



EN

Control

Expert 3.0 MIG/MAG

099-00L20M-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.

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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 using 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
	Incorrect / Invalid		Switch
	Correct / Valid		Turn
	Input		Numerical value – adjustable
	Navigation		Signal light lights up in green
	Exit		Signal light flashes green
	Time representation (e.g.: wait 4 s / actuate)		Signal light lights up in red
	Interruption in the menu display (other setting options possible)		Signal light flashes red
	Tool not required/do not use		Signal light lights up in blue
	Tool required/use		Signal light flashes blue

2.3 Safety instructions

WARNING



Risk of accidents due to non-compliance with the safety instructions!

Non-compliance with the safety instructions can be fatal!

- Carefully read the safety instructions in this manual!
- Observe the accident prevention regulations and any regional regulations!
- Inform persons in the working area that they must comply with the regulations!



Risk of injury from electrical voltage!

Voltages can cause potentially fatal electric shocks and burns on contact. Even low voltages can cause a shock and lead to accidents.

- Never touch live components such as welding current sockets or stick, tungsten or wire electrodes!
- Always place torches and electrode holders on an insulated surface!
- Wear the full personal protective equipment (depending on the application)!
- The machine may only be opened by qualified personnel!
- The device must not be used to defrost pipes!



Hazard when interconnecting multiple power sources!

If a number of power sources are to be connected in parallel or in series, only a technical specialist may interconnect the sources as per standard IEC 60974-9:2010: Installation and use and German Accident Prevention Regulation BVG D1 (formerly VBG 15) or country-specific regulations.

Before commencing arc welding, a test must verify that the equipment cannot exceed the maximum permitted open circuit voltage.

- Only qualified personnel may connect the machine.
- When taking individual power sources out of operation, all mains and welding current leads must be safely disconnected from the welding system as a whole. (Hazard due to reverse polarity voltage!)
- Do not interconnect welding machines with pole reversing switch (PWS series) or machines for AC welding since a minor error in operation can cause the welding voltages to be combined, which is not permitted.



Risk of injury due to radiation or heat!

Arc radiation can lead to skin and eye injuries.

Contact with hot workpieces and sparks can lead to burns.

- Use hand shield or welding helmet with the appropriate safety level (depends on the application).
- Wear dry protective clothing (e.g. hand shield, gloves, etc.) in accordance with the applicable regulations of your country.
- Persons who are not directly involved should be protected with a welding curtain or suitable safety screen against radiation and the risk of blinding!

 **WARNING****Risk of injury due to improper clothing!**

During arc welding, radiation, heat and voltage are sources of risk that cannot be avoided. The user has to be equipped with the complete personal protective equipment at all times. The protective equipment has to include:

- Respiratory protection against hazardous substances and mixtures (fumes and vapours); otherwise implement suitable measures such as extraction facilities.
- Welding helmet with proper protection against ionizing radiation (IR and UV radiation) and heat.
- Dry welding clothing (shoes, gloves and body protection) to protect against warm environments with conditions comparable to ambient temperatures of 100 °C or higher and arcing and work on live components.
- Hearing protection against harming noise.

**Explosion risk!**

Apparently harmless substances in closed containers may generate excessive pressure when heated.

- Move containers with inflammable or explosive liquids away from the working area!
- Never heat explosive liquids, dusts or gases by welding or cutting!

**Fire hazard!**

Flames may form due to the high temperatures, flying sparks, glowing parts and hot slag generated during welding.

- Keep flammable materials and easily flammable objects such as paper, substances, matches, lighters or chemicals at a safe distance from the heat source!
- Keep suitable fire extinguishers available in the working area!
- Remove all residues of flammable substances from the workpiece before starting to weld.
- Process welded workpieces only after they have cooled. Do not bring them into contact with flammable materials!

⚠ CAUTION



Smoke and gases!

Smoke and gases may lead to shortness of breath and poisoning! The ultraviolet radiation of the arc may also convert solvent vapours (chlorinated hydrocarbon) into poisonous phosgene.

- Ensure sufficient fresh air!
- Keep solvent vapours away from the arc beam field!
- Wear suitable respiratory protection if necessary!
- To prevent the formation of phosgene, residues of chlorinated solvents on workpieces must first be neutralised using appropriate measures.



Noise pollution!

Noise above 70 dBA may cause permanent hearing damage!

- People in the working area must wear suitable hearing protection!



According to IEC 60974-10, welding machines are divided into two classes of electromagnetic compatibility (the EMC class can be found in the Technical data):

Class A machines are not intended for use in residential areas where the power supply comes from the low-voltage public mains network. When ensuring the electromagnetic compatibility of class A machines, difficulties can arise in these areas due to interference not only in the supply lines but also in the form of radiated interference.



Class B machines fulfil the EMC requirements in industrial as well as residential areas, including residential areas connected to the low-voltage public mains network.



Setting up and operating

When operating arc welding systems, in some cases, electro-magnetic interference can occur although all of the welding machines comply with the emission limits specified in the standard. The user is responsible for any interference caused by welding.

In order to **evaluate** any possible problems with electromagnetic compatibility in the surrounding area, the user must consider the following: (see also EN 60974-10 Appendix A)

- Mains, control, signal and telecommunication lines
- Radios and televisions
- Computers and other control systems
- Safety equipment
- The health of neighbouring persons, especially if they have a pacemaker or wear a hearing aid
- Calibration and measuring equipment
- The immunity to interference of other equipment in the surrounding area
- The time of day at which the welding work must be carried out

Recommendations for **reducing interference emission**

- Mains connection, e.g. additional mains filter or shielding with a metal tube
- Maintenance of the arc welding system
- Welding leads should be as short as possible and run closely together along the ground
- Potential equalization
- Earthing of the workpiece. In cases where it is not possible to earth the workpiece directly, it should be connected by means of suitable capacitors.
- Shielding from other equipment in the surrounding area or the entire welding system



Electromagnetic fields!

The power source can create electrical or electromagnetic fields that may impair the function of electronic systems such as EDP and CNC devices, telecommunication, power and signal lines as well as pacemakers and defibrillators.



- Follow the maintenance instructions > see 9 chapter!
- Unwind the welding leads completely!
- Shield radiation-sensitive equipment or facilities appropriately!
- The function of pacemakers may be impaired (seek medical advice if necessary).

⚠ CAUTION**Obligations of the operator!**

The respective national directives and laws must be complied with when operating the machine!

- Implementation of national legislation relating to framework directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work and associated individual guidelines.
- In particular, directive 89/655/EEC concerning the minimum safety and health requirements for the use of work equipment by workers at work.
- The regulations applicable to occupational safety and accident prevention in the country concerned.
- Setting up and operating the machine as per IEC 60974.-9.
- Brief the user on safety-conscious work practices on a regular basis.
- Regularly inspect the machine as per IEC 60974.-4.



The manufacturer's warranty becomes void if non-genuine parts are used!

- ***Only use system components and options (power sources, welding torches, electrode holders, remote controls, spare parts and replacement parts, etc.) from our range of products!***
- ***Only insert and lock accessory components into the relevant connection socket when the machine is switched off.***

Requirements for connection to the public mains network

High-performance machines can influence the mains quality by taking current from the mains network. For some types of machines, connection restrictions or requirements relating to the maximum possible line impedance or the necessary minimum supply capacity at the interface with the public network (Point of Common Coupling, PCC) can therefore apply. In this respect, attention is also drawn to the machines' technical data. In this case, it is the responsibility of the operator, where necessary in consultation with the mains network operator, to ensure that the machine can be connected.

2.4 Transport and installation

⚠ WARNING**Risk of injury due to improper handling of shielding gas cylinders!**

Improper handling and insufficient securing of shielding gas cylinders can cause serious injuries!

- Observe the instructions from the gas manufacturer and any relevant regulations concerning the use of compressed air!
- Do not attach any element to the shielding gas cylinder valve!
- Prevent the shielding gas cylinder from heating up.

CAUTION



Risk of accidents due to supply lines!

During transport, attached supply lines (mains leads, control cables, etc.) can cause risks, e.g. by causing connected machines to tip over and injure persons!

- Disconnect all supply lines before transport!



Risk of tipping!

There is a risk of the machine tipping over and injuring persons or being damaged itself during movement and set up. Tilt resistance is guaranteed up to an angle of 10° (according to IEC 60974-1).

- Set up and transport the machine on level, solid ground.
- Secure add-on parts using suitable equipment.



Risk of accidents due to incorrectly installed leads!

Incorrectly installed leads (mains, control and welding leads or intermediate hose packages) can present a tripping hazard.

- Lay the supply lines flat on the floor (avoid loops).
- Avoid laying the leads on passage ways.



Risk of injury from heated coolant and its connections!

The coolant used and its connection or connection points can heat up significantly during operation (water-cooled version). When opening the coolant circuit, escaping coolant may cause scalding.

- Open the coolant circuit only when the power source or cooling unit is switched off!
- Wear proper protective equipment (protective gloves)!
- Seal open connections of the hose leads with suitable plugs.



The units are designed for operation in an upright position!

Operation in non-permissible positions can cause equipment damage.

- ***Only transport and operate in an upright position!***



Accessory components and the power source itself can be damaged by incorrect connection!

- ***Only insert and lock accessory components into the relevant connection socket when the machine is switched off.***
- ***Comprehensive descriptions can be found in the operating instructions for the relevant accessory components.***
- ***Accessory components are detected automatically after the power source is switched on.***



Protective dust caps protect the connection sockets and therefore the machine against dirt and damage.

- ***The protective dust cap must be fitted if there is no accessory component being operated on that connection.***
- ***The cap must be replaced if faulty or if lost!***

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 Applications

Machine control for arc welding machines to enable gas metal arc welding. Accessory components may expand the range of functions (see the relevant documentation in the chapter of the same name).

3.2 Software version

The software version of the machine control is displayed on the start screen during the loading process > see 4.2.1 chapter.

3.3 Use and operation solely with the following machines

The following system components can be combined:

- Titan XQ/Phoenix XQ/Taurus XQ 350-600 D puls
- Titan XQ 400 AC puls
- Phoenix XQ/Taurus XQ 355-505 puls
- Titan XQ/Phoenix XQ/Taurus XQ 350-400 C puls

3.4 Documents which also apply

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

3.4.1 Part of the complete documentation

This document is 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.

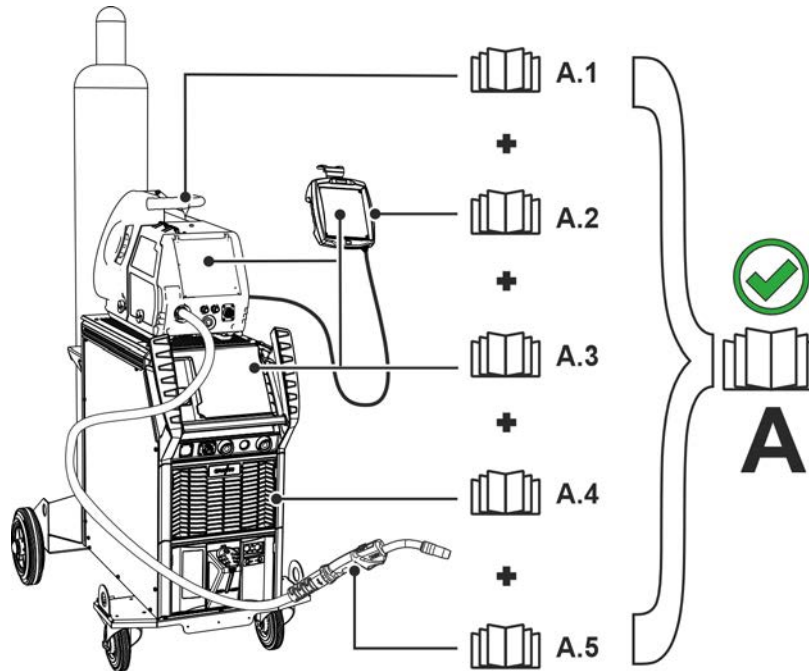


Figure 3-1

Item	Documentation
A.1	Wire feed unit
A.2	Remote control
A.3	Control
A.4	Power source
A.5	Welding torch
A	Complete documentation

4 Product description – quick reference

4.1 Operating elements

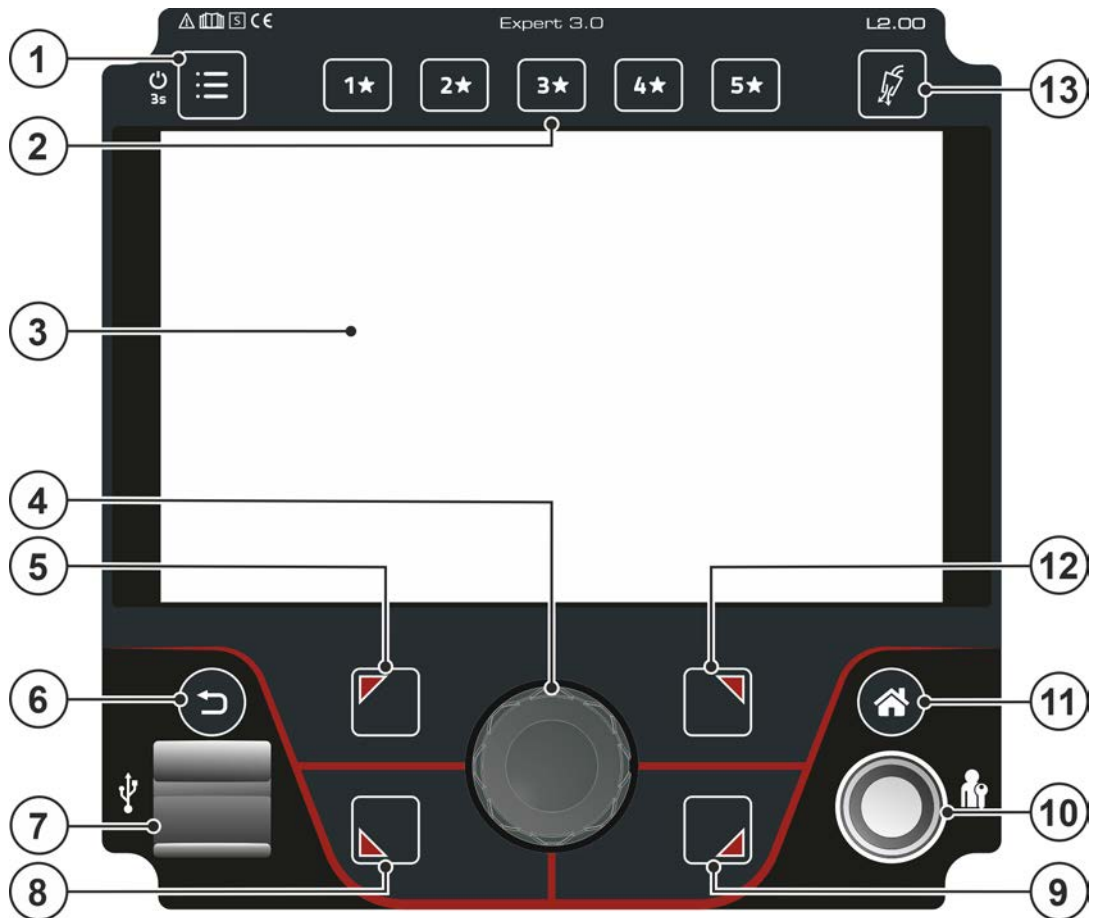








Figure 4-1

Item	Symbol	Description
1		System push-button (main menu) <ul style="list-style-type: none"> •-----Display and configuration of system settings > see 5.2 chapter. •-----Protection against accidental adjustment (lock function) > see 5.3 chapter.
2		Push-buttons for JOB-favourites > see 8.2 chapter Memory locations for frequently used welding tasks.
3		Machine display Machine display showing all machine functions, menus and parameters with their values > see 4.2 chapter.
4		Click wheel Control button for setting the parameters by turning and pressing. <ul style="list-style-type: none"> •-----Setting the welding power •-----Navigating through menu and parameters •-----Setting the parameter values depending on the preselection.
5		Push-button OL (top left) with multiple functions <ul style="list-style-type: none"> •-----Selection of the possible welding procedure variant (short button press). •-----Double allocation Hotkey > see 5.1.4 chapter (long button press).
6		Back push-button Go back one step in the menu navigation.
7		USB interface USB for offline data transfer Connection capability for a USB flash drive - industrial USB flash drive recommended (FAT32).

Item	Symbol	Description
8		Push-button UL (bottom left) with multiple functions <ul style="list-style-type: none"> • ----- Setting the operating mode in the main menu > see 5.4.7 chapter • ----- Double allocation Hotkey > see 5.1.4 chapter (long button press).
9		Push-button UR (bottom right) with multiple functions <ul style="list-style-type: none"> • ----- Setting the pulse welding procedure in the main menu > see 5.4.3 chapter • ----- Double allocation Hotkey > see 5.1.4 chapter (long button press).
10		Interface - Xbutton Welding release with user-defined rights to protect against unauthorised use > see 8.3 chapter.
11		Home Push-button The view changes between Home (main screen) > see 4.2.3 chapter and Quick Menü (quick access parameters) > see 4.2.3.1 chapter
12		Push-button OR (top right) with multiple functions <ul style="list-style-type: none"> • ----- Selecting advanced settings > see 5.1 chapter (short button press). • ----- Double allocation Hotkey > see 5.1.4 chapter (long button press).
13		Push-button gas test / rinse hose package > see 5.4.5 chapter

4.2 Machine display

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

4.2.1 Loading screen

The loading bar on the loading screen shows the progress of the loading process. Basic information such as the set system language > see 4.2.1.1 chapter, control name, device software version and date and time are also displayed.




Figure 4-2

Item	Symbol	Description
1		Machine control name
2		Date and time
3		Control software version
4		Loading bar
5		Indication of the system language selected
6		Change system selection during start process > see 4.2.1.1 chapter


4.2.1.1 Change system language

The system language can be changed during the start process.

- Press the context-dependent push-button UR  during the start phase (the loading bar is displayed).
- Select the required language by turning the control button click wheel.
- Confirm the selected language by pressing the control button (the user can exit the menu by pressing the push-button Home without making any changes).

The system language can also be changed while the system is running in the main menu (system > system settings > languages).

Selection

 System settings
< Language

4.2.1.2 Status bar

The status bar displays system and process states. Symbols with a green background in the status display indicate an active parameter. The overview of status and screen symbols is summarised in the table screen symbols > see 4.2.2 chapter.

