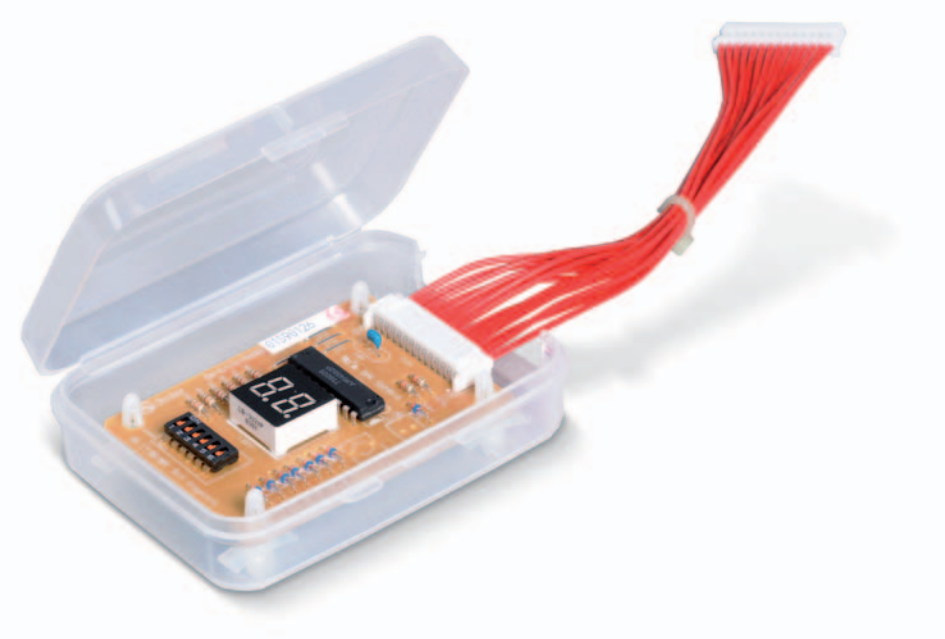
SYSTEM MONITOR
FOR REMKO SUPERTEC INVERTER

Operation · Fault codes · Troubleshooting



Edition GB – W12

Contents

Read this installation manual carefully before commissioning / using the device!

These instructions are an integral part of the system and must always be kept in the vicinity of the installation location or on the unit itself.
This operating manual is a translation of the German original.

Made by REMKO

Subject to modifications; no liability accepted for errors or misprints!

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Safety notes

Carefully read the operating manual before placing the unit in service for the first time. It contains useful tips and notes such as hazard warnings to prevent injury and material damage. Failure to follow the directions in this manual can result in endangerment to persons, the environment and the equipment itself and will void any claims for liability.

- Keep this manual and the refrigerant data sheet near to the units.
- The units and components should be set up and installed only by qualified personnel.
- The set-up, connection, and operation of the units and their components must be in accordance with the operating conditions stipulated in this manual and comply with all applicable local regulations.
- Mobile units must be set up securely on suitable surfaces and in an upright position. Stationary units must be permanently installed before operation.
- Modification of units and components supplied by REMKO is not permitted and can cause malfunctions.
- Units and components may not be operated in areas where there is an increased risk of damage. Observe the minimum clearances.
- The electrical supply is to be adapted to the requirements of the units.
- The operational safety of the units and components is only assured if they are fully assembled and used as intended. Safety devices may not be modified or bypassed.
- Do not operate units or components with obvious defects or signs of damage.
- All housing parts and openings in the unit, e.g. air intakes and outlets, must be free of foreign objects, fluids, or gases.
- The units and components must be kept an adequate distance from flammable, explosive, combustible, abrasive and dirty areas or atmospheres.
- Touching some parts of the unit can result in burns or other injuries.
- Installation, repair and maintenance work may be carried out only by authorised specialists. Visual inspections and cleaning can be performed by the operator as long as power is disconnected from the equipment.
- To preclude any danger from the unit, take appropriate hazard-prevention measures when performing installation, repair or maintenance work or cleaning the units.
- The units or components are not to be exposed to any mechanical stresses, extreme levels of humidity or direct sunlight.

Environmental protection and recycling

Disposing of packaging

All products are packed for transport in environmentally friendly materials. You can make a valuable contribution to reducing waste and sustaining raw materials by only disposing of packaging at approved collection points.

Disposing of the units and their components

Only recyclable materials are used in the manufacture of the units and components. Help protect the environment by ensuring that the units or components (for example batteries) are not disposed of in household waste, but only in accordance with local regulations and in an environmentally safe manner, e.g. using authorised disposal and recycling specialists or council collection points.

Warranty

The precondition for possible warranty claims is that the ordering party or their representative
fully complete the warranty registration card and commissioning report included with the unit, at the time when the equipment is purchased and commissioned, and return it to
REMKO GmbH & Co. KG.

The warranty conditions are listed in the "General terms and conditions". Furthermore, only the parties to a contract can strike special agreements beyond these conditions. For this reason, please contact your contract partner in the first instance.

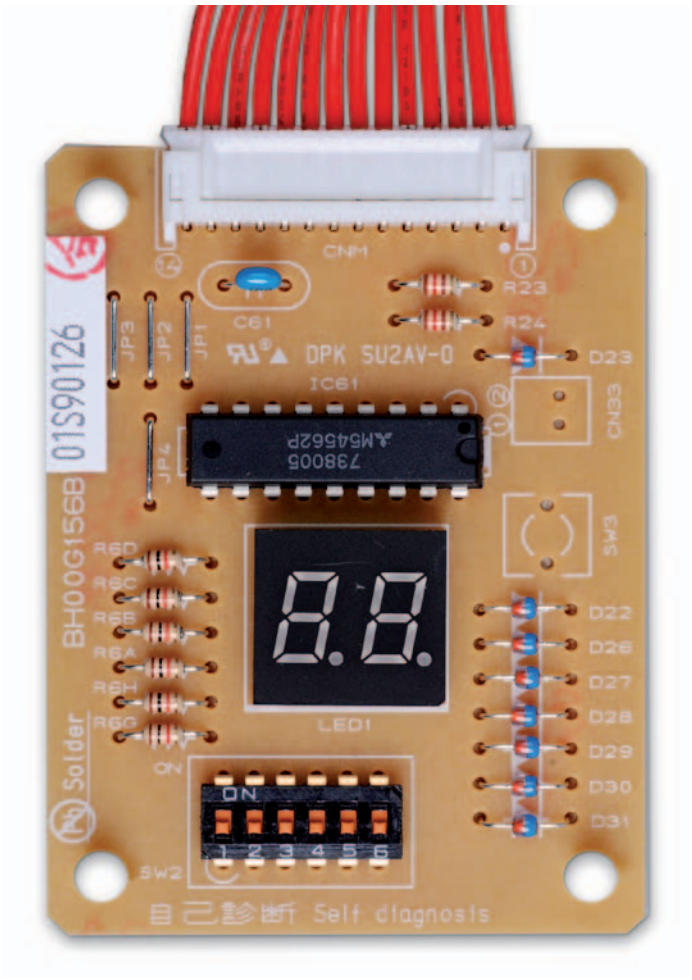
Transport and packaging

The equipment is delivered in sturdy transport packaging. Immediately check the equipment on delivery and make note of any damage or missing parts on the delivery note and inform the forwarding agent and your contractual partner.
No warranty can be assumed for later claims.

