GUARDIAN
RCC-20

Reciprocating Compressor Controller for coldstores and supermarkets

- **Suction pressure setpoint control of up to 6 uneven/even compressors**
- **Discharge pressure setpoint control of variable speed condenser fans**
- **Configurable as discharge pressure controller for 6 condenser fans**
- **Compressor monitor with capacity, pressure & hours-run displays**
- **Alarm, trip & load monitoring**
- **Local panel operation & setup of timers, limits and configuration**
- **Remote RS485 monitoring and setup**

Operation and Setup Manual

The RCC-20 reciprocating or scroll compressor controller provides suction pressure setpoint control and alarm monitoring for up to six even or uneven size multi-stage compressors plus discharge pressure control for up to six fixed or variable speed condenser fans.

Pushbuttons on the local control panel permit operator display of setpoints, pressures, temperatures, liquid level, alarm and trip settings, compressor load, run hours and status. Control strategy, setpoints, alarm and trip settings may be changed from the panel after entry of the appropriate passcode.

The RCC-20 communicates with a GUARDIAN Autograph Terminal which provides remote central alarm monitoring, data recording and graphs.

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Contents

Getting Started

Guardian Controllers provide refrigeration engineers with

- **ULTIMATE FLEXIBILITY**
- **ASSURED MONITORING**
- **RELIABLE ALARMS**

This manual provides refrigeration designers, installers, service mechanics and supermarket personnel with the necessary information to achieve the above objectives.

All users require to know a few basic facts about this controller before successfully starting to perform their design, commissioning, maintenance or operating functions.
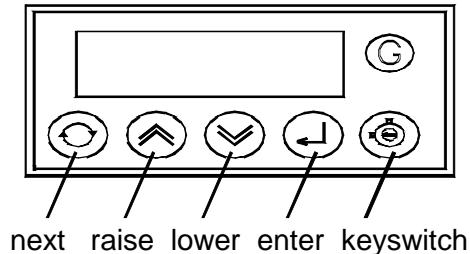
a) All GUARDIAN controllers need to be set up with a unit model selection and other basic settings for setpoints, timers and addresses. All these settings need to be done using the SKD.9 Keyswitch Display, so the understanding of the button operation of this unit is essential.

b) The shorthand used in the following chapters for concisely expressing button pressing and selection sequences to do all this setup needs to be understood.

c) Mains power input voltage and hardware switch and link option selections (if any are required) must correspond to the selected unit model configuration.

d) Since each controller can be configured in a number of different ways to perform flexible refrigeration control then an understanding of how to find out what unit model is currently selected, what it does and how it is connected, is also necessary

SKD.9 KEYSWITCH DISPLAY OPERATION

GUARDIAN controllers require a SKD.9 Keyswitch Display unit to be plugged into the telephone jack socket in the controller before any settings can be changed.
The SKD.9 is connected to the GUARDIAN controller via a 6-core telephone cable.
The SKD.9 Keyswitch/Display comprises a plastic enclosure housing a PCB with four membrane pushbuttons, four LED displays and a 2-position Keyswitch.

next raise lower enter keyswitch

SKD.9 buttons have the following functions when pressed:

@	'next' button	displays next value or menu selection in sequence.
/	'raise' button	raises a menu settings value or menu item selection.
<	'lower' button	decreases a menu settings value or item selection.
?	'accept' or 'enter' button	accepts any alarm and is used for entering a menu selection or settings value data entry

The two position **keyswitch** may be used to toggle display case control status from OFF to FANS only and back to AUTO
The Keyswitch is not used on any compressor controllers.

BUTTON OPERATION SHORTHAND

To assist in easy setup of control setpoints, delays, timers and other configuration settings, the sequence of button presses and subsequent displays will be shown in this handbook as below:
ii) A button symbol means press that button
iii) A display box shows the result of the last button press on the SKD.9 display.
EXAMPLES

@ Auto   ?   OFF=   ?   -OFF   is   shorthand
                                        for

Press '**next**' button which then displays AUTO
Press '**next**' button which then displays OFF
Then press '**enter**' button which changes the control mode to OFF and displays -OFF

@: @ Auto   ?

Press '**next**' repeatedly until **Auto** is displayed then press '**enter**'.

Suct   4.8b

means the display alternates between the value identifier tag and the latest value.

diSc =oC= FAIL

means the display alternately flashes between the value identifier tag (discharge temperature), the measured value (open circuit) and the alarm or trip message.

HARDWARE CONFIGURATION CHECKS

Prior to switching on the GUARDIAN controller check that the hardware unit is the correct type for the incoming mains voltage

Models with **BLUE**   labels and suffix '**L' (LOW VOLTAGE)** operate at **24vac**
Models with **BLACK** labels and no suffix **(NORMAL 230vac)** operate at **230vac**

230vac MAINS SUPPLY WILL DAMAGE A BLUE LABEL CONTROLLER !!!
 A BLACK label controller will not work with a 24vac supply

When satisfied that the correct type of controller is available then the following checks should be made prior to controller installation or replacement
a) Ensure mains supply is wired correctly to the appropriate TERMINAL WIRING drawing for the model selected.
b) Ensure that any transducer selector switches specified on the TERMINAL WIRING diagram are in the correct state.
c) Ensure any shorting link selector pins specified on the TERMINAL WIRING diagram are correctly fitted.
d) Ensure that probes are wired to the terminal WIRING DIAGRAM and the correct type of thermistor or pressure transducer probes are fitted.
e) The SKD.9 Keypad/display unit is fitted correctly in its 6 way telephone socket.
f) The RS485 highway connections (if required) are wired to the correct terminals and the screen drain wire is continuous to earth.

CONFIGURE UNIT MODEL, SYSTEM No & ADDRESS

Enter Passcode PP05 for normal changes

Before any permanent change of controller settings are made then the correct entry of the appropriate passcode is necessary.
Most normal system settings require entry of passcode PP05

$$@:@ \quad SEt= \quad ? \quad PP00 \quad /:/ \quad PP05 \quad ?$$

Press '**next**' repeatedly until **SEt** is displayed then press '**enter**'. **PP00** is displayed.
Press '**raise**' repeatedly until **PP05** is displayed and then press '**enter'.**

Select Unit Model

$$@:@ \quad SEt= \quad ? \quad PP00 \quad /:/ \quad PP05 \quad ?$$

Enter Passcode PP05 as button sequence above

$$@:@ \quad Unit \quad ? \quad 8pAC \quad /:/ \quad 6PAC \; ? \quad 6PAC$$

Press '**next**' repeatedly until **Unit** is displayed and then press '**enter**'
Display shows unit model currently selected which may be wrong.
Press '**raise**' repeatedly until correct model is displayed (e.g. 6PAC) and then press '**enter**' which causes the display to wink briefly and display the new unit model selection(e.g. 6PAC)

Select System No and Address

e.g. setup unit for system 60 case 1 at address 180

Enter Passcode as button sequence as above

```
@:@   Unit    ?
@:@   Sn01   /:/   Sn60    ?    Sn60
   @  Cn01    ?    Cn01
   @  A001   /:/   A180    ?    A180
@:@   End=    ?    =-26
```

RS485 Communications

When the correct system number, case/compressor number and highway address have been entered as above then the controller can communicate with the GUARDIAN AutoGraph Terminal PC for central alarm monitoring and temperature display. Control setpoints, defrost times and alarm limits may then be sent to the controller from the PC rather than using the SKD9 Keyswitch display. For further details see page 41

UNIT MODELS

Guardian controllers may be configured in a number of different ways dependent on unit model selection. Each unit model fulfils a different refrigeration temperature monitoring and control requirement. In order to perform the required refrigeration control then each model has different uses for the controller's input output signals. This section gives details of all the model variations available for the controller and the way to connect the wiring to the plant devices and measuring transducers.

Available unit models (RCC-20)

RCC-20 '1LT'	Single LT Compressor with Fans
RCC-20 '1HT'	Single HT Compressor with Fans
RCC-20 '3PAC'	3 Compressors with Fans
RCC-20 '4SAT'	3 Compressors with with Loading Valves plus 1 Satellite Compressor
RCC-20 '6PAC'	Rooftop unit for 6 Compressors and variable speed Fans
RCC-20 '6FAN'	Condenser Fan Controller
RCC-20 '8PAC'	Rooftop unit for 8 Compressors and variable speed Fans

GENERAL SPECIFICATION

Power	**RCC–20**	110 / 230 Vac 50 Hz 10VA
	RCC–20 L	24 Vac 50 Hz 10VA
Operation	0 to 55ºC	
Approx. dimensions	Width 70 x length 100 x height off rail 110mm.	

The RCC-20 controller is housed in a DIN rail mounting enclosure with 20 screw clamp connectors.
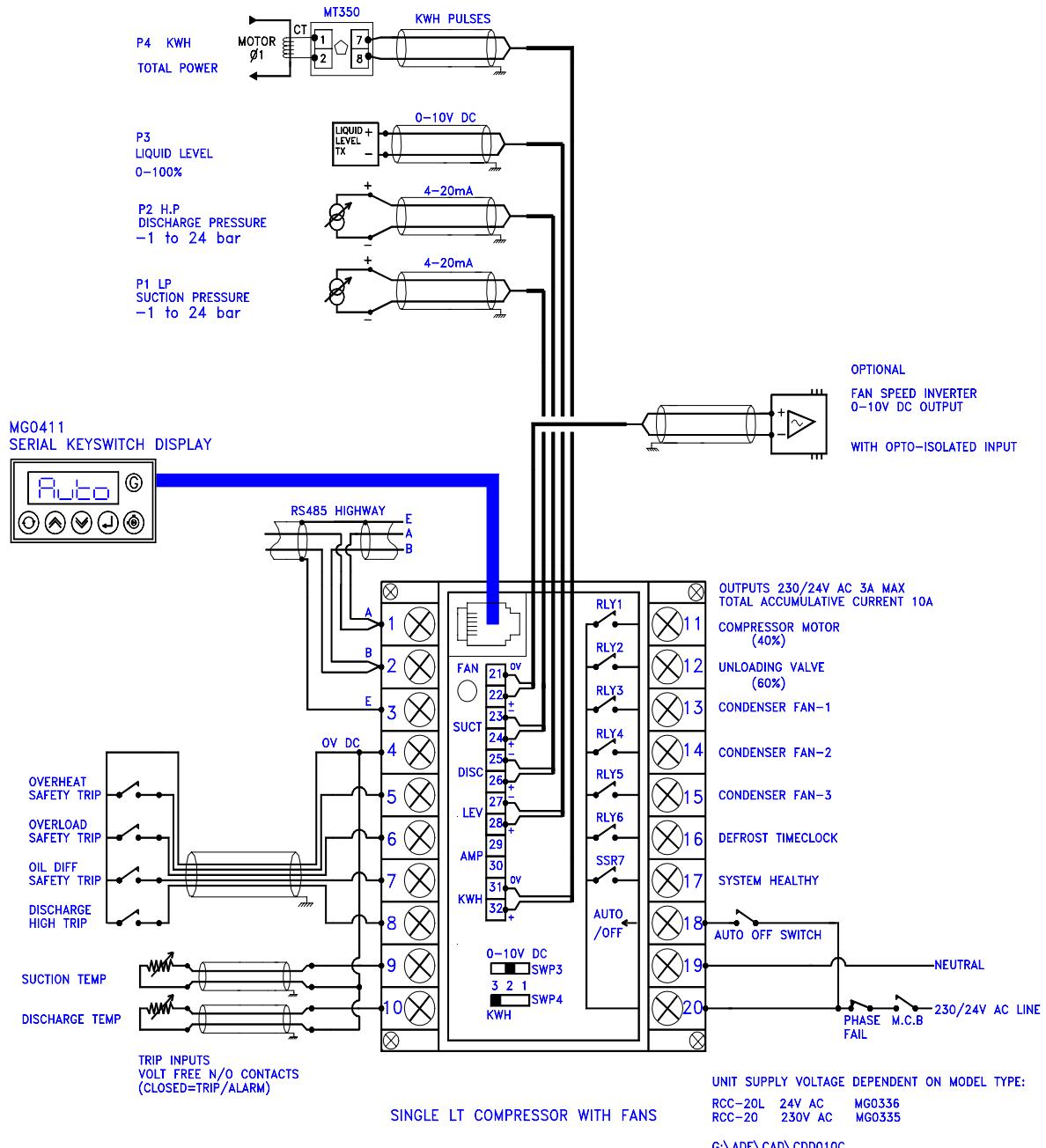
RCC-20 '1-LT'

