Installation and Operating Instructions*
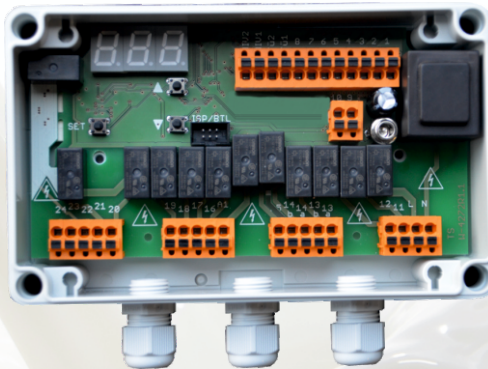
WELBA

Measuring - Controlling - Regulating
All from the same source

welba.de

RM-20

Exchange Milking Control

Firmware V08

for the installation into the Westfalia rinsing machine TURBOSTAR

Repair kit for

- **rear derailleur**
- **time relay**
- **mech. thermostats**
- **level controller**

* the latest version of the operating instructions can be found on our website.

RM-20   104180   02/2022 - V0.8

Contents

Intended use

These operating instructions contain important technical and safety information.

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

The exchange milking system control RM-20 is exclusively intended for the installation into Westfalia rinsing machines, type Turbostar, in order to replace the mechanical switching mechanism. It is used to control vacuum pumps, solenoid valves, heaters and dosing pumps in milking plants. Any other use of the device is permitted only with prior written permission from the manufacturer.

The universal milking control is ready for use once the parameters have been set. It should not be used before this has been done as this might result in damage to the plant and the item to be cleaned.

The device is fitted with a resistance temperature sensor

CE The device must not be installed in potentially explosive atmospheres. The universal milking control type RM-20 fulfils the EC requirements for electromagnetic compatibility (EMC) and the Low Voltage Directive (LVD).

The safety components meet the VDE regulations.
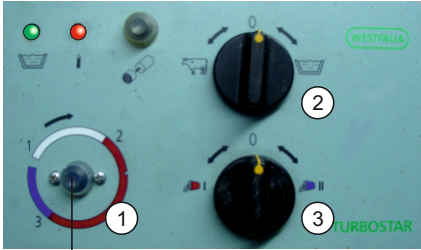
Satefty

The RM-20 must be installed by an authorised specialist observing local safety regulations.

Access to the environment when connected must be restricted to specialised personnel.

The RM-20 contains live components and must not be opened up.

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

No fluids must penetrate the housing.

*After the installation of the RM-20 button **1** replaces the old rotary switch.*

The RM-20 is an exchange control as replacement of defective timers in the Westfalia "TURBOSTAR" rinsing machines. Furthermore, the exchange control is also suitable for the replacement of relays, the level controllers and the mechanical thermostats. (For the replacement of the mechanical thermostats it is necessary to order the optional temperature sensor "TF-1A").

The RM-20 is installed in the existing stainless-steel box and is invisible to the user. Only for the start of the cleaning process, start button **1** is installed which is included in the scope of delivery. The selection of the operating modes is still made via the operating mode selector switch **2**. The green operating lamp indicates by different flashing frequencies during the cleaning process in which rinsing process the control is currently working.

The RM-20 milking system control distinguishes between three different operating modes:

- **OFF mode**
  The operating mode selector switch **2** is on position "0".
  Both lamps are off. All output relays are deactivated.
  ATTENTION:
  Even when switched off, the control is under voltage!

- **Mode MILKING**
  The operating mode selector switch 2 is on position "COW".
  The vacuum pump is switched on via the control.

- **Mode CLEANING**
  The operating mode selector switch 2 is on position "TANK".
  The green lamp flashes permanently and signals: READY TO START.

- Press start button **1** "briefly":
  The rinsing program starts and runs the complete program.

- "Hold" start button 1 until the green lamp flashes:
  Only the last rinsing (after-rinse) is performed.

  The wash timer automatically controls the water dosage. The running times from the heating, the pump and the detergent are pre-set at the factory.
  The various processes and times for careful cleaning are controlled fully automatically by the RM-20.
  When the cleaning is complete and faultless, this is finally indicated by a slow flashing of the green lamp.

  After a power failure:

- during the modes OFF or MILKING: The control starts in the mode in which it was before the power failure

-)during the mode CLEANING: The green lamp flashes and signalises: Error! (Restart only possible via position "0").

Installation

⚠️ **Incorrect electrical connection can cause damage to the tank control and to the equipment.**

The mains voltage should not be switched on until all components including the sensor are connected.

No appliances with current levels in excess of the maximum values indicated on the relays should be connected to the relay contacts

Scope of delivery

- Exchange control with wiring harness
- Start button
- Protective cap for start button
- Installation and operating instruction

Disposal

For the purposes of disposal, the device is classified as waste electronic equipment within the meaning of European Directive 2002/96/EC (WEEE) and must not be included with household waste. It must be disposed of through the correct channels.

Local and current legislation must be observed.

⚠️ **Access to the connected environment is only permitted for qualified personnel !**

The following describes how the exchange milking control RM-20 is installed and connected to the existing TURBOSTAR rinsing machine. Proceed as follows:

> **Disconnect the entire system from the power supply and secure it against an unintentional restart!**

• Open the rinsing machine and remove the cover.

