



EN

Control

L1.01 - Expert 2.0

L1.02 - Expert 2.0

099-00L100-EW501

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General instructions

WARNING



Read the operating instructions!

The operating instructions provide an introduction to the safe use of the products.

- Read and observe the operating instructions for all system components, especially the safety instructions and warning notices!
- Observe the accident prevention regulations and any regional regulations!
- The operating instructions must be kept at the location where the machine is operated.
- Safety and warning labels on the machine indicate any possible risks. Keep these labels clean and legible at all times.
- The machine has been constructed to state-of-the-art standards in line with any applicable regulations and industrial standards. Only trained personnel may operate, service and repair the machine.
- Technical changes due to further development in machine technology may lead to a differing welding behaviour.

In the event of queries on installation, commissioning, operation or special conditions at the installation site, or on usage, please contact your sales partner or our customer service department on +49 2680 181-0.

A list of authorised sales partners can be found at www.ewm-group.com/en/specialist-dealers.

Liability relating to the operation of this equipment is restricted solely to the function of the equipment. No other form of liability, regardless of type, shall be accepted. This exclusion of liability shall be deemed accepted by the user on commissioning the equipment.

The manufacturer is unable to monitor whether or not these instructions or the conditions and methods are observed during installation, operation, usage and maintenance of the equipment.

An incorrectly performed installation can result in material damage and injure persons as a result. For this reason, we do not accept any responsibility or liability for losses, damages or costs arising from incorrect installation, improper operation or incorrect usage and maintenance or any actions connected to this in any way.

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2 For your safety

2.1 Notes on the use of these operating instructions

DANGER

Working or operating procedures which must be closely observed to prevent imminent serious and even fatal injuries.

- Safety notes include the "DANGER" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol on the edge of the page.

WARNING

Working or operating procedures which must be closely observed to prevent serious and even fatal injuries.

- Safety notes include the "WARNING" keyword in the heading with a general warning symbol.
- The hazard is also highlighted using a symbol in the page margin.

CAUTION

Working or operating procedures which must be closely observed to prevent possible minor personal injury.

- The safety information includes the "CAUTION" keyword in its heading with a general warning symbol.
- The risk is explained using a symbol on the edge of the page.



Technical aspects which the user must observe to avoid material or equipment damage.

Instructions and lists detailing step-by-step actions for given situations can be recognised via bullet points, e.g.:

- Insert the welding current lead socket into the relevant socket and lock.

2.2 Explanation of icons

Symbol	Description	Symbol	Description
	Indicates technical aspects which the user must observe.		Activate and release / Tap / Tip
	Switch off machine		Release
	Switch on machine		Press and hold
			Switch
	Incorrect / Invalid		Turn
	Correct / Valid		Numerical value – adjustable
	Input		Signal light lights up in green
	Navigation		Signal light flashes green
	Output		Signal light lights up in red
	Time representation (e.g.: wait 4 s / actuate)		Signal light flashes red
	Interruption in the menu display (other setting options possible)		
	Tool not required/do not use		
	Tool required/use		

2.3 Part of the complete documentation

These operating instructions are part of the complete documentation and valid only in combination with all other parts of these instructions! Read and observe the operating instructions for all system components, especially the safety instructions!

The illustration shows a general example of a welding system.

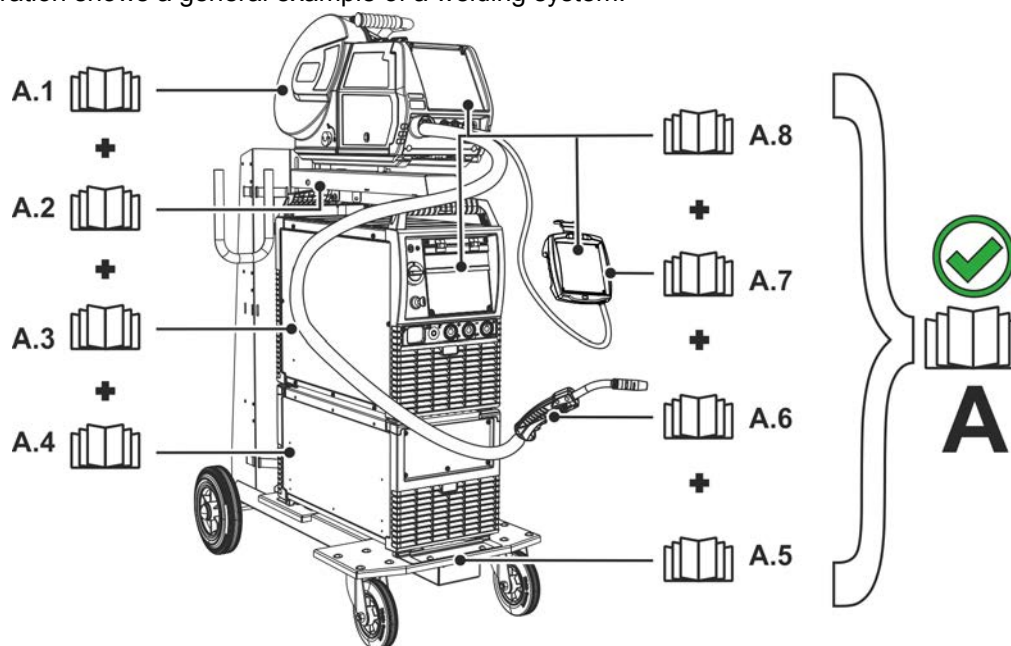


Figure 2-1

Item	Documentation
A.1	Wire feeder
A.2	Conversion instructions
A.3	Power source
A.4	Cooling unit, voltage converter, tool box etc.
A.5	Trolley
A.6	Welding torch
A.7	Remote control
A.8	Control
A	Complete documentation

3 Intended use

⚠ WARNING



Hazards due to improper usage!

The machine has been constructed to the state of the art and any regulations and standards applicable for use in industry and trade. It may only be used for the welding procedures indicated at the rating plate. Hazards may arise for persons, animals and material objects if the equipment is not used correctly. No liability is accepted for any damages arising from improper usage!

- The equipment must only be used in line with its designated purpose and by trained or expert personnel!
- Do not improperly modify or convert the equipment!

3.1 Use and operation solely with the following machines

The following system components can be combined:

This description may only be applied to machines with the Expert 2.0 machine control.

Welding machine control	Expert 2.0	Expert 2.0 LG	Expert 2.0 WLG
Description	No network connection	Version with LAN	Version with LAN and Wi-Fi

3.2 Applications

Machine series	Main process							Secondary process		
	Standard MIG/MAG welding				Pulsed MIG/MAG welding			TIG welding (lift arc)	MMA welding	Gouging
	forceArc	rootArc	coldArc	pipeSolution	forceArc puls	rootArc puls	coldArc puls			
alpha Q puls MM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Phoenix puls MM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Taurus Synergic S MM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

3.3 Documents which also apply

- Operating instructions for the connected welding machines
- Documents of the optional expansions

3.4 Software version

These instructions apply to the following software version:

1.0.D.0

The machine control software version is shown on the screen during the start process > see 4.2.3 chapter.

4 Quick overview

4.1 Machine control – Operating elements

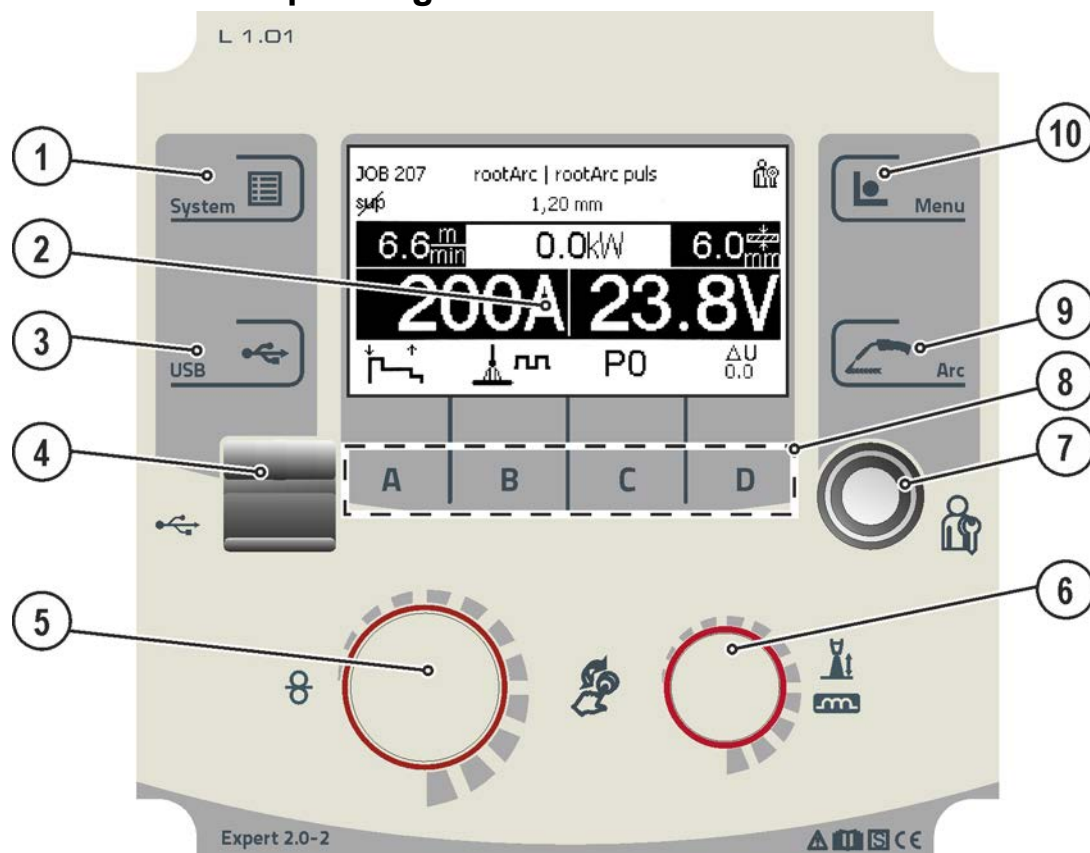




Figure 4-1

Item	Symbol	Description
1		System push-button To display and configure the system settings > see 5.4.4 chapter.
2		Machine display Graphical machine display showing all machine functions, menus and parameters with their values > see 4.2.1 chapter.
3		USB push-button To use and configure the USB interface > see 5.5 chapter.
4		USB interface for offline data transfer Connection capability for a USB flash memory (industrial USB flash memory recommended).
5		Click wheel welding power <ul style="list-style-type: none"> ----- Setting the welding power > see 5.1 chapter ----- Setting various parameters values depending on the preselection. It is possible to adjust settings when the backlight is activated.
6		Click wheel correction of arc <ul style="list-style-type: none"> ----- Setting the correction of arc length > see 6.1.4 chapter ----- Setting the arc dynamics > see 6.1.5 chapter It is possible to adjust settings when the backlight is activated.
7		Interface (Xbutton) Welding access based on user-defined rights to protect against unauthorised use > see 5.4.2 chapter.
8	A B C D	Context-dependent push-button > see 5.3 chapter

Item	Symbol	Description
9		Arc push-button This push-button has a double function: <ul style="list-style-type: none">• Initial state of main screen: Switching of the welding procedure based on the selected material, gas and welding consumable.• Initial state of any sub-menu: Display switches back to the main screen.
10		Menu push-button To organise welding tasks and configure process parameters.

4.2 Screen icons

Symbol	Description
	Shielding gas
	Material type
	Wire inching
	Wire return
	Advanced settings
	Set-up mode
	Non-latched operating mode
	Special non-latched operating mode
	Latched operating mode
	Special latched operating mode
JOB	Welding task
sup	superPuls
	superPuls switched off
	Interference
	Temperature error
	Spot welding operating mode
	Material thickness
	Disabled; selected function is not available with the current access rights - check access rights.
$\frac{m}{min}$	Wire feed speed
	Arc length correction
kW	Welding power
P	Programs (P0 - P15) > see 5.6.3.1 chapter
	Warning; could be an imminent interference
	Wired local network (LAN)
	Wireless local network (WiFi)
	User logged in
	Not possible, check priorities
	Xbutton login
	Xbutton logout
	Arc dynamics
	Xbutton version number not recognised
	Cancel operation
	Confirm operation
	Wire diameter (welding consumable)
	Menu navigation; one menu back
	Menu navigation; expanding the content of the display

Symbol	Description
	Save data to USB medium
	Load data from USB medium
	USB data recording
	Screen type 3/4, switching buttons
	Pulse arc welding
	Standard arc welding
	Welding procedure
	Refresh
	After welding, the last weld values (hold values) from the main program are displayed
	Information
	Welding current
	Welding voltage
	Motor current, wire feed motor
	Welding duration
	Plasma gas
	Wire feed speed
	Value correct or applicable

4.2.1 Machine display

The machine display shows all the information relevant to the user as text and/or graphics.

4.2.1.1 Actual values, nominal values, hold values

Parameter	Before welding	During welding		After welding	
	Nominal value	Actual value	Nominal value	Hold value	Nominal value
Welding current	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Material thickness	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Wire feed speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Welding voltage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

4.2.2 Main screen

The main screen shows all the information relevant for the welding process before, while and after it is carried out. In addition, it shows status information on the machine state. The assignment of the context-dependent push-buttons is also shown on the main screen.

The user can choose between different main screens > see 4.2.2.1 chapter.

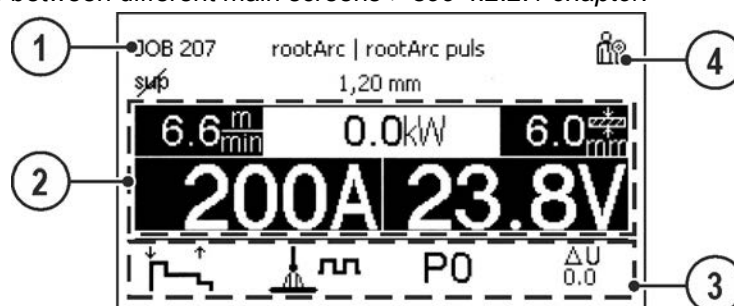


Figure 4-2

Item	Symbol	Description
1		Information on the welding task selected JOB number, process etc.
2		Display area for welding data Welding current, welding voltage, wire feed speed, material thickness etc.
3		Display area for process parameters Operating mode, voltage correction, program, welding method etc.
4		Display area for system status Network status, error status etc. > see 4.2 chapter

By pressing push-button A for a prolonged time (on the operating mode main screen) it is possible to directly switch to the program sequence.

4.2.2.1 Main screen variants

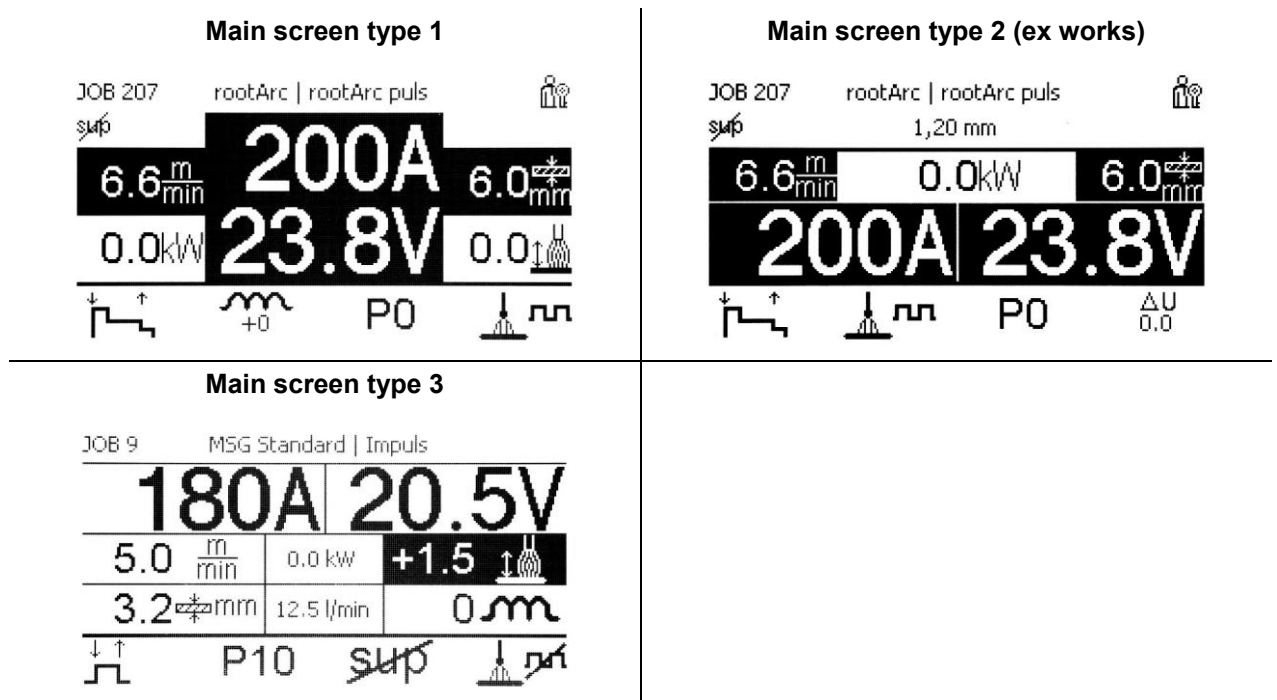


Figure 4-3

You can select the required variant (type of main screen) in the Machine configuration (system) menu > see 5.4.6 chapter.

4.2.3 Initial screen

During the start process the control name, machine software version and selected language are shown on the screen.



Figure 4-4

Item	Symbol	Description
1		Machine control name
2		Progress bar Shows the load progress during the start process.
3		Advanced settings Display and setting of advanced system parameters > see 4.2.3.1 chapter
4		Indication of the system language selected The system language can be changed during the start process > see 4.2.3.2 chapter.
5		Control software version

4.2.3.1 Basic settings for operation with two wire feeders (P10)

The setting is available/required in the following cases only:

- the control is integrated in the wire feeder
- the control is integrated in the power source (compact design)

Menu item/parameter	Value	Comment
DVX (single)	0	
DVX-Unit 1 (master)	1	
DVX-Unit 2 (slave)	2	

With single unit operation (P10 = 0) a second wire feeder may not be connected!

- Remove any connections to the second wire feeder

With double unit operation (P10 = 1 or 2) both wire feeders have to be connected and be set up for this operation at the control with different configurations.

- Configure one wire feeder as master (P10 = 1)
- Configure the other wire feeder as slave (P10 = 2)

Access control

If one of the wire feeders in the welding system is equipped with an access control key switch, it has to be configured as master (P10 = 1). With double unit operation, if more than one wire feeder is equipped with an access control key switch, either one can be configured as master. The wire feeder configured as master is active as soon as the welding machine has been switching on. There are no other functional differences between the wire feeders.

4.2.3.2 Change system language

During the start process the user can select or change the system language at the machine control.

- Switch the machine off and on again.
- Press the context-dependent push-button [D] during the start phase (the word MULTIMATRIX is displayed).
- Select the required language by turning the control button.
- Confirm the selected language by pressing the control button (the user can exit the menu by pressing the context-dependent push-button [A] without making any changes).

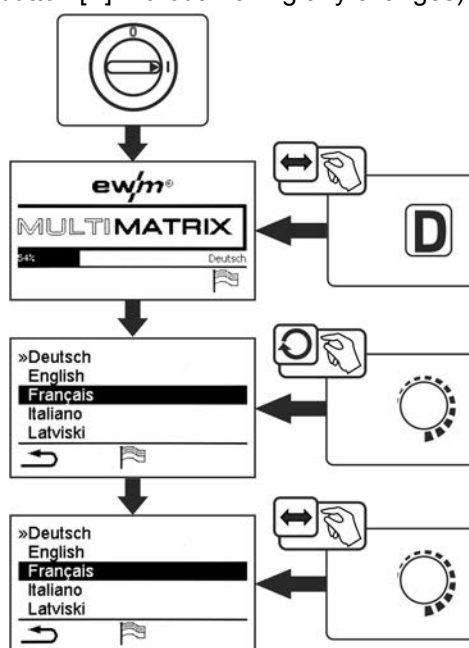


Figure 4-5

5 Operating the machine control

In general the control is operated with the central control button below the machine display.

Select the required menu item by turning (navigate) and pressing (confirm) the central control button. In addition, the context-dependent push-buttons below the machine display can be used for confirmation.

5.1 Welding power setting

The welding power is adjusted with the rotary knob (click wheel) for welding power. You can also adjust the parameters in the operation sequence or settings in the various machine menus.

MIG/MAG settings

The welding power (heat input into the material) can be changed by setting the following three parameters:

- wire feed speed m/min
- material thickness mm
- welding current A

These three parameters are interdependent and always change together. The significant parameter is the wire feed speed in m/min. The wire feed speed can be adjusted in increments of 0.1 m/min (4.0 ipm). The associated welding current and material thickness are determined from the wire feed speed.

The welding current displayed and material thickness are to be understood as guide values for the user and rounded to full amperage and 0.1 mm material thickness.

A change in the wire feed speed, for example by 0.1 m/min, leads to a more or less large change in the welding current displayed or in the material thickness displayed depending on the selected welding wire diameter. The display of the welding current and the material thickness are also dependent on the selected wire diameter.

For example, a change in wire feed speed of 0.1 m/min and a selected wire diameter of 0.8 mm results in a smaller change in the current or thickness of material than a change in wire feed speed of 0.1 m/min and a selected wire diameter of 1.6 mm.

Depending on the diameter of the wire to be welded, it is possible that smaller or larger jumps in the display of material thickness or welding current take place or changes of these values become visible only after several "clicks" on the rotary transducer. As described above, the reason for this is the change in the wire feed speed by 0.1 m/min per click and the resulting change in the current or material thickness as a function of the preselected welding wire diameter.

