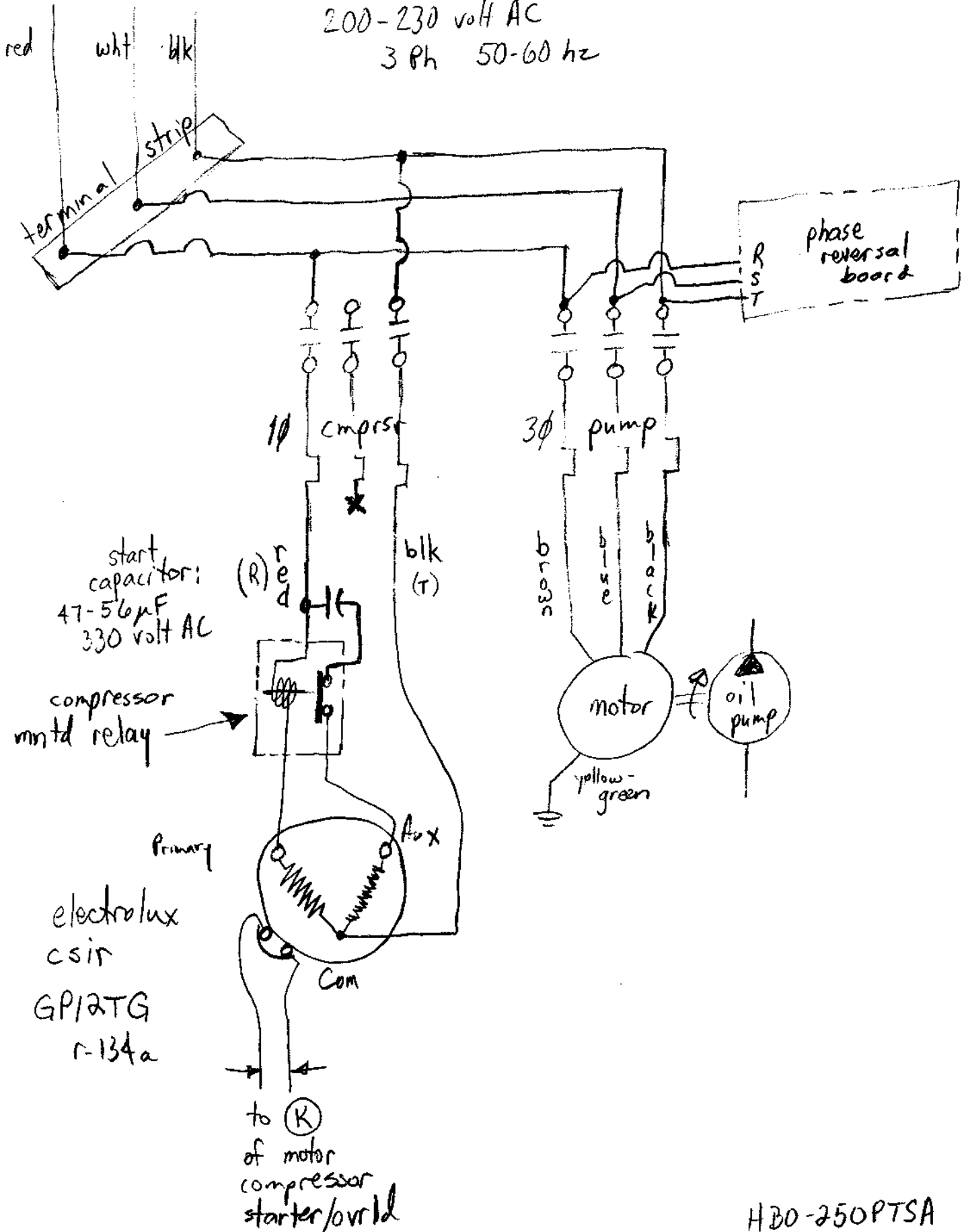
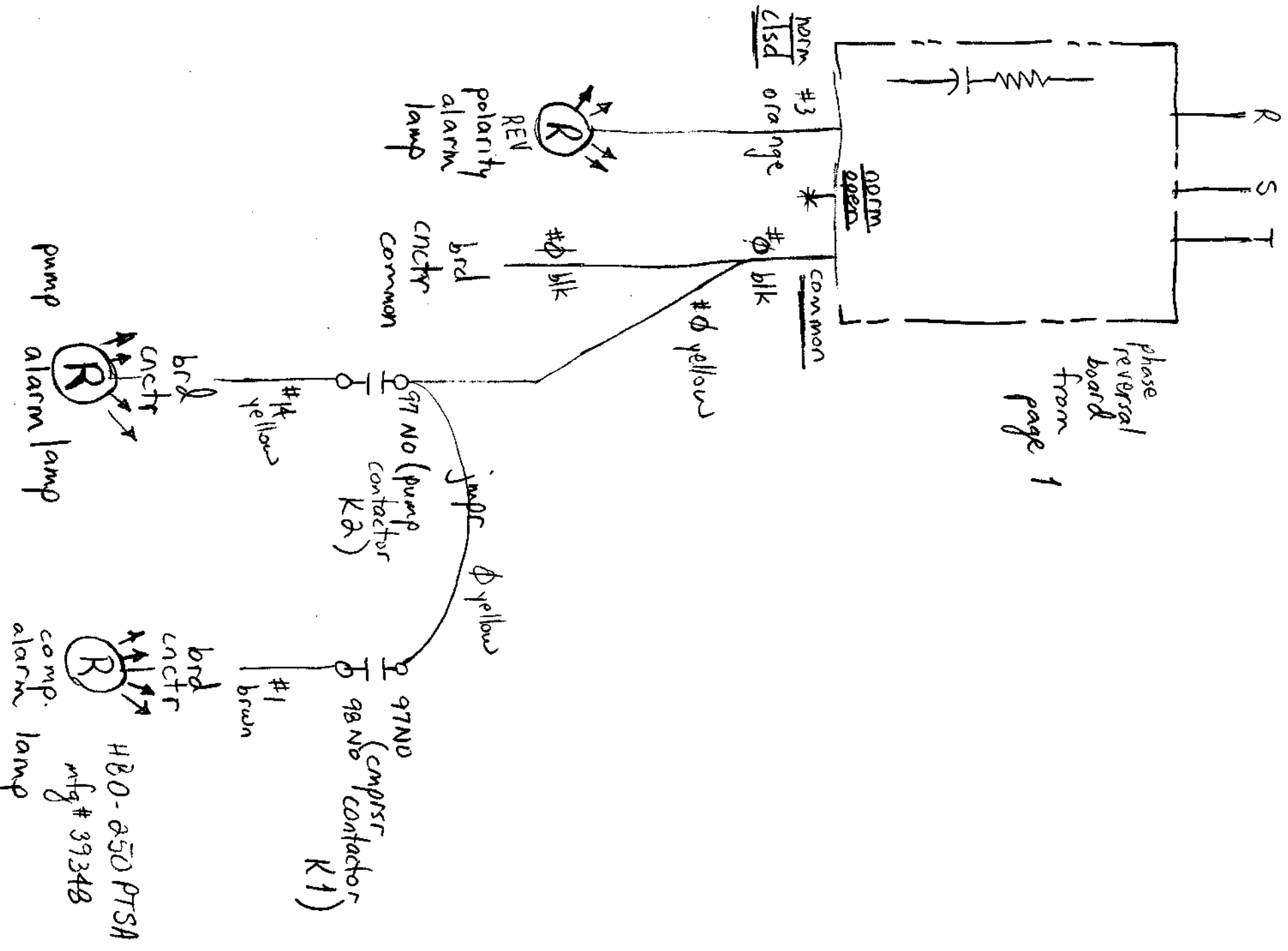


