Operating instructions

EN

Remote control

RT1 19POL
RTF1 19POL
RTG1
RTP1 19POL
RTP2 19POL
RTP3 spotArc 19POL
RT PWS1 19POL
RTA PWS2
RTAC1 19POL

099-008097-EW501 | Observe additional system documents! | 7.8.2023

General instructions

⚠ WARNING

Read the operating instructions!

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

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

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

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

Liability relating to the operation of this equipment is restricted solely to the function of the equipment. No other form of liability, regardless of type, shall be accepted. This exclusion of liability shall be deemed accepted by the user on commissioning the equipment.
The manufacturer is unable to monitor whether or not these instructions or the conditions and methods are observed during installation, operation, usage and maintenance of the equipment.

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

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The content of this document has been prepared and reviewed with all reasonable care. The information provided is subject to change; errors excepted.

Data security

The user is responsible for backing up data of all changes from the factory setting. The user is liable for erased personal settings. The manufacturer does not assume any liability for this.

1 Contents

2 For your safety

2.1 Notes on using these operating instructions

⚠ DANGER

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

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

⚠ WARNING

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

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

⚠ CAUTION

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

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

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

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

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

2.2 Explanation of icons

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

2.3 Safety instructions

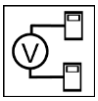
⚠ WARNING

Risk of accidents due to non-compliance with the safety instructions!
Non-compliance with the safety instructions can be fatal!

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

Risk of injury from electrical voltage!
Voltages can cause potentially fatal electric shocks and burns on contact. Even low voltages can cause a shock and lead to accidents.

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



Hazard when interconnecting multiple power sources!
If a number of power sources are to be connected in parallel or in series, only a technical specialist may interconnect the sources as per standard IEC 60974-9:2010: Installation and use and German Accident Prevention Regulation BVG D1 (formerly VBG 15) or country-specific regulations.
Before commencing arc welding, a test must verify that the equipment cannot exceed the maximum permitted open circuit voltage.

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

Risk of injury due to radiation or heat!
Arc radiation can lead to skin and eye injuries.
Contact with hot workpieces and sparks can lead to burns.

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

⚠ WARNING

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

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

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

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

Fire hazard!
Due to the high temperatures, sparks, glowing parts and hot slag that occur during welding, there is a risk of flames.

- Be watchful of potential sources of fire in the working area!
- Do not carry any easily inflammable objects, e.g. matches or lighters.
- Ensure suitable fire extinguishers are available in the working area!
- Thoroughly remove any residue of flammable materials from the workpiece prior to starting to weld.
- Only further process workpieces after they have cooled down. Do not allow them to contact any flammable materials!

⚠ CAUTION

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

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

Noise 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!

According to IEC 60974-10, welding machines are divided into two classes of electromagnetic compatibility (the EMC class can be found in the Technical data) > *see 7 chapter*:

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

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

Setting up and operating

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

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

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

Recommendations for **reducing interference emission**

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

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

- Follow the maintenance instructions > *see 6 chapter*!
- Unwind the welding leads completely!
- Shield radiation-sensitive equipment or facilities appropriately!
- The function of pacemakers may be impaired (seek medical advice if necessary).

⚠ CAUTION

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

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

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

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

Requirements for connection to the public mains network

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

2.4 Transport and installation

⚠ WARNING

Risk of injury due to improper handling of shielding gas cylinders!
Improper handling and insufficient securing of shielding gas cylinders can cause serious injuries!

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

⚠ CAUTION

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

- Disconnect all supply lines before transport!

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

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

Risk of accidents due to incorrectly installed leads!
Incorrectly installed leads (mains, control and welding leads or intermediate hose packages) can present a tripping hazard.

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

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

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

☞ ***The units are designed for operation in an upright position!***
Operation in non-permissible positions can cause equipment damage.

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

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

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

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

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

3 Intended use

⚠ WARNING

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

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

3.1 Applications

Remote controls are used for the remote operation of various machine functions.

3.1.1 Warranty

For more information refer to the "Warranty registration" brochure supplied and our information regarding warranty, maintenance and testing at www.ewm-group.com!

3.1.2 Declaration of Conformity

This product corresponds in its design and construction to the EU directives listed in the declaration. The product comes with a relevant declaration of conformity in the original.
The manufacturer recommends carrying out the safety inspection according to national and international standards and guidelines every 12 months (from commissioning).

3.1.3 Service documents (spare parts and circuit diagrams)

⚠ WARNING

No improper repairs and modifications!
To prevent injuries and damage to the machine, only competent personnel (authorised service personnel) are allowed to repair or modify the machine.
Unauthorised manipulations will invalidate the warranty!

- Instruct competent personnel (authorised service personnel) to repair the machine.

Original copies of the circuit diagrams are enclosed with the unit.
Spare parts can be obtained from the relevant authorised dealer.

3.2 Use and operation solely with the following machines

These remote controls are specifically designed for use with the following welding machines and offer various setting options depending on the model.

	RT1 19POL	RTF1 19POL	RTG1 19POL	RTP1,-2,-3	RT PWS1	RTA PWS2	RTAC1
Pico 180 puls	✓	✓	✓	✗	✗	✗	✗
Pico 200 puls	✓	✓	✓	✗	✗	✓ [1]	✗
Pico 300 cel	✓	✓	✓	✗	✗	✗	✗
Pico 300 cel pws	✓	✓	✓	✗	✓	✗	✗
Pico 350 cel puls	✓	✓	✓	✗	✗	✓ [1,2]	✗
Pico 350 cel puls pws	✓	✓	✓	✗	✓	✓ [3]	✗
Pico 350 cel puls pws dgs	✓	✓	✓	✗	✓	✓ [4]	✗
Pico 400 cel puls	✓	✓	✓	✗	✗	✓ [1,5]	✗
Pico 400 cel puls pws	✓	✓	✓	✗	✓	✓ [6]	✗
Picotig 200	✓	✓	✓	✗	✗	✗	✗
Picotig 200 AC/DC	✓	✓	✓	✓	✗	✗	✗
Picotig 220	✓	✓	✓	✗	✗	✓ [1]	✗
Microplasma 25-2, 55-2, 105-2	✓	✓	✓	RTP1	✗	✗	✗
Tetrix 200	✓	✓	✓	✓	✗	✗	✗
Tetrix XQ 230	✓	✓	✓	✓	✗	✗	✗
Tetrix XQ 230 AC/DC	✓	✓	✓	✓	✗	✗	✓
Tetrix 300	✓	✓	✓	✓	✗	✗	✗
Tetrix 300 AC/DC	✓	✓	✓	✓	✓	✗	✓
Tetrix XQ 300 AC/DC	✓	✓	✓	✗	✓	✗	✓
Tetrix 351-551 DC	✓	✓	✓	✓	✗	✗	✗
Tetrix XQ 350-600 DC	✓	✓	✓	✗	✗	✗	✗
Tetrix 351-551 AC/DC	✓	✓	✓	✓	✓	✗	✓
Tetrix XQ 350-500 AC/DC	✓	✓	✓	✗	✓	✗	✓
Taurus 400 Basic	✓	✓	✓	✗	✗	✗	✗

[1] Limited functionality

[2] Compatible from serial number 0000743313

[3] Compatible from serial number 0000741710

[4] Compatible from serial number 0000756635

[5] Compatible from serial number 0000748457

[6] Compatible from serial number 0000780887

3.3 Part of the complete documentation

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

The illustration shows a general example of a welding system.

