



# OPERATING INSTRUCTIONS

Cold wire feeder

## APUS 20 C

### REHM SCHWEISSTECHNIK



## Operating Instructions

**Designation** Cold wire feeder

**Type** **APUS 20 C**

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# **1. Introduction**

## **1.1 Foreword**

Dear Customer,

You have purchased a REHM cold wire unit and thus a quality German product. We would like to thank you for your confidence in the quality of our products.

Only the highest quality components are used in the development and manufacture of REHM APUS cold wire units. For a long service life, even under the toughest conditions, only those components that meet the REHM's strict quality requirements are used in REHM cold wire units. APUS cold wire units have been developed and designed in accordance with generally approved safety regulations. All relevant statutory provisions are observed, as evidenced by the declaration of conformity and the CE mark.

REHM cold wire units are manufactured in Germany and carry the quality label "Made in Germany".

As REHM endeavours to stay abreast of technical advances, we reserve the right to adapt and change the design of these cold wire units to meet current technical requirements at any time.

## 1.2 General Description

**Note:**

The APUS 20 C cold wire unit is only supported from software version V1.22 onwards in the "INVERTIG.PRO" or "INVERTIG.PRO *digital*" power source. For older versions of the software, an update is needed.



Figure 1: IMAGE APUS 20 C

### 1.2.1 Intended use

REHM cold wire units are only suitable for the automatic feed of wire for welding. Unauthorised modifications and changes to the machine are prohibited for safety reasons. The manufacturer is not liable for any resulting damages.

REHM cold wire units are intended for use in both hand and machine operation.

REHM cold wire units are for sale to commercial / industrial users and only intended to be used by them, unless explicitly stated in writing by REHM. They may only be used by personnel who have been instructed and trained by REHM in the operation and maintenance of cold wire units and welding equipment.

Cold wire units may not be used in areas where there is an increased electrical risk.

This manual contains rules and guidelines for the use of the equipment for which it is intended. Use in accordance with its intended purpose requires compliance with these rules and guidelines. Risks and damage resulting from other uses is the responsibility of the operator. In case of special requirements, there may be additional particular provisions to be observed.

If in doubt, please ask your local Safety Officer or contact REHM Customer Service.

Note should also be taken of the specific instructions for proper use listed in the supplier's documentation.

The operation of the equipment is also governed by national regulations without any restrictions.

Intended use also includes compliance with the instructions specified for assembly, disassembly and re-assembly, commissioning, operation and maintenance requirements, together with disposal of the unit. Please note in particular the information contained in Chapter 2 Safety Instructions and Chapter 8.4 Proper Disposal.

The unit may only be operated under the aforementioned conditions. Any other use is considered not to be as intended. Any consequences that may arise are the responsibility of the operator.

## 1.3 Symbols used

### Typographic mark-ups

- Enumerated items preceded by a bullet: General enumeration
- ☐ Enumerated items preceded by a square: Work or operational steps that must be performed in the order listed.

### → Chapter 2.2, warning symbols on the equipment

Cross-reference: to Chapter 2.2, warning symbols on the equipment.

**Bold text** is used for emphasis

### Note!

... indicates tips and other useful information.

### Safety symbols



The safety symbols used in this manual: → Chapter 2.1

## 2. Safety instructions

### 2.1 Safety symbols in this manual

Warnings and symbols



This symbol, or one that more accurately identifies the risk, is used with all safety instructions in this manual where there is a risk to life and limb.

One of the signal words below (Danger!, Warning!, Caution!) indicates the level of risk:

**Danger!** ... an imminent danger.

If this is not avoided, can result in death or serious injury.

**Warning** ... a potentially dangerous situation.

If this is not avoided, can result in death or serious injury.

**Caution:** ... a potentially harmful situation.

If this is not avoided, can result in slight or minor injuries and may cause damage.

**Important!**



Indicates a potentially harmful situation. If this is not avoided, can result in the product or something nearby being damaged.



Materials that are a risk to health or the environment. Materials / consumables that are to be handled and/or disposed of in accordance with regulations.

### 2.2 Warning symbols on the system

identify risks and hazards in the equipment.

**Danger!**

**Risk of electric shock!**



Failure to comply can result in death or injury.

### 2.3 Instructions and requirements

Risks arising from non-compliance

The unit has been developed in accordance with generally accepted engineering and construction rules.

Nevertheless, its use may constitute a risk to the life and limb of the user or third parties or cause damage to the equipment or other property.



	<p>Safety devices must never be removed or disabled, as this may result in hazards and the equipment no longer being used in accordance with its intended use. The removal of safety devices when setting up, repairing and carrying out maintenance is described elsewhere. Immediately after completing such work, the safety devices must be reattached.</p> <p>When using third party materials (e.g. solvents for cleaning) the operator of the equipment must ensure the safety of the unit.</p> <p>All safety and hazard information and the rating plate on the equipment must be kept complete and legible, and be complied with.</p>
<b>Safety instructions</b>	<p>Safety instructions are for health and safety. They must be observed.</p> <p>Safety instructions, including those listed in other chapters, must be observed, as must the special safety instructions contained in the text.</p> <p>Also observe the safety information signs in the operator's workshop.</p>
<b>Applications</b>	<p>REHM cold wire units are for sale to commercial / industrial users and only intended to be used by them, unless explicitly stated in writing by REHM. No one is permitted in the work area except the welder.</p>
<b>Hazards of this machine</b>	<p>The cold wire units have been subjected to a safety check and acceptance. Improper operation or misuse can pose a risk to</p> <ul style="list-style-type: none"><li>• Life and limb of the operator,</li><li>• The machine, and other property belonging to the operator</li><li>• The efficient operation of the machine</li></ul> <p>All persons who are involved with the installation, commissioning, operation and maintenance of the machine must</p> <ul style="list-style-type: none"><li>• be suitably qualified</li><li>• carefully observe these operating instructions.</li></ul> <p>It's about your safety!</p>
<b>Workplace</b>	<p>The workplace is the area around the machine and, according to the size of the clamped work piece, must be kept unobstructed.</p>
<b>Emissions</b>	<p>The A-weighted equivalent continuous sound pressure level of the cold wire unit is less than 75 dB(A)</p>
<b>Qualification of operating personnel</b>	<p>REHM cold-wire units may only be operated by personnel who have been instructed and trained in the use and maintenance of cold-wire units, and their safety instructions. Only qualified, trained personnel who have been tasked to do so may work on the equipment</p> <p>The machine operator is responsible for others present in the work area. The responsibilities for this machine must be clearly defined and adhered to. Inadequate competence is a safety risk.</p> <p>The user must</p> <ul style="list-style-type: none"><li>• make the operating instructions are accessible to the machine operator</li><li>• make sure that the machine operator has read and understood them.</li></ul> <p>Fit the machine with a lockable switch that makes operation by unauthorised personnel impossible.</p>
<b>Purpose of the document</b>	<p>This manual contains important information on how you can operate this equipment safely, properly and efficiently. A copy of the manual must be kept near the equipment at a suitable location. Before using the device, be sure to read the information summarised for you in the operating instructions. You will receive important advice on using the unit, which will enable you to benefit fully</p>

from the technical features of your REHM unit. You will also find information regarding maintenance and repair, as well as operation and functional safety.



### **Changes to the equipment**

This manual does not replace instruction given by REHM service personnel. The documentation of any additional options that may possibly be present must also be considered.

Changes to the equipment or adding on or installing additional devices is not permitted. Doing so will invalidate the warranty and any liability claims.

Any tampering with or disabling of safety devices will result in all warranty claims becoming null and void.

