



MODEL NMF-371-SW

OPERATION, SERVICE AND PARTS MANUAL

ADDENDUM TO STANDARD NMF-371-S SYSTEM MANUAL (K35-NMF371-S)

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REVISION RECORD

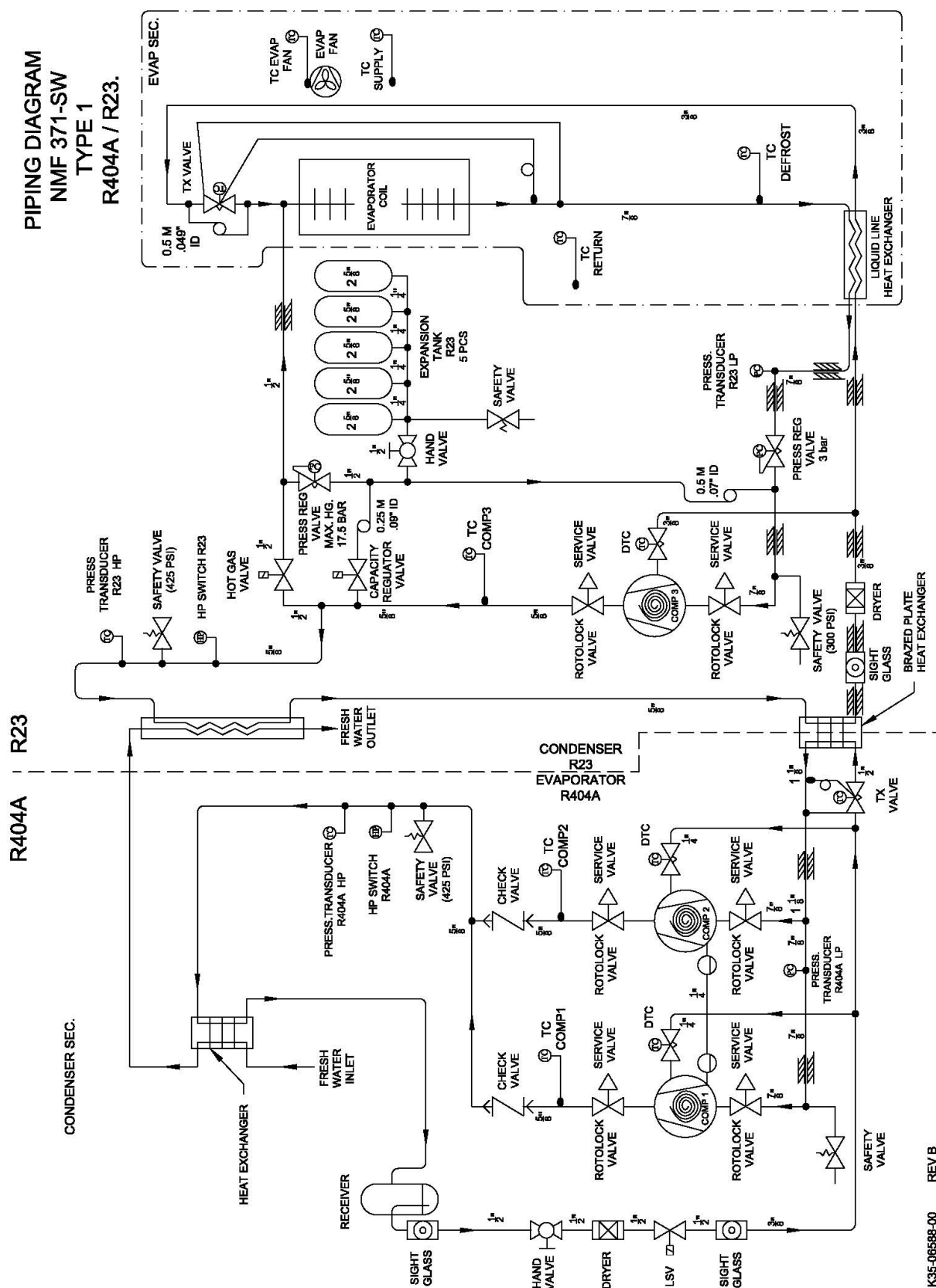
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This addendum is to be used in conjunction with the **NMF-371-S** Unit (**N**ose **M**ounted **F**reezer) standard Operation, Service and Parts Manual.

When using this manual along with the NMF-371-S manual note the following:

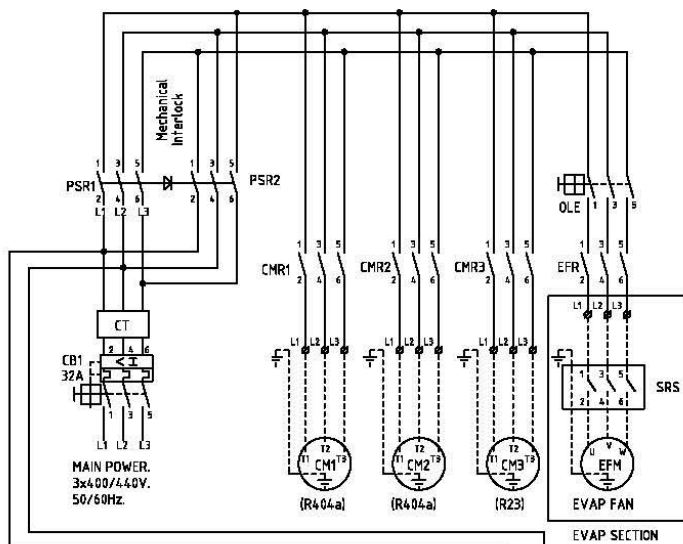
1. All references to R134a, should instead be R404A.
2. The NMR-371-SW uses a flat plate heat exchanger in place of the standard system's condenser coil and condenser fan circulation system. Therefore, references to the condenser coil should instead be identified as the condenser water heat exchanger.
3. Section 2.3 Unit Piping Diagram, see replacement below.
4. Section 4.4 Electrical Diagram, see replacement below.
5. Section 5 Controller Instructions and Sequence: references to the condenser fan in the Controller Starting Sequence and Unit Auto Test are to be ignored.
6. Section 6.11 Refrigerant / Temperature / Pressure chart has been updated to incorporate R404a (included below).
7. Section 8.2 Alarm Chart has been updated to reference the water heat exchanger (included below).
8. Section 9. Service Parts for the NMF-371-SW has been included in its entirety below.

