



Welding machine

Taurus 351, 451, 551

Observe additional system documents!

099-005050-EW501

15.01.2010

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General instructions

CAUTION



Read the operating instructions!

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

- Read the operating instructions for all system components!
- Observe accident prevention regulations!
- Observe all local regulations!
- Confirm with a signature where appropriate.

NOTE



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

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

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 Safety instructions

2.1 Notes on the use of these operating instructions



DANGER

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

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



WARNING

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

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



CAUTION

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

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

CAUTION

Working and operating procedures which must be followed precisely to avoid damaging or destroying the product.

- The safety information includes the "CAUTION" keyword in its heading without a general warning symbol.
- The hazard is explained using a symbol at the edge of the page.

NOTE
















Special technical points which users must observe.

- Notes include the "NOTE" keyword in the heading without a general warning symbol.
- Notes are highlighted using a "hand" symbol at the edge of the page.

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.

Symbol	Description
	Press
	Do not press
	Turn
	Switch
	Switch off machine
	Switch on machine
	ENTER (enter the menu)
	NAVIGATION (Navigating in the menu)
	EXIT (Exit the menu)
	Time display (example: wait 4s/press)
	Interruption in the menu display (other setting options possible)
	Tool not required/do not use
	Tool required/use

2.2 General



DANGER



Electric shock!

Welding machines use high voltages which can result in potentially fatal electric shocks and burns on contact. Even low voltages can cause you to get a shock and lead to accidents.

- Do not touch any live parts in or on the machine!
- Connection cables and leads must be free of faults!
- Switching off alone is not sufficient!
- Place welding torch and stick electrode holder on an insulated surface!
- The unit should only be opened by specialist staff after the mains plug has been unplugged!
- Only wear dry protective clothing!
- Wait for 4 minutes until the capacitors have discharged!



Electromagnetic fields!

The power source may cause electrical or electromagnetic fields to be produced which could affect the correct functioning of electronic equipment such as IT or CNC devices, telecommunication lines, power cables, signal lines and pacemakers.

- Observe the maintenance instructions! (see Maintenance and Testing chapter)
- Unwind welding lines completely!
- Shield devices or equipment sensitive to radiation accordingly!
- The correct functioning of pacemakers may be affected (obtain advice from a doctor if necessary).



Do not carry out any unauthorised repairs or modifications!

To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!

The warranty becomes null and void in the event of unauthorised interference.

- Appoint only skilled persons for repair work (trained service personnel)!



WARNING



Risk of accidents if these safety instructions are not observed!

Non-observance of these safety instructions is potentially fatal!

- Carefully read the safety information in this manual!
- Observe the accident prevention regulations in your country.
- Inform persons in the working area that they must observe the regulations!



Risk of injury due to radiation or heat!

Arc radiation results in injury to skin and eyes.

Contact with hot workpieces and sparks results in burns.

- Wear dry protective clothing (e.g. welding shield, gloves, etc.) according to the relevant regulations in the country in question!
- Protect persons not involved in the work against arc beams and the risk of glare using safety curtains!



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!

**WARNING****Smoke and gases!**

Smoke and gases can lead to breathing difficulties and poisoning. In addition, solvent vapour (chlorinated hydrocarbon) may be converted into poisonous phosgene due to the ultraviolet radiation of the arc!

- Ensure that there is sufficient fresh air!
- Keep solvent vapour away from the arc beam field!
- Wear suitable breathing apparatus if appropriate!

**Fire hazard!**

Flames may arise as a result of the high temperatures, stray sparks, glowing-hot parts and hot slag produced during the welding process.

Stray welding currents can also result in flames forming!

- Check for fire hazards in the working area!
- Do not carry any easily flammable objects such as matches or lighters.
- Keep appropriate fire extinguishing equipment to hand in the working area!
- Thoroughly remove any residue of flammable substances from the workpiece before starting welding.
- Only continue work on welded workpieces once they have cooled down.
Do not allow to come into contact with flammable material!
- Connect welding leads correctly!

**CAUTION****Noise exposure!**

Noise exceeding 70 dBA can cause permanent hearing damage!

- Wear suitable ear protection!
- Persons located within the working area must wear suitable ear protection!

CAUTION



Obligations of the operator!

In the European Economic Area (EEA), the relevant national version of the basic guidelines must be followed and observed!

- National version of the basic guidelines (89/391/EEC) as well as the relevant individual guidelines.
- In particular the Directive (89/655/EEC) on the minimum regulations for safety and health protection when staff members are using equipment during work.
- The regulations regarding work safety and accident prevention for the respective country.
- Check at regular intervals that users are working in a safety-conscious way!



Damage due to the use of non-genuine parts!

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.



Electromagnetic interference!

The machines are intended to be used in industrial areas, according to IEC 60974-10. If they are used in residential areas, for example, problems may occur with ensuring electromagnetic compatibility.

- Check whether interference is caused to other machines!

2.3 Transport and installation



WARNING



Incorrect handling of shielding gas cylinders!

Incorrect handling of shielding gas cylinders can result in serious and even fatal injury.

- Observe the instructions from the gas manufacturer and in any relevant regulations concerning the use of compressed air!
- Place shielding gas cylinders in the holders provided for them and secure with fixing devices.
- Avoid heating the shielding gas cylinder!



CAUTION



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, -3, -10).

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



Damage due to supply lines not being disconnected!

During transport, supply lines which have not been disconnected (mains supply leads, control leads, etc.) may cause hazards such as connected equipment tipping over and injuring persons!

- Disconnect supply lines!

CAUTION



Equipment damage when not operated in an upright position!

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!

2.3.1 Lifting by crane



DANGER



Risk of injury during lifting by crane!

When lifting the equipment by crane, serious injuries can be inflicted by falling equipment or add-on units.

- Transport on all lifting lugs at the same time (see Fig. Lifting principle)!
- Ensure that there is an even load distribution! Only use ring chains or suspension ropes of the same length!
- Observe the lifting principle (see Fig.)!
- Remove all accessory components before lifting (e.g. shielding gas cylinders, tool boxes, wire feed units, etc.)!
- Avoid jerky movements when raising or lowering!
- Use shackles and load hooks of the appropriate size!

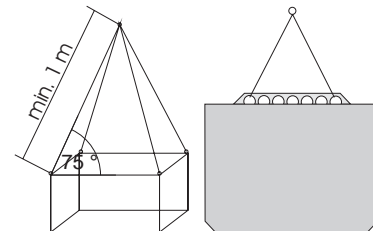


Fig. Lifting principle



Risk of injury due to unsuitable ring screws!

In case of improper use of ring screws or the use of unsuitable ring screws, persons can be seriously damaged by falling equipment or add-on components!

- The ring screw must be completely screwed in!
- The ring screw must be positioned flat onto and in full contact with the supporting surfaces!
- Check that the ring screws are securely fastened before use and check for any damage (corrosion, deformation)!
- Do not use or screw in damaged ring screws!
- Avoid lateral loading of the ring screws!

2.4 Ambient conditions



CAUTION



Installation site!

The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!

- The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.
- Safe operation of the machine must be guaranteed at all times.

CAUTION



Equipment damage due to dirt accumulation!

Unusually high quantities of dust, acid, corrosive gases or substances may damage the equipment.

- Avoid high volumes of smoke, vapour, oil vapour and grinding dust!
- Avoid ambient air containing salt (sea air)!



Non-permissible ambient conditions!

Insufficient ventilation results in a reduction in performance and equipment damage.

- Observe the ambient conditions!
- Keep the cooling air inlet and outlet clear!
- Observe the minimum distance of 0.5 m from obstacles!

2.4.1 In operation

Temperature range of the ambient air:

- -20 °C to +40 °C

Relative air humidity:

- Up to 50% at 40 °C
- Up to 90% at 20 °C

2.4.2 Transport and storage

Storage in an enclosed space, temperature range of the ambient air:

- -25 °C to +55 °C

Relative air humidity

- Up to 90% at 20 °C

3 Intended use

This machine has been manufactured according to the latest developments in technology and current regulations and standards. It must only be operated in line with the instructions on correct usage.



WARNING



Hazards due to improper usage!

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 proper usage and by trained or expert staff!
- Do not modify or convert the equipment improperly!

3.1 Applications

3.1.1 MIG/MAG standard welding

Metal arc welding using a wire electrode whereby gas from an external source surrounds the arc and the molten pool to protect them from the atmosphere.

3.1.2 MIG/MAG cored wire welding

Welding with cored wire electrodes consisting of a metal casing and a powder core.

As with MIG/MAG standard welding, the arc is protected from the atmosphere by shielding gas. The gas is supplied either externally (gas shielded cored wires) or produced in the arc by means of the powder core (self-shielding cored wires).

3.1.3 TIG (Liftarc) welding

TIG welding process with arc ignition by means of workpiece contact.

3.1.4 MMA welding

Manual arc welding or, for short, MMA welding. It is characterised by the fact that the arc burns between a melting electrode and the molten pool. There is no external protection; any protection against the atmosphere comes from the electrode.

3.2 Use and operation solely with the following machines

NOTE



A suitable wire feed unit (system component) is required in order to operate the welding machine!

	Taurus Drive 4L	Taurus Drive 4
Taurus 301	<input type="checkbox"/>	<input type="checkbox"/>
Taurus 351	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Taurus 451	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Taurus 551	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

3.3 Documents which also apply

3.3.1 Warranty

NOTE



For further information, please see the accompanying supplementary sheets "Machine and Company Data, Maintenance and Testing, Warranty"!

3.3.2 Declaration of Conformity



The designated machine conforms to EC Directives and standards in terms of its design and construction:

- EC Low Voltage Directive (2006/95/EC),
- EC EMC Directive (2004/108/EC),

This declaration shall become null and void in the event of unauthorised modifications, improperly conducted repairs, non-observance of the deadlines for the repetition test and / or non-permitted conversion work not specifically authorised by the manufacturer.

The original copy of the declaration of conformity is enclosed with the unit.

3.3.3 Welding in environments with increased electrical hazards



In compliance with IEC / DIN EN 60974, VDE 0544 the machines can be used in environments with an increased electrical hazard.

3.3.4 Service documents (spare parts and circuit diagrams)



DANGER



Do not carry out any unauthorised repairs or modifications!

To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!

The warranty becomes null and void in the event of unauthorised interference.

- Appoint only skilled persons for repair work (trained service personnel)!

Original copies of the circuit diagrams are enclosed with the unit.

Spare parts can be obtained from the relevant authorised dealer.

4 Machine description – quick overview

4.1 Taurus 351, 451, 551

4.1.1 Front view

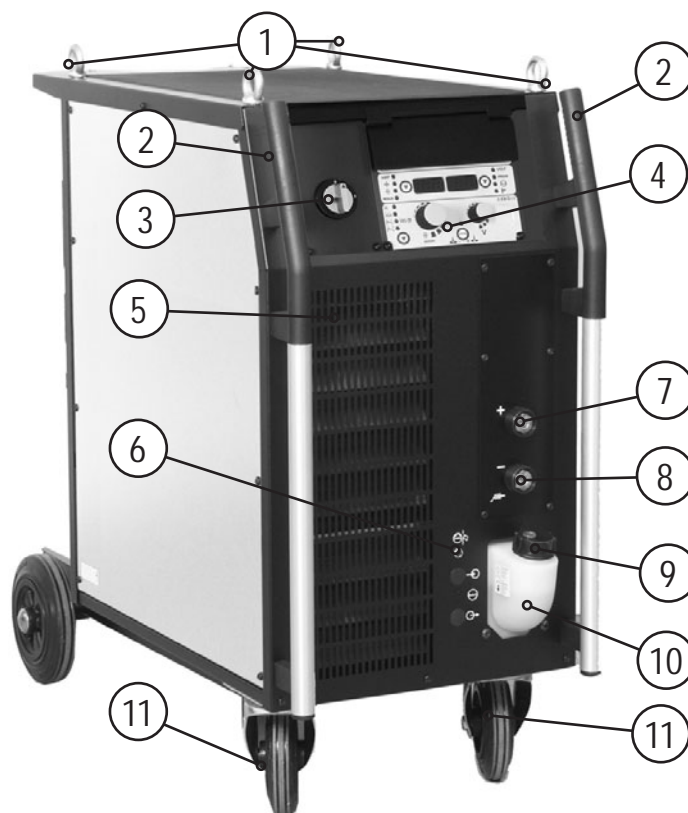


Figure 4-1

Item	Symbol	Description
1		Lifting lug
2		Carrying handle
3		Main switch, machine on/off
4		Machine control See Machine control – operating elements chapter
5		Cooling air inlet
6		Automatic cut-out of coolant pump key button press to reset a triggered fuse
7		Connection socket, "+" welding current <ul style="list-style-type: none"> MIG/MAG cored wire welding: Workpiece connection TIG welding: Workpiece connection MMA welding: Workpiece connection
8		"-" welding current connection socket <ul style="list-style-type: none"> MIG/MAG welding: Workpiece connection TIG welding: Welding current connection for welding torch MMA welding: electrode holder connection
9		Coolant tank cap
10		Coolant tank
11		Conveyor rolls, guide castors

4.1.2 Rear view

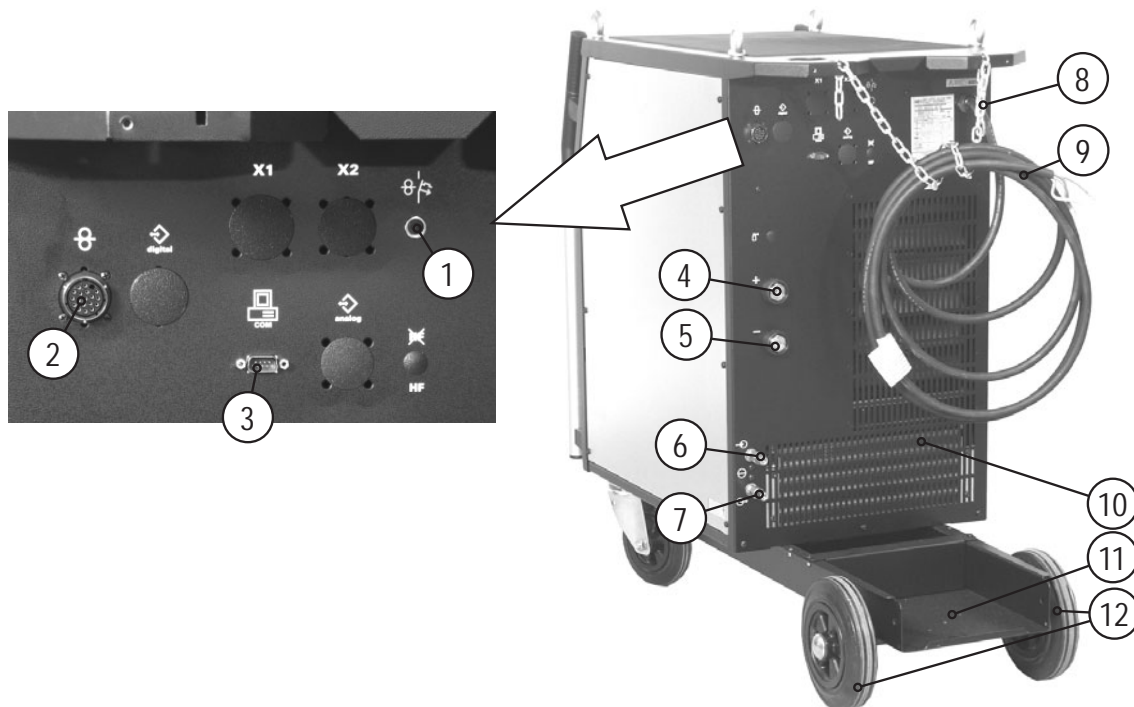









Figure 4-2

Item	Symbol	Description
1		Key button, Automatic cutout Wire feed motor supply voltage fuse (press to reset a triggered fuse)
2		19-pole connection socket (analogue) Wire feed unit control lead connection
3		PC interface, serial (D-SUB connection socket, 9-pole)
4		Connection socket, "+" welding current • MIG/MAG welding: Welding current to central connection/torch
5		"-" welding current connection socket • MIG/MAG cored wire welding: Welding current to central connection/torch
6		Rapid-action closure coupling (red) coolant return
7		Rapid-action closure coupling (blue) coolant supply
8		Securing elements for shielding gas cylinder (strap/chain)
9		Mains connection cable
10		Cooling air outlet
11		Bracket for shielding gas cylinder
12		Conveyor rolls, fixed castors

4.2 Machine control – Operating elements

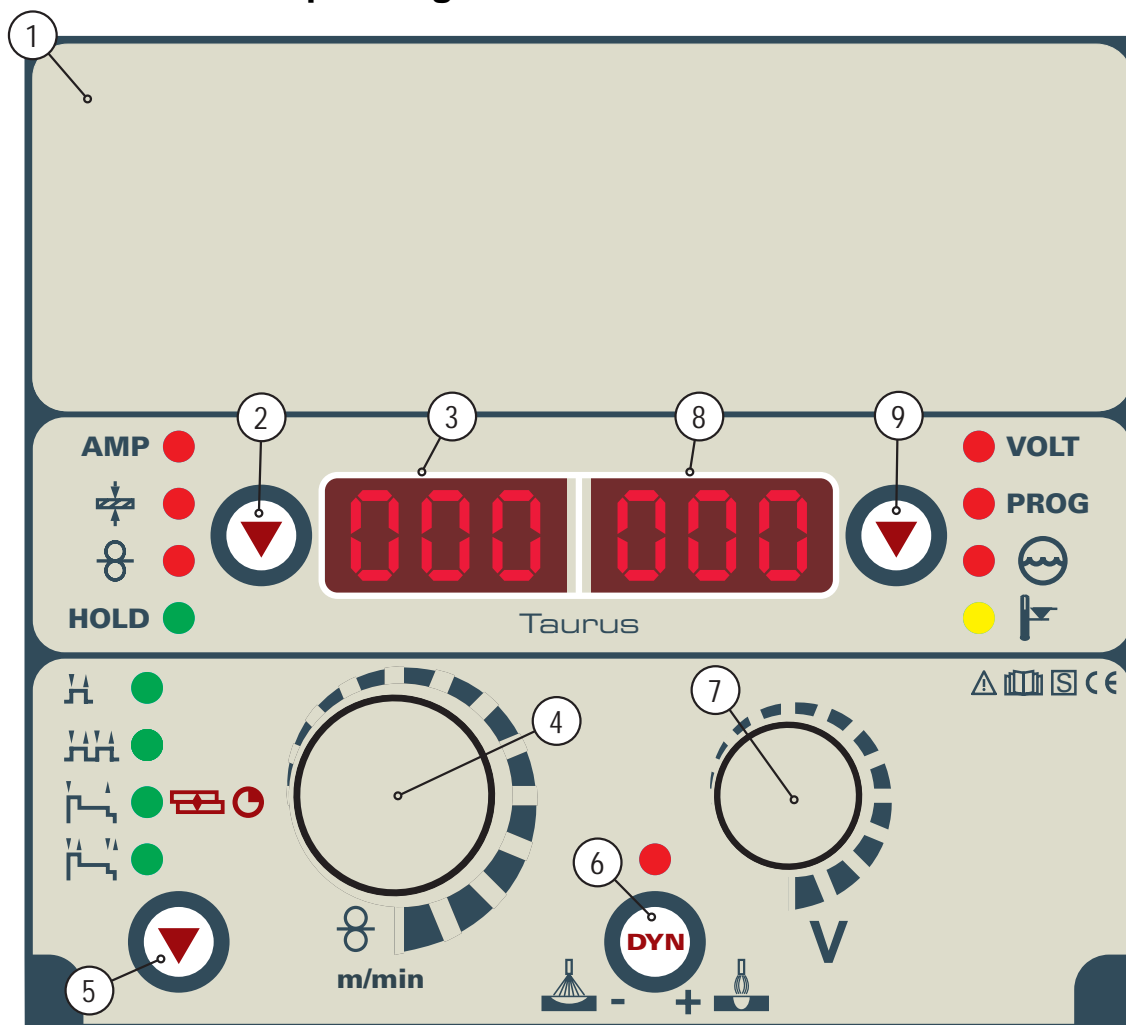




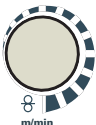
















Figure 4-3

Item	Symbol	Description
1		Lid (see chap. "Machine control – concealed operating elements")
2		Button, Parameter selection left AMP Welding current  Material thickness  Wire speed HOLD After each completed welding process, the last parameter values used for the welding process are shown on the display in the main program; the signal light is on
3		Display, left Welding current, material thickness, wire speed, hold values
4		Welding parameter setting, rotary dial For setting the welding performance, for selecting the JOB (welding task) and for setting other welding parameters.
5		Select operating mode button  Non-latched  Latched  Signal light lights up in green: Special non-latched  Signal light lights up in red: MIG spots  Special latched
6		Dynamics/choke effect button  Arc harder and narrower  Arc softer and wider
7		Arc length correction/selection of welding program, rotary dial <ul style="list-style-type: none"> Correction of the arc length from -9.9 V to +9.9 V. Selection of welding programs 0 to 15 (not possible if accessory components, such as program torches, are connected).
8		Display, right Welding voltage, program number
9		Button, Parameter selection (right) VOLT Welding voltage PROG Program number  Coolant error  Temperature error