Remove the old cables and components

ATTENTION: The existing cables remain partially preserved! Follow the instructions described below EXACTLY!
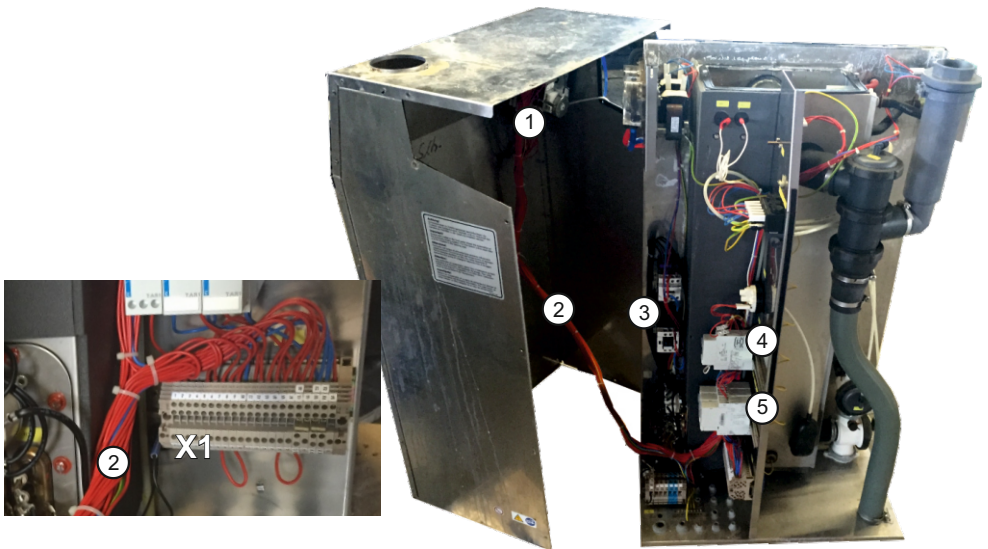
• Remove the complete wiring harness **2**.
• **ATTENTION**
  DO NOT REMOVE the cables of external system components connected at the **bottom** of the terminal block X1 **!**
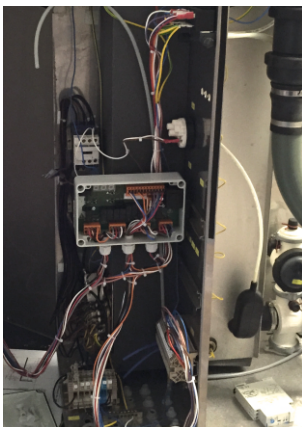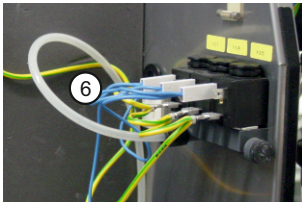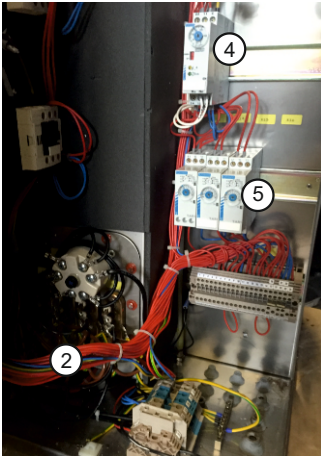
EXCEPTION: The following cable bridges must be removed from the bottom of the terminal block X1:
- 7/8
- 11/12
- 13/14
- 15/16

Attention:

If installed - the 24-hour timer will remain in the unit.

The wiring heating / contactors 3 will remain in the unit


- Remove all **red** and **white** cables from the control.
- Remove the blue cables for the time- and level relays.
- Remove from the top of the terminal block X1 the cable bridge (blue) from terminal 10 to 23.
- Remove the level relay **4**.
- Remove the three existing timers **5**.
- Disassemble the existing rear derailleur **1**

Installation of the new components

- Fit the push button supplied into the hole in which the rear derailleur was previously installed.
- Install the push button protection cap.
- Close the two small holes next to the push button with the screws / nuts supplied.

- Check if the cable connection (blue) of terminal block X1 clamp 20 to terminal block 1x1 clamp "N" does exist, if not: Please install it.
- Check if the cable connection (blue) of terminal block 1x1 clamp "N"
  - to contactor 1K11 clamp "A2"
  - further on to contactor 1K12 clamp "A2"
  - further on to dosing pump M11 and M12
  does exist - if not: Please install it.
- Check if the cable connection **6** (blue) of the pneumatic valves (Y13 - Y15) to the terminal block X1 clamp 21 does exist - if not: Please install it.

- Unscrew the cover of the exchange control and install the plastic housing into the stainless steel box onto the upper top-hat rail.
- Plug all the cable shoes of the new cable harness supplied onto the corresponding components according to their labelling.
  See next pages.

  Do not pay attention to unused cables (e.g. optional timer).

Connect the new wiring harness
according to the connection diagram / wiring diagram

RM-20 Connection diagram
23.03.2016

RM-20 Wiring diagram
23.03.2016
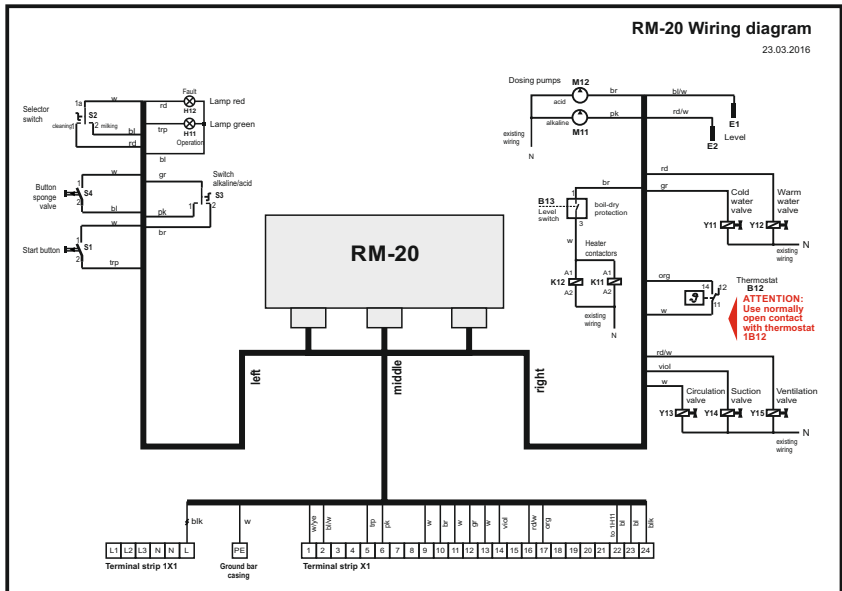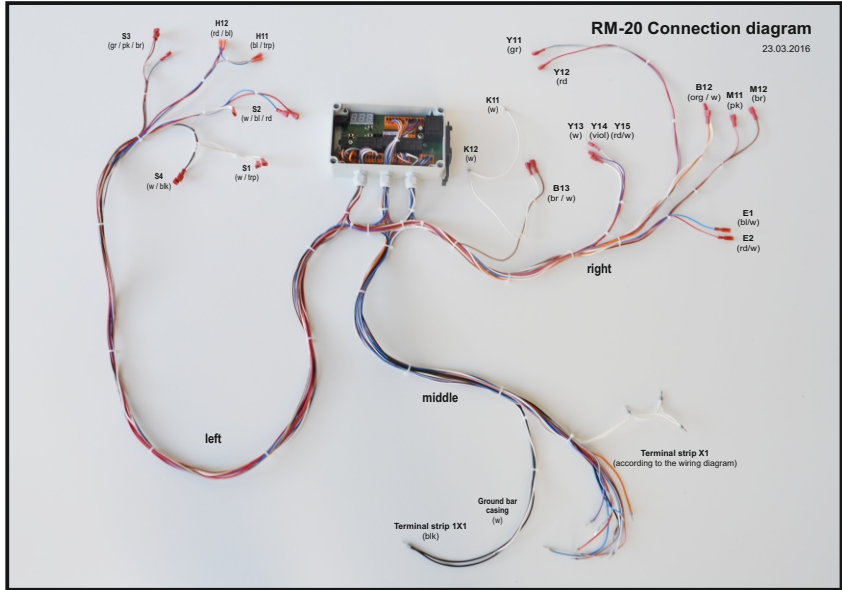
Wiring harness on the left
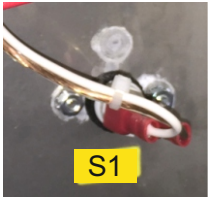
S1 - Start button
(cable transp./white)
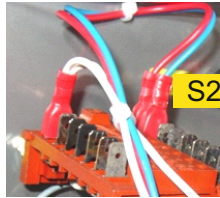
S2 - Selector switch
milking/cleaning
(cable red/blue/white)
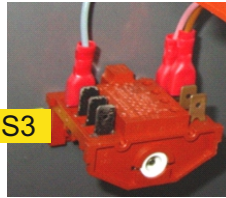
S3 - Selector switch
alkaline/acidic
(Cable pink/brown/grey)
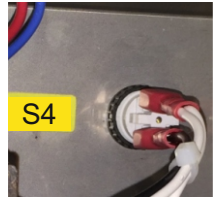
S4 - Button
sponge valve
(cable white/black)
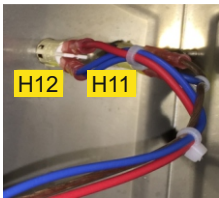
H11 - Lamp green (cable transp./blue)
H12 - Lamp red   (cable red/blue)