### 3. Functional Description

#### 3.1 Description of Controls

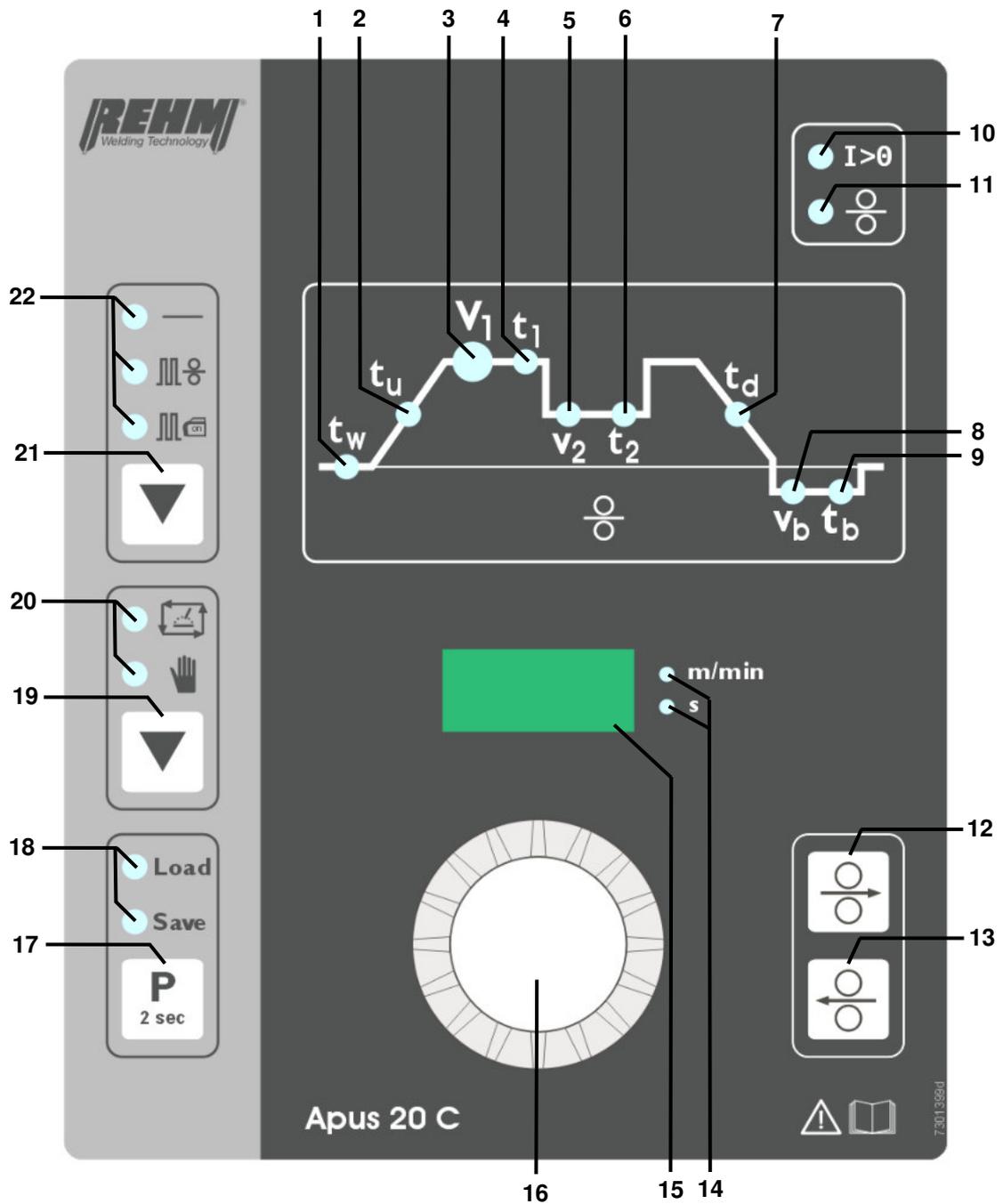


Figure 2: APUS 20 C panel

## Functional Description

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1	Start delay time ( $t_w$ )	Page 15
2	Acceleration time ( $t_u$ )	Page 15
3	Wire feed speed 1 ( $v_1$ )	Page 15
4	Pulse time 1 ( $t_1$ )	Page 15
5	Wire feed speed 2 ( $v_2$ )	Page 15
6	Pulse time 2 ( $t_2$ )	Page 16
7	Delay time ( $t_d$ )	Page 16
8	Wire retraction speed ( $v_b$ )	Page 16
9	Wire retraction time ( $t_b$ )	Page 16
10	Warning light "current flowing"	Page 21
11	Warning light "motor running"	Page 22
12	Threading button	Page 20
13	Unthreading button	Page 20
14	Display LEDs for	Page 20
	<ul style="list-style-type: none"><li>• Metres per minute (m/min) for the wire feed speed</li><li>• Seconds (s) for times</li></ul>	
15	3-digit display	Page 14
16	Push and turn knob	Page 14
17	Program selection button	Page 21
18	Display LEDs for programs	Page 21
	<ul style="list-style-type: none"><li>• Load programs</li><li>• Save programs</li></ul>	
19	Mode selection button	Page 16
20	Operating mode display	Pages 16 ff
	<ul style="list-style-type: none"><li>• Automatic mode</li><li>• Manual mode</li></ul>	
21	Pulse selection button	Page 19
22	Display LED's for pulsing	Page 19
	<ul style="list-style-type: none"><li>• No pulses</li><li>• Pulsing on</li><li>• Synchronous pulses</li></ul>	

## 3.2 Switching on

Check the power supply first, then switch on the APUS cold wire unit (mains switch on front). After turning on, all the LEDs and the digital display [15] illuminate for about 1 second. The software version is then displayed in the digital display [15] for about 2 seconds. All the settings are then run through and the set values appear in the digital display [15]. This process can be aborted at any time. This is carried out by pressing a control element on the control unit or on the TIG torch. The APUS 20 C cold wire unit is now ready.

## 3.3 Special features of the control panel

All set parameters are saved when the unit is powered off. On restarting, the set parameters are those used during the last cold wire job.

Only those parameters that are available in the current configuration can be set.

If the selected parameter is not changed for 20 seconds, it automatically returns to the wire feed speed (V1) [4]. Thus the most important parameters are always displayed in the initial state.

## 3.4 Push and turn knob

The push and turn button [16] is centrally positioned and is equally easy to use from both the left and right hand side. The selection and setting of process-relevant parameters [1-9] and the operation of special parameters is carried out using the push-and-turn knob [16].

## 3.5 Digital display

The 3-digit display [15] gives a quick and clear indication of the parameters, all relevant information and the error messages (see Chapter 7). The indicator LEDs [14] to the right of the digital display [15] show the units of the selected parameter by illuminating.

## 3.6 The Parameters

The selection of the parameters [1 to 9] assigned to the displayed curve is carried out using the push-and-turn knob [16]. The parameters are always selected and set in the same way in conjunction with the light-emitting diodes [1-9] and the 3-digit display [15], (see Chapter 3.6.1).

### 3.6.1 Basic setting of the parameters

- Turning the push-and-turn knob [16] until the desired parameters (e.g.  $t_w$ ). The currently selected parameter is indicated by the associated LED and the corresponding value will appear in the digital display [15].
- Press the push-and-turn knob [16] to select the parameter, the corresponding LED flashes.
- Turn the push-and-turn knob [16] to set the desired value.
- Press the push-and-turn knob [16] to confirm the new value.

The parameters are described below in the order presented in Figure 2.

### 3.6.2 Start delay time ( $t_w$ )

The setting of the start delay time [1] is carried out as described in Section 3.6.1. The start delay time is the time between ignition of the arc and the start of the wire feeder. This time is needed to melt / preheat the work piece.

The start delay time is only active in "automatic mode".

### 3.6.3 Acceleration time ( $t_u$ )

The setting of the acceleration time to the wire feed speed 1 ( $v_1$ ) [3] is carried out as described in Section 3.6.1.

The acceleration time is the time in which the wire feed speed is linearly increased after starting, up to the preselected wire feed speed 1 ( $v_1$ ) [3].

### 3.6.4 Wire feed speed 1 ( $v_1$ )

The setting of the wire feed speed 1 ( $v_1$ ) [3] is carried out as described in Section 3.6.1.

The wire feed speed 1 ( $v_1$ ) is the speed at which the wire is fed in non-pulsed operation. In pulsed operation, wire feed speed 1 is used during pulse time 1 ( $t_1$ ) [4].

See Section 3.8, pulsing.

### 3.6.5 Pulse time 1 ( $t_1$ )

The setting of the pulse time 1 ( $t_1$ ) [4] is performed as described in Section 3.6.1.

Pulse time 1 ( $t_1$ ) is the time used for the wire feed speed 1 ( $v_1$ ) in pulsed operation.

See Section 3.8, pulsing.

### 3.6.6 Wire feed speed 2 ( $v_2$ )

The adjustment of the wire feed speed 2 ( $v_2$ ) [5] is carried out as described in Section 3.6.1.

The wire feed speed 2 ( $v_2$ ) is the speed at which the wire is fed during pulse time 2 ( $t_2$ ) in pulsed operation

See Section 3.8, pulsing.

### 3.6.7 Pulse time 2 ( $t_2$ )

The setting of the pulse time 2 [6] is carried out as described in Section 3.6.1.

Pulse time 2 ( $t_2$ ) is the time used for the wire feed speed 2 ( $v_2$ ) in pulsed operation.

See Section 3.8, pulsing mode.

### 3.6.8 Delay time ( $t_d$ )

The setting of the delay time ( $t_d$ ) [7] of the welding wire feed is carried out as described in Section 3.6.1.

The delay time ( $t_d$ ) is the time in which the welding wire feed reduces in a linear fashion to a standstill.

Note:

If the delay time ( $t_d$ ) is greater than the current down slope time of the power source, this can lead to a stuck wire.

### **3.6.9 Wire retraction speed ( $v_b$ )**

The setting of the wire retraction speed ( $v_b$ ) [8] is carried out as described in Section 3.6.1.

The wire retraction speed ( $v_b$ ) is the speed at which the wire is withdrawn, after the delay time ( $t_d$ ) has finished.

### **3.6.10 Wire retraction time ( $t_b$ )**

The setting of the wire retraction time ( $t_b$ ) [9] is carried out as described in Section 3.6.1.

The wire retraction time ( $t_b$ ) is the time at which the wire is withdrawn after the delay time ( $t_d$ ) has finished

## **3.7 Operating mode**

The push button [19] is used to select "automatic mode" or "manual mode", where the indicator LEDs [20] show the selected setting by illuminating.

### **3.7.1 "Automatic operation" mode**

#### **Without REHM INVERTIG.PRO or INVERTIG.PRO *digital* power source**

The wire feed is started or stopped via the start/stop input of the "external" socket.

#### **With REHM INVERTIG.PRO or INVERTIG.PRO *digital* power source**

The wire feed is started or stopped via the REHM INVERTIG.PRO or INVERTIG.PRO *digital* current source.