Please note also that the guide value of the welding current displayed before welding may deviate from the guide value during welding depending on the actual stick-out (free wire end used for welding).

The reason lies in the preheating of the free wire end by the welding current. For example, the preheating in the welding wire increases with the length of the stick-out. This means if the stick-out (free wire end) increases, the actual welding current decreases due to larger preheating in the wire. If the free wire end decreases, the actual welding current increases. This enables the welder to influence the heat input in the component within limits by changing the distance of the welding torch.

Setting of TIG/MMA:


The welding power is set with the parameter "welding current" that can be adjusted in increments of 1 ampere.

5.2 Direct access keys

Several push-buttons on the right and left of the display can be used to directly access the most important menus.

5.3 Context-dependent push-buttons

The bottom push-buttons are so-called context-dependent operating elements. The selection options of these buttons depend on each screen content.

If the  icon is shown on the display the user can skip back to the previous menu item (often assigned to the [A] push-button).

5.3.1 Changing basic settings (machine configuration menu)

The basic welding system functions can be adjusted in the machine configuration menu. Only experienced users should change the settings > see 5.4 chapter.

5.4 Machine configuration (system)

In the System menu the user can set the basic machine configuration.

Enter the menu:

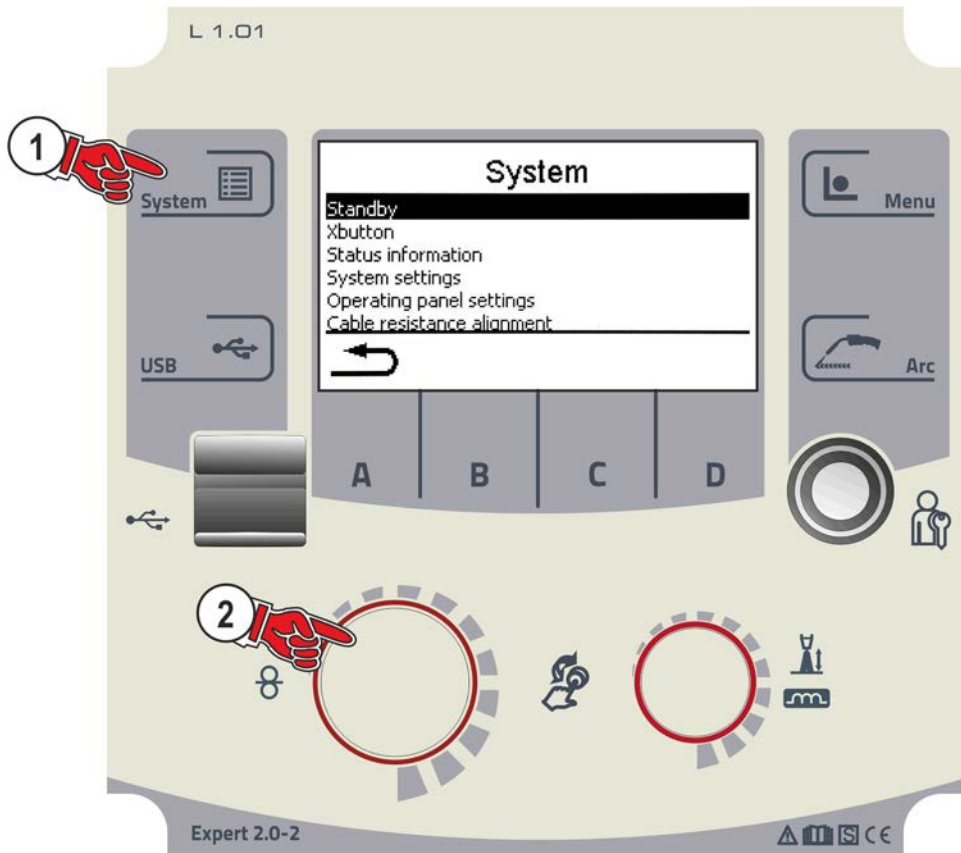


Figure 5-1

5.4.1 Power-saving mode (Standby)

There are three options to activate the power-saving mode:

1. Direct activation by prolonged pressing of the button at the wire feeder control (decompact machines).
2. Direct activation by selecting the "Trigger at once" menu item at the Expert 2.0 machine control.
3. Activation via a configurable parameter in the configuration menu (time-dependent power-saving mode).

When the power-saving mode is active the Expert 2.0 machine control display is dimmed and the wire feeder displays only show the digit in the middle.

Pressing any operating element (e.g. tapping the torch trigger) deactivates the power-saving mode and the machine is ready for welding again.

Menu item/parameter	Value	Comment
Trigger at once	Yes	When confirmed, the machine enters power-saving mode at once.
	No	No change
Time automatic [min.]	Off	Function switched off
	5–60	Time to activation of the power-saving mode in case of inactivity.
Log off user in standby mode	Yes	The user will be logged off when the power-saving mode is active.
	No	The user will not be logged off when the power-saving mode is active.

5.4.2 Access permission (Xbutton)

The welding system offers two options to prevent unauthorised access to welding parameters or unintentional reconfiguration.

- 1 Key switch (available depending on machine version). With the key switch in position 1 all functions and parameters can be configured without any restriction. In position 0 certain predefined welding parameters or functions cannot be modified (see relevant documentation).
- 2 Xbutton. With this function, permissions can be assigned to users to access those areas of the machine control defined for them. To do so, the user needs a digital key (Xbutton) to log on to the machine via the Xbutton interface. The key itself is configured by the system user (welding supervisor).

If the Xbutton function is activated, the key switch/key switch function is deactivated.

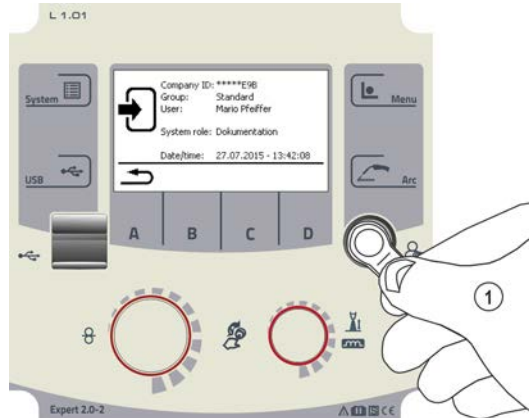


Figure 5-2

To activate Xbutton rights follow these instructions:

1. Set key switch to position "1".
2. Log on with a Xbutton and administrator rights.
3. Set menu option "Xbutton rights active" to "yes".

By following these instructions you make sure not to inadvertently block your access while not owning an Xbutton with administrator rights.

5.4.2.1 User information

User information such as company ID, user name, group etc. are shown.

5.4.2.2 Activating the Xbutton rights

Menu navigation:

Menu item/parameter	Value	Comment
Xbutton rights active:	Yes	Access rights active
	No	Key switch active
Reset Xbutton configuration:	Yes	Company ID, group and access rights when logged off will be reset to the factory settings. Xbutton rights will be deactivated.
	No	

5.4.3 Status information

This menu provides the user with information on current system interferences and warnings..

5.4.3.1 Errors and warnings

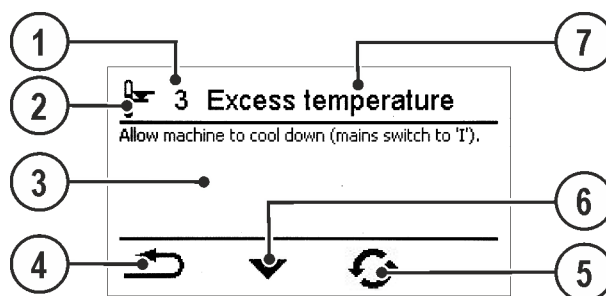








Figure 5-3

Item	Symbol	Description
1		Error number > see 7.4 chapter
2		Error icons  ----- Warning (prior to interference)  ----- Interference (welding process will be stopped)  ----- Specific (e.g. temperature error)
3		Long error description
4		Menu navigation Skip back to previous menu
5		Reset message The message can be reset
6		Menu navigation (if available) Scroll to next page or message
7		Error name

5.4.3.2 Running time

Menu item/parameter	Value	Comment
Duty cycle can be reset:	0:00 h	Values can be reset by pressing or turning the main control button
Arc time can be reset:	0:00 h	
Overall duty cycle:	0:00 h	
Overall arc time:	0:00 h	

5.4.3.3 System components

A list of all components available in the system is displayed, along with ID number, software version and name.

5.4.4 System settings

In this area the user can configure advanced system settings.

5.4.4.1 Date

Menu item/parameter	Value	Comment
Year:	2014	
Month:	10	
Day:	28	
Date format:	DD.MM.YYYY	
	YYYY.MM.DD	

5.4.4.2 Time

Menu item/parameter	Value	Comment
Hour:	0–24	
Minute:	0–59	
Time zone (UTC +/-):	-12h to +14h	
Summer time:	Yes	
	No	
Time format:	24 h	
	12 h AM/PM	

5.4.4.3 Water block

Permanently switching off the water block may damage the welding torch.

Menu item/parameter	Value	Comment
Cooling unit postflow time [min.]:	1–63	
Cooling unit control:	Automatic	
	Permanently ON	
	Permanently OFF	

5.4.4.4 Special parameter

The special parameters of the wire feeder control are used to customize the machine function configuration.

The number of selectable special parameters can deviate between the machine controls used in the welding system.

It may be required to restart the machine in order to apply a parameter change.

Systems with two wire feeder controls show the parameters of the active wire feeder only (special parameter U1 or special parameter U2).

Menu item/parameter	Value	Comment
P1	1-0	Wire inching / wire return ramp time 0 = -----normal inching (10 s ramp time) 1 = -----fast inching (3 s ramp time) (ex works)
P2	0-1	Block program "0" 0 = -----Enabled (ex works) 1 = -----P0 blocked
P3	0-1	Display mode for Up/Down welding torch with one-digit 7-segment display (two keys) 0 = -----Normal display (ex works) program number/welding power (0-9) 1 = -----Display toggles between program number/welding type
P7	0-1	Correction operation, limit value setting 0 = -----Correction operation switched off (ex works) 1 = -----Correction operation switched on
P8	0-1	Program switching with standard welding torch 0 = -----No program switching (ex works) 1 = -----Special latched 2 = -----Special latched (n-cycle active)
P9	0-1	Tapping start for latched and special latched operation 0 = -----no 4-cycle inching start 1 = -----4-cycle inching start possible (ex works)
P11	0-1	Special latched tapping time 0 = ----- Tapping function switched off. 1 = -----300 ms (ex works) 2 = -----600 ms
P12	1-2	JOB list switching 1 = -----Real JOB list (ex works) 2 = -----Real JOB list and JOB switching activated via accessories
P13	129	Lower limit remote JOB switching JOB range of the function torches (MT PC2, PM 2U/D, PM RD2) Lower limit: 129 (ex works)
P14	169	Upper limit remote JOB switching JOB range of the function torches (MT PC2, PM 2U/D, PM RD2) Upper limit: 169 (ex works)
P16	0-1	JOB batch mode 0 = -----Block JOB mode not enabled (ex works) 1 = -----Block JOB mode enabled
P17	0-1	Program selection with standard torch trigger 0 = -----No program selection (ex works) 1 = -----Program selection possible
P20	0-1	Pulse in program A 0 = -----not active 1 = -----active (factory setting)

Menu i-tem/parameter	Value	Comment
P23	0-1	Program settings for relative programs 0 =----- Combined setting of relative programs possible (ex works). 1 =----- Individual setting of relative programs possible.
P27	0-1	Operating mode switching at welding start 0 =----- Not enabled (factory setting) 1 =----- Enabled
P28	30 %	Error threshold of electronic gas flow control Error output in case of gas nominal value deviation
Reset to factory setting:	No	
	Yes	All special parameters are reset to the corresponding factory setting.

Wire inching ramp time (P1)

The wire inching starts with a speed 1.0 m/min for 2 secs. It is subsequently increased to a ramp function to 6.0 m/min. The ramp time can be set between two ranges.

During wire inching, the speed can be changed by means of the welding power rotary knob. Changing the speed has no effect on the ramp time.

Program "0", release of program block (P2)

The program P0 (manual setting) is blocked. Only operation with P1-P15 is possible, irrespective of the key switch position.

Display mode for Up/Down welding torch with one-digit 7-segment display (P3)

Normal display:

- Program mode: Program number
- Up/down operation: Welding power (0=minimum current/9=maximum current)

Toggle display:

- Program mode: Program number and welding procedure (P=pulse/n=not pulse) are toggled
- Up/down operation: Welding power (0=minimum current/9=maximum current) and symbol for up/down operation are toggled

Switching on/off correction operation (P7)

The correction operation is switched on and off for all JOBS and their programs at the same time. A correction operation is specified for wire speed (DV) and welding voltage correction (U_{corr}) for each JOB. The correction value is saved separately for each program. The correction range can be maximum 30% of the wire speed and +/-9.9 V welding voltage.

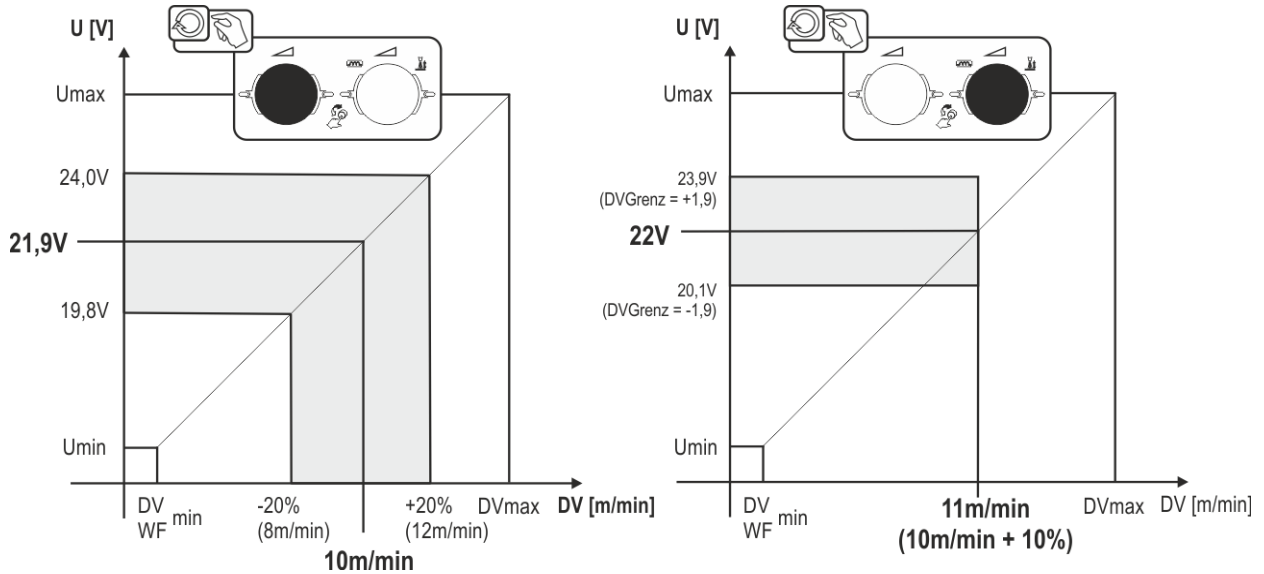


Figure 5-4

Example for the operating point in correction mode:

The wire speed in one program (1 to 15) is set on 10.0 m/min.

This corresponds to a welding voltage (U) of 21,9 V. When the key switch is set to "0" position, welding in this program can only be carried out with these values.

To allow the welder also to perform wire and voltage correction in program mode, the correction mode must be switched on and limit values for wire and voltage must be specified.

Setting of the correction limit value = WFlimit = 20% / Ulimit = 1.9 V

Now the wire speed can be corrected by 20% (8.0 up to 12.0 m/min) and the welding voltage by +/-1.9 V (3.8 V).

In the example the wire speed is set on 11.0 m/min. This corresponds to a welding voltage of 22 V

Now the welding voltage can be corrected by further 1.9 V (20.1 V and 23.9 V).

The values for voltage and wire-speed correction will be reset if the key switch is moved to the "1" setting.

Program switching with standard welding torch (P8)**Special latched (latched absolute program sequence)**

- Cycle 1: absolute program 1 is run
- Cycle 2: absolute program 2 is run after completion of "tstart".
- Cycle 3: absolute program 3 is run until the "t3" time has elapsed. The program then switches automatically to absolute program 4.

Accessory components such as remote controls or special torches may not be connected!

Program switching at the wire feed unit control is disabled.

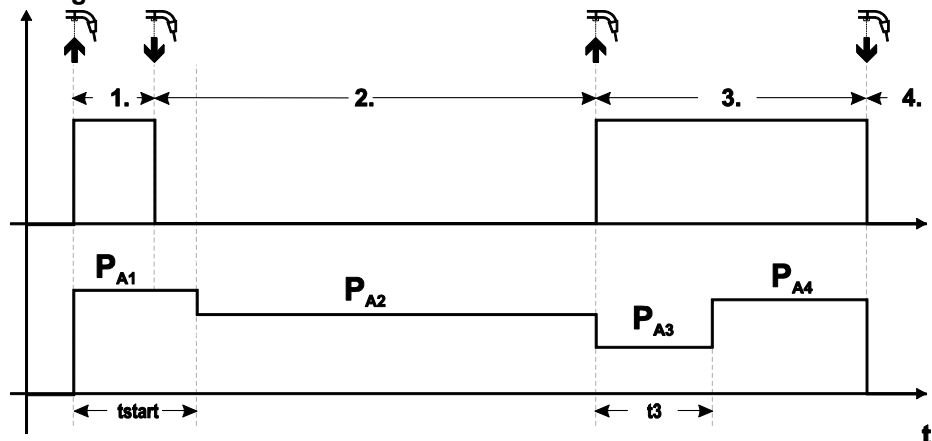


Figure 5-5

Specific latched special (n cycle)

In the n cycle program sequence, the unit starts in the 1st cycle with start program P_{start} from P_1

In the second cycle, the machine switches to absolute program 2, once the start time "tstart" has elapsed. Tapping switches to other programs (P_{A1} to max. P_{A9}).

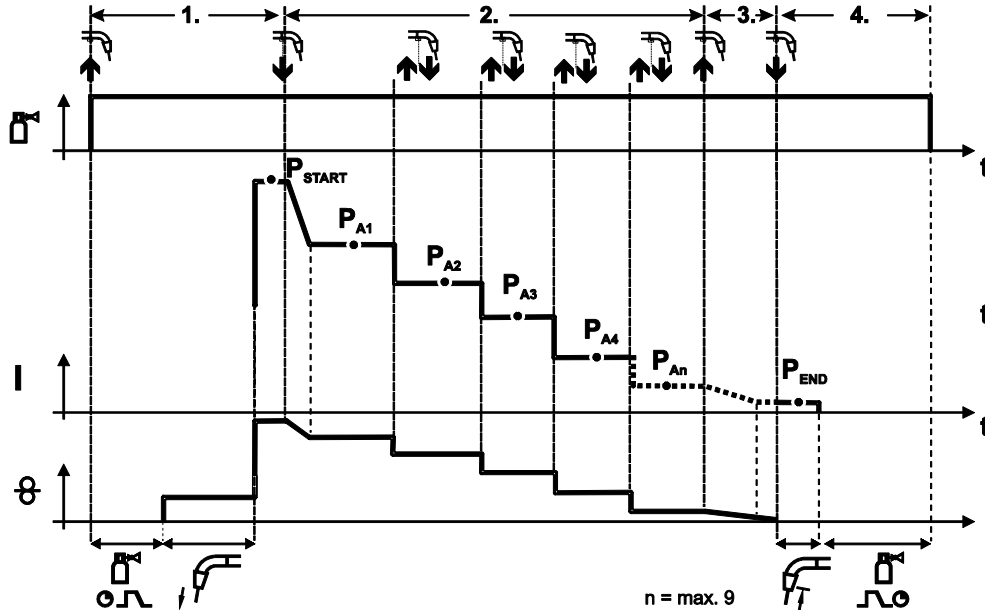


Figure 5-6

The number of programs (P_{An}) corresponds to the cycle number specified under N cycle.

1st cycle

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).
- Wire feed motor runs at "creep speed".
- Arc ignites after the wire electrode makes contact with the workpiece, welding current is flowing (start program P_{START} from P_{A1})

2nd cycle

- Release torch trigger.
- Slope to main program P_{A1} .

The slope to main program P_{A1} is given at the earliest after the set time t_{START} elapses and at the latest when the torch trigger is released. Tapping (pressing briefly and releasing within 0.3 sec) can switch to other programs. Programs P_{A1} to P_{A9} are possible.

3rd cycle

- Press and hold torch trigger.
- Slope to end program P_{END} from P_{AN} . The program can be stopped at any time by pressing the torch trigger longer than 0.3 sec. P_{END} from P_{AN} is then executed.

4th cycle

- Release torch trigger.
- WF motor stops.
- Arc is extinguished after the pre-selected wire burn-back time elapses.
- Gas post-flow time elapses.

Special latched tapping start (P9)

In latched – tap start – operating mode it is possible to switch straight to the second step by tapping the torch trigger; it is not necessary for current to be flowing.

The welding can be halted by pressing the torch trigger for a second time.

Set special latched tapping time (P11)

The tapping time for changing over between the main program and reduced main program can be set in three levels.

0 = no tapping

1 = 320ms (factory setting)

2 = 640ms

JOB list switching (P12)

Value	Name	Explanation
1	Real JOB list	JOB numbers correspond to the actual memory cells. Every job can be selected, there will be no memory cells if the selection will be skipped.
2	Real JOB list, JOB switching active	Like real JOB list. In addition JOB switching with appropriate accessory components such as a function torch is possible.

Creating user-defined JOB lists

An associated memory area, in which switching with accessory components such as a function torch between JOBS is possible, is created.