4.2.1 Covered operating elements

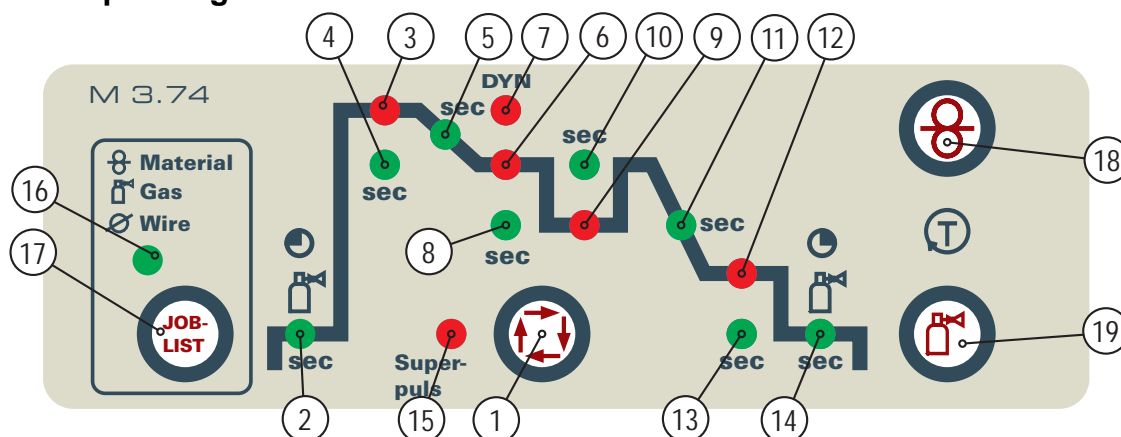






Figure 4-4

Item	Symbol	Description
1		Select welding parameters button This button is used to select the welding parameters depending on the welding process and operating mode used.
2		Signal light, gas pre-flow time Setting range 0.0 s to 20.0 s
3		Signal light, start program (P_{START}) <ul style="list-style-type: none"> Wire speed: 1% to 200% of the main program P_A Correction of the arc length -9.9 V to +9.9 V
4	sec	Signal light, start time Setting range, absolute 0.0 s to 20.0 s (0.1 s increments)
5	sec	Signal light, slope time program P_{START} to main program P_A Setting range 0.0 s to 20.0 s (0.1 s increments)
6		Signal light, main program (P_A) <ul style="list-style-type: none"> Wire speed WF-min. to WF-max. Correction of the arc length -9.9 V to +9.9 V
7	DYN	Signal light, dynamics Setting range -40 to +40
8	sec	Signal light, duration of main program P_A Setting range 0.0 s to 20.0 s (0.1 s increments). Used e.g. in connection with the super pulse function
9		Signal light, reduced main program (P_B) <ul style="list-style-type: none"> Wire speed: 1% to 200% of the main program P_A Correction of the arc length -9.9 V to +9.9 V
10	sec	Signal light, duration reduced main program P_B Setting range 0.0 s to 20.0 s (0.1 s increments). Used e.g. in connection with the super pulse function.
11	sec	Signal light, slope time program P_A (or P_B) to end program P_{END} Setting range 0.0 s to 20.0 s (0.1 s increments)
12		Signal light, end program (P_{END}) <ul style="list-style-type: none"> Wire speed: 1% to 200% of the main program P_A Correction of the arc length -9.9 V to +9.9 V
13	sec	Signal light, duration of end program P_{END} Setting range 0.0 s to 20.0 s (0.1 s increments)
14		Signal light, gas post-flow time Setting range 0.0 s to 20.0 s

Item	Symbol	Description
15	Super-puls	Signal lamp, super pulse function Lights up when the super pulse function is active.
16	 Material Gas Wire	Signal light, JOB-List Illuminates upon display or selection of the JOB number
17		Key button, JOB-List Selection of the welding task (JOB) from the JOB list
18		Wire inching button See also "Inching the Wire Electrode" chapter
19		Gas test / rinse button <ul style="list-style-type: none"> Gas test: For setting the shielding gas quantity Rinse: For rinsing longer tube packages See also "Shielding Gas Supply" chapter

5 Design and function

NOTE



Observe documentation of other system components when connecting!

5.1 General



DANGER



Risk of injury from electric shock!

Contact with live parts, e.g. welding current sockets, is potentially fatal!

- Follow safety instructions on the opening pages of the operating instructions.
- Commissioning may only be carried out by persons who have the relevant expertise of working with arc welding machines!
- Connection and welding leads (e.g. electrode holder, welding torch, workpiece lead, interfaces) may only be connected when the machine is switched off!



CAUTION



Risk of burns on the welding current connection!

If the welding current connections are not locked, connections and leads heat up and can cause burns, if touched!

- Check the welding current connections every day and lock by turning in clockwise direction, if necessary.



Risk of injury due to moving parts!

The wire feed units are equipped with moving parts, which can trap hands, hair, clothing or tools and thus injure persons!

- Do not reach into rotating or moving parts or drive components!
- Keep casing covers closed during operation!



Risk of injury due to welding wire escaping in an unpredictable manner!

Welding wire can be conveyed at very high speeds and, if conveyed incorrectly, may escape in an uncontrolled manner and injure persons!

- Before mains connection, set up the complete wire guide system from the wire spool to the welding torch!
- Remove the counter pressure rollers from the wire feed unit if no welding torch is fitted!
- Check wire guide at regular intervals!
- Keep all casing covers closed during operation!



Risk from electrical current!

If welding is carried out alternately using different methods and if a welding torch and an electrode holder remain connected to the machine, the open-circuit/welding voltage is applied simultaneously on all cables.

- The torch and the electrode holder should therefore always be placed on an insulated surface before starting work and during breaks.

CAUTION



Using protective dust caps!

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!

5.2 Installation



CAUTION



Installation site!

The machine must not be operated in the open air and must only be set up and operated on a suitable, stable and level base!

- The operator must ensure that the ground is non-slip and level, and provide sufficient lighting for the place of work.
- Safe operation of the machine must be guaranteed at all times.

5.3 Machine cooling

To obtain an optimal duty cycle from the power components, the following precautions should be observed:

- Ensure that the working area is adequately ventilated.
- Do not obstruct the air inlets and outlets of the machine.
- Do not allow metal parts, dust or other objects to get into the machine.

5.4 Workpiece lead, general



CAUTION



Risk of burns due to incorrect connection of the workpiece lead!

Paint, rust and dirt on the connection restrict the power flow and may lead to stray welding currents.

Stray welding currents may cause fires and injuries!

- Clean the connections!
- Fix the workpiece lead securely!
- Do not use structural parts of the workpiece as a return lead for the welding current!
- Take care to ensure faultless power connections!

5.5 Welding torch cooling system

5.5.1 General

CAUTION



Coolant mixtures!

Mixtures with other liquids or the use of unsuitable coolants result in material damage and renders the manufacturer's warranty void!

- Only use the coolant described in this manual (overview of coolants).
- Do not mix different coolants.
- When changing the coolant, the entire volume of liquid must be changed.



Insufficient frost protection in the welding torch coolant!

Depending on the ambient conditions, different liquids are used for cooling the welding torch (see overview of coolants).

Coolants with frost protection (KF 37E or KF 23E) must be checked regularly to ensure that the frost protection is adequate to prevent damage to the machine or the accessory components.

- The coolant must be checked for adequate frost protection with the TYP 1 frost protection tester (see accessories).
- Replace coolant as necessary if frost protection is inadequate!

NOTE



The disposal of coolant must be carried out according to official regulations and observing the relevant safety data sheets (German waste code number: 70104)!

- Coolant must not be disposed of together with household waste.
- Coolant must not be discharged into the sewerage system.
- Recommended cleaning agent: water, if necessary with cleaning agent added.

5.5.2 List of coolants

The following coolants may be used (for item nos., please see the Accessories chapter):

Coolant	Temperature range
KF 23E (Standard)	-10°C to +40°C
KF 37E	-20°C to +10°C
DKF 23E (for plasma machines)	0°C to +40°C

5.5.3 Adding coolant

NOTE



After the initial filling, wait for at least one minute when the machine is switched on so that the tube package is filled with coolant completely and without bubbles.
With frequent changes of torch and during the initial filling process, the cooling unit tank should be topped up as necessary.

The unit is supplied ex works with a minimum level of coolant.

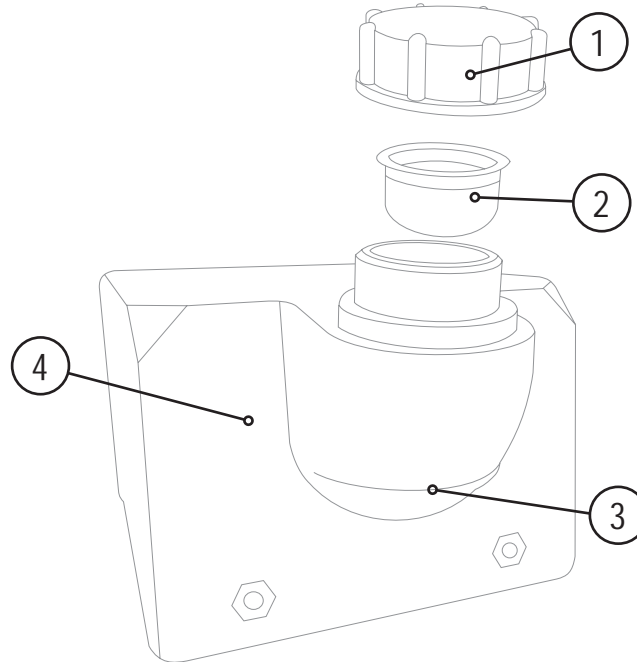


Figure 5-1

Item	Symbol	Description
1		Coolant tank cap
2		Coolant filter sieve
3		"Min" mark Minimum coolant level
4		Coolant tank

- Unscrew and remove the coolant tank sealing cover.
- Check filter sieve insert for dirt, clean if necessary and reinsert into position.
- Top up coolant to the filter sieve insert, close sealing cover again.

NOTE



The level of coolant must never fall below the "min" mark.

5.6 Mains connection



DANGER



Hazard caused by improper mains connection!

An improper mains connection can cause injuries or damage property!

- Only use machine with a plug socket that has a correctly fitted protective conductor.
- If a mains plug must be fitted, this may only be carried out by an electrician in accordance with the relevant national provisions or regulations (any phase sequence for three-phase machines)!
- Mains plug, socket and lead must be checked regularly by an electrician!

5.6.1 Mains configuration

NOTE



The machine may be connected to TN, TT or IT networks with a protective conductor (as available).

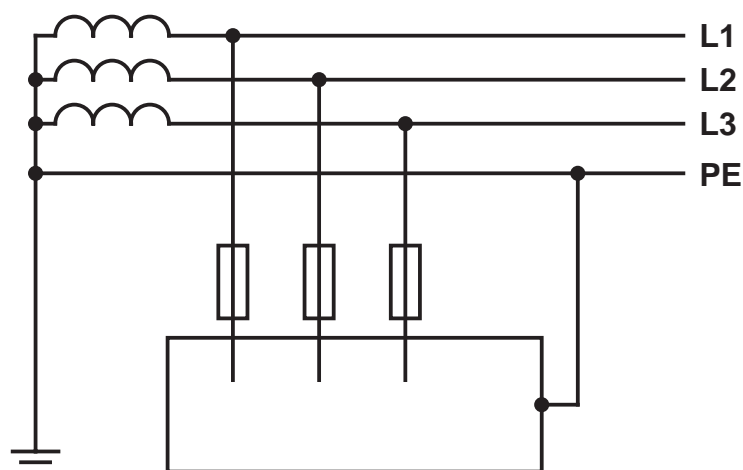


Figure 5-2

Legend

Item	Designation	Colour code
L1	Outer conductor 1	black
L2	Outer conductor 2	brown
L3	Outer conductor 3	grey
PE	Protective conductor	green-yellow

CAUTION



Operating voltage - mains voltage!

The operating voltage shown on the rating plate must be consistent with the mains voltage, in order to avoid damage to the machine!

- For mains fuse protection, please refer to the "Technical data" chapter!

- Insert mains plug of the switched-off machine into the appropriate socket.

5.7 Shielding gas supply

5.7.1 Connecting the shielding gas supply



WARNING



Incorrect handling of shielding gas cylinders!

Incorrect handling of shielding gas cylinders can result in serious and even fatal injury.

- Observe the instructions from the gas manufacturer and in any relevant regulations concerning the use of compressed air!
- Place shielding gas cylinders in the holders provided for them and secure with fixing devices.
- Avoid heating the shielding gas cylinder!

CAUTION



Faults in the shielding gas supply.

An unhindered shielding gas supply from the shielding gas cylinder to the welding torch is a fundamental requirement for optimum welding results. In addition, a blocked shielding gas supply may result in the welding torch being destroyed.

- Always re-fit the yellow protective cap when not using the shielding gas connection.
- All shielding gas connections must be gas tight.

NOTE



Before connecting the pressure reducer to the gas cylinder, open the cylinder valve briefly to expel any dirt.

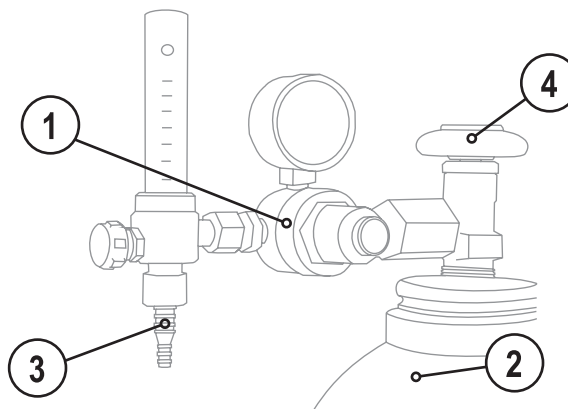



Figure 5-3

Item	Symbol	Description
1		Pressure reducer
2		Shielding gas cylinder
3		Output side of the pressure reducer
4		Cylinder valve



- Place the shielding gas cylinder into the relevant cylinder bracket.
- Secure the shielding gas cylinder using a securing chain.
- Tighten the pressure reducer screw connection on the gas bottle valve to be gas-tight.
- Tighten gas hose on pressure reducer to be gas tight.

5.7.2 Gas test

- Slowly open the gas cylinder valve.
- Open the pressure reducer.
- Switch on the power source at the main switch.
- Initiate gas test function on the machine control.
- Set the relevant gas quantity for the application on the pressure reducer.
- The gas test is triggered on the machine control by pressing the  button briefly.

Shielding gas flows for around 25 seconds or until the button is pressed again.

5.7.3 “Rinse tube package” function

Operating Element	Action	Result
	 5 s	Select rinse tube package. Shielding gas flows continuously until the Gas Test button is pressed again.

5.7.4 Setting the shielding gas quantity

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

NOTE



Incorrect shielding gas setting!

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!

5.8 Software key switch

To protect against unauthorised or unintentional adjustment of the welding parameters on the machine, the control input can be locked with the aid of a key switch.

In key switch position 1 all functions and parameters can be set without restriction.

In key switch position 0 the following functions and parameters cannot be changed:

- Job switching function, welding task selection
(block job mode possible with Power-control torch)
- Job Manager mode
- Program Steps mode
- Program A mode
- Job Info mode
- Super pulse function

NOTE



The function of the key switch is implemented with a special parameter. See chapter "Advanced Settings"

5.9 Intermediate hose package connection

NOTE



Note the polarity of the welding current!

Some wire electrodes (e.g. self-shielding cored wire) are welded using negative polarity. In this case, the welding current lead should be connected to the "-" welding current socket, and the workpiece lead should be connected to the "+" welding current socket.

- Observe the information from the electrode manufacturer!

