



OPERATING INSTRUCTIONS
MIG/MAG impulse welding units

MEGA.PULS *FOCUS* 230 – 530
SYNERGIC.PULS 230 - 430

REHM SCHWEISSTECHNIK



Product identification

Name MIG/MAG impulse welding systems

Type

MEGA.PULS FOCUS 230	SYNERGIC.PULS 230
MEGA.PULS FOCUS 280	
MEGA.PULS FOCUS 330	SYNERGIC.PULS 330
MEGA.PULS FOCUS 380	
MEGA.PULS FOCUS 430	SYNERGIC.PULS 430
MEGA.PULS FOCUS 480	
MEGA.PULS FOCUS 530	

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Subject to change.

List of contents

1	Important user instructions	7
2	Intended use	7
3	General description	8
3.1	The principle of the inert gas metal welding process	8
3.2	Principle of function of REHM- MEGA.PULS <i>FOCUS</i> , SYNERGIC.PULS welding systems	9
3.3	MSG standard welding POWER.ARC and FOCUS.ARC (conventional / continuous)	10
3.3.1	Continuously variable MSG standard welding POWER.ARC and FOCUS.ARC (conventional) with synergy characteristic curves	11
3.3.1.1	Arc when continuous welding	11
3.4	MSG pulse welding POWER.PULS and FOCUS.PULS (only with MEGA.PULS <i>FOCUS</i>)	12
3.4.1	MSG double pulses	14
4	Controls and their functions	15
4.1	Controls and plug connections on the front panel of the welding power source	15
4.1.1	Power switch S1	15
4.1.2	Welding cable socket "workpiece" (X4/L-)	15
4.1.3	Welding cable socket "Rod electrode" (X2/I*+)	15
4.1.4	Selector switch S26 (Option)	15
4.2	Plug connections of the rear of the welding current source	15
4.2.1	Control cable socket (12 pin)	15
4.2.2	Welding cable socket "Wire feed case": (X3/L+)	15
4.2.3	Cooling water connections (for cooling the welding torch)	16
4.2.4	Control cable unit plug (7 pin)	16
4.3	Plug connections on the front panel of the wire feed case	16
4.3.1	Welding torch central connection (ZA)	16
4.3.2	Water connection "feed": WV (only for the design with water cooling)	16
4.3.3	Water connection "return": WR (only for the design with water cooling)	17
4.3.4	Remote control socket (17 pin)	17
4.3.5	REHMtronik socket (7 pin)	17
4.3.6	Control cable plug (12 pin): X20	18
4.3.7	Welding cable plug "wire feed case": X21	18
4.3.8	Cooling water connection (RK intermediate hose set)	18
4.3.9	Gas connection	18
4.4	Controls and displays on the welding unit and case	19
4.4.1	Controls in the vicinity of the wire when operating in the case	19
4.4.2	Controls on the front panel when operating in the case (only MEGA.PULS <i>FOCUS</i>)	19
4.4.3	Controls in the case when operating in the current source (BU)	21
4.4.4	Controls on the front panel when operating in the current source (BU)	22
4.4.5	MEGA.PULS <i>FOCUS</i> Controls on the front panel of the current source	22
4.4.6	SYNERGIC.PULS Controls on the front panel of the current source	23
4.5	Description of the controls	24
4.5.1	Assignment table (S21 / S22 / S23)	24
4.5.2	Selector switch "Wire diameter": S21	24
4.5.3	Selector switch "Inert gas": S22	24
4.5.4	Selector switch "Material": S23	24
4.5.5	Button "Wire feed": S24	25
4.5.6	Button "Gas test": S25	25

4.5.7	LED "Program error (PRG-ERROR)": H21	25
4.5.8	Option "Key switch": S26	25
4.5.9	Selector switch operating modes 2 cycle / 2 cycle with crater filling program / 4 cycle / 4 cycle with crater filling program / spot welding": S3	25
4.5.9.1	2 cycle mode (2T)	25
4.5.9.2	2 cycle mode with crater fill program (2TK)	27
4.5.9.3	4 cycle mode (4T)	28
4.5.9.4	4 cycle mode with crater fill program (4TK)	29
4.5.9.5	Spot welding mode (spot welding)	30
4.5.10	Selector switch welding processes "Rod electrode / MSG standard / MSG pulse / MSG double pulse welding": S2	31
4.5.11	Selector switch "REHMtronik" / "Manual" / "Job": S1 (only MEGA.PULS <i>FOCUS</i>)	31
4.5.12	Membrane button "Special parameters (SP)": S5	32
4.5.13	Illuminated button "Store": S4 (only MEGA.PULS <i>FOCUS</i>)	33
4.5.14	LED "Welding": H9	33
4.5.15	LED "Submenu": H8	33
4.5.16	LEDs "Rt1 to Rt4": H1 - H4	33
4.5.17	LED "Spot welds" H11	33
4.5.18	LEDs "welding current, wire feed, sheet thickness": H5 - H7	34
4.5.19	LED "Hold": H10	34
4.5.20	Adjuster "welding energy (welding power)": S6	34
4.5.21	Adjuster "Arc length (LBL)": S7	34
4.5.22	Working with remote controls	34
4.5.23	Digital displays (A1/A2)	35
4.5.24	Control displays	37
4.6	Special parameters	38
4.6.1	Graphical overview	38
4.6.2	The most important special parameters	39
5	Welding system functions	45
5.1	Water recirculation cooling with monitoring	45
5.2	Filtering the cooling circuit.	45
5.3	System stand-by mode	45
5.3.1	Fans	45
5.3.2	Water pump	45
5.4	Synergy control	45
5.5	Compensation for power supply fluctuations	46
5.6	Integrated digital adjustment and calibrating system	46
5.7	Temperature monitoring of the power units	46
5.8	External cooling of the power units	46
5.9	Forced shutdown in the event of a power outage	46
6	Jobs (only MEGA.PULS <i>FOCUS</i>)	47
6.1	What are Jobs?	47
6.2	Memory management for jobs	47
6.3	The second level (green sector) of selector switch S1	47
6.3.1	Manual welding with jobs	48
6.3.2	Creation of a job from a characteristic curve	49
6.3.3	Copy and delete jobs.	50
6.3.4	Jobs with REHMtronik	52
7	Accessories	53
7.1	Standard accessories	53

7.2	MEGA.PULS <i>FOCUS</i> and SYNERGIC.PULS unit versions and options	53
7.2.1	Remote control for MEGA.PULS <i>FOCUS</i> , SYNERGIC.PULS	55
8	Transport	56
9	Commissioning	57
9.1	Setting up the welding system	57
9.2	Power supply connection of the welding unit or welding system	57
9.3	Welding torch connection	57
9.4	Connection: Workpiece cable	57
9.5	Gas connection	58
9.6	Coolant – checking	58
9.7	Inserting the wire electrode	58
9.8	Threading the wire electrode	58
10	Practical instructions for use	59
10.1	Weldable materials	59
10.2	Wire electrodes	59
10.3	Inert gases	59
10.4	MIG/MAG welding torch	60
10.5	Welding torch accessories	60
10.5.1	Contact tips	60
10.5.2	Gas nozzles	60
10.5.3	Wire liner	60
10.6	Welding torch position and distance	60
11	Safety information	61
11.1	Safety regulations and measures	61
11.2	Serious risks when welding	61
12	Maintenance work	65
12.1	Cleaning the inside of the unit	65
12.2	Checking cooling water and the cooler	65
12.3	Parts subject to wear	65
12.4	Periodic maintenance work	66
12.5	Customer service and repair work	66
12.6	Proper disposal	66
13	In the event of a fault	67
14	Technical data	73
15	Component and spare parts list with REHM item numbers	75
16	Circuit diagram: MEGA.PULS <i>FOCUS</i>, SYNERGIC.PULS compact	78
17	Circuit diagram: MEGA.PULS <i>FOCUS</i>, SYNERGIC.PULS with case (BU)	80
18	Circuit diagram: MEGA.PULS <i>FOCUS</i> with case (BO)	81
19	Sub assembly marking current source	82
20	Circuit diagram: MEGA.PULS <i>FOCUS</i>, SYNERGIC.PULS case (BU)	83
21	Circuit diagram: MEGA.PULS <i>FOCUS</i> case (BO)	84
22	Sub assembly marking wire feed case	85

Appendix to the Operating and Function Manual MEGA.PULS <i>FOCUS</i>	89
A. Assignment of special parameters	90
B. Special parameter assignment table	92
C. Table concerning welding programs MEGA.PULS <i>FOCUS</i>	93
D. Table concerning welding programs SYNERGIC.PULS	97
E. Leaflet regarding the controls on the front panel of the wire feed case	99
F. Leaflet regarding the controls in the wire feed case	99

1 Important user instructions

Dear Customer,

You have purchased a REHM inert gas welding system, a renowned German brand name. We thank you for the confidence you have placed in our quality products.

Only components of the highest quality are used in the manufacture of REHM **MEGA.PULS FOCUS**, **SYNERGIC.PULS** inert gas welding systems. To guarantee a long service life even under the most severe conditions, only components which meet the requirements of the VDE tests, DIN regulations and European standards (EN) are used for all REHM welding systems.

REHM welding machines are manufactured in Germany and therefore bear the "Made in Germany" quality label.

A prerequisite for the safe and successful use of REHM welding systems is that the information contained in this operating manual is made available to the personnel using the equipment.

REHM welding systems are, except when this is expressly stated in writing by REHM, only for sale to commercial / industrial users and are only intended to be used by commercial / industrial users. The welding systems may only be operated by persons who trained in the use and maintenance of welding equipment.

This operating and function manual must be carefully and completely studied before starting the unit for the first time.

The information given in this manual is believed to be correct, however REHM does not accept any liability for its use.

REHM GmbH & Co. KG Schweißtechnik reserves the right to adapt and change the design of these welding systems at any time.

If any points in this operating and functional manual are affected, then this is corrected in the appendix to this manual under "Amendments and extensions"

2 Intended use

MEGA.PULS Focus welding machines may be used only for MSG or electrode welding as intended. REHM welding devices are designed for welding various different metallic materials such as unalloyed and alloyed steels, stainless steels, copper, titanium and aluminium. Also observe the special rules that apply to your applications.

REHM welding machines are designed for use in hand-held and machine-guided operation. REHM welding machines are, except when this is expressly stated in writing by REHM, only for sale to commercial / industrial users and are only intended to be used by commercial / industrial users. The machines may only be operated by persons who trained in the use and maintenance of welding equipment.

Welding power sources may not be installed in areas with increased electrical risk.

Welding power sources may not be used to defrost pipes.

This manual contains rules and guidelines for the intended use of your system. Only compliance with these guidelines shall be considered as proper use. Risks and damages incurred due to any other use is the responsibility of the operator. Use under special requirements may necessitate the observance of particular regulations.

Intended use also includes compliance with the prescribed assembly, disassembly and reassembly, commissioning, use, maintenance and disposal measures. Please pay special attention to the information on safety instructions and proper disposal.

The system may only be operated under the aforementioned conditions. Any other use is considered unintended use. The consequences of unintended use rests with the operator.

3 General description

3.1 The principle of the inert gas metal welding process

With the inert gas metal welding process an electric arc burns between a melting wire electrode and the workpiece. Argon, carbon dioxide (CO₂) or a mixture of these or other inert gasses are used. The wire electrode is unwound from a coil by a wire feed motor and pushed through the welding torch hose set to the current contact tips.

The positive pole flows from the current contact tips to the wire electrode and the negative pole is connected to the workpiece. An electric arc forms between the wire electrode and the workpiece that melts both the wire electrode and the workpiece. The wire electrode is therefore the conductor for the arc and weld filler material.

The wire electrode and the weld pool are protected from contact with the oxygen in the air by the inert gas, which flows continuously from the inert gas nozzle that is arranged concentrically around the electrode.

3.2 Principle of function of REHM- MEGA.PULS *FOCUS*, SYNERGIC.PULS welding systems

All of the welding systems in the **MEGA.PULS *FOCUS***, **SYNERGIC.PULS** range can be easily adapted to any welding task.

In addition to the welding **energy reference variable (welding power)** the user can individually set the length of the arc that they desire (LBL). The user is also able to freely select which type of operation or which type of arc they desire for their specific work.

- **MSG standard welding POWER.ARC (conventional / continuous)**
 - with a synergy characteristic curve for short arc or spray arc/long arc
- **MSG pulse welding POWER.PULS:**
 - with a synergy characteristic curve with or without double pulses
- **MSG-FOCUS.ARC welding:**
 - with a synergy characteristic curve for a short, powerful arc (only **MEGA.PULS *FOCUS***)
- **MSG-FOCUS.PULS welding:**
 - with a synergy characteristic curve characteristic for a short, powerful pulse arc (only **MEGA.PULS *FOCUS***)


The **synergy control** provides the welding program the best possible data for every adjustable working point using parametrised characteristics from the factory.

An **industrial high-performance processor** and various control and regulation systems ensure that the welding process runs as very high speed, accuracy and reproducibility.

The **secondary switched power unit** (transistor plate or chopper) with transistor switches, ensure the best possible effectiveness, highly dynamic and stable process and the highest reliability.

3.3 MSG standard welding POWER.ARC and FOCUS.ARC (conventional / continuous)

In this switch setting **MEGA.PULS FOCUS**, **SYNERGIC.PULS** works exclusively as a continuously variable MSG welding system.

Symbol: 

Working principle and types of arc:

Unlike pulse welding continuously variable GSM standard welding works with a constant voltage characteristic.

However, depending on the selected arc power and the inert gas being used very different material transitions are encountered and therefore also different characteristic types of arc.

Material transitions and the use of different arc types:

- Short arc:
Fine beads, uniform short-circuit
Its low heat input make it ideal for thin steel and for welding in root passes and tight welding situations.
- Transition arc:
Irregular transition with fine to course beads,
therefore this range (also referred to as a transitional arc) should be avoided.
- Long arc:
Irregular transition with coarse beads.
For welding with CO₂ or gas mixtures with a high CO₂ content.
- Spray arc:
Fine to finest beads pass to the workpiece evenly and without short-circuit, therefore with little spatter.
Achieves deep fusion penetration, high rate of deposition and a high transfer of heat.
Use for filling passes and final passes in the PA position with steel; with aluminium also in tight welding positions due to the rapid heat dissipation.

3.3.1 Continuously variable MSG standard welding POWER.ARC and FOCUS.ARC (conventional) with synergy characteristic curves

MEGA.PULS FOCUS, SYNERGIC.PULS welding equipments are comprehensively provided with the respective synergy characteristic curves. This enables all common materials to be welded easily using the continuous welding process.

3.3.1.1 Arc when continuous welding

With conventional welding systems:

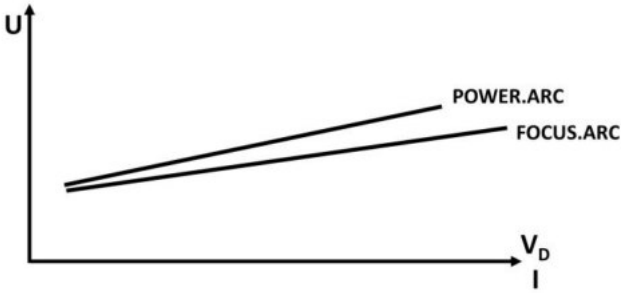
Welding torch central connection

- 1) Spray arc:
With gas mixtures with a high argon content or inert gasses.
- 2) Long arcs:
With CO₂ gas mixtures with high CO₂ content.

With **MEGA.PULS FOCUS, SYNERGIC.PULS** welding systems and operating mode "MSG standard welding conventional".

Reduced sputter
Less rework

Targeted control actions reduce the critical and prone to spatter area of transition to a minimum. This significantly extends the work area with the best welding results. There are also two welding processes available for conventional welding. These two processes are completely different in terms of heat introduction and the length of the arc.

<p>POWER.ARC</p> <ul style="list-style-type: none"> • Conventional arc • Optimised for the challenges of manual welding • Safe handling • Universal applications • Robust, compensates for tolerances • Flat weld seam geometry • Standardised <p>FOCUS.ARC (only MEGA.PULS FOCUS)</p> <ul style="list-style-type: none"> • Conventional arc • Shorter, more powerful arc • Deeper fusion penetration, reliable root formation • Welding with long stickout • No penetration notches • Reduced heat input • Very good control of the weld pool 	 <p>The graph shows two linear curves representing the synergy characteristic curves for POWER.ARC and FOCUS.ARC. The vertical axis is labeled 'U' (Voltage) and the horizontal axis is labeled 'V_D / I' (Current). The POWER.ARC curve is steeper than the FOCUS.ARC curve, indicating a higher voltage drop for the same current increase.</p>
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3.4 MSG pulse welding **POWER.PULS** and **FOCUS.PULS** (only with **MEGA.PULS FOCUS**)

In the switch position “MSG pulse welding” the system functions only with the pulse arc.

This enables all common materials to be easily and perfectly welded using the pulse process.

Symbol: 

Working principle of pulse arc welding:

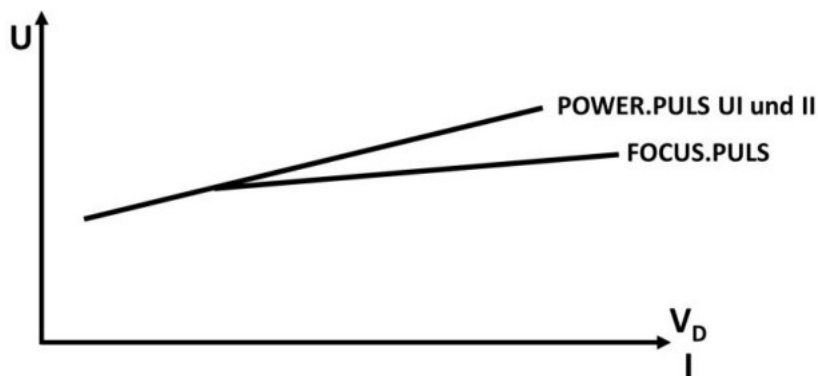
The pulse arc distinguished by a direct current with a frequency that varies between a low base current phase and a high pulse phase.

The base current keeps the weld pool and the wire electrode molten, the pulse current effects a bead separation in the same rhythm as the frequency (controlled bead transmission).

Applications and advantages of pulse arc welding:

- The controlled, short material transition results in a low spatter to almost spatter free weld that does not need reworking.
- The pulse arc enables the intense spatter that occurs with non-alloy or low alloy steel due to the transitional arc associated with the MSG standard welding mode (continuous/conventional) to be avoided.
- The reduced heat input compared to other welding processes with constant arc power enables thin sheet metal to be welded.
- Thicker wire electrodes can be used at the same arc power.

There are 3 principle processes for pulse welding. These are differentiated by the type of arc control and the heat input.



POWER.PULS I/I

- Pulsed arc I/I controlled
- Frequency controlled bead detachment
- Perfect arc length
- Very good flow properties, flat weld seam geometry
- High arc energy, broad fusion penetration for demanding manual welding
- Safe handling
- Universal applications
- Robust, compensates for tolerances
- Particularly for CrNi and Al

POWER.PULS U/I


- Pulse arc U/I – controlled
- Self-regulating, highly dynamic pulse arc
- Reduced heat input
- Insensitive to external disturbances, optimised for demanding manual welding
- Safe handling
- High arc pressure, deeper fusing penetration
- Reliable flank wetting
- Universal applications
- Very good control of the weld pool
- Robust, compensates for tolerances
- Particularly for Fe

FOCUS.PULS (only **MEGA.PULS FOCUS**)

- Pulse arc U/I – controlled
- Self-regulating, highly dynamic pulse arc
- Low energy process
- Short, powerful pulse arc
- Deep fusion penetration
- No penetration notches
- Very good control of the weld pool
- The appearance of the weld seam can be modelled
- Reliable root formation
- The highest deposition rate are possible
- Reduced heat input

3.4.1 MSG double pulses

The basis of the MSG double pulse welding process is MSG pulse arc welding. MSG double pulses arc welding using two periodically alternating power levels for the welding arc.

Symbol: 

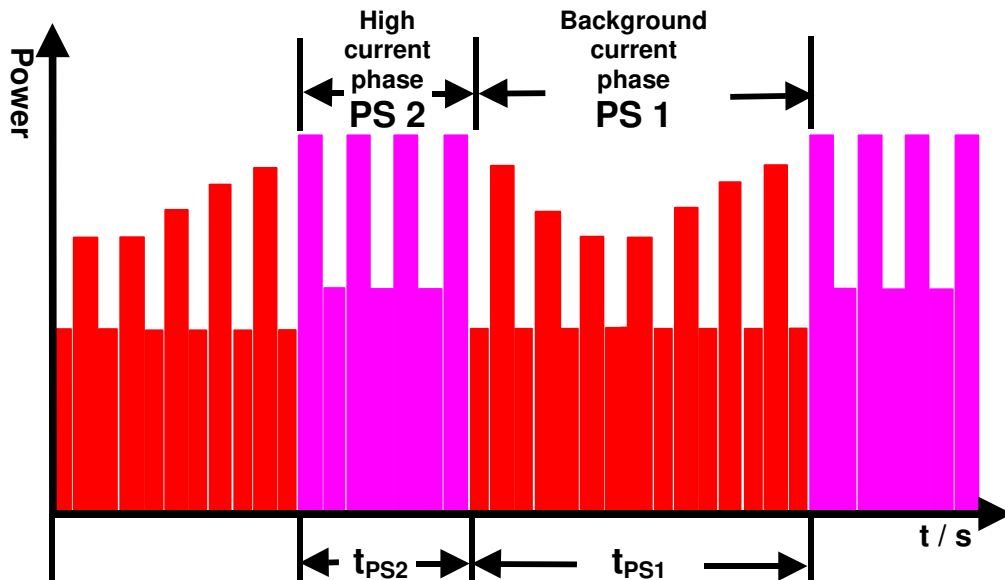
Settings:

The operating mode “MSG double pulses” is selected on the operating panel on the wire feed case. MSG double pulses can be used with many synergy characteristics (pulse programs).

Principle of the MSG double pulse process:

The basis of the MSG double pulse welding process is MSG pulse arc welding. MSG double pulses arc welding uses two periodically alternating power levels for the welding arc, this means that during pulse welding the power level switches continuously between a low current phase (PS1) and a high current phase (PS2). The double pulse frequency lies between 0.05 and 5 Hertz.

MIG/MAG double pulses with adjustable *smooth transitions*:



Advantages offered by MSG double pulses:

- very good weld seam pattern
- the appearance of the weld seam is similar to MIG welding
- improved control of the weld pool
- improved arc guidance
- the root of the weld seam is reliable penetrated in the high current phase (PS2)
- less warping of the workpiece due to reduced heat input during the low current phase (PS1) – the base material can cool during the “cold pulse phase” because of the reduced power
- prevention of hot crack formation
- the wetting of the flanks is more even

4 Controls and their functions

An overview of the controls is given from chapter 16.

4.1 Controls and plug connections on the front panel of the welding power source

4.1.1 Power switch S1

The power switch with indicator lamp is used to connect the welding system to the power supply. The integrated indicator lamp shows the operation readiness of the welding system.

4.1.2 Welding cable socket “workpiece” (X4/L-)

Used to connect the cable to the workpiece.

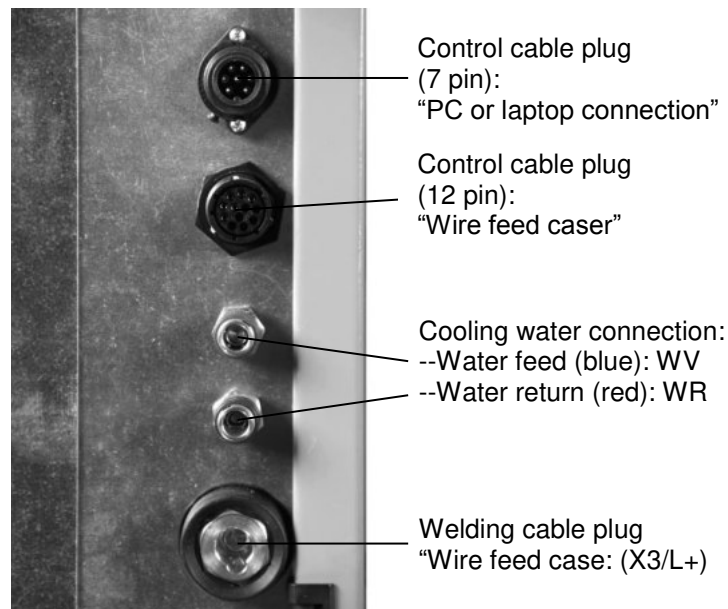
4.1.3 Welding cable socket “Rod electrode” (X2/I*+)

Used to connect the welding cable to the rod electrode holder (positive pole to the rod electrode).

4.1.4 Selector switch S26 (Option)

The selector switch inhibits access to the special parameters. The selector switch is available as an option. (With **MEGA.PULS FOCUS** in a case, with **MEGA.PULS FOCUS BU** on the front of the machine)

4.2 Plug connections of the rear of the welding current source



4.2.1 Control cable socket (12 pin)

Used to connect the control cable plug from the intermediate hose set to the wire feed case.

4.2.2 Welding cable socket “Wire feed case”: (X3/L+)

Used to connect the welding cable from the intermediate hose set to the wire feed case.

