P6 HW

Mobile power source

TIG - Hot Wire, AVC, OSC.

Operating, maintenance and programming manual

POLYSOUDE
THE ART OF WELDING

Product	P6 HW mobile power source
Reference	0025069101
Manual	PN-0110008
Redactor	SBR

Document revision

Rev. 0	Original	02/2011
Rev. 1	Update "Start cycle with restart"	09/2011
Rev. 2	Update "Option commands mechanised equipmen"	11/2011
Rev. 3	Update: FNCA 1201-039 and FNCA 1201-019 – Items on pages 56, 57, 58 und 59 – minimal gas values on page 19, "Rear connector panel" on page 39.	02/2012
Rev. 4	Addition of chapters: Connecting the measuring unit, Adjusting the measuring card, Compatibility of standard equipment. Changes to pictures of the P6 power source. Update : Error and codes processing	03/2012
Rev.5	Updated after FNC 1206-031 (reference card source changes and corrections of translation)	06/2012
Rev. 6	Addition adapter manual torch.	10/2012
Rev. 7	Addition "Settings oxygen meter configuration" "IP Address", updates chapters "Making adjustments during a weld cycle" and "Error and codes processing"	11/2012
Rev. 8	Modification touchscreen controller, addition chapter remotes control on board	03/2013
Rev. 9	Addition manual torch adapter 0023000901	04/2013
Rev. 10	Using the remote control to regulate the AVC	10/2013
Rev. 11	Update touchscreen (09/2013)	02/2014
Rev. 12	Aktualisierung : " Servicing"	08/2014

If this technical manual is to be printed, both sides of the page must be used to improve understanding and readability.

This manual must be delivered to users.

Contents

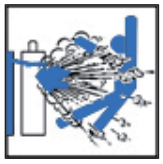
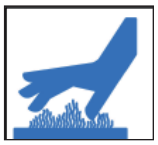
1. Safety instructions

Warning: Protect yourself and others from injury – Read and follow these precautions.

1. 1. Hazards associated with arc welding

The symbols reproduced below are used throughout this Technical Manual in order to draw your attention and identify the potential hazards. When you see one of these symbols, **refer to the safety instructions in the following section 'Recommendations'.**
This equipment must only be installed, used, maintained and repaired by qualified persons.
While it is in use, anyone not working with the equipment must be kept well away.

1. 2. Meaning of the symbols

	**Risk of electric shocks.**		**Risk of serious injury caused by rotating parts.**
	**Risk of inhaling fumes or gases.**		**Risk of explosion.**
	**Risk of burns to the eyes or the skin due to heat radiation.**		**Risk of exposure to magnetic fields.**
	**Warning: hot surfaces – Risk of burns.**		**Danger caused by noise.**
	**Risk of burns to the eyes or the skin due to flying sparks.**		**Read the instructions.**
	**Risk of excessive heat or fire.**		**Safety goggles must be worn.**
	**Safety boots must be worn.**		**Safety helmets must be worn.**
	**Fall hazard.**		**Refer to the recommendations below in order to take the necessary precautions to avoid any hazard.**

1. 3. Recommendations

Risk of electric shocks.

The electrical components include the electrode, the welding circuit, the input circuit and the internal circuits, the welding wire and the metal parts in contact with it, the wire spool and the housing for the welding wire feed rollers. The slightest contact with these parts may cause an electric shock or even electrocution when the machine is switched on.
Factors increasing the risk of electric shock: Moisture in the immediate area, working on an electrically-conductive surface, inadequate earthing, poor maintenance of the equipment, unsafe working methods.
Preventing risks:

- Avoid any contact with live wire spools.
- In the case of water-cooled torches, inspect the torch at regular intervals in order to identify any leaks; take care to prevent condensation.
- Do not coil the cables around your body.
- Before replacing the electrode, ensure that it is no longer live.
- Switch off the machine before carrying out any maintenance or repair operations or while it is not in use.
- Wear safety gloves, clothing, aprons and boots which are dry and free from holes.
- Insulate the component and the earth by means of mats or other means of providing sufficient insulation if the welder is required to work on metal surfaces or structures.
- This machine must be installed and earthed in accordance with its User Manual and with national, local and municipal codes of practice.
- The return cable must be attached correctly (clean contact surface, cable securely fastened, as close as possible to the area to be welded).
- Do not use damaged, worn or bare (uninsulated) cables which are of insufficient size or not properly assembled. If this is the case, they must be replaced immediately.
- The welding station must be correctly earthed.
- If the component to be welded has to be earthed, use a separate cable.
- Use the appropriate connectors.

Note the no-load voltage, which is limited to 80 V r.m.s. for alternating current or 113 V for direct current (the voltage required to strike the arc). The maximum value for plasma cutting power sources is: 500 V.

Risk of inhaling fumes or gases.

Welding generates fumes and gases which are hazardous to health. Do not inhale the fumes.
Origin of the fumes and gases: Base metal, filler metal, coating (flux) with welding by coated electrode, shielding gas, solvents and materials covering the metal to be welded.

In order to prevent risks:

- Use breathing apparatus, such as filtering masks, assisted-ventilation masks, inducted air masks and disposable masks.
- Avoid chlorinated solvents.
- Ensure that the components are completely dry before welding.
- Do not work alone!
- Trap the fumes and gases at source.
- Remove paint, oil or any other surface coating.

Risk of burns to the eyes or the skin due to radiation.

Les rayonnements de l'arc de soudage sont susRadiation from arc welding is liable to cause burns to the eyes and the skin.

Identifying the risks: Exposure to the radiation emitted by the arc, generating intense visible and invisible rays (ultraviolet and infrared), reflection of the rays while welding metals such as aluminium and stainless steel, arc strike, sparks, pin-holes created by the tip of a tungsten electrode.

In order to prevent risks:

- Wear gloves or leather gauntlets to protect your hands and lower arms.
- Wear an apron or gaiters to protect your legs, knees and forefoot.
- Wear a mask (headband-type, hand-held or electronic mask) or goggles fitted with a suitable filter.
- Use safety shields to protect nearby workers.
- Tie a scarf around your neck and button the neck of the protective clothing.

Warning: hot surfaces – Risk of burns.

Do not touch welded or flame-cut components with bare hands. If such components have to be handled, use the appropriate tools and/or wear welders' gloves, thick and insulated, to prevent any burns.
Allow the components to cool before handling them or welding them.

Risk of burns to the eyes or the skin due to flying sparks.

- Wear gloves or leather gauntlets to protect your hands and lower arms.
- Wear an apron or gaiters to protect your legs, knees and forefoot.
- Wear a mask (headband-type, hand-held or electronic mask) or goggles fitted with a suitable filter.
- Use safety shields to protect nearby workers.
- Wear garments with long cotton or woollen sleeves, preferably free from any traces of oil or grease. Do not wear clothing made from synthetic fabrics.
- Tie a scarf around your neck and button the neck of the protective clothing.
- Wear welders' safety boots.

Risk of excessive heat or fire.

- Maintain the equipment at the electrical workstation in good operating condition, particularly the cables carrying the feed and return current.
- Maintain a minimum distance of 6 metres between the welding equipment and any greasy, inflammable or dust-laden materials.
- Use safety shields to protect nearby workers.

Risk of explosion.

These risks are associated with the use and handling of gas cylinders and flying sparks.

- Do not use damaged cylinders.
- Store the cylinders in a well-ventilated area and restrict access to anyone other than authorised personnel.
- Never exceed a temperature of 55 ºC while storing or using the cylinders.
- Clearly identify empty cylinders to distinguish them from full ones.
- Protect the cylinders from extremes of temperature (ice, sunlight, sparks, etc.).
- Check the connectors and hoses at regular intervals.
- Use protective shields.

Risk of serious injury caused by rotating parts.

- Do not place your hands near fans or any moving parts.
- Keep all safety shields closed or in the 'safety' position.

Risk of exposure to magnetic fields.

The distance between the welding circuit and the brain is of fundamental importance.

- Never coil the cables around your body and certainly not around your shoulders.
- Advise your immediate superior if you are wearing a heart pacemaker. The interference generated by the circuit requires special protective measures, which must be applied in consultation with the company doctor.

The operator must ensure that no-one is exposed to the hazardous area.

1. 4. Danger in using a power source

Work or maintenance procedures described in this manual may be accompanied by dangers or risks. Such procedures are indicated by the following pictograms.

Risk or situation with danger of serious injuries or even death.

Operating procedures and settings for preventing damage to equipment and special instructions will be marked by the heading **Remark** or **Note**.

1. 4. 1. Training of the operators

Behind the power source, close to the Power On switch, this label states that it is advisable to read the instruction manual.
An instruction manual is delivered to the client. A copy (all rights reserved) of this manual MUST be given to the user personnel: operators, setters, servicing personnel, etc. They must have appropriate qualification for the tasks they have to do, in accordance with the rules for new employees governed by the Labour Code.

1. 4. 2. Access for maintenance and adjustments

Access to the upper parts of the equipment for adjustment or servicing of units which are out of reach of the operator must be undertaken using a stable method, such as a ladder or stepladder, in accordance with current safety standards.
It is strictly forbidden to climb up the equipment by supporting oneself on pipework, a desk, a console or bracket for the cycle control buttons, etc.

1. 4. 3. Ergonomics

Signs

Elements used for the signalisation, especially safety-relevant parts (e.g. colours of push-buttons and indicator lights — refer to NF X 08 003, NF EN 60073, NF EN 894-1, ISO 369)) must not be modified in any circumstances (inversion of the colours). Indicator lights or buttons with whose colours become indiscernible due to aging or wear MUST be replaced.

Adequate illumination of work areas

Generally, welding equipment does not require the use of spot lights, but rather a medium surrounding level of illumination. The user must take all necessary measures to ensure that the workshop is equipped with suitable lighting (avoiding shadow areas and glare) so that the operators do not suffer from excessive tiredness or inconvenience.

1. 4. 4. Protectionintheeventofbreakdownorfailure of the equipment

During operations other than welding, personnel must protect themselves by operating the isolation device appropriate for the operation they have to perform.

1. 4. 5. Devices for isolating energy sources

Provision of shut off devices

Isolation devices (electrical, hydraulic, pneumatic, ...) are mandatory. If they do not form part of the POLYSOUDE supply (as is the case with portable installations), they MUST be provided by the user who must install them at his cost and responsibility.

Operation of shut off devices

In accordance with the stipulations in the manufacturer's technical manual, before actioning shut-off devices (isolation of equipment from its source of power), personnel must make sure that neither they not any third party is in danger.

1. 4. 6. Prevention of fire and explosion

Welding equipment must not be used on premises where inflammable, volatile or explosive products are present. In no circumstances is the P6 power source to be used to thaw pipework.

1. 4. 7. Preventing release of gas and fumes

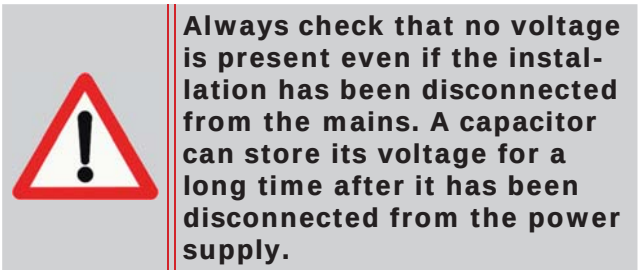
It is the user's responsibility to assess:

- Inconvenience or unhealthy conditions inside his workshop and to take the necessary measures to apply this clause.
- Protection against radiation from electric arcs
- Safety instructions and protective arrangements must conform to NF EN 166 and NF EN 169.

1. 4. 8. Faultfinding

Only a qualified electrician is authorised to inspect, test, adjust or repair electric or electronic equipment.

Before any maintenance work can be carried out or an instrument is connected to a circuit, the the mains supply must be disconnected and a waiting period of 2 minutes must be elapsed. These instructions are specified on the label at the right side of the power source.



Never shunt or remove the safety devices or interlocks installed to protect personnel.

Never stand on a wet or humid floor during intervention on electric or electronic devices. It is essential to avoid any leakage of liquids inside electric or electronic equipment.

Never use volatile solvents or flammable solvents in the workshop. The electric arc could ignite the vapours or flammable liquids.

During faultfinding and maintenance work on electrical equipment, take off any jewellery (rings, watches, bracelets, etc.). Insulating shoes must be worn when the situation requires it.

2. General Information

2. 1. Applicable directives

2004/108/EC	Electromagnetic compatibility
2006/95/EC	Electrical equipment designed to be used within certain voltage limits

2. 2. Standards applied

EN 60974-1	Arc welding equipment - Part 1: Welding power sources
EN 60974-10	Arc welding equipment — Part 10: Electromagnetic compatibility (EMC) requirements.

2. 3. Reference documents

PN-0908080	User manual for touchscreen
PN-1108122	User manual measurement unit

3. Introduction

3. 1. The P4-P6 series

The P6 HW belongs to a new series of universal and functional power sources for orbital TIG welding. The complete realisation of a weld is the result of applying a WP (Weld Procedure), containing one or more programs when several passes are necessary, documentation for preserving information about the weld, such as preparation of the tubes, electrode diameter and grinding angle, workpiece/ electrode distance, wire diameter and feeding angle etc.

The WP also assists the operator in selecting solutions for successful welding. The features of the P6 HW generator are as follows:

- The welding sequences are completely programmable in the operator's language.
- The handling is simple and easy to learn because of the intuitive programming concept.
- Built-in library of WPs for fast weld parameter search.
- A measurement data acquisition system.
- An integrated printer for archiving and documentation to ISO 9000.
- WPs can be stored on internal memory or on a USB key.
- Modern power sources using inverter-technology.
- Mechanised welding can be carried out with all the convenience of the P4-P6 series power sources.

Features of the P4-P6 power sources:

- DC or pulsed weld current can be supplied.
- Continuous or pulsed movement and continuous or pulsed wire feeding in synchronisation with the weld current.

P6 HW

520 A mobile power source.
Ideal for high current, hot-wire welding.

Fig. 3.3 - P6 HW power source

P6

300 A mobile power source.
Ideal for prefabrication work.

Fig. 3.2 - P6 power source

P4

170 A mobile power source.
Ideal for mobile use on site.

Fig. 3.1 - P4 power source

P6 HW - 400/415 V ± 10%, 50/60 Hz (with standard couplings) with torch rotation control, touch screen, wire feeder control, printer, remote control pendant 6 axes, torch rotation control, arc voltage control (AVC), oscillation control (OSC)	00 2506 9105


POLYSOUDE
P6 HW

3. 2. The welding heads

These power sources support several of the Polysoude series welding heads.

3. 2. 1. The open welding heads

- MU IV type (Fig. 3.4) for standard or special applications. Modular design. Welding heads designed for butt welding pipes, with or without filler wire.
- Polycar welding head (Fig. 3.5) to weld large diameter pipes.

Fig. 3.4 - MU IV welding head

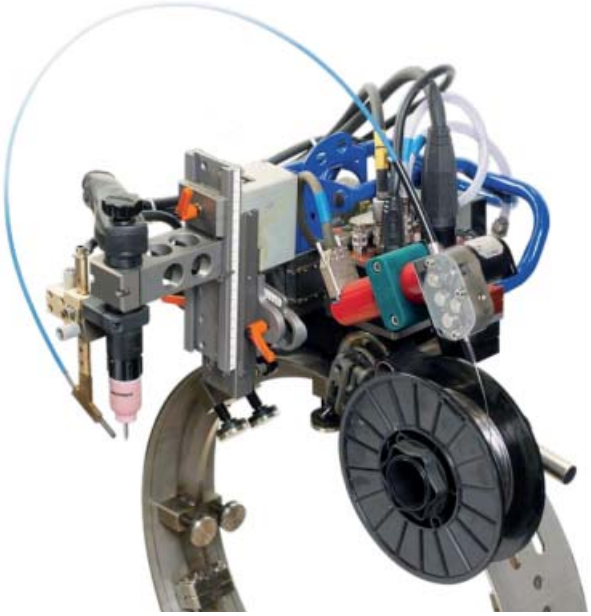


Fig. 3.5 - Polycar welding carriage

3. 2. 2. The closed chamber welding heads

- MW (Fig. 3.6) when high productivity is required. High duty cycle due to water cooling. Adaptor kits available for welding of accessories (elbows, flanges, valves, connections, etc.).
- Sentry UHP for the demands of ultra high purity welding. Welding head with closed chamber designed for but welding thin pipes without filler wire. It ensures high quality welds and its compact design enables it to be used in areas with restricted access.
- HD when the access to the weld area is restricted.
- K for applications calling for the best shielding gas protection.

Fig. 3.6 - MW welding head

3. 2. 3. The tube to tube sheet welding heads

TS welding heads to meet sought-after productivity and quality requirements.

TS25, standard head for welding tubes/plates.
Closed head, designed for flush or slightly protruding tubes.

TS 34 (Fig. 3.7), standard head for welding tubes/plates for applications with high duty cycles.
Closed head, designed for flush or slightly protruding tubes.

TS 2000 (Fig. 3.8) and TS 8/75 (Fig. 3.9), standard head for welding tubes/plates.
Open head, designed for flush, protruding or sunken tubes.

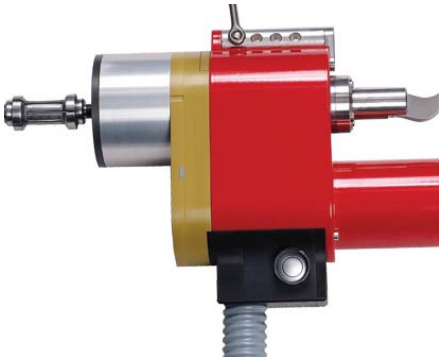


Fig. 3.7 - TS 34 welding head

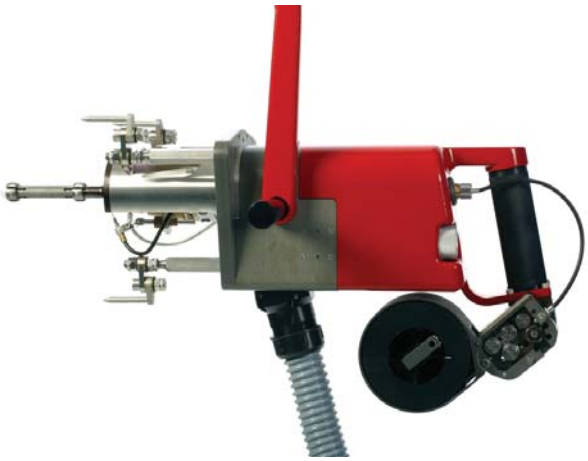


Fig. 3.8 - TS 2000 welding head

3. 2. 4. Accessories

POLYFIL-3 (Fig. 3.10) External wire feeder.
Wire feeder with linear drive using four rollers.
Absence of distortion of damage to the surface of the wire.

Fig. 3.10 - Polyfil-3 wire feeder

Fig. 3.9 - TS 8/75 welding head

3. 3. Technical data for the P6 HW

3. 3. 1. Basic design

The welding set contains the power source, all control electronics and the torch cooling. All connections are made on a connector panel situated at the front of the power source.

The front panel also supports the printer and connections for the USB key and the RJ45 link for connecting a PC.
There is a touchscreen mounted on top of the power source for programming and monitoring of the weld cycles.
The power source is fitted with a 2-metre long power supply cable.

1 Protection for programming screen
2 Screen and touchscreen (option)
3 Printer (option)
4 RJ45 connection
5 USB connection
6 Connection panel

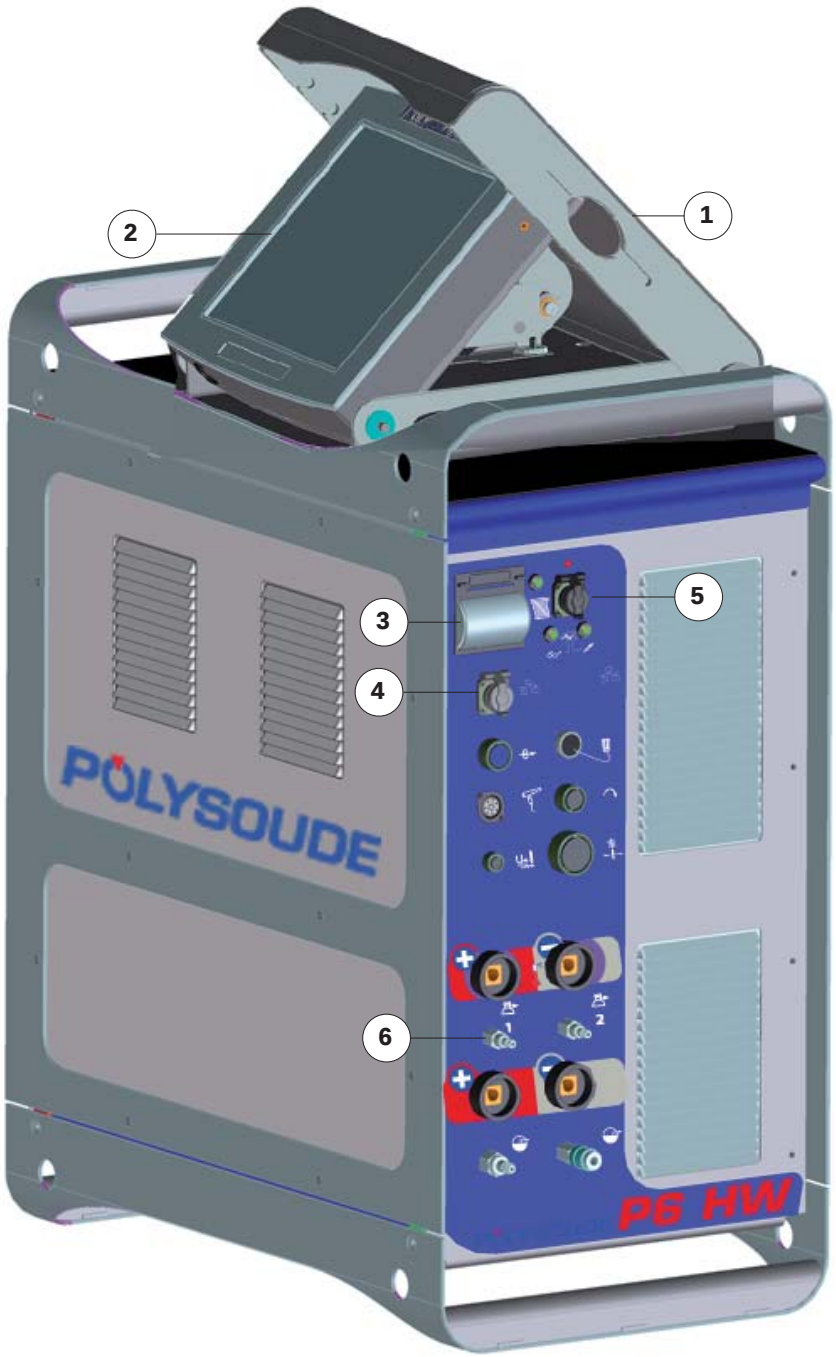


Fig. 3.11 - Description of the P6 HW power source

3. 3. 2. The P6 HW version remote control

This remote control controls and adapts all functions and settings remotely:

- Positioning welding heads and wire feeders.
- Starting and stopping weld cycles.
- Starting and suspension of the “hot wire” current.
- Selecting WPs and programs.
- Simulating weld programs.
- Minor modifications during a weld cycle.
- Shielding gas test.
- Manual starting of the cooling pump(s) and the gas(es).