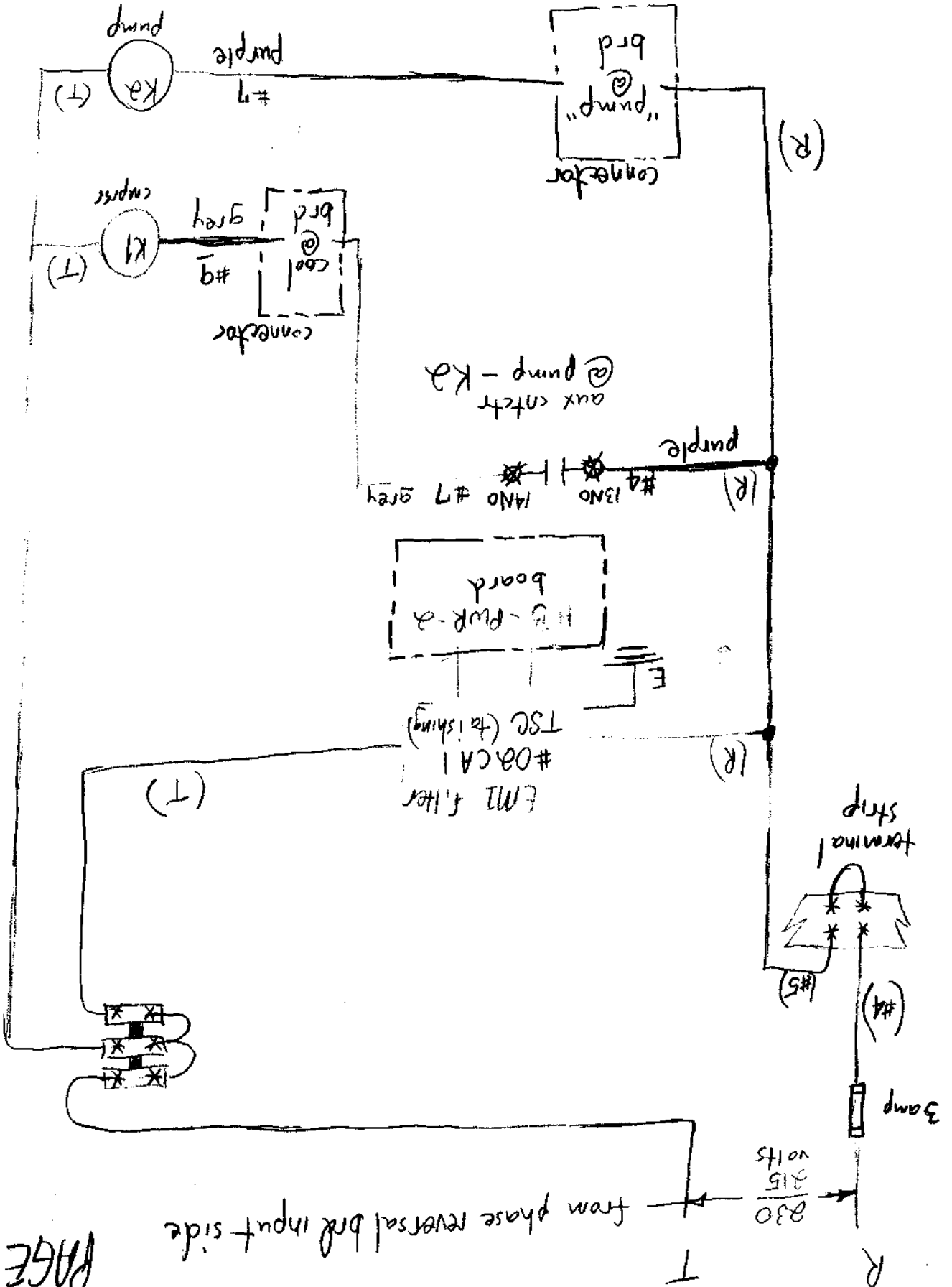
R S T

200-230 volt AC
3 Ph 50-60 hz

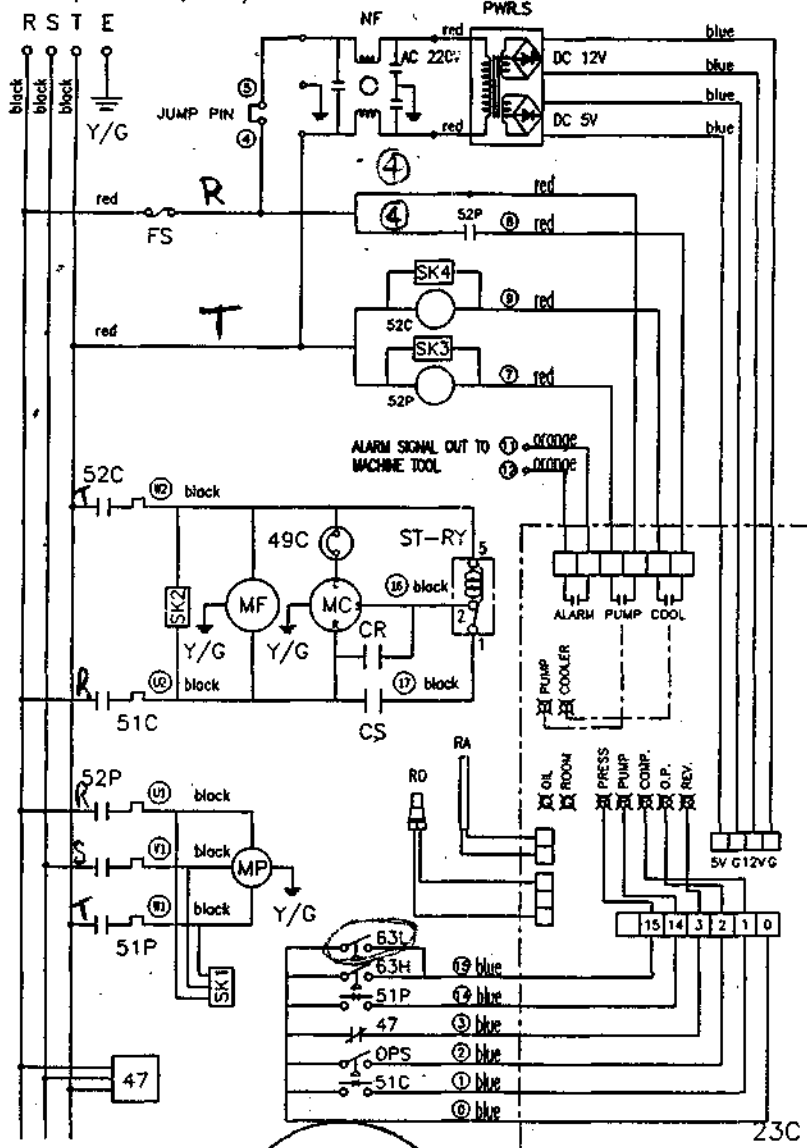




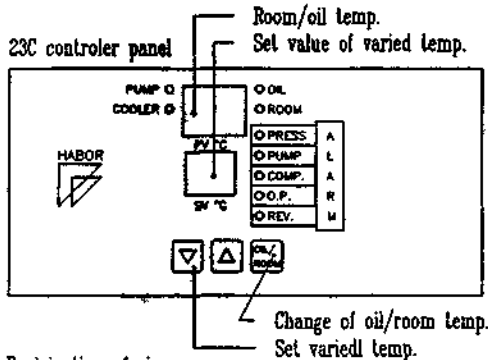
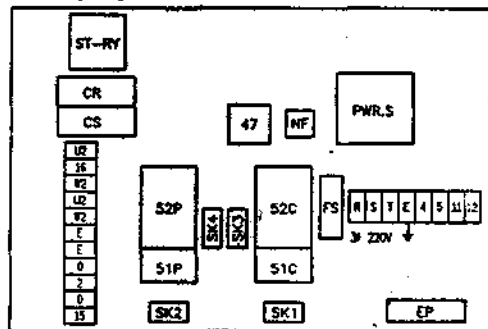
HBO-250 PISA
 mfg # 39348