- Set special parameters P12 to "2".
- Set switch "Program or Up/Down Function" to "Up/Down" position.
- Select existing JOB, which comes as close as possible to the desired result.
- Copy JOB to one or more destination JOB numbers.

If JOB parameters still need to be adjusted, select destination JOBS one after the other and adjust parameters individually.

- Special parameters P13 to the lower limit and
- Adjust special parameters P14 to the upper limit of the destination JOBS.
- Set switch "Program or Up/down function" to position "Program".

With the accessory component JOBS can be switched in the specified range.

Copying JOBS, "Copy to" function

The possible target range is between 129 - 169.

- First configure special parameter P12 to P12 = 2 or P12 = 1!

Copy JOB by number, see corresponding operating instructions ("Control").

By repeating the last two steps, the same source JOB can be copied to multiple target JOBS.

If the control does not register any user activity for longer than 5 seconds, the parameter display is shown once more and the copy process is complete.

Lower and upper limit of JOB remote switching (P13, P14)

The highest and lowest JOB numbers which can be selected using accessory components, such as the PowerControl 2 torch.

Avoids an accidental changeover into undesirable or undefined JOBS.

Block JOB mode (P16)

The following accessory components support block JOB mode:

- Up/Down welding torch with one-digit 7-segment display (two keys)
Program 0 is always active in JOB 0 and program 1 in all other JOBS

In this operating mode, up to 30 JOBS (welding tasks) divided into three blocks can be called up with accessory components.

The following configurations must be carried out to use the block JOB operation:

- Set the "Program or Up/Down function" changeover switch to "Program"
- Set the JOB list to actual JOB list (special parameter P12 = "1")
- Enable block JOB mode (special parameter P16 = "1")
- Switch to block JOB mode by selecting one of the special JOBS 129, 130 or 131.

Simultaneous operation with interfaces such as RINT X11, BUSINT X11, DVINT X11 or digital accessory components like the R40 remote control is not possible!

Allocation of JOB numbers to the display on the accessory components

JOB no.	Display/selection on the accessory component									
	0	1	2	3	4	5	6	7	8	9
Special JOB 1	129	141	142	143	144	145	146	147	148	149
Special JOB 2	130	151	152	153	154	155	156	157	158	159
Special JOB 3	131	161	162	163	164	165	166	167	168	169

JOB 0:

This JOB allows you to set the welding parameters manually.

Selection of JOB 0 can be prevented via the key switch or with the "block program 0" parameter (P2).

Key switch position 0, or special parameter P2 = 0: JOB 0 is blocked.

Key switch position 1, or special parameter P2 = 1: JOB 0 can be selected.

JOBS 1-9:

Nine JOBS can be called up in each special JOB (see table).

Nominal values for wire speed, arc correction, dynamics etc must be defined in advance in these JOBS. This can be done easily with the PC300.NET software.

If the software is not available, user-defined JOB lists can be created in the special JOB areas with the "Copy to" function. (See explanations about this in the "Switching JOB lists (P12)" chapter)

Selecting programs with the standard torch trigger (P17)

Allows you to select a program or switch a program before starting welding.

You switch to the next program by tapping the torch trigger. Once the last enabled program is reached, you start again at the beginning.

- Program 0 is the first enabled program, provided that it is not blocked.
(see also special parameter P2).
- The last enabled program is P15.
 - If the programs are not limited by special parameter P4 (see special parameter P4).
 - Or if the programs are limited for the selected JOB by the n cycle setting (see parameter P8).
- Welding starts when the torch trigger is held for longer than 0.64 s.

You can select programs with the standard torch trigger in all operating modes (non-latched, special non-latched, latched and special latched).

Program settings for relative programs (P23)

The start, down-slope and end program relative programs can be set individually or combined for the P0-P15 operating points. When choosing the combined setting, in contrast to the individual setting, the parameter values are saved in the JOB. With the individual setting, the parameter values are identical for all JOBS (except for special JOBS and SP1, SP2 und SP3).

Operating mode switching at welding start (P27)

With the selected 4-cycle-Special mode, the user can determine by the time of the torch trigger operation in which operating mode (4-cycle or 4-cycle-Special) the program sequence shall be carried out.

Hold torch trigger (longer than 300 ms): Program sequence with **operating mode** 4-cycle-Special (standard).

Tap torch trigger: Device changes to operating mode 4-cycle.

Error threshold of electronic gas flow control (P28)

The set percentage value is the error threshold; if it is undershot or exceeded, an error message > see 7.4 chapter is displayed.

5.4.5 Control

Menu item / parameter	Value	Comment
Operation without wire feeder is possible (This parameter controls the system behaviour depending on the connected wire feeder)	No (factory setting)	The wire feeder (WF) can be changed during operation. Operation without a connected wire feeder is not possible.
	Yes	The welding system can be operated without a wire feeder connected.

5.4.6 Operating panel settings

Menu item/parameter	Value	Comment
Main screen	1-2	
Autom. selection of welding power	Off-30 s	
Display brightness:	0-100%	
Display contrast:	0-100%	
Display negative:	No	
	Yes	
Non-latched operation available	No	
	Yes	
Latched operation available	No	
	Yes	
Special non-latched operation available	No	
	Yes	
Spot welding selectable available	No	
	Yes	
Special latched operation available	No	
	Yes	
P0 of Expert 2.0 can be changed:	No	
	Yes	
Average value display for superPuls:	Yes	When superPuls is enabled the welding power is displayed as average value.
	No	The welding power is displayed by program A even when superPuls is enabled.
Hold function:	On	
	Off	
Language	German	
Reset Expert 2.0 to factory setting	Yes	Only those parameters relevant for Expert 2.0 (e.g. display settings, language and texts) will be reset. System parameters such as Xbutton activation or JOBs are not affected.
	No	

5.4.7 Aligning the cable resistance

The resistance value of cables can either be set directly or it can be aligned using the power source. The factory setting of the power sources is 8 mΩ. This value corresponds to a 5 m earth cable, a 1.5 m intermediate hose package and a 3 m water-cooled welding torch. With other hose package lengths, it is necessary to carry out a +/- voltage correction to optimise welding properties. The voltage correction value can be set close to zero by means of realigning the cable resistance. It is recommended to align the electric cable resistance after replacing accessories such as torches or intermediate hose packages.

In case a second wire feeder is used the (rL2) parameter has to be aligned. For all other configurations it is sufficient to align the (rL1) parameter.

1 Preparation

- Switch off the welding machine.
- Unscrew the gas nozzle from the welding torch.
- Trim the welding wire so that it is flush with the contact tip.
- Pull the welding wire back a little (about 50 mm) on the wire feeder (by pressing button B - wire return). There should be no more welding wire in the contact tip at this point.

2 Configuration

- Switch on the welding machine
- Press the "System" push-button.
- Select the "Cable resistance alignment" parameter using the main control button. Parameter RL1 must be aligned for all machine combinations. In case of welding systems with a second power circuit – if two wire feeders are to be operated from a single power source, for example – a second alignment with parameter RL2 must be made. To activate the required wire feeder for measurement, briefly activate (tap) the torch trigger of this machine.

3 Alignment / Measurement

- Press the "D" push-button.
- Place the welding torch with the contact tip on a clean spot of the workpiece with a little pressure and press the torch trigger for approx. 2 seconds. A short-circuit current will flow briefly, which is used to determine and display the cable resistance. The value can be between 0 mΩ and 40 mΩ. The new value is immediately saved without requiring further confirmation. If no value is shown on the display, then the measurement failed. The measurement must be repeated.
- Press the "A" push-button after successful measurement.

4 Restoring welding standby mode

- Switch off the welding machine.
- Screw the gas nozzle onto the welding torch.
- Switch on the welding machine.
- Insert the welding wire again.

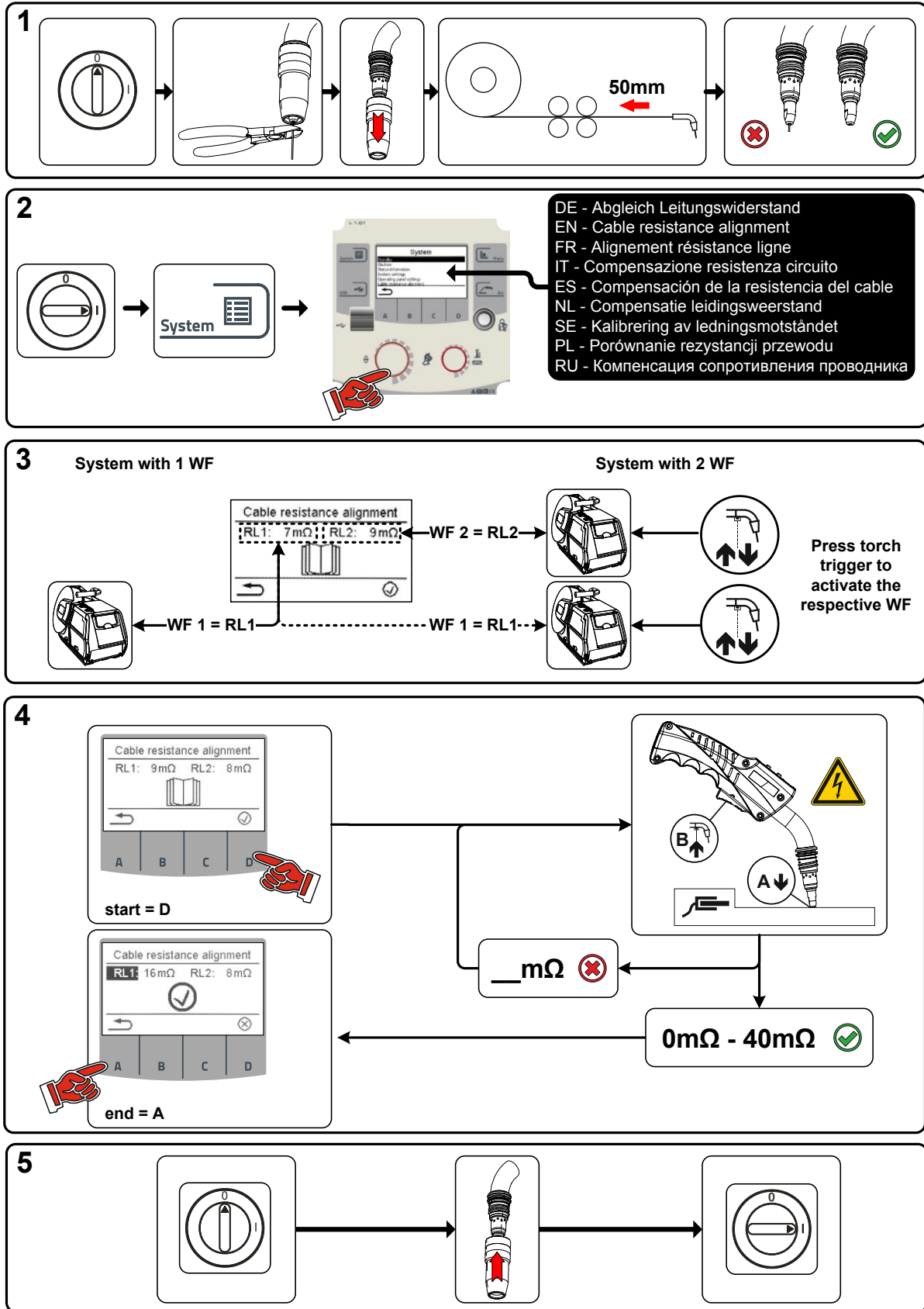


Figure 5-7

5.4.7.1 Xnet machine

The Xnet machine defines the system component required for operating the Xnet system as part of the Expert 2.0 Net/Gateway to connect to power sources or to record welding data.

5.4.7.2 Coupling mobile machines

QR code for coupling mobile end devices. Upon a successful connection, welding data are displayed on the end device.

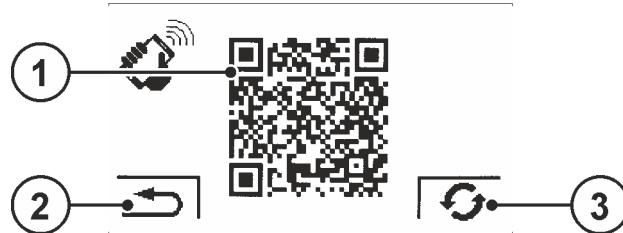


Figure 5-8

Item	Symbol	Description
1		QR code
2		Menu navigation Skip back to previous menu
3		Reset message The message can be reset and a new QR code may be requested from the network.

5.4.7.3 Component identification

Bar codes predefined in ewm Xnet are recorded with a manual scanner. Component data are retrieved and displayed in the control.

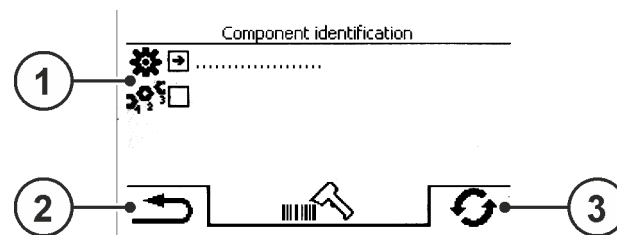


Figure 5-9

Item	Symbol	Description
1		Component data
2		Menu navigation Skip back to previous menu
3		Reset message The message can be reset

5.4.7.4 Component details

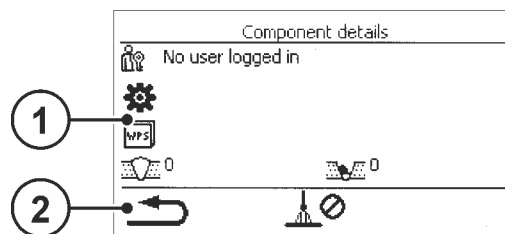


Figure 5-10

Item	Symbol	Description
1		Component data
2		Menu navigation Skip back to previous menu

5.4.7.5 Errors and warnings

A list of all ewm Xnet-specific errors and warnings are displayed with their ID number and description.

5.4.8 Status information

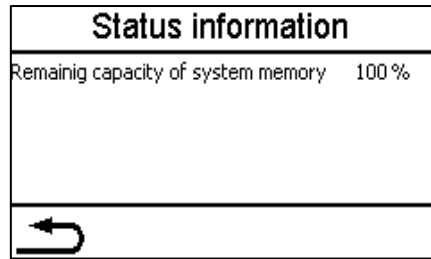


Figure 5-11

5.4.8.1 Network

Network	Network	WiFi
>Device-Name<	Status of network use	Status
IP address 004.003.002.001	DHCP-Configuration DHCP-PLUS	connected
Subnet mask 208.192.176.160	DHCP-Status DHCP-PLUS OK	SSID Network-Name
Gateway 139.122.111.094		BSSID BSSID-Name
MAC address C3:D2:E1:F0:B4:A5		Channel number 23
		WiFi firmware ModulVersion
← ▼	← ▼ ▲	← ▲

Figure 5-12

5.4.9 Clear system memory


Resets the internal system memory used for saving welding and log data and deletes all data.

All welding data recorded so far, which have not been transferred to the Xnet server via flash drive or network connection, will be permanently deleted.

5.4.10 Reset to factory settings

All machine configuration data relating to Xnet will be reset to the factory setting. The system memory data will not be affected, i.e. any welding or log data recorded will be saved.

5.5 Offline data transfer (USB)

 **You may only use this USB interface to exchange data with a USB flash memory. You must not connect any other USB devices such as keyboards, hard disks, mobile telephones, cameras or other devices so as to avoid any damage to the machine. The interface does not provide any load functions either.**

Using the USB interface, data can be transferred between the machine control and a USB storage medium.

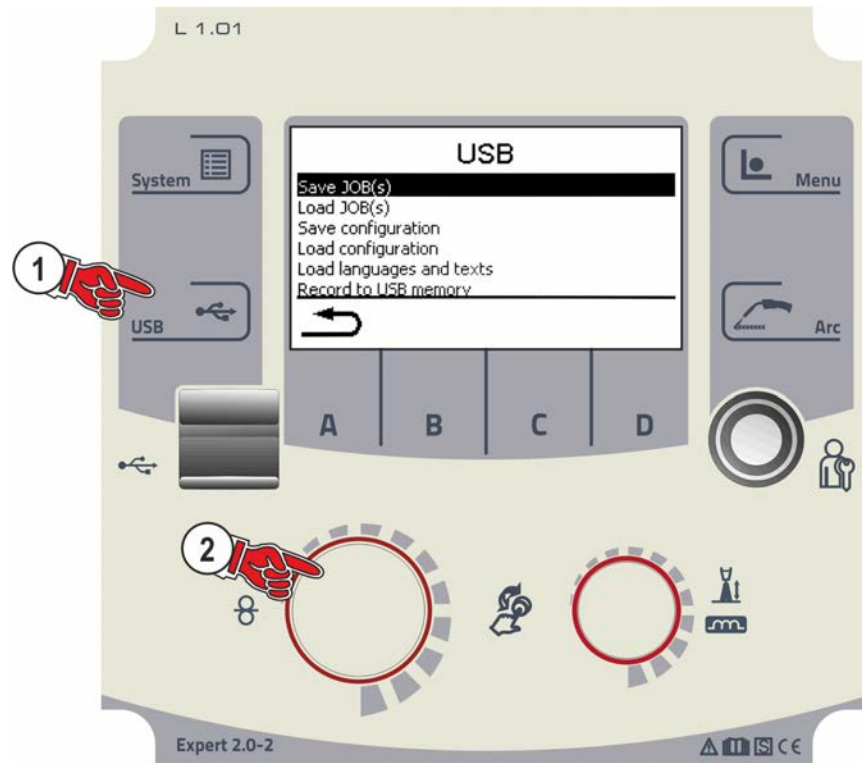


Figure 5-13

5.5.1 Save JOB(s)

Saving a single (JOB) or a range of welding tasks (JOB)s (from-to) from the welding machine to the storage media (USB).

5.5.2 Load JOB(s)

Loading a single JOB or a range of welding tasks (JOB)s (from-to) from the storage media (USB) to the welding machine.

5.5.3 Save configuration

5.5.3.1 System

Configuration data of the power source's system components.

5.5.3.2 Xnet machine

Master configuration

Core data for network communication (independent of machine).

Individual configuration

Machine-related configuration data, matching the current power source only.

5.5.4 Load configuration

5.5.4.1 System

Configuration data of the power source's system components.

5.5.4.2 Xnet machine

Master configuration

Core data for network communication (independent of machine).

Individual configuration

Machine-related configuration data, matching the current power source only.

5.5.5 Load languages and texts

Load a language and text package from the storage medium (USB) to the welding machine.

5.5.6 Record on USB drive


You can record welding data on a storage medium and read or analyse them using the Xnet quality management software when required. For machine variants with network capability (LG/WLG) only!

5.5.6.1 Register USB drive

To identify and allocate the welding data between power source and storage medium the storage medium has to be registered once. This is done by selecting the menu option "Register USB drive" or by starting a data recording process. Successful registration is indicated by a checkmark next to the relevant menu option.

If the storage medium is registered and connected when the power source is being switched on, recording of the welding data starts automatically.

5.5.6.2 Start recording

After confirming the start of data recording the storage medium will be registered (if not registered yet). Data recording starts and is indicated at the main screen by a slow flashing of the  icon.

5.5.6.3 Stop recording

To avoid data loss, finish the recording with this menu option before removing the USB drive or switching off the machine.

Welding data must be imported into the Xnet quality management software using the XWDImport software. This software is an integral part of the Xnet installation.

5.6 Welding task administration (Menu)

In this menu the user can carry out all welding task (JOB) organisation operations.

This machine series offers user-friendly operation and a multitude of features.

- Various welding tasks (JOBS) consisting of welding procedure, material type, wire diameter and shielding gas type have been predefined > see 8.1 chapter.
- The system calculates the required process parameters depending on the operating point specified (one-knob operation via wire feed speed rotary transducer).
- You can adjust additional parameters at the machine control or using the PC300.NET welding parameter software, if required.

Enter the menu:

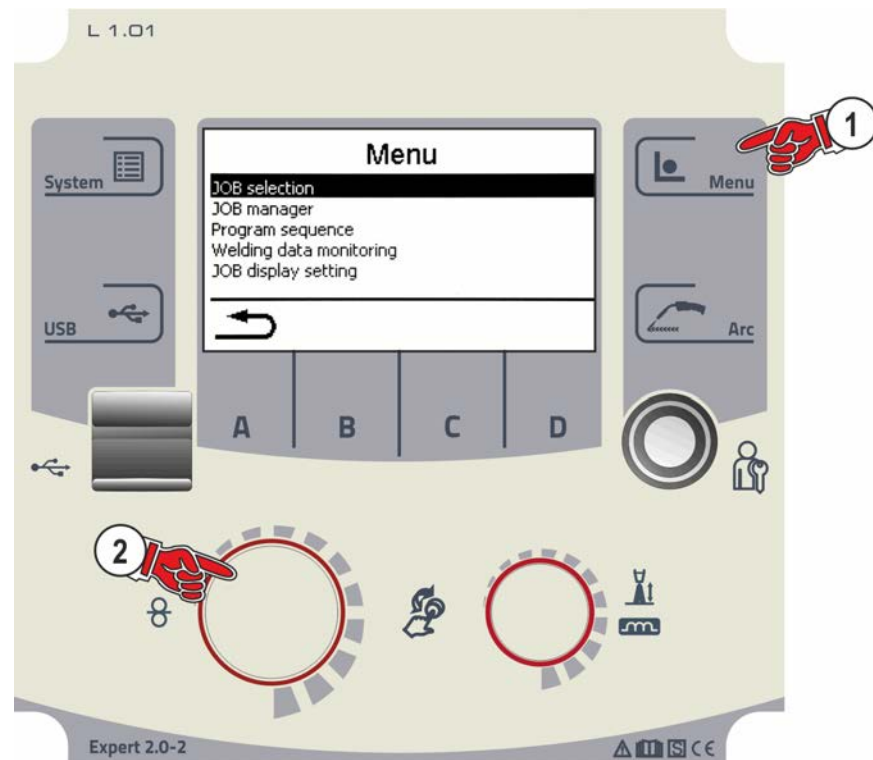


Figure 5-14

5.6.1 JOB selection (material/wire/gas)

The welding task (JOB) can be set in two ways:

- Enter the relevant JOB number. Each welding task has a unique JOB number (for predefined JOBS > see 8.1 chapter, see the JOB list in the annex or the sticker on the machine).
- Enter the basic welding parameters: welding procedure, material type, wire diameter and shielding gas type.

