INTRODUCTION

MIGATRONIC welding equipment has a good reputation - and we know how important it is to live up to the standards we have set ourselves.
The welding machine you have purchased is the result of years of **MIGATRONIC'S** experience in the field of welding machine manufacture. This experience, combined with correct operation and maintenance of your machine, provides a guarantee of excellent performance in the years ahead.
Thank you for buying a **MIGATRONIC** machine.

MIGATRONIC A/S

INSTRUCTION MANUAL
PILOT 2400/1600

50173109 E

EC DECLARATION OF CONFORMITY

MIGATRONIC A/S
Aggersundvej 33
9690 Fjerritslev
Denmark

hereby declare that our machine as stated below

Type: PILOT 2400/1600
as of: week 45, 1995

conforms to directives 73/23/EEC and 89/336/EEC.

European Standards: EN60974-1
EN50199

Issued in Fjerritslev on 20th November 1995.

Peter Roed
Managing director

Valid from 0020

CONTENTS

WARNING

Arc welding and cutting can be dangerous to the user, people working nearby, and the surroundings if the equipment is handled or used incorrectly. Therefore, the equipment must only be used under the strict observance of all relevant safety instructions. In particular, your attention is drawn to the following:

Electricity
- The welding equipment must be installed according to safety regulations and by a properly trained and qualified person.
- Avoid all contact with live components in the welding circuit and with electrodes and wires if you have bare hands. Always use dry welding gloves without holes.
- Make sure that you are properly and safely earthed (e.g use shoes with rubber sole).
- Use a safe and stable working position (e.g. avoid any risk of accidents by falling).
- Make sure that the welding equipment is correctly maintained. In the case of damaged cables or insulation work must be stopped immediately in order to carry out repairs.
- Repairs and maintenance of the equipment must be carried out by a properly trained and qualified person.

Light and heat emissions
- Protect the eyes as even a short-term exposure can cause lasting damage to the eyes. Use a welding helmet with suitable radiation protection glass.
- Protect the body against the light from the arc as the skin can be damaged by welding radiation. Use protective clothes, covering all parts of the body.
- The place of work should be screened, if possible, and other persons in the area warned against the light from the arc.

Welding smoke and gases
- The breathing in of the smoke and gases emitted during welding is damaging to health. Make sure that any exhaust systems are working properly and that there is sufficient ventilation.

Fire hazard
- Radiation and sparks from the arc represent a fire hazard. As a consequence, combustible materials must be removed from the place of welding.
- Working clothing should also be secure against sparks from the arc (e.g. use a fire-resistant material and watch out for folds and open pockets).

Noise
- The arc generates surface noise according to welding task. In some cases, use of hearing aids is necessary.

Use of the machine for other purposes than it is designed for (e.g. to unfreeze water pipes) is strongly deprecrated. If occasion should arise this will be carried out without responsibility on our part.

Read this instruction manual carefully
before the equipment is installed and in operation

Electromagnetic emissions and the radiation of electromagnetic disturbances

This welding equipment for industrial and professional use is in conformity with the European Standard EN50199. The purpose of this standard is to prevent the occurrence of situations where the equipment is disturbed or is itself the source of disturbance in other electrical equipment or appliances. The arc radiates disturbances, and therefore, a trouble-free performance without disturbances or disruption, requires that certain measures are taken when installing and using the welding equipment. The user must ensure that the operation of the machine does not occasion disturbances of the above mentioned nature.
The following shall be taken into account in the surrounding area:
1. Supply and signalling cables in the welding area which are connected to other electrical equipment.
2. Radio or television transmitters and receivers.
3. Computers and any electrical control equipment.
4. Critical safety equipment e.g. electrically or electronically controlled guards or protective systems.
5. Users of pacemakers and hearing aids etc.
6. Equipment used for calibration and measurement.
7. The time of day that welding and other activities are to be carried out.
8. The structure and use of buildings.

If the welding equipment is used in a domestic establishment it may be necessary to take special and additional precautions in order to prevent problems of emission (e.g. information of temporary welding work).

Methods of reducing electromagnetic emissions:
1. Avoid using equipment which is able to be disturbed.
2. Use short welding cables.
3. Place the positive and the negative cables close together.
4. Place the welding cables at or close to floor level.
5. Remove signalling cables in the welding area from the supply cables.
6. Protect signalling cables in the welding area, e.g. with selective screening.
7. Use separately-insulated mains supply cables for sensitive electronic equipment.
8. Screening of the entire welding installation may be considered under special circumstances and for special applications.

MACHINE PROGRAMME

PILOT 2400/1600 is a line of portable welding machines, especially designed for welding where weight and dimensions have to be small.

The machine is available in five versions:

PILOT 2400 E
PILOT 1600 H
PILOT 2400 H
PILOT 1600 HP
PILOT 2400 HP

All versions are included in this instruction manual.

PILOT 2400 E:
A MMA welding machine with a max. current of 240 A. The machine has adjustable Arc-power and hot start and can be equipped with connection for external adjustment.

PILOT 1600 H/PILOT 2400 H:
MMA and TIG welding machines with a max. current of respectively 160 A and 240 A. The machine has adjustable Arc-power and hot start for MMA welding and adjustable pre-flow, post-flow and slope-down for TIG welding. Moreover, it possible to choose between 2-times and four times welding and between HF and LIFTIG ignition. The machine can be equipped with connection for external adjustment and connection for cooling module for torch cooling.

PILOT 1600 HP/PILOT 2400 HP:
MMA and TIG welding machines with a max. current of respectively 160 A and 240 A. Moreover, the machine can be used for pulse welding. In connection with pulse welding it is possible to adjust pulse time, pause time and base amp. The machine has a pilot arc. The machine has adjustable Arc-power and hot start for MMA welding and adjustable pre-flow, post-flow, starting current, slope-up, reduced current, slope-down, and stop current for TIG welding. Moreover, it possible to choose between two-times, four-times and spot welding and between HF and LIFTIG ignition. The machine can be equipped with connection for external adjustment and connection for cooling module for torch cooling. The machine memorises 8 complete welding settings.

Transportation equipment
The MIGATRONIC programme includes a transport trolley and shoulder strap which can be used for alle PILOT versions.

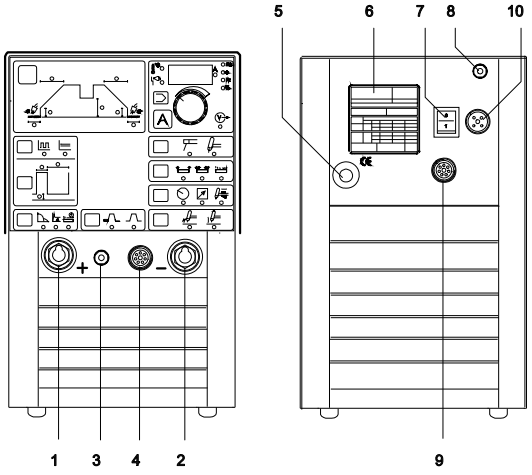
Hoses
The machine can be equipped with TIG welding hoses, electrode holders and return current cables from the MIGATRONIC programme.

External adjustment
Remote control and foot control units can be delivered to PILOT machines with connection for external adjustment.

Torch cooling module
A torch cooling module can be delivered to PILOT machines with TIG which enables use of TIG welding torches from the MIGATRONIC programme.

INITIAL OPERATION

Mains connection
PILOT 2400/1600 must be connected to a mains supply with 3 phases and protection earthing. After the mains plug has been connected to the mains cable (5) the machine is ready for use. Please note that all cable connections must be made by authorised and qualified staff. Switch on and off the machine by means of the breaker on the rear of the machine.



Configuration
MIGATRONIC disclaims all responsibility for damaged cables and other damages related to welding with under sized welding torch and welding cables measured by welding specifications e.g. in relation to permissible load.

Gas connection
Connect the machine to the gas system by means of a gas flow control. Press the gas hose mounted with a quick connection on the gasconnection on the rear of the machine (8).

Connection of welding cables
Connect the welding cables and the return current cable to the front of the machine (1 and 2). Please note that the plug must be turned 45 degrees after insertion into the socket - otherweise the plug can be damaged due to excessive contact resistance.

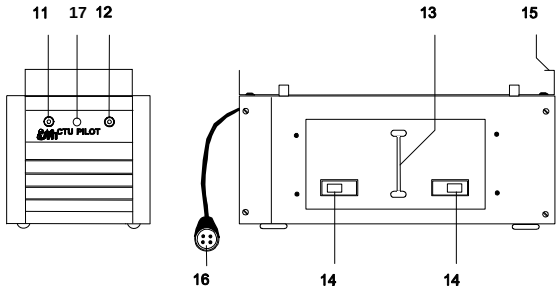
Connect always the TIG connection in the minus (-) tap (2) and the return current cable in the plus (+) tap (1).

The control signals from the TIG torch are transformed to the machine through the circulary 7-poled plug (4). When the plug has been assembled please secure it by turning the "circulator" clockwise. Connect the gas hose to the quick connection (3).

Electrodes are marked with a polarity on the packing. Mount the electrode tongs in accordance with this marking to the plus/minus taps of the machine (1 and 2).

