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5100V/5180V

100 and 180 mm video-graphics recorders

User guide

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EUROTHERM

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EUROTHERM

Declaration of Conformity

Manufacturer's name:	**Eurotherm Limited**
Manufacturer's address	**Faraday Close, Worthing, West Sussex, BN13 3PL, United Kingdom.**
Product type:	**Industrial video-graphic recorder**
Models:	**5100V Status level O21 and above** **5180V Status level O28 and above**
Safety specification:	**EN61010-1**
EMC emissions specification:	**EN61326**
EMC immunity specification:	**EN61326**

Eurotherm Limited hereby declares that the above products conform to the safety and EMC specifications listed. Eurotherm Limited further declares that the above products comply with the EMC Directive 89 / 336 / EEC amended by 93 / 68 / EEC, and also with the Low Voltage Directive 73 /23 / EEC

Signed: W R S Davis Dated: 27 March 2003

Signed for and on behalf of Eurotherm Limited
William Davis
(General Manager)

CE

IA249986U570 Issue 1 Mar 2003

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GRAPHICS RECORDER

USER GUIDE

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EFFECTIVITY

This manual refers to recorders fitted with software version 3.4 To determine the software version fitted to the recorder, the 'About' screen in the System menu may be accessed as described in section 4.6.5.

For details of Remote Viewer and Modbus communications including the ASCII Printer Output option, see HA028122.
For software options other than those included in this user guide (e.g. Auditor pack), see HA028121

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SAFETY NOTES

WARNING

Any interruption of the protective conductor inside or outside the apparatus, or disconnection of the protective earth terminal is likely to make the apparatus dangerous under some fault conditions. Intentional interruption is prohibited.

Note: in order to comply with the requirements of safety standard BS EN61010, the recorder shall have one of the following as a disconnecting device, fitted within easy reach of the operator, and labelled as the disconnecting device.

a A switch or circuit breaker which complies with the requirements of IEC947-1 and IEC947-3
b. A separable coupler which can be disconnected without the use of a tool
c. A separable plug, without a locking device, to mate with a socket outlet in the building.

1. Before any other connection is made, the protective earth terminal shall be connected to a protective conductor. The mains (supply voltage) wiring must be terminated within the connector in such a way that, should it slip in the cable clamp, the Earth wire would be the last wire to become disconnected.
2. In the case of portable equipment, the protective earth terminal must remain connected (even if the recorder is isolated from the mains supply), if any of the I/O circuits are connected to hazardous voltages*.
3. The mains supply fuse within the power supply is not replaceable. If it is suspected that the fuse is faulty, the manufacturer's local service centre should be contacted for advice.
4. Whenever it is likely that protection has been impaired, the unit shall be made inoperative, and secured against accidental operation. The manufacturer's nearest service centre should be contacted for advice.
5. Any adjustment, maintenance and repair of the opened apparatus under voltage, should be avoided as far as possible and, if inevitable, shall be carried out only by a skilled person who is aware of the hazard involved.
6. Where conductive pollution (e.g. condensation, carbon dust) is likely, adequate air conditioning/filtering/sealing etc. must be installed in the recorder enclosure.
7. Signal and supply voltage wiring should be kept separate from one another. Where this is impractical, shielded cables should be used for the signal wiring.
8. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment might be impaired.

* A full definition of 'Hazardous' voltages appears under 'Hazardous live' in BS EN61010. Briefly, under normal operating conditions, hazardous voltages are defined as being > 30V RMS (42.2V peak) or > 60V dc.

SYMBOLS USED ON THE RECORDER LABELLING

One or more of the symbols below may appear as a part of the recorder labelling.

	Refer to the manual for instructions
	Protective earth
	This recorder for ac supply only
	This recorder for dc supply only
	This recorder for either ac or dc supply
	Risk of electric shock

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USER GUIDE

1 INTRODUCTION

This document describes the installation, operation and configuration of a video-graphic, chart-less recorder. The recorder comes in two versions, which differ in physical size, and in the number of I/O channels and options available, but which are otherwise identical (i.e. the operation and configuration procedures are the same for both).

The recorder comes, as standard, equipped for FTP transfer and Remote viewer connection.

The recorder instrument time can be updated from a unicast (i.e. point-to-point) Simple Network Time Protocol (SNTP) server and is also itself an SNTP server. SNTP time is based on elapsed seconds since 00:00 hrs. on 1st Jan. 1900 GMT and is affected neither by time zones nor by daylight saving. The relevant TCP port number is 123. See sections 4.3.1 (Instrument configuration), 4.5.1 (Network Address configuration) and B6 (Annex B) for more details.

1.1 UNPACKING THE RECORDER

The recorder is despatched in a special pack, designed to give adequate protection during transit. Should the outer box show signs of damage, it should be opened immediately, and the recorder examined. If there is evidence of damage, the instrument should not be operated and the local representative contacted for instructions. After the recorder has been removed from its packing, the packing should be examined to ensure that all accessories and documentation have been removed. The packing should then be stored against future transport requirements.

2 INSTALLATION

2.1 MECHANICAL INSTALLATION

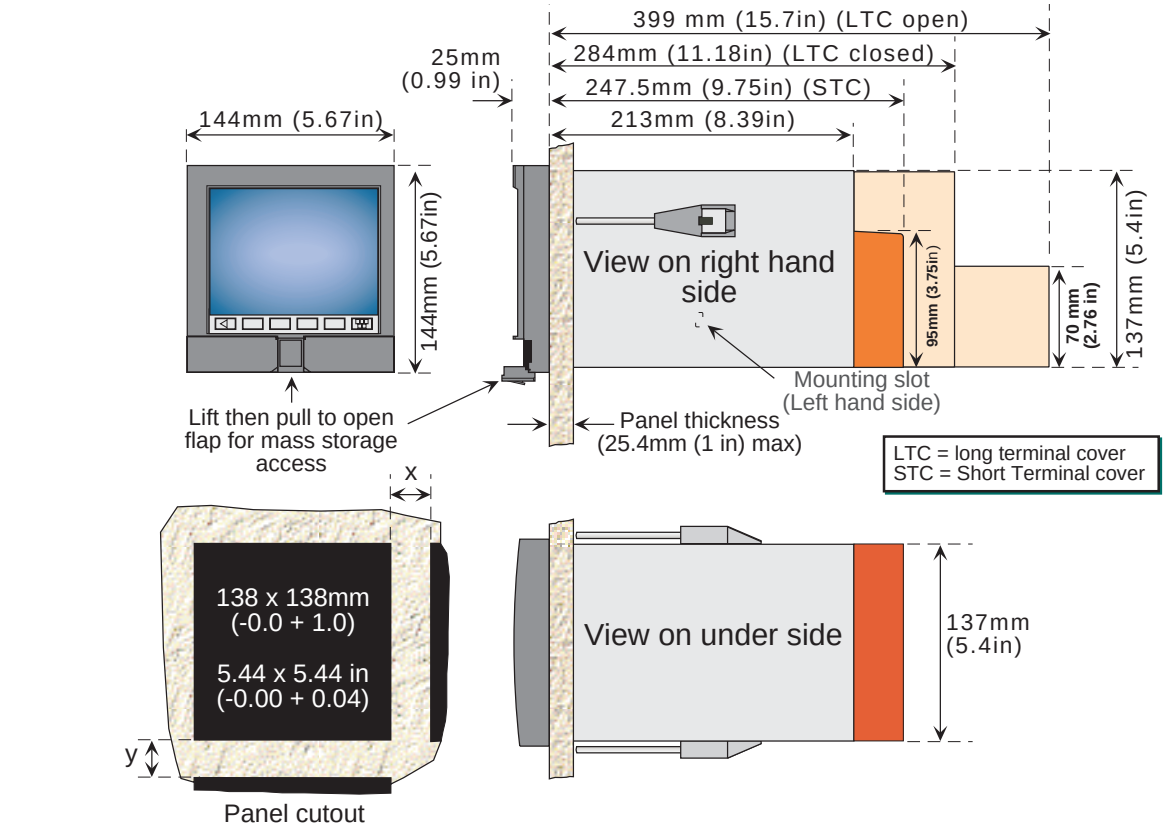
Figures 2.1a and 2.1b give installation details for the 137 x 137 mm case and for the 277 x 277 mm case respectively.

Note: It is recommended that the rear face of the panel be centre-punched at suitable positions to locate the tips of the case clamps. Otherwise, particularly on smooth surfaces, the clamps can 'wander' as they are tightened, leading to inefficient clamping and possible damage to the recorder mounting slots.

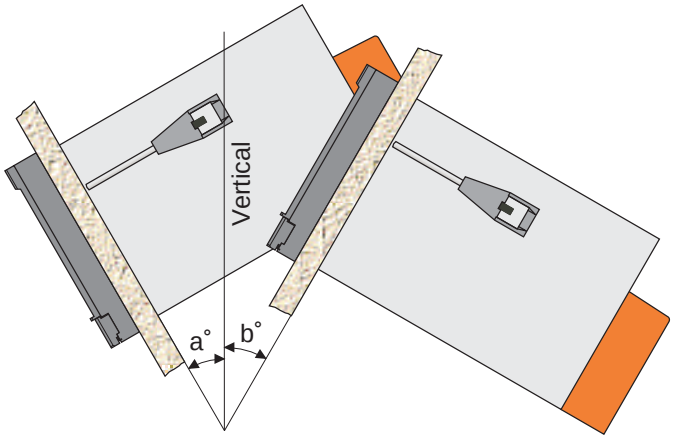
The unit is inserted through the panel aperture from the front of the panel. With the weight of the recorder supported, a panel clamp is inserted into each of the mounting slots (one each on the left- and right-hand sides). The jacking screws are then tightened sufficiently to clamp the recorder into position. EXCESS FORCE SHOULD NOT BE USED IN TIGHTENING THESE SCREWS.

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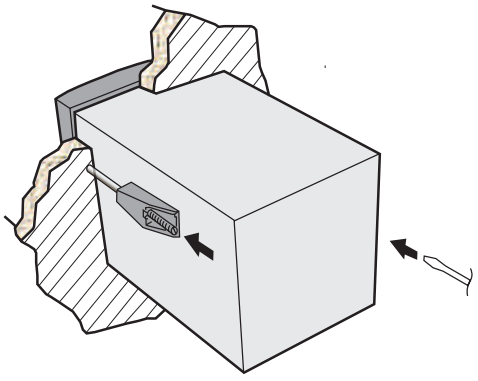
2 INSTALLATION (Cont.)



Minimum recommended inter-unit spacing	
Side clamps	Top/bottom clamps
x = 15mm (0.6 inch) y = 10 mm (0.4 in)	x = 10 mm (0.4 in) y = 15mm (0.6 inch)



MAXIMUM INSTALLED ANGLE
Hard disk option: vertical panels only
Floppy disk option: a = b = 15 degrees max
Otherwise: a = b = 45 degrees max



Panel clamping

Figure 2.1a Mechanical installation details - small frame unit

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2 INSTALLATION (Cont.)

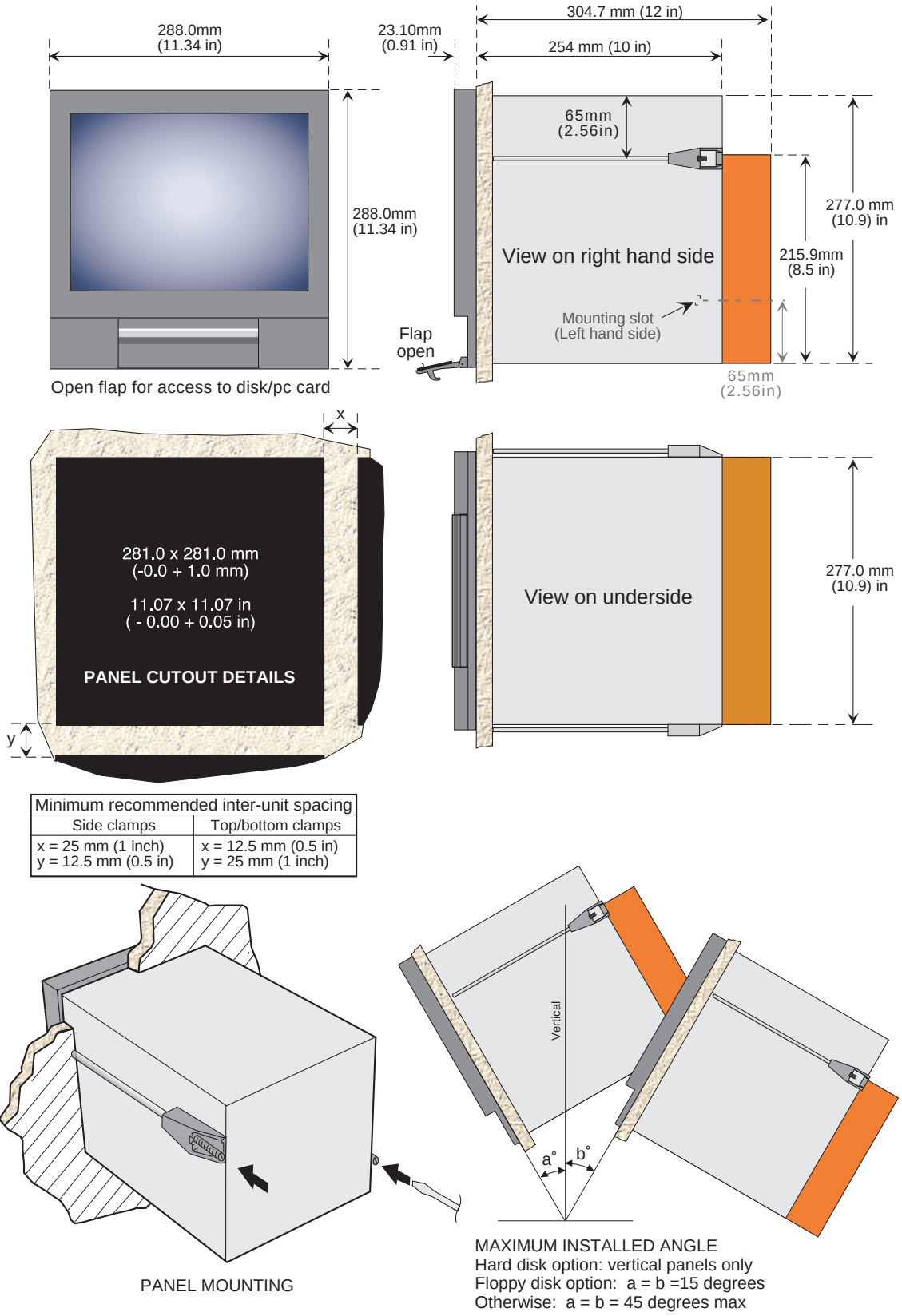


Figure 2.1b Mechanical installation details -large frame unit

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2.2 ELECTRICAL INSTALLATION

2.2.1 Signal wiring

Figures 2.2.1a and 2.2.1b show connector locations for the input channel wiring and optional relay output wiring for the small and large-frame recorders respectively. The figures are not to the same scale.

For the 100 mm recorder, if 18 input channels are fitted, then only one option board may be fitted, and this may be only a relay board, or an event input board, and it may be fitted only in option board slot 1.

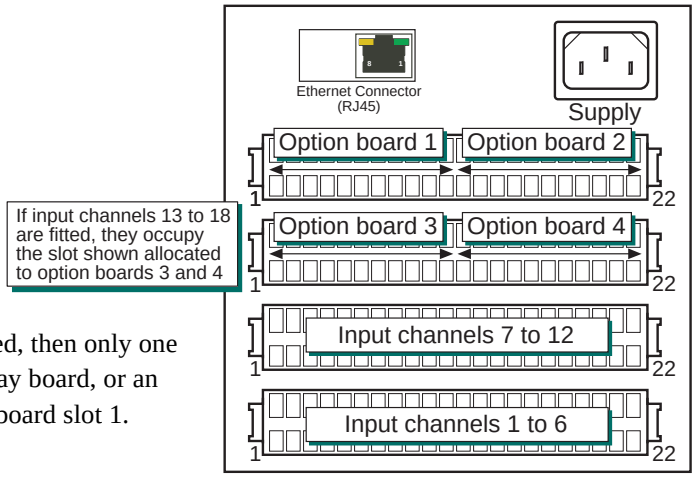


Figure 2.2.1a
Connector locations - small frame units

CONNECTOR WIRING DETAILS

Maximum wire size = 4.13mm^2 (11 AWG)
Minimum wire size = 0.081mm^2 (28 AWG)
Design torque = 0.8Nm.

Figure 2.2.1c shows details of input board wiring and figure 2.2.1d shows relay output wiring.

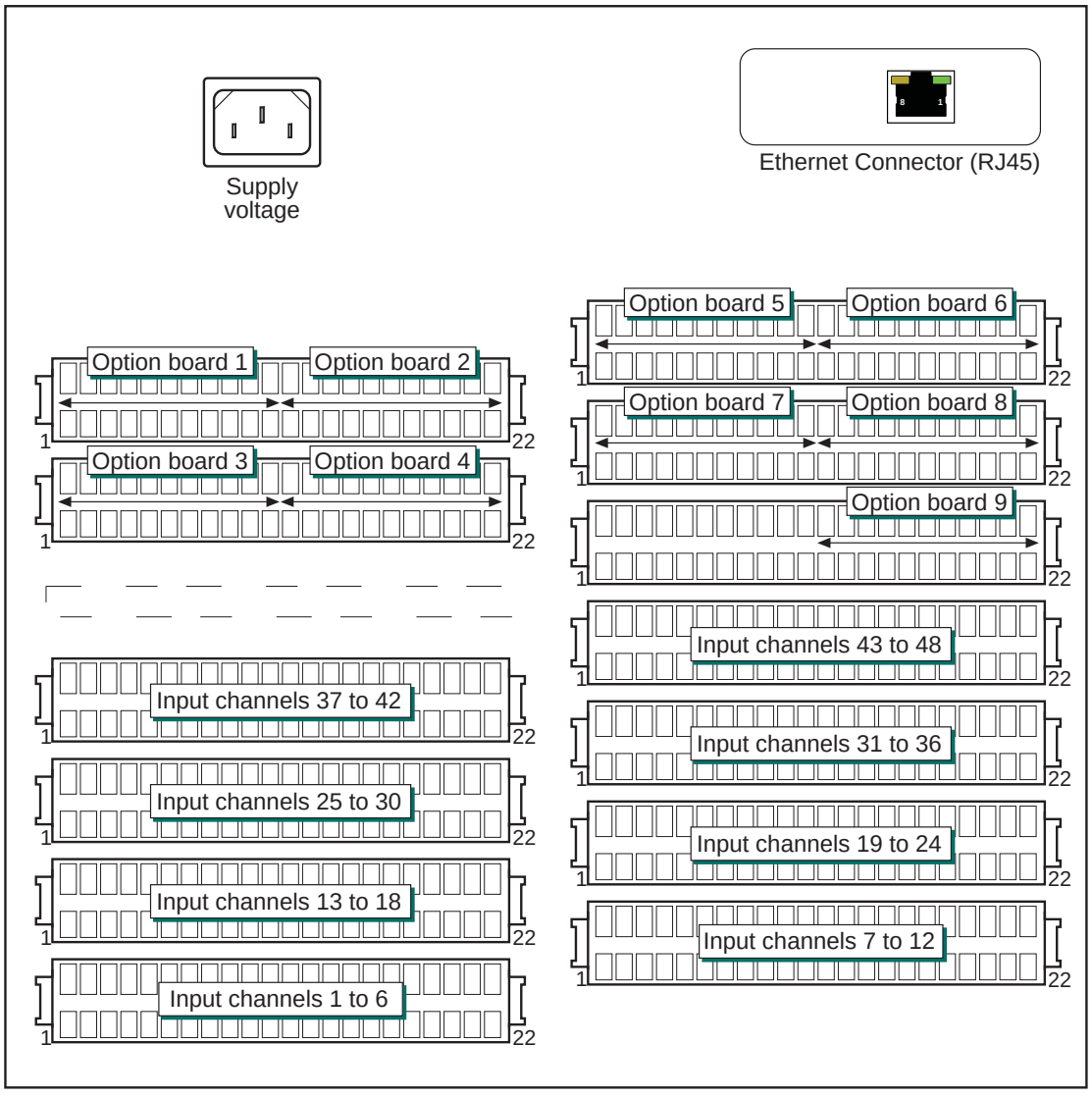


Figure 2.2.1b Connector locations - large frame units

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2.2.1 SIGNAL WIRING (Cont.)

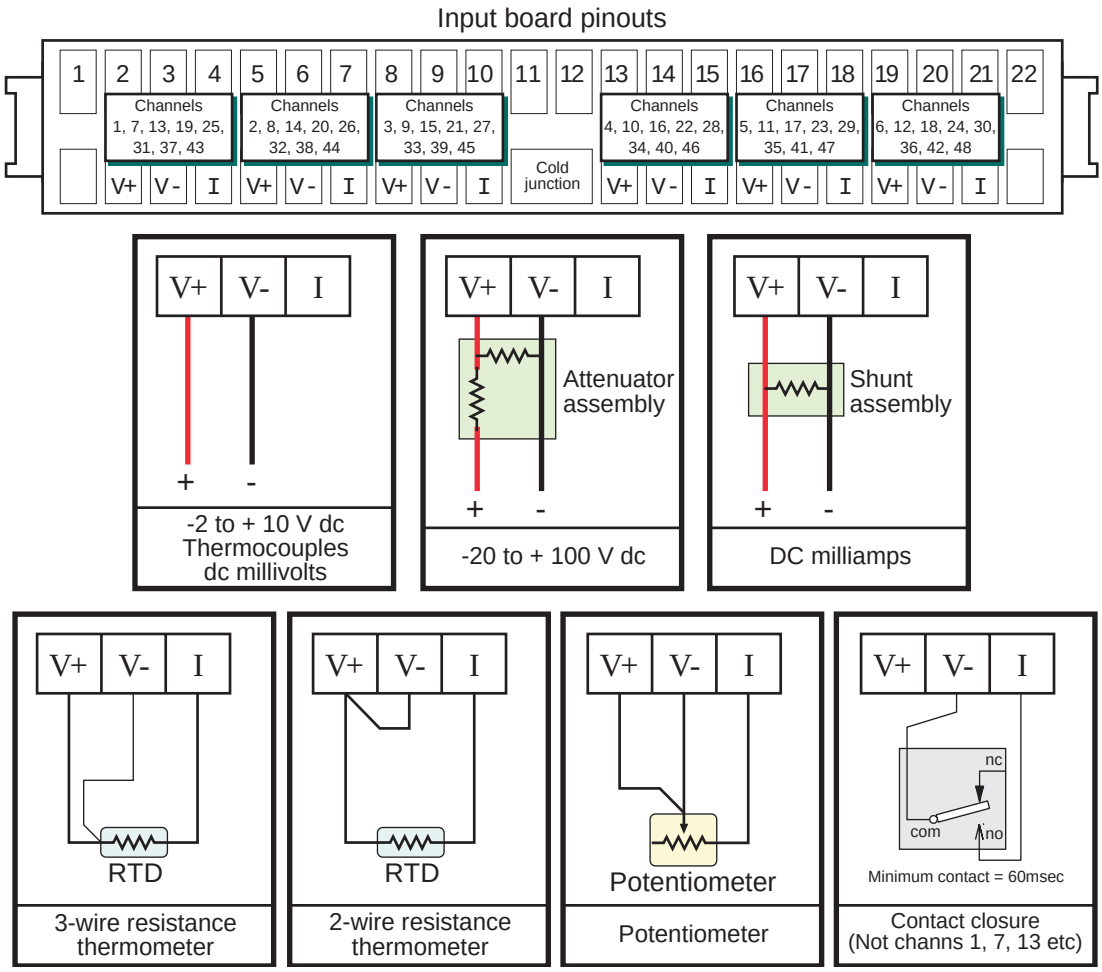


Figure 2.2.1c Input board wiring

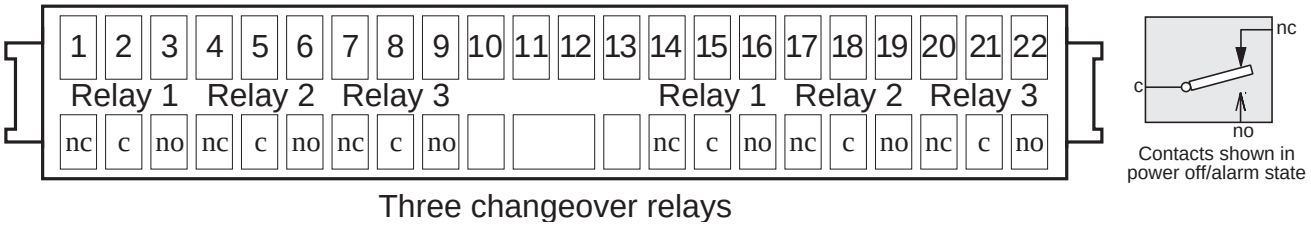


Figure 2.2.1d Relay board wiring

Note: Wiring details for options other than relays are to be found in the relevant option's description.