### **Application notes "4-stroke"**

- Press the torch trigger and hold until the base material has melted. When you release the torch trigger the cold wire unit starts and the wire feed begins.
- In order to avoid the welding wire sticking, the down slope ( $t_d$ ) of the welding current source should be set so that it is higher than the delay time ( $t_d$ ) of the cold wire unit.

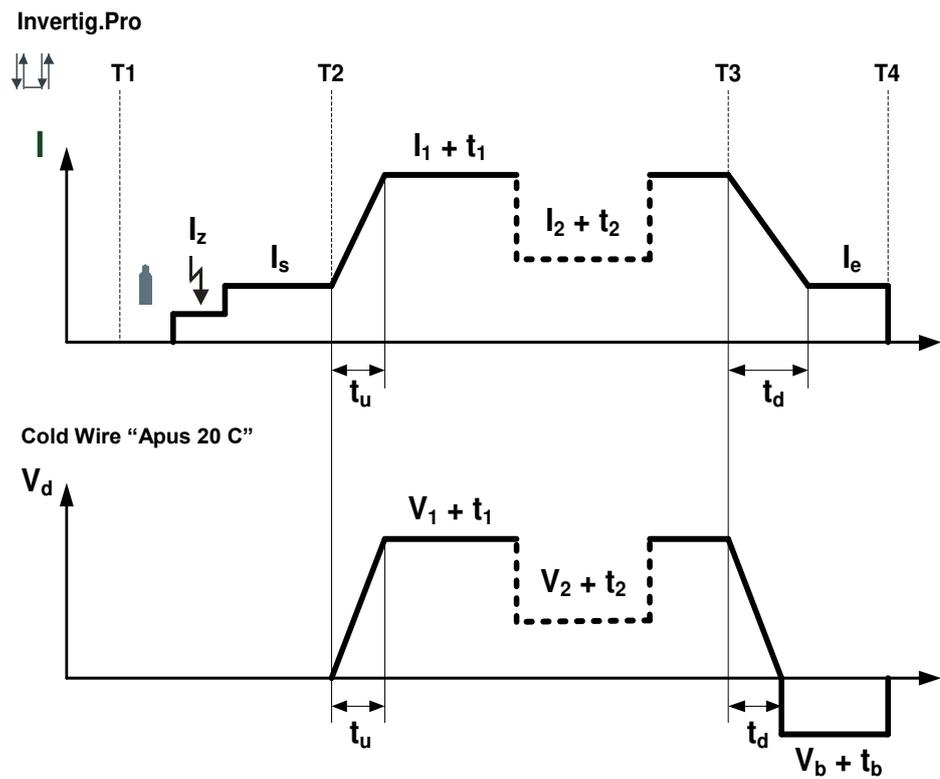


Figure 3: 4-stroke sequence

### Application notes "2-stroke"

- Select the start delay time ( $t_w$ ) on the cold wire unit so that the wire feed only starts when the base material has melted.
- In order to avoid the welding wire sticking, the down slope ( $t_d$ ) of the welding current source should be set so that it is higher than the delay time ( $t_d$ ) of the cold wire unit.

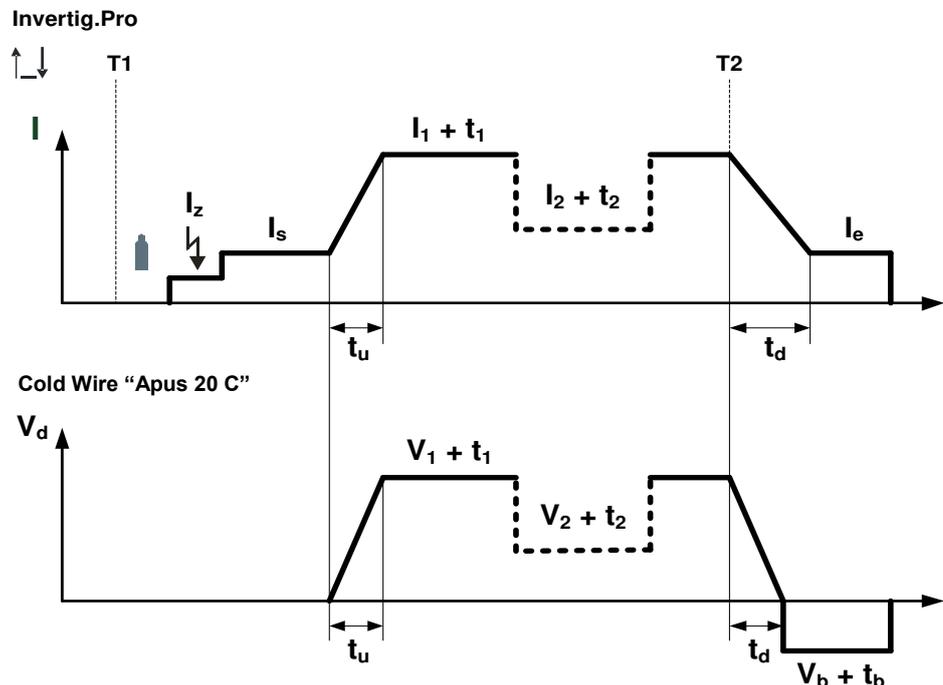


Figure 4: 2-stroke sequence

### 3.7.2 "Manual operation" mode

#### Without REHM INVERTIG.PRO or INVERTIG.PRO digital power source

The wire feed is started or stopped via the start/stop input of the "external" socket. Pressing it again stops the wire feed.

#### With REHM INVERTIG.PRO or INVERTIG.PRO digital power source

By pressing the torch trigger "Up", wire feed starts. Pressing it again stops the wire feed.



When using the torch Up / Down buttons, in the case of the INVERTIG.PRO or INVERTIG.PRO digital the torch Up/Down button must be set to cold wire.

### Application note "Operation with foot pedal"

- Set the cold wire unit to "manual operation" and start the arc with the foot pedal. Enable or disable the cold wire with the Up/Down button

## 3.8 Pulsing

Pressing the button [21] offers the choice of "without pulsing", "pulsing on" and "synchronous pulsing" and the indicator LEDs [22] display the welding process selected by illuminating.

### 3.8.1 Without Pulsing

If welding without pulsing is selected, the wire is fed in at a constant wire feed speed 1 ( $v_1$ ) [3].

Pulse time 1 ( $t_1$ ) [4], wire feed speed 2 ( $v_2$ ) [5] and pulse time 2 ( $t_2$ ) [6] are not selected with this setting.

### 3.8.2 Pulsing On

With pulsing on, the wire is fed in pulses. After starting with the acceleration time ( $t_u$ ) [2] the wire feed speed ( $v_1$ ) [3] increases. Thereafter, the wire is fed in at the wire feed speeds ( $v_1, v_2$ ) [3+5], and the appropriate pulse times ( $t_1, t_2$ ) [4+6].

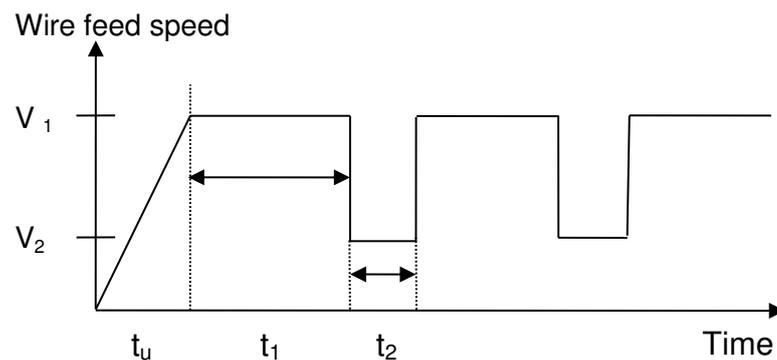


Figure 5: Pulsing on sequence

### 3.8.3 Synchronous Pulsing

With synchronous pulsing, the wire is fed synchronous with the welding current. Following the start of the acceleration time ( $t_u$ ) [2], the wire feed speed 1 ( $v_1$ ) [3] increases. Thereafter, the wire is fed in pulses at the wire feed speeds ( $v_1, v_2$ ) [3+5], with the switching taking place synchronously with the change in welding current from  $I_1$  to  $I_2$ . Pulse times 1 ( $t_1$ ) and 2 ( $t_2$ ) are not active in this mode.

