P6

Mobile power source

TIG – With or without filler wire , AVC , OSC

Operating, maintenance and programming manual

POLYSOUDE
THE ART OF WELDING

Product	P6 mobile power source
Reference	0025059101/0025059103/0025059104/0025059105
Manual	PN-0509076
Redactor	SBR

Revisions of the document

Rev. 0	Translation of the original document	
Rev. 1	Up-dating due to new 6-axes version	
Rev. 2	Update after a report of non-conformity and product evaluations; sub-points § 7.2 and § 7.3 are added to the section "Adjustment of the tachometer"	01/2011
Rev. 3	Update "Start cycle with restart" and "Fuses coolant pump control»	09/2011
Rev. 4	Update "Option commands mechanised equipment»	11/2011
Rev. 5	Update: FNCA 1201-039 and FNCA 1201-019 – Items on pages 56 to 59 – Fuse § 6.2.2 and on page 46, Shunt for UHP welding heads on page 23, gas values on page 20.	02/2012
Rev. 6	Addition of chapters: Connecting the measuring unit, Adjusting the measuring card, Compatibility of standard equipment. Changes to pictures of the P6 power source.	03/2012
Rev. 7	Addition chapter 4.5.3 Quick connector gas input Addition chapter Setting oxygen meter	06/2012
Rev. 8	Addition adapter manual torch and remote control 4 axis.	10/2012
Rev. 9	Addition "Settings oxygen meter configuration" "IP Address", updates chapters "Making adjustments during a weld cycle" and "Error and codes processing"	11/2012
Rev. 10	Modification touchscreen controller, addition chapter remotes control on board	03/2013
Rev. 11	Addition manual torch adapter 0023000901 and ref remote control	04/2013
Rev. 12	Using the remote control to regulate the AVC	10/2013
Rev. 13	Update part list of the power source	01/2014
Rev. 14	Update touchscreen (09/2013)	02/2014
Rev. 15	Update part list remote control	06/2014
Rev. 16	Update : " 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.

Sommaire

1. Safety precautions

Note: Protect yourself and others from injury - read and follow these instructions

1. 1. Arc welding hazards

The following symbols are used in the text to draw your attention and to identify risks and dangers. When you see a symbol, **consult the safety rules in the Recommendations chapter below.**
Only qualified staff are permitted to undertake installation, use, maintenance and repair work on a power source.
When using the equipment, keep away everybody who is not working with the installation.

1. 2. Meaning of symbols

Risk of electric shocks

Risk of severe injuries caused by moving parts

Risk of fume or gas inhalation

Risk of explosion

Risk of eye or skin burns caused by radiation

Risk caused by magnetic fields

Warning: hot parts – Risk of burns

Danger caused by noise

Risk of eye or skin burns caused by flying sparks

Read the instructions

Risk of overheating, fire

Eye protection mandatory

Foot protection mandatory

Helmet mandatory

Risk of falling.

Refer to the recommendations below in order to take the necessary precautions to avoid any hazard.

1. 3. Recommendations

Risk of electric shocks

Electrical parts are the electrode, the weld circuit, the supply circuit and the internal circuits, the filler wire and metal parts in contact with it, the wire feeder unit and the wire feeding mechanism. Any contact with these parts can cause an electric shock if the installation is connected to the mains supply.
Circumstances increasing the risk of electric shocks: humid environment, working on a conducting surface, poor earth connection, poor maintenance of equipment, unsafe working conditions.

To prevent risks:
- Avoid any contact with energised wire spools.
- Inspect water cooled torches regularly to detect leakage, take care to avoid condensation.
- Do not wind the cables around your body.
- Make sure that the electrode is not energised when changing it.
- Before any maintenance or repair work or if equipment is not in use, disconnect the equipment from the mains supply.
- Wear gloves, clothes, aprons and safety shoes that are dry and without holes.
- Isolate yourself from the part and from earth using carpets or other suitable insulating materials if carrying out welding on metal surfaces or structures.
- The equipment must be installed and earthed as specified in the operating manual and in national, local and municipal codes of practice.
- The current return cable must be fixed correctly (clean surface, solid clamping as close as possible to the weld area).
- Cables that are damaged, worn or without sheathing, the wrong size or badly assembled must not be used. They must be replaced immediately.
- The welding set must be properly earthed.
- Use a separate cable if the workpiece must be earthed.
- Appropriate connectors must be used.

Make sure that the open circuit voltage limited to 80 Vac rms or 113 Vdc (voltage needed for arc ignition). Maximum value for plasma cutting power sources: 500 V.

Risk of fume or gas inhalation

During welding, fumes and gases are released which are dangerous to your health. Avoid inhaling fumes.
Sources of fumes and gases: base metal: basic material, filler metal, weld coating (flux) with coated rod electrodes, shielding gas, solvents and materials covering the workpiece.

To prevent risks:
- Use breathing apparatus such as filter masks, forced ventilation masks, air-shield masks, disposable masks.
- Avoid chlorinated solvents.
- Dry the workpieces thoroughly before welding.
- Do not work alone!
- Control fumes and gases at source.
- Remove paint, oil and any other coatings from the surface.

Risk of eye or skin burns caused by radiation

Radiation from the welding arc can cause eye and skin burns.
Risk identification: exposure to radiation emitted from the arc generating intense visible and invisible radiation (ultraviolet and infrared); reflections of radiation when welding metals such as aluminium or stainless steel; blinding glare, sparks, stings caused by the tungsten electrode tip.

To prevent risks:
- Wear gloves or leather sleeves to protect hands and forearms.
- Wear an apron or gaiters to protect the legs and knees to upper foot.
- Wear a mask (strapped to the head, handheld or electronic) or goggles equipped with a suitable filter.
- Use shielding curtains to protect staff working nearby.
- Wear a scarf around your neck and close the collar of your clothing.

Warning: hot parts – Risk of burns

- Do not touch welded or torch-cut parts with bare hands. If you have to handle them use suitable tools and/or wear thick and insulating welding gloves to prevent burns.
- Welded parts must cool down before handling or further weld operations.

Risk of eye or skin burns caused by flying sparks

- Wear gloves or leather sleeves to protect hands and forearms.
- Wear an apron or gaiters to protect the legs and knees to upper foot.
- Wear a mask (strapped to the head, handheld or electronic) or goggles equipped with a suitable filter
- Use shielding curtains to protect staff working nearby.
- Wear cotton or woollen clothes with long sleeves, without oil or lubricant marks - avoid synthetic fabrics.
- Wear a scarf around your neck and close the collar of your clothing.
- Wear safety boots made for welders.

Risk of overheating, fire

- Keep the installation in good condition, especially the supply cables and the current return cable.
- Keep a minimum distance of 6 m between the welding equipment and any greasy, explosive or dusty substance.
- Use shielding curtains to protect staff working nearby.

Risk of explosion

These risks are caused by using and handling gas bottles and by flying sparks.

- Never use damaged gas bottles.
- Stock the gas bottles in a well-ventilated room, allowing access only to authorised staff.
- The temperature limit of 55 °C must be respected for the storage and use of gas bottles.
- Separate clearly marked empty gas bottles from new ones.
- Protect gas bottles from extreme temperatures (freezing, sun, sparks, etc.).
- Inspect connections and hoses regularly.
- Use shielding curtains.

Risk of severe injuries caused by moving parts

-
- Never place your hands near a fan or other moving parts.
- Keep all safety devices closed or in safe mode.

Risk caused by magnetic fields

The distance between the brain and the welding circuit is a very important parameter.

- Never wind cables around your body or, even worse, over your shoulders.
- Make it known if you have been fitted with a pacemaker. Possible interference must be prevented by special measures in co-ordination with a physician.

The operator must ensure that no one is exposed to dangerous areas

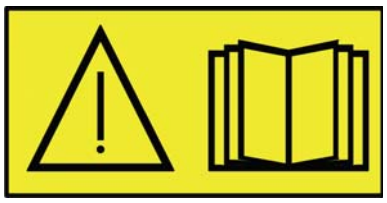
1. 4. Danger in using a power source

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 headings **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 French Labour Code.

1. 4. 2. Accessformaintenanceandadjustments

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

A. Signs
Elements used for the signs, 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.
B. 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.

Protection in case of breakdown or failure of the equipment

If no welding operations are carried out, the staff must protect themselves by activating appropriate separation devices.

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. Device 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

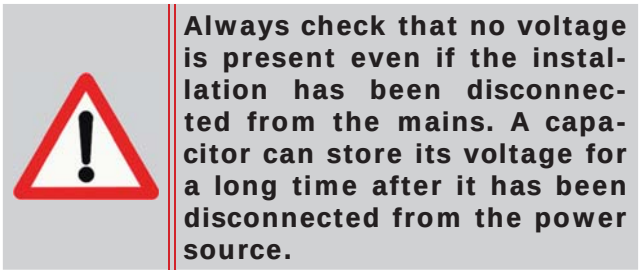
It is the user's responsibility to assess:

- 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 mains supply must be disconnected and a waiting period of 2 minutes must have 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 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 for use 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) require-ments.

2. 3. Reference documents

PN-0908080	User manual for touchscreen

3. Introduction

3. 1. The P4-P6 P6 HW series

The P6 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 finding a successful solution of the weld problem. Particular features of the power source P6 are:

- 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 P6 HW 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. 3.1 - P6 HW power source

P6

300 A mobile power source.
Ideal for prefabrication work.

P4

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

Fig. 3.2 - P6 power source

Fig. 3.3 - P4 power source

P6 CW orbital power source

P6 CW - 400/415 V ± 10%, three-phase, 50/60 Hz – Basic version (including torch rotation control) with printer	00 2505 9101
P6 CW - 400/415 V ± 10%, three-phase, 50/60 Hz (4 axes) – Basic version (including torch rotation control) with touchscreen, wire feeder control, printer and remote control pendant (4 axes)	00 2505 9103
P6 CW - 400/415 V ± 10%, three-phase, 50/60 Hz (5 axes) – Basic version (including torch rotation control) with touchscreen, wire feeder control, printer, remote control pendant (6 axes) and arc voltage control (AVC)	00 2505 9104
P6 CW - 400/415 V ± 10%, three-phase, 50/60 Hz (6 axes) – Basic version (including torch rotation control) with touchscreen, wire feeder control, printer, remote control pendant (6 axes), arc voltage control (AVC) and oscillation control (OSC)	00 2505 9105


POLYSOUDE
POLYSOUDE P6

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. Weldheads 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

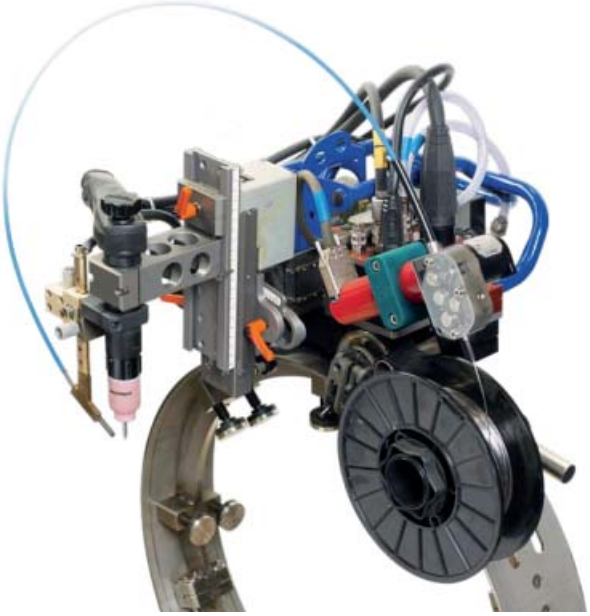


Fig. 3.5 - Polycar welding carriage

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 tubesheet welding heads

- TS welding heads to meet sought-after productivity and quality requirements.
- TS 25, standard welding head for tube to tube sheet.
  Closed welding head, designed for slightly protruding or flush tubes.
- TS 34 (Fig.3.7), standard welding head for tube to tube sheet particularly designed for high duty cycle applications.
  Closed welding head for slightly protruding or flush tubes.
- TS 2000 (Fig.3.8) and TS 8/75 (Fig3.9), standard welding head for tube to tubesheet applications.
  Open weldhead for protruding, flush or recessed tubes.

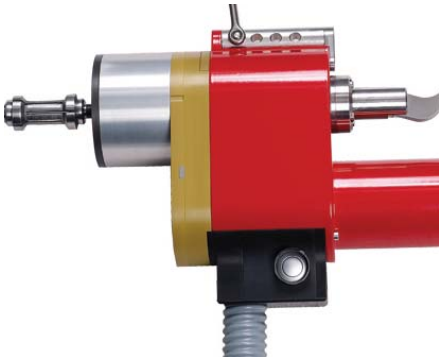


Fig. 3.7 - TS 34 welding head

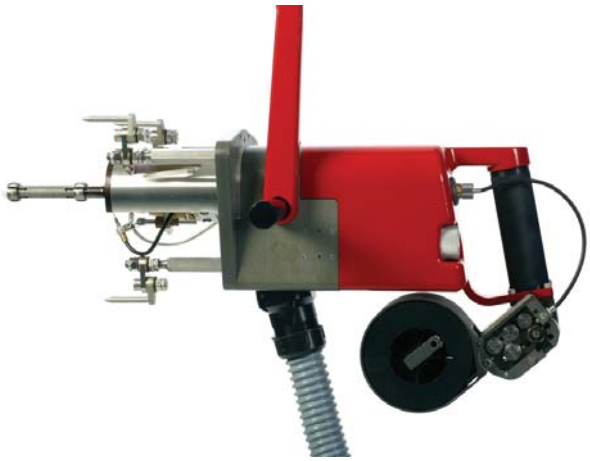


Fig. 3.8 - TS 2000 welding head

3. 2. 4. Accessories

POLYFIL-3 (Fig.3.10) external wire feeder.
Wire feeder with four-roller linear drive system to minimise wire deformation and damage to wire surface.

Fig. 3.9 - TS 8/75 welding head

Fig. 3.10 - Polyfil-3 wire feeder

3. 3. TechnicalspecificationsoftheP6power source

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.

Fig. 3.11 - Description of P6 power source

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

3. 3. 2. Remote control unit 6 axis

All functions and parameters can be monitored and changed by the remote control unit (option):

- Positioning welding heads and wire feeders.
- Starting and stopping weld cycles.
- Selecting WPs and programs.
- Simulating weld programs.
- Minor modifications during a weld cycle.
- Shielding gas test.
- Manual starting of the cooling pump.

3. 3. 3. Remote control pendant 4 axis

All operations and parameters can be controlled by the remote control pendant:

- Set up of Welding heads and wire feeders.
- Start and stop of weld cycles.
- Selection of WPs and programs.
- Simulation of weld cycles without arc.
- Parameter modifications during a weld cycle.
- Shielding gas test.
- Manual start of the cooling pump.

Fig. 3.12 - P6 remotes control unit

3. 4. Technical characteristics

Mains power source	Threephase + earth 400 V/415 V ± 10 % 50 or 60 Hz Multivoltage option 200 V - 480 V ± 10 %
Current consumption	13 A (400 V)
Open circuit voltage	100 V
Insulation class	F (E for multivoltage option)
Protection class	IP 23 (with touchscreen closed) IP 20 (with touchscreen open)
Weld current range	5 to 300 A
Current regulation	± 1 % if I > 100 A and ± 1 A if I ≤ 100 A
Duty cycle	300 A at 60 % 240 A at 100 %
Pulsed current range	300 A range: 5 to 300 A Time period from 10 to 3300 ms
Movements monitored	Welding head rotation Wire feeder Height of arc - AVC - (option) Oscillation - OSC- (option)
Speed accuracy	± 1 % at Vp ≥ ¼ V_{max} (Vp = programmed speed) ± 2 % at Vp < ¼ V_{max}
Gas monitored	Torch gas, second gas (option)
Source cooling	Forced ventilation
Weld torch cooling	Cooling liquid in closed loop with safety device (2nd circuit as option)
Display of actual magnitudes during cycle	Continuous display of the power source output voltage and the weld current (if remote control unit or touchscreen option present)
Number of stored WPs	200 maximum
Sectors per program	99 maximum
Archiving and loading	on USB-key
Overall dimensions	630 x 470 x 790 mm (L x D x H) 630 x 470 x 1110 mm (Multivoltage version)
Weight	76 kg (with cooling liquid, touchscreen and printer) 160 kg in multivoltage version with carrier
Standards	EN 60974-1 et EN 60974-10

The EMC classification to EN 55011 (EN 60974-10) has been executed to class A requirements.
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. Receipt of a P6 power source

The P6 power source is delivered in packaging consisting of a box and protection, etc. This original packaging must be kept and used each time the power source is transported, in order to avoid damage.