4.2.3 Cooling water connections (for cooling the welding torch)

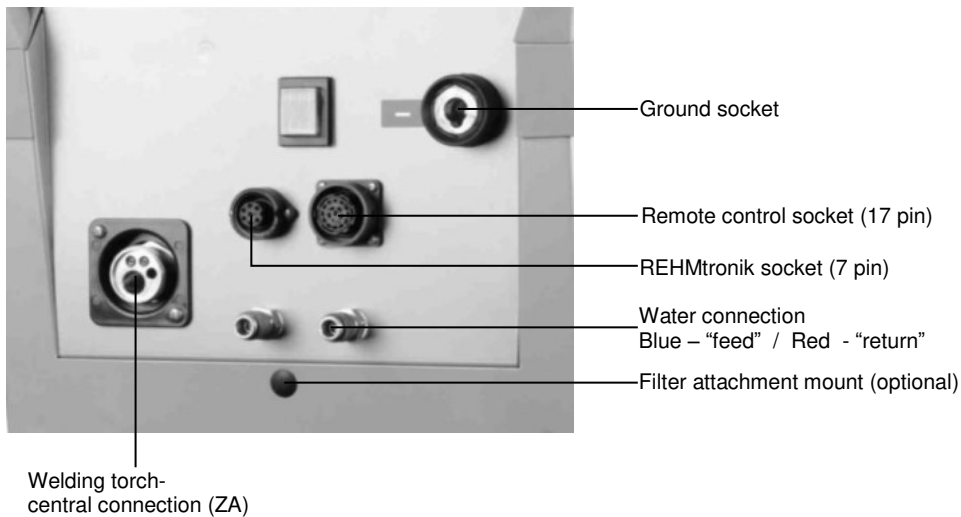
Used to connect the cooling water hoses from the intermediate hose set to the wire feed case.

4.2.4 Control cable unit plug (7 pin)

Used to connect the control cable coupling from the laptop or PC (serial interface; for example: COM 1).

Note: The serial interface must be floating, this means it must not have any connection to the positive conductor.

4.3 Plug connections on the front panel of the wire feed case



4.3.1 Welding torch central connection (ZA)

Used to facilitate quick connection and changing of the welding torch.

4.3.2 Water connection "feed": WV (only for the design with water cooling)

One-hand coupling bordered in blue - (quick coupling) - coupling for connecting the welding torch.

4.3.3 Water connection “return”: WR (only for the design with water cooling)

One-hand coupling bordered in red - (quick coupling) - coupling for connecting the welding torch.

4.3.4 Remote control socket (17 pin)

This socket is provided as standard and is used to connect a remote control. The following remote control can be supplied:

MIG PLUS 2: Remote control with two adjusters.

For example: One adjuster for “welding energy (welding power)” and another adjuster for “Arc length (LBL)”.

4.3.5 REHMtronik socket (7 pin)

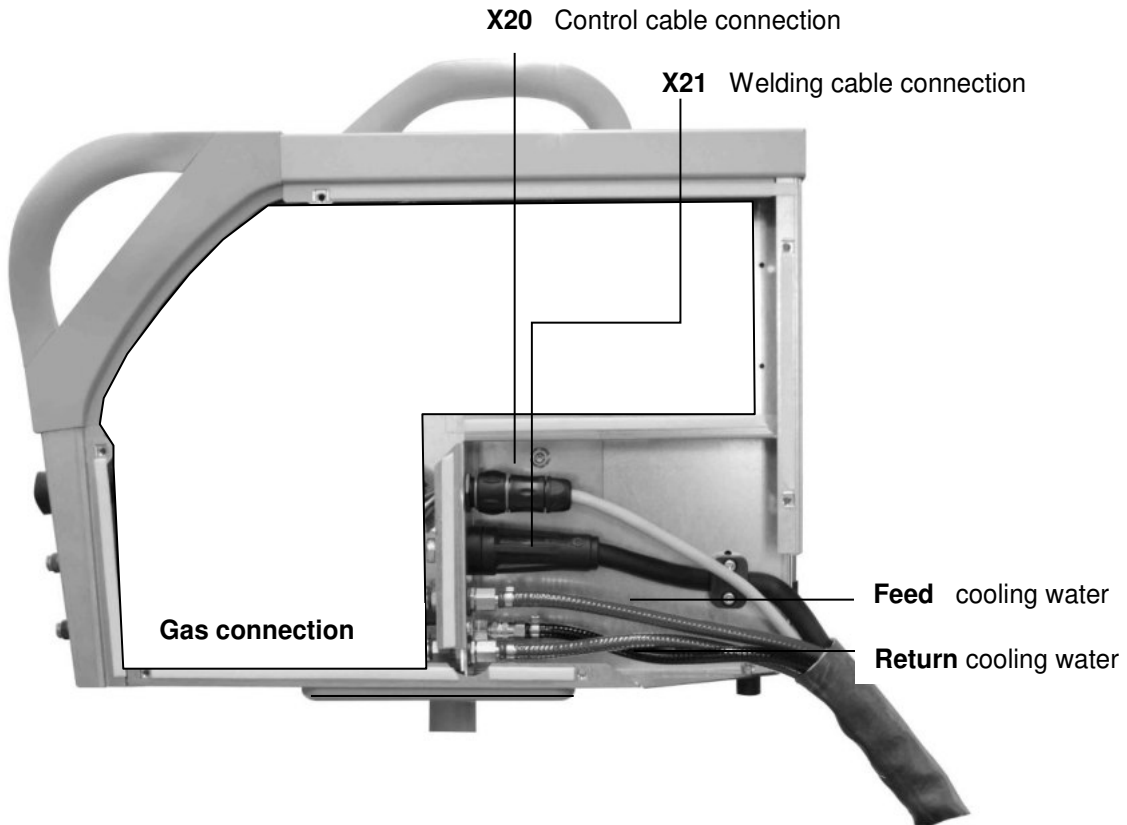
MEGA.PULS FOCUS

This socket is provided as standard and is used to connect a REHMtronik welding torch. Using the additional up/down buttons and the four light-emitting diodes (LEDs) on the welding torch it is possible to call four REHMtronik working points. Each of the up or down buttons (REHMtronik buttons) can be used to call the next stored REHMtronik(Rt) working point. The buttons can also be used to continuously increase or decrease the welding power.

SYNERGIC.PULS

The welding power can be increased or decreased stepless with the up/down buttons.

Plug connections on the rear of the wire feed case



4.3.6 Control cable plug (12 pin): X20

Used to connect the control cable socket from the intermediate hose set to the welding current source.

4.3.7 Welding cable plug “wire feed case”: X21

Used to connect the welding cable from the intermediate hose set to the welding current source.

4.3.8 Cooling water connection (RK intermediate hose set)

Used to connect the cooling water hose from the intermediate hose set to the welding current source.

4.3.9 Gas connection

Used to connect the inert gas hose from the pressure reducer or inert gas bottle.

4.4 Controls and displays on the welding unit and case

4.4.1 Controls in the vicinity of the wire when operating in the case

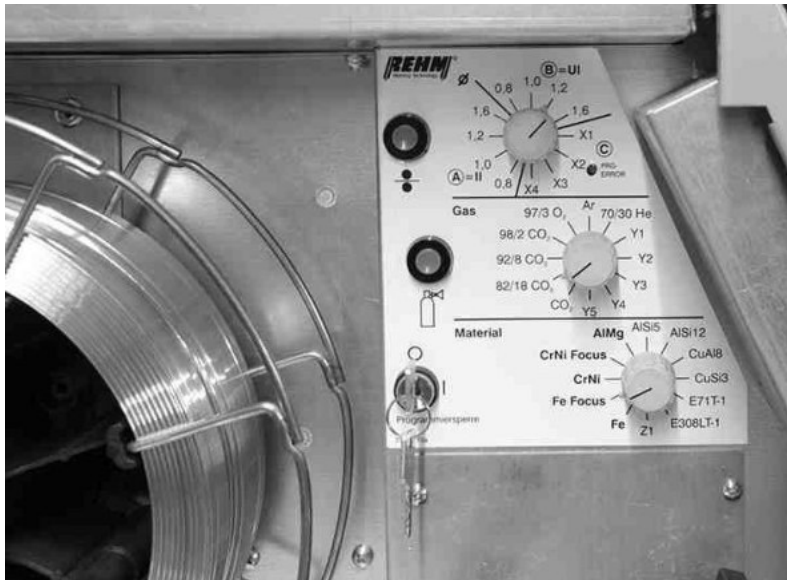
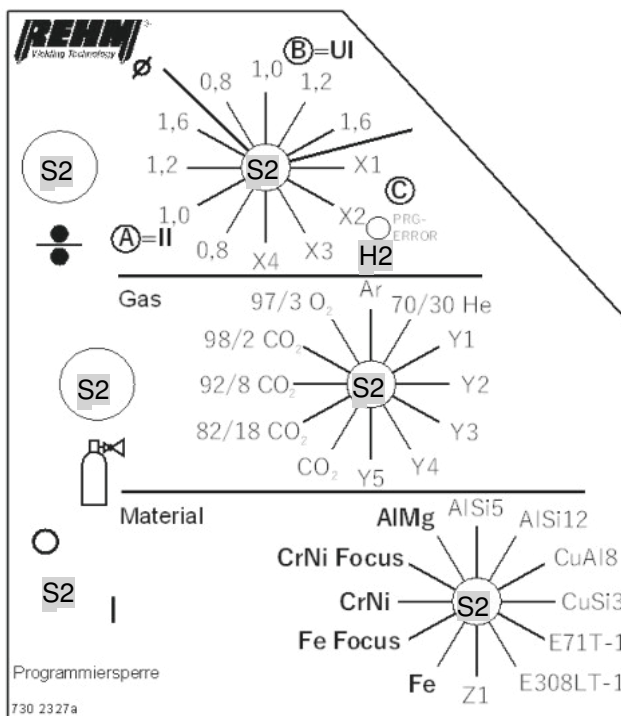


Figure: MEGA.PULS FOCUS

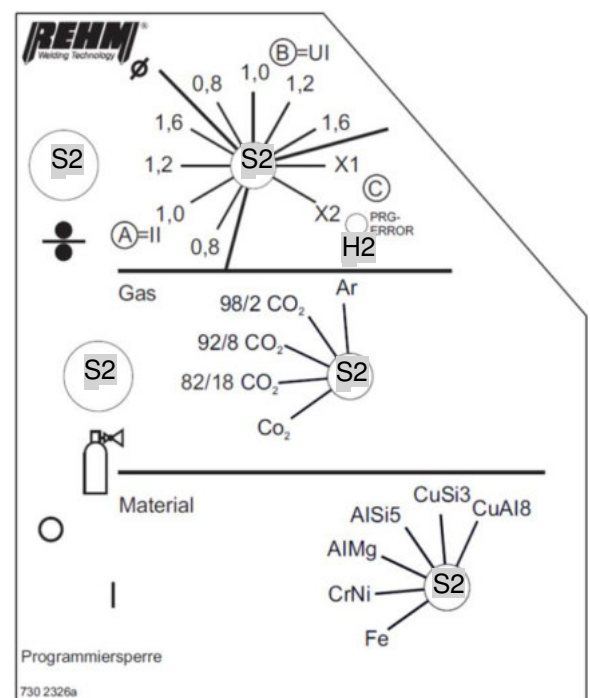
4.4.2 Controls on the front panel when operating in the case (only MEGA.PULS FOCUS)

Controls and displays are integrated into the operating panel that are used for the actual welding. All presets and corrections can be made before the start of the welding process and during the welding process. All current welding data and system statuses are also readily available.

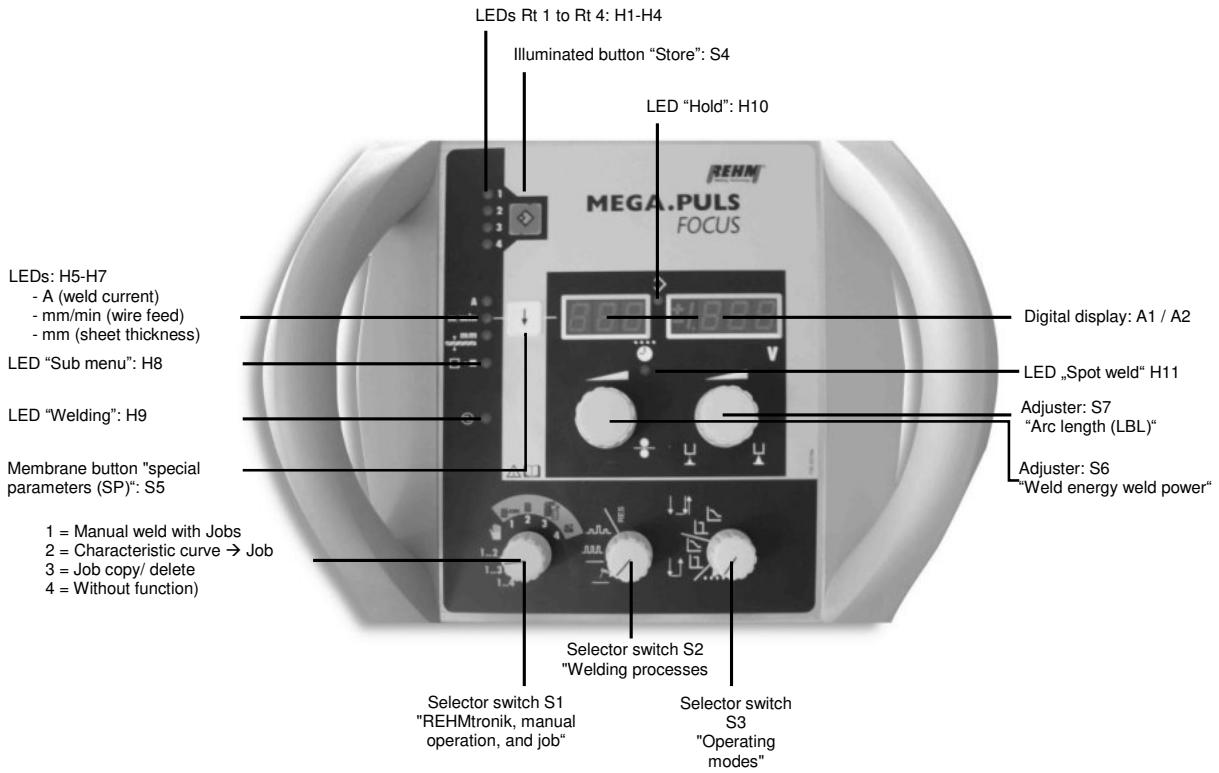
Operating panel MEGA.PULS FOCUS



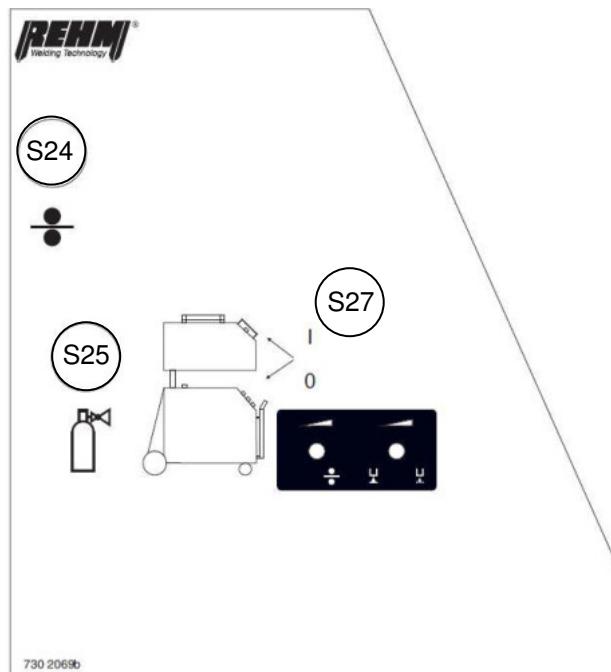
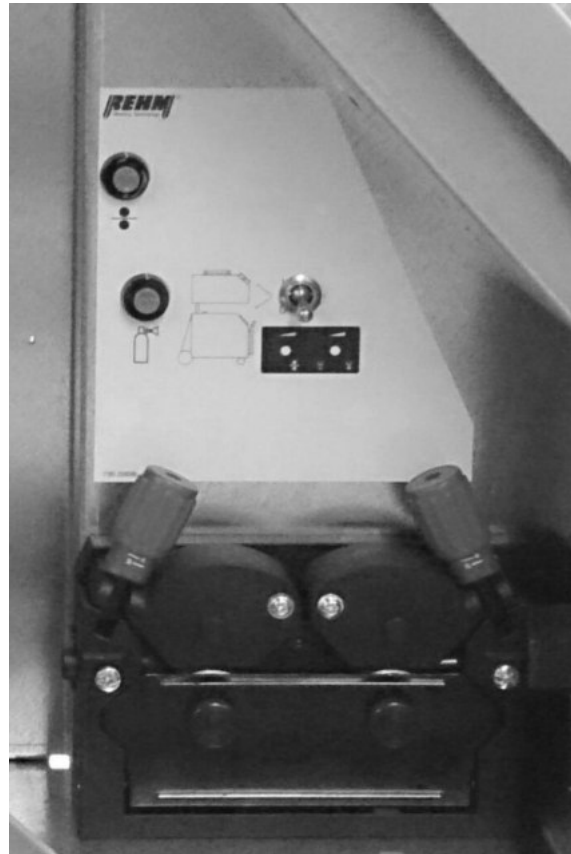
Operating panel SYNERGIC.PULS



Operating panel MEGA.PULS FOCUS – operation in the wire feed case



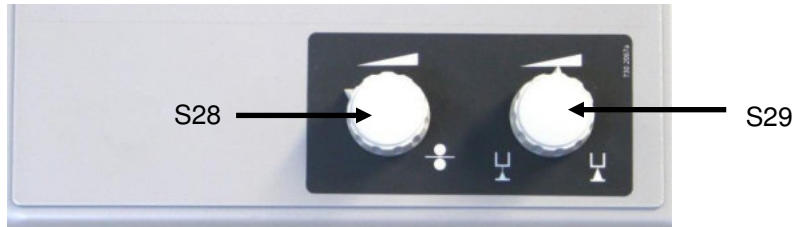
4.4.3 Controls in the case when operating in the current source (BU)



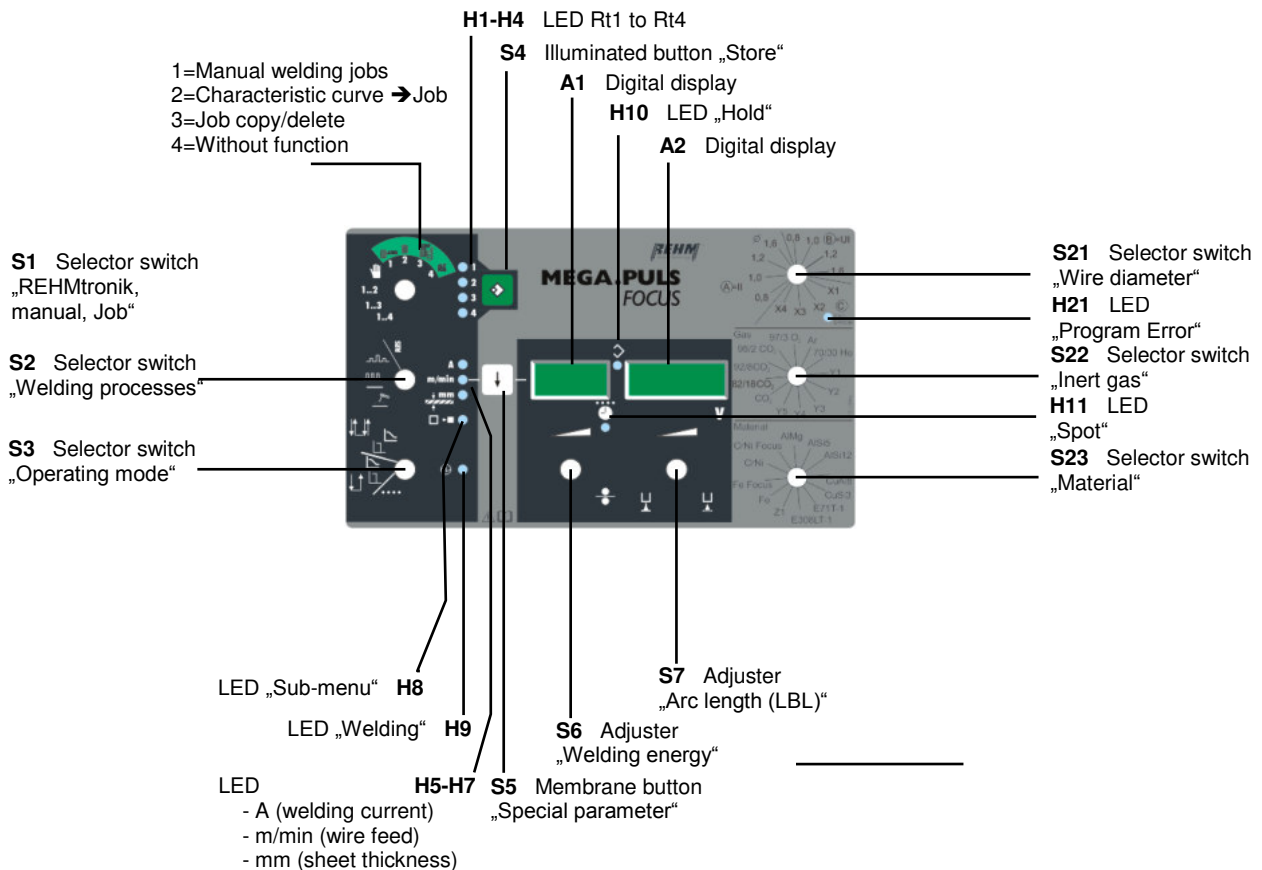
The figure above shows the operation in the unit with the remote control option.

4.4.4 Controls on the front panel when operating in the current source (BU)

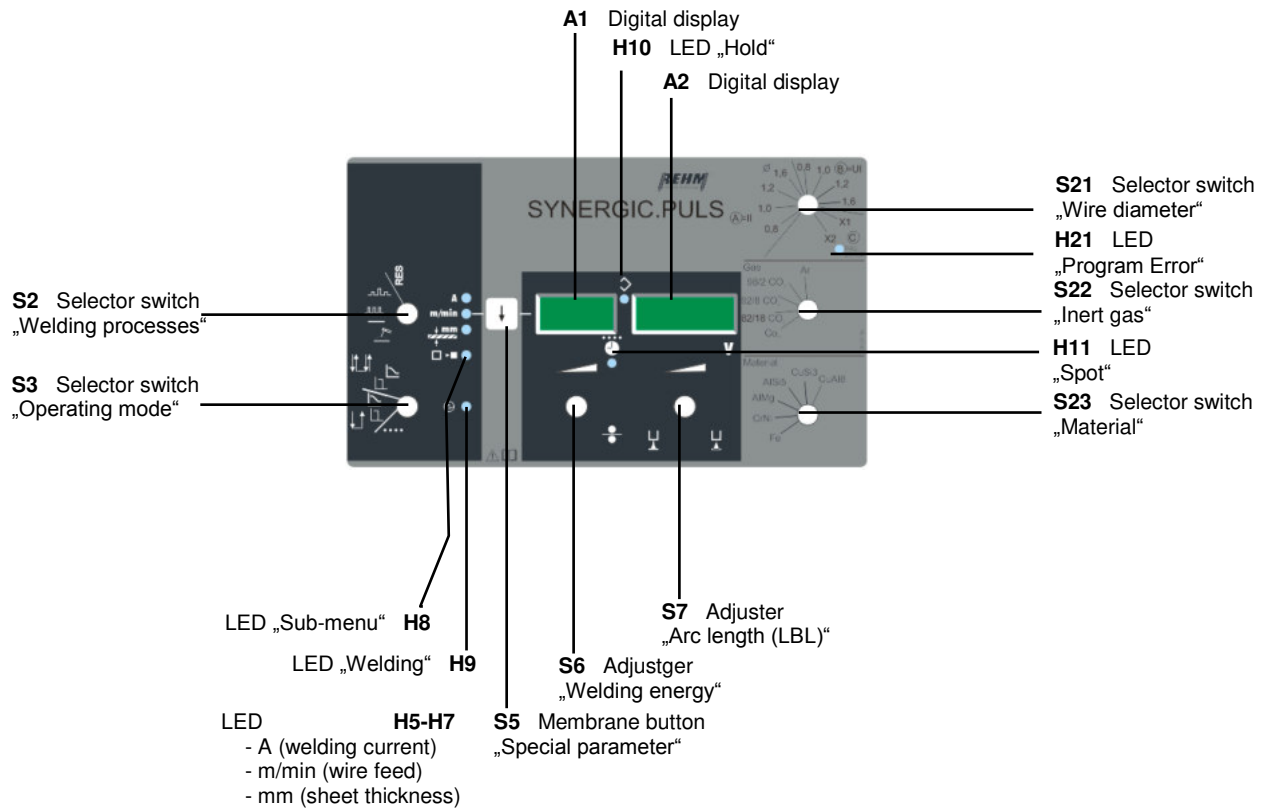
With the **MEGA.PULS FOCUS BU, SYNERGIC.PULS** the main control is on the current source. Adjusters are available on the case as option 2, with which the welding power can be adjusted and arc corrections made.



4.4.5 MEGA.PULS FOCUS Controls on the front panel of the current source



4.4.6 SYNERGIC.PULS Controls on the front panel of the current source



4.5 Description of the controls

4.5.1 Assignment table (S21 / S22 / S23)

For selecting the desired welding characteristic curve (synergy characteristic curves) it is always necessary for the three selector switches for inert gas / material / wire diameter to be brought to the correct respective positions.

From page 93 in the Annex to this instruction manual there is a complete list of the welding characteristic curves that can be selected with the respective switch positions.

4.5.2 Selector switch "Wire diameter": S21

To call the desired welding characteristic curve (synergy characteristic curve) the selector switch must be brought to the respective position. The selector switch is divided into three sectors A, B and C:

Sector	Welding process being used
A	MSG-Puls-II / MSG-Normal
B	MSG-Puls-UI / MSG-Normal
C	User defined sector

In addition to the common welding wire diameters ranging from 0.8mm to 1.6mm for solid wire, the free switch positions ranging from X1 to X4 (sector C) may optionally be assigned with customer-specific welding characteristic curves (synergy characteristic curves), for example for cored wires.