Middle wiring harness
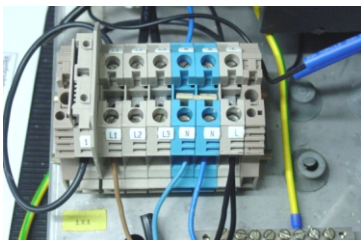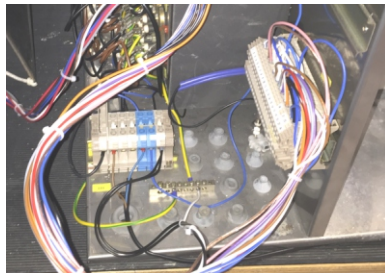
Terminal strip **1X1**
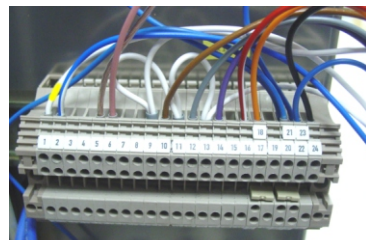
Terminal strip **X1**

Wiring harness on the right

Y11 - Cold water valve (grey/blue cable)
Y12 - Hot water valve   (red/blue cable)
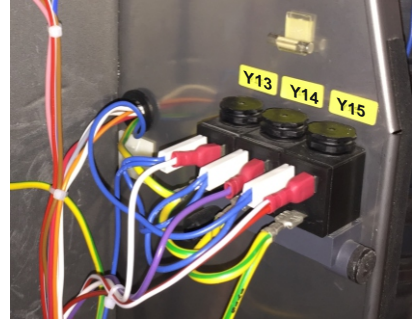
Y13 - Circulation valve (cable white/blue)
Y14 - Suction valve (violet/blue cable)
Y15 - Ventilation valve (red/white/blue wire)

K12 - Heater contactor

K11 - Heater contactor
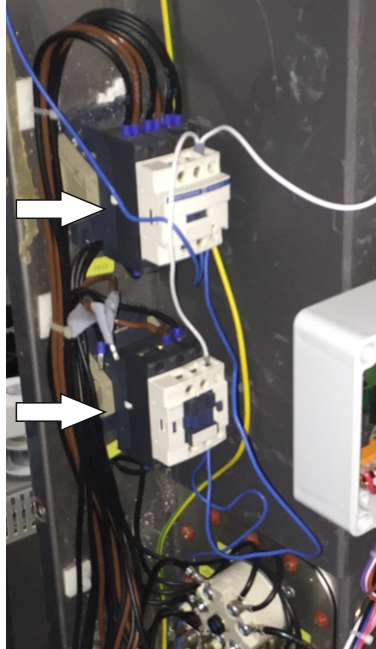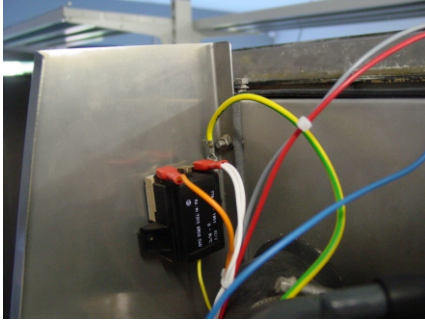
1B12 - Thermostat (orange/white wire)
ATTENTION: Use normally open contact with thermostat 1B12!
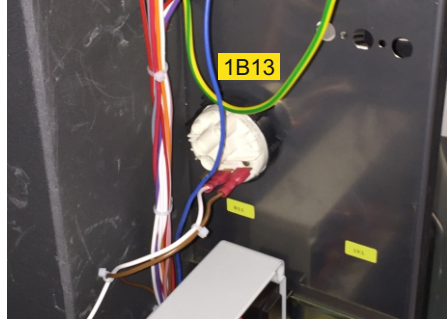
1B13 - Level switch (cable white/brown)