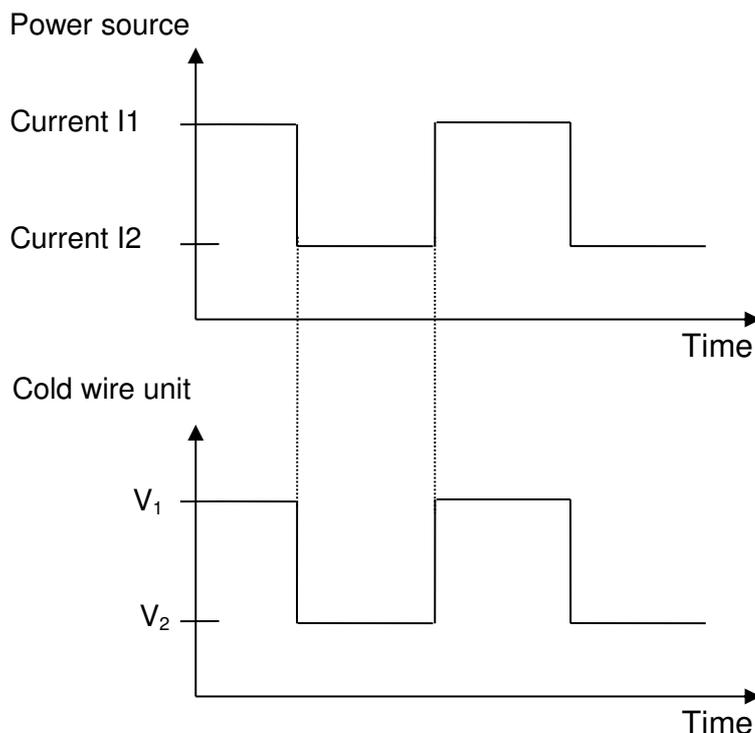


Figure 6: Synchronous pulsing sequence

### 3.9 Threading

Threading of welding wire is carried out by pressing the threading button [12]. The wire speed can be adjusted during threading using the push and turn knob [16]. The actual wire feed speed is displayed on the digital display [15].

### 3.10 Unthreading

The unthreading of the welding wire is carried out by pressing the unthreading button [13]. The actual wire feed speed is displayed on the digital display [15].

When using the REHM INVERTIG.PRO or INVERTIG.PRO *digital* welding power source, unthreading can be carried out by pressing the "Down" button on the torch.

#### Note

- When unthreading, the wire feed speed cannot be set by the user.
- After retracting the wire, it is momentarily transported forward again in order to eliminate the play in the wire feed core.
- When using the torch "Down" button with the INVERTIG.PRO or INVERTIG.PRO *digital*, the torch Up/Down button must be set to "cold wire".

### 3.11 Positioning the welding wire

The positioning of the welding wire is carried out by pressing the "Up" torch button when TIG welding is inactive.

#### Note

- This function is only available in conjunction with the REHM INVERTIG.PRO and INVERTIG.PRO *digital* welding power source.

- When using the "Up" torch button with the REHM INVERTIG.PRO and INVERTIG.PRO *digital*, the Up/Down torch button must be set to "cold wire".

### 3.12 Loading and saving programs

The loading and saving of the 99 programs is carried out with the program selection button [17]. The programs can be saved and loaded using a number of your choice, with all cold wire parameters [1 to 9 and 22].

This means that once the cold wire parameters [1 to 9 and 22] have been determined, they can be reset quickly for welding jobs that come up frequently. This saves time and ensures consistent quality.

#### 3.12.1 Loading Programs

Loading a program is carried out using the the program selection button [17].

- A short press (<1 s) of the program selection button [17] illuminates the "Load" indicator LED [18] for loading a program.
- Using the push-and-turn knob [16], select the desired program number (e.g. "P34."). Only those program numbers that are already allocated are shown in the digital display[15].
- Press and hold the program selection button [17] for 2 seconds. When loading the values, the digital display [15] goes out for about 0.5 seconds. The desired program is loaded.

#### 3.12.2 Saving programs

Saving a program is carried out with the program selection button [17].

- Enter the desired settings of the cold wire parameters [1 to 9 and 22].
- Two short presses (<1 s) of the button [17] illuminates the "Save" indicator LED [18] for saving the program.
- Use the push-and-turn knob [16] to select the desired program number. The program number is displayed on the digital display [15]. Program numbers that have previously been assigned are prefixed with "P" (e.g. "P34."). Free program numbers are prefixed with a dash (e.g. "-35").
- Press and hold the program selection button [17] for 2 seconds. The program is saved. When saving the values, the digital display [15] goes out for about 0.5 seconds. The desired program has been saved.



**Note**

It is advisable to create a table for the management of programs, linking each program number with its associated jobs.

### 3.13 Indicator lights

<b>I &gt; 0</b>	<p>Indicator light "current flowing" [10] (only in conjunction with REHM INVERTIG.PRO or INVERTIG.PRO <i>digital</i> power source)</p> <p>Remains illuminated as long as "current flowing" is reported from the power source.</p>
-----------------	---

	Indicator light "motor running" [11] Illuminated while the motor is running.
---	---

### 3.14 Special Parameters

The user can make further adjustments using the special parameters.

Special parameters:

- A - time for play compensation  
Duration of the positioning of welding wire after wire retraction, to compensate for the play (slip) in the wire feed core.  
This time must be adjusted depending on the length of the wire feed core.
- CLr - All cold wire parameters [1 to 9 and 22] are set to factory settings.

Cold wire parameters	Factory setting
Start delay time ( $t_w$ )	0.1 seconds
Acceleration time ( $t_u$ )	1.0 seconds
Wire feed speed 1 ( $v_1$ )	0.9 m / min
Pulse time 1 ( $t_1$ )	0.1 seconds
Wire feed speed 2 ( $v_2$ )	0.6 m / min
Pulse time 2 ( $t_2$ )	0.3 seconds
Delay time ( $t_d$ )	0.0 seconds
Wire retraction speed ( $v_b$ )	-1.4 m / min
Wire retraction time ( $t_b$ )	0.8 seconds
Pulsing	On

#### 3.14.1 Setting the special parameter

- Select the parameter wire feed speed 1 ( $v_1$ ) [3] using the push and turn knob [16].
- Turn the push and turn knob [16] to the maximum value for the wire feed speed 1 ( $v_1$ ) [20.0 m/min].
- Press the push and turn knob [16] for 2 seconds. The parameters related to the special parameter and the associated value appear in the digital display [15].  
Example: Display "A1.2" - play compensation time of 1.2 seconds
- The desired parameter is selected by turning the push and turn knob [16].
- Press the push and turn knob [16] to activate the parameter change. The parameter letter flashes.
- By turning the push and turn knob [16] the desired parameter is set.
- Press the push and turn knob [16] to accept the set parameter.
- Exit setting special parameters: Press the push and turn knob [16] for 2 seconds. All special parameters are now saved.

## 4. Accessories and Options

This manual is based on using accessories approved by REHM.

### 4.1 Overview

REHM Part Number	Designation
	<b>Basket coil adapter</b>
7516004	Basket coil adapter "professional"
7516000	Basket coil adapter "industrial"
	<b>Feed roller pair for solid wire</b>
7502030	Feed roller pair with sprocket 0.8 mm
7502031	Feed roller pair with sprocket 1.0 mm
7502032	Feed roller pair with sprocket 1.2 mm
	<b>Feed roller pair for aluminium</b>
7502071	2 feed roller pairs with sprocket 1.0 mm
7502072	2 feed roller pairs with sprocket 1.2 mm
	<b>Feed roller for solid wire</b>
7502011	Feed roller 0.8mm
7502012	Feed roller 1.0 mm
7502013	Feed roller 1.2 mm
	<b>More wire feed parts</b>
7502038	Counter pressure roller
4000112	Sprocket
4000093	Drive pinion
2900359	Tension spring
4000101	Metal washer
4000102	PVC washer
7502049	Capillary tube 58.5mm long
7502053	Support tube 57 mm long
	<b>Central plug</b>
7701700	Central europlug
7701600	Connecting nut
7701504	Anti-kink device machine side
7701503	Anti-kink spring NW 19
7701601	Lock nut M 10 x 1
7700891	Wire feed sleeve 4m
	<b>Carbon Teflon core</b>
7700847	50 m roll, black, for wire 1.0 to 1.4 mm (2.0 mm/4.0 mm)

<b>Torch feed</b>	
8800580	Torch feed complete R-TIG 200/450 30°
<b>Spare parts for 8800580</b>	
2001300 (1)	Brass bolts
2600066 (2)	Plastic washer
2900362 (3)	Cylinder screw M4x12
2900365 (4)	Knurled head screw with collar M4x16
2900366 (5)	Knurled head screw flat M4x8
3000040 (6)	Aluminium holder
3400240 (7)	Insulating ring 450 Pertinax
7700878 (9)	Wire guide tube 7x1, bent 30°
7700879 (10)	Clamping bracket
7700880 (11)	Guide spiral
7700881 (12)	Double nipple
7700095 (13)	Cold wire guide nozzle 0.8mm
7700096 (14)	Cold wire guide nozzle 1.0mm
7700097 (15)	Cold wire guide nozzle 1.2mm
8800581	Torch feed complete R-TIG 150 / 260W 30°
<b>Spare parts for 8800581</b>	
2001300 (1)	Brass bolts
2600066 (2)	Plastic washer
2900362 (3)	Cylinder screw M4x12
2900365 (4)	Knurled head screw with collar M4x16
2900366 (5)	Knurled head screw flat M4x8
3000040 (6)	Aluminium holder
3400241 (16)	Insulating ring 260 Pertinax
7700878 (9)	Wire guide tube 7x1, bent 30°
7700879 (10)	Clamping bracket
7700880 (11)	Guide spiral
7700881 (12)	Double nipple
7700095 (13)	Cold wire guide nozzle 0.8mm
7700096 (14)	Cold wire guide nozzle 1.0mm
7700097 (15)	Cold wire guide nozzle 1.2mm
8800582	Torch feed complete R-TIG 200/450 50°
<b>Spare parts for 8800582</b>	
2001300 (1)	Brass bolts
2600066 (2)	Plastic washer
2900362 (3)	Cylinder screw M4x12
2900365 (4)	Knurled head screw with collar M4x16
2900366 (5)	Knurled head screw flat M4x8
3000040 (6)	Aluminium holder
3400240 (7)	Insulating ring 450 Pertinax
7700877 (8)	Wire guide tube 7x1, bent 50°
7700879 (10)	Clamping bracket
7700880 (11)	Guide spiral
7700881 (12)	Double nipple
7700095 (13)	Cold wire guide nozzle 0.8mm
7700096 (14)	Cold wire guide nozzle 1.0mm
7700097 (15)	Cold wire guide nozzle 1.2mm