RCC-20 '1-LT' and '1-HT' Input/Output Signals

1-LT	1-HT		
Analogue Inputs			
P1 LP	P1 LP	Suction Pressure	-1 to 24 bar
P2 HP	P2 HP	Discharge Pressure	-1 to 24 bar
P3	P3	Liquid Level	0 - 100%
P4	P4	Total Power	KWH
Optional	Optional	Fan Speed Inverter	0 - 10V DC
Digital Inputs		**volt free contact**	
Yes	Yes	Overheat Safety Trip	
Yes	Yes	Overload Safety Trip	
Yes	Yes	Oil Differential Safety Trip	
Yes	Yes	Discharge PressureHigh Trip	
Yes	Yes	Suction Temperature	
Yes	Yes	Discharge Temperature	
Mains Input	**Yes**	**230vac / 24vac**	
Yes	Yes	Auto On Switch	
Relay Outputs 230/24v AC 3 amp. Maximum Accumulative Current 10 amp.			
RLY1	RLY1	Compressor Motor	40%
RLY2		Unloading Valve	if 'Lneg'
	RLY2	Loading Valve	if 'LPOS'
RLY3	RLY3	Condenser Fan-1	
RLY4	RLY4	Condenser Fan-2	
RLY5	RLY5	Condenser Fan-3	
RLY6		Defrost Timeclock	if '1-LT'
	RLY6	Condensor Fan-4	if '1-HT'
SSR7	SSR7	System Healthy	

RCC-20 Termination Wiring - '1-LT' model selection

Single LT compressor with Fans
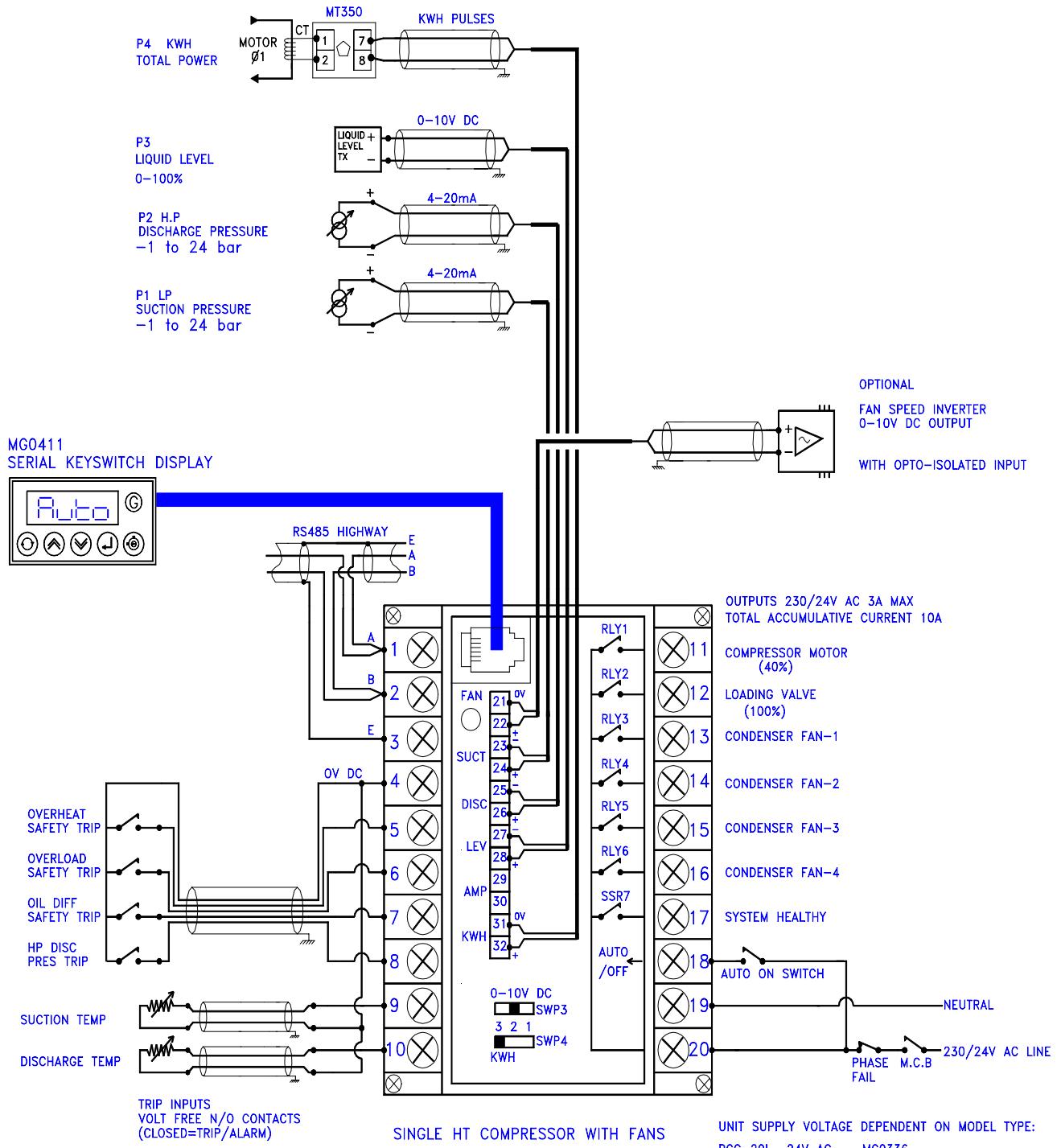
SINGLE LT COMPRESSOR WITH FANS

RCC-20 '1-HT'

RCC-20 Termination Wiring - '1HT' model selection

Single HT compressor with Fans

RCC-20 '3PAC'

3 even/uneven compressors with Fans

RCC-20 '3PAC' Input/Output Signals
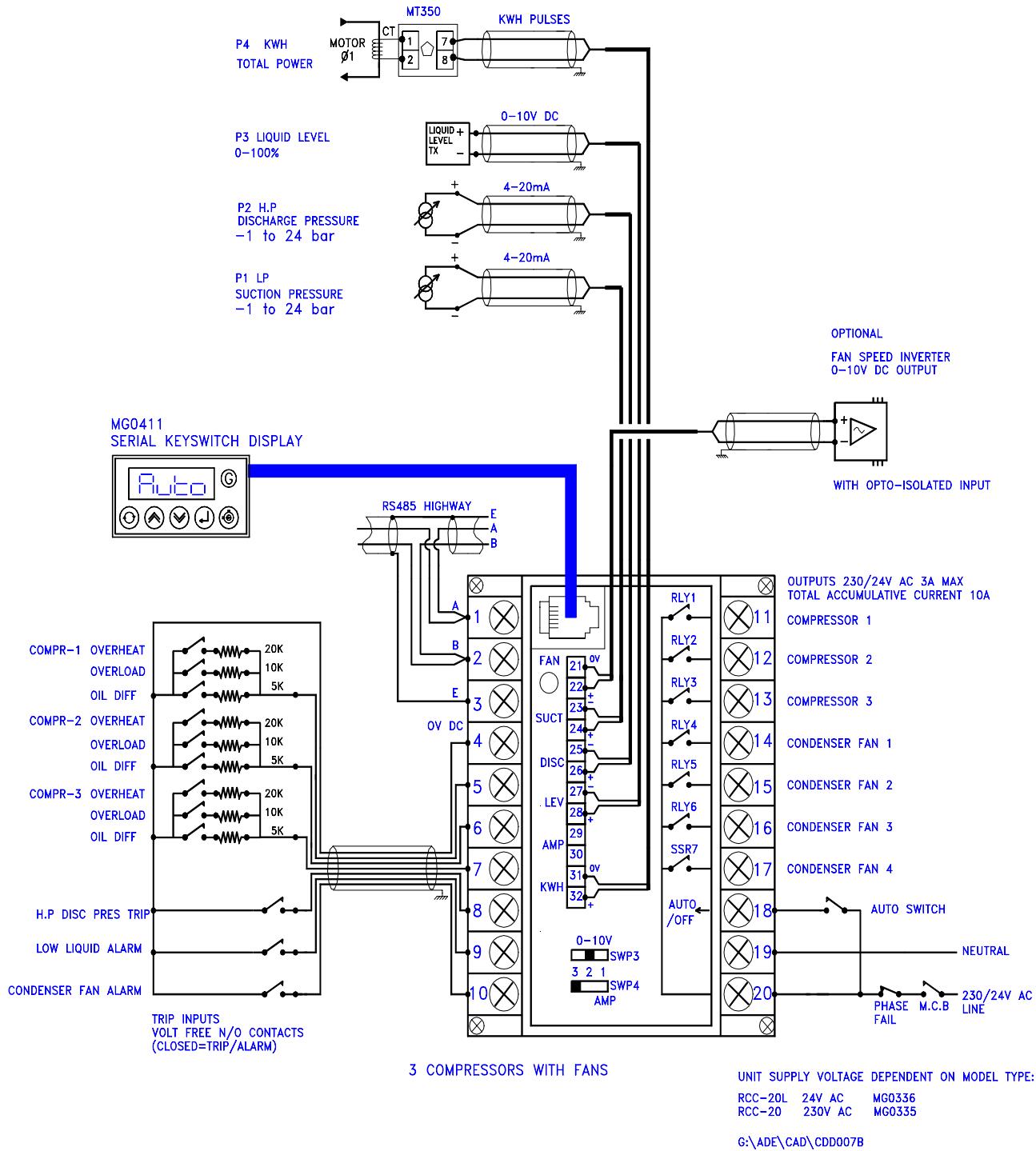
3PAC		
Analogue Inputs		
P1 LP	Suction Pressure	-1 to 24 bar
P2	Satellite Pressure	-1 to 24 bar
P3 DISC	Discharge Pressure	-1 to 24 bar
P4 SYST	Low Oil Level	Alr (On/Off) Digital
Digital Inputs		
Trip 1	Compressor 1 Safety Trip	
Trip 2	Compressor 2 Safety Trip	
Trip 3	Compressor 3 Safety Trip	
Trip 4	Pack H.P.Safety Trip	
	Low Liquid Alarm	
	Condenser Fan Alarm	
Mains Input	**230vac / 24vac**	
Yes	Auto On Switch	
Relay Outputs 230/24v AC 3 amp. Maximum Accumulative Current 10 amp.		
RLY1	Compressor 1	
RLY2	Compressor 2	
RLY3	Compressor 3	
RLY4	Condenser Fan 1	
RLY5	Condenser Fan 2	
RLY6	Condenser Fan 3	
SSR7	Condenser Fan 4	

