

Alarm Descriptions

Star Cool Refrigeration Unit



Model SCI-20/40/CA and SCU-20/40

Version 810900E June 2026

1. Preface

This version of the manual is dated June 2026, edited by Maersk Container Industry AS. All rights reserved. This user's manual is valid for software version 0365 or newer versions. The information herein is subject to change without notice and does not represent a commitment on any part of Maersk Container Industry AS. While the information herein is assumed to be accurate, Maersk Container Industry AS assumes no responsibility for any errors or omissions that may appear in this documentation.

This manual is valid for:

Model	SCI - 20/40/CA and SCU - 20/40
Software version	0365

2. Warnings

Do not operate or maintain this refrigeration unit until you have familiarized yourself completely with the equipment and operation of this unit by reading the instructions in this manual.

Smoking is prohibited inside and around the container.

Do not perform any soldering on the unit before disconnecting the power plug and having removed the refrigerant. Furthermore, disconnect the power measurement module and main controller (and modem if present).

Disconnect the main power supply to the unit before inspecting the interior of the controller box.

The unit is charged with R134a, R513A, or R1234yf and ester oil BSE 55. Do not use any other refrigerant or oil. Do not use contaminated refrigerant or oil. Never release any refrigerant into the atmosphere.

Use recovery equipment according to present legislation and which has been designed for use with the three above mentioned refrigerants.

During maintenance, please observe that refrigerants operate with high and low temperatures in combination with high pressures, which may cause personal injuries if not handled properly.

During recovery and maintenance of the refrigerant, personal protection equipment (goggles and gloves suitable for working with refrigerants) must be worn.

Do not trap any liquid refrigerant inside pipes during soldering work. This may lead to an explosion of the pipes. Any brazing or soldering work must be done with an inert gas (nitrogen) flowing inside the area being worked on to prevent carbon contamination.

Please note that some unit models do not have Schröder valves installed for Psuc and Pdis transmitters.

While R134a and R513A are classified as non-flammable refrigerants (A1 according to ISO817), and R1234yf being classified as mildly flammable (A2I according to ISO817), all three refrigerants decompose to toxic hydrogen fluoride gas when ignited or when in contact with hot surfaces. Ensure that the refrigerant is removed from the system, prior to conducting hot work.

We do not recommend cleaning the inside of a reefer container with soap/chemicals with a PH value below 7. However, if this occurs, clean the evaporator coil through the inspection hatches with a soap that has a PH value between 7 and 9. This cleaning is vital to reduce the risk of copper damage in the evaporator coil.

Do not enter the container, including opening the service hatches, when the oxygen level is below 20.9%. Ventilation is necessary before entering, either for repairing the unit or unloading. Stay away from doors while venting.

Human response to low oxygen atmosphere:

Oxygen content of air	Symptoms of a person exposed
20.9%	Level in ambient air - no effect.
15% - 19%	May impair coordination and induce early symptoms in persons who have coronary, pulmonary, or circulatory problems.
12% - 15%	Respiration and pulse increase, impaired coordination, poor perception and judgement.
10% - 12%	Respiration increases further in rate and depth, poor judgement, and bluish lips.
8% - 10%	Mental failure, fainting, unconsciousness, an ash-coloured face, blue lips, nausea, and vomiting.
6% - 8%	8 minutes - 100% fatal, 4-5 minutes - recovery with treatment.
4% - 6%	Coma within 40 seconds, convulsions, respiration ceases, death.

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4. Legend

Short name	Name
AAS	Alarm Action System
Act	Actual
ACT	Automatic Cold Treatment
AirEx	Air exchange
AKS	Danfoss pressure transmitter
AL	Alarm
Atm	Atmosphere
AV	Automatic Ventilation
CA	Controlled Atmosphere
CalUs1	Calibration USDA sensor 1
CalUs2	Calibration USDA sensor 2
CalUs3	Calibration USDA sensor 3
CapReq	Requested capacity
Com	Communication
Cond	Condenser
Cpr	Compressor
CT	Cold treatment
Cur	Current
Err	Error
Evap	Evaporator
F	Frequency
Fact	Compressor actual frequency
FC	Frequency converter
Fcpr	Compressor frequency
FcprAct	Compressor frequency actual
FcprReq	Compressor frequency requested
Fpower	Power supply frequency converter
FT	Function test
FW	Firmware
H	Heater
Hevap	Evaporator heater
HP	High pressure
HPS	High pressure switch
Hpump	Vacuum pump motor heating element
I	Current
I1	Current phase 1
I2	Current phase 2
I3	Current phase 3
Ifc	Current in AC compressor motor
Init	Initialization
ITI	Intelligent Trip Inspection
LED	Light emitting diode
LP	Low pressure
M	Motor
Mcond	Condenser motor
Mcpr	Compressor motor

Short name	Name
Mevap	Evaporator motor
Mevap1	Evaporator motor 1
Mevap2	Evaporator motor 2
MOP	Maximum operating pressure
Mpump	Vacuum pump motor
MTS	Multi Temperature Setpoints program
NSK/DST	Saigonmya/DST P100 pressure transmitter
OH	Overheat
P	Pressure
PCB	Printed circuit board
Pdis	Discharge pressure
Pmem	Pressure membrane
Psuc	Suction pressure
PTI	Pre Trip Inspection
PTI Short	Pre Trip Inspection Short
Ptot	Power total
PWM	Pulse Width Modulation
Pwr	Power
Req	Requested
RH	Relative humidity
RHset	Relative humidity setpoint
RMM	Remote Monitoring Modem
S	Switch contact key
SC	Star Cool
Set	Setpoint
SH	Superheat
Shp	High pressure switch
Sup	Supply
T	Temperature
Tact	Actual temperature
Tamb	Ambient temperature
TC	Calculated condenser temperature
Tcargo	Cargo temperature
TCmin	Temperature condensor minimum
Tevap	Evaporator temperature
Tfc	Frequency converter temperature
Tint	Tinternal (controller board)
T0	Calculated suction temperature
Tret	Return air temperature
Tset	Temperature setpoint
Tsuc	Suction temperature
Tsup	Supply air temperature average
Tsup1	Supply air temperature 1
Tsup2	Supply air temperature 2
Tusda1	USDA 1 temperature

Short name	Name
Tusda2	USDA 2 temperature
Tusda3	USDA 3 temperature
Ubat	Battery voltage
Udc	DC voltage in frequency converter
U/f	Voltage/frequency ratio
V	Valve
Veco	Economizer valve
Vexp	Expansion valve
Vhg	Hot gas valve

5. Alarms

The alarm list holds all active and inactive alarms. By pressing  all active alarms are shown. The full list of active/inactive alarms, fatal alarms, and warnings can be accessed by pressing  and viewing line T00. If any alarms are in the list, the icon  is displayed in upper left corner of the main display.

Alarm handling is to protect the unit and the cargo, and to inform the user in case of error conditions. Alarm handling is split into 2 parts:

1. Detect an abnormal situation and report it as an alarm.
2. React on the alarms and compensate for them (AAS - Alarm Action System).

An alarm can have 4 different levels:

- Log: Information for service. Only in the datalog, not on the display.
No risk to cargo.
- Warning: Warning of an abnormal situation, but the unit continues to operate with unchanged or little change in functionality in the actual running mode.
No risk to cargo.
- Alarm: The unit operates with reduced or changed functionality.
Risk to cargo.
- Fatal Alarm: The unit potentially stops working and needs servicing immediately.
Serious risk to cargo!

All alarms in the 4 levels can have two states:

- Active: The alarm is active.
- Inactive: The alarm is no longer active. The alarm can be acknowledged from the alarm list.

The 4 alarm levels will be treated by the controller in the following way:

Alarm type	Datalog	Alarm list	Red LED	Cargo risk
Log	Yes	No	OFF	No risk to cargo
Warning	Yes	Yes	OFF	No risk to cargo
Alarm	Yes	Yes	SLOW FLASH 2% ON, 98% OFF Duty time of 3 sec	Risk to cargo
Fatal Alarm	Yes	Yes	QUICK FLASH 80% ON, 20% OFF Duty time of 1 sec	Serious risk to cargo

Alarm handling is made to detect abnormal situations, possibly solve issues, and report the problems. The alarm types indicate for the operator, how severe the problem is for the safety of the cargo. Some problems are fluctuant where the problem may be fixed if the unit restarts. Some of the alarms are only warnings but will restart the unit to try to solve the problem. There is an individual time-out period for the alarms. A Warning will not stop the unit permanently. If a problem with Warning type continues to be active over a period, the problem seems to be of a more stable and therefore more severe character and another alarm is triggered with alarm type Alarm.

The AAS (Alarm Action System) will substitute a missing or malfunctioning sensor with one of the other sensors and thereby try to keep the cargo safe for as long as absolutely possible. The substitution may lead to a deteriorated control precision, especially in Freeze mode, but the unit is not fully stopped until there are no further sensors to substitute with. The unit may try to restart to see if the malfunctioning is fluctuant. For example, if there is no substitution for a sensor or the substitute sensor is also faulty, alarm 611 "Too many sensor err" is raised and the specific sensor(s) are listed separately in the alarm list.

The alarm list can include a maximum of 16 active/inactive alarms. In case of an empty alarm list,  and "No alarms" is shown.

An active alarm is shown as Acc AAnnn, where cc is the list number from 01 to 16, and nnn is the actual alarm number. An inactive alarm is shown as Acc IAnnn, where cc is the list number from 01 to 16, and nnn is the actual alarm number.

An active alarm is not deletable from the list, but may change to the inactive state when the cause of the alarm is eliminated.

An inactive alarm is deletable from the list by pressing  when displaying the alarm.

5.1 Detailed alarm description

In the following, all alarms are listed with a description, possible causes, and trouble shooting instructions.

- Alarm text is the text shown in the controller display.
- If Log is marked with a cross, then the alarm is logged in the data log.
- If Alarm is marked with a cross, then an error is shown in the controller alarm list.
- The following alarm light texts can be shown:
 - Off: Indicates that the alarm diodes are de-energized and there are no active alarms.
 - Slow flash: Indicates that the diodes are turned on shortly every 3 sec. and that there are active alarm(s).
 - Quick flash: Indicates that the diodes are turned on for 0.8 sec. every 1 sec. and that there are active fatal alarm(s).

When troubleshooting several alarms, it is generally advisable to start with the active alarm that has the lowest number and then move up to the active alarms with higher numbers. Remember that some alarms have a time-out of 30 sec. or more.

5.2 Alarm list

The following list includes a view of all alarms as listed on the display with a description text. This list is continuously updated. Be sure to visit **alarm.starcool.com** for the latest version.

Id	Display text	Description	Alarm type
1. Temperature sensor alarms			
102	Tret invalid	Return air temperature sensor invalid	Alarm
105	Tsup 1 invalid	Supply air temperature sensor 1 invalid	Alarm
108	Tsup 2 invalid	Supply air temperature sensor 2 invalid	Alarm
111	Tusda 1 out of range	USDA 1 temperature sensor invalid	Log
114	Tusda 2 out of range	USDA 2 temperature sensor invalid	Log
117	Tusda 3 out of range	USDA 3 temperature sensor invalid	Log
120	Tcargo out of range	Cargo temperature sensor invalid	Log
123	Tevap invalid	Evaporator temperature sensor invalid	Warning
126	Tsuc invalid	Suction temperature sensor invalid	Alarm
129	Tamb invalid	Ambient temperature sensor invalid	Alarm
130	Tamb invalid	Ambient temperature sensor invalid	Warning
132	Tpump invalid	Vacuum pump temperature sensor invalid	Alarm
148	Tsup error	Supply air temperature error	Alarm
2. Pressure transmitter alarms			
202	Pdis unrealistic	Tc value is above the limit that is realistic for the system	Alarm
203	Pdis invalid	Compressor discharge pressure transmitter invalid	Alarm
206	Psuc unrealistic	T0 value is below the limit that is realistic for the system	Alarm
207	Psuc invalid	Compressor suction pressure transmitter invalid	Alarm
214	Pmem invalid	Vacuum pump pressure transmitter invalid	Alarm
3. Other sensors			
302	RH invalid	Relative humidity sensor invalid	Alarm
303	AirEx invalid	Air exchange sensor short circuit	Alarm
306	HPS switch - K1	High pressure switch is active	Fatal alarm
307	K1 low resistance	K1 contactor resistance is too low	Warning
308	Pdis high - K1	High pressure switch is not active, but pressure measurement exceeds limits	Fatal alarm

309	HPS - K1 loose	HPS/K1 circuit is open and the pressure is low	Alarm
310	CO ₂ sensor invalid	CO ₂ sensor communication missing	Alarm
313	O ₂ sensor invalid	O ₂ sensor communication missing	Alarm
314	Replace CO ₂ sensor	Replace CO ₂ sensor	Warning
315	Replace O ₂ sensor	Replace O ₂ sensor	Warning
4. Power alarms			
400	Mevap 1 over heat	Evaporator motor 1 overheat	Fatal alarm
401	Mevap 2 over heat	Evaporator motor 2 overheat	Fatal alarm
402	Mcond over heat	Condenser motor overheat	Fatal alarm
403	Mpump over heat	Vacuum pump motor overheat	Alarm
415	Invalid power sup	U1-2 and U1-3 and U2-3 overvoltage	Fatal alarm
418	Invalid power sup	U1-2 and U1-3 and U2-3 undervoltage	Fatal alarm
421	Over current	I1-2 and I1-3 and I2-3 overcurrent	Fatal alarm
423	No phase direction	Phase direction not detectable	Fatal alarm
424	Power frequency	Phase frequency error	Log
425	Frequency too high	Power frequency too high	Fatal alarm
430	Cpr connection	Power cable from FC to compressor faulty	Alarm
5. FC alarms			
501	FC local control	FC setting in Local mode	Alarm
508	Compr connection	FC short circuit	Alarm
509	FC 24 V fault	FC internal 24 V supply fault	Alarm
510	Compr connection	FC earth fault	Alarm
511	Compr over current	Compressor over current	Alarm
513	Compr overload	Compressor overload	Alarm
514	Invalid power sup	FC undervoltage fault	Alarm
515	Invalid power sup	FC overvoltage fault	Alarm
516	FC supply error	Power supply error indication	Alarm
517	FC over temp	FC over temperature fault	Alarm
518	FC inrush	FC inrush fault	Alarm
519	FC internal error	Frequency converter high voltage fault warning	Alarm
523	FC phase loss	Power supply error indication	Log
530	FC alarm undefined	Unclear error in FC	Alarm
531	PCB temperature	FC critical temperature	Alarm
532	Blocked rotor	Compressor restart fail	Alarm
595	Tfc invalid	Internal FC temperature sensor is invalid	Alarm
6. Operation alarms			
600	No control sensors	Supply air sensor 1, supply air sensor 2, return air sensor all malfunctioning	Fatal alarm
601	No watercooling	Water-cooling fault	Alarm
603	In range fault	In-range fault	Fatal alarm
605	Mair failure	Automatic air exchange cannot open/close	Alarm
607	AirEx open	Air exchange valve open in conflict with settings	Alarm
610	Defrost time exceed	Max. defrost time exceeded	Log
623	Loss of cooling	Attempts to cool down but Tsup is above Tret	Fatal alarm
624	Config valve type	System identifies controller was changed	Alarm
630	Manual phase dir	Manually selected phase direction	Warning
646	Low refr. charge	Loss of charge (LoC) detected on non-yf unit.	Alarm
649	Check yf beacon	No connection to the beacon	Warning
650	O ₂ low	The O ₂ sensor measures low O ₂ levels in container	Alarm
651	CO ₂ high	The CO ₂ sensor measures high CO ₂ levels in container	Fatal alarm
652	Vacuum fault	Vacuum pump unable to reach the required pressure	Alarm
653	Mpump heat element	Vacuum pump operating temperature is low	Alarm

654	Mpump temp high	Motor for vacuum pump is overheated	Alarm
656	Pump service	Vacuum pump needs an oil and filter change	Warning
657	Mpump start failure	Vacuum pump operating in wrong direction	Fatal alarm
658	Mpump Uf lockout	Vacuum pump cannot start due to bad U/f ratio	Alarm
660	Check coil	Coil(s) acting suspicious	Warning
661	Check contactor	Contactor(s) acting suspicious	Warning
662	Mevap lo contactor	Mevap low contactor detected to be faulty (only in heating)	Alarm
663	Mevap hi contactor	Mevap high contactor detected to be faulty (only in heating)	Alarm
664	Mevap contactors	Both Mevap contactors detected to be faulty (only in heating)	Alarm
665	Hevap contactor	Hevap contactors detected to be faulty (only in heating)	Alarm
666	Reduced refr. flow	The flow of refrigerant in the system is reduced	Warning
667	Refr leak detected	R1234yf refrigerant is leaking from the unit	Warning/ Alarm
668	Repair refr leak	Loss of charge (LoC) detected on yf unit	Alarm
670	CA memb/hose leak	Vacuum pump has stopped due to leak	Alarm
671	Mpump vacuum loss	Vacuum pump has stopped due to loss of vacuum in the system	Alarm
672	Mpump oil low	Vacuum pump oil level is detected as being low	Alarm
673	Leak detection disabled	Not possible to detect a leak on a unit running with R1234yf	Alarm
674	Manual ethylene injection	Ethylene injection did not occur	Alarm
675	Man emergency mode	User has activated manual emergency mode	Alarm
676	Check refr base	The controller configuration for refrigerant design base does not match the current heater type detected	Warning
677	Check valve plates	Compressor valve plate/s detected to be broken	Warning
681	Phase contactors	K2 or K8 contactors may be faulty	Alarm
683	Check coil Vexp	Expansion valve coil has low resistance	Warning/ Alarm
684	Check coil Veco	Economizer valve coil has lo resistance	Warning
685	Check coil Vhg	Hot gas valve coil has low resistance	Warning
7. Communication alarms			
700	No FC/contr com	FC missing	Fatal alarm
710	No userpanel com	(Can only be seen in StarView)	Log
720	No SPM com	Communication to power module is missing	Alarm
730	No RH sens com	RH sensor is missing	Log/Alarm
740	No CO ₂ sens com	CO ₂ sensor is missing or communication lost	Log/Alarm
750	No SSC com	CA module is missing or communication is lost	Log
760	No O ₂ sens com	O ₂ sensor is missing or communication lost	Log/Alarm
770	No door sens com	No communication from the door sensor	Warning
771	Missing door sensor	No Bluetooth communication between the door sensor and the transceiver	Warning
780	Modem installation	Sekstant gateway cannot send data	Warning
781	Modem cloud com	Sekstant gateway cannot send data	Warning
8. Test alarms			
800	Func test failed	Function test fault	Warning
801	Controller	Controller internal voltage reference fault	Warning
802	AirEx open	Manual airex is opened preventing other function tests to succeed	Warning
803	Reduced refr. flow	The flow of refrigerant in the system is reduced	Warning
805	Idle current	Unit idle overcurrent fault	Warning
810	Mevap cur LO speed	Evaporator motor low speed current fault	Warning
811	Mevap cur HI speed	Evaporator motor high speed current fault	Warning
812	Mevap current OFF	Evaporator motor off current fault	Warning
815	Mcond cur LO speed	Condenser motor low speed current fault	Warning
816	Mcond cur HI speed	Condenser motor high speed current fault	Warning
817	Mcond current OFF	Condenser motor off current fault	Warning
819	Contactor error	Contactor(s) acting suspicious	Warning

820	Hevap current ON	Evaporator heater on current fault	Warning
821	Hevap current OFF	Evaporator heater off current fault	Warning
822	Hevap current error	Hevap current failure	Warning
823	Hevap current drop	The controller configuration for refrigerant design base does not match the current heater type detected	Warning
824	K2/K8 contactor error	K2 or K8 contactors may be faulty	Warning
826	Hpump current ON	Heat vacuum pump too high or too low	Warning
827	Hpump current OFF	Measured current is too high when heater is turned off	Warning
830	Mpump current error	Mpump current failure	Warning
831	Pmem sensor	Pmem above or below 1000 mBar (± 60 mBar) after Mpump off for 300 sec.	Warning
832	CO ₂ sensor	No reading or value above 1%	Warning
833	O ₂ sensor	No reading or value out of range	Warning
836	Pmem vacuum	Unable to create vacuum	Warning
837	Pmem ambient	Not measuring Pmem pressure 1000 mBar (± 60 mBar)	Warning
838	Mpump ON current	Current failure	Warning
839	Mpump OFF current	Current in off position is too high	Warning
840	Valve leaks	Valve leak fault	Warning
841	K1 contactor welded	Contactor damaged (always drawn) making FC always powered	Warning
842	Expansion valve	Expansion valve fault	Warning
844	Hot gas valve	Hot gas valve fault	Warning
846	FC check	FC internal fault	Warning
847	High press switch	High pressure switch fault	Warning
848	Temp sensors invalid	Temperature sensor(s) malfunctioning	Warning
849	Valve error	Check that compressor can operate valves failed	Warning
850	PTI test failed	PTI test fault	Warning
851	Alarm is active	Active alarms turning ITI checkmark off	Warning
855	PTI Tset 5	PTI 5°C set fault	Warning
857	CA curtain	No CA curtain is mounted	Warning
858	Gateway	Sekstant gateway installation error	Warning
859	Low refr. charge (PTI)	Loss of charge (LoC) detected on non-yf unit during PTI	Alarm
860	PTI Tset 0	PTI 0°C set fault	Warning
865	Yf beacon	Manual beacon test failed	Warning
866	Mair	Automatic air exchange did not open/close	Warning
868	Ethylene injection	Manual ethylene injection test failed	Warning
870	PTI defrost	PTI defrost fault	Warning
879	PTI check cont/valve	Evaporator and/or economizer valve error	Warning
880	PTI Tset -18	PTI -18°C set fault	Warning
884	Psuc invalid	Compressor suction pressure transmitter invalid	Warning
885	Tsup1 invalid	Supply air temperature sensor 1 invalid	Warning
886	Tsup2 invalid	Supply air temperature sensor 2 invalid	Warning
887	Tevap invalid	Evaporator temperature sensor invalid	Warning
888	Tsuc invalid	Suction temperature sensor invalid	Warning
889	Tret invalid	Return air temperature sensor invalid	Warning
890	PTI Tset 13	PTI test fault	Warning
891	Hpump current	Vacuum pump heater fault	Warning
892	O ₂ /CO ₂ sensor	Calibration of the O ₂ and/or CO ₂ sensor failed	Warning
894	RH sensor	RH sensor communication missing	Warning
895	CO ₂ sensor	The CO ₂ sensor communication and CO ₂ level are tested	Warning
896	O ₂ sensor	The O ₂ sensor communication and O ₂ level are tested	Warning
897	Hpump broken	Vacuum pump could not be heated	Warning
899	ITI failed	ITI test fault	Log

9. Controller alarms			
902	Battery malfunction	Battery malfunctioning	Alarm
904	Datalog error	SCCU6 data log fault	Alarm
905	Database corrupt	SCCU6 database fault	Log
907	Realtime error	Real-time clock needs checking	Alarm
913	Gateway voltage	Battery and/or battery power measurement module is defective	Warning
953	Temp ref 1 LO	Controller internal voltage reference fault	Warning
954	Temp ref 1 HI	Controller internal voltage reference fault	Warning
955	Temp ref 2 LO	Controller internal voltage reference fault	Warning
956	Temp ref 2 HI	Controller internal voltage reference fault	Warning
961	Pdis sens sup LO	Controller internal voltage reference fault	Log
962	Pdis sens sup HI	Controller internal voltage reference fault	Log
963	Psuc sens sup LO	Controller internal voltage reference fault	Log
964	Psuc sens sup HI	Controller internal voltage reference fault	Log
965	Controller sup LO	Controller internal voltage reference fault	Log
966	Controller sup HI	Controller internal voltage reference fault	Log
967	AirExMot sup LO	Controller internal voltage reference fault	Log
968	AirExMot sup HI	Controller internal voltage reference fault	Log
969	AirEx sens sup LO	Controller internal voltage reference fault	Log
970	AirEx sens sup HI	Controller internal voltage reference fault	Log
972	Sensor bus sup HI	Controller internal voltage reference fault	Log
973	SUP6 SPM6 sup LO	Supply voltage SUP6 SPM6 low	Log
974	SUP6 SPM6 sup HI	Supply voltage SUP6 SPM6 high	Log
975	Internal sup LO	12 V supply voltage low on SMC6	Log
976	Internal sup HI	12 V supply voltage high on SMC6	Log
977	Pmem sens sup LOW	Controller internal voltage reference fault	Log
978	Pmem sens sup HIGH	Controller internal voltage reference fault	Log
990	Firmware update fail	The firmware update failed.	Alarm
994	Req min SW352-11	The software which has been uploaded to the controller is not compatible with the current hardware version, please use software 0352 rev. 11 or newer	Alarm
995	Contr internal error	Controller module must be replaced	Alarm
996	SW incompatible	The software which has been uploaded to the controller is not compatible with this unit	Warning
998	Could not detect CA	Unable to detect CA	Alarm
999	Keyboard failure	Indication of defective keyboard or connection	Warning

5.3 Temperature sensor alarms (AL 1XX)

102	Tret invalid					Alarm
Description	Return air temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X24 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire sensor (818940A). 3. Check that the sensor is mounted correctly. 4. Check the controller X24 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. To see if the above has solved the problem, go to the Service menu , line S01 Manual operation, and change the value of line M01 from AUTO to MANUAL. Select line M03 Evaporator fan and change the value to HI. Wait for 5 minutes before viewing the sensor readings in the Information menu . All should be approximately the same. 6. If the above has not solved the issue, disconnect the controller X24 plug and measure the resistance on the plug terminal screws 9 and 10. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 7. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X24 plug. If the resistance is out of range, replace the entire sensor (818940A). 8. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X24 pins 9 and 10. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	For Star Cool the sensor reading is below -50°C (-58°F) or above +100°C (+212°F). For Star Freeze the sensor reading is below -81°C (-114°F) or above +81°C (+178°F). The reading must be invalid for 30 sec. for alarm activation.					
Controller action	Replaced by new value from AAS system.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Deteriorated control precision in Frozen mode.					
Elimination	When sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 120 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error 1 = Max limit 2 = Min limit 5 = Relations 6 = Connection 7 = Derivatives 8 = Ventilation mode	Minimum value	Maximum value	Actual value		

105	Tsup 1 invalid					Alarm
Description	Supply air temperature sensor 1 invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensor(s) not mounted correctly. • Controller X25 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace it with a full length (3 meter) new sensor (818943B). 3. Check that supply sensor(s), are are inserted equally with the same protruding length and are mounted correctly. 4. Check the controller X25 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. To see if the above has solved the problem, go to the Service menu , line S01 Manual operation, and change the value of line M01 from AUTO to MANUAL. Select line M03 Evaporator fan and change the value to HI. Wait for 5 minutes before viewing the sensor readings in the Information menu . All should be approximately the same. 6. If the above has not solved the issue, disconnect the controller X25 plug and measure the resistance on the plug terminal screws 1 and 2. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 7. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X25 plug. If the resistance is out of range, replace the complete sensor and cable (818943B). 8. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X25 pins 1 and 2. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	For Star Cool the sensor reading is below -50°C (-58°F) or above +100°C (+212°F) or the difference between Tsup1 and Tsup2 is more than 1°C (1,8°F) for more than 30 min. For Star Freeze the sensor reading is below -81°C (-114°F) or above +81°C (+178°F). The reading must be invalid for 30 sec. for alarm activation.					
Controller action	Replacement by new value from AAS system.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Deteriorated control precision in Chill mode.					
Elimination	When sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 120 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error 1 = Max limit 2 = Min limit 5 = Relations 6 = Connection 7 = Derivatives 8 = Ventilation mode	Minimum value	Maximum value	Actual value		

108	Tsup 2 invalid					Alarm
Description	Supply air temperature sensor 2 invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X25 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace it with a full length (3 meter) new sensor (818943B). 3. Check that both sensors, Tsup1 and Tsup2, are inserted equally with the same protruding length and are mounted correctly. 4. Check the controller X25 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. To see if the above has solved the problem, go to the Service menu , line S01 Manual operation, and change the value of line M01 from AUTO to MANUAL. Select line M03 Evaporator fan and change the value to HI. Wait for 5 minutes before viewing the sensor readings in the Information menu . All should be approximately the same. 6. If the above has not solved the issue, disconnect the controller X25 plug and measure the resistance on the plug terminal screws 3 and 4. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 7. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X25 plug. If the resistance is out of range, replace the complete sensor and cable (818943B). 8. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X25 pins 3 and 4. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	Value is below alarm limit -50°C (-58°F) or above +100°C (+212°F). The reading must be invalid for 30 sec. for alarm activation. Difference between Tsup1 and Tsup2 is more than +1°C (+34°F) for 30 min. or up to +10°C (+50°F) difference.					
Controller action	Replacement by new value from AAS system.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Deteriorated control precision in Chill mode.					
Elimination	When sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 120 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error 1 = Max limit 2 = Min limit 5 = Relations 6 = Connection 7 = Derivatives 8 = Ventilation mode	Minimum value	Maximum value	Actual value		

111	Tusda 1 out of range					Log
Description	USDA 1 temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X24 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire sensor. 3. Check that the sensor is mounted correctly. 4. Check the controller X24 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. If the above has not solved the issue, disconnect the controller X24 plug and measure the resistance on the plug terminal screws 1 and 2. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 6. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X24 plug. If the resistance is out of range, replace the entire sensor. 7. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X24 pins 1 and 2. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	Value below alarm limit -50°C (-58°F) or above +100°C (+212°F). Value must be invalid for 30 sec. for alarm activation.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	If cold treatment (CT) is activated, it will be affected.					
Elimination	When sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 120 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error 1 = Max limit 2 = Min limit	Minimum value	Maximum value	Actual value		

114	Tusda 2 out of range					Log
Description	USDA 2 temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X24 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire sensor. 3. Check that the sensor is mounted correctly. 4. Check the controller X24 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. If the above has not solved the issue, disconnect the controller X24 plug and measure the resistance on the plug terminal screws 3 and 4. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 6. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X24 plug. If the resistance is out of range, replace the entire sensor. 7. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X24 pins 3 and 4. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	Value below alarm limit -50°C (-58°F) or above +100°C (+212°F). Value must be invalid for 30 sec. for alarm activation.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	If cold treatment (CT) is activated, it will be affected.					
Elimination	When sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 120 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error 1 = Max limit 2 = Min limit	Minimum value	Maximum value	Actual value		

117	Tusda 3 out of range					Log
Description	USDA 3 temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X24 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire sensor. 3. Check that the sensor is mounted correctly. 4. Check the controller X24 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. If the above has not solved the issue, disconnect the controller X24 plug and measure the resistance on the plug terminal screws 5 and 6. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 6. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X24 plug. If the resistance is out of range, replace the entire sensor. 7. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X24 pins 5 and 6. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	Value below alarm limit -50°C (-58°F) or above +100°C (+212°F). Value must be invalid for 30 sec. for alarm activation.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	If cold treatment (CT) is activated, it will be affected.					
Elimination	When sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 120 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error 1 = Max limit 2 = Min limit	Minimum value	Maximum value	Actual value		

120	Tcargo out of range					Log
Description	Cargo temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X24 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire sensor. 3. Check that the sensor is mounted correctly. 4. Check the controller X24 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. If the above has not solved the issue, disconnect the controller X24 plug and measure the resistance on the plug terminal screws 7 and 8. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 6. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X24 plug. If the resistance is out of range, replace the entire sensor. 7. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X24 pins 7 and 8. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	Value below alarm limit -50°C (-58°F) or above +100°C (+212°F). Value must be invalid for 30 sec. for alarm activation.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	If cold treatment (CT) is activated, it will be affected.					
Elimination	When sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 120 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error 1 = Max limit 2 = Min limit	Minimum value	Maximum value	Actual value		

123	Tevap invalid				Warning	
Description	Evaporator temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X25 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire sensor (818940A). 3. Check that the sensor is inserted 40-45 mm into the evaporator coil. 4. Check the controller X25 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. To see if the above has solved the problem, go to the Service menu , line S01 Manual operation, and change the value of line M01 from AUTO to MANUAL. Select line M03 Evaporator fan and change the value to HI. Wait for 5 minutes before viewing the sensor readings in the Information menu . All should be approximately the same. 6. If the above has not solved the issue, disconnect the controller X25 plug and measure the resistance on the plug terminal screws 9 and 10. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 7. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X25 plug. If the resistance is out of range, replace the entire sensor (818940A). 8. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X25 pins 9 and 10. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	For Star Cool the sensor reading is below -50°C (-58°F) or above +100°C (+212°F). For Star Freeze the sensor reading is below -50°C (-58°F) or above +139°C (+282°F). The reading must be invalid for 30 sec. for alarm activation.					
Controller action	Substituted by new value from AAS system.					
	Log	X	Alarm	X	Alarm light	Off
Consequence						
Elimination	When sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 120 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error 1 = Max limit 2 = Min limit 5 = Relations 6 = Connection 7 = Derivatives 8 = Ventilation mode	Minimum value	Maximum value	Actual value		

126	Tsuc invalid					Alarm
Description	Suction temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X25 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire sensor (818940A). 3. Check that the sensor is mounted correctly. 4. Check the controller X25 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. To see if the above has solved the problem, go to the Service menu , line S01 Manual operation, and change the value of line M01 from AUTO to MANUAL. Select line M03 Evaporator fan and change the value to HI. Wait for 5 minutes before viewing the sensor readings in the Information menu . All should be approximately the same. 6. If the above has not solved the issue, disconnect the controller X25 plug and measure the resistance on the plug terminal screws 7 and 8. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 7. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X25 plug. If the resistance is out of range, replace the entire sensor (818940A). 8. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X25 pins 7 and 8. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	For Star Cool the sensor reading is below -50°C (-58°F) or above +100°C (+212°F). For Star Freeze the sensor reading is below -59°C (-74°F) or above +139°C (+282°F). The reading must be invalid for 30 sec. for alarm activation.					
Controller action	Replacement by new value from AAS system.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Superheat control deactivation.					
Elimination	When sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 120 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error 1 = Max limit 2 = Min limit 5 = Relations 6 = Connection 7 = Derivatives 8 = Ventilation mode	Minimum value	Maximum value	Actual value		

129	Tamb invalid					Alarm
Description	Ambient temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X25 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace it with a full length (3 meter) new sensor (818943B). 3. Check that the sensor is mounted correctly. 4. Check the controller X25 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. If the above has not solved the issue, disconnect the controller X25 plug and measure the resistance on the plug terminal screws 5 and 6. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 6. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X25 plug. If the resistance is out of range, replace the complete sensor and cable (818943B). 7. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X25 pins 5 and 6. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	For Star Cool the sensor reading is below -50°C (-58°F) or above +100°C (+212°F). For Star Freeze the sensor reading is below -59°C (-74°F) or above +139°C (+282°F). The reading must be invalid for 60 sec. for alarm activation.					
Controller action	Replacement by new value from AAS system.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence						
Elimination	Alarm inactive after power cycle.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error: 1 = Max limit 2 = Min limit	Minimum value	Maximum value	Actual value		

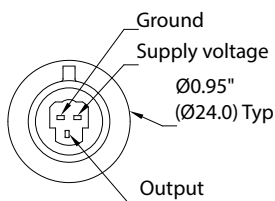
130	Tamb invalid					Warning
Description	Ambient temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X25 plug. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace it with a full length (3 meter) new sensor (818943B). 3. Check that the sensor is mounted correctly. 4. Check the controller X25 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. If the above has not solved the issue, disconnect the controller X25 plug and measure the resistance on the plug terminal screws 5 and 6. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 6. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X25 plug. If the resistance is out of range, replace the complete sensor and cable (818943B). 7. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X25 pins 5 and 6. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	Test at unit start up (after minimum 10 hours off power) has failed and Range program is active. Tamb sensor reading during test is not within +/- 6K of Tfc and/or Tint.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence						
Elimination	Alarm inactive after power cycle.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Tamb	Tfc	Tint	Tc	Pdis	

