Resistance Welding Solutions

INSTALLATION, OPERATING AND MAINTENANCE MANUAL

PROJECTION WELDERS

PFP 181 - 201 - 231 - 251

CE

INDEX

1. GENERAL INSTRUCTIONS

1.1 MANUFACTURER AND WELDING MACHINE IDENTIFICATION DATA

Manufacturer data

SUREWELD UK LTD
Sanders Lodge Industrial Estate
Rushden Northants NN10 6BQ
T : 01933 357005
F : 01933 357606
E : info@sureweld.co.uk

Welding machine data

Resistance type welding machine; see the data plate on the machine and the certificate of conformity attached to this manual for the model, serial number and year of construction.

Introduction

This manual contains the information needed to install, use and service your welding machine.
Follow the instructions to get the best out of your welding machine, in the most economical way and in complete safety.

1.2 GENERAL SAFETY WARNINGS

THE FAILURE TO OBSERVE THESE WARNINGS AND/OR ANY MODIFICATION OF OR TAMPERING WITH THE WELDING MACHINE WILL RELEASE SUREWELD FROM ANY LIABILITIES IN THE CASE OF ACCIDENTS TO PEOPLE OR DAMAGE TO THINGS AND/OR TO THE WELDING MACHINE ITSELF.

Before turning the welding machine on it is essential that the user knows how to carry out all the operations described in this manual.
The manual is an integral of the machine and must be kept until it is disposed of.

RESIDUAL RISKS

By residual risks we mean any hazard that could not be totally eliminated with the design or protection means and any potential hazard that is not evident.

	There must not be excessive quantities of dust, acids, corrosive substances or gases etc., on the premises except those generated by the welding machine. **We recommend keeping an extinguisher near the workstation.**
	It must not be excessively humid on the premises. **We recommend using an insulating platform.** All maintenance jobs must be done on the machine only after having disconnected it from the electricity mains.
	Mind your hands when working; always keep them well away from the electrodes and moving parts when welding.
	The strong magnetic field that the welding machine generates during welding can be dangerous for people wearing pacemakers. Watches and electronic devices in general, if placed near the welding machine, can be damaged.
	Pay attention moving the welders: due to the high centre of gravity, the machine could roll over.
	An incorrect adjustment of welding pressure, an erroneous setting of parameters or malfunctioning of the pneumatic system can all cause squirts of melted material during welding.
	The electrodes become very hot during welding. Do not touch them with your bare hands immediately after welding.

1.3 PREVENTION MEASURES TO BE TAKEN BY THE USER

- We recommend wearing safety glasses.
- The user must observe the safety instructions given on the welding machine.
- Personal protection gear must comply with and be certified by current standards.
- Signs must be placed in the vicinity of the machine relative to the risks that call for personal protection gear.
- It is compulsory that the user observe the accident prevention laws in force in his country.
- Just one operator who has been specifically trained to use welding machines and welding equipment can use the welding machine.
- Install a suction unit if the material to be welded produces fumes.
- The operator must wear glasses to protect his eyes against squirts of melted material, a protective apron and leather gloves.
- The operator must avoid wearing metal objects (bracelets, watches etc.)
- Routine and extraordinary maintenance jobs must only be done on the machine after having disconnected the power sources (electricity, pneumatic power).
- Make sure the machine is earthed effectively and protected by a suitable RCD/CB.

1.4 TECHNICAL DATA

		PFP 181	PFP 201	PFP 231	PFP 251
RATED POWER @ 50% DUTY CYCLE	kVA	80	100	130	150
SHORT CIRCUIT SEC. CURRENT	kA	29.5	35	38.5	41
MAX. SEC. WELDING CURRENT	kA	23.6	28	30.8	32.8
ELECTRODE FORCE (6 bar)	daN	735	735	735	735
PERMANENT SECONDARY CURRENT	kA	8.3	8.8	10.4	11.1
SECONDARY VOLTAGE	V	6.75	8.0	8.8	9.5
NOMINAL POWER SUPPLY SINGLE PHASE	V	400	400	400	400
NOMINAL SUPPLY FREQUENCY	Hz	50	50	50	50
DELAYED FUSES	A	140	180	230	260
AIR CONSUMPTION	Nm^3	13.3	13.3	13.3	13.3
WATER CONSUMPTION	L/min	5	5	5	5
COMPRESSED AIR PRESSURE	bar	6	6	6	6
THROAT GAP e	mm	195-495	195-495	195-495	195-495
USEFUL DEPTH l	mm	270	270	270	270
HOLDERS DIAMETER	mm	30	30	30	30
ELECTRODES DIAMETER	mm	20	20	20	20
ELECTRODES STROKE	mm	80	80	80	80
WEIGHT	Kg	470	500	525	550

1.5 INTENDED AND NON INTENDED USE

The failure to observe the prescribed instructions constitutes a condition of improper use from a technical point of view and as regards the safety of people.

Intended use conditions

SUREWELD welding machines must only be used for welding metals keeping within the power limits given on the data plate..
Only one trained operator is allowed to use the machine, who has experience in handling welding equipment.

