



EN

Remote control

RTF1
RT1
RTG1
RT PWS1
RTP1
RTP2
RTP3
RTAC1

099-008097-EW501

Observe additional system documents!

22.03.2018

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General instructions

WARNING



Read the operating instructions!

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

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



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

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

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

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

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

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

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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.



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		
	Tool required/use		

2.3 General

WARNING



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!

⚠ WARNING**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!

**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!

**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!

⚠ CAUTION**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 6.2 chapter!
- Unwind welding leads completely!
- Shield devices or equipment sensitive to radiation accordingly!
- The correct functioning of pacemakers may be affected (obtain advice from a doctor if necessary).

**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!



**Trained personnel!**

Commissioning is reserved for persons who have the relevant expertise of working with arc welding machines.



These supplementary sheets must be used in conjunction with the appropriate standard operating instructions for the described product! These supplementary sheets expand or replace one or more chapters of the same name(s) in the standard description.

Read and observe the operating instructions for all system components, especially the safety instructions!

-  **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.***

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 (see operating instructions for remote control). Depending on the machine design, the remote control connection can be 7- or 19-pole (for connection, see > see 4 chapter).

3.2 Use and operation solely with the following machines


These remote controls are specifically designed for use with Pico, Picotig and Tetrax welding machines and give various options depending on the model.

RTF1	RT1	RTG1
<ul style="list-style-type: none"> • Pico 180 puls • Pico 220 cel puls • Pico 300 cel • Pico 350 cel puls • Picotig 200 puls • Picotig 200 AC/DC puls • Tetrax 150 Plasma • Tetrax 200 puls • Tetrax 230 DC 2.0 puls • Tetrax 230 AC/DC 2.0 puls • Tetrax 300 DC 2.0 puls • Tetrax 300 AC/DC 2.0 puls • Tetrax 300 TM • Tetrax 351 DC • Tetrax 351 AC/DC • Tetrax 451 DC • Tetrax 451 AC/DC • Tetrax 551 DC • Tetrax 551 AC/DC 	<ul style="list-style-type: none"> • Pico 180 puls • Pico 220 cel puls • Pico 300 cel • Pico 350 cel puls • Picotig 200 puls • Picotig 200 AC/DC puls • Tetrax 150 Plasma • Tetrax 200 puls • Tetrax 230 DC 2.0 puls • Tetrax 230 AC/DC 2.0 puls • Tetrax 300 DC 2.0 puls • Tetrax 300 AC/DC 2.0 puls • Tetrax 300 TM • Tetrax 351 DC • Tetrax 351 AC/DC • Tetrax 451 DC • Tetrax 451 AC/DC • Tetrax 551 DC • Tetrax 551 AC/DC • Taurus 400 Basic TDG 	<ul style="list-style-type: none"> • Pico 220 cel puls • Pico 350 cel puls • Picotig 200 puls • Picotig 200 AC/DC puls • Tetrax 200 puls • Tetrax 230 DC 2.0 puls • Tetrax 230 AC/DC 2.0 puls • Tetrax 300 DC 2.0 puls • Tetrax 300 AC/DC 2.0 puls • Tetrax 300 TM • Tetrax 351 DC • Tetrax 351 AC/DC • Tetrax 451 DC • Tetrax 451 AC/DC • Tetrax 551 DC • Tetrax 551 AC/DC

RT PWS 1	RTP1, RTP2, RTP3	RTAC1
<ul style="list-style-type: none"> • Pico 300 cel • Pico 350 cel • Tetrax 351 AC/DC • Tetrax 451 AC/DC • Tetrax 551 AC/DC 	<ul style="list-style-type: none"> • Picotig 200 AC/DC puls • Tetrax 150 Plasma • Tetrax 200 puls • Tetrax 230 DC 2.0 puls • Tetrax 230 AC/DC 2.0 puls • Tetrax 300 DC 2.0 puls • Tetrax 300 AC/DC 2.0 puls • Tetrax 300 TM • Tetrax 351 DC • Tetrax 351 AC/DC • Tetrax 451 DC • Tetrax 451 AC/DC • Tetrax 551 DC • Tetrax 551 AC/DC 	<ul style="list-style-type: none"> • Tetrax 300 AC/DC 2.0 puls • Tetrax 351 AC/DC • Tetrax 451 AC/DC • Tetrax 551 AC/DC

3.3 Documents which also apply

3.3.1 Warranty

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

3.3.2 Declaration of Conformity

 The labelled machine complies with the following EC directives in terms of its design and construction:

- Low Voltage Directive (LVD)
- Electromagnetic Compatibility Directive (EMC)
- Restriction of Hazardous Substance (RoHS)

In case of unauthorised changes, improper repairs, non-compliance with specified deadlines for "Arc Welding Equipment – Inspection and Testing during Operation," and/or prohibited modifications which have not been explicitly authorised by the manufacturer, this declaration shall be voided. An original document of the specific declaration of conformity is included with every product.

