Dear Reader

Introduction

Thank you for choosing Fronius - and congratulations on your new, technically high-grade Fronius product! This instruction manual will help you get to know your new machine. Read the manual carefully and you will soon be familiar with all the many great features of your new Fronius product. This really is the best way to get the most out of all the advantages that your machine has to offer.

Please also take special note of the safety rules - and observe them! In this way, you will help to ensure more safety at your product location. And of course, if you treat your product carefully, this definitely helps to prolong its enduring quality and reliability - things which are both essential prerequisites for getting outstanding results.
Safety rules

DANGER!

“DANGER!” indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations. This signal word is not used for property damage hazards unless personal injury risk appropriate to this level is also involved.

WARNING!

“WARNING!” indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury. This signal word is not used for property damage hazards unless personal injury risk appropriate to this level is also involved.

CAUTION!

“CAUTION!” indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices that may cause property damage.

NOTE!

“NOTE!” indicates a situation which implies a risk of impaired welding result and damage to the equipment.

Important!

“Important!” indicates practical hints and other useful special-information. It is no signal word for a harmful or dangerous situation.

Whenever you see any of the symbols shown above, you must pay even closer attention to the contents of the manual!

General remarks

This equipment has been made in accordance with the state of the art and all recognised safety rules. Nevertheless, incorrect operation or misuse may still lead to danger for
- the life and well-being of the operator or of third parties,
- the equipment and other tangible assets belonging to the owner/operator,
- efficient working with the equipment.

All persons involved in any way with starting up, operating, servicing and maintaining the equipment must
- be suitably qualified
- know about welding and
- read and follow exactly the instructions given in this manual.

The instruction manual must be kept at the machine location at all times. In addition to the instruction manual, copies of both the generally applicable and the local accident prevention and environmental protection rules must be kept on hand, and of course observed in practice.

All the safety instructions and danger warnings on the machine itself:
- must be kept in a legible condition
- must not be damaged, must not be removed
- must not be covered, pasted or painted over

For information about where the safety instructions and danger warnings are located on the machine, please see the section of your machine’s instruction manual headed “General remarks”.

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Any malfunctions which might impair machine safety must be eliminated immediately - meaning before the equipment is next switched on.

It’s your safety that’s at stake!

Utilisation for intended purpose only

The machine may only be used for jobs as defined by the “Intended purpose”.

The machine may ONLY be used for the welding processes stated on the rating plate.

Utilisation for any other purpose, or in any other manner, shall be deemed to be "not in accordance with the intended purpose". The manufacturer shall not be liable for any damage resulting from such improper use.

Utilisation in accordance with the “intended purpose” also comprises
- complete reading and following of all the instructions given in this manual
- complete reading and following of all the safety instructions and danger warnings
- performing all stipulated inspection and servicing work.

The appliance must never be used for the following:
- Thawing pipes
- Charging batteries/accumulators
- Starting engines

The machine is designed to be used in industrial and workshop environments. The manufacturer shall not be liable for any damage resulting from use of the machine in residential premises.

likewise the manufacturer will accept no liability for defective or faulty work results.

Ambient conditions

Operation or storage of the power source outside the stipulated range is deemed to be "not in accordance with the intended use". The manufacturer shall not be liable for any damage resulting herefrom.

Temperature range of ambient air:
- when operating: -10 °C to + 40 °C (14 °F to 104 °F)
- when being transported or stored: -25 °C to + 55 °C (-13 °F to 131 °F)

Relative atmospheric humidity:
- up to 50 % at 40 °C (104 °F)
- up to 90 % at 20 °C (68 °F)

Ambient air: Free of dust, acids, corrosive gases or substances etc.

Elevation above sea level: Up to 2000 m (6500 ft)

Obligations of owner/operator

The owner/operator undertakes to ensure that the only persons allowed to work with the machine are persons who
- are familiar with the basic regulations on workplace safety and accident prevention and who have been instructed in how to operate the machine
- have read and understood the sections on "safety rules" and the "warnings" contained in this manual, and have confirmed as much with their signatures
- be trained in such a way that meets with the requirements of the work results

Regular checks must be performed to ensure that personnel are still working in a safety-conscious manner.
Before starting work, all persons to be entrusted with carrying out work with (or on) the machine shall undertake
- to observe the basic regulations on workplace safety and accident prevention
- to read the sections on “safety rules” and the “warnings” contained in this manual, and to sign to confirm that they have understood these and will comply with them.

Before leaving the workplace, personnel must ensure that there is no risk of injury or damage being caused during their absence.

High-performance devices can affect the quality of the mains power due to their current-input. This may affect a number of types of device in terms of:
- connection restrictions
- criteria with regard to maximum permissible mains impedance
- criteria with regard to minimum short-circuit power requirement

*) at the interface with the public mains network

In this case, the plant operator or the person using the device should check whether or not the device is allowed to be connected, where appropriate through discussion with the power supply company.

When welding, you are exposed to many different hazards such as:
- flying sparks and hot metal particles
- arc radiation which could damage your eyes and skin
- harmful electromagnetic fields which may put the lives of cardiac pacemaker users at risk
- electrical hazards from mains and welding current
- increased exposure to noise
- noxious welding fumes and gases.

Anybody working on the workpiece during welding must wear suitable protective clothing with the following characteristics:
- flame-retardant
- isolating and dry
- must cover whole body, be undamaged and in good condition
- protective helmet
- trousers with no turn-ups
The fumes given off during welding contain gases and vapors that are harmful to health.

Welding fumes contain substances which may cause birth defects and cancers.

Keep your head away from discharges of welding fumes and gases.

Do not inhale any fumes or noxious gases that are given off. Extract all fumes and gases away from the workplace, using suitable means.

Ensure a sufficient supply of fresh air.

Where insufficient ventilation is available, use a respirator mask with an independent air supply.

If you are not sure whether your fume-extraction system is sufficiently powerful, compare the measured pollutant emission values with the permitted threshold limit values.
Hazards from mains and welding current

An electric shock is potentially life-threatening, and can be fatal.

Do not touch any live parts, either inside or outside the machine.

In MIG/MAG and TIG welding, the welding wire, the wire spool, the drive rollers and all metal parts having contact with the welding wire are also live.

Always place the wirefeeder on an adequately insulated floor or base, or else use a suitable insulating wirefeeder holder.

Ensure sufficient protection for yourself and for other people by means of a dry base or cover that provides adequate insulation against the ground/frame potential. The base or cover must completely cover the entire area between your body and the ground/frame potential.

All cables and other leads must be firmly attached, undamaged, properly insulated and adequately dimensioned. Immediately replace any loose connections, scorched, damaged or underdimensioned cables or other leads.

Hazards from noxious gases and vapours

The harmfulness of the welding fumes will depend on e.g. the following components:
- the metals used in and for the workpiece
- the electrodes
- coatings
- cleaning and degreasing agents and the like

For this reason, pay attention to the relevant Materials Safety Data Sheets and the information given by the manufacturer regarding the components listed above.

Keep all flammable vapors (e.g. from solvents) well away from the arc radiation.

Hazards from flying sparks

Flying sparks can cause fires and explosions!

Never perform welding anywhere near combustible materials.

Combustible materials must be at least 11 meters (35 feet) away from the arc, or else must be covered over with approved coverings.

Have a suitable, approved fire extinguisher at the ready.