132	Tpump invalid					Alarm	
Description	Vacuum pump temperature sensor invalid.						
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X27 plug. • Sensor is defective.						
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace it with a full length (3 meter) new sensor (818943B). 3. Check that the sensor is mounted correctly. 4. Check the controller X27 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. If the above has not solved the issue, disconnect the controller X27 plug and measure the resistance on the plug terminal screws 3 and 4. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 6. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X27 plug. If the resistance is out of range, replace the complete sensor and cable (818943B). 7. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X27 pins 3 and 4. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.						
Criteria	Reading below -35°C (-31°F) or above +130°C (+266°F). The reading must be invalid for 60 sec. for alarm activation.						
Controller action							
	Log	X	Alarm	X	Alarm light	Slow flash	
Consequence	It is not possible to control the heating element in the vacuum pump.						
Elimination	When the sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 60 sec. to set alarm to inactive.						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5		
	Detection/error: 1 = Max limit 2 = Min limit	Minimum value	Maximum value	Actual value			

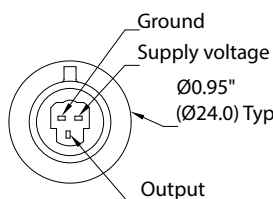
148	Tsup error					Alarm
Description	Supply air temperature error.					
Cause	• Unexpected behaviour in old software version. • Sensor cable is damaged or has been improperly spliced. • Indication of sensors not mounted correctly. • Controller X25 plug. • Tsup 1 and Tsup 2 sensor readings deviate too much. • Sensor is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace it with a full length (3 meter) new sensor (818943B). 3. Check that the sensors are mounted correctly. 4. Check the controller X25 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. To see if the above has solved the problem, go to the Service menu , line S01 Manual operation, and change the value of line M01 from AUTO to MANUAL. Select line M03 Evaporator fan and change the value to HI. Wait for 5 minutes before viewing the sensor readings in the Information menu . All should be approximately the same. 6. If the above has not solved the issue, disconnect the controller X25 plug and measure the resistance on the plug terminal screws 1 and 2, 3 and 4. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 7. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the wires. If the resistance is in range, replace the X25 plug. If the resistance is out of range, replace the complete sensor and cable (818943B). 8. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X25 pins 1 and 2, 3 and 4. The value should be between 3.2 and 3.4 V DC. If not, replace the controller.					
Criteria	Difference between Tsup1 and Tsup2 integrated to more than +30°C (+54°F) a minute, e.g. 1°C (1,8°F) for 30 minutes, 6°C (10,8°F) for 5 minutes or 30°C (54°F) for 1 minute.					
Controller action	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Deteriorated control precision in Chill mode.					
Elimination	Power cycle to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Tsup1	Tsup2	Tevap	Tret		

5.4 Pressure transmitter alarms (AL 2XX)

202	Pdis unrealistic					Alarm
Description	Tc value is above the limit that is realistic for the system.					
Cause	- Connector for high pressure transmitter X22. - Cable has been improperly spliced.					
Trouble shooting	- Ensure screw terminals on X22 are correctly tightened and connected. Disconnect and reconnect the controller plug X22. - Inspect the transmitter cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire cable.					
Criteria	Tc > 80 °C for more than 30 seconds.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	Unit restarts after 30 seconds when sensor value is in a realistic range. Alarm is marked as inactive in the alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Actual Tc	Actual Tret	Actual Tamb			

203	Pdis invalid					Alarm
Description	Compressor discharge pressure transmitter invalid.					
Cause	• Unexpected behaviour in old software version. • Pressure transmitter is incorrectly configured in the controller. • Pressure transmitter is not mounted correctly. • Pressure transmitter wires are damaged or have been improperly spliced. • Controller X22 plug. • Pressure transmitter is defective. • Schrader valve is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If Star Cool, check that the controller is configured correctly. Go to the Service menu , line S05 Configuration, and select line F11 High pressure type and change the value to match the installed pressure transmitter NSK or DST. 3. Check that the connector on the pressure transmitter is free from corrosion and is mounted correctly according to the drawing below.  4. Inspect the transmitter cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire cable. 5. Check continuity of the wires by measuring from the controller X22 plug terminals 4, 5 and 6 to the other end at the pressure transmitter. If any are not ok, replace the cable. 6. Connect AC power to the unit and turn it on. Measure the voltage between the controller X22 terminal 4 and 6. The voltage should be 5 V DC. If not, replace the controller. 7. Disconnect the signal wire from the controller X22 terminal 5. Measure the voltage between the wire and ground. The value should be according to the 'Voltage - pressure table, HP transmitter' in the Operating and Service Manual. If not, replace the pressure transmitter. 8. Below points only for Star Cool: Connect a service gauge to the compressor discharge valve and compare its reading with the discharge pressure value shown in the main display. 9. Close all 3 service valves (suction, discharge and economizer) on the compressor. Recover all refrigerant in the compressor. 10. Dismount the discharge pressure transmitter. If the unit has a Schrader valve mounted, then remove the Schrader valve and mount the pressure transmitter again. 11. Before opening the service valves again, ensure that the compressor has been vacuumed and the necessary refrigerant has been charged. 12. Compare the discharge pressure in the main display with the service gauge again.					
Criteria	Discharge pressure value is below -3.5 Bar (14,5 Psi) or above 45.5 Bar (660 Psi). Pressure transmitter voltage is below 0.05 V or above 4.95 V.					
Controller action	Log	X	Alarm	X	Alarm light	Slow flash
Consequence						
Elimination	When discharge pressure value becomes valid, alarm is marked as inactive and may then be deleted. Value must be valid for 60 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error 1 = Max limit 2 = Min limit 8 = Internal sensor diagnostics	Minimum value	Maximum value	Actual value		

206	Psuc unrealistic					Alarm
Description	T0 value is below the limit that is realistic for the system.					
Cause	- Connector for low pressure transmitter X22. - Cable has been improperly spliced.					
Trouble shooting	- Ensure screw terminals on X22 are correctly tightened and connected. Disconnect and reconnect the controller plug X22. - Inspect the transmitter cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire cable.					
Criteria	T0 < -65 °C for more than 30 seconds during normal operation.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Compressor is slowed down and only operating at 20 Hz.					
Elimination	When sensor value is in a realistic range, it is marked as inactive in the alarm list and may then be deleted. Value must be valid for 30 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Actual T0	Actual Tret	Actual Tamb			

207	Psuc invalid					Alarm										
Description	Compressor suction pressure transmitter invalid.															
Cause	• Unexpected behaviour in old software version. • Pressure transmitter is incorrectly configured in the controller. • Pressure transmitter is not mounted or wired correctly. • Pressure transmitter wires are damaged or have been improperly spliced. • Controller X22 plug. • Pressure transmitter is defective. • Schrader valve is defective.															
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If Star Cool, check that the controller is configured correctly. Go to the Service menu , line S05 Configuration, and select line F10 Low pressure type and change the value to match the installed pressure transmitter NSK or DST. 3. Check that the connector on the pressure transmitter is free from corrosion and is mounted correctly according to the drawing below.  4. Inspect the transmitter cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire cable. 5. Ensure that the Psuc ground wire is connected securely to the controller X22 plug. 6. Check continuity of the wires by measuring from the controller X22 plug terminals 1, 2 and 3 to the other end at the pressure transmitter. If any are not ok, replace the cable. 7. Connect AC power to the unit and turn it on. Measure the voltage between the controller X22 terminal 1 and 3. The voltage should be 5 V DC. If not, replace the controller. 8. Disconnect the signal wire from the controller X22 terminal 2. Measure the voltage between the wire and ground. The value should be according to the 'Voltage - pressure table, LP transmitter' in the Operating and Service Manual. If not, replace the pressure transmitter. 9. Below points only for Star Cool: Connect a service gauge to the compressor suction valve and compare its reading with the suction pressure value shown in the main display. 10. Close all 3 service valves (suction, discharge and economizer) on the compressor. Recover all refrigerant in the compressor. 11. Dismount the suction pressure transmitter. If the unit has a Schrader valve mounted, then remove the Schrader valve and mount the pressure transmitter again. 12. Before opening the service valves again, ensure that the compressor has been vacuumed and the necessary refrigerant has been charged. 13. Compare the suction pressure in the main display with the service gauge again.															
Criteria	Suction pressure value is below -0.9 BarE (-13 Psi) or above 11.8 BarE (171 Psi) or DST: if the reading is between -0.3 bar to -0.5 bar and stays in that range while Tsuc has changed with more than 7C. NSK: if the reading is between 10.4 bar to 10.6 bar and stays in that range while Tsuc has changed with more than 7C.															
Controller action	<table><tr><td>Log</td><td>X</td><td>Alarm</td><td>X</td><td>Alarm light</td><td>Slow flash</td></tr></table>						Log	X	Alarm	X	Alarm light	Slow flash				
Log	X	Alarm	X	Alarm light	Slow flash											
Consequence																
Elimination	When suction pressure value becomes valid, alarm is marked as inactive and may then be deleted. Value must be valid for 60 sec. to set alarm inactive.															
Log data	<table><tr><td>Parm 1</td><td>Parm 2</td><td>Parm 3</td><td>Parm 4</td><td>Parm 5</td></tr><tr><td>Detection/error 1 = Max limit 2 = Min limit 8 = Internal sensor diagnostics</td><td>Minimum value</td><td>Maximum value</td><td>Actual value</td><td></td></tr></table>						Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	Detection/error 1 = Max limit 2 = Min limit 8 = Internal sensor diagnostics	Minimum value	Maximum value	Actual value	
Parm 1	Parm 2	Parm 3	Parm 4	Parm 5												
Detection/error 1 = Max limit 2 = Min limit 8 = Internal sensor diagnostics	Minimum value	Maximum value	Actual value													

214	Pmem invalid					Alarm
Description	Vacuum pump pressure transmitter invalid.					
Cause	• Unexpected behaviour in old software version. • Cable has been improperly spliced. • Connector for pressure transmitter Pmem not correctly mounted. • Vacuum pump pressure transmitter Pmem defective. • Cable for vacuum pump pressure transmitter Pmem defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the transmitter cables for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace the entire cable. 3. Check the resistance on contactor coil K9 and K10 between A1 and A2. Schneider (grey type) coil resistance is 6-8 Ω Schneider (green type) coil resistance is 8-10 Ω Danfoss coil resistance is 5-6 Ω 4. Check that the connector is mounted correctly according to the wiring diagram. a. Check the cable (measure the resistance in the cable). If the cable is defective, replace cable. b. Disconnect signal wire on controller module according to wiring schematic. Measure voltage between signal wire and GND on controller module according to wiring schematic. If voltage is below 0.2 V DC, transmitter or connection between transmitter and cable is defective. If not, then mount signal wire. Measure voltage between SIGNAL and GND. If voltage is between 0.2 V DC and 4.7 V DC and this alarm is still active, then check the connector X23 on the controller.					
Criteria	Pmem out of range for more than 30 sec.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence						
Elimination	When the transmitter value becomes valid, the alarm is inactive and can be deleted. Value must be valid for 60 sec. to set alarm to inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/error: 1 = Max limit 2 = Min limit	Low limit	High limit	Actual value		

5.5 Other sensor alarms (AL 3XX)

302	RH invalid					Alarm
Description	Relative humidity sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Relative humidity sensor RH or cable defective. • X10 cable is defective. • Main controller defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if any other alarms are active or inactive. If so, troubleshoot accordingly before replacing anything. 3. Run the sensor test by going to the Service menu, line S10 Other sensors. Follow the instructions on the display during the test. 4. If the cable by inspection is defective, replace cable. 5. Measure the resistance between the terminals at the controller end. If the resistance is less than 230 Ω, the cable is defective and must be replaced. 6. Mount the cable for RH in controller cabinet and on the sensor. Disconnect signal wire on main controller X10 terminal 2 and 3. Measure voltage between wire and GND on the main controller. If voltage is below 0.5 V DC, sensor or connection between sensor and cable is defective. 7. Mount the signal wire. Measure voltage on controller plug X10 between SIGNAL and GND. If voltage is between 0.5 V DC and 10 V DC and this alarm is still active, replace the main controller. 8. If it's a CIM 5 unit and the connector has been cut, the connection is as follows: Terminal 21 White = No. 2 marked on sensor wire. Terminal 22 Blue = No. 3 marked on sensor wire. Terminal 23 Brown = No. 1 marked on sensor wire. No. 4, marked on sensor wire, is not in use.					
Criteria	Value below alarm limit 10% RH or above 110% RH. Value invalid for 120 sec. for alarm activation.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Dehumidification impossible.					
Elimination	When sensor value becomes valid, it is marked as inactive in alarm list and may then be deleted. Value must be valid for 120 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Error type 1 = Max value exceeded 2 = Min value exceeded 4 = Modbus comm error	Low limit	High limit	Actual value		

303	AirEx invalid					Alarm
Description	Air exchange sensor short circuit.					
Cause	• Unexpected behaviour in old software version. • Indication of a loose connection, defective or lack of air exchange sensor. • AirEx is out of calibration. • Air exchange sensor AirEx or cable defective. • X23 cable is defective. • Main controller defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If the cable by inspection is defective, replace cable. 3. Calibrate the air exchange see "Calibration of air exchange sensor". If the value shown in controller is wrong or alarm still active then disconnect the cable for AirEx on the main controller according to the wiring schematics inside the control cabinet and from the AirEx sensor. 4. Mount the cable for AirEx in controller cabinet and on the sensor. Disconnect signal wire on main controller. Measure voltage between wire and GND on the main controller. If the voltage is over 4.0 V DC, sensor or connection between sensor and cable is defective. If the voltage is between 0.2 V DC and 4.0 V DC, continue to 5. 5. Mount signal wire. Measure voltage between SIGNAL and GND. If the voltage is between 0.2 V DC and 4.0 V DC and this alarm is still active, replace the main controller.					
Criteria	Value above alarm limit 225 m ³ /hour.					
Controller action	Log	X	Alarm	X	Alarm light	Slow flash
Consequence						
Elimination	When sensor value becomes valid, it is marked as inactive in alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Low limit	High limit	Actual value		

306	HPS switch - K1				Fatal alarm	
Description	High pressure switch or K1 contactor is active.					
Cause	• Ambient temperature is over spec. limit +50°C (+122°F). • Wrong pressure transmitter configuration in relation to transmitter type. • Compressor service valves or manual stop valve not fully open. • Condenser fan motor is not running or wrong direction. • Condenser blocked. • High pressure switch or X15 cable is defective. • K1 contactor defective. • Damaged piping. • Contaminated or overcharged refrigerant.					
Trouble shooting	1. The unit uses cooling refrigerant R134a or R513A and it is very difficult to operate at temperatures above specification. 2. Check if pressure transmitter is correctly configured in the controller (Configuration menu line F11). Set value according to transmitter type AKS/NSK/DST. Check with gauge that pressure transmitter is giving right value in controller. 3. Ensure that all service valves on the compressor and the manual stop valve are fully open. 4. Check that the condenser fan is running forward see arrows on unit. 5. If not running - Check that there are no alarm for the condenser fan motor, AL 402 and AL 426. Also that the fan can rotate freely. If it cannot rotate freely, replace the motor. 6. Clean the condenser coil to secure any residues is removed. It is critical that the condenser is free from fouling and/or dust and there is no limitation for air to go to and from the condenser. 7. Disconnect the cable for high pressure switch on the main controller X15. 8. Measure if the resistance in the high pressure switch cable is open or closed. The value should be close to 0 Ohm. If not, inspect the cable for damages and poor splices. Cut out the damaged/spliced part and splice the cable properly. If this does not help, repalce the HP switch. 9. Measure resistance of compressor/FC contactor coil between K1 A1 and A2. The resistance should be: Danfoss ± 5-6 Ω / Schneider grey type ± 6-8 Ω / Schneider green type ± 8-10 Ω / ABB ± 11-13 Ω. If outside the range, replace the contactor. 10. Check that there are no damages to the pipes after the compressor. Repair if they are damaged and check the refrigerant level.					
Criteria	Discharge pressure is above high pressure switch safety limit. Cut – out: 22.5 BarE ± 0.7 Bar (326.3 psi ± 10.2 psi), Cut-in: 15.9 BarE ± 0.7 Bar (230.6 psi ± 10.2 psi). Or the high pressure switch is off.					
Controller action	Frequency controller is stopped and unit stops.					
	Log	X	Alarm	X	Alarm light	Quick flash
Consequence	Unit stops.					
Elimination	Unit restarts after 5 min. When sensor value becomes valid, it is marked as inactive in alarm list and may then be deleted. Value must be valid for 60 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Pdis last 6 sec max		Psuc 6 sec	FCtemp 6 sec	

307	K1 low resistance					Warning
Description	K1 contactor resistance is too low.					
Cause	• X16 cable and/or wiring. • K1 contactor defective.					
Trouble shooting	1. Inspect cables from controller X16 to contactor K1 for damages and poor splices. If there is a poorly done splice, cut out the damaged part and splice the cable properly. 2. Check the cables are wired correctly according to the wiring diagram on the inside of the controller cabinet door. 3. Measure the contactor coil resistance between A1 and A2 of contactor K1. Depending on the brand of contactor and the ambient temperature, the resistance should be: Danfoss $\pm 5\text{-}6\ \Omega$ / Schneider grey type $\pm 6\text{-}8\ \Omega$ / Schneider green type $\pm 8\text{-}10\ \Omega$ / ABB $\pm 11\text{-}13\ \Omega$. If outside the range, replace the contactor.					
Criteria	Low resistance of contactor K1.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence						
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Pdis		Psuc	FC temp	

308	Pdis high - K1				Fatal alarm	
Description	High pressure switch is not active, but pressure measurement exceeds limits.					
Cause	- Discharge pressure is too high and the high pressure switch off. - Alarm 306 is active. - High pressure due to: - Ambient temperature is over spec. limit +50°C (+122°F). - Condenser blocked. - Condenser fan motor is not running or wrong direction. - Manual valve after compressor closed. - HP pipe damaged. - High pressure switch or cable is defective. - X15 cable is defective. - K1 contactor defective. - Wrong pressure transmitter configuration in relation to transmitter type. - Pressure transmitter defective. - Main controller defective.					
Trouble shooting	- The unit uses cooling refrigerant R134a or R513A and it is very difficult to operate at temperatures above specification. - If condenser coil is blocked, clean the condenser coil to secure any residues is removed. It is critical that the condenser is free from fouling and/or dust and there is no limitation for air to go to and from the condenser. If no failure are found and extra cooling is needed water can be sprayed on the condenser inlet bottom up or if unit has water cooling installed then use the water cooler for extra cooling down. - Check that the condenser fan is running forward see arrows on unit. - If not running - Check that there are no alarm for the condenser fan motor, AL 402 and AL 426. Also that the fan can rotate freely. - If the pressure rises very quickly after start of the compressor, check that the valve after the compressor (discharge side) is not closed or only partially open. Make sure valve is fully open. - Check that there are no damages to the pipes after the compressor. Repair if they are damaged and check refrigerant level. - Disconnect the cable for high pressure switch on the main controller according to the wiring schematics inside the control cabinet. - Measure the voltage between the two connectors for the high pressure switch on the connector PCB. If the voltage is below 15 V AC, measure resistance of compressor/FC contactor coil Danfoss (± 5-6 Ω) / Schneider (± 8-10 Ω) / ABB (± 11-13 Ω). - Check the cable (measure the resistance in the cable). If the cable is defective, replace cable and high pressure switch. - Check if pressure transmitter is correctly configured in the controller (Configuration menu line F11). Set value according to transmitter type AKS/NSK/DST. Check with gauge that pressure transmitter is giving right value in controller.					
Criteria	Pressure is above high pressure switch safety limit. Pdis is above 25 bar for 15 seconds or constantly above 26 BarE ± 0.7 Bar (377.1 psi ± 10.2 psi), Cut-in: 15.9 BarE ± 0.7 Bar (230.6 psi ± 10.2 psi).					
Controller action	Frequency controller is stopped and unit stops.					
	Log	X	Alarm	X	Alarm light	Quick flash
Consequence	Unit stops.					
Elimination	Unit restarts after 5 min. When sensor value becomes valid, it is marked as inactive in alarm list and may then be deleted. Value must be valid for 60 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Pdis 6 sec		Psuc 6 sec	FCtemp 6 sec	

309	HPS - K1 loose					Alarm
Description	HPS/K1 circuit is open and the pressure is low.					
Cause	• X15 cable and/or wiring. • X16 cable and/or wiring. • FC power cable and/or wiring. • High pressure switch is defective. • K1 contactor defective.					
Trouble shooting	1. Inspect cables from controller X15 to high pressure switch, controller X16 to contactor K1, and contactor K1 to FC for damages and poor splices. If there is a poorly done splice, cut out the damaged part and splice the cable properly. 2. Check the cables are wired correctly according to the wiring diagram on the inside of the controller cabinet door. 3. Disconnect the cable for high pressure switch on the controller X15. 4. Measure if the resistance in the HP switch cable is open or closed. The value should be close to 0 Ohm. If not, replace the HP switch. 5. Measure the contactor coil resistance between A1 and A2 of contactor K1. Depending on the brand of contactor and the ambient temperature, the resistance should be: Danfoss $\pm 5\text{-}6\ \Omega$ / Schneider grey type $\pm 6\text{-}8\ \Omega$ / Schneider green type $\pm 8\text{-}10\ \Omega$ / ABB $\pm 11\text{-}13\ \Omega$. If outside the range, replace the contactor.					
Criteria	Pdis is below 15 bar and HPS/K1 circuit is open.					
Controller action	Frequency controller is stopped and unit stops.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	0 = K1 disconnected 1=HPS is open/disconnected	Pdis		Psuc	FC temp	

310	CO ₂ sensor invalid					Alarm
Description	CO ₂ sensor communication missing.					
Cause	• Unexpected behaviour in old software version. • Communication with CO₂ sensor. • Defective CO₂ sensor. • COMRH cable, RH-cable and/or COMCA cable is defective.					
Trouble shooting	1. To ensure correct troubleshooting and to prevent unnecessary replacements, ensure that the controller is running the latest software version - before proceeding to step 2. 2. Verify that the sensor is mounted correctly and that all cables are in good shape. 3. Verify cable connections between controller and sensor (according to the wiring diagram on the controller door). 4. Verify correct supply voltage (10-14V DC) to the sensor between pin 1 and pin 4 on connector X10.					
Criteria	Communication with CO ₂ sensor not possible for min. 2 min.					
Controller action	CA: Start membrane pump AV+: -					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	CO ₂ level can not be regulated.					
Elimination	When the sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/ error: 1 = Max limit 2 = Min limit 8 = Internal sensor diagnostics	Low limit	High limit	Actual value		

313	O ₂ sensor invalid					Alarm
Description	O ₂ sensor communication missing.					
Cause	• Unexpected behaviour in old software version. • Communication with O₂ sensor. • COMRH cable, RH-cable and/or COMCA cable is defective. • Defective O₂ sensor.					
Trouble shooting	1. To ensure correct troubleshooting and to prevent unnecessary replacements, ensure that the controller is running the latest software version - before proceeding to step 2. 2. Verify that the sensor is mounted correctly and that all cables are in good shape. 3. Verify cable connections between controller and sensor (according to the wiring diagram on the controller door). 4. Verify correct supply voltage (10-14V DC) to the sensor between pin 1 and pin 4 on connector X10.					
Criteria	Communication with O ₂ sensor not possible for min. 2 min.					
Controller action	Open air exchange 4%.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	O ₂ level can not be regulated.					
Elimination	When the sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Detection/ error: 1 = Max limit 2 = Min limit 8 = Internal sensor diagnostics	Low limit	High limit	Actual value		

314	Replace CO ₂ sensor					Warning
Description	Replace CO ₂ sensor.					
Cause	• Unexpected behaviour in old software version. • CO₂ measurement after calibration (PTI) is out of range. • Sensor measurement out of range from last PTI (calibration) and CA/AV+ is active.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Run a CA PTI by pressing (PTI) and selecting line T05 PTI, then choosing CA on line T51 PTI test. 3. Replace the CO₂ sensor.					
Criteria	After a passed PTI test, the CO ₂ measurement value should be between -0.35% and +0.34%.					
Controller action	Alarm.					
	Log	X	Alarm	X	Alarm light	Off
Consequence						
Elimination	When the sensor value becomes valid, the alarm is marked as inactive in the alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	CO ₂ meas					

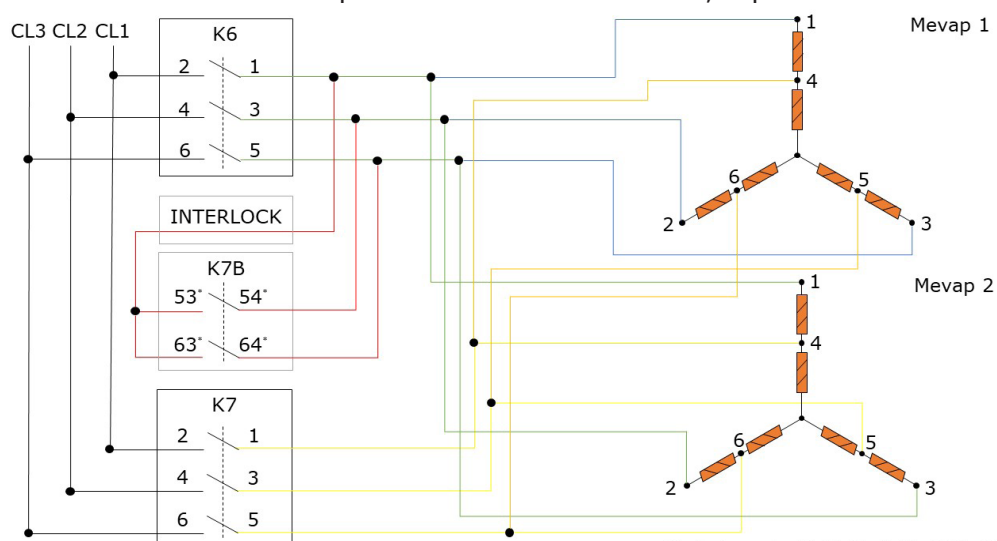
315	Replace O₂ sensor					Warning
Description	Replace O ₂ sensor.					
Cause	• Unexpected behaviour in old software version. • O₂ measurement after calibration (PTI) is out of range. • Sensor measurement out of range from last PTI (calibration) and CA/AV+ is active.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Run a CA PTI by pressing (PTI) and selecting line T05 PTI, then choosing CA on line T51 PTI test. 3. Replace the O₂ sensor.					
Criteria	After a passed PTI test, the O ₂ measurement value should be between 20.4% and 21.4%.					
Controller action	Alarm.					
	Log	X	Alarm	X	Alarm light	Off
Consequence						
Elimination	When the sensor value becomes valid, the alarm is marked as inactive in the alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	O ₂ meas					

5.6 Power alarms (AL 4XX)

400	Mevap 1 overheat	Fatal alarm
Description	Evaporator motor 1 overheat.	
Cause	• Unexpected behaviour in old software version. • Controller plugs X17, X18 or X26. • Motor cable and/or plug is damaged. • K6 and K7 contactors. • Evaporator motor 1 defective.	
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Turn the unit off and disconnect the power. Unplug X17, X18 and X26 from the controller. Tighten the plug terminal screws to 0.25 Nm. Plug in X17 and X18 again ensuring that they are not sitting loose. 3. Measure the resistance of the X26 plug terminals screws 1 to 2. The value should be below 250 Ohm. Plug in X26 ensuring that it is not sitting loose. 4. If the resistance values were ok, turn the unit on and check if the alarm is still active. If it is, replace the X26 connector. If the alarm is still active, replace the controller. 5. Ensure that the unit is turned off and is disconnected from the mains power. Dismount the left-hand inspection cover. Check that the fan blade is correctly aligned and that it can rotate freely. If it cannot rotate, replace the motor. 6. Disconnect the motor cable from the plug on the top of the motor. Check that the pins in the motor plug are not damaged or pushed in. If any pins are damaged, replace the motor. If any pins are pushed in, remove the motor cover and reposition the pins. 7. Check that the cable plug is not damaged in any way. If it is, replace it with a cable adapter. Ensure to plug it back into the motor correctly. 8. Mount a motor plug adapter and using a multimeter, measure the resistance of the wires 1 to 2, 2 to 3, and 1 to 3 which are controlling the low speed. For these three measurements you are measuring through 4 windings each time. The values should be the same. If not, replace the motor. 9. Then measure the resistance of the wires 4 to 5, 5 to 6, and 4 to 6 which are controlling the high speed. For these three measurements you are measuring through 2 windings each time. Therefore, the values should be the same and half the value of the low speed measurements. If not, replace the motor.	
	* For Danfoss version: 53 = 28, 63 = 38, 54 = 27, 64 = 37.	

10. Using a 500 V megger, measure all wires 1-8 till ground to verify if any are shorted to ground. If any short is found, replace the motor. 11. Plug in the motor cable and remount the inspection cover. 12. Open the controller cabinet and tighten all screws on the K6 and K7 contactors as well as the auxiliary contactor with a torque screwdriver to 1.5 Nm. 13. Measure the contactor coil resistance between A1 and A2 of contactors K6 and K7. Depending on the brand of contactor and the ambient temperature, the resistance should be: Danfoss $\pm 5-6 \Omega$ / Schneider grey type $\pm 6-8 \Omega$ / Schneider green type $\pm 8-10 \Omega$ / ABB $\pm 11-13 \Omega$. If they are outside the range, replace the contactor. 14. Connect power to the unit and turn it on. Check if the alarm is still active. 15. If the alarm is still active, go to the Service menu and select line S01 Manual operation. Change the value of line M01 Operating mode from AUTO to MAN. Then go down to line M03 Evaporator fan and change the value to LO (to check the K6 contactor) or HI (to check the K7 contactor). 16. If the contactor does not pull, measure the voltage of the contactor inlets A1 to A2. The value should be between 2.5 and 6.5 V DC. If yes, replace the contactor. 17. If the value is not correct, measure the voltage on the X17 connector terminal 5 and X18 terminal 1 to ground. The voltage should be between 2.5 and 6.5 V DC. If not, replace the controller. 18. If the contactor pulls when in Manual mode, measure the voltage of the contactor inlets 2, 4, and 6 to ground. The values will depend on the power supply, but they should all be the same. If not, check the power supply from the phase contactors K2 and K8. 19. Measure the voltage of the contactor outlets 1, 3, and 5 to ground. The values should be the same as the inlets. If not, replace the contactor.					
Criteria	Value above high alarm limit 10K Ohm.				
Controller action	Both evaporator fan motors stop.				
	Log	X	Alarm	X	Alarm light Quick flash
Consequence	Air circulation in container stops causing unit to stop.				
Elimination	When overheating disappears, alarm will be marked as inactive in alarm list and may then be deleted. Control is again released, but fan motors will only be allowed to operate at low speed for the first 5 min. If the error does not reoccur, problem will be considered solved and evaporator fan high speed is again released.				
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5
			High limit	Actual value	

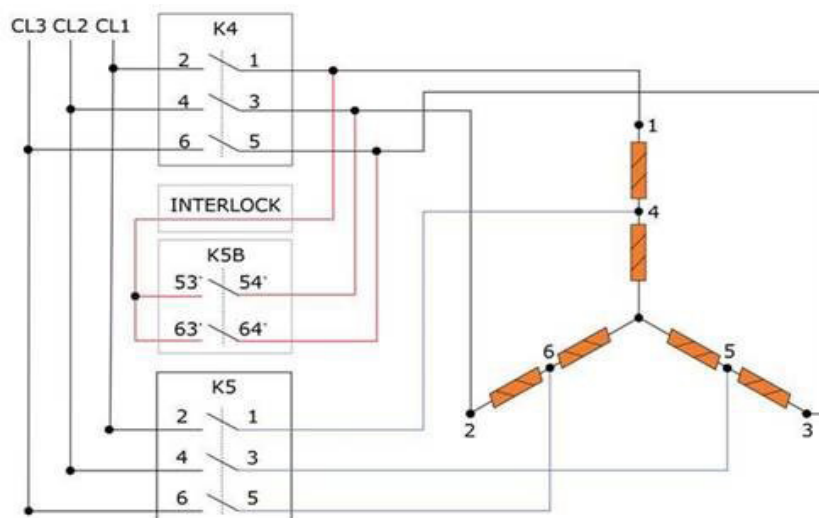
401	Mevap 2 overheat	Fatal alarm
Description	Evaporator motor 2 overheat.	
Cause	• Unexpected behaviour in old software version. • Controller plugs X17, X18 or X26. • Motor cable and/or plug is damaged. • K6 and K7 contactors. • Evaporator motor 2 defective.	
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller 2. Turn the unit off and disconnect the power. Unplug X17, X18 and X26 from the controller. Tighten the plug terminal screws to 0.25 Nm. Plug in X17 and X18 again ensuring that they are not sitting loose. 3. Measure the resistance of the X26 plug terminals screws 3 to 4. The value should be below 250 Ohm. Plug in X26 ensuring that it is not sitting loose. 4. If the resistance values were ok, turn the unit on and check if the alarm is still active. If it is, replace the X26 connector. If the alarm is still active, replace the controller. 5. Ensure that the unit is turned off and is disconnected from the mains power. Dismount the right-hand inspection cover. Check that the fan blade is correctly aligned and that it can rotate freely. If it cannot rotate, replace the motor. 6. Disconnect the motor cable from the plug on the top of the motor. Check that the pins in the motor plug are not damaged or pushed in. If any pins are damaged, replace the motor. If any pins are pushed in, remove the motor cover and reposition the pins. 7. Check that the cable plug is not damaged in any way. If it is, replace it with a cable adapter. Ensure to plug it back into the motor correctly. 8. Mount a motor plug adapter and using a multimeter, measure the resistance of the wires 1 to 2, 2 to 3, and 1 to 3 which are controlling the low speed. For these three measurements you are measuring through 4 windings each time. The values should be the same. If not, replace the motor. 9. Then measure the resistance of the wires 4 to 5, 5 to 6, and 4 to 6 which are controlling the high speed. For these three measurements you are measuring through 2 windings each time. Therefore, the values should be the same and half the value of the low speed measurements. If not, replace the motor.	



* For Danfoss version: 53 = 28, 63 = 38, 54 = 27, 64 = 37.