3.3.3 Service documents (spare parts and circuit diagrams)

WARNING



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.

3.3.4 Calibration/Validation

We hereby confirm that this machine has been tested using calibrated measuring equipment, as stipulated in IEC/EN 60974, ISO/EN 17662, EN 50504, and complies with the admissible tolerances. Recommended calibration interval: 12 months

4 Machine description – quick overview

4.1 RTF1 19POL

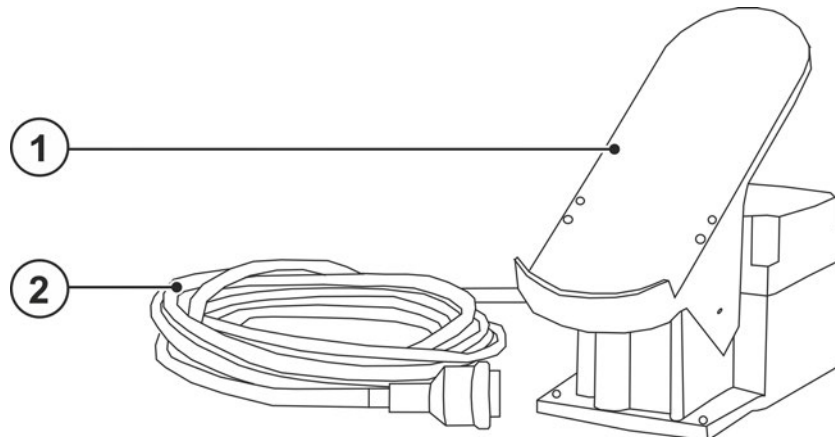


Figure 4-1

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

4.2 RT1 19POL

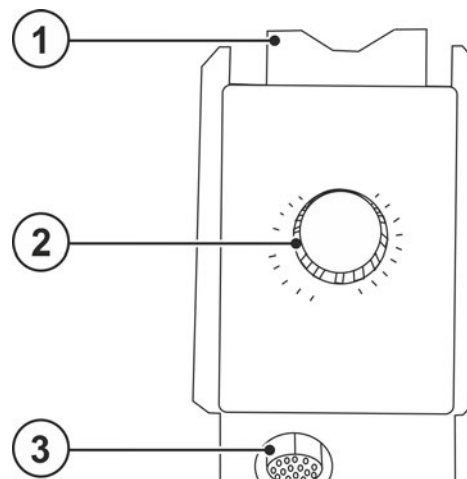


Figure 4-2

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.

4.3 RTG1 19POL

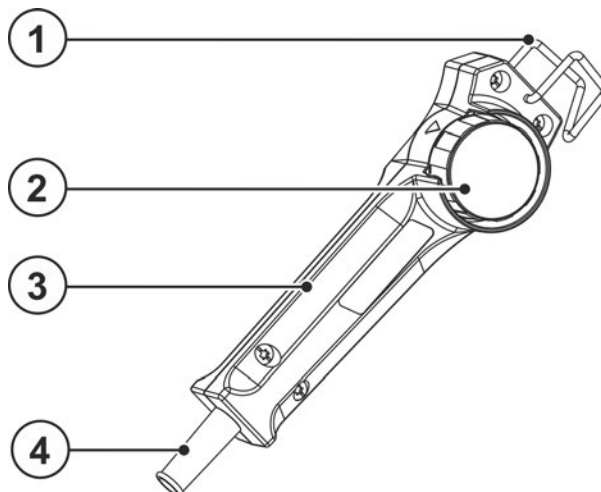


Figure 4-3

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 RT PWS1 19POL

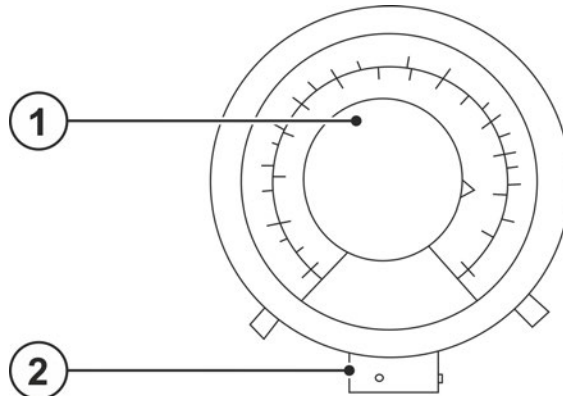


Figure 4-4

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		19-pole connection socket (analogue) For connecting the control lead.

