BOSCH

Service guide

230 V 1 N~/400 V 3 N~

A/W Split 3400 Outdoor unit

ODU Split 4kW/ 6kW/ 8kW /10 kW 230V – R32
ODU Split 12kW/ 14kW 230V – R410A
ODU Split 10kW /12kW /14kW 400V – R410A

6721877754 (2025/12)

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1. TROUBLESHOOTING

1.1 Precaution, advise and notice items

1.1.1 High voltage in Indoor and Outdoor unit electrical assembly

- Open the Outdoor unit controller assembly only after one minute from power off.
- Whole controller assembly, including the wires, connected to the Outdoor unit may have the potential hazard voltage when power is on.
- Touching the Outdoor unit controller assembly may cause an electrical shock.
- Do not touch the naked lead wire and do not insert finger, conductor or anything else into the controller when power is on.

1.1.2 Charged Capacitors

- Large capacity electrolytic capacitors are used in the outdoor unit controller and driver.
- Charging voltage (380VDC) remains after power is down.
- Discharging takes about one minute after turned off.
- Touching the outdoor unit electrical assembly before discharging may cause an electrical shock.
- Measure the electrolytic capacitors voltage to be below 50VDC before further checking electrical assembly parts.

1.1.3 Advisory Notes

- When open the Outdoor unit electrical assembly, do not touch the soldering pin by hand or by any conductive material.
- When connecting or disconnecting the connectors on the PCB, hold the whole housing, do not pull the wire.

WARNING!!!

- When Power Up – the outdoor and indoor unit electrical assemblies, including the wiring, are under ***HIGH VOLTAGE***!
- Never open the outdoor or indoor units before turning off ***ALL*** Power sources!
- When turned off, the outdoor unit electrical assembly is still charged (400V)!
- DC capacitors are discharging for about ***ONE Minute*** after power is OFF.
- Touching the electrical before discharging may cause anelectrical shock!

- **For safe handling of the electrical assembly please refer to section *1.1* above.**

1.2 Technician Test Mode

This test is aimed for the technicians to check the system under a preset compressor and outdoor fan values while the expansion valves will function according to the normal running mode.

1.2.1 Entering technician mode

- This mode is entered through the outdoor unit using the HMI;
- It can be selected either for cool or heat;
- Technician test is not possible to enter during the anti-freeze protection.

1.2.2 Technician mode procedure

- The outdoor unit will be working normally (according to the run mode control logic) except the following changes:
- The dry contacts inputs will be ignored.
- Protections will be operative for stop compressor.
- The compressor and the outdoor fan will be working in target preset values according to IDU (hydro unit) and ODU model.

1.2.3 Exiting technician mode

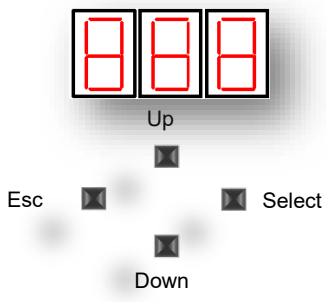
Technician mode will be closed either when:

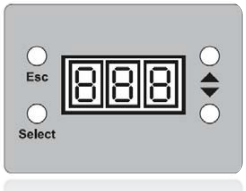
- Exit the HMI (exiting the PtC/CtC or PtH/CtH menus) or;
- After 60 minutes without exit the menu.

1.3 User Interface

1.3.1 User interface description

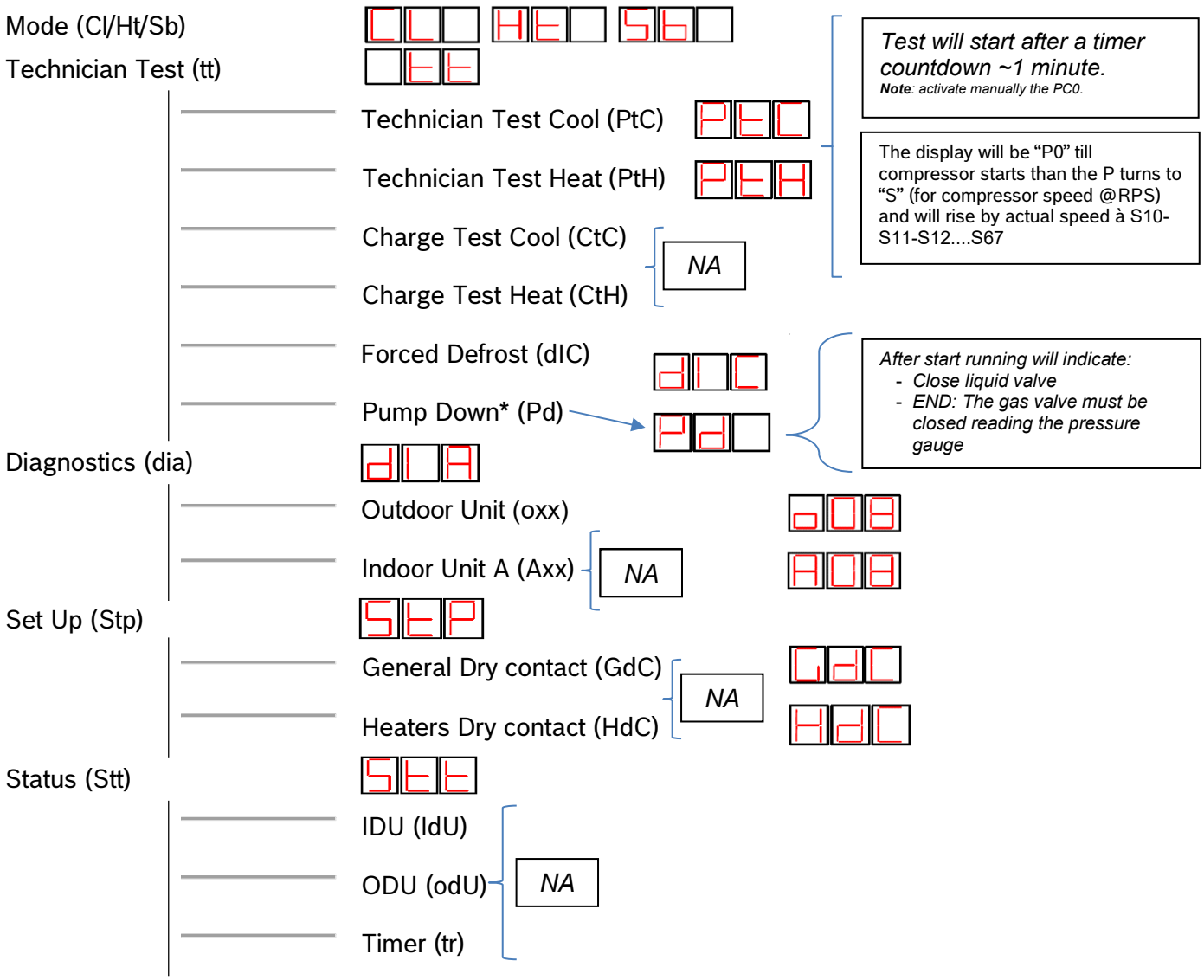
- The user interface uses three 7 segments, and 4 keys.
- Keys, the 4 keys are:
  - Scroll - used to scroll between options (up and down);
  - Select - use to select an option;
  - Esc - Will go up one level in the menu;
- The user interface concept is Tree menus.
- Active selection or status will be indicated by a dot at the right side of the third digit.





1.3.2 Menus

1.3.2.1 Main Menu

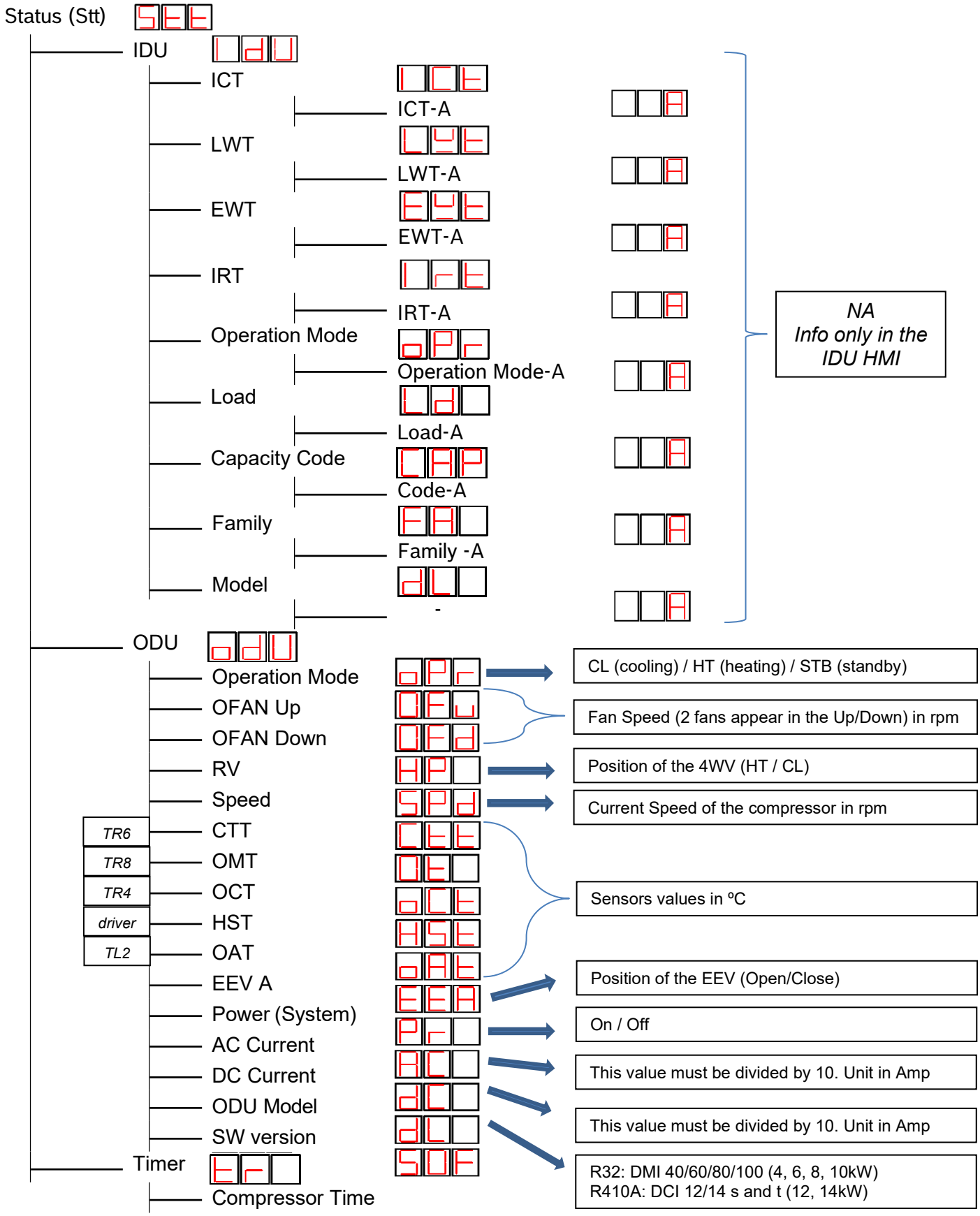


Notes:

- The default presentation will be the mode of the unit (Cl/Ht/Sb).
- In diagnostics menu, xx means failure code. Only the last active (operative) failure code will be shown, if there is no active failure a " - "sign will be shown (the faults Numbers are the one shown in the single split table).
- All the menus, except technician menus- Status, Technician Test and their sub menus, are automatically exited to the main menu after 1 continuous minute out of any press.
- When Technician test cool or heat menu is selected, it will blink constantly until this menu is escaped.
- NA – Not applicable for this model

Note: This service menus are only for the ODU HMI.
*: See procedure (***2.19***)

1.3.2.2 Status (Sub Menu)



1.4 General System Failures and Corrective Actions

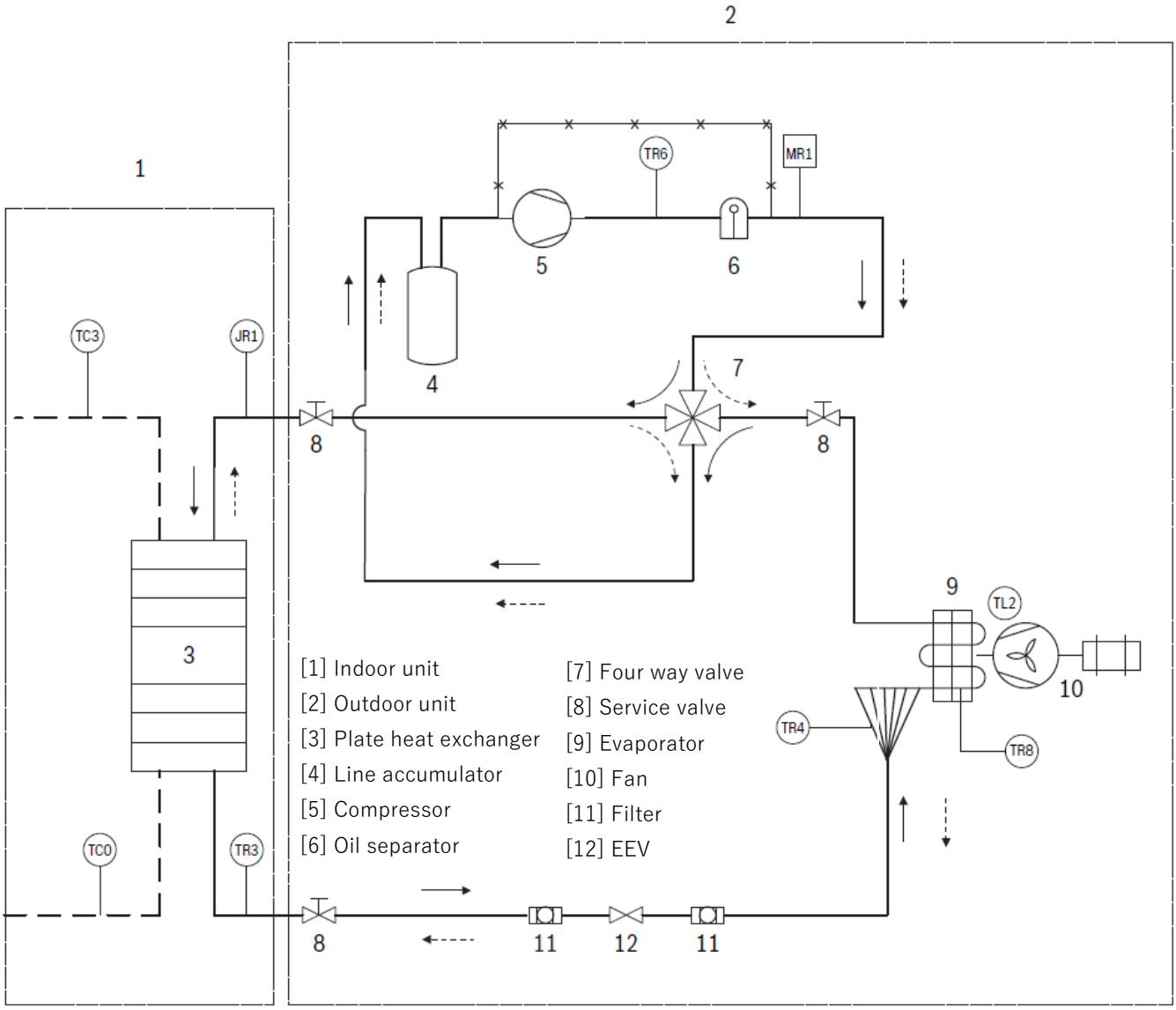
No.	SYMPTOM / PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Outdoor unit			
1.	Outdoor unit display board and LEDs are off	No power supply	Check supply voltage to main terminals L and N with multimeter.
		Miss-wiring	Check all supply wiring to controller and terminals according to wiring diagram
		Loose connection	Check all power wiring connections
		Burnt fuse	Check fuse on the main board ***(1.7.7)***
		If still not OK	Replace main board ***(2.13)***
2.	Compressor does not start operation	One or some components are not operating well	Check for any fault code shown on display board and act accordingly.
		Electronics control problem or protection	
		PFC Chock coil	Check the PFC Chock coil ***(1.7.5)***
		Driver failure	Check if fault code # is shown on display board. If so, fix the problem according to ***1.7.4*** or replace driver.
		If still not OK	Replace compressor.
3.	Cooling capacity is not sufficient	Unit size does not match the load	Check if the size chosen for the complete room(s) load is enough or need bigger units
		Piping size not matching system	Check if piping is installed correctly and proper diameter size and total length is according to unit specifications
		Refrigerant leakage	Check refrigeration system ***(1.5)***
		Refrigerant over-charge	
		Refrigerant clog	Check and repair clogging specially near the EEV
		Electronics control problem or protection	Check for any fault code shown on display board and act accordingly.
		Compressor failure	Check if fault code # is shown on display board. If so, fix the problem according to ***1.7.9*** or replace driver
		Indoor coil block	Clean filters and/or remove block or air by- pass
		Indoor fan malfunction	Check the motor and capacitor ***(Error! Reference source not found.)***
		Outdoor coil block	Remove block and/or avoid air by-pass
		Outdoor fan malfunction	Check outdoor fan motors ***(1.7.8)***
		EEV malfunction	Check EEV ***(1.7.11)***

No.	SYMPTOM / PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
		Thermistor(s) malfunction	Check if any of fault codes #1-7 is shown on display board. Replace faulty sensors ***(1.7.12)***
4.	Heating capacity is not sufficient	Check all according to above cooling problem ***(3)***	
		Reverse valve	Check reversing valve operation ***(1.7.10)***
		Deicing not performed well (during low outdoors temperatures)	Check OCT (**TR4**) and OAT (**TL2**) sensors fault codes (#1 and 4) Check OCT(**TR4**)/OMT(**TR8**) sensor if connected well to pipe Check OAT (**TL2**) sensor if connected well Check the sensors operation ***(1.7.12)***.
5.	Compressor is over heated	Electronic control	Check for any fault code shown on display board and act accordingly.
		EEV problem	Check EEV ***(1.7.11)***
		Refrigerant leakage	Check refrigeration system ***(1.5)***
		Indoor coil block	Clean filters and/or remove block
		Indoor fan malfunction	Check indoor fan motor and capacitor **(*Error! Reference source not found.*)**
		Outdoor coil block	Remove block and/or avoid air by-pass
		Outdoor fan malfunction	Check outdoor fan motors ***(1.7.8)***
		Compressor malfunction	Check the compressor ***(1.7.9)***
6.	Compressor stops many times during operation	Check all according to above problem.	
		HP Switch	Check if HPS fault code (#8) is accruing frequently. If so, check the switch operation ***(1.7.14)***
		LP Switch	Check if LPS fault code (#9) is accruing frequently. If so, check the switch operation **(*Error! Reference source not found.*)**
7.	Not all units are operating	Communication problems	Check the communication between outdoor and indoor units ***(1.7.16)***
8.	Unit is cooling while in heat mode	RV problem	Check RV operation ***(1.7.10)***
		IDU-ODU communication	Check the communication between outdoor and indoor units ***(1.7.16)***
9.	Compressor is generating abnormal noise	Phase order to compressor is wrong	Check compressor phase order
		Compressor internal parts wearing	Replace compressor.
		Vibration	Check all piping connections Check compressor rubbers are fixed well Check all screws on unit metal chassis are tightened Check that no piping is in contact with each other or with other parts.
10.			Check that no obstructions to outdoor unit coil air inlet.

No.	SYMPTOM / PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
	Freezing of outdoor unit coil in heat mode and outdoor unit base is blocked with ice	Hard conditions of low temperatures and high humidity	Check the all holes in bottom of outdoor unit base and open and clean from dirt. Check OCT (**TR4**) and OAT (**TL2**) sensors Connect base heater
11.	The unit stop suddenly during operation	EMC interference to the A/C unit	Check for EMC problems ***(1.7.17.1)***
12.	Indoor unit Indicator LEDs may flicker		
13.	Other home appliances operation is faulty such as noise appears in the television picture, or the picture is distorted, or static occurs in the radio sound	EMC interference by the A/C unit	Check for EMC problems ***(1.7.17.1)***
14.	All others	Specific problems of indoor or outdoor units	Check for any fault code shown on display board and act accordingly.

1.5 Checking the refrigeration system

1.5.1 System layout



1.5.2 Checking the refrigeration system

Checking system pressures and other thermodynamic measures should be done when system is in technician Mode where the system operates as in fixed settings.

DISPLAY BOARD GENERAL DESCRIPTION

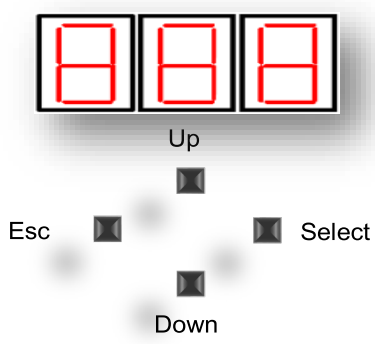
The display board serves as interface between the installer/technician and the A/C unit.

