SDI 1200

Operating Manual

This manual includes technical information only.

ITS has the right to make any modifications without any notice

SDI 1200

Hydraulic operated Tees derivation machine (pipe-pipe derated 0.7) suitable for fabrication for PE & PP tee derivation.
The configurable nature of the machine components let you a perfect welding of aligned or misaligned derivation.

	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 utilised, adjusted and keep in the perfect functioning conditions by skill operators.

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CE

SDI 1200

VOLT	400 – 3 phases
HZ	50
KW	6,7
A	36

SAFETY RULES ACCORDING TO DIRECTIVE CEE

(To be read carefully and apply while utilizing the SDI 1200)

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 utilised, adjusted and keep in the perfect functioning conditions by skill operators.

Warning - Rules - Obligations

1.Transport
Keep the maximum care, utilising mechanical aids, to move the machine.
Due to the high temperature of heating mirror and bushes (above 200°C) keep the maximum care when moving the machine. For each part of the machine please check the related chapter for more details.

2.Electric connections
The machine is operated by 400 Volts therefore be sure that the power supply socket and/or electric system are 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.
Check regularly the cables and the plug and in case substitute by qualified personnel.
Do not pull the cable to drag/move components of the machine

3.Environmental conditions
The working area must be clean and duly lighted.
It's very dangerous to utilise the machine in case of rain or in wheat conditions or even close to flammable liquids.

4.Clothes
Keep the maximum care while utilising 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.

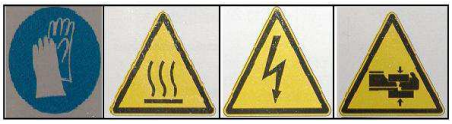
5.Correct machine's operation
Remember to check and read carefully the operating manual before utilising the machine and the accessories.

6.Keep always attention
After the heating mirror has been disconnected temperature will be hot for some minutes
Keep the maximum care while utilising the facing tool. Be careful to the blades , it's strongly suggested to use suitable gloves.
Avoid utilising 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.

7. Acoustic pollution
The acoustic pollution created by the engine of the hydraulic unit is inside permitted range.
In case of malfunctioning of the hydraulic unit the acoustic pollution could be increased. In these cases it is suggested to switch off the machine and check the state of the hydraulic unit, the required maintenance of the hydraulic unit must be achieved. If the problem does not disappear contact our technical department.
In any case we suggest you to acoustic 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



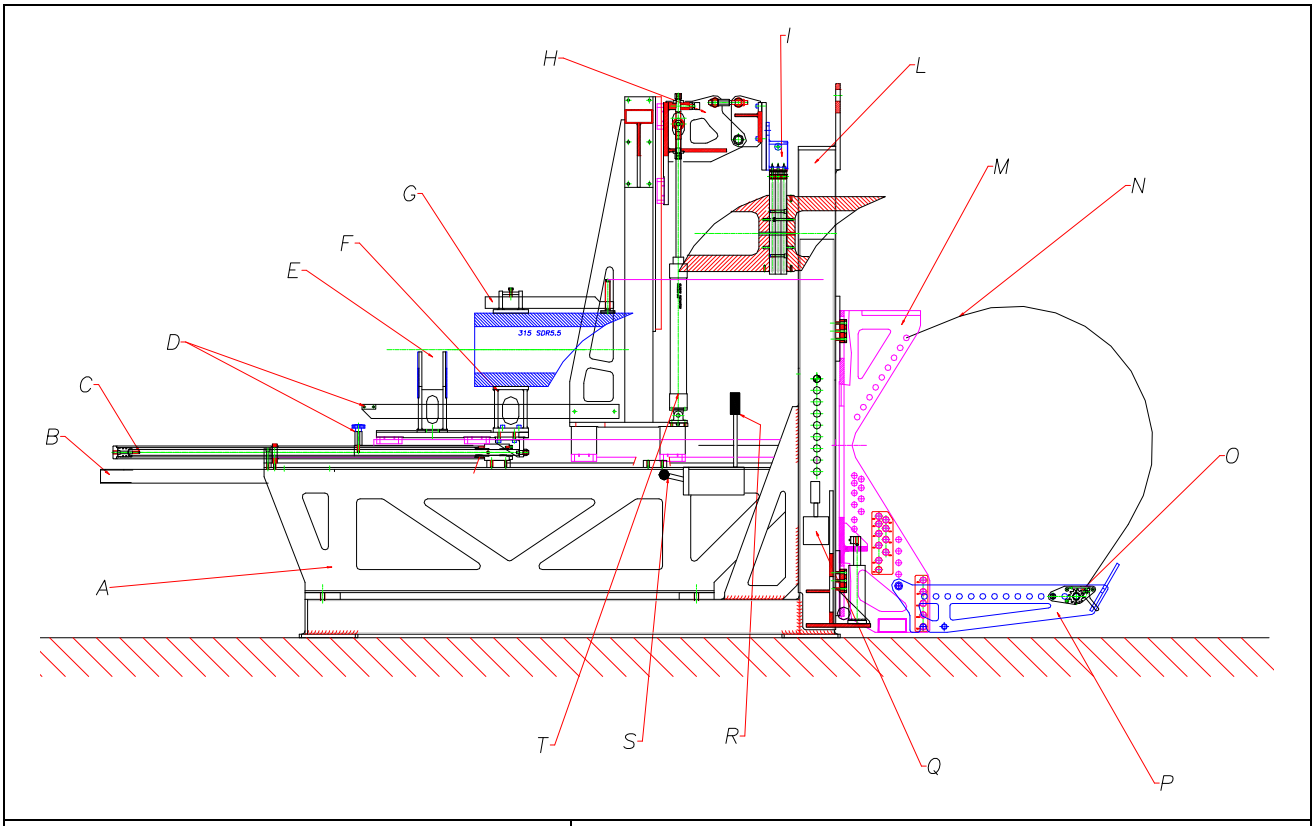
WEAR GLOVES | BURNS DANGER | ELECTRIC DANGER | SQUASHING DANGER

Technical Data

Welding range	
Derivation outside diameter	Ø 160 – 200 – 315mm
Derivation wall thickness	Ø 160-200 35mm
	Ø 315 57.5mm
Main pipe	From ø 250 to 1200mm
Electric Data	
Voltage	400 V 3PH
Frequency	50 Hz
Total Power Installed	6.7 KW 36 A
Heating Mirror	IP 43 13 KW 19 A
Hydraulic Unit double speed (2850 rpm)	IP 55 2,2 KW 5.7 A
Hydraulic Data	
Maximum Working Pressure	140 bar
Trolleys Cylinder's Section	12,57 sq. cm.
Pressure gauge range	0 – 160 bars
Pressure gauge precision class	1
Pump capacity	5 cc/rev.
Hydraulic Oil	ISO 46
Oil Tank	7 l
Mechanical data	
Trolley Maximum Stroke	1470 mm
Compressed air Data	
Minimum compressed air pressure	6 bars
Compressed air consumption	10 NL/h
Operating Data	
Outside temperature	0-45°C
Humidity (without condensation)	95 RH %
Stocking and transport range temperature	From -10° to 60°
Weight	
Basic machine	1620 kg
Dimensions (mm)	
Basic machine	4400x1400x2800 h

SDI 1200 – main components description

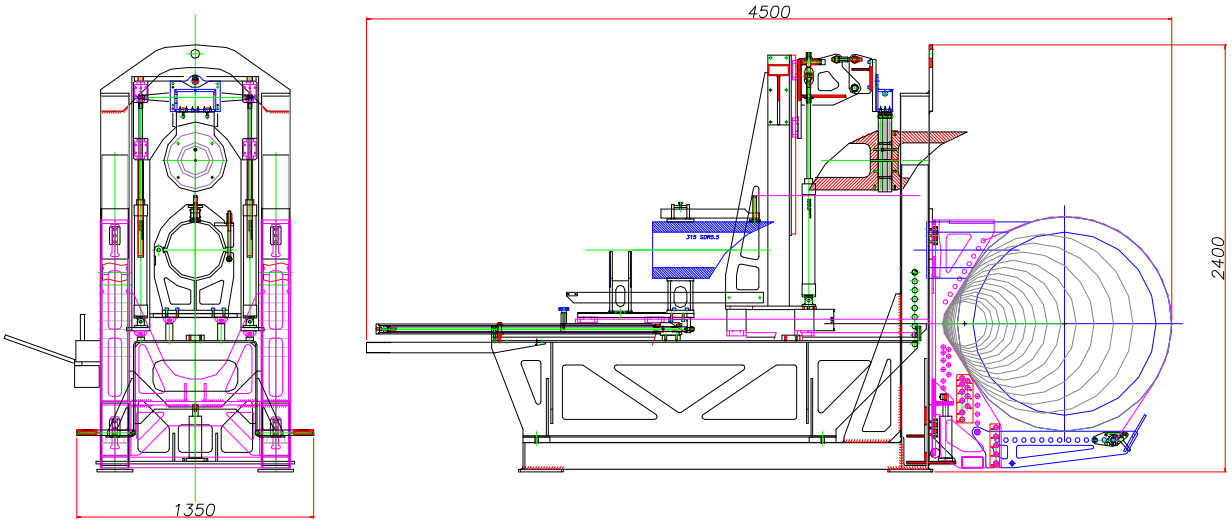
The draw below shows the main components of the machine, for more information on components check the following chapters:



A – Frame B – Cylinder's protection C - Cylinder D – Heating mirror disconnecting device E – Support for back part of pipe F – Derivation clamp G – Pipe anti-lift device H- Adjustable heating mirror support I – Heating mirror	L – Portal supporting the pipe M – Main pipe clamp N – Belt for fixing the main pipe O – Belt tensioner P – Pipe support shelf Q – Pipes (main pipe+derivation) alignment pump R – Control panel S – Lever for heating mirror lifting T – Cylinder for lifting the heating mirror

Machine's dimensions

The figure below shows the maximum dimensions of the machine.

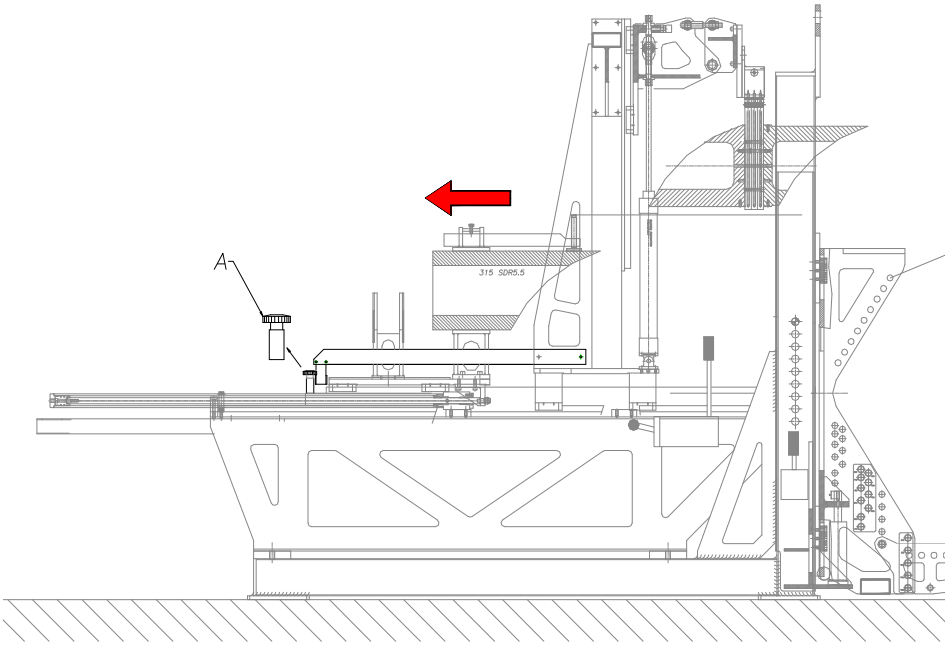


Machine's Description

1. Heating mirror disconnecting device and removal system

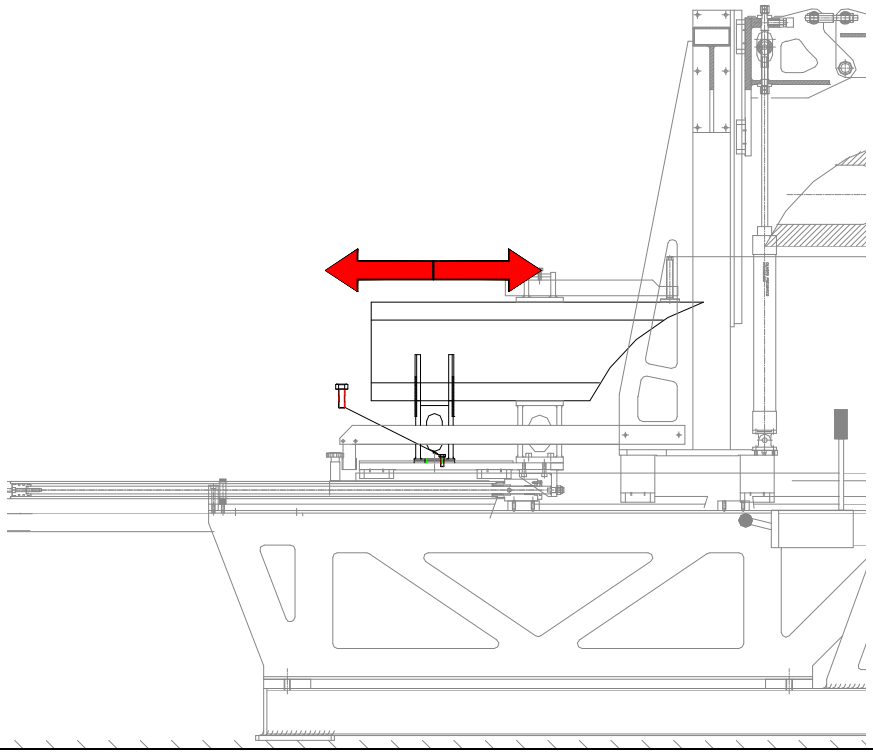
The machine is equipped with a heating mirror disconnecting device that can be easily disabled to let you assembly the bushes on the heating mirror. If you remove the lock A, the heating mirror trolley can be moved backward.

Before proceeding with a new welding, bring the heating mirror in forward position and place the lock A again.



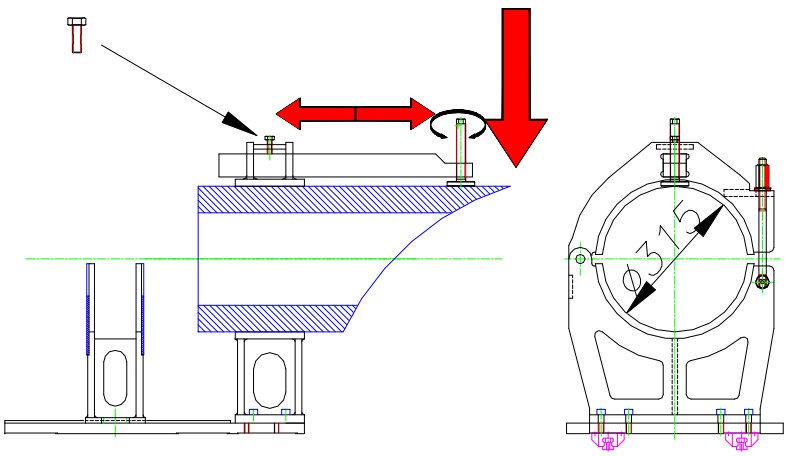
2. Support for back part of pipe

The machine is equipped with a support for the back part of pipe with adjustable position as per pipe length.
The support is supplied with three reductions one for each diameter of the derivation.



