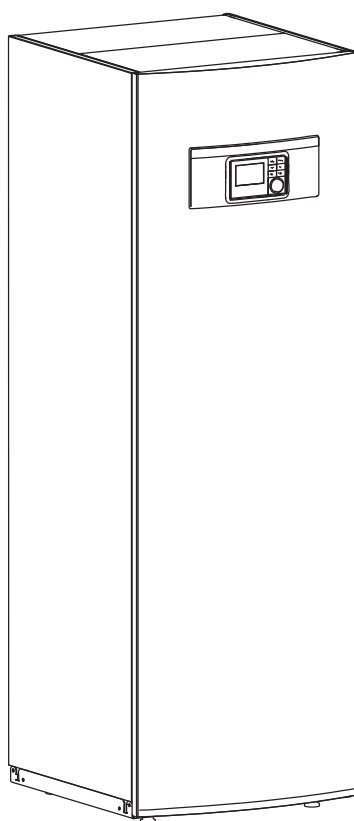


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# IVT Geo 312 C

## Bosch Compress 7000 12 LWM



## ***Service Manual***

2016-06-14

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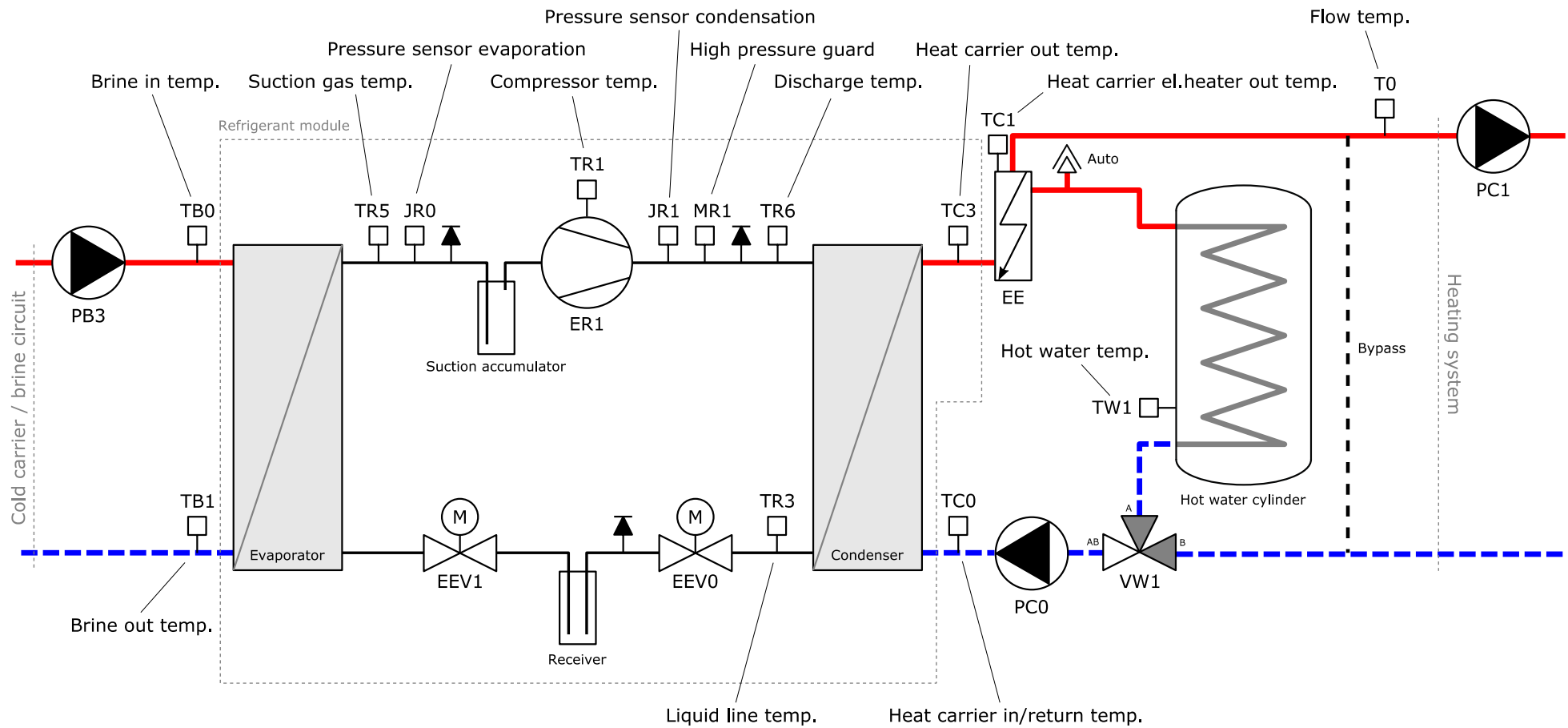
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# 1 About the Service Manual

The service manual is subject to continuous updates and is therefore not distributed in printed form. When important changes are made, a new version will be sent out to a number of selected individuals representing each market. If you think you should be in the distribution list, please send us an e-mail at [service.tthp@se.bosch.com](mailto:service.tthp@se.bosch.com).

## 2 System Overview

### 2.1 Principle Sketch



## 2.2 Sensors

A few different temperature sensors are used in the heat pump, adapted for best accuracy in different temperature ranges. Note that the hot water sensor for IVT and Bosch have different characteristics.

Sensor	Function	Sensor type	Part number	Part name
T0	Flow	NTC, Rn at 40°C	8733703181	Temperature sensor 200 mm, 10 kOhm
T1	Outdoor (IVT)	NTC, Rn at 0°C	87183114600	Temperature sensor
T1	Outdoor (Bosch)	NTC, Rn at 0°C	8738203521	Outside temperature sensor 4,7K
TB0	Brine in	NTC, Rn at 0°C	8733703183	Temperature sensor 200mm, 4,7 kOhm
TB1	Brine out	NTC, Rn at 0°C	8733703183	Temperature sensor 200mm, 4,7 kOhm
TC0	Heat carrier in/return	NTC, Rn at 40°C	8733703181	Temperature sensor 200 mm, 10 kOhm
TC1	Heat carrier, el. heater out	NTC, Rn at 40°C	8733703181	Temperature sensor 200 mm, 10 kOhm
TC3	Heat carrier out/flow	NTC, Rn at 40°C	8733703181	Temperature sensor 200 mm, 10 kOhm
TR1	Compressor	NTC, Rn at 40°C	8733703182	Temperature sensor 200 mm, 20kOhm
TR3	Liquid line	NTC, Rn at 40°C	8733703181	Temperature sensor 200 mm, 10 kOhm
TR5	Suction gas	NTC, Rn at 0°C	8733703183	Temperature sensor 200mm, 4,7 kOhm
TR6	Discharge temp.	NTC, Rn at 80°C	8733703182	Temperature sensor 200 mm, 20kOhm
TW1	Hot water (IVT)	NTC, Rn at 40°C	8738206065	Temperature sensor NTC 1000mm R40 molex
TW1	Hot water (Bosch)	NTC, Rn at 60°C	8738206175	DHW Sensor Bosch/Junkers 1000mm

**Rn@0°C, R<sub>25</sub>=4,7kΩ**

Temp. [°C]	Resistance [Ohm]
-40	154300
-35	111700
-30	81700
-25	60400
-20	45100
-15	33950
-10	25800
-5	19770
0	15280
5	11900
10	9330
15	7370
20	5870
25	4700
30	3890
35	3070
40	2510
45	2055
50	1696
55	1405
60	1170
65	980
70	824
75	696
80	590
85	503
90	430

**Rn@40°C, R<sub>25</sub>=10kΩ**

Temp. [°C]	Resistance [Ohm]
20	12488
25	10001
30	8060
35	6536
40	5331
45	4372
50	3605
55	2989
60	2490
65	2084
70	1753
75	1480
80	1256
85	1070
90	915

**Rn@60°C, R<sub>25</sub>=12kΩ**

Temp. [°C]	Resistance [Ohm]
20	14768
25	11977
30	9783
35	8045
40	6650
45	5521
50	4606
55	3855
60	3242
65	2744
70	2332
75	1989
80	1703
85	1463
90	1262

**Rn@80°C, R<sub>25</sub>=20kΩ**

Temp. [°C]	Resistance [Ohm]
-20	198500
-15	148600
-10	112400
-5	85790
0	66050
5	51220
10	40040
15	31540
20	25030
25	20000
30	16090
35	13030
40	10610
45	8697
50	6899
55	5937
60	4943
65	4137
70	3478
75	2938
80	2492
85	2123
90	1816
95	1559
100	1344
105	1162
110	1009
115	879

## 3 Troubleshooting

### 3.1 Alarm List

Alarm code	Display level	Alarm text	Alarm definition	Possible cause	Action
1001/A2x	Customer	No communication betw. system controller and remote control	Room sensor will display error code A21/A22/A23/A24 depending on which heating circuit it controls. The Room sensor has first been installed successfully. Then the EMS bus signal has gone absent from the parent controller (display HMC300/HPC400).	Poor EMS connection between display and installer module.	Check both ends of EMS cabling between the boards.
1010	Customer	No communication via EMS BUS connection	The local device hasn't received its EMS token from the EMS bus master for a certain amount of time.	Break/disruption in EMS connection.	Check that accessories for the EMS bus (room control, mixing module, etc.) are properly connected.
				Interference on the EMS bus.	Check that the EMS bus (GND) is not in contact with the chassis. On some appliances it has happened that the 3,5 mm tele female connector attached to the BBT port of the inst.module [terminal 23,24,25] is in contact with the chassis. Then interference can enter the EMS bus via ground. Insulate the connector.
1051	Customer	No communication with external room temp. sensor module	The module for external room temperature sensor has not been developed. The alarm is triggered if the installer still selects this module to control a heating circuit.	Incorrect setting in software. Service menu >> Set heating/cooling >> Heating circ. 1 >> Ext. room temp. sensor, shall always be set to No.	The correct setting is made in Service menu >> Set heating/cooling >> Heating circ. 1 >> Programming unit = RC100/CR10. See room sensors' installer guide for more information.
1052	Customer	No communication with external room temp. sensor module	The module for external room temperature sensor has not been developed. The alarm is triggered if the installer still selects this module to control a heating circuit.	Incorrect setting in software. Service menu >> Set heating/cooling >> Heating circ. 2 >> Ext. room temp. sensor, shall always be set to No.	The correct setting is made in Service menu >> Set heating/cooling >> Heating circ. 2 >> Programming unit = RC100/CR10. See room sensors' installer guide for more information.

1053	Customer	No communication with external room temp. sensor module	The module for external room temperature sensor has not been developed. The alarm is triggered if the installer still selects this module to control a heating circuit.	Incorrect setting in software. Service menu >> Set heating/cooling >> Heating circ. 3 >> Ext. room temp. sensor, shall always be set to No.	The correct setting is made in Service menu >> Set heating/cooling >> Heating circ. 3 >> Programming unit = RC100/CR10. See room sensors' installer guide for more information.
1054	Customer	No communication with external room temp. sensor module	The module for external room temperature sensor has not been developed. The alarm is triggered if the installer still selects this module to control a heating circuit.	Incorrect setting in software. Service menu >> Set heating/cooling >> Heating circ. 4 >> Ext. room temp. sensor, shall always be set to No.	The correct setting is made in Service menu >> Set heating/cooling >> Heating circ. 4 >> Programming unit = RC100/CR10. See room sensors' installer guide for more information.
1081	Customer	Two master prog units in the system.	The room sensor for heating circuit 1 has been incorrectly configured as a controller ("CO"/"SC").	The display unit in the indoor unit is always the controller in the system, and more than one is not allowed.	Configure the room sensor for remote control "Fb". See room sensors' installation guide for more information.
1082	Customer	Two master prog units in the system.	The room sensor for heating circuit 2 has been incorrectly configured as a controller ("CO"/"SC").	The display unit in the indoor unit is always the controller in the system, and more than one is not allowed.	Configure the room sensor for remote control "Fb". See room sensors' installation guide for more information.
1083	Customer	Two master prog units in the system.	The room sensor for heating circuit 3 has been incorrectly configured as a controller ("CO"/"SC").	The display unit in the indoor unit is always the controller in the system, and more than one is not allowed.	Configure the room sensor for remote control "Fb". See room sensors' installation guide for more information.
1084	Customer	Two master prog units in the system.	The room sensor for heating circuit 4 has been incorrectly configured as a controller ("CO"/"SC").	The display unit in the indoor unit is always the controller in the system, and more than one is not allowed.	Configure the room sensor for remote control "Fb". See room sensors' installation guide for more information.
3061	Customer	No communication with mixer module	A mixing module has previously been installed for heating circuit 1 and now the installer module is unable to communicate with the rooms sensor over the EMS bus.	Poor connection or improperly installed EMS cable between installer module and mixing module.	Check EMS cabling.
3062	Customer	No communication with mixer module	A mixing module has previously been installed for heating circuit 2 and now the installer module is unable to communicate with the rooms sensor over the EMS bus.	Poor connection or improperly installed EMS cable between installer module and mixing module.	Check EMS cabling.
3063	Customer	No communication with mixer module	A mixing module has previously been installed for heating circuit 3 and now the installer module is unable to communicate with the rooms sensor over the EMS bus.	Poor connection or improperly installed EMS cable between installer module and mixing module.	Check EMS cabling.

3064	Customer	No communication with mixer module	A mixing module has previously been installed for heating circuit 4 and now the installer module is unable to communicate with the rooms sensor over the EMS bus.	Poor connection or improperly installed EMS cable between installer module and mixing module.	Check EMS cabling.
3071	Customer	No communication with remote control	A room sensor has previously been installed for heating circuit 1 and now the installer module is unable to communicate with the rooms sensor over the EMS bus.	Poor connection or improperly installed EMS cable between installer module and room sensor.	Check EMS cabling.
3072	Customer	No communication with remote control	A room sensor has previously been installed for heating circuit 2 and now the installer module is unable to communicate with the rooms sensor over the EMS bus.	Poor connection or improperly installed EMS cable between installer module and room sensor.	Check EMS cabling.
3073	Customer	No communication with remote control	A room sensor has previously been installed for heating circuit 3 and now the installer module is unable to communicate with the rooms sensor over the EMS bus.	Poor connection or improperly installed EMS cable between installer module and room sensor.	Check EMS cabling.
3074	Customer	No communication with remote control	A room sensor has previously been installed for heating circuit 4 and now the installer module is unable to communicate with the rooms sensor over the EMS bus.	Poor connection or improperly installed EMS cable between installer module and room sensor.	Check EMS cabling.
3091/A61	Customer	Room temperature sensor faulty	The thermistor inside the room sensor for heating circuit 1 is defective. EMS communication is working.	Broken room sensor.	The room sensor must be replaced.
3092/A62	Customer	Room temperature sensor faulty	The thermistor inside the room sensor for heating circuit 2 is defective. EMS communication is working.	Broken room sensor.	The room sensor must be replaced.
3093/A63	Customer	Room temperature sensor faulty	The thermistor inside the room sensor for heating circuit 3 is defective. EMS communication is working.	Broken room sensor.	The room sensor must be replaced.
3094/A64	Customer	Room temperature sensor faulty	The thermistor inside the room sensor for heating circuit 4 is defective. EMS communication is working.	Broken room sensor.	The room sensor must be replaced.



5201	Installer	Warning Outside temp. sensor T1 open circuit	Warning if the resistance of the outdoor sensor T1 > 179 kOhm (corresponding to a temperature < -50°C).	Outdoor sensor T1 has not been installed.	Install outdoor sensor.
				Break on signal cable between installer module and sensor.	Check signal cable and connection to installer module.
5202	Installer	Warning Outdoor temp. sensor T1 short circuit	Warning if the resistance of the outdoor sensor T1 < 824 Ohm (corresponding to a temperature > 70°C).	Outdoor sensor T1/signal cable shorted.	Check signal cable.
5203	Customer	Alarm Outside temperature sensor T1 fault	Alarm if 3 warnings are registered withing 3 hours, or if the circuit for outdoor sensor T1 is continuously shorted/broken for 30 minutes.	See possible causes for the warnings 5201 and 5202.	See possible actions for the warnings 5201 and 5202.
				Outdoor sensor T1 value is out of range (> 179 kOhm or < 824 Ohm).	Measure the resistance of the temperature sensor. If the value is out of range the signal cable may have a break or short. Replace signal cable or sensor T1 if necessary.
				Defective installer module.	If sensor T1 measures the correct value, and the same warning (5201/5202) remains when the sensor is connected, replace the installer module.
5204	Installer	Warning Z1 Flow temperature sensor T0 open circuit	Warning if the resistance of flow sensor T0 > 30 kOhm (<0°C).	Break on signal cable between installer module and sensor.	Check signal cable and screw terminal on installer module.
5205	Installer	Warning Z1 Flow temperature sensor T0 short circuit	Warning if the resistance of flow sensor T0 < 500 Ohm (>110°C).	Flow sensor T0/signal cable shorted.	Check signal cable.
5206	Customer	Alarm Z1 Flow temperature sensor T0 failure	Alarm if 3 warnings are registered withing 3 hours, or if the circuit for flow sensor T0 is continuously shorted/broken for 30 minutes.	See possible causes for the warnings 5204 and 5205.	Se possible actions for the warnings 5204 and 5205.
				Flow sensor T0 value is out of range (> 30 kOhm or < 500 Ohm).	Measure the resistance of the temperature sensor. If the value is out of range the signal cable may have a break or short. Replace signal cable or sensor T0 if necessary.
				Defective installer module.	If sensor T0 measures the correct value, and the same warning (5204/5205) remains when the sensor is connected, replace the installer module.

5207	Installer	Warning Temperature sensor TC1 open circuit	Warning if open circuit (>179 kOhm) on sensor TC1 after 3 registered errors within 2 hours.	Screw terminal on installer module not properly tightened.	Check screw terminal for TC1.
				Heat carrier outlet sensor TC1/signal cable open circuit.	With TC1 disconnected from installer module, compare measured Ohm value with sensor table in documentation. Replace sensor if necessary.
				Defective installer module.	Replace installer module.
5208	Installer	Warning Temperature sensor TC1 short circuit	Warning short circuit (<3900 Ohm) on sensor TC1, if 3 registered errors within 2 hours.	Heat carrier outlet sensor TC1/signal cable shorted.	With TC1 disconnected from installer module, compare measured Ohm value with sensor table in documentation. Repair sensor cable or replace sensor if necessary.
				Defective installer module.	Replace installer module.
5209	Customer	Alarm Temperature sensor TC1 fault	Alarm after 3 errors within 3 hours, or 15 minutes of continuously broken/shorted circuit for sensor TC1.	See possible causes for alarm code 5207, 5208.	See actions for alarm codes 5207, 5209.
5213	Installer	Warning Z1 Inlet temp. sensor TC0 open circuit	Warning if the resistance of heat carrier return-sensor TC0 > 30 kOhm (<0°C).	Screw terminal in installer module, for heat carrier return sensor TC1, not properly tightened.	Check screw terminal for TC1.
				Heat carrier return sensor TC0/signal cable broken.	With sensor disconnected from the installer board, measure the Ohm value and compare it to table value in documentation. Repair cable or replace sensor if necessary.
				Defective installer module.	Replace installer module.
5214	Installer	Warning Z1 Inlet temp. sensor TC0 short circuit	Warning if the resistance of heat carrier return-sensor TC0 < 500 Ohm (>110°C).	Heat carrier return sensor TC0/signal cable shorted.	With sensor TC0 disconnected from the installer board, measure the resistance and compare it to sensor table in documentation. Replace sensor if necessary.
				Defective installer board.	Replace installer board.
5215	Customer	Alarm Z1 Inlet temperature sensor TC0 fault	Alarm if 3 warnings are registered within 3 hours, or if the circuit for sensor TC0 is continuously broken/shorted for 15 minutes.	See possible causes for alarm codes 5213, 5214.	See possible actions for alarm codes 5213, 5214.

5234	Installer	Warning Pool temp. sensor TP1 open circuit	Warning for interruption of the circuit (>179 kOhm) on sensor TP1, after 3 faults within 2 hours.	Pool temperature sensor TP1/signal cable interruption.	Measure resistance of sensor TP1/signal cable, and compare value to sensor table in documentation. TP1 needs to be disconnected from the I/O module during measurement. Repair cable or replace sensor if necessary.
				Screw terminal for sensor TP1 is not properly tightened.	Tighten screws.
				Defective I/O module.	Replace I/O module.
5235	Installer	Warning Pool temp. sensor TP1 short circuit	Warning if circuit for pool temperature sensor TP1 is shorted. Warning is triggered if three detected faults within 2 hours.	Pool temperature sensor TP1/signal cable shorted.	Measure resistance of sensor TP1/signal cable, and compare value to sensor table in documentation. TP1 needs to be disconnected from the I/O module during measurement. Repair cable or replace sensor if necessary.
				Defective I/O module.	Replace I/O module.
5236	Customer	Alarm Pool temperature sensor TP1 fault	Alarm if 3 errors within 3 hours, or if circuit for pool temperature sensor TP1 is broken/shorted continuously for 15 minutes.	See possible causes for codes 5234, 5235.	See trouble-shooting advice for codes 5234, 5235.
5237	Installer	Warning DHW temp. sensor TW1 open circuit	Warning if the resistance for hot water sensor TW1 > 30 kOhm (<0°C). [IVT] Warning if the resistance for hot water sensor TW1 > 36 kOhm (<0°C). [Bosch]	Screw terminal for TW1 on installer module not properly tightened.	Check screw terminal.
				Sensor TW1 or signal cable is broken.	With the sensor disconnected from the installer board, measure and compare the resistance to sensor table in documentation. Repair cable or replace sensor if necessary.
				Defective installer board.	Replace installer board.
5239	Customer	Alarm DHW temp. sens. TW1 fault	Alarm is triggered if 3 warnings have been registered within 3 hours, or if the circuit for sensor TW1 is continuously broken/shorted for 15 minutes.	See possible causes for warning codes 5237 and 5238.	See possible actions for warning codes 5237 and 5238.