Connection of external adjustment
Connect the remote control unit on the rear of the machine on the circulary 8-poled plug (9).

Connection of a cooling module
Fastened the module under the machine with the fitting (15). Mount the 4-poled plug (16) in the corresponding socket in the machine (10). Mount the flow hose on the water cooled torch in the quick connection marked with blue (11) and the return hose in the quick connection marked with red (12).



Control of cooling liquid and draining
The cooling liquid level can be inspected in the inspection cover frame (13). Refillment of cooling liquid should be carried out behind the front cover (14). In case of problems when starting up, the drain plug (17) should be loosened.

Usage of the machine (PILOT 2400)
When welding with PILOT 2400 machines a heating of various components of the machine takes place and during breaks these components will cool down again.

It must be ensured that the air intake and outlet are not blocked.

It is not possible to overload the machine in normal use, and there is no need for cooling down periods at current settings up to 160 Amps. When the machine is set for welding currents higher than these, there will be a need for periods during which the machine can cool down.

The length of these periods depends on the current setting, and the machine should not be switched off in the meantime. If the periods for cooling down during use of the machine are not sufficiently long, the overheating protection will automatically stop the welding process and the yellow LED will come on. The yellow LED switches off when the machine has cooled down sufficiently, and the machine is ready for welding.

Max. load is:

100% max. load	160 A
60% max. load	200 A
35% max. load	240 A

60 % max. load when MMA welding means that a cooling period of 4 minutes after welding for 6 minutes is required at a current setting of 200 A; 10 minutes between start of each welding period must be calculated in connection with the above table.
Above-mentioned values are valid for PILOT 2400 only. For other types, please see type plate (6).

MAINTENANCE

Insufficient maintenance may result in reduced operational reliability and in lapse of guarantee.

The PILOT welding machines require virtually no maintenance. However, exposure to extremely dusty, damp or corrosive air is damaging to welding machines.

Periodically maintenance
In order to prevent problems arising, the following procedure should be observed at least once a year or as required.

- disconnect the machine from the mains supply and wait 2 minutes before removing the front panels.

- clean the fan blades and the components in the cooling pipe with clean, dry, compressed air.

- drain the cooling liquid out of the cooling module and welding hoses. Remove dirt and flush with pure water in the tank and cooling hoses. Fill up with new cooling liquid. The machine is delivered with a cooling liquid of type propylene glycol in the ratio 1:3 which provides an anti-freeze solution up to -10^{o}C.

Calibration
The machine has been calibrated from the fabric. The certificate is valid for one year. If maintenance of the calibration is requested, please contact the Migatronic service department for drawing up a contract.

INITIAL INSTRUCTIONS

All "parameters" are set by the use of only one control knob. These parameters include current, pulse time, slope-up time, etc.

This control knob is positioned below a digital display which shows the value of the parameter being set. The unit of measurement of the parameter is shown at the right hand side of the digital display.

As above, selection of a function, e.g. HF-TIG or LIFTIG, is by means of the keypad in the relevant section. The function selected is indicated by a bright indication light.

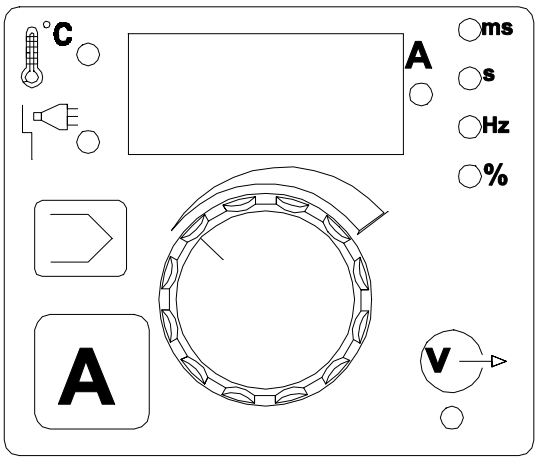
Storage of parameters
The machine memorises all settings when the mains input voltage is switced off, thus ensuring that the same machine settings are available when the machine is switched on again.

The exact adjustments in the two welding processes (MMA electrode and TIG) are stored as well, so that shifting from one welding process to another does not require a new current setting.

Setting of the machine
The following describes in detail the operation of the machine and includes references to the three different control panels illustrated at the end of the chapter.

The control panel is divided in sections and each is described whith a letter from **a** to **i**.

a



Welding current
On pressing this keypad the control knob can be used to set the welding current unless however that, the machine has been set to external adjustment.

After the welding process has stopped, the adjusted current is shown on the display, during welding, however, the actual welding current is shown. During pulse welding an average welding current is automatically shown when shifting between welding current and base current becomes faster than possible viewing.

Setting of welding jobs
This function enables storage of often used machine settings and shift from one complete setting to another. By pressing the keypad the display shows a "P" and a number: "1", "2" etc. Each number is a setting of all parameters and functions of the machine. It is therefore possible to have one setting for each welding job for which the machine is used. The control knob is used for shifting between these settings. During shifting it is possible to see both process and the other on/off-functions in each setting. Change of setting is not possible during the welding process. The setting selected is effected by releasing the keypad.

Welding voltage
The welding voltage indicator is illuminated for reasons of safety and in order to show if there is voltage on the electrode or the TIG torch.

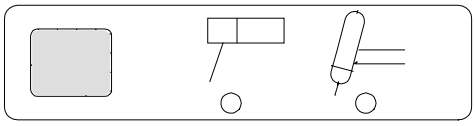
Units of measurement of the parameter
Units of measurement of the parameter shown in the digital display.

Overheating
The overheating indicator is illuminated if welding is interrupted due to overheating of the machine. The indicator remains illuminated 5 seconds after the overheating error is removed. Please read chapter conc. "fault indification".

Mains error
The mains error indicator is illuminated if the mains voltage is too high or low. The indicator remains illuminated 5 seconds after the mains error is corrected/removed.

b

Welding process



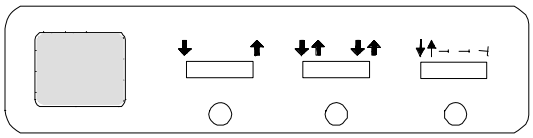
This display is used to select the welding process, e.g. MMA electrode or TIG. The function is fixed during welding, and shift from TIG to MMA is not possible before the post-flow has been finished.

MMA electrode:
MMA electrode welding has been selected.

TIG:
TIG welding has been selected.

c

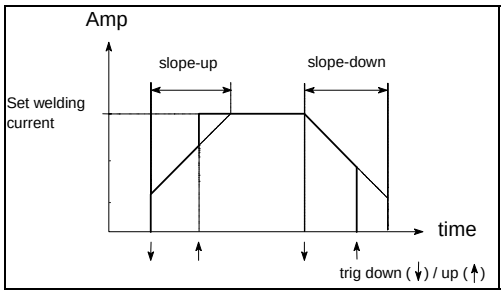
Function of the torch trigger
(The trigger method)



This display is used to decide whether the start/stop method of the TIG welding process is to be two-times, four-times (latching), or spot. Welding process means the phases: pre-flow, slope-up, welding with adjusted current, if necessary, reduced current, slope-down and post-flow. It is not possible to change trigger method during the welding process.

Two-times:
The welding process begins by pressing the torch trigger. Welding continues until the trigger is released again which effects the slope-down period.

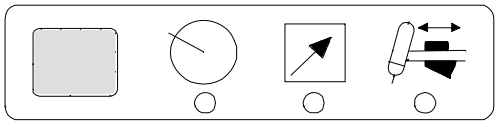
Four-times:
The welding process begins by pressing the torch trigger. Releasing the torch trigger during gas pre-flow activates the slope-up period. If the torch trigger is released during the slope-up period welding continues with the adjusted welding current. In order to stop the welding process the trigger must be pressed again after which the slope-down period begins. The slope-down period can be stopped by releasing the trigger.



Spot:
The welding process begins by pressing the torch trigger. Welding stops automatically, depending on the time set in spot time.

d

Amp setting function
The AMP keypad is used to select the method by which the required welding current shall be established. This welding current is then shown in the display and cannot be changed during the welding process.



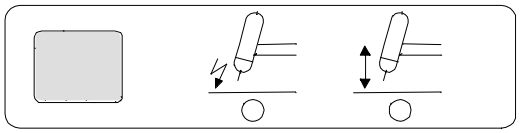
Internal adjustment:
The control knob positioned below the digital display is used to set the current.

External adjustment:
Current setting to be by means of a Migatronic remote control unit. The remote control unit is connected to a plug positioned on the rear of the machine (not standard equipment).

Torch adjustment:
Current setting to be by means of the current control knob located in the handle of a Migatronic dialog torch, if a dialog torch is used. The maximum current is set with the control knob on the front panel. The torch control is used to reduce the current from the maximum set current to the minimum current.

e

Ignition of TIG welding
It is possible to choose between two different methods of ignition for TIG welding: High-frequency (HF) and LIFTIG ignition. The method of ignition cannot be changed during the welding process.



HF-ignition:
In HF-TIG ignition the TIG arc is ignited without contact. A high-frequency (HF) impulse initiates the arc when the trigger is activated. Even though HF-ignition is selected, it is possible to make a LIFTIG-ignition. However, the machine will ensure that only a reduced current will run through the electrode in order not to distroy it.