Sparks and hot metal particles may also get into surrounding areas through small cracks and openings. Take suitable measures here to ensure that there is no risk of injury or fire.

Do not perform welding in locations that are at risk from fire and/or explosion, or in enclosed tanks, barrels or pipes, unless these latter have been prepared for welding in accordance with the relevant national and international standards.

Welding must NEVER be performed on containers that have had gases, fuels, mineral oils etc. stored in them. Even small traces of these substances left in the containers are a major explosion hazard.
Hazards from mains and welding current (continued)

Do not loop any cables or other leads around your body or any part of your body.

Never immerse the welding electrode (rod electrode, tungsten electrode, welding wire, ...) in liquid in order to cool it, and never touch it when the power source is ON.

Twice the open-circuit voltage of one single welding machine may occur between the welding electrodes of two welding machines. Touching the potentials of both electrodes simultaneously may be fatal.

Have the mains and the machine supply leads checked regularly by a qualified electrician to ensure that the PE (protective earth) conductor is functioning correctly.

Only run the machine on a mains network with a PE conductor, and plugged into a power outlet socket with a protective-conductor contact.

If the machine is run on a mains network without a PE conductor and plugged into a power outlet socket without a protective-conductor contact, this counts as gross negligence and the manufacturer shall not be liable for any resulting damage.

Wherever necessary, use suitable measures to ensure that the workpiece is sufficiently grounded (earthed).

Switch off any appliances that are not in use.

Wear a safety harness if working at height.

Before doing any work on the machine, switch it off and unplug it from the mains.

Put up a clearly legible and easy-to-understand warning sign to stop anybody inadvertently plugging the machine back into the mains and switching it back on again.

After opening up the machine:
- discharge any components that may be storing an electrical charge
- ensure that all machine components are electrically dead.

If work needs to be performed on any live parts, there must be a second person on hand to immediately switch off the machine at the main switch in an emergency.

Stray welding currents

If the following instructions are ignored, stray welding currents may occur. These can cause:
- fires
- overheating of components that are connected to the workpiece
- destruction of PE conductors
- damage to the machine and other electrical equipment

Ensure that the workpiece clamp is tightly connected to the workpiece.

Attach the workpiece clamp as close as possible to the area to be welded.

On electrically conductive floors, the machine must be set up in such a way that it is sufficiently insulated from the floor.
When using current supply distributors, twin head wire feeder fixtures etc., please note the following: The electrode on the unused welding torch/welding tongs is also current carrying. Please ensure that there is sufficient insulating storage for the unused welding torch/tongs.

In the case of automated MIG/MAG applications, ensure that only insulated filler wire is routed from the welding wire drum, large wirefeeder spool or wirespool to the wirefeeder.

**EMC device classifications**

Devices with emission class A:
- are only designed for use in an industrial setting
- can cause conducted and emitted interference in other areas.

Devices with emission class B:
- satisfy the emissions criteria for residential and industrial areas. This also applies to residential areas in which power is supplied from the public low-voltage grid.

**EMC device classification as per the rating plate or technical specifications**

**EMC measures**

In certain cases, even though a device complies with the standard limit values for emissions, it may affect the application area for which it was designed (e.g. when there is sensitive equipment at the same location, or if the site where the device is installed is close to either radio or television receivers). If this is the case, then the operator is obliged to take appropriate action to rectify the situation.

Examine and evaluate any possible electromagnetic problems that may occur on equipment in the vicinity, and the degree of immunity of this equipment, in accordance with national and international regulations:
- safety features
- mains, signal and data-transmission leads
- IT and telecoms equipment
- measurement and calibration devices

**Ancillary measures for preventing EMC problems:**

a) Mains supply
- If electromagnetic interference still occurs, despite the fact that the mains connection is in accordance with the regulations, take additional measures (e.g. use a suitable mains filter).

b) Welding cables
- Keep these as short as possible
- Arrange them so that they run close together (to prevent EMI problems as well)
- Lay them well away from other leads.

c) Equipotential bonding

d) Workpiece grounding (earthing)
- where necessary, run the connection to ground (earth) via suitable capacitors.

e) Shielding, where necessary
- Shield other equipment in the vicinity
- Shield the entire welding installation.
Electromagnetic fields may cause as yet unknown damage to health.
- Effects on the health of persons in the vicinity, e.g. users of heart pacemakers and hearing aids
- Users of heart pacemakers must take medical advice before going anywhere near welding equipment or welding workplaces
- Keep as much space as possible between welding cables and head/body of welder for safety reasons
- Do not carry welding cables and hose pack over shoulder and do not loop around body or any part of body

Keep your hands, hair, clothing and tools well away from all moving parts, e.g.:
- fans
- toothed wheels, rollers, shafts
- wire-spools and welding wires

Do not put your fingers anywhere near the rotating toothed wheels of the wirefeed drive.

Covers and sideguards may only be opened or removed for as long as is absolutely necessary to carry out maintenance and repair work.

While the machine is in use:
- ensure that all the covers are closed and that all the sideguards are properly mounted ...
- ... and that all covers and sideguards are kept closed.

When the welding wire emerges from the torch, there is a high risk of injury (the wire may pierce the welder’s hand, injure his face and eyes ...). For this reason, when feeder-inching etc., always hold the torch so that it is pointing away from your body (machines with wirefeeder).

Do not touch the workpiece during and after welding - risk of injury from burning!

Slag may suddenly “jump” off workpieces as they cool. For this reason, continue to wear the regulation protective gear, and to ensure that other persons are suitably protected, when doing post-weld finishing on workpieces.

Allow welding torches - and other items of equipment that are used at high operating temperatures - to cool down before doing any work on them.

Special regulations apply to rooms at risk from fire and/or explosion. Observe all relevant national and international regulations.

Power sources for use in spaces with increased electrical danger (e.g. boilers) must be identified by the $\text{\textcopyright}$ (for “safety”) mark. However, the power source should not be in such rooms.

Risk of scalding from accidental discharge of hot coolant. Before unplugging the connectors for coolant forward flow and return flow, switch off the cooling unit.
Shielding-gas cylinders contain pressurized gas and may explode if they are damaged. As shielding-gas cylinders are an integral part of the overall welding outfit, they also have to be treated with great care.

Protect shielding-gas cylinders containing compressed gas from excessive heat, mechanical impact, slag, naked flames, sparks and arcs.

Mount the shielding-gas cylinders in the vertical and fasten them in such a way that they cannot fall over (i.e. as shown in the instruction manual).

Keep shielding-gas cylinders well away from welding circuits (and, indeed, from any other electrical circuits).

Never hang a welding torch on a shielding-gas cylinder.

Never touch a shielding-gas cylinder with a welding electrode.

Explosion hazard - never perform welding on a pressurized shielding-gas cylinder.

Use only shielding-gas cylinders that are suitable for the application in question, together with matching, suitable accessories (pressure regulators, hoses and fittings, ...). Only use shielding-gas cylinders and accessories that are in good condition.

When opening the valve of a shielding-gas cylinder, always turn your face away from the outlet nozzle.

Close the shielding-gas cylinder valve when no welding is being carried out.

When the shielding-gas cylinder is not connected up, leave the cap in place on the shielding-gas cylinder valve.

Observe the manufacturer’s instructions and all relevant national and international rules applying to shielding-gas cylinders and accessories.
A machine that topples over can easily kill someone! For this reason, always place the machine on an even, firm floor in such a way that it stands firmly. - An angle of inclination of up to 10° is permissible.