5246	Customer	Alarm Z1 Electr.boost.heater E2 high li. saf. cut-out or press.reg. triggered	The alarm circuit has two guards connected in series: The overheating protector for the electrical heater is triggered. The pressure guard MC1 for the heating system is triggered due to pressure < 0,5 bar. Either of these two can cause the alarm.	Low system pressure. Air in the heating system.	De-air heating system according to instruction in the installer guide. Refill heating system.
				Clogged filterball SC1 on return pipe.	Clean filter ball SC1.
				Bad circulation in the heating carrier/heating system.	Check adjustment valves/thermostats for heating system.
				Fuse F1 is broken.	Replace fuse F1.
				Defective system pressure guard MC1.	Replace system pressure guard.
				Defective overheating protector.	Verify breaking temperature (96°C) for the overheating protector.
				Defective installer module, PWM signal for the circulation pump missing.	Disconnect PWM signal from terminal 40,41 on installer module. The speed of the circulation pump should increase to 100%.
				Fuse F50 on installer module is broken.	Replace fuse F50.
				230 V supply missing on installer module.	Ensure that supply voltage is 230 V on installer module.
				Defective installer module.	Replace installer module.
				Defective circulation pump.	Replace circulation pump.
Contact for electrical heater has got jammed in closed (active) position.	Check / replace contactor.				
5252	Installer	Warning Z1 Restr. in flow rate btw. outdoor and ind. unit (check strainer)	Warning when the heat carrier delta >13K in heating mode, or >7K in cooling mode.	Bad circulation in the heating carrier/heating system.	Check adjustment valves/thermostats for heating system.

5265	Installer	Warning Z1 PCB disconnected	Bad connection or interference on CANbus between heat pump and indoor unit.	Bad CANbus connections on installer board (indoor unit) or I/O board (outdoor unit).	Check CANbus connections on installer board and I/O board.
				Open circuit/break on CANbus cable between indoor and outdoor unit.	Replace CANbus cable.
				Incorrect type of CANbus cable. Read printed documentation for further info.	Change to proper type of cable.
				CANbus cable is placed together with power supply to heat pump. Interference can be generated by electromagnetic induction.	Separate CANbus and power supply by at least 100 mm.
				Incorrect earthing of CANbus cable.	Remove/connect cable shield to/from earth.
5266	Customer	Alarm Z1 PCB disconnected	Alarm after 3 warnings within 3 hours, or continuous disruption in 15 minutes.	See possible causes for warning 5265.	See actions for alarm 5265.
5269	Customer	Alarm Z1 Additional electric heater EE too high temperature	Alarm when sensor TC1>87°C. The alarm is automatically acknowledged/reset when TC1<80°C.	Dirt in filter ball SC1 on return line.	Clear system filter/filter ball SC1.
				Poor circulation in heat transfer system/heating system.	Check adjustment valves/thermostats for heating system. Ensure adequate flow.
				Defective TC1 sensor.	With TC1 disconnected from the installer module, compare its measured value to sensor table in documentation. Replace sensor TC1 if necessary.
5271	Customer	Alarm Heating circuit 1 high flow temperature	Alarm when sensor T0 > "Max. flow temperature" set point value + 5 degrees, for 10 seconds. The alarm is blocked for 5 minutes after a DHW cycle.	Defective T0 sensor.	With sensor disconnected from the installer board, compare sensor resistans to table values for T0 found in the documentation.
				Low flow in heating system.	Clean filter ball on return pipe. Check adjustment valves and thermostats for the heating system.
				The system is in heating mode but the diverter valve has not switched over to DHW.	Check that 230 V is available on terminal 53 (VW1) during DHW mode. If 230 V during DHW mode, replace the motor/cable for the diverter valve. If voltage is missing during DHW mode, replace the installer module.

5272	Customer	Alarm External heater EM is not operational	Alarm for external additional heater/overheating protector. Alarm is triggered if 230 V is detected on terminal 64 on installer module.	See possible causes for alarm 5246.	See actions for alarm 5246.
				Tripped fuse at distribution box.	Replace/reset fuses at distribution box.
5273	Customer	Alarm Z1 Phase monitoring	Alarm if phase is missing. Only applicable for 3-phase models. 1-phase: If L1 is missing the indoor unit shuts down. If L3 is missing the heat pump shuts down.	Tripped fuse in indoor unit (tower).	Reset fuse in indoor unit.
				Phase/phases missing on terminals for supply voltage in heat pump.	Check that all phases are properly connected and that each one carries voltage.
				Phase/phases missing on terminals for supply voltage on EMI filter in the inverter.	Check that all phases are available on terminals for EMI filter.
				If voltage is present on all phases connected to the EMI filter, and alarm remains, the inverter is broken.	Replace inverter.
5275	Customer	Alarm Electric anode is out of order	Alarm if voltage > 1 V DC on terminal 45, 46 on installer module, for longer than 6 hours.	LED on electrical anode board is lit red.	Check connection/cable on terminal X2, and electrical anode rod in cylinder.
				Check that the LED is lit green on the electrical anode board.	If LED is lit green, check that voltage exceeds 1 V DC on terminal 45, 46 on installer module.
				If voltage > 1V DC on terminal 45,46, the installer module is defective.	Replace installer module.
				Green LED on electrical anode board is not turned on.	Ensure that 230V is available on terminal X1 on electrical anode board.
				If 230 V is available on terminal X1 If green LED on electrical anode board is turned off, the board is broken.	Replace electrical anode board.
5276	Customer	Alarm Z1 Pressure in brine circuit too low	Alarm if the circuit for pressure guard, external input I1-I2-I3-I4, is broken.	Pressure is below chosen limit.	Check the pressure of cold carrier.

5284	Installer	Warning Last thermal disinfection failed	The domestic hot water temperature, sensor TW1, has not reached 65°C within 180 minutes.	Water is continuously tapped from the cylinder.	Stop such continuous usage or change (prolong) the time for thermal disinfection.
				The electrical heaters output power is set too low in relation to hot water volume.	If the fuse requires the heater to run at limited power, you may need to allow a longer time for thermal disinfection. The time can be adjusted under [Service menu >> DHW >> Max. time].
				Hot water sensor is misplaced, or have come loose from the cylinder.	Put the hot water sensor in the correct position.
				Air in the heating coil.	De-air the heating coil.
				If using hot water circulation, too big losses from the pipes.	Make sure that circulation pipes are properly insulated.
				Incorrect reading from temperature sensor TW1.	With sensor disconnected from the installer module, measure its resistance and compare it to table value in documentation. Replace if necessary.
				Incorrectly connected pipes to hot water system.	Fix any pipe connection issues.
5285	Installer	Warning Risk of frost in heat. sys.	Varning om T0 (framledning), TC3 (värmebärare ut) eller TC0 (värmebärare retur) < 5°C i 10 minuter. När varningen triggas startar tillgängliga värmekällor och alla shuntventiler öppnar för att värma systemet. Återställning sker när ovan nämnda givare > 25°C.	Defective sensor.	Check the different sensors and compare Ohm-values to table values in documentation. Replace sensor if sensor if necessary.
				Supply voltage (230 V) is missing for circulation pump PC0.	Check that 230V is available on terminal PC0 (51, N) on the installation module. If not, also check that the fuse on the installation module is OK.
				PWM signal for circulation pump PC0 is missing.	Disconnect PWM signal from terminal 40,41 on the installation module. The speed of the circulation pump shall increase to max. If this does not happen, replace the circulation pump.
				Defective installation module (does not provide 230V for PC0 despite the fuse being OK, or that the PWM-signal is not working).	Replace installation module.

5298	Installer	Warning Z1 High pressure alarm JR1	Warning if JR1 > 67°C (Pe=44 bar).	Dirt in system filter/filterball valve SC1.	Clean the filter.
				Poor circulation in heat transfer system/heating system.	Ensure sufficient flow.
				Air in heat transfer system/heating system.	Vent the heating system in accordance with instructions in installation manual. Fill up with water.
				Defective sensor TC3, TC0 or T0.	With sensors disconnected from installer module, measure the resistance of the sensors. Read out values from sensor table in documentation and compare them to actual temperatures. Replace any defective sensor.
				Diverter valve VW1 does not shift from hot water production to heating.	Check VW1 position. A=hot water, B=heating system.
				Defective installer module, bad control signal for diverter valve.	Check that terminal 53 on installer module provides 230V in hot water mode only.
				Defective installer module, PWM signal missing for circulation pump PC0.	Disconnect the PWM signal from terminal 40, 41 on the installer module. The speed of the pump should increase to 100%. If not, replace the circulation pump.
				Defective installer module, supply voltage, 230 V, missing from circulation pump PC0.	Measure voltage on terminal 51-N. If no voltage, replace installer module.
5299	Customer	Alarm Z1 High pressure alarm JR1	Alarm if JR1 > 67°C (Pe=44 bar) 3 times within 2 hours.	See possible causes for warning 5298.	See actions for warning 5298.
5302	Installer	Warning Z1 Too high temperature on compressor driver	Internal high temperature protection in inverter. Warning is triggered if temperature exceeds 80°C.	Poor heat transfer to cooling coil.	Check screw mountings for cooling coil.
5203	Customer	Alarm Z1 Temperature too high on compressor control system	Internal high temperature protection in inverter. Alarm if 3 warnings (code 5302) are triggered within 3 hours, or if the temperature continuously exceeds 80°C for 30 minutes.	See warning 5302.	See warning 5302.
				Defective inverter.	Replace inverter.



5310	Installer	Warning Z1 Too high discharge gas temperature	Warning if hot gas temperature TR6 > maximum temperature (90 or 115°C) for more than 60 seconds.	Suction gas overheating too high. The suction gas overheating is calculated through TR5 - JR0, and controls the position of the electronic expansion valve. Therefore correct readings from these sensors are important.	Compare read value from sensor TR5 with value of external thermometer. Connect manometer to refrigerant circuit and measure low pressure. Compare evaporating temperature value to read value from JR0.
				If neither JR0 or TR5 are bad, a possible cause could be that the electronic expansion valve is not regulating properly.	Use magnet to manually change position of the EEV during operation. This to ensure that the valve has not seized.
5311	Customer	Alarm Z1 Too high discharge gas temperature	Alarm after 3 warnings within 3 hours (TR6 > 90 or 115°C), or if warning is continuously active for more than 30 minutes.	See possible causes for warning 5310.	See possible actions for warning 5310.
5314	Installer	Warning Z1 Disch. gas temp. sensor TR6 open circuit	Broken circuit (> 364 kOhm) for sensor TR6.	Broken circuit for discharge gas temperature sensor TR6.	Check resistance of sensor TR6 and signal cable and compare to table value in documentation. Measurement is done with sensor disconnected from I/O-module. Replace sensor if necessary.
				Defective I/O module.	If signal cable is intact and the resistance of sensor TR6 is correct in relation to temperature, replace I/O module.
5315	Installer	Warning Z1 Disch. gas temp. sensor TR6 short circuit	Shorted circuit (< 350 kOhm) for sensor TR6, for more than 1 minute.	Discharge gas temperature sensor TR6 or signal cable is shorted.	Check resistance of sensor TR6 and signal cable and compare to table value in documentation. Measurement is done with sensor disconnected from I/O module. Repair cable or replace sensor if necessary.
				Defective I/O module.	Replace I/O module.
5316	Customer	Alarm Z1 Discharge gas temp. sensor TR6 fault	Alarm if any of the warnings 5314 or 5315 has been triggered 3 times within 2 hours, or if any of the warnings have been active for more than 15 minutes.	See possible causes for warning codes 5314, 5315.	See actions for warning codes 5314, 5315.

5320	Installer	Warning Temperature sensor TC3 open circuit	Broken circuit (> 390 kOhm) for sensor TC3 (heat carrier out).	Broken sensor TC3/signal cable.	With sensor disconnected from I/O module, measure resistance of sensor/signal cable and compare to table values in documentation.
				Connector not properly seated in I/O module.	Check connector.
				Broken sensor TC3/signal cable.	Replace sensor TC3.
				Defective I/O module.	Replace I/O module.
5321	Installer	Warning Temperature sensor TC3 short circuit	Shorted circuit (< 350 kOhm) for sensor TC3 (heat carrier out).	Sensor TC3/signal cable is shorted.	With sensor disconnected from I/O module, measure the resistance of sensor and signal cable. Compare to table values in documentation. Repair signal cable or replace sensor.
				Defective I/O module.	Replace I/O module.
5322	Customer	Alarm Temperature sensor TC3 fault	Alarm if any of the warning codes 5320 and 5321 are registered 3 times within 3 hours, or if TC3 circuit is continuously broken/shorted for 15 minutes.	See possible causes for warning codes 5320, 5321.	See actions for warning codes 5320, 5321.
5330	Installer	Warning Z1 Communication fault to compressor driver	Warning if more than 20% of data sent to the inverter returns with errors (bad reply or no reply).	Supply voltage missing in outdoor unit.	Check 230/400 V connections in both indoor and outdoor unit.
				Interference on MODbus.	Check MODbus cable/connection terminals between I/O module and inverter.
				Incorrect CANbus connection between indoor and outdoor unit.	Check connections and cable routing. A 100 mm gap between supply voltage cables and CANbus cables are needed to avoid interference.

5331	Customer	Alarm Z1 Communication fault to compressor control system	Alarm if communication is missing, or more than 30% of data sent to inverter returns with errors (incorrect reply or no reply at all).	Supply voltage missing in outdoor unit.	Check 230V/400V connections in IDU and ODU.
				Incorrect program selection (P-selector on I/O-module (outdoor unit). The meaning of P=4 and P=6 have become mixed up in some manuals.	Compare P-selection with setting defined in manual. The following information is correct. P=4: HP 13 kW 3N~ P=6: HP 13 kW 1N~
				Interference on MODbus.	Check MODbus cable/connection terminals between I/O module and inverter.
				Improper routing of CANbus cable between indoor and outdoor unit.	Check cabling and routing. CANbus should be separated from supply voltage cables by at least 100 mm, to avoid interference.
				Defective I/O module.	Check that 12V DC is available on MODbus terminal (31, 34) on I/O module. If 12V DC missing, replace I/O module.
				Defective inverter.	Replace inverter.
5347	Installer	Warning Z1 Undervoltage at power supply	Warning if incoming AC voltage to inverter < 165 V during 10 s, or if voltage < 180 V during 0.5 s. Warning is automatically reset after 2 minutes if incoming AC voltage > 190 V.	Bad connection in mains voltage to either indoor or outdoor unit.	Check supply voltage.
				Low incoming mains voltage to indoor or outdoor unit.	If repeated warnings, contact the electricity supplier.
				Low incoming mains voltage to installer module.	If repeated warnings, contact the electricity supplier.
5350	Installer	Warning Z1 Driving failure on compressor	Warning compressor motor (synchronous motor) not synchronous after 5 failed start attempts.	Bad cabling connection between inverter and compressor.	Check cabling/connections between inverter and compressor.
				Oil/liquid in compressor during start attempt.	Bad reading from compressor sensor TR1.
				Bad temperature reading from compressor sensor TR1.	Compare value of TR1 with value measured by external thermometer.
				Improper setting of rotary encoders on the I/O module.	Check that the A- and P-selectors (rotary encoders) are set according to the wiring diagram. It's a good idea to double-check these settings if the I/O module has previously been replaced.
5351	Customer	Alarm Z1 Driving failure on compressor	Alarm if 3 warnings are registered within 3 hours, or if the warning is active for 30 minutes. The alarm is automatically reset after 4 minutes if the condition is no longer fulfilled.	See possible causes for warning code 5350.	See possible actions for warning code 5350.

5354	Installer	Warning Z1 Overcurrent on the compressor	Warning if the inverter registers an overcurrent >42 A DC to compressor, for more than 20 microseconds. Warning is automatically reset after 4 minutes if the condition is not fulfilled.	Broken/shorted cabling between the inverter and compressor.	Check cabling between inverter and compressor.
5355	Customer	Alarm Z1 Overcurrent on the compressor	Alarm after if 3 warnings are registered within 3 hours, or if the warning is active for 30 minutes.	See possible causes for warning code 5354.	See possible actions for warning code 5354.
				Defective inverter.	Replace inverter.
				Electrical fault in compressor.	Measure the resistance between windings and earth. If resistance < 10 kOhm, replace the compressor.
5362	Customer	Info Z1 overvoltage	Info if supply voltage to heat pump >400 V for more than 30 seconds. Automatically reset after 4 minutes if voltage drops below 380 V.	Too high incoming voltage to heat pump.	Check main fuses with regard to poor contact.
				Too high incoming mains voltage.	If repeated warnings, contact the electricity supplier.
5366	Installer	Warning Z1 Low superheat of refrigerant	Warning if suction gas overheating < 2 degrees and the discharge gas overheating < 20 degrees.	Motor not correctly mounted on electronic expansion valve.	Check motor.
				Check that the electronic expansion valves open/close in the correct order.	Activate test outdoor unit.
				Defective expansion valve motor.	Measure the resistance between the gray cable and orange, red, yellow and black cables. 46 kOhm = OK. If broken or shorted circuit, replace motor.
				Expansion valve VR1 opens too much/gets stuck in open position.	If repeated warnings, replace the expansion valve.
5367	Customer	Alarm Z1 Superheat of refrigerant too low	Alarm if 3 warnings are registered within 3 hours, or if the warning is active for 30 minutes.	See possible causes for warning code 5366.	See possible actions for warning code 5366.

5374	Installer	Warning Z1 Risk of frost in condenser	Warning if TC3 < 5°C. Warning is automatically reset when TC3 and TC1 > 7°C.	Insufficient or no circulation in heat transfer system/heating system.	Check adjustment valves/radiator thermostats.
				Dirt in system filter/filterball valve SC1.	Clean the filter.
				Air in heat transfer system/heating system.	De-air the heating system in accordance with instructions in installation manual. Fill up with water.
				Defective TC3 sensor (heat carrier out).	Compare sensor reading in display to actual temperature. Replace sensor if necessary.
				Defective installer module, PWM-signal for circulation pump PC0 missing.	Disconnect PWM signal from terminal 36,37 on I/O module. The speed of the the circulation pump should increase to 100%.
				Defective I/O module, 230 V supply missing for circulation pump.	Check that 230 V is available on terminal 51,N on installer module.
				Defective installer module.	Replace installer module.
				Defective circulation pump.	Replace circulation pump.
5375	Customer	Alarm Z1 Risk of frost in condenser	Alarm if 3 warnings are registered within 3 hours, or if the warning is active for 30 minutes.	See possible causes for warning code 5374.	See possible actions for warning code 5374.
5387	Customer	Alarm Z1 PFC compressor driver overheat	Warning if internal temperature sensor in the inverter's PFC module > 80°C for 10 seconds.	Poor heat transfer to cooling coil.	Check screw mountings for cooling coil.
				If repeated alarms, the inverter is likely defective.	Replace inverter.
5394	Installer	Warning Z1 Internal compressor driver fault 1	Warning if inverter registers over-current > 42 A DC to compressor, for more than 20 microseconds. Warning is automatically reset after 4 minutes if condition is no longer fulfilled.	Break/interruption or short-circuit in cabling between inverter and compressor.	Check cabling between inverter and compressor.

5395	Customer	Alarm Z1 Internal compressor driver fault 1	Alarm if 3 warnings (code 5394) are registered within 3 hours, or if the warning is continuously active for 30 minutes.	See possible causes for warning code 5394.	See possible actions for warning code 5394.
				Incorrect setting on rotary encoder/selector P on the heat pump's I/O module. The meaning of P=4 and P=6 has been accidentally swapped in some manuals.	Compare P-selection with setting defined in manual. The following information is correct. P=4: HP 13 kW 3N~ P=6: HP 13 kW 1N~
				Electrical fault in compressor.	Measure the resistance between the compressor windings and earth. If resistance < 10 kOhm, replace the compressor.
				Defective inverter.	Replace inverter.
5414	Installer	Warning Z1 Condensate sensor heating mode TR3 open circuit	Warning if circuit for sensor TR3 is broken (> 179 kOhm).	Screw terminal on I/O-module for sensor TR3 has not been tightened properly.	Check screw terminal.
				Sensor TR3/signal cable is broken.	With sensor disconnected from I/O module, measure resistance of sensor and compare it to table values in documentation. If broken, replace sensor.
				Defective I/O module.	If the sensor measures correctly but the same warning code persists, replace the I/O module.
5416	Customer	Alarm Z1 Condensate sensor heating mode TR3 fault	Alarm if any of the warning codes 5414 or 5415 are registered 3 times within 2 hours, or if sensor TR3 is continuously broken/shorted for 15 minutes.	See possible causes for warning codes 5414, 5415.	See possible actions for warning codes 5414, 5415.
5420	Installer	Warning Z1 Condensate sensor cooling mode TR4 open circuit	Warning if circuit for sensor TR4 is broken (> 170 kOhm).	Screw terminal on I/O module, for sensor TR4, is not properly tightened.	Check screw terminal of I/O module.
				Broken sensor TR4/signal cable.	With sensor disconnected from I/O module, measure its resistance. If broken, replace sensor.
				Defective I/O module.	If the sensor measures correctly but the same warning code persists, replace the I/O module.