Distribution diagram
 3φ 200/200~220V 50/60Hz



Electric plot plan



Explanation of sign

MF	風扇馬達 MOTOR OF FAN	47	逆相電斷 PHASE REVERSAL RELAY
MC	壓縮機馬達 MOTOR OF COMP.	FS	保險絲座 FUSE BLOCK
49C	壓縮機馬達內重油電斷 OVER LOAD OF M.C.	NF	雜訊濾波器 CHIL FILTER
ST-RY	啟動電斷 STARTING RELAY	PWR.S	電源供應器 POWER SUPPLY
CS	啟動電容 STARTING CAPACITOR	23C	溫度控制器 DIFF. TEMP. CONTROLLER
CR	運轉電容 RUNNING CAPACITOR	RO	油溫感測器 OIL TEMP. SENSOR
52C	壓縮機電磁開關 MAGNETIC SWITCH OF COMP.	RA	室溫感測器 ROOM TEMP. SENSOR
51C	壓縮機馬達過電斷 OVER LOAD OF S2C	63HL	高低壓開關 HIGH AND LOW PRESS. SWITCH
MP	泵浦馬達 MOTOR OF PUMP	OPS	油壓開關 OIL CIRCULATING PRESS. SWITCH
52P	泵浦電磁開關 MAGNETIC SWITCH OF PUMP	SK1-A	火花消滅器 NOISE KILLER
51P	泵浦馬達過電斷 OVER LOAD OF S2P	EP	接地板 EARTH PANEL

Operation of 23C controller

- Accuracy : ±1.0°C
- Range of set value : -15°C ~ +15°C
- Alarm device : normal open A or normal close B
- This unit runs at least 5 seconds and cool the oil at set temperature, it stops running automatically.
- This unit keeps stopping at least 5 seconds and when oil is above set temperature, it again start running automatically.

Explanation of the sign of unusual system

- 5OL** Oil sensor is broken string
- AH OL** Oil temperature is higher (at) 45°C
- Compressor ON when oil temperature is higher than (at) 5°C.
- Sno In** Room sensor is broken string.
- Alarm of the following one which the lamp is light
- PRESS** (Failure of pressure in cooling system)
- PUMP** (Failure of pump)
- COMP.** (Failure of compressor)
- O.P.** (Failure of oil pressure)
- REV.** (Power is phase reversal)

Explain for the use of panel point

- JUMP PIN**
- ④ It's the jump point which machine body remotely controls cooler.
(Cooler runs when the point is closed and stops when the point is open.)
- 23C/ALARM**
- ⑪ It's the point which machine body remotely inspects the unusual part of cooler.
(The point is closed when the machine body runs and open when the machine body stops.)

disconnect 63L because the switch is actuated on rise "design" board



編號	P-BO-1RPSB-5	版本	A1	圖名	配電圖	每合件數	
製圖	陳民其	日期	1222.1998	圖號	BOEB6E	比例	
校對		熱處理		機種	HBO-1000PSB-KIA		
品管		表面處理		哈伯精齒工業有限公司			
更改	日期	更改者	內容	審定	單位	HARBOR PRECISE INDUSTRIES CO. LTD.	

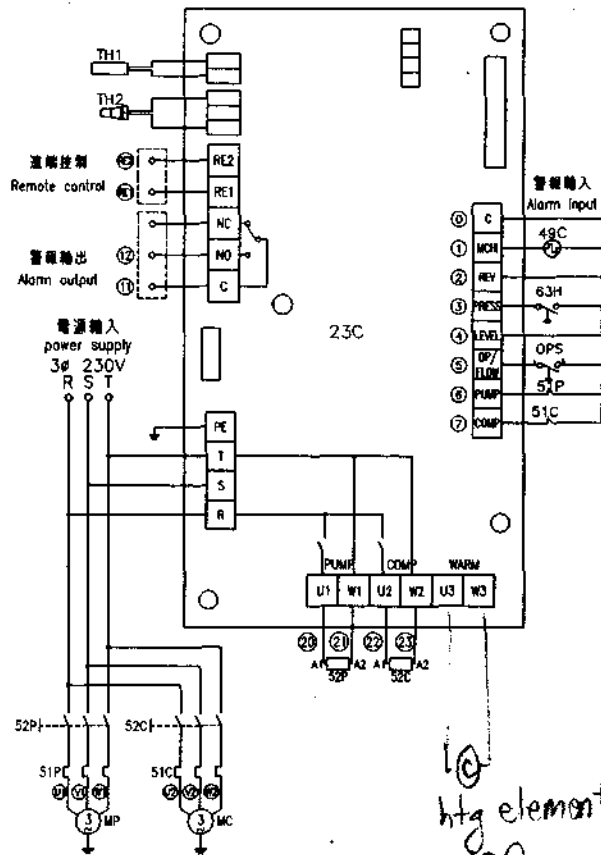
P22B- A2
P22B- ?
P22B- P2

H30-400PSB-47
Johnford

Trouble Shooting for P2 controller

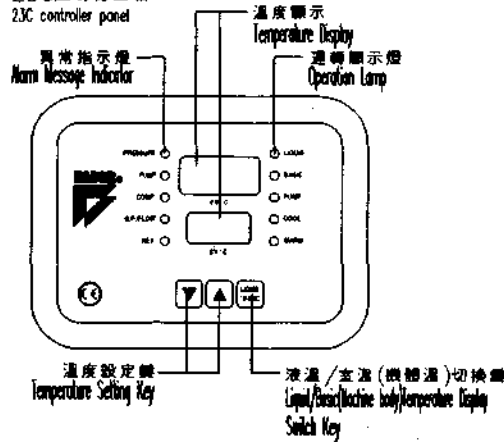
Error	Explanation
---	Remote contactor fault
E0	Failure of liquid temperature sensor or poor connection of liquid temperature sensor wire
E1	Failure of base temperature sensor or poor connection of base temperature sensor wire
E2	Liquid temperature is too high ($\geq 45^{\circ}\text{C}$)
E3	Liquid temperature is too low ($\leq 5^{\circ}\text{C}$)
E4	Liquid temperature is higher than upper limit (Optional)
E5	Liquid temperature is lower than lower limit (Optional)
E6	Refrigerant pressure system fault
E7	Failure of pump motor
E8	Failure of compressor
E9	Liquid circulation system fault
EA	Reverse-phase power or failure of reverse-phase relay
EC	Liquid level fault
Ed	Air filter is too dirty; Poor ventilation for removing hot air
EE	Failure of fan
EF	Surface temp. of compressor housing is too high
EU	Failure of power phase inspection circuit
--	Remote contactor fault
Sn Ol	Failure of liquid temperature sensor or poor connection of liquid temperature sensor wire
Sn RO	Failure of base temperature sensor or poor connection of base temperature sensor wire
AH OL	Liquid temperature is too high
AL OL	Liquid temperature is too low
uu OL	Liquid temperature is higher than upper limit
nn OL	Liquid temperature is lower than lower limit