Special regulations apply to rooms at risk from fire and/or explosion. Observe all relevant national and international regulations.

By means of internal instructions and checks, ensure that the workplace and the area around it are always kept clean and tidy.

The appliance must only be installed and operated in accordance with the protection type stated on the specifications plate.

When installing the appliance, please ensure a clearance radius of 0.5 m (1.6ft.), so that cool air can circulate freely.

When transporting the appliance, please ensure that the valid national and regional guidelines and accident protection regulations are followed. This applies in particular to guidelines in respect of dangers during transportation and carriage.

Before transportation, completely drain any coolant and dismantle the following components:
- Wire feed
- Wire wound coil
- Gas bottle

Before commissioning and after transportation, a visual check for damage must be carried out. Any damage must be repaired by trained service personnel before commissioning.

Only operate the machine if all of its protective features are fully functional. If any of the protective features are not fully functional, this endangers:
- the life and well-being of the operator or other persons
- the equipment and other tangible assets belonging to the owner/operator
- efficient working with the equipment.

Any safety features that are not fully functional must be put right before you switch on the machine.

Never evade safety features and never put safety features out of order.

Before switching on the machine, ensure that nobody can be endangered by your doing so.

- At least once a week, check the machine for any damage that may be visible from the outside, and check that the safety features all function correctly.
- Always fasten the shielding-gas cylinder firmly, and remove it altogether before hoisting the machine by crane.
- Owing to its special properties (in terms of electrical conductivity, frost-proofing, materials-compatibility, combustibility etc.), only original coolant of the manufacturer is suitable for use in our machines.
- Only use suitable original coolant of the manufacturer.
- Do not mix original coolant of the manufacturer with other coolants.
Safety precautions in normal operation (continued)

- If any damage occurs in cases where other coolants have been used, the manufacturer shall not be liable for any such damage, and all warranty claims shall be null and void.
- Under certain conditions, the coolant is flammable. Only transport the coolant in closed original containers, and keep it away from sources of ignition.
- Used coolant must be disposed of properly in accordance with the relevant national and international regulations. A safety data sheet is available from your service centre and on the manufacturer’s homepage.
- Before starting welding - while the machine is still cool - check the coolant level.

Preventive and corrective maintenance

With parts sourced from other suppliers, there is no certainty that these parts will have been designed and manufactured to cope with the stressing and safety requirements that will be made of them. Use only original spares and wearing parts (this also applies to standard parts).

Do not make any alterations, installations or modifications to the machine without getting permission from the manufacturer first.

Replace immediately any components that are not in perfect condition.

When ordering spare parts, please state the exact designation and the relevant part number, as given in the spare parts list. Please also quote the serial number of your machine.

Safety inspection

The manufacturer recommends that a safety inspection of the device is performed at least once every 12 months.

The manufacturer recommends that the power source be calibrated during the same 12-month period.

A safety inspection should be carried out by a qualified electrician
- after any changes are made
- after any additional parts are installed, or after any conversions
- after repair, care and maintenance has been carried out
- at least every twelve months.

For safety inspections, follow the appropriate national and international standards and directives.

Further details on safety inspection and calibration can be obtained from your service centre. They will provide you on request with any documents you may require.

Disposal

Do not dispose of this device with normal domestic waste!
To comply with the European Directive 2002/96/EC on Waste Electrical and Electronic Equipment and its implementation as national law, electrical equipment that has reached the end of its life must be collected separately and returned to an approved recycling facility. Any device that you no longer require must be returned to our agent, or find out about the approved collection and recycling facilities in your area.
Ignoring this European Directive may have potentially adverse affects on the environment and your health!
Safety markings

Equipment with CE-markings fulfils the basic requirements of the Low-Voltage and Electromagnetic Compatibility Guideline (e.g. relevant product standards according to EN 60 974).

Equipment marked with the CSA-Test Mark fulfils the requirements made in the relevant standards for Canada and the USA.

Data security

The user is responsible for the data security of changes made to factory settings. The manufacturer is not liable, if personal settings are deleted.

Copyright

Copyright to this instruction manual remains the property of the manufacturer.

The text and illustrations are all technically correct at the time of going to print. The right to effect modifications is reserved. The contents of the instruction manual shall not provide the basis for any claims whatever on the part of the purchaser. If you have any suggestions for improvement, or can point out to us any mistakes which you may have found in the manual, we should be most grateful for your comments.
PlasmaModule 10

Control panel

Gas Setup

- GP: Gas pre-flow time - Plasma gas pre-flow time
- Gp: Gas post-flow time - Plasma gas post-flow time
- GPur: Gas Purger - Plasma gas purging
- GPr: Gas pre-flow amount - Amount of plasma gas during the plasma gas pre-flow time and the plasma gas post-flow time

Setup menu

- IPL: Pilot arc - Pilot arc current
- FACTORY: Factory - For resetting the plasma module
- 2nd: Second level of Setup menu

Setup menu level 2 (2nd)

- Flow monitoring
- Cor: Correction - Gas correction
- SEL: Setting - Country-specific setting (Standard / USA)
- Ito: Ignition Time-Out - Time until safety cut-out following an abortive ignition attempt
- Arc: Arc break watchdog
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General remarks

Device concept

The digital PlasmaModule 10 can be used with all TIG power sources from Fronius. Together with an appropriate power source, a cooling unit and a water-cooled plasma torch, it allows plasma welding processes to be carried out.

Thanks to the modular concept designed by Fronius, PlasmaModule 10 can also be used with existing welding systems.

As a stand-alone unit, PlasmaModule 10 can serve as a further component in a complex welding system.

A self-explanatory, intuitive operating concept makes PlasmaModule 10 easy to work with. The welder can see the key functions at a glance and adjust them accordingly.

In view of the modular product design, the digital PlasmaModule 10 is extremely flexible and can be adapted to many types of task.

Explanation of terms used

Plasma
Plasma is a gas with positive charge carriers (ions) and negative charge carriers (electrons). The ions and electrons determine the properties of a plasma. Plasma can only be created at high temperature. Plasma is known as the „fourth aggregate state of matter“, besides solid, liquid and gaseous materials.

Plasma welding
Plasma welding is a welding process which uses a constricted arc as the heat source. The arc is constricted by a cooled nozzle. The following plasma welding processes are distinguished:
- Microplasma welding
- (Soft) plasma welding
- Plasma keyhole welding
- Plasma brazing
PlasmaModule 10 can be operated with the following power sources:
- MagicWave 4000 / 5000
- MagicWave 2600 / 2600 CEL / 3000
- TransTig 2600 / 2600 CEL / 3000
- TransTig 4000 / 5000

**NOTE!** Select the appropriate cooling unit for the existing plasma welding torch and the application.

**NOTE!** With plasma welding the duty cycle of the TIG power source is shortened depending on the application.

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**The principle of plasma welding**

![Diagram of plasma welding process]

**Fig. 2 The principle of plasma welding**

1. Shielding gas pressure regulator
2. TIG power Source
3. Cooling unit
4. Digital PlasmaModule 10 with digital plasma gas control
5. Plasma gas pressure regulator
Advantages of plasma welding over TIG welding

- Low component distortion thanks to the concentrated arc
- Smaller heat-affected zone
- Arc can be relatively long
- Higher temperature in the arc: Plasma up to 25,000°C (45,032°F) - TIG up to 10,000°C (18,032°F)
- No time-consuming seam preparation needed (e.g. square butt joint with material thickness up to 10 mm)
- Higher welding speed
- Impossible for the tungsten electrode to dip into the weld pool
- Longer torch service life (with optimum torch cooling)

Application areas

The digital PlasmaModule 10 is used in automated and manual applications, for example:
- in the automotive and component supply industry,
- in the manufacture of special vehicles and construction plant
- in pipeline and equipment construction
- in plant, container, machine and steel engineering
- in rail vehicle construction and shipbuilding
- in applications requiring the highest quality standards
- for welding materials with a sheet thickness of 0.4 - 10 mm (0.02 - 0.39 in.)