5421	Installer	Warning Z1 Condensate sensor cooling mode TR4 short circuit	Warning if circuit for sensor TR4 is shorted.	Sensor TR4/signal cable broken.	With sensor disconnected from I/O module, measure its resistance. If shorted, replace sensor.
				Defective I/O module.	If the sensor measures correctly but the same warning code persists, replace the I/O module.
5422	Customer	Alarm Z1 Condensate sensor cooling mode TR4 fault	Alarm is triggered if any of the warning codes 5420, 5421, are registered 3 times within 2 hours, or if circuit for sensor TR4 is continuously broken/shorted for 15 minutes.	See possible causes for warning codes 5420, 5421.	See possible actions for warning codes 5420, 5421.
5426	Installer	Warning Z1 Suction gas temperature sensor TR5 open circuit	Warning if circuit for sensor TR5 is broken (> 179 kOhm).	Screw terminal on I/O module, for sensor TR5, not properly tightened.	Check screw terminal on I/O module.
				Sensor TR5/signal cable broken.	With sensor disconnected from I/O module, measure its resistance. If broken, replace sensor.
				Defective I/O module.	If the sensor measures correctly but the same warning code persists, replace the I/O module.
5427	Installer	Warning Z1 Suction gas temperature sensor TR5 short circuit	Warning if circuit for sensor TR5 is shorted (< 390 Ohm).	Sensor TR5/signal cable shorted.	With the sensor disconnected from I/O module, measure its resistance. If shorted, replace sensor.
				Defective I/O module.	If the sensor measures correctly but the same warning code persists, replace the I/O module.
5428	Customer	Alarm Z1 Suction gas temperature sensor TR5 fault	Alarm if any of the warning codes 5426, 5427 are registered 3 times within 2 hours, or if circuit for sensor TR5 is continuously broken/shorted for 15 minutes.	See possible causes for warning codes 5426, 5427.	See possible actions for warning codes 5426, 5427.

5432	Installer	Warning Z1 Low pressure sensor JR0 open circuit	Warning if voltage < 0,5 V DC on terminal 17 on I/O module.	Poor connection in cabling/terminal 17,19 on I/O module.	Check cabling and terminal connections 17, 19 on I/O module.
				Defective I/O module.	Check that 5V DC is available between terminal 19 and 17, when the pressure sensor is disconnected. If voltage is missing, the I/O module is defective and needs to be replaced.
				Pressure sensor JR0 is defective.	If voltage between terminal 19 and 17 is 5 V DC, the pressure sensor is likely broken. Replace pressure sensor.
5434	Customer	Alarm Z1 Low pressure sensor JR0 fault	Alarm if warning 5432 is registered 3 times within 15 minutes, or if the circuit is continuously broken for 15 minutes.	See possible causes for warning code 5432.	See possible actions for warning code 5432.
5438	Installer	Warning Z1 High pressure sensor JR1 open circuit	Warning if voltage < 0,5 V DC on terminal 16 on I/O module.	Poor connection in cabling/terminal 16,18 on I/O module.	Check cabling and terminal connections 16, 18 on I/O module.
				Defective I/O module.	Check that 5V DC is available between terminal 18 and 16, when the pressure sensor is disconnected. If voltage is missing, the I/O module is defective and needs to be replaced.
				Pressure sensor JR1 is defective.	If voltage between terminal 18 and 16 is 5 V DC, the pressure sensor is likely broken. Replace pressure sensor.
5440	Customer	Alarm Z1 High pressure sensor JR1 fault	Alarm if warning 5438 is registered 3 times within 2 hours, or if circuit for pressure sensor JR1 is continuously broken for 15 minutes.	See possible causes for warning code 5438.	See possible actions for warning code 5438.
5446	Installer	Alarm Z1 Flow and return between indoor and outdoor unit mixed up	Alarm if $(TC3 - 1) < TC0$ , and $JR1 > (TC3 + 7)$ , for more than 30 seconds. (Where TC3 is heat carrier flow, TC0 is heat carrier return, JR1 is high pressure sensor (condensation temperature).)	Hoses for flow and return between the heat pump and indoor unit have been mixed up.	Install hoses on the right connections.
				Defective sensor TC3 or TC0.	Check placement of sensors. Compare displayed temperatures for TC3 and TC0 with an external thermometer on these positions. Replace sensor(s) if deviations are found.



5448	Installer	Alarm Z1 Lack of refrigerant	Alarm after 20 minutes if the electronic expansion valve VR0 has opened 20% more than calculated value.	Too little refrigerant in heat pump.	Check refrigerant filling. Note! Activate the function "evacuation/fill" function when evacuating or filling refrigerant.
				Possible leak in refrigerant circuit.	Check/repair leak.
5452	Customer	Warning Z1 Internal compressor control system fault	Alarm for internal fault in inverter.	Defective inverter.	Replace inverter.
5453	Customer	Warning Z1 No power supply to outdoor unit	Warning if incoming AC voltage to inverter < 165 V for 10 seconds. Warning is automatically reset after 2 minutes if the incoming AC voltage > 190 V.	Low or no voltage to outdoor unit.	Check main fuses with regards to poor contact and blown fuses.
				Low incoming mains voltage.	With repeated warnings, contact the electricity supplier.
5463	Customer	Alarm Z1 Defrost failure. Clean outdoor unit	Alarm if timer for defrost exceeds 800 seconds 3 times, or if a the need to defrost has occurred 3 times within minimal time, in heating mode.	Evaporator clogged with ice.	Gently melt the ice with hot water..
				The heat pump is overfilled.	Empty heat pump and fill according to information on type plate.
				Too low temperature on heating system.	Open more thermostats in heating system.
				Dirt in system filter/filterball SC1.	Clean system filter/filterball SC1.
5500	Customer	Warning Underfloor heating temp. Limiter has tripped	Alarm if the external input 1-3 on I/O module is closed, depending on selection.	Protective thermostat for underfloor heating has been tripped.	Reset thermostat, adjust heat curve if necessary.
5503	Installer	Warning Connection problem with the power guard	Communication between installer module and power guard is missing for 30 seconds.	Incorrect cabling/connections.	Check cabling/connections.
				Poor connection in CANbus connections on installer module or power guard.	Check CANbus connections on installer module and power guard.
				Interruption/break on CANbus cable between installer module and power guard.	Replace CANbus cable.
				Incorrect type of CANbus cable.	Replace to correct type of CANbus cable. Check documentation for more information.
				CANbus cable installed together with/close to supply voltage to heat pump.	Separate CANbus and power cables by at least 100 mm to prevent interference.
5504	Customer	Alarm Connection problem with the power guard	Alarm if warning 5503 is registered 3 times within 3 hours, or if the warning is active for 30 minutes.	See possible causes for warning code 5503.	See possible actions for warning code 5503.
5506	Installer	Alarm Z1 Compressor does not start	Alarm if the compressor has not started within 2 minutes after a start signal has been sent.	Temporary malfunction in inverter.	Break power to heat pump and turn it on again.
				Internal error in inverter.	Replace inverter.

5507	Installer	Warning Z1 MR1 High pressure warn.	The circuit for the high pressure guard MR1 is broken for more than 3 seconds. The compressor stops.	Defective pressure guard, i.e. broken circuit even though the current pressure is below the limit.	Replace pressure guard if it triggers too early. Normal breaking pressure is 44 bar (R410A).
				Break or poor connection in cabling between MR1 and inverter.	Check cabling/connections between MR1 and inverter.
				Break or poor connection in cabling between MR1 and inverter.	Make sure that the high pressure guard is connected.
5508	Customer	Alarm Z1 MR1 High pressure alarm	Alarm if warning 5507 is registered 2 times within 3 hours.	See possible causes for warning code 5507 above.	See possible actions for warning code 5507 above.
5512	Installer	Warning Z1 Condensation temp. Outside control range	Warning if temperature of JR1 > the currently allowed envelope, for more than 30 seconds.	Too low evaporating temperature in relation to condensation temperature.	The most likely cause is low outdoor temperature. See diagram, chapter 4 of installer guide.
5513	Customer	Alarm Z1 Condensation temperature too high	Alarm if 3 warnings (code 5512) are registered within 3 hours, or warning active for 30 minutes.	Too low evaporating temperature in relation to condensation temperature.	The most likely cause is low outdoor temperature. See diagram, chapter 4 of installer guide.
				Too high flow or too low delta on heating system.	Adjust temperature/flow.
5514	Installer	Warning Z1 Evap. Pressure on JR0 too low	Warning if temperature of JR0 < the currently allowed envelope (-27°C) for more than 30 seconds.	Blocked or low air flow through air heat exchanger of heat pump.	Ensure sufficient air flow through air heat exchanger.
				Defective fan.	Activate test for outdoor unit.
				230 V supply voltage missing from fan.	Check if 230 V voltage is available on output PL3, terminal 32 (78, N)
				0-10 V control signal missing for fan.	Check 0-10V voltage on output PL3 PWM, terminal 20 (20, 26) using test function for outdoor unit.
				Defective fan.	If voltages are available in accordance with above and the fan is still not running, replace the fan.
				One of the expansion valves has got stuck in its closed position.	Check control cables to expansion valves. Run test cycle for outdoor unit and check that the expansion valves are opening.
				Defective I/O module.	If any of the voltages are missing, in accordance with above, replace the I/O module.
5515	Customer	Alarm Z1 Evap. Pressure on JR0 too low	Alarm if 3 warnings (code 5514) are registered within 3 hours, or if warning is active for 30 minutes.	See possible causes for warning code 5514.	See possible actions for warning code 5514.

5522	Installer	Alarm Wrong combination of indoor and outdoor units.	Setting of rotary encoder on installer board does not match the installed heat pump.	Non matching combination of heat pump and indoor unit.	Check combination.
				If I/O module has been replaced, it's possible that rotary encoder has not been set up correctly on the new I/O module.	Compare setting with rotary encoder of old I/O module. If that is not available the information can be found in the installer guide.
				When replacing installer module, the rotary encoder has not been set up properly on the new board.	Check setting of the rotary encoder, compare it to old board.
5523	Installer	Warning Z1 Internal compressor driver warning 3	Warning if incoming AC current > 31 A, 6 times. The warning is automatically reset after 4 minutes if the condition is no longer fulfilled.	Internal error in inverter.	Temporary malfunction. Await possible alarm in customer level (code 5524), until applying further actions..
5524	Customer	Alarm Z1 Internal compressor driver error 3	Alarm if warning 5524 is registered 3 times within 3 hours, or if the warning is active for 30 minutes.	Internal error in inverter.	Replace inverter.
5527	Customer	Alarm Z1 Too much refrigerant in cooling circuit	Alarm if JR1 > (TC3 + 5°C) and subcooling > set point value. Both conditions needs to be fulfilled for more than 5 minutes during hot water production.	Heat pump overfilled.	Evacuate heat pump and refill with quantity specified on type plate.
5531	Installer	Warning Z1 Compr. temperature sensor TR1 open circuit	Warning if circuit for sensor TR1 is broken (> 364 kOhm), for more than 2 hours.	Screw terminal for compressor sensor TR1, on I/O module, not properly tightened.	Check screw terminal.
				Broken compressor sensor TR1/signal cable.	Replace compressor sensor TR1.
				Defective I/O module.	Replace I/O module.
5532	Installer	Warning Z1 Compr. temperature sensor TR1 short circuit	Warning if circuit for sensor TR1 is broken (<350 Ohm).	Compressor sensor TR1/signal cable is shorted.	With sensor disconnected from I/O module, measure resistance of sensor. If shorted, replace sensor.
				Defective I/O module.	Replace I/O module.
5533	Customer	Alarm Z1 Compressor temperature sensor TR1 failure	Alarm if any of the warnings 5531, 5532, are registered 3 times within 3 hours, or if circuit is continuously broken/shorted for 15 minutes.	See possible causes for warning codes 5531, 5532.	See possible actions for warning codes 5531, 5532.

5541	Customer	Alarm Pool board communication failure	No communication between installer module and pool board for 90 seconds.	Poor connection in CANbus connections on installer module or pool module.	Check CANbus connections on installer module and pool module.
				Break on CANbus cable between installer module and pool module.	Replace CANbus cable between installer module and pool module.
				Improper type of CANbus cable.	Change to the correct type of cable. More information can be found in the installer guide.
				CANbus cable installed together with/close to supply voltage to heat pump.	Separate CANbus and power cables by at least 100 mm to prevent interference.
				Improper earthing of CANbus cable.	Disconnect/connect cable shield from/to earth.
5543	Installer	Warning Z1 Overheating temperature is excessive	Suction gas overheating (TR5 - JR0) exceeds 10 degrees for more than 10 minutes, where TR5 is the suction gas temp and JR0 is the low pressure sensor.	Incorrect reading from suction gas temperature sensor TR5.	Measure the temperature with an external thermometer. If the value presented in the display does not match the measured valve, replace the sensor.
				Incorrect reading from low pressure sensor JR0.	Connect manometer check the pressure on the low pressure side. Replace the low pressure sensor if the values do not match.
				Poor connection of control signal cables for expansion valve.	Check that the cabling is properly attached in both ends.
				Lack of refrigerant or defective expansion valve.	A suction gas overheating below 6 degrees for 10 minutes, can be a sign of shortage, but the symptoms can also be caused by an expansion valve that doesn't open properly. Contact local service department for guidance.
5545	Customer	Alarm Z1 Both brine temp. Sensors TB0 and TB1 are defective	Alarm after 3 registered errors within 2 hours, or 15 minutes of broken/shorted circuit for sensor TB0 and TB1.	Screw terminals for sensors not properly tightened on I/O module.	Check screw terminals on I/O module.
				Brine sensor TB0 and TB1 / signal cables broken.	Replace sensors TB0, TB1 / repair signal cable(s).
				Defective I/O module.	Replace I/O module.
5547	Installer	Warning Z1 Brine inlet temperature at TB0 is too low	Warning if TB0 < -6°C (for borehole) or +2°C (for groundwater)	Incorrect reading from sensor TB0.	Compare sensor reading to actual temperature. Replace sensor if there is a deviation.
5549	Customer	Alarm Z1 Brine inlet temperature at TB0 is too low	Alarm if TB0 < -6°C (for borehole) or +2°C (for groundwater)	Incorrect reading from sensor TB0.	Compare sensor reading to actual temperature. Replace sensor if there is a deviation.

5551	Installer	Warning Z1 Brine outlet temperature at TB1 is too low	Warning if TB1 < -6°C (for borehole) or +2°C (for groundwater)	Incorrect reading from sensor TB1.	Compare sensor reading to actual temperature. Replace sensor if there is a deviation.
5553	Customer	Alarm Z1 Brine outlet temperature at TB1 is too low	Alarm if TB1 < -6°C (for borehole) or +2°C (for groundwater)	Incorrect reading from sensor TB1.	Compare sensor reading to actual temperature. Replace sensor if there is a deviation.
5555	Installer	Warning Z1 Brine inlet temperature at TB0 is too high	Warning if TB0 > 30°C for 15 seconds. The compressor stops.	Incorrect reading from sensor TB0.	Compare sensor reading to actual temperature. Replace sensor if there is a deviation.
5557	Customer	Alarm Z1 Brine inlet temperature at TB0 is too high	Alarm if TB0 > 30°C for 15 seconds. The compressor stops.	Incorrect reading from sensor TB0.	Compare sensor reading to actual temperature. Replace sensor if there is a deviation.
5559	Installer	Warning Z1 Brine outlet temperature at TB1 is too high	Warning if TB1 > 30°C for 15 seconds. The compressor stops.	Incorrect reading from sensor TB0.	Compare sensor reading to actual temperature. Replace sensor if there is a deviation.
5561	Customer	Alarm Z1 Brine outlet temperature at TB1 is too high	Alarm if TB1 > 30°C for 15 seconds. The compressor stops.	Incorrect reading from sensor TB0.	Compare sensor reading to actual temperature. Replace sensor if there is a deviation.
5563	Installer	Warning Z1 High temp. Difference between TB0 and TB1	Warning if delta between TB0 and TB1 > 10 degrees K and TB1 must be < 10°C.	System filter/filterball is clogged.	Check filter. Clean if necessary.
				Air in brine system.	De-air brine system according to instruction in manual.
				Brine circulation pump PB3 is defective.	Test brine pump PB3 using manual operation from the display.
				Bad reading from brine sensor TB0/TB1.	Compare displayed values to actual temperatures measured with an external thermometer. Replace sensor(s) if deviation(s) found.
5565	Customer	Alarm Z1 High temperature difference between TB0 and TB1	Alarm if delta between TB0 and TB1 > 10K and TB1 must be < 10°C. Alarm if 3 stops within 2 hours.	System filter/filterball is clogged.	Check filter. Clean if necessary.
				Air in brine system.	De-air brine system according to instruction in manual.
				Brine circulation pump PB3 is defective.	Test brine pump PB3 using manual operation from the display.
				Bad reading from TB0/TB1.	Compare displayed values to actual temperatures measured with an external thermometer. Replace sensor(s) if deviation(s) found.
5567	Installer	Warning Z1 Brine pump failure	Warning if SSM I/O module, terminal 74-75 circuit is broken.	System filter/filterball is clogged.	Check filter. Clean if necessary.
				Air in brine system.	De-air brine system according to instruction in manual.
				Brine circulation pump PB3 is defective.	Test brine pump PB3 using manual operation from the display.

5569	Customer	Alarm Z1 Brine pump failure	Alarm if SSM input is open for more than 3 minutes. I/O module terminal 74-75.	System filter/filterball is clogged.	Check filter. Clean if necessary.
				Air in brine system.	De-air brine system according to instruction in manual.
				Brine circulation pump PB3 is defective.	Test brine pump PB3 using manual operation from the display.
5571	Installer	Warning Z1 Brine inlet temperature sensor TB0 short-circuit	Warning if circuit for sensor TB0 is shorted (< 390 Ohm).	Circuit for brine in sensor TB0 is broken.	With sensor disconnected from I/O module, measure resistance of sensor. If shorted, replace sensor.
				Screw terminal for sensor TB0 on I/O module not properly tightened.	Check screw terminal.
				Defective I/O module.	Replace I/O module.
5573	Installer	Warning Z1 Brine inlet temperature sensor TB0 open circuit	Warning if circuit for sensor TB0 is broken (> 179 kOhm).	Brine in sensor TB0/signal cable broken.	With sensor disconnected from I/O module, measure resistance of sensor. If broken, replace sensor or repair signal cable..
				Screw terminal for brine sensor TB0 not properly tightened.	Check screw terminal.
				Defective I/O module.	Replace I/O module.
5575	Customer	Alarm Z1 Brine inlet temperature sensor TB0 failure	Alarm if any of the warning codes 5571, 5573, are registered 3 times within 2 hours, or circuit for sensor TB0 is continuously broken/shorted for 15 minutes.	See possible causes for warning codes 5571, 5573.	See possible actions for warning codes 5571, 5573.
5577	Installer	Warning Z1 Brine outlet temperature sensor TB1 short-circuit	Warning if circuit for sensor TB1 is shorted (< 390 Ohm).	Brine out sensor TB1/signal cable is shorted.	With sensor disconnected from I/O module, measure resistance of sensor. If shorted, replace sensor or repair signal cable.
				Screw terminal for brine sensor TB1 not properly tightened.	Check screw terminal on I/O module.
				Defective I/O module.	Replace I/O module.
5579	Installer	Warning Z1 Brine outlet temperature sensor TB1 open circuit	Warning if circuit for sensor TB1 is shorted (> 179 kOhm).	Brine out sensor TB1/signal cable is broken.	With sensor disconnected from I/O module, measure resistance of sensor. If broken, replace sensor or repair signal cable.
				Screw terminal for brine sensor TB1 not properly tightened.	Check screw terminal on I/O module.
				Defective I/O module.	Replace I/O module.
5581	Customer	Warning Z1 Brine outlet temperature sensor TB1 failure	Alarm if any of the warning codes 5577, 5579, are registered three times within 2 hours, or if circuit for TB1 is continuously broken/shorted for 15 minutes.	See possible causes for warning codes 5577, 5579.	See possible actions for warning codes 5577, 5579.

5585	Customer	Alarm Z1 Low pressure sensor detect. problems in brine circuit	Alarm i JR0 indicated low pressure, after 3 warnings within 3 hours. (Note! Only active in cooling mode.)	See possible causes for warning code 5567.	See possible actions for warning code 5567.
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## 3.2 Why does the heat pump go on/off during low heating demand?