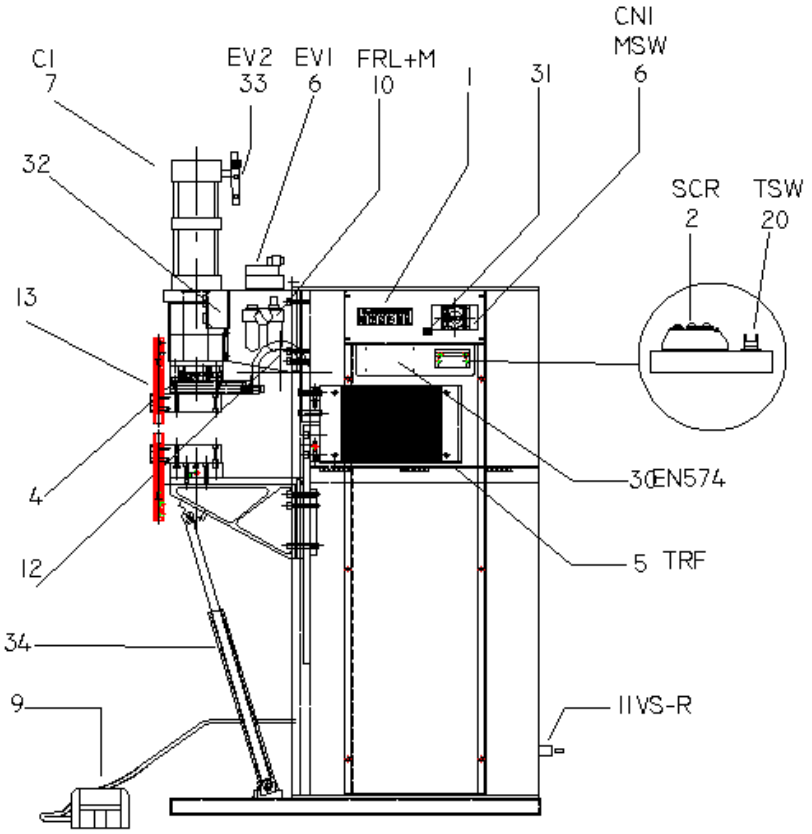
Non intended use conditions

SUREWELD welding machines cannot be used to exert pressure or deform materials.
It is forbidden to weld materials that can generate toxic vapours or cause explosions due to heating.

1.6 DESCRIPTION OF THE PRODUCT AND HOW IT WORKS

SUREWELD spot welders belong to the family of resistance type welding machines.
By this we mean autogenous welding obtained by *pressure*, without using weld material, using the thermal effect of electricity flowing through the components to be welded (Joule effect) for heating.
The components to be welded are gripped between two electrodes with a dual purpose: to let electricity pass through and to exert enough force for welding.
The intensity of the current, the force on the electrodes and weld time are the most important parameters for welding. Force must be applied during the electrodes' squeeze time phases, weld time and holding time.
The welding cycle phases are managed by the welding control unit; the times set are given in mains periods (1/50th of a second if mains frequency is 50 Hz).
The main switch turns the welding machine on (item 6) which also has the function of an emergency stop switch.
Welding is started either by the double push buttons (32) or the electric pedal (9).
The welding machine is equipped with safety thermostats to stop operation if it overheats.

1.7 GENERAL OVERVIEW



2. INSTALLATION INSTRUCTIONS

2.1 ENVIRONMENTAL CONDITIONS

Operating clearances
The machine must be positioned to ensure working and maintenance clearances and for any emergency situations that may arise. For this reason we recommend leaving a clearance of about 1 metre all around the machine.

Environmental characteristics
The place where the machine is going to be used must be suitably illuminated for both production and maintenance, free from dust, acids, corrosive substances or gases, with temperatures ranging between + 5°C and + 40°C.
Altitude must be less than 1000 metres.
Relative air humidity: 50% up to 40°C
90% up to 20°C

Floor
The machine must be put on a flat surface that must also be able to withstand its weight.
Machine must be fixed on to the floor by screws.

2.2 ENERGY REQUIREMENT

Electricity

Model	Mains power (single-phase power) kVA
PFP 181	64
PFP 201	80
PFP 231	104
PFP 251	120

Pneumatic energy

Air consumption	See technical data
Minimum circuit pressure	6.5 bar = 650 KPa

2.3 CONNECTION TO THE ENERGY SOURCES

Qualified personnel who can also certify their work must install the machine.

THE INSTALLER IS RESPONSIBLE FOR A CORRECT INSTALLATION AND, IN PARTICULAR, FOR THE CHOICE OF DEVICES TO PROTECT AGAINST SHORT CIRCUITING, OVERLOADS, LEAKAGE CURRENTS IN THE CASE OF A FAILURE AND OF THE WIRES USED TO CONNECT TO THE MAINS WHICH MUST COMPLY WITH CURRENT LAWS AND STANDARDS.
THE INSTALLER MUST ALSO CHECK THAT THE EARTHING SYSTEM, TO WHICH THE WELDING MACHINE IS CONNECTED, IS EFFECTIVE.

Electrical connection

Dimensioning of line fuses and the cross section of the supply cables. With a mains voltage of V1=400V and a mains frequency of f=50Hz.

