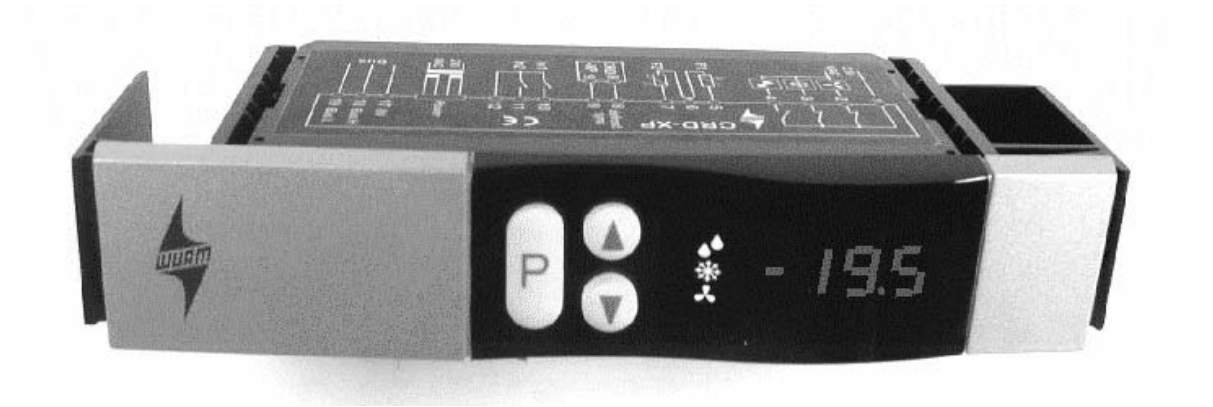
CRD-XP

Universal cold location controller
for installation in commercial refrigerators or cabinet doors

Front view



Features

- Suitable for all cold location types
  (cold rooms and commercial refrigerators etc.)
- Forced air, electric, hot or cold gas defrosting
- Synchronised defrost of several cold location controllers
- Defrosting over fixed times or cyclical interval
- Thermostatic fan control
- Run-up, run-down function of the fan controller
- Surge guard and runtime monitoring
- 2. Setpoint and independent day / night changeover
- Sharp frost function
- 3-Point control
- High voltage range of mains power supply
- High electromagnetic compatibility
- Fast installation thanks to innovative and elegant fitted housing
- Large data storage for temperature history

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1 Connection diagrams

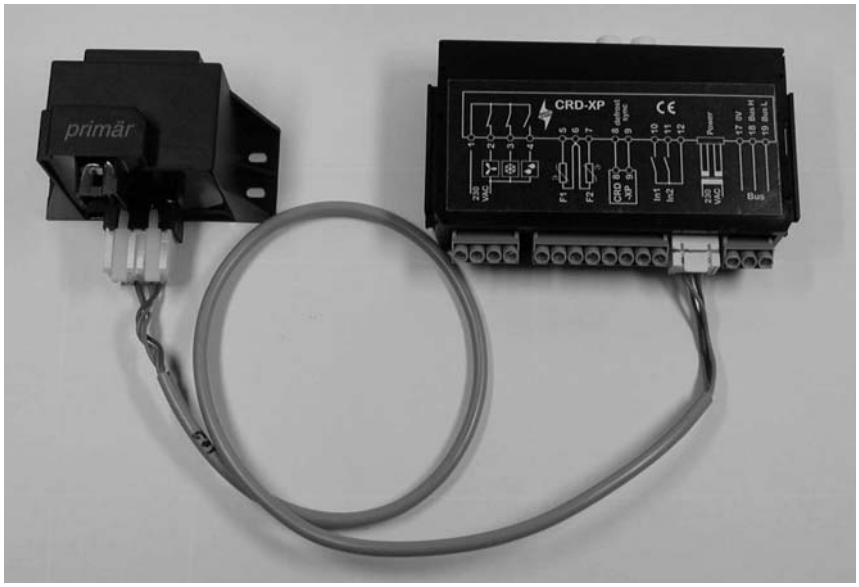
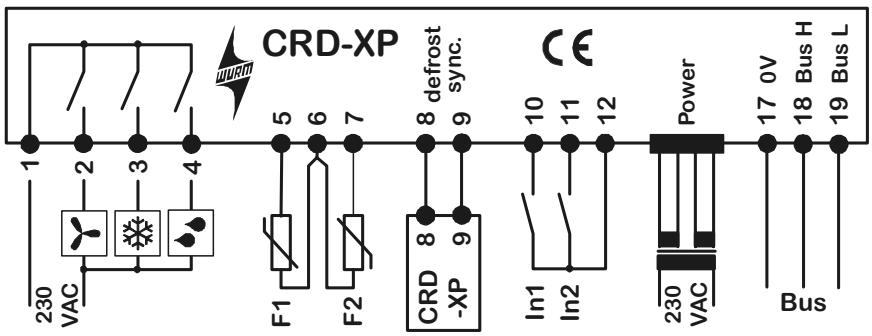