The compressors' lowest permitted operating frequency is 45 Hz (13%). At startup however, the compressor runs temporarily at 156 Hz (45%). This initialization phase lasts for 4 minutes and serves to ensure good lubrication in the compressor. Only then will the speed be adjusted down to match the heating demand. A small heating demand may be met already during the initialization phase and stop the compressor before it has time to slow down.

## 4 Work Instructions

### 4.1 Recommended hand tools

The following tools are needed to carry through the operations described in the following sections.

- Screw driver Torx Torx T10, T20, T25, T27, T30.
- Pipe wrench, gap size 46 mm.
- Socket tools with 6-point socket for M5, M6, M8.
- Spanner.

This is not a complete list. Additional equipment may be required in different contexts, such as filling barrel when replacing brine pump, or a recovery machine and pressure gauge when doing work in the refrigerant circuit. Generally when trouble shooting it is always a good idea to have a multimeter at hand.

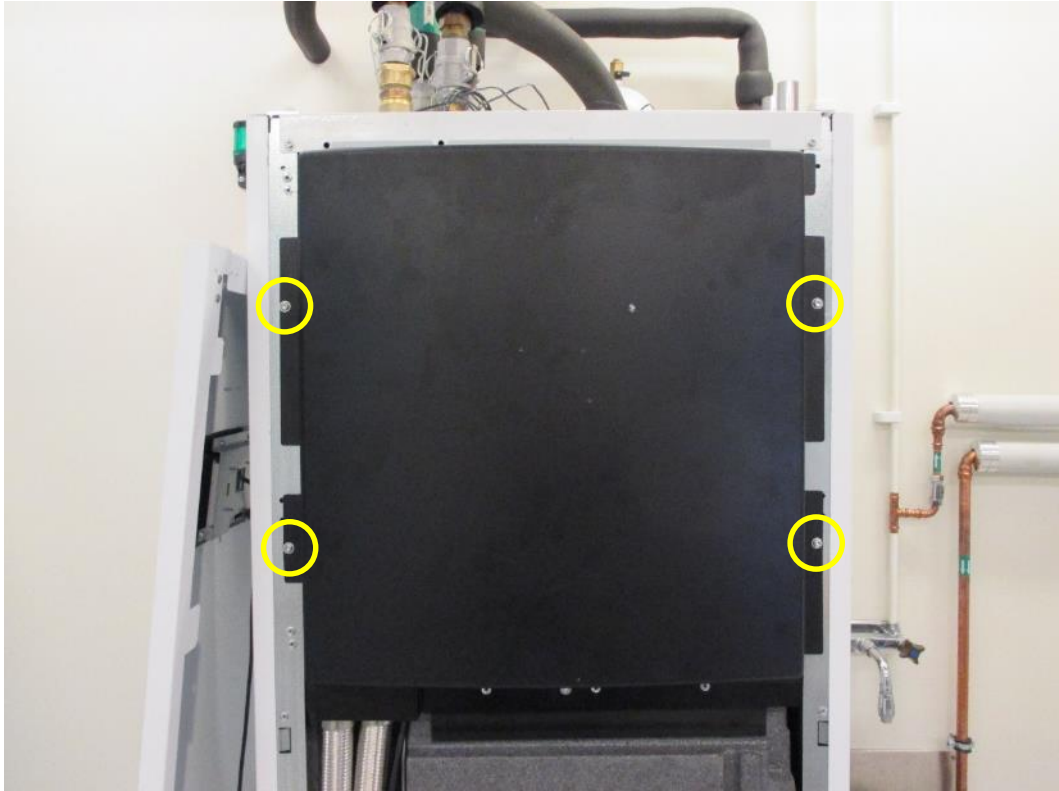
### 4.2 Preparatory steps for service work

Step 1. Switch off the power before starting work.

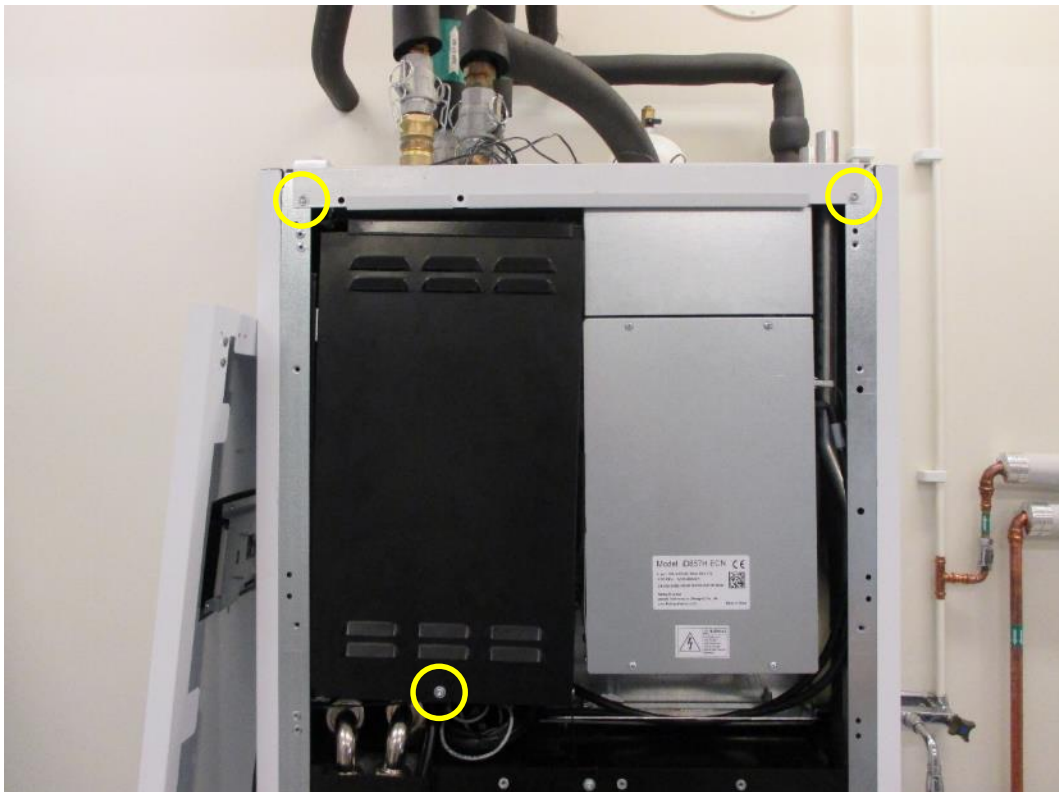


Step 2. Remove the front plate by pulling out the lower edge and then lifting the plate upwards.

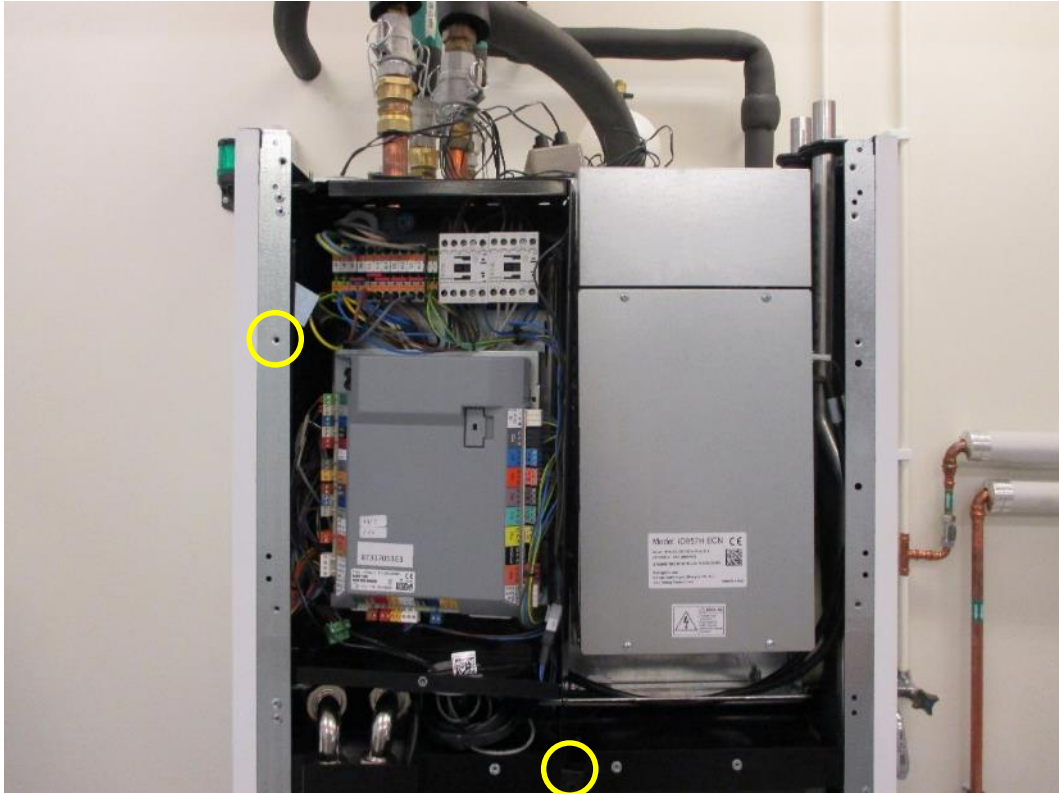




Step 3. Remove insulation. 4 screws (Torx T25).



Step 4. Remove front top late, 3 screws (Torx T25) and lift it off.



Step 5. Remove lid from the electrical box, 1 screw (Torx T25) and fit screw in the left corner profile.

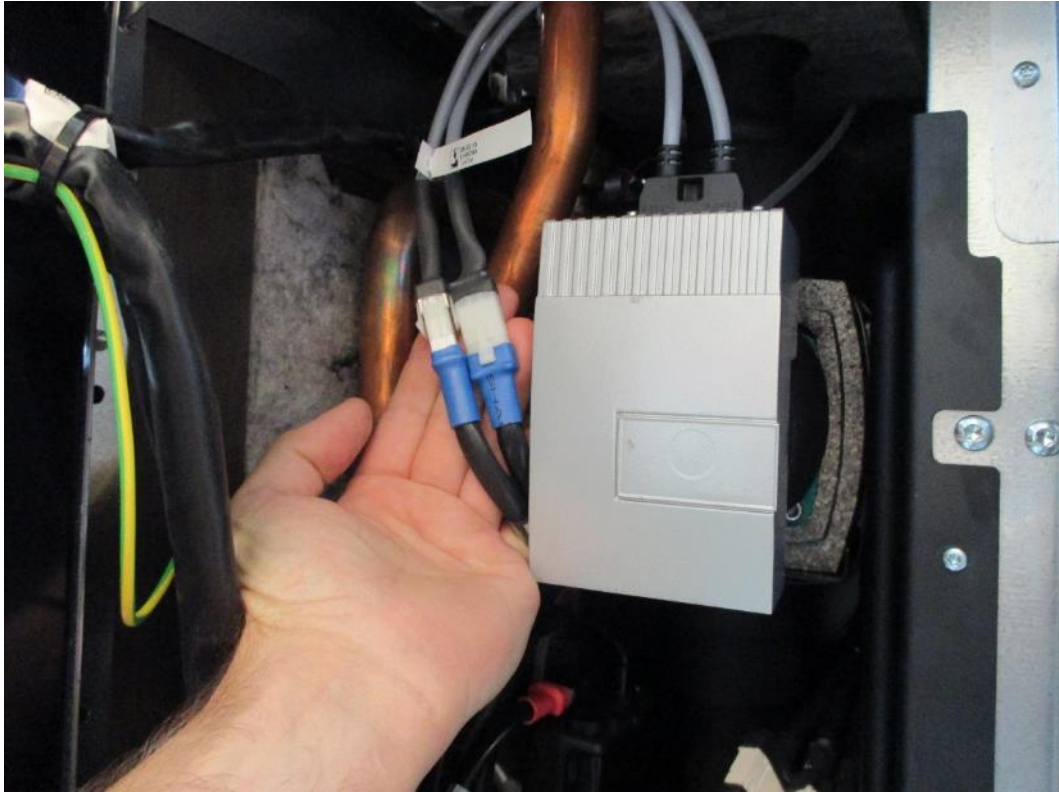


Step 6. Lift the electrical box and hang it on the left corner profile. (There is a 10 mm hole on the gable of the electrical box.)

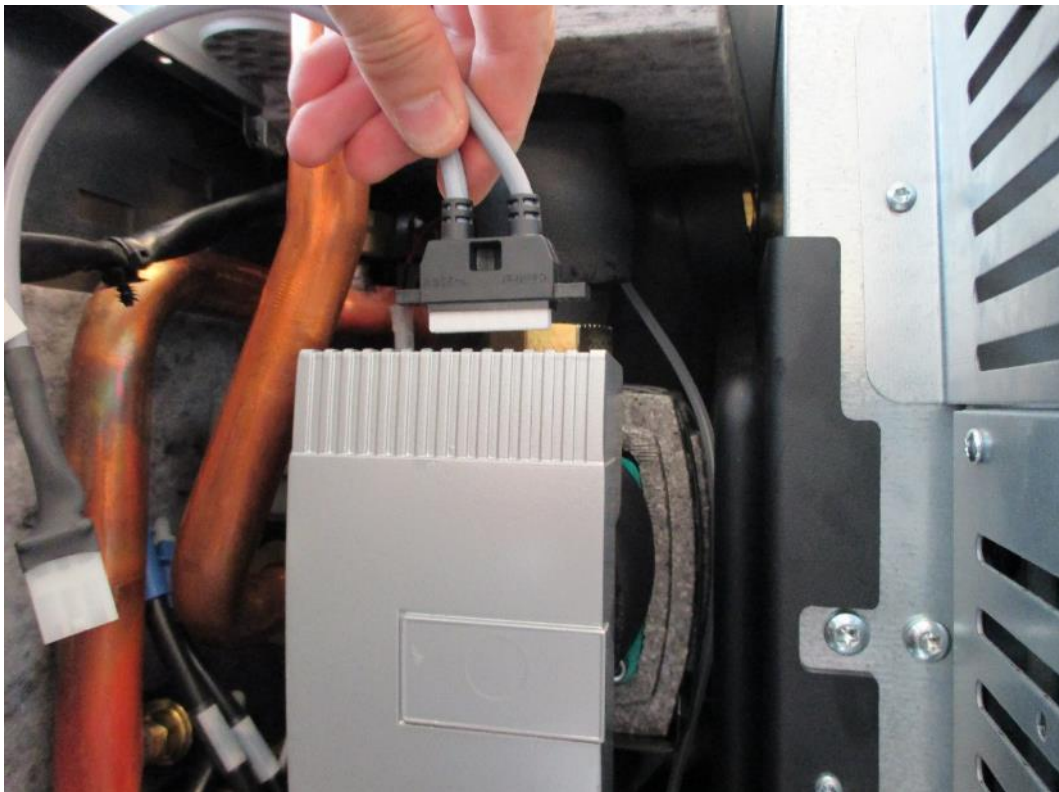
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### 4.3 Replacement of brine pump

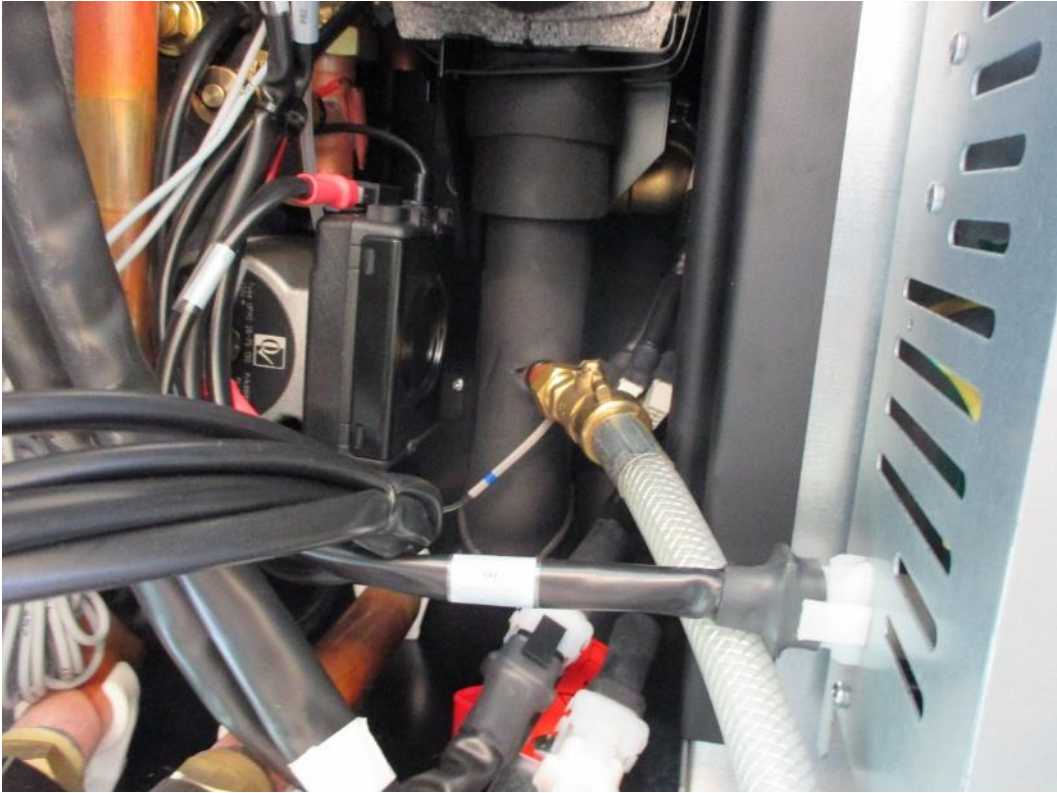
Follow step 1-6 in the previous section, Preparatory steps for service work, page 32. Then proceed with the following instructions.



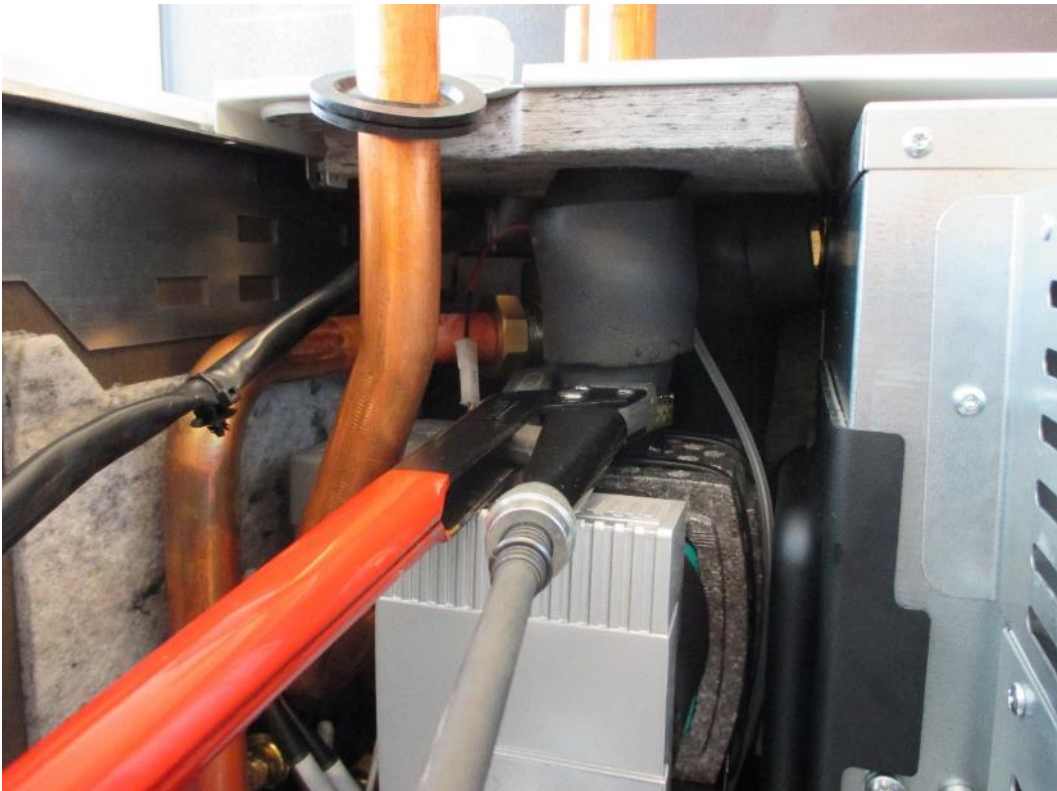
Step 7. Disconnect contacts for brine pump.