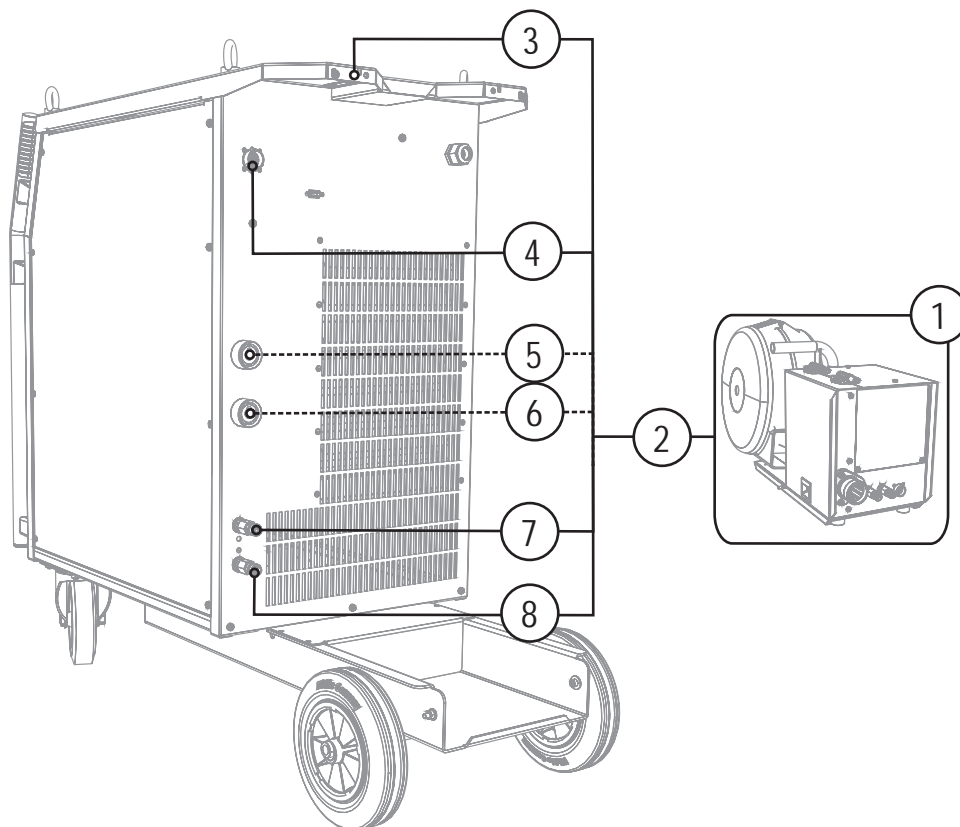


Figure 5-4

Item	Symbol	Description
1		Wire feed unit
2		Intermediate tube package
3		Intermediate tube package strain relief
4		19-pole connection socket (analogue) Wire feed unit control lead connection
5		Connection socket, "+" welding current • MIG/MAG welding: Welding current to central connection/torch
6		"-" welding current connection socket • MIG/MAG cored wire welding: Welding current to central connection/torch
7		Rapid-action closure coupling (red) coolant return
8		Rapid-action closure coupling (blue) coolant supply

- Insert the end of the tube package through the strain relief of the tube package and lock by turning to the right.
- Insert the plug on the welding current lead into the welding current connection socket "+" and lock.
- Insert cable plug on the control lead into the 19-pole connection socket and secure with crown nut (the plug can only be inserted into the connection socket in one position).
- Lock connecting nipples of the cooling water tubes into the corresponding rapid-action closure couplings:
Return line red to rapid-action closure coupling, red (coolant return) and
supply line blue to rapid-action closure coupling, blue (coolant supply).

5.10 MIG/MAG welding

5.10.1 Connection for workpiece lead

NOTE



Note the polarity of the welding current!

Some wire electrodes (e.g. self-shielding cored wire) are welded using negative polarity. In this case, the welding current lead should be connected to the "-" welding current socket, and the workpiece lead should be connected to the "+" welding current socket.

- Observe the information from the electrode manufacturer!

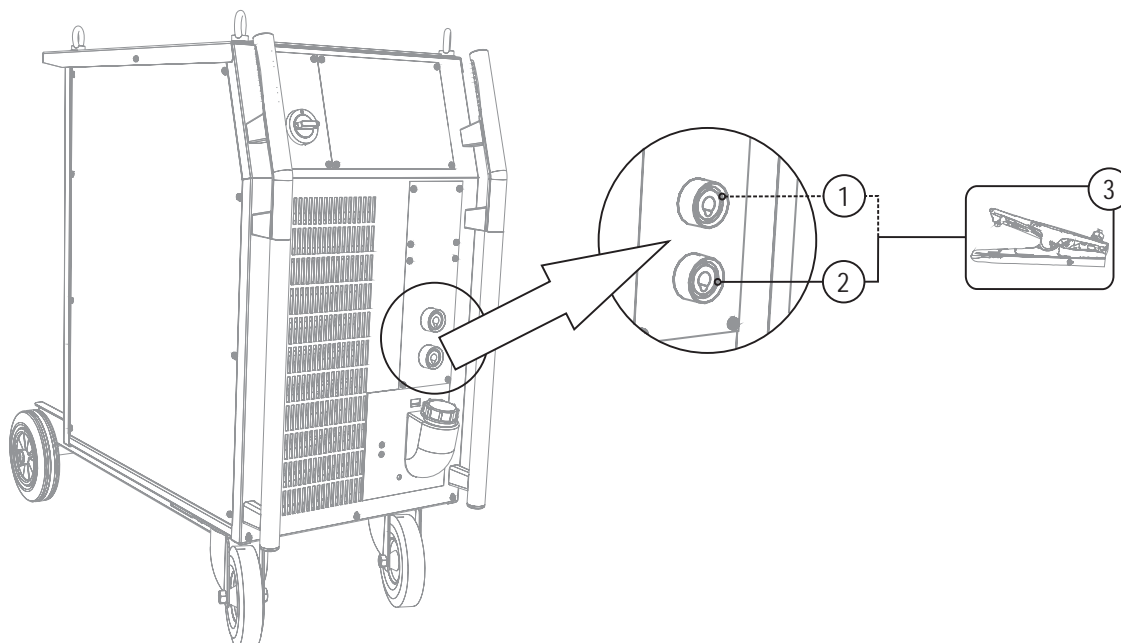


Figure 5-5

Item	Symbol	Description
1	+	Connection socket, "+" welding current <ul style="list-style-type: none"> • MIG/MAG cored wire welding: Workpiece connection
2	-	"-" welding current connection socket <ul style="list-style-type: none"> • MIG/MAG welding: Workpiece connection
3		Workpiece clamp

- Insert the plug on the workpiece lead into the "-" welding current connection socket and lock.

5.10.2 Definition of MIG/MAG welding tasks

This range of machines feature simple operation with a very wide range of functions.

- 128 of 256 JOBS (welding tasks, consisting of welding process, material type, wire diameter and shielding gas type) are already pre-defined.
- Simple JOB selection from a list of pre-defined JOBS (sticker on the machine).
- The required process parameters are calculated by the system depending on the operating point specified (single-dial operation via wire speed rotary dial).
- Additional parameters can be modified as required in the configuration menu on the control or using the PC300.NET welding parameter software.

5.10.3 welding task selection

5.10.3.1 Basic welding parameters

- Select JOB (welding task) using the JOB list.
On decompact welding systems, the "JOB list" sticker is located on the inside on the wire feed unit cover; with compact machines it is on the right-hand power source cover.

It is only possible to change the JOB number when no welding current is flowing.

Operating element	Action	Result	Display
	1 x	Select JOB list (LED is on)	
		Set JOB number. Wait 3s until the setting has been adopted.	

5.10.3.2 Operating mode

Operating element	Action	Result	Display
	n x	Select operating mode The LED displays the selected operating mode. Non-latched operation Latched operation Green Special non-latched mode Red Spot operating mode Special latched mode	No change

5.10.3.3 Welding type

NOTE

Pulse arc welding machines only.

Operating element	Action	Result	Display
	n x	Select welding type The signal light indicates the selection. Standard MIG/MAG welding Pulse arc MIG/MAG welding	No change

5.10.3.4 Choke effect / dynamics

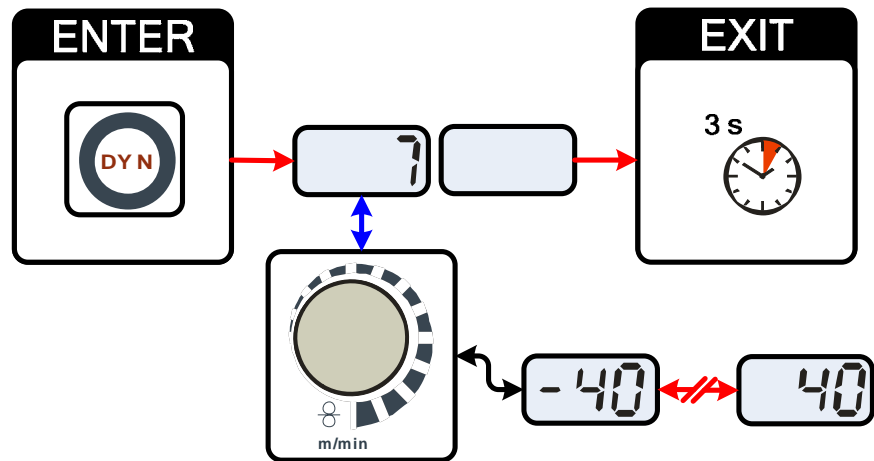


Figure 5-6

Display	Setting/selection
	Dynamics setting 40: Arc harder and narrower -40: Arc softer and wider

5.10.3.5 Superpulses

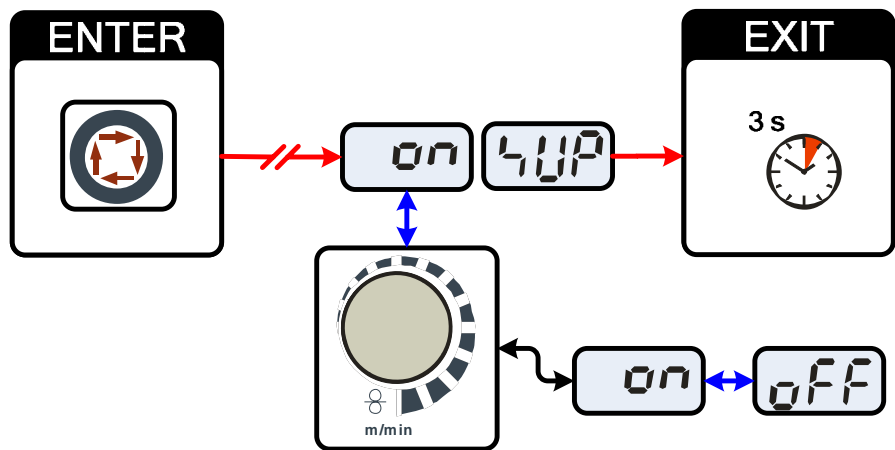


Figure 5-7

Display	Setting/selection
	Selects super pulses Switches function on or off.
	Switch on Switching on machine function
	Switch off Switching off machine function

5.10.3.6 Wire burn-back

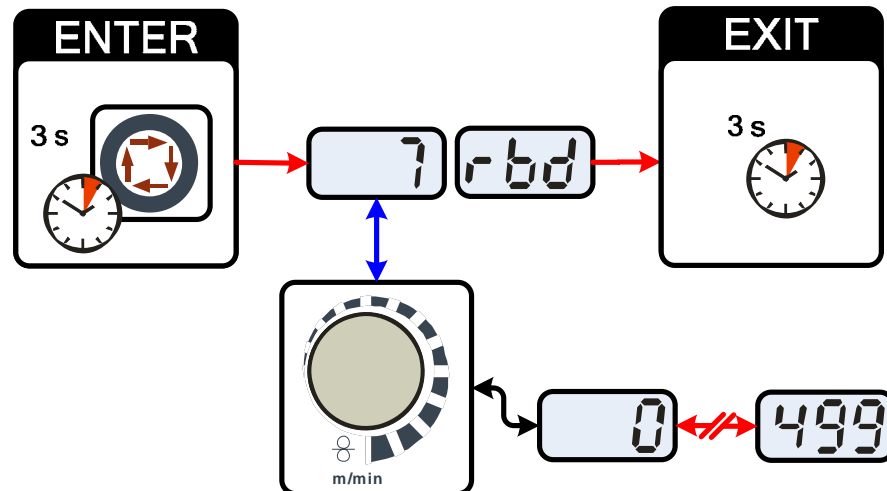


Figure 5-8

Display	Setting/selection
	menu wire burn-back Set wire burn-back
	Parameter setting (setting range 0 to 499) Wire back-burn set too high: large drops developing on the wire electrode result in poor ignition properties or the wire electrode sticking to the welding nozzle. Wire back-burn set too low: Wire electrode sticks in the molten pool

5.10.4 MIG/MAG operating point

The operating point (welding output) is specified using the principle of MIG/MAG one-dial operation, i.e. the user need only specify the operating point by setting the required wire speed, for example, and the digital system will calculate the optimum values for welding current and voltage (operating point).

The operating point setting can also be specified using the accessory components such as the remote control, welding torch, etc.

5.10.4.1 Selecting the display unit

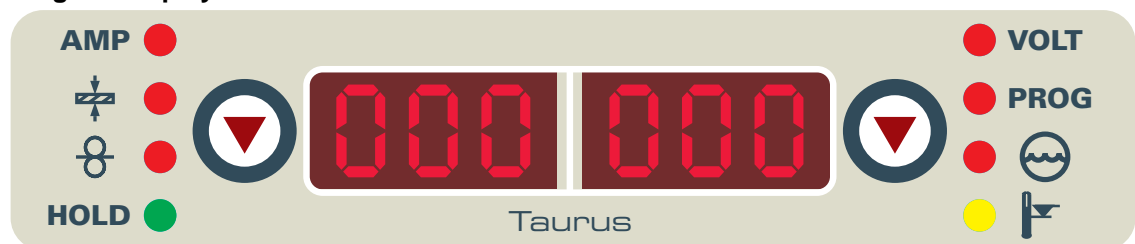


Figure 5-9

The operating point (welding performance) can be displayed as the welding current, material thickness or wire speed.

Operating element	Action	Result
	n x	Switching the display between: AMP Welding current Material thickness Wire speed

Application example

Aluminium is to be welded.

- Material = AlMg,
- Gas = Ar 100%,
- Wire diameter = 1.2 mm

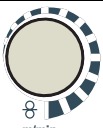


The correct wire speed is not known and is to be determined.

- Select the appropriate JOB (see "JOB list" sticker)
- Switch to the material thickness display
- Set the material thickness as appropriate (e.g. 5 mm)
- Switch to the wire speed display

The resulting wire speed will be shown (e.g. 8.4 m/min).




5.10.4.2 Operating point setting using material thickness, welding current, wire speed

Given below is a description of the setting work via the wire speed parameters as an example of operating point setting.

Operating element	Action	Result	Display
		Increase or reduce welding performance via the wire speed parameter. Display example: 10.5 m/min	

5.10.4.3 Arc length correction setting

The arc length can be corrected as follows.

Operating element	Action	Result	Display
		"Arc length correction" setting (Display example: -0.9V, setting range -9.9 V to +9.9 V)	

5.10.4.4 Accessory components for operating point setting

The operating point can also be set with various accessory components such as

- remote controls
- special torches
- PC software

5.10.5 MIG/MAG welding data display

To the left and right of the control displays are the "Parameter selection" buttons (⊙). They are used to select welding parameters to be displayed.

Each press of the button advances the display to the next parameter (LEDs next to the button indicate the selection). After the last parameter is reached, the system starts again from the beginning.

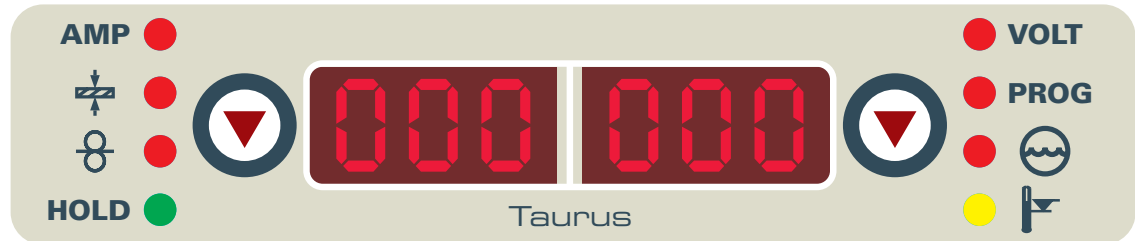


Figure 5-10

The display shows:

- Nominal values (before welding)
- Actual values (during welding)
- Hold values (after welding)

Parameter	Nominal values	Actual values	Hold values
Welding current	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Material thickness	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wire speed	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Welding voltage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

When the settings are changed (e.g. wire speed), the system switches over immediately to the setpoint setting.






5.10.6 MIG/MAG functional sequences / operating modes

NOTE



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

5.10.6.1 Explanation of signs and functions

Symbol	Meaning
	Press torch trigger
	Release torch trigger
	Tap torch trigger (press briefly and release)
	Shielding gas flowing
I	Welding output
	Wire electrode is being conveyed
	Wire creep
	Wire burn-back
	Gas pre-flows
	Gas post-flows
	Non-latched
	Special, non-latched
	Latched
	Special, latched
t	Time
PSTART	Ignition program
PA	Main program
PB	Reduced main program
PEND	End program
t2	Spot time

