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1. GENERAL INSTRUCTIONS

1.1 MANUFACTURER AND WELDING MACHINE IDENTIFICATION DATA

Manufacturer data**P.E.I.-POINT SRL**

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Tel. +39 049 8840695 / 8848052 Fax +39 049 8841129 e-mail: info@pei-point.com**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 THE MANUFACTURER 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. Warning: high tension stored (600 VDC). Before doing anything inside the welding machine wait at least 6 minutes after having cleared the voltage
	Be very careful where your hands are put when operating the welder; always keep them away from the area of electrodes and from the moving parts during the welding cycle and maintenance.
	The strong magnetic field generated by the welding machine during welding can be very dangerous for those with pace-makers. Watches and electronic devices in general placed nearby can be damaged. Some good sense must be used to reduce the exposition of the human body to the electromagnetic fields: keep the cables and the welding clamps as far away as possible from the body. Do not stand between the two cables of the spotter; possibly keep both cables on the same side of the body.
	Only use the spot welder on a horizontal plane. If it slants more than 15° with respect to the floor it could tip 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 spot-welder must only be used on a horizontal plane. An inclination of more than 15° with respect to the floor could cause tipping over. An erroneous adjustment of the welding pressure, a wrong setting of the parameters or bad functioning of the pneumatic system may cause splashes of melted material during welding. The welding clamp and the spotter are connected to the same source of current. When one of these devices is used, the other is always under live. The tool that is not used must therefore be put away in the appropriate insulated bracket. Otherwise, there may be splashes of welding material and sparks that may damage the equipment or be dangerous for the operators.
	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 residual current circuit breaker (RCB) or ground fault circuit breaker (GFCB).

1.4 TECHNICAL DATA

		90PUNTP11	90PUNTP12	90PUNTP13
Rated output @ 50% duty cycle	kVA	10	25	13
Secondary max welding current	kA	11,5	11,5	15
Three-phase supply voltage +/- 10%	V	400	400	400
Mains frequency	Hz	50/60	50/60	50/60
Delayed fuses	A	32	32	32
Secondary no load voltage	V	16	16	6,2

PNEUMATIC WELDING GUN 245				
Welding capacity on steel	mm	2,5+2,5	2,5+2,5	-----
Electrodes force	daN	245	245	-----
Welding cable length	mm	2500	2500	-----
Welding cable section	mm ²	150	150	-----
Arms diameter	mm	20	20	-----
Electrodes diameter	mm	12	12	-----

PNEUMATIC WELDING GUN 370				
Welding capacity on steel	mm	-----	3+3	3+3
Electrodes force	daN	-----	370	370
Welding cable length	mm	-----	2500	-----
Welding cable section	mm ²	-----	150	-----
Arms diameter	mm	-----	24	24
Electrodes diameter	mm	-----	12	12

PNEUMATIC WELDING GUN 560				
Welding capacity on steel	mm	-----	3+3	3+3
Electrodes force	daN	-----	560	560
Welding cable length	mm	-----	2500	-----
Welding cable section	mm ²	-----	150	-----
Arms diameter	mm	-----	24	24
Electrodes diameter	mm	-----	12	12

SPOTTER GUN (single sided)				
Gun cable length	mm	2500	2500	-----
Ground cable length	mm	2500	2500	-----
Gun and ground cable section	mm ²	150	150	-----

1.4 TECHNICAL DATA

		90PUNTPI21	90PUNTPI22	90PUNTPI23
Rated output @ 50% duty cycle	kVA	10	25	13
Secondary max welding current	kA	10	10	11
Three-phase supply voltage +/- 10%	V	200	200	200
Mains frequency	Hz	50/60	50/60	50/60
Delayed fuses	A	63	63	45
Secondary no load voltage	V	13,5	13,5	6,2

PNEUMATIC WELDING GUN 245				
Welding capacity on steel	mm	2,5+2,5	2,5+2,5	-----
Electrodes force	daN	245	245	-----
Welding cable length	mm	2000	2000	-----
Welding cable section	mm ²	200	200	-----
Arms diameter	mm	20	20	-----
Electrodes diameter	mm	12	12	-----

