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каталоги, инструкции, сервисные мануалы, схемы.

HITACHI
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Service Manual

Maintenance Instructions.

AIR COOLED WATER CHILLERS -SCREW TYPE-

RCUE40AG1-400AG1 (R407C)
Cooling Capacity 108 kW - 1068 kW

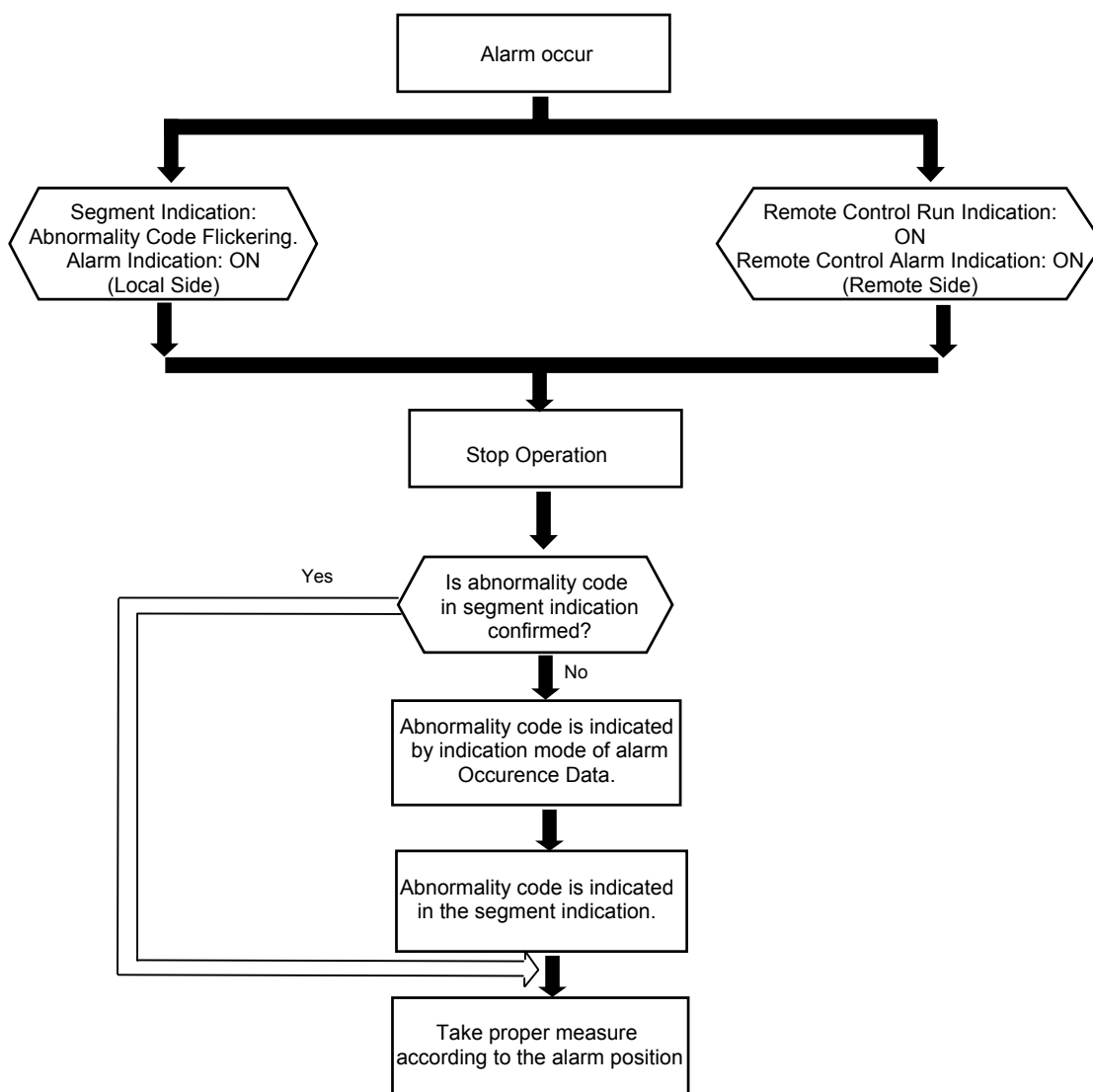
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1 TROUBLESHOOTING

1.1. OUTLINE OF FAILURE DIAGNOSIS

In the case of abnormality, alarm lamp of remote control and alarm LED on the control panel are ON. And segment indication on the control panel is flickering. For stopping the unit, put it into stop operation without power OFF.

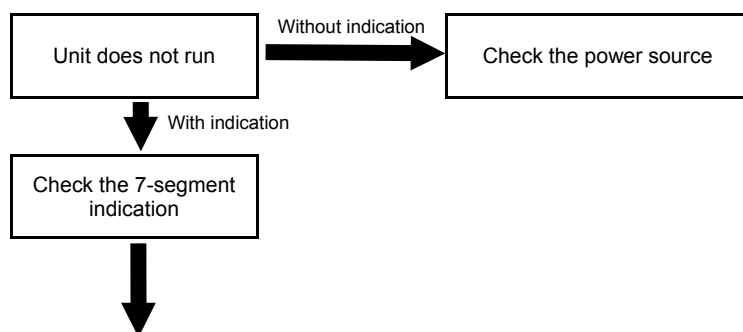


NOTE:

- After the stop operation, alarm indication is turned off and initial status 88 is displayed. And then abnormality code, which activated before is indicated by "Indication Mode of Alarm Occurrence Data".
- When the power turns off and turns on, the indication is initial status. And then abnormal code, which activated before is indicated by "Indication Mode of Alarm Occurrence Data"

1.2. ALARM INDICATION

7-Segment indication shows the following abnormalities



Alarm Code No.1~6 cycles	Description of abnormality
[<i>L</i> 1-1 <i>l</i>]~[<i>L</i> 5-15]	Excessively Low Pressure
[<i>L</i> 1-1 <i>l</i>]~[<i>L</i> 5-15]	Low Pressure Protection by Suction Gas Thermistor
[<i>L</i> 1-9 <i>l</i>]~[<i>L</i> 5-95]	Excess Low Temperature of Cooler Inlet Refrigerant
[<i>L</i> 1-P5]~[<i>L</i> 5-P5]	Freezing Protection Control by Cooler Inlet Refrigerant Temperature and excess low suction pressure (retry operation)
[13 - 13]	Activation of Freezing Protection Control
[<i>L</i> 1-H <i>l</i>]~[<i>L</i> 5-H5]	Activation of High Pressure Switch
[<i>L</i> 1-5 <i>l</i>]~[<i>L</i> 5-55]	Activation of Discharge Gas Thermostat
[<i>L</i> 1-7 <i>l</i>]~[<i>L</i> 5-75]	Activation of Compressor Internal Thermostat
[<i>L</i> 1-05]~[<i>L</i> 5-05]	Phase Abnormally
[<i>L</i> 1-04]~[<i>L</i> 5-04]	Error communication between Ctrl. PCB and Fan Speed Ctrl. PCB's (Low Ambient Fan Speed Ctrl. Option)
[<i>L</i> 1-24]~[<i>L</i> 5-24]	Failure of Thermistor set before Expansion Valve (Open / Short)
[<i>L</i> 1-4 <i>l</i>]~[<i>L</i> 5-45]	Activation of Fan Motor Internal Thermostat
[22 - 22]	Failure of Ambient Temperature Thermistor (Open / Short)
[<i>L</i> 1-2 <i>l</i>]~[<i>L</i> 5-2 <i>l</i>]	Failure of Cooler Inlet Refrigerant Thermistor (Open/Short)
[<i>L</i> 1-23]~[<i>L</i> 5-23]	Failure of Discharge Gas Thermistor (Open/Short)
[<i>L</i> 1-25]~[<i>L</i> 5-25]	Failure of water outlet temperature thremistor i cooler siter (Open / Short)
[<i>L</i> 1-26]~[<i>L</i> 5-26]	Failure of Suction Gas Thermistor (Open / Short)
[<i>L</i> 1-27]~[<i>L</i> 5-27]	Failure of Discharge Gas Pressure Sensor (Open / Short)
[<i>L</i> 1-28]~[<i>L</i> 5-28]	Failure of Suction Gas Pressure Sensor (Open / Short)
[<i>L</i> P - <i>L</i> P]	Error communication between Ctrl. PCB (PCB _{C1} , PCB _{C2})
[11 - 11]	Failure of Water Inlet Temperature (Open / Short)
[12 - 12]	Failure of Water Outlet Temperature Thermistor (Open / Short)
[15 - 15]	Failure of Water Outlet 2 Temperature Thermistor (Open/Short)
[16 - 16]	Failure of Water Outlet 3 Temperature Thermistor (Open/Short)
[40 - 40]	Malfunction
[<i>L</i> 1-0 <i>l</i>]~[<i>L</i> 5-05]	Activation of Differential Pressure Control
[<i>L</i> 1-5 <i>l</i>]~[<i>L</i> 5-55]	Activation of Thermal Relay for Compressor
[<i>L</i> 1-5P]~[<i>L</i> 5-5P]	No Feedback Signal from Water Pump
[<i>L</i> 1-P _w]~[<i>L</i> 5-P _w]	Alarm of Excessively High Water -Temperature
[5E - 5E]	Alarm of Water Failure (Differential Water Pressure Switch Option)
[<i>R</i> P - <i>R</i> P]	Activation of Additional Protection Device (Option)

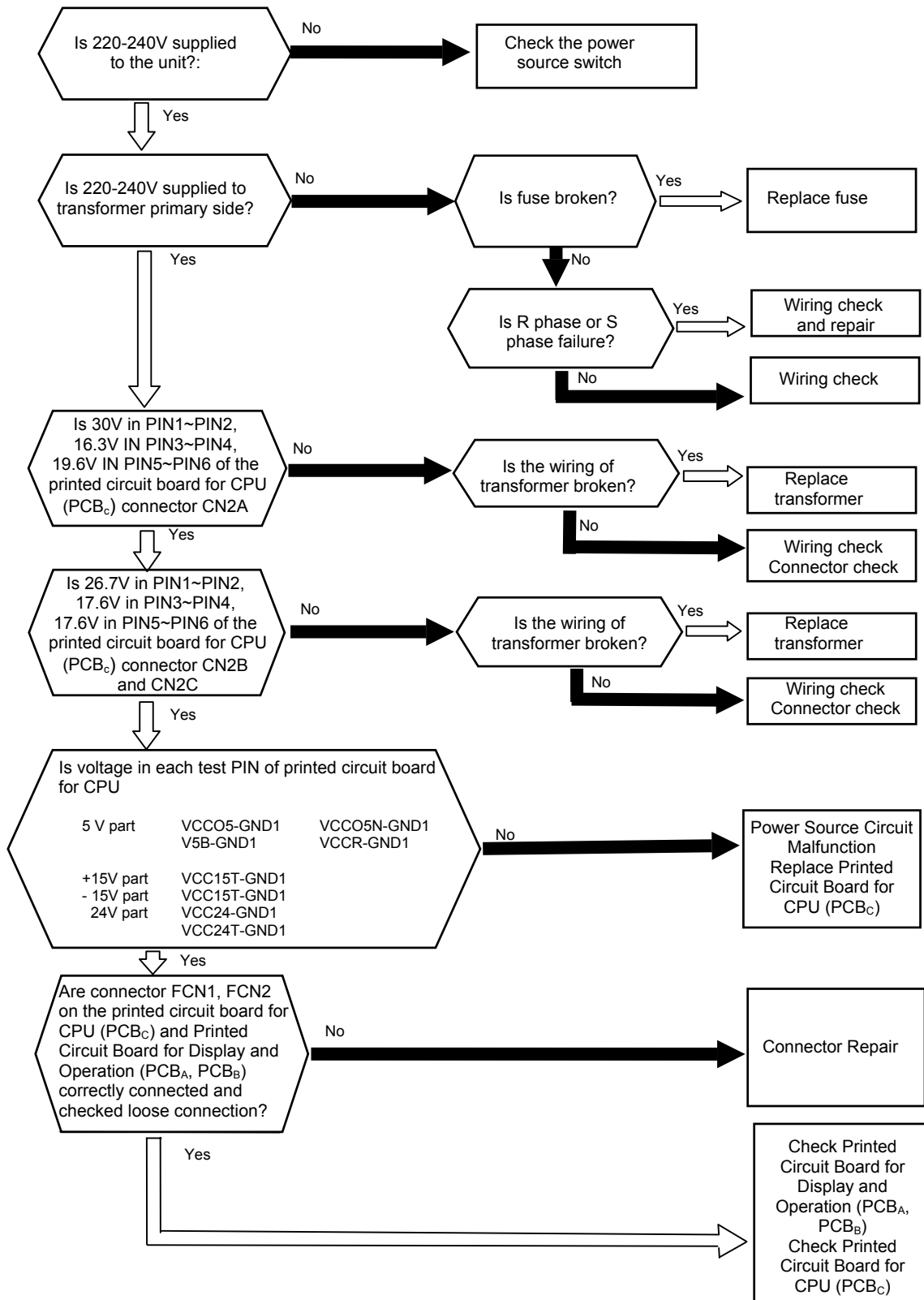
" " - " " : Flickering.

XX - XX : SEG1-SEG2

1.3. FAILURE DIAGNOSIS METHOD

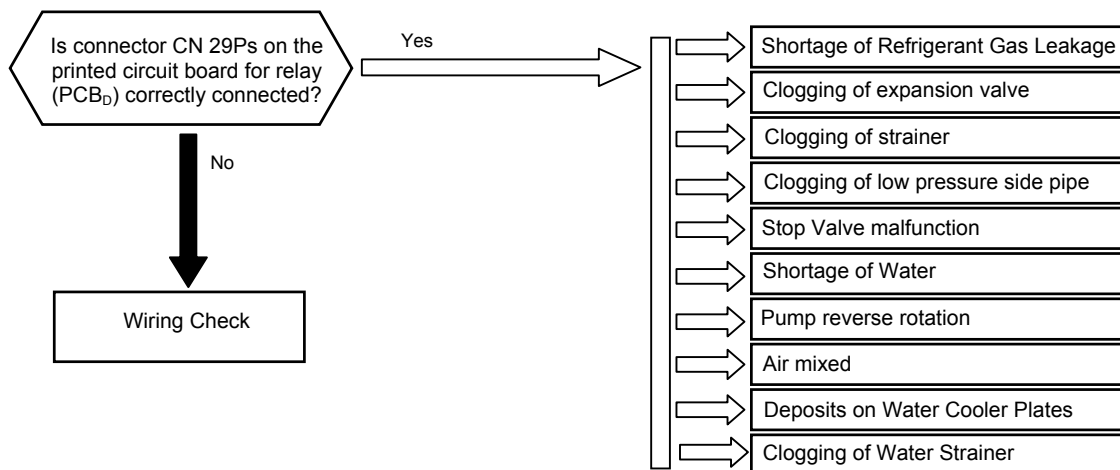
1.3.1. GENERAL CHECK OF FAILURE DIAGNOSIS.

In the case of no segment indication, unit cannot operate.



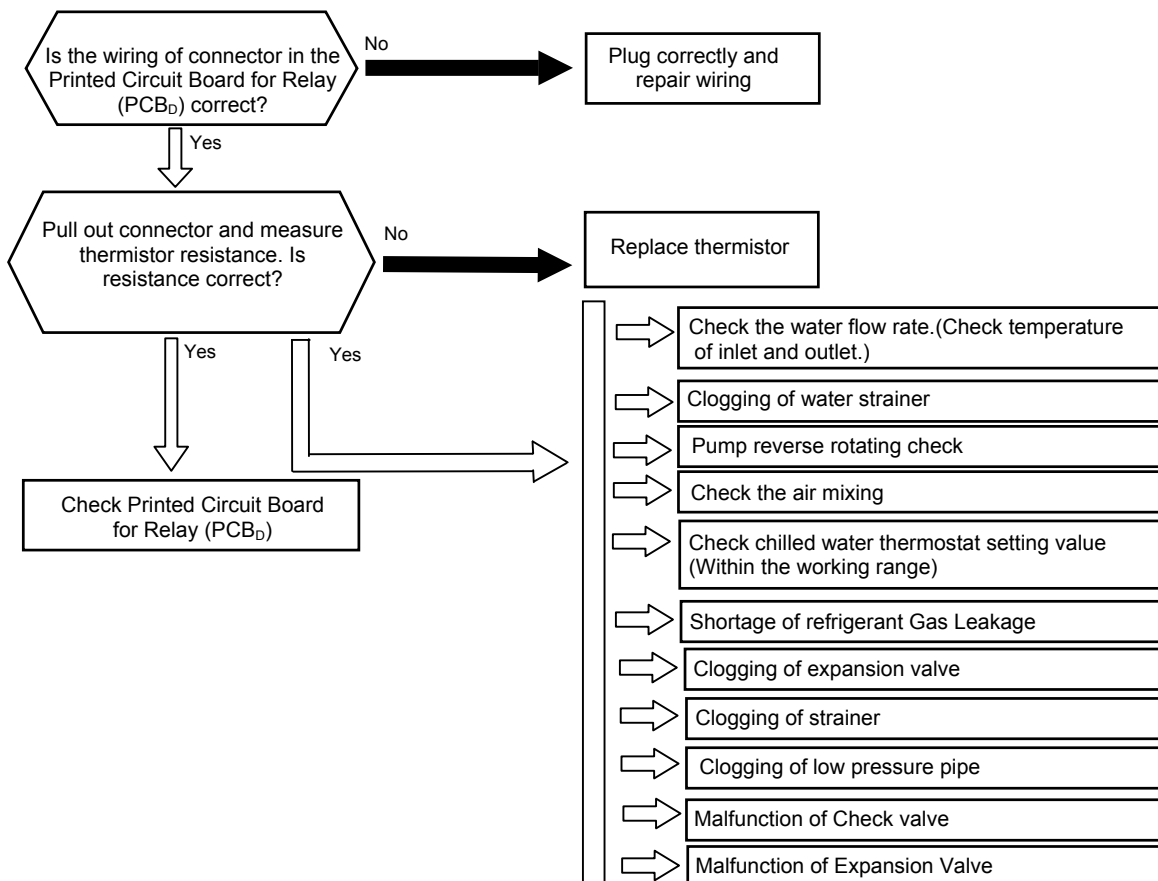
■ [E 1-L 1] ~ [E 5-L 5] Excessively Low Suction Pressure

In case of the suction pressure is less than 0.31 Mpa during 90 seconds, the unit will stop at once and indicate "[E 1-P 5]~[E 5-P 5]". 3 minutes later, the unit will start again. This Alarm code is indicated when it occurs 3 times during 30 minutes (It will retry until 2 times.).