Non-latched mode

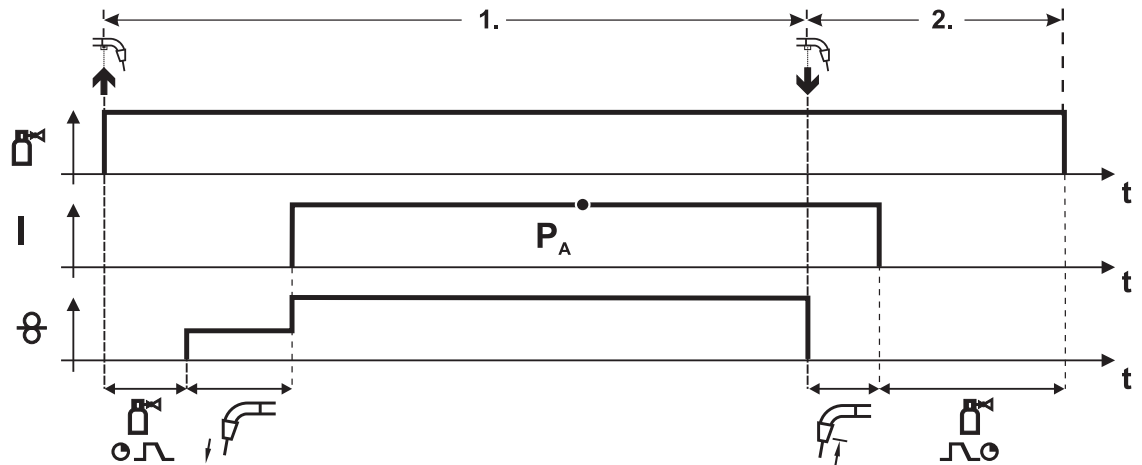


Figure 5-11

Step 1

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

Step 2

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

Non-latched operation with superpulse

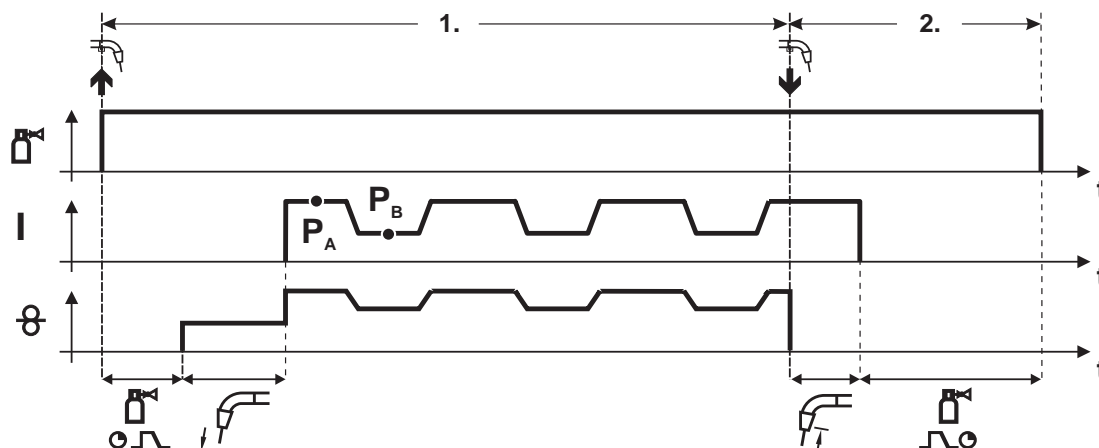


Figure 5-12

Step 1

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

Step 2

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

Special, non-latched

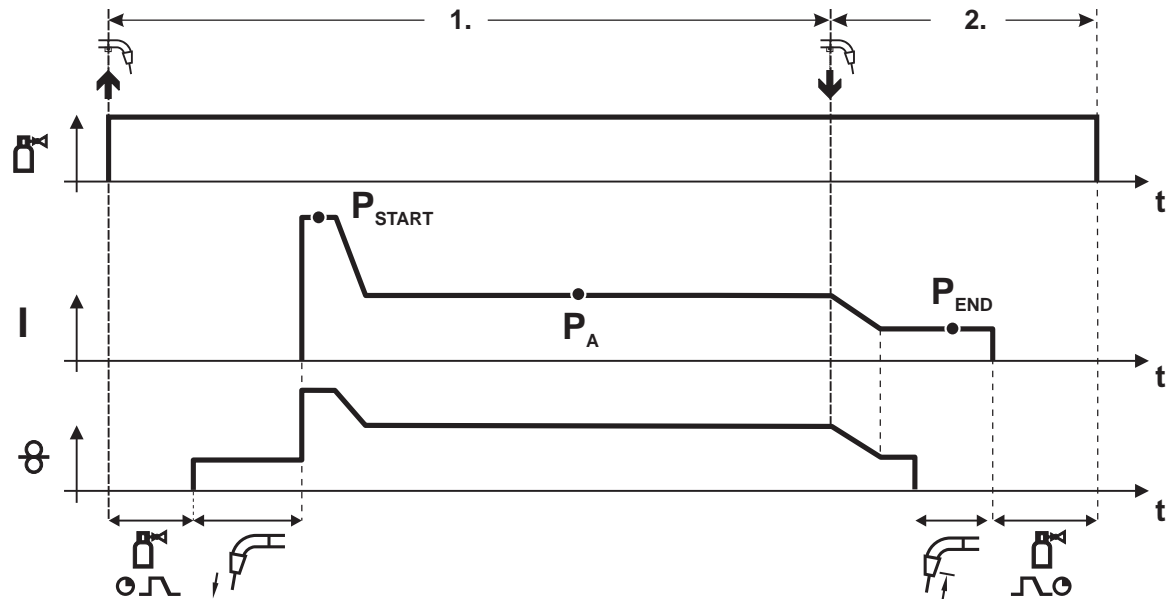


Figure 5-13

Step 1

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

Step 2

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

Spots

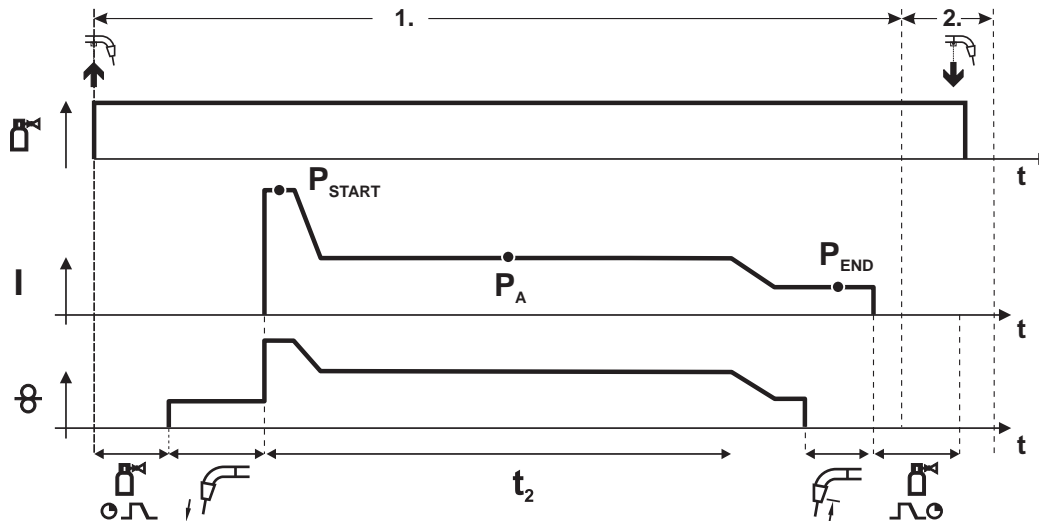


Figure 5-14

NOTE



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

1st cycle

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

2nd cycle

- Release torch trigger

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

Special, non-latched with superpulse

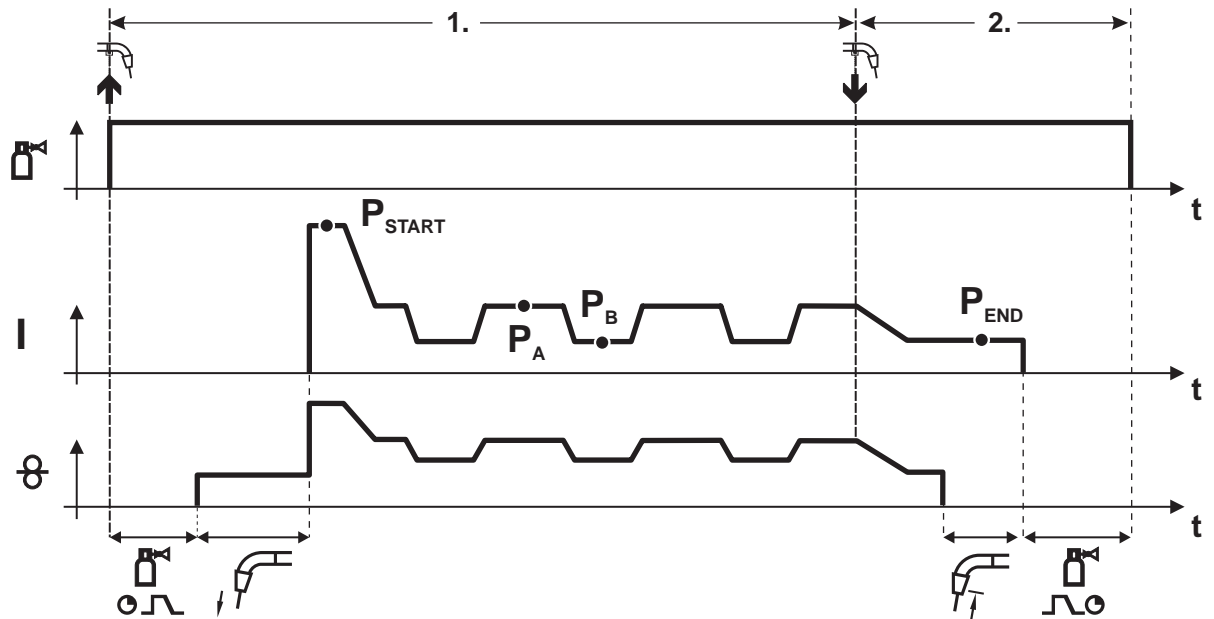


Figure 5-15

Step 1

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

Step 2

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

Latched mode

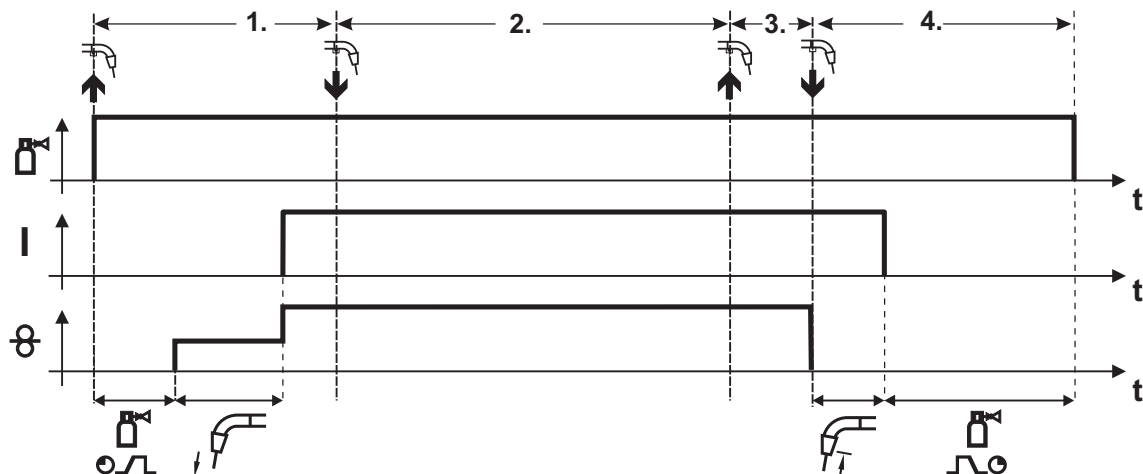


Figure 5-16

Step 1

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

Step 2

- Release torch trigger (no effect)

Step 3

- Press torch trigger (no effect)

Step 4

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

Latched mode with superpulse

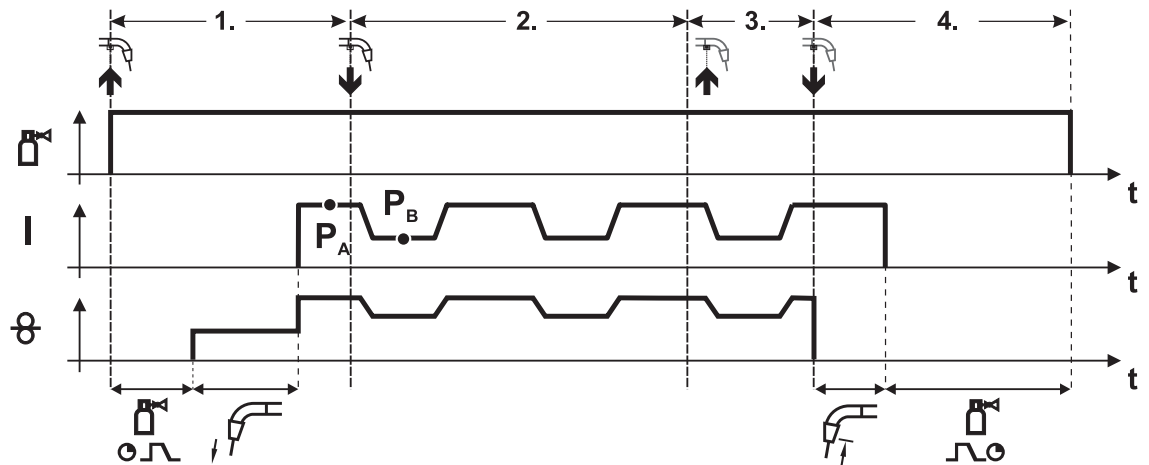


Figure 5-17

Step 1:

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

Step 2:

- Release torch trigger (no effect)

Step 3:

- Press torch trigger (no effect)

Step 4:

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

Latched special

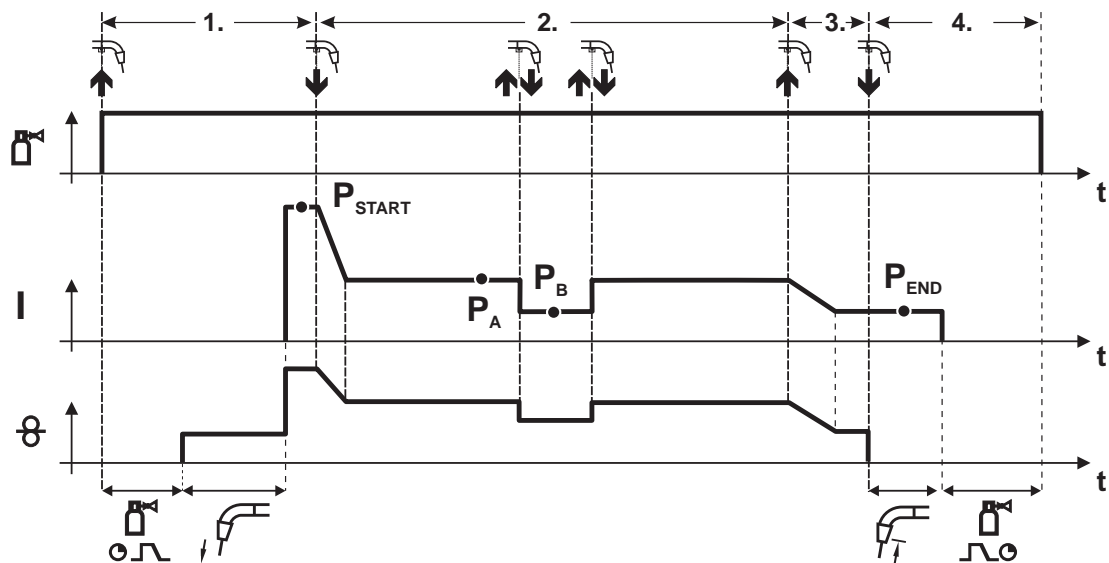


Figure 5-18

Step 1

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

Step 2

- Release torch trigger
- Slope to main program P_A .

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

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

Repeated tapping will switch back to the main program P_A .

Step 3

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

Step 4

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

NOTE



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

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

Special, latched with superpulse

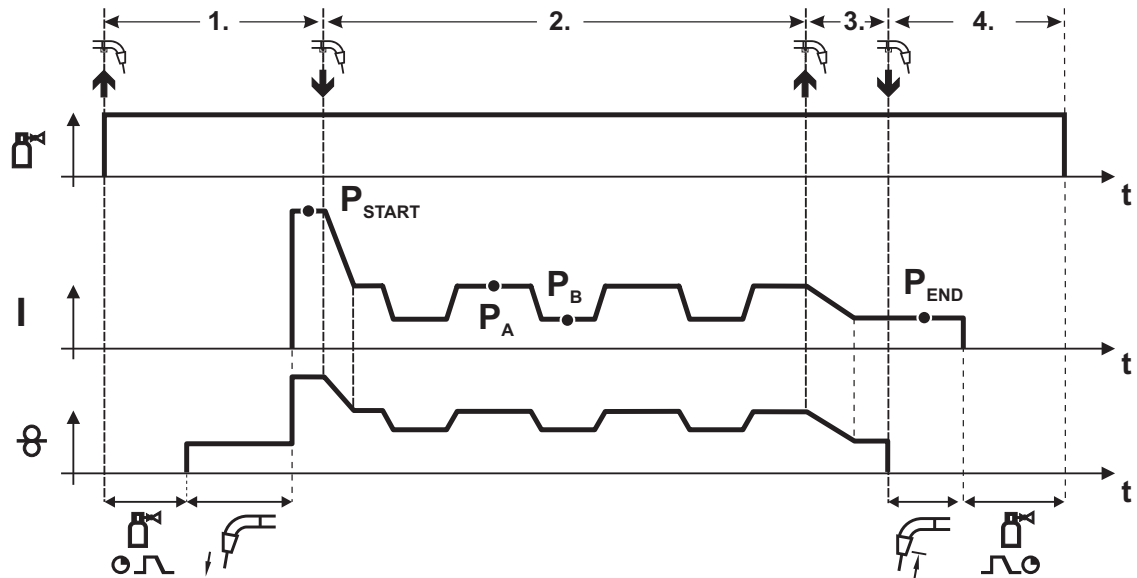


Figure 5-19

Step 1

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

Step 2

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

Step 3

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

Step 4

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

5.10.7 MIG/MAG program sequence ("Program steps" mode)

Certain materials, such as aluminium, require special functions in order to be able to weld them safely and at high quality. The latched special operating mode is used here with the following programs:

- Start program P_{START} (reduction of cool points at the start of the seam)
- Main program P_A (continuous welding)
- Reduced main program P_B (targeted heat reduction)
- End program P_{END} (minimisation of end craters via targeted heat reduction)

The programs include the parameters wire speed (operating point), arc length correction, slope times, program duration, etc.

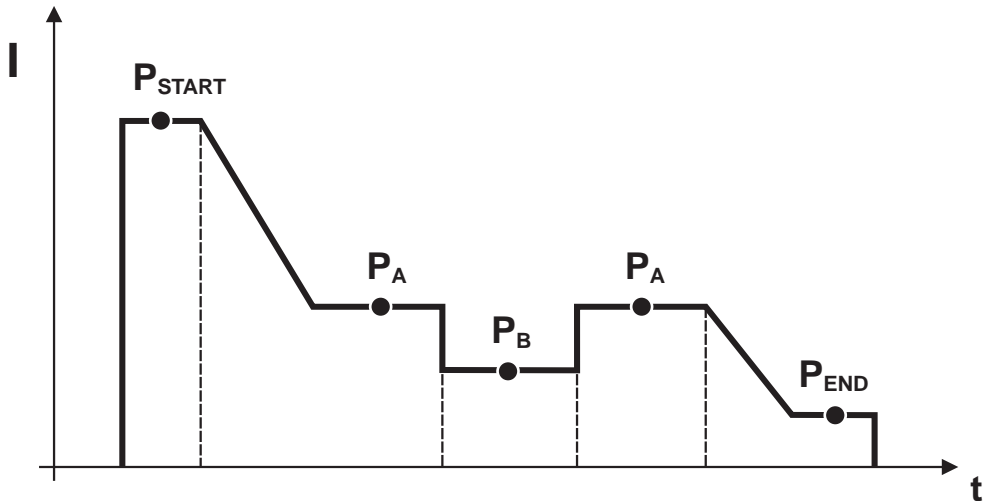


Figure 5-20

NOTE



This function can only be enabled with the PC300.NET software.
(See operating instructions for the software)

5.10.7.1 Selection of the program sequence parameter

Operating Element	Action	Result	Display
		Select parameter in the program sequence	
		Setting welding parameters	0.1 Sec

5.10.7.2 MIG/MAG overview of parameters

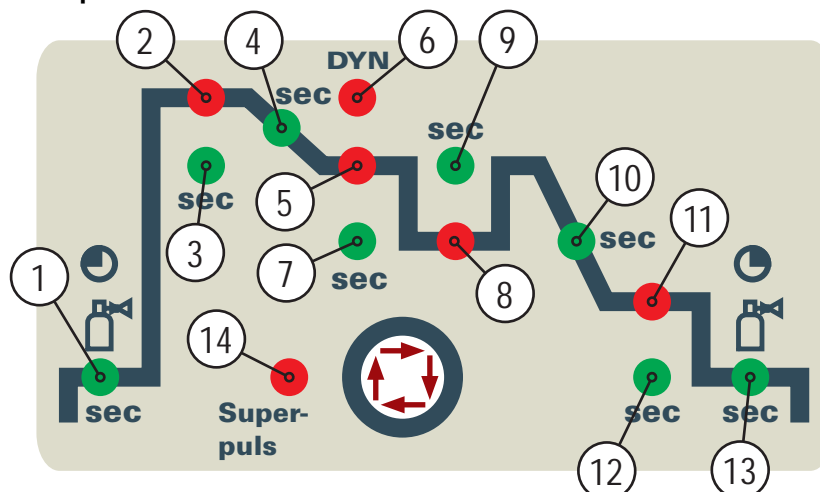


Figure 5-21

Basic Parameters

Item	Meaning / Explanation	Setting Range
1	Gas pre-flow time	0.0s to 20.0s
2	P_{START} Wire speed, relative Arc length correction	1% to 200% -9.9V to +9.9V
3	Duration	0.0s to 20.0s
4	Slope duration from P_{START} to P_A	0.0s to 20.0s
5	P_A Wire speed, absolute	0.1 m/min to 40 m/min
6	Dynamics	-40 to +40
7	Duration (spot time and superpulse)	0.01s to 20.0s
8	P_B Wire speed, relative Arc length correction, relative	1% to 200% -9.9V to +9.9V
9	Duration	0.01s to 20.0s
10	Slope duration from P_A to P_{END}	0.0s to 20s
11	P_{END} Wire speed, relative Arc length correction	1% to 200% -9.9V to +9.9V
12	Duration (superpulse)	0.0s to 20s
13	Gas post-flow time	0.0s to 20s
14	Superpulses	On / Off

NOTE



In the factory setting, P_{START} , P_B , and P_{END} are "relative programs". They relate to percentages of the wire feed value from the main program P_A .