2.3 UNIT PIPING DIAGRAM.



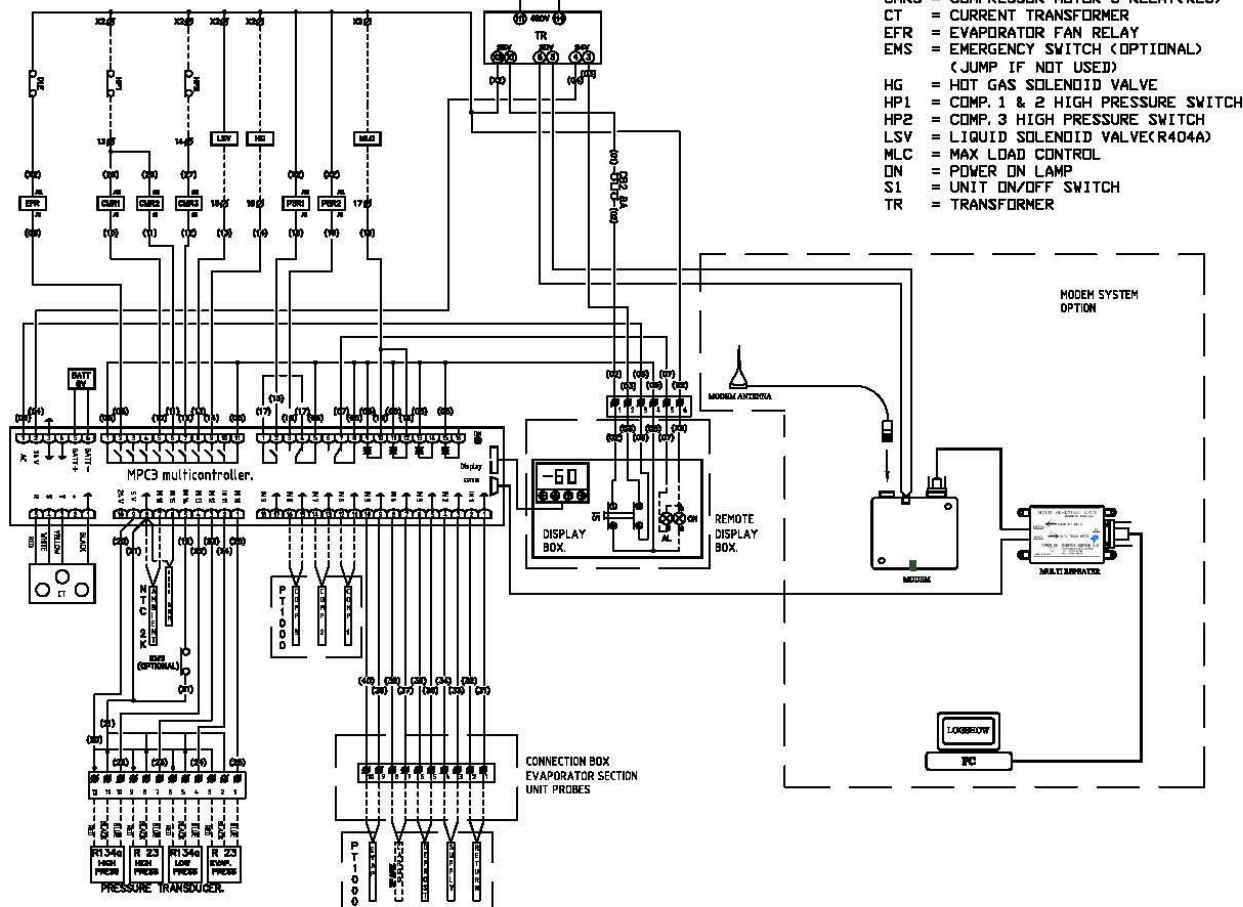
4.4 ELECTRICAL DIAGRAM

MAIN POWER.



CB1 = CIRCUIT BREAKER 32A.
 CM1 = COMPRESSOR MOTOR 1.
 CM2 = COMPRESSOR MOTOR 2.
 CM3 = COMPRESSOR MOTOR 3.
 CMR1 = COMPRESSOR MOTOR 1 RELAY.
 CMR2 = COMPRESSOR MOTOR 2 RELAY.
 CMR3 = COMPRESSOR MOTOR 3 RELAY.
 CT = CURRENT TRANSFORMER.
 EFM = EVAPORATOR FAN MOTOR.
 OLE = OVERLOAD EVAP FAN MOTOR.
 EFR = EVAPORATOR FAN RELAY.
 PSR1 = PHASE SENSOR RELAY 1.
 PSR2 = PHASE SENSOR RELAY 2.
 SRS = SERVICE REPAIR SWITCH.

CONTROL POWER.