Model	Normal current delayed fuses (A)	Supply cable cross section up to 20 metres (mm²)
PFP 181	140	35 mm²
PFP 201	180	50 mm²
PFP 231	230	70 mm²
PFP 251	260	70 mm²

- Check machine plate data before connecting it (voltage rating, nominal frequency and number of phases).
- Connect the welding machine to an RCD with a minimum current dispersion of 30 mA.

The welding machine must be protected with either delayed line fuses or a circuit breaker with the values given in the above table.

Pneumatic connection

Connect the air pipe, with an inside diameter of 7mm, to the inlet coupling (item 11).

Connection to the cooling circuit

- Install a cooling system that has the pressure characteristics given in the table
- Connect the water supply pipe to the machine's input connection
- Connect the water drain pipe to the machine's output connection
- Install a water conditioner if necessary

Inside pipe diameter	7 mm
Minimum coolant pressure	2.5 bar
Maximum coolant pressure	4 bar
Minimum rate of flow	6 Lt/min
Maximum coolant temperature	30° C

2.4 DATA ON TRANSPORTING, STORAGE AND ASSEMBLY

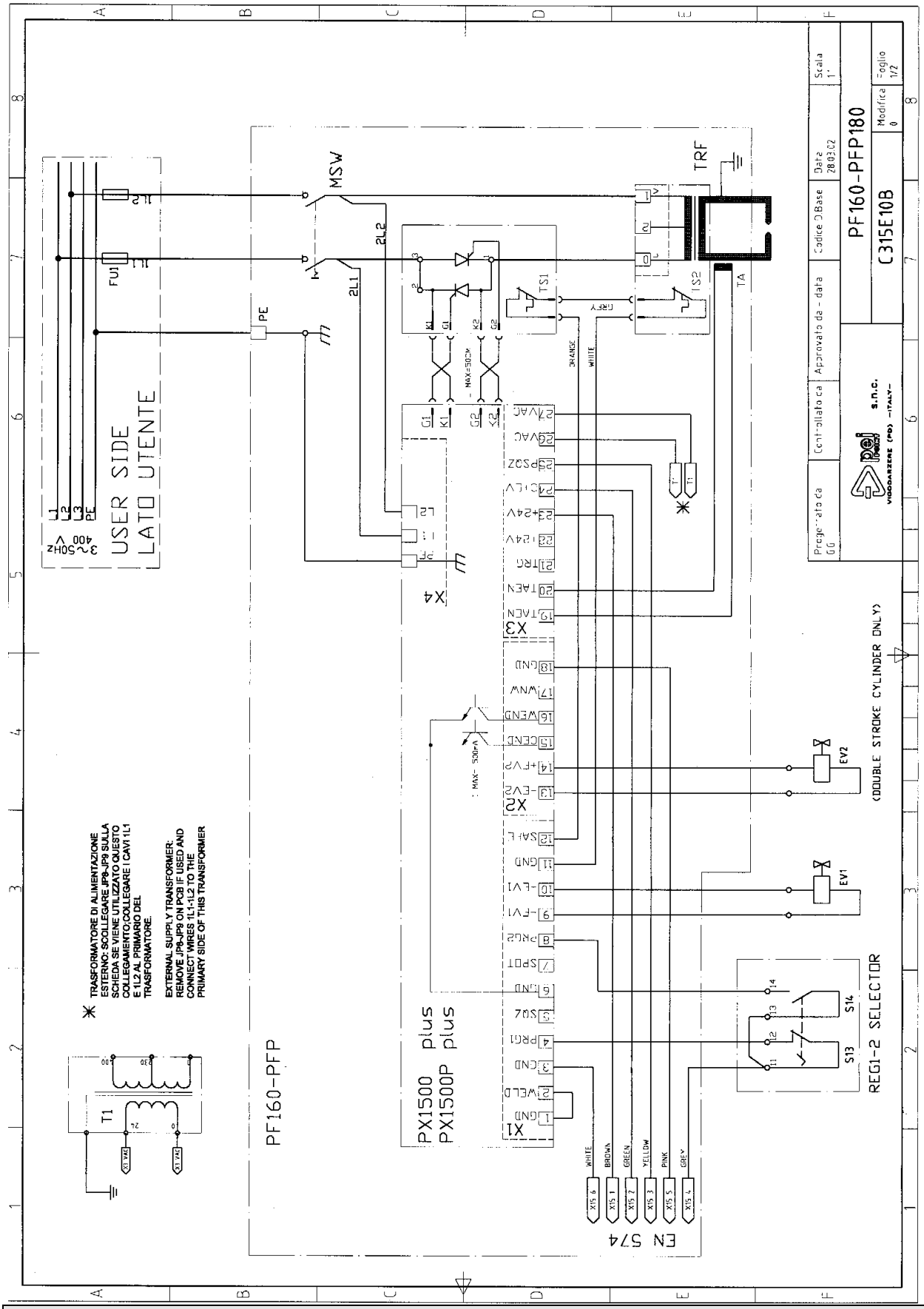
Shipping

Make sure that the means used to transport the welding machine is strong enough to withstand its weight.
Pay attention to the air connections and projecting parts to avoid any damage being done.
The weights of the different models are given in the technical data.

