B18	Danger label	2	45	PT630B45	Inserts pg n8x12	8
19+20	PT630B19+20	Second clamp (19+20)	1	46	PT630B46	Block for heating mirror hook	1
21	PT630B21	50.30 FB1 bush	4	47	PT630B47	Mirror hook	1
22+23	PT630B22+23	Third clamp (22+23)	1	48	PT630B48	Screw TCEI UNI 5931 8.8 10x25 z	1
24	PT630B24	Screw TCEI UNI 5931 8.8 10x25 z	3	49	PT630B49	Special spacer for heating mirror	1
25	PT630B25	Spacer	2	50	PT630B50	Basic machine frame	1
26+27	PT630B26+27	Fourth clamp (26+27)	1	51	PT630B51	rivet tt UNI 9200 3x7 all	4
28	PT630B28	Nut din 981 30X1.5 km	2	52	PT630B52	ITS – TECNODUE label	1

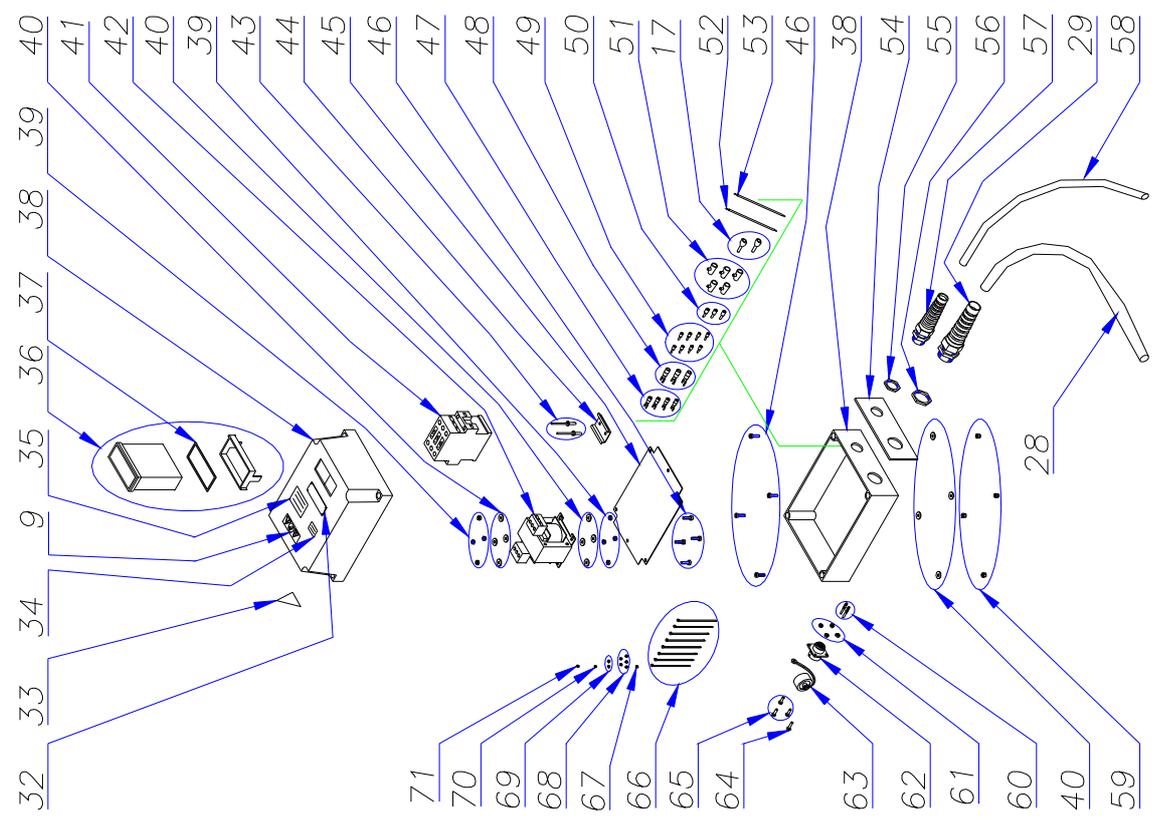
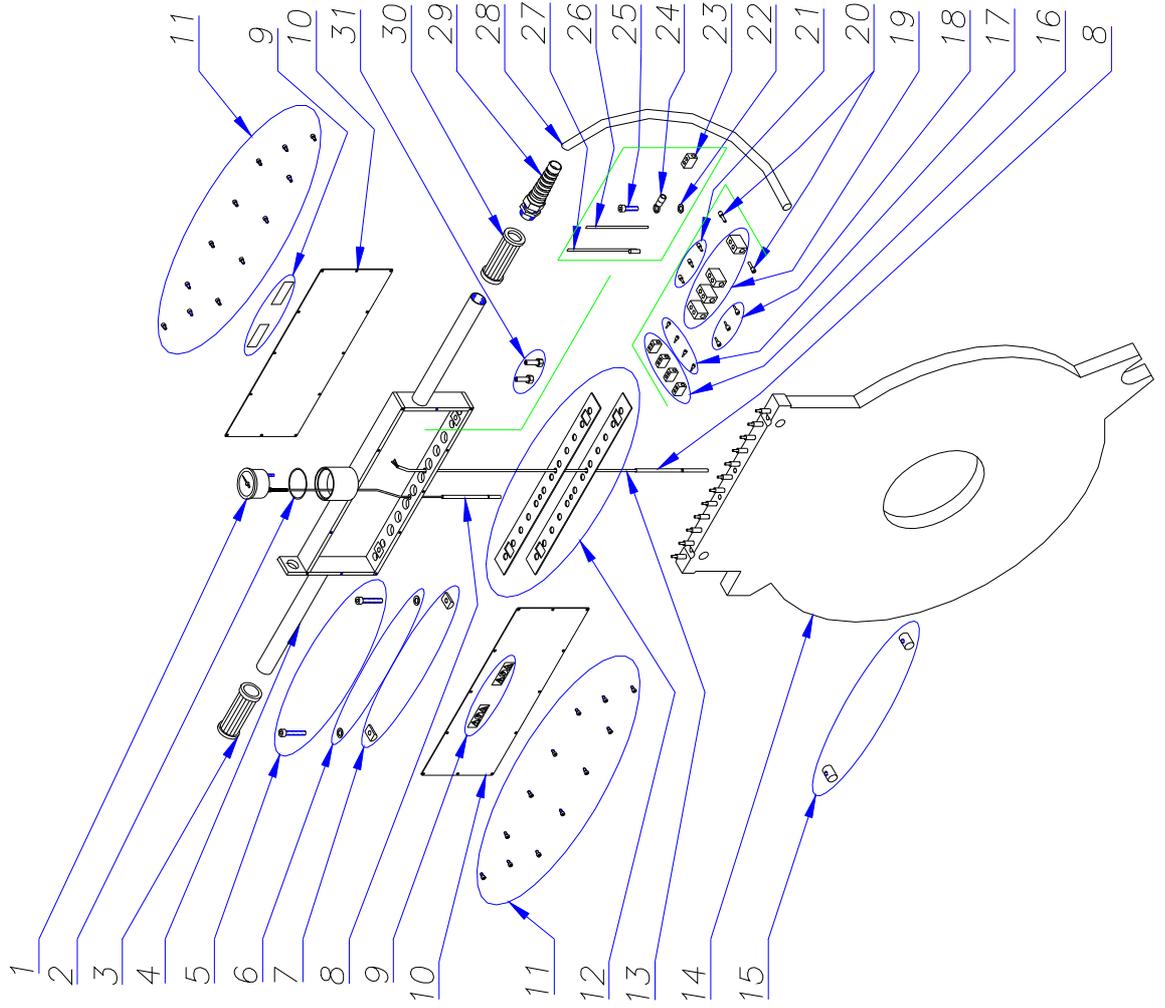
PT 630 Cylinder, Code: PT630B15				PT 630 Gasket kit, Code: PT630B15KT			
Pos.	Code	Description	Qty	Pos.	Code	Description	Qty
1	PT630B1501	Gasket GHK 322 50.0 58.6 5.3 54.0	2	1	PT630B1501	Gasket GHK 322 50.0 58.6 5.3 54.0	2
2	PT630B1502	50.60 FB1 bush	2	4	PT630B1504	Gasket I/GR 0500 NCR	2
3	PT630B1503	Cylinder head	2	5	PT630B1505	O-ring 171 NBR 3.53x68.26 (842)	2
4	PT630B1504	Gasket I/GR 0500 NCR	2	8	PT630B1508	Gasket E/GR 0600 NPS	1
5	PT630B1505	O-ring 171 NBR 3.53x68.26 (842)	2				
6	PT630B1506	Cylinder's housing	1				
7	PT630B1507	Stopper ring	2				
8	PT630B1508	Gasket E/GR 0600 NPS	1				
9	PT630B1509	Cylinder's stem	1				
10	PT630B1510	Cylinder's stopper	2				
11	PT630B1511	Plug ¼ for cylinder's head	2				
12	PT630B1512	Washer bonded for plug ¼	2				