4.5.3 Selector switch "Inert gas": S22

To call the desired welding characteristic curve (synergy characteristic curve) the selector switch must be brought to the respective position.

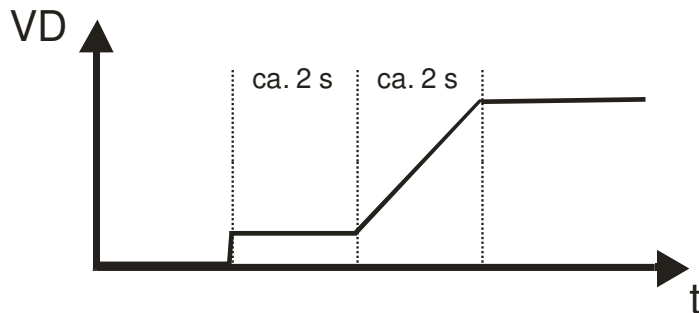
4.5.4 Selector switch "Material": S23

To call the desired welding characteristic curve (synergy characteristic curve) the selector switch must be brought to the respective position.

The material selection can also be used to call the desired welding process **FOCUS.ARC** (Fe Focus/ CrNi Focus) and **FOCUS.PULS** (Fe Focus/ CrNi Focus) or **POWER.ARC** and **POWER.PULS** (Fe / CrNi / AlMg / AlSi5 / AlSi12 / CuAl8 / CuSi3 / E71T-1 / E308LT-1 / Z1).

4.5.5 Button “Wire feed”: S24

Pressing this button transports the welding wire without inert gas and voltage into the torch using the wire feed motor and following a defined procedure. The wire is threaded through the welding torch connection and the torch hose set up to the contact tip. The wire feed speed is factory set to 7.0 m/min.



4.5.6 Button “Gas test”: S25

Briefly pressing the “gas test” button S25 opens the gas valve. The gas valve is closed again by briefly pressing the button a second time. If the gas test is not stopped by the user the gas valve closes automatically after 20 seconds.

This enables the desired gas flow to be set without wire feeding and voltage.

4.5.7 LED “Program error (PRG-ERROR)”: H21

Illuminates if the selection of a particular welding characteristic curve is not possible, for example if a welding characteristic curve is selected that is not available.

4.5.8 Option “Key switch”: S26

The selector switch inhibits access to the special parameters. The selector switch is available as an option. (With **MEGA.PULS FOCUS** in a case, with **MEGA.PULS FOCUS BU** on the front of the machine)

4.5.9 Selector switch operating modes

2 cycle / 2 cycle with crater filling program / 4 cycle / 4 cycle with crater filling program / spot welding”: S3

The operating mode is selected using the respective switch positions.

4.5.9.1 2 cycle mode (2T)

Welding in 2 cycle mode is recommended for short weld seams and for rapid, controlled tack welding and spot welding.

Actuating the welding torch (cycle 1) initiates the welding process **Start** program:

- the gas pre-flow period (t_{gv}) begins so that the arc is protected.
- the wire is fed up to the workpiece at reduced speed (initial wire feed speed).
- the arc is struck by the ignition program.
- then the welding process start program runs through:
 - Start power: Special parameter SP3
 - Start time: Special parameter SP4 SP4 (t_s)/time controlled
 - Start ramp: Special parameter SP5 (t_{RS})

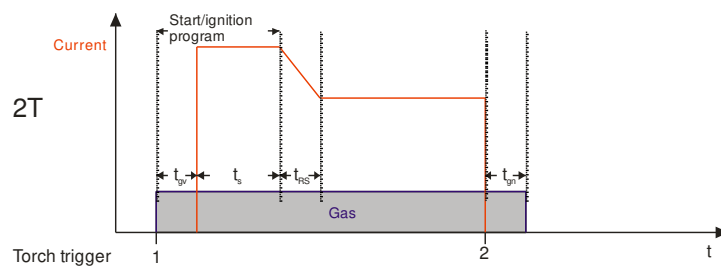
After reliable ignition the **fixed welding process** begins:

- the wire feed is increased to welding speed in accordance with the set welding energy.
- the process control delivers the welding process with the optimum welding parameters in accordance with the presets.

The fixed welding process then continues to run until the torch trigger is released (cycle 2).

When the torch trigger is released the end program runs:

- the free burning time ensures that the end of the wire is matched to the energy.
- the end of the wire is kept “sharp” by removing the ball.
- the weld pool is protected by a gas post-flow time (t_{gn}) after the arc is extinguished.



Restarting during the gas post-flow time

If the welding torch is again actuated before the gas post-flow time has expired, the startup program and the arc are restarted without the gas pre-flow.

4.5.9.2 2 cycle mode with crater fill program (2TK)

Welding in 2 cycle mode is recommended for short weld seams and for rapid, controlled tack welding and spot welding.

Actuating the welding torch (cycle 1) initiates the welding process **Start** program:

- the arc is protected by a gas post-flow time (t_{gv}).
- the wire is fed up to the workpiece at reduced speed (initial wire feed speed).
- the arc is struck by the ignition program.
- then the welding process start program runs through:
 - Start power: Special parameter SP3
 - Start time: Special parameter SP4 SP4 (t_s)/time controlled
 - Start ramp: Special parameter SP5 (t_{RS})

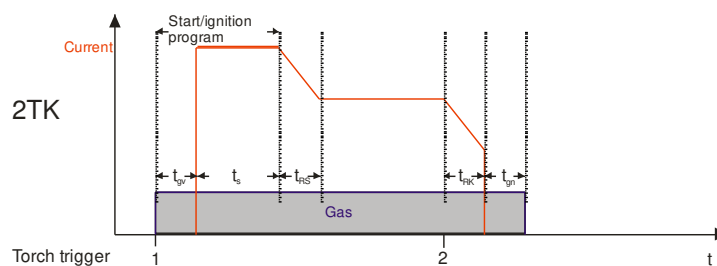
After reliable ignition the **fixed welding process** begins:

- the wire feed is increased to welding speed in accordance with the set welding energy.
- the process control delivers the welding process with the optimum welding parameters in accordance with the presets.

The fixed welding process then continues to run until the torch trigger is released (cycle 2).

When the torch trigger is released, the crater fill program runs (time controlled; can be adjusted using special parameter SP15 (ramp-down / time t_{RK}) or using special parameter SP16 (crater fill power) and then the **end** program runs:

- the free burning time ensures that the end of the wire is matched to the energy.
- the end of the wire is kept “sharp” by removing the ball.
- the weld pool is protected by a gas post-flow time (t_{gn}) after the arc is extinguished.



Restarting during the gas post-flow time

If the welding torch is again actuated before the gas post-flow time has expired, the startup program and the arc are restarted without the gas pre-flow.

4.5.9.3 4 cycle mode (4T)

With 4 cycle operation the continuous holding down of the trigger is not necessary and the welding torch can be guided for a longer period without the user becoming fatigued.

When the torch trigger is actuated (cycle 1) the welding process begins. The arc is ignited by the **Start** program. The ignition program is automatically started once the arc has ignited.

- the gas pre-flow period (t_{qv}) begins so that the arc is protected.
- the wire is fed up to the workpiece at reduced speed (initial wire feed speed).
- the arc is struck by the ignition program.
- then the welding process start program runs through:
 - Start power: Special parameter SP3
 - Start ramp: Special parameter SP5 (t_{RS})

The starting power is maintained until the torch trigger is released (cycle 2). The welding power is now set using a ramp (special parameter SP5).

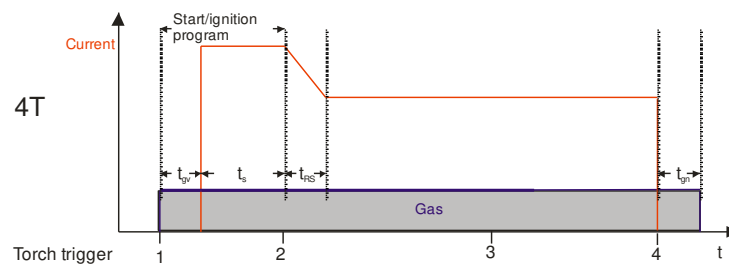
After reliable ignition the **fixed welding process** begins:

- the wire feed is increased to welding speed in accordance with the set welding energy.
- the process control delivers the welding process with the optimum welding parameters in accordance with the presets.

The set welding power remains unchanged until the torch trigger is again actuated (cycle 3) and once again released (cycle 4). The end program then starts automatically

After cycle 4 the end program runs:

- the free burning time ensures that the end of the wire is matched to the energy.
- end of the wire is kept "sharp" by removing the ball.
- the weld pool is protected by a gas post-flow time (t_{gn}) after the arc is extinguished.



Restarting during the gas post-flow time

If the welding torch is again actuated before the gas post-flow time has expired, the startup program and the arc are restarted without the gas pre-flow.

4.5.9.4 4 cycle mode with crater fill program (4TK)

With 4 cycle operation the continuous holding down of the trigger is not necessary and the welding torch can be guided for a longer period without the user becoming fatigued.

When the torch trigger is actuated (cycle 1) the welding process begins. The arc is ignited by the **Start** program. The ignition program is automatically started once the arc has ignited.

- the gas pre-flow period (t_{qv}) begins so that the arc is protected.
- the wire is fed up to the workpiece at reduced speed (initial wire feed speed).
- the arc is struck by the ignition program.
- then the welding process start program runs through:
 - Start power: Special parameter SP3
 - Start ramp: Special parameter SP5 (t_{RS})

The starting power is maintained until the torch trigger is released (cycle 2). The welding power is now set using a ramp (special parameter 5).

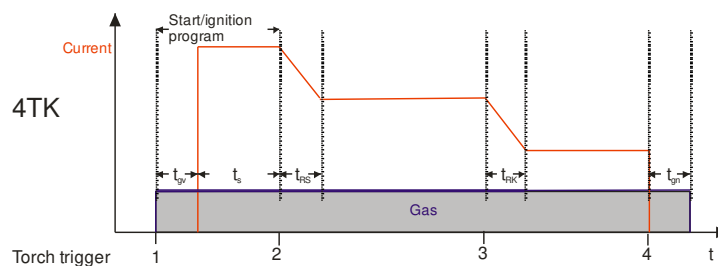
After reliable ignition the **fixed welding process** begins:

- the wire feed is increased to welding speed in accordance with the set welding energy.
- the process control delivers the welding process with the optimum welding parameters in accordance with the presets.

The set welding power remains unchanged until the torch trigger is again actuated (cycle 3). Now the welding power is reduced using a ramp (special parameter SP15) to the crater fill power (special parameter SP16). The crater fill power is maintained until the torch trigger is again released (cycle 4). The end program then starts automatically

After cycle 4 the end program runs:

- the free burning time ensures that the end of the wire is matched to the energy.
- end of the wire is kept "sharp" by removing the ball.
- the weld pool is protected by a gas post-flow time (t_{qn}) after the arc is extinguished.



Restart during gas post flow period

If the welding torch is again actuated before the gas post-flow time has expired, the startup program and the arc are restarted without the gas pre-flow.

4.5.9.5 Spot welding mode (spot welding)

Welding with the spot welding mode is recommended for welding using a set fixed spot welding time. The spot welding time is set using an adjuster “welding energy” S6 and the digital display A1.

Actuating the welding torch (cycle 1) initiates the welding process start program:

- the gas pre-flow period (t_{gv}) begins so that the arc is protected.
- the wire is fed up to the workpiece at reduced speed (initial wire feed speed).
- the arc is struck by the ignition program.

After reliable ignition the **fixed welding process** begins:

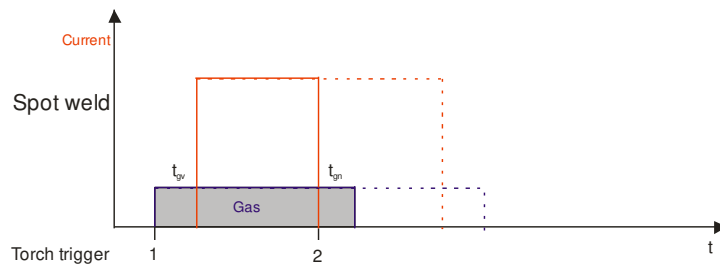
- the wire feed is increased to welding speed in accordance with the set welding energy.
- the process control delivers the welding process with the optimum welding parameters in accordance with the presets.

The fixed welding process runs with a fixed spot welding time, unless the trigger is released prematurely during the welding (cycle 2).

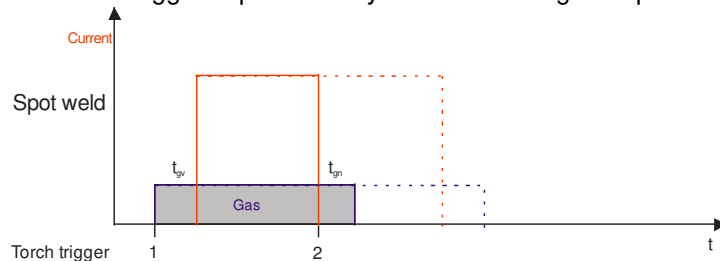
The **End** program runs after expiry of the set spot welding time or after releasing the torch trigger during the welding:

- the free burning time ensures that the end of the wire is matched to the energy.
- the end of the wire is kept “sharp” by removing the ball.
- the weld pool is protected by a gas post-flow time (t_{qn}) after the arc is extinguished.

Normal sequence:



The torch trigger is prematurely released during the spot welding time:



4.5.10 Selector switch welding processes

"Rod electrode / MSG standard / MSG pulse / MSG double pulse welding": S2

Selector switch S2 is used to select one of the four available welding processes ("rod electrode", "MSG standard", "MSG pulse", "MSG double pulse")

Note: The switch position "RES" (Reserve) cannot be selected at this time as no function has been assigned to this position.

4.5.11 Selector switch "REHMtronik" / "Manual" / "Job": S1 (only MEGA.PULS FOCUS)

This selector switch is used to select the following possibilities:

Postilion 1-4: Up to four additional working points or Jobs can be called using an additional trigger on the welding torch.

Postilion 1-3: Up to three additional working points or Jobs can be called using an additional trigger on the welding torch.

Postilion 1-2: Up to two additional working points or Jobs can be called using an additional button on the welding torch.

Position manual: The synergy characteristics selected via the selector switches "wire diameter", "inert gas" and "material" can be set via the adjuster "welding power" S6 and "Arc length (LBL)" S7. The energy can also be increased or reduced using Up/Down or Rt4 Torch.

Position 1, position 2, position 3 and position 4:

One working point can be set and stored per switch position.

Storing is performed using the illuminated button "Store" S4. To store the data the button must be held down for approximately 2 seconds. The display flashes briefly to confirm that the data has been stored.

Special parameter SP 40 must be set to "1" (default delivery state) to release the working points.

Special parameter SP 40 must be set to "2" (default delivery state) to release the jobs.

Note: The upper (green) selector switch scale S1 is only possible if the special parameter SP40 is set to "2" (see chapter 6.3).

When using an optimum remote control the REHMtronik function is disabled.

"REHMtronik" function

Between one and four working points (or jobs) can be called or set during welding using an additional button on the welding torch (REHMtronik welding torch = Rt welding torch). The energy can also be continuously increased or decreased.

Rt welding torch
with four LEDs:



When using an optional remote control the REHMtronik function is disabled.

4.5.12 Membrane button "Special parameters (SP)": S5

The "special parameter" submenu is called using the S5 button.
To call the submenu the button must be held down for longer than 2 seconds.
It is also possible to store new special parameter settings.

Note: The illuminating of the LED "submenu" H8 indicates that the welding program is in the submenu.

4.5.13 Illuminated button “Store”: S4 (only MEGA.PULS FOCUS)

The working points are stored using this button.

The button must be held down for longer than 2 seconds to store the working point.

Note: The digital display flashes briefly to confirm that the working point has been transferred in the selected memory position 1,2,3 or 4.

There are two methods for storing the working points:

1. Copy function

Turn the selector switch to the “manual” position and set the desired synergy characteristic curve using the “welding power” S6 and “arc length (LBL)” adjusters S7. Then tap the illuminated button “Store” S4 (S4 illuminates in response). Then turn the selector switch to the desired working point memory position (position 1, 2, 3, or 4). To store the new working position press and hold down for longer than 2 seconds the illuminated button “Store” S4 until the digital display flashes.

Note: S4 illuminates for approximately 5 seconds. The copy function must be completed within this time otherwise the storing of the working position must be repeated.

2. Edit the working position

Turn the selector switch to the position of the working point memory to be edited (position 1, 2, 3 or 4). Set the synergy characteristic curve using the “welding power” S6 and “arc length (LBL)” adjusters S7. To store the new working position press and hold down for longer than 2 seconds the illuminated button “Store” S4 until the digital display flashes.

4.5.14 LED “Welding”: H9

Illuminates when the welding system is performing welding operation.

4.5.15 LED “Submenu”: H8

Illuminates when the welding system is in the submenu “special parameters (SP)”.

4.5.16 LEDs “Rt1 to Rt4”: H1 - H4

The selected working point Rt1, Rt2, Rt3 or Rt4 are indicated by the LEDs H1 to H4.

4.5.17 LED “Spot welds” H11

Illuminates when the “spot weld” is selected. The spot welding time can be set in digital display A1 (left) in the range of 0.1 to 20 seconds via the adjuster “welding power” S6.

Note: To set the welding power or welding energy, the mode must be switched from “spot weld” to “2 cycle” or “4 cycle”. After the welding energy has been set the mode can be switched back to “spot weld”.

4.5.18 LEDs “welding current, wire feed, sheet thickness”: H5 - H7

The respective LED illuminates for the set display:

- H5: A Welding current display in the ampere display
- H6: m/min Wire feed display in mm/min in display
- H7: mm Sheet thickness display in the display

4.5.19 LED "Hold": H10

After welding, the last welding values “welding current and voltage” used for welding are shown on the digital displays A1/A2 (hold function). If the hold function is active, the LED "Hold" H10 is illuminated. The LED “hold” (H10) illuminates for a period of 20 seconds (hold time).

4.5.20 Adjuster “welding energy (welding power)”: S6

The adjuster “welding energy (welding power)” is used to continuously adjust the welding power and thereby the working point.

Every working point can be selected anywhere between the maximum and minimum setting. The processor control automatically and correctly provides the necessary parameters for the entire welding process.

4.5.21 Adjuster “Arc length (LBL)”: S7

The adjuster “arc length” is used to continuously adjust the arc length.

Note: Special parameter SP26 must be “On” in order to adjust the arc length.

4.5.22 Working with remote controls

For remote operation there are two optional remote controls or various welding torches.



Optional remote control when operation from below



Optional manual remote control
MIG PLUS 2

The selection of which and how many adjusters should be enabled in the remote control can be made via the special parameter SP 23 “remote controls - execution” and also via the selector switch S27. The following tables contain information on the possible adjustments and the respective control function.

- Comments:
- Remote control connection is automatic.
Please take note that the adjuster “welding energy” S6 and/or the adjuster “arc length” S7 on the operating panel are sometimes without function when working with a remote control.
 - Special parameter SP26 must be “On” in order to adjust the arc length

Working with the remote control option in the case with **MEGA.PULS FOCUS BU** (if no other remote control is connected)

SP23	Selector switch S27	Energy setting	Arc length setting
1	0	S6	S7
	1	S28	S29
2	0	S6	S7
	1	S28	S7
3	0	S6	S7
	1	S6	S28

Working with the manual remote control option
(The remote control in the case option for **MEGA.PULS FOCUS BU** and **SYNERGIC.PULS** has no function)

SP23	Selector switch S27	Energy setting	Arc length setting
1	Without function	S30	S31
2	Without function	S30	S7
3	Without function	S6	S30

4.5.23 Digital displays (A1/A2)

Left digital display A1: Welding current: LED “A” (amps) illuminates.
When the welding system is idling the set current is displayed. When the arc is struck the actual current (actual value) is displayed.

Wire feed: LED “m/min” illuminates.
Sheet thickness: LED “mm” illuminates.
Spot welding time: When the LED “spot welding“ illuminates.

Note: Tapping on button S5 switches between the various displays “welding current”, “wire feed” and “sheet thickness”.

Right digital display A2: Welding current

When the welding system is idling the welding current target figure is displayed. When the arc is struck the actual welding current (actual value) is displayed.
During the welding process “rod electrode” the idle current is always displayed.

Special feature:

The digital display has a positive and negative sign segment (+ or -) in front:

The sign is used for displaying the setting of the correction of the "arc length (LBL)", this means:

- : the arc is shortened

+ : the arc is lengthened

Comments: - When switching the system on, the digital displays are assigned as follows:

Left digital display A1	Right digital display A2
Case number	Software version

- If the subprogram (special parameter SP) is called using the button S5, the LED "submenu" H8 illuminates. The digital displays are then assigned as follows:

Left digital display A1	Right digital display A2
Special parameter (SP)	Special parameter value

- If a fault occurs the digital displays are assigned as follows:

Left digital display A1	Right digital display A2
"ERR"	Fault number

Please find the meaning of the fault number from the fault display list in Section 3.6.24 (control displays) in this manual.

After welding (hold function)

The average value of the welding current and welding voltage remain in the digital display for 20 seconds to enable them to be read or noted. During this time the LED "hold" H10 is illuminated. Briefly actuating the torch trigger or pressing button S5 immediately deletes stored values and jumps back to the preset.

4.5.24 Control displays

Control displays:

Lamps	Function	Explanation
In the main power switch S1 (green)	Main power switch on/off	Power supply on, control on.
H9 (yellow)	Welding operation on/off	Indicates that the welding system is in welding mode. Illuminates for as long as the welding process is running, that is from the beginning of the gas pre-flow to the end of the gas post-flow.

Fault indicators:

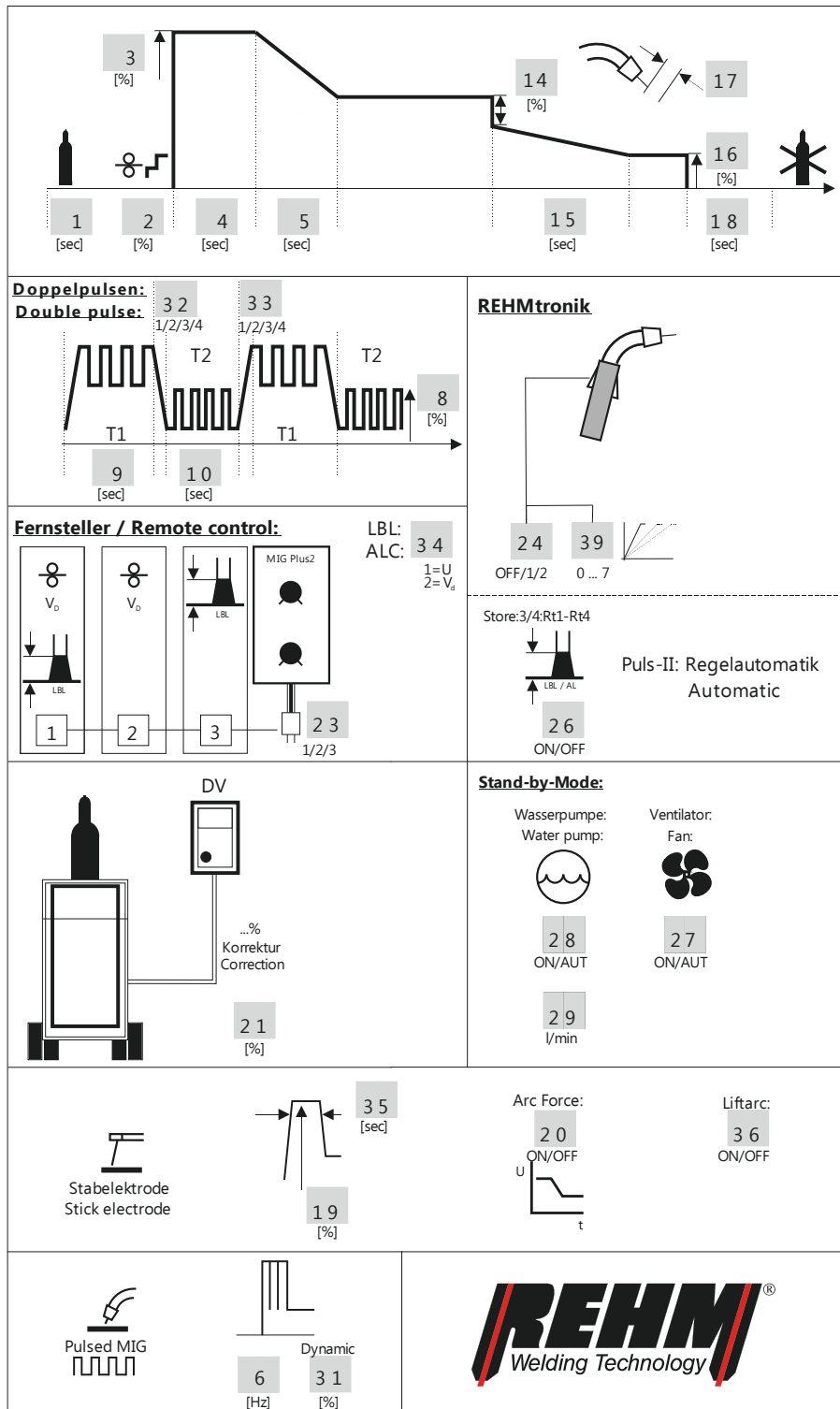
When a fault indicator is illuminated the system is blocked and welding is not possible. As soon as the cause has been eliminated the related indicator goes out and the system is once again ready for welding. The fault indication is shown on the digital displays A1 and A2.