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2.2.2 Supply voltage wiring

WARNING

DC supply voltages must never be applied to recorders fitted with isolated transmitter power supplies.

Note: The minimum recommended wire size is 16/0.2 (0.5mm^2).

LINE SUPPLY

The supply voltage to the recorder is terminated using an IEC socket which is connected to the mating plug at the rear of the recorder. The recorder is suitable for use with all ac voltages between 85 and 265 V RMS (47 to 63 Hz), and requires 60 VA max. power. For recorders without transmitter power supplies, supply voltages between 110V dc and 370V dc are also suitable.

LOW VOLTAGE SUPPLY OPTION

Not suitable for recorders fitted with the isolated transmitter power supply option.

The low voltage supply option is terminated at a three-pin connector (plug mounted on recorder - socket on supply cable) as shown in figure 2.2.2. The option allows the use of ac or dc supplies with the following characteristics:

AC: 20 to 42V RMS (45 to 400 Hz)

DC: 20 to 54V (See warning above)

Power: 60VA max.

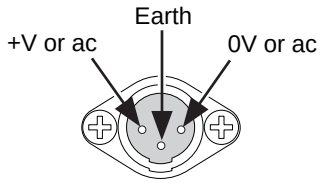


Figure 2.2.2 Low voltage supply pinout

2.3 DISK/PC CARD INSERTION AND REMOVAL

The disk/PC card slot is located below the recorder screen, and is protected by a flap. For 100 mm units, the bottom of the central part of the flap is lifted and then used as a handle to pull the main flap open. For 180mm units, the pull handle is used to gain access to the disk or pc card. Figures 2.3, below, gives details (not drawn to the same scale). If a disk/pc card is already fitted, it is removed by pressing on the eject button.

Note: Before disk/pc card removal, archiving should be suspended (section 4.1) (wait for the green section of the disk icon (section 3.1.4) to stop flashing), otherwise data might be lost.

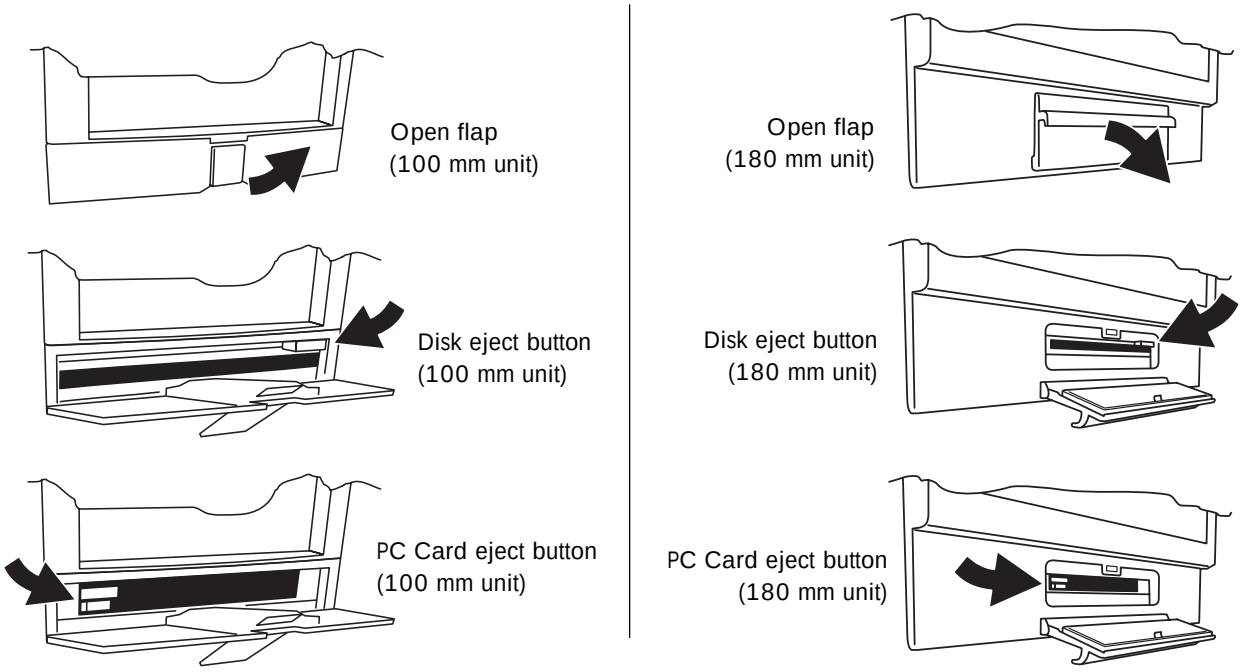


Figure 2.3 Floppy disk/PC Card access

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3 PROCESS VARIABLE DISPLAY

The operator interface consists of a touch-sensitive screen, showing either process variable values in one of a number of formats, or, showing configuration or operational details for use in setting up the recorder. This section (3) describes the process variable displays. Section 4 describes the Configuration displays.

Figure 3, below, depicts a typical trend display and gives details of the various areas of the display page.

Note: Dialogue boxes, message boxes etc. cause Process Variable displays to 'freeze' for as long as the box is on display. Root and Option menus (amongst others) time-out (i.e. are removed from the display) after approximately one minute. Messages, however, are displayed until the operator takes action to remove them. It should be noted, especially, that several message boxes may be active at one time, but only the oldest one is visible, until it is removed to reveal the 'next oldest' message, and so on.

TRUNCATION OF NUMERIC VALUES

If the amount of space on the display page is insufficient to display the full width of the process variable or scale value, then the displayed value is rounded down and the number of decimal places reduced. If the width is still too restricted, the value is displayed in 'scientific' format, or if this is still too wide, the final visible character of the integer part of the value is replaced by a '?' (as depicted in figure 3.4.3b)

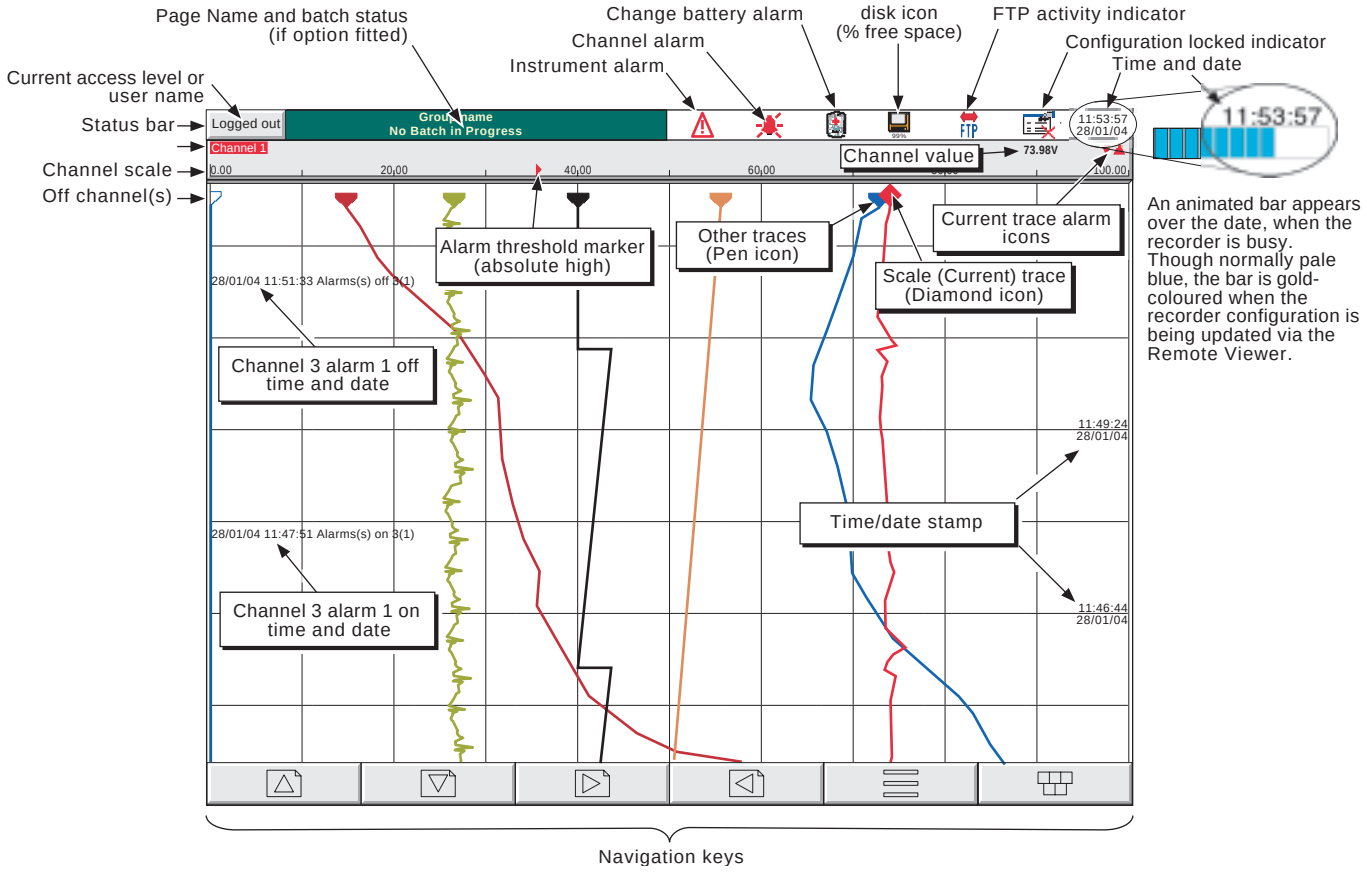


Figure 3 Trend display definitions

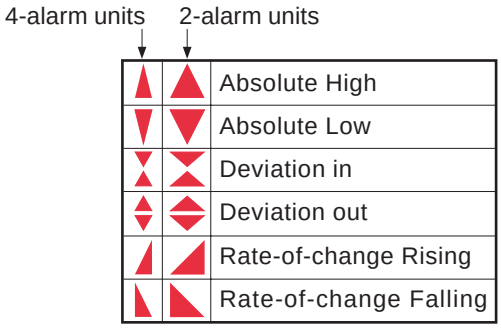
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3 PROCESS VARIABLE DISPLAY (Cont.)

CURRENT TRACE ALARM ICONS

In each of the different types of PV display, each channel's faceplate gives the status of the channel's alarms. The status of each alarm is shown by one of the icons depicted in table 3, either flashing (if it is active and unacknowledged) or on continuously (if it is active and acknowledged). (See section 3.1.3, below, for a description of how to acknowledge alarms.) Absolute alarm threshold icons and deviation alarm bars appear in any display which includes a scale (except circular charts). For deviation alarms the bar stretches from (Reference - Deviation) to (Reference + Deviation).

Notes:
1. For software versions 2.3 onwards, 32MB versions of the recorder come with four alarms per point, instead of two per point as supplied with previous software versions. The System/About display can be used establish what size of DRAM is fitted - see section 4.6.5.
2. 'Trigger' alarms do not display threshold marks or bars, or faceplate symbols.



Faceplate symbols

	Absolute low	Absolute high	Deviation In / Out	Rate of change
Horizontal scales	◀	▶	d R d	No indication
Vertical scales	▼	▲	R d	No indication
For Deviation alarms, R = Reference; d = deviation				

Scale symbols

Table 3 Alarm icons

3.1 STATUS BAR

This appears across the top of the display, and contains the items described below.

3.1.1 Current access level

There are four access levels available (Logged out, Operator, Engineer and Service), and the current level is displayed in this key at the top left hand corner of the display. Touching this key calls the login page as described in section 3.3.1 (Access to configuration) below. If a user has been added (using the 'Add User' part of the Security setup - section 4.4.3, below), then the 'Full User Name' is displayed instead of the access level.

3.1.2 Page name

Initially this shows the current group's descriptor. The name changes according to context for example 'Operator' or 'Config-Archive' If the Batch option is fitted, this area contains batch information as well as the page name. Touching the area calls the Batch Status page. See section 1 of the Options Manual for further Batch details.

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3.1.3 Alarm indication

This area of the display can contain up to four icons: Instrument alarm, Channel alarm, Battery change, Disk status. Pressing this area of the screen calls a pop-up display (figure 3.1.3a) allowing the user to view instrument alarms, to acknowledge all channel alarms, or to display the Alarm Summary page. Entry to Message Log pages (section 3.2.1) is also possible from this pop-up. For channel alarm symbols refer to 'Current Trace Alarm Icons', above.

ALARM SUMMARY PAGE

As shown in figure 3.1.3a, below, the alarm summary page contains the following information for the current group:

1. Alarm identifier. This appears as a point ID, followed by the relevant alarm number in parentheses. For example, Alarm 1 on maths channel 6 would appear as: D6 (1). Maths channels are prefixed by 'D'. Totalisers are prefixed by 'T' and Counters are prefixed by 'C'. Input channels are not prefixed.
2. Alarm threshold for absolute alarms only
3. The current process value for the point
4. An alarm symbol (see Table 3). Alarm symbols flash until acknowledged.

Notes:

1. Alarms are always listed in Point/Alarm order with input channels first, followed by derived channels, totalisers and counters, if these options are fitted.
2. When the alarm source returns to its non-alarm state: Unlatched alarms are removed from the list whether or not they have been acknowledged; latched alarms remain displayed until acknowledged. See section 4.3.3 for a description of alarm types and actions.
3. There are no time or history components associated with the Alarm Summary. If Alarm messages have been enabled in the relevant group's configuration (section 4.3.2), then alarm initiation/acknowledgement times and dates can be found from the trend and trend history displays, described in section 3.4 or in Message log described in section 3.2.1.
4. If an alarm is active on a channel which is not included in any group, then although the channel alarm symbol will flash, the alarm will not appear in any of the alarm summary pages.

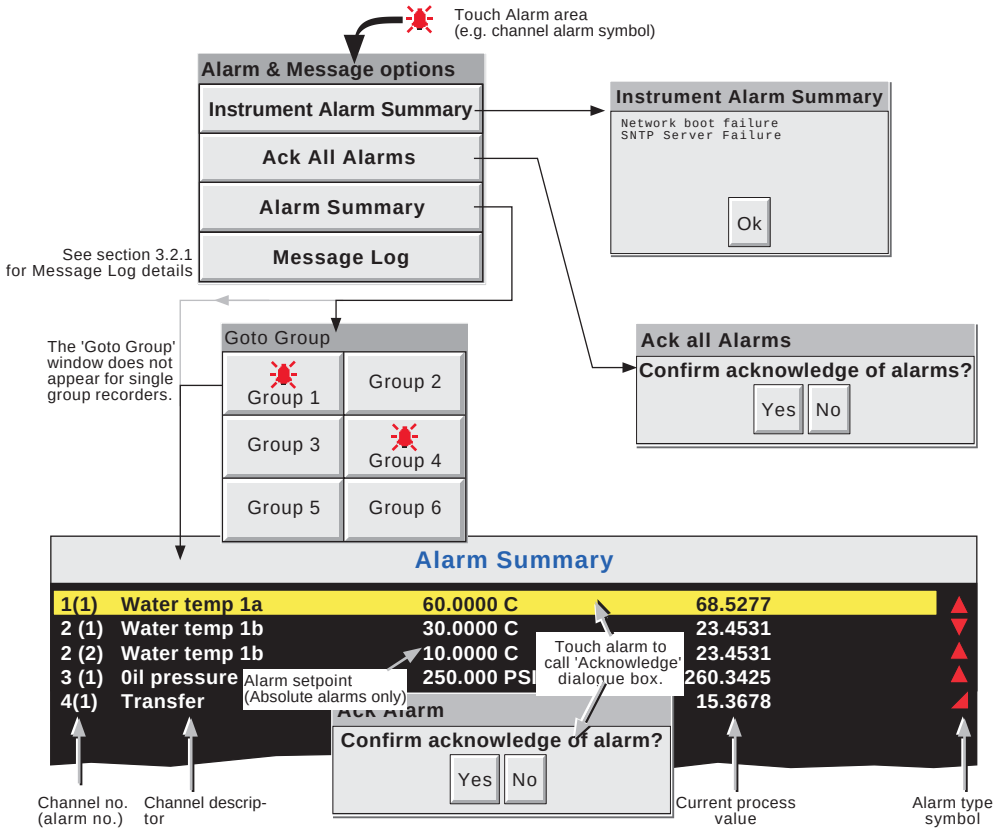


Figure 3.1.3a Alarm and message options display

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3.1.3 ALARM INDICATORS (Cont.)

ALARM ACKNOWLEDGEMENT

Alarms can be acknowledged individually, on a group basis, or globally (all alarms).

INDIVIDUAL ALARMS

Individual alarms are acknowledged from the alarm summary page by touching the relevant item (highlights yellow), then touching 'Yes' in the resulting pop-up confirmation box. Figure 3.1.3a, above, attempts to show this process.

GROUP ALARMS

For recorders with multiple groups, alarms can be acknowledged on a group basis by calling the alarm summary page for the relevant group, then pressing the Options key (section 3.2), the 'Ack Group Alarms' key and finally, 'Yes' in the resulting pop-up confirmation box. Figure 3.1.3b, below, attempts to show this process.

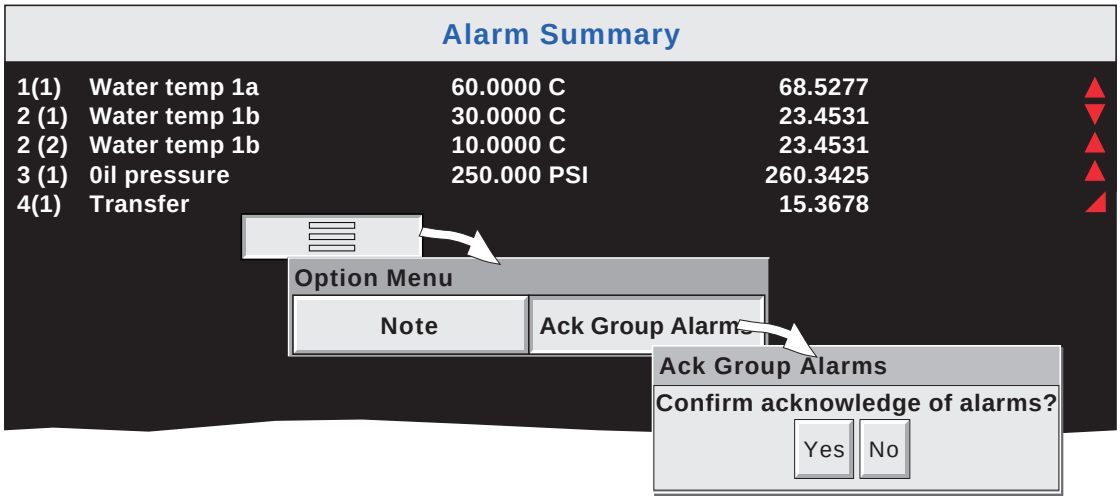


Figure 3.1.3b Group Alarm acknowledgement

ALL ALARMS

To acknowledge all active alarms, touch (e.g.) the channel alarm icon at the top of the screen. From the resulting pop-up menu, select 'Ack all Alarms', then finally, touch 'Yes' in the resulting pop-up confirmation box. Figure 3.1.3a shows the process.

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3.1.3 ALARM INDICATORS (Cont.)

INSTRUMENT ALARM 

This indicator appears, flashing, if any of the following errors are active. The instrument alarm summary page, described above, allows the user to view such alarms.

Archive failed -(message)	Message explains archive failure - due to disk being missing, write protected etc.
Battery-backed RAM cleared	This message appears if the battery has failed, and the unit has been switched off.
Clock failure	Internal clock was corrupt at power up, or the time has never been set. Can be caused by battery failure, in which case the battery icon will also be visible. The error is cleared by setting the time and date. Server time forced to 00:00 1/1/1900.
Channel error	Indicates a hardware failure in the channel circuit or in the internal CJ temperature measurement
Channel failure	Indicates a hardware failure in the input channel circuit
Floppy disk worn	Appears if a number of attempts had to be made before write to the disk was successful. No data is lost, but the disk should be replaced as soon as is practicable.
Floppy disk corrupt	This appears if all attempts to write to the disk fail. In such a case, some data may be lost. If the damaged area of the disk is in the system part of the disk, it might appear to the recorder that it is unformatted, and the disk icon will disappear. The disk should be replaced immediately.
FTP Primary Server Failure	This error is set if the recorder fails, after two attempts, to establish communications with the primary server as defined in Archive Configuration (section 4.3.5). After the second attempt has failed, the Secondary server is tried.
FTP Secondary Server Failure	This error is set if the recorder fails, after two attempts, to establish communications with the secondary server as defined in Archive Configuration (section 4.3.5). See also 'FTP Primary Server Failure, above.
Insufficient non-volatile memory...	There is insufficient memory available for the configuration. Can be caused by use of Rolling Average maths functions
Internal flash: \user\ required repair	Error found (in the internal file system) at power-up, and corrected.
Internal flash: \user\ is full	Appears if the User partition is full. To clear, either user screens must be simplified or files must be deleted from \User\, or both.
Internal flash: \system\ required repair	Error found (in the internal file system) at power-up, and corrected.
Internal flash: \history\ required repair	Error found (in the internal file system) at power-up, and corrected.
Maths Channel failure	Appears if, for example, the divisor of a divide function is zero.
Network boot failure	The recorder is unable to establish connection with the bootP server. This might be caused by, for example, cable failure, network hardware failure, etc.
Paper Low/Paper Out	Warning messages from the ASCII printer (if fitted).
Printer not responding	There is a fault in the serial comms link with the ASCII printer (if fitted).
Recording failure - (message)	Message explains recording failure - due to file error, internal overflow etc.
Removable media failure	This error is set if the disk or PC card is corrupt, wrongly formatted etc. Becomes active only when an Archive is attempted.
Removable media full	Floppy disk or PC card full. Becomes active only when an Archive is in progress.
SNTP server failure	This error is set if:- a) the year received from the server is < 2001 or > 2035 or b) the configured SNTP server cannot be accessed.
Time synchronisation failure	Set if 5 or more 'Time change events' are caused by the SNTP server within 24 hrs. A 'Time change event' occurs whenever the recorder time is found to be more than 2 seconds different from the server time. The alarm does not appear until 24 hours have elapsed since the first of the five or more Time Change events occurred.
Unrecognised PC Card	Appears if the PC card is corrupt or if a card of a type which is unsupported has been inserted.

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3.1.3 ALARM INDICATORS (Cont.)

CHANNEL ALARM 

This red 'bell' indicator appears if any channel is in alarm. The symbol is illuminated continuously if all alarms are acknowledged or flashes if any active alarm is unacknowledged. Refer to 'ALARM ACKNOWLEDGEMENT' above, for details of how to acknowledge alarms.

CHANGE BATTERY 

This flashing indicator first appears when the battery voltage indicates that the battery is approaching the end of its useful life. The indicator continues to flash until the battery is replaced (B3.2 in Annex B). The indicator does not appear if the battery is not fitted.

3.1.4 Disk icon

This shows the free space available on the mass storage medium (disk or data card as fitted). The disk icon appears soon after a disk or data card is inserted. Only archiving activity is indicated; during archiving, the central area of the disk icon flashes green, regularly. No other disk activity is indicated.