PT 630 Hydraulic Unit , Code: PT630A				PT 630 Hydraulic Unit , Code: PT630A			
Pos.	Code	Description	Qty	Pos.	Code	Description	Qty
1	PT630A01	Hose R1T M 1/4 + FD 1/4 L=2500	2	47	PT630A47	Serial number label	1
2	PT630A02	Oil tank LT.7	1	48	PT630A48	Technical data label	1
3	PT630A03	washer 1/2	1	49	PT630A49	Carter	1
4	PT630A04	Plug 1/2	1	50	PT630A50	Rivet tt uni 9200 3x7 all	4
5	PT630A05	Filter UP 100	1	51	PT630A51	ITS - TECNODUE 80X25 label	1
6	PT630A06	Screw TCEI uni 5931 8.8 8x85 zin	2	52	PT630A52	Screw TC CR UNI 6954 3.5X19 zin	4
7	PT630A07	Washer grower UNI 1751 m8 z	2	53	PT630A53	Electric danger label	2
8	PT630A08	Gear pump PS-1/1.2 S	1	54	PT630A54	Box cover – 3 ph. engine HP1/2/3	1
9	PT630A09	O-ring 2037 NBR 1.78x9.25 (012)	1	55	PT630A55	Fan cover MEC 80	1
10	PT630A10	O-ring 3106 NBR 2.62x26.65 (121)	1	56	PT630A56	Fan MEC 80	1
11	PT630A11	O-ring 4450 NBR 3.53x113.9 (246)	1	57	PT630A57	Plastic cable stopper M20 X 1.5	1
12	PT630A12	Max pressure valve FPMDC15P35	1	58	PT630A58	Cable H07 RNF 4G1.5 TITANEX	0,9
13	PT630A13	Pump body HY 10 K3P0-01 1/4 BB	1	59	PT630A59	Engine 3 ph. HP1.54 B14 380V 2800rpm	1
14	PT630A14	Screw TCEI uni 5931 8.8 6x35 zin	4	60	PT630A60	Cable H07 RNF 4G1.5 TITANEX	5,3
15	PT630A15	O-ring 2056 NBR 1.78x14.00 (015)	4	61	PT630A61	Hollow screw	1
16	PT630A16	Distributor's spacer	1	62	PT630A62	Plug 1/4	1
17	PT630A17	Check valve RPC 04 / 2.5 00 00	1	63	PT630A63	Pressure gauge support	1
18	PT630A18	Distributor shaft TC2 dr. C0618	1	64	PT630A64	Pressure gauge D.100 range 0-160 BAR-PSI	1
19	PT630A19	Distributor block HD 104	1	65	PT630A65	Cable stopper PG13.5	1
20	PT630A20	Lever protection HD 104	1	66	PT630A66	Brass nut PG13.5 169/13.5	1
21	PT630A21	By pass valve V03/M	1	67	PT630A67	Screw TCEI UNI 5931 8.8 6x16 zin	8
22	PT630A22	Handle	1	68	PT630A68	Engine flange c.a. HP 1.5 FLCA80	1
