APPENDIX A REMOTE DISPLAY UNIT

A1 INTRODUCTION

This appendix describes the recommended 32h8e remote display unit for the EPower unit.

This instrument is a horizontal 1/8 DIN indicator and alarm unit that performs the dual function of remote display and independent 'policeman' (to disconnect power should an over temperature or other excess process condition occur). The unit is intended for indoor use in a permanent installation, enclosed in an electrical panel. To ensure IP65 and NEMA 4 front sealing against dust and water, the panel should have a non-textured surface.

Communications between the unit and EPower are via RJ45 'Panel comms port' located on the underside of the controller module. The communications standard is 3-wire EIA485, and It uses Modbus protocol.

The display unit comes complete with one relay output (OP1) and one analogue output (OP3).

A1.1 SAFETY AND EMC INFORMATION NOTES

WARNING

The safety and EMC protection can be seriously impaired if the unit is not used in the manner specified. The installer must ensure the safety and EMC of the installation.

WARNING

Live sensors. The remote panel is designed to operate if the temperature sensor is connected directly to an electrical heating element. However, you must ensure that service personnel do not touch connections to these inputs while they are live. With a live sensor, all cables, connectors and switches for connecting the sensor must be mains rated for use in 240Vac CATII.

WARNING

The Remote Panel must not be wired to a three phase supply with an unearthed star connection. Under fault conditions such a supply could rise above 240Vac with respect to ground and the product would not be safe.

CAUTION

Charged capacitors: Before removing an instrument from its sleeve, disconnect the supply and wait at least two minutes to allow capacitors to discharge. Avoid touching the exposed electronics of an instrument when withdrawing it from the sleeve.

1. This instrument is intended for industrial temperature and process control applications within the requirements of the European Directives on Safety and EMC.
2. Safety. This instrument complies with the European Low Voltage Directive 73/23/EEC, by the application of the safety standard EN 61010.
3. Unpacking and storage. If on receipt, the packaging or unit is damaged, do not install but contact your supplier. If being stored before use, protect from humidity and dust in an ambient temperature range of
   -30°C to +75°C.
4. Always observe all electrostatic precautions before handling the unit.
5. This instrument has no user serviceable parts. Contact your supplier for repair.
6. Isopropyl alcohol may be used to clean labels. Do not use water or water based products. A mild soap solution may be used to clean other exterior surfaces.
7. Electromagnetic compatibility. This instrument conforms with the essential protection requirements of the EMC Directive 89/336/EEC, by the application of a Technical Construction File. It satisfies the general requirements of the industrial environment defined in EN 61326.

A1.1 SAFETY AND EMC INFORMATION (Cont.)

8. Installation Category and Pollution Degree: This unit has been designed to conform to BSEN61010 installation category II and pollution degree 2, defined as follows:
    Installation Category II (CAT II). The rated impulse voltage for equipment on nominal 230V supply is 2500V.
    Pollution Degree 2. Normally only non conductive pollution occurs. However, a temporary conductivity caused by condensation must be expected.
9. Installation may be carried out only by suitably qualified personnel
10. To prevent hands or metal tools touching parts that may be electrically live, the Remote Panel must be installed in an enclosure.
11. Wiring must comply with all local wiring regulations, i.e. UK, the latest IEE wiring regulations, (BS7671), and USA, NEC Class 1 wiring methods.
12. Do not connect AC supply to low voltage sensor input or low level inputs and outputs.
13. Voltage rating. The maximum continuous voltage applied between any of the following terminals must not exceed 240Vac:
    relay output to logic, dc or sensor connections;
    any connection to ground.
14. Conductive pollution. Electrically conductive pollution i.e. carbon dust, MUST be excluded from the enclosure in which the Remote Panel is installed. To secure a suitable atmosphere in conditions of conductive pollution, fit an air filter to the air intake of the enclosure. Where condensation is likely, include a thermostatically controlled heater in the enclosure.
15. Grounding of the temperature sensor shield. In some installations it is common practice to replace the temperature sensor while the Remote Panel is still powered up. Under these conditions, as additional protection against electric shock, it is recommended that the temperature sensor shield be grounded. Grounding through the framework of the machine should not be relied on.
16. Over Temperature Protection. To prevent overheating of the process under fault conditions, a separate over-temperature protection unit should be fitted which will isolate the heating circuit. This must have an independent temperature sensor. The 32h8e is intended for this function.

> Note: Alarm relays within the unit do not give protection under all failure conditions.

17. To comply with European EMC directive certain installation precautions are necessary:
    General guidance. Refer to EMC Installation Guide, Part no. HA025464.
    Relay outputs. It may be necessary to fit a suitable filter (depending on load type) to suppress conducted emissions.
    Table top installation. If using a standard power socket, compliance with commercial and light industrial emissions standard is usually required. To comply with conducted emissions standard, a suitable mains filter must be installed.

SYMBOLS

Symbols used on the instrument are defined in the table below

⚠	Caution refer to accompanying document
▣	Equipment protected throughout by DOUBLE ISOLATION

A2 MECHANICAL INSTALLATION

A location should be chosen which is subject to minimum vibrations; the allowable ambient temperature range is 0 to 55°C (32 to 131°F) and the acceptable humidity range is 5 to 95% RH non-condensing.

To remove the indicator from its Sleeve, ease the latching ears outwards and pull the unit forward. When plugging back in ensure that the latching ears click into place (maintains the IP65 sealing).

1. An aperture with dimensions as shown in figure A2 should be made in the panel.
2. If it is not already in place, fit the IP65 sealing gasket behind the front bezel of the unit
3. From the front of the panel, insert the unit, through the cut-out.
4. Spring the panel retaining clips into place and secure the unit in position by pushing both retaining clips forwards, until they bear on the back of the panel.
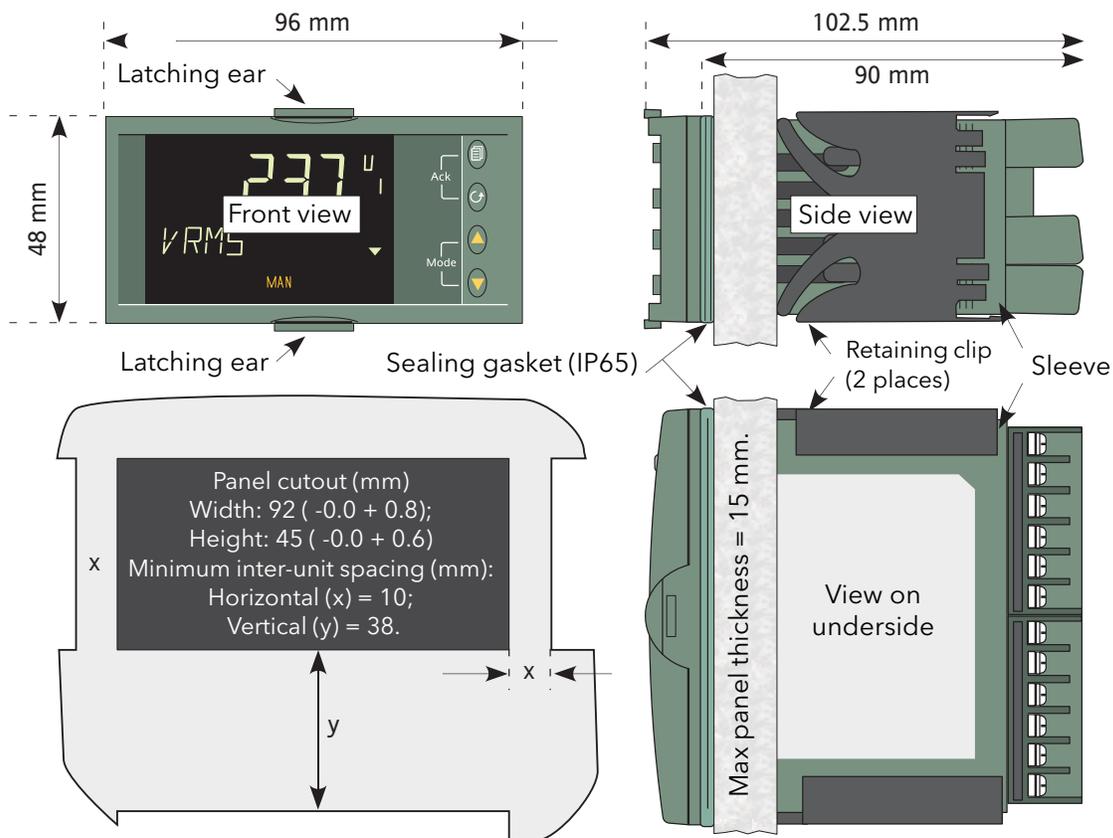5. Peel off the protective cover from the display.