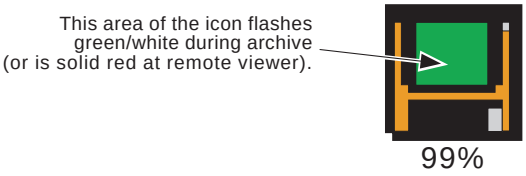


Figure 3.1.4 Archive activity indication

Note: When seen via Remote Viewer,, the green flashing area of the disk appears as a solid red area during archive activity.

3.1.5 FTP Icon 

The FTP icon appears to the right of the disc icon position whenever transfer activity is taking place.

3.1.6 Configuration Locked indicator 

This symbol appears only when the Remote Viewer software is being used, in the following situations:

1. Whilst units are 'synchronising' configuration changes
2. Whilst configuration is taking place. If the reconfiguration is taking place at the host pc, then the symbol appears at the target instrument, and *vice-versa*.

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3.2 NAVIGATION KEYS

Above the lower edge of the display screen are six keys (as shown below) which allow the user to perform various context-related tasks such as to change the display mode (section 3.4), to access the recorder configuration, to archive data, to select groups etc. In addition to this, left and right arrow keys or open/close folder keys appear when relevant.

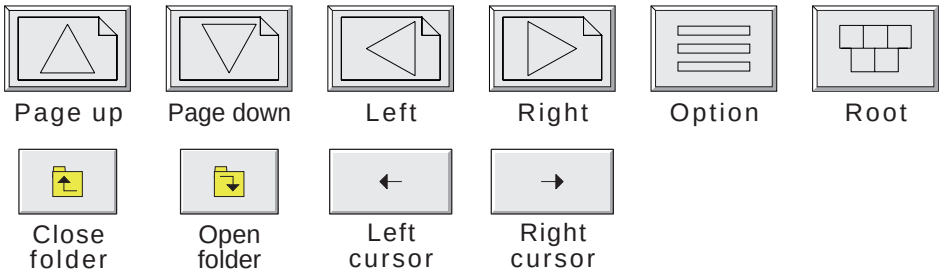


Figure 3.2 Navigation keys

3.2.1 Key functions

Page up	Used, as appropriate, to recall the previous (higher level) display page, to call the previous display mode and to scroll through previous text entries. Where relevant, the function of this key is mimicked by the 'Close folder' key.
Page down	Used, where appropriate, to call a further (lower level) display page, to call the next display mode and to scroll through previous text entries. Where relevant, the function of this key is mimicked by the 'Open folder' key.
Left arrow	Used a) if multiple groups are fitted, to select previous group, or b) to navigate backwards through a text string, when editing. Where relevant, the function of this key is mimicked by the 'Left cursor' key.
Right arrow	Used a) if multiple groups are fitted, to select next group, or b) to navigate forwards through a text string, when editing. Where relevant, the function of this key is mimicked by the Right Cursor' key.
Option	Calls a pop-up Options menu allowing the user to carry out functions such as entering/quitting history, turning channel cycling on and off etc. according to context.
Root	Calls the 'Root Menu' as shown. To quit the Root menu, touch the root key again.

ROOT MENU KEYS

Home	Causes a return to the 'Home' page from any page in the recorder. As delivered, the 'Home' page is the Group 1, vertical trend display as depicted in figure 3, but this can be edited (in Config/Views) to be any of the other available groups' display modes - Horizontal trend, Vertical bargraph, Horizontal bargraph, Numeric etc.
Operator	Causes the top level Operator page to appear. The appearance of this display is dictated by the security level that the recorder is set to, and by the access level of the user. As despatched from the factory, the recorder is in 'logged out' mode and the Operator page contains only two buttons, one labelled 'Archive'; the other 'Security'. Further details appear in 'Access to configuration' below.
File	Allows the file system in that area of Flash memory that is accessible to the user, and the file system on any floppy disk or data card fitted to be viewed. See section 5 for details.
Go to View	Allows the user to select the display mode for the current group, as shown in figure 3.2.1a. Display modes not enabled for this group in Config/Views configuration page (section 4.3.4) do not appear. As an alternative, display modes can be scrolled-through using the up and down arrow navigation keys. Goto View also offers an alternative means of entry to the Alarm Summary page described in section 3.1.3, and also allows entry to the current group's Message Log pages, described below.

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3.2.1 KEY FUNCTIONS (Cont.)

ROOT MENU KEYS (Cont.)

Goto Group — Allows a group to be selected for display. Groups which are not 'display enabled' in the Config/Views page (section 4.3.4) are greyed. An alarm icon appears (as shown for groups 1 and 4, in figure 3.2.1b, below) for any group containing one or more points in alarm. The icon flashes if any of the group's alarms have not been acknowledged. If multiple groups are not fitted, the Goto Group menu does not appear.

Note: For multiple groups only, the right arrow key can be used to scroll through groups in ascending group number order. The left arrow key can be used to scroll through groups in descending group number order.

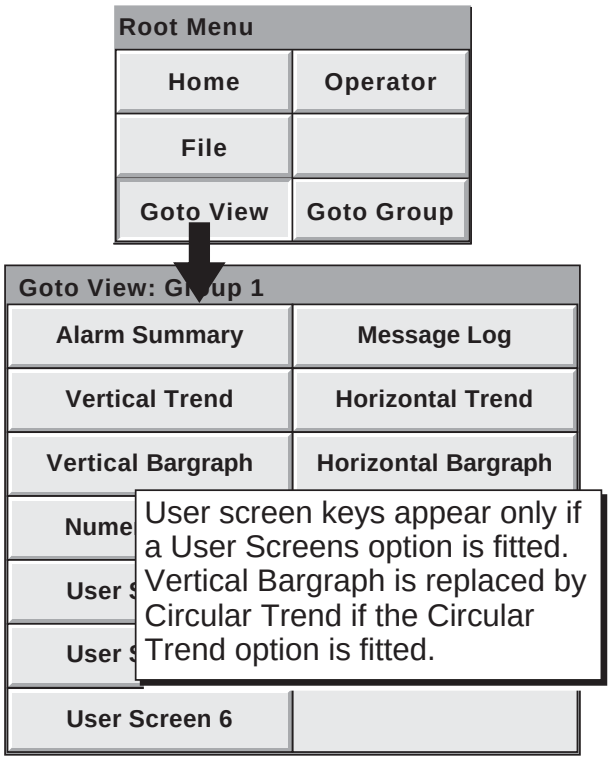


Figure 3.2.1a Root menu with Goto View sub menu

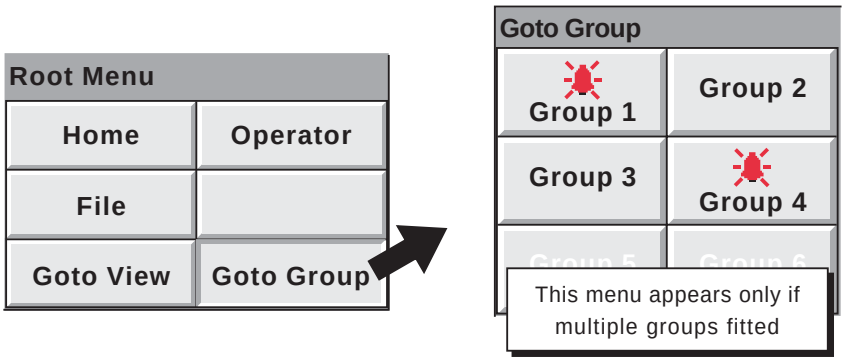


Figure 3.2.1b Root menu with Goto Group sub menu

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3.2.1 KEY FUNCTIONS (Cont.)

MESSAGE LOG

The Root menu/Goto View/Message log key calls the first Message Log page for the current group to the screen, as shown in figure 3.2.1c, below. Alternatively, Message Log can be selected from the Alarm & Message options menu, (section 3.1.3) and in this case, the user selects a 'Group' for the Message Log display from a pop-up (Goto Group) menu.

If there are more messages than can be displayed in the height of the screen, a scroll bar appears to allow 'hidden' messages to be displayed.

Messages are retrieved from the history files in batches of 100 messages. If there are more than 100 messages, 'Earlier messages..' appears after the hundredth message. Touching 'Earlier messages..' calls the option menu, and touching 'Earlier messages..' in this menu, calls the next batch of 100, and so on. If applicable, operating 'Later messages..' / 'Later messages..' calls the previously displayed 100 messages.

As can be seen from the figure, the list of messages can be 'filtered' both by type and by time. For example, setting the message type to 'Alarm' and the period filter to 'Last Day' excludes all messages except alarm messages which have occurred within the previous 24 hours.

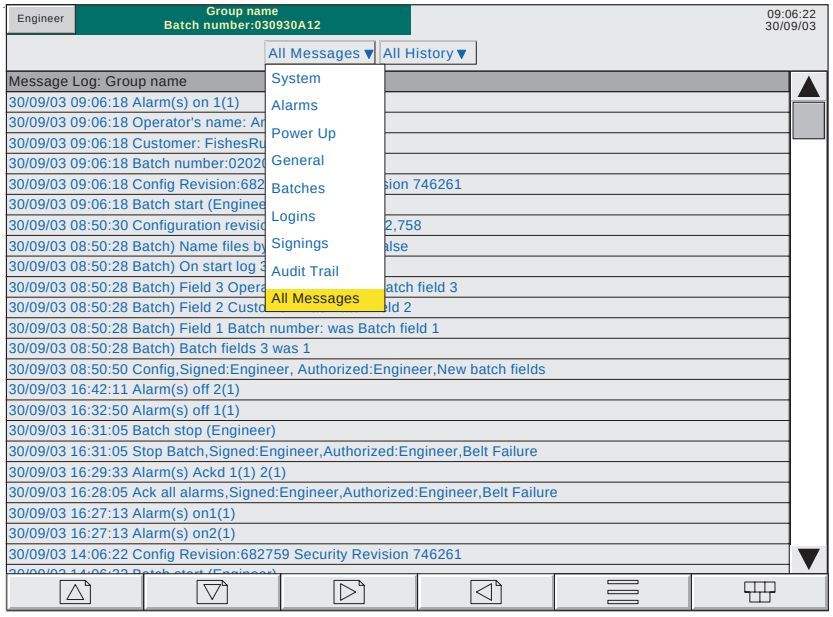


Figure 3.2.1c Message log page showing message-type picklist

MESSAGE TYPE FILTER

All Messages	All messages are displayed
System	Only System messages and instrument alarms are listed
Alarms	Only alarm on/off and acknowledgement messages appear.
Power Up	Displays power up messages only. If the Auditor Pack option is enabled, then Config Revision and Security revision are included. See sections 4.4 and 4.6.5 for more details.
General	Displays messages sent via Modbus, operator notes/custom messages etc. if they do not have to be 'signed' (Auditor Pack option only - see section 4.4 for more details). If the notes etc. are signed, they appear in the 'Signings' message type list. If the e-mail option is fitted, a message is generated each time an e-mail is sent (see section 11 of the Options manual for details of the e-mail option).
Batches	Displays only batch messages (including Config and Security Revisions if the Auditor Pack option is fitted).
Logins	Lists only changes in login.
Signings	This list contains only notes, messages etc. that have been signed/authorized. This category is used only when the Auditor Pack option is fitted - see section 4.4 for more details.
Audit trail	This list contains Configuration change messages only. This category is used only when the Auditor Pack option is fitted - see section 4.4 for more details.

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3.2.1 KEY FUNCTIONS (Cont.)

PERIOD FILTER

This picklist allows the user to select one of the following to define the period of time that the message list is to encompass:

All History, Last Month (28 days), Last Week, Last 3 Days, Last Day or Last Hour,

OPTION MENU

Touching a message (highlights yellow) calls the Option Menu* as shown in figure 3.2.1d, below.

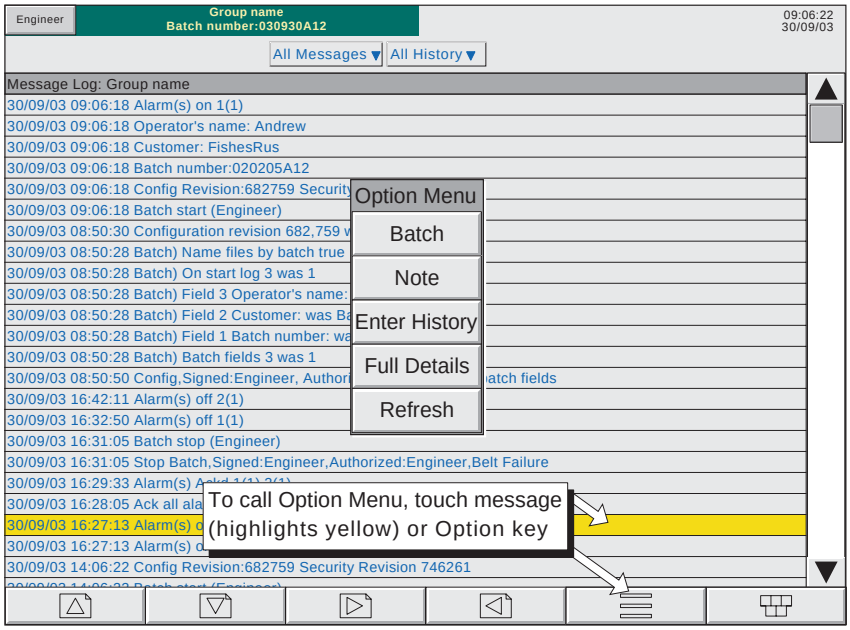


Figure 3.2.1d Message Log options menu

Batch	See section 1 of the Options Manual.
Note	See section 3.5 of this manual
Enter history	Operating the Enter History key causes the recorder to display that page of history which includes the highlighted message. See section 3.4.1 for details of trend history. When in Trend history mode, operating the Message Log key calls that message log page which contains those messages which are nearest the trend history cursor time.
Full details	If the highlighted message is wider than the display, the whole message can be displayed by operating the 'Full Details' key.
Refresh/Earlier messages../Later messages..	'Refresh' places (at the top of the screen), any messages, which have occurred since the Message Log page was last entered, or since the last 'Refresh'. If earlier or later messages have been selected, then 'Refresh' is replaced by 'Earlier messages..' or 'Later messages..' as appropriate, and operating the key calls the next or previously displayed group of 100 messages to the display respectively.

* The option menu can also be called by touching the option key. In this case:

a. Enter History calls the current Trend History display, as described in section 3.4.1, and

b. Because no message is highlighted, the 'Full Details' key is not enabled,

Notes:

1 Selecting 'Enter History' whilst either 'Earlier Messages' or 'Later Messages' is highlighted calls the current History page.

2 If the Option Menu has 'timed out' leaving a message highlighted, and the option key is operated, then this is equivalent to reselecting the message.

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3.3 FIRST SWITCH-ON

When power is applied the recorder initialises, and once this process is complete, the home page is displayed. It is unlikely that this will contain any useful information because the input channels will not, as yet, have been configured to suit the type of input signals being applied to them, as described in section 4.

Notes:
1 There is no on/off switch associated with the recorder.
2 Date, time and the message 'Power Up' are printed on the chart each time power is applied to the recorder, followed (if the Auditor Pack option is fitted) by a similar message giving 'Config Revision' and 'Security Revision'.
3 A red line is drawn across the width of the chart at power up

The recorder has four security levels as follows:

Logged out	Initially, no access to recorder configuration is possible. Only Archive, Login/security and the System 'About' functions can be accessed - via the root menu. Limited or full access can be permitted from 'Engineer' level.
Operator*	No access to recorder configuration is possible until access permissions have been set up. Section 4.4.1 describes how limited or full access can be permitted by an operator with 'Engineer' level access.
Engineer*	Accessed initially, by entering '10' as the password (section 3.3.1, below). Full access to all recorder functions is available. Section 4.4.1 describes how the Engineer level password can be edited and an Operator password can be entered if required. The section also describes how access permission to some or all of the recorder functions can be granted, or not, to individual user names and default security levels (except 'Service').
Service	Full access to all recorder functions and to areas of recorder memory for diagnostic purposes. For use only by Service Engineers.

*Note: For units fitted with software versions 3.1 onwards, AND which have the Auditor Pack Option enabled, the default Engineer and Operator passwords are both '100'.

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3.3.1 Access to Configuration

1 As shown in figure 3.3.1a, once the recorder has initialised, touch the current access level key
2 Touch the 'Logged out' field and then touch 'Engineer' from the resulting picklist.
3 Touch the blank Password area to call the keyboard display (see figure 3.3.1b).
4 Touch <Numeric><1><0><OK> (note 1) to enter the password '10'. The screen reverts to the 'Home' page.
5 Operation of the Root key followed by a touch on the Operator key calls the top level page allowing access to the Archive, Save/Restore, Config, Security, Network and System areas described in section 4 below.

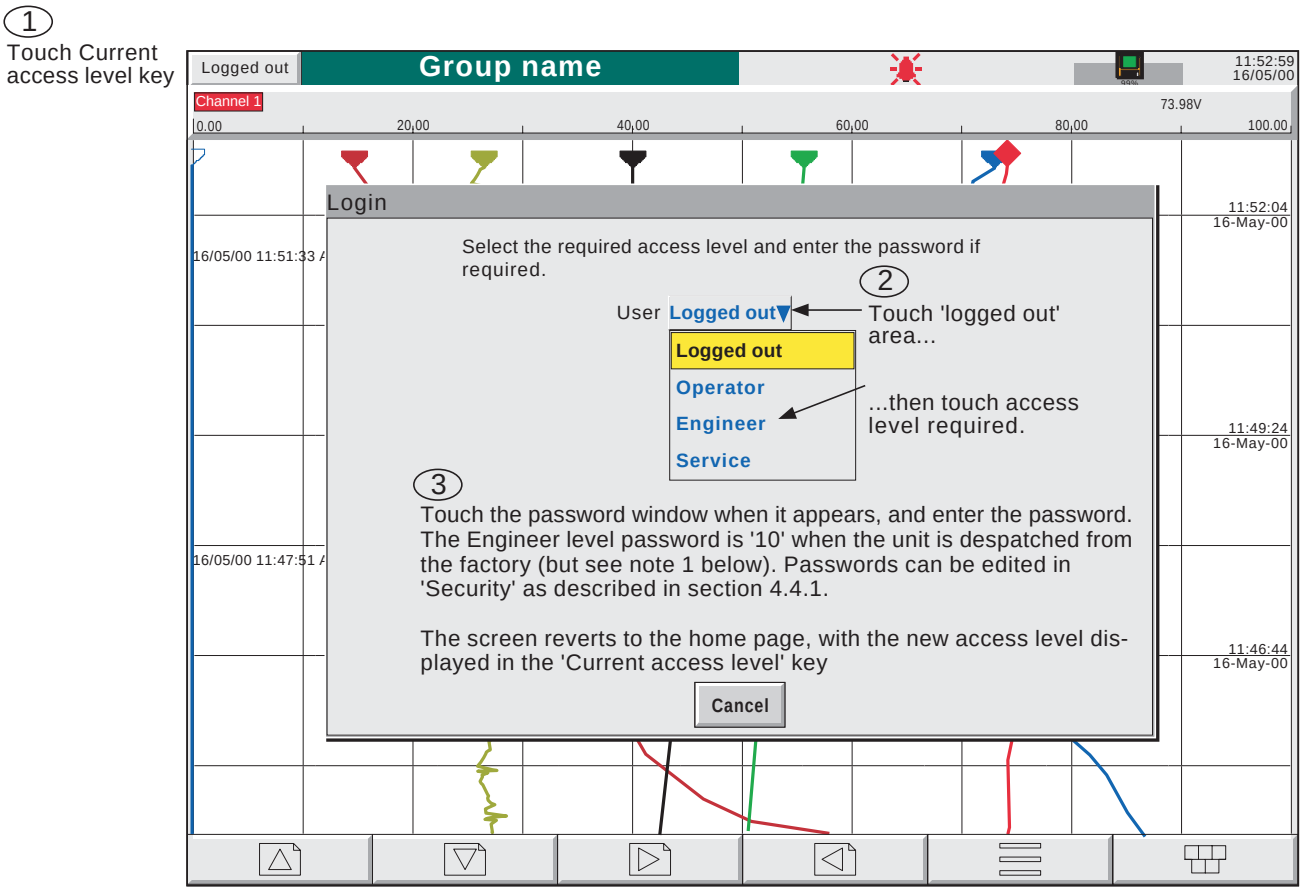


Figure 3.3.1a Access to configuration

Notes:
1. For units fitted with software versions 3.1 onwards, AND which have the Auditor Pack Option enabled, the default Engineer and Operator passwords are both '100'.
2. Figure 3.3.1a shows 'Login by user list' which is the default method. If the Audit pack and/or Security management option is fitted, an alternative 'Login by user ID' procedure is possible. See section 4.4.2 (Management) for details.

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3.3.1 ACCESS TO CONFIGURATION (Cont.)

TEXT STRING ENTRY

The keyboard which appears when the password area is touched is the same as that which appears when any non-numeric text string entry is required (e.g. channel descriptor). Figures 3.3.1b and 3.3.1c below are an attempt, within the limitations of the illustrating process, to depict the available keyboards and thus the available character set. Actual entry of the text string is by touching the relevant key. For items which require only a numeric entry (e.g. channel range) the numeric keyboard appears.

When editing existing text strings, the existing text string appears highlighted, and will be replaced in its entirety by the first character entered. To avoid this, the left arrow key* can be touched to 'unhighlight' it. The down and up arrow keys can be used to scroll through previously entered text strings.

Immediately below the keyboard are six keys with the functions listed below. When active, the background colour changes to yellow for as long as the key is active.

Shift*	Once the shift key has been pressed, the next-entered letter appears as a capital; subsequent letters are in lower case.
Caps*	When pressed, all subsequent letters appear as capital letters until the Caps key is operated again
BSpc	This backspace key deletes character to the left of the cursor.
Ovr	If selected, the next-entered character replaces (overwrites) the existing character to the right of the cursor position. If not selected, the next-entered character in inserted into the existing text string at the cursor position.
Ok	Used to save the new text string and to return to the page from which the keyboard was called.
Cancel	Causes a return to the page from which the keyboard was called without saving the new string.

*Notes
1. The character on each display key is always a capital letter, whether or not the actual character being entered is in capitals or lower case.
2. The cursor keys mimic the function of the left and right arrow keys.