Fig. 3.12 - Remote control - version P6 HW

3. 4. Technical characteristics

Mains power supply		Three-phase + earth 400 V/415 V ± 10% 50 or 60 Hz
Input current		25 A (400 V)
No-load voltage		78V
Insulation class		F
Protection rating		IP 23S (touchscreen closed) IP 20 (touchscreen open)
Welding current range		5 to 520 A
Current regulation		± 1% for I > 100 A and ± 1 A for I ≤ 100 A
Duty cycle	Welding current	520 A at 60% 420 A at 100%
	Hot wire current	140 A to 100 %
Current pulsing range		520 A range: 5 to 520 A Time: 10 to 3300 ms
Controlled movements		Head rotation Wire feeder Arc height - AVC Oscillation - OSC
Speed accuracy		± 1% for Vp ≥ ¼ V_{max} (Vp = programmed speed) ± 2 % for Vp < ¼ V_{max}
Controlled gases		Torch gas, second gas (optional)
Source cooling		Forced ventilation
Torch cooling		By external coolant
Actual value display in-cycle		Permanent power source output voltage and welding current display (if equipped with optional remove control or touch-screen)
WPs in memory		maximum 200
Sectors per program		maximum 99
Backup and loading		On USB flash drive
Dimensions		800 x 470 x 950 mm (L x W x H) without trolley 1060 x 530 x 1145 mm with trolley
Weight		138 kg without trolley 154 kg with trolley
Standards		EN 60974-1 and EN 60974-10

The EMC classification in accordance with EN 60974-10 has been produced according to class A.
The heating tests have been carried out at ambient temperature. The duty cycle at 40 °C has been determined by simulation.

4. Setting to work

4. 1. Receiving a P6 HW generator

The P6 HW generator is delivered packaged: crate, protection, etc. The original packaging must be kept for use each time the power source is transported in order to prevent damage.

When the power source is not in use, it must be stored on a suitable support and protected against impact damage (e.g. in its packaging).

In the package you will find:

- The D2616 remote control unit version P6 HW (Fig. 4.1 - 1).
- 9 meters of hot wire current earthing cable (Fig. 4.1 - 2a).
- 9 meters of welding earthing cable (Fig. 4.1 - 2b) with $U_{workpiece}$ measurement cable.
- A gas hose connector (3 hose connectors if the optional second gas has been ordered) (Fig. 4.1 – 3).
- This user manual (Fig. 4.1 - 4).
- A USB Key 9000629193 (Fig. 4.1 – 5).
- The installation CD ROM (Fig. 4.1 – 6).
- A RJ45 twisted cable to connect the PC with the power source (Fig. 4.1 – 7).
- A adapter manual torch ref. 0023000901(Fig.4.1 - Rep.8).
- Pad set anti-slip (Fig.4.1 - Rep.9).

Fig. 4.1 - P6 HW power source accessories

If a PC is used you must use the RJ45 cable supplied with the power source. Failure to use this cable may result in hazards for the user. Polysoude declines to accept any liability unless the PC/Power source connection is made with the RJ45 cable.

4. 2. Installation

4. 2. 1. Handling

To move the P6 power source use the handles provided. Never pull on any cables or pipework. If moving using a fork-lift truck take care to ensure stability. For lifting, the slings must be attached at the four holes in the upper arch so as to distribute the load evenly with a maximum angle of 15° with respect to the vertical.

4. 2. 2. Installation

During installation, make sure that the system is placed on a flat and stable surface.
If the equipment is used on a slope, take care to ensure that the power source does not topple over.
Openings are provided for ventilation of the power source. When installing it allows a minimum distance of 30 cm between these openings and any surface.
The power source is designed to protection class IP23S; it can be stored outside but must not be used without protection during precipitation.

4. 2. 3. Connection to mains electricity supply

All connections must be made by a qualified technician in accordance with the safety instructions quoted in the safety chapter.

General

The P6 HW power source is connected to the mains power supply with a cable containing 3 conductors + earth. A 3.5 m long cable is provided for this purpose. To ensure safety of operators, the protective (earth) conductor must be connected. Refer to the power source rating plate for the currents consumed for different mains voltages. For example, for a 400 V mains supply a 32 A protection is required.

To ensure safety of operators, the protective (earth) conductor must be connected.

For information: the user is responsible for the installation and use of the arc welding equipment in accordance with the manufacturer's instructions.
If electromagnetic interference is detected it must be the responsibility of the user of the arc welding equipment to resolve matters, with assistance from the manufacturer (taken from EN 60974-10 2008 – Appendix A.).

Power source for connecting to 400 / 415 V

In your installation, you must provide "inductive load fuse protection (motor rated)" with a 32 A rating.

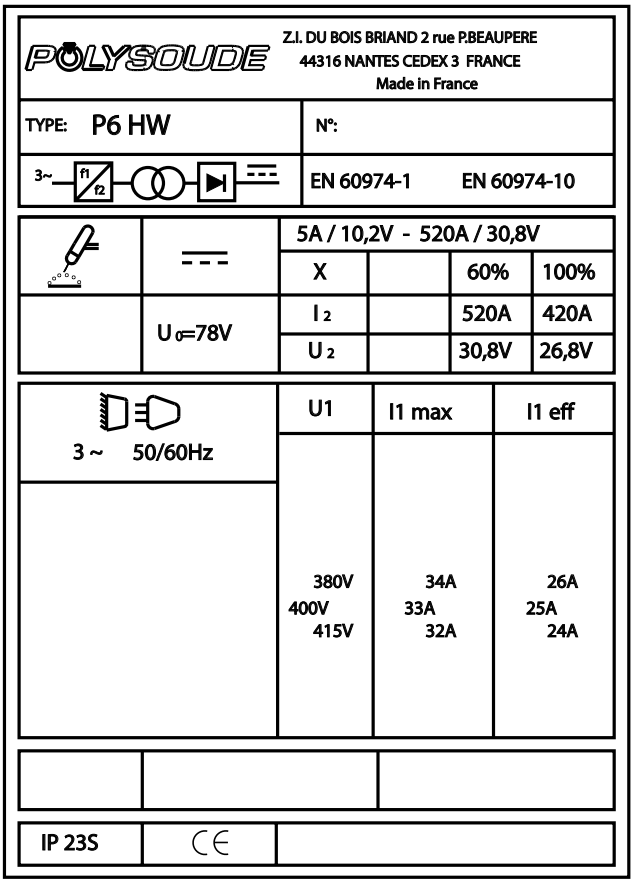


Fig. 4.2 - P6 HW rating plate

4. 2. 4. Connection with the gas supply

The connection is made on the rear connector panel of the power source using the connectors delivered with the machine.
Use litre flow meters at the outlet from the gas source (cylinder or manifold). You will find the order number for litre flow meters in 6.2.4 (spare parts list). Before making any connections, briefly open the gas valve to expel any impurities.

Fig. 4.3, Fig. 4.4 & Fig. 4.5 - 1	Gas 1
Fig. 4.3, Fig. 4.4 & Fig. 4.5 - 2	Gas 2

To ensure a successful welding cycle, please provide for a minimum of 2.5 L/min for Argon gas flow and 8 L/min for Helium flow.

Continuous gas option for UHP head on P6 HW

A gas flow continuing outside the weld cycle can be obtained, if a UHP welding head is connected to a power source which is equipped with the continuous gas flow option.

The flow rate of this gas is controlled by:
- a manual adjustment valve inserted into the circuit if the gas used (refer to Fig. 4.4) is the same as the welding gas. The valve (Fig. 4.4 - A) is adjusted manually.

- the litre flowmeter installed in the gas source (cylinder or manifold) if the gas used (refer to Fig. 4.5) is not the same as the welding gas. Connection is made at the rear of the power source at gas inlet 2.

How it works

Depending on the power source configuration, the gas flows as soon as the power source is switched on with a rate set by the manual adjustment valve or the litre flowmeter installed at the gas source.
When the welding cycle is started, with or without arc, the gas flow is switched to the welding gas with the rate set by the litre flowmeter on the welding gas source and ends when the post-welding gas timer has elapsed. Afterwards the gas keeps on flowing at the continuous gas flow rate.
As long as a UHP head is connected to the power source, the internal cooling circuit is inhibited.
Once the head is disconnected, the continuous gas flow is stopped.

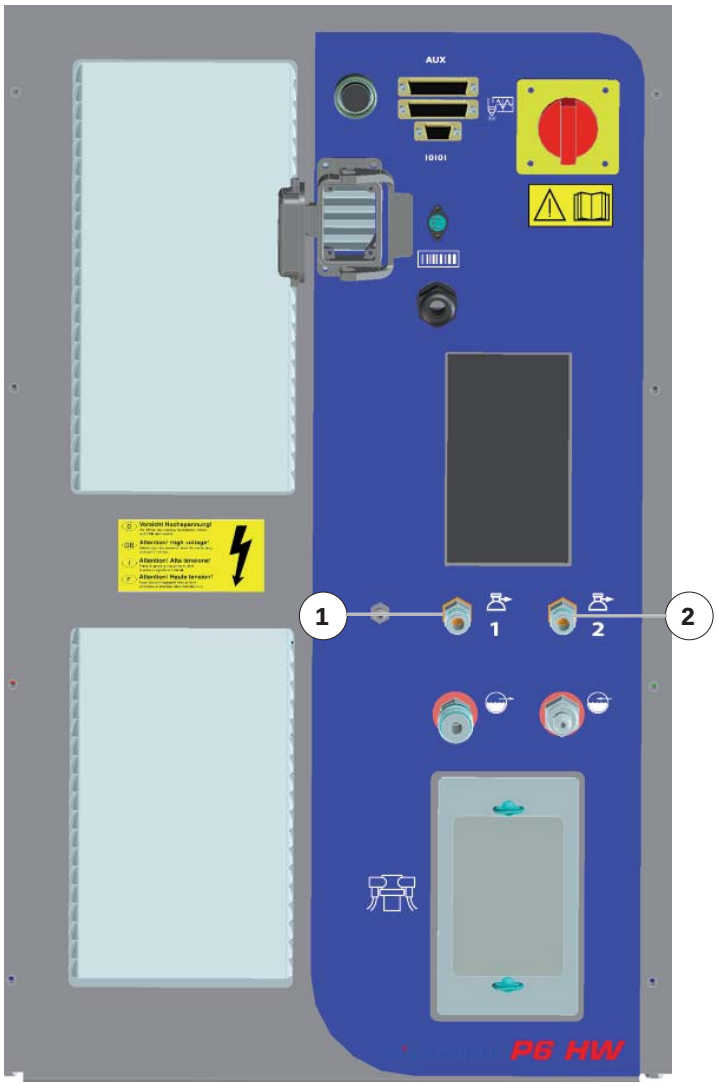


Fig. 4.3 - Connecting the gas supply to the P6 HW

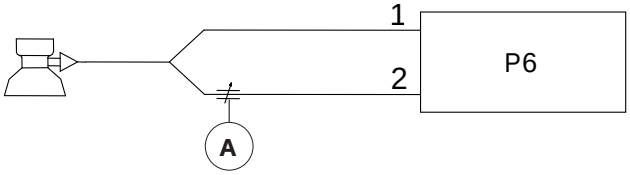


Fig. 4.4 - Connection diagram if one gas is used

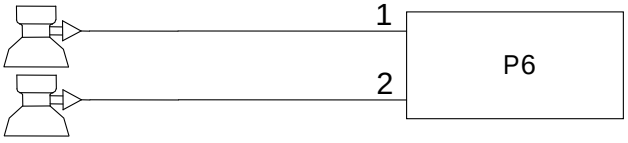
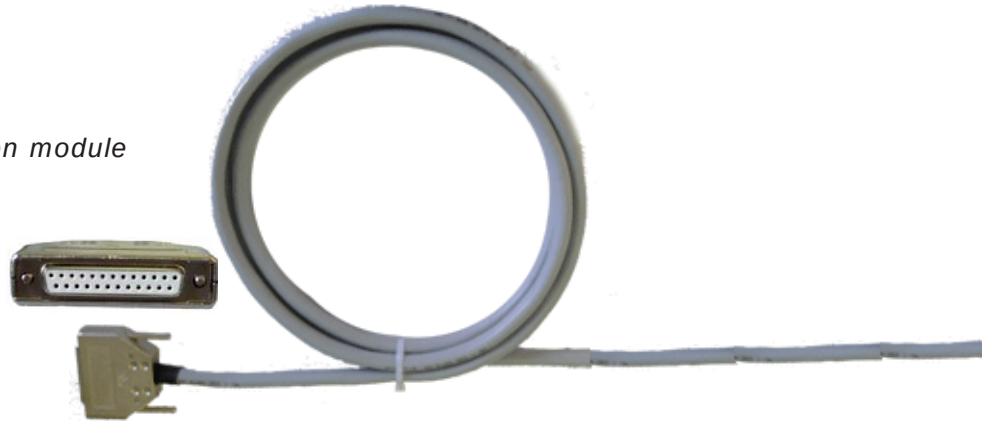


Fig. 4.5 - Connection diagram if two different gases are used

4. 2. 5. Connecting the acquisition module



Acquisition module

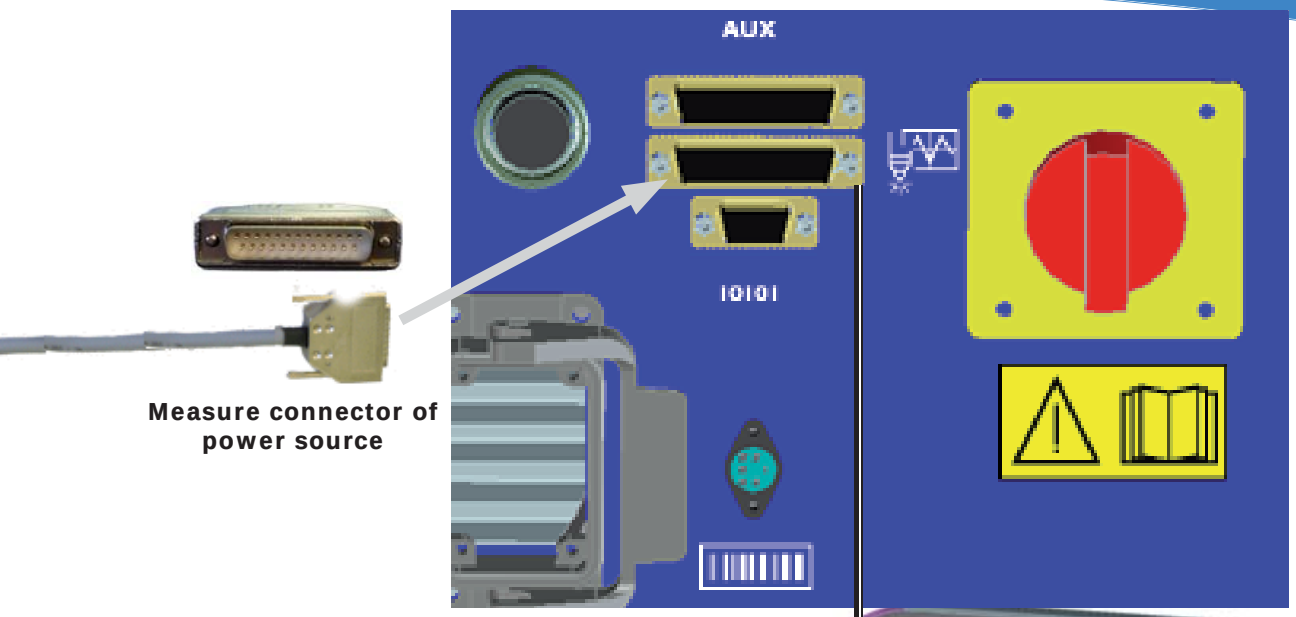
Ethernet cable RJ45

240 V_{AC}

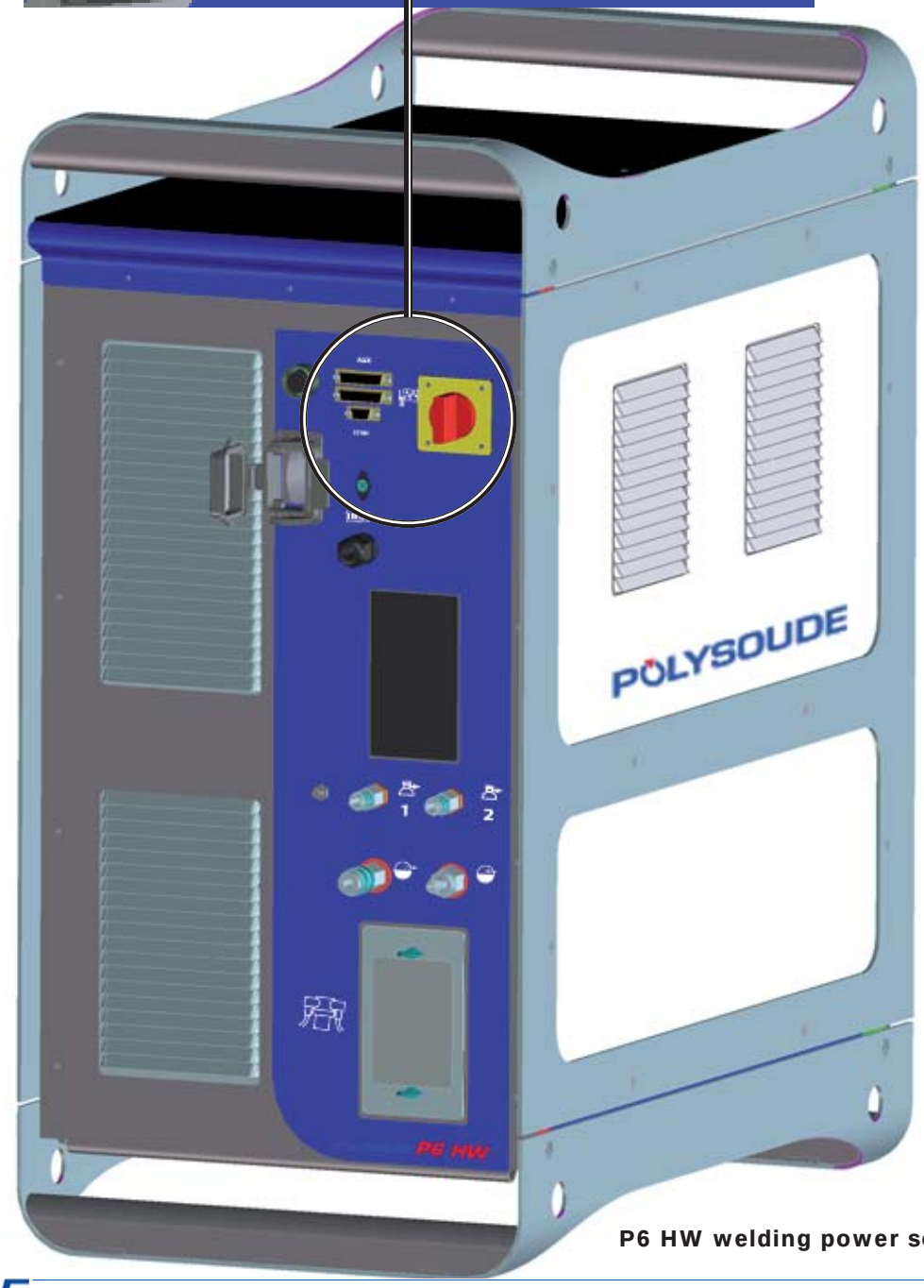
Power supply

Printer (optional)

Notebook P.C.



Measure connector of power source



P6 HW welding power source

4. 2. 6. Torch cooler connections

The P6 HW must be connected to an external cooler. The connection to a wastewater system or external cooling system is at the rear of the power source.

Fig. 4.6 - 1	"Water" inlet	
Fig. 4.6 - 2	"Water" return	

The direction in which the coolant travels must be correct as the flow rate is controlled by a safety system internal to the P6 HW.

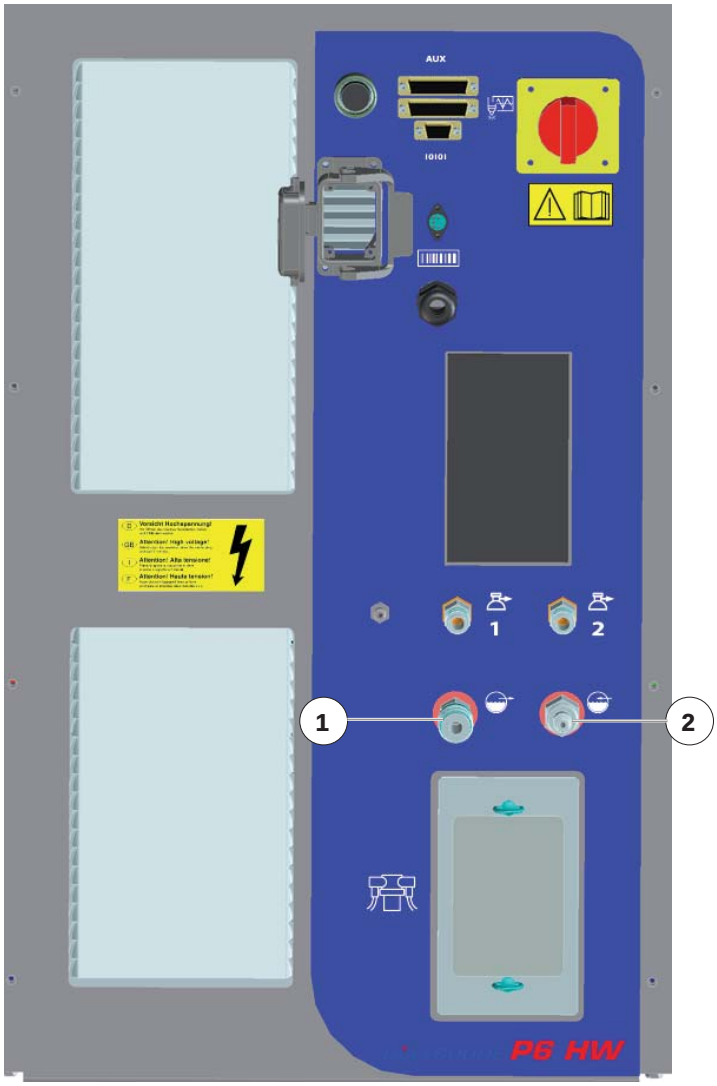


Fig. 4.6 - Connection of external coolant to the P6 HW

4. 2. 7. PC/Power source connection

If a PC is used you must use the RJ45 cable supplied with the power source. Failure to use this cable may result in hazards for the user. Polysoude declines to accept any liability unless the PC/Power source connection is made with the RJ45 cable.

Connect the PC to the RJ45 connector situated at the front of the power source with the Ethernet cable supplied .

The default IP address of the power source is 172.16.200.20

Configuring the power source's IP address:

Press the button **BT 6** "I-" of the remote control pendant during several seconds.
On the display of the remote control pendant appears:

	>		I	P		A	d	r	e	s	s			
			T	a	c	h	o							

Select "IP Adress" with the button **BT 1**.
Confirm the selection with the button **BT 3** "N+".
On the display of the remote control pendant appears Ip number

The IP address is in the form of four numeric blocks that can be modified by **BT2** and **BT3**. Moving from one block to another is effected by a pulse on **BT1.**

Once you have reached the last block, pressing once more on BT1 stores the new entry in memory and terminates the IP address modification procedure.

Configuring the IP address in Windows™ 2000, XP or NT:

In order to modify the IP address of the PC.
In the **Start** menu, select **Settings** > **Network Connections**.
The list of connections appears. Right click **Local network connection** then click on **Properties**. The **General** tab contains all of the elements used for the connection.
Double click on Internet protocol (**TCP/IP**), and tick the option "Use the following IP address" and enter the address of the power source.

