

REOTRON

REOTRON SMP MFM-WK 50-125
(ID-Nr. 6740.01)

REOTRON SMP MFM-WK 50-250
(ID-Nr. 6741.01)

DC-power supply

Technical information for the user

This description contains the necessary information for the correct application of the product described below. It is intended for use by technically qualified personnel.

Qualified personnel are persons who, because of their training, experience and position as well as their knowledge of appropriate standards, regulations, health and safety requirements and working conditions, are authorised to be responsible for the safety of the equipment, at all times, whilst carrying out their normal duties and are therefore aware of, and can report, possible hazards (Definition of specialist according to IEC 364).

Safety Instructions

The following instructions are provided for the personal safety of operators and also for the protection of the described product and connected equipment.



Warning!

Hazardous Voltage

Failure to observe can kill, cause serious injury or damage

- Isolate from mains before installation or dismantling work, as well as for fuse changes or post installation modifications.
- Observe the prescribed accident prevention and safety rules for the specific application.
- Before putting into operation check if the rated voltage for the unit conforms with the local supply voltage
- Emergency stop devices must be provided for all applications. Operation of the emergency stop must inhibit any further uncontrolled operation.
- **Electrical connections must be covered!**
- **Earth bonding must be tested prior to operation!**



WARNING

After switching off the supply voltages, the units are still under dangerous power for 15 minutes. Work on the unit may only be executed if this time has elapsed.

Prescribed Use

The units described herein are electrically powered for use in industrial applications and are **not** suitable for domestic use.

Units with open electrical connections are only determined for the installation.

These units comply with Directive 2004/108/EC EMC Directive **CE**

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1.0 General

The REOTRON SMP MFM-WK range contains water-cooled and primary-switched power supplies with DC output. The units are suitable for resistive, inductive and capacitive loads and they can be used for voltage-, current- and power regulation. The control is provided via appropriate set points that are given via a built-in or external pluggable display or via several field bus interfaces depending on version.

The units can be used as fixed voltage power supplies with adjustable current limit as well as adjustable voltage- / current- / power source for example in the process technology. All internal regulatory circuits work with auto-off, so that the controller, whose limit value is reached, intervenes.

To compensate voltage drops on the output lines the voltage feedback cables may be connected directly to the sense-terminals from the load. The detection is automatic.

Via extensive parameters limit values, ramp times, control time constants etc. can be set to adjust the power supply to the load respectively to the control loop. All device settings can be set via the display or also via a field bus interface. The output of the unit can be locally switched on or off by pressing the keys "I" / "O" of the display.

An enable input is available for the on / off remote control. The enable input can be operated by an external, potential-free contact or by an external 24 V signal voltage. In both cases there is a separation of the power supply unit from the mains input!

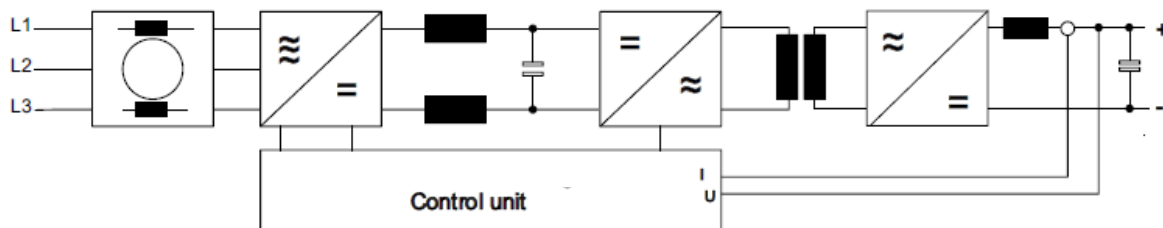
As field bus interface there are Profibus-DP, CAN-Bus, DeviceNet or EtherCAT available.

The input is designed for three-phase AC-nets with $3 \times 400 \text{ V}$, $\pm 10\%$ mains frequency 47...63 Hz.

The units have **no** input fuses! Input fuses shall be externally provided. Fuses / Si automats with a slow characteristic or motor protection switch are recommended.

The electrical connection is made on the input side via screw terminals and on the output side via copper bars.

Schematic circuit:



2.0 Technical data

Unit type	REOTRON SMP MFM-WK 50-125	REOTRON SMP MFM-WK 50-250
Input voltage	3 x 400 VAC \pm 10 %	
Input frequency range	47...63 Hz	
Input current maximum	3 x 12 A ¹⁾	3x 24 A ¹⁾
Starting current maximum	20 A at 400 VAC / 10 ms	37 A at 400 VAC / 10 ms
Efficiency	ca. 90%	ca. 90%
Power factor	0,9	0,9
Earth leakage current	< 4,0 mA	< 6,5 mA
Power loss	606 W	1212 W
Output voltage	0,8 ... 48,5 V (50 V) ²⁾	0,8 ... 48,5 V (50 V) ²⁾
Output current range	2 ... 125 A	2 ... 250 A
Unit output power	max. 6.250 W	max. 12.500 W
Ripple & Noise	+/- 200 mVp-p	
Voltage tolerance	+/- 1 %	
Current tolerance	+/- 1 %	
Set point input	Display / field bus interface	
Voltage / current / power		
Enable input (remote control)	24 VDC, 3300 Ohm or potential-free contact	
Field bus option	Profibus-DP, CAN-Bus, DeviceNet, EtherCAT	
Amount of cooling water	6 L/Min.	
Cooling water pressure	min. 3 Bar	
Water connection	hose connector 13 mm	
Working temperature	0...+45 °C	
Working humidity	20 ~ 90 % RH without condensation	
Storage temperature	5...+70 °C	
Storage humidity	10 ... 95 % RH	
Standards	EN 50178, EN 61000-6-2, EN 61000-6-4	
Protection	IP 20	
Withstand voltage	Input - Output 1,5 kVAC Input - PE 1,5 kVAC Output - PE 0,5 kVAC	
Isolation resistance	Input - Output, Input - PE, Output - PE: >100 kOhm / 500 VDC	
Dimensions (W x D x H)	430(+39) x 110 x 500 (+52) mm	430 (+42) x 170 x 500 (+52) mm
Packing / Weight	21,5 kg	28 kg

All parameters not specially mentioned are measured at 3 x 400 VAC input, rated load and +25 °C of ambient temperature.