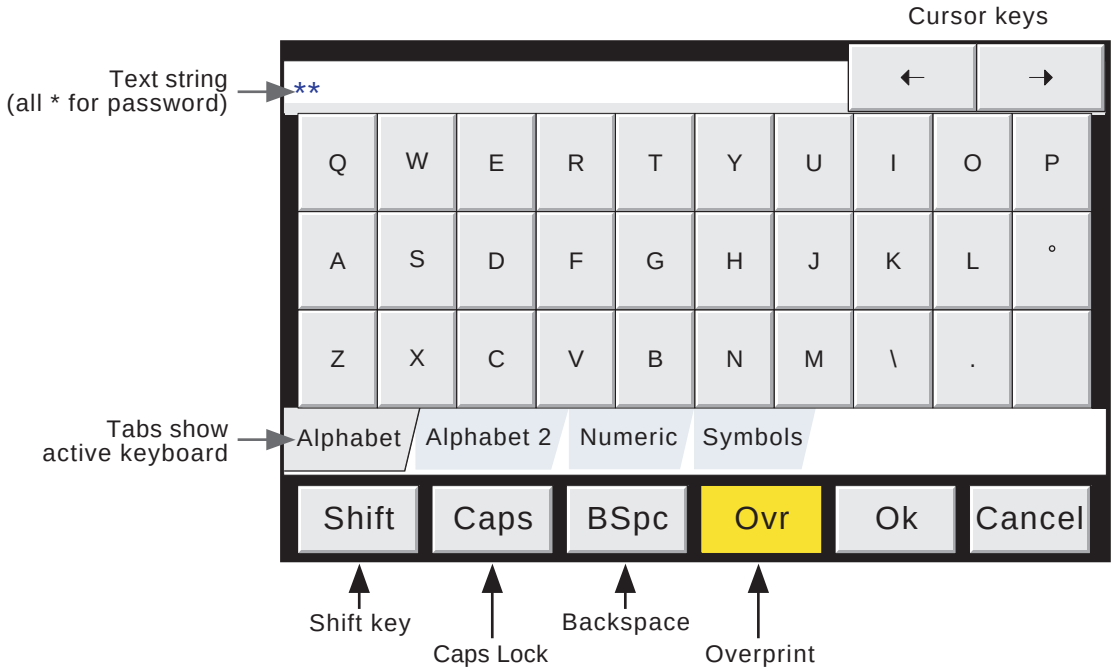
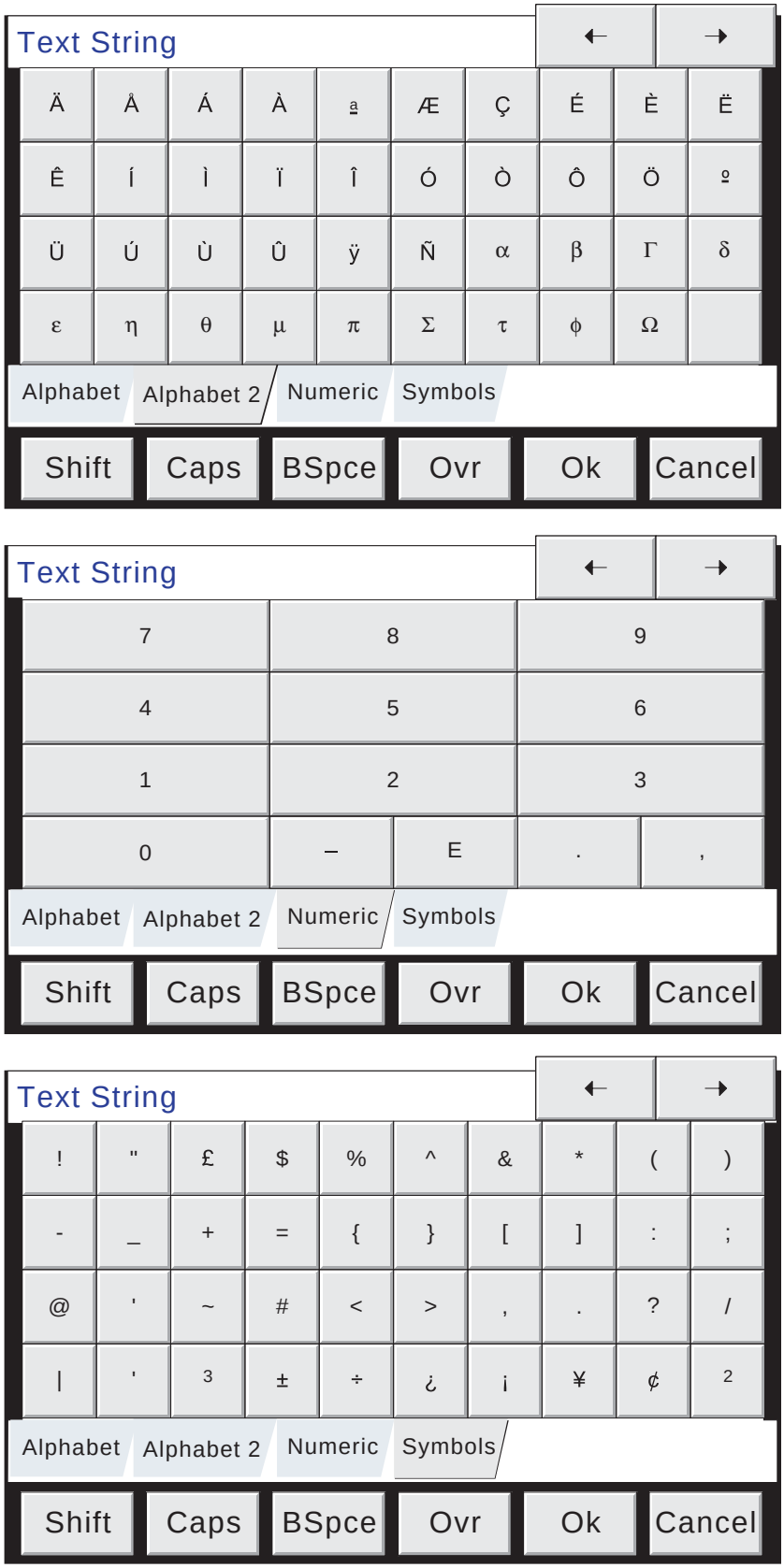


Figure 3.3.1b Alphabet 1 keyboard

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3.3.1 ACCESS TO CONFIGURATION (Cont.)

TEXT STRING ENTRY (Cont.)



The 'E' key is used to enter exponents

Figure 3.3.1c Alternative keyboards

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3.4 DISPLAY MODES

The display modes described below allow the currently displayed group's process values (channels, totalisers etc.- known collectively as points) to be displayed as vertical or horizontal 'chart' traces, as vertical or horizontal bargraphs or as a numeric value. If the Circular Trend option is fitted (180 mm recorders only), the points can alternatively be displayed as traces on a circular 'chart'. If fitted, Circular Trend display mode replaces Vertical Bargraph display mode. The various display modes are cycled-through using the up/down arrow keys, or a specific mode (or view) can be selected from the Root Menu 'Goto View' key. If Multiple Groups are fitted, then groups can be scrolled using the left/right arrow keys. The Home key returns the user to the Home page (defined in Configuration/Views - section 4.3.4) from anywhere in the Operator or Configuration pages in the recorder. When dispatched, the Home page is Group 1, vertical trend display. See also the User Screens description in section 2 of the Options Manual.

3.4.1 Vertical Trend display

This (default) display (figure 3.4.1b) shows each point in the display group as though it were being traced on a white chart. (It is possible to display on a black 'chart' instead, by selecting Dark Trend Background in Configuration - Views). In either case, some thought should be given to trace colours selected in channel configuration. When selected, dark background applies both to vertical and horizontal trend display modes for all Groups.

One of the channels is said to be the 'current' or 'scale' channel. This channel is identified by its diamond shaped pen icon and by its descriptor, digital value and scale being displayed on a 'faceplate' across the full width of the screen, above the chart. Faceplates for all the group channels can be displayed, by using the Faceplates On/Off key in the option menu. If selected On, faceplates (showing colour, descriptor, digital value and units) for all the group's channels appear either above the current channel's faceplate or, if there are too many to fit across the screen, at the right hand edge of the screen. When necessary, a slider bar appears to allow further (hidden) faceplates to be viewed.

Each channel in the display group becomes the 'current' channel, in turn, for approximately 10 seconds – i.e. the channels are cycled-through, starting with the lowest numbered channel. Once the final channel in the group has been displayed for 10 seconds, the lowest numbered channel is returned to and the sequence repeats. This scrolling process can be stopped using the Channel Cycling key in the Option menu.

To select a particular channel to be the current channel, the relevant pen icon can be touched. To cycle through the channels manually, the faceplate area is touched repeatedly until the required channel is reached.

If a channel is included in the display group but its status is 'not good' for some reason, then its pen icon is hollow.

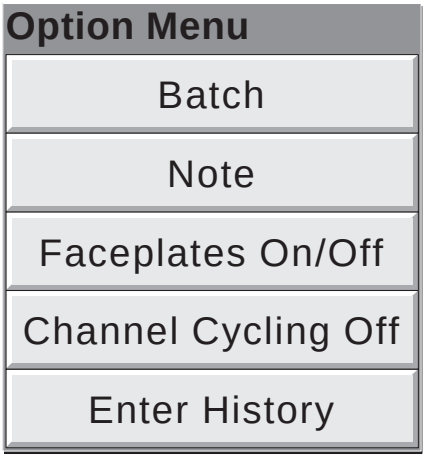


Figure 3.4.1a Option Menu (Typical)

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VERTICAL TREND DISPLAY (Cont.)

TIME CHANGE RECORDS

For vertical trend mode only, a line is drawn across the width of the chart whenever a time discontinuity in the record occurs. These lines are volatile in real-time i.e. they disappear if the display mode is changed, or if a configuration page is called etc.

Red line	A red line is drawn on the trend history chart at power up.
Blue line	A blue line indicates that recording has been disable/enabled in Group Configuration (section 4.3.2), or by a recording job (section 4.7.10).
Green line	A green line appears if there has been a time change as a result of a clock job (section 4.7.6), an SNTP synchronisation or by the operator physically changing the recorder time.

Note: Changes from standard time to daylight saving time and back again are not 'green lined' in this way

TREND HISTORY

Trend history, allows the user to view the history of the display group. The maximum amount that can be reviewed depends on a number of factors, including how many points are configured, how rapidly the traces are changing and so on. At a recording rate of 20 mm/hour (see group configuration - section 4.3.2), with all channels configured, a minimum of 30 day's worth of traces is available for viewing, provided that the group contents are not re-configured during this period (in which case, the history starts at the end of the re-configuration). The amount of trace visible on the screen depends on the recording rate, the higher the rate, the less trace is visible at any one time.

Notes:

1. Trend history mode is not available for groups with 'Recording Enable' disabled (Group configuration - section 4.3.2).
2. Channel cycling is inhibited in trend history mode. To increment the current channel, touch the faceplate.
3. Group faceplates are not displayed in trend history mode.
4. Operation of the Root/Goto View/Message Log key (section 3.2.1), when in history mode, displays a message log page containing messages which occurred at or near the selected cursor time.
5. With A/B switching selected, traces are displayed with the 'A' or 'B' span/zone, colour settings etc. obtaining at the cursor time. See sections 4.3.2, 4.3.3 and 4.7, for more details of A/B switching.

To enter trend history mode, the option key can be used (as shown in figure 3.4.1b), or the trace area of the screen can be continuously touched until the screen blanks prior to re-drawing. A 'Preparing History, please wait' message appears whilst the re-drawing calculation is taking place. Although tracing stops whilst trace history mode is active, no data is lost. Process Variable values are saved in the recorder memory. Alarms are still scanned-for and any associated action taken.

The trend history display is similar to the real-time trend display, with the addition of a slider control and up and down keys for selecting that part of trend history which is to be displayed. The controls are used as follows:

1 Touching the up/down key causes the trace history to move an incremental amount.
2 Holding the up/down key continuously, causes continuous movement.
3 Touching the bar above or below the slider causes a page-height shift. The Page up and Page down keys can also be used to provide this function
4 Touching and dragging the slider, whilst observing the time/date display, allows the user to select the section of history exactly.

On first entry to trend history mode, the channel value and the time and date shown in the faceplate are those at the top edge of the chart. Touching the screen causes a cursor to appear at point of screen contact. This cursor can be touched and dragged up and down the screen to provide a reference point on the current trace. The displayed value date and time refer to the cursor intersection with the current channel. To return to real-time trending, the Option key is operated, followed by 'Exit History'.

When back in real-time trending, the Horizontal Trend display can be called using the down arrow key. Alternatively, any one of the enabled display modes (section 4.3.4) can be selected using the Root Menu, 'Goto View' key.

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VERTICAL TREND DISPLAY (Cont.)

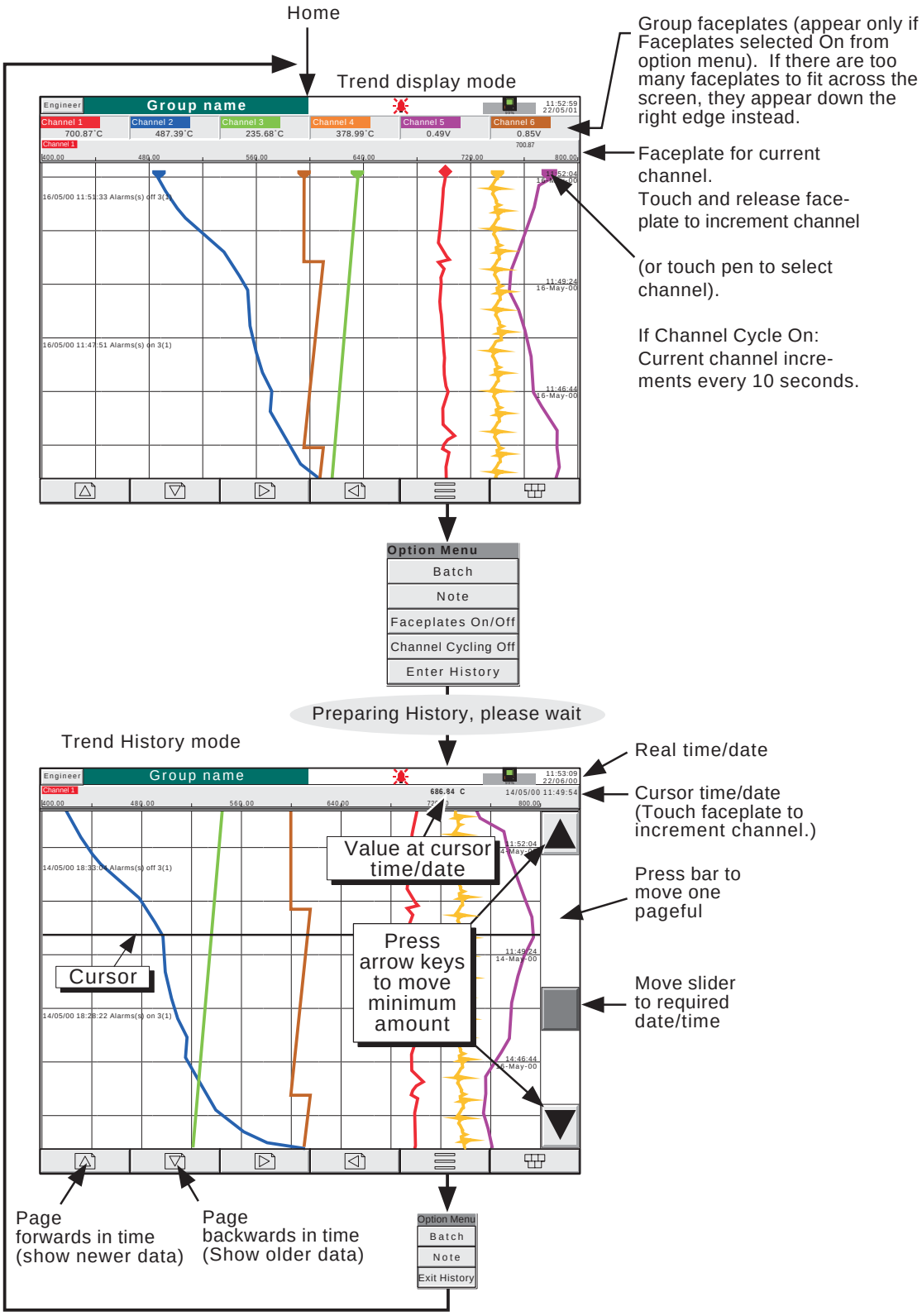


Figure 3.4.1b Trend display mode and trend history mode

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3.4 DISPLAY MODES (Cont.)

3.4.2 Horizontal Trend display

Entered from the Vertical Trend display by means of the down arrow key, or selected via the Root Menu 'Goto View' key, this display mode (figure 3.4.2a) is similar to the Vertical Trend display described in section 3.4.1 above, except that the traces are produced horizontally rather than vertically.

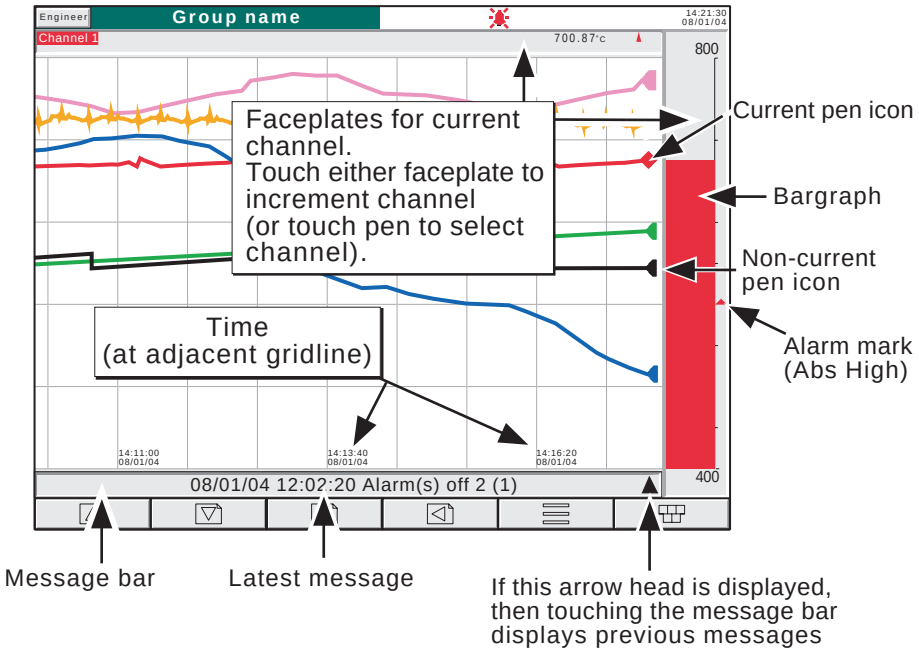


Figure 3.4.2a Horizontal Trend Display

One of the channels is defined as being the 'current' or 'scale' channel and this is identified on the chart by its pen icon being diamond shaped rather than triangular as for non-current channels. If a channel is included in the display group, but its status is 'not good' for some reason, then its pen icon is hollow. Each channel in the display group becomes the 'current' channel, in turn, for approximately 10 seconds – i.e. the channels are cycled-through, starting with the lowest numbered channel. Once the final channel in the group has been displayed for 10 seconds, the lowest numbered channel is returned to and the sequence repeats. This scrolling process can be stopped using the Channel Cycling key in the Option menu.

There are two faceplates associated with this display mode, one above the 'chart', showing the current channel's descriptor and its digital value; the other - to the right of the 'chart' - showing a bargraph representation of the current channel's value, together with a scale showing the low and high range values for the channel. Touching either of these faceplates* causes the current channel number to increment. To select a particular channel to be the current channel, the relevant pen icon can be touched. In either case, the bargraph and the background colour of the channel descriptor take the colour of the new current channel.

There is no horizontal trend history function. Touching the trace for a few seconds, or using the Option key then 'Enter History' calls the Vertical trend history page described in section 3.4.1, above.

Time and date are printed on the 'chart' immediately to the right of grid lines, and it is to these grid lines that the printed time and date relate.

*Note For zoned channels, the bargraph must be touched within the scale area.

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3.4.2 HORIZONTAL TREND MODE (Cont.)

Below the 'chart' is a message bar, containing the latest message. If there is more than one message, an arrow head icon appears near the right-hand end of the message bar. If this arrow head appears, then touching the message bar calls a pop-up box (figure 3.4.2b) which displays the latest messages. If there are more messages than can be displayed in the box, a slider control appears, which can be used to access previous messages, up to a total of 60 messages. Further messages, cause the oldest messages to be discarded to keep the total to 60.

Note: At power-up, only those messages which occurred within the 'time width' of the page are displayed

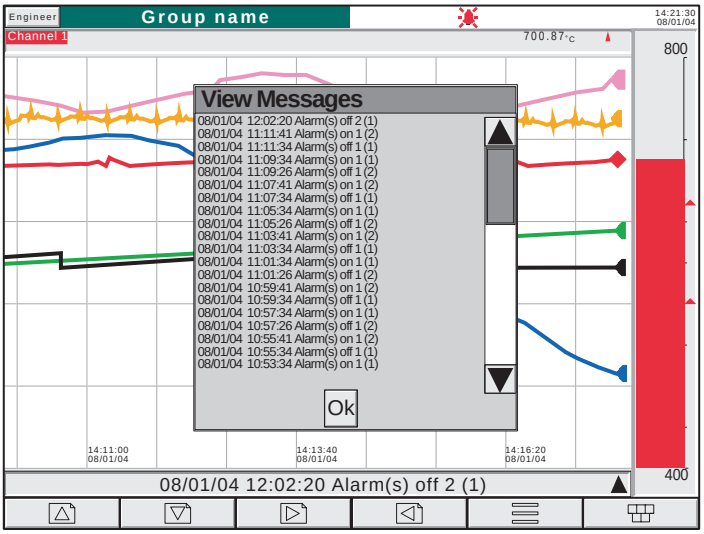


Figure 3.4.2b Horizontal Trend mode message dialogue box

The vertical bargraph display mode (or Circular Trend mode, if the option is fitted) can be called by using the down arrow key. Alternatively, any one of the enabled display modes (section 4.3.4) can be selected using the Root Menu, 'Goto View' key.

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3.4 DISPLAY MODES (Cont.)

3.4.3 Vertical bargraph

> Note: If the Circular Trend option is fitted (section 3.4.6), the Circular Trend display mode replaces the Vertical Bargraph mode. In such a case, Vertical Bargraph does not appear in the Views configuration menu, in the GoTo View menu or in the down arrow scroll list, but is available to user screens if the relevant option is fitted. (See section 2 of the Options Manual for a description of User screens.)

Entered from Horizontal Trend mode by means of the down arrow key, or selected from the Root Menu 'Goto View' key, this display mode shows the Process Variable (PV) values as vertical bars with faceplates containing digital values and alarm data. There are two versions, one with faceplates above the bars (1 to 6 channels - figure 3.4.3a); the other (with faceplates at the right hand edge of the display - figure 3.4.3b) is used where there are more than six channels.

> Note: The description above refers to the 180 mm version of the recorder. For the 100 mm version, the faceplates appear above the bars for one or two points, but to the right of the bars for three or more points.

Operation of the option key calls the Option menu display for this display page, allowing faceplates to be selected on or off. This feature is available for vertical trend and vertical bargraph displays only.

To call the horizontal bargraph display mode, use the down arrow key. Alternatively, any one of the enabled display modes (section 4.3.4) can be selected using the Root Menu, 'Goto View' key.

Trend history mode is not available from this display mode.

FACEPLATES ABOVE THE BARS

See figure 3.4.3a.

As the number of channels in the display group increases, the bars and their faceplates get narrower,

FACEPLATES AT RIGHT-HAND EDGE

See figure 3.4.3b.

As the number of PVs increases, the bars get narrower. As the bars get narrower, so the scale values become truncated as shown in figure 3.4.3b. The bars have a set minimum width, and if the total number of points in the group cannot be displayed within the width of the screen, a horizontal scroll bar appears, allowing 'hidden' bars to be viewed. Similarly, the faceplates reduce in height to a minimum readable height. If there are more point faceplates than can be accommodated within the height of the screen, a vertical scroll bar appears, allowing hidden faceplates to be displayed as required.

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3.4.3 VERTICAL BARGRAPH (Cont.)