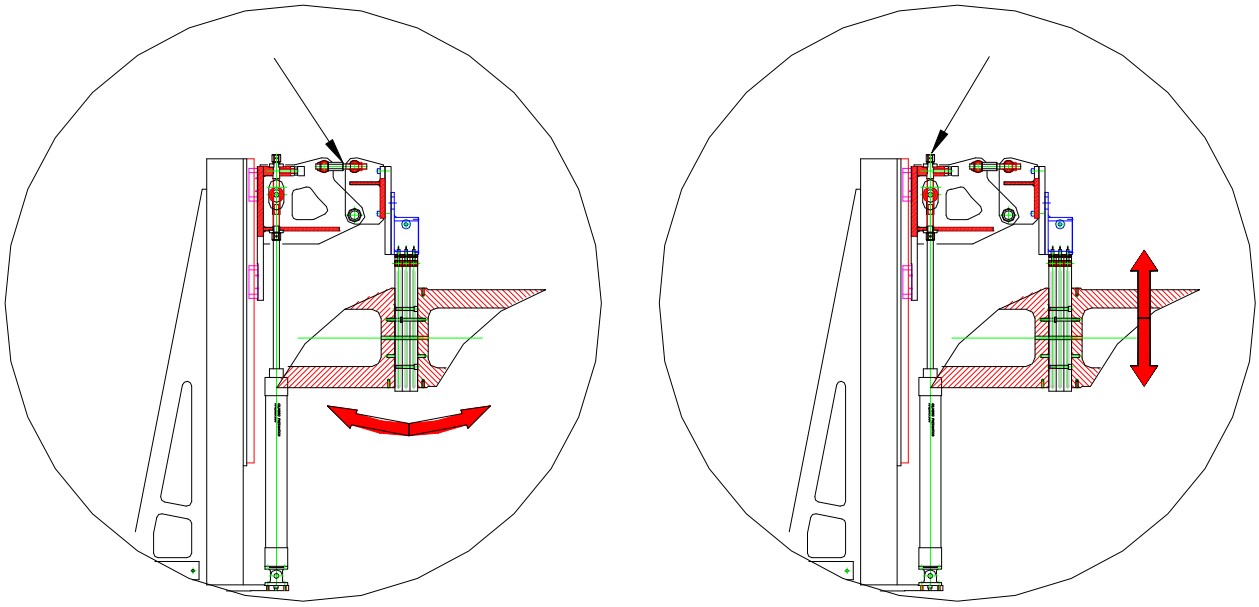
3. Derivation clamp

The clamp for derivation assembled on the machine can clamp pipes with an o.d. 315mm. Furthermore the machine has been supplied with set of reductions d. 160 & 200mm. The adjustable upper bar is necessary to keep in the right position the thinner part of the derivation during the welding phase.



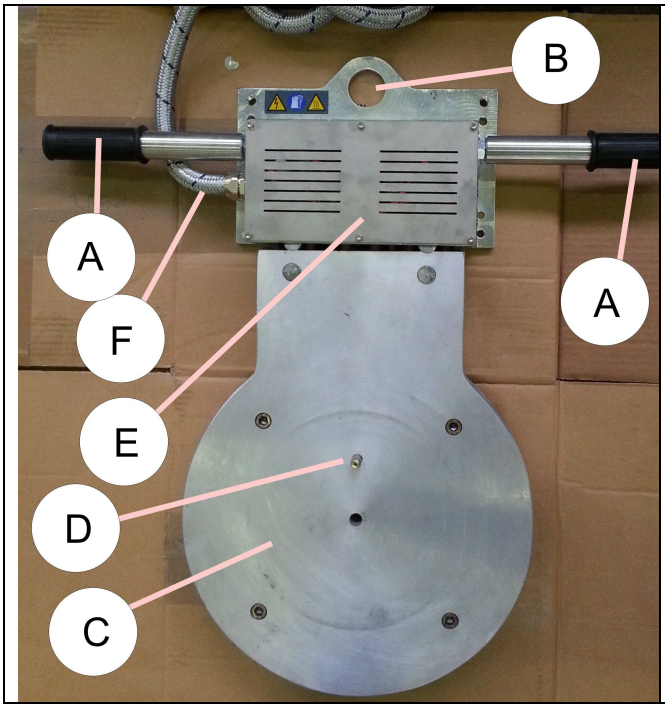
4. Adjustable heating mirror support

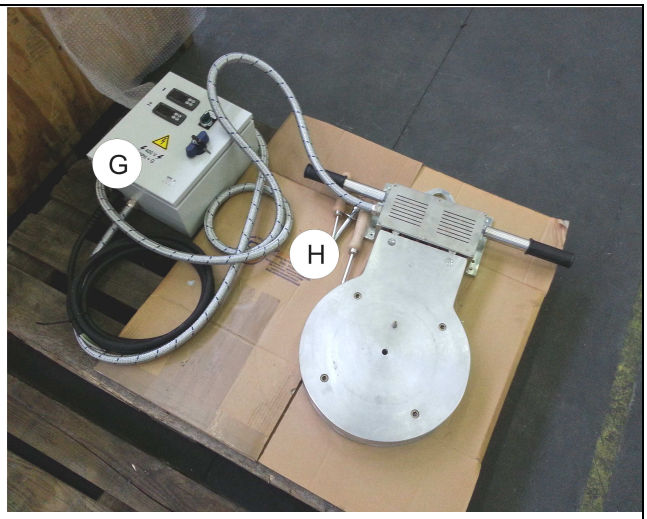
It is possible to adjust the high position and the tilt angle of the heating mirror as shown in figures here below



5. Heating mirror and PTFE coated bushes

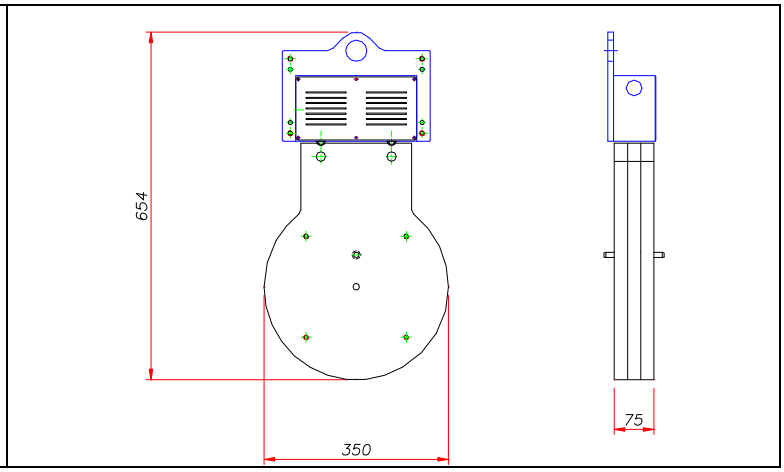
5.1 Heating mirror main parts description



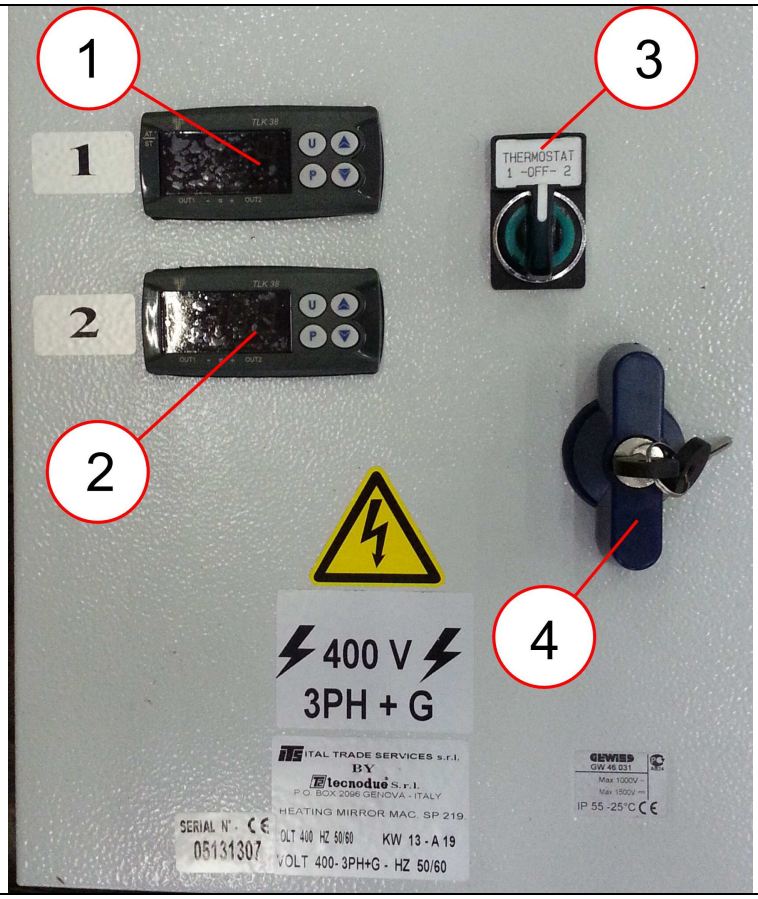


A – Handles (must be assembled only when you use the heating mirror outside the machine)
B – Lifting hook
C – Heating plate
D – Centering pin
E – Connections box
F – Power supply and connections cable
G – Electrical box

5.2 Dimensions

The drawing show the dimensions of the heating mirror	

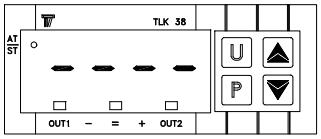
5.3 Main controls description

The electrical box is equipped with a 3 position selector (**3**), 2 thermostats (**1** & **2**) and a main switch (**4**). The positions of the selector are: OFF – Heating mirror switched off 1 – Temperature adjusted by thermostat no. 1. 2 – Temperature adjusted by thermostat no. 2.	