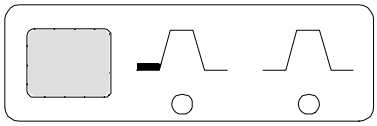
LIFTIG-ignition:
In LIFTIG ignition the TIG arc is ignited after making contact between the workpiece and the tungsten electrode, after which the trigger is activated and the arc is established by lifting the electrode from the workpiece.

Please note! Both HF as well as LIFTIG ignition cannot be effected until post-flow is finished.

f

Pilot arc

In this section it is possible to choose whether the pilot arc should be activated or not. Connection/disconnection of this function cannot be changed during the welding process.



The pilot arc cannot be activated.

The pilot arc can be activated.

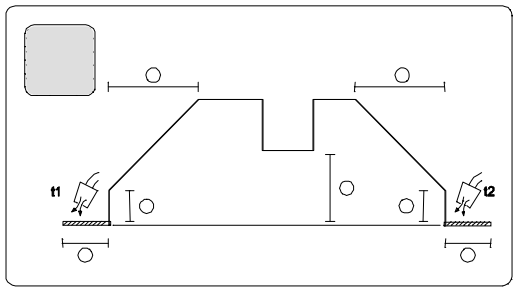
Used only in the TIG welding process, a pilot arc is a weak arc which illuminates the workpiece, and thereby makes it easier to find the starting point of the actual welding process.

The pilot arc can be ignited by briefly activating the torch trigger (less than 0.3 seconds). If activation is longer (more than 0.3 seconds), the machine switches automatically to ordinary welding.

Switch from pilot arc to ordinary welding by keeping the torch trigger activated when two-times TIG-welding or by long activation (>0.3 seconds) when four-times TIG or spot welding. The welding process then continues in normal fashion. However, after slope-down the machine does not switch directly to post-flow but to pilot arc again. It is now possible to continue with a new welding process by a lengthy activation of the torch trigger (> 0.3 seconds), or to go to standby automatically by a brief activation (< 0.3 seconds).

g

The welding process for TIG welding
The parameters that can be selected and adjusted are illustrated in the figure below:



Pre-flow:
Pre-flow is the period of time for which gas flows after the torch switch is pressed and before the HF arc is established, or until the torch is lifted away from the workpiece in the LIFTIG process. Variable 0-10 secs.

Start Amp:
Immediately after the arc has been established, the machine regulates the welding current to the value stated in the Start Amp parameter. Start Amp is set as a percentage of the required welding current and is variable between 0-100% of the welding current with a minimum value of 5 A.

Slope-up:
Once the arc has been established, the welding process enters a slope-up stage during which the welding current is increased in linear fashion from the value stated in the Start Amp parameter to the required welding current. The duration of this slope-up time is variable 0-10 secs.

Slope-down:
When welding has stopped by activating the trigger, the machine enters a slope-down stage. During this stage current is reduced from welding current to Stop Amp over a period of time called the slope-down time and variable 0-10 secs.

Stop Amp:
The slope-down stage is completed when the current level has fallen to the value stated in the Stop Amp parameter. Stop Amp is stated as a percentage of the required welding current and is variable between 0-100% of the welding current with a minimum value of 5 A.

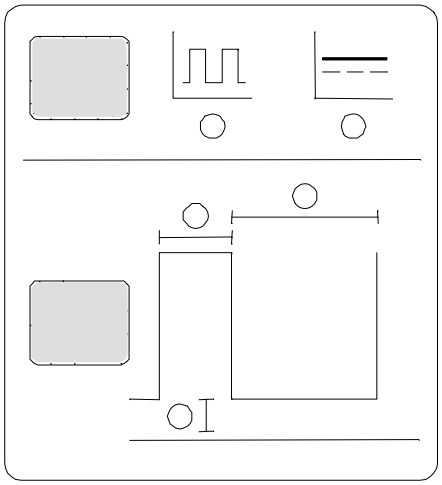
Post-flow:
Post-flow is the period of time for which gas flows after the arc is extinguished and is variable 3-20 secs.

Reduced current:
When four-times welding a reduced current is activated by pressing the trigger briefly. This reduced current is set to a percentage value of the welding current and is variable between 0-100% of the welding current with a minimum value of 5 A.

Indication of a welding process
During welding, when adjustment of current is activated by means of the A-keypad, it is possible to see the actual phase of the welding process in section **g**.

h

Pulse welding
Section **h** contains functions for pulse welding. The section is divided in two: the above connects or disconnects pulse welding, the below contains the diffent pulse parameters.

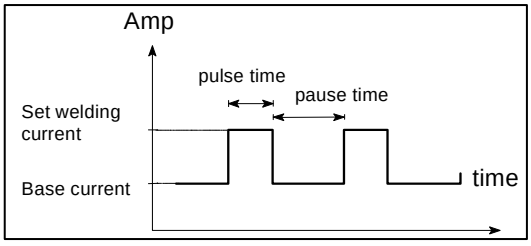


Pulse cannot be connected or disconnected during the welding process.

Pulse:
Pulse welding has been selected.

No pulse:
Welding without pulse has been selected. The pulse parameters cannot be activated.

Pulse parameters
The pulse parameters can be both selected and changed during pulse welding. The figure below illustrates the meaning of the three pulse parameters:



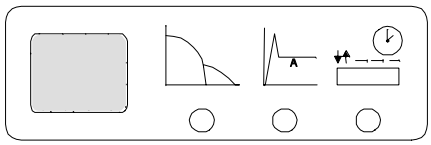
The pulse time:
Reflects the time the machine is welding with the pulse current. The pulse current is the adjusted welding current. Time is adjustable between 0.01 and 10 seconds.

Pause time:
Reflects the time the machine is welding with base current. Time is adjustable between 0.01 and 10 seconds.

Base amp:
Is set as a percentage value between 1 and 99% of the current level set on the display (= pulse current), although this percentage cannot be less than a value that corresponds to 5 A.

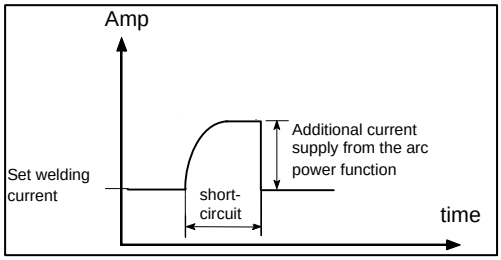
i

Parameters for MMA welding and TIG spot welding



Parameters can be both selected and adjusted during welding.

Arc-power:
The arc power function is used to stabilise the arc in MMA welding. This can be achived by increasing welding current by a percentage value when metal droplets are short-circuited. The additional current ceases when the short circuit is no longer present.

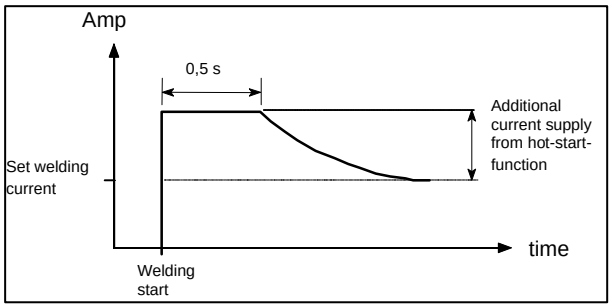


Arc power can be adjusted between 0 and 150% of the welding current setting.

E.g. If the welding current is set to 40A and arc power to 100% the additional current is 40 A equals 80 A when doing arc power. If the arc power is set to 150% the additional current is 60 A equals 100 A when doing arc power.

Hot start:

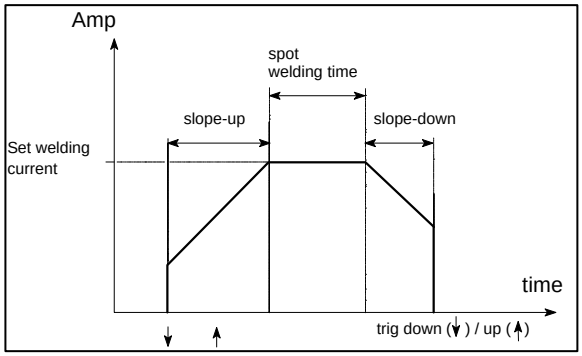
Hot start is a function that helps to establish the arc during MMA welding. This can be achieved by increasing welding current (when the electrode is applied to the workpiece) by a certain percentage value in relation to the set value. This increased start amp is maintained for half a second, after which it decreases exponentially over a period of one second to the set value of welding current.



The hot start value reflects the percentage value by which initial current is increased, and can be set between 0% and 100%.

Spot time:

Spot time is the time for the production of a spot-weld and can only be used with the TIG process. The time includes any slope-up and slope-down times and can be set only after spot trigger mode has been selected on the keypad.



If spot time is changed during welding, this change will not be carried into effect until next welding process.

