

Directions for use
Spare parts list
PDE

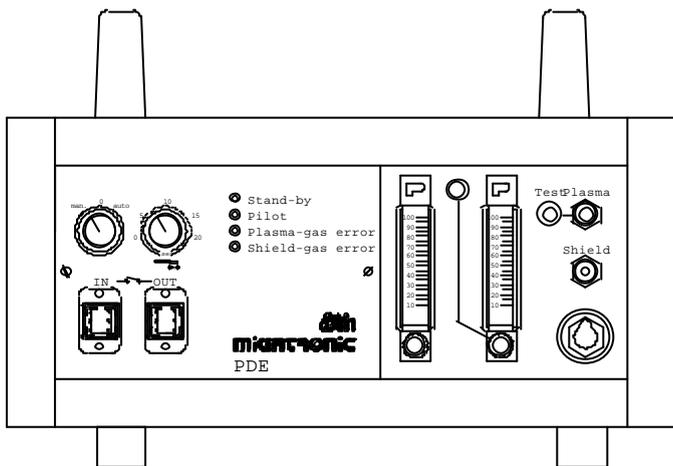


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IMPORTANT SAFETY INSTRUCTIONS

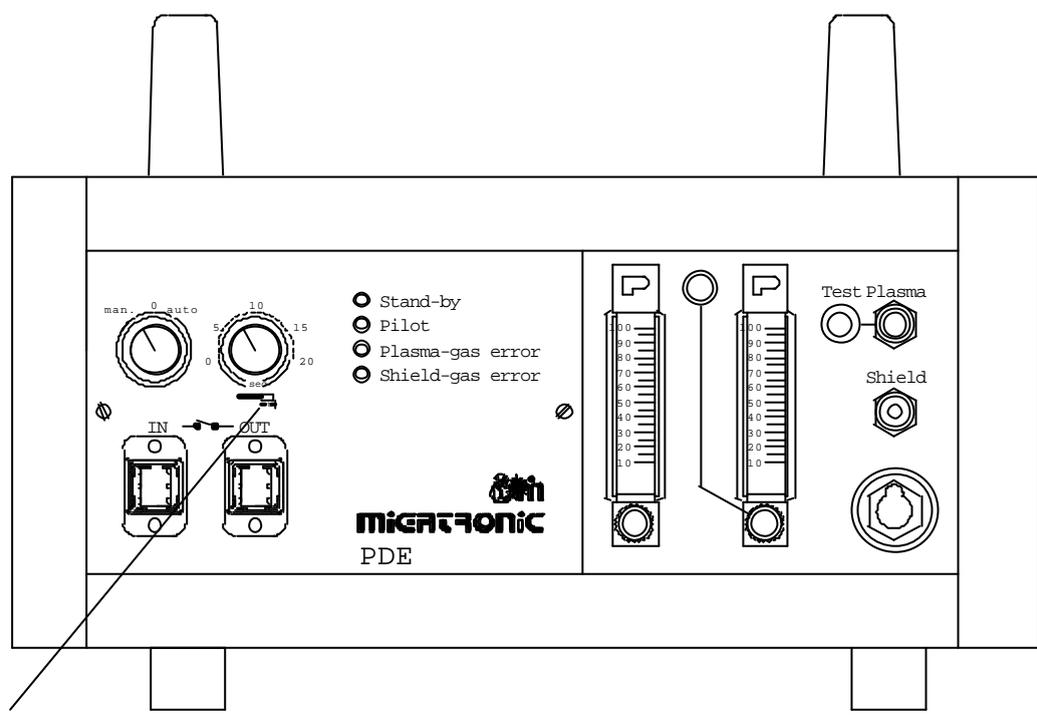
Carefully read Operator's Manual before handling the machine. Observe instructions and safety rules when operating. The safety instructions contained in the **PERSONAL SAFETY** sections of this manual should be read and observed when installing and operating

the machine.

This manual and the accompanying instructions for use must be accessible at all times to the staff engaged in the installation, operation and maintenance of the machine.

Technical data:

Current supply	: By way of the LDE power source
Welding current	: 400A - 60%
Pilot current	: 5 - 12A (adjustable inside)
Flow plasma-gas	: 0 - 1.5 l/min. or 0 - 3.0 l/min.
Flow shielding-gas	: 0 - 12.5 l/min.
Post-weld gasflow	: 0 - 20 sec. / manual operation
Dimensions	: 400 x 410 x 270mm
Weight	: 14kgs
Welding torch	: PWM2, PWM3, PWM4, PWM6, PWM300



By use of the Migatron PDE add-on unit, Migatron LDE welding rectifiers fitted with the TDE400 TIG welding units can now be used for plasma welding applications.