Figure A2 Installation dimensions drawing

A3 ELECTRICAL INSTALLATION

A3.1 PINOUT

Figure A3.1, below shows the rear terminal arrangement.
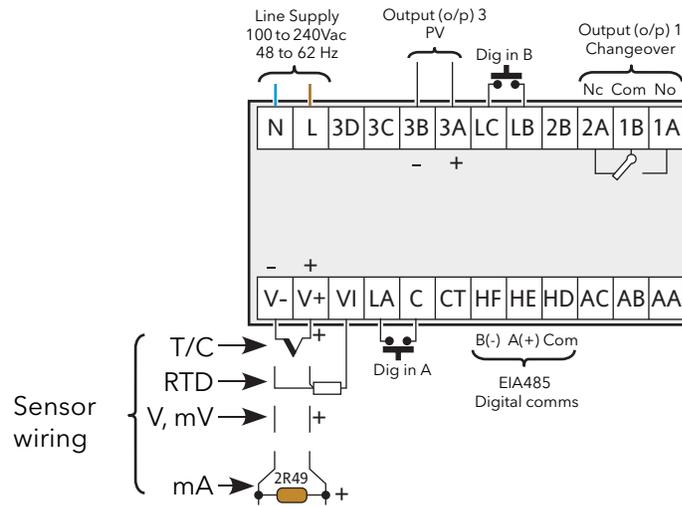
Figure A3.1 Terminal arrangement

A3.2 WIRING

A3.2.1 Termination details

The screw terminals accept wire sizes from 0.5 to 1.5 mm (16 to 22AWG). Hinged insulating covers prevent accidental contact with live wires. The recommended maximum rear terminal screw torque is 0.4Nm.

A3.2.2 Supply voltage

Please read the safety notes in section A1.1 of this manual. Additionally:

1. Only copper conductors may be used.
2. The power supply input is not fuse protected. Fusing must be provided externally by a type T fuse with a 2 Amp, 250V rating.

SUPPLY VOLTAGE RANGE

100 to 240Vac, -15%, +10%, 48 to 62 Hz

A3.2.3 Signal wiring

Notes:

1. Input wires should not be run in proximity with power cables
2. When shielded cable is used, it should be grounded at one point only
3. Any external components (such as Zener barriers) connected between sensor and input terminals may cause errors in measurement due to excessive and/or unbalanced lead resistance and leakage currents.
4. Analogue inputs are not isolated from digital inputs or from logic outputs.

ANALOGUE (MEASURING) INPUTS
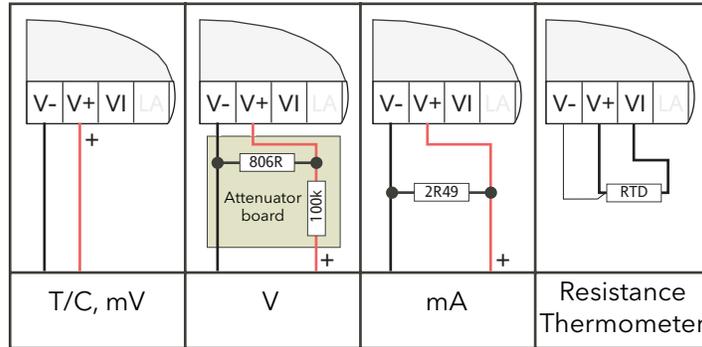
Figure A3.2.3a Input wiring

Notes:

1. For thermocouple inputs, compensation cable suitable for the thermocouple type must be used, preferably shielded.
2. For voltage inputs an attenuator board must be fitted as shown. A suitable board is available from the manufacturer.
3. For resistance temperature detectors, the resistance element is wired across V+ and VI; the lead compensation wire being terminated at V-. The resistance of all three wires must be equal. Line resistances greater than 22 Ohms cause measurement errors.

OUTPUT WIRING
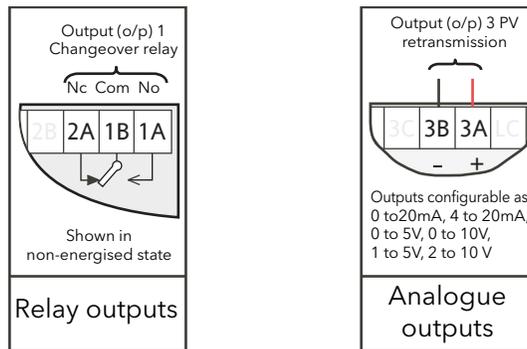
Figure A3.2.3b Output wiring

A3.2.4 Digital communications wiring
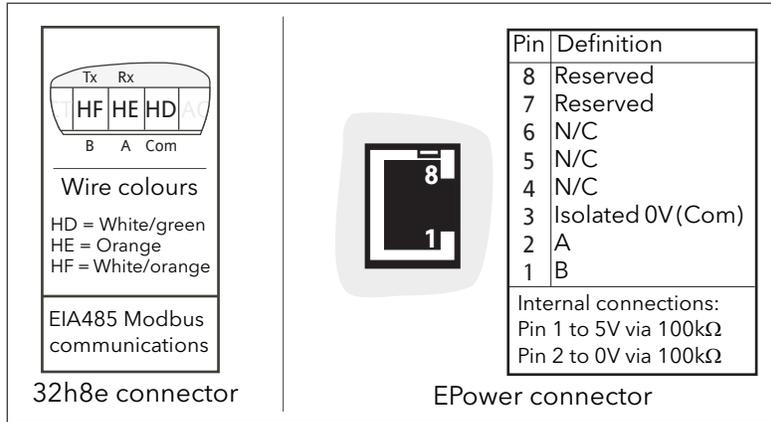
Figure A3.2.4 Digital communications pinouts

A3.3 OVER TEMPERATURE APPLICATION WIRING

Figure A3.3 shows a typical application where the Remote Display Unit is used to trip the main contactor to the EPower units if it detects an over-temperature.

The figure is intended for guidance only, and does not show detailed EPower wiring, this being discussed in depth in section A2 of this manual.

Notes:

1. When switching inductive loads, the 22nF/100 Ohm snubber (supplied with the instrument) should be wired across the relay connections as shown.
2. Snubbers pass 0.6mA at 110V and 1.2mA at 230Vac. This is sometimes sufficient to hold high impedance loads on. Snubbers should not be used in such cases.
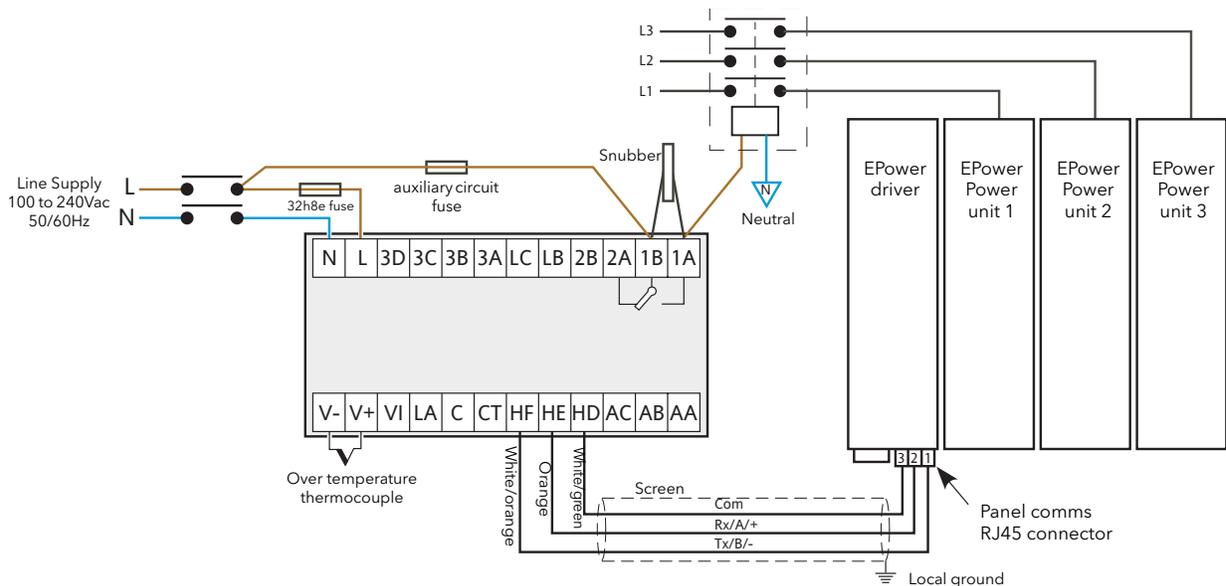
Figure A3.3 Typical wiring

A4 FIRST SWITCH ON

At first switch on, after the start-up sequence, the initial configuration page is displayed.

Note: the following 'quickstart' description apples only to new (not previously configured) instruments. If the instrument has previously been configured (either at the factory or subsequently) the instruments starts up showing the relevant process value.

The initial display shows 'Set1' on the top line, with a coded display below (figure A4) with its first item flashing. The lower line is decoded as shown in table A4a.

The 'mode' (up/down arrows) are used to scroll through the available choices for each item. Once the required value is displayed, the scroll key is used to select the next character for editing. Once all five characters have been edited, further operations of the scroll key call the range high display (allowing the high range value to be edited using the mode keys), then the range low display (allowing the low range value to be edited). A further operation calls the Set2 display, which is decoded in table A4b.

After Set2 parameters have been edited, a further operation of the scroll key invites the user to Exit. Operating the scroll key returns to the Set1 display; operating a mode key to display 'yes' quits the quickstart menu and causes the unit to enter operating mode.