Fixed functions

The functions below are fixed and cannot be connected and disconnected from the display:

Anti-freeze:

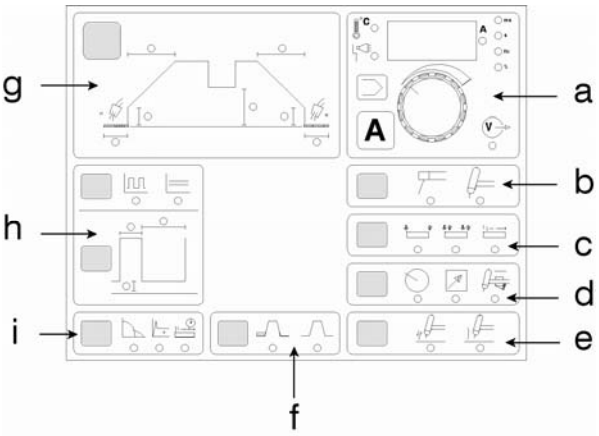
The anti-freeze-function is always on. During MMA and TIG welding the electrode sometimes sticks onto the workpiece. The machine will register that the electrode has stuck onto the workpiece, and will then reduce the welding current so that the area of the workpiece which has melted will harden, making it possible to break off the electrode. Welding can then continue in the usual way.

Torch cooling:

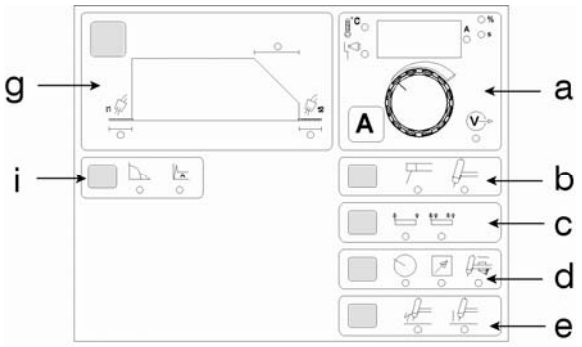
The machine will automatically start cooling when establishing the arc if the machine has been mounted with a cooling module and a Migatronic water-cooled torch. Cooling continues until 2½ min. after the welding process has stopped.

THE CONTROL PANEL

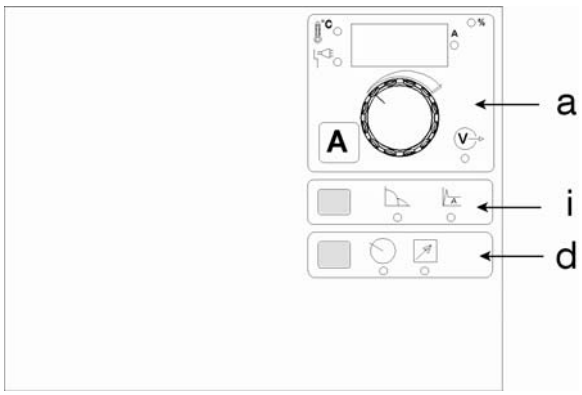
PILOT 2400/1600 HP



PILOT 2400/1600 H



PILOT 2400/1600 E



FAULT IDENTIFICATION

Overheating error

Welding is interrupted due to overheating if the machine is used beyound the specifications mentioned in chapter "Technical Data". The machine must remain turned on and connected to the mains supply as the fan continues until the machine has been sufficiently cooled. Thereafter, the machine is automatically switched in.

An overheating error is more oftenly seen if the machine is used in surroundings with temperatures above 40°C. It is not recommendable to place the machine in direct sun light as this increases the possibility of an overheating of the machine.

Mains error

The mains error arises if the mains voltage is too high or low.

Please make sure that the mains plug is correctly mounted and that all fuses are intact. Moreover, please control that the mains voltage does not exceed the technical specifications and that there are no short-term voltage drops or voltage peaks.

Torch cooling error

This error can be seen by the text "Etc" in the machine display. Turn off the machine if the cooling water does not flow in the water-cooled torch. Make sure that all hoses have a free passage, see chapter "maintenance". Turn on the machine again when a free passage has been established. Welding can then be continued.

Other errors shown in the display:

If other errors arise than those decribed above, please contact the Migatronic service department.

TECHNICAL DATA

Power source	**PILOT 2400 E**	**PILOT 2400 H** **PILOT 2400 HP**	**PILOT 1600 H** **PILOT 1600 HP**
Mains voltage	3x400 V ±15%	3x400 V ±15%	3x400 V ±15%
Fuse	16 A	16 A	10 A
Consumption max.	8.64 kW	8.64 kW	5.76 kW
Efficiency	0.85	0.85	0.85
Permitted load: - 35% duty cycle (v. 40°C) - 60% duty cycle (v. 40°C) - 100% duty cycle (v. 40°C)	 240 A 200 A 160 A	 240 A 200 A 160 A	 160 A 130 A 100 A
Open circuit voltage	85 V	85 V	85 V
Current range	5 - 240 A	5 - 240 A	5 - 160 A
[1]Protection class (IEC 529)	IP 23	IP 23	IP 23
[2]Application class	S	S	S
Standards	EN60974-1 EN50199	EN60974-1 EN50199	EN60974-1 EN50199
Dimensions (W-H-L)	22x40x50 cm	22x40x50 cm	22x40x50 cm
Weight	18 kg	20 kg	20 kg
Torch cooling module:			
Cooling capacity	-	0,5 kW	0,5 kW
Cooling tank, volume	-	2,2 l	2,2 l
Dimensions (W-H-L)	22x21x50 cm	22x21x50 cm	22x21x50 cm
Weight	-	26 kg	26 kg

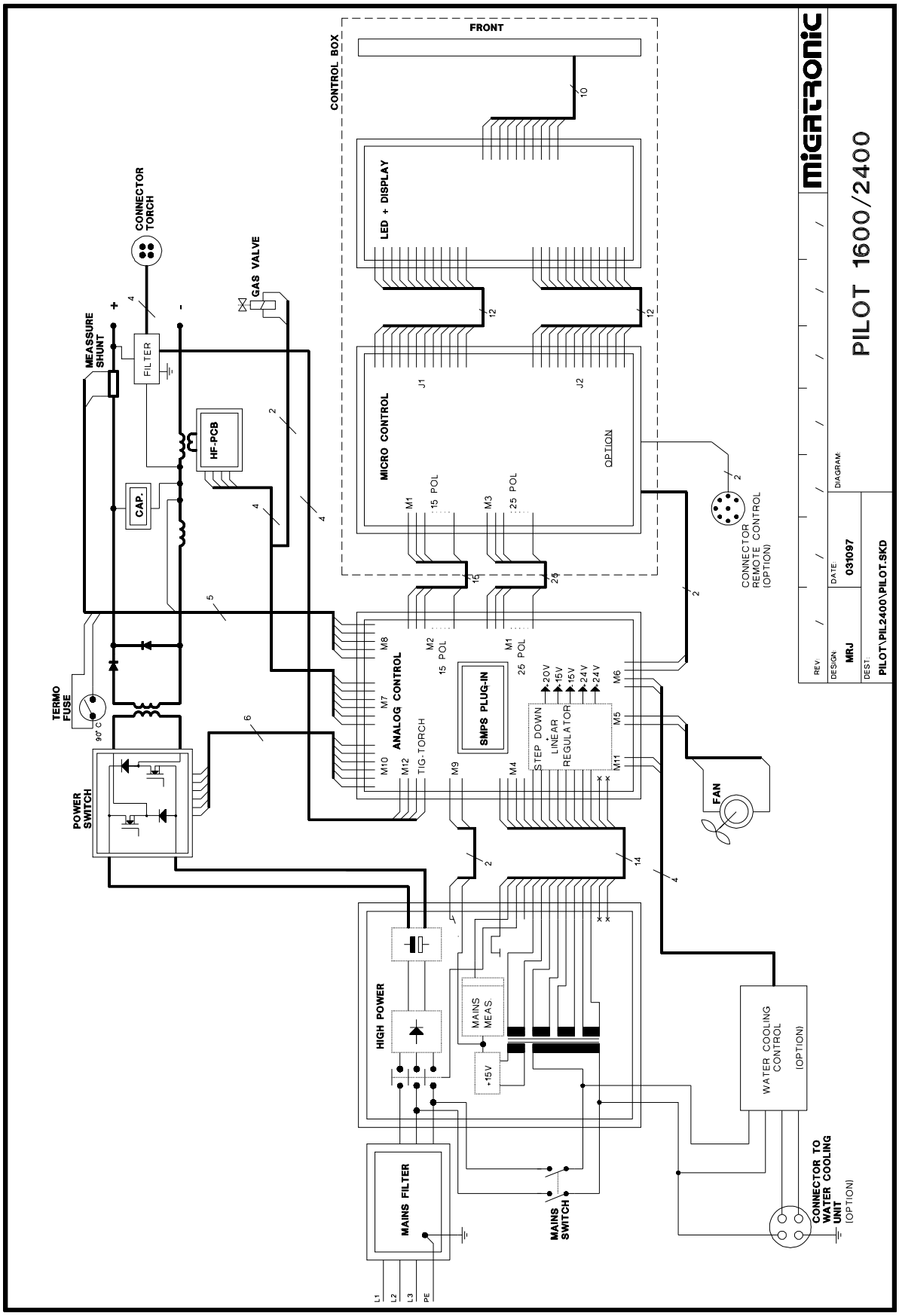
[1] The machine is designed for outdoor applications as it meets the demands of protection class IP23. However, it is a condition that the machine is placed in an upright position.