Tolerances refer to line regulation and load regulation.

1) I_{max} at rated load and input voltage -10%.

2) Customer-specific adjustment possible

! Note:

The devices may only be operated permanently until the respective device rated power. The current value and voltage value have to be adjusted via the set points or via limit possibilities.

3.0 Functions

3.1 Soft-start: /

After switching on the enabling or the mains voltage, the output voltage increases from 0-Volt to the adjusted set-point via the time ramp 0...60 seconds.

3.2 Soft-stop: \

After switching off the enabling the output voltage decreases (with connected load) from the adjusted set-point to 0-Volt via the time ramp 0...60 seconds.

4.0 User controls

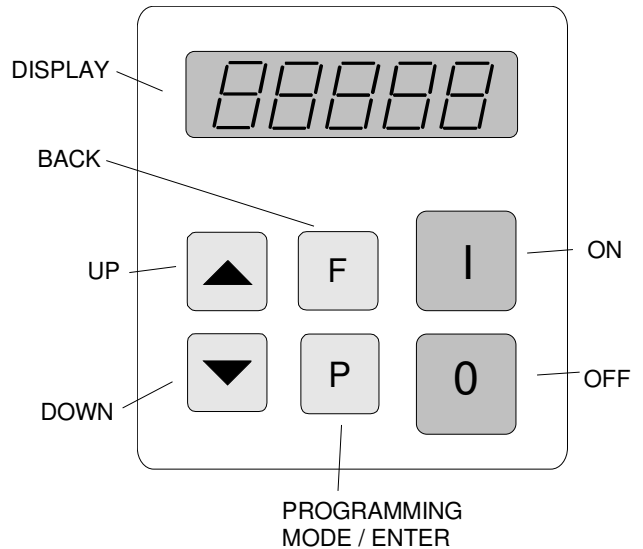
Display internal / external

4.1 Controls

The six buttons and a LED display located in the front-panel are used for operating and setting up the unit. All operating methods and adjustable parameters can be set up through this panel.

The “I” and “O” buttons are used for switching the unit ON and OFF, however, **this does not provide mains isolation**, it simply inhibits the power semi-conductors.

The “P”, “F” and “Cursor Buttons” are used for parameter adjustment. Parameters are set by using menu controls that are called up by entering operator codes. In section “Adjustment” the functions in the menu control are explained.



4.2 Adjustment

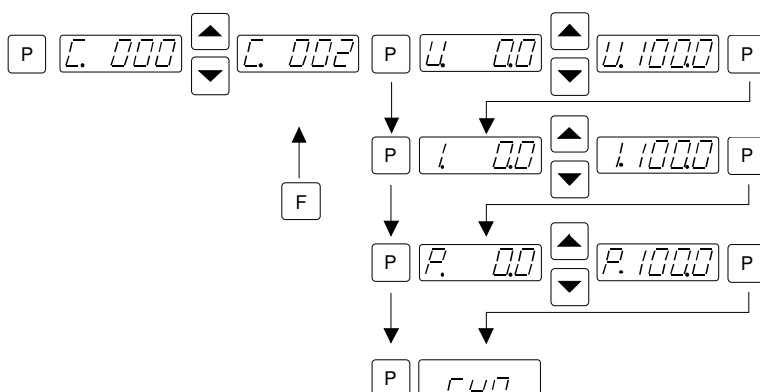
The display value can be increased or decreased by units, or tenths of units, by a short press of either cursor button. Holding a button down will cause the display to change in units of ten.

To prevent accidental or unauthorized adjustment the adjustment parameters, in the user menus, are protected. A code must be entered to open the user menus. There are different pass codes for each function group.

Setting adjustments are automatically saved upon leaving the programming mode or if no button is pressed for a period of 100 seconds.

4.3 Adjustment procedure

All setting routines are commenced by pressing the programming button “P”. The following diagram should clarify the sequence in which the keys are pressed:

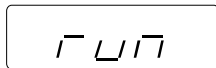


1. Press the „P“ key.
2. Select the code number with the cursor keys.
3. Press the „P“ key. This displays the first menu point. The required menu point can be found by repeatedly pressing the „P“ key (scrolling).
4. The value in the menu point can be changed with the cursor keys.
5. Scroll to the next menu point or to the end of the menu which returns the display to the set point value, by pressing the “P” key. To exit the menu and return back to the normal display quickly, depress the „P“ key for 5 seconds.
6. To return back to the previous position in the menu, press the „F“ key.

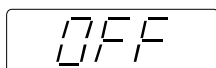
4.4 Display messages

During normal running mode, „run“ is shown in the LED display. In the programming mode an abbreviation for the corresponding parameter (see setting up instructions) and its set value are displayed. Setting changes are stored upon leaving the programming mode or if a key is not touched for a period of 100 seconds.