M11 - Dosing pump (cable pink/blue)
M12 - Dosing pump (cable brown/blue)
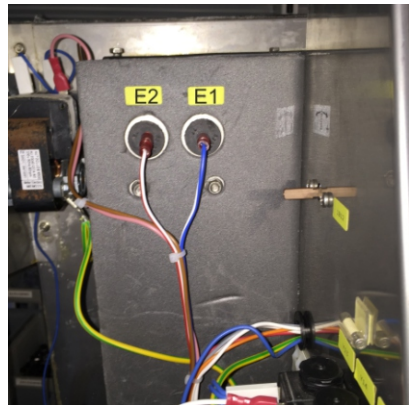
E1 - Level (cable blue/white)
E2 - Level (cable red/white)

Carry out a function test - as described on the next page

⚠️ **A function check prior the commissioning is of highest importance!!!**

⚠️ **The function test may only be performed by an authorised specialist.**
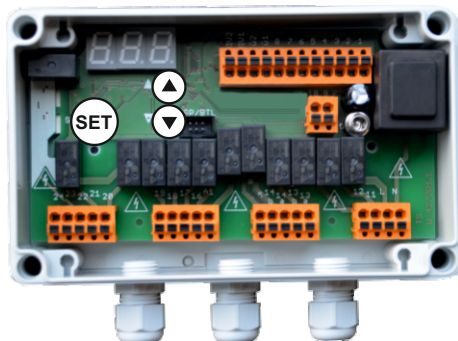
After all cables are plugged according to their labelling, check the function of all inputs and outputs as described below.

- Switch the selector switch "milking/cleaning" to position "0".
- Energise the system

The exchange control RM-20 performs a self-test. The display shows "OFF".

Note:

After approx. 1 hour, the display goes out. When pressing the key, the display lights up again

Enter code '5-6-7' :

- Press the two arrow keys simultaneously for approx. 5 seconds. A request to enter the code follows.
- The display shows "000" - the first "**0**" flashes.
- Adjust with the arrow keys the first digit "**5**" and confirm with "SET". The second "0" flashes.
- Adjust with the arrow keys the second digit "**6**" and confirm with "SET". The third "0" flashes.
- Adjust with the arrow keys the third digit "**7**" and confirm with "SET". The first parameter "t1" appears.

If an incorrect code was entered, the control goes back to the OFF-mode.

Check if the wiring is correct as described on the next two pages.

Test of the outputs

Parameter "t1" (cold water valve) is displayed.

With the arrow keys all outputs [t1 to t13] can be selected and test as follows:

- Select the required parameter with the arrow keys.
- Press the SET-button und hold it: The display shows "0" or "1" (depending on the present adjustment of the corresponding parameter).
- Hold the SET-button and change the setting with the arrow key. The component selected (example cold water valve) is switched on or off.

When the SET-button is released, the component remains switched on, until it is manually switched off again in the same way.
That makes it possible to switch on different components at the same time.
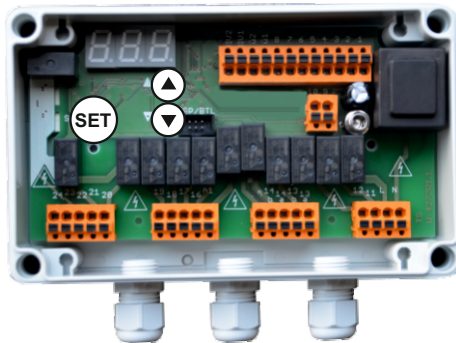
Check the correct wiring (one after another) of the following outputs:

t1	cold water valve
t2	hot water valve
t3	breast pump
t4	vacuum pump
t5	heating
t6	pneumatic bypass valve
t7	pneumatic suction valve
t8	pneumatic release valve
t9	dosing pump
t10	vacuum increase
t11	sponge valve
t12	signal lamp green
t13	signal lamp redt14 unused

Switch back to the operating level:

(The switching back is possible from each parameter).
- Press UP- and DOWN button simultaneously for about 5 seconds.

Test of inputs

With the arrow keys all inputs [t21 to t32] can be selected and tested as follows:

- Select the required parameter with the arrow keys.
- Press SET-button: The display shows "0" or "1" (depending on the present adjustment of the corresponding parameter).
- Change of switching status (e.g. start button). The display switches back and forth between "0" and "1".
- Press SET-button once again: The display shows the present parameter name again

Check the correct wiring (one after another) of the following inputs:

t21   Rotary switch position "cleaning"

t22   Rotary switch position "milking"

t23   "Milking parlor" switch (external remote start)

t24   Safety switch *

t25   Button sponge valve

t26   Start button

t27   Unused

t28   Timer input (if present)

t29   Temperature 1 (sensor or digital input)**

t30   Temperature 2 (unused)**

t31   Level 1 down***

t32   Level 2 above***

With parameter C90 it can be set that the rinse cycles can be advanced by one step at a time.

*	0 = no release
	1 = release
**	0 = temperature not achieved
	1 = temperature achieved
***	0 = no level
	1 = level achieved

Switch back to the operating level:

(The switching back is possible from each parameter).

- Switch selector switch "Milking/Cleaning" to position "0":
- Press UP- and DOWN button simultaneously for about 5 seconds. The display shows "OFF

After completion of the function test, the control must be parameterised as described below.

Commissioning without the corresponding parameter setting is not advisable and may also cause damage to the milking system.

Note   *The program sequence of the exchange milking control RM-20 is pre-parameterised at the factory and is suitable for the most common systems. However, adjustments or fine adjustments can be made at any time.*

Display

SET

▲ ▣
▼ ▣

RM-20

Digital inputs

rd/w	bl/w		org	br		trp	blk	viol	gr	bl	rd	
Level E2 (above)	Level E1 (below)	unused	Temperature 1	Timer	unused	Stard button	Button sponge valve	Safety blkitch	Remote stard milking	Milking active	Cleaning active	
Lev2	Lev1	Sen2	Sen1	8	7	6	5	4	3	2	1	

10	9

K14	K13	K12	K11	K10		K9	K8	K7	K6		K5	K4		K3			K2	K1		
24	23	22	21	20		19	18	17	16	A1	15	14 b	14 a	13 b	13 a		12	11	L	N
	rd	trp	blk	org		gr	rd/w	viol	w	blk	br	pk	trp	bl/w	w/ye		rd	gr	blk	bl
unused	Lamp red	Lamp green	Sponge valve	vacuum increase		Dosing pump	Air intake	Water withdrawal	Circulation	L1	Heater	Vacuum pump		Milk pump		GND	Warm water	Cold water	230VAC +/-10%	50/60 Hz

The maximum possible switching current of relays K1 to K11 is 230V / 6 A AC1

The two semi-conductor switches (terminals 22/23) may only be used to control the existing indicator lamps of the control.