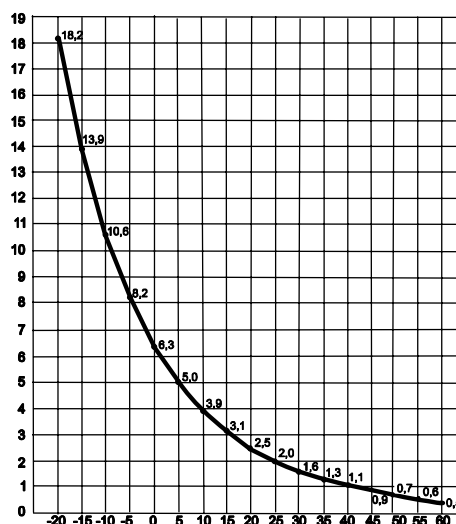


■ [E 1-1] ~ [E 5-15] Low Pressure Protection by Suction Gas Thermistor

This alarm code is indicated when the suction temperature is lower than -2°C during 10 seconds.



Thermistor resistance (KΩ)

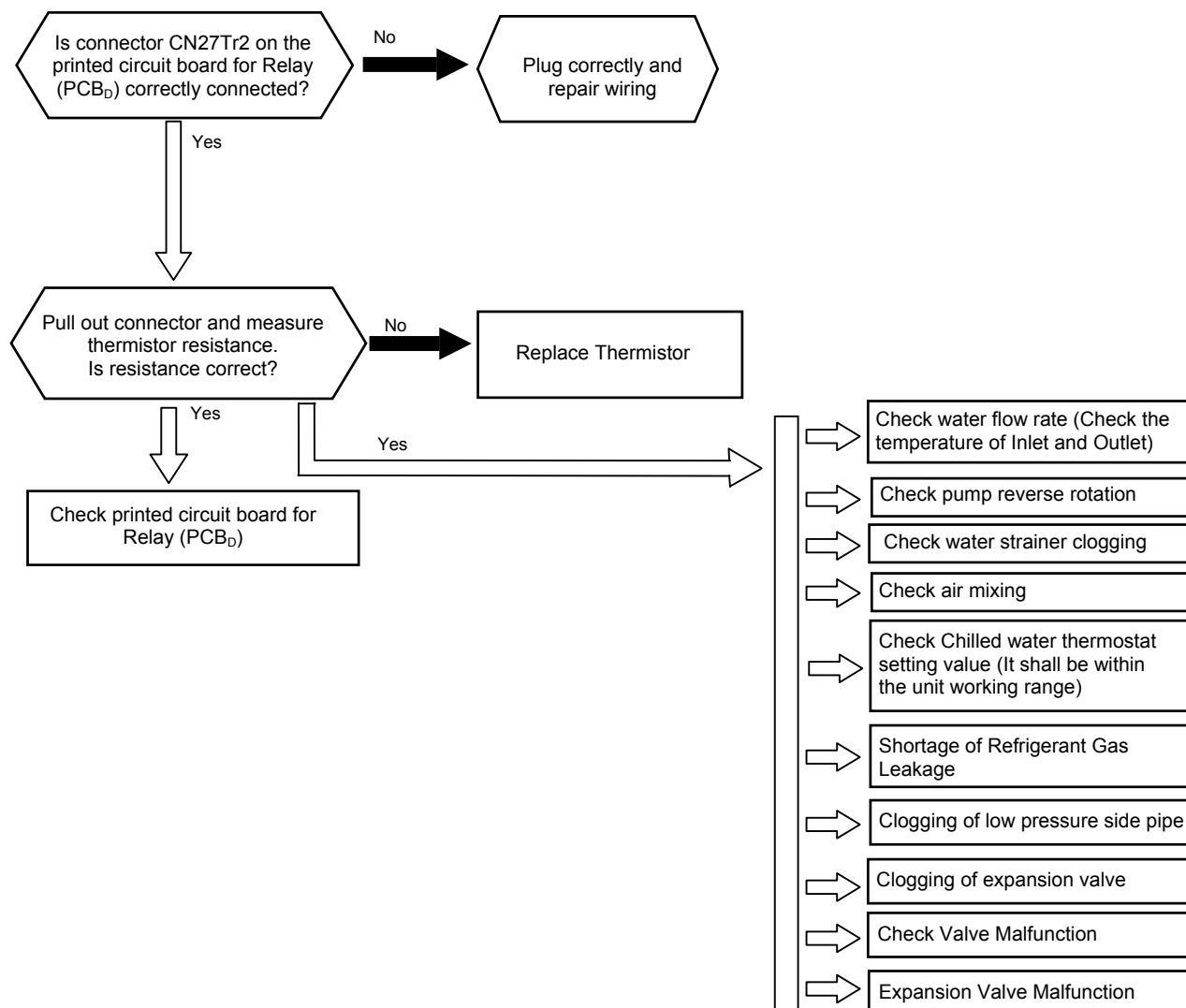


Temperature (°C)

Thermistor for Suction Gas Temperature characteristics

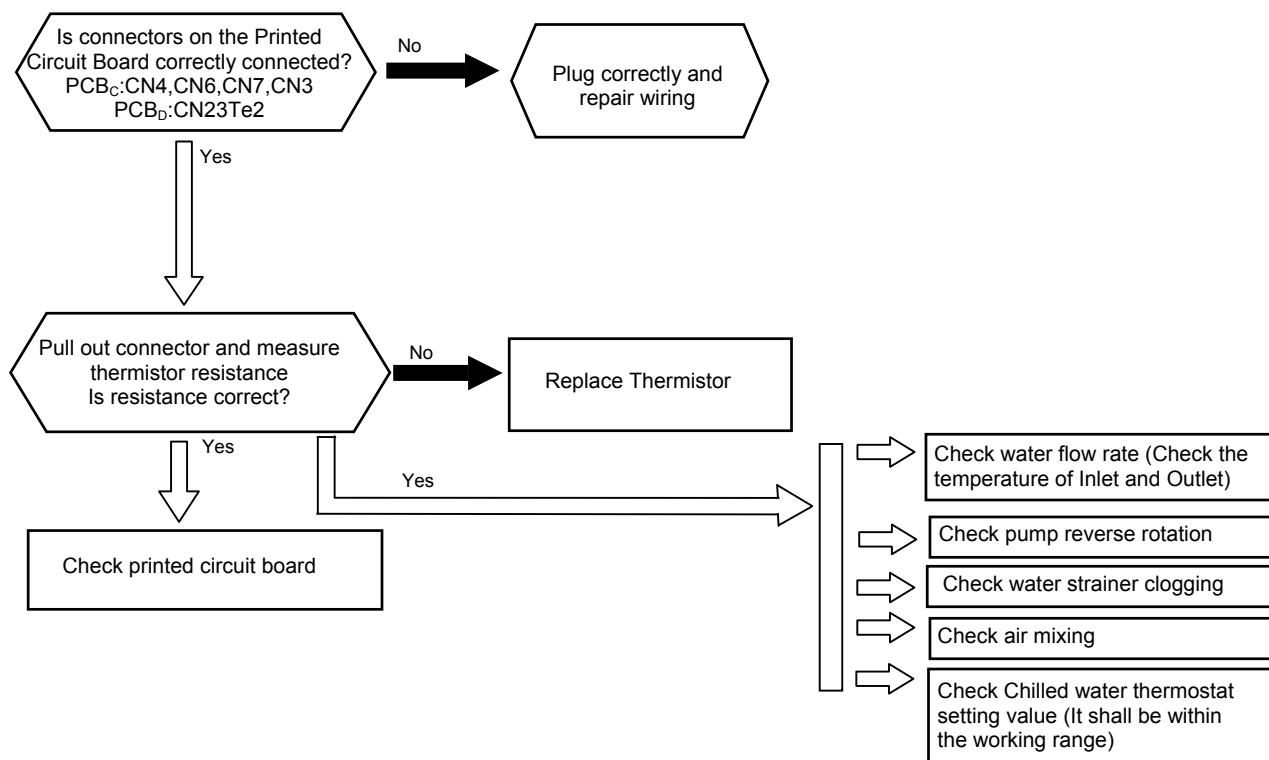
■ [E 1-9]~[E 5-9E] Excess Low Temperature of Cooler Inlet Refrigerant

In case of the cooler inlet refrigerant temperature is lower than -3°C during 10 seconds, the unit will stop at once and indicate "[E 1-P5]~[E 5-P5]". 3 minutes later, the unit will start again. This alarm code is indicated when it occurs 3 times during 30 minutes (It will retry until 2 times)

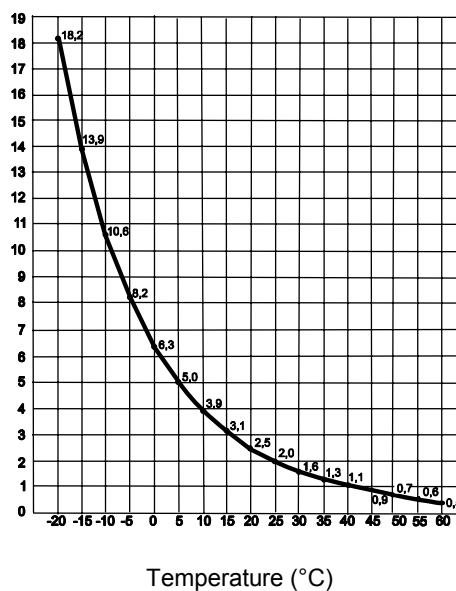


■ [13 - 13] Activation of Freeze Protection Control

This alarm code is indicated when the water inlet or outlet temperature is lower than 2°C.



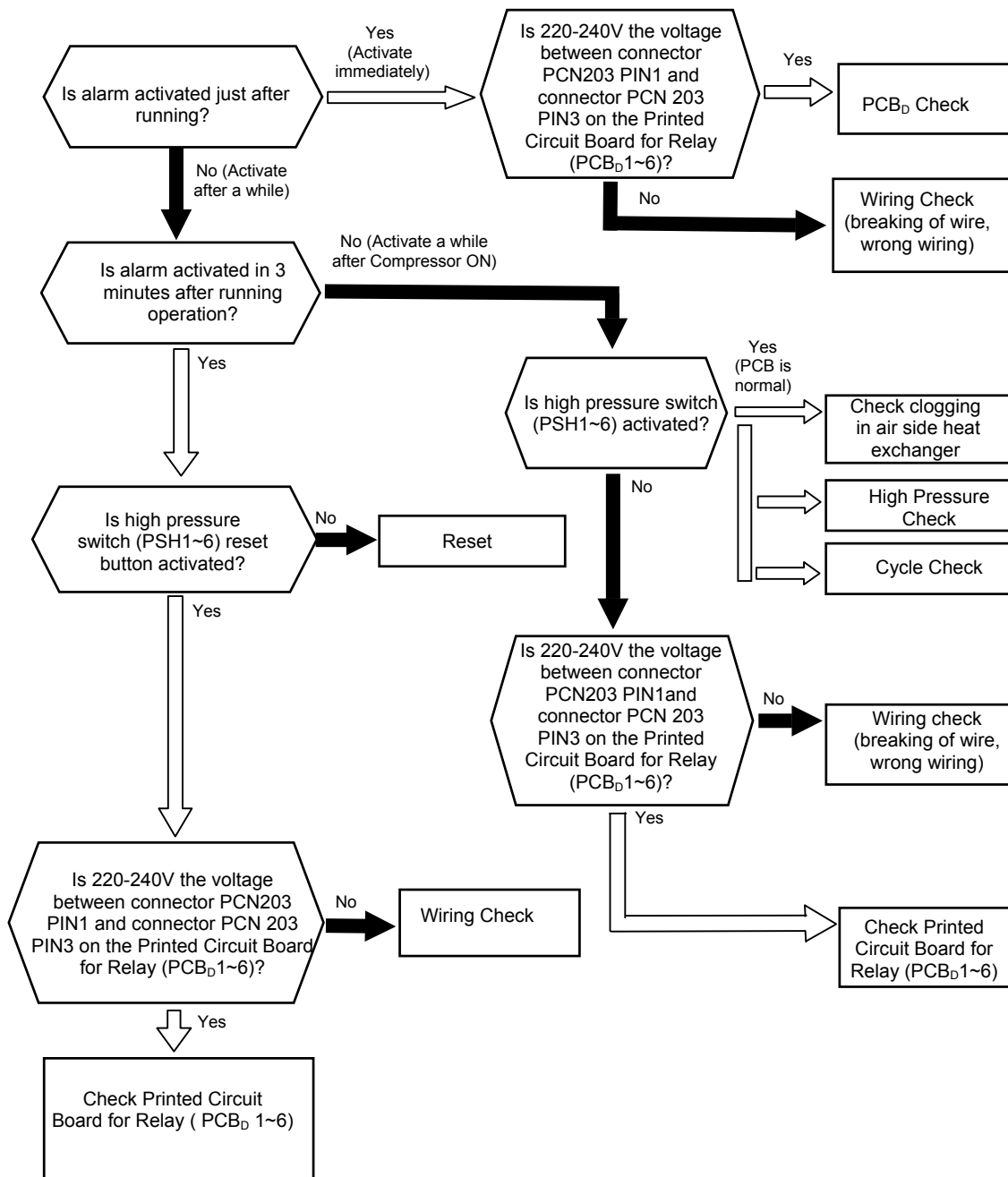
Thermistor resistance (KΩ)



Thermistor for Water Temperature characteristics

■ [I-H] ~ [E-H] Activation of high pressure switch (PSH₁₋₆)

This alarm code is indicated when the discharge pressure is higher than 2.74 Mpa.

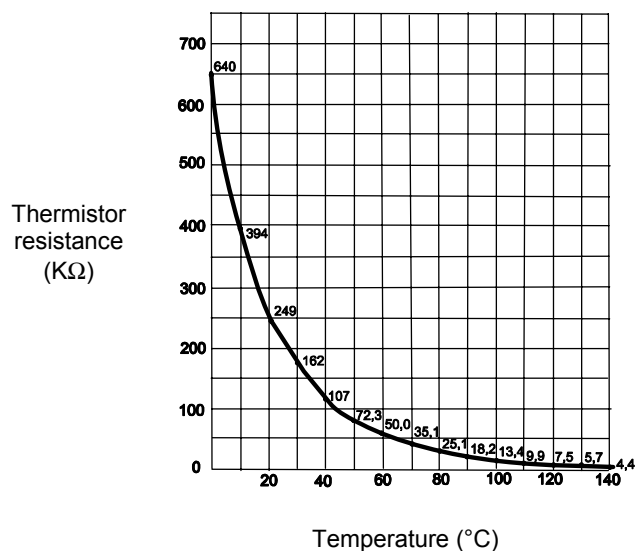
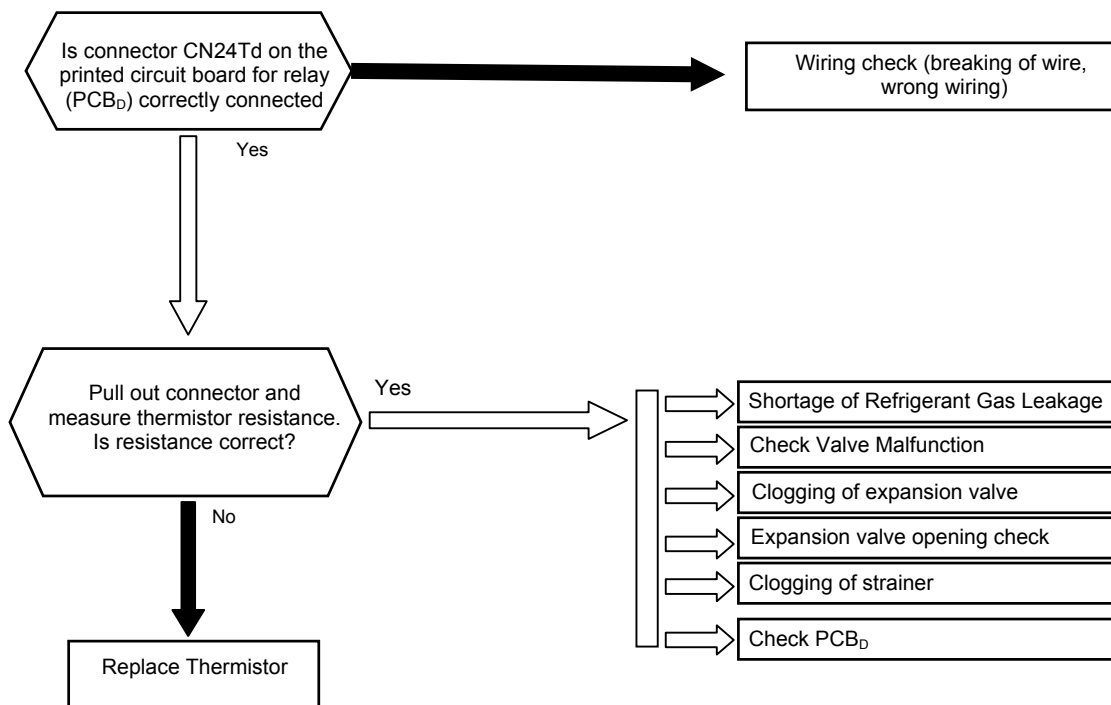


NOTE:

To check the nominal value for pressure refer to safety and control device setting table to the technical catalogue