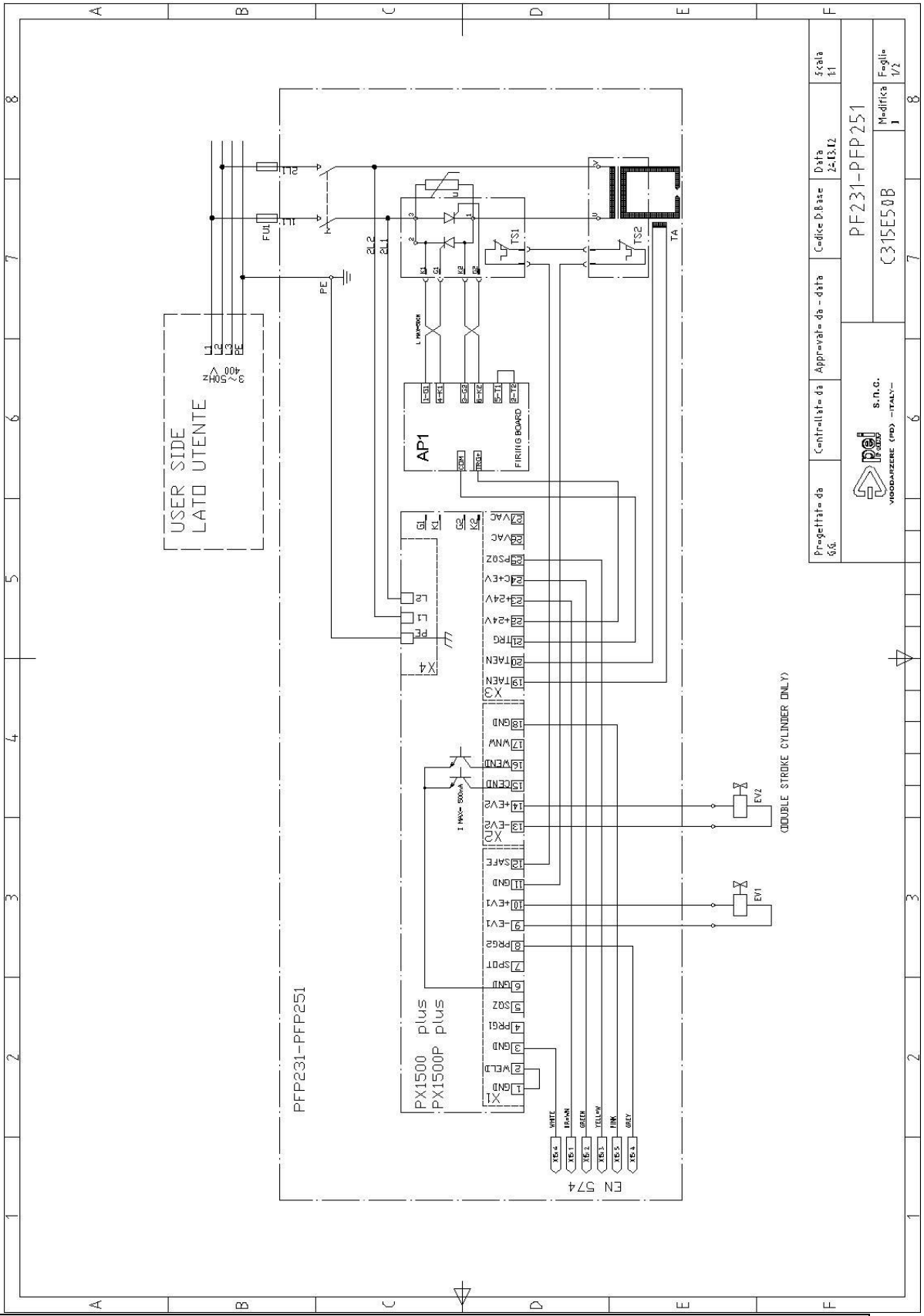
Unpacking - Assembly

Remove the packaging from the welding machine with care, checking that all the accessories are inside and that nothing has been damaged during shipping.
THE PEOPLE IN CHARGE OF LIFTING AND POSITIONING THE MACHINE MUST BE SUITABLY QUALIFIED.