[2] This machine meets the demands made for machines which are to operate in environments with an increased hazard of electric shocks. Therefore the machine is marked with S on the type plate.

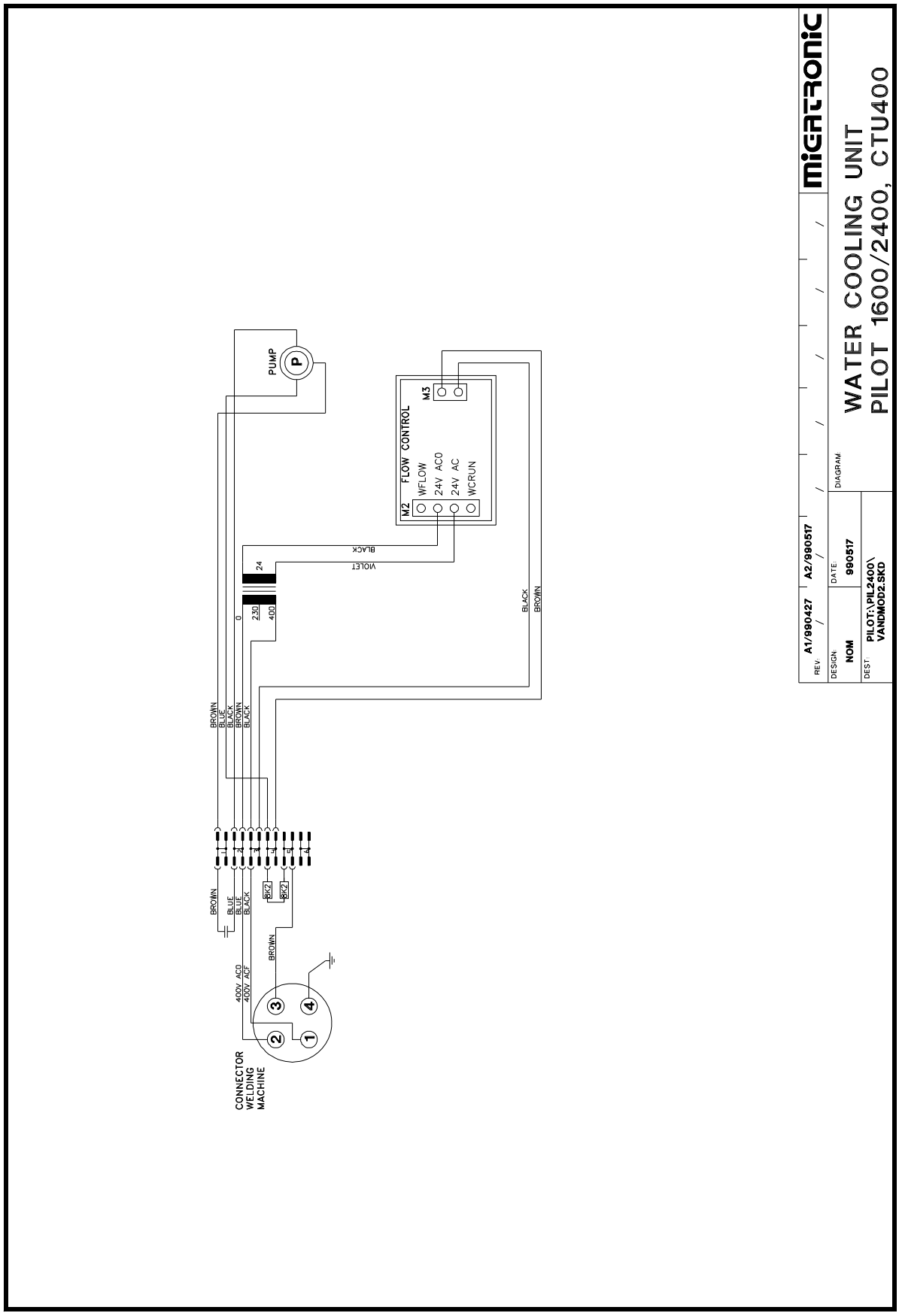
TECHNICAL DATA (continued)

Control	Process	PILOT 1600 HP PILOT 2400 HP	PILOT 1600 H PILOT 2400 H	PILOT 2400 E
Arc power	MMA	0 - 150%, max. 160/240 A	0 - 150%, max. 160/240 A	0 - 150%, max. 240 A
Hot-start	MMA	0 - 100%, max. 160/240 A	0 - 100%, max. 160/240 A	0 - 100%, max. 240 A
Anti-stick	TIG/MMA	5 A	5 A	5 A
Pilot arc	TIG	4%, min. 5 A	-	-
Starting current	TIG	0 - 100%, min. 5 A	-	-
Stop current	TIG	0 - 100%, min. 5 A	-	-
Slope-up	TIG	0 - 10 s	-	-
Slope-down	TIG	0 - 10 s	0 - 10 s	-
Gas pre-flow	TIG	0 - 10 s	0 - 10 s	-
Gas post-flow	TIG	3 - 20 s	3 - 20 s	-
Spot welding time	TIG	0,1 - 50 s	-	-
Pulse time	TIG/MMA	0,01 - 10 s	-	-
Pause time	TIG/MMA	0,01 - 10 s	-	-
Base current	TIG/MMA	1 - 99%, min. 5 A	-	-
Reduced current	TIG	0 - 100%, min. 5 A	-	-
Setting of welding jobs	TIG/MMA	8	-	-

CIRCUIT DIAGRAM



CIRCUIT DIAGRAM, WATER COOLING UNIT



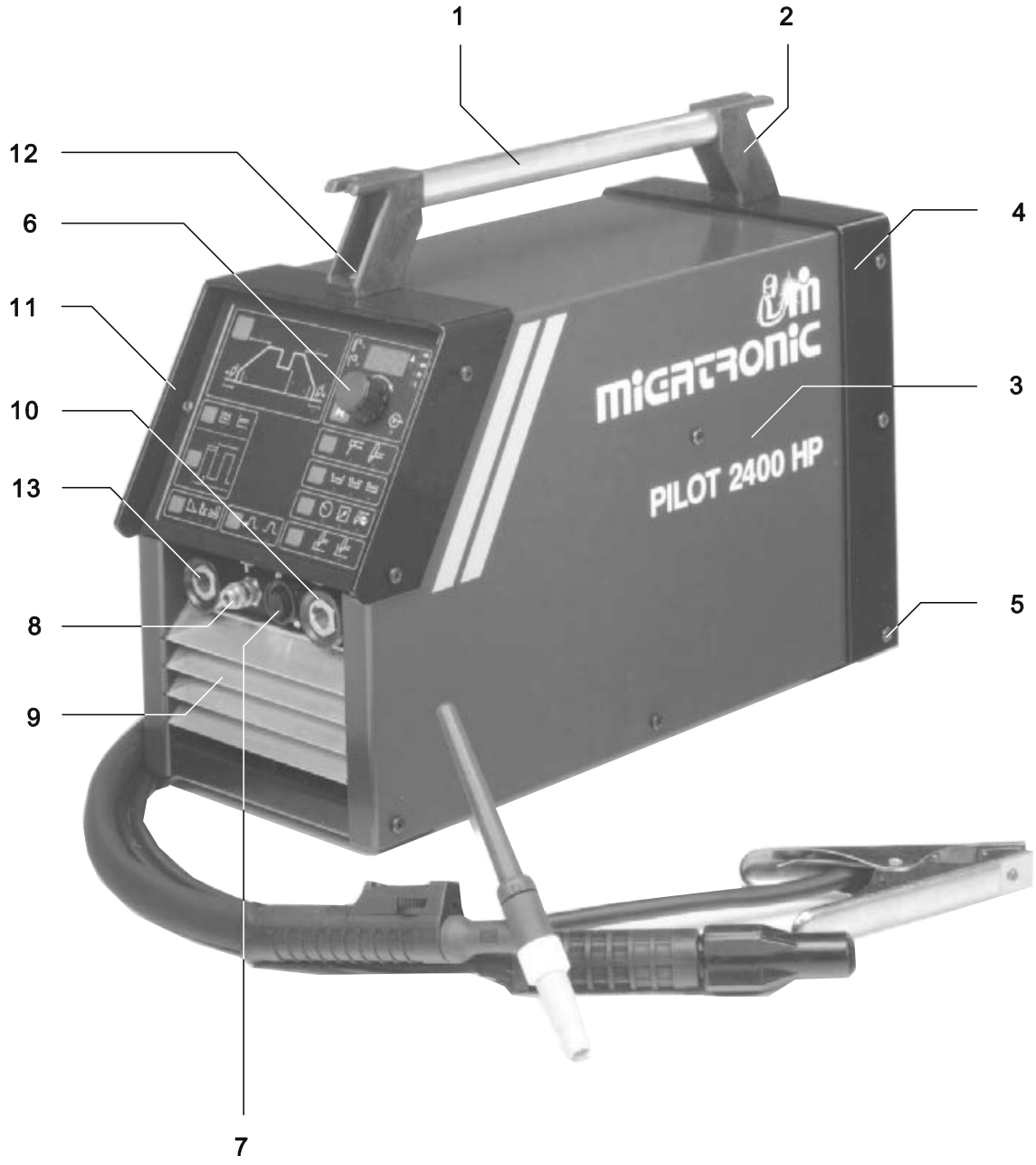
Reservedelsliste
Spare parts list
Ersatzteilliste
Liste des pièces de rechange

