



Operating instructions

Milk temperature regulator

MPR-M2



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The MPR-M2 is a microprocessor-controlled milk temperature regulator with automatic afterstirring. It has separate relay contacts for the compressor contactor and the stirrer. The measured milk temperature is shown constantly on the display.

Two freely adjustable target temperatures may be selected by push buttons. Should the milk temperature exceed the chosen target temperature (T1 or T2) by the hysteresis value, the compressor and stirrer are automatically switched on. Once the target temperature is reached, the compressor contactor switches off. The stirrer continues for the programmed period. During refrigeration pauses, the stirrer automatically switches on again according to the programmed intervals, to ensure an even temperature throughout the milk.

Independently of this, a short or longer period of intermittent stirring can be set. If required, a MPR-M2 model is also available with constant stirring, where the stirrer is turned on or off by push button.

Operation of the buttons for "intermittent stirring" and "select target temperature" may also be transferred to external switches. Separate connections for this purpose are located on the terminal block.



These operating instructions contain important technical and safety information.

Please read carefully before installation and before any work on or with the regulator.

Intended use

The milk temperature regulator type MPR-M2 is used to control the stirrer motors and cooling compressors of milk-cooling systems. Any other use of the device is permissible only with the manufacturer's written consent.

The device is fitted with a resistance temperature sensor. The output ports are designed as relay ports.



The electronic milk-cooling thermostat type MPR-M2 fulfils EC requirements for electromagnetic compatibility (EMC). The safety components meet VDE regulations.

Safety



The milk temperature regulator may only be installed by an authorised specialist, observing all local safety requirements.

Only specialists must be allowed to access the environment when connected.

The regulator contains live components and must not be opened.

The device must not be used if the housing or the connection terminals are damaged.

No liquids must penetrate the housing.

The regulator may be exported to the USA with the permission of the manufacturer only.

Operating

The milk temperature regulator is operated at two levels:

- 1. Working level** (for everyday purposes)
 - Switching over the target temperature T1 / T2
 - Display and changing of the target temperature T1 / T2
 - Intermittent stirring, operated by push button as programmed.
- 2. Programming level** (for personal settings)
 - Setting target temperatures T1 / T2
 - Setting the hysteresis for target temperatures T1 and T2
 - Setting desired automatic afterstirring time (usually = 120 sek.)
 - Setting the stirring interval (usually = 20 min.)
 - Setting the length of short intermittent stirring (usually = 2 min.)
 - Setting the length of long intermittent stirring (usually = 10 min.)
 - Setting the sensor correction
 - Blocking target temperature changes at working level.

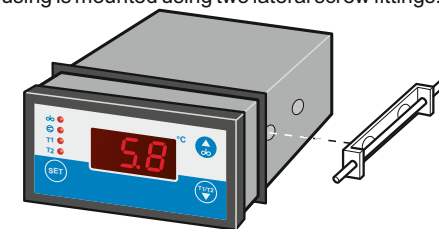
Operation overview

- The milk is cooled to the selected target temperature (T1 or T2). The stirrer runs constantly at this stage.
- Once the target temperature has been reached the compressor switches off.
- The stirrer switches off after the programmed afterstirring time.
- During refrigeration pauses, the stirrer switches on for the duration of the afterstirring time to ensure an even temperature throughout the milk.
- Should the milk temperature exceed the selected target temperature (T1 or T2) by the hysteresis value, the compressor and stirrer are automatically switched on again.

Installation

Housing installation

The housing is mounted using two lateral screw fittings.



- Place the housing through the front opening.
- Attach the lateral screw fittings.
- Tighten the screws.

Fitting the temperature sensor

The sensor cable must not be chafed or kinked.

There must be no substantial mechanical pressure on the sensor tube.

If it is necessary to lengthen or shorten the sensor cable during installation (or should a sensor other than the provided one need to be installed), the parameter "sensor correction" [C91] must be adjusted as appropriate. Reference thermometer necessary.