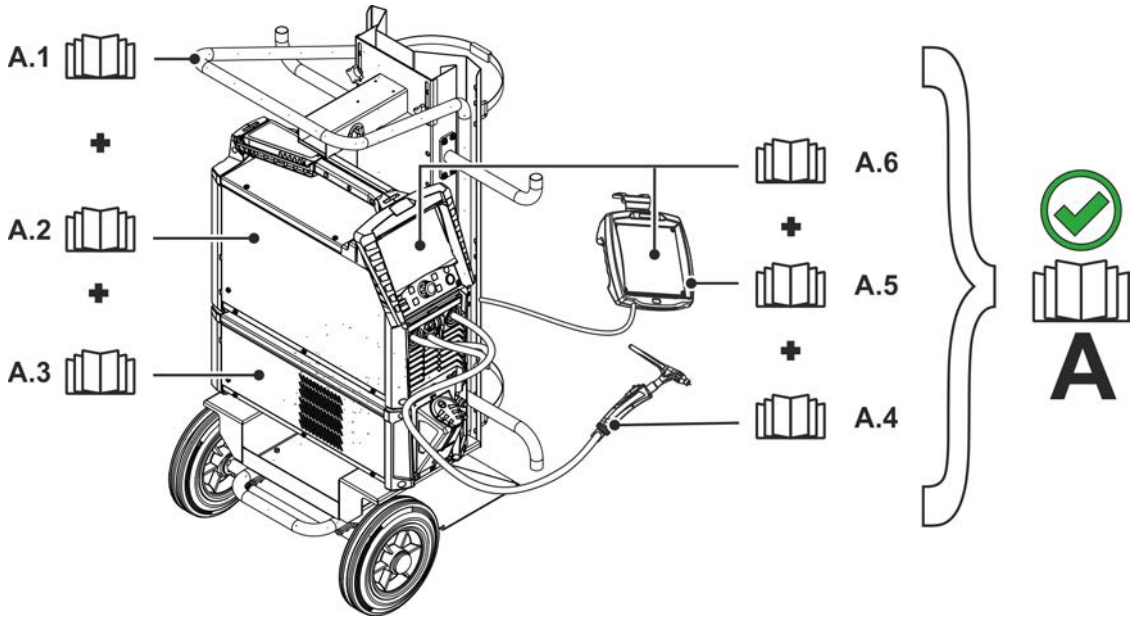


Figure 3-1

Item	Documentation
A.1	Transport vehicle
A.2	Power source
A.3	Cooling unit
A.4	Welding torch
A.5	Remote control
A.6	Control
A	Complete documentation

4 Machine description – quick overview

4.1 RT1 19POL

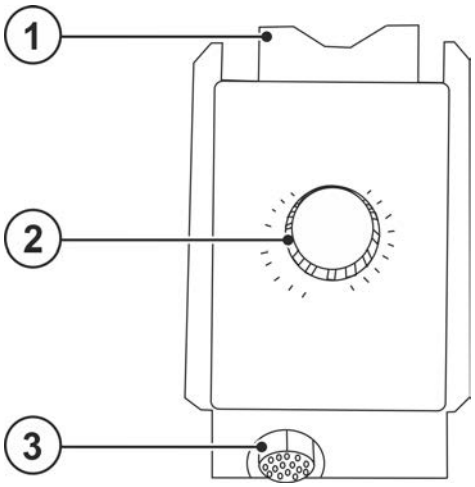
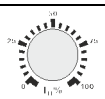


Figure 4-1

Item	Symbol	Description
1		**Holder for suspending the remote control.**
2		**Welding current rotary dial** Infinitely adjustable welding current, 0% to 100% of the main current preset on the power source.
3		**19-pole connection socket (analogue)** For connecting the control lead.

4.2 RTF1 19POL

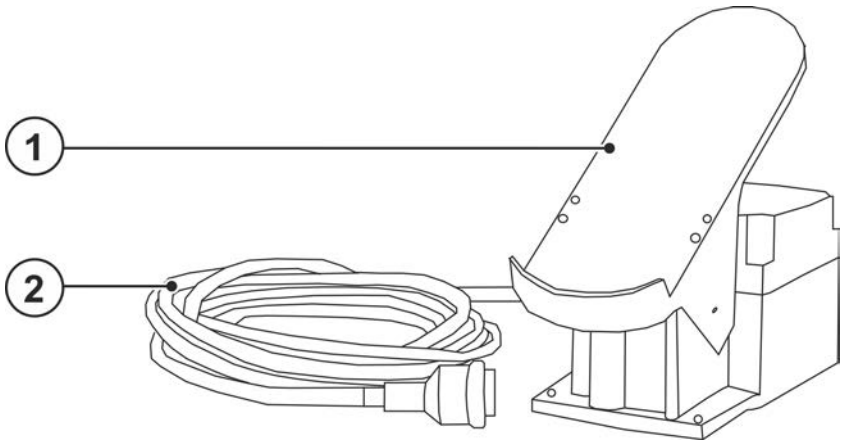


Figure 4-2

Item	Symbol	Description
1		**Foot-operated switch**
2		**Connection cable, 19-pole**

4.3 RTG1 19POL

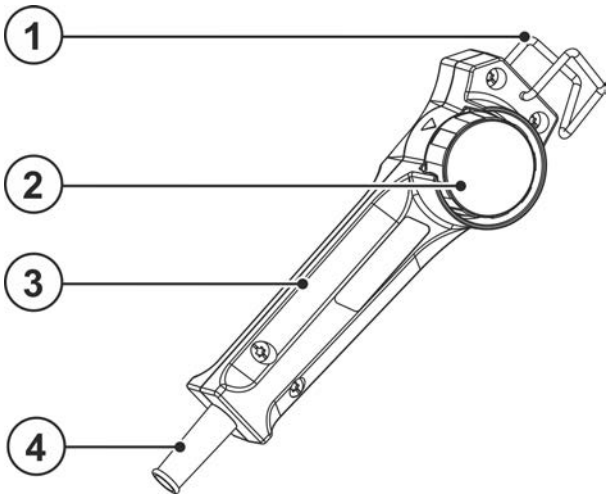
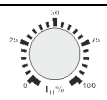


Figure 4-3

Item	Symbol	Description
1		**Holder for suspending the remote control.**
2		**Welding current rotary dial** Infinitely adjustable welding current, 0% to 100% of the main current preset on the power source.
3		**Torch body**
4		**Connection cable, 19-pole**