10. Using a 500 V megger, measure all wires 1-8 till ground to verify if any are shorted to ground. If any short is found, replace the motor. 11. Plug in the motor cable and remount the inspection cover. 12. Open the controller cabinet and tighten all screws on the K6 and K7 contactors as well as the auxiliary contactor with a torque screwdriver to 1.5 Nm. 13. Measure the contactor coil resistance between A1 and A2 of contactors K6 and K7. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type $\pm 8-10 \Omega$ / Schneider grey type $\pm 6-8 \Omega$ / Danfoss $\pm 5-6 \Omega$ / ABB $\pm 11-13 \Omega$. If they are outside the range, replace the contactor. 14. Connect power to the unit and turn it on. Check if the alarm is still active. 15. If the alarm is still active, go to the Service menu and select line S01 Manual operation. Change the value of line M01 Operating mode from AUTO to MAN. Then go down to line M03 Evaporator fan and change the value to LO (to check the K6 contactor) or HI (to check the K7 contactor). 16. If the contactor does not pull, measure the voltage of the contactor inlets A1 to A2. The value should be between 2.5 and 6.5 V DC. If yes, replace the contactor. 17. If the value is not correct, measure the voltage on the X17 connector terminal 5 and X18 terminal 1 to ground. The voltage should be between 2.5 and 6.5 V DC. If not, replace the controller. 18. If the contactor pulls when in Manual mode, measure the voltage of the contactor inlets 2, 4, and 6 to ground. The values will depend on the power supply, but they should all be the same. If not, check the power supply from the phase contactors K2 and K8. 19. Measure the voltage of the contactor outlets 1, 3, and 5 to ground. The values should be the same as the inlets. If not, replace the contactor.					
Criteria	Value above high alarm limit 10K Ohm.				
Controller action	Both evaporator fan motors stop.				
	Log	X	Alarm	X	Alarm light Quick flash
Consequence	Air circulation in container stops causing unit to stop.				
Elimination	When overheating disappears, alarm will be marked as inactive in alarm list and may then be deleted. Control is again released, but fan motors will only be allowed to operate at low speed for the first 5 min. If the error does not reoccur, problem will be considered solved and evaporator fan high speed is again released.				
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5
			High limit	Actual value	

402	Mcond overheat	Fatal alarm
Description	Condenser motor overheat.	
Cause	• Unexpected behaviour in old software version. • Controller plugs X17 or X27. • Motor cable and/or plug is damaged. • K4 and K5 contactors. • Condenser motor defective.	
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller 2. Turn the unit off and disconnect the power. Unplug X17 and X27 from the controller. Tighten the plug terminal screws to 0.25 Nm. Plug in X17 again ensuring it is not sitting loose. 3. Using a multimeter, measure the resistance of the X27 plug terminals screws 1 to 2. The value should be below 250 Ohm. Plug in X27 ensuring that it is not sitting loose. 4. If the resistance values were ok, turn the unit on and check if the alarm is still active. If it is, replace the X27 connector. If the alarm is still active, replace the controller. 5. Ensure that the unit is turned off and is disconnected from the mains power. Dismount the fan grille. Check that the fan blade is correctly aligned and that it can rotate freely. If it cannot rotate, replace the motor. 6. Disconnect the motor cable from the plug on the top of the motor. Using a mirror, phone camera or by dismounting the fan blade, check that the pins in the motor plug are not damaged or pushed in. If any pins are damaged, replace the motor. If any pins are pushed in, remove the motor cover and reposition the pins. 7. Check that the cable plug is not damaged in any way. If it is, replace it with a cable adapter. Ensure to plug it back into the motor correctly. 8. Mount a motor plug adapter and using a multimeter, measure the resistance of the wires 1 to 2, 2 to 3, and 1 to 3 which are controlling the low speed. For these three measurements you are measuring through 4 windings each time. The values should be the same. If not, replace the motor. 9. Then measure the resistance of the wires 4 to 5, 5 to 6, and 4 to 6 which are controlling the high speed. For these three measurements you are measuring through 2 windings each time. Therefore, the values should be the same and half the value of the low speed measurements. If not, replace the motor.	



10. Using a 500 V megger, measure all wires 1-8 to ground to verify if any are shorted to ground. If any short is found, replace the motor. 11. Plug in the motor cable and remount the fan grille. 12. Open the controller cabinet and tighten all screws on the K4 and K5 contactors as well as the auxiliary contactor with a torque screwdriver to 1.5 Nm. 13. Using a multimeter, measure the contactor coil resistance between A1 and A2 of contactors K4 and K5. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type $\pm 8-10 \Omega$ / Schneider grey type $\pm 6-8 \Omega$ / Danfoss $\pm 5-6 \Omega$ / ABB $\pm 11-13 \Omega$. If they are outside the range, replace the contactor. 14. Connect power to the unit and turn it on. Check if the alarm is still active. 15. If the alarm is still active, go to the Service menu and select line S01 Manual operation. Change the value of line M01 Operating mode from AUTO to MAN. Then go down to line M04 Condenser fan and change the value to LO (to check the K4 contactor) or HI (to check the K5 contactor). 16. If the contactor does not pull, measure the voltage of the contactor inlets A1 to A2. The value should be between 2.5 and 6.5 V DC. If yes, replace the contactor. 17. If the value is not correct, measure the voltage on the X17 connector terminal 1 and 3 to ground. The voltage should be between 2.5 and 6.5 V DC. If not, replace the controller. 18. If the contactor pulls when in Manual mode, measure the voltage of the contactor inlets 2, 4, and 6 to ground. The values will depend on the power supply, but they should all be the same. If not, check the power supply from the phase contactors K2 and K8. 19. Measure the voltage of the contactor outlets 1, 3, and 5 to ground. The values should be the same as the inlets. If not, replace the contactor.					
Criteria	Value above high alarm limit 10K Ohm.				
Controller action	Condenser fan motor stops.				
	Log	X	Alarm	X	Alarm light Quick flash
Consequence	Air circulation in container stops causing unit to stop.				
Elimination	When overheating disappears, alarm will be marked as inactive in alarm list and may then be deleted. Control is again released, but fan motors will only be allowed to operate at low speed for the first 5 min. If the error does not reoccur, problem will be considered solved and condenser fan high speed is again released.				
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5
			High limit	Actual value	

403	Mpump overheat				Alarm	
Description	Vacuum pump motor overheat.					
Cause	• Unexpected behaviour in old software version. • Loose thermistor cable connection. • Vacuum pump motor defective. • Cable for measuring vacuum pump motor overheat defect. • Controller module defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Disconnect the motor plug and inspect if the cables female plug has been damaged, deformed, or enlarged which can cause the bad connection between plug and motor. Repair or replace if necessary. 3. Turn the unit off. Take the fan cover of the vacuum pump off to see if the fan can turn freely. If not, perform oil check. See trouble shooting AL 656. If the motor is hot, it may be overloaded and jammed or defective. 4. Inspect the cable for Mpump, including the pin positions on both connector and pump side, and replace if defective or impossible to fix. 5. Disconnect the cable for Mpump from the controller module (X14) and check for corrosion and correct torque. 6. Measure the resistance in the cable. If the resistance is more than 1 MΩ, the cable or the motor is defect and should be replaced. If the resistance is less than 5 kΩ, the cable and motor should be OK. 7. Turn the unit on again. Measure the voltage over the Mpump connector X14. It should be between 3.2V DC and 3.4V DC. a. If the voltage is inside the above range, connect the sensor again. Measure the voltage over the sensor and check the voltage. If the voltage is less than 2.5 V DC, the measurement is OK. If the alarm after 30 sec. is still active on the display, the controller module is defect. Replace the controller module. b. If the voltage is outside the range, the controller module is defect or another error might affect the voltage. Check other alarms before replacing the controller module.					
Criteria	Value above high alarm limit 10k Ohm.					
Controller action	Vacuum pump is stopped until alarm is removed.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Extraction of CO ₂ is stopped.					
Elimination	When overheating stops, the alarm will be marked as inactive in the alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Low limit	High limit	Actual value		

415	Invalid power sup				Fatal alarm	
Description	U1-2 and U1-3 and U2-3 over voltage.					
Cause	- Unexpected behaviour in old software version. - Indication of error in container supply voltage between phases. - The unit is supplied with a voltage above specified level.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Measure the voltage applied to the unit. - Apply correct voltage to the unit. - The FC will be destroyed if it is running at a too high voltage. - Measure the actual voltage and compare with the value in the display. If the measurement differs the power module PCB may be defective. Replace or bypass power module PCB by pressing  selecting the Configuration menu, then phase direction and then cw. If condenser fan rotates in the wrong direction, choose ccw. This action is to be performed at every unit start up.					
Criteria	Value above top alarm limit 535/560 Volt.					
Controller action	Controller breaks supply after 60 sec. After 30 sec. the unit restarts with a normal startup procedure.					
	Log	X	Alarm	X	Alarm light	Quick flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive if another phase voltage measuring is below limit. It may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Limit	U1-2	U2-3	U1-3	NetFreq	

418	Invalid power sup				Fatal alarm	
Description	U1-2 and U1-3 and U2-3 under voltage.					
Cause	• Unexpected behaviour in old software version. • Indication of error in container supply voltage between phases. • The unit is supplied with a voltage below specified level. • Defective Power module PCB.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Measure the voltage applied to the unit. 3. Apply correct voltage to the unit. 4. The FC will not be able to maintain stable speed of the compressor motor due to a too low voltage and therefore the unit will make a restart. 5. Measure the actual voltage and compare with the value in the display. If the measurement differs the power module PCB may be defective. Replace or bypass power module PCB by pressing  selecting configuration then phase direction and then cw. If condenser fan rotates in the wrong direction, choose ccw. This action is to be performed at every unit start up.					
Criteria	Value below low alarm limit 300 Volt.					
Controller action	Controller breaks supply after 60 sec. After 30 sec. the unit restarts with a normal startup procedure.					
	Log	X	Alarm	X	Alarm light	Quick flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive if another phase voltage measuring is above limit. It may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Limit	U1-2	U2-3	U1-3	NetFreq	

421	Over current					Fatal alarm
Description	I1-2 and I1-3 and I2-3 over current.					
Cause	• Unexpected behaviour in old software version. • Indication of short circuit in electric installations of Star Cool unit. • The unit is using too much power on one phase. • Defective Power module PCB.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. The voltage may have been too low for too long. 3. Check power cables for short circuits and damages. 4. Check cables for heaters and motors for short circuits and damages. 5. Measure the actual current and compare with the value in the display. If the measurement differs, the power module PCB may be defective. Replace or bypass power module PCB by pressing  selecting configuration then phase direction and then cw. If condenser fan rotates in the wrong direction, choose ccw. This action is to be performed at every unit start up.					
Criteria	Value above upper alarm limit 20 Amp.					
Controller action						
	Log	X	Alarm	X	Alarm light Quick flash	
Consequence	Unit stops.					
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Limit	I1	I2	I3	Ifc	
Info	This alarm is used for service purposes. The fuses are protecting the unit.					

423	No phase direction					Fatal alarm
Description	Phase direction not detectable.					
Cause	- Unexpected behaviour in old software version. - The unit is supplied with an unstable voltage or/and power frequency. - K2 and K8 contactors. - Power measurement module X41 plug. - Controller plugs X11, X16 or X18. - Incorrect or damaged wiring. - Power measurement module defective.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Verify that the power supply frequency is within specified range. - Turn the unit off and disconnect the power. - Check the power measurement module X41 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. - Ensure the K2 and K8 contactors are wired correctly according to the wiring diagram. - Measure the contactor coil resistance between A1 and A2 of contactors K2 and K8. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type $\pm 8\text{-}10\ \Omega$ / Schneider grey type $\pm 6\text{-}8\ \Omega$ / Danfoss $\pm 5\text{-}6\ \Omega$ / ABB $\pm 11\text{-}13\ \Omega$. If they are outside the range, replace contactor. - Check the controller X16 and X18 plugs are mounted correctly and are not damaged. Tighten the terminal screws to 0.25 Nm. - If the user panel also has a problem, check the controller X11 plug is mounted correctly and is not damaged. Tighten the terminal screws to 0.25 Nm. - Connect AC power to the unit and turn it on. - Go to the Service menu  , line S05 Configuration. Go down to line F05 Phase detection and change the value to CW or CCW. - Measure the voltage on X16 terminal 3 for CW or X18 terminal 3 for CCW. The value should be in the range 2.5 - 6.5 V DC. If not, replace the controller. - Measure the voltage on the controller X11 pins 1 and 4. The value should be 12 V DC. If not, replace the controller. - Measure the voltage on the power measurement module X41 pins 1 and 4. The value should be 12 V DC. If not, replace the cable and plugs. - If all above measurements are within range, replace the power measurement module.					
Criteria	Impossible to detect phase sequence in power supply.					
Controller action	Unit does not start up.					
	Log	X	Alarm	X	Alarm light	Quick flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive in alarm list when phase sequence can be established. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	U1_2	U2_3	U1_3	Period	Delay	

424	Power frequency					Log
Description	Phase frequency error.					
Cause	• Unexpected behaviour in old software version. • Indication of error on Star Cool unit power supply. • The unit is supplied with an unstable voltage. • The power frequency is out of specified range.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if voltage on all 3 phases is within specified range. 3. Verify that all 3 phases are applied to the unit and for example not just 2 phases. 4. Verify that power frequency is within specified range. 5. Apply correct voltage to the unit.					
Criteria	Value out of limits. Power frequency must be between 42.5 Hz and 62.5 Hz.					
Controller action	None					
	Log	X	Alarm		Alarm light	Off
Consequence	At very low frequencies this error will lead to AL 423. Otherwise, normal operation can take place; The measuring system, however, will perform badly.					
Elimination	Power frequency within range again.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Frequency					

425	Frequency too high					Fatal alarm
Description	Power frequency too high warning.					
Cause	• Unexpected behaviour in old software version. • Power generator adjusted to too high frequency. • The power frequency is out of specified range.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Adjust the frequency of the power generator to a lower frequency. 3. Verify that power frequency is within specified range. 4. Apply correct voltage to the unit.					
Criteria	Power frequency above 70 Hz.					
Controller action	Unit stop flag.					
	Log	X	Alarm	X	Alarm light	Quick flash
Consequence	Reduced capacity of unit.					
Elimination	Power frequency within range again.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Frequency				

430	Cpr connection				Alarm	
Description	Power cable from FC to compressor is faulty.					
Cause	• Unexpected behaviour in old software version. • Indication of error with power cable between FC and compressor. The compressor is not using any power. • The power cable between the FC and the compressor motor is defective. • The current measuring circuit in the FC is faulty. • The compressor motor is damaged.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if supply voltage on all 3 phases is within specified range. 3. Check that the power cable between the FC and the compressor motor is not damaged. 4. Measure that the compressor motor is not damaged. 5. The FC may be defective.					
Criteria	FC is running but the current draw less than 0,5A from the FC.					
Controller action	FC reset procedure 2.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Controller will retry after 1 min.					
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Fact	Idc			

5.7 Frequency converter (FC) alarms (AL 5XX)

For some of the alarms in this section, the FC may be faulty and must be replaced. For continuing operation until replacement is possible, the unit can be rewired and started for emergency operation: See "Emergency Operation" in the Operating and Service Manual.

501	FC local control					Alarm
Description	FC setting in Local mode.					
Cause	• Unexpected behaviour in old software version. • Cable FC-com periodically defective. • Internal fault in the FC. • Defective FC.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. 1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Try to correct the error by uploading the latest software version to the controller. 4. Check that the cable FC-com is connected and not damaged. 5. If the alarm is then still active, the FC is defective and must be replaced. If there is no FC replacement available, the unit can be rewired for emergency operation: See "Emergency Operation" in the Operating and Service Manual.					
Criteria	FC in the local mode.					
Controller action	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive in alarm list when local mode is reset on frequency converter. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

508	Compr connection				Alarm	
Description	FC short circuit.					
Cause	• Unexpected behaviour in old software version. • Damaged FC cable and/or plug. • Short circuit on the compressor terminal block. • Damaged compressor windings.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. 1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Try to correct the error by uploading the latest software version to the controller. 4. Turn the unit off and disconnect the power. 5. Dismount the FC and check the cable for physical damages. The cable plug should be free from burn marks. Replace the cable if any damages are found. 6. Using a multimeter, measure the compressor windings resistance on the terminal block. Measure between pins U - X, V - Y, and W - Z. All 3 values should be almost the same (max 5% difference) and with the range 0.9 - 2.00 Ω. 7. Using a megger, measure each pin to ground. All values should be above 5 MΩ. 8. If not, close all the 3 service valves (suction, discharge and economizer) on the compressor. Evacuate all refrigerant. 9. Using a 6 mm hexagon socket wrench, dismount the terminal block. If the wires are not marked, use a permanent marker to label the wires (U, V, W, X, Y, Z) as you disconnect them using pliers or by hand. 10. Using a multimeter, measure the resistance between the wires U - X, V - Y, and W - Z. All 3 values should be almost the same (max 5% difference) and with the range 0.9 - 2.00 Ω. If all values are ok, replace the terminal block. 11. Using a megger, measure each wire to ground. If all values are above 5 MΩ, replace the terminal block. 12. If any values are not ok when measuring directly on the wires, replace the compressor. 13. Mount the FC again. 14. Before opening the service valves again, ensure that the compressor has been vacuumed and the necessary refrigerant has been charged.					
Criteria	Compressor motor current has been above 40 Amp.					
Controller action	FC reset procedure 2.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive in alarm list when reset by the FC and can then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

509	FC 24 V fault					Alarm
Description	FC internal 24 V supply fault.					
Cause	- Unexpected behaviour in old software version. - Internal fault in the FC.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. - Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. - After minimum 1 minute, reconnect the power supply and turn the unit on. - Try to correct the error by uploading the latest software version to the controller. - If the alarm is then still active, the FC is defective and must be replaced. If there is no FC replacement available, the unit can be rewired for emergency operation: See "Emergency Operation" in the Operating and Service Manual.					
Criteria	Internal 24 V supply error.					
Controller action	FC reset procedure 2.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive in alarm list when reset by FC. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

510	Compr connection					Alarm
Description	FC earth fault.					
Cause	• Unexpected behaviour in old software version. • Isolation damaged on the FC power output to the compressor. • Defective FC. • Damaged cable and/or plugs.					
Trouble shooting	1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Try to correct the error by uploading the latest software version to the controller. 4. The power cable for the compressor motor (Mcpr) may have defective isolation. Check the cable and replace if it is defective. 5. Measure resistance phase to ground (must be above 2 MΩ). 6. The FC is defective and must be replaced. IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. If there is no FC replacement available, the unit can be rewired for emergency operation: See "Emergency Operation" in the Operating and Service Manual.					
Criteria	Leakage current from phase to ground of FC. Current 10 A for more than 3 ms.					
Controller action	FC reset procedure 2.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive in alarm list when reset by FC. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

511	Compr over current					Alarm
Description	Compressor over current.					
Cause	• Unexpected behaviour in old software version. • Unstable power supply (generator/genset). • The compressor motor draws too much current. • Condenser blocked due to dirt and residue. • Defective motor cable, compressor or FC.					
Trouble shooting	1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Try to upload the latest software version to the controller. 4. If “Wait – Adapting to genset” is shown in display, unit is adapting to an unstable power supply. Wait until adjustment is completed. a. When “Wait – Adapting to genset” is no longer displayed and compressor is stuck on 60 Hz, find a better power supply. b. Rewire to emergency operation until a better power supply can be connected, to avoid FC alarms. 5. Turn off unit and wait 10 min. before turning on the unit again. 6. If the compressor cannot run or runs very short time before this alarm comes again, the compressor, motor cable or terminal block is defective and must be replaced. 7. If the compressor can run several min. without alarm, the motor cable, terminal block or FC may be defective and must be replaced if the alarm comes again. IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. 8. Clean the condenser. 9. Rewire the FC for emergency operation until a better power source can be found. See “Emergency Operation” in the Operating and Service Manual.					
Criteria	FC overloaded. Current above 38 Amp for approx. 1 sec.					
Controller action	FC reset procedure 2.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive in alarm list when reset by FC. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

513	Compr overload					Alarm
Description	Compressor overload.					
Cause	• Indication of sensor(s) not mounted correctly. • Refrigerant level. • Compressor drawing too much power. • Defective compressor.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. 1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Inspect the supply sensor(s) cable for splices and/or damages. Redo all splices on the cables. Cut out any damaged parts and splice the cable. 4. Check that supply sensor(s) are inserted equally with the same protruding length and are mounted correctly. 5. Check refrigerant level and Veco operation. 6. Check that all bolts fixing the FC to the compressor are properly tightened and nothing is jammed between the FC and the compressor. 7. Impedance measured on FC terminals: U-V 0.7 Ω V-W 0.7 Ω W-U 0.7 Ω 8. Check the motor cable and replace it if it is defective. Clean both the FC and the compressor surfaces. Tighten bolts properly for better cooling (apply thermo paste if available). 9. Compressor coil resistance: V-Y 1.1 Ω U-X 1.1 Ω W-Z 1.1 Ω 10. Also ensure to check to ground Value above 5 MΩ = OK, replace terminal block only. Value below 5 MΩ = Remove terminal block and measure again on windings directly. 11. If still below 5 MΩ, replace compressor.					
Criteria	Compressor overloaded. Current has been above 24 Amp for 20 sec.					
Controller action	FC reset procedure 1.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	The FC will be restarted after 10 min. Alarm will be marked as inactive in alarm list when reset by FC. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

514	Invalid power supply					Alarm
Description	Unit power supply undervoltage fault.					
Cause	- Unexpected behaviour in old software version. - The unit is supplied with too low a voltage, the specification for the unit is as follows: 3-phase power source at 50 Hz (+/- 2.5) and 360-460 V AC (max. 465 V AC) or at 60 Hz (+/- 2.5) and 400-500 V AC (max. 535 V AC).					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. - Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. - After minimum 1 minute, reconnect the power supply and turn the unit on. - Try to correct the error by uploading the latest software version to the controller. - Measure for correct power source on contactor K1 output side pin 1, 3 and 5. If it can be documented that the voltage is within specification and not unstable, the cause must be found elsewhere e.g. defective F.C. Try to replace F.C., if there is no FC replacement available, the unit can be rewired for emergency operation: See "Emergency Operation" in the Operating and Service Manual.					
Criteria	Supply voltage to FC is less than 330 V AC with full load. The minimum voltage depends on the load of the FC.					
Controller action	FC shut-down.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive in alarm list when reset by FC. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

515	Invalid power supply					Alarm
Description	FC overvoltage fault.					
Cause	• Unexpected behaviour in old software version. • The FC is supplied with too high voltage for continuous operation. • Defective FC.					
Trouble shooting	1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Try to correct the error by uploading the latest software version to the controller. 4. Supply unit with correct power voltage according to specification. The FC will be destroyed at too high voltages and is therefore being shut down. 5. If voltage is within specification and not unstable, the FC may be defective and must be replaced. If there is no FC replacement available, the unit can be rewired for emergency operation: See "Emergency Operation" in the Operating and Service Manual. IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened.					
Criteria	Supply voltage of FC is more than 550 V AC (800 V DC).					
Controller action	FC reset procedure 2.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive in alarm list when reset by FC. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCtemp	Fact	IFC	Psuc	Pdis	

516	FC supply error					Alarm
Description	Power supply error indication.					
Cause	• Unexpected behaviour in old software version. • Unstable power supply (generator/genset). • One or more phases are not applied to the FC.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. 1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Try to upload the latest software version to the controller. 4. If "Wait – Adapting to genset" is shown in display, unit is adapting to an unstable power supply. Wait until adjustment is completed. a. When "Wait – Adapting to genset" is no longer displayed and compressor is stuck on 60 Hz, find a better power supply. 5. Verify that all 3 phases are present and voltage is correct. 6. Verify that voltage difference between the 3 phases is less than 20 V AC. 7. Rewire the FC for emergency operation until a better power source can be found. See "Emergency Operation" in the Operating and Service Manual.					
Criteria	FC cannot maintain DC filter voltage (or too much ripple in DC voltage). AL 523 has been active for more than 50 sec.					
Controller action	FC reset procedure 1.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	Alarm will be marked as inactive in alarm list when reset by FC. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

517	FC over temp					Alarm
Description	FC over temperature fault.					
Cause	• Lack of refrigerant. • Insufficient cooling for the FC. • Air gap between FC and compressor. • Damage to the compressor LP valve plates. • Defect Veco valve.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. 1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Check refrigerant level in the sight glass. The FC cooling is, if lack off refrigerant, the first failure. 4. The FC cooling is dependent on a tight and flush mounting on the compressor endshield. A small air gap between compressor and FC will reduce the FC cooling. 5. Dismount FC and clean both compressor and FC. Make sure that all 4 studs on the compressor are tightened correctly, before mounting the FC again (even smallest air gap is critical). 6. Check the motor cable between FC and compressor. The cable may be jammed between FC and compressor. 7. Apply new thermal paste on FC contact area and mount the FC again. 8. Check that all bolts fixing the FC to the compressor are tightened and nothing is jammed between the FC and the compressor. 9. Make a compressor pump down and check the LP valve plates for damage. 10. Check that Veco can open properly and check the controller for burned output to Veco. E.g. activate Veco in manual mode and listen for the "click sound".					
Criteria	FCM 375: temperature exceeds +85°C (+185°F), or above +78°C (+172°F) for more than 15 min. FC 2.0: temperature exceeds +95°C (+203°F) for more than 15 min.					
Controller action	FC reset procedure 2.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops and restarts when FC has cooled down.					
Elimination	Alarm will be marked as inactive in alarm list when reset by FC. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

518	FC inrush					Alarm
Description	FC inrush fault.					
Cause	• Unexpected behaviour in old software version. • The FC has had too many restarts within short time. • CIM5: Manual activation of contactor (K8) on/off too many times. • CIM6: Manual activation of contactor (K1) on/off too many times. • Loose power connection for the FC. • Loose FC-com cable for communication with the FC. • Defective FC.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. 1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Try to correct the error by uploading the latest software version to the controller. 4. Verify that supply power for the unit is stable and within specification. 5. Check the FC-com cable for damages and loose connection. 6. Check supply power cables for the FC. 7. The FC may be defective and should be replaced. If there is no FC replacement available, the unit can be rewired for emergency operation: See “Emergency Operation” in the Operating and Service Manual.					
Criteria	May occur if FC is activated too many times during a one minute period (the primary side). FC has been switched on/off more than twice within 1 minute.					
Controller action	FC reset procedure 1.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops and restarts after some min.					
Elimination	Alarm will be marked as inactive in the alarm list when reset by the FC. The alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCtemp	Fact	IFC	Psuc	Pdis	

519	FC internal error					Alarm
Description	Frequency inverter internal error detected.					
Cause	- Unexpected behaviour in old software version. - Defective FC.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. - Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. - After minimum 1 minute, reconnect the power supply and turn the unit on. - Try to correct the error by uploading the latest software version to the controller. - The FC reports an internal failure. See if there should be other FC alarms (AL 5XX) and if they can be deleted first. - Turn off the unit for 10 min. and then start again. - If this alarm becomes active again, the FC has a permanent internal fault and must be replaced. If there is no FC replacement available, the unit can be rewired for emergency operation: See "Emergency Operation" in the Operating and Service Manual.					
Criteria	Internal error in FC.					
Controller action	FC reset procedure 2.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	Alarm reset requires that supply voltage is disconnected from frequency converter. Alarm will be marked as inactive in alarm list when reset by FC. The alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Internal error word low 16 bits	Internal error word high 16 bits	

523	FC phase loss					Log
Description	Power supply error indication.					
Cause	• Unexpected behaviour in old software version. • Unstable power supply (generator/genset). • One or more phases are not applied to the FC.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. 1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Try to upload the latest software version to the controller. 4. If "Wait – Adapting to genset" is shown in display, unit is adapting to an unstable power supply. Wait until adjustment is completed. a. When "Wait – Adapting to genset" is no longer displayed and compressor is stuck on 60 Hz, find a better power supply 5. Verify that voltage levels are the same for all 3 phases (voltage difference less than 15 V AC). 6. Supply unit with correct power voltage according to ISO Standard. 7. Rewire the FC for emergency operation until a better power source can be found. See "Emergency Operation" in the Operating and Service Manual.					
Criteria	More than 70 V diff. in min./max. for phases in power supply.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	If not solved, this problem can cause FC to stop due to alarm 516.					
Elimination	Warning will be marked as inactive in alarm list when reset by FC. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

530	FC alarm undefined					Alarm
Description	Unclear error in FC.					
Cause	Unexpected behaviour in old software version.					
Trouble shooting	- Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. - After minimum 1 minute, reconnect the power supply and turn the unit on. - Try to correct the error by uploading the latest software version to the controller.					
Criteria	FC error report.					
Controller action	FC reset procedure 0.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	The compressor will not start.					
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Alarm word low 16 bits	Alarm word high 16 bits	

531	PCB temperature					Alarm
Description	Critical FC PCB temperature.					
Cause	• Air gap between FC and compressor. • Insufficient cooling for the FC. • Lack of refrigerant. • Defect Veco valve. • FC operates at operating limits.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. 1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Check refrigerant level in the sight glass. The FC cooling is, if lack off refrigerant, the first failure. 4. The FC cooling is dependent on a tight and flush mounting on the compressor endshield. A small air gap between compressor and FC will reduce the FC cooling. 5. Dismount FC and clean both compressor and FC. Make sure that all 4 studs on the compressor are tightened correctly, before mounting the FC again (even smallest air gap is critical). 6. Check the motor cable between FC and compressor. The cable may be jammed between FC and compressor. 7. Apply new thermal paste on FC contact area and mount the FC again. 8. Check that all bolts fixing the FC to the compressor are tightened and nothing is jammed between the FC and the compressor. 9. If this alarm appears more than once, dismount FC and check motor cable before mounting the FC again. Tighten bolts properly for better cooling. 10. Check Veco that it can open properly and check controller for burned output to Veco. E.g. activate Veco in manual mode and listen for the "clicksound". 11. If unit is running in critical situations, the unit can be rewired for emergency operation. See "Emergency Operation" in the Operating and Service Manual.					
Criteria	FC PCB temperature exceed 85°C.					
Controller action	FC reset procedure 2.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	If not solved, this problem can cause FC to stop.					
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

532	Blocked rotor					Alarm
Description	Compressor restart fail.					
Cause	- Unexpected behaviour in old software version. - Compressor motor not turning due to high pressure difference Pdis - Psuc.					
Trouble shooting	- Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. - After minimum 1 minute, reconnect the power supply and turn the unit on. - Try to upload the latest software version to the controller. - If pressure difference Pdis – Psuc is more than 5 bar, then hot gas valve might not open. Try to open hot gas valve using a permanent magnet. Check solenoid coil and/or check controller output. - The compressor motor draws too much current from the FC. The compressor motor, compressor piston, the motor cable or terminal block may be jammed or defective.					
Criteria	Motor current above 24 Amp for approx. 10 sec					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	After 5 x restart, alarm is given and unit stops after additional 10 restart attempts.					
Elimination	Alarm inactive after power cycle.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	FCTemp	Fact	IFC	Psuc	Pdis	

595	Tfc invalid					Alarm
Description	Internal FC temperature sensor is invalid.					
Cause	Internal sensor error in the frequency converter.					
Trouble shooting	IMPORTANT! Opening the FC 2.0/2.1 will void its warranty – only the black cover may be opened. 1. Replace the FC. If there is no FC replacement available, the unit can be rewired for emergency operation: See “Emergency Operation” in the Operating and Service Manual.					
Criteria	If Tfc value is below -30°C for 30 consecutive seconds while FC is online and has no communication issues.					
Controller action	Causes motor heating and preventive motor heating to be disabled.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence						
Elimination	If Tfc value is -30°C or above for 30 consecutive seconds while FC is online and has no communication issues, alarm shall be deactivated.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Tfc					

5.8 Operation alarms (AL 6XX)

600	No control sensors					Fatal alarm	
Description	Supply air sensor 1, supply air sensor 2, return air sensor, and evaporator sensor are all malfunctioning.						
Cause	• Unexpected behaviour in old software version. • Sensors are malfunctioning. • X22, X23, X24 and X25 cable are defective. • Main controller is defective.						
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Verify all other sensor alarms AL 100 to AL 3XX and try to remove these alarms. 3. If this alarm remains active, replace main controller.						
Criteria	No valid control sensor values.						
Controller action	Unit stop flag.						
	Log	X	Alarm	X	Alarm light	Quick flash	
Consequence	Unit stops.						
Elimination	When one of the control sensor values enters into the valid area, it is again possible to control container temperature. For reliability reasons at least one of the control sensor values must be valid for 30 sec. before sensor may be used as control reference again.						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5		

601	No watercooling					Alarm
Description	Water-cooling fault.					
Cause	• Unexpected behaviour in old software version. • Water cooling selected and no water cooling active. • Insufficient water cooling capacity. • If program is chosen, warning can occur in units without water cooling.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Verify that water cooling hoses are applied and water is running when selecting water cooling. 3. Verify that the water is not too hot and not able to be used for cooling the unit.					
Criteria	Compressor discharge temperature exceeds limit for water-cooling, +60°C (+140°F) in more than 1 hour.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence						
Elimination	Alarm will be marked as inactive in alarm list next time water-cooling is activated. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Tc	WC off			

603	In range fault				Fatal alarm	
Description	In-range fault.					
Cause	• Unexpected behaviour in old software version. • Container doors are open or gasket defective. • Not enough refrigerant for the compressor. • Incorrect Psuc reading. • Insufficient airflow through evaporator. • Insufficient airflow through condenser. • Defective hot gas valve (leaking).					
Trouble shooting	1. The unit will continue the cooling but the next steps could be checked anyway. 2. Try to correct the error by uploading the latest software version to the controller. 3. If other alarms – follow troubleshooting for these alarms. 4. Check container doors and gaskets. 5. If Psuc reads -1 bar (-14.5 psi), check connector at the sensor and at X22 on the controller by disconnecting and reconnecting the connector. If still reading -1 bar (-14.5 psi), compare Psuc reading with the service gauges. 6. Check if there is enough refrigerant in the unit. Check if the evaporator is filled with ice or dirt blocking air circulation. Check if evaporator motors can rotate (turn unit off first). 7. Check if the condenser is filled with dirt and blocking air circulation. Check if condenser motor can rotate (turn unit off first). 8. Check hot gas valve for leaking. Let the compressor run in manual for some time. Stop compressor and see if the suction pressure rises more than normal. If valve is defective, replace valve.					
Criteria	Temperature no longer in-range. Has been in range for minimum 30 min. and after that in out-range for more than 4 consecutive hours.					
Controller action						
	Log	X	Alarm	X	Alarm light	Quick flash
Consequence	If error is detected during PTI-test, PTI-test will fail.					
Elimination	Alarm will be marked as inactive in alarm list when in-range is reached and alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Tset	Tact			

605	Mair failure				Alarm	
Description	Automatic air exchange cannot open/close.					
Cause	• Unexpected behaviour in old software version. • Air exchange motor connected incorrectly. • Damaged or blocked air exchange module. • Air exchange motor mounted incorrectly. • Air exchange motor cable or plug damaged or poorly spliced. • Air exchange motor defective. • Controller defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check that the air exchange motor is connected correctly according to the wiring diagram on the inside of the controller cabinet door. 3. Check the air exchange module for damages and ensure nothing is obstructing the air exchange pistons from opening and closing. Remove any obstructions or repair/replace damaged parts. 4. Check that the air exchange motor is mounted correctly. 5. Inspect the air exchange motor cable and plug for damages and poor splices. If there is a poorly done splice, cut out the damaged part and splice the cable properly. 6. Check that the controller X20 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 7. Go to the Service menu, line S01 Manual operation and change the value of line M01 Operating mode to Man. Go down to line M09 Air Ex auto and change the value to 100%. Check if the air exchange pistons now open fully. 8. Go to the Service menu, line S01 Manual operation and change the value of line M01 Operating mode to Man. Go down to line M09 Air Ex auto and change the value to 0%. Check if the air exchange pistons now close fully. 9. If the air exchange pistons opened and closed correctly, the alarm can now be cleared.					
Criteria	The air exchange did not open or close on a unit with a CIM 6.4 controller mounted and the unit is running with refrigerant R1234yf or the active application is either AV, AV+, AV+O2, CA, or CR.					
Controller action						
	Log	X	Alarm	X	Alarm light	Quick flash
Consequence	If the unit is running with R1234yf, ventilation of any potential flammable atmosphere from inside the container is not possible.					
Elimination	The alarm can be cleared when the air exchange pistons open or close.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Refrigerant type	Atmosphere	Actual voltage	Mair action (open/close)	Voltage limit (opening/closing)	