Buttons description:

Up & Down - used to scroll between options (up and down)

Select - used to select an option

Esc - Will go up one level in the menu



Mode (Cl/Ht/Sb)
Technician Test (tt) - Technician Test Cool (ttC) - Technician Test Heat (ttH)

1.6 Troubleshooting by Diagnostics Codes

1.6.1 Fault codes Outdoor unit

If any fault exists in the system, its fault will be shown according to the following coding method. The 5 last faults occurred in the system will be stored in the **EEPROM**.

If no fault exists in the system, no fault code will be displayed during normal operation mode. **STATUS LED** is blinking 5 times in 5 seconds and shut off for the next 5 seconds.

FAULT LED (Only R10A ODU) will blink during the same 5 seconds according to the table below *"Outdoor unit diagnostics and corrective actions"*.

Note: This LED doesn't have blinking code errors. Only indicates a possible error (see table below in 1.6.2)

Only one code is shown. Order of priority is lower to the higher number. Diagnostics is continuously ON as long power is on.

1.6.2 Outdoor unit diagnostics and corrective actions

Code #	Sub-Fault Description	Fault Trigger (Description)	Fault Description	Corrective Action
1	ODUC MCU Reset	MCU reset	Stop Compressor Request Due to Fault: **NO**	Normally no action is required. If the problem persists it may need to check the power supply to PCB A and /or replace controller.
2	CBI MCU Reset			
4	Driver MCU Reset			
10	OCT (TR4) shorted	Temp >105 °C	Sensor not connected or damaged	Check sensor ***(1.7.12)***
11	OCT (TR4) Disconnected	Temp <-45°C		
12	CTT (TR6) is shorted	Temp >125 °C		
13	CTT (TR6) disconnected	Temp <-45°C		
14	HST shorted	Temp >125 °C		
15	HST disconnected	Temp <-45°C		
16	Heat Sink Sensor Error- By Driver	Heatsink sensor is over 110°C	Compressor stopped due to high pressure protection	Normally no action is required If the problem persists for more than twice on each hour, check for refrigerant
17	OAT (TL2) shorted	Temp >75 °C	Sensor not connected or damaged	Check sensor ***(1.7.12)***
18	OAT (TL2) disconnected	Temp <-45°C		
19	OMT (TR8) shorted	Temp >105 °C		
20	OMT (TR8) disconnected	Temp <-45°C		
41	HPS open (by compressor driver)	- High Pressure Switch is damaged (always open) - Refrigeration Circuit is clogged (e.g. service valve is closed) - HW problem related to HPS	- Check and replace the HPS - Check and correct the refrigeration circuit clogging - Replace ODUC	
42	HPS open (by control logic)			

43	Low pressure protection	Reserved	Stop Compressor Request due to Fault: **YES**	NA
44/46	Outdoor controller does not receive messages	ODU 4-9: not used ODU10-14: Message is missing or checksum in-correct >30 sec.	Driver fault	Check power supply to driver **Check the Fuses of the top PCB** Check driver communication (***1.7.15***)
45	No Communication (with IDU)	Message is missing or checksum in-correct over 30 s.	IDU-ODU communication	Check communication between indoor and outdoor units ***(1.7.16)***
50	IPM Fault signal detection	IPM Fault signal detection	Over current / IPM malfunction	Check no obstruction to electrical box and outdoor coil air inlet Check Compressor (***1.7.9***) Check driver (***1.7.4***)
51	Current sensor fault	Hardware current sensor false reading		
52	IPM drive pin fault	Hardware control signal to IPM pin is not correct		
53	Compressor wire error	No current to compressor wire	Compressor stopped due to high pressure protection	Normally no action is required If the problem persists for more than twice on each hour, check for refrigerant clog. Check the switch operation ***(1.7.14)*** Check HST sensor ***(1.7.12)***
54	Compressor current Sensor	Hardware current sensor false reading	Driver fault	Check power supply lines, if OK, Replace Compressor Driver
55	Compressor Driver pin	Hardware control signal to IPM pin is not correct		
56	DC Under voltage	400V: <380VDC 230V: <235VDC	DC voltage exceeds its limit	Check if input voltage out of limit, if not and the problem persists, replace driver. If voltage is high/Low, shut off the power and recommend the customer to fix the power supply

57	DC Overvoltage	400V: >820VDC 230V: >430VDC	DC voltage exceeds its limit	Check if input voltage out of limit, if not and the problem persists, replace driver. If voltage is high/Low, shut off the power and recommend the customer to fix the power supply
58	DC Over Current (by logic)	Protection - Stop compressor above limit	Compressor stopped due to over current protection	Normally no action is required If the problem persists for more than twice on each hour, check for refrigerant leak or clog and thermodynamic operation ***(1.5)***
59	Undefined driver Fault	Driver failure		Check Compressor ***(1.7.9)*** Check driver ***(1.7.4)***
60	Open Phase	Phase failure		Check the phases from the power grid
61	Compressor Over Current	ODU 4-8: not used ODU 10-14: Instant running compressor current larger than IPM withstands	Compressor stopped due to over current protection	Normally no action is required If the problem persists for more than twice on each hour, check for refrigerant leak or clog and thermodynamic operation ***(1.5)***
Compressor Driver Faults				
70	PFC current sensor fault	Hardware current sensor false reading	Driver fault	Check that compressor wiring is correctly installed and not loose wiring Check that compressor wiring is not installed in reverse order Check power supply lines, if OK, Replace Compressor Driver
71	PFC over current fault	ODU 4-8: Instant running current larger than IPM withstands ODU 10-14: not used		
72	Input Reversed Phase state	Check the correct connection of the phases		
73	PFC Over Current fault	Instant running compressor current is over 60A	ODU 4-8: not used ODU 10-14: Instant running PFC current is larger than IPM withstands	Check power supply lines, if OK, Replace Compressor Driver

74	AC Under Voltage	400V: <380VAC Peak 230V: <230VAC Peak	AC input voltage is lower/higher than limit	Check if input voltage is out of limit between all phases and neutral, if not and the problem persists, replace driver. If voltage is High/low, recommend the customer to fix the power supply
75	AC Over Voltage	400V: >700VAC Peak 230V: >410VAC Peak		
76	AC input zero Cross error	AC Hz <40Hz AC Hz >70Hz Or no AC zero cross signal		
77	AC Over Current (by Logic)	Protection - Stop compressor above limit	Compressor stopped due to over current protection	Normally no action is required If the problem persists for more than twice on each hour, check for refrigerant leak or clog and thermodynamic operation ***(1.5)***
78	System Over Power (by Logic)	Protection - Stop compressor above limit		Normally no action is required If the problem persists for more than twice on each hour, check for refrigerant leak or clog and thermodynamic operation ***(1.5)***
PFC side Faults				
90	Abnormal System Behavior	Compressor cannot start properly	Compressor suspicious for reverse rotation	Reset power and check again after 5 min. If happens again, replace driver. Note: Could happen when use in lab with PC Tool and change Min-Max speed of compressor. Then reset to default speed parameters
91	OFAN Up no feedback	No encoder signal from motor	Outdoor fan(s) does not rotate	Check no obstruction to outdoor unit coil air path. Check OFAN motor ***(1.7.8)***
92	OFAN Down no feedback			

93	OFAN mismatch	The FAN is not the correct one		Check the correct model of the FAN
96	Mismatch between IDU & ODU models	IDU code not matched ODU code	Mismatch between IDU and ODU models	Indoor unit sizes are exceeding outdoor unit capacity, check indoor units model plugs. Either too high or too low capacity indoor units
97	Missing ODU configuration	Dip switches are not set correctly	ODU dip switches are not configured correctly	Check ODU dip switch setting if correct.
98	Undefined ODU Model			
99	HW Type and ODU model	ODU controller not matching ODU model dip switch	Dip switches are not set correctly or ODU controller does not match ODU type	
100	Undefined compressor model (reported by driver)	Dip switches are not set correctly	ODU dip switches are not configured correctly	
101	Non-Hydro Setting		IDU dip switches are not configured correctly	Configuration by DIP switches/indoor unit
110	Heat Sink Overheating (by logic)	Protection - HST>80ºC Reset- HST <68ºC	- Air blockage at the primary heat exchanger side - Outdoor fan/motor problem - Check the screws connecting the driver to heat sink are tighten -HST electronic circuit failure	Check that the airflow around the ODU is free and the fan is running free. Check the screws connecting the driver to Heat Sink are tightened. Replace the inverter. Check outdoor fan motor ***(1.7.8)***
111	Heat sink overheat (by driver)	Protection - HST>85ºC Reset- HST <85ºC		
112	Compressor Over Heating Protection	Protection – CTT (**TR6**)>110ºC Reset – CTT (**TR6**) <92ºC	- Refrigerant Leakage - EEV problem- restriction - Faulty CTT (**TR6**) (fake) - Refrigeration Circuit Blockage - CTT (**TR6**) electronic circuit failure	Normally no action is required. If the problem persists for more than twice on each hour, check for refrigerant clog. Check the switch operation ***(1.7.14)*** Check HST sensor ***(1.7.12)***

				Replace the inverter.
115	Low evaporating temperature cooling	Protection: 6 minutes after compressor start up and ICT (**JR1**) <0°C for 10 seconds Reset: 6 minutes after compressor start up and ICT (**JR1**)>0°C for 10 seconds	Indoor coil is freezing - protection -Reverse Valve is stuck -Refrigerant leakage -ICT fake low -ICT hardware circuit problem	Normally no action is required If the problem persists for more than twice on each hour: Check water flow too low Check refrigerant leakage – add refrigerant if required according to pressure charts on section ***Error! Reference source not found.*** Check ICT (**JR1**) sensor – replace if required
116	Low evaporating temperature heating - faulty reverse valve ***(1.7.10)***	RV valve in OFF state during heat mode Protect against four way valve malfunction in heating mode	-Reverse Valve is stuck. Reset it -Refrigerant leakage -ICT (**JR1**) fake low -ICT (**JR1**) hardware circuit problem	- Check Reverse valve operation, and replace when malfunctioned -Check proper refrigerant charge - Replace ICT (**JR1**) sensor when malfunctioned -Replace ODUC
117	Low entering /leaving water temperature cooling ***(1.7.10)***	LWT (**TC0**)/EWT(**TC3**) <4°C during cool mode		Check water flow too low Check refrigerant leakage – add refrigerant if required according to pressure charts. Check LWT(**TC3**) sensor – replace if required
118	Low leaving water temperature defrost	LWT(**TC3**) <8°C during defrost mode		
121	Low Entering Water Temperature defrost	EWT (**TC0**) < 15°C while **JR0** < 0°C (for 10 seconds)	Stop Compressor Request Due to Fault (Operation mode type)	
122	Too Low Condensing Temperature- Defrost (new)	Defrost Defrost (individual lock)	Detects 4WV malfunction in Defrost Max (OCT (**TR4**), OMT (**TR8**)) <0 at the end of Defrost	Refrigerant Leakage or Faulty 4WV

127	Too High Evaporating Temperature-Cooling	Detects 4WV malfunction in cooling	ICT > (LWT + 10) Compressor Stops	- Faulty 4WV
128	Outdoor Coil Overheating for **cooling and defrost**	Protects against high condensing temperature the Primary Heat Exchanger	Protection: OMT (**TR8**)> 65°C. Reset value: OMT (**TR8**)< 53°C - Primary Heat exchanger is blocked (air side) - Outdoor fan/motor problem - OMT (**TR8**) Faulty sensor (fake) - OMT (**TR8**) electronic circuit failure	- Clear the secondary Primary Heat exchanger - Replace OMT (**TR8**) sensor - Replace ICT (**JR1**) sensor - Replace ODUC -Correct the reverse valve (if the error occurs in cooling) Check for refrigerant clog and sensor operation ***(1.5)*** Check sensor ***(1.7.12)***
129	Indoor Coil Overheating	Protects against high condensing temperature the Secondary Heat Exchanger	Protection: ICT (**JR1**) > 65°C Reset value: ICT (**JR1**) < 55°C - Secondary Heat exchanger is blocked (Water and refrigerant sides) - ICT (**JR1**) Faulty (fake) - ICT (**JR1**) electronic circuit problem - Faulty reverse valve (in cooling mode)	
130	Instant defrost HMI ***(1.5)***	Primary Heat Exchanger Defrost Process in heating mode Defrost triggered by HMI	OCT (**TR4**)>12ºC Or Defrost Time> 15 minutes or terminated by HMI or Defrost Failure (min LWT(**TC0**)/EWT(**TC3**) <8ºC)	Normal operation (no root cause)
131	Instant defrost M2L ***(1.5)***	Defrost triggered by M2L		

132	Instant defrost IDU ***(1.5)***	Defrost triggered by indoor unit		
133	Automatic Defrost- Regular (by OCT (**TR4**) only) ***(1.5)***	When OAT (**TL2**)>0ºC : OCT (**TR4**)<-8ºC and Dynamic timer (average 40 minutes) When OAT (**TL2**) ≤0ºC: OCT (**TR4**)<(8 -0.9*OAT (**TL2**)) and Dynamic timer (average 40 minutes) Reset: OCT (**TR4**)>12ºC or Defrost Time> 15 minutes or Defrost Failure (min LWT(**TC0**)/EWT(**TC3**) <8ºC)	-Mostly normal Operation when defrost cycles occur at regular frequency When the defrost occurs too frequently: - Refrigerant Leakage - OAT (**TL2**) fake up - OCT (**TR4**) fake down - Outdoor unit air blockage - Improper outdoor fan runs at too low speed - OCT (**TR4**) or OAT (**TL2**) or Outdoor fan hardware circuit problem - Refrigerant Circuit Blockage that causes improper OCT (**TR4**) reading	-No corrective action is required When the defrost occurs too frequently: - Correct refrigerant amount - Replace OAT (**TL2**) sensor - Replace OCT (**TR4**) sensor - Clear the Outdoor unit air blockage - Improper outdoor fan runs at too low speed - Replace outdoor controller - Clear the Refrigerant Circuit Blockage when possible
134	Automatic defrost- Fast (by OCT (**TR4**)) ***(1.5)***	OCT (**TR4**)<OAT (**TL2**)-12ºC and 30 minutes from last defrost OCT (**TR4**)>12ºC or Defrost Time> 15 minutes or Defrost Failure (min (LWT(**TC0**)/EWT(**TC3**)<8ºC)		

135	Automatic defrost- Backup (by OCT (**TR4**))	OCT (**TR4**)<-3ºC and 4 hours from last defrost Reset: OCT (**TR4**)>12ºC or Defrost Time> 15 minutes or Defrost Failure (min (LWT(**TC0**)/EWT(**TC3**) <8ºC)		Normally no action is required If the problem persists for more than twice on each hour, check for refrigerant leak and thermodynamic operation ***(1.5)***
136	Automatic defrost- Regular (by OMT (**TR8**))	When OAT (**TL2**)>0ºC: OMT<-8 and Dynamic timer (average 40 minutes) When OAT (**TL2**)≤0ºC: OMT< (8 -0.9*OAT (**TL2**)) and Dynamic timer (average 40 minutes)	OMT (**TR8**)>30ºC or Defrost Time> 15 minutes or Defrost Failure (min (LWT(**TC0**)/EWT(**TC3**)<8ºC) -Mostly normal Operation when defrost cycles occur at regular frequency When the defrost occurs too frequently: - Refrigerant Leakage - OAT (**TL2**) fake up - OMT (**TR8**) fake down - Outdoor unit air blockage - Improper outdoor fan runs at too low speed - OMT (**TR8**) or OAT (**TL2**) or Outdoor fan hardware circuit problem - Refrigerant Circuit Blockage that causes improper OMT (**TR8**) reading	-No corrective action is required When the defrost occurs too frequently: -Correct refrigerant amount -Replace OAT (**TL2**) sensor -Replace OMT (**TR8**) sensor - Clear the Outdoor unit air blockage - Improper outdoor fan runs at too low speed - Replace outdoor controller -Clear the Refrigerant Circuit Blockage when possible ***(1.5)***

137	Automatic defrost- Fast (by OMT (**TR8**))	Primary Heat Exchanger Defrost Process in heating mode: OMT (**TR8**) <OAT (**TL2**)-12ºC and 30 minutes from last defrost Reset: OMT (**TR8**) >30ºC or Defrost Time> 15 minutes or Defrost Failure (min (LWT(**TC0**)/EWT(**TC3**)<8ºC)	'-Mostly normal Operation when defrost cycles occur at regular frequency When the defrost occurs too frequently: -Refrigerant Leakage -OAT (**TL2**) fake up -OMT (**TR8**) fake down - Outdoor unit air blockage - Improper outdoor fan runs at too low speed - OMT (**TR8**) or OAT (**TL2**) or Outdoor fan hardware circuit problem - Refrigerant Circuit Blockage that causes improper OMT (**TR8**) reading	-No corrective action is required When the defrost occurs too frequently: -Correct refrigerant amount -Replace OAT (**TL2**) sensor -Replace OMT (**TR8**) sensor - Clear the Outdoor unit air blockage - Improper outdoor fan runs at too low speed - Replace outdoor controller -Clear the Refrigerant Circuit Blockage when possible ***(1.5)***
138	Automatic defrost- Backup (by OMT (**TR8**))	Primary Heat Exchanger Defrost Process in heating mode: OMT (**TR8**)<-3ºC and 4 hours from last defrost Reset: OMT (**TR8**) >30ºC Or Defrost Time> 15 minutes or Defrost Failure (min(LWT,EWT)<8ºC)		Normally no action is required If the problem persists for more than twice on each hour, check for refrigerant leak and thermodynamic operation ***(1.5)***
141	Indoor non-defrost request during defrost Process			
142	Indoor Defrost request during non-defrost process			

146	Leaving Water Temperature Countermeasure	System is performing out of its water temperature limitations: Heating:>LWT(**TC3**)>57ºC/62ºC	Protection - Stop compressor above limit (if function enabled)	Check LWT (**TC3**) sensor Check refrigerant leakage Check obstacle to air flow
147	Low Pressure countermeasure	Prevent the system from starting whenever the service valves are not open. In this case, the nitrogen pressure at the indoor side will be 2 bars, which is equivalent to -28 ºC. Also, whenever the plate heat exchanger is already broken, the compressor will not be starting to prevent further system damages (the pressures measure the water pressure which is 1.8 bar).		Check LWT (**TC3**) sensor Check for refrigerant clog and sensor operation ***(1.5)***. Check hydronic unit
148	HST overheating countermeasure	HST >70 ºC, ODU in Stand By mode	Protects the ODU controller while in SB mode and exposed to high temperature surrounding. ODU will remain in SB until HST reduces to <60 ºC, during this time the outdoor fans will operate to remove the excessive heat from ODU controller.	Install outdoor unit in a shade
149	Ambient Countermeasure- Low Cooling	Protects against low ambient operation in cooling: OAT (**TL2**)≤10ºC Reset: OAT (**TL2**)≥12ºC	- Ambient condition is too low in cooling - OAT (**TL2**) sensor fakes - OAT (**TL2**) hardware circuit problem	- The unit will recover automatically once the ambient conditions increases - Replace OAT (**TL2**) sensor - Replace outdoor controller

150	Ambient Countermeasure - High Cooling	Protects against high ambient operation in cooling: OAT (**TL2**)≥48ºC Reset: OAT (**TL2**)≤46ºC	-Ambient condition is too high in cooling -OAT (**TL2**) sensor fakes -OAT (**TL2**) hardware circuit problem	- The unit will recover automatically once the Ambient conditions reduces - Replace OAT (**TL2**) sensor - Replace outdoor controller
151	Ambient Countermeasure - Low Heating	Protects against high ambient operation in heating: OAT (**TL2**)≤-23ºC Reset: OAT (**TL2**)≥-21ºC	-Ambient condition is too low in heating -OAT (**TL2**) sensor fakes -OAT (**TL2**) hardware circuit problem	- The unit will recover automatically once the ambient conditions increases - Replace OAT (**TL2**) sensor - Replace outdoor controller
152	Ambient Countermeasure - High Heating	Protects against high ambient operation in heating: OAT (**TL2**)≥48ºC Reset: OAT (**TL2**)≤46ºC		
165	Outdoor Coil Overheating in Heating	Cool mode protection - Stop compressor if outdoor coil temperature exceeds the limit Set: OMT (**TR8**)>65 Reset: OMT (**TR8**)< 48	Detects 4WV malfunction in Heating	- Check 4WV