Photo showing cables connecting CRD-XP to transformer

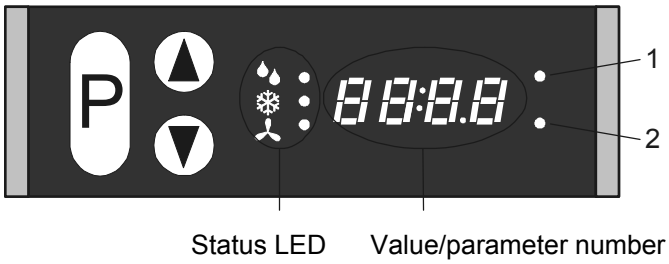


Connection terminals on CRD-XP

The wiring diagram applies to devices of Version 2.0 and higher.
Caution: On Version 1.0 and 1.1 devices, the cooling and fan output relays have been designed to act as openers.

2 Operation

Display



1 Set value adjustment enabled
2 Advanced level P00...P73

Defrost
Cool
Fan

Selecting parameters

1. Press the <P> key to display the parameter number.
   The parameter number will appear in the display for as long as the key is depressed.
2. To select individual parameters with the <P> key depressed, press the ▲ or ▼ key.
   When the key is released, the value corresponding to the parameter appears.

Parameter levels: Standard level and advanced level

The setting menu is divided into two distinct function areas, the standard level and the advanced level. The **standard level** comprises parameters P00 to P09. In this area, all standard actual values can be displayed and the basic set value for the controller can be set. Parameter P09 can trigger a manual defrost if required.
The **advanced level** comprises both parameters P00 to P09 and also parameters P10 to P70. In this area, all control, defrost, fan, compressor and probe parameters can be displayed and set.
Within a level, you can toggle between the parameters with one single operating function.

Enabling the advanced level

1. To switch to the advanced level, press the <P> key for 5 seconds.
   The LED "Advanced level" will flash for as long as the level is enabled.

2. To return to the advanced level, press the <P> key again for 5 seconds.

   If no key is pressed within 2 minutes, the display automatically returns to the standard level. The return is always to the temperature display which is defined by parameter P60.

Adjusting set values

1. Select the parameter to be adjusted (having previously enabled the advanced level if necessary).
2. Set value adjustment enabled.
   Press all three keys down simultaneously for 5 seconds. The "Set value adjustment enabled" LED flashes.
3. Change the values using the ▲ or ▼ keys to change values.

5 Sek.

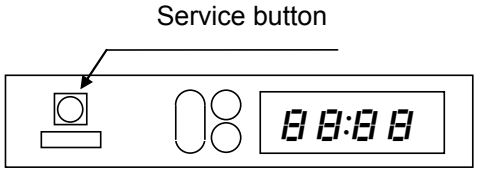
When changing the parameters, it is not necessary to re-enable access to make further set value adjustments.
Actual values are only displayed, they cannot be adjusted even if the "Set value adjustment enabled" LED is flashing.

4. To disable set value adjustment, press all three keys simultaneously again for 5 seconds.

   If no key is pressed within 2 minutes, the display automatically returns to the standard level and set value adjustment is disabled. The return is always to the temperature display which is defined by parameter P60.

Set address

Fundamentally, one can proceed as described above to set the device address to Parameter P64. But additionally, there is the possibility of changing directly to Parameter P64 with the help of the service button arrayed behind the front plate. For this, the service button must be briefly actuated 3 times. The advanced level is automatically released.



3 Description of parameters

Standard level: Actual values and set values					
No.	Parameter	Plant	Min.	Max.	Description
P00	Control actual value		-50°C	+70°C	Current actual value of temperature control Temperature of control probe F1
P01	Current control set value		-50°C	+70°C	Display of the actual set value of the control in consideration of shift P13 and sharp set value P14
P02	Set value	7°C	-50°C	+70°C	Input of basic set value for the control (Setting range is defined with P11 and P12 advanced level)
P03	Actual value Reg/Control probe F1		-50°C	+65°C	Temperature of control probe F1
P04	Actual value Limit probe F2		-50°C	+65°C	Temperature of defrost limit probe F2
P05	Not used				
P06	Defrost time	min.			Duration of last defrost
P07	Melting time	min.			Duration of last melting phase
P08	Operating time	%			Operating time during last 60 minutes
P09	Manual defrost		OFF	On	Manual start and stop of a defrost => Chapter 6 **Manual defrost must be enabled via parameter P65!**