The digital inputs (terminals 1 to 8) may only be connected with the potential provided on terminal "GND". Only potential-free contacts may be used for the switching process.

Cleaning cycle

Cleaning stage / Program step

	Pre-rinse (cold)						STOP (C42)	Main-rinse										After-rinse (cold)								
Program step	P10	P11	P12	P13	P14	P15	C42	P20	P21	P22	P23	P24	P25	P26	P27	P28	P30	P31	P32	P33	P34	P35	P36	P37
Heat at/after	Lev2	Lev2	Lev2	C3	C4	C7		Lev2	C8	C1	T1	Lev2	Lev2	C3	C4	C7	Lev2	Lev2	Lev2	C3	C4	C5	C6	C7
Timeout at	C20	C20	C21					C20			C22	C20	C21				C20	C20	C21					
Vacuum pump																								
Vacuum increase																								
Cold water																								
Warm water																								
Dosing																								
Y13 Circulation																								
Y14 Suction																								
Y15 Ventilation																								
Heater																								
Milk pump		↑	↓									↑	↓					↑	↓					
Sponge valve		←	→									←	→					←	→					

Legend:
- Lev1 = Below the lower level
- Lev2 = Reached the upper level
- T1 = Target temperature

Colour references:
- see C30
- see C13
- see C14
- see C35

Cleaning stage

Generates flushing
Number adjustable in C31

Generates flushing
Number adjustable in C32

Main-rinse

Warm-up time C10	Temperature reached C11 timed out	Circulation time C12
	Within this time, the system is automatically filled with water and flushing is generated	

Cleaning stage 1 (Pre-rinse)

		Range	Default
P10	intake of cold water up to level 2 Skips P11, as level 2 has already been achieved.	Timeout C20	10 min.
P11	intake of warm water up to level 2 In C30 "cold water only" can be adjusted to 2.	Timeout C20	10 min.
P12	extraction up to level 1 If the water level falls below level 1, a step back to P11 takes place to get another water intake. This process is repeated until the set number of water intakes C31 is achieved. Then the control continues to programme step P13.	Timeout C21	10 min.
P13	Extraction time	C3	15 sec.
P14	Draining	C4	180 sec.
P15	Final pumping	C7	30 sec.

Cleaning stage 2 (Main-rinse)

		Range	Default
P20	Intake of warm water up to level 2	Timeout C20	10 min.
P21	Overfilling Water continues to run after achieving level E2 for time C8 to have more water available for the first rinse.	C8	0 sec.
P22	Dosing of detergent	C1	120 sec.
P23	Heating up to temperature T1 Skips P24, as level 2 is already achieved.	Timeout C22	10 min.
P24	Intake of warm water up to level 2 after delay C13 If level 2 is achieved by the water flowing back from the circulation, the control continues to P25.	Timeout C20	10 min.
P25	Extraction up to level 1 If the water level falls below level 1, further water pulses are sent through the milking system until all criteria of the main rinse are fulfilled. Now the control continues to program step P26 (see also page 19)	Timeout C21	10 min.
P26	Extraction time	C3	15 sec.
P27	Draining	C4	180 sec.
P28	Final pumping	C7	30 sec.

Cleaning stage 3 (After-rinse)

		Range	Default
P30	Intake of cold water up to level 2 Skips P31, as level 2 is achieved.	Timeout C20	10 min.
P31	Intake of cold water up to level 2	Timeout C20	10 min.
P32	Extraction up to level 1 If the water level falls below level 1, a step back to P31 takes place to get another water intake. This process is repeated until the set number of water intakes C32 is achieved. Then the control continues to programme step P33.	Timeout C21	10 min.
P33	Extraction time	C3	15 sec.
P34	Draining	C4	180 sec.
P35	Sponge valve	C5	0 sec.
P36	Break/draining	C6	120 sec.
P37	Final pumping	C7	30 sec.
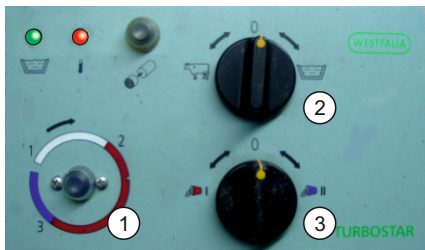
■ **Vacuum pump** (relay K4)

- Selector switch **2** is on "milking":
The vacuum pump works permanently.
(If C41 is activated, the vacuum pump runs in dependence on the switch position)

- Selector switch 2 is on "rinse":
The vacuum pump operates according to the flow chart.

■ **Milk pump** (relay K3)

The milk pump operates according to the flow chart.

■ **Warm water valve Y12** (relay K2)
■ **Cold water valve Y11** (relay K1)

The water valves switch according to the flow chart.

■ **Dosing pump alkalini M11**
■ **Dosing pump acidic M12**
(relay K9)

- Selector switch **3** is on "red (left)":
Acidic detergent is dosed.

- Selector switch **3** is on "blue (right)":
Alkaline detergent is dosed.

from the
milking system

alkaline
acid

cold water
hot water

Y13

E2

Y15

Heater

E1

Y14

B12

to the
milking system

Drain

ATTENTION:
In case of
thermostat 1B12
use N/C contact

■ **Circulation valve 13** (relay K6)

The valve controls whether the water returning from the system is drained or circulates in the system.

■ **Suction valve Y14** (relay K7)

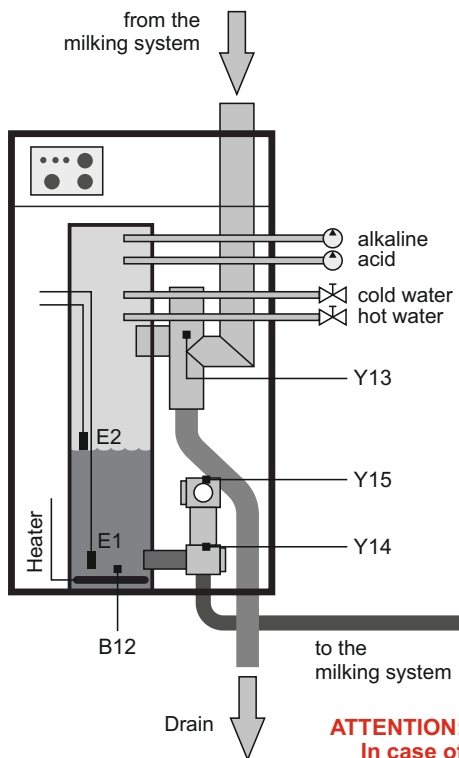The valve controls that the water of the storage tank of the RM-20 can be sucked into the milking system.