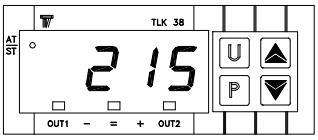
5.4 Electronic thermostat – different functions

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).



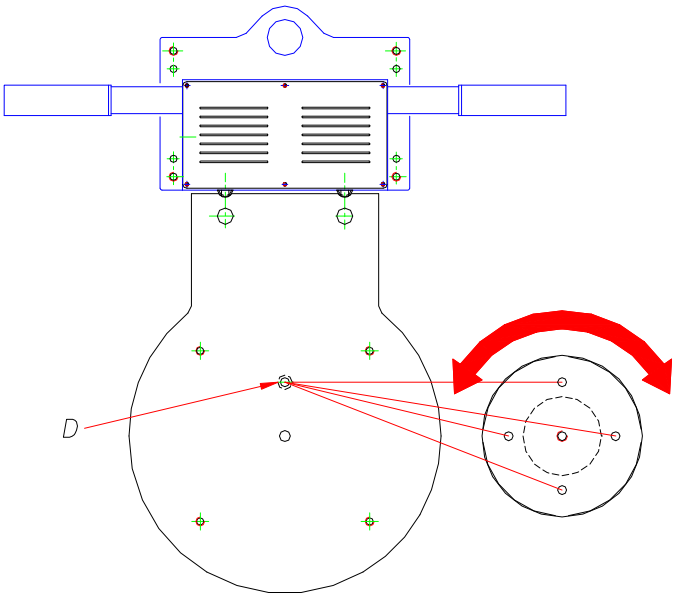
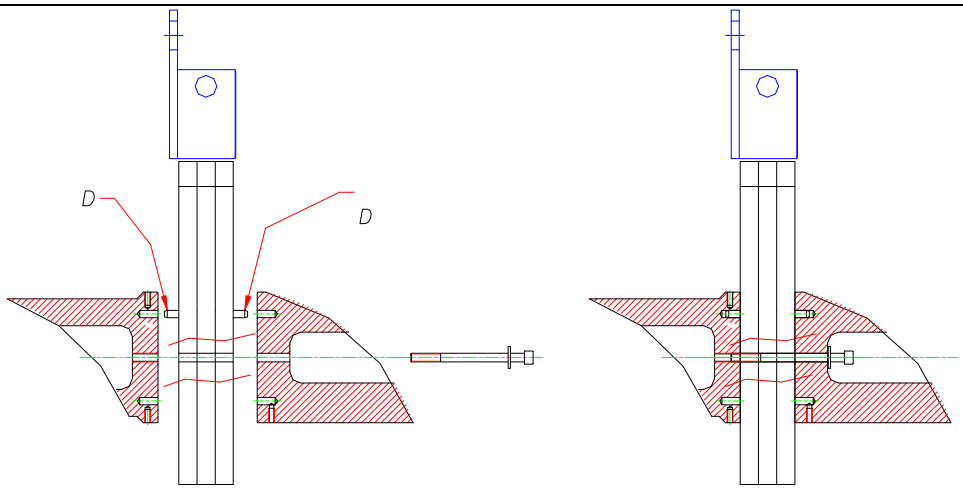
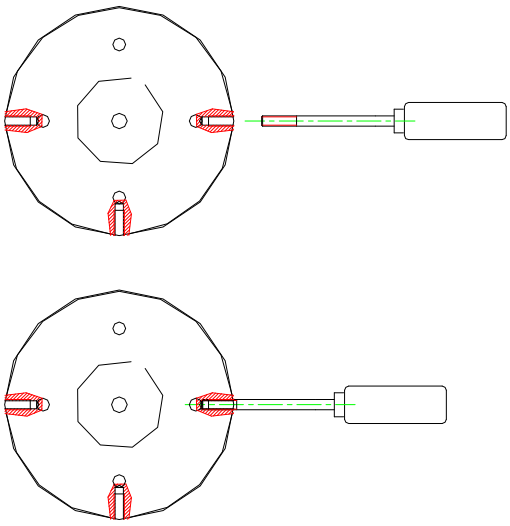
To display the actual set point value of the temperature stored by the thermostat, push the key **P.** The display will show alternately the
writing **'SP1'** and the **set point value of the temperature.** After 5 seconds the display will show again the real value of the heating
mirror temperature

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 possibile 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.

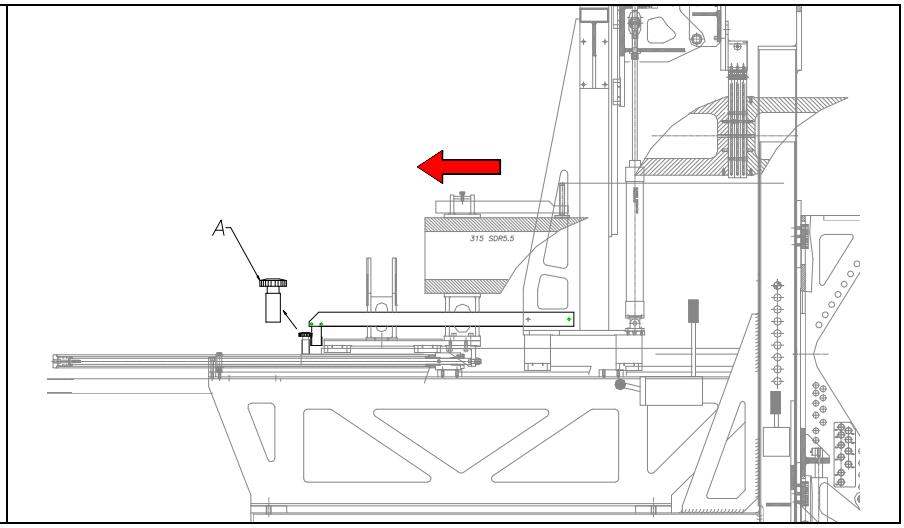
**Warning: On the thermostat display is always shown the actual value of the heating mirror temperature (and never the set
point value!)**

5.5 How to assemble and disassemble the bushes

On the heating plate is present the centering pin **D** to point the bushes in the correct way. It can be used with one of the four holes on the back part of each bush	
Use the supplied screw to assemble the bushes on the heating plate.	
To avoid the rotation of the bushes during the fastening operation of the central screw, you can use the accessory supplied as shown in figures.	

	Wait the cooling down of bushes before disassembling them. The cooling time could last for hours due to the big mass of the bushes. Check the temperature before disassembling the bushes

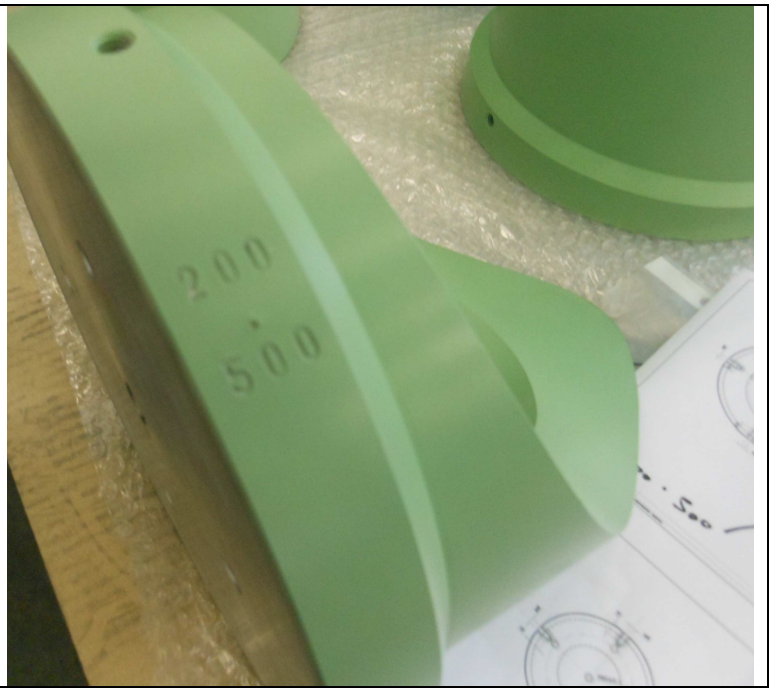
To ease the bushes assembling/disassembling operation, bring backward the heating mirror trolley as shown in previous chapter.