Advanced level: Control					
No.	Parameter	Plant	Min.	Max.	Description
P10	Hysteresis	2K	1K	20K	Switching differential, symmetrical around set value P02
P11	Upper set value	10°C	-50°C	+70°C	Input of upper adjustment limit for set value in standard level P02
P12	Lower set value	0°C	-50°C	+70°C	Input of lower adjustment limit for set value in standard level P02
P13	Set value shift	0K	-20K	+20K	Shift of set value (lowering or raising) via day/night signal
P14	Shock/ 2nd setpoint	-10°C	-50°C	+70°C	Setpoint for sharp frost function P52
Advanced level: Defrost control					
No.	Parameter	Plant	Min.	Max.	Description
P15	Defrost type	Air	Air	HGon	Air: Circulation air defrost EL: Electrical defrost HG: Hot gas defrost CG: Cold gas defrost HGon: Hot gas defrosting with switched-on solenoid valve
P16	Time	hh:mm	hh:mm	Hh:mm	Time on device **Control unit works with Gateway system time!**
P17	Master / Slave	ON	OFF	ON	**ON: MASTER OFF: SLAVE** In SLAVE mode, the defrost times are inactive. Defrosts are started only via the synchronous line.
P18	Defrost time 1	06:00	--:--	23:59	Start time for 1st defrost **If no defrost time is to be programmed, the time must be set to "--:--".**
P19	Defrost time 2	20:00	--:--	23:59	Start time for 2nd defrost
P20	Defrost time 3	--:--	--:--	23:59	Start time for 3rd defrost
P21	Defrost time 4	--:--	--:--	23:59	Start time for 4th defrost
P22	Defrost time 5	--:--	--:--	23:59	Start time for 5th defrost
P23	Defrost time 6	--:--	--:--	23:59	Start time for 6th defrost
P24	Defrost limit temperature	8°C	0°C	30°C	Electro, hot gas and cold gas defrosting: Defrosting is ended when the limit temperature is reached. **At a setting of 30°C, temperature limiting is inactive!**
P25	Defrost (safety) time	45 mins	10 mins	180min	Defrosting is always ended when the safety time is reached.
P26	Draining time	0min	0min	9min	Defrosting can be ended by waiting before switching the cooler back on after the defrost heater has been switched off. Even after the defrost safety time has lapsed on electric, hot gas or cold gas defrosting, the set draining time always lapses first.
P27	Time between 2 defrosts	15h	0h	170h	Setting cyclical defrosts if the timer is faulty (timer will not synchronise or set after a restart)
Advanced level: Fan control					
No.	Parameter	Plant	Min.	Max.	Description
P28	Fan control	0	0	2	**0: Continuous operation 1: timed 2: themostatic**
P29	Fan set value for thermostatic fan control	-15°C	-50°C	+50°C	Independent set value for thermostatic fan control. This is an expanded function for use in cold room control applications. Optimum setting ensures less ice formation on the evaporator. **Benefits:** 1. Fewer defrosts. 2. Ensures that no warm air can penetrate the cold room following a defrost. **Risks:** 1. The fan may switch on too late when cooling is requested, if the limit probe is placed in an unfavourable position. The evaporator floods because the cooling output is not conveyed into the atmosphere. 2. Incorrect fan set values and hysteresis can result in cyclical or continuous fan operation. The settings depend largely on the operating point of the cold generation unit.
P30	Fan hysteresis	1K	1K	10K	Independent control hysteresis for thermostatic fan control.
P31	Fan behaviour during defrost	1	0	1	**0: off 1: continuous operation** => Chapter 5 Fan behaviour, see sequence diagram
P32	Fan delay	0mins	0mins	10 mins	Dwell time following defrost => Chapter 5 Fan behaviour, see sequence diagram

No.	Parameter	Plant	Min.	Max.	Description
P33	Fan runup time	0mins	0mins	10 mins	Run-up time of fan prior to cooling command => Chapter 5 Fan behaviour, see sequence diagram
P34	Fan rundown time	0mins	0mins	10 mins	Rundown time of fan following cooling command => Chapter 5 Fan behaviour, see sequence diagram
P35	Not used				
P36	Not used				
P37	Not used				
Advanced level: Compressor parameters					
No.	Parameter	Plant	Min.	Max.	Description
P38	Minimum dwell time	0mins	0mins	20mins	Minimum dwell time of the compressor control (surge protection). If the actual controller value increases to above the switch-on threshold before the minimum dwell time is reached, the compressor remains switched off until this period has lapsed.
P39	Minimum operating time	0mins	0mins	20mins	Minimum operating time of the compressor control (surge protection). If the actual controller value falls to below the switch-off threshold before the minimum dwell time is reached, the compressor remains switched on until this period has lapsed.
P40	Maximum operating time	720min	10 mins	999mins	Maximum operating time of the compressor. The operating time of the compressor is monitored. If the "maximum operating time" is exceeded, it is switched off for the dwell time preset on P41.
P41	Defined dwell time	0mins	0mins	120mins	Defined dwell time after the maximum operating time is exceeded (see maximum operating time P40)
P42	Switch-on time	5mins	2mins	120mins	Operating time for safety mode if malfunction occurs. If the control probe (e.g. probe break) fails, an emergency program is initiated. The cooling command is controlled with the adjustable switch-on and switch-off period (see dwell time P43).
P43	Dwell time	5mins	2mins	120mins	Switch-off period for safety mode if malfunction occurs. (See switch-on period P42)
Advanced level: Alarms					
No.	Parameter	Plant	Min.	Max.	Description
P44	Alarm delay	60mins	0mins	120mins	Period from onset of malfunction until error message is generated
P45	Alarm delay following defrost	90mins	0mins	180mins	Alarm delay following defrost. The temperature monitoring function is inactive following defrost. P45 defines the delay time following a defrost. The alarm delay becomes effect even if a set value has been changed. This may be the case, for example through a shift or sharp operation.
P46	Alarm priority	1	0 (off)	3	Priority for the differentiated message by remote data transmission or central module expansion
P47	Over-temperature alarm	4K	0K	70K	Temperature threshold for over-temperature alarm. The temperature of the control probe is monitored for both over and under temperatures (P48). The respective values are the deviation and/or differential to the control set value P01 (set value + any set value shift).
P48	Under-temperature alarm	4K	0K	70K	Temperature threshold for under-temperature alarm. (See over-temperature alarm)
P49	Fan / alarm relay	Lu	Lu	ALnc	Function selection for the fan relay **Lu** **Fan relay** **ALno** **Alarm relay NO, Alarm = contact closed** **ALnc** **Alarm relay NO, Alarm = contact open** (V.2.1) (NO normally open, NC normally closed)