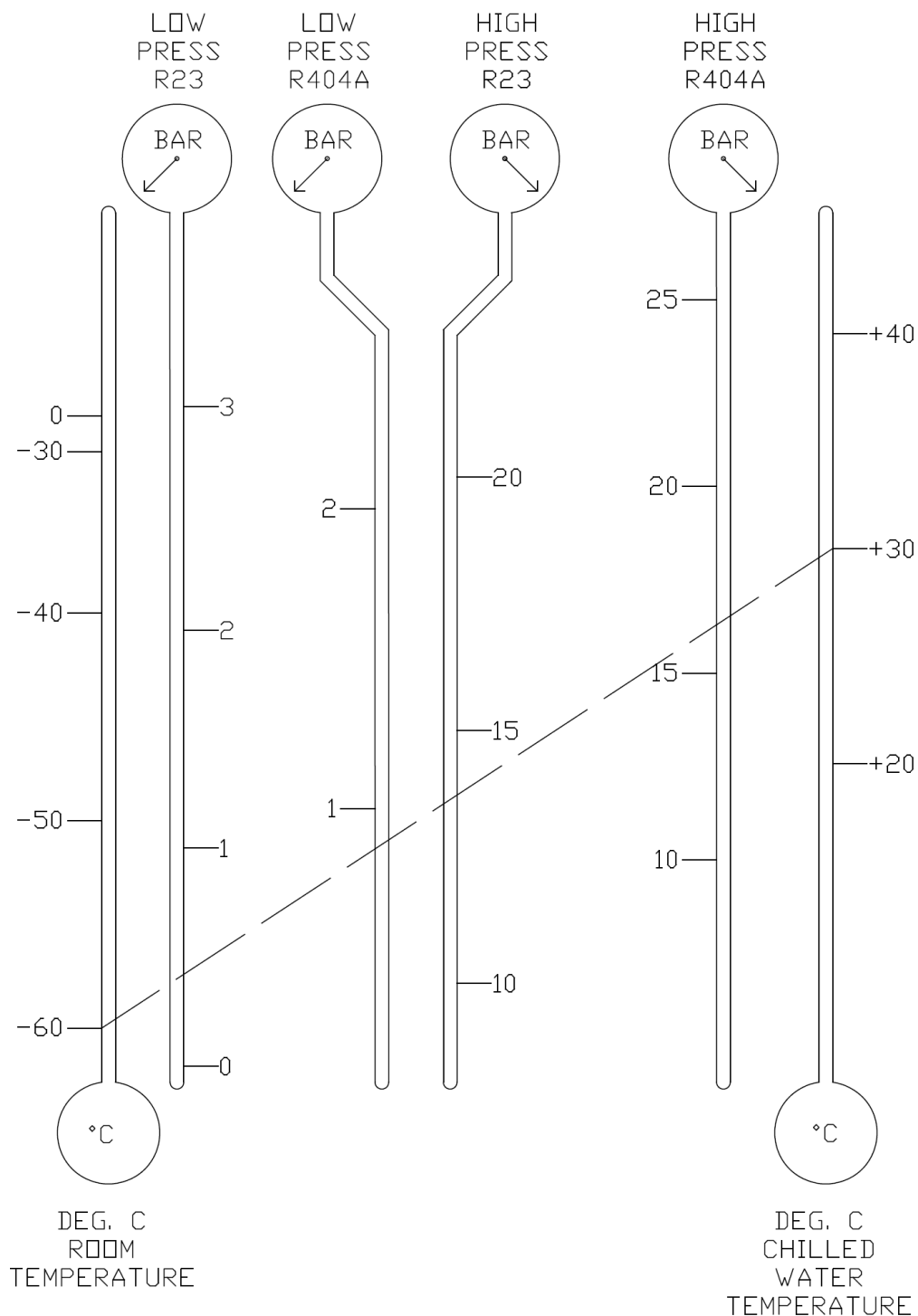
AL = ALARM LAMP.
 CB2 = CIRCUIT BREAKER.
 CMR1 = COMPRESSOR MOTOR 1 RELAY(R404A).
 CMR2 = COMPRESSOR MOTOR 2 RELAY(R404A).
 CMR3 = COMPRESSOR MOTOR 3 RELAY(R23).
 CT = CURRENT TRANSFORMER.
 EFR = EVAPORATOR FAN RELAY.
 EMS = EMERGENCY SWITCH (OPTIONAL).
 (JUMP IF NOT USED).
 HG = HOT GAS SOLENOID VALVE.
 HP1 = COMP. 1 & 2 HIGH PRESSURE SWITCH.
 HP2 = COMP. 3 HIGH PRESSURE SWITCH.
 LSV = LIQUID SOLENOID VALVE(R404A).
 MLC = MAX LOAD CONTROL.
 DN = POWER ON LAMP.
 S1 = UNIT ON/OFF SWITCH.
 TR = TRANSFORMER.

ELECTRICAL DIAGRAM NMF 371-SW

K35-06586-00 REV C

6.11 REFRIGERANT R404a /R23, TEMPERATURE / PRESSURE TABLE.

The table shows the pressure and temperature between the two refrigerant systems, with a ΔT at 5° to 10°C on the heat exchange between high pressure in the R23 system, and low pressure in the R40a system.



When Return temperature is -60°C, and condenser water is +30°C, then the pressures will approx. be:

R23	LP: 0.5 bar.
R404A	LP: 0.9 bar.
R23	HP: 14 bar.
R404A	HP: 16 bar.

SECTION 8. TROUBLE SHOOTING.

8.1 GENERAL INFORMATION.

Several components are incorporated in the unit to assist the service engineer to find the cause of problems, concerning the operation and efficiency of the unit.

L.E.D. lights on the display panel indicate which cycle the micro-processor controller is calling for and should be used in conjunction with the pressure gauges to determine whether certain cycles are operating.

NOTE: It is recommended to initiate the test after all repairs. The alarm light on the display panel will be lit until the failure is repaired. **(If the fault causing an alarm corrects itself, the alarm light will shut off after one hour delay.)**

8.2 ALARM CHART.

"ALARM" LAMP LIGHT ON.

GO TO "ALARM" IN MAIN MENU, PRESS (→) FOR ENTER. THE DISPLAY SHOWS ACTIVE ALARM CODE.

SCROLL, PRESS (↓) OR (↑). PRESS (→) FOR CANCEL. ESC. PRESS (←)