■ [E 1-5 1] ~ [E 5-55] Activation of Discharge Gas Thermostat

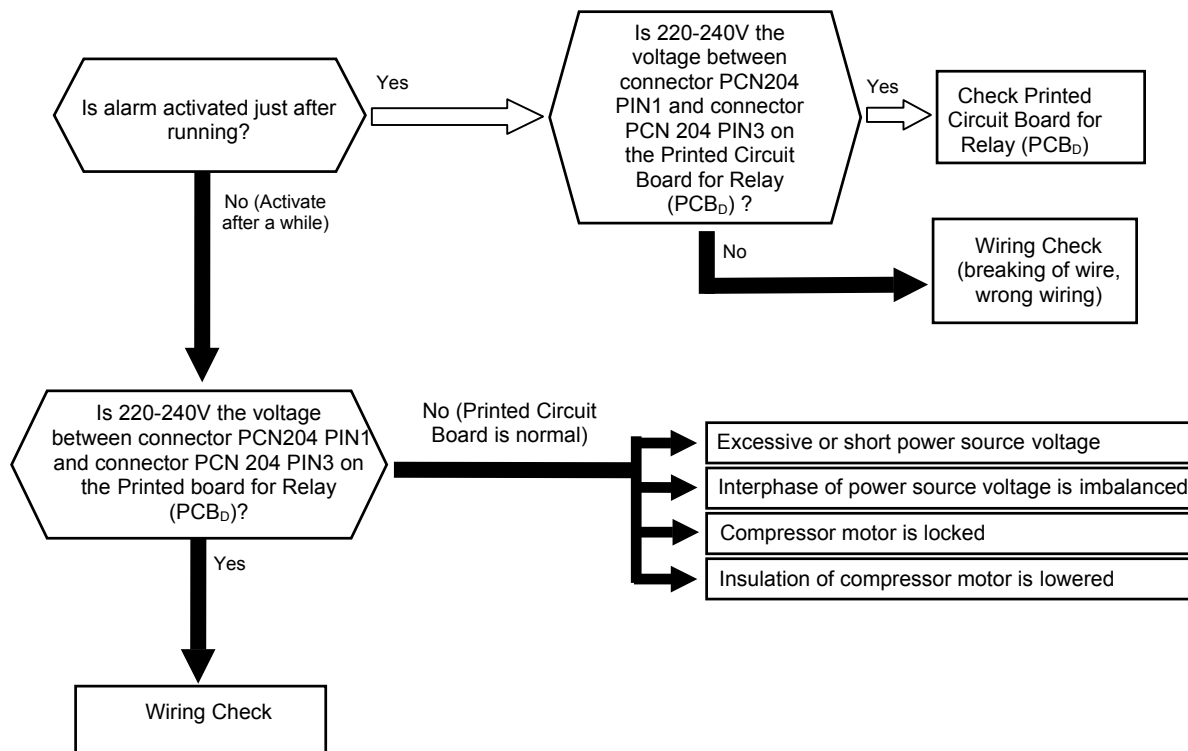
This alarm code is indicated when the temperature in discharge pipe is higher than 140°C



Thermistor for Discharge Gas Temperature characteristics

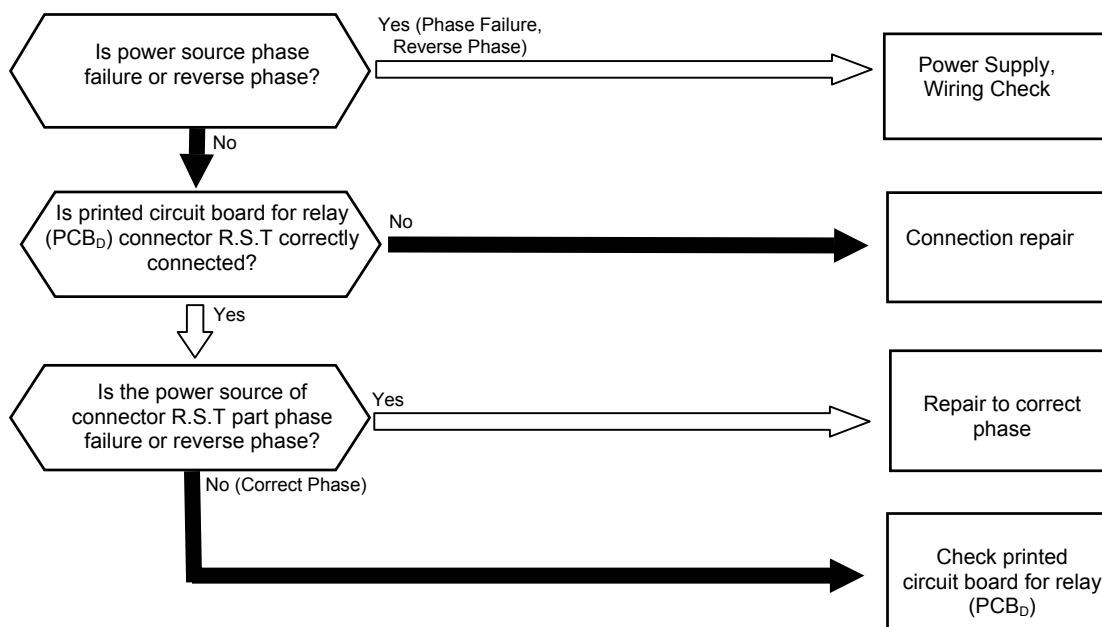
■ [E 1-71] ~ [E 5-75] Activation of Compressor Internal Thermostat

This alarm code is indicated when the compressor internal thermostat is higher than 115°C



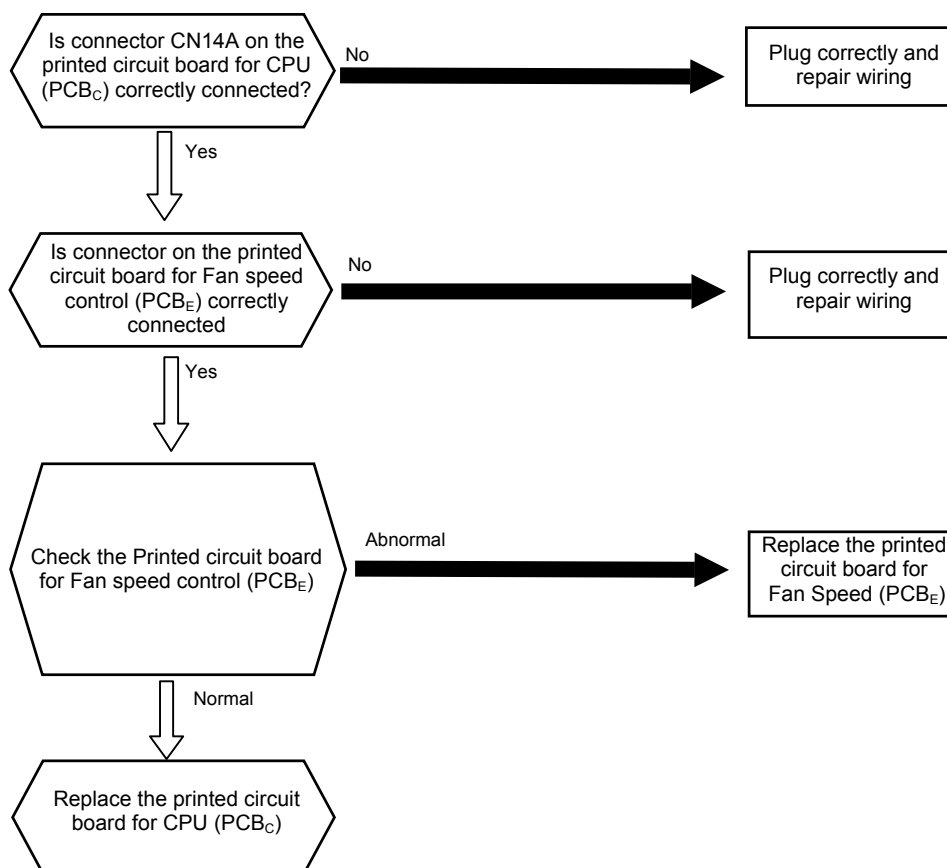
■ [E 1-05] ~ [E 5-05] Phase Abnormality

This alarm code is indicated when the power source phase failure or reverse phase occur.



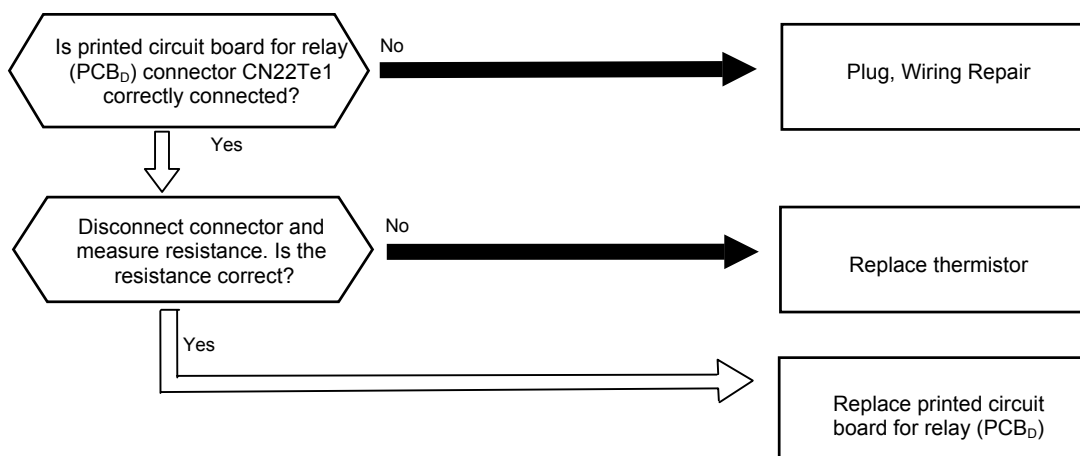
■ [E1-04]~[E5-04] Error communication between Ctrl. PCB and Fan speed Ctrl. PCB

This alarm code is indicated when the transmission signal is missing more than 5 seconds.



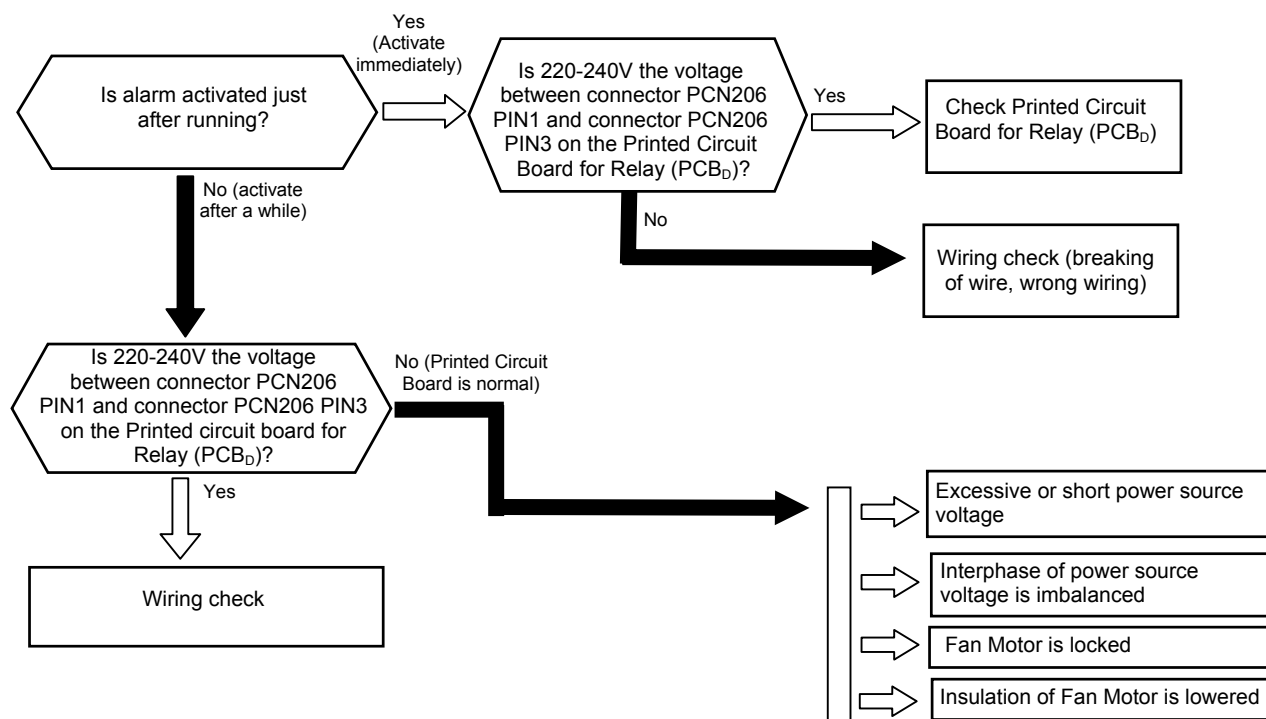
■ [E 1-24]~[E 5-24] Thermistor set before Expansion Valve Abnormality

This alarm code is indicated when the thermistor resistance is out of range ($72 \Omega \leq \text{Resistance} \leq 179 \text{ k}\Omega$)



■ [E 1-4 1]~[E 5-45] Activation of Fan Motor Internal Thermostat

This alarm code is indicated when the fan motor internal thermostat is higher than 135°C



■ [11-14][12-12][15-15][16-16][22-22][1-25]~[16-25] Temperature Thermistor Abnormality

This alarm code is indicated when the thermistor resistance is out of range.

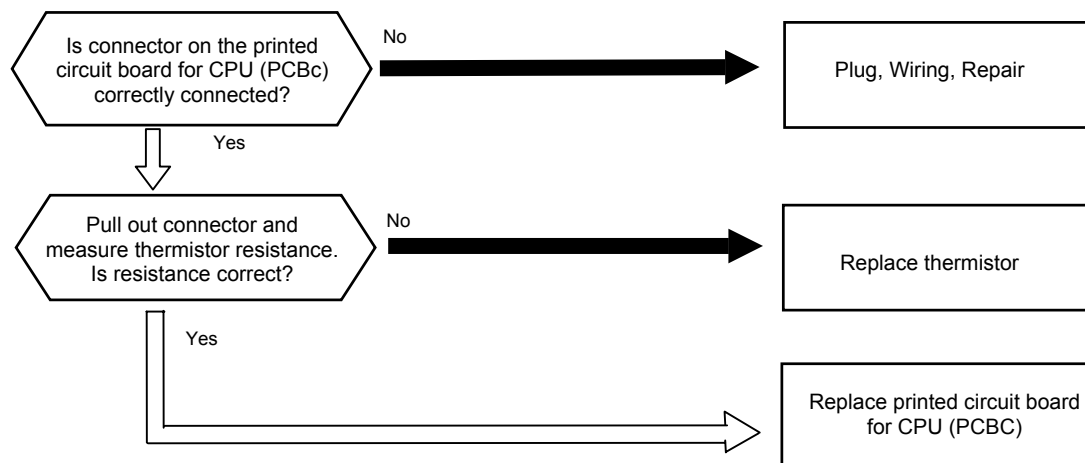
(Water Temperature Thermistor: $240\ \Omega \leq \text{Resistance} \leq 39\ \text{k}\Omega$)

(Ambient Temperature Thermistor: $240\ \Omega \leq \text{Resistance} \leq 600\ \text{k}\Omega$)

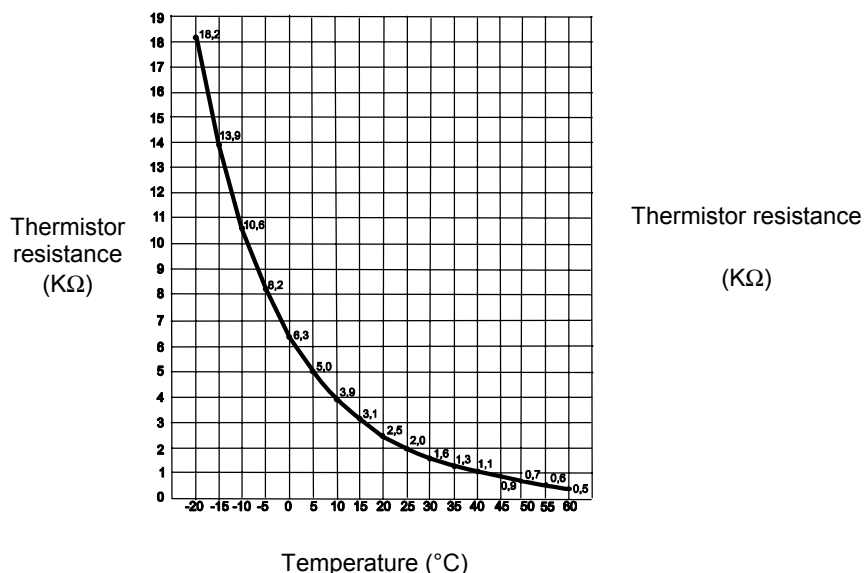
[11-14] Inlet Water Temperature Thermistor Abnormality

[12-12][15-15][16-16] Outlet Water Temperature Thermistor Abnormality

[22-22] Ambient Temperature Thermistor Abnormality



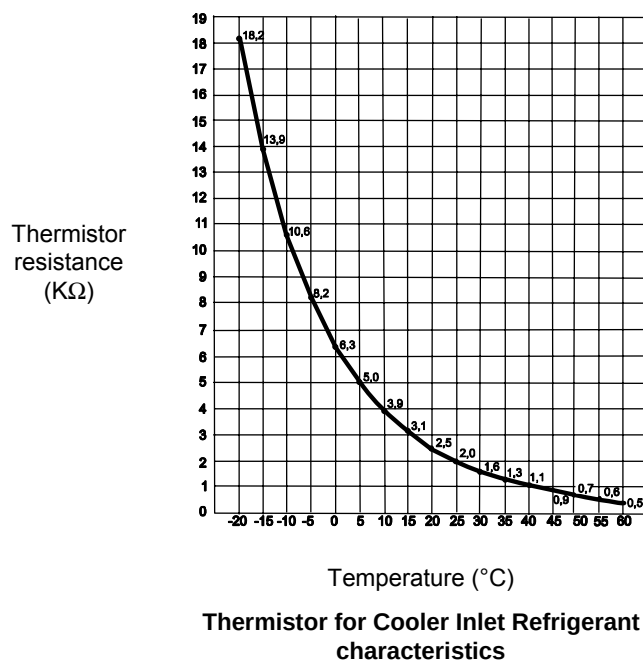
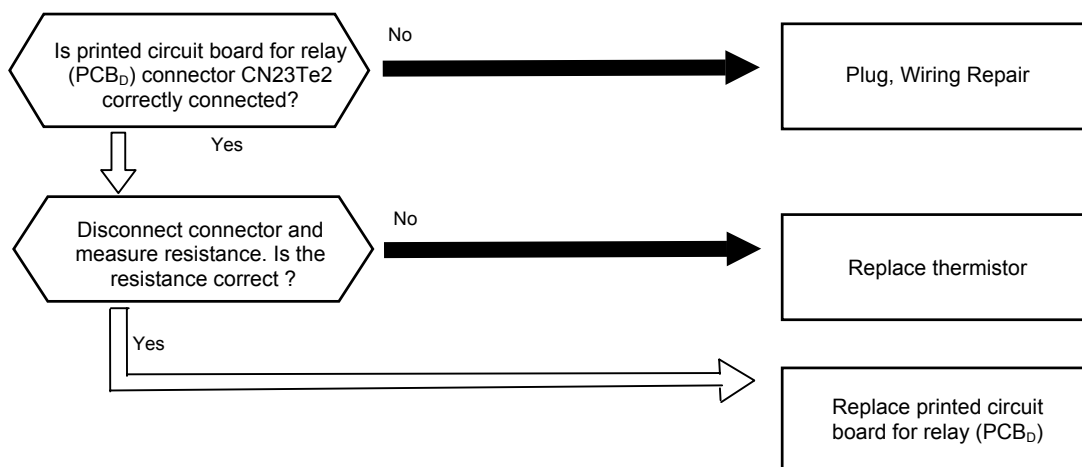
[11-14][12-12][15-15]
[1-25]~[16-25]
[22-22]