Digital displays		Function	Explanation
A1	A2		
ERR	198	No welding program	No welding characteristic curve exists for the combination of switch positions for gas / material / wire diameter (S21, S22, S23) and welding process (S2).
ERR	H20	Water volume	As soon as the cooling circuit no longer has a sufficient volume of water the welding system switches off to protect the welding torch.
ERR	10	Temperature	Indicates that the permissible temperature of the power unit has been exceeded.
ERR	11	Phase failure	Indicates a failure of one phase of the power supply.

4.6 Special parameters

4.6.1 Graphical overview

The most important welding parameters can be edited and stored in the special parameter submenu (short: SP).



4.6.2 The most important special parameters

Special parameters enable the user to edit and adapt for their own requirements basic machine settings and welding parameters such as

- the selection of remote operation using a remote control or welding torch,
- correction factors for the intermediate hose set (ZwiPa) being used and the
- workpiece cable, the
- duration of crater filling and the gas post-flow

as well as many other parameters.

The special parameter functions are accessed by pressing and holding the button S5 (for approximately 2 seconds). LED H8 illuminates indicating that the special parameters can be modified. Digital display A1 shows the number of the special parameter being modified. The number assigned to the respective special parameter is taken from the attached overview foil. This is located in the wire feed case.

Changing the special parameter settings:

- Press and hold down the button S5 for approximately 2 seconds (call the submenu “special parameters”)
- Select the desired special parameter using adjuster S6: The respective special parameter number is shown in digital display A1
- Change the value using adjuster S7: The value is shown in digital display A2
- Store the change by pressing and holding button S5 for approximately 2 seconds.
- If it is necessary to change multiple parameters the process must be repeated for every special parameter value.
- Once all of the changes have been made, exit the special parameter mode by briefly pressing S5.

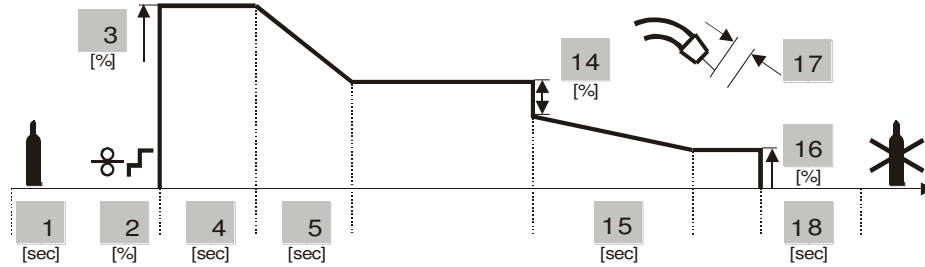
Changing the special parameter settings:

If the changes are not to be stored, exit the special parameter function by briefly pressing S5 (without pressing and holding S5).

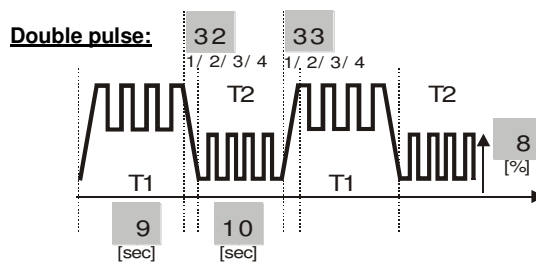
When changing the respective parameters a ‘+’ or ‘-’ sign is added in front to the value. This sign indicates the direction that the value is being changed, in comparison to the factory default value. This is intended as an orientation aid for the user.

Note: Some parameters have an influence on the machine settings, others only on the selected welding characteristic curve. For further information on this refer to the “assignment” column in the assignment table in the annex to this manual.

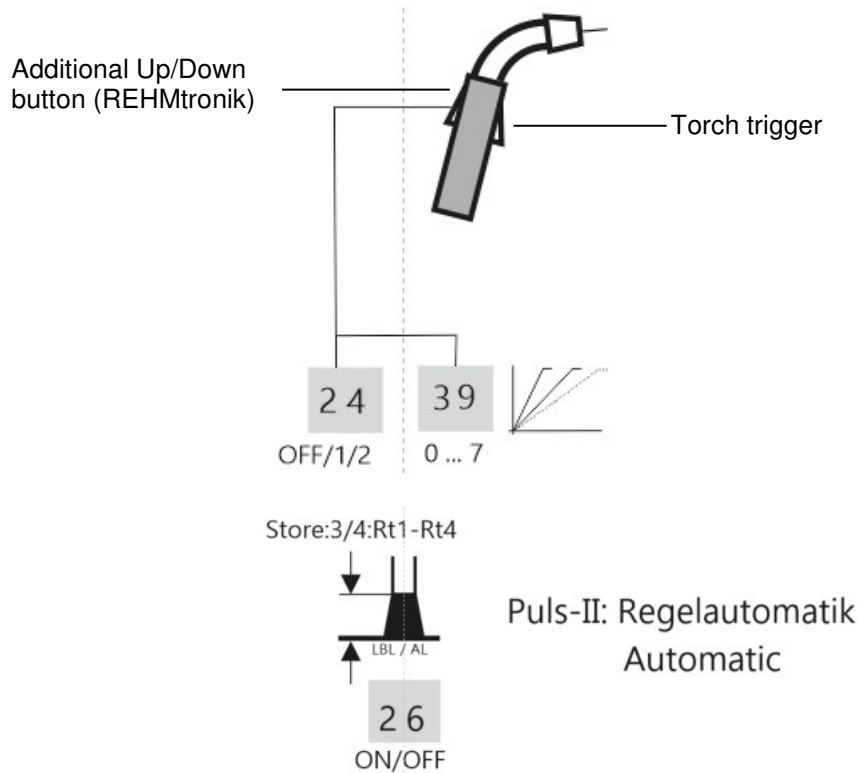
Explanation of the special parameters:



- SP1: Gas pre-flow time [0.0 - 20.0 sec]
- SP2: Initial wire feed speed [10 - 200%]
- SP3: Starting welding current [50 - 150%]
- SP4: Starting time: Period during which the starting current is applied [0.1 - 10.0 sec]
- SP5: Start ramp: Slope time during which the starting current is corrected to welding current whilst welding. [0.1 - 10.0 sec]
- SP14: Dropping jump: Magnitude of a current value by which a welding current value is suddenly dropped. [10 - 100%]
 This is the current to which the welding current suddenly drops. This jump prevents an increase in the weld seam width at an end crater and ensures that the end crater is closed.
- SP15: Drop time [0.1 - 10.0 sec]
- SP16: Crater filling current: Current level to which the current is dropped in the drop time set under SP15. [1 - 100%]
- SP17: Burning off: The wire feed is switched off with the current applied and current flowing. The wire electrode burns back. [0 - 20]
- SP18: Gas post flow time [0.1 - 20.0 sec]



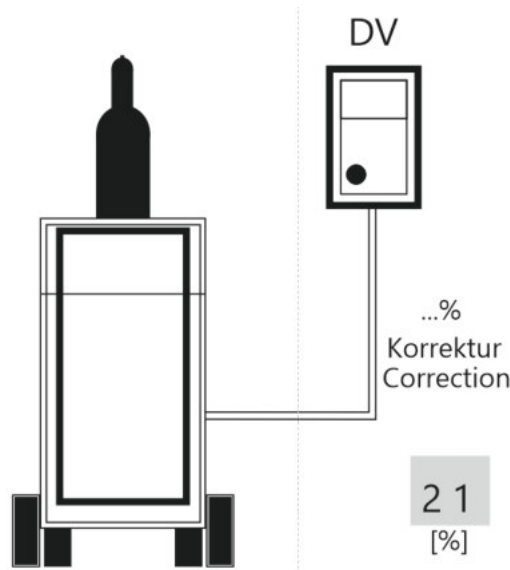
- SP8: Double pulse: Amplitude [20 - 180%]
- SP9: Double pulse T1 time [0.1 - 10.0 sec]
- SP10: Double pulse T2 time [0.1 - 10.0 sec]
- SP32: Double pulse slope T1/T2: Four defined times [1, 2, 3, 4]
- SP33: Double pulse slope T2/T1: Four defined times [1, 2, 3, 4]
 1=slow 4=fast



SP24:	Function	SP24 on display	Comments
	without	OFF	-
	REHMtronik	1	Working points / jobs cannot be stored.
		2	Working points / jobs can be stored.
SP39:	REHMtronik	0...7	Adjusting speed up/down

REHMtronik Working point / jobs (Rt1...rt4) can be called using the additional button on the welding torch.

- SP25: Not assigned []
- SP26: Arc length controller (LBL) - controller [On / OFF]
- SP21: Zwipa Control factor to correct the length of the intermediate hose set to the case. [50 – 100 – 150%]
 Setting "100" means that there is no correction in the databank of stored welding characteristic curves or synergy characteristic curves.
 Note: SP21 is not changed or reset with CLr ALL.



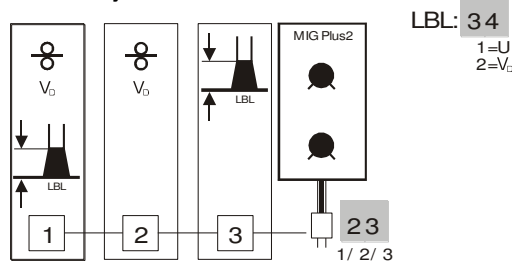
SP22: Not assigned

[]

When welding with characteristic curves FOCUS.PULS and FOCUS.PULS U/I the correction factor for the respective intermediate hose set can be determined in a very simple way. The correction factor should be set so that no transition from the start phase to welding, approximately the first 3 seconds, is defined, in particular for the arc length.

SP23: Remote control execution: Setting the remote control functions for [1, 2, 3] the welding torch or a remote control.

Remote adjuster:



- 1 = Adjustment range of both set values: Energy and arc length
- 2 = Only the energy can be adjusted from the remote control or from the welding torch. The arc length must be changed on the wire feed case or on the machine.
- 3 = Only the arc length can be adjusted from the remote control or from the welding torch. The energy must be changed on the wire feed case or on the machine.

SP34: Arc length correction (LBL):

- 1= LBL correction via U (voltage)
- 2= LBL correction via V_D (wire feed)

[1, 2]

SP27: Fan ⁽¹⁾

- Auto: The fan only runs during operation.
- On: The fan runs continuously.

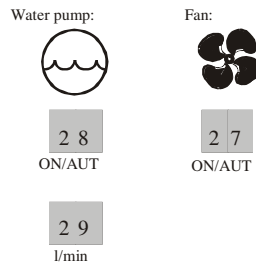
[Auto / On]

To reduce the idle power of the welding unit the transformer is disconnected from the power supply at the same time as the fan.

SP28: Water pump ⁽¹⁾ [Auto / On]
 Auto: The water pump only runs when required.
 On: The water pump is permanently switched on.

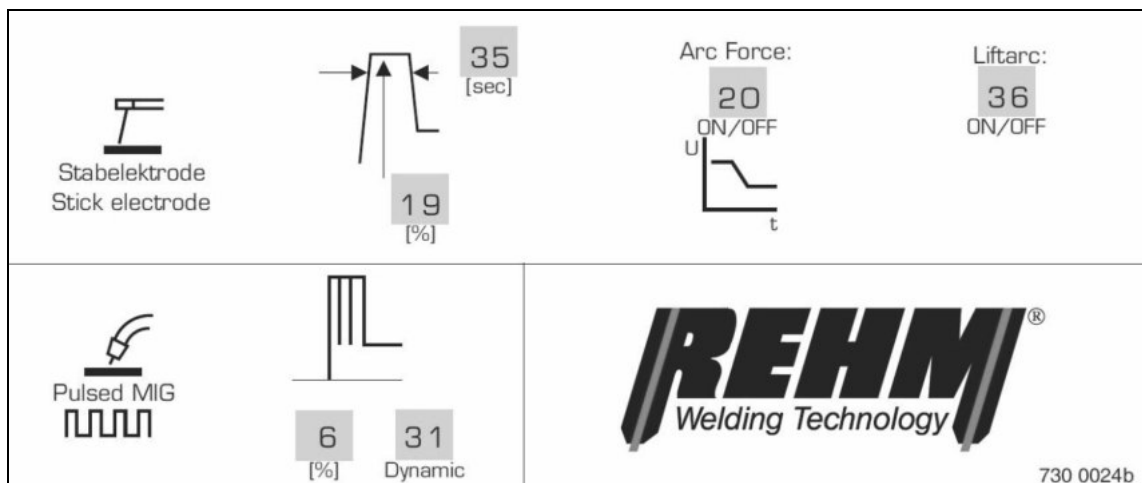
⁽¹⁾ The post-run time of the fan and the water pump depends on the welding time and the welding current.

Stand-by-Modus:



SP29: Flow volume [l/min]
 Display of the current water flow volume in l/min

SP30: Not assigned []



SP6: Option: Start frequency change [50 - 150]
 SP19: Option: Hotstart electrode from the set welding current [100 - 200%]
 SP31: Option: Start frequency dynamic [1 - 100%]
 SP20: Option: Arc force: Current increase to burn off the wire electrode [On / OFF]
 SP35: Option: Hotstart time [0.1 - 10 sec]

SP36: Liftarc for rod electrodes or TIG welding [On / OFF]

Note: Many special parameters are not assigned and therefore cannot be changed.

SP37,38: not assigned
 SP41...52: not assigned, excluding SP46 (see below)
 SP53...56: option
 SP57: Clear all: Return to factory defaults

As a last resort and the special parameters are hopelessly maladjusted, then the factors default settings can be reinstated by selecting the last special parameter location (SP53) using the function "CLr ALL" (display A1 and A2) and pressing and holding the button S2 for a long period.

There is the special parameter for the "jobs" function.

- SP40: Operating mode [1 - 2]
1=welding system in manual mode (REHMtronik)
2=welding system in jobs mode
- SP46: Display duration [5 - 120s]
Setting the display duration of the set / actual values for current and voltage.

5 Welding system functions

5.1 Water recirculation cooling with monitoring

The REHM-**MEGA.PULS FOCUS**, **SYNERGIC.PULS** inert gas welding system is equipped with water recirculation cooling of the welding torch as standard.

The effectiveness of the cooling is continuously checked by a flow monitor.

In the event of insufficient water flow or impermissibly low pressure the flow monitor switches off the welding current. This is indicated by the fault message: "ERR H20". Once the fault has been eliminated (for example by topping up with water or repairing a leak or a kink in the water hose) the fault message can be reset by switching the system back on.

5.2 Filtering the cooling circuit.

When topping up the cooling liquid it is cleaned by passing through a fine mesh screen. This provides the welding torch with additional protection against contamination, increasing reliability and service life.

5.3 System stand-by mode

Stand-by mode saves energy and reduces noise as well as increasing the service life of the water pump and the fans.

5.3.1 Fans

Special parameter SP 27: On position

The fans are permanently switched on (continuous run)

Special parameter SP 27: AUT position (Automatic)

The fans are switched on and off as required.

When welding commences the fans are always switched on.

The fans are switched off after some time after welding ceases, to always ensure that the components have adequate cooling.

5.3.2 Water pump

Special parameter SP 28: On position

The water cooling for the welding torch is permanently switched on (continuous run).

Special parameter SP 28: AUT position (Automatic)

The water cooling for the welding torch is switched on and off as required.

When welding commences the water cooling is always switched on.

The water cooling is switched off after some time after welding ceases, to always ensure that the welding torch has adequate cooling.

5.4 Synergy control

The data programmed and stored in the hard drive (flash) is always provided automatically, at the correct point in the sequence for every working point for ignition, start, crater fill, and end program.

The synergy control means that the user never needs to perform any settings.

5.5 Compensation for power supply fluctuations

Power supply changes in the range of +/- 10 percent to the present welding power have no influence, that means they cause no change.

5.6 Integrated digital adjustment and calibrating system

The system operates digitally to the greatest possible extent. Therefore, any potentiometer or other adjustable component is eliminated.

Manual adjusting and setting work is therefore no longer necessary.

5.7 Temperature monitoring of the power units

If the maximum permissible temperature is exceeded, the welding current and the wire feed is automatically switched off; this is indicated by the "ERR 10" appearing on the digital display. After the power supply has cooled down the system automatically switches back into operating mode.

The following conditions can cause the temperature switch to trigger:

- Exceeding the maximum duty cycle
- Ambient temperature too high
- Dirt in the air intake or outlet
- Covering the air intake or outlet

5.8 External cooling of the power units

The power units for the REHM- **MEGA.PULS FOCUS** *welding systems* are designed to ensure a high degree of efficiency. The specific placing of the cooling fans ensures an optimum heat extraction with minimum noise.

5.9 Forced shutdown in the event of a power outage

The welding voltage is automatically switched off if the welding current is interrupted for longer than 2 seconds in the "4 cycle" operating mode. The welding system then automatically returns to the basic state. This provides the user of REHM- **MEGA.PULS FOCUS** *welding systems* with additional protection against contact with electrical voltages and escaping inert gas.

6 Jobs (only MEGA.PULS FOCUS)

6.1 What are Jobs?

A job is a firmly defined working point with a stored characteristic curve under which the welding process and the operating mode are stored.

No jobs are programmed ex-works. These must be created by the user directly on the system. Chapter 6.3.2 explains how to create jobs on the system.

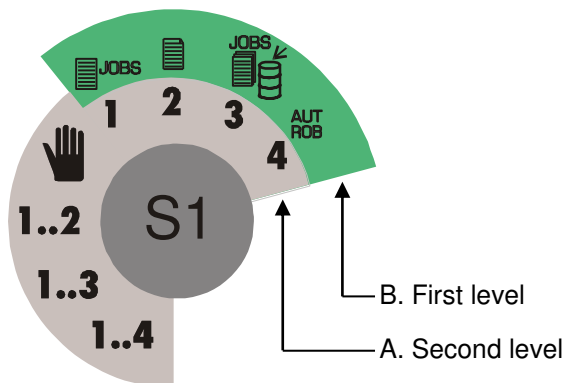
6.2 Memory management for jobs

The number of possible characteristic curves and jobs is limited to:

- max. 127 characteristic curves and
- max. 64 Jobs

6.3 The second level (green sector) of selector switch S1


Selector switch S1 has two levels. The first level corresponds to the standard welding function, for which working points can also be selected. The second level is only for job mode. The determination of which level is active is made using special parameter SP40.



SP40	Level
1	A
2	B

To use jobs selector switch S1 must be brought to the second level, (i.e. SP40 = 2). The second level is explained in detail in the following individual chapters.

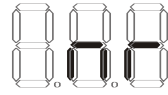
6.3.1 Manual welding with jobs

Symbol:  JOBS

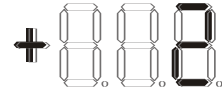
Select jobs

1. On selecting the position "manual welding with jobs" a job number appears. If no job is present the error message "ERR 499" appears.

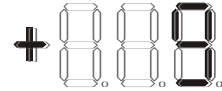
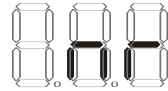
Display A1



Display A2



2. A job number can be selected by turning adjuster S7.
Note: Only existing job numbers can be selected.



Displaying the set value


Briefly pressing the illuminated button "Store" S4 switches between the job display and the set value display of the selected job. The energy and arc length can be altered in the set value display using the adjusters S6 and S7. If an adjuster is turned this is indicated to the user by the lighting up of the illuminated button "Store" S4. This change can be taken into the job working point by pressing and holding (longer than 2 seconds - existing data is thereby overwritten). On selecting a new job any changes to the energy or the arc length are lost if these are not saved.

Note: After an adjustable time period (special parameter SP46) the display automatically jumps back from the set value display to the job display.

Note:

- ◆ In this state the job selection via the communication interface AUT 01 is blocked.
- ◆ A new job can also be selected during welding (job relaying).

6.3.2 Creation of a job from a characteristic curve

Symbol: 

Operation and display:

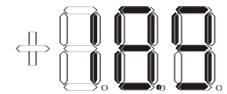
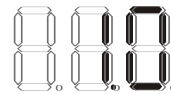
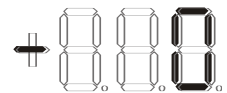
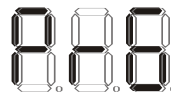
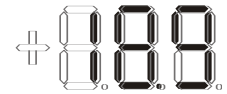
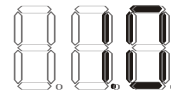
Proceed as follows to create a job:

Create a job

1. Set special parameter 40 on 2 "jobs and automation" and with the selector switch S1 select "create job".
2. Set the following welding parameters on the system: Characteristic curve S21-S23, operating mode S3, welding process S2, welding power S6 and arc length S7. The set values are shown in the digital display.
3. Press illuminated switch "store" S4. Then digital display A1 shows "PrG" and digital display A2 shows the first free job number; illuminated button "store" S4 lights up. The job desired number is selected using adjuster S7. A plus sign (+) in front of the job number indicates that there is a job number already stored behind the selected job number, a minus sign (-) indicates that there is no job behind the selected job number.
4. Press and hold (longer than 2 seconds) the illuminated button "store" S4 until the digital display flashes. The flashing signals that the job has been stored. Briefly (less than two seconds) pressing the illuminated button "store" S4 jumps back one step, the set value is shown on the digital displays A1/A2.
5. To create further jobs from a characteristic curve repeat points 2 to 4.

Display A1

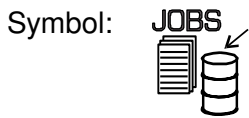
Display A2



Note:

- ◆ No jobs can be created under the welding process "rod electrode" (error message "ERR 405").
- ◆ In this state the job selection via the communication interface AUT 01 is blocked.
- ◆ If "PrG" is shown on digital display A1 no welding is possible with the welding system.

6.3.3 Copy and delete jobs.



Copying a job:

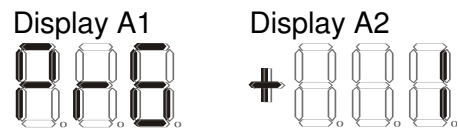
LEDs H1 - H4 indicate the current copying step during the copying process:

- H1 flashing → Selection of the job to be copied
- H2 flashing → Energy & LBL settings for the AP; welding can take place.
- H3 flashing → Define the memory position for the new job
- H4 flashing → Select the case: 1 = case 1

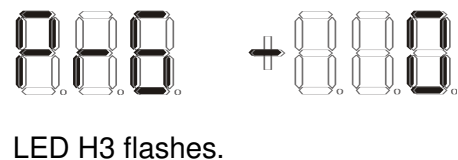
It is possible to jump back to the previous copying step by briefly (less than two seconds) pressing the illuminated button "store S4.

Copy a job

1. Set special parameter 40 on 2 "jobs and automation" and with selector switch S1 select "copy/delete job". Digital display A1 shows either "PrG" or "CLr" and digital display A2 the last selected job number or the first assigned job number.
2. Press button S5 until "PrG" is shown on digital display A1.
3. The job number to be copied can be selected using adjuster S7. Only assigned job numbers are shown. If no job number is present "---" appears in digital display A2.
4. Press and hold (longer than 2 seconds) the illuminated button "store" S4 until the digital display flashes. Flashing indicates that the job number has been adopted.
5. The energy and the arc length of the selected job can be changed using adjusters S6 and S7.
6. Press and hold (longer than 2 seconds) the illuminated button "store" S4 until the digital display flashes. Flashing indicates that the selected changes have been adopted.
7. The lowest free job number is shown. The desired job number is selected using adjuster S7. A plus sign (+) in front of the job number indicates that there is a job number already stored behind the selected job number, a minus sign (-) indicates that there is no job behind the selected job number.

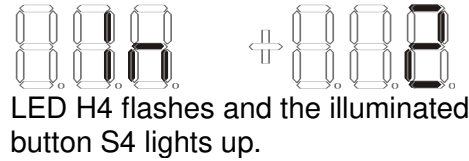


LED H1 flashes.



8. Press and hold (longer than 2 seconds) the illuminated button "store" S4 until the digital display flashes. Flashing indicates that the job number has been adopted.

9. The case number is now shown. Selection is not possible.



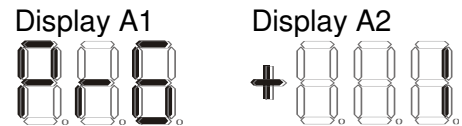
10. Press and hold (longer than 2 seconds) the illuminated button "store" S4 until the digital display flashes. Flashing indicates that the selected job number has been stored.
11. When copying further jobs see points 2 to 10.

Deleting a job:

LEDs H1 - H4 indicate the current deletion step during the deletion process:
 H1 flashes → Selection of the job to be deleted

Delete job

- Set special parameter 40 on 2 "jobs and automation" and with selector switch S1 select "copy/delete job". Digital display A1 shows either "PrG" or "CLr" and digital display A2 the last selected job number or the first assigned job number.
- If no job number is present "---" appears in digital display A2.
- The desired job number is selected using adjuster S7. Only assigned job numbers are shown. If no job number is present "---" appears in digital display A2.
- Press and hold (longer than 2 seconds) the illuminated button "store" S4 until the digital display flashes. Flashing indicates that the selected job number has been deleted.
- After deletion the lowest job number is selected. If no further job is present error "RR 499" appears.



LED H1 flashes.



Note:

- ◆ In this state the job selection via the communication interface AUT 01 is blocked.
- ◆ If there are no jobs in the job memory on selecting "copy and delete a job" error "RR 499" appears.

Comments:

- ◆ If "PrG" is shown on digital display A1 no welding is possible with the welding system.

6.3.4 Jobs with REHMtronik

In operating mode JOBS there are two possibilities for switching between multiple JOBS even when welding (if the torch has this option)

1) Job groups

Multiple jobs to be welded must be arranged in groups. A group is separated from other groups with a JOB that is not assigned.

Set selector switch S1 to position "load jobs". Select a job as described in section 5.3.1. It is now possible to change between the next higher or next lower job within a group using the buttons on the torch.