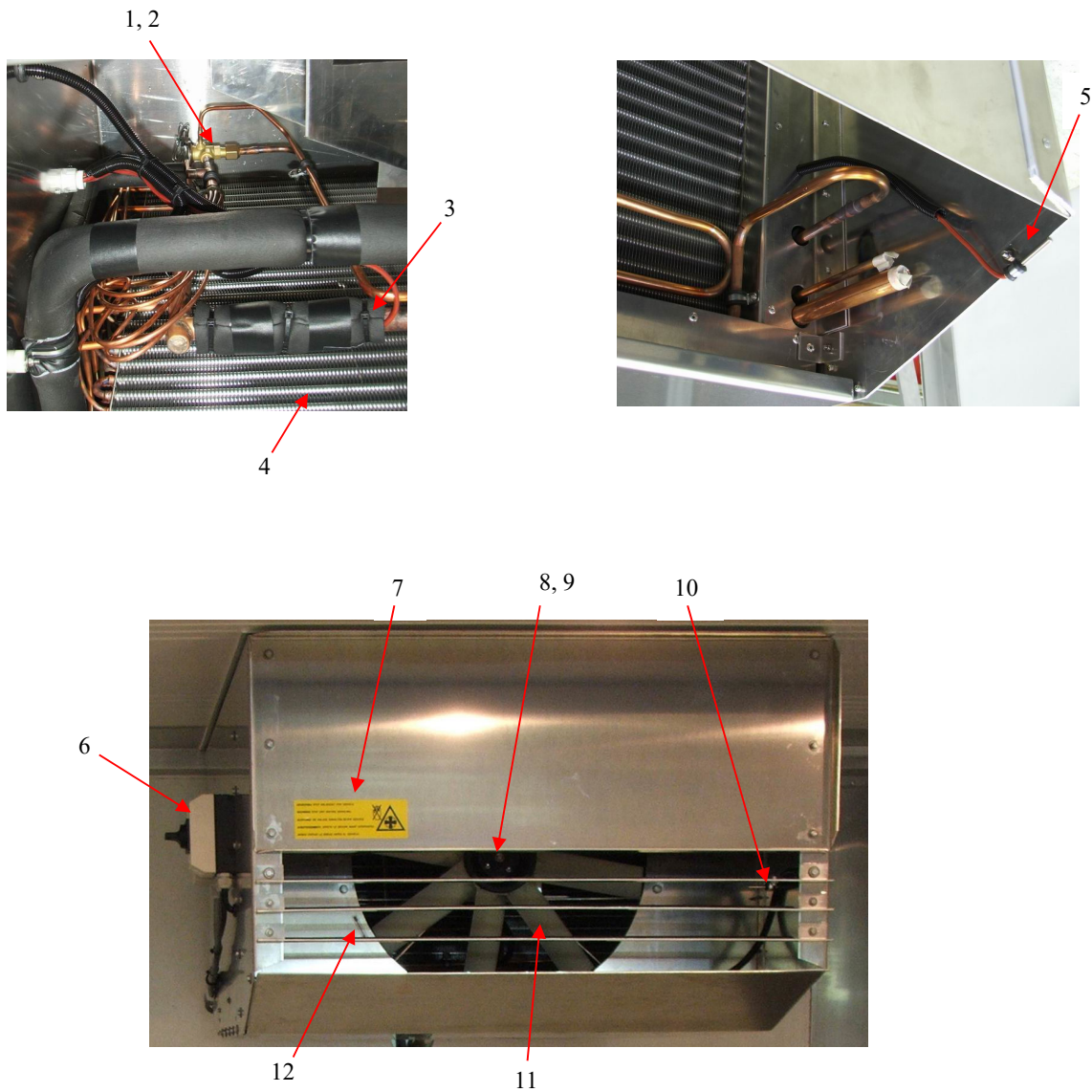
Display text		Description	Corrective Action
Return air sensor, Out of range.	A01	The sensor has an open (999.9°C) or short circuit (-99.9°C).	Replace defective sensor.
Supply air sensor, Out of range.	A02	The sensor has an open (999.9°C) or short circuit (-99.9°C).	Replace defective sensor.
Defrost sensor, Out of range.	A03	The sensor has an open (999.9°C) or short circuit (-99.9°C).	Replace defective sensor.
Cargo sensor, Out of range.	A04	The sensor has an open (999.9°C) or short circuit (-99.9°C).	Replace defective sensor.
Evap motor sensor, Out of range.	A05	The sensor has an open (999.9°C) or short circuit (-99.9°C).	Replace defective sensor.
Compr 1 sensor. Out of range.	A06	The sensor has an open (999.9°C) or short circuit (-99.9°C).	Replace defective sensor.
Compr 2 sensor. Out of range.	A07	The sensor has an open (999.9°C) or short circuit (-99.9°C).	Replace defective sensor.
Compr 3 sensor. Out of range.	A08	The sensor has an open (999.9°C) or short circuit (-99.9°C).	Replace defective sensor.
R23 low press. Out of range.	A10	Pressure Transducer, R23 low pressure, has an open (210 psi) or short circuit (-42 psi).	Replace defective transducer.
R404a low press. Out of range.	A11	Pressure transducer, R404a low pressure has an open (210 psi) or short circuit (-42 psi).	Replace defective transducer.
R23 high press. Out of range.	A12	Pressure transducer, R23 high pressure, has an open (580 psi) or short circuit (-70 psi).	Replace defective transducer.
R404a high press. Out of range.	A13	Pressure transducer, R404a high pressure has an open (580 psi) or short circuit (-70 psi).	Replace defective transducer.
Ambient temp sensor. Out of range.	A16	The sensor has an open (999.9°C) or short circuit (-99.9°C).	Replace defective sensor.
Reference error. Shutdown.	A17	Internal controller error	Replace defective MPC3 Controller.
Comp #1 temp too high.	A22	Compressor 1, discharge line temp above 120°C.	Repair or replace defective sensor.
		Defective refrigerant system.	Check R404a refrigerant charge. (Sight glass)
		Too high condensing temperature. (Max. 30°C above ambient.)	Check cooling water temperature or heat exchanger for blockage.
Comp #2 temp too high.	A23	Defect liquid injection valve.	Repair or replace defective part.
		Compressor 2, discharge line temp above 120°C.	Repair or replace defective sensor.
		Defective refrigerant system.	Check R404a refrigerant charge. (Sight glass)
		Too high condensing temperature. (Max. 30°C above ambient.)	Check cooling water temperature or heat exchanger for blockage.
		Defective liquid injection valve.	Repair or replace defective part.

ALARM CHART.

No alarm:		Description	Corrective Action
Comp #3 temp. too high.	A24	Compressor 3, discharge line temp above 130°C.	Repair or replace defective sensor.
		Defective refrigerant system.	Check R23 refrigerant charge. (Sight glass)
		Too high condensing temperature. (Heat exchanger R404a/R23 not operating optimal.)	Check R404a refrigerant charge. (Sight glass)
Drop of temperature is slow.	A26	This alarm is activated when the return air sensor is within 5°C of the set point AND there is a decrease in the average drop in temperature measured at the return air over a period of ten minutes.	Check container door is closed. Check refrigerant system. Reset evap fan motor
Evaporator fan current too low	A30	Evaporator fan current too low <0.5 Amp.	Check evaporator fan amperage Repair or replace defective fan motor
"Phase direction problem" (Controller not able to "set" phase direction)	A31	Missing phase from main power.	Check power in all 3 phases.
		Defective phase sensor relay.	Repair or replace defective relay.
R23 High pressure cut-out.	A33	Defective refrigerant R404a system.	
		Defective compressor R404a system.	Check R404a compressors.
		Defective refrigerant system.	Check R23 refrigerant system.
R404a High pressure cut-out.	A34	Too high condensing temperature. (Max. 30°C above ambient.)	Check cooling water temperature or heat exchanger for blockage.
		Defective refrigerant system.	Check 404a refrigerant system.
R23 Low pressure cut out	A35	Suction pressure R23 too low <0 psi.	Check R23 charge Check R23 TX valve Check evap fan motor Check air circulation in container
R404a Low pressure cut out	A36	Suction pressure R404a too low < -7.25 [so.	Check R404a charge Check R404a TX valve Check R23 system for fault. Check air circulation in container
Evap fan motor temp too high.	A37	Evaporator motor temp above 65°C. (If the motor operated too long with high box temperature (+°C), the motor will be overheated)	Check motor condition (run free) and try to restart.
Evap fan motor starts fail.	A38	Evaporator motor has failed to start, motor may be frozen/stuck in fan blade.	Check motor condition (run free) and try to restart.
Auto test error, amps too low.	A40	Current of one of the tested parts is too low.	Check amps on the faulty part with an amp meter. Repair or replace defective part.
Auto test error, amps too high.	A41	Current of one of the tested parts is too high.	Check amps on the faulty part with an amp meter. Repair or replace defective part.
Auto test error, delta amps too high.	A42	The difference in current of one of the tested parts is too high.	Check amps on the faulty part with an amp meter. Repair or replace defective part.
Emergency stop activated.	A46	Emergency switch in container is activated.	Check for person in container. Reset Emergency switch. Defective Emergency switch.