5.6.2 JOB manager

5.6.2.1 Copy JOB to number

Copy JOB to a number of the definable range (129–169).

5.6.2.2 Reset current JOB

Reset all parameters of the selected JOB to the factory setting

5.6.2.3 Reset all JOBs

Reset all JOBs to the factory setting, except JOBs in the definable range (129–169) > see 7.1 chapter.

5.6.3 Program sequence

In the program sequence, you can select welding parameters and set their values. The number of parameters shown depends on the selected operating mode.

In addition, the user can access advanced settings and the setup mode.

The setting range for the parameter values are summarised in the parameter overview section > see 8.2 chapter.

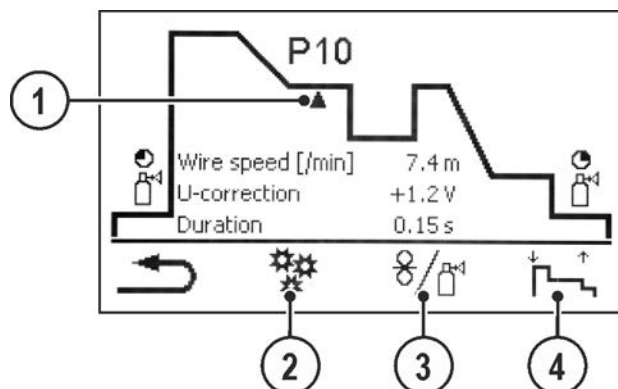


Figure 5-15

Item	Symbol	Description
1	▲	Parameter position Displays the currently selected welding parameters in the functional sequence
2	***	Advanced settings Display and setting of advanced process parameters
3	⚙️/⚙️	Setup mode > see 5.6.4 chapter
4		Operating mode setting

5.6.3.1 Programs (P_A 1-15)

In the manual program P0, the user can adjust the operating point in a conventional way using the parameter settings on the machine control. The active program is shown in the main menu of the machine display in the display area for process parameters with the letter "P" and the corresponding program number.

Different welding tasks or positions on a workpiece require different welding power values (operating points) or parameter settings. These settings can be stored in up to 15 programs (P1 to P15) and recalled, as needed, at the machine control or a suitable accessory component (e.g. welding torch).

Welding parameters for program 0 (P0) are changed for decompact machine systems at the machine control of the wire feeder (factory setting). To change the parameters using the Expert 2.0 machine control, the parameter "P0 changeable by Expert 2.0" must be set to "Yes" > see 5.4.6 chapter.

Welding parameters for programs 1 - 15 can be changed on any control connected in the system.

The following parameters and their values are stored in each program:

- Wire feed speed and voltage correction (welding power)
- Operating mode, welding type, dynamics and setting superPuls

Changes to the parameter settings are stored in the selected program without further prompt.

Selection

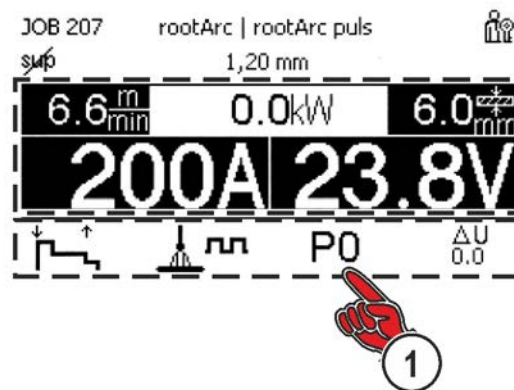


Figure 5-16

5.6.3.2 Overview of the welding parameter switching options

The user can change the welding parameters of the main programs with the following components.

	Program switching	JOB switching	Process switching	Welding type	Program	Operating mode	Wire feed speed	Voltage correction	Dynamics
M3.7 – I/J Wire feeder control			✓		P0		✓		
					P1-15				
PC 300.NET Software	✗		✓		P0	✓		✗	
					P1-15		✓		
MT Up/Down Welding torch	✓		✗		P0	✗	✓		✗
					P1-9	✗	✗		
MT 2 Up/Down Welding torch	✓		✗		P0	✗	✓		✗
					P1-15	✗	✗		✗
MT PC 1 Welding torch	✓		✗		P0	✗	✓		✗
					P1-15	✗	✗		
MT PC 2 Welding torch	✓		✗		P0	✗	✓		✗
					P1-15	✗	✗		
PM 2 Up/Down Welding torch	✓		✗		P0	✗	✓		✗
					P1-15	✗	✗		
PM RD 2 Welding torch	✓		✗		P0	✗	✓		✗
					P1-15	✗	✗		
PM RD 3 Welding torch	✓	✗	✓		P0		✓		
					P1-15				

Example 1: Welding workpieces with different sheet metal thicknesses (non-latched)

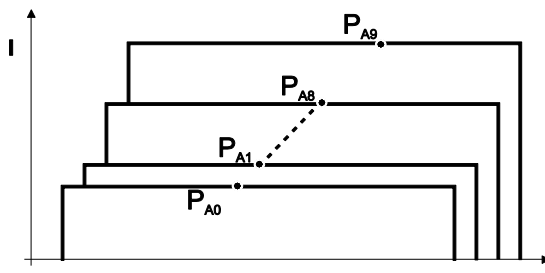


Figure 5-17

Example 2: Welding different positions on a workpiece (latched)

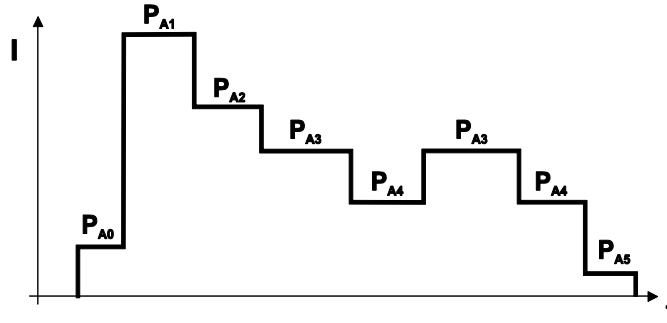


Figure 5-18

Example 3: Aluminium welding of different sheet metal thicknesses (non-latched or latched special)

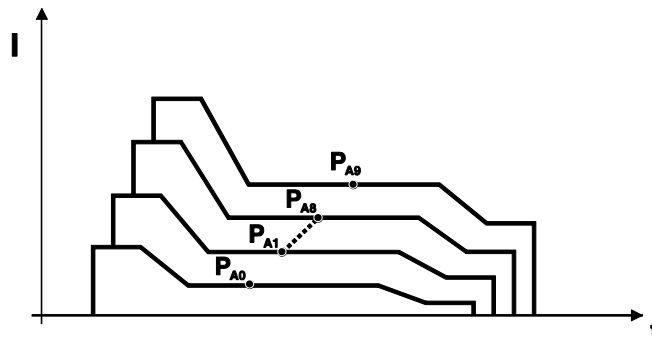


Figure 5-19

5.6.3.3 MIG/MAG welding

In every JOB, separate settings can be made for the ignition program, reduced main program and end program as to whether or not to alternate with the pulse process.

These properties are stored on the welding machine with the JOB. This means that in the factory settings, the pulse process is active during the end program in all forceArc JOBs.

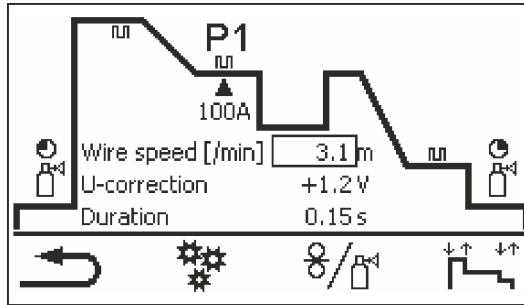


Figure 5-20

P_{START} , P_B and P_{END} are set as relative programs ex factory. They relate to percentages of the wire feed value of the main program P_A . These programs can also be configured using absolute values, if desired (see Absolute value set point). > see 5.6.7 chapter.

Menu item/parameter	Program	Comment
Gas pre-flow time		
Gas nominal value		GFE option/variant (electronic gas volume control) required
WF relative	P_{START}	Wire feed speed, relative
Duration		Duration (start program)
U correction		Arc length correction
Slope time		Slope duration from P_{START} to P_A
WF (/min.)	P_A	Wire feed speed, absolute
U correction		Arc length correction
Duration		Duration (spot time and superPuls time)
Slope time		Slope duration from P_A to P_B
WF relative	P_B	Wire feed speed, relative
Duration		Duration (reduced main program)
U correction		Arc length correction, relative
Slope time		Slope duration from P_B to P_A
Slope time		Slope duration from P_B to P_{END}
WF relative	P_{END}	Wire feed speed, relative
Duration		Duration (end program)
U correction		Arc length correction, relative
Wire burn-back		
Gas post-flow time		

5.6.3.4 Advanced settings

Menu item/parameter	Value	Comment
Process switching	Off	
	On	
Start program pulsing	Off	
	On	
End program pulsing	Off	
	On	
Wire retraction ignition	Off	
	Lift arc (PP)	
	Lift arc	
End pulse duration	0.0–20 ms	
U correction limit	0.0–9.9 V	Applies with correction operation enabled
Wire correction limit	0–30%	
N cycle program limit	Off	
	1–15	
Slope between programs (/100 ms)	Off	
	0.1–2.0 m/min	
waveArc	Off	
	On	

5.6.3.5 TIG welding

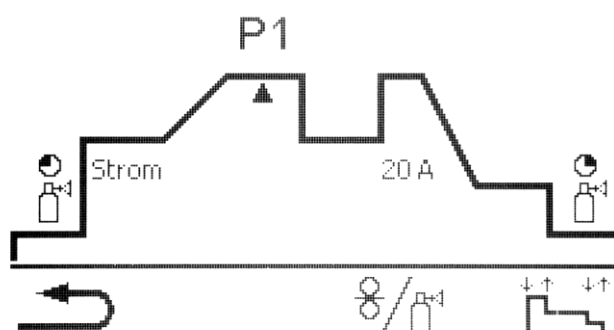


Figure 5-21

Menu item/parameter	Program	Comment
Gas pre-flow time		
Gas nominal value		GFE option/variant (electronic gas volume control) required
Current	P _{START}	Ignition current
Duration		Duration (start program)
Slope time		Slope duration from P _{START} to P _A
Current	P _A	Welding current, absolute
Duration		Pulse time (superPuls)
Slope time		Slope duration from P _A to P _B
Current	P _B	Welding current
Duration		Pulse pause time (superPuls)
Slope time		Slope duration from P _B to P _A
Slope time		Slope duration from P _A to P _{END}
Current	P _{END}	Welding current
Duration		
Gas post-flow time		

5.6.3.6 MMA welding

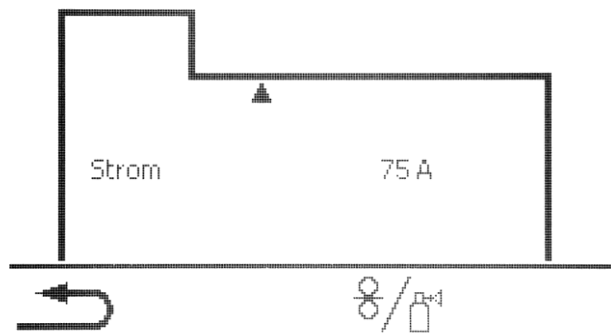


Figure 5-22

Menu item/parameter	Comment
Current	Hot start current
Duration	Hot start time
Current	Main current

The hotstart current is a percentage based on the welding current selected.

5.6.4 Setup mode

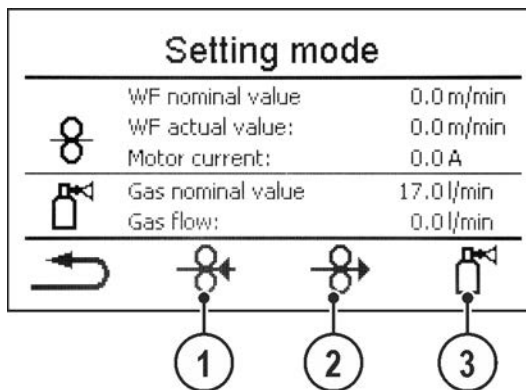


Figure 5-23

Item	Symbol	Description
1		Wire return Results in reverse inching of the wire. Pressing the push-button longer will increase the wire reversing speed.
2		Wire inching The wire is inched into the hose package. Pressing the push-button longer will increase the wire inching speed.
3		Push-button, gas test/purge hose package <ul style="list-style-type: none"> ----- Gas test: Shielding gas (symbol flashes slowly) will flow for approximately 20 seconds after pressing the push-button once. Press the button again to cancel the process early. ----- Purge hose package: Press push-button for about 5 sec: Shielding gas flows permanently (mac 300 s) until the Gas test push-button is pressed again (shielding gas flashes fast).

All functions run without current (set-up phase). This provides a high degree of safety for the welder, since the arc cannot be inadvertently ignited. The following parameters can be monitored during the wire configuration:

Menu item/parameter	Value	Comment
WF nominal value	0.0 m/min	only if the control is integrated in the wire feeder
WF actual value	0.0 m/min	
Motor current	0.0 A	
Gas nominal value	0.0 l/min	GFE option/variant (electronic gas volume control) required
Gas flow	0.0 l/min	

5.6.5 WPQR welding data assistant

The cooling-down time from 800°C to 500°C essential for the welding result (known also as t8/5 time) can be calculated using the input data in the WPQR welding data assistant. Prerequisite is the prior determination of the heat input. Upon input of the values, the valid t8/5 time is displayed with a black background.

Menu item/parameter	Value	Comment
Weld length:	1.0-999.9 cm	
Welding speed:	1.0-999.9 cm/min.	
Thermal efficiency:	10-100%	
Heat input:	kJ/mm	
Preheating temperature:	0-499 °C	
Material thickness:	1.0-999.9 mm	
Weld seam factor:	0.01-1.5	
Transition thickness:	mm	
t8/5-time:	s	

5.6.6 Welding monitoring

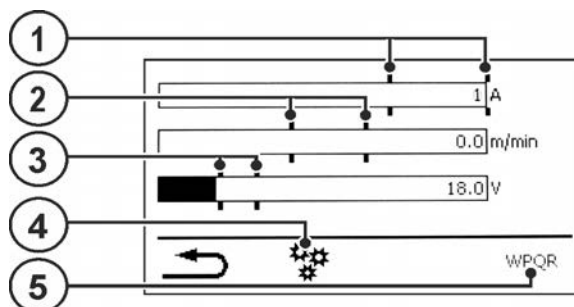


Figure 5-24

Item	Symbol	Description
1		Current tolerance
2		WF tolerance
3		Voltage tolerance
4		Advanced settings Display and setting of advanced system parameters > see 4.2.3 chapter
5	WPQR	WPQR welding data assistant

Menu item / parameter	Value	Comment
Automatic	No	
	Yes	The welding monitoring window opens automatically from the main screen after a welding start. A rotary knob actuation automatically switches back to the main window.
Errors and warnings	Off	
	Warnings	Exceeding a tolerance limit for the duration of the tolerance response time triggers warning 12.
	Error	Exceeding a tolerance limit for the duration of the tolerance response time triggers error 61. Please note: Error leads to immediate stop of the ongoing welding!
Voltage tolerance	0-100 %	
Current tolerance	0-100 %	
Tolerance response time	0.00-20.0 s	For voltage and current tolerance
Wire feeder tolerance	0-100 %	
Maximum permissible motor current	0.0-5.0 A	
Tolerance response time	0.00-20.0 s	For WF tolerance and motor current

5.6.7 JOB display setting

Menu item/parameter	Value	Comment
Text for material:	Standard	
	Alternative	
Text for gas:	Standard	
	Alternative	
Absolute value set point:	Yes	Ignition current, secondary current and end current are set and displayed as absolute values
	No	Ignition current, secondary current and end current are defined and displayed as a percentage of program A (ex works)

5.7 Change welding procedure (Arc)

In this menu the user can change the welding procedure based on the preselected material, wire and gas (change of process based on welding task).

For changing the welding task (JOB) > see 5.6 chapter

Enter the menu:

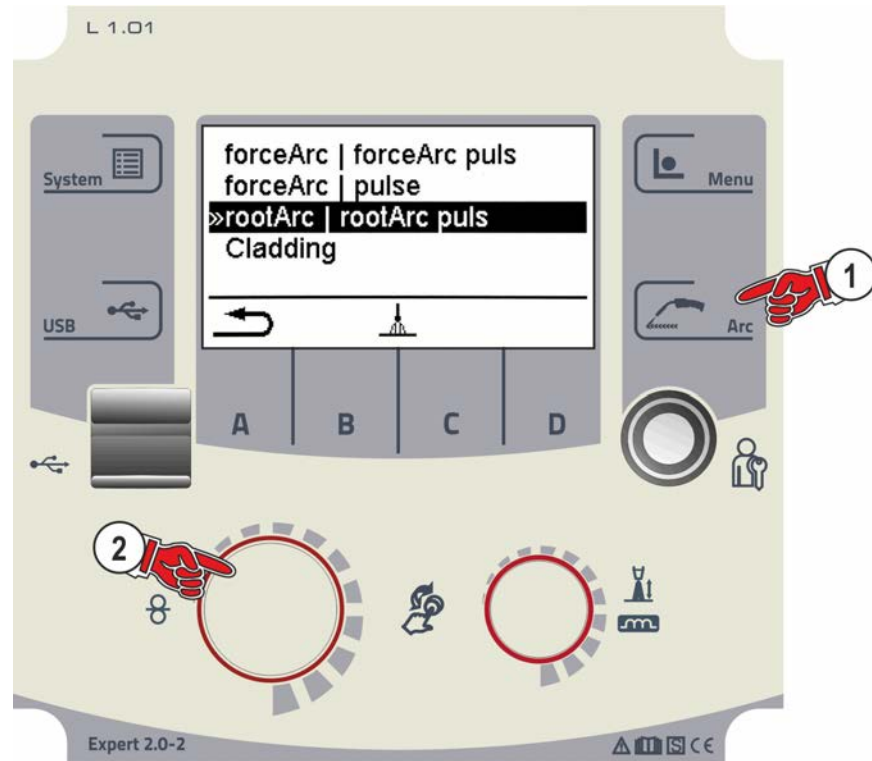


Figure 5-25

5.8 Online data transfer (network)

For machine variants with network capability (LG/WLG) only!

The network is used to transfer welding data from manual, automated and welding machines. It can include as many welding machines and computers as require and the collected data can be retrieved from one or several server PCs.

The Xnet software allows the user to monitor all welding parameters in real time and/or to subsequently analyse the saved welding data. The results can be used for process optimisation, welding calculations or checking welding wire batches.

Depending on the welding machine the data are transferred to the server via LAN/WiFi and can then be accessed in a browser window. The user interface and web-based design of the software offer the possibility to analyse and monitor the welding data via a tablet PC.

5.8.1 Wired local network (LAN)

Status description	Status display
No physical connection to a network	Deactivated LAN symbol
Connection to the network, the machine has been configured, no data transfer	Activated LAN symbol
Connection to the network, the machine has been configured and transfers data	LAN symbol flashing
Connection to the network, the machine has been configured and tries to connect to the data server	LAN symbol flashing in the specified rhythm

5.8.2 Wireless local network (WiFi)

Status description	Status display
No physical connection to a network	Deactivated WiFi symbol
Connection to a network, no data transfer	Activated WiFi symbol
Connection to a network, transferring data	WiFi symbol flashing
Connection to the network, the machine has been configured and tries to connect to the data server	LAN symbol flashing in the specified rhythm

6 Welding procedure

The welding task is selected in the JOB selection menu (material/wire/gas) > see 5.6.1 chapter.

The basic settings of the relevant welding procedure, such as operating mode or arc length correction, can be selected on the main screen on the process parameter panel > see 4.2.2 chapter.

The program sequence settings are set in the program sequence menu > see 5.6.3 chapter.

6.1 MIG/MAG welding

6.1.1 Welding type

Different forms of MIG/MAG processes are referred to as welding type.

Standard (Welding with standard arc)

Depending on the set combination of wire feed speed and arc voltage, the arc types short arc, transitional arc or spray arc can be used for welding.

Pulse (Welding with pulsed arc)

A targeted change in the welding current generates current pulses in the arc, which lead to a 1 drop per pulse of material transfer. The result is an almost spatter-free process, suitable for welding of all materials, in particular high-alloy CrNi steels or aluminium.

Positionweld (Positional welding)

A combination of the pulse/standard or pulse/pulse welding types, which is particularly suitable for positional welding due to factory-optimized parameters.

6.1.2 Welding power (operating point)

The welding power is adjusted according to the principle of one-knob operation. The user can set their operating point optionally as wire feed speed, welding current or material thickness. The optimum welding voltage for the operating point is calculated and set by the welding machine. If necessary, the user can correct this welding voltage > see 6.1.4 chapter.

Application example (setting via material thickness)

The required wire feed speed is not known and is to be determined.

- Select welding task JOB 76(> see 6.1 chapter): material = AlMg, gas = Ar 100%, wire diameter = 1.2 mm.
- Switch the display to material thickness.
- Measure the material thickness (workpiece).
- Set the measured value, e.g. 5 mm, at the machine control.
This set value corresponds to a specific wire feed speed. Switching the display to this parameter will show the associated value.