The PDE add-on units connections is especially fitted for these TIG welding machines and cannot be applied in connection with other welding machines.

PERSONAL SAFETY



Light and heat emission

A welding arc emits radiation which is damaging to the human eye. Even short-term exposure to this radiation can cause lasting damage. Protect your eyes from powerful radiation by infra-red, visible and also ultra-violet light by installing suitable radiation protection glass in your welding helmet.

Your skin can also be damaged by welding radiation. Radiation can cause serious burns. Protect your skin by wearing a welding helmet, working clothing covering all exposed parts, and gloves.

During welding, warn other people in the vicinity of the danger of radiation and sparks. If possible, place a screen between the place of work and the surroundings.

The heat emitted from the arc and pool crater - as well as the sparks emitted during welding - represent a fire hazard. Consequently, welding should never be carried out near combustible materials.

Working clothing must not be made of substances which are easily combustible, and should have no folds or open pockets into which sparks can fall. Wear a fire resistant apron if necessary.



Welding fumes

The smoke and gasses emitted during welding are damaging to health. Consequently, the inhalation of welding smoke and gasses should be avoided by taking suitable preventive measures (e.g. local air extraction, ventilation, or supply of fresh air to welding helmet).



Electricity

Avoid contact with all live components.

The voltages used in welding are not sufficient to represent a danger in themselves. However, if damp clothing is worn, or if working in damp conditions, electric shocks can be caused, representing an indirect source of danger. Considerable electric shocks can be caused by HF high voltage ignition during TIG welding in particular, and may lead to minor burns beneath the skin.

Consequently, all contact with live components should be avoided as far as possible.

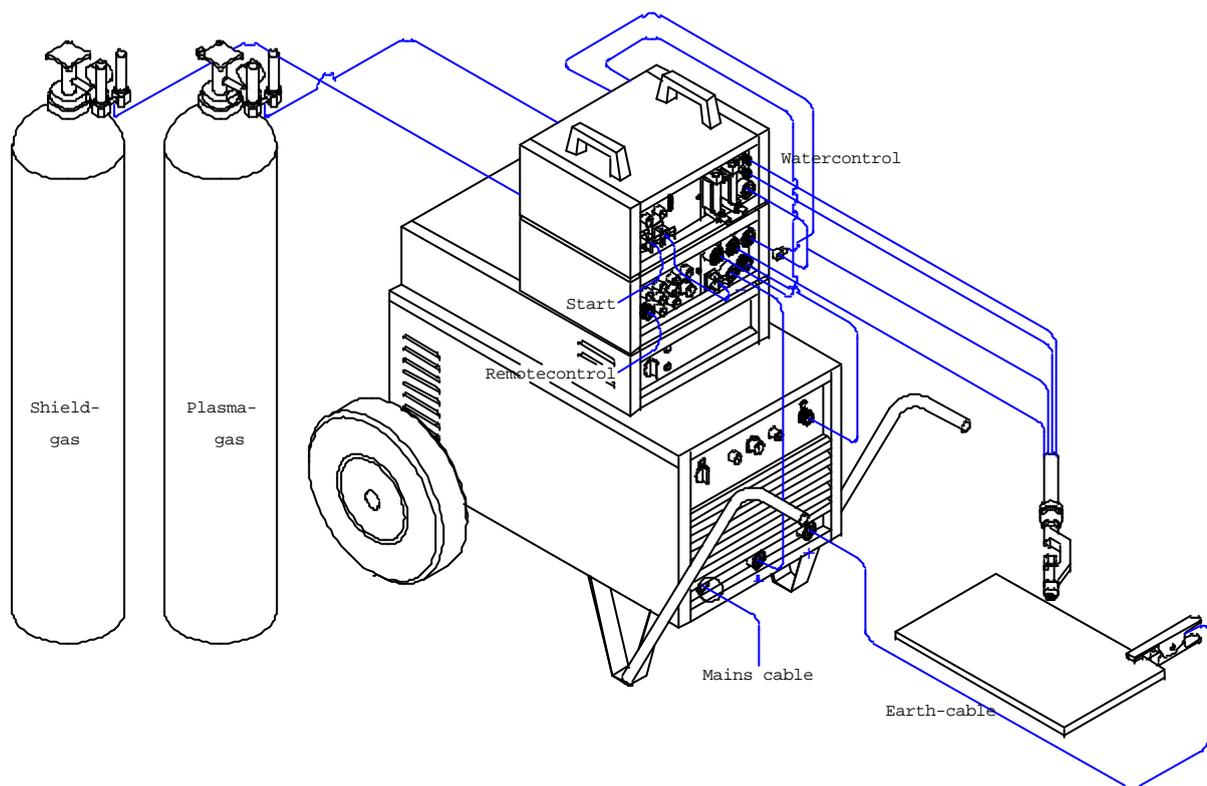
Always use dry, leather welding gloves and wear dry working clothing and shoes. Keep cables, torches, and the welding machine itself dry at all times.