Advanced level: Digital inputs					
No.	Parameter	Plant	Min.	Max.	Description
P50	Digital input 1	3	0	3	**0: direct alarm** Zero current principle, direct alarm on loss of current at the input **1: delayed alarm** Zero current principle, delayed alarm on loss of current at the input setting of delay time with P44 **2: external defrost trigger** start of defrost either by button or an external defrost timer **3: Cold location off** Control, temperature monitoring and probe monitoring inactive, alarms are suppressed, communication remains active, no messages via remote data transmission
P51	Status input 1	OFF	OFF	ON	Voltage status at digital input 1 (independent of selected function)
P52	Digital input 2	0	0	2	0: Door contact When the cold room is entered, fan and evaporator solenoid switch off for a maximum of 15 mins. Alarm after alarm delay 1: Day signal Signals day operation, set value shift for night operation 2: Shock freeze The desired sharp freezing temperature is preset via P14. It is controlled on the sharp setpoint. After the function is ended and the sharp temperature is reached, forced defrosting is performed; only when this is completed does the device return to normal operation. During sharp freezing, defrosting is not started. 3: Cooler off Control, temperature monitoring and probe monitoring inactive, alarms are suppressed, communication remains active, no messages via remote data transmission 4: 2nd setpoint Control to the 2nd setpoint The 2nd setpoint is preset via P14 (sharp set value).
P53	Status input 2	OFF	OFF	ON	Voltage status at digital input 2 (independent of selected function)
Advanced level: Probe parameters					
No.	Parameter	Plant	Min.	Max.	Description
P54	Operating mode	1	1	2	1: Control with one probe F1 2: No control 3: Weighted control with probes F1 and F2 4: Heating/cooling with one probe F1
P55	Not used				
P56	Not used				
P57	Adjustment to Reg/Control probe F1	0K	-10K	+10K	Calibration for control probe F1 Depending on probe arrangement, an adjust may be necessary. Reading and adjustment value amount to the actual probe value.
P58	Adjustment to limit probe F2	0K	-10K	+10K	Calibration for limit probe F2 (See P57)
P59	Not used				
Advanced level: Display					
No.	Parameter	Plant	Min.	Max.	Description
P60	Displayed temperature	P00	P00	P03	Standard display without operation
P61	Display resolution	0.1K	0.1K	1K	Alternatively, resolution of display 0, 1K or 1K.

Advanced level: Temperature register					
No.	Parameter	Plant	Min.	Max.	Description
P62	Register cycle	15mins	1min	15mins	1: 1min grid, register depth approx. 0.5 days **Do not use for continuous operation!** 5: 5min time slot pattern, memory depth approx. 2.5 days 10: 10min time slot pattern, memory depth approx. 5 days 15: 15min time slot pattern, memory depth approx. 7.3 days
P63	Not used				
Advanced level: General					
No.	Parameter	Plant	Min.	Max.	Description
P64	Address	0	0	120	CAN bus address of the controller (0= no data traffic, alarm via bus system (P71) possible)
P65	Manual defrost	ON	OFF	ON	Manual defrost permitted with parameter P09.
P66	Relay test	0	0	3	Test of all output relays **0: off 1: cooling relay 2: fan relay 3: Defrost relay** **All relays off** On exiting the menu or if no further keys are pressed within 2 minutes, the relay test is automatically deactivated.
P67	Day,Month	dd.mm			Current date
P68	Year	yyyy			Current year
P69	Probe type	277	277	2015	Selection of temperature probe type for all probes 277: TRK277PLUS 2015: T2015
From Version 2.30					
P70	Cooler on/off	ON	OFF	ON	Switches the control and alarm on/off
P71	Bus alarm	OFF	OFF	ON	Uses the bus system as a central alarm system via separate module ALC-XP (only possible for address 0, see P64)
P72	HACCP	ON	OFF	ON	Switches on/off consideration in the HACCP summary in Frigodata-XP
P73	Version				Device version used