4.4 RTP1 19POL

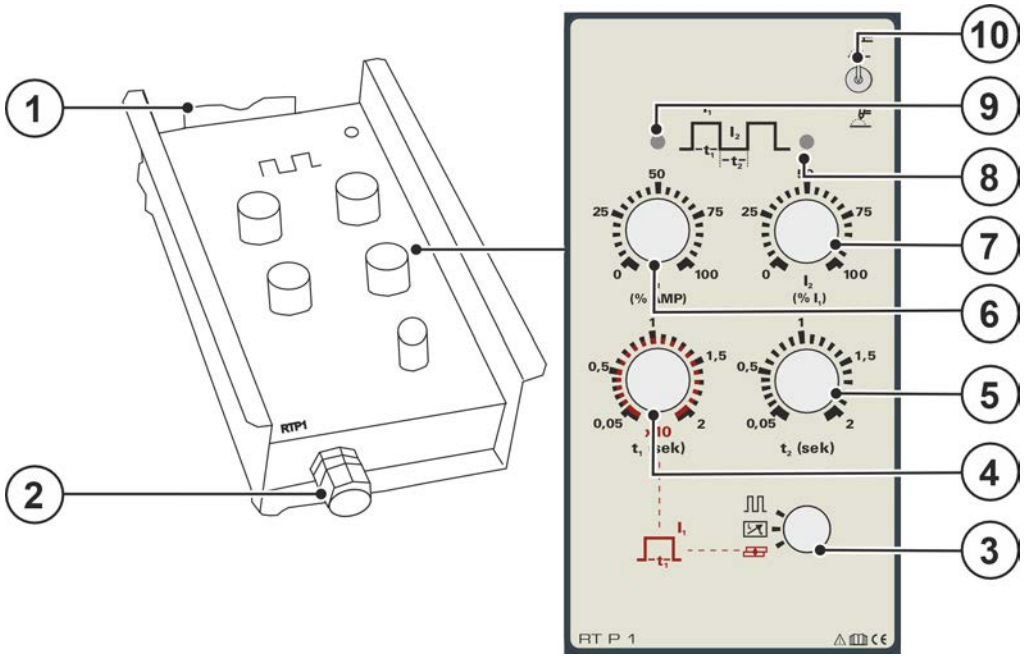
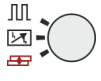
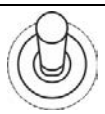


Figure 4-4

Item	Symbol	Description
1		**Holder for suspending the remote control.**
2		**19-pole connection socket (analogue)** For connecting the control lead.
3		**Rotary switch** **--------Pulsing** **--------Standard** **----Spot welding**

Item	Symbol	Description
4		**Rotary knob Pulse / spot time** Pulsing: Setting the pulse time (0.05 to 2sec). Spot welding: Setting the spot time (0.5 to 20sec).
5		**Rotary knob Pulse pause time** Pulsing: Setting the pause time (0.05 to 2sec).
6		**Rotary knob I_1 (welding, pulse, point current)** The setting is made as a percentage depending on the welding current setting on the welding machine. Pulsing: Pulse current setting Spot welding: Point current setting Standard: Welding current setting
7		**Rotary knob I_2 (secondary current / pulse pause current)** The setting is made as a percentage depending on the welding current setting I_1 on the remote control. Pulsing: Pulse pause current setting Standard: Secondary current setting (accessible with the 2nd torch trigger)
8		**Signal light Pulse pause current** Signal light is illuminated when the pulse pause current flows.
9		**Signal light Pulse current** Signal light is illuminated when the remote control is ready for operation and when pulse current flows.
10		**Welding procedure changeover switch**  ------ MMA welding  ------- TIG welding

4.5 RTP2 19POL

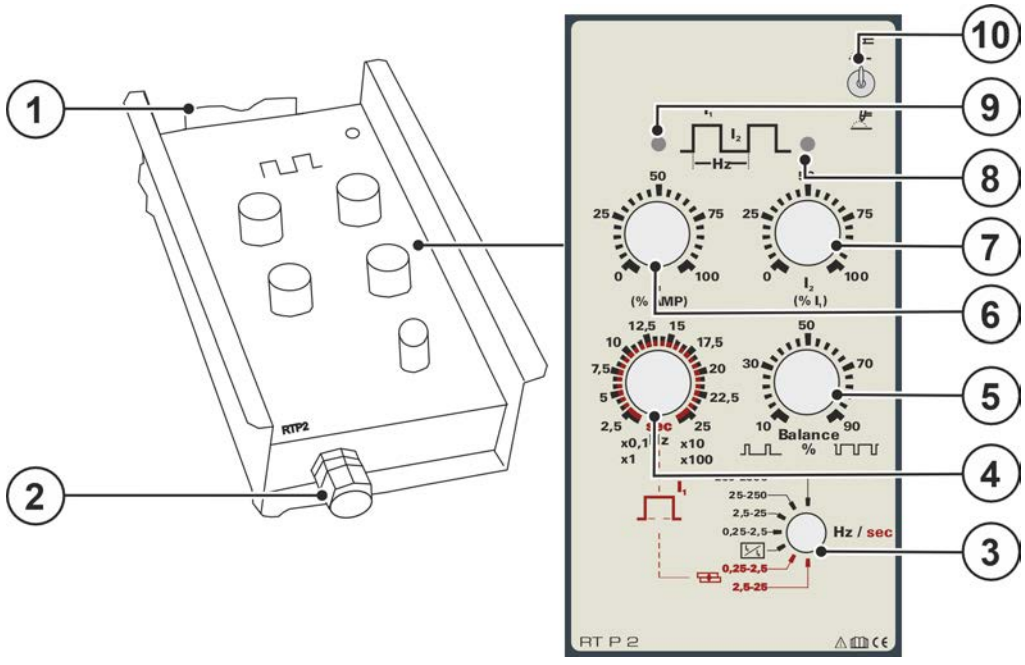
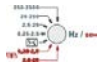
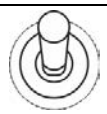


Figure 4-5

Item	Symbol	Description
1		**Holder for suspending the remote control.**
2		**19-pole connection socket (analogue)** For connecting the control lead.

Item	Symbol	Description
3		**Rotary switch Frequency range / operating mode** ----- **Pulsing** Setting the pulse frequency in 4 ranges: 0.25 to 2.5Hz 2.5 to 25Hz 25 to 250Hz 250 to 2500Hz --------**Standard** Standard pulses here are switched between the welding current and the secondary current. ------**Spot welding** Setting the spot time in 2 areas: 0.25 to 2.5sec 2.5 to 25sec.
4		**Rotary knob Pulse frequency** Setting the pulse and pulse pause time. The setting range depends on the selection of rotary switch Frequency range / operating mode!
5		**Rotary knob Balance** Pulsing: -Setting the pulse/pause ratio (10% to 90%)
6		**Rotary knob I_1 (welding, pulse, point current)** The setting is made as a percentage depending on the welding current setting on the welding machine. Pulsing: Pulse current setting Spot welding: Point current setting Standard: Welding current setting
7		**Rotary knob I_2 (secondary current / pulse pause current)** The setting is made as a percentage depending on the welding current setting I_1 on the remote control. Pulsing: Pulse pause current setting Standard: Secondary current setting (accessible with the 2nd torch trigger)
8		**Signal light Pulse pause current** Signal light is illuminated when the pulse pause current flows.
9		**Signal light Pulse current** Signal light is illuminated when the remote control is ready for operation and when pulse current flows.
10		**Welding procedure changeover switch** -------MMA welding -------TIG welding