Thermistor for Water Temperature characteristics

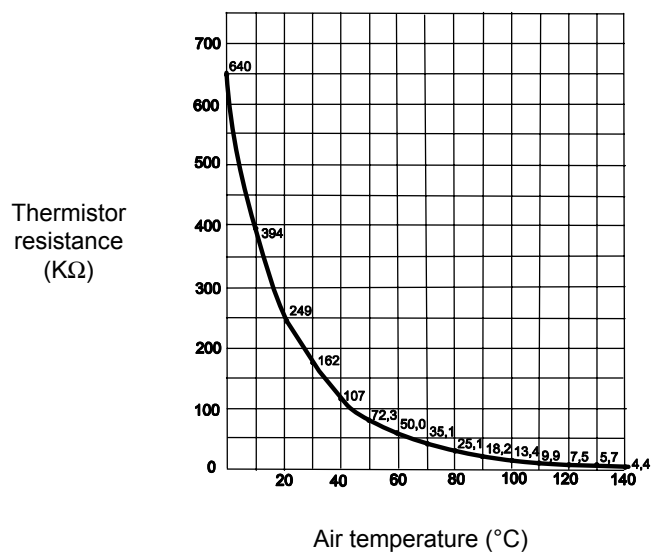
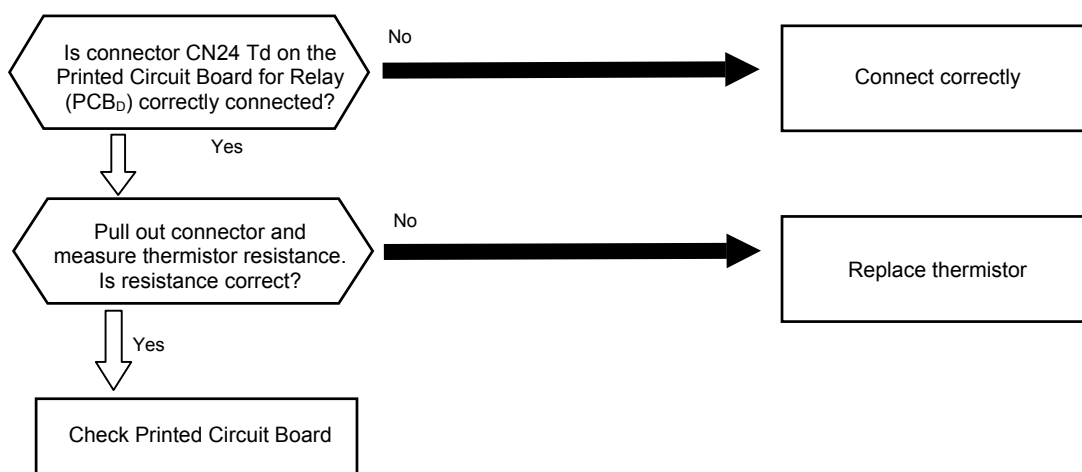
■ [E 1-2 1]~[E 5-2 1] Cooler Inlet Refrigerant Temperature Thermistor Abnormality

This alarm code is indicated when the thermistor resistance is out of range ($72 \Omega \leq \text{Resistance} \leq 179 \text{ k}\Omega$)



■ [E 1-23]~[E 5-23] Discharge Gas Temperature Thermistor Abnormality

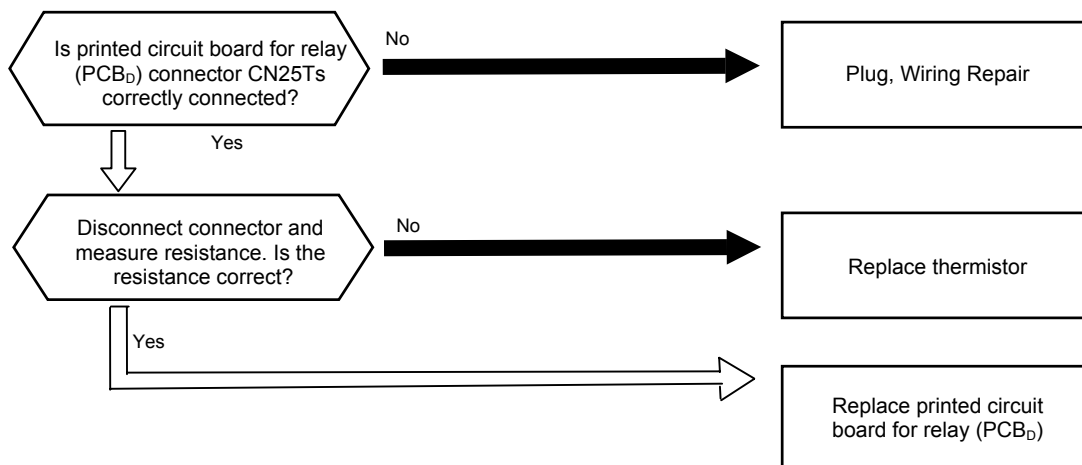
This alarm code is indicated when the thermistor resistance is out of range (Refer below table).



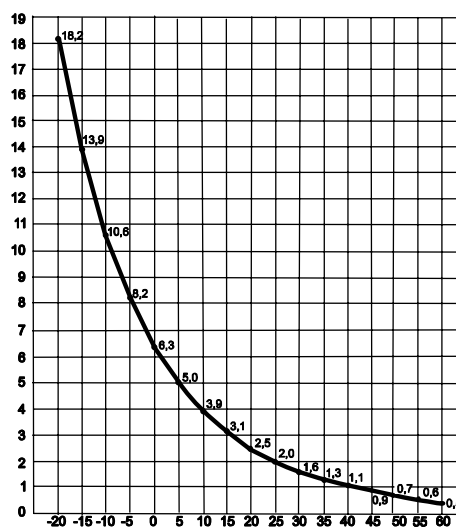
Thermistor for Discharge Gas Temperature characteristics

■ [E1-2E]~[E5-2E] Suction Gas Thermister Abnormality

This alarm code is indicated when the thermistor resistance is out of range ($72\ \Omega \leq \text{Resistance} \leq 179\ \text{k}\Omega$)



Thermistor
resistance
(K Ω)

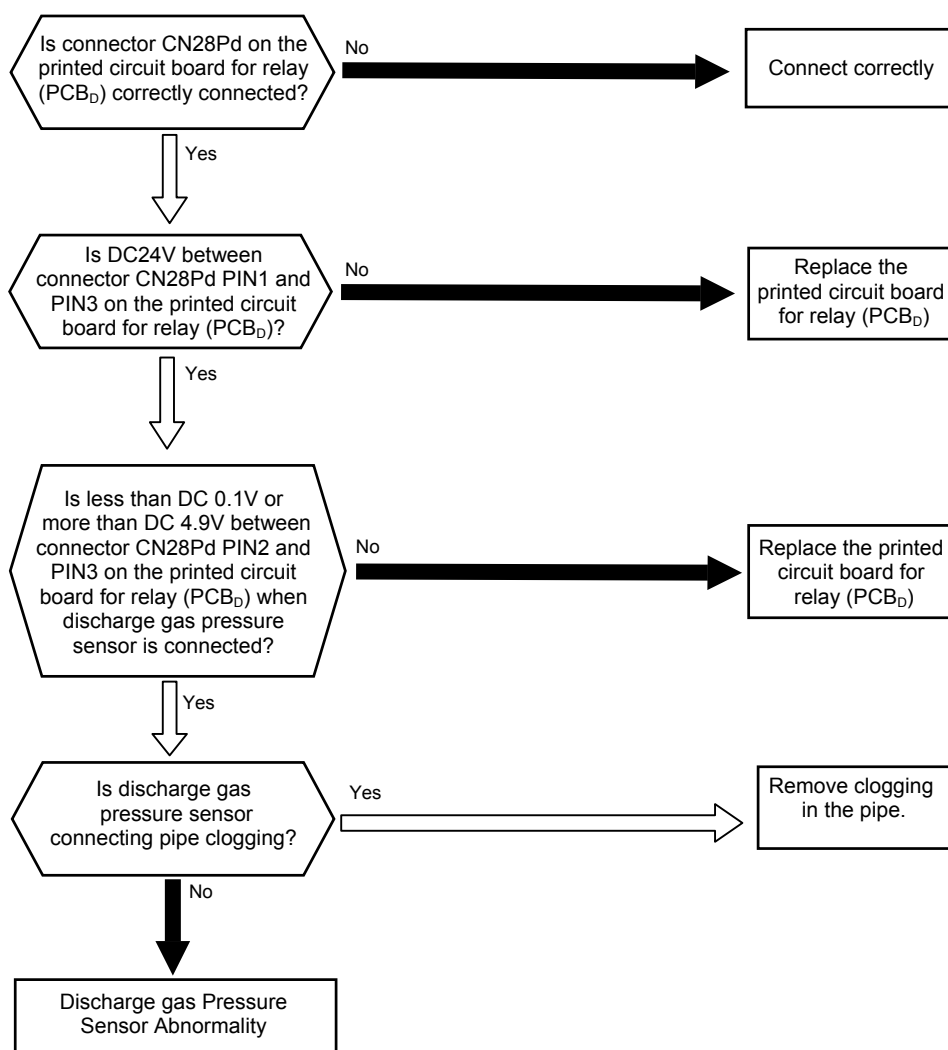


Temperature (°C)

Thermistor for Suction Gas Temperature
characteristics

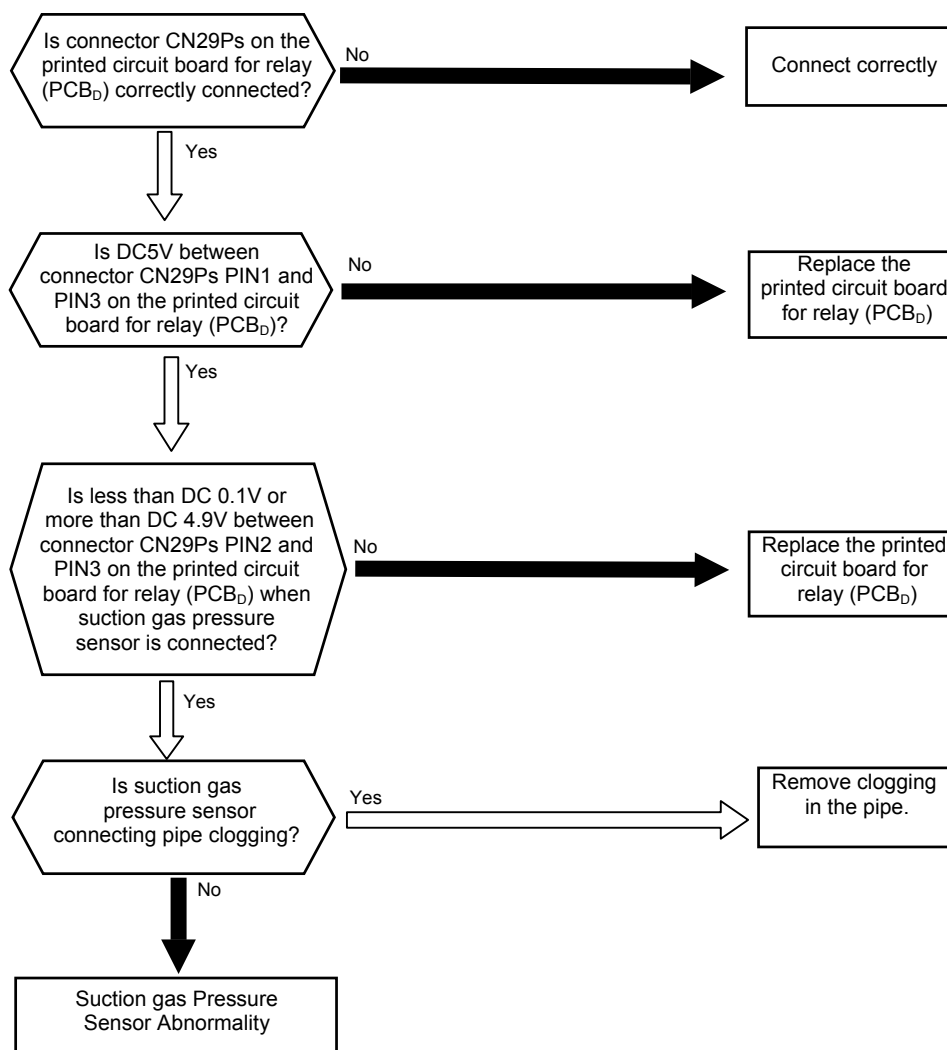
■ [C 1-27] [CB-27] Discharge Gas Pressure Sensor Abnormality

Malfunction of pressure sensor



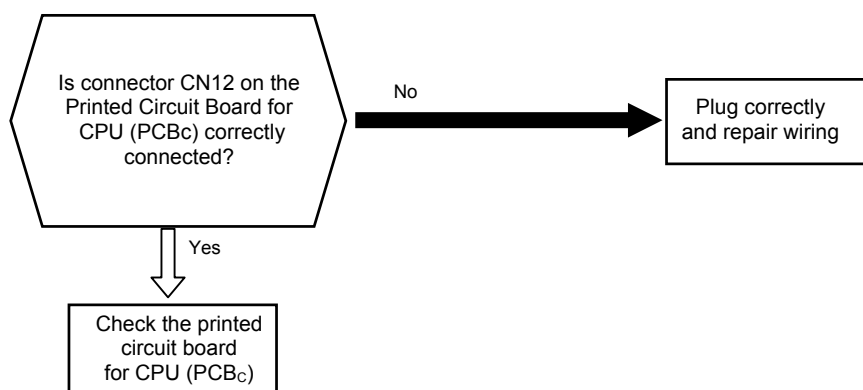
■ [E 1-2B] [E5-2B] Suction Gas Pressure Sensor Abnormality

Malfunction of pressure sensor



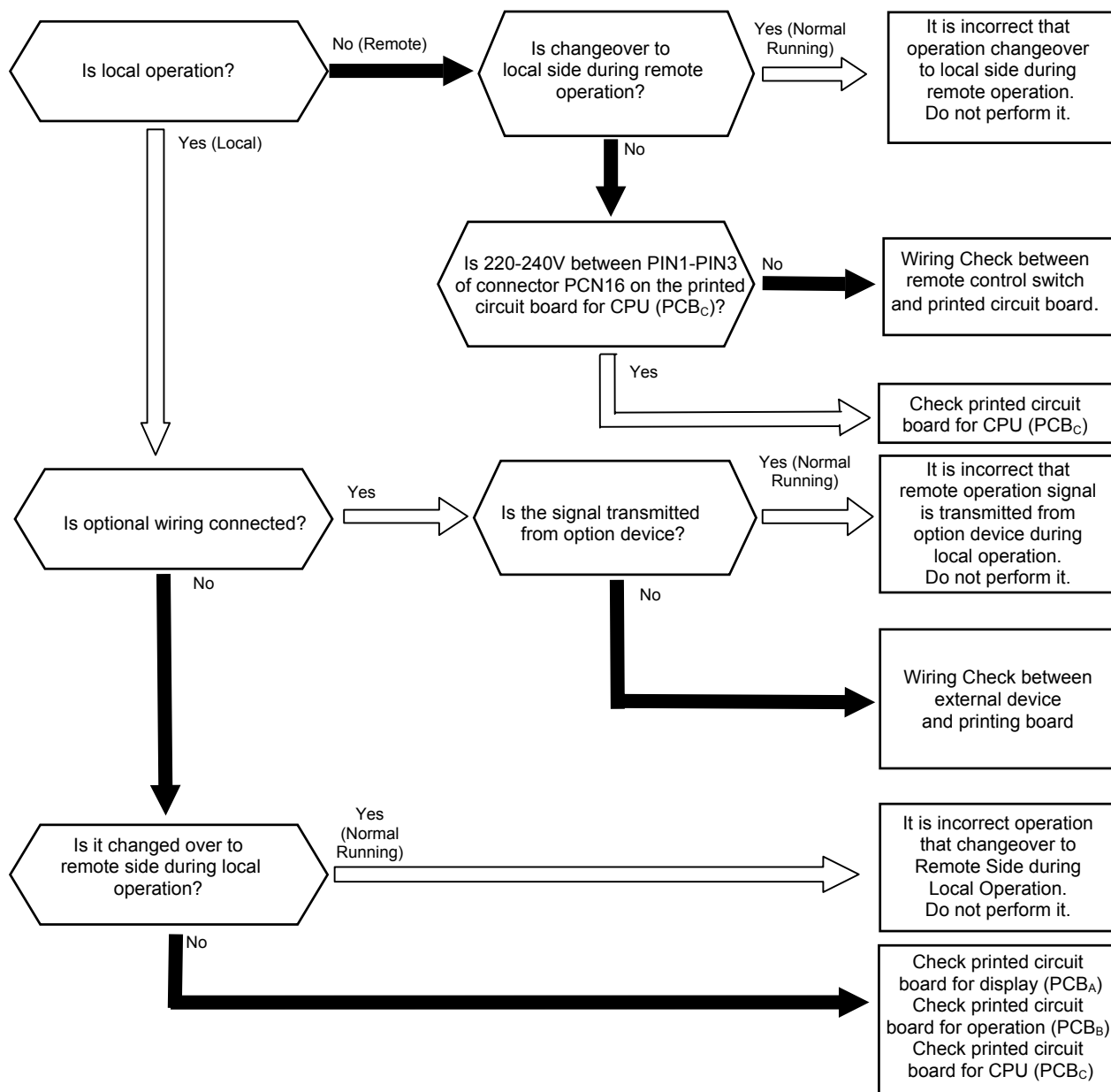
■ [LP-LP] Error communication between Ctrl. PCB

This alarm code is indicated when the transmission signal between Ctrl PCB is missing more than 30 seconds.