PNEUMATIC WELDING GUN 370				
Welding capacity on steel	mm	-----	3+3	3+3
Electrodes force	daN	-----	370	370
Welding cable length	mm	-----	2000	-----
Welding cable section	mm ²	-----	200	-----
Arms diameter	mm	-----	24	24
Electrodes diameter	mm	-----	12	12

PNEUMATIC WELDING GUN 560				
Welding capacity on steel	mm	-----	3+3	3+3
Electrodes force	daN	-----	560	560
Welding cable length	mm	-----	2000	-----
Welding cable section	mm ²	-----	200	-----
Arms diameter	mm	-----	24	24
Electrodes diameter	mm	-----	12	12

SPOTTER GUN (single sided)				
Gun cable length	mm	2500	2500	-----
Ground cable length	mm	2500	2500	-----
Gun and ground cable section	mm ²	150	150	-----

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

Welders 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 with experience to handle welding equipment.

Non intended use conditions

Welders 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

This welder belongs 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 control unit manages the welding cycle phases; the times set are given in 1/100 sec when the mains frequency is 50 Hz and 1/120 sec. when the mains frequency is 60 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 RED button on the gun (1) or the lever switch (trigger) on the studder gun (2).

The welding machine is equipped with safety thermostats to stop operation if it overheats.

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.

2.2 ENERGY REQUIREMENT

Electricity

Model	Mains power (three-phase power) kVA
400V	20
200V	20

Pneumatic energy

Air consumption	See technical data
Minimum circuit pressure	6,5 bar = Kpa 650

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. THE MACHINE MUST BE CONNECTED WITH A PLUG TO THE POWER SOURCE IN ORDER TO BE UNDER THE OPERATOR SURVEILLANCE.

Electrical connection

Modello	Rated current of delayed action fuses or circuit breaker	Supply cable cross section up to 20 metres
400V	32	16 mm ²
200V	63	16 mm ²

- 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 minimum 7mm, to the inlet coupling.

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.

3. INSTRUCTIONS FOR THE OPERATOR

3.1 DESCRIPTION OF THE FUNCTIONS

To weld, the operator can either press the red button on the gun or use the lever switch on the studder gun. Squeeze time tests can be run without welding by pressing the black push button on the top of the handle. 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 cycle start push button. If the start push button is released during weld time, the spot might not be strong enough.

3.2 GUIDE TO STARTING THE WELDING MACHINE FOR THE FIRST TIME

- a) check there is compressed air
- b) check that the level of the coolant liquid is sufficient (see tab. below)
- c) power on via the main switch
- d) set the required electrode force by means of the pressure adjuster
- e) set welding parameters on the control unit (see next paragraph)

It is possible to use only (clean) water or water and glycol monopropylene with the following percentage:

Coolant liquid	
Ambient temperature (°C)	Glycole percentage (%)
0	-
-5	14
-10	23
-15	30

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 unit.

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 200ms) it effects a small area of material being heated but the welding machine's performance is superior.

Long weld time: (400-1000ms) it leaves a heavy electrode mark on the sheets and utilises the machine to the utmost

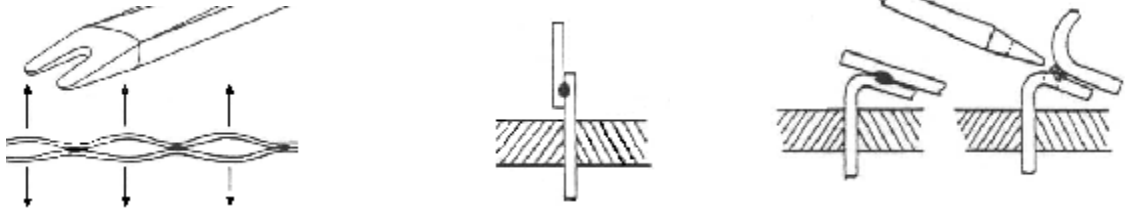
Medium weld time: (200-400ms) a good compromise between the two extremes

Current

Welding current influences the strength of the spot as does weld time but the influence is much stronger.