SECTION 9. SERVICE PARTS

EVAPORATOR SECTION (360-16615-10)

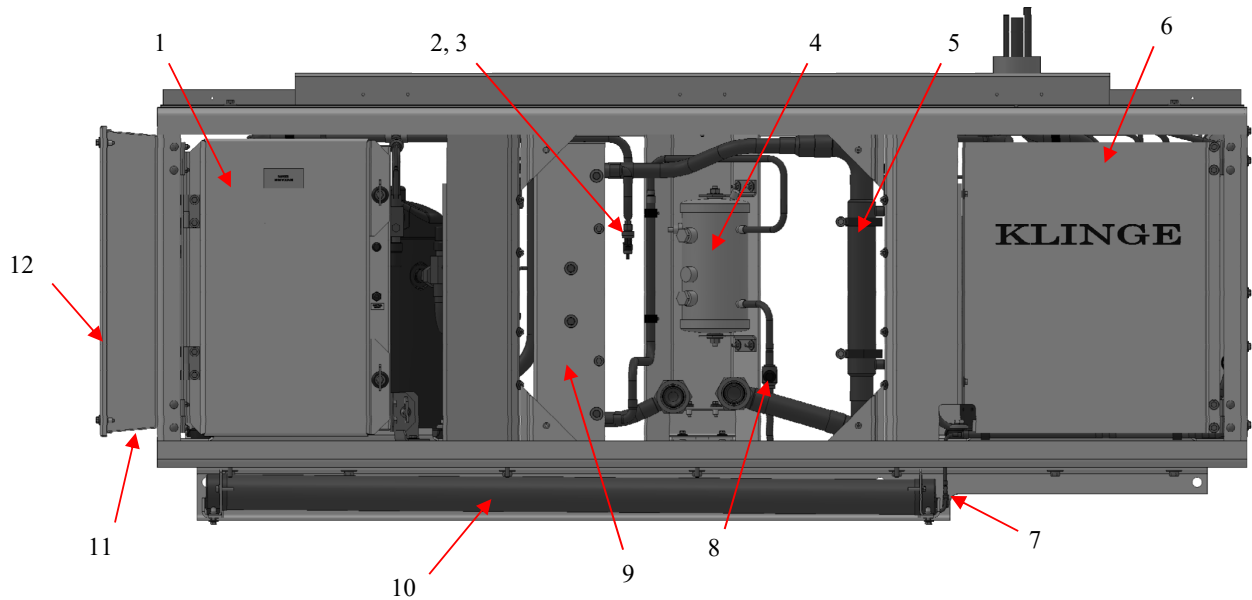


EVAPORATOR SECTION – Parts List

ITEM	PART NO.	DESCRIPTION	QTY.
1	K25-25728-00	EXPANSION VALVE R23	1
2	K25-25729-00	ORIFICE TX VALVE	1
3	360-16509-38	SENSOR, DEFROST	1
4	K26-25229-00	COIL EVAPORATOR	1
5	360-16509-40	SENSOR, RETURN AIR (BACK SIDE OF UNIT.)	1
6	K24-22498-00	REPAIR SWITCH	1
7	K35-04602 00	LABEL, WARNING	2
8	K24-22499-00	MOTOR, EVAP. FAN	1
9	360-16509-41	SENSOR, MOTOR	1
10	360-16509-39	SENSOR, SUPPLY AIR	1
11	K26-25230-00	FAN, EVAP. MOTOR	1
12	K35-05606-00	LABEL ARROW	1

CONDENSER SECTION (360-16776-00)