4. 2. 8. Equipment compatibility

To know the standard axis configuration to equipments Polysoude, see the memo „Axis Configuration Standard".

L'opérateur doit impérativement respecter le choix de types d'axes spécifiés par Polysoude.
En cas de non respect de ce choix il existe de forts risques de destruction du matériel.

Fig.4.7 - Memo Axis configuration standard

4. 3. Setting to work

4. 3. 1. Remotes control on board

When using the remote control board on TS, MW and hand torches, must keep pressing the button for one second that action be taken into account

4. 3. 2. Remote control unit connection

The wire feed unit is connected at the front connection panel of the P6 HW by a screw connector. If the remote control is not connected, a power source fitted with the emergency stop option cannot be powered on.

Fig. 4.8 - Connection of the remote control unit to the P6 HW power source

4. 3. 3. Connection of an open welding head of the MU type or a tube/tube sheet welding head of the type TS or TP

Connection of the electrode current cable

Connect the current cable on the "-" terminal with the quick connector, locking it by rotation to the right.

Earth cable connection

Connect the earth cable to the "+" terminal on the connector panel. The terminal is surrounded by a red ring. Connection is made with a quick-fit connector, locked by turning clockwise. Connect the other end of the cable to the workpiece, as close as possible to the joint to be welded, in an area free from grease and oxide.

Connecting the voltage measurement device to the workpiece

If servo control of height to the arc voltage is required, this voltage must be measured on the workpiece directly and as close as possible to the electrode. A white wire, tied to the earth cable makes it possible to measure the arc voltage on the workpiece. At the power source end, this wire is connected to the FA26 socket on the front pane (symbol 

) using a screw connector.

Connection of the rotation motor cable

Connection is made on the connector panel at connector (symbol ). Make sure that the securing ring is properly tightened, otherwise the system may not function correctly.

Connecting the arc height / oscillation motor cables

Connection is made on the connector panel at connector (symbol ).

Connection of the torch shielding gas

Connection is made with a quick push-pull coupling on the connector panel (Symbol ).

Cooler connections

Connection is made by 2 quick couplings on the front panel (Symbols  and ).

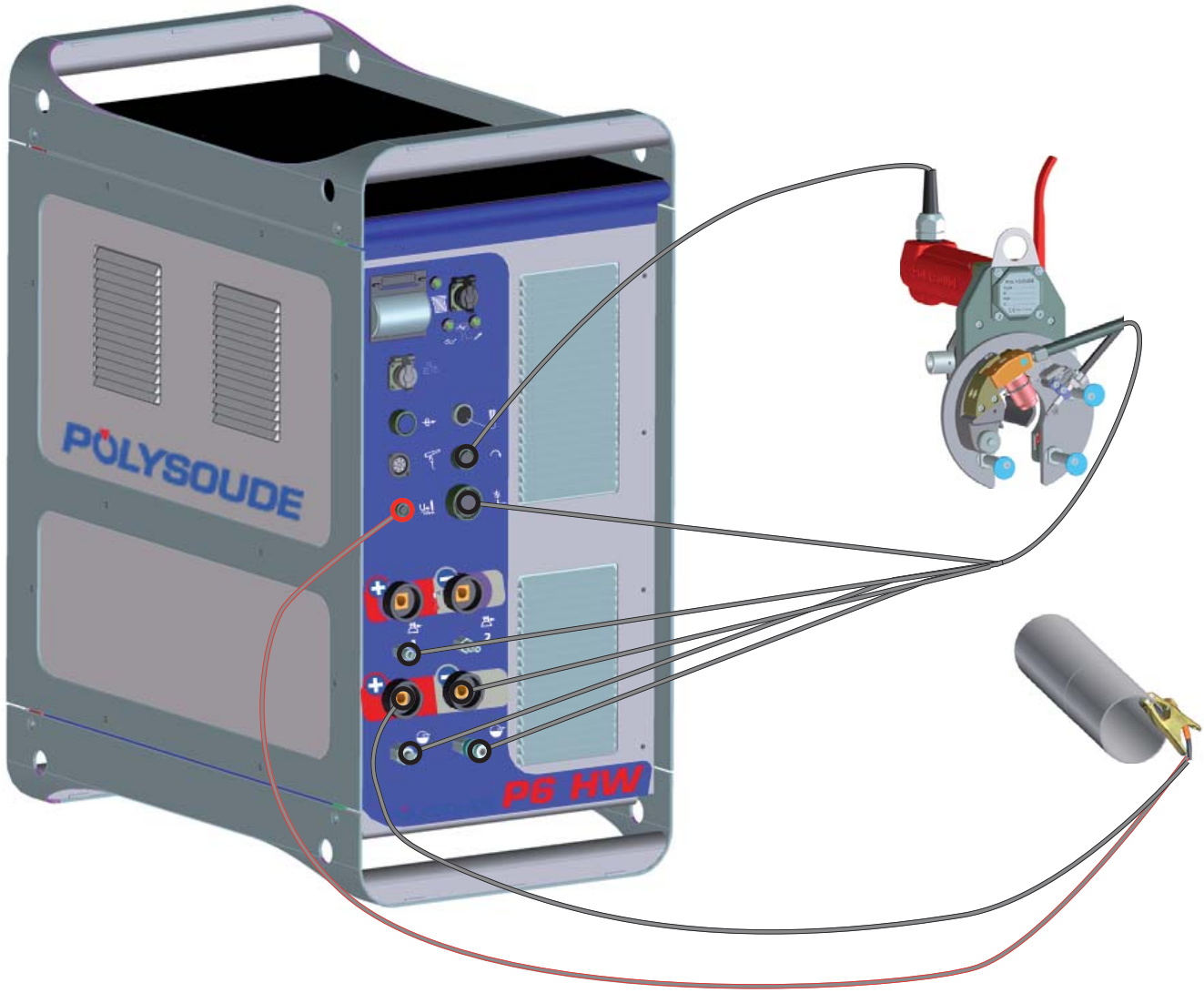


Fig. 4.9 - Connection of an open welding head of the MU type or a tube/tube sheet welding head of the type TS or TP

4. 3. 4. Connecting a "Polycar Hot Wire" type head

Connecting the electrode and hot wire current cables

Connect the current cable to the terminal marked "-" and the hot wire current cable to the "-" terminal circled in purple on the connection panel using quick connectors which lock by turning clockwise.

Connecting earth cables

Connect the welding earth cable to the terminal marked "+" and the hot wire current earth cable to the "+" terminal circled in purple on the connection panel. These terminals are surrounded by a red ring. Connection is made with a quick-fit connector, locked by turning clockwise. Connect the other end of the cable to the workpiece (Fig. 4.10), as close as possible to the joint to be welded, in an area free from grease and oxide.

Connecting the voltage measurement device to the workpiece

If servo control of height to the arc voltage is required, this voltage must be measured on the workpiece directly and as close as possible to the electrode. A white wire, tied to the earth cable makes it possible to measure the arc voltage on the workpiece. At the power source end, this wire is connected to the front connector panel **FA 26** (symbol 

) with a screw connector.

Connection of the rotation motor cable

Connection is made on the connector panel at connector (symbol ). Make sure that the securing ring is properly tightened, otherwise the system may not function correctly.

Connecting the arc height / oscillation motor cables

Connection is made on the connector panel at connector (symbol ).

Connecting the wire feeder motor cable

Connection is made on the connector panel using a screw connector (symbol ).

Make sure that the securing ring is properly tightened, otherwise the system may not function correctly.

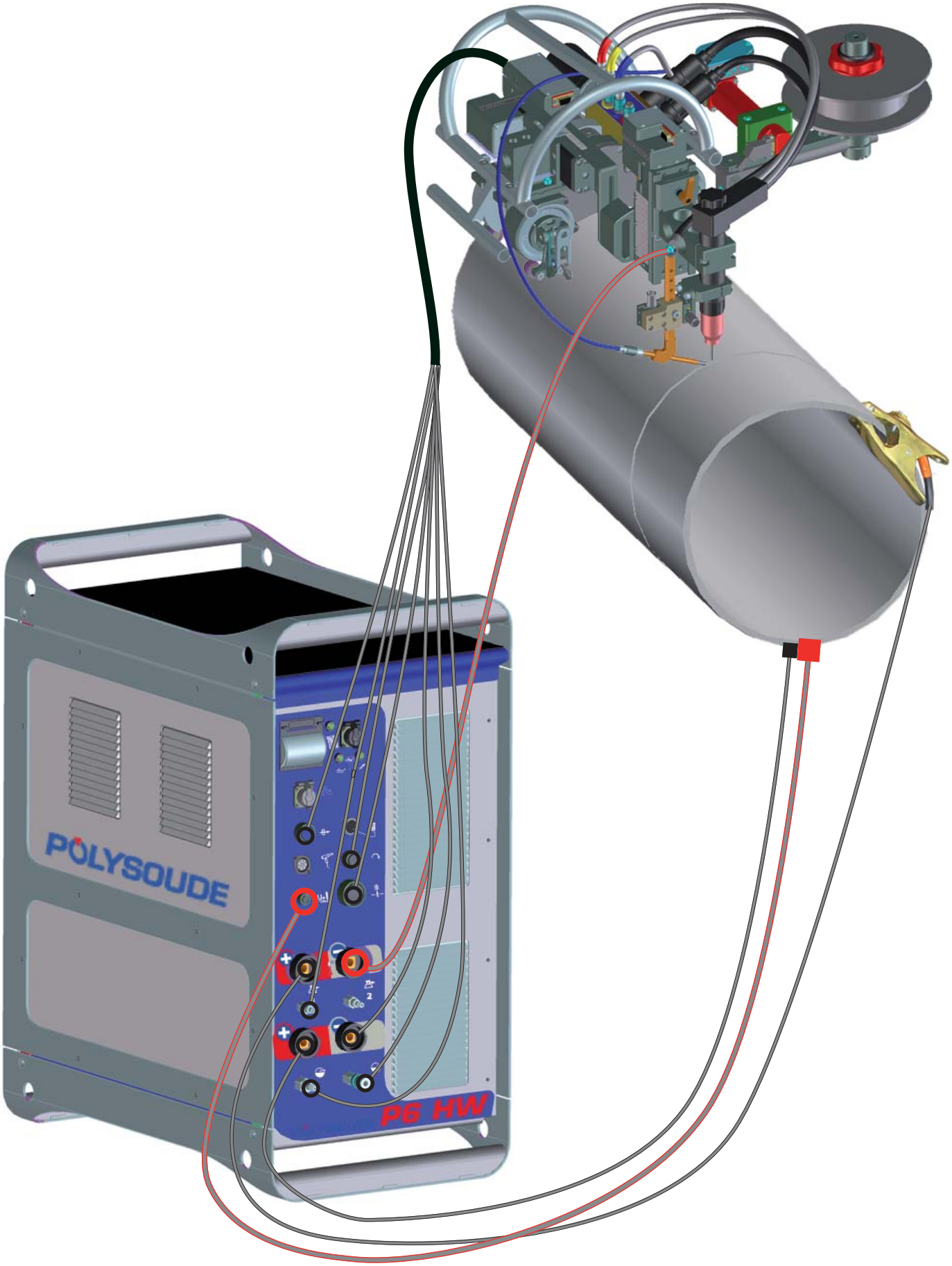


Fig. 4.10 - Connection of a “Polycar hot wire” type head

4. 3. 5. Connection of a gas cooled closed chamber welding head

Polysoude UHP heads belong to this group.

Connection of the electrode current cable

Connect the current cable on the "-" terminal with the quick connector, locking it by rotation to the right. This terminal is not marked by a colour.

Earth cable connection

Connect the earth cable to the "+" terminal on the connector panel. The terminal is surrounded by a red ring. Connection is made with a quick-fit connector, locked by turning clockwise. The cable end is marked red.

Connection of the rotation motor cable

Connection is made on the connector panel at connector (symbol). Make sure that the securing ring is properly tightened, otherwise the system may not function correctly.

Connection of the torch shielding gas

Connection is made with a quick push-pull coupling on the connector panel.

(Symbol 1).

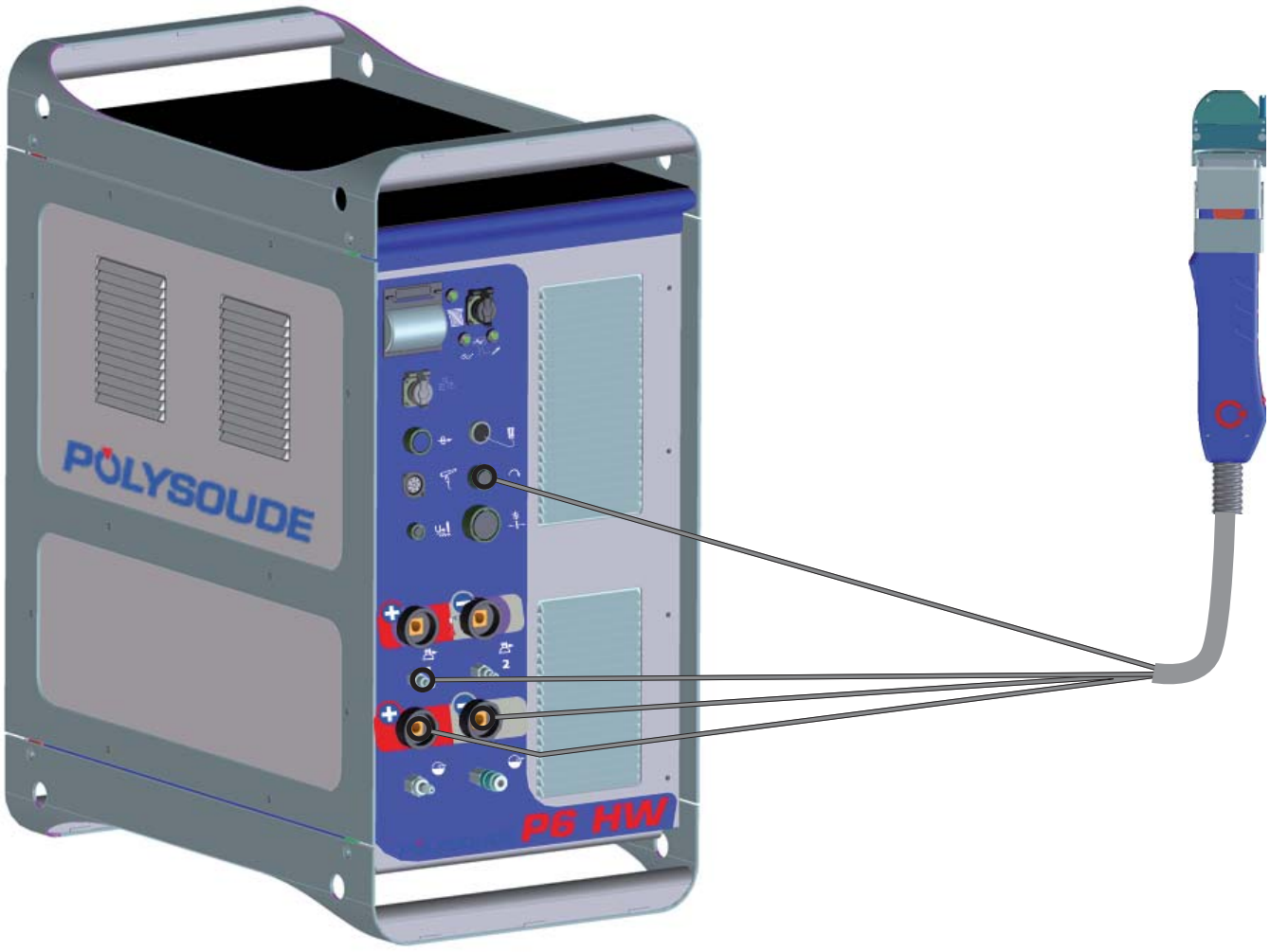


Fig. 4.11 - Connection of a gas cooled closed chamber welding head

4. 3. 6. Connection of a liquid cooled closed chamber welding head with integrated command buttons (MW 40-3, 65-3, 115-3, 170)

Connection of the electrode current cable

Connect the current cable on the "-" terminal with the quick connector, locking it by rotation to the right.

Earth cable connection

Connect the earth cable to the "+" terminal on the connector panel. The terminal is surrounded by a red ring. Connection is made with a quick-fit connector, locked by turning clockwise. The cable end is marked red.

Connection of the rotation motor cable

The wire feed unit is connected at the front connection panel of the P6 HW by a screw connector (symbol). Make sure that the securing ring is properly tightened, otherwise the system may not function correctly.

Connection of the integrated control cable for new version type MW heads

Connect the integrated control cable to the "manual torch" terminal (connecter **FA 5**) of the connection panel with connection ref 0023000901.

Connection of the cooling circuit

Connection is made by 2 quick couplings on the front panel (symbols and).

Connection of the torch shielding gas

Connection is made with a quick push-pull coupling on the connector panel.

(Symbol 1).

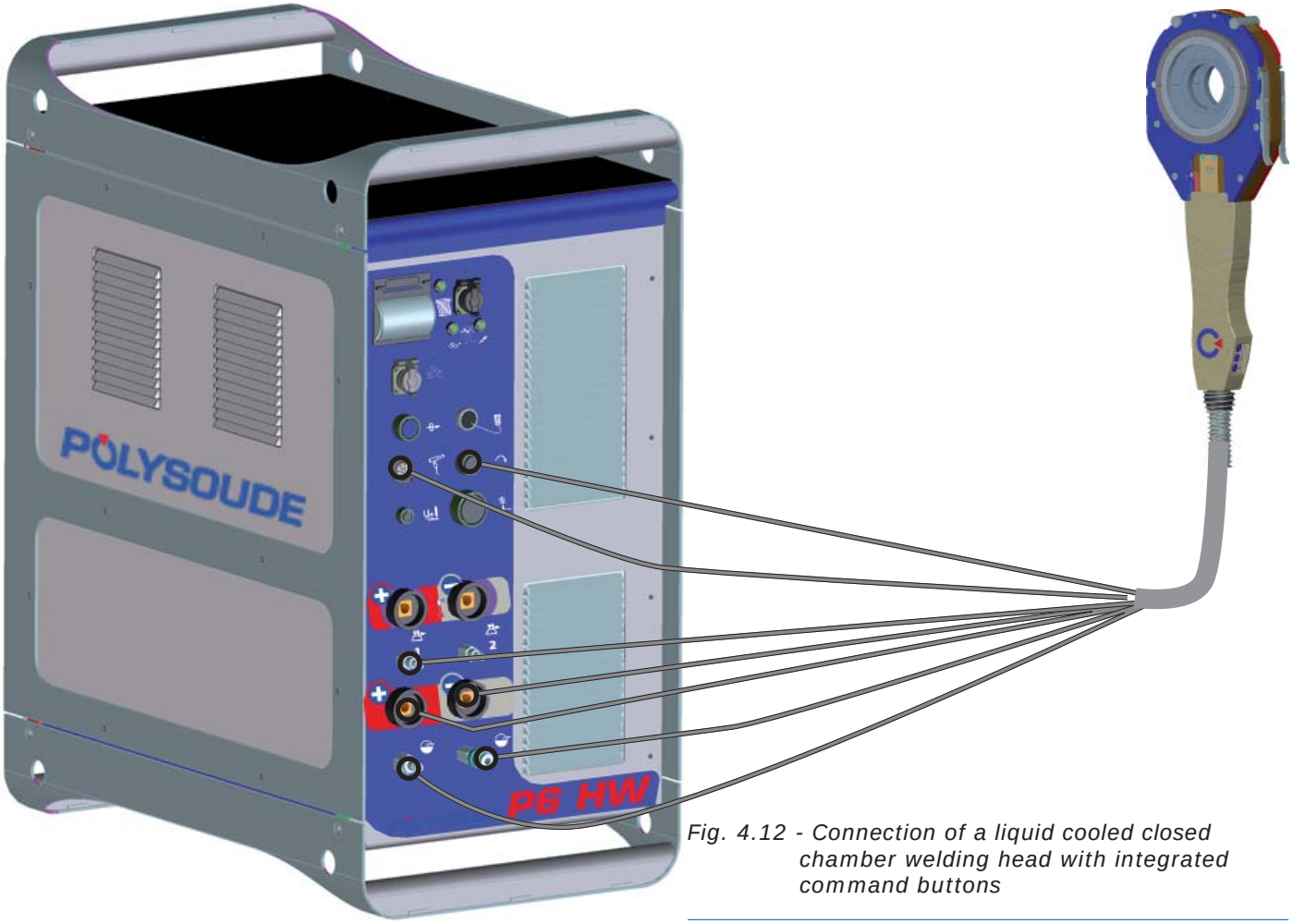


Fig. 4.12 - Connection of a liquid cooled closed chamber welding head with integrated command buttons

4. 3. 7. Connection of a wire feed unit

The wire feed unit is connected at the front connection panel of the P6 HW by a screw connector (symbol).

Make sure that the securing ring is properly tightened, otherwise the system may not function correctly.

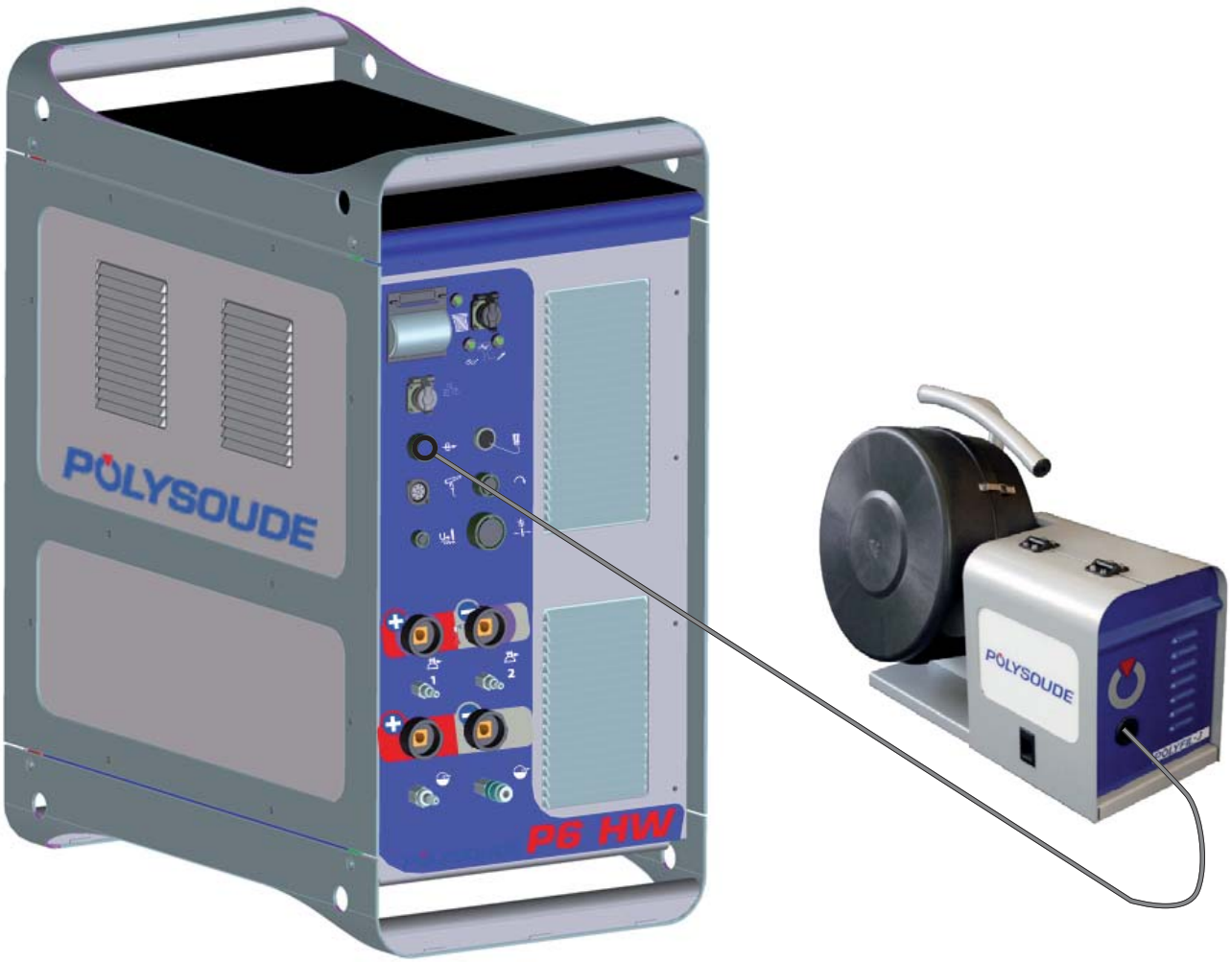


Fig. 4.13 - Connection of a wire feed unit

4. 3. 8. Connection of a closed chamber welding head equipped with tacheo-metry (option)

Adapters are mounted in the lines from the welding head to the power source/cooling system assembly:

- Gas circuit
- Torch rotation
- Electrode current and water return
- Earth current and water feed

The connection of these adapters to the power source and cooling circuit is identical to those of a liquid cooled closed chamber welding head.