RCC-20 Termination Wiring - '3 PAC' model selection

3 even/uneven compressors with Fans
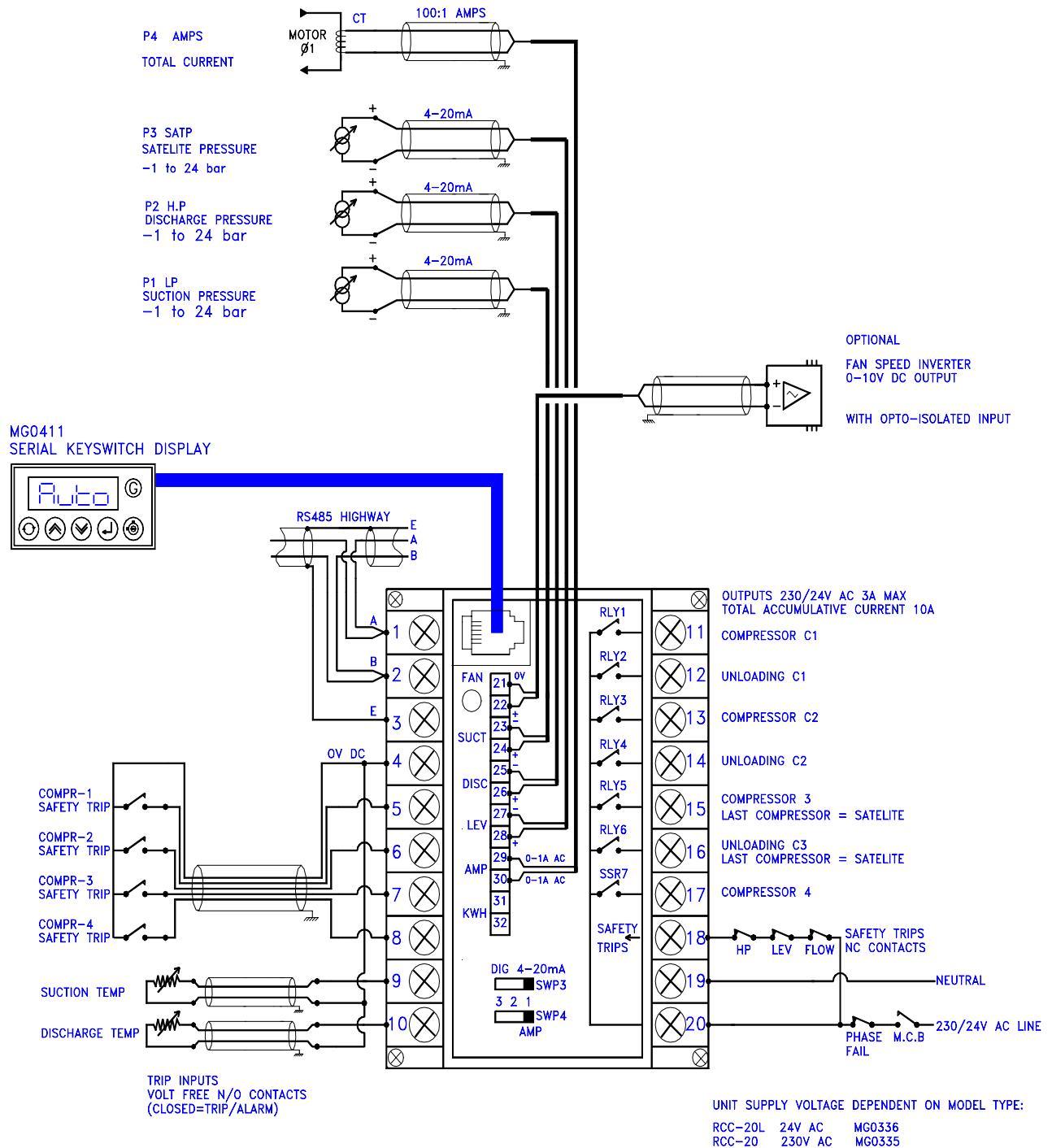
RCC-20 '4SAT'

3 Even/uneven Compressors with loading valves plus one satellite compressor

RCC-20 '4SAT' Input/Output Signals

4SAT		
Analogue Inputs		
P1 LP	Suction Pressure	-1 to 24 bar
P2 HP	Discharge Pressure	-1 to 24 bar
P3 SATP	Satellite Pressure	-1 to 24 bar
P4 AMPS	Total Current	
Optional	Fan Speed Inverter	0 - 10V DC
Digital Inputs		
Trip 1	Compressor Safety Trip 1	
Trip 2	Compressor Safety Trip 2	
Trip 3	Compressor Safety Trip 3	
Trip 4	Compressor Safety Trip 4	
	Suction Temperature	
	Discharge Temperature	
Mains Input	**230vac / 24vac**	
Safety Trips	HP / LVL / FLOW	
Relay Outputs 230/24v AC 3 amp. Maximum Accumulative Current 10 amp.		
RLY1	Compressor C1	
RLY2	Unloading C1	
RLY3	Compressor C2	
RLY4	Unloading C2	
RLY5	Compressor 3	Last Compressor = Satellite
RLY6	Unloading Compressor 3	Last Compressor = Satellite
SSR7	Compressor 4	

RCC-20 Termination Wiring - '4SAT' model selection

3 Even/uneven Compressors with loading valves plus one satellite compressor

3 COMPRESSORS WITH LOADING VALVES PLUS ONE SATELITE COMPRESSOR

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RCC-20 '6PAC'
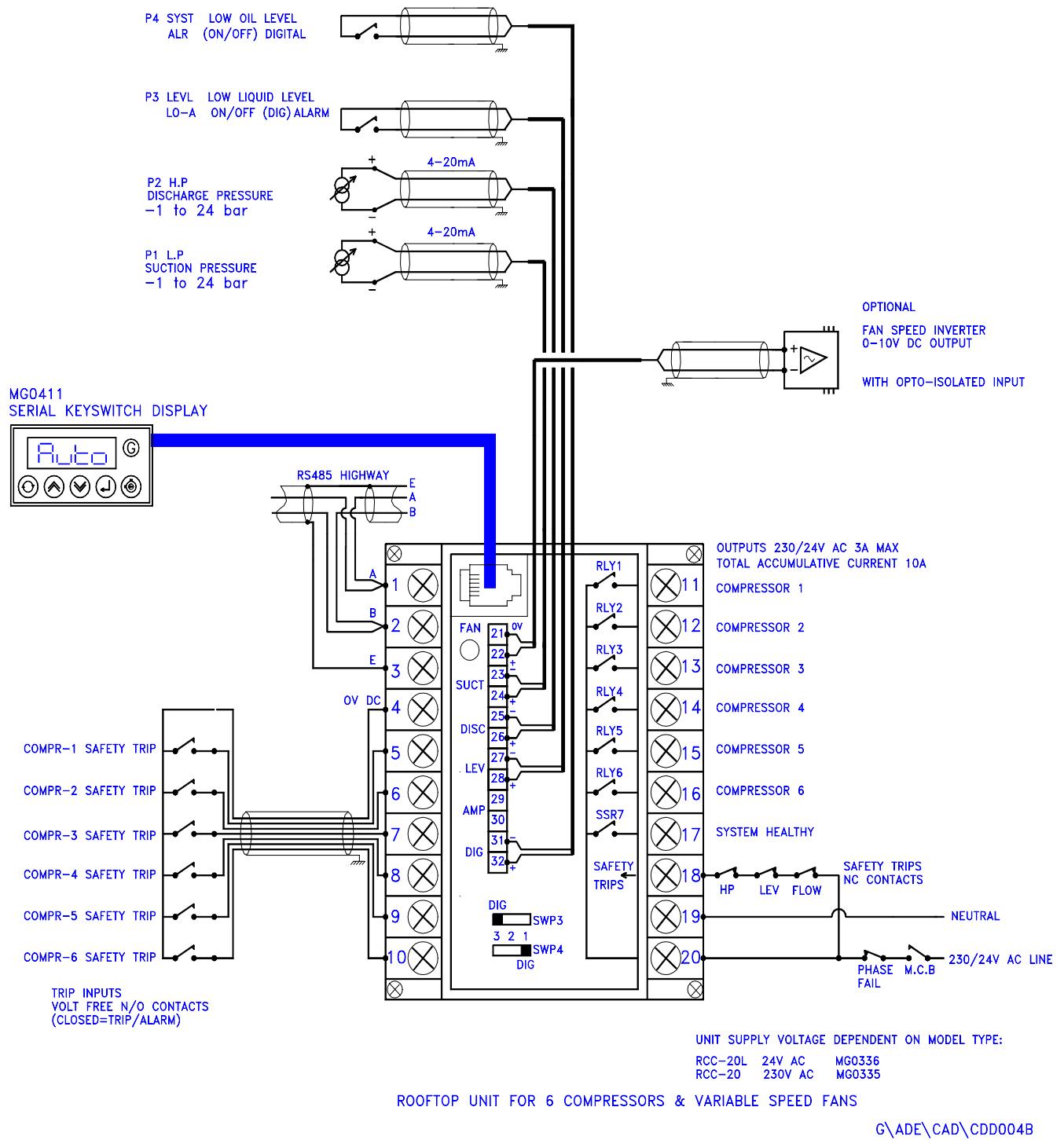
Rooftop Unit For 6 even/uneven Compressors & variable speed Fans

RCC-20 '6PAC', '8PAC' Input/Output Signals

6PAC		
Analogue Inputs		
P1 LP	Suction Pressure	-1 to 24 bar
P2 HP	Discharge Pressure	-1 to 24 bar
P3 LEVL	Low Liquid Level	10-A On/Off (Dig) Alarm
P4 SYST	Low Oil Level	ALR (On/Off) Digital
Optional	Fan Speed Inverter	0 - 10V DC
Digital Inputs		
Trip 1	Compressor Safety Trip 1	
Trip 2	Compressor Safety Trip 2	
Trip 3	Compressor Safety Trip 3	
Trip 4	Compressor Safety Trip 4	
Trip 5	Compressor Safety Trip 5	
Trip 6	Compressor Safety Trip 6	
Mains Input	**230vac / 24vac**	
Safety Trips	HP / LVL / FLOW	
Relay Outputs 230/24v AC 3 amp. Maximum Accumulative Current 10 amp.		
RLY1	Compressor 1	
RLY2	Compressor 2	
RLY3	Compressor 3	
RLY4	Compressor 4	
RLY5	Compressor 5	
RLY6	Compressor 6	
SSR7	System Healthy	
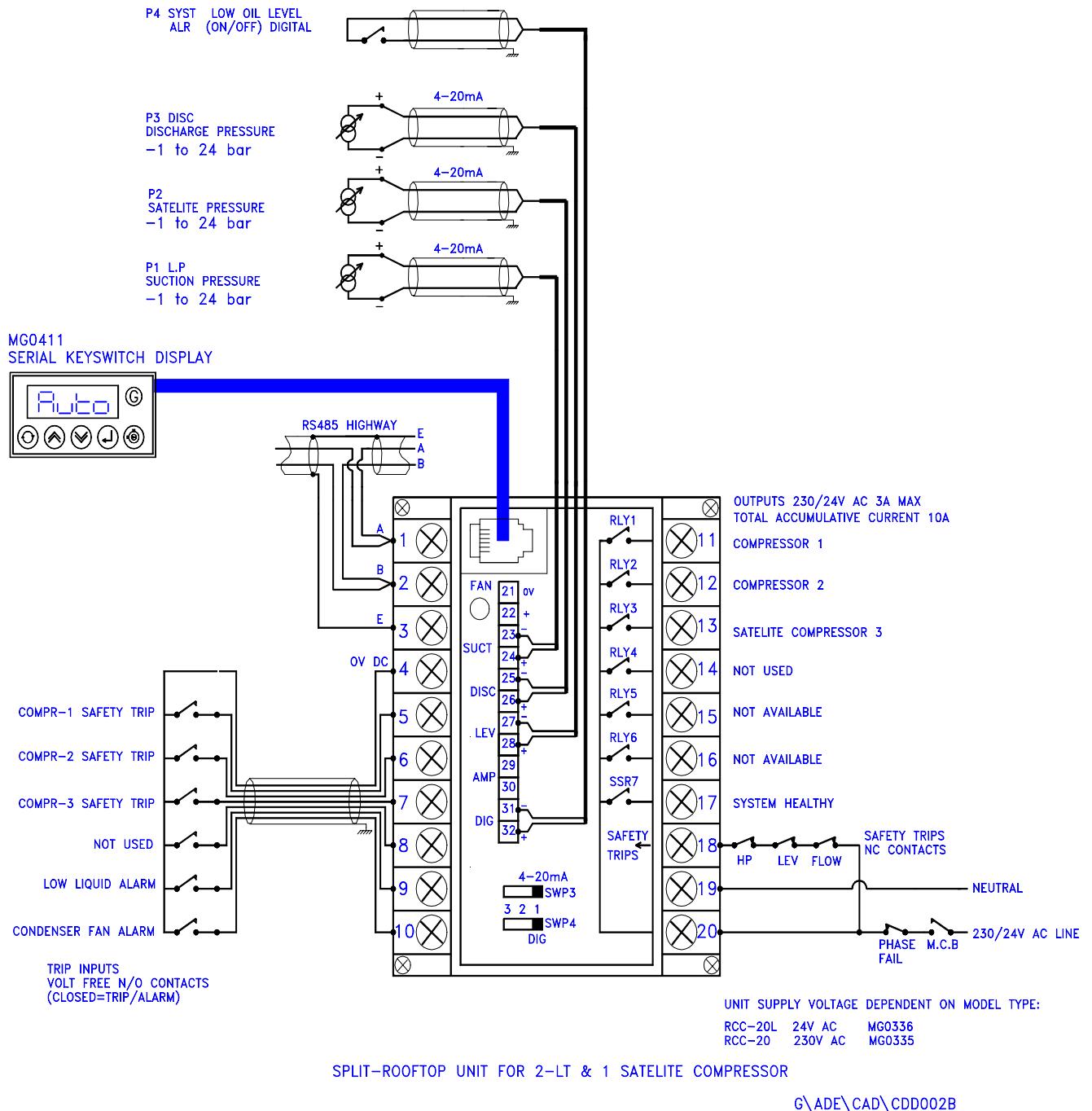
RCC-20 Termination Wiring - '6PAC' model selection