23	PT630A23	Distributor lever HD 104 L.185	1	69	PT630A69	Screw TCEI UNI 5931 8.8 6x20 zin	4
24	PT630A24	Complete distributor TC2	1	70	PT630A70	Joint gr. 1 HP 1.5	1
25	PT630A25	Pressure regulating valve VEN 06	1	71	PT630A71	Pump joint g. 1 x 0.27 reinf.	1
26	PT630A26	Screw TCEI UNI 5931 8.8 4x10 z	2	72	PT630A72	Frame	1
27	PT630A27	Washer UNI 6592 m 4 zin	6	73	PT630A73	Washer fl uni 6593 m 10x30x2,5 zin	2
28	PT630A28	Nut UNI 7473 8 m4	2	74	PT630A74	Support 28-30	4
29	PT630A29	Plastic cap	1	75	PT630A75	Screw TCEI UNI 5931 8.8 10x30 zin	2
30	PT630A30	Screw TCEI UNI 5931 8.8 4x35z	2	76	PT630A76	Screw TCEI UNI 5931 8.8 5x20 zin	2
31	PT630A31	Microswitch ASITZ 7141	1	77	PT630A77	Cable stopper PG11 106/11	2
32	PT630A32	Screw STEI UNI 5923 45h 10x14 z	1	78	PT630A78	Plastic nut PG11	2
33	PT630A33	Nut UNI 5589 8 m 10 zin	1	79	PT630A79	Box SAREL 105X70X48	1
34	PT630A34	Spring latch	1	80	PT630A80	Washer UNI 6592 m 5 zin	4
35	PT630A35	Ball 5/16"	1	81	PT630A81	Nut autofr uni 7473 8 m 5	2
36	PT630A36	Washer 1/4	9	82	PT630A82	Plastic nut PG9 116/9	1
37	PT630A37	Screw TCEI UNI 5931 8.8 8x70z	2	83	PT630A83	Cable stopper PG9 106/9	1
38	PT630A38	Generic danger label	1	84	PT630A84	Cable H07 RNF 2G1 TITANEX	1,1
39	PT630A39	Connector FT 299 44 M 1/4"	1	85	PT630A85	Double black insul. pipe 2x1.5mm ² P=8MM	1
40	PT630A40	Ball plug d. 8	1	86	PT630A86	Connector 2.5 mm ²	0,1
41	PT630A41	Nipples M 1/4 - M 18x1.5	1	87	PT630A87	Insulating pipe 1.5mm ² P=8MM red	14
42	PT630A42	Washer 18X1.5	1	88	PT630A88	Remote control switch 16A 400V	1
43	PT630A43	accumulator L 01/8 with 20 g. oil	1	89	PT630A89	quick coupling M/F 1/4	1
44	PT630A44	Hydraulic unit control label	1	90	PT630A90	Nut DIN 6923 8 m 6	4
45	PT630A45	Carter for valves protection	1	91	PT630A91	Unit HY10 model 257 complete	1
46	PT630A46	Screws TBEI 10.9 6X10 z	4				