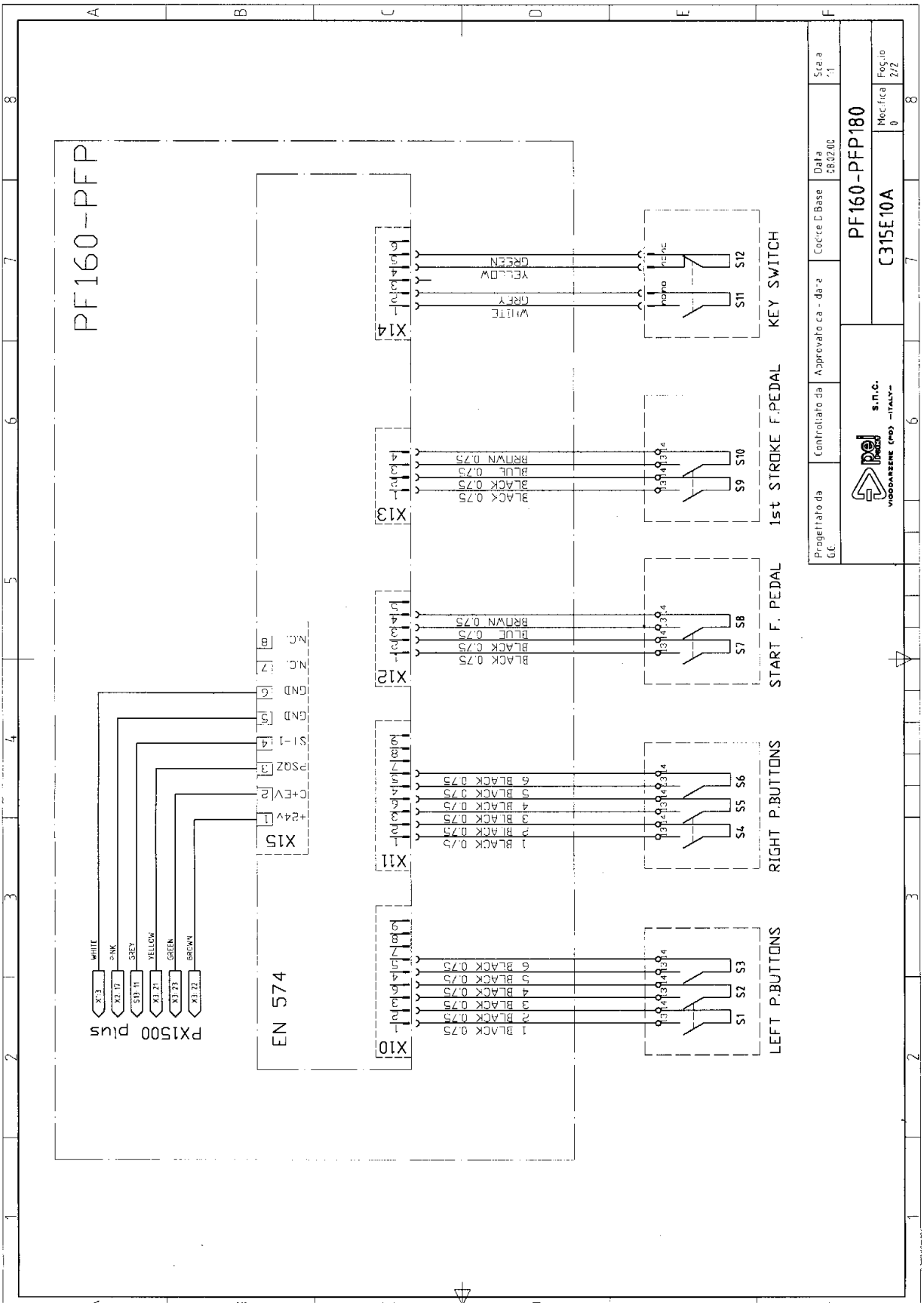
2.5.1 WIRING DIAGRAMS



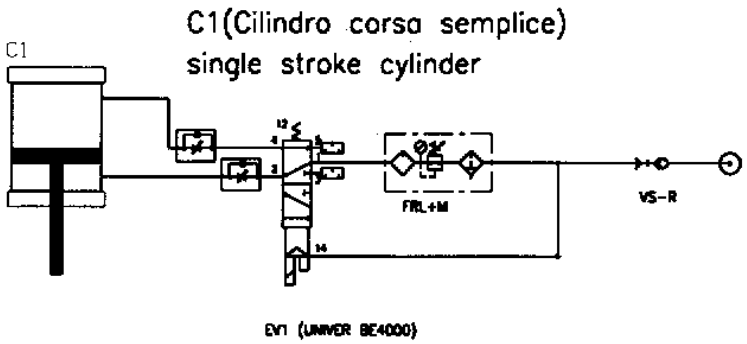
2.5.2 WIRING DIAGRAMS

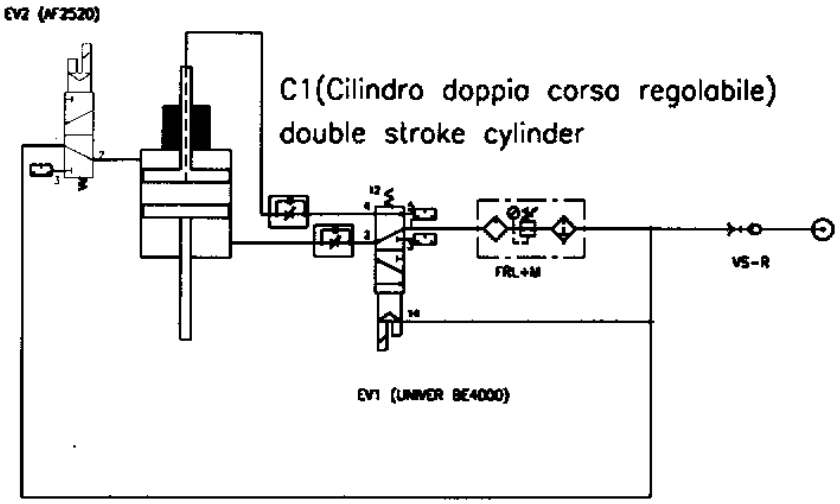


2.5.3 WIRING DIAGRAMS

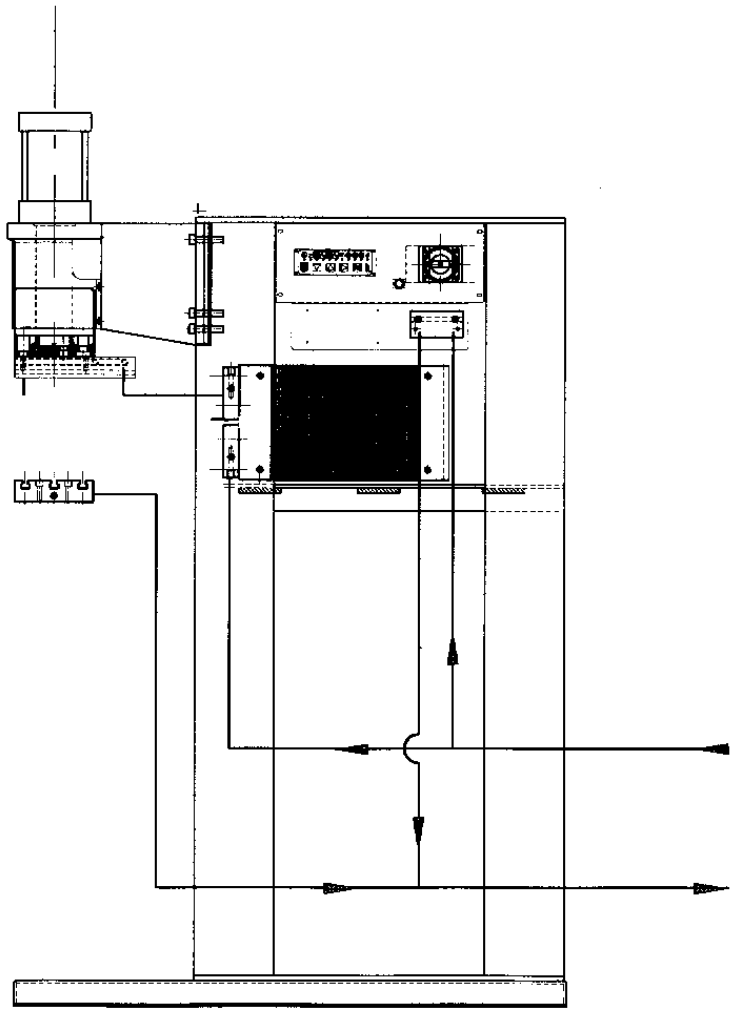


2.6 PNEUMATIC DIAGRAMS





2.7 COOLING CIRCUIT



3. INSTRUCTIONS FOR THE OPERATOR

3.1 DESCRIPTION OF THE FUNCTIONS

To weld, the operator has to press the pedal or the push-buttons, according to the key-switch (31).
When the welding control unit receives consent to start the cycle it performs the welding sequence according to the parameters set on it.
The sequence can be interrupted at any time by releasing the start device.
If the start device is released during weld time, the spot might not be strong enough.

NOTICE ABOUT DOUBLE START DEVICE

This welder has been equipped with two devices for beginning the welding cycle.
This system is composed of foot-pedal switch and two hands push buttons. It is allowed to work with only one device choosing the position of the key-switch in the front panel (foot or push).

WARNING: CHOOSING OF START DEVICE DEPENDS BY THE RESPONSIBLE OF THE WORK. ANYWAY IT IS ADMITTED FOOT PEDAL DEVICE ONLY "IF IS POSSIBLE TO HOLD WITHOUT HAZARD PIECES TO WELD .."

From European norm EN 50063 par. 3

3.2 GUIDE TO STARTING THE WELDING MACHINE FOR THE FIRST TIME

a) check there is compressed air
b) power on via the main switch
c) set the required electrode force by means of the pressure adjuster
d) set welding parameters on the control unit (see next paragraph)