In this example, a material thickness of 5 mm corresponds to a wire feed speed of 8.4 m/min.

The material thickness details in the welding programs generally refer to fillet welds in the PB welding position. They should be regarded as guideline values and may differ in other welding positions.

6.1.3 Accessory components for operating point setting

The operating point can be set at various accessory components as well, such as remote control, special welding torches or robot and industrial bus interfaces (optional interface for automated welding required, not available for all machines of this series).

See the operating instructions for the machine in question for a more detailed description of the individual machines and their functions.

6.1.4 Arc length

When required, the arc length (welding voltage) can be adjusted for the welding task in hand by +/- 9.9 V.

6.1.5 Arc dynamics (choke effect)

This function can be used to adjust the arc between a narrow, hard arc with deep penetration (positive values) and a wide and soft arc (negative values). In addition, the selected settings are displayed with signal lights below the rotary knobs.

6.1.6 superPuls

In superPuls mode, the program toggles between the main program (PA) and the reduced main program (PB). This function is e.g. used for thin sheet welding to reduce the heat input in a controlled manner or for positional welding without the need for weaving.

The combination of superPuls and other EWM welding processes offers a multitude of possibilities. For example, to enable the welding of vertical-up welds without the "Christmas tree" technique, when selecting program 1 > see 5.6.3.1 chapter the relevant superPuls variant (depending on the material) is activated as well. The required superPuls parameters are defined ex works.

The welding power can be represented as average value (ex works) or solely as program A value. If the average value display is activated the signal lights of the main (PA) and reduced main program (PB) are illuminated simultaneously. The display variants can be toggled using special parameter P19, > see 5.4.4.4 chapter.

6.1.7 Operating modes

There are optimum pre-sets for welding parameters such as gas pre-flow and burn back, etc. for numerous applications (although these can also be changed if required).

6.1.7.1 Explanation of signs and functions

Symbol	Meaning
	Press torch trigger
	Release torch trigger
	Tap torch trigger (press briefly and release)
	Shielding gas flowing
I	Welding output
	Wire electrode is being conveyed
	Wire creep
	Wire burn-back
	Gas pre-flows
	Gas post-flows
	Non-latched
	Special, non-latched
	Latched
	Special, latched
t	Time
P _{START}	Ignition program
P _A	Main program
P _B	Reduced main program
P _{END}	End program
t ₂	Spot time

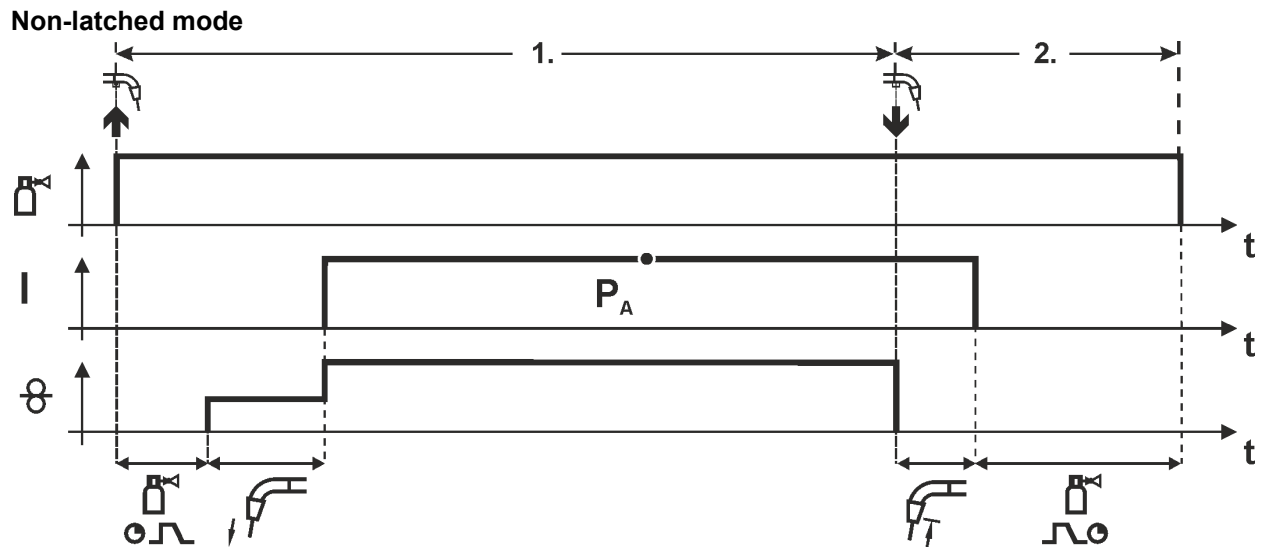


Figure 6-1

Step 1

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).
- Wire feed motor runs at "creep speed".
- Arc ignites after the wire electrode makes contact with the workpiece; welding current flows.
- Change over to pre-selected wire speed.

Step 2

- Release torch trigger.
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

Non-latched operation with superpulse

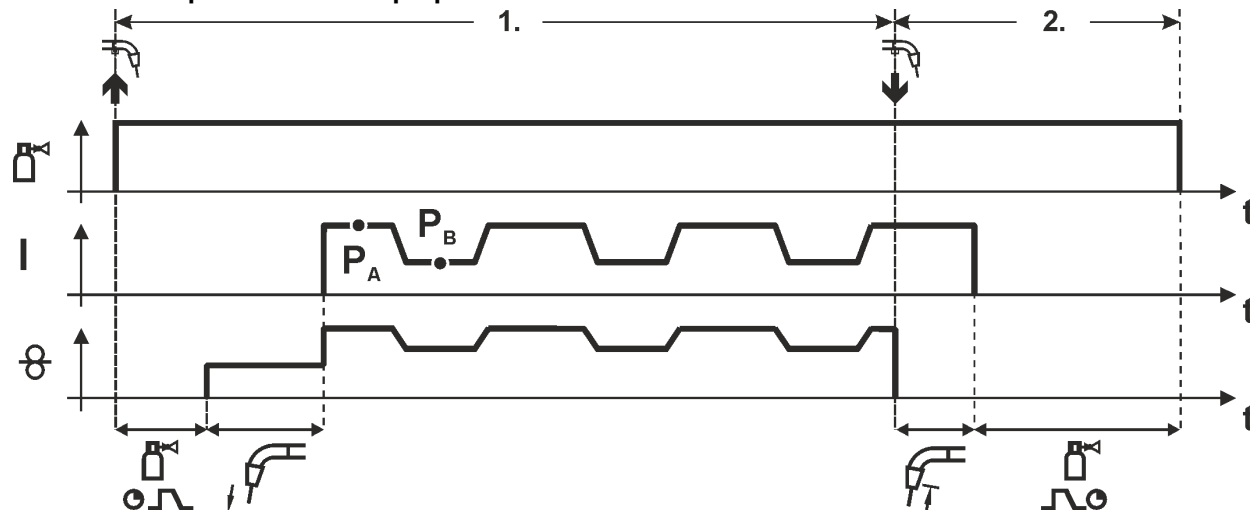


Figure 6-2

Step 1

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).
- Wire feed motor runs at “creep speed”.
- Arc ignites after the wire electrode makes contact with the workpiece; welding current flows.
- Start the super pulse function beginning with main program P_A :
The welding parameters change at the specified times between main program P_A and the reduced main program P_B .

Step 2

- Release torch trigger.
- Super pulse function is ended.
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

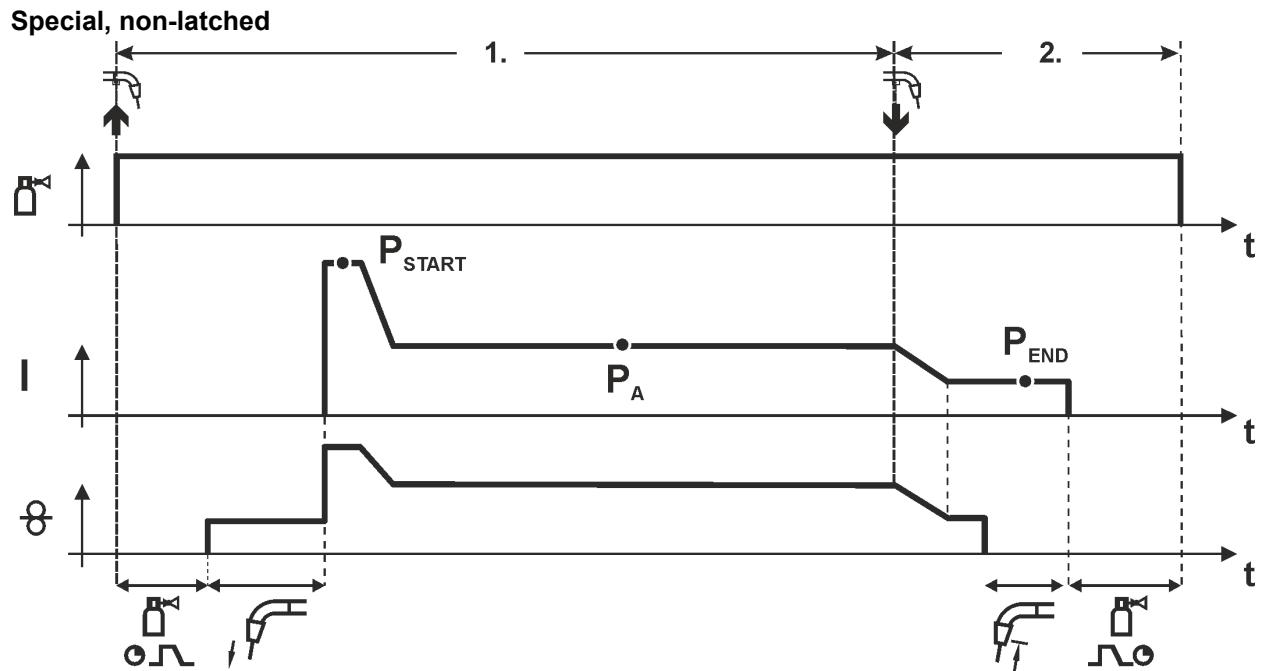


Figure 6-3

Step 1

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at “creep speed”.
- Arc ignites after the wire electrode makes contact with the workpiece, welding current is flowing (start program P_{START} for the time t_{start})
- Slope to main program P_A .

Step 2

- Release torch trigger
- Slope to end program P_{END} for the time t_{end} .
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

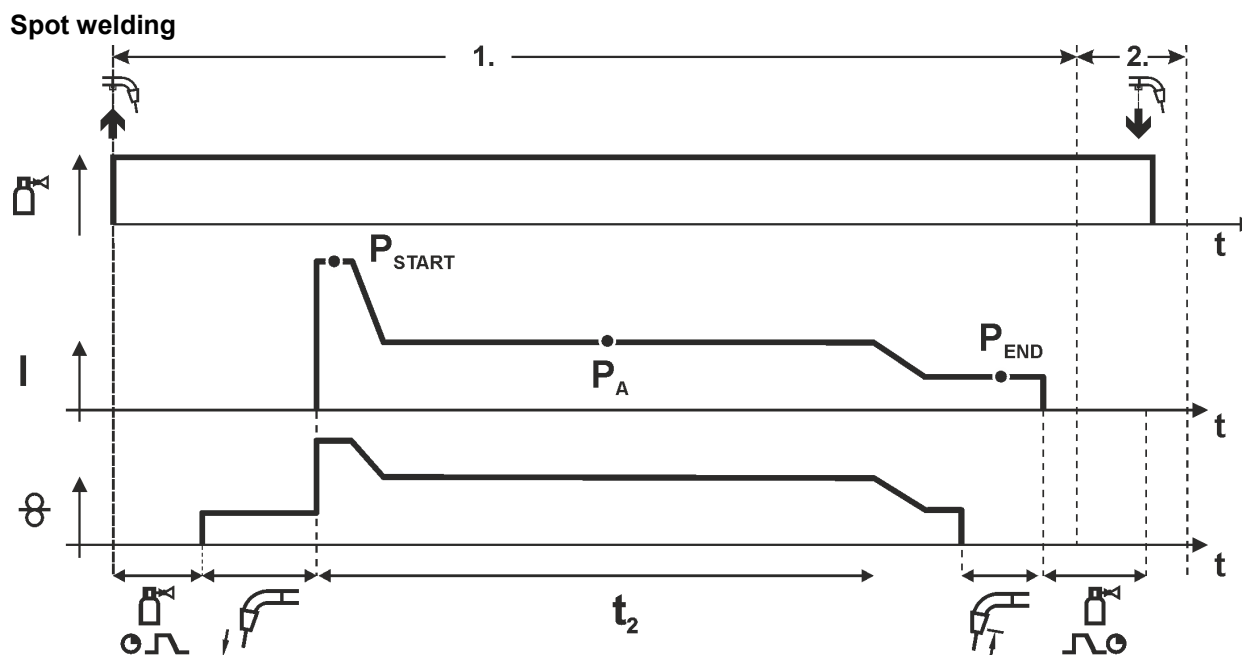


Figure 6-4

The ignition time t_{start} must be added to the spot time t_2 .

1st cycle

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at "creep speed"
- Arc ignites after the wire electrode makes contact with the workpiece, welding current is flowing (start program P_{START} , spot time starts)
- Slope to main program P_A
- After the set spot time elapses, slope goes to end program P_{END} .
- Wire feed motor stop welding.
- Arc is extinguished after the pre-selected wire burn-back time elapses
- Gas post-flow time elapses.

2nd cycle

- Release torch trigger

Releasing the torch trigger (step 2) interrupts the welding process even if the spot time has not yet elapsed (slope to end program P_{END}).

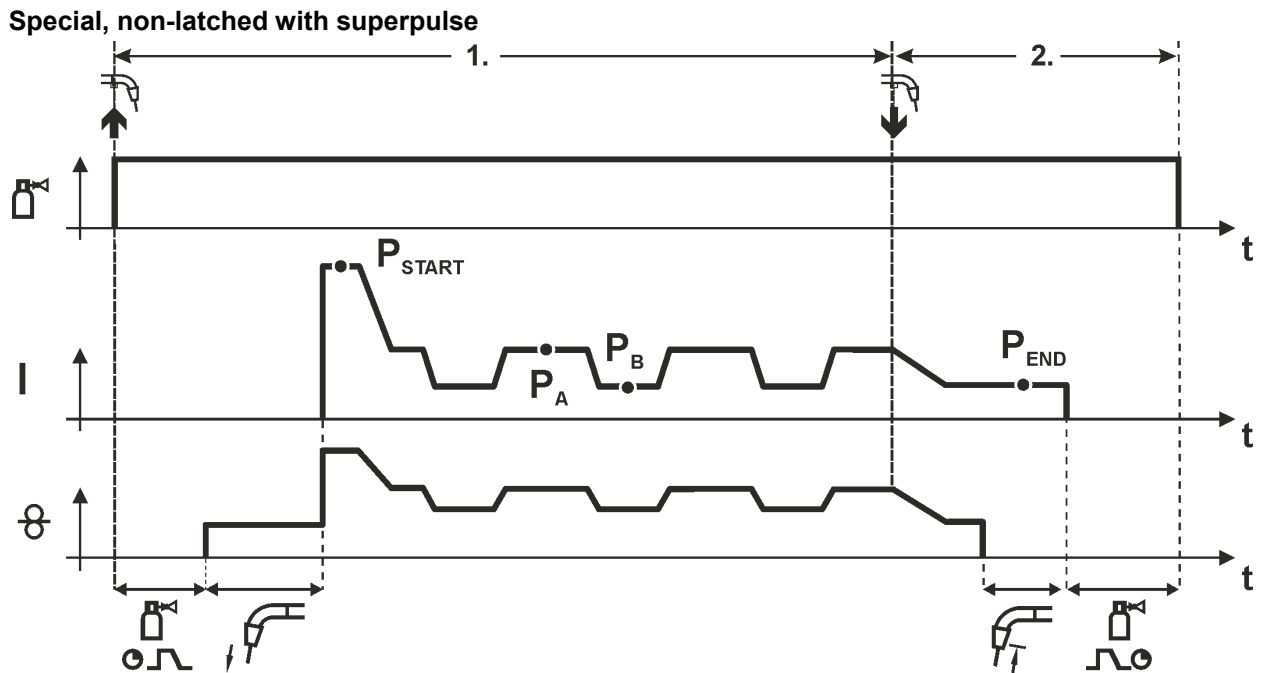


Figure 6-5

Step 1

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at “creep speed”.
- Arc ignites after the wire electrode makes contact with the workpiece, welding current is flowing (start program P_{START} for the time t_{start}).
- Slope on main program P_A .
- Start the super pulse function beginning with main program P_A :
The welding parameters change at the specified times between main program P_A and the reduced main program P_B .

Step 2

- Release torch trigger
- Super pulse function is ended.
- Slope to end program P_{END} for the time t_{end} .
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

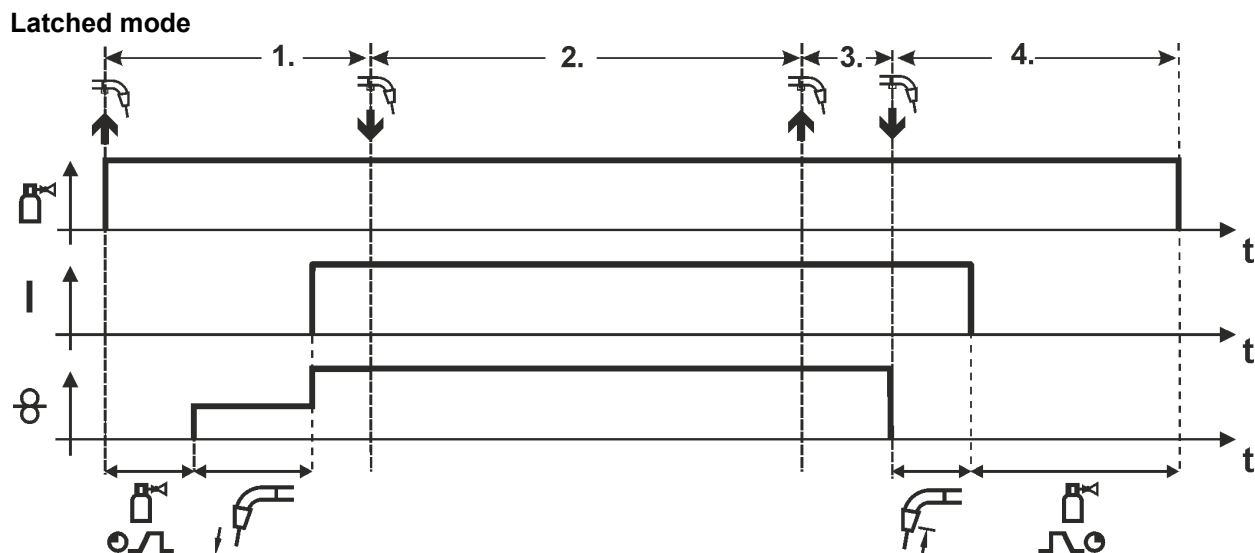


Figure 6-6

Step 1

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at "creep speed".
- Arc ignites after the wire electrode makes contact with the workpiece; welding current flows.
- Change over to pre-selected WF speed (main program P_A).

Step 2

- Release torch trigger (no effect)

Step 3

- Press torch trigger (no effect)

Step 4

- Release torch trigger
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

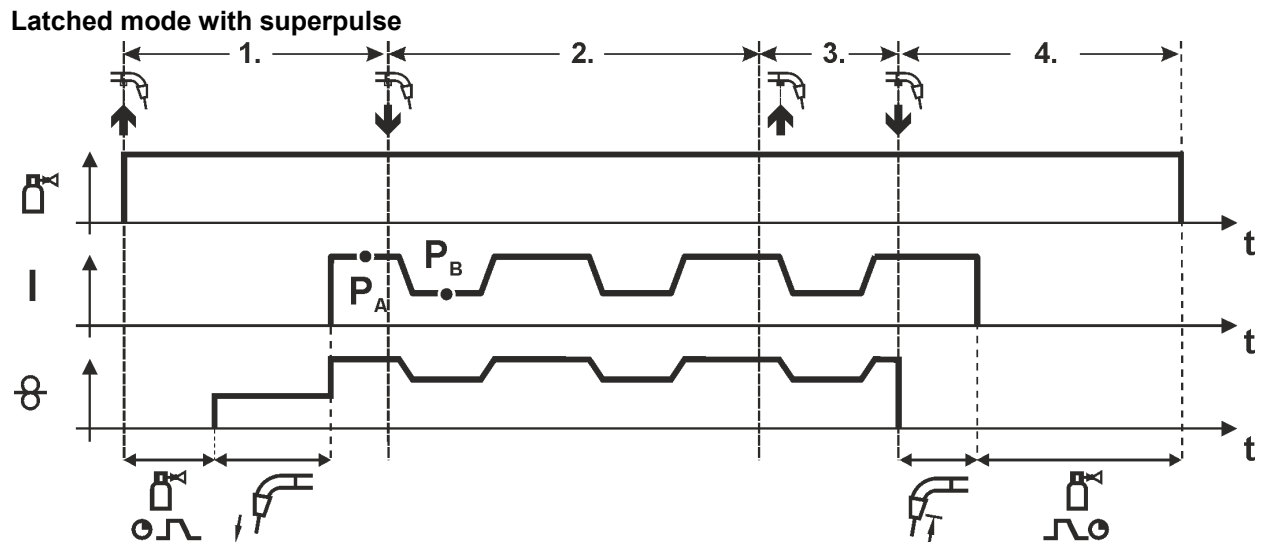


Figure 6-7

Step 1:

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at “creep speed”.
- Arc ignites after the wire electrode makes contact with the workpiece; welding current flows.
- Start the super pulse function beginning with main program P_A.
The welding parameters change at the specified times between main program P_A and the reduced main program P_B.