4.5 RTP1 19POL

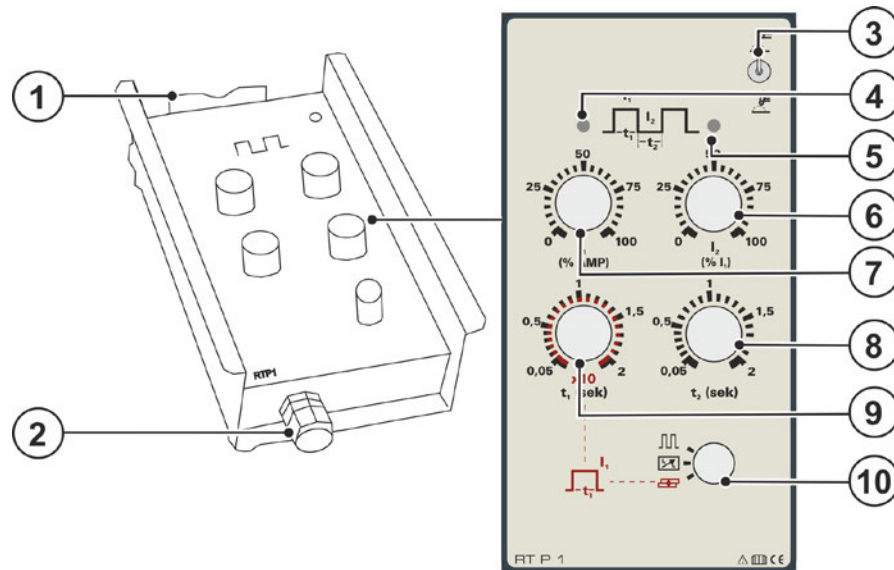



Figure 4-5

Item	Symbol	Description
1		Holder for suspending the remote control
2		19-pole connection socket (analogue) For connecting the control lead.
3		Welding procedure changeover switch ----- MMA welding ----- TIG welding
4		Signal light Pulse current Signal light is illuminated when the remote control is ready for operation and when pulse current flows.
5		Signal light Pulse pause current Signal light is illuminated when the pulse pause current flows.
6		Rotary knob I2 secondary current / pulse pause current (in% of I1) (percentage depending on the pulse current setting I1 on the remote control 0-100%). Pulsing: Setting the pause current Standard: setting the secondary current (accessible with the 2 nd torch trigger)
7		Rotary knob I1 Welding, pulse, point current (% AMP) (percentage depending on the welding current setting on the welding machine 0-100%). Pulsing: Setting the pulse current Spot welding: Setting the point current Standard: setting the secondary current
8		Rotary knob Pulse pause time Pulsing: Setting the pause time (0.05 to 2sec).
9		Rotary knob Pulse / spot time Pulsing: Setting the pulse time (0.05 to 2sec). Spot welding: Setting the spot time (0.5 to 20sec).

Item	Symbol	Description
10		Rotary switch ⏏ ----- Pulsing ⏏ ----- Standard ⏏ ----- Spot welding

4.6 RTP2 19POL

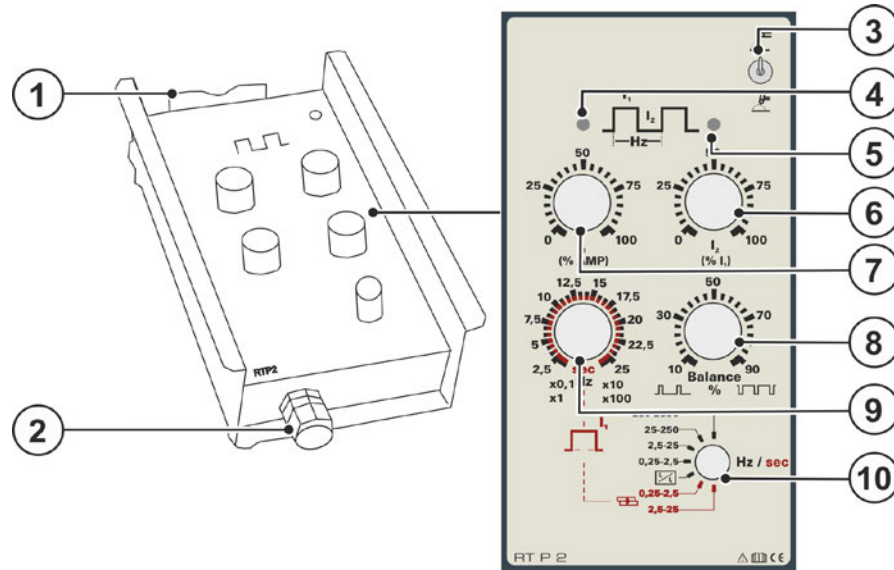
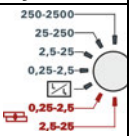