PILOT 2400/1600 MK I

50113109 G

Valid from 2008 week 37

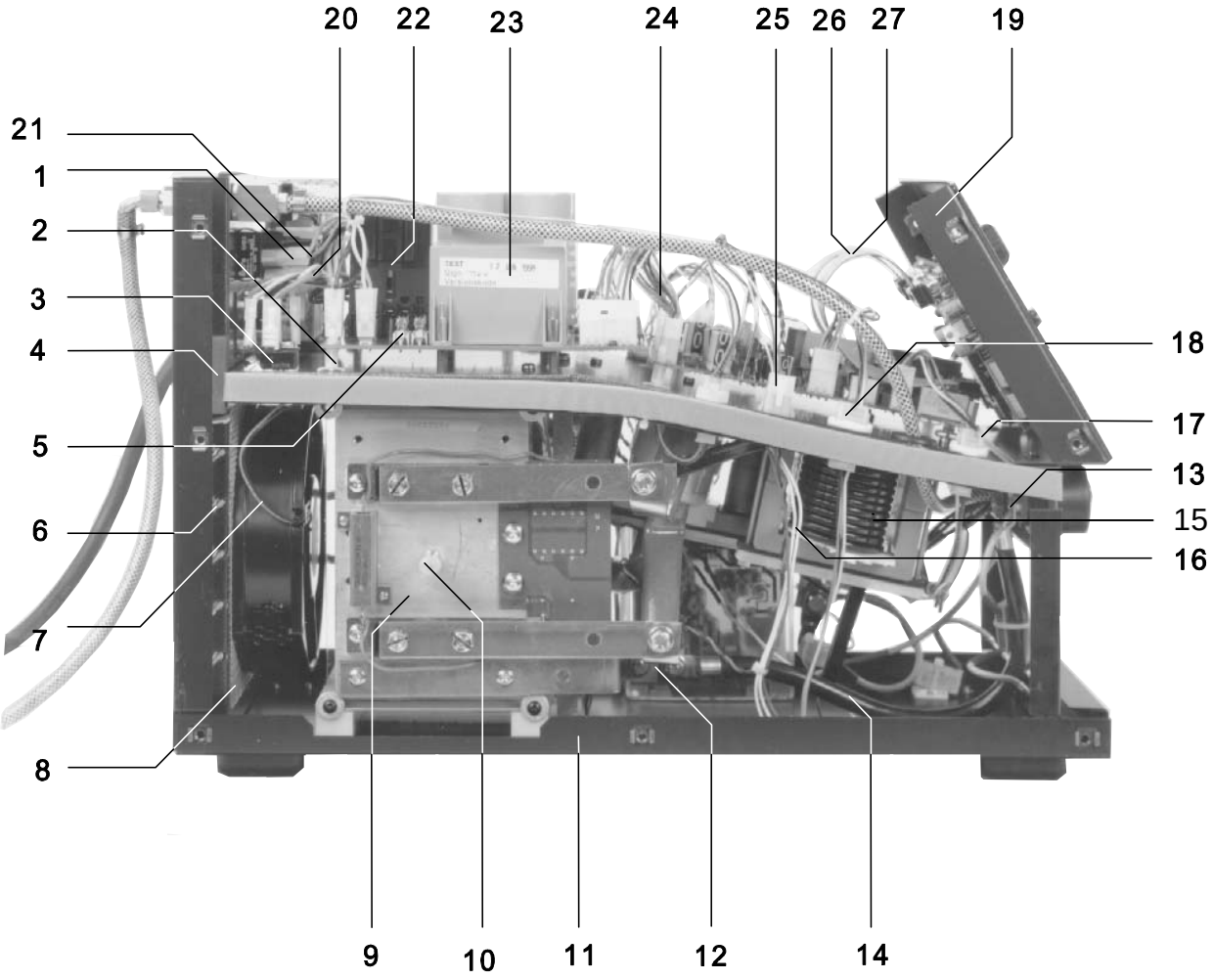
PILOT 2400/1600



PILOT 2400/1600

Pos.	No.	Varebetegnelse Warenbezeichnung	Description of goods Désignation des pièces
1	26330007	Rør for håndtag Rohr für Handgriff	Steel handle Poignée métallique
2	45050206	Holder for håndtag Halter für Handgriff	Holder for Handle Support pour poignée
3	61113310	Svøb Rahmen	Frame Châssis
4	24630090	Bageste bånd Hinteres Band	Rear strap Feuillard arrière
5	40111516	PH skrue PH Schraube	PH screw Vis à empreinte cruciforme
6	18503605	Knap ø28 Knopf ø28	Button ø28 Bouton ø28
6	18521205	Dæksel for knap ø28 Deckel für den Knopf ø28	Cover for button ø28 Couvercle de bouton ø28
7	74470851	Ledningssæt, tast Kabelbaum, Taste	Wire harness, button Jeu de câble, gâchette
7	17200056	Multistik, 7-pol Vielfachstecker, 7-Pol	Multiplug, 7-pole Prise multibroche mâle, 7-pôle
8	43120007	Lynkobling gas, ø5mm Schnellkupplung Gas, ø5mm	Quick clutch gas, ø5mm Unité d'accouplement rapide gaz, ø5mm
9	24530160	Gælle for svøb Lüftungsslitz für Gehäuse	Gill for cabinet Profilé du coffret extérieur
10	18110008	Tig-tilslutning komplet WIG Zentralanschluß komplett	TIG central adaptor complete Raccord ZA TIG complet
10	18119003	Møtrik M20 Mutter M20	Nut M20 Ecrou M20
11	24630088	Forreste bånd Vorderes Band	Front strap Feuillard avant
12	40060625	Flangehoved unbraco M6x25 Flanschkopf Inbus-Schraube	Flange head allen screw Tête de collet d'ècrou six pans en creux
13	18110002	Dinsebøsning Dinsebuchse	Dinse coupling socket Fiche DIX femelle

PILOT 2400/1600



Pos.	No.	Varebetegnelse Warenbezeichnung	Description of goods Désignation des pièces
1	17110015	Afbryder, vandtæt Schalter wasserdict	Waterproof switch Interrupteur, étanche à l'eau
2	18360001	Printpladeholder Printträger	Holder for circuit board Support pour circuit imprimé
3	12260008	Ensretterbro 3-faset 25 A 3-phasige Gleichrichterbrücke 25A	3-Phase rectifier bridge 25 A Pont de redresseur tri-phasé 25 A
4	43490031	Pakning bagplade/mellemplade Dichtung, Rückwand/Zwischenplatte	Gasket, back panel/intermediary panel Garniture de plaque arrière/latérale
5	17173010	Sikring 1 A, træg Sicherung 1 A, träg	Fuse 1 A, slow Fusible 1 A, lent
6	24530158	Løs gælle, bag Loser Lüftungsslitz, Rück-wand	Loose gill, rear Profilé mobile, arrière
7	74470873	Ledningssæt, blæser Leitungsbündel, Lüfter	Wire harness, fan Filerie, ventilateur
8	24710054	Ventilatorgitter Lüftungsgitter	Fan grille Grille de ventilateur
9	73523301	Diodemodul PILOT 2400 Diodenmodul PILOT 2400	Diodemodule PILOT 2400 Pont de diode PILOT 2400
9	73523303	Diodemodul PILOT 1600 Diodenmodul PILOT 1600	Diodemodule PILOT 1600 Pont de diode PILOT 1600