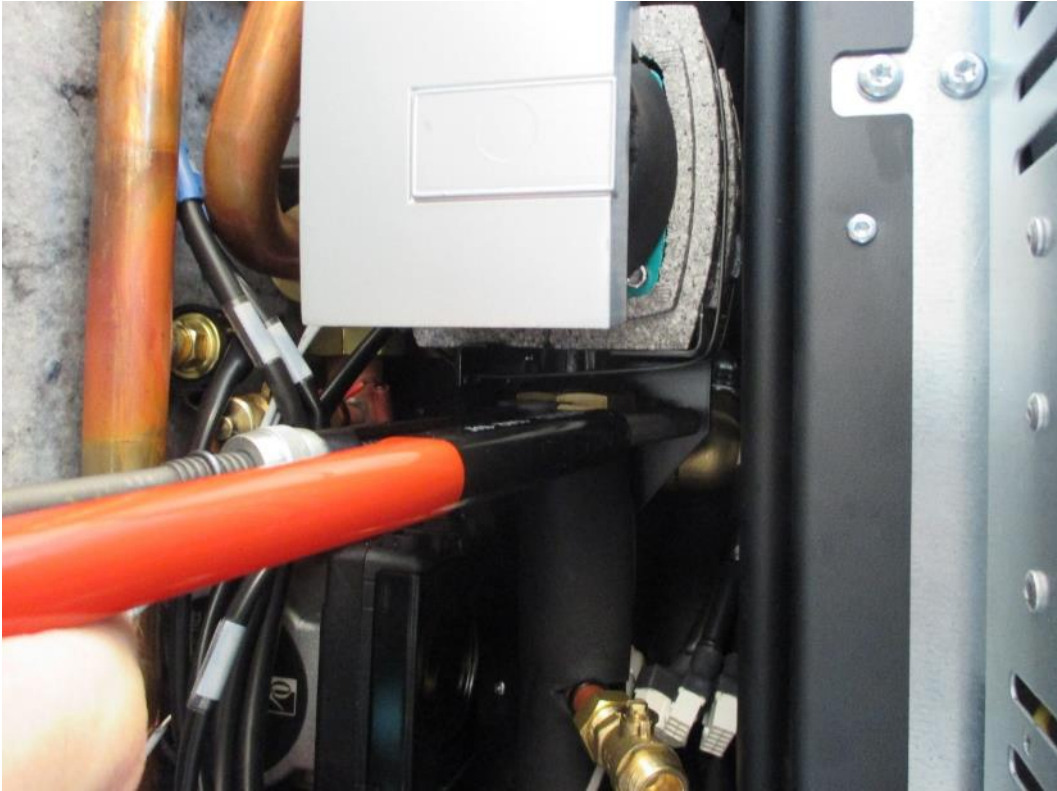
Step 8. Disconnect contact for brine pump cabling, 2 pcs Torx T10.



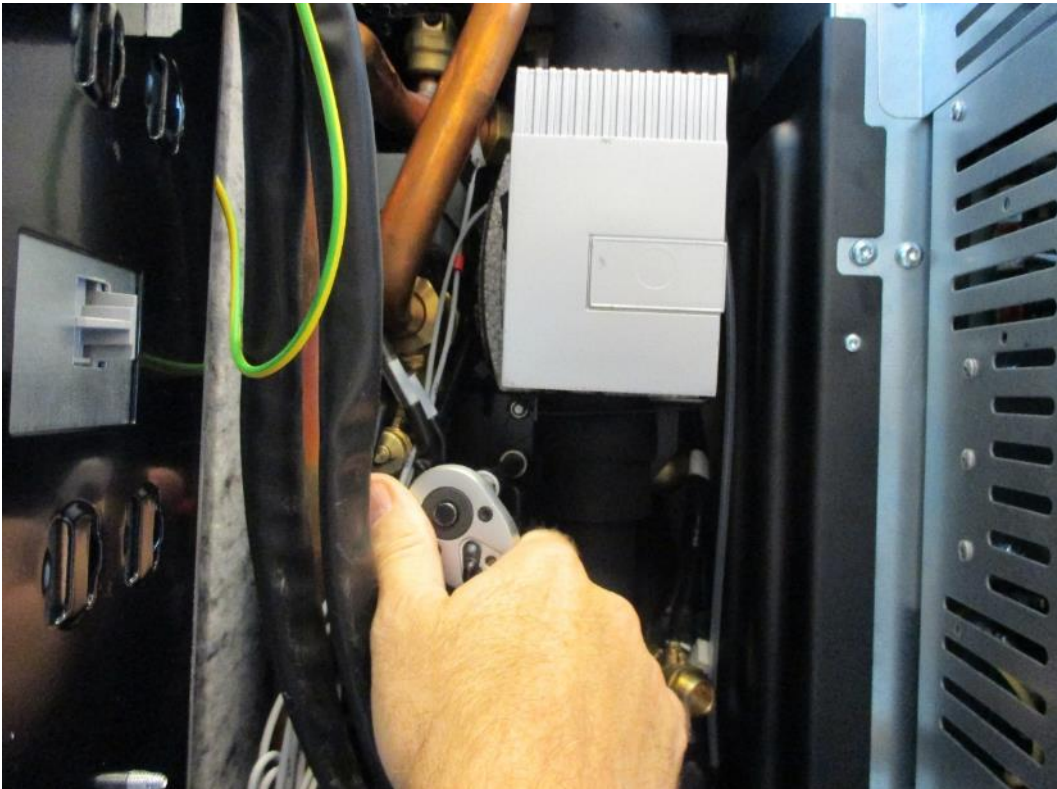
Step 9. Drain the brine fluid from the drain tap, 1/2" connection.



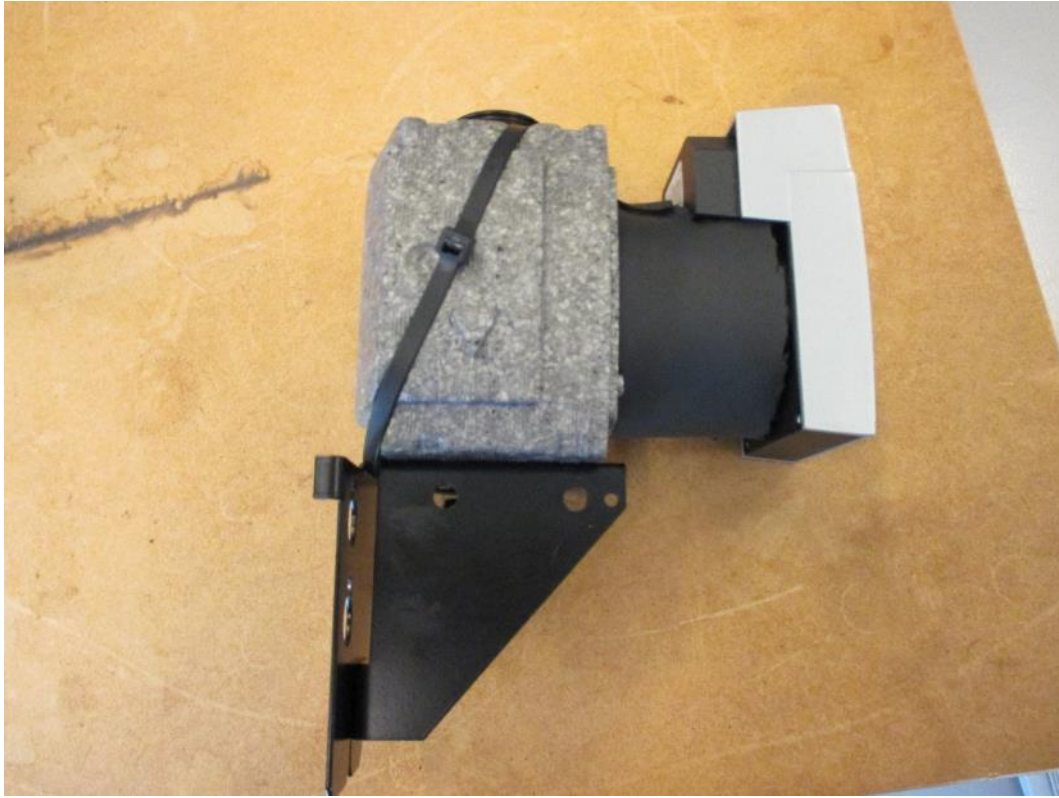
Step 10. Remove the upper connection nut. Gap size 46 mm. If possible, demount the pipe for incoming brine to make more room.



Step 11. Remove the lower connection nut. Gap size 46 mm.



Step 12. Remove 2 pcs M8 nuts from the brine pump attachment. Lift upwards and remove brine pump.



Step 13. Install cable tie and insulation on the new brine pump as shown in picture. Install brine pump following instructions in the opposite order. De-air with filling barrel.

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## 4.4 Removal of refrigerant module

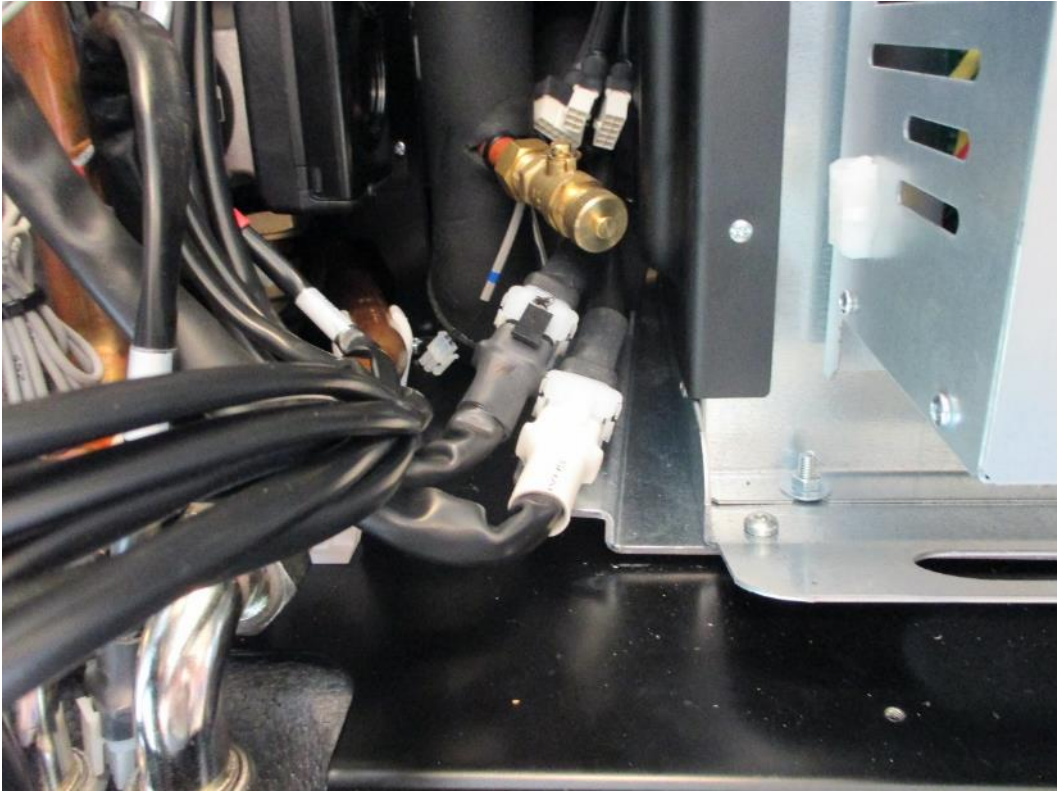
Follow steps 1-6 in the section Preparatory steps for service work, page 32. Proceed with steps 7-12 in section Replacement of brine pump, page 35. Then follow the instructions below.



Step 13. Disconnect 3 contacts from the refrigerant module.



Step 14. Disconnect electrical power connection to inverter.



Step 15. Disconnect 2 electrical connections to the electrical heater.



Step 16. Drain the heat carrier from the drain tap, 1/2" connection.





Step 17. Dismantle the upper cold carrier connection. Remove hose by pulling it downwards.



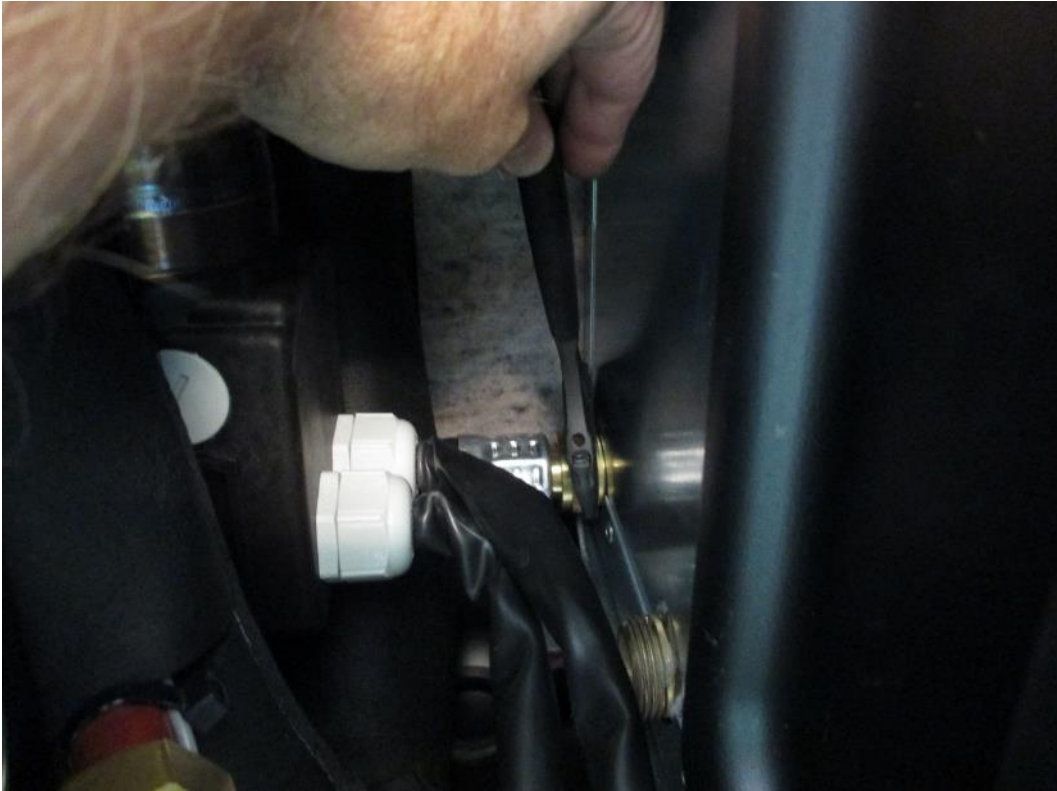
Step 18. Dismantle lower cold carrier connection.



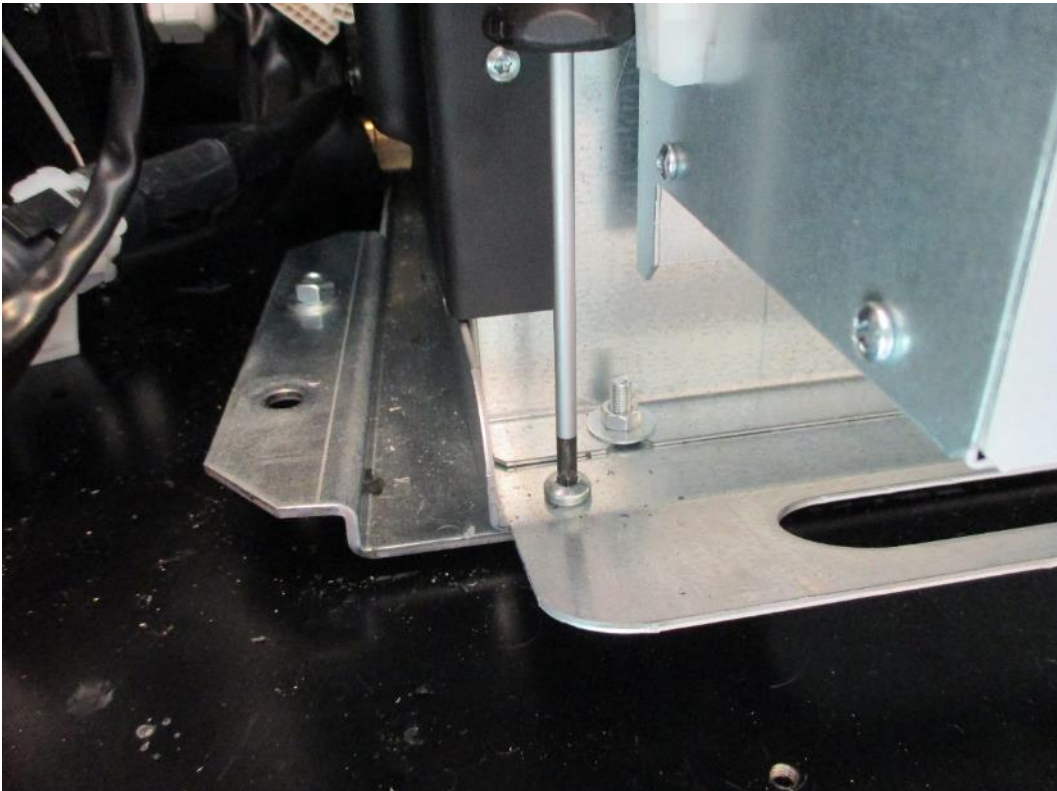
Step 19. Dismantle upper heat carrier connection.



Step 20. Dismantle connection for incoming heat carrier to the electrical heater. Remove hose.



Step 21. Dismantle connection for incoming heat carrier to condenser.

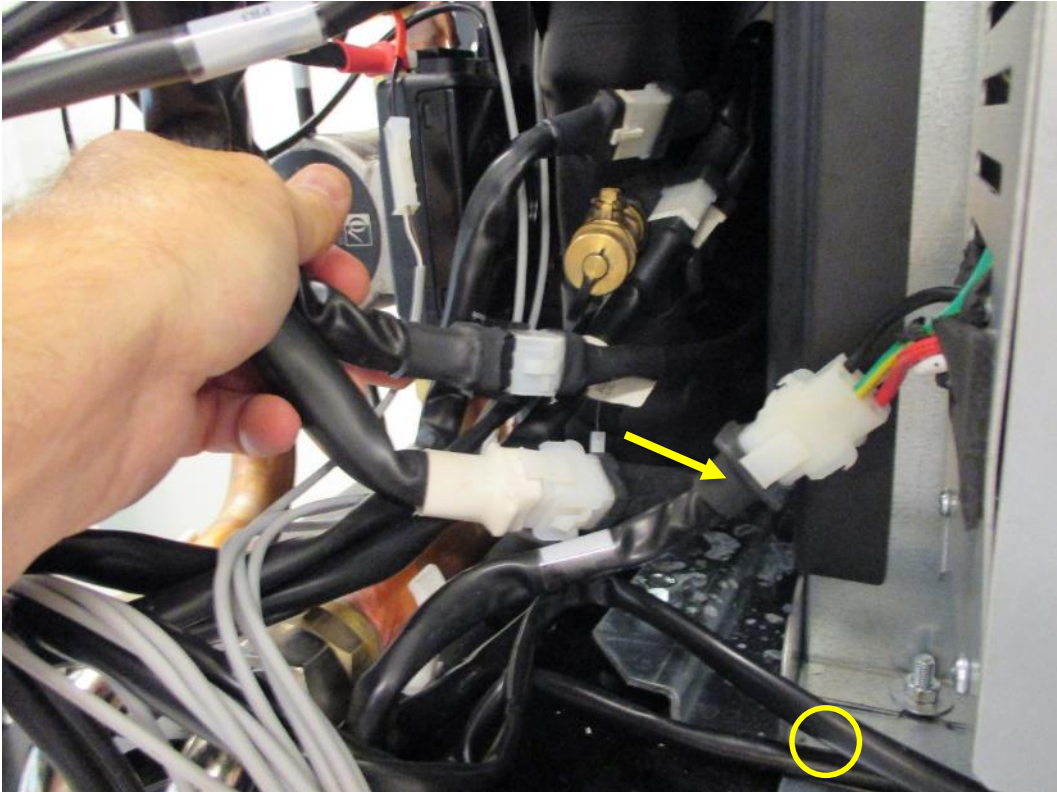


Step 22. Remove Torx T30 screw. Lift out refrigerant module. It weighs 63 kg and two people should be doing the lift. Reassemble in the opposite order.