■ **Ventilation valve Y15** (relay K8)

In case of a closed suction valve the valve allows that the residual water in the milking system can circulate into the RM-20.

■ **Thermostat B12** (Input Sen1)

if existing thermostat is functional:

(Parameter C80 - Default 0)

The switching contact of the mechanical thermostat is "queried" and the heating is controlled accordingly.

If existing thermostat is defective

(Parameter C80 - Default 1)

A sensor KTY 81-210 must be connected at input Sen1 (optional). If this is the case, the desired target temperatures are to be set via parameters C83 and C84.

■ **Heating** (relay K5)

Serves to control the heating depending on thermostat B12.

■ **Safety switch when cleaning**
(Parameter C40)

If safety switch [C40] is parameterised with "1" and selector switch 2 is on "cleaning (right)":

If the contact of the safety switch is not closed, the cleaning is not started. The green lamp flashes quickly (red lamp is off) and F4 is displayed.

If the error is eliminated (green lamp flashes permanently again) the cleaning process can be restarted by pressing the start button.

If an error of the safety switch is detected during the cleaning process, the process stops.
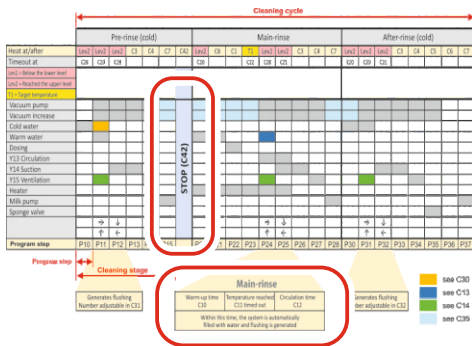
Stop function at the end of the pre-rinse:
See picture on the left

Between pre-rinse and main-rinse a STOP can be programmed with C42. To start this STOP three different options are available:.

1. Cleaning can be restarted at a certain time by a timer. For this purpose, the timer sends a signal to the corresponding digital input at the time programmed.

2. The cleaning can be restarted by pressing the start button.

3. The cleaning can be started acc. to a programmed time (3…999 minutes).

Main rinse

In the main rinse, rinse pushes are constantly generated. It compromises three phases:

1. Heating time [C10]: is for the heating of the rinse water and the filling of the milking system. The water heated in P23 is pulled into the system. P24 and P25 are repeating constantly depending on the level and thus create the rinse-pushes. The control fills the system automatically with water. If C10 is finished, follows phase 2

2. Temperature achieved [C11]: Wait until the return flow temperature of the water is achieved. In this section the temperature is checked at the end of program step P24. If the temperature is achieved, follows phase 3, however, after the thermostop-limitation C11 at the latest.

3. Circulation time [C12]: For the time C12 rinse-pushes are constantly created. The hot water with the detergent circulates in the system. .

For control:

During cleaning the display shows the current cleaning step.

If the display is dark, just press a button

Working level
for normal daily operation

Code 471	*Code 567*	*Code FFF*
Plant parameters	**Service parameters**	**Error memory**
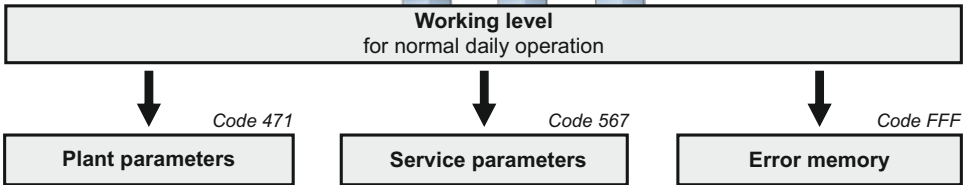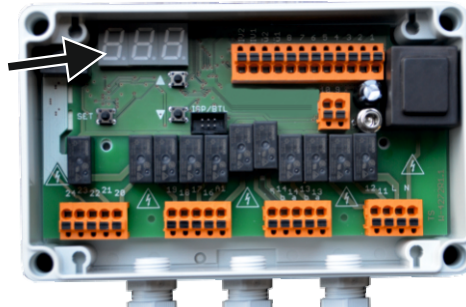
The RM-20 is operated on different levels:

Operating level:

... for normal daily operation .

- OFF mode
- MILK mode
- CLEAN mode

The various modes are selected using the existing selector switch on the TURBOSTAR.

The subordinate parameter pages can only be accessed after a code has been entered. This is to avoid an accidental adjustment of the parameters.
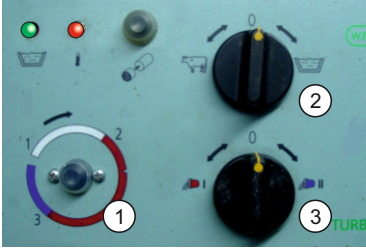
Plant parameters

Basic milking system parameters are set here.

Service parameters

Parameters for commissioning the system.

Error memory

The last 10 error codes are saved here. These can be called up for service purposes.

Mode „OFF" (selection switch **2** on position 0)

All relays are switched off. Both lamps are off.

Mode „Milking" - selection switch **2** on position "cow"

The vacuum pump is switched on via the control.
Both lamps are off.

- If in parameter C41 the milking level switch activated, the vacuum pump can be switched on or off.
- (Only if in parameter C40 the safety switch is activated): The safety switch indicates that the hose is incorrectly inserted so that the vacuum pump is switched off and "F5" is displayed.

Mode „cleaning" - selector switch 2 on position "tank"

The green lamp flashes and signalises "ready to start". All outputs are still switched off.

- Press start button **1** "briefly": The rinse-program starts and performs the complete program.
- Hold start button **1** until the green lamp flashes: On the last rinse-cycle (after-rinse) is made.

A running rinse-program is signalised by the flashing of the green lamp.
The flashing rhythm indicates in which rinse-cycle the control is.

Rinse-cycle 1 (pre-rinse) ●○●○○●○●○●○●○●○●○●○●○●○
Rinse-cycle 2 (main rinse) ●●○●○○●○●○●○●○●○●○●○●●○
Rinse-cycle 3 (after rinse) ●●●○○●●○●○●○●●○●○●○●○●●○

During the "main-rinse" the red lamp flashes during the heating phase.
If the cleaning is completely finished without an error it is indicated by a slow flashing of the green lamp.