To avoid damage or poor weld quality it is recommended to readjust the tachometer of the welding head while putting into operation the equipment.

See as well section "Adjustment of the tachometer" in chapter "Maintenance" of the present paper

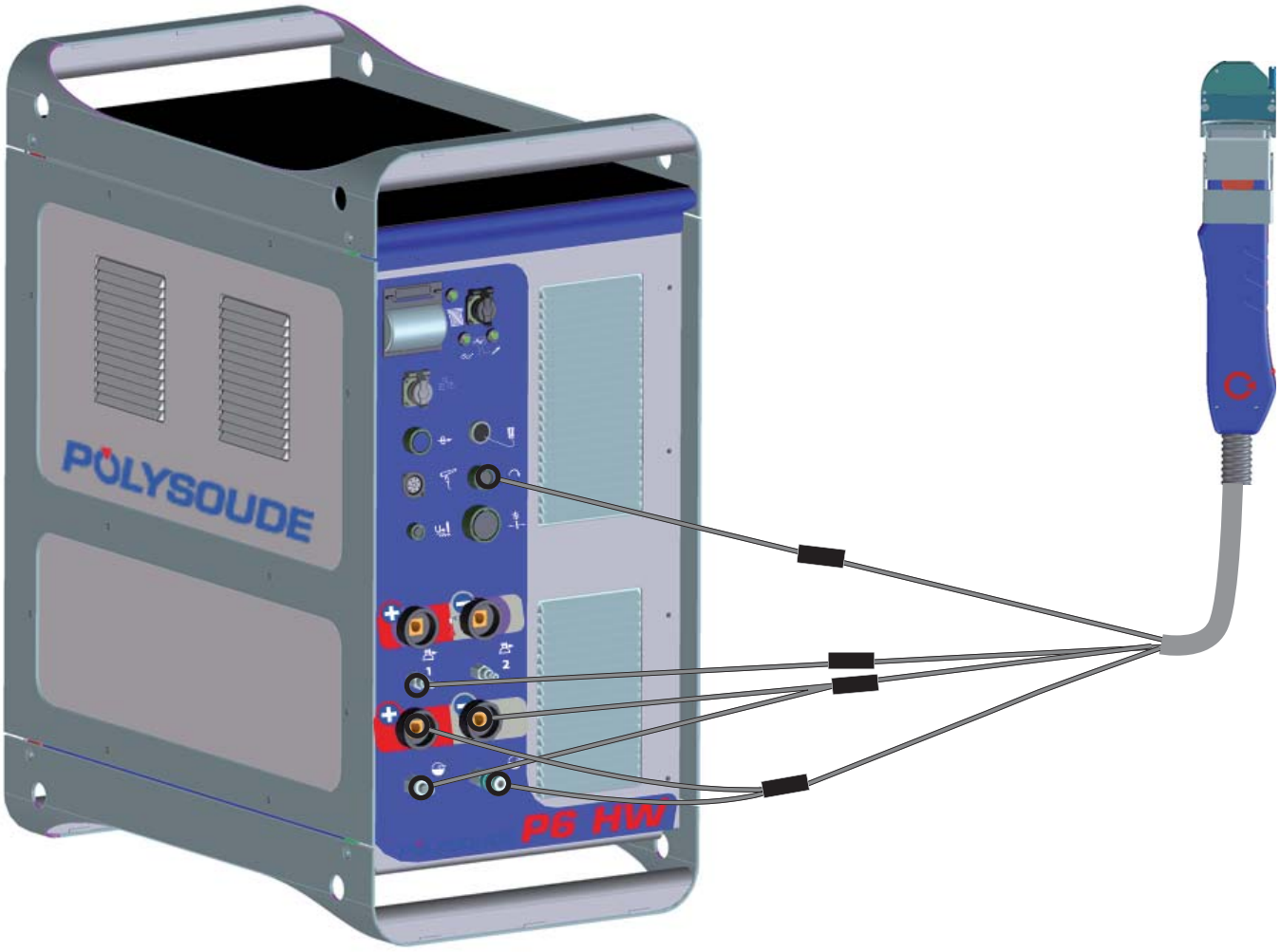


Fig. 4.14 - Connection of a closed chamber welding head equipped with tacheometry

4. 3. 9. Connection of a manual torch with double command

Connection of the electrode current cable

Connect the current cable on the "-" terminal with the quick connector, locking it by rotation to the right.

Earth cable connection

Connect the earth cable to the "+" terminal on the connector panel. The terminal is surrounded by a red ring. Connection is made with a quick-fit connector, locked by turning clockwise. Connect the other end of the cable to the workpiece, as close as possible to the joint to be welded, in an area free from grease and oxide.

Connection of the trigger control

Connect the trigger control cable to the "manual torch" terminal (connecter **FA 5**) of the connection panel. Use the adapter for manual torch 0023000901.

Connection of the cooling circuit (option)

Connection is made by 2 quick couplings on the front panel (symbols and).

Connection of the torch shielding gas

Connection is made with a quick push-pull coupling on the connector panel (symbol 1).

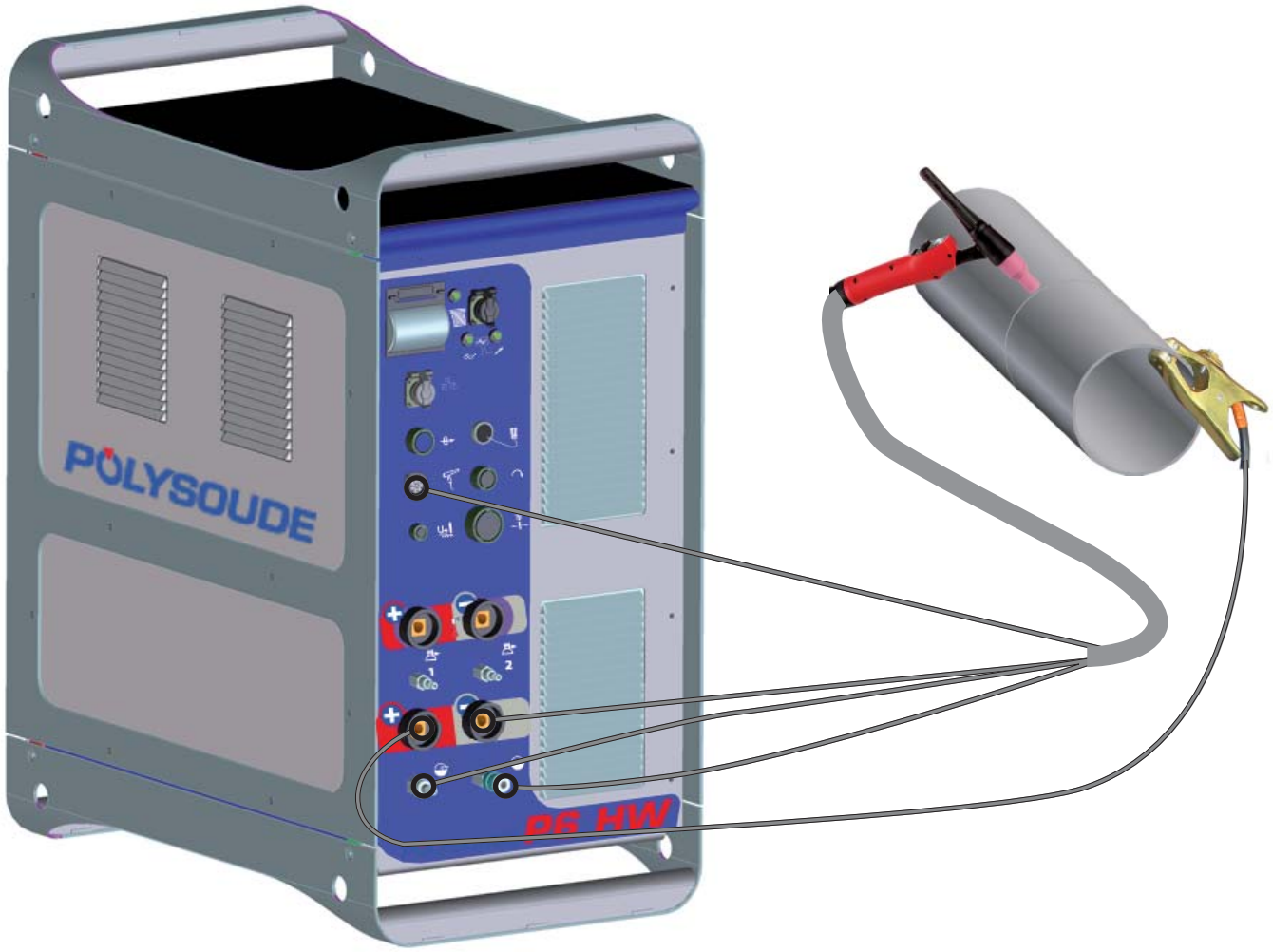


Fig. 4.15 - Connection of a manual torch

4. 3. 10. Detection of the welding head

If the head connected to the power source does not correspond with the welding procedure selected, the cycle will not start.
Select the correct procedure or change the head appropriately to enable the welding cycle to start.

4. 3. 11. Detection of the "open head" position

If an old type of closed head is used, the power source starts to strike an arc provided that the head is in the "open head" position. If this is not so it will not start the cycle.
If there is any doubt make a test. No damage will occur.

With the various detection functions not operating, the operator has to pay more attention.

4. 3. 12. Oxygen meter option

This chapter provides a description of the interface between the power source and the oxygen meter.
It is possible to install an oxygen meter to the power source-GUI assembly. Communication for the oxygen meter and the power source is provided by an RS232 serial port cable whose operation is fixed at 19200 baud.

In order to use an oxygen meter with the power source it is essential to use the RS232 serial port cable supplied by Polysoude. Use of any other cable will result in major malfunction.

Connect the RS232 serial port cable to connector **FA 22** (Fig. 4.16 – 1) on the connection panel at the rear of the power source. Connect the other end of the RS232 serial port cable to the front panel of the oxygen meter (Fig. 4.16 – 2). Please refer to the GUI user manual in order to adjust settings of the oxygen meter on the GUI. It is particularly important to refer to the oxygen meter user manual. In it, you will find detailed explanations of the various functions of the equipment.

Oxygen meter settings

Two parameters must be set on the oxygen meter and two parameters must be checked before use.
If one of these parameters is not set correctly or if the value received by the HMI differs from the value programmed, the HMI will indicate "Oxygen fault".

The parameters to be checked before use are:
- The temperature of the probe must be at 750°C (permitted value between 748 and 752°C).
- The airflow must be adjusted to between 5L/min and 10L/min. The pump must be running. If it is not, the HMI will indicate "Oxygen fault".

The parameters to be set before use are:
- The «Documentation» line of the display must be at «Off» in the «Basic Settings» menu.
- The value of «Baud» must be set to 19200 in the «System Settings» menu.

In order to perform these settings and to start to use the equipment, please refer to the oxygen meter user manual.

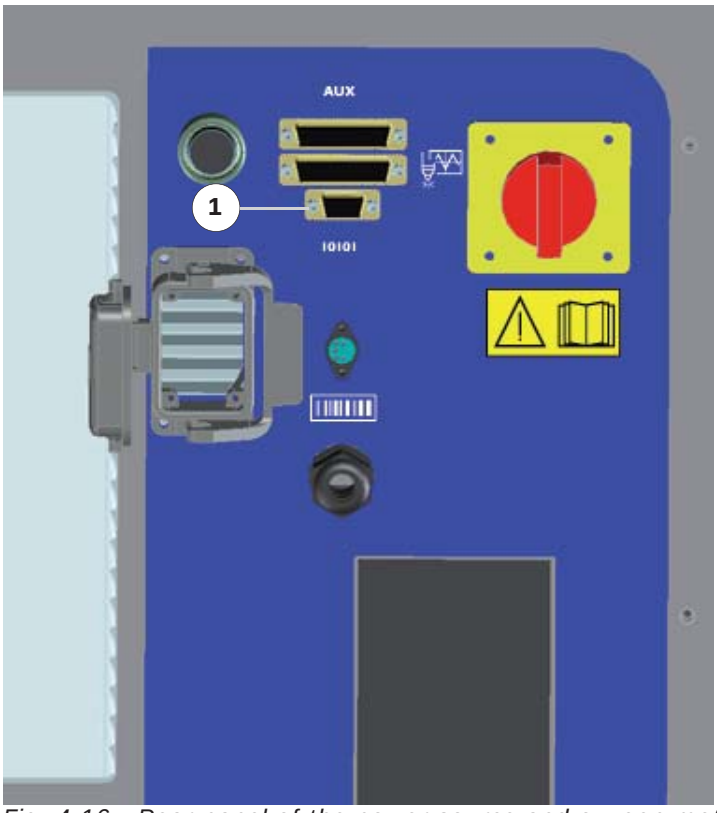


Fig. 4.16 - Rear panel of the power source and oxygen meter

4. 3. 13. Option commands mechanised equipment

With this option the power source operates mechanised equipment type boom, positioner etc... The power source is equipped with modules (Fig. 4.18) of an Ethernet switch and power supply (Fig. 4.19), and is associated with an external drive.
To access the modules must remove the left side plate of the power source. To access the Ethernet switch and power supply must be filed right side plate of the power source.

The drive connects to the power source via a cable equipped with an auxiliary connector 44–pin (0-10 V or -10/+10 V signal, right stop and left stop, drive connect OK, direction control, triggering the start and stop welding cycle).

The auxiliary connector is connected to the outlet **FA 20** (Fig. 4.17 - Pos.1) on the back cover of the power source.

The power source is equipped with an emergency stop (Fig. 4.17 - Pos.2) that is used to connect an emergency stop button on a bay, a desk or other customer equipment. The remote control is also equipped with emergency stop button (Fig. 4.20 - Pos.1). These emergency stops power cut stops of the entire installation.

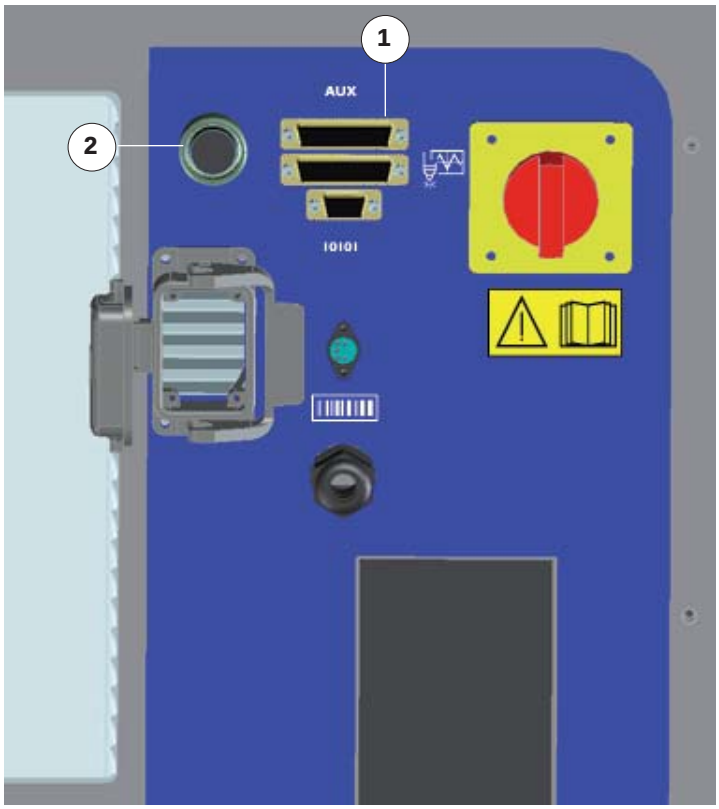


Fig. 4.17 - Power source rear connection panel

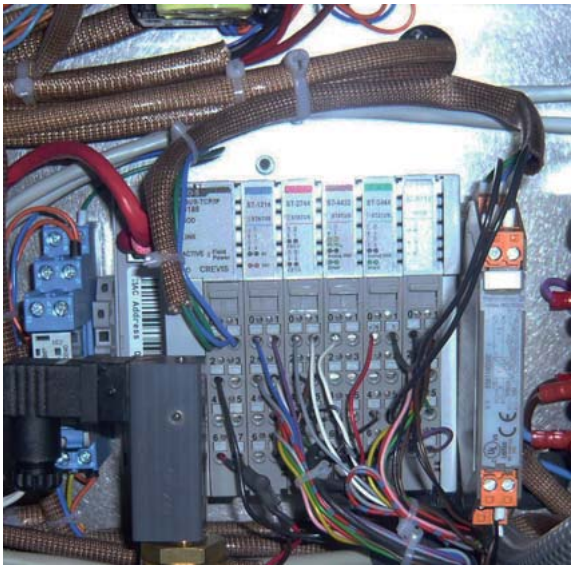


Fig. 4.18 - Modules

Fig. 4.19 - Ethernet switch and power supply

The rear connector 44–pin connector allows the drive. Here the representation of the connector with the I / O available.

Fig. 4.20 - Remote control unit with emergency stop

Item	Designation
1	Way A encoder
2	0V encoder
3	0V
4	Drive connects ready
5	Order cycle stop
6	24 V max (input)
7	Reverse gear
8	24 V max (input)
9	0V motor
10	Not used (0->10V signal)
11	Not used
12	Not used
13	
14	
15	
16	Way B encoder
17	0V encoder
18	24V output
19	Left stop
20	Order start cycle
21	Forward run
22	24 V max (input)
23	State with arc
24	
25	Not used (0->10V input)
26	
27	
28	
29	
30	
31	Not used
32	Not used
33	Right stop
34	Downslope cycle control
35	24 V max (input)
36	State cycle
37	Set motor 0->10V or -10V->10V
38	
39	
40	
41	
42	
43	
44	

Fig. 4.21 - Connector wiring

4. 4. Description of controls

4. 4. 1. Front control and connection panel

Item	Description
FA 2	Remote control unit connection.
FA 3	Connection of the rotation system.
FA 4	Connection of the wire feeder.
FA 5	Connection of the command cable of a manual torch or of a type MW welding head.
FA 7	Connection of a second gas (option).
FA 9	Connection of the torch shielding gas.
FA 10	Earth cable connection.
FA 11	Connection of the torch current cable.
FA 12	Coolant outlet connection 1.
FA 13	Coolant return connection 1.
FA 14	Connection of the PC interface (RJ45).
FA 15	Connection of the USB key.
FA 16	**Short press**: a ticket is printed summarising the welding carried out. **Long press** (> 2 s): print-out of the program selected.
FA 17	Indicator light on when USB key busy with reading/writing.  **Do not remove the USB key when the light is illuminated.**
FA 18	Write command on the USB key. (WP export + ticket).
FA 19	Read command on the USB key. (WP import).
FA 26	Work piece voltage connection.
FA 27	Connection of arc height and oscillation.
FA 28	Positive connection of the "hot wire" current source.
FA 29	Negative connection of the "hot wire" current source.

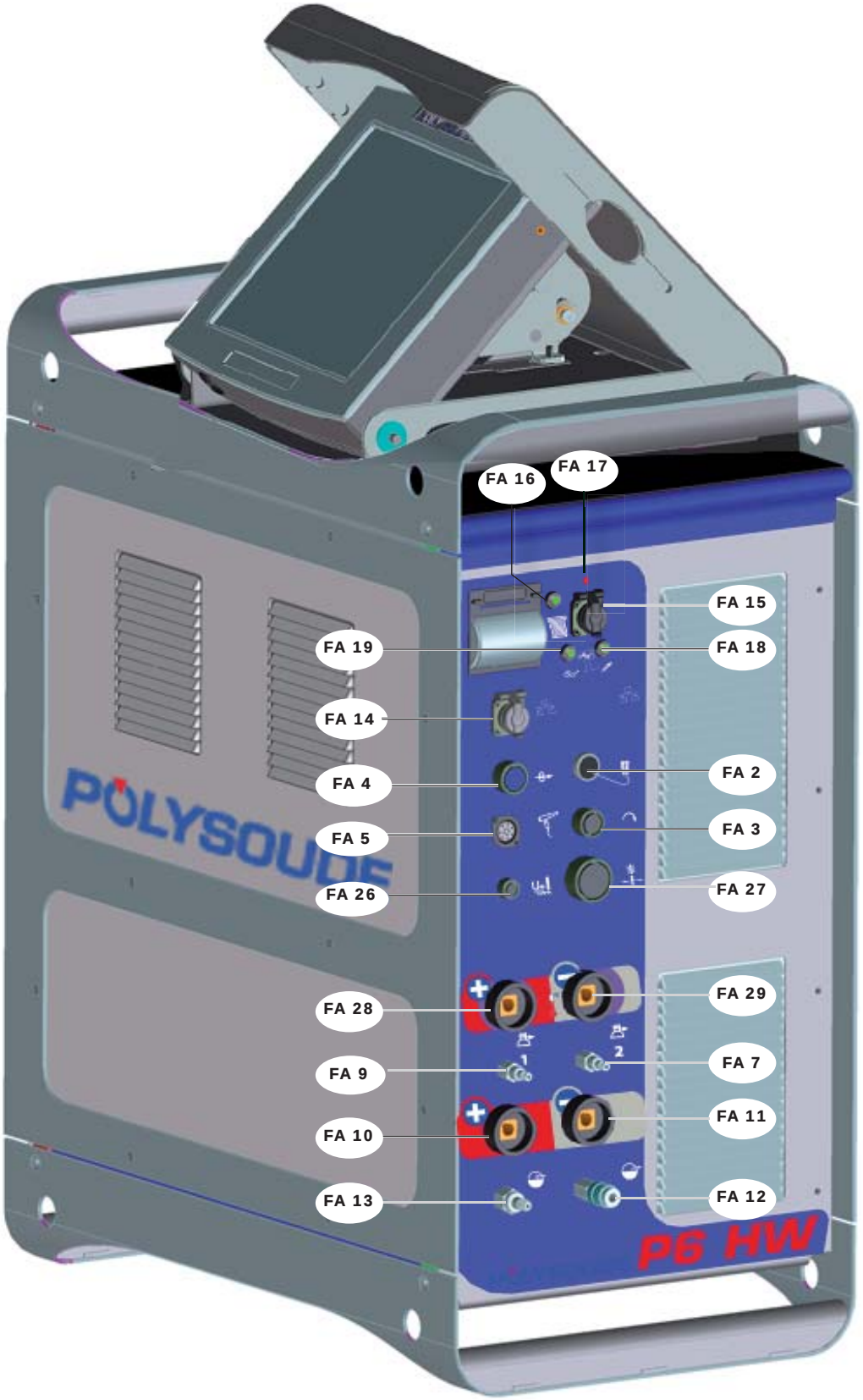


Fig. 4.22 - Front connector panel

4. 4. 2. Rear connector panel

Item	Description
FA 1	On/off switch.
FA 6	Connection of the second gas supply (option).
FA 8	Connection of the torch shielding gas input
FA 20	Connection of auxiliary equipments.
FA 21	Connection of the data acquisition unit.
FA 22	Connection for RS232 serial link (oxygen analyzer).