Figure 4-6

Item	Symbol	Description
1		Holder for suspending the remote control
2		19-pole connection socket (analogue) For connecting the control lead.
3		Welding procedure changeover switch ----- MMA welding ----- TIG welding
4		Signal light Pulse current Signal light is illuminated when the remote control is ready for operation and when pulse current flows.
5		Signal light Pulse pause current Signal light is illuminated when the pulse pause current flows.
6		Rotary knob I2 secondary current / pulse pause current (in% of I1) (percentage depending on the pulse current setting I1 on the remote control 0-100%). Pulsing: Setting the pause current Standard: setting the secondary current (accessible with the 2 nd torch trigger)
7		Rotary knob I1 Welding, pulse, point current (% AMP) (percentage depending on the welding current setting on the welding machine 0-100%). Pulsing: Setting the pulse current Spot welding: Setting the point current Standard: setting the secondary current
8		Rotary knob Balance Pulsing: - Setting the pulse/pulse ratio (10% to 90%)
9		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!

Item	Symbol	Description
10		<p>Rotary switch Frequency range / operating mode</p> <p>ПП----- Pulsing Setting the pulse frequency in 4 ranges: 0.25 to 2.5Hz 2.5 to 25Hz 25 to 250Hz 250 to 2500Hz</p> <p>□----- Standard Standard pulses here are switched between the welding current and the secondary current.</p> <p>⏏--- Spot welding Setting the spot time in 2 areas: 0.25 to 2.5sec 2.5 to 25sec.</p>

4.7 RTP3 spotArc 19POL

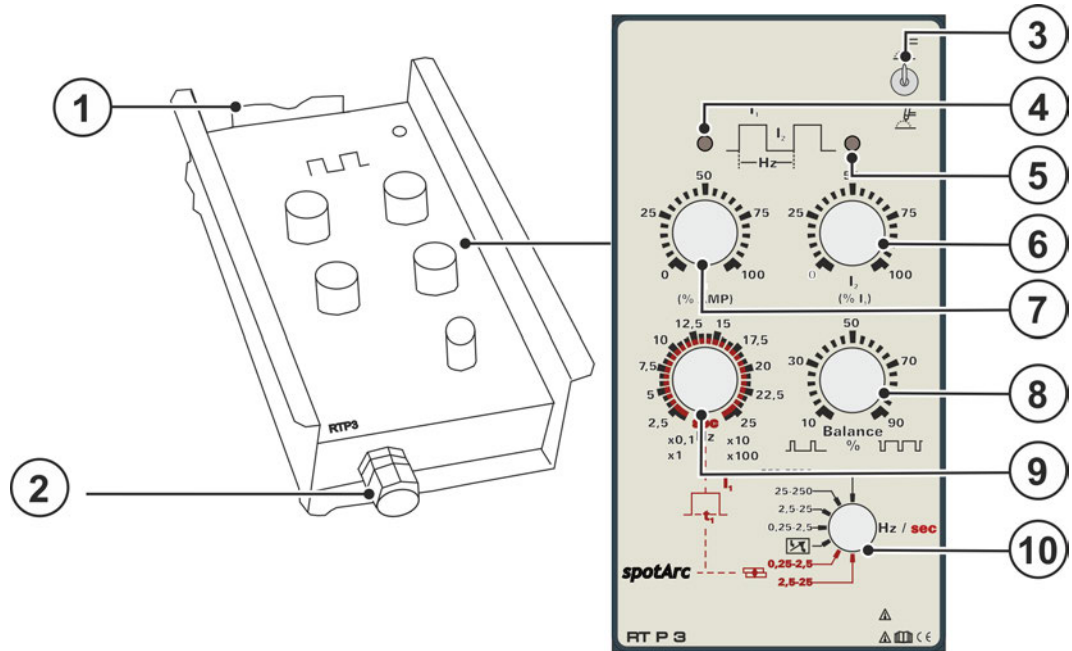
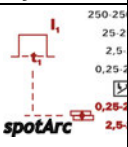





Figure 4-7

Item	Symbol	Description
1		Holder for suspending the remote control
2		19-pole connection socket (analogue) For connecting the control lead.
3		Welding procedure changeover switch ----- MMA welding ----- TIG welding
4		Signal light Pulse current Signal light is illuminated when the remote control is ready for operation and when pulse current flows.
5		Signal light Pulse pause current Signal light is illuminated when the pulse pause current flows.
6		Rotary knob I2 secondary current / pulse pause current (in% of I1) (percentage depending on the pulse current setting I1 on the remote control 0-100%). Pulsing: Setting the pause current Standard: setting the secondary current (accessible with the 2 nd torch trigger)
7		Rotary knob I1 Welding, pulse, point current (% AMP) (percentage depending on the welding current setting on the welding machine 0-100%). Pulsing: Setting the pulse current Spot welding: Setting the point current Standard: setting the secondary current
8		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!
9		Rotary knob Balance Pulsing: - Setting the pulse/pause ratio (10% to 90%)