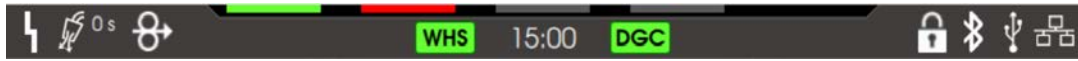


Figure 4-3

4.2.2 Screen icons

Symbol	Description
	System settings
	Favourites (example Favourite 1)
	Favourites
	Gas test, gas purge
	Back to previous menu
JOB	Welding task
SP	superPuls
	BT-Connect - Radio link
	USB connection
	MIG/MAG welding
	TIG welding
	MMA welding
WHS	Wire heating
DGC	Digital gas control
	Wire / wire feed speed
	Shielding gas
	Gas pre-flow
	Gas post-flow
	Time / duration
	Arc length / voltage correction
	Advanced settings / setup
	JOB Manager
	Information
	Warning; could be an imminent malfunction.
	Fault, malfunction
	User logged in
	Xbutton Login
	Xbutton Logout
	Xbutton Version number not recognised.

Symbol	Description
	Locked; selected function is not available with the current access rights or procedure combination - check access rights (Xbutton).
	Local network (LAN)
	Pulse settings
Prog	Program (P0-P15) > see 4.2.5 chapter
	After welding, the last welded values (hold values) are displayed.
	Arcforce (welding characteristics)
	Remote control
	Manual remote control
	Foot-operated remote control
	Foot-operated remote control in start/stop operation
	Analogue interface for automated welding
	Digital interface for automated welding

4.2.3 Main screen (Homescreen)

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.



Figure 4-4

Item	Symbol	Description
1		Status bar > see 4.2.1.2 chapter display area
2		Information on the welding task selected Display of basic settings for selected welding task (JOB). Can be selected with the push-buttons OL , OR , UL und UR .
3		Parameter selection and setting Procedure-dependent selection of welding parameters and access to the welding sequence > see 4.2.4 chapter. Selectable with the control button (click wheel).

Example: TIG welding



Figure 4-5

Example: MMA welding



Figure 4-6

4.2.3.1 Quick menu

Use the quick menu to define the display of process parameters. The display of the parameters (except for wire feed speed or main current) can be shown or hidden.

- Press the push-button Home



Figure 4-7

4.2.4 Welding process

In a welding process, successive welding phases with their process parameters are mapped. The process parameters are preset for a variety of applications but can be adjusted if required.

The number and representation of these parameters expand accordingly with the number of functions or operating modes activated. These parameters can be accessed from several menu items depending on the context.

The start, main and end phases are factory-set as a percentage dependent on the set wire feed value or welding current of the main phase A. This representation can also be changed to absolute values if required (see the parameter for the welding wire setting in the menu System>Control panel).

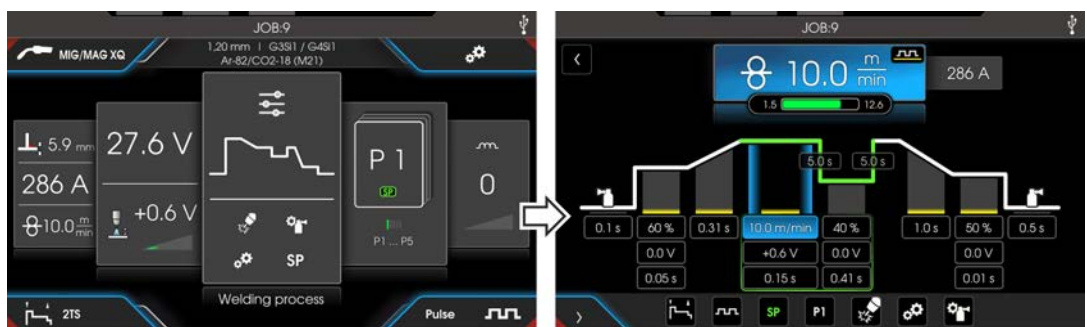


Figure 4-8

4.2.4.1 Welding phases

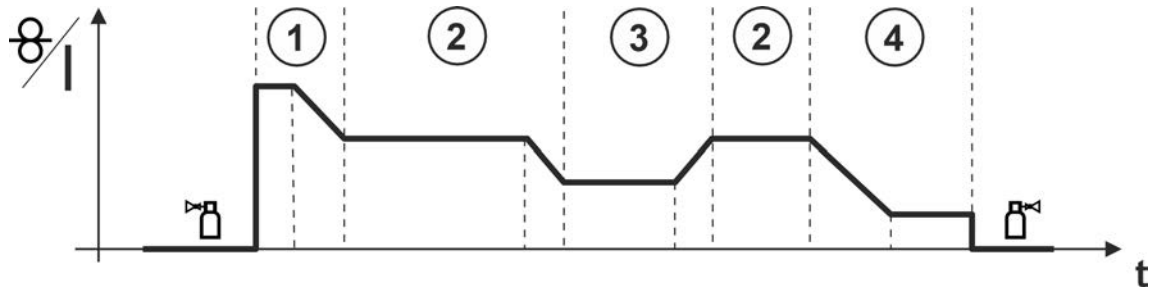


Figure 4-9

Item	Description
1	Start phase P_{START} The start phase in the welding process ensures correct burning and melting of the materials at the start of seam to ensure a stable connection between the workpieces. A clean ignition and correct heat supply are crucial for a consistent weld.
2	Main phase A The main phase A usually refers to the period in which the actual welding process takes place at full power (e.g., current and voltage).
3	Main phase B The main phase B usually refers to a second period to the main phase A, in which the actual welding process takes place with an alternative power (e.g., current and voltage).
4	End phase P_{END} Period at the end of the welding process to prevent undercuts, cracks or pores at the end of the seam.

The setting range for the parameter values are summarised in the parameter overview section.

4.2.5 Programs (P_A 1-15)

Different welding tasks or positions on a workpiece require different welding power values (operating points) or parameter settings. The settings can be saved in up to 15 programs (P1 to P15) and retrieved when required on the machine control or a suitable accessory component (e.g., welding torch).

The active program is displayed on the home screen of the machine display in the program display area with the letter “P” and the corresponding program number.

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

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

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

Selection

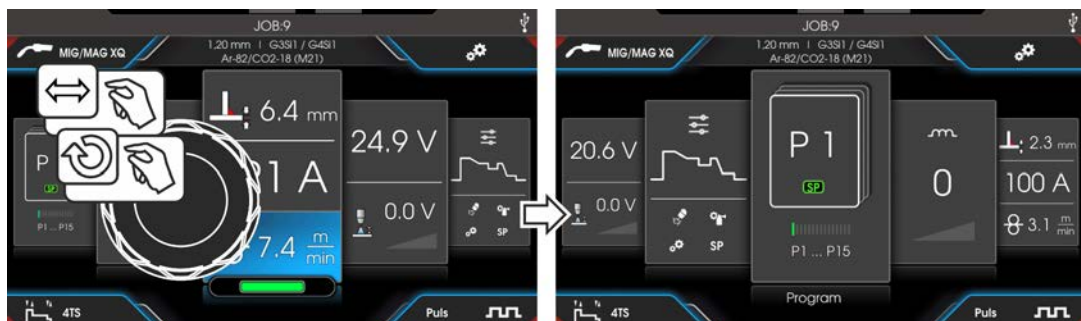


Figure 4-10

5 Operating the machine control

After switching on the device, the start-up process of the machine control begins (switching on until ready to weld) and the loading screen with the loading bar > see 4.2.1 chapter is shown in the machine display. After the start process, the machine display will split into the main screen > see 4.2.3 chapter and the status bar > see 4.2.1.2 chapter.

On the main screen, either system menus and basic settings > see 5.2 chapter or process-dependent processes and their parameters are displayed (Homescreen).

Users can jump back to the main screen from any menu item with the push-button Home. If the user is already on the main screen, they can use this push-button to define the process parameters that should be displayed in the functional sequence (quick menu > see 4.2.3.1 chapter).

The central control is operated with the rotating push-button (click wheel) and the context-dependent push-buttons OL, OR, UL and UR.



Figure 5-1

5.1 Advanced settings

Advanced settings in the menu are additional parameters, settings or organisational program items.

5.1.1 JOB finder

The JOB finder is an auxiliary function for finding the required welding task (JOB).



Figure 5-2

5.1.2 JOB Manager (organising welding tasks)

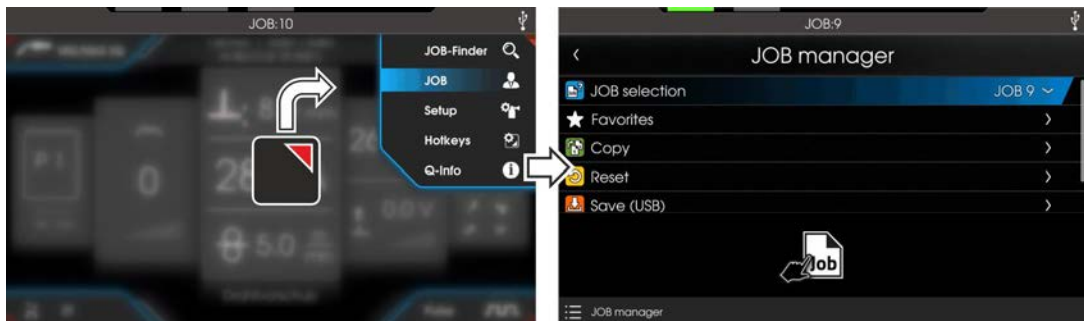


Figure 5-3

5.1.3 Setup



Figure 5-4

5.1.3.1 Wire inching

The wire inching function is used for potential- and gas-free inching of the wire electrode after the wire spool change. By pressing and holding the wire inching push-button, the wire inching speed increases in a ramp function of 1 m/min up to the set maximum value (special parameter P1 > see 8.4.1.1 chapter).

5.1.3.2 Wire return

The wire return function is used to retract the wire electrode without tension and protection gas. By simultaneously pressing and holding the wire inching and gas test buttons, the wire return speed increases in a ramp function (special parameter P1 > see 8.4.1.1 chapter) from 1 m/min to the set maximum value. The maximum value is set by simultaneously pressing the wire inching button and turning the left click wheel. During the process, the wire spool must be turned by hand clockwise to wind up the wire electrode again. The operating elements are installed under the protective cap of wire feed mechanism.

5.1.4 Hotkey double allocation

Hotkeys are shortcut keys for quick access to freely selectable machine functions. These machine functions can be set as a dual function on the push-buttons OL, UL, UR and OR.

The push-buttons can be assigned in the Hotkeys menu. A long button press (using an unassigned button) also takes you to the Hotkeys menu.

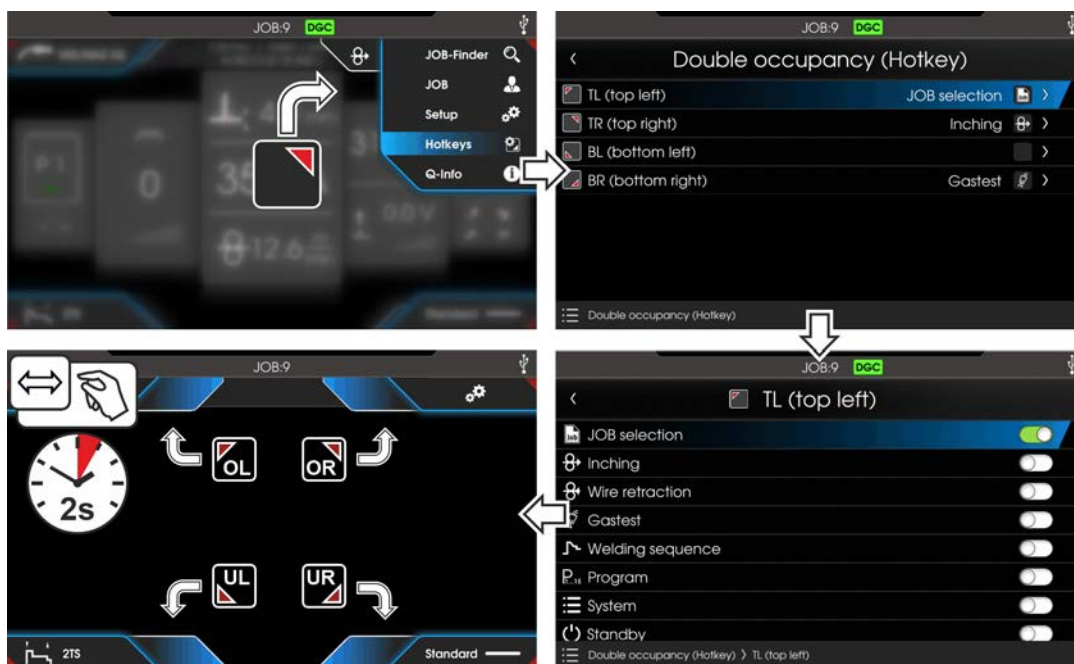


Figure 5-5

5.1.5 Operator assistance Q-Info

The graphic user interface provides basic control functions to help guide the user. The sub-menu Q-Info is located in the Advanced settings menu and can be selected with the push-button OR.

By turning the control button, the different information screens can be navigated.

You can exit the Q-Info menu by pressing the pushbutton Back or Home.



Figure 5-6

5.2 System (main menu)

5.2.1 System settings

☰ System settings
< Language
< Operating panel
< System settings
< Brightness
< Units
< Program 0 (P0) can be adjusted from the power source
< Status bar
< Time/JOB
< Home screen > see 4.2.3 chapter / welding process > see 4.2.4 chapter
< Display selection
< Operating mode selection
< Double allocation (hotkey) > see 5.1.4 chapter
< Welding wire setting
< JOB Display settings
< Additional display of parameter names
< Welding
< Hold value
< Throat thickness instead of power (kW)
< superPuls Average value display
< Time / date
< Time zone
< Time
< Date
< 24-hour time format
< Date format

< Power source P5
< Energy saving function
< Standby time 5bR
< Log off user in standby mode
< Control
< Operation without WF
< Lock program 0 > see 8.4.1.2 chapter
< Correction operation > see 8.4.1.6 chapter
< JOB list switching > see 8.4.1.11 chapter
< Lower limit JOB range > see 8.4.1.12 chapter
< Upper limit JOB range > see 8.4.1.12 chapter
< Block-JOB operation > see 8.4.1.14 chapter
< Relative programs can be set separately > see 8.4.1.20 chapter
< Process PrC
< Operating mode switchover at welding start > see 8.4.1.24 chapter
< Error threshold for gas flow control DGC > see 8.4.1.25 chapter
< Wire feeder
< Ramp time wire inching/reverse inching > see 8.4.1.1 chapter
< Welding torch ErD
< Display mode up/down welding torch > see 8.4.1.3 chapter
< Program switching with standard torch > see 8.4.1.7 chapter
< 4T/4Ts tip start > see 8.4.1.8 chapter
< 4Ts tapping time > see 8.4.1.10 chapter
< Program selection with torch trigger > see 8.4.1.15 chapter
< Cooling unit CoL
< Torch cooling
< Follow-up time of the torch cooling Et
< Error limit of the coolant temperature Et
< Coolant flow monitoring FLD
< Error limit of the coolant flow FLt

5.2.2 Adjustment

☰ Adjustment
< Measuring wire feeder 1
< Measuring the cable resistance of wire feeder 1

5.2.3 JOB Manager (organising welding tasks)

☰	JOB manager
<	JOB selection
<	Favourites
<	Delete favourites
<	Load favourites
<	Save favourites to USB flash drive
<	Copy
<	JOB
<	Target JOB
<	Start
<	Reset
<	Resetting
<	Reset all JOBs
<	Save (USB)
<	JOB range
<	Filename
<	Start
<	Safely remove the USB flash drive
<	Load (USB)
<	Filename
<	JOB range
<	Start
<	Safely remove the USB flash drive

5.2.4 Xbutton

☰	Xbutton
<	User information
<	Company ID
<	Group
<	User
<	Activating the Xbutton rights
<	Xbutton rights active
<	Reset Xbutton configuration

5.2.5 Service



☰ Service
< Contacting
< EWM GmbH
< Ihr Händler
< Visitenkarte laden (USB)
< Visitenkarte löschen
< Vorlage speichern (USB)
< Safely remove the USB flash drive
< Searching for a dealer
< Screenshot
< Software update
< Reset
< JOBs
< Cooling unit
< Wire feeder
< Operating panel
< Control unit system memory
< Advanced
< Factory settings

5.2.6 System information

☰ System information
< Errors > see 10.2 chapter
< Messages
< History
< Erase history
< Warnings/notes > see 10.1 chapter
< Messages
< History
< Erase history
< Running time
< Operating time (resettable)
< Arc time (resettable)
< Operating time (overall)
< Arc time (overall)
< System components

< Temperatures
< Housing inside
< Secondary transformer
< Primary heatsink
< Sensors
< Coolant flow

5.3 Lock function

The lock function protects against accidental changes to the machine settings. All operating elements are deactivated when the function is activated and signalled by the display . Press and hold (> 3 s) the push-button  to enable or disable the function.

5.4 MIG/MAG welding

5.4.1 Welding task selection

A welding task (JOB) is a predefined configuration that includes all the required process parameters for a specific weld and is saved under a JOB number. This makes it easier to repeat and track specific welding tasks.

For MIG/MAG welding, the current, material-related settings must be communicated to the welding system. These include the type of material, wire diameter and type of shielding gas. The welding procedure variant must also be selected depending on the product variant. The combination of these basic parameters results in a JOB number that must be selected on the machine control. This basic setting must be rechecked or adjusted only when changing the wire or gas. Changing the welding process may also have an impact on the JOB number.

The following steps have to be carried out for the welding task selection:

- Set the MIG/MAG welding procedure and the combination of basic welding parameters (material type, wire diameter, shielding gas type). Use the JOB finder > see 5.4.2 chapter to find the basic welding parameters or use the JOB- Manager > see 11.1 chapter to enter them directly with the corresponding JOB number from the JOB list > see 8.1 chapter.
- Select operating mode.
- Select the welding type.
- Set the welding power (operating point).
- Correct arc length and dynamics if necessary.
- Adjust the expert or special parameters.

5.4.2 JOB finder

The JOB finder is an auxiliary function for finding the required welding task (JOB).



Figure 5-7

5.4.2.1 Welding procedure

After setting the basic parameters you can switch between the welding procedures MIG/MAG, forceArc, wiredArc, rootArc und coldArc (if there is a corresponding combination of the basic parameters). The process change will also change the JOB number, but the basic parameters remain unchanged.



Figure 5-8

5.4.2.2 Operating mode

The operating mode determines the welding process controlled by the welding torch. Detailed descriptions of the operating modes > see 5.4.7 chapter.



Figure 5-9

5.4.3 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.

The range of functions depends on the machine series:

Machine series	Standard	Puls	Positionweld
Titan XQ	✔	✔	✔
Phoenix XQ	✔	✔	✔ [1]
Taurus XQ	✔	✘	✘

[1] Aluminium welding



Figure 5-10

5.4.4 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 5.4.4.2 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 5.4.1 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.

5.4.4.1 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.

5.4.4.2 Arc length

If necessary, the arc length (welding voltage) can be corrected by +/- 9.9 V for each welding task. Effect on the arc:

- Setting to the negative side > shorter arc > more penetration > more spatter formation.
- Setting to the positive side > longer arc > less penetration > less spatter formation.

5.4.4.3 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.