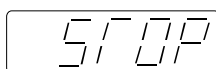
4.4.1 Operating modes



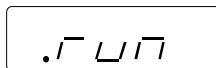
Normal operation



Unit not enabled



Switched-off using „0-key“



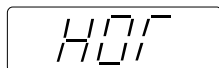
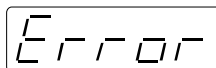
Left-hand decimal point in display illuminated. Current regulation mode, maximum unit current or the set-point value for current regulation has been reached.

4.4.2 Fault messages

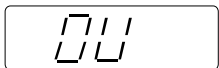
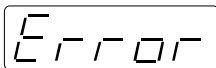
Fault messages are displayed for:

Over-temperature	Error	HOT
Low supply voltage	Lo.Po.	
Phase failure	Lo.Po.	
High supply voltage	Error	OU

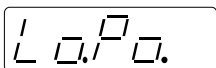
When there is a fault, an „Error“ message is displayed and the unit switches off internally. The unit can be reset using the green „I“ button on the display or with „Clr.Er“ in menu „C 009“.



Over-temperature



Supply voltage too high



Supply voltage too low or phase failure

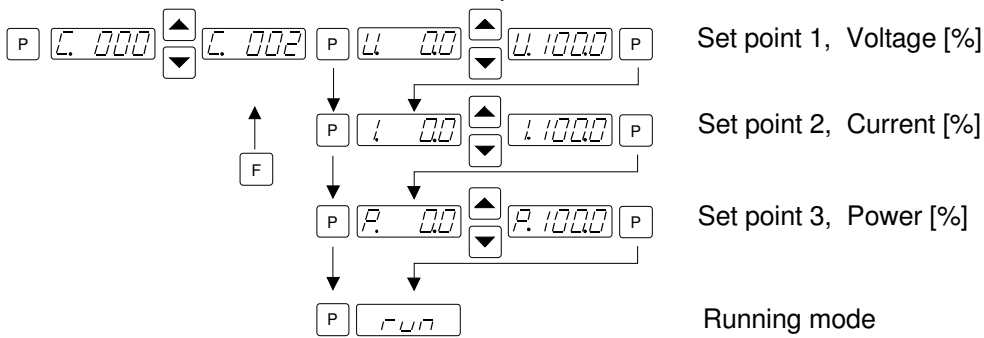
4.5 Possible settings

Parameter		Code	Factory setting:	Menu Code:
• Enable inverting	0 / 1	-En.	0	003
• Enable external set-point OFF	0 / 1	E.S.O.	0	003
• 4...20 mA	0 / 1	4.20	0	003
• Power regulation	0 / 1	E.F.P.	0	003
• Minimum voltage	0...100 %	U.	0	002, 020
• Minimum current	0...100 %	I.	0	002, 020
• Minimum power	0...100 %	P.	100	002, 020
• Maximum voltage	50...100 %	u.	100	020
• Maximum current	50...100 %	i.	100	020
• Maximum power	50...100%	p.	100	020
• Voltage regulation gain	P-characteristic 1...100	P.U.	20	020
• Current regulation gain	P-characteristic 1...100	P.I.	20	020
• Power regulation gain	P-characteristic 1...100	P.P.	20	020
• Soft-start	0...60 sec.	⌊	0,1	020
• Soft-stop	0...60 sec.	⌋	0,1	020
• Internal voltage set-point (Display)	0...100 %	U.	0	002
• Internal current set-point (Display)	0...100 %	I.	0	002
• Internal power set-point (Display)	0...100 %	P.	100	002
• Error reset		Clr.Er.		009
• Save user settings		PUSH.		143
• Recall factory settings		FAC.		210
• Recall user settings		US.PA.		210
• Hide programming menus	0 / 1	Hd.C.	0	117
• Interface ON	0 / 1	S.I.F.	0	017
• Display actual set-point (in %)				
• Voltage		u.		050
• Current		i.		050
• Power		P.		050
• Display actual effective value (in %)				
• Voltage		u.		051
• Current		i.		051
• Power		P.		051

Customer-specific settings can be saved in the unit and they can be reloaded.