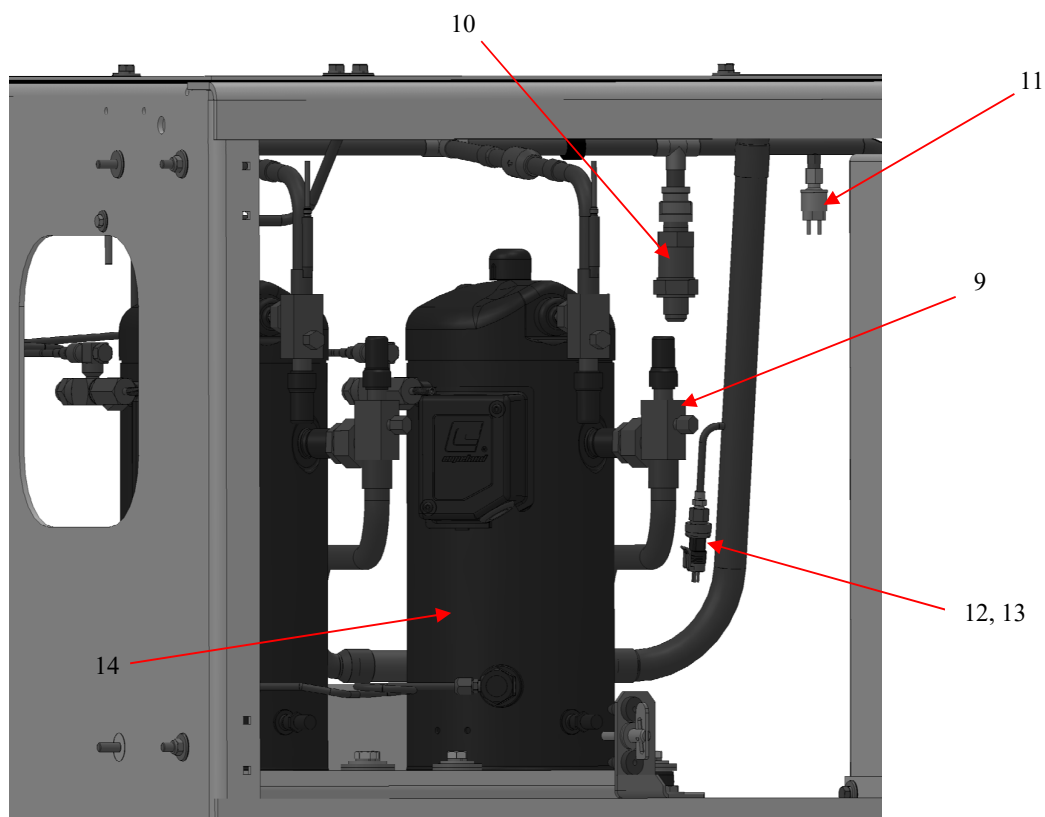
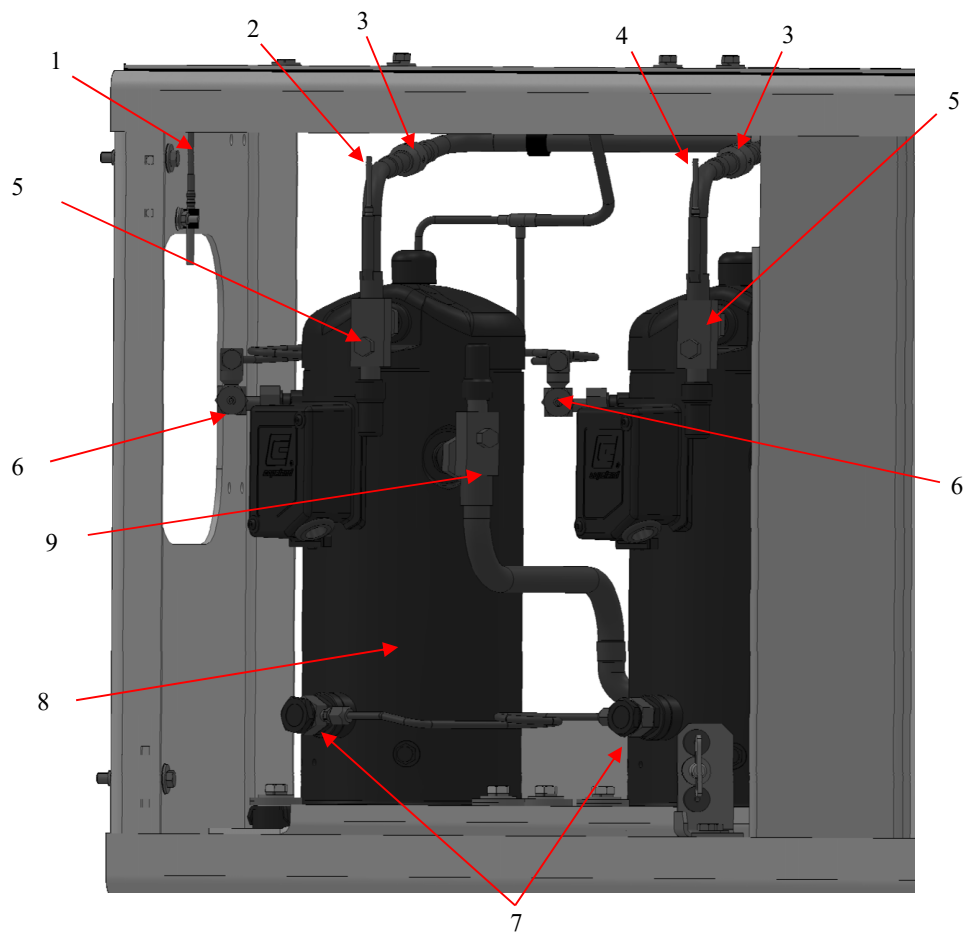
(front panel and front buffer tank rail not shown)



CONDENSER SECTION - Parts List

ITEM	PART NO.	DESCRIPTION	QTY.
1	360-16781-00	ELECTRICAL BOX COMPLETE	1
2	K25-26810-00	TRANSDUCER 0-500 PSI	1
3	360-16805-03	CABLE R404A HP PRESS TRANS	1
4	K26-51758-00	RECEIVER 5" OD 10" LG W/GLASSES	1
5	K26-25297-00	HEAT EXCH 1-5/8 C 5/8 LIQ	1
6	360-16691-00	PANEL ACCESS	1
7	K22-04988-01	VALVE BRS SCHRADER STR ¼ ODF	1
8	K22-07030-03	VALVE SHUT-OFF 1/2C X 1/2C	1
9	K26-25294-00	20kW HEAT EXCHANGER	1
10	360-16519-10	TANK BUFFER NMF-371-10	5
11	360-16828-00	BOX JUNCTION NMF-371	1
12	360-16833-00	COVER BOX JUNCTION	1