5.10.7.3 Example, tack welding (non-latched)

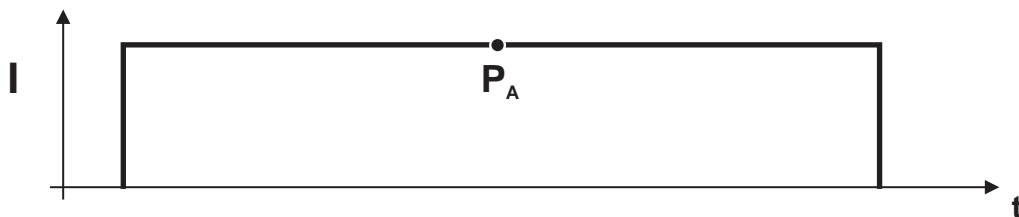


Figure 5-22

Basic parameters

Parameter	Meaning / explanation	Setting range
GASstr	Gas pre-flow time	0.0s to 20.0s
GASend:	Gas post-flow time	0.0s to 20s
RUECK	Wire burn-back length	2 to 500

"P_A" main program

Setting the wire speed

5.10.7.4 Example, aluminium tack welding (non-latched special)

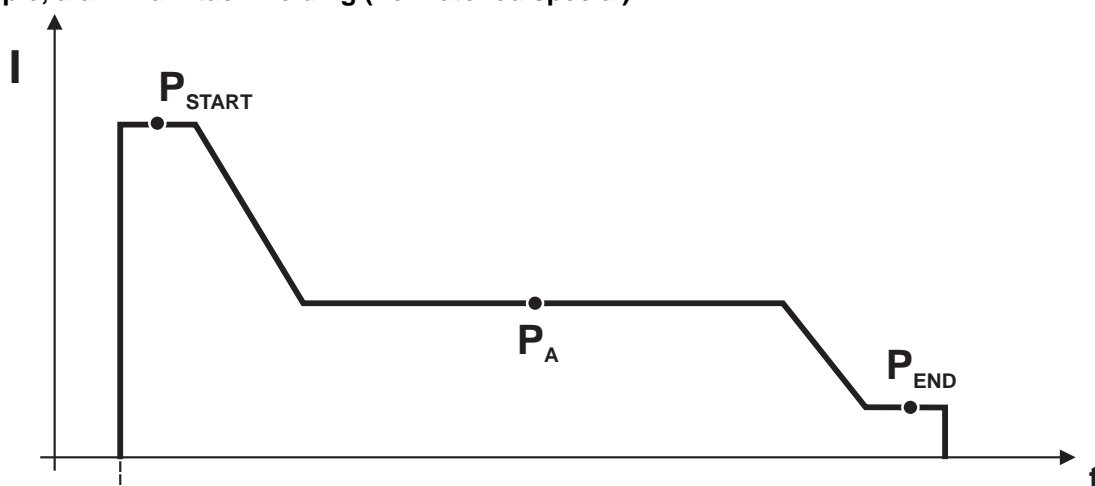


Figure 5-23

Basic parameters

Welding parameter	Meaning / explanation	Setting range
GASstr	Gas pre-flow time	0.0s to 20.0s
GASend:	Gas post-flow time	0.0s to 20.0s
RUECK	Wire burn-back length	2 to 500

"P_{START}" start program

DVstart	Wire speed	0% to 200%
ustart	Arc length correction	-9.9V to +9.9V
tstart	Duration	0.0s to 20s

"P_A" main program

Setting the wire speed

"P_{END}" end-crater program

DVend	Wire speed	0% to 200%
Uend	Arc length correction	-9.9V to +9.9V
tend	Duration	0.0s to 20s

5.10.7.5 Example, aluminium welding (latched special)

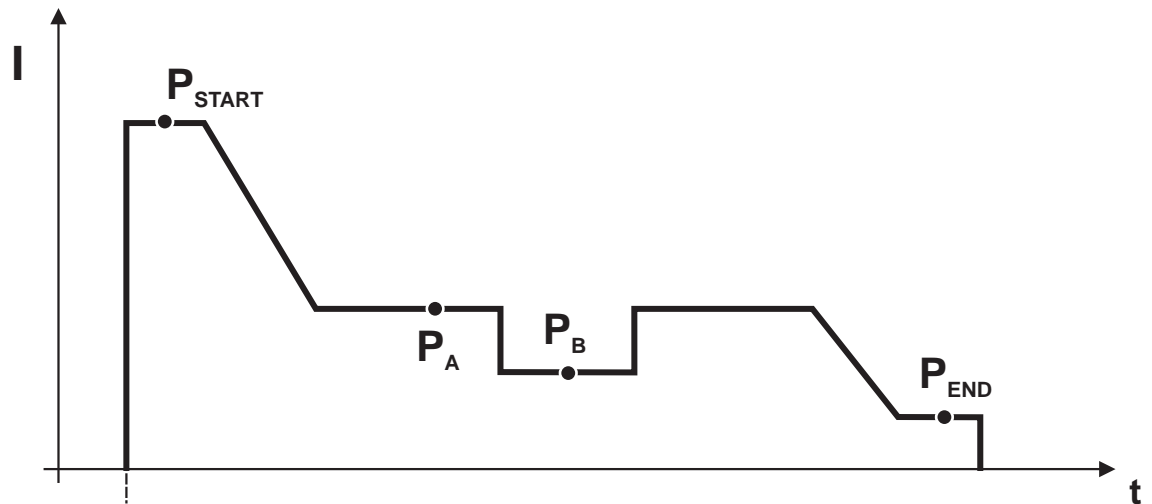


Figure 5-24

Basic parameters

Welding parameter	Meaning / explanation	Setting range
GASstr	Gas pre-flow time	0.0s to 20.0s
GASend:	Gas post-flow time	0.0s to 20.0s
RUECK	Wire burn-back length	2 to 500
"P_{START}" start program		
DVstart	Wire speed	0% to 200%
ustart	Arc length correction	-9.9V to +9.9V
tstart	Duration	0.0s to 20s
"P_A" main program		
	Setting the wire speed	
"P_B" reduced main program		
DV3	Wire speed	0% to 200%
U3	Arc length correction	-9.9V to +9.9V
"P_{END}" end-crater program		
tSend	Slope duration from P _A or P _B to P _{END}	0.0s to 20s
DVend	Wire speed	0% to 200%
Uend	Arc length correction	-9.9V to +9.9V
tend	Duration	0.0s to 20s

5.10.7.6 Example, visible seams (latched super pulse)

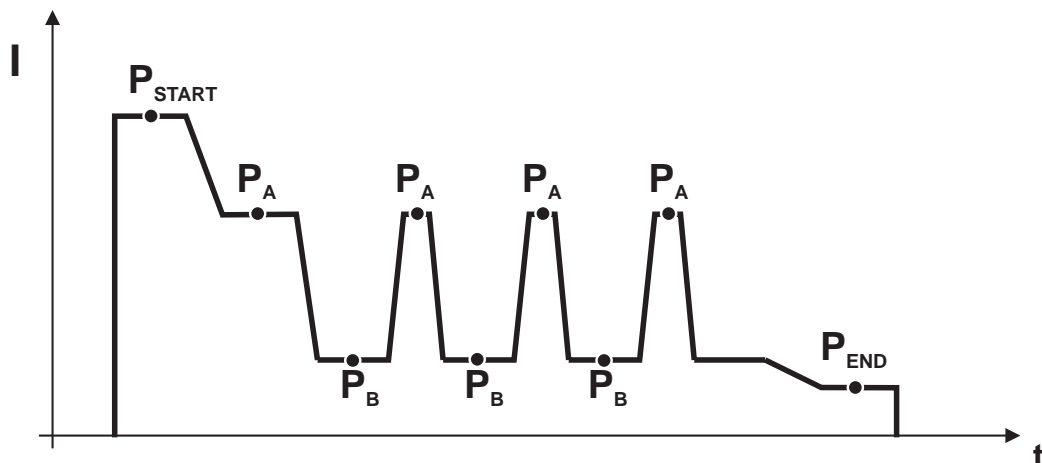


Figure 5-25

Basic parameters

Welding parameter	Meaning / explanation	Setting range
GASstr	Gas pre-flow time	0.0s to 20.0s
GASend:	Gas post-flow time	0.0s to 20.0s
RUECK	Wire burn-back length	2 to 500
PROC.SP.	Travel speed to determine the a-measurement*	10cm to 200cm
"P_{START}" start program		
DVstart	Wire speed	0% to 200%
ustart	Arc length correction	-9.9V to +9.9V
tstart	Duration	0.0s to 20s
"P_A" main program		
tS1	Slope duration from P _{START} to P _A	0.0s to 20s
	Setting the wire speed	
t2	Duration	0.1s to 20s
tS3	Slope duration from P _B to P _A	0.0s to 20s
"P_B" reduced main program		
tS2	Slope duration from P _A to P _B	0.0s to 20s
DV3	Wire speed	0% to 200%
U3	Arc length correction	-9.9V to +9.9V
t3	Duration	0.1s to 20s
"P_{END}" end-crater program		
tSend	Slope duration from P _A or P _B to P _{END}	0.0s to 20s
DVend	Wire speed	0% to 200%
Uend	Arc length correction	-9.9V to +9.9V
tend	Duration	0.0s to 20s

5.10.8 Main program A mode

Different welding tasks or positions on a workpiece demand various welding performances (operating points) or welding programs. The following parameters are stored in each of the up to 16 programs:

- Operating mode
- Welding type
- Superpulses (ON/OFF)
- Wire feed speed (DV2)
- Voltage correction (U2)
- Dynamics (DYN2)

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

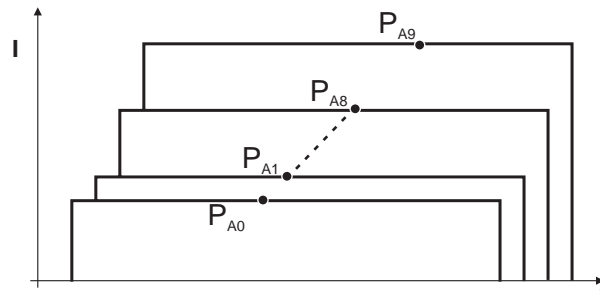


Figure 5-26

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

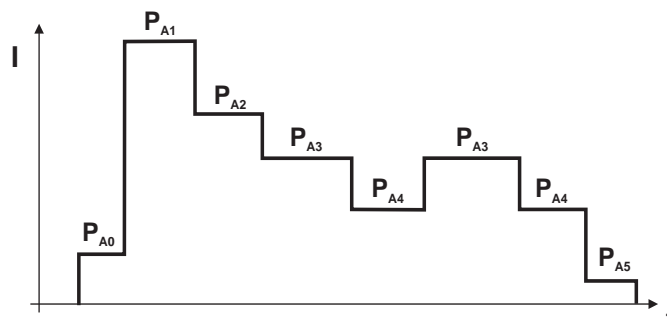


Figure 5-27

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

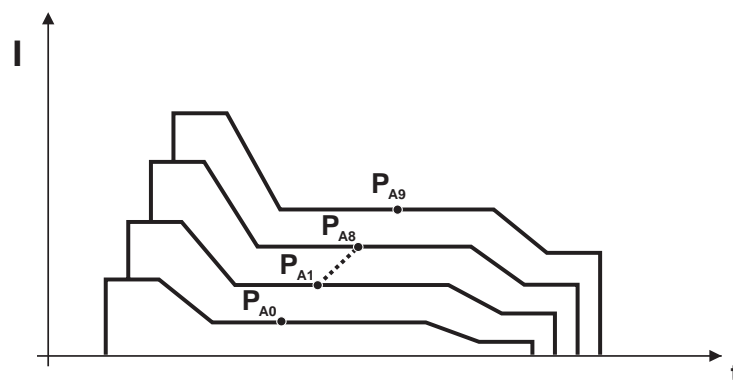


Figure 5-28

NOTE



Up to 16 programs (P_{A0} to P_{A15}) can be defined.

An operating point (wire speed, arc length correction, dynamics/choke effect) can be defined permanently in each program.

Program P0 is an exception: the settings for operating points are made manually here.

Changes to the welding parameters are saved immediately!



5.10.8.1 Selecting parameters (program A)

Operating element	Action	Result	Display
	n x	Change welding data display over to program display. (LED PROG is on)	
		Select program number. Display example: Program "1".	
	n x	Select program sequence parameter "Main program (P _A)". (LED is on)	
		Set wire speed. (Absolute value)	
		Set arc length correction. Display example: "-0.8 V" correction (Setting range: -9.9 V to +9.9 V)	
	1 x	Select "Dynamic" program sequence parameter. (LED DYN is on)	
		Set dynamic. (Setting range 40 to -40) 40: Arc hard and narrow. -40: Arc soft and wide.	


NOTE



Changes to the welding parameters can only be made when the key switch is in position "1".

5.10.9 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

Other functions are also possible by tapping the torch trigger, depending on the machine type and control configuration:

- Change over between welding programs (see "Program changeover with standard torches (P8)" chapter).
- Program selection before starting welding (see chapter entitled "Selecting programs with the standard torch trigger (P17)").
- Change over between pulse and standard welding in the special latched operating mode.

5.10.10 MIG/MAG special-torches

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

The following special torches can be used together with this welding machine:

- UP/DOWN welding torch with one rocker
 - for setting the wire speed or
 - to change up to 10 welding programs

5.10.11 Remote control

CAUTION



Using protective dust caps!

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!

NOTE



The remote controls are operated via the 19-pole remote control connection socket (analogue) or the 7-pole remote control connection socket (digital), depending on the model.

5.10.12 R10

Type	R10
Port	19-pole, analogue
Display	-
Dimensions L x W x H in mm	180 x 100 x 75
Weight in kg	0.86

- Setting the operating point via the wire speed (single-dial operation)
- Arc length correction

5.10.13 Advanced settings

The special parameters cannot be viewed directly since they are normally only set and stored once. The machine control offers the following special functions:

5.10.13.1 Selecting, changing and saving parameters

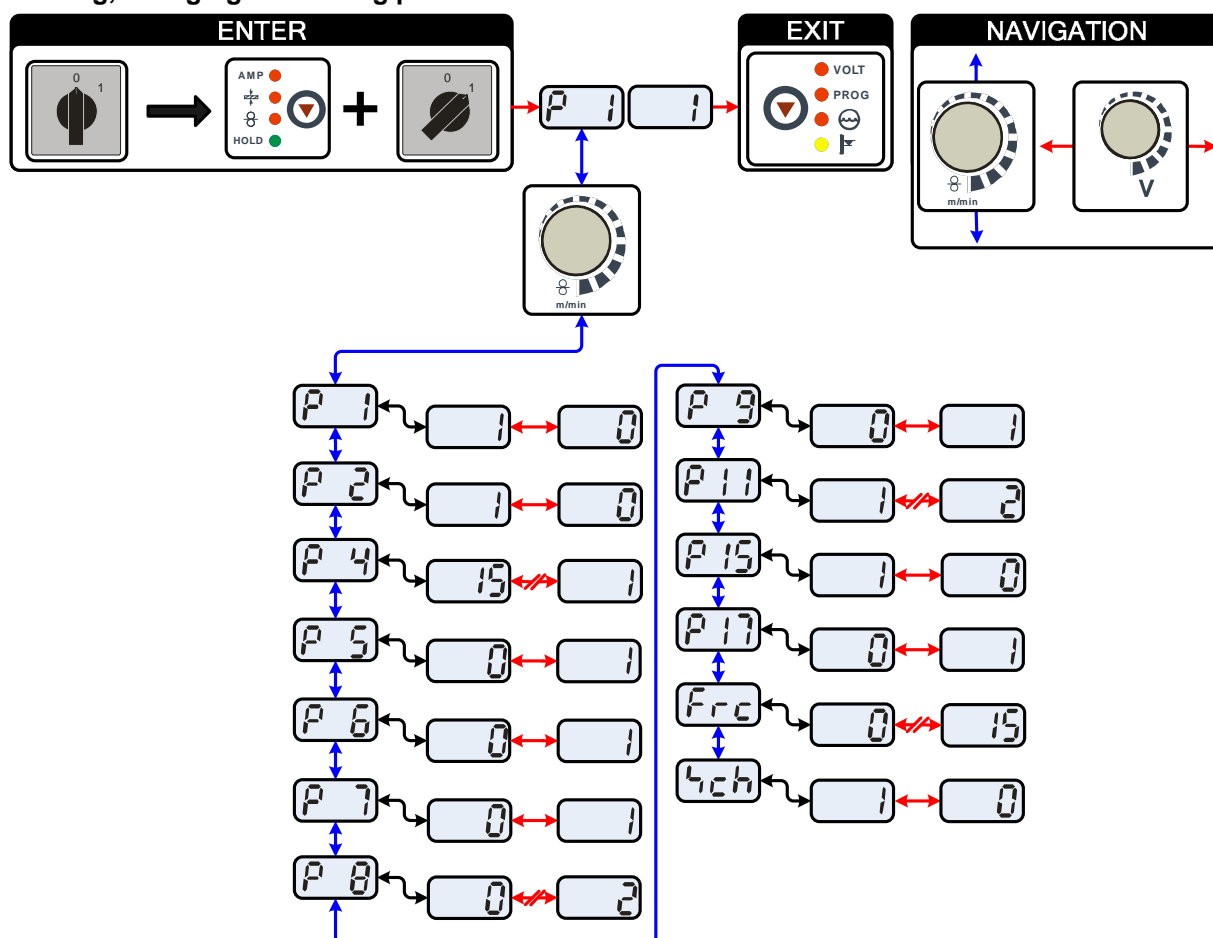


Figure 5-29

NOTE



ENTER (Enter the menu)












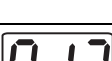
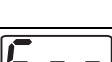
- Switch off machine at the main switch.
- Press and hold the "left parameter selection" button and switch the machine on again at the same time.