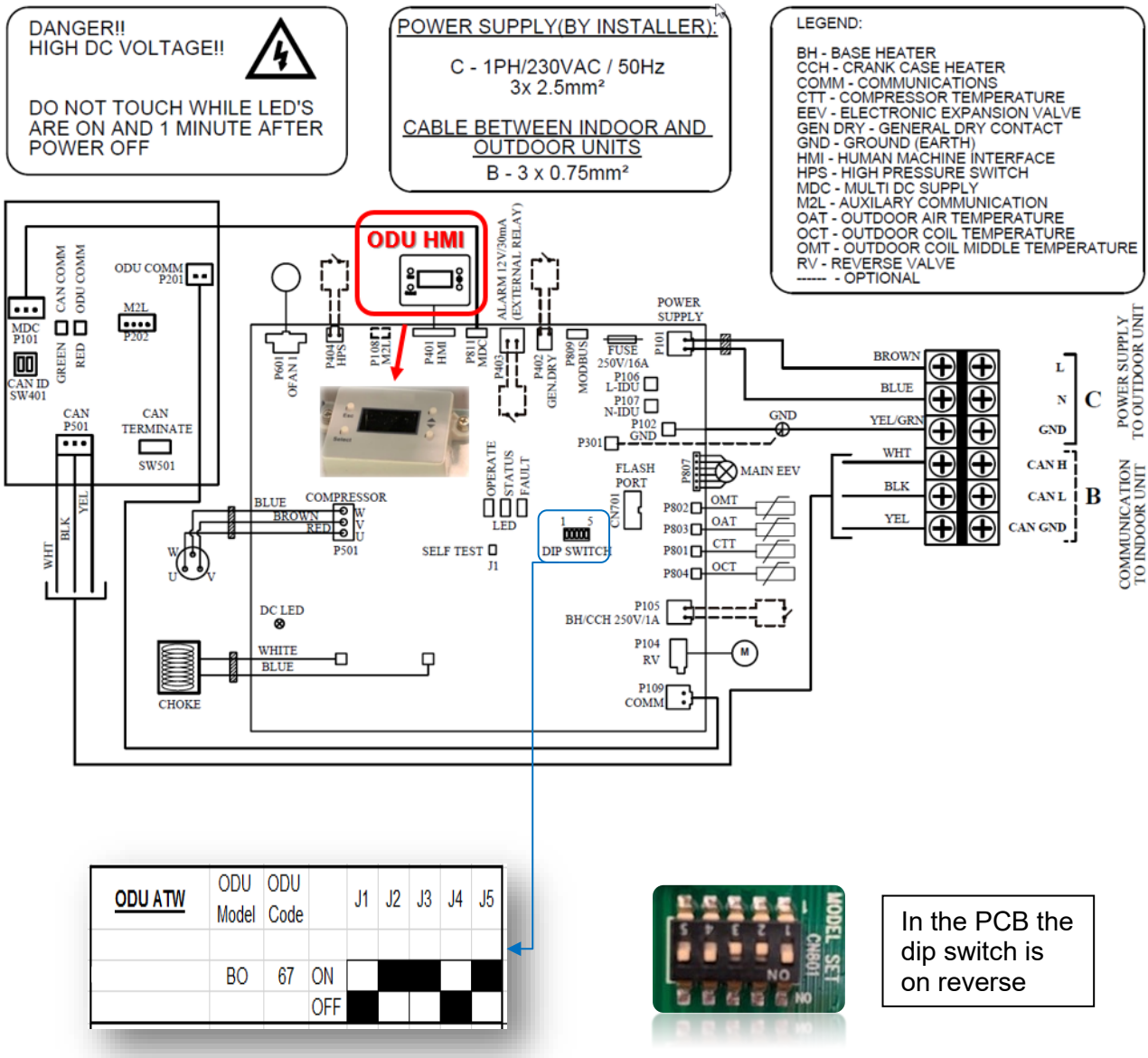
1.7 Procedures for checking Main Parts

1.7.1 Discharge DC Voltage and PCB electric schematics

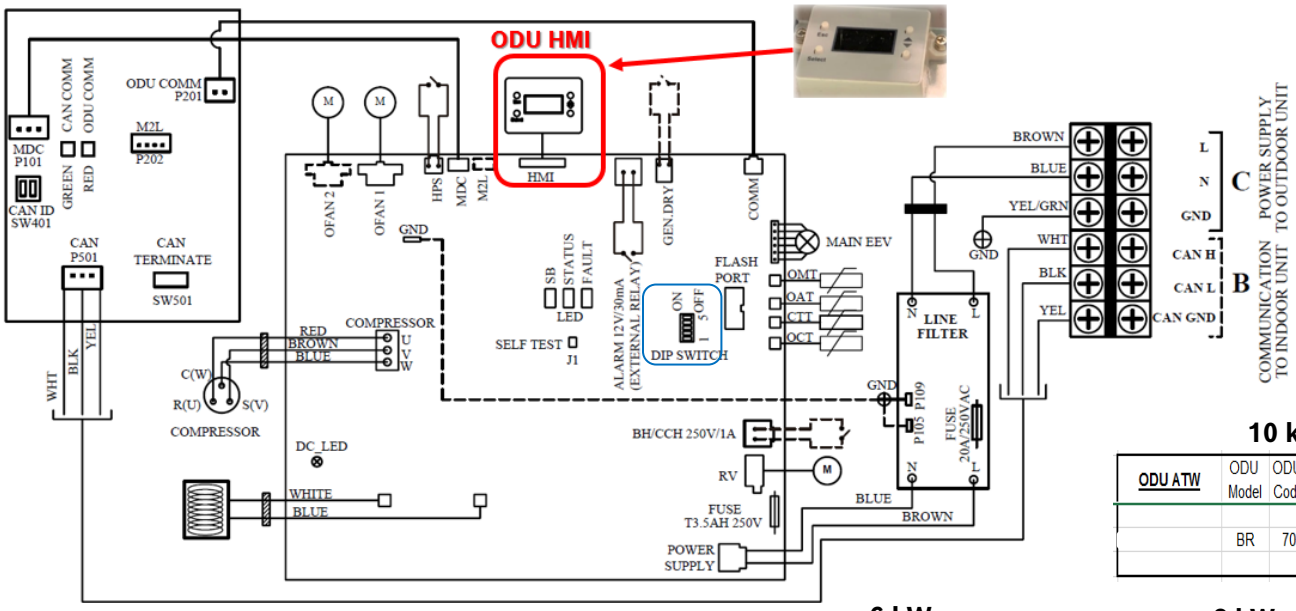
CAUTION

High voltage!!!
Wait for DC voltage to be discharged before touching any part of the driver to avoid electric shock
Check to ensure that DC voltage has reduced to below 50VDC, if not, keep waiting until it does.

ODU 4 kW 230V (R32)



ODU 6/8/10/ kW 230V (R32)



10 kW

ODU ATW	ODU Model	ODU Code		J1	J2	J3	J4	J5
	BR	70	ON	■			■	
			OFF		■	■		

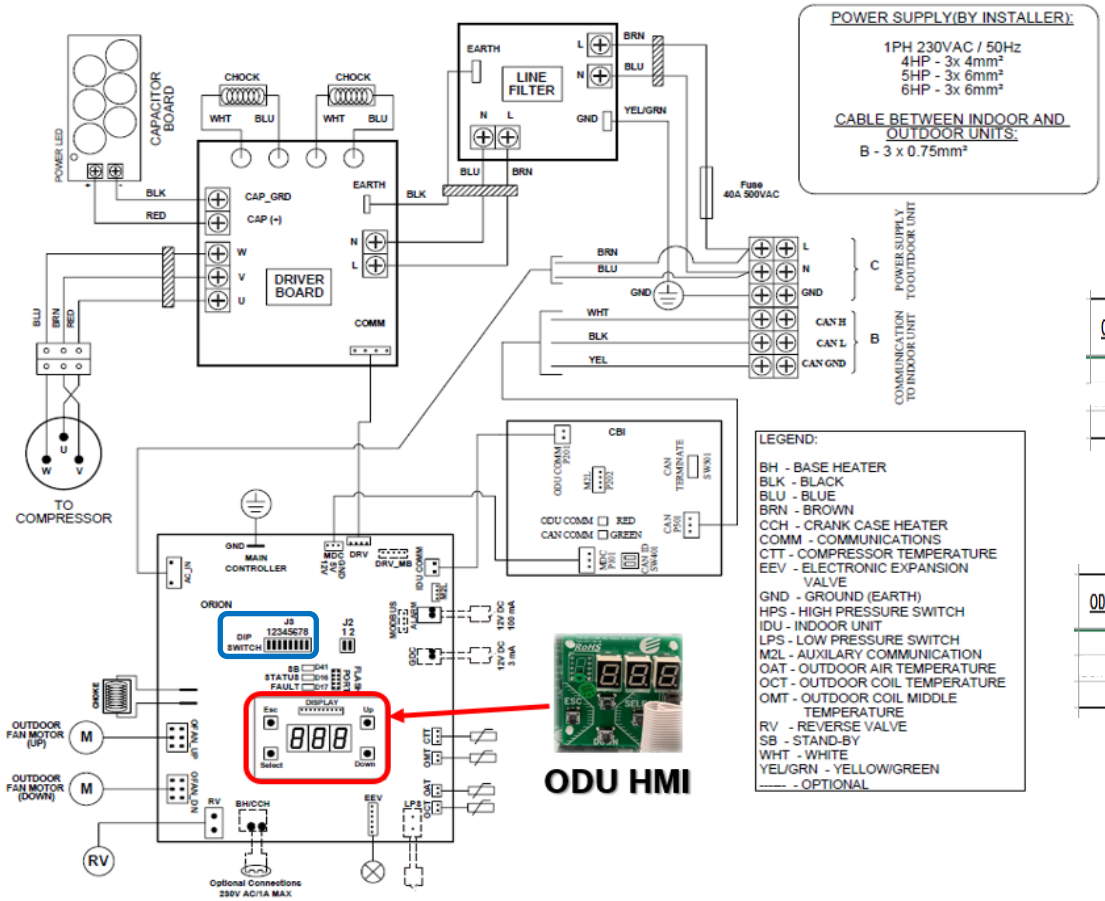
6 kW

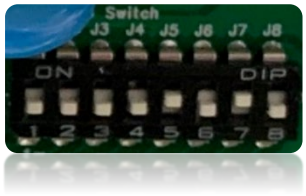
ODU ATW	ODU Model	ODU Code		J1	J2	J3	J4	J5
	BP	68	ON	■	■	■		■
			OFF				■	

8 kW

ODU	ODU Model	ODU Code		J1	J2	J3	J4	J5
	BQ	69	ON				■	■
			OFF	■	■	■		

ODU 12/14 kW 230V (R410A)





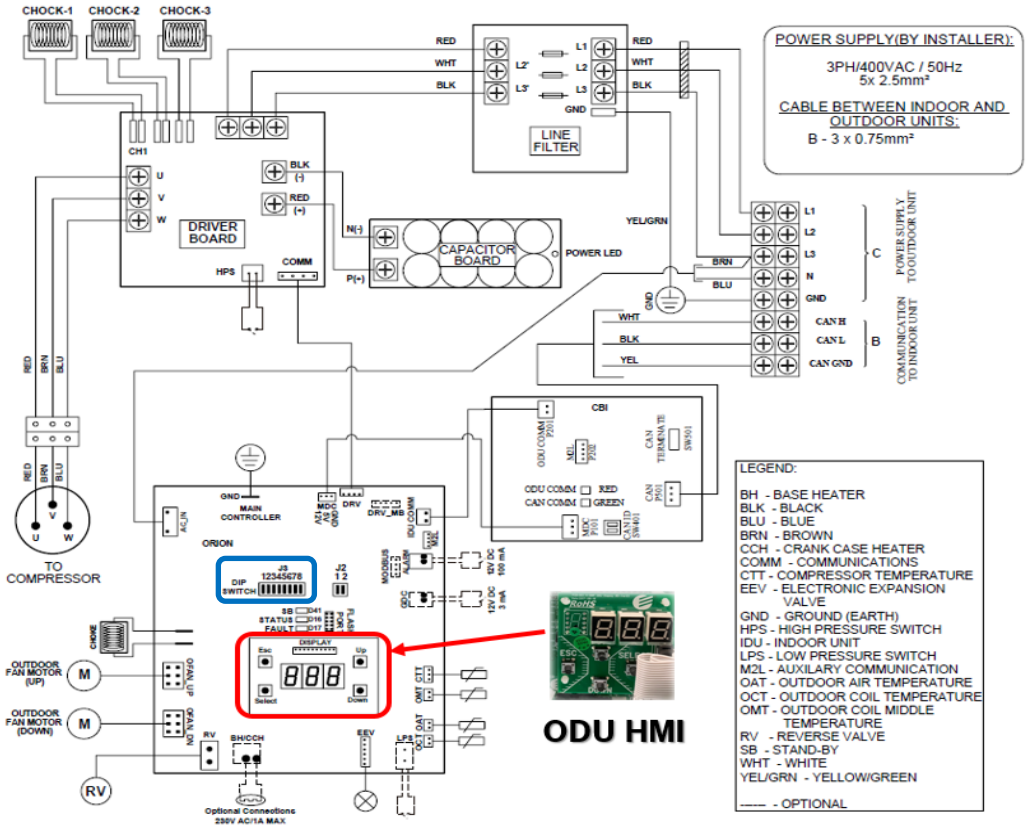
12 kW

ODU ATW	ODU Model	ODU Code		J3-1	J3-2	J3-3	J3-4	J3-5	J3-6	J3-7	J3-8
	AN	40	ON				■		■		
			OFF	■	■	■		■		■	■

14 kW

ODU ATW	ODU Model	ODU Code		J3-1	J3-2	J3-3	J3-4	J3-5	J3-6	J3-7	J3-8
	CE	83	ON	■			■		■		
			OFF		■	■		■		■	■

ODU 10/12/14 kW 400V (R410A)



10 kW

ODU ATW	ODU Model	ODU Code		J3-1	J3-2	J3-3	J3-4	J3-5	J3-6	J3-7	J3-8
DCI100 400V	AJ	36	ON			■			■		
			OFF	■		■	■		■		■

12 kW

ODU ATW	ODU Model	ODU Code		J3-1	J3-2	J3-3	J3-4	J3-5	J3-6	J3-7	J3-8
DCI125 400V	AK	37	ON	■		■			■		
			OFF		■		■	■		■	■

14 kW

ODU ATW	ODU Model	ODU Code		J3-1	J3-2	J3-3	J3-4	J3-5	J3-6	J3-7	J3-8
DCI140 400V	AL	38	ON		■	■			■		
			OFF	■			■	■		■	■

1.7.2 Checking Mains Voltage

Confirm that the mains voltage in range. If mains voltage is out of this range, abnormal operation of the system is expected. If in range, check the Power (Circuit) Breaker and look for broken or loosed cable lugs or wiring mistakes.

1.7.3 Checking Line Filter Board

1) Check for any burn signs on the filter board and its coils and relays, replace if any.
2) Check voltage at the inlet and outlet of the line filter. If no output voltage, replace line filter.
3) In case of burnt main fuse in line filter – replace both Line filter and driver.

Replacing line filter - ***(2.16)***

1.7.4 Checking Compressor Driver

ODU 4/6/8 kW

In normal operation the 7-segments display is ON continuously. Even is that case, there can still be a Hardware problem that prevents the system to perform well or at all. If no other problem is found, replace the driver.

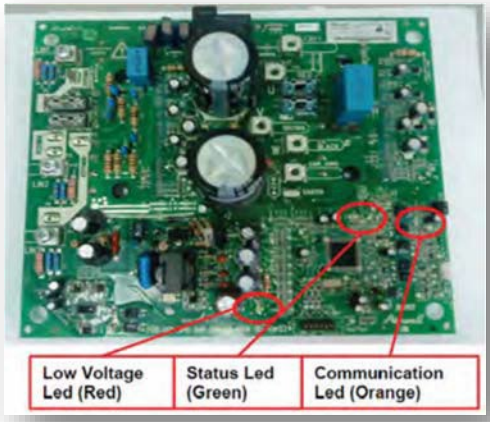
- Check power supply to driver connected well and no burn marks on wiring.
- PFC chock is connected well. Correct if needed.
- Check PFC Chock ***(1.5.4.3)***. Replace chock if needed.
- Check line filter and main fuse. In case fuse is burnt, replace both driver and filter.

If all is well but still LEDs are OFF, Replace driver.

ODU 10/12/14 kW 400V

In normal operation the red and orange LEDs are ON continuously and green led is blinking.
Even in that case, there can still be a Hardware problem that prevents the system to perform well or at all. If no other problem is found, replace the driver.

1. Check power supply to driver board: L,N,CAP+, CAP_ GND.
2. Red led (Low Voltage) should be ON. If not, check wiring connection between driver and filter.
3. Orange led (communication) should be ON. If not, check wiring connection between driver and main board.
4. Green led (status) should be blinking ON/OFF in rate of 1 time per sec. in case of SB and should be ON in case of operation. If led is blinking fast (3 times per second):
   i. Check ODU main controller dipswitch setting to be correct;
   ii. Check the fault type in the diagnostics.
5. If all is well but still no compressor action, replace driver.



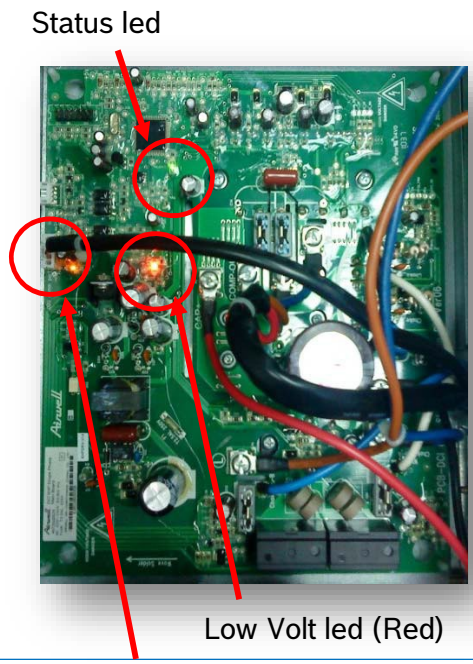
ODU 10/12/14 kW 230V

In normal operation the red and orange LEDs are ON continuously and green led is blinking.
Even in that case, there can still be a Hardware problem that prevents the system to perform well or at all. If no other problem is found, replace the driver.

1. Check power supply to driver board: L, N, CAP+, CAP_GND.
2. Red led (Low Voltage) should be ON. If not, check wiring connection between driver and filter.
3. Orange led (communication) should be ON. If not, check wiring connection between driver and main board.
4. Green led (status) should be blinking ON/OFF in rate of 1 time per sec. in case of SB and should be ON in case of operation. If led is blinking fast (3 times per second):
   i. Check ODU main controller dipswitch setting to be correct.
   ii. Check the fault type in the diagnostics.

If all is well but still no compressor action, Replace driver.

Replacing Driver – (***2.15***).



1.7.5 Checking PFC Chock coil

1) Check PFC chock connections – repair if needed.
2) Visually check to see any burn marks on the wires – replace the chock(s) if needed.
3) Disconnect the chock from the driver and check if the 2 ending wires of each chock are shorted (continuity check) – if they are NOT shorted replace the chock(s) if they are shorted – check the driver ***(1.7.4)***.

Replacing PFC chock - ***(2.17)***

1.7.6 Checking DC Capacitors (Only for R410A models)

1) Check visually for burn marks on the capacitor PCB and the capacitors for swelling casing – replace if needed.
2) When power is ON - Check that red led is ON, if not check voltage between + and - poles to be according to table:

Unit	Voltage
ODU: All R410A 400V	**560±50VDC**
ODU: All R410A 230V	**310±50VDC**

3) When power is OFF - Check capacitance between the + and – poles, should be according to table - replace if not:

Unit	Capacitance
ODU: All R410A 400V	**1360±270µF**
ODU: All R410A 230V	**3360±670µF**

Replacing DC Capacitor board - ***(2.18)***

1.7.7 Checking fuse on Main Board

If the 3.15A fuse on the main Board is burnt, check the outdoor fan motors or any other peripheral that can cause a short:

1) In case of a burnt fan motors - replace both motors.
2) In case of a burnt other peripheral - replace it.
3) In case no problematic peripheral replace the burnt fuse.
4) In case of frequent burning fuse, replace the controller.

Replacing main board - ***(2.13)***

1.7.8 Checking Outdoor Fan Motor

An outdoor fan motor fault message may occur during very high winds outdoors that may stop the fan rotation for short periods. If so, need to relocate the outdoor unit to a more protected place from winds or install measure of air deflection in front of the fan outlets.

1.7.8.1 Checking fan motor connection on board

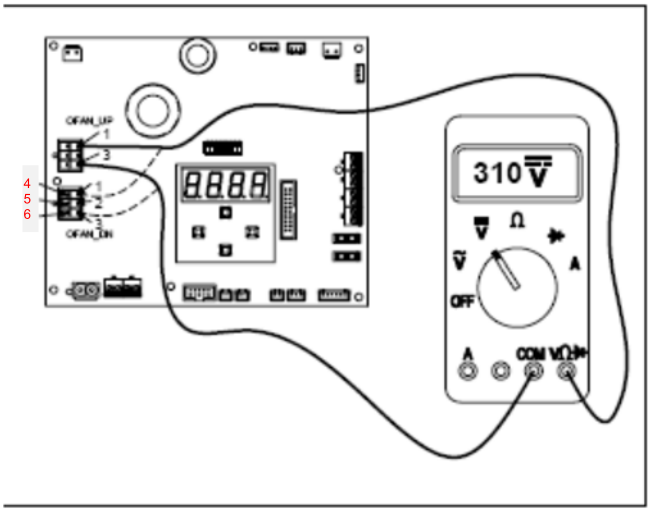
1) Check OFAN connections - Repair if needed.

