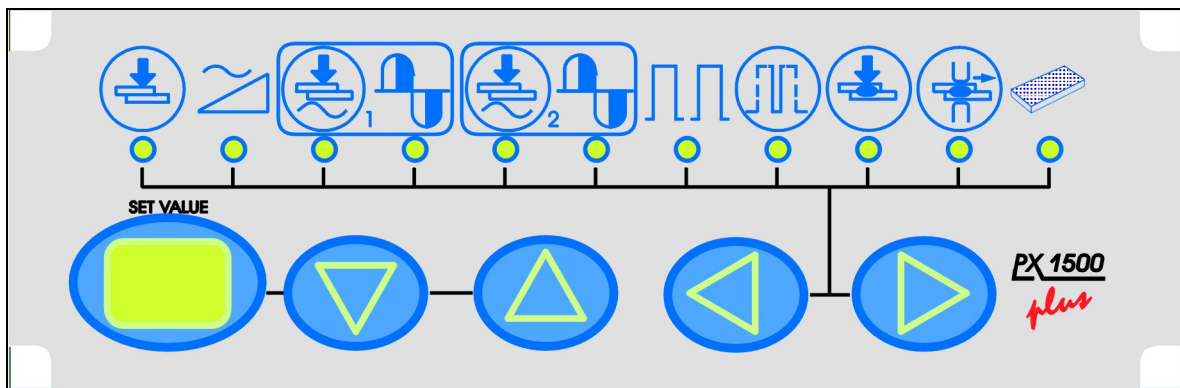




3.7 DESCRIPTION OF THE WELDING CONTROL UNIT

PX1500 *plus* PX1500P *plus*





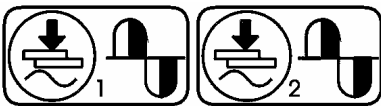







DESCRIPTION OF THE SYNOPTIC PANEL

The synoptic panel is divided in two parts. The top shows the graphical symbols of the functions available as well as the LEDs signalling the function selected. The bottom part has the four arrow keys for programming and a two-digit display that shows the value of the function selected.



DESCRIPTION OF THE FUNCTIONS

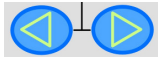
PX1500-PX1500P *plus* are timers that controls the welding cycle . A mains period is the timer's unit of time, corresponding to 1/50th of a second (50Hz). If, for instance, a squeeze time of 50 periods is set, time will be equal to 1 second.

	<p>Squeeze time (0-99 periods): it is the time needed by the welding machine's electrodes to come into contact with the piece to be welded and to exert the welding pressure Melted material will squirt if this time is too short.</p>
	<p>Current rise time (0-20 periods): Weld time with growing current increase. If this value is not zero, welding current will gradually reach the value required during risetime. This technique is used when welding extra thick sheets that are not well matched together, or for welding steels</p>
	<p>Adjustment 1-2: Welding time and current, together with the force on the electrodes, are the most important parameters to make a spot weld. If the thickness of the pieces to be welded differ then (at least) the welding current has to be modified, leaving all the other parameters as they are. This is why PX1500 plus has two times and two different currents. Adjustment 1 or Adjustment 2 are selected automatically by the welding control if either an additional foot pedal or a selector are fitted. If not, only Adjustment 1 is selected.</p>
	<p>Weld time (0-99 periods): time during which the pieces to be welded have welding current passing through them.</p>
	<p>Power adjustment (0-99%): The value of the welding current is determined as a percentage of power.</p>
	<p>Number of pulses (1-20): weld time is repeated without opening the electrodes, according to the value set. Attention: this function cannot be used if weld time is longer than 20 periods</p>
	<p>Cold time (0-99 periods): pause time between welding pulses.</p>
	<p>Holding time (0-99 periods): time during which the electrodes stay closed after weld time.</p>
	<p>Pause time (0-99 periods): if this time is 0, the welding machine will carry out a single welding cycle even if the START signal persists. If this time is not 0 the welding cycle will be repeated automatically. In such a case, pause time determines the interval between one cycle and another.</p>
	<p>Energy function (0-1): By setting value 1 the "energy compensation" function is enabled to facilitate the welding of dirty or oxidised sheets. This function is disabled if 0 is set.</p>



PROGRAMMING

When the control is not carrying out a welding cycle it can be used to programme or modify welding parameters.



Simply press the key to select the parameters of the welding cycle wanted.

The illuminated green LED under the graphical symbol highlights the function selected.



The SET VALUE display shows the value of the function selected. With keys the value contained in the SET VALUE is either increased or decreased.

OPERATING INSTRUCTIONS

When the welding machine is turned on **PX** carries out a test on all the indicator lights. The SET VALUE display shows the software version installed.