電路配線圖
Electric diagram

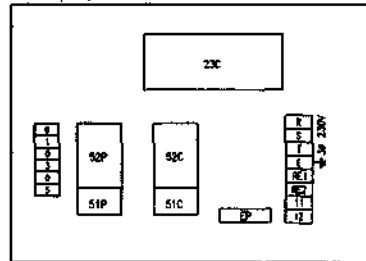


htg element
OR
solenoid
operated
equalizing
valve
on
Whiregartner

23C控制轉面板
23C controller panel



配線圖
Electric plot plan



符號名稱說明
Explanation of sign

MC	壓縮機馬達 MOTOR OF COMP.	23C	溫度控制器 TEMP. CONTROLLER
52C	壓縮機馬達電磁開關 MAGNETIC SWITCH OF MC	TH1	基礎溫度測器 BASE TEMP. SENSOR
51C	壓縮機馬達過熱器 OVERLOAD PROTECTOR OF 52C	TH2	液溫感測器 LIQUID TEMP. SENSOR
49C	壓縮機馬達內置溫度器 THERMAL PROTECTOR OF COMP.	OPS	油壓開關 OIL PRESSURE SWITCH
MP	泵浦馬達 MOTOR OF PUMP	6.5H	高壓開關 HIGH-PRESSURE SWITCH
52P	泵浦馬達電磁開關 MAGNETIC SWITCH OF MP	EP	接地板 GROUND PLATE
51P	泵浦馬達過熱器 OVERLOAD PROTECTOR OF 52P		

23C控制器動作諸元
Working mode of 23C controller

- 溫度設定範圍: $-10^{\circ}\text{C} \sim +10^{\circ}\text{C}$
Temp. setting range:
- 警報輸出裝置: 無電壓A接點 或 無電壓B接點
Alarm output mode: normal open A or normal close B
- 壓縮機於液溫高於 5°C 始運轉
Compressor never run if liquid temp. is 5°C or below.

異常符號說明
Explanation of alarm message

- SC 液溫感測器故障或斷線
Sensor body fault of wire connection fault of liquid temp. sensor.
- DL 液溫高於 45°C 異常警告
Liquid temp. is too high ($\geq 45^{\circ}\text{C}$)
- AH 壓縮機殼高溫警告
Surface temp. of compressor housing is too high.
- EF 基礎溫度感測器故障或斷線
Sensor body fault of wire connection fault of basic temp. sensor.
- 下列偵測點異常警告
Alarm message for one of the followings
- PRESS (冷媒系統壓力故障) (Pressure fault of refrigerant system)
- PUMP (循環泵浦馬達故障) (Motor fault of circulating pump)
- COMP (壓縮機馬達故障) (Compressor fault)
- O.P./FLOW (循環液系統故障) (Pressure or flow rate fault of liquid circulating system)
- REV. (輸入電源逆相) (Reverse phase connected power)

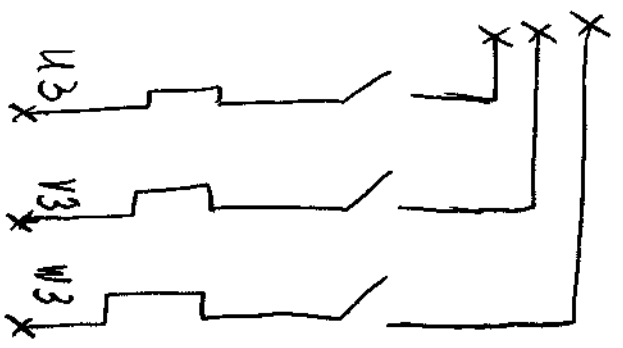
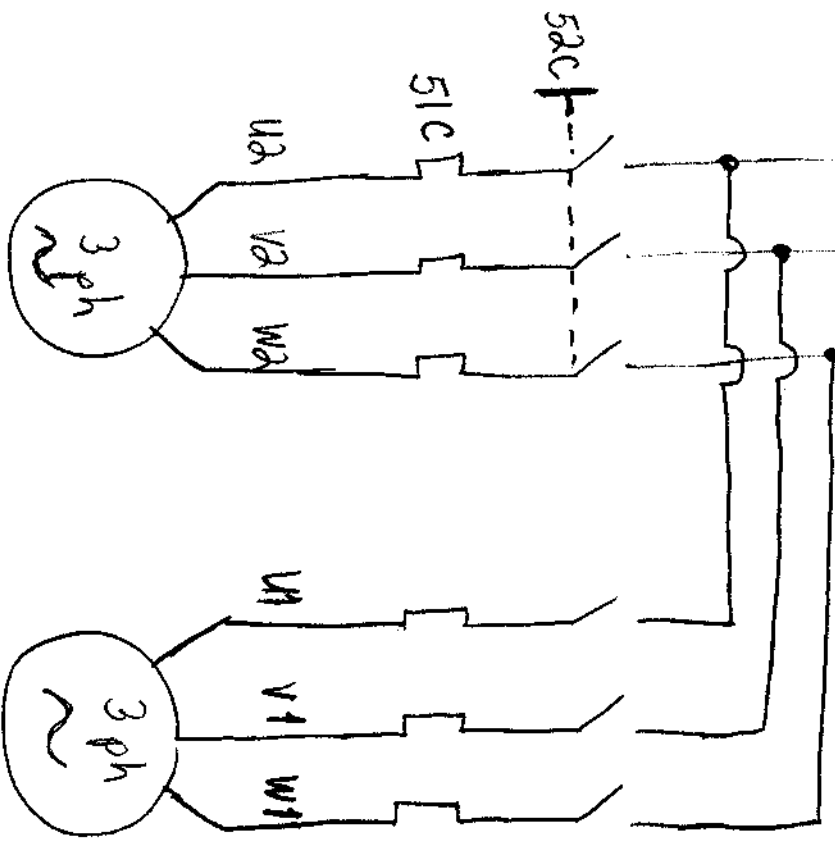
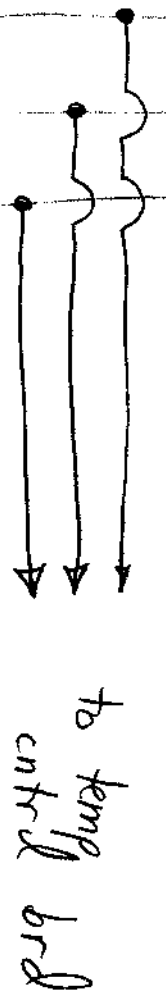
外接接點用途說明
Explanation of remote control connectors

- 工作機接點用於控制冷卻機運轉之跳接點
(接點閉合冷卻機運轉, 接點斷路冷卻機停止)
Connectors for remote control of cooler working from M/C.
Cooler runs when connectors are closed,
Cooler stops when connectors are open.
工作機接點僅供測冷卻機異常之接點
(冷卻機運轉時接點閉合, 冷卻機異常時接點斷路)
Connectors for alarm message output from cooler to M/C.
Connectors are closed when cooler working is normal,
Connectors are open when cooler working is abnormal.



NO	P-BO-600PTS82-2	VERSION	Checking-2	DRAWING NAME	ELECTRICAL DIAGRAM	PC
DRAWER	陳蔚華	DATE	06.04.2005	MATERIAL		
CHECK	李文隆	QUALITY CONTROL	94.6.6	DRAW. NO.	OTCB3E	SCALE
MODEL	HBO-600PTS82					
哈伯精確工業有限公司 HABOR PRECISE INDUSTRIES CO., LTD.						