Item	Description
FA 23	Connection of a bar code reader.
FA 24	Incoming external coolant feed (cold circuit)
FA 25	External coolant return (hot circuit)
FA 30	Connection of the video system - Harting connector
FA 31	Connection emergency stop button (option)
FA 32	Connection of the video gas shielding

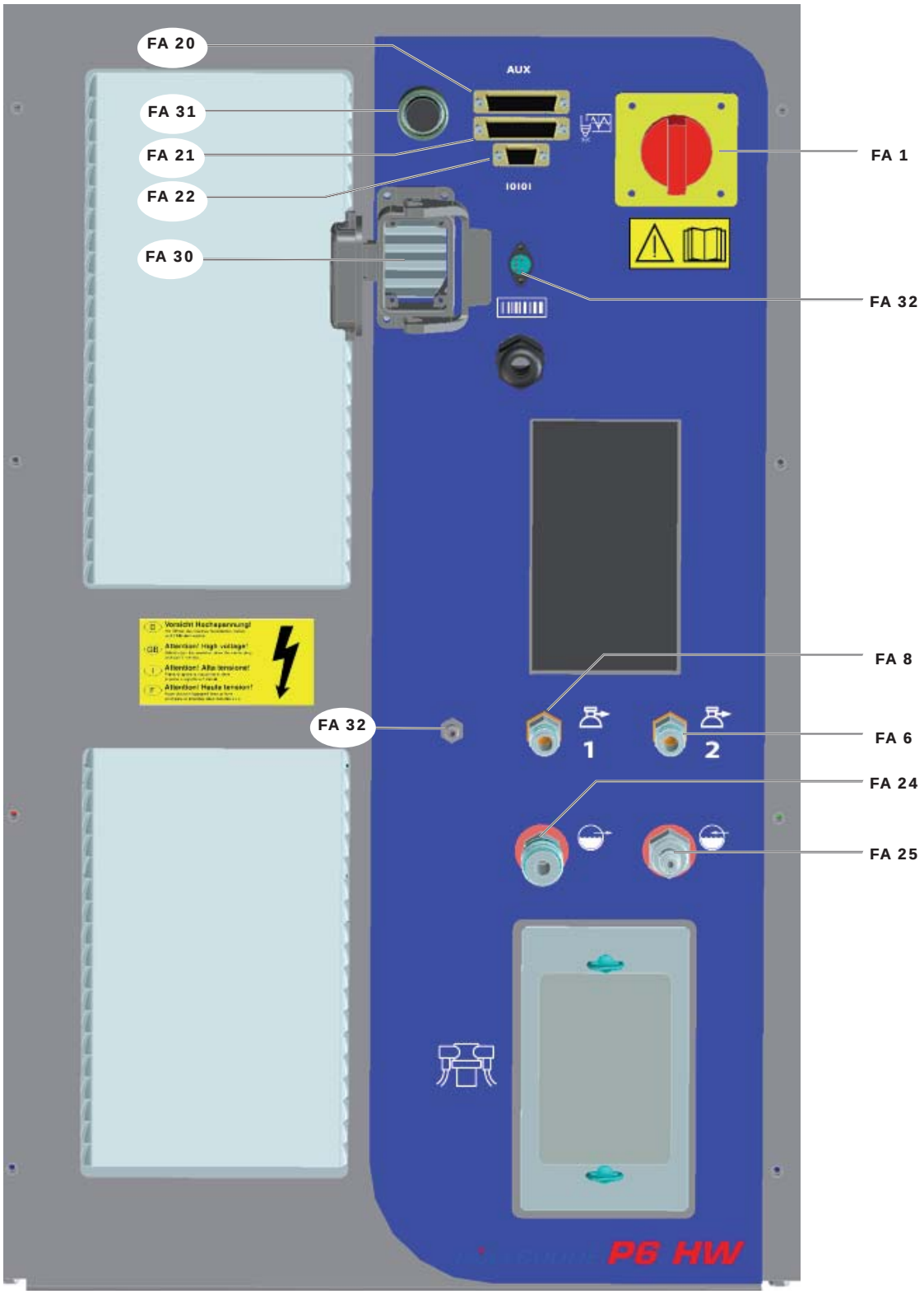


Fig. 4.23 - Rear connector panel

4. 4. 3. Remote control unit

4. 4. 3. 1. Functions of the components

Item	Function
AF 1	4 line 20 character backlight display.
V 1	Red indicator light for simulation cycle.
V 2	Green indicator light for cycle with arc.
V 3	Green indicator illuminated: Increment actions on low level.
V 4	Green indicator illuminated: Increment actions on high level.
V 3 + V 4	Green and red indicator illuminated: Increment actions on low and high level.
V 5	Red indicator light for wire feed in manual mode when **BT 12** is pressed.
V 6	Green indicator illuminated: automatic filler wire operation according to programmed parameters.
V 7	Green indicator light for variation in amplitude overrides
V 8	Green indicator light for variation in overrides over time
V 9	Green indicator light shows AVC is operating
V 10	Red indicator light shows AVC is suspended
V 11	Green indicator light for the operation of the "hot wire" current.
V 12	Red indicator light for the suspension of the "hot wire" current.
BT 1	Push button for line toggling on the display.
BT 2	Push button to move down in the WP or program list or to decrease a numeric value. If held down for more than 1 second, automatic mode is applied.
BT 3	Push button to move up in the WP or program list or to increase a numeric value. If held down for more than 1 second, automatic mode is applied.
BT 4	**Out of cycle**: Toggles between simulation cycle or arc cycle (coupled with V1 and V2).
BT 5	Loops round three options regarding increments: high level or both levels (coupled with V3 and V4).

BT 6	**Out cycle** : Press the button **BT 6** "I-" of the remote control pendant during several seconds.
	On the display of the remote control pendant appears:
	`> IP Adress`
	`Tacho`
	Select "IP Adress" with the button **BT 1**.
	Confirm the selection with the button **BT 3** "N+".
	Modification of the IP address. The IP address is in the form of four numeric blocks that can be modified by **BT 2** and **BT 3**. Moving from one block to another is effected by a pulse on **BT 1**. Once you have reached the last block, pressing once more on **BT 1** stores the new entry in memory and terminates the IP address modification procedure.
	
	In cycle: Decrementation of the weld current level selected with **BT 5**.

BT 7	**In cycle**: Incrementation of the weld current level selected with **BT 5**.
BT 8	Has two functions. **Out of cycle**: carries out manual rotation in reverse at slow speed if pressed and held for 1 second, medium speed for 2 seconds, then fast speed. **In cycle**: decrements the rotation speed on the levels selected by **BT 5**.
BT 9	Has two functions. **Out of cycle**: carries out manual forward rotation at slow speed if pressed and held for 1 second, medium speed for 2 seconds, then fast speed. **In cycle**: decrements the rotation speed on the levels selected by **BT 5**.
BT 10	Has two functions. **Off cycle in automatic mode (V6 lit)**: feeds wire forward manually at slow speed if pressed and held for 1 second, medium speed for 2 seconds, then fast speed. **Off cycle in manual mode (V 5 lit)**: feeds the wire quickly forward on first press. Stops the wire feed when pressed again. **In cycle**: increments the wire feeding speed level selected with **BT 5**.
BT 11	Has two functions. **Out of cycle**: feeds wire manually in reverse at slow speed if pressed and held for 1 second, medium speed for 2 seconds, then fast speed. **In cycle**: Decrement the wire feeding speed level selected with **BT 5**.
BT 12	Toggles between - Wire feed in automatic mode (indicator lamp **V 6** lit). - Wire feed in manual mode (indicator lamp **V 5** lit).

Fig. 4.24 - Remote control - version P6 HW

Item	Function
BT 13	Has two functions. **Out of cycle**: Controls coolant pump and gas 1 and 2 flow rates. **In cycle**: Stops cycle manually with slope-down.
BT 14	Push button “Start cycle with restart”.
BT 15	Push button "Start cycle".
BT 16	Push button "Stop cycle immediately".
BT 18	Has two functions. **Out of cycle**: Raise torch. **In cycle**: Increment torch height.
BT 19	Has two functions. **Out of cycle**: Lower torch. **In cycle**: Decrement torch height.
BT 20	Toggles between: - Suspension of the AVC (**V 10** illuminated). - Running of the AVC (**V 9** illuminated). **Function not available**

Item	Function
BT 21	Pushbutton to toggle between the following overrides: - In amplitude "A" (**V 7** illuminated). - In time "T" (**V 8** illuminated).
BT 22	Has two functions. **Out of cycle**: torch oscillation with self-centring. **In cycle**: Decreases the oscillation in amplitude or in time according to **BT 21**.
BT 23	Has two functions. **Out of cycle**: no action. **In cycle**: Increases the oscillation in amplitude or in time according to **BT 21**.
BT 24	Push button to off-set torch to the left.
BT 25	Push button to off-set torch to the right.
BT 26	**In cycle**: Increases the "hot wire" current
BT 27	**In cycle**: Decreases the "hot wire" current
BT 28	Toggles between: - Suspension of "hot wire" current (indicator light **V 12** lit). - Operation of "hot wire" current (indicator light **V 11** lit).

4. 4. 4. Using the remote control to regulate the AVC

	Remote control		
Programmed regulation	**Override mode**	**AVC +**	**AVC -**
Smooth voltage	High	**U +** △	**U -** △
	Low	**U +** △	**U -** △
	High and low	**U +** △	**U -** △
High voltage	High	**Uh +** △	**Uh -** △
	Low	-	-
	High and low	-	-
Low voltage	High	-	-
	Low	**Ul +** △	**Ul -** △
	High and low	-	-
High and low voltage	High	**Uh +** △	**Uh -** △
	Low	**Ul +** △	**Ul -** △
	High and low	**Uh +** △ **Ul +** △	**Uh -** △ **Ul -** △


BT 1
BT 2
BT 3
AF 1
V1
BT 13
V2
BT 16
BT 4
V4
BT 15
BT 5
BT 14
V3
BT 6
BT 8
BT 7
BT 9
BT 12
BT 10
BT 11
V 5
V 6
V 12
V 11
BT 28
BT 27
BT 21
BT 26
BT 18
BT 22
V 7
BT 23
BT 19
BT 25
BT 24
V 9
V 8
V 10
BT 20
D 2616
POLYSOUDE
STOP
ON
OFF

4. 4. 4. 1. Layout of displays

Examples of displayed messages out of weld cycle:

Switching on

		-	-		P	O	L	Y	S	O	U	D	E		-	-	-	
.	.	.	.	.														

End of installation

>	W	P		:	0	0	1	I	N	1	7	0	x	1	5			
	P	R	G	:	<	0	3	A	B	C	D	E	F	G	>			
	F	r	i		0	5		J	a	n		2	0	0	7			
							1	1	:	4	9							

Example of fault message

	W	P		:	0	0	1	I	N	1	7	0	x	1	5			
	P	R	G	:	<	0	3	A	B	C	D	E	F	G	>			
R	O	T	A	T	I	O	N	:							0	4	2	4	1
		*	!	*			S	p	e	e	d		R	e	g	u	l	.	

During a gas and water flow rate test. The message disappears when the button is released to be replaced by the names of the WP and the program.

	W	P		:	0	0	1	I	N	1	7	0	x	1	5			
	P	R	G	:	<	0	3	A	B	C	D	E	F	G	>			
		G	a	s	1	/	2					O	K	/	N	O	K	
		W	a	t	e	r	=			0	.	8	L	/	m	i	n	

Display during the end of a cycle which has executed correctly. Pressing **BT 1** displays the end of installation screen indicating the WP and the program.

BT1

	W	P		:	0	0	1	I	N	1	7	0	x	1	5			
	P	R	G	:	<	0	3	A	B	C	D	E	F	G	>			
		S	9	9		T	0	0	5	5	s		0	3	6	0	i	
		C	y	c	l	e		e	n	d		O	K					

>	W	P		:	0	0	1	I	N	1	7	0	x	1	5			
	P	R	G	:	<	0	3	A	B	C	D	E	F	G	>			
	F	r	i		0	5		J	a	n		2	0	0	7			
							1	1	:	4	9							

Display during the end of cycle caused by the slope down key (**BT 13**). Pressing **BT 1** displays the end of installation screen indicating the WP and the program.

BT1

	W	P		:	0	0	1	I	N	1	7	0	x	1	5			
	P	R	G	:	<	0	3	A	B	C	D	E	F	G	>			
		S	0	5		T	0	0	1	5	s		0	1	2	4	i	
		M	a	n	u	a	l		d	o	w	n	s	l	o	p	e	

>	W	P		:	0	0	1	I	N	1	7	0	x	1	5			
	P	R	G	:	<	0	3	A	B	C	D	E	F	G	>			
	F	r	i		0	5		J	a	n		2	0	0	7			
							1	1	:	4	9							

Examples of displayed messages during a weld cycle:

The display during a cycle shows:

- on the first two rows, the WP and the current program,
- on the third row, the number of the current sector, elapsed time and the movement pulses,
- on the fourth row, 2 stars (1Hz) encircling an exclamation mark, the arc voltage and welding current (**I22**).

	W	P		:	0	0	1	I	N	1	7	0	x	1	5		
	P	R	G	:	<	0	3	A	B	C	D	E	F	G	>		
		S	0	5		T	0	0	1	5	s		0	1	2	4	i
		*	!	*		1	2	.	3	V		1	5	0	.	0	A

Changing a speed override erases the first two rows and displays the new values sent. After 5 seconds, the standard display shown during a cycle reappears.

		V	3	2	=	0	1	2	5		m	m	/	m	i	n	
		S	0	5		T	0	0	1	5	s		0	1	2	4	i
		*	!	*		1	2	.	3	V		1	5	0	.	0	A

Changing a current override erases the first two rows and displays the new values sent. After 5 seconds, the standard display shown during a cycle reappears.

		I	2	2	=	1	1	2		A							
		S	0	5		T	0	0	1	5	s		0	1	2	4	i
		*	!	*		1	2	.	3	V		1	5	0	.	0	A

A stop or slope down caused during a cycle displays the corresponding message.

	W	P		:	0	0	1	I	N	1	7	0	x	1	5		
	P	R	G	:	<	0	3	A	B	C	D	E	F	G	>		
		S	0	5		T	0	0	5	5	s		0	3	6	0	i
		C	y	c	l	e		e	n	d							

5. Using the P6 HW power source

5. 1. Fundamental procedures

5. 1. 1. Switching on

With the installation connected (see chapter 4), set the switch **FA 1** (Fig. 4.18) to position 1. After a short moment, the power source is powered up and ready for operation. The remote control unit display must show information on the WPs and programs.

Comment: if the power source is equipped with the emergency stop function, the operator control unit must be connected to the P6 HW, otherwise the latter will not power up.

In case of problems, see chapter 6.2 Maintenance.

After the power source has been turned off by the switch FA 1, wait for a time period of at least 15 seconds before turning it on again.

5. 1. 2. Equipment recognition

Depending on the date of manufacture, the P6 HW power source can detect the types welding heads or wire feeding units connected automatically.

5. 1. 3. Positioning a welding head on the workpiece

In order to position the POLYSOUDE welding heads on the part to be welded, refer to the instructions supplied with each head. With the welding head in place, and before beginning the weld cycle, you may move the electrode manually to wherever you wish using the buttons **BT 8** and **BT 9** of the remote control unit. Attention: with some closed chamber welding heads the cycle cannot be started unless the electrode is in the "open head" position.

The command is carried out in 3 stages: for 1 second the rotation is made at low speed, then for 2 seconds the rotation changes to medium speed, afterwards it continues at high speed. This permits accurate and rapid positioning.
If the welding head is equipped with a contact to detect its "open" position, manual rotation stops when the "open" position is reached. Release the button then press it again to continue rotation.

5. 1. 4. Wire setting

To adjust the wire, two pushbuttons are provided on the remote control: **BT 10** and **BT 11**. Both of these buttons, used with the "Auto/Manual Wire" switch **BT 12 (V 5 & V 6)** allow the user to position the wire accurately.

If the switch is in the "Auto" position, pressing one of the buttons causes the wire to advance (**BT 10**) or retract (**BT 11**). The command is carried out in 3 stages: for 1 second the wire advances at low speed, then for 2 seconds wire feeding changes to medium speed, afterwards it continues at high speed. This permits accurate and rapid positioning. To stop the wire, release the button.

If the switch is in "Manual" position, the wire retract button **BT 11** works in the same way, but the advance button works in toggle mode: The first press starts the wire feed in high speed, the second press stops it. This feature is particularly useful for inserting filler wire into the wire-guide sheath.

Fig. 5.1 - Controls used for positioning the electrode

Fig. 5.2 - Controls used for positioning the filler wire

5. 1. 5. Adjustment of the oscillation

Using buttons **BT 24** and **BT 25** on the remote control, you can position the electrode in the axis of the joint. This position is considered as the reference point for the program. This operation is simplest for welding without bevels. For welding with bevels and edges it is possible to self-centre the torch. In order to do this, position the torch between the two edges using **BT 22**. Pressing **BT 22** results in automatic centring of the electrode by touching the sides. This implies that the workpiece voltage measurement wire and electrode must be connected.

Fig. 5.3 - Controls used for adjusting the oscillation

5. 1. 6. Adjustment of the gas flow

The gas flow is adjusted with a flow meter installed on the gas bottle or the supply network. Pressing **BT 13** starts the gas flow manually.

Fig. 5.4 - Push button for testing gas - testing coolant - and restarting the coolant pump

5. 1. 7. Switching on the coolant pump

After changing a welding head, and particularly if an extension cable is used, the coolant pipes may be empty. Therefore a fault in the cooling system may be detected when starting a cycle again. Using pushbutton **BT 13** which restarts the coolant pump, you can fill the pipes before starting the first cycle.

5. 2. Use

5. 2. 1. Safety instructions

Before starting any manipulation on the equipment please refer to chapter 1 “Safety precautions”.

5. 2. 2. Program selection

The WP and the program to be executed are selected with **BT 1**, **BT 2** and **BT 3** on the remote control unit. The names of the WPs and the program selected are shown on the remote control unit display and on the home page of the touchscreen. After 2 seconds without operator action the WP or program is loaded and can be used.

A long press (> 2 s) on button **FA 16** will print out the selected program.

Fig. 5.5 - Controls used for selecting the WP/program

5. 2. 3. Simulation

In order to check the programming without any risk to the parts to be welded, you can first run a simulation cycle. In this case, all the functions of the program are carried out except those concerning the arc.
The gas commands that you have programmed are executed but no account is taken of any flow rate errors. In this way, you can, if you wish, check the flow rate settings or save gas during the simulation phases. Selection of a simulation is made with **BT 4** which illuminates **V 1**.

Fig. 5.6 - “Simulation / With Arc” indicator lights

5. 2. 4. Weld cycle

Running a welding cycle

- A weld cycle is started by pressing **BT 15** on the remote control unit.

Fig. 5.7 - Pushbutton to control cycle start

Making adjustments during a weld cycle.

During a welding cycle you can make adjustments to the parameters very easily. This is done using the remote control.
Parameter values which can be modified within each sector:

- The current (**I22**) and/or the back ground current (**I23**) in the case of pulsed current.
- The rotation speed **(V32)** and/or the low rotation speed **(V33)** in the case of pulsed rotation.
- The wire speed **(V42**) and/or the low wire speed **(V43)** in the case of pulsed wire.
- The AVC (**H50**) the height.
- The oscillation **(T63)** left edge delaying **(T62)** right edge delaying **(V60)** the gap **(A62)** the amplitude.

The modified parameter values can be confirmed with **BT 5** in conjunction with the 2 indicator lights **V 3** and **V 4**:

- **V 3** illuminated: Modifications of the low levels.
- **V 4** illuminated: Modifications of the high levels.
- **V 3** & **V 4** illuminated: Modifications of the low and of the high levels.

Fig. 5.8 - Pushbutton for tuning during the cycle

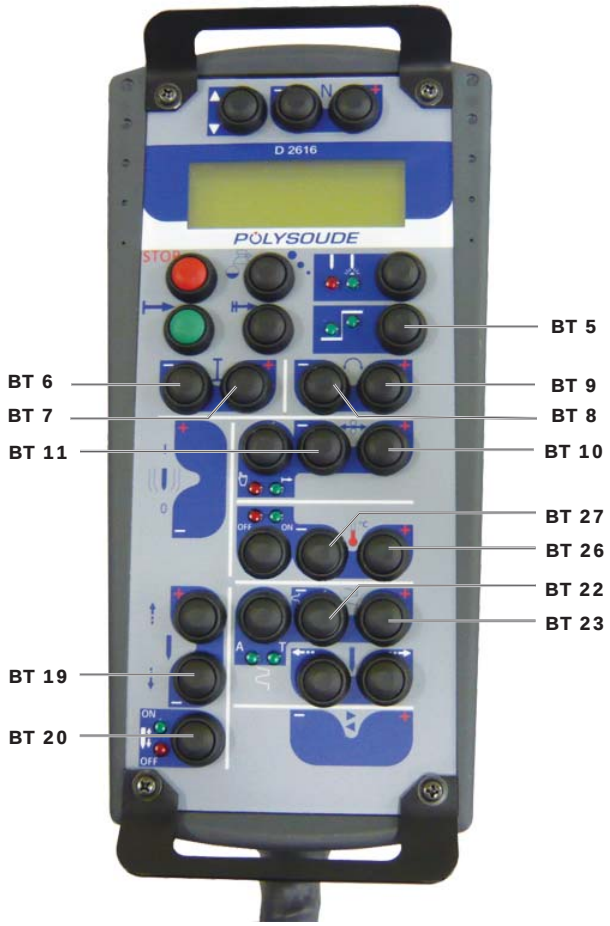


Fig. 5.9 - "Override" buttons for developing programs

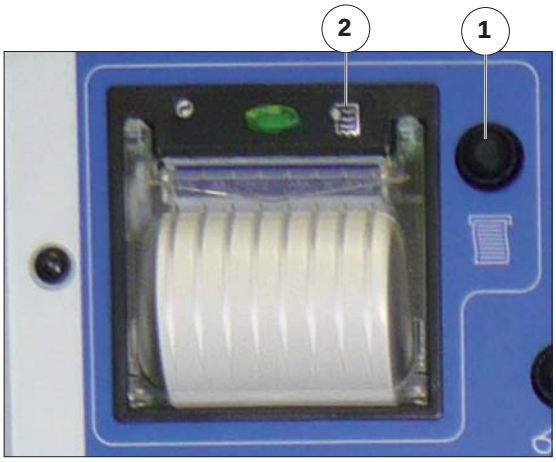


Fig. 5.10 - Reprint ticket for weld carried out

5. 2. 5. Stop at end of the weld cycle

Stop at end of a correct weld cycle

If the end of a correctly executed weld cycle is reached, the message "Program end OK" is displayed on the remote control unit. The power source is then ready to start a new cycle.