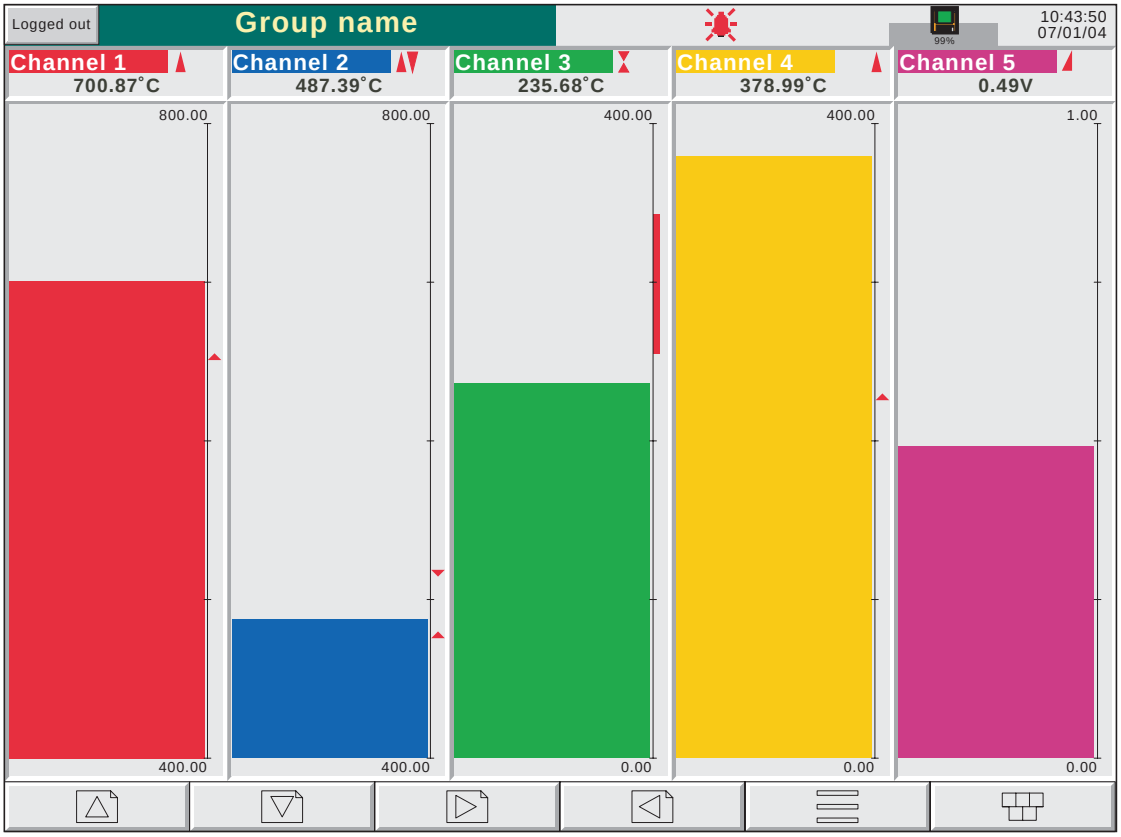


Figure 3.4.3a Vertical bargraph display (1 to 6 channels)

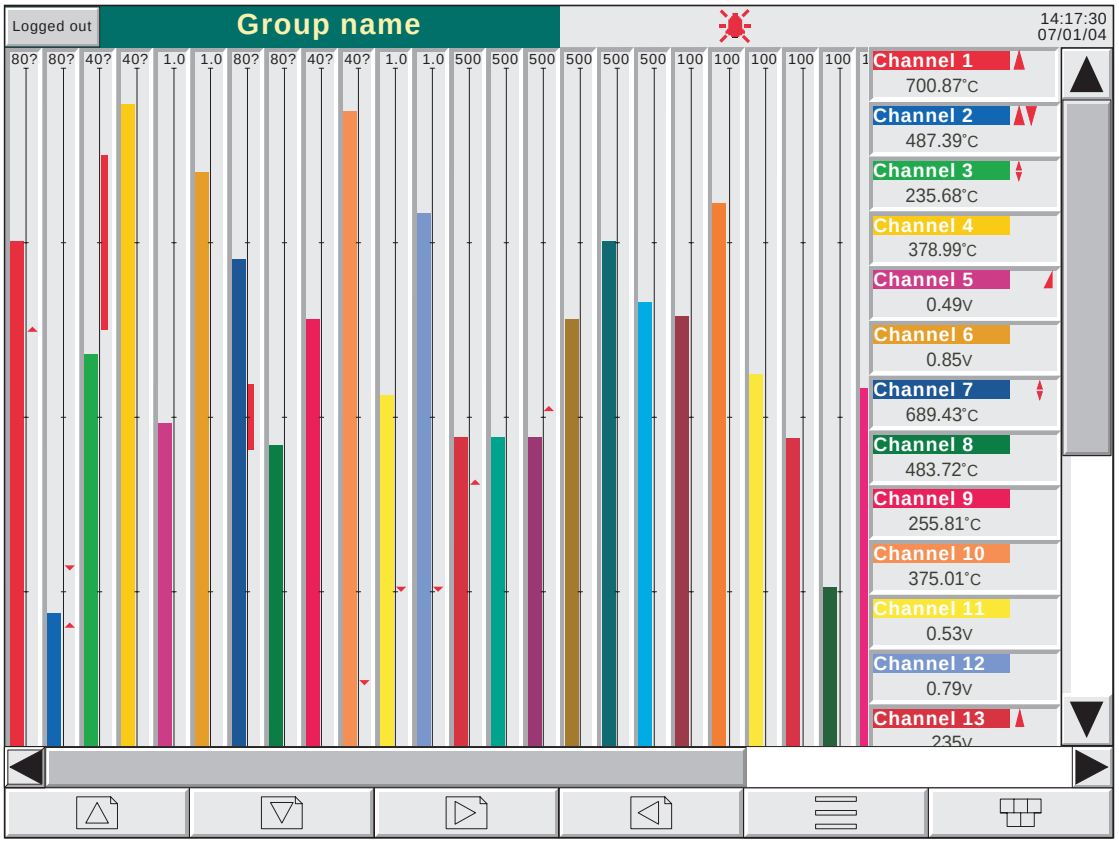


Figure 3.4.3b Vertical bargraph display (more than 6 channels)

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3.4 DISPLAY MODES (Cont.)

3.4.4 Horizontal bargraph

Entered from Vertical bargraph or (if fitted) the Circular trend mode, by means of the down arrow key, or selected using the Root Menu 'Goto View' key, this display mode shows the Process Variable (PV) values as horizontal bars with digital values and alarm data displayed, as shown in figures 3.4.4a and 3.4.4b. Single column format is used when there are up to 12 channels in the display group; double column for more than 12 channels.

Trend history mode is not available from this display mode.

To call numeric display mode, use the down arrow key. Alternatively, any one of the enabled display modes (section 4.3.4) can be selected using the Root Menu, 'Goto View' key.

Note: No more than 26 channels can be displayed on one page. If more than 26 channels are configured, a vertical scroll bar appears allowing currently hidden channels to be displayed.

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3.4.4 HORIZONTAL BARGRAPH (Cont.)

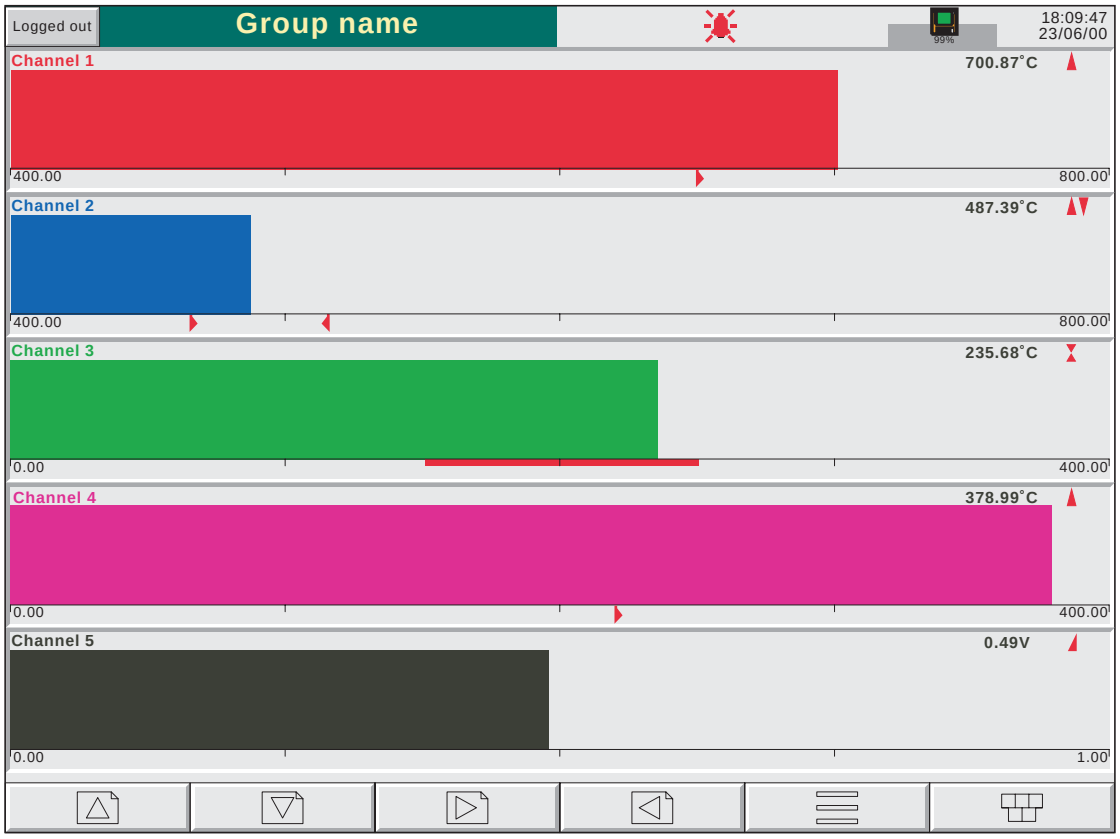


Figure 3.4.4a Horizontal bargraph display (1 to 12 channels)

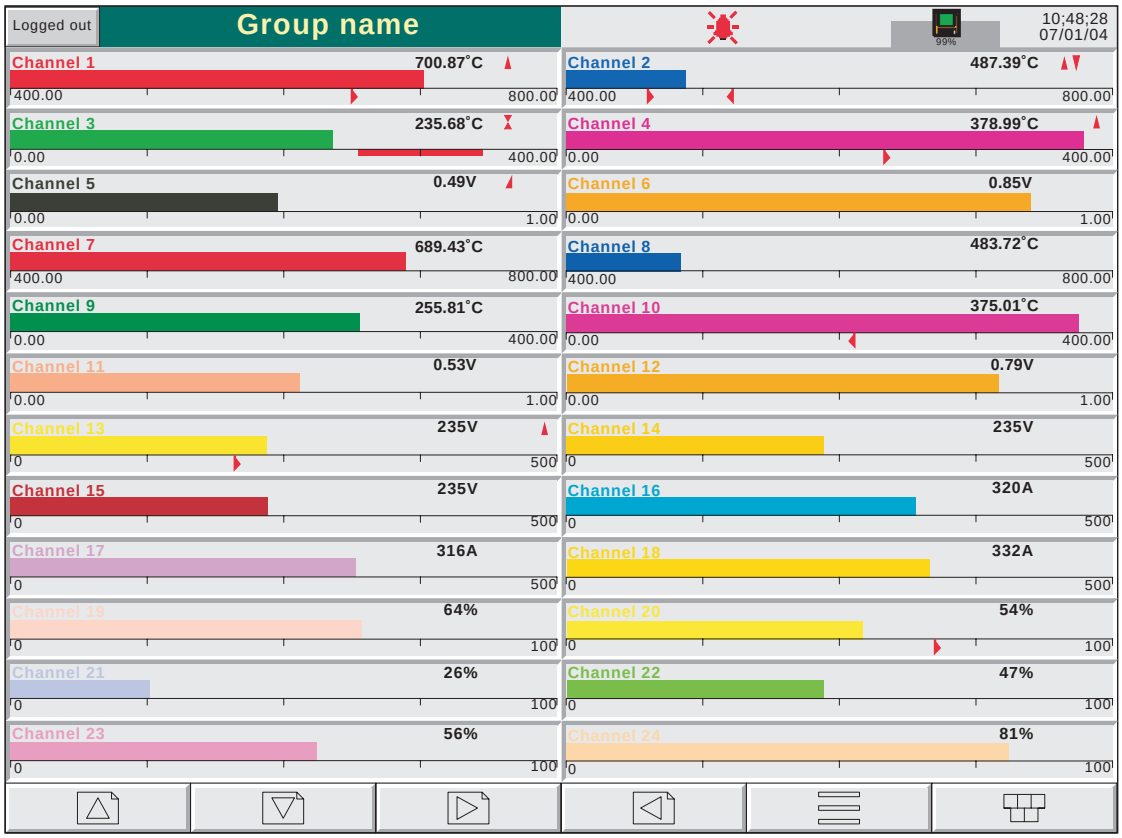


Figure 3.4.4b Horizontal bargraph display (more than 12 channels)

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3.4 DISPLAY MODES (Cont.)

3.4.5 Numeric

Entered from Horizontal bargraph mode by means of the down arrow key, or selected using the Root Menu 'Goto View' key, this display mode shows the Process Variable (PV) values as digital values. The format (which is automatically selected) is based on the number of channels in the display group. Figures 3.4.5a, 3.4.5b and 3.4.5c, show typical examples of the one column (up to five channels), two column (six to 18 channels) and three column versions (19 to 24 channels) of this display mode respectively. Within each version, the process variable display areas expand or contract to fill the screen.

Trend history mode is not available from this display mode.

A further operation of the down arrow key returns to Vertical Trend Display mode described in section 3.4.1 above, or if user screens are fitted and enabled, to the first user screen (section 2 of the Options Manual). Alternatively, any one of the enabled display modes (section 4.3.4) can be selected using the Root Menu, 'Goto View' key.

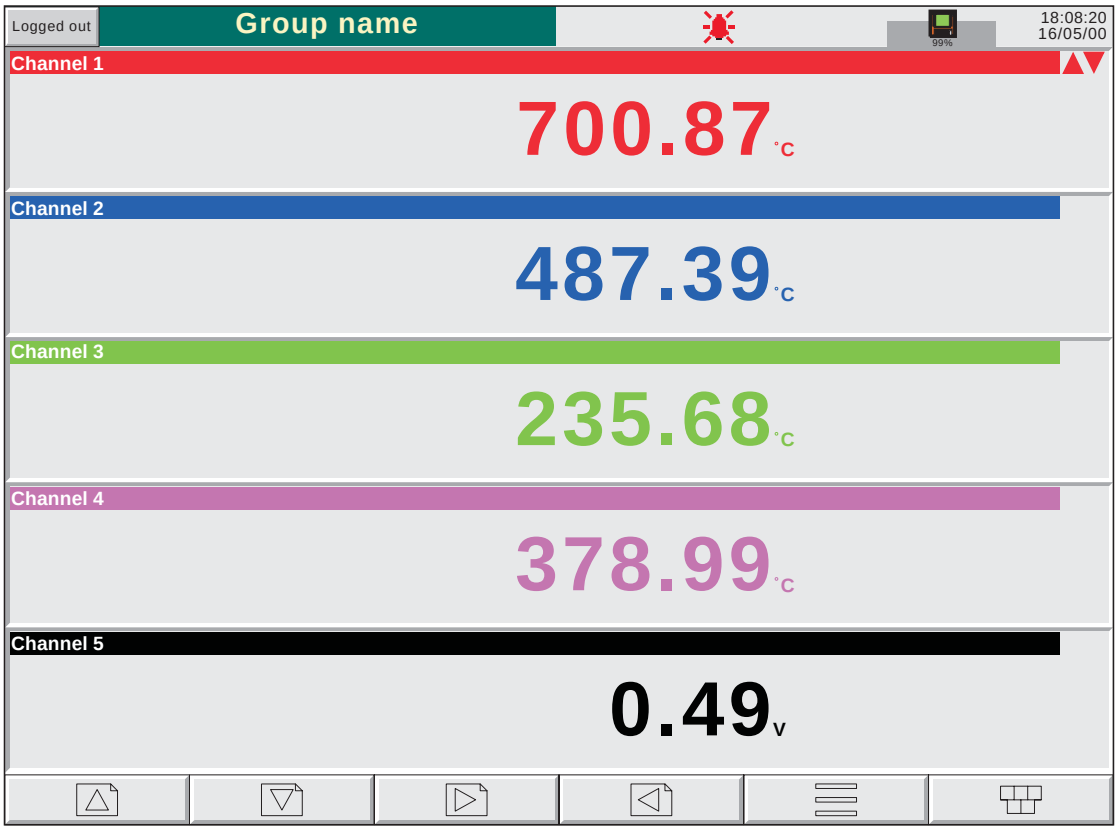


Figure 3.4.5a Numeric display mode (1 to 5 channels)

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3.4.5 NUMERIC DISPLAY MODES (Cont.)

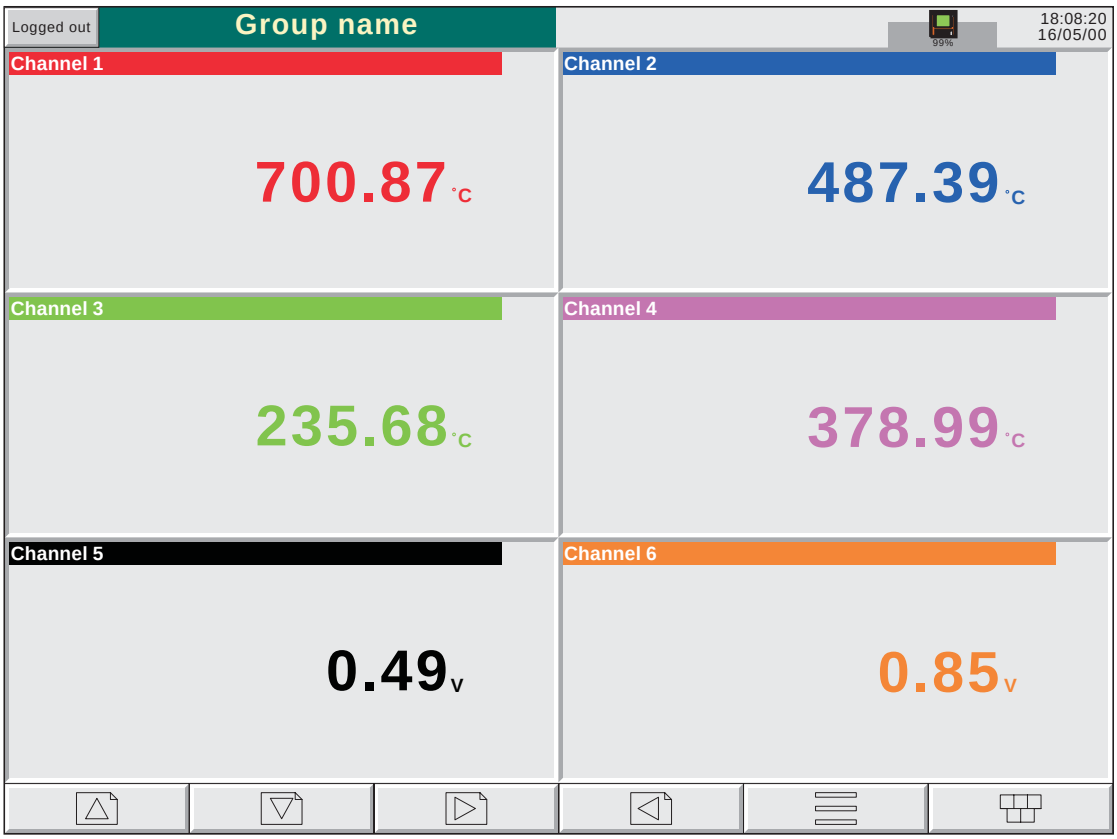


Figure 3.4.5b Numeric display mode (6 channels)

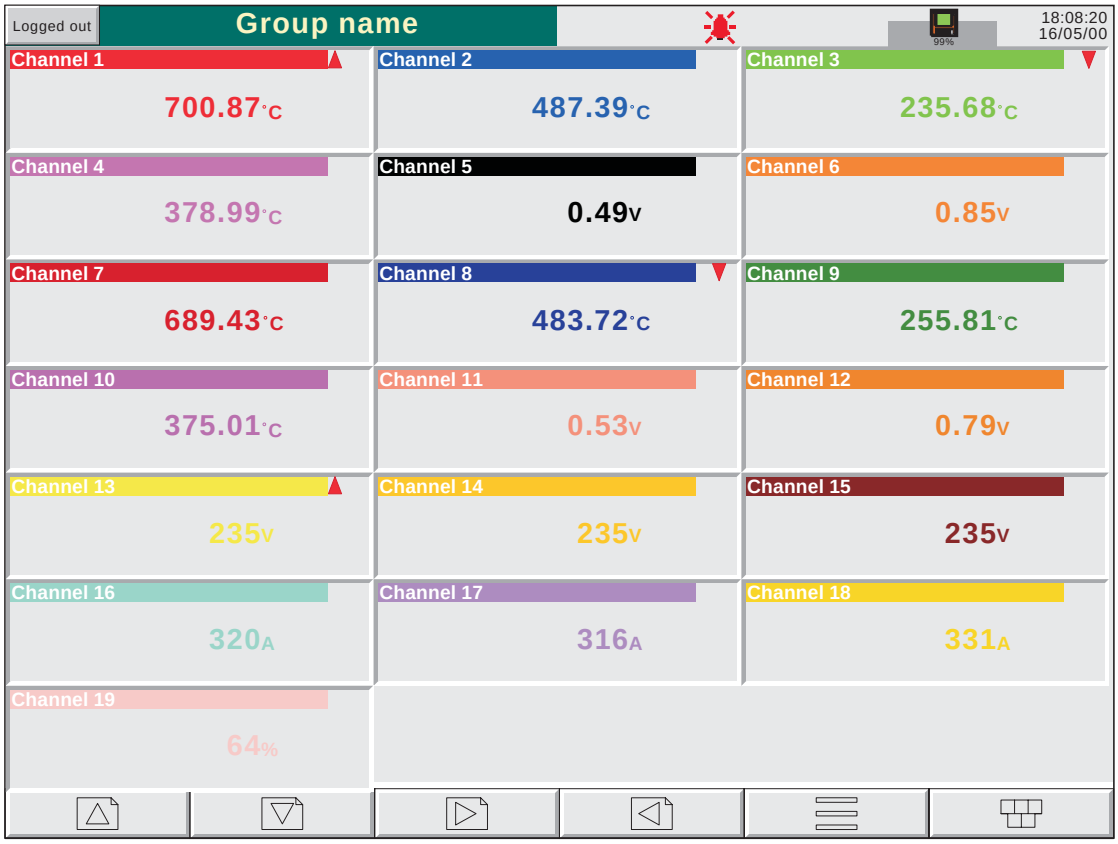


Figure 3.4.5c Numeric display mode (19 channels)

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3.4.6 Circular Trend Option

This option is available for 180 mm versions of the recorder only.

If this option is fitted, it replaces Vertical bargraph mode in the display scroll list, the Goto View menu and in the Views configuration page (section 4.3.4).

The option allows up to 12 points to be traced as though on a circular chart. More than 12 points can be included in the group, but only the first 12 traces and their associated faceplates are included in the real-time display. Entering Trend History mode (by using the Options button or by continuously touching the screen for a few seconds), allows all the points to be reviewed, but only in vertical trend history mode, described in section 3.4.1, above.

The option provides two alternative views called 'Full Screen' and 'Normal View'. These views are toggled between by means of a push-button key near the top left corner of the screen. In each case, faceplates can be displayed, or not, as required, using the Option key 'Faceplates On/Off' selection. The diameter of the chart is independent of faceplate on/off selection. When quitting History, Normal view is always returned to.

Note: Alarm marks (section 3) do not appear on circular trend scales.

TREND MODES

The way in which traces are laid down on the chart depends on the action to be taken when the chart is 'full', as set up in group configuration - section 4.3.2. The user can select 'Rotate' or 'New Chart'.

ROTATE

In the following description, the word 'segment' is used interchangeably with 'Major chart division'. The number of Major chart divisions is a function of the selected chart speed, as described in Group Configuration (section 4.3.2).

With 'Rotate' selected, the traces start one major chart division anti-clockwise from the top of the chart and trace clockwise until they reach the top of the chart ('12 o'clock'). At this point, the chart, complete with time stamps and traces, rotates one major chart division anticlockwise, and the tracing process continues. When the chart is 'full', the oldest segment-full of tracing is removed, leaving an empty segment to be traced-on when the chart rotates.

Figures 3.4.6b and 3.4.6c, below show Circular trending in 'Rotate' mode.

NEW CHART

With 'New Chart' selected, tracing starts at top of the chart (12 o'clock) and continue to trace clockwise round the chart, back up to the vertical. When the chart is full, it is cleared, new timestamps are displayed, and tracing re-starts from the top of the chart.

The start time of the tracing can be set as a part ('Start at') of group configuration, the choices available depending on the time per revolution setting. The start time is placed at top centre of the chart, and 'backfilled', clockwise, round to the current time.

Figure 3.4.6a, below, shows New Chart mode.

Note: The use of '12 o'clock' above is intended to be illustrative and only to explain angles in terms of a normal analogue clock face. It does not mean that this position must actually be noon or midnight in real time.