5.4.4.4 superPuls

With superPuls, the welding process switches back and forth between main phase A and main phase B. 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.

superPuls in combination with EWM welding processes offers a variety of options. For example, to weld vertical-up welds without using the so-called Christmas tree technique, the corresponding superpuls variant (depending on the material) is activated when program 1 > see 4.2.5 chapter is selected. The required superPuls parameters are factory-set.

The welding power can be displayed either as an average value from main phase A and main phase B or as a maximum value from main phase A. When the average value display is switched on, the signal lights for main phase A and main phase B light up simultaneously. The display variants can be toggled using special parameter P19, > see 8.4.1.16 chapter.

5.4.5 Shielding gas volume settings

If the shielding gas setting is too low or too high, this can introduce air to the weld pool and may cause pores to form. Adjust the shielding gas quantity to suit the welding task!

- Slowly open the gas cylinder valve.
- Open the pressure regulator.
- Switch on the power source at the main switch.
- Trigger gas test > see 5.4.5.1 chapter function (welding voltage and wire feed motor remain switched off – no accidental arc ignition).
- Set the relevant gas quantity for the application on the pressure regulator.

Setting instructions

Welding process	Recommended shielding gas quantity
MAG welding	Wire diameter x 11.5 = l/min
MIG brazing	Wire diameter x 11.5 = l/min
MIG welding (aluminium)	Wire diameter x 13.5 = l/min (100 % argon)
TIG	Gas nozzle diameter in mm corresponds to l/min gas throughput

Helium-rich gas mixtures require a higher gas volume!

The table below can be used to correct the gas volume calculated where necessary:

Shielding gas	Factor
75% Ar/25% He	1.14
50% Ar/50% He	1.35
25% Ar/75% He	1.75
100% He	3.16

5.4.5.1 Gas test

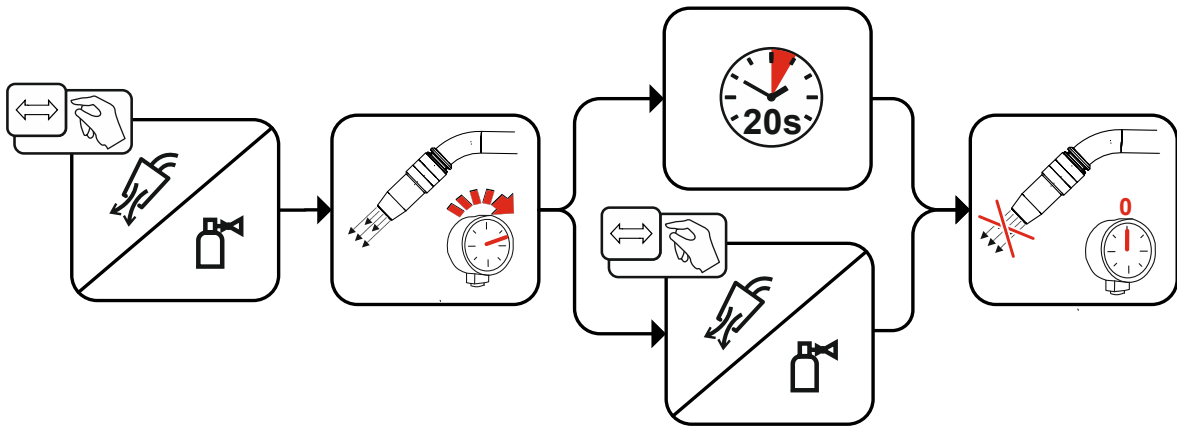


Figure 5-11

5.4.5.2 Purge hose package

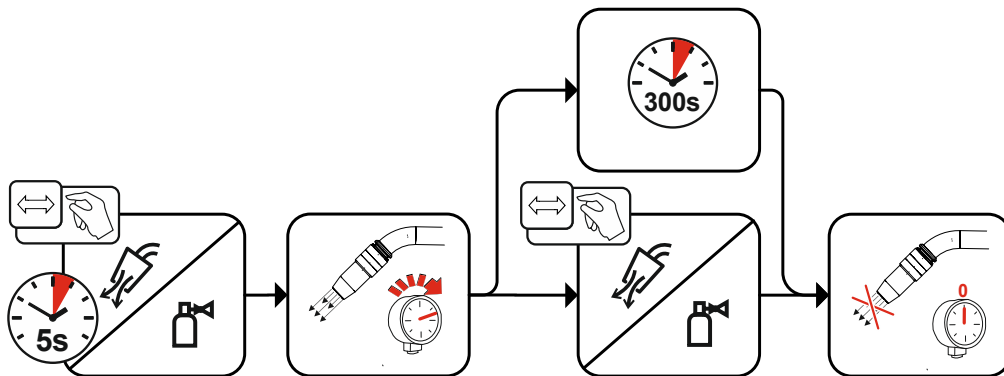


Figure 5-12

5.4.5.3 Wire inching

The wire inching function is used for potential- and gas-free inching of the wire electrode after the wire spool change. By pressing and holding the wire inching push-button, the wire inching speed increases in a ramp function of 1 m/min up to the set maximum value (special parameter P1 > see 8.4.1.1 chapter).













5.4.6 Wire return

The wire return function is used to retract the wire electrode without tension and protection gas. By simultaneously pressing and holding the wire inching and gas test buttons, the wire return speed increases in a ramp function (special parameter P1 > see 8.4.1.1 chapter) from 1 m/min to the set maximum value. The maximum value is set by simultaneously pressing the wire inching button and turning the left click wheel. During the process, the wire spool must be turned by hand clockwise to wind up the wire electrode again. The operating elements are installed under the protective cap of wire feed mechanism.

5.4.7 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).

5.4.7.1 Explanation of signs and functions

Symbol	Meaning
	Pressing the torch trigger
	Releasing the torch trigger
	Tap the torch trigger (briefly press and release)
	Shielding gas
I	Welding current
	Wire electrode is being fed
	Wire creeping
	Wire burn-back
	Gas pre-flow
	Gas post-flow
	Non-latched
	Special non-latched
	Latched
	Special latched
t	Time
P _{START}	Start phase
P _A	Main phase A
P _B	Main phase B
P _{END}	End phase
t ₂	Spot time

Non-latched mode

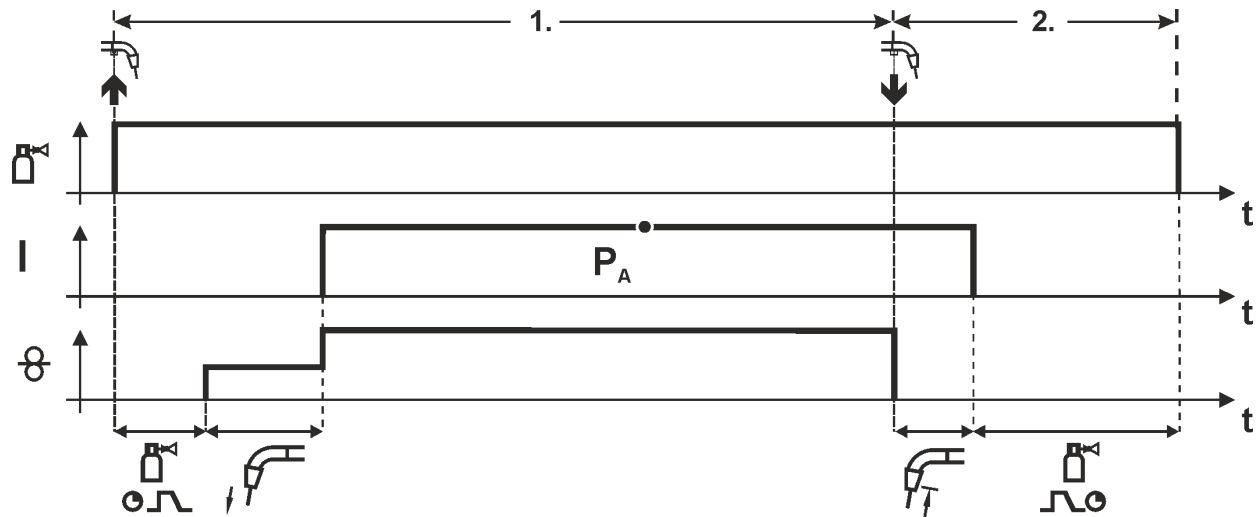


Figure 5-13

1st cycle

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at wire creep speed.
- Arc ignites after the wire electrode hits the workpiece, welding current flows.

2nd cycle

- Release the torch trigger.
- Superpulse function is terminated.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

Non-latched operation with superPuls

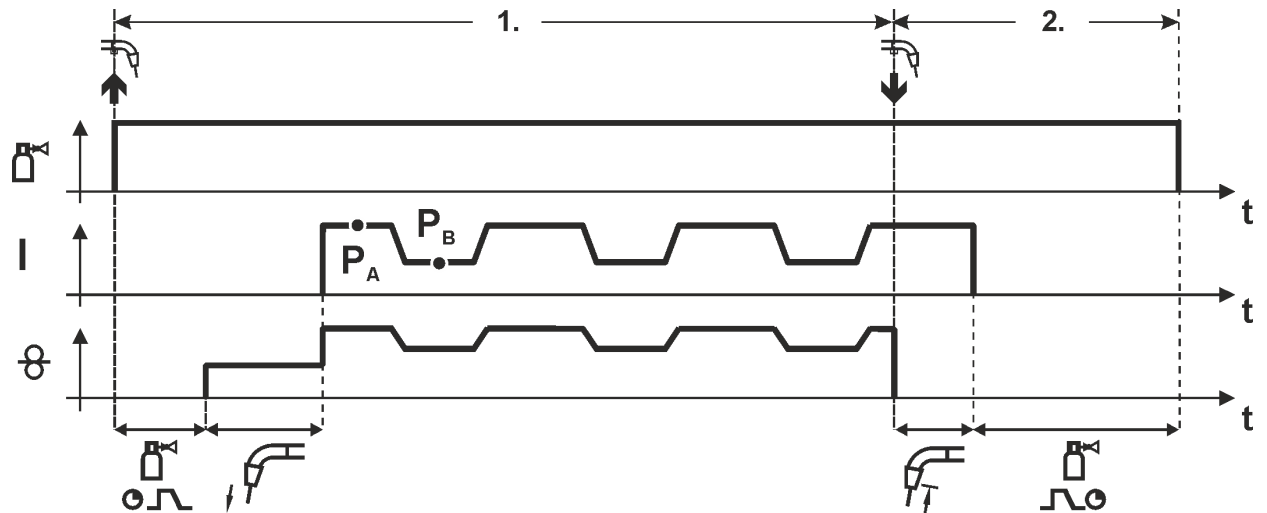


Figure 5-14

1st cycle

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at wire creep speed.
- Arc ignites after the wire electrode hits the workpiece, welding current flows.
- Starting the Superpulse function from main phase A on:
The welding current alternates between main phase A and main phase B with the specified times for parameters duration A and duration B.

2nd cycle

- Release the torch trigger.
- Superpulse function is terminated.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

Special, non-latched

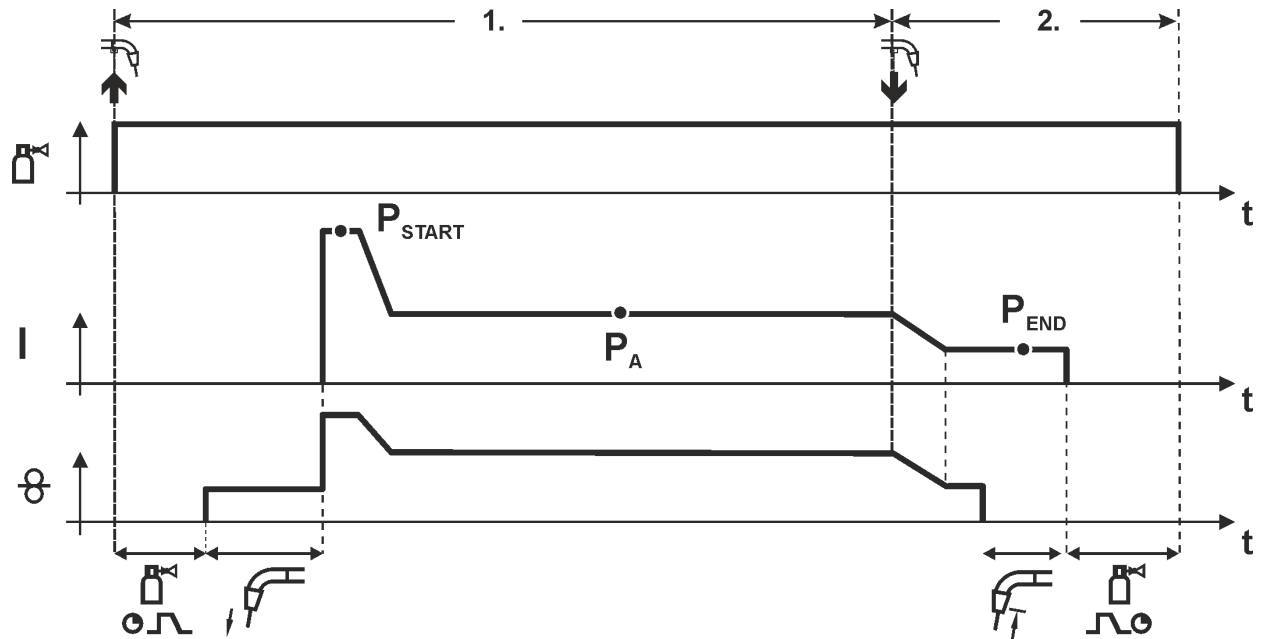


Figure 5-15

1st cycle

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at wire creep speed.
- Arc ignites after the wire electrode hits the workpiece, welding current flows (start phase P_{START} for the duration of start).
- Slope time to end phase P_A .

2nd cycle

- Release the torch trigger.
- Slope time to end phase P_{END} for the end duration.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

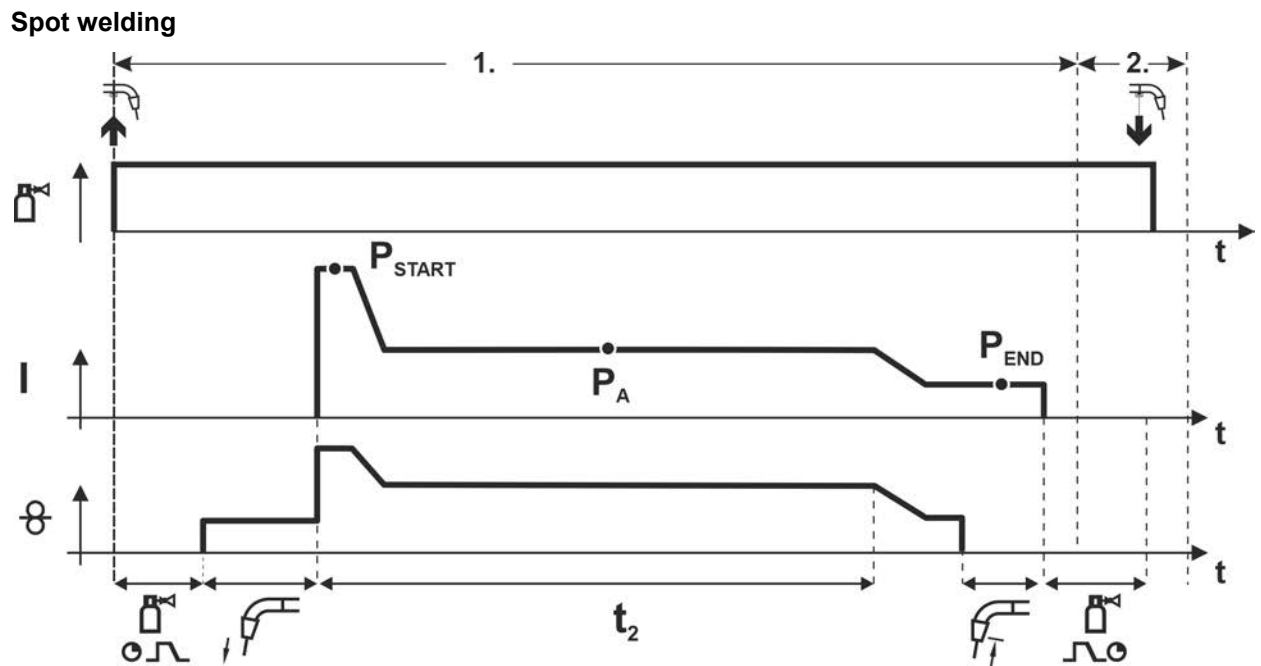


Figure 5-16

Start duration and slope time start from the start phase must be added to the spot time.

1st cycle

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at wire creep speed.
- Arc ignites after the wire electrode hits the workpiece, welding current flows (start phase P_{START} , spot time begins).
Slope time to main phase P_A .
- After the set spot time has elapsed, slope time is applied to end phase P_{END} .
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

2nd cycle

- Release the torch trigger.

When the torch trigger is released (cycle 2), the welding process is stopped even before the spot time has expired (slope time to end phase P_{END}).

Special, non-latched with superPuls

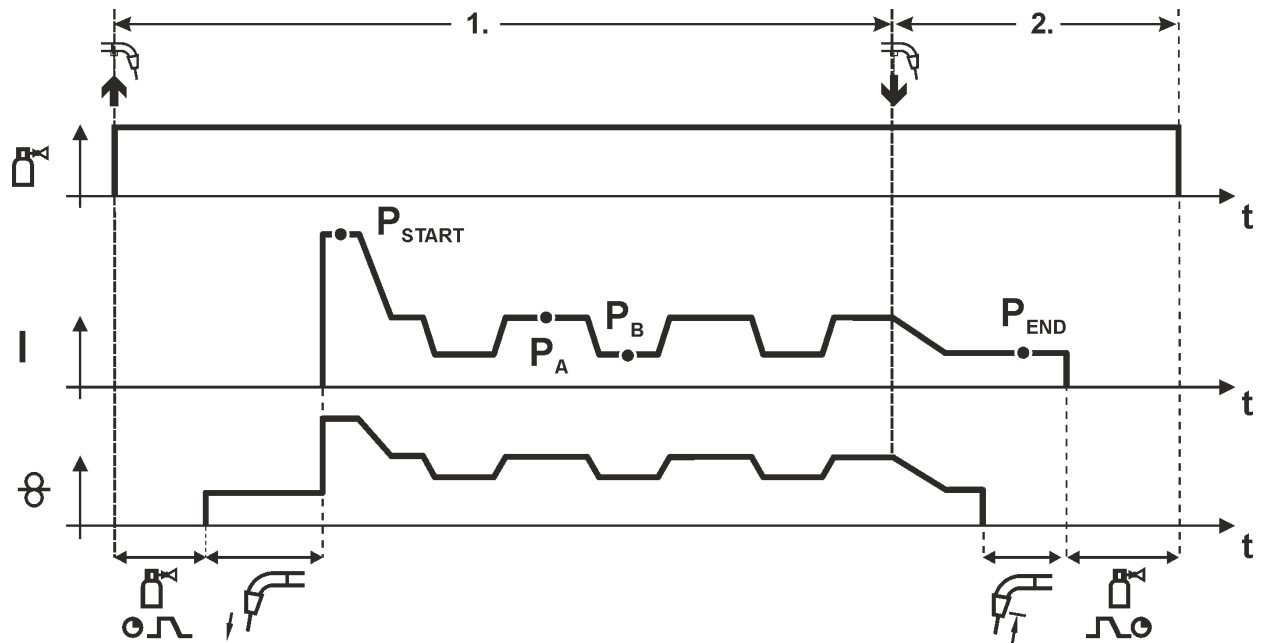


Figure 5-17

1st cycle

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at wire creep speed.
- Arc ignites after the wire electrode hits the workpiece.
Welding current flows (start phase P_{START}) for the duration of start.
- Slope time to end phase P_A .
- Starting the Superpulse function from main phase P_A on:
The welding current alternates between the main phase P_A and the main phase P_B at the specified times (duration A and duration B).