The table shows an example assignment with 2 groups:

Job No.	Assignment	Group
0	Assigned	Group 1
1	Assigned	
2	Assigned	
3	Assigned	
4	Assigned	
5	Not assigned	
6	Assigned	Group 2
7	Assigned	
8	Assigned	
9-60	Not assigned	
61	Not assigned	
62	Assigned	Group 1
63	Assigned	

2) Jobs

The REHMtronik function, with display of the job number using LEDs on the torch, can also be used with jobs.

Selector switch S1 Relaying between

Selector switch S1 at position	Job number
"1..2"	Job1 to Job2
"1..3"	Job1, Job2 and Job 3
"1..4"	Job1, Job2, Job 3 and Job4

The remaining job numbers in this type of use cannot be processed by REHMtronik. If a job other than a REHMtronik program is to be run, the job must be copied in this range (1-4).

If a selected welding sequence is not complete, meaning that one or more jobs in the welding sequence (1-2 / 1-3 / 1-4) are missing, error "ERR 497" appears. The initial operating mode is always used for welding, that is if a another job is relayed during welding the old operating mode (2 cycle / 4 cycle etc.) is retained until welding is completed.

7 Accessories

7.1 Standard accessories

- With air cooled welding systems:
Water cooled MIG/MAG inert gas welding torch (optional)
Comments: Various welding torches can be supplied. Please contact your REHM dealer.
- With air cooled welding systems:
Air cooled MIG/MAG inert gas welding torch (optional)
Comments: Various welding torches can be supplied. Please contact your REHM dealer
- Power supply cable: 4.3 m of free cable
- Workpiece cable: 4 m (optional)
- Pressure reducer with bottle content and flow indicators (optional)
- Operating manual

7.2 MEGA.PULS *FOCUS* and SYNERGIC.PULS unit versions and options

MEGA.PULS <i>FOCUS</i>	
Compact system	Product no.
MPF 230 water cooled	1306232
MPF 280 gas cooled	1306280
MPF 280 water cooled	1306282
MPF 330 gas cooled	1306330
MPF 330 water cooled	1306332
MPF 380 gas cooled	1306380
MPF 380 water cooled	1306382
MPF 430 gas cooled	1306430
MPF 430 water cooled	1306432
MPF 480 gas cooled	1306480
MPF 480 water cooled	1306482
Case systems	Product no.
MPF 230 gas cooled operated from the machine	1306234
MPF 230 gas cooled operated from the case	1306235
MPF 230 water cooled operated from the machine	1306236
MPF 230 water cooled operated from the case	1306237
MPF 280 gas cooled operated from the machine	1306284
MPF 280 gas cooled operated from the case	1306285
MPF 280 water cooled operated from the machine	1306286
MPF 280 water cooled operated from the case	1306287
MPF 330 gas cooled operated from the machine	1306334
MPF 330 gas cooled operated from the case	1306335
MPF 330 water cooled operated from the machine	1306336
MPF 330 water cooled operated from the case	1306337
MPF 380 gas cooled operated from the machine	1306384

Case systems	Product no.
MPF 380 gas cooled operated from the case	1306385
MPF 380 water cooled operated from the machine	1306386
MPF 380 water cooled operated from the case	1306387
MPF 430 gas cooled operated from the machine	1306434
MPF 430 gas cooled operated from the case	1306435
MPF 430 water cooled operated from the machine	1306436
MPF 430 water cooled operated from the case	1306437
MPF 480 gas cooled operated from the machine	1306484
MPF 480 gas cooled operated from the case	1306485
MPF 480 water cooled operated from the machine	1306486
MPF 480 water cooled operated from the case	1306487
MPF 530 water cooled operated from the machine	1306536
MPF 530 water cooled operated from the case	1306537
SYNERGIC.PULS	
Compact system	Product no.
SYNERGIC.PULS 230 0,8/1,0	1305230
SYNERGIC.PULS 230 W 0,8/1,0	1305232
SYNERGIC.PULS 330 0,8/1,0	1305330
SYNERGIC.PULS 330 W 0,8/1,0	1305332
SYNERGIC.PULS 430 1,0/1,2	1305430
SYNERGIC.PULS 430 W 1,0/1,2	1305432
Case systems	Product no.
SYNERGIC.PULS 230 S 0,8/1,0 operated from the machine	1305234
SYNERGIC.PULS 230 WS 0,8/1,0 operated from the machine	1305236
SYNERGIC.PULS 330 S 0,8/1,0 operated from the machine	1305334
SYNERGIC.PULS 330 WS operated from the machine	1305336
SYNERGIC.PULS 430 S 1,0/1,2 operated from the machine	1305434
SYNERGIC.PULS 430 WS 1,0/1,2 operated from the machine	1305436
Intermediate hose set 50mm²	Product no.
ZWIPA MSG 50mm ² 1,4m gas cooled	7503015
ZWIPA MSG 50mm ² 5m gas cooled	7503016
ZWIPA MSG 50mm ² 10m gas cooled	7503017
ZWIPA MSG 50mm ² 1,4m water cooled	7503018
ZWIPA MSG 50mm ² 5m water cooled	7503019
ZWIPA MSG 50mm ² 10m water cooled	7503020
Intermediate hose set 70mm²	Product no.
ZWIPA MSG 70mm ² 1.4m gas cooled	7503021
ZWIPA MSG 70mm ² 5m gas cooled	7503022
ZWIPA MSG 70mm ² 10m gas cooled	7503023
ZWIPA MSG 70mm ² 15m gas cooled	7503024
ZWIPA MSG 70mm ² 20m gas cooled	7503025
ZWIPA MSG 70mm ² 1.4m water cooled	7503026
ZWIPA MSG 70mm ² 5m water cooled	7503027
ZWIPA MSG 70mm ² 10m water cooled	7503028
ZWIPA MSG 70mm ² 15m water cooled	7503029
ZWIPA MSG 70mm ² 20m water cooled	7503030

Intermediate hose set 95 mm²	Product no.
ZWIPA MSG 95mm ² 1.4m gas cooled	7503031
ZWIPA MSG 95mm ² 5m gas cooled	7503032
ZWIPA MSG 95mm ² 10m gas cooled	7503033
ZWIPA MSG 95mm ² 15m gas cooled	7503034
ZWIPA MSG 95mm ² 20m gas cooled	7503035
ZWIPA MSG 95mm ² 1.4m water cooled	7503036
ZWIPA MSG 95mm ² 5m water cooled	7503037
ZWIPA MSG 95mm ² 10m water cooled	7503038
ZWIPA MSG 95mm ² 15m water cooled	7503039
ZWIPA MSG 95mm ² 20m water cooled	7503040
Options ex works	Product no.
Remote control on the case when operated from below	1381365
Key actuator fixed (only MEGA.PULS FOCUS)	1381366
Key actuator variable (only MEGA.PULS FOCUS)	1381339
Optional air filter attachment	1381351
Optional crane lifting eyes with storage draw	1180213
Optional crane lifting eyes with wire feed case	1180167
Optional torch with hose set bracket Torch and hose pack bracket	1180214
Optional drum wire feedthrough	1180570
Optional cover flap for the machine operating panel	1381372
Optional cover flap for the case operating panel	1381373
Push-pull connector	1180139
Optional interface RI 01	1381369
Optional interface RI 02	1381370
Case holder complete	1381374
Retrofit options	Item no.
Retrofit air filter	1381353
Retrofit Push Pull connection	4300318

7.2.1 Remote control for **MEGA.PULS FOCUS**, **SYNERGIC.PULS**

MIG PLUS 2: Manual remote control



With two adjusting knobs for setting the “welding energy (welding power)” or the “arc length (LBL)”.

Used for easy and rapid setting of the “welding energy (welding power)” and the “arc length (LBL)” directly from the workplace.

The function of the adjusters “welding energy (welding power)” and the “arc length (LBL)” are identical to those located on the operating panel on the wire feed case.

8 Transport

The following safety regulations must be observed for transport:

- **The welding system is not suitable for transport by crane. Crane lifting eyes for crane transport are available as an option.**
- **A pallet must be used when transporting with a fork lift truck. The system must be securely and safely anchored. The pallet must be secured so that tipping of the pallet and/or the system is not possible, (when transporting in the open take the weather conditions into account). The fork-lift truck must comply with the current safety regulations.**
- **The *REHM*- system must only be transported in a horizontal position.**
- **Please take note of the weight information (see the “technical specification”).**
- **The information given excludes the wire coils.**

9 Commissioning

Carefully read function and operating instructions before any work with the welding system begins.

9.1 Setting up the welding system

Set up the *REHM welding system* so that the welder has sufficient space in front of the welding system to oversee and operate the adjusting devices.

The air inflow and air exhaust must also not be obstructed. The duty cycle of the welding system can only be achieved with sufficient air flow rate.

Pay particular attention to preventing the ingress of metal parts, dust or other foreign objects into the welding system.

9.2 Power supply connection of the welding unit or welding system

Welding units or welding systems may only be connected to the power grid in accordance with the applicable EC and VDE regulations.

The specification regarding the power supply voltage and mains fuses must be exactly followed. Fuses must always be dimensioned for the stated current (see the “technical specifications”).

When using circuit breakers the circuit breakers may trip when the machine is switched on or run-up from standstill. Therefore it is recommended that the circuit breakers used are suitable for strongly inductive or capacitive loads (e.g. DIN EN 60898-1 Type D or K).

9.3 Welding torch connection

On the wire feed case a welding torch central connection is provided for connection of MIG/MAG welding torches and through which the connections for welding current, torch button cables and inert gas are made.

Insert the welding torch connector into the central connection socket and tighten using the union nut.

With welding systems with water cooling as standard, the water connections must be inserted in the quick coupling connector indicated (red=return, blue= feed).

If an air cooled welding system is used, the two quick coupling connections for the water circuit must be connected together using a water hose bridge to prevent possible damage to the pump.

9.4 Connection: Workpiece cable

Insert the workpiece cable into the marked workpiece socket (X4/L-) of the welding current source and lock in position by turning.

Ensure that there is always a good electrical connection between the workpiece and the workpiece cable.

9.5 Gas connection

Place the inert gas bottle on the bottle bracket provided on the unit and secure against tipping with the safety chain.

Screw the bottle pressure reducer tightly on the thread and check the connection for tightness.

Screw the inert gas hose onto the pressure reducer and tighten with an open-end spanner.

Open the inert gas bottle and set the required volume of inert gas on the pressure reducer.

9.6 Coolant – checking

Before commencing any welding work check the water level in the cooling water tank.

If the water level is lower than 3/4 of the tank capacity, top up with "REHM-Special" coolant. Contact your REHM dealer if you have any questions

9.7 Inserting the wire electrode

Insert the welding wire coil (up to a maximum weight of 15 kg and size up to D300) onto the wire coil holder in the wire feed case.

When using plastic coils the opening must align with the carrier mandrel.

When using small coils (such as D200) an additional adapter must be inserted.

Please set the wire coil break in the wire coil holder to match the wire electrode being used.

9.8 Threading the wire electrode

Please ensure that the wire transport rollers and on the torch the correct contact tip and wire liner used are correct for the actual diameter of the wire electrode.

The welding system is now ready for welding and the operating mode and the desired welding characteristic curves can be selected for the particular task.

10 Practical instructions for use

The practical tips for the user listed below can only give an excerpt for the various applications REHM-**MEGA.PULS FOCUS** inert gas welding systems. In the event of questions regarding special welding tasks, materials, inert gases or welding fixtures refer to the topic-related technical literature from:

DVS-Bücher:
Deutscher Verlag für Schweißtechnik
Aachener Straße 172
40223 Düsseldorf

or from the
REHM specialist
dealers.

10.1 Weldable materials

REHM **MEHA.PULS FOCUS**, **SYNERGIC.PULS** inert gas welding systems are suitable for welding all common materials, such as alloyed and non-alloyed steels, stainless steel and aluminium.

10.2 Wire electrodes

Various different wire diameters and materials are offered and used for MIG/MAG welding.

The diameter of the wire is based on the thickness of the base material and the required welding current.

The wire electrode material is selected based on the base material and the desired quality of the weld seam.

The most common materials and their respective specifications can be found in the relevant specialist literature.

A large assortment can be found in the REHM accessory catalogue (or under www.rehm-online.de).

10.3 Inert gases

When welding steel it is most common to use a gas mixture of 82% argon + 18% CO₂, for stainless steel a mixture of 98% argon + 2% CO₂, and for aluminium pure welding argon.

The volume of inert gas required depends on the wire diameter, size of the gas nozzle, welding current strength and the movement of air depending on the working place.

An empirical formula for the gas setting is:

For steel: Wire diameter x 10 = gas volume in litres / minute.
For stainless steel: Wire diameter x 11 = gas volume in litres / minute.
For Aluminium: Wire diameter x 12 = gas volume in litres / minute.

10.4 MIG/MAG welding torch

REHM welding systems are equipped in part for a water cooled welding torch. The welding torch equipment depends on and must be matched to the particular welding task.

10.5 Welding torch accessories

10.5.1 Contact tips

Contact tips are wear parts and must be replaced periodically. Care must be taken to select contact tips of the correct size for the respective wire diameter.

Special contact tips are available for various different wire diameters for aluminium welding tasks and can be found in the REHM catalogue.

10.5.2 Gas nozzles

Gas nozzles is various different designs for different applications can be found in the REHM accessories catalogue.

10.5.3 Wire liner

Wire liners must be selected to match the various different types of material and wire gauges. An assortment can be found in the REHM accessory catalogue.

10.6 Welding torch position and distance

The following information gives recommended guide values to aid the user to achieve good working results.

However, these values can be individually adapted within certain limits depending on the welding task.

For standard MSG welding:

For continuous or conventional welding with synergy characteristic curves:

Welding torch position: Neutral or piercing, depending on the desired weld seam and notch shape

Welding torch distance*: approximately 10 to 15 mm

For MSG pulse welding:

Welding torch position: always slightly piercing, approximately 10° to 15°,

Welding torch distance*: approximately 15 to 20 mm.
i.e. the arc should always be visible

-
- Welding torch distance = distance from the contact tips to the workpiece.

11 Safety information

Working with and maintaining electric welding units and systems is always associated with possible hazards.

Persons who are not familiar with this type of welding units and systems can injure themselves and others. For this reason operating personnel must be made aware of the following potential hazards and the safety measures to prevent possible damage or injury.

11.1 Safety regulations and measures

The most essential regulations for handling welding devices and welding systems are defined in the accident prevention regulations BGV A3, TRBS 2131 and BGR 500 Chapter 2.26.

These regulations can be obtained from the publisher Carl-Heymanns-Verlag, Luxemburger Straße 449, 50939 Cologne.

The supplementary

"Sicherheitsregeln der Berufsgenossenschaft" (Insurance Association Safety Rules)

can also be requested from the responsible insurance association.

Der Deutsche Verlag für Schweißtechnik (German Welding Association) (Aachener Straße 172 in 40223 Düsseldorf, www.dvs-verlag.de) also offers useful information with the publications:

- "Arbeitsschutz beim Schweißen"
- "Die schweißtechnische Praxis / Band 14: 111 Arbeitsregeln für das Schutzgas-Schweißen"

The specialist publisher WEKA (Morellstr. 53, 86159 Augsburg) also offers a useful manual:

- "Schweißaufsicht-Arbeitssicherheit und Unfallverhütung"

11.2 Serious risks when welding

1.) Fire and explosion

Materials can be ignited by the electric arc, hot slag, secondary flames or thermal radiation.

Therefore remove all combustible materials from the area where welding will be performed and keep a fire extinguisher handy as a preventative measure.

There is an explosion risk from the combustible materials particularly due to leaking hoses and containers.

Welding activities are forbidden if the risk of an explosion cannot be excluded.

2.) Harmful substances

Gasses, vapours, smoke and dust can be absorbed by the body through respiration, swallowing or through the skin.

In particular, avoid welding galvanised and coated materials or materials that have been treated with degreasing agent.

The workplace must be set up with respect to the process, materials and conditions of use so that respiratory air is kept free of contaminants (see BGV A3).

If necessary suitable ventilation or extraction must be provided to ensure that the permissible limits (MAK = maximum permissible concentrations of noxious compounds in the workplace) is not exceeded.

3.) Noise

Noise is generated during welding work by knocking off slag, grinding, the arc and to a lesser extend by the welding system. Noise generated by the welding process depends heavily on the selected welding process, the position of the welding torch, the base material and the surroundings.

The noise level can be reduced through noise insulating measures or encapsulation.

Important:

Noise pressure above 85dB(A) can result in damage to hearing and the human nervous system.

Therefore, is this noise level is exceeded personal hearing protection must be worn.

4.) Optical radiation

Light emitted from the electric arc can glare and dazzle.
Ultraviolet radiation can result in conjunctivitis and burns to the skin.

Therefore always wear the correct personal protective equipment. Ensure that the protective filter for the eyes conforms to the valid regulations (e.g. DIN EN 166, DIN EN 169 or DIN EN 379) and that the correct protection level has been selected for the intended work. The levels of protection stated in the tables must never be fallen short of. Selecting a protective filter that is too low causes flickering of the eyes and eye damage.

5.) Electrical hazard

Contact with the welding current circuit can result in a dangerous electric shock. Always ensure sufficient protective measures against this risk.

Always wear:

- proper protective welding gloves
- closed, where possible dry protective clothing
- safety shoes with an undamaged rubber sole

Always use only items of equipment and welding equipment that are in perfect condition.

Avoid direct contact with live parts.

Live parts (such as: the welding torch and welding cable connections) are not free of current when operated in "rod electrode welding" mode and in the "MSG welding" mode are only free of current depending on the welding torch trigger signal.

Only change the wire electrodes with the current source disconnected.

Always switch off the welding system during longer breaks in the work and never leave the welding system unattended.

6) Mechanical hazard

Ensure that the welding unit is only operated with the housing closed. There is a risk of trapping fingers between the feed rollers or the rotating wire coil and parts of the housing.

The wire is threaded without the wire feed motor running. When threading the wire into the torch the wire feed speed is reduced so the wire can be threaded without risk.

7.) Working under elevated electrical risk

All REHM inert gas welding systems are suitable for working under elevated electrical risk and therefore carry the S mark.

Increased electrical risk exists where:

- compulsory contact with electrical conducting parts by unprotected parts of the body is unavoidable (kneeling, lying, leaning),
- the room for free movement between electrically conducting parts is less than 2 m (accidental contact),
- wet, damp or hot workplaces which increase the risk of electric shock.

Protective measures against increased electric risk:

- Use a *REHM* current supply with the S mark,
- use insulating intermediate layers (such as rubber mats),
- do not place the welding system in restricted spaces,
- only use suitable personal protective equipment in perfect condition.

8.) Handling errors

Handling errors can occur on welding systems or devices and protective equipment.

Only qualified or specially instructed persons who are familiar with the equipment and the process may be assigned with welding work.

Errors can also occur when operating or handling the welding system itself.

Therefore this function and operating manual must be carefully read and followed by all persons that work with this welding system.

The function and operating manual must be kept in a way that it is immediately at hand for all welders and the maintenance personnel.

The best suited place for keeping this manual is at the welding system itself.

Improper handling invalidates the right to claim under the warranty.

9.) Electromagnetic compatibility

Electric current passing through any conductor created local electric and magnetic fields (EMF). Welding current generates an electromagnetic field around the welding current circuit and the welding equipment. Electromagnetic fields can interfere with some medical implants such as cardiac pacemakers. Measures must be taken to protect persons with medical implants. This includes limiting access for passers by or individual risk assessments for welders.

All welders should use the following measures to minimise their exposure to electromagnetic fields generated by the welding circuit.

MEGA.PULS FOCUS, SYNERGIC.PULS inert gas welding equipment is designed in accordance with EN 60974-1 Arc welding equipment -welding power sources for overvoltage category III and pollution degree 3 and in accordance with EN 60974-10 Arc welding equipment - electromagnetic compatibility (EMC) for Group 2 Class A and should be suitable for use in all areas, except residential areas that are connected

directly to a public low-voltage supply system. It may possibly be difficult to ensure electromagnetic compatibility in these areas due to both conducted and radiated interference. Suitable measures to meet the requirements:

- Keep your head and trunk as far away as possible from the welding current circuit
- Do not place your body between the welding cables
- Both welding cables must run on the same side of the body
- Connect the return cable to the workpiece as close as possible to the site being welded.
- Never wind the welding cables around your body
- Never work in the vicinity of the welding current source, never sit on or lean against it
- Never perform welding when carrying the welding current source or the wire feed unit
- Power supply grid filter
- Shielding such as the use of shielded cables
- Keep welding cables as short as possible
- Grounding the workpiece
- Potential equalisation
- Lay welding cables together and secure with adhesive tape if necessary

Furthermore, an evaluation of the surroundings (such as computers, control equipment, sound and TV transmitters, persons in the vicinity, for example those using a cardiac pacemaker) is necessary. The responsibility for any fault lies with the user. For more information and recommendations, see, inter alia, DIN EN60974-10: 2008-09, Annex A.

12 Maintenance work

The system must undergo a continuous maintenance program to ensure safe and reliable operation.

Before beginning cleaning work the welding system must be switched off and disconnected from the mains supply. Ensure that no plug and socket connections separate or become loose during this work.

12.1 Cleaning the inside of the unit

If the REHM welding unit is used in a dusty environment the inside of the unit must be cleaned at regular intervals by blowing out or vacuuming.

The frequency of this cleaning depends on the respective conditions of use. Only use clean, dry air to blow out the unit or use a vacuum cleaner.

12.2 Checking cooling water and the cooler

For welding systems with an integrated water cooling circuit it is necessary to check the water level in the cooling water tank. If the water level is lower than 3/4 of the tank capacity, top up with "REHM special" coolant Contact your REHM dealer if you have any questions.

The fine filter screen in the exterior mounted water tank should also be checked and cleaned if necessary. To do this undo the screws on the water level and draw the filter upwards and out.

As part of this check, the degree of contamination in the cooling water should also be checked. To ensure the proper welding torch cooling the cooler should be cleaned by blowing out or sucking out.

12.3 Parts subject to wear

Various parts of the welding torch and the hose set are subject to high rates of wear because of their thermal, electrical or mechanical load.

Therefore the following points should be especially observed for their operation and maintenance:

Welding torch:

- Fit contact tips that match the diameter of the wire electrode
- Tighten contact tips
- Securely tighten the contact tips
- Use care and periodically clean the gas nozzle and contact tip holder of any weld spatter
- Spray the gas nozzle and contact tip holder with releasing agent

Welding torch hose set:

- Securely tighten the connection to the welding system so that it is free of leaks.
- Use a wire liner that matches the diameter of the wire electrode
- Periodically free the wire liner of wear residues by blowing out and replace if worn.
- For wire electrodes made of aluminium the wire liner must be replaced with a Teflon core.
- Do not kink the hose set
- Use the shortest possible hose set

12.4 Periodic maintenance work

Periodic maintenance work reduces welding system breakdowns due to wear and increases the quality standard of the welding system.

In accordance with the accident prevention regulations UVV BGV A3 and VDE 0544-207 the operator of electrical welding systems is also obliged to have the systems checked by a qualified electrician at specific time periods to ensure that the systems are in a proper condition.

This requires mobile equipment such as welding systems to be checked at least annually.

The operator of electrical welding equipment is held responsible for non-observance of this regulation or in the event of damage.

Therefore use the opportunity offered by a maintenance contract with REHM or an authorised REHM dealer to benefit from the advantage in terms of production reliability and quality.

12.5 Customer service and repair work

Troubleshooting and repair work on electrical welding systems may only be performed by electricians with the appropriate training.

If parts need to be replaced during a repair then only genuine REHM replacement parts may be used.

If a fault occurs that cannot be eliminated please contact your responsible REHM dealer.

If customer service or repair work is performed by persons who have not been trained and authorised to carry out the work by REHM, then and claims against REHM become void.

12.6 Proper disposal

Only for EU countries.

Do not dispose of electric appliances in domestic waste!

In accordance with the European Directive 2002/96/EC concerning old electrical and electronic devices and its transposition into national law, used electrical appliances must be collected separately and recycled in an environmentally friendly manner.



13 In the event of a fault

Fault description, root cause of the fault and fault elimination

If the measures for the elimination of the fault described below are of no useful assistance, the REHM service and repair department or an authorised REHM dealer must be called in.

Important!

Work on electrical devices must only be performed by appropriately trained specialist personnel.

Control lamp in the power switch does not illuminate - no function	
<u>Cause:</u>	<u>Remedy:</u>
The power supply voltage or phase voltage is not present	Check the voltage
Fault in the power supply cable or plug	Check
Fuse on the phase that has dropped out	Check the fuse and replace if necessary
LED "welding" is permanently illuminated.	
<u>Cause:</u>	<u>Remedy:</u>
Faulty torch trigger	Check the torch trigger
Check for a short in the torch trigger	circuit !
LED "welding" (H9) does not illuminate - welding is not possible	
<u>Cause:</u>	<u>Remedy:</u>
Operation is blocked	"ERR..." shown in digital display A1/A2
Torch plug is not inserted	Check and insert
Torch trigger or cable is faulty	Requires servicing
Machine fuse has blown	Check the fuse, replace if necessary
LED "PRG ERROR" illuminates or display "ERR 198" appears in digital display A1/A2	
<u>Cause:</u>	<u>Remedy:</u>
A welding characteristic curve is selected that is not available.	Selector switch: S21, S22, S23, S2 Correct the selection of "gas / material / wire diameter" and "welding process" in the wire feed case and bring to the correct switching position.