PlasmaModule 10 is generator-compatible and exceptionally sturdy in operation, thanks to the protected controls and a powder-coated housing.

Options and accessories

- PTW 1500: Plasma manual welding torch
- Robacta PTW 1500: Plasma robot welding torch
- PMW 350: Plasma welding torch for keyhole welding
- PlasmaModule 10 - MagicWave / TransTig interconnecting hosepack
- Air filter
- PlasmaModule holder
- PlasmaModule flow watch dog (for installation in the PlasmaModule holder)

**NOTE!** Where PlasmaModule 10 is operated on the PlasmaModule holder, the PlasmaModule flow watchdog option is also necessary.
Controls and connections

General remarks

WARNING! Operating the equipment incorrectly can cause serious injury and damage. You should not use the functions described until you have thoroughly read and understood the following documents:
- these Operating Instructions
- all the operating instructions for the system components, especially the safety regulations

Housing front panel

Fig. 05 PlasmaModule 10 - Front panel
(1) Left digital display
(2) Left unit display
Either CFH or l/min appears in the Setup menu depending on the country setting
(3) Right digital display
(4) Right unit display
Either CFH or l/min appears in the Setup menu depending on the country setting
(5) Parameter unit display
Either % or s appears depending on which parameter is chosen in the Setup menu
(6) Pilot flow LED
lights up when the pilot flow parameter is selected
(7) Pilot arc on LED
lights up when the plasma process is active
(8) Start/Stop button
- to start or end the plasma process manually
- to access the Setup menu
(9) Gas test button
- to test the plasma gas flow
- to access the gas test menu
(10) Pilot flow (-) / plasma gas connection
   to connect the pilot flow (-) / plasma gas cable from the plasma welding torch
(11) Pilot flow (+) connection
   to connect the pilot flow (+) cable from the plasma welding torch
(12) Store button
- to access the Setup menu
- to access the gas test menu
(13) Adjusting dial (with LED)
   for setting parameter values; when the LED on the adjusting dial is lit, the selected parameter can be set
(14) Plasma gas LED
   lights up when the plasma gas parameter is selected
(15) Over-temperature indicator
   lights up if the PlasmaModule overheats
(16) Operating instructions symbol
   Observe all safety instructions and notes on operation, care and maintenance in the operating manual
(17) **LocalNet connection**
Standard connection socket for system add-ons (e.g. robot interface ROB 3000 or ROB 4000)

(18) **Plasma gas connection**
including supply pressure regulator; max. supply pressure 9 bar (130 psi)

(19) **Mains switch**

(20) **Mains cable**
Before commissioning

General remarks

**WARNING!** Operating the equipment incorrectly can cause serious injury and damage. You should not use the functions described until you have thoroughly read and understood the following documents:
- these Operating Instructions
- all the operating instructions for the system components, especially the safety regulations

Utilisation in accordance with “intended purpose”

The digital PlasmaModule 10 is intended to be used only in conjunction with a suitable TIG power source and a suitable plasma torch (e.g. Fronius PTW 1500). The following plasma welding processes can be carried out with the PlasmaModule 10:
- Soft plasma welding (sheet thicknesses from 0.4 - 3.0 mm / 0.02 - 0.12 in.)
- Plasma keyhole welding (sheet thicknesses from 3.0 - 10.0 mm / 0.12 - 0.39 in.)
- Plasma brazing

Utilisation for any other purpose, or in any other manner, shall be deemed to be „not in accordance with the intended purpose”. The manufacturer shall not be liable for any damage resulting from such improper use.

Utilisation in accordance with the „intended purpose” also comprises
- following all the instructions in this manual
- performing all stipulated inspection and servicing work.

Setup regulations

The machine is tested to “Degree of protection IP23”, meaning:
- Protection against penetration by solid foreign bodies with diameters > 12 mm (0.47 in.)
- protection against direct sprays of water up to 60° from the vertical

The machine can be set up and operated outdoors in accordance with IP23. However, direct wetting (e.g. from rain) should be avoided.

**WARNING!** If one of these devices topples over or falls it could cause serious or even fatal injury. Place machine on a solid, level surface in such a way that it remains stable.

The venting duct is a very important safety feature. When choosing the machine location, ensure that the cooling air can enter and exit unhindered through the air ducts on the front and back of the machine. Electrically conductive metallic dust (from grinding work, for example) must not be allowed to get sucked into the machine.

Mains connection

The equipment is designed to run on the mains voltage given on the respective rating plates. If your version of the machine does not come with mains cables and plugs ready-fitted, these must be fitted in accordance with national regulations and standards. The fuse protection of the mains supply is described in the Technical Data.

**NOTE!** Inadequately dimensioned electrical installations can lead to serious damage. The mains lead and its fuse protection must be rated accordingly. The technical data shown on the rating plate shall apply.
PlasmaModule 10 is generator-compatible, provided the maximum apparent power delivered by the generator is at least 1.5 kVA.

**NOTE!** The voltage delivered by the generator must never exceed the upper or lower limits of the mains voltage tolerance range. Details of the mains voltage tolerance are given in the section “Technical data”.

---

**Digital plasma gas control**

The digital PlasmaModule 10 is fitted with a digital plasma gas regulator as standard.

**WARNING!** Plasma gas is colourless and odourless, is hazardous to health and can cause asphyxiation. If the following instructions are not observed, after welding has finished there is a danger of the control valve not closing fully. Colourless and odourless plasma gas may escape undetected.

- Use the digital PlasmaModule 10 only in conjunction with the standard supply pressure regulator.
- Never alter the adjusting screw on the supply pressure regulator. If the adjusting screw is altered, Fronius accepts no liability for resulting damage.
- Do not exceed the maximum supply pressure of 9 bar (130 psi).

**Important!** Before operating for the first time, mount the supply pressure regulator, supplied separately, on the rear of the PlasmaModule 10. When mounting, pay attention to the sealing ring in the supply pressure regulator.

For the digital plasma gas regulator in PlasmaModule 10 to reach the maximum gas flow, the following requirements must be met:

- If the plasma gas supply has a pressure regulator, open it fully after connecting the gas hose.
- The pressure regulator with metering tube (item number: 43,0011,0008) is not suitable, as it does not allow a sufficient supply pressure.
- Where the plasma and shielding gas are supplied by gas cylinders: use separate gas cylinders for plasma gas and shielding gas.
Installation

General remarks
The installation of a plasma welding system depends on many factors, e.g.:
- the application
- the material to be welded
- the available space
- influences of robots and robot control system or other automation apparatus
- accessibility
- Environmental conditions

For detailed information on the work steps, please refer to the documentation for the individual components.