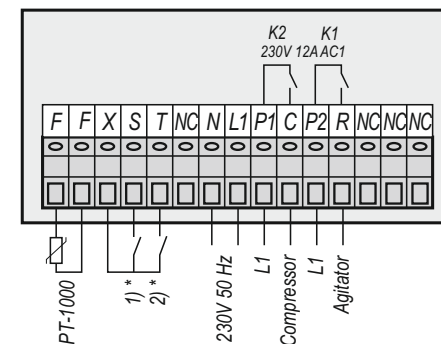
Electrical connections

Electrical connections must be as shown in the diagram below. A switching contactor for connection of the cooling compressor is essential.

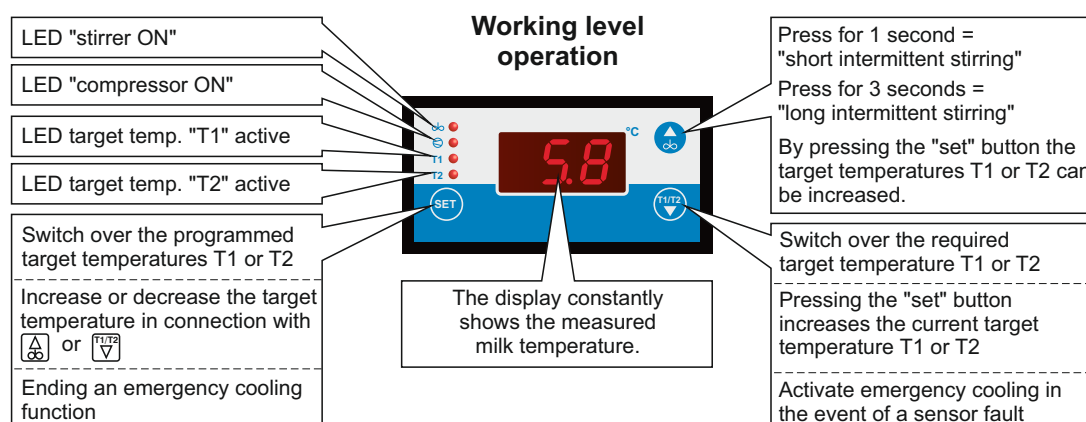
As soon as power is connected to the thermostat, the stirrer will run (for the duration of the programmed afterstirring time C10). The cooling compressor switches on as a function of the milk temperature.

The supply voltage may not be switched on until all components, including the sensor, are connected.

Pay attention to the technical data.



- * 1) = external selector switch "Switch setpoint temperature T1/T2"
* 2) = external button "intermediate stirring"



Adjustment of parameters

Parameters are changed as follows:

- Select parameter.
- Press SET button for the duration of the setting operation.
- Select desired value using the up or down buttons.
- Note: pressing the up and down buttons for longer changes the value more quickly.
- Release SET button.

Switching back to working level:

(possible from any parameter)

- Press up-arrow and down-arrow simultaneously for approx. 5 seconds. The current actual value appears in the display.

If, at programming or configuration level, no buttons are pressed for approx. 1 minute, the regulator switches back to working level automatically.

Operating overview for working level

Switch from target temperature T1 to T2

 The LED changes from T1 to T2 or from T2 to T1

SHORT interm. stirring

 1 sec. Duration corresponds to programmed value C50

LONG interm. stirring

 3 sec. Duration corresponds to programmed value C51

	Display setting	Altering setting	Factory setting
	Press SET button	Press SET and  or simultaneously 	
Target temperature T1 when LED  lit		 or 	4°
Target temperature T2 when LED  lit		 or 	8°

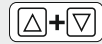
Operating overview for programming level

To change to programming level =

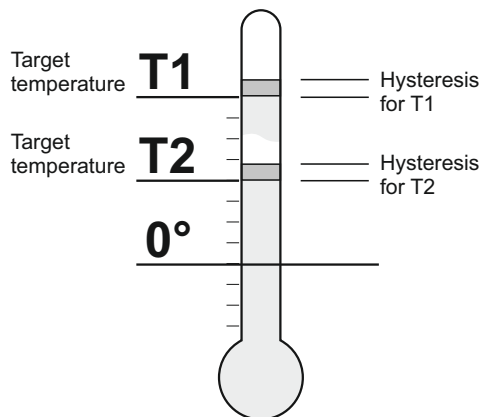
 Press for 5 seconds simultaneously, until parameter C1 lit.