Figure A4 Set 1 display

Input type
B	Type B T/C
J	Type J T/C
K	Type K T/C
L	Type L T/C
N	Type N T/C
R	Type R T/C
S	Type S T/C
T	Type T T/C
C	Custom T/C
P	Pt100 RTD
M	Linear 0 to 80 mV
2	Linear 0 to 20 mA
4	Linear 4 to 20 mA
0	Linear 0 to 10V dc
3	Linear 2 to 10V dc
6	Linear 0 to 5V dc

Display units
C	Degrees Celsius
F	Degrees Fahrenheit
K	Kelvins
*	None
P	%
0	Pa (Pascals)
1	mPa (milli Pascals)
2	kPa (kilo Pascals)
3	Bar
4	mBar
5	PSI
6	kg/cm
7	mmwG
8	inwG
9	mmHg
A	Torr
B	litres/hr
D	litres/min
E	% RH
G	%o2
H	%Co2
J	%CP
L	V
M	Amp
R	mA
T	mV
U	Ohm
W	ppm
Y	RPM
Z	metres/sec

Decimal places
0	nnnnn
1	nnnn.n
2	nnn.nn
3	nn.nnn
4	n.nnnn

Display top line (PV) colour
G	Green
R	Red
C	Red in alarm, else green

Home display
N	PV only
A	First alarm setpoint (SP) only
1	PV + Alarm SP (Read/write)
2	PV + Alarm SP (Read only)
I	Current (see note)
V	Voltage (see note)
P	Power (see note)
E	Energy (see note)

Note:
The default display for I, V, P and E is network 1. The 'page' key is used to access the parameter for other networks.

Select the first list

Select the next list

Change to the next character

Table A4a Set 1 parameter coding

A4 FIRST SWITCH ON (Cont.)

Relay output (OP1)	Analogue output (OP3)	Not used	Digital input A	Digital input B
x Not configured	x Not configured		x Not configured	x Not configured
H High alarm only	1 4 to 20mA output		W Alarm acknowledge	W Alarm acknowledge
L Low alarm only	2 0 to 20mA output		K Keylock	K Keylock
R Rate of change (ROC) alarm only	3 0 to 5 V dc output		U Remote up button	U Remote up button
N New alarm	4 1 to 5V dc output		D Remote down button	D Remote down button
O Sensor break only	5 0 to 10V dc output		V Recipe 2/ select	V Recipe 2/ select
P After power fail only	6 2 to 10V dc output		J Alarm inhibit	J Alarm inhibit
7 High alarm or sensor break			M Peak Reset	M Peak Reset
8 Low alarm or sensor break			Y Freeze PV	Y Freeze PV
9 ROC alarm or sensor break				
A High alarm or after power fail				
B Low alarm or after power fail				
C ROC alarm or after power fail				
E High alarm or sensor break or power fail				
F Low alarm or sensor break or power fail				
G ROC alarm or sensor break or power fail				

Select the first list

Select the next list

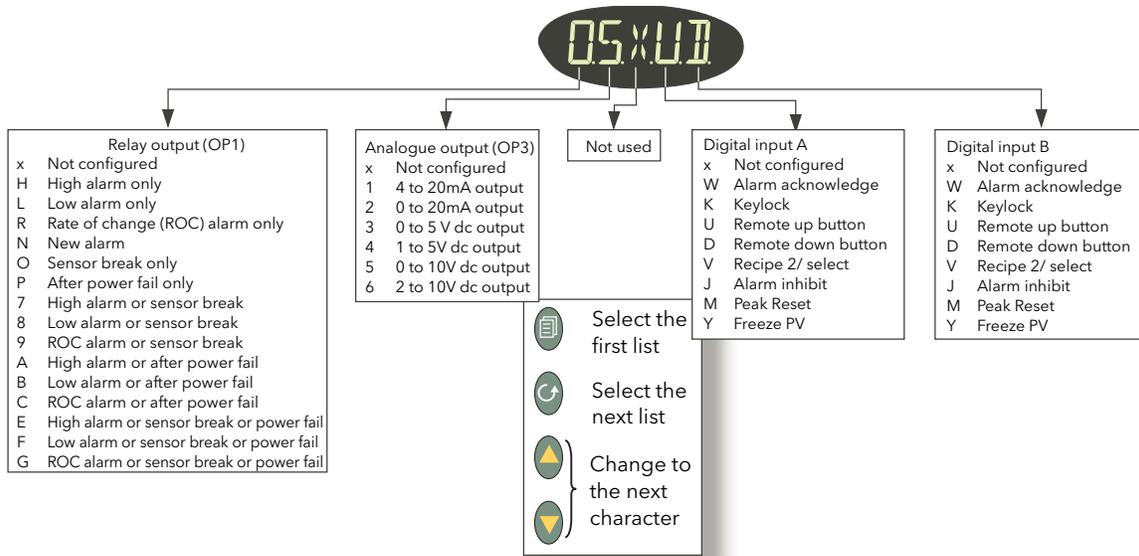Change to the next character

Table A4b Set 2 parameter coding

Notes:

1. In order for the unit to act as an over-temperature 'police officer', the OP1 alarm type should be selected as a high alarm.
2. The relay output automatically operates in fail-safe mode, in that it is de-energised in Alarm. It will thus enter an alarm state when power is removed from the unit.
3. To re-enter quickstart mode,
   Remove power from the unit
   Keeping the 'Page' key operated continuously, restore power and wait until a password is requested. Release the 'Page' key and use the up/down arrow keys to enter the quickstart password (default = 4).

A5 OPERATING MODE

A5.1 FRONT PANEL LAYOUT

When the instrument starts, or after quitting the quickstart procedure, the Operator level 1 display is entered and the page defined as the 'Home' page in 'Set 1' is displayed (unless there are any errors, in which case the unit displays the relevant error messages). Figure A5.1, below, shows the home page for the case where 'V' has been selected as Home display in 'Set 1'.
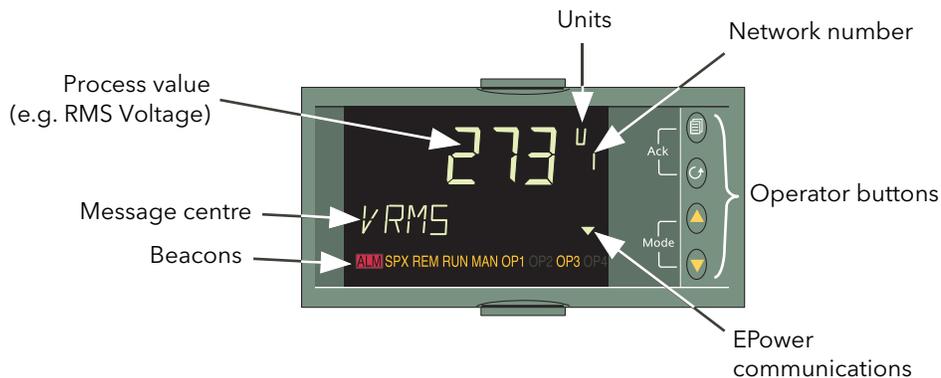

Figure A5.1 Display panel details

A5.1 FRONT PANEL LAYOUT (Cont.)

A5.1.1 Front panel details

Process Variable	Normally shows the value of the selected process variable. Where EPower variables are being displayed, the value for network 1 is displayed by default. Other network values are accessed by using the 'Page' key. If the instrument is in an error state, then an indication of what the error might be is flashed on and off instead (e.g. 'Sbr' is flashed if an input sensor break has been detected). Set1 PV colour allows this part of the display to be selected as permanently green ('G', permanently red ('R'), or normally green but red in error or alarm states ('C').
Units	Displays the units associated with the currently displayed process value.
Network number	For EPower parameters, shows the network for the currently displayed process variable.
Message centre	This displays scrolling event and/or alarm messages (e.g. 'INPUT SENSOR BROKEN')

Beacons

ALM	Indicates an active alarm. Flashes if alarm unacknowledged.
SPX	Alternative setpoint. Not used in this application.
REM*	Illuminated when 'Remote Setpoint' is selected for this EPower network.
RUN	Timer or programmer running/held. Not used in this application.
MAN*	Illuminated when 'Local Setpoint' is selected for this EPower network.
OP1	Illuminated if output 1 (relay) is active.
OP2	Illuminated if output 2 is active. Not used in this application.
OP3	Illuminated if output 3 has been configured to retransmit the process value.
OP4	Illuminated if output 4 is active. Not used in this application.

Operator buttons   Four buttons to allow navigation and configuration functions.:

Page key. Toggles between process variable and summary parameters. Also used (simultaneously with the Scroll key) to acknowledge alarms.

Scroll key. Press to select new parameter. Hold down to scroll through parameters. Also used (simultaneously with the Page key) to acknowledge alarms.

Up Arrow. Used to change (increase) a parameter value.

Down Arrow. Used to change (decrease) a parameter value.

Comms indicator   If flashing, this arrow head indicates that communications with EPower are active.

* See REM/MAN BEACONS (below) for more details.