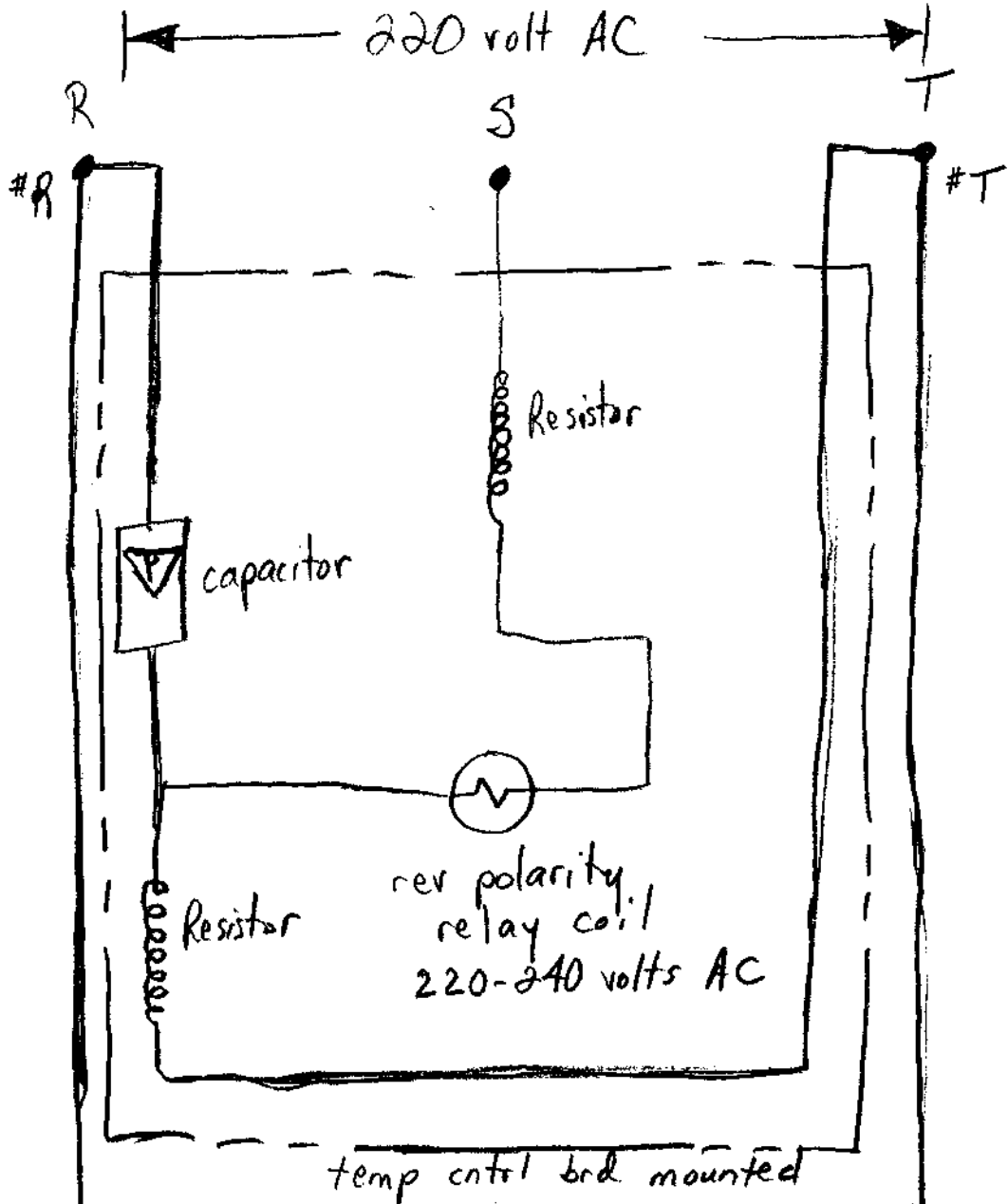
R S T
3 ϕ 208-230 volt



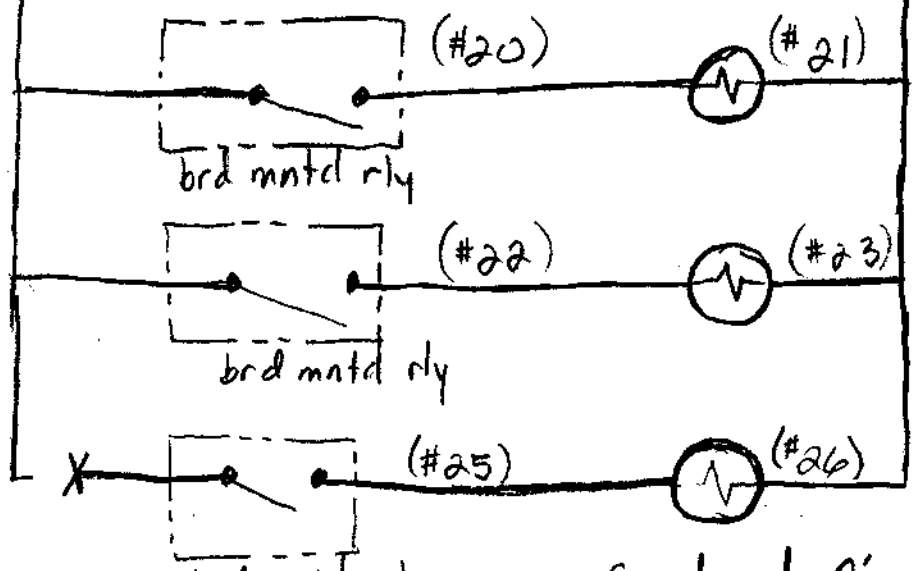
3 ϕ H
if applicable
(heat)