607	AirEx open					Alarm
Description	Air exchange valve open in conflict with settings.					
Cause	• Air exchange is open in Frozen mode (below -4.9°C), CA/AV+ mode, or with a humidity setpoint between 50 % and 64 %. • Unexpected behaviour in old software version. • Air exchange sensor calibrated incorrectly. • Sensor cable is damaged or has been improperly spliced. • Controller X23 plug. • Sensor is defective.					
Trouble shooting	1. If unit is running in Frozen mode, CA/AV+ mode, or with a setpoint between 50 % and 64 %, ensure that the air exchange is completely closed. 2. Try to correct the error by uploading the latest software version to the controller. 3. Fully close the air exchange cover plate. Then calibrate the air exchange sensor by going to the Service menu  line S05 Configuration. Go down to line F06 Air Ex 0 calibration and press and hold Enter  until the hourglass appears in the screen. Calibration is then completed. 4. Inspect the sensor cable for damages and poor splices. If there is a poorly done splice, cut out the damaged part and splice the cable properly or replace it with a full length cable (item no. 818572B). 5. Check the controller X23 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 6. If none of the above solves the alarm, replace the air exchange sensor.					
Criteria	Air exchange is open while unit is in Frozen mode (below -4.9°C), CA/AV+ mode, or with a humidity setpoint between 50 % and 64 %.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Deteriorated control precision.					
Elimination	When the air exchange is registered as being closed, the alarm will be marked as inactive in the alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Opening (m3/h)	Opening (%)				

610	Defrost time exceed					Log
Description	Max. defrost time exceeded.					
Cause	• Unexpected behaviour in old software version. • There has been too much ice in the evaporator. • The heaters are not working/defective. • Defective Psuc pressure transmitter. • Defective Pdis pressure transmitter. • Defective Tevap evaporator temperature sensor. • Lack of refrigerant.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check and clear other alarms first. Check refrigerant level. 3. Check pressure transmitter configuration and confirm values from Psuc and Pdis by comparing them to gauge readings. 4. Start a manual defrost time to remove remaining ice now. See if there has been used current for the heaters on the information menu - Current phase 1, 2 and 3 should be above 6 A when the heater symbol, Σ, is shown on the display. If current is lower, check if there is power for the heaters. 5. Run a PTI test after the cargo is unloaded.					
Criteria	Defrost time has exceeded 60 min.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	All the ice may not have been melted with a deteriorated yield.					
Elimination	Alarm will be marked as inactive when a new defrosting is terminated on temperature and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Max defrost time				

623	Loss of cooling					Fatal alarm	
Description	The refrigeration systems tries to cool down but Tsup is above Tret.						
Cause	• Unexpected behaviour in old software version. • Wrong controller configuration. • Service valves are closed. • Filter drier is blocked. • Low refrigerant level. • Evaporator fan wiring. • Incorrectly storage of cargo. • Defective valves. • Defective compressor valve plate(s). • Defective compressor.						
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check the configuration of the pressure transmitters, refrigerant, valves, and compressor. Go to the Service menu  line SO5 Configuration. Check the values of lines F10, F11, F12, F13 and F14 are according to the physically used part. 3. Remove the black caps from the service valves (discharge service valve, suction service valve, economizer service valve, and manual stop valve) and ensure the valves are fully open. Mount the black caps again. 4. Check if the filter drier is blocked. This can be identified by a heat difference between the inlet and outlet of the filter. The inlet may be warm, and the outlet iced up. If the filter is blocked, replace the filter. 5. Check the refrigerant level in receiver sight glass. If low, find and repair the leak point, before recharging the unit with the right amount. 6. Dismount the inspection covers and check the evaporator fans are rotating and in the right direction according to the arrow. If they are not turning or are in the wrong direction, check the wiring according to the wiring schematic. At the same time, check if there is cargo or packing material visible through the evaporator grille. 7. Go to the PTI menu and select line T03 Function test. Troubleshoot according to the alarm given after this test (AL840, AL842, AL843, AL844, or AL845). 8. If replacement of the valve plates is not possible or if another part of the compressor is defective, replace the compressor.						
Criteria	Compressor running AND evaporator heaters are off AND Tret is 0.5°C below Tsup AND inrange LED is off AND requested capacity is -100. All above criterias must be true for 120 min. before the alarm is activated.						
Controller action	Unit stop.						
	Log	X	Alarm	X	Alarm light	Quick flash	
Consequence	Unit stops until it is power cycled.						
Elimination							
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5		
	Tret	Tsup	FCType	FreqAct	Hevap%		

624	Config valve type					Alarm
Description	System identifies that the controller was changed.					
Cause	- Unexpected behaviour in old software version. - Controller has been replaced, requires manual setting of valve version (Ver. 1, Ver. 2, Ver. 3).					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Manually select the valve version in the Configuration menu on line F13 Valve. If in doubt which valve version is installed, please refer to bulletin 00143. - If there is a York modem installed, try to disconnect it from the controller.					
Criteria	It is determined that the controller was changed, when both the user panel and power module serial numbers change in one power down.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Possibility for non-optimal operation.					
Elimination	The operator must manually select the valve version in the Configuration menu on line F13 Valve.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

630	Manual phase dir					Warning
Description	Manually selected phase direction.					
Cause	• Unexpected behaviour in old software version. • Indication of insufficient yield or defective controller. • The user has selected a manual phase direction.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. The quality of the power frequency is so poor that the user must decide phase direction. Apply valid power supply to the unit. Ensure condenser fan is running the right direction if no better power supply is available. 3. There is a failure in the power wiring for the unit. Check that there are 3 valid phases for the unit. 4. There is a fault in the phase direction detection circuit. Turn unit off and on again and see if the phase can be detected now. If phases still can not be detected, replace the power measure module spm 100 / spm 200. 5. The main controller is defective. Replace main controller.					
Criteria	User has manually selected phase direction.					
Controller action	Use the selected phase direction.					
	Log	X	Alarm	X	Alarm light	Off
Consequence	User controls the rotation direction of the motors.					
Elimination	When switched to automatic, the alarm is marked as inactive and can be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
			Manual phase dir. CW/CCW			

646	Low refr. charge					Alarm
Description	Loss of charge (LoC) detected on non-yf unit.					
Cause	• Wrong controller configuration. • Service valves not fully open. • Pressure transmitters and/or solenoid coils wired or mounted incorrectly. • Connector plug(s) damaged. • Damage to the compressor valves or valve plates. • Blocked refrigerant flow in the system. • Not sufficient refrigerant in the system. • Blocked air flow due to cargo above loading line or packaging in the evaporator fan grille.					
Trouble shooting	1. Check the configuration of the pressure transmitters, refrigerant, valves, and compressor. Go to the Service menu line SO5 Configuration. Check the values of lines F10, F11, F12, F13 and F14 are according to the physically used part. 2. Check all the compressor service valves and the manual stop valve are in the back seated position. 3. If alarm 603 or 623 are active, check the troubleshooting for these first. 4. Check the controller X19 and X22 plugs are mounted correctly and are not damaged. Check the wiring is according to the diagram on the inside of the controller cabinet door. Tighten the plug terminal screws to 0.25 Nm. 5. Check that the pressure transmitters are free from corrosion and are mounted correctly. 6. Check that the solenoid coils are mounted on the correct valves by viewing the naming on the wires. 7. Unplug the black connector plugs from the coils and check for moisture and corrosion. Replace the connector plug if necessary (item no. 818760B). 8. Measure resistance directly on the solenoid coils. The values should be above 4.5 Ohm. If below, replace the solenoid coil. 9. Check for any possible refrigerant flow restriction. E.g. blocked (partly) filter dryer, recent pipe repairs or dents, etc. 10. Follow the valve check instructions to identify if any valves are defective. https://media.mcicontainers.com/instructions/english/valve-check 11. Check the refrigerant level by recovering the refrigerant. Perform a pressure test to check for leaks. Repair any leaks before vacuuming the system and charging 4.5 kg refrigerant. Instructions can be found here: https://media.mcicontainers.com/instructions/english/refrigerant-handling 12. If the container is laden, remove the inspection covers and inspect if the evaporator fan grill has been blocked by cargo packaging. If so, restuffing will be required.					
Criteria	System has lost more than 1.5 kg refrigerant charge.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Loss of cooling.					
Elimination	Power cycle.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	LoC	On time [hours]	CapReq [%]	Vexp [%]	Psuc	

649	Check yf beacon					Warning
Description	No connection to the beacon.					
Cause	• Unexpected behaviour in old software version. • Wrong controller mounted. • Wrong refrigerant configured in the controller. • Beacon cable is damaged or has been improperly spliced. • Controller X18 plug. • Beacon is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check that a CIM 6.4 (beige coloured) controller is mounted. 3. Check that the controller is configured with the type of refrigerant that is charged in the system. 4. Inspect the beacon cable for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable. 5. Check the controller X18 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 6. If the above has not solved the issue, disconnect the controller X18 plug and measure the resistance on the plug terminal screws 5 and 6. The value should be between 3 to 4 kOhm. 7. If resistance is not correct, disconnect the beacon wires from the plug and measure directly on the 2 wires. If the resistance is ok, replace the X18 plug. 8. If resistance on the wires is not correct, replace the beacon.					
Criteria	Hardware feedback signal indicating trouble detected.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Risk of no audio and visual signalling if loss of refrigerant charge occurs.					
Elimination	Power cycle will inactivate the alarm.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

650	O₂ low					Alarm
Description	The O ₂ sensor measures low O ₂ levels the in container.					
Cause	• Unexpected behaviour in old software version. • The system is not able to vent fresh air into the container. • Lack of oil in the vacuum pump. • Automatic air exchange defect. • O₂ sensor defect.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. See if the automatic air exchange valves are open. If not, try to open them in Manual mode. 3. Check oil level (must be above minimum level). 4. See if the vacuum pump is running. a. If the pump is running it will, in time, make sure there is enough O₂ in the container. Open the damper to accelerate this, open it until the O₂ level is higher than the O₂ setpoint.					
Criteria	O ₂ level < O ₂ setpoint – 0.3 * O ₂ setpoint.					
Controller action	Run pump.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	If not flushed with O ₂ , the cargo might experience anaerobic respiration and thereby deteriorate.					
Elimination	When the sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Limit	Actual	Setpoint		

651	CO ₂ high					Fatal alarm	
Description	The CO ₂ sensor measures high CO ₂ levels in the container.						
Cause	- Air exchange motor defective. - CO₂ sensor defective.						
Trouble shooting	1. Check valves and air exchange module for obstructions. 2. Check connections according to wiring schematic. 3. Replace CO ₂ sensor and run air exchange manually.						
Criteria	CO ₂ level > CO ₂ setpoint + 0.5 * CO ₂ setpoint (and rising).						
Controller action	CA: Open fresh air valve 0-100% (CO2 value is 1,0% above setpoint -> CO2 high limit AV+: No action						
	Log	X	Alarm	X	Alarm light	Quick flash	
Consequence	If CO ₂ is not removed from the container, this will cause damage to the cargo.						
Elimination	When the sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted.						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5		
		Limit	Actual	Setpoint			

652	Vacuum fault					Alarm
Description	Vacuum pump unable to reach the required pressure.					
Cause	• Unexpected behaviour in old software version. • Lack of oil. • Leak in vacuum system or membrane. • Defective pressure sensor. • Vacuum pump is defective. • Contactor/controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If AL 403 is active, see trouble shooting for AL 403. If AL 652 does not turn inactive, proceed with 3. 3. The vacuum pump is not running. a. Check if the bi-metallic switch is connected according to the wiring schematic X78 (depending on model). b. Activate the pump in Manual mode, to see if the contactor energizes. If not, check the controller output. If it does, check the contactor coil. If similar value as the other, replace the vacuum pump. 4. The vacuum pump is running. a. Perform "Vacuum system test".					
Criteria	Pump on > 5 min and Pmem > 135 mBar in 15 min, and CO ₂ act > CO ₂ set + 2%.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	If the system cannot achieve low pressure, the membrane does not work and is therefore not able to extract CO ₂ from the container.					
Elimination	When the sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Limit	Actual	Pump on time		

653	Mpump heat element					Alarm
Description	Vacuum pump operating temperature is low.					
Cause	• Unexpected behaviour in old software version. • Very low ambient temperature. • Sensor cable is damaged or has been improperly spliced. • Indication of sensor not mounted correctly. • Controller X27 plug. • Defective temperature sensor Tpump. • Defective contactor K10. • Defective heating element.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the sensor cable for damages and poor splices. Redo all splices on the cable. Cut out any damaged parts and splice the cable or replace it with a full length (3 meter) new sensor (818943B). 3. Check that the sensor is mounted correctly and inserted completely in the sensor pocket. 4. Check the controller X27 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 5. If the above has not solved the issue, disconnect the controller X27 plug and measure the resistance on the plug terminal screws 3 and 4. See the Temperature Sensor - Resistance Table in the Operating and Service Manual for the correct value. 6. If the resistance is out of range, disconnect the sensor from the plug and measure directly on the 2 wires. If the resistance is in range, replace the X27 plug. If the resistance is out of range, replace the complete sensor and cable (818943B). 7. If the resistance is within range, connect AC power to the unit and turn it on. Measure the voltage on the controller X27 pins 3 and 4. The value should be between 3.2 and 3.4 V DC. If not, replace the controller. 8. Measure the contactor coil resistance between A1 and A2 of the contactor K10. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type ± 8-10 Ω / Schneider grey type ± 6-8 Ω / Danfoss ± 5-6 Ω. If it is outside the range, replace the contactor. 9. Measure the heating element resistance at the contactor K10 between terminals 1 and 3. There should be approx. 0.9 kΩ. If not replace the heating element.					
Criteria	Heating pump on for 30 minutes; Tpump < Tamb + 5°C.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Condensation of water vapor in the pump housing.					
Elimination	When the sensor value becomes valid, it is marked as inactive in the alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Limit	Actual	Heater on time		

654	Mpump temp high					Alarm
Description	Motor for vacuum pump is overheated.					
Causes	• Unexpected behaviour in old software version. • Very high ambient temperature. • Lack of oil. • Missing one power phase into the pump. • Vacuum pump motor is overheated. • Vacuum pump is defective or jammed.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if the fan for the vacuum pump can turn freely. If it cannot turn, remove any obstacle. 3. Check that the vacuum housing is not blocked. 4. Check that the oil level in the pump is correct. 5. Check that the heating element is turned off, and check the heater contactor. 6. Check that the temperature sensor Tpump is installed correctly. 7. If none of the above solves the problem, and the pump seems to be more than 115°C (239°F), replace the vacuum pump.					
Criteria	Tpump > 115°C (239°F).					
Controller action	Stop vacuum pump.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	The CA system will not be able to remove CO2 from the container.					
Elimination	AL 654 will become invalid when the temperature decreases.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Limit	Actual			

656	Pump service					Warning
Description	Vacuum pump needs oil and filter change.					
Cause	Pump runtime > 2000 h.					
Trouble shooting	- Upload the latest software version to the controller. - Pump running hours can be viewed in the Service menu , S04 Runtime counters, line R08 Vacuum pump oil/filt. - Turn the unit off and disconnect the power to the unit. - Dismount the vacuum pump cover by removing the 4 screws. - Visually inspect if there are any oil leakages or discolouration of the pump. - Use a mirror, mobile phone camera, or remove the pump if needed in order to replace the filter best possible. - Dismount the black exhaust cover or adapter by removing the 4 screws. - If installed, loosen the screw (7 mm) that holds the flat spring and filter in place. Turn the flat spring counter clockwise and remove it. - Remove the filter. Check that the filter o-ring is not left behind. If so, remove it with a hook. - Attach the adaptor to the new filter. Check that the pin of the filter end cap is between 2 fingers and be careful no to get the wire bow between the adapter and the filter. - Clean the end of the vacuum pump housing and then insert the new filter with o-ring attached ensuring that it is positioned correctly in the housing with the wire bow at the top. - Gently position the adapter end piece and tighten the four screws of the adapter, first with 1 Nm and then with 3 Nm. - If no adapter is available, loosen the screw on the flat spring and align the flat spring into its position by turning it clockwise. Tighten the screw (7 mm) to apply adequate force on the spring but do not over tighten, to prevent puncturing the filter end cap. - Check the position of the flat spring. It should be perfectly aligned with the housing and should not be able to move when being rotated with your fingers. If it is misaligned, adjust it into the correct position. - Clean the end of the vacuum pump housing and mount the black exhaust cover with its 4 screws tightened to 3 Nm. - Drain oil from the vacuum pump by removing the lower black plug next to the sight glass. If the sight glass is dirty, remove and clean it ensuring the o-ring is intact and seated correctly before tightening with a 30 mm socket to 15 Nm. - Mount the black plug again and via the top black plug, fill up with 350 ml oil (item no. 818668A/818672A). This will exceed the maximum indicator of the sight glass. - Reconnect power to the unit and turn it on. - Go to the Service menu  and select line S01 Manual operation. Change the value of line M01 from Auto to Manual. Go down to line M10 and change the value from Off to On. Let the vacuum pump run for 5 minutes. - Go to the Information menu  and view line I18 Membrane pressure. The value should be between 20mbar and 79mbar. If not within specified range, proceed with trouble shooting according to the Operating and Service Manual. - Mount the vacuum pump cover and its 4 screws. - Active the CA PTI and confirm the change of filter and oil in the alarm 656 message screen. Alternatively, go to the Service menu , S08 Maintenance, select line K01 Mpump oil/filter and confirm the oil and filter change.					
Criteria	Pump runtime > 2000 h.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Unit cannot pass CA PTI. Not performing an oil change every 2000 pump running hours will decrease pump-lifetime dramatically.					
Elimination	When the alarm becomes inactive, it can be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	0 = Service interval of 2000 h exceeded 1 = Oil level below critical level	Time since last service Time spent in oil level detection(s)	N/A Avg supply voltage (V)	N/A Energy used (Wh)	N/A Energy threshold (Wh)	

657	Mpump start failure				Fatal alarm	
Description	Vacuum pump unable to create sufficient vacuum after startup.					
Cause	• Unexpected behaviour in old software version. • Wrong phase direction. • Supply voltage to pump defective. • Pressure tansmitter defective. • Vacuum hose leak. • Leaks in the vacuum system. • Contactor defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Power cycle the controller. 3. Check contactor K10. 4. Check pump connection according to the wiring schematic. 5. See "Troubleshooting the vacuum system". 6. Check the pressure transmitter Pmem.					
Criteria	Pump ON > 7 sec and Pmem > 600 mBar.					
Controller action	Stop Mpump until alarm is either when the unit is power cycled or the phase direction is changed.					
	Log	X	Alarm	X	Alarm light	Quick flash
Consequence	Vacuum pump stop and CA non-functionable.					
Elimination	When the alarm becomes inactive, it can be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Limit	Actual	Pump on time	CO ₂	

658	Mpump Uf lockout					Alarm
Description	Vacuum pump cannot start due to bad U/f ratio.					
Cause	• Bad power supply to the unit. • U/f ratio is outside its legal operational envelope and the CA system wants the pump to run.					
Trouble shooting	1. Check unit power supply or try connecting the unit to another correct power source.					
Criteria	U/f ratio is outside its legal operational envelope and the CA system wants the pump to run.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	The CA system is not running optimally.					
Elimination	The alarm becomes inactive when the U/f ration is inside its legal envelope for more than 1 minute.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

660	Check coil					Warning
Description	Coil(s) acting suspicious.					
Cause	• Solenoid coils mounted incorrectly. • Connector plug(s) damaged. • Solenoid coil(s) defective. • X19 wires damaged or poorly spliced. • X19 plug damaged. • Controller defective.					
Trouble shooting	1. Check that the solenoid coils are mounted on the correct valves by viewing the naming on the wires. 2. Check that X19 is wired according to the wiring diagram posted on the inside of the controller cabinet door. 3. Unplug the black connector plugs from the coils and check for moisture and corrosion. Replace the connector plug if necessary (item no. 818760B). 4. Measure resistance directly on the solenoid coils. The values should be above 4.5 Ohm. If below, replace the solenoid coil. 5. Measure resistance on the X19 terminals 1-2 for Veco, 3-4 for Vexp and 5-6 for Vhg. The values should be above 4.5 Ohm. If not, check the wires from X19 to each solenoid coil for damages or poor splices. Repair wires as necessary. 6. Activate the 3 solenoid coils by going to the Service menu , line S01 Manual operation. Change the value of line M01 Manual mode from AUTO to MANUAL. Go down to lines M06, M07 and M08, and set the values to 100%. 7. Using a multimeter, measure the output voltages on X19 terminals 1-2 for Veco, 3-4 for Vexp and 5-6 for Vhg. The values should be between 2.5 and 6.5 V DC. 8. If no output voltage measured on X19, unplug X19 and measure directly on the controller. If still no voltage, replace the controller. Otherwise replace the X19 plug. 9. See service bulletin "00053 Controller output voltages" for further details.					
Criteria	Hardware feedback signal indicating trouble detected.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	If a coil, controlling a valve, is malfunctioning, cooling can be disabled adding risk to cargo.					
Elimination	Power cycle will inactivate alarm.					
Log data	Parm 1		Parm 2	Parm 3	Parm 4	Parm 5
	Coil	Value				
	Veco	512				
	Vexp	1024				
	Vhg	2048				
	If more than one coil fails, values are accumulated e.g. Veco and Vhg result in value 512 + 2048 = 2560.					

661	Check contactor					Warning
Description	Contactor(s) acting suspicious.					
Cause	• One or more contactors needs inspection. • Controller output electronic defect. • Contactor close circuit. • Contactor open circuit. • Contactor coil. • Controller output voltages.					
Trouble shooting	1. Measure output voltages (X16, X17, X18) with a multi-meter – OK range 2.5V to 6.5V. In case of a contactor coil is short circuited (hence the current draw will be too high), the controller voltages output will shut off and the measured output voltage is 0 Vdc. 2. Repeat 1. with related contactor disconnected to check output. 3. If voltage is out of OK range, measure the resistance of the component connected to the "defective" controller output – OK range Contactor coil: approx. 5-6 Ω (Danfoss), 8-10 Ω (Schneider), 11-13 Ω (ABB). 4. Replace components according to 1., 2. and 3. 5. See service bulletin "00053 Controller output voltages" for further information.					
Criteria	Hardware feedback signal indicating trouble detected.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Depending on which contactor potentially is malfunctioning, cooling can be disabled adding risk to cargo.					
Elimination	Power cycle will inactivate alarm.					
Log data	Parm 1		Parm 2	Parm 3	Parm 4	Parm 5
	Contactor	Value				
	K2 CCW	2				
	K3 Hevap	4				
	K4 Mcond L	8				
	K5 Mcond H	16				
	K6 Mevap L	32				
	K7 Mevap H	64				
	K8 CW	128				
	K9 Mpump	16384				
	K10 Mheat	32768				
	If more than one contactor fails, values are accumulated e.g K2 CCW and K6 Mevap L result in value 2 + 32 = 34.					

662	Mevap lo contactor					Alarm
Description	Mevap low contactor detected to be faulty (only in heating).					
Cause	• One or more contactors needs inspection. • Controller output electronic defect. • Contactor close circuit. • Contactor open circuit. • Contactor coil. • Controller output voltages.					
Trouble shooting	1. In Manual mode, verify that the fans are physically running. 2. If alarm is active together with AL 661, check wiring. 3. Measure output voltages (X16, X17, X18) with a multi-meter – OK range 2.5V to 6.5V. In case of a contactor coil is short circuited (hence the current draw will be too high), the controller voltages output will shut off and the measured output voltage is 0 Vdc. 4. Repeat point 3 with related contactor disconnected to check output. 5. If voltage is out of OK range, measure the resistance of the component connected to the “defective” controller output – OK range Contactor coil: approx. 5-6 Ω (Danfoss), 8-10 Ω (Schneider), 11-13 Ω (ABB). 6. See service bulletin “00053 Controller output voltages” for further information.					
Criteria	Current consumption is not as expected.					
Controller action	Compensates for MevapLo failure by running with MevapHi.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Increased power consumption and entering fan emergency mode.					
Elimination	Power cycle will inactivate the alarm.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

663	Mevap hi contactor				Alarm
Description	Mevap high contactor detected to be faulty (only in heating).				
Cause	• One or more contactors needs inspection. • Controller output electronic defect. • Contactor close circuit. • Contactor open circuit. • Contactor coil. • Controller output voltages.				
Trouble shooting	1. In Manual mode, verify that the fans are physically running. 2. If alarm is active together with AL 661, check wiring. 3. Measure output voltages (X16, X17, X18) with a multi-meter – OK range 2.5V to 6.5V. In case of a contactor coil is short circuited (hence the current draw will be too high), the controller voltages output will shut off and the measured output voltage is 0 Vdc. 4. Repeat point 3 with related contactor disconnected to check output. 5. If voltage is out of OK range, measure the resistance of the component connected to the “defective” controller output – OK range Contactor coil: approx. 5-6 Ω (Danfoss), 8-10 Ω (Schneider), 11-13 Ω (ABB). 6. See service bulletin “00053 Controller output voltages” for further information.				
Criteria	Current consumption is not as expected.				
Controller action	Compensates for MevapHi failure by running with MevapLo.				
	Log	X	Alarm	X	Alarm light Slow flash
Consequence	Lower ventilation and entering fan emergency mode. Potential risk to cargo.				
Elimination	Power cycle will inactivate the alarm.				
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5

664	Mevap contactors (both)					Alarm
Description	Both Mevap contactors detected to be faulty (only in heating).					
Cause	• Problem with the interlock. • One or more contactors needs inspection. • Controller output electronic defect. • Contactor close circuit. • Contactor open circuit. • Contactor coil. • Controller output voltages.					
Trouble shooting	1. Measure output voltages (X16, X17, X18) with a multi-meter – OK range 2.5V to 6.5V. In case of a contactor coil is short circuited (hence the current draw will be too high), the controller voltages output will shut off and the measured output voltage is 0 Vdc. 2. Repeat point 1 with related contactor disconnected to check output. 3. If voltage is out of OK range, measure the resistance of the component connected to the “defective” controller output – OK range Contactor coil: approx. 5-6 Ω (Danfoss), 8-10 Ω (Schneider), 11-13 Ω (ABB). 4. See service bulletin “00053 Controller output voltages” for further information.					
Criteria	Current consumption is not as expected.					
Controller action	Release all contactors except K2/K8 and the FC contactor (K1).					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops. Potential risk to cargo.					
Elimination	Power cycle will inactivate the alarm.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

665	Hevap contactor					Alarm
Description	Hevap contactors detected to be faulty (only in heating).					
Cause	• One or more contactors needs inspection. • Controller output electronic defect. • Contactor close circuit. • Contactor open circuit. • Contactor coil. • Controller output voltages.					
Trouble shooting	1. Verify in Manual mode. 2. If alarm is active together with AL 661, check wiring. 3. Measure output voltages (X16, X17, X18) with a multi-meter – OK range 2.5V to 6.5V. In case of a contactor coil is short circuited (hence the current draw will be too high), the controller voltages output will shut off and the measured output voltage is 0 Vdc. 4. Repeat point 3 with related contactor disconnected to check output. 5. If voltage is out of OK range, measure the resistance of the component connected to the “defective” controller output – OK range Contactor coil: approx. 5-6 Ω (Danfoss), 8-10 Ω (Schneider), 11-13 Ω (ABB). 6. See service bulletin “00053 Controller output voltages” for further information.					
Criteria	Current consumption is not as expected.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Reduced capacity. Potential risk to cargo.					
Elimination	Power cycle will inactivate the alarm.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

666	Reduced refr. flow					Warning
Description	The flow of refrigerant in the system is reduced.					
Cause	- Expansion valve is incorrectly configured in the controller. - Solenoid coil, connector plug or cable damaged or improperly spliced. - Controller X19 plug. - Expansion valve is not functioning correctly. - Lack of refrigerant in the system.					
Trouble shooting	- Check the expansion valve version is correctly configured. Go to the Service menu, line S05 Configuration, and check the value of line F13 Valve is Version 1, Version 2 or Version 3. For further valve details, see bulletin 00143. - Inspect the solenoid coil cable for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable. - Check the controller X19 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. - Disconnect the controller X19 plug and measure the resistance on the plug terminal screws 3 and 4. The value should be above 4.5 Ω. - If not, disconnect the wires from the X19 plug terminals 3 and 4. Measure the resistance directly on the 2 wires. If the resistance is above 4.5 Ω, replace the X19 plug. - If the resistance is still below 4.5 Ω, dismount the connector plug from the solenoid coil and check for moisture and corrosion. Replace the connector plug and cable (818761A) if necessary. - Measure the resistance directly on the solenoid coil. If the resistance is above 4.5 Ω, replace the connector plug and cable (818761A). If the resistance is below 4.5 Ω, replace the solenoid coil. - If the valve is not opening and closing, manually open the expansion valve by going to the Service menu, line S01 Manual operation and change the value of line M01 from Auto to Manual. Go down to line M06 Expansion valve and change the value to 10 %. - Measure the voltage on the controller X19 pins 3 and 4. The value should be between 2.5 and 6.5 V DC. If not, disconnect the X19 plug and power cycle the unit. - Manually open the expansion valve by going to the Service menu, line S01 Manual operation and change the value of line M01 from Auto to Manual. Go down to line M06 Expansion valve and change the value to 10 %. - Measure again directly on the controller X19 terminal pins. If between 2.5 and 6.5 VDC, replace the X19 plug. If not, replace the controller. - Check if Tsuc is showing the correct temperature, access cover is installed and sensor is mounted and insulated correctly. - Check if Psuc is showing the correct pressure in the bottom left corner of the display by verifying with a zero calibrated manifold. - Check for any possible refrigerant flow restriction. E.g. blocked (partly) filter drier, service valves fully open, recent pipe repairs or dents, etc. - Check that there is enough refrigerant in the system and that there are no leaks. There should be 4.5 kg in total. - If the alarm is still active, replace the expansion valve.					
Criteria	ITI initiated alarm due to a defective expansion valve.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Reduced cooling capacity. Potential risk to cargo.					
Elimination	When the alarm becomes inactive, it can be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Vexp	Tamb	Psuc	Pdis	Result: 0 = Not run 1 = Pressure not achieved 2 = Valve defective 3 = Passed	

667	Refr leak detected				Warning/ Alarm	
Description	R1234yf refrigerant is leaking from the unit.					
Cause	- Blocked refrigerant flow in the system. - Not sufficient refrigerant in the system.					
Trouble shooting	- If 667 is active as a warning (no alarm light), please follow troubleshooting for alarm 668. - While the beacon and this alarm are active, do not troubleshoot or repair the unit. The beacon can be deactivated by the responsible operator. - If alarm 605 is also active, ensure there is no source of ignition within 3 meters of the reefer. Then proceed to either open the reefer doors or open the air exchange to allow any potential flammable atmosphere from inside the container to ventilate. - The container is currently running the condenser and evaporator fans at high speed with the air exchange open. This is in order to ventilate any potential flammable atmosphere from inside the container by diluting the refrigerant concentration. - The compressor will do a pump down. - After 20 minutes, the beacon will become inactive. - After 2 hours, alarm 668 will become active informing that the leak on the unit must now be repaired.					
Criteria	Leak detection is enabled and a leak was detected.					
Controller action	Unit stop then open the air exchange 100%, start condenser and evaporator fans on high speed, and activate the beacon.					
	Log	X	Alarm	X	Alarm light	Off/Slow flash
Consequence	Alarm 668 is triggered.					
Elimination	Ventilation is completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	1=Standstill outdoor (1)	Tamb	Pdis			
	2=Standstill indoor (1)	Tavg	Psuc			
	3=Standstill indoor (2)	Tavg	Psuc	Psuc ref.		
	4=LOC (heater)	On time hours	CapReq %	Vexp %	Psuc	
	5=LOC	On time hours	CapReq %	Vexp %	Psuc	

668	Repair refr leak					Alarm
Description	Loss of charge (LoC) detected on yf unit.					
Cause	• Wrong controller configuration. • Service valves not fully open. • Pressure transmitters and/or solenoid coils wired or mounted incorrectly. • Connector plug(s) damaged. • Damage to the compressor valves or valve plates. • Blocked refrigerant flow in the system. • Not sufficient refrigerant in the system. • Blocked air flow due to cargo above loading line or packaging in the evaporator fan grille.					
Trouble shooting	1. Check the configuration of the pressure transmitters, refrigerant, valves, and compressor. Go to the Service menu line SO5 Configuration. Check the values of lines F10, F11, F12, F13 and F14 are according to the physically used part. 2. Check all the compressor service valves and the manual stop valve are in the back seated position. 3. If alarm 603 or 623 are active, check the troubleshooting for these first. 4. Check the controller X19 and X22 plugs are mounted correctly and are not damaged. Check the wiring is according to the diagram on the inside of the controller cabinet door. Tighten the plug terminal screws to 0.25 Nm. 5. Check that the pressure transmitters are free from corrosion and are mounted correctly. 6. Check that the solenoid coils are mounted on the correct valves by viewing the naming on the wires. 7. Unplug the black connector plugs from the coils and check for moisture and corrosion. Replace the connector plug if necessary (item no. 818760B). 8. Measure resistance directly on the solenoid coils. The values should be above 4.5 Ohm. If below, replace the solenoid coil. 9. Check for any possible refrigerant flow restriction. E.g. blocked (partly) filter dryer, recent pipe repairs or dents, etc. 10. Follow the valve check instructions to identify if any valves are defective. https://media.mcicontainers.com/instructions/english/valve-check 11. Check the refrigerant level by recovering the refrigerant. Perform a pressure test to check for leaks. Repair any leaks before vacuuming the system and charging 4.5 kg refrigerant. Instructions can be found here: https://media.mcicontainers.com/instructions/english/refrigerant-handling 12. If the container is laden, remove the inspection covers and inspect if the evaporator fan grill has been blocked by cargo packaging. If so, restuffing will be required. 13. Confirm that the leak was repaired on the main display.					
Criteria	Ventilation is completed.					
Controller action	Unit stop.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Loss of cooling.					
Elimination	Power cycle.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

670	CA memb/hose leak				Alarm	
Description	Vacuum pump has stopped due to leak.					
Cause	• Membrane is leaking. • Vacuum pump hose is leaking.					
Trouble shooting	1. Check the hose connections onto the vacuum pump and the membrane are tight and secured correctly. 2. Start the pump manually by going to the Service menu and selecting line S01 Manual Operation. Change the value of line M01 from Auto to Manual. Go down to line M10 and change the value from Off to On. 3. Disconnect the vacuum hose at the vacuum pump and block the vacuum pump inlet. 4. If the membrane pressure in the Information menu on line I18 is below 30 mBar, go to point 7. If the pressure is above 30 mBar go to point 9. 5. Connect the hose back onto the vacuum pump and ensure the connection is tight. Disconnect the vacuum hose at the membrane and plug or seal it. If the membrane pressure on line I18 is still below 30 mBar, the membrane connection or the membrane itself is leaking. Replace the membrane. If the unit is in operation with cargo, be aware of possible high CO2 level and low O2 level. Check this on the controller main display. Vent the container according to the Operating and Service Manual before removing the right hand inspection cover. 6. If the membrane pressure on line I18 is above 30 mBar, check the hose for leaks and repair or replace it. Ensure it is connected correctly. After repair or replacement of the vacuum hose, conduct a container leak test according to the Operating and Service Manual. This is not possible on units in operation with cargo. 7. Connect the hose back onto the vacuum pump and ensure the connection is tight. Install a manometer at the transmitter inlet and check the reading is similar to the display reading. If not, replace the pressure transmitter. 8. If the manometer is showing the same “high” pressure (above 30 mBar) as the display, check the vacuum pump running hours in the Service menu, S04 Runtime counters, line R08 Vacuum pump oil/filt. If the number of running hours is above or approaching 2000, perform a mandatory vacuum pump oil and filter change according to the Operating and Service Manual. 9. If the vacuum pump oil and filter has not been changed, check that the vacuum pump oil level is above minimum. Fill with the correct oil type (as specified in the Operating and Service Manual) until maximum level is reached. Check the position of the flat spring. It should be perfectly aligned with the housing and should not be able to move when being rotated with your fingers. If it is misaligned, adjust it into the correct position. If it has fallen off completely, check that there is no damage to the filter before refitting it in the correct position. If the filter has been damaged, replace the filter. 10. Replace the vacuum pump.					
Criteria	Pmem has been greater than 120 mBar and increased from operating pressure to 90% of the ambient pressure in less than 20 sec (rise time).					
Controller action	Mpump stops, CA is deactivated, and AV+ is activated.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Reduced O2 control.					
Elimination	Power cycle the unit. CA will automatically be activated again with the previous settings.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Rise time	Pmem amb	Pmem current	Pmem when on		