Description

With the REMKO SYSTEM MONITOR, REMKO is offering an external display unit for CMF/CMT outdoor units, which makes it both simple and convenient to query operating data from all system components. The REMKO SYSTEM MONITOR is equipped with a DIP switch (SW2) and a two-digit, seven-segment LED display. During fault-free normal operation this shows the operating status, and in the event of a fault shows details on which faults have occurred on the various system components. Using DIP switch SW2 on the REMKO SYSTEM MONITOR, is it possible to perform targeted diagnostics. To do so, it is necessary to connect the supplied cable to the CNM connector on the control board of the CMF/CMT outdoor unit. In the following pages, you will find the settings for SW2 and the associated normal value ranges of the system monitor.

SYSTEM MONITOR for REMKO SuperTec Inverter



The REMKO SYSTEM MONITOR offers you the option to monitor your system components electronically on the outdoor unit. You can query the operating data of all system components, enabling you to perform targeted troubleshooting, and quickly and easily resolve the cause of the fault. In the following text, this function is identified as the System Monitor, which offers targeted querying of temperatures, pressures, voltages, etc.

NOTE

DIP switch SW2 is located on the circuit board of the REMKO SYSTEM MONITOR

NOTE

The REMKO SYSTEM MONITOR is not included in the scope of delivery of the inverter heat pump, and must be ordered separately. The REMKO SYSTEM MONITOR can be used with all outdoor units in the CMF/CMT range.
You can find a detailed list of all the fault codes from page 18 onwards

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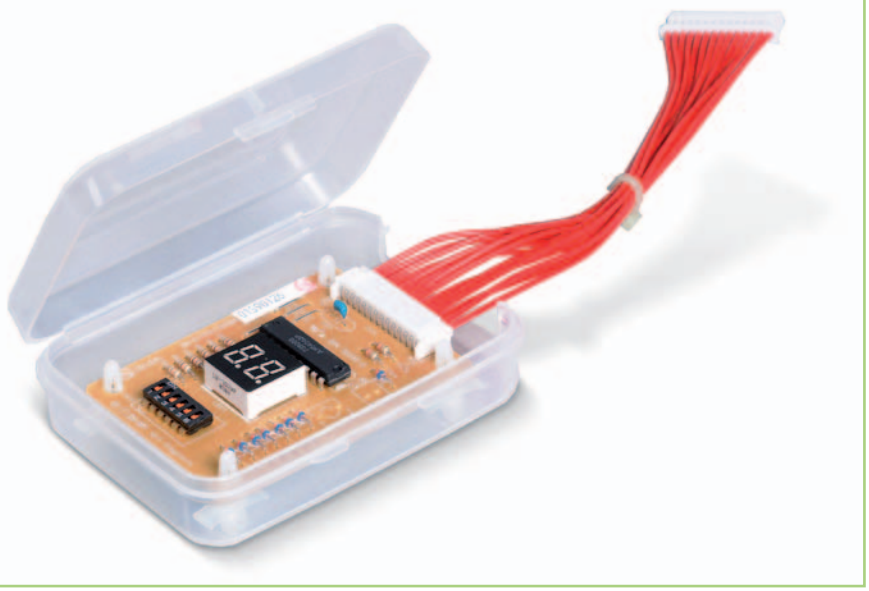
Decommissioning

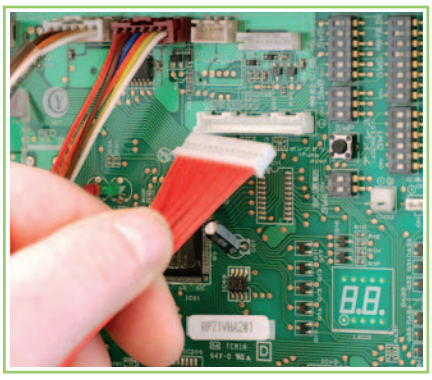
- Shut down the system using the heat pump manager.
- Switch off the power supply of the outdoor unit.
- Remove the supplied connector for the SYSTEM MONITOR from the CMN socket on the control board of the outdoor unit.
- Switch the power supply of the outdoor unit back on.
- Place the system back into service using the heat pump manager.

Operation

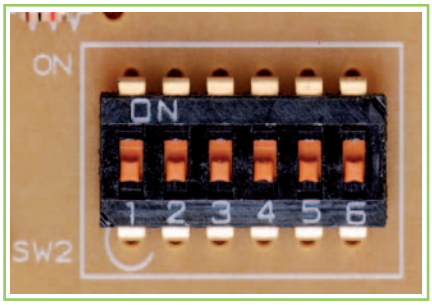
SYSTEM MONITOR for REMKO SuperTec Inverter



- Shut down the system using the heat pump manager.
- Switch off the power supply of the outdoor unit.
- Remove the right side panel. This is achieved by undoing three screws on the panel and then pulling off the panel in a downwards direction.
- Connect the SYSTEM MONITOR using the supplied connector to the CMN socket on the control board of the outdoor unit.



- Switch the power supply of the outdoor unit back on.
- Place the system back into service using the heat pump manager.
- DIP switch SW2 allows targeted diagnostics to be performed

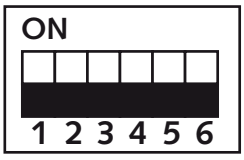


- From page 7 onwards, you can find a precise description of the associated normal value ranges of the System Monitor.
- In the event of a fault, you can find a precise fault description with cause and remedy under the "Fault codes" section.

DIP switch SW 2 during normal operation

- Switch off the power supply of the outdoor unit.
- To do so, set switches 1-6 of SW2 to their initial setting. All switches in the OFF position
- Remove the supplied connector for the SYSTEM MONITOR from the CMN socket on the control board of the outdoor unit.
- Switch the power supply of the outdoor unit back on.
- Place the system back into service using the heat pump manager.

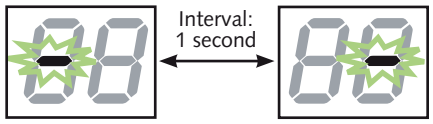
The initial setting of DIP switch SW2 in normal operation looks like this:



Seven-segment LED display

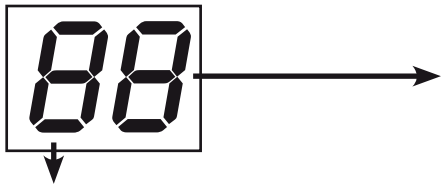
LEDs flash during normal operation

When the power supply is switched on , the LEDs flash while the air conditioning system is carrying out an internal system check. This lasts max. 4 minutes.