2nd cycle

- Release the torch trigger.
- Superpulse function is terminated.
- Slope time to end phase P_{END} for the end duration.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

Latched mode

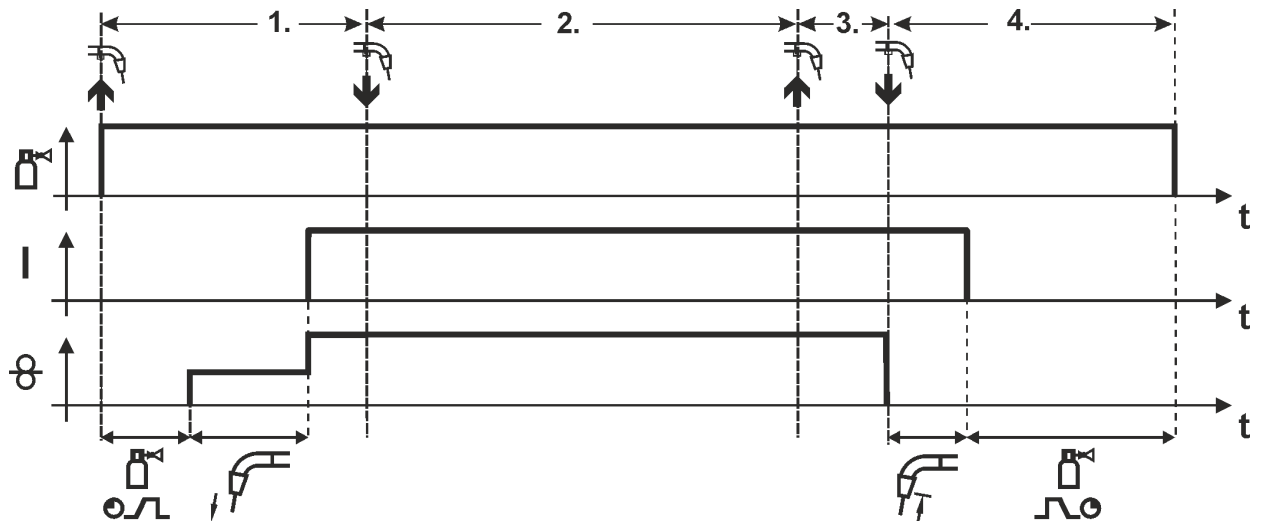


Figure 5-18

1st cycle

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at wire creep speed.
- Arc ignites after the wire electrode hits the workpiece. Welding current flows.
- Switching to preselected wire feed speed (main phase P_A).

2nd cycle

- Release torch trigger (no effect).

3rd cycle

- Press torch trigger (no effect).

4th cycle

- Release the torch trigger.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

Latched mode with superPuls

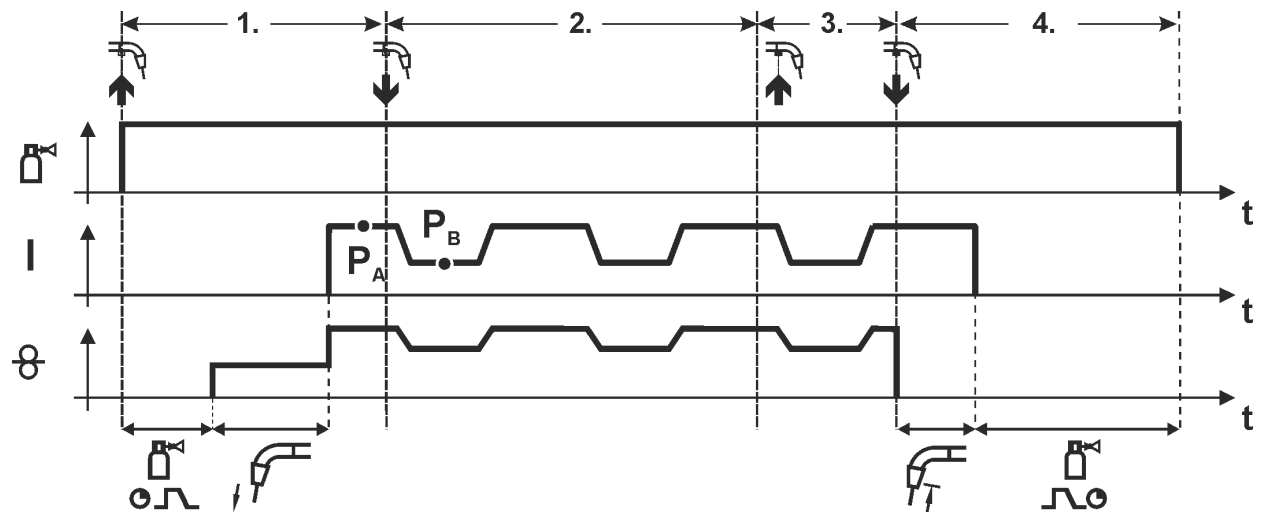


Figure 5-19

1st cycle:

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at wire creep speed.
- Arc ignites after the wire electrode hits the workpiece. Welding current flows.
- Starting the Superpulse function from main phase P_A on:
The welding current alternates between the main phase P_A and the main phase P_B at the specified times (duration A and duration B).

2nd cycle:

- Release torch trigger (no effect).

3rd cycle:

- Press torch trigger (no effect).

4th cycle:

- Release the torch trigger.
- Superpulse function is terminated.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

Latched with changing welding method (process switching)

Exclusively for devices with pulsed arc welding type > see 3.1 chapter.

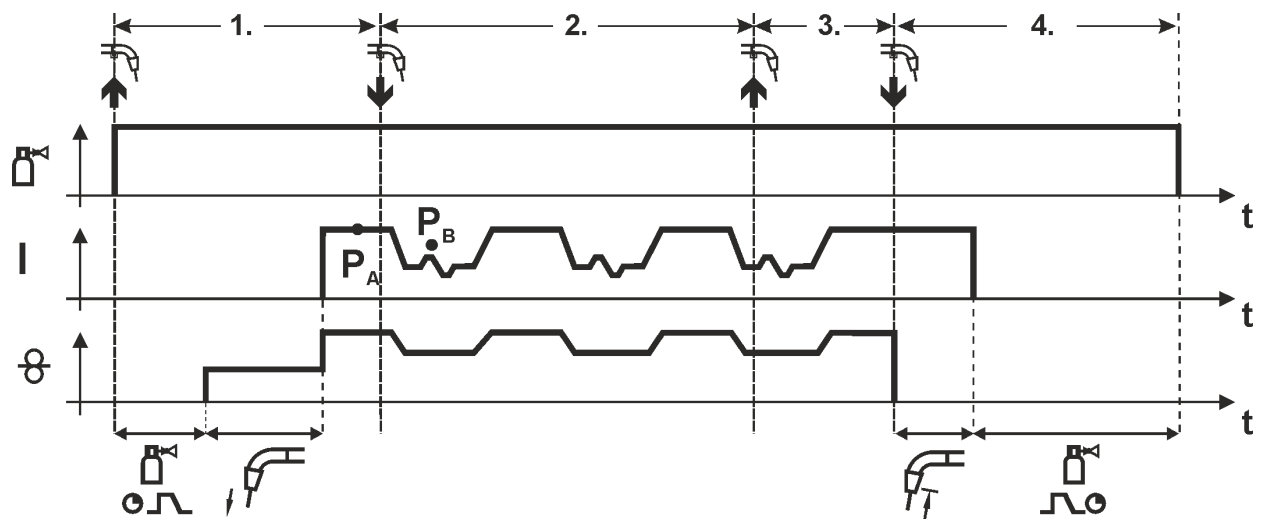


Figure 5-20

1st cycle:

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at wire creep speed.
- Arc ignites after the wire electrode hits the workpiece, welding current flows.
- Starting the Superpulse function from procedure P_A on:
The welding procedures alternate with the specified times (duration A and duration B) between the procedure P_A stored in the JOB and the contrary procedure P_B.

If a standard procedure is stored in the JOB, a permanent switch happens between initially the standard and then the pulse arc procedure. The same applies in the opposite case.

2nd cycle:

- Release torch trigger (no effect).

3rd cycle:

- Press torch trigger (no effect).

4th cycle:

- Release the torch trigger.
- Procedure change is terminated.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

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

Refer to the software operating instructions.

Latched special

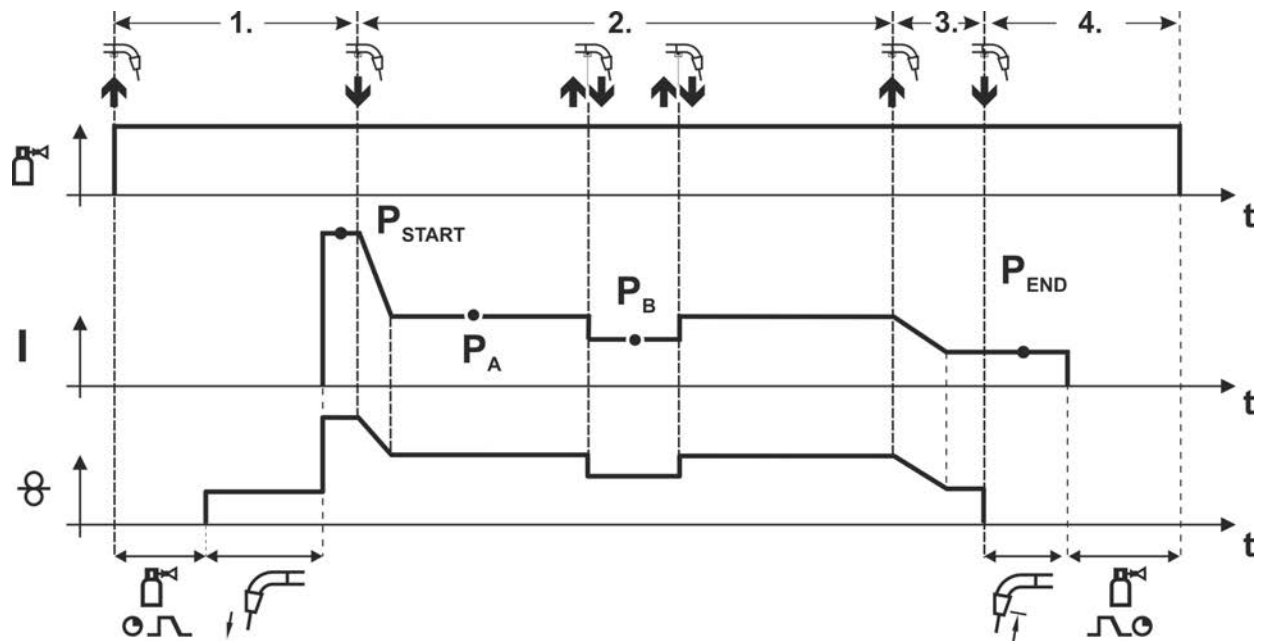


Figure 5-21

1st cycle

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

The slope time to the main phase P_A takes place at the earliest after the set start time has elapsed or at the latest when the torch trigger is released.

2nd cycle

- Release the torch trigger.
- Slope time to end phase P_A .

Tap¹⁾ to switch to the main phase P_B .

Tap again to switch back to the main phase P_A .

3rd cycle

- Press and hold the torch trigger.
- Slope time to end phase P_{END} .

4th cycle

- Release the torch trigger.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

¹⁾ Suppress tapping (short press and release within 0.3 s):

If the switching of the welding current to the main phase P_B with tapping should be suppressed, the parameter value for the main phase P_B must be set to 100% ($P_A = P_B$) in the welding process.

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

Exclusively for devices with pulsed arc welding type > see 3.1 chapter.

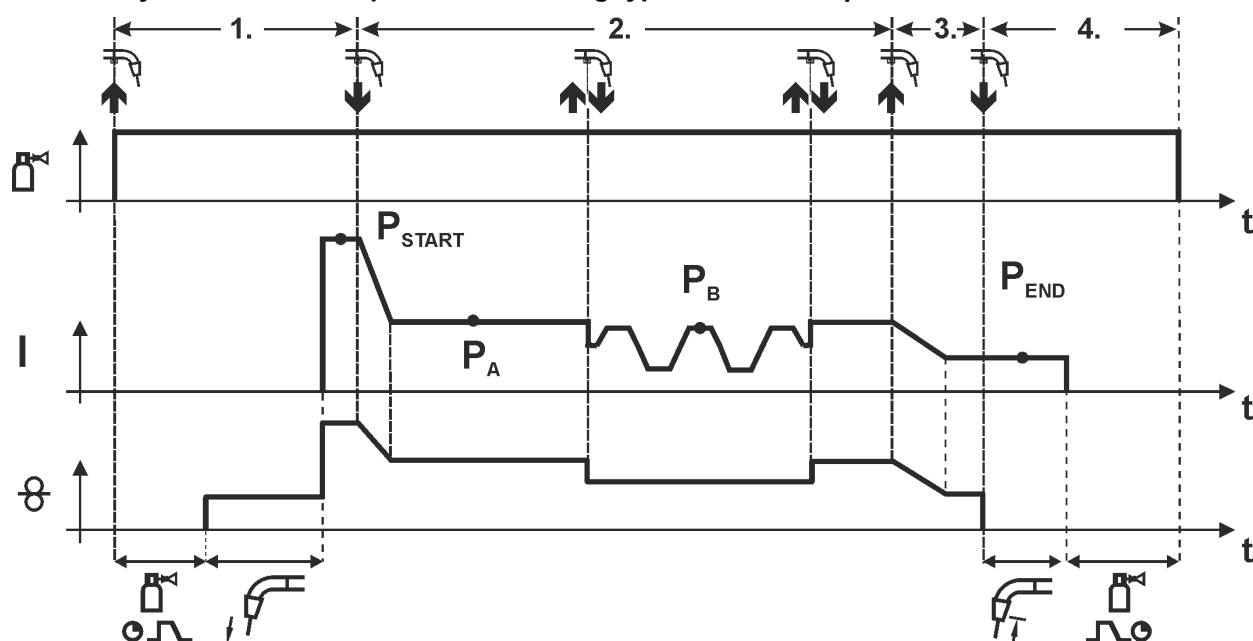


Figure 5-22

1st cycle

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

2nd cycle

- Release the torch trigger.
- Slope time to end phase P_A

The slope time to the main phase P_A takes place at the earliest after the set start time has elapsed or at the latest when the torch trigger is released.

Tapping (pressing the torch trigger for less than 0.3 s) switches the welding procedure (P_B).

If a standard procedure is defined in the main phase, tapping switches to the pulse arc procedure. Tapping again switches back to the standard procedure, etc.

3rd cycle

- Press and hold the torch trigger.
- Slope time to end phase P_{END} .

4th cycle

- Release the torch trigger.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The 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 3.1 chapter.

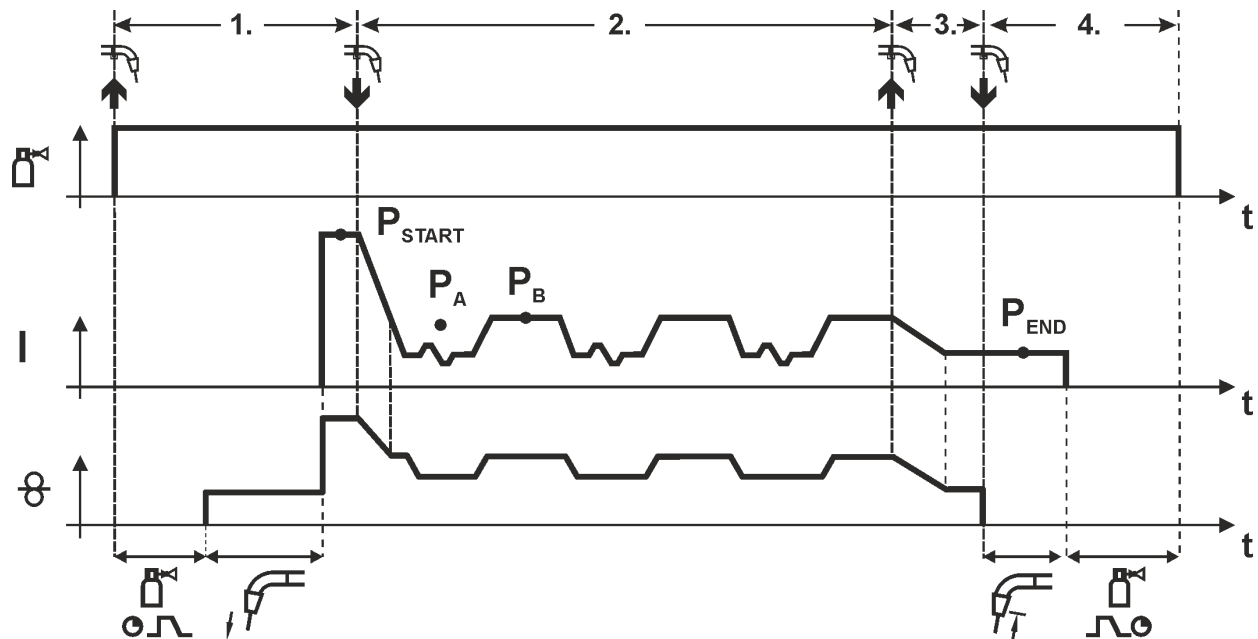


Figure 5-23

1st cycle

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at “wire creep speed”.
- Arc ignites after the wire electrode hits the workpiece.
Welding current flows (start phase P_{START} for the duration of start).

2nd cycle

- Release the torch trigger.
- Slope time to end phase P_A .
- Starting the Superpulse function from procedure P_A on:
The welding procedures alternate with the specified times (duration A and duration B) between the procedure P_A stored in the JOB and the contrary procedure P_B .

If a standard procedure is stored in the JOB, a permanent switch happens between initially the standard and then the pulse arc procedure. The same applies in the opposite case.

3rd cycle

- Press the torch trigger.
- Superpulse function is terminated.
- Slope time into the end phase P_{END} for the end duration.

4th cycle

- Release the torch trigger.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

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

Refer to the software operating instructions.