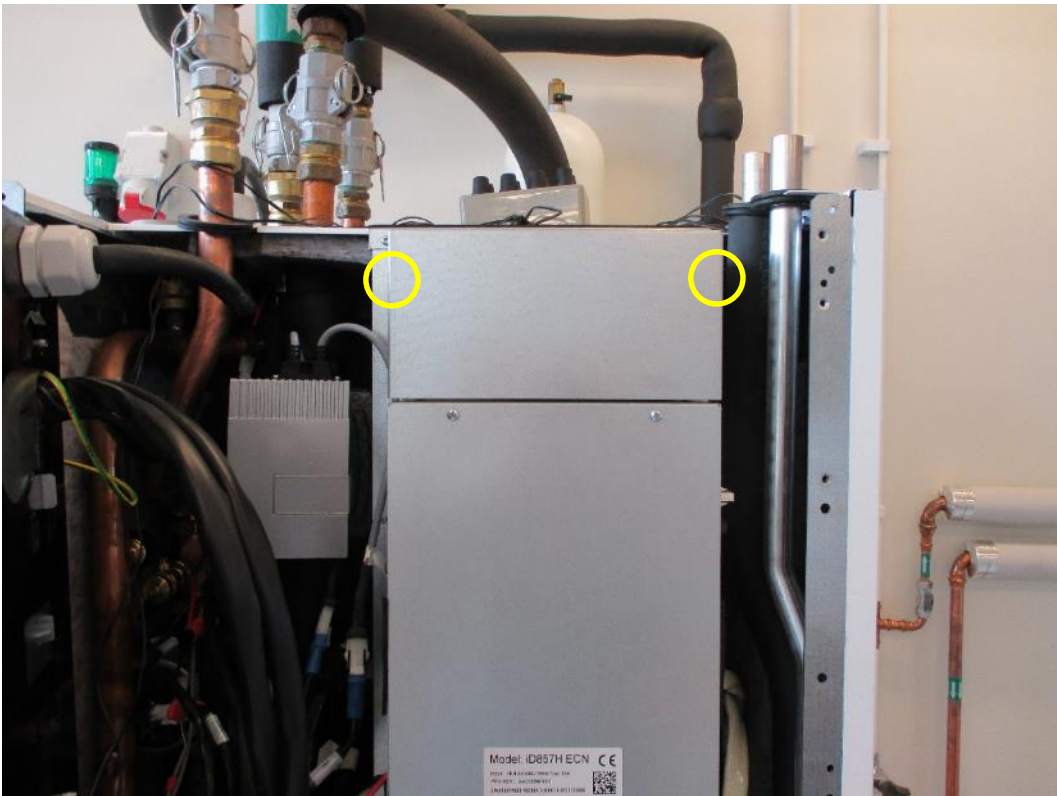
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## 4.5 Replacement of inverter

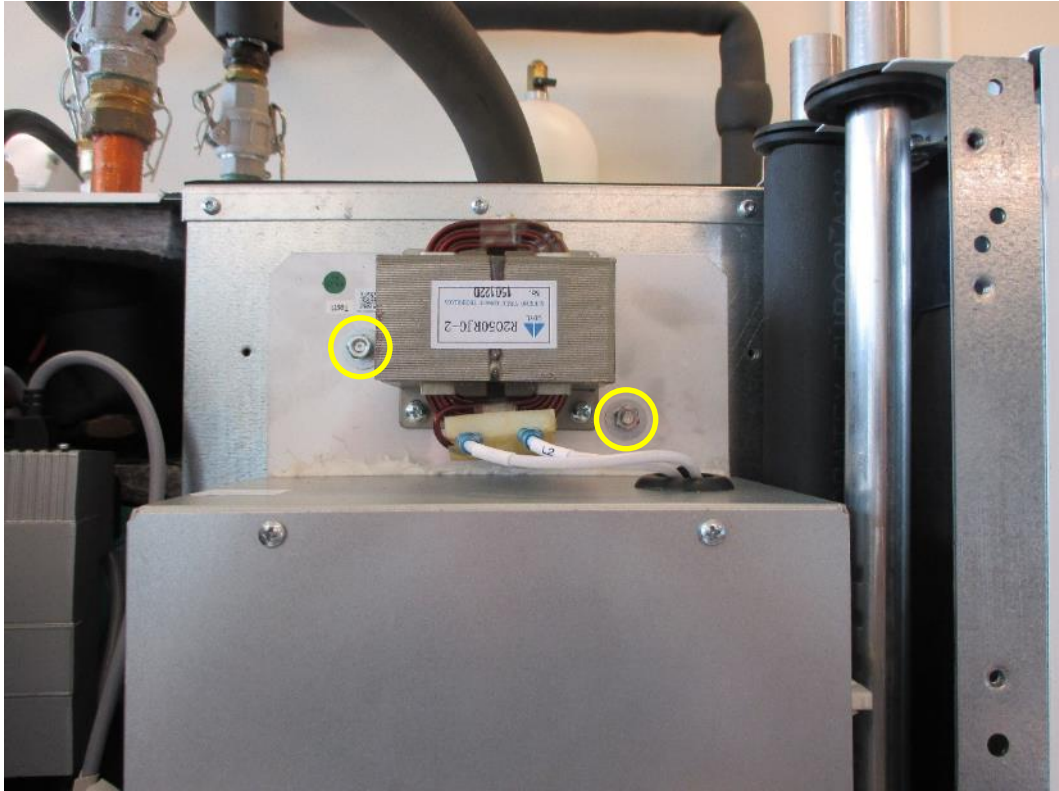
First follow steps 1-6 in the section Preparatory steps for service work, page 32. Then proceed with the following.



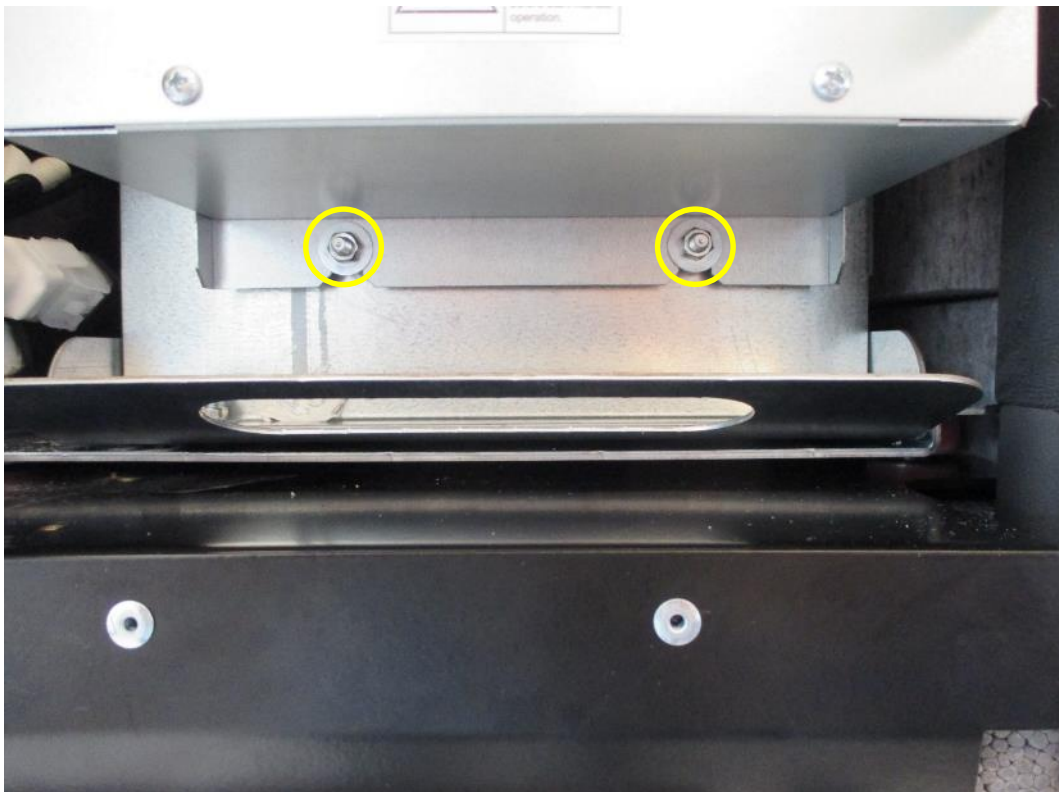
Step 7. Disconnect electrical connection for inverter. Remove one screw (Torx T27) to unfasten the refrigerant module.



Step 8. Turn refrigerant module to the left. Remove lid for choke coil (Torx T20).



Step 9. Remove 2 nuts M6 (socket No 10).

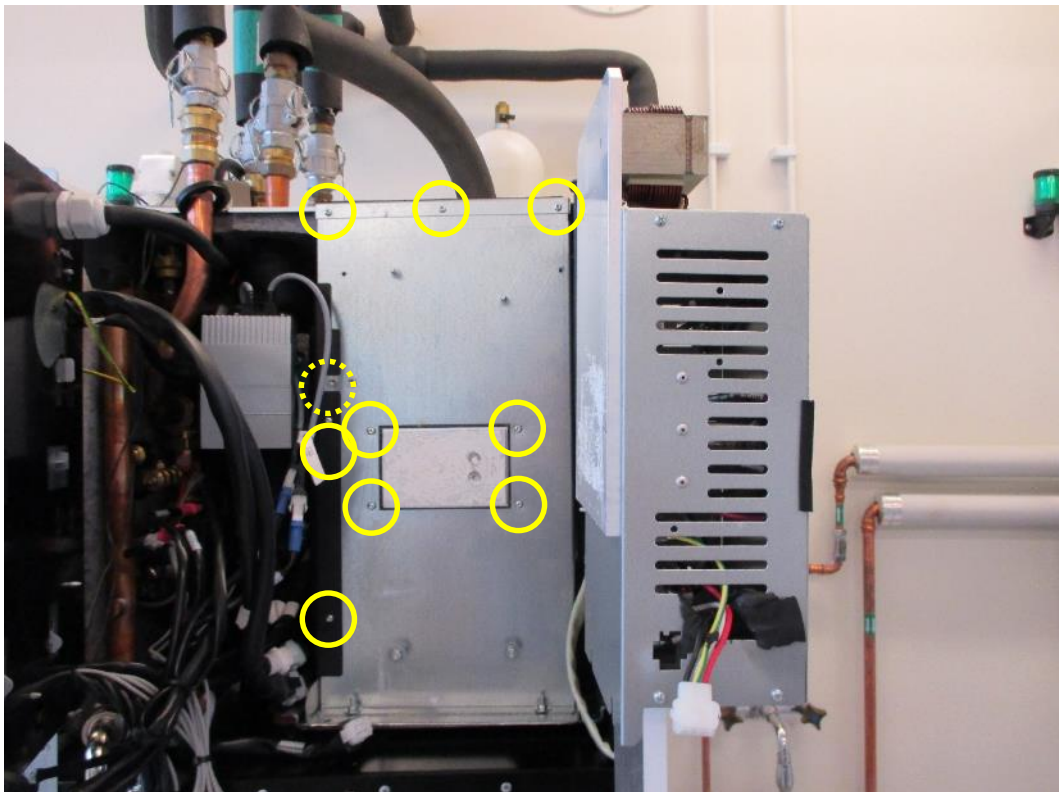


Step 10. Remove 2 nuts M6 (socket No 10). Gently lift the inverter.

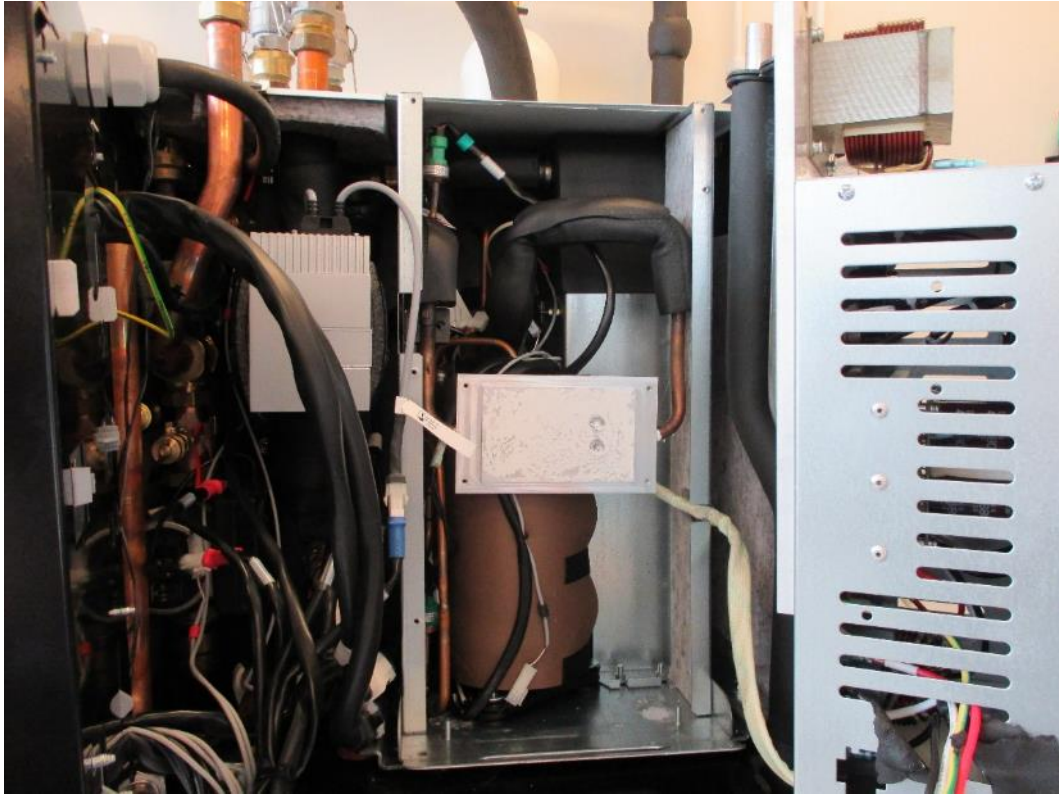


Step 11. Detach inverter in upper edge. Install 2 cable ties in series.

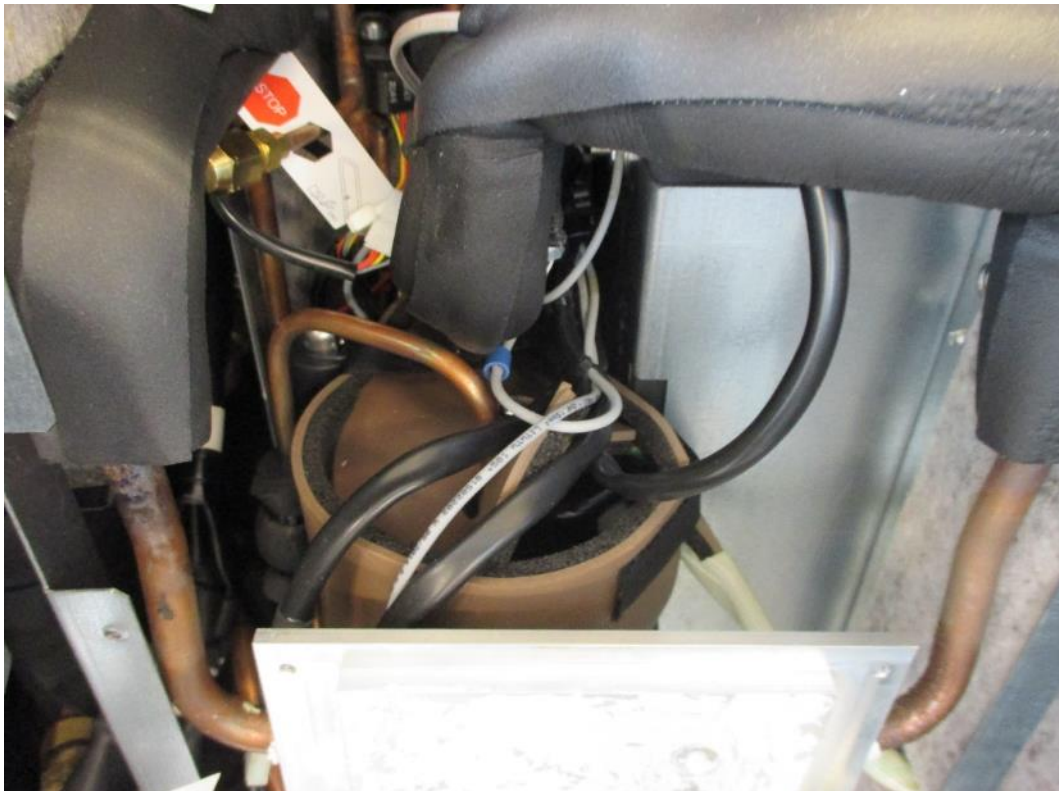
Step 12. Hang inverter on the right pillar/corner profile.



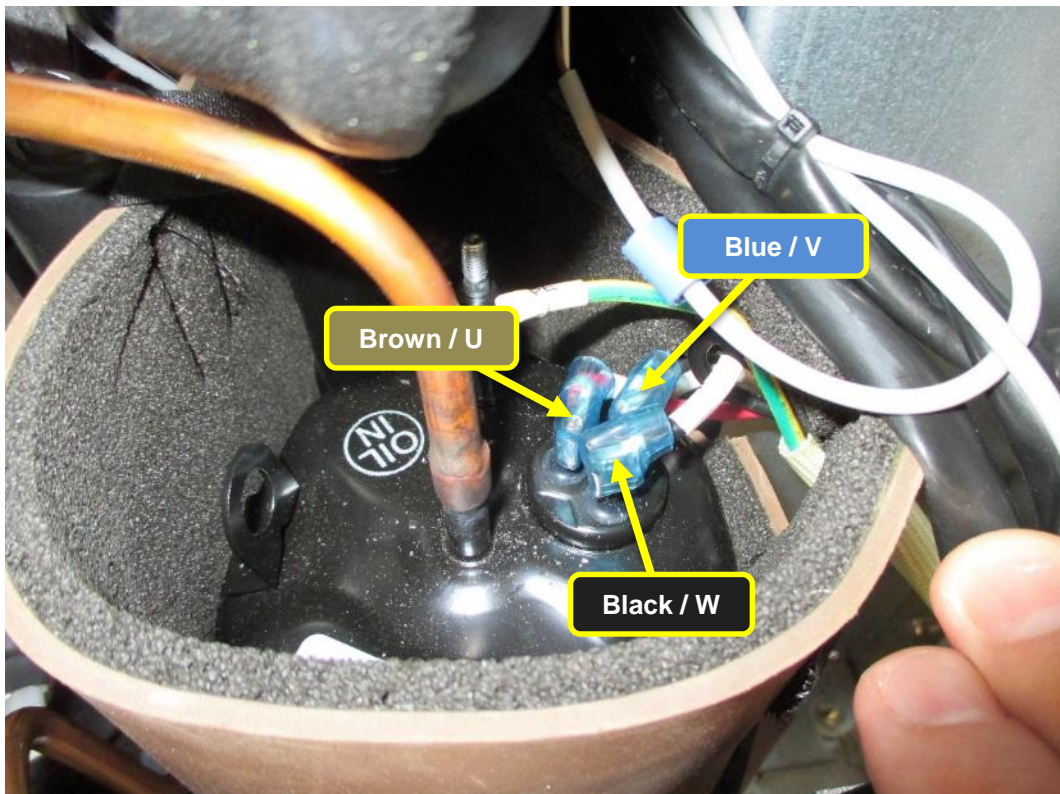
Step 13. Dismantle the plate for refrigerant circuit, 9 screws (Torx T20). And also 2 screw (Torx T30) for suction line staple (both can be found within the dotted marking).



Step 14. Remove front plate and top plate of refrigerant module.



Step 15. Remove top insulation on the compressor and open up the Velcro fastener on the side. Unscrew 2 M5 nuts for the plastic lid to the compressor's electrical connections.



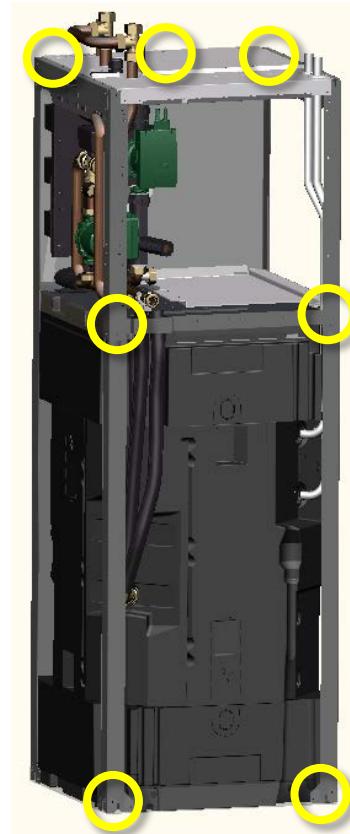
Step 16. Disconnect electrical cabling from the compressor. Replace inverter and reassemble in opposite order. **Make sure that the compressor cabling is connected in the correct color order.** See the above image for reference.



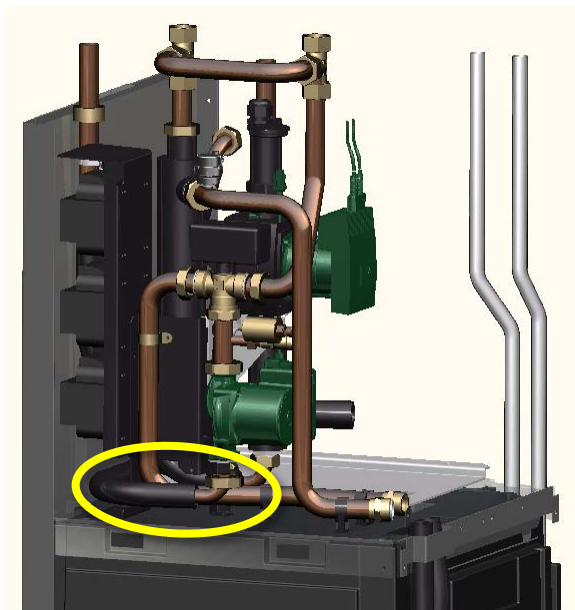
## 4.6 Replacement of cylinder



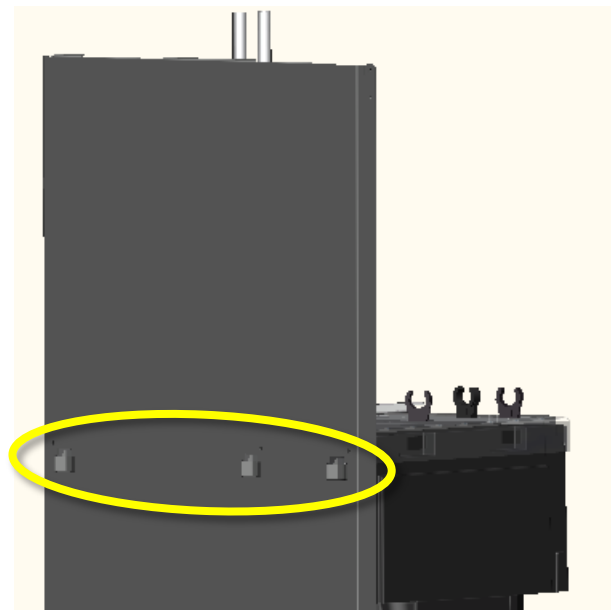
Remove refrigerant module. See page 39.