4.6 RTP3 spotArc 19POL

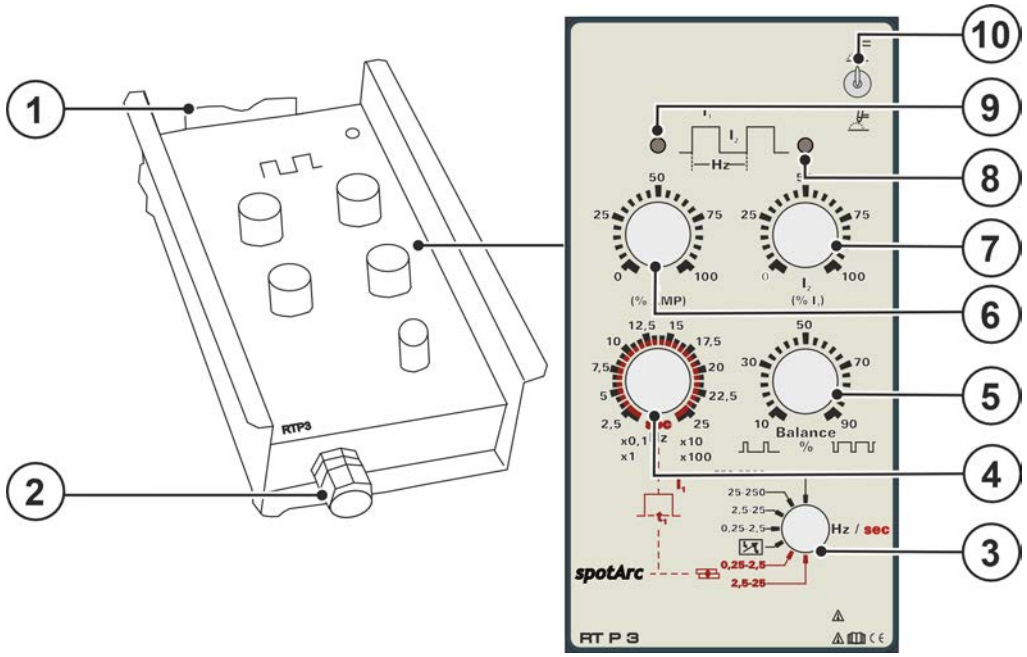
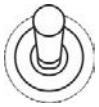


Figure 4-6

Item	Symbol	Description
1		**Holder for suspending the remote control.**
2		**19-pole connection socket (analogue)** For connecting the control lead.
3		**Rotary switch Frequency range / operating mode** ⎍⎍ ----- **Pulses** Setting the pulse frequency in 4 areas: 0.25 to 2.5Hz 2.5 to 25Hz 25 to 250Hz 250 to 2500Hz ⎍--------**Standard** Standard pulses are switched here between the welding current and the secondary current. ⎍----- **spotArc spot welding** Setting the spot time in 2 areas: 0.25 to 2.5sec 2.5 to 25sec.
4		**Rotary knob Pulse frequency** Setting the pulse and pulse pause time. The setting range depends on the selection of rotary switch Frequency range / operating mode!
5		**Rotary knob Balance** Pulsing: - Setting the pulse/pause ratio (10% to 90%)
6		**Rotary knob I_1 (welding, pulse, point current)** The setting is made as a percentage depending on the welding current setting on the welding machine. Pulsing: Pulse current setting Spot welding: Point current setting Standard: Welding current setting

Item	Symbol	Description
7		**Rotary knob I_2 (secondary current / pulse pause current)** The setting is made as a percentage depending on the welding current setting I_1 on the remote control. Pulsing: Pulse pause current setting Standard: Secondary current setting (accessible with the 2nd torch trigger)
8		**Signal light Pulse pause current** Signal light is illuminated when the pulse pause current flows.
9		**Signal light Pulse current** Signal light is illuminated when the remote control is ready for operation and when pulse current flows.
10		**Welding procedure changeover switch**  -------MMA welding  -------TIG welding

4.7 RT PWS1 19POL

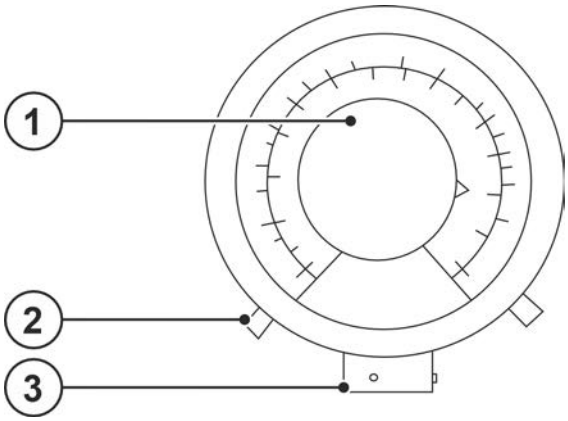
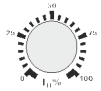


Figure 4-7

Item	Symbol	Description
1		**Welding current rotary dial** Infinitely adjustable welding current, 0% to 100% of the main current preset on the power source.
2		**Polarity switch (pole reversal)** The changeover switch allows reversal of the current polarity (+/-) at the connection sockets.
3		**19-pole connection socket (analogue)** For connecting the control lead.

4.8 RTA PWS2

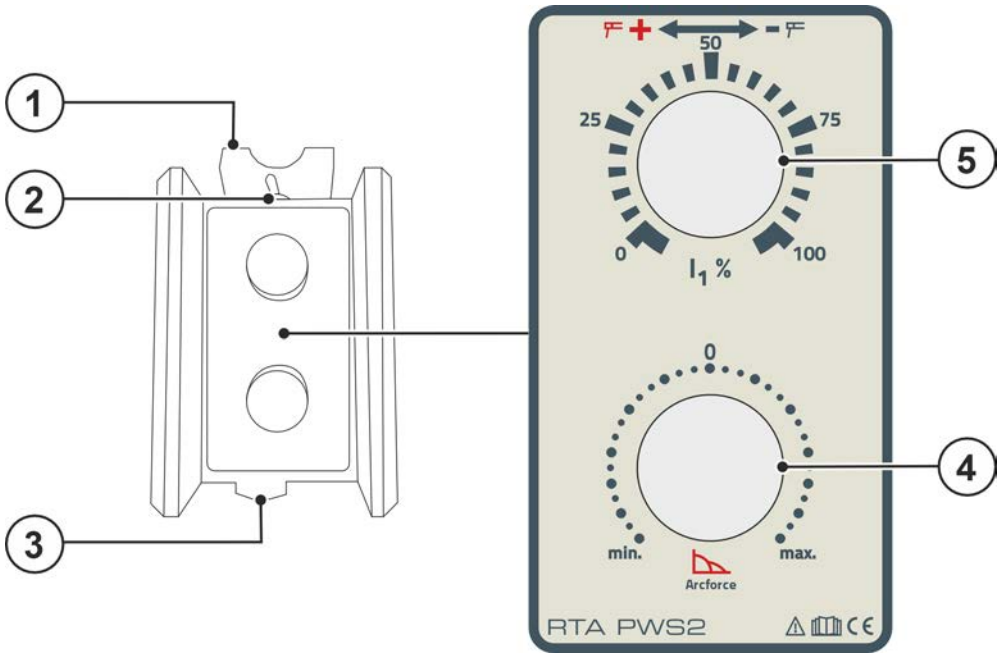


Figure 4-8

Item	Symbol	Description
1		**Holder for suspending the remote control.**
2		**Polarity switch (pole reversal)** The changeover switch allows reversal of the current polarity (+/-) at the connection sockets.
3		**19-pole connection socket (analogue)** For connecting the control lead.
4		**Rotary knob Arcforce** To adjust the welding parameters to the electrode type used. Infinite setting from rutile (soft arc) to cellulose (hard arc) electrode types.
5		**Welding current rotary dial** Infinitely adjustable welding current, 0% to 100% of the main current preset on the power source.