	Display setting	Altering setting	Factory setting
	Press SET button	Press SET and  or simultaneously 	
Target temperat. for T1	 	 or 	4°
Target temperat. for T2	 	 or 	8°
Hysteresis for target temp. 1	 	 or 	0,7 K
Hysteresis for target temp. 2	 	 or 	0,7 K
Duration of afterstirring	 	 or 	120 sec.
Duration of pause	 	 or 	20 min.
Duration of "short" interm. stirring	 	 or 	2 min.
Duration of "long" interm. stirring	 	 or 	10 min.
Current aktual value	 	 or 	
Sensor correction	 	 or 	
Installed software version	 	 or 	
Button lock	 	 or 	0

To switch back to the working level:

 Press for 5 seconds simultaneously (Switches back automatically after 30 seconds.)

Explanation of operation level parameters



Para. C10: Hysteresis for target temp. 1

Para. C11: Hysteresis for target temp. 2

The hysteresis determines how much the milk temperature may deviate from the target temperature before the cooling compressor is switched on.

Param. C20: Duration of afterstirring

Duration for which the stirrer runs after the compressor has switched off.

Param. C21: Duration of pause

Duration until the stirrer is switched back on after being turned off.

Param. C50: Duration of SHORT interm. stirring

Duration of stirring after short pressing of the "intermittent stirring" button.

Param. C51: Duration of LONG interm. stirring

Duration of stirring after longer pressing of the "intermittent stirring" button.

Param. C90: Current actual value

Setting reference temperature.

Param. C91: Sensor correction

The sensor reading can be provided with a corrector which works cumulatively over the entire measurement range. See also the section on "sensor installation" under "Installation".

Param. C98: Software version

Display of the installed software version.

Param. C99: Button lock

Alteration of the target temperatures in the working level can be blocked by setting the button lock. 0 = lock off, 1 = lock on.

Sensor correction

Adjusting sensor correction is only necessary when the sensor cable length is changed or when a faulty sensor is replaced.

A reference thermometer is required for this purpose. Proceed as follows:

- Install sensor.
- Using the reference thermometer, measure the temperature of the milk.
- Switch on the control and set parameter [C90] to the determined temperature.

The control calculates the difference value between the reference thermometer and temperature sensor 1 and automatically sets this in parameter [C91].

The parameter [C91] can be displayed and adjusted at any time.

- Press and hold the Up and Down arrow keys at the same time: The settings are saved

Fault indication

F1 = Sensor short circuit

F2 = Broken sensor

The sensor or the sensor cable is faulty and must be replaced or repaired. The parameter [C91] "sensor correction" must then be adjusted.

EEP = Memory error

Invalid memory areas were detected.

FFF = Temperature has exceeded the range

The controller can only record temperatures between -9.9° and +99.9°C.

Technical data

Operating voltage	110 .. 240V AC, 50/60 Hz
Relay contact	2 make-contacts
Max. switching current	12A AC 1 / 250 V ~
Display	13 mm LED, 3 digits
Control action	Two-step controller
Sensor	PT-1000
Measuring range	-9,9° to 99,9° C
Sensor cable length	2 metres
Housing	Standard
Front panel cut-out	90 x 42 mm
Protection (housing front)	IP 64
Connection	Screw terminals
Environment specifications	
- Operating temperature	0° to 50° C
- Max. Humidity	75% (no dew)