Error messages of the indicator lamps:

Cleaning completed,
Green flashes slowly – red flashes constantly

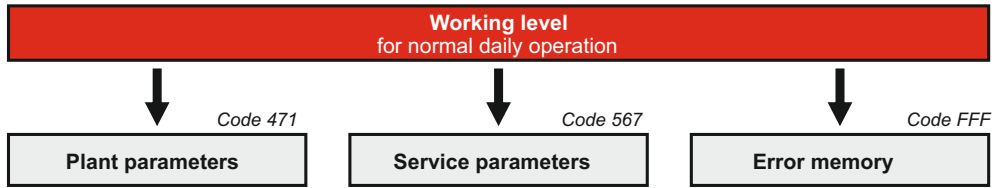Error: P24/25 thermostop limitation exceeded [C11] or P22 heat up the timeout [C20].

The last error is indicated - see error list.

Cleaning interrupted,
green flashes quickly, red is off.

Error: Cleaning interrupted – has to be repeated! Mains failure, safety switch has been triggered or time out during water intake (C20 or C21 was exceeded).
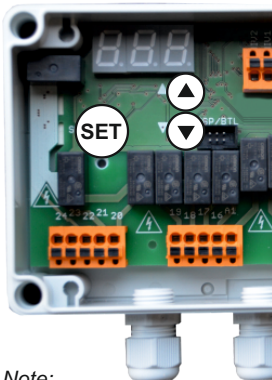
The last error is indicated – see error list.

Working level
for normal daily operation

Code 471	Code 567	Code FFF
Plant parameters	**Service parameters**	**Error memory**

Enter level code:

In order to change parameters in one of the lower levels enter the appropriate 'level letter' und the 'code'.

Plant parameters . . . . Code 471
Service parameters . . . . Code 567
Error memory . . . . Code FFF

Proceed as follows (control unit must be in OFF mode):

* Press the two arrow keys simultaneously for about 5 seconds: The display shows '0000' - the first '0' flashes.
* Use the arrow keys to set the first digit of the desired code
* Confirm the correct digit with "SET". The set digit has been accepted - the second '0' flashes.
* Use arrow keys to set the second digit.
* Confirm the correct digit with "SET". The third '0' flashes.
* Use arrow keys to set the third digit
* Confirm the correct digit with "SET". The first parameter of the selected level now appears. .

  If an incorrect code is entered the control unit switches back into OFF mode.

Note:

If no button is pressed for a longer time the display switches off.

Display parameter value:

* Use the arrow keys to select the desired parameter.
* Press the "SET" button: The parameter value is displayed.

Change parameter value:

* Use the arrow keys to select the desired parameter.
* Hold down the "SET" button and use the arrow buttons to set the desired value. (If the arrow buttons are held, the value starts to run) In order to store the value in the memory, first release the arrow button and then the "SET" button.

Return to working level:

(possible from any parameter)

* Press the UP- and DOWN-button simultaneously for about 5 seconds. The actual value is displayed. (If no button is pressed for 60 seconds, the control switches back to the operating level. Attention: Possible changes are not adopted!).

Working level
for normal daily operation

Code 471 → **Plant parameters**
Code 567 → **Service parameters**
Code FFF → **Error memory**
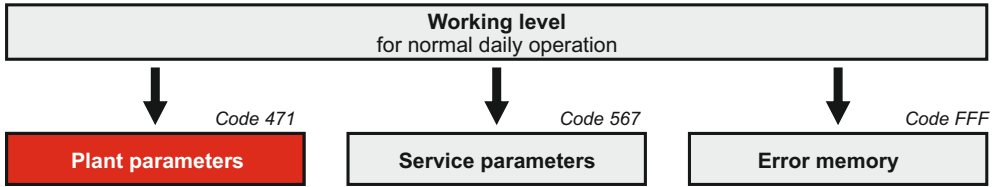
c parameters

Switch to level "Plant parameters"
- See page 22.

Program step runtimes C1...		Range	Default
C1	Dosing time (program step P22)	5…500 sec.	120
C3	Suction time (program step P13, P26, P33)	10…60 sec.	15
C4	Emptying (program step P14+P27+P34)	5…500 sec.	180
C5	Sponge valve (program step P35)	0…500 sec.	0
C6	Pause / drainage in the after-rinse (program step P36)	0…500 sec.	120
C7	Final pump down (program step P15, P28, P37)	10…60 sec.	30
C8	Trapping time (program step P21)	0…300 sec.	0

After reaching level E2, the water continues to run for time C8 in order to have more water ready for the first flush.

Function runtimes C10…		Range	Default
C10	Warm-up time (program step P24↔P25)	5…15 min.	5
C11	Thermostop limitation (program step P24↔P25)	5…90 min.	30
C12	Circulation time (program step P24↔P25)	1…50 min.	7
C13	Water refill delay from the start of program step P24	5…120 sec.	35
C14	Aeration time within program step P11+P24+P31	5…500 sec.	35

Timeout times C20…		Range	Default
C20	Timeout time water intake (program step P10, P11, P20, P24, P30, P31)	2…20 min.	10
C21	Timeout time water suction (program step P12, P25, P32)	2…20 min.	10
C22	Timeout time heating (program step P23)	10…30 min.	10

Cleaning schedule settings C30…		Range	Default
C30	Pre-rinse with cold water (program step P11)	0…1	0
	0 = first cleaning stage cold, all others warm		
	1 = all cleaning stages cold		
C31	Number of rinse cycles pre-rinse (pr. step P11↔P12)	1…20	3
C32	Number of rinse cycles after-rinse (pro. step P31↔P32)	1…20	3
C35	Vacuum pump setting	0...1	0
	0 = off in final pumping and water intake		
	1 = always on from program step P11 to P35		

Options C40…

C40	Safety switch	0…1	0
	0: deactivated		
	1: activated		
C41	Milking parlor switch	0…1	0
	0: deactivated		
	1: activated		
C42	Stop in the first rinse	0...999	0
	0: deactivated		
	1: activated, continue via timer (digital input)		
	2: activated, continue via timer or start button		
	3…999: activated, continue via timer or start		
	button or time (3…990 minutes)	0…999	0

Hardware adjustments C80…

C80	Activation sensor input KTY	0…1	0
	0 = no sensor (mechanical thermostat is used)		
	1 = sensor activated (order sensor with Welba)		
C83	Target value 1 (heating temp.) only if C80 is active.	5…90 °C	65
	Refers to P23.		
C84	Target value 2 (return temp.) only if C80 is active.	5…90 °C	45
	Refers to P24/P25.		
C85	Level sensitivity	-10…10	0
	Fine adjustment to compensate different water conductivities		
	poorly conducting water = set a higher value		
	better conducting water = set a lower value.		