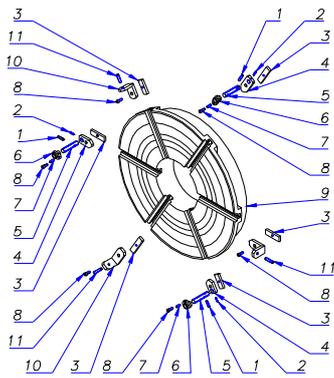
PT 630 Facing Tool , Code: PT630F				PT 630 Facing Tool , Code: PT630F			
Pos.	Code	Description	Qty	Pos.	Code	Description	Qty
1	PT630F01	Cable H07 RNF 4G1,5 TITANEX	1	38	PT630F38	Chain joint ½ x 3/16 TPM 084	1
2	PT630F02	Engine 3 ph. HP 1.5 B14 380V 1400rpm	1	39	PT630F39	Chain ½ x 3/16 TPM 084	1,8
3	PT630F03	Nut 25x1.5	1	40	PT630F40	False chain joint ½ x 3/16 TPM 084	1
4	PT630F04	Engine reducing gear	1	41	PT630F41	Disk with crown gear support	1
5	PT630F05	Screw TE UNI 5739 8.8 8x20 z	4	42	PT630F42	Screw tspi UNI 6109 5x12 a2	12
6	PT630F06	Facing tool stopper pin	1	43	PT630F43	6 holes blade	2
7	PT630F07	Hook for chain	1	44	PT630F44	Screw TCEI UNI 5931 8.8 10x100 zin	6
8	PT630F08	Facing tool stopper chain	0,2	45	PT630F45	Crown gear	1
9	PT630F09	Screw TCEI UNI 5931 8.8 4x12 zin	1	46	PT630F46	Screw TSPEI 5933 10.9 8x20 z	6
10	PT630F10	Washer fl UNI 6593 m 4x12x1,5 zin	3	47	PT630F47	Connecting box cover	1
11	PT630F11	Reducing gear shaft	1	48	PT630F48	Electric danger label	1
12	PT630F12	Tongue UNI 6604a c45 8x7x30	2	49	PT630F49	Chain tightener shaft	1
13	PT630F13	Pinion ½ x 3/16 Z=10	1	50	PT630F50	O-ring 3068 NBR 2.62x17.13 (115)	1
14	PT630F14	Screw STEI UNI 5923 45h 6x16 z	1	51	PT630F51	Spring for chain tightener shaft	1
15	PT630F15	Screw TCEI UNI 5931 8.8 4x10 z	20	52	PT630F52	Support for chain tightener shaft	1
16	PT630F16	Cable holder	3	53	PT630F53	O-ring 119 NBR 2.62x15.08 (616)	1
17	PT630F17	Facing stopper screw	2	54	PT630F54	Nut DIN 981 30x1.5	1
18	PT630F18	Facing stopper	2	55	PT630F55	Washer	1
19	PT630F19	Hook	1	56	PT630F56	Screw TSPEI 5933 10.9 6x16 z	1
20	PT630F20	Plastic handle	2	57	PT630F57	Pinion ½ x 3/16 Z=8	1
21	PT630F21	Screw TCEI UNI 5931 8.8 6x20 z	4	58	PT630F58	Chain tightener pinion pin	1
22	PT630F22	Safety switch bush	1	59	PT630F59	Screw TCEI UNI 5931 8.8 4x8 z	1
23	PT630F23	Safety switch	1	60	PT630F60	Omega length 45	1
24	PT630F24	Cable stopper PG11 163/11	2	61	PT630F61	Metal cable holder	1
25	PT630F25	Cable H07 RNF 3G1.5 TITANEX	1	62	PT630F62	Brass cable stopper PG13.5	1
26	PT630F26	Screw TCEI UNI 5931 8.8 5x35 z	2	63	PT630F63	Cable stopper PG13.5 163/13.5	1
27	PT630F27	Screw TCEI UNI 5931 8.8 6x20 z	4	64	PT630F64	Cable H07 RNF 4G1,5 TITANEX	5,3
28	PT630F28	Remote control switch 16A 400V	1	65	PT630F65	Terminal mm ² 6	1
29	PT630F29	Terminal NC 1	2	66	PT630F66	Connector M4 red	1
30	PT630F30	Terminal NA 1	1	67	PT630F67	Facing tool body	1
31	PT630F31	"Emergency-stop" label	1	68	PT630F68	Rivets tt UNI 7346 2,5x6,5 brass	4
32	PT630F32	Black selector 3 positions	1	69	PT630F69	label ITS - TECNODUE 80X25	1
33	PT630F33	Push button 40 RER	1	70	PT630F70	Ball bearing NBB 6028	2
34	PT630F34	Carter	1	71	PT630F71	Ring uni 7437 c70 210	1
35	PT630F35	Generic danger label	1	72	PT630F72	Ball bearing spacer	1
36	PT630F36	Technical data label	1	73	PT630F73	Disk	1
37	PT630F37	Serial no. label	1				