Make sure that the welding machine's earth connection is properly and safely earthed. Do not open the machine to expose live components. Maintenance and service which require access to live components inside the machine must be carried out by an authorized electrician.

Connection:

The PDE add-on unit is designed for direct current straight polarity plasma arc welding and works with an open plasma-arc. The PDE add-on unit is part of a system which consists of:

- * a plasma torch
 - * a control console
 - * a power supply
 - * a coolant recirculator
- the necessary interconnecting leads and hoses



Pilot arc:

When the torch is started, a pilot arc is established between the electrode and the welding tip. This pilot arc appears as a small “flame” to illuminate the workpiece and assists in starting the main welding arc. It can also be left on, while welding at low current levels to stabilize the welding arc.

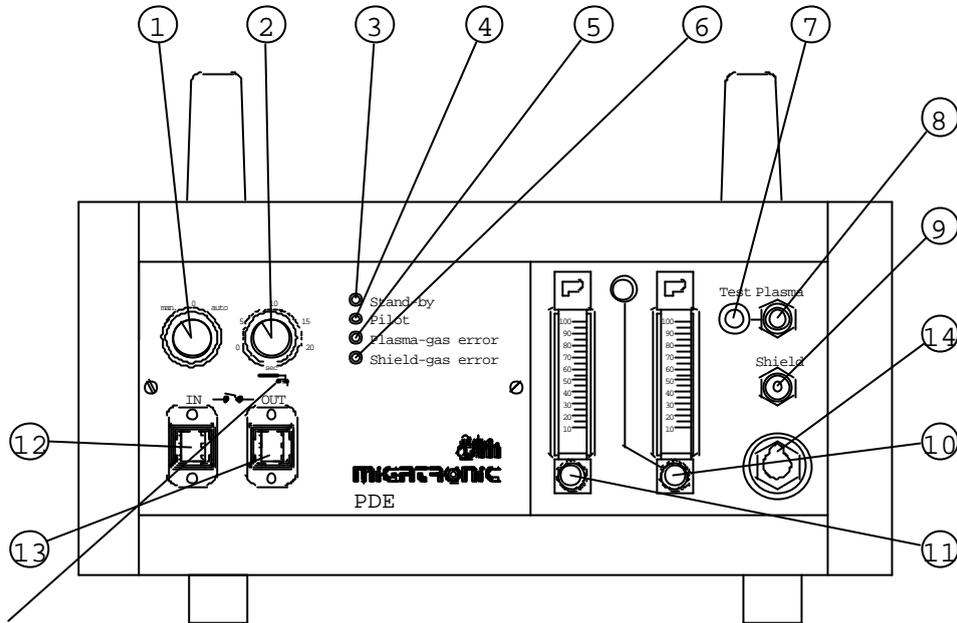
High-frequency:

A high voltage, high frequency current is superimposed on the direct current to establish the pilot arc.

Welding arc:

The power supply provides the direct current (DC) for welding. The negative output is connected to the electrode through the negative liquid cooled lead. The positive output is connected to the workpiece through the welding cable. The electrically charged plasma gas closes the electrical circuit and becomes the welding arc.

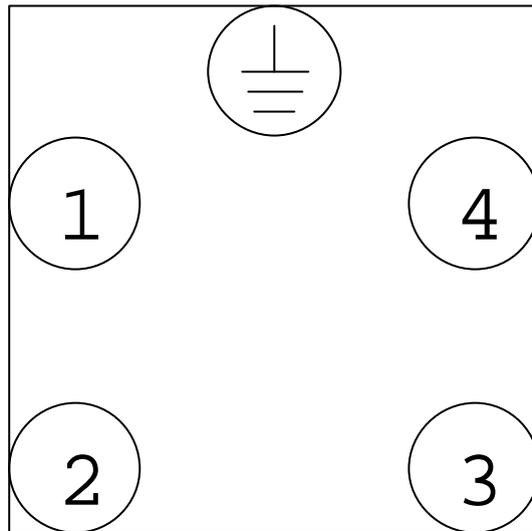
Directions for use:



- Pos. 1 **Switch**
Switch for setting of “MAN” (manual operation) or “AUTO” (constant pilot arc).
When the switch is in position “AUTO”, the pilot arc is on. Remember to purge the welding hose properly with plasma gas before turning the switch in to “AUTO”-position, to prevent the electrode and tip from being damaged.
When arc is established, the pilot arc is put out. This will automatically be established when the welding stops.
Manual operation: Pilot arc and welding start at the same time, yet the pilot arc is put out automatically, when the arc is established.
- Pos. 2 **Continuously variable post-weld gas flow.**
This control enables you to set the post-weld gas-flow. Variable 3 - 20 sec.
The post-weld gas flow time should be set in accordance with the plate thickness and the diameter of the tungsten electrode. The time is correctly set when there is no temper colour at the end of the tungsten electrode after the burn-back delay is over, and a correct setting will extend the life of the tungsten electrode.
The button only works in “MAN” operation.
- Pos. 3 **Stand by**
A yellow light diode shows that the PDE add-on unit is ready for use. During welding the light diode is out.

- Pos. 4 Pilot
A green light diode shows when the pilot arc is established.
- 5 -
- Pos. 5 Plasma-gas error
A red light diode shows that plasma-gas is missing.
Welding is not possible.
- Pos. 6 Shield-gas error
A red light diode shows that shield-gas is missing.
Welding is not possible.
- Pos. 7 Test button
Test button for control and adjustment of plasma-gas and pre-purging of welding hose before the pilot arc is turned on.
- Pos. 8 Quick release connector for plasma-gas.
- Pos. 9 Quick release connector for shield-gas.
- Pos. 10 Purgemeter for plasma-gas.
Division lines which show the litre of plasma-gas per minute.
0 - 1.5 l/min. / 0 - 3.0 l/min.
Plasma-gas purgemeters occur in two versions:
0 - 1.5 l/min. - used for welding current up to 50 Amp and
0 - 3.0 l/min. - used for welding current above 50 Amp.
- Pos. 11 Purgemeter for shield-gas
Division lines which show the litre of shield-gas per minute.
0 - 12.5 l/min.
- Pos. 12 Multiplug 6-pole - ext. start/stop
Pin 2 & 6 - Start welding - from button / foot switch / control unit / etc.
Pin 3 & 5 - Arc established - Signal from relay that can be applied for a potential connected control unit / PLC / etc.
- Pos. 13 Multiplug 6-pole which is connected to the TDE welding unit.
(Pin 1 & 4 - Turn on high-frequency)
(Pin 2 & 6 - Start welding)
(Pin 3 & 5 - Arc established)
- Pos. 14 Connection to plasma welding torch (pilot current).

Apart from this there is a supply cable at the back of the PDE add-on unit. This supply cable is connected to the LDE, and hereby the PDE gets its supply voltage.



1 = 42V AC - phase

2 = 42V AC - phase

3 = 42V AC - phase

 = ground

Further more there is a possibility of connecting an external water control unit.

Please see if there is a label inside the PDE add-on unit.

Maintenance:

The PDE add-on unit requires little maintenance, but dusty and damp conditions should be avoided if possible.

A recommended procedure at least once a year is to open the add-on unit and clean all parts with dry, compressed air. The fan blades should also be cleaned, and all terminals should be inspected and cleaned or replaced, if necessary.

There are many parts in the plasma-welding torch that have to be cleaned regularly. The main parts are the contact tip and the gas nozzle. During the welding process, these parts are bombarded with spatter that sticks in the nozzles. This may disturb the shielding gas flowing from the gas nozzle down to the molten pool, and the welding process should be stopped immediately, as the torch can be broken in a very short time. The spatter should therefore be removed regularly and spatter remover applied in order to prevent spatter from burning into the nozzle. During the cleaning process, the gas nozzle should be removed.

A torch which is separated or where water-cooling is not established will be broken immediately, if the welding machine is activated.