Comment: Welding heads equipped with a contact to detect the "open head" position return automatically to this position if a correct end of the cycle is reached.

Printing a weld cycle ticket

At the end of the weld cycle, you may print a ticket summarising the weld performed.
On this ticket are:

- The names of the WP and program.
- Values of current, voltage, rotation speed and wire feed speed measured regularly during the cycle.
- Reason for stopping ("OK" for normal cycle, otherwise an error code).
- Weld start time.
- Date of weld execution.
- Cycle duration.
- Movement effected.

A ticket is printed summarising the welding carried out.

An incident may occur which prevents the ticket being output at the end of the cycle. This could happen, for example, when the paper roll runs out. If this occurs, the ticket for the last welding operation can be reprinted. To do this, push button **FA 16** (Fig. 5.10 - 1) located to the left of the printer.

For paper feeding, at the start or end of printing, press the push button built into the printer (Fig. 5-10 – 2).

5. 2. 6. Induced stoppage

Manual weld cycle stop with downslope

The downslope sequence determined in the program can be started at any moment during weld cycle execution by pressing **BT 13** on the remote control unit. This procedure prevents the workpiece from being damaged during welding as far as possible. The message "Manual downslope" is displayed on the remote control unit.

Fig. 5.11 - Pushbutton to command stoppage with slope down

Immediate manual stop

If **BT 16** on the remote control unit is pressed, the arc is cut and all movements are stopped immediately. The post-gas flow is maintained during the programmed time **T25**. The message 'Manual stop' is displayed on the remote control unit.

Fig. 5.12 - Pushbutton to command immediate stoppage

Using a manual torch

When you use a manual torch, and if the torch control socket has been connected up as indicated in section 4.3.7, the equipment operates in a special way. A program from the set of special WP for manual torches must be loaded. This program disables all wire feed, AVC, Oscillation and rotation movements.

Provided that the current selected in the welding procedure is "Manual Pulsed", pressing on the torch manual On button causes an arc to be struck. The intensity of the ignition current is also the intensity of the weld current. If the button is released, the high current **(I22)** is applied. Another press of the button switches to the background current **(I23)**. Pressing again changes to high current and so on. The cycle is stopped either by pressing the downslope button, or pressing both buttons at the same time will stop the cycle immediately.

5. 2. 7. Use of the USB key

When the welding procedure is exported for the first time, a "Polysoude" folder is created in the root of the USB key. It is necessary to create it in the root of the Polysoude key (x:\Polysoude).

Fig. 5.13 - Polysoude USB key

5. 2. 8. Start cycle with restart

Restart allows you to restart a weld when a cycle was stopped under the following conditions:

- Stop caused by manual slope-down
- Stop caused by a carrying out a «Stop»
- Stop caused by the appearance of a fault

It is not possible to carry out a restart in the following cases:

- The previous cycle finished correctly
- The restart is requested outside the welding area (0 > electrode position > N20)
- Rotation had not started during the previous cycle
- After changing a machine setting (WP setting, program setting, etc.)
- After changing a program or WP.
- After a change via the GUI

The start cycle with recovery can resume welding parameter values corresponding to the position of the electrode. Adjusting the position of the electrode is made via the manual controls on the remote before the start of cycle start with recovery.

During a restart:

- The timer is reset to zero
- The pulse counter is set to the position at which the start is requested
- The touch workpiece is rerun
- Pre-winding is not rerun.

Fig. 5.14 - Push button start cycle with restart

6. Servicing, maintenance and troubleshooting

6. 1. Servicing

6. 1. 1. Adjustments

General

The following information concerns routine checks and adjustments to be performed periodically or as often as necessary.
These operations are not the same as calibrations that have to be done periodically in order to satisfy quality system requirements, according to ISO 9000 or Quality Assurance regulations. These calibrations must be performed using inspection equipment which has itself been calibrated in accordance with written procedures by personnel appointed for that purpose. If specifically requested, we can carry out these calibrations on the customer's site or in our workshops.

When to adjust?

Due to the ageing of components, a drift of the source characteristics may occur gradually. Therefore it is recommended to check the power source adjustments once a year.

Exchange of cards or the source

Adjustments are required if card 0028029200 or the "hot wire" current source and card 0028029400 or the welding current source are replaced.

6. 1. 2. Adjustment of the tachometer

If the power source is equipped with the optional tachometer card, it is recommended to check whether the programmed speed corresponds to the real travel speed achieved by the rotation of the welding head.
The adaptation kit for the welding head connections must be installed correctly. In home position a sign should be marked as point of reference on the fix part of the welding head..

With the remote control pendant

Press the button **BT 6** "I-" of the remote control pendant during several seconds.
On the display of the remote control pendant appears:

	>		I	P		A	d	r	e	s	s			
			T	a	c	h	o							

Select "Tacho" with the button **BT 1**.
Confirm the selection with the button **BT 3** "N+".
On the display of the remote control pendant appears:

	C	a	l	i	b	e	r	.		T	a	c	h	o
+	:	S	t	a	r	t	.		-	:	Q	u	i	t

Press the button **BT 3** "N+" again. The welding head will now carry out a rotation of 360°. After the end of the cycle, verify by means of the point of reference whether the rotation really stopped at 360°. If the achieved result is correct, leave by pressing the button **BT 2** (N- = QUIT).
If the result is not o.k. adjust the travel speed of the welding head with the corresponding potentiometer (to identify the potentiometer, refer to the appropriate operating manual) and repeat the procedure until the rotation stops correctly at the point of reference.
Verify the adjustment by carrying out a weld cycle in simulation mode.

Using the GUI software (PC or touch screen)

Using the touchscreen, program a 360° rotation and start a weld cycle in simulation mode. After the end of the cycle, verify by means of the point of reference whether the rotation really stopped at 360°. If the achieved result is correct the welding can be carried out.
If the result is not o.k. adjust the travel speed of the welding head with the corresponding potentiometer (to identify the potentiometer, refer to the appropriate operating manual) and repeat the procedure until the rotation stops correctly at the point of reference.

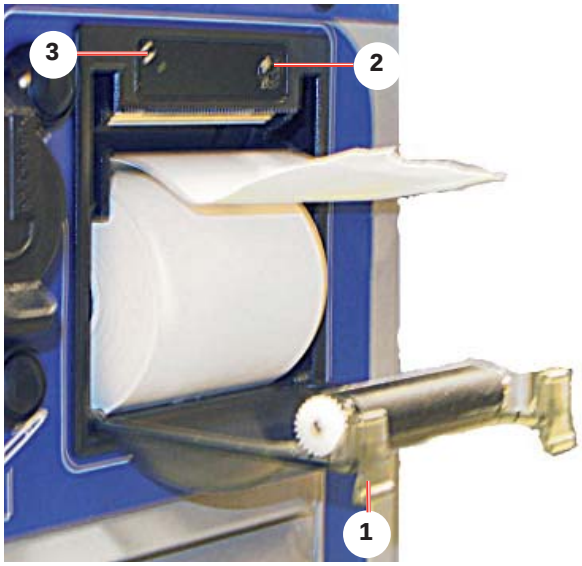
6. 1. 3. Cooling circuit

The cooling circuit is fitted with a liquid temperature safety device which which stops the weld cycle stop and prevents cycle start-up from 80°C.

6. 1. 4. Printer

Changing the printer paper.

To change paper the power source must be switched on. Depending on the model of printer, change the roll of thermal paper either by pulling down the two tabs of the cover (Fig. 6.1 - 1) or by pressing the button (Fig. 6.1 - 4). Take out the empty roll and insert the new one so that the curve of the paper is at the inside face of the printer and the start of the paper upwards.
Unwind enough paper so that after closing the cover a strip of paper appears at the outside.
To feed paper, push the button (Fig. 6.1 - 4).
The green indicator light (Fig. 6.1 - 6) located to the right is continually lit when the printer is operational. It flashes if there is a defect or no paper.



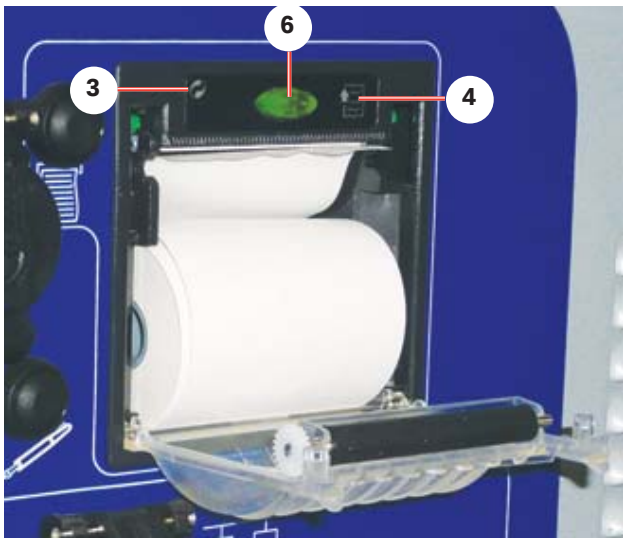


Fig. 6.1 - Printers

6. 2. Maintenance and troubleshooting

6. 2. 1. Replacement of fuses

A blown fuse often indicates that there is a fault. Take great care when switching on the machine after a fuse has been replaced.

Fuse FU1 with a time delay of 4AT (Fig 6.2 - 1) for all auxiliary power supplies is located on the upper right side of the power source.
Fuses FU2 (Fig. 6.2 - 2) and FU3 (Fig. 6.2 - 3) with time delay 16AT for the power supply to the primary of the transformer for the auxiliaries and the "hot wire" current source area located on the right of the rear panel of the power source.
Fuse FU4 (Fig. 6.3 - 4) with time delay 1.6 AT for transformers T2 and T3 is located on the lower left-hand side of the power source.

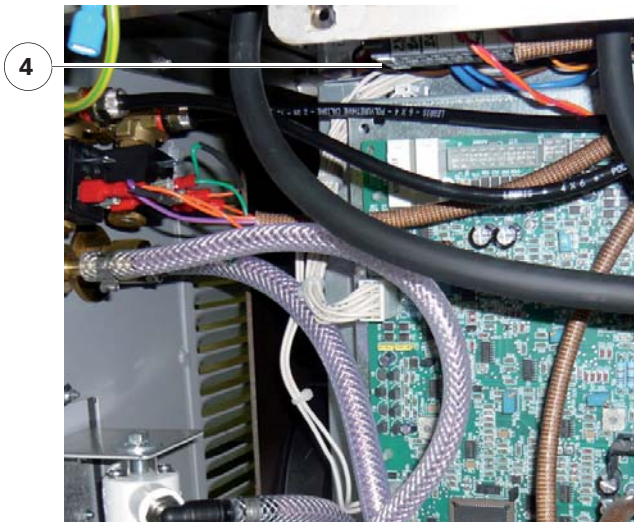


Fig. 6.3 - Location of fuse FU4

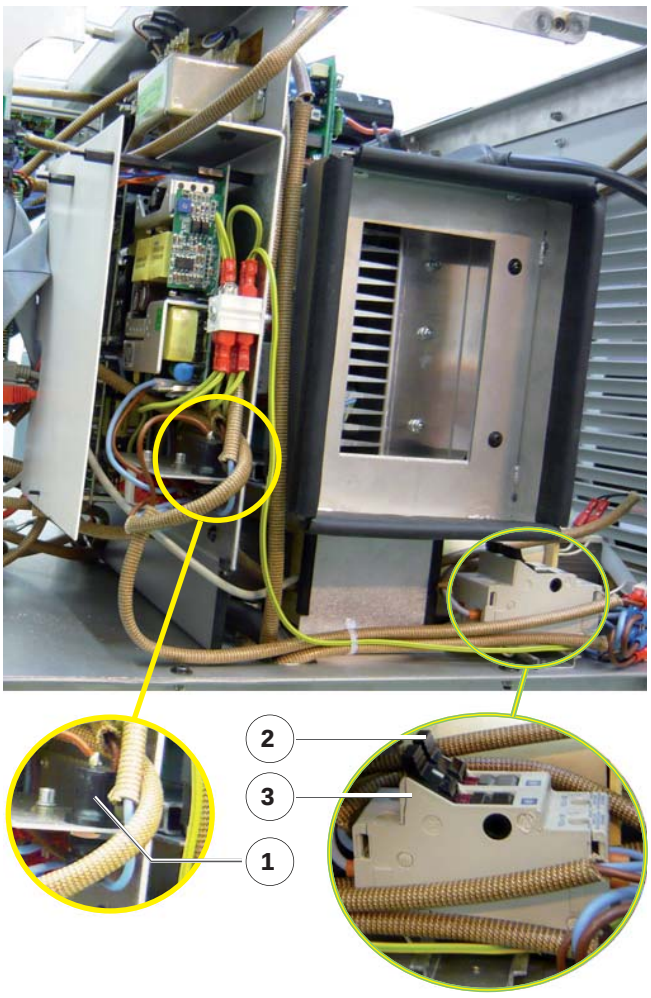


Fig. 6.2 - Location of fuses FU1, FU2 and FU3

6. 2. 2. Cooling circuit filter

The P6 HW generator is fitted with a filter in the cooling circuit. We recommend checking the cleanliness of the filter element every 6 months.

The filter element is accessible after undoing by a 1/4 turn the two fasteners (Fig. 6.4 - 1) securing the inspection hatch in the rear panel.
Place a container below the filter beforehand. Unscrew the transparent or white housing (Fig. 6.4 – 2) and take the filter element out for cleaning or replacement.
For better accessibility, disconnect the two unions by pulling the pressed flange (Fig. 6.4 – 3) upwards and lowering the two hose end fittings.

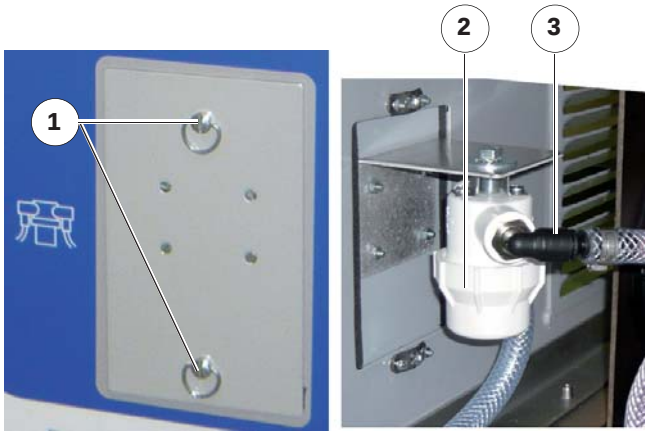


Fig. 6.4 - Coolant filter

6. 2. 3. Troubleshooting guide

Defects occurring during operation

Problem (Consequence)	Possible causes	What to do
Impossible to switch the power source on	Fuse FU1 defect.	Replace (chap. 6.2.1).
	Plugs or mains supply cables defect.	Replace.
	Remote control defect (emergency stop button locked).	Check and correct or replace.
	Main switch defect.	Check or replace.
Circuit breaker (outside the power source) releases if the power source is switched on	Unsuitable circuit breaker.	Install a circuit breaker of 32 A (with D characteristic) for 400 V mains supply (see rating plate).
The cycle or a movement (rotation, wire, gas, coolant) starts on its own	The power source is not connected to the earth.	Correct.
	Remote control defect.	Check and correct or replace.
	Cable shielding of the remote control damaged.	Replace the cable.
	Remote control card 0028049100 defect.	Replace.
Some buttons of the remote control pendant are inoperative	Remote control defect.	Check and correct or replace.
	Remote control card 0028049100 defect.	Replace.
No display on the remote control or no backlighting	Remote control card 0028049100 or display adapter 0028209200 defect.	Replace.
The parameter value cannot be modified (buttons "+" and "-" inoperative)	WP configuration set to "modifications not allowed".	Change the selection.
Touchscreen is illuminated but inoperative	Touchscreen controller RS232 defect.	Contact Polysoude After Sales Service.
Nothing displayed on the touchscreen	Connector J17 on the card LVDS 0028069100 is unplugged.	Check.
	Card LVDS 0028069100 defect.	Replace.
No cycle start possible with a manual torch	Bad connection of the manual torch plug or wrong cabling.	Check and correct.
Gas flow rate too low **(Immediate stop)**	Gas channel inside the welding head blocked.	Check, clean.
	Gas safety device defect.	Must be checked and, if necessary, replaced by a qualified electrician.
	Gas solenoid valve defect.	
No rotation (head or wire feed unit) without error message	Shear pin of the welding head or wire feed unit broken.	Replace (consult operating manual of the head or the wire feed unit).
	Power source converter cards 0028019100 (rotation and/or wire feeding) defect.	Replace.

Problem (Consequence)	Possible causes	What to do
Gas **(Immediate stop)**	Gas bottle empty or valve closed.	Check, replace or open.
	Quick coupling of the welding head badly connected.	Check.
	Solenoid valve defect.	Must be checked and, if necessary, replaced by a qualified electrician.
Cooling unit **(Imposed downslope)**	Coolant level too low.	Check and correct.
	Coolant circuit fouled.	Check, empty and clean the circuit, clean the water filter. Fill up with fresh coolant.
	Shunt of the cooling circuit not connected (air cooled closed chamber welding heads).	Check and correct (§ 4.3.3).
	Quick couplings of the welding head badly connected.	Check and correct.
	Fuse defect.	Check and change (§ 6.2.1).
	Polygaine defect (MU welding heads).	Replace.
Ignition **(Immediate stop)**	Weld current cable badly connected or cut.	Correct or replace.
	Earth connection not clamped at a clean zone.	Move earth connection (§ 4.3.2 or 4.3.6).
	Electrode contaminated or too far from workpiece.	Consult operation manual of the welding head for electrode changing.
	Polygaine defect (MU welding heads).	Replace.
	Ignition device not fitted or badly positioned (welding heads MU, TP, TS …).	Change position.
	Gas not suitable, gas flow rate not adapted.	Try with argon.
	Power source badly adjusted.	Contact Polysoude After Sales Service.
	Current source defect.	Contact Polysoude After Sales Service.
Arc loss **(Immediate stop)**	Electrode tip damaged or wrongly prepared.	Consult operation manual of the welding head for electrode changing.
	Wrong distance electrode/workpiece.	Correct.
	Poor gas protection.	Check flow rate, gas diffuser, clean, correct.
	Weld current programmed too low.	Correct.
	Ignition device too close to the torch (heads MU, TP, TS …).	Correct the position.

Problem (Consequence)	Possible causes	What to do
Short-circuit **(Immediate stop)**	Electrode in contact with the part to be welded.	Correct.
	Electrode touches filler wire.	Modify position of wire entry.
	Ignition device in contact with the torch (heads MU, TP, TS …).	Correct the position.
	Bad insulation between wire guide and torch.	Check and correct.
	Interface card source 0028029400 defect.	Replace.
	Current source defect.	Contact Polysoude After Sales Service.
Overheating **(Immediate stop)**	Bad air circulation.	Respect a minimal distance between the openings and any surface (§ 4.2.2), let the source cool down.
	Power source capacity exceeded.	Modify conditions of use.
	Fan failure.	Must be checked and, if necessary, replaced by a qualified electrician.
Source control **(Immediate stop)**	Mains supply voltage too low.	Correct or modify the connection.
	Polygaine defect (MU welding heads).	Replace.
	Power source badly adjusted.	Contact Polysoude After Sales Service.
	Current source defect.	Contact Polysoude After Sales Service.
Rotation or wire feed control **(Immediate stop or enforced slope down)**	Sticky mechanics of the head or the wire feed unit.	Clean. Check for foreign bodies inside the head or wire feed unit.
Rotation or wire feed overcurrent **(Immediate stop)**	Sticky mechanics of the head or the wire feed unit.	Clean. Check for foreign bodies inside the head or wire feed unit.
	Power source converter card 0028019100 defective.	Replace.
Rotation or wire feed pulse sensor **(Immediate stop)**	Wire feed unit or head sensor damaged.	Replace.
	Connection cable with the power source damaged.	Must be checked by a qualified electrician.
	Power source converter card 0028019100 defective.	Replace.
Manual fading **(Imposed downslope)**	The power source is not connected to the earth.	Correct.
	Remote control defect.	Check.
	Cable shielding of the remote control damaged.	Replace the cable.
	Remote control card 0028049100 defect.	Replace.
Manual stop **(Immediate stop)**	Remote control defect.	Replace.
	Remote control card 0028049100 defect.	Replace.

Problem (Consequence)	Possible causes	What to do
End stop fault on oscillation/ Arc height or touched part fault. **(Immediate stop)**	Surface of the workpiece in poor condition.	Improve the surface if it is possible.
	Connections on the +/- plugs are wrong and arc voltage measurement on the power source U_{arc} is wrong too.	Check and reconnect if necessary.
	Absence of workpiece voltage greater than 0.3V off cycle between electrode and part to be welded.	Check whether the voltage between electrode and workpiece is higher than 0.3 V. If not, contact Polysoude After Sales Service.
	37 pin front connector (arc height/ oscillation) not connected or cable damaged (item FA 27 in § 4.4.1.).	Correct or modify connections or replace cable if damaged.
Fault of arc height regulation **(Immediate stop)**	Poor synchronisation between pulses of current, voltage, arc voltage, rotation, wire and oscillation.	Check or correct programming
	Pulses too short for servo control to arc voltage.	Correct the values of parameters in the welding program.
	Insufficient sensitivity.	Check and correct the values of parameters in the welding program
	Connection of U_{arc} measurements defective.	Correct or modify connections or replace cable if damaged.
Start Position **(Immediate stop)**	Closed chamber welding heads of the type MW or H: • The welding head is not in the open position. • Head open detector switch is badly adjusted or defective.	• Modify the start position of the welding head. • Check and correct or replace.
	Other welding heads. Terminals D and E are not connected together at the head rotation cable connector.	Correct.
	In all cases. Power source converter card 0028019100 defective.	Replace.
Printer **(No printing)**	Lack of paper or printer defect.	Replace.
	No recording.	See programming.
Data backup **(No record)**	The USB key has been removed before the end of the backup.	Start the backup operation again.
USB key empty **(No loading)**	No programs stored on the USB key.	Use a USB key with stored programs.
Reading or writing **(No record or load)**	Reading or writing error of the USB key.	Change the USB key.
	The USB key has been removed before the end of program backup.	Repeat the read or write operation.
USB key full **(No record)**	The USB key is full.	Erase a WP or take another USB key.

6. 2. 4. Transfert of Log-files

To find out the best solution in case of problems the so-called Log-files must be copied from the power source and sent to the Polysoude After Sales Service. Logs files should be recovered as soon as possible after the onset of the problem.

Necessary equipment :

1 empty Polysoude USB flash drive without any stored directories or files.

Copying of the Log-files :

To avoid loss of important files the power source must not be switched off when the problem occurs.

If it had been switched off by mistake anyhow the following instructions shall be carried out to save the remaining files.

- Connect the USB flash drive to the appropriate USB port.Appuyer sur le bouton «Ecriture sur clé USB» (symbole stylo en façade)
- Push the button "Write on USB flash drive" at the front side of the power source, which is marked by a pencil symbol.
- The file transfer from the power source to the USB flash drive is indicated by a flashing red LED.
- The red LED stops flashing when the file transfer has been finished (transfer time about 30 seconds).
- Disconnect the USB flash drive.
- Copy the directory named "Polysoude" with the transmitted files and send it per e-mail to the Polysoude After Sales Service.