Step 2:

- Release torch trigger (no effect)

Step 3:

- Press torch trigger (no effect)

Step 4:

- Release torch trigger
- Super pulse function is ended.
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

Latched with changing welding method (process switching)

Exclusively for devices with pulsed arc welding type > see 3.2 chapter.

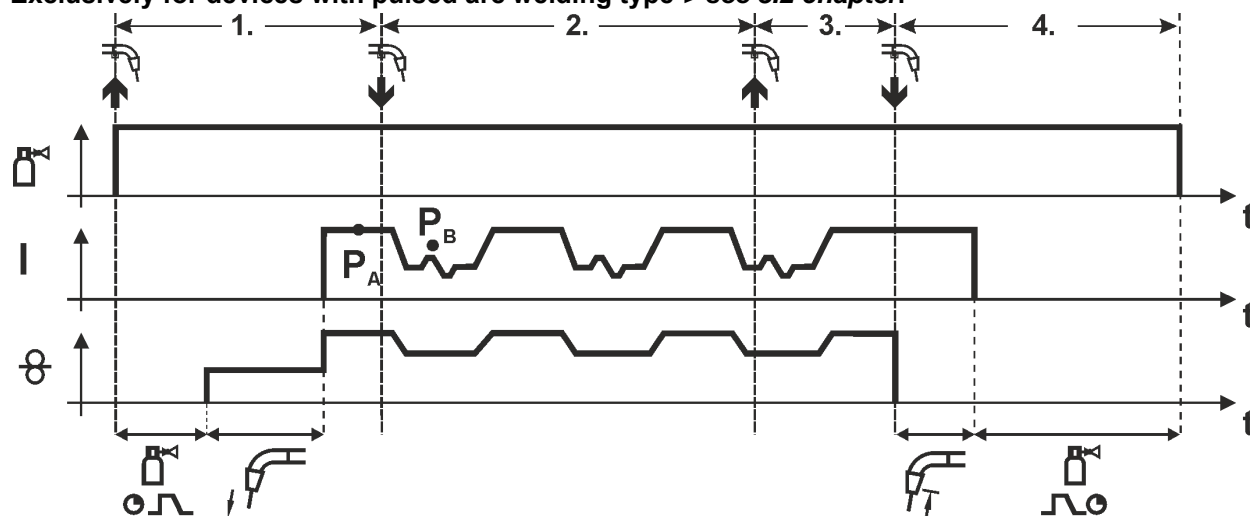


Figure 6-8

1st cycle:

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at "creep speed"
- Arc ignites after the wire electrode makes contact with the workpiece; welding current flows
- Start the process alternation starting with process P_A :
The welding processes alternate between the process P_A stored in the JOB and the opposite process P_B at the specified times (t_2 and t_3)

If a standard process is stored in the JOB, this means that there is a permanent alternation between the processes, starting with the standard process and followed by the pulse process. The same applies if the situation is reversed.

2nd cycle:

- Release torch trigger (no effect)

3rd cycle:

- Press torch trigger (no effect)

4th cycle:

- Release torch trigger
- Super pulse function is ended
- WF motor stops
- Arc is extinguished after the pre-selected wire burn-back time elapses
- Gas post-flow time elapses

This function can be activated using the PC300.NET software.

Refer to the software operating instructions.

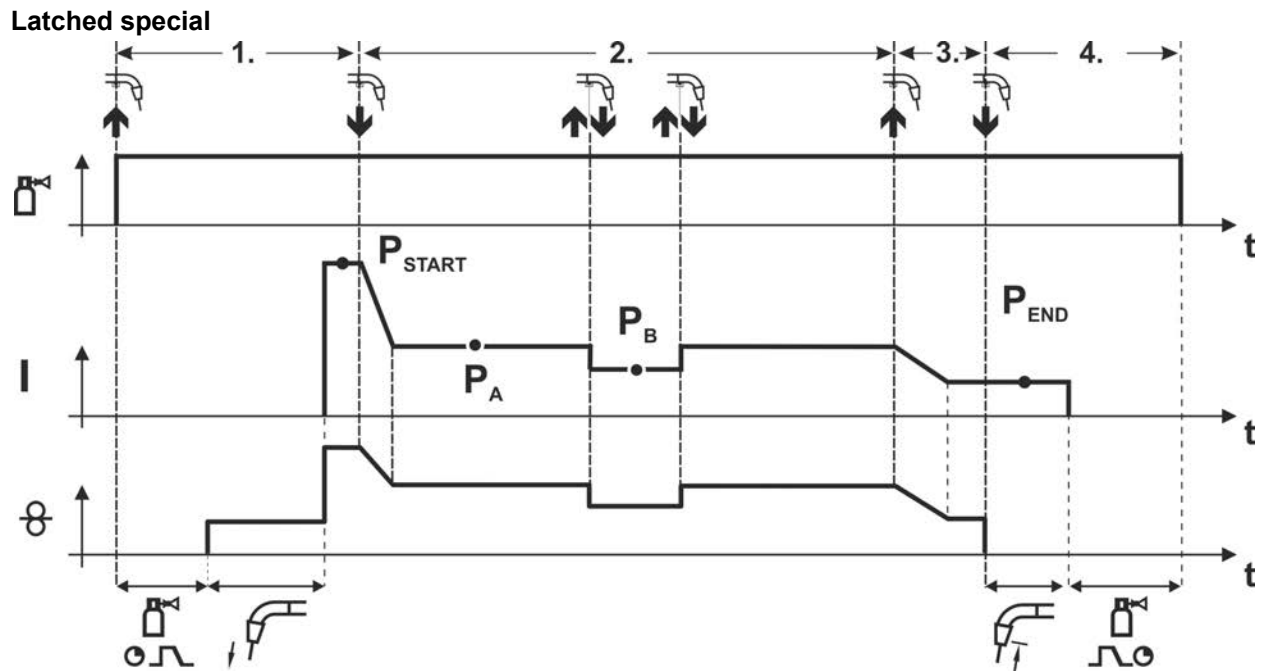


Figure 6-9

Step 1

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at “creep speed”.
- Arc ignites after the wire electrode makes contact with the workpiece, welding current is flowing (start program P_{START})

Step 2

- Release torch trigger
- Slope to main program P_A .

The slope on main program P_A is given at the earliest after the set time t_{START} elapses and at the latest when the torch trigger is released.

Tapping¹⁾ can be used to change over to the reduced main program P_B .

Repeated tapping will switch back to the main program P_A .

Step 3

- Press and hold torch trigger
- Slope to end program P_{END} .

Step 4

- Release torch trigger
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

¹⁾ Prevent tapping (brief press and release within 0.3 seconds)

If the welding current is to be prevented from switching over to the reduced main program P_B by tapping, the parameter value for WF3 needs to be set to 100% ($P_A = P_B$) in the program sequence.

Special latched with changing welding method by tapping (process switching)

Exclusively for devices with pulsed arc welding type > see 3.2 chapter.

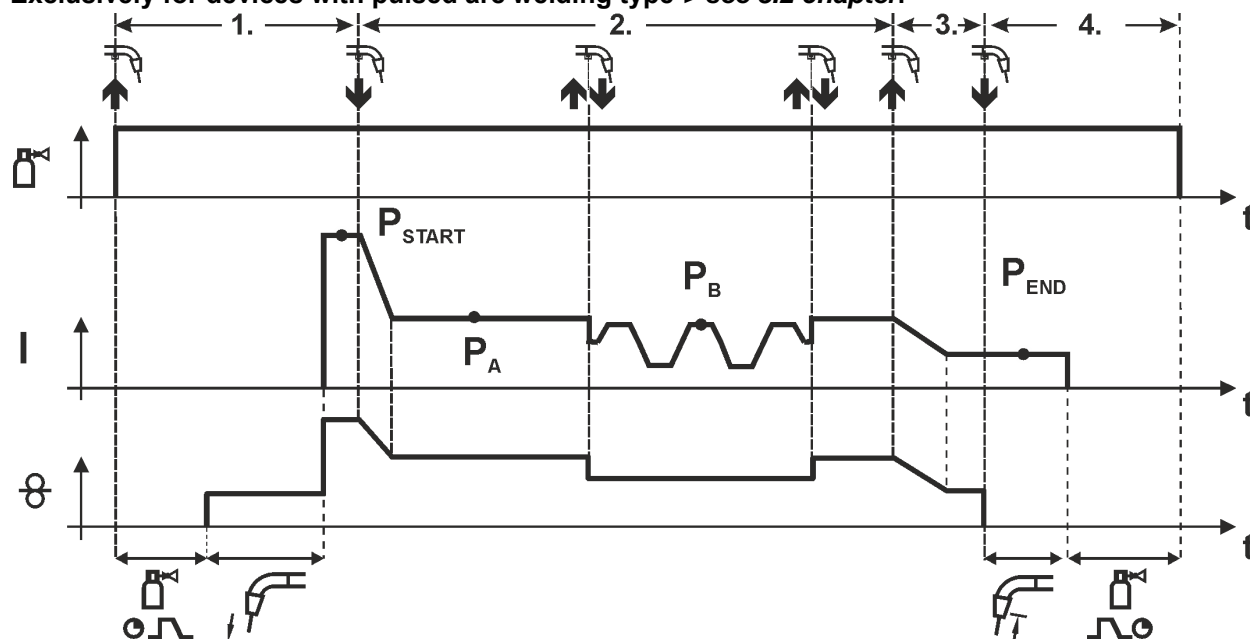


Figure 6-10

1st cycle

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at "creep speed"
- Arc ignites after the wire electrode makes contact with the workpiece, welding current is flowing (start program P_{START})

2nd cycle

- Release torch trigger
- Slope on main program P_A

The slope on main program P_A is given at the earliest after the set time t_{START} elapses and at the latest when the torch trigger is released.

Tapping (pressing the torch trigger for less than 0.3 sec.) changes over the welding process (P_B).

If a standard process has been defined in the main program, tapping changes to the pulse process, and tapping again will return to the standard process, etc.

3rd cycle

- Press and hold torch trigger
- Slope to end program P_{END}

4th cycle

- Release torch trigger
- WF motor stops
- Arc is extinguished after the pre-selected wire burn-back time elapses
- Gas post-flow time elapses

This function can be activated using the PC300.NET software.

Refer to the software operating instructions.

Special latched with changing welding method (process switching)

Exclusively for devices with pulsed arc welding type > see 3.2 chapter.

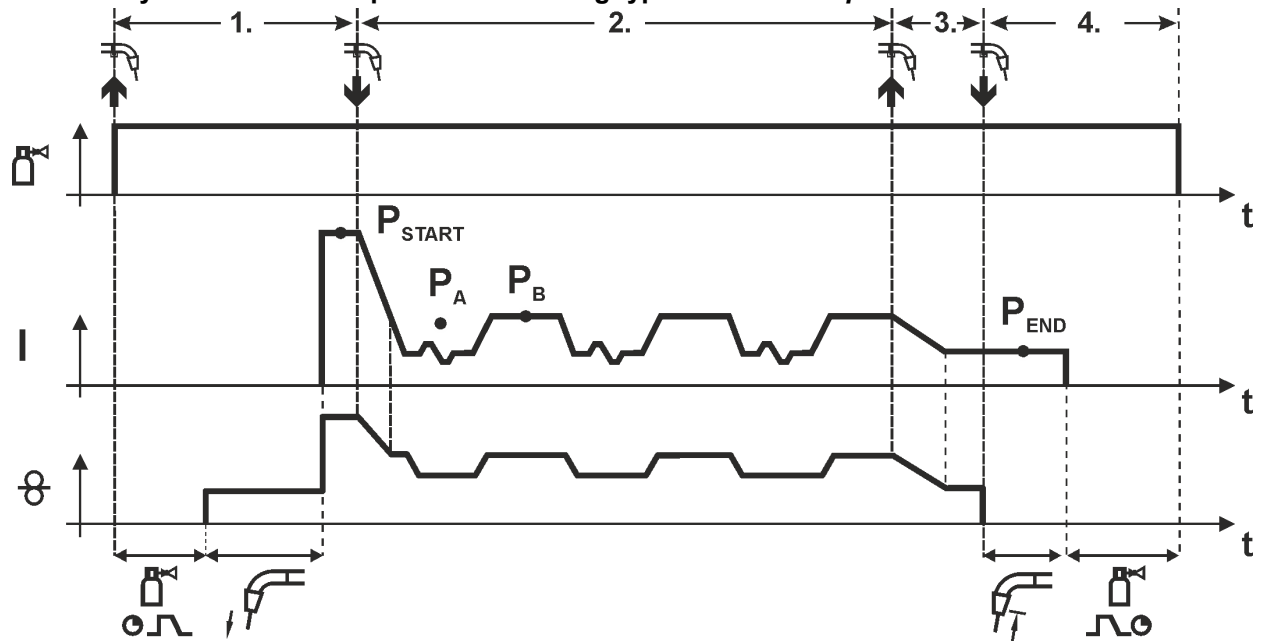


Figure 6-11

1st cycle

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at "creep speed"
- Arc ignites after the wire electrode makes contact with the workpiece, welding current is flowing (start program P_{START} for the time t_{start})

2nd cycle

- Release torch trigger
- Slope on main program P_A
- Start the process alternation starting with process P_A :
The welding processes alternate between the process P_A stored in the JOB and the opposite process P_B at the specified times (t_2 and t_3)

If a standard process is stored in the JOB, this means that there is a permanent alternation between the processes, starting with the standard process and followed by the pulse process. The same applies if the situation is reversed.

3rd cycle

- Press the torch trigger
- Super pulse function is ended
- Slope in the end program P_{END} for the time t_{end}

4th cycle

- Release torch trigger
- WF motor stops
- Arc is extinguished after the pre-selected wire burn-back time elapses
- Gas post-flow time elapses

This function can be activated using the PC300.NET software.

Refer to the software operating instructions.

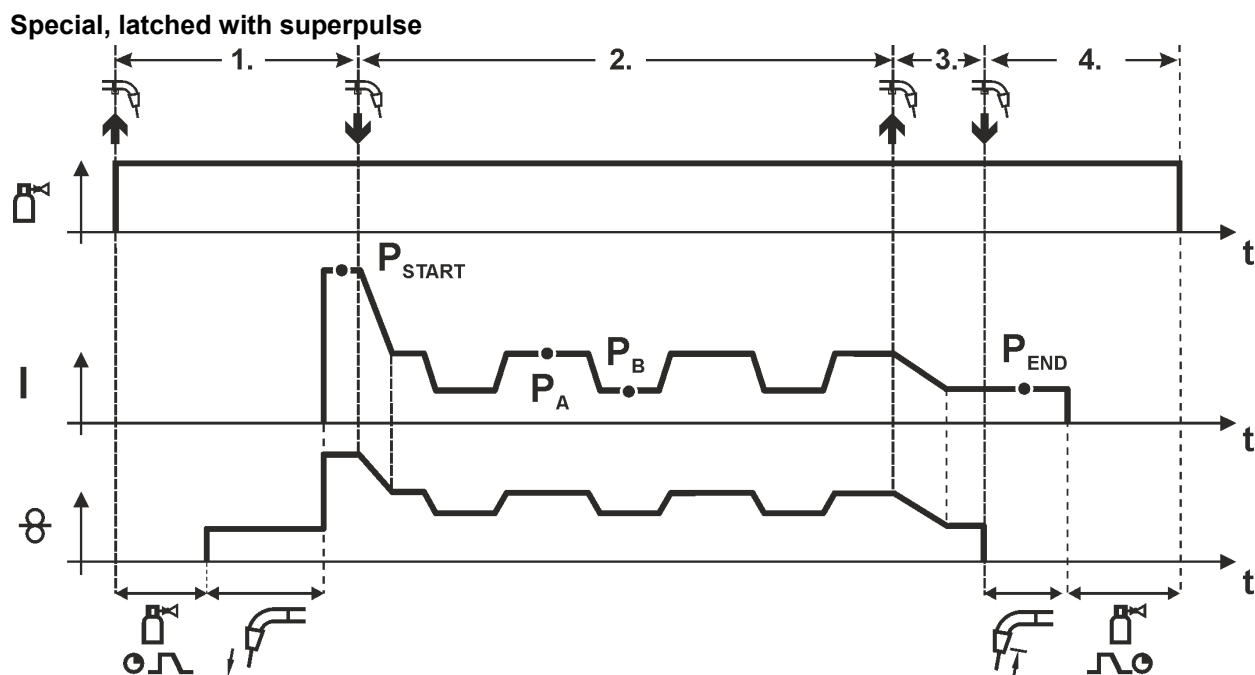


Figure 6-12

Step 1

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)
- Wire feed motor runs at “creep speed”.
- Arc ignites after the wire electrode makes contact with the workpiece, welding current is flowing (start program P_{START} for the time t_{start}).

Step 2

- Release torch trigger
- Slope on main program P_A .
- Start the super pulse function beginning with main program P_A :
The welding parameters change at the specified times between main program P_A and the reduced main program P_B .

Step 3

- Press the torch trigger.
- Super pulse function is ended.
- Slope in the end program P_{END} for the time t_{end} .

Step 4

- Release torch trigger
- WF motor stops.
- Arc is extinguished after the preselected wire burn-back time expires.
- Gas post-flow time elapses.

6.1.7.2 Automatic cut-out

Once the fault periods have elapsed, the automatic cut-out stops the welding process when it has been triggered by one of two states:

- During ignition
5 s after the start of the welding process, no welding current flows (ignition error).
- During welding
The arc is interrupted for more than 5 s (arc interruption).

6.1.8 coldArc / coldArc puls

Heat-reduced, low-spatter short arc for high dimensional stability welding and brazing of thin metal sheets with excellent gap-bridging.



Figure 6-13

After selecting the coldArc process > see 5.6 chapter you benefit from:

- Less distortion and reduced discolouration thanks to minimised heat input
- Considerably reduced spatter thanks to virtually power-free material transfer
- Easy welding of the root passes in all plate thicknesses and in all positions
- Perfect gap bridging even with inconsistent gap widths
- Manual and automated applications

> see 5.6.1 chapter

You can make use of these properties after selecting the coldArc process (see the "Selecting a MIG/MAG welding task" chapter).

With coldArc welding, it is important to ensure good quality wire feeding because of the welding filler materials being used!

- Equip the welding torch and torch hose package to suit the task! (and the operating instructions for the welding torch.)

This function can only be enabled with the PC300.NET software.

(See operating instructions for the software)

6.1.9 forceArc / forceArc puls

Heat-reduced, directionally-stable and powerful arc with deep fusion penetration for the upper power range.

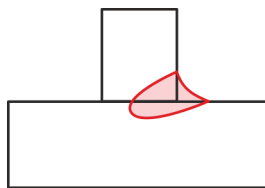


Figure 6-14

- Smaller included angle due to deep penetration and directionally stable arc
- Excellent root and sidewall fusion
- Secure welding also with very long stick-outs
- Reduced undercuts
- Manual and automated applications

You can make use of these properties after selecting the forceArc process > see 5.6 chapter.

As with pulse arc welding, it is important to make sure of a good welding current connection.

- Keep welding current cables as short as possible and ensure that cable cross-sections are adequate!
- Fully unroll welding current cables, torch hose packages and, if applicable, intermediate hose packages. Avoid loops!
- Use welding torches, preferably water-cooled, that are suitable for the higher power range.
- Use welding wire with adequate copper coating when welding steel. The wire spool should have layer spooling.

Unstable arc!

Welding current cables that are not fully unrolled can cause faults in the arc (flickering).

- **Fully unroll welding current cables, torch hose packages and, if applicable, intermediate hose packages. Avoid loops!**

6.1.10 rootArc/rootArc puls

Short arc with perfect weld modelling capabilities for effortless gap bridging, especially for root welding



Figure 6-15

- Reduced spatter compared to standard short arc
- Good root formation and secure sidewall fusion
- Manual and automated applications

Unstable arc!

Welding current cables that are not fully unrolled can cause faults in the arc (flickering).

- **Fully unroll welding current cables, torch hose packages and, if applicable, intermediate hose packages. Avoid loops!**

6.1.11 wiredArc

Welding process with active wire control for stable and uniform penetration characteristics and perfect arc length stability, even in difficult applications and positional welding.

With a GMAW arc, the welding current (AMP) changes with the change of the stick-out. If, for instance, the stick-out is extended, the welding current decreases at constant wire feed speed (DG). Thus, the heat input into the workpiece (molten metal) decreases and the penetration reduces.

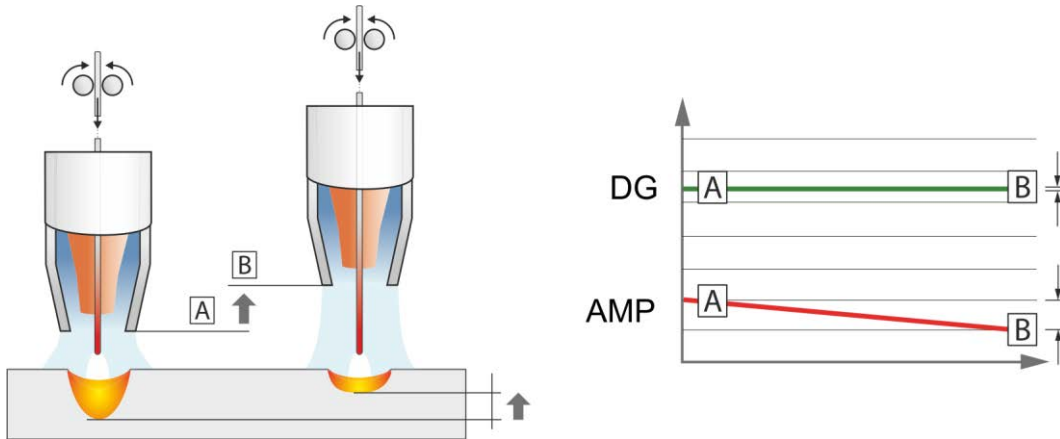


Figure 6-16

With the EWM wiredArc arc with wire control, the welding current (AMP) changes with the change of the stick-out only slightly. The compensation of the welding current takes place with an active control of wire feed speed (DG). If, for instance, the stick-out is extended, the wire feed speed will be increased. Due to this, the welding current remains almost constant and thus the heat input into the workpiece remains almost constant. As a result, the penetration changes with the change of the stick-out only slightly.