A5.1.1 FRONT PANEL DETAILS (Cont.)

REM/MAN BEACONS

Table A5.1.1 summarises the operating characteristics of the 'REM' and 'MAN' beacons which depend on the network with which the currently displayed value is associated, and on which SetProv function blocks are enabled (if any).

Network 1	If no SetProv blocks are enabled, then MAN always illuminated. Otherwise REM/MAN operation depends on SetProv1 'SPselect' parameter.
Network 2	If no SetProv blocks are enabled, then MAN always illuminated. If SetProv.1 and SetProv.2 are enabled, REM/MAN operation depends on SetProv.2 'SPselect' parameter. If SetProv.1 and SetProv.3 are enabled, REM/MAN operation depends on SetProv.3 'SPselect' parameter. If only SetProv.1 enabled: REM/MAN operation depends on SetProv1 'SPselect' parameter.
Network 3	If no SetProv blocks enabled, then MAN always illuminated. If SetProv.1 and SetProv.3 are enabled, REM/MAN operation depends on SetProv.3 'SPselect' parameter. If only SetProv.1 enabled, REM/MAN operation depends on SetProv1 'SPselect' parameter.
Network 4	If no SetProv blocks enabled, then MAN always illuminated. If SetProv.1 and SetProv.4 are enabled, REM/MAN operation depends on SetProv.4 'SPselect' parameter. If only SetProv.1 enabled, REM/MAN operation depends on SetProv1 'SPselect' parameter.

Table A5.1.1 REM/MAN beacon characteristics

A5.2 LEVEL 1 OPERATION

Level 1 operation is entered when Set2 is quit, or after applying power to the instrument (other than at first power-up).

Level 1 operation allows the user to scroll through the various parameters associated with the instrument on a Read-only basis. The parameters which appear depend on the configuration. Figure A5.2a is an example showing the display pages where the home page (set 1) is PV only and the configuration comprises one or more single phase EPower units. Figure A5.2b is an example giving the parameters for a 2x2 leg, three-phase configuration.
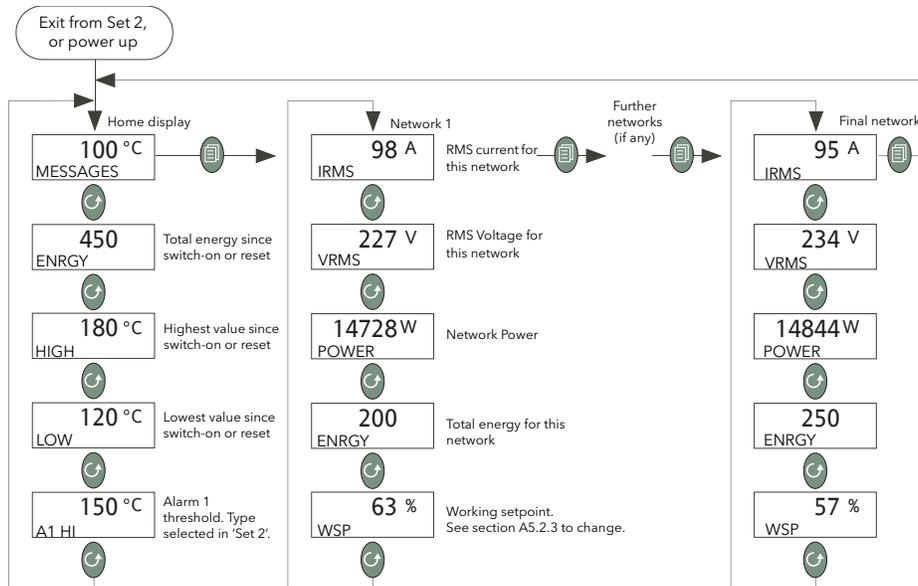
A5.2 LEVEL 1 OPERATION (Cont.)

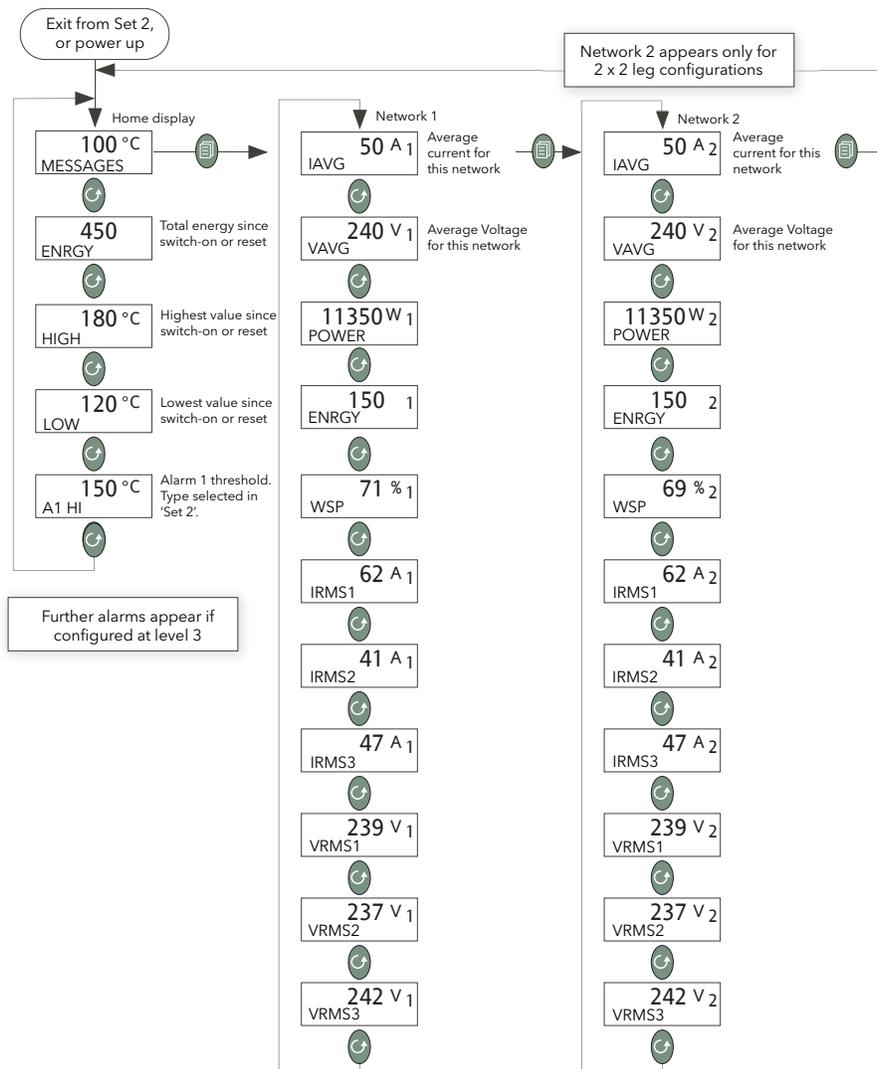Figure A5.2a Single phase example configuration

Figure A5.2b Three-phase (2x2leg) example configuration

A5.2 LEVEL 1 OPERATION (Cont.)

A5.2.1 Process Parameters

ENRGY	Energy. Shows the global energy counter in the EPower instrument. This is only available if the Energy Counter feature is enabled in the connected EPower instrument.
HIGH	Peak High. Shows the highest reading that the indicator has recorded since switch on or since reset (Level 2).
LOW	Peak Low. Shows the lowest reading that the indicator has recorded since switch on or since reset (Level 2).
A1 (*Type*)	Alarm 1 type and setpoint. Indicates the threshold value for alarm 1. 'Type' = 'Hi', 'Lo' or 'ROC' according to configuration (Set 2). This parameter does not appear if it is 'Unconfigured' in Set 2.
An (*Type*)	('n' = 2, 3 or 4) Further alarm types and threshold values, as configured in level 3 configuration.

A5.2.2 EPower Network summary parameters

IRMS	The RMS value of load current (Amps), for this network.
VRMS	The RMS value of load voltage (Volts) for this network
POWER	Either P or PBurst according to network type. Watts or kilowatts
ENRGY	Energy. Shows the energy for this network. This is only available if the Energy Counter feature is enabled in the connected EPower instrument.
WSP	Working setpoint. WSP is the working setpoint currently being used by the EPower unit and is either the Local setpoint, or the remote setpoint (from an analogue input or via a communications link).
SP	Target setpoint (% or Engineering units) for the network in use. It may be edited via the remote panel either directly setting the Control Setpoint (if EPower's SetProv function block is not enabled) or setting the local setpoint of the SetProv function block (if it is enabled and its SPSelect parameter is set to 'Local'). If the value is greater than 99999, the displayed value is divided by 1000 and shown with suffix 'K' in the format 'nnnn.nK' ('K' = kilo). (E.G. a value of 1000000 would be displayed as '1000.0K'.
SP.SEL	Setpoint Select. Available only in level 2 and if the associated SetProv function block in EPower is enabled, allowing the user to select between local (LSP) and remote setpoints (rSP).
E.RST	Energy Reset. Available only in level 2 and if the Energy Counter is enabled in EPower. User Energy total can be reset.
IRMS1 (2) (3)	RMS Load current for phase 1 (2) (3). (3-phase networks only)
VRMS1 (2) (3)	RMS Load voltage for phase 1 (2) (3). (3-phase networks only)
IAVG	Average load current (3-phase networks only)
VAVG	Average load voltage (3-phase networks only)

A5.2.3 Setpoint editing from the 32h8E

Operating the up or down arrow key from any of the power summary displays (e.g. IRMS) takes the user to the WSP display. Further operation of the up or down arrow causes the display to switch to 'SP' provided that the unit is operationg in Local mode (MAN illuminated) rather than Remote mode (REM illuminated). In Rmote mode, the SP parameter does not appear.