2) Rotate the fan slowly by hand - If the fan does not rotate easily, check whether something is

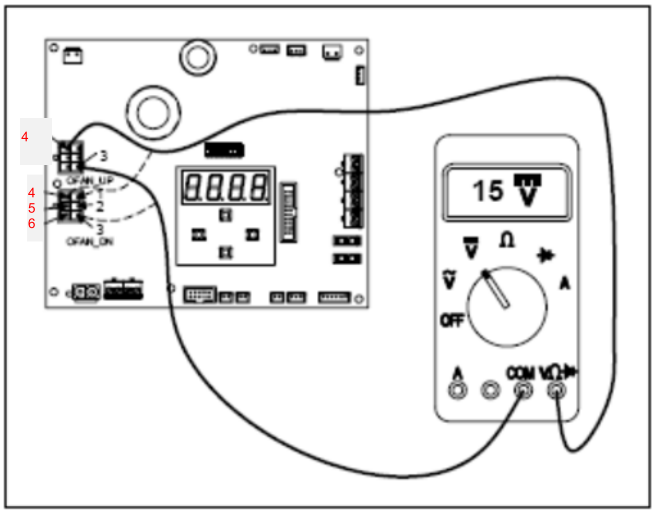
obstructing the fan preventing it from rotating – remove the obstruction if necessary. If no obstruction and still not operating - the fan motor bearings have seized - Replace the motor.

3) Disconnect the OFAN connector from the main board, switch ON the power and check the fan motor connector on the main board:

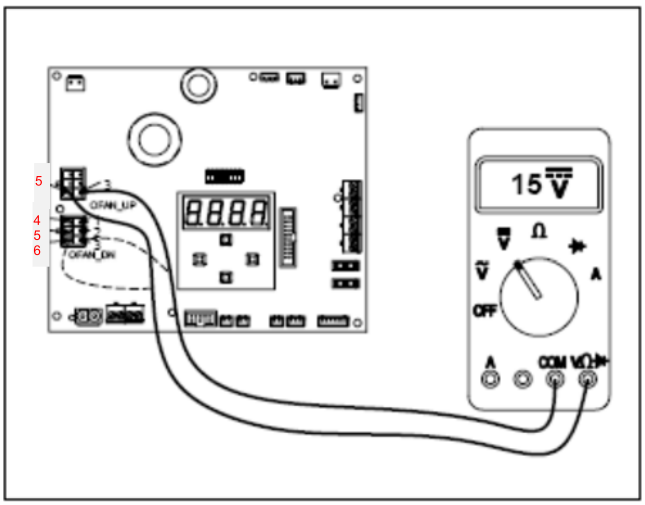
   a. Between 1 and 3 – should be 310VDC. If very low or 0VDC, replace main board.
   b. Between 3 and 4 – should be 15VDC. If very low or 0VDC, replace main board.
   c. Between 3 and 6 – should be 15VDC. If very low or 0VDC, replace main board.



a Check motor supply voltage



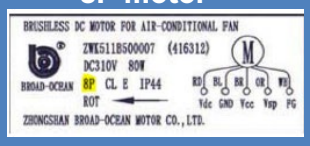
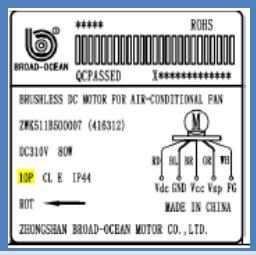
b Check motor command voltage



c Check motor command voltage

1.7.8.2 Checking fan motor

1) Rotate the motor shaft slowly by hand - If the shaft does not rotate easily, the fan motor bearings have seized, or the supply is shorted - Replace the motor.
2) Check the motor connector:
3)

Check between*	8P motor 	10P motor 
	0ºC – 25ºC	
3 – 1	0.7: 2.0 MΩ	0.7: 2.05 MΩ
3 – 4**	20: 60 kΩ	1.0 kΩ: 39 MΩ
3 – 5	40: 120 kΩ	44: 147 kΩ
3 – 6**	25: 75 kΩ	20 kΩ: 5.0 MΩ
6 – 4	6: 16 kΩ	5: 15 kΩ

**Values measured between COM-V/Ω*
*** 3-4 and 3-6 can vary greatly due to capacitance in the circuit*

Replacing outdoor unit fan motor - ***(2.17)***
Replacing main board - ***(2.13)***

1.7.9 Checking Compressor

1) Check Compressor connections - Repair if needed.
2) Check the resistance between the three phases – all three coil resistances should be the same:

Unit	Resistance	ºC
ODU 10/12/14 kW 400V	0.44 Ω	@20ºC
ODU 12/14 kW 230V	0.19 Ω	@20ºC
ODU 4 kW 230V R32	1.8 Ω	@75ºC
ODU 6/8/10 kW 230V R32	0.628 Ω	@25ºC
Insulation Resistance	**50 MΩ**	

Note: *due to overheating of winding, it is advised to conduct the measurements after some cooling time.*

Replacing compressor- ***(2.11)***

1.7.10 Checking Reverse Valve (RV)

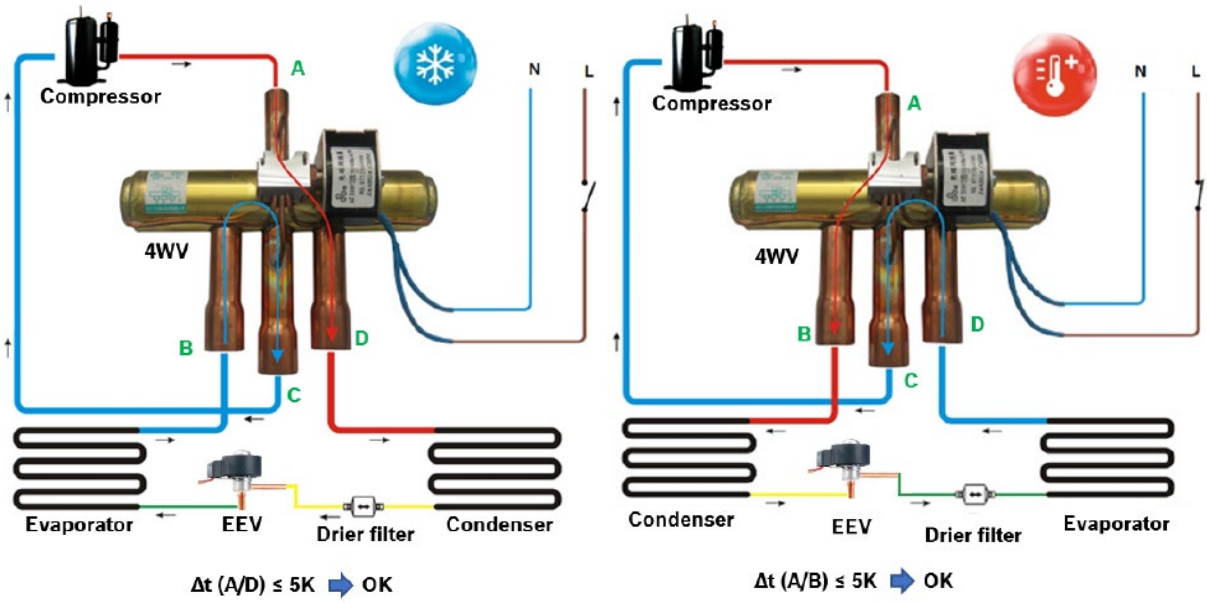
The RV has two parts, Solenoid and valve:

1) Disconnect the RV connector from the main board and operate the unit in heating mode, check the

voltage between two pins of reverse valve connector, **normal voltage is 230VAC** - if no power supply to RV, replace outdoor main board.

2) Check RV operation with direct 230VAC power supply. If RV solenoid is OK (but still no heating operation while compressor is ON), replace the RV valve from the refrigeration system. If not, replace the RV coil.
3) RV resistance value: **~1,9 kΩ.**

Replacing RV Coil ***(2.7)***
Replacing RV Valve - ***(2.7)***
Replacing main board - ***(2.13)***



1.7.11 Checking Electrical Expansion Valve (EEV)

The EEV has two parts, step motor and valve.

1) When Outdoor unit is powered on, EEV shall have vibration and click sound. If not, replace the coil with the additional one and check again.
2) Turn OFF the unit, insert a good coil onto an additional (external) operating valve and turn the unit ON, vibration and click sound should be performed. If OK, replace EEV valve from the unit.
3) If both EEV coil and valve are still not operating, replace the ODU main board.
4) Check the impedance in the coil wires to be as following:

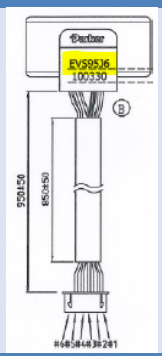
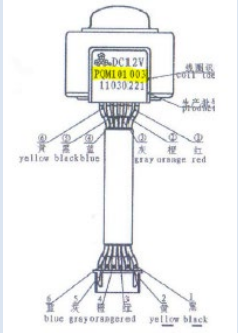
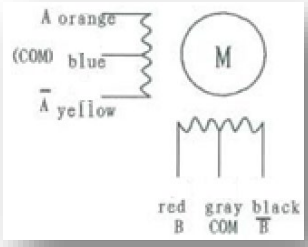
   Common wire to phase wire – **about 100Ω**.

   Phase wires – each one to the others (except common) – **about 50Ω**;

   Use the table below for wire colors and description.

Note: ODU 14 kW has one common wire, so all phases relate to this common.

ODU 4/6/8 kW has 2 common wires, so each phase relates to its common wire.

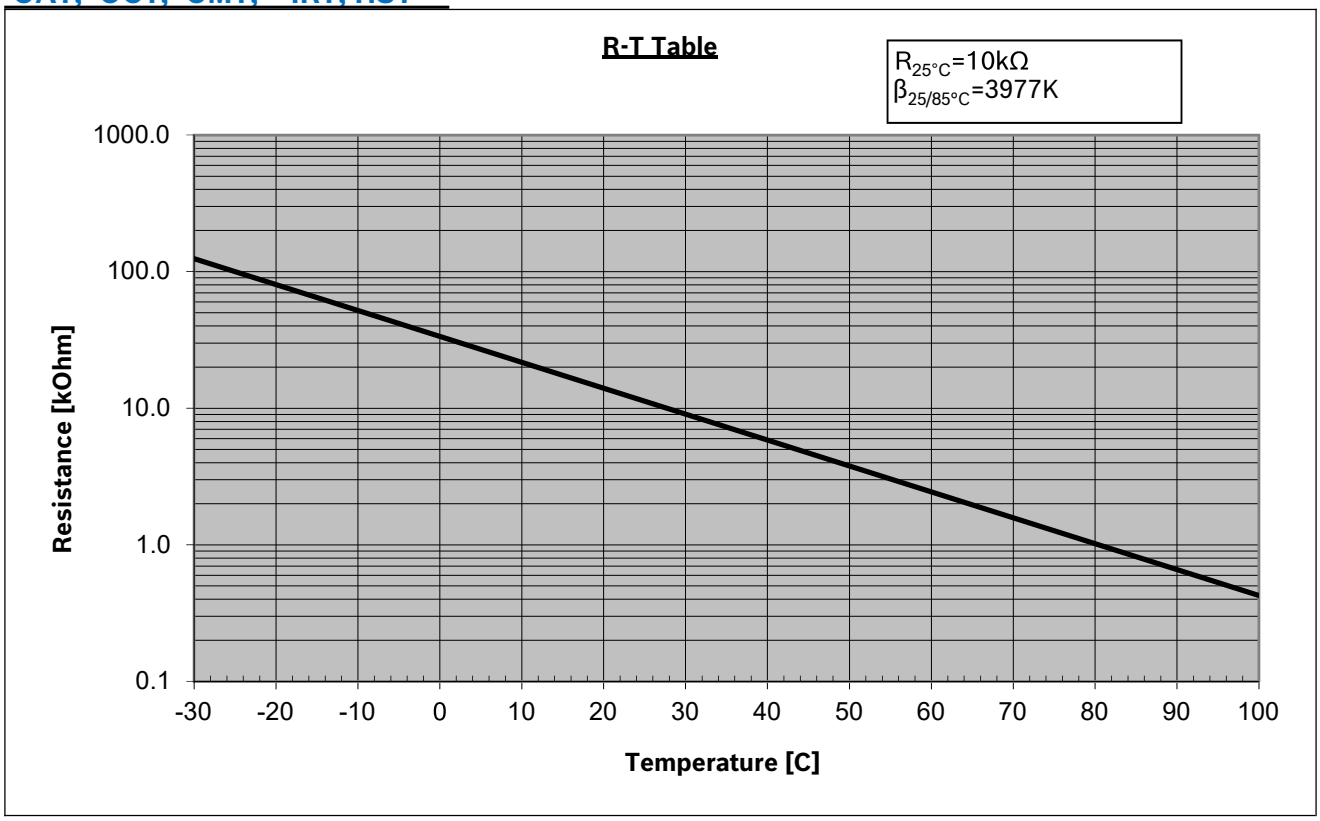
ODU Model	EEV coil connector	Wiring diagram/description
ODU 12/14 kW 230V-400V R410A		(1–2 PHASE EXECITATION) NO. / LEAD WIRE COLOR / PHASE 1 ORANGE A 2 RED B 3 YELLOW /A 4 BLACK /B 5 GRAY COM 6 CAVITY –
ODU 4/6/8/10 kW 230V R32		

Replacing EEV Valve Coil - ***(2.8)***
Replacing EEV Valve - ***(2.8)***
Replacing main board - ***(2.13)***

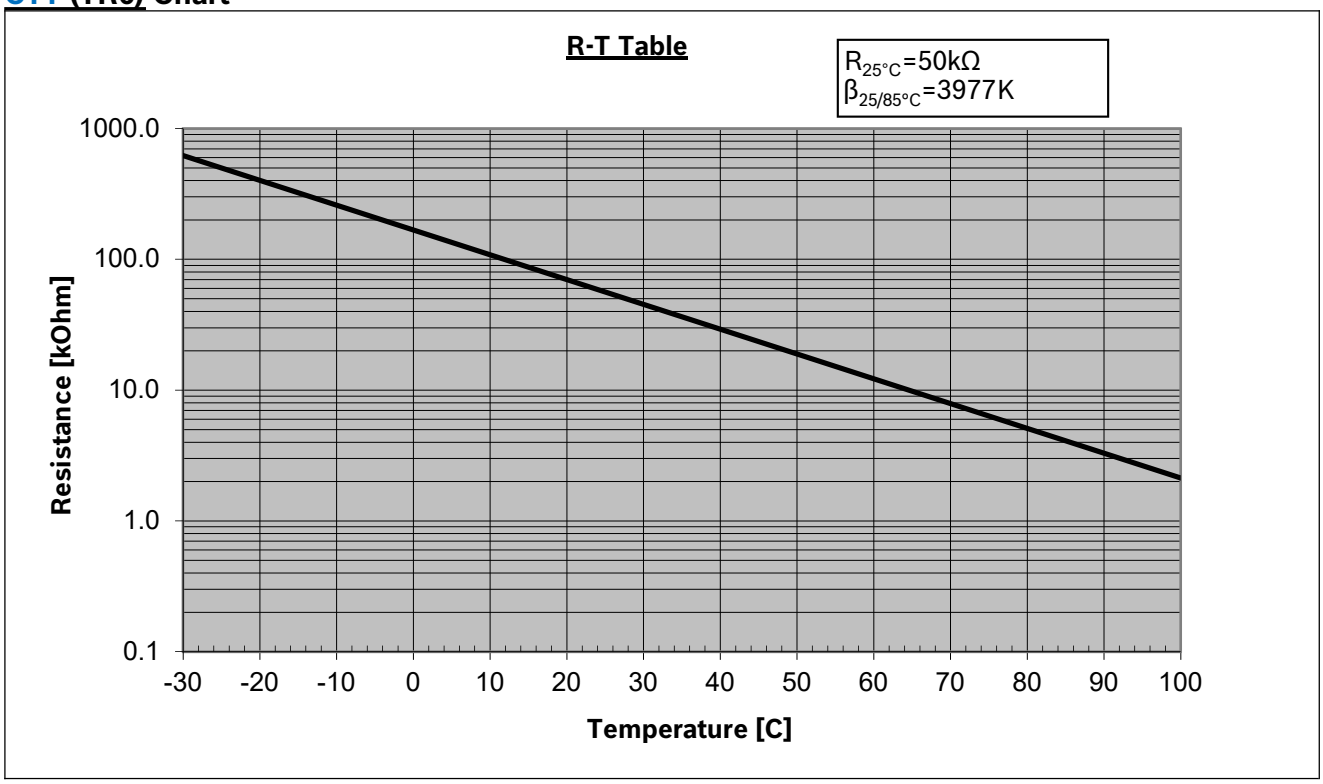
1.7.12 Checking Thermistors

1) Check sensor connections and wiring - Replace if needed.
2) Check sensor visually - Replace if needed.
3) Check sensor attachment to pipe (or other parts) specially pay attention to the spring holding the sensor towards its sensing part – repair if needed.
4) Disconnect the connector from the main board and check sensor resistance – should be according the charts below for each sensor. If not in range of 10%, replace sensor.
5) If sensor resistance check is OK but reading is still wrong, replace main board.

(TL2), (TR4), (TR8), (TR3)
OAT, OCT, OMT, IRT, HST



CTT (TR6) Chart



Replacing sensors - ***(2.11, 2.12, 2.9)*** Replacing main board - ***(2.13)***

1.7.13 Fake Sensor Reading Analysis

Fake sensor reading is defined as a temperature sensor or pressure sensor that reads higher or lower than expected. Fake sensor reading could result from NTC damage or impurities that enters the sensor body

Behavior	Compressor Frequency	EEV Opening	OFAN Speed	Capacity/COP
CTT (TR6) (Cool)				
Fake Up- High	0 (CTT (TR6) short)	Fix	0	**0**
Fake Up- Medium	↓ (CTT (TR6) overheat)	↑	↑	↓
Fake Up- Low	-	↑	↑	↓
No Fake	-	-	-	**Regular**
Fake Down- Low	-	↓	-	↓
Fake Down- High	0 (CTT (TR6) open)	Fix	0	**0**
CTT (TR6) (Heat)				
Fake Up- High	0 (CTT (TR6) short)	Fix	0	**0**
Fake Up- Medium	↓ (CTT (TR6) overheat)	↑	-	↓
Fake Up- Low	-	↑	-	↓
No Fake	-	-	-	**Regular**
Fake Down- Low	-	↓	-	↓
Fake Down- High	0 (CTT (TR6) open)	Fix	0	**0**
ICT (JR1) (Heat)				
Fake Up- High	0 (ICT (JR1) short)	Fix	0	**0**
Fake Up- Medium	↓ (ICT (JR1) Overheat)	↑	-	↓
Fake Up- Low	-	↑	-	↓
No Fake	-	-	-	**Regular**
Fake Down- Low	-	↓	-	↓
Fake Down- Medium	0 (ICT (JR1) Freezing) Stops from time to time (high pressure)	Fix	0	**0**
Fake Down- High	0 (ICT (JR1) Open)	Fix	0	**0**
ICT (JR1) (Cool)				
Fake Up- High	0 (ICT (JR1) short)	Fix	0	**0**
Fake Up- Medium	-	↑	-	↓
Fake Up- Low	-	↑	-	↓
No Fake	-	-	-	**Regular**
Fake Down- Low	-	↓	-	↓
Fake Down- Medium	↓ (ICT (JR1) Freezing)	Fix	-	↓
Fake Down- High	0 (Open)	Fix	0	**0**
OCT (TR4) (Cool)				
Fake Up- High	Stops from time to time (at low cooling)	-	↑	**↓(at low cooling)**
Fake Up- Medium	-	-	↑	**↓(at low cooling)**
Fake Up- Low	-	-	↑	**↓(at low cooling)**
OCT (TR4) (Heat)				
Fake Up- High	-	↑	-	↓
No Fake	-	-	-	-

Behavior	Compressor Frequency	EEV Opening	OFAN Speed	Capacity/COP
Fake Down- Low	↓ (Limited Defrost)	↓	↑ (at high heating)	↓
Fake Down- High	↓ (Limited Defrost)	↓	↑ (at high heating)	↓
OMT (TR8) (Cool)				
Fake Up- High	0 (OMT (TR8) short)	Fix	0	**0**
Fake Up- Medium	↓ (OMT (TR8) Overheat)	↑	↑	↓
Fake Up- Low	-	↑	↑	↓
No Fake	-	-	-	-
Fake Down- Low	-	↑	↓	↓
Fake Down-Medium	Stops from time to time (high pressure)	↑	↓	↓
Fake Down- High	0 (OMT (TR8) Open)	Fix	0	**0**
OMT (TR8) (Heat)				
Fake Up- High	-	-	-	-
No Fake	-	-	-	-
Fake Down- Low	-	-	↑ (high heating)	↓
Fake Down- High	-	-	-	-
HST				
Fake Up- High	0 (HST short)	Fix	0	**0**
Fake Up- Medium	↓ (HST Overheat)	-	↑	↓
Fake Up- Low	↓ (HST Overheat)	-	↑	↓
No Fake	-	-	-	-
Fake Down- Low	-	-	-	-
Fake Down-Medium	Stops from time to time (inverter internal protection)	-	-	-
Fake Down- High	0 (HST Open)	Fix	0	**0**
OAT (TL2) (Cool)				
Fake Up- High	0 (Ambient protection)	Improper Start Up	-	**↓(slight reduction)**
Fake Up- Low	-	Improper Start Up	-	**↓(slight reduction)**
No Fake	-	-	-	**↓(slight reduction)**
Fake Down- Low	-	Improper Start Up	-	**↓(slight reduction)**
Fake Down- High	0 (Ambient protection)	Improper Start Up	-	**↓(slight reduction)**
OAT (TL2) (heat)				
Fake Up- High	↓ (Limited Defrost)	Improper Start	-	↓
Fake Up- Low	↓ (Limited Defrost)	Improper Start	-	↓
No Fake		-	-	↓
Fake Down- Low	↓ (Limited Defrost)	Improper Start	-	↓
Fake Down-Medium	↓ (Limited Defrost) 0 (Ambient protection)	Improper Start	-	↓
Fake Down- High	↓ (Limited Defrost)	Improper Start	-	↓

1.7.14 Checking High Pressure Switch (HPS) and JR1 sensor

1) Disconnect HPS connector from the main board and check resistance between the 2 pins of the HPS connector – if shorted the HPS is OK, otherwise replace HPS.