LED display lights up during normal operation

1. During fault-free normal operation, and with DIP switch SW2 1-6 set to OFF, the first digit of the LED shows the operating mode (Off, Cooling, Heating, Defrost) and the second digit shows the status of the condenser and solenoid valves.
   You can find detailed descrip tions in the following tables.
2. If a fault occurs (the condenser is switched off by the protective device) the fault code for the particular fault appears on the LED display. This fault code will remain on the display until the condenser is restarted.



First digit: operating mode

Display	Operating mode
O	OFF/Fan
C	Cooling/Drying
H	Heating
d	Defrost

Second digit: switching position of the control relay, relay output

Display	Preheating mode	Condenser	Four-way valve	Solenoid valve
0	-	-	-	-
1	-	-	-	ON
2	-	-	ON	-
3	-	-	ON	ON
4	-	ON	-	-
5	-	ON	-	ON
6	-	ON	ON	-
7	-	ON	ON	ON

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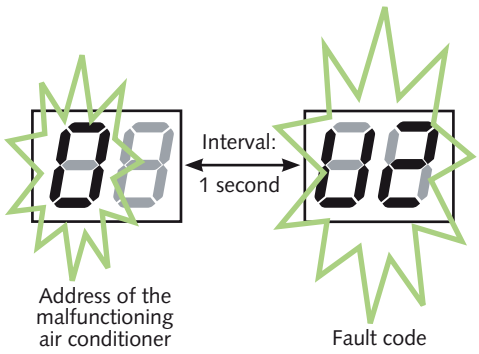
LED display flashes when a fault has occurred

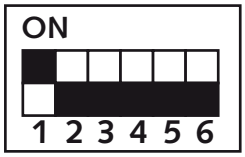
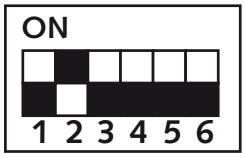
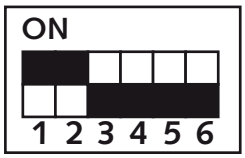
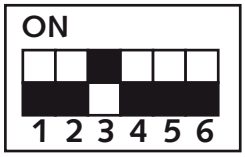
If the condenser is switched off by a protective device after a fault has occurred, the LED display alternates between showing the unit address of the air conditioner in question and the fault code.



Display	Description (during operation)
U1	Fault on the high pressure switch, 63H was triggered
U2	Hot gas temperature too high, lack of refrigerant
U3	Hot gas temperature sensor TH 4 detected open circuit /short-circuit
U4	Temperature sensor TH3, TH6, TH7, TH8 in outdoor unit detected open circuit/short-circuit
U5	Cooling fin temperature sensor detected open circuit/short-circuit
U6	Fault in the power module (inverter)
U7	Overheating fault; hot gas temperature too low
UF	Condenser stopped due to overcurrent (condenser disabled)
UH	Fault on the current sensor
UL	Fault on the low pressure switch, 62L was triggered
UP	Condenser stopped by overcurrent
A0-A7	Data transmission fault: priority signal on the M-net

Display	Description (during operation)
F3	Connector 63L (red) is disconnected
F5	Connector 63H (yellow) is disconnected
F9	Both connector 63L and 63H are disconnected
E8	Data transmission fault: outdoor unit is not receiving any signals from the indoor unit
E9	Data transmission fault: outdoor unit is not transmitting any signals to the indoor unit
EA	Wiring fault in the interior/exterior control cables: too many indoor units (max. 4)
Eb	Wiring fault in the interior/exterior control cables: polarity reversed, cable detached
Ec	Timeout on system startup
E0-E7	Data transmission fault: other without outdoor unit

Switch assignment of DIP switch SW2

Setting on SW2	System component	Measuring range and description	Unit
	Line temperature TH3 -40 – 90	-40 – +90 If the temperature sensor measures values below 0°C, the display switches between the sign, the value, and 2 spaces. Example: TH3 = -10°C: 0.5 s 0.5 s 2 s „- □“ ►„10“ ► „□□“	°C
	Hot gas temperature TH4 3 – 217	3 – 217 If the temperature sensor measures values above 99°C, the display switches between the 100s digit, 10s and 1s digits, and 2 spaces. Example: TH4 = 105°C: 0.5 s 0.5 s 2 s „□ 1“ ►„05“ ► „□□“	°C
	Fan speed (outdoor unit) 0 – 10	0 – 10	Levels / Steps
	Number of switch on/off procedures of the condenser 0 – 9999	0 – 9999 If the number is above 99, the display switches between the 100s digit, the 10s and 1s digits, and 2 spaces. Example: 42500 switching proc.: 425 × 100 0.5 s 0.5 s 2 s „□ 4“ ►„25“ ► „□□“	X 100

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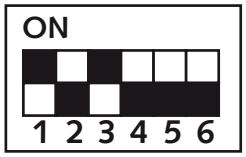
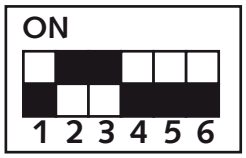
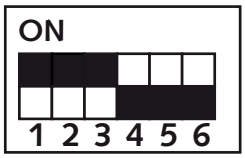
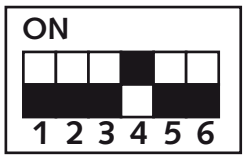
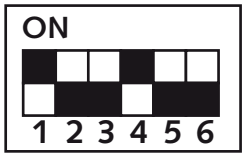
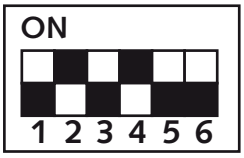
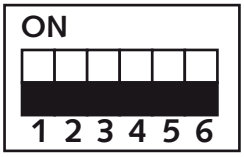
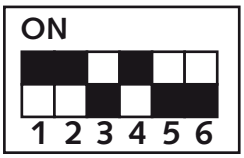
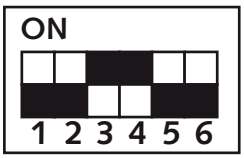
Setting on SW2	System component	Measuring range and description	Unit
	Condenser operating time 0 – 9999	0 – 9999 If the number is above 99, the display switches between the 100s digit, the 10s and 1s digits, and 2 spaces. Example: 245: 0.5 s 0.5 s 2 s „ □2“ ►„45“ ► „□□“	10 hrs
	Operating current of the condenser 0 – 50	0 – 50 (without decimal places)	A
	Condenser operating frequency 0 – 225	0 – 225 If the condenser operating frequency is over 99, the display switches between the 100s digit, 10s and 1s digits, and 2 spaces. Example: 125 Hz: 0.5 s 0.5 s 2 s „□ 1“ ►„25“ ► „□□“	Hz
	Opening width of the LEV-A 0 – 480	0 – 480 If the opening width of the LEV-A is over 99 impulses, the display switches between the 100s digit, the 10s and 1s digits, and 2 spaces. Example: 150 impulses: 0.5 s 0.5 s 2 s „□ 1“ ►„00“ ► „□□“	Impulses