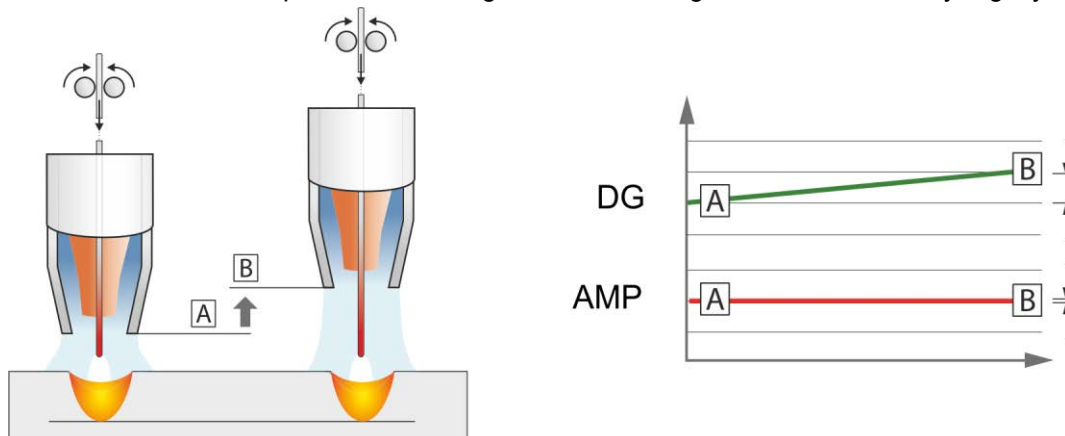



Figure 6-17

6.1.12 Standard MIG/MAG torch

The MIG welding torch trigger is essentially used to start and stop the welding process.

Operating elements	Functions
 Torch trigger	• Start/stop welding

Additional functions such as program switching (before or after welding) are possible by tapping the torch trigger (depending on machine type and control configuration).











The following parameters must be configured accordingly in the menu Special Parameters > see 5.4.4.4 chapter .

> see 5.6.3.4 chapter

6.2 TIG welding

6.2.1 Operating modes (functional sequences)

6.2.1.1 Explanation of signs and functions

Symbol	Meaning
	Press torch trigger
	Release torch trigger
	Tap torch trigger (press briefly and release)
	Shielding gas flowing
I	Welding output
	Gas pre-flows
	Gas post-flows
	Non-latched
	Special, non-latched
	Latched
	Special, latched
t	Time
P _{START}	Ignition program
P _A	Main program
P _B	Reduced main program
P _{END}	End program
tS1	Slope duration from P _{START} to P _A

6.2.1.2 Automatic cut-out

Once the fault periods have elapsed, the automatic cut-out stops the welding process when it has been triggered by one of two states:

- During ignition
5 s after the start of the welding process, no welding current flows (ignition error).
- During welding
The arc is interrupted for more than 5 s (arc interruption).

Non-latched mode

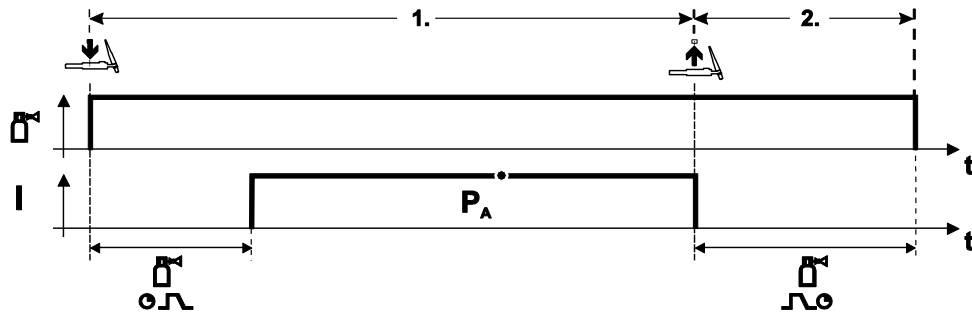


Figure 6-18

Selection

- Select non-latched operating mode

Step 1

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).

The arc is ignited using liftarc.

- Welding current flows with pre-selected setting.

Step 2

- Release torch trigger.
- Arc is extinguished.
- Gas post-flow time elapses.

Special, non-latched

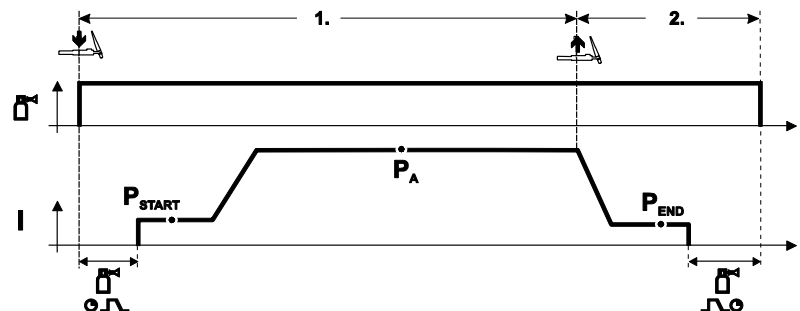


Figure 6-19

Selection

- Select non-latched special mode

Step 1

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)

The arc is ignited using liftarc.

- Welding gas flows with pre-selected setting in start program "P_{START}".
- After the "t_{start}" ignition current time elapses, the welding current rises with the set upslope time "t_{S1}" to the main program "P_A".

Step 2

- Release torch trigger.
- The welding current reduces with the downslope time "t_{Se}" to the end program "P_{END}".
- After the end current time "end" elapses, the arc will extinguish.
- Gas post-flow time elapses.

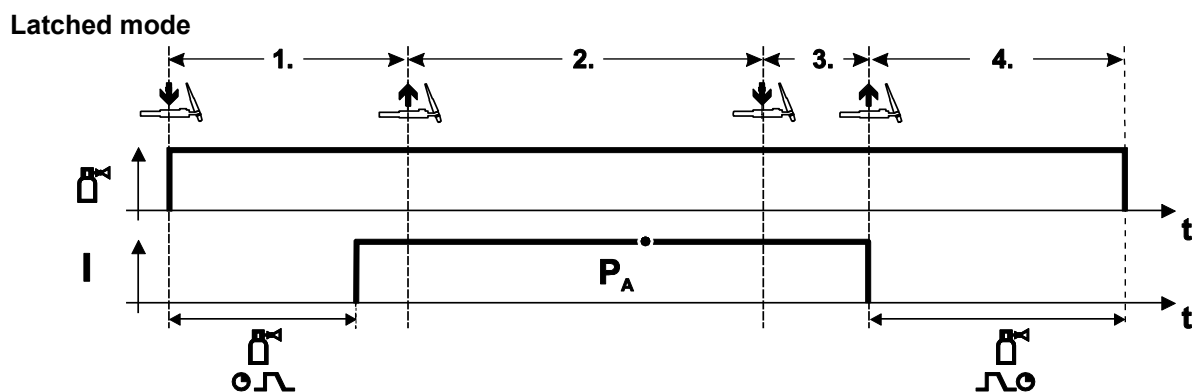


Figure 6-20

Selection

- Select latched operating mode

Step 1

- Press and hold torch trigger
- Shielding gas is expelled (gas pre-flows)

The arc is ignited using liftarc.

- Welding current flows with pre-selected setting.

Step 2

- Release torch trigger (no effect)

Step 3

- Press torch trigger (no effect)

Step 4

- Release torch trigger
- Arc is extinguished.
- Gas post-flow time elapses.

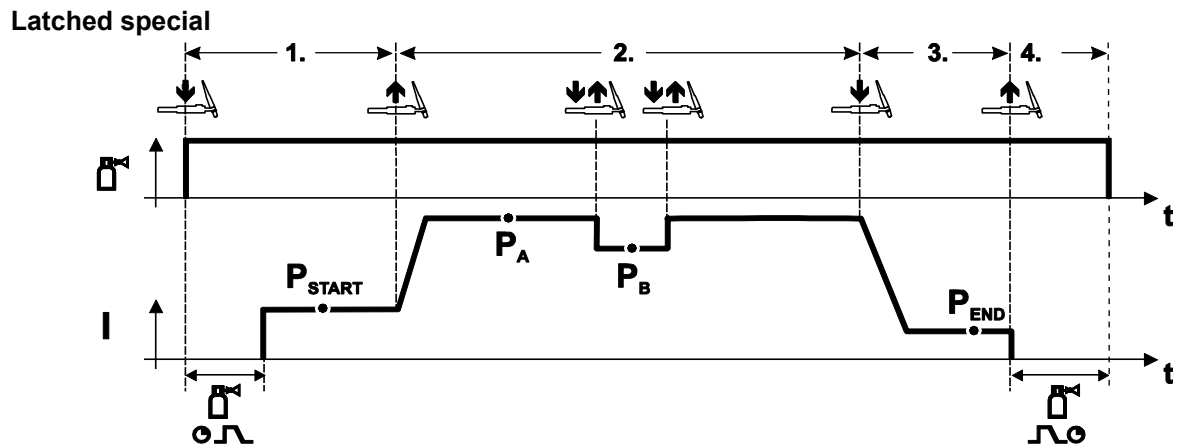


Figure 6-21

Selection

- Select latched special mode

Step 1

- Press and hold torch trigger.
- Shielding gas is expelled (gas pre-flows).

The arc is ignited using liftarc.

- Welding gas flows at pre-selected setting in start program "P_{START}".

Step 2

- Release torch trigger.
- Slope on main program "P_A".

The slope on main program P_A is given at the earliest after the set time t_{START} elapses and at the latest when the torch trigger is released.

Tapping can be used to switch to the reduced main program "P_B". Repeated tapping will switch back to the main program "P_A".

Step 3

- Press the torch trigger.
- Slope to end program "P_{END}".

Step 4

- Release torch trigger.
- Arc is extinguished.
- Gas post-flow time elapses.

6.2.2 Arc ignition

6.2.2.1 Liftarc

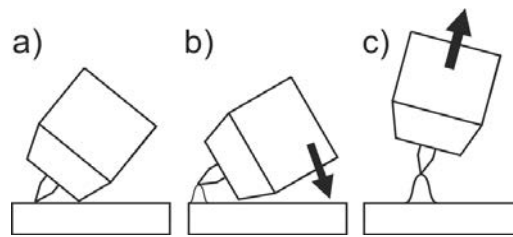


Figure 6-22

The arc ignites through contact with the workpiece:

- Carefully place the torch gas nozzle and tungsten electrode tip against the workpiece (lift arc current flows independent of the set main current)
- Angle the torch above the torch gas nozzle until the distance between electrode tip and workpiece is approx. 2–3 mm (arc ignites, current increases to the set main current).
- Lift the torch off and bring into normal position.

Complete the welding task: Remove the torch from the workpiece so that the arc extinguishes.

6.3 MMA welding

6.3.1 Hotstart

The function hot start ensures a secure igniting of the arc and a sufficient heating to the still cold parent metal at the beginning of the welding process. The ignition takes place here with increased current (hot start current) over a certain time (hot start time).

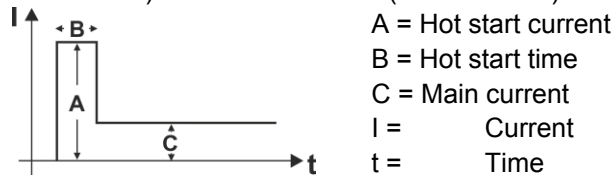
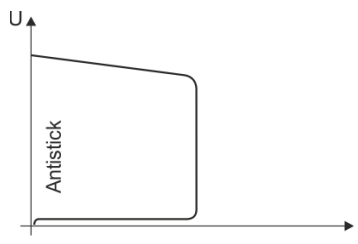


Figure 6-23

6.3.2 Antistick



The Antistick feature prevents the electrode from annealing.

Should the electrode stick despite the Arcforce feature, the machine automatically switches to the minimum current within approx. one second. This prevents the electrode from annealing. Check the welding current setting and correct for the welding task in hand.

Figure 6-24

6.4 Air arc gouging

During gouging, an arc burns between a carbon electrode and the workpiece, heating the workpiece until it is molten. At the same time, the molten metal is blown out with compressed air. Special electrode holders with a compressed-air connection and carbon electrodes are required for gouging.

7 Rectifying faults

All products are subject to rigorous production checks and final checks. If, despite this, something fails to work at any time, please check the product using the following flowchart. If none of the fault rectification procedures described leads to the correct functioning of the product, please inform your authorised dealer.

7.1 Resetting JOBs (welding tasks) to the factory settings

All customised welding parameters that are stored will be replaced by the factory settings.


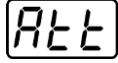
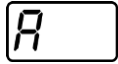
Instructions on how to reset welding tasks (JOBs) to the factory setting can be found in the JOB manager > see 5.6.2 chapter chapter.

7.2 Display machine control software version

Identifying the machine software is key to quick troubleshooting by the authorised service technician. The version number is shown on the initial screen of the machine control for about 5 seconds (switch the machine off and on again) > see 4.2.3 chapter.

7.3 Warnings

Depending on the display options of the machine display, a warning message is displayed as follows:

Display type - machine control	Display
Graphic display	
two 7-segment displays	
one 7-segment display	

The cause of the warning is indicated by a corresponding warning number (see table).

- In case of multiple warnings, these are displayed in sequence.
- Document machine warning and inform service personnel, if required.

No.	Warning	Possible cause
1	Excess temperature	A shutdown is imminent due to excess temperature.
4	Shielding gas ^[2]	Check shielding gas supply.
5	Coolant flow ^[3]	Flow rate ($\leq 0.7\text{l/min}$ / $\leq 0.18\text{ gal./min}$) ^[1]
6	low wire	Only a small amount of wire is left on the spool.
7	CAN bus failure	Wire feeder not connected, automatic circuit-breaker of wire feed motor (reset the tripped automatic circuit-breaker by actuating).
8	Welding circuit	The welding circuit inductance is too high for the selected welding task.
10	Partial inverter	One of several partial inverters is not supplying welding current.
11	Excess temperature, coolant ^[3]	Coolant ($\geq 65^\circ\text{C}$ / $\geq 149^\circ\text{F}$) ^[1]
12	Welding monitor	The actual value of a welding parameter is outside the specified tolerance field.
13	Contact error	The resistance in the welding circuit is too high. Check earth connection.
32	Tacho error	Fault of wire feeder, permanent overload of the wire drive.
33	WF excess current	Overcurrent detection of the main WF drive.
34	JOB unknown	JOB selection was not performed because the JOB number is unknown.
35	WF excess current slave	Overload of the slave WF drive (front drive push/push system or intermediate drive).
36	Slave tacho error	Fault of wire feeder, permanent overload of the slave WF drive (front drive push/push system or intermediate drive).
37	FST bus failure	Wire feeder not connected, automatic circuit-breaker of wire feed motor (reset the tripped automatic circuit-breaker by actuating).

^[1] factory setting

^[2] option

^[3] only machine series Titan XQ

7.4 Error messages


A welding machine error will be signalled by an error code (see table) on the control display. In the event of an error, the power unit shuts down.

The display of possible error numbers depends on the machine version (interfaces/functions).

- Document machine errors and inform service staff as necessary.
- If multiple errors occur, these are displayed in succession.

Err	Category			Possible cause	Remedy
	a)	b)	c)		
1	✗	✗	✓	Mains overvoltage	Check the mains voltages and compare with the connection voltages of the welding machine
2	✗	✗	✓	Mains undervoltage	
3	✓	✗	✗	Excess temperature of welding machine	Allow the machine to cool down (mains switch to "1")
4	✓	✓	✗	Coolant error	Fill coolant Turn on pump shaft (coolant pump) Check overcurrent trip of air cooling unit
5	✓	✗	✗	Wire feeder, tachometer error	Check the wire feeder tachometer generator sends no signal, motor control defective > inform Service.
6	✓	✗	✗	Shielding gas error	Check shielding gas supply (for machines with shielding gas monitoring)
7	✗	✗	✓	Overvoltage on secondary	Inverter error > inform Service
8	✗	✗	✓	Wire error	Separate the electrical connection between welding wire and housing or an earthed object
9	✓	✗	✗	Fast shutdown	Rectify error on robot (Interface for automated welding)
10	✗	✓	✗	Arc interruption	Check wire feeding (interface for automated welding)
11	✗	✓	✗	Ignition error (after 5 s)	Check wire feeding (interface for automated welding)
13	✓	✗	✗	Emergency stop deactivation	Check the emergency stop switch of the interface for automated welding
14	✗	✓	✗	Wire feeder detection	Check cable connections
				ID number allocation error (2DV)	Correct ID numbers
15	✗	✓	✗	Detection of wire feeder 2	Check cable connections
16	✗	✗	✓	Error in open circuit voltage reduction (VRD)	Inform Service.
17	✗	✓	✓	Overcurrent detection on wire feeder	Check ease of wire feeding
18	✗	✓	✓	Error in tachometer generator signal	Check the connection and particularly the tachometer generator of the second wire feeder (slave drive).
56	✗	✗	✓	Mains phase failure	Check mains voltages
58	✗	✓	✗	Short circuit	Check welding circuit for short circuit; put down welding torch isolated
59	✗	✗	✓	Machine incompatible	Check machine usage
60	✗	✗	✓	Software update required	Inform Service.

Legend for categories (reset error)

- a) The error message will disappear once the error has been rectified.
- b) The error message can be reset by pressing a context-dependent push-button with the  icon.
- c) The error message can only be reset by switching the machine off and on again.

8 Appendix

8.1 JOB-List

JOB	Procedure	Material	Gas	Ø [mm]
1	GMAW standard	G3Si1 / G4Si1	CO2 100 (C1)	0,8
2	GMAW standard	G3Si1 / G4Si1	CO2 100 (C1)	0,9
3	GMAW standard	G3Si1 / G4Si1	CO2 100 (C1)	1,0
4	GMAW standard	G3Si1 / G4Si1	CO2 100 (C1)	1,2
5	GMAW standard	G3Si1 / G4Si1	CO2 100 (C1)	1,6
6	Standard GMAW / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	0,8
7	Standard GMAW / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	0,9
8	Standard GMAW / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
9	Standard GMAW / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2
10	Standard GMAW / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,6
11	Standard GMAW / pulse	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	0,8
12	Standard GMAW / pulse	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	0,9
13	Standard GMAW / pulse	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,0
14	Standard GMAW / pulse	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,2
15	Standard GMAW / pulse	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,6
26	Standard GMAW / pulse	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	0,8
27	Standard GMAW / pulse	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	1,0
28	Standard GMAW / pulse	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	1,2
29	Standard GMAW / pulse	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	1,6
30	Standard GMAW / pulse	CrNi 18 8 / 1.4370	Ar-97,5 / CO2-2,5 (M12)	0,8
31	Standard GMAW / pulse	CrNi 18 8 / 1.4370	Ar-97,5 / CO2-2,5 (M12)	1,0
32	Standard GMAW / pulse	CrNi 18 8 / 1.4370	Ar-97,5 / CO2-2,5 (M12)	1,2
33	Standard GMAW / pulse	CrNi 18 8 / 1.4370	Ar-97,5 / CO2-2,5 (M12)	1,6
34	Standard GMAW / pulse	CrNi 19 9 / 1.4316	Ar-97,5 / CO2-2,5 (M12)	0,8
35	Standard GMAW / pulse	CrNi 19 9 / 1.4316	Ar-97,5 / CO2-2,5 (M12)	1,0
36	Standard GMAW / pulse	CrNi 19 9 / 1.4316	Ar-97,5 / CO2-2,5 (M12)	1,2
37	Standard GMAW / pulse	CrNi 19 9 / 1.4316	Ar-97,5 / CO2-2,5 (M12)	1,6
38	Standard GMAW / pulse	CrNi 19 12 3 / 1.4430	Ar-97,5 / CO2-2,5 (M12)	0,8
39	Standard GMAW / pulse	CrNi 19 12 3 / 1.4430	Ar-97,5 / CO2-2,5 (M12)	1,0
40	Standard GMAW / pulse	CrNi 19 12 3 / 1.4430	Ar-97,5 / CO2-2,5 (M12)	1,2
41	Standard GMAW / pulse	CrNi 19 12 3 / 1.4430	Ar-97,5 / CO2-2,5 (M12)	1,6
42	Standard GMAW / pulse	CrNi 22 9 3 / 1.4462	Ar-97,5 / CO2-2,5 (M12)	0,8
43	Standard GMAW / pulse	CrNi 22 9 3 / 1.4462	Ar-97,5 / CO2-2,5 (M12)	1,0
44	Standard GMAW / pulse	CrNi 22 9 3 / 1.4462	Ar-97,5 / CO2-2,5 (M12)	1,2
45	Standard GMAW / pulse	CrNi 22 9 3 / 1.4462	Ar-97,5 / CO2-2,5 (M12)	1,6