Replacing HPS - ***(2.9)***

JR1 Sensor:

In Heating Mode:

- PL1 is not actually the evaporation temperature, but rather an approximate value --> equal to TR4 which in turn measures a temperature value close to the evaporation temperature.
- PH1 is effectively the condensation temperature (measured by the JR1 sensor).

PH1 = JR1
PL1 = TR4

In Cooling/Defrost Mode:

- PL1 is effectively the evaporation temperature (measured by the JR1 sensor).
- PH1 is not actually the condensation temperature, but rather an approximate value --> equal to TR8, which in turn measures a temperature value close to the condensation temperature.

PH1 = TR8
PL1 = JR1

1.7.15 Checking Compressor Driver Communications

1) Disconnect the wire cable from the connectors on both sides (driver and main board), check the wiring continuity – Repair or replace wiring if needed.
2) Turn power ON and check if the red led in the driver is lighted. If OK and still no communications, replace main board. If the LED is OFF, replace driver.

Replacing Outdoor Unit main board - ***(2.13)***
Replacing driver - ***(2.15)***

1.7.16 Checking Indoor-Outdoor Unit Communications

1) Check voltage on the interconnection wiring:

Typically measuring equipment has a filter, meaning it will be more likely to measure something in this range of values:

- 1.5V <**Can high- Can gnd**< 3V
- 1.5V <**Can low- Can gnd**< 3V
- 0V < **Can high- Can low**< 1V

Replacing Outdoor Unit main board - ***(2.13)***

1.7.17 Checking for electromagnetic interference (EMC problems)

1.7.17.1 EMC interference to the A/C unit

Locations most susceptible to interference

1) Locations near broadcast stations where there are strong electromagnetic waves.
2) Locations near amateur radio (short wave) stations.
3) Locations near electronic sewing machines and arc-welding machines.

Problem:

1) The unit may stop suddenly during operation.
2) Indicator lamps may flicker

Correction Actions:

The fundamental concept is to make the system less susceptible to noise by Insulation for noise or distance from the noise source.

1) Use shielded wires.
2) Move unit away from the noise source

1.7.17.2 EMC interference to nearby home appliances

Locations most susceptible to interference:

1) A television or radio is located near the A/C and A/C wiring.
2) The antenna cable for a television or radio is located close to the A/C and A/C wiring.
3) Locations where television and radio signals are weak.

Problem:

1) Noise appears in the television picture, or the picture is distorted.
2) Static occurs in the radio sound.

Correction Actions:

1) Select a separate power source.
2) Keep the A/C and A/C wiring at least 1 meter away from wireless devices and antenna cables.
3) Change the wireless device's antenna to a high sensitivity antenna.
4) Change the antenna cable to a BS coaxial cable.
5) Use a noise filter (for the wireless device).
6) Use a signal booster.

2. SERVICING

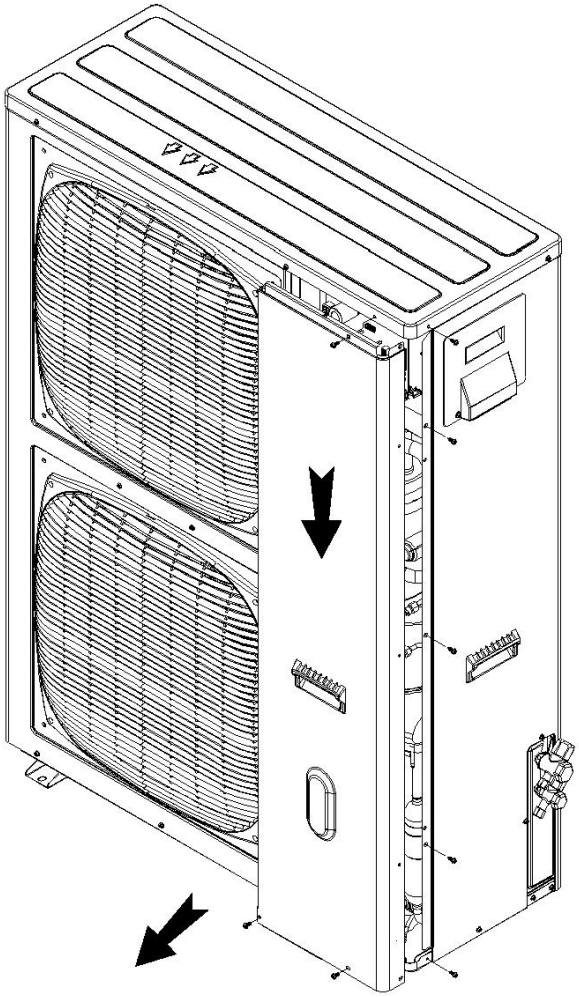
***Note*: To reassemble perform the procedures in reverse.**

2.1 Removing Service (front) cover

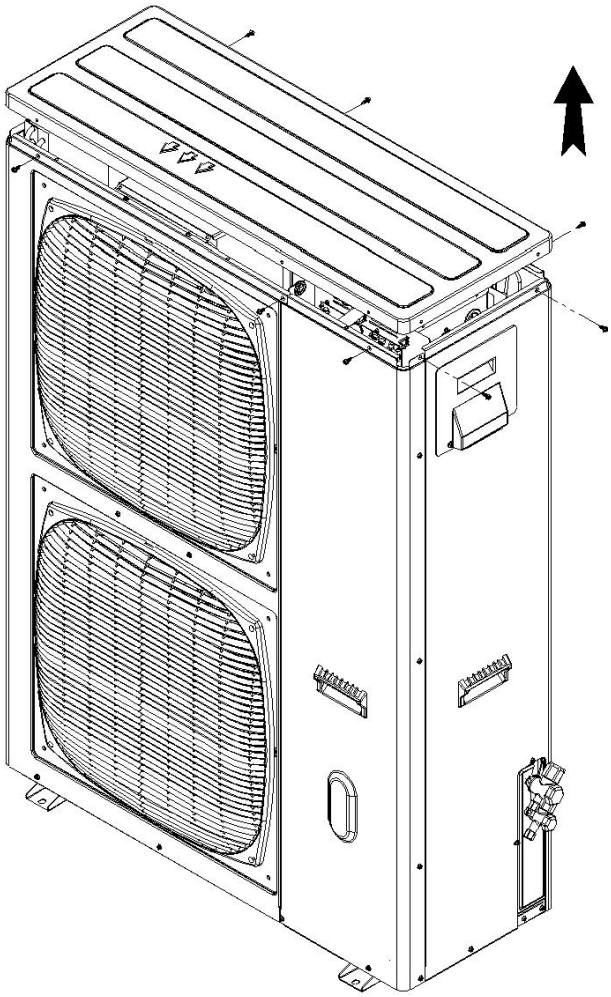
Remove the fixing screws and slide the service (front) panel downwards to remove it.

2.2 Removing top cover

Remove the fixing screws and take out the top cover.



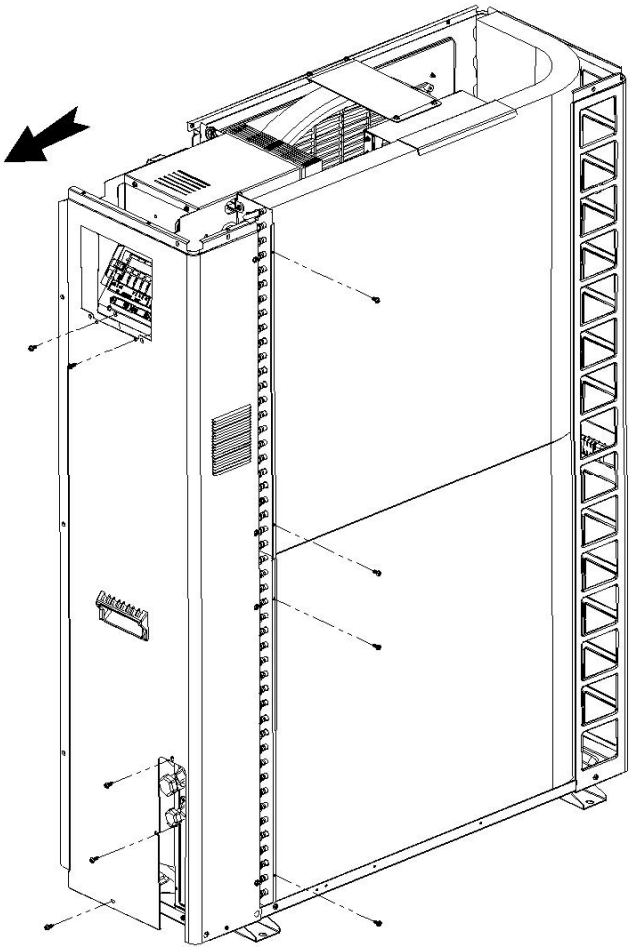
Removing Service (front) panel



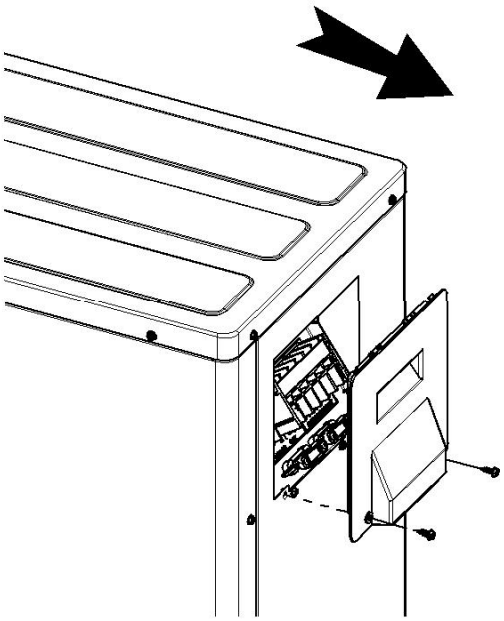
Removing Top panel

2.3 Removing side panel

1. Remove the top cover as in above ***(2.2)***.
2. Remove the screws holding the electrical plastic cover and disconnect the power supply cords.
3. Remove the fixing screws and take out the side panel.



Removing side panel



Removing Electrical Cover

2.4 Removing Air Outlet Grille(s)

Remove the fixing screws of each grille. Push flat small screwdriver to the gap to release the plastic snap and release the grille.

2.5 Removing Outdoor Fan

Remove the air outlet grille according to ***2.4***.

Remove the hex nut from the motor shaft. To ease the removal, use rubber hammer to hit on the hex nut while pulling out the fan.

NOTES for re-assemble the fan:

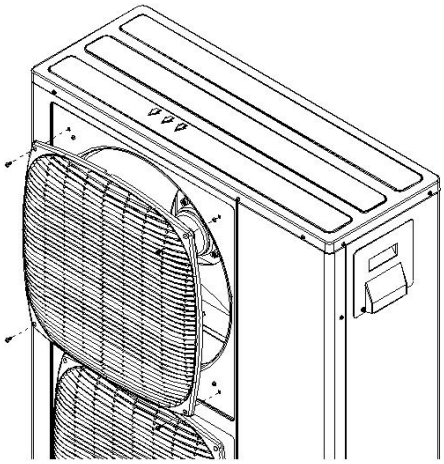
4. Insert the skidding protection part of fan boss in accordance with the cutting part of motor shaft. Push hard until fan can no longer be inserted.
5. Fix the screw after with tightening Torque of 8.0Nm (80kg*cm)

2.6 Removing Outdoor Fan Motor

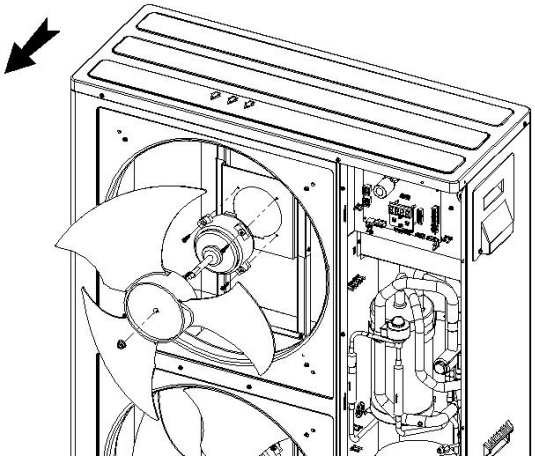
1. Remove the outdoor fan according to ***2.5***.
2. Disconnect the motor connector from the main board.
3. Cut the nylon ties holding the motor cable.
4. Remove the fixing screws for the motor

NOTES for re-assemble the motor:

1. When mounting the motor, ensure the cables points downwards.
2. Fix the motor wires with nylon ties to prevent obstruction to the propeller fan.
3. Fix back the air outlet grille.



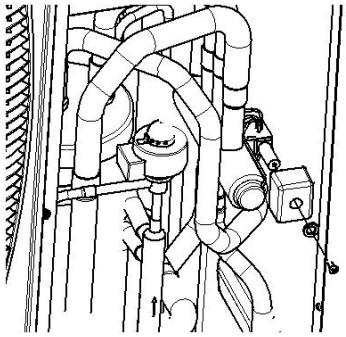
Removing Air Outlet Grille



Removing Outdoor Fan & Motor

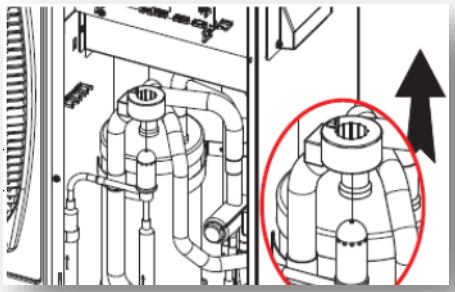
2.7 Removing Reversing Valve coil

1. Remove the service front panel according to ***2.1***.
2. Check to ensure that LEDs and display board are OFF.
3. Disconnect the RV connector from the main board.
4. Remove the RV wires from the cable holders along the electronics box.
5. Remove the fixing screw from the reversing valve coil and take the coil out



2.8 Removing expansion Valve coil

1. Remove the service front panel according to ***2.1***.
2. Check to ensure that LEDs and display board are OFF.
3. Disconnect the EEV connector from the main board.
4. Remove the EEV wires from the cable holders along the electronics box.
5. Rotate and pull up the EEV coil.



2.9 Removing Refrigeration parts

Refrigeration parts: Expansion valve, Reversing valve, high-pressure switch, etc.

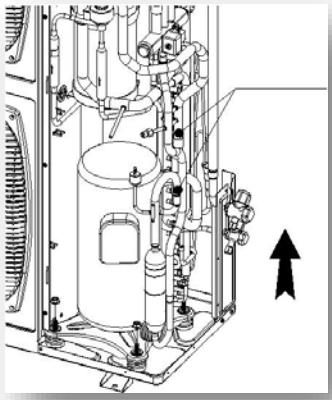
1. Remove the refrigerant from the unit by a pumping machine via the 2 valves.

   Note: *open the valves gradually and leave them only partially open for as long as the refrigerant exerts from the unit. Do not open the valves fully as not to lose any oil.*
2. Remove the service front panel according to ***2.1***.
3. Check to ensure that LEDs and display board are OFF.
4. Remove the part connector from the main board.
5. Remove the part wires from the cable holders along the electronics box and or the partition.
6. Remove the part from its pipes using burner.

2.10 Removing Compressor

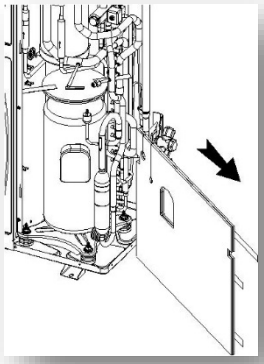
1. Remove the refrigerant from the unit by a pumping machine via the 2 valves.

Note: *open the valves gradually and leave them only partially open for as long as the refrigerant exerts from the unit. Do not open the valves fully as not to lose any oil.*



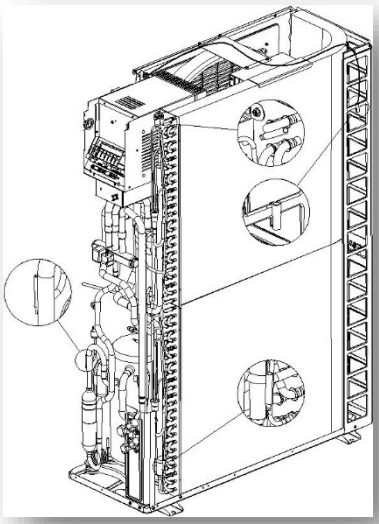
2. Remove the service front panel according to ***2.1***.
3. Remove the side and top panels according to ***2.2*** and ***2.3***.
4. Check to ensure that LEDs and display board are OFF.
5. Take out the insulation surrounding the compressor and the cover.
6. Remove the compressor electrical cover. Use flat screw if required.
7. Remove the compressor wires from the terminals.
8. Remove the compressor wires from the cable holders along the partition and secure the wire on the top of the unit to avoid its burning by the burner.
9. Disconnect the suction pipe from the compressor.
10. Disconnect the discharge pipe from the compressor. Remove the nuts fixing the compressor and lift the compressor.

NOTES for re-assembling new compressor:



1. To prevent contamination of the refrigerant with water or foreign particles, do not expose open pipes to atmosphere for long periods. If necessary, seal pipe ends using caps or tape.
2. Remove the caps for the new compressor just before replacing the compressor. Seal suction and discharge pipe using tape when mounting to prevent the foreign particles entering the compressor.
   Check to ensure each wire color goes to correct compressor terminal. If wrongly connected, the compressor may fail due to reverse rotation.

2.11 Removing Tubing Thermistors



1. Remove the service front panel according to ***2.19***.
2. Remove the side and top panels according to ***2.2*** and ***2.3***.
3. Check to ensure that LEDs and display board are OFF.
4. Disconnect the thermistor connector from the main board.
5. Remove the thermistor wires from the cable holders along the electronics box.
6. Cut the nylon ties holding the wires to the pipes.
7. Pull up the spring from the housing while pulling the thermistor.

Notes for re-assemble the thermistor:

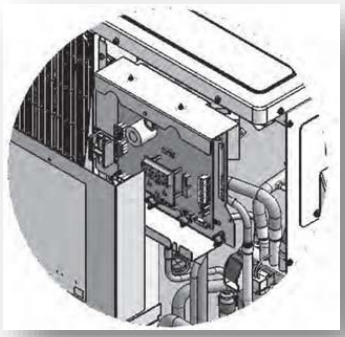
1. Make sure the spring is insert first and is facing the tube to be attach too.
2. Hold the thermistor wires to the tube with nylon tie holding both the wires and the protective sleeve.

2.12 Removing Outdoor Air Thermistor

1. Remove the service front panel according to ***2.1***.
2. Remove the top panel according to ***2.2***.
3. Check to ensure that LEDs and display board are OFF.
4. Disconnect the thermistor connector from the main board
5. Remove the thermistor wires from the cable holders along the electronics box and the fan motor assembly.
6. Cut the nylon ties holding the wires to the metal chassis.

2.13 Removing main board ODU 14 kW

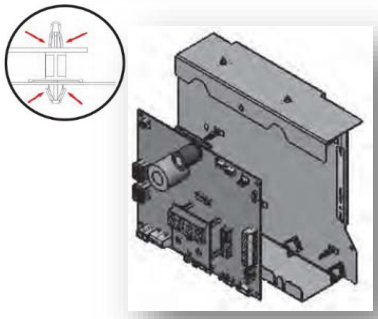
1. Remove the service front panel according to ***2.1***.
2. Remove the controller cover by taking out the screw and lift upwards.
3. Check to ensure that LEDs and display board are OFF.
4. Disconnect all connectors from the main board.
5. Squeeze the spacers head with Long-Nose Pliers and pull out the board.



Note: It might be easier to remove the main board panel first and then pull out the board from its space.

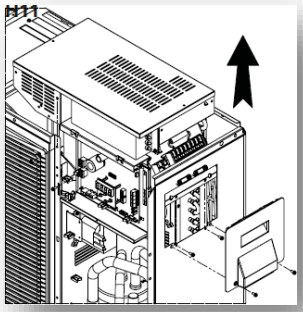
Notes for re-assemble the main board:

1. Make sure to connect all the connectors into the right locations. If incorrectly connected, malfunction or damage to the electrical parts may occur.
2. Hold the wires to the cable holders.
3. Ensure to set all the dipswitches to the same configuration as the original.



2.14 Removing Electrical Assembly ODU 14 kW

1. Remove the service front panel according to ***2.1*** and ***2.2***.
2. Check to ensure that LEDs and display board are OFF.
3. Disconnect the connectors from main board.
4. Unplug compressor wiring.
5. Unplug chock wiring.
6. Remove the screws fixing the electrical box to the front fan panel, the partition and the side cover.
7. Pull up the box.