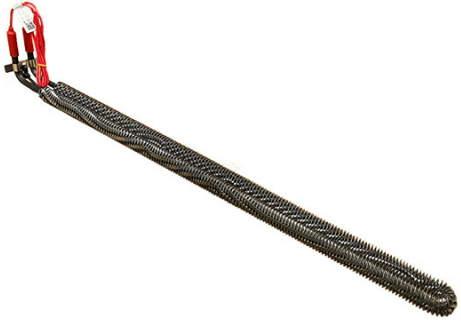
671	Mpump vacuum loss					Alarm
Description	Vacuum pump has stopped due to loss of vacuum in the system.					
Cause	• Vacuum pump oil level is low. • Vacuum pump filter is damaged or not installed correctly. • Vacuum pump is defective.					
Trouble shooting	1. If alarm 670 and/or 672 are also active, check troubleshooting for those alarms first. 2. Check the vacuum pump running hours in the Service menu , S04 Runtime counters, line R08 Vacuum pump oil/filt. If the number of running hours is above or approaching 2000, perform a mandatory vacuum pump oil and filter change according to the Operating and Service Manual. 3. If the vacuum pump oil and filter has not been changed, check that the vacuum pump oil level is above minimum. Fill with the correct oil type (as specified in the Operating and Service Manual) until maximum level is reached. Check the position of the flat spring. It should be perfectly aligned with the housing and should not be able to move when being rotated with your fingers. If it is misaligned, adjust it into the correct position. If it has fallen off completely, check that there is no damage to the filter before refitting it in the correct position. If the filter has been damaged, replace the filter. 4. Check the hose connections onto the vacuum pump and the membrane are tight and secured correctly. 5. Start the pump manually by going to the Service menu and selecting line S01 Manual Operation. Change the value of line M01 from Auto to Manual. Go down to line M10 and change the value from Off to On. 6. Disconnect the vacuum hose at the vacuum pump and plug the vacuum pump inlet. 7. If the membrane pressure in the Information menu on line I18 is above 30 mBar, install a manometer at the transmitter inlet and check the reading is similar to the display reading. If not, replace the pressure transmitter. 8. If the manometer is showing the same “high” pressure (above 30 mBar) as the display, replace the vacuum pump.					
Criteria	Pmem has been greater than 120 mbar and increased from operating pressure to 90% of the ambient pressure in more than 20 sec (rise time).					
Controller action	Mpump stops, CA is deactivated, and AV+ is activated.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Reduced O2 control.					
Elimination	Power cycle the unit. CA will automatically be activated again with the previous settings.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Rise time	Pmem amb	Pmem current	Pmem when on		

672	Mpump oil low					Alarm
Description	Vacuum pump oil level is detected as being low.					
Cause	• Vacuum pump oil level is low. • Vacuum pump filter is damaged or not installed correctly. • Vacuum pump is defective.					
Trouble shooting	1. Check the vacuum pump running hours in the Service menu , S04 Runtime counters, line R08 Vacuum pump oil/filter. If the number of running hours is above or approaching 2000, perform a mandatory vacuum pump oil and filter change according to the Operating and Service Manual. 2. If the vacuum pump oil and filter has not been changed, check that the vacuum pump oil level is above minimum. Fill with the correct oil type (as specified in the Operating and Service Manual) until maximum level is reached. Check the position of the flat spring. It should be perfectly aligned with the housing and should not be able to move when being rotated with your fingers. If it is misaligned, adjust it into the correct position. If it has fallen off completely, check that there is no damage to the filter before refitting it in the correct position. If the filter has been damaged, replace the filter. 3. Check the hose connections onto the vacuum pump and the membrane are tight and secured correctly. 4. Start the pump manually by going to the Service menu and selecting line S01 Manual Operation. Change the value of line M01 from Auto to Manual. Go down to line M10 and change the value from Off to On. 5. Disconnect the vacuum hose at the vacuum pump and plug the vacuum pump inlet. 6. If the membrane pressure in the Information menu on line I18 is above 30 mBar, install a manometer at the transmitter inlet and check the reading is similar to the display reading. If not, replace the pressure transmitter. 7. If the manometer is showing the same "high" pressure (above 30 mBar) as the display, replace the vacuum pump.					
Criteria	Pmem has been greater than 100 mbar and increased from operating pressure to 90% of the ambient pressure in more than 20 sec (rise time).					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Reduced CA efficiency and eventual pump damage.					
Elimination	Power cycle the unit.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Rise time	Pmem amb	Pmem current	Pmem when on		

673	Leak detection disabled					Alarm
Description	Not possible to detect a leak on a unit running with R1234yf.					
Cause	- Wrong controller configuration. - An alarm is active for one or more of the parts needed to calculate a leak.					
Trouble shooting	- Check the configuration of the refrigerant is according to the actual refrigerant charge in the unit. Go to the Service menu  line SO5 Configuration. Check the value of line F12 Refrigerant. - Follow the troubleshooting guide for the other active alarms.					
Criteria	One or more of the following alarms is active when the unit is running with R1234yf: 102, 105, 108, 126, 203, 206, 400, 401, 611, 666, 679.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	A leak could occur without the unit raising an alarm.					
Elimination	Other alarms must be cleared before this alarm is inactive in the alarm list. As a temporary measure, the warning can be cleared for 24 hours from the Maintenance menu, line K02 refrigerant leak.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

674	Manual ethylene injection					Alarm
Description	Ethylene injection did not occur.					
Cause	Ethylene was not injected into the reefer container as expected.					
Trouble shooting	- Check if the ethylene bottle is empty by squeezing it with your hand. If you can crush the bottle, then it is empty. - Please replace the bottle and immediately contact us by e-mail: ripe@starcool.com for further instructions.					
Criteria	Not enough ethylene has been injected or injection did not occur within 3 minutes.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Ripening cannot take place.					
Elimination	Contact ripe@starcool.com .					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

675	Man emergency opr					Alarm	
Description	User has activated manual emergency mode.						
Cause	• User changed the value of line ME1 EFM Hi, no T ctrl to ON.						
Trouble shooting	1. Go to the Service menu  , select line S12 Man emergency opr. 2. Change the value of line ME1 EFM Hi, no T ctrl to OFF.						
Criteria	The value of line ME1 EFM Hi, no T ctrl is ON.						
Controller action	Evap fan motors run high speed. All other components are turned off.						
	Log	X	Alarm	X	Alarm light	Slow flash	
Consequence	No temperature control.						
Elimination	Change the value of line ME1 EFM Hi, no T ctrl to OFF.						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5		

676	Check refr base					Warning
Description	The controller configuration for refrigerant design base does not match the current heater type detected.					
Cause	- Wrong controller configuration. - Wrong defrost heater elements mounted.					
Trouble shooting	- Check the controller configuration of the refrigerant design base. Go to the Service menu , line SO5 Configuration. Check the value of line F17 Refrigerant design base. - Verify that the correct defrost heater elements are installed. R134a (Star Cool 1.0)  R1234yf (Star Cool 1.1) 					
Criteria	The configured refrigerant design base does not match the heaters installed.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence						
Elimination	When the controller detects the heater type that matches the configured refrigerant design base, the alarm is marked as inactive and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Heater type: 0: Undetermined 1: FR 2: PTC					

677	Check valve plates					Warning
Description	Compressor valve plate/s detected to be broken.					
Cause	Valve plate/s broken.					
Trouble shooting	1. Follow the valve check instructions to identify which valve is defective. https://media.mcicontainers.com/instructions/english/valve-check					
Criteria	The expansion valve is not leaking and it has been detected that one or both of the compressor valve plates are broken.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence						
Elimination	Power cycle will deactivate alarm.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	BVP	Massflow Vexp in g/s	Massflow Cpr in g/s	FlowDiv in %	FlowDivPWM in %	

681	Phase contactors					Alarm
Description	K2 or K8 contactors may be faulty.					
Cause	- Controller plugs X16 or X18. - K2 contactor. - K8 contactor.					
Trouble shooting	- Disconnect the power measurement module from the controller X11. - Powercycle the unit. - Go to the Service menu , line S05 Configuration. Go down to line F05 Phase detection and change the value to CW or CCW. - Measure the voltage on X16 terminal 3 for CW or X18 terminal 3 for CCW. The value should be in the range 2.5 - 6.5 V DC. - If not, unplug the plugs and measure directly on the controller pins. If these values are within range, replace the plug/s. - If these values are exactly 0 V DC, replace the contactor as it has a short circuit. - If the value is not 0 V DC as is not within range, replace the controller. - Turn the unit off and disconnect the power. - Check the controller X16 and X18 plugs are mounted correctly and are not damaged. Tighten the terminal screws to 0.25 Nm. - Measure the contactor coil resistance between A1 and A2 of contactors K2 and K8. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type ± 8-10 Ω / Schneider grey type ± 6-8 Ω / Danfoss ± 5-6 Ω / ABB ± 11-13 Ω. If they are outside the range, replace the contactor. - Check the interlock. Push in K2 contactor and while pushed, try to push K8 contactor. If possible to push in K8 contactor, the interlock is damaged (or missing) and should be replaced. Push in K8 contactor and while pushed, try to push K2 contactor. If possible to push in K2 contactor, the interlock is damaged (or missing) and should be replaced.					
Criteria	Measured idle current and/or on current not in range.					
Controller action						
	Datalog	X	Alarm list	X	Alarm light	Quick flash
Consequence	Depending on which contactor potentially is malfunctioning, cooling can be disabled adding risk to cargo.					
Elimination	Power cycle will deactivate alarm.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Failure reason: 0 = Passed 1 = K2 or K8 stuck drawn 2 = K2 stuck released 3 = K8 stuck released 4 = K2 and K8 stuck released 5 = Unknown					

683	Check coil Vexp					Warning/ Alarm
Description	Expansion valve coil has low resistance.					
Cause	• Solenoid coils mounted incorrectly. • X19 wired incorrectly. • X19 wires damaged or poorly spliced. • Connector plug(s) damaged. • Solenoid coil degraded/defective.					
Trouble shooting	1. Check that the solenoid coils are mounted on the correct valves by viewing the naming on the wires. 2. Check the controller X19 plug is mounted correctly and is not damaged. Check that X19 is wired according to the wiring diagram posted on the inside of the controller cabinet door. Tighten the plug terminal screws to 0.25 Nm. 3. Unplug the black connector plug from the coil and check for moisture and corrosion. Replace the connector plug if necessary (item no. 818760B). 4. Measure resistance on the X19 terminals 3-4. The values should be above 4.5 Ohm. If not, check the wire from X19 to the solenoid coil for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable. 5. If above has not solved the problem, replace the solenoid coil. 6. Activate the solenoid coil by going to the Service menu , line S01 Manual operation. Change the value of line M01 Manual mode from AUTO to MANUAL. Go down to line M06 Expansion valve and set the value to 100%. 7. Using a multimeter, measure the output voltages on X19 terminals 3-4. The value should be between 2.5 and 6.5 V DC. If not, replace the controller.					
Criteria	CIM 6.4 controller is mounted and it measures that the expansion valve coil has a too low resistance.					
Controller action						
	Datalog	X	Alarm list	X	Alarm light	Off/Slow flash
Consequence						
Elimination	Alarm is deactivated when the ITI2400 test step is passed. This test step can be started in the Trip inspection menu line T08 Contactors or will run automatically after a power cycle.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	ITI test 2402					

684	Check coil Veco					Warning
Description	Economizer valve coil has low resistance.					
Cause	• Solenoid coils mounted incorrectly. • X19 wired incorrectly. • X19 wires damaged or poorly spliced. • Connector plug(s) damaged. • Solenoid coil degraded/defective.					
Trouble shooting	1. Check that the solenoid coils are mounted on the correct valves by viewing the naming on the wires. 2. Check the controller X19 plug is mounted correctly and is not damaged. Check that X19 is wired according to the wiring diagram posted on the inside of the controller cabinet door. Tighten the plug terminal screws to 0.25 Nm. 3. Unplug the black connector plug from the coil and check for moisture and corrosion. Replace the connector plug if necessary (item no. 818760B). 4. Measure resistance on the X19 terminals 1-2. The value should be above 4.5 Ohm. If not, check the wire from X19 to the solenoid coil for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable. 5. If above has not solved the problem, replace the solenoid coil. 6. Activate the solenoid coil by going to the Service menu , line S01 Manual operation. Change the value of line M01 Manual mode from AUTO to MANUAL. Go down to line M08 Economizer valve, and set the value to 100%. 7. Using a multimeter, measure the output voltages on X19 terminals 1-2. The value should be between 2.5 and 6.5 V DC. If not, replace the controller.					
Criteria	CIM 6.4 controller is mounted and it measures that the economizer valve coil has a too low resistance.					
Controller action						
	Datalog	X	Alarm list	X	Alarm light	Off
Consequence						
Elimination	Alarm is deactivated when the ITI2400 test step is passed. This test step can be started in the Trip inspection menu line T08 Contactors or will run automatically after a power cycle.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	ITI test 2403					

685	Check coil Vhg					Warning
Description	Hot gas valve coil has low resistance.					
Cause	• Solenoid coils mounted incorrectly. • X19 wired incorrectly. • X19 wires damaged or poorly spliced. • Connector plug(s) damaged. • Solenoid coil degraded/defective.					
Trouble shooting	1. Check that the solenoid coils are mounted on the correct valves by viewing the naming on the wires. 2. Check the controller X19 plug is mounted correctly and is not damaged. Check that X19 is wired according to the wiring diagram posted on the inside of the controller cabinet door. Tighten the plug terminal screws to 0.25 Nm. 3. Unplug the black connector plug from the coil and check for moisture and corrosion. Replace the connector plug if necessary (item no. 818760B). 4. Measure resistance on the X19 terminals 5-6. The value should be above 4.5 Ohm. If not, check the wire from X19 to the solenoid coil for splices and/or damages. Redo all splices on the cable. Cut out any damaged parts and splice the cable. 5. If above has not solved the problem, replace the solenoid coil. 6. Activate the 3 solenoid coils by going to the Service menu , line S01 Manual operation. Change the value of line M01 Manual mode from AUTO to MANUAL. Go down to line M07 Hotgas valve, and set the value to 100%. 7. Using a multimeter, measure the output voltages on X19 terminals 5-6. The value should be between 2.5 and 6.5 V DC. If not, replace the controller.					
Criteria	CIM 6.4 controller is mounted and it measures that the hot gas valve coil has a too low resistance.					
Controller action						
	Datalog	X	Alarm list	X	Alarm light	Off
Consequence						
Elimination	Alarm is deactivated when the ITI2400 test step is passed. This test step can be started in the Trip inspection menu line T08 Contactors or will run automatically after a power cycle.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	ITI test 2404					

5.9 Communication alarms (AL 7XX)

700	No FC/Contr com				Fatal alarm
Description	No communication between the controller and the FC.				
Cause	• Unexpected behaviour in old software version. • FC wired for emergency operation. • K1 contactor defective. • Communication cable defective. • Main controller defective. • FC defective.				
Trouble shooting	1. Turn the unit off and remove the power supply by either disconnecting the power plug or switching off the main circuit breaker. 2. After minimum 1 minute, reconnect the power supply and turn the unit on. 3. Try to correct the error by uploading the latest software version to the controller. 4. Remove the black cover on the FC. 5. Check that power to the FC is not wired for emergency operation. 6. Verify that the FC communication cable and controller X8 plug is mounted correctly according to wiring diagram inside the controller cabinet and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 7. Turn the unit off, wait 1 minute and turn the unit on again. 8. Verify that there are correct AC voltages (according to unit's supply voltage) on all 3 phases on the FC L1, 2, and 3. If no voltage, check the K1 contactor and AL 306 troubleshooting. 9. Disconnect the FC communication wires A, B and ground from the terminal X100 at the FC. Measure directly on the terminal the voltage from A to ground and B to ground. The value should be above +2.2 V DC (or below -2.2 V DC). If any one of the values is not, replace the FC. 10. Check continuity of the communication cable by measuring from the controller X8 terminals 1, 2 and 3 to the other end at the FC terminal X100 A, B and ground. If any one is not ok, replace the cable. 11. With the communication cables A, B and ground still disconnected from the FC, measure the controller X8 terminals 1 to ground and 2 to ground. The value should be above +2.2 V DC (or below -2.2 V DC). If not, replace the controller. 12. Turn the unit off, wait 1 minute and turn the unit on again. 13. If possible, run a FC selftest. Go to the Service menu , line S01 Manual operation and change the value of line M01 Operating mode from AUTO to MAN. Then go down and select line M11 FC selftest. Select line J01 to start the selftest.				
Criteria	Communication with FC not possible.				
Controller action	Controller will keep trying to communicate with the FC.				
	Log	X	Alarm	X	Alarm light Quick flash
Consequence	Unit stops.				
Elimination	When communication to the FC is active, it is marked as inactive in alarm list and may then be deleted.				
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5
	FC type	Communication quality			

710	No userpanel com (Seen in StarView)					Log
Description	No communication with display.					
Cause	• Unexpected behaviour in old software version. • Communication cable is damaged or has been improperly spliced. • Controller X11 plug. • User panel defective. • Main controller defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Inspect the communication cable for damages and poor splices. Redo all splices on the cable. Cut out any damaged parts and splice the cable. 3. Check the controller X11 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 4. Connect AC power to the unit and turn it on. Measure the voltage between the controller X11 terminal 1 and 4. The voltage should be 12 V DC. If not, replace the controller. 5. Measure between the controller X11 terminals 2 and 3. There should be a small DC signal. If not, replace the controller. 6. If there is a small DC signal, replace the user panel.					
Criteria	Communication via the user panel display is not possible.					
Controller action	None. Unit can perform normally without the display.					
	Log	X	Alarm		Alarm light	Off
Consequence	User not able to interact with the user panel.					
Elimination	When communication to the user panel and display is active, it is marked as inactive in alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
					Which node is unit connected to 1 (bit0) = LUP 2 (bit1) = LPM 4 (bit2) = RH 8 (bit3) = CO2 16 (bit4) = CA (LOM module) 32 (bit5) = O2 64 (bit6) = O2 SST 128 (bit7) = CAM 256 (bit8) = LPM200 512 (bit9) = FC 1024 (bit10) = Penta RH (single) 2048 (bit11) = Senmatic O2 4096 (bit12) = Senmatic CO2 8192 (bit13) = Senmatic or Penta RH 16384 (bit14) = Door sensor	

720	No SPM com					Alarm
Description	No communication.					
Cause	• Unexpected behaviour in old software version. • Indication of defective power module, lack of or improper connection. • Communication with power module SPM6 broken. • 12 V DC to the power module SPM6 not applied. • Main controller defective. • Defective power module SPM6. • X11 cable is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Verify that power module cable is mounted correctly (and is not damaged) according to wiring diagram inside the controller cabinet. 3. Verify that plugs are properly connected. 4. Verify that there are correct voltages on all 3 phases for the power module. If voltage is not correct, disconnect the sensor and measure the voltage directly from the controller. If not correct, replace the controller. If correct, replace the sensor. 5. Measure with a multimeter that there is a small DC signal on the connector PCB for power module-com and check Extended Service page 8 that UCOM2's voltage is above 10.5V. a. If there is no signal: The main controller is defective. Replace the main controller. b. If there is signal: The power module is defective and must be replaced.					
Criteria	Communication with controller not possible.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Unit stops.					
Elimination	When sensor value becomes valid, it is marked as inactive in alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
					Which node is unit connected to 1 (bit0) = LUP 2 (bit1) = LPM 4 (bit2) = RH 8 (bit3) = CO2 16 (bit4) = CA (LOM module) 32 (bit5) = O2 64 (bit6) = O2 SST 128 (bit7) = CAM 256 (bit8) = LPM200 512 (bit9) = FC 1024 (bit10) = Penta RH (single) 2048 (bit11) = Senmatic O2 4096 (bit12) = Senmatic CO2 8192 (bit13) = Senmatic or Penta RH 16384 (bit14) = Door sensor	

730	No RH sens com					Log/Alarm						
Description	RH sensor communication missing.											
Cause	• Unexpected behaviour in old software version. • Indication of improper connection or defective RH sensor. • Communication with RH sensor broken. • X10 cable is defective. • Defective RH sensor. • CO₂ sensor defective (for some models). • O₂ sensor defective (for some models). • Main controller defective.											
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Verify that cable RH-com and sensor is mounted correctly (and is not damaged) according to wiring diagram inside the controller cabinet. 3. If model has CO₂ and/or O₂ sensor, disconnect O₂ and CO₂ sensors and check if RH reading and communication returns to normal. This can be checked in Service menu line S10 Atmosphere Sensors. If ok, see troubleshooting for AL 740 and/or AL 760. f not ok, replace the RH sensor. 4. Verify that there are correct voltages (12 V DC) on controller plug X10 between terminals 1 and 4 and on X73 between terminals 1 and 2 (see page 12 in the Extended Service menu). 5. If voltage is not correct, disconnect the sensor and measure the voltage directly from the controller. If not correct, replace the controller. If correct, replace the sensor.											
Criteria	Communication with RH sensor not possible.											
Controller action	<table><tr><td>Log</td><td>X</td><td>Alarm</td><td>-/X</td><td>Alarm light</td><td>Off/Slow flash</td></tr></table>						Log	X	Alarm	-/X	Alarm light	Off/Slow flash
Log	X	Alarm	-/X	Alarm light	Off/Slow flash							
Consequence	Dehumidification is impossible and dehumidification will stop.											
Elimination	When sensor value becomes valid, it is marked as inactive in alarm list and may then be deleted.											
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5							
					Which node is unit connected to 1 (bit0) = LUP 2 (bit1) = LPM 4 (bit2) = RH 8 (bit3) = CO2 16 (bit4) = CA (LOM module) 32 (bit5) = O2 64 (bit6) = O2 SST 128 (bit7) = CAM 256 (bit8) = LPM200 512 (bit9) = FC 1024 (bit10) = Penta RH (single) 2048 (bit11) = Senmatic O2 4096 (bit12) = Senmatic CO2 8192 (bit13) = Senmatic or Penta RH 16384 (bit14) = Door sensor							

740	No CO ₂ sens com					Log/Alarm
Description	CO ₂ sensor is missing or communication is lost.					
Cause	• Unexpected behaviour in old software version. • Communication to CO₂ sensor lost. • CO₂ sensor is missing. • RH sensor is defective. • CO₂ sensor is defective. • Cable to the controller is defective. • Main controller defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If one or more alarms are active, check wires, plugs, and connectors. 3. Check voltage supply 12V DC and communication - small AC voltage between 3 and 4 on X10 (see page 12 in the Extended Service menu). 4. If voltage is not correct, disconnect sensor and measure voltage directly from the controller. If not correct, replace the controller. If correct, replace the sensor. 5. Disconnect RH and O₂ sensor and monitor if reading is normal. It might require a power cycle. 6. If only AL 740 active, then check the CO₂ sensor. Possibly test with another CO₂ sensor. 7. If AL 740 is still active, replace the controller module.					
Criteria	Checking communication has been on for 1 hour.					
Controller action						
	Log	X	Alarm	-/X	Alarm light	Off/Slow flash
Consequence	Not possible to run AV+.					
Elimination	Alarm may be deleted when inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
					Which node is unit connected to 1 (bit0) = LUP 2 (bit1) = LPM 4 (bit2) = RH 8 (bit3) = CO2 16 (bit4) = CA (LOM module) 32 (bit5) = O2 64 (bit6) = O2 SST 128 (bit7) = CAM 256 (bit8) = LPM200 512 (bit9) = FC 1024 (bit10) = Penta RH (single) 2048 (bit11) = Senmatic O2 4096 (bit12) = Senmatic CO2 8192 (bit13) = Senmatic or Penta RH 16384 (bit14) = Door sensor	

750	No SSC com					Log
Description	CA module is missing or communication is lost.					
Cause	- Unexpected behaviour in old software version. - CA module is missing. - Communication to CA module lost. - CA module defective.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - If one or more alarms are active, check wires, plugs, and connectors. - Check controller voltage supply (X71) according to the wiring schematic. - If only AL 750 active, then check the connection to the CA module and correct if faulty. If not, then replace the CA module.					
Criteria	No communication for 2 min.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Not possible to run CA.					
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
					Which node is unit connected to 1 (bit0) = LUP 2 (bit1) = LPM 4 (bit2) = RH 8 (bit3) = CO2 16 (bit4) = CA (LOM module) 32 (bit5) = O2 64 (bit6) = O2 SST 128 (bit7) = CAM 256 (bit8) = LPM200 512 (bit9) = FC 1024 (bit10) = Penta RH (single) 2048 (bit11) = Senmatic O2 4096 (bit12) = Senmatic CO2 8192 (bit13) = Senmatic or Penta RH 16384 (bit14) = Door sensor	

760	No O ₂ sens com					Log/Alarm
Description	O ₂ sensor is missing or communication lost.					
Cause	- Unexpected behaviour in old software version. - O₂ sensor is missing. - RH sensor is defective. - O₂ is defective. - Cable to the controller is defective. - Main controller is defective.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Check voltage supply 12V DC and communication - small AC voltage between 3 and 4 on X10. - Disconnect RH and O₂ sensor and monitor if reading is normal. It might require a power cycle. - If only AL 760 is active, then check connection to the O₂. Possibly test with another O₂ sensor. - If AL 760 is still active, replace the controller module.					
Criteria	Checking communication have been on for 1 hour.					
Controller action						
	Log	X	Alarm	-/X	Alarm light	Off/Slow flash
Consequence	Not possible to run CA.					
Elimination	Alarm may be deleted when inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
					Which node is unit connected to 1 (bit0) = LUP 2 (bit1) = LPM 4 (bit2) = RH 8 (bit3) = CO2 16 (bit4) = CA (LOM module) 32 (bit5) = O2 64 (bit6) = O2 SST 128 (bit7) = CAM 256 (bit8) = LPM200 512 (bit9) = FC 1024 (bit10) = Penta RH (single) 2048 (bit11) = Senmatic O2 4096 (bit12) = Senmatic CO2 8192 (bit13) = Senmatic or Penta RH 16384 (bit14) = Door sensor	

770	No door sens com					Warning
Description	No communication from the door sensor.					
Cause	- Unexpected behaviour in old software version. - The model code specifies that a door sensor is mounted and there is no communication with the door sensor for more than 2 minutes.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller.					
Criteria						
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence						
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
					Which node is unit connected to 1 (bit0) = LUP 2 (bit1) = LPM 4 (bit2) = RH 8 (bit3) = CO2 16 (bit4) = CA (LOM module) 32 (bit5) = O2 64 (bit6) = O2 SST 128 (bit7) = CAM 256 (bit8) = LPM200 512 (bit9) = FC 1024 (bit10) = Penta RH (single) 2048 (bit11) = Senmatic O2 4096 (bit12) = Senmatic CO2 8192 (bit13) = Senmatic or Penta RH 16384 (bit14) = Door sensor	

771	Missing door sensor					Warning
Description	No Bluetooth communication between the door sensor and the transceiver.					
Cause	• Door sensor has been removed. • Cargo is loaded above the load lines, blocking the Bluetooth signal between the transceiver and the sensor. • Door sensor has run out of battery or is defective.					
Trouble shooting	1. Open the right-hand container door and confirm that the door sensor is mounted on the inside ceiling of the container approx. 20 cm from the left-hand door. 2. Check that the door sensor magnet is mounted on the right-hand door so that it is aligned with the sensor upon closing the door. 3. Confirm that the sensor LED is flashing every 30 seconds. If not, replace the entire door sensor kit (transceiver, sensor and magnet).					
Criteria	No Bluetooth communication between the door sensor and the transceiver for 1 hour.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Door opening and closing cannot be registered and monitored.					
Elimination	Alarm is deactivated when communication between the sensor and the transceiver has returned.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	ConnectFlag	CIConnFI	RSSI	ConnCount	DconnCount	

780	Modem installation					Warning										
Description	Sekstant gateway cannot send data.															
Cause	• Sekstant gateway is not connected to the controller X9. • Sekstant gateway is not connected to power. • The battery is not charged over 12 V. • The battery is not connected to the Sekstant gateway. • Lack of cellular network signal.															
Trouble shooting	1. Go to the Service menu , line S05 Configuration. Verify that the container ID on line F01 is correct. 2. Go to the Service menu , line S09 Modem. Verify if the gateway serial number on line W01 is correct. Take a photo. 3. Go to the Information menu , line I31. Verify if the battery voltage on line I31 is 12 V or more. Take a photo. 4. Turn the reefer unit off and disconnect the AC power cable. 5. Disconnect the battery from the gateway. 6. Disconnect the battery from the controller X3. 7. Disconnect the gateway from the controller X9. 8. Check that the gateway and battery are mounted correctly to the AC power. Take a photo. 9. Reconnect the gateway to the controller X9. Take a photo. 10. Reconnect the battery to the controller X3. Take a photo. 11. Ensuring the connectors are rotated correctly, connect the battery to the gateway. Take a photo. 12. Connect AC power and turn the reefer unit on. 13. After 30 minutes on AC power, note the gateway LED status. 14. Check again if the gateway serial number is shown in the Modem menu. Take a photo. 15. If the LED is not solid green or no data is uploaded after 1 hour, contact sekstant-support@mcicontainers.com.															
Criteria	After gateway installation check completed, no gateway communication for more than 3 minutes. No gateway communication for more than 10 hours during normal operation.															
Controller action	<table><tr><td>Log</td><td>X</td><td>Alarm</td><td>X</td><td>Alarm light</td><td>Off</td></tr></table>						Log	X	Alarm	X	Alarm light	Off				
Log	X	Alarm	X	Alarm light	Off											
Consequence	Complete reefer data will not be uploaded by the Sekstant gateway.															
Elimination	Alarm is deactivated when communication between the Sekstant gateway and the controller has returned. If there is no longer a Sekstant gateway mounted on the reefer, the alarm can be disabled.															
Log data	<table><tr><td>Parm 1</td><td>Parm 2</td><td>Parm 3</td><td>Parm 4</td><td>Parm 5</td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>						Parm 1	Parm 2	Parm 3	Parm 4	Parm 5					
Parm 1	Parm 2	Parm 3	Parm 4	Parm 5												

781	Modem Cloud Com					Warning
Description	Sekstant gateway cannot send data.					
Cause	• Container ID in the controller is configured incorrectly. • Lack of cellular network signal. • Sekstant cloud servers are down.					
Trouble shooting	1. Go to the Service menu (9), line S05 Configuration. Verify that the container ID on line F01 is correct. 2. Turn the reefer unit off and disconnect the AC power cable. 3. Disconnect the battery from the gateway. 4. Disconnect the battery from the controller X3. 5. Disconnect the gateway from the controller X9. 6. Wait 2 minutes. 7. Check that the gateway and battery are mounted correctly to the AC power. 8. Reconnect the gateway to the controller X9. 9. Reconnect the battery to the controller X3. 10. Ensuring the connectors are rotated correctly, connect the battery to the gateway. 11. Connect AC power and turn the reefer unit on. 12. After 30 minutes on AC power, note the gateway LED status. 13. If the LED is not solid green or no data is uploaded after 1 hour, contact sekstant-support@mcicontainers.com.					
Criteria	Gateway has not been able to contact the cloud server for more than 10 hours.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	No data will be uploaded by the gateway.					
Elimination	Alarm is deactivated when communication between the Sekstant gateway and the cloud server has returned.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

5.10 Test alarms (AL 8XX)

800	Func test failed					Warning
Description	Function test fault.					
Cause	- Unexpected behaviour in old software version. - One or more of the individual test steps have failed.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. See individual AL 8XX alarms for cause.					
Criteria	One or more of the individual test steps have failed.					
Controller action	FC will soon trip with error 516 and stop compressor.					
	Log	X	Alarm	X	Alarm light	Off
Consequence	Deteriorated control precision and capacity.					
Elimination	When currents are normal, it is marked as inactive in alarm list and may then be deleted. Value must be valid for 30 sec. to set alarm inactive.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Failure reason Bit 1 = Mpump oil needs change		Seconds	Alarm count	

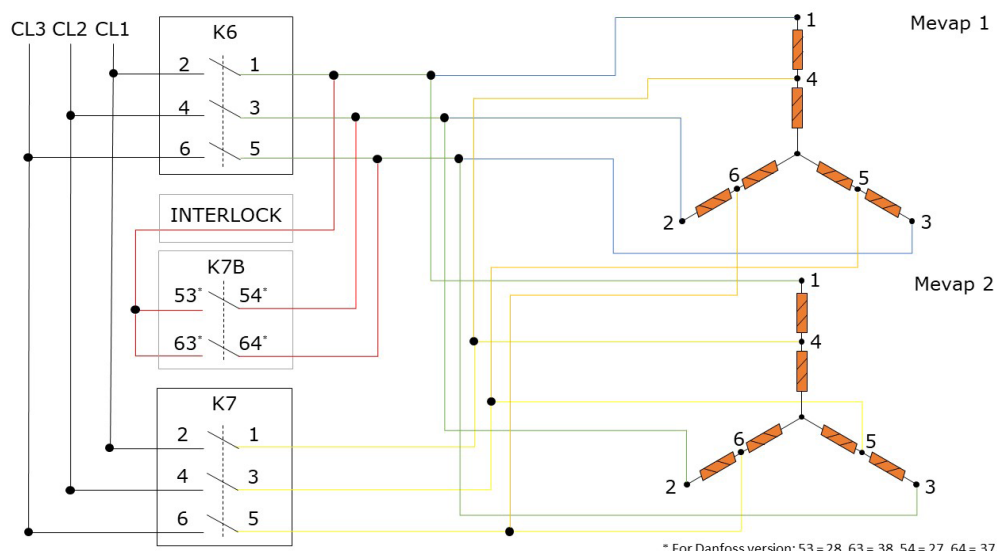
801	Controller					Warning
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Air exchange sensor defective. • Pressure transmitter/s defective. • Humidity sensor defective. • Transformer defective. • Controller defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If there are any other active alarms, check their trouble shooting and clear them before proceeding. 3. Connect the unit to AC power and turn it on. 4. Using a multimeter, measure the voltage for the air exchange sensor on the controller plug X23 between terminals 1 and 3 which should be close to 5 V DC. Then measure between terminals 2 and 3 which should be between 0.2 - 4.0 V DC. If values are not within range, replace the air exchange sensor. 5. Using a multimeter, measure the voltage of all the pressure transmitters on plugs X22 and X23 (if CA container). Refer to the wiring schematic found inside the controller cabinet or in the Operating and Service Manual. All values should be close to 5 VDC. If not, replace the pressure transmitter. 6. Using a multimeter, measure the voltage of the humidity sensor on plug X10 terminals 1 to 4 which should be between 12 - 34 V DC. If not, replace the humidity sensor. 7. Using a multimeter, measure the voltage on the transformer terminals T3 and T4 which should be between 15.30 V AC - 24.30 V AC. Then measure between terminals T5 and T6 which should be between 18.86 V AC - 30.00 V AC. If either value is not within range, replace the transformer. 8. If all above measured values are within range, replace the controller.					
Criteria	One or more of the internal reference voltages are out of limits.					
Controller action	Unit stops.					
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	0 = Alarm 953 1 = Alarm 954 2 = Alarm 955 3 = Alarm 956 4 = Alarm 961 5 = Alarm 962 6 = Alarm 963 7 = Alarm 964 8 = Alarm 965 9 = Alarm 966 10 = Alarm 975 11 = Alarm 976 12 = Alarm 969 13 = Alarm 970 14 = Alarm 996				