5.6 How to identify the bushes

On cylindrical part of each bushes there is stamped the main and derivation pipe dimensions

The picture show a bushes to weld a derivation pipe d. 200mm on a main pipe d. 500mm.

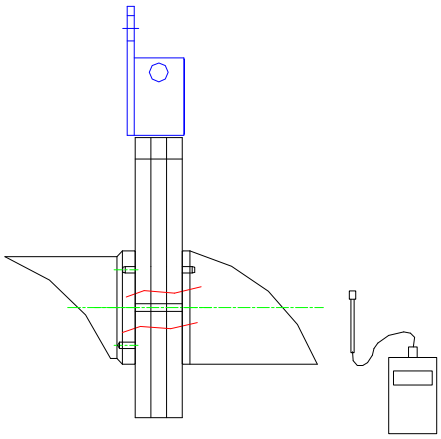


5.7 How to switch on the heating mirror

To switch on the heating mirror it is necessary to select the position 1 or 2 in the green selector of the connections box (**3**)
The thermostat 1 has been set up by the factory at 280°C while the thermostat no.2 the set up is at 230°C.
The double thermostat let a quick and easy selection between temperatures and speed up the heating up of bigger bushes.
The table below shows approximate time required for a complete heating up of each bush.
The times have been calculated considering standard working operations with ambient temperature around 20°
In any case it is always necessary to check the bush temperature before starting to weld.

Bush diameter	Suggested time in minutes before welding if you have selected the thermostat no. 1 (preset at 280°C)	Suggested time in minutes before welding if you have selected the thermostat no. 2 (preset at 230°C)
160	20	5 ÷ 10
200	30	8 ÷ 12
315	45	10 ÷ 15

5.8 Temperature checking

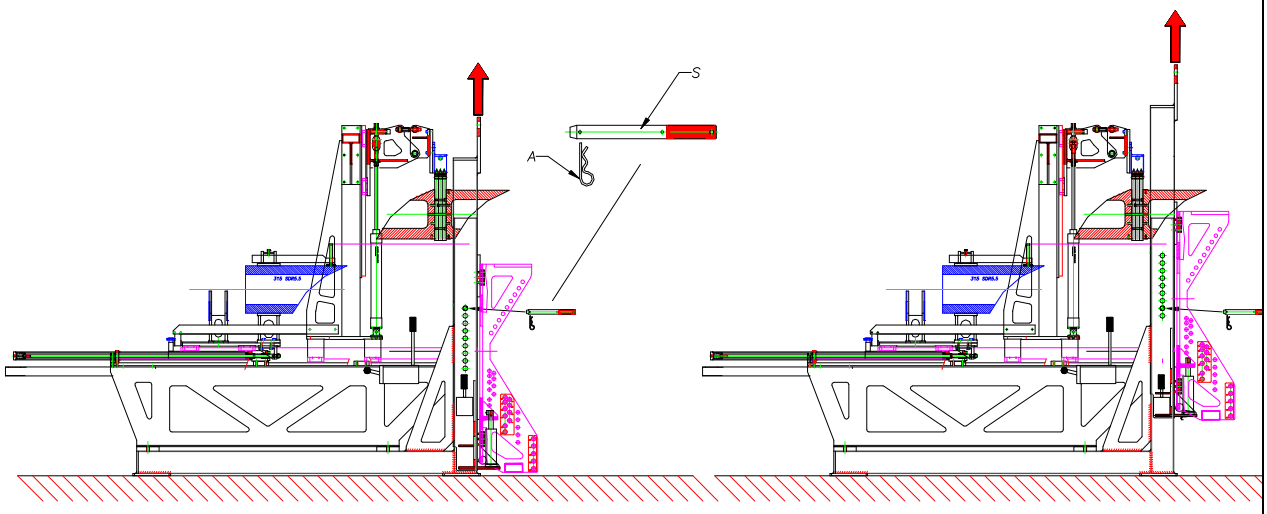
IMPORTANT Wrong temperature could affect the welding result Check always the bushes temperature before starting to weld. Use a pyrometer and make necessary adjustments	

6. Main pipe clamp

The main pipe clamp and pipe support shelf can be set up in consideration of the diameter of the main pipe. You can position the clamp at different heights to obtain aligned or misaligned welds. The alignment of the derivation pipes can be obtained by acting on a lever controlling a hydraulic cylinder.

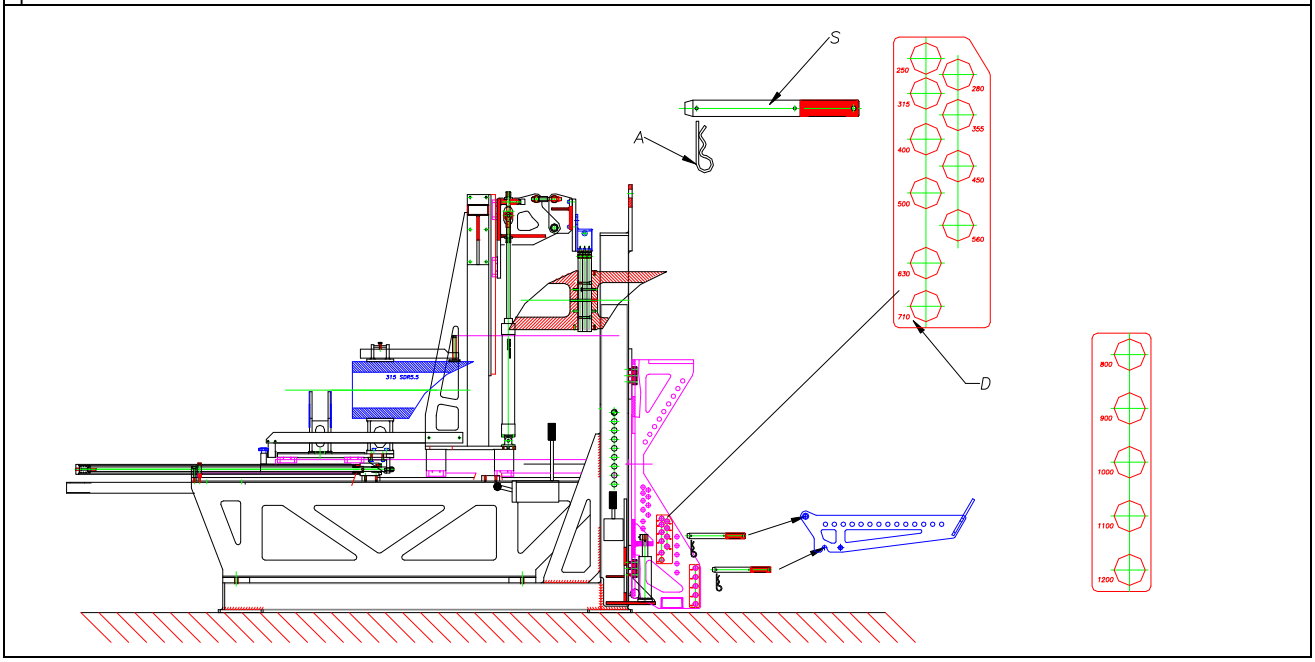
6.1 How to adjust the position of the main pipe clamp

The main pipe clamp can be positioned at different heights as per figure below
After fixing the position by the pin S use always the safety split pin A.