Setting on SW2	System component	Measuring range and description	Unit
	New fault message on the outdoor unit (1) The last message in the fault list is deleted, and the remaining messages are moved down one.	Fault message "00" is not moved „00“ Flashing: fault message will be moved Constant: movement cancelled	Fault code
	Operating mode before fault stop	Code for operating mode before fault stop Fault code is displayed if all switches on DIP switch SW2 are in the OFF position. 	
	Line temperature TH3 before fault -40 – 90	-40 – +90 If the temperature sensor measures values below 0°C, the display switches between the sign, the value, and 2 spaces. Example: TH3 = -15°C: 0.5 s 0.5 s 2 s „-□ “ ►„15“ ► „□□“	°C
	Condenser or hot gas temperature TH4 before fault 3 – 217	3 – 217 If the temperature sensor measures values above 99°C, the display switches between the 100s digit, 10s and 1s digits, and 2 spaces. Example: TH4 = 130°C: 0.5 s 0.5 s 2 s „□ 1“ ►„30“ ► „□□“	°C

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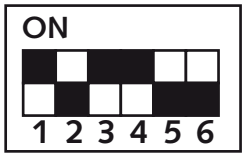
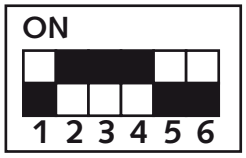
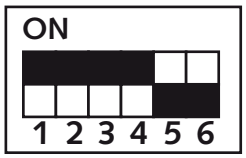
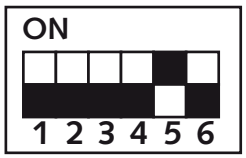
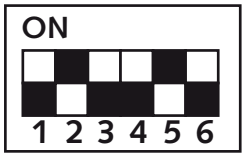
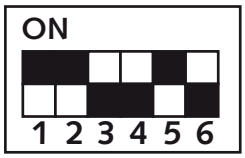
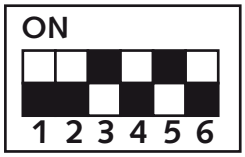
Setting on SW2	System component	Measuring range and description	Unit
	Operating current of the condenser before fault 0 – 20	0 – 20	A
	List of the latest faults (1) Alternating display of unit address and fault code	If there are no fault messages, the display switches between "00" and "– –"	Fault code
	List of older faults (2) Alternating display of unit address and fault code	If there are no fault messages, the display switches between "00" and "– –"	Fault code
	Duration of test operation 0 – 120	0 – 120 If the duration is over 99 min., the display switches between the 100s digit, the 10s and 1s digits, and 2 spaces. Example: 105 min.: 0.5 s 0.5 s 2 s „□ 1“ ►„05“ ► „□□“	Minutes

Setting on SW2	System component	Measuring range and description	Unit
	Unit output	Display takes the form of a capacity code Unit output: capacity code CMF80/90: 14 CMF 140/150: 25 CMT100: 14 CMT150: 25	Capacity code
	Settings on the outdoor unit	1s digit: (Defrosting mode) 0 = Standard 1 = For high humidity 10s digit (Operating mode) (Single/three-phased) 0 = Heat pump 0 = Single-phased 1 = Cooling unit 2 = Three-phased	
	Temperature sensor TH2 -39 – 88	-39 – +88 If the temperature sensor measures values below 0°C, the display switches between the sign and the value.	°C
	Vaporiser/condenser temperature sensor of the indoor unit TH5 -39 – 88	-39 – +88 If the temperature sensor measures values below 0°C, the display switches between the sign and the value.	°C

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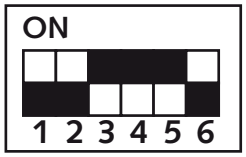
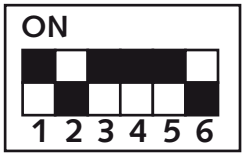
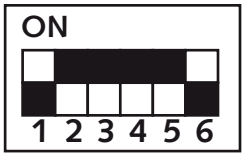
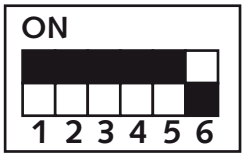
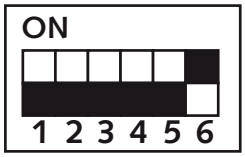
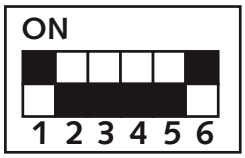
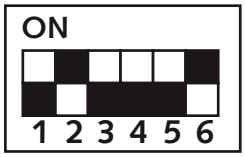
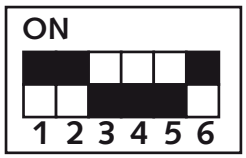
Setting on SW2	System component	Measuring range and description	Unit
	Heat exchanger temperature sensor on the outdoor unit (two-phase mixture) TH6 -39 – 88	-39 – +88 If the temperature sensor measures values below 0°C, the display switches between the sign and the value.	°C
	Outdoor temperature TH7 -39 – 88	-39 – +88 If the temperature sensor measures values below 0°C, the display switches between the sign and the value.	°C
	Cooling fin temperature sensor TH8 -40 – 200	-40 – +200 If the temperature sensor measures values below 0°C, the display switches between the sign and the value. If the temperature is over 99°C, the display switches between the 100s digit and the 10s and 1s digits.	°C
	Hot gas overheating temperature SHd 0 – 255 Cooling: TH4 - TH6 Heating: TH4 - TH5	0 – 255 If the temperature difference is over 99 K, the display switches between the 100s digit and the 10s and 1s digits.	K

Setting on SW2	System component	Measuring range and description	Unit
	Subcooler temperature SC 0 – 130 Cooling: TH6 - TH3 Heating: TH5 - TH4	0 – 130 If the temperature difference is over 99 K, the display switches between the 100s digit and the 10s and 1s digits.	K
	Operating current of the in-door unit 0 – 500	0 – 500 If the number is above 99, the display switches between the 100s digit and the 10s and 1s digits.	0.1A
	Opening width of the LEV B 0 – 480	0 – 480 If the opening width is over 99 impulses, the display switches between the 100s digit and the 10s and 1s digits.	Impulses
	Target operating frequency 0 – 255	0 – 255 If the operating frequency is over 99 Hz, the display switches between the 100s digit and the 10s and 1s digits.	Hz