3.3 GETTING READY TO WELD

WELDING CYCLE
The welding cycle consists of three basic times:

Squeeze time: it is the interval of time between the start of the cycle and the moment the electrodes, under the force exerted on them, come into contact with the piece to be welded.

Weld time: this is the time during which the welding current passes through the electrode contact area

Holding time: this is the time during which the force of the electrodes is maintained after weld time has finished.

The welding cycle can be divided in different times; for a more detailed explanation of this please read the paragraph relative to the welding control units.

3.4 INFLUENCE OF THE VARIOUS PARAMETERS ON THE WELDING RESULT

Force on the electrodes

The greater the force is on the electrodes, the weaker contact resistance will be between the electrodes and the sheets and the **less risk** there will be **of melted material being squirted.**
However, the force on the electrodes is limited by the welding machine's capacity. The greater the force is on the electrodes, the greater the current value will be to achieve welding.

Weld time
Welding can be achieved with different weld times:

Short weld time: (less than 10 periods) — it effects a small area of material being heated but the welding machine's performance is superior.

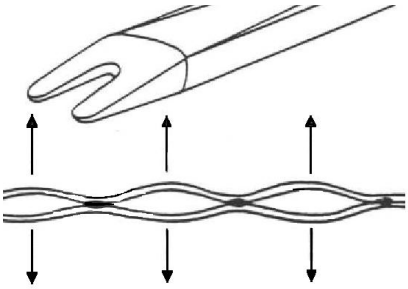
Long weld time: (20-99 periods) — it leaves a heavy electrode mark on the sheets and utilises the machine to the utmost.