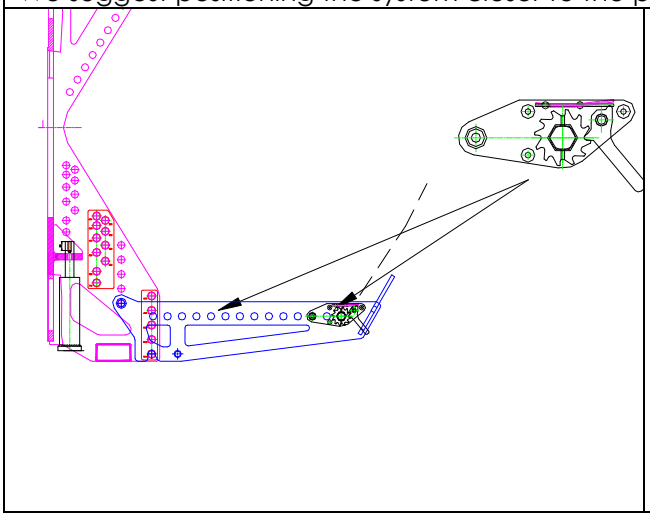
6.2 How to use the pipe support shelf

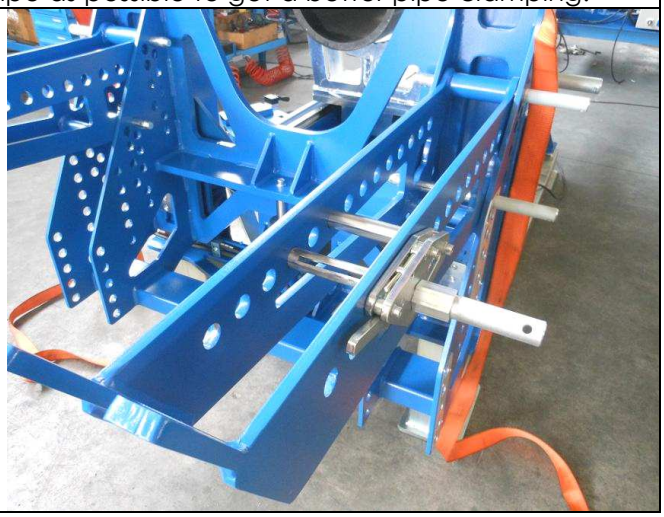
The pipe support shelves must be placed to the correct height with reference to diameter of pipe to be clamped.
After inserting the two pins S in the holes corresponding to the pipe o.d., use always the safety split pin A.



6.3 How to position the belt tensioner system

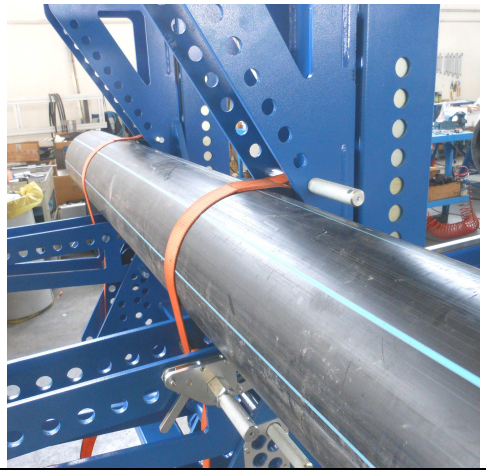
Inserting the belt tensioner system in the holes of the pipe supporting shelf
We suggest positioning the system closer to the pipe as possible to get a better pipe clamping.

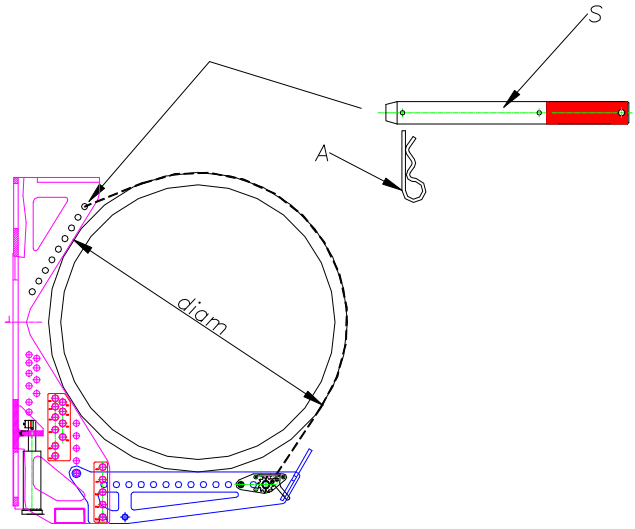




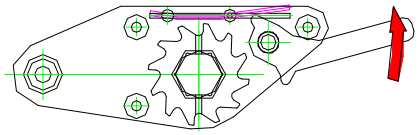
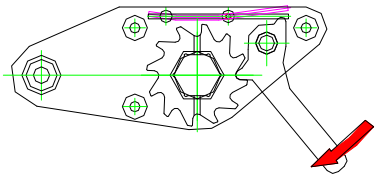
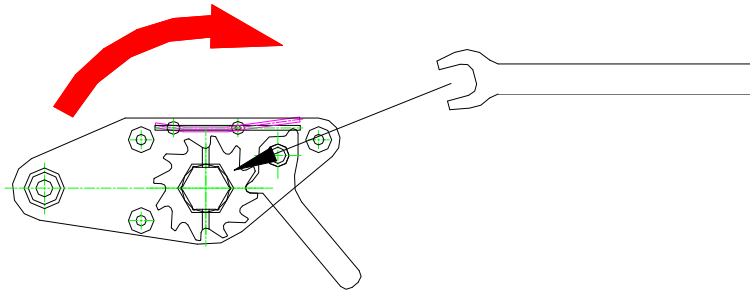
6.4 How to use the belts

Fix the belt by using one of the holes of the upper part of the main pipe clamp with reference to the pipe outside diameter. After fixing both pin S as per instructions above, always use the safety slip pin A.



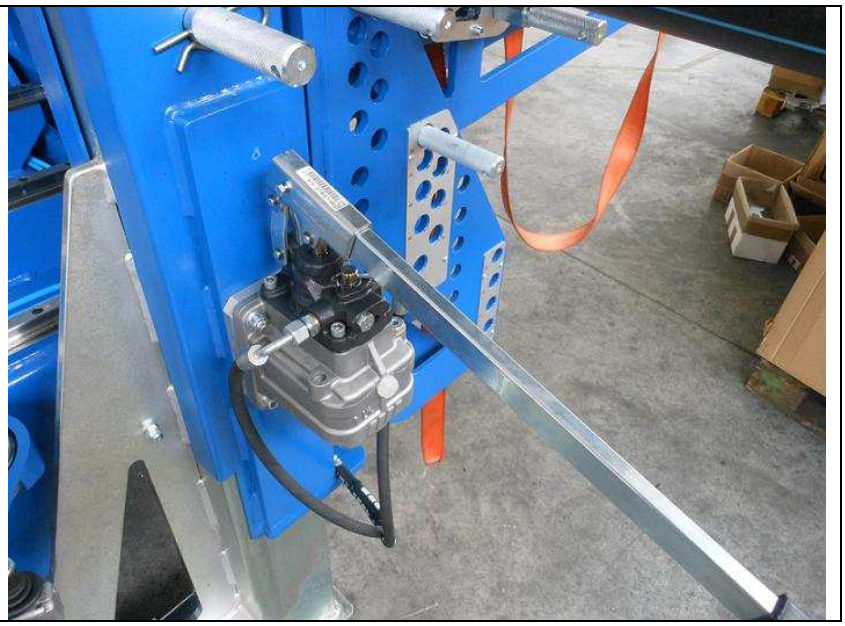


6.5 How to tighten the belts

After placing the belt tensioner system, follow this procedure:	
Insert the belt in the belt tensioner system.	
Lift the lever and start to wind manually the belt.	
Lower the lever and to complete the belt tightening by open end wrench	
To tighten the belt respect the verse indicated by the arrow.	
To release the belt tightening, use a open end wrench for increasing a little bit the belt tightening while you are lifting the lever	

6.6 Pipes alignment

To get a precise alignment between the main and derivation pipe the machine has been equipped with a hydraulic cylinder with manual pump

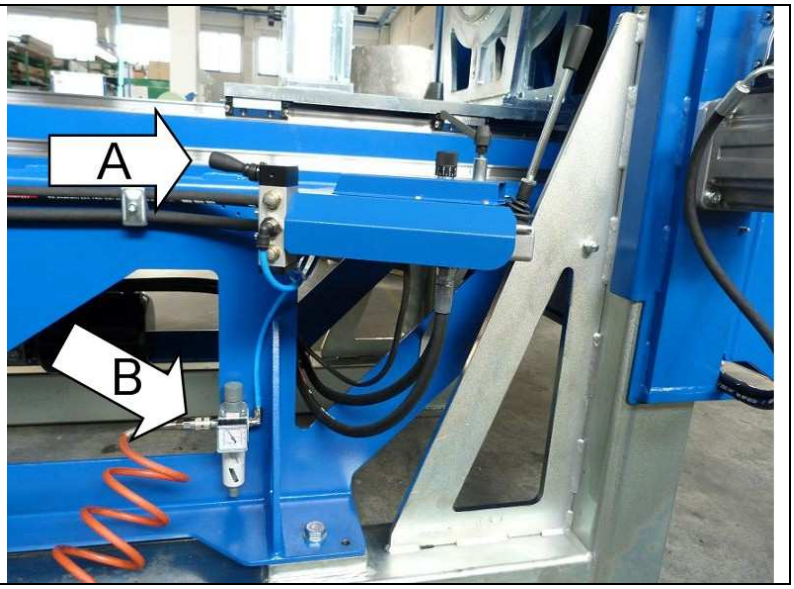


6.7 Control panel

The picture shows the control panel. The following chapter will instruct you how to use the control panel and will show the welding basis