8800583	Torch feed complete R-TIG 150 / 260W 50°
	<b>Spare parts for 8800583</b>
2001300 (1)	Brass bolts
2600066 (2)	Plastic washer
2900362 (3)	Cylinder screw M4x12
2900365 (4)	Knurled head screw with collar M4x16
2900366 (5)	Knurled head screw flat M4x8
3000040 (6)	Aluminium holder
3400241 (16)	Insulating ring 260 Pertinax
7700877 (8)	Wire guide tube 7x1, bent 50°
7700879 (10)	Clamping bracket
7700880 (11)	Guide spiral
7700881 (12)	Double nipple
7700095 (13)	Cold wire guide nozzle 0.8mm
7700096 (14)	Cold wire guide nozzle 1.0mm
7700097 (15)	Cold wire guide nozzle 1.2mm

	<b>Sleeve packets and wire guides</b>
7631744	Cold wire torch guide 6m
7631741	R-TIG 450 W SC/4m with wire guide in sleeve package
7631742	R-TIG 260 W SC/4m with wire guide in sleeve package
7701060	Leather sleeve for TIG cold wire 4m with Velcro fastening
	<b>CAN cable</b>
3600547	CAN cable plug - plug 2m (included)
7531045	CAN cable plug - plug 6m
3600542	CAN extension 5m
7531040	CAN extension 8m
7531041	CAN extension 12m
7531043	CAN extension 20m
7531044	CAN extension 25m

	<b>Equipment options</b>
7501502	Trolley for wire feeder case
1180167	Eyebolts on case
7500458	Adapter plate to accept APUS 20 C and INVERTIG.PRO on TIG Cart / TIG-COOL Cart



Figure 7: Cold wire torch feed 6m  
Item no. 763 1744



Fig. 8: Torch R-TIG 12-450 W / 12-260 W SC / 4m  
Item No. 763 1741 / 763 1742  
(with torch guide see figure 9)

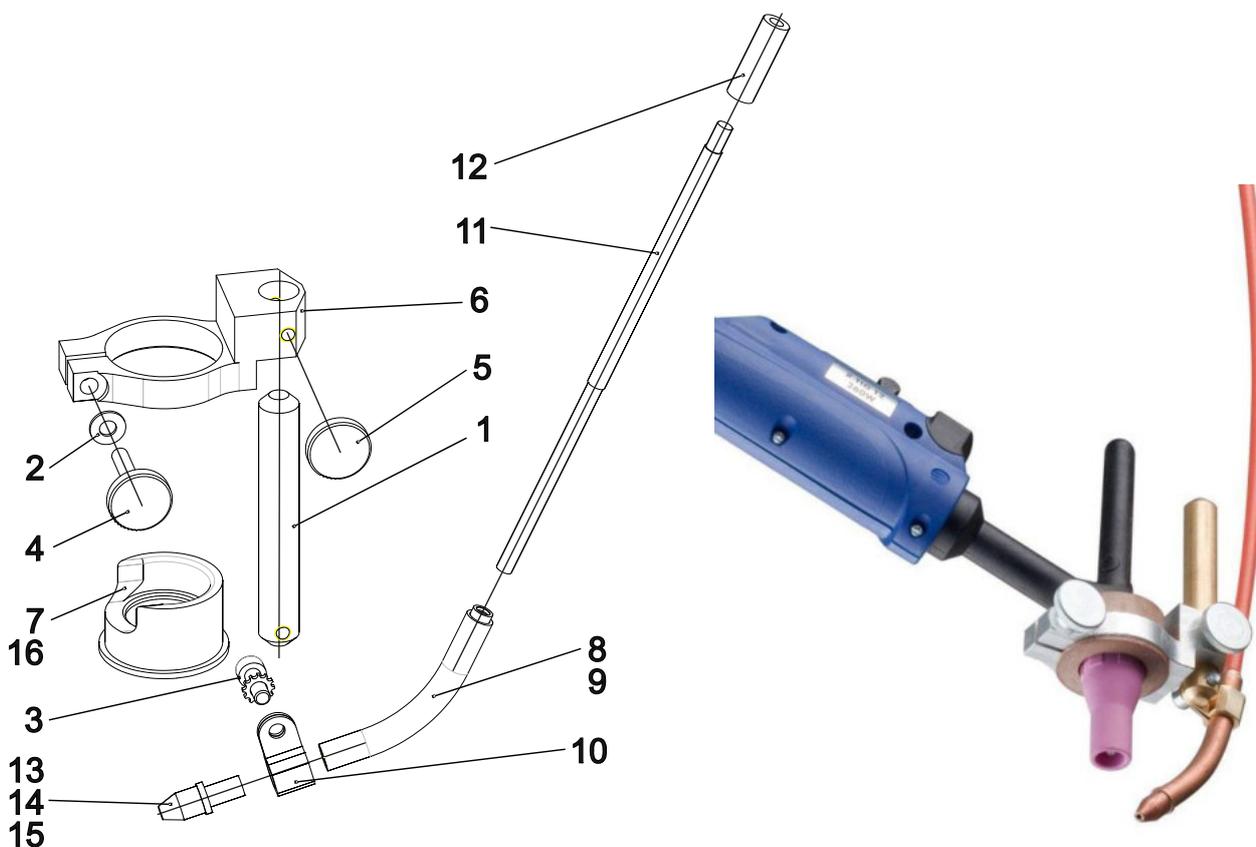


Figure 9: Torch guide R-TIG 200/450 and R-TIG 150/260 complete  
Item no. 8800580/8800581/8800582/8800583

## 5. Commissioning

### 5.1 Safety instructions

Read the manual carefully, especially → **Chapter 2, Safety instructions**, just before starting work on the welding positioner/table.



**Warning!**

**REHM cold-wire units may only be operated by personnel who have been instructed and trained in the use and maintenance of cold-wire units, and their safety instructions.**

**Always wear protective clothing when welding, making sure that bystanders are not endangered by the UV radiation from the arc.**

### 5.2 Setting up the cold wire unit

**Important:**

Ensure that the working environment is always clean and tidy by issuing internal instructions and establishing controls as appropriate.

Set up the REHM APUS 20 C cold wire unit in such a way that the welder has enough space in front of the unit so that he can control and operate the setting elements.

Only place the APUS 20 C cold wire unit firmly on a level, non-slip and solid surface or mount it on a suitable bracket.

Secure the APUS 20 C cold wire unit so that it cannot roll away or fall off.

Only transport the APUS 20 C cold wire unit in compliance with current health and safety regulations. Only use transport methods and slinging points specified by REHM.



**Danger! Electric shock!**

**Do not use the cold wire unit outdoors in the rain!**

### 5.3 Connecting the cold wire unit

The REHM cold wire unit should only be connected to the mains according to the current VDE regulations, keeping in mind the relevant health and safety rules.

When connecting the device, note the information regarding the supply voltage and the mains fuse. Circuit breakers and fuses must always be suitable for the specified current. The information required can be found on the device's rating plate.

Turn the unit off when not in use.

Observe relevant health and safety rules.

### 5.3.1 Connections

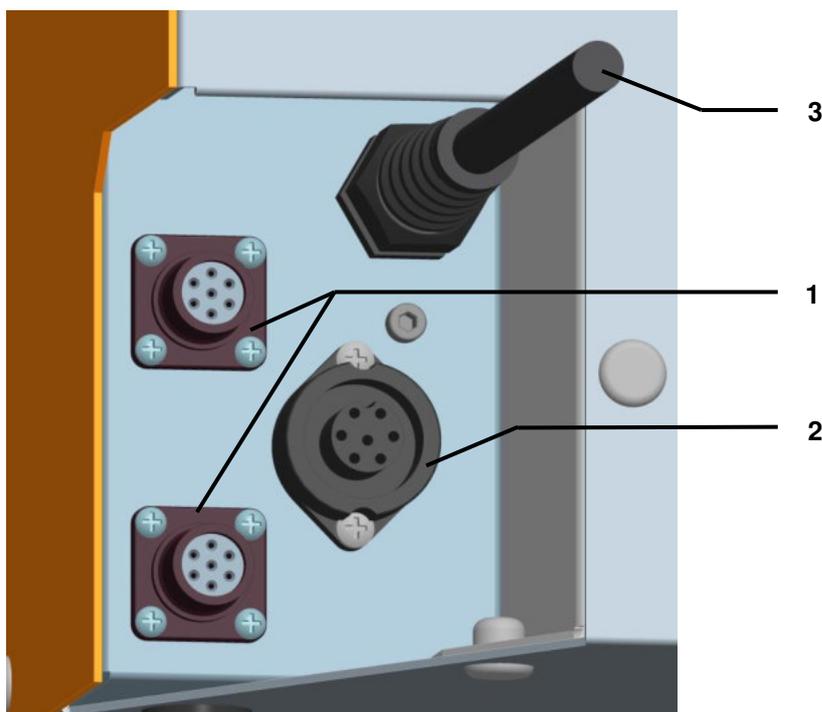


Figure 10: Connections for the APUS 20 C cold wire unit (rear)

- 1 Connecting sockets for REHM INVERTIG.PRO and INVERTIG.PRO *digital*  
Note:  
*The existing dummy plug must always be used when the cables are not plugged in.*
- 2 External connecting socket (analogue)
- 3 230V/50Hz power cord, length = 3.15 m

### 5.3.2 Assignment of sockets for external control:

Pin number	Designation	Remarks
1	Output 1	Status "motor operating" Max: 30V / 150mA
2		
3	Digital input	Cold wire start/stop
4	+5V	Output
5	Output 2	Status "current flowing" Max: 30V / 150mA
6		

**Note**

- The "cold-wire start/stop" input is only available when the REHM INVERTIG.PRO or INVERTIG.PRO *digital* welding power source is not connected.
- Output 2 status "current flowing" is only available when the REHM INVERTIG.PRO or INVERTIG.PRO *digital* welding power source is not connected.