NAVIGATION (Navigate in the menu)

- Parameters are selected by turning the "welding parameter setting" rotary dial.
- Set or change the parameters by turning the "arc length correction/select welding program" rotary dial.


EXIT (Exit the menu)











- Press the "right parameter selection" button (settings will be applied, machine changes to the ready-to-operate status).

Display	Setting/selection
	Ramp time for wire inching 0 = normal inching (10s ramp time) 1 = fast inching (3s ramp time) (Ex works)
	Block program "0" 0 = P0 enabled (Ex works) 1 = P0 blocked
	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
	Enable special jobs SP1 to SP3 0 = no enabling (Ex works) 1 = enabling of Sp1-3
	Correction operation, threshold value setting 0 = correction operation switched off (Ex works) 1 = correction operation on "Main program (PA)" flashing
	Program changeover with standard torch 0 = no program changeover (Ex works) 1 = special latched 2 = specific latched special (n cycle active)
	Lat. and sp. lat. tapping start 0 = no latched tapping start (Ex works) 1 = latched tapping start possible
	Special latched tapping time 0 = tapping function switched off 1 = 300ms (Ex works) 2 = 600ms
	HOLD function 0 = HOLD values are not displayed 1 = HOLD values are displayed (Ex works)
	Program selection with standard torch trigger 0 = no program selection (Ex works) 1 = program selection possible
	Alternative remote control coding (FRC) 0 = no alternative remote control coding (works setting) 1-15 = alternative remote control coding
	Software key switch 0 = system complete 1 = system not complete (Ex works)

5.10.13.2 Reset to factory settings

NOTE

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

Operating element	Action	Result	Displays	
			Left	Right
		Switch off welding machine		
		Keep the button pressed		
		Switch on welding machine	Pho	371
		Release the button, wait about 3 seconds	t1	on
		Switch off welding machine and restart in order to put the changes into effect		

5.10.13.3 The special parameters in detail

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.

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

In previous versions of the M3.70/M3.71 control system the block is dependent on the key switch setting. With this version a block will only be effective when the locked status is active.

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

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 (see "Machine description"). 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 (see "Machine description").

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

With the special sequence activated, the start of the welding process changes as follows:

Sequence for special non-latched mode/special latched mode:

- Start program "P_{START}"
- Main program "P_A"

Sequence for special non-latched mode/special latched mode with custom sequence activated:

- Start program "P_{START}"
- Reduced main program "P_B"
- Main program "P_A"

Enabling special JOBs SP1 to SP3 (P6)

The JOB changeover is blocked if the key switch is in the "0" position.

This block can be cancelled for the special JOBs (SP1 - SP3).

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_{kor}) for each JOB. The correction value is saved separately for each program. The correction range can be maximum 30% of the wire speed and +/-9.9 V welding voltage.

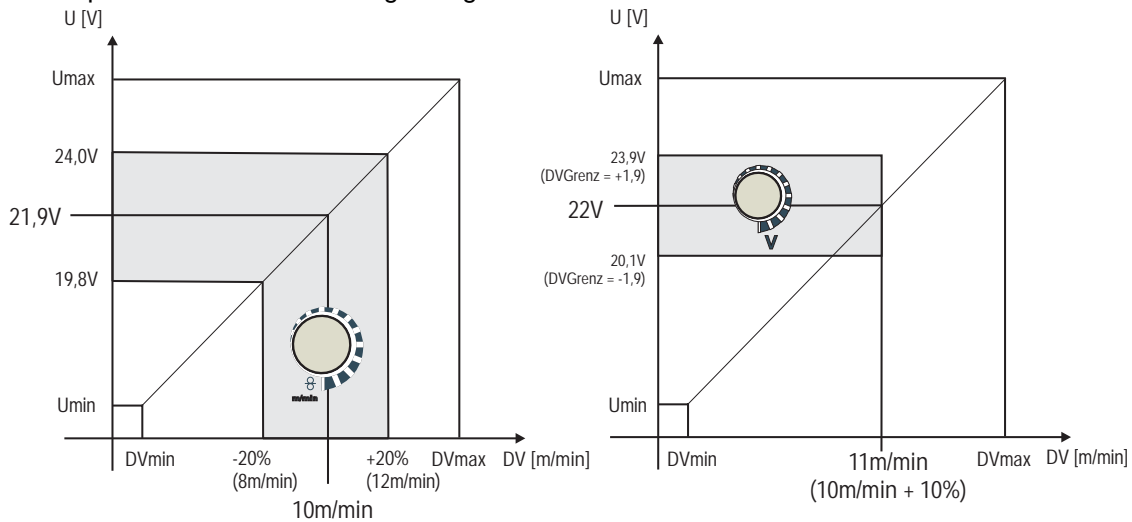


Figure 5-30

Example for the operating point in correction mode:

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

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

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

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

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

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

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

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

Setting the correction range:

- Switch on the "Correction operation" special parameter (P7=1) and save the setting. (See chapter entitled "Selecting, changing and saving parameters".)
- Key switch to position "1".
- Set correction range according to the following table:

Operating element	Action	Result	Display (examples)	
			Left	Right
	 x n	Press button until "PROG" LED comes on. Left: Wire feed speed Right: Program number		
	 4 s	Press button and hold down for approx. 4 s Left: Current limit value of the wire feed speed correction Right: Current limit value of the voltage correction		
 m/min		Set limit value for the wire feed speed correction		
 V		Set limit value for voltage correction		
After approx. 5 s without further user intervention, the set values are adopted and the display switches back to the program display,				

- Key switch back to position "0"!

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 feed unit control is disabled.

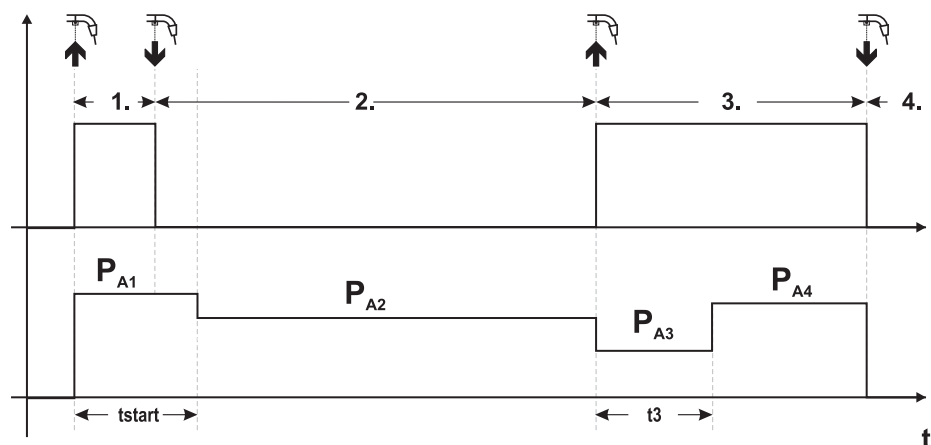


Figure 5-31

Specific latched special (n cycle)

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

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

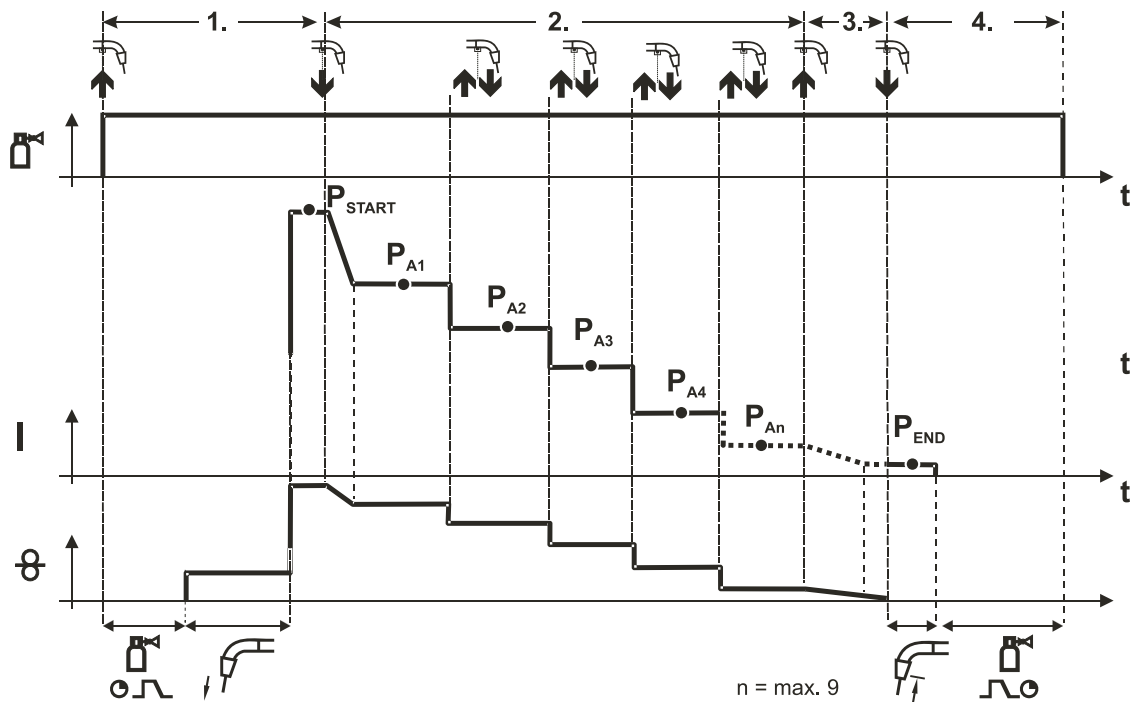


Figure 5-32

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

1st cycle

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

2nd cycle

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

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

3rd cycle

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

4th cycle

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

N cycle setting

NOTE

 The n cycle function should always be activated before the n cycle setting (see "Program changeover with standard torch (P8)").

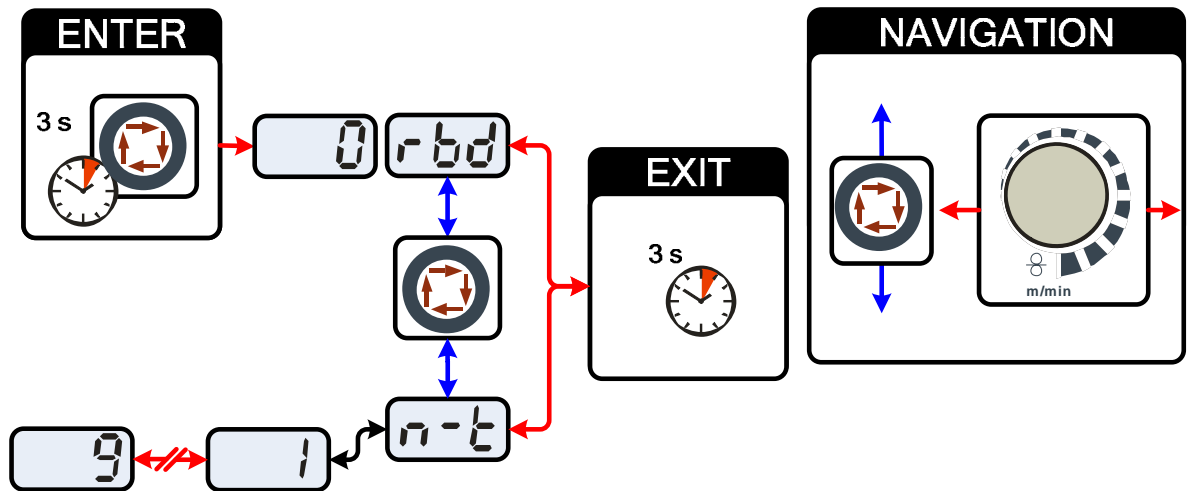


Figure 5-33

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.

Latched special tapping time setting (P11)

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

0 = no tapping

1 = 320ms (factory setting)

2 = 640ms

Hold function (P15)**Hold function active (P15 = 1)**

- Mean values for the last main program parameters used for welding are displayed.

Hold function not active (P15 = 0)

- Setpoint values for the main program parameters are displayed.

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).


Software key switch (SCH)

The key switch function allows the welding machine to be locked using the software.

5.11 TIG welding

5.11.1 Welding torch connection

NOTE

 TIG combi welding torches are connected to wire feed unit and power source. The welding current for the intermediate hose package must be connected to the welding current connection (-) at the rear of the unit!
Connection example: wire feed unit Taurus Drive 4L.

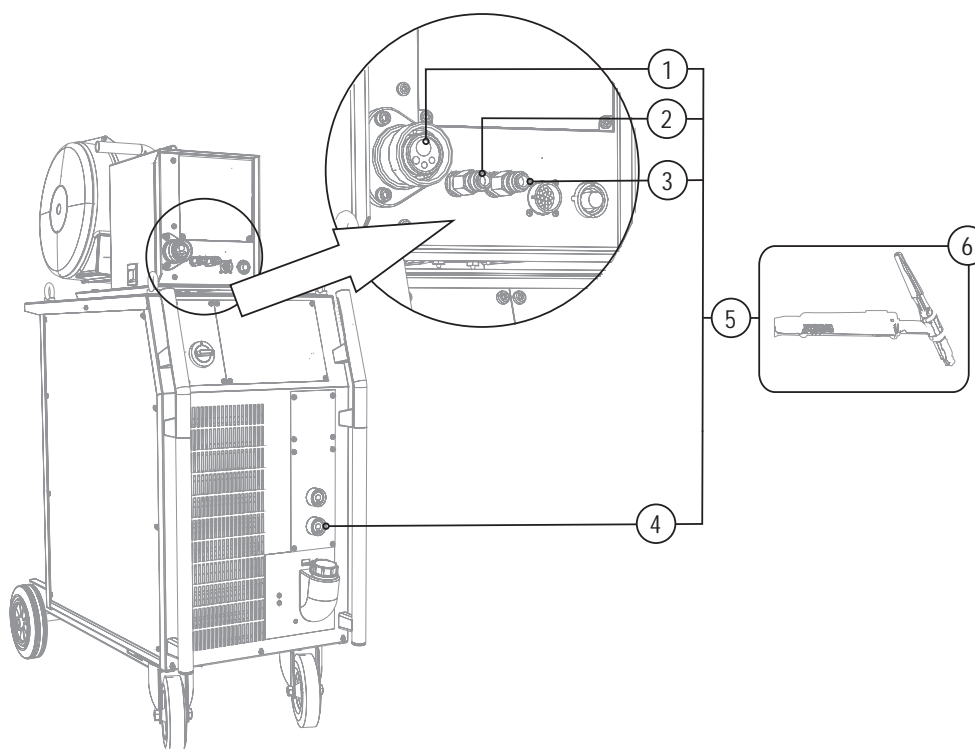






Figure 5-34

Item	Symbol	Description
1		Central connection for welding torch (Euro) Integrated welding current, shielding gas and torch trigger
2		Rapid-action closure coupling (red) coolant return
3		Rapid-action closure coupling (blue) coolant supply
4		"-" welding current connection socket • TIG welding: Welding current connection for welding torch
5		Welding torch hose package
6		Welding torch

- Insert the central plug for the welding torch into the central connector and screw together with crown nut.
- Insert the welding current plug on the combi torch into the "-" welding current connection socket and lock by turning to the right.
- Lock connecting nipples of the cooling water tubes into the corresponding rapid-action closure couplings:
Return line red to rapid-action closure coupling, red (coolant return) and supply line blue to rapid-action closure coupling, blue (coolant supply).

5.11.2 Connection for workpiece lead

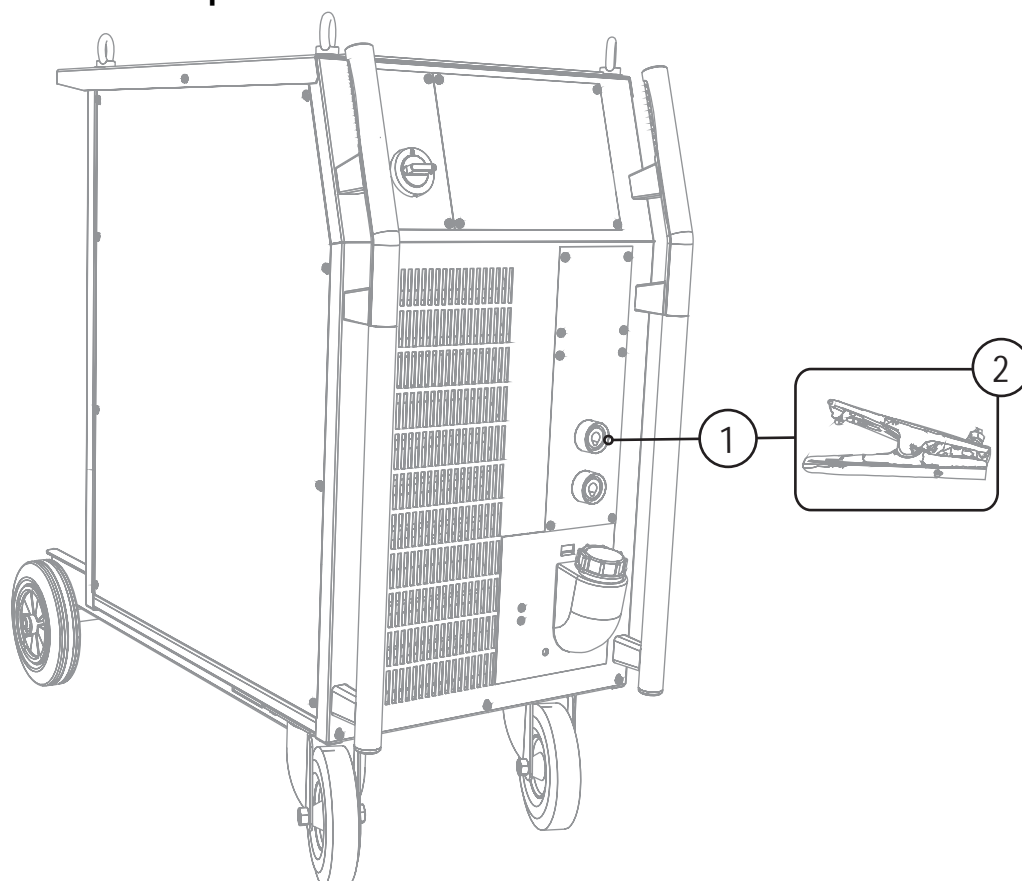


Figure 5-35

Item	Symbol	Description
1	+	Connection socket, "+" welding current <ul style="list-style-type: none"> TIG welding: Workpiece connection
2		Workpiece clamp





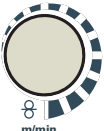


- Insert the cable plug on the work piece lead into the "+" welding current connection socket and lock by turning to the right.

5.11.3 welding task selection

- Select JOB 127 (TIG welding task).



It is only possible to change the JOB number when no welding current is flowing.

On decompact welding systems, the "JOB list" sticker is located on the inside on the wire feed unit cover; with compact machines it is on the right-hand power source cover.