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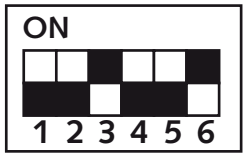
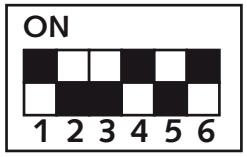
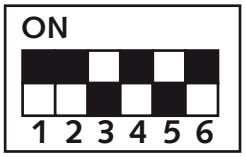
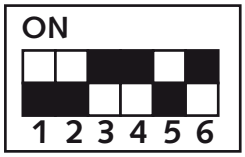
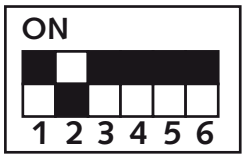
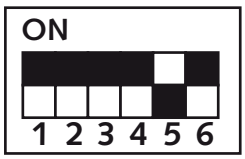
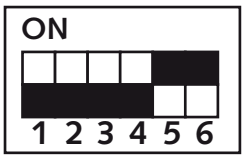
Setting on SW2	System component	Measuring range and description	Unit
	DC bus voltage CMF 80/90/140/150 CMT 100/150 180 - 370	180 – 370 If the voltage is over 99 V, the display switches between the 100s digit1 and the 10s and 1s digits.	°C
	Fault on the temperature sensor If no temperature sensor fault has occurred, "—" appears on the LED display.	3 = Liquid line on the outdoor unit TH3, TH32 6 = two-phase line (condenser/vaporiser) on the outdoor unit TH6 7 = Outdoor air temperature TH7 8 = Cooling fin temperature sensor TH8	Code
	Condenser operating frequency before fault 0 – 255	0 – 255 If the operating frequency is over 99 Hz, the display switches between the 100s digit, the 10s and 1s digits, and 2 spaces. Example: 125 Hz: 0.5 s 0.5 s 2 s „□1“ ►„25“ ► „□□“	Hz
	Fan speed before fault 0 – 10	0 – 10	Levels / Steps

Setting on SW2	System component	Measuring range and description	Unit
	Opening width of the LEV A before fault 0 – 480	0 – 480 If the opening width is over 99 impulses, the display switches between the 100s digit, the 10s and 1s digits, and 2 spaces. Example: 130 impulses: 0.5 s 0.5 s 2 s „□ 1“ ► „30“ ► „□□“	Impulses
	Line temperature of the outdoor unit TH33 before fault -39 – 88	-39 – +88 If the temperature sensor measures values below 0°C, the display switches between the sign and the value.	°C
	Vaporiser/condenser temperature sensor of the indoor unit TH5 before fault -39 – 88	-39 – +88 If the temperature sensor measures values below 0°C, the display switches between the sign, the value, and 2 spaces. Example: -15 °C: 0.5 s 0.5 s 2 s „-□ “ ► „15“ ► „□□“	°C
	Heat exchanger temperature sensor of the outdoor unit TH6 (two-phase mixture) before fault -39 – 88	-39 – +88 If the temperature sensor measures values below 0°C, the display switches between the sign, the value, and 2 spaces. Example: -15 °C: 0.5 s 0.5 s 2 s „-□ “ ►„15“ ► „□□“	°C

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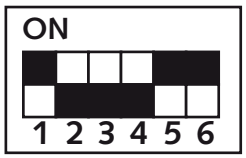
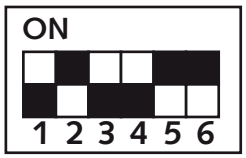
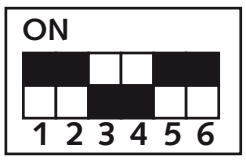
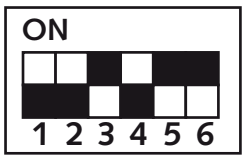
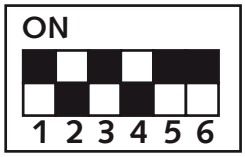
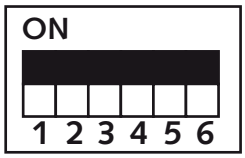
Setting on SW2	System component	Measuring range and description	Unit
	Outdoor temperature TH7 before fault -39 – 88	-39 – +88 If the temperature sensor measures values below 0°C, the display switches between the sign, the value, and 2 spaces. Example: -15 °C: 0.5 s 0.5 s 2 s „-□ “ ► „15“ ► „□□“	Impulses
	Cooling fin temperature sensor TH8 before fault -40 – 200	-40 – +200 If the temperature sensor measures values below 0°C, the display switches between the sign, the value, and 2 spaces. If the temperature sensor measures values over 99°C, the display switches between the 100s digit, the 10s and 1s digits, and 2 spaces.	°C
	Hot gas overheating temperature SHd before fault 0 – 255 Cooling: TH4 - TH6 Heating: TH4 - TH5	0 – 255 If the temperature difference is over 99 K, the display switches between the 100s digit, the 10s and 1s digits, and 2 spaces. Example: 150 K: 0.5 s 0.5 s 2 s „□1 “ ► „50“ ► „□□“	K
	Subcooler temperature SC before fault 0 – 130 Cooling: TH6 - TH3 Heating: TH5 - TH2	0 – 130 If the temperature difference is over 99 K, the display switches between the 100s digit, the 10s and 1s digits, and 2 spaces. Example: 115 K: 0.5 s 0.5 s 2 s „1 “ ► „15“ ► „□□“	K

Setting on SW2	System component	Measuring range and description	Unit
	Switch-on duration until fault 0 – 999	0 – 999 If the duration is over 99 min., the display switches between the 100s digit, the 10s and 1s digits, and 2 spaces. Example: 415 min.: 0.5 s 0.5 s 2 s „□4“ ►„15“ ► „□□“	Minutes
	U9: Fault status during the fault	00 No fault 01 Voltage too high (voltage board) 02 Voltage too low (control board) 04 L-phase fault (control board) 08 Operating signal fault (voltage board) 10 PFC fault -Overvoltage -Undervoltage -Overcurrent (voltage board) 20 PFC/ACTM fault -Undervoltage (check wiring from CNAF, ACTM defective Examples of multiple faults: 03 Overvoltage (01) and undervoltage (02) 0A Under voltage (02) and operating signal fault (08) 14 L-phase fault (04) and PFC fault (10)	Code

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Fault codes

Please note the following when a fault message is issued:

In the event of a communication error, the information from the LED indicators of the outdoor unit and that on the display of the REMKO SYSTEM MONITOR may differ, or the outdoor unit may not show a fault at all.
If a fault occurs, you can determine its cause from the following tables.

⚠ CAUTION

When a fault occurs, the fault code is issued on the outdoor unit using flashing codes on two LEDs

Fault code display			Description
LED 1 (green)	LED 2 (red)	Display	
Flashes once	Flashes once	F1	Phase fault detected Phase fault, wiring fault between indoor/outdoor unit
		F2	Phase fault detected Open L3-phase detected
	Flashes twice	F3	Connector 63L open No contact detected from 63L for 3 min.
		F4	Connector 49C open No contact detected from 49C for 3 min.
		F5	Connector 63H open No contact detected from 63H for 3 min.
		F9	Two or more connectors open At least two open connector contacts detected
	Flashes 3 times	FA	L2-phase or connector 51CM open No L2-phase or no contact detected from 51CM for 3 min.
		F7	Fault on the phase fault detection circuit (control board) No signal detected on control board
		F8	Fault with the system circuitry No feedback signal received from the indoor unit 0.5 sec. after applying the supply voltage
Flashes twice	Flashes once	EA	Wiring fault between indoor and outdoor unit
		Eb	Wiring fault between indoor and outdoor unit (cable break, loose connection)
	Flashes twice	E8	Data transfer between indoor and outdoor unit
		E9	
	Flashes 4 times	Fb	Fault on the control board in the indoor unit