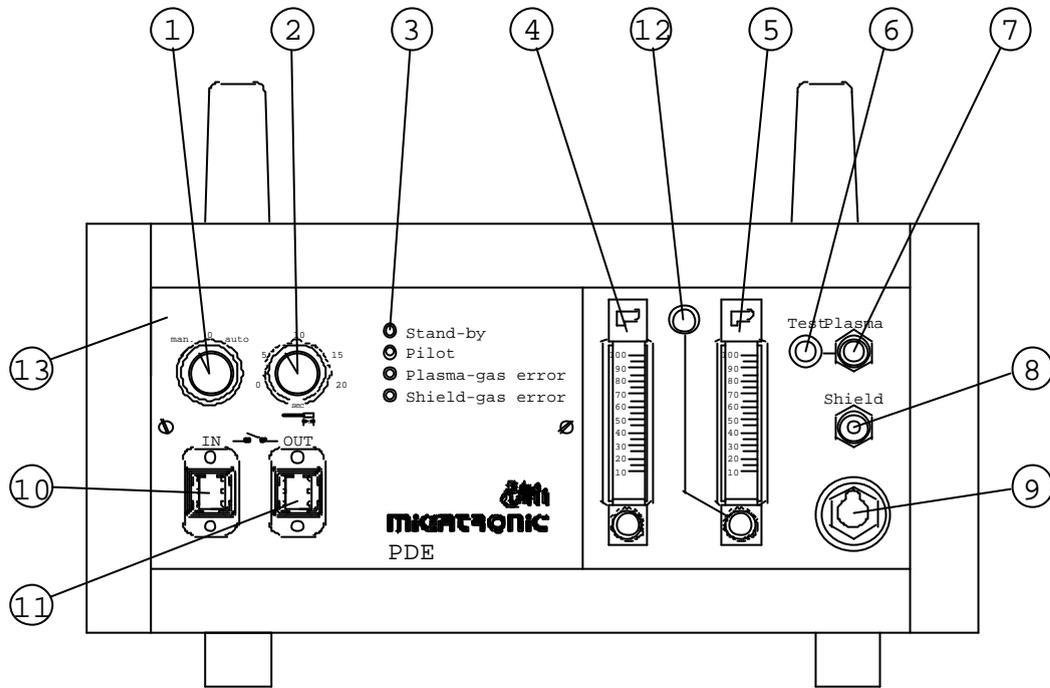
Do not clean by beating the torch !!!

Locations of errors:

Attempts to locate errors should only be made by trained experts.

FAULTS	CAUSE AND REMEDY
The green light diode on the PDE add-on unit are not on.	Check watercontrol and pressure switch.
Machine starts welding but does not stop automatically when connected automatic device.	The welding machine is set to 4 times welding. Set the welding machine to 2 times welding.
PDE add-on unit indicates "Plasma-gas error".	Occurs if there is insufficient gas flow in the gas hose, or if the plasma-gas cylinder must be replaced. Check gas cylinder or bent gas hose.
PDE add-on unit indicates "Shield-gas error".	Occurs if there is insufficient gas flow in the gas hose, or if the cylinder must be replaced. Check gas cylinder or bent gas hose.
Pilot arc "sputters" and the light "Pilot on" flashes.	Check for damp by nozzle and electrode. Replace nozzle and electrode, and o-ring if necessary.
PDE add-on unit does not turn the pilot arc on.	Check the 3 pcs. 42V AC phases from LDE. Check external water control unit if mounted.

Spare parts list:



Pos.	Description	Partnumber
1	Button, with mark ø22mm	18502603-0
	Cover, with mark ø22mm	18521303-0
	Switch 4 x 3	17120005-0
2	Button, with mark ø22mm	18502603-0
	Cover, with mark ø22mm	18521303-0
	Potentiometer 2M2	14500007-0
3	Light diode 5mm, yellow	12242002-0
	Light diode 5mm, green	12242003-0
	Light diode 5mm, red	12242001-0
4	Purgemeter - shieldgas 0 - 12.5 l/min.	18230402-1
5	Purgemeter - plasmagas, 0-1.5 l/min.	18230401-1
	To convert to 0-3.0 l/min. replace the adhesive label 0-3.0 l/min. and the ball in the flowmeter.	
	Part number for the ball (SS18) and label	18230604-1

6	Button, green	17110200-1
7	Quick release connector - plasma gas	43120205-1
- 11 -		
8	Quick release connector - shield gas	43120204-1
9	Dinse coupling socket	18110002-0
10	Multiplug 6-pole, female Flange socket	17200001-0 18200102-0
11	Cable 0,4m	74320009-1
12	Valve for plasma gas	48133445-1
13	Electronic unit - complete	76110020-1

Spare parts inside the PDE add-on unit:

Powre resistance 100, 300W	14491101-0
Solenoid valve, plasma gas, 24V~	17230006-0
Pressure switch, plasma- and shield gas 0.1-1.0 bar	17240001-0
Ventilator 230V~	17300010-0
Current transformer 42/24/230V~	16160020-1
Filter HF	74420100-1