PT 630 HEATING MIRROR

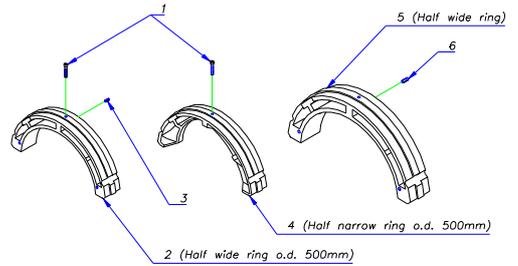


PT 630 Heating Mirror , Code: PT630T				PT 630 Heating Mirror , Code: PT630T			
Pos.	Code	Description	Qty	Pos.	Code	Description	Qty
1	PT630T01	Thermometer	1	37	PT630T37	Gasket for TLK38 thermostat 33X74	1
2	PT630T02	o-ring 2200 NBR 1.78x50.52 (033)	1	38	PT630T38	Thermostat box	1
3	PT630T03	Rubber handle D. 30	1	39	PT630T39	Nut UNI 5588 8 M 4 Z	8
4	PT630T04	Box with handles	1	40	PT630T40	Washer fl UNI 6593 4X12X1.5 z	12
5	PT630T05	Screw TCEI UNI 5931 8x45 a2	2	41	PT630T41	Contact maker 230V 50-60hz 7.5 Kwr	1
6	PT630T06	Washer grower UNI 1751 m8 z	2	42	PT630T42	Transformer 50VA 400-110-110CE	1
7	PT630T07	Fixing screws for box with handles	2	43	PT630T43	Rivett uni 9200 4X12 all	2
8	PT630T08	Insulating hose pipe D.5 1.5V	0,2	44	PT630T44	OMEGA lenght 45	1
9	PT630T09	Danger and compulsory label	5	45	PT630T45	SAREL box bottom	1
10	PT630T10	Cover for box with handle	2	46	PT630T46	Screw TC CR 7687 4.8 4x16 zin	8
11	PT630T11	Screw TCEI UNI 5931 4x8 a2	24	47	PT630T47	Red connector 4 mm ²	4
12	PT630T12	Insulating gasket FASIT 75 428X40X2	2	48	PT630T48	Yellow connector 5 mm ²	3
13	PT630T13	Probe PT100 2+2 wires 0,5	1	49	PT630T49	Yellow insulating pipe 1 mm ² P=8MM	8
14	PT630T14	Heating plate	1	50	PT630T50	Blue insulating pipe 1,5 mm ² P=8MM	3
15	PT630T15	Fixing support for box with handles	2	51	PT630T51	Connector 4 mm ²	5
16	PT630T16	Steatite terminal 4 mm ²	4	52	PT630T52	Black flame retardant wire 1,5 mm ²	5
17	PT630T17	Double red insul. pipe 2x1mm ² P=8MM	4	53	PT630T53	Y/G flame retardant wire 1,5 mm ²	0,5
18	PT630T18	Blue insulating pipe 2,5 mm ² P=8MM	3	54	PT630T54	Plate for connecting box	1
19	PT630T19	Steatite terminal 16 mm ²	4	55	PT630T55	Brass nut PG16 169/16	1
20	PT630T20	Brown insulating pipe 10mm ² P=12MM	2	56	PT630T56	Brass nut PG21 169/21	1
21	PT630T21	Black insulating pipe 6mm ² P=12MM	3	57	PT630T57	Cable stopper PG16	1
22	PT630T22	Washer UNI 6592 m 6 z	1	58	PT630T58	Cable H07 RNF 4G2.5 TITANEX	5,3
23	PT630T23	Steatite terminal 6 mm ²	1	59	PT630T59	Nut UNI 7473 8 m 4	4
24	PT630T24	Blue connector M6	1	60	PT630T60	Female connector	2
25	PT630T25	Screw TCEI UNI 5931 8.8 6x10 z	1	61	PT630T61	Nut UNI 5588 8 M 3 brass	4
26	PT630T26	Y/G Sylicon wire 2,5 mm ²	0,2	62	PT630T62	Connector UTG 012-8S	1
27	PT630T27	Screw for ground	1	63	PT630T63	Connector 8 pins	1
28	PT630T28	Cable H07 RNF 10G1,5 TITANEX	5,6	64	PT630T64	Screw TSPI UNI 6109 3x12 brass	1
29	PT630T29	Cable stopper PG21	2	65	PT630T65	Screw TCI UNI 6107 3x10 brass	3
30	PT630T30	Handle with hole for cable st.	1	66	PT630T66	Black plastic ring 99x2.5	8
31	PT630T31	Fixing screw for thermometer	2	67	PT630T67	Ring 3.5 type 0	1
32	PT630T32	ITS – TECNODUE 80X25 label	1	68	PT630T68	Ring 3.5 type 1	5
33	PT630T33	Electric danger label	1	69	PT630T69	Ring 3.5 type 2	2
34	PT630T34	Serial no. label	1	70	PT630T70	Ring 3.5 type 3	1
35	PT630T35	Technical data label	1	71	PT630T71	Ring 3.5 type 5	1
36	PT630T36	Thermostat TLK38	1				