Operating instructions

Fan relay	Reason / remedy
Set value level cannot be enabled	Keys **P**, ▲ or ▼ were pressed for less than 5 seconds or a key was released in between
Cannot switch to advanced level	Key **P** was not pressed for at least 5 seconds
Parameter number cannot be changed	Key **P** was not held down when keys ▲ or ▼ were pressed
Parameter cannot be changed	Access is not enabled Parameter is not a set value Key **P** pressed simultaneously with key ▲ or ▼
Parameter numbers greater than P09 cannot be selected	The advanced level has not been selected
Manual defrost cannot be triggered or terminated	P65 is set to OFF Manual defrost triggering is disabled. The defrost conditions are not met. (see chapter 6)

4 Control

Normal operation with 1 probe

In normal control operation, F1 is used to measure the regulating actual value. F2 serves as defrosting limit probe. If the actual value exceeds the current setpoint by half the hysterisis amount, the cooling relay is switched on. If the regulating actual value falls below the current setpoint by half the hysterisis amount, the cooling relay is switched off again. To reduce the switching frequency of possible compressors, you can enter a minimum run and standstill time (→ P38/P39).

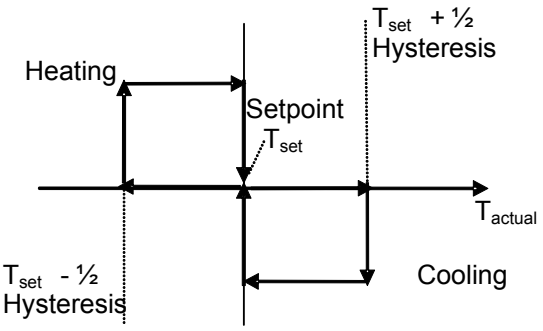
No active temperature control

When the controller is used as a pure defrosting slave, the control can be switched to inactive. In this operation mode, dashes represent the regulating actual value in the display. The control probe F1 is not monitored. The defrosting synchronised by the master is terminated via the limit probe F2. Recording of the measured temperatures and statuses in the history or in the historical storage remains active.

Weighted control with 2 probes

Both probes F1 and F2 are used for control in the "Weighted control" operation mode. F1 measures the supply air temperature, whereas F2 determines the return air temperature. The true regulating actual value is calculated through a weighting of both probes. The weighting is set with 50% return air in day operation and 60% return air in night operation. The supply air probe F1 is used as a limit probe for defrosting. If one of the two probes malfunctions, the still-intact probe is used for control.

3-point control, heating/cooling



The defrosting output is used for the heating operation. The cooling operation is active when the actual value exceeds the setpoint by half the hysteresis amount. When the setpoint is reached, cooling is switched off again. Heating begins when the regulating actual value falls below the setpoint by half the hysteresis amount. It ends when the setpoint is reached.

Initiation of defrosting is possible in this operation mode as well. If defrosting is not desired, the times must be explicitly deleted. With forced air defrosting, there is no triggering of the defrosting output (heat register). With electrical defrosting, the heating/defrosting output becomes active. F2 serves here as a limit probe.

Sharp frost function

Input 2 can be configured via parameter P54 to trigger the sharp frost function. The desired sharp freezing temperature is preset via P14. After input 2 is activated, the system is cooled down to the sharp setpoint. There it plays no role whether the input is set only briefly or remains activated. If input 2 is still active when the sharp frost temperature is reached, controlling remains at the sharp frost temperature. After the input is opened, the system is cooled again below the sharp frost setpoint and, immediately after this, forced defrosting is initiated. If, in contrast, input 2 is only briefly set (at least 2 s) and then reopened, the device conducts forced defrosting immediately after falling below the sharp temperature for the first time.

5 Fan control – Cooling operation and defrosting

The parameters P28 and P31 can influence ventilator behaviour. P28 is used to set controls in normal operation, P31 during defrosting.

Continuous operation (P28 = 0)