Rooftop Unit For 6 even/uneven Compressors & variable speed Fans

RCC-20 Termination Wiring - '6PAC-SAtC' model selection

Split-Rooftop Unit For 2-LT & 1 satellite Compressor

SPLIT-ROOFTOP UNIT FOR 2-LT & 1 SATELITE COMPRESSOR

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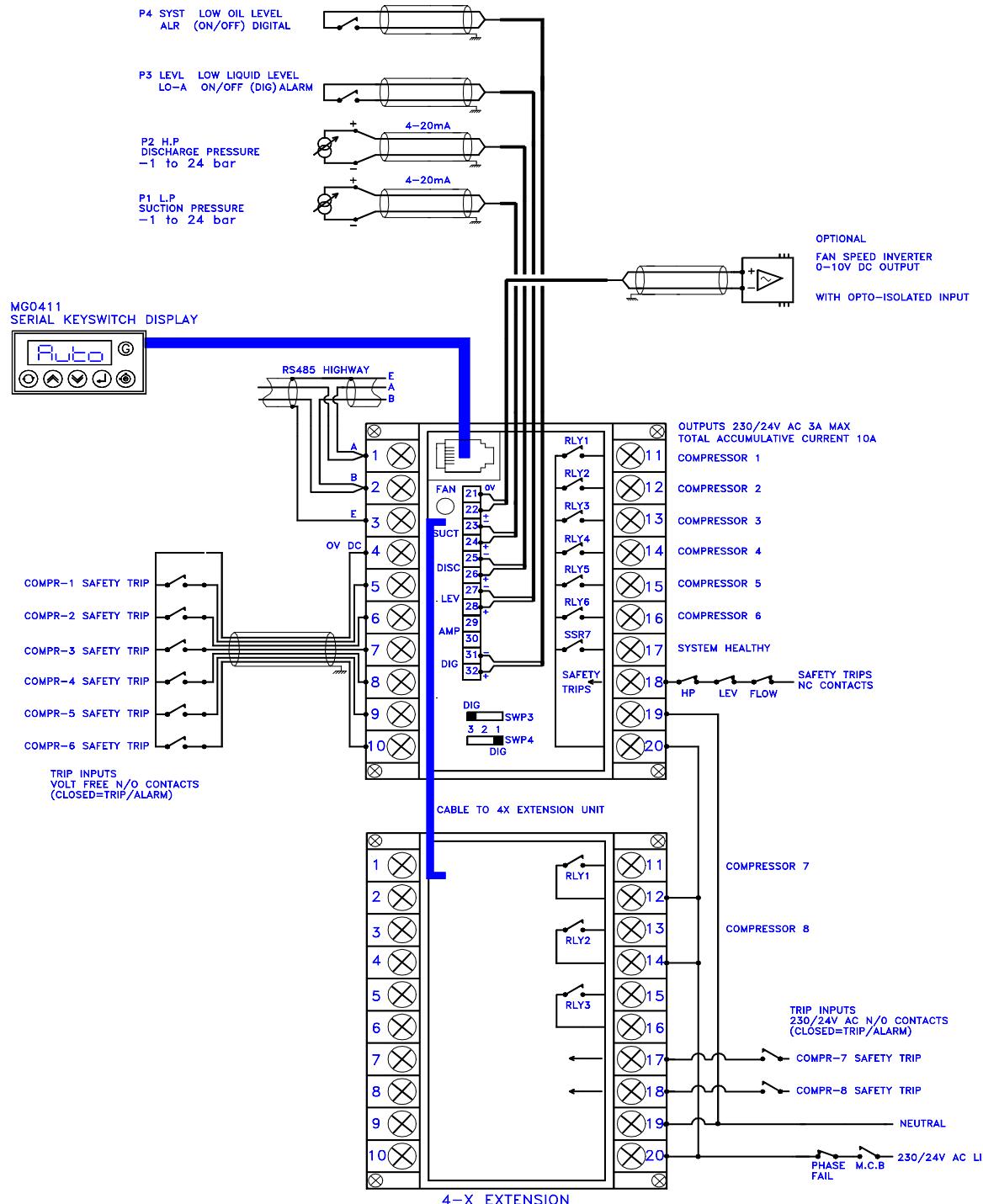
RCC-20 '8PAC'

RCC-20 Termination Wiring - '8PAC' model selection

Rooftop Unit For 8 Compressors & variable speed Fans
5
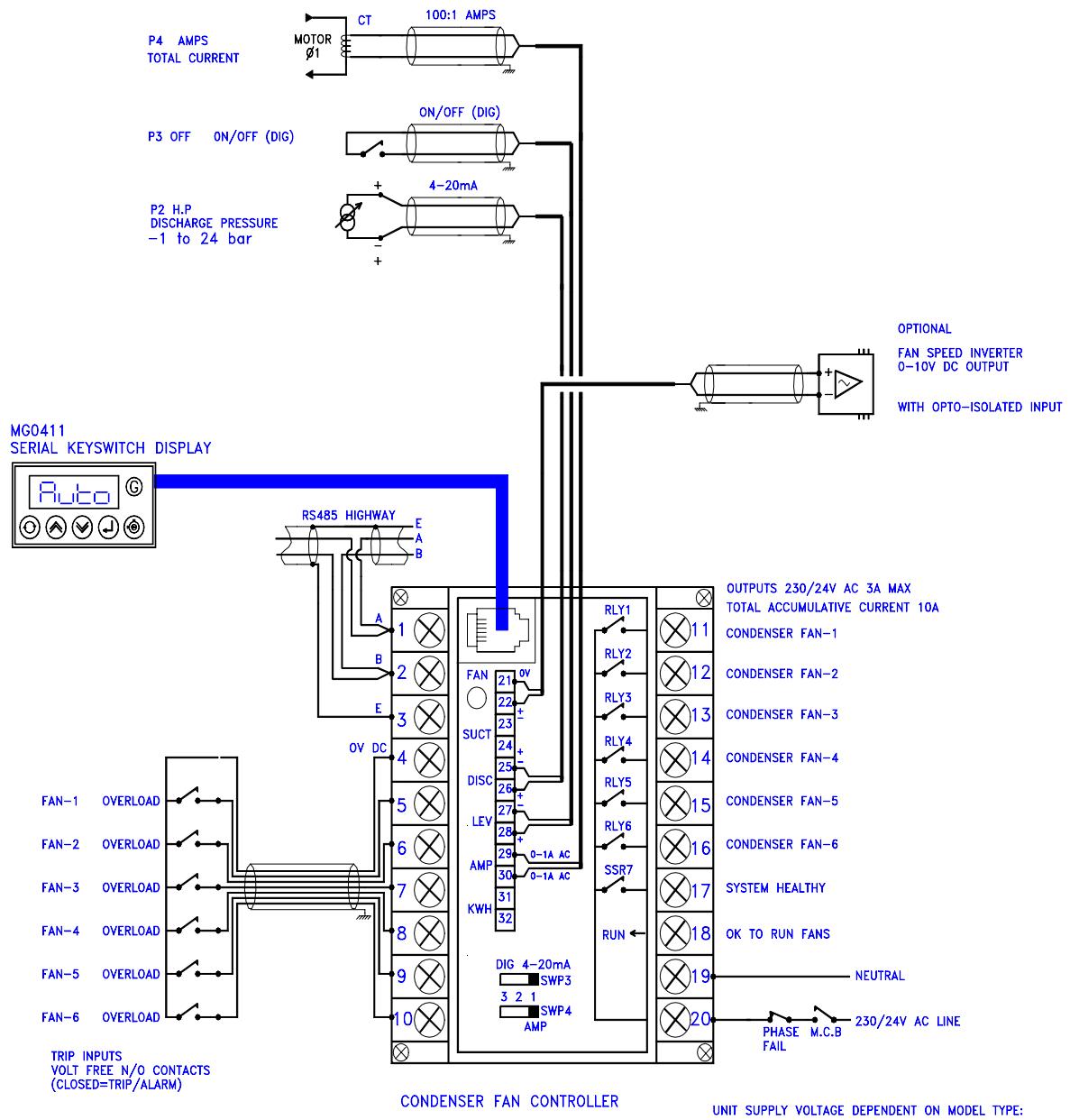
RCC-20 '6FAN'

RCC-20 '6FAN' Input/Output Signals

6FAN		
Analogue Inputs		
P2 HP	Discharge Pressure	-1 to 24 bar
P3 OFF	On/Off (Dig)	
P4 AMPS	Total Current	
Optional		
Digital Inputs		
Trip 1	Fan 1 Overload	
Trip 2	Fan 2 Overload	
Trip 3	Fan 3 Overload	
Trip 4	Fan 4 Overload	
Trip 5	Fan 5 Overload	
Trip 6	Fan 6 Overload	
Mains Input	**230vac / 24vac**	
	OK to run Fans	
Relay Outputs 230/24v AC 3 amp. Maximum Accumulative Current 10 amp.		
RLY1	Condenser Fan 1	
RLY2	Condenser Fan 2	
RLY3	Condenser Fan 3	
RLY4	Condenser Fan 4	
RLY5	Condenser Fan 5	
RLY6	Condenser Fan 6	
SSR7	System Healthy	

RCC-20 Termination Wiring - '6FAN' model selection

Condenser Fan controller

OPERATION

The SKD.9 Keyswitch display provides a display at the control panel of:

Compressor suction pressure
Condenser discharge pressure.
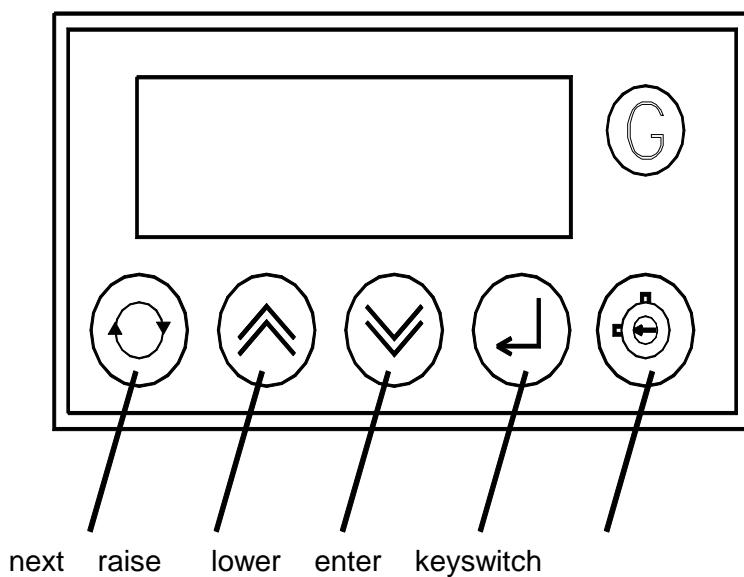
Display of other temperatures pressures etc by pressing'next' @ button,

 the values displayed depend on the unit model selected.
The keyswitch. Is not used on the RCC20
Passcode protected setup of controller setpoints, timers and limits.
Alarms and trips are reset by pressing accept

next   raise   lower   enter   keyswitch

DISPLAY INDICATIONS

Compressor Displays

The following displays are available by repeatedly pressing $@$ .Value displays are alternated with an identification Tag (ie 'Suct') which is displayed for a quarter time:-
All pressure are followed by 'b' to denote bar guage

Tag	Value	
Suct	=2. 3b	Suction pressure (-1 to 24barG)
LoAd	=125	Total pack amps
CAP=	=100	Total Pack Capacity % (0 to 100 %) (capacity raise/lower operative in HAnd control mode)
S-uP	==3. 5	Stage up timer count
S-dn	==0. 3	Stage down timer count
	Auto	Pack Auto control mode (press 'accept')
	OFF=	Pack OFF control mode (press 'accept')
	hAnd	HANd control mode (press 'accept') (enables raise/lower buttons)
CPrS	1=11	Compressor motors running status
triP	==11	Motor trip status
LEuI	==35	Liquid level % if fitted
=St=	=-36	Suction temperature if 'STSH'
=Et=	=-38	Equivalent Suction temperature if 'STSH'
=SH=	===4	Suction superheat temperature if 'STSH'
CSEt		Request compressor parameter change
FAnS		Press 'accept' to display discharge

CONDENSER FAN DISPLAYS MAY ALSO BE SELECTED BY PRESSING 'Lower' with 'Suct' on display

COMPRESSOR SETTINGS MAY ALSO BE SELECTED BY PRESSING 'Raise' with 'Suct' on display

Default Displays

The default suction pressure display

Suct =2.3b   Suction pressure (-1 to 24barG)

is during AUTO or restart sometimes replaced by

8888   During restart

6PAC   Unit model configuration selected

u1.1A   (Software version)

-OFF   If unit selected OFF

HAnd   If unit selected hand control

=PC= FAiL   if RS485 comms watchdog fail

TRIPS AND ALARMS

PACK AND COMPRESSOR SAFETY TRIPS

Pack trips always de-energise the system healthy output, stops all motors and de-energises the loading valve and fan relays.