PILOT 2400/1600

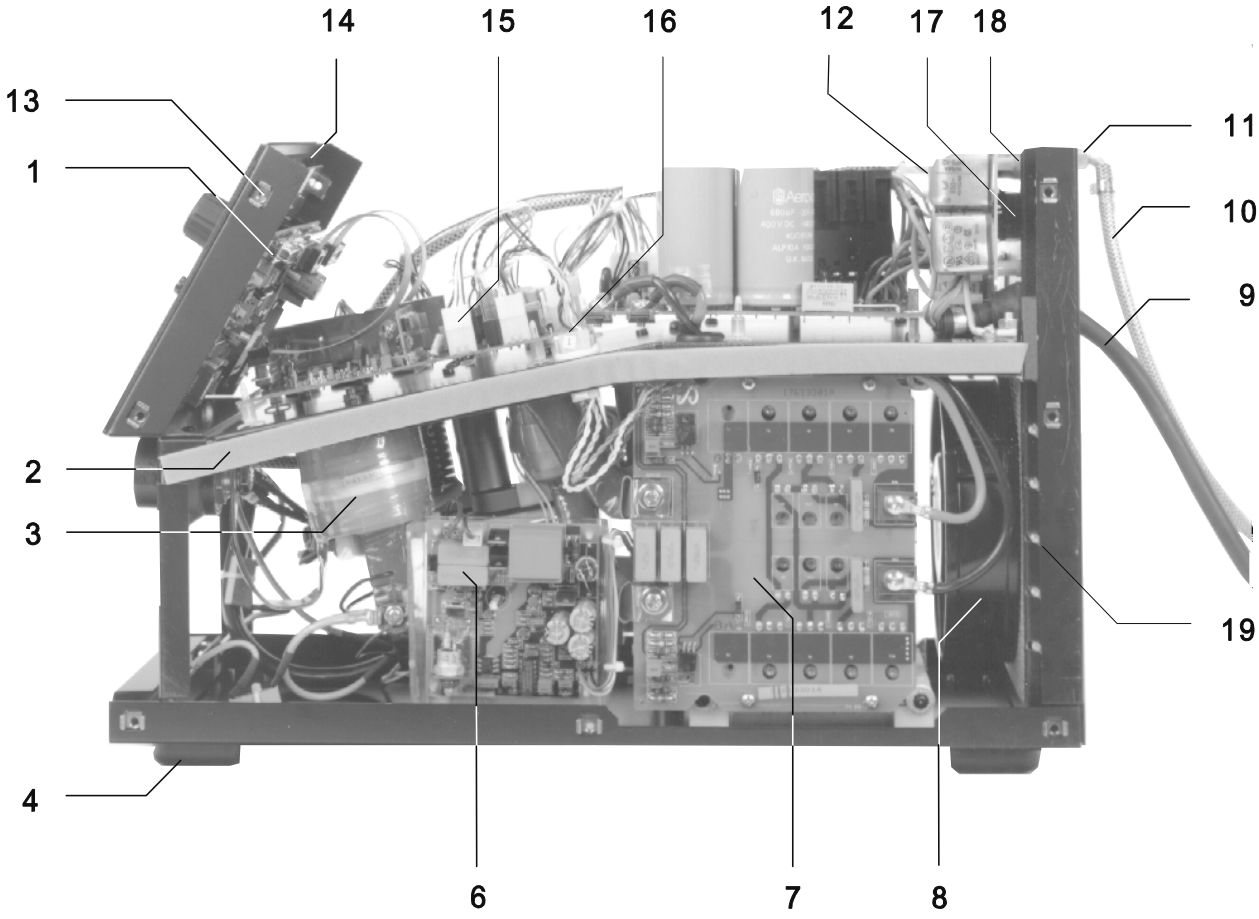
Pos.	No.	Varebetegnelse Warenbezeichnung	Description of goods Désignation des pièces
10	45050228	Beskyttelseshætte Schutzkappe	Protection cap Bouchon de protection
11	24333301	Bundplade Bodenplatte	Sole plate Plaque de fond
12	14990009	Shunt Messwiderstand	Shunt Shunt
13	71613302	Afkoblingsprint Entkopplungsprint	Decoupling PCB Circuit imprimé de découplage
14	74222521	Kabel 200x25mm² Kabel 200x25mm²	Cable 200x25mm² Câble 200x25mm²
15*	16413300	Drosselspole Drosselspule	Inductor coil (please order 2pcs 17440021) Bobine d'inductance
15a	17440021	Drosselkerne Drosselkern	Inductor core Noyau d'inductance
16	74470848	Ledningssæt I/U måling Kabelbaum I/U Messung	Wire harness I/U measurement Jeu de câble pour mésure I/U
17	74470870	ledningssæt, tast Kabelbaum, Taste	Wire harness, button Jeu de câble, gâchette
18	74470872	ledningssæt control print, stik Kabelbaum, Steuerplatine, Stecker	Wire harness control PCB, plug Jeu de câble pour circuit imprimé de contrôle, prise
19	24113303	Skråplade for boxfront Schrägplatte für Boxfront	Inclined plate for box front Plaque incliné pour le front du coffret
20	74470846	Ledningssæt 3-faset, ind 3-phasiger Kabelbaum, Eingang	3-phase wire harness, Input Jeu de câble tri-phasé, entrée
21	74470855	Ledningssæt, netafbryder Leitungsbündel	Wire harness, main switch Jeu de câble
22	17140037	Kontaktor Kontaktor	Contactor Commutateur
23	71613300	Monteret supply print PILOT 2400 Montierte Versorgungsplatine PILOT 2400	Mounted supply PCB PILOT 2400 Circuit imprimé d'alimentation, monté PILOT 2400
23	71613315	Monteret supply print PILOT 1600 Montierte Versorgungsplatine PILOT 1600	Mounted supply PCB PILOT 1600 Circuit imprimé d'alimentation, monté PILOT 1600
24	74470847	Ledningssæt HF og Gas Kabelbaum HF und Gas	Wire harness HF and gas Jeu de câble, HF et gaz
25	74470871	Ledningssæt control print I/U måling Kabelbaum Steuerplatine I/U Messung	Wire harness control PCB I/U measurement Jeu de câble pour circuit imprimé de contrôle, mésure I/U
26	17200138	Fladkabel 15-pol Flachkabel 15-Pol	Flat cable 15-pole Câble méplat 15-pôle
27	17200139	Fladkabel 25-pol Flachkabel 25-Pol	Flat cable 25-pole Câble méplat 25-pôle

***** Bemærk:Drosselspole (16413300) er excl. drosselkerne (17440021).
Der anvendes 2 stk kerne i drosselspolen og disse bestilles særskilt (ps. 15a).

***** Please notice: choke coil (16413300) is without core (17440021).
2 cores are used in the chocke coil and these should be ordered separately (ps. 15a)

***** Bitte bemerken: Drosselspule (16413300) ist ohne Kern (17440021)
2 Kerne sind in der Drosselspule angewendet og sie müssen separat bestellt werden (Ps. 15a)