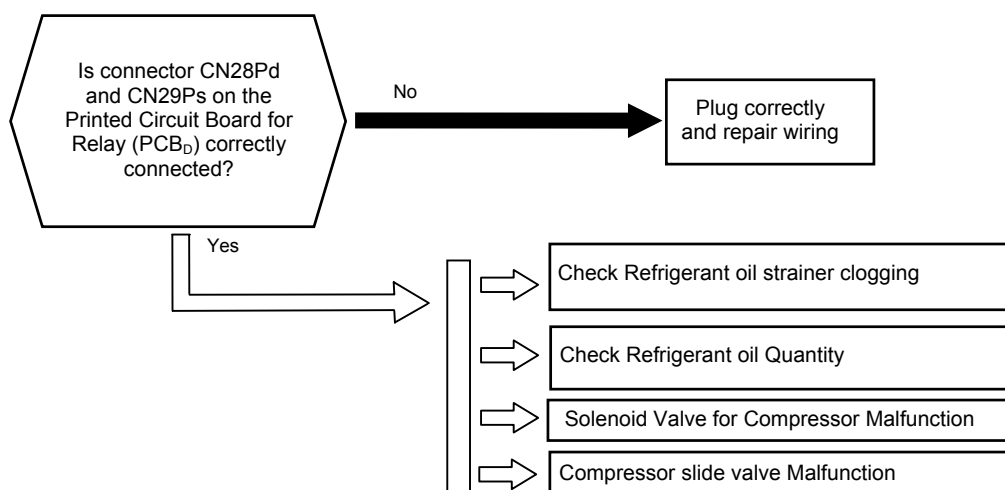
■ [40-40] Alarm for Operation Error

Performed incorrect operation.



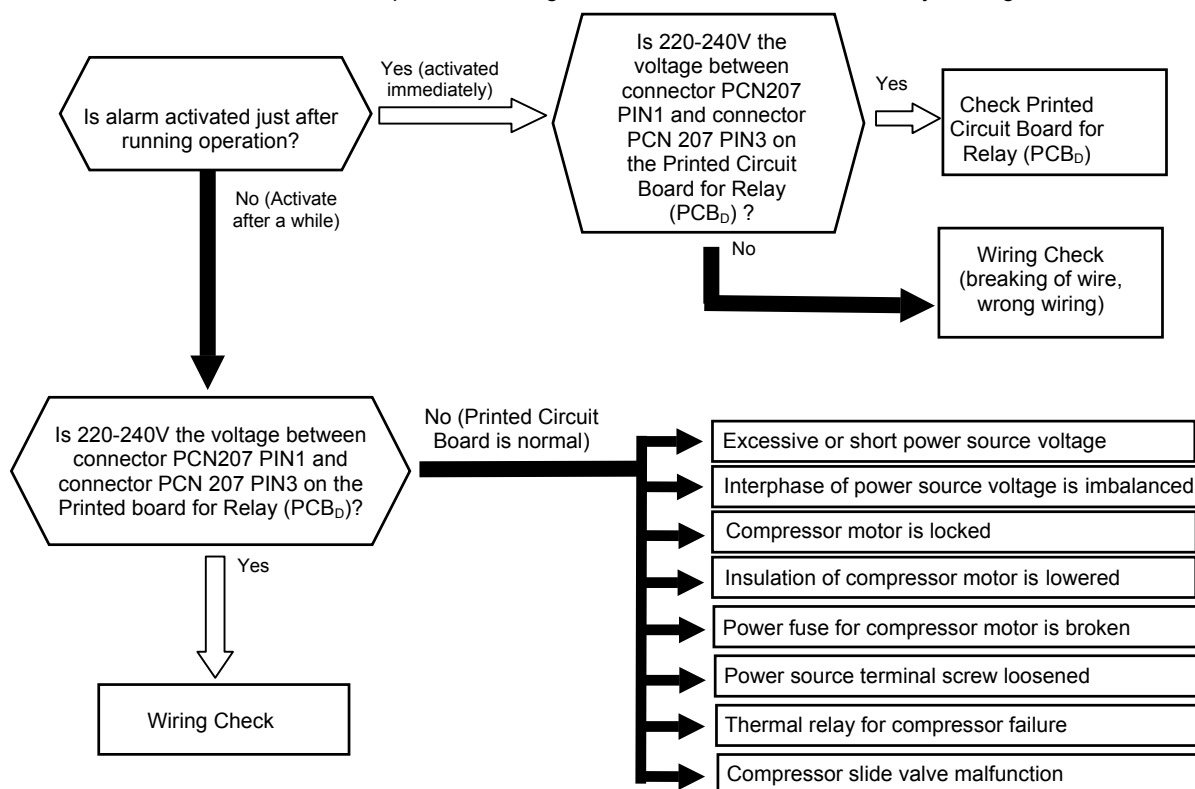
■ [E1-01] ~ [E5-05] Activation of Differential Pressure Control

This alarm code is indicated when the pressure difference between discharge and suction pressure is less than 0.3 Mpa during 3 minutes.



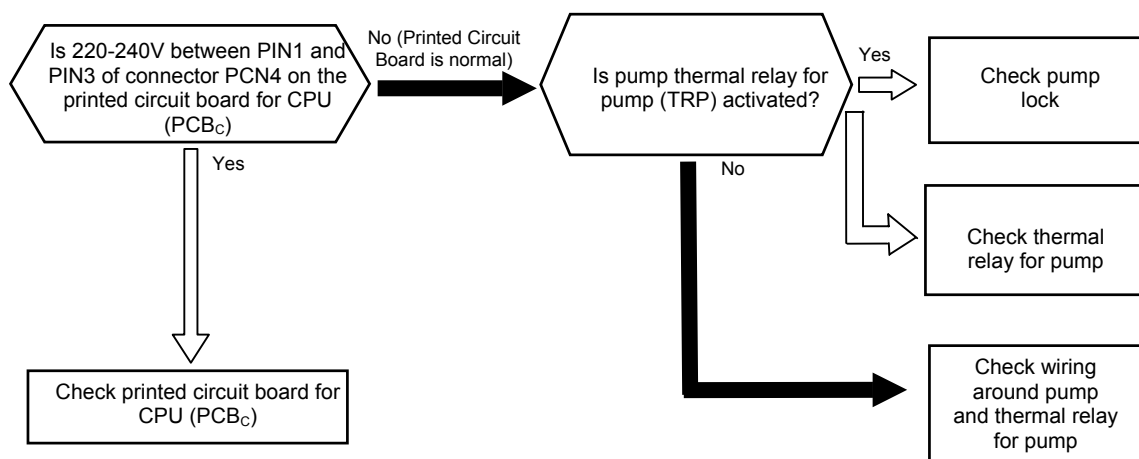
■ [E 1-5 1] ~ [E 5-5E] Activation of Thermal Relay for Compressor

This alarm code is indicated when the compressor running current is more than thermal Relay Setting Value.



■ [E 1-5P] ~ [E 5-5P] No Feedback Signal from Water Pump

CMP pump feed back signal is not coming and Unit stops

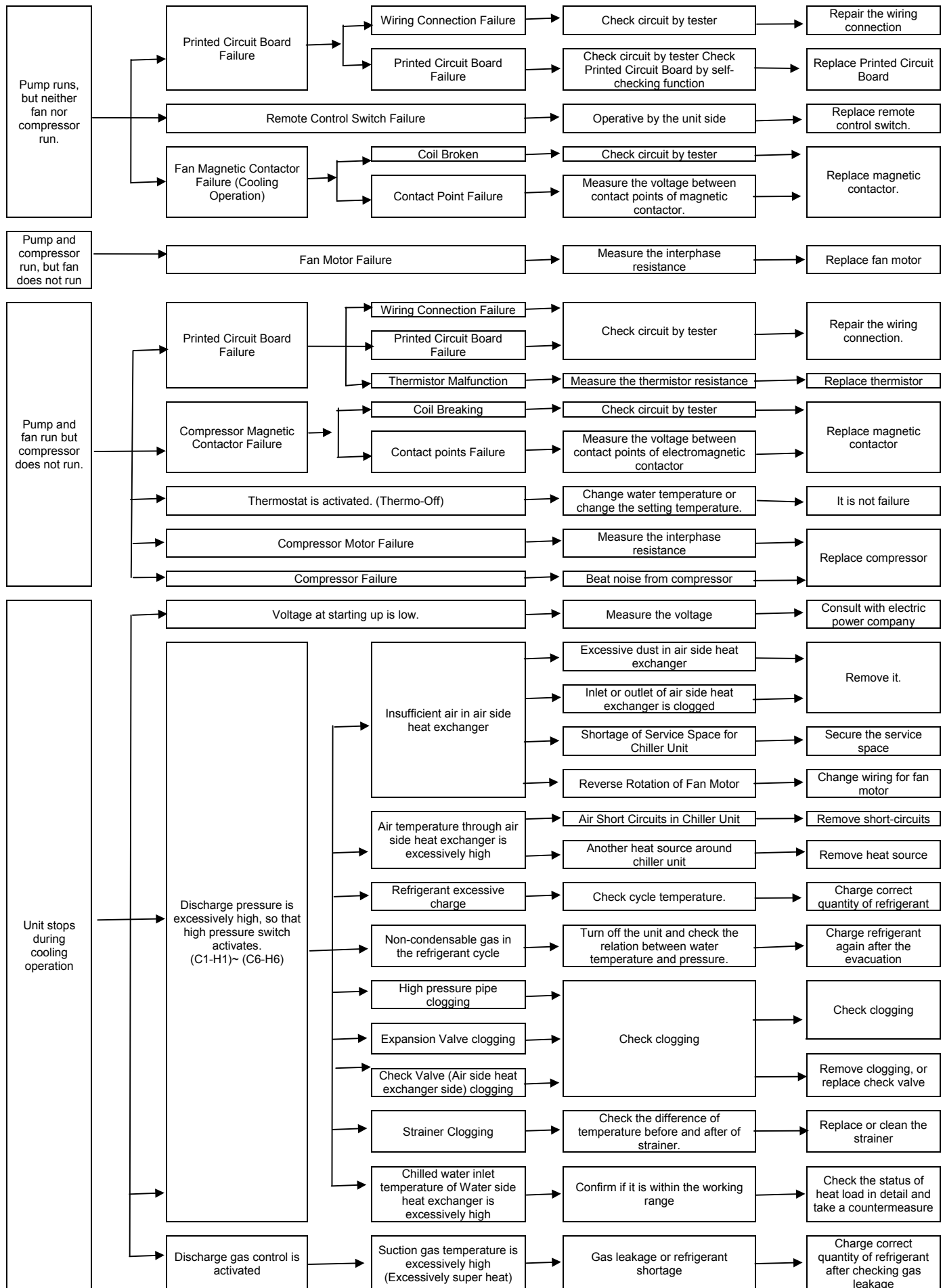


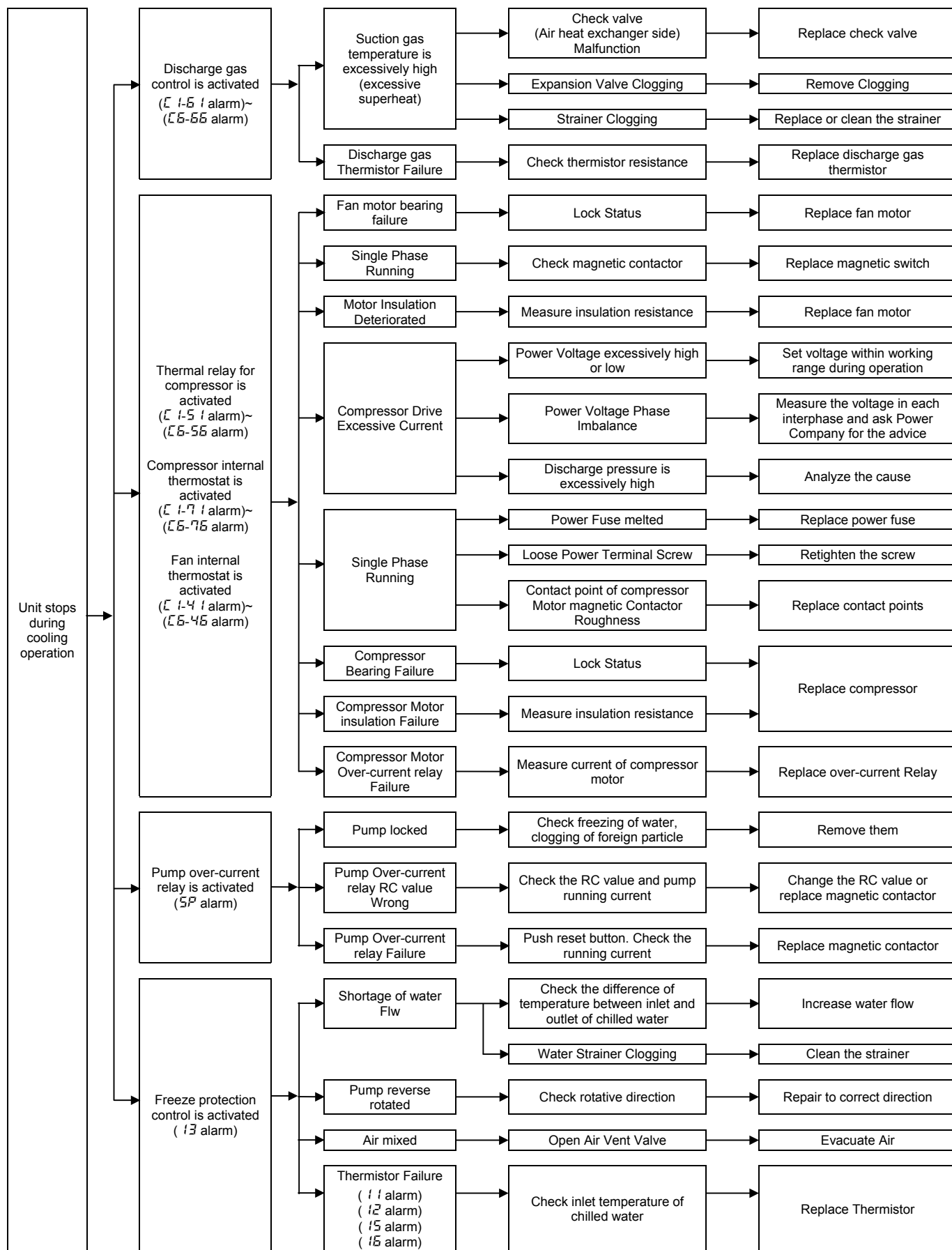
1.4. ANALYSIS AND COUNTERMEASURE OF ABNORMAL RUNNING

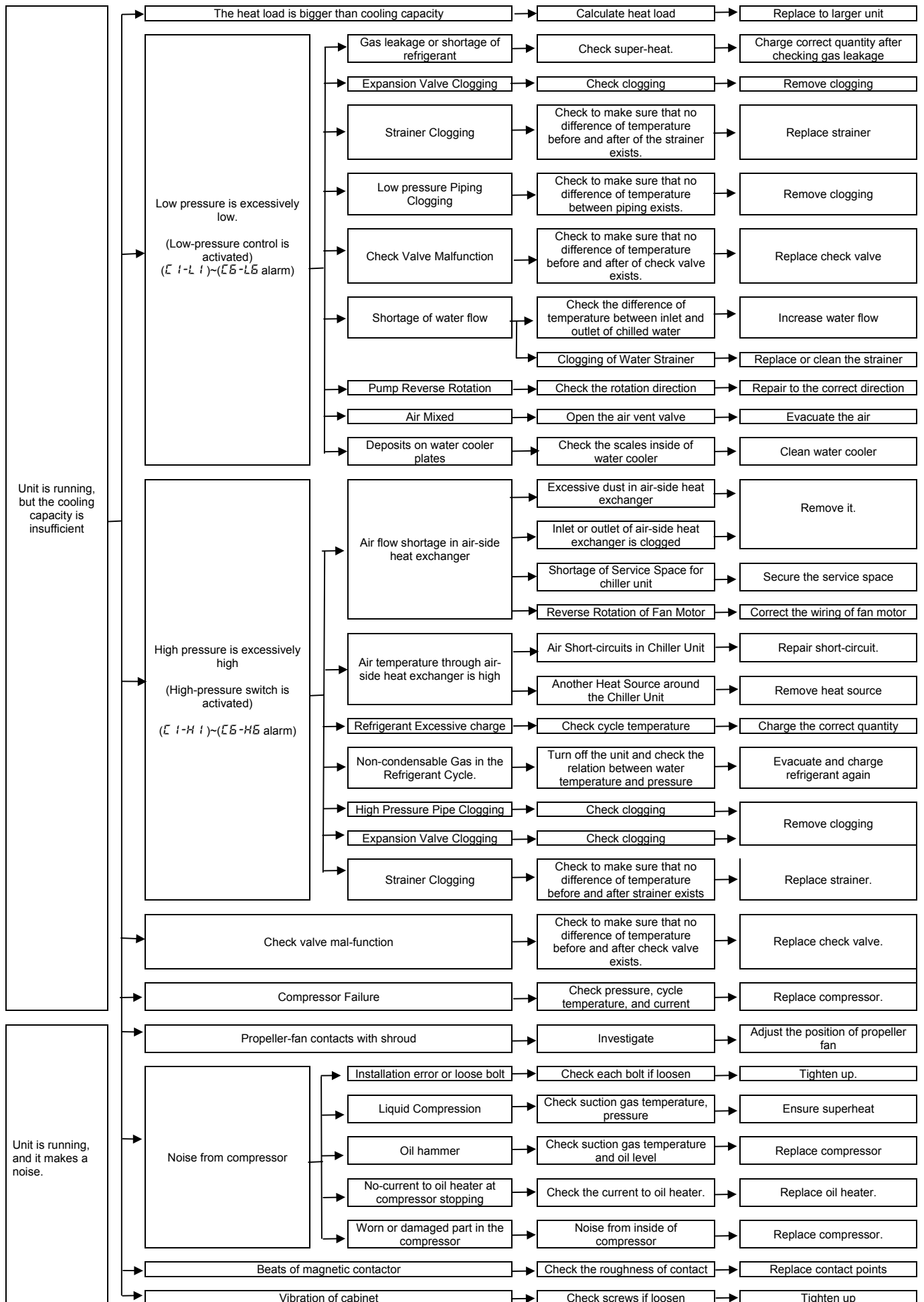
Chiller unit has various kinds of protection device. When the operation is not correct status due to the activation of some protection device, refer to the table below and find out the main reason to take a countermeasure.