Special, latched with superpulse

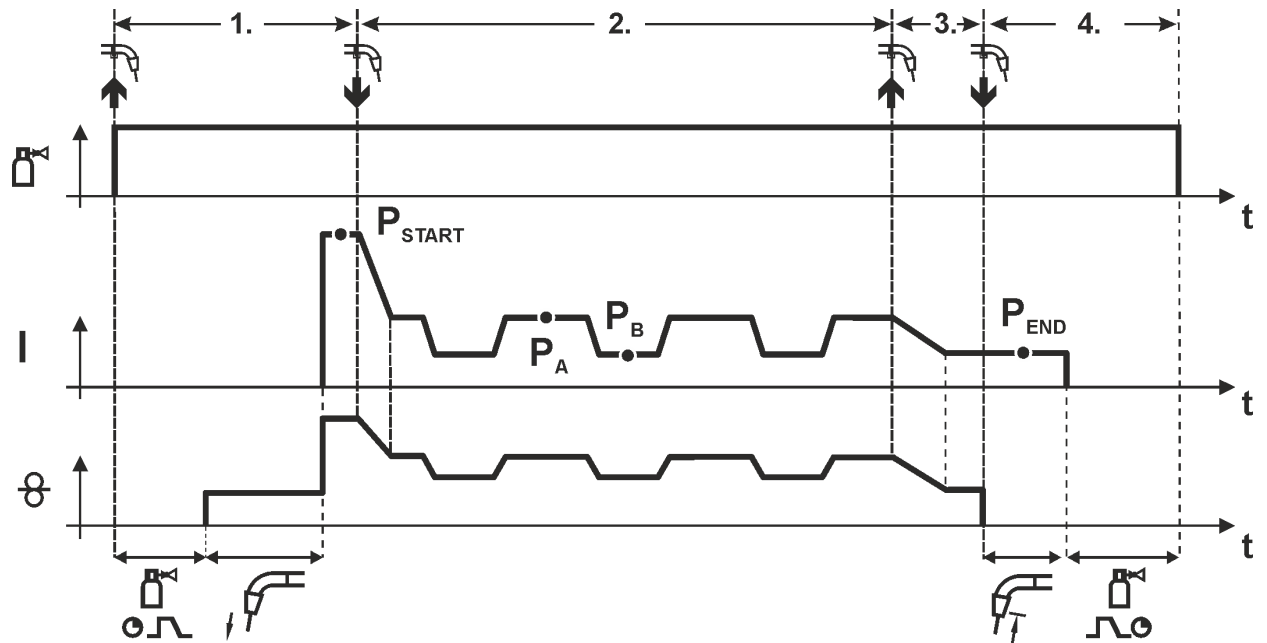


Figure 5-24

1st cycle

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at “wire creep speed”.
- Arc ignites after the wire electrode hits the workpiece.
Welding current flows (start phase P_{START} for the duration of start).

2nd cycle

- Release the torch trigger.
- Slope time to end phase P_A .
- Starting the Superpulse function from main phase P_A on:
The welding current alternates between the main phase P_A and the main phase P_B at the specified times (duration A and duration B).

3rd cycle

- Press the torch trigger.
- Superpulse function is terminated.
- Slope time to end phase P_{END} for the end duration.

4th cycle

- Release the torch trigger.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

5.4.7.2 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).

5.4.8 coldArc XQ / coldArc puls XQ

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



Figure 5-25

After selecting the coldArc process > see 5.4.1 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

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)

5.4.9 forceArc XQ / forceArc puls XQ

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

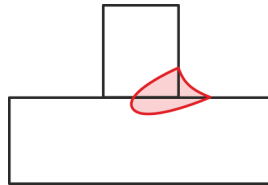


Figure 5-26

- 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 5.4.1 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!**

5.4.10 rootArc XQ / rootArc pulse XQ

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



Figure 5-27

- 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!**

5.4.11 acArc puls XQ

The alternating current welding process acArc puls XQ makes MIG aluminium welding even easier in manual and automated modes. Clean weld seams with no traces of powder on the thinnest metal sheets, even with AlMg alloys, are possible with acArc puls XQ.

Advantages

- Perfect aluminium welding, especially in thin sheet metal due to directed heat reduction
- Excellent gap bridging, also facilitates automated applications
- Minimised heat input - reduces the risk of burn-through
- Less welding fume emissions
- Clean weld seams due to greatly reduced magnesium burn-off
- Easy and safe handling of the arc for manual and automated welding

A constant change of polarity (see following figure) takes place during the process.

The heat input from the material shifts to the welding consumable and the drop size increases significantly (compared to the direct current welding process). This ensures excellent bridging of air gaps and reduced welding fume emissions.

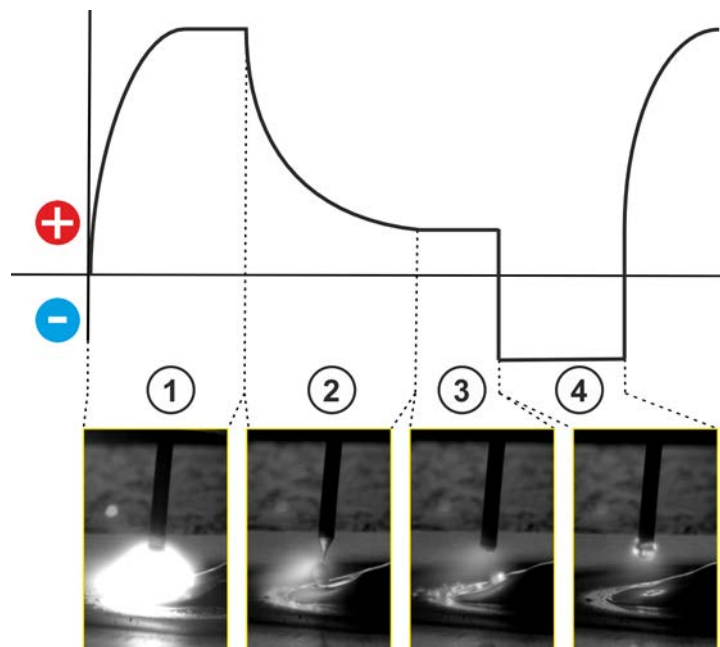


Figure 5-28

Item	Symbol	Description
1		Droplet formation in the pulse phase
2		Droplet detachment after the pulse phase
3		Fundamental current phase

Item	Symbol	Description
4		Cleaning and preheating the wire in the negative phase

The arc dynamics can be used to influence the negative phase in the welding process:

Dynamics setting (operating element)	Welding properties
Left turn (more minus), negative phase gets longer	<ul style="list-style-type: none"> • ----- More power on the wire • ----- Droplet volume increases • ----- Process becomes cooler
Right turn (more plus), negative phase gets shorter	<ul style="list-style-type: none"> • ----- More power on the workpiece • ----- Droplet volume decreases • ----- Process becomes hotter

The basic requirement for optimum welding results is the application-specific equipment of the wire feed system. For the acArc puls XQ welding process, the entire wire feed system of the Titan XQ AC series is factory-equipped with components for aluminium welding consumables! Recommended system components:

- Power source of type Titan XQ 400 AC puls D
- Wire feeder of type Drive XQ AC
- Welding torch series of type PM 551 W Alu

Note the following equipment and setting features of the wire feed system:

- Wire feed rolls (set contact pressure depending on welding consumables and hose package lengths)
- Central torch connection (use guide tube instead of capillary tube)
- Combined liner (PA liner with matching inner diameter for welding consumables)
- Use contact tips with forced contact

5.4.12 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.

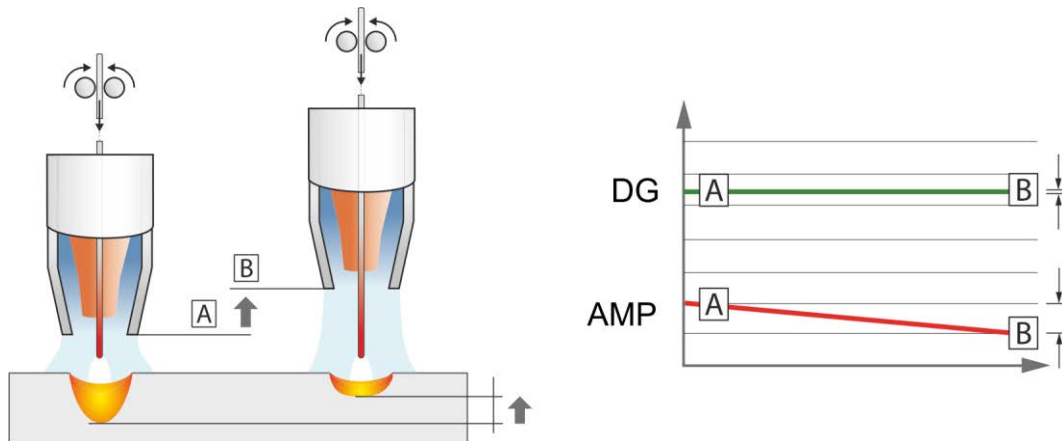


Figure 5-29

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.

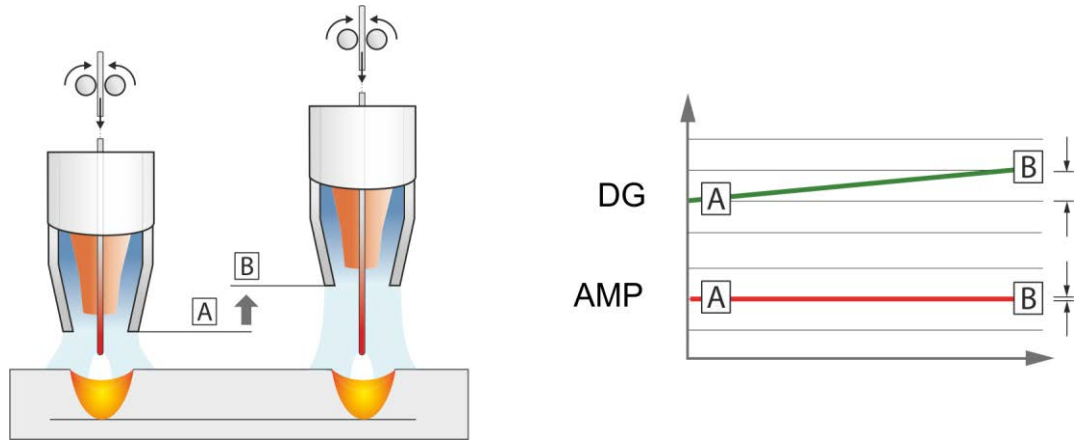


Figure 5-30

5.4.13 Standard MIG/MAG torch

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

Operating elements	Functions
 Torch trigger	<ul style="list-style-type: none"> 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 8.4 chapter .

5.4.14 MIG/MAG special-torches

Function specifications and more indepth information can be found in the operating manual for the relevant welding torch!

5.4.14.1 Program and up/down operation

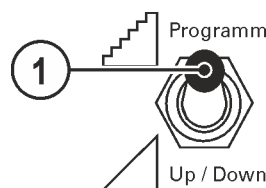





Figure 5-31

Item	Symbol	Description
1		Welding torch function changeover switch - special welding torch required  Programm --- Changing over programs or JOBS  Up / Down --- Infinite adjustment of welding performance.

Does not apply to wire feeders of the Drive XQ IC 200 series. These machines are configured for program mode. They do not have a changeover switch.

5.4.15 Aligning the cable resistance

To ensure optimum welding properties, the electric cable resistance should be aligned again whenever an accessory component such as the welding torch or the intermediate hose package (AW) has been changed. The resistance value of the cables can be set directly or can be aligned by the power source. In the delivery state the cable resistance is set to the optimum values. To optimise the welding properties for other cable lengths, an alignment process (voltage correction) is necessary.

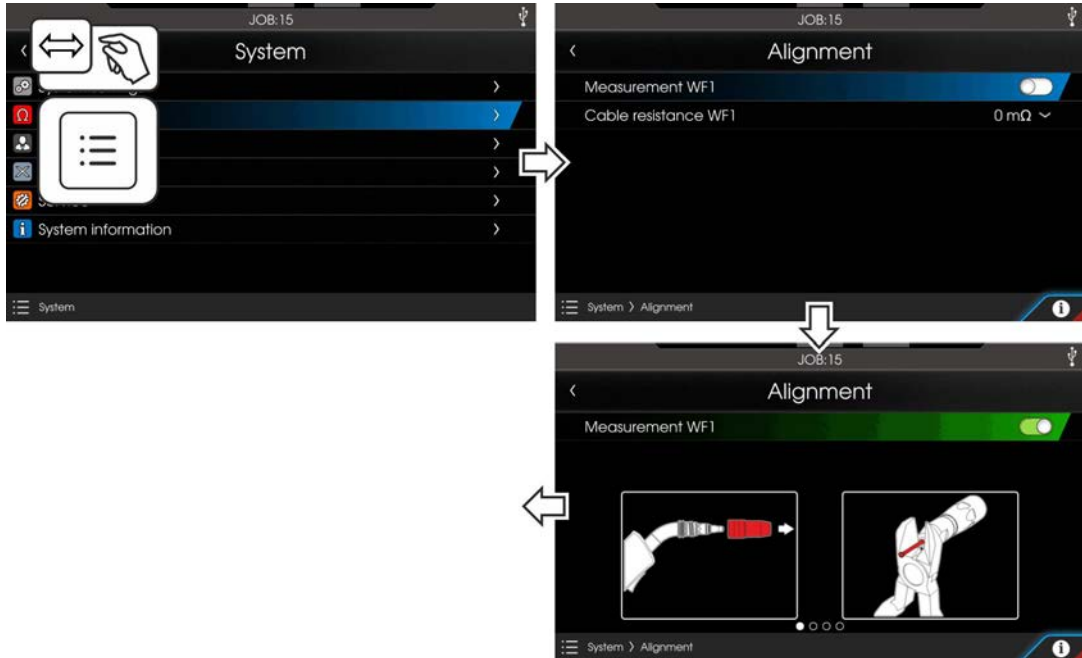


Figure 5-32

6 TIG welding

6.1 Welding task selection

Setting the welding task JOB 127 in JOB manager > see 5.2.3 chapter.

6.1.1 Arc ignition

6.1.1.1 Liftarc

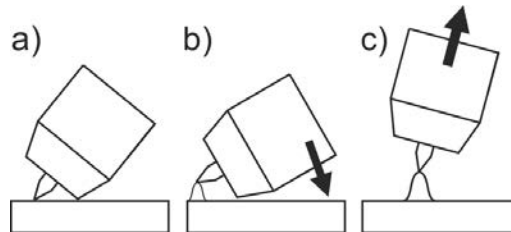



Figure 6-1

The arc is ignited on contact with the workpiece:

- Carefully place the torch gas nozzle and tungsten electrode tip onto the workpiece and press the torch trigger (liftarc current flowing, regardless of the main current set).
- Incline the torch over the torch gas nozzle to produce a gap of approx. 2-3 mm between the electrode tip and the workpiece. The arc ignites and the welding current is increased, depending on the operating mode set, to the ignition or main current set.
- Lift off the torch and swivel to the normal position.

Ending the welding process: Release or press the torch trigger depending on the operating mode selected.

6.2 Setting the shielding gas volume (gas test)/rinse hose package

- Slowly open the gas cylinder valve.
- Open the pressure regulator.
- Switch on the power source at the main switch.
- Set the relevant gas quantity for the application on the pressure regulator.
- Press the push-button Gas test / flush hose package  to activate the gas test.

Setting the shielding gas quantity (gas test)

- Shielding gas flows for 20 s or until the push-button is pressed again.

Purging long hose packages (purging)

- Press push-button for about 5 s. • Shielding gas flows for approx. 5 min. or until the push-button is pressed again.

If the shielding gas setting is too low or too high, this can introduce air to the weld pool and may cause pores to form. Adjust the shielding gas quantity to suit the welding task!

Setting instructions

Welding process	Recommended shielding gas quantity
MAG welding	Wire diameter x 11.5 = l/min
MIG brazing	Wire diameter x 11.5 = l/min
MIG welding (aluminium)	Wire diameter x 13.5 = l/min (100 % argon)
TIG	Gas nozzle diameter in mm corresponds to l/min gas throughput

Helium-rich gas mixtures require a higher gas volume!

The table below can be used to correct the gas volume calculated where necessary:

Shielding gas	Factor
75% Ar/25% He	1.14
50% Ar/50% He	1.35
25% Ar/75% He	1.75
100% He	3.16

For connecting the shielding gas supply and handling the shielding gas cylinder refer to the power source operating instructions.

6.3 Pulse welding

The functional processes behave the same as with standard welding. However, there is also switching back and forth between main phase A (pulse current) and main phase B (pulse-pause current) with the set times of duration A and duration B.

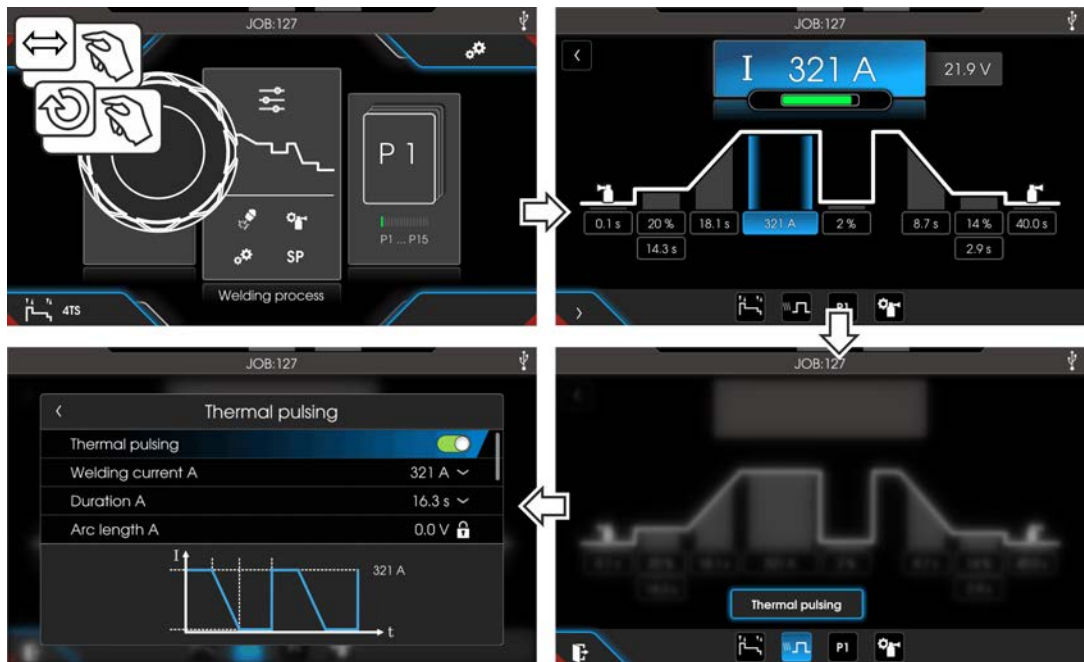


Figure 6-2

7 MMA welding

Setting the welding task JOB 128 in JOB manager > see 5.2.3 chapter.