Service adjustments C90…

C90	advance rinse-sequence one step at a time	0…5	0
	with the start button		
	This function is for the commissioning and deactivates		
	itself after x adjusted rinse-cycles.		
C98	Software version		

Working level		
for normal daily operation		

Code 471	Code 567	Code FFF
Plant parameters	**Service parameters**	**Error memory**
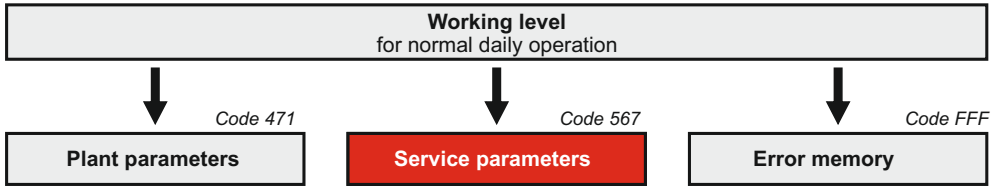
t parameters

Switch to level "Service parameters"

- See page 22.

Meaning of the parameters

Outputs:		Adjustment range
t1	Cold water valve, 230V	0 .. 1
t2	Warm water valve, 230V	0 .. 1
t3	Milk pump external via contactor, 230V	0 .. 1
t4	Vacuum pump external via contactor, 230V	0 .. 1
t5	Heater via contactor, 230V	0 .. 1
t6	Air valve circulation, 230V	0 .. 1
t7	Air valve water extraction, 230V	0 .. 1
t8	Air valve air inlet, 230V	0 .. 1
t9	Dosing pump 230V	0 .. 1
t10	Vacuum increase	0 .. 1
t11	Sponge valve	0 .. 1
t12	Greene lamp	0 .. 1
t13	Red lamp	0 .. 1
t14	Free / for optional features (not implemented yet)	0 .. 1

Inputs:		Display range
t21	Rotary switch 'cleaning'	0 .. 1
t22	Rotary switch 'milking'	0 .. 1
t23	Milking parlor switch	0 .. 1
t24	Safety switch	0 .. 1
t25	Button for sponge valve	0 .. 1
t26	Start button 'cleaning'	0 .. 1
t27	Free / for optional features (not implemented yet)	0 .. 1
t28	Timer input (starts cleaning from STOP)	0 .. 1
t29	Sen1 temperature 1, as a sensor or digital input (if thermal switch continues to be used)	0 .. 1 0 .. 1
t30	Sen2 temperature 2, unused.	0 .. 1
t31	Lev1 Level below	0 .. 1
t32	Lev2 Level above	0 .. 1

Working level for normal daily operation		
↓ *Code 471*	↓ *Code 567*	↓ *Code FFF*
Plant parameters	**Service parameters**	**Error memory**
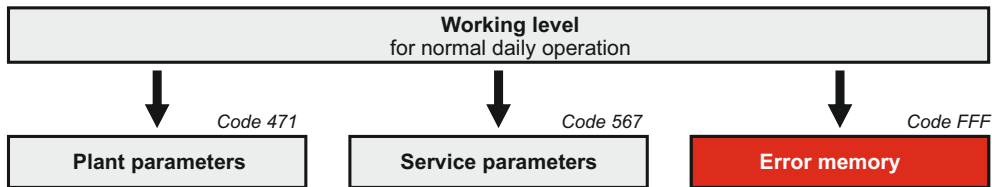
Switch to level "Error memory"

- See Page 22.

Troubleshooting

The errors are stored in the error memory (access with code FFF). Errors are stored in the amount they have occurred (up to 10 times).

In the OFF-mode the last error can be displayed by pressing the SET-button.

Clearing of the error memory:

- Select parameter [F99] with the arrow buttons.
- Press the SET-button and hold it and press button "arrow up". The display switches to "1".
- Release SET-button.
- Press both arrow buttons simultaneously for about 5 seconds, until "OFF" is displayed

F1:   Heating temperature in P22 not achieved

The cleaning is not stopped. When the cleaning is finished, the red lamp flashes.

F2:   Return flow temperature in circulation not achieved

Cleaning is not stopped. After the time C11 the control changes into the circulation time C12. When the cleaning is finished, the red lamp flashes.

F3:   Mains failure during cleaning

The mains failure is detected when the unit is switched on again, if the rotary switch is still in the cleaning position. Cleaning does not start automatically, but displays error F3 - the red lamp flashes and the green lamp flashes quickly. The switch must be reset by turning the rotary switch to OFF.

F4:   Safety switch cleaning

If the safety switch is activated and, when cleaning is selected, the contact of the

switch is not closed, the cleaning cannot be started, the green lamp flashes quickly (red lamp is off) and F4 is displayed.

When the error is eliminated (green lamp flashes permanently again), the cleaning can be started by pressing the start button. If, however, a safety switch fault is detected during the cleaning, the cleaning will stop. (See behaviour in case of a stop).

F5:   Safety switch milking

If the safety switch is activated and the contact of the switch is closed during milking, the vacuum pump is switched off, the red lamp flashes and error F5 is displayed.

F8:   Sensor 1 error (only if KTY-sensor is activated)

F10: Timeout during water intake in step P10

F11: Timeout during water intake in step P11

F12: Timeout during water extraction in step P12

F20: Timeout during water intake in step P20

F24: Timeout during water intake in step P24

F25: Timeout during water extraction in step P25

F30: Timeout during water intake in step P30

F31: Timeout during water intake in step 31

F32: Timeout during water extraction in step 32

All timeout errors of the level control cause a stop of the cleaning process. The red lamp flashes, the green lamp flashes quickly and the error is displayed.

F50: Niveaufehler

Is triggered when upper level is detected and lower level is not detected. This error is saved and displayed, but does not lead to a stop.