4.9 RTAC1 19POL

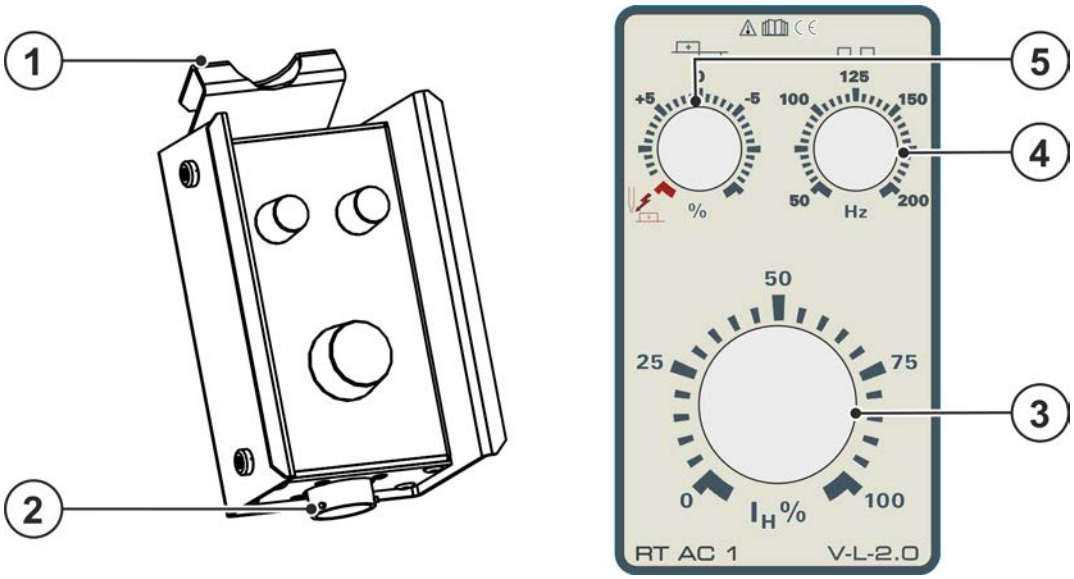
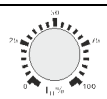


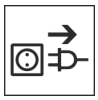
Figure 4-9

Item	Symbol	Description
1		**Holder for suspending the remote control.**
2		**19-pole connection socket (analogue)** For connecting the control lead.
3		**Welding current rotary dial** Infinitely adjustable welding current, 0% to 100% of the main current preset on the power source.
4		**Alternating current frequency (TIG AC)** 50 Hz to 200 Hz (1 Hz increments). Constriction and stabilisation of the arc: At a higher frequency, the cleaning effect is increased. Particularly thin panels (welding with a low current), anodised sheet aluminium or highly contaminated articles for welding can be welded and cleaned perfectly at a higher frequency.
5		**Alternating current balance (TIG AC)** Max. setting range: -15% to +15%

5 Design and function

5.1 Transport and installation

⚠ CAUTION



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

- Disconnect all supply lines before transport!

Read and observe the documentation to all system and accessory components!

5.2 Scope of delivery

The delivery is checked and packaged carefully before dispatch, however it is not possible to exclude the possibility of damage during transit.

Receiving inspection

- Check that the delivery is complete using the delivery note!

In the event of damage to the packaging

- Check the delivery for damage (visual inspection)!

In the event of complaints

If the delivery has been damaged during transport:

- Please contact the last haulier immediately!
- Keep the packaging (for possible checking by the haulier or for the return shipment).

Packaging for returns

If possible, please use the original packaging and the original packaging material. If you have any queries on packaging and protection during transport, please contact your supplier.

☞ ***Equipment damage due to contamination!***
Unusually high amounts of dust, acids, corrosive gases or substances can damage the machine (observe maintenance intervals > see 6.2 chapter).

- ***Avoid large amounts of smoke, steam, oily fumes, grinding dust and corrosive ambient air!***

In operation

Temperature range of the ambient air:

- -25 °C to +40 °C (-13 °F to 104 °F) [1]

Relative humidity:

- up to 50 % at 40 °C (104 °F)
- up to 90 % at 20 °C (68 °F)

Transport and storage

Storage in a closed room, temperature range of the ambient air:

- -30 °C to +70 °C (-22 °F to 158 °F) [1]

Relative humidity

- up to 90 % at 20 °C (68 °F)

5.3 Establishing the connections

☞ ***Damage to the machine due to improper connection!***
The remote controls have been specially developed for the connection to welding machines. Connecting them to other machines may cause damage to the machines!

- ***Follow the operating instructions for the welding machine!***
- ***Switch off the welding machine before connecting!***

5.3.1 Connection cable

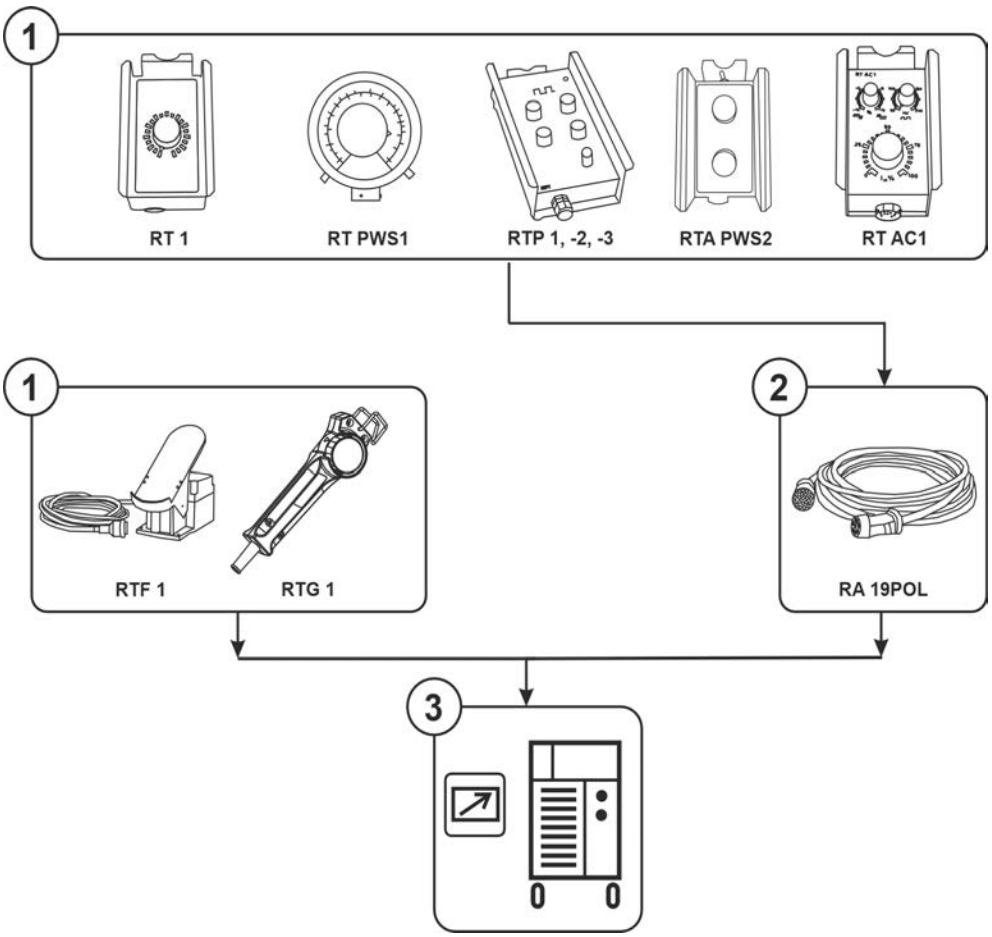


Figure 5-1

Item	Symbol	Description
1		**Manual remote control**
2		**Extension cable for 19-pole connections**
3		**Power source**