7.1 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).

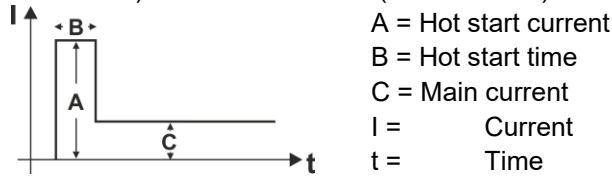


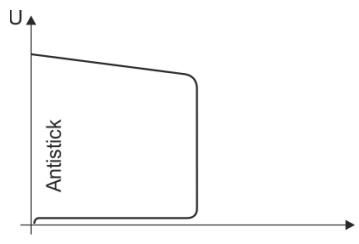
Figure 7-1

7.2 Arcforce

During the welding process, arcforce prevents the electrode sticking in the weld pool with increases in current. This makes it easier to weld large-drop melting electrode types at low current strengths with a short arc in particular.

The parameter is set on the main screen (Home screen) > see 4.2.3 chapter.

7.3 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 7-2

8 Functional characteristics

8.1 JOB Manager (organising welding tasks)

Use the JOB Manager to organise the welding tasks in the welding system.

The following operations can be carried out in the JOB Manager:

- JOB loading for active use (alternatively, use the JOB finder function).
- JOB favourites organisation.
- Copy any JOB into the free JOB area (JOB 129 to JOB 169)
- Reset a specific JOB or all JOBS to factory settings.
- Export individual or a specific JOB range to or import from a USB mass storage device.

Things worth knowing about the JOB memory ranges:

In general, there are two memory categories:

- 121 factory-set, pre-programmed, permanent JOBS. Permanent JOBS are not loaded but are defined by the welding task (each welding task is permanently assigned a JOB number).
- 128 freely definable JOBS (JOBS 129 to 256)

Selection

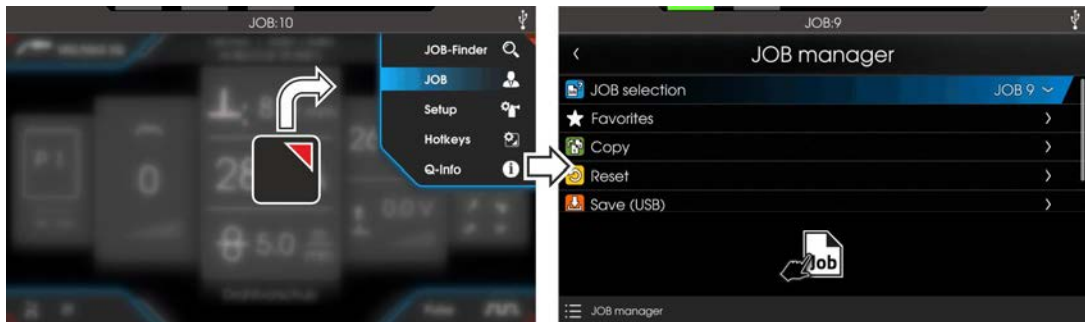


Figure 8-1

8.2 JOB favourites

JOB- favourites are additional memory locations for saving frequently used welding tasks, programs and their settings and loading them when required. The status of the Favourites (loaded, changed, not loaded) is indicated by signal lights.

- There are 5 JOB- favourite memory locations available for any settings.
- If required, access control can be adjusted using the key switch or the Xbutton function.



Figure 8-2

Item	Symbol	Description
1		Push-buttons for JOB-favourites Memory locations for frequently used welding tasks.
2		Status display JOB-favourites <ul style="list-style-type: none"> • ----- does not light up: no favourite stored in this memory location. • ----- lights up green: Favourite saved or loaded; saved settings and the current machine settings are identical. • ----- lights up red: Favourite loaded, but the saved settings and current machine settings are not identical (e.g., the operating point was changed). • ----- lights up grey: Favourite is saved in this memory location but not selected.

8.2.1 Saving current settings to Favourites

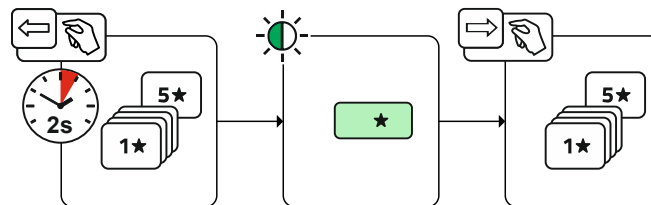


Figure 8-3

- Press and hold the favourite memory push-button for 2 s (the status display for Favourites lights up green).

8.2.2 Loading saved Favourites

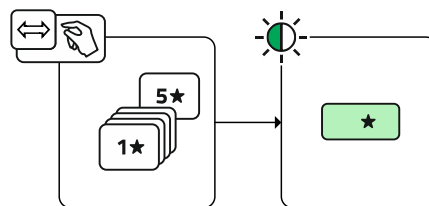


Figure 8-4

- Press the favourite memory push-button (the status display for Favourites lights up green).

8.2.3 Deleting saved Favourites

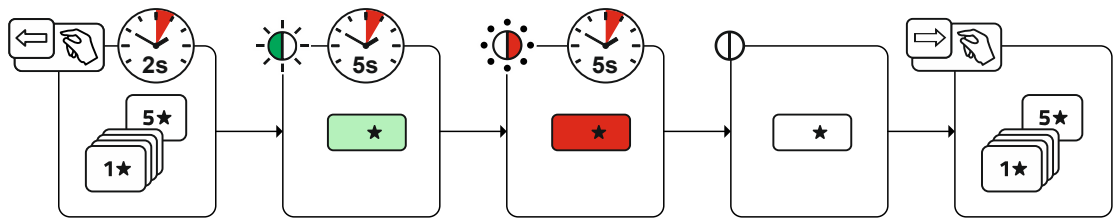


Figure 8-5

- Press and hold the favourite memory push-button.
After 2 seconds, the status display for Favourites turns green
after another 5 s, the signal light starts flashing red
after another 5 s the signal light goes out
- Release the favourite memory push-button.

8.3 Access permission (Xbutton)

Xbutton is a system for the intelligent control of access rights in EWM welding machines and components that are equipped with Expert control. Using convenient, programmable recognition memories (Xbutton), varying usage rights can be granted to users.

The Xbutton system can be used for two distinct access restrictions.

1. Access management by logged-out state (requires one Xbutton)

The welding coordination personnel has one Xbutton with administrator rights. After successful activation / registration of the Xbutton rights, the desired welding parameters (e.g., using WPS) are set. Now the responsible welding coordination personnel log off using the Xbutton. The power source is now in a locked state. The welder can now only process the welding task with the preset parameters. With the Xbutton tool, the access rights can be defined in more detail (company ID, groups and access rights) when logged off and transferred to the power source using the programming key (Xbutton).

2. Access management using various Xbutton (requires several Xbutton)

Each welder receives an Xbutton with the appropriate authorisation specified by welding coordination personnel. By logging in using the Xbutton, the welder can only carry out the welding task with his personalised access rights. The Xbutton tool required here is used to manage the recognition memories (Xbutton) as well as the users and enables the management of the welders and their welder qualifications.



Figure 8-6

8.3.1 User information

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

8.3.2 Activating the Xbutton rights

To activate the Xbutton rights, follow these instructions:

1. Log in with an Xbutton including administrator rights.
2. Enable the menu item "Xbutton rights active".

8.3.3 Resetting the Xbutton configuration

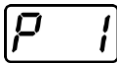
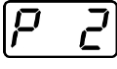
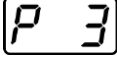
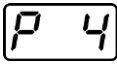
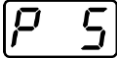
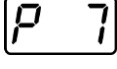
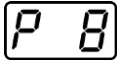
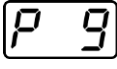
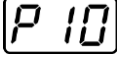
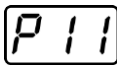
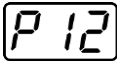
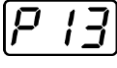
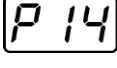
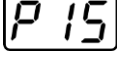
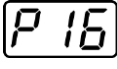
To reset the Xbutton configuration, you must be logged in with the appropriate Xbutton (administrator rights). The company ID stored in the power source, the assigned group and the access rights for the logged-out state are reverted to factory settings. The Xbutton rights are deactivated at the same time.

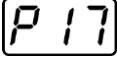
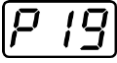
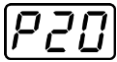
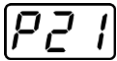
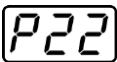
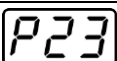
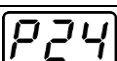
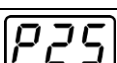
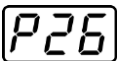
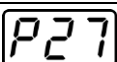
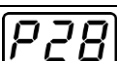
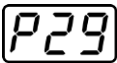

8.4 Special parameters (advanced settings)

Special parameters (P1 to Pn) are applied for customer-specific configuration of machine functions. This allows the user maximum flexibility in optimising their requirements.

These settings are not configured directly on the machine control since a regular setting of the parameters is generally not required. The number of selectable special parameters can deviate between the machine controls used in the welding system (also see the relevant standard operating instructions).

If required, the special parameters can be reset to the factory settings > see 5.2.5 chapter.

Display	Setting/selection
	Wire inching / wire return ramp time 0 = -----normal inching (10 s ramp time) 1 = -----fast inching (3 s ramp time) (ex works)
	Block program "0" 0 = -----P0 enabled 1 = -----P0 blocked (Ex works)
	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
	Program limitation Programs 1 to max. 15 Ex works: 15
	Special cycle in the special latched and non-latched operating modes 0 = -----normal (previous) non-latched/latched (Ex works) 1 = -----WF3 cycle for non-latched/latched
	Correction operation, limit value setting 0 = -----Correction operation switched off (factory set) 1 = -----The correction operation is switched on The signal light main phase P _A flashes.
	Program switching with standard welding torch 0 = No program switching (factory setting) 1 = -----Special latched 2 = -----Special latched (n-cycle active) 3 = -----Special latched (n-cycle sequence from any program)
	Tapping start for latched and special latched operation 0 = -----no 4-cycle inching start 1 = -----4-cycle inching start possible (ex works)
	One or two-wire feed operation 0 = -----single operation (Ex works) 1 = -----dual operation, this unit is the "master" 2 = -----dual operation, this unit is the "slave"
	Tapping time 0 = -----The tapping function is switched off 1 = -----320 ms (factory setting) 2 = -----640 ms
	JOB list changeover 0 = -----task-oriented JOB list 1 = -----actual JOB list (Ex works) 2 = -----actual JOB list, JOB changeover activated via accessories
	Lower limit remote JOB switching JOB range of the function torches (PM 2U/D, PM RD2) Lower limit: 129 (ex works)
	Upper limit remote JOB switching JOB area of the function torch (PM 2U/D, PM RD2) Upper limit: 169 (ex works)
	HOLD function 0 = -----HOLD values are not displayed 1 = -----HOLD values are displayed (Ex works)
	Block JOB mode 0 = -----Block JOB mode not enabled (Ex works) 1 = -----Block JOB mode enabled

Display	Setting/selection
	Program selection with standard torch trigger 0 = ----- no program selection (Ex works) 1 = ----- program selection possible
	Average value display for superPuls 0 = ----- Function switched off. 1 = ----- Function switched on (ex factory).
	Specification of pulse arc welding in main phase A 0 = ----- The pulse arc welding specification in main phase A is switched off. 1 = ----- When the superPuls and welding procedure switching functions are available and switched on, the pulse arc welding procedure is always carried out in main phase A (factory set).
	Absolute value set point Start phase, main phase B and end phase can be set either relative or absolute to main phase A. 0 = ----- Relative parameter setting (factory set). 1 = ----- Absolute parameter setting.
	Electronic gas flow control, type 1 = ----- type A (ex works) 0 = ----- type B
	Program settings for relative programs 0 = ----- Combined setting of relative programs possible (ex works). 1 = ----- Individual setting of relative programs possible (ex works).
	Correction or nominal voltage display 0 = ----- Correction voltage display (ex works). 1 = ----- Absolute nominal voltage display.
	JOB selection in Expert mode Without function in this machine version.
	Nominal value of wire spool heater (OW WHS) > see 8.4.1.23 chapter off = switched off Temperature setting range: 25°C - 50°C (45°C ex works)
	Operating mode switching at welding start > see 8.4.1.24 chapter 0 = ----- Not enabled (ex works) 1 = ----- Enabled
	Error threshold of electronic gas flow control > see 8.4.1.25 chapter Error output in case of gas nominal value deviation
	Unit system > see 8.4.1.26 chapter 0 = ----- metric system (ex works) 1 = ----- Imperial system
	Selection option for program sequence with rotary knob > see 8.4.1.27 chapter 0 = ----- Not enabled 1 = ----- Enabled (ex works)

8.4.1 Special parameters in detail

8.4.1.1 Ramp time for wire inching (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.

8.4.1.2 Program "0", releasing the program block (P2)

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

8.4.1.3 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

8.4.1.4 Program limit (P4)

Program selection can be limited with the special parameter P4.

- The setting is adopted for all JOBs.
- Program selection depends on the position of the "welding torch function" changeover switch.

Programs can only be switched when the changeover switch is in the "program" position.

- Programs can be switched by means of a connected remote control or special welding torch.
- If a special welding torch or a remote control is not connected, it is only possible to switch programs by means of the "arc length correction/select welding program" rotary dial.

8.4.1.5 Special cycle in the operating modes special latched and non-latched (P5)

Process of special non-latched operation / special latched operation:

- Start phase P_{START}
- Main phase P_A

Process of special non-latched operation / special latched operation with special process:

- Start phase P_{START}
- Main phase P_B
- Main phase P_A

8.4.1.6 Correction operation, threshold value setting (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_{korrr}) 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.

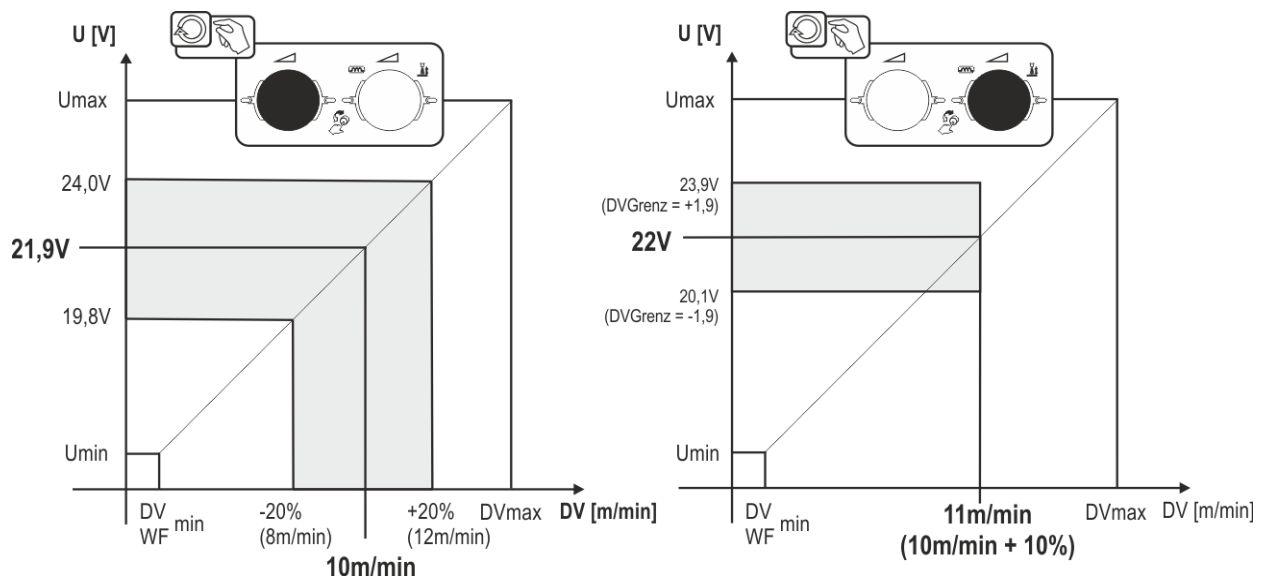



Figure 8-7

Example for the operating point in correction operation:

The wire feed speed in a program (1 to 15) is set to 10.0 m/min. This corresponds to a welding voltage (U) of, for example, 21.9 V. When the key switch is now turned to position , welding can only be carried out with these values in this program.

If the welder is also to carry out wire and voltage correction in program mode, correction operation must be switched on and limit values for wire and voltage must be specified.

Setting the correction limit for wire = 20 %.


Setting the correction limit for voltage = 1.9 V.

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

In the example, the wire feed speed is set to 11.0 m/min. This corresponds to a welding voltage of 22 V. Now the welding voltage can be corrected by 1.9 V (20.1 V and 23.9 V).

When the key switch is turned to position , the values for voltage and wire feed speed correction are reset.

Setting the correction range:

- Activate the special parameter "Correction operation" (P7=1) and save.
- Key switch to position .
- Set the correction range as follows:

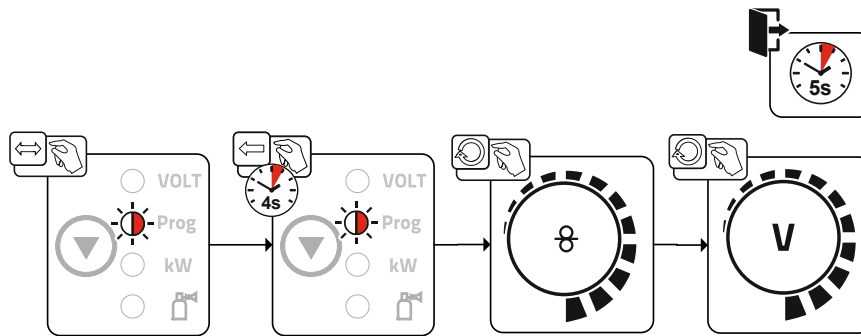



Figure 8-8

- If the user is inactive for about 5 seconds, the pre-set values will be applied and the display switches back to the program display.
- Turn the key switch back to position !