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

In the package you will find:

- A remote control unit D2616, 6-axes version (Fig.4.1 – Item 1b (option).
- A 9 m long earth cable (Fig.4.1 – item 2).
- A gas hose connector (3 hose connectors if the optional second gas has been ordered) (Fig.4.1 – Item 3).
- This user manual (Fig.4.1 - Item 4).
- A USB Key (Fig.4.1 – Item 5).
- The installation CD ROM (Fig.4.1 – Item 6).
- A RJ45 cross-coupled cable to connect the PC with the power source (Fig.4.1 – Item 7).
- A adapter manual torch ref. 0023000901 (Fig.4.1 - Rep.8).
- Pad set anti-slip (Fig.4.1 - Rep.9).

Fig. 4.1 - Accessories supplied with the power source P6

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. Placing in position

Make sure that the system is placed flat, on a 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 allow 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 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. It is essential to connect the earth conductor in order to ensure the safety of the operators.
Refer to the power source rating plate for the currents consumed for different mains voltages. For example, for a 400 V mains supply a 16 A protection is required.

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

Note: The operating company is responsible for the installation and the use of the arc welding equipment conform to the manufacturer's instructions. If electromagnetic interference occurs, the operating company must solve the problem with the support of the manufacturer (extract of the standard EN 60974-10 2008 – annex A).

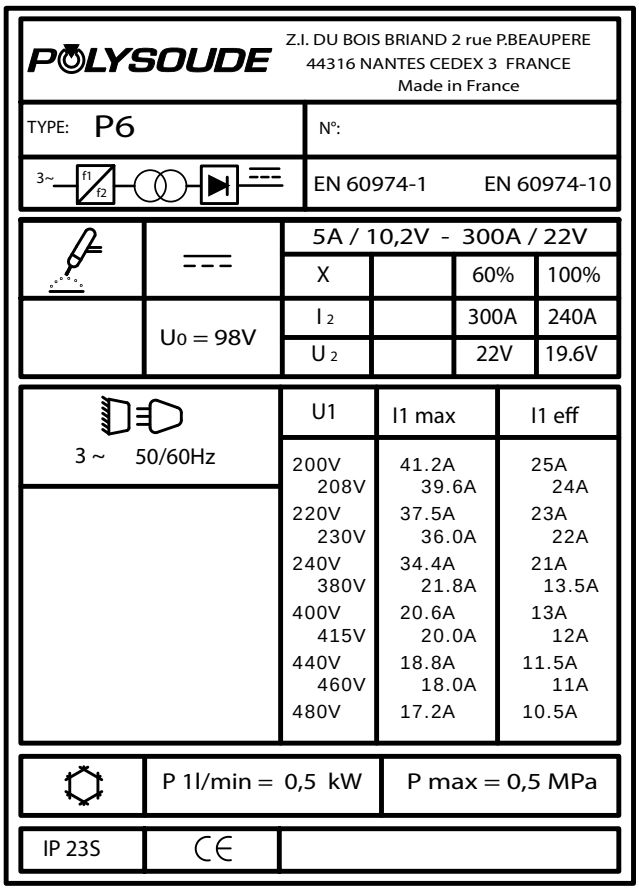


Fig. 4.2 - Rating plate of the P6 power source

Power source for connecting to 400 / 415 V

In your installation, you must provide «inductive load fuse protection (motor rated) with a 16 A rating.

Multi-voltage power source

In your installation, you must provide «inductive load fuse protection (motor rated). For the fuse rating please refer to the I1rms current on the rating plate as a function of the mains voltage.

Mains coupling

Before proceeding on any electrical part, make sure the machine is not connected to the electric supply and the voltage corresponds to one of the values mentioned in the table

For a P6 fitted with the multi-voltage kit the transformer must be coupled up before the mains is connected. The table in Fig. 4.3 gives the position of the coupling links as a function of the mains voltage. The power sources are coupled up for 480V when they leave the factory.

In order to connect the transformer, open the access hatch at the rear of the multi-voltage module in the bottom area of the power source.

U1	Up			Us		
	L1 ↓	L2 ↓	L3 ↓	U1 ↑	V1 ↑	W1 ↑
200V	A	A	A	Z	Z	Z
208V	A	A	A	Y	Y	Y
220V	B	B	B	Z	Z	Z
230V	B	B	B	Y	Y	Y
240V	B	B	B	X	X	X
380V	C	C	C	Z	Z	Z
400V	C	C	C	Y	Y	Y
415V	C	C	C	X	X	X
440V	D	D	D	Z	Z	Z
460V	D	D	D	Y	Y	Y
480V	D	D	D	X	X	X

Fig. 4.3 - Transformer coupling

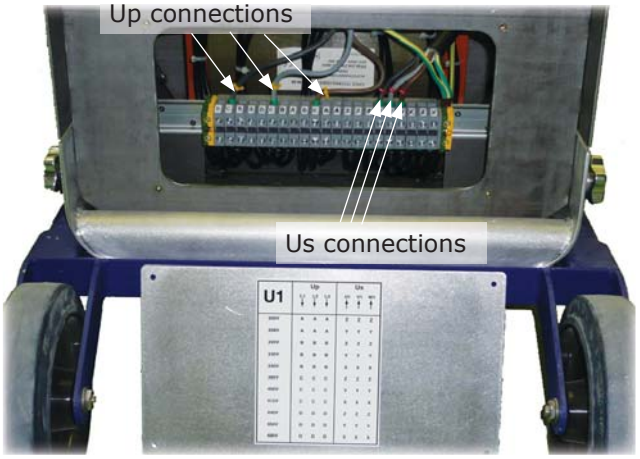


Fig. 4.4 - Layout of coupling terminal block

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.
On the gas source outlet (gas cylinder or manifold) litre flowmeters should be used (see § 4.2.4 Spare parts) for the flowmeter reference. Before making any connections, briefly open the gas valve to expel any impurities.

Fig.4.5, Fig.4.6 & Fig.4.7 - Rep.1	Gas 1
Fig.4.5, Fig.4.6 & Fig.4.7 - Rep.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 flow option for P6 with UHP welding head

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 flowrate of this gas is controlled by:
- a manual adjustment valve inserted into the circuit if the gas used (refer to Fig.4.6) is the same as the welding gas. The valve (Fig.4.6 - item A) is adjusted manually.
- the litre flowmeter installed in the gas source (cylinder or manifold) if the gas used (refer to Fig.4.7) is not the same as the welding gas. Connection is made at the rear of the generator at gas inlet 2).

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.

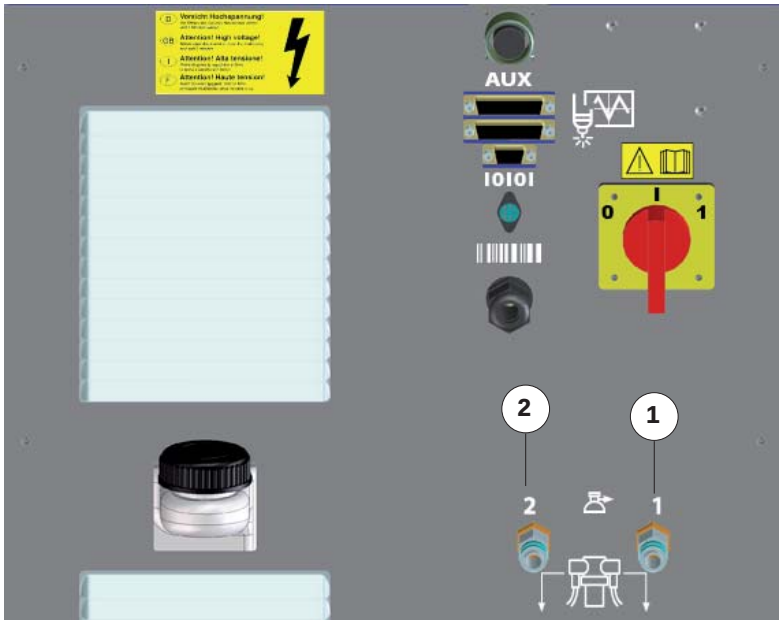


Fig. 4.5 - Connection of the gas supply to the power source P6

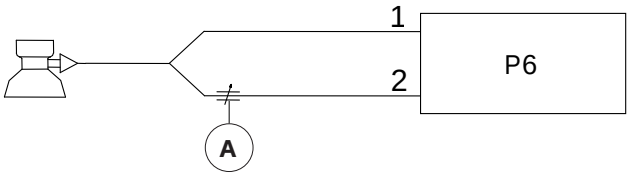


Fig. 4.6 - Connection diagram if one gas is used

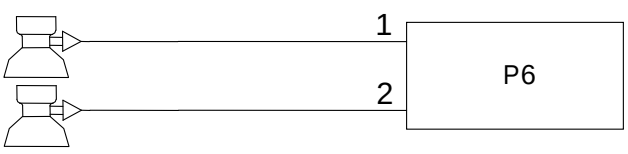
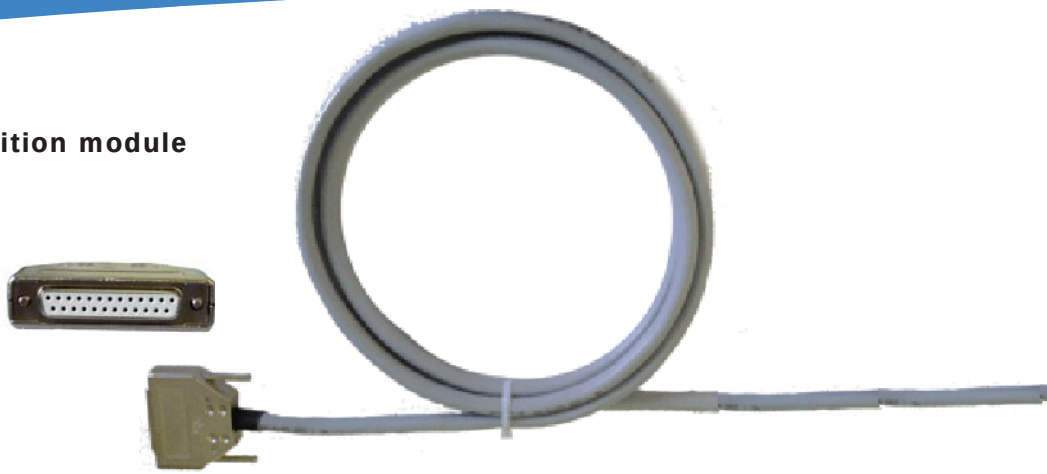


Fig. 4.7 - Connection diagram if two different gases are used

4. 3. Connecting the acquisition module



Acquisition module

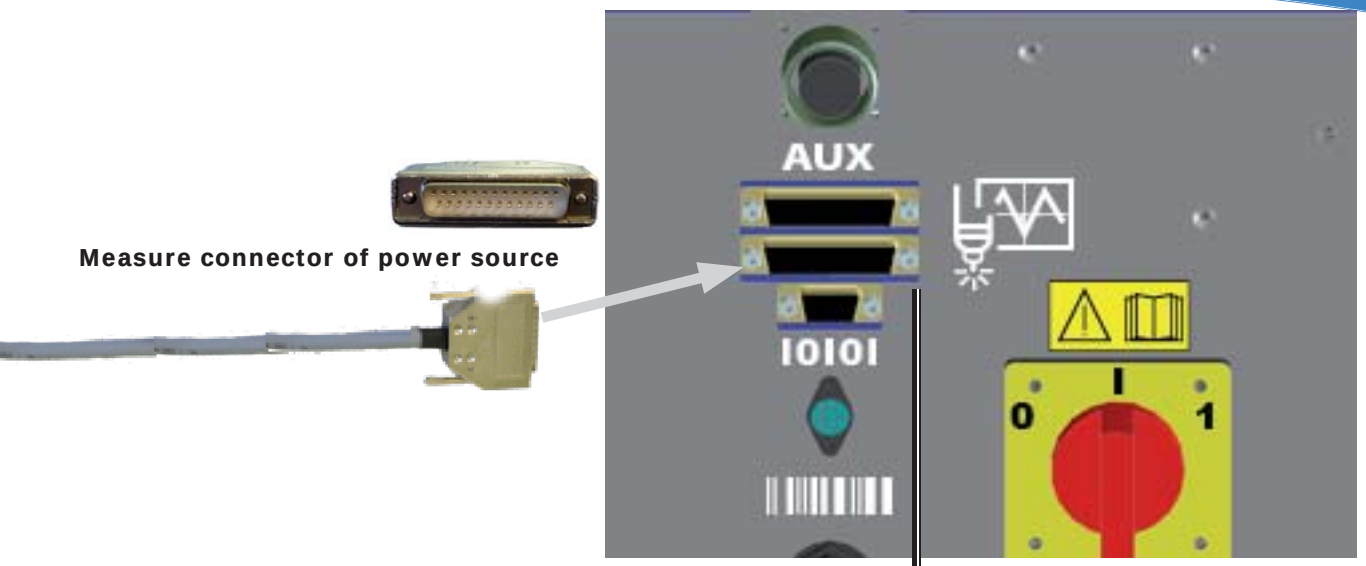
Ethernet cable RJ45

240 V_{AC}

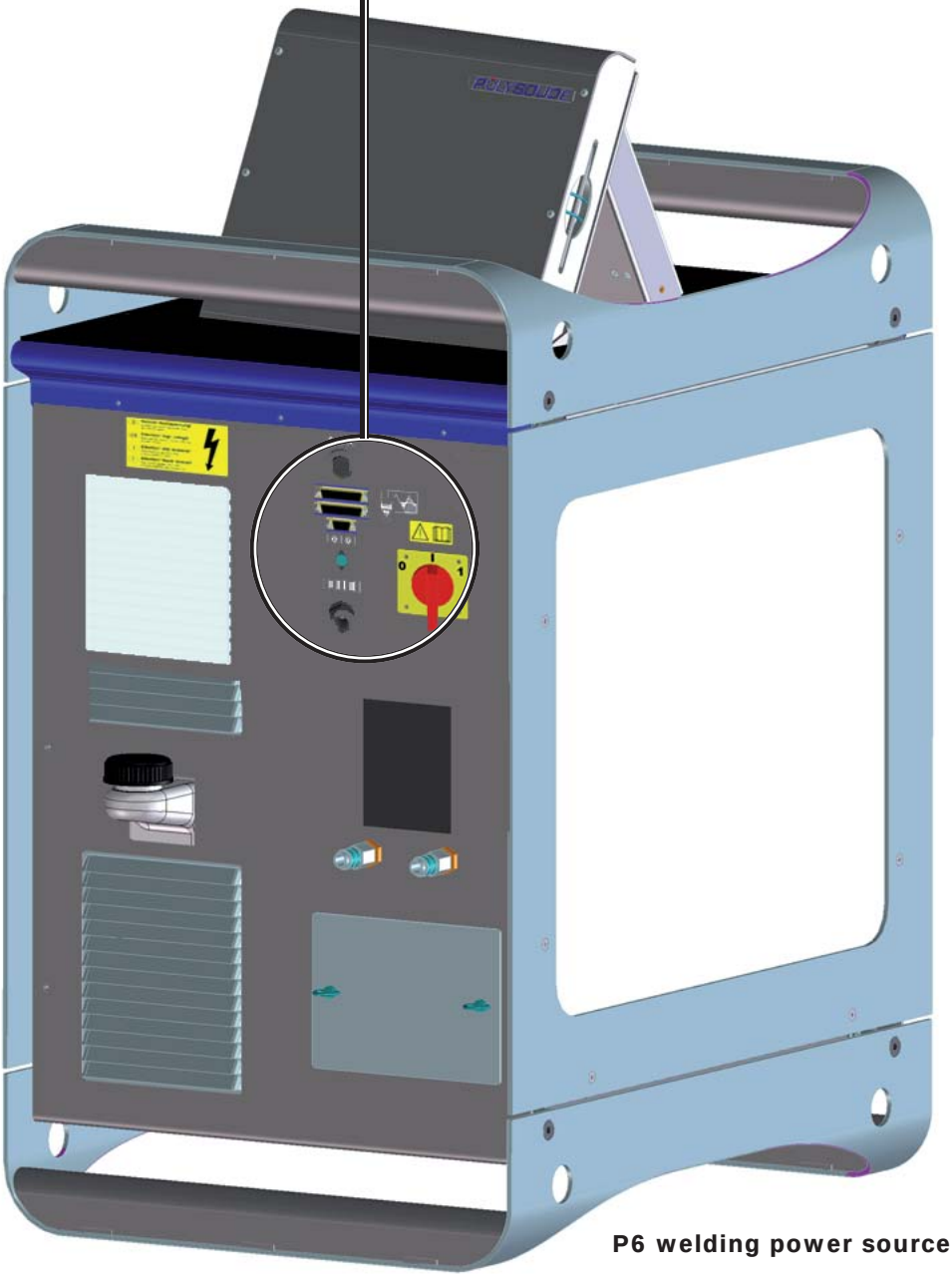
Power supply

Notebook P.C.