Fig. 6.8 - Connector for USB key

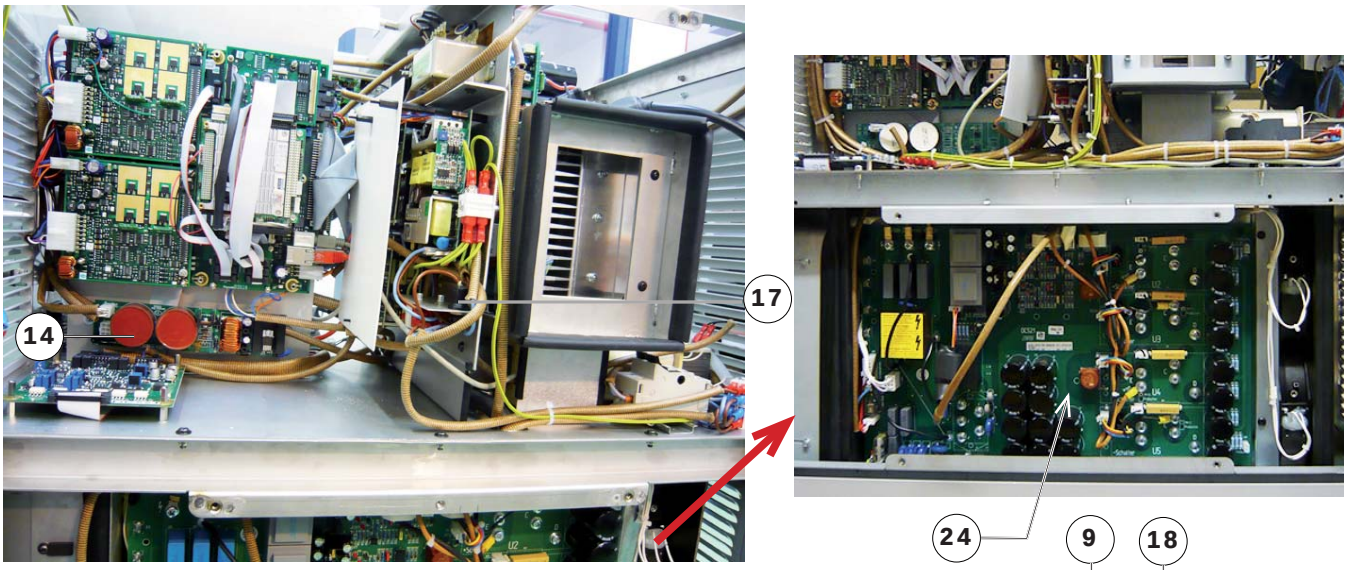


Fig. 6.9 - Internal right-hand view

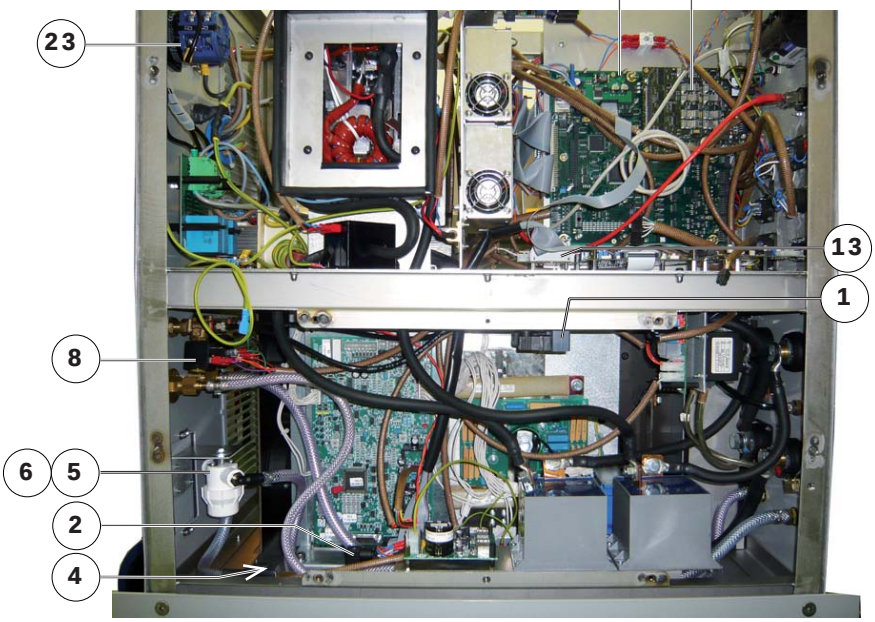


Fig. 6.10 - Internal left-hand view

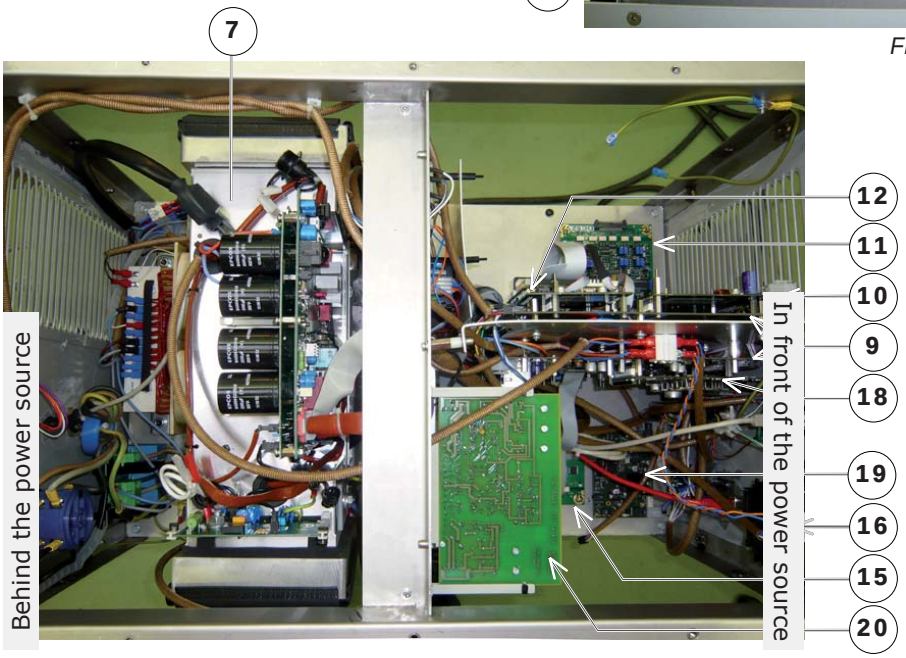


Fig. 6.11 - Internal view from above

POLYSOUDE THE ART OF WELDING

6. 2. 5. Spare parts of the power source

Fig 6.9 to Fig 6.11

Item.	Order Code	Description
1	**00629085**	Gas flow rate safety device
2	**9000629198**	Water flow rate safety device
3	**0028219100**	Adaptation of "hot wire" source
4	**9000629189**	Water temperature safety device
5	**9000699063**	Coolant filter housing with stainless filter element
6	**9000699064**	Sieve filter element (stainless)
7	**9000629157**	"Hot wire" source, 140A
8	**9000629174**	Gas solenoid valve 24 V_{dc}
9	**0028009100**	Sequencer 1 module and Sequencer 2 module
10	**0028019100**	Rotation or wire feeding module
11	**0028029400**	Welding current source module
12	**0028069100**	LVDS screen module
13	**0028279100**	Welding source adaptation
14	**0028229200**	motor inductor interface
24	**9000629245**	Source 520 A
15	**0028029200**	"Hot wire" source module
16	**9000629184**	Printer
17	**00530054**	Fuse FU1 (4 AT)
18	**0028039100**	AVC/oscillation module
19	**0028079100**	Arc voltage measurement module
20	**0021700771**	"Hot wire" source interface
21	**0025069122**	Earth cable 120 mm²
22	**64599801**	Hot wire source earthing cable
23	**9000629221**	Switch (without emergency stop)
24	**9000629245**	Source 520 A
-	**9000629140**	Switch self-holding (with emergency stop)
-	**9000590068**	Roll of thermal printer paper 57 x 50
-	**75110071**	Coolant for external coolant unit
-	**75501002**	Pressure-reducing valve with flowmeter Argon France
-	**71701418**	Pressure-reducing valve with flowmeter Argon Export
-	**71701421**	Pressure-reducing valve with flowmeter argon/hydrogen
	0023000901	A manual torch adaptater

Fig. 6.12 - View of P6 HW remote control front panel

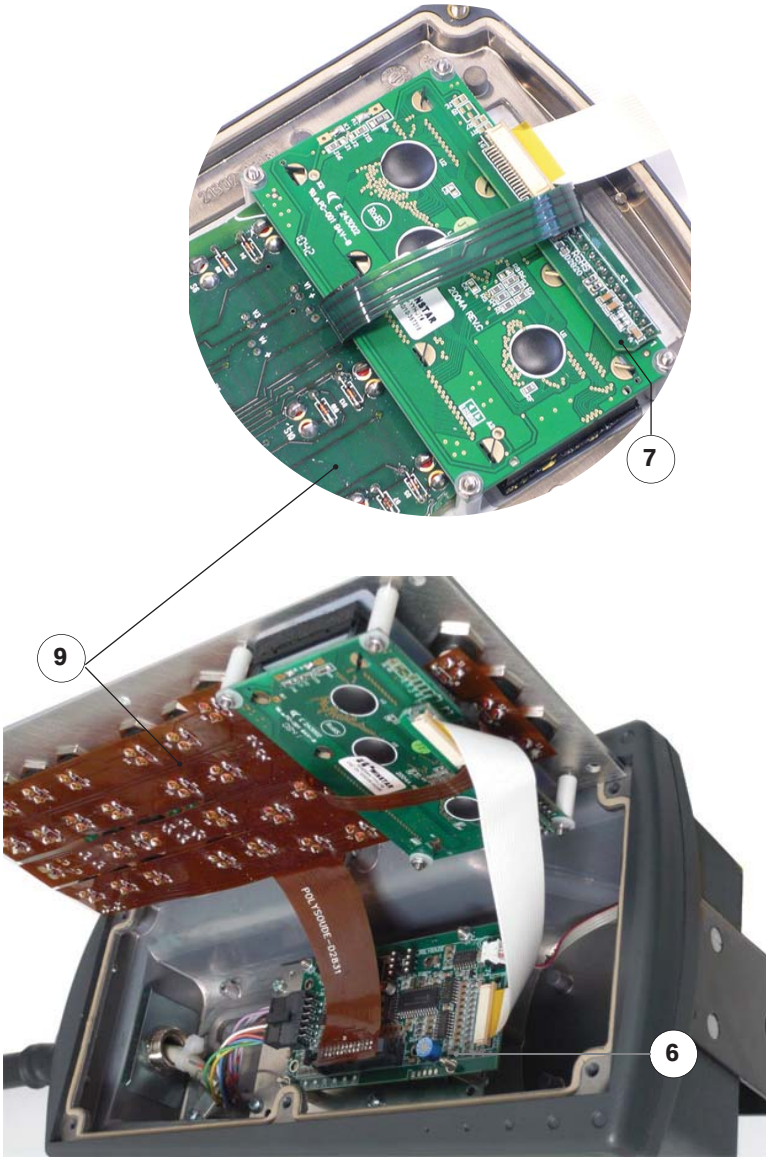


Fig. 6.13 - Internal view of P6 HW remote control

6. 2. 6. Spare parts for P6 HW remote control

Fig 6.12 and Fig 6.13

Item.	Order Code	Description
-	**0026169102**	Remote control complete (without emergency stop)
-	**0026169103**	Remote control complete (with emergency stop)
-	**9000563323**	Remote control plug
-	**9000563326**	Crimp contact for the plug
1	**9000502015**	Green light
2	**9000502019**	Red light
3	**9000542083**	Green button for the remote control
4	**9000542082**	Red button for the remote control
5	**9000542081**	Black button for the remote control
6	**0028049100**	Remote control module
7	**0028209200**	Display adapter
8	**00503026**	Display 4 x 20 characters
9	**0028319100**	Assembled flexible card for P6 pendant

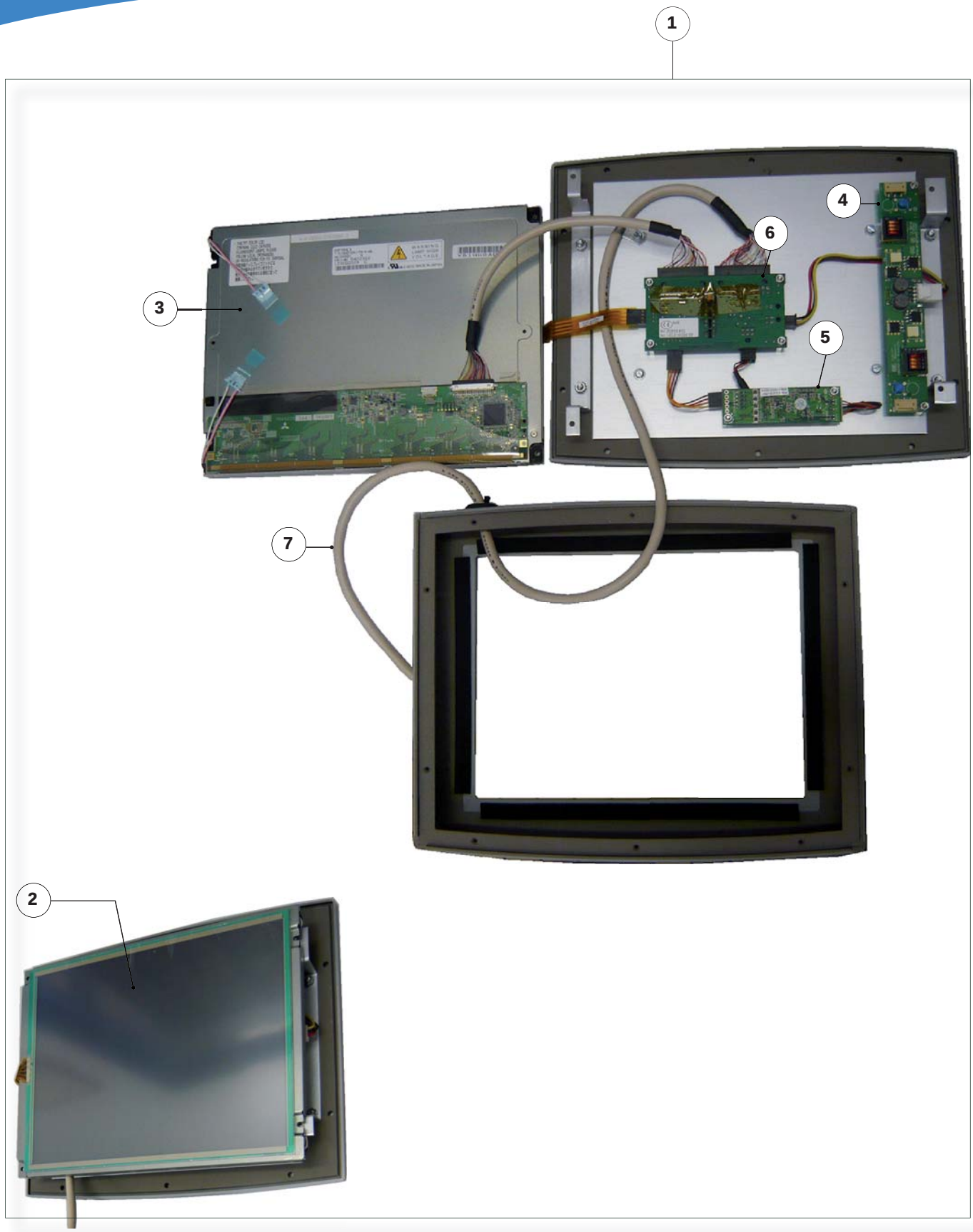


Fig. 6.14 -Internal view of the touchscreen

6. 2. 7. Spare parts of the touchscreen

Fig 6.14

Position	Reference no.	Designation
1	**0026119199**	Touchscreen unit
2	**9000623722**	Touchscreen
3	**9000623724**	Screen SVGA LVDS 10.4’
4	**9000623725**	Backlight converter for the screen
5	**9000623723**	Touchscreen controller (old)
	9000623790	Touchscreen controller (new 09/2013)
6	**0028239100**	Interconnection card for the screen
7	**0026119121**	Cable power source / touchscreen link

6. 2. 8. *Electrical and electronic drawings*

Warning

The following description refers to the wiring file for the P6 HW (Ref. 002506xxxx), as well as those following:

Remote control unit	Ref. 002616xxxx
touchscreen	Ref. 002611xxxx
sequencer card	Ref. 002800xxxx
source interface card	Ref. 002802xxxx
LVDS interface card	Ref. 002806xxxx
rotation/wire feeding card	Ref. 002801xxxx
AVC/oscillation card	Ref. 002803xxxx
Arc voltage measurement card	Ref. 002807xxxx
Hot wire source adaptor card	Ref. 002821xxxx
Welding source adaptor card	Ref. 002827xxxx
inductor & pump interface	Ref. 002822xxxx
touchscreen interconnection	Ref. 002823xxxx
LCD/USB/RJ45 interconnection	Ref. 002824xxxx
remote control keyboard	Ref. 002825xxxx.
Hot wire interface	Ref. 0021700771.

The signal names are abbreviations of their functions. It is useful to know the convention whereby if the number is preceded by a slash "/", this means that the signal is active at low level (0 V).
On the block diagram, the number inside the frames Fo:xy indicates the page number of the corresponding folder.

General description and wiring diagram

The various power supplies for the cards or components come from a sub-assembly providing 5 switching power supplies connections, operating from mains voltages of 90 V to 260 V_{ac} at 50 Hz or 60 Hz.
The basic functions of the P6 HW are realised by a PC card of the PC104 standard, connected to the sequencer card (0028009100). This sequencer card is the main link between the commands issued by the PC card and the signals for the controlled devices. Besides the PC card, the rotation and wire control cards (0028019100) and the LVDS screen and touchscreen control card (0028069100) are directly connected to sequencer card 1. The welding current source interface card (0028029400) is connected via a ribbon cable with sequencer 1. All the cards communicate via an SPI (Serial Peripheral Interface) synchronized on 3 wires. A single wire connects several information sources in parallel such as the welding head and wire feeder models along with the equipment properties of the welding station.
The main part of the P6 HW cabling transits via the sequencer card connectors or the cards connected to it. For the AVC/oscillation options, a second Sequencer card, connected to the basis sequencer card, makes it possible to controlboth speed control cards for the AVC and oscillation motors (0028039100). These are directly connected to sequencer card 2. The "arc voltage measurement" card (0028079100) converts the workpiece.electrode voltage into digital signals via an SPI bus to sequencer card 2. A second source card (0028029200) connected to sequencer card 2 controls the "hot wire" current source.

Welding current source

The current source is totally integrated and uses "chopper" technology. The current setting, generated by the source card, is an analogue signal from 0 V to +10 V, where +10 V corresponds to 520 A.
A logic command, active at low level (0 V), commands the source to switch on, and another logic command, active at low level (0 V), controls the HF unit. If the source overheats, the welding set orders stoppage of the weld cycle.
The power source also outputs a display of the welding current (+10 V corresponds to an actual 1000 A) and of the welding set's output voltage (+10 V corresponds to actual value of 100 V). These displays are used for monitoring ignition, short circuits, and the displays on the remote control or the touchscreen.

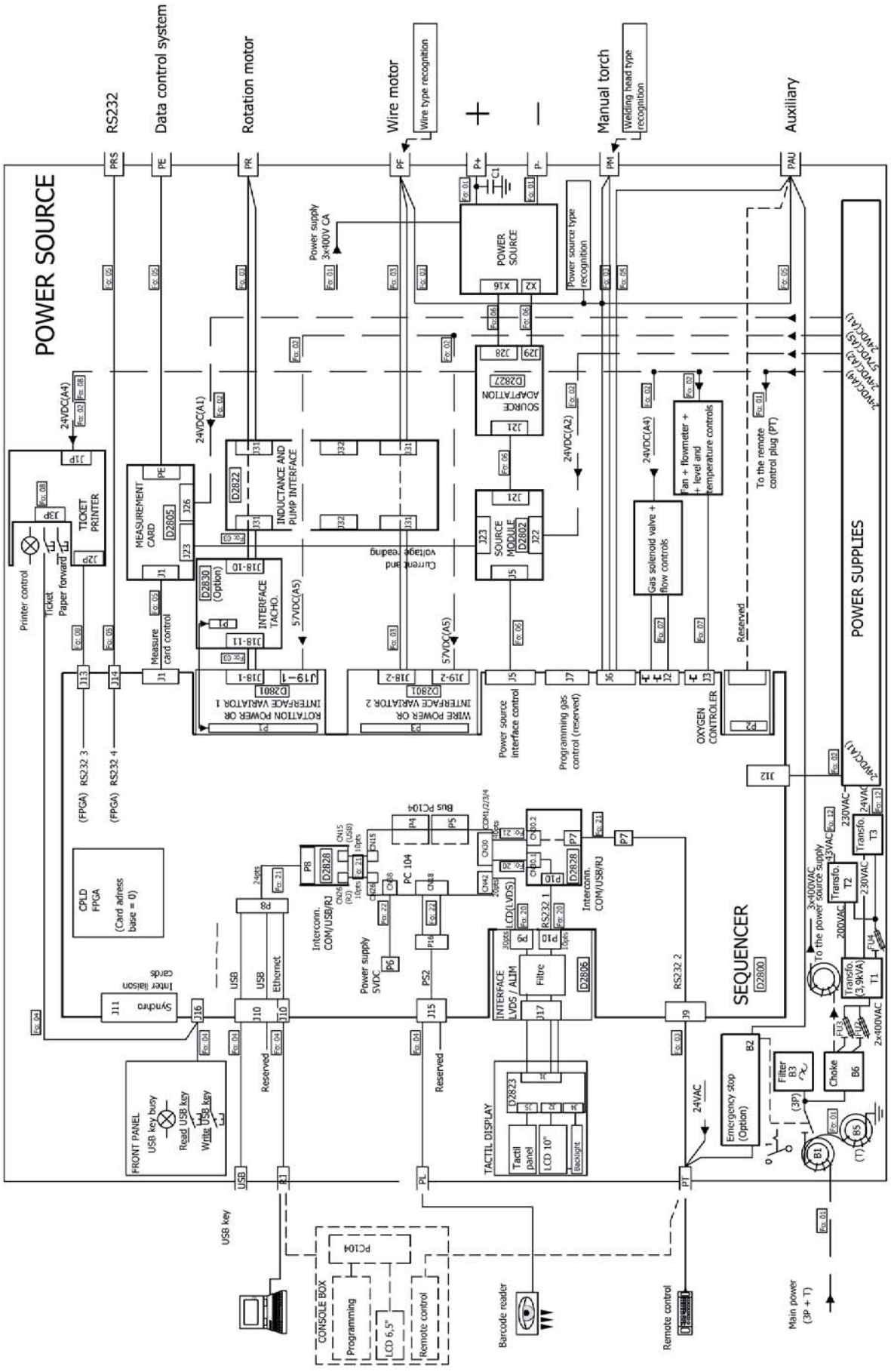


Fig. 6.15 - Block diagram of the P6 HW power source for gas, current, rotation and wire-feeding