6.8 Lever for lifting the heating mirror

The picture shows the lever (A) used to lift and lower the heating mirror. The pictures shows as well the air pressure regulator c/w coupler (B)



7. Machine use

7.1 Startup and shutoff

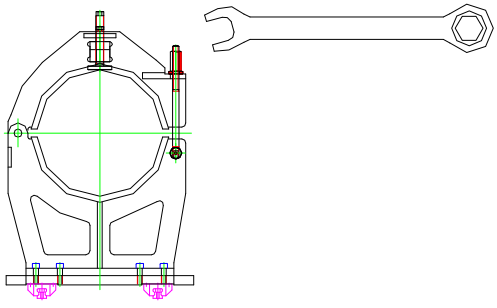
When you receive the machine, the machine is not ready to work, some actions are necessary to start using the machine.
Many parts of the machine have been protected by wax. Therefore by using a soft cloth and alcohol, remove the protective wax from the basic machine (cylinders rods, clamps, quick couplers), hydraulic unit (pressure gauge, body), hearting mirror (heating plate and handles), facing tool (blade and disks)
It is necessary to replace the steel plug of the hydraulic unit with the plastic plug supplied with the machine

	**Warning related to the machine shutoff and storage** **Always protect the machine from weathering.** **After long rest of the machine, always clean and lubricate the cylinders rods before the use**

7.2 Electric connections

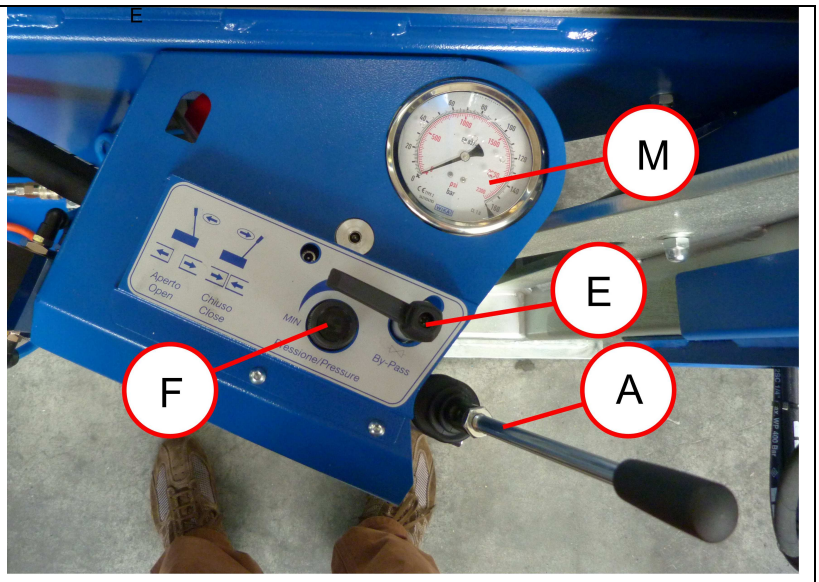
The power source must be equipped with adequate safety devices to avoid any damages to the machine. When you plug the machine keep the maximum care to the right connections of the wires:
The blue wire is the neutral
The yellow/green wire is the ground
After plugging the machine check the hydraulic unit engine rotation by acting on the control lever to close the trolleys. If you have properly connected the cables the pressure increases and trolleys start to close. In different case try to connect two phases in an inverted way.
Check that all the electrical cables are not in contact with hot surfaces of the heating mirror.

7.3 How to clamp the derivation pipes

The clamps are supplied with one manual tie rod on one side and a hinge on the other side. Use the supplied wrench to clamp the pipes.	

7.4 How to use the hydraulic controls of the control panel

The control lever **A** let you open and close the moveable trolley of the basic machine.
Bringing the lever to left (position with automatic return) you will open the moveable trolley at the maximum pressure set up in the hydraulic unit.
In central position (idle position), the engine is automatically switched off.
Bringing the lever to right (position with hooking) the trolley is closing, the hooking of such position allow the operator increase or decrease the pressure by acting on by pass valve E



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 decreases, while turning clockwise the pressure increases .
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 to the end stroke the by pass valve, the pressure will be blocked and the hydraulic unit will maintain the same pressure in case of engine has been switched off.
The pressure gauge **M** shows the current pressure of the hydraulic circuit.

8. Welding procedure

8.1 How to measure the inertial (drag) pressure

Before beginning 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 derivated 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 left position
b) By turning the lever **F (Hyd. Controls)** anticlockwise bring the pressure to zero, checking the pressure gauge
c) Turn clockwise the lever **E (Hyd. Controls)** until closing
d) Bring the lever **A (Hyd. Controls)** into right position (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

Set the welding pressure on the machine, close the trolleys (lever A in right position) and check if pipes are sliding or not!

8.2 Alignment of pipes

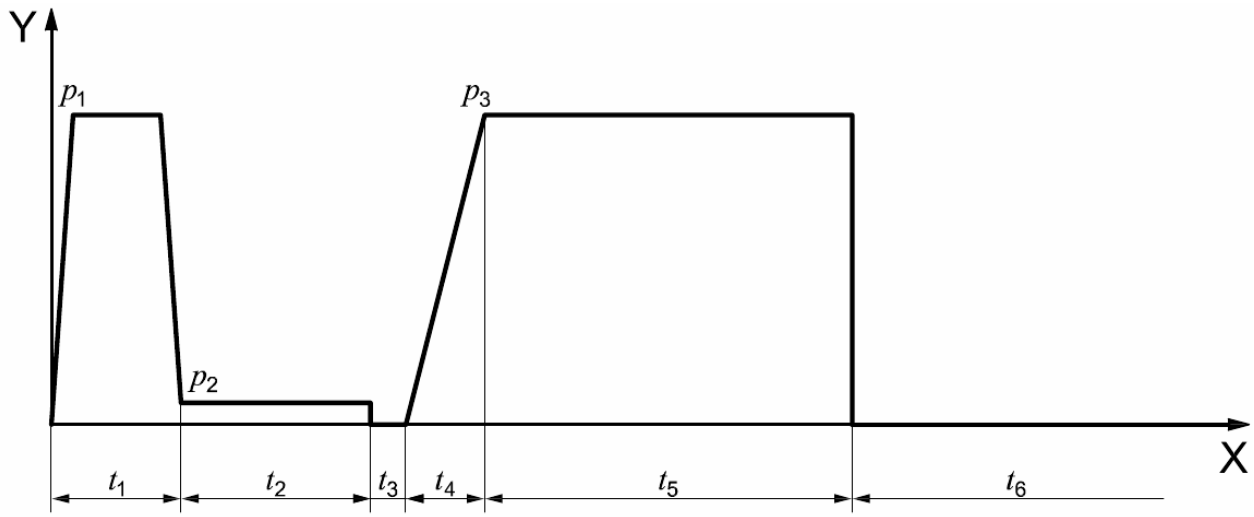
a) Completely open the movable trolley of the machine by means of acting the lever **A** and take it in left position
b) Position the pipes into the machine, check the alignment by approaching the surface to be weld, misalignment can be corrected as per instructions contained in previous chapters.

FOR GOOD WELDING RESULTS ONLY QUALIFIED/PREPARED PERSONELL MUST USE THE MACHINE. WE STRONGLY SUGGEST TO TRY MANY TIMES TO BECOME FAMILIAR WITH THE MACHINE.