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 OPERATING GUIDE

Prior to welding:

- Turn the welding machine on with the main switch (6)
- Check 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:

- **Gun:** Press the red push button 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. Press black push button in order to clamp work piece without welding, if clamping position is correct, it is possible to complete the weld sequence pressing red button. If an extra opening is needed to reach difficult welding point, use the side yellow push button to achieve it.
- **Spotter:** Use the gun's lever switch to spot weld.

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.

3.6.1 OPERATING GUIDE FOR AUTOBODY REPAIR WORKS

Double side gun electrode adjustment

- Remove the compressed air supply
- Close by hands the arms and adjust the electrodes so that they are perfectly aligned: a wrong aligning would reduce the spot strength.



- Sharpen the electrodes if necessary.

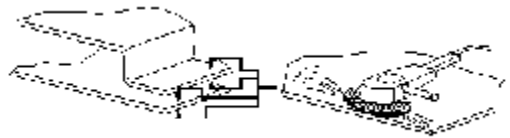
Replacing the arms

- Press the large yellow clamp pushbutton to obtain the wide opening of the clamp
- Turn off the compressed air supply
- Switch off the machine
- Place the clamp into the appropriate holder or at any rate at a position higher than the coolant liquid container
- Slacken off the arm locking screws
- Slip off the arms
- Take the other arms and make sure that some grease is spread on the whole surface of the arm attachment (recommended grease: Loctite 8065 C5-A copper anti seize)
- Insert the arms fully into the mechanical stop
- After having aligned the surfaces of the electrodes tighten the lock-screws.

Double side welding preparation

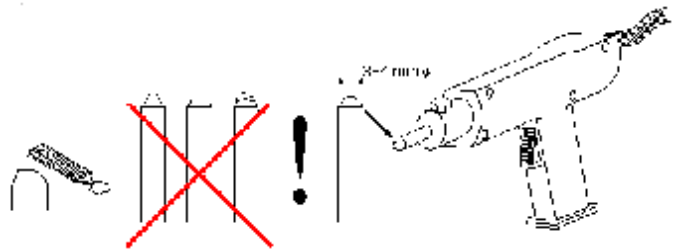
Clean both sides of the sheet metal on the area of the welding spot to insure a good electric contact between the electrodes and the metal sheets and between the sheets surfaces

CLEAN BOTH SIDE OF THE 2 METAL SHEETS



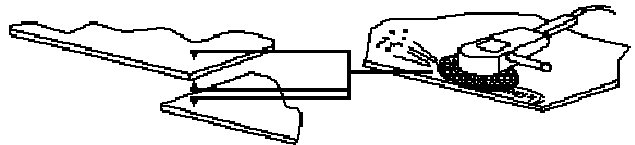
Single side gun electrode sharpening

- Sharpen the electrodes with a file
- The electrode shape should be regular and not flat, typically round or conic



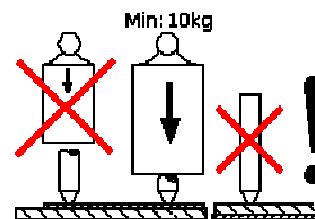
Single side welding preparation

- Clean both sides of the top metal sheet
- Clean the top side of the bottom metal sheet
- Clean the bottom metal sheet at the ground contact point

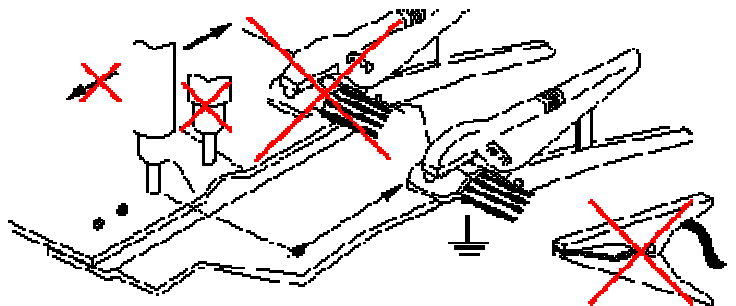


Single sided gun welding recommendations

- Apply a pressure of at least 10kg (20lbs) on the electrode
- Always weld on the thinner metal sheet side.