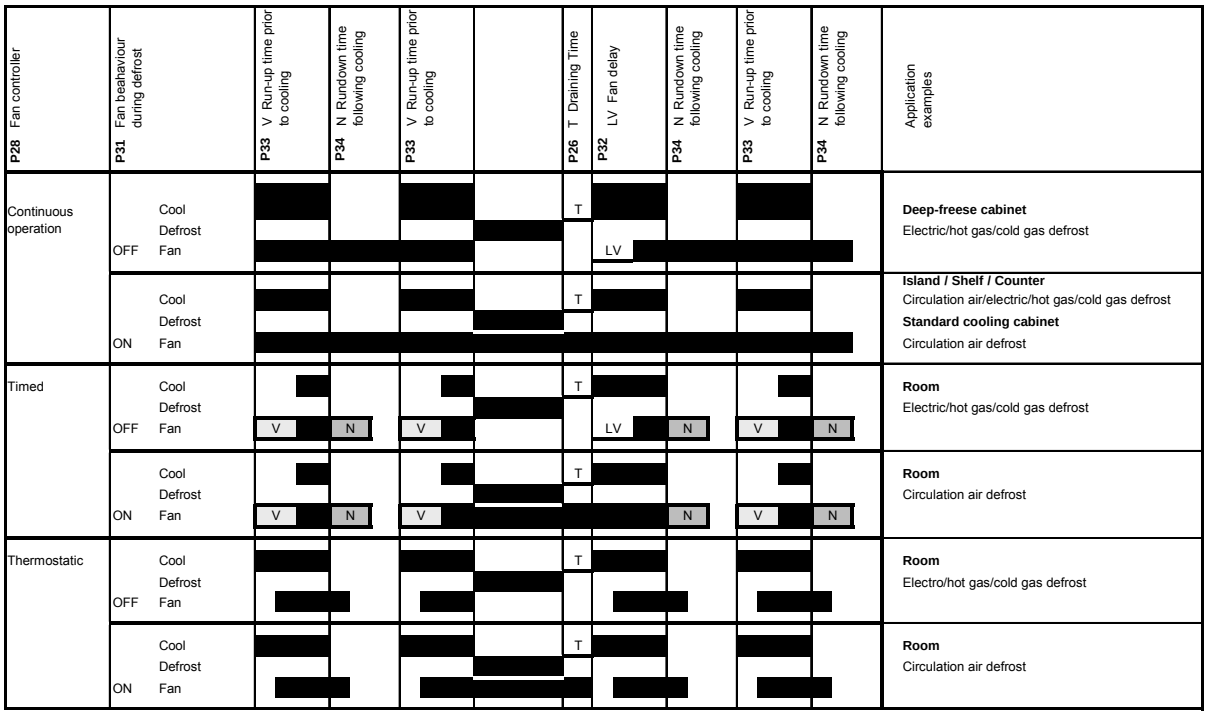
If parameter P31 is set to "1", the ventilator is triggered without interruption. At position "0", the ventilator is switched off during defrosting. It is switched on again after any draining (P26) and ventilator delay time (P32).

Timed ventilator control (P28 =1)

With this ventilator control, the ventilator output is timed with the cooling command, taking into account the parameters P33 and P34. The ventilator starts in advance of cooling by the time set in P33 and continues to run after cooling is switched off for the time set in P34.
If the ventilator should be switched off during defrosting, parameter P31 must be set to "0". The ventilator starts again after defrosting and after the ventilator delay time P32.

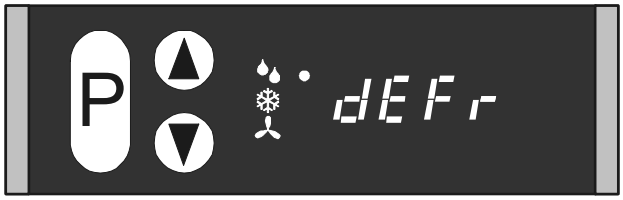
Thermostatic ventilator control (P28 = 2)

The ventilator is only switched on when the regulating actual value falls below the temperature set in parameter P29 minus half the hysterisis (from P30). The ventilator is switched off when the regulating actual value lies above the temperature set in P29 plus half the hysterisis.



6 Defrosting

Display during active defrost



During a defrost, the text "dEFr" (defrost) is shown in place of the temperature value in the standard level.
The text remains in the display in cold locations with set values of > -15°C to 20 minutes and in cold locations with set values of < -15°C to 30 minutes following the end of defrost and draining time.

Triggering a manual defrost

1. Select parameter P09 "Manual defrost".
2. Enable set value adjustment.
3. Press the ▲ key. Manual defrost starts.

If several cold location controllers are connected via defrost synchronisation, the defrost operation is triggered for all.

Terminating a defrost

1. Select parameter P09 "Manual defrost".
2. Enable set value adjustment.
3. Press the ▼ key. The controller defrost operation is terminated.

If several cold location controllers are connected via defrost synchronisation, the defrost operation must be terminated for all, before the controllers switch back to cooling mode.

Timer-controlled defrost

Time-controlled defrost is only possible on operation in the BUS system. The time is transferred from the Gateway to the controller.

6 defrost times are available, which can be set separately (P18 – P23). For these times to be effective, the device must be programmed as MASTER via parameter P17 ("ON").
The required defrost times are deactivated by setting to '**--:--**'.

Synchronised defrost

To synchronise the defrosting of several controllers, they can be connected via terminals 8 and 9. A maximum of 4 controllers can be coupled to each other.
Each device sends a signal to the terminals for the duration of its own defrost. If the Slave controller detects that the Master controller is defrosting, it will start a defrost under the relevant conditions.

To prevent other devices triggering their own time-controlled defrost, the second device should be programmed as the SLAVE via parameter P17 ("OFF"). On the other hand, additional times are possible through the operation as additional master.

On completion of the individual defrost operations triggered by limit probe or time, all synchronised devices wait until all thermometers have received their synchronous signal from the bus before starting cooling. This means that the start of cooling as well as the start of defrosting is synchronised.

Cyclical defrost

If the defrost interval should be longer than 1 day, cyclical defrosting can be activated. The cycle time in hours is set via parameter P27. It is effective when no individual defrost times are programmed or the controller has been configured as slave.
If the controller does not request a cyclical defrost, the cycle time P27 must be set to "0".