Printer (optional)



Measure connector of power source



P6 welding power source

4. 3. 1. 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 on the connection whose address is to be changed. Then click on **Properties**. The «General» tab contains all of the elements used for the connection. Click on the Networking tab.
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. 3. 2. 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.4.8 - Memo Axis configuration standard

4. 4. Setting to work

4. 4. 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. 4. 2. Connection of the remote control unit

The cable of the remote control unit is connected by means of a bayonet fitting on the connector panel.
Power sources equipped with the emergency stop option cannot be powered up if the remote control unit is not connected.

Fig. 4.9 - Connection of the remote control unit to the P6 power source

4. 4. 3. 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 with the quick connector to the "-" terminal on the connector panel, locking it by rotation to the right. This terminal is not marked by a colour.

Connection of the earth cable

Connect the earth cable to the "+" terminal on the connector panel. The terminal is surrounded by a red ring. The connection is made with a quick connector, locked by rotation to the right. 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

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

Connection of a shunt to the cooling fault detection circuit

On power sources before v.2.5.0 version, it is necessary to shunt the cooling circuit to prevent a coolant fault detection.

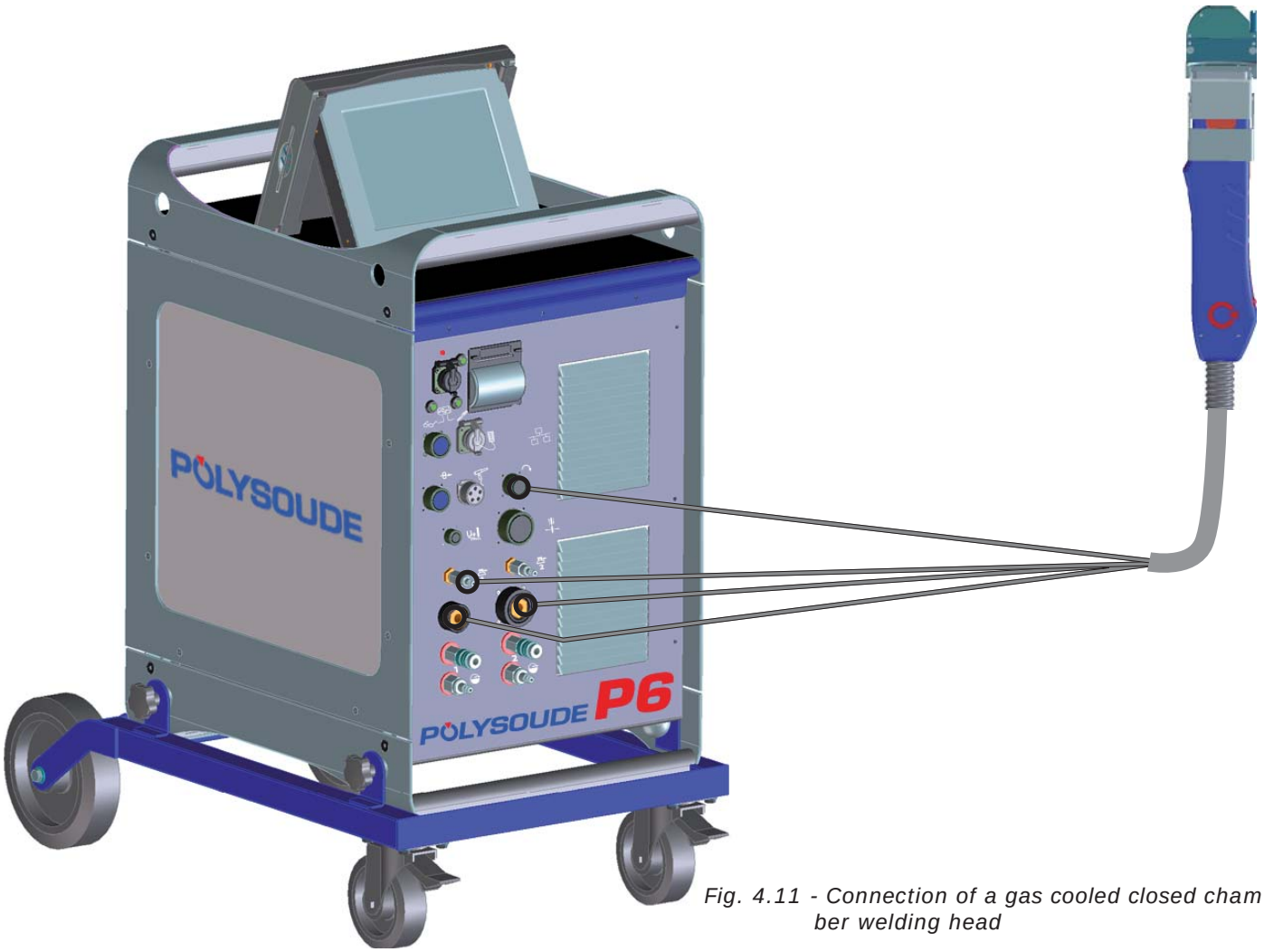


Fig. 4.11 - Connection of a gas cooled closed chamber welding head

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

Connection of the electrode current cable

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

Connection of the earth cable

Connect the earth cable to the "+" terminal on the connector panel. The terminal is surrounded by a red ring. The connection is made with a quick connector, locked by rotation to the right. 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 AVC measurement plug 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.

Connection of the AVC / oscillation motor cable

Connect the cable to socket (symbol ) on the front connection panel.

Connection of the torch shielding gas

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

Connection of the cooling circuit

The connection is made with 2 quick couplings on the front connector panel (symbols  and ).

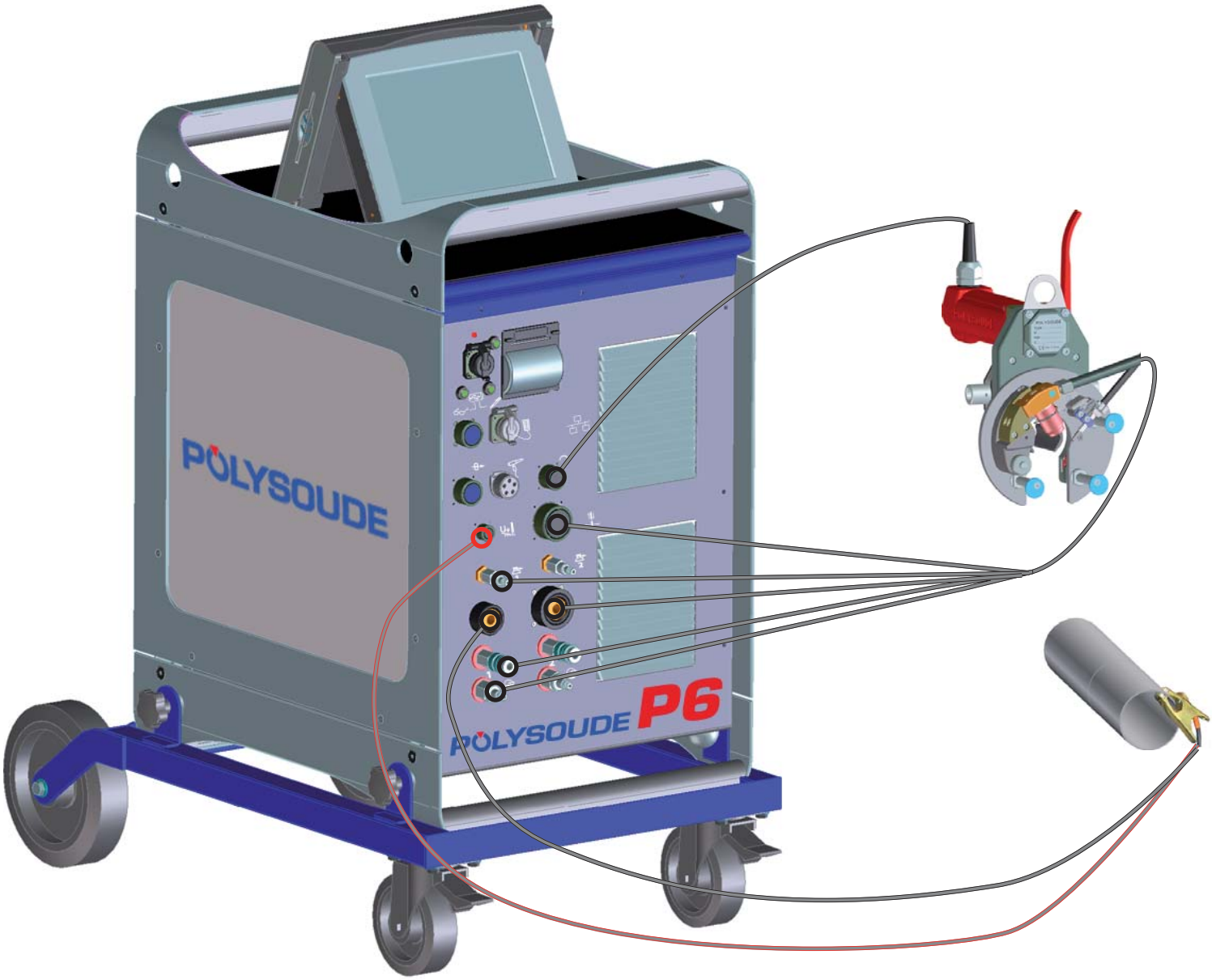


Fig. 4.10 - Connection of an open welding head of the MU type or a tube/tubesheet welding head of the type TS or TP

4. 4. 5. Connection of a liquid cooled closed chamber welding head

Gas cooled closed chamber welding heads of the type K and MW old versions belong to this group.

Connection of the electrode current cable

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

Connection of the earth cable

Connect the earth cable to the "+" terminal on the connector panel. The terminal is surrounded by a red ring. The connection is made with a quick connector, locked by rotation to the right. 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 cooling circuit

The connection is made with 2 quick couplings on the front connector panel (symbols and).

Connection of the torch shielding gas

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

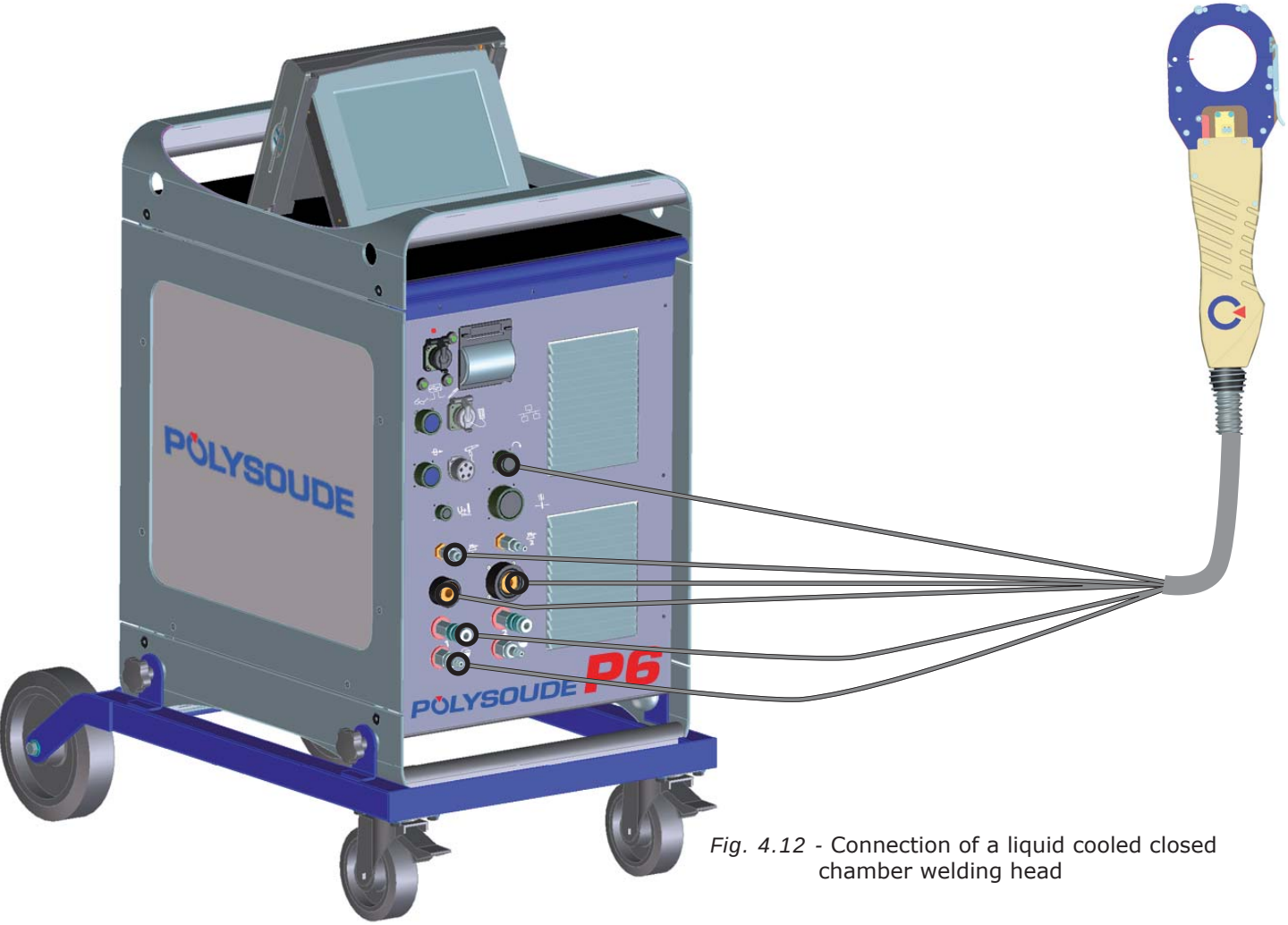


Fig. 4.12 - Connection of a liquid cooled closed chamber welding head

4. 4. 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 with the quick connector to the "-" terminal, locking it by a short rotation to the right. This terminal is not marked by a colour.

Connection of the earth cable

Connect the earth cable to the "+" terminal on the connector panel. The terminal is surrounded by a red ring. The connection is made with a quick connector, locked by rotation to the right. The cable end is marked red.

Connection of the rotation motor cable

Connection is made at the front of the P6 at connector (symbol). Make sure that the securing ring is properly tightened, otherwise the system may not function correctly.

Connection of the manual command cable of the type MW heads

Join the manual command cable to the connector **FA 5** on the connection panel of the power source with connection ref 0023000901..

Connection of the cooling circuit

The connection is made with 2 quick couplings on the front connector panel (symbols and).

Connection of the torch shielding gas

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

Connection of the integrated commands

A connection kit is arranged on the supply from head to power source.