Compressor Motor trips only stop the appropriate compressor.

ALL Trips are RESET locally by pressing the 'enter' button.

The last safety trip input detected is automatically displayed with a flashing alternative **'triP'** message.

The **'next'** button may always be used to view other displays.

Trip messages displayed depend on the unit model and the configuration selected.

Analogue Trips

Suct =oc= FAiL   Suction pressure open circuit

diSc =oc= FAiL   Discharge pressure open circuit

Suct 10.5 triP   Suction pressure high trip

diSc 18.6 triP   Discharge pressure high trip

=SH= -0.5 triP   Superheat low trip

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Digital Trips

Safety Trip Messages from digital inputs include:-

SFtY triP   Pack Safety trip input removed

Individual compressor trips include:-

L.P. triP   L.P. safety trip active

H.P. triP   H.P. safety trip active

diFF triP   Oil diff safety trip active

LOAd triP   Overload safety trip active

HEAt triP   thermistor safety trip active

SFtY =C-3   Safety trip compressor C-3

System Healthy Output

IF a pack Safety trip occurs or suction pressure or discharge pressure signal inputs detect an open circuit FAIL or exceed trip limits then the System Healthy output is removed.

ALARMS

Analogue Alarms

If the suction pressure, amps liquid level or superheat values go outside the high or low alarm limits then the appropriate value is displayed with a flashing alternative '**Hi**' or '**Lo**' alarm message.

Suct -0.8b =Lo   Suction Pressure Low alarm

Suct 10.8b Hi =   Suction Pressure High alarm

LoAd =120 Hi ==   Motor Load High alarm - also unloads pack

LeuL ==15 ==Lo   Liquid level Low alarm

=SH= ===1 ==Lo   Superheat Low alarm

Digital Alarms

Digital alarm messages include:-

$$Lo-A\ Leu=$$ Digital input Low level liquid alarm

$$SYSt\ AI\ r=$$ Digital system alarm (ie oil Low level)

$$Fan=\ AI\ r=$$ Condenser Fan Alarm

PC-FAIL ALARM

If the RCC20 unit is in **'Auto'** mode and a valid status request has not been received for 60 seconds via the RS485 highway then a Watchdog timer **'PC/FAIL'** message is displayed. This alarm is reset if 485 communications are restored or the AGT/SYS5/Locl/nonE is set to **'LocL'** or **'nonE'** in unit settings.

$$=PC=\ FAI\ L$$ if RS485 comms watchdog fail

MODE CHANGE Compressors

Pressing 'next' until the pack mode selections are on display and then pressing **'enter'** changes the pack mode to the new selection displayed.

$$Auto$$ AUTO pack control mode with compressor control on suction pressure

$$oFF=$$ -OFF = pack control stopped   (standby operation)

$$hAnd$$ hAnd = pack control in local manual operation

Pack Capacity Manual

With the pack mode selected to HANd, the pack capacity can be increased or decreased by pressing **'raise'** or **'lower'** buttons when the pack capacity is on display.

$$@:@\ HAnd\ ?$$

$$@:@\ CAP=\ ==50\ /:/\ ==75\ ?$$

GLOBAL RS485 COMMANDS

IF all compressors are tripped or the unit is in **'OFF'** mode and Trip Settings are **'CoFF'** then a GLOBAL RS485 **'OFF'**command is sent to all case controllers on the same section of RS485 Highway to prevent liquid floodback.

A GLOBAL RS485 **'AUTO'** command is sent on **restart**, when trip **'reset'** is pressed or when control mode is selected **'AUTO'**.
A GLOBAL RS485 **TIME** synchronisation command is sent to all case controllers twice per day if **Agt/SYS5/Locl/nonE** protocol selected is **'LocL'**

CONDENSER FAN DISPLAY

The following displays are available by repeatedly pressing the 'next' button:-

di Sc	14. 5	Discharge pressure
FAnS	===3	Number of fans running (No. of fans running changed by raise/lower buttons if HANd selected)
dELY	==13	Fan stage delay timer (secs)
Auto		Auto control mode (press 'accept')
oFF=		OFF control mode (press 'accept')
hAnd		Hand control mode (press 'accept') (enables raise/lower buttons)
triP	11==	Fan trip status
LooP	==66	analog output 0-100% if applicable for variable speed Fans
FSEt		Request parameter change for FANS (press accept & raise to PP05)

Return to compressor display
COMPRESSOR DISPLAYS MAY ALSO BE SELECTED BY PRESSING 'Lower' with 'Disc' on display

CONDENSER SETTINGS MAY ALSO BE SELECTED BY PRESSING 'Raise' with 'Disc' on display

HIGH DISCHARGE PRESSURE

If the discharge pressure goes outside the high alarm limit then the pressure value is displayed with a flashing alternative 'Hi' alarm message. The compressors are automatically unloaded to reduce the discharge pressure.

Di Sc 10. 8b ==Hi   Discharge Pressure High alarm

FAN OVERLOAD TRIPS

Any fan overload trip causes the default display to alternate the failed FAN no. with a 'triP' message.

FAn3 triP   fan 3 trip input closed

MODE CHANGE CONDENSERS

Pressing 'next' until the condenser mode selections are on display and then pressing 'enter' changes the condenser mode to the new selection displayed.

Auto	Auto AUTO fan control mode with compressor control on discharge pressure
OFF=	Fan control stopped
hAnd	Fan control in local manual operation

FAN CAPACITY MANUAL

With the fan mode selected to 'HANd', the condenser capacity can be increased or decreased by pressing 'raise' or 'lower' buttons when the fan capacity is on display.

@: @   HAnd   ?

@: @   CAP=   ==50   /:/   ==75   ?

A maximum of seven fan stages (fans or valves) are sequenced up or down.

USEFUL BUTTON SEQUENCES

The following button sequences should prove useful during normal service operation

Reset ALARM or TRIP

`diFF   triP   ?      =2.4b`

      RESET

Change suction control setpoint and differential

`@:@   SEt=    ?    PPOO   /:/    PPO5   ?`

`@:@   cprs    ?`

`@:@   c2.0b  /:/   c2.5b    ?     c2.5b`

`  @   cd01   /:/   cd02     ?     cd02`

`@:@   End=    ?    =2.6b`

Check Unit Model

`@:@   SEt=    ?    PPOO   /:/    PPO5   ?`

`@:@   Unit    ?    3PAC` This unit model is '3PAC'

`@:@   End=    ?    =2.6b`

Select Stub, Case No and Address

e.g. setup unit for system 60, case 1, at address 180

`@:@   SEt=    ?    PPOO   /:/    PPO5   ?`

`@:@   unit    ?`

`@:@   Sn01   /:/   Sn60     ?     Sn60`

`  @   Cn01    ?    Cn01`

`  @   A001   /:/   A180     ?     A180`

`@:@   End=    ?    =2.6b`

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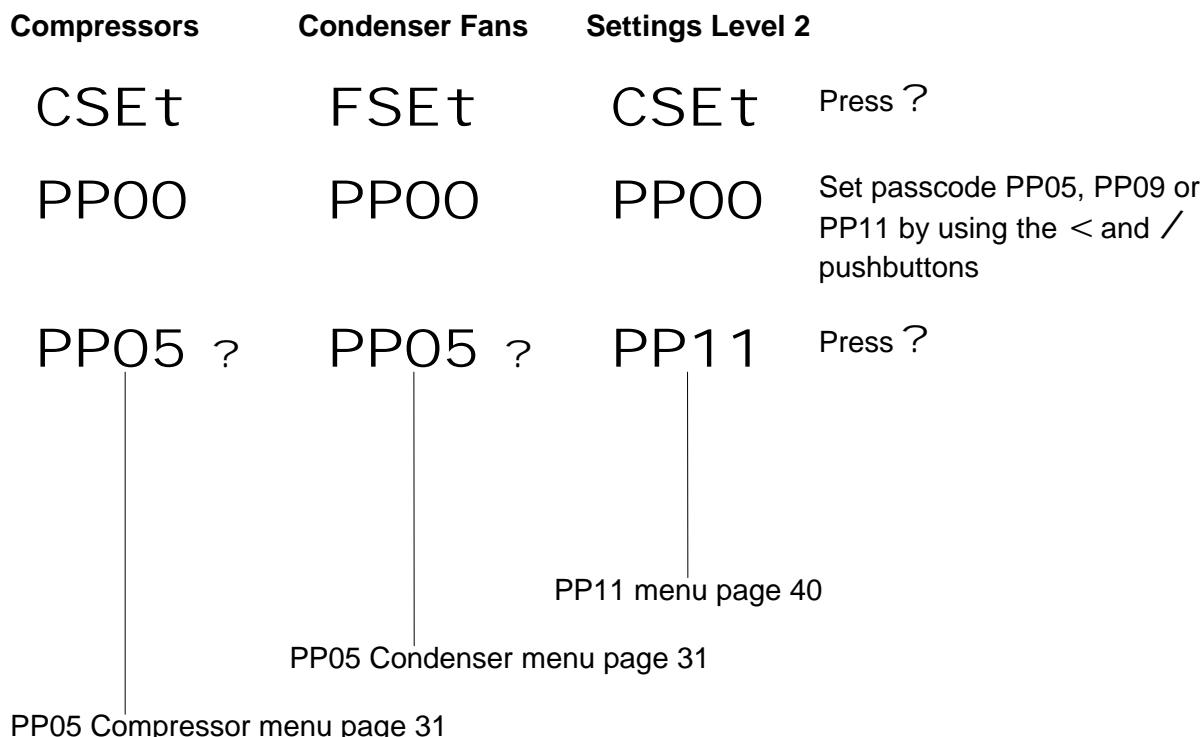
SETUP OPERATION

Setup operation lasts for a maximum of 5 minutes after being activated by pressing ?
with CSEt or FSEt on the display panel.
On entry to Setup passcode PP00 is displayed.

To change any settings passcode PP05, PP09 or PP11 must be first selected using /

and ? pushbuttons.

If the correct passcode is not entered then setup values may be displayed but any attempted changes are ignored.

Compressors	**Condenser Fans**	**Settings Level 2**	
CSEt	FSEt	CSEt	Press ?
PP00	PP00	PP00	Set passcode PP05, PP09 or PP11 by using the < and / pushbuttons
PP05 ?	PP05 ?	PP11	Press ?