Fault code display			Description
LED 1 (green)	LED 2 (red)	Display	
Flashes 3 times	Flashes once	U2	Hot gas temperature sensor Internal thermostat of compressor motor 49C was triggered. Refrigerant level
		U7	Hot gas overheating too low
	Flashes twice	U1 UE	High pressure switch 63H was triggered
		UL	Low pressure switch 63L was triggered
	Flashes 3 times	Ud	Overheating protection function
	Flashes 4 times	U6	Circuit breaker on the condenser (overload) Fault in the power module
		UA	Circuit breaker on the condenser (thermal overload relay) Thermal overload relay is triggered Only for models with a three-phase power supply
		UC	Condenser switched off by internal protection function
		UF	Condenser blocked, overcurrent protection device was triggered
		UP	Overload protection device was triggered
		UH	Fault on the current sensor
	Flashes 5 times	U3	Fault on the hot gas temperature sensor TH4
		U4	Fault on the line temperature sensor of the outdoor unit TH3 Fault on the heat exchanger temperature sensor of the outdoor unit TH6 Fault on the outdoor air temperature sensor of the outdoor unit TH7 Fault on the inverter cooling block temperature sensor TH8
	Flashes 6 times	U5	Temperature fault on inverter cooling block
	Flashes 7 times	U6	Fault in power supply

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Fault code	Meaning	Cause	Remedial measures
No display and no function	–	No supply voltage is present at terminal block TB1. The main switch connected upstream is turned off. Poor or detached contacts at the terminals. Open phase (L, L1 or N)	Check main switch. Check connection, wiring, phases and contacts at TB1 and correct
		There is no voltage at the input of the power supply on the voltage board. Poor or detached contacts at the terminals. Open phase on the voltage board. Connector unplugged: CMF80/90/-CMT100: R or S CMF140/150-CMT150: TABT or TABS	Check connection, wiring, phases and contacts at TB1 and correct. Check connection, wiring, phases and contacts at the connectors on the voltage board and correct.
		No voltage is supplied to the control board. Poor or detached contacts on the CNDC connector or connector unplugged.	Check contacts on the CNDC connector on the control board and repair. Contacts on connectors LD1, LD2 CNDC on the voltage board Check interference filter and repair.
		Poor or detached contacts on the DCL or ACL transformer.	Check contacts on the DCL transformer and repair. wwLO and LO on the interference board R and S on the voltage board Check contacts of L1 and L2 on the active filter module ACTM and repair.
		Poor or detached contacts on the interference board or components of the interference board defective.	Check contacts on the interference board and repair. Replace defective interference board.
		Voltage board defective.	Replace defective voltage board.
		Control board on the outdoor unit a) 6.3 A fuse blown. b) Defective components	Replace 6.3 A fuse Replace defective control board if the above points have not proved to be of assistance.
		Control board on the outdoor unit defective.	Replace defective control board if the above points have not proved to be of assistance.

Fault code	Meaning	Cause	Remedial measures
F1	Phases reversed, power supply, polarity reversed on connection and control cables to the indoor unit 1. Three seconds after switching on the power supply, a phase fault is detected. 2. Four minutes after switching on the power supply, reverse polarities are detected on the supply and control cables.	Control cables to S1, S2, S3 reversed (TB4), note polarity. Phases L1, L2, L3 reversed (TB1), note polarity. Cables reversed at the terminals for supply voltage TB1 and control cables TB4.	Check connection and polarity at the terminals. Swap phases L1 and L2 at TB1. Check wiring and correct.
F2	L3-phase open If a phase fault is detected on L3 two seconds after switching on the power supply, fault message "F2" is issued	Open phase on L3.	Check wiring and correct.
F3	Low pressure switch 63L If the circuit of low pressure switch 63L does not report a contact for over 3 mins after applying the supply voltage, fault message "F3" is issued	Poor or detached contacts on the 63L connector on the control board of the outdoor unit, or connector unplugged. Poor or detached contacts on 63L. 63L was triggered due to a lack of refrigerant or by defective components. Control board defective.	Check contacts on the 63L connector on the control board and repair. Check contacts and cable on 63L and repair. Check refrigerant level. Test electrical components. Replace defective components. Replace defective control board.
F5	High pressure switch 63H If the circuit of high pressure switch 63H reports a contact for over 3 mins after applying the supply voltage, fault message "F5" is issued.	Poor or detached contacts on the 63H connector on the control board of the outdoor unit, or connector unplugged. Poor or detached contacts on 63H. 63L was triggered due to defective components. Control board defective.	Check contacts on the 63H connector on the control board and repair. Check contacts and cable on 63H and repair. Test electrical components. Replace defective components. Replace defective control board.
F7	Phase fault on the control board. If no signal is being generated by the phase measuring circuit three seconds after switching on the power supply, fault message "F7" is issued.	Control board defective.	Replace defective control board.

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Fault code	Meaning	Cause	Remedial measures
F9	High and low pressure switches 63H, 63L Thermal relay 51CM If the circuits of the identified components report a contact for over 3 mins after applying the supply voltage, fault message "F9" is issued.	Poor or detached contacts on the connectors on the control board of the outdoor unit, or connectors unplugged. Poor or detached contacts on other components. Components were triggered by defective components. Control board defective.	Check contacts on the connectors on the control board and repair. Check contacts and cables of the components and repair. Test electrical components. Replace defective components. Replace defective control board.
FA	Thermal relay 51CM If the circuits of the thermal relay 51CM report a contact for over 3 mins after applying the supply voltage, fault message "FA" is issued.	Poor or detached contacts on connector 51CM on the control board of the outdoor unit, or connector unplugged. Poor or detached contacts on thermal relay 51CM. Thermal relay 51CM was triggered due to defective components. Control board defective.	Check contacts on connector 51CM on the control board and repair. Check contacts and cable on 51CM and repair. Test electrical components. Replace defective components. Replace defective control board.
EA	Control cables between indoor and outdoor units defective, too many indoor units connected A test circuit will automatically detect the number of indoor units connected. If the control cables continue not to work for longer than 4 mins after the power supply is applied, fault message "EA" is issued.	Poor or detached contacts on the connections of the control cables, or wiring fault. Incorrectly dimensioned control cables. Interference noise in the control cables.	Check contacts, cables and connections of the control cables on all units and repair. Check cable section and lengths of the control cables and correct: max. length 50 m (indoor-outdoor) or max. 30 m (indoor-indoor) Check polarity of control cables S1, S2 and S3 and correct. Switch the supply voltage off and back on once and check if the fault still occurs. Replace the control boards of the affected indoor and outdoor units if the fault does still occur. Check control cables. Check control cables and rectify the cause of the interference noise. These remedial measures apply to "EA", "Eb" and "EC".
Eb	Wiring fault on the control cables between the indoor units and outdoor unit (phases reversed, no contact) A test circuit will automatically set the number of indoor units connected. If the control cables continue not to work for longer than 4 mins after the power supply is applied, fault message "Eb" is issued.	Poor or detached contacts on the connections of the control cables, or wiring fault Incorrectly dimensioned control cables. Interference noise in the control cables. Voltage board on the outdoor unit defective	
EC	Time limit for start of operation exceeded The system has still not been properly initialised over four mins after the start of operation. The fault message "EC" is issued.	Poor or detached contacts on the connections of the control cables, or wiring fault. Incorrectly dimensioned control cables. Interference noise in the control cables.	