Subsequent to self-testing, **PX** returns as it was prior to turning off; simply press START for the welding machine to start the work cycle.

During welding **PX** displays all the phases of the cycle by turning the function LEDs on in sequence.

SELECTING THE WELDING PROGRAMME (only for the PX1500P *plus* version)

PX1500P can carry out nine different welding programmes.



To select the one you want, press the key several times until the display starts flashing.

The PX1500P will now display the active programme.



If you wish to recall a different programme use the keys selecting a value between 1 and 9.



DESCRIPTION OF CONTROL CONNECTIONS

No.	name	Description
4	PRG1 (in)	Start cycle with time-current 1 (active when low)
8	PRG2* (in)	Start cycle with time-current 2 (active when low)
7	SPOT (in)	Start cycle with time-current 2 without solenoid valve EV1 (active when low)
2	WELD (in)	Welding time enable (active when low)
17	WNW* (in)	Excludes the current from the welding cycle (active when low)
12	SAFE (in)	Safety input: if high, cycle is not possible and display "00" flashing
5	SQZ (in)	When active, change status of output EV1
25	PSQZ* (in)	When active, change status of output EV2 (if SW 1.1 = ON) If SW1.1 = OFF EV2 is "on" if the input PSQZ is active
16	WEND* (out)	End of welding time: become low after the welding time; it will be active till the start signal (PRG1 or PRG2) are active (open connectors 500mA max)
15	CEND* (out)	End cycle: become low after the welding time; it will be active till the start signal (PRG1 or PRG2) are active (open connectors 500mA max)
1-3-6-11-18	GND	Ø volt, common line for all the inputs
22-23	+24V	Supply voltage (24V dc 500mA max)
24	C+EV1	COMUNE (+24V EV1 Elettrovalvola accostaggio)
13-14	-EV2+EV2* (out)	EV2 supply (extra stroke cylinder) 24V / 7W
9-10	-EV1+EV1 (out)	EV1 supply (welding stroke) 24V / 7W
19-20	TAEN-TAEN (in)	Input signal for welding current sensor
26-27	Vac IN	Connections to supply control (24V ac) from external source: JP8-JP9 must be removed
21	TRG	Firing signal for external SCR firing module : JP7 must be removed if this signal is used
L1		Supply phase L1-400V 50/60 Hz
L2		Supply phase L2-400V 50/60 Hz
PE		Protection earth connection

(*only PX1500 *plus* and PX1500P *plus*)

DESCRIPTION OF DIP-SWITCHES FUNCTION ON PX1500 *plus* - PX1500P *plus*

SOFTWARE VERSION 2.0

		OFF	ON
SW1.1	Out ev2	Monostable	Bistable
SW1.2	Energy compensation	Disabled	Enabled
SW1.3	Cos fi adjustment	Minimum	Maximum
SW1.4	Time unit	1 cycle	½ cycle
SW1.5	Pause time	Enabled	Disabled
SW1.6	Out ev1	Free	EV1=on if EV2=on
SW1.7	First half cycle delay	3.5 msec.	4 msec.
SW1.8	Seam welding operation	Not	Yes

DESCRIPTION OF JUMPERS ON PCB

	CLOSED	OPEN
JP7	Internal firing circuit enabled	Internal firing circuit disabled
JP8-JP9	Internal supply transformer enabled (parallel jumpers)	Internal supply transformer disabled (parallel jumpers)



3.8.1 TROUBLESHOOTING AND A GUIDE TO ELIMINATING PROBLEMS IN THE WELDING CYCLE

PROBLEM	CAUSE	REMEDY
The control unit does not turn when the main switch has been turned on.	<ul style="list-style-type: none">• No electricity• Line fuses have blown• Fuses on the control unit have blown	<ul style="list-style-type: none">• Check mains voltage and soundness of the fuses
The control unit turns on but when the push button is pressed the welding cycle fails to start.	<ul style="list-style-type: none">• Mains voltage is too low	<ul style="list-style-type: none">• Check mains voltage and compare it with the machine's rating plate data.
The control unit turns on and the SET VALUE display flashes "00"	<ul style="list-style-type: none">• The thermostats have tripped• Pedal microswitch is faulty	<ul style="list-style-type: none">• Welding programming time is too long• Change the microswitch
Squirts of material when the electrodes come into contact	<ul style="list-style-type: none">• Squeeze time is too short• Electrodes' pressure is too low• SCR has short circuited	<ul style="list-style-type: none">• Increase squeeze time• Increase force on the electrodes• Change the SCR
While you are welding there is a loud noise coming from the welding transformer and the line fuses blow	<ul style="list-style-type: none">• SCR has failed	<ul style="list-style-type: none">• Change the SCR• Change the control card