Display "ERR H20" appears in digital display A1/A2: Fault (cooling water)	
<u>Cause:</u>	<u>Remedy:</u>
No or insufficient cooling water	Top up cooling water*
Hoses kinked or unplugged	Check*
Welding torch circulation blocked	Reinstate the circulation, but do not blow through as this may destroy the flow monitor *
The pump is not delivering	Check fuse F2, replace if necessary
Pump faulty	Requires servicing
Display "ERR 10" appears in digital display A1/A2: Fault (temperature exceeded)	
<u>Cause:</u>	<u>Remedy:</u>
Permitted temperature in the power unit has been exceeded	Leave to cool, ensure free air circulation, clean the welding system if necessary
Maximum duty cycle is exceeded	Leave the welding system to cool down
Ambient temperature too high	Ensure sufficient cooling
Contamination of the air intake or outlet	Clean, ensure free air flow
Air intake or outlet is covered	Remove the cover, ensure free air flow
Fan does not rotate	Check fuse F1, replace if necessary
Fan faulty	Requires servicing
Electronics on the process card VK01 defective	Replace process card VK01. Note: Recalibration is possibly necessary (requires servicing)
Display "ERR 11" appears in digital display A1/A2: Fault (phase failure)	
<u>Cause:</u>	<u>Remedy:</u>
Failure of one phase of the power supply	Check the external fuses, replace if necessary
Defect in the power supply cable or plug	If necessary check if service is required*
Power supply contactor is defective	Replace the contactor*
Electronics on the process card VK01 defective	Replace process card VK01 Comment: Possibly a new calibration must be carried out (service case).
Display "ERR 50" "ERR 51" "ERR 52" "ERR 53" "ERR 54" "ERR 55" in the digital display A1/A2: Fault (system)	
<u>Cause:</u>	<u>Remedy:</u>
System fault	Service call
Display "ERR 101 (ERR 201)" on the digital display A1/A2: Fault (operating unit)	
<u>Cause:</u>	<u>Remedy:</u>
A fault has been identified in the operating unit.	Service call! ERR 101: Replace the operating unit (DV1) ERR 201: Replace the operating unit (DV2)

* Note.: The fault message can only be reset by switching the system off and back on again.

Display "ERR 102 (ERR 202)" on the digital display A1/A2: Fault (Motor/Encoder)	
<u>Cause:</u>	<u>Remedy:</u>
A fault has been identified on the motor or encoder.	Service call! ERR 102: Motor or encoder defective (DV1) ERR 202: Motor or encoder defective (DV2)
Display "ERR 110 (ERR 210)" on the digital display A1/A2: Fault (Reserve)	
<u>Cause:</u>	<u>Remedy:</u>
A fault has been identified on selector switch S2.	Turn selector switch S2 to another position. The position "RES" is not valid.
Display "ERR 400" appears in digital display A1/A2: Fault (Emergency stop)	
<u>Cause:</u>	<u>Remedy:</u>
The welding system has been set in the emergency stop state by the automation interface AUT 01.	<ul style="list-style-type: none"> - Eliminate the emergency stop trigger, possibly restart the system. - Check special parameter SP48.
Display "ERR 401" appears in digital display A1/A2: Fault (Collision)	
<u>Cause:</u>	<u>Remedy:</u>
A collision has been detected.	<ul style="list-style-type: none"> - Switch the system off. Remove the obstruction. - Check special parameter SP49
Display "ERR 402" appears in digital display A1/A2: Fault (Wire)	
<u>Cause:</u>	<u>Remedy:</u>
The end of the wire electrode has been detected.	<ul style="list-style-type: none"> - Switch the system off. Load a new coil of wire. - Check special parameter SP51
Display "ERR 403" appears in digital display A1/A2: Fault (Gas)	
<u>Cause:</u>	<u>Remedy:</u>
The lack of gas flow has been detected.	<ul style="list-style-type: none"> - Switch the system off. Exchange the gas bottle. - Check special parameter SP50
Display "ERR 404" appears in digital display A1/A2: Fault (The wire electrode is burnt onto the workpiece)	
<u>Cause:</u>	<u>Remedy:</u>
The burnt on state is detected.	No welding can be performed for time $t_{DFE}=5$ seconds. Eliminate the burnt on state. Welding is now possible.

Display "ERR 405" appears in digital display A1/A2: Fault (Welding process)	
<u>Cause:</u>	<u>Remedy:</u>
The job has an invalid welding process (e.g. rod electrode).	Assign the job a valid welding process (conventional, pulse, double pulse).
Display "ERR 406" appears in digital display A1/A2: Fault (AUT 01)	
<u>Cause:</u>	<u>Remedy:</u>
The optional board "AUT 01" is not present.	Switch the system off. Insert optional board "AUT 01" in VK01.
Display "ERR 407" appears in digital display A1/A2: Fault (BCD)	
<u>Cause:</u>	<u>Remedy:</u>
An incorrect BCD code has been detected.	Check special parameter SP41 (code) and machine settings.
Display "ERR 408" appears in digital display A1/A2: Fault (General)	
<u>Cause:</u>	<u>Remedy:</u>
A fault has been detected.	Eliminate the fault.
Display "ERR 497" appears in digital display A1/A2: Fault (Welding sequence)	
<u>Cause:</u>	<u>Remedy:</u>
The selected welding sequence is not complete, that means one or more jobs in the welding sequence are missing.	Check and correct if necessary job numbers 1 to 4.
Display "ERR 498" appears in digital display A1/A2: Fault (Job number)	
<u>Cause:</u>	<u>Remedy:</u>
An incorrect job number has been selected via the automation interface. Note: The previous job remains selected.	<ul style="list-style-type: none"> - Check special parameter SP41 (code) and machine settings. - The job number must not be greater than 63. - Select another job number or create a job for the selected job number.
Display "ERR 499" appears in digital display A1/A2: Fault (Job)	
<u>Cause:</u>	<u>Remedy:</u>
No job present.	Create jobs from the characteristic curve.

No flow of inert gas	
<u>Cause:</u>	<u>Remedy:</u>
Inert gas bottle empty	check
Pressure reducer is defective	check
Gas hose is kinked	check
Gas valve in the wire feed case defective	check
The wire electrode uncoils in an uncontrolled manner	
<u>Cause:</u>	<u>Remedy:</u>
Wire coil brake is applied either too strong or too weak	Adjust the wire coil brake with the wire coil holder
Wire guiding problems	The hose set should be blown through at every wire electrode change. The wire liner and the feed rolls must be matched to the wire diameter. This also applies to the respective parts of the welding torch.
No welding current present even though the LED „welding“ (H9) is illuminated	
<u>Cause:</u>	<u>Remedy:</u>
Workpiece cable is not attached	Establish connection
Welding torch is defective (interruption)	Replace the welding torch
Welding torch too hot	
<u>Cause:</u>	<u>Remedy:</u>
Position of the water connection hoses is switched	Properly reconnect
Water circuit is blocked	Clean the water circuit
Coolant is dirty	Drain the coolant and replace

Welding result is unsatisfactory (too much weld spatter, unsteady electric arc, pores, etc.)	
<u>Cause:</u>	<u>Remedy:</u>
The actual combination of "gas / material / wire diameter" does not match the settings of the selected welding characteristic curve	Either correct the combination or correct the welding characteristic curve to the current combination
Arc is too long or too short	Correct using the adjuster "arc length (LBL)"
Poor or loose connection of the workpiece terminal	Place the workpiece clamp connection as close to the welding arc as possible to ensure secure contact and flow of electricity.
Workpiece very dirty	Clean the surface
Poor quality wire electrode	Use material from another batch
Welding torch position and distance not matched	Correct the welding torch position and distance
Gas nozzle obstructed by weld spatter	Clean the gas nozzle, spray with separating agent if necessary. Replace the gas nozzle if necessary.
Volume of inert gas not properly adjusted	Correct the inert gas

Important!

If fuses are replaced they must be of the same rating!

Fuses may only be replaced with the welding system disconnected from the power supply.

If fuses are replaced with fuses of a higher rating the warranty is invalidated, because this can result in serious consequential damage!

14 Technical data

Type	230	280	330	380	430	480	530	
Adjustment range (continuous)	10-240	10-290	10-340	10-390	10-440	10-490	10-540	[A]
Duty cycle at maximum @40°C	60	60	60	60	60	60	50	[%]
Continuous operation 100%	180	220	260	310	340	370	390	[A]
Diameter steel / stainless steel	0.8/1.0/1.2	0.8/1.0/1.2	0.8/1.0/1.2	0.8/1.0/1.2	0.8/1.0/1.2	0.8/1.0/1.2/1.6	0.8/1.0/1.2/1.6	[mm]
Wire diameter aluminium	1.0/1.2	1.0/1.2	1.0/1.2	1.0/1.2	1.0/1.2	1.0/1.2/1.6	1.0/1.2/1.6	[mm]
Idle voltage, approx.	77	77	77	77	77	77	77	[V]
Mains connection	3/PE 400							[V _{50Hz}]
Continuous output 100%	8.1	10.8	13.8	15.8	15.8	21.0	21.0	[kVA]
Fuse (slow-blow) D characteristic	16	16	32	32	32	32	32	[A]
Power factor λ	0.91							[%]
Cooling type	AF							
Protection type	IP 23							
Noise pressure level to DIN 45635								
Sleep	<10							[dB(A) 1 m]
Stand-by	<57							
Idle	<68							
Welding*	<73							
Weight	155	155	155	165	165	177	177	[kg]
Dimensions	L x B x H 1030 x 800 x 1270							[mm]

	Wire feed case RK 2 L/W	
Supply voltage	52	[VAC]
Rated current idling / under load	1.2 / 2.0	[A]
Duty cycle (ED) at 530A (40°C)	50	[%]
Continuous operation 100%	390	[A]
Wire diameter	0.8 to 1.6	[mm]
Wire coil diameter max.	300	[mm]
Wire coil weight max.	18	[kg]
Wire feed speed	0.5 to 30.0	[m/min]
Protection type	IP23	
Max. gas pressure	5	[bar]
Weight	25	[kg]
Dimensions (L x B x H)	620 x 300 x 520	[mm]

- Emissions values:

The welding current source generate a noise pressure level of <68 dB(A) when idling and 73 dB(A) for the maximum permissible working point at standard load in accordance with VDE 0544-1 and EN 60 974-1. The sound pressure level measurements for the data given were made following DIN 45635. The sound pressure level was measured at a distance of 1 m from the welding current source.

A working place based emission value when welding cannot be established as this depends on the process and environment. It depends on a wide range of different parameters, such as the welding process, the type of welding current, the type of weld metal, the work place surroundings and much more.

15 Component and spare parts list with REHM item numbers

Pos.	Name	Part*	Comments	Item number
A10	EMC filter	E		690 0322
A11	Control "process card"	E	VK01	690 0344
A12	Start-up control	E		690 0323
A13	Fan control	E		690 0435
A20	Motor control card	E	DVK01	690 0310
A21	Operating unit card MEGA.PULS FOCUS	E	COM01	690 0320
A21	Operating unit card SYNERGIC.PULS	E	COM01	690 0324
A22	Operating unit card "material / wire / gas"	E	COM02	690 0325
C2	Interference suppressor	E		690 0051
F1/F2	Control fuse "control transformer" on the power supply filter	E	6.3 A slow-blow	660 0046
F1	Control fuse "fan"	E	2 A slow-blow	660 0031
F2	Control fuse "circulating water pump" (standard)	E	2 A slow-blow	660 0031
F3	Control fuse "case"	E	10 A slow-blow	660 0018
K1	Main fuse	E		420 0063
L11	Smoothing choke	E		220 3062
M1.1 M1.2	Ventilator	E	Fan 230VAC	410 0013
M1.1 M1.2	Ventilator	E	Fan 240VDC	410 0055
M2	Circulating water pump (standard)	V		410 0027
M20	Wire feed motor	V		410 0068
M21	Wire feed unit excluding motor	E		400 0127
M22	Encoder cable for feed motor	E		360 0682
R1	Shunt	E	500 A / 75 mV	670 0033

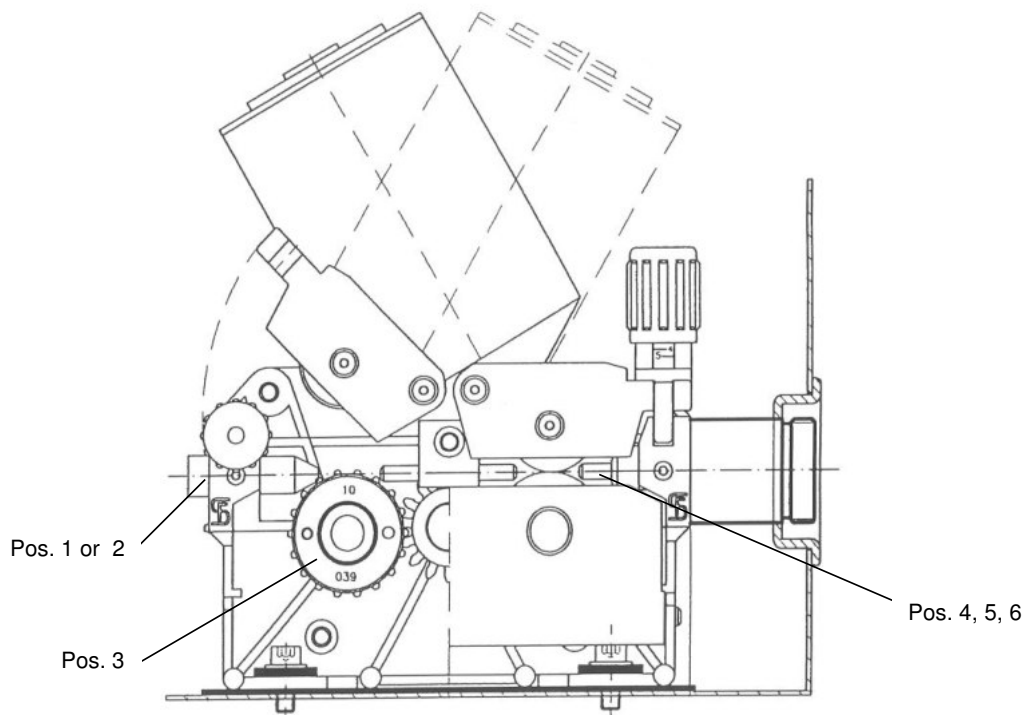
S1	Mains switch (with indicator light)	E		420 0051
S3	Flow sensor "cooling water"	E	(Encoder)	310 0082
S20/21	Button "Gas" / "Wire feed"	E		420 0082
S22	Key switch	E	Option	420 0050
T1	Main transformer	E	230A – 330A	470 0417
T1	Main transformer	E	380A – 430A	470 0416
T1	Main transformer	E	480A – 530A	470 0420
T2	Control transformer (gas cooled)	E		470 0166
T2	Control transformer (water cooled)	E		470 0287
V1	Main rectifier	E	230A – 530A	530 0141
V2	Power unit	E	380A – 530A	220 3060
V2	Power unit		230A – 330A	220 3061
X3/L+	Welding cable socket	E	Zwipa (RK2W)	430 0122
X4/L-	Welding cable socket	E	workpiece	430 0122
X5	Device plug (PC)	E	7 pin	430 0162
X6	Cable set with socket for ZwiPa	E	12 pin	360 0680
X21	Welding current connection: Panel connector case	E		430 0138
X22	Welding torch central connection	E	ZA	750 0443
X23	Socket for remote control	E	17 pin	430 0045
X24	Socket for REHMtronik	E	7 pin	430 0022
Y21	Gas valve (solenoid valve)	E		420 0113
Y22	Compressed air valve (solenoid valve)	E	Option	420 0113
1	Torch holder	E	Option	200 0902
2	Pertinax board for the torch holder	E	Option	340 0175
3	Gas hood case operation	E	Option	260 0358
4	Gas hood machine operation	E	Option	260 0357

* E = spare part; V= wear part

Wire feed unit excluding motor

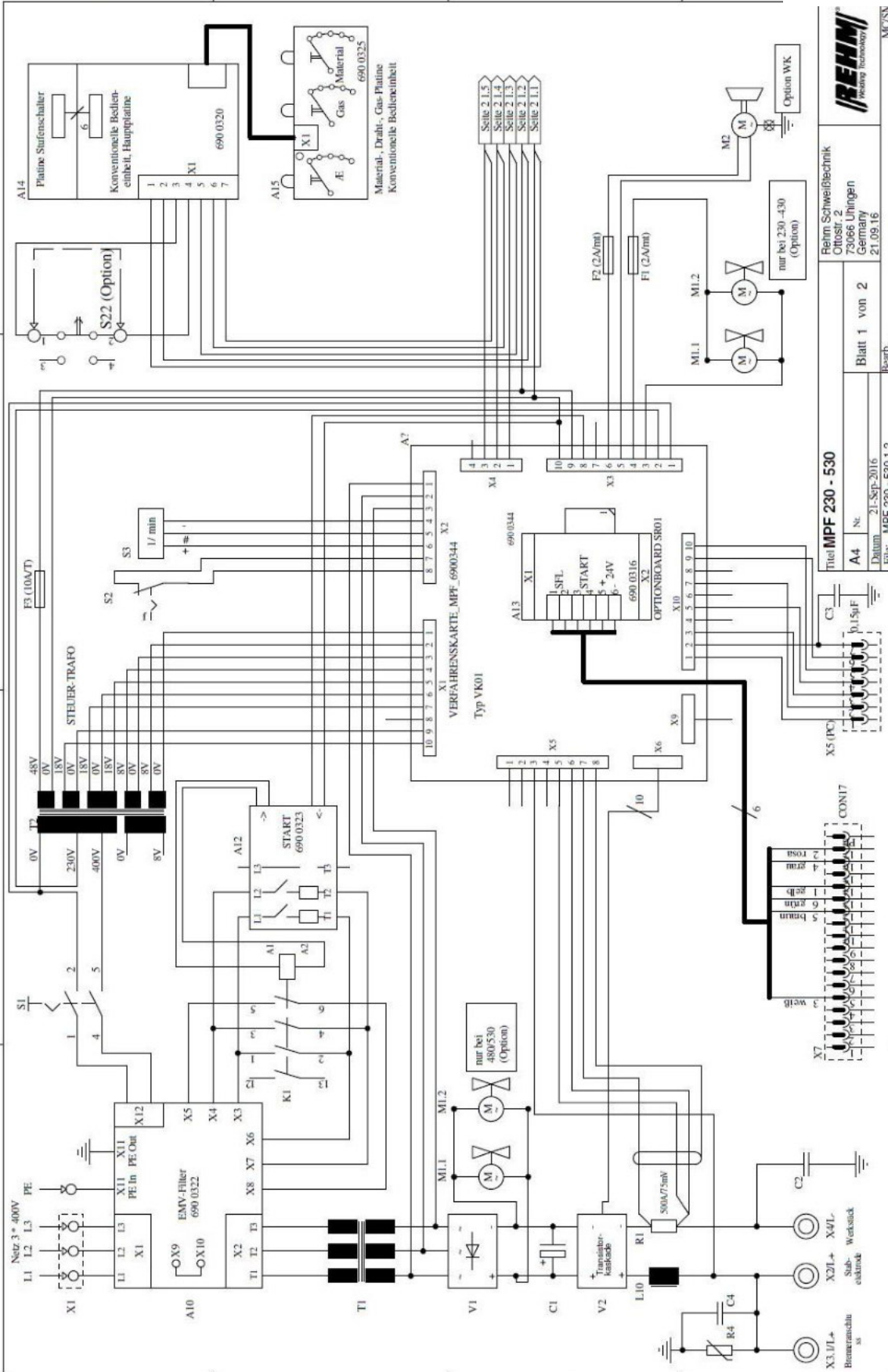
Pos.	Name	Part *	Comments	Item number
1	Wire infeed nipple (standard)	V	Plastic	260 0142
2	Wire infeed nipple (optional)	V	Ms	410 0040
3	Feed rolls	V	0.8/1.0 steel	750 2054
		V	0.9/1.2 steel	750 2058
		V	1.0/1.2 steel	750 2055
		V	1.2/1.6 steel	750 2056
		V	1.0/1.6 steel	750 2064
		V	0.8/1.0 Alu	750 2065
		V	1.0/1.2 Alu	750 2066
		V	1.2/1.6 Alu	750 2068
4	Capillary tube up to 1.2 mm \varnothing wire electrode	E	Ms	750 2049
5	Capillary tube up to 1.6 mm \varnothing wire electrode	E	Steel	750 2048
6	Protective tube for Teflon core up to 4 mm outside diameter	E	Ms	750 2053

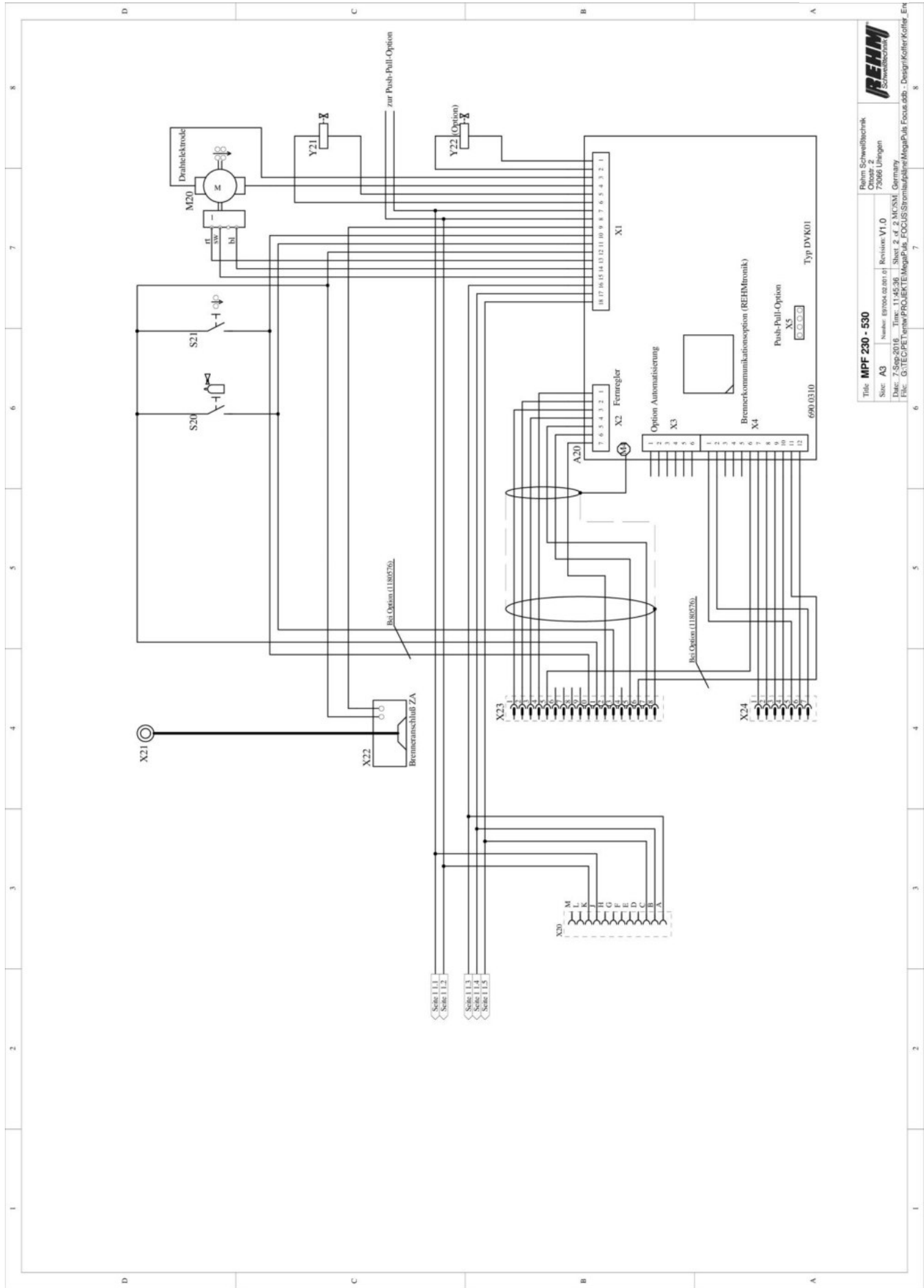
* E = spare part; V= wear part



16 Circuit diagram: MEGA.PULS FOCUS, SYNERGIC.PULS compact

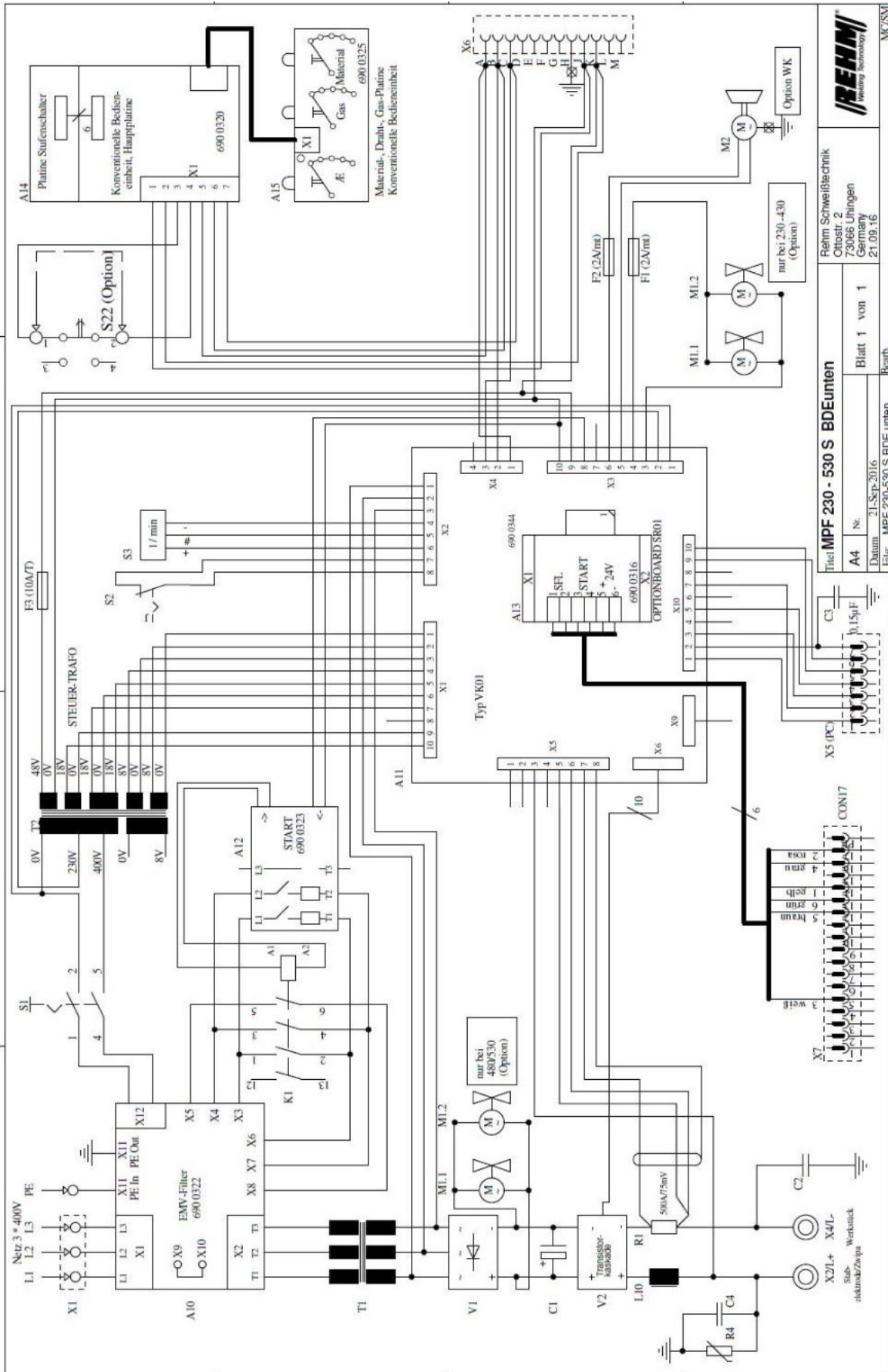
Page 1_2





Title: MPF 230 - 530		Rehm Schweißtechnik
Size: A3	Number: 697004.02.001.01	Revision: V1.0
Date: 7-Sep-2016	Time: 11:45:36	Sheet 2 of 2 MCSM Germany
File: G:\TECPEL\erw\PROJEKTE\MegaPlus_FOCUS\Stromlaufpläne\MegaPlus_Focus.dbb - Design\Keller\Keller_Ext		