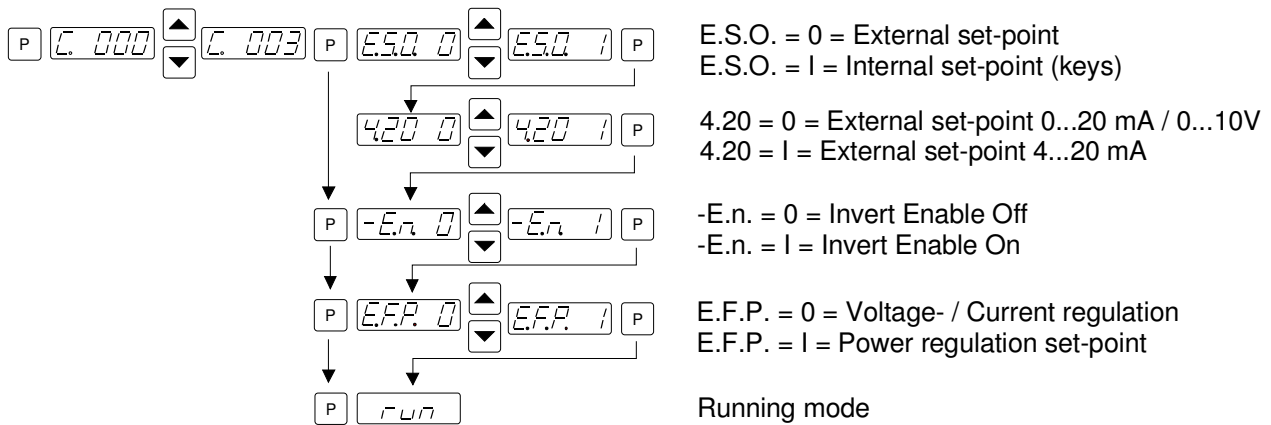
5.0 Settings

Code 002 Minimum values or internal set-points



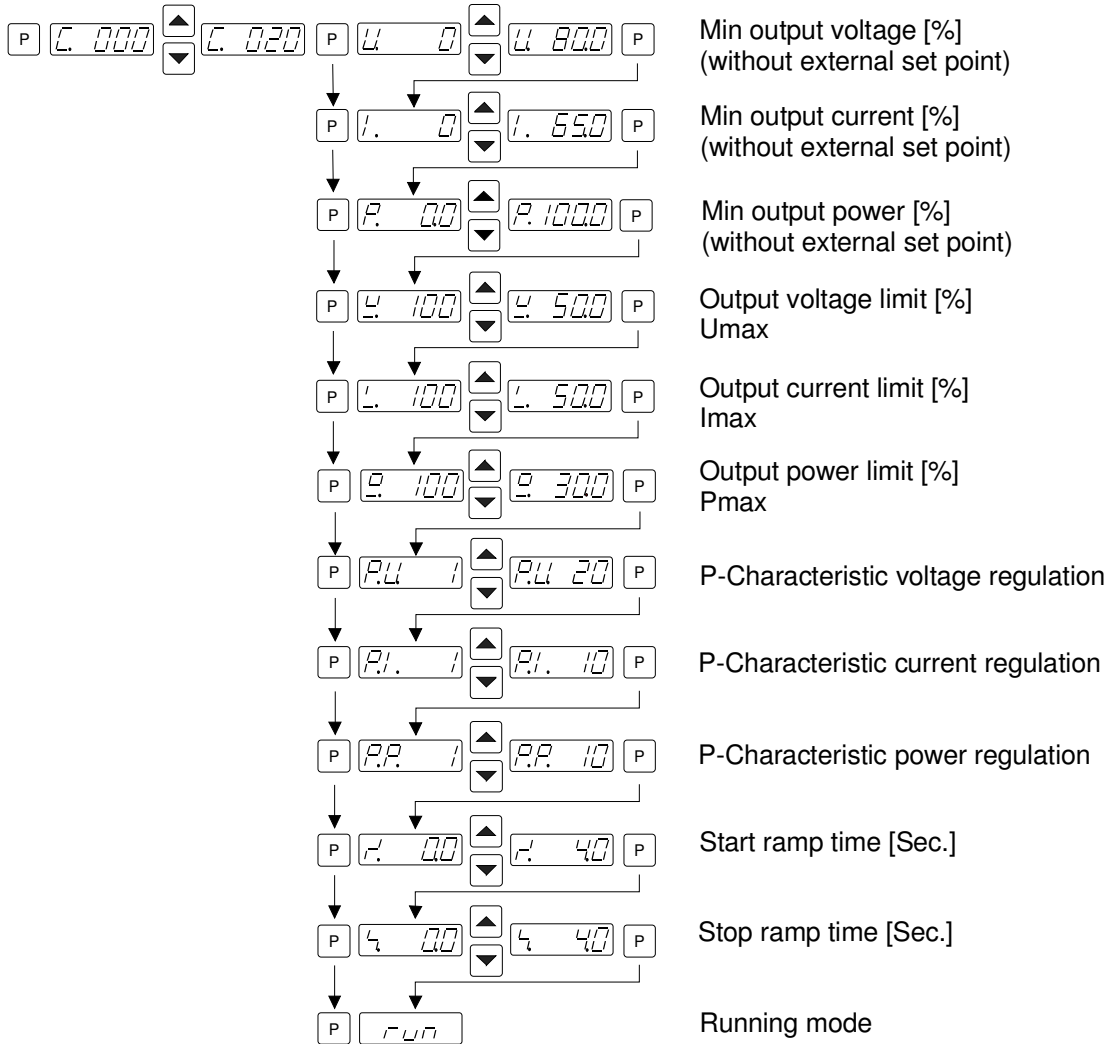
5.1 Configure

Code 003



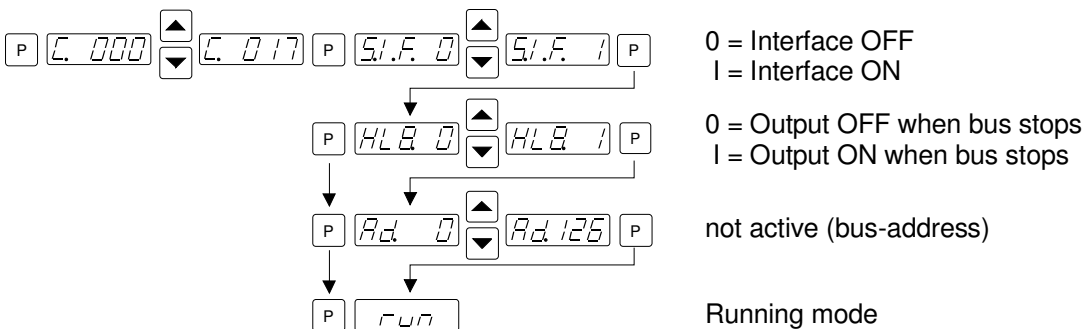
5.2 Minimum and maximum values

Code 020



5.3 Activate interface

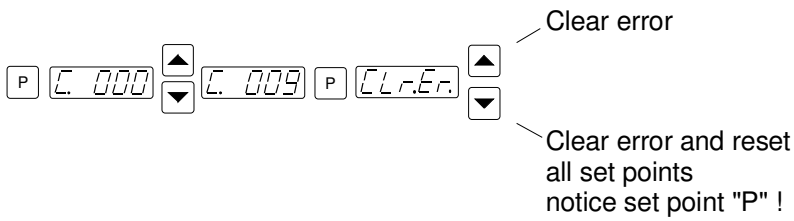
Code 017



To enable the interface-mode the parameter „SIF“ must be set to “1”. To operate manually for example for testing purposes, this parameter “SIF” must be set to “0”.