Fault code	Meaning	Cause	Remedial measures
U1	High pressure too high (63H was triggered) The high pressure switch 63H was triggered because the high pressure exceeded 4.14 MPa during continuous condenser operation.	Dirt on the heat exchanger in the indoor module. Pump motor in the indoor unit jammed. Malfunction of the pump motor in the indoor module. Faulty ball shut-off valve (not fully open). Blocked or cracked refrigerant line. Fan motor on the outdoor unit jammed. Malfunction of the fan motor on the outdoor unit. Air "short-circuit" on the outdoor unit. Dirt on the heat exchanger of the outdoor unit. Reduced airflow volume due to inaccurate temperature measurement on the outdoor air temperature sensor (measurement too low). Defective contact of connector 63H to the control board of the outdoor unit. Faulty connection of 63H. Control board of the outdoor unit defective. Faulty LEV Defective fan drive Too much refrigerant in the system	Check components and rectify cause of the fault. Check that all ball shut-off valves are fully open. Check pipework and rectify fault. Check outdoor unit and replace/ repair defective components. Check the temperature sensor with the help of the system monitor and proceed accordingly in order to rectify the fault. Switch supply voltage off and back on again once. Check if fault codes "F5" or "UH" are displayed. If so, see "Remedial measures" for "F5" or "UH". Check LEV. Replace defective control board of the outdoor unit. Correct refrigerant level
U2	Hot gas temperature too high At hot gas temperature sensor TH4, over 125°C was detected or over 110°C for a period of 5 minutes. In defrost mode, over 40°C was detected at TH5 and over 110°C at hot gas temperature sensor TH4. Continued on the next page	Rise in temperature in the condenser due to lack of refrigerant. Defective temperature sensor TH4, TH5, TH6. Control board of the outdoor unit defective. Faulty LEV.	Check inlet overheating. Check pipework, refrigerant level and additional fill amount. Switch supply voltage off and back on again once. Check if fault code "U3" is then displayed. If so, see "Remedial measures" for "U3". Check LEV.

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Fault code	Meaning	Cause	Remedial measures
U2	Refrigerant level Incorrect if the hot gas overheating in cooling mode TH4–TH5 / in heating mode TH4–TH6 rises as follows. All conditions must be fulfilled for a period of 10 mins (at least 6 mins after the condenser starts up)! The condenser is working in heating mode. The hot gas overheating is 70°C or more. TH6 > TH7 – 5K TH5 < 35°C The condenser is working (C/H). In cooling mode the hot gas overheating is 80°C or more. In heating mode the hot gas overheating is 90°C or more. In cooling mode the condensation temperature is TH6 < –40°C	Rise in temperature in the condenser due to lack of refrigerant. Defective temperature sensor TH4, TH5, TH6. Control board of the outdoor unit defective. Faulty LEV.	Check inlet overheating. Check pipework, refrigerant level and additional fill amount. Switch supply voltage off and back on again once. Check if fault code "U3" is then displayed. If so, see "Remedial measures" for "U3". Check LEV.
U3	Open circuit/short-circuit on the hot gas temperature sensor TH4 or condenser temperature sensor TH32 If no resistance (0°C = 0 Ω) or infinite resistance (>217°C = ∞ Ω) is measured on the hot gas temperature sensor TH4 when the condenser is operational, fault message "U3" is issued (this function is not available in the first 5 to 10 mins after the condenser begins operation, after the conclusion of defrost mode or while defrost mode is operational.)	Poor or detached contacts of the cables and connectors on the control board. Temperature sensor defective. Control board of the outdoor unit defective.	Check connectors and contacts of the temperature sensor on the control board and repair. Check connection cables of the temperature sensor for cable break or similar. Check the temperature sensor with the help of the system monitor and proceed accordingly in order to rectify the fault. Replace defective control board of the outdoor unit.

Fault code	Meaning	Cause	Remedial measures
U4	Open circuit/short-circuit on the temperature sensors of the outdoor unit (TH3, TH32, TH33, TH6, TH7 and TH8). If no resistance (0 Ω) or infinite resistance (∞ Ω) is measured by one of the temperature sensors when the condenser is operational, fault message "U4" is issued. With the help of the system monitor on the outdoor unit, you can detect which temperature sensor is affected (this function is not available in the first 10 mins after the condenser begins operation, after the conclusion of defrost mode or while defrost mode is operational.)	Poor or detached contacts of the cables and connectors of one or more of the temperature sensors on the control board. Temperature sensor defective. Control board of the outdoor unit defective.	Check connectors and contacts of the temperature sensors on the control board and repair. Check connection cables of the temperature sensors for cable break or similar. Check the temperature sensor with the help of the system monitor and proceed accordingly in order to rectify the fault. Replace defective control board of the outdoor unit

Name	Description	Open(XX),at	Short-circuit (0X), at
TH3, TH32, TH33	Cable temperature sensor	-40°C and lower	90°C and higher
TH6	Two-phase mixture	-40°C and lower	90°C and higher
TH7	Outdoor air	-40°C and lower	90°C and higher
TH8	Inverter cooling block	-27°C and lower	102°C and higher

U5	Temperature fault on inverter cooling block If the temperature at TH8 on the inverter cooling block reaches or exceeds the value specified below, fault message "U5" is issued. CMF80/90: 77°C CMT100: 77°C CMF140/150: 95°C CMT150: 95°C	Fan motor jammed. Fault on the fan motor. Air inlets and outlets dirty/ blocked. Increase in outside air temperature. Temperature sensor defective. Input circuits (supply voltage) on the voltage board of the outdoor unit defective. Drive circuit of the outdoor unit fan defective.	Check fan motor. Check air inlets and outlets and clean. Check whether other weather-related causes are responsible for the rise in temperature. Upper temperature limit 46°C. Switch the supply voltage off and back on. Check if fault "U5" is issued again within the next half hour. If "U4" is issued, rather than "U5", you can find the descriptions under "U4". Measure the resistance of the temperature sensor TH8 or use the system monitor to query the temperature at TH8. Replace defective temperature sensor. Replace defective voltage board on the outdoor unit.