Operating element	Action	Result	Display
	1 x 	Select JOB number input <ul style="list-style-type: none"> Material Gas Wire  comes on	
		Set the JOB number The machine adopts the required setting after approx. 3 seconds	

5.11.4 welding current setting

The welding current is normally set using the "Wire speed" rotary dial.

Operating element	Action	Result	Displays
		Welding current is set	Setpoint setting

5.11.5 TIG arc ignition

5.11.5.1 Liftarc ignition

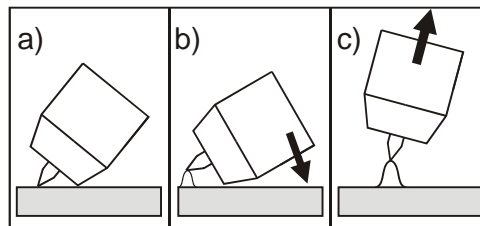


Figure 5-36

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.

5.11.6 Pulses, function sequences











NOTE



This machine series has the following features:

- Liftarc arc ignition (see "TIG arc ignition" chapter).
- Automatic cut-out when ignition fails or if the welding process is interrupted for a longer period (see "TIG automatic cut-out" chapter).

5.11.6.1 Explanation of signs and functions

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

Non-latched mode

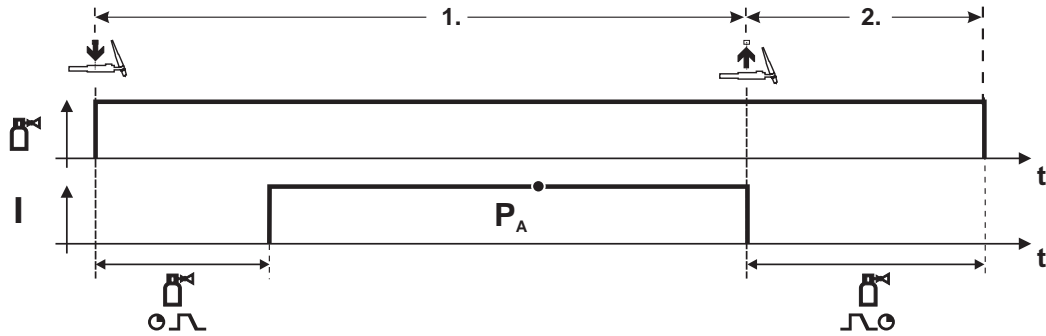



Figure 5-37

Selection

- Select non-latched operating mode .

Step 1

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

The arc is ignited using liftarc.

- Welding current flows with pre-selected setting.

Step 2

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

Special, non-latched

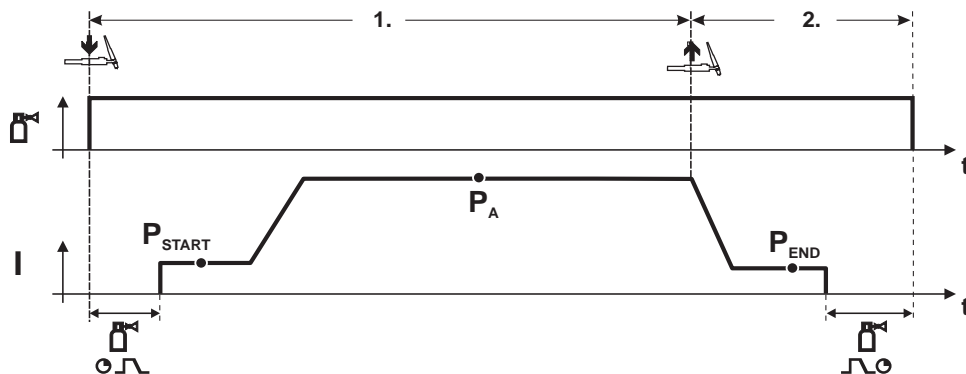


Figure 5-38

Selection

- Select non-latched special mode .

Step 1

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

The arc is ignited using liftarc.

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

Step 2

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

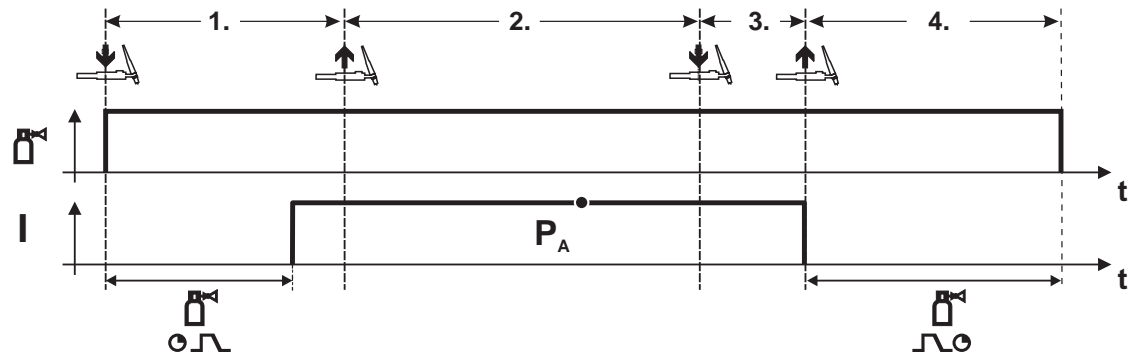
Latched mode

Figure 5-39

Selection

- Select latched operating mode

Step 1

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

The arc is ignited using liftarc.

- Welding current flows with pre-selected setting.

Step 2

- Release torch trigger (no effect)

Step 3

- Press torch trigger (no effect)

Step 4

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

Latched special

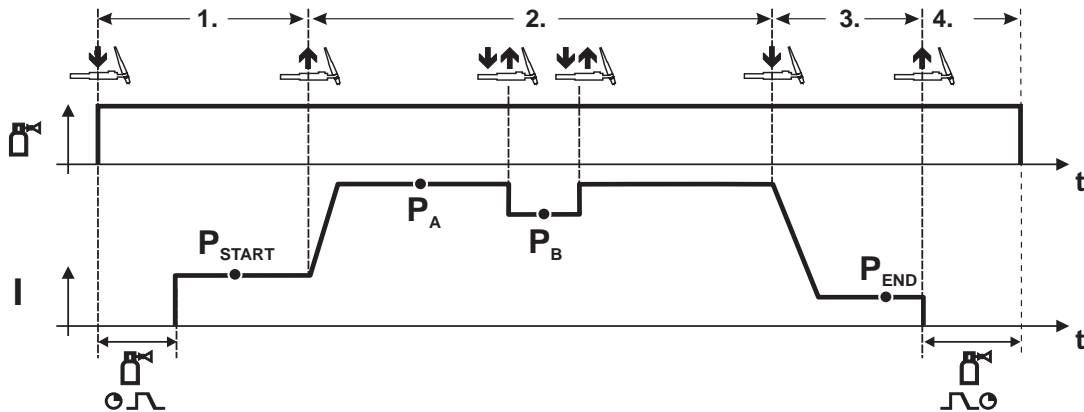



Figure 5-40

Selection

- Select latched special mode .

Step 1

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

The arc is ignited using liftarc.

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

Step 2

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

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

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

Step 3

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

Step 4

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

5.11.7 TIG automatic cut-out

NOTE



The welding machine ends the ignition process or the welding process with an

- ignition fault (no welding current flows within 5 s after the start signal)
- arc interruption (arc is interrupted for longer than 5 s)

5.11.8 TIG program sequence ("Program steps" mode)

5.11.8.1 TIG parameter overview

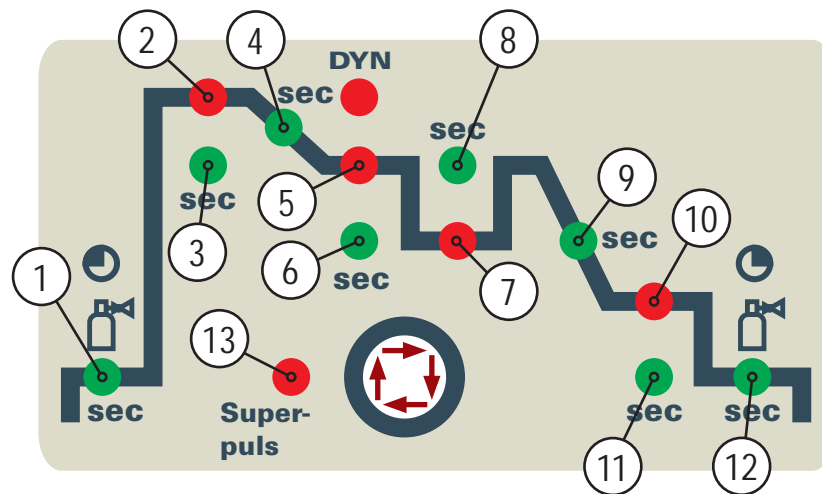


Figure 5-41

Basic parameters

Item	Meaning/explanation	Setting range
1	Gas pre-flow time	0 s to 0.9 s
2	P_{START} Ignition current	0% to 200%
3	Duration (start program)	0 s to 20 s
4	Slope duration from P_{START} to P_A	0 s to 20 s
5	P_A (main program) Welding current, absolute	5 A to 550 A
6	Duration (P_A)	0.01 s to 20.0 s
7	P_B (reduced main program) Welding current	1% to 100%
8	Duration (reduced main program)	0.01 s to 20.0 s
9	Slope duration from P_A to P_{END}	0 s to 20 s
10	P_{END} (end program) Welding current	1% to 100%
11	Duration (end program)	0 s to 20 s
12	Gas post-flow time	0 s to 20 s
13	Superpulsing	on/off

P_{START} , P_B , and P_{END} are relative programs whose welding current settings are a percentage based on the general welding current setting.

5.12 MMA welding

⚠ CAUTION



Risk of being crushed or burnt.

When replacing spent or new stick electrodes

- Switch off machine at the main switch
- Wear appropriate safety gloves
- Use insulated tongs to remove spent stick electrodes or to move welded workpieces and
- Always put the electrode holder down on an insulated surface.

5.12.1 Connecting the electrode holder and workpiece lead

NOTE



Polarity depends on the instructions from the electrode manufacturer given on the electrode packaging.

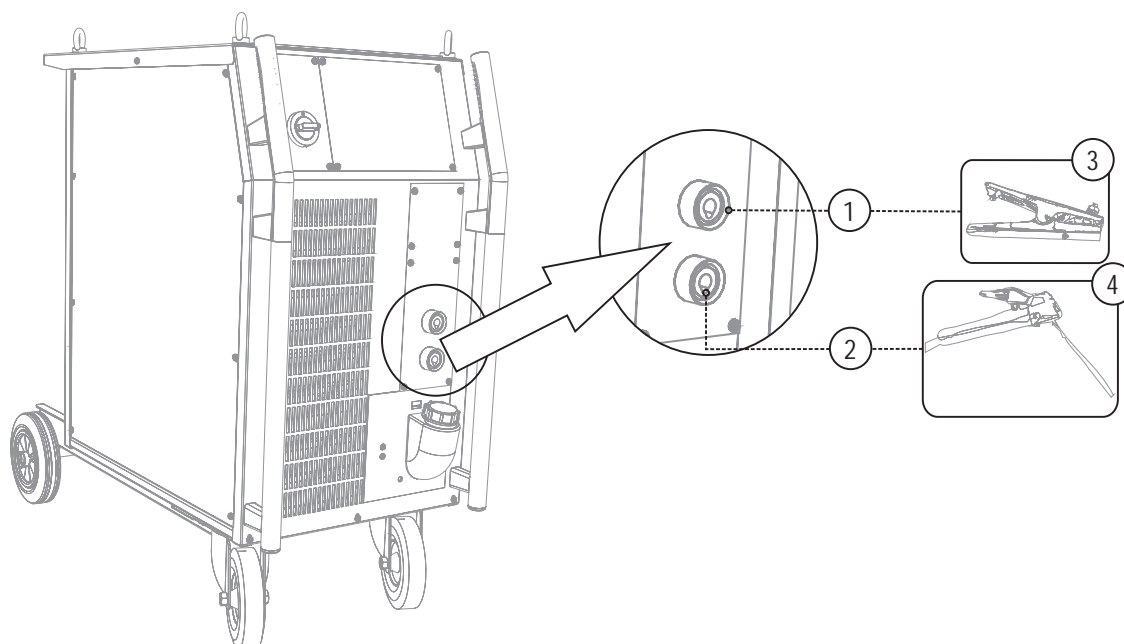


Figure 5-42

Item	Symbol	Description
1		Connection socket, "+" welding current
2		Connection socket, "-" welding current
3		Workpiece clamp
4		Electrode holder




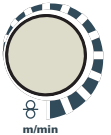


- Insert cable plug of the electrode holder into either the "+" or "-" welding current connection socket and lock by turning to the right.
- Insert cable plug of the workpiece lead into either the "+" or "-" welding current connection socket and lock by turning to the right.

5.12.2 welding task selection

- Select JOB 128 (MMA welding task).

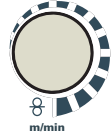

It is only possible to change the JOB number when no welding current is flowing.

On decompact welding systems, the "JOB list" sticker is located on the inside on the wire feed unit cover; with compact machines it is on the right-hand power source cover.




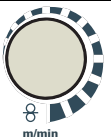



Operating element	Action	Result	Display
	1 x 	Select JOB number input Material Gas Wire ● comes on	
		Set the JOB number The machine adopts the required setting after approx. 3 seconds	

5.12.3 welding current setting

The welding current is normally set using the "Wire speed" rotary dial.

Operating element	Action	Result	Displays
		Welding current is set	Setpoint setting

5.12.4 Arcforce

Operating element	Action	Result	Display
		Select arcforcing welding parameter LED for the button ● is on.	
		Arcforcing setting for electrode types: (Setting range -40 to 40) Negative values Rutile Values around zero Basic Positive values Cellulose	 

5.12.5 Hotstart

The hotstart device improves the ignition of the stick electrodes using an increased ignition current.

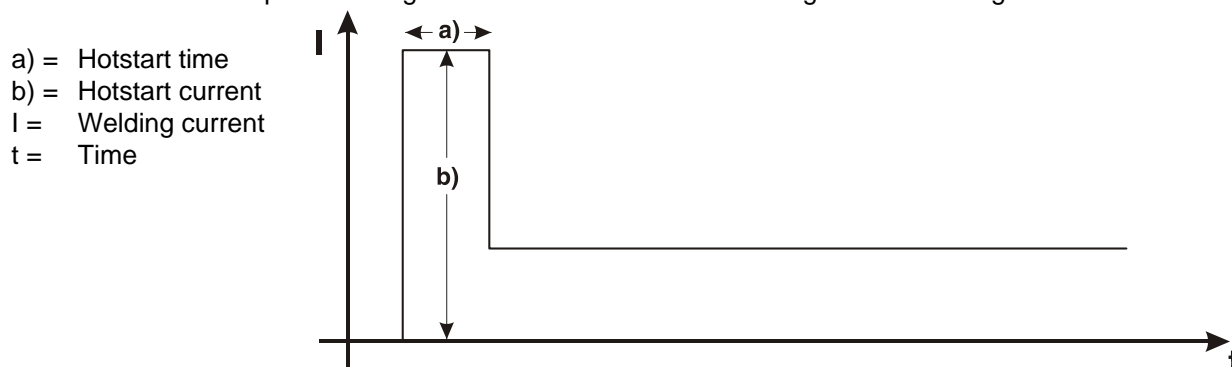
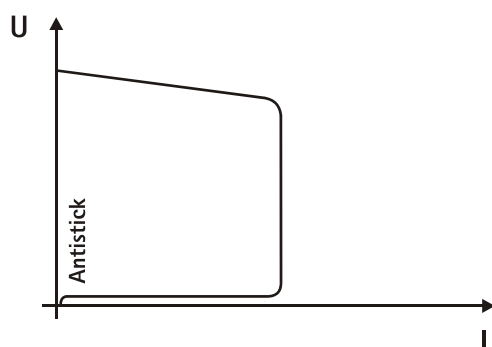


Figure 5-43

5.12.6 Antistick



Anti-stick prevents the electrode from annealing.

If the electrode sticks in spite of the Arcforce device, the machine automatically switches over to the minimum current within about 1 second to prevent the electrode from overheating. Check the welding current setting and correct according to the welding task!

Figure 5-44

5.12.7 Parameter overview

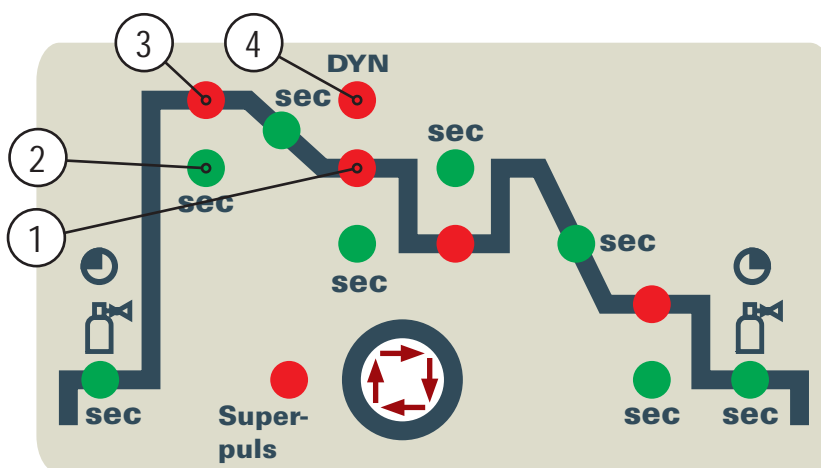


Figure 5-45

Basic parameters

Item	Meaning/explanation	Setting range
1	Welding current	5 A to maximum welding current
2	Hotstart time	0 to 20 s
3	Hotstart current	0 to 200 %
4	Arcforce	-40 to 40

NOTE



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

5.13 PC Interfaces

CAUTION



Equipment damage or faults may occur if the PC is connected incorrectly!

Not using the SECINT X10USB interface results in equipment damage or faults in signal transmission. The PC may be destroyed due to high frequency ignition pulses.

- Interface SECINT X10USB must be connected between the PC and the welding machine!
- The connection must only be made using the cables supplied (do not use any additional extension cables)!

PC 300 welding parameter software

Create all welding parameters quickly on the PC and easily transfer them to one or more welding machines (accessories: set consisting of software, interface, connection leads).

6 Maintenance, care and disposal



DANGER



Risk of injury from electric shock!

Cleaning machines that are not disconnected from the mains can lead to serious injuries!

- Disconnect the machine completely from the mains.
- Remove the mains plug!
- Wait for 4 minutes until the capacitors have discharged!

6.1 General

When used in the specified environmental conditions and under normal operating conditions, this machine is largely maintenance-free and requires a minimum of care.

There are some points, which should be observed, to guarantee fault-free operation of your welding machine. Among these are regular cleaning and checking as described below, depending on the pollution level of the environment and the length of time the unit is in use.