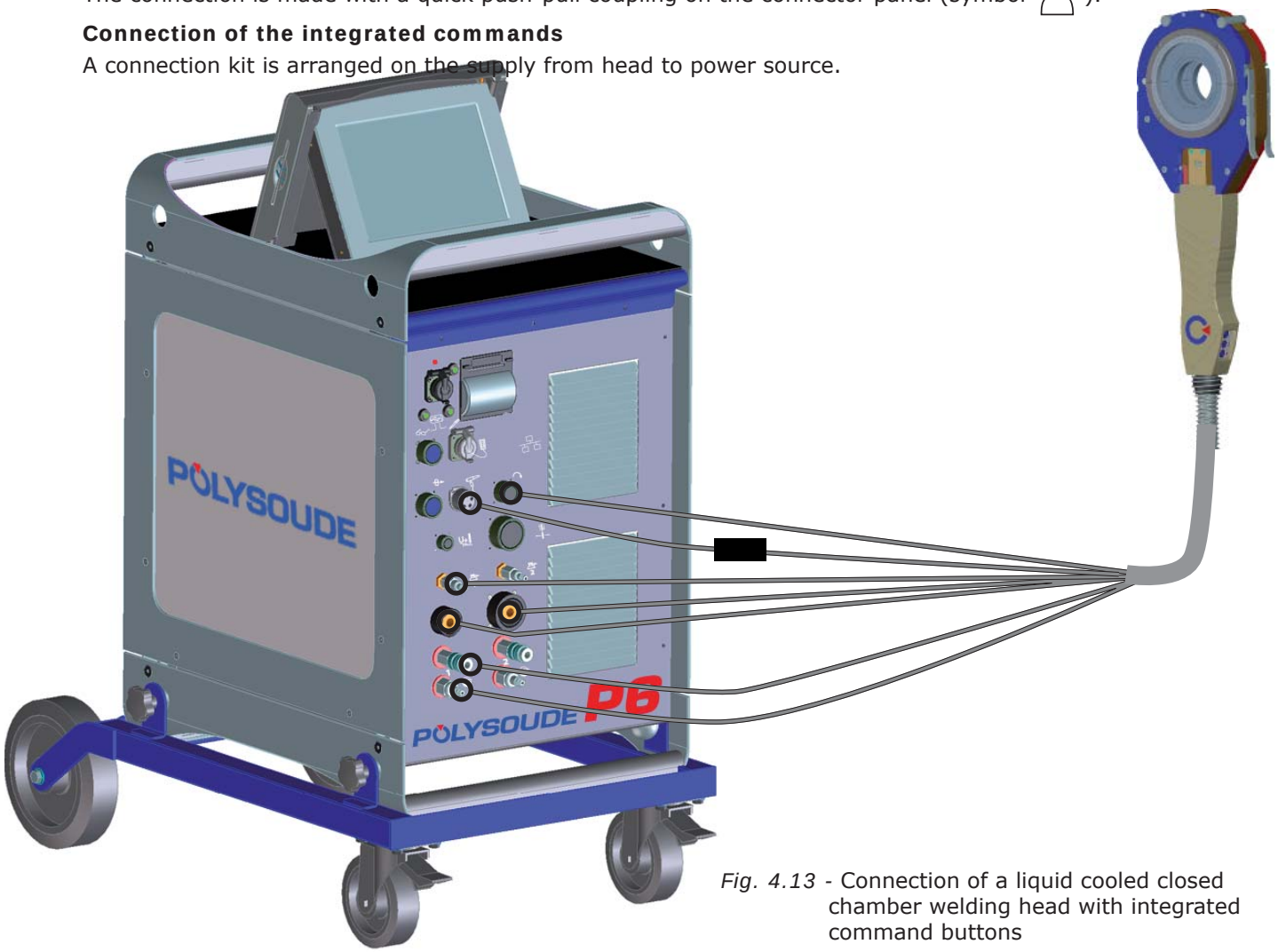


Fig. 4.13 - Connection of a liquid cooled closed chamber welding head with integrated command buttons

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

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

Fig. 4.14 - Connection of a wire feed unit

4. 4. 8. Connection of a closed chamber welding head equipped with tacheometry (option)

Adapters are mounted in the lines from the welding head to the power source/cooling system assembly:
- Welding gas.
- 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. 4.15 - Connection of a closed chamber welding head equipped with tacheometry

4. 4. 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.

Connection of the earth cable

Connect the earth cable to the "+" terminal surrounded by a red ring. Connection is made with a quick connector, with right hand locking. 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 command cable

The command cable of the manual torch has to be joined to the socket **FA 5** on the connector 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).

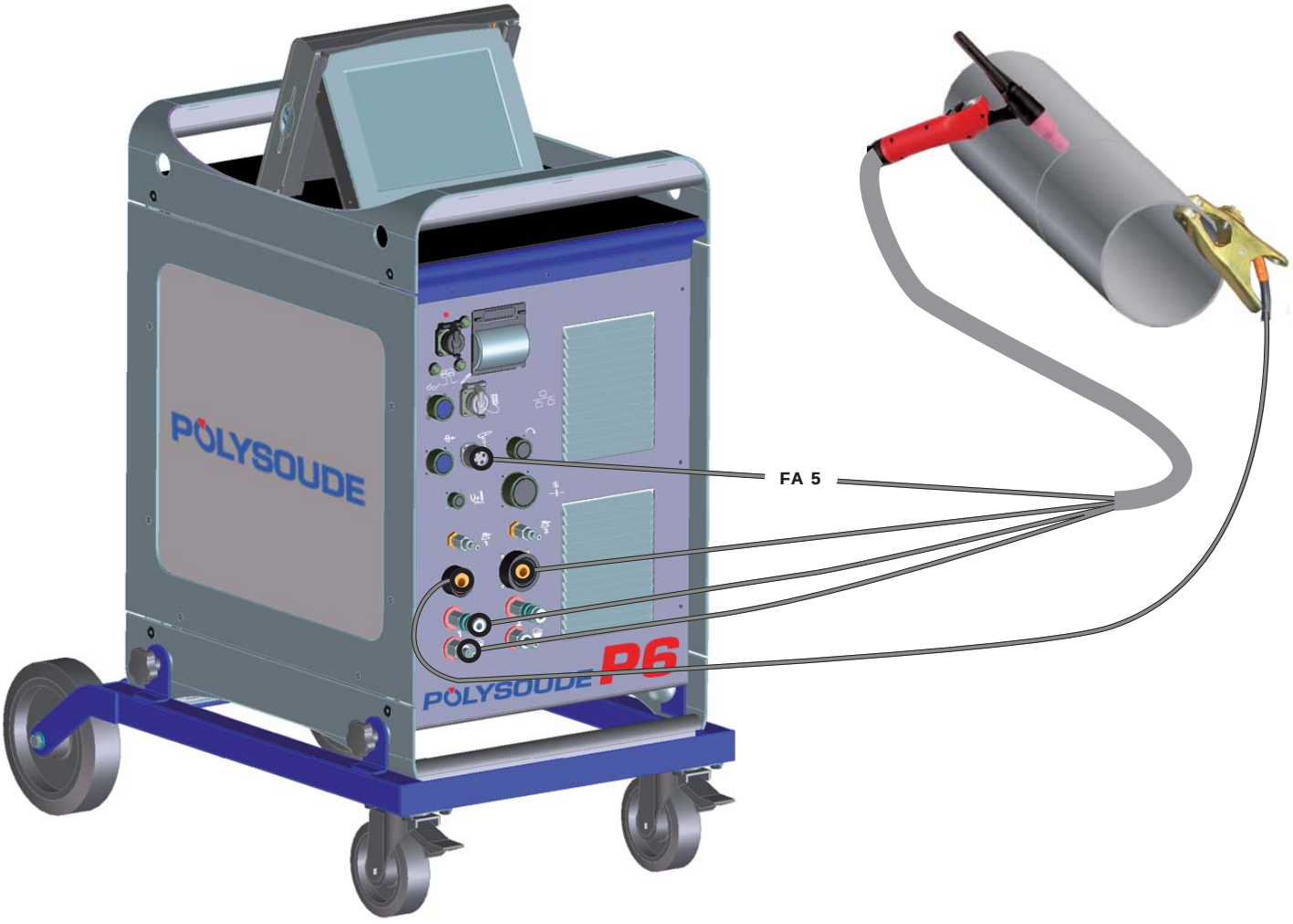


Fig. 4.16 - Connection of a manual torch

4. 4. 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 WP or change the head appropriately to enable the welding cycle to start.

4. 4. 11. Detection of the «closed head» position

If an old type of head is used (MW, MU III, ...), 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 dou**BT** make a test. No damage will occur.

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

4. 4. 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-HMI 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 – Pos. 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.4.17 – Pos. 1).

Please refer to the HMI user manual in order to adjust settings of the oxygen meter on the HMI.
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.

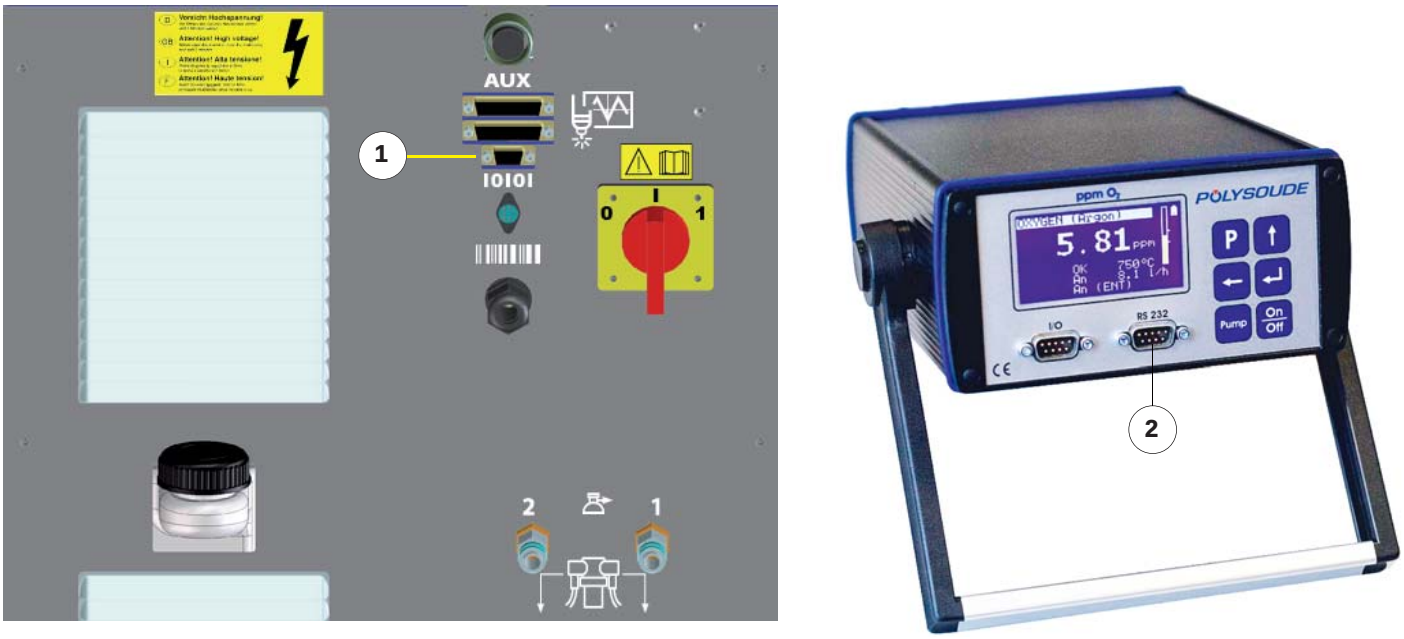


Fig. 4.17 - Power source rear connection panel and oxygen meter

4. 4. 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.4.19) of an Ethernet switch and power supply (Fig. 4.20), 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.4.18 - Pos. 1) on the back cover of the power source.

The power source is equipped with an emergency stop (Fig.4.18 - 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.4.21 - Pos. 1).
These emergency stops power cut stops of the entire installation.

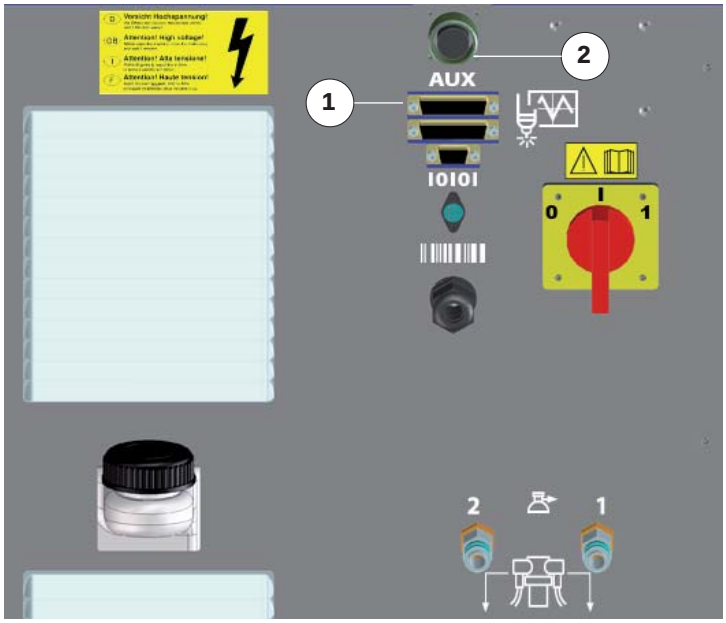


Fig. 4.18 - Power source rear connection panel

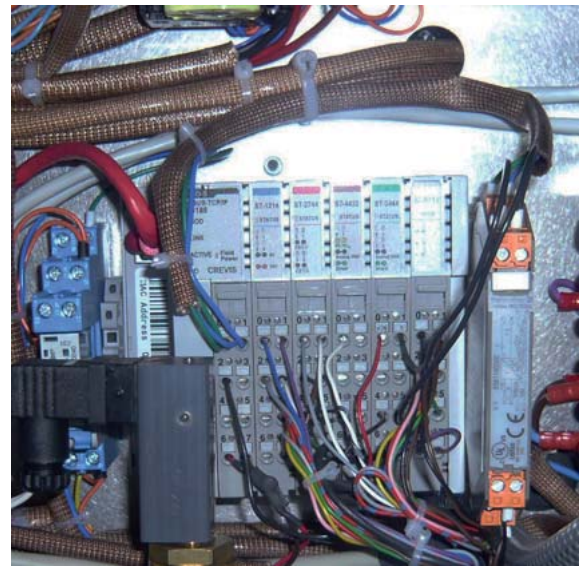


Fig. 4.19 - Modules

Fig. 4.20 - Ethernet swtich and power supply

Fig. 4.21 - Remote control unit with emergency stop

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

Item	Description
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. 4.22 - Connector wiring

4. 5. Description of controls

4. 5. 1. Front control and connection panel

Item	Designation
FA 2	Connection of the remote control unit.
FA 3	Connection of the rotation cable.
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 gas.
FA 10	Connection of the earth cable.
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.
FA 19	Read command on the USB key.
FA 24	Coolant outlet connection 2.
FA 25	Coolant return connection 2.
FA 26	Connection of workpiece U_{arc} cable
FA 27	Connection of AVC and oscillation cable