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3.4.6 CIRCULAR TREND OPTION (Cont.)

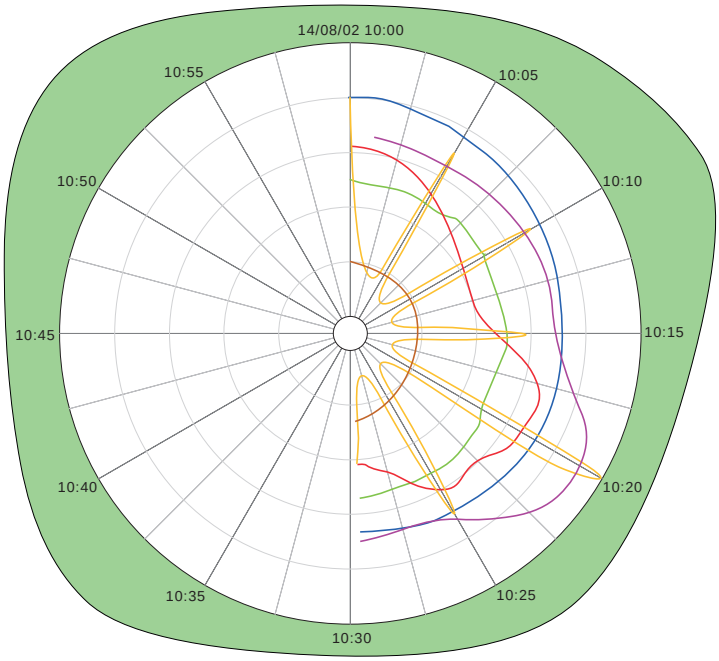


Figure 3.4.6a Circular trend - New chart mode

NORMAL VIEW

As shown in figure 3.4.6b, below, this provides a view of the chart, together with scale, chart speed, message bar and navigation keys. The figure shows a view with faceplates selected on.

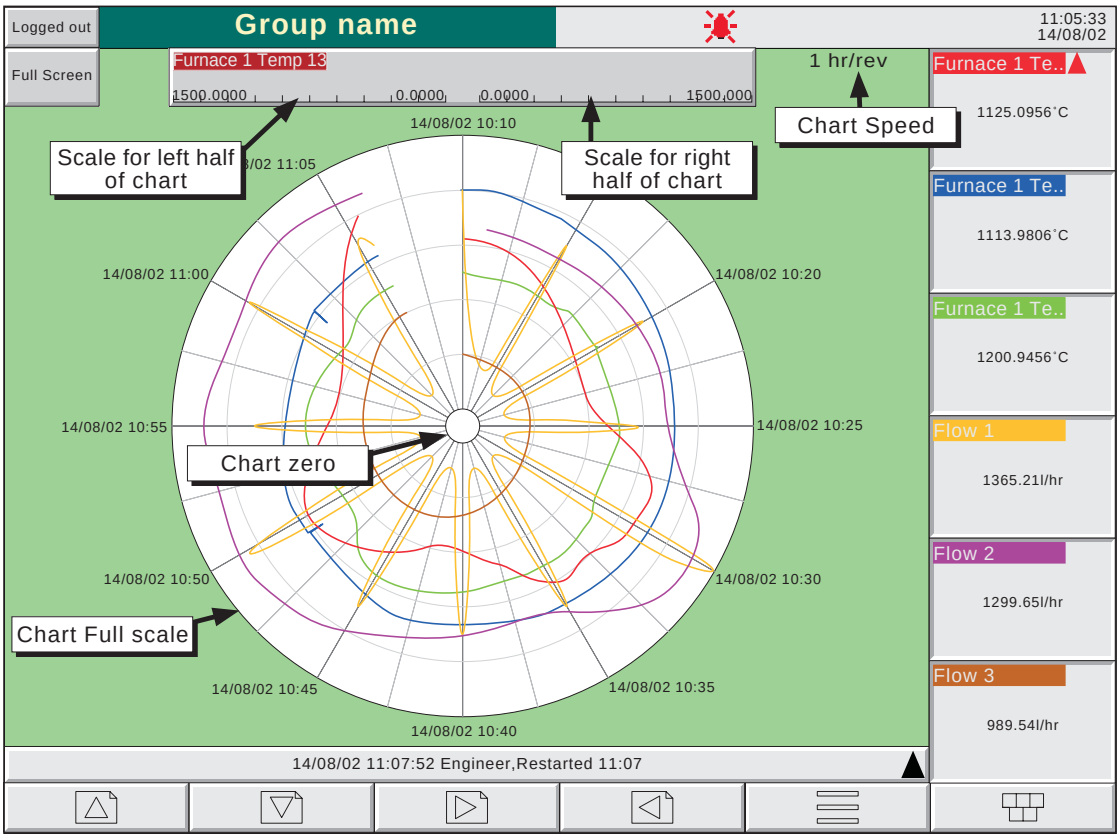


Figure 3.4.6b Circular Trend normal view (with faceplates)

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3.4.6 CIRCULAR TREND OPTION (Cont.)

NORMAL VIEW FEATURES

Scales	Two scales are provided, one for the left hand side of the chart, the other for the right hand side. Channel scaling is a part of channel configuration, as described in section 4.3.3, below. The scales apply only to values along the horizontal line through the centre of the chart. Values for other angles (times) can be most easily found from the trace history, selected from the Option key, or by touching anywhere in the chart or in the green background area for a few seconds.
Chart speed	This displays the currently selected speed of revolution of the chart. This speed is set up as a part of Group configuration (section 4.3.2)
Faceplates	Up to 12 faceplates can be displayed, giving point values and alarm indication.
Message Bar	The message bar at the bottom of the screen displays the latest message. If an up arrow appears at the right hand end of the bar, there is more than one message. Touching the message bar calls a 'View Messages' window, detailing previous messages. See the description in section 3.4.2 for more details.

FULL SCREEN DISPLAY

As shown in figure 3.4.6c, below, this maximizes the chart diameter, leaving only the chart, chart speed and faceplates (if selected on) on display. The figure shows a view with faceplates selected off. As the navigation keys are not available in this mode, Faceplate on/off selection can be made only from one of the other display modes.

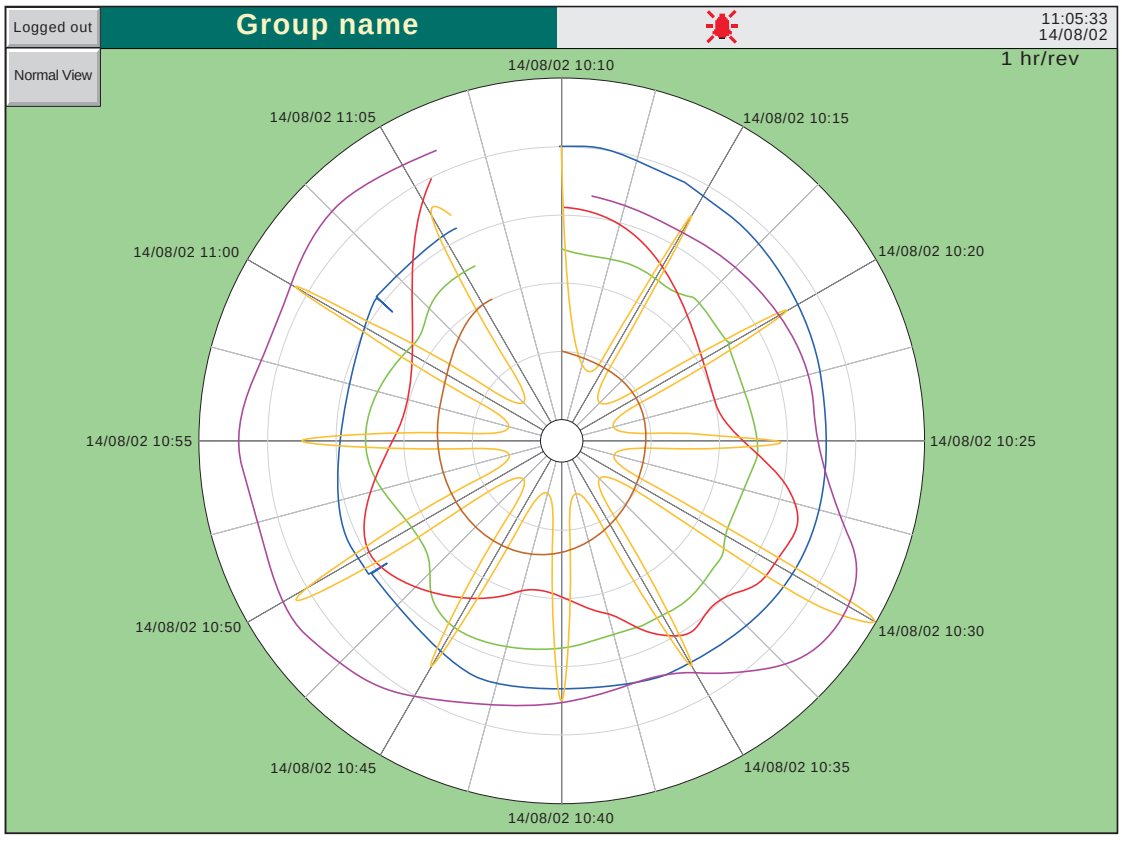


Figure 3.4.6c Circular Trend full screen view (with faceplates selected off)

FULL SCREEN FEATURES

Faceplates	As described above for Normal View features

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3.4.6 CIRCULAR TREND OPTION (Cont.)

TIMESTAMPS

Time and/or date are displayed at every major chart division. The following rules apply:

1. For chart durations of a week or more, only the date is displayed
2. For chart durations of less than a week, both time and date appear, with the following exception:
   In 'New Chart' mode (unless the chart 'bridges' midnight), the date appears only at top centre of the chart. All other chart divisions are identified by time only.

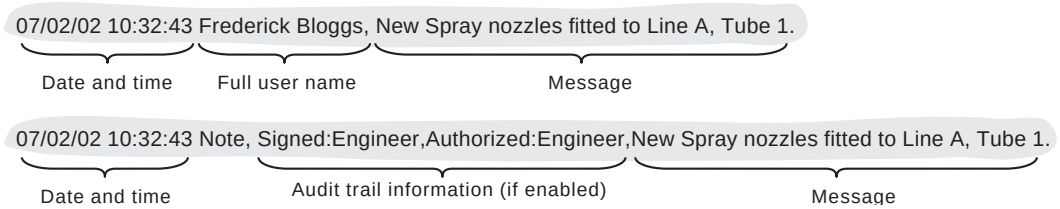
OTHER NOTES

1. In dark trend background, the chart is black against a 'white' background. Chart division lines are also in 'white'.
2. Adaptive recording results in two traces per trend, as in other trend display modes.
3. When the option is enabled, Circular Trend is the default home page.
4. For successful circular trend display, 'Circular Settings' must be enabled for the relevant group (section 4.3.2), and 'Circular Trend' must be enabled for the group, in Views configuration (section 4.3.4). If Circular Trend is enabled, but Circular Settings is disabled, then, although the circular chart will appear, it is unlikely that it will contain any trends.
5. The circular chart speed is unaffected by A/B switching of Trend Speed/Interval (section 4.3.2)

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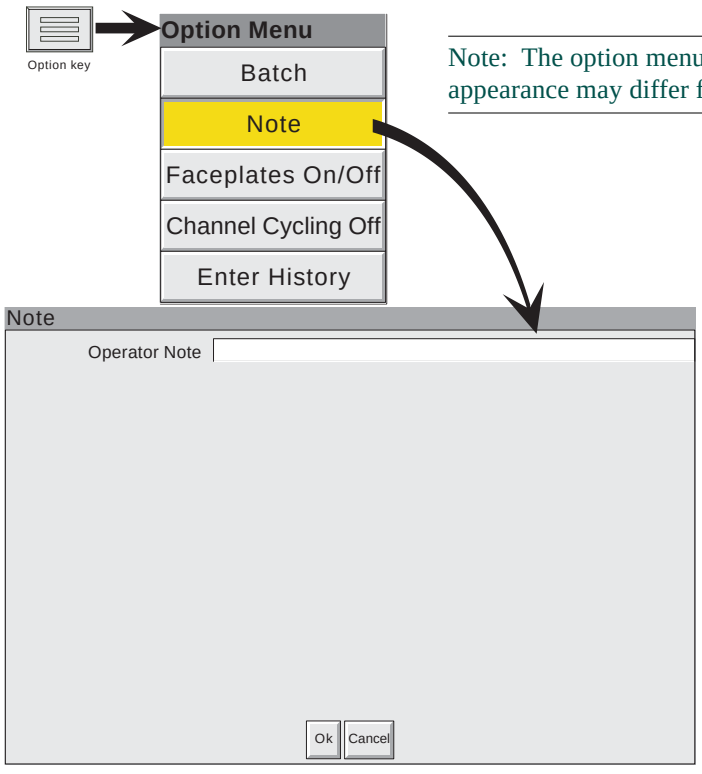
3.5 OPERATOR NOTES

It is possible for the user to enter a note, of up to 60 characters, at any time, from any display page (not from configuration pages). Each note is associated with the current display group and becomes a part of that group's history. The notes appear on vertical and horizontal trend displays only, although they can be entered in any display mode.
The note appears on the chart and in the Message Log, preceded by the date, time and current full user name, as shown in the first example below. If the Auditor Pack option is fitted, and enabled, the note contains audit trail information, as shown in the second example below. See section 4.4.2 for details of the Auditor Pack (Management) option.



To enter a message:

1. Press the Option key, then the 'Note' key
2. If necessary enter Signature and Authorization passwords (Auditor pack option only - see section 4.4.2).
3. Touch the note area of the resulting pop-up display.
4. Enter the required text of up to 60 characters (spaces are also counted as characters) using the pop-up keyboard display. Press Ok when finished.
5. View the note and
   a. press the Ok button to enter the note OR
   b. re-touch the text area to edit the note OR
   c. press the Cancel key to quit note entry.



Note: The option menu is context sensitive, so its appearance may differ from the example shown

Figure 3.5 Access to Note entry page

Note: Operator notes should not be confused with similar messages, appearing as a result of job action. Such messages are available only if the Message option (described in section 4.3.8 of this manual) is fitted.

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4 SETTING UP THE RECORDER

As described in the 'Access to Configuration' (section 3.3.1) above, the setting-up of the recorder is divided into the following areas:

Archive	Section 4.1 - Allows manual archiving of data to disk or to a remote host (FTP transfer).
Save/restore	Section 4.2 - Allows new configurations to be created and saved, and saved configurations to be 're-stored'. Save/Restore also allows the importing and exporting of User Screens can be carried out if the User Screens option is fitted.
Config	Section 4.3 - This is the major channel/alarm option etc. area of configuration.
Security	Section 4.4 - Allows passwords to be entered and edited and allows the Engineer-level password holder to enable/disable areas of configuration to Operator-level password holders. New users can be added, with their own user names, passwords and access level permissions.
Network	Section 4.5 - This area sets up the IP address/host names etc. used in FTP transfer, Remote Viewer and SNTP applications.
System	Section 4.6 - Allows time and date functions to be set and edited (including daylight saving start and finish dates, time zones etc.) The system key also allows the display language to be chosen, Option key codes to be entered, and contains an 'About' screen describing the software/hardware status of the recorder.

Note: In all the following descriptions, if a change is made to a menu item, then the item text changes from black to red, until it is 'saved'

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4.1 ARCHIVE

Note: The archiving functions described below can also be initiated by job action - see section 4.7.15.

4.1.1 Archive to disk

This allows the user to initiate data transfer, to a mass storage medium such as a floppy disk, for all groups with 'Archive to Media' enabled (Group configuration - section 4.3.2), by touching the relevant archive period key (e.g. Last Day').

Archiving starts as soon as the selection is made, and cannot be stopped until completed, unless the Cancel Archive key is operated, in which case the archive will be stopped after a confirmatory message has been responded to. The Cancel key is active only if 'Archiving Control' is enabled in Security/Access (section 4.4 of this manual). If archiving is enabled for more than one group, a warning message appears.

Selection of 'Bring Archive Up To Date' causes the recorder to select whichever of the Last Hour/Last Day etc. categories is appropriate to bring the archive up to date. Figure 4.4.1 shows the archive to disk menu.

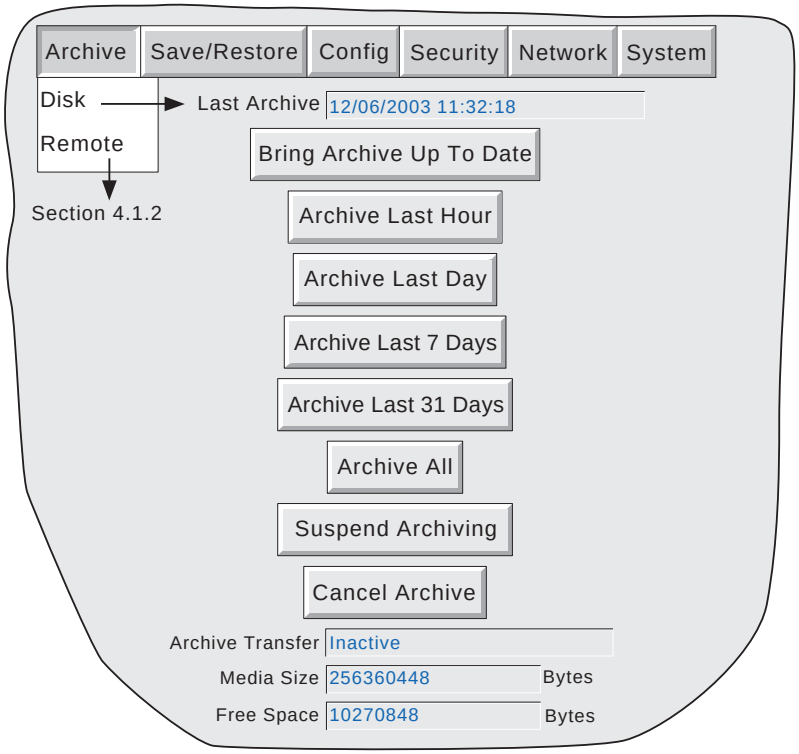


Figure 4.1.1 Disk archive strategy configuration

If the disk becomes full before archiving is complete, archiving pauses and a pop-up request appears, asking for the disk to be replaced. If this request is not responded-to within 10 minutes of its appearance, archiving is aborted,

Unattended archiving can be paused by the user (e.g. to change disks without losing data) by operating the 'Suspend Archiving' / 'Resume Archiving' button. Any archiving in progress is allowed to complete before the 'Suspend Archiving' request takes effect. Transfer activity is indicated in the 'Archive transfer' window. Should the disk become full, the user will be prompted to replace it with a different one.

Below the selection buttons are a number of status windows relating to the mass storage medium.

If automatic archiving is active (section 4.3.5), then this and the manual archive will operate on a first come-first served basis. Some files will be saved twice in such a circumstance, the later archive's files overwriting any earlier archive's files which have the same name.

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4.1.2 Remote archiving (FTP transfer)

This allows archiving of recorder files, for all groups with 'Archive via FTP' enabled, to a remote computer, connected (using the RJ45 telephone type connector at the rear of the recorder) either directly, or via a network . 'Archive via FTP' is enabled/disabled as part of (Group configuration - section 4.3.2)

In order to carry out a successful transfer, details of the remote host must be entered in the Archive section of the 'Config' menu (section 4.3.5).

Note: An FTP server must be running on the remote host.

Figure 4.1.2 shows the archive menu for remote archiving. The Archive last hour/day etc. keys allow the user to determine which files are to be archived. Selection of 'Bring Archive Up To Date' causes the recorder to select whichever of the Last Hour/Last Day etc. categories is appropriate in order to bring the archive up to date. The 'Last Archive' window shows the time and date of the previous archive. The Archive Transfer window shows archive status as 'Active' or 'Inactive'.

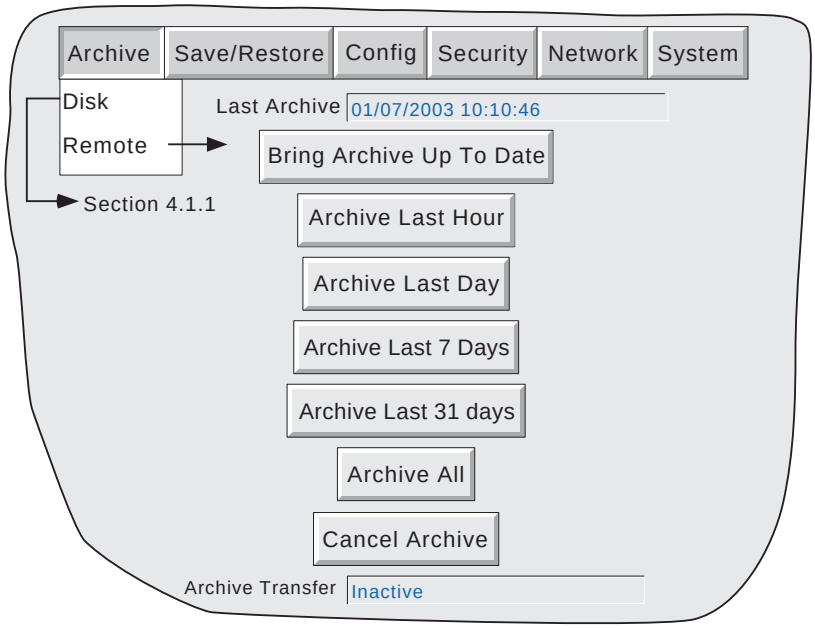


Figure 4.1.2 Remote archive strategy configuration

Additionally, a user on a remote PC has full viewing capabilities, can extract recorder files at any time, and can access those items of recorder configuration that are associated with the user's login. For successful connection, 'Connect from Remote' must be enabled and the 'Remote user name' and 'Remote password' must be defined in one of the accounts (all in the Security access menu (section 4.4.1).

Notes:

1. In order to view history files when accessing the instrument remotely, the recorder's address, the 'Remote user name' and the 'Remote password' must be supplied to an FTP client such as PC Review or Microsoft® Internet Explorer.
2. When accessing files using Microsoft® Internet Explorer, the address (URL) field can be in one of two forms:
   a ftp://<instrument IP address>. This allows the user to log in as the anonymous user (if the instrument has any account with 'Remote user name' set to 'Anonymous' and a blank password).
   b ftp://<user name>:<password>@<instrument IP address> to log in as a specific user.
3. For IE5 users only: Microsoft® Internet Explorer displays, by default, history files only. To exit the history folder, either uncheck the Tools/Internet Options/Advanced/Browsing/"Enable folder view for FTP sites" option, or check the Tools/Internet Options/Advanced/Browsing/"Use Web based FTP" option.

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4.2 SAVE / RESTORE

As shown in figure 4.2a, touching the 'Save/Restore' key calls the picklist: Save, Restore, New, Text, Import/Export Screen, Import/Export User Linearisation. Import/Export Screen choices appear only if the User screens option is fitted.