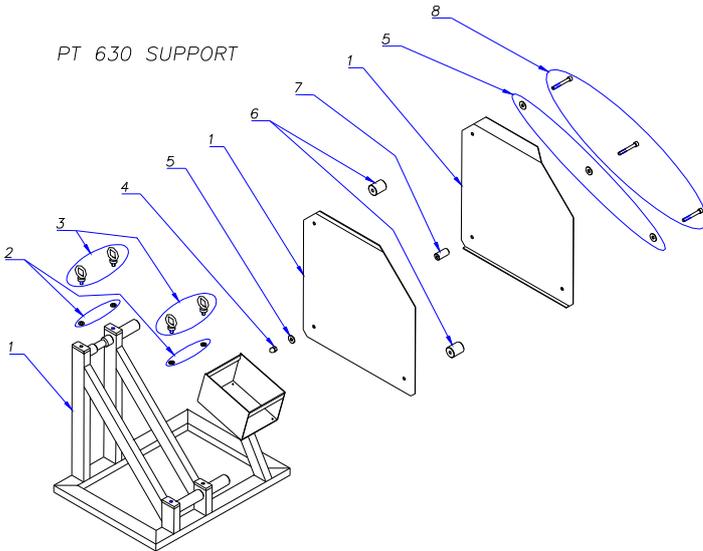
PT 630 STUB END DEVICE



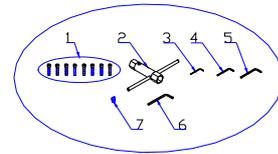
PT 630 HALF RINGS REDUCTIONS



PT 630 SUPPORT



PT 630 TOOLS KIT



PT 630 Stub Device , Code: PT630S				PT 630 Stub Device , Code: PT630S			
Pos.	Code	Description	Qty	Pos.	Code	Description	Qty
1	PT630S01	Screw STEI UNI 5927 45h 8x35 zin	3	7	PT630S07	Screw STEI UNI 5923 45h 8x20	3
2	PT630S02	Screw STEI UNI 5927 45h 5x8 zin	3	8	PT630S08	screw TCEI UNI 5931 8.8 8x20 zin	6
3	PT630S03	Plate for fixing s.e. braket	6	9	PT630S09	Plateau PT 630	1
4	PT630S04	Bracket	3	10	PT630S10	Fixing stub end bracket	3
5	PT630S05	Screw for fixing s.e. braket	3	11	PT630S11	Screw STEI UNI 5927 45h 10x35 zin	3
6	PT630S06	Upper stopper	3				

PT 630 Tools kit, Code: PT630TK				PT 630 Tools kit, Code: PT630TK			
Pos.	Code	Description	Qty	Pos.	Code	Description	Qty
1	PT630TK01	Screw TCEI UNI 5931 8.8 8x45 zin	8	5	PT630TK05	Setscrew wrench UNI 6753 s 5	1
2	PT630TK02	Socket wrench 30X32	1	6	PT630TK06	Setscrew wrench UNI 6753 s 6	1
3	PT630TK03	Setscrew wrench UNI 6753 s 3	1	7	PT630TK07	Plug ½ for hydraulic unit	1
4	PT630TK04	Setscrew wrench UNI 6753 s 4	1				

PT 630 Support, Code: PT630U				PT 630 Support, Code: PT630U			
Pos.	Code	Description	Qty	Pos.	Code	Description	Qty
1	PT630U01	Support	1	5	PT630U05	Washer UNI 6593 m 10x30x2.5 z	4
2	PT630U02	Washer UNI 6592 m 10 z	4	6	PT630U06	Spacer for support	2
3	PT630U03	Hook	4	7	PT630U07	Back spacer	1
4	PT630U04	Blind nut UNI 5721 8 m 10 z	1	8	PT630U08	Screw TCE UNI 5931 8.8 10x80 z	3

PT 630 Half reduction			PT 630 Half reduction		
Pos.	Description	Qty	Pos.	Description	Qty
1	Screw TCEI UNI 5931 8.8 8x25 zin		4	Half narrow ring av. sizes: 315,355,400,450x500mm	1
2	Half wide ring av. sizes: 315,355,400,450x500mm		5	Half wide ring av. sizes: 500x630mm	
3	Screw STEI UNI 5923 45h 6x20		6	Half wide ring av. sizes: 560x630mm	

This manual has been printed on December 2008

The technical data and information contained in this manual can be changed without any notice