1 failure can affect other different conditions. Thus, do not check only 1 point but analyze it from overall viewpoint in detail.

Phenomenon	Cause	Check Point	Countermeasure
It does not run when operate	Power Failure	Measure voltage by tester.	Wait the recovery of power source
	Power is OFF	Check power switch.	Power Switch ON
	Fuse for power source is melted	Wiring Short Circuit	Check falling of wiring coating.
		Wiring Earth Fault	Measure insulation resistance.
		Compressor Motor Failure	Measure the interphase resistance, insulation resistance.
		Fan Motor Failure	
	Fuse for operation circuit is melted	Wiring Short-circuit	Check falling of wiring device.
		Earth Fault in Operation Circuit	Measure insulation resistance.
		Magnetic Contactor for Compressor Motor Failure	Measure the coil resistance.
		Magnetic Contactor for Fan Motor Failure	
		Magnetic Contactor for pump motor Failure	
		Auxiliary Relay Coil Failure	
		Solenoid Valve Coil Failure	
		Printed Circuit Board Short-Circuit	Conductive Foreign Particle.
		Crankcase Heater Failure	Measure resistance.
	Trans Coil Failure	Measure the transformer secondary voltage.	
	Remote Control Wiring Incorrect	Wiring	
	R, S, T phase of power source is phase failure or reverse phase. (05 alarm)	Check the connection of R, S, and T phase	
	Remote Control Switch Failure. Change-over switch of Printed Circuit Board is "Local" (40 alarm)	Check changeover switch.	
	Printed Circuit Board Failure	Wiring Connection Failure	
		Printed Circuit Board Failure	
	Pump Magnetic Contactor for Pump Failure (52P)	Breaking of Coil	
		Loose Connection	
Pump stops before compressor running	Pump Over-current Relay Activated (TRP) (5P Alarm)	Pump locked	Check water freeze, clogging of foreign particle.
		Pump Over-current relay RC Value Wrong	Check the RC value and pump running current.
		Pump over-current relay failure	Push reset button and check running current.

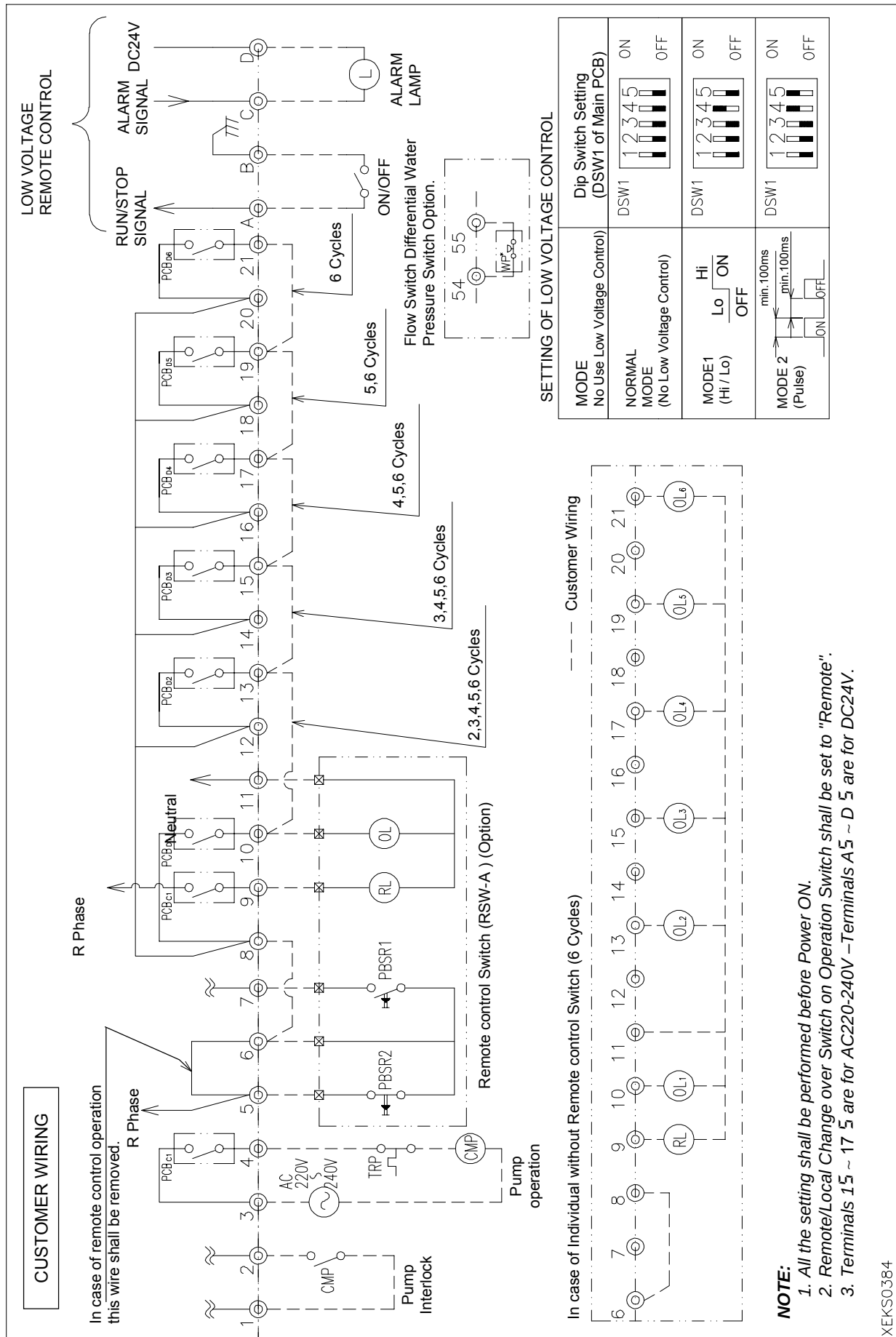






2. ELECTRICAL WIRING

2.1. CUSTOMER WIRING



PARTS LIST

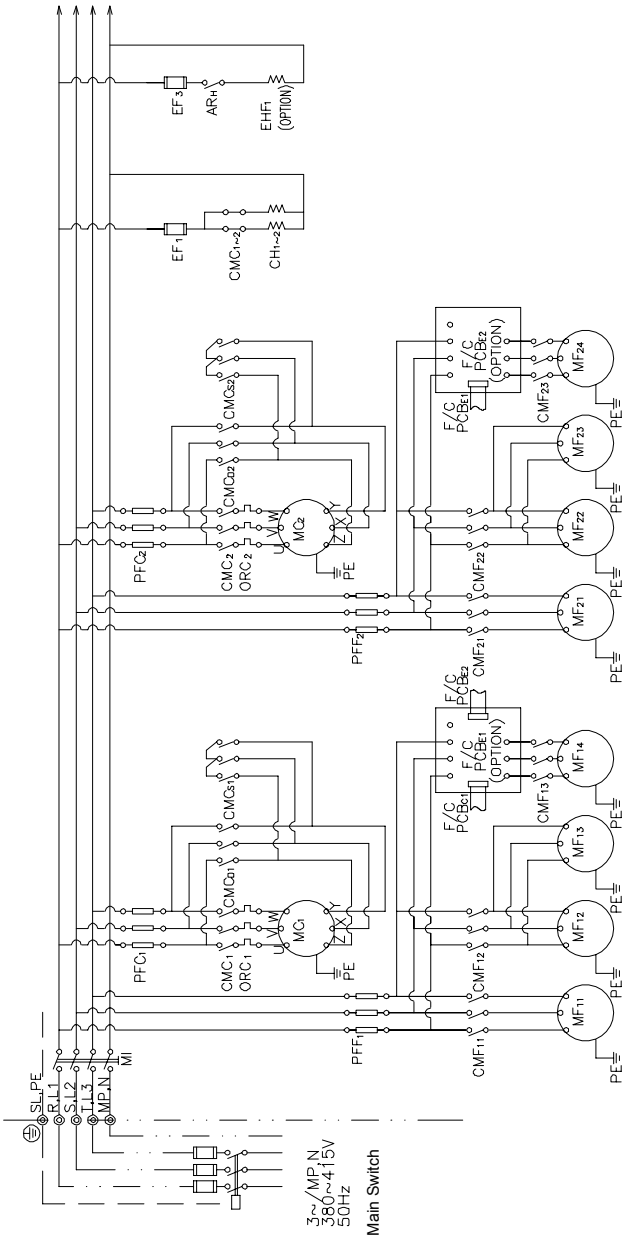
(n=1~N)

Mark	Name	Remark	Mark	Name	Remark
MC _{1-n}	Compressor Motor		THMs _{1-n}	Suction Gas Temperature Thermistor	
MF _{11-n4}	Condenser Fan Motor		THM _{1-n}	Liquid Temperature Thermistor	OPTION
MI	Main Isolator		EF _{1~3, R,S,T}	Fuse	6A
CMC _{1-n}	Contactora for Compressor Motor		SV _{11-n1}	Solenoid Valve for Starting	
CMC _{s1-sn}	Contactora for Compressor Motor (Start Operation)		SV _{12-n2}	Solenoid Valve for Load-down	
CMC _{D1-Dn}	Contactora for Compressor Motor (Delta Operation)		SV _{13-n3}	Solenoid Valve for Load-up	
CMF _{11-n4}	Contactora for Condenser Fan Motor		TM _{1-n}	Hour Meter	
EFC _{1-n}	Fuse for Compressor Motor	or optional Circuit Breaker	PCB _A	Printed Circuit Board for Display	
ORC _{1-n}	Overcurrent Relay for Compressor Motor		PCB _B	Printed Circuit Board for Operation	
EFF _{11-n4}	Fuse for Condenser Fan Motor	or optional Circuit Breaker	PCB _{C1,C2}	Printed Circuit Board for CPU	
ITC _{1-n}	Internal Thermostat for Compressor		PCB _{D1-Dn}	Printed Circuit Board for Relay	
ITF _{11-n4}	Internal Thermostat for Fan Motor		PCB _{E1-En}	Printed Circuit Board for Fan Control	OPTION
CH _{1-n}	Crankcase Heater		WP	Water Pressure Switch, Water Flow Switch	OPTION
AR _{1-n,H,R}	Auxiliary Relay		PBSR ₁	Push Button Switch for Starting (REMOTE)	OPTION
PSH _{1-n}	High Pressure Switch	OFF: 2.74Mpa ON: Manual Reset	PBSR ₂	Push Button Switch for Stoppage (REMOTE)	Field Supplied
Pd _{1-n}	High Pressure Sensor		RL	Pilot Lamp for Remote Indication (Unit Operation)	
Ps _{1-n}	Low Pressure Sensor		OL _{1-n}	Pilot Lamp for Remote Indication (Alarm)	
THM _i	Inlet Water Temperature Thermistor		CMP	Contactora for Pump	
THM _{01, 02, 03}	Outlet Water Temperature Thermistor		TRP	Thermal Relay for Pump	
THMr _{2 1-n}	Cooler Inlet Refrigerant Thermistor		SVE _n	Solenoid Valve for Economizer	
THMd _{1-n}	Discharge Gas Thermistor		PSW _n	Pressure Switch for Economizer	
PFC _{1-n}	Fuse holder for Compresor Motor	Or optional Circuit Breaker	EHF _{1-n}	Cooler Heater	
PFF _{1-n}	Fuse holder for Compresor Fan Motor	Or optional Circuit Breaker	TF _{1,2,3,4,5}	Transformers	
THM _a	Atmosphere Temperature Thermistor				

Model	N
RCUE 40, 50, 60, 70AG1	1
RCUE 80, 100, 120, 140AG1	2
RCUE 150, 180, 200AG1	3
RCUE 240, 270AG1	4
RCUE 300, 330AG1	5
RCUE 360, 400AG1	6