802	Air Ex Open					Warning
Description	Manual air exchange is opened preventing other function tests to succeed.					
Cause	In case the manual airex is opened, during execution of "Temperature and Pressure sensors function test", the Air Ex open alarm (802) is activated.					
Trouble shooting	1. Close the manual airex and re-run "Temperature and Pressure sensors function test" by running FT or PTI again.					
Criteria	Air exchange is opened. Air exchange > 0%.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID					

803	Reduced refr. flow	Warning
Description	The flow of refrigerant in the system is reduced.	
Cause	• Expansion valve is incorrectly configured in the controller. • Solenoid coil connector is defective. • Solenoid coil is defective. • Lack of refrigerant in the system. • Expansion valve is not functioning correctly.	
Trouble shooting	1. Check the expansion valve version is correctly configured. Go to the Service menu, line S05 Configuration, and check the value of line F13 Valve is Version 1, Version 2 or Version 3. For further valve details, see bulletin 00143. 2. Check the resistance between the solenoid coil and the controller X19 terminal 3-4. It should be 5-6 Ω. 3. If not, remove the connector at the solenoid coil and measure the resistance directly on the solenoid coil. 4. If the resistance is ok, replace the connector for the solenoid coil. 5. If the resistance is not ok, replace the solenoid coil. 6. Measure output voltages on the connector X19 with a multimeter. It should be between 2.5-6.5 V. If not, measure the output voltages directly on the controller terminals. If still not within range, replace the main controller. If within range, replace the connector X19. 7. Check if Tsuc is showing the correct temperature, access cover is installed and sensor is mounted and insulated correctly. 8. Check if Psuc is showing the correct pressure in the bottom left corner of the display by verifying with a zero calibrated manifold. 9. Check for any possible refrigerant flow restriction. E.g. blocked (partly) filter drier, service valves fully open, recent pipe repairs or dents, etc. 10. Check that there is enough refrigerant in the system and that there are no leaks. There should be 4.5 kg in total. 11. Check Vexp with permanent magnet if opens with a firm clicking sound. 12. If alarm is still active, replace the expansion valve. When completed power cycle the unit and run the Vexp test.	
Criteria	FT initiated alarm due to a defective expansion valve.	
Controller action		
	Log	X Alarm X Alarm light Off
Consequence	Reduced cooling capacity. Potential risk to cargo.	
Elimination	When the alarm becomes inactive, it can be deleted.	
Log data	Parm 1	Parm 2
	Step ID	Parm 3 Parm 4 Parm 5 Result: 0 = Not run 1 = Pressure not acheived 2 = Valve defective 3 = Passed

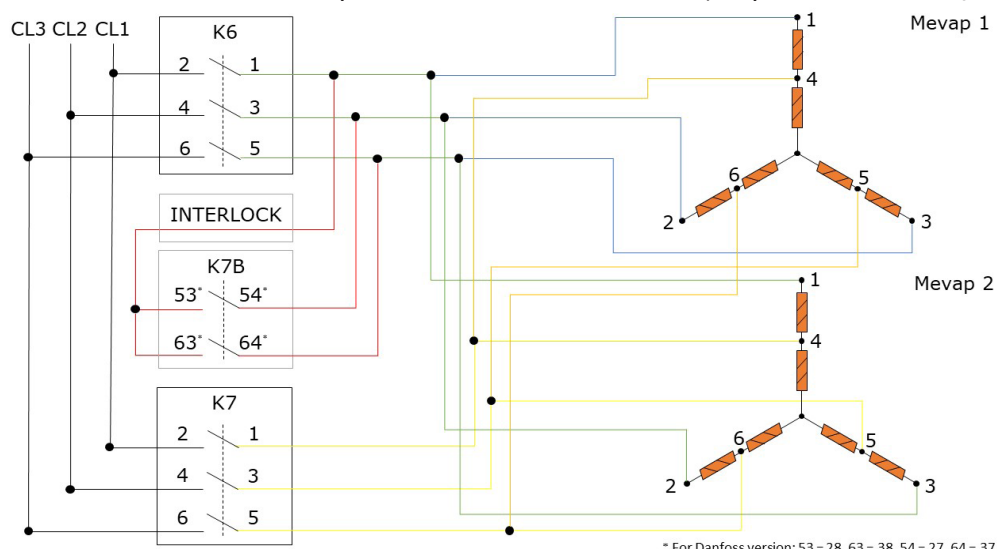
805	Idle current					Warning
Description	Unit idle overcurrent fault.					
Cause	• Unexpected behaviour in old software version. • There is a short-circuit in the main controller. • The power module PCB is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check cables for sensors for damages. 3. The main controller is defective. Replace the main controller.					
Criteria	Idle current exceeds limit of 0.3 A with only controller running.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Idle	I1	I2	I3	

810	Mevap cur LO speed	Warning
Description	Evaporator motor low speed current fault.	
Cause	• Unexpected behaviour in old software version. • Controller plugs X17 or X18. • Motor cable and/or plug is damaged. • K6 and K7 contactors. • Evaporator motor/s defective.	
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller 2. Turn the unit off and disconnect the power. Unplug X17 and X18 from the controller. Tighten the plug terminal screws to 0.25 Nm. Plug in X17 and X18 again ensuring that they are not sitting loose. 3. Ensure that the unit is turned off and is disconnected from the mains power. Dismount the inspection covers. Check that the fan blades are correctly aligned and that they can rotate freely. If they cannot rotate, replace the motor/s. 4. Disconnect the motor cables from the plug on the top of the motors. Check that the pins in the motor plug are not damaged or pushed in. If any pins are damaged, replace the motor/s. If any pins are pushed in, remove the motor cover and reposition the pins. 5. Check that the cable plug is not damaged in any way. If it is, replace it with a cable adapter. Ensure to plug it back into the motor correctly. 6. Mount a motor plug adapter and using a multimeter, measure the resistance of the wires 1 to 2, 2 to 3, and 1 to 3 which are controlling the low speed. For these three measurements you are measuring through 4 windings each time. The values should be the same. If not, replace the motor/s. 7. Then measure the resistance of the wires 4 to 5, 5 to 6, and 4 to 6 which are controlling the high speed. For these three measurements you are measuring through 2 windings each time. Therefore, the values should be the same and half the value of the low speed measurements. If not, replace the motor/s.	



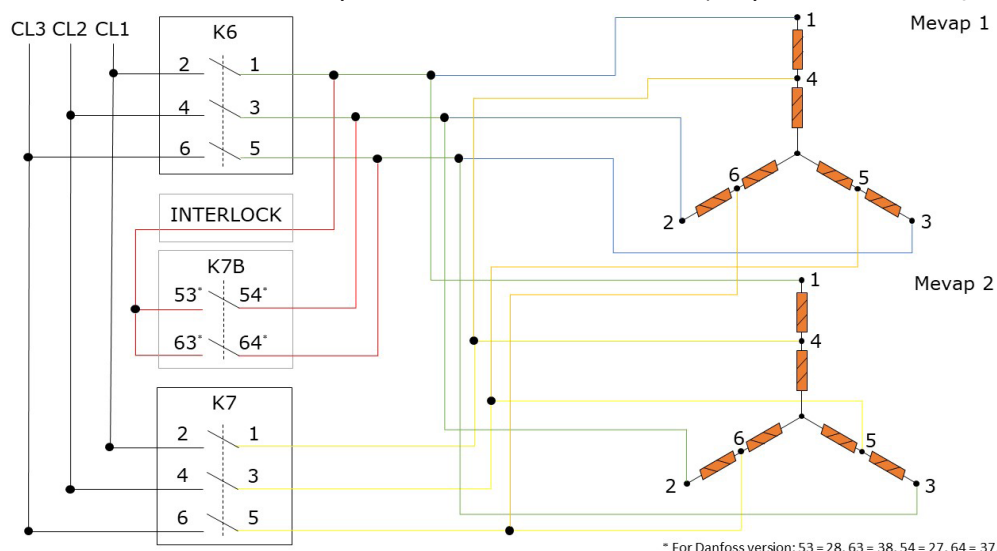
8. Using a 500 V megger, measure all wires 1-8 till ground to verify if any are shorted to ground. If any short is found, replace the motor/s. 9. Plug in the motor cables and remount the inspection covers. 10. Open the controller cabinet and tighten all screws on the K6 and K7 contactors as well as the auxiliary contactor with a torque screwdriver to 1.5 Nm. 11. Measure the contactor coil resistance between A1 and A2 of contactors K6 and K7. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type $\pm 8-10 \Omega$ / Schneider grey type $\pm 6-8 \Omega$ / Danfoss $\pm 5-6 \Omega$ / ABB $\pm 11-13 \Omega$. If they are outside the range, replace the contactor. 12. Connect power to the unit and turn it on. Check if the alarm is still active. 13. If the alarm is still active, go to the Service menu  and select line S01 Manual operation. Change the value of line M01 Operating mode from AUTO to MAN. Then go down to line M03 Evaporator fan and change the value to LO (to check the K6 contactor) or HI (to check the K7 contactor). 14. If the contactor does not pull, measure the voltage of the contactor inlets A1 to A2. The value should be between 2.5 and 6.5 V DC. If yes, replace the contactor. 15. If the value is not correct, measure the voltage on the X17 connector terminal 5 and X18 terminal 1 to ground. The voltage should be between 2.5 and 6.5 V DC. If not, unplug the plugs and measure directly on the controller pins. If these values are ok, replace the plug/s. If these values are not ok, replace the controller. 16. If the contactor pulls when in Manual mode, measure the voltage of the contactor inlets 2, 4, and 6 to ground. The values will depend on the power supply, but they should all be the same. If not, check the power supply from the phase contactors K2 and K8. 17. Measure the voltage of the contactor outlets 1, 3, and 5 to ground. The values should be the same as the inlets. If not, replace the contactor.					
Criteria	Evaporator fan motors have exceeded current limit at low speed. 0.6 – 0.7 Amp on one or more phases.				
Controller action					
	Log	X	Alarm	X	Alarm light Off
Consequence	Test failed.				
Elimination	Alarm may then be deleted after test completed.				
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5
	Step ID	INom	I1	I2	I3

811	Mevap cur HI speed	Warning
Description	Evaporator motor high speed current fault.	
Cause	• Unexpected behaviour in old software version. • Controller plugs X17 or X18. • Motor cable and/or plug is damaged. • K6 and K7 contactors. • Evaporator motor/s defective.	
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller 2. Turn the unit off and disconnect the power. Unplug X17 and X18 from the controller. Tighten the plug terminal screws to 0.25 Nm. Plug in X17 and X18 again ensuring that they are not sitting loose. 3. Ensure that the unit is turned off and is disconnected from the mains power. Dismount the inspection covers. Check that the fan blades are correctly aligned and that they can rotate freely. If they cannot rotate, replace the motor/s. 4. Disconnect the motor cables from the plug on the top of the motors. Check that the pins in the motor plug are not damaged or pushed in. If any pins are damaged, replace the motor/s. If any pins are pushed in, remove the motor cover and reposition the pins. 5. Check that the cable plug is not damaged in any way. If it is, replace it with a cable adapter. Ensure to plug it back into the motor correctly. 6. Mount a motor plug adapter and using a multimeter, measure the resistance of the wires 1 to 2, 2 to 3, and 1 to 3 which are controlling the low speed. For these three measurements you are measuring through 4 windings each time. The values should be the same. If not, replace the motor/s. 7. Then measure the resistance of the wires 4 to 5, 5 to 6, and 4 to 6 which are controlling the high speed. For these three measurements you are measuring through 2 windings each time. Therefore, the values should be the same and half the value of the low speed measurements. If not, replace the motor/s.	

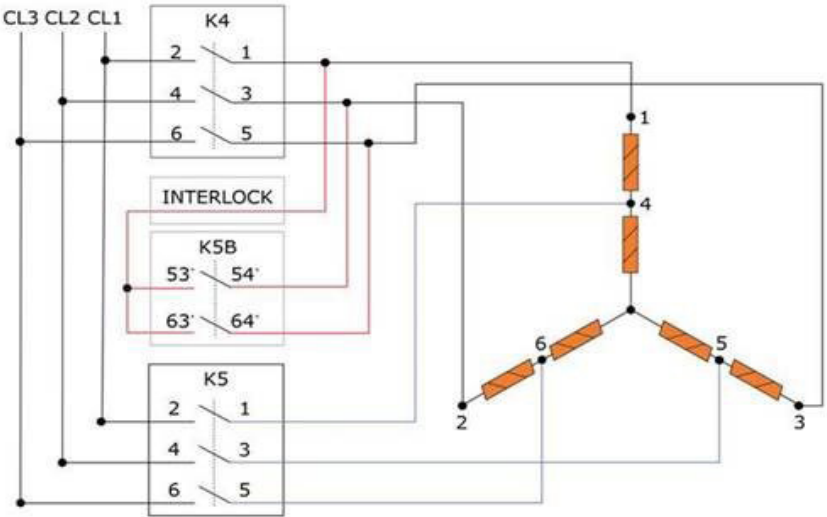


8. Using a 500 V megger, measure all wires 1-8 till ground to verify if any are shorted to ground. If any short is found, replace the motor/s. 9. Plug in the motor cables and remount the inspection covers. 10. Open the controller cabinet and tighten all screws on the K6 and K7 contactors as well as the auxiliary contactor with a torque screwdriver to 1.5 Nm. 11. Measure the contactor coil resistance between A1 and A2 of contactors K6 and K7. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type $\pm 8-10 \Omega$ / Schneider grey type $\pm 6-8 \Omega$ / Danfoss $\pm 5-6 \Omega$ / ABB $\pm 11-13 \Omega$. If they are outside the range, replace the contactor. 12. Connect power to the unit and turn it on. Check if the alarm is still active. 13. If the alarm is still active, go to the Service menu  and select line S01 Manual operation. Change the value of line M01 Operating mode from AUTO to MAN. Then go down to line M03 Evaporator fan and change the value to LO (to check the K6 contactor) or HI (to check the K7 contactor). 14. If the contactor does not pull, measure the voltage of the contactor inlets A1 to A2. The value should be between 2.5 and 6.5 V DC. If yes, replace the contactor. 15. If the value is not correct, measure the voltage on the X17 connector terminal 5 and X18 terminal 1 to ground. The voltage should be between 2.5 and 6.5 V DC. If not, unplug the plugs and measure directly on the controller pins. If these values are ok, replace the plug/s. If these values are not ok, replace the controller. 16. If the contactor pulls when in Manual mode, measure the voltage of the contactor inlets 2, 4, and 6 to ground. The values will depend on the power supply, but they should all be the same. If not, check the power supply from the phase contactors K2 and K8. 17. Measure the voltage of the contactor outlets 1, 3, and 5 to ground. The values should be the same as the inlets. If not, replace the contactor.						
Criteria	Evaporator fan motors have exceeded current limit at high speed. 50 Hz: 1.8 – 1.9 Amp. 60 Hz: 2.1 – 2.6 Amp.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	INom	I1	I2	I3	

812	Mevap current OFF	Warning
Description	Evaporator motor off current fault.	
Cause	• Unexpected behaviour in old software version. • Controller plugs X17 or X18. • Motor cable and/or plug is damaged. • K6 and K7 contactors. • Evaporator motor/s defective.	
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller 2. Turn the unit off and disconnect the power. Unplug X17 and X18 from the controller. Tighten the plug terminal screws to 0.25 Nm. Plug in X17 and X18 again ensuring that they are not sitting loose. 3. Ensure that the unit is turned off and is disconnected from the mains power. Dismount the inspection covers. Check that the fan blades are correctly aligned and that they can rotate freely. If they cannot rotate, replace the motor/s. 4. Disconnect the motor cables from the plug on the top of the motors. Check that the pins in the motor plug are not damaged or pushed in. If any pins are damaged, replace the motor/s. If any pins are pushed in, remove the motor cover and reposition the pins. 5. Check that the cable plug is not damaged in any way. If it is, replace it with a cable adapter. Ensure to plug it back into the motor correctly. 6. Mount a motor plug adapter and using a multimeter, measure the resistance of the wires 1 to 2, 2 to 3, and 1 to 3 which are controlling the low speed. For these three measurements you are measuring through 4 windings each time. The values should be the same. If not, replace the motor/s. 7. Then measure the resistance of the wires 4 to 5, 5 to 6, and 4 to 6 which are controlling the high speed. For these three measurements you are measuring through 2 windings each time. Therefore, the values should be the same and half the value of the low speed measurements. If not, replace the motor/s.	

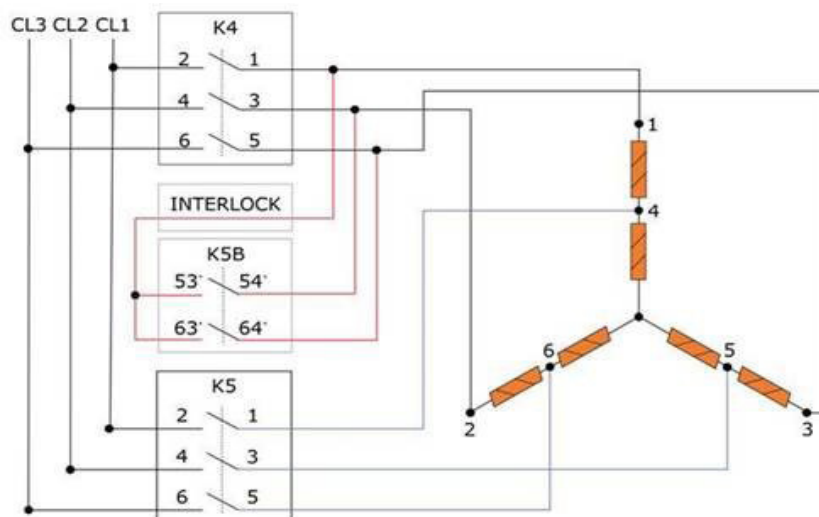


8. Using a 500 V megger, measure all wires 1-8 till ground to verify if any are shorted to ground. If any short is found, replace the motor/s. 9. Plug in the motor cables and remount the inspection covers. 10. Open the controller cabinet and tighten all screws on the K6 and K7 contactors as well as the auxiliary contactor with a torque screwdriver to 1.5 Nm. 11. Measure the contactor coil resistance between A1 and A2 of contactors K6 and K7. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type $\pm 8-10 \Omega$ / Schneider grey type $\pm 6-8 \Omega$ / Danfoss $\pm 5-6 \Omega$ / ABB $\pm 11-13 \Omega$. If they are outside the range, replace the contactor. 12. Connect power to the unit and turn it on. Check if the alarm is still active. 13. If the alarm is still active, go to the Service menu  and select line S01 Manual operation. Change the value of line M01 Operating mode from AUTO to MAN. Then go down to line M03 Evaporator fan and change the value to LO (to check the K6 contactor) or HI (to check the K7 contactor). 14. If the contactor does not pull, measure the voltage of the contactor inlets A1 to A2. The value should be between 2.5 and 6.5 V DC. If yes, replace the contactor. 15. If the value is not correct, measure the voltage on the X17 connector terminal 5 and X18 terminal 1 to ground. The voltage should be between 2.5 and 6.5 V DC. If not, unplug the plugs and measure directly on the controller pins. If these values are ok, replace the plug/s. If these values are not ok, replace the controller. 16. If the contactor pulls when in Manual mode, measure the voltage of the contactor inlets 2, 4, and 6 to ground. The values will depend on the power supply, but they should all be the same. If not, check the power supply from the phase contactors K2 and K8. 17. Measure the voltage of the contactor outlets 1, 3, and 5 to ground. The values should be the same as the inlets. If not, replace the contactor.					
Criteria	Evaporator fan motors have exceeded off current limit.				
Controller action					
	Log	X	Alarm	X	Alarm light Off
Consequence	Test failed.				
Elimination	Alarm may then be deleted after test completed.				
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5
	Step ID	INom	I1	I2	I3

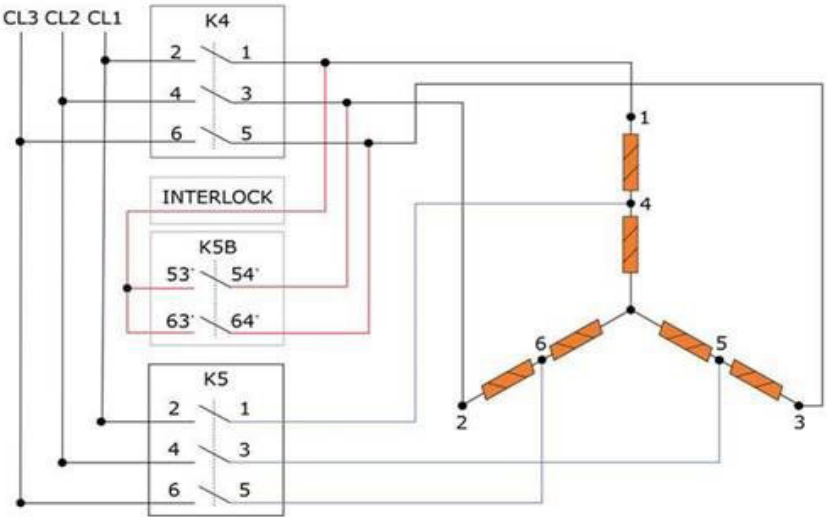
815	Mcond cur LO speed	Warning
Description	Condenser motor low speed current fault.	
Cause	• Unexpected behaviour in old software version. • Controller plug X17. • Motor cable and/or plug is damaged. • K4 and K5 contactors. • Condenser motor defective.	
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller 2. Turn the unit off and disconnect the power. Unplug X17 from the controller. Tighten the plug terminal screws to 0.25 Nm. Plug in X17 again ensuring it is not sitting loose. 3. Ensure that the unit is turned off and is disconnected from the mains power. Dismount the fan grille. Check that the fan blade is correctly aligned and that it can rotate freely. If it cannot rotate, replace the motor. 4. Disconnect the motor cable from the plug on the top of the motor. Using a mirror, phone camera or by dismounting the fan blade, check that the pins in the motor plug are not damaged or pushed in. If any pins are damaged, replace the motor. If any pins are pushed in, remove the motor cover and reposition the pins. 5. Check that the cable plug is not damaged in any way. If it is, replace it with a cable adapter. Ensure to plug it back into the motor correctly. 6. Mount a motor plug adapter and using a multimeter, measure the resistance of the wires 1 to 2, 2 to 3, and 1 to 3 which are controlling the low speed. For these three measurements you are measuring through 4 windings each time. The values should be the same. If not, replace the motor. 7. Then measure the resistance of the wires 4 to 5, 5 to 6, and 4 to 6 which are controlling the high speed. For these three measurements you are measuring through 2 windings each time. Therefore, the values should be the same and half the value of the low speed measurements. If not, replace the motor. 	

	8. Using a 500 V megger, measure all wires 1-8 till ground to verify if any are shorted to ground. If any short is found, replace the motor.					
	9. Plug in the motor cable and remount the fan grille.					
	10. Open the controller cabinet and tighten all screws on the K4 and K5 contactors as well as the auxiliary contactor with a torque screwdriver to 1.5 Nm.					
	11. Measure the contactor coil resistance between A1 and A2 of contactors K4 and K5. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type $\pm 8-10 \Omega$ / Schneider grey type $\pm 6-8 \Omega$ / Danfoss $\pm 5-6 \Omega$ / ABB $\pm 11-13 \Omega$. If they are outside the range, replace the contactor.					
	12. Connect power to the unit and turn it on. Check if the alarm is still active.					
	13. If the alarm is still active, go to the Service menu  and select line S01 Manual operation. Change the value of line M01 Operating mode from AUTO to MAN. Then go down to line M04 Condenser fan and change the value to LO (to check the K4 contactor) or HI (to check the K5 contactor).					
	14. If the contactor does not pull, measure the voltage of the contactor inlets A1 to A2. The value should be between 2.5 and 6.5 V DC. If yes, replace the contactor.					
	15. If the value is not correct, measure the voltage on the X17 connector terminal 1 and 3 to ground. The voltage should be between 2.5 and 6.5 V DC. If not, unplug X17 and measure directly on the controller pins. If these values are ok, replace the plug. If these values are not ok, replace the controller.					
	16. If the contactor pulls when in Manual mode, measure the voltage of the contactor inlets 2, 4, and 6 to ground. The values will depend on the power supply, but they should all be the same. If not, check the power supply from the phase contactors K2 and K8.					
	17. Measure the voltage of the contactor outlets 1, 3, and 5 to ground. The values should be the same as the inlets. If not, replace the contactor.					
Criteria	Condenser fan motor has exceeded current limit at low speed. 0.2 – 0.3 Amp.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	INom	I1	I2	I3	

816	Mcond cur HI speed	Warning
Description	Condenser motor high speed current fault.	
Cause	• Unexpected behaviour in old software version. • Controller plug X17. • Motor cable and/or plug is damaged. • K4 and K5 contactors. • Condenser motor defective.	
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller 2. Turn the unit off and disconnect the power. Unplug X17 from the controller. Tighten the plug terminal screws to 0.25 Nm. Plug in X17 again ensuring it is not sitting loose. 3. Ensure that the unit is turned off and is disconnected from the mains power. Dismount the fan grille. Check that the fan blade is correctly aligned and that it can rotate freely. If it cannot rotate, replace the motor. 4. Disconnect the motor cable from the plug on the top of the motor. Using a mirror, phone camera or by dismounting the fan blade, check that the pins in the motor plug are not damaged or pushed in. If any pins are damaged, replace the motor. If any pins are pushed in, remove the motor cover and reposition the pins. 5. Check that the cable plug is not damaged in any way. If it is, replace it with a cable adapter. Ensure to plug it back into the motor correctly. 6. Mount a motor plug adapter and using a multimeter, measure the resistance of the wires 1 to 2, 2 to 3, and 1 to 3 which are controlling the low speed. For these three measurements you are measuring through 4 windings each time. The values should be the same. If not, replace the motor. 7. Then measure the resistance of the wires 4 to 5, 5 to 6, and 4 to 6 which are controlling the high speed. For these three measurements you are measuring through 2 windings each time. Therefore, the values should be the same and half the value of the low speed measurements. If not, replace the motor.	



8. Using a 500 V megger, measure all wires 1-8 till ground to verify if any are shorted to ground. If any short is found, replace the motor. 9. Plug in the motor cable and remount the fan grille. 10. Open the controller cabinet and tighten all screws on the K4 and K5 contactors as well as the auxiliary contactor with a torque screwdriver to 1.5 Nm. 11. Measure the contactor coil resistance between A1 and A2 of contactors K4 and K5. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type $\pm 8-10 \Omega$ / Schneider grey type $\pm 6-8 \Omega$ / Danfoss $\pm 5-6 \Omega$ / ABB $\pm 11-13 \Omega$. If they are outside the range, replace the contactor. 12. Connect power to the unit and turn it on. Check if the alarm is still active. 13. If the alarm is still active, go to the Service menu  and select line S01 Manual operation. Change the value of line M01 Operating mode from AUTO to MAN. Then go down to line M04 Condenser fan and change the value to LO (to check the K4 contactor) or HI (to check the K5 contactor). 14. If the contactor does not pull, measure the voltage of the contactor inlets A1 to A2. The value should be between 2.5 and 6.5 V DC. If yes, replace the contactor. 15. If the value is not correct, measure the voltage on the X17 connector terminal 1 and 3 to ground. The voltage should be between 2.5 and 6.5 V DC. If not, unplug X17 and measure directly on the controller pins. If these values are ok, replace the plug. If these values are not ok, replace the controller. 16. If the contactor pulls when in Manual mode, measure the voltage of the contactor inlets 2, 4, and 6 to ground. The values will depend on the power supply, but they should all be the same. If not, check the power supply from the phase contactors K2 and K8. 17. Measure the voltage of the contactor outlets 1, 3, and 5 to ground. The values should be the same as the inlets. If not, replace the contactor.					
Criteria	Condenser fan motor has exceeded current limit at high speed. 50 Hz: 0.7 – 0.8 Amp. 60 Hz: 1.0 – 1.8 Amp.				
Controller action					
	Log	X	Alarm	X	Alarm light Off
Consequence	Test failed.				
Elimination	Alarm may then be deleted after test completed.				
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5
	Step ID	INom	I1	I2	I3

817	Mcond current OFF	Warning
Description	Condenser motor off current fault.	
Cause	• Unexpected behaviour in old software version. • Controller plug X17. • Motor cable and/or plug is damaged. • K4 and K5 contactors. • Condenser motor defective.	
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller 2. Turn the unit off and disconnect the power. Unplug X17 from the controller. Tighten the plug terminal screws to 0.25 Nm. Plug in X17 again ensuring it is not sitting loose. 3. Ensure that the unit is turned off and is disconnected from the mains power. Dismount the fan grille. Check that the fan blade is correctly aligned and that it can rotate freely. If it cannot rotate, replace the motor. 4. Disconnect the motor cable from the plug on the top of the motor. Using a mirror, phone camera or by dismounting the fan blade, check that the pins in the motor plug are not damaged or pushed in. If any pins are damaged, replace the motor. If any pins are pushed in, remove the motor cover and reposition the pins. 5. Check that the cable plug is not damaged in any way. If it is, replace it with a cable adapter. Ensure to plug it back into the motor correctly. 6. Mount a motor plug adapter and using a multimeter, measure the resistance of the wires 1 to 2, 2 to 3, and 1 to 3 which are controlling the low speed. For these three measurements you are measuring through 4 windings each time. The values should be the same. If not, replace the motor. 7. Then measure the resistance of the wires 4 to 5, 5 to 6, and 4 to 6 which are controlling the high speed. For these three measurements you are measuring through 2 windings each time. Therefore, the values should be the same and half the value of the low speed measurements. If not, replace the motor. 	

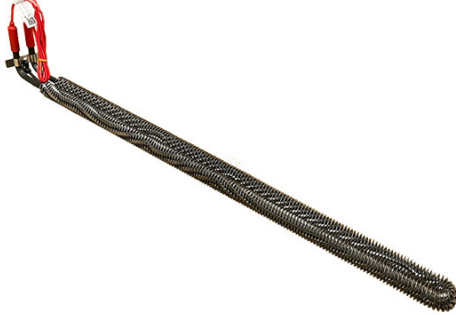
8. Using a 500 V megger, measure all wires 1-8 till ground to verify if any are shorted to ground. If any short is found, replace the motor. 9. Plug in the motor cable and remount the fan grille. 10. Open the controller cabinet and tighten all screws on the K4 and K5 contactors as well as the auxiliary contactor with a torque screwdriver to 1.5 Nm. 11. Measure the contactor coil resistance between A1 and A2 of contactors K4 and K5. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type $\pm 8-10 \Omega$ / Schneider grey type $\pm 6-8 \Omega$ / Danfoss $\pm 5-6 \Omega$ / ABB $\pm 11-13 \Omega$. If they are outside the range, replace the contactor. 12. Connect power to the unit and turn it on. Check if the alarm is still active. 13. If the alarm is still active, go to the Service menu  and select line S01 Manual operation. Change the value of line M01 Operating mode from AUTO to MAN. Then go down to line M04 Condenser fan and change the value to LO (to check the K4 contactor) or HI (to check the K5 contactor). 14. If the contactor does not pull, measure the voltage of the contactor inlets A1 to A2. The value should be between 2.5 and 6.5 V DC. If yes, replace the contactor. 15. If the value is not correct, measure the voltage on the X17 connector terminal 1 and 3 to ground. The voltage should be between 2.5 and 6.5 V DC. If not, unplug X17 and measure directly on the controller pins. If these values are ok, replace the plug. If these values are not ok, replace the controller. 16. If the contactor pulls when in Manual mode, measure the voltage of the contactor inlets 2, 4, and 6 to ground. The values will depend on the power supply, but they should all be the same. If not, check the power supply from the phase contactors K2 and K8. 17. Measure the voltage of the contactor outlets 1, 3, and 5 to ground. The values should be the same as the inlets. If not, replace the contactor.					
Criteria	Condenser fan motor has exceeded off current limit.				
Controller action					
	Log	X	Alarm	X	Alarm light Off
Consequence	Test failed.				
Elimination	Alarm may then be deleted after test completed.				
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5
	Step ID	INom	I1	I2	I3

819	Contactor error					Warning
Description	Contactor(s) acting suspicious.					
Cause	• One or more contactors needs inspection. • Controller output electronic defect. • Contactor close circuit. • Contactor open circuit. • Contactor coil. • Controller output voltages.					
Trouble shooting	1. Measure output voltages (X16, X17, X18) with a multimeter – OK range 2.5V to 6.5V. In case a contactor coil is short circuited (hence the current draw will be too high), the controller's voltage output will shut off and the measured output voltage will be 0 Vdc. 2. Repeat point 1 with related contactor disconnected to check output. 3. If voltage is out of OK range, measure the resistance of the component connected to the "defective" controller output – OK range for contactor coil: approx. 5-6 Ω (Danfoss), 8-10 Ω (Schneider), 11-13 Ω (ABB). 4. See service bulletin "00053 Controller output voltages" for further information.					
Criteria	Only active during ITI.					
Controller action	Fan speed forced to low or high speed. If neither possible, alarm 661 becomes active.					
	Log	X	Alarm		Alarm light	Off
Consequence	ITI failed and checkmark is cleared.					
Elimination	Power cycle the unit to clear the warning.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Idle current	K3 on current	K6 on current	K7 on current	

820	Hevap current ON					Warning
Description	Evaporator heater on current fault.					
Cause	• Unexpected behaviour in old software version. • Check contactor. • Heaters defective. • Heater power cable defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check voltage in/out of heater contactor, for all 3 phases. 3. Check the power cable for the heaters for defects. Replace cables if they are defective. 4. The heater(s) are defective. Dismount the power for the heaters one by one to find the defective heater, see wiring schematics inside in the controller cabinet. Replace the defective heater.					
Criteria	Evaporator heater has exceeded on current limit.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Ilimit	I1	I2	I3	

821	Hevap current OFF					Warning
Description	Evaporator heater off current fault.					
Cause	• Unexpected behaviour in old software version. • Defective heater contactor. • Defective contactor driver circuit.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check the heater contactor for defects. Replace the contactor. 3. Check that the heater power cable are mounted correctly.					
Criteria	Evaporator heater has exceeded off current limit.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Ilimit	I1	I2	I3	

822	Hevap current error					Warning
Description	Hevap current failure.					
Cause	Current outside limits in ITI test.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Check voltage in/out of heater contactor, for all 3 phases. - Check the power cable for the heaters for defects. Replace cables if they are defective. - The heater(s) are defective. Dismount the power for the heaters one by one to find the defective heater, see wiring schematics inside in the controller cabinet. Replace the defective heater.					
Criteria	Evaporator heater has exceeded on/off current limit.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Ilimit	I1	I2	I3	

823	Hevap current drop					Warning
Description	The controller configuration for refrigerant design base does not match the current heater type detected.					
Cause	- Wrong controller configuration. - Wrong defrost heater elements mounted.					
Trouble shooting	- Check the controller configuration of the refrigerant design base. Go to the Service menu , line S05 Configuration. Check the value of line F17 Refrigerant design base. - Verify that the correct defrost heater elements are installed. R134a (Star Cool 1.0)  R1234yf (Star Cool 1.1) 					
Criteria	The measured current consumption drop over time does not match the configured refrigerant design base.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Avg current after 15 seconds	Avg current after 60 seconds			