Suppressing defrosts

Electric, hot gas or cold gas defrosts are not triggered if:
- the limit probe temperature is higher than the set limit temperature
- the limit probe is +5K warmer than the regulator set value and
  the regulator actual value has exceeded the over-temperature threshold.
- The limit probe malfunctions

Hot gas defrosts with solenoid valve switching

Hot gas defrosting with switched-on solenoid valve is available as an additional defrost type (display: HGon). After defrosting starts, the cooler solenoid valve is also switched on with a 1 minute delay. An additional external linking of the solenoid valve with hot gas generation is thus not needed.

7 Error messages

In the event of malfunction, the display flashes with the error code. Depiction of the error code is suppressed in the advanced level (point in lower right flashes).

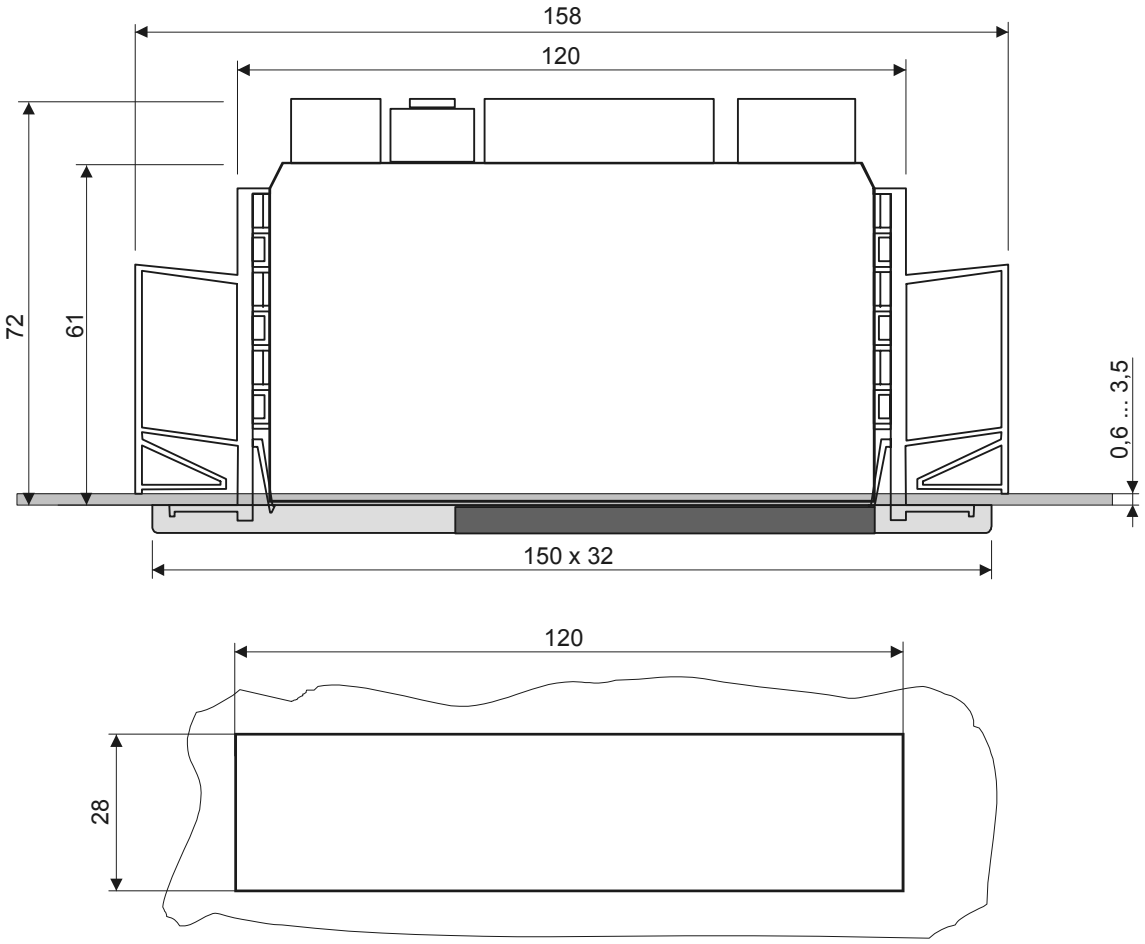
Display	Cause of malfunction	Monitoring function and emergency program
F 1	Short-circuit or incoming air probe interrupted	Cooling command with defined operating time (Parameters P42, P43)
F2	Short-circuit or limit probe interrupted	With electric, hot gas or cold gas defrosting and a defect in the limit probe, defrosting does not take place.
EE	Data error in non-volatile memory	A power surge may destroy the set values. Operation takes place with default settings. Re-enter all memory locations! Isolate thermostat!
COLL	Address collision on the bus	The set address is already assigned. Set a different address for the device !
buS	Bus error No bus	Check bus connection or set address to 0 (P64)
door	Cold room door open too long	Close cold room door!
AL	**Alarm digital Input 1**	Zero current principle, alarm on loss of current at the input 1
dAL	Delayed alarm via input 1	Apply voltage to input 1, rectify external fault
Uhr	Timer has invalid time on address > 0	Restore bus connection to the gateway or enter time (P16) and set address to 0 (P64)
-6 T flashing	Over or under-temperature alarm of regulator actual value	Thermostat is too warm or too cold. Check setting of over-temperature threshold P47 or under-temperature threshold P48.