3.8.2 HOW TO ELIMINATE WELDING DEFECTS

DEFECT	CAUSE	REMEDY
Squirts of melted material	<ul style="list-style-type: none">• Squeeze time is too short• Force on the electrodes is too weak• Welding current is too high• Insufficient contact of the electrodes	<ul style="list-style-type: none">• Increase squeeze time• Increase force on the electrodes• Reduce welding current
The mark on the welded pieces is too pronounced	<ul style="list-style-type: none">• Electrodes' diameter is insufficient• Force on the electrodes is too strong• Welding current is too high• Welding time too long	<ul style="list-style-type: none">• Change the electrodes with ones of a suitable diameter• Reduce pressure• Reduce welding power (time and current)
Spot strength is not good enough	<ul style="list-style-type: none">• Weld time is too short• Current is too weak• Electrodes' diameter is too big• Excessive force on the electrodes• Secondary circuit contacts are dirty	<ul style="list-style-type: none">• Increase weld time• Increase welding current• Reduce electrode diameter• Reduce electrode force• Clean the secondary circuit
Deformed electrodes	<ul style="list-style-type: none">• Weld time is too long• Excessive force on the electrodes• Excessive current• Insufficient contact area• The electrodes' copper alloy is too weak	
Craters in the welding core	<ul style="list-style-type: none">• Holding time is too short• Insufficient electrodes force• Material is dirty	



4. MAINTENANCE INSTRUCTIONS

4.1 MAINTENANCE INFORMATION

Maintenance personnel must be qualified, know the welding machine and work without modifying the safety of the product. The maintenance person must also respect the general accident prevention rules and regulations.

Small maintenance jobs

Use a fine grain file to keep the electrode tips free from ferrous waste and from the small craters that form. Restore electrode diameter to its original size because welding tends to widen it.

4.2 GUIDE TO MAINTENANCE

Daily checks

- clean surfaces that are dirty with oil, grease and water.
- clean the area around the welding machine
- clean any transparent guards
- make sure that all the protection devices are in their place and working properly

Attention: **do not squirt jets of water on the welding machine**
 do not use solvents to clean the painted parts

Electrical system and welding control unit

- check condition of the protection circuit and tightness of the "PE" terminal
- check condition of the electric contacts (microswitches)
- check condition of the setting keypads/potentiometers
- see if there is any noise coming from secondary connections that have not been fixed properly
- check that all the signalling lights are in proper working order

Compressed air circuit

- check for any air leaks
- check line pressure, welding pressure, force on the electrodes
- empty the air line filter
- check lubricator oil level (if there is one)

Mechanical parts

- lubricate the cylinder rod
- check tightness of the components: cylinder, arm holder, arms, electrode holder



Weekly checks

- check any unusual operations with the operator
- remove oil stains from the welding area floor
- check for any air leaks

Electrical system and control unit

- check the microswitches
- check to see if any unauthorised changes have been made to the programming parameters.

Electrodes and electrode holder

- carry out an internal inspection of the electrodes and electrode holder
- clean the electrodes, electrode holder, clamps
- check parallelism of the arms in the welding position

Compressed air circuit

- check tightness of connections
- check tightness of the cylinder screws

Six-monthly checks

Electrical system

- clean all the contacts of the secondary circuit to remove corrosion with fine grain abrasive material
- tighten all connections
- check protection devices and overloads (thermostats)
- check welding parameters and correct them if necessary
- check tightness of the power, transformer and welding control unit terminals

Compressed air circuit

- check the proper working order of the filter-regulator-gauge (FRG) unit
- change any damaged connections
- empty the air line filter