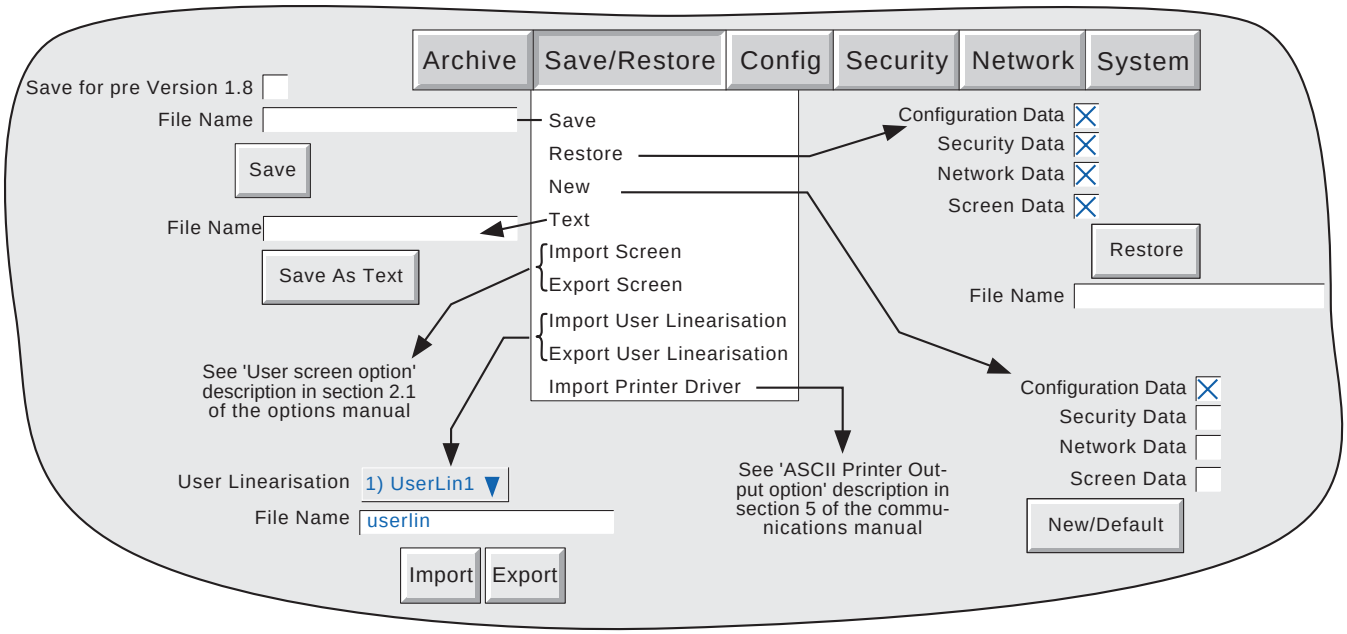


Figure 4.2a Save/Restore menu

Where a file name is required, then, if the displayed file name is suitable, operation of the 'Save', 'Restore', 'Import' or 'Export' key will initiate the action. If, instead, a file name has to be entered, this is carried out as follows:

Touching the filename window causes a pop-up menu to appear, giving a list of 'Volumes' in the Flash memory or on the mass storage medium (if inserted). Figure 4.2b shows an imaginary Volume contents list, displayed by touching the name 'user', then operating the down arrow or 'open folder' key. (See section 5, below for more details), Once the correct folder is open, either select an existing file, or enter a new filename, by touching the FileName window and entering the name using the pop-up keyboard(s) as described in section 3.3.1 above. Operation of the Save/Restore key initiates the action.

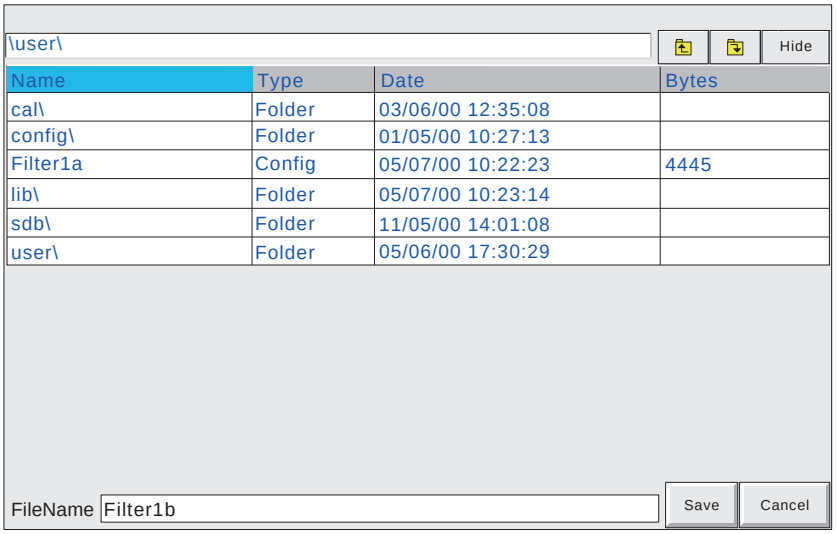


Figure 4.2b Typical volume contents page

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4.2.1 Save

Touching this item allows the current configuration to be saved in the recorder's memory. Files saved in this way are not in a 'readable' format and are used only for archive /security purposes or for transfer to another, similar, recorder.

SAVE FOR PRE VERSION 1.8

Checking this box, prior to saving a configuration, means that the configuration can successfully be loaded (Restored) into other recorders running software versions prior to 1.8. If the box is left unchecked, then Saved configurations can be Restored only to recorders running software versions 1.8 or higher. The message 'Unsupported File' appears if an attempt is made to save an 'Unchecked' configuration into a pre version 1.8 recorder. See Section 4.6.5 (About) for details of how to determine software version.

4.2.2 Restore

Touching this item allows the user to select or type-in a previously saved configuration file name, which will then be used as the current configuration. Touching the 'Restore' key completes the operation. Checkboxes allow one or more of Configuration Data, Security data (note 3), Network data and Screen data to be chosen for the restore function.

Notes:

1 Screen data restores faceplate status for vertical trend and vertical bargraph modes, and user screen information if the option is fitted.

2. If archiving is in progress when a 'Restore' is requested, the Restore operation will be delayed until the archive is complete (maybe several minutes). If required, the 'Cancel Archive' key (section 4.1 above) can be used to speed up the Restore process, at the cost of losing the archive data.

3. If 'Centralised Security' is active (part of Security/Management configuration - section 4.4.2) 'Security Data' is not selectable (either for 'Restore' or for 'New' (below)).

4.2.3 New

Touching this item causes the factory entered default configuration to be loaded for use, or for editing. Operation of the New/Default key completes the operation. Touching the 'Restore' key completes the operation. Checkboxes allow one or more of Configuration Data, Security data (note 3 above) and Network data to be chosen for the restore function.

For recorders with the User screens option (section 2 of the Options Manual), a further tick box is displayed - 'Screen Data'

4.2.4 Text

This is identical to the 'Save' function described above, but the configuration is saved in ASCII format, and can be transferred to a computer and read, printed etc. as required. It is not possible, using this means, to modify the configuration and then re-load it.

4.2.5 Import screen

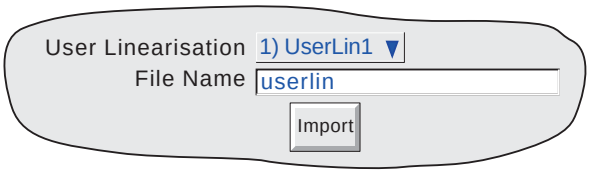
This field appears only if the User Screens option (section 2 of the Options Manual) is fitted, and allows a previously exported User Screen file to be imported.

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4.2.6 Export screen

This field appears only if the User Screens option (section 2 of the Options Manual) is fitted, and allows a User Screen to be exported to disk or Flash memory. The exported screen can subsequently be imported either into this recorder or into a different recorder.

4.2.7 Import User Linearisation



The Import Linearisation feature allows linearisation tables to be imported either via the floppy disk or pc card, or if the Remote Viewer option is fitted, directly from the host PC.

Touching the User Linearisation field allows the user to select which of 'UserLin1' to 'UserLin4' is to contain the imported file.

Touching the File Name field, calls a popup menu similar to that shown in figure 4.2b. This allows the user to select the table to be imported.

The file must be comma separated ASCII as follows:
n,
X1,Y1
X2.Y2
X3,Y3
.
.
Xn,Yn
where 'n' is the total number of XY pairs in the table, and or each pair, X is the input value, and Y is the linearised value corresponding to X. See section 4.3.9 for full details.

Note: Imported linearisation tables will not become effective until after the next configuration 'Apply' operation

4.2.8 Export User Linearisation

Similar to 'Import user Linearisation', above, the Export Linearisation feature allows linearisation tables created in the recorder to be exported either via the floppy disk or pc card, or if the Remote Viewer option is fitted, directly to the host PC. See section 4.3.9 for full details.

4.2.9 Import printer driver

This field appears only if the ASCII Output Printer option is fitted.

Similar to 'Import user Linearisation', above, this allows driver (.uhi) files for new printer types to be imported either via the floppy disk or pc card, or if the Remote Viewer option is fitted, directly from the host PC. See section 5 of the Communications manual for further details.

Note: Imported printer drivers do not become effective until after the next configuration 'Apply' operation.

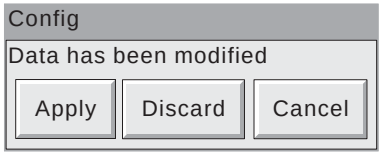
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4.3 CONFIGURATION

Touching this key calls the top level configuration pick list: Instrument, Groups, Channels, Views, Archive, Events, Messages, etc. as shown in the overview figure (figure 4.3b).

When making changes to the configuration the name of each changed parameter is displayed in red (instead of the normal black) until the 'Apply/Discard' key has been operated. For example, in channel configuration, if a thermocouple were to be changed from Type J to Type K, 'Lin Type' would appear in red, until the Apply key was operated.

Should an attempt be made to leave configuration with unsaved changes, a warning message appears, allowing the user to apply the changes, to discard the changes or to return to configuration (Cancel).



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4.3 CONFIGURATION (Cont.)

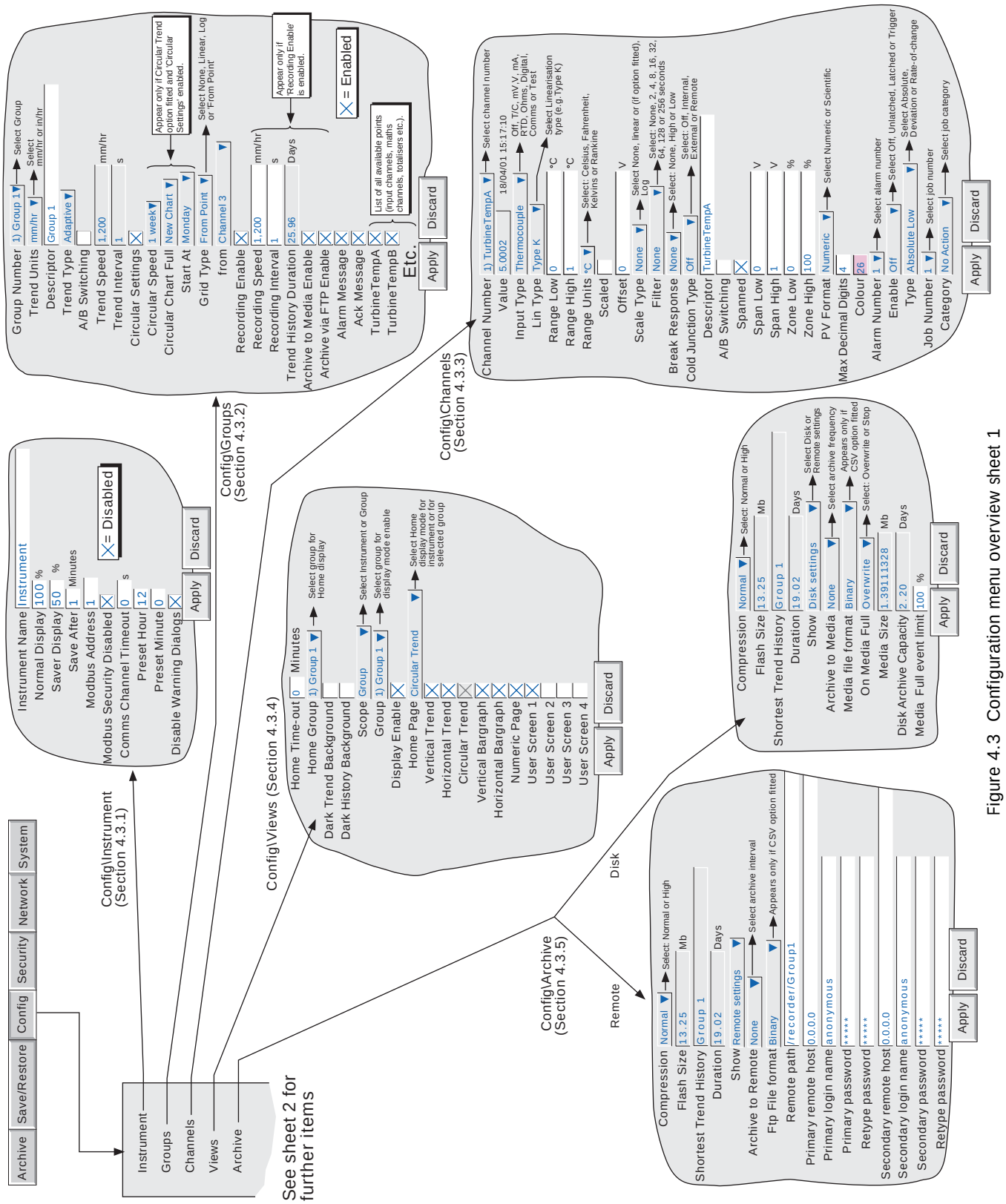


Figure 4.3 Configuration menu overview sheet 1

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4.3 CONFIGURATION (Cont.)

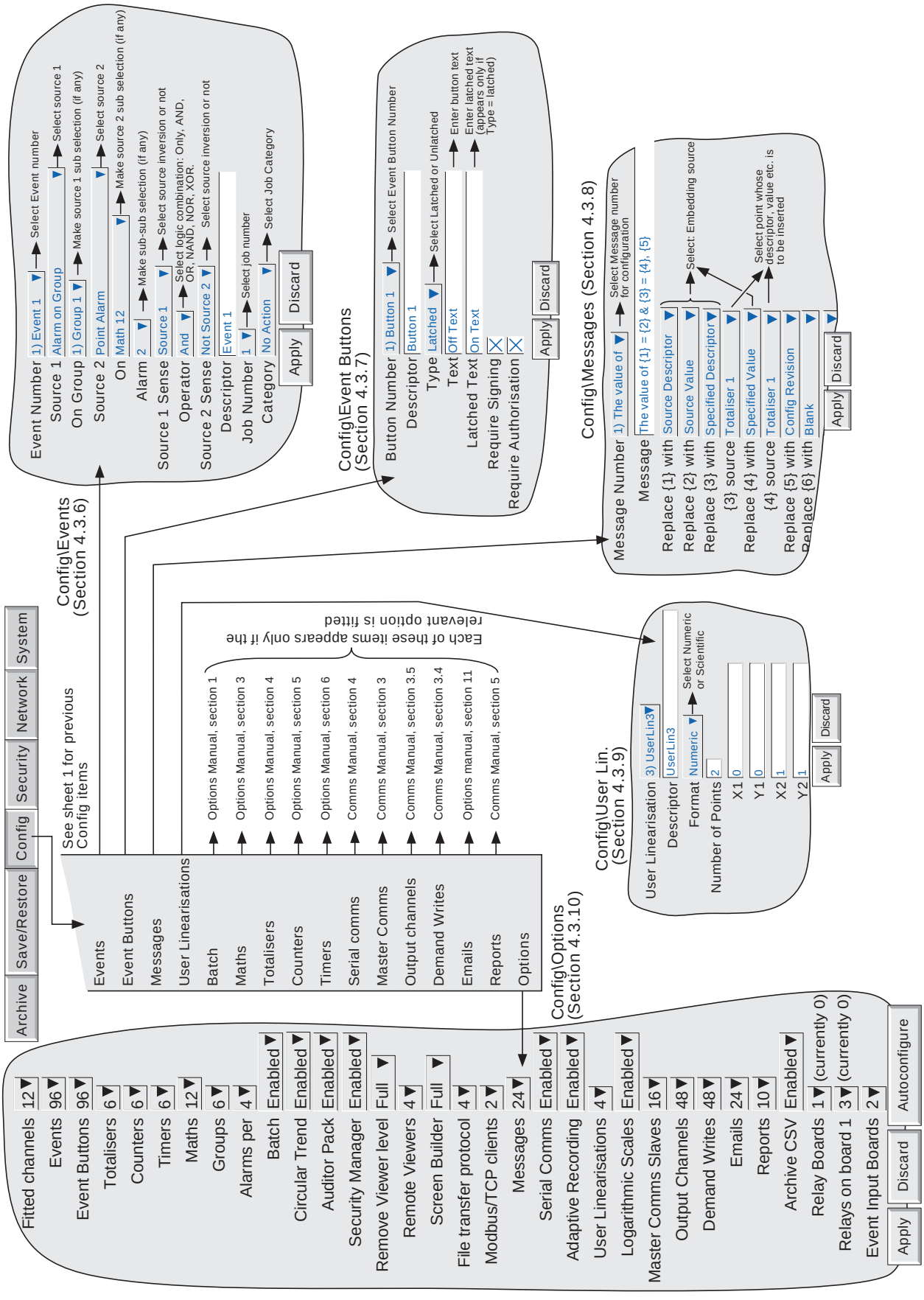


Figure 4.3 Configuration menu overview sheet 2

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4.3.1 Instrument configuration

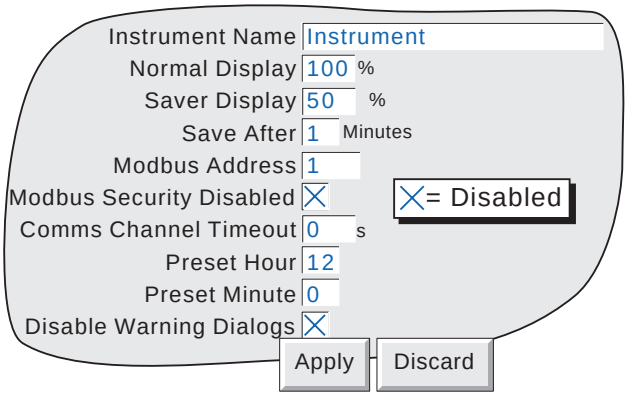


Figure 4.3.1 Instrument Configuration menu

INSTRUMENT NAME

Allows the entry of an alphanumeric name for the recorder, up to 20 characters long. See section 3.3.1 for text entry techniques.

NORMAL/SAVER DISPLAY

Allows normal and 'saver' display brightnesses to be defined. Defaults are Normal = 100%; Saver = 50%

SAVE AFTER

The number of minutes (between 1 and 99 inclusive), which are to elapse after a screen operation, before the screen brightness changes from 'normal' to 'saver'. Default is one minute.

MODBUS ADDRESS

Allows a modbus address between 1 and 247 to be set up for Modbus slaves.

MODBUS SECURITY DISABLED

When using MODBUS, it is possible, by 'checking' this field to allow a host computer to access the recorder without its first having to supply a valid User name and Password. This box must be checked if this unit is acting as a Modbus slave in order for the unit to be detected. Once communications have been established, Modbus security can be enabled, providing that the Slave's Remote user name and password have been entered at the Master. See also section 2.2.4 of the Communications Manual.

COMMS CHANNEL TIMEOUT

Allows a number of seconds (between 1 and 999) to be entered. If none of the channels set to 'Comms' is communicated with, within this period, an event source (Comms channel timeout) is set, and remains set until the next communication. An entry of 0 disables the time out.

PRESET HOUR

Enter an hours number between 0 and 23 for use with Clock Job - Preset clock.

PRESET MINUTE

Enter a minutes number between 0 and 59 for use with Clock Job - Preset clock.

> Note: See section 4.7 for a description of recorder jobs, and section 4.5.1 for further details of time synchronisation.

DISABLE WARNING DIALOGS

Checking this box prevents instrument alarm messages from appearing on the screen.

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4.3.2 Group configuration

Note: Group 1 is a standard recorder feature. The supply of groups two to six (Multiple groups) is an optional extra.

Group configuration allows the user to define the following:

a Group trend speed/interval
b Group recording speed/interval
c Group descriptor
d Group content
e Circular Trend Option speed and chart-full operation
f Chart grid divisions

The production of alarm messages and the saving of group data to Flash memory, to removable mass storage medium (e.g. floppy disk) and/or to remote computer (FTP transfer) can also be enabled / disabled from this menu.

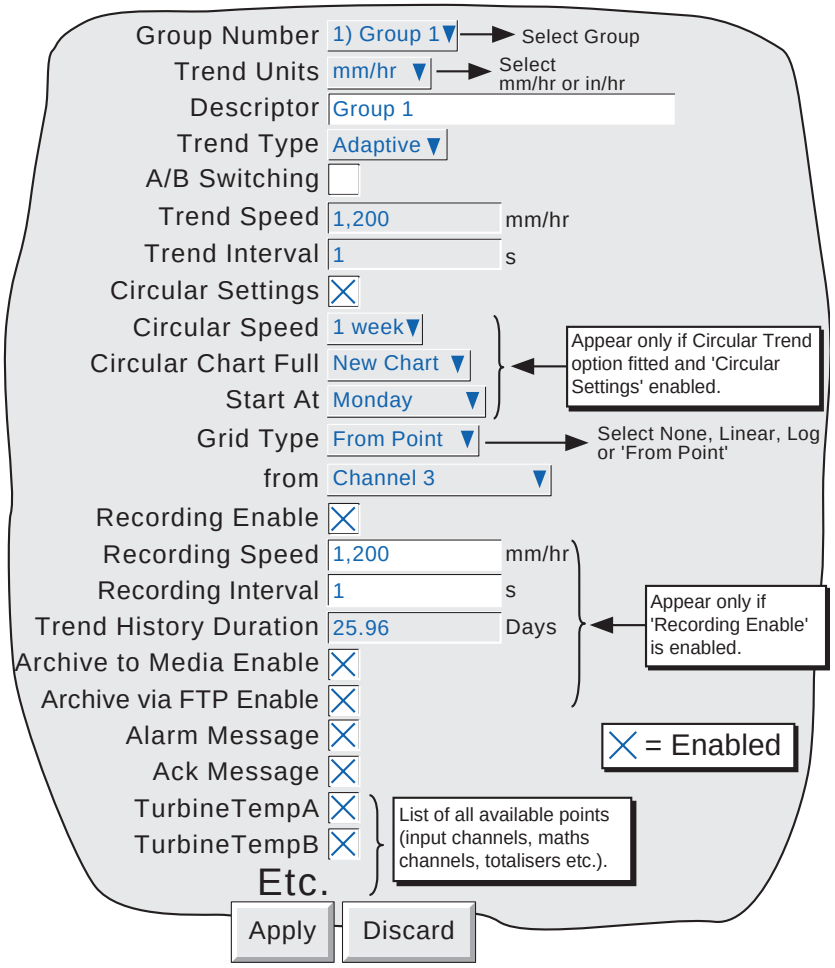


Figure 4.3.2a Group configuration menu

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4.3.2 GROUP CONFIGURATION (Cont.)

GROUP NUMBER

For recorders with Multiple Groups fitted, this allows a particular group to be selected for configuration. Otherwise, only Group 1 is available.

TREND UNITS

Allows mm/hr or inches per hour to be selected for the 'chart' speed. Automatically converts the trend speed field below.

DESCRIPTOR

Allows the group name to be edited. See section 3.3.1 for text entry techniques.

TREND TYPE

For recorders with 32MByte DRAM only (see System/About - section 4.6.5), this allows the selection of Adaptive Recording for vertical and horizontal trend modes. The purpose of adaptive recording is to ensure that rapid, short duration spikes (for example), are represented on the 'chart' even at low trend speeds. This allows the user to extend the total amount of history stored in the recorder (by using slow trend speeds) without losing transient data.

The adaptive recording method works by measuring the input signal at the normal 125msec period, and saving the maximum and minimum values, continuously, over the period of trend update. When the trend is updated, both maximum and minimum values are traced on the chart - i.e. two traces are produced for each channel in the group.

The faceplates and pen positions are still updated every second, as normal.

Notes:

1 During the period between updates, the maximum and minimum values are shown on the trend as a horizontal line just beneath the pen, where the ends of the line represent the minimum and maximum values so far. This line is removed at trend update time.
2. Adaptive recording takes twice as much memory as normal recording, so an increase in the total amount of history stored, occurs only if the trend speed is reduced to less than half of that which would normally be used.
3. In Trend History mode, both minimum and maximum values for the cursor position are shown on the faceplate. See section 3.4.1 for a description of trend history

Figure 4.3.2b shows the difference between normal and adaptive recording, at slow trend rates. Note that rapid changes in signal, (such as those shown in the circled area of the 'actual signal') are largely filtered out by Normal Tracing, but is displayed by the Adaptive Trace. Figure 4.3.2b is for illustrative purposes only, as traces such as these could never appear on the chart together.