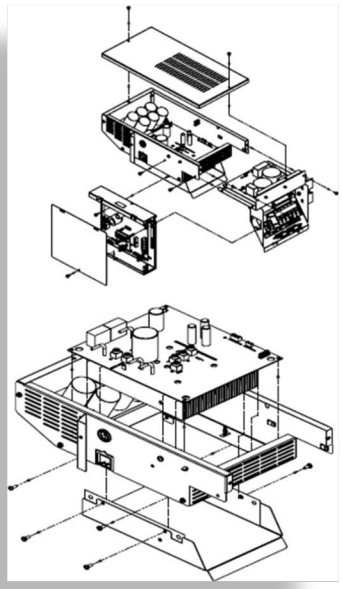


Notes for re-assemble the Electrical assembly:

1. Make sure to connect all the connectors into the right locations. If incorrectly connected, malfunction or damage to the electrical parts may occur.
2. Hold the wires to the cable holders.

2.15 Removing driver module ODU 14 kW

1. Remove the electrical assembly according to ***2.14***.
2. Remove the screws fixing the main board panel to the assembly and take out the panel.
3. Remove the screws fixing the filter panel to the assembly and take out the panel.
4. Disconnect all wires from the driver.
5. Remove the screws fixing the driver module to the panel.
6. Pull out the driver module.

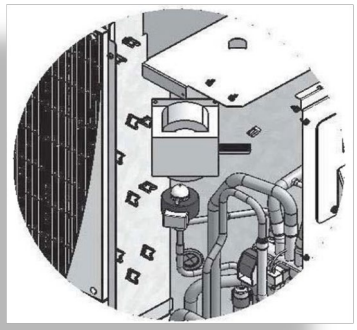


Notes for re-assemble the electrical assembly:

1. Make sure to connect all the connectors into the right locations. If incorrectly connected, malfunction or damage to the electrical parts may occur.
2. Hold the wires to the cable holders.

2.16 Remove Chock Coil

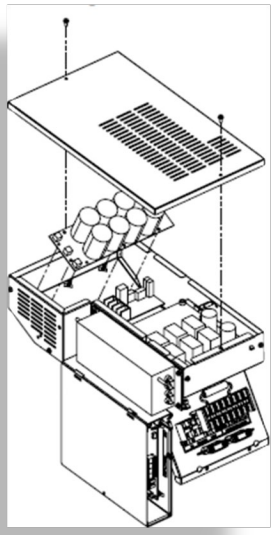
1. Remove the chock coil wires from the chock terminal block.
2. Remove the 2 screws to release the chock coil from the partition.



Removing Chocks Coils

2.17 Remove Capacitor Board ODU 14 kW

1. Perform the Electrical Assembly removal procedure in ***2.14***.
2. Remove the capacitor wires from the board.
3. Squeeze the spacers head with Long-Nose Pliers and pull out the board.

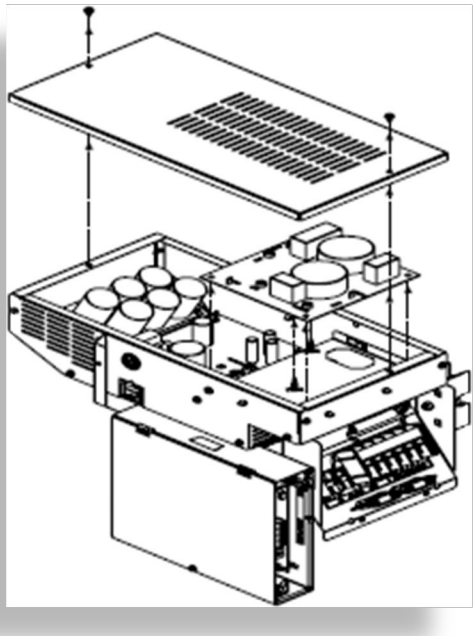


Note to re-assemble the capacitor board:

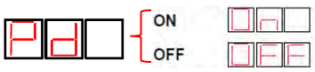
Capacitors has polarity (+ and -), check to ensure each terminal before connecting.

2.18 Removing Line Filter Board ODU 14 kW

1. Perform the diver module removal procedure in ***2.15***.
2. Open driver assembly cover
3. Release all wires from filter board.
4. Remove the screws fixing the filter to the driver assembly.
5. Squeeze the spacers head with Long-Nose Pliers and pull out the board.



2.19 Pump down test procedure (ODU HMI)



After start running will indicate:
- *Close liquid valve*
- *End.*

Pump Down is used to evacuate the refrigerant back to the ODU in case of need to dis-connect the indoor unit or the inter-connecting piping for repair:

1. Start the operation by navigating the HMI.
2. ODU will start operating.
3. After about 1 minute (finish of the pre-test) the display will show: 

   At this stage - close the Liquid valve.
4. After about 1 minute, as soon as the low pressure will drop to below 1.5 bar, the LPS - Low Pressure Status will blink ***END***
5. Close the suction valve
6. Shut the unit power ***OFF***
7. The test will end after about 2 minutes. This is for percussion reasons in case the unit will not be shut OFF (or not closes the valves).

NOTE: *In the HMI of the IDU is possible to do this procedure using the Function test > "**Evacuate/fill**".*

2.20 Alarm List (ODU+IDU)

A/W Split, Compress 3400 AWS

Error code	Display Code(s)	Display Level	Alarm Text	Alarm Definition	Possible Cause	Action
251	EC	Customer	System fault appliance electronics / basic controller	Alarm is triggered if the installer boards' built-in EEPROM-memory is corrupted, or access is not permitted.	If the software version of the installer board ≤1.04, "stand-alone"-operation is not handled correctly. Communication with the EEPROM-memory ceases and execution is halted. The user interface will be locked.	Replace installer board. Ensure that the new installer board has software version ≥1.06.
1001	A21 A22 A23 A24	Customer	No communication between system controller and remote control	Room sensor will display error code A21/A22/A23/A24 depending on which heating circuit 1-4 it controls. The Room sensor has first been installed successfully. Then the EMS bus signal has gone absent from the parent controller (display).	Poor EMS connection between display and installer board.	Check both ends of EMS cabling between the boards.
1010	A11	Customer	No communication via EMS BUS connection	The local device hasn't received its EMS token from the EMS bus master for 2 minutes.	Break/disruption in EMS connection.	Check that accessories for the EMS bus (room control, mixing module, etc.) are properly connected. Also check connection between display and installer board.
1037		Customer	Outdoor temperature sensor faulty - heating standby mode active	The EMS communication between the sensor and the control unit.	The alarm can occur in conjunction with alarm 1010. Also see code 1010.	Check the alarm history and look for adjacent 1010 alarms. If one exists, the installer board shall be upgraded with the latest available software.
					If alarm 1010 is not included in the alarm history, there can be a fault in the microcontroller of the installer board.	Replace the installer board.
1038		Customer	Invalid time/date	Time/date has not been set.	Time/date has not been set.	Set the time and date again.
					Extended power outage.	Set the time and date again.
1041		Customer	Voltage failure during screed drying	The alarm is given if power is lost during ongoing screed drying program. The program is automatically resumed when the power is back, unless the interruption outlasts the battery reserve of the control unit, or if the set maximum time (normally 12 h) has been exceeded.	Power loss.	Check fuses, possible bad connections etc.

1051		Customer	No communication with external room temperature 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. The alarm is delayed by 4 minutes. (Also see alarm 3091.)	Incorrect setting in software. Service menu >> Set heating/cooling >> Heating circ. 1 >> Ext. room temp. sensor, shall always be set to No.	Under Service menu >> Set heating/cooling >> Heating circ. 1, make sure that Ext. room temp. Sensor = No, and that Programming unit = RC100/CR10. See room sensors' installer guide for more information.
1052		Customer	No communication with external room temperature 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. The alarm is delayed by 4 minutes. (Also see alarm 3092.)	Incorrect setting in software. Service menu >> Set heating/cooling >> Heating circ. 2 >> Ext. room temp. sensor, shall always be set to No.	Under Service menu >> Set heating/cooling >> Heating circ. 2, make sure that Ext. room temp. Sensor = No, and that Programming unit = RC100/CR10. See room sensors' installer guide for more information.
1053		Customer	No communication with external room temperature 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. (Also see alarm 3093.)	Incorrect setting in software. Service menu >> Set heating/cooling >> Heating circ. 3 >> Ext. room temp. sensor, shall always be set to No.	Under Service menu >> Set heating/cooling >> Heating circ. 3, make sure that Ext. room temp. Sensor = No, and that Programming unit = RC100/CR10. See room sensors' installer guide for more information.
1054		Customer	No communication with external room temperature 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. The alarm is delayed by 4 minutes. (Also see alarm 3094.)	Incorrect setting in software. Service menu >> Set heating/cooling >> Heating circ. 4 >> Ext. room temp. sensor, shall always be set to No.	Under Service menu >> Set heating/cooling >> Heating circ. 4, make sure that Ext. room temp. Sensor = No, and that Programming unit = RC100/CR10. See room sensors' installer guide for more information.
1081		Customer	Two master remote controls in 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 remote controls in 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 remote controls in 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 remote controls in 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	A11	Customer	No communication with mixer module	A mixing module has previously been installed for heating circuit 1, and now the installer board has been unable to communicate with the mixing module over the EMS bus for the past 4 minutes. The alarm is automatically acknowledged when communication is re-established.	Poor connection or improperly installed EMS cable between installer board and mixing module.	Check EMS cabling.
3062	A11	Customer	No communication with heating zone module	A mixing module has previously been installed for heating circuit 2, and now the installer board has been unable to communicate with the mixing module over the EMS bus for the past 4 minutes. The alarm is automatically acknowledged when communication is re-established.	Poor connection or improperly installed EMS cable between installer board and mixing module.	Check EMS cabling.
3063	A11	Customer	No communication with heating zone module	A mixing module has previously been installed for heating circuit 3, and now the installer board has been unable to communicate with the mixing module over the EMS bus for the past 4 minutes. The alarm is automatically acknowledged when communication is re-established.	Poor connection or improperly installed EMS cable between installer board and mixing module.	Check EMS cabling.
3064	A11	Customer	No communication with heating zone module	A mixing module has previously been installed for heating circuit 4, and now the installer board has been unable to communicate with the mixing module over the EMS bus for the past 4 minutes. The alarm is automatically acknowledged when communication is re-established.	Poor connection or improperly installed EMS cable between installer board and mixing module.	Check EMS cabling.
3071	A11	Customer	No communication with remote control	A room sensor has previously been installed for heating circuit 1, and now the installer board has been unable to communicate with the room sensor over the EMS bus for the past 4 minutes. The alarm is automatically acknowledged when communication is re- established.	Poor connection or improperly installed EMS cable between installer board and room sensor.	Check EMS cabling.
3072	A11	Customer	No communication with remote control	A room sensor has previously been installed for heating circuit 2, and now the installer board has been unable to communicate with the room sensor over the EMS bus for the past 4 minutes. The alarm is automatically acknowledged when communication is re- established.	Poor connection or improperly installed EMS cable between installer board and room sensor.	Check EMS cabling.

3073	A11	Customer	No communication with remote control	A room sensor has previously been installed for heating circuit 3, and now the installer board has been unable to communicate with the room sensor over the EMS bus for the past 4 minutes. The alarm is automatically acknowledged when communication is re- established.	Poor connection or improperly installed EMS cable between installer board and room sensor.	Check EMS cabling.
3074	A11	Customer	No communication with remote control	A room sensor has previously been installed for heating circuit 4, and now the installer board has been unable to communicate with the room sensor over the EMS bus for the past 4 minutes. The alarm is automatically acknowledged when communication is re-established.	Poor connection or improperly installed EMS cable between installer board and room sensor.	Check EMS cabling.
3081		Customer	Configuration error: Remote control not used	The room sensor refers to a circuit that does not exist.	The room sensor refers to a circuit that does not exist.	Ensure that the room sensor refers to the correct heating circuit.
3091	A11	Customer	Room temperature sensor fault	The resistance thermometer inside the room sensor for heating circuit 1 is defective. (EMS communication is working.) An incorrect configuration of the room sensor will produce the same alarm.	Incorrect configuration of external room sensor. (This will also produce alarm 1051.)	Ensure that the setting Service menu >> Set heating/cooling >> Heating circ. 1 >> Ext. room temp. Sensor = No.
					Broken room sensor.	The room sensor must be replaced.
3092	A11	Customer	Room temperature sensor fault	The resistance thermometer inside the room sensor for heating circuit 2 is defective. (EMS communication is working.) An incorrect configuration of the room sensor will produce the same alarm.	Incorrect configuration of external room sensor. (This will also produce alarm 1052.)	Ensure that the setting Service menu >> Set heating/cooling >> Heating circ. 2 >> Ext. room temp. Sensor = No.
					Broken room sensor.	The room sensor must be replaced.
3093	A11	Customer	Room temperature sensor fault	The resistance thermometer inside the room sensor for heating circuit 3 is defective. (EMS communication is working.) An incorrect configuration of the room sensor will produce the same alarm.	Incorrect configuration of external room sensor. (This will also produce alarm 1053.)	Ensure that the setting Service menu >> Set heating/cooling >> Heating circ. 3 >> Ext. room temp. Sensor = No.
					Broken room sensor.	The room sensor must be replaced.
3094	A11	Customer	Room temperature sensor fault	The resistance thermometer inside the room sensor for heating circuit 4 is defective. (EMS communication is working.) An incorrect configuration of the room sensor will produce the same alarm.	Incorrect configuration of external room sensor. (This will also produce alarm 1054.)	Ensure that the setting Service menu >> Set heating/cooling >> Heating circ. 4 >> Ext. room temp. Sensor = No.
					Broken room sensor.	The room sensor must be replaced.
3111	A11	Customer	Configuration error: Incorrect remote control	The alarm is given if a room sensor was previously acknowledged, but it is later replaced with another room sensor type with hygrometer - or vice versa.	The alarm is given if a room sensor was previously acknowledged, but it is later replaced with another room sensor type with hygrometer - or vice versa.	Run the configuration wizard from Service menu / Commissioning. It automatically identifies the type of room sensor used.
3121		Customer	Temperature limit triggered	The alarm is given by the mixing module MM100 for circuit 1, if its MC1 input is open. It is possible to install a temperature guard	High temperature.	Check the function of the mixing valve and mixing module. Check the cut-off threshold for the temperature guard.

				which breaks up the connection over MC1 when the temperature is too high.	Intermittent connection in cabling between temperature guard and MC1 input of MM100.	Check the cabling for continuity.
3122		Customer	Temperature limit triggered	The alarm is given by the mixing module MM100 for circuit 2, if its MC1 input is open. It is possible to install a temperature guard which breaks up the connection over MC1 when the temperature is too high.	High temperature.	Check the function of the mixing valve and mixing module. Check the cut-off threshold for the temperature guard.
					Intermittent connection in cabling between temperature guard and MC1 input of MM100.	Check the cabling for continuity.
3123		Customer	Temperature limit triggered	The alarm is given by the mixing module MM100 for circuit 3, if its MC1 input is open. It is possible to install a temperature guard which breaks up the connection over MC1 when the temperature is too high.	High temperature.	Check the function of the mixing valve and mixing module. Check the cut-off threshold for the temperature guard.
					Intermittent connection in cabling between temperature guard and MC1 input of MM100.	Check the cabling for continuity.
3124		Customer	Temperature limit triggered	The alarm is given by the mixing module MM100 for circuit 4, if its MC1 input is open. It is possible to install a temperature guard which breaks up the connection over MC1 when the temperature is too high.	High temperature.	Check the function of the mixing valve and mixing module. Check the cut-off threshold for the temperature guard.
					Intermittent connection in cabling between temperature guard and MC1 input of MM100.	Check the cabling for continuity.
3141	A21	Customer	Humidity sensor fault	Sensor for relative humidity is faulty in the room sensor for circuit 1.	Sensor for relative humidity is faulty in the room sensor.	Replace room sensor.
3142	A22	Customer	Humidity sensor fault	Sensor for relative humidity is faulty in the room sensor for circuit 2.	Sensor for relative humidity is faulty in the room sensor.	Replace room sensor.
3143	A23	Customer	Humidity sensor fault	Sensor for relative humidity is faulty in the room sensor for circuit 3.	Sensor for relative humidity is faulty in the room sensor.	Replace room sensor.
3144	A24	Customer	Humidity sensor fault	Sensor for relative humidity is faulty in the room sensor for circuit 4.	Sensor for relative humidity is faulty in the room sensor.	Replace room sensor.
5201	A01	Installer	Warning Outside temperature 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 board and sensor.	Check signal cable and connection to installer board.
5202	A01	Installer	Warning Outside temperature 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	H01	Customer	Error Z1 Sensor T1 broken	Alarm if 3 errors of type 5201 or 5202 are registered within 3 hours, or if the circuit for outside sensor T1 is continuously shorted/broken for 30 minutes.		**See definition for error code 5201/2 above.**
5204	A01	Installer	Warning Z1 Supply temperature sensor T0 open circuit	Warning if the resistance of flow sensor T0 > 30 kOhm (<0°C).	Break on signal cable between installer board and sensor.	Check signal cable and screw terminal on installer board.

5205	A01	Installer	Warning Z1 Flow temperature sensor T0 short circuit	Warning if the resistance of flow sensor T0 <500 Ohm (corresponding to a temperature >110°C).	Flow sensor T0/signal cable shorted.	Check signal cable.
5206	H01	Customer	Alarm Z1 Flow temperature sensor T0 failure	Alarm if 3 errors of type 5204 or 5205 are registered within 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.**
					Flow sensor T0 value is out of range (>15 kOhm or <300 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 board.	If sensor T0 measures the correct value, and the same warning (5204/5205) remains when the sensor is connected, replace the installer board.
5207	A01	Installer	Warning Temperature sensor TC1 open circuit	Warning if resistance of sensor >30 kOhm (corresponding to a temperature <0°C).	Screw terminal on installer board not properly tightened.	Check screw terminal for TC1
					Heat carrier outlet sensor TC1/signal cable open circuit.	With TC1 disconnected from installer board, compare measured Ohm value with sensor table in documentation. Replace sensor if necessary.
					Defective installer board.	Replace installer board.
5208	A01	Installer	Warning Temperature sensor TC1 short circuit	Warning if the resistance of the sensor <500 Ohm (corresponding to a temperature >110°C).	Heat carrier outlet sensor TC1/signal cable shorted.	With TC1 disconnected from installer board, compare measured Ohm value with sensor table in documentation. Repair sensor cable
					Defective installer board.	Replace installer board.
5209	H01	Customer	Error Z1 Sensor TC1 broken	Alarm if 3 errors of type 5207 or 5208 are registered within 3 hours, or if the circuit for sensor TC1 is continuously broken/shorted for more than 30 minutes.		**See definition for error code 5207/8 above.**
5213	A01	Installer	Warning Z1 Inlet temp sensor TC0 open circuit	Warning if the resistance of heat carrier return-sensor TC0 >30 kOhm (corresponding to temperature <0°C). The compressor is stopped.	Screw terminal in installer board, 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 board.	Replace installer board

5214	A01	Installer	Warning Z1 Inlet temp sensor TC0 short circuit	Warning if the resistance of heat carrier return-sensor TC0 <500 Ohm (corresponding to temperature > 110°C). The compressor is stopped.	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	H01	Customer	Alarm Z1 Inlet temp sensor TC0 fault	Alarm if 3 errors of type 5213 or 5214 are registered within 3 hours, or if the circuit for sensor TC0 is continuously broken/shorted for 15 minutes. The compressor is stopped.		**See definition for error code 5213/4 above**
5234	A01	Installer	Warning Pool temperature sensor TP1 open circuit	Warning if the resistance for sensor TP1, which is named TC1 on the pool module, is >32 kOhm (corresponding to a temperature <0°C).	Screw terminal for TC1 on pool module is not properly tightened.	Check terminal
					Defective sensor or broken signal cable	With sensor TC1 disconnected from the pool module, measure its resistance and compare it to sensor table. Repair cable or replace sensor if necessary.
					Defective pool module.	Replace pool module.
5235	A01	Installer	Warning Pool temperature sensor TP1 short circuit	Warning if the resistance for sensor TP1, which is named TC1 on the pool module, is <680 Ohm (corresponding to a temperature >110°C).	Screw terminal for TC1 on pool module is not properly tightened.	Check terminal.
					Pool temperature sensor TP1/signal cable shorted.	With sensor TC1 disconnected from the pool module, measure its resistance and compare it to sensor table. Repair cable or replace sensor if necessary.
					Defective pool module.	Replace pool module.
5236	H01	Customer	Alarm Pool temperature sensor TP1 fault	Alarm is triggered if 3 errors of type 5234 or 5235, are registered within 3 hours, or if the circuit for sensor TP1 is continuously broken/shorted for more than 30 minutes. The alarm needs manual reset.		**See definition for error code 5234/5 above**
5237	A01	Installer	Warning DHW temperature sensor TW1 open circuit	Warning if the domestic hot water sensor TW1 <0°C. Automatically reset if the temperature >0°C. Sensor TW1 has different characteristics depending on the products' brand. See sensor table for more information.	Screw terminal for TW1 on installer board 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.