The mode can be changed between local and remote from the SPSEL parameter at level 2, or from the EPower operator interface, iTools or over a comms link.

Once in SP, the up and down arrows are used to edit the setpoint value. Once this is complete, the display times out to the original power summary SP page after a few seconds. Figure A5.2.3 attempts to show this process.

CTL.SP = No   This presentation is the only one available up to
             and including version V1.10

30 A
IRMS

Network Display

▼ ▲

20 %
WSP

The value of the working setpoint is displayed

▼ ▲

20 %
SP

The value of the local setpoint is displayed

▼ ▲   Use the up/down arrows to edit the value

50 %
SP

↓   One the edit is confirmed, or no edit has taken place, the display reverts to the parameter orginally being viewed

40 A
IRMS

CTL.SP = Yes

30 A
WSP

Network Display

▼ ▲

20 %
WSP

The value of the working setpoint is displayed

▼ ▲

20 %
SP

The value of the local setpoint is displayed

▼ ▲   Use the up/down arrows to edit the value

50 %
SP

↓   One the edit is confirmed, or no edit has taken place, the display reverts to the parameter orginally being viewed
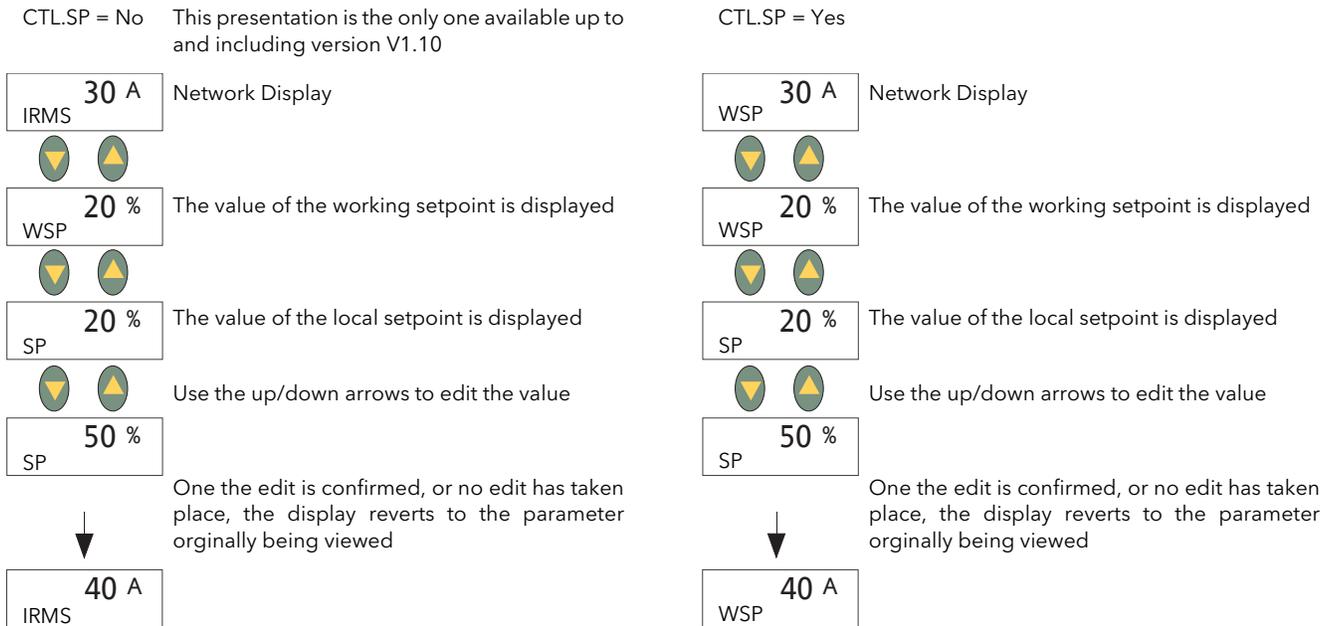
40 A
WSP

Figure A5.2.3 Setpoint editing

A5.3 LEVEL 2 OPERATION

To switch to level 2 parameters (figure A5.3a):

1. From any display press and hold the page key until the Lev 1 display appears
2. Operate the up or down arrow to display 'Lev 2'
3. After a few seconds, the 'Code' page appears. Use the up arrow key twice to enter the value '2'
4. After a few seconds the display reverts to the home display.

To return to level 1:

1. From any display press and hold the page key until the Lev 2 display appears
2. Operate the up or down arrow to display 'Lev 1'
3. After a few seconds the display reverts to the home display.

The scroll key is used to enter the parameter display from the home display.
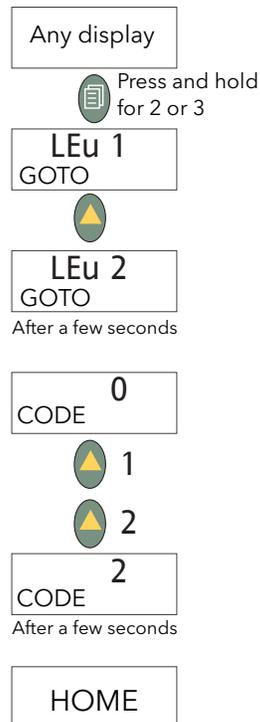
Figure A5.3a Selecting level 2

A5.3.1 Level 2 parameters

Figure A5.3.1 Level 2 parameter menu

ENRGY   Energy counter. Shows the global energy counter in the EPower instrument. This is
               only available if the Energy Counter feature is enabled in the connected EPower
               instrument.

E.RST   Energy Reset. Allows the energy counter to be reset. Only available only if the Energy
               Counter is enabled in EPower. Set to 'yes' to reset. Automatically returns to 'no'.

PRST	Peak Reset. Allows the high and low peak values to be reset (to the current value). Set to 'On' to reset. Automatically returns to 'Off'.
HIGH	Peak High. Shows the highest reading that the indicator has recorded since switch on or since reset (Level 2).
LOW	Peak Low. Shows the lowest reading that the indicator has recorded since switch on or since reset (Level 2).
A1 (*Type*)	Alarm 1 type and setpoint. Indicates the threshold value for alarm 1. 'Type' = 'Hi', 'Lo' or 'ROC' according to configuration (Set 2). This parameter does not appear if it is 'Unconfigured' in Set 2.
An (*Type*)	('n' = 2, 3 or 4) Further alarm types and threshold values, as configured in level 3 configuration.
ADDR	Address. Modbus address (1 to 254) for the instrument
HOME	Home display.

PU = process variable   Alm = Alarm threshold
PU.AL = Process variable + Alarm SP   P.A.ro = PV + Alarm SP (read only)
EP.I = EPower Current   EP.U = EPower Voltage
EP.P = EPower Power

ID	Customer ID Customised instrument identification number (0 to 9999)
RECNO	Current Recipe Number. The current recipe number (1 to 5) or 'nonE' if no recipe running, or FAiL if there are no recipes available. See section A6.2 for further details.
STORE	Recipe to save. Takes a 'snapshot' of the current recipe values and saves them in a recipe number from 1 to 5. 'nonE' does not save; 'donE' appears after a successful save. See section A6.2 for further details.
UNITS	Display units. Table A5.3.1, below, shows the available units in down-arrow scroll order.

Unit	Definition	Display	Unit	Definition	Display	Unit	Definition	Display
nonE	No units		m-S	Milliseconds	m-S	L-H	Litres per hour	L-H
°k	Kelvins	k	rPm	Revs/minute	rPm	torr	Torr	tor
°F	Degrees Fahrenheit	°F	PPm	Parts per milion	PPm	mmHg	mm of mercury	mmHG
°C	Degrees Celsius	°C	Ohm	Ohms	Ohm	inwG	inches of water gauge	inwG
kG	Kilograms	kg	mU	Millivolts	mU	mmwG	mm of water gauge	mmwG
GrAm	Grams	G	mA	MilliAmps	mA	kGcm	Kilograms/square cm	kg/cm²
mG	Milligrams	mG	Amp	Amps	A	PSi	Pounds/square inch	PSi
mpH	Miles/hour	mPH	Uolt	Volts	U	mbAr	Millibar	bAr
P.PH	%ph	%PH	P.CP	% carbon potential	%CP	bAr	Bar	bAr
PH	pH	PH	P.CO2	% carbon dioxide	%CO2	kPA	KiloPascals	kPA
hrs	Hours	hr-S	P.O2	% oxygen	%O2	mPa	MegaPascals	mPA
min	Minutes	m in	P.rH	% relative humidity	%rH	PA	Pascals	PA
SEC	Seconds	SEC	L-m	Litres per minute	L-m	PErc	Percent	%

A5.4 LEVEL 3 AND CONF LEVEL OPERATION

To switch to level 3 parameters (figure A5.4):

1. From any display press and hold the page key until 'Lev 3' appears ('Lev1' or 'Lev2' appears first - keep holding).
2. If required, operate the up arrow to display 'ConF'
3. In either case, after a few seconds, the 'Code' page appears. Use the up arrow key twice to enter the value '3' (to enter level 3) or '4' (to enter Configuration level).
4. After a few seconds the display reverts to the home display.