PP11 menu page 40

PP05 Condenser menu page 31

PP05 Compressor menu page 31

Setup Functions (Normal) passcode 05

PP05 Menu

Press @ to sequence through the following PP05 Menu selections:-
Press ? to select the displayed menu

Compressors

Unit	Uni t	Unit model setup RCC-20 Page 32
CPRS	CPrS	Compressor setup Page 34
Delay	dELY	Compressor delay timers Page 34
Suction	Suct	Suction pressure alarm levels Page 35
Levels	LEuL	Superheat and Liquid Alarm levels Page 35
Trip	tri P	Trip inputs and control Page 35
Size	SI ZE	Compressor sizes Page 36
Load	LOAd	Amps high alarm Page 36
Defrost	dEFr	Defrost timeclock setup 1-LT only Page 36
Test	tESt	Force relays on/off Page 37
End	End=	Return to suction pressure display

Condenser Fans

Cond	Cond	Condenser configuration Page 38
Fans	FAnS	Fan control settings Page 38
Delay	dELY	Fan control delays Page 39
Fanp	FAnP	Fan pressure Alarm Limits Page 39
Loop	LooP	Fan inverter Speed Control settings Page 39
End	End=	Return to condenser pressure display

Compressor Settings

Unit

Uni t

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Unit Model YYYY

	YYYY = 1-LT	Single LT compressor with fans
	1-HT	Single HT compressor with fans
	3PAC	3 compressors with fans
	4SAT	3 compressors with loading valves plus one satellite compressor
	6PAC	Rooftop unit For 6 compressors and variable speed Fans
	6FAN	Condenser fan controller
	8PAC	6 compressors and variable speed fans

CMC12 control - YYYY

	YYYY = Std.	Normal setting without CMC12 control
	rcL	remote R/L compressor loading of CMC12
	r485	future rs485 loading of CMC12 with fan control

A3 settings - YYYY   Hardware SW3 must be compatible

	YYYY = dLEv	Digital liquid level alarm input
	dOFF	Digital off input
	ALEv	Analog liquid level input (0-5vdc)
	SAtP	Satellite compressor pressure
	OILP	Oil pressure transducer

A4 settings YYYY   Hardware SW4 must be compatible

	YYYY = AmP	Total load from xxx:1 Current transformer
	KwH	pulse from MT350 giving Kil
	dOFF	Digital off input
	dALr	Digital SYSTEM alarm input

System number Snnn   nn = 1 - 255

Monitor Address Annn   nnn = 1 - 255
RCC20 units require 12 addresses in sequence

Comms protocol YYYY

	YYYY = Agt	Autograph terminal PC
	SYS5	Woodley System 5
	LocL	Local highway only
	nonE	If 'Locl' or 'nonE' is selected the 'PC FAIL' message

is not displayed

CPrS

CPrs

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Pack suction control setpoint	=c2. 1	n.n = –0.6 to 5.0
Control deadband	dbn. n	nn = 0.1 to 1.0
Satellite compressor selection	YYYY	

YYYY = SAtC
         noSC

Satelite suction control	C=n. n	n.n = –0.6 to 5.0 Setpoint if 'SatC' selected
Loading valve polarity	YYYY	

YYYY = LPoS Positive
         LnEg Negative

Fast response deadband	FbYY	yy = 0.1 to 2.0
stage up control algorithm	CAuu	u = 0 to 9
stage down control algorithm	CAdd	d = 0 to 9

u/d determines rate of response when outside fast deadband with relation to amount of error from setpoint.
Stage time = stage-delay - (stage-delay x error from setpoint) / Control Algorithm

dELY

dELY

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Control delays

Starts per hour	SHnn	nn = 2 to 25
Stage up delay	Sun. n	n.n = 0.2 to 9.9 mins
Stage down delay	Sdn. n	n.n = 0.2 to 9.9 mins

Suct

Suct

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

| Suction pressure low alarm limit | L=n. n | n.n = –1.0 to 5.0 |
| Suction pressure high alarm limit | Hnn. n | nn.n = 0 to 20.0 |

LEvL

LEuL

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Suction temperature and superheat selectionl	noSt	nn =STSH is suction temp & superheat required = noSt if no suction superheat required
Superheat low alarm level	A=nn	nn = –10 to 60
Superheat low trip level	t-nn	nn = –10 to 60
Low liquid alarm level	LLnn	nn = % after 60 minute guardtime 0 to 99

triP

triP

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Number of trip inputs/compressor

ntcn

ntc 1 = combined safety Cn /trip
ntc 3 = 3 resistor inputs

20k overheat	OH/trip
10K overload	OL/trip
5K oil diff	diff/trip

GLOBAL RS485 command action after all compressors tripped or OFF

CYYY

CoFF = Cases OFF on highway section
CnoA = Cases no Action on trip

SIZE

SIZE

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Size 1st compressor   1Cnn   nn = 1 to 99

Size 2nd compressor   2Cnn   nn = 1 to 99

etc

Size 8th compressor   8Cnn   nn = 1 to 99

Number of sizes displayed depends on unit model
Size 0 means no compressor fitted

LOAd

LOAd

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

High total current alarm level   Hnnn   nnn = 100 to 250

Low current alarm level   Lnnn   nnn = -1 to 99

dEFr

dEFr

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

1-LT only. Defrost timeclock setup

Number of defrosts/day   dnnn   nn = 0 to 6

First defrost time hours   1hNN   nn = 0 to 23 hours

First defrost time   1tnn   nn = 0 to 59 minutes
Remaining defrost times are calculated automatically

Defrost period   dPnn   nn = 2 to 60 minutes

Test
`tESt`

Press @ to sequence through the relay selections

Repeatedly press **?** to switch the relays on and off

Relay R1   `1OFF`   `1=on`

Relay R2   `2OFF`   `2=on`

Relay R3   `3OFF`   `3=on`

etc

Relay R7   `7OFF`   `7=on`

4-X Relay R1   `AOFF`   `A=on`   compressor C7

4-X Relay R2   `bOFF`   `b=on`   compressor C8

End
`End=`

Exit settings change and return to default compressor display

CONDENSER SETTINGS

Cond

Cond

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Fan control selection =YYY YYY = Lin - Linear Fan stage up stage down (last on first off)
rot = Rotating fans and condensers
Spd = Speed control using analog output

Max. number of fans Fn=n n = (0 - 7)

Trip input polarity tYYY tYYY = tNEG - negative
tPoS - positive

FAnS

FAnS

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Control settings

Fan control setpoint Fnn. n nn.n = 0 to 23.0

Control deadband dbnn nn = 0.1 to 5.0 (0.1 bar inc)

Fast response deadband FbYY yy = 0.1 to 5.0 (0.1 bar)

Stage up control algorithm FAuu u = (0-9)

Stage down control algorithm FAdd d = (0-9)

u/d determines rate of response when outside fast deadband with relation to amount of error from setpoint.
stage time = stage_delay - (stage_delay x error from setpoint) / Control Algorithm.
FAu0 = not used.
FAu9 = fastest fan response.

dELY

dELY

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Control delays

Fan stage delay

Fdnn   nn = 0.1 to 3.0 mins

FAnP

FAnP

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Fan pressure Alarm Limits

Discharge pressure
Hi-alarm limit   Hnn. n   nn.n = 0 to 23.0

Discharge pressure
Hi-trip limit   tnn. n   nn.n = 0 to 23.0

LOOP

LooP

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Fan inverter Speed Control settings

Loop proportional
term   P=nn   nn = 0 to 23.0

Loop integral term   i =nn   nn = 0 to 23.0

Loop derivative term   d=nn   nn = 0 to 23.0

Start speed %   Stnn   nn = 0 to 99 %

Stop speed %   SPnn   nn = 0 to 99 %

End

End=   Return to condenser pressure display

PP11 Menu - SETTINGS LEVEL 2

rtc
rtc=

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Real Time Clock

real time hours	rhnn	nn = 0 - 23 hours
real time minutes	rtnn	nn = 0 - 59 minutes

SCAL
SCAL

Press @ to sequence through the Setup selections

Press / or < to change the settings

Press ? to accept the settings

Pressure transducer 1 =P1= Press ?

L-n.n   4ma value bar gauge

Hnn.n   20ma value bar gauge

Pressure transducer 2 =P2= Press ?

L-n.n   4ma value bar gauge

Hnn.n   20ma value bar gauge

Pressure transducer 3 =P3= Press ?

L-nn.   4ma value bar gauge

Hnn.n   20ma value bar gauge

Current input =P4= Press ?

L=n.n   current

Hnnn   CT max Amps rating

Clear compressor
runhours   CLrH   Press ?

SurE   Are you sure? if so press accept to clear all run hours

End
End=

Exit settings change
Return to suction pressure display

COMMUNICATIONS

Communication facilities are available for interrogation of temperatures, status and modification / display of setpoints, limits and timeclock settings. All communication is via a daisy chain RS485 link which connects all GUARDIAN controllers units in series.

Communication commands and replies are checked for parity and block length and automatically re-transmit if errors are detected.

Each GUARDIAN controller has a unique unit number address UU/u which is used to select the appropriate unit for interrogation or modification.

> UU is stub no. 1-80
> u is case / coldstore number 1-3.
> i.e. case 3 stub 56 has address 56/3
> and coldstore stub 45 has address 45/1

Some communication commands may use 'wildcard' stub number 99 and 'wildcard' case number 9 to access all stubs on the highway or all cases in a stub.

GUARDIAN controllers are inactive until they are addressed.

When the organisation of commands on the RS485 highway is under the control of a Woodley Mk V then GUARDIAN units only accept status requests which transmit case, discharge and return air temperatures and defrost status.

GUARDIAN Autograph or RM-256 Refrigeration Monitor Communication commands available are:-

a) Transmit Unit Status   which replies with command plus stub status & case temperature

b) Transmit Values   which replies with stub address plus latest signed temperature values, time, trip states, relay states and internal status

c) Transmit Setpoints   which replies with setpoints and limits.
System Sn and unit Addresses Axxx may not be changed via the RS485 serial link

d) Receive setpoints with new setpoint values

e) Receive Time and Date with new hours and minutes, day, month and year for real time clock

f) Remote Reset of alarm or trip

g) ON auto / unit OFF selection from PC

RCC20 1-LT Displays

RCC.20 1.LT Compressor detail

```
=======[Microm Electronics - Guardian AutoGraph Terminal v5.0f]=======
 SAFEWAY CAMBERWELL          Compressor Detail        10:07:27 Mon Mar 17 1997
Unit____name_____..status.__SUCTION_____SETPOINT_____DISCHARGE___CAPACITY___
 4 RACK D F/F C/R                   0.7         1.0        15.7        50.0

                         Mode
  RCC-20 (1-LT)          Local
                         Suction       Discharge
  PRESSURES bar g          0.7           15.7
                         Suction       Discharge
  TEMPERATURE C           10.0           45.0
                       C/room Temp     Defrost
  COOLROOM TEMP.         -21.5           off
                         Comp 1        Timer        Hours run
  COMPRESSOR              on           28.0           728


                         Comp 1
  SAFETY TRIPS            off
                         Fan 1        Fan 2
  CONDENSER              off           off

 ┌─────────────────────────────────────────────────────────────────────────┐
 │  F1       F2      F3     F4     F5     F6       F7          F8       F9      F10 │
 │FindComp RESET  REMOTE LOCAL  OFF   Limits  Configure     Setup   NextComp Done │
```

RCC.20 1.LT Compressor Setpoints

```
=======[Microm Electronics - Guardian AutoGraph Terminal v5.0f]=======P
 SAFEWAY CAMBERWELL          Compressor Setpoints     10:08:47 Mon Mar 17 1997
 4 RACK D F/F C/R
                        ==Value==       ==Max==    ==Min==
 1 Suction Setpoint        1.0            5.0       -0.5
 2 RCC20 1-LT              0.0            2.0        0.0
 3 Motor1 Capacity%       99.0           99.0        0.0
 4                         0.0           99.0        0.0
 5                         0.0           99.0        0.0
 6 Fans Deadband          0.5            1.0        0.1
 7 Fans Setpoint         15.5           24.0        0.0
 8 Fans Stage Delay       0.3           10.0        0.1
 9 Stage_up delay         0.2           10.0        0.2
10 Stage_down delay       0.1           10.0        0.1
11 Suction Deadband       0.1            1.0        0.1
12 Delay_after_stop       1.0            2.0        0.1
13 Starts/Hour           15.0           15.0        2.0
14 Loading neg/pos        0.0            1.0        0.0
15 Compr.Fastband         0.5            2.0        0.0
16 Fans Fastband          0.3            5.0        0.0

           F2                        F6                      F10
        Transfer                  Settings                  Done
```