WARNING! An electric shock can be fatal. If the machine is plugged into the mains electricity supply during installation, there is a high risk of very serious injury and damage. Only carry out work on the machine when
- the mains switch is in the “O” position,
- the machine is unplugged from the mains.

CAUTION! Falling equipment can cause injury. Make sure PlasmaModule 10 and the PlasmaModule holder stand firmly.

1. Set up the individual components of the plasma welding system according to the intended application (see also the section „Configuration examples“)

Connecting the interconnecting hosepack to the TIG power source

![Diagram of connecting the interconnecting hosepack to the TIG power source](image-url)
Connecting the interconnecting hosepack to the TIG power source (continued)

Fig. 08 Connecting the interconnecting hosepack to the TIG power source TransTig 4000 / 5000 and cooling unit FK 4000 R

Connecting the plasma welding torch

Fig. 09 Connecting the plasma welding torch to PlasmaModule 10 and the PlasmaModule holder
Connecting the shielding gas and plasma gas

**NOTE!** Where the gas for a plasma welding system is supplied by gas cylinders, there must be one cylinder for plasma gas and another cylinder for shielding gas. Never take plasma gas and shielding gas from one and the same gas cylinder.

1. Connect the plasma gas to the plasma gas connection of PlasmaModule 10 (on the rear of the unit), working pressure approx. 6 - 8 bar (86.99 - 115.99 psi.)

   **Important!** Use only pure argon as plasma gas

2. Connect the shielding gas to the gas connection of the power source (on the rear of the unit)

   **Important!** Use only inert gases as shielding gas (e.g. argon)

Connecting PlasmaModule 10 and TIG power source to the robot control

Where the parameters required for the plasma welding process are supplied via a robot control unit, a robot interface is required (e.g. ROB 3000, ROB 4000).

1. Connect a 10-pole remote control cable to the LocalNet connection on the rear of PlasmaModule 10 and to the robot interface for PlasmaModule 10

2. Connect a 10-pole remote control cable to the LocalNet connection on the rear of the TIG power source and to the robot interface for the TIG power source
Commissioning

General remarks
For detailed information on the work steps, please refer to the documentation for the individual components.

Commissioning
1. Insert a tungsten electrode in the plasma welding torch
   IMPORTANT! The tip angle of the tungsten electrode should be approx. 30°
2. Check the distance between the plasma nozzle and the tungsten electrode (approx. 1 - 2.5 mm or 0.04 - 0.1 in.) with an adjusting gauge
3. Turn the main switch of the power source to the „I“ position
4. Connect PlasmaModule 10 to the mains and turn the main switch to the „I“ position
   IMPORTANT! The PlasmaModule 10 must reach a certain operating temperature before it can regulate the gas accurately. If the ambient temperature is below 20°C (68°F), let the PlasmaModule 10 run for about 10 - 15 minutes without any load to allow it to reach this operating temperature.
5. On the power source select current type „DC“
6. Set the cooling unit to permanent operation (Setup menu on power source, parameter C-C = ON )
7. On MagicWave power sources, switch off „Reverse polarity ignition“ (Setup menu on power source: Parameter rPi = OFF)
8. On the TIG power source, set „High-frequency ignition“ to „Start with external arc starters“ (Setup menu on power source, parameter HFt = EHF)
9. Set welding parameters on TIG power source and on PlasmaModule 10
10. Purge shielding gas and plasma gas for at least 30 seconds
11. Ignite pilot arc on PlasmaModule 10 manually or via the robot control unit
12. Start plasma welding by pressing the torch trigger or via the start signal from the robot control unit

Notes on operation
To reduce wear, the pilot arc should burn throughout the operation.

Shielding gas flow rate in operation: at least 12 l/min (25.71 CFH)

The robot control unit should emit a permanent plasma gas command value
- for the pilot arc,
- so that the „Gas Test“ function can be performed on the PlasmaModule 10.

With robot control, if a hot wire power source is used, provide a separate „ground“ for the hot wire power source.
Plasma welding process

- Shielding gas pre-flow
- Starting current
- Current up-slope
- Main current
- Base current
- Current down-slope
- Final current
- Shielding gas post-flow

- Welding current

- Shielding gas

- Pilot flow

- Plasma gas pre-flow
- Plasma gas

- Plasma gas post-flow

- I (A)
- Gas (l/min)
- t (s)
The Setup menu

General remarks
The Setup menu makes it easy to adapt the parameters saved in the unit to different types of task:

- The plasma gas supply parameters are set in the Gas Setup.
- The Setup menu contains parameters which have an immediate effect on the plasma process.
- Machine pre-sets are defined in the Setup menu level 2 (2nd).

Gas Setup
1. To enter Gas Setup, press the Store button and the Gas Test button simultaneously.
   The plasma gas setting parameter last called is displayed.
2. Select parameter by pressing the Gas Test button
3. Change the parameter values by using the adjusting dial
4. Press the Store button to exit Gas Setup

Parameters for plasma gas supply

GPr
Gas pre-flow time - Plasma gas pre-flow time
Unit s
Setting range 0 - 9.9
Factory setting 0.4

GPo
Gas post-flow time - Plasma gas post-flow time
Unit s
Setting range 0 - 9.9
Factory setting 5

GPU
Gas purger - Plasma gas purging
Unit min
Setting range OFF / 0.1 - 10.0
Factory setting OFF

Plasma gas purging begins as soon as GPU is allocated a value.

For safety reasons, plasma gas purging cannot be restarted until a new GPU value is entered.

Important! Plasma gas purging is necessary above all where condensation forms after the device has been left unused in a cold environment for a long time. Long hosepacks are most affected.
Gas Setup (continued)

GPA
Gas pre-flow amount - Plasma gas quantity during the plasma gas pre-flow time and plasma gas post-flow time

<table>
<thead>
<tr>
<th>Unit</th>
<th>l/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting range</td>
<td>0,2 - 10</td>
</tr>
<tr>
<td>Factory setting</td>
<td>3</td>
</tr>
</tbody>
</table>

Setup menu

1. To enter the Setup menu, press the Store button and the Start/Stop button simultaneously
   The plasma process parameter last called is displayed.

2. Select parameters by pressing the Start / Stop button

3. Change the parameter values by using the adjusting dial

4. Press the Store button to exit the Setup menu

Parameters for the plasma process

IPL
I pilot arc - Pilot arc current

<table>
<thead>
<tr>
<th>Unit</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting range</td>
<td>3,0 - 30,0</td>
</tr>
<tr>
<td>Factory setting</td>
<td>10</td>
</tr>
</tbody>
</table>

FAC
Factory - for resetting PlasmaModule 10
Press and hold the Store button for 2 s to reset the machine to the factory settings. If „PrG“ appears on the display, the parameters of the PlasmaModule are reset to the factory settings.

Important! The settings in the Setup menu will be lost when the PlasmaModule is reset. The parameter settings in the second level of the set-up menu (2nd) are not deleted either.

2nd
Second level of Setup menu

Setup menu level 2 (2nd)

1. Access the Setup menu by pressing the Store button and the Start / Stop button simultaneously
   The plasma process parameter last called is displayed.