To return to lower access levels:

1. From any display press and hold the page key until 'Lev 3' or 'ConF' appears
2. Operate the down arrow one or more times to display the required access level.
3. After a few seconds the display reverts to the home display.
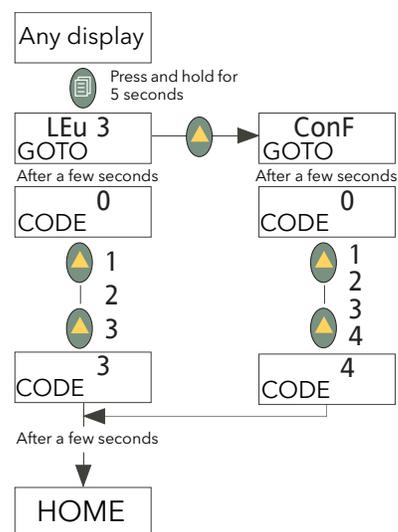
Figure A5.4 Selecting level 3 or Conf

A5.4.1 Level 3/Conf parameters

Most Level 3 and/or Configuration level parameters associated with the remote panel indicator are described in the 3200i Engineering Handbook (HA029006) available from the manufacturer. There are a number of additional parameters associated with the 32h8e, which are described below.

Level 3 access level makes those operating parameters, which are not Read only available to the user. Examples are Input Filter Time Constant, Alarm Delay time, and so on. Level 3 is used, typically, when commissioning the indicator.

Configuration level enables the fundamental characteristics of the indicator to be changed. This includes the quick-start code parameters amongst others.

The menu structures for Level 3 and Configuration levels are identical (see figure A5.4.1a) but there are more parameters available within each 'heading' at Configuration level.
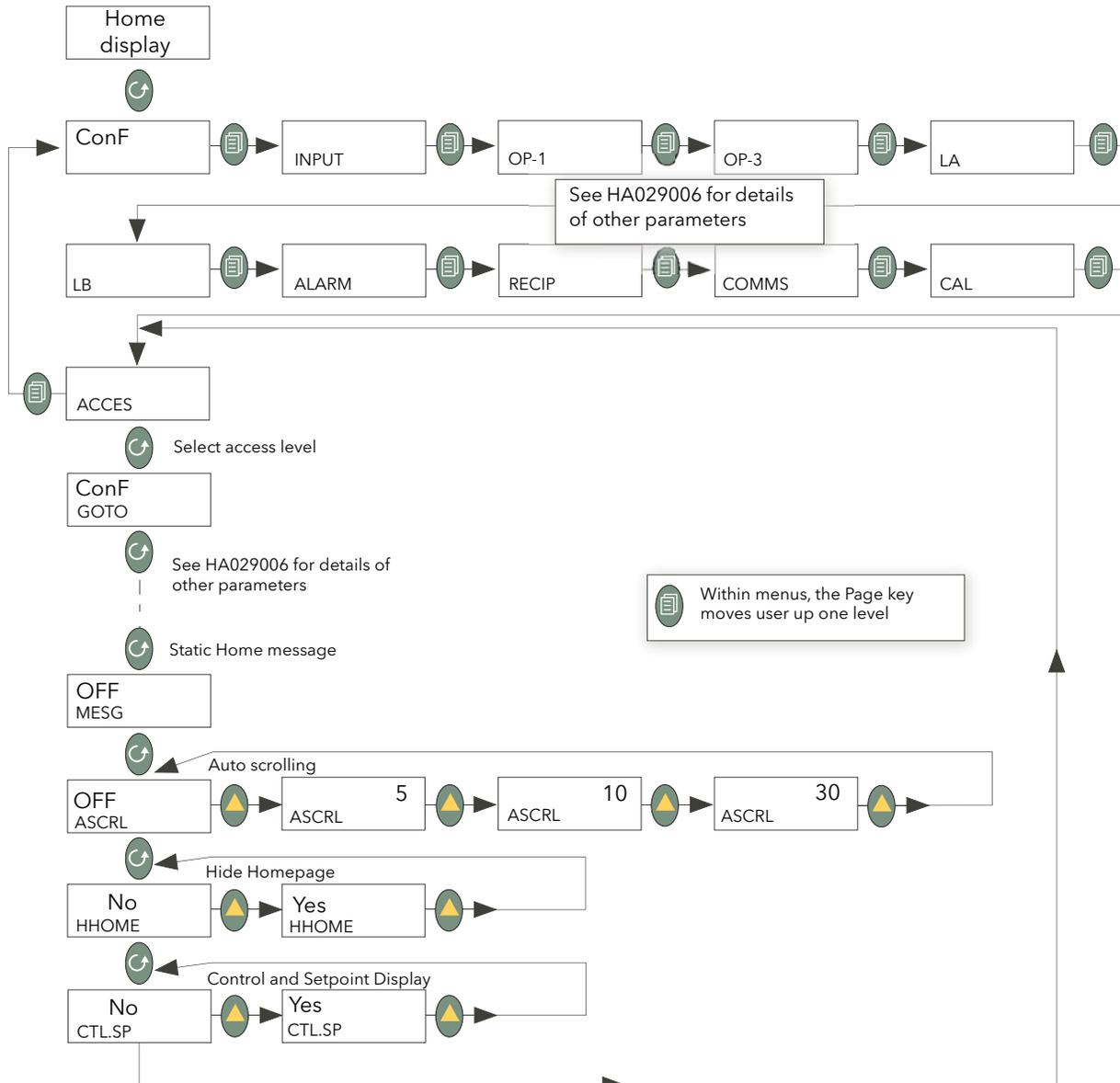
Home
display

ConF → INPUT → OP-1 → OP-3 → LA

See HA029006 for details
of other parameters

LB → ALARM → RECIP → COMMS → CAL

ACCES

Select access level

ConF
GOTO

See HA029006 for details of
other parameters

Static Home message

OFF
MESG

Within menus, the Page key
moves user up one level

Auto scrolling

OFF   5   10   30
ASCRL   ASCRL   ASCRL   ASCRL

Hide Homepage

No   Yes
HHOME   HHOME

Control and Setpoint Display

No   Yes
CTL.SP   CTL.SP

Figure A5.4.1a Level 3 and configuration level menu structure.

ASCRL	Auto scrolling. The up (or down) arrow is used to scroll through the values available, these being 'Off' (No scrolling) or 5, 10 or 30 seconds (where the selected time value specifies the time between scrolls). See 'AUTO SCROLL' below for further details.
HHOME	Hide Homepage. If set to 'Yes', the home page is never displayed, so the associated parameters can never be viewed at lower access levels.
CTL.SP	Control and Setpoint Display. If set to 'Yes' the EPower control parameters (Current, Voltage, or Power) can be viewed, in Operator level, simultaneously with it's associated Setpoint. When displaying an EPower control parameter, the bottom line of the display is used to display the working setpoint. When set to 'No', the bottom line of the display is used to display the parameter name and parameter description (as per other indicator displays). Also see section A5.2.3.

For all other parameters, refer to the 3200i Engineering Handbook (HA029006).

5.4.1 LEVEL 3/CONF PARAMETERS (Cont.)

AUTO SCROLLING

This causes the EPower summary parameters to scroll through continuously, at a frequency defined by the value selected for the ASCRL parameter. The actual order of parameter appearance depends on level of access, and complexity of network.