824	K2/K8 contactor error					Warning
Description	K2 or K8 contactors may be faulty.					
Cause	- Controller plugs X16 or X18. - K2 contactor. - K8 contactor.					
Trouble shooting	- Check the controller X16 and X18 plugs are mounted correctly and are not damaged. Tighten the terminal screws to 0.25 Nm. - Connect AC power to the unit and turn it on. - Go to the Service menu , line S05 Configuration. Go down to line F05 Phase detection and change the value to CW or CCW. - Measure the voltage on X16 terminal 3 for CW or X18 terminal 3 for CCW. The value should be in the range 2.5 - 6.5 V DC. - If not, unplug the plugs and measure directly on the controller pins. If these values are within range, replace the plug/s. - If these values are exactly 0 V DC, replace the contactor as it has a short circuit. - If the value is not 0 V DC as is not within range, replace the controller. - Turn the unit off and disconnect the power. - Measure the contactor coil resistance between A1 and A2 of contactors K2 and K8. Depending on the brand of contactor and the ambient temperature, the resistance should be: Schneider green type $\pm 8\text{-}10\ \Omega$ / Schneider grey type $\pm 6\text{-}8\ \Omega$ / Danfoss $\pm 5\text{-}6\ \Omega$ / ABB $\pm 11\text{-}13\ \Omega$. If they are outside the range, replace the contactor. - Check the interlock. Push in K2 contactor and while pushed, try to push K8 contactor. If possible to push in K8 contactor, the interlock is damaged (or missing) and should be replaced. Push in K8 contactor and while pushed, try to push K2 contactor. If possible to push in K2 contactor, the interlock is damaged (or missing) and should be replaced.					
Criteria	Only active during ITI. Measured idle current and/or on current not in range.					
Controller action	Datalog	X	Alarm list	X	Alarm light	Off
Consequence	ITI failed and checkmark is cleared.					
Elimination	Power cycle the unit to clear the warning.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Idle current	K2 on current	K8 on current	Failure: 0 = Passed 1 = K2 or K8 stuck drawn 2 = K2 stuck released 3 = K8 stuck released 4 = K2 and K8 stuck released 5 = Unknown	

826	Hpump current ON					Warning
Description	Heat vacuum pump too high or too low.					
Cause	• Unexpected behaviour in old software version. • Defective cables. • Defective heating element. • Defective controller module. • Defective power meas.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check the connections according to the wiring schematic. 3. Defective heating element, see AL 653. 4. Check supply [Amp] reading and compare with display reading. If reading approx. 10 times normal value, replace the controller module.					
Criteria	Current < Imin = 0,5*(U/973,2) or current > Imax = 1,5*(U/973,2).					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Cannot pass PTI.					
Elimination	Alarm may be deleted after the test is complete.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Ilimit	I1	I2	I3	

827	Hpump current OFF					Warning
Description	Measured current is too high when heater is turned off.					
Cause	• Unexpected behaviour in old software version. • Mheat controller defective. • Defective controller module. • Defective contactor.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If no accompanied alarms, check contactor K10.					
Criteria	0.5 Amp if off.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Cannot pass PTI.					
Elimination	Alarm may be deleted after the test is complete.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Ilimit	I1	I2	I3	

830	Mpump current error					Warning
Description	Mpump current failure.					
Cause	- Current outside limits in ITI test. - K9 contactor defective.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Check the oil level. It shall be at least minimum level. - If no accompanied alarms, check contactor K9. If K9 is defective, replace. - Run the pump manually and observe current. If the current is outside the range 0.9 - 1.3 A, replace the vacuum pump.					
Criteria	Vacuum pump current is outside its limit 0.9 - 1.3 Amp.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Avg Off Current	Avg On Current			

831	Pmem sensor					Warning
Description	Pmem above or below 1000 mBar (± 60 mBar) after Mpump off for 300 sec.					
Cause	- Unexpected behaviour in old software version. - Measure or hardware error. - Pmem defective.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - See trouble shooting for accompanied alarms AL 211 and AL 212.					
Criteria	Reading out of range. 950 mBar < normal < 1060 mBar.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Cannot pass PTI.					
Elimination	Alarm may be deleted after the test is complete.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Airex motor	Pmem	CO ₂	O ₂	

832	CO ₂ sensor					Warning
Description	No reading or value above 1%.					
Cause	• Unexpected behaviour in old software version. • Defective cable or sensor. • Communication to CO2 sensor lost. • CO2 sensor is missing. • CO2 sensor is defective. • COMRH cable and or RH-cable are defective. • Main controller defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If one or more alarms are active, check wires, plugs, and connectors. 3. Check voltage supply 12V DC and communication - small AC voltage between 3 and 4 on X10. 4. If only AL 740 active, then check the CO2 sensor. Possibly test with another CO2 sensor. 5. If AL 740 is still active, replace the controller module.					
Criteria	Reading out of range (normal range 0-1% CO ₂).					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Cannot pass PTI.					
Elimination	Alarm may be deleted after the test is complete.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Airex motor	Pmem	CO ₂	O ₂	

833	O ₂ sensor					Warning
Description	No reading or value is out of range.					
Cause	• Unexpected behaviour in old software version. • Communication to the O2 sensor lost. • Defective O2 sensor. • COMRH cable, RH-cable, and/or COMCA cable is defective. • Controller module defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If one or more alarms are active, check wires, plugs and connectors. 3. Check voltage according to wire diagram. 4. If only AL 760 is active, then check connection to the O2 sensor and correct if faulty. If not, replace the CA module.					
Criteria	Reading out of range (normal 19-22 % O ₂).					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Cannot pass PTI.					
Elimination	Alarm may be deleted after the test is complete.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Airex motor	Pmem	CO ₂	O ₂	

836	Pmem vacuum					Warning
Description	Unable to create a vacuum.					
Cause	• Unexpected behaviour in old software version. • Leakage or low performance vacuum pump. • Lack of oil in the vacuum pump. • Pump not running. • Leakage involving membrane, hose and/or connections. • Low performance from the vacuum pump.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if the pump is running. If not, see accompanied alarms for trouble shooting first. 3. The vacuum pump is not running. a. Check if the bi-metallic switch is connected according to the wire schematic X78 (depending on model). b. Activate the pump in Manual mode, to see if the contactor energizes. If not, check the controller output. If it does, check the contactor coil. If similar value as the other, replace the vacuum pump. 4. The vacuum pump is running. a. Perform "Vacuum system test".					
Criteria	Unable to reach 20 mBar < Pmem < 79 mBar.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Cannot pass PTI.					
Elimination	Alarm may be deleted after test complete.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Tpump	Pmem	CO ₂	O ₂	

837	Pmem ambient					Warning
Description	Not measuring Pmem pressure 1000 mBar (± 60 mBar).					
Cause	• Unexpected behaviour in old software version. • Actual pressure measurement out of range. • Pmem defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. See trouble shooting for accompanied alarms.					
Criteria	Unable to reach Pmem. $950 \text{ mBar} < \text{Pmem} < 1060 \text{ mBar}$.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Cannot pass PTI.					
Elimination	Alarm may be deleted after the test is complete.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Tpump	Pmem	CO ₂	O ₂	

838	Mpump ON current					Warning
Description	Current failure.					
Cause	• Unexpected behaviour in old software version. • Uses more or less current than specified. • Bad power connection or supply (1 phase missing). • Jammed contactor or damaged vacuum pump. • Low performance from the vacuum pump due to lack of oil.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check the oil level. It shall be at least minimum level. 3. Run the pump manually and observe current. If the current is outside the range 0.9 - 1.3 A, replace the vacuum pump.					
Criteria	Vacuum pump current is outside its limit 0.9 - 1.3 Amp.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Cannot pass PTI.					
Elimination	Alarm may be deleted after the test is complete.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Ilimit	I1	I2	I3	

839	Mpump OFF current					Warning
Description	Current in off position is too high.					
Cause	• Unexpected behaviour in old software version. • Mpump contactor K9 defective. • Defective controller module.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If no accompanied alarms, check contactor K9. If K9 is defective, replace.					
Criteria	Less than 0.5 Amp.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Cannot pass PTI.					
Elimination	Alarm may be deleted after the test is complete.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Ilimit	I1	I2	I3	

840	Valve leaks					Warning
Description	Valve leak fault.					
Cause	• Unexpected behaviour in old software version. • One or more valves have leaks (defective).					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check and clear other valve alarms, AL 84X. 3. Follow the valve check instructions to identify which valve is defective. https://media.mcicontainers.com/instructions/english/valve-check					
Criteria	Temperature indicates cooling.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	T0	T0 Diff	Pdis	Pdis Diff	
Info	See “Function test”.					

841	K1 contactor welded					Warning
Description	Contactor damaged (always drawn) making FC always powered.					
Cause	• Contactor contacts welded.					
Trouble shooting	1. Measure the resistance of the K1 contactor resistance. If defect replace contactor.					
Criteria	Turning K1 off is not removing power from FC.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	FC Type	FC online	Mcpr	FC on/off seconds	

842	Expansion valve					Warning												
Description	Expansion valve fault.																	
Cause	• Unexpected behaviour in old software version. • Wrong controller configuration. • Incorrect wiring. • Solenoid coil, connector plug or cable damaged or improperly spliced. • Controller X19 plug. • Expansion valve is defective. • Deformation or damage to the valve plate.																	
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check the configuration of the pressure transmitters, refrigerant, valves, and compressor. Go to the Service menu line SO5 Configuration. Check the values of lines F10, F11, F12, F13 and F14 are according to the physically used part. 3. Inspect the solenoid coil cable for damages and poor splices. If there is a poorly done splice, cut out the damaged part and splice the cable properly or replace the complete cable. 4. If there is more than one valve alarm active, turn the unit off and check that the wiring from the controller X19 plug to each valve is according to the wiring diagram and that the correct solenoid coil is mounted on the correct valve. 5. Check the controller X19 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 6. Disconnect the controller X19 plug and measure the resistance on the plug terminal screws 3 and 4. The value should be above 4.5 Ω. 7. If not, disconnect the wires from the X19 plug terminals 3 and 4. Measure the resistance directly on the 2 wires. If the resistance is above 4.5 Ω, replace the X19 plug. 8. If the resistance is below 4.5 Ω, dismount the connector plug from the solenoid coil and check for moisture and corrosion. Replace the connector plug and cable (818761A) if necessary. 9. Measure the resistance directly on the solenoid coil. If the resistance is above 4.5 Ω, replace the connector plug and cable (818761A). If the resistance is below 4.5 Ω, replace the solenoid coil. 10. If the valve is not opening and closing, manually open the expansion valve by going to the Service menu, line S01 Manual operation and change the value of line M01 from Auto to Manual. Go down to line M06 Expansion valve and change the value to 10 %. 11. Measure the voltage on the controller X19 pins 3 and 4. The value should be between 2.5 and 6.5 V DC. If not, disconnect the X19 plug and power cycle the unit. 12. Manually open the expansion valve by going to the Service menu, line S01 Manual operation and change the value of line M01 from Auto to Manual. Go down to line M06 Expansion valve and change the value to 10 %. 13. Measure again directly on the controller X19 terminal pins. If between 2.5 and 6.5 V DC, replace the X19 plug. If not, replace the controller. 14. Follow the valve check instructions to identify which valve is defective. https://media.mcicontainers.com/instructions/english/valve-check																	
Criteria	Pdis more than 5 BarE: Max change on Pdis: ± 0.75 Bar Pdis is less than 5 BarE: Max change on Pdis: ± 0.30 Bar Tret more than or equal to -15°C : Min change on T0: $+20^{\circ}\text{K}$ Tret is less than -15°C : Min change on T0: $+10^{\circ}\text{K}$																	
Controller action	<table><tr><td>Log</td><td>X</td><td>Alarm</td><td>X</td><td>Alarm light</td><td>Off</td></tr></table>						Log	X	Alarm	X	Alarm light	Off						
Log	X	Alarm	X	Alarm light	Off													
Consequence	Test failed.																	
Elimination	Alarm may then be deleted after test completed.																	
Log data	<table><tr><td>Parm 1</td><td>Parm 2</td><td>Parm 3</td><td>Parm 4</td><td colspan="2">Parm 5</td></tr><tr><td>Step ID</td><td>T0</td><td>T0 diff.</td><td>Pdis</td><td colspan="2">Pdis diff</td></tr></table>						Parm 1	Parm 2	Parm 3	Parm 4	Parm 5		Step ID	T0	T0 diff.	Pdis	Pdis diff	
Parm 1	Parm 2	Parm 3	Parm 4	Parm 5														
Step ID	T0	T0 diff.	Pdis	Pdis diff														

844	Hot gas valve					Warning	
Description	Hot gas valve fault.						
Cause	• Unexpected behaviour in old software version. • Wrong controller configuration. • Incorrect wiring. • Solenoid coil, connector plug or cable damaged or improperly spliced. • Controller X19 plug. • Hot gas valve is defective. • Deformation or damage to the valve plate.						
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check the configuration of the pressure transmitters, refrigerant, valves, and compressor. Go to the Service menu line SO5 Configuration. Check the values of lines F10, F11, F12, F13 and F14 are according to the physically used part. 3. Inspect the solenoid coil cable for damages and poor splices. If there is a poorly done splice, cut out the damaged part and splice the cable properly or replace the complete cable. 4. If there is more than one valve alarm active, turn the unit off and check that the wiring from the controller X19 plug to each valve is according to the wiring diagram and that the correct solenoid coil is mounted on the correct valve. 5. Check the controller X19 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 6. Disconnect the controller X19 plug and measure the resistance on the plug terminal screws 5 and 6. The value should be above 4.5 Ω. 7. If not, disconnect the wires from the X19 plug terminals 5 and 6. Measure the resistance directly on the 2 wires. If the resistance is above 4.5 Ω, replace the X19 plug. 8. If the resistance is below 4.5 Ω, dismount the connector plug from the solenoid coil and check for moisture and corrosion. Replace the connector plug and cable (818761A) if necessary. 9. Measure the resistance directly on the solenoid coil. If the resistance is above 4.5 Ω, replace the connector plug and cable (818761A). If the resistance is below 4.5 Ω, replace the solenoid coil. 10. If the valve is not opening and closing, manually open the hot gas valve by going to the Service menu, line S01 Manual operation and change the value of line M01 from Auto to Manual. Go down to line M07 Hot gas valve and change the value to 10 %. 11. Measure the voltage on the controller X19 pins 5 and 6. The value should be between 2.5 and 6.5 V DC. If not, disconnect the X19 plug and power cycle the unit. 12. Manually open the hot gas valve by going to the Service menu, line S01 Manual operation and change the value of line M01 from Auto to Manual. Go down to line M07 Hot gas valve and change the value to 10 %. 13. Measure again directly on the controller X19 terminal pins. If between 2.5 and 6.5 V DC, replace the X19 plug. If not, replace the controller. 14. Follow the valve check instructions to identify which valve is defective. https://media.mcicontainers.com/instructions/english/valve-check						
Criteria	Pdis more than 5 BarE: Max change on Pdis: ± 0.75 Bar Pdis is less than 5 BarE: Max change on Pdis: ± 0.30 Bar Tret is more than or equal to -15°C : Min. change on T0: $+20^{\circ}\text{K}$ Tret is less than -15°C : Min. change on T0: $+10^{\circ}\text{K}$						
Controller action							
	Log	X	Alarm	X	Alarm light	Off	
Consequence	Test failed.						
Elimination	Alarm may then be deleted after test completed.						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5		
	Step ID	T0	T0 diff.	Pdis	Pdis diff.		

846	FC check					Warning
Description	Internal fault in FC.					
Cause	- Unexpected behaviour in old software version. - Internal failure in the FC.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Check and clear other alarms first. - Check that FC cover is mounted correctly with all screws. - Check motor cable (Connection cable between FC and compressor). - The FC needs repair and should be replaced.					
Criteria	FC temperature not increased by 15°C within 5 min. during step 8 of Function test.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Tfc	Tfc diff	Umotor	Ifc	

847	High press switch	Warning
Description	High pressure switch fault.	
Cause	- Discharge pressure is too high and the high pressure switch off. - High pressure due to: - Ambient temperature is over spec. limit +50°C (+122°F). - Condenser blocked. - Condenser fan motor is not running or wrong direction. - Manual valve after compressor closed. - HP pipe damaged. - High pressure switch or cable is defective. - X15 cable is defective. - K1 contactor defective. - Wrong pressure transmitter configuration in relation to transmitter type. - Pressure transmitter defective.	
Trouble shooting	- The unit uses cooling refrigerant R134a or R513A and it is very difficult to operate at temperatures above specification. - If the condenser coil is blocked, clean the condenser coil to secure any residues is removed. It is critical that the condenser is free from fouling and/or dust and there is no limitation for air to go to and from the condenser. If no failures are found and extra cooling is needed, water can be sprayed on the condenser inlet bottom up or if the unit has water cooling installed, then use the water cooler for extra cooling down. - Check that the condenser fan is running in the right direction. See the arrows on the unit. - If not running, check that there are no alarms for the condenser fan motor, AL 402 and AL 426. Also that the fan can rotate freely. - If the pressure rises very quickly after start of the compressor, check that the valve after the compressor (discharge side) is not closed or only partially open. Make sure the valve is fully open. - Check that there are no damages to the pipes after the compressor. Repair if they are damaged and check the refrigerant level. - Disconnect the cable for the high pressure switch on the main controller according to the wiring schematics inside the control cabinet. - Measure the voltage between the two connectors for the high pressure switch on the connector PCB. If the voltage is below 0.5 V DC, measure resistance of compressor/FC contactor coil Schneider (grey type) coil resistance is 6-8 Ω, Schneider (green type) coil resistance is 8-10 Ω, ABB coil resistance is 11-13 Ω, Danfoss coil resistance is 5-6 Ω. - Check the cable (measure the resistance in the cable). If the cable is defective, replace cable and high pressure switch. - Check if pressure transmitter is according to Service menu, line S05 Configuration, line F11 and set value according to transmitter type AKS/NSK/DST. Check with gauge that pressure transmitter is giving the right value in display.	
Criteria	Pdis is between 20-24 bar.	
Controller action		
	Log	X Alarm X Alarm light Off
Consequence	Test failed.	
Elimination		
Log data	Parm 1	Parm 2 Parm 3 Parm 4 Parm 5
	Step ID	T0 Psuc Pdis Tamb

848	Temp sensors invalid						Warning	
Description	Temperature sensor(s) malfunctioning.							
Cause	• One or more temperature sensors not working.							
Trouble shooting	1. See corresponding temperature sensor alarm troubleshooting (AL1xx).							
Criteria								
Controller action								
	Log	X		Alarm	X		Alarm light	Off
Consequence	Test failed.							
Elimination								
Log data	Parm 1	Parm 2		Parm 3	Parm 4		Parm 5	
	Step ID	Invalid temperature sensors (bit field) Tret = 0x0001 Tsup1 = 0x0002 Tsup2 = 0x0004 Tevap = 0x0080 Tpump = 0x400						

849	Valve error					Warning										
Description	Check that compressor can operate valves failed.															
Cause	• Unexpected behaviour in old software version. • Wrong controller configuration. • Incorrect wiring. • Solenoid coil, connector plug or cable damaged or improperly spliced. • Controller X19 plug. • One or more valves are defective. • Deformation or damage to the valve plate.															
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check the configuration of the pressure transmitters, refrigerant, valves, and compressor. Go to the Service menu  line SO5 Configuration. Check the values of lines F10, F11, F12, F13 and F14 are according to the physically used part. 3. Inspect the solenoid coil cable for damages and poor splices. If there is a poorly done splice, cut out the damaged part and splice the cable properly or replace the complete cable. 4. If there is more than one valve alarm active, turn the unit off and check that the wiring from the controller X19 plug to each valve is according to the wiring diagram and that the correct solenoid coil is mounted on the correct valve. 5. Check the controller X19 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 6. Disconnect the controller X19 plug and measure the resistance on the plug terminal screws 3 and 4. The value should be above 4.5 Ω. 7. If not, disconnect the wires from the X19 plug terminals 3 and 4. Measure the resistance directly on the 2 wires. If the resistance is above 4.5 Ω, replace the X19 plug. 8. If the resistance is below 4.5 Ω, dismount the connector plug from the solenoid coil and check for moisture and corrosion. Replace the connector plug and cable (818761A) if necessary. 9. Measure the resistance directly on the solenoid coil. If the resistance is above 4.5 Ω, replace the connector plug and cable (818761A). If the resistance is below 4.5 Ω, replace the solenoid coil. 10. If any valves are not opening and closing, manually open them one at a time by going to the Service menu, line S01 Manual operation and change the value of line M01 from Auto to Manual. Go down to line M06 (Vexp), M07 (Vhg), M08 (Veco) and change the value to 10 %. 11. Measure the voltage on the controller X19 pins 1 and 2 (Veco), 3 and 4 (Vexp), 5 and 6 (Vhg). The value should be between 2.5 and 6.5 V DC. If not, disconnect the X19 plug and power cycle the unit. 12. Manually open them one at a time by going to the Service menu, line S01 Manual operation and change the value of line M01 from Auto to Manual. Go down to line M06 (Vexp), M07 (Vhg), M08 (Veco) and change the value to 10 %. 13. Measure again directly on the controller X19 terminal pins. If between 2.5 and 6.5 V DC, replace the X19 plug. If not, replace the controller. 14. Follow the valve check instructions to identify which valve is defective. https://media.mcicontainers.com/instructions/english/valve-check															
Criteria	Pdis more than 5 BarE: Max change on Pdis: ±0.75 Bar Pdis is less than 5 BarE: Max change on Pdis: ±0.30 Bar Tret is more than or equal to -15°C: Min. change on T0: +20°K Tret is less than -15°C: Min. change on T0: +10°K															
Controller action	<table><tr><td>Log</td><td>X</td><td>Alarm</td><td>X</td><td>Alarm light</td><td>Off</td></tr></table>						Log	X	Alarm	X	Alarm light	Off				
Log	X	Alarm	X	Alarm light	Off											
Consequence	Test failed.															
Elimination	Alarm may then be deleted after test completed.															
Log data	<table><tr><td>Parm 1</td><td>Parm 2</td><td>Parm 3</td><td>Parm 4</td><td>Parm 5</td></tr><tr><td>Step ID</td><td>Passed on reliability</td><td>Mass flow compressor</td><td>Mass flow expansion valve</td><td>T0 mean</td></tr></table>						Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	Step ID	Passed on reliability	Mass flow compressor	Mass flow expansion valve	T0 mean
Parm 1	Parm 2	Parm 3	Parm 4	Parm 5												
Step ID	Passed on reliability	Mass flow compressor	Mass flow expansion valve	T0 mean												

850	PTI test failed					Warning
Description	PTI test fault.					
Cause	- Unexpected behaviour in old software version. - There is one or more active alarms.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - There are other active AL 8XX alarms. Check and troubleshoot these alarms first before running a PTI again.					
Criteria	One or more of the individual PTI test steps have failed.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	PTI test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID			Seconds	Alarm count	

851	Alarm is active					Warning
Description	Active alarms turning ITI checkmark off.					
Cause	This warning is set, when ITI monitor has identified one or more active alarms. Warning is only logged when ITI result logging is requested.					
Trouble shooting	1. This warning is only reflecting other alarms, so look at these individual descriptions.					
Criteria	One or more active alarms.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	First active alarm code	Second active alarm code	Third...	Fourth...	

857	CA curtain					Warning
Description	No CA curtain is mounted.					
Cause	- In pop up page for test step 1300, user stated that no CA curtain is mounted. - In pop up page for test step 1300, no user feedback within 60 minutes.					
Trouble shooting	- Mount a CA curtain. - Be present at the container when test step 1300 begins. - Select Yes in the pop up page for test step 1300 within 60 minutes.					
Criteria	User has not verified that a CA curtain is mounted.					
Controller action	Unit continues to run the test.					
	Log	X	Alarm	X	Alarm light	Off
Consequence	PTI test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	User response time (seconds)				

858	Gateway					Warning
Description	Sekstant gateway installation error.					
Cause	• Container ID in the controller is configured incorrectly. • Sekstant gateway is not connected to the controller X9. • Sekstant gateway is not connected to power. • Battery not connected or defective. • Battery PMM broken.					
Trouble shooting	1. Go to the Service menu , line S05 Configuration. Verify that the container ID on line F01 is correct. 2. Verify that the battery is an original Star Cool rechargeable battery. 3. Turn the reefer unit off and disconnect the AC power cable. 4. Disconnect the battery from the gateway. 5. Disconnect the battery from the controller X3. 6. Disconnect the gateway from the controller X9. 7. Check that the gateway and battery are mounted securely to the AC power (on/off switch or orange wago connector). Take a photo. 8. Reconnect the gateway to the controller X9. Take a photo. 9. Reconnect the battery to the controller X3. Take a photo. 10. Ensuring the connectors are rotated correctly, connect the battery to the gateway. Take a photo. 11. Connect AC power and turn the reefer unit on. 12. If alarm 913 is active, complete troubleshooting from alarm 913. 13. After 30 minutes on AC power, note the gateway LED status. 14. Check if the gateway serial number is shown in the Modem menu. Take a photo. 15. If the LED is not solid green or no data is uploaded after 1 hour, contact sekstant-support@mcicontainers.com.					
Criteria	No communication with the Sekstant gateway for more than 3 minutes.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed. Complete reefer data will not be uploaded by the Sekstant gateway.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID					

859	Low refr. charge (PTI)					Warning
Description	Loss of charge (LoC) detected on non-yf unit during PTI.					
Cause	• Wrong controller configuration. • Service valves not fully open. • Pressure transmitters and/or solenoid coils wired or mounted incorrectly. • Connector plug(s) damaged. • Damage to the compressor valves or valve plates. • Blocked refrigerant flow in the system. • Not sufficient refrigerant in the system. • Blocked air flow due to cargo above loading line or packaging in the evaporator fan grille.					
Trouble shooting	1. Check the configuration of the pressure transmitters, refrigerant, valves, and compressor. Go to the Service menu line SO5 Configuration. Check the values of lines F10, F11, F12, F13 and F14 are according to the physically used part. 2. Check all the compressor service valves and the manual stop valve are in the back seated position. 3. If alarm 603 or 623 are active, check the troubleshooting for these first. 4. Check the controller X19 and X22 plugs are mounted correctly and are not damaged. Check the wiring is according to the diagram on the inside of the controller cabinet door. Tighten the plug terminal screws to 0.25 Nm. 5. Check that the pressure transmitters are free from corrosion and are mounted correctly. 6. Check that the solenoid coils are mounted on the correct valves by viewing the naming on the wires. 7. Unplug the black connector plugs from the coils and check for moisture and corrosion. Replace the connector plug if necessary (item no. 818760B). 8. Measure resistance directly on the solenoid coils. The values should be above 4.5 Ohm. If below, replace the solenoid coil. 9. Check for any possible refrigerant flow restriction. E.g. blocked (partly) filter dryer, recent pipe repairs or dents, etc. 10. Follow the valve check instructions to identify if any valves are defective. https://media.mcicontainers.com/instructions/english/valve-check 11. Check the refrigerant level by recovering the refrigerant. Perform a pressure test to check for leaks. Repair any leaks before vacuuming the system and charging 4.5 kg refrigerant. Instructions can be found here: https://media.mcicontainers.com/instructions/english/refrigerant-handling					
Criteria	System has lost more than 1.5 kg refrigerant charge.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed - Loss of cooling.					
Elimination	Power cycle.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID					

860	PTI Tset 0					Warning
Description	PTI 0°C set fault.					
Cause	• Unexpected behaviour in old software version. • Doors are open. • The heaters do not operate normally. • There may not be enough refrigerant in the unit. • The cooling capacity is too limited.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Verify that the doors are closed. 3. If start temperature was below 0°C, the heaters may be defective. Start the heaters in manual mode and see if the current consumption is higher than 5 A each phase. 4. The unit may need refrigerant. Check if the small red balls in the sight glass in the receiver (receiver tank) are not at the bottom when the unit is turned off. Search for leaks, repair and charge the unit.					
Criteria	Set-point 0°C was not reached within the 3 hour time limit.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Tset	Tact	Tevap	Tret	

865	Yf beacon					Warning
Description	Manual beacon test failed.					
Cause	- User did not confirm the horn could be heard and the light could be seen. - User did not confirm within 5 minutes.					
Trouble shooting	1. User must confirm on the main display that the horn can be heard and the light can be seen within 5 minutes.					
Criteria	User confirmation required on main display within 5 minutes.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	User response time (seconds)				

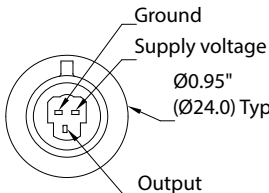
866	Mair					Warning						
Description	Automatic air exchange did not open/close.											
Cause	• Unexpected behaviour in old software version. • Damaged or blocked air exchange module. • Air exchange motor mounted incorrectly. • Air exchange motor cable or plug damaged or poorly spliced. • Air exchange potentiometer defective. • Air exchange motor defective. • Controller defective.											
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Turn the unit off and disconenct the AC power. 3. Check the air exchange module for damages and ensure nothing is obstructing the air exchange pistons from opening and closing. Remove any obstructions or repair/replace damaged parts. 4. Check that the air exchange motor is mounted correctly. 5. Inspect the motor cable and plug for damages and poor splices. If there is a poorly done splice, cut out the damaged part and splice the cable properly. 6. Check that the controller X20 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 7. Connect AC power to the unit and turn it on. 8. Go to the Service menu, line S01 Manual operation and change the value of line M01 Operating mode to Man. Go down to line M09 Air Ex auto and change the value to 100%. Check if the air exchange pistons now open fully. 9. Go to the Service menu, line S01 Manual operation and change the value of line M01 Operating mode to Man. Go down to line M09 Air Ex auto and change the value to 0%. Check if the air exchange pistons now close fully. 10.If the air exchange pistons opened and closed correctly, the alarm can now be cleared.											
Criteria	The air exchange did not open or close on a unit with a CIM 6.4 controller mounted and the unit is running with refrigerant R1234yf or the active application is either AV, AV+, AV+O2, CA, or CR.											
Controller action	<table><tr><td>Log</td><td>X</td><td>Alarm</td><td>X</td><td>Alarm light</td><td>Off</td></tr></table>						Log	X	Alarm	X	Alarm light	Off
Log	X	Alarm	X	Alarm light	Off							
Consequence	Test failed.											
Elimination	Alarm may then be deleted after test completed.											
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5							
	Step ID	Refrigerant type	Atmosphere config	Actual voltage	Voltage limit							

868	Ethylene injection					Warning
Description	Manual ethylene injection test failed.					
Cause	• User did not confirm mounting a spare canister for the test. • Ethylene gas release device did not open correctly during test. • Pressure sensor (Pinj) not measuring correctly. • Spare canister empty or defective. • User did not confirm mounting a new canister after the test.					
Trouble shooting	1. Ensure that the ethylene gas release device is connected correctly to the controller according to the wiring diagram inside the controller cabinet. 2. Ensure that the pressure transmitter (Pinj) is connected correctly to the controller according to the wiring diagram inside the controller cabinet. 3. Check that the spare canister is fully pressurized. The canister cannot bend inwards when squeezed by hand. If it is not full, the canister can be squeezed by hand. 4. Restart the test. User must confirm on the main display that a spare canister has been mounted within 90 minutes. 5. Listen to hear if the gas is released. 6. If you can hear the gas being released, but the test still fails, replace the pressure sensor (item no. 819503C). 7. If you cannot hear the gas being released and the spare canister is still full, replace the ethylene gas release device (item no. 889210A). 8. After the test is completed, the user must confirm on the main display that a new canister has been mounted within 90 minutes.					
Criteria						
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	User response time (seconds)				

870	PTI defrost					Warning
Description	PTI defrost fault.					
Cause	• Unexpected behaviour in old software version. • Defective Tevap temperature sensor. • Defective Psuc pressure transmitter. • Defective heaters. • Defective hot gas valve. • Evaporator was filled with too much ice.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Defrosting is terminated when Tevap rises above +15°C (+59°F). Check Tevap and Psuc sensors according to trouble shooting in alarms AL 123 and AL 207. 3. The heaters may be defective. Start the heaters in manual mode and see if the current consumption is higher than 5 A per phase else the heaters or the power cables for the heaters may be defective. 4. The hot gas valve is not working properly and the heaters may be defective. Check trouble shooting for the hot gas valve in alarm AL 844. 5. See if the evaporator is filled with ice (through the inspection holes). Be careful with the evaporators fans.					
Criteria	Defrost terminated on 45 min. time-out.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Tset	Tact	Tevap	Tret	

879	PTI check cont/valve				Warning
Description	Evaporator and/or economizer valve error.				
Cause	• Wrong controller configuration. • Incorrect wiring. • Solenoid coil, connector plug or cable damaged or improperly spliced. • Controller X19 plug. • Evaporator expansion valve and/or economizer expansion valve is defective.				
Trouble shooting	1. Check the configuration of the pressure transmitters, refrigerant, valves, and compressor. Go to the Service menu line SO5 Configuration. Check the values of lines F10, F11, F12, F13 and F14 are according to the physically used part. 2. Check Vexp and Veco with a permanent magnet. They should open with a firm clicking sound. If no clicking sound, replace the valve. 3. Inspect the solenoid coil cables for damages and poor splices. If there is a poorly done splice, cut out the damaged part and splice the cable properly or replace the complete cable. 4. If there is more than one valve alarm active, turn the unit off and check that the wiring from the controller X19 plug to each valve is according to the wiring diagram and that the correct solenoid coil is mounted on the correct valve. 5. Check the controller X19 plug is mounted correctly and is not damaged. Tighten the plug terminal screws to 0.25 Nm. 6. Disconnect the controller X19 plug and measure the resistance on the plug terminal screws 1 and 2 (Veco), then 3 and 4 (Vexp). The value should be above 4.5 Ω. 7. If not, disconnect the wires from the X19 plug terminals 1, 2, 3, and 4. Measure the resistance directly on the wires. If the resistance is above 4.5 Ω, replace the X19 plug. 8. If the resistance is below 4.5 Ω, dismount the connector plug from the solenoid coil and check for moisture and corrosion. Replace the connector plug and cable (818761A) if necessary. 9. Measure the resistance directly on the solenoid coil. If the resistance is above 4.5 Ω, replace the connector plug and cable (818761A). If the resistance is below 4.5 Ω, replace the solenoid coil. 10. Manually open the valve by going to the Service menu, line S01 Manual operation and change the value of line M01 from Auto to Manual. Go down to line M06 Expansion valve or M08 Economizer valve and change the value to 10 %. 11. Measure the voltage on the controller X19 terminals 1 and 2 (Veco) or 3 and 4 (Vexp). The value should be between 2.5 and 6.5 V DC. If not, disconnect the X19 plug and power cycle the unit. 12. Manually open the valve by going to the Service menu, line S01 Manual operation and change the value of line M01 from Auto to Manual. Go down to line M06 Expansion valve or M08 Economizer valve and change the value to 10 %. 13. Measure again directly on the controller X19 terminal pins. If between 2.5 and 6.5 V DC, replace the X19 plug. If not, replace the controller.				
Criteria	CIM 6.4 controller is mounted and it measures that one or both of the valves have a resistance lower than ~3.5 ohms.				
Controller action					
	Datalog	X	Alarm list	X	Alarm light Off
Consequence	PTI test failed.				
Elimination	Power cycle the unit to clear the warning or the warning can be cleared after the valve test has been passed.				
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5
	9 = Veco 10 = Vexp				

880	PTI Tset -18					Warning
Description	PTI -18°C set fault.					
Cause	• Unexpected behaviour in old software version. • Indication of insufficient performance. • Doors are open. • There may not be enough refrigerant in the unit. • The cooling capacity is too limited. • Hot gas valve leaking.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Verify that the doors are closed. 3. The unit may need refrigerant. Check if the small red balls in the sight glass in the receiver (receiver tank) are not at the bottom when the unit is turned off. Refill with refrigerant. 4. Hot gas valve is leaking. Feel both sides (before and after) the valve - there should be a temp. diff. in this case.					
Criteria	Setpoint -18°C was not reached within the 3 hour time limit.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Tset	Tact	Tevap	Tret	