2. Select „2nd“ parameter by pressing the Start / Stop button

3. To enter the Setup menu level 2, press the Store button and the Start/Stop button simultaneously
   The machine pre-set parameter last called is displayed.
Parameters for machine pre-sets

**C-C**
Flow monitoring

<table>
<thead>
<tr>
<th>Unit</th>
<th>Setting range</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ON / OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

„ON“ position: Flow monitoring remains permanently switched on
„OFF“ position: Flow monitoring remains permanently switched off

**COr**
Correction - Gas correction

<table>
<thead>
<tr>
<th>Unit</th>
<th>Setting range</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AUT / 1.0 - 10.0</td>
<td>AUT (corresponds to a correction factor of 1.76 and therefore argon 100 %)</td>
</tr>
</tbody>
</table>

Other correction factors for other plasma gases can be found in the table of correction factors.

**SEt**
Setting - Country-specific setting (Standard / USA)

<table>
<thead>
<tr>
<th>Unit</th>
<th>Setting range</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Std / US</td>
<td>Standard version: Std (l/min) USA-Version: US (cfh)</td>
</tr>
</tbody>
</table>

**ItO**
Ignition Time-Out - Time until safety cut-out following an abortive ignition attempt

<table>
<thead>
<tr>
<th>Unit</th>
<th>Setting range</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>s</td>
<td>0,1 - 9,9</td>
<td>5</td>
</tr>
</tbody>
</table>

Important! „Ignition Time-Out“ is a safety function so cannot be deactivated. A description of the „Ignition Time-Out“ function may be found in the section headed „TIG welding“.

**Arc**
Arc - Arc break watchdog: Time until safety cut-out following an arc break

<table>
<thead>
<tr>
<th>Unit</th>
<th>Setting range</th>
<th>Factory setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>s</td>
<td>0,1 - 9,9</td>
<td>2</td>
</tr>
</tbody>
</table>

Important! The arc break watchdog is a safety function so cannot be deactivated.
The correction factor takes account of the lowest gas volume than can be set „Gas min.“. This volume depends on the plasma gas mixture that is being used.

<table>
<thead>
<tr>
<th>Plasma gas</th>
<th>Composition</th>
<th>DIN EN 439</th>
<th>COR</th>
<th>Gas min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I1 100 % Ar</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>I1</td>
</tr>
<tr>
<td>I3 Ar 50 % He</td>
<td>50</td>
<td>50</td>
<td>-</td>
<td>I3</td>
</tr>
<tr>
<td>I3 Ar 15 % He</td>
<td>85</td>
<td>15</td>
<td>-</td>
<td>I3</td>
</tr>
<tr>
<td>I3 Ar 25 % He</td>
<td>75</td>
<td>25</td>
<td>-</td>
<td>I3</td>
</tr>
<tr>
<td>I3 Ar 30 % He</td>
<td>70</td>
<td>30</td>
<td>-</td>
<td>I3</td>
</tr>
<tr>
<td>I3 Ar +75 % He</td>
<td>25</td>
<td>75</td>
<td>-</td>
<td>I3</td>
</tr>
<tr>
<td>Varigon He</td>
<td>10</td>
<td>90</td>
<td>-</td>
<td>I3</td>
</tr>
<tr>
<td>Varigon H2</td>
<td>98</td>
<td>-</td>
<td>2</td>
<td>R1</td>
</tr>
<tr>
<td>Varigon H3</td>
<td>97</td>
<td>-</td>
<td>3</td>
<td>R1</td>
</tr>
<tr>
<td>Varigon H5</td>
<td>95</td>
<td>-</td>
<td>5</td>
<td>R1</td>
</tr>
<tr>
<td>Varigon H7.5</td>
<td>92.5</td>
<td>-</td>
<td>7.5</td>
<td>R1</td>
</tr>
</tbody>
</table>
Signals for robot welding

General remarks

Robot operation of PlasmaModule 10 requires a robot interface. PlasmaModule 10 can be controlled via the following interfaces:
- Robot interface ROB 3000
- Robot interface ROB 4000
- Field bus

Overview

<table>
<thead>
<tr>
<th>Signal</th>
<th>I/O</th>
<th>ROB 3000</th>
<th>ROB 4000</th>
<th>Field bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arc on (welding start)</td>
<td>E</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Robot ready / quick stop (robot ready / quick stop)</td>
<td>E</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Gas test</td>
<td>E</td>
<td>-</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Welding simulation (welding simulation)</td>
<td>E</td>
<td>-</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Power input value (power input value)</td>
<td>E</td>
<td>-</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Arc stable (arc stable)</td>
<td>A</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Power source ready (power source ready)</td>
<td>A</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Welding current real value (welding current real value)</td>
<td>A</td>
<td>-</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

I = input signal (signal from the robot control unit)
O = output signal (signal to the robot control unit)

Signals for robot welding

Signals for robot-controlled plasma welding operation and their function on the PlasmaModule 10:

Welding start
starts the pilot arc

Robot ready / quick stop
24 V = Robot ready to weld / 0 V = quick stop; quick stop stops the welding process immediately

Gas test
activates the Gas Test function on PlasmaModule 10

Welding simulation
The welding simulation signal allows a programmed welding path to be simulated; an arc and shielding gas are not required.

Power input value
Specifies the plasma gas flow rate; 0 V = minimum plasma gas flow rate, 10 V = maximum plasma gas flow rate

Arc stable
The "arc stable" signal is set as soon as a stable arc is present after the pilot arc has ignited.
Signals for robot welding

(continued)

**Power source ready**
The “Power source ready” signal remains on as long as PlasmaModule 10 is ready to weld.

**Welding current real value**
Via the “Welding current real value” signal, the actual plasma gas value is indicated by a voltage of 0 - 10 V on the analog output.

For further information about the signals, refer to the relevant operating instructions for the robot interface.

**Signal waveform**

![Signal waveform diagram]

**Application example**

Example of how to connect the robot interface to the robot control:

```
+24 V

Robót

X2:4 DI Welding start (*)
X2:12 DO Arc stable (*)
X2:1 AI Power input value + (*)
X2:8 AI Power input value - (*)
X2:6 Not in use
X2:5 DI Robot ready / quick stop (*)
X2:14 DO Power source ready
X12:1 +24 V secondary (*)
X12:2 GND secondary (*)
X14:1 Supply voltage (*)
X14:2 Not in use
X2:14 DI Welding simulation

DI = digital in  DO = digital out  AI = analog in  AO = analog out

(*) = required for robot operation
```
**Important information for robot operation**

**WARNING!** Risk of injury and damage if welding starts unexpectedly. The “Arc on” signal must not be set while the error is being rectified, otherwise welding will start as soon as the error is fixed.

**NOTE!** If the connection between the power source and the robot interface goes down, all digital and analog output signals on the robot interface will be set to “0”.

The power supply for the power source is available in the robot interface (24 V secondary). The 24 V secondary supply is electrically isolated from the LocalNet. A suppressor circuit limits excess voltages to 100 V.

Use pin X14/1 to select which voltage is to be connected to the digital outputs of the robot interface.

a) 24 V external voltage from the digital output card of the robot control or
b) Power source supply voltage (24 V secondary):
   - Place a jumper between X14/1 and X14/7.
**Troubleshooting**

**General remarks**

The digital PlasmaModule 10 is equipped with an intelligent safety system that does not require fuses. After a possible malfunction has been remedied, PlasmaModule 10 can be put back into normal operation again without any fuses having to be changed.

**WARNING!** An electric shock can be fatal. Before opening up the machine
- Move the mains switch to the “O” position
- Unplug machine from the mains
- Put up an easy-to-understand warning sign to stop anybody inadvertently switching it back on again
- Using a suitable measuring instrument, check to make sure that electrically charged components (e.g. capacitors) have been discharged

**CAUTION!** Failure to connect an appropriate earth lead may result in serious injury or damage. The housing screws provide a suitable PE conductor connection for earthing (grounding) the housing and must NOT be replaced by any other screws which do not provide a reliable PE conductor connection.