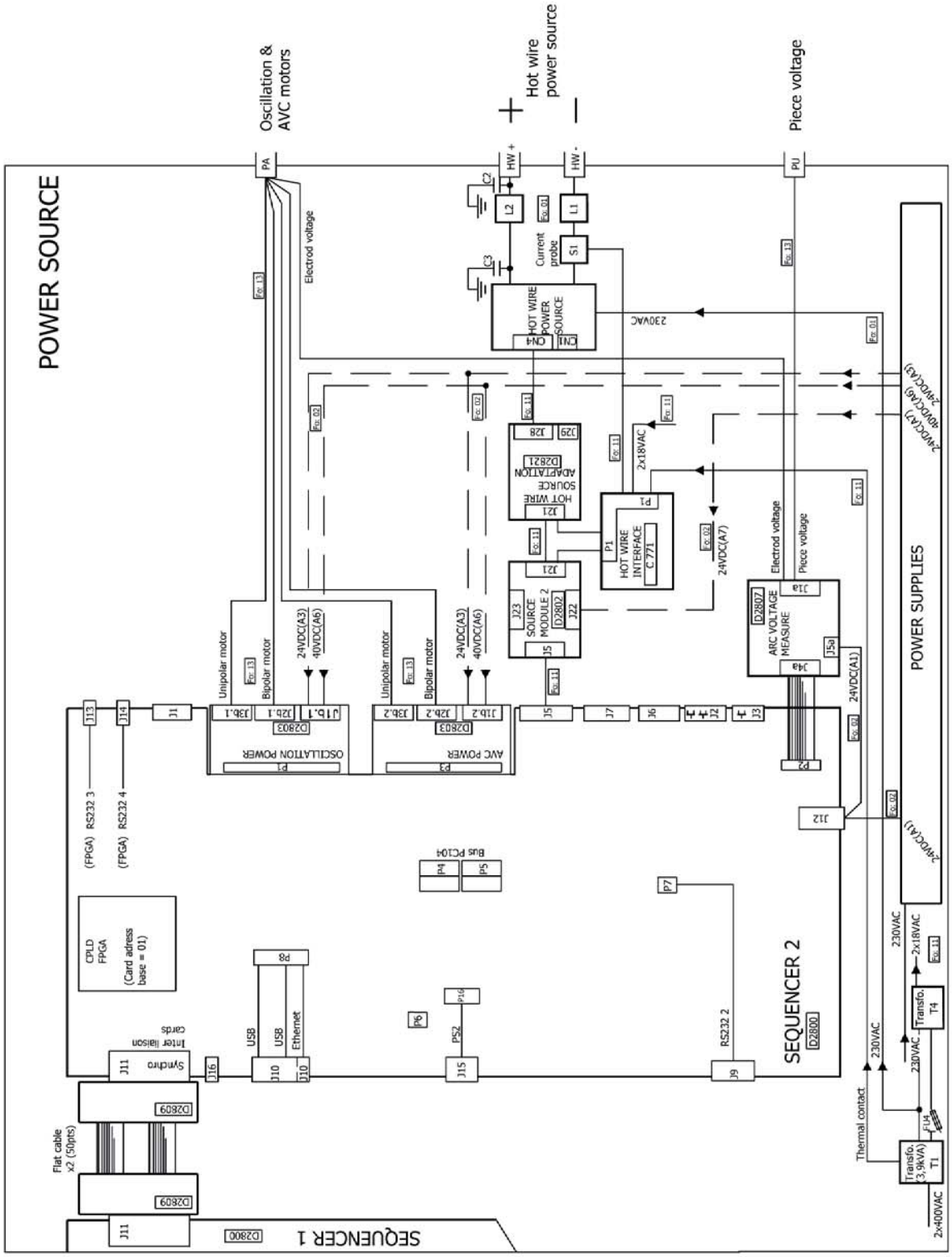


Fig. 6.16 - Block diagram of the P6 HW for AVC, Oscillation and "hot wire"

7. APPENDIX

7. 1. Pre-established WPs

The pre-established WPs (Welding Procedures) have been developed by the Polysoude laboratory to allow a fast approach to customised procedures. These WPs correspond to frequently faced applications. Search criteria are the name of the WP, the tube diameter, the wall thickness, the base material, the application, the type of welding head, the weld position; the P6 HW power source can offer you the predefined WP best suited to the request. You are then able to modify this user WP to refine the welding procedure.
All WPs are intended to be executed with argon as shielding gas.

Warning: some applications require several programs.

All programs that use filler wire have been developed with wire of 0.8 mm diameter.

The result and the quality of a weld is influenced considerably by no-programmable adjustments. In the predefined WPs you will find the values chosen as each program was generated. The parameters are:

Fig. 7.1	Pos.1	Tube end preparation.
Fig. 7.1	Pos.2	Electrode diameter.
Fig. 7.1	Pos.3	Sharpening angle of the electrode.
Fig. 7.1	Pos.4	Flattened tip of the electrode.
Fig. 7.1	Pos.5	Distance electrode/workpiece.
Fig. 7.1	Pos.6	Filler wire diameter.
Fig. 7.1	Pos.7	Filler wire outlet angle.
Fig. 7.1	Pos.8	Distance electrode/wire.
Fig. 7.1	Pos.9	Start position of the weld.
Fig. 7.2	Pos.10	Preparation angle.
Fig. 7.2	Pos.11	Land thickness.
Fig. 7.2	Pos.12	Land length in case of a J prep.

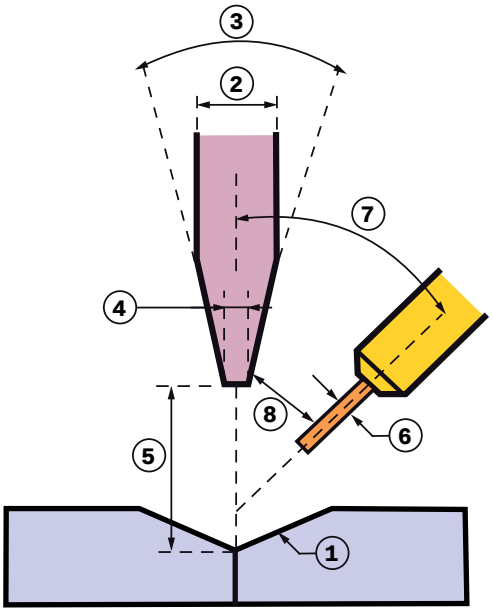
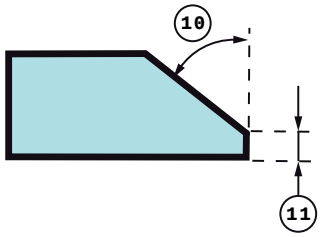
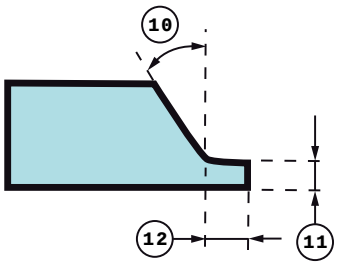


Fig. 7.1 - Non-programmable settings



Single **V**-butt weld preparation



Single **U**-butt weld preparation

Fig. 7.2 - Preparing tubes

7. 2. Error and codes processing

Cause	Code	Fault	Consequence
Gas	4097	Gas flowmeter not present (1)	Stop
	4465	Oxygen error (1)	Stop
	4673	Oxygen error (2)	Stop
	4529	Gas flowmeter not present (2)	Stop
Cooling	4113	Cooling flowmeter not present (1)	Imposed downslope
	4129	Cooling level too low (1)	Stop
	4145	Cooling temperature too high (1)	Imposed downslope
	4513	Cooling flowmeter not present (2)	Imposed downslope
Voltage	4161	Short-circuit	Stop
Current	4193	Ignition impossible	Stop
	4177	Arc loss	Stop
	4209	Power supply temperature too high (Overheating)	Stop
	4225	Troubles on supply voltages	Stop
Rotation	4241	Control of rotation speed	Stop
	4273	Rotation overcurrent (Rotation motor blocked)	Stop
	4449	Start open welding head	Stop
Wire	4257	Control of wire speed	Imposed downslope
	4289	Wire overcurrent (Wire motor blocked)	Stop
Hot wire	4625	HW error	Imposed downslope
Power source	4305	Priority stop	Stop
	4321	Overvoltage	
	4337	Undervoltage	
	4353	Priority stop requested (software)	
	4369	Control system	Stop
	4417	Wrong detection of equipment	No cycle start
	4433	Welding head detection impossible with extension	
	4481	Impossible restart	No restart
	4497	GUI problem	
Arc voltage control (AVC)	4577	High end stop reached	Stop
	4593	Low end stop reached	Stop
Oscillation	4545	Right end stop reached	Stop
	4561	Left end stop reached	Stop
Variator	4689	Variator not ready (absent)	Stop
	4705	variator connection impossible	Stop

7. 3. List of programmed welding parameters

Gas axis

Function	Wording	Ref.	Min.	Max.	Unit	Increment	Default
Prepurge time	Pregas time	**T10**	1,0	999,0	s	0,1	10,0
Postpurge time	Postgas time	**T11**	1,0	999,0	s	0,1	10,0
Oxygen flow rate control	Oxygen threshold	**L10**	1,0	206400	ppm	0,1	50,0

Current axis

Function	Wording	Ref.	Min.	Max.	Unit	Increment	Default
Ignition current	Ignition current	**I20**	5	520	A	1	25
Prefusion ramp time	Ramp time	**T20**	0	9999	s	1	0
High current	High current	**I22**	5,0	520.0	A	0,1	10
High current time	Pulse time high	**T22**	0 ou 10	3000	ms	1	100
Low current	Low current	**I23**	5,0	520.0	A	0,1	5
Low current time	Pulse time low	**T23**	0 ou 10	3000	ms	1	100
Start of downslope	Start downslope	**N20**	361	9999	°	1	365
Downslope time	Downslope time	**T25**	0,1	60,0	s	0,1	3,0
Arc cut-off current	Arc cut-off current	**I25**	5	520	A	1	5
Hot-wire leadtime	Hot-wire leadtime	**T27**	0,0	60,0	s	0,1	3,0

Rotation axis

Function	Wording	Ref.	Min.	Max.	Unit	Increment	Default
Prerotation time	Prerotation time	**T30**	0,0	60,0	s	0,1	3
Pre-rolling	Angle	**N30**	0	9999	°	1	0
Tube diameter to be welded	Diameter	**D**	(a)	(a)	mm	0,1	(a)
Rotation ramp time	Ramp time	**T31**	0,0	99,0	s	0,1	0
Rotation speed (high)	Speed	**V32**	0 (b) then (c)	(c)	mm/ min	1	(c)
			0 (b) then (c)	(c)	in/min	0.01	(c)
			0 (b) then (c)	(c)	tr/min	0,001	(c)
Rotation speed (low)	Speed	**V33**	0 (b) then (c)	(c)	mm/ min	1	(c)
			0 (b) then (c)	(c)	in/min	0.01	(c)
			0 (b) then (c)	(c)	tr/min	0.001	(c)

Wire axis

Function	Wording	Ref.	Min.	Max.	Unit	Increment	Default
Start delaying	Pre-wire time	**T40**	0,0	60,0	s	0,1	4
Wire speed	Speed or High wire speed	**V42**	0 then (d)	(d)	mm/ min	1	(d)
			0 then (d)	(d)	in/min	0,1	(d)
Wire speed (low current)	Low wire speed	**V43**	0 then (d)	(d)	mm/ min	1	(d)
			0 then (d)	(d)	in/min	0,1	(d)
Delaying of wire feeding stop	Stop wire	**N40**	0	9999	°	1	360
Wire retract time at the end of cycle	Wire retract	**T41**	0,0	9,9	s	0,1	2
Ramp time	Ramp time	**T44**	0,0	9999,0	s	0,1	0
Ramp time Downslope	Ramp time	**T45**	0,0	9999,0	s	1	0

(a) depending on type and model of the welding head minimum and maximum values differ.
(b) because of gliding losses at each stop a speed pulsed at 0 can cause a cumulated error. In the case, the observed displacement depending on th pulse frequency and speed must be added to the program.
(c) minimum and maximum speeds are calculated depending on type and model of the used welding head and on the diameter of the tubes to be welded.
(d) lspeeds and amplitudes depend on on the wire feeder or slides.

Arc voltage control axis – AVC (option)

Function	Wording	Ref.	Min.	Max.	Unit	Increment	Default
Delay before start	AVC leadtime	**T50**	0,0	999,0	s	0,1	5,0
Ignition height	Height	**H50**	(e)	(e)	mm	1	(e)
			(e)	(e)	in	0,001	(e)
Torch height regulation speed	Speed	**V50**	(e)	(e)	mm/ min	0,1	(e)
			(e)	(e)	in/min	0,01	(e)
AVC sensitivity	Sensitivity	**S50**	1,0	20,0	/	0,1	5
Activate Stop AVC	Position	**N50**	0	9999	°	0	365
Arc voltage (pulse current or background current at thermal pulsing)	High voltage	**H51**	(e)	(e)	V	0,1	(e)
Ramp time	Ramp time	**T51**	0,0	999,0	s	0,1	0
Arc voltage (pulse current at thermal pulsing)		**H52**	(e)	(e)	V	0,1	(e)
Arc voltage (background current)	Low voltage	**H53**	(e)	(e)	V	0,1	(e)
Time	Blocage front	**T54**	10	250	ms	1	10
Height torch retract	Height	**H54**	(e)	(e)	mm	1	(e)
			(e)	(e)	in/min	0,1	(e)

Oscillation axis – OSC (option)

Function	Wording	Ref.	Min.	Max.	Unit	Increment	Default
Delay before start	Preoscillation time	**T60**	0	40	s	0,1	5
Offset	Gap	**E60**	(e)	(e)	mm	0,1	0
			(e)	(e)	in	0,01	0
Oscillation speed	Speed	**V60**	(e)	(e)	mm/ min	1	(e)
			(e)	(e)	in/min	0,1	(e)
Speed	Speed	**V61**	(e)	(e)	mm/ min	0,1	(e)
			(e)	(e)	in/min	0,01	(e)
Oscillation width	Amplitude	**A62**	(e)	(e)	mm	1	(e)
			(e)	(e)	in	0,01	(e)
Right edge delaying	Right edge delaying	**T62**	0.1	9.9	s	0,1	0,3
Left edge delaying	Left edge de-laying	**T63**	0.1	9.9	s	0,1	0,3
Ramp time	Ramp time	**T64**	0,0	99,9	s	1	0

(e) the parameter values (speed, amplitude, voltage, etc.) depend on the equipment.

8. End of service life, recycling the machine

Our equipment incorporates electrical and electronic components which must be collected in accordance with Directive 2002/96/EC. Any item of equipment which is declared obsolete or out of service must be sent to approved recycling companies in order to reduce the amount of ultimate waste disposal. A number of solutions may be deployed, including:

- Re-use,
- Recycling,
- Any other form of recovery (including energy recovery) of WEEE (Waste from Electrical and Electronic Equipment).

POLYSOUDE
THE ART OF WELDING

RETURN OF EQUIPMENT

(Please fill out and join this sheet when returning equipment to POLYSOUDE)

Reseller / Person in charge : .....

Customer / Person in charge / Tel. : .....

EQUIPMENT RETURNED :

❑ Power source Type :..... Serial number :.....

❑ Welding head Type :..... Serial number :.....

❑ Wire feeder Type :..... Serial number :.....

❑ Other (*specify designation*) : .....
↳ taken from :

- ❑ Power source Type :..... Serial number :.....
- ❑ Welding head Type :..... Serial number :.....
- ❑ Wire feeder Type :..... Serial number :.....
- ❑ Other(*to be specified*) : ..... Serial number :.....

REASON FOR RETURN :

❑ Return of loan equipment
❑ Return of demonstration / fair equipment
❑ Return of hired equipment
❑ Return after exchange
❑ Deficient delivery / incorrect order
❑ Return for modification (*to be specified*) : .....
❑ Return for revision
❑ Return for calibration

❑ Return for repair
to be specified : ❑ systematically occurring error
❑ occasionally occurring error

Description of breakdown :

_____

_____

_____

_____

❑ Other issue *(to be specified)* :.....

Date :..... Signature:.....

Polysoude S.A.S.
21 du Bois Blanc
12 rue Paul Seaupère - F - 44800 NANTES
tél : +33(0)2 40 68 11 00 - fax : +33(0)2 40 68 11 88
www.polysoude.com - e-mail : info@polysoude.com
société par actions simplifiée au capital de 1 105 452 Euros
R.C.S. Nantes B 898 800 031
TVA N° : FR 84898800031 - a member of Global Welding Technologies AB

Table of illustrations

Printed in France.
Published by Polysoude, Nantes, France.

www.polysoude.com info@polysoude.com

MANUT0309106_rev.1 _25/09/2009

ISO 9001
BUREAU VERITAS
Certification

Translation of original instructions

POLYSOUDE : Related Services

Guidance and technical support
A welding application specialist in your area will advise you on the welding process and appropriate equipment for your application.

Maintenance / Repair
Maintenance and repair operations can be carried out at the Polysoude plant as well as on site by our service network.

Commissioning / Training
A complete training program will enable you to start using the equipment immediately and in the best way possible.

Rental service
Increase the flexibility of your production! A large range of equipment is available for rental from our hire fleet.

Your partners worldwide

ARGENTINA
STMAC SRL
+54 11 4247 2184
stmac@telecentro.com.ar

AUSTRALIA
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

AUSTRIA
POLYSOUDE AUSTRIA GmbH
+43 (0) 3613 200 36
austria@polysoude.at

BELGIUM
POLYSOUDE BENELUX
+31 (0) 653 84 23 36
lmeurs@polysoude.com

POLYSOUDE BENELUX (SERVICE)
+31 (0) 653 38 85 58
humilden@polysoude.com

BRAZIL
AJADE COMÉRCIO INSTALAÇÕES E SERVIÇOS Ltda.
+55 (0) 11 4524 3898
fernando@ajade.com.br

BULGARIA
KARWELD EOOD
+359 (0) 297 3 32 15
Karweld@bg400.bg

CANADA
MAG TOOL Inc.
EDMONTON – ALBERTA
800 661 9983

mark@magtool.com
ray@magtool.com
michael@magtool.com

CHINA
POLYSOUDE SHANGHAI CO. Ltd
+86 (0) 2164 09 78 26
jm.pan@polysoude.com.cn

CROATIA
EUROARC D.O.O.
+385 (0) 1 2 40 6077
euroarc@euroarc.hr

CZECH REPUBLIC
POLYSOUDE CZ
+420 602 60 28 55
m.matousek@polysoude.cz

DENMARK
HALL & CO. INDUSTRI
+45 (0) 39 56 06 76
p.lorenzen@polysoude.com

EGYPT
POLYSOUDE UK
+44 (0) 1942 820 935
info@polysoude.com

ESTONIA
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

FINLAND
SUOMEN TEKNOHAUS OY
+358 (0) 927 47 2 10
info@teknohaus.fi

FRANCE
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

GERMANY
POLYSOUDE DEUTSCHLAND GmbH
DUSSLINGEN
+49 (0) 7072 60076 0
info@polysoude.de

POLYSOUDE DEUTSCHLAND GmbH
NIEDERLASSUNG LEVERKUSEN
+49 (0) 2171 58 13 36
info@polysoude.de

GREAT BRITAIN
POLYSOUDE UK
+44 (0) 1942 820 935
info@polysoude.com

GREECE
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

HUNGARY
POLYWELD Kft.
+36 (0) 20 29 88 708
polyweld@polyweld.hu

INDIA
POLYSOUDE INDIA
+91 (0) 20 40 03 59 31
abdulkarim@polysoude.in

INDONESIA
POLYSOUDE SINGAPORE OFFICE
+65 0734 8452
jmpan@singnet.com.sg

ISRAEL
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

ITALY
POLYSOUDE ITALIA SRL
+39 (0) 2 9379 90 94
info@polysoude.it

JAPAN
GMT CO Ltd - KAWASAKI
+81 (0) 44 222 67 51
gmt@e-gmt.co.jp

GMT CO Ltd - OSAKA
+81 (0) 789 35 67 51
gmt.kansai@e-gmt.co.jp

JORDAN
POLYSOUDE UK
+44 (0) 1942 820 935
info@polysoude.com

LATVIA
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

LITHUANIA
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

MALAYSIA
POLYSOUDE SINGAPORE OFFICE
+65 0734 8452
jmpan@singnet.com.sg

NETHERLANDS
POLYSOUDE BENELUX
+31 (0) 653 84 23 36
lmeurs@polysoude.com

POLYSOUDE BENELUX (SERVICE)
+31 (0) 653 38 85 58
humilden@polysoude.com

NEW ZEALAND
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

NORWAY
TEMA NORGE AS
+47 (0) 51 69 25 00
torunge.tjenovoll@nemo-norge.no

PAKISTAN
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

PHILIPPINES
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

POLAND
UNIDAWELD – BEDZIN
+48 (0) 32 267 05 54
dariusz.zroba@unidaweld.pl

ZALCO Sp.z.o.o. - WARSZAWA
+48 (0) 22 894 55 30
mbergman@zalco.pl

PORTUGAL
POLYSOUDE IBERIA OFFICE
+34 609 154 683
ladeandres@polysoude.com

ROMANIA
DEBISUD S.R.L.
+40 (0) 255 21 57 85
debisud@rdslink.ro

RUSSIA + C.I.S.
POLYSOUDE RUSSIA
+7 495 564 86 81
polysoude@co.ru

SAUDI ARABIA
ALRUQEE INDUSTRIAL MARKETING Co. Ltd
+966 (0) 3857 6383
ITManagerKhaldoun@alruqee.com

SINGAPORE
POLYSOUDE SINGAPORE OFFICE
+65 0734 8452
jmpan@singnet.com.sg

SIN SOON HUAT WELDING PRODUCTS PTE. Ltd
+65 (0) 62 65 60 88
wchng@sshcorp.com

SLOVAKIA
POLYSOUDE CZ
+420 602 60 28 55
m.matousek@polysoude.cz

SOUTH AFRICA
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

SOUTH KOREA
CHEMIKO CO Ltd
+82 (0) 2 567 5336
chemiko@chol.com

SPAIN
POLYSOUDE IBERIA OFFICE
+34 609 154 683
ladeandres@polysoude.com

SWEDEN
HALL & CO. INDUSTRI
+45 (0) 39 56 06 76
p.lorenzen@polysoude.com

SWITZERLAND
POLYSOUDE (SWITZERLAND) Inc.
+41 (0) 43 243 50 80
consocio@polysoude.ch

TAIWAN R.O.C.
FIRST ELITE ENT. CO. Ltd
+886 (0) 297 97 88 99
autopipe@mission.net

THAILAND
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

TURKEY
POLYSOUDE S.A.S.
+33 (0) 2 40 68 11 00
info@polysoude.com

UNITED ARAB EMIRATES
GERMAN GULF ENTERPRISES Ltd
+971 (0) 65 31 61 71
info@polysoude.com

UKRAINE
POLYSOUDE RUSSIA
+7 (0) 495 564 86 81
polysoude@co.ru

UNITED STATES
ASTRO ARC POLYSOUDE Inc.
+1 661 702 01 41
sales@astroarc.com

VENEZUELA
ENRIVA C.A.
+58 (0) 243 242 45 41
enriva@conix.net

POLYSOUDE
THE ART OF WELDING

Polysoude S.A.S.
ZI du Bois Briand • 2 rue Paul Beaupère • BP 41606
F- 44316 NANTES Cedex 3
Tél.: +33 (0) 2 40 68 11 00 • Fax: + 33 (0) 2 40 68 11 88
www.polysoude.com • e-mail: info@polysoude.com

Find us on Facebook