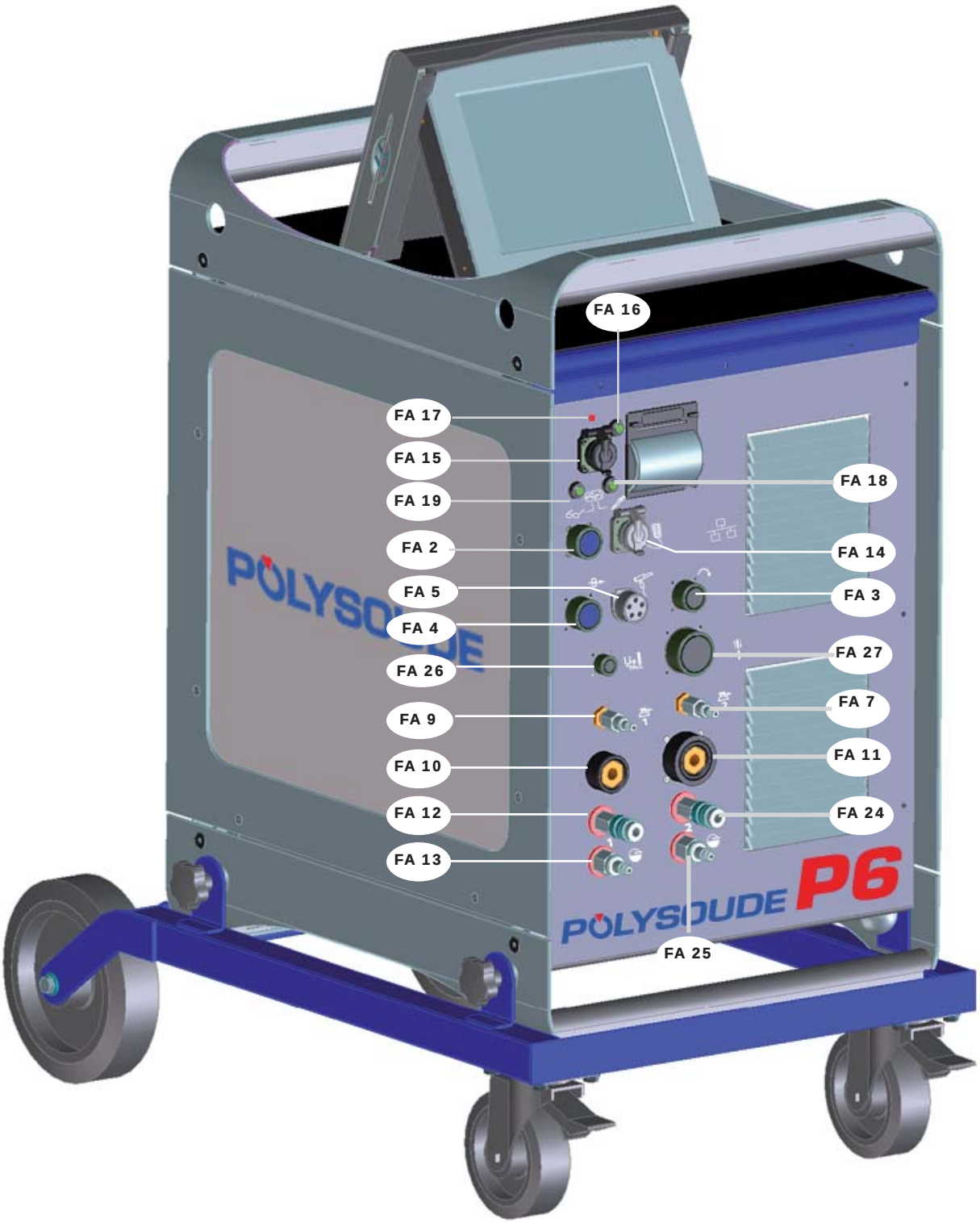


Fig. 4.23 - Front connector panel

4. 5. 2. Rear connector panel

Item	Designation	Item	Designation
FA 1	On/off switch.	**FA 21**	Connection of the data acquisition unit..
FA 6	Connection of the second gas supply (option).	**FA 22**	Serial connection RS232..
FA 8	Connection of the shielding gas supply.	**FA 23**	Connection of a bar code reader.
FA 20	Connection of auxiliary equipment.		

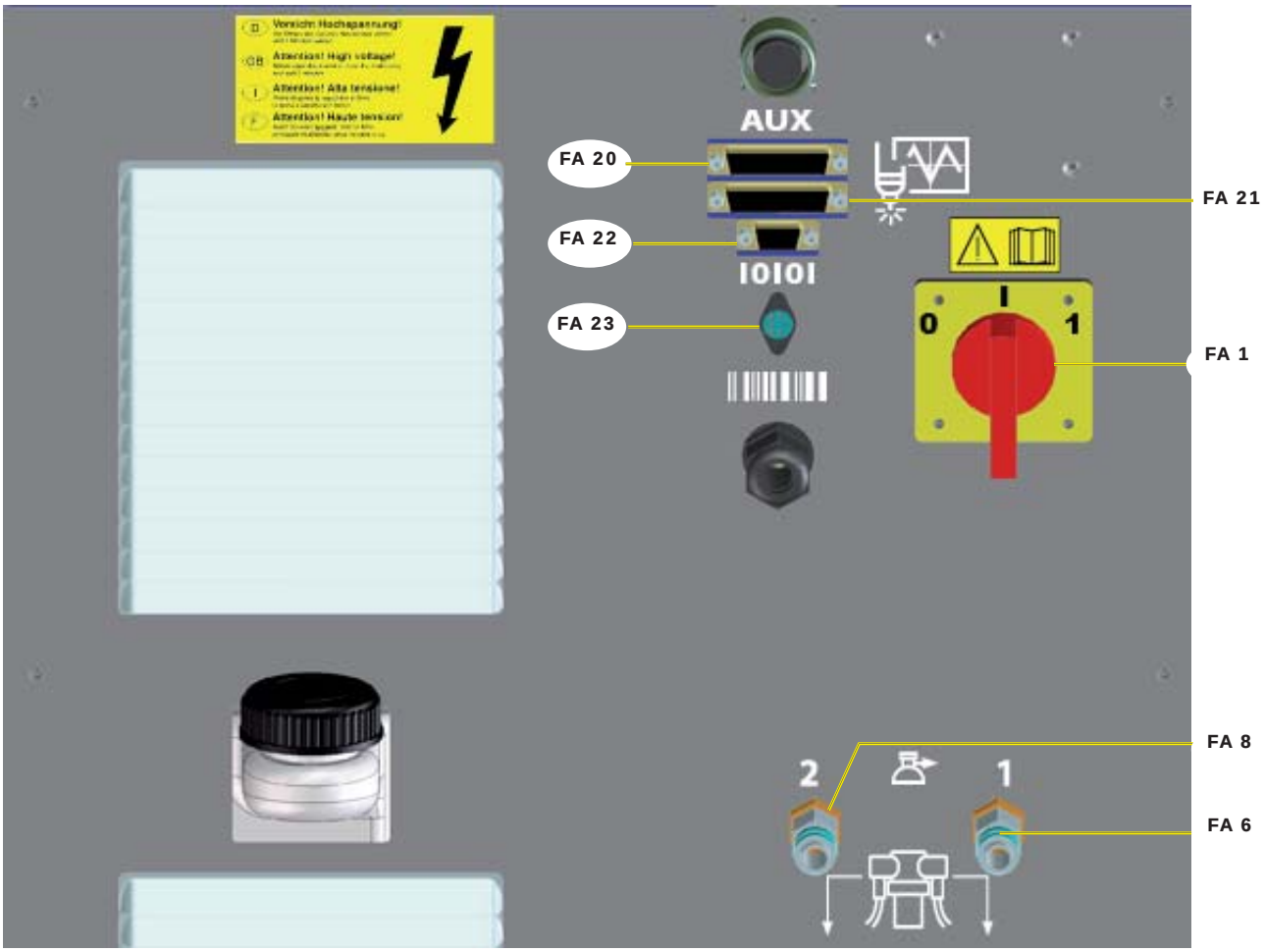


Fig. 4.24 - Rear connector panel

4. 5. 3. Quick connector gas input

- Gas fitting female - Part number 01514008 - Item 1.
- Ribbing bush - Part number 00692055 - Item 2.
- Copper seal 13.5x18x1.5. -No part number - Item 3.

Fig. 4.25 - Quick connector gas input

4. 5. 4. Remote control units 6 axis 0026169101

4. 5. 4. 1. 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 -** △

4. 5. 4. 2. Functions of elements of remote control unit

Item	Designation
AF 1	2 line 16 character backlight display.
V 1	Red indicator illuminated: Simulation without arc.
V 2	Green indicator illuminated: Weld mode 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 illuminated: filler wire operation during weld cycle controlled by **BT 10**.
V 6	Green indicator illuminated: automatic filler wire operation according to programmed parameters.
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. After 1 s of continued pushing, the automatic mode is applied.
BT 3	Push button to move up in the WP or program list or to increase a numeric value. After 1 s of continued pushing, the automatic mode is applied.
BT 4	**Out of cycle:** push button to toggle between simulation without arc and weld mode with arc (associated with V 1 & V 2).
BT 5	Push button to toggle between increment actions on low level, increment actions on high level or increment actions on both levels (associated with V 3 & V 4).

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
	
	During a weld cycle: Decrementation of the weld current level selected with BT 5.

BT 7	**For a weld cycle:** Incrementation of the weld current level selected with **BT 5**.
BT 8	Push button operating in two modes: **Out of cycle:** Manual rotation rearwards at low speed for 1 s, at medium speed for 2 s, afterwards at full speed. **For a weld cycle:** Decrementation of the rotation speed level selected with **BT 5**.
BT 9	Push button operating in two modes: **Out of cycle:** Manual rotation forwards at low speed for 1 s, at medium speed for 2 s, afterwards at full speed. **For a weld cycle:** Incrementation of the rotation speed level selected with **BT** 5.
BT 10	Push button operating in two modes: **Out of cycle in automatic mode (V 6 illuminated)**: Manual wire feeding forwards at low speed for 1 s, at medium speed for 2 s, afterwards at full speed. **Out of cycle in manual mode (V 5 illuminated)**: The first press starts wire feeding at high speed, the second press stops it. **For a weld cycle:** Incrementation of the wire feeding speed level selected with **BT 5**.
BT 11	Push button operating in two modes: **Out of cycle**: Manual wire feeding rearwards at low speed for 1 s, at medium speed for 2 s, afterwards at full speed. **For a weld cycle**: Decrement the wire feeding speed level selected with **BT 5**.
BT 12	Push button to toggle between the automatic wire feeding mode (indicator **V 6** illuminated) or the manual wire feeding mode (indicator **V 5** illuminated).
BT 13	Push button operating in two modes: **Out of cycle**: coolant pump, gas 1 and gas 2 commands. **For a weld cycle**: Manual cycle stop with downslope.
BT 14	Push button «Start cycle with restart».
BT 15	Push button "Start cycle".
BT 16	Push button "Stop cycle immediately".
BT 18	Push button operating in two modes: **Out of cycle:** Raise torch. **For a weld cycle** : Increment torch height.
BT 19	Push button operating in two modes: **Out of cycle** : Lower torch. **For a weld cycle** : decrement torch height.
BT 20	Push button to choose function in loop. - Suspension of the AVC (V 10 illuminated). - Running of the AVC (V 9 illuminated). **Function not available**
BT 21	Push button to choose delta corrections. - In amplitude "A" (**V 7** illuminated). - In time "T" (**V 8** illuminated).
BT 22	Push button operating in two modes: **Out of cycle**: torch oscillation with self-centering. **For a weld cycle**: Decrease of the oscillation in amplitude or in time according to **BT 21** position.
BT 23	Push button operating in two modes: **Out of cycle**: no action. **For a weld cycle**: Increase of the oscillation in amplitude or in time according to **BT 21** position.
BT 24	Push button to off-set torch to the left.
BT 25	Push button to off-set torch to the right.

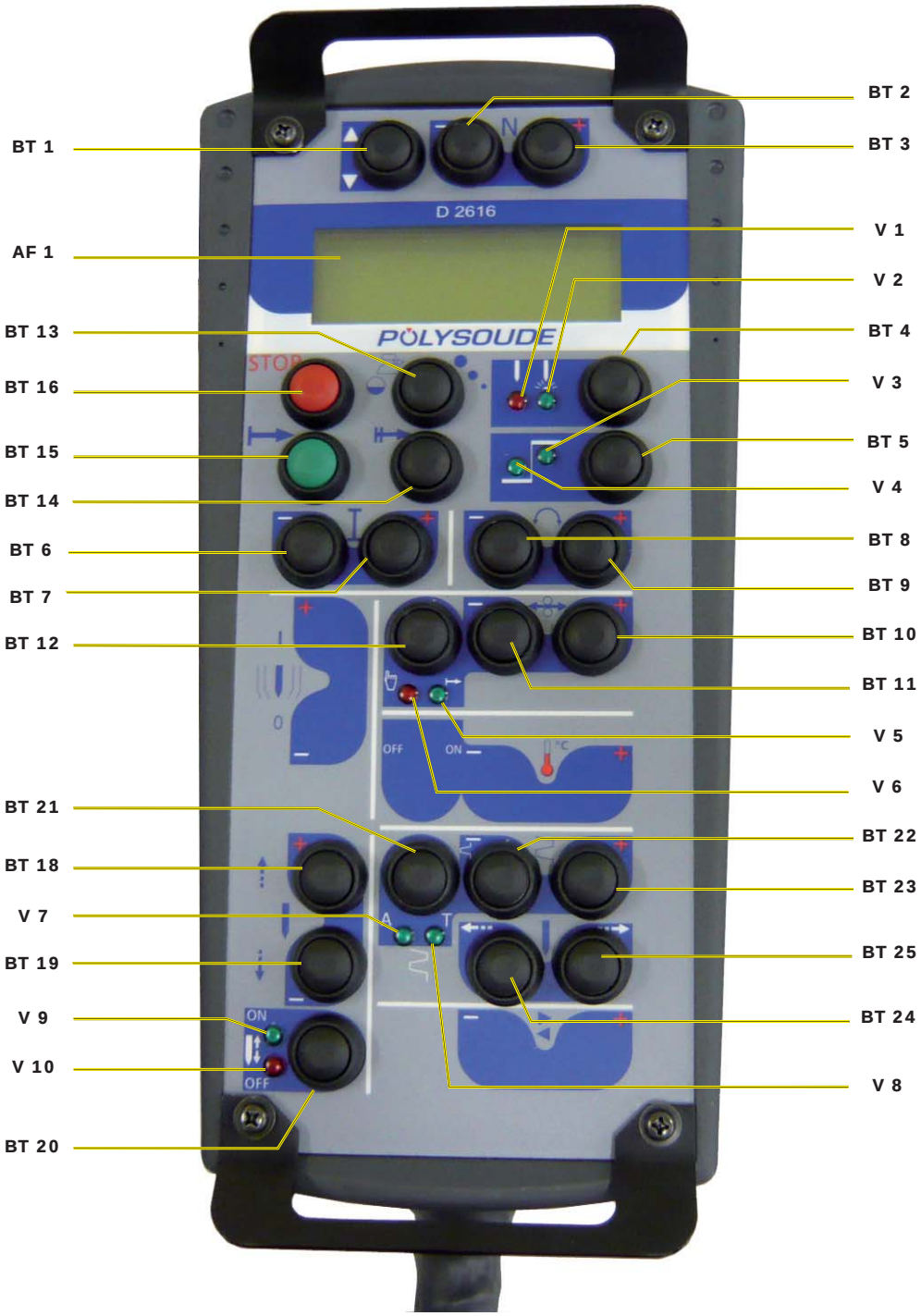


Fig. 4.26 - Remote control unit 6 axis

4. 5. 5. *Remotecontrolpendant4axis0026149101*

Function of operating elements

Pos	Designation
AF 1	2 line 16 character backlight display.
V 1	Red indicator illuminated: Simulation without arc.
V 2	Green indicator illuminated: Weld mode 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 illuminated: filler wire operation during weld cycle controlled by BT 10.
V 6	Green indicator illuminated: automatic filler wire operation according to programmed parameters.
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. After 1 s of continued pushing, the automatic mode is applied.
BT 3	Push button to move up in the WP or program list or to increase a numeric value. After 1 s of continued pushing, the automatic mode is applied.
BT 4	Push button to toggle between simulation without arc and weld mode with arc (associated with V 1 & V 2).
BT 5	Push button to toggle between increment actions on low level, increment actions on high level or increment actions on both levels (associated with V 3 & V 4).

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 Address`
	`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
	
	During a weld cycle: Decrementation of the weld current level selected with BT 5.

BT 7	During a weld cycle: Incrementation of the weld current level selected with BT 5.