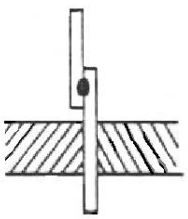
Medium weld time: (10÷20 periods) — a good compromise between the two extremes

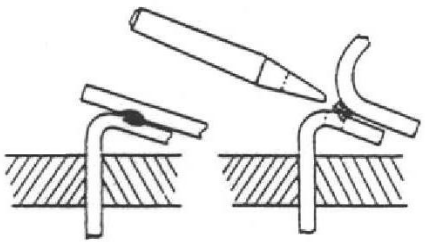
Current
Welding current influences the strength of the spot as does weld time but the influence is much stronger.
This means that current is the variable factor and must be adjusted with maximum attention.
To find the optimum welding current you have make several attempts on some sample pieces, starting from a low value (10) and gradually increasing up to a satisfactory value (max. 99).

3.5 CHECKING SPOT QUALITY

There are different ways to check the quality of a welding spot.
The best way, for the strength test, is the separation test of the welded parts.
This test entails gripping the welded sample pieces in a clamp and opening them with a scalpel. Strength is good if, after the sheets have been separated, there is a hole on one sheet and the melted core on the other sheet.







3.6 GUIDE TO STARTING

Prior to welding:

- Turn the welding machine on with the main switch (3) and make sure that the “set value” display turns on and that all the signalling lights are tested.
- Check on the gauge for compressed air
- Check that the set welding parameters are ideal for the piece you are welding and for electrode aperture (squeeze time).
- Wear individual protection gear (gloves, glasses, aprons, etc.).

Starting:

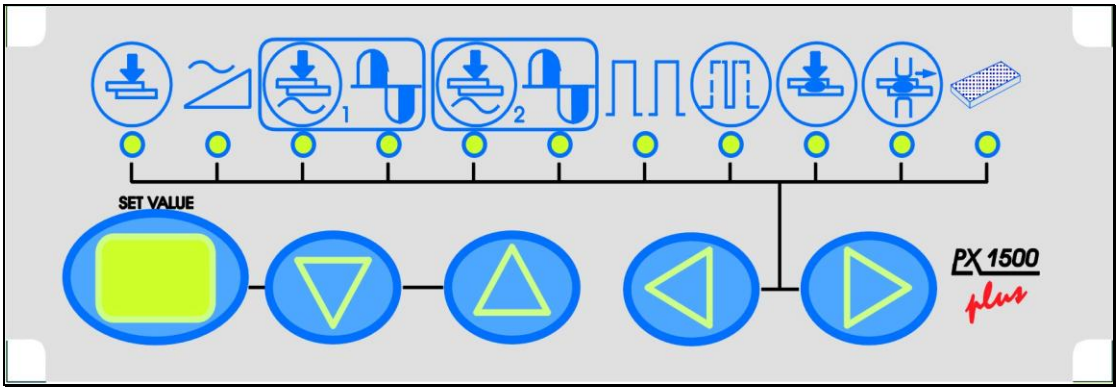
- Press the start device to bring the electrodes to the point to be welded.
- Once squeeze time has elapsed, current will start passing between the sheets, determining the welding spot.

Stopping the cycle and emergency stopping:

- The cycle can be stopped at any time, when you take your foot off the pedal.
- To stop in an emergency, turn the main switch off and discharge the pneumatic circuit through the dump valve VS-R (item 11).

3.7 DESCRIPTION OF THE WELDING CONTROL UNIT

PX1500 *plus*
PX1500P *plus*



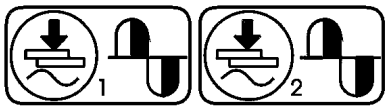
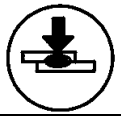
DESCRIPTION OF THE SYNOPTIC PANEL

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

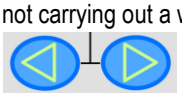
PX1500-PX1500P *plus* are timers that controls the welding cycle . A mains period is the timer's unit of time, corresponding to 1/50th of a second (50Hz). If, for instance, a squeeze time of 50 periods is set, time will be equal to 1 second.

	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.
	**Current risetime (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
	**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 has two times and two different currents. Adjustment 1 is selected automatically by the welding control if the input PRG1 is activated.
	**Weld time (0-99 periods):** time during which the pieces to be welded have welding current passing through them.
	**Power adjustment (0-99%):** The value of the welding current is determined as a percentage of power.
	**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**
	**Cold time (0-99 periods):** pause time between welding pulses.
	**Holding time (0-99 periods):** time during wich the electrodes stay closed after weld time
	**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 persist. 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.
	**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.

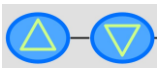
PROGRAMMING

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 the welding control carries out a test on all the indicator lights.

The SET VALUE display shows the software version installed.

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

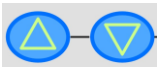
During welding **PX** displays all the phases of the cycle by turning the function LEDs on in sequence.