POWER CIRCUIT FOR RCUE 80AG1, RCUE 100AG1, RCUE 120AG1, RCUE 140AG1

POWER CIRCUIT

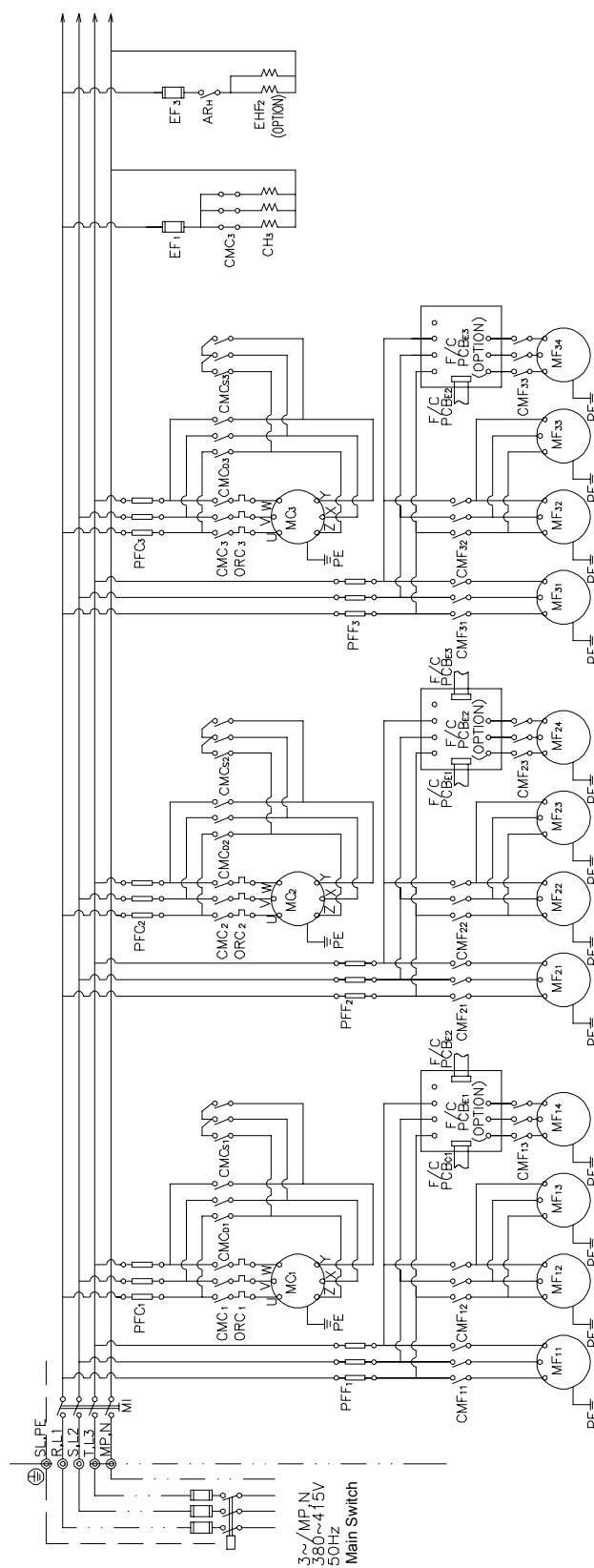


Models
RCUE 80AG1
RCUE 100AG1
RCUE 120AG1
RCUE 140AG1

XEKS0620

POWER CIRCUIT FOR RCUE 150AG1, RCUE 180AG1, RCUE 200AG1

POWER CIRCUIT

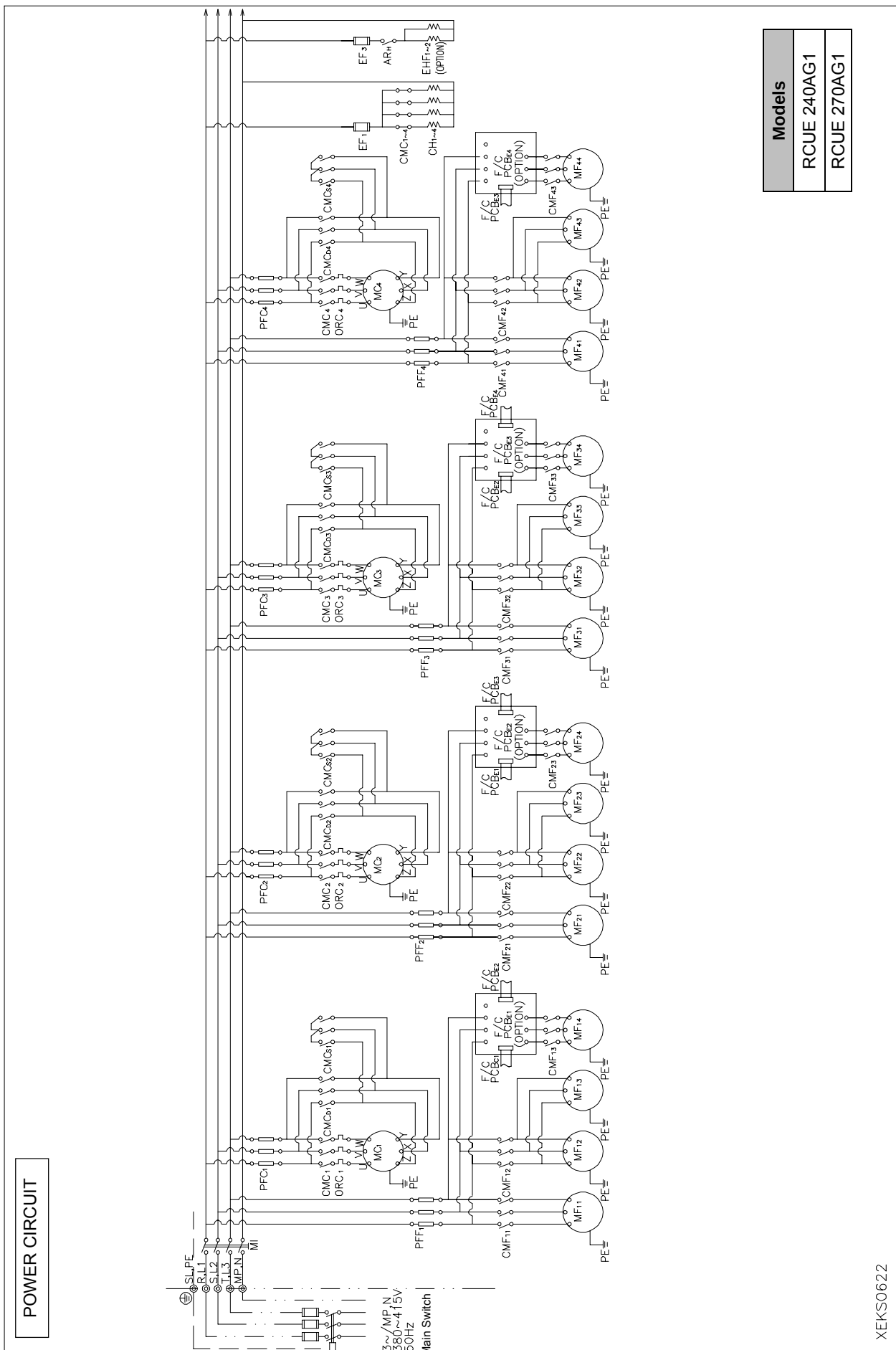


Models

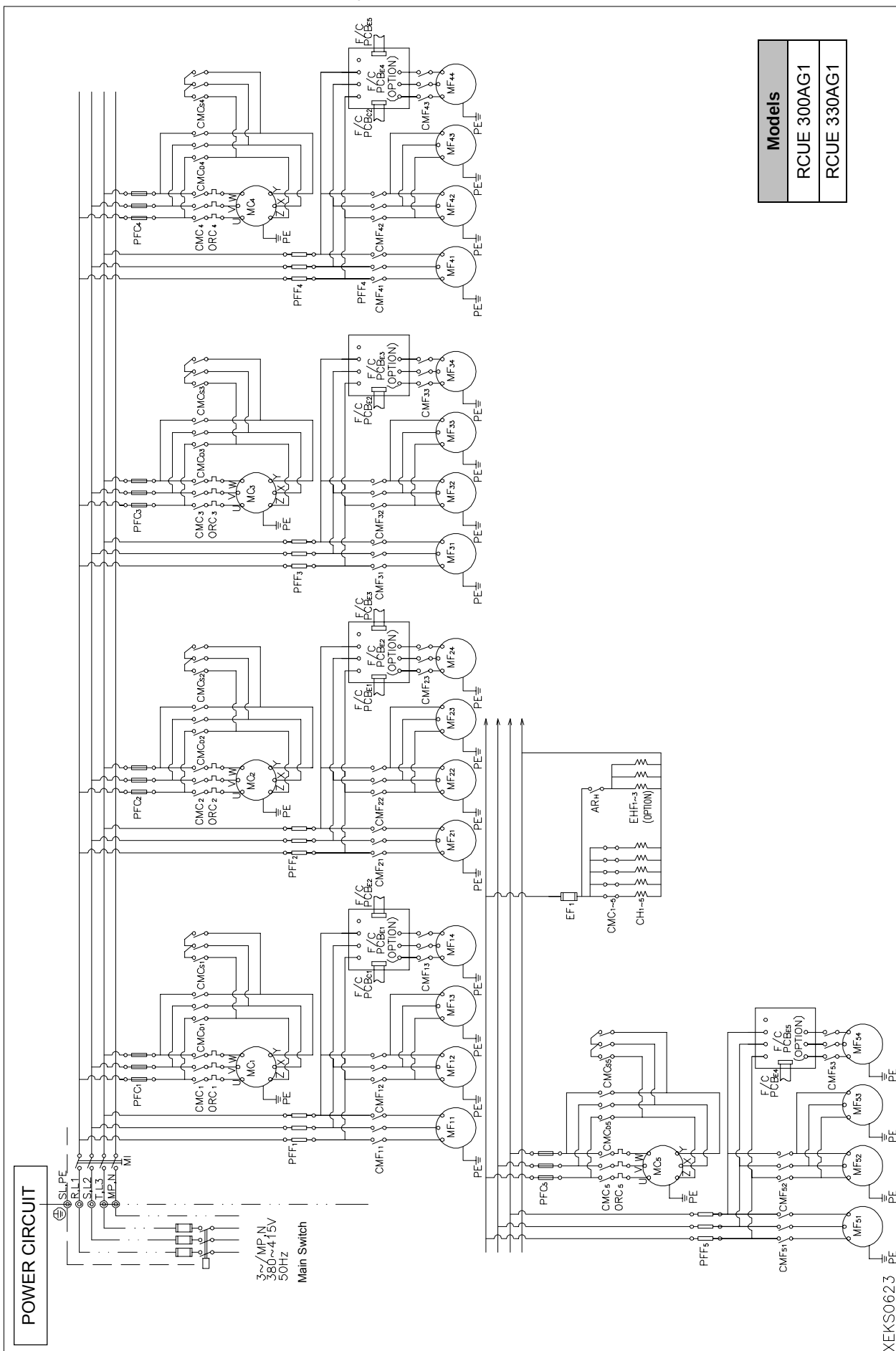
RCUE 150AG1
RCUE 180AG1
RCUE 200AG1

XEKS0621

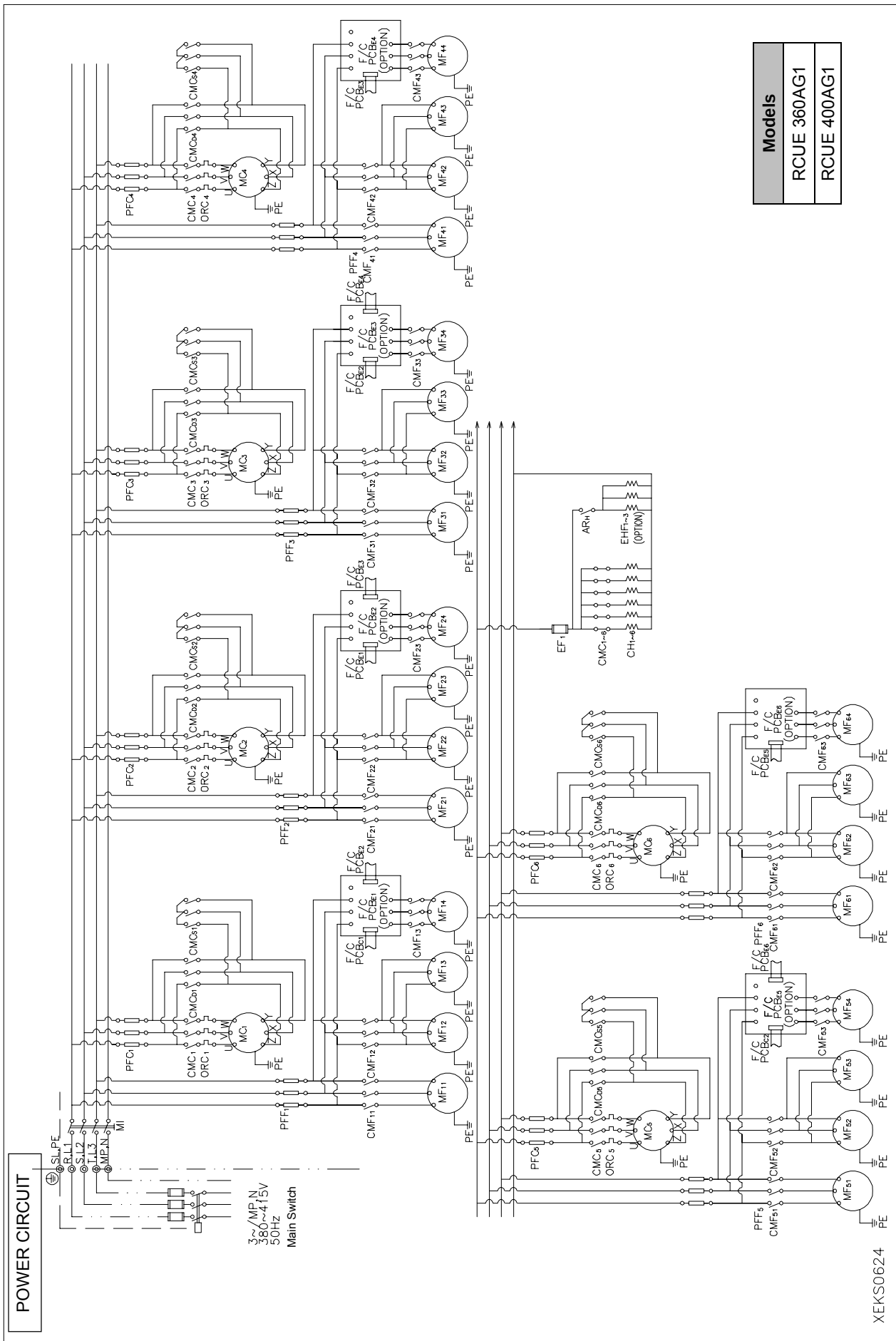
POWER CIRCUIT FOR RCUE 240AG1, RCUE 270AG1



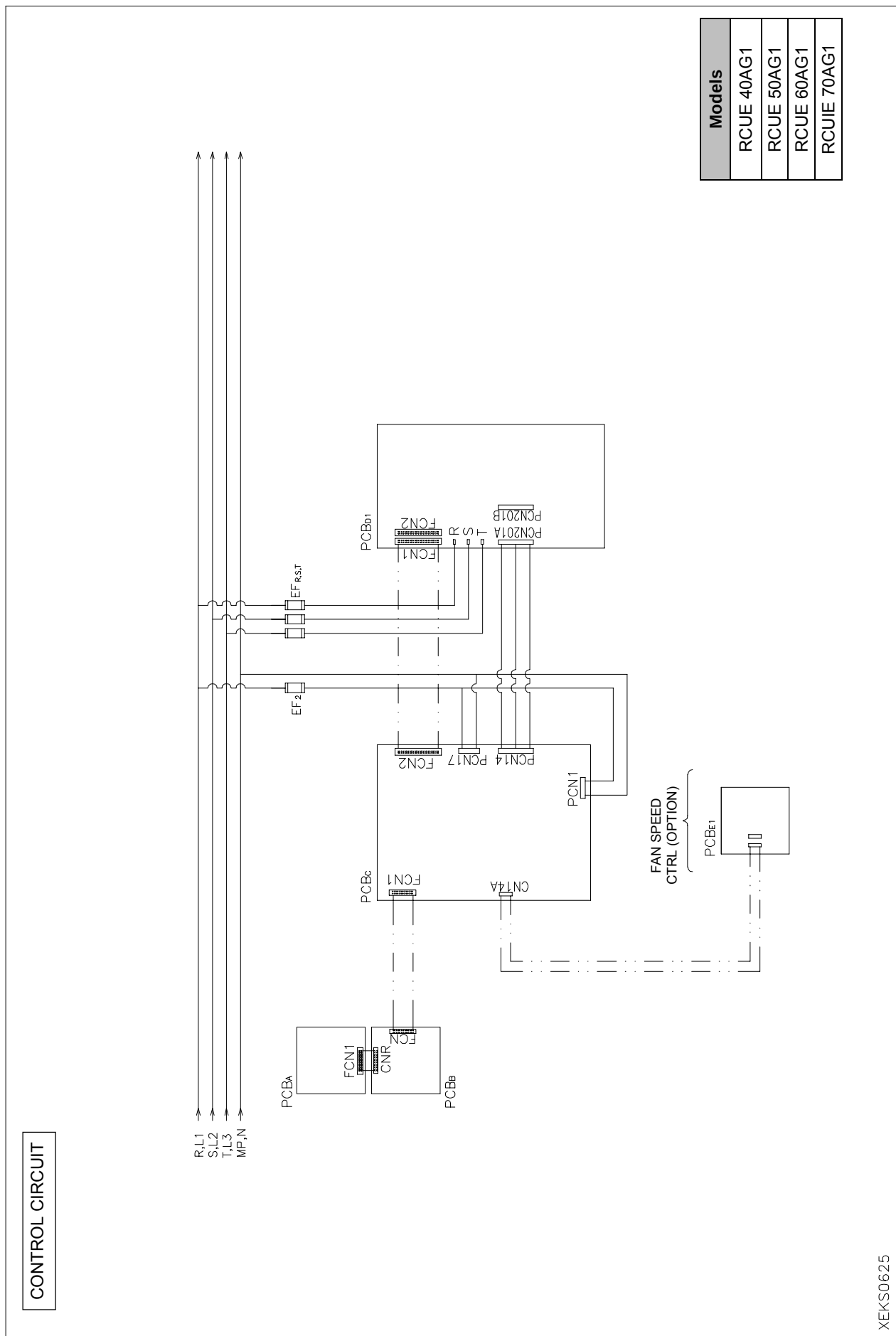
POWER CIRCUIT FOR RCUE 300AG1, RCUE 330AG1



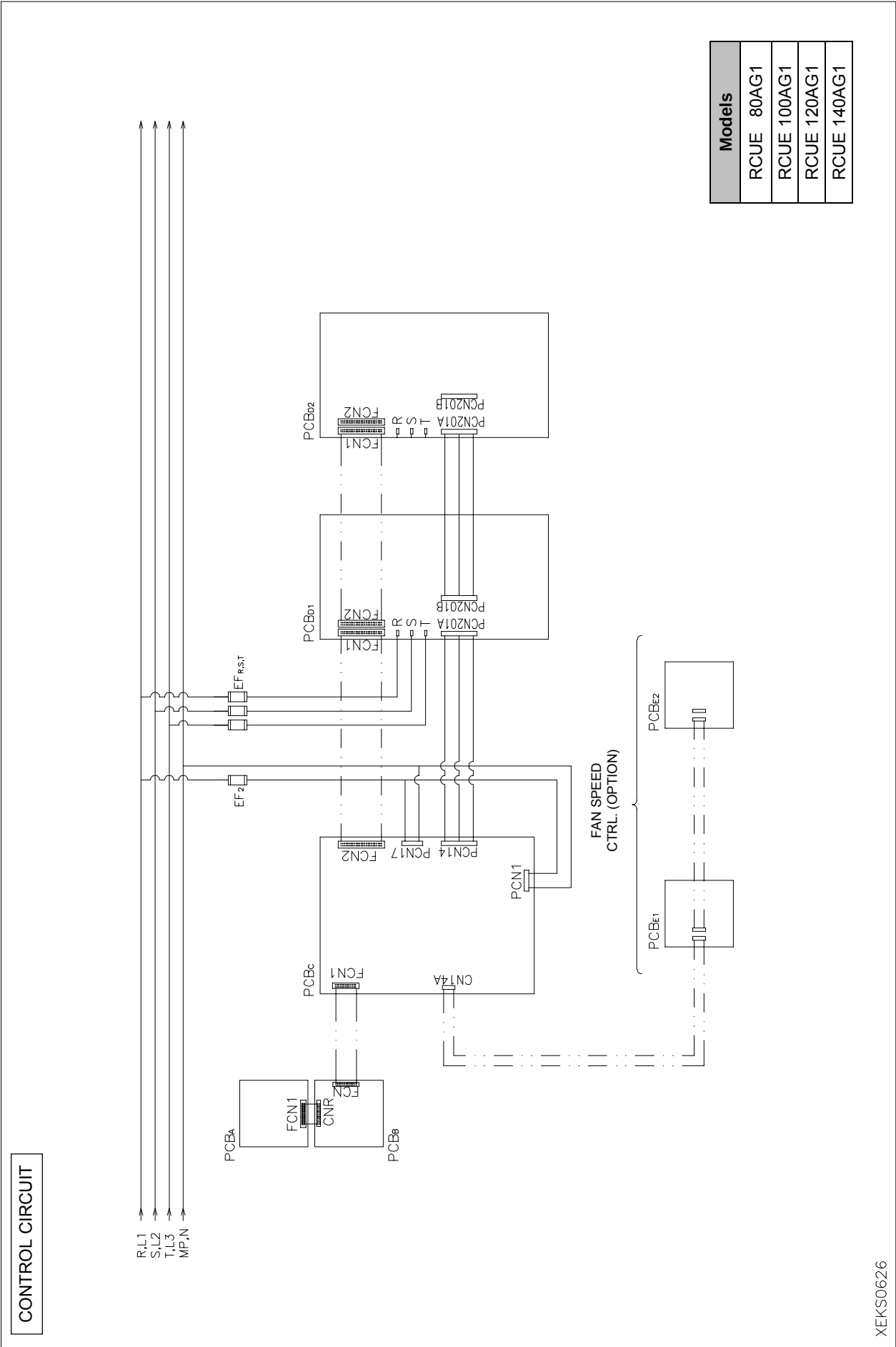
POWER CIRCUIT FOR RCUE 360AG1, RCUE 400AG1