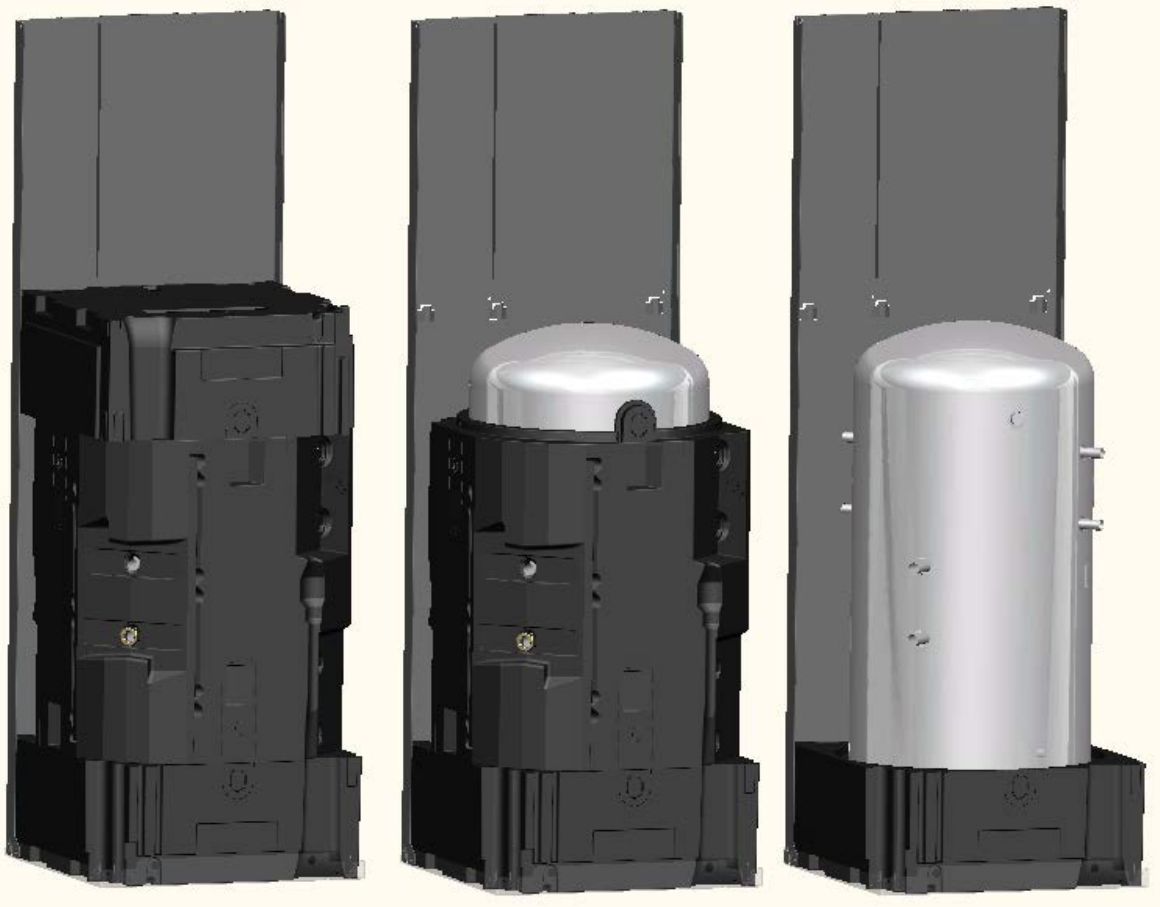
Drill out rivets in the lower edge of pillar/corner profile (2x4), middle shelf (2x2), rear top plate (2x2) and middle top plate (1). A total of 17 rivets. Drill 4.8 mm. Lift off top and pillars.



Remove 3 screw, Torx T27, lower fastener for hydraulic circuit. Lift off hydraulic circuit.



Drill out rivets in the lower edge of pillar (2x4), middle shelf (2x2), rear top (2x2), and middle top (1). 17 rivets in total. Drill 4.8 mm. Lift off top and pillars.



Remove hoses and insulation. Replace cylinder. Reassemble in opposite order.

---

## 4.7 Replacement of compressor, expansion valve, drying filter

**Note!** When doing work in the refrigerant circuit, national, regional and technical regulations and guidelines must be followed.

**Warning!** Before you start make any brazing, use soldering protection blankets to protect the insulation from flames /heat.

### Material and spare parts needed

Compressor 8733703188 Kompessor SNB172  
Drying filter 8733706482 Torkfilter 8659

We recommend the following soldering material and maximum nitrogen pressure for service interventions for this heat pump that operates with R410A refrigerant.

- Copper-copper connection (exp.valve) Brace Tec Silfos (5 % Ag)
- Copper pipe – filter dryer Brace Tec 5600 (56 % Ag)
- Maximum nitrogen pressure for tightness control 18 bar.
- Nitrogen pressure for short tightness control "4.0" and for long-term test "5.0".

### Evacuation of the refrigerant

Turn off the power to the heat pump from the main supply switch. Evacuate the refrigerant with a refrigerant recovery machine. To evacuate the refrigerant, use service schrader connections, see page for step 20, page 53. 1=low pressure side. 2 = high pressure side.

### Connect nitrogen

When connecting, ensure that the nitrogen flow is directed away from heat sensitive components during brazing. Always cool heat sensitive components, such as the expansion valve, with a wet cloth. Always protect insulation parts with heat insulating blanket.

### How to evacuate to vacuum

Vacuum service schrader connection, see picture for step 20, page 53. Vacuum pressure 1.33 mbar / 1000 micron or lower.

### How to refill R410 A

To refill refrigerant, use service connection, see picture for step 20, page 53. See type plate for amount of R410A. (Always use new refrigerant.)

### Installation of filter dryer after a service action

Always mount a filter dryer after a service intervention in the refrigerant circuit. See step 23 and 24 on page 54.

### Oil trapped in refrigerant parts

If the expansion valves is defective oil can get trapped in the copper pipe that leads into the evaporator and we suggest to use a pipe cutter to cut off the pipes with a tube cutter. (Never use a saw.) Blow out the oil by using nitrogen and collect it in a vessel.

### Dismantling of refrigerant module

First follow steps 1-6 in the section Preparatory steps for service work, page 32. Then follow steps 7-12 i the section Replacement of brine pump, page 35. Then proceed with the following steps.



Step 13. Remove lid for DC choke coil (Torx T20).



Step 14. Dismount inverter, 4 nuts M6 (socket No 10).



Step 15. Dismount top and service hatch to refrigerant circuit (Torx T20).



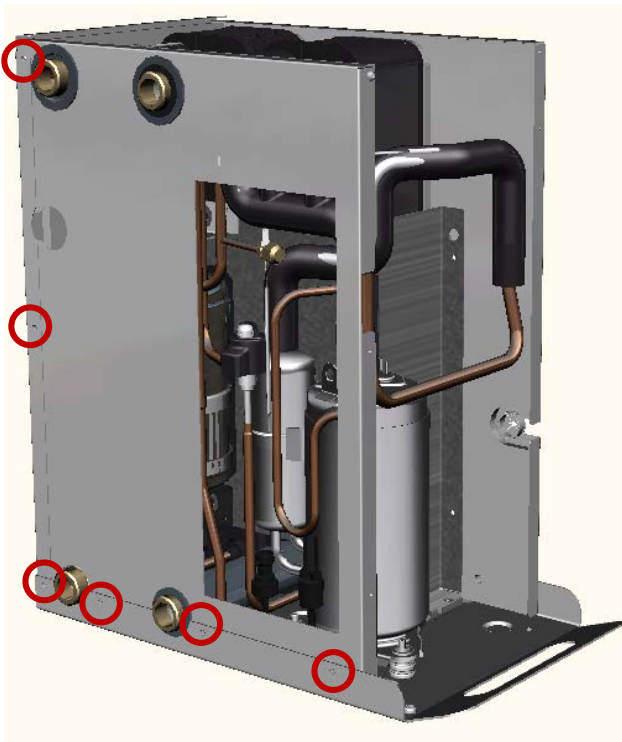
Step 16. Dismount plate to refrigerant circuit, 4 screws (Torx T20) and 2 screws (Torx T30) for staple and 2 M6 nuts.



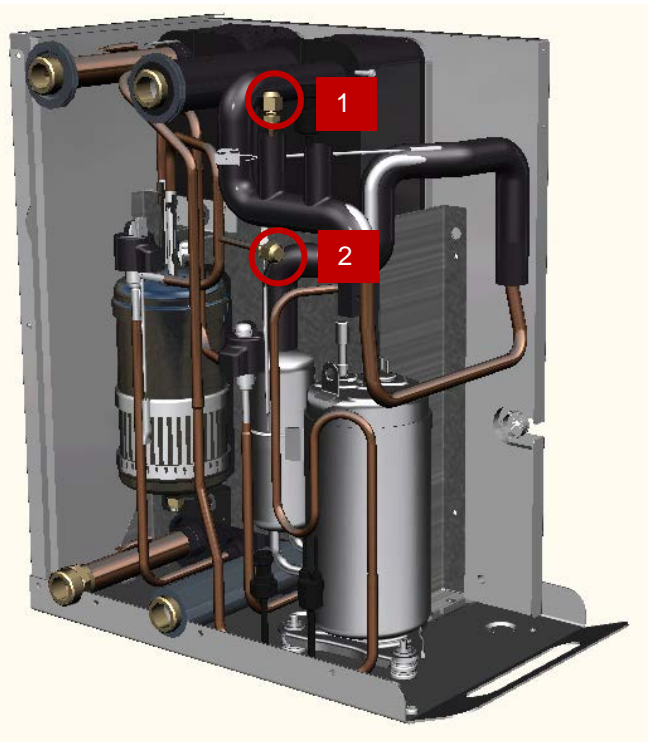
Step 17. Dismount cooling plate for inverter (Torx T20).



Step 18. Dismount staple and electrical cable harness for compressor.

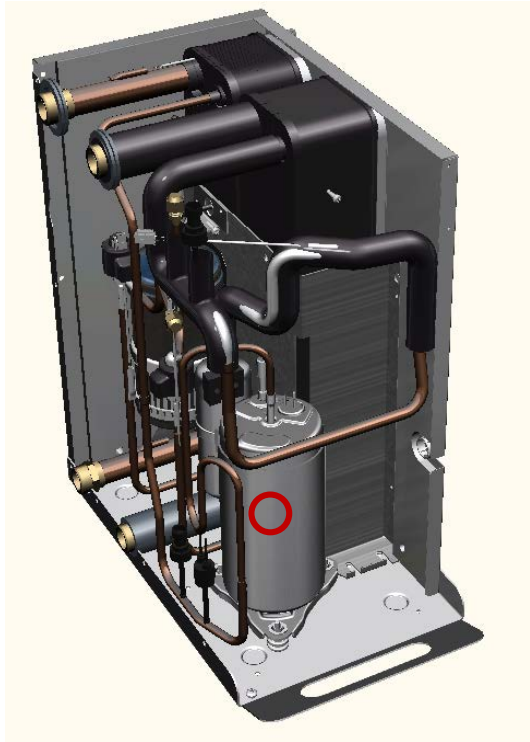


Step 19. Drill out the rivets, 6 pcs. 4.8x10. Remove the side panel.

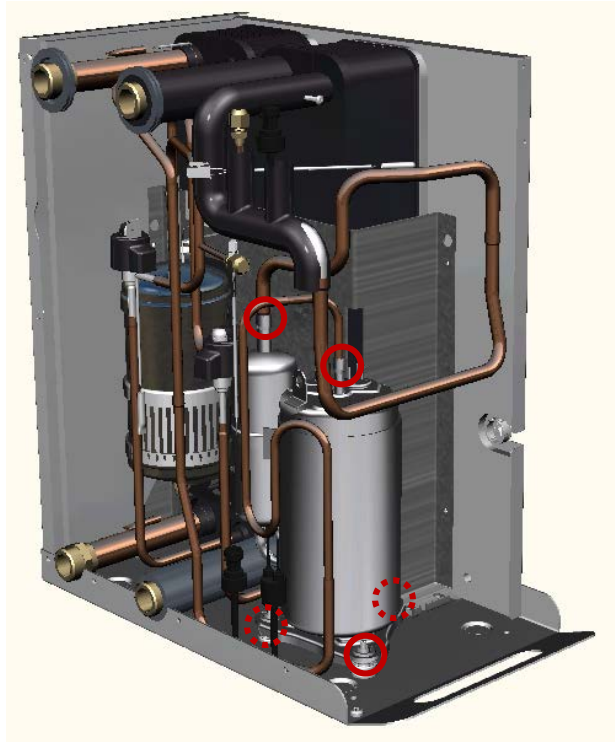


Step 20. Connect the pressure gauge on the service valves and evacuate the refrigerant with a refrigerant recovery machine.

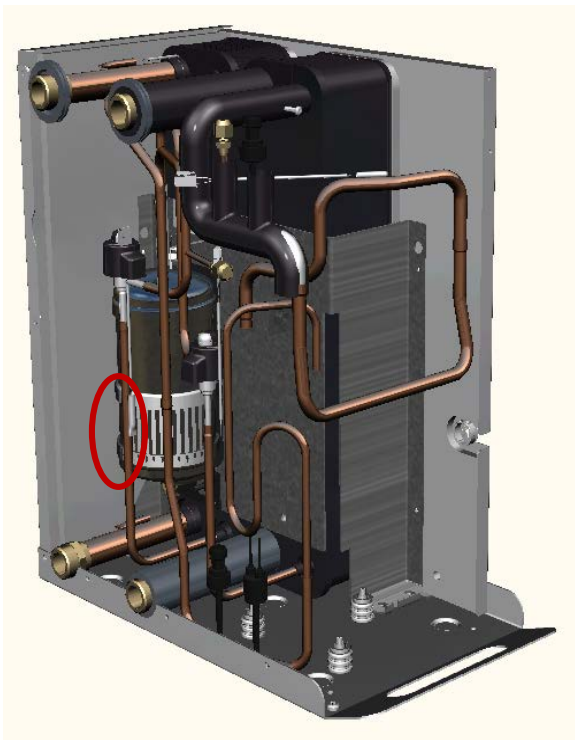
- 1 = Low pressure/evaporator side
- 2 = High pressure/condenser side



Step 21. Remove insulation from compressor and suction line.



Step 22. Remove the suction line and discharge pipes by heating up the solder joints. Remove the 3 M8 nuts for the compressor.



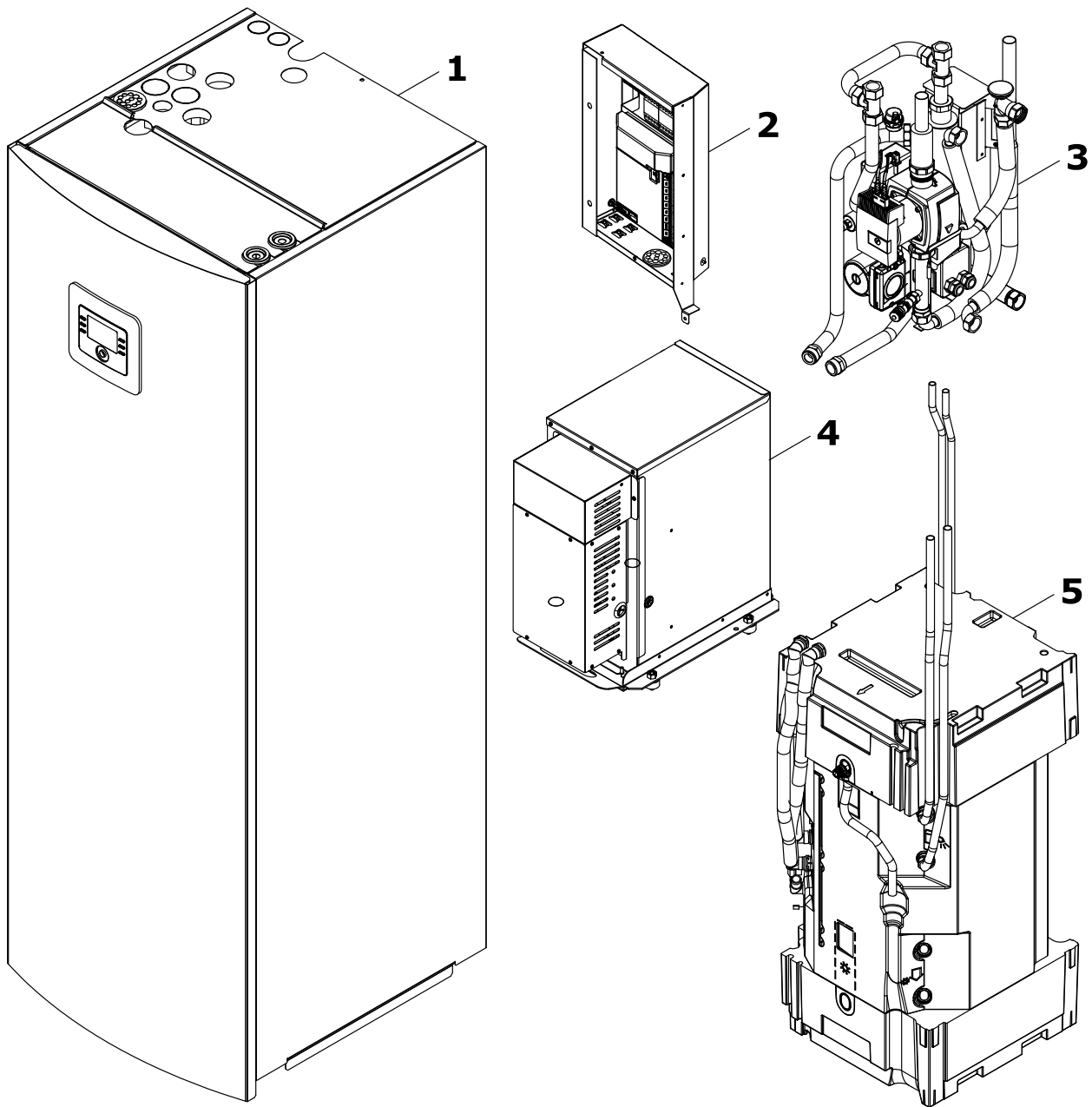
Step 23. Measure and cut the liquid line pipe for the filter dryer.



Step 24. Mount compressor. Solder the filter dryer and compressor. Note! Use nitrogen as protection gas and cool exp.valve with wet cloth. See filter flow direction.

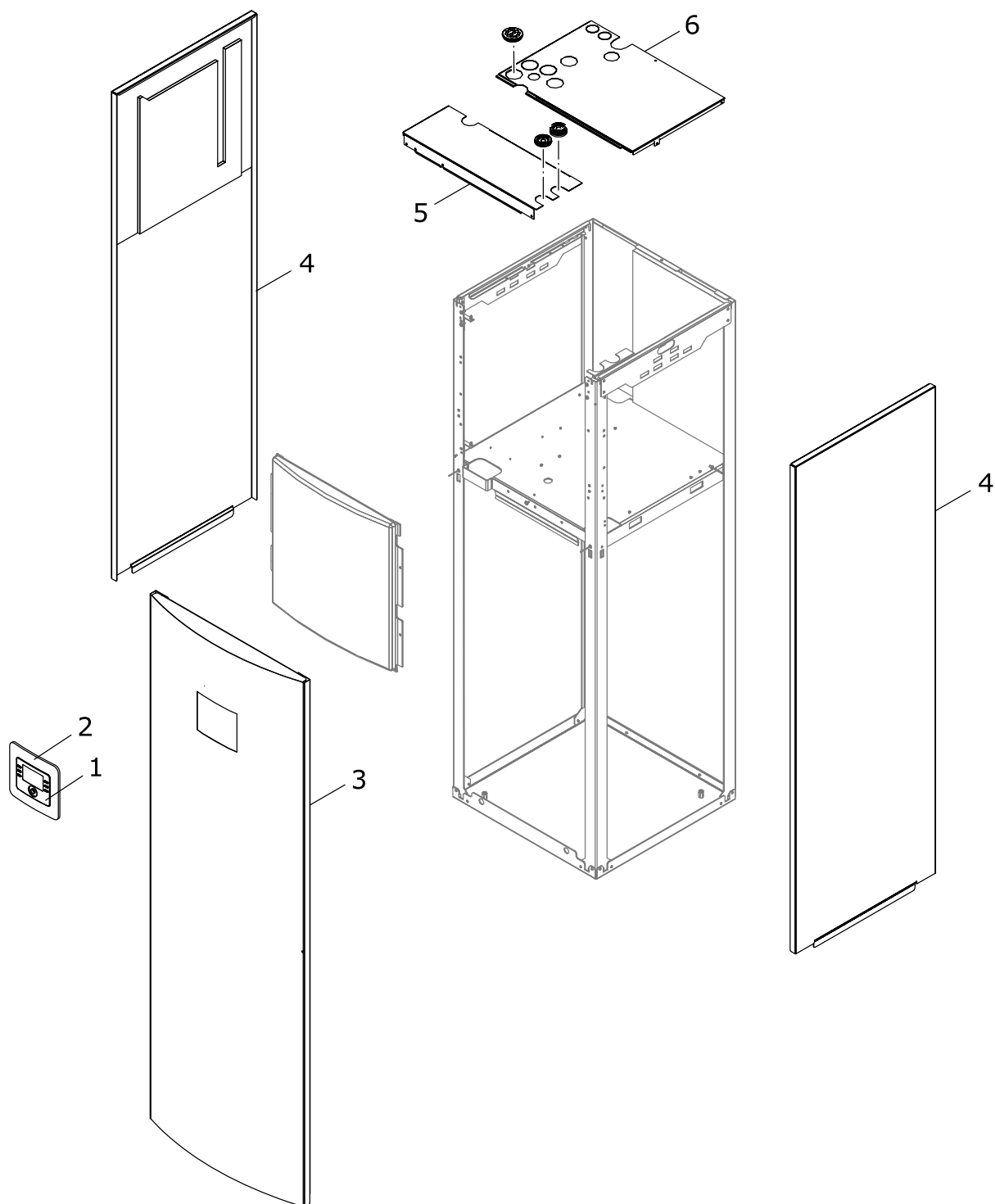
Assemble in reverse order. Ensure that the compressor cables are reinstalled in correct color order. (See picture on page 48 for reference.)