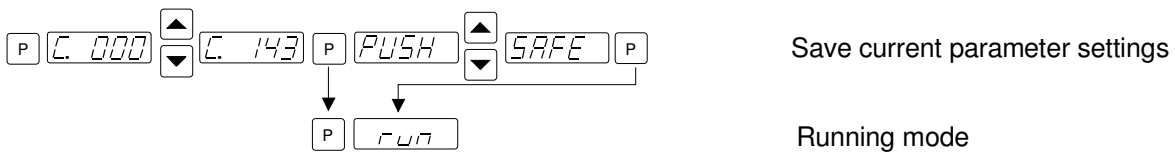
5.4 Reset error messages

Code 009



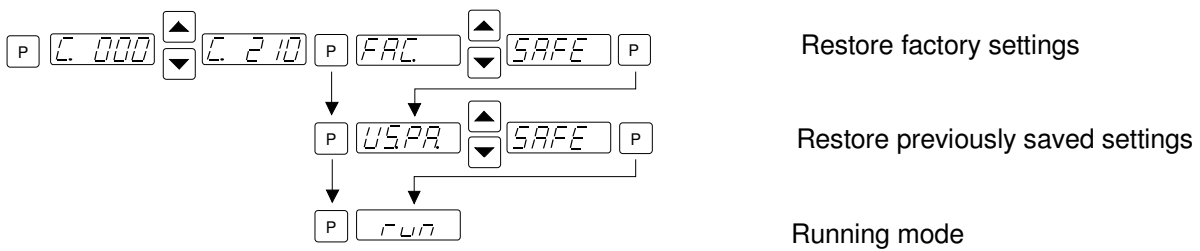
5.5 Save user parameters

Code 143



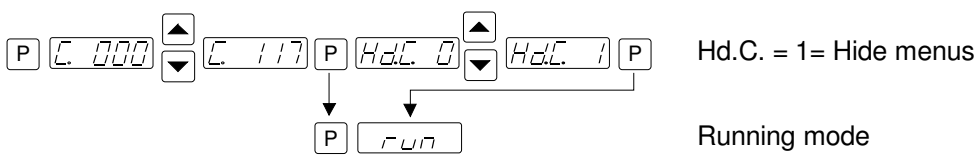
5.6 Recall saved settings

Code 210



5.7 Hide/show user menus

Code 117

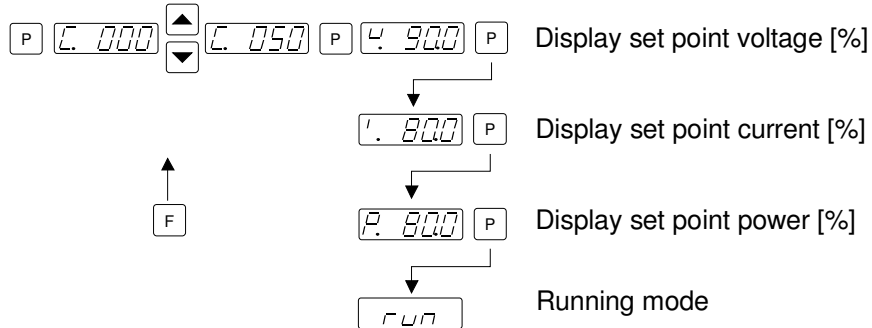


If „Hd.C. = 1“, only Menu C 002 (internal set-points) is available.

6.0 Service menu

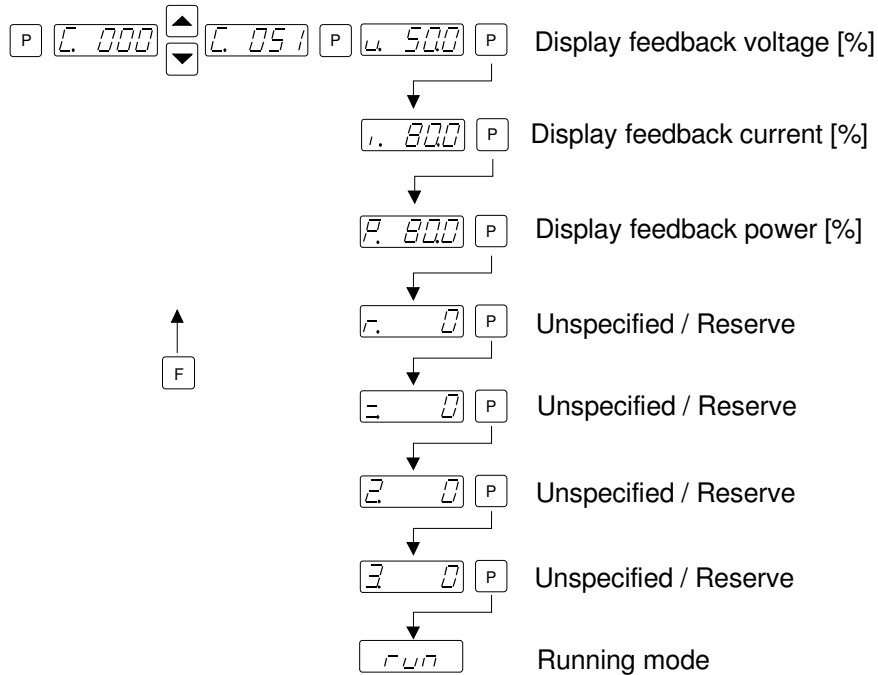
Display the set-point values sent to the unit during interface operation.