Item	Symbol	Description
10		<p>Rotary switch Frequency range / operating mode</p> <p> ----- Pulses Setting the pulse frequency in 4 areas: 0.25 to 2.5Hz 2.5 to 25Hz 25 to 250Hz 250 to 2500Hz</p> <p> ----- Standard Standard pulses are switched here between the welding current and the secondary current.</p> <p> ----- spotArc spot welding Setting the spot time in 2 areas: 0.25 to 2.5sec 2.5 to 25sec.</p>

4.8 RTAC1 19POL

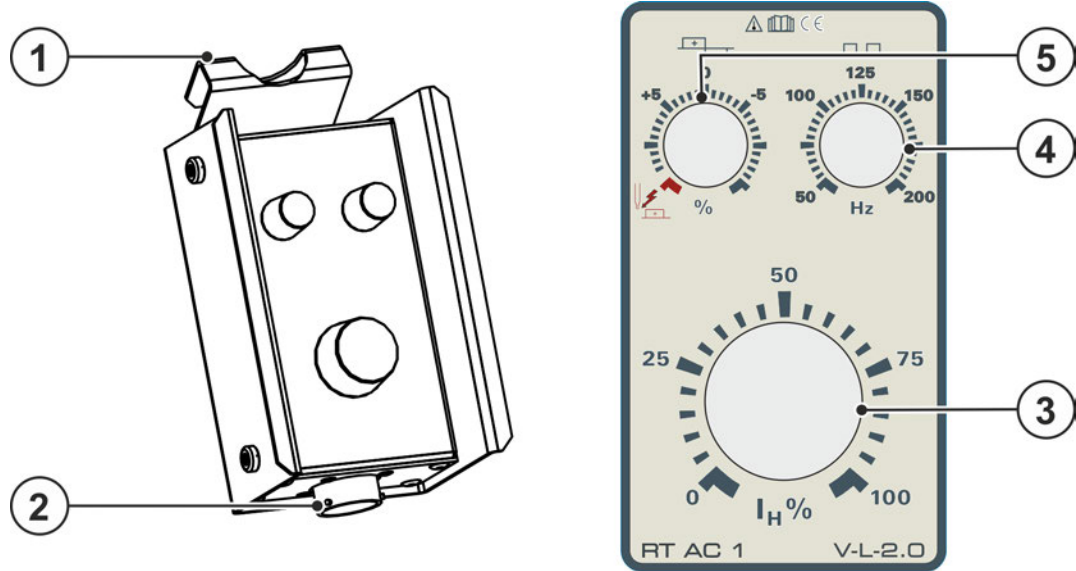


Figure 4-8

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% (1% increments). The setting range may also be lower depending on the factory setting. Optimisation of cleaning effect and fusion penetration characteristics. An increase in the positive half-wave means: <ul style="list-style-type: none"> • greater cleaning effect • higher temperature of the tungsten electrode • greater ball formation on the tungsten electrode • broader weld seam, little fusion penetration An increase in the negative half-wave means: <ul style="list-style-type: none"> • narrower weld seam, deeper fusion penetration • reduced cleaning effect • lower temperature of the tungsten electrode • less ball formation on the tungsten electrode

5 Design and function

5.1 Transport

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.

5.2.1 Ambient conditions



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!**

5.2.1.1 In operation

Temperature range of the ambient air:

- -25 °C to +40 °C (-13 F to 104 F)

Relative humidity:

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

5.2.1.2 Transport and storage

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

- -30 °C to +70 °C (-22 F to 158 F)

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 developed to be connected to welding machines or wire feed units only. Connecting them to other machines may cause damage to the machines!

- **Observe the operating instructions for the welding machine or wire feed unit!**
- **Switch off the welding machine before connecting!**