8.4.1.7 Switching programs with the standard torch trigger (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 feeder control is disabled.**

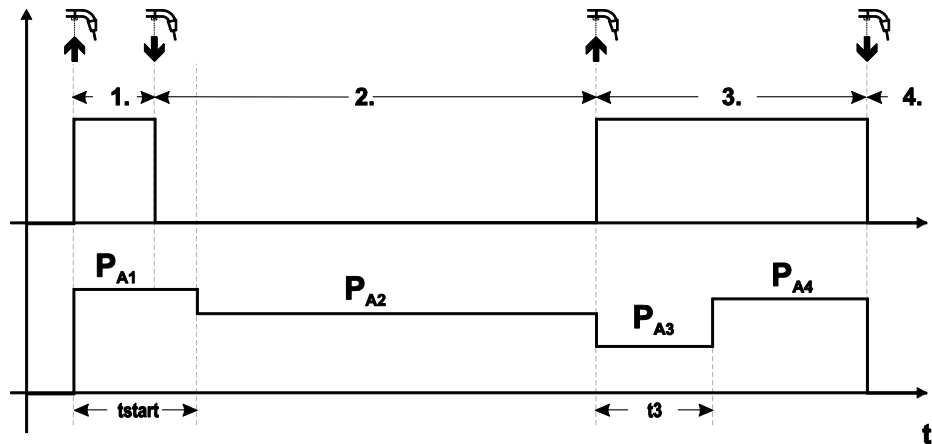


Figure 8-9

Special latched (n-cycle)

- Cycle 1: Start phase P_{start} of program P₁ is run.
- Cycle 2: Main phase P_{A1} is run after t_{start} has elapsed. Tap the torch trigger to switch to other programs (P_{A1} to max. P_{A9}).

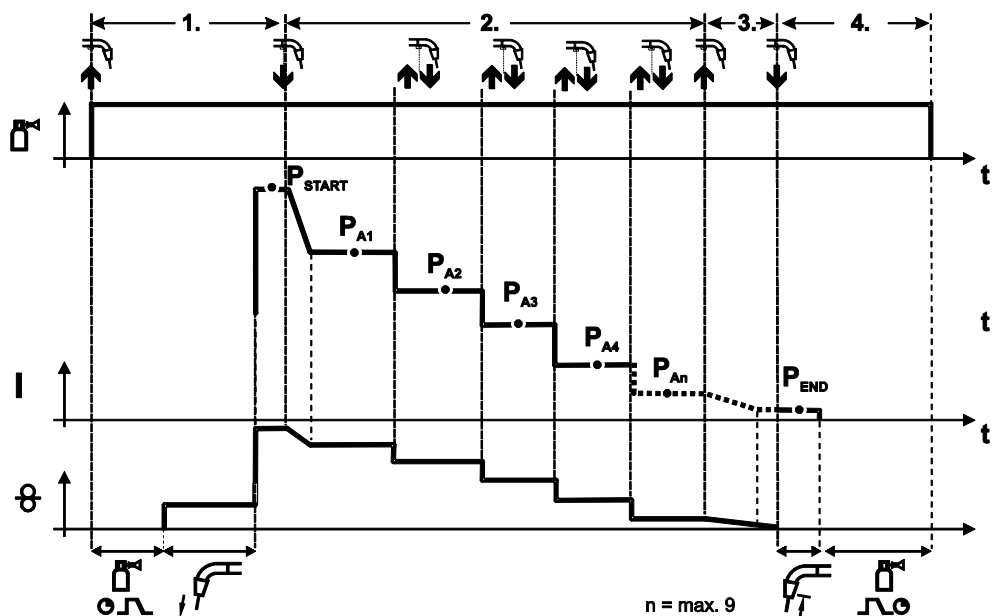


Figure 8-10

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

1st cycle

- Press and hold the torch trigger.
- Shielding gas is flowing (gas pre-flow).
- Wire feed motor runs at wire creep speed.
- Arc ignites after the wire electrode hits the workpiece.
Welding current flows (main phase P_{START} of program P_{A1}).

2nd cycle

- Release the torch trigger.
- Slope time to program P_{A1} of main phase A

The slope time to main program P_{A1} takes place at the earliest after the set time t_{START} has elapsed or at the latest when the torch trigger is released. By tapping (briefly pressing and releasing within 0.3 s), you can switch to other programs. The programs P_{A1} to P_{A9} are possible.

3rd cycle

- Press and hold the torch trigger.
- Slope time to end phase P_{END} of P_{AN} . The process can be stopped at any time by pressing the torch trigger for a long time (>0.3 s). P_{END} of P_{AN} is then executed.

4th cycle

- Release the torch trigger.
- Wire feed motor stops.
- The arc is extinguished once the wire burn-back time has elapsed.
- The gas post-flow time elapses.

Special latched (n-cycle sequence from any program)

The function specification is the same as for n-cycle active (parameter setting 2) with the difference that after P_{start} , the program selected before the welding start follows and not P_{A1} . This setting can also be combined with $P17$.

8.4.1.8 Latched/special-latched tap 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.

8.4.1.9 "Single or dual operation" (P10) setting

If the system is fitted with two wire feeds, no further accessory components may be operated on the 7-pole connection socket (digital)! This relates to digital remote controls, robot interfaces, documentation interfaces, welding torches with digital control lead connection, etc.

No second wire feed may be connected in single operation ($P10 = 0$)!

- Remove connections to the second wire feed

In dual operation ($P10 = 1$ or 2), both wire feed units must be connected and configured differently on the controls for this operating mode!

- Configure one wire feed unit as the master ($P10 = 1$)
- Configure the other wire feed unit as a slave ($P10 = 2$)

Wire feed units with key switches (optional, > see 8.3 chapter) must be configured as masters ($P10 = 1$).

The wire feed configured as the master is active after the welding machine is switched on. There are no other functional differences between the wire feeds.

8.4.1.10 Tapping time (P11)

The tapping time (briefly pressing the torch button to change the function) can be set to three levels.

0= No tapping

1 = 320 ms (factory setting)

2 = 640 ms

8.4.1.11 JOB list switching (P12)

Value	Name	Explanation
0	Task-based JOB list	JOB numbers are sorted by welding wires and shielding gases. When selecting, the JOB numbers may be skipped.
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.

8.4.1.12 Lower and upper limits of the remote JOB changeover process (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.

8.4.1.13 Hold function (P15)

HOLD function is active (P15 = 1)

- The average values of the last welded main program parameters are displayed.

Hold function is not active (P15 = 0)

- The nominal values of the main program parameters are displayed.

8.4.1.14 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 the manual setting of the welding parameters.

The selection of JOB 0 can be prevented by using the key switch or with the parameter "Block program 0" (P2).

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

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

JOBS 1-9:

In each special JOB, nine JOBS (see Table) can be called up.

Nominal values for wire feed speed, arc correction, dynamics, etc. must be stored in advance in these JOBS. This is done conveniently using the software PC300.Net.

If the software is not available, the "Copy to" function can be used to create user-defined JOB lists in the special JOB areas (see explanations in the Chapter "JOB list switching (P12)").

8.4.1.15 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).

8.4.1.16 Average value display for superPuls (P19)

Function active (P19 = 1)

- With superPuls, the average value for the power from main phase A (P_A) and main phase B (P_B) is shown in the display (factory set).

Function inactive (P19 = 0)

- With superPuls, only the power of main phase A is shown in the display.

If the function is enabled and only "000" is shown on the machine display, this is a rare case of an incompatible system set-up. Solution: Disable special parameter P19.

8.4.1.17 Predefined execution of the pulsed arc welding process in the PA program (P20)

For machine versions with pulsed arc welding procedures only.

Function active (P20 = 1)

- When the superPuls and welding procedure switching functions are available and switched on, the pulse arc welding procedure is always carried out in main phase P_A (factory set).

Function inactive (P20 = 0)

- The specification of pulse arc welding in the main phase P_A is switched off.

8.4.1.18 Predefined absolute value for relative programs (P21)

Start phase P_{START}, main phase P_B and end phase P_{END} can be set either relative or absolute to the main phase P_A.

Function active (P21 = 1)

- Absolute parameter setting.

Function inactive (P21 = 0)

- Relative parameter setting (factory set).

8.4.1.19 Electronic gas flow control, type (P22)

Active only in machines with integrated gas flow control (option ex works).

Adjustment may only be carried out by authorised service personnel (basic setting = 1).

8.4.1.20 Program settings for relative programs (P23)

Start phase, main phase B and end phase can be set either together or separately for the operating points P0-P15. When choosing the combined setting, in contrast to the individual setting, the parameter values are saved in the JOB. When set separately, the parameter values are the same for all JOBs (except for special JOBs SP1, SP2 und SP3).

8.4.1.21 Correction or nominal voltage display (P24)

When setting the arc correction using the right-hand rotary knob the display will either show the correction voltage +- 9.9 V (ex works) or the absolute nominal voltage.

8.4.1.22 JOB selection in Expert mode (P25)

The special parameter P25 can be used to specify whether the special JOBs SP1/2/3 or the welding job selection according to the JOB list can be selected on the wire feeder.

8.4.1.23 Nominal value wire heater (P26)

The Wire Heating System (WHS) prevents moisture deposits on the welding wire and thus reduces the risk of pinholes. The setting is infinitely variable in the temperature range from 25°C to 50°C; the factory setting of 45°C is mainly used for moisture-attracting welding consumables such as aluminium or flux-cored wire.

8.4.1.24 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.

8.4.1.25 Error threshold electronic gas flow control (P28)

The set percentage value is the error threshold; if it is undershot or exceeded, an error message > see 10.2 chapter is displayed.

8.4.1.26 Units system (P29)

Function not active

- Metric metric units are displayed.

Function active

- Imperial units are displayed.

8.4.1.27 Selection option – Program sequence with welding power rotary knob (P30)

Function not active

- The rotary knob is locked, use the welding parameters push-button to select the welding parameters.

Function active

- Rotary knob can be used to select the welding parameters.

8.5 Energy saving function (Standby)

The power-saving mode can be activated by the time-dependent energy saving function. If no user input is made to the welding system within the set time, the machine switches to power-saving mode.

The display of the Expert 3.0 machine control is dimmed and only the middle digit is shown in the machine displays of the wire feeder.

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

Selection

☰	System settings
<	Power source P5
<	Energy saving function
<	Standby time 55A

9 Maintenance, care and disposal

9.1 General

DANGER



Risk of injury due to electrical voltage after switching off!

Working on an open machine can lead to fatal injuries!

Capacitors are loaded with electrical voltage during operation. Voltage remains present for up to four minutes after the mains plug is removed.

1. Switch off machine.
2. Remove the mains plug.
3. Wait for at last 4 minutes until the capacitors have discharged!

WARNING



Improper maintenance, testing and repairs!

Maintenance, testing and repair of the machine may only be carried out by skilled and qualified personnel (authorised service personnel). A competent person is someone who, based on training, knowledge and experience, can recognize the hazards and possible consequential damage that may occur when testing power sources and can take the necessary safety precautions.

- Follow the maintenance instructions > see 9 chapter.
- If any of the test requirements below are not met, the unit must not be put back into operation until it has been repaired and tested again.

Repair and maintenance work may only be performed by qualified authorised personnel; otherwise the right to claim under warranty is void. In all service matters, always consult the dealer who supplied the machine. Return deliveries of defective equipment subject to warranty may only be made through your dealer. When replacing parts, use only original spare parts. When ordering spare parts, please quote the machine type, serial number and item number of the machine, as well as the type designation and item number of the spare part.

Under the specified ambient conditions and normal working conditions this machine is essentially maintenance-free and requires just a minimum of care.

Contamination of the machine may impair service life and duty cycle. The cleaning intervals depend on the ambient conditions and the resulting contamination of the machine. The minimum interval is every six months.

9.2 Disposing of equipment



Proper disposal!

The machine contains valuable raw materials, which should be recycled, and electronic components, which must be disposed of.

- Do not dispose of in household waste!
- Observe the local regulations regarding disposal!

In addition to the national or international regulations mentioned below, it is mandatory to follow the respective national laws and regulations on disposal.

- According to European provisions (Directive 2012/19/EU on Waste of Electrical and Electronic Equipment), used electric and electronic equipment may no longer be placed in unsorted municipal waste. It must be collected separately. The symbol depicting a waste container on wheels indicates that the equipment must be collected separately.

This machine has to be disposed of, or recycled, in accordance with the waste separation systems in use.

According to German law (law governing the distribution, taking back and environmentally correct disposal of electrical and electronic equipment (ElektroG)), used machines are to be placed in a collection system separate from unsorted municipal waste. The public waste management utilities (communities) have created collection points at which used equipment from private households can be disposed of free of charge.

The deletion of personal data is the responsibility of the end user.

Lamps, batteries or accumulators must be removed and disposed of separately before disposing of the device. The type of battery or accumulator and its composition is marked on the top (type CR2032 or SR44). The following EWM products may contain batteries or accumulators:

- Welding helmets
Batteries or accumulators are easy to remove from the LED cassette.
- Device controls
Batteries or accumulators are located on the back of these in corresponding sockets on the circuit board and are easy to remove. The controls can be removed using standard tools.

Information on returning used equipment or collections can be obtained from the respective municipal administration office. Devices can also be returned to EWM sales partners across Europe.


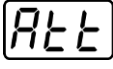

Further information on the topic of the disposal of electrical and electronic equipment can be found on our website at: <https://www.ewm-group.com/de/nachhaltigkeit.html>.

10 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.

10.1 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.

Warning	Potential cause / remedy
1 Excess temperature	A shutdown is imminent due to excess temperature.
2 Half-wave failures	Check process parameters.
3 Welding torch cooling warning	Check the coolant level and top up if necessary.
4 Shielding gas	Check the shielding gas supply.
5 Coolant flow	Check min. flow rate. ^[2]
6 Wire reserve	Only a small amount of wire is left on the spool.
7 CAN bus failure	The wire feeder is not connected; the automatic circuit-breaker of the wire feed motor (reset the tripped automatic circuit breaker by actuating).
8 Welding circuit	The inductance of the welding circuit is too high for the selected welding task.
9 WF configuration	Check WF configuration.
10 Partial inverter	One of several partial inverters is not supplying welding current.
11 Excess temperature of the coolant ^[1]	Check temperature and switching thresholds. ^[2]
12 Welding monitoring	The actual value of a welding parameter is outside the specified tolerance range.
13 Contact error	The resistance in the welding circuit is too high. Check the earth connection.
14 Alignment error	Switch the machine off and on. If the error persists, notify Service.
15 Mains fuse	The power limit of the mains fuse is reached and the welding power is reduced. Check the fuse setting.
16 Shielding gas warning	Check the gas supply.
17 Plasma gas warning	Check the gas supply.
18 Forming gas warning	Check the gas supply.
19 Gas warning 4	reserved

Warning	Potential cause / remedy
20 Coolant temperature warning	Check the coolant level and top up if necessary.
21 Excess temperature 2	reserved
22 Excess temperature 3	reserved
23 Excess temperature 4	reserved
24 Coolant flow warning	Check the coolant supply. Check the coolant level and top up if necessary. Check flow and switching thresholds. ^[2]
25 Flow 2	reserved
26 Flow 3	reserved
27 Flow 4	reserved
28 Wire stock warning	Check the wire feeding.
29 Low wire 2	reserved
30 Low wire 3	reserved
31 Low wire 4	reserved
32 Tacho error	Fault of the wire feeder - permanent overload of the wire drive.
33 Wire feed motor excess current	Excess current detected on wire feed motor.
34 JOB unknown	JOB selection was not carried out because the JOB number is unknown.
35 Wire feed motor slave excess current	Excess current detected on wire feed motor slave (push/push system or intermediate drive).
36 Slave tacho error	Fault of the wire feeder - permanent overload of the wire drive (push/push system or intermediate drive).
37 FAST bus failure	The wire feeder is not connected (reset by actuating the automatic circuit breaker of the wire feed motor).
38 Incomplete component information	Check the Xnet component management.
39 Halfwave failure	Check supply voltage.
40 Weak power grid	Check supply voltage.
41 Cooling unit not recognised	A liquid-cooled welding torch was connected but no cooling unit has been detected. <ul style="list-style-type: none"> • Check the connection of the cooling unit • Use a gas-cooled welding torch
47 Battery (remote control, type BT)	Battery level is low (replace battery)


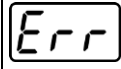

^[1] only for the XQ machine series

^[2] See technical data for values and other switching thresholds.

10.2 Error messages (power source)

The possible error numbers displayed depend on the machine series and version!

Depending on the options of the machine display, a fault is shown as follows:

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

The possible cause of the fault is signalled by a corresponding fault number (see table). In the case of an error, the power unit shuts down.

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

Reset error (category legend)

^A The error message disappears when the error is eliminated.

^B The error message can be reset by pressing a push-button ◀.

All other error messages can only be reset by switching the machine off and on again.

Error 3: Tacho error

Categories A, B

- ✓ Fault in the wire feeder.
 - ✘ Check the electrical connections (connectors, lines).
- ✓ Permanent overload of the wire drive.
 - ✘ Do not lay the liner in tight radii.
 - ✘ Check the wire in the liner for ease of movement.

Error 4: Excess temperature

Category A

- ✓ The power source is overheating.
 - ✘ Allow the switched-on machine to cool.
- ✓ Fan is blocked, dirty or defective.
 - ✘ Check the fan and clean or replace.
- ✓ Air inlet or outlet is blocked.
 - ✘ Check the air inlet and outlet.

Error 5: Mains overvoltage

Category A ^[1]

- ✓ Mains voltage is too high.
 - ✘ Check the mains voltages and compare them with the connection voltages of the power source.

Error 6: Mains undervoltage

Category A ^[1]

- ✓ Mains voltage is too low.
 - ✘ Check the mains voltages and compare them with the connection voltages of the power source.

Error 7: Low coolant level

Category B

- ✓ Low flow rate.
 - ✘ Fill with coolant.
 - ✘ Check coolant flow - remove kinks in the hose package.
 - ✘ Adjust the flow threshold ^[2].
 - ✘ Clean the cooler.
- ✓ The pump does not turn.
 - ✘ Turn the pump shaft.
- ✓ Air in the coolant circuit.
 - ✘ Vent the coolant circuit.
- ✓ The hose package is not filled with coolant.
 - ✘ Switch the machine off and on > pump running > filling process.
- ✓ Operation with a gas-cooled welding torch.
 - ✘ Deactivate the torch cooling.
 - ✘ Connect the coolant feed and return with a hose bridge.

Error 8: Shielding gas error

Categories A, B

- ✓ No gas.
 - ✘ Check the gas supply.
- ✓ The pre-pressure is too low.
 - ✘ Remove kinks in the hose package (nominal value: 4-6 bar pre-pressure).

Error 9: Secondary overvoltage

- ✓ Overvoltage at the output: Inverter error.
 - ✘ Request service.

Error 10: Earth fault (PE error)

- ✓ Connection between welding wire and machine casing.
 - ✘ Remove the electrical connection.
- ✓ Connection between welding circuit and machine casing.
 - ✘ Check the connection and routing of the earth wire / welding torch.

Error 11: Fast shut-down

Categories A, B

- ✓ Remove the logical signal "Robot ready" during the process.
 - ✘ Eliminate errors in the higher-level control.

Error 16: Pilot arc power source - collective error

Category A

- ✓ The external emergency stop circuit has been interrupted.
 - ✘ Check the emergency stop circuit and eliminate the cause of the error.
- ✓ The emergency stop circuit of the power source has been activated (internally configurable).
 - ✘ Deactivate the emergency stop circuit.
- ✓ The power source is overheating.
 - ✘ Allow the switched-on machine to cool.
- ✓ Fan is blocked, dirty or faulty.
 - ✘ Check the fan and clean or replace it.
- ✓ Air inlet or outlet is blocked.
 - ✘ Check the air inlet and outlet.
- ✓ Short circuit on welding torch.
 - ✘ Check the welding torch.
 - ✘ Request service.