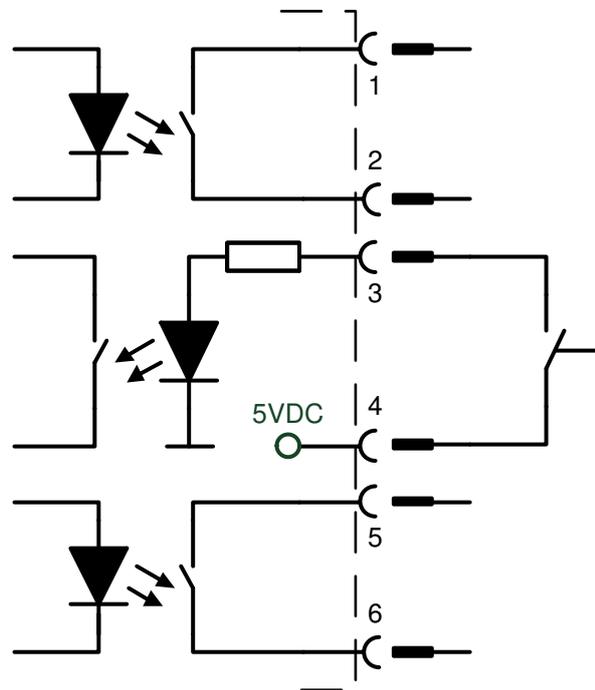


Figure 11: Electrical diagram of inputs and outputs

## 5.4 Guidelines for working with welding power sources

Welding work may only be carried out by qualified or trained personnel who are familiar with the equipment and the procedures. When welding, wear protective clothing and ensure that bystanders are not at risk.

## 6. Operation

### 6.1 Safety instructions

Read the manual carefully, especially → **Chapter 2, Safety Instructions**, prior to commissioning and before starting work with the cold-wire unit.

#### Warning!



**REHM cold-wire units may only be operated by personnel who have been instructed and trained in the use and maintenance of cold-wire units, and their safety instructions.**

Working with and maintaining electrical cold wire units always involves potential hazards. Personnel who are not familiar with such units and systems may cause injury to themselves or others. For this reason, operators must be made aware of the following potential hazards and the safety measures necessary to prevent possible damage and injury. Nevertheless, the user of a cold wire unit must understand the safety regulations that apply to its operation before starting work.

### 6.2 Electrical hazards



Connection and servicing on cold-wire units and their accessories may only be carried out in accordance with the current VDE regulations and the regulations laid down by the relevant health and safety authorities.

- Never touch live metal parts with bare skin or wet clothing
- When welding, always wear gloves and welding helmets with the appropriate filters.
- Make sure that all parts you come into contact with when working are always kept dry, such as your clothes, your work area, the welding torch, the electrode holder, the cold wire unit and the welder itself. Never work in a wet environment.
- Make sure you are well insulated by wearing dry gloves and rubber soled shoes and standing on a dry, insulating surface, especially if you are standing on metal whilst working or are in areas where there is an increased electrical risk.
- Do not use worn or damaged welding cables. Make sure that the welding cables are not overloaded. Only use equipment that is in perfect order.
- Turn off the cold wire unit during any prolonged work stoppage.
- Never leave the cold wire unit unattended when it is switched on.

### 6.3 Notes for your personal safety

Radiation given off by the electric arc or hot metal can severely burn exposed skin and eyes.

- Use only welding hoods that are in perfect condition and fitted with the appropriate protective filters, leather gloves and a welding helmet for protecting the eyes and body from sparks and radiation from the arc (see

TRBS 2131 and BGR 500 KAP. 2.26). Wear such protection even when you are only supervising welding work.

- Advise bystanders of the dangers of arc radiation and splash back of hot metal, providing protection for them with non-flammable screens.
- Compressed gas cylinders represent a potential risk. Strictly observe the safety regulations laid down by the relevant health and safety authorities and the suppliers. Secure gas cylinders to prevent them from falling over. Never transport gas cylinders without a protective cap.

## 6.4 Fire Protection

Hot slag or sparks can cause fires if they come into contact with flammable materials, liquids or gases. Remove all flammable materials from the welding area and have a fire extinguisher ready.

## 6.5 Ventilation

Work stations must be set up taking account of the methods, materials and conditions, such that the user can breathe air that is free of harmful substances (see TRBS 2131 and BGR 500 KAP. 2.26).

Make sure that the welding area is properly ventilated by either natural or artificial ventilation.

Do not weld work pieces that are painted or have been treated with degreasing agents, as this can cause toxic vapours to be generated.

## 6.6 Tests before switching on

It is assumed that

- the system is set up properly according to → **Chapter 5, Start-up**,
- all connections have been made in accordance with → **Chapter 5, Start-up**,
- the maintenance work that is due according to the service interval has been carried out → **Chapter 8, Servicing**
- the safety devices and system components have been checked by the operator and are functioning correctly,
- the operator and those involved have put on appropriate protective clothing and secured the work area such that no bystanders are at risk.

## 7. Faults

### 7.1 Safety instructions



#### Warning!

If a fault occurs that poses a risk to personnel, equipment and/or the environment, the system must be immediately shut down and secured to prevent it being switched on again.

Only start the system up again when the cause of the fault has been eliminated and there is no longer any risk to people, machines and/or the environment.

Faults should only be rectified by qualified personnel in accordance with all safety instructions. → Chapter 2

Before re-starting, the system must be released for use by a qualified person.

### 7.2 Fault table

#### **REHM control panel not functioning**

**Nothing appears on the digital display and no LEDs are illuminated**

Cause:

There is no power (possibly fused)  
Power cord or plug defective

Remedial action:

Check voltage  
Check

**On switching on, the system has other parameters than those when it was switched off**

Cause:

Values are only stored after the feed has started

Remedial action:

Start the feed.

### 7.3 Fault reporting

Fault number	Fault	Cause	Remedy
Err 45	INVERTIG.PRO or INVERTIG.PRO <i>digital</i> is not available	APUS 20 C cold wire unit has no connection to the INVERTIG.PRO or INVERTIG.PRO <i>digital</i>	<ul style="list-style-type: none"> <li>• Switch on INVERTIG.PRO or INVERTIG.PRO <i>digital</i>.</li> <li>• Check cable connection between APUS 20 C cold wire INVERTIG.PRO or INVERTIG.PRO <i>digital</i></li> </ul>
Err 46	AUT interface: Wrong program number	The AUT interface is trying to retrieve a non-existent or incorrect program number on the cold wire unit.	<ul style="list-style-type: none"> <li>• Use program numbers from 1 to 99.</li> <li>• Use a program number that is available.</li> </ul>
Err 396	INVERTIG.PRO or INVERTIG.PRO <i>digital</i> software version	The software version of the INVERTIG.PRO or INVERTIG.PRO <i>digital</i> s incompatible with the APUS 20 C cold wire.	<ul style="list-style-type: none"> <li>• Run a software update for the INVERTIG.PRO or INVERTIG.PRO <i>digital</i> control system.</li> </ul>
Err 234 Err 368 to Err 378, Err 395 Err 397	Service case	Only a service technician can determine the cause	
other	For faults in other parts of the system, see REHM INVERTIG.PRO or INVERTIG.PRO <i>digital</i> Instruction Manual		

- If several faults occur simultaneously, they are displayed one after the other.
- Document the faults and, if necessary, notify service personnel.
- Faults with error codes 45 and 46 can be confirmed by pressing the push and turn knob [16] on the APUS 20 C cold wire, and on the REHM INVERTIG.PRO or INVERTIG.PRO *digital* control panel.
- The error messages are displayed on both the digital display of the power source and the display of cold wire unit.
- It should also be noted that faults in the INVERTIG.PRO or INVERTIG.PRO *digital* power source are displayed on the cold wire unit. Refer to the manual of the power source for these fault numbers.