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Fault code	Meaning	Cause	Remedial measures
U6	Power modules in the inverter circuit defective. If overcurrent is detected in the inverter circuit ("UF" or "UP" is displayed), the inverter circuit is defective and fault message "U6" is issued.	Faulty ball shut-off valve (not fully open). Increase in supply voltage. Poor or detached contacts of the connection cables to the condenser or reversed phases. Condenser defective. Voltage board defective.	Check and fully open all ball shut-off valves. Check supply voltage (mains). Check condenser wiring and correct (phases U, V, W). Check condenser, replace condenser if defective Replace defective voltage board on the outdoor unit.
U7	Overheating interrupted by too low hot gas temperature If the overheating is around -15 K for over 3 mins, the LEV is almost closed (lowest impulse rate) and 10 mins have passed since the condenser was started up, fault message "U7" is issued.	Poor or detached contacts of the cables and connectors of the hot gas temperature sensor TH4 on the control board. Hot gas temperature sensor TH4 not properly secured. Poor or detached contacts of the cables and connectors on the LEV drive. Poor or detached contacts of the LEV cables on the control board. LEV defective.	Check contacts, cables and connections of the temperature sensor TH4 and repair. Secure temperature sensor TH4 properly. Check contacts, cables and connections of the LEV drive and repair. Check LEV and replace.
U8	Speed fault on the fan motor. The speed of the fan motor is determined to be faulty if: at an outdoor temperature above 20 °C for a duration of 15 s, a maximum of only 100 rpm is measured. for a duration of one minute, less than 50 rpm or over 1500 rpm is measured.	Fan motor defective. Control board defective.	Check fan motor and replace defective motor. Check control board and replace defective circuit board

Fault code	Meaning	Cause	Remedial measures
U9	Overvoltage or undervoltage in the inverter and fault in the serial communication of the circuit boards. Drop of the bus voltage below 310 V Sudden drop of the bus voltage below 200 V (CMF80/90 CMT100) below 350 V (CMF140/150 CMT150) Rise of bus voltage above 420 V (CMF80/90 CMT140) above 760 V (CMF140/150 CMT 150) Drop in the power consumption of the outdoor unit to just 0.5 A with an operating frequency of 40 Hz or condenser current of 5.0 A.	Rise in the supply voltage (mains). Wiring detached from the condenser. Contactor 52C defective. Connector CN52C detached or unplugged. PFC module on the voltage board of the outdoor unit (CMF80/90CMT100) defective ACT module defective. ACT circuit defective. Connector CNAF detached or unplugged. Converter circuit on outdoor unit (CMF140/150CMT150) defective 52C circuit on the control board (CMF80/90CMT100) defective Connector CN5 on the voltage board detached or unplugged 52C circuit on the voltage board (CMF140/150CMT150) defective Connector CN5 on the voltage board detached or unplugged	Check supply voltage at the mains. Check wiring to the condenser and voltage board and correct. Replace defective 52C. Check fit and wiring of CN52C and correct. Replace control board. Replace ACT module. Replace voltage board. Check fit and wiring of CNAF and correct. Replace converter board. Replace control board. Check fit and wiring of CN5 and correct. Replace voltage board. Check fit and wiring of CN2 and correct.
UA	Thermal relay 51C was triggered. If thermal relay 51C is triggered, fault message "UA" is issued.	Shut-off valves closed during operation. Fault on the condenser. Variations in the supply voltage (mains). Brief interruption to the supply voltage (mains).	Shut-off valve fully open. Check condenser and if necessary replace. Check supply voltage (mains).
Ud	Overheating protection (overload protection, fan motor fault) If the line temperature (TH3) exceeds 70°C, fault message "Ud" is issued.	In cooling mode: fan motor defective, air "short-circuit". Temperature sensor TH3 defective. Control board defective.	Check fan motor, replace if defective. Switch supply voltage off and back on to check if "U4" will be displayed when the system starts back up. If "U4" is displayed, see "U4". Check temperature sensor, replace if defective. Check control board, replace if defective.

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Fault code	Meaning	Cause	Remedial measures
UE	High pressure fault, 63H was triggered The high pressure protective switch detected 4.14 MPa in heating mode for the first time within the first 20 s after condenser startup, and switched the condenser off. Fault message "UE" is issued.	Shut-off valves closed during operation. Connector 63H detached or unplugged. Control board defective. Power supply was switched back on, air filters on indoor unit are dirty, overload operation. Control board defective LEV defective	Shut-off valve fully open. Switch supply voltage off and back on to check if "F5" will be displayed when the system starts back up. If "F5" is displayed, see "F5". Replace defective control board. Check LEV.
UF	Protective device to protect against overcurrent on the condenser: condenser blocked If the operating current of the condenser exceeds 1.2 times the permissible value, fault message "UF" is issued. If overcurrent is detected on the DC bus or in the condenser 30 s after condenser startup, fault message "UF" is issued.	Shut-off valves closed. Rise in the supply voltage (mains). Connector detached or unplugged, cable break, phases reversed. Condenser defective. Voltage board defective Phase fault on the condenser	Open shut-off valves. Check supply voltage at the mains. Check wiring and phases (U, V, W) on the condenser and voltage board, correct and replace defective components. Check condenser, replace defective condenser. Replace voltage board. Check wiring on the condenser and correct.
UH	Fault on the current sensor. If a current between -1.5 A and +1.5 A is detected on the current sensor while the condenser is running, fault message "UH" is issued. This fault is ignored during test runs.	Poor or detached contacts of the connection cables to the condenser or reversed phases. Circuit (current sensor) on the voltage board of the outdoor unit defective.	Check condenser wiring and correct (phases U, V, W). Replace defective voltage board on the outdoor unit.

Fault code	Meaning	Cause	Remedial measures
UL	Low pressure fault (63L was triggered). If one of the two following conditions are met in heating mode for a duration of 3 mins within the first 10 mins after condenser startup, fault message "UL" is issued (this fault is ignored if the total operating time of the condenser since it was started has reached or exceeded a sum of 30 mins.) TH7 – TH3 ≤ 4 K TH5 – room temp. ≤ 2K Meaning the following: TH3: liquid line temperature in the outdoor unit in °C. TH5: vaporiser/condenser temperature in the indoor unit in °C. TH7: Outdoor air temperature in °C	Shut-off valves closed. Lack of refrigerant or leakage. LEV defective.	Open shut-off valves Check refrigerant level and additional fill amount. Check pipe system for leaks and rectify. Check LEV.
UP	Overcurrent in the condenser – protective device was triggered. If, 30 seconds after condenser startup, the protective device has been triggered due to DC overcurrent, fault message "UP" is issued.	Ball shut-off valve closed during operation. Rise in the supply voltage (mains). Poor or detached contacts of the connection cables to the condenser or reversed phases. Blower or fan defective. Air "short circuit" on outdoor unit. Input circuit (voltage) on the control board of the outdoor module defective. Condenser defective. Inverter board defective. Incorrect DIP switch settings on the control board of the outdoor unit.	Check and fully open all ball shut-off valves. Check supply voltage (mains). Check condenser wiring and correct (phases U, V, W). Check blower and/or fan. Rectify air "short-circuit". Replace defective circuit boards. Check condenser and replace if defective.* Replace defective circuit boards. Check DIP switch and correct settings.

* Before replacing the condenser, check that the voltage and frequency applied between phases U-V, V-W and W-U is the same.

To do so, disconnect the condenser and start the test run. Measure the voltage. If the same voltage and frequency is applied between the phases, the condenser is defective and must be replaced.

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