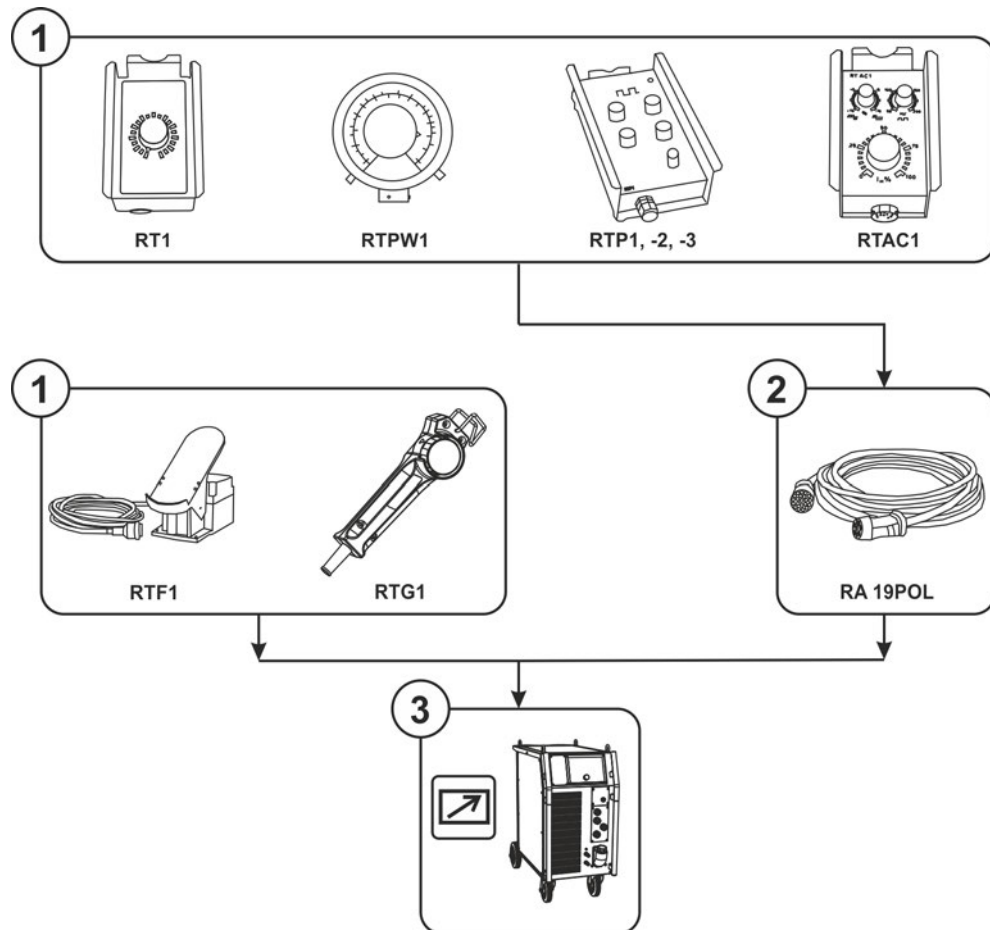


Figure 5-1

Item	Symbol	Description
1		Manual remote control
2		Extension cable for 19-pole connections
3		Power source (TIG) Observe additional system documents!

- Switch off the welding machine
- Insert the male connector plug (socket) into the remote control connection socket and lock by turning to the right.
- Insert connector plug, pin contact into the remote control connection socket on the welding machine/wire feeder and lock by turning to the right.

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 RTF1 -, RT1 -, 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.
- Connect the remote control to the welding machine (observe the standard operating manual of the welding machine).
- Set welding process 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: 120A

Pulse current on the remote control: 50%

Pulse pause current on the remote control: 25%

Result:

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

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

- Set pulse time t1 and pulse pause time t2.

Spot welding operating mode

- Set point current on the remote control.
- Set the spot time (The rotary knob is assigned a double function, therefore the the set value is to be multiplied by 10).

Example with the following settings:

Spot time: 1.5sec.

Result:

1.5sec. x 10 = spot time 15sec.

Standard operation

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

5.4.4 RTP2 19POL

- Select the maximum welding current at the welding machine.
- Connect the remote control to the welding machine (observe the standard operating manual of the welding machine).
- Set welding process TIG or MMA.
- Set pulsing, spot welding or standard operation.

The rotary knob “AMP%” on the welding machine is not functional.

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: 120A

Pulse current on the remote control: 50%

Pulse pause current on the remote control: 25%

Result:

Pulse current 60A (120A x 50%)

Pulse pause current 15A (120A 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.

Spot welding operating mode

- Set point current on the remote control.
- Set the spot time depending on the rotary switch.

(This rotary knob has a double function:)

Example with the following settings:

Rotary switch Frequency range / operating mode to position 0.25 to 2.5sec

Rotary knob Pulse frequency to position 15

Result:

15sec. / 0.1 = spot time 1.5 sec.

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)
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)

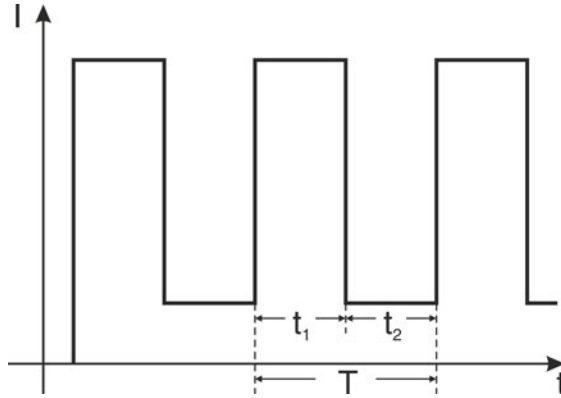
Rotary knob Balance: 50%

Pulse time t_1 :