Pos	Designation
BT 8	Push button operating in two modes: Out of cycle: Manual rotation rearwards at low speed during 1 s, at medium speed during 2 s, afterwards at full speed. During a weld cycle: Decrementation of the rotation speed level selected with BT 5.
BT 9	Push button operating in two modes: Out of cycle: Manual rotation forwards at low speed during 1 s, at medium speed during 2 s, afterwards at full speed. During a weld cycle: Incrementation of the rotation speed level selected with BT 5.
BT 10	Push button operating in two modes: Out of cycle in automatic mode (V 6 illuminated): Manual wire feeding forwards at low speed during 1 s, at medium speed during 2 s, afterwards at full speed. Out of cycle in manual mode (V 5 illuminated): The first touch starts wire feeding at high speed, the second touch stops it. During a weld cycle: Incrementation of the wire feeding speed level selected with BT 5.
BT 11	Push button operating in two modes: Out of cycle: Manual wire feeding rearwards at low speed during 1 s, at medium speed during 2 s, afterwards at full speed. During a weld cycle: Decrementation of the wire feeding speed level selected with BT 5.
BT 12	Push button to toggle between the automatic wire feeding mode (indicator V 6 illuminated) or the manual wire feeding mode (indicator V 5 illuminated).
BT 13	Push button operating in two modes: Out of cycle: coolant pump, gas 1 and gas 2 commands. During a weld cycle: Manual cycle stop with downslope.
BT 14	Push button "Start cycle with restart".
BT 15	Push button "Start cycle".
BT 16	Push button "Stop cycle immediately".

Fig.4.27 - Remote control pendant 4 axis

4. 5. 5. 1. Display messages

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. Operation of the power source P6

5. 1. Fundamental procedures

5. 1. 1. Switching on

With the installation connected (see chapter 4), set the switch **FA 1** (Fig. 4.17) 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.

Remark: If the power source is equipped with the EMERGENCY STOP function, the operator control unit must be connected to the P6, 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. Automatic equipment detection

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

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

To position a POLYSOUDE welding head on the workpiece to be welded, consult 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 feature allows quick and accurate 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

In combination with the «Manual/Automatic wire mode» selected with switch **BT 12** (V 5 and V 6), the buttons **BT 10** and **BT 11** on the remote control unit are used for accurate wire setting.

With the switch **BT 12** in the «Auto» position, pressing **BT 10** advances the wire, whereas pressing **BT 11** retracts it. 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 feature allows quick and accurate wire positioning. To stop the wire, release the button.
With the switch **BT 12** in the "Manual" position, the function of the wire retract button **BT 11** remains as stated above, but **BT 10** has a toggling function. 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 - Command buttons used for positioning the electrode

Fig. 5.2 - Command buttons used for wire setting

5. 1. 5. *Adjustment of the oscillation*

To position the electrode in line with the joint use **BT 24** and **BT 25** of the remote control unit. 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 - Command buttons used to adjust 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.

5. 1. 7. *Switching on the coolant pump manually*

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. With the button **BT 13** the coolant pump can be switched on to replenish the system before starting the next cycle.

Fig. 5.4 - Push button for gas flow test - cooling system test - and manual start of the coolant pump

5. 2. Execution of a weld cycle

5. 2. 1. Safety precautions

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 - Command button used to select the welding program

5. 2. 3. Simulation

To check the selected program without affecting the workpiece to be welded, a simulation can be started.
In this case, all the functions of the program are carried out except those concerning the arc.
The gas commands are executed as programmed but any flow rate faults are not noted. So it is possible to check the flow adjustment or reduce the gas consumption during the simulation. 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

Start of a weld cycle

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

Fig. 5.7 - Weld cycle start push-button

Parameter modifications during a weld cycle

By means of the remote control unit, parameter modifications can be easily made during a weld cycle.

Parameters 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 - BT5 push-button

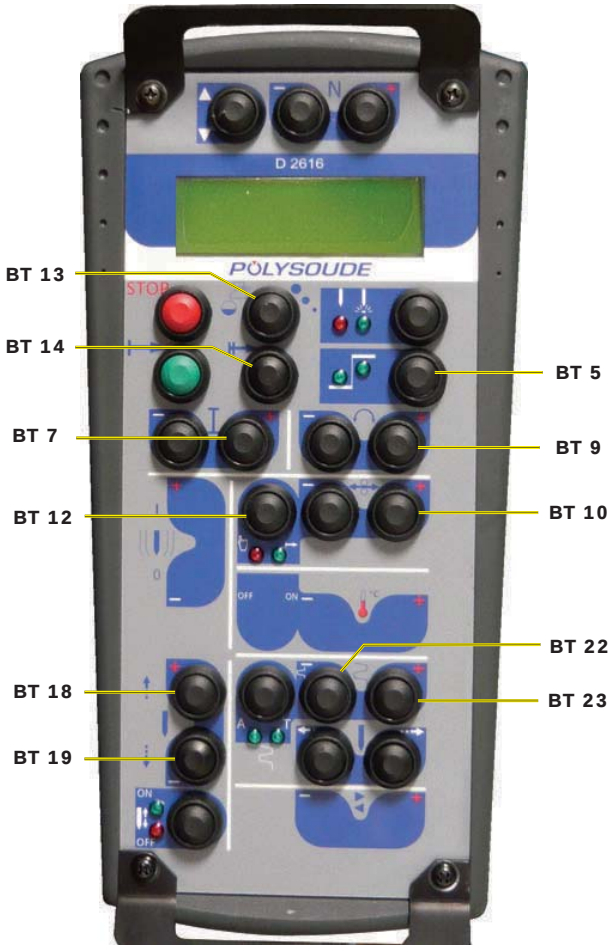


Fig. 5.9 - "Delta" buttons for modifications of the parameter values

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.

Note: 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.

Reprinting a weld cycle ticket

If the printout of a weld cycle ticket at the end of a cycle fails, for example because of a lack of paper, a ticket for the last weld performed can be printed by pressing **FA 16** (Fig. 5-10 – Item 1) on the left side of the printer.

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

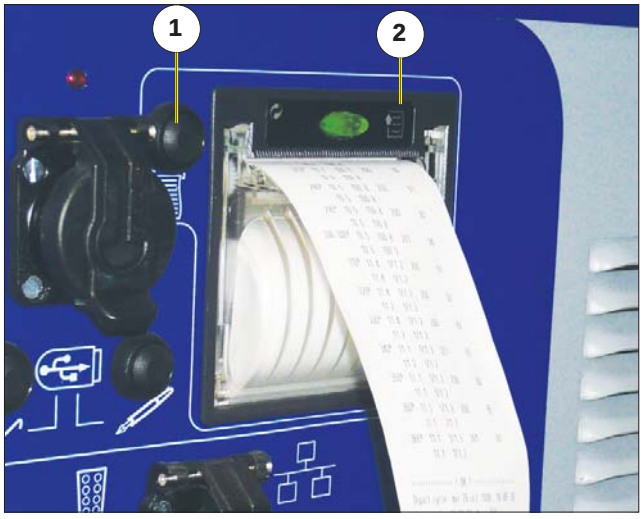


Fig. 5.10 - Print button and paper feeding

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 - Push-button for cycle stop with downslope

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 - Push-button for immediate stop

Using a manual torch

If a manual torch is connected to the power source P6 as described at chapter 4.3.8, special functions are available. 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 switches back to **I22**, 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 an USB key

When the welding procedure is exported for the first time, a «Polysoude» folder is created in the root of the USB key. If this is not the case, 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 usinginspection equipment which has itself been calibrated in accordance with written procedures by personnel appointed for that purpose.

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

Adjustment is necessary after replacement of the card 0028029300 or the source.

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 touch screen, 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 equipped with a safety device to stop the actual weld cycle and to prevent the start of a new one if the coolant temperature exceeds 80°C. A coolant level safety device prevents the start of a weld cycle if there are less than 4 litres in the tank. If the level sinks below the limit during a weld cycle the safety device does not trigger shut-down or downslope.

The coolant should be changed once a year. To do this, siphon off the old fluid by placing a hose nozzle on the water outlet (symbol), and pressing the pump start button, **BT 13** (symbol) on the remote control unit.
The circuit should be rinsed with pure water afterwards. The coolant tank is Refilled through the orifice situated on top of the power source (Fig.6.1 – item 1).

Fig. 6.1 - Refill the coolant

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.6.2 – Item 1) or by pressing the button (Fig.6.2 - Item 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.6.2 - Item 2).

The green indicator light (Fig.6.2 - Item 3) is illuminated steady if the printer is ready to work; in case of a fault or lack of paper, it flashes.

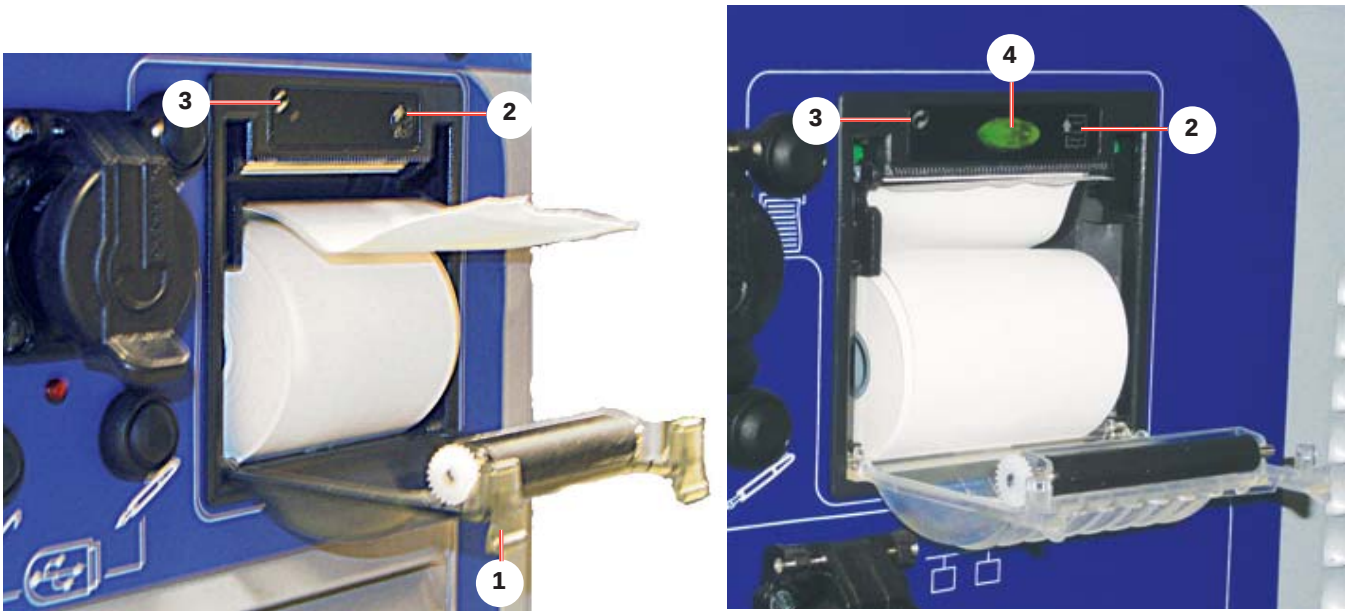


Fig. 6.2 - Printers

6. 2. Maintenance and troubleshooting

6. 2. 1. Replacement of fuses

Warning: a blown fuse often indicates That there is a fault. Take great Care when switching on the machine after a fuse has been replaced.

The FU1 delayed action fuse 4 A (Fig.6.3 – item 1) for the supply of all auxiliary devices is situated at the lower left side of the power source.

The F1 and F2 delayed action fuses 6.3 A (Fig.6.4 – item 1) for the primary power supply of the auxiliary transformer are situated at the upper right side of the power source.

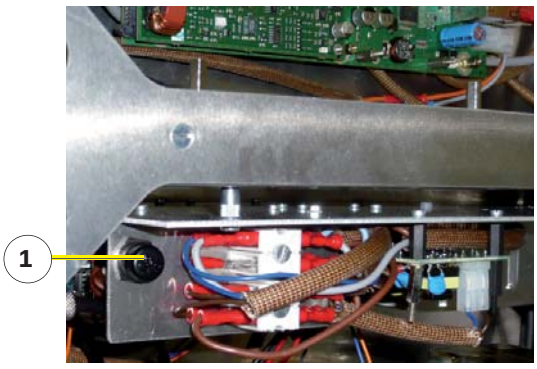


Fig. 6.3 - Fuse FU1 location

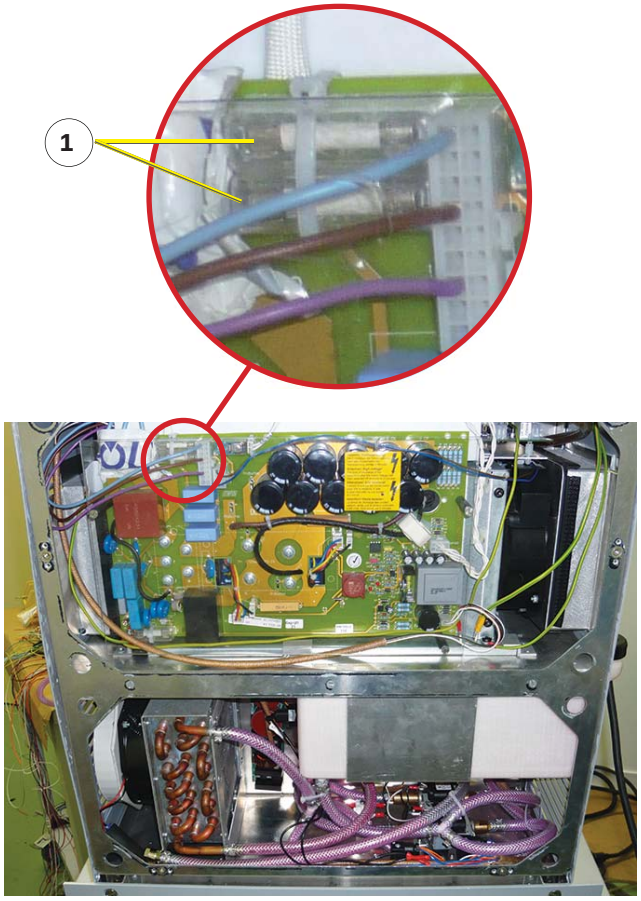


Fig. 6.4 - Fuses F1 & F2 location

6. 2. 2. Fuses coolant pump control

3 A timed fuses (Fig.6.5 - item 1) coolant pump control are at the end of the module "Interface pumps / motors chokes" reference 0028229100.

Fig. 6.5 - Interface card Pumps / motors chokes

6. 2. 3. Cooling circuit filter

The P6 power source is equipped with one or two filters in the cooling circuit(s) depending on the options selected. The cleanliness of the filter cartridge should be checked every six months.

The filter element is accessible after undoing by a 1/4 turn the two fasteners securing the inspection hatch in the rear panel. Place a container below the filter beforehand. Unscrew the transparent or white housing (Fig.6.6 – item 2) and take the filter element out for cleaning or replacement. For better accessibility, disconnect the two unions by pulling the pressed flange (Fig.6.6 – item 3) upwards and lowering the two hose end-fittings.