Code 050



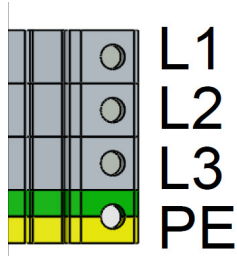
Display the effective values measured by the unit during interface operation.

Code 051



7.0 Connections

Mains supply input



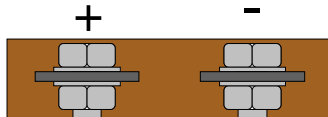
3 x 400V, +/- 10% 47...63 Hz

Connecting cable Max. 10 mm² / AWG 6

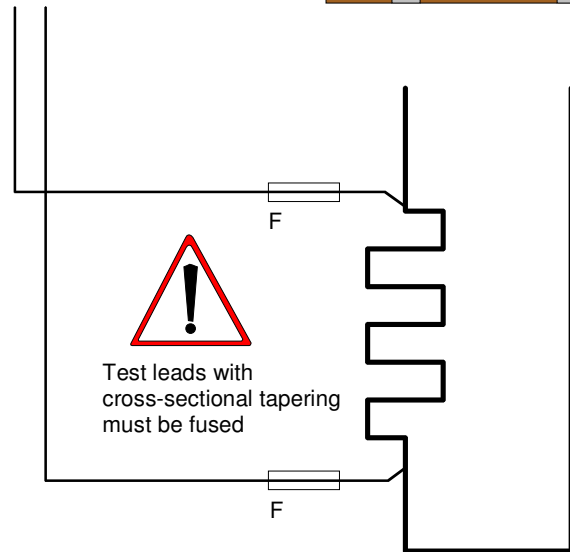
DC-Power output

Voltage feedback
(to compensate the
voltage drop on the cable)

Power output

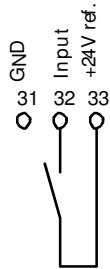


Copper bar for cable shoe, screw M10

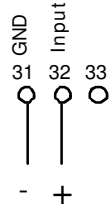


Enable input

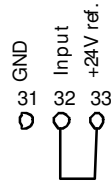
Potential-free contact, control voltage 24 Vdc or fixed bridge



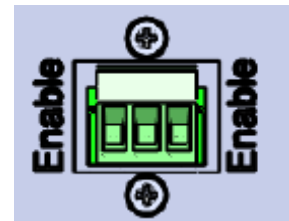
External contact
potential-free



External 24 V
Control voltage



Bridge for
continuous
operation



Interface module

For the operation via a field bus interface several interface modules can be built-in.