6.2 Maintenance work, intervals

6.2.1 Daily maintenance tasks

- Mains supply lead and its strain relief
- Welding current cables (check that they are fitted correctly and secured)
- Gas tubes and their switching equipment (solenoid valve)
- Gas cylinder securing elements
- Operating, message, safety and adjustment devices (Functional test)
- Other, general condition

6.2.2 Monthly maintenance tasks

- Casing damage (front, rear and side walls)
- Transport rollers and their securing elements
- Transport elements (strap, lifting lugs, handle)
- Selector switches, command devices, emergency stop devices, voltage reducing devices, message and control lamps
- Check coolant tubes and their connections for impurities
- Check that the wire guide elements (inlet nipple, wire guide tube) are fitted securely.

6.2.3 Annual test (inspection and testing during operation)

NOTE



The welding machine may only be tested by competent, capable persons!

A capable person is one who, because of his training, knowledge and experience, is able to recognise the dangers that can occur while testing welding power sources as well as possible subsequent damage and who is able to implement the required safety procedures.



For further information, please see the accompanying supplementary sheets "Machine and Company Data, Maintenance and Testing, Warranty"!

The former term of repetition test has been replaced due to a change in the corresponding standard with "Inspection and testing during operation".

In addition to the regulations on the test given here, the relevant local laws and regulations must also be observed.

6.3 Repair Work



DANGER



Do not carry out any unauthorised repairs or modifications!

To avoid injury and equipment damage, the unit must only be repaired or modified by specialist, skilled persons!

The warranty becomes null and void in the event of unauthorised interference.

- Appoint only skilled persons for repair work (trained service personnel)!

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.

6.4 Disposing of equipment

NOTE



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!



6.4.1 Manufacturer's declaration to the end user

- According to European provisions (guideline 2002/96/EG of the European Parliament and the Council of January, 27th 2003), 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 is to be placed for disposal or recycling in the waste separation systems provided for this purpose.
- According to German law (law governing the distribution, taking back and environmentally correct disposal of electric and electronic equipment (ElektroG) from 16.03.2005), 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.
- Information about giving back used equipment or about collections can be obtained from the respective municipal administration office.
- EWM participates in an approved waste disposal and recycling system and is registered in the Used Electrical Equipment Register (EAR) under number WEEE DE 57686922.
- In addition to this, returns are also possible throughout Europe via EWM sales partners.

6.5 Meeting the requirements of RoHS

We, EWM HIGHTEC Welding GmbH Mündersbach, hereby confirm that all products supplied by us which are affected by the RoHS Directive, meet the requirements of the RoHS (Directive 2002/95/EC).

7 Rectifying faults

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

7.1 Customer checklist

Error	Possible cause	Remedy
No wire feed	Spatter has blocked the contact nozzle Feed roller is slipping Wire feed motor is not turning over Wire bent Wire coil brake too strong Torch defective	Clean nozzle, spray on separating agent Check contact pressure roller. Check for wear and tear and replace if necessary Check automatic cut-out on the wire feed motor Unfasten contact nozzle, cut off wire after bent section Set coil brake correctly Replace
Loop in wire	Core or nozzle blocked Tube package bent too much	Clean, replace if necessary Stretch out tube package
Wire feed irregular	Wire feed coils blocked or damaged Wire coil brake too strong Contact nozzle too small	Clean, replace if necessary Set coil brake correctly Check, replace if necessary
Weld seam porous	Incorrect shielding gas setting Gas cylinder empty Electrode is projecting too far forwards Air current Poor wire quality Very dirty workpiece Local overheating of the workpiece Gas line is drawing in air	Correct: Rule of thumb "Wire diameter *10 = flow in l/min" Change Move torch closer to weld seam Shield welding area Use high quality wire, store in a dry and clean location. Clean workpiece first Include occasional pauses in welding to allow the workpiece to cool down. Check seal tightness on lines, seal / replace if necessary.
Machine will not switch on	No mains voltage Power source faulty	Check the mains fuses, replace as necessary Contact service
Strong spatter	Blow effect No gas	Connect workpiece line more appropriately Set gas quantity to match the application
No welding current	Workpiece line has no or poor contact Power source overheating	Check connection Allow machine to cool down
Wire feed or gas valve faulty	Electronic control	Check line connections, replace electronics if necessary. Contact service
Unstable arc, heavy "flickering".	Interference within the welding current cable	Fully unroll welding current cables, torch tube packages and, if applicable, intermediate tube packages. Avoid loops!

7.2 Error messages (power source)

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

NOTE



A welding machine error is indicated by an error code being displayed (see table) on the display on the machine control.

In the event of a machine error, the power unit is shut down.

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

Error	Category		Possible cause	Remedy
	a)	b)		
Err 1	-	x	Mains overvoltage	Check the mains voltages and compare with the connection voltages of the welding machine (see Technical Data, chapter 1)
Err 2	-	x	Mains undervoltage	
Err 3	x	-	Welding machine, excess temperature	Allow the machine to cool down (mains switch to "1")
Err 4	-	x	Low coolant level	Top up the coolant Leak in the coolant circuit > rectify the leak and top up the coolant Coolant pump is not working > check excess current release on air cooling unit
Err 5	-	x	Error WF unit, WF motor fault, Speedometer error	Check wire feed unit check wire-feeding no signal from speedometer, > inform Service
Err 7	-	x	Secondary overvoltage	Inverter error > inform Service
Err 8	-	x	Earth fault between welding wire and earth line	Separate the connection between the welding wire and casing or an earthed object
Err 9	x	-	Fast shut-down triggered by BUSINT X10 or RINT X11	Rectify error on robot
Err 10	-	x	Arc interruption triggered by BUSINT X10 or RINT X11	Check wire feed
Err 11	-	x	Ignition fault after 5 s triggered by BUSINT X10 or RINT X11	Check wire feed

Category legend for error reset

- a) The error message will disappear once the error has been rectified.
- b) Errors can only be reset by switching the machine off and back on again.

7.3 Resetting JOBS (welding tasks) to the factory settings

NOTE

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

7.3.1 Resetting a single JOB

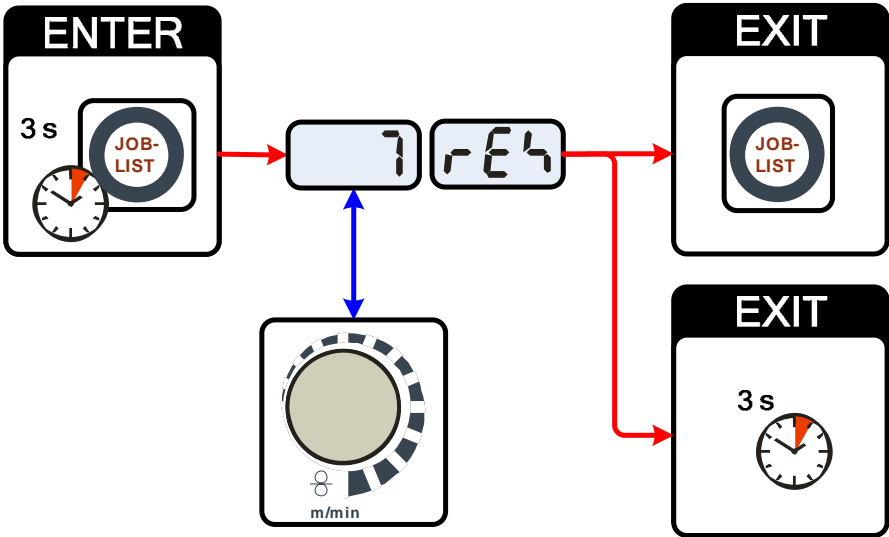


Figure 7-1

Display	Setting/selection
	Reset to factory settings The RESET will be done after pressing the button. The menu will be ended when no changes are done after 3 sec.
	JOB-number (example) The shown JOB will be set to ex works.

7.3.2 Resetting all JOBs

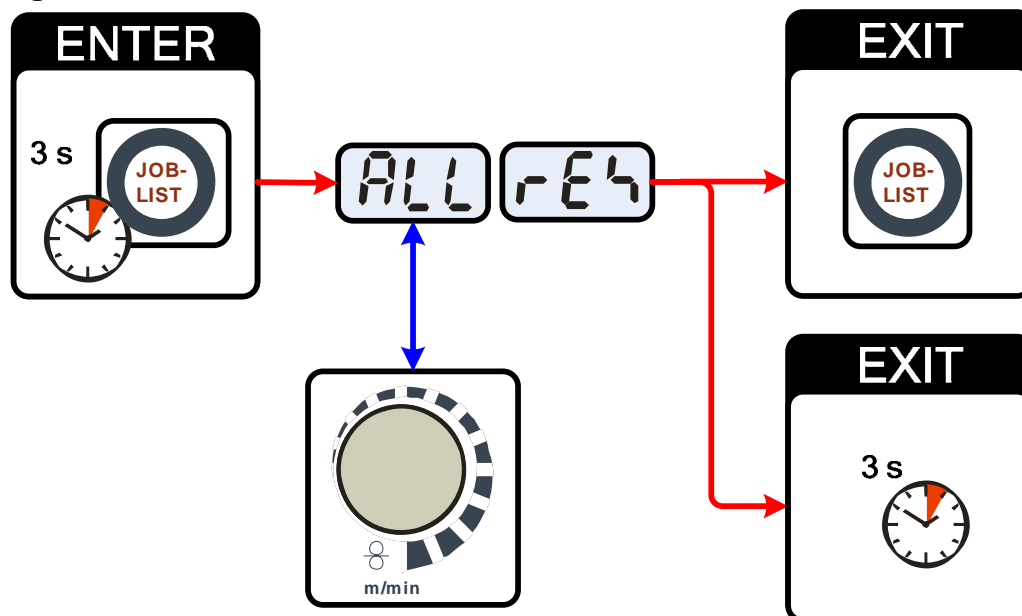



Figure 7-2

Display	Setting/selection
	Reset to factory settings The RESET will be done after pressing the button. The menu will be ended when no changes are done after 3 sec.

7.4 General operating problems

Problem	Possible cause > remedy
Machine control without displaying the signal lights after switching on	<ul style="list-style-type: none"> Phase failure > check mains connection (fuses)
no welding performance	<ul style="list-style-type: none"> Phase failure > check mains connection (fuses)
various parameters cannot be set	<ul style="list-style-type: none"> Entry level is blocked > disable access lock (see chapter entitled "key switch", if available)

8 Technical data

8.1 Taurus 351, 451, 551

NOTE



Performance specifications and guarantee only in connection with original spare and replacement parts!

	351	451	551
Setting range welding current/voltage:			
TIG	5 to 350 A 10.2 to 24.0 V	5 to 450 A 10.2 to 28 V	5 to 550 A 10.2 to 32 V
MMA	5 to 350 A 20.2 to 34.0 V	5 to 450 A 20.2 to 38 V	5 to 550 A 20.2 to 42 V
MIG/MAG	5 to 350 A 14.3 to 31.5 V	5 to 450 A 14.3 to 36.5 V	5 to 550 A 14.3 to 41.5 V
Duty cycle at 25 °C			
60%	-	-	550 A
80%	-	-	520 A
100%	350 A	450 A	450 A
Duty cycle at 40 °C			
60%			550 A
80%	-	450 A	-
100%	350 A	420 A	420 A
Load alternation	10 min. (60% DC \triangle 6 min. welding, 4 min. break)		
Open circuit voltage	79 V		
Mains voltage (tolerances)	3 x 400 V (-25% to +20%)		
Frequency	50/60 Hz		
Mains fuse (safety fuse, slow-blow)	3 x 25 A	3 x 35 A	
Mains connection lead	H07RN-F4G6		
Maximum connected load			
MIG/MAG	13.9 kVA	20.7 kVA	28 kVA
TIG	10.6 kVA	15.9 kVA	22.2 kVA
MMA	15.0 kVA	21.6 kVA	29.2 kVA
Recommended generator rating	20.3 kVA	29.1 kVA	39.4 kVA
Cosφ	0.99		
Insulation class/protection classification	H/IP 23		
Ambient temperature	-20 °C to +40 °C		
Machine/torch cooling	Fan/water		
Cooling capacity at 1 l/min	1500 W		
Maximum flow rate	5 l/min.		
Maximum coolant output pressure	3.5 bar		
Maximum tank capacity	12 l		
Coolant	Ex works: KF 23E (-10 °C to +40 °C) or KF 37E (-20 °C to +10 °C)		
Workpiece lead	70 mm ²	95 mm ²	
Dimensions L x W x H in mm	1100 x 455 x 1000		
Weight	125 kg		
Protection classification	IP 23		
Constructed to standards	IEC 60974-1, -2, -10/§/C €		

9 Accessories, options

9.1 System components

Type	Designation	Item no.
Taurus Drive 4L	Wire feed unit, water, Euro central connector	090-005134-00502
Taurus Drive 4	Wire feed unit, water, Euro central connector	090-005147-00502

9.2 General accessories

Type	Designation	Item no.
AK300	Adapter for K300 basket coil	094-001803-00001
TYP 1	Frost protection tester	094-014499-00000
KF 23E-10	Coolant (-10 °C), 9.3 l	094-000530-00000
KF 23E-200	Coolant (-10°C), 200 litres	094-000530-00001
KF 37E-10	Coolant (-20 °C), 9.3 l	094-006256-00000
KF 37E-200	Coolant (-20 °C), 200 l	094-006256-00001
DM1 32L/MIN	Manometer pressure reducer	094-000009-00000
G1 2M G1/4 R 2M	Gas hose	094-000010-00001
GS16L G1/4" SW 17	Pilot static tube	094-000914-00000
GS25L G1/4" SW 17	Pilot static tube	094-001100-00000
5POLE/CEE/32A/M	Machine plug	094-000207-00000
Schlauch Bruecke	Tube bridge	092-007843-00000

9.3 Welding torch

9.3.1 Water cooled

9.3.1.1 Taurus 351, 451

Type	Designation	Item no.
MT450W 3M EZA	MIG welding torch, water cooled	094-500002-00000
MT450W 3M U/D EZA	MIG welding torch, Up/Down, water cooled	094-500002-00200

9.3.1.2 Taurus 551

Type	Designation	Item no.
MT550WR 3M EZA	MIG welding torch, water cooled	094-500004-00000
MT550WR 3M U/D EZA	MIG welding torch, Up/Down, water cooled	094-500004-00200
MT550WLR 3M EZA	MIG welding torch, water cooled, long neck	094-500004-20000
MT550WLR 3M U/D EZA	MIG welding torch, UP/DOWN, water cooled, long neck	094-500004-20200

9.4 TIG combi torches

Type	Designation	Item no.
TIG 18 WZ 4M COMBI	TIG combi welding torch, water cooled, central	094-000654-00000
TIG 18 WZ 8M KOMBI	TIG combi welding torch, water cooled, central	094-000654-00008

9.5 Electrode holder / workpiece lead

Type	Designation	Item no.
EH70QMM 4M	Electrode holder	092-000011-00000
EH95QMM 4M	Electrode holder	092-000010-00000
WK70QMM 4M Z	Workpiece cable, grip	092-000013-00000
WK95QMM 4M Z	Workpiece lead, tongs	092-000171-00000

9.6 Remote control / connection cable

Type	Designation	Item no.
R10	Remote control with WF speed correction	090-008087-00000
RA5 19POL 5M	Remote control e.g. connection cable	092-001470-00005
RA10 19POL 10M	Remote control e.g. connection cable	092-001470-00010
RA20 19POL 20M	Remote control e.g. connection cable	092-001470-00020

9.7 Options

Type	Designation	Item no.
ON FSB WHEELS W/T/P	Retrofit option for locking brake for machine wheels	092-002110-00000
ON HOSE/FR MOUNT DK	Optional holder for tubes and remote control for machines with star handle	092-002117-00000
ON HOSE/FR MOUNT	Optional holder for tubes and remote control for machines without star handle	092-002116-00000
ON FILTER T/P	Retrofit option contamination filter for air inlet	092-002092-00000
ON TOOL BOX	Retrofit option tool box	092-002138-00000
ON HOLDER GAS BOTTLE <50L	Retrofit option holding plate for gas bottle <50 L	092-002151-00000
ON SHOCK PROTECT	Ram protection retrofit option	092-002154-00000
ON automatic breaker	Optional automatic breaker retrofitting	092-002412-00000
ON operating hours counter	Optional operating hours counter retrofitting	092-002434-00000

9.8 Computer communication

Type	Designation	Item no.
PC300.NET	PC300.Net welding parameter software set incl. cable and SECINT X10 USB interface	090-008265-00000
CD-ROM PC300.NET	PC300.Net Update on CD-ROM	092-008172-00001



9.9 Intermediate tube packages



9.9.1 Water cooled

Type	Designation	Item no.
ZWIPA 70QMM MIG W 1M	Intermediate hose package, water	094-000406-00000
ZWIPA 70QMM MIG W 5M	Intermediate hose package, water	094-000406-00001
ZWIPA 70QMM MIG W 10M	Intermediate hose package, water	094-000406-00002
ZWIPA 95QMM MIG W 1M	Intermediate hose package, water	094-000407-00000
ZWIPA 95QMM MIG W 5M	Intermediate hose package, water	094-000407-00001
ZWIPA 95QMM MIG W 10M	Intermediate hose package, water	094-000407-00002

10 Appendix A

10.1 JOB-List

ewm®		JOB-LIST		094-015119-00501			
● Massivdraht / Solid Wire	 Material	 % Gas	Ø Wire				
			0,8	1,0	1,2	1,6	
			Job-Nr.				
	SG2/3 G3/4 Si1	CO ₂ 100 / C1	1	3	4	5	
Ar80-90 / M2		6	8	9	10		
CrNi	Ar91-99 / M12- M13	34	35	36	37		
	Ar/He / I3	42	43	44	45		
CuSi	Ar100 / I1	98	99	100	101		
CuAl	Ar100 / I1	106	107	108	109		
CuSi Löten / Brazing	Ar100 / I1	114	115	116	117		
	Ar91-99 / M12- M13	110	111	112	113		
CuAl Löten / Brazing	Ar100 / I1	122	123	124	125		
	Ar91-99 / M12- M13	118	119	120	121		
AlMg	Ar100 / I1	74	75	76	77		
	Ar/He / I3	78	79	80	81		
AlSi	Ar100 / I1	82	83	84	85		
	Ar/He / I3	86	87	88	89		
Al99	Ar100 / I1	90	91	92	93		
	Ar/He / I3	94	95	96	97		

● Fülldraht / Flux-Cored Wire	 Material	 % Gas	Ø Wire			
			0,8	1,0	1,2	1,6
			Job-Nr.			
	SG2/3 G3/4 Si1 Metal	Ar80-90 / M2	235	237	238	239
SG2/3 G3/4 Si1 Rutil / Basic	Ar80-90 / M2	240	242	243	244	
CrNi Metal	Ar91-99 / M12- M13	227	228	229	230	
CrNi Rutil / Basic	Ar98/2 / M13	231	232	233	234	
	Ar92/8 / M22	210	211	212	213	
CrNiMn Rutil / Basic	Ar98/2 / M13	223	224	225	226	
	Ar92/8 / M22	206	207	208	209	

SP1		129
SP2		130
SP3		131
GMAW non synergic <8m / min		188
GMAW non synergic >8m / min		187
WIG / TIG		127
MMA / E-Hand		128

Figure 10-1

11 Appendix B

11.1 Overview of EWM branches

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