8.3 Welding cycle

The welding phase is composed by 5 phases with 5 different times:
PHASE 1 = t1 = Time requested for the bead formation with the specified wall thickness
PHASE 2 = t2 = Time requested for the continual heating
PHASE 3 = t3 = Time requested for the change over
PHASE 4 = t4 = Time requested for bringing up the pressure
PHASE 5 = t5 = Time requested for cooling down

Pressure-Time diagram for butt welding



PHASE 1 = Initial bead-up time t1

a) Fit the heating mirror taking care that the temperature of the surfaces is the one selected
b) Bring the lever **A (Hyd. Controls)** to right position in order to have the bead formation as per attached table, this operation must be done with the true welding pressure value: (Inertial pressure + **P1**).
c) Check the Bead formation wall thickness according to the attached welding table

PHASE 2 = Heat soak time t2

a) After bead formation act on lever **E (Hyd. Controls)** anticlockwise in order to bring the pressure nearly to zero and proceed to the heating time **t2** at pressure **P2**

PHASE 3 = Heater plate removal time t3

a) Elapsed the heating time at pressure **P2** bring the lever **A (Hyd. Controls)** to left to open the trolley and remove the heating mirror and immediately bring the lever **A** to right position and acting on lever **E** clockwise put in contact the two pipes

PHASE 4 = Time to achieve fusion jointing pressure t4

a) Achieve the true welding pressure value: (Inertial pressure + P1 = P5) by checking the pressure gauge, This operation must be done
according to the time indicated into the attached welding table.

PHASE 5 = Minimum cooling time in the machine under pressure t5

a) Bring the lever **A** to central position 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
b) Elapsed the cooling time by acting on lever **E** anticlockwise bring the pressure to zero.
c) Take away the pipes welded

PHASE 6 = Minimum cooling time out of the machine t6

d) A further cooling time out of the machine and before rough handling may be recommended but in most cases
is not necessary with these cooling times.
e) Based in our experience, we suggest to wait the same minimum time requested for the cooling in the machine under pressure before rough handling the pipes

Important !!!
In case of any doubt please refer to the specific instructions

9. Maintenance

9.1. Basic machine

It's strongly suggested to keep always the machine clean with particular care of the bolts, the cylinder's heads and quick couplers. To clean the basic machine we suggest you a soft clean soaked with not aggressive liquid hydrocarbons.

Warning: Never use water to clean the components of the machine!!!

9.2. Heating mirror

Please take care on handling the heating mirror and bushes 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

9.3. Hydraulic unit

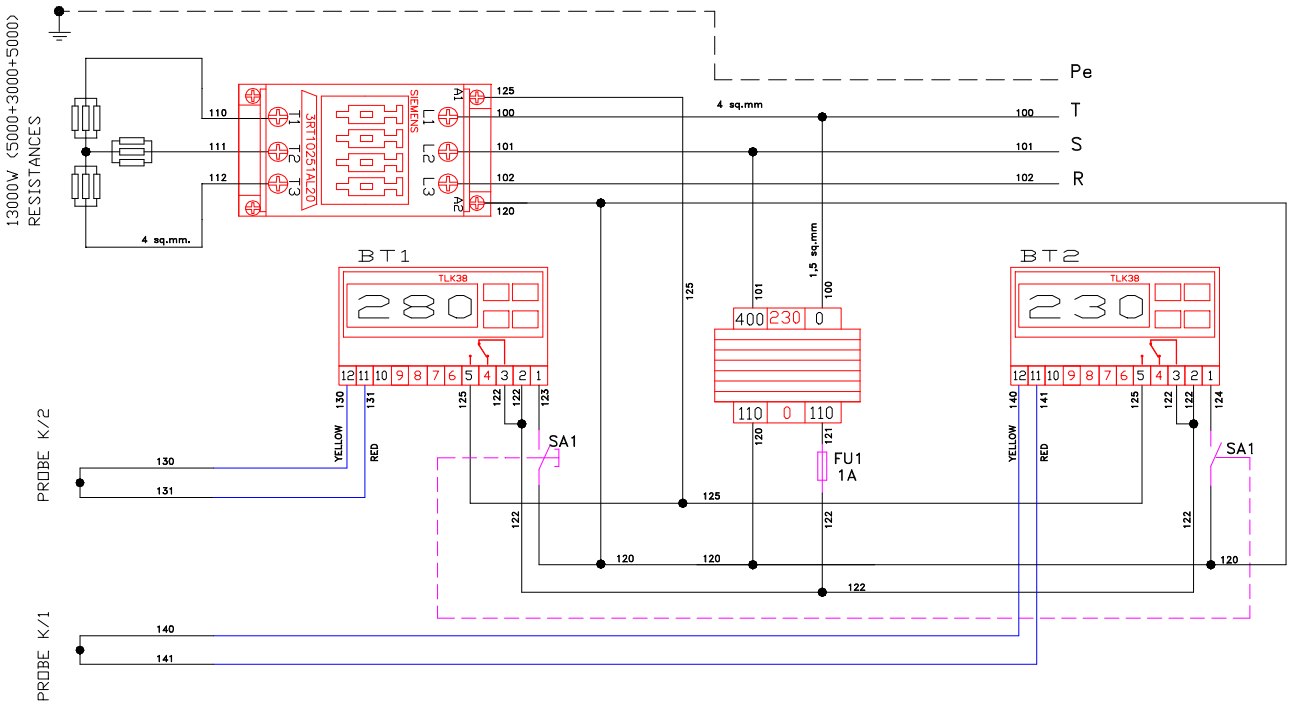
The hydraulic unit does not need particular maintenance nevertheless the following instructions must be followed:
1. Check periodically the oil level, by removing the plug (the correct oil level is 5 cm under the plug). In case add with oil type:
   ESSO NUTO H 68,SHELL TELLUS 68,MOBIL DTE 26,AGIP OSO 46
   The level should not be lower than 5 cm from the tank maximum level.
   A checking every 40 working days it's strongly suggested.
2. Replace totally the oil every 12 months or after 2000 working hours.

Suggested maintenances for SDI 1200 machine

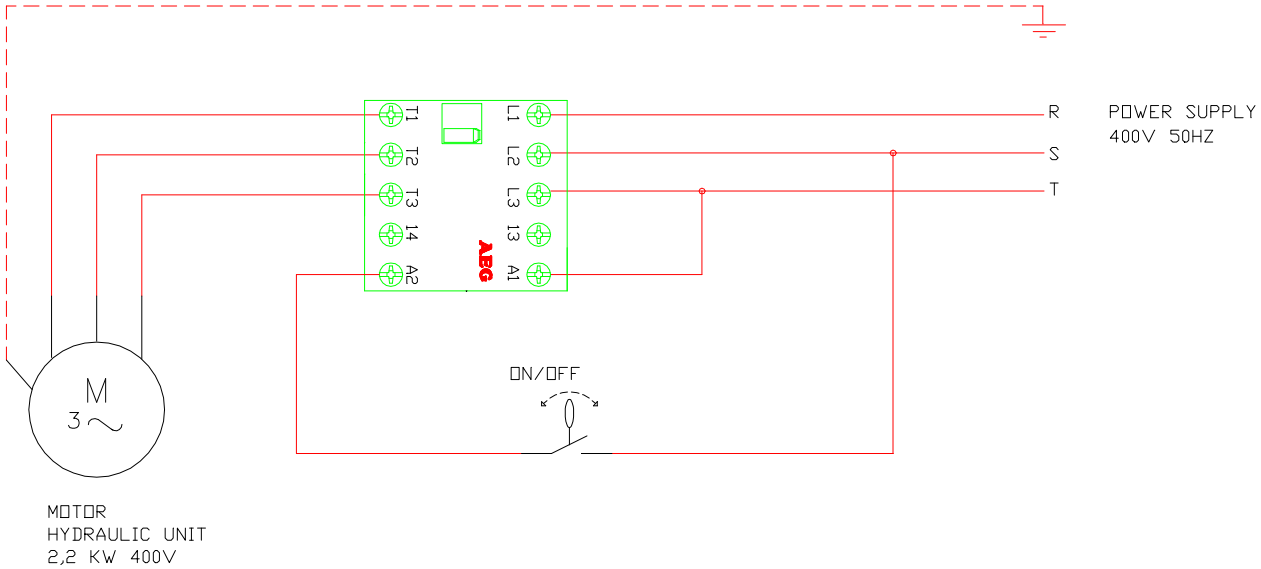
	AT THE MACHINE STARTUP	IF NECESSARY	DAILY	WEEKLY	MONTHLY	YEARLY
Cylinder's road cleaning				X		
Basic machine cleaning				X		
Tie rod cleaning & lubrication					X	
Screws tightening check up						X
Heating plate cleaning				X		
Heating plate surfaces check up			X			
Cables check up	X				X	
Oil level check up				X		
Oil replacement						X
Oil filter replacement		X				

10. Wiring diagrams

10.1. Heating mirror wiring diagram



10.2. Hydraulic unit wiring diagram



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