P222B-A21
Haber Precise

Power Circuit



coil operates with proper R-S-T sequence and AC voltage



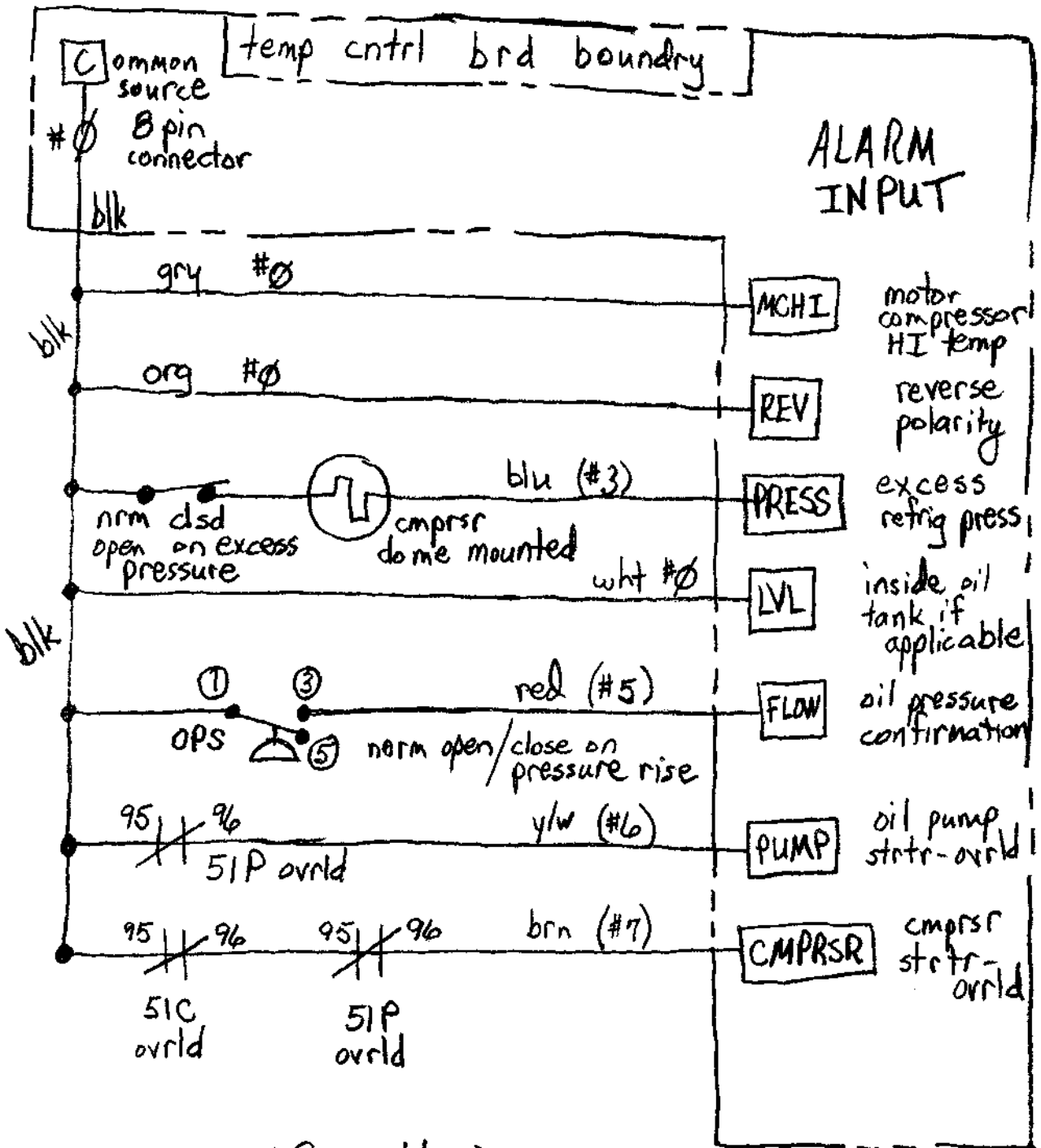
oil pump starter - contact

cmprsr starter - contact

Heat cntctr coil if applicable

Habor Precise

Control Circuit applicable
P22B-A21



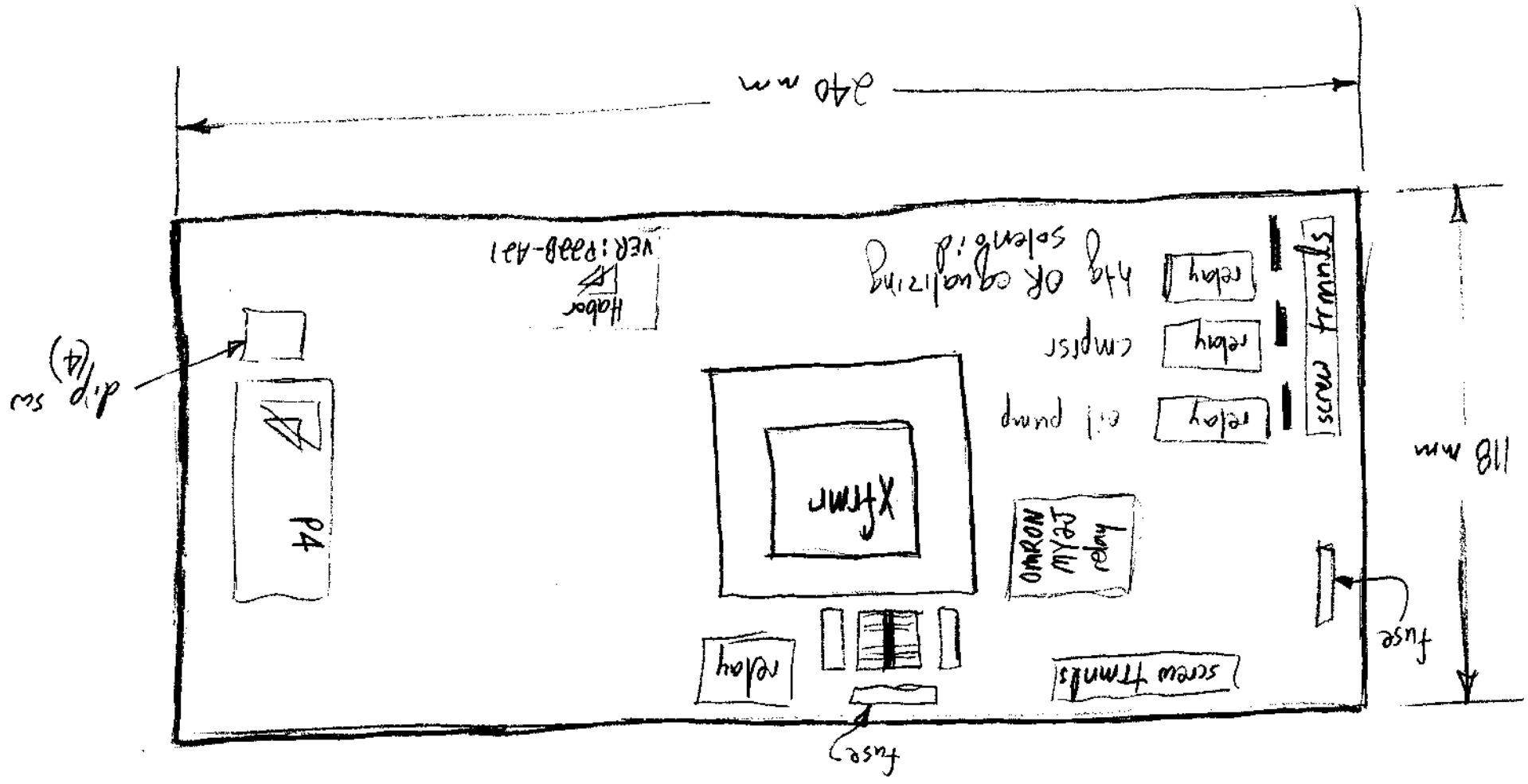
12 volts D.C.

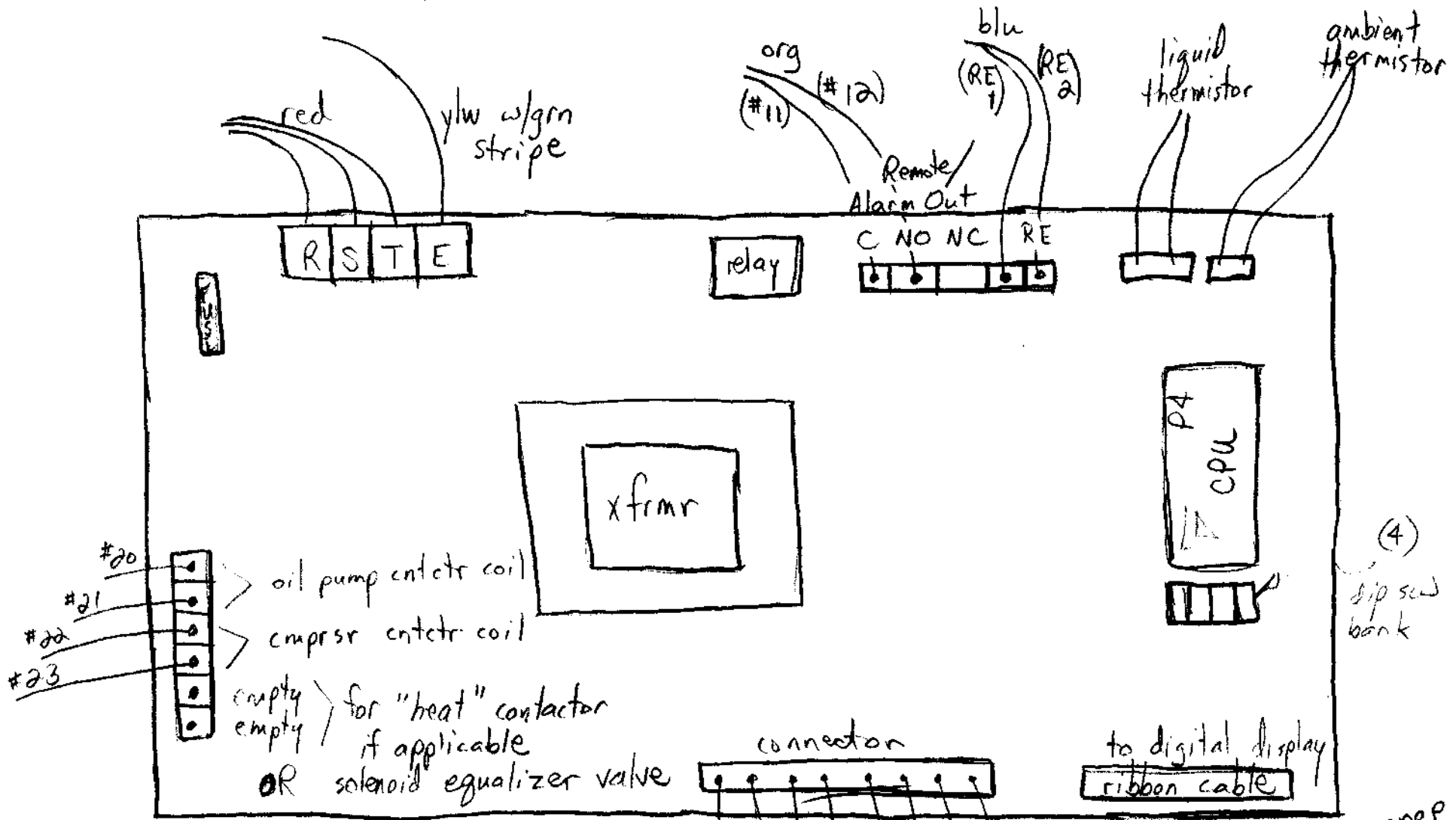
temperature control board
with external alarm circuit
components