Example: EtherCAT



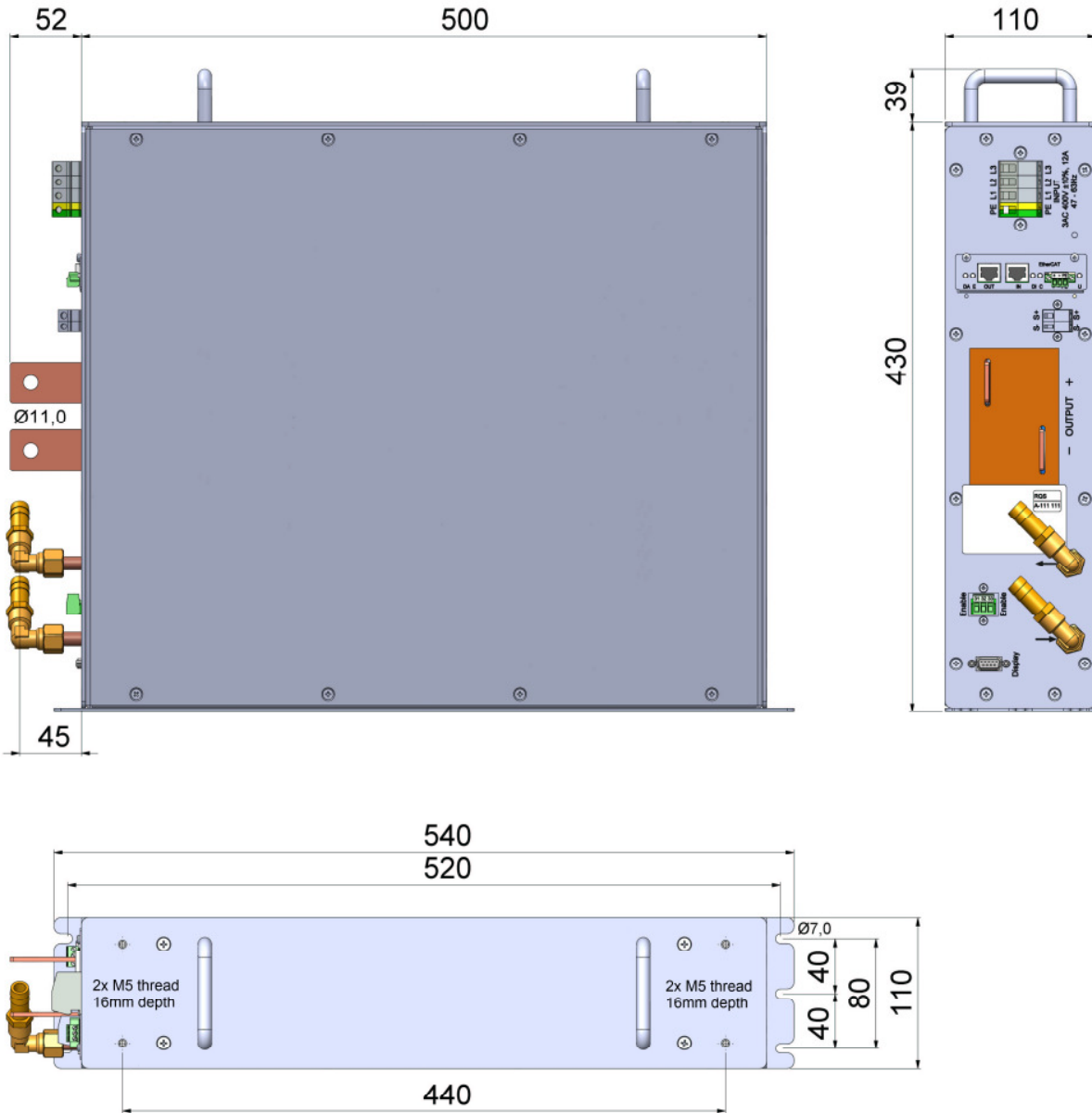
Display connection

Electric socket for connection of an external control unit (REO service box) for adjustment and service.