Error 17: Cold wire error

Category B

- ✓ Fault in the wire feeder.
 - ✘ Check the electrical connections (connectors, lines).
- ✓ Permanent overload of the wire drive.
 - ✘ Do not lay the liner in tight radii.
 - ✘ Check the liner for ease of movement.

Error 18: Plasma gas error

Category B

- ✓ No gas.
 - ✘ Check the gas supply.
- ✓ The pre-pressure is too low.
 - ✘ Remove kinks in the hose package (nominal value: 4-6 bar pre-pressure).

Error 19: Shielding gas error

Category B

- ✓ No gas.
 - ✘ Check the gas supply.
- ✓ The pre-pressure is too low.
 - ✘ Remove kinks in the hose package (nominal value: 4-6 bar pre-pressure).

Error 20: Low coolant level

Category B

- ✓ Low flow rate.
 - ✗ Fill with coolant.
 - ✗ Check coolant flow - remove kinks in the hose package.
 - ✗ Adjust the flow threshold [2].
 - ✗ Clean the cooler.
- ✓ The pump does not turn.
 - ✗ Turn the pump shaft.
- ✓ Air in the coolant circuit.
 - ✗ Vent the coolant circuit.
- ✓ The hose package is not filled with coolant.
 - ✗ Switch the machine off and on > pump running > filling process.
- ✓ Operation with a gas-cooled welding torch.
 - ✗ Deactivate the torch cooling.
 - ✗ Connect the coolant feed and return with a hose bridge.

Error 22: Excess coolant temperature

Category B

- ✓ Coolant is overheating [2].
 - ✗ Allow the switched-on machine to cool.
- ✓ Fan is blocked, dirty or faulty.
 - ✗ Check the fan and clean or replace it.
- ✓ Air inlet or outlet is blocked.
 - ✗ Check the air inlet and outlet.

Error 23: Excess temperature

Category A

- ✓ External component (e.g. HF ignition units) overheated.
- ✓ The power source is overheating.
 - ✗ Allow the switched-on machine to cool.
- ✓ Fan is blocked, dirty or faulty.
 - ✗ Check the fan and clean or replace it.
- ✓ Air inlet or outlet is blocked.
 - ✗ Check the air inlet and outlet.

Error 24: Pilot arc ignition error

Category B

- ✓ The pilot arc cannot ignite.
 - ✗ Check the welding torch equipment.

Error 25: Forming gas error

Category B

- ✓ No gas.
 - ✗ Check the gas supply.
- ✓ The pre-pressure is too low.
 - ✗ Remove kinks in the hose package (nominal value: 4-6 bar pre-pressure).

Error 26: Excess pilot arc module temperature

Category A

- ✓ The power source is overheating.
 - ✘ Allow the switched-on machine to cool.
- ✓ Fan is blocked, dirty or faulty.
 - ✘ Check the fan and clean or replace it.
- ✓ Air inlet or outlet is blocked.
 - ✘ Check the air inlet and outlet.

Error 32: Error I>0

- ✓ The current detection is incorrect.
 - ✘ Request service.

Error 33: Error UIST

- ✓ Voltage recording is faulty.
 - ✘ Eliminate the short circuit in the welding circuit.
 - ✘ Remove the external sensor voltage.
 - ✘ Request service.


Error 34: Electronics error

- ✓ A/D channel error
 - ✘ Switch the machine off and on.
 - ✘ Request service.

Error 35: Electronics error

- ✓ Slope error
 - ✘ Switch the machine off and on.
 - ✘ Request service.

Error 36:  fault

- ✓  conditions violated.
 - ✘ Switch the machine off and on.
 - ✘ Request service.

Error 37: Excess temperature / electronics error

- ✓ The power source is overheating.
 - ✘ Allow the switched-on machine to cool.
- ✓ Fan is blocked, dirty or faulty.
 - ✘ Check the fan and clean or replace it.
- ✓ Air inlet or outlet is blocked.
 - ✘ Check the air inlet and outlet.

Error 38: Error IIST

- ✓ Short circuit in the welding circuit before welding.
 - ✘ Eliminate the short circuit in the welding circuit.
 - ✘ Request service.

Error 39: Electronics error

- ✓ Secondary overvoltage
 - ✘ Switch the machine off and on.
 - ✘ Request service.

Error 40: Electronics error

- ✓ Error in the power supply of the electronics
 - ✘ Request service.

Error 47: Radio link (BT)

Category B

- ✓ Connection error between the welding machine and peripheral unit.
 - ✘ Note the documentation for the data interface with radio transmission.

Error 48: Ignition error

Category B

- ✓ No ignition at process start (automated machines).
 - ✘ Check the wire feeding
 - ✘ Check the load cable connections in the welding circuit.
 - ✘ Clean corroded surfaces on the workpiece before welding if necessary.

Error 49: Arc interruption

Category B

- ✓ An arc interruption occurred during welding with an automated system.
 - ✘ Check the wire feeding.
 - ✘ Adjust the welding speed.

Error 50: Program number

Category B

- ✓ Internal error.
 - ✘ Request service.

Error 51: Emergency stop

Category A

- ✓ The external emergency stop circuit has been interrupted.
 - ✘ Check the emergency stop circuit and eliminate the cause of the error.
- ✓ The emergency stop circuit of the power source has been activated (internally configurable).
 - ✘ Deactivate the emergency stop circuit.

Error 52: No wire feeder

- ✓ After switching on the automated system, no wire feeder (DV) was detected.
 - ✘ Check or connect the control cables of the wire feeders.
 - ✘ Check the identification number of the automated wire feeder (for 1DV: number 1, for 2DV: each a wire feeder with number 1 and a wire feeder with number 2).

Error 53: No wire feeder 2

Category B

- ✓ Wire feeder 2 was not detected.
 - ✘ Check the control cable connections.

Error 54: VRD fault

- ✓ Error in the voltage reduction device.
 - ✘ If necessary, disconnect the external machine from the welding circuit.
 - ✘ Request service.

Error 55: Excess wire feeder current

Category B

- ✓ Excess current detected in the wire feed mechanism.
 - ✘ Do not lay the liner in tight radii.
 - ✘ Check the liner for ease of movement.

Error 56: Mains phase failure

- ✓ One phase of the mains voltage has failed.
 - ✘ Check the mains connection, mains plug and mains fuses.

Error 57: Slave tacho error

Category B

- ✓ Fault in the wire feeder (slave drive).
 - ✘ Check the connections (connectors, lines).
- ✓ Permanent overload of the wire drive (slave drive).
 - ✘ Do not lay the liner in tight radii.
 - ✘ Check the liner for ease of movement.

Error 58: Short circuit

Category B

- ✓ Short circuit in the welding circuit.
 - ✘ Eliminate the short circuit in the welding circuit.
 - ✘ Place the welding torch on an insulated surface.

Error 59: Incompatible machine

- ✓ A machine connected to the system is not compatible.
 - ✘ Disconnect the incompatible machine from the system.

Error 60: Incompatible software

- ✓ The software of a machine is not compatible.
 - ✘ Disconnect the incompatible machine from the system
 - ✘ Request service.

Error 61: Welding monitoring

- ✓ The actual value of a welding parameter is outside the specified tolerance range.
 - ✘ Maintain the tolerance ranges.
 - ✘ Adjust the welding parameters.

Error 62: System component

- ✓ The system component was not found.
 - ✘ Request service.

Error 63: Mains voltage error

- ✓ Operating and mains voltage are incompatible.
 - ✘ Check or adjust the operating and mains voltage.

[1] only Picotig 220 pulse

[2] See technical data for values and other switching thresholds.

10.3 Resetting welding parameters to the factory settings

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

Selection

☰	Service
<	Reset
<	Factory settings
<	Advanced (service area)

10.4 The software versions of the system components

Identifying the machine software is the basis for quick troubleshooting by authorised service personnel. The version numbers of the system components are displayed in the System information menu.

Selection

☰	System information
<	System components

11 Appendix

11.1 JOB list

JOB no.	Procedure	Material	Gas	Diameter [mm]
1	GMAW standard	G3Si1 / G4Si1	100% CO2	0,8
2	GMAW standard	G3Si1 / G4Si1	100% CO2	0,9
3	GMAW standard	G3Si1 / G4Si1	100% CO2	1,0
4	GMAW standard	G3Si1 / G4Si1	100% CO2	1,2
5	GMAW standard	G3Si1 / G4Si1	100% CO2	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
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

JOB no.	Procedure	Material	Gas	Diameter [mm]
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	AlMg4.5Mn	Ar-100 (I1)	1,0
56	coldArc / coldArc puls	AlMg4.5Mn	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	AlMg4.5Mn	Ar-100 (I1)	0,8
75	Standard GMAW / pulse	AlMg4.5Mn	Ar-100 (I1)	1,0
76	Standard GMAW / pulse	AlMg4.5Mn	Ar-100 (I1)	1,2
77	Standard GMAW / pulse	AlMg4.5Mn	Ar-100 (I1)	1,6
78	Standard GMAW / pulse	AlMg4.5Mn	Ar-70 / He-30 (I3)	0,8
79	Standard GMAW / pulse	AlMg4.5Mn	Ar-70 / He-30 (I3)	1,0
80	Standard GMAW / pulse	AlMg4.5Mn	Ar-70 / He-30 (I3)	1,2
81	Standard GMAW / pulse	AlMg4.5Mn	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
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

JOB no.	Procedure	Material	Gas	Diameter [mm]
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	SpecialJOB 1	Special	Special	Spezial
130	SpecialJOB 2	Special	Special	Spezial
131	SpecialJOB 3	Special	Special	Spezial
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		

JOB no.	Procedure	Material	Gas	Diameter [mm]
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	coldArc / coldArc puls	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,0
172	coldArc / coldArc puls	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,2
173	rootArc / rootArc puls	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	1,0
174	rootArc / rootArc puls	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
188	GMAW non-synergic	Special	Special	Spezial
189	forceArc / forceArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	0,8
190	forceArc / forceArc puls	G3Si1 / G4Si1	Ar-90 / CO2-10 (M20)	0,8
191	coldArc / coldArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	0,8
192	coldArc / coldArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	0,9
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 / He-30 (I3)	1,2

JOB no.	Procedure	Material	Gas	Diameter [mm]
209	coldArc - Mg/Mg	Mg	Ar-70 / He-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
216	Standard GMAW / pulse	AlMg3	Ar-100 (I1)	1,0
217	Standard GMAW / pulse	AlMg3	Ar-100 (I1)	1,2
218	Standard GMAW / pulse	AlMg3	Ar-100 (I1)	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
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	AlMg4.5Mn	Ar-100 (I1)	1,2
248	forceArc / forceArc puls	AlMg4.5Mn	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
258	Standard GMAW / pulse	AlMg4.5Mn	Ar-50/He-50 (I3)	1,2
259	Standard GMAW / pulse	AlMg4.5Mn	Ar-50/He-50 (I3)	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	High-strength steels / Special	Ar-82 / CO2-18 (M21)	1,2
264	Flux cored wire basic	FCW Steel Basic	Ar-82 / CO2-18 (M21)	1,2
268	Cladding	NiCr 6617 / 2.4627	Ar-70 / He-30 (I3)	1,2
269	Cladding	NiCr 6617 / 2.4627	Ar-70 / He-30 (I3)	1,6
271	Cladding	NiCr 6625 / 2.4831	Ar-70 / He-30 (I3)	1,0
272	Cladding	NiCr 6625 / 2.4831	Ar-70 / He-30 (I3)	1,2
273	Cladding	NiCr 6625 / 2.4831	Ar-70 / He-30 (I3)	1,6
275	Cladding	NiCr 6625 / 2.4831	Ar-78 / He-20 / CO2-2 (M12)	1,0

JOB no.	Procedure	Material	Gas	Diameter [mm]
276	Cladding	NiCr 6625 / 2.4831	Ar-78 / He-20 / CO2-2 (M12)	1,2
277	Cladding	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
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 Flux-cored wire metal	FCW steel metal	Ar-82 / CO2-18 (M21)	0,8
291	forceArc / forceArc puls Flux-cored wire metal	FCW steel metal	Ar-82 / CO2-18 (M21)	1,0
292	forceArc / forceArc puls Flux-cored wire metal	FCW steel metal	Ar-82 / CO2-18 (M21)	1,2
293	forceArc / forceArc puls Flux-cored wire metal	FCW steel metal	Ar-82 / CO2-18 (M21)	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
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

JOB no.	Procedure	Material	Gas	Diameter [mm]
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 / Duplex	Ar-97.5 / CO2-2.5 (M12)	0,8
339	coldArc / coldArc puls	CrNi 22 9 3 / 1.4462 / Duplex	Ar-97.5 / CO2-2.5 (M12)	1,0
340	coldArc / coldArc puls	CrNi 22 9 3 / 1.4462 / Duplex	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 puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
360	wiredArc / wiredArc puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2
367	wiredArc / wiredArc puls	CrNi 19 9 / 1.4316	Ar-97.5 / CO2-2.5 (M12)	1,0
368	wiredArc / wiredArc puls	CrNi 19 9 / 1.4316	Ar-97.5 / CO2-2.5 (M12)	1,2
371	wiredArc / wiredArc puls	CrNi 19 12 3 / 1.4430	Ar-97.5 / CO2-2.5 (M12)	1,0
384	wiredArc / wiredArc puls	AlMg4.5Mn	Ar-50/He-50 (I3)	1,2
385	wiredArc / wiredArc puls	AlMg4.5Mn	Ar-50/He-50 (I3)	1,6
386	Cladding	Co-based	Ar-100 (I1)	1,2
387	Cladding	Co-based	Ar-100 (I1)	1,6
388	Cladding	CrNi 23 12 / 1.4332	Ar-97.5 / CO2-2.5 (M12)	1,2
389	Cladding	CrNi 23 12 / 1.4332	Ar-97.5 / CO2-2.5 (M12)	1,6
391	acArc puls ^[1]	AlMg4.5Mn	Ar-100 (I1)	1,0
392	acArc puls ^[1]	AlMg4.5Mn	Ar-100 (I1)	1,2
393	acArc puls ^[1]	AlMg4.5Mn	Ar-100 (I1)	1,6
394	acArc puls ^[1]	AlSi	Ar-residue/O2-0.03	1,0
395	acArc puls ^[1]	AlSi	Ar-residue/O2-0.03	1,2
426	React RCC / React RCC puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
427	React RCC / React RCC puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2
429	React Speed RCC / React Speed RCC puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,0
430	React Speed RCC / React Speed RCC puls	G3Si1 / G4Si1	Ar-82 / CO2-18 (M21)	1,2
438	React RCC / React RCC puls	AlMg4.5Mn	Ar-100 (I1)	1,0
439	React RCC / React RCC puls	AlMg4.5Mn	Ar-100 (I1)	1,2
440	React Speed RCC / React Speed RCC puls	AlMg4.5Mn	Ar-100 (I1)	1,0
441	React Speed RCC / React Speed RCC puls	AlMg4.5Mn	Ar-100 (I1)	1,2
442	React RCC / React RCC puls	AlSi	Ar-100 (I1)	1,0
443	React RCC / React RCC puls	AlSi	Ar-100 (I1)	1,2

JOB no.	Procedure	Material	Gas	Diameter [mm]
444	React Speed RCC / React Speed RCC puls	AlSi	Ar-100 (I1)	1,0
445	React Speed RCC / React Speed RCC puls	AlSi	Ar-100 (I1)	1,2
450	React Speed RCC / React Speed RCC puls	NiCr 6625 / 2.4831	Ar-70 / He-30 (I3)	1,0
451	React Speed RCC / React Speed RCC puls	NiCr 6625 / 2.4831	Ar-70 / He-30 (I3)	1,2
452	React Speed RCC / React Speed RCC puls	NiCr 6625 / 2.4831	Ar-78 / He-20 / CO2-2 (M12)	1,0
453	React Speed RCC / React Speed RCC puls	NiCr 6625 / 2.4831	Ar-78 / He-20 / CO2-2 (M12)	1,2
456	React RCC / React RCC puls	CrNi 19 9 / 1.4316	Ar-97.5/CO2-2.5 (M12)	1,0
457	React RCC / React RCC puls	CrNi 19 9 / 1.4316	Ar-97.5/CO2-2.5 (M12)	1,2
458	React Speed RCC / React Speed RCC puls	CrNi 19 9 / 1.4316	Ar-97.5/CO2-2.5 (M12)	1,0
459	React Speed RCC / React Speed RCC puls	CrNi 19 9 / 1.4316	Ar-97.5/CO2-2.5 (M12)	1,2

^[1] active only in machine series Titan XQ AC.

11.2 Parameter overview – setting ranges

11.2.1 MIG/MAG welding

Name	Display		Setting range	
	Code	Unit	min.	max.
Gas pre-flow duration	\overline{GPR}	s	0	20
Wire feeding start	-	%	1	200
Voltage correction start	-	V	-9,9	9,9
Start duration	\overline{ESE}	s	0,00	20,0
Slope time start	\overline{ESS}	s	0,00	20,0
Wire feeder A, depending on the power source	-	m/min	-	-
Arc length A	-	V	-9,9	9,9
Duration A	-	s	0,00	20,0
Slope time A -> B	-	s	0,00	20,0
Wire feeder B	-	%	1	200
Voltage correction	-	V	-9,9	9,9
Duration B	-	s	0,00	20,0
Slope time B -> A	-	s	0,00	20,0
Slope time end	\overline{ESE}	s	0,00	20,0
Wire feeding end	-	%	1	200
Voltage correction end	-	V	-9,9	9,9
End duration	\overline{EEB}	s	0,00	20,0
Gas post-flow duration	\overline{GPE}	s	0,00	40,0

11.2.2 TIG welding

Name	Display		Setting range	
	Code	Unit	min.	max.
Gas pre-flow duration	GP _r	s	0	20
Welding current start	-	%	25	200
Start duration	ES _t	s	0,00	20,0
Slope time start	ES _s	s	0,00	20,0
Welding current A, depending on the power source	-	A	5	max.
Duration A	-	s	0,00	20,0
Slope time A -> B	-	s	0,00	20,0
Welding current B	-	%	1	200
Duration B	-	s	0,00	20,0
Slope time B -> A	-	s	0,00	20,0
Slope time end	EE _e	s	0,00	20,0
Welding current end	-	%	1	200
End duration	EE _d	s	0,00	20,0
Gas post-flow duration	GP _e	s	0,00	40,0

11.2.3 MMA welding

Name	Display		Setting range	
	Code	Unit	min.	max.
Hot start current	ES _c	%	0	200
Hot start current duration	-	s	0	20
Welding current, absolute, depending on the power source	-	A	-	-
Arcforce	RR _c	-	-40	40

11.3 Searching for a dealer

Sales & service partners
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