Habor Precise
Alarm Circuitry
P22B-A21
-A22

Habor Preise
P22B-A21 w/ CPU chip

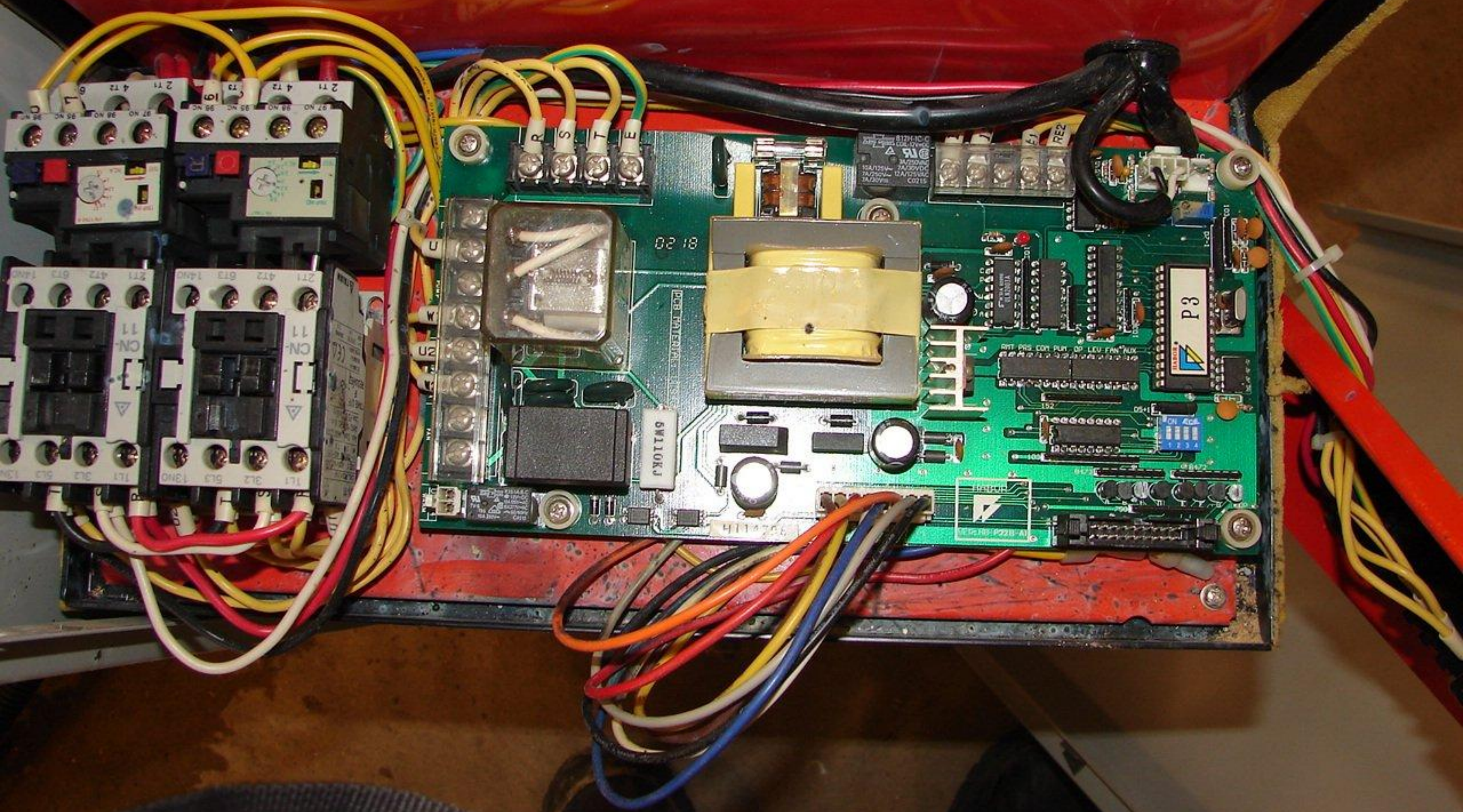
this board version has the
"RP" circuit built into
the controller-board





[entctr 52C] [entctr overld 51C]
 [entctr 52P] [entctr overld 51P]

pressure sw (#5) oil pump/flow red (w/tank only) oil level #4 wht
 (cmprsr) #7 brn (oil pump) #6 ylw
 blk #0 common
 gry #1 cmprsr motor "Hot"
 org #2 rev Ph fault
 blu #3 oil pressure switch
 P22 B A21 w/ CPU dip Harbor Precise
 snap action sw