**Service codes displayed**

If any error message that is not described here appears on the displays, then the fault is one that can only be put right by a service technician. Make a note of the error message shown in the display, and of the serial number and configuration of the PlasmaModule, and get in touch with our after-sales service, giving them a detailed description of the error.

<table>
<thead>
<tr>
<th>Code</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>tP1</td>
<td>Overheating in the primary circuit of PlasmaModule 10</td>
<td>Allow PlasmaModule 10 to cool down</td>
</tr>
<tr>
<td>tS1</td>
<td>Overheating in the secondary circuit of PlasmaModule 10</td>
<td>Allow PlasmaModule 10 to cool down</td>
</tr>
<tr>
<td>tSt</td>
<td>Overheating in the control circuit of PlasmaModule 10</td>
<td>Allow PlasmaModule 10 to cool down</td>
</tr>
<tr>
<td>Err</td>
<td>051</td>
<td>Mains undervoltage: The mains voltage has dropped below the tolerance range (see chapter „Technical data“)</td>
</tr>
<tr>
<td>Err</td>
<td>052</td>
<td>Mains overvoltage: The mains voltage has exceeded the upper limit of the tolerance range (see chapter „Technical data“)</td>
</tr>
<tr>
<td>Service code</td>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>IGN</td>
<td>„Ignition time-out“ function is active: No current started flowing before the end of the time specified in the Setup menu. The safety cut-out of Plasma-Module 10 has tripped.</td>
</tr>
<tr>
<td>Remedy:</td>
<td></td>
<td>Repeatedly press the Start / Stop button; clean the workpiece surface; if necessary, in „Setup menu level 2“ increase the time until the safety cut-out is triggered.</td>
</tr>
<tr>
<td>Err</td>
<td>IP</td>
<td>Cause: Primary overcurrent</td>
</tr>
<tr>
<td>Remedy:</td>
<td></td>
<td>Contact After-Sales Service</td>
</tr>
<tr>
<td>Err</td>
<td>bPS</td>
<td>Cause: Fault in power module</td>
</tr>
<tr>
<td>Remedy:</td>
<td></td>
<td>Contact After-Sales Service</td>
</tr>
<tr>
<td>dSP</td>
<td>Axx, dSP</td>
<td>Cause: Fault in central control and regulation unit</td>
</tr>
<tr>
<td>dSP</td>
<td>Cxx, dSP</td>
<td>Remedy: Contact After-Sales Service</td>
</tr>
<tr>
<td>dSP</td>
<td>Exx, dSP</td>
<td>Remedy: Contact After-Sales Service</td>
</tr>
<tr>
<td>dSP</td>
<td>Sy, dSP</td>
<td>Remedy: Contact After-Sales Service</td>
</tr>
<tr>
<td>dSP</td>
<td>nSy</td>
<td>Remedy: Contact After-Sales Service</td>
</tr>
<tr>
<td>no</td>
<td>Arc</td>
<td>Cause: Break in pilot arc</td>
</tr>
<tr>
<td>Remedy:</td>
<td></td>
<td>Clean the workpiece surface, clean the plasma nozzle</td>
</tr>
<tr>
<td>no</td>
<td>H2O</td>
<td>Cause: Flow watchdog in the PlasmaModule PM 10 holder has responded</td>
</tr>
<tr>
<td>Remedy:</td>
<td></td>
<td>Check the cooling unit; if necessary, top up the coolant and vent the water flow hose as described in „Putting the cooling unit into service“</td>
</tr>
<tr>
<td>-St</td>
<td>oP-</td>
<td>where the power source is operated with a robot interface or a field bus</td>
</tr>
<tr>
<td>Cause:</td>
<td>Robot not ready</td>
<td></td>
</tr>
<tr>
<td>Remedy:</td>
<td>Initialise „Robot ready“ signal, initialise „Source error reset“ signal (N.B. „Source error reset“ only available in conjunction with ROB 5000 and field bus coupler for robot control)</td>
<td></td>
</tr>
<tr>
<td>Err</td>
<td>70.1</td>
<td>Cause: Gas flow sensor not found</td>
</tr>
<tr>
<td>Remedy:</td>
<td>Check connections of the signal cable for the gas flow sensor</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>GAS</td>
<td>Cause: Plasma gas supply absent or inadequate</td>
</tr>
<tr>
<td>Remedy:</td>
<td>Establish the plasma gas supply (e.g. open the gas cylinder valve and pressure regulator fully), reset no</td>
<td>GAS by pressing the Store button; when using a ROB 5000 robot interface or field bus coupler, reset „Source error reset“ via digital input signal.</td>
</tr>
<tr>
<td>Err</td>
<td>70.3</td>
<td>Cause: Calibration error: Supply pressure at pressure regulating valve is too high or pressure regulating valve is faulty.</td>
</tr>
<tr>
<td>Remedy:</td>
<td>Reduce supply pressure at pressure regulating valve to no more than 9 bar (130 psi.) or replace pressure regulating valve</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reset Err</td>
<td>70.3 by pressing the Store button</td>
</tr>
</tbody>
</table>
**Service codes displayed (continued)**

<table>
<thead>
<tr>
<th>Service Code</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Err</td>
<td>70.4</td>
<td>Control valve faulty</td>
</tr>
<tr>
<td></td>
<td>Cause:</td>
<td>Remedy:</td>
</tr>
<tr>
<td></td>
<td>Control valve not found</td>
<td>Check connections of the signal cable for the control valve</td>
</tr>
</tbody>
</table>

**Troubleshooting**

**No function**
Mains switch is ON, but indicators are not lit up

<table>
<thead>
<tr>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>No connection to the mains</td>
<td>Check mains lead, mains plug and mains cable</td>
</tr>
<tr>
<td>mains fuse is faulty</td>
<td>Replace mains fuse</td>
</tr>
<tr>
<td>Mains outlet socket or plug is faulty</td>
<td>Replace faulty components</td>
</tr>
</tbody>
</table>

**No pilot arc**
Mains switch is on, digital displays are lit up

<table>
<thead>
<tr>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short-circuit between tungsten electrode and plasma nozzle</td>
<td>Readjust electrode with adjusting gauge</td>
</tr>
<tr>
<td>Plasma torch faulty</td>
<td>Replace plasma torch</td>
</tr>
</tbody>
</table>
Care, maintenance and disposal

General remarks
Under normal operating conditions, PlasmaModule 10 requires only a minimum of care and maintenance. However, it is vital to observe some important points to ensure the plasma welding system remains in a usable condition for many years.

WARNING! An electric shock can be fatal. Before opening up the machine
- Move the mains switch to the “O” position
- Unplug machine from the mains
- Put up an easy-to-understand warning sign to stop anybody inadvertently switching it back on again
- Using a suitable measuring instrument, check to make sure that electrically charged components (e.g. capacitors) have been discharged

Every start-up
- Check mains plug, mains cable, plasma torch, interconnecting hosepack and earth connection for damage
- Check that there is a gap of 0.5 m (19.69 in.) all around the machine to ensure that cooling air can flow and escape unhindered.

NOTE! Air inlets and outlets must never be covered, not even partially.