PILOT 2400/1600



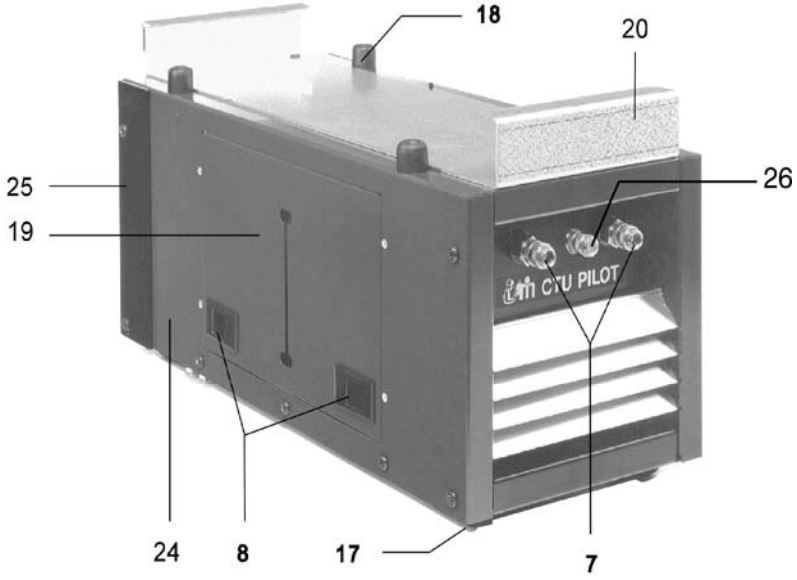
PILOT 2400/1600

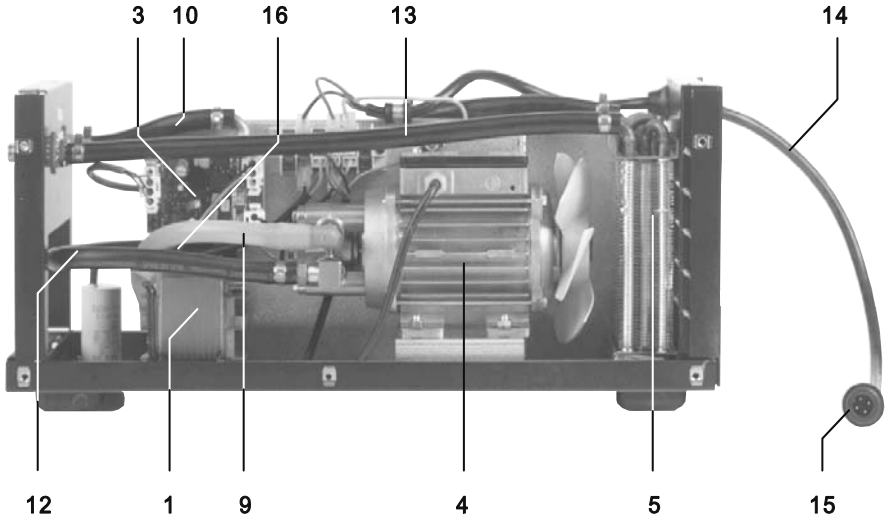
Pos.	No.	Varebetegnelse Warenbezeichnung	Description of goods Désignation des pièces
1	76113300	Elektronikboks, TIG PULS (HP) Elektronikbox, TIG PULS (HP)	Control box, TIG PULS (HP) Boîtier de commande, TIG PULS (HP)
1	76113301	Elektronikboks, TIG Elektronikbox, TIG	Control box, TIG Boîtier de commande, TIG
1	76113302	Elektronikboks, MMA (E) Elektronikbox, MMA (E)	Control box, MMA (E) Boîtier de commande, MMA (E)
1	76113303	Elektronikboks, TIG PULS-P (HP) Elektronikbox, TIG PULS-P (HP)	Control box, TIG PULS-P (HP) Boîtier de commande, TIG PULS-P (HP)
2	24630092	Mellemplade Zwischenplatte	Intermediary plate Plaque intermédiare
3	75110002	HF-enhed HF Einheit	HF unit Unité HF
4	45050212	Fod Gummifuß	Rubber foot Base
6	71613305	Monteret HF-print Montierte HF Platine	Mounted HF PCB Circuit imprimé HF, monté
7	73523300	Switchmodul PILOT 2400 Switchmodul PILOT 2400	Switch module PILOT 2400 Module de commutation PILOT 2400
7	73523302	Switchmodul PILOT 1600 Switchmodul PILOT 1600	Switch module PILOT 1600 Module de commutation PILOT 1600
8	73940050	Ventilator PILOT 2400 Lüfter PILOT 2400	Fan PILOT 2400 Ventilateur PILOT 2400
8	73940053	Ventilator PILOT 1600 Lüfter PILOT 1600	Fan PILOT 1600 Ventilateur PILOT 1600
9	74234017	Netkabel Netzkabel	Mains supply cable Câble d'alimentation
10	73940051	Gasslange Gasschlauch	Gas hose Tuyauterie de gaz
10a	43120025	Lynkobling gas ø6, hun Schnellkupplung weiblich ø6 für Gasschlauch	Quick clutch gas ø6, female Unité d'accouplement rapide gaz ø6, femelle
11	43120027	Lynkobling gas, han 1/8” Schnellkupplung Gas, männlich 1/8”	Quick clutch gas, male 1/8” Unité d'accouplement rapide gaz, mâle 1/8”
12	43320021	Slangenippel 5x1/8" Schlauchnippel 5x1/8"	Hose nipple 5x1/8" Raccord d'extrèmitè
13	41318405	Clipsmøtrik M5 Klippmutter M5	Clip nut M5 Clip d'écrou M5
14	41318406	Clipsmøtrik M6 Klippmutter M6	Clip nut M6 Clip d'écrou M6
15	71613313*	Monteret control print PILOT 2400 Montierte Steuerplatine PILOT 2400	Mounted control PCB PILOT 2400 Circuit imprimé de contrôle, monté PILOT 2400
15	71613311*	Monteret control print PILOT 1600 Montierte Steuerplatine PILOT 1600	Mounted control PCB PILOT 1600 Circuit imprimé de contrôle, monté PILOT 1600
16	74470869	Ledningssæt, control print, switch power Kabelbaum, Steuerplatine, Schaltkraft	Wire harness, control PCB, switch power Jeu de câble pour circuit imprimé de contrôle, switch power
17	71610022	Monteret filter Netzfilter	Mains supply filter Filtre éliminateur
18	17230012	Magnetventil Magnetventil	Solenoid valve Solenoide
19	24233301	Bagplade Rückwand	Back panel plaque arrière

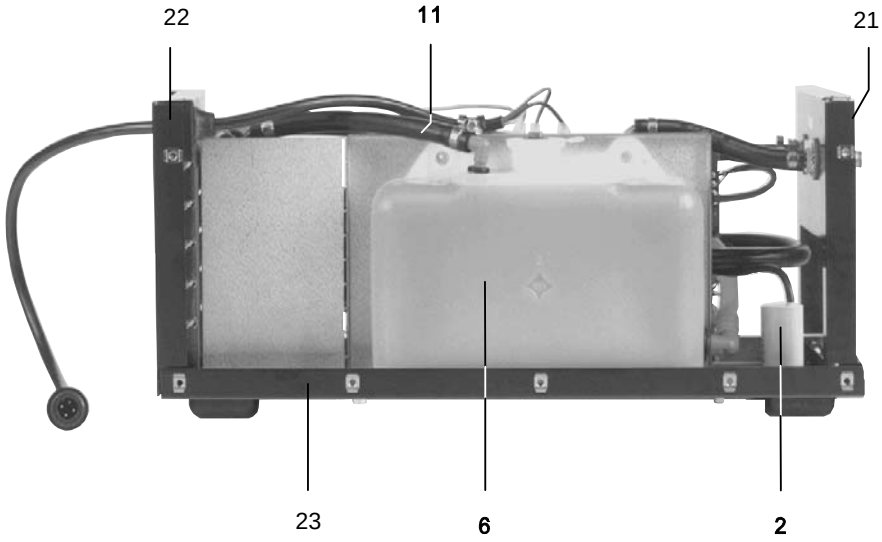
***** Se sidste side/See last page/Siehe letzte Seite/Voir la derniere page

PILOT 2400/1600

VANDKØLEMODUL
WATER COOLING UNIT
WASSERMODUL
MODULE HYDRAULIQUE







PILOT 2400/1600

VANDKØLEMODUL
WATER COOLING UNIT
WASSERMODUL
MODULE HYDRAULIQUE

Pos.	No.	Varebetegnelse Warenbezeichnung	Description of goods Désignation des pièces
	78812038*	Vandkølemodul, komplet Wassermodul, komplett	Water cooling unit, complete Module hydraulique, complet
1	16160081*	Transformator Trafo	Transformer Transformateur
2	15480500*	Kondensator, 5 UF Kondensator, 5 UF	Condenser 5 UF Condenseur 5 UF
3	75903001	Flowkontrolmodul Kontrollplatine	Control PCB Circuit imprimé
4	17310020*	Vandpumpe med ventilator Wasserpumpe mit Lüfter	Water pump with fan Pompe à eau avec ventilateur
5	71240017*	Køler Kühler	Refrigerator Refroidisseur
6	45050231	Vandtank Wassertank	Water tank Réservoir à eau
7	43129007	Lynkoblingssæt rød m/ventil, 8mm Anschlußsatz rot mit Ventil, 8mm	Quick adaptor set red with valve, 8mm Jeu d'accouplement rapide rouge avec valve, 8mm
7	43129008	Lynkoblingssæt blå m/ventil, 8mm Anschlußsatz blau mit Ventil, 8mm	Quick adaptor set blue with valve, 8mm Jeu d'accouplement rapide bleu avec valve, 8mm
8	41319019	Skærmlås Verschluß für Seitenschirm	Catches for side panel Fermoir plaque
9	74120068*	Slange ø10x250mm Schlauch ø10x250mm	Hose ø10x250mm Tuyau ø10x250mm
10	74124512*	Slange ø8x120mm Schlauch ø8x120mm	Hose ø8x120mm Tuyau ø8x120mm
11	74124516	Slange ø8x160mm Schlauch ø8x160mm	Hose ø8x160mm Tuyau ø8x160mm
12	74124535	Slange ø8x350mm Schlauch ø8x350mm	Hose ø8x350mm Tuyau ø8x350mm
13	74124539	Slange ø8x390mm Schlauch ø8x390mm	Hose ø8x390mm Tuyau ø8x390mm
14	74234038	Netkabel, komplet Netzkabel, komplett	Mains supply cable, complete Câble d'alimentation, complet
15	17210030	4-polet stik 4-polig Stecker, männlich	Plug 4-pole, male Prise multibroche mâle, 4-pôles
16	74471012*	Ledningssæt Kabelbaum	Wire harness Jeu de câble
17	45050212	Fod Fuß	Foot Base
18	45070009	Gummifod Gummifuß	Rubber foot Base
19	24433305	Låge for vandtank Deckel für Wassertank	Cover for water tank Couvercle pour réservoir d'eau
20	70210452	Beslag for sammenspænding Beschlag für Zusammenspannen	Fitting for assembling Garniture d'assemblage
20a	24611136	Vinkel for sammenspænding Winkel für Zusammenspannen	Angle for assembling Angle d’assemblage
21	24133305	Front Front	Front plate Pièce avant
22	24233309	Bagplade Rückwand	Back panel Plaque arrière
23	24333311	Bund Boden	End piece Fond
24	24433303	Skærm/låg Seitenschirm/Deckel	Side panel/lid Plaque latérale/couvercle
25	24530163	Bånd for svøb Band für Gehäusedeckel	Strip for cover with sides Bord de la plaque protectrice
26	43620055	Luftskrue Luftschraube	Air screw Vis d'air
	99290101	Propylenglycol Propylenglykol	Propylene glycol Glycol propylène

PILOT 2400/1600

15480500	Condenser Water cooling units until	99.03.01	use	15480600
16160081	Transformer Water cooling units until	99.03.01	use	16160042
17310020	Water pump with fan Water cooling units	from 98.06.15 to 99.03.01	use	17310019
	(Please note: together with 17310020 (water pump) always use 15480500 (condenser))			
17310020	Water pump with fan Water cooling units until	98.06.15	use	17310008 (water pump) and 17300033 (fan)
71240017	Refrigerator Water cooling units until	98.06.15	use	71240013
71613311	Mounted control PCB PILOT 1600 machines until	96.05.13	use	71613303
71613313	Mounted control PCB PILOT 2400 machines until	96.05.28	use	71613303
74120068	Hose ø10 x 250 mm Water cooling units until	98.06.15	use	74120059
74124512	Hose ø8 x 120 mm Water cooling units until	98.06.15	use	74124532
74471012	Wire harness Water cooling units until	98.06.15	use	74470898
78812038	Water cooling unit until	98.06.15	use	78812031

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