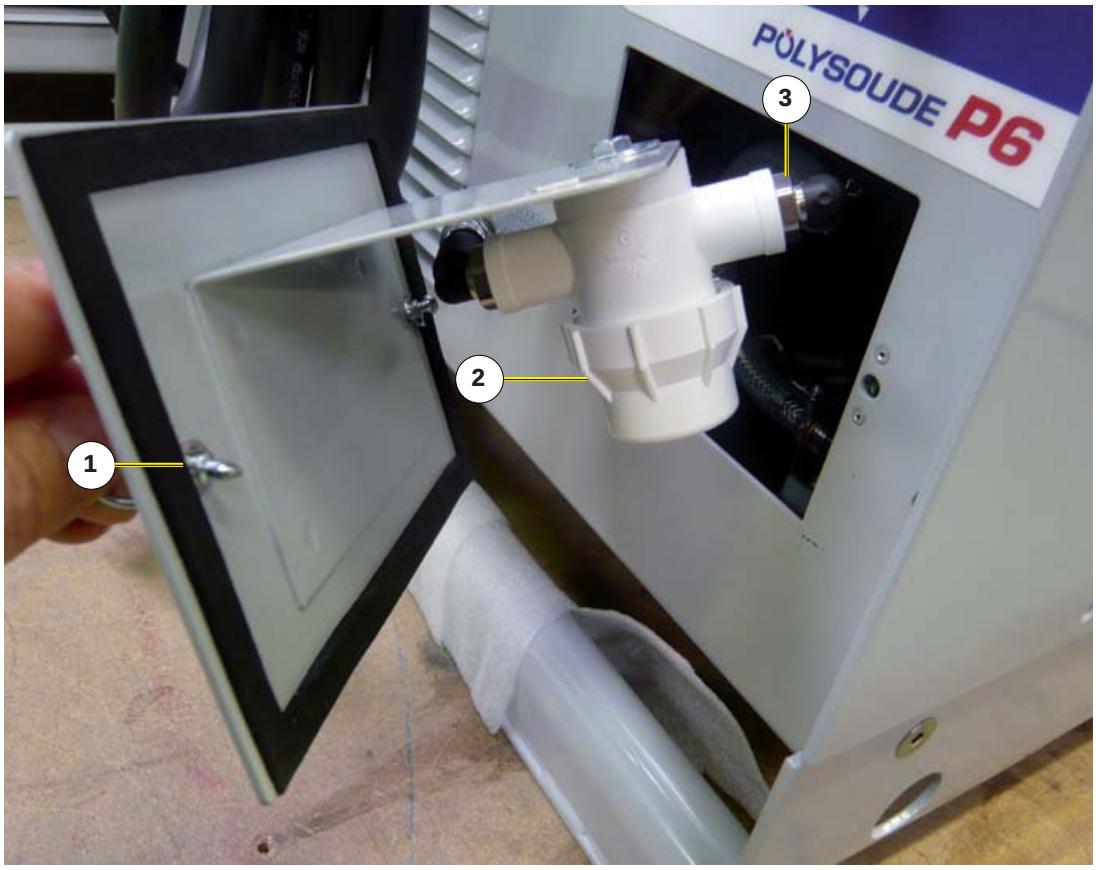


Fig. 6.6 - Filter of the coolant

6. 2. 4. Trouble shooting

Defects occurring during operation

Problem (Consequence)	Possible causes	What to do
Impossible to switch the power source on	Fuse FU1 defect	Change (chap. 6.2.1)
	Plugs or mains supply cables defect	Change
	Remote control defect (EMERGENCY STOP button locked)	Check and correct or change
	Main switch defect	Check or change
Circuit breaker (outside the power source) releases if the power source is switched on	Unsuitable circuit breaker	Install a circuit breaker of 20 A (with D characteristic) for 400 V mains supply (see rating plate)
The cycle or a movement (rotation, wire, gas, cooling pump) starts on its own	The power source is not connected to the earth	Correct
	Remote control defect	Check and repair or change
	Cable shielding of the remote control damaged	Change the cable
	Remote control card 0028049100 defect	Replace
Some buttons of the remote control pendant are inoperative	Remote control defect	Check and repair or change
	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 »	Select other WP
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
	Wrong WP selected	Select other WP
Gas flowrate too low **(Stop immediately)**	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 **(Stop immediately)**	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 circuit **(Imposed downslope)**	Coolant level too low	Check and correct
	Cooling circuit blocked	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) - see power source version	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)
	Pump defect	Must be checked and, if necessary, replaced by a qualified electrician
	Polygaine defect (MU welding heads)	Replace
Ignition **(Stop immediately)**	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 **(Stop immediately)**	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 help mounted too near to the torch (heads MU, TP, TS …)	Correct the position
Short circuit **(Stop immediately)**	Electrode touches workpiece	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 0028029100 defect	Replace
	Current source defect	Contact Polysoude After Sales Service

Problem (Consequence)	Possible causes	What to do
Overheating **(Stop immediately)**	Air circulation blocked	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 **(Stop immediately)**	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 **(Stop or imposed downslope)**	Sticky mechanics of the head or the wire feed unit	Clean Check for foreign bodies inside the head or wire feed unit
Overcurrent rotation or wire feed **(Stop immediately)**	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 defect	Replace
Rotation or wire feed pulse sensor **(Stop immediately)**	Wire feed unit or head sensor damaged	Replace
	Connection cable with the power source damaged	Must be checked and, if necessary, replaced by a qualified electrician
	Power source converter card 0028019100 defect	Replace
Manual downslope **(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 **(Stop immediately)**	Remote control defect	Replace
	Remote control card 0028049100 defect	Replace
End stop fault on oscillation/ Arc height or touched part fault. **(Stop immediately)**	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.	Connect properly and check
	Voltage between workpiece and electrode less than 0.3 V when not welding	Check whether the voltage between electrode and workpiece is higher than 0.3 V when not welding. 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 modify connections or change the cable if it is damaged.

Problem (Consequence)	Possible causes	What to do
Fault of arc height regulation **(Stop immediately)**	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 Uarc measurements defective.	Correct or modify connections or replace cable if damaged.
Start position **(Stop immediately)**	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
	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 defect	Change
Printer **(No printing)**	Lack of paper or printer defect	Load or replace
Data backup **(No backup)**	The USB flash drive has been removed before the end of the backup	Start the backup operation again
	No recording	Refer to programming
USB key empty **(No loading)**	No programs stored on the USB key	Take a USB key with stored programs
Reading or writing **(No recording or loading)**	Reading or writing error of the USB key	Change the USB key
	The USB key has been removed before the end of program backup	Start the backup operation again
USB key full **(No recording)**	The USB key is full	Erase a WP or take another USB key

6. 2. 5. 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.
- 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. 6.9 - Connector for USB-key

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

Fig 6.10 to Fig 6.13

Item	Reference no.	Designation
1	**00629085**	Gas flow rate safety device
2	**9000629198**	Water flow rate safety device
3	**9000629220**	Water level safety device
4	**9000629189**	Water temperature safety device
5	**9000699063**	Coolant filter housing with stainless filter element
6	**9000699064**	Sieve filter element (stainless)
7	**9000629170**	Pump 24 V
8	**9000629174**	Gas solenoid valve 24 Vdc
9	**0028009100**	Sequencer 1 module and Sequencer 2 module
10	**0028019100**	Rotation or wire feeding module
11	**0028029300**	Source module
12	**0028069100**	LVDS screen module
13	**0028279100**	Source adapter
14	**0028229100**	Pump / motor inductor interface
	9000629204	Source 300 A
	9000629140	Switch self-holding (with EMERGENCY STOP)
	9000629221	Switch (without EMERGENCY STOP)
15	**9000629172**	Fan 24 V DC
16	**9000629184**	Printer
17	**00530054**	Fuse FU1 (4 A)
	9000530520	Fuse 6.3A x 500Vac
	9000590068	Thermal paper roll 57 x 50
	64599807	Ground cable AVC 70 mm², 9 m long
	75110071	Coolant
	75501002	Pressure-reducing valve with flowmeter argon France
	71701418	Pressure-reducing valve with flowmeter argon Export
	71701421	Pressure-reducing valve with flowmeter argon/hydrogen
18	**0028039100**	AVC/oscillation module
19	**0028079100**	Arc voltage measurement module
	9000532004	Fuse 3 A for module 0028229100
	0023000901	A manual torch adaptater

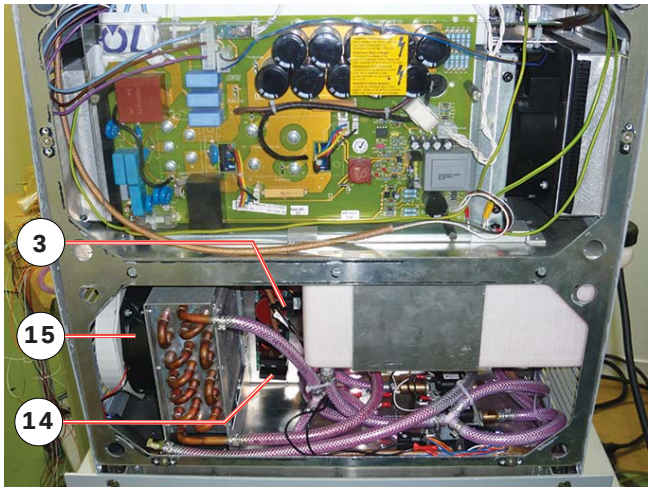


Fig. 6.10 - Internal view of the right side

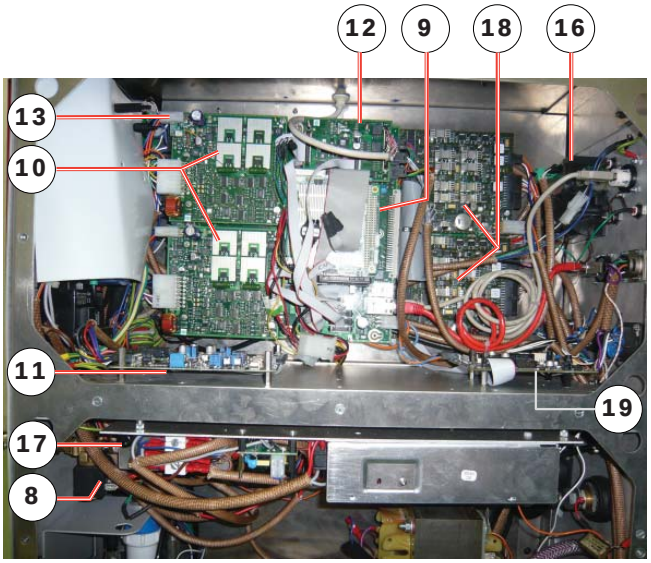


Fig. 6.11 - Internal view of the left side

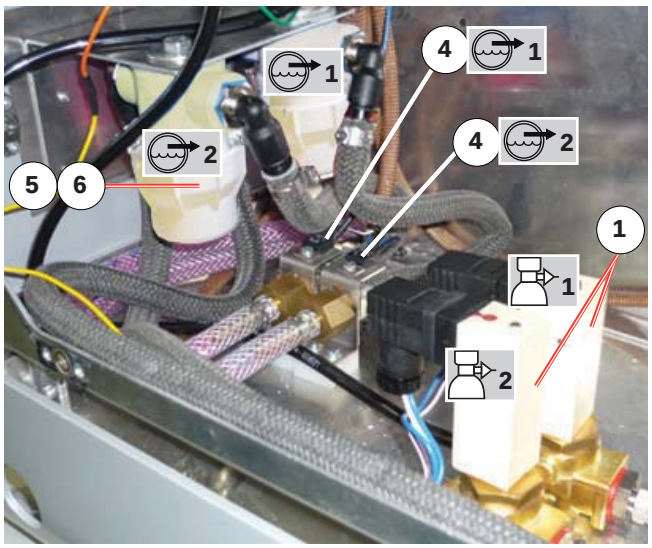


Fig. 6.12 - Internal view bottom right

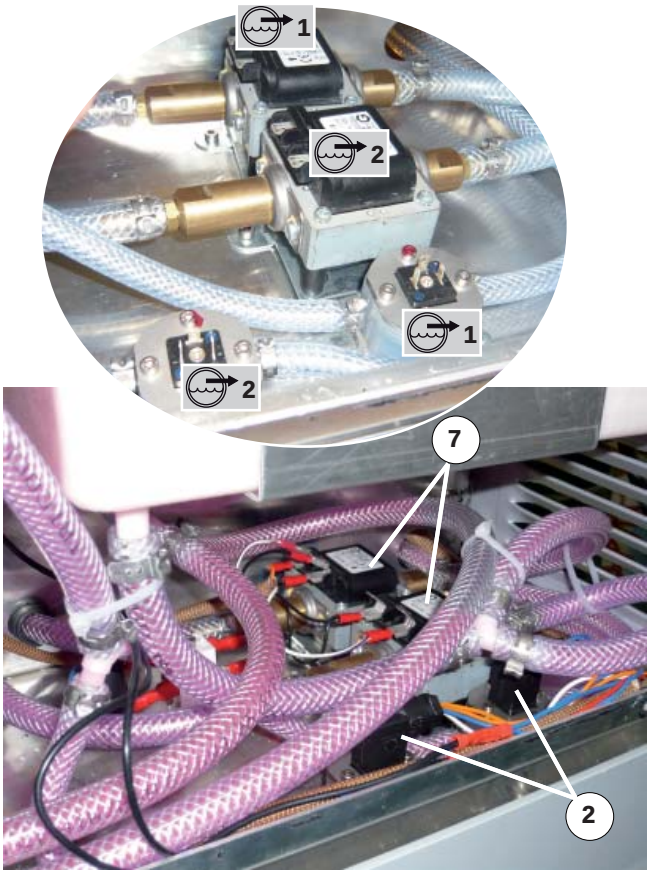


Fig. 6.13 - Internal view bottom left

6. 2. 7. Spare parts for P6 remote control

Fig 6.14 and Fig 6.15

Item	Reference no.	Designation
	0026169101	Remote control complete 6 axis
	0026149101	Remote control complete 4 axis
	9000563323	Remote control plug
	9000563326	Crimp contact for the plug
1	**9000502015**	Green indicator light
2	**9000502019**	Red indicator 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
	0026149110	Cable assembly (Spare remote control P4/P6)