Note: The 3-phase parameters IRMS1, IRMS2, IRMS3, VRMS1, VRMS2, VRMS3 are not included in autoscrolling sequences.
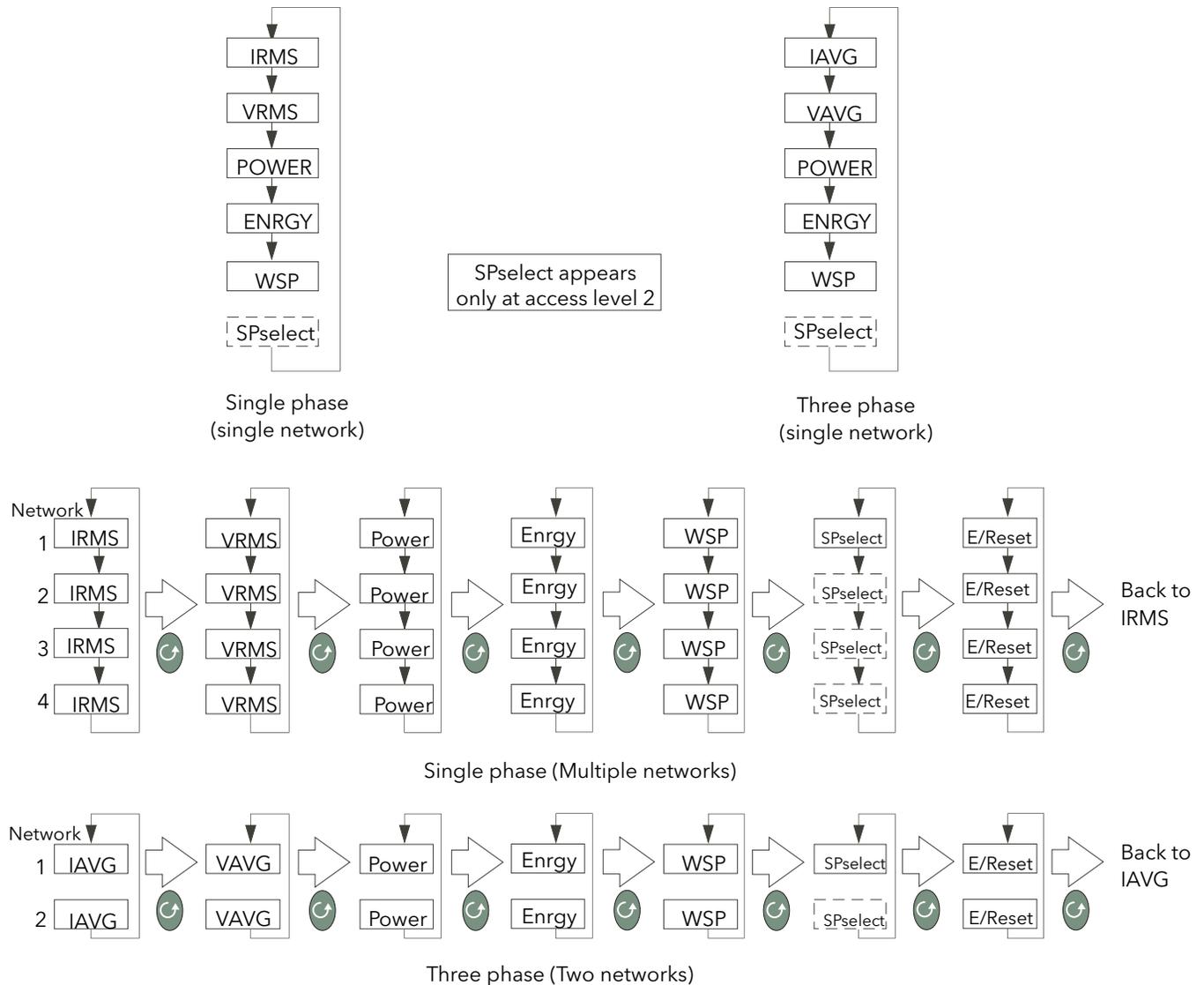

Figure A5.4.1b Various scrolling sequences

Note: For single networks, each EPower summary value (parameter) is displayed in turn. For multiple networks, the same parameter is displayed for each network in turn, the scroll key being used to select a different parameter if required.

A6 OTHER FEATURES

A6.1 ALARMS AND ERRORS

A6.1.1 Alarm indication

Up to four alarms can be set up in configuration level (refer to HA029006 for full details). Each alarm can be configured as 'nonE' (off), HI (high), Lo (low), r.roc (rising rate-of-change) or F.roc (falling rate-of-change).

If any alarm occurs the ALM beacon flashes, any output associated with the alarm becomes active, and the message area of the display shows a scrolling text message describing the alarm state. If the display is configured to go red on alarm (Set 2), the PV colour changes to flashing red.

A6.1.2 Alarm acknowledgement

Alarms are acknowledged by operating the Page key and the Scroll key simultaneously.

Further to this a global acknowledge of EPower alarms occurs when:

1.   The indicator home page is selected, or
2.   When the EPower Home page is displayed and the Home page is hidden

The results of alarm acknowledgement are as follows:

1.   For EPower alarms, the alarm indication at the EPower operator interface is acknowledged (removed). The alarm indication remains at the 32h8e until the alarm is no longer active.
2.   For Temperature (Process) auto-latching alarms, the alarm beacon and Process value stop flashing. Any output assigned to the alarm continues to operate until the alarm trigger is no longer active. If configured to change colour (Set 2), the process value returns to green only when the alarm trigger is no longer active.
3.   For Temperature (Process) manual-latching alarms, acknowledgement has no effect, and the alarm indication continues until the alarm trigger is no longer active.
4.   When EPower and auto-latching process alarms are both present, acknowledgement causes the beacon and Process Value (PV) display to stop flashing. Should the Process Value alarm subsequently go non-active, leaving only the EPower alarm, the beacon and PV display will resume flashing. For manual-latching alarms, acknowledge is ignored and the alarm indication continues until the alarm trigger is no longer active.

Note: Alarm parameters can be configured in Configuration mode, as described in the 3200i Engineering handbook HA029006.
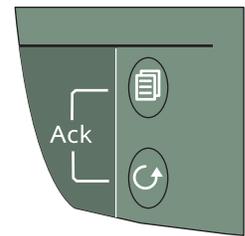
A6.1.3 Sensor Break detection and indication

An alarm condition (Sbr) is indicated if the indicator detects a break, or over range condition in the temperature sensor circuit.

Notes:

1. For a resistance thermometer a sensor break is indicated if any of the three wires is broken.
2. mA sensor breaks are not detected because the effect is masked by the resistor across the input.
3. For Volt inputs, sensor breaks might not always be detected, because the effect is masked by the attenuator (potential divider) board connected across the input.

A6.1.4 Error indication

The following error indications can appear, flashing, in the top line of the display:

Com.Er	Communication error. Modbus transactions between the 32h8e and the EPower driver module fail. Can be caused by a break in the physical communications link, by the EPower module being powered down etc.
EP.CnF	The number of power modules is selected as zero. The indicator can therefore not show Current, Voltage or Power values.
EP.Er	One or more 'Fatal', 'Config' or 'Standby' error has been detected.

The error condition(s) must be cleared before the 32h8e will respond to operator keystrokes.

A6.1.5 EPower Event and Alarm Messages

The messages shown below are generated by the EPower module and are displayed as scrolling text strings in the 'Message centre' area of the display.

MISS MAINS	Supply power to one or more power modules is not connected, or is isolated.
THYR SC	A thyristor short circuit has been detected. In such a case, current flows even when the thyristor is not 'firing'.
OPEN THYR	A thyristor open circuit has been detected. In such a case, no current flows even when the thyristor is 'firing'.
FUSE BLOWN	One or more of the thyristor protection fuses has ruptured.
OVER TEMP	The thyristor heat sink temperature has exceeded the specified limit, and the thyristor has been shut down. The temperature must fall to below the specified limit (including the hysteresis value) before firing can re-commence.
VOLT DIPS	This detects a reduction in supply voltage. Detection threshold is set up in EPower configuration (Network/Setup).
FREQ FAULT	Supply frequency is below 47Hz or above 63Hz. Firing stops until the supply frequency has returned to a value between 47Hz and 63Hz.
PB 24V	The 24V power rail in a power module has failed. Firing stops and restarts only when the problem has been resolved.
TLF	Total load failure. The load connection from one or more power modules is missing or open circuit.
CHOP OFF	Triggered if the load current meets or exceeds a specified threshold for more than five seconds. Firing stops until either the alarm is acknowledged or until 100mS has elapsed, according to configuration. See Network/Setup for further details.
PLF	Partial Load Failure. The alarm is triggered if a change in static load impedance is detected over a mains cycle (phase angle mode) or burst period (burst or logic mode). The sensitivity of the measurement can be configured as described in the Network/Setup area of EPower configuration.
PLU	Partial Load Unbalance. This alarm is triggered when the difference between the maximum and minimum currents of a three-phase system exceeds a configurable threshold. See Network/Setup for further details.
VOLT FAULT	One or more phases missing or out of limits.
PRE TEMP	Acts as a warning that the operating temperature is unexpectedly high. This alarm becomes active before unit operation is stopped.
PMOD WDOG	One or more power module watchdogs has performed a reset.
PMOD COM ERR	A power module communications error has been detected. Typically this would be caused by a damaged inter-module ribbon cable.
PMOD T OUT	A power module communications time out error has occurred. Typically this would be caused by a damaged inter-module ribbon cable.
CLOSED LP	The control loop cannot achieve setpoint, despite the loop demanding 0% or 100% power. Typically caused by external constraints on the load.
OUT FAULT	A short circuit has been detected in the output circuit. Firing is inhibited.

A6.2 RECIPES

Note: Level two access (section A5.3) is required in order for the user to be able to save and/or restore 'recipes' as described below.

It is possible to store operating values by tacking a 'snapshot' of the current settings and storing these snapshots in one of up to five 'recipes'. An example would be to store several sets of alarm setpoint values, one of which can then be recalled for a particular process.