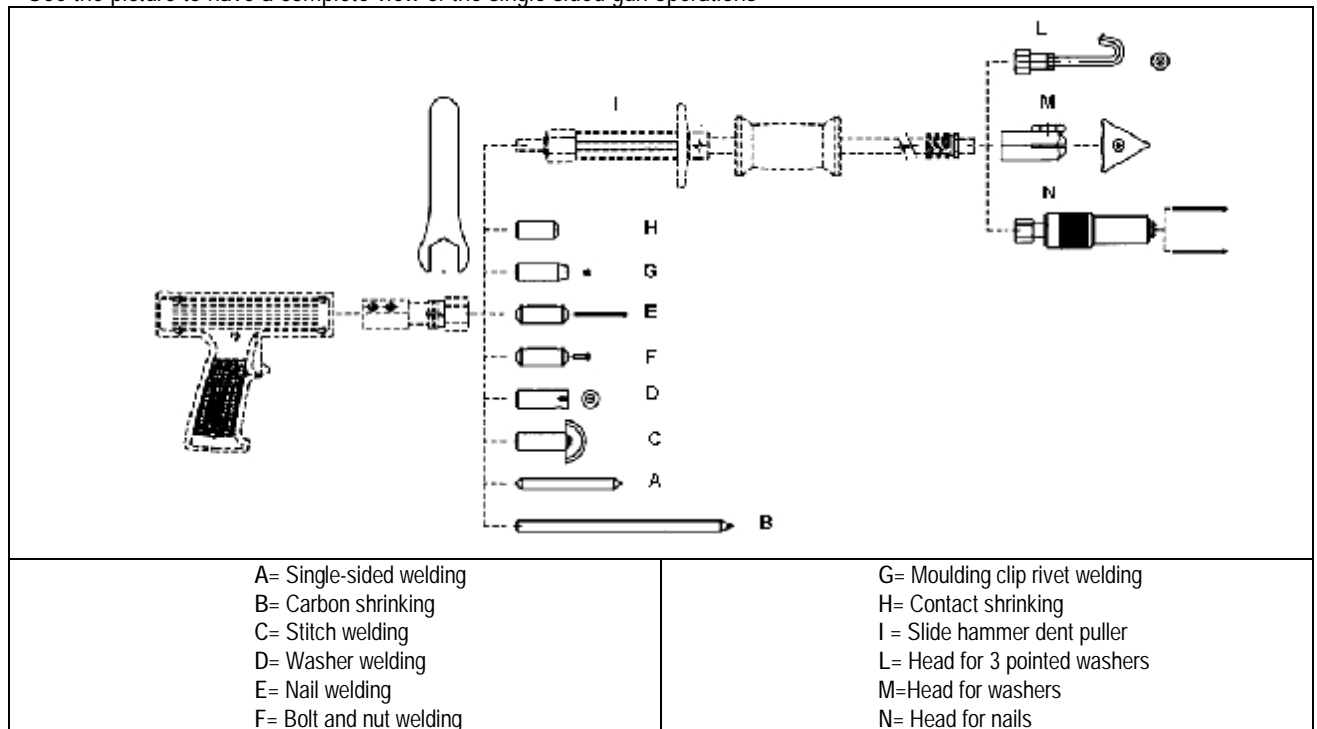


- Always start with the furthest point to the ground to the closest.
- Always connect the ground to the bottom metal sheet.
- Use a strong blocking clamp to secure the ground (no spring clamp)



Single sided gun dent pulling operations

See the picture to have a complete view of the single sided gun operations



3.7 DESCRIPTION OF THE WELDING CONTROL UNIT

SEE WELDING CONTROL INSTRUCTION MANUAL

3.8.1 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 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