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 wioth time-current 2 without solenoid valve EV1 (active whern 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 connecotrs 500mA max)
1-3-6-11-18	GND		∅ 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

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.	• No electricity • Line fuses have blown • Fuses on the control unit have blown	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.	• Mains voltage is too low	Check mains voltage and compare it with the machine's rating plate data.
The (C2) control unit turns on; when the pedal is pressed, squeeze is obtained but not the welding cycle.	• The thermostats have tripped • Pedal microswitch is faulty	• Welding time is too long • Change the microswitch
The (PX1500) control unit turns on and the SET VALUE display flashes "00"	• The thermostats have tripped • Pedal microswitch is faulty	• Welding programming time is too long • Change the microswitch
Squirts of material when the electrodes come into contact	• Squeeze time is too short • Electrodes' pressure is too low • SCR has short circuited	• 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	• SCR has failed	• Change the SCR • Change the control card

3.8.2 HOW TO ELIMINATE WELDING DEFECTS

DEFECT	CAUSE	REMEDY
Squirts of melted material	• Squeeze time is too short • Force on the electrodes is too	• Increase squeeze time • Increase force on the electrodes

	weak • Welding current is too high • Insufficient contact of the electrodes	• Reduce welding current
The mark on the welded pieces is too pronounced	• Electrodes' diameter is insufficient • Force on the electrodes is too strong • Welding current is too high • Weldiong time too long	• Change the electrodes with ones of a suitable diameter • Reduce pressure • Reduce welding power (time and current)
Spot strength is not good enough	• Weld time is too short • Current is too weak • Electrodes' diameter is too big • Excessive force on the electrodes • Secondary circuit contacts are dirty	• Increase weld time • Increase welding current • Reduce electrode diameter • Reduce electrode force • Clean the secondary circuit
Deformed electrodes	• 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	• 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

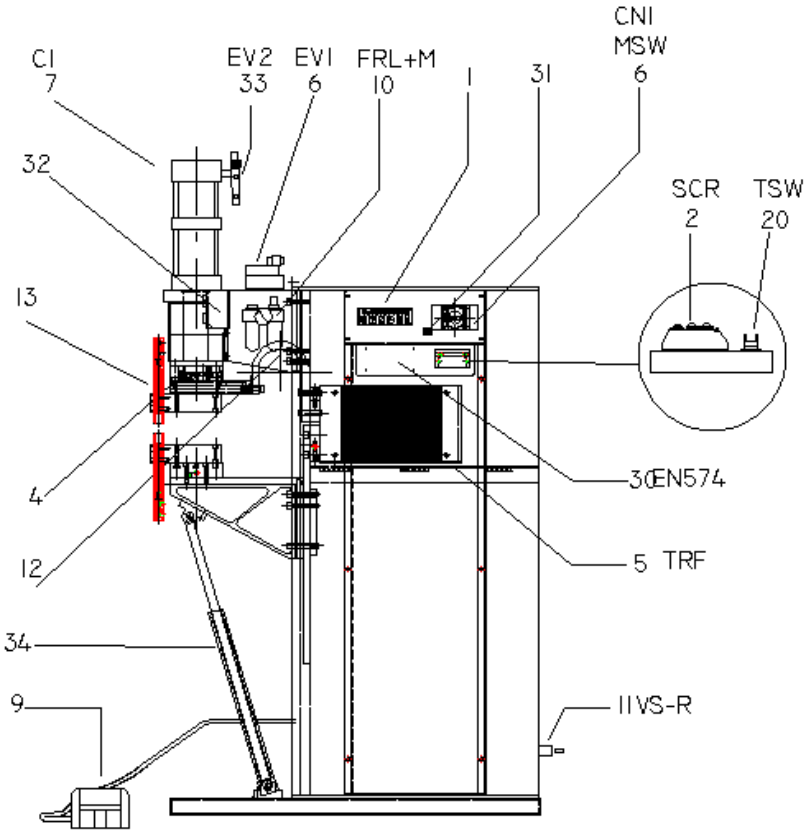
- ❑ check the proper working order of the filter-regulator-gauge (FRG) unit
- ❑ change any damaged connections
- ❑ empty the air line filter

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

1.8 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 *plus* welding control without SCR thyristor module
"	CS065	PX1500P *plus* welding control without SCR thyristor module
2	ME052	Thyristor module SKIW 900/12
"	ME051	Thyristor module SKKT 162/12
3	ME120	Main switch 100A
4	BC049	Insulating bush C315C21A
5	TR151	Welding transformer PFP 80 KVA at 50% - 400V
"	TR152	Welding transformer PFP 100 KVA at 50% - 400V
"	TR153	Welding transformer PFP 130 KVA at 50% - 400V
6	PN051	Solenoid valve BE-4700Y
7	0C060	Cylinder ∅ 125x60+20 (not adjustable)
9	XAC010	Electric pedal – cable mt 1
10	PN607	FRL group 3/8"
11	PN060	Dump valve 3/8"
12	0H075	Elastic connection C315E01A
20	ME170	Thermostat 100° N.C.
30	CS035	Two hands PCB EN 574
31	ME090/ME091	Complete key switch
32	ME118/ME119	Start pushbutton
33	PN054	Electro-valve 3/2 AF-2520
34	GM094	Lower knee support
35	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.