17 Circuit diagram: MEGA.PULS FOCUS, SYNERGIC.PULS with case (BU)



REHM
Welding Technology

Rehm Schweißtechnik
Ochtersheim
73065 Ulm
Germany

Blatt 1 von 1

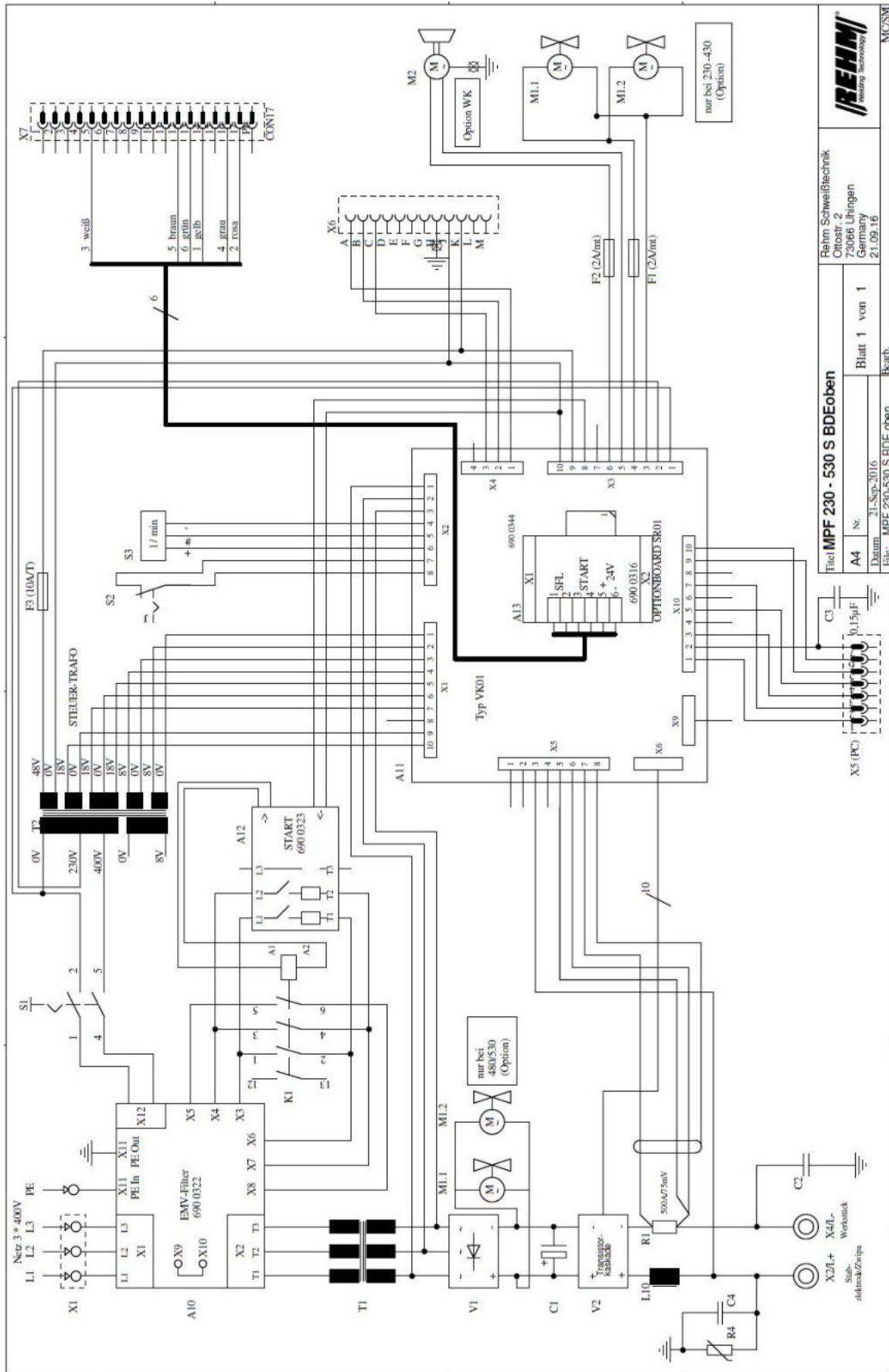
Datum: 31.07.2016

File: MPF 230-530 S BDE unten

Bearb.:

MC/SM

18 Circuit diagram: MEGA.PULS FOCUS with case (BO)

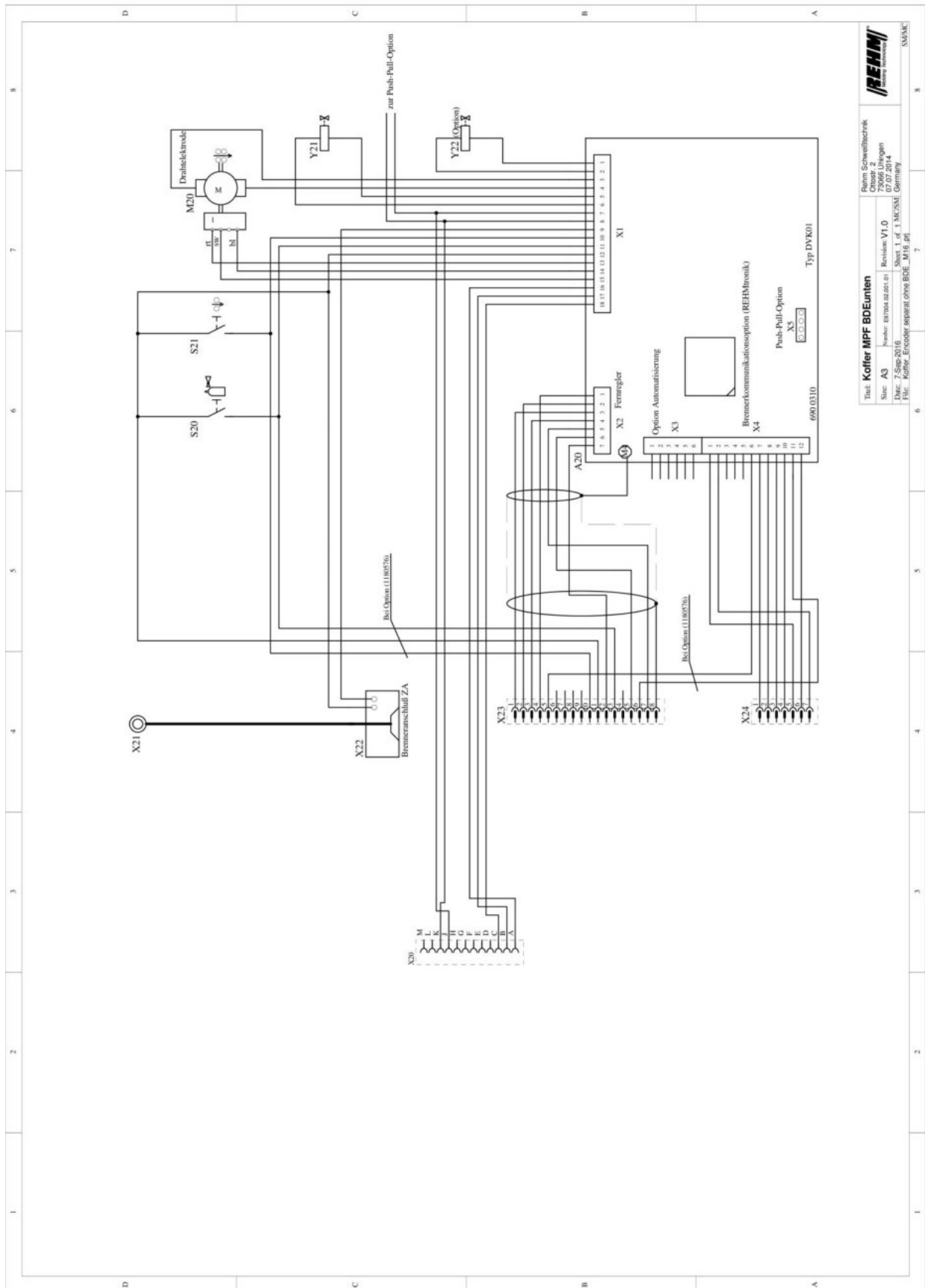


Rehm Schweißtechnik Otfenstr. 2 73066 Ultingen Germany	
Blatt 1 von 1	Kz:arb.
Datum: 21. Sep. 2016	File: MPF-230-530 S BDE oben
Titel: MPF 230 - 530 S BDE oben	MGS/SM

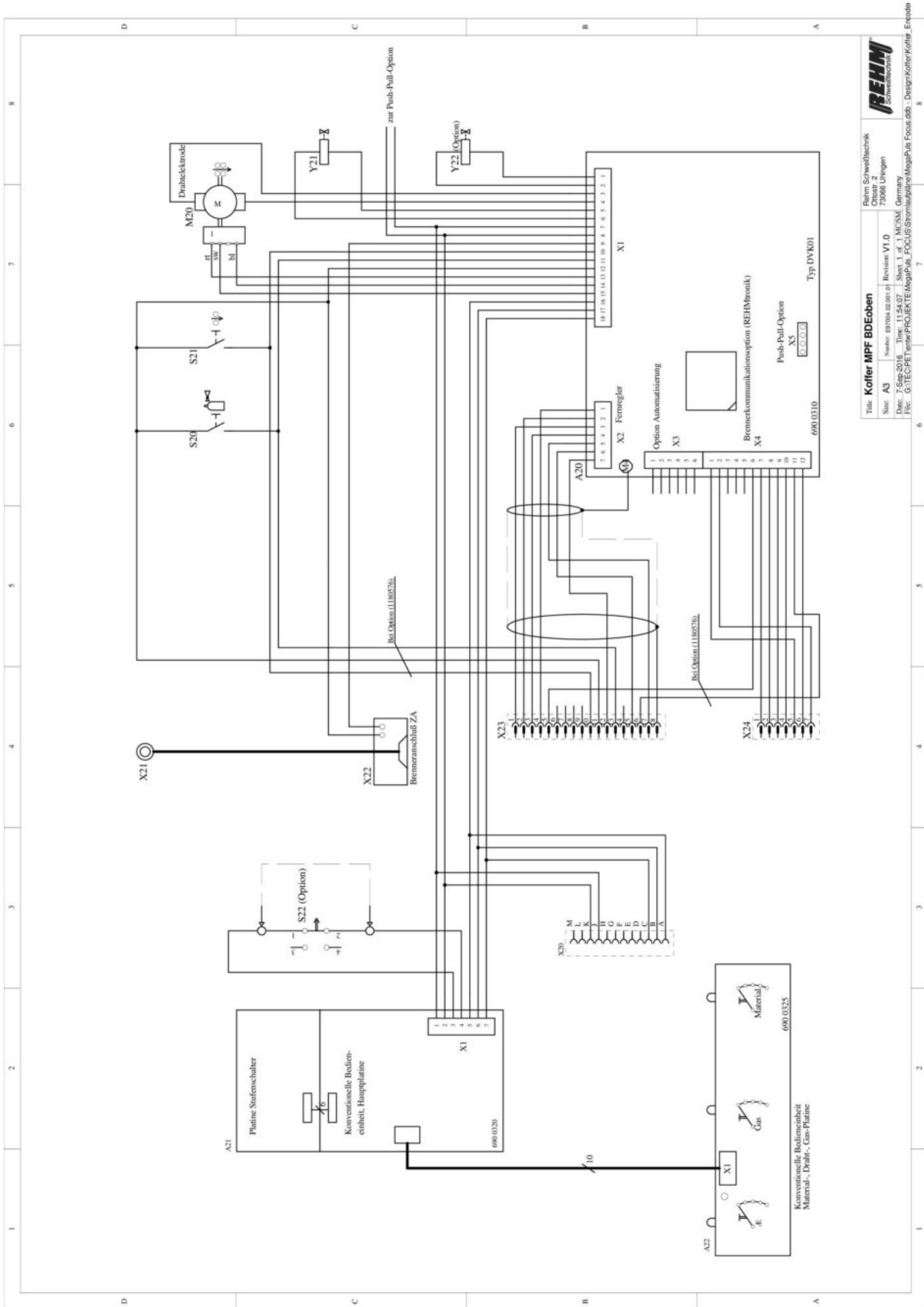
19 Sub assembly marking current source

A10	EMC filter
A11	Process card, type VK01
C2	Compensator interference suppressor
C3	Compensator interference suppressor
F1	Fuse fan (2A/mt)
F2	Fuse water pump (2A/mt)
F1/F2	Fuse control transformer (6.3A/t)
F3	Fuse case (10A/t)
K1	Main fuse
A10	Inductance EMC filter
M1.1-M1.3	Fan
M2	Water pump
R1	Shunt 500A/75mV
S1	Power supply switch
S3	Flow sensor "cooling water"
T1	Main transformer
T2	Control transformer
V1	Main rectifier
V2	Power unit
X1	Power supply terminal
X3/L+	Socket for Zwipa (RK2W)
X4/L-	Socket for workpiece cable
X5	Device socket for PC (7 pin)
X6	Socket for Zwipa (RK2W)

20 Circuit diagram: MEGA.PULS FOCUS, SYNERGIC.PULS case (BU)



21 Circuit diagram: MEGA.PULS FOCUS case (BO)



Title: Kofter MPF BDEoben		Rehm Schweißtechnik	
Size: A3	Number: 6900.02.00.01	Revision: V1.0	Sheet: 2 of 2
Date: 7.Sep.2016	Time: 11:54:07	Sheet: 1 of 1	
File: G:\TECPE\TIP\PROJEKTE\MegaPuls_FOCUS\Stromtafel\MegaPuls_Focus.dwg - Designer:Kofler/Kofler - Ersteller:			

22 Sub assembly marking wire feed case

A20	Card, motor control, type DVK01
A21	Card, control unit, type COM01
A22	Card, control unit "material wire gas" type COM02
M20	Wire feed motor
S20	Button "Gas"
S21	Button "wire feed"
S22	Key switch (optional)
X21	Welding current circuit "L+"
X22	Welding torch connection (ZA)
X23	Socket for remote control (17 pin)
X24	Socket for torch communication (7 pin): REHMtronik
Y21	Solenoid valve "inert gas"
Y22	Solenoid valve "compressed air" (optional)



EC declaration of conformity

For the following named products

MIG/MAG – inert gas - welding systems

MEGA.PULS FOCUS 230...530

MEGA.PULS FOCUS 230...530 W

MEGA.PULS FOCUS 230...530 S

MEGA.PULS FOCUS 230...530 WS

SYNERGIC.PULS 230...430

SYNERGIC.PULS 230...430 W

SYNERGIC.PULS 230...430 S

SYNERGIC.PULS 230...430 WS

it is hereby confirmed that they comply with the essential protection requirements which are laid down in the Directive **2014/30/EU** (EMC Directive) of the council on the approximation of the laws of the Member States relating to electromagnetic compatibility and in the Directive **2014/35/EU** relating to electrical equipment designed for use within certain voltage limits.

The above products comply with the requirements of this directive and comply with the safety requirements for arc welding devices in accordance with the following product standards:

EN 60 974-1 *

Arc welding equipment - Part 1: Welding power source

EN 60 974-2 *

Arc welding equipment - Part 2: Liquid cooling systems

EN 60 974-5 *

Arc welding equipment - Part 5: Wire feed device

EN 60974-10 *

Arc welding equipment - Part 10: Electromagnetic compatibility (EMC) requirements

* in the latest production version

according to the EC. Directive **2006/42/EU** article 1, paragraph 2 the above mentioned products fall exclusively within the scope of the directive **2014/35/EC** relating to electrical equipment designed for use within certain voltage limits.

This declaration is given for the manufacturer:

REHM GmbH u. Co. KG Schweißtechnik
Ottostr. 2
73066 Uhingen

Uhingen, 14/03/2017

submitted by



R. Stumpp
Managing Director

Appendix

to

Operating and function manual

MEGA.PULS *FOCUS* 230, 280, 330, 380, 430, 480, 530

SYNERGIC.PULS 230, 330, 430

Status 02/2015

Content:

- A. Assignment of special parameters
- B. Special parameter assignment table
- C. Table concerning welding programs MEGA.PULS *FOCUS*
- D. Table concerning welding programs SYNERGIC.PULS
- E. Leaflet regarding the controls on the front panel of the wire feed case
- F. Leaflet regarding the controls in the wire feed case

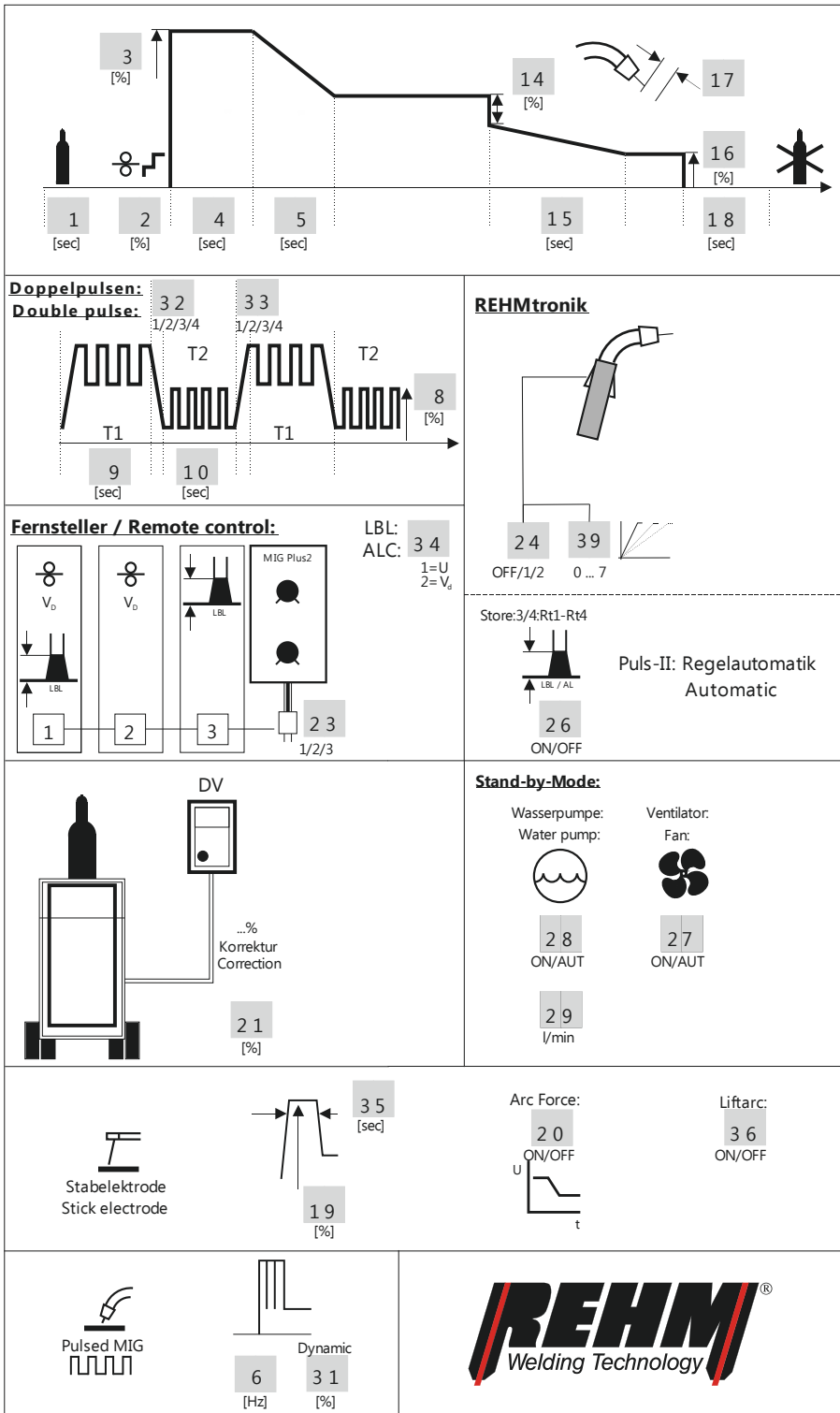
A. Assignment of special parameters

SP..	Name	Factory settings	Sector	Resolution	Assignment
SP1	Gas pre-flow time	0.0s	0.0-20.0 s	0.1s	Characteristic curves
SP2	Creep	100%	10-200%	1%	Characteristic curves
SP3	Starting current	100%	50-150%	1%	Characteristic curves
SP4	Starting time	0.1s	0.1-10.0s	0.1s	Characteristic curves
SP5	Start ramp	0.1s	0.0-10.0s	0.1s	Characteristic curves
SP6	Start frequency change:	100	50-150 Hz	1 Hz.	Characteristic curves
SP7	(at present not assigned)				
SP8	Double pulse: Amplitude	70%	20-180%	1%	Characteristic curves
SP9	Double pulse: T1	0.5s	0.1-10.0s	0.1s	Characteristic curves
SP10	Double pulse: T2	0.5s	0.1-10.0s	0.1s	Characteristic curves
SP11...13	(at present not assigned)				
SP14	Dropping jump	100%	10-100%	1%	Characteristic curves
SP15	Dropping time	0.1s	0.1-10.0s	0.1s	Characteristic curves
SP16	Dropping current	65%	1-100%	1%	Characteristic curves
SP17	Burn-off length	10	0-20	1	Characteristic curves
SP18	Gas post flow time	0.1s	0.1-20.0s	0.1s	Characteristic curves
SP19	Hotstart electrode	100%	100-200%	1%	Machine
SP20	Arc force	OFF	On/OFF	1	Machine
SP21	Zwipa length correction	100%	50-100-150%	1%	Machine
SP22	(at present not assigned)				
SP23	Remote control design	1	1,2,3	1	Machine
SP24	REHMtronik function	2	OFF,1,2	1	Machine
SP25	(at present not assigned)				
SP26	Arc length (LBL)-Controller (Puls-II)	On	On/OFF	1	Machine
SP27	Fan	Auto	Auto/On	1	Machine
SP28	Water pump	Auto	Auto/On	1	Machine
SP29	Flow volume (current)	-	...l/min	0.1 l/min	Machine
SP30	(at present not assigned)				
SP31	Start frequency dynamic	100%	1-100%	1%	Characteristic curves
SP32	Double pulse - slope T1/T2	4	1,2,3,4	1	Characteristic curves

SP33	Double pulse - slope T2/T1	4	1,2,3,4	1	Characteristic curves
SP34	LBL: 1=U / 2=VD _(wire speed)	1 or 2	1;2	1	Characteristic curves
SP35	Hotstart time	0.1s	0.1-10.0s	0.1s	Machine
SP36	Liftarc	OFF	On/OFF	1	Machine
SP37,38	(at present not assigned)				
SP39	Adjustment speed Up/Down RT torch	3	0...7 slow...fast	1	Machine
SP40	Operating mode	1	1-2	1	Machine
SP41...45	(at present not assigned)				
SP46	Display duration	20s	5-120s	1s	Machine
SP47...52	(at present not assigned)				
SP53...56	Option				
SP57	Clear All - factory setting				

The column "assignment" in the assignment table specified the influence of the special parameter. A special parameter can influence the entire system, a single characteristic curve or an individual job. For characteristic curves and jobs the column "factory settings" only applies to the majority of characteristic curves and jobs.