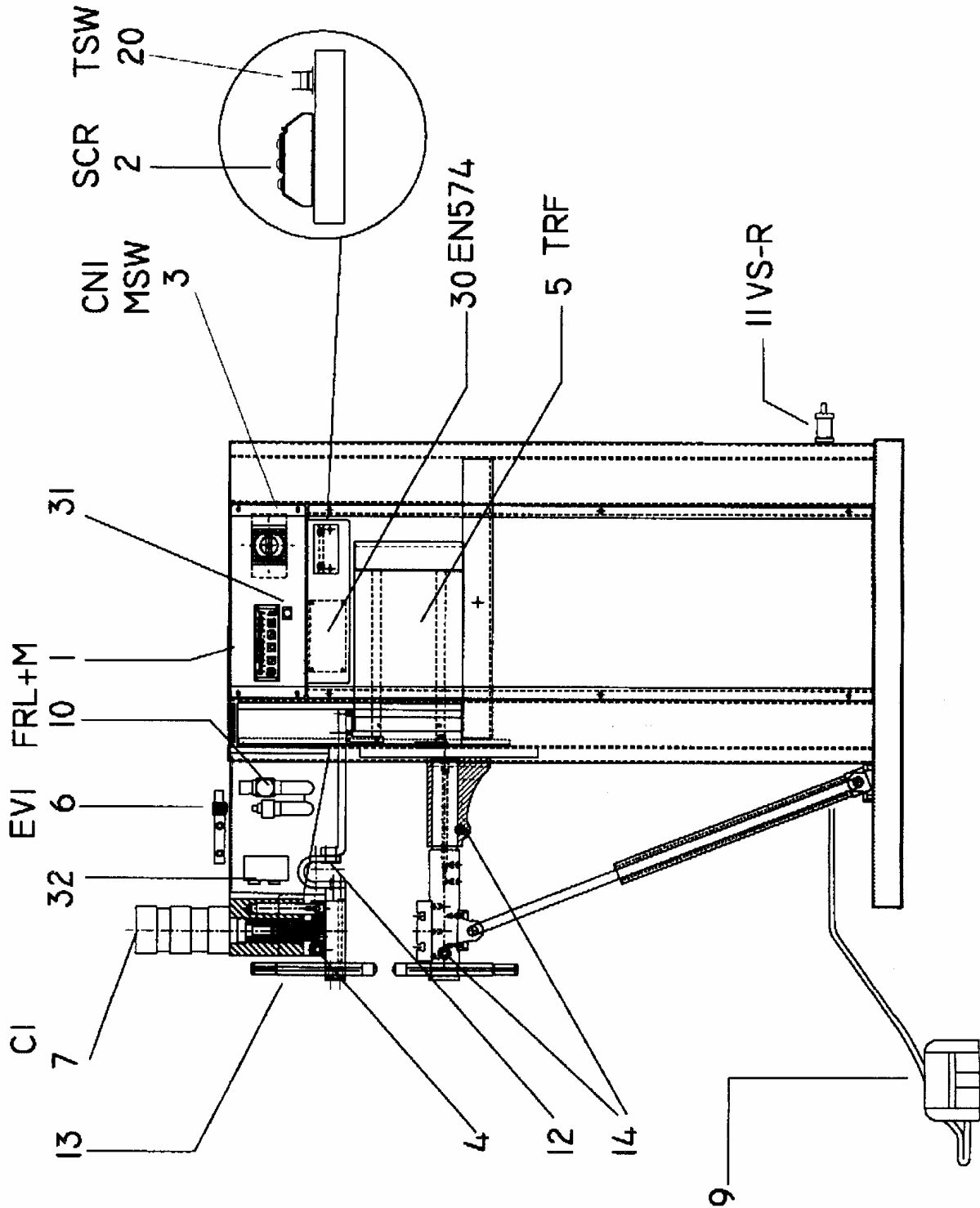
When the welding machine is not going to be used

If the welding machine is not going to be used for some time there are a few things that need doing to prevent damage:

- lock the cylinder in the completely retracted position
- if the machine has to be stored away protect it by wrapping it with a protective film
- the welding machine must be stored in a dry place
- protect unpainted parts from dirt and corrosion



GENERAL OVERVIEW





4.3 SPARE PARTS

Here is a list of the basic spare parts for those parts subject to wear and tear and for the machine's safety devices.

item	code	description
1	CS057	PX1500 <i>plus</i> welding control without SCR thyristor module
"	CS065	PX1500P <i>plus</i> welding control without SCR thyristor module
2	ME050	Thyristor module SCR SKKT 92/16E
2A	ME051	Thyristor module SCR SKKT 162/16E (PF 161)
3	ME120	Main switch 100A
4	BC055	Insulating bush C210C05B
5	TR090	Welding transformer 35 KVA @ 50% - 400V
"	TR091	Welding transformer 50 KVA @ 50% - 400V
"	TR092	Welding transformer 60 KVA @ 50% - 400V
6	PN115	Solenoid valve CM-9640
7	0C045	Cylinder 63x60/40 (PF135)
7A	0C500	Cylinder 63x60/40+20 adjustable double stroke
7B	0C046	Cylinder 80x60/40+20 double stroke
7C	0C025	Cylinder 80x60/40+20 (PF151-PF161)
9	XAC010	Electric pedal - cable mt 1
10	PN104	FR+L group 1/4" with manometer
12	0H112	Secondary Strap C260E01B
13	0M153	Brass clamp Ø 25mm C130C25C
14	0M151	Brass clamp Ø 16mm C220C32A
20	ME170	Thermostat 100° N.C.
22	ME030	Coil TA3000

4.4 TECHNICAL ASSISTANCE

If the problem you have with the welding machine is not mentioned in the TROUBLESHOOTING table then contact an authorised dealer.