## 8. Servicing

### 8.1 Safety instructions



#### Warning!

Repair and maintenance work may only be carried out by personnel who have been trained by REHM. Consult your REHM dealer. When replacing parts, only use original REHM spare parts.

If service or repair work is carried out on this unit by personnel who have not been trained by REHM and are not authorised to carry out such work, all REHM warranties and liabilities are null and void.

Before starting cleaning, the cold wire unit must be turned off and unplugged from the mains!

Before servicing, the cold wire unit must be turned off and unplugged from the mains and secured against inadvertent switching on.

Supply lines must be shut off and de-pressurised.

Observe the warnings listed in → Chapter 2 "Safety".

The cold wire unit and its components are to be serviced according to the operating and maintenance instructions.

Inadequate or improper maintenance or repair may lead to stoppages. Regular maintenance of the system is therefore essential. No structural alterations or additions may be made to the system.

### 8.2 Maintenance Table

The maintenance intervals are recommended by REHM on the basis of normal standard usage (e.g. one shift operation, use in a clean, dry environment). The exact intervals are to be set by your Safety Officer.

Activity	Interval
Cleaning the inside of the unit	depending on operational conditions
Functional testing of the safety devices by operators	daily
Visual inspection of the system	daily

Activity	Interval
All cables to be checked by qualified personnel; record in the inspection log intended for the purpose. <b>Perform test according to state regulations or more frequently.</b>	biannually
The entire cold wire unit is to be checked by qualified personnel; record in the inspection log intended for the purpose. <b>Perform test according to state law or more frequently.</b>	annually

### 8.3 Cleaning the inside of the unit

If the *REHM* welding machine is used in dusty conditions, the inside of the unit must be cleaned periodically by blowing or sucking.

The frequency of such cleaning depends on the particular conditions in which it is used. Only use clean, dry air to blow through the unit or use a vacuum cleaner.

If service or repair work is carried out on this unit by personnel who have not been trained by REHM and are not authorised to carry out such work, all REHM warranties and liabilities are null and void.

### 8.4 Proper Disposal

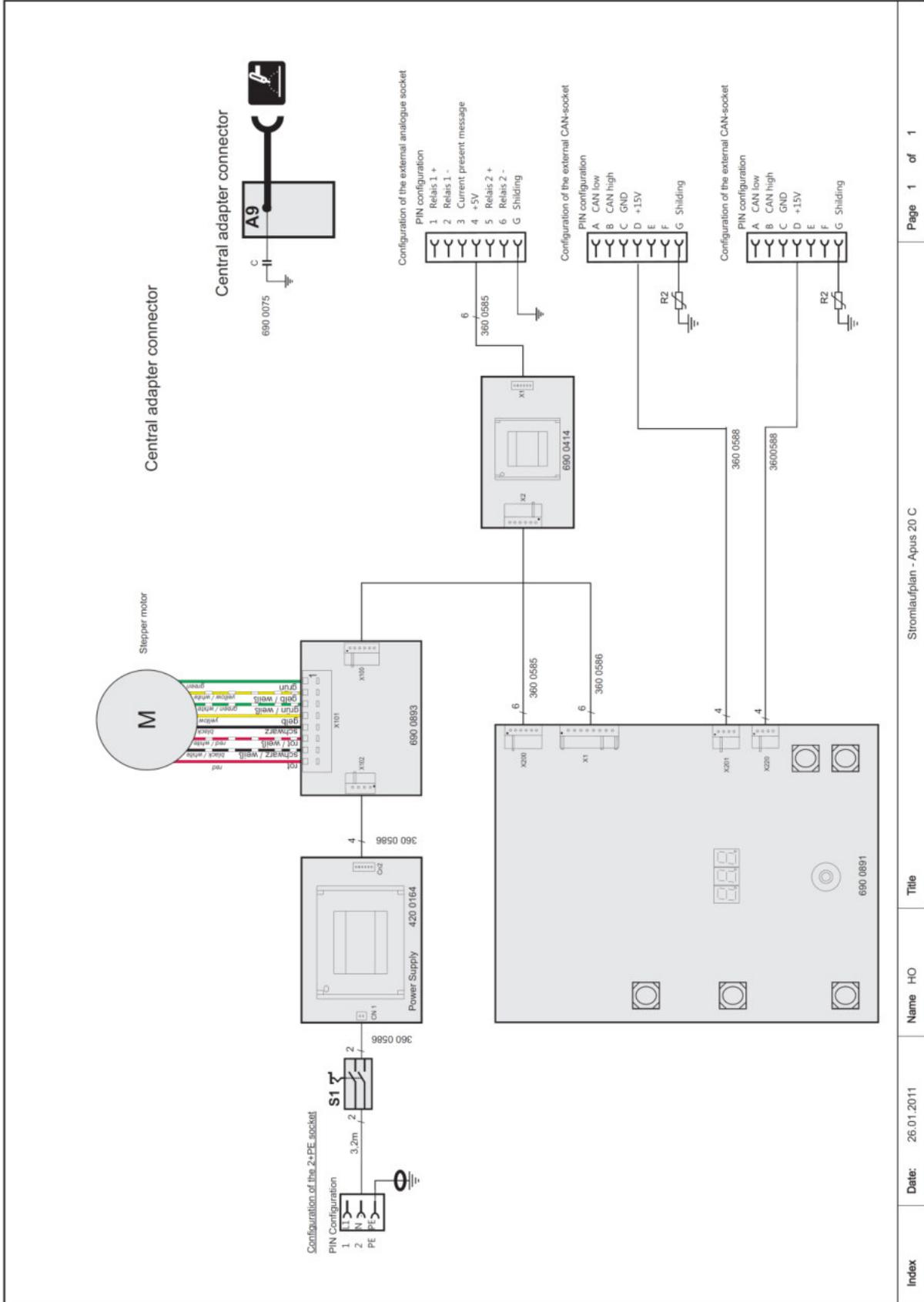


Only for EU countries.

Do not dispose of electrical tools with household waste!

In accordance with European Directive 2002/96/EC on waste electrical and electronic equipment and its implementation in national law, electrical tools must be collected separately and taken to an environmentally compatible recycling location.

## 9. Circuit diagram



## 10. Components Cold wire unit

### 10.1 Parts list with REHM order numbers

No.	Designation	
1.	Front panel	2101866
2.	Right side panel	2101867
3.	Base / back panel	2101870
4.	Cover	2101873
5.	Left side wall	2101874
6.	Feed unit 4 roll / 1.0 mm complete	2200490
7.	Snap lock	2500035
8.	180° hinge	2500066
9.	Handle	2500100
10.	Grip plate	2500101
11.	Spool spindle, large	2600051
12.	Nut for spool spindle	2600049
13.	ZA-mask	2600194
14.	Sleeve	2600196
15.	Handle	2600207
16.	Knob	2600214
17.	Knob base section	2600215
18.	Rubber-metal buffer 20x15	3300006
19.	Spring pin 4x22	2900359
20.	Insulating board	3400208
21.	Drive pinion	4000093
22.	Feed plate 4 rolls / 1.0 mm	4000103
23.	Stepper motor	4100014
24.	Power switch	4200126
25.	PSU CSS 150-48	4200164
26.	Cable harness CAN-BUS cold wire digital	3600588
27.	Cable set cold wire analogue socket	3600585
28.	Cold wire control	6900891
29.	Controller board for stepper motor	6900893
30.	Graphic film for operating panel	7301399
31.	Interference suppression board	6900414
32.	Central adapter	7500446
33.	Wire feed screw	4000012
34.	Locking lever complete	4000118
35.	Right angle lever	4000120
36.	Left angle lever	4000121
37.	PVC washer	4000102
38.	Metal washer	4000101
39.	Feed roll sprocket	4000112
40.	Locking cap	4000002
41.	Feed roll retaining bar	4000122
42.	Feed roller, pair, 1.0 mm	7502012
43.	Bushing for feed roller	4000113
44.	Suppression member central adapter	6900075
45.	Power cable 3G 1.5 mm <sup>2</sup> 3.15 m 230V	3600356
46.	Power supply cable set (no picture)	3600586