- Switch off machine at the main switch.
- Plug the remote control connector directly or with an appropriate connection/extension cable into the remote control socket of the welding machine and lock it by turning it to the right. (follow the standard operating instructions for the welding machine).
- Switch on the machine.

5.4 Functional characteristics

The operation of the remote control and its settings are directly dependent on the configuration of the respective welding machine or wire feed unit. The settings are defined by changeover switches or by setting special parameters (dependent on the control).

The position of the key switch, to protect against unauthorised use, also has a direct influence on the operation of the respective remote control.

5.4.1 RT1 19POL; RTF1 19POL; RTG1 19POL

- Select the maximum welding current at the welding machine.

Infinitely adjustable welding current (0% - 100%) depending on the main current preselected at the welding machine.

- Setting of operating point directly at the welding location.

5.4.2 RT PWS1 19POL

- Select the maximum welding current at the welding machine.

Infinitely adjustable welding current (0% - 100%) depending on the main current preselected at the welding machine.

- Pole reversal switch, suitable for machines with PWS functionality.
- Setting of operating point directly at the welding location.

5.4.3 RTP1 19POL

- Select the maximum welding current at the welding machine.
- Set the welding procedure TIG or MMA.
- Set pulsing, spot welding or standard operation.

Operating mode pulsing

- Set pulse current and pulse pause current on the remote control.

Example with the following settings:

maximum welding current on the welding machine: 120 A

Pulse current on the remote control: 50 %

Pulse pause current on the remote control: 25 %

Result:

Pulse current = 60 A (120 A x 50 %)

Pulse pause current = 15 A (120 A x 50 % x 25 %)

- Set the pulse time $t_1$and pulse pause time t_2.

Operating mode spot welding

- Set the point current on the remote control.
- Set the spot time (the rotary knob has a dual function; therefore, the set value must be multiplied by 10).

Example with the following settings:

Spot time: 1.5 s

Result: 1.5 s x 10 = spot time 15 s

Standard operation

- Set the welding current I_1 (0-100 % of the rotary knob main current on the welding machine)
- Set the secondary current I_2 (0-100 % of the rotary knob welding current I_1 on the remote control), accessible with the 2nd torch trigger.

5.4.4 RTP2 19POL

- Select the maximum welding current at the welding machine.
- Set the welding procedure TIG or MMA.
- Set pulsing, spot welding or standard operation.

The rotary knob welding current on the welding machine has no function.

Operating mode pulsing

- Set pulse current and pulse pause current on the remote control.

Example with the following settings:

maximum welding current on the welding machine: 120 A

Pulse current on the remote control: 50 %

Pulse pause current on the remote control: 25 %

Result:

Pulse current 60 A (120 A x 50 %)

Pulse pause current 15 A (120 A x 50 % x 25 %)

- Set the pulse frequency.

The frequency range depends on the setting of the rotary switch Frequency range / operating mode.

- Set balance.

Operating mode spot welding

- Set the point current on the remote control.
- Set the spot time depending on the rotary knob (the rotary knob has a dual function).

Example with the following settings:

Rotary switch frequency range / operating mode in position 0.25 to 2.5 s

Rotary knob pulse frequency in position 15

Result:

15 s / 0.1 = spot time 1.5 s

Standard operation

- Set the welding current I_1
  (0-100 % of rotary knob welding current on the welding machine)
- Set the secondary current I_2 (0-100 % of the rotary knob welding current on the remote control), accessible with the 2nd torch trigger.

5.4.4.1 Calculation examples for pulse and pulse pause currents

Formulas for calculation:

$$\text{Pulse time [sec]} = \frac{\text{Balance [\%]}}{100\% \times \text{Frequency [Hz]}}$$

$$\text{Pulse pause time [sec]} = \frac{100\ \% - \text{Balance [\%]}}{100\% \times \text{Frequency [Hz]}}$$

Example with the following settings:

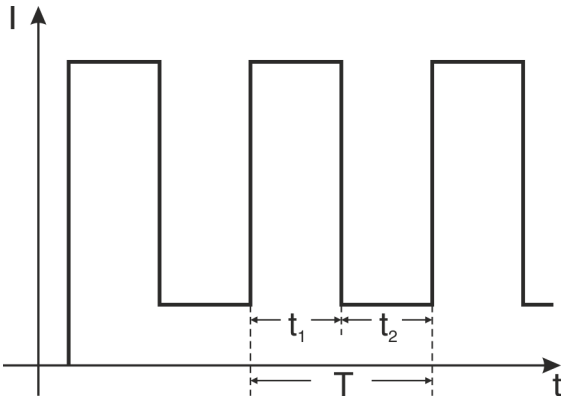
Rotary switch Frequency range: 0.25-2.5 Hz

Rotary knob Pulse frequency: 1Hz (10 Hz x 0.1)

Rotary knob Balance: 50%

Pulse time t_1:
0.5 sec = $\frac{50\ \%}{100\ \% \times 1\ Hz}$

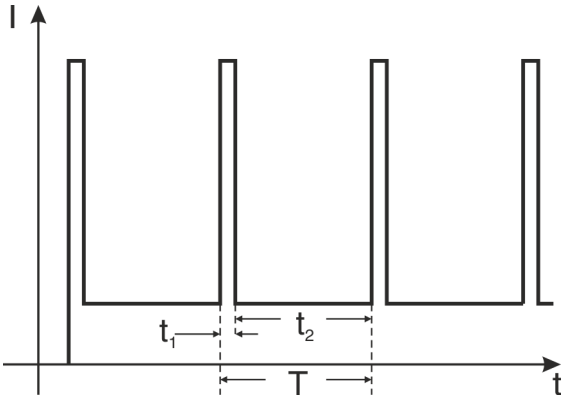
Pulse pause time t_2:
0.5 sec = $\frac{100\ \% - 50\ \%}{100\ \% \times 1\ Hz}$