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

Pulse pause time t_2 :

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



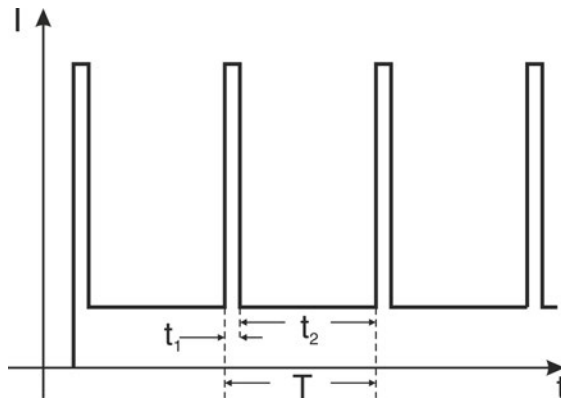
Rotary knob Balance: 10%

Pulse time t_1 :

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

Pulse pause time t_2 :

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



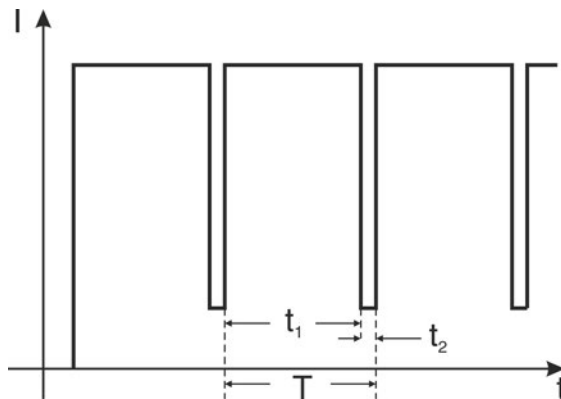
Rotary knob Balance: 90%

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 RTP3 spotArc 19POL

- Select the maximum welding current at the welding machine.
- Connect the remote control to the welding machine (observe the standard operating manual of the welding machine).
- Set welding process TIG or MMA.
- Pulsing, spotArc spot welding or standard mode with rotary switch Frequency range / operating mode.

The rotary knob "AMP%" on the welding machine is not functional.

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: 1 Hz (10 Hz x 0.1)

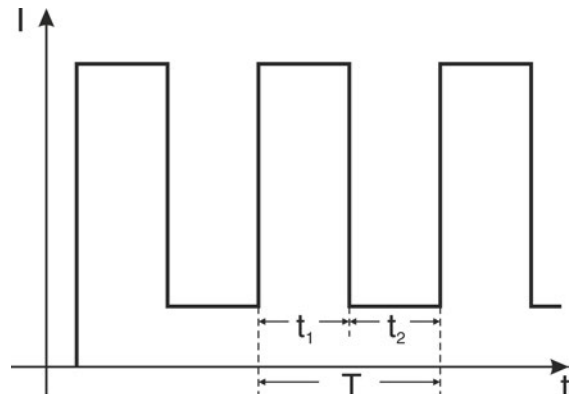
Rotary knob Balance: 50%

Pulse time t_1 :

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

Pulse pause time t_2 :

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



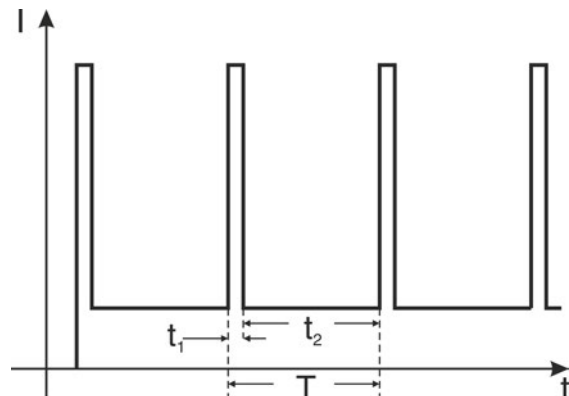
Rotary knob Balance: 10%

Pulse time t_1 :

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

Pulse pause time t_2 :

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



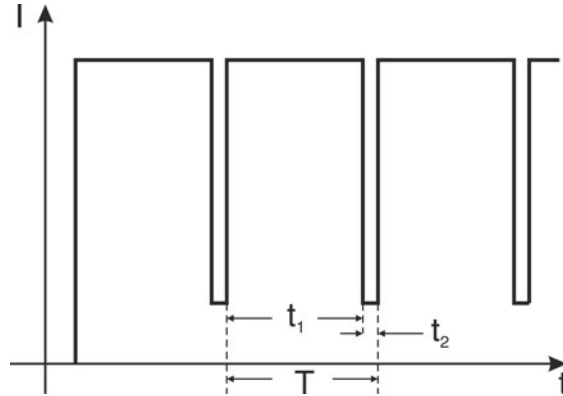
Rotary knob Balance: 90%

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

$$15 \text{ sec} / 0.1 = \text{spot time } 1.5 \text{ sec.}$$

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.