5238	A01	Installer	Warning DHW temperature sensor TW1 short circuit	Warning if the domestic hot water sensor TW1 >110°C. Automatically reset if the temperature <110°C. Sensor TW1 has different characteristics depending on the products' brand. See sensor table for more information.	Hot water sensor TW1/signal cable shorted.	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.	If the sensor is found to be working and the warning is still triggered, replace the installer board.
5239	H01	Customer	Alarm DHW temperature sensor TW1 fault	Alarm is triggered if 3 errors of type 5237 or 5238, are registered within 3 hours, or if the circuit for sensor TW1 is continuously broken/shorted for more than 15 minutes. The alarm needs manual reset.		**See definition for error code 5237/8 above.**
5246	A01	Installer	Alarm Z1 electric booster heater E2 manual reset high limit (STB) or pressure switch tripped	Alarm is given if the overheating protector is tripped. 230V voltage missing on installer board terminal. **Only for Comfort model:** This will trip when the system pressure drops below 0.5 bar and triggers the same alarm.	Tripped overheating protector.	Reset the overheating protector. Note that the button must be pushed hard. A "click" is heard when reset.
					Low system pressure. Air in the heating system.	De-air heating system according to instruction in the installer guide. Refill heating system.
					Clogged filter ball 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. (See alarm definition)	Replace system pressure guard.
					EVU is incorrectly configured or connected. (EVU "Energieversorgungsunternehmen" is a function used in some countries, to block the compressor and/or the electrical heater certain times of the day, on signal from the electricity supplier.) Defective overheating protector (cannot be reset).	If the EVU cut-out is active but not wired correctly (for example a signal via I1, terminals 13 & 14) or parameters have been set incorrectly, there is no voltage on terminal 64 of the installer board. This will result in alarm 5246.
					PWM signal or 230 V supply voltage missing for circulation pump PC0.	Verify breaking temperature (96°C). Measure the voltage on both sides of the overheating protector. Replace if it trips at too low temperature
					Defective circulation pump.	Ensure 230 V supply to PC0. Disconnect PWM signal from terminal 40, 41 on installer board. The speed of the circulation pump should increase to 100%.

					Contactor for electrical heater has got jammed in closed (active) position, causing overheat.	Replace circulation pump.
					If all points above have been checked and the alarm persists, the installer board may be defective.	Check / replace contactor.
					If all points above have been checked and the alarm persists, the installer board may be defective.	Replace installer board.
5252	H01	Costumer	Warning Z1 Flow between outdoor and indoor unit restricted (check filter)	Warning when the heat carrier delta >13K in heating mode, or >7K in cooling mode between TC3 and TC0.	Bad circulation in the heat carrier/heating system.	Check adjustment valves/thermostats for heating system.
5265	A01	Installer	Warning Z1 PCB disconnected	Bad connection or interference on CANbus between heat pump and indoor unit.	Bad CAN bus connections on installer board (indoor unit) or I/O board (outdoor unit).	Check CAN bus connections on installer board and HP board. **Change the CBI board**
					Open circuit/break on CAN bus cable between indoor and outdoor unit.	Replace CAN bus cable.
					Incorrect type of CAN bus cable. Read printed documentation for further info.	Change to proper type of cable.
					CAN bus cable is placed together with power supply to heat pump. Interference can be generated by electromagnetic induction.	Separate CAN bus and power supply by at least 100 mm.
					Incorrect earthing of CAN bus cable.	Remove/connect cable shield to/from earth.
5266	H01	Customer	Warning Z1 PCB disconnected	Alarm if error code 5265 is registered 3 times within 2h, or if the CANbus communication has been continuously broken for 15 minutes.		**See definition for error code 5265 above.**
5269	A01	Customer	Alarm Z1 Electric booster heater EE temperature too high	Alarm when sensor TC1 >87°C. Electrical heater operation is blocked. The alarm is inactivated when TC1 <80°C. The customer can acknowledge the message, but the alarm remains active until the temperature has dropped below the approved level.	Dirt in filter ball on the return line.	Clear system filter/filter ball.
					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 board, compare its measured value to sensor table in documentation. Replace sensor TC1 if necessary.
5271	A01	Customer	Alarm Heating circuit 1 high supply temp	Alarm when sensor T0 >"Max. flow temperature" + 5K, for 10 s. If T0 >"Max. flow temperature" + 15K, the alarm is given without delay.	Low system pressure. Air in the heating system.	De-air heating system according to instruction in the installer guide. Refill heating system.
					Low flow in heating system.	Clean filter ball on return pipe. Check adjustment valves and thermostats for the heating system.

				(Service menu/ Set heating/cooling/ Heating circ. <nr>/ Set heating curve/ Max. flow temperature) **Note:** The alarm is blocked for 5 minutes after a DHW cycle. Automatically reset takes place when T0 temperature drops.	Defective T0 sensor. The flow sensor T0 is located too close to the heat pump (or too close to the diverter valve). **HINT**: The "Max temp HC" in the HMI is too close to the highest temperature on the heat curve.	With sensor disconnected from the installer board, compare sensor resistance to table values for T0 found in the documentation. Move the T0-sensor as far away from the heat pump as possible (the whole cable length if it´s possible). Separate "Max. temp HC" at least 10K from the highest temperature on the heat curve
					The system is in heating mode, but the diverter valve has not switched over to DHW.	Run the 3-way valve in manual mode and check that 230 V is available on terminal 53 (VW1) in DHW mode. If that is the case but the valve does not switch, replace the motor/cable for the diverter valve. If voltage is missing during DHW mode, replace the installer board.
5272	A01	Customer	Alarm External auxiliary heater EM is not operational	Alarm for external additional heater/overheating protector. Alarm is triggered if 230 V is missing on terminal 64 on installer board.	Low system pressure. Air in the heating system.	De-air heating system according to instruction in the installer guide. Refill heating system.
					Clogged filter ball 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.
					Tripped fuse at distribution box.	Reset/replace fuses at distribution box.
					Defective circulation pump.	Ensure 230 V supply to PC0. Disconnect PWM signal from terminal 40,41 on installer board. The speed of the circulation pump shall increase to 100%. If the circulation pump still does not run, replace it.
					PWM output, terminal 40,41, for controlling the speed of circulation pump PC0, is not working.	From the previous test it is known that the circulation pump is working. Ensure that the PWM signal, terminal 40,41 is connected to the circulation pump. Run PC0 in manual mode from the HMI and try different speed settings. If PC0 does not run, the output from the installer board may be defective. Replace the installer board.

					Defective system pressure guard MC1. (Note. Not all appliances are equipped with a system pressure guard. When it does exist, it is connected in series with the overheating protector.)	Disconnect MC1 and measure its resistance. If the circuit is open (infinite resistance) and the actual system pressure is higher than 0.5 (±0.1) bar, replace the system pressure guard MC1.
					Defective overheating protector.	Verify breaking temperature (96°C) for the overheating protector. For instance, raise the temperature with Extra DHW program, to see if it triggers too soon.
					Contactor for electrical heater has got jammed in closed (active) position.	Measure control voltage and output voltage of each contactor to check if it has been jammed. If a contactor is continuously active regardless of control voltage, replace it.
					If all points above have been checked and the alarm persists, the installer board may be defective.	Possible problem with alarm input of installer board. Replace installer board.
5275	H01	Customer	Alarm Electric anode is out of order	Alarm if voltage >1 V DC on terminal 45, 46 on installer board, 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 board.
					If voltage >1V DC on terminal 45, 46, the installer board is defective.	Replace installer board.
					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.
5284	A01	Customer	Warning Last thermal disinfection failed	The domestic hot water temperature, sensor TW1, has not reached 65°C within 180 minutes. If the warning is triggered a new attempt is postponed until the next day. **Note:** This is true for factory settings. These settings can be changed in HMI	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 board, 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	H01	Customer	Warning Risk of frost in heating system	Warning if TC1 (heat carrier flow) or TC0 (heat carrier return) <5°C for 10 minutes. When the warning is triggered, all available heat sources are activated and all mixing valves are opened, to heat the system. The warning is reset when all the previously mentioned sensors >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.
5294	A01	Installer	Warning Dew point monitor has tripped	The circuit for the dew point guard/condensate guard MD1 (previously named MK2) has been closed over terminal 34, 35 on the installer board. The warning is automatically reset when the circuit has been open for 60 seconds.	Short circuit in cable/humidity sensor.	Measure the resistance of the circuit.
5295	H01	Customer	Alarm Condensation monitor has tripped	Alarm when warning 5294 has been active for 30 minutes. The alarm must be manually acknowledged.	Short circuit in cable/humidity sensor.	Measure the resistance of the circuit.
					Defective installer board.	Measure voltage on terminal MD1 (34, 35) on installer board, with the humidity sensor disconnected. If voltage is < 2,5V DC, replace installer board.

5296	H01	Customer	High evaporating temperature in cooling	ODU 4-way valve is stuck. Refrigerant leakage.	Defective coil for 4-way valve.	**See ODU instructions on page 18/ #122 and page 19/ #127 of the table.**
5297	H01	Customer	Alarm Z1 4-way valve fault, cannot switch to heating mode	Protect against four way valve malfunction in heating mode. RV valve in OFF state during heat mode.	Defective coil for 4-way valve	Measure the resistance of the coil on the 4-way valve. It shall be in the order of 1-2.5 kOhm. If the resistance deviates greatly from the recommended value, replace the coil. **See ODU instructions on page 18/ #116 of the table and 24/ #165**
					No control signal to 4-way valve. (230 VAC missing on terminal RV ODU board.)	Activate function test for the heat pump: Service menu >> Diagnosis >> Function test >> Activate function tests = Yes. Heat pump >> Outdoor unit test = On. Check that the control signal, shifts between 0 and 230 VAC during the 2 minute test cycle. If the voltage is always 0 V, replace the HP board.
						See ODU instructions on page 18/ #115 of the table.
					Seized/defective 4-way valve.	Replace 4-way valve. Only as a very last step if a compressor replacement did not solve the problem.
5298	A01	Installer	Warning Z1 High pressure alarm JR1		Dirt in system filter/filter ball valve SC1.	Clean the filter.
					Poor circulation in heat transfer system/heating system.	Ensure enough 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 board, 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 board.	By manually operating the VW1 valve from the HMI, check that terminal 53 on the installer board provides 230V only in hot water mode.
					Defective installer board, PWM signal missing for circulation pump PC0.	Disconnect the PWM signal from terminal 40, 41 on the installer board. The speed of the pump should increase to 100%. If not, replace the circulation pump.
					Defective installer board, supply voltage, 230 V, missing from circulation pump PC0.	Measure voltage on terminal 51-N. If no voltage, replace installer board.
5314	A01	Installer	Warning Z1 Gaseous refrigerant temperature sensor TR6 open circuit	Warning if the resistance for sensor TR6 (**CTT**) >582 kOhm (corresponding to a temperature < -45 °C).	Broken circuit for discharge gas temperature sensor TR6 (**CTT**).	Check resistance of sensor TR6 (**CTT**) and signal cable and compare to table value in documentation. Measurement is done with sensor disconnected from HP board. Replace sensor if necessary.
5315	A01	Installer	Warning Z1 Gaseous refrigerant temperature sensor TR6 short circuit	Shorted circuit (<0,2KOhm) for sensor TR6 (**CTT**) for more than 1 minute.	Discharge gas temperature sensor TR6 (**CTT**) or signal cable is shorted.	Check resistance of sensor TR6 (**CTT**) and signal cable and compare to table value in documentation. Measurement is done with sensor disconnected from HP board. Repair cable or replace sensor if necessary.
5316	H01	Customer	Alarm Z1 Gaseous refrigerant temperature sensor TR6 fault	Alarm if any of the error codes 5314 or 5315 has been triggered 13 times within 1 hour, or if any of the error codes have been active for more than 4 hours.		**See possible actions for error codes 5314 and 5315.**
						Replace installer board.
5320	A01	Installer	Warning Temperature sensor TC3 open circuit	Open circuit for sensor TC3 (**LWT**) (resist > 32.9 kOhm, corresponding to a temperature reading < 0°C). Reset is done automatically when read temperature exceeds 0°C.	Broken condenser outlet sensor TC3/signal cable.	With sensor disconnected from HP board, measure resistance of sensor/signal cable and compare to table values in documentation.
					Connector not properly seated in HP board.	Check connector.
					Broken sensor TC3 (**LWT**)/signal cable.	Replace sensor TC3 (**LWT**).
					Defective installer board.	Replace installer board.
5321	A01	Installer	Warning Temperature sensor TC3 short circuit	Shorted circuit (< 390 Ohm) for condenser sensor TC3 (**LWT**). Shorted circuit for sensor TC3 (**LWT**) (resistance <390 Ohm corresponding to a temperature reading >110°C). Reset is done automatically when read temperature drops below 110°C.	Broken condenser outlet sensor TC3 (**LWT**) or shorted signal cable.	With sensor disconnected from installer board, measure the resistance of sensor and signal cable. Compare to table values in documentation. Repair signal cable or replace sensor.
					Defective installer board.	Replace installer board.
5322	H01	Customer	Alarm Temperature sensor TC3 fault	Alarm if any of the error codes 5320 or 5321 are registered 3 times within 3 hours, or if any of them is active for more than 30 min.		**See possible actions for error codes 5320, 5321.**

5330	A01	Installer	Warning Z1 Inverter communication			**See instructions on page 14/ #44 of the table.**
5331	H01	Customer	Error Z1 Inverter communication			**See definition for error code 5330 above.**
5347/ 6208	H01	Installer	Warning Z1 Undervoltage in power supply	Warning if incoming AC voltage to installer board < limits. Warning is automatically reset when incoming AC voltage >190 V for 2 minutes: Limit for 400V: Below 380VDC Limit for 230V: Below 235VDC	Low mains voltage. This alarm can also be registered in the event of a power failure and is shown when the heat pump is turned on again.	If repeated warnings, contact the electricity supplier. **See instructions on page 16/ #74 of the table.**
					Bad connection in cable for supply voltage (230/400 VAC) to installer board.	Ensure proper connection. **See instructions on page 16/ #74 of the table.**
5354	A01	Installer	Warning Z1 Current consumption on compressor too high	Warning if the inverter registers an overcurrent transient to compressor. Warning is automatically reset after 4 minutes if the condition is not fulfilled. (The probability of a defective inverter is low.)	Broken/shorted cabling between the inverter and compressor.	**See instructions on page 16/ #77 of the table.**
5362	A01	Customer	Info Z1 Overvoltage	The message is produced if the AC bus voltage inside the inverter exceeds: 400V: Over 700VAC Peak 230V: Over 410VAC Peak The message must be acknowledged in order to allow a new start to attempt.		**See instructions on page 16/ #75 of the table.**
						Replace the inverter.
5374	A01	Installer	Warning Z1 Risk of frost in condenser	In cooling operation: Warning is given if: • TC0/TC3 <4°C during cool mode • TC0/TC3 <8°C during defrost mode	Insufficient or no circulation in heat transfer system/heating system.	Check adjustment valves/radiator thermostats.
					Dirt in system filter/filter ball 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.
					A sensor could be defective.	Compare each of the sensors' reading in display to the actual temperatures. Replace sensor if necessary.

					Defective installer board, PWM-signal for circulation pump PC0 missing.	Disconnect PWM signal from terminal 36, 37 on HP board. The speed of the circulation pump should increase to 100%.
					Defective Installer board, 230 V supply missing for circulation pump.	Check that 230 V is available on terminal 51, Non installer board.
					The available amount of energy bound in the heat carrier, is insufficient for a defrost.	Raise the maximum power level for the additional heater.
					Defective installer board.	Replace installer board.
					Defective circulation pump.	Replace circulation pump. **See also ODU instructions on page 18/ #115, #116 of the table.**
5375	H01	Customer	Error Z1 risk of frost in condenser	Alarm if 3 error codes are registered within 3 hours, or if the warning is active for more than 30 minutes.		**See definition for error code 5374 above.**
5378	A01	Installer	Warning Z1 Outdoor unit defrost failure	In defrost operation: Warning is given if: - TC3 ≤8°C or - TC0 <15°C and JR1 (**ICT**) <0°C.	Too low temperature of heating system.	Open more thermostats on the heating system. **See instructions on page 18/ #117, #118 of the table.**
5408	A01	Installer	Warning Z1 Air inlet sensor TL2 open circuit	Circuit or air inlet sensor TL2 (**OAT**) is open/broken (> ~582 kOhm).		**See instructions on page 13/ #18 of the table.**
5409	A01	Installer	Warning Z1 Air inlet sensor TL2 short circuit	Warning circuit for air inlet sensor TL2 (**OAT**) is shorted (< 0,6 kOhm).		**See instructions on page 13/ #17 of the table.**
5410	H01	Customer	Alarm Z1 Air inlet sensor TL2 fault	Error code 5408 or 5409 is registered more than 2 times within 2 hours or is continuously active for 15 minutes.	**See possible causes for error codes 5408, 5409.**	Disconnect sensor TL2 (**OAT**) from installer board and check Ohm value for sensor and cable. Compare to sensor table above.
5420	A01	Installer	Warning Z1 Refrigerant condensate sensor cooling mode TR4 open circuit	Open circuit for temperature sensor TR4.	Screw terminal on installer board, for sensor TR4 (**OCT**), is not properly tightened.	Check screw terminal of HP board.
					Broken sensor TR4 (**OCT**)/signal cable.	With sensor disconnected from installer board, measure its resistance. If broken, replace sensor.

					Defective HP board.	If the sensor measures correctly but the same error code persists, replace the HP board.
5421	A01	Installer	Warning Z1 Refrigerant condensate sensor cooling mode TR4 short circuit	Shorted circuit for temperature sensor TR4.	Sensor TR4 (**OCT**)/signal cable broken.	With sensor disconnected from HP board, measure its resistance. If shorted, replace sensor.
					Defective HP board.	If the sensor measures correctly but the same error code persists, replace the HP board. Compare to sensor table above.
5422	H01	Customer	Alarm Z1 Refrigerant condensate sensor cooling mode TR4 fault	Alarm is given if any of the error codes 5420 or 5421 are registered more than 2 times within 2 hours, or if the circuit for sensor TR4 (**OCT**) is continuously broken/shorted for 15 minutes.		**See possible actions for error codes 5420, 5421**.
5438	A01	Installer	Warning Z1 High pressure sensor JR1 open circuit	JR1<0.4V/0bar or JR1>4.5V/47bar)	Poor connection in cabling/terminal installer board.	Check cabling and terminal connections.
					Defective Installer board.	Check that 5V DC is available between terminal of the pressure sensor, when the pressure sensor is disconnected. If voltage is missing, the installer board is defective and needs to be replaced.
					Pressure sensor JR1 is defective.	If voltage in the terminals of the pressure sensor is 5 V DC, the pressure sensor is likely broken. Replace pressure sensor.
5440	H01	Customer	Alarm Z1 High-pressure sensor JR1 fault	Alarm is given if error code 5438/5439 is registered 3 times within 3 hours, or if the circuit for JR1 has been continuously open for 30 minutes.		**See definition for error code 5438/9 above.**
5445	H01	Customer	Alarm Z1 Fan central fault message	Alarm if 230 V is missing on terminal FAN on HP board.		**See instructions on page 16/ #91, #92, #93 of the table.**
5451	H01	Customer	Alarm Z1 Flow rate too low during defrosting	Alarm if temperature difference: • *Low flow condition*: TC0 – TC3 > +15K. • *No flow condition*: TR3 < -6°C • depending on the outdoor temperature (T1) at the beginning of the defrost: ○ If T1 < -10°C, *TR3 time* = 150 seconds ○ Else, *TR3 time* = 130 seconds *Low flow condition based on evaporation temperature*:	Too low temperature on heating system.	Open more thermostats on the heating system.
					Dirt in system filter/filter ball SC1.	Clean system filter/filter ball SC1. **Clean the PHE**
					Air in heating system.	De-air heating system in accordance with instruction in manual. Fill heating system.
					Insufficient flow in heating system.	Check adjustment valves/radiator thermostats. **Clean the PHE**

				if the JR1 temperature reaches one of the thresholds below (considering cumulative time below the threshold, during one complete defrost cycle), but only while the Compressor is running with the 4-way valve in Cooling position: JR1 temperature < 0°C for 300 seconds JR1 temperature < -10°C for 150 seconds JR1 temperature < -15°C for 75 seconds JR1 temperature < -20°C for 50 seconds JR1 temperature < -25°C for 3 seconds	Bypass or buffer tank missing.	Install bypass or buffer tank to create proper conditions for successful defrosting. See installation guide for more information.
					Defective installer board, PWM signal to circulation pump PC0 is missing.	Disconnect PWM signal on terminal 40, 41 on installer board. The speed of the circulation pump shall increase to 100%.
					Defective installer board, 230 V missing on terminal PC0 (51, N).	Make sure that 230 V is available on terminal PC0 (51, N) on installer board.
					Defective installer board.	Replace installer board.
					Defective circulation pump.	Replace circulation pump.
5463	H01	Customer	Alarm Z1 Defrost failure	3 failed defrosts in the past 12 hours. The ODU is then blocked and the alarm is displayed on end-customer level. The installation then needs to analysed to find the root cause	Evaporator clogged with ice.	Gently melt the ice with hot water.
					Plate Heat Exchanger with dirt inside	Clean the PHE with a cleaning machine to remove the dirt inside.
					Too low temperature on heating system.	Open more thermostats in heating system.
					Dirt in system filter/filter ball SC1.	Clean system filter/filter ball SC1.
5500	A01	Customer	Warning Underfloor temperature limiter has tripped	The circuit's own protective thermostat has tripped. Alarm is given when the external input configured for this purpose, on the installer board, is closed.	Protective thermostat for underfloor heating has been tripped.	Reset thermostat, adjust heat curve if necessary.
5503	A01	Installer	Warning Connection to current monitor faulty	Communication between installer board and power guard is missing for 30 seconds.	Incorrect cabling / connections.	Check cabling/connections.
					Poor connection in CAN bus connections on installer board or power guard.	Check CAN bus connections on installer board and power guard.
					Interruption/break on CAN bus cable between installer board and power guard.	Replace CAN bus cable.
					Incorrect type of CAN bus cable.	Replace to correct type of CAN bus cable. Check documentation for more information.
					CAN bus cable installed together with/close to supply voltage to heat pump.	Separate CAN bus and power cables by at least 100 mm to prevent interference.
5504	H01	Customer	Alarm Connection to current monitor faulty	Alarm is given if error code 5503 is registered 3 times within 2 hours, or if communication with the power guard has been missing for 15 minutes.		**See definition for error code 5503 above.**
5507	A01	Installer	Warning Z1 High pressure warning	The circuit for the high-pressure guard is open. The compressor stops.	The heat carrier flow is too low. The reason can be long pipe lengths or a heating system that is completely or partially closed.	Try to decrease the pressure drop.