CONTROL CIRCUIT FOR RCUE 40AG1, RCUE 50AG1, RCUE 60AG1, RCUE 70AG1

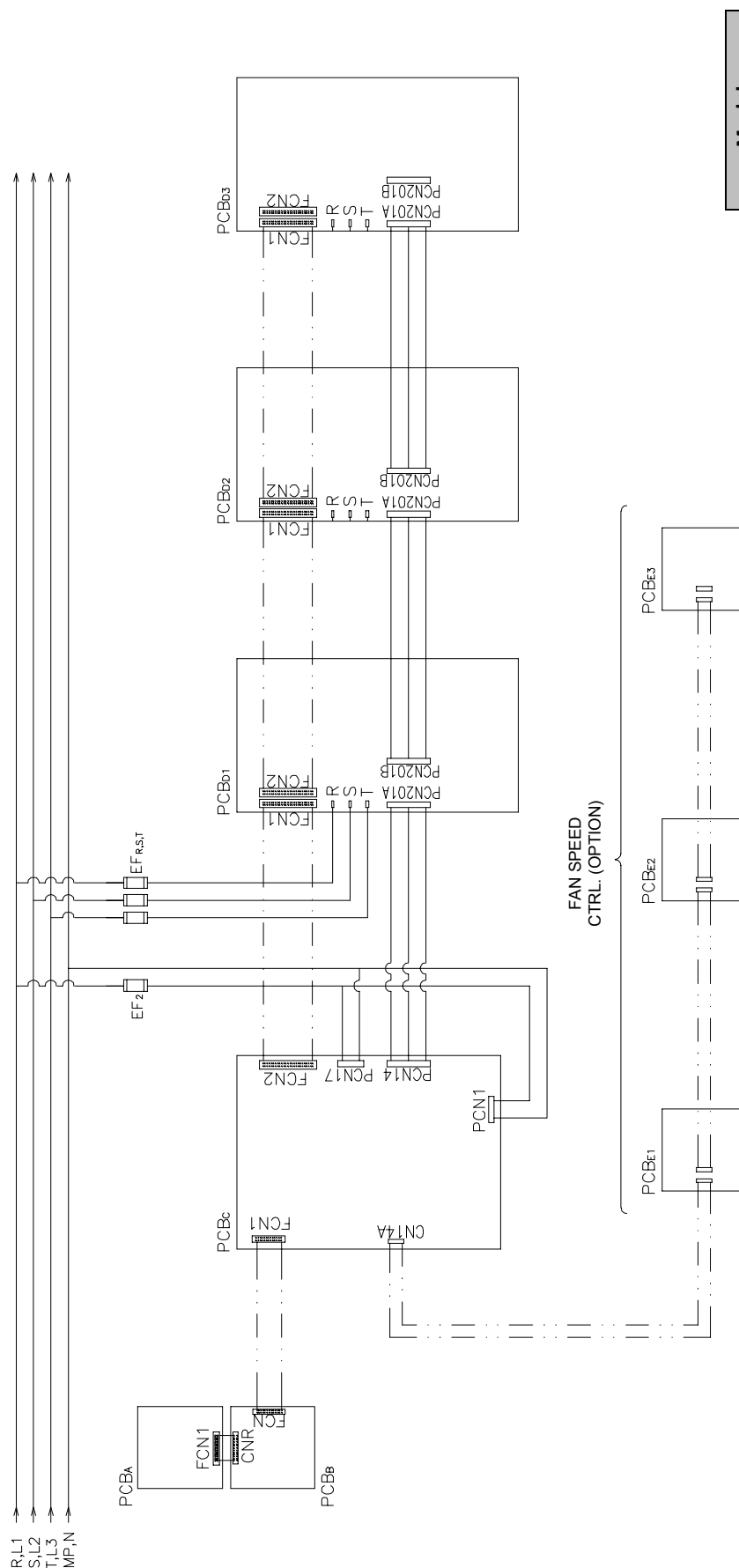


CONTROL CIRCUIT FOR RCUE 80AG1, RCUE 100AG1, RCUE 120AG1, RCUE 140AG1



CONTROL CIRCUIT FOR RCUE 150AG1, RCUE 180AG1, RCUE 200AG1

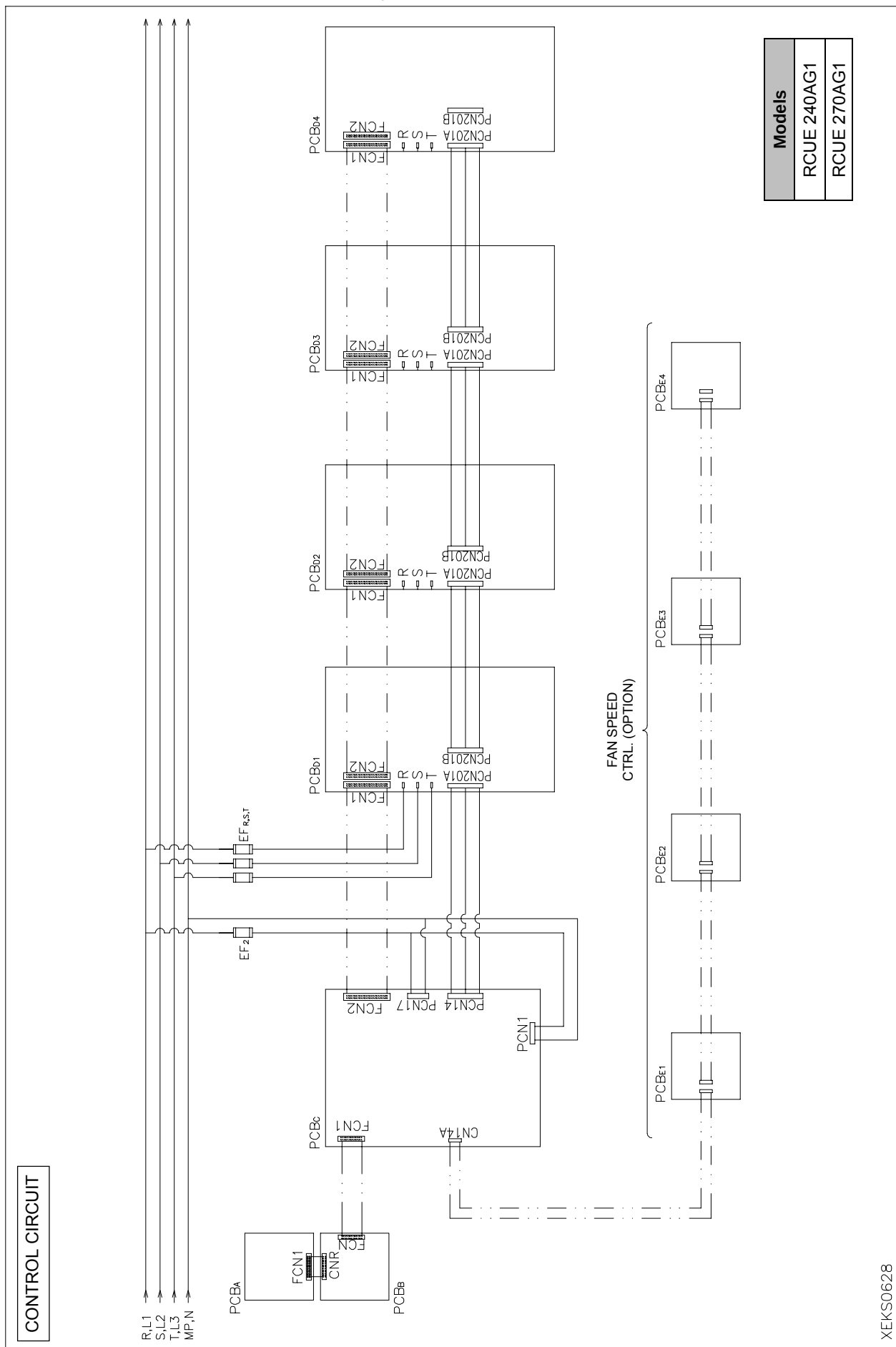
CONTROL CIRCUIT



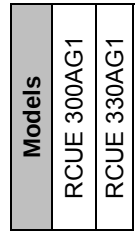
Models
RCUE 150AG1
RCUE 180AG1
RCUE 200AG1

XEKS0627

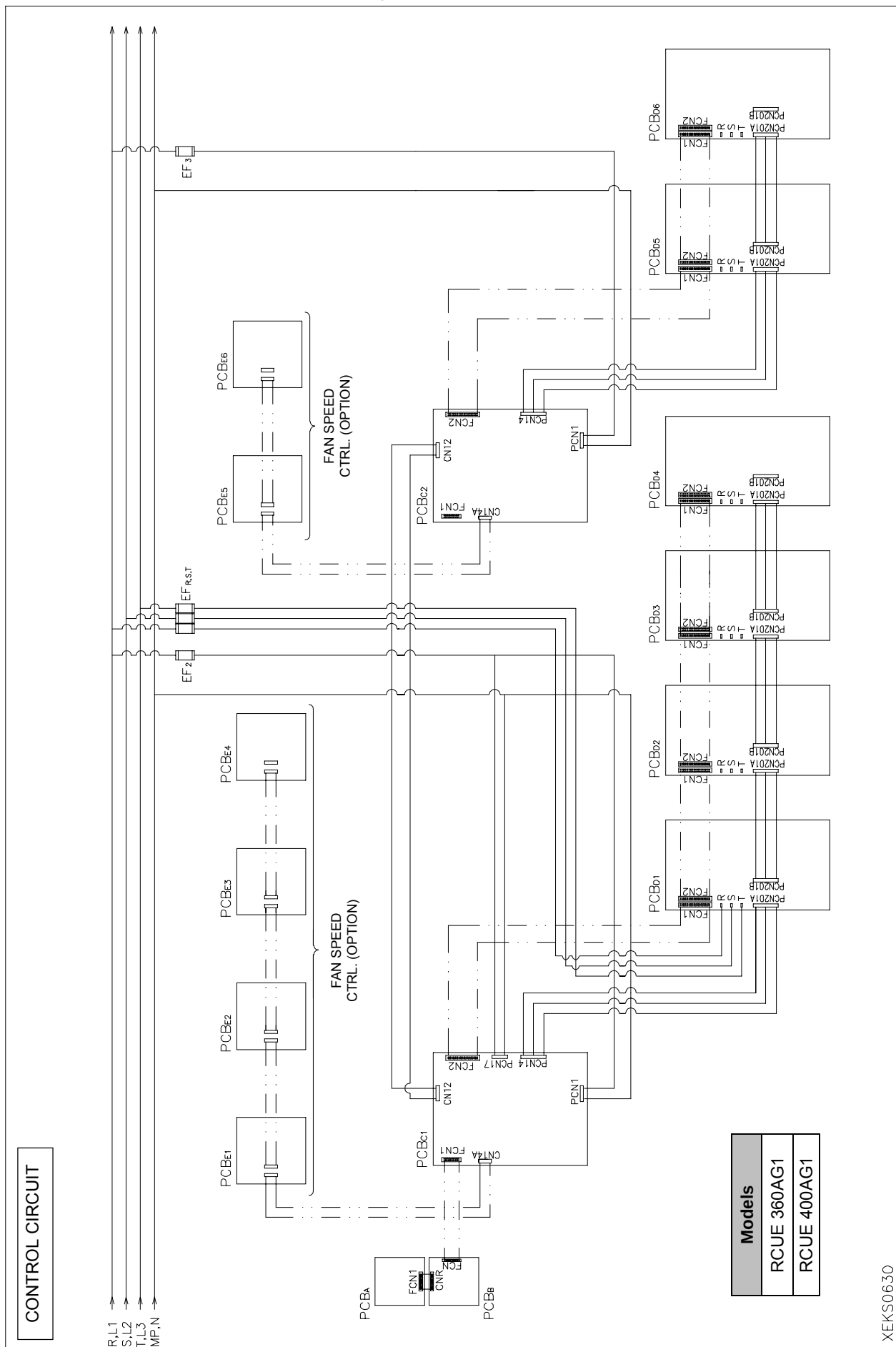
CONTROL CIRCUIT FOR RCUE 240AG1, RCUE 270AG1



CONTROL CIRCUIT

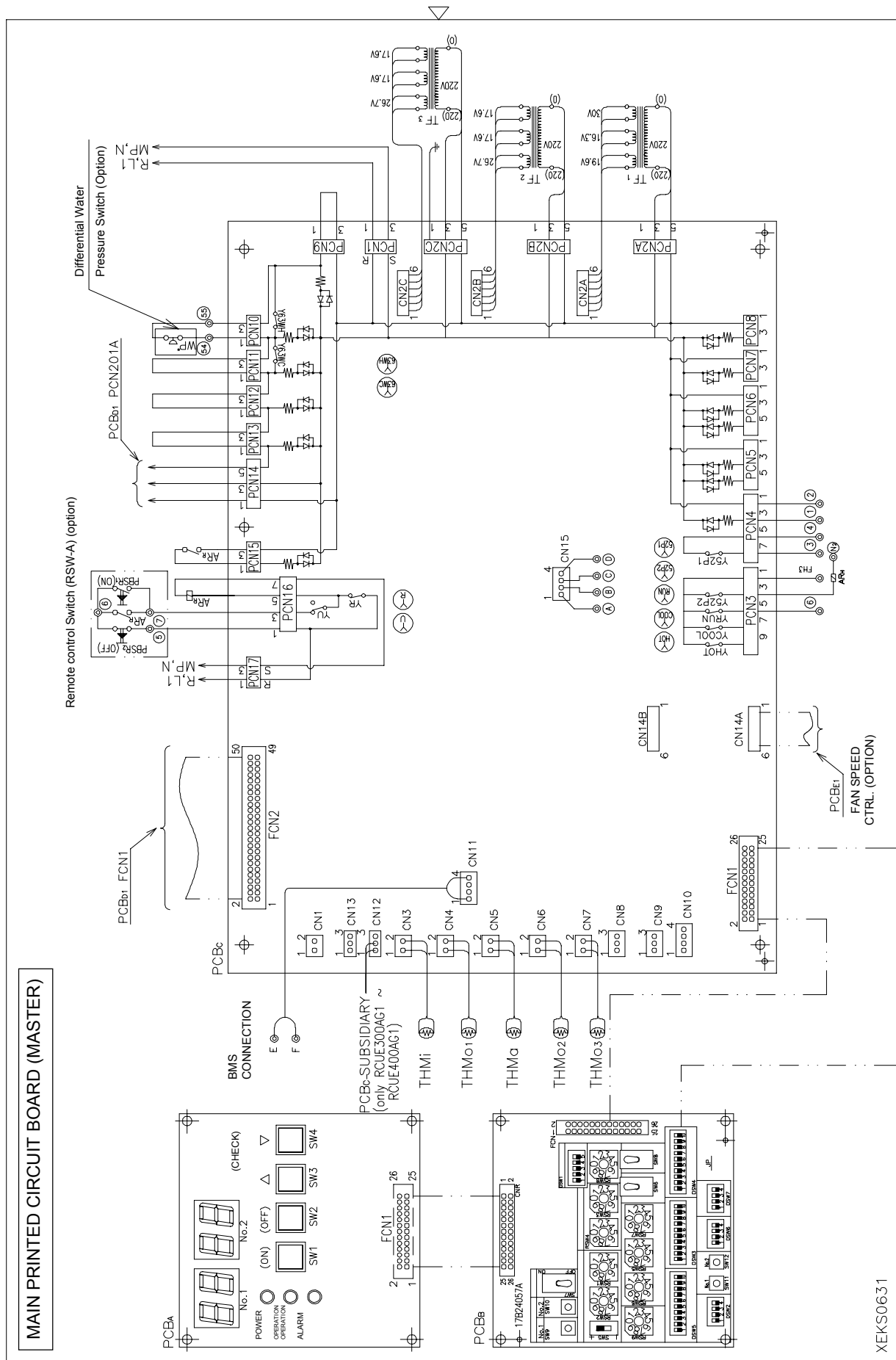


CONTROL CIRCUIT FOR RCUE 360AG1, RCUE 400AG1



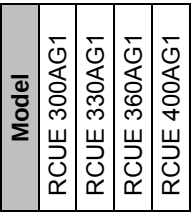
XEKS0630

MAIN PRINTED CIRCUIT BOARD (MASTER)



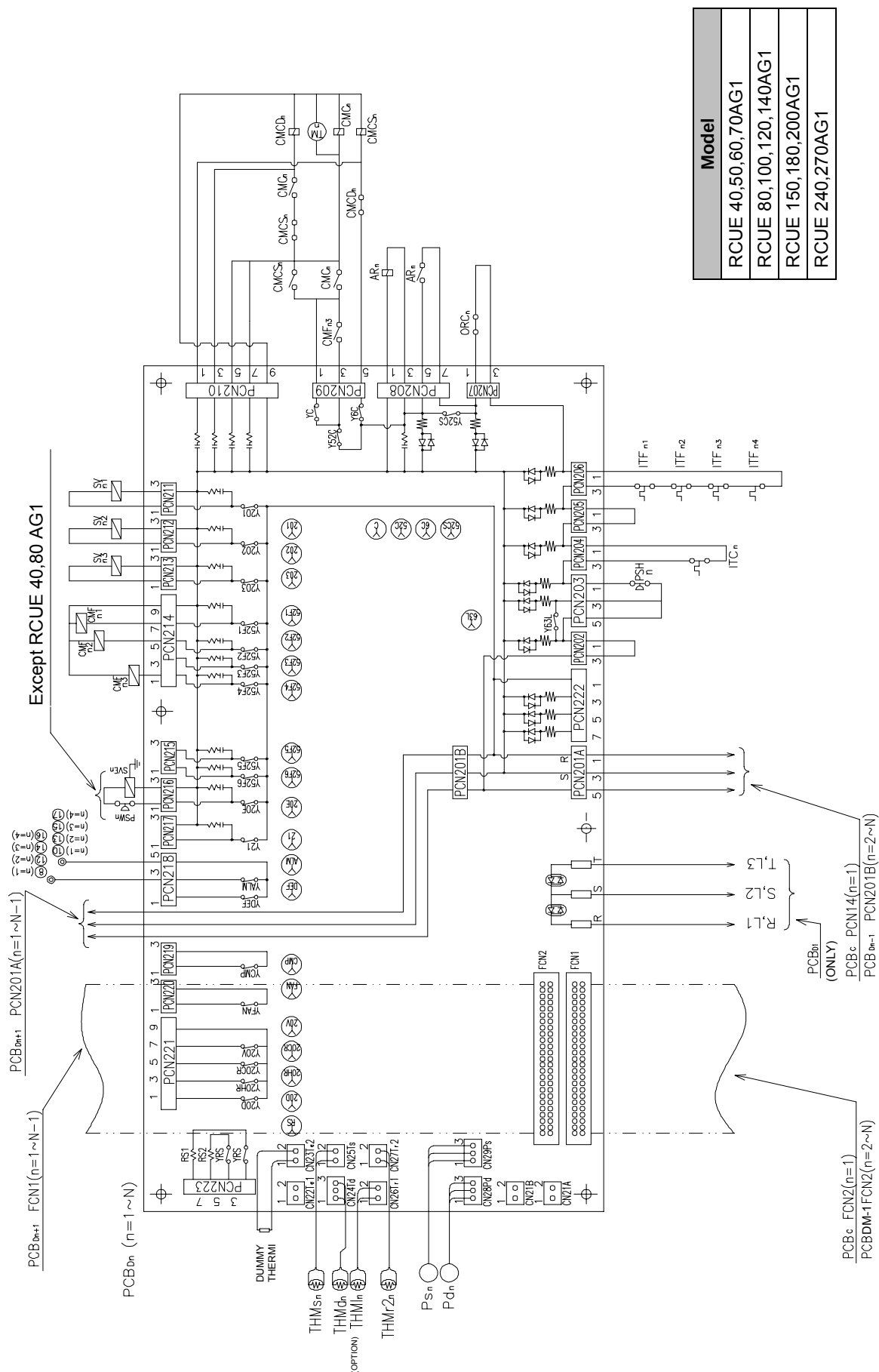
XEKS0631

RELAYS PRINTED CIRCUIT BOARD (SUBSIDIARY)



XEKS0632

RELAYS PRINTED CIRCUIT BOARD



XEKS0633

Certification No.
JQA-1084



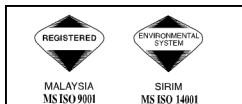
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Ronda Shimizu, 1 - Políg. Ind. Can Torrella
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ISO 9002 certified by AENOR, Spain



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Products are manufactured according to the ISO certification system.
Air Conditioning Systems Operation, Shimizu-shi,
Shizuoka-ken, Japan: ISO9001 certified by JQA, Japan



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Certification ISO 9001, Malaysia

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