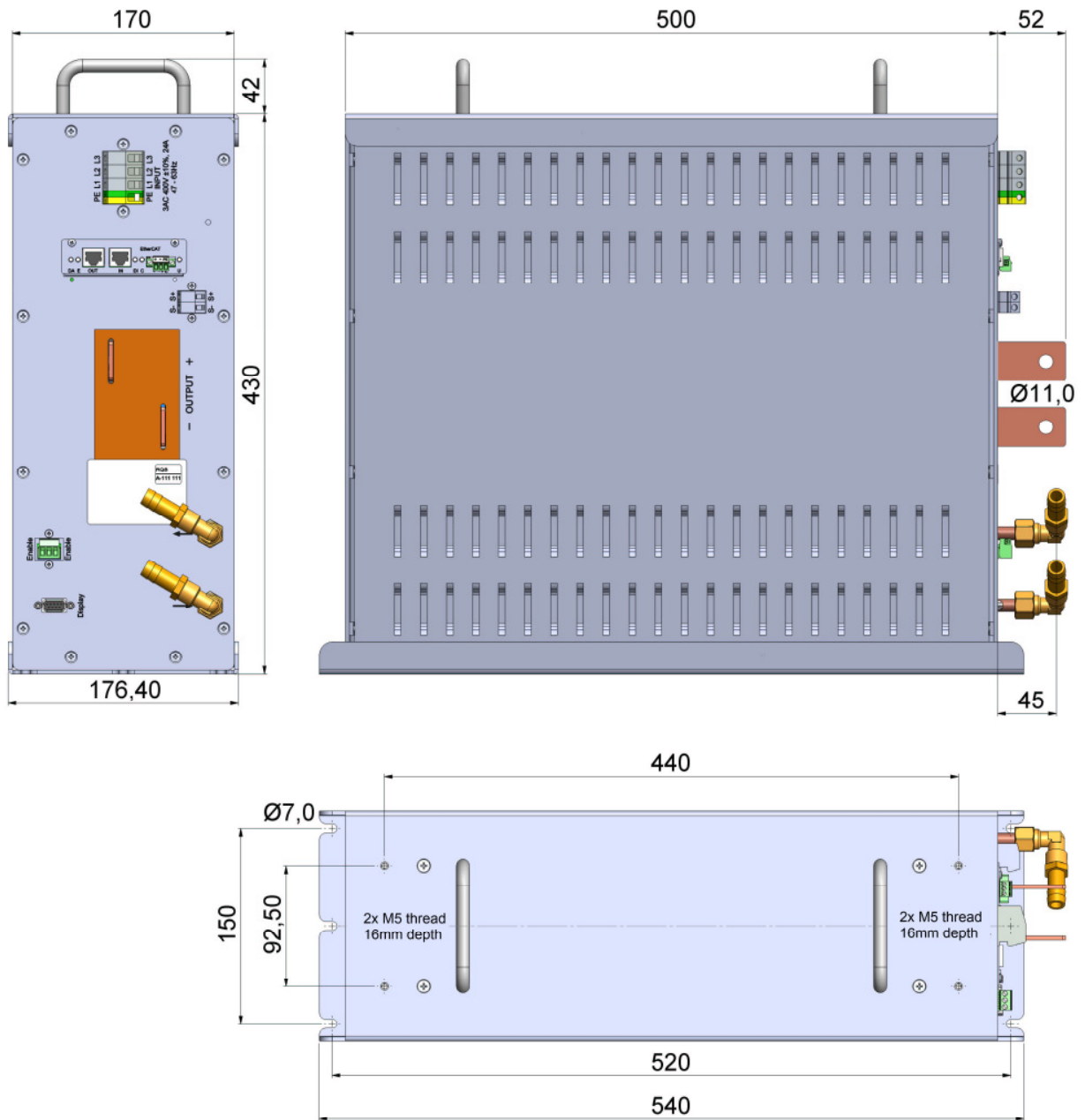


8.0 Dimensions

REOTRON SMP-MFM-WK 50-125



REOTRON SMP-MFM-WK 50-250



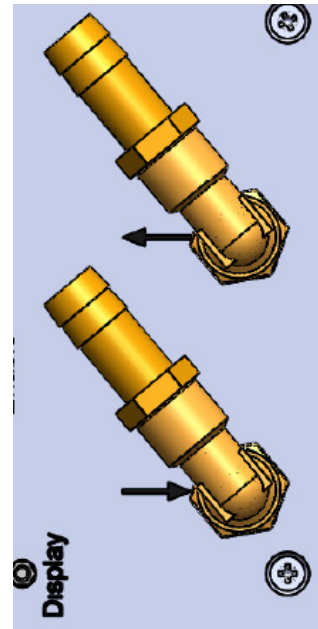
9.0 Connection to the water supply

The connection to the water supply is designed for an internal hose diameter of 13 mm.

On delivery, the orientation of connections is ca. 45° to the vertical.
Water inlet and outlet are given by arrows, however not absolutely necessary in that manner.

The connections are connected with the internal water pipe via compression fittings, in case of a change for example an angle change it will be necessary to ensure that no mechanical force is exerted on the copper tubes. In that case the angle screwing has to be fixed with appropriate tools for example an open-end spanner.

Plugged-on hoses have to be secured with hose clips.



10.0 Commissioning instructions

After mounting, the cooling water circuit has to be connected and the water flow must be ensured.



Warning!

Installation and service work on the refrigeration-technical part may only be executed in voltage-free state of electrical equipment.

The construction of the cooling circuit may only be done by qualified personnel.



CAUTION!

If the unit was ON without a connected load, the output connectors can carry voltage for up to 5 minutes after its disconnection from the mains.



WARNING!

Liquid-cooled devices have to be absolutely dry before powering up and during operation. In case of leakages with escape of liquids (drops, puddle) it must be immediately switched off! When venting no liquid may splash on the devices and connections. If this warning is ignored, there is the danger of short circuits with damage and malfunctions.

CAUTION!

It must be ensured for the correct functioning of the cooling circuit that there are no air bubbles in the cooling circuit.

Warning when opening the device



Danger!

Discharge time of the intermediate circuit capacitors.

After disconnection from the power supply, high voltages are present at the internal intermediate circuit capacitors. This high voltage can result in serious injury or death when improperly handled.

The intermediate circuit capacitors need a discharge time of 15 minutes until they are unloaded on the not dangerous value (<60 V).

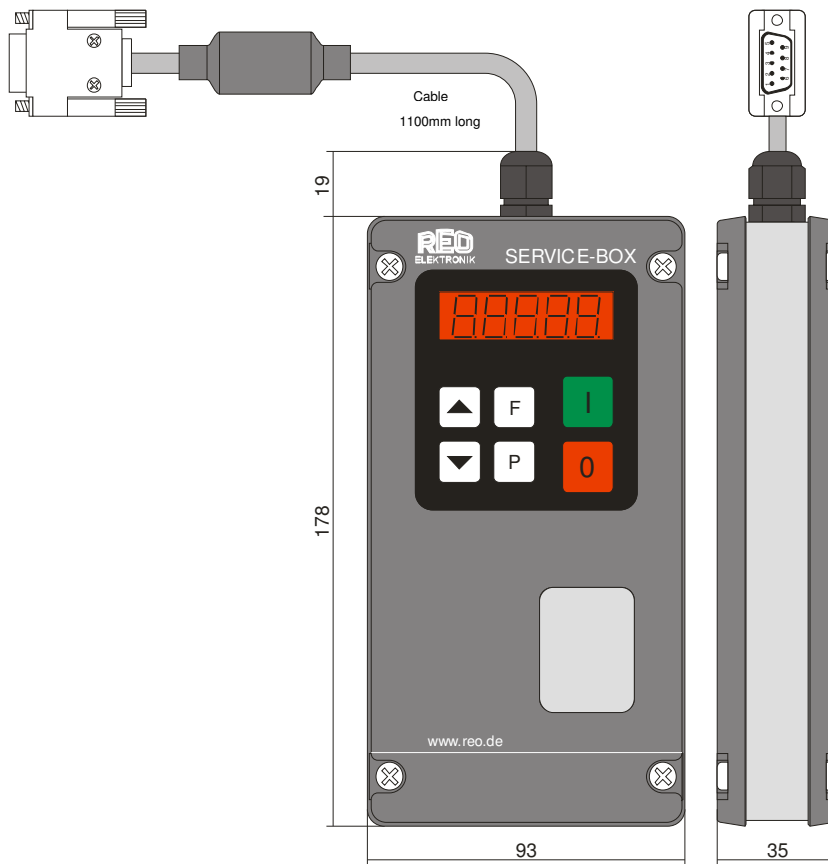
After switching off the power supply, wait a discharge time of 15 minutes, before beginning any maintenance or repair work and don't remove covers during this time.

11.0 Order code

Type	Article number
REOTRON SMP-MFM-WK 50-125	300674001
REOTRON SMP-MFM-WK 50-250	300674101

12.0 Accessories

REO-Service Box (control unit)



Type	Art-Nr.
REO-Service Box (control unit)	676010



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