RCC.20 1.LT Alarm Limits Page 1

```
═════════════[Microm Electronics - Guardian AutoGraph Terminal v5.0f]═══════════A
║ SAFEWAY CAMBERWELL          Alarm & Trip Limits        10:07:45 Mon Mar 17 1997║
║   4 RACK D F/F C/R        -         RCC20 1-LT                                  ║
║═══════════════════ Value Alarm Đ=LowAlarm══HiAlarm═══LowTrip══HighTrip═        ║
║1 suction press       0.7              ..       15.0      -0.9       ..          ║
║2 discharge press    15.7              ..       22.5       ..       23.0         ║
║3                     n/f              ..        ..        ..        ..          ║
║4                     n/f              ..        ..        ..        ..          ║
║5 suction temp       10.0              ..        ..        ..        ..          ║
║6 discharge temp     45.0              ..        ..        ..        ..          ║
║7 Pack Load           0.0              ..        ..       74.0       ..          ║
║8 Fans Running        0.0              ..        ..        ..        ..          ║
║9 pack capacity %    50.0              ..        ..        ..        ..          ║
║═════ INPUTS ═════ state Alarm Ï type_mode_guard══ OUTPUTS ═══ state =           ║
║A                              12     0     0  I Motor              on           ║
║B Auto on Switch       on       8     0     0  J Unloading Valve    on           ║
║C Alarm                        16     0    30  K Condenser Fan 1   off           ║
║D Low Liquid sw.               16     0    30  L Condenser Fan 2   off           ║
║E                              12     3     0  M Condenser Fan 3   off           ║
║F                              12     3     0  N Defrost Output    off           ║
║G                              12     3     0  O System Healthy     on           ║
║H                              12     3     5  P                    on           ║
║= F1 ═══ F2 ═══ F3 ════════════╳══════ F6 ════ F7 ═══ F9 ═══ F10 =               ║
║FindPage Transfer Name                     Set Limits  Setup  Next Page  Done    ║
```

RCC.20 1.LT Alarm Limits Page 2

```
═════════════[Microm Electronics - Guardian AutoGraph Terminal v5.0f]═══════════A
║ SAFEWAY CAMBERWELL          Alarm & Trip Limits        10:08:00 Mon Mar 17 1997║
║   4 RACK D F/F C/R        -         RCC20 1-LT                                  ║
║═══════════════════ Value Alarm Đ=LowAlarm══HiAlarm═══LowTrip══HighTrip═        ║
║1                     1.0              ..        ..        ..        ..          ║
║2 Suction Temp       10.0              ..        ..        ..        ..          ║
║3 Equivalent Temp.    n/f              ..        ..        ..        ..          ║
║4 Superheat           n/f            -5.0        ..      -10.0       ..          ║
║5                     0.0              ..        ..        ..        ..          ║
║6                     0.0              ..        ..        ..        ..          ║
║7                     0.0              ..        ..        ..        ..          ║
║8                     0.0              ..        ..        ..        ..          ║
║9 Compressor Mode   Local              ..        ..        ..        ..          ║
║═════ INPUTS ═════ state Alarm Ï type_mode_guard══ OUTPUTS ═══ state =           ║
║A                              13     0     0  I                   off           ║
║B                              13     0     0  J                   off           ║
║C                              13     0     0  K                   off           ║
║D                              13     0     0  L                   off           ║
║E                              13     0     0  M                    on           ║
║F                              13     0     0  N                   off           ║
║G                              13     0     0  O                   off           ║
║H                              13     0     0  P                   off           ║
║= F1 ═══ F2 ═══ F3 ════════════╳══════ F6 ════ F7 ═══ F9 ═══ F10 =               ║
║FindPage Transfer Name                     Set Limits  Setup  Next Page  Done    ║
```

RCC.20 1.LT Alarm Limits Page 3

```
┌──────────────[Microm Electronics - Guardian AutoGraph Terminal v5.0f]──────────────┐
│  SAFEWAY CAMBERWELL          Alarm & Trip Limits          10:08:21 Mon Mar 17 1997 │
│   4 RACK D F/F C/R        -              RCC20 1LT                                  │
│══════════════════ Value Alarm Đ=LowAlarm════HiAlarm════LowTrip════HighTrip═        │
│1 Compressor No.      0.0              ..        ..        ..        ..             │
│2                                      ..        ..        ..        ..             │
│3 Capacity            728              ..        ..        ..        ..             │
│4                                      ..        ..        ..        ..             │
│5 Hours Run            0               ..        ..        ..        ..             │
│6 Wait Timer                           ..        ..        ..        ..             │
│7                      0               ..        ..        ..        ..             │
│8                                      ..        ..        ..        ..             │
│9 Motor Mode           0               ..        ..        ..        ..             │
│══════ INPUTS ══════ state Alarm Ï type_mode_guard┬═════ OUTPUTS ══════ state ═     │
│A                                  12    3     0  │ I                        off    │
│B H.P.Safety                       13    3     0  │ J                        off    │
│C Oil Diff. Safety                 13    3     0  │ K                        off    │
│D                                  12    3     0  │ L                        off    │
│E Overload Safety                  13    3     0  │ M                        off    │
│F Overheat Safety                  13    3     0  │ N                        off    │
│G                                  12    3     0  │ O                        off    │
│H                                  12    3     0  │ P                        off    │
│═ F1 ═════ F2 ═════ F3 ═════════════╪═       F6 ═════ F7 ═════ F9 ═════ F10 ═       │
│FindPage Transfer Name                       Set Limits   Setup   Next Page   Done  │
└────────────────────────────────────────────────────────────────────────────────────┘
```

RCC20 3PAC Displays

RCC.20 3PAC Compressor detail

```
=================[Microm Electronics - Guardian AutoGraph Terminal v5.0f]================P
 SAFEWAY CAMBERWELL              Compressor Detail            10:06:02 Mon Mar 17 1997
Unit____name_____..status.__SUCTION_____SETPOINT_____DISCHARGE___CAPACITY___
 1 RACK A                         0.8          0.8          16.3       70.0

                       Mode        Capacity %                      Liquid lev
     RCC20 3PAC        Local          70.0
                       Suction     Discharge     Fans Running
     PRESSURES bar g    0.8          16.3           1.0
                       Suction     Discharge     Fan trip
     RACK TEMPS        -9.5          76.0
                       Comp 1       Comp 2        Comp 3
     COMPRESSORS        on           on            off
                       Comp 1       Comp 2        Comp 3
     HOURS RUN         1302         1302           380
                       Comp 1       Comp 2        Comp 3
     TIMERS            0.0          0.0            0.0
                       Comp 1       Comp 2        Comp 3
     SAFETY TRIPS      off          off            off
                       Last 30m     Yesterday                    Auto sw
     KILOWATT HOURS    183.0         9050

    F1        F2      F3      F4     F5     F6        F7           F8          F9      F10
 FindComp  RESET  REMOTE  LOCAL  OFF   Limits   Configure     Setup      NextComp  Done
```

RCC.20 3PAC Compressor Setpoints

```
=================[Microm Electronics - Guardian AutoGraph Terminal v5.0f]================A
 SAFEWAY CAMBERWELL              Compressor Setpoints         10:06:58 Mon Mar 17 1997
 1 RACK A
                          =Value=         =Max=====Min=
  1 Suction Setpoint        0.8            5.0      -0.5
  2 RCC-20 (3PAC)           2.0            2.0       2.0
  3 Motor1 Capacity%       35.0           99.0       0.0
  4 Motor2 Capacity%       35.0           99.0       0.0
  5 Motor3 Capacity%       30.0           99.0       0.0
  6 Fans Deadband           0.1            1.0       0.1
  7 Fans Setpoint          15.5           20.0       0.0
  8 Fans Stage Delay        0.3            5.0       0.0
  9 Stage_up delay          0.2           12.5       0.5
 10 Stage_down delay        0.2           10.0       0.5
 11 Suction Deadband        0.1            1.0       0.1
 12 Delay_after_stop        1.0           12.5       1.0
 13 Starts per Hour        15.0           15.0       2.0
 14 Loading neg/pos         0.0            1.0       0.0
 15 Compr. Fastband         0.3            5.0       0.0
 16 Fans Fastband           0.1            2.0       0.0

          F2                           F6                        F10
       Transfer                     Settings                    Done
```

RCC.20 3PAC Alarm Limits Page 1

```
==========[Microm Electronics - Guardian AutoGraph Terminal v5.0f]===========A
 SAFEWAY CAMBERWELL            Alarm & Trip Limits         10:06:14 Mon Mar 17 1997
  1 RACK A              -        RCC20 3PAC page1
===================== Value Alarm Ð=LowAlarm=====HiAlarm======LowTrip======HighTrip=
1 suction press         0.8           ..         12.0        0.2          ..
2 discharge press      16.3           ..         22.5         ..         23.0
3                       n/f           ..          ..          ..          ..
4                       n/f           ..          ..          ..          ..
5                       n/f           ..          ..          ..          ..
6                       n/f           ..          ..          ..          ..
7 Total Pack Load       0.0           ..          ..          ..          ..
8 Fans Running          1.0           ..          ..          ..          ..
9 pack capacity %      70.0           ..          ..          ..          ..
===== INPUTS ===== state Alarm Ï type_mode_guard======= OUTPUTS ==== state =
A                               12      0      0  I Motor 1                on
B Auto switch         on         8      0      0  J Motor 2                on
C Alarm input                   13      0     30  K Motor 3               off
D Low Liquid                    13      0     60  L Condenser Fan 1        on
E H.P.Safety                    13      3      0  M Condenser Fan 2       off
F                               12      3      0  N Condenser Fan 3       off
G                               12      3      0  O Condenser Fan 4        on
H                               12      3      5  P                        on
= F1 ===== F2 ===== F3 ================x======== F6 ===== F7 === F9 ==== F10 =
FindPage Transfer Name                      Set Limits   Setup  Next Page   Done
```

RCC.20 3_PAC Alarm Limits Page 2

```
==========[Microm Electronics - Guardian AutoGraph Terminal v5.0f]===========
 SAFEWAY CAMBERWELL            Alarm & Trip Limits         10:06:27 Mon Mar 17 1997
  1 RACK A              -        RCC20 3PAC page2
===================== Value Alarm Ð=LowAlarm=====HiAlarm======LowTrip======HighTrip=
1 Motor Load %          2.0           ..        100.0         ..          ..
2                       n/f           ..          ..          ..          ..
3                       n/f           ..          ..          ..          ..
4                       n/f           ..          ..          ..          ..
5                       0.0           ..          ..          ..          ..
6                       0.0           ..          ..          ..          ..
7                       0.0           ..          ..          ..          ..
8                       0.0           ..          ..          ..          ..
9 Compressor Mode    Local           ..          ..          ..          ..
===== INPUTS ===== state Alarm Ï type_mode_guard======= OUTPUTS ==== state =
A                               13      0      0  I                       off
B                               13      0      0  J                       off
C                               13      0      0  K                       off
D                               13      0      0  L                       off
E                               13      0      0  M                        on
F                               13      0      0  N                       off
G                               13      0      0  O                       off
H                               13      0      0  P                       off
= F1 ===== F2 ===== F3 ================x======== F6 ===== F7 === F9 ==== F10 =
FindPage Transfer Name                      Set Limits   Setup  Next Page   Done
```

GUARDIAN CONTROLS
international

RCC.20 3PAC Limits Page 3

```
=============[Microm Electronics - Guardian AutoGraph Terminal v5.0f]=============
 Coles Fremantle            Alarm & Trip Limits          23:33:57 Mon Apr 28 1997
   3 M.T. RACK C                -       C4L1 Pack
===================== Value Alarm D=LowAlarm====HiAlarm====LowTrip====HighTrip====
1 kwh last period     13.0               ..         ..         ..         ..
2                                        ..         ..         ..         ..
3 Compr-1 Hoursrun    3585               ..         ..         ..         ..
4                                        ..         ..         ..         ..
5 Compr-2 Hoursrun    3585               ..         ..         ..         ..
6                                        ..         ..         ..         ..
7 Compr-3 Hoursrun    3585               ..         ..         ..         ..
8                                        ..         ..         ..         ..
9 Compr-4 Hoursrun    1359               ..         ..         ..         ..
======== INPUTS ======= state Alarm I type_mode_guard===== OUTPUTS === state =
A                                     12    3    0  I                       off
B                                     12    3    0  J                       off
C                                     12    3    0  K                       off
D                                     12    3    0  L                       off
E                                     12    3    0  M                       off
F                                     12    3    0  N                       off
G                                     12    3    0  O                       off
H                                     12    3    0  P                       off
= F1 ==== F2 ==== F3 ===============x==== F6 ====== F7 ==== F9 ==== F10 =
FindPage Transfer Name                       Set Limits   Setup  Next Page  Done
```