B. Special parameter assignment table



730 2328a

C. Table concerning welding programs MEGA.PULS FOCUS

On delivery, **MEGA.PULS FOCUS** systems are equipped with the following welding characteristic curves and synergy characteristic curves:

Ø	Inert gas	Material	Welding process	Switch positions
1.0	Ar	AlMg 5	POWER.PULS-II, POWER.ARC	A1.0 // Ar // AlMg
1.0	Ar	AlMg 5	POWER.PULS-UI, POWER.ARC	B1.0 // Ar // AlMg
1.2	Ar	AlMg 5	POWER.PULS-II, POWER.ARC	A1.2 // Ar // AlMg
1.2	Ar	AlMg 5	POWER.PULS-UI, POWER.ARC	B1.2 // Ar // AlMg
1.6*	Ar	AlMg 5	POWER.PULS-II, POWER.ARC	A1.6 // Ar // AlMg
1.6*	Ar	AlMg 5	POWER.PULS-UI, POWER.ARC	B1.6 // Ar // AlMg
1.0	Ar 70/30 He	AlMg 5	POWER.PULS -II	A1.0 // 70/30He // AlMg
1.0	Ar 70/30 He	AlMg 5	POWER.PULS -UI	B1.0 // 70/30He // AlMg
1.2	Ar 70/30 He	AlMg 5	POWER.PULS -II	A1.2 // 70/30He // AlMg
1.2	Ar 70/30 He	AlMg 5	POWER.PULS -UI	B1.2 // 70/30He // AlMg
1.6*	Ar 70/30 He	AlMg 5	POWER.PULS -II	A1.6 // 70/30He // AlMg
1.6*	Ar 70/30 He	AlMg 5	POWER.PULS -UI	B1.6 // 70/30He // AlMg
1.0	Ar	AlSi 5	POWER.PULS -II, POWER.ARC	A1.0 // Ar // AlSi5
1.0	Ar	AlSi 5	POWER.PULS -UI, POWER.ARC	B1.0 // Ar // AlSi5
1.2	Ar	AlSi 5	POWER.PULS -II, POWER.ARC	A1.2 // Ar // AlSi5
1.2	Ar	AlSi 5	POWER.PULS -UI, POWER.ARC	B1.2 // Ar // AlSi5
1.6*	Ar	AlSi 5	POWER.PULS -II, POWER.ARC	A1.6 // Ar // AlSi5
1.6*	Ar	AlSi 5	POWER.PULS -UI, POWER.ARC	B1.6 // Ar // AlSi5
1.0	Ar 70/30 He	AlSi 5	POWER.PULS -II	A1.0 // 70/30He // AlSi5
1.0	Ar 70/30 He	AlSi 5	POWER.PULS -UI	B1.0 // 70/30He // AlSi5
1.2	Ar 70/30 He	AlSi 5	POWER.PULS -II	A1.2 // 70/30He // AlSi5
1.2	Ar 70/30 He	AlSi 5	POWER.PULS -UI	B1.2 // 70/30He // AlSi5
1.6*	Ar 70/30 He	AlSi 5	POWER.PULS -II	A1.6 // 70/30He // AlSi5
1.6*	Ar 70/30 He	AlSi 5	POWER.PULS -UI	B1.6 // 70/30He // AlSi5
0.8	CO ₂	C-steel (SG 2)	POWER.ARC	A0.8 // CO ₂ // Fe
0.8	CO ₂	C-steel (SG 2)	POWER.ARC	B0.8 // CO ₂ // Fe
1.0	CO ₂	C-steel (SG 2)	POWER.ARC	A1.0 // CO ₂ // Fe
1.0	CO ₂	C-steel (SG 2)	POWER.ARC	B1.0 // CO ₂ // Fe
1.2	CO ₂	C-steel (SG 2)	POWER.ARC	A1.2 // CO ₂ // Fe
1.2	CO ₂	C-steel (SG 2)	POWER.ARC	B1.2 // CO ₂ // Fe

*only with MEGA.PULS Focus 480/530

Ø	Inert gas	Material	Welding process	Switch positions
0.8	Ar82/18CO ₂	C-steel (SG 2)	POWER.PULS -II, POWER.ARC	A0.8 // 82/18CO ₂ // Fe
0.8	Ar82/18CO ₂	C-steel (SG 2)	POWER.PULS -UI, POWER.ARC	B0.8 // 82/18CO ₂ // Fe
0.8	Ar82/18CO ₂	C-steel (SG 2)	FOCUS.ARC	A0.8 // 82/18CO ₂ // Fe Focus
0.8	Ar82/18CO ₂	C-steel (SG 2)	FOCUS.ARC	B0.8 // 82/18CO ₂ // Fe Focus
0.9	Ar82/18CO ₂	C-steel (SG 2)	POWER.PULS -II, POWER.ARC	X1 // 82/18CO ₂ // Fe
0.9	Ar82/18CO ₂	C-steel (SG 2)	POWER.PULS -UI, POWER.ARC	X2 // 82/18CO ₂ // Fe
1.0	Ar82/18CO ₂	C-steel (SG 2)	POWER.PULS -II, POWER.ARC	A1.0 // 82/18CO ₂ // Fe
1.0	Ar82/18CO ₂	C-steel (SG 2)	POWER.PULS -UI, POWER.ARC	B1.0 // 82/18CO ₂ // Fe
1.0	Ar82/18CO ₂	C-steel (SG 2)	FOCUS.ARC	A1.0 // 82/18CO ₂ // Fe Focus
1.0	Ar82/18CO ₂	C-steel (SG 2)	FOCUS.PULS, FOCUS.ARC	B1.0 // 82/18CO ₂ // Fe Focus
1.2	Ar82/18CO ₂	C-steel (SG 2)	POWER.PULS -II, POWER.ARC	A1.2 // 82/18CO ₂ // Fe
1.2	Ar82/18CO ₂	C-steel (SG 2)	POWER.PULS -UI, POWER.ARC	B1.2 // 82/18CO ₂ // Fe
1.2	Ar82/18CO ₂	C-steel (SG 2)	FOCUS.ARC	A1.2 // 82/18CO ₂ // Fe Focus
1.2	Ar82/18CO ₂	C-steel (SG 2)	FOCUS.PULS, FOCUS.ARC	B1.2 // 82/18CO ₂ // Fe Focus
1.6*	Ar82/18CO ₂	C-steel (SG 2)	POWER.ARC	A1.6 // 82/18CO ₂ // Fe
1.6*	Ar82/18CO ₂	C-steel (SG 2)	POWER.ARC	B1.6 // 82/18CO ₂ // Fe
1.6*	Ar82/18CO ₂	C-steel (SG 2)	FOCUS.ARC	A1.6 // 82/18CO ₂ // Fe Focus
1.6*	Ar82/18CO ₂	C-steel (SG 2)	FOCUS.PULS, FOCUS.ARC	B1.6 // 82/18CO ₂ // Fe Focus
0.8	Ar 92/8 CO ₂	C-steel (SG 2)	POWER.PULS -II, POWER.ARC	A0.8 // 92/8CO ₂ // Fe
0.8	Ar 92/8 CO ₂	C-steel (SG 2)	POWER.PULS -UI, POWER.ARC	B0.8 // 92/8CO ₂ // Fe
1.0	Ar 92/8 CO ₂	C-steel (SG 2)	POWER.PULS -II, POWER.ARC	A1.0 // 92/8CO ₂ // Fe
1.0	Ar 92/8 CO ₂	C-steel (SG 2)	POWER.PULS -UI, POWER.ARC	B1.0 // 92/8CO ₂ // Fe
1.2	Ar 92/8 CO ₂	C-steel (SG 2)	POWER.PULS -II, POWER.ARC	A1.2 // 92/8CO ₂ // Fe
1.2	Ar 92/8 CO ₂	C-steel (SG 2)	POWER.PULS -UI, POWER.ARC	B1.2 // 92/8CO ₂ // Fe
1.6*	Ar 92/8 CO ₂	C-steel (SG 2)	POWER.PULS -II, POWER.ARC	A1.6 // 92/8CO ₂ // Fe
1.6*	Ar 92/8 CO ₂	C-steel (SG 2)	POWER.PULS -UI, POWER.ARC	B1.6 // 92/8CO ₂ // Fe
0.8	Ar 98/2 CO ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A0.8 // 98/2CO ₂ // CrNi
0.8	Ar 98/2 CO ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B0.8 // 98/2CO ₂ // CrNi
1.0	Ar 98/2 CO ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A1.0 // 98/2CO ₂ // CrNi
1.0	Ar 98/2 CO ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B1.0 // 98/2CO ₂ // CrNi
1.0	Ar 98/2 CO ₂	CrNi 1.4430	FOCUS.ARC	A1.0 // 98/2CO ₂ // CrNi Focus
1.0	Ar 98/2 CO ₂	CrNi 1.4430	FOCUS.PULS, FOCUS.ARC	B1.0 // 98/2CO ₂ // CrNi Focus
1.2	Ar 98/2 CO ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A1.2 // 98/2CO ₂ // CrNi
1.2	Ar 98/2 CO ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B1.2 // 98/2CO ₂ // CrNi
1.2	Ar 98/2 CO ₂	CrNi 1.4430	FOCUS.ARC	A1.2 // 98/2CO ₂ // CrNi Focus
1.2	Ar 98/2 CO ₂	CrNi 1.4430	FOCUS.PULS, FOCUS.ARC	B1.2 // 98/2CO ₂ // CrNi Focus
1.6*	Ar 98/2 CO ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A1.6 // 98/2CO ₂ // CrNi
1.6*	Ar 98/2 CO ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B1.6 // 98/2CO ₂ // CrNi

*only with MEGA.PULS Focus 480/530

Ø	Inert gas	Material	Welding process	Switch positions
0.8	Ar 92/8 CO ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A0.8 // 92/8CO ₂ // CrNi
0.8	Ar 92/8 CO ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B0.8 // 92/8CO ₂ // CrNi
1.0	Ar 92/8 CO ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A1.0 // 92/8CO ₂ // CrNi
1.0	Ar 92/8 CO ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B1.0 // 92/8CO ₂ // CrNi
1.2	Ar 92/8 CO ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A1.2 // 92/8CO ₂ // CrNi
1.2	Ar 92/8 CO ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B1.2 // 92/8CO ₂ // CrNi
1.6*	Ar 92/8 CO ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A1.6 // 92/8CO ₂ // CrNi
1.6*	Ar 92/8 CO ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B1.6 // 92/8CO ₂ // CrNi
0.8	Ar 97/3 O ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A0.8 // 97/3O ₂ // CrNi
0.8	Ar 97/3 O ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B0.8 // 97/3O ₂ // CrNi
1.0	Ar 97/3 O ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A1.0 // 97/3O ₂ // CrNi
1.0	Ar 97/3 O ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B1.0 // 97/3O ₂ // CrNi
1.2	Ar 97/3 O ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A1.2 // 97/3O ₂ // CrNi
1.2	Ar 97/3 O ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B1.2 // 97/3O ₂ // CrNi
1.6*	Ar 97/3 O ₂	CrNi 1.4430	POWER.PULS -II, POWER.ARC	A1.6 // 97/3O ₂ // CrNi
1.6*	Ar 97/3 O ₂	CrNi 1.4430	POWER.PULS -UI, POWER.ARC	B1.6 // 97/3O ₂ // CrNi
0.8	Ar	CuAl 8	POWER.PULS -II, POWER.ARC	A0.8 // Ar // CuAl8
1.0	Ar	CuAl 8	POWER.PULS -II, POWER.ARC	A1.0 // Ar // CuAl8
1.2	Ar	CuAl 8	POWER.PULS -II, POWER.ARC	A1.2 // Ar // CuAl8
0.8	Ar	CuSi3	POWER.ARC	A0.8 // Ar // CuSi3
1.0	Ar	CuSi3	POWER.PULS -II, POWER.ARC	A1.0 // Ar // CuSi3
1.2	Ar	CuSi3	POWER.PULS -II, POWER.ARC	A1.2 // Ar // CuSi3
0.8	Ar 98/2 CO ₂	CuSi3	POWER.ARC	A0.8 // 98/2CO ₂ // CuSi3
1.0	Ar 98/2 CO ₂	CuSi3	POWER.PULS -II, POWER.ARC	A1.0 // 98/2CO ₂ // CuSi3
0.8	Ar	CuAl5Ni2	POWER.PULS -II	A0.8 // Y1 // CuSi3
1.0	Ar	CuAl5Ni2	POWER.PULS -II	A1.0 // Y1 // CuSi3
1.2	Ar82/18CO ₂	C-steell710M core wire	POWER.ARC	A1.2 // 82/18CO ₂ // E71T-1
1.2	Ar82/18CO ₂	C-steell710M core wire	POWER.ARC	B1.2 // 82/18CO ₂ // E71T-1
1.6	Ar82/18CO ₂	C-steell710M core wire	POWER.ARC	A1.6 // 82/18CO ₂ // E71T-1
1.6	Ar82/18CO ₂	C-steell710M core wire	POWER.ARC	B1.6 // 82/18CO ₂ // E71T-1
1.2	Ar82/18CO ₂	CrNi 1.4316 core wire	POWER.ARC	A1.2 // 82/18CO ₂ // E308LT-1
1.2	Ar82/18CO ₂	CrNi 1.4316 core wire	POWER.ARC	B1.2 // 82/18CO ₂ // E308LT-1

*only with MEGA.PULS Focus 480/530

Ø	Inert gas	Material	Welding process	Switch positions
1.0	Ar	AISI 12	POWER.PULS -II	A1,0 // Ar // AISi12
1.0	Ar	AISI 12	POWER.PULS -UI	B1,0 // Ar // AISi12
1.2	Ar	AISI 12	POWER.PULS -II	A1,2 // Ar // AISi12
1.2	Ar	AISI 12	POWER.PULS -UI	B1,2 // Ar // AISi12
1.0	Ar82/18CO ₂	MSG6-60 (1.4718)	POWER.ARC	A1,0 // 82/18CO ₂ // Z1
1.0	Ar82/18CO ₂	MSG6-60 (1.4718)	POWER.PULS -UI, POWER.ARC	B1,0 // 82/18CO ₂ // Z1
1.2	Ar82/18CO ₂	MSG6-60 (1.4718)	POWER.ARC	A1,2 // 82/18CO ₂ // Z1
1.2	Ar82/18CO ₂	MSG6-60 (1.4718)	POWER.PULS -UI, POWER.ARC	B1,2 // 82/18CO ₂ // Z1
1.0	Ar 97/3 O ₂	MSG6-60 (1.4718)	POWER.ARC	A1,0 // 97/3O ₂ // Z1
1.0	Ar 97/3 O ₂	MSG6-60 (1.4718)	POWER.PULS -UI, POWER.ARC	B1,0 // 97/3O ₂ // Z1
1.2	Ar 97/3 O ₂	MSG6-60 (1.4718)	POWER.ARC	A1,2 // 97/3O ₂ // Z1
1.2	Ar 97/3 O ₂	MSG6-60 (1.4718)	POWER.PULS -UI, POWER.ARC	B1,2 // 97/3O ₂ // Z1

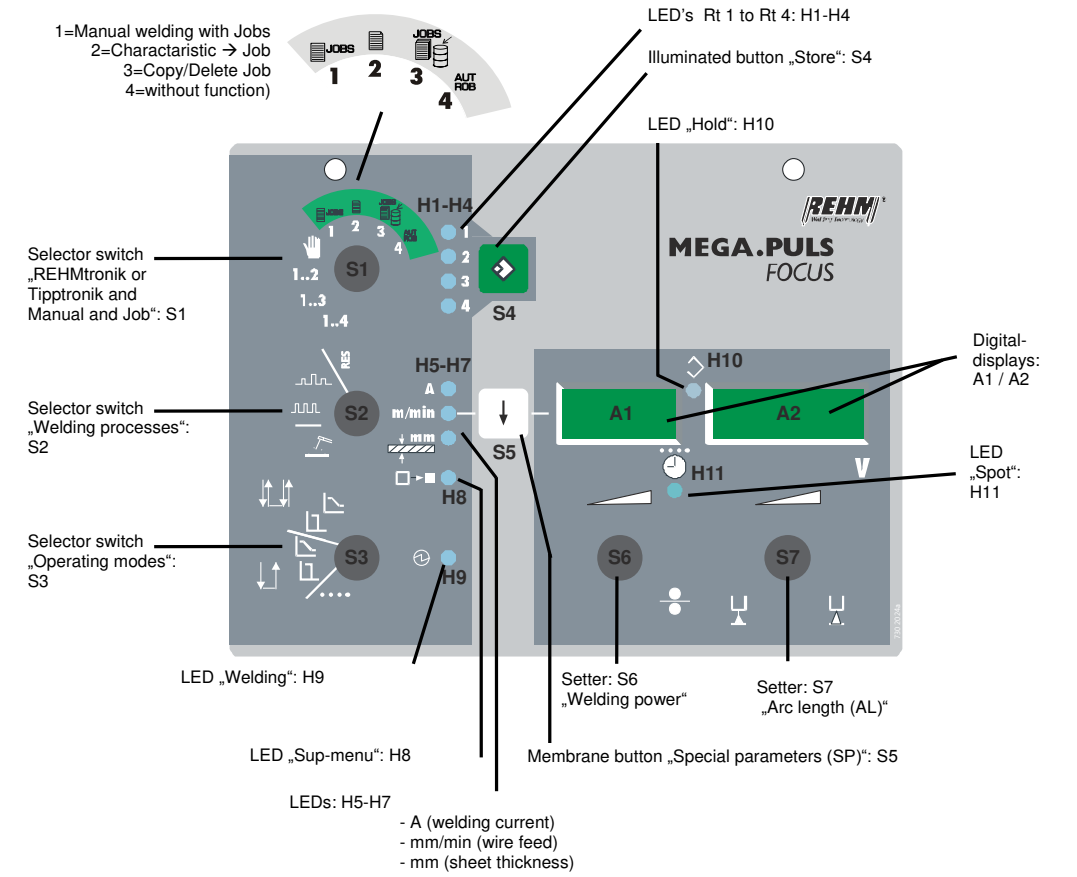
D. Table concerning welding programs SYNERGIC.PULS

On delivery, **SYNERGIC.PULS** systems are equipped with the following welding characteristic curves and synergy characteristic curves:

Ø	Inert gas	Material	Welding process	Switch positions
0,8	Ar82/18CO ₂	C-steel (SG 2)	Power.Puls -II, POWER.ARC	A0,8 // 82/18CO ₂ // Fe
0,8	Ar82/18CO ₂	C- steel (SG 2)	Power.Puls -UI, POWER.ARC	B0,8 // 82/18CO ₂ // Fe
0,9	Ar8 2/18CO ₂	C- steel (SG 2)	Power.Puls -II, POWER.ARC	X1 // 82/18CO ₂ // Fe
0,9	Ar82/18CO ₂	C- steel (SG 2)	Power.Puls -UI, POWER.ARC	X2 // 82/18CO ₂ // Fe
1,0	Ar82/18CO ₂	C- steel (SG 2)	Power.Puls -II, POWER.ARC	A1,0 // 82/18CO ₂ // Fe
1,0	Ar82/18CO ₂	C- steel (SG 2)	Power.Puls -UI, POWER.ARC	B1,0 // 82/18CO ₂ // Fe
1,2	Ar82/18CO ₂	C- steel (SG 2)	Power.Puls -II, POWER.ARC	A1,2 // 82/18CO ₂ // Fe
1,2	Ar82/18CO ₂	C- steel (SG 2)	Power.Puls -UI, POWER.ARC	B1,2 // 82/18CO ₂ // Fe
0,8	Ar 92/8 CO ₂	C- steel (SG 2)	Power.Puls -II, POWER.ARC	A0,8 // 92/8CO ₂ // Fe
0,8	Ar 92/8 CO ₂	C- steel (SG 2)	Power.Puls -UI, POWER.ARC	B0,8 // 92/8CO ₂ // Fe
1,0	Ar 92/8 CO ₂	C- steel (SG 2)	Power.Puls -II, POWER.ARC	A1,0 // 92/8CO ₂ // Fe
1,0	Ar 92/8 CO ₂	C- steel (SG 2)	Power.Puls -UI, POWER.ARC	B1,0 // 92/8CO ₂ // Fe
1,2	Ar 92/8 CO ₂	C- steel (SG 2)	Power.Puls -II, POWER.ARC	A1,2 // 92/8CO ₂ // Fe
1,2	Ar 92/8 CO ₂	C- steel (SG 2)	Power.Puls -UI, POWER.ARC	B1,2 // 92/8CO ₂ // Fe
0,8	CO ₂	C- steel (SG 2)	POWER.ARC	A0,8 // CO ₂ // Fe
0,8	CO ₂	C- steel (SG 2)	POWER.ARC	B0,8 // CO ₂ // Fe
1,0	CO ₂	C- steel (SG 2)	POWER.ARC	A1,0 // CO ₂ // Fe
1,0	CO ₂	C- steel (SG 2)	POWER.ARC	B1,0 // CO ₂ // Fe
1,2	CO ₂	C- steel (SG 2)	POWER.ARC	A1,2 // CO ₂ // Fe
1,2	CO ₂	C- steel (SG 2)	POWER.ARC	B1,2 // CO ₂ // Fe
0,8	Ar 98/2 CO ₂	CrNi 1.4430	Power.Puls -II, POWER.ARC	A0,8 // 98/2CO ₂ // CrNi
0,8	Ar 98/2 CO ₂	CrNi 1.4430	Power.Puls -UI, POWER.ARC	B0,8 // 98/2CO ₂ // CrNi
1,0	Ar 98/2 CO ₂	CrNi 1.4430	Power.Puls -II, POWER.ARC	A1,0 // 98/2CO ₂ // CrNi
1,0	Ar 98/2 CO ₂	CrNi 1.4430	Power.Puls -UI, POWER.ARC	B1,0 // 98/2CO ₂ // CrNi
1,2	Ar 98/2 CO ₂	CrNi 1.4430	Power.Puls -II, POWER.ARC	A1,2 // 98/2CO ₂ // CrNi
1,2	Ar 98/2 CO ₂	CrNi 1.4430	Power.Puls -UI, POWER.ARC	B1,2 // 98/2CO ₂ // CrNi
1,0	Ar	AlMg 5	Power.Puls-II, POWER.ARC	A1,0 // Ar // AlMg
1,0	Ar	AlMg 5	Power.Puls-UI, POWER.ARC	B1,0 // Ar // AlMg
1,2	Ar	AlMg 5	Power.Puls-II, POWER.ARC	A1,2 // Ar // AlMg
1,2	Ar	AlMg 5	Power.Puls-UI, POWER.ARC	B1,2 // Ar // AlMg
1,0	Ar	AlSi 5	Power.Puls -II, POWER.ARC	A1,0 // Ar // AlSi5
1,0	Ar	AlSi 5	Power.Puls -UI, POWER.ARC	B1,0 // Ar // AlSi5
1,2	Ar	AlSi 5	Power.Puls -II, POWER.ARC	A1,2 // Ar // AlSi5
1,2	Ar	AlSi 5	Power.Puls -UI, POWER.ARC	B1,2 // Ar // AlSi5
1,0	Ar	CuSi3	Power.Puls -II, POWER.ARC	A1,0 // Ar // CuSi3

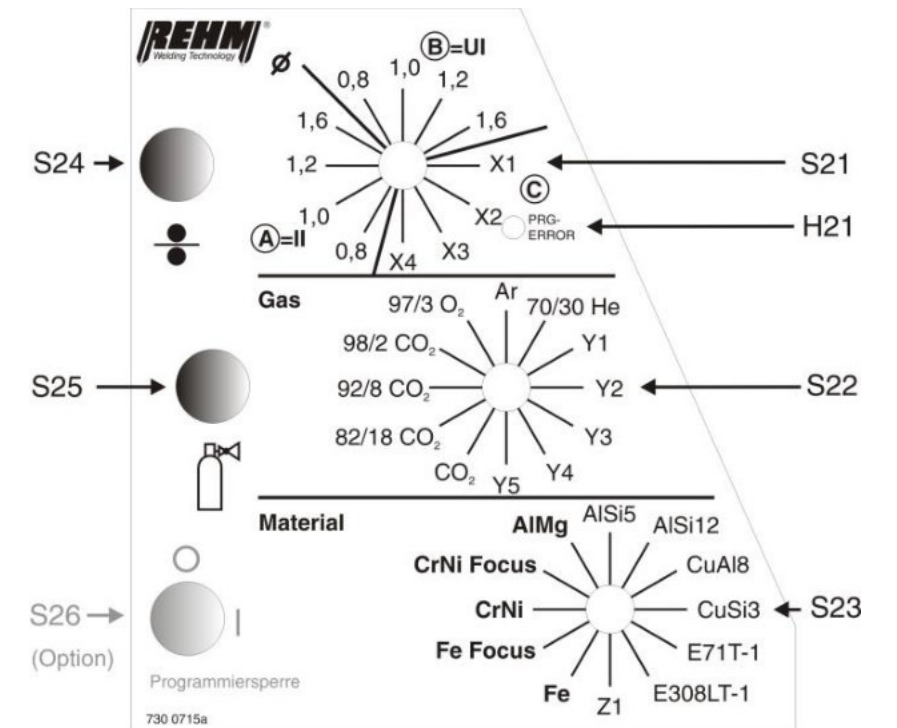
E. Leaflet regarding the controls on the front panel of the wire feed case

(For description of the controls see P. 24)
 (view applies to **MEGA.PULS FOCUS**)
 (for **MEGA.PULS FOCUS BU** on the machine front)



F. Leaflet regarding the controls in the wire feed case

(For description of the controls see P. 24)
 (view applies to **MEGA.PULS FOCUS**)
 (for **MEGA.PULS FOCUS BU S21-S23** and H21 on the machine front)



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