Fig. 6.14 - Front of P6 remote control

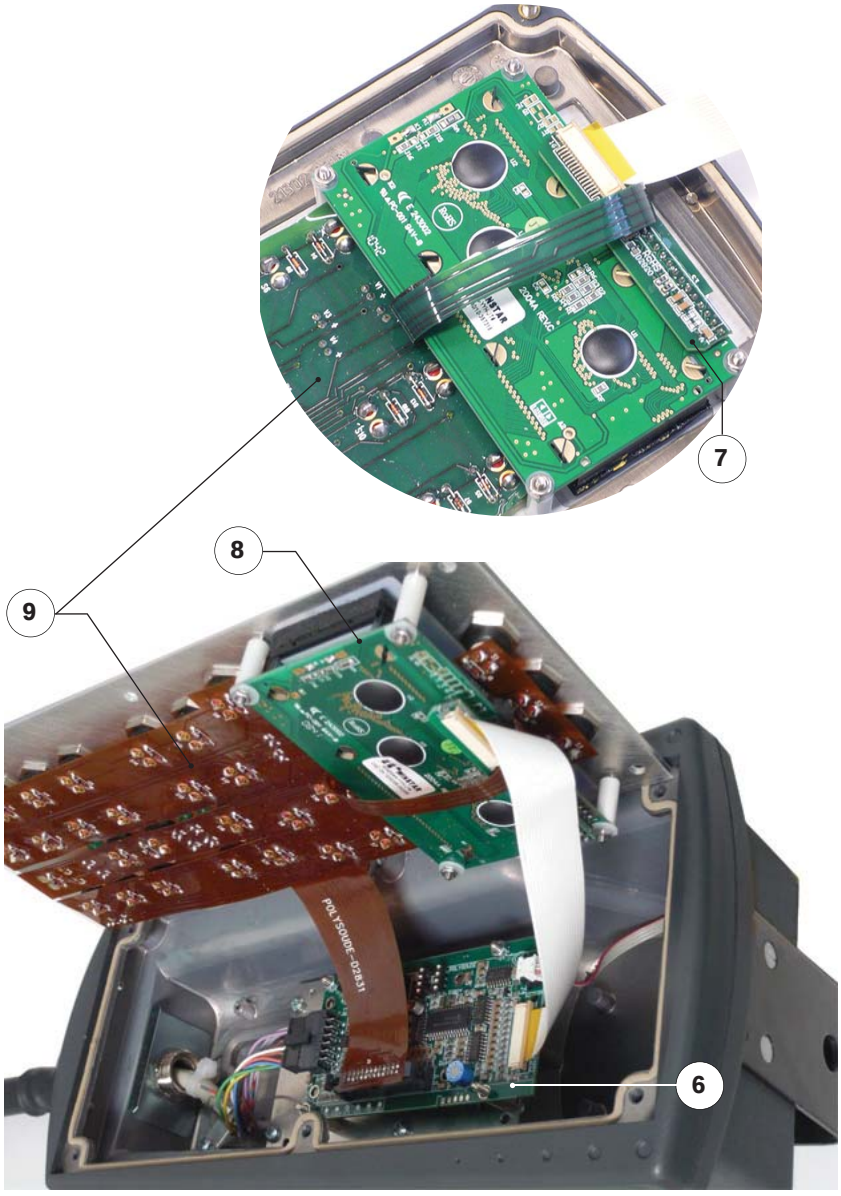


Fig. 6.15 - Internal view of the remote control

6. 2. 8. Spare parts of the touchscreen

Fig 6.16

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

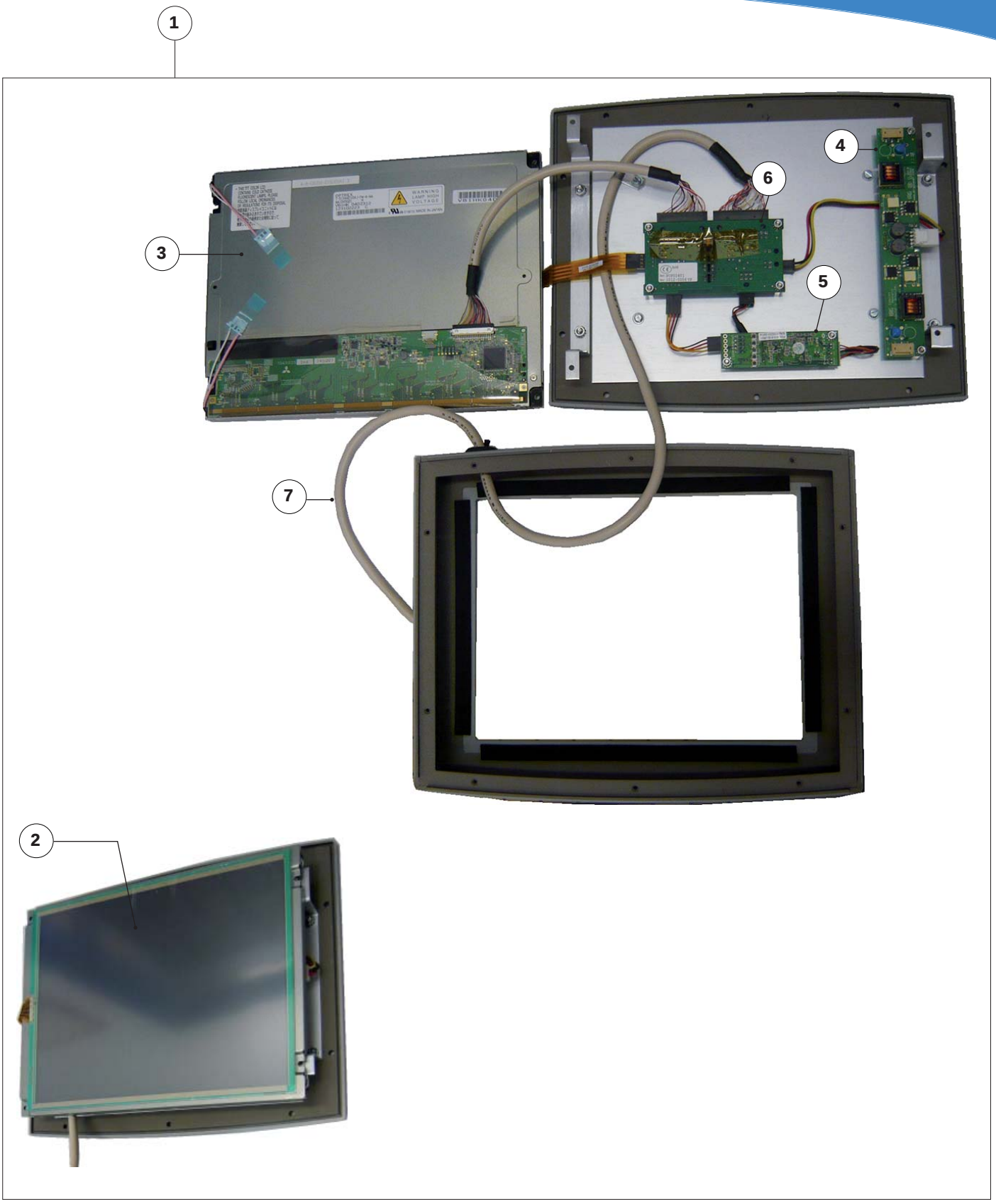


Fig. 6.16 -Internal view of the touchscreen

6. 2. 9. Electrical and electronic drawings

Warning

The following description is referenced to the folder of the connection diagram of the power source P6 (Ref. 002505xxxx), and the others below:

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
source adapter card	Ref. 002827xxxx
inductor & pump interface	Ref. 002822xxxx
touchscreen interconnection	Ref. 002823xxxx
LCD/USB/RJ45 interconnection	Ref. 002824xxxx
remote control keyboard	Ref. 002825xxxx.

The signal names are abbreviations of their functions. If the signal is active at low voltage (0 V), its name is preceded by a slash (/).

On the block diagram, the number inside the frame 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 Vac at 50 Hz or 60 Hz.

The basic functions of the P6 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. In addition to the PC card, the sequencer card is connected directly to the rotation and wire speed control cards (0028019100) and to the command card (0028069100) for the LVDS display and touchscreen. The source interface card (0028029300) is connected via flat cable to the sequencer. All of these cards communicate via a 3-wire synchronous serial SPI (Serial Peripheral Interface) bus. A single wire enables several sources of information to be connected in parallel, such as welding head and wire feed unit models, and the properties of welding set equipment.

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). The latter are directly connected to sequencer card 2. The «arc voltage measurement» card (0028079100) converts the part/electrode voltage into digital signals through an SPI serial bus to sequencer card 2.

The 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 300 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.

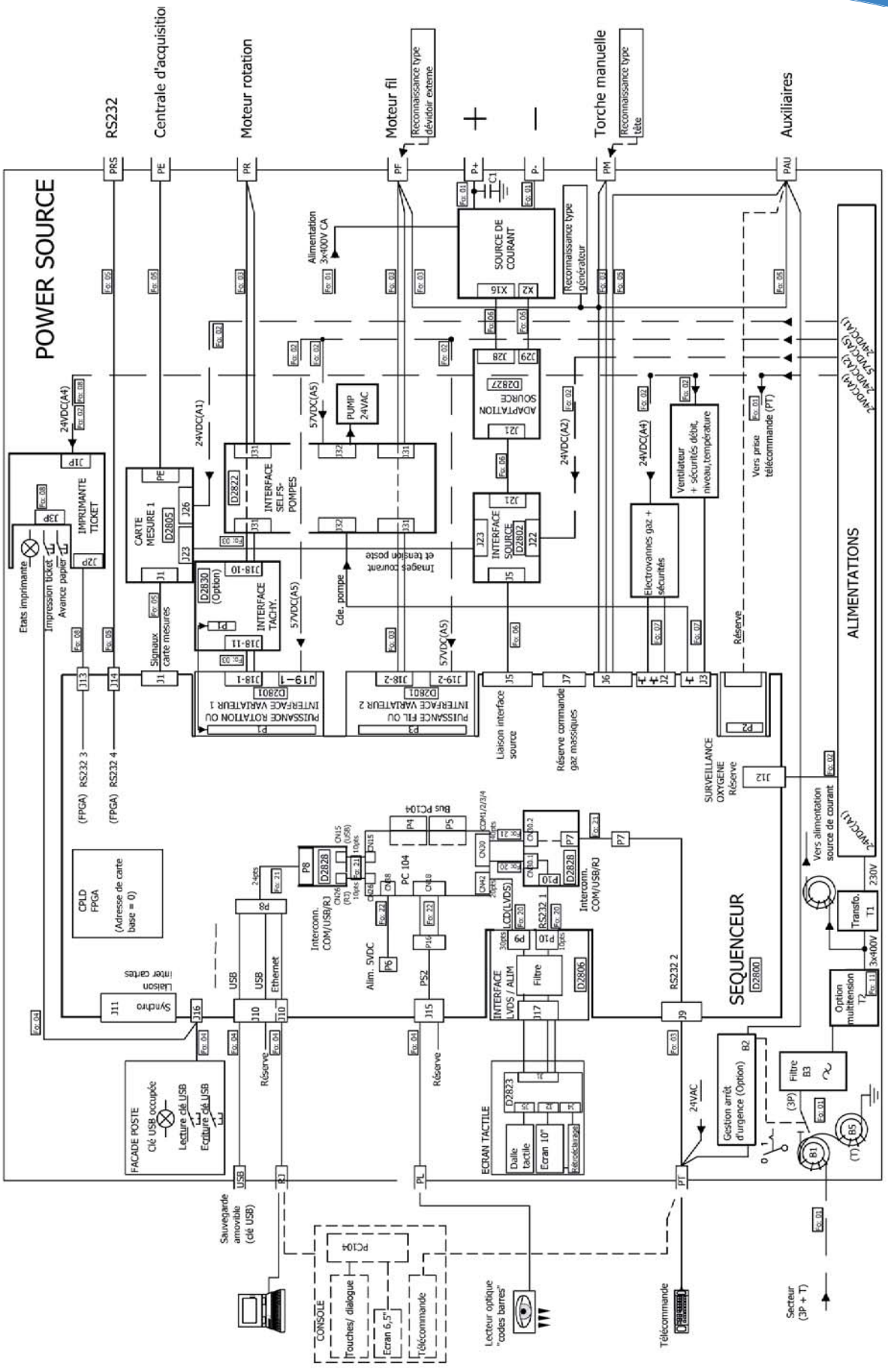


Fig. 6.17 - Block diagram of the P6 power source

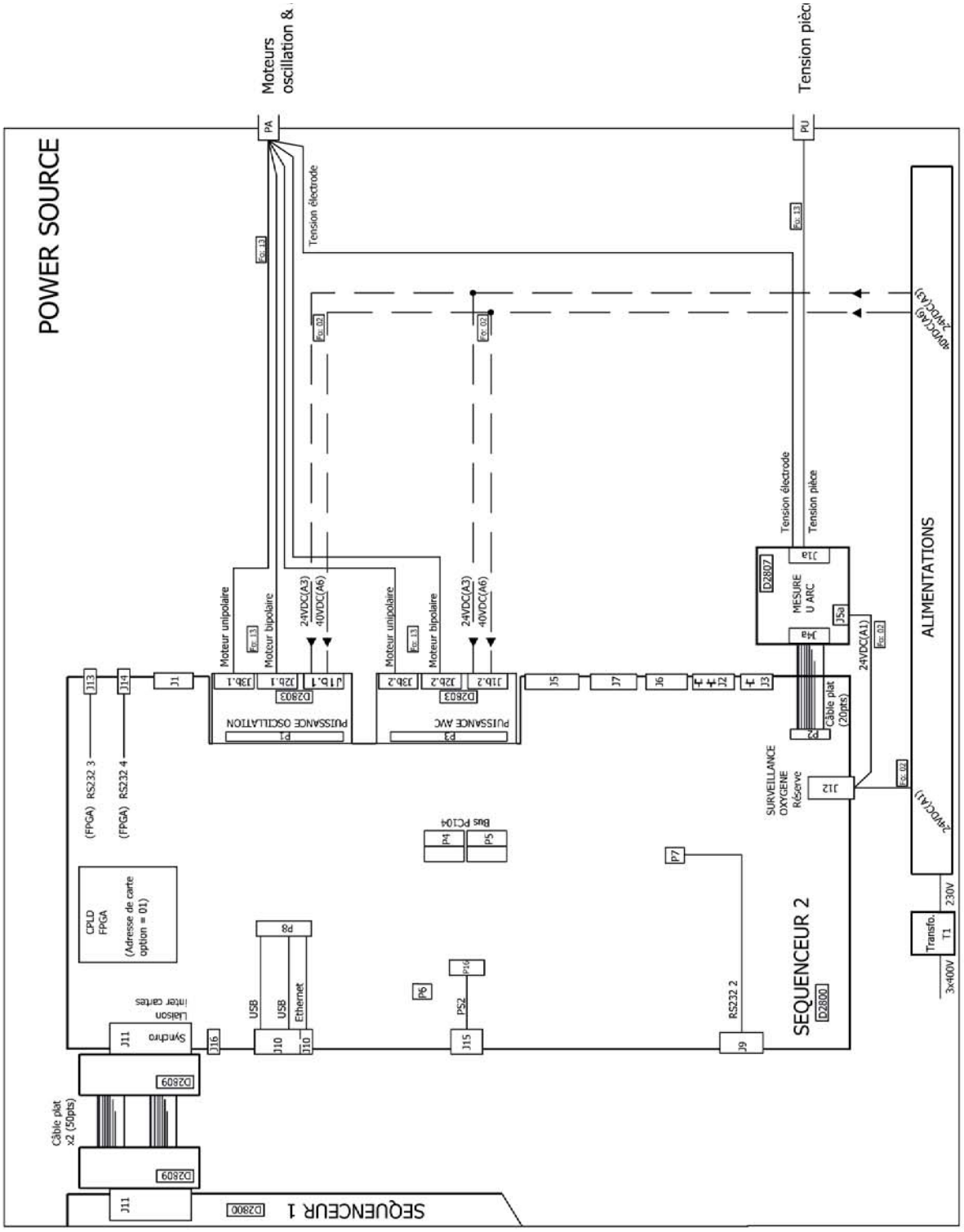


Fig. 6.18 - Block diagram of AVC/Oscillation options

7. APPENDIX

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 power source can offer you the pre-defined 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 two or more 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 non-programmable adjustments. In the pre-defined WPs you will find the values chosen as each program was generated. The parameters are:

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

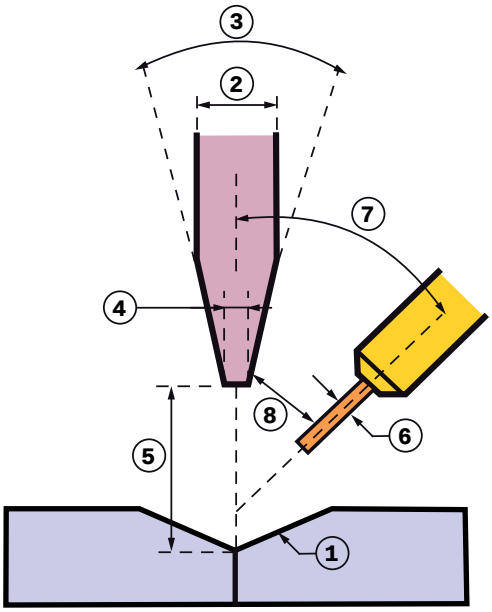


Fig. 7.1 - Some non-programmable parameters

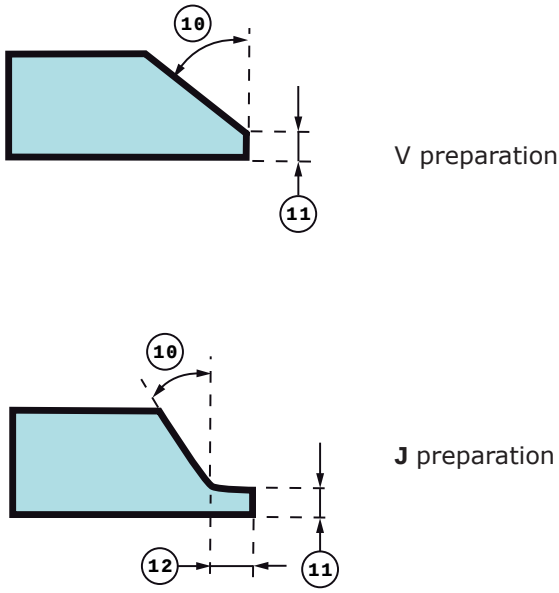


Fig. 7.2 - Tube end preparations

7. 1. 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. 2. 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	300	A	1	25
Prefusion ramp time	Ramp time	**T20**	0	9999	s	1	0
High current	High current	**I22**	5.0	300.0	A	0.1	10
High current time	Pulse time high	**T22**	0 or 10	3000	ms	1	100
Low current	Low current	**I23**	5.0	300.0	A	0.1	5
Low current time	Pulse time low	**T23**	0 or 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	300	A	1	5

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) speeds 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 equipment

Our equipment incorporates electrical and electronic components which must be collected in accordance with Directive 2002/96/CE. 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: .....

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ISO 9001
BUREAU VERITAS
Certification

Translation of original instructions

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

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