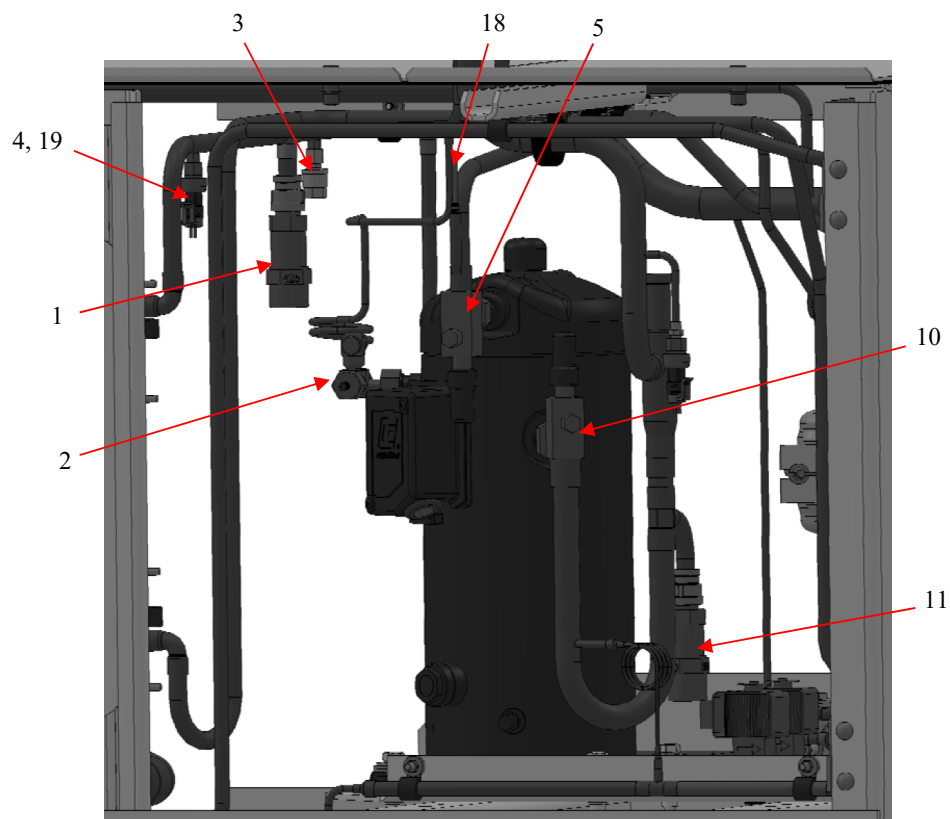
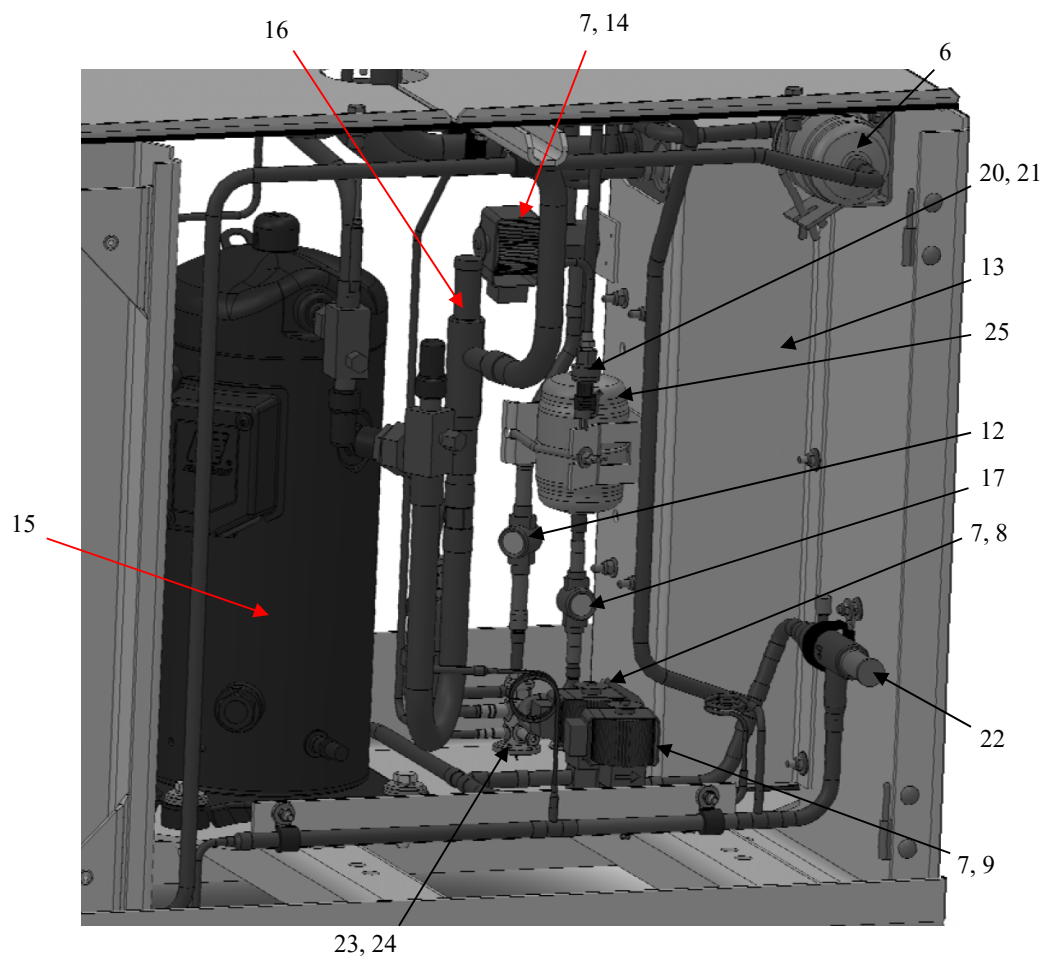
CONDENSER SECTION LH (R404a Compressor side)



CONDENSER SECTION LH (R404a Compressor side) - Parts List

ITEM	PART NO.	DESCRIPTION	QTY.
1	360-16509-20	PROBE AMBIENT 1	1
2	360-16509-25	PROBE COMPRESSOR 1	1
3	K26-58023-30	CHECK VALVE 5/8C X 5/8C	2
4	360-16509-26	PROBE COMPRESSOR 2	1
5	K22-06970-00	VALVE ROTA 1 1/4 X 5/8C BRASS	2
6	K15-00042-13	KIT VALVE DTC DISCH TEMP CONTL	2
7	360-16577-00	COUPLING COMPRESSOR OIL SHARING	2
8	360-16581-01	COMPRESSOR 1 R404A	1
9	K22-06910-00	VALVE ROTA 1 1/4-12 X 7/8C BRASS	2
10	K22-07028-01	VALVE RELIEF (425 PSIG)	1
11	360-16805-01	CABLE HIGH PRESS SW 1 R404A	1
12	360-16509-32	CABLE R404A LP PRESS TRANS	1
13	K25-26809-00	TRANSDUCER 0-200 PSI	1
14	360-16581-02	COMPRESSOR 2 R404A	1

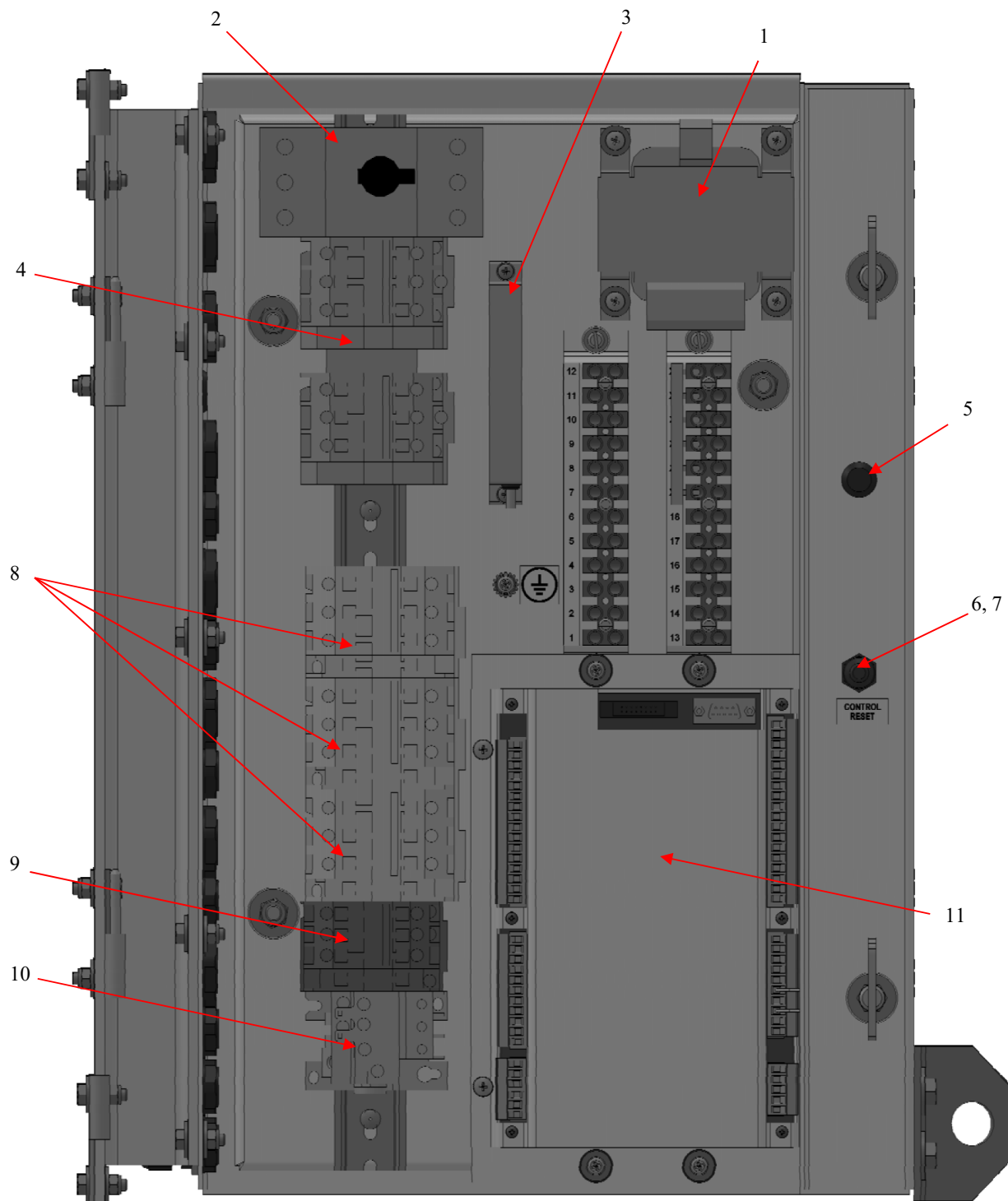
CONDENSER SECTION RH (R23 Compressor side)