To store values in a recipe:

1. In the level two list of parameters (figure A5.3.1), press the scroll key repeatedly (or hold continuously) until 'STORE' appears.
2. Select a recipe number using the up/down arrow keys. After a few seconds the word donE appears to indicate that the current parameter values have been saved to the selected recipe number. Previous values are over-written without confirmation.

To retrieve a recipe:

1. In the level two list of parameters (figure A5.3.1), press the scroll key repeatedly (or hold continuously) until 'RECNO' appears, along with a number (between 1 and 5 inclusive) indicating which recipe was last selected.
2. Select the required recipe number using the up/down arrow keys. After a few seconds the recipe number will blink, to indicate that the load is complete. If the selected recipe is empty, the word FAIL appears instead of the recipe number.

A6.3 EPOWER SETPROV CONFIGURATIONS

If EPower is configured via QuickStart and the analogue input has been set to 'Setpoint', then, in a multiple network configuration, QuickStart will wire SetProv1 'workingSP' to the 'Main.SP' of all the networks' Control blocks so that all the control blocks share the same setpoint.

Figure A6.3, below shows two examples of this, as displayed in the iTools Graphical wiring editor.
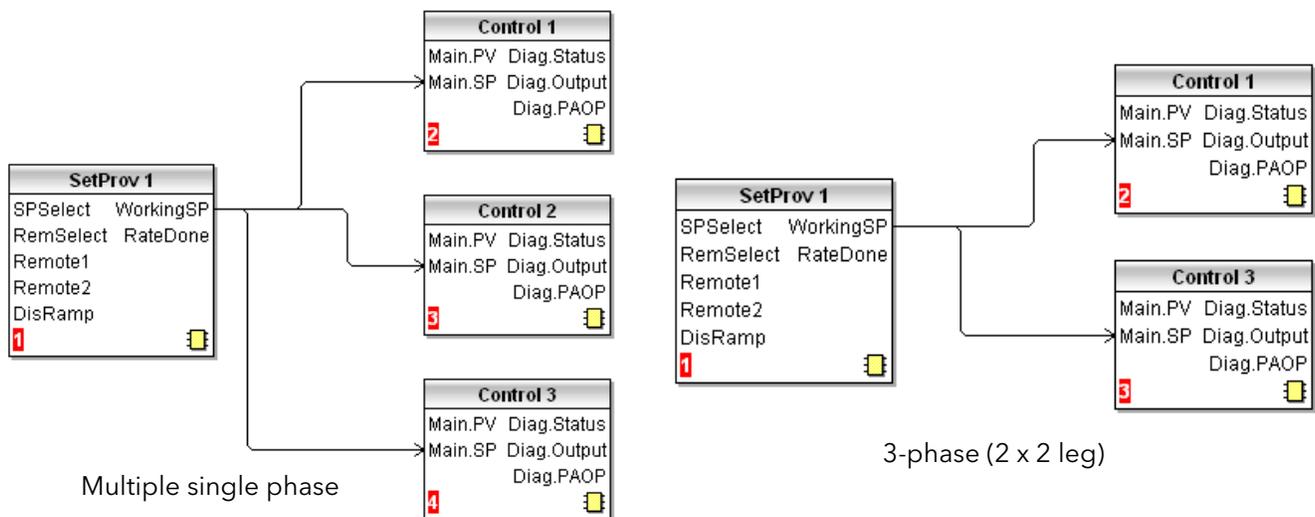

Figure A6.3 Setpoint to Control block wiring (iTools graphical wiring editor display)

A6.3 EPOWER SETPROV CONFIGURATIONS (Cont.)

If EPower is configured using QuickStart, and the analogue input is not set to 'Setpoint', then none of the Set-Prov function blocks is enabled and each control block setpoint can be set locally.

If EPower is configured using the iTools Graphical wiring editor, then it is possible to enable all of the SetProv function blocks, thus allowing each control block to have individual local or remote setpoints. This flexibility has an effect on the operation of the REM and MAN beacons, as described in section A5.1.1.

A6.3.1 Setpoint availability

MULTIPLE SINGLE PHASE CONFIGURATION

Figure A6.3.1a shows three examples of different single phase setpoint configurations. Figure A6.3.1b, is similar, but shows three-phase 2 x 2 leg examples.
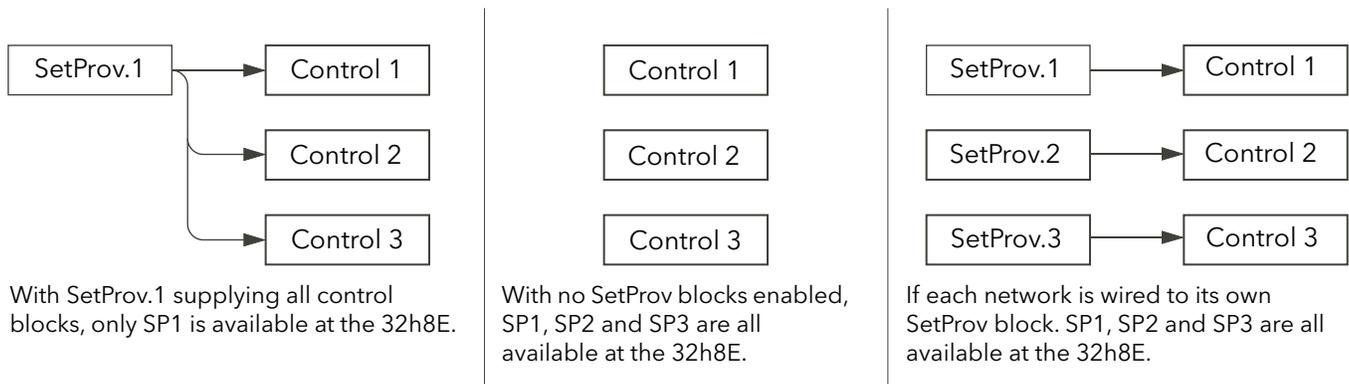

With SetProv.1 supplying all control blocks, only SP1 is available at the 32h8E.

With no SetProv blocks enabled, SP1, SP2 and SP3 are all available at the 32h8E.

If each network is wired to its own SetProv block. SP1, SP2 and SP3 are all available at the 32h8E.

Figure A6.3.1a Setpoint availability (multiple single phases)

With SetProv.1 supplying both control blocks, only SP1 is available at the 32h8E.

If no SetProv.1 blocks enabled. SP1and SP2 are both available at the 32h8e.

If each network is wired to its own SetProv block, SP1 and SP2 are available at the 32h8e.
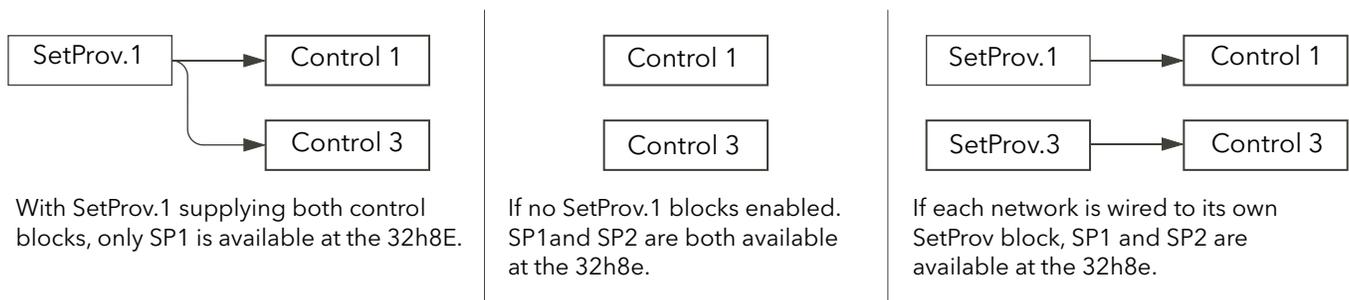
Figure A6.3.1b Setpoint availability (three-phase 2 x 2 leg)

A6.4 PV RETRANSMISSION

EPower parameters may be communicated to a Fieldbus Network Master i.e. SCADA package, PLC or DCS system. The 32h8e is intended as an independent policeman, and its process PV may also be communicated to the Fieldbus network master. To this end, the 32h8e PV is written every 1/2 second to the EPower's Instrument.Config.RemotePV parameter, which can then be transmitted to the master device.

PV retransmission is also provided as an analogue (V or mA) signal at the analogue output OP3. This may be used as a back-up to the digitally communicated parameter in the event of a failure of the communications link.

A6.5 DIGITAL ALARM OPTIONS

The following source parameters can be logically OR'ed together to give a digital output state.

1.SRC.A
1.SRC.B
1.SRC.C
1.SRC.D
EP.AL

1.SRC.A to 1.SRC.D are described in the Engineering Handbook (HA029006); EP.AL is defined as: All EPower alarms.

> Note: the ALL.A (All Alarms) parameter includes the above EP.AL as well as the indicator alarms.

A6.6 HOME PAGE TIMEOUT

The 32h8e normally forces the display to return to the Home page after a period of keyboard inactivity.

If, however, the current focus is on an EPower parameter, then the HOME Page timeout is not imposed, thus allowing the user to display a specific Network parameter indefinitely (providing that auto-scrolling is disabled).

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