Rotary knob Balance: 10%

Pulse time t_1:
0.1 sec = $\frac{10\ \%}{100\ \% \times 1\ Hz}$

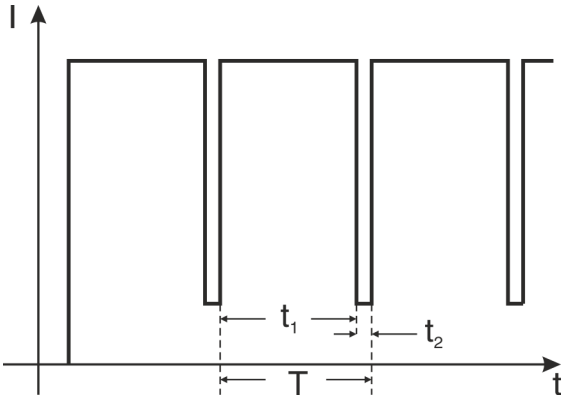
Pulse pause time t_2:
0.9 sec = $\frac{100\ \% - 10\ \%}{100\ \% \times 1\ Hz}$



Rotary knob Balance: 90%

Pulse time t_1:
0.9 sec = $\frac{90\ \%}{100\ \% \times 1\ Hz}$

Pulse pause time t_2:
0.1 sec = $\frac{100\ \% - 90\ \%}{100\ \% \times 1\ Hz}$



5.4.5 RTP3 spotArc 19POL

- Select the maximum welding current at the welding machine.
- Set the welding procedure TIG or MMA.
- Set the pulsing, spotArc® spot welding or standard mode with rotary switch frequency range / operating mode.

The secondary current on the welding machine has no function.

Operating mode pulsing

- Set pulse current and pulse pause current on the remote control.
- Set the pulse frequency.

The frequency range depends on the setting of the rotary switch Frequency range.

- Set balance.

Calculation examples for pulse and pulse pause currents

- Set the maximum welding current at the welding machine to 120 A.
- Set the pulse current on the remote control to 50 %.
- Set the pulse pause current on the remote control to 25 %.

Result

Pulse current = 60 A (120 A x 50 %)

Pulse pause current = 15 A (120 A x 50 % x 25 %)

5.4.5.1 Calculation examples for pulse and pulse pause currents

Formulas for calculation:

$$\text{Pulse time [sec]} = \frac{\text{Balance [\%]}}{100\% \times \text{Frequency [Hz]}}$$

$$\text{Pulse pause time [sec]} = \frac{100\ \% - \text{Balance [\%]}}{100\% \times \text{Frequency [Hz]}}$$

Example with the following settings:

Rotary switch Frequency range: 0.25-2.5 Hz

Rotary knob Pulse frequency: 1Hz (10 Hz x 0.1)

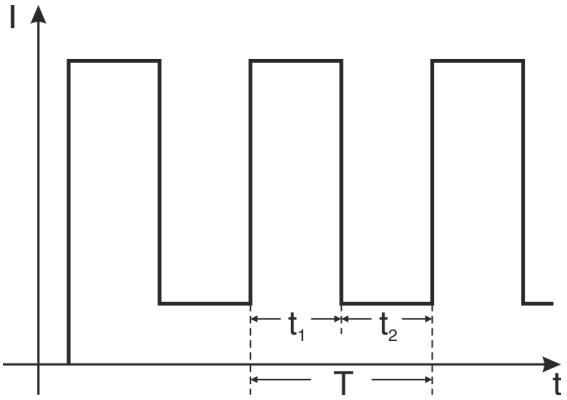
Rotary knob Balance: 50%

Pulse time t_1:

$$0.5\ \text{sec} = \frac{50\ \%}{100\ \% \times 1\ \text{Hz}}$$

Pulse pause time t_2:

$$0.5\ \text{sec} = \frac{100\ \% - 50\ \%}{100\ \% \times 1\ \text{Hz}}$$



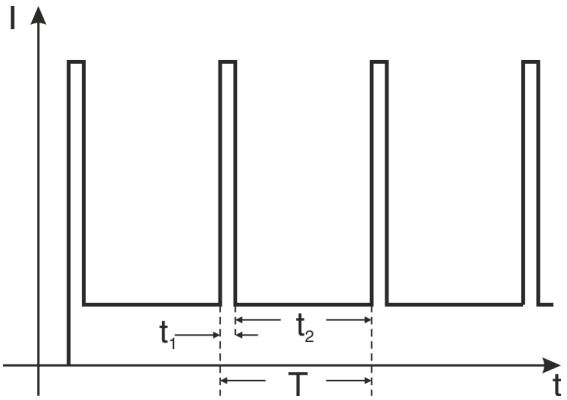
Rotary knob Balance: 10%

Pulse time t_1:

$$0.1\ \text{sec} = \frac{10\ \%}{100\ \% \times 1\ \text{Hz}}$$

Pulse pause time t_2:

$$0.9\ \text{sec} = \frac{100\ \% - 10\ \%}{100\ \% \times 1\ \text{Hz}}$$



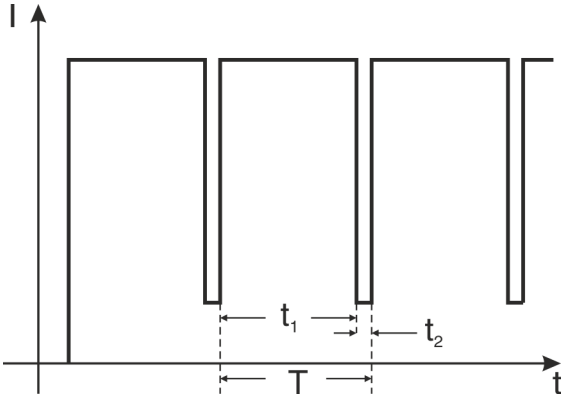
Rotary knob Balance: 90%

Pulse time t_1:

$$0.9\ \text{sec} = \frac{90\ \%}{100\ \% \times 1\ \text{Hz}}$$

Pulse pause time t_2:

$$0.1\ \text{sec} = \frac{100\ \% - 90\ \%}{100\ \% \times 1\ \text{Hz}}$$



5.4.5.2 spotArc

Setting

- Select the maximum welding current at the welding machine.
- Set point current on the remote control (percentage depending on the selected welding current (AMP) on the welding machine).
- Preselect on the rotary switch Operating mode the spot time range (2 ranges).
- Set the spot time depending on the preselected spot time range.

This setting is automatically applied to Tetrix series welding machines.

Example

- Rotary switch to position 0.25 sec to 2.5 sec
- Spot time to position 15

Result

15 sec / 0.1 = spot time 1.5 sec.

5.4.5.3 Diagram of TIG spotArc spot welding with pulsed welding current

Frequency, balance and the pulse/pause current ratio has been optimized for this procedure and cannot be changed.

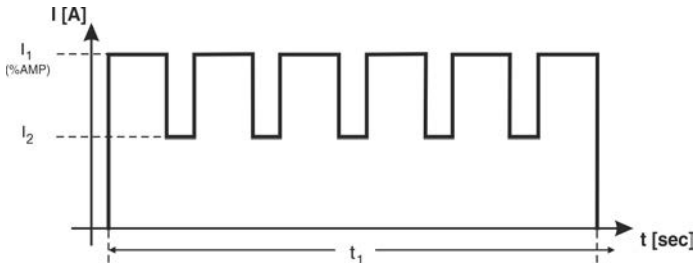


Figure 5-2

5.4.5.4 Setting instructions

Example of high-alloy CrNi sheets

Presettings

Material: ***Chrome-nickel, high-alloy***

Gas / quantity: ***Argon / 8 l/min.***

Tungsten electrode diameter: 2.4 mm

- Rotary switch Operating mode to position 0.25 sec to 2.5 sec.
- Welding current I_2 on the welding machine control to 50%.