CONDENSER SECTION RH (R23 Compressor side) - Parts List

ITEM	PART NO.	DESCRIPTION	QTY.
1	K22-07028-01	SAFETY RELIEVE VALVE HP	1
2	K15-00042-13	LIQUID INJECTION VALVE	1
3	360-16805-02	CABLE HIGH PRESS SW R23	1
4	K25-26810-00	PRESSURE TRANSDUCER HP	1
5	K22-06970-00	VALVE ROTA 1-14 X 5/8C BRASS	1
6	K26-10795-01	FILTER DRIER ½ " SOLDER	1
7	K25-26089-00	COIL SOLENOID VALVE	3
8	360-16509-02	CABLE HOT GAS SOLENOID	1
9	360-16509-04	CABLE MAX LOAD CONTROL SOLENOID	1
10	K22-06910-00	VALVE ROTA 1-1/4-12 X 7/8C BRASS	1
11	K22-07028-00	SAFETY RELIEVE VALVE LP	1
12	K26-25216-00	INDICATOR MOISTURE ½ C	1
13	K26-25220-00	HEAT EXCHANGER R404a / R23	1
14	360-16509-01	CABLE LIQUID SOLENOID	1
15	360-16581-03	COMPRESSOR 3 R23	1
16	K22-07026-00	SUCTION PRESSURE REGULATOR	1
17	K26-25116-01	INDICATOR MOISTURE 3/8 C MODIFIED	1
18	360-16509-27	PROBE COMPRESSOR 3	1
19	360-16805-04	CABLE R23 HP PRESS TRANS	1
20	K25-26809-00	TRANSDUCER 0-200 PSI	1
21	360-16509-33	CABLE R23 LP PRESS TRANS	1
22	K22-07027-00	PRESSURE REGULATOR BUFFER TANKS	1
23	K25-26547-00	TX VALVE R404a	1
24	K25-25729-01	TX VALVE ORIFICE R404a (TORQUE REQUIRED: 35-40 Nm (26-30 ft-lbs))	1
25	K26-25215-00	FILTER DRYER 3/8 SOLDER	1

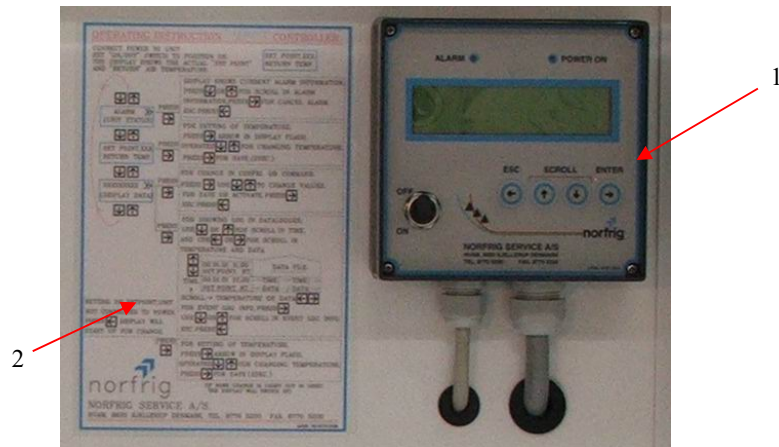
CONTROL BOX (360-16781-00)



CONTROL BOX (inside) – Parts List

ITEM	PART NO.	DESCRIPTION	QTY.
1	K25-26741-00	TRANSFORMER	1
2	K24-22439-00	MAIN CIRCUIT BREAKER	1
3	K25-26743-20	CURRENT TRANSFORMER ASSEMBLY	1
4	K24-22315-01	PHASE REVERSING CONTACTORS 25A 24/29V	1
5	K28-10936-04	PLUG	1
6	K24-18164-00	CONTROL CIRCUIT BREAKER BOOT	1
7	K24-20565-00	CONTROL CIRCUIT BREAKER 8A	1
8	K24-58160-05	CONTACTOR RELAY 25A 24/29V	3
9	K24-58160-03	CONTACTOR RELAY 12A 24/29V	1
10	K24-22268-00	MOTOR OVERLOAD RELAY	1
11	K31-00927-10	CONTROLLER MPC3 LABELED	1
12	K25-26756-00	BATTERY PACK FOR MPC3 (LOCATED UNDER MPC3)	1
13	360-16862-00	CONTROL BOX DOOR (NOT SHOWN)	1

REMOTE DISPLAY AND CONTROLS



REMOTE DISPLAY AND CONTROLS – Parts List

ITEM	PART NO.	DESCRIPTION	QTY.
1	360-16824-00	DISPLAY CONTROL	1
2	K35-06467-00	LABEL OPER INSTRUCT MPC-3	1