## 11. Exploded drawing

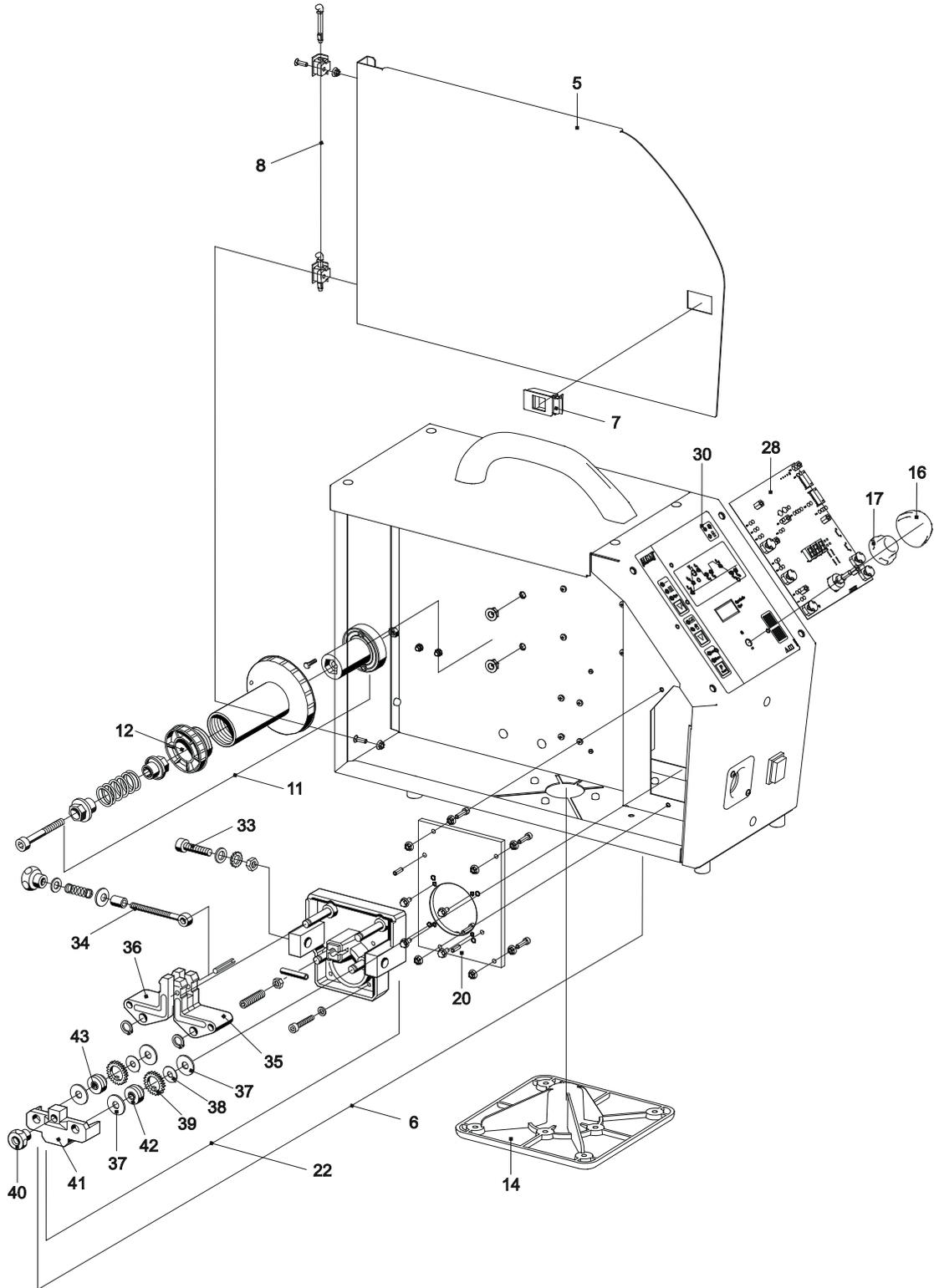


Figure 12: APUS 20C cold wire unit exploded drawing

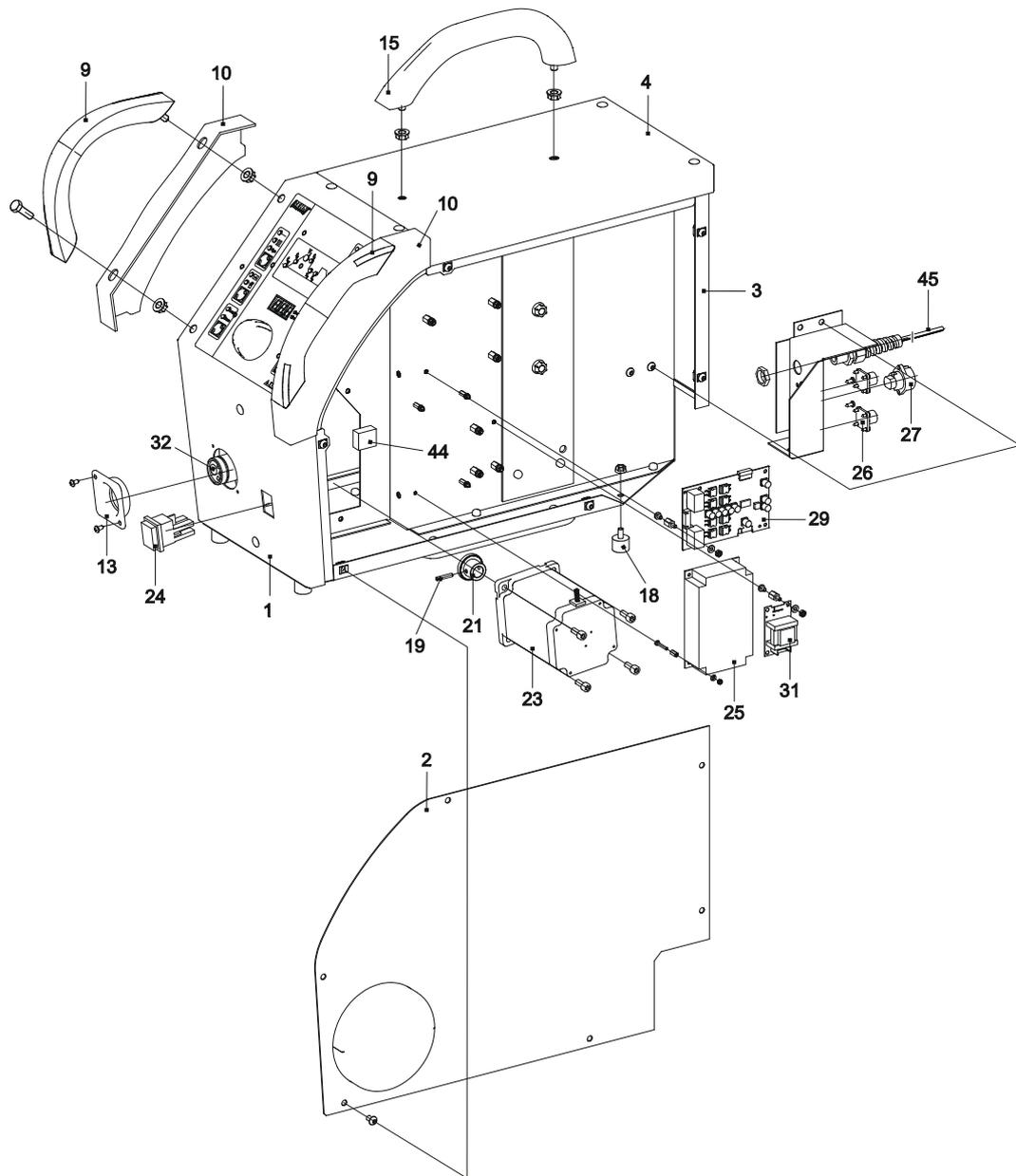


Figure 13: APUS 20C cold wire unit exploded drawing

## 12. Specifications

<b>Type</b>		<b>APUS 20 C</b>
Adjustment range	m/min	0.1 – 20.0 step size 0.1 m/min
Duty cycle	%	100
Input voltage	V/50 Hz	230 (90 – 264V 47 – 400Hz)
Input current	A	4
Fuse (slow)	A	16
Protection rating*		IP23
Sound level according to DIN 45635 in operation	dB	<75
Wire diameter	[mm]	0.6 – 1.6
Dimensions (LxWxH)	[mm]	620 x 300 520
Weight (without wire coil)	[kg]	25

Technical changes as a result of further development reserved.

\* Protection rating

The protection rating defines the scope of protection afforded by the enclosure against ingress of solid particles and water (IP23 = Protected against solid particles > 12.5 mm diameter and against spraying water).

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## EU Declaration of Conformity

For the following product

### **Cold wire unit APUS 20 C**

We declare that the design of the machine meets EU directive 98/37/EC.

Applicable standards are, where applicable or appropriate EN 292-1, EN 292-2, EN 1050, EN 60204-1, EN 50082-2, DIN VDE 0875-11, EN 50011, EN 294, EN 349, EN 60974-1.

The safety and related performance requirements for the construction and testing of the machine are guaranteed.

The machine may not be commissioned until it has been determined that

- a) after further work or completion, the machine conforms to the above directives, or
- b) when the machine is used in a system that in its totality complies with Machinery Directive 2006/42/EG.

This declaration is made for and on behalf of the manufacturer t

REHM GmbH u. Co. KG Schweißtechnik  
Ottostr. 2  
73066 Uhingen

Uhingen, 16/01/2013

issued by

---

R. Stumpp

*Managing Director*

## REHM – Setting the pace in welding and cutting

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- **REHM MIG/MAG inert gas welding units**
  - SYNERGIC.PRO<sup>2</sup> gas- and water-cooled to 450 A
  - SYNERGIC.PRO<sup>2</sup> water-cooled 500 A to 600 A
  - MEGA.ARC stepless regulation to 450 A
  - MEGA.ARC<sup>2</sup> stepless regulation to 450 A
  - RP REHM Professional to 560 A
  - PANTHER 202 PULS pulse welding unit with 200 A
  - MEGAPULS pulse welding units to 500 A
- **REHM TIG inert gas welding units**
  - TIGER, portable 100 KHz inverter
  - INVERTIG.PRO TIG welding unit
  - INVERTIG.PRO *digital* TIG welding unit
- **REHM MMA inverter technology**
  - TIGER and BOOSTER.PRO 100 KHz electrode inverter
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WEEE-Reg.-Nr. DE 42214869

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