8 Service connection

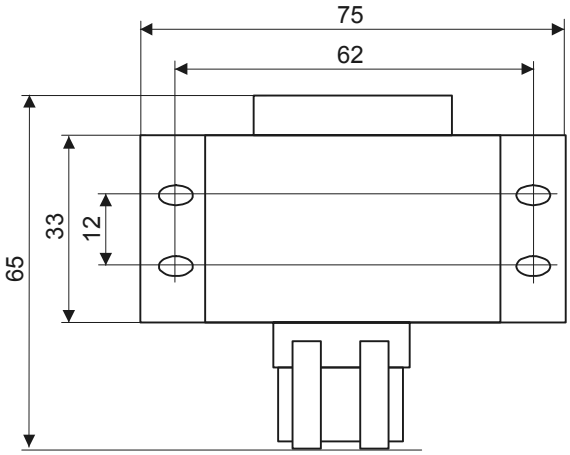
For service and commissioning purposes, a laptop can be connected directly to the cold location controller. The required connection sockets for the communication bus are located to the left behind the front plate. The CAN-PC901 – converter must be used for communication with the computer.

A “service button” is located above the connection socket. (→ chapter 2)

9 Installation



Installation dimensions for CRD-XP cold location controller



Installation dimensions for transformer TR9-9-4 (WZU001)

10 Accessories

CRD-XP	Cooler controller
TR9-9-4 (WZU001)	Transformer
ZCB-C/TR-0.6	Connection cable 0.6m CRD-XP to TR9-9-4
ZCB-C/TR-2.6 (WZU112,VBK9)	Connection cable 2.0m CRD-XP to TR9-9-4
TRK277/7 plus	Temperature probe 7m connection cable

11 Technical data

CRD-XP cold location controller

Supply voltage	2 x 9V~ via transformer TR9-9-4 with plug connection
Power draw	approx. 4VA
Digital inputs	2 x zero-potential multi-function inputs
Temperature probe	2 x TRK277plus
Output relay	1x ventilator/alarm – closer contact, 230V~ 4(2)A 1x cooling – closer contact , 230V~ 4(2)A 1x defrost – closer contact , 230~ 4(2)A
Communication	3-wire CAN-BUS interface
Service connection	CAN bus interface for laptop
Housing	Plastic housing
Dimensions	(WxHxD) 158 x 32 x 75 mm³
Mounting	See installation instructions
Permitted temperature range	0...45°C
Weight	approx. 150 g
EC Conformity declaration	As defined by EC Directive on Electromagnetic Compatibility 89/336/EEC

TR-9-9-4 - Transformer

Primary voltage	230V~, +10%/-20%
Power draw	approx. 4VA
Fusing	Max. 6A
Secondary voltage	2 x 9V~ for CRD-XP with plug connection
Primary side connection	2 x AMP connection, 6.3mm
Housing	Cast plastic housing
Dimensions	(WxHxD) 75 x 65 x 60 mm³, excluding cable
Mounting	See installation instructions
Ambient temperature	0...45°C (operation)
Weight	Approx. 350 g
EC Conformity declaration	As defined by EC Directive on Electromagnetic Compatibility 89/336/EEC

12 Software revisions and validity of documentation

Software version		Functional enhancement	Page
V1.1	11-2002	**Documentation basis** First delivered software version	
V2.0	03-2003	New hardware; all relay contacts are designed as closer contacts	**2**
V2.1	10-2003	Temperature range expanded to +70°C	**4**
		Function types of the fan relay expanded (parameter P49)	**6,10**
V2.30	12-2005	Simplified address setting through jump to the corresponding parameter P64 with threefold pressing of the service button	**4**
		Switching off of the cooler at the unit (parameter P70)	**8**
		Flexible use of the 2nd digital input (parameter P52)	**7**
		Control for independent 2nd setpoint (parameter P52)	**7**
		New operation mode "Operation mode 3-point control, heating / cooling"	**9**
		New operation mode "Weighted control"	**9**
		Expanded function of sharp freeze	**9**
		Expansion of the range of alarm thresholds (parameter P47, P48)	**6**
		New defrost type "Hot gas with solenoid valve control"	**12**
		Use of the CAN-bus as a central alarm system with alarm module ALC-XP (parameter P71)	**8**
		Improved HACCP function (parameter P72)	**8**
		Expansion of the range of intervals of cyclic defrost to 170 hours (parameter P27)	**5,12**

All software versions that are not listed are special solutions for individual projects and are not documented in this description in detail.

The general technical guidelines must be observed!

This document will automatically become invalid when superseded by a new technical description of the device.