						See instructions on page 13/ #16 of the table.
5508	H01	Customer	Alarm Z1 MR1 High pressure alarm			
5522	A01	Installer	Alarm Indoor and outdoor unit are incompatible	Missing ODU configuration Undefined ODU Model HW Type and ODU model Undefined compressor model (reported by driver).	IDU code not matched ODU code.	**See instructions on page 17/ #96 of the table.**
5541	A01	Customer	Alarm Pool module communication failure	No communication between installer board and pool board for 90 seconds.	Poor connection in CAN bus connections on installer board or pool module.	Check CAN bus connections on installer board and pool module.
					Break on CAN bus cable between installer board and pool module.	Replace CAN bus cable between installer board and pool module.
					Improper type of CAN bus cable.	Change to the correct type of cable. More information can be found in the installer guide.
					CAN bus cable installed together with/close to supply voltage to heat pump.	Separate CAN bus and power cables by at least 100 mm to prevent interference.
					Improper earthing of CAN bus cable.	Disconnect/connect cable shield from/to earth.
5594	H01	Customer	Alarm Z1 Air in system	The temperature of sensor TC1 has increased too fast (> 0.8 K/s) for normal working conditions. **The alarm is only applicable for all indoor units with integrated 9/6 kW electrical heater.**	The flow is blocked by valve.	Wait two minutes for the appliance to cool down. Check if there is any closed valve blocking the flow.
					The flow is blocked because of bad electrical connection to circulation pump.	Ensure that the circulation pump is running.
					If there is nothing blocking the flow, there is likely air in the appliance.	Redo the filling and venting according to described procedure in the documentation. Ensure that all air is removed from the appliance and heating system.
5600	A01	Installer	Warning Compressor blocked (IPM fault)		Hint: Possible caps from the refrigerant pipes where not removed	**Switch off the power of both units (IDU/ODU) for 5 minutes then switch on the power again.** **If problem persists see instructions on page 14/ #44, #50 of the table.**
5601	H01	Customer	Alarm Compressor blocked (IPM fault)		Hint: Possible caps from the refrigerant pipes where not removed	

5604/ 5726	A01	Installer	Warning DC voltage outside allowable range	The DC link voltage is too low or too high. See separate error handling instructions for Split outdoor unit for limits. The outdoor unit will automatically attempt to restart when the condition is no longer fulfilled.		**See instructions on page 14/ #56, #57 of the table.**
5605	H01	Customer	Alarm DC voltage outside allowable range			
5610	A01	Installer	Warning Compressor phase sequence incorrectly connected			**See instructions on page 14/#54, #55 of the table.**
5611	H01	Customer	Alarm Compressor phase sequence incorrectly connected			
5616	A01	Installer	Warning Compressor current consumption too high			**See instructions on page 16/#73 of the table.**
5626	A01	Installer	Warning Evaporator average temperature sensor TR8 fault	TR8 (**OMT**) fault.		**See instructions on page 13/#18, #20 of the table.**
5627	H01	Customer	Alarm Evaporator average temperature sensor TR8 fault			
5634	A01	Installer	Warning Internal outdoor unit CAN communication faulty	Error unlikely to occur on IDU since there will be no communication (but possible if ODU does not receive replies from IDU).		**See instructions on page 14/#45 of the table.**
5635	H01	Customer	Error Z1 Internal outdoor unit CAN communication faulty			
5636	A01	Installer	Warning Phase sequence wrong or phase missing			**See instructions on page 15/#60, #72 of the table.**
5637	H01	Customer	Alarm Phase sequence wrong or phase missing			
5642	A01	Installer	Warning Temperature on inverter too high (> 80°C)	Fin temperature unusual rise detection.		**See instructions on page 17/ #110 of the table.**
5643	H01	Customer	Alarm Temperature on inverter too high (> 80°C)	Heatsink overheating.	**Hint:** The Heatsink sensor is inside of the inverter PCB. The issue is the inverter!!	
5646	A01	Installer	Warning Inverter temperature sensor fault	ODU Inverter fault.		**See instructions on page 14/ #54 of the table.**

5647	H01	Customer	Alarm Inverter temperature sensor fault			
5656	A01	Installer	Error Z1 sensor TR3 (IRT) open	Open circuit for sensor TR3 (IRT) (resistance > 0,5 kOhm, corresponding to a temperature reading < 105°C). Reset is done automatically when read temperature drops below 105°C.		
5657	A01	Installer	Error Z1 sensor TR3 (IRT) short	Short circuit for sensor TR3 (IRT) (resistance > 200 kOhm, corresponding to a temperature reading < -40°C). Reset is done automatically when read temperature exceeds -40°C.		
5658	H01	Customer	Error Z1 sensor TR3 (IRT) broken			**See definition for error code 5656/7 above.**
5726	A01	Installer	Warning Z1 DC undervoltage			**See instructions on page 14/#56 of the table.**
5800	A01	Installer	Warning ODU restart	Outdoor unit controller restarted	ODU control unit crash or power supply cut off	If the ODU is intentionally power cycled, info is expected, no corrective measure needed. Otherwise, check stability of power supply grid. If problem is recurrent and power supply is stable, replace the ODU control unit.
5801	A01	Installer	Warning CBI restart	Outdoor unit CAN gateway restarted	ODU CAN gateway (CBI) crash or power supply cut off	If the ODU is intentionally power cycled, info is expected, no corrective measure needed. Otherwise, check stability of power supply grid. If problem is recurrent and power supply is stable, replace the CAN gateway (CBI).
5802	A01	Installer	Warning Compressor wire	No power supply at compressor	Compressor wire (power supply) is faulty, or missing No power supply to the compressor	Check compressor wire and high pressure switch connections
5803	H01	Customer	Error Compressor wire fault	No power supply at compressor Compressor wire (power supply) is faulty, or missing	No power supply to the compressor (outdoor unit locked).	Check compressor wire and high pressure switch connections
5804	A01	Installer	Warning Current sensor fault	Current sensor fault	Hardware current sensor false reading	**See instructions on page 14/#51 of the table.**
5805	H01	Customer	Error Z1 current sensor fault			
5806	A01	Installer	Warning IPM Driver pin	IPM driver pin fault	Hardware control signal to IPM pin is not correct	**See instructions on page 14/#52 of the table.**

5807	H01	Customer	Warning Z1 IPM driver PIN			
5808	A01	Installer	Warning Z1 AC cross fault			**See instructions on page 16/#76 of the table.**
5809	H01	Customer	Error Z1 AC cross fault			
5810	A01	Installer	Warning Z1 Compressor current sensor fault			**See instructions on page 14/#54 of the table.**
5811	H01	Customer	Error Z1 Compressor current sensor fault			
5812	A01	Installer	Warning Z1 Compressor driver PIN		Hardware control signal to IPM pin is not correct	**See instructions on page 14/#55 of the table.**
5813	H01	Customer	Error Z1 Compressor driver PIN			
5814	A01	Installer	Warning Z1 PFC current sensor fault		Hardware current sensor false reading	**See instructions on page 15/#70 of the table.**
5815	H01	Customer	Error Z1 PFC current sensor fault			
5816	A01	Installer	Warning Z1 PFC overcurrent		Instant running current larger than IPM withstands	**See instructions on page 15/#71 of the table.**
5817	H01	Customer	Error Z1 PFC overcurrent			
5818	A01	Installer	Warning Overcurrent compressor		Compressor PFC over current fault	
5819	A01	installer	Warning Z1 AC overcurrent		Compressor AC over current	**See instructions on page 16/#77 of the table.**
5820	A01	Installer	Warning Compressor lock undefined driver fault	Hint: Possible caps from the refrigerant pipes where not removed	Unknown compressor or compressor driver fault	Check compressor connections. Check compressor internal resistances. Check compressor driver.
5821	A01	Installer	Info Low evaporating temperature in heating (faulty reverse valve)	ODU 4-way valve is stuck. Refrigerant leakage. ICT misreading pressure value. ICT hardware circuit problem on ODUC.	Check ODU 4-way valve operation and replace when malfunctioned. Check proper refrigerant charge. Replace ICT sensor when malfunctioned. Replace ODUC.	**See instructions on page 18/#116 of the table.**
5822	A01	Installer	Warning Z1 low evaporation temperature cooling	Low evaporating temperature in cooling	Indoor coil anti-freezing protection - Stop compressor when evaporating temperature is below minimum limit in cooling.	**See instructions on page 18/#115 of the table.** **Change the PCB main Board**

5823	A01	Installer	Warning Z1 abnormal system behavior	Compressor cannot start	Abnormal System Behavior (suspicion that compressor has reversed its rotation)	**See instructions on page 16/#90 of the table.**
5824	A01	Installer	Warning Z1 Outdoor coil overheating			**See instructions on page 19/#128 of the table.** **See ODU instructions on page 24/ #165**
5825	A01	Installer	Warning Z1 compressor envelope low pressure	Low pressure in refrigerant circuit	System running with service valves closed, or burst plate heat exchanger, causing too low refrigerant pressure.	Check if service valves are open. Check **TC3** sensor: - Check for refrigerant clog and thermodynamic operation - Check indoor unit.
5826	A01	Installer	Warning Envelope heat sink overheating	Outdoor unit heat sink overheating in standby mode	Outdoor unit under high temperature environment (high Heat Sink Temperature, while unit is in stand-by)	Protect outdoor unit from intense, direct sun light - install outdoor unit in a shade.
5827	A01	Installer	Warning Unknown ODU fault	Unspecified (unsupported) outdoor unit fault	Outdoor unit reports a fault code that is not supported by the indoor unit (new or invalid code). Error code 5828 based on internal communication issues of ODU. Change the ODU PCB (SI A-09-24-007-04-A)	Check reported fault code on outdoor unit controller's HMI and cross-check it with latest alarm list troubleshoots and/or refer to service information. - See the HMI ODU error: 115/117/122
5828	H01	Customer	Error Unknown ODU fault			
5829	A01	Installer	High evaporating temperature in cooling	ODU 4-way valve is stuck. Refrigerant leakage. ICT misreading pressure value. ICT hardware circuit problem on ODUC		Check ODU 4-way valve operation and replace when malfunctioned. Check proper refrigerant charge. Replace ICT sensor when malfunctioned. Replace ODUC. **See instructions on page 24/ # 122, #165 of the table and page 19/ #127 of the table**
5902	A01	Installer	Warning Z1 Compressor overload			**See instructions on page 16/#78 of the table.**

3. Safety procedures (DIN IEC 60335-2-40:2024)

General Procedures:

- Do not use means to accelerate the defrosting process or to clean the appliance, other than those recommended by the manufacturer.
- The appliance must be stored in a room without continuously operating ignition sources (e.g., open flames, an operating gas, or an operating electric heater).
- Do not pierce or burn.
- Be aware that the refrigerant my not contain any odour.
- The length of piping between the outdoor unit and indoor unit must be as short as possible.
- The pipe-work shall not be installed in an unventilated space, if that space is smaller than *A*min in Annex GG, except for A2L refrigerants where installed pipe-work has no connecting joints or is connected with at least one of the following:
  i) joints in compliance with ISO 14903,
  ii) joints in enclosures which vent to the unit or to the outside,
  iii) joints in enclosures which vent to a room with a room area of at least *A*min as specified in GG.2.1;
- A warning that precautions shall be taken to avoid excessive vibration or pulsation to refrigerating piping;
- A warning that protection devices, piping and fittings shall be protected as far as possible against adverse environmental effects, for example the danger of water collecting and freezing in relief pipes or the accumulation of dirt and debris;
- A warning that provision shall be made for expansion and contraction of long runs of piping;
- A warning that piping in refrigerating systems shall be so designed and installed as to minimize the likelihood of hydraulic shock damaging the system;
- A warning that solenoid valves shall be correctly positioned in the piping to avoid hydraulic shock and shall not block in liquid refrigerant unless adequate relief is provided;
- A warning that steel pipes and components shall be protected against corrosion with a rustproof coating before applying any insulation;
- Where field installed **safety shut-off valves** are specified for refrigerating systems, a warning that only **safety shut-off valves** specified by the appliance manufacturer shall be used;
- Where **safety shut-off valves** are to be field installed, information on where and how the **safety shut-off valves** shall be installed;
- Information that **safety shut-off valves** shall only be replaced with valves specified by the appliance manufacturer;
- Field-made refrigerant joints indoors shall be tightness tested. The test method shall have a sensitivity of 5 grams per year of refrigerant or better under a pressure of at least 0,25 times the **maximum allowable pressure**. No leak shall be detected;
- Where remote **refrigerant detection systems** are specified, a warning that only **refrigerant sensors** specified by the appliance manufacturer may be used;
- Information that the **refrigerant detection system refrigerant sensors** shall only be replaced with **refrigerant sensors** specified by the appliance manufacturer;
- For appliances with a **leak detection system**, **safety shut-off valves** shall not be reset until the room has been ventilated, because resetting can result in additional **flammable refrigerant** released into the space;
- Electrical components that can arc or spark, which are not considered ignition sources due to compliance with 22.116.1 points b), c), d), or f) of the regulation shall only be replaced with parts specified by the appliance manufacturer. Replacement with other parts can result in the ignition of refrigerant in the event of a leak;
- Follow national gas regulations.
- Mechanical connections to the indoor unit must be accessible for maintenance purposes.
- Maximum refrigerant charge and instructions on how to add additional refrigerant charge and information for handling, installing, cleaning, and disposing refrigerant.
- Check the outdoor unit installation manual.
- Ducts connected to the appliance must not contain potential ignition sources.
- Follow manufacturer recommendations for servicing.
- The appliance must be stored on a suitable place to prevent mechanical damages.
- The appliance must be installed, maintained, repaired, and removed by a qualified installer or service person. Only qualified personnel can open sealed components and handle, fill, purge and dispose of the refrigerant.

Maintenance and service considerations

Before working on the appliance, ensure that the risk of ignition is minimised by preforming a safety check:

- Work in a controlled environment to minimize the risk of leakage of flammable gas or vapour during the working procedure.
- All personnel responsible for maintenance must have proper training. Work in ventilated areas and avoid confined spaces.
- Prior and during working procedures, make sure that there are not refrigerant leaks with an appropriate refrigerant detector (i.e., no sparking, that is adequately sealed and intrinsically safe). Under no circumstances shall potentially sources of ignition be used in the search for detection of refrigerant leaks. A halide torch (or anu other detector using a naked flame) shall not be used. If refrigerant leaks ventilate the room immediately.
- When conducting any hot work, dry powder or CO2 fire extinguisher shall be kept ready.
- Ensure that no cigarette smoke or any other possible ignition sources exist around the working area during installation, repairing, removing and disposal, during which refrigerant can be released to the surrounding space.
- Ensure that all work is conducted in a ventilated area.
- When changing electrical components, assure that these fit the purpose and have the correct specifications. All maintenance and service guidelines must be followed.
- Before any repair and maintenance procedure, an initial safety check and component inspection procedure should be performed to check that:
  - Capacitors are discharged.
  - All electrical components are switched off and wiring is not exposed when charging, recovering, or purging the system.
  - Earth bonding continuity is ensured.
- The appliance shall be stored to prevent mechanical damage from occurring.

Repairs to sealed components

- When repairing sealed components, ensure that all electrical supplies are disconnected before any removal of sealed covers, etc. If it is necessary to have an electrical supply to equipment during servicing, a permanently operating form of leak detection must be used to warn of a potentially hazardous situation.
- When working on electrical components be aware that the casing is not altered in such a way that could affect the level of protection (e.g., damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc). Ensure that the appliance is mounted securely. Ensure that seals or sealing materials are in good conditions to prevent leaks. Replace components only with parts specified by the manufacturer.

Repairs to intrinsically safe components

- Ensure that inductive or capacitance loads applied will not exceed voltage and current allowed for this appliance. Intrinsically safe components can be worked on while live in the presence of a flammable atmosphere. Use the correct rating to test the appliance. Replace components only with parts specified by the manufacturer.

cabling

- Ensure that cabling should not be subject to adverse environmental effects (e.g., wear, corrosion, excessive pressure, sharp edges) having in consideration aging effects and vibration.

Detection of flammable refrigerants

- Potential ignition sources must not be used for detecting refrigerant leaks. A halide torch (or any other detector using a naked flame) must not be used. Electronic leak detectors may be used with adequate calibration.
- Leak detection with fluids (e.g., bubble or fluorescent agent method) may also be used, except detergents containing chlorine as it may corrode coper pipes. If a leakage is detected all naked flames must be extinguished. If the leak requires brazing, all refrigerants must be recovered or isolated before brazing.

Charging procedure

When charging the appliance ensure that:

- Contamination from different refrigerants does not occur.
- Hoses lines are as short as possible.

- Cylinders are kept in appropriate position.
- Refrigerant system is earthed before charging the system with refrigerant.
- Refrigerant system is not overfilled.

Test pressure with purging gas before recharging. After charging and before commissioning preform a leakage test.

Removal, evacuation and decommissioning of refrigerant system

- Before making repairs to the refrigerant circuit remove the refrigerant and open the circuit by cutting or brazing. Refrigerant must be recovered to adequate cylinders and purged with oxygen free nitrogen.
- Do not use compressed air or oxygen to purge the system.
- Make sure that the outlet for vacuum pump is not close to potential ignition sources and that ventilation is available.
- The manufacturer shall specify the inert gases that can be used. Compressed air or oxygen shall not be used for purging refrigerant systems. NOTE An example of an inert gas is dry nitrogen.
- Purging of the refrigerant circuit shall be achieved by breaking the vacuum in the system with inert gas and continuing to fill until the working pressure is achieved, then releasing to atmosphere, and finally pulling down to a vacuum. This process shall be repeated until no refrigerant is within the system.
- The system shall be vented down to atmospheric pressure to enable work to take place.

Decommissioning must be done by a technician which is familiar with the equipment.
For decommissioning, ensure that:

- Electrical power must be available before initiating.
- Isolate the system electrically.
- Before the procedure ensure that mechanical and protective equipment are available and correctly used, the process is supervised by competent persons and that recovery equipment and cylinders follow the required standards.
- Pump down the refrigerant system.
- When vacuum is not possible, make a manifold to remove refrigerant from various parts of the system.
- Before recovering, cylinder is situated on scales.
- Operate recover machine according to instructions.
- Do not overfill or exceed maximum working pressure of cylinders.
- When the cylinders process is complete, ensure to remove the cylinder and equipment from site promptly and close isolation valves.
- Do not charge the recovered refrigerant into another refrigerant system unless it has been cleaned and checked.
- State in equipment labels that the system flammable refrigerant has been de-commissioned and emptied. The label must be dated a signed.

Recovery

Remove all refrigerants safely. For recovery, ensure that:

- Cylinders are appropriate for the refrigerant being recovered.
- Correct number of cylinders for holding the system charge are available.
- Cylinders are complete with pressure relief valve and shut off valves.
- before recovery, empty cylinders are evacuated and cooled.
- recovery equipment is in good working conditions and with a set of instructions available.
- Calibrated weighing scales are available.
- Hoses are leak free and in good conditions.
- Working conditions are satisfactory and electrical components are sealed.
- Refrigerants are not mixed in recovery units and in cylinders.
- Refrigerant is returned to refrigerants supplier.
- When removing compressor oils, they have been evacuated properly and that no refrigerant remains in within the lubricant. Evacuation processes must be carried before returning the compressor to suppliers. After draining the oil from the system, carry it safely.

- The recovered refrigerant shall be processed in the correct recovery cylinder, and the relevant waste transfer note arranged. Local legislation can apply. Do not mix refrigerants in recovery units and especially not in cylinders.
- If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that **flammable refrigerant** does not remain within the lubricant. The compressor body shall not be heated by an open flame or other ignition sources to accelerate this process. Draining of oil from a system shall be carried out safely.