## 5 Spare Parts and Exploded Views



- 1 Chassis
- 2 Electrical panel
- 3 Hydraulics
- 4 Refrigerant circuit
- 5 Cylinder

## 5.1 Chassis



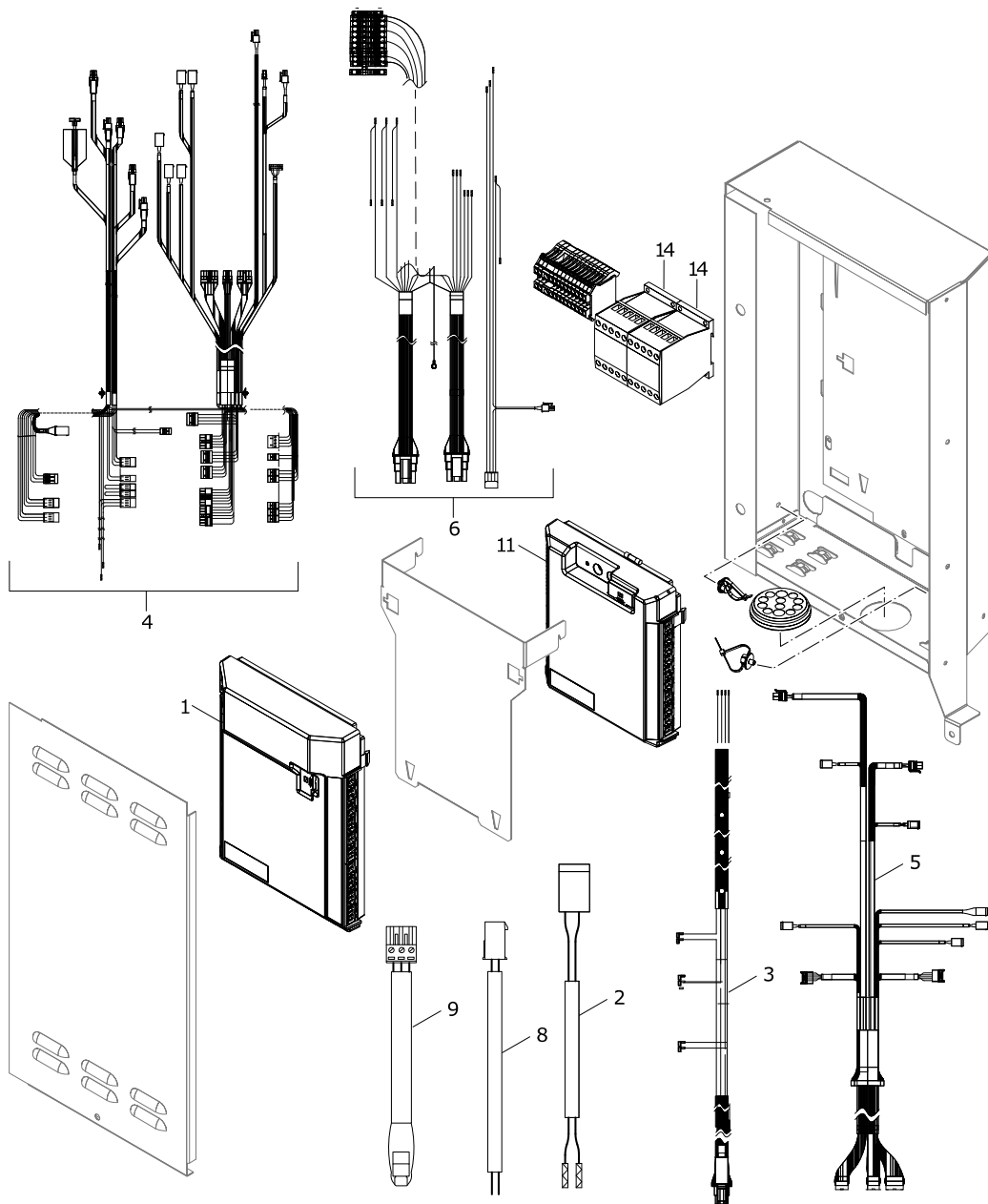
<b>IVT</b>		
1	87377064400	Display HMC300 IVT
2	8733703225	Cover Display IVT
3	8738206037	Front panel IVT

<b>Bosch</b>		
87377064390	Control unit HPC400 Bosch	
8738206038	Frame NSC Bosch	
8733703224	Front panel Bosch	

<b>Shared components</b>		
4	8733703222	Side panel
5	8738207576	Cover Roof front
6	8738207575	Cover Roof back



## 5.2 Electrical panel



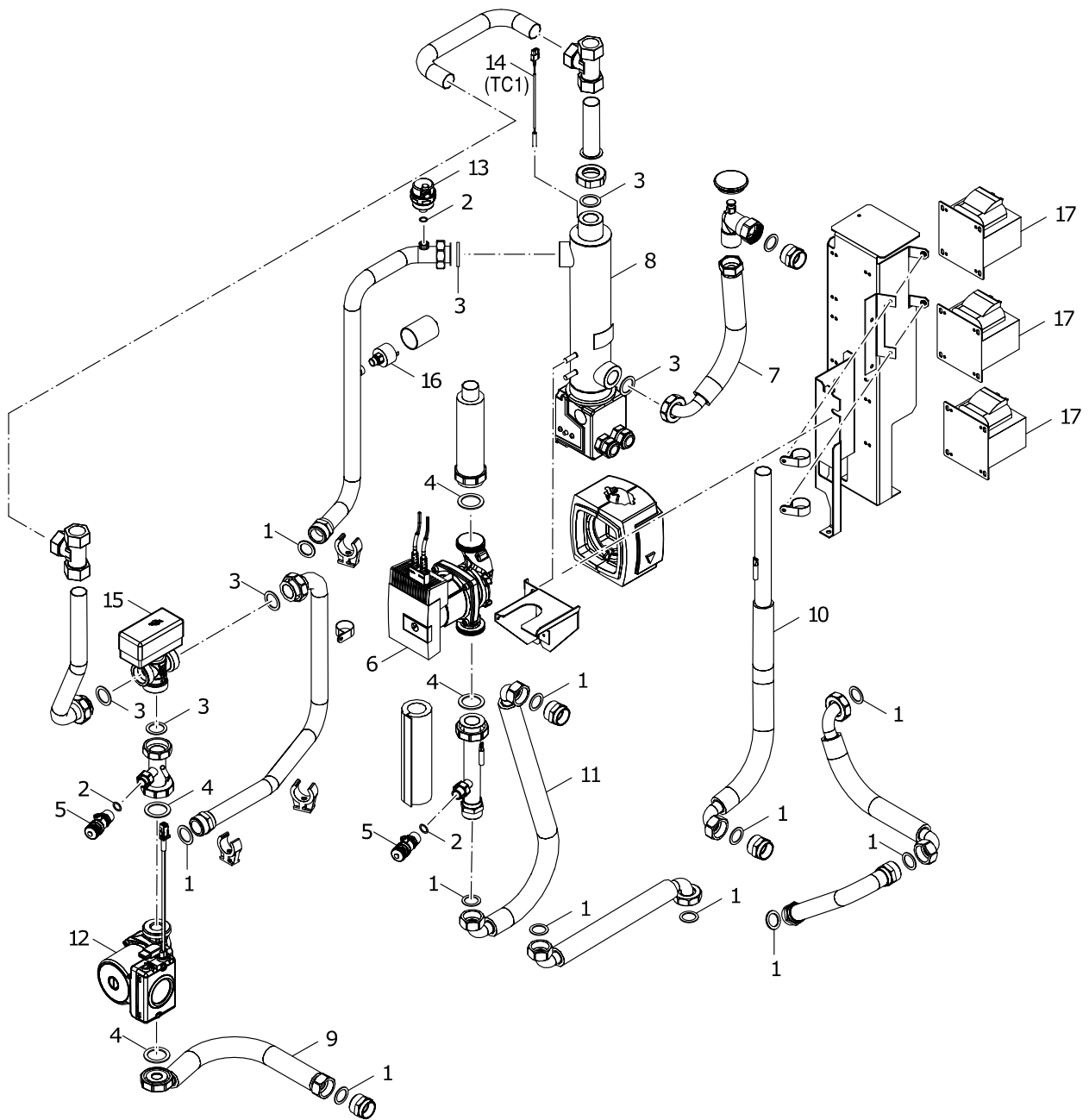
- IVT**
- 1 8738207583 CUHP Installer board IVT/Bu
  - 87183114600 Outdoor temp sensor IVT

- Bosch**
- 8738207868 Control device CUHP Bo/Ju
  - 8738203521 Outside temperature sensor 4,7K

### Shared components

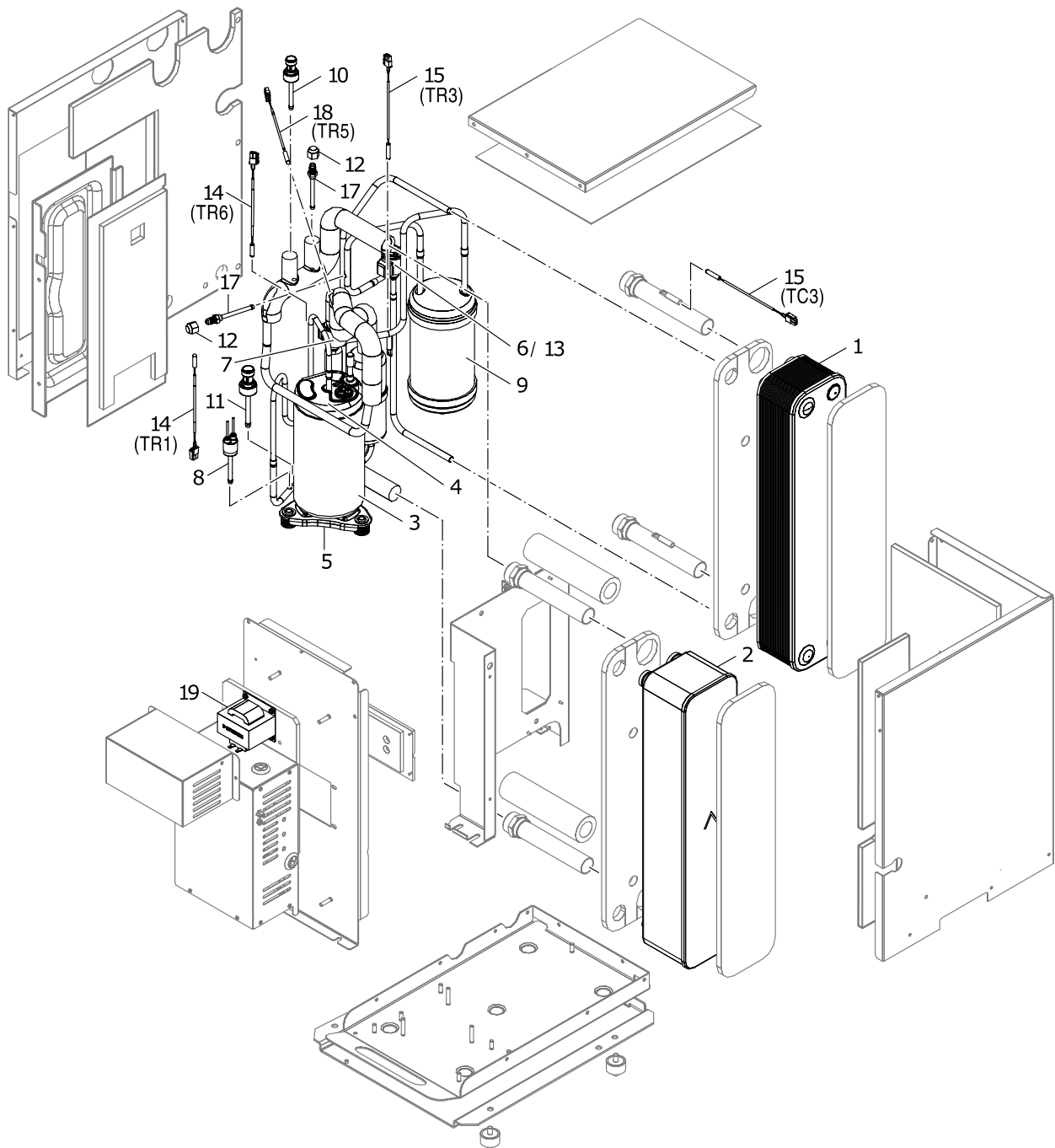
- 8733704175 IP-Modul CUHP SP
- 8738207585 Cable for Smart Grid
- 2 8733703254 Cable 100mm HMI CUHP
- 3 8738207577 Harness LW compressor
- 4 8738207578 Harness LW 9kW
- 5 8738207579 Harness LW cooling circuit
- 6 8738207580 Harness LW electrical heater
- 7 8738206040 Plugkit SP
- 8 8738206161 Cable Molex cut 4m SP
- 9 8738207584 Cabel for BB-Tool adapter
- 11 8738207582 I/O board
- 14 87172010480 Contactor DILM9-10

## 5.3 Hydraulics



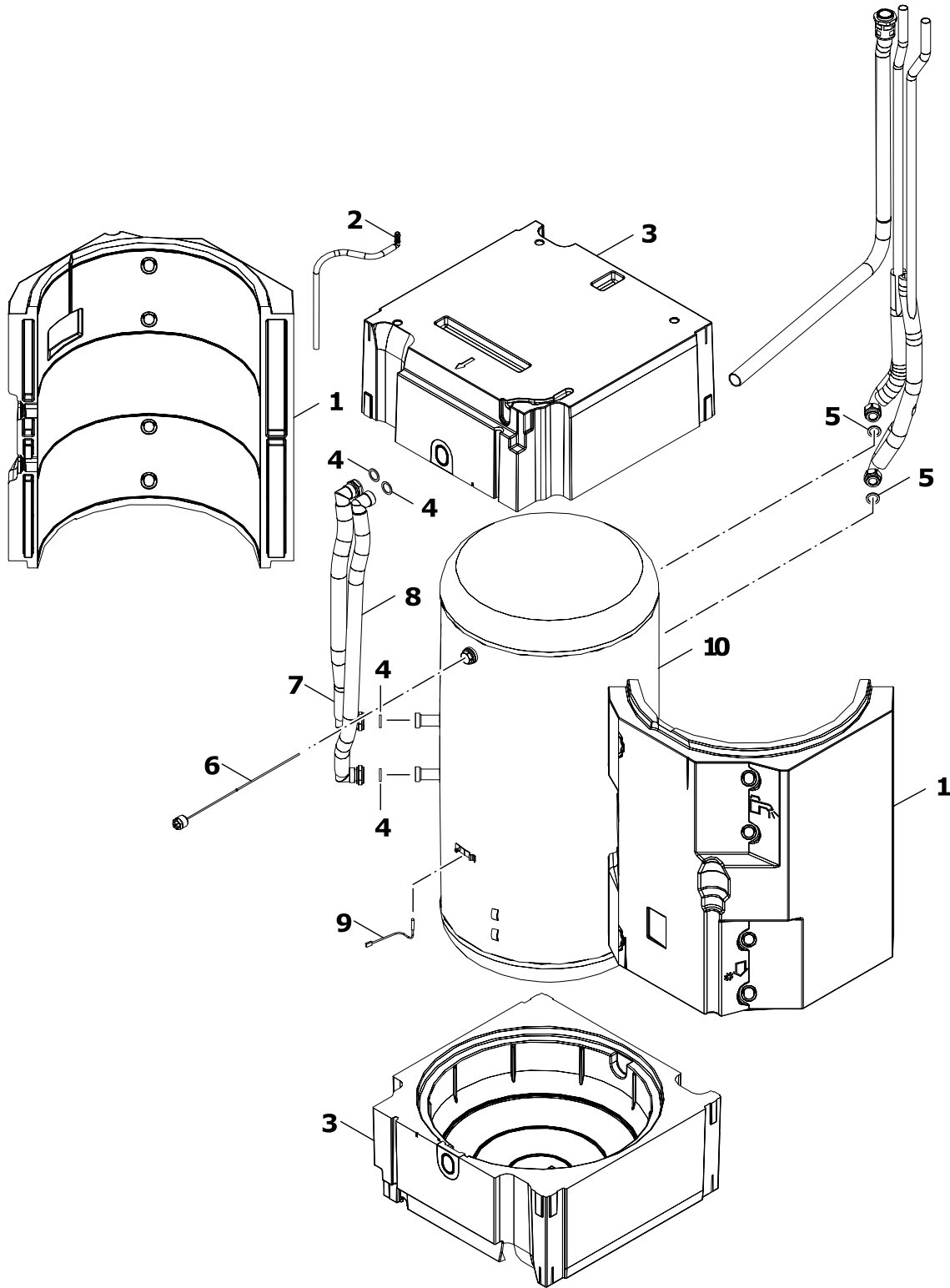
1	87110043620	Gasket 30x21x2 10pcs	10	8738207569	Hose Brine out
2	8738206074	Gasket 18x13x2 10pcs	11	8738207570	Hose - cold CP-evaporator 850 mm
3	87183101440	Gasket 8733700225 10 pcs	12	8738207571	Pump Grundfos UPM 2 25-75 130
4	8738204369	Seal 44x32x3 (10x)	13	8738207572	Valve Automatic air vent G 1/4"
5	8733703249	Drain valve G1/2	14	8733703181	Sensor 200mm 10kohm
6	8733703234	Circ.p. Strator Para 25/1-11 1	15	8733701138	3-way valve 525-G1" Motor EMV1
7	8738207566	Hose condenser - Heater	16	8733703239	Pressure switch PC G1/4"
8	8738207567	Heater 9kW	17	8738207581	Filter AC reactor 25mH LE105-1
9	8738207568	Hose pump - condenser ASM			

## 5.4 Refrigerant circuit



	8733706482	Dry filter 8659		10	8738206740	Sensor 0-15 bar high acc
1	8738207562	Heat Exchanger Swep QN85H-46		11	8738206739	Sensor 0-46 bar high acc
2	8738207563	Heat Exchanger Alpha CBH65-50H		12	8738207560	Schrader head R410a
3	8738207564	Insulation comp. round SNB 130		13	8733703216	Coil Exp. valve UKV-A300mm
4	8738207565	Insulation compressor top SNB		14	8733703182	Sensor 200mm 20kohm
5	8733703188	Compressor SNB172FEKMT		15	8733703181	Sensor 200mm 10kohm
6	8733703212	Expansion valve UKV 18		16	8738206065	Temperature sensor NTC 1000mm
7	8733703213	Expansion valve UKV 25D260		17	8738207586	Valve Schrader w pipe 410A 5/1
8	8733703199	Switch 43,8bar		18	8733703183	Sensor 200mm 4,7kohm
9	8733703211	Reciver 1,5l		19	8738207561	Inverter ID857 ECN-version

## 5.5 Cylinder



1	8733703231	Insulation side	6	8738204928	Acc. Electrical anode kit
2	8733703244	Hose 14x10 L=1500	7	8733703237	Hose G1" 647mm
3	8733703232	Insulation top/bottom	8	8733703238	Hose G1" 810mm
4	87110043620	Gasket 30x21x2 10pcs	9	8738206065	Temperature sensor NTC 1000mm
5	87110043610	Gasket 24x17x2 10 pcs	10	8733703229	Cylinder 180 l