Every 2 months
- Optional: Clean air filter

Every 6 months
- Dismantle machine side panels and clean machine inside with dry reduced compressed air

NOTE! Risk of damage to electronic components. Do not bring the air nozzle too close to the electronic components.
- If a lot of dust has accumulated, clean the cooling-air ducts.

Disposal
Dispose of in accordance with the applicable national and local regulations.
Configuration examples

“Manual mode” configuration

Fig. 10 „Manual mode“ configuration: Plasma welding system for manual use
<table>
<thead>
<tr>
<th>No.</th>
<th>Component Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>“PickUp” trolley</td>
</tr>
<tr>
<td>11</td>
<td>“Duo cylinder holder” installation set</td>
</tr>
<tr>
<td>20</td>
<td>Cooling unit FK 2600 R</td>
</tr>
<tr>
<td>30</td>
<td>TIG power source TransTig 2600 W / F</td>
</tr>
<tr>
<td>40</td>
<td>Swivel pin receptor installation set VR 4000</td>
</tr>
<tr>
<td>50</td>
<td>Interconnecting hosepack W / 2 m / 70 mm²</td>
</tr>
<tr>
<td>60</td>
<td>PlasmaModule holder installation set</td>
</tr>
<tr>
<td>61</td>
<td>Flow watchdog installation set PM 10</td>
</tr>
<tr>
<td>70</td>
<td>PlasmaModule 10</td>
</tr>
<tr>
<td>80</td>
<td>Plasma manual welding torch PTW 1500 F++ / FG / UD / 4 m</td>
</tr>
<tr>
<td>90</td>
<td>Grounding (earthing) cable 50 mm² / 4 m / 400 A / Plug 50 mm²</td>
</tr>
</tbody>
</table>
"Robot mode" configuration

Fig. 11 "Robot mode" configuration: Plasma welding system for automated use
<table>
<thead>
<tr>
<th>Component Description</th>
<th>Stock Number(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upright console</td>
<td>(10)</td>
</tr>
<tr>
<td>Cooling unit FK 4000-R FC</td>
<td>(20)</td>
</tr>
<tr>
<td><strong>NOTE!</strong> Filler neck, filter and connections for water supply and return must be on the same side.</td>
<td></td>
</tr>
<tr>
<td>TIG power source TransTig 4000 Job G / F</td>
<td>(30)</td>
</tr>
<tr>
<td>KD-Digital / LocalNet installation set</td>
<td>(31)</td>
</tr>
<tr>
<td>Remote control cable 10-pole, 10 m</td>
<td>(32)</td>
</tr>
<tr>
<td>Interconnecting hosepack W / 2 m / 70 mm²</td>
<td>(40)</td>
</tr>
<tr>
<td>LocalNet cable 3.5 m (from Interconnecting hosepack)</td>
<td>(40a)</td>
</tr>
<tr>
<td>Swivel pin receptor installation set VR 4000</td>
<td>(50)</td>
</tr>
<tr>
<td>Twin-head feeder mount VR 4000</td>
<td>(60)</td>
</tr>
<tr>
<td>Cold wire feeder KD 7000 D-11</td>
<td>(70)</td>
</tr>
<tr>
<td>KD-Drive installation set</td>
<td>(71)</td>
</tr>
<tr>
<td>Hot wire power source TransPocket 1500 RC HD</td>
<td>(80)</td>
</tr>
<tr>
<td>Grounding (earthing) cable 25 mm² / 6 m / hot wire</td>
<td>(81)</td>
</tr>
<tr>
<td>Connecting cable for TP 1500 RC HD</td>
<td>(82)</td>
</tr>
<tr>
<td>PlasmaModule 10</td>
<td>(90)</td>
</tr>
<tr>
<td>Remote control cable 10-pole, 10 m</td>
<td>(91)</td>
</tr>
<tr>
<td>PlasmaModule holder installation set</td>
<td>(100)</td>
</tr>
<tr>
<td>Flow watchdog installation set PM 10</td>
<td>(101)</td>
</tr>
<tr>
<td>Plasma robot welding torch Robacta PTW 1500 F++ / FG / 4 m</td>
<td>(110)</td>
</tr>
<tr>
<td>Robacta Plasma KD Drive, 0 - 6 m</td>
<td>(111)</td>
</tr>
<tr>
<td>Original equipment TIG RO</td>
<td>(112)</td>
</tr>
<tr>
<td>Hot wire option</td>
<td>(113)</td>
</tr>
<tr>
<td>Power cable G / 25 mm² / 6 m / hot wire plasma</td>
<td>(113a)</td>
</tr>
<tr>
<td>Installation set Rob 4000 LocalNet interface</td>
<td>(120)</td>
</tr>
<tr>
<td>Installation set TIG Rob 4000 cable harness 1.5 m</td>
<td>(121)</td>
</tr>
<tr>
<td>Installation set Rob 5000 LocalNet interface</td>
<td>(130)</td>
</tr>
<tr>
<td>Installation set TIG Rob 5000 cable harness 1.5 m</td>
<td>(131)</td>
</tr>
<tr>
<td>Grounding (earthing) cable 95 mm² / 10 m</td>
<td>(140)</td>
</tr>
</tbody>
</table>
### Technical data

**General remarks**

NOTE! Inadequately dimensioned electrical installations can lead to serious damage. The mains lead and its fuse protection must be rated accordingly. The technical data shown on the rating plate shall apply.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains voltage</td>
<td>230 V</td>
</tr>
<tr>
<td>Mains voltage tolerance</td>
<td>-20% / +15%</td>
</tr>
<tr>
<td>Mains fuse protection (slow-blow)</td>
<td>16 A</td>
</tr>
<tr>
<td>Mains connection 1)</td>
<td>$Z_{\text{max}}$ on PCC 2) = 142 mOhm</td>
</tr>
<tr>
<td>Primary contin. power (100% d.c. 3))</td>
<td>0.9 kVA</td>
</tr>
<tr>
<td>Cos phi</td>
<td>0.99</td>
</tr>
<tr>
<td>Plasma current range</td>
<td>3.0 - 30.0 A</td>
</tr>
<tr>
<td>Pilot current at 10 min / 40°C (104°F) 100% d.c. 3)</td>
<td>30 A</td>
</tr>
<tr>
<td>Open-circuit voltage</td>
<td>88 V</td>
</tr>
<tr>
<td>Standardised working voltage</td>
<td>10.1 - 11.2 V</td>
</tr>
<tr>
<td>Striking voltage (U$_{\text{i}}$)</td>
<td>9.5 kV</td>
</tr>
<tr>
<td>The arc striking voltage is designed for manual guided operation.</td>
<td></td>
</tr>
<tr>
<td>Protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Type of cooling</td>
<td>AF</td>
</tr>
<tr>
<td>Insulation class</td>
<td>B</td>
</tr>
<tr>
<td>Dimensions l/w/h</td>
<td>505/180/344 mm</td>
</tr>
<tr>
<td></td>
<td>19.88/7.09/13.54 in.</td>
</tr>
<tr>
<td>Weight</td>
<td>14.2 kg</td>
</tr>
<tr>
<td></td>
<td>33.31 lbs.</td>
</tr>
<tr>
<td>Marks of conformity</td>
<td>S, CE</td>
</tr>
</tbody>
</table>

1) To 230/400 V, 50 Hz public supply mains
2) PCC = point of common coupling
3) d.c. = duty cycle