81 20

DC POWER SUPPLY

6W110KJ

4111470

RESEARCH

DESIGN P222-A1

P3

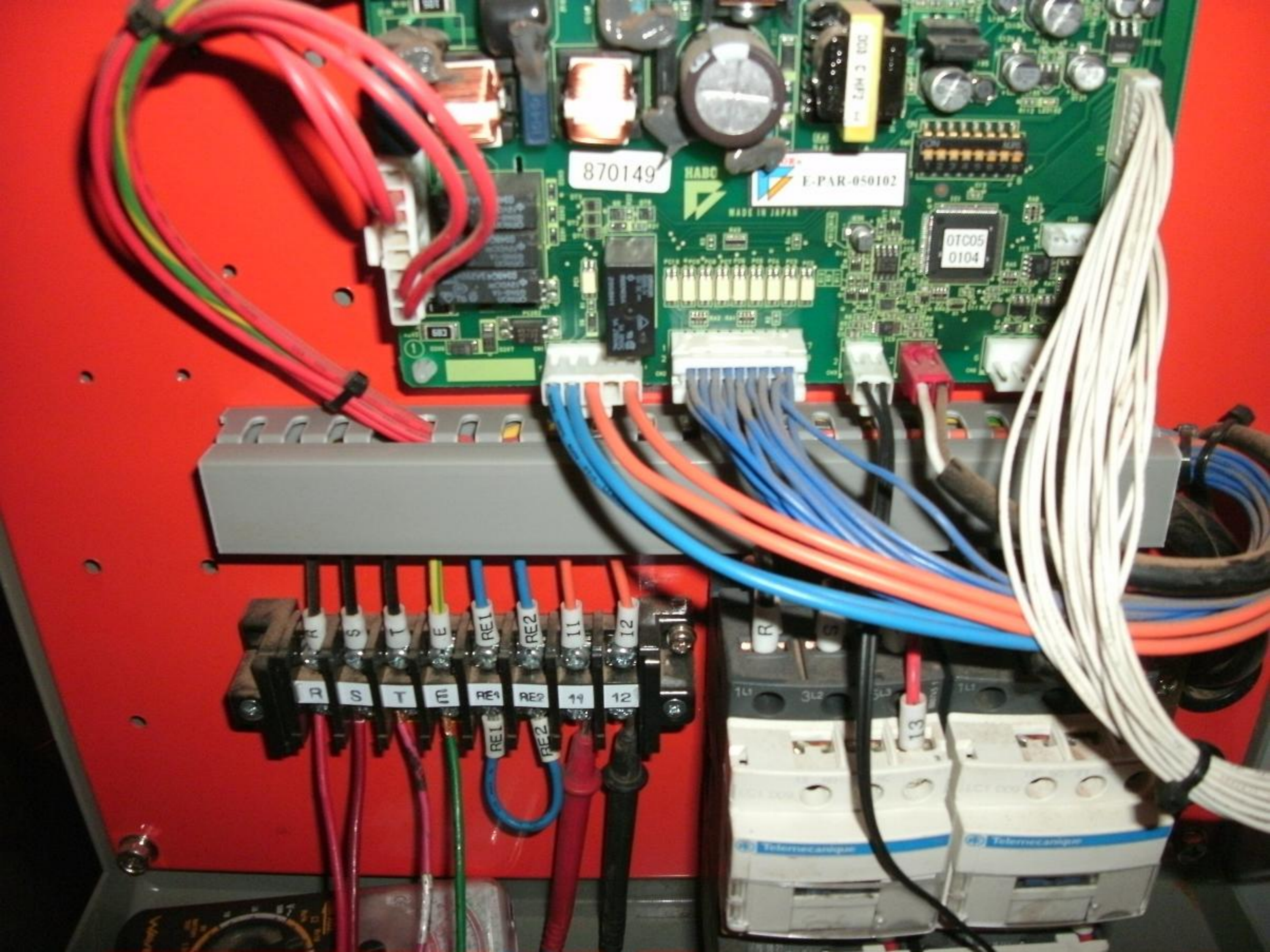
15A/125V
2A/250VDC
2A/250VAC
1A/250VAC
C0215

RE2

2 T1 4 T2 2 T1
97 NO 98 NC 99 NC
97 NO 98 NC 99 NC

2T1 4T2 6T3 14NO
11 CN 11

1L1 3L2 5L3 13NO
11 CN 11



870149

E-PAR-050102

OTC05
0104

R S T E RE1 RE2 11 12
R S T E RE1 RE2 11 12

Telemecanique
Telemecanique

OTC05 TROUBLESHOOTING

Error	Explanation
---	Remote contactor fault; see re --
--	Remote contactor fault; see re --
re	
--	Remote contactor fault; check RE1 and RE2 connection; jumper wire not installed, bad wiring or bad switch at remote power-on location; chiller operates on its own if RE1 and RE2 are jumpered
E0	Failure of liquid temperature sensor or poor connection of liquid temperature sensor wire (chrome plated thermistor body located in liquid pump line)
E1	Failure of base temperature sensor or poor connection of base temperature sensor wire (chrome plated thermistor body located near control panel)
E2	Room temperature is too high (greater than or equal to 45 deg C)
E3	Room temperature is too low (less than or equal to 5 deg C)
E4	Liquid temperature is higher than upper limit control panel setting (+/- 3 deg C for some; +/- 10 deg C others; CPU varies)
E5	Liquid temperature is lower than lower limit control panel setting (+/- 3 deg C for some; +/- 10 deg C others; CPU varies)

- E6 Refrigerant pressure system too high
Check equipment safety fault switch
attached to copper tubing, soldered
into high pressure side of
refrigeration circuit
- E7 Failure of liquid circulating pump
(starter-contactor block tripped)
- E8 Failure of compressor motor (starter-
contactor block tripped)
- E9 Liquid circulation system fault
(optional in-line liquid flow sensor)
- EA Reverse-phase of power if wires
MANUALLY changed after factory delivery

OR failure of factory installed
reverse-phase protection (Relay circuit
located in chiller electrical box or on
chiller temperature control board)
- EC Liquid level fault (tank float switch -
optional) Error is not a universal
application / Machine tool specific
- ED Lacking condenser air flow: filter is
too dirty; Poor ventilation for unit
due to placement; damaged fan blade
- EE Failure of fan motor overload
(optional)
- EF Surface temperature of compressor
housing is too high - a switch (located
on top of or sometimes in the case of
compressor)
- EU Failure of input power circuit L1, L2,
L3 to control board Sometimes referred
to as R, S, T or U, V, W

Sn OL Failure of liquid temperature sensor (chrome plated thermistor body) or poor connection of liquid temperature sensor wire to control

Sn RO Failure of base temperature sensor (chrome plated thermistor body at front of chiller control panel OR alternate machine tool casting sensor - never both) Check for poor connection of base temperature sensor wire to control or damaged thermistor

AH OL Circulating liquid temperature is greater than control panel setting (liquid is too hot) AH OL is the same as uu OL error message Consider error message E2 or blocked circulating liquid flow from dirty liquid intake screen (Machine headstock of chiller tank id applicable)

AL OL Circulating liquid temperature is less than control panel setting i.e. the liquid is too cold. AL OL means "Alarm" "Low" "Outer Limit" It is the same as nn OL error message; "lower" "Outer Limit". Consider or check error message E3. Troubleshoot for blocked circulating liquid flow combined with continual compressor operation

uu OL Circulating liquid temperature is greater than control panel setting i.e. the liquid is too hot. uu OL means "upper" "Outer Limit". It is the same as the AH OL error message; "Alarm" "High" "Outer Limit"

nn OL Circulating liquid temperature is less than control panel setting i.e. the liquid is too cold. nn OL means "lower" "Outer Limit" is the same as AL OL error message; "Alarm" "Low" "Outer Limit"

DIP Switch Setting

DIP switch setting information has always been hidden from the end user by the factory. However, some experience working with different control board has left some insight into assignments.

#1 - Absolute versus Differential temperature control

Absolute is a setting maintained in degrees C

Differential is a plus or minus degree setting relative to room temperature

If the room warms up or cools down “the difference” setting of the oil or water glycol remains the same but actual temperature of the liquid rises or falls with room temperature

#2 –

#3 –

#4 –

#5 –

#6 –

#7 –

#8 –

E – error --- remote contactor fault (flat line)

Sn – sensor

R – resistor (thermistor)

A –alarm

H – high

L – low

OL – outer limit

uu – upper

nn – lower

ALARM OUTPUT – Hi versus Low

Find connector #1 (CN1 - five pin) with two blue wires and two orange wires. Reading RIGHT to left #1 #2 and #3 are related to Hi versus Low alarm logic output. #1 = common, #2 = normally open, #3 = normally closed. Using a paper clip release the #2 wire and reinsert it into the #3 position.

Positions #4 and #5 are RE1 and RE2 direct current wires and should never be positioned differently.