JOB	Procedure	Material	Gas	Ø [mm]
46	Standard GMAW / pulse	CrNi 22 9 3 / 1.4462	Ar-78 / He-20 / CO2-2 (M12)	0,8
47	Standard GMAW / pulse	CrNi 22 9 3 / 1.4462	Ar-78 / He-20 / CO2-2 (M12)	1,0
48	Standard GMAW / pulse	CrNi 22 9 3 / 1.4462	Ar-78 / He-20 / CO2-2 (M12)	1,2
49	Standard GMAW / pulse	CrNi 22 9 3 / 1.4462	Ar-78 / He-20 / CO2-2 (M12)	1,6
50*	coldArc / coldArc puls	CrNi 19 9 / 1.4316	Ar-97,5 / CO2-2,5 (M12)	0,8
51*	coldArc / coldArc puls	CrNi 19 9 / 1.4316	Ar-97,5 / CO2-2,5 (M12)	1,0
52*	coldArc / coldArc puls	CrNi 19 9 / 1.4316	Ar-97,5 / CO2-2,5 (M12)	1,2
55*	coldArc / coldArc puls	AlMg	Ar-100 (I1)	1,0
56*	coldArc / coldArc puls	AlMg	Ar-100 (I1)	1,2
59*	coldArc / coldArc puls	AlSi	Ar-100 (I1)	1,0
60*	coldArc / coldArc puls	AlSi	Ar-100 (I1)	1,2
63*	coldArc / coldArc puls	Al99	Ar-100 (I1)	1,0
64*	coldArc / coldArc puls	Al99	Ar-100 (I1)	1,2
66*	coldArc brazing	CuSi	Ar-100 (I1)	0,8
67*	coldArc brazing	CuSi	Ar-100 (I1)	1,0
68*	coldArc brazing	CuSi	Ar-100 (I1)	1,2
70*	coldArc brazing	CuAl	Ar-100 (I1)	0,8
71*	coldArc brazing	CuAl	Ar-100 (I1)	1,0
72*	coldArc brazing	CuAl	Ar-100 (I1)	1,2
74	Standard GMAW / pulse	AlMg	Ar-100 (I1)	0,8
75	Standard GMAW / pulse	AlMg	Ar-100 (I1)	1,0
76	Standard GMAW / pulse	AlMg	Ar-100 (I1)	1,2
77	Standard GMAW / pulse	AlMg	Ar-100 (I1)	1,6
78	Standard GMAW / pulse	AlMg	Ar-70 / He-30 (I3)	0,8
79	Standard GMAW / pulse	AlMg	Ar-70 / He-30 (I3)	1,0
80	Standard GMAW / pulse	AlMg	Ar-70 / He-30 (I3)	1,2
81	Standard GMAW / pulse	AlMg	Ar-70 / He-30 (I3)	1,6
82	Standard GMAW / pulse	AlSi	Ar-100 (I1)	0,8
83	Standard GMAW / pulse	AlSi	Ar-100 (I1)	1,0
84	Standard GMAW / pulse	AlSi	Ar-100 (I1)	1,2
85	Standard GMAW / pulse	AlSi	Ar-100 (I1)	1,6
86	Standard GMAW / pulse	AlSi	Ar-70 / He-30 (I3)	0,8
87	Standard GMAW / pulse	AlSi	Ar-70 / He-30 (I3)	1,0
88	Standard GMAW / pulse	AlSi	Ar-70 / He-30 (I3)	1,2
89	Standard GMAW / pulse	AlSi	Ar-70 / He-30 (I3)	1,6
90	Standard GMAW / pulse	Al99	Ar-100 (I1)	0,8
91	Standard GMAW / pulse	Al99	Ar-100 (I1)	1,0

JOB	Procedure	Material	Gas	Ø [mm]
92	Standard GMAW / pulse	Al99	Ar-100 (I1)	1,2
93	Standard GMAW / pulse	Al99	Ar-100 (I1)	1,6
94	Standard GMAW / pulse	Al99	Ar-70 / He-30 (I3)	0,8
95	Standard GMAW / pulse	Al99	Ar-70 / He-30 (I3)	1,0
96	Standard GMAW / pulse	Al99	Ar-70 / He-30 (I3)	1,2
97	Standard GMAW / pulse	Al99	Ar-70 / He-30 (I3)	1,6
98	Standard GMAW / pulse	CuSi	Ar-100 (I1)	0,8
99	Standard GMAW / pulse	CuSi	Ar-100 (I1)	1,0
100	Standard GMAW / pulse	CuSi	Ar-100 (I1)	1,2
101	Standard GMAW / pulse	CuSi	Ar-100 (I1)	1,6
102	Standard GMAW / pulse	CuSi	Ar-97,5/CO2-2,5 (M12)	0,8
103	Standard GMAW / pulse	CuSi	Ar-97,5/CO2-2,5 (M12)	1,0
104	Standard GMAW / pulse	CuSi	Ar-97,5/CO2-2,5 (M12)	1,2
105	Standard GMAW / pulse	CuSi	Ar-97,5/CO2-2,5 (M12)	1,6
106	Standard GMAW / pulse	CuAl	Ar-100 (I1)	0,8
107	Standard GMAW / pulse	CuAl	Ar-100 (I1)	1,0
108	Standard GMAW / pulse	CuAl	Ar-100 (I1)	1,2
109	Standard GMAW / pulse	CuAl	Ar-100 (I1)	1,6
110	Brazing	CuSi	Ar-97,5 / CO2-2,5 (M12)	0,8
111	Brazing	CuSi	Ar-97,5 / CO2-2,5 (M12)	1,0
112	Brazing	CuSi	Ar-97,5 / CO2-2,5 (M12)	1,2
113	Brazing	CuSi	Ar-97,5 / CO2-2,5 (M12)	1,6
114	Brazing	CuSi	Ar-100 (I1)	0,8
115	Brazing	CuSi	Ar-100 (I1)	1,0
116	Brazing	CuSi	Ar-100 (I1)	1,2
117	Brazing	CuSi	Ar-100 (I1)	1,6
118	Brazing	CuAl	Ar-97,5 / CO2-2,5 (M12)	0,8
119	Brazing	CuAl	Ar-97,5 / CO2-2,5 (M12)	1,0
120	Brazing	CuAl	Ar-97,5 / CO2-2,5 (M12)	1,2
121	Brazing	CuAl	Ar-97,5 / CO2-2,5 (M12)	1,6
122	Brazing	CuAl	Ar-100 (I1)	0,8
123	Brazing	CuAl	Ar-100 (I1)	1,0
124	Brazing	CuAl	Ar-100 (I1)	1,2
125	Brazing	CuAl	Ar-100 (I1)	1,6
126	Gouging			
127	TIG Liftarc			
128	MMA			
129	Special JOB 1	Free JOB		
130	Special JOB 2	Free JOB		
131	Special JOB 3	Free JOB		

JOB	Procedure	Material	Gas	Ø [mm]
132		Free JOB		
133		Free JOB		
134		Free JOB		
135		Free JOB		
136		Free JOB		
137		Free JOB		
138		Free JOB		
139		Free JOB		
140		Block 1 / JOB1		
141		Block 1 / JOB2		
142		Block 1 / JOB3		
143		Block 1 / JOB4		
144		Block 1 / JOB5		
145		Block 1 / JOB6		
146		Block 1 / JOB7		
147		Block 1 / JOB8		
148		Block 1 / JOB9		
149		Block 1 / JOB10		
150		Block 2 / JOB1		
151		Block 2 / JOB2		
152		Block 2 / JOB3		
153		Block 2 / JOB4		
154		Block 2 / JOB5		
155		Block 2 / JOB6		
156		Block 2 / JOB7		
157		Block 2 / JOB8		
158		Block 2 / JOB9		
159		Block 2 / JOB10		
160		Block 3 / JOB1		
161		Block 3 / JOB2		
162		Block 3 / JOB3		
163		Block 3 / JOB4		
164		Block 3 / JOB5		
165		Block 3 / JOB6		
166		Block 3 / JOB7		
167		Block 3 / JOB8		
168		Block 3 / JOB9		
169		Block 3 / JOB10		
171*	pipeSolution	G3Si1 / G4Si1	CO2-100 (C1)	1,0
172*	pipeSolution	G3Si1 / G4Si1	CO2-100 (C1)	1,2

JOB	Procedure	Material	Gas	Ø [mm]
173*	pipeSolution / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
174*	pipeSolution / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2
177	GMAW Highspeed	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,0
178	GMAW Highspeed	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,2
179	forceArc / forceArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
180	forceArc / forceArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2
181	forceArc / forceArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,6
182*	coldArc	G3Si1 / G4Si1	CO2-100 (C1)	0,8
183*	coldArc	G3Si1 / G4Si1	CO2-100 (C1)	0,9
184*	coldArc	G3Si1 / G4Si1	CO2-100 (C1)	1,0
185*	coldArc	G3Si1 / G4Si1	CO2-100 (C1)	1,2
187	GMAW Non-synergic	Special	Special	Special
188	GMAW Non-synergic	Special	Special	Special
189	forceArc / forceArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	0,8
190	forceArc / forceArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M20)	0,8
191*	coldArc / coldArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	0,8
193*	coldArc / coldArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
194*	coldArc / coldArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2
195*	coldArc / coldArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,6
197*	coldArc brazing	AlSi	Ar-100 (I1)	1,0
198*	coldArc brazing	AlSi	Ar-100 (I1)	1,2
201*	coldArc brazing	ZnAl	Ar-100 (I1)	1,0
202*	coldArc brazing	ZnAl	Ar-100 (I1)	1,2
204	rootArc	G3Si1 / G4Si1	CO2-100 (C1)	1,0
205	rootArc	G3Si1 / G4Si1	CO2-100 (C1)	1,2
206	rootArc / rootArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
207	rootArc / rootArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2
208*	coldArc - Mg/Mg	Mg	Ar-70 / H3-30 (I3)	1,2
209*	coldArc - Mg/Mg	Mg	Ar-70 / H3-30 (I3)	1,6
212	Flux cored wire rutile	FCW CrNi - Rutile	CO2-100 (C1)	1,2
213	Flux cored wire rutile	FCW CrNi - Rutile	CO2-100 (C1)	1,6
214	Surfacing	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	0,8
215	Surfacing	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	0,9
216	Surfacing	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
217	Surfacing	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2
218	Surfacing	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,6
220*	coldArc - St/Al	ZnAl	Ar-100 (I1)	1,0
221*	coldArc - St/Al	ZnAl	Ar-100 (I1)	1,2
224*	coldArc - St/Al	AlSi	Ar-100 (I1)	1,0
225*	coldArc - St/Al	AlSi	Ar-100 (I1)	1,2

JOB	Procedure	Material	Gas	Ø [mm]
229	Flux cored wire metal	FCW CrNi - Metal	Ar-97,5 / CO2-2,5 (M12)	1,2
230	Flux cored wire metal	FCW CrNi - Metal	Ar-97,5 / CO2-2,5 (M12)	1,6
233	Flux cored wire rutile	FCW CrNi - Rutile	Ar-82 / CO2-18 (M21)	1,2
234	Flux cored wire rutile	FCW CrNi - Rutile	Ar-82 / CO2-18 (M21)	1,6
235	Flux cored wire metal	FCW Steel - Metal	Ar-82 / CO2-18 (M21)	0,8
237	Flux cored wire metal	FCW Steel - Metal	Ar-82 / CO2-18 (M21)	1,0
238	Flux cored wire metal	FCW Steel - Metal	Ar-82 / CO2-18 (M21)	1,2
239	Flux cored wire metal	FCW Steel - Metal	Ar-82 / CO2-18 (M21)	1,6
240	Flux cored wire rutile	FCW Steel - Rutile	Ar-82 / CO2-18 (M21)	0,8
242	Flux cored wire rutile	FCW Steel - Rutile	Ar-82 / CO2-18 (M21)	1,0
243	Flux cored wire rutile	FCW Steel - Rutile	Ar-82 / CO2-18 (M21)	1,2
244	Flux cored wire rutile	FCW Steel - Rutile	Ar-82 / CO2-18 (M21)	1,6
245	forceArc / forceArc puls	Al99	Ar-100 (I1)	1,2
246	forceArc / forceArc puls	Al99	Ar-100 (I1)	1,6
247	forceArc / forceArc puls	AlMg	Ar-100 (I1)	1,2
248	forceArc / forceArc puls	AlMg	Ar-100 (I1)	1,6
249	forceArc / forceArc puls	AlSi	Ar-100 (I1)	1,2
250	forceArc / forceArc puls	AlSi	Ar-100 (I1)	1,6
251	forceArc / forceArc puls	CrNi 19 9 / 1.4316	Ar-97,5 / CO2-2,5 (M12)	1,0
252	forceArc / forceArc puls	CrNi 19 9 / 1.4316	Ar-97,5 / CO2-2,5 (M12)	1,2
253	forceArc / forceArc puls	CrNi 19 9 / 1.4316	Ar-97,5 / CO2-2,5 (M12)	1,6
254	forceArc / forceArc puls	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,0
255	forceArc / forceArc puls	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,2
256	forceArc / forceArc puls	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,6
260	Flux cored wire rutile	FCW Steel - Rutile	CO2-100 (C1)	1,2
261	Flux cored wire rutile	FCW Steel - Rutile	CO2-100 (C1)	1,6
263	Flux cored wire metal	Special	Ar-82 / CO2-18 (M21)	1,2
264	Flux cored wire basic	FCW Steel - Basic	Ar-82 / CO2-18 (M21)	1,2
268	Standard GMAW / pulse	NiCr 6617 / 2.4627	Ar-70 / He-30 (I3)	1,2
269	Standard GMAW / pulse	NiCr 6617 / 2.4627	Ar-70 / He-30 (I3)	1,6
271	Standard GMAW / pulse	NiCr 6625 / 2.4831	Ar-70 / He-30 (I3)	1,0
272	Standard GMAW / pulse	NiCr 6625 / 2.4831	Ar-70 / He-30 (I3)	1,2
273	Standard GMAW / pulse	NiCr 6625 / 2.4831	Ar-70 / He-30 (I3)	1,6
275	Standard GMAW / pulse	NiCr 6625 / 2.4831	Ar-78/He-20/CO2-2 (M12)	1,0
276	Standard GMAW / pulse	NiCr 6625 / 2.4831	Ar-78/He-20/CO2-2 (M12)	1,2
277	Standard GMAW / pulse	NiCr 6625 / 2.4831	Ar-78/He-20/CO2-2 (M12)	1,6
279	Standard GMAW / pulse	CrNi 25 20 / 1.4842	Ar-97,5 / CO2-2,5 (M12)	1,0
280	Standard GMAW / pulse	CrNi 25 20 / 1.4842	Ar-97,5 / CO2-2,5 (M12)	1,2
282	Standard GMAW / pulse	CrNi 23 12 / 1.4332	Ar-97,5 / CO2-2,5 (M12)	0,8
283	Standard GMAW / pulse	CrNi 23 12 / 1.4332	Ar-97,5 / CO2-2,5 (M12)	1,0

JOB	Procedure	Material	Gas	Ø [mm]
284	Standard GMAW / pulse	CrNi 23 12 / 1.4332	Ar-97,5 / CO2-2,5 (M12)	1,2
285	Standard GMAW / pulse	CrNi 23 12 / 1.4332	Ar-97,5 / CO2-2,5 (M12)	1,6
290	forceArc / forceArc puls	FCW Steel - Metal	Ar-82 / CO2-18 (M21)	0,8
291	forceArc / forceArc puls	FCW Steel - Metal	Ar-82 / CO2-18 (M21)	1,0
292	forceArc / forceArc puls	FCW Steel - Metal	Ar-82 / CO2-18 (M21)	1,2
293	forceArc / forceArc puls	FCW Steel - Metal	Ar-82 / CO2-18 (M21)	1,6
294	forceArc / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	0,8
295	forceArc / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
296	forceArc / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2
297	forceArc / pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,6
298	forceArc / pulse	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	0,8
299	forceArc / pulse	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,0
300	forceArc / pulse	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,2
301	forceArc / pulse	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,6
303	forceArc / forceArc puls	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	1,0
304	forceArc / forceArc puls	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	1,2
305	forceArc / forceArc puls	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	1,6
307	forceArc / forceArc puls	CrNi 18 8 / 1.4370	Ar-97,5 / CO2-2,5 (M12)	1,0
308	forceArc / forceArc puls	CrNi 18 8 / 1.4370	Ar-97,5 / CO2-2,5 (M12)	1,2
309	forceArc / forceArc puls	CrNi 18 8 / 1.4370	Ar-97,5 / CO2-2,5 (M12)	1,6
311	forceArc / forceArc puls	CrNi 19 12 3 / 1.4430	Ar-97,5 / CO2-2,5 (M12)	1,0
312	forceArc / forceArc puls	CrNi 19 12 3 / 1.4430	Ar-97,5 / CO2-2,5 (M12)	1,2
313	forceArc / forceArc puls	CrNi 19 12 3 / 1.4430	Ar-97,5 / CO2-2,5 (M12)	1,6
315	forceArc / forceArc puls	CrNi 22 9 3 / 1.4462	Ar-97,5 / CO2-2,5 (M12)	1,0
316	forceArc / forceArc puls	CrNi 22 9 3 / 1.4462	Ar-97,5 / CO2-2,5 (M12)	1,2
317	forceArc / forceArc puls	CrNi 22 9 3 / 1.4462	Ar-97,5 / CO2-2,5 (M12)	1,6
319	forceArc / forceArc puls	CrNi 25 20 / 1.4842	Ar-97,5 / CO2-2,5 (M12)	1,0
320	forceArc / forceArc puls	CrNi 25 20 / 1.4842	Ar-97,5 / CO2-2,5 (M12)	1,2
323	forceArc / forceArc puls	CrNi 23 12 / 1.4332	Ar-97,5 / CO2-2,5 (M12)	1,0
324	forceArc / forceArc puls	CrNi 23 12 / 1.4332	Ar-97,5 / CO2-2,5 (M12)	1,2
325	forceArc / forceArc puls	CrNi 23 12 / 1.4332	Ar-97,5 / CO2-2,5 (M12)	1,6
326*	coldArc / coldArc puls	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	0,8
327*	coldArc / coldArc puls	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	1,0
328*	coldArc / coldArc puls	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	1,2
329*	coldArc / coldArc puls	CrNi 19 12 3 Nb / 1.4576	Ar-97,5 / CO2-2,5 (M12)	1,6

JOB	Procedure	Material	Gas	Ø [mm]
330*	coldArc / coldArc puls	CrNi 18 8 / 1.4370	Ar-97,5 / CO2-2,5 (M12)	0,8
331*	coldArc / coldArc puls	CrNi 18 8 / 1.4370	Ar-97,5 / CO2-2,5 (M12)	1,0
332*	coldArc / coldArc puls	CrNi 18 8 / 1.4370	Ar-97,5 / CO2-2,5 (M12)	1,2
334*	coldArc / coldArc puls	CrNi 19 12 3 / 1.4430	Ar-97,5 / CO2-2,5 (M12)	0,8
335*	coldArc / coldArc puls	CrNi 19 12 3 / 1.4430	Ar-97,5 / CO2-2,5 (M12)	1,0
336*	coldArc / coldArc puls	CrNi 19 12 3 / 1.4430	Ar-97,5 / CO2-2,5 (M12)	1,2
338*	coldArc / coldArc puls	CrNi 22 9 3 / 1.4462	Ar-97,5 / CO2-2,5 (M12)	0,8
339*	coldArc / coldArc puls	CrNi 22 9 3 / 1.4462	Ar-97,5 / CO2-2,5 (M12)	1,0
340*	coldArc / coldArc puls	CrNi 22 9 3 / 1.4462	Ar-97,5 / CO2-2,5 (M12)	1,2
350	Self-shielded flux cored wire	FCW Steel – Rutile	No Gas	0,9
351	Self-shielded flux cored wire	FCW Steel – Rutile	No Gas	1,0
352	Self-shielded flux cored wire	FCW Steel – Rutile	No Gas	1,2
359	wiredArc / wiredArc pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
360	wiredArc / wiredArc pulse	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2

* Only in device series alpha Q and Titan XQ active.

8.2 Parameter overview – setting ranges

Parameter	Setting range					Comment
	Standard	Unit	Min.		Max.	
MIG/MAG						
Gas pre-flow time	0,1	s	0	-	20	
Gas nominal value		l/min.				GFE option
Start program P _{START}						
WF relative	55	%	1	-	200	
Duration	0,1	s	0,00	-	20,0	
U correction	0	V	-9,9	-	9,9	
Slope time	0,6	s	0,00		20,0	
Main program P _A						
WF [min.]	0,01	m/min.	0,00	-	20,0	
U correction	0	V	-9,9	-	9,9	
Duration	0,15	s	0,00	-	20,0	
Slope time	0,10	s	0,00	-	20,0	
Down-slope program P _B						
WF relative	60	%	0	-	200	
Duration	0,40	s	0,0	-	20,0	
U correction	0	V	-9,9	-	9,9	
Slope time	0,05	s	0,00	-	20,0	
Slope time	0,00	s	0,00	-	20,0	
End program P _{END}						
WF relative	100	%	0	-	200	
Duration	0,00	s	0,0	-	20,0	
U correction	0	V	-9,9	-	9,9	
Wire burn-back	15		0		499	
Gas post-flow time	0,5	s	0,0		20,0	
TIG						
Gas pre-flow time	0,1	s	0	-	20	
Ignition current AMP%	50	%	0	-	200	% of main current AMP
Start time	0,5	s	0,00	-	20,0	
Up-slope time	0,5	s	0,0	-	20,0	
Pulse current	140	%	1		200	
Pulse time	0,2	s	0,01	-	20,0	
Slope time	0,1	s	0,00	-	20,0	Time from main current AMP to secondary current AMP%
Secondary current AMP%	50	%	1		200	% of main current AMP
Pulse pause time	0,2	s	0,01	-	20,0	
Slope time	0,1	s	0,00	-	20,0	Time from main current AMP to secondary current AMP%
Down-slope time	0,5	s	0,0	-	20,0	
End current AMP%	30	%	0	-	200	% of main current AMP
End current time	0,5	s	0,00	-	20,0	
Gas post-flow time	5	s	0,0	-	20,0	

Parameter	Setting range					Comment
	Standard	Unit	Min.		Max.	
MMA						
Hot start current	120	%	1	-	200	
Hot start time	0,5	s	0,0	-	-10,0	
Arcforce	0		-40	-	40	

8.3 Searching for a dealer

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