Seam type	Plate thickness	Welding current (I_1)	Time setting (t_1)
Connection	1 mm with 2 mm	260 A	10 (≙ 1 sec.)
Butt joint	1 mm	70 A	2.5 (≙ 0.25 sec.)
Butt joint	2 mm	130 A	2.5 (≙ 0.25 sec.)
Fillet weld	1 mm	120 A	2.5 (≙ 0.25 sec.)
Fillet weld	2 mm	170 A	2.5 (≙ 0.25 sec.)
Edge weld	1 mm	70 A	2.5 (≙ 0.25 sec.)
Edge weld	2 mm	130 A	2.5 (≙ 0.25 sec.)

5.4.5.5 Standard operation

- Set welding current I1 (0-100% of rotary knob (AMP) on welding machine)
- Set secondary current I2 (0-100% of rotary knob Welding current I1, accessible with the 2nd torch trigger.

5.4.6 RTA PWS2

- Set the welding procedure MMA or TIG.
- Select the maximum possible welding current I_1 on the welding machine.
- Set the welding current I_1% on the remote control.
- If necessary, the welding characteristic (Arcforce) can be optimised using the Arcforce rotary knob (MMA).
- If required, the welding current polarity (+/-) can be switched over at the polarity switch (only for machines with a pole reversing switch (type PWS).

5.4.7 RTAC1 19POL

5.4.7.1 Standard operation

- Select the maximum welding current at the welding machine.
- Set secondary current I2 (0-100% of rotary knob Welding current I1)
- Set the AC frequency.
- Set balance.
- Function Form a balled end (depending on device version)

Explanation of AC frequency (TIG-AC)

Constriction and stabilisation of the arc:
The cleaning effect increases with a higher frequency. Especially thin metal sheets (welding with low current), anodised aluminium sheets or very impure weld metals can be welded and cleaned immaculately with higher frequency.

Explanation of AC balance (TIG-AC)

Optimising cleaning effect and penetration characteristics.

Increasing the positive half-wave means:

- greater cleaning effect
- higher temperature of the tungsten electrode
- larger ball formation at the tungsten electrode
- wider weld seam, less penetration

Increasing the negative half-wave means:

- narrower weld seam, deep penetration
- lower cleaning effect
- lower temperature of the tungsten electrode
- smaller ball formation at the tungsten electrode

6 Maintenance, care and disposal

6.1 General

⚠ DANGER

Risk of injury due to electrical voltage after switching off!
Working on an open machine can lead to fatal injuries!
Capacitors are loaded with electrical voltage during operation. Voltage remains present for up to four minutes after the mains plug is removed.

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

⚠ WARNING

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

- Follow the maintenance instructions > *see 6.2 chapter*.
- If any of the test requirements below are not met, the unit must not be put back into operation until it has been repaired and tested again.

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

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

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

6.2 Maintenance schedule

Inspector	Type of inspection	8h	24h	Maintenance step ! Only personnel designated as inspectors or repairers due to their training are allowed to carry out the relevant work step! Non-applicable inspection points are omitted.	Repairer
				• Checking all supply lines and their connections (pipes, hoses, hose packages) for damage or leaks. • Checking the product for damage to the housing. • Transport elements (strap, lifting eyes, handle, wheels, parking brake) corresponding safety elements (if necessary fuse caps) are present and flawless?	
				• Checking operating, signalling and indicator lights, protective devices and actuators.	
				• Clean external surfaces with a damp cloth (do not use aggressive cleaning agents).	

6.3 Explanation of icons

Personnel			
	Welder / operator		Qualified person (authorised service personnel)
Test			
	Visual inspection		Functional test
Period, interval			
	One-shift operation		Multi-shift operation
	Every 8 hours		Daily
	Weekly		Monthly
	Every 6 months		Annually

6.4 Disposing of equipment

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

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

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

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

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

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

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

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

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

7 Technical data

7.1 RT1 19POL

Interface	19- pole
Dimensions (l x b x h)	174 x 100 x 80 mm 6.8 x 3.9 x 3.1 inch
Weight	1,2 kg 2.6 lb.
Test mark	CE / EAC / UKCA
Standards used	See declaration of conformity (appliance documents)

7.2 RTF1 19POL

Interface	19- pole
Dimensions (l x b x h)	244 x 115 x 174 mm 9.6 x 4.5 x 6.9 inch
Weight	2,8 kg 6.2 lb.
Test mark	CE / EAC / UKCA
Standards used	See declaration of conformity (appliance documents)

7.3 RTG1 19POL

Interface	19- pole
Dimensions (l x b x h)	223 x 57 x 54 mm 8.8 x 2.2 x 2.1 inch
Weight	0,7 kg (5 m) / 1,5 kg (10 m) 1.5 lb. (5 m) / 3.3 lb. (10 m)
Test mark	CE / EAC / UKCA
Standards used	See declaration of conformity (appliance documents)

7.4 RTP1 19POL

Interface	19- pole
Dimensions (l x b x h)	264 x 147 x 76 mm 10.4 x 5.8 x 3 inch
Weight	1,5 kg 3.3 lb.
Test mark	CE / EAC / UKCA
Standards used	See declaration of conformity (appliance documents)

7.5 RTP2 19POL

Interface	19- pole
Dimensions (l x b x h)	264 x 147 x 76 mm 10.4 x 5.8 x 3 inch
Weight	1,5 kg 3.3 lb.
Test mark	CE / EAC / UKCA
Standards used	See declaration of conformity (appliance documents)

7.6 RTP3 spotArc 19POL

Interface	19- pole
Dimensions (l x b x h)	264 x 147 x 76 mm 10.4 x 5.8 x 3 inch
Weight	1,5 kg 3.3 lb.
Test mark	CE / EAC
Standards used	See declaration of conformity (appliance documents)

7.7 RT PWS1 19POL

Interface	19- pole
Dimensions (l x b x h)	111 x 111 x 90 mm 4.4 x 4.4 x 3.5 inch
Weight	0,42 kg 0.9 lb.
Test mark	CE / EAC / UKCA
Standards used	See declaration of conformity (appliance documents)

7.8 RTA PWS2

Interface	19- pole
Dimensions (l x b x h)	174 x 100 x 80 mm 6.8 x 3.9 x 3.1 inch
Weight	1 kg 2.2 lb.
Test mark	CE / EAC / UKCA
Standards used	See declaration of conformity (appliance documents)

7.9 RTAC1 19POL

Interface	19- pole
Dimensions (l x b x h)	174 x 100 x 80 mm 6.8 x 3.9 x 3.1 inch
Weight	1,1 kg 2.4 lb.
Test mark	CE / EAC / UKCA
Standards used	See declaration of conformity (appliance documents)

8 Accessories

8.1 Connection and extension cables

Type	Designation	Item no.
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 Appendix

9.1 Searching for a dealer

Sales & service partners
www.ewm-group.com/en/specialist-dealers

"More than 400 EWM sales partners worldwide"