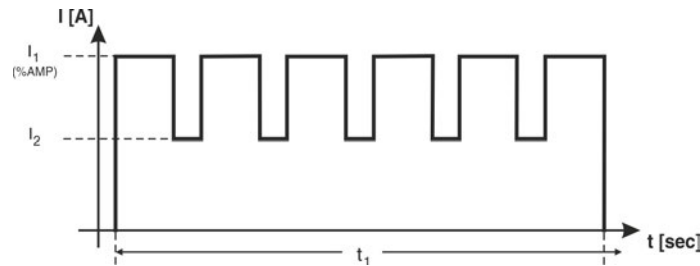


Figure 5-2

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 (\pm 1 sec.)
Butt joint	1 mm	70 A	2.5 (\pm 0.25 sec.)
Butt joint	2 mm	130 A	2.5 (\pm 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 RTAC1 19POL

5.4.6.1 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



Incorrect maintenance, testing and repair!

Maintenance, testing and repair of the machine may only be carried out by skilled and qualified personnel. A qualified person is one who, because of his or her 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.

Observe the maintenance instructions > see 6.2 chapter.

- In the event that the provisions of one of the below-stated tests are not met, the machine must not be operated again until it has been repaired and a new test has been carried out!

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.

6.1.1 Cleaning

- Clean the outer surfaces with a moist cloth (no aggressive cleaning agents).
- Purge the machine venting channel and cooling fins (if present) with oil- and water-free compressed air. Compressed air may overspeed and destroy the machine fans. Never direct the compressed air directly at the machine fans. Mechanically block the fans, if required.
- Check the coolant for contaminants and replace, if necessary.

6.1.2 Dirt filter

The duty cycle of the welding machine decreases as an effect of the reduced cooling air volume. The dirt filter must be removed at regular intervals and cleaned by blowing out with compressed air (depending on the level of soiling).

6.2 Maintenance work, intervals

6.2.1 Daily maintenance tasks

Visual inspection

- Mains supply lead and its strain relief
- Gas cylinder securing elements
- Check hose package and power connections for exterior damage and replace or have repaired by specialist staff as necessary!
- Gas tubes and their switching equipment (solenoid valve)
- Check that all connections and wearing parts are hand-tight and tighten if necessary.
- Check correct mounting of the wire spool.
- Wheels and their securing elements
- Transport elements (strap, lifting lugs, handle)
- Other, general condition

Functional test

- Operating, message, safety and adjustment devices (Functional test)
- Welding current cables (check that they are fitted correctly and secured)
- Gas tubes and their switching equipment (solenoid valve)
- Gas cylinder securing elements
- Check correct mounting of the wire spool.
- Check that all screw and plug connections and replaceable parts are secured correctly, tighten if necessary.
- Remove any spatter.
- Clean the wire feed rollers on a regular basis (depending on the degree of soiling).

6.2.2 Monthly maintenance tasks

Visual inspection

- Casing damage (front, rear and side walls)
- Wheels and their securing elements
- Transport elements (strap, lifting lugs, handle)
- Check coolant tubes and their connections for impurities

Functional test

- Selector switches, command devices, emergency stop devices, voltage reducing devices, message and control lamps
- Check that the wire guide elements (inlet nipple, wire guide tube) are fitted securely.
- Check coolant tubes and their connections for impurities
- Check and clean the welding torch. Deposits in the torch can cause short circuits and have a negative impact on the welding result, ultimately causing damage to the torch.

6.2.3 Annual test (inspection and testing during operation)

A periodic test according to IEC 60974-4 "Periodic inspection and test" has to be carried out. In addition to the regulations on testing given here, the relevant local laws and regulations must also be observed.



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

6.3 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 electric 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.
- Information about returning used equipment or about collections can be obtained from the respective municipal administration office.
- In addition to this, returns are also possible throughout Europe via EWM sales partners.



7 Technical data

Type	RTF1	RT1	RTG1	RT PWS1
Interface	19-pole	19-pole	19-pole	19-pole
Dimensions L x W x H in mm		180 x 100 x 70		180 x 100 x 70
Weight in kg	2.8	1.0	1.0	1.2

Type	RTP1	RTP2	RTP3	RTAC1
Interface	19-pole	19-pole	19-pole	19-pole
Dimensions L x W x H in mm	260 x 147 x 75	260 x 147 x 75	260 x 147 x 75	260 x 147 x 75
Weight in kg	1.5	1.5	1.5	1.0

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 A

9.1 Searching for a dealer

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



"More than 400 EWM sales partners worldwide"