RCC20 6PAC Displays

RCC.20 6PAC Compressor detail

```
===========[Microm Electronics - Guardian AutoGraph Terminal v5.0f]===========P
 Coles Fremantle            Compressor Detail          23:32:26 Mon Apr 28 1997
Unit____name____..status.__SUCTION____SETPOINT___DISCHARGE__CAPACITY_
 3 M.T. RACK C                3.2        3.0        14.3       50.0

                      mode       Kwh Y/day   Kwh 1/2 Hr   Capacity %
   RCC20 6-PAC        Local        1359        13.0         50.0
                      Motor     Safety Trip  Run Hours    Wait Timer
   COMPRESSOR 1        off         off         3585         0.0
   COMPRESSOR 2        off         off         3585         0.0
   COMPRESSOR 3        on          off         3585        27.0
   COMPRESSOR 4        on          off         3584         0.0


                      Oil Level   Liquid Level Mains Saftey
   Inputs                           61.0
   F1                                                    F9        F10
FindComp                                              NextComp    Done
```

RCC.20 6PAC Compressor Setpoints

```
===========[Microm Electronics - Guardian AutoGraph Terminal v5.0f]===========
 Coles Fremantle            Compressor Setpoints        23:32:53 Mon Apr 28 1997
   3 M.T. RACK C
==========================Value======Max====Min====
 1 Suction Setpoint     3.0        5.0     -0.5
 2 RCC20 m6PAC          4.0        4.0      4.0
 3 Motor1 Capacity%    25.0      100.0      0.0
 4 Motor2 Capacity%    25.0      100.0      0.0
 5 Motor3 Capacity%    25.0      100.0      0.0
 6 Motor4 Capacity%    25.0      100.0      0.0
 7 Motor5 Capacity%     0.0      100.0      0.0
 8 Motor6 Capacity%     0.0      100.0      0.0
 9 Stage_up delay       0.2       12.5      0.2
10 Stage_down delay     0.2       10.0      0.2
11 Suction Deadband     0.2        1.0      0.1
12 Delay_after_stop     1.0       12.5      1.0
13 Starts/Hour         15.0       15.0      2.0
14 Loading neg/pos      0.0        0.1      0.0
15 SateliteSetpoint     0.0        5.0     -0.9
16 Satelite Compr.      0.0        0.1      0.0


        F2                      F6                    F10
      Transfer                Settings               Done
```

RCC.20 6PAC Limits Page 1

```
════════════[Microm Electronics - Guardian AutoGraph Terminal v5.0f]════════════
║ Coles Fremantle           Alarm & Trip Limits        23:33:39 Mon Apr 28 1997║
║   3 M.T. RACK C            -        C4L1 (inc Sat-C)                          ║
║═════════════════════ Value Alarm Ð=LowAlarm═══HiAlarm═══LowTrip═══HighTrip═══║
║1 suction press       3.2            0.0       8.0       0.0        0.0        ║
║2 discharge press    14.1            ..       20.0       ..        22.0        ║
║3                     n/f            ..        ..        ..         ..         ║
║4 liquid level       62.0           10.0       ..        ..         ..         ║
║5                     n/f            ..        ..        ..         ..         ║
║6                     n/f            ..        ..        ..         ..         ║
║7 Pack Load           0.0            ..       174.0      ..         ..         ║
║8                     0.0            ..        ..        ..         ..         ║
║9 pack capacity %    50.0            ..        ..        ..         ..         ║
║══════ INPUTS ══════ state Alarm Ï type_mode_guard══════ OUTPUTS ══════ state ═║
║A                     off          8    0    0 ║I Motor 1              off     ║
║B Local Auto Sw.      on           8    0    0 ║J Motor 2              off     ║
║C Oil Level                       16    0   30 ║K Motor 3              on      ║
║D Liquid Level        off          8    3   30 ║L Motor 4              on      ║
║E Mains Safety                    13    3    0 ║M Motor 5              off     ║
║F                                 12    3    0 ║N Motor 6              off     ║
║G                                 12    3    0 ║O System Healthy       on      ║
║H                                 12    3    5 ║P                      on      ║
║═ F1 ═════ F2 ═════ F3 ═════════════×═══════════ F6 ═════ F7 ═══ F9 ═══ F10 ═║
║FindPage Transfer Name                      Set Limits   Setup  Next Page  Done║
```

RCC.20 6PAC Limits Page 2

```
════════════[Microm Electronics - Guardian AutoGraph Terminal v5.0f]════════════
║ Coles Fremantle           Alarm & Trip Limits        23:33:48 Mon Apr 28 1997║
║   3 M.T. RACK C            -        C4L1 Pack                                 ║
║═════════════════════ Value Alarm Ð=LowAlarm═══HiAlarm═══LowTrip═══HighTrip═══║
║1                     3.0            ..        ..        ..         ..         ║
║2                     n/f            ..        ..        ..         ..         ║
║3                     n/f            ..        ..        ..         ..         ║
║4                     n/f            ..        ..        ..         ..         ║
║5                     0.0            ..        ..        ..         ..         ║
║6                     0.0            ..        ..        ..         ..         ║
║7                     0.0            ..        ..        ..         ..         ║
║8                     0.0            ..        ..        ..         ..         ║
║9 Compressor Mode    Local          ..        ..        ..         ..         ║
║══════ INPUTS ══════ state Alarm Ï type_mode_guard══════ OUTPUTS ══════ state ═║
║A                                 13    0    0 ║I                      off     ║
║B                                 13    0    0 ║J                      off     ║
║C                                 13    0    0 ║K                      off     ║
║D                                 13    0    0 ║L                      off     ║
║E                                 13    0    0 ║M                      on      ║
║F                                 13    0    0 ║N                      off     ║
║G                                 13    0    0 ║O Alarm                off     ║
║H                                 13    0    0 ║P TRIPPED LAMP         off     ║
║═ F1 ═════ F2 ═════ F3 ═════════════×═══════════ F6 ═════ F7 ═══ F9 ═══ F10 ═║
║FindPage Transfer Name                      Set Limits   Setup  Next Page  Done║
```

RCC.20 Motor Zone

```
=======[Microm Electronics - Guardian AutoGraph Terminal v5.0f]=======A
 Coles Fremantle          ZONE ALARM LIMITS         23:34:40 Mon Apr 28 1997
 12 Rack-d
    Point_____Value_ALARM__Type_Mode__Setpoint_Diff/Dial__Guard(m)_
Temp.1 Compr No.        2.0         0    3      0.0      0.0        0
     2                  n/f         0    3      0.0      0.0        0
     3 Capacity         100.0       0    0      0.0      0.0        0
     4                              0    0      0.0      0.0        0
     5 Hours Run        1520        0    0      0.0      0.0        0
     6 Wait timer       26.0        0    0      100.0    0.0        0
     7                  0.0         0    0      0.0      0.0        0
     8                  11.6        0    0      11.6     11.6       0
     9 Motor Mode       Remote      0    0      0.0      0.0        0
InputA                  off         0    3                          0
     B H.P.Safety       off         0    3                          0
     C Oil diff Safety  off         0    3                          0
     D                  off         0    3                          0
     E Overload Safety  off         0    3                          0
     F Overheat Safety  off         0    3                          0
     G                  off         0    3                          0
     H                  off         0    3                          0

  F1        F2          F3         F4                      F9         F10
 Edit     Transfer    Name/Addr  Setup                  Next Page    Done
```

Setup / commissioning Parameters

PP05 Normal Menu Compressor Settings

		unit	ACTUAL settings	Default setting	Min. setting	Max. setting
Unit	Model for RCC-20			6PAC	1–Lt	8PAC
	Control selection for CMC12 units			Std.	Std.	r485
	A3 settings			dLEv	dLEv	oilP
	A4 settings			AnnP	AnnP	dAlr
	System number		*Sn*	Sn01	Sn01	S255
	Monitor Address		*A*	A 01	A 01	A255
	Monitor Comms Protocol			Agt	Agt	nonE
Cprs	Pack suction control setpoint	bar	*c*	c 0.0	c–0.6	c 5.0
	Control deadband	bar	*db*	db0.1	db0.1	db1.0
	Satellite compressor selection			noSC	noSC	SAtC
	Setpoint if 'SatC' selected	bar	*c*	c 0.0	c–0.6	c 5.0
	Loading valve polarity			Lneg	Lneg	LPoS
	Fast response deadband	bar	*Fb*	Fb0.1	Fb0.1	Fb2.0
	Stage up control algorithm		*CAu*	CAu0	CAu0	CAu9
	Stage down control algorithm		*CAd*	CAd0	CAd0	CAd9
dELY	Starts per hour		*SH*	SH12	SH02	SH25
	Stage up delay	mins	*Su*	Su0.2	Su0.2	Su9.9
	Stage down delay	mins	*Sd*	Sd0.2	Sd0.2	Sd9.9
	After Stop delay	mins	*dA*	dA1.0	dA0.1	dA9.9
Suct	Suction pressure low alarm limit	bar	*L*	L–1.0	L–1.0	L 5.0
	Suction pressure high alarm limit	bar	*H*	15.0	0.0	20.0
LEuL	Suction temperature being used			noSt	noSt	StSH
	Superheat low alarm level	°C	*A*	A 05	A–10	A 60
	Superheat low trip level	°C	*t*	t 00	t–10	t 60
	Low liquid alarm level	%	*LL*	LL50	LL00	LL99

tri P	Number of trips inputs/compressor			ntc1	ntc3	OILr
	GLOBAL RS485 command action			CnoA	CoFF	CnoA

		unit	ACTUAL settings	Default setting	Min. setting	Max. setting
SI ZE	Size 1st compressor	%	*1C*	01	00	99
	Size 2nd compressor	%	*2C*	01	00	99
	Size 3rd compressor	%	*3C*	01	00	99
	Size 4th compressor	%	*4C*	01	00	99
	Size 5th compressor	%	*5C*	01	00	99
	Size 6th compressor	%	*6C*	01	00	99

LOAd	High total current AMPS alarm level	Amp	*H*	H100	H100	H250
	Low total current AMPS alarm level	Amp	*L*	L −01	L −01	L100

dEFr	Number of defrosts / day		*dn*	dn00	dn00	dn06
1–LT only	First defrost time hours	hrs	*1H*	1H00	1H00	1H23
	First defrost time minutes	mins	*1t*	1t00	1t00	1t59
	Defrost period	mins	*dP*	dP02	dP02	dP60

PP05 Normal Menu Condenser Settings

Cond	Fan control selection			Lin	Lin	Spd
	Number of fans		*Fn*	Fn00	Fn00	Fn07
	Trip input polarity		*t*	tPoS	tnEg	tPoS

FAnS	Fan control setpoint	bar	*F*	F0.5	F 0.0	F23.0
	Control deadband	bar	*db*	db0.1	db0.1	db5.0
	Fast response deadband	bar	*Fb*	Fb0.1	Fb0.1	Fb5.0
	Fast response Algorithm up	bar	*FAu*	FAu0	FAu0	FAu9
	Fast response Algorithm down	bar	*FAd*	FAd0	FAd0	Fad9

dELY	Fan stage delay	mins	*Fd*	Fd0.1	Fd0.1	Fd3.0

FAnP	Discharge pressure Hi-alarm limit	bar	**H**	H15.0	0.0	23.0
	Discharge pressure Hi-trip limit	bar	**t**	t22.0	0.0	23.0

only if 'SPd' selected for 'Cond'

		unit	ACTUAL settings	Default setting	Min. setting	Max. setting
LooP	Fan Speed Loop settings selection					
	Loop proportional term		**P**	P 0.0	P 0.0	P23.0
	Loop integral term		**I**	i 0.0	i 0.0	i23.0
	Loop derivative term		**d**	d 0.0	d 0.0	d23.0
	Start speed %	%	**St**	St00	St00	St99
	Stop speed %	%	**SP**	SP01	SP00	SP99

PP11 Menu - Settings Level 2

Compressors

rtc=	Real time hours	Hrs	**rh**	rh00	rh00	rh23
	Real time minutes	mins	**rt**	rt00	rt00	rt59

SCAL						
	Pressure Transducer 1 4ma bar gauge	bar	**L**	L–01	–13	242
	Pressure Transducer 1 20ma bar gauge	bar	**H**	H24	–13	242
	Pressure Transducer 2 4ma bar gauge	bar	**L**	L–01	–13	242
	Pressure Transducer 2 20ma bar gauge	bar	**H**	H24	–13	242
	Pressure Transducer 3 4ma bar gauge	bar	**L**	L–01	–13	242
	Pressure Transducer 3 20ma bar gauge	bar	**H**	H24	–13	242
	Current input 0 current	A	**L**	L00	–13	242
	CT max amps rating	A	**H**	H200	–13	242

CLrH	Clear Compressor run hours to zero		**SurE**	if yes	enter	if not press next

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