884	Psuc invalid					Warning
Description	Compressor suction pressure transmitter invalid.					
Cause	• Unexpected behaviour in old software version. • Pressure transmitter is incorrectly configured in the controller. • Pressure transmitter wires are damaged or improperly spliced. • X22 plug is loose. • Pressure transmitter is not mounted correctly. • Pressure transmitter is defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Compare pressure in the display with service gauge. 3. Check that the controller is configured correctly. Go to the Service menu , line S05 Configuration, and select line F10 Low pressure type and change the value to match the installed pressure transmitter AKS, NSK or DST. 4. Inspect the pressure transmitter wires for damages and poor splices. Measure the continuity in the wires. If the wires are defective, replace wires/repair poor splices. 5. Check the X22 plug is mounted correctly into the controller and tighten the screws to 0.25Nm. 6. Check that the connector on the pressure transmitter is free from corrosion and is mounted correctly according to the drawing below.  7. Disconnect the signal wire on the controller plug X22 terminal 2. Measure voltage between the signal wire and GND. If voltage is below 0.3 V DC, replace the pressure transmitter.					
Criteria	Value below alarm limit -0.9 BarE (-13 Psi) or above 11.8 BarE (171 Psi). Value invalid for 30 sec. for alarm activation.					
Controller action	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Max deviation	Actual deviation	Failing sensor actual value	Average value of OK sensors	

885	Tsup1 invalid					Warning
Description	Supply air temperature sensor 1 invalid.					
Cause	- Unexpected behaviour in old software version. - Indication of defective supply air temperature sensor, its measuring circuitry or sensor not mounted correctly in unit. - Active alarms AL 103 or AL 104 (if CIM 5 software). - Temperature sensor reading is out of valid range: -50°C (-58°F) or above +100°C (+212°F). - Difference between Tsup1 and Tsup2 is larger than 1°C: 1°C difference for more than 30 min. up to 10°C difference in more than 3 min.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - If alarms AL 103 or AL 104 are active, check their trouble shooting first. - Check that both sensors, Tsup1 and Tsup2 are mounted correct in the supply air pockets. - Disconnect the sensor cable for sensor Tsup1 from the connector on the main controller, according to the wiring schematics inside in the control cabinet. - Measure the resistance between the two wires. If the resistance is out of range, see "Temperature sensor - resistance table", the temperature sensor and cable are defective and should be replaced.					
Criteria	Value is below alarm limit -50°C (-58°F) or above +100°C (+212°F) or difference between Tsup1 and Tsup2 is more than 1°C (1,8°F) for 30 min. Value invalid for 30 sec. for alarm activation.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Max deviation	Actual deviation	Failing sensor actual value	Average value of OK sensors	

886	Tsup2 invalid					Warning
Description	Supply air temperature sensor 2 invalid.					
Cause	- Unexpected behaviour in old software version. - Indication of defective supply air temperature sensor or its measuring circuitry or sensor not mounted correctly in unit. - Active alarms AL 106 or AL 107 (if CIM 5 software). - Temperature sensor reading is out of valid range: -50°C (-58°F) or above +100°C (+212°F). - Difference between Tsup1 and Tsup2 is larger than 1°C: 1°C difference for more than 30 min. or up to 10°C difference in more than 3 min.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - If alarms AL 106 or AL 107 are active, check their trouble shooting first. - Check that both sensors, Tsup1 and Tsup2 are mounted correct in the supply air pockets. - Disconnect the sensor cable for sensor Tsup2 from the connector on the main controller, according to the wiring schematics inside in the control cabinet. - Measure the resistance between the two wires. If the resistance is out of range, see "Temperature sensor - resistance table", the temperature sensor and cable are defective and should be replaced.					
Criteria	Value is below alarm limit -50°C (-58°F) or above +100°C (+212°F) or difference between Tsup1 and Tsup2 is more than 1°C for 30 min. or up to 10°C difference. Value invalid for 30 sec. for alarm activation.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Max deviation	Actual deviation	Failing sensor actual value	Average value of OK sensors	

887	Tevap invalid					Warning
Description	Evaporator temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Indication of defective evaporator temperature sensor or its measuring circuitry. • Active alarms AL 121 or AL 122 (if CIM 5 software) • Temperature sensor reading is out of valid range: -50°C (-58°F) or above +100°C (+212°F).					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If alarms AL 121 or AL 122 are active, check their trouble shooting first. 3. Disconnect the sensor cable for sensor Tevap from the connector on the main controller, according to the wiring schematics inside in the control cabinet. 4. Measure the resistance between the two wires. If the resistance is out of range, see "Temperature sensor - resistance table", the temperature sensor and cable are defective and should be replaced.					
Criteria	Value below alarm limit -50°C (-58°F) or above +100°C (+212°F). Value must be invalid for 30 sec. for alarm activation.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Max deviation	Actual deviation	Failing sensor actual value	Average value of OK sensors	

888	Tsuc invalid					Warning
Description	Suction temperature sensor invalid.					
Cause	• Unexpected behaviour in old software version. • Indication of defective suction temperature sensor or its measuring circuitry. • Active alarms AL 124 or AL 125 (if CIM 5 software). • Temperature sensor reading is out of valid range: -50°C (-58°F) or above +100°C (+212°F).					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If alarms AL 124 or AL 125 are active, check their trouble shooting first. 3. Disconnect the sensor cable for sensor Tsuc from the connector on the main controller, according to the wiring schematics inside in the control cabinet. 4. Measure the resistance between the two wires. If the resistance is out of range, see "Temperature sensor - resistance table", the temperature sensor and cable are defective and should be replaced. 5. Ensure that the foam gasket on the backside of the air exchange damper is not damaged and that the damper is fully closed as this can influence the temperature readings during the test.					
Criteria	Value below alarm limit -50°C (-58°F) or above +100°C (+212°F). Value must be invalid for 30 sec. for alarm activation.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Max deviation	Actual deviation	Failing sensor actual value	Average value of OK sensors	

889	Tret invalid					Warning
Description	Return air temperature sensor invalid.					
Cause	- Unexpected behaviour in old software version. - Indication of defective return air temperature sensor or its measuring circuitry. - Active alarms AL 100 or AL 101 (if CIM 5 software). - Temperature sensor reading is out of valid range: -50°C (-58°F) or above +100°C (+212°F).					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - If alarms AL 100 or AL 101 are active, check their trouble shooting first. - Disconnect the sensor cable for sensor Tret from the connector on the main controller, according to the wiring schematics inside in the control cabinet. - Measure the resistance between the two wires. - If the resistance is out of range, see "Temperature sensor - resistance table". The temperature sensor and cable are defective and should be replaced. - If the resistance is within range, perform main controller check "Trouble shooting for Star Cool main controller" before replacing main controller.					
Criteria	Sensor is defective and the missing sensor reading has been substituted by a value from AAS system. See "Alarm Action System (AAS)".					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Max deviation	Actual deviation	Failing sensor actual value	Average value of OK sensors	

890	PTI Tset 13					Warning
Description	PTI 13°C (55°F) Set Fault.					
Cause	• Unexpected behaviour in old software version. • Doors are open. • There may not be enough refrigerant in the unit. • The heaters do not operate correctly.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Verify that the doors are closed. 3. If start temperature was below +5°C (41°F), the heaters may be defective. Start the heaters in Manual mode and see if the current consumption is higher than 5 A each phase. 4. The unit may be lacking refrigerant. Check if the small red balls in the sight glass in the receiver (receiver tank) are not at the bottom when the unit is turned off . Search for leaks, then repair and charge the unit.					
Criteria	Setpoint +13°C (55.4°F) was not reached within the 3 hour limit.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Tset	Tact	Tevap	Tret	

891	Hpump current					Warning
Description	Vacuum pump heater fault					
Cause	• Unexpected behaviour in old software version. • Vacuum pump heater current out of limits. • Defective heater contactor. • Defective contactor driver circuit. • Heater power cable defective. • Heaters defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check voltage in/out of heater contactor, for all 3 phases. 3. Check the heater contactor for defects. Replace the contactor. 4. Check that the heater power cable are mounted correctly. 5. Check the power cable for the heaters for defects. Replace cables if they are defective. 6. The heater(s) are defective. Dismount the power for the heaters one by one to find the defective heater, see wiring schematics inside in the controller cabinet. Replace the defective heater.					
Criteria	Vacuum pump heater current out of limits.					
Controller action	None					
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	I limit	I1	I2	I3	

892	O2/CO2 sensor					Warning
Description	Calibration of the O2 and/or CO2 sensor failed.					
Cause	- Unexpected behaviour in old software version. - O2 and/or CO2 sensor calibration failed.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Go to the Service menu , line S10 Other sensors. - Go to page 4 and view the sensor reading of the CO2 sensor. If it is outside the range -0.35% to +1.00%, replace the sensor. - Go to page 5 and view the sensor reading of the O2 sensor. If it is outside the range 19% to 22%, replace the sensor.					
Criteria	After sensor calibration, the O2 and/or CO2 sensor is reading out of range.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	CO2 measurement	O2 measurement			

894	RH sensor					Warning
Description	RH sensor communication missing.					
Cause	• Unexpected behaviour in old software version. • Indication of defective RH sensor, or lack of or improper connection. • Communication with RH sensor broken. • Defective RH sensor. • X10 cable is defective. • Main controller defective. • CO2 sensor defective (for some models). • O2 sensor defective (for some models).					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Verify that cable RH-com is mounted correctly (and is not damaged) according to wiring diagram inside the controller cabinet. 3. Verify that plugs are properly connected. 4. Verify that there are correct voltages 12 V DC between 1 and 4 on X10 or between 1 and 2 on X73. 5. If model has CO2 and or O2 sensor, see troubleshooting for AL 740 and or AL 760 in "Operating and service manual Controlled Atmosphere" 6. Measure with a multimeter that there is a small DC signal between 2 and 3 on X10, and between 2 and 3 on X75. If there is no signal: The main controller is defective and must be replaced. If there is signal: The RH sensor is defective and must be replaced.					
Criteria	Communication with RH sensor not possible.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Humidity control not possible.					
Elimination	When sensor value becomes valid, it is marked as inactive in alarm list and may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID					

895	CO₂ sensor					Warning
Description	The CO ₂ sensor communication and CO ₂ level are tested.					
Cause	Communication failed and/or CO₂ level out of normal range.					
Trouble shooting	- Check that controller sw is minimum version 00_363. - If one or more alarms are active, check wires, plugs, and connectors. - Check voltage supply 12V DC and communication - small AC voltage between 3 and 4 on X10. - Run sensor communication test - menu line S10. - Run ITI CA sensor check.					
Criteria	No communication for 2 min. Reading out of range (normal range 0-1% CO ₂).					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Not possible to run AV+. Cannot pass PTI.					
Elimination	Alarm may be deleted when inactive and after the test is completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID					

896	O ₂ sensor					Warning
Description	The O ₂ sensor communication and O ₂ level are tested.					
Cause	Communication failed and/or O₂ level out of normal range.					
Trouble shooting	- Check that controller sw is minimum version 00_363. - If one or more alarms are active, check wires, plugs, and connectors. - Check voltage supply 12V DC and communication - small AC voltage between 3 and 4 on X10. - Run sensor communication test - menu line S10. - Run ITI CA sensor check.					
Criteria	No communication for 2 min. Reading out of range (normal 19-22 % O ₂).					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Not possible to run CA. Cannot pass PTI.					
Elimination	Alarm may be deleted when inactive or when test is completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Insession	O ₂ level			

897	Hpump broken					Warning
Description	Vacuum pump could not be heated.					
Cause	• Vacuum pump heater is turned on, but vacuum pump temperature does not exceed 75°C (167°F) before timeout. • Lack of oil in the vacuum pump. • Defective temperature sensor (Tpump) in the vacuum pump. • Heater contactor K10 is defective. • Defective heating element.					
Trouble shooting	1. Check the oil level in the vacuum pump must be in the required level. 2. Measure the voltages to and from the K10 contactor when it is energized and the resistance in the contactor coil (A1-A2) and compare the value with the other contactors. 3. Check that the temperature sensor is fully inserted into the sensor pocket and that it is free from damages and is properly connected at the controller X27 according to the wiring diagram. 4. Measure the resistance at the contactor K10. There should be approx. 0.9 kΩ. If not replace the heating element.					
Criteria	Vacuum pump temperature > 75°C (167°F) within 75 minutes of heating.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Tpump (start)	Tpump (end)			

899	ITI failed					Log
Description	ITI test fault.					
Cause	Normal function will be affected as there is one or more ITI alarms.					
Trouble shooting	1. Check ITI alarms generated and correct accordingly.					
Criteria	One or more of the individual ITI test steps have failed.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Test failed.					
Elimination	Alarm may then be deleted after test completed.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Step ID	Failure reason 1 = Mpump oil needs change				

5.11 Controller alarms (AL 9XX)

902	Battery malfunction					Warning/ Alarm
Description	Main battery malfunctioning.					
Cause	The main battery used for logging is defective.					
Trouble shooting	- Check if alarm 999 is active and if so troubleshoot accordingly. - Verify that the battery is an original Star Cool rechargeable battery. - Ensure the battery is connected to the controller X3. - Run the unit for a minimum of 3 hours in order to charge the main battery. - If the voltage is not in the range of 10-18 V, replace the main battery.					
Criteria	CIM 6.0 controller: Main battery voltage is below lower limit (10 V) or above upper limit (18 V). CIM 6.1 and 6.2 controller: The voltage rise of the main battery is more than 0.7 V in 2 minutes while charging. Warning state when battery malfunctions and a door sensor is mounted/ configured or the refrigerant is R1234yf.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off/Slow flash
Consequence	Logging in battery mode is not possible. When detected during FT/PTI/ITI test, the test will fail.					
Elimination	Alarm will be marked as inactive in alarm list when voltage reoccurs on the battery. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Reason: 0 = Low voltage 1 = High voltage 2 = Voltage change	Internal battery state	Battery voltage	Battery voltage change		

904	Datalog error					Alarm
Description	SCCU6 data log fault.					
Cause	- Unexpected behaviour in old software version. - Datalog in controller has become defective.					
Trouble shooting	- The unit will continue its temperature control, but the logging of data is unreliable. - Try to correct the error by uploading the latest software version to the controller. - Replace main controller. - Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Controller data log corrupted.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Data logging unreliable. Temperature control is functioning.					
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		1 or 2			Error bits	

905	Database corrupt					Log
Description	SCCU6 database faulty.					
Cause	• Unexpected behaviour in old software version. • Failed validation of EEPROM backup. • Main controller defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Replace main controller. 3. Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Controller database corrupted.					
Controller action	Default value preset.					
	Log	X	Alarm		Alarm light	Off
Consequence	Parameters may have changed.					
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

907	Real-time error					Alarm
Description	Real-time clock unreliable.					
Cause	- Unexpected behaviour in old software version. - Main battery or real-time clock battery defective.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Reset the GMT in the Service menu (S03). - Check if alarm 999 is active and if so, troubleshoot accordingly. - Verify that the battery is an original Star Cool rechargeable battery. - Power down the unit for 1 hour, then turn power it up and check if the GMT has been reset. - Turn on the unit and let it run for minimum 3 hours. - Check the main battery voltage. If it is not in the range of 10V-18V, replace the main battery. - If the alarm still active after replacing the main battery, replace the main controller.					
Criteria	Activated in case of real-time clock read/write fault.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Invalid date/time setting in datalog.					
Elimination	Check real-time clock battery and main battery. Reset the GMT. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

913	Gateway voltage					Warning
Description	Battery and/or battery power measurement module is defective.					
Cause	• Battery not mounted correctly. • Battery PMM broken. • Reefer has been off power for more than 2-3 months. • Battery malfunction.					
Trouble shooting	1. Verify that the battery is an original Star Cool rechargeable battery. 2. Verify that the battery is connected to the AC power (on/off switch or orange wago connector), the controller X3, and to the Sekstant gateway. 3. Check there is battery voltage by viewing the Information menu line I31 or in the datalog. If the battery voltage is more than 0.3 V, replace the battery. 4. If the battery voltage is below 0.3 V, check that the battery is connected to the controller X3 and that it is connected to the AC power (either via the backside of the on/off switch or the orange wago connector). 5. If all connections are ok, confirm the voltage by measuring the battery voltage directly. 6. If the battery voltage is below 0.3 V, run the reefer unit for a minimum 3 hours in order to charge the battery. 7. If confirmed still below 0.3 V, replace the battery.					
Criteria	Sekstant gateway has reported an issue with the battery voltage for more than 30 minutes.					
Controller action						
	Datalog	X	Alarm list	X	Alarm light Off	
Consequence	Sekstant gateway is not able to report using the battery. When detected during PTI/ITI the test will fail.					
Elimination	Alarm will be marked as inactive in the alarm list if the battery voltage returns to normal range. The alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	1 = Low voltage 2 = High voltage					

953	Temp ref 1 LO					Warning
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective sensor pulling power supply down. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Check voltage level of 24 V DC and 5 V signals to see if power supply has a short circuit or other damages. If OK, the main controller is defective. 4. Replace main controller. 5. Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage 1 below 3.16 V DC.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Temperature measurement too high.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		
Info	The measured voltage is internal on the main controller and cannot easily be measured.					

954	Temp ref 1 HI					Warning	
Description	Controller internal voltage reference fault.						
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective main controller.						
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Check voltage level of 24 V DC and 5 V signals to see if power supply has an open circuit or other damages. If voltages are OK, the main controller is defective. 4. Replace main controller. 5. Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.						
Criteria	Reference voltage 1 above 3.29 V DC.						
Controller action							
	Log	X	Alarm	X	Alarm light	Off	
Consequence	Temperature measurement too low.						
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5		
		Minimum value	Maximum value	Actual			
Info	The measured voltage is internal on the main controller and cannot easily be measured.						

955	Temp ref 2 LO					Warning
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective sensor pulling power supply down. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Check voltage level of 24 V DC and 5 V signals to see if power supply has a short circuit or other damages. If OK, the main controller is defective. 4. Replace main controller. 5. Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage 1 below 3.16 V DC.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Temperature measurement too high.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		
Info	The measured voltage is internal on the main controller and cannot easily be measured.					

956	Temp ref 2 HI					Warning
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Check voltage level of 24 V DC and 5 V signals to see if power supply has an open circuit or other damages. If voltages are OK, the main controller is defective. 4. Replace main controller. 5. Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage 1 above 3.29 V DC.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Temperature measurement too low.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		
Info	The measured voltage is internal on the main controller and cannot easily be measured.					

961	Pdis sens sup LO					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective Pdis pressure transmitter. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Access the "special menu" by pressing  for more than 3 sec. Scroll down until you see the label "U Pdis" in the display. The value of "U Pdis" should be in the range between 4.50 V and 5.5 V DC. 4. While displaying "U Pdis", remove the connector at Pdis. – If "U Pdis" is now inside the above range, the Pdis pressure transmitter is defective. Replace the Pdis pressure transmitter. – If "U Pdis" is still outside the above range, proceed to next step. 5. While displaying "U Pdis", disconnect Pdis from the terminals according to wiring schematics inside in the control cabinet. – If "U Pdis" is now inside the above range, the cable for Pdis is defective. Replace cable for Pdis. – If the correct voltage is measured at X22 then circuit is defective. 6. Replace the main controller. 7. Ensure the controller have the latest software version installed, otherwise update the software if possible and make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage Pdis below 4.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

962	Pdis sens sup HI					Log
Description	Controller internal voltage reference fault.					
Cause	- Defective power supply for main controller. - Defective main controller.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. - Access the "special menu" by pressing  for more than 3 sec. Scroll down until you see the label "U Pdis" in the display. The value of "U Pdis" should be in the range between 4.50 V and 5.5 V DC. - While displaying "U Pdis", remove the connector at Pdis. - If "U Pdis" is now inside the above range, the Pdis pressure transmitter is defective. Replace the Pdis pressure transmitter. - If "U Pdis" is still outside the above range, proceed to next step. - While displaying "U Pdis", disconnect Pdis from the terminals according to wiring schematics inside in the control cabinet. - If "U Pdis" is now inside the above range, the cable for Pdis is defective. Replace cable for Pdis. - If the correct voltage is measured at X22 then circuit is defective. - Replace the main controller. - Ensure the controller have the latest software version installed, otherwise update the software if possible and make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage Pdis above 5.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

963	Psuc sens sup LO					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective Psuc pressure transmitter. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Access the "special menu" by pressing  for more than 3 sec. Scroll down until you see the label "U Psuc" in the display. The value of "U Psuc" should be in the range between 4.50 V and 5.5 V DC. 4. While displaying "U Psuc", remove the connector at Psuc. – If "U Psuc" is now inside the correct above range (4.50 V – 5.5 V DC), the Psuc pressure transmitter is defective. Replace the Psuc pressure transmitter. – If "U Psuc" is still outside the above range, proceed to next step. 5. While displaying "U Psuc", disconnect Pdis from the terminals according to wiring schematics inside in the control cabinet. – If "U Psuc" is now inside the above range the cable for Psuc is defective. Mount connector correctly or replace connector cable for Psuc. – If the correct voltage is measured at X22 then circuit is defective. 6. Replace the main controller. 7. Ensure the controller have the latest software version installed, otherwise update the software if possible and make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage Psuc below 4.50 V DC.					
Controller action	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

964	Psuc sens sup HI					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Access the "special menu" by pressing  for more than 3 sec. Scroll down until you see the label "U Psuc" in the display. The value of "U Psuc" should be in the range between 4.50 V and 5.5 V DC. 4. While displaying "U Psuc", remove the connector at Psuc. – If "U Psuc" is now inside the correct above range (4.50 V – 5.5 V DC), the Psuc pressure transmitter is defective. Replace the Psuc pressure transmitter. – If "U Psuc" is still outside the above range, proceed to next step. 5. While displaying "U Psuc", disconnect Pdis from the terminals according to wiring schematics inside in the control cabinet. – If "U Psuc" is now inside the above range the cable for Psuc is defective. Mount connector correctly or replace connector cable for Psuc. – If the correct voltage is measured at X22 then circuit is defective. 6. Replace the main controller. 7. Ensure the controller have the latest software version installed, otherwise update the software if possible and make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage Psuc above 5.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

965	Controller sup LO					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Air exchange sensor defective. • Pressure transmitter/s defective. • Humidity sensor defective. • Transformer defective. • Controller defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If there are any other active alarms, check their trouble shooting and clear them before proceeding. 3. Connect the unit to AC power and turn it on. 4. Using a multimeter, measure the voltage for the air exchange sensor on the controller plug X23 between terminals 1 and 3 which should be close to 5 V DC. Then measure between terminals 2 and 3 which should be between 0.2 - 4.0 V DC. If values are not within range, replace the air exchange sensor. 5. Using a multimeter, measure the voltage of all the pressure transmitters on plugs X22 and X23 (if CA container). Refer to the wiring schematic found inside the controller cabinet or in the Operating and Service Manual. All values should be close to 5 VDC. If not, replace the pressure transmitter. 6. Using a multimeter, measure the voltage of the humidity sensor on plug X10 terminals 1 to 4 which should be between 12 - 34 V DC. If not, replace the humidity sensor. 7. Using a multimeter, measure the voltage on the transformer terminals T3 and T4 which should be between 15.30 V AC - 24.30 V AC. Then measure between terminals T5 and T6 which should be between 18.86 V AC - 30.00 V AC. If either value is not within range, replace the transformer. 8. If all above measured values are within range, replace the controller.					
Criteria	Reference voltage below 4.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement from sensors X22 and X23.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

966	Controller sup HI					Log
Description	Controller internal voltage reference fault.					
Cause	- Unexpected behaviour in old software version. - Defective power supply for main controller. - Defective main controller.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. - Check voltage level of 24 V DC and 5 V signals to see if power supply has an open circuit or other damages. If voltages are OK, the main controller is defective. - Replace main controller. - Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage above 5.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement from sensors X22 and X23.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		
Info	The measured voltage is internal on the main controller and cannot easily be measured.					

967	AirExMot sup LO					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective sensor pulling power supply down. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Access the "special menu" by pressing  for more than 3 sec. Scroll down until you see the label "U Motor pos" in the display. The value of "U Motor pos" should be in the range between 4.50 and 5.5 V DC. 4. While displaying "U Motor pos", remove the connector at AirEx potentiometer. – If "U Motor pos" is now inside the correct above range (4.50 – 5.50 V DC), the motor potentiometer is defective. Replace the "AirMotor". – If "U Motor pos" is still outside the above range, proceed to next step. 5. While displaying "U Motor pos", disconnect "AirMotor" from the terminals according to wiring schematics inside in the control cabinet. – If "U AirEx" is now inside the above range the cable for "AirMotor" is defective. Mount connector correctly or replace connector cable for "AirMotor". – If the correct voltage is measured at X23 then circuit is defective. 6. Replace the main controller. 7. Ensure the controller have the latest software version installed, otherwise update the software if possible and make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage air exchange motor below 4.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

968	AirExMot sup HI					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Check voltage level of 24 V DC and 5 V signals to see if power supply has an open circuit or other damages. If the correct voltage is measured at X23 then circuit is defective. 4. Replace main controller. 5. Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage air exchange motor above 5.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

969	AirEx sens sup LO					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective sensor pulling power supply down. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Access the "special menu" by pressing  for more than 3 sec. Scroll down until you see the label "U AirEx" in the display. The value of "U AirEx" should be in the range between 4.50 V DC and 5.5 V DC. 4. While displaying "U AirEx", remove the connector at AirEx potentiometer. – If "U AirEx" is now inside the correct above range (4.50 – 5.50 V DC), the AirEx potentiometer is defective. Replace the AirEx potentiometer – If "U AirEx" is still outside the above range, proceed to next step. 5. While displaying "U AirEx", disconnect "AirEx" from the terminals according to wiring schematics inside in the control cabinet. – If "U AirEx" is now inside the above range the cable for "AirEx" is defective. Mount connector correctly or replace connector cable for "AirEx". – If the correct voltage is measured at X22 and at X23 then circuit is defective. 6. Replace main controller. 7. Ensure the controller have the latest software version installed, otherwise update the software if possible and make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage air exchange below 4.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

970	AirEx sens sup HI					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Check voltage level of 24 V DC and 5 V signals to see if power supply has an open circuit or other damages. If the correct voltage is measured at X22 and at X23 then circuit is defective. 4. Replace main controller. 5. Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage air exchange above 5.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

972	Sensor bus sup HI					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective 12 V power supply on main controller. • Defective main controller. • Short circuit between 24 V DC and 12 V DC.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Check voltage level of 24 V DC and 12 V signals to see if power supply has an short circuit or other damages. If the correct voltage is measured at X10 then circuit is defective. 4. Replace main controller. 5. Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage sensor bus above 14 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement and damage to sensors.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

973	SUP6 SPM6 sup LO					Log
Description	Supply voltage SUP6 SPM6 low.					
Cause	• Unexpected behaviour in old software version. • Defective 12 V power supply to SUP6 or SMP6. • Short circuit on SUP6 SPM6. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms (AL 971 and or AL 972) Clear these alarms first using their trouble shooting. 3. Disconnect the air exchange X23 and RH sensor X10 from the controller. If one of these is defective it can interrupt the controller voltages. 4. Access the "special menu" by pressing  for more than 3 sec. Scroll down until you see the label "SUP6 SPM6" in the display. The value of "U SUP6 SPM6" should be in the range between 11 and 14 V DC. 5. While displaying "U SUP6 SPM6", remove the connector at X9. – If "U SUP6 SPM6" is now inside the correct above range (11 – 14 V DC), the display and or power module is defective. Test with another display and or power module. – If "U SUP6 SPM6" is still outside the above range, proceed to next step. 6. While displaying "U SUP6 SPM6", disconnect display and or power module from the terminals according to wiring schematics inside in the control cabinet. – If "U SUP6 SPM6" is now inside the above range the cable for the display and or power module is defective. Mount connector correctly or replace connector cable for display and or power module. – If the correct voltage is measured at X11 then circuit is defective. 7. Replace main controller. 8. Ensure the controller has the latest software version installed, otherwise update the software if possible and make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage U sensor bus below 10 V DC.					
Controller action	Log	X	Alarm		Alarm light	Off
Consequence						
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

974	SUP6 SMP6 sup HI					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective 12 V power supply to sensor bus. • Defective main controller. • Short circuit between 24 V DC and 12 V DC.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. 3. Check voltage level of 24 V DC and 12 V signals to see if power supply has an short circuit or other damages. If the correct voltage is measured at X11 then circuit is defective. 4. Replace main controller. 5. Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Reference voltage sensor bus above 14 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement and damage to sensors.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

975	Internal sup LO					Log
Description	12 V supply voltage low on SMC6.					
Cause	• Unexpected behaviour in old software version. • Defective 12 V power supply on SMC6. • Defective main controller. • Short circuit on SUP6 and SPM6 or RH sensor and CO sensor.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check if there are other active (sensor) alarms (AL 971 and or AL 972) Clear these alarms first using their trouble shooting. 3. (Future possibility) Access the "special menu" by pressing  for more than 3 sec. Scroll down until you see the label "SUP6 SPM6" in the display. The value of "U SUP6 SPM6" should be in the range between 10 and 14 V DC. 4. While displaying "U SUP6 SPM6", remove the connector at X10. – If "U SUP6 SPM6" is inside the correct range at X11 pin 1 and 4, the display and or power module is defective. Test with another display and or power module. – If "U SUP6 SPM6" is still outside the above range, proceed to next step. 5. While displaying "U SUP6 SPM6", disconnect RH at X10 and measure voltage. If not in-range, SMC6 may be defective or have insufficient supply at X1. If in-range, check SUP6 at X80 and SPM6 at X41.					
Criteria	Internal power supply below 10 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurements.					
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

976	Internal sup HI					Log
Description	12 V supply voltage high on SMC6.					
Cause	- Defective 12 V power supply. - Defective main controller. - Short circuit between 24 V DC and 12 V DC.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Check if there are other active (sensor) alarms. Clear these alarms first using their trouble shooting. - Check voltage level of 24 V DC and 12 V signals to see if power supply has a short circuit or other damages. If the correct voltage is measured at X11 then circuit is defective. - Replace main controller. - Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Internal power supply above 14 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurements and risk for damage to sensors.					
Elimination	Alarm will be marked as inactive in alarm list when supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

977	Pmem sens sup LOW					Log
Description	Controller internal voltage reference fault.					
Cause	- Unexpected behaviour in old software version. - Controller defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. See trouble shooting for accompanying alarms.					
Criteria	Voltage < 4.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement.					
Elimination	Alarm will be marked as inactive in the alarm list when the supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

978	Pmem sens sup HIGH					Log
Description	Controller internal voltage reference fault.					
Cause	• Unexpected behaviour in old software version. • Defective power supply for main controller. • Defective Pmem pressure transmitter. • Defective main controller.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. See trouble shooting for accompanying alarms.					
Criteria	Voltage > 5.50 V DC.					
Controller action						
	Log	X	Alarm		Alarm light	Off
Consequence	Less accurate readings from measurement.					
Elimination	Alarm will be marked as inactive in the alarm list when the supply voltage is correct. Alarm may then be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		Minimum value	Maximum value	Actual		

990	Firmware update fail					Alarm
Description	The firmware update failed.					
Cause	- Unexpected behaviour in old firmware version. - The firmware attempted to be installed is not compatible with hardware (SUP6, SMC6, SPM6).					
Trouble shooting	- Powercycle the unit 1-2 times. This can help the controller with getting the latest programming. - Try to correct the error by uploading the latest firmware version to the controller. - Disconnect X10 and X11 from the controller and try to update the firmware again. After programming is completed, connect X10 and X11 again before powercycling the unit. - Test the firmware with another unit of the same type as the failing one. If the firmware update is successful, see point 5. - There is a fault on either SUP6, SMC6, SPM6. Review the log parameters to identify the part for replacement.					
Criteria						
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence						
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	BZC6	SMC6	SUP6	SPM6/CAM	SCC6/penta	

994	Req min SW352-11					Alarm
Description	The software which has been uploaded to the controller is not compatible with the current hardware version, please use software 0352 rev. 11 or newer.					
Cause	Software not compatible.					
Criteria						
Controller action	Update failed.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Update failed					
Elimination						
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

995	Control internal error					Alarm
Description	Controller module must be replaced.					
Cause	- Unexpected behaviour in old software version. - Internal memory error.					
Trouble shooting	- Try to correct the error by uploading the latest software version to the controller. - Replace controller module. - Ensure the new controller has the latest software version installed, otherwise update the software if possible. Make sure the container ID and configuration is set correctly.					
Criteria	Type 0 (parameter 1 in the event log): Wrong dataflash page size.					
Controller action						
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Power cycle could lead to non operating controller. Possible corruption of datalog.					
Elimination	Replace main controller module.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
			FPSize			

996	SW incompatible					Warning
Description	The software which has been uploaded to the controller is not compatible with this unit.					
Cause	- Software version uploaded is not compatible with this unit. - Reefer unit is potentially running R1234yf. - Reefer unit has compressor version 2. - Reefer unit has controller CIM 6.4.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. Minimum software version required: 364_00.					
Criteria	This reefer unit requires minimum software version 364_00.					
Controller action	Software update failed. Controller will continue on current software version.					
	Log	X	Alarm	X	Alarm light	Off
Consequence	Software update failed.					
Elimination	Alarm will be marked as inactive in alarm list and can be deleted.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
	Compatibility flags (firmware) 1 = YF 2 = Cpr Gen 2 4 = LMC604	Compatibility flags (application) 1 = YF 2 = Cpr Gen 2 4 = LMC604				

998	Could not detect CA					Alarm
Description	Unable to detect CA.					
Cause	• Unexpected behaviour in old software version. • Broken communication. • COMCA cable defective (for some models). • Heating element defective. • Contactors defective K10. • Controller module defective.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. Check connections according to the wiring schematic. 3. Restart the unit. 4. See trouble shooting for AL 653.					
Criteria	Could not detect CA module in time (up until 10 min. from start up).					
Controller action	Cannot run CA mode.					
	Log	X	Alarm	X	Alarm light	Slow flash
Consequence	Cannot pass CA PTI.					
Elimination	Alarm may be deleted after the test is complete.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	
		CA mode	CA communication	Idle current sum	Hpump on current sum	

999	Keypad failure					Warning
Description	Indication of defective keypad or connection.					
Cause	• Unexpected behaviour in old software version. • Corrosion in the keypad ribbon connector CN8. • Defective keypad.					
Trouble shooting	1. Try to correct the error by uploading the latest software version to the controller. 2. If any accompanied alarms are active, handle these first. 3. If there is an Arrowspot modem installed, try to disconnect it from the controller. 4. Clean the keypad as below (full instructions with pictures here). 5. Disconnect X80 from the user panel and unscrew the 4 fasteners. 6. Locate the side locking ramp tabs of the ribbon connector CN8. 7. Gently pull the locking ramp tabs away from CN8, keeping both sides parallel. 8. Gently remove the ribbon. Using multi-purpose precision lubricant CRC 2-26 (item number 818651A) or similar electro cleaner and lubricator, clean the contact end of the ribbon and the inside surfaces of the CN8 connector. 9. Feed the ribbon back into the CN8 connector until it stops. 10. Push both sides of the locking ramp tabs toward CN8 until locked. 11. Refit the back cover, reconnect X80 and test the user panel keypad operation. 12. If alarm is still active, replace the keypad (item no. 818527C).					
Criteria	A key has been pressed at least 20 times during 1 hour. Corrosion in the keypad ribbon connector CN8.					
Controller action						
	Log	X	Alarm	X	Alarm light	Off
Consequence	Menus can change automatically. The controller can be power up in battery mode automatically.					
Elimination	Clean the CN8 connection.					
Log data	Parm 1	Parm 2	Parm 3	Parm 4	Parm 5	

Star Cool Service



The app

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Spare parts

By using only genuine Star Cool spare parts and consumables, you ensure a long and reliable life time of your reefer machines.

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