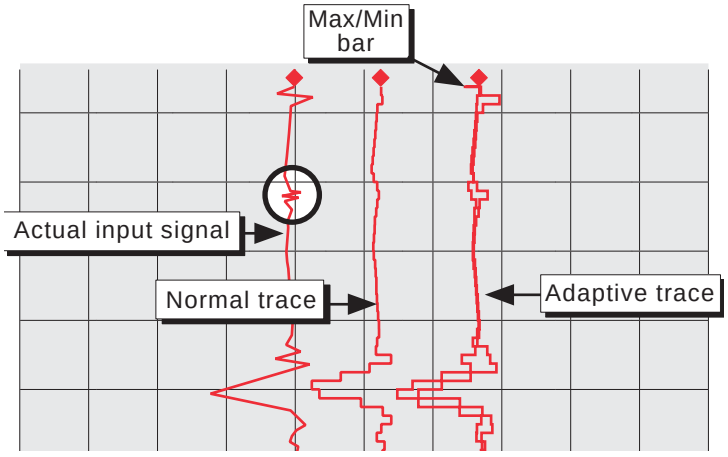


Figure 4.3.2b Adaptive recording compared with Normal tracing

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4.3.2 GROUP CONFIGURATION (Cont.)

A/B SWITCHING

If enabled, this function allows alternative values for Trend speed/interval and Recording speed/interval to be entered. 'A' values are used during normal operation. 'B' values are switched to by job action, as described in section 4.7

TREND SPEED/TREND INTERVAL

Allows the 'chart' speed to be selected either as mm or in per hour, or as an interval. Entering a value in one field automatically converts the value in the other field. A trend interval of N seconds is equivalent to 1200/N mm/hr chart speed; a chart speed of P mm/hr is equivalent to a trend interval of 1200/P seconds.

If A/B switching is enabled, a second Trend Speed /Interval value can be entered. Trend Speed/Interval 'A' is used during normal operation. Trend Speed/Interval 'B' is switched to by job action, as described in section 4.7

Note: Trend speed/interval are not editable fields if 'Circular Settings' is enabled. The Circular Settings check box, described below, appears only if the Circular Trend option is fitted.

CIRCULAR SETTINGS

This checkbox appears only if the Circular Trend option is fitted, and, when checked, causes the Circular Speed/Chart Full/Start At fields, described below, to appear. When checked, the Trend Speed and Trend Interval fields described above are disabled (i.e. they are no longer editable).

Notes:

1 The following Circular Chart fields appear only if the Circular Trend option is fitted, and 'Circular Settings' is enabled, as described above. Circular Trend is not available for 100 mm instruments.

2 If Circular Settings is not enabled, here in Group configuration, but Circular Trend is enabled for the group in Views configuration (section 4.3.4), then, although the circular chart will appear, it is unlikely that the chart will contain any trends.

CIRCULAR SPEED

This field allows the chart speed to be selected from a pick list, as detailed in table 4.3.2, below. The table also shows the number of major and minor chart divisions.

CIRCULAR CHART FULL

This allows 'New Chart' or 'Rotate' to be selected from a picklist. See section 3.4.6 for details. Table 3.4.2 shows the major and minor chart divisions for each chart speed.

START AT

This item, (which appears only if 'New Chart' has been selected in 'Circular Chart Full', above) allows the user to select a start time and/or date for the new chart. The exception is for a chart speed of 1 hr/rev, which always starts on the hour.

Chart spd. (hours/rev)	Chart divs		New Chart Start at	
	Major	Minor	Start at choices	Examples/comments
1	12	2	On the hour	
2	12	2	00 to 23 at 00:00 hrs	4 hours/rev.; Start at 12. This chart will start at 1200 hrs and re-start at 1600, 2000, 2400, 0400, 0800 hrs etc.
4	12	2		
6	12	2		
8	8	2		
12	12	2		
16	8	2		
24	12	2		
48	12	2	Day of week at 00:00:00	48 hrs/rev.; Start Monday. Chart starts Mon. 00:00:00 and restarts Weds, Fri etc,
168*	7	4		
336*	7	4	Day of week at 00:00:00	At each power-on, the system resets to the first week of the period, with the most recent 'Start at' day of the week at the top of the chart.
672*	4	7		
720*	30	0		
* 168 hrs = 1 week; 336 hrs = 2 weeks; 672 hrs = 4 weeks; 720 hrs = 30 days.				

Table 4.3.2 Circular chart speed details

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4.3.2 GROUP CONFIGURATION (Cont.)

GRID TYPE

Grid type allows the chart grid type to be defined for the group being configured. This is not necessarily related to channel scale (section 4.3.3), unless 'From point' is selected, when the grid matches the scale of the selected point.

NONE

No chart grid is traced.

LINEAR

The chart grid is linear, with the major and minor divisions defined by the fields Grid Divisions - Major and Minor, which appear if 'Linear' is selected as grid type.
Figure 4.3.2c, below, defines major and minor divisions.

LOG

This menu item appears only if the Log Scales option is fitted.
The chart grid is logarithmic, with the number of decades being selected in the 'Grid Decades' field which appears if 'Log' is selected as Grid Type. Figure 4.3.2c gives an example.

FROM POINT

This allows the chart grid to be aligned with the scale of a particular 'point', selected in the 'from' field which appears if 'From Point' is selected as 'Grid Type'

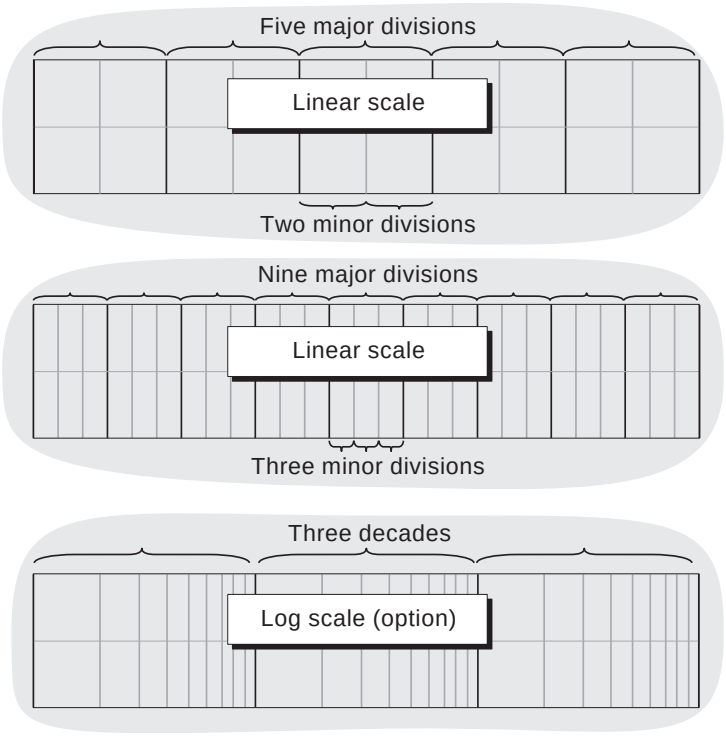


Figure 4.3.2c Chart grid definitions

RECORDING ENABLE

This tick box allows the logging of this group's data to the flash memory to be enabled/disabled. When disabled:

a The recording speed/interval and Trend history duration fields do not appear.

b Display trends are not preserved when changing 'Views'.

> Note: If a 'Recording' job (section 4.7.10) are set to act on a particular group, then the group will be recorded only whilst the job is active, and only if Recording is enabled for the group.

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4.3.2 GROUP CONFIGURATION (Cont.)

RECORDING SPEED/RECORDING INTERVAL

If recording is enabled, these fields are as for trend speed/interval but define the rate at which data is saved to Flash memory. This value also affects how much trace history appears per screen height in trend history mode (section 3.4.1). If recording is not enabled, these fields do not appear.

If A/B switching is enabled, a second Recording Speed /Interval value can be entered. Recording Speed/Interval 'A' is used during normal operation. Recording Speed/Interval 'B' is switched to by job action, as described in section 4.7

TREND HISTORY DURATION

Gives an estimated time to fill the group's trend history area of the Flash memory. The calculation is based on the archive rate, the compression ratio, the flash size and on the exact nature of the data. (Rapidly changing values use more space than static/slowly changing values.) If A/B switching is enabled the calculation is based on Recording Speed/Interval 'A'.

For recorders with more than one group, changing the contents of one group may affect the Trend History Duration of other groups. This happens because the recorder attempts to store, as nearly as possible, the same amount of history for all groups, regardless of how many points there are in the groups. For 'empty' groups, the Trend History Duration is displayed as '0' Days

ARCHIVE TO MEDIA/ARCHIVE VIA FTP

If recording is enabled, these tick boxes allow the archiving of this group's data to removable mass storage media (e.g. floppy disk) and to a remote host (FTP) to be enabled or disabled. If recording is disabled, these fields do not appear.

> Note: For recorders with Multiple Groups and floppy disk drives only, it is recommended that only one group be set up for automatic archiving. This is because history files are typically 400kB in size and this limits the number of files which can be saved to a 1.4MB floppy disk, to three. If more than one group is set up to archive, and if 'Overwrite' strategy is selected, then it is likely that all the data for one or more of the groups will be lost. If an attempt is made to setup more than one group for archiving the following message appears:
> 'Not recommended to archive more than 1 group to floppy disk due to limited space - see manual'

ALARM MESSAGE

This box allows the printing of alarm on and off messages on the 'chart' to be enabled (cross) or disabled (no cross) as required. Alarm messages appear on the trend display and in PC Review in the form HH:MM:SS Alarm ON n/m and HH:MM:SS Alarm OFF n/m, where 'n' is the relevant channel number and 'm' is the alarm number (1 or 2).

ACK MESSAGE

This tick box allows the printing of alarm acknowledgement messages on the 'chart' to be enabled (tick) or disabled (no tick) as required. Acknowledge messages appear on the trend display and in PC Review in the form HH:MM:SS

ALARM ACKNOWLEDGE
Alarms are acknowledged as described in section 3.1.3.

GROUP CONTENTS

This appears as a number of tick-boxes, to include the ticked items in, or to exclude non-ticked items from, the group, as required. Each group may contain any or all of the measuring channels, maths channels and totalisers (if fitted), but only the first 36 will be displayed.

> Note: If a configuration has been generated on a recorder version 1.2 or later, and this configuration has been 'restored' into a version 1.1 recorder, a message "Invalid item" appears on entering group configuration unless an auto-configuration (section 4.3.10) has been carried out since the Restore operation. Operation of the "OK" key clears the message, and the recorder operates as normal.

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4.3.3 Channel/Alarm configuration

Figure 4.3.3a below, shows a typical configuration menu for an input channel. (For maths channels see section 3 of the Options Manual.) The actual fields that appear depend on what input type is selected, what linearisation type is selected, and so on.

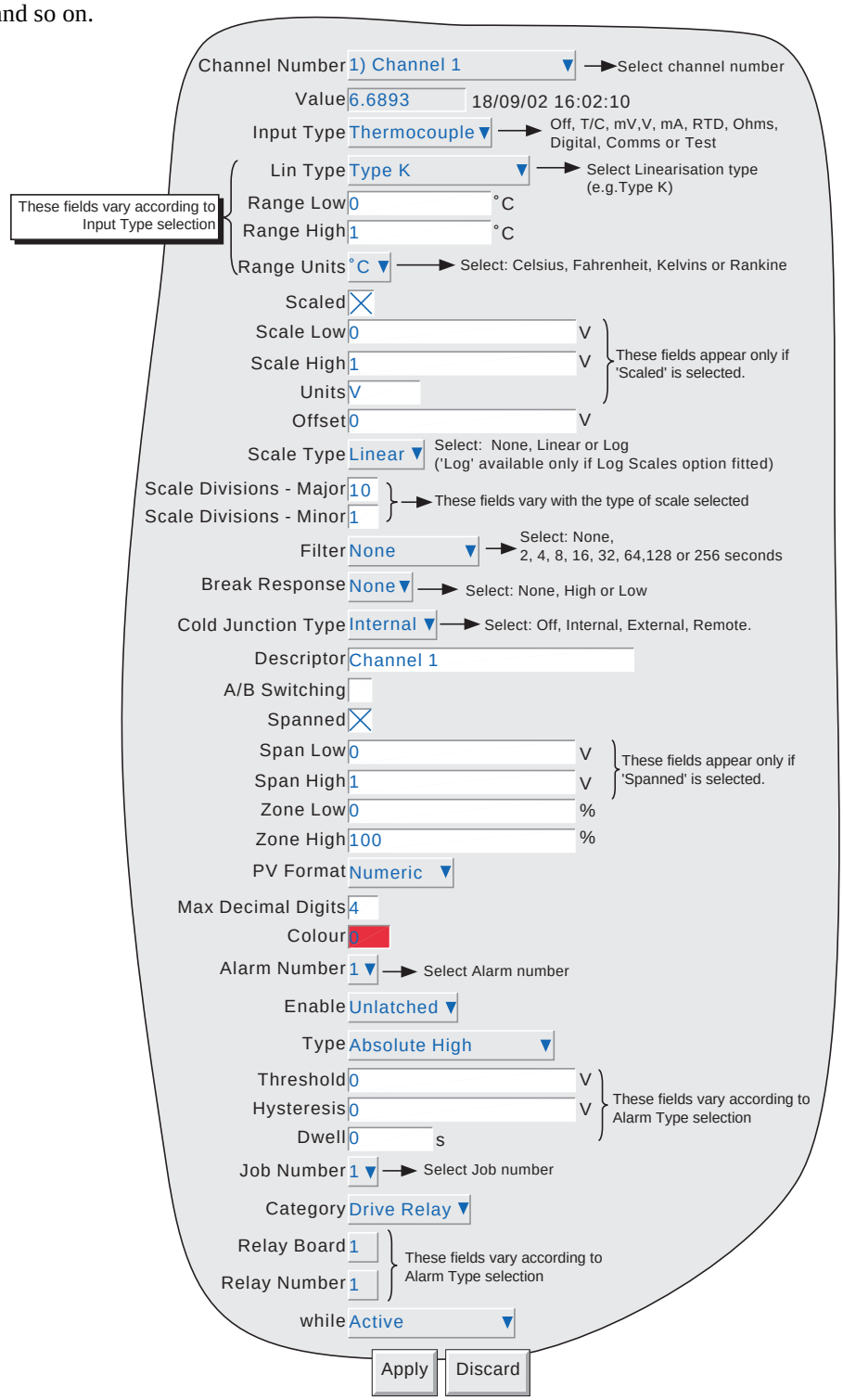


Figure 4.3.3a Channel/alarm configuration menu (typical)

Notes

1. Numeric values (e.g. 'input low') can be up to 10 characters including decimal point
2. Refer to section 3.3.1 for numeric and text entry techniques.

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4.3.3 CHANNEL/ALARM CONFIGURATION (Cont.)

Example: A type J thermocouple is used to measure a temperature range of 100 to 200 degrees Celsius. This thermocouple output is transmitted to the recorder by a 4 to 20 mA transmitter, for display as an efficiency value between 0 and 100%. In such a case, the following values would be set up:

Input type =	milliamp
Input range low =	4.0
Input range high =	20.0
Scale low =	0.0
Scale high =	100
Scale units =	%
Linearisation range low =	100
Linearisation range high =	200
Linearisation type units =	degrees C
Linearisation type =	Type J thermocouple.
Input shunt value =	250 ohms

Note: The following description shows all possible fields. The recorder itself edits the list and shows only those fields appropriate to the setup so far. For example, the 'Shunt' field appears only for mA input type.

CHANNEL NUMBER

The current channel and its descriptor are displayed. Touching the window area allows another channel to be selected for configuration.

VALUE

Shows the current value of the channel, together with either 'Unadjusted' or the date and time of channel adjustment.

INPUT TYPE

Select thermocouple, millivolt, Volt, milliamp, RTD, Ohms, Digital (not channel 1, 7 etc.), Slave Comms, Test or Master Comms as input type. Slave Comms must be selected if the channel is to be written-to via Modbus. Master Comms must be selected if this channel is to read from another instrument. For details of Master Comms see section 3 of the Communications Manual.

LIN TYPE

The following linearisation tables are available as standard:

Linear, square root, $x^{3/2}$, $x^{5/2}$, UserLin1, UserLin2, UserLin3, UserLin4 (see section 4.3.9 for user linearisations)
Thermocouple types B, C, D, E, G2, J, K, L, N, R, S, T, U, NiMo/NiCo, Platinel, Ni/NiMo, Pt20%Rh/Pt40%Rh
Resistance thermometer (RTD) types Cu10, Pt_{100}, Pt_{100}A, JPT_{100}, Pt_{1000}, Ni_{100}, Ni_{120}, Cu_{53}.

For input ranges, accuracies etc. associated with the above thermocouple/RTD tables, see Annex A.

INPUT LOW

Enter the lowest value to be applied to the input terminals (e.g.4.00).

INPUT HIGH

Enter the highest value to be applied across the input terminals (e.g. 20.00).

SHUNT

Allows a shunt resistor value to be entered for input type = mA. Commonly used values are 100 ohms and 250 ohms. Note that shunt resistors are connected to the input connector. The recorder cannot detect whether a shunt is fitted, or if one is, what value it has. Therefore it is the responsibility of the user to ensure that the ohmic value of any shunt fitted matches the shunt value entered in this field.

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4.3.3 CHANNEL/ALARM CONFIGURATION (Cont.)

RANGE LOW

Enter the lowest value of the required linearisation range (e.g. 100)

RANGE HIGH

Enter the highest value of the required linearisation range (e.g. 200)

RANGE UNITS

Selectable from degrees Celsius, degrees Fahrenheit, Kelvin or Rankine.

SCALED

This box allows the user to select low and high values and units for a scale.

SCALE LOW

Enter the scale value to correspond with input range low (e.g. 0).

SCALE HIGH

Enter the scale value to correspond with input range high (e.g. 100).

SCALE UNITS

Enter up to five characters of unit descriptor (e.g.%).

> Note:
> User linearisation tables units
> To set user linearisation table units to temperature units (˚C for example), the Range Units selection box can be used.
> To enter custom units, 'Scaled' must be selected. Scale low must be set to Range Low; Scale high must be set to Range High. The required Units string is entered in the Scale units text entry box.

OFFSET

Allows a fixed value to be added to or subtracted from the process variable. Recorder accuracy figures no longer apply if an offset is included.

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4.3.3 CHANNEL/ALARM CONFIGURATION (Cont.)

SCALE TYPE

This field allows 'None', 'Linear' or (if the Log Scales option is fitted), 'Log' to be selected as scale type. For linear scales, the number of major/minor scale divisions can be selected. This does not affect the 'chart' grid divisions, which is set up as a part of Group configuration (section 4.3.2).

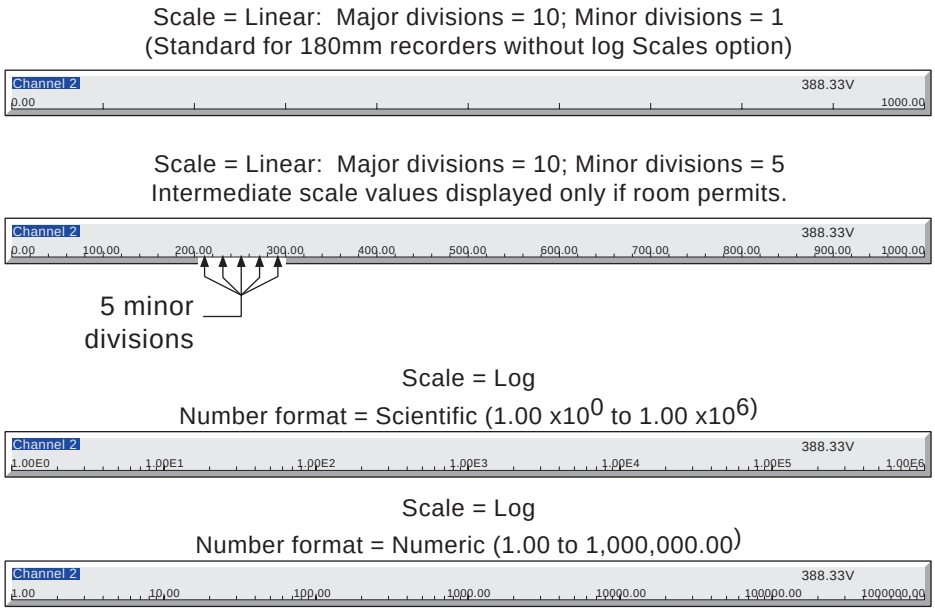


Figure 4.3.3b Scale type examples

NONE

Channels with Scale Type selected to 'None', appear with no scale information in any display mode.

LINEAR

Channels with Scale Type = Linear, appear with scale information in all display modes (except numeric). The number of major and minor divisions can be selected from subsequent fields. Examples are shown in figure 4.3.3b, above.

LOG

This menu item appears only if the Log Scales option is fitted.

Channels with Scale Type = Log, appear with logarithmic scales. These scales have major divisions at each decade boundary, and (space permitting), minor divisions for mantissa values 2 to 9. Examples are shown in figure 4.3.3b, above. Because of the nature of logarithms, neither negative values nor the value 0 can be used as scale 'zero'.

SCALE DIVISIONS - MAJOR

Appears for Linear Scale types only. Setting major divisions to 1, means that the scale consists only of 'zero' and full scale. Setting Major divisions to 2, means that the scale has divisions at zero, 50% and full scale, and so on. Intermediate scale values appear at major divisions if there is sufficient space.

SCALE DIVISIONS - MINOR

Appears for Linear Scale types only. Setting minor divisions to 1, means that the scale major divisions are not divided i.e. no minor division tick marks appear . Setting Minor divisions to 2, means that each major scale division is divided into two, and so on. See figure 4.3.3b, above, for an example showing five minor divisions.

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4.3.3 CHANNEL/ALARM CONFIGURATION (Cont.)

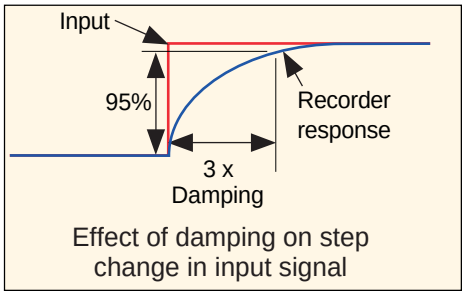


Figure 4.3.3c Channel filter

FILTER

For 'noisy' slowly changing signals, damping can be used to filter noise so that the underlying trend can be seen more clearly. None, 2, 4, 8, 16, 32, 64, 128 or 256 seconds can be selected.

It is not recommended that damping be used on quickly changing signals.

BREAK RESPONSE

For thermocouples and other low level inputs (i.e. input voltages less than 150mV), the recorder can be made to respond in one of the following ways, if a break in the input circuit is detected.

None trace drifts with the input wiring acting as an aerial.
Drive hi trace placed at full scale
Drive lo trace placed at scale 'zero'

COLD JUNCTION COMPENSATION (CJC)

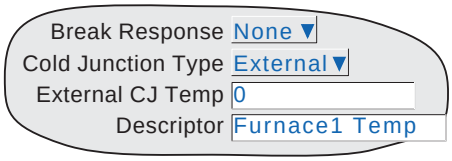
For input type = thermocouple, None, Internal, External or Remote can be selected for cold junction compensation.

INTERNAL

Internal CJC is by means of an RTD connected across pins 11 and 12 of the input board connector.

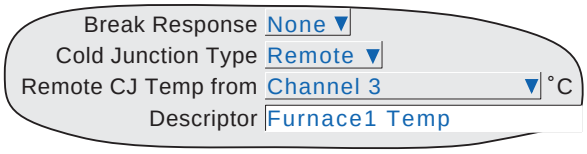
EXTERNAL

If the cold junction is maintained (by the user) at a known, fixed temperature, 'external' should be selected. An extra numeric entry box appears to allow the user to enter the temperature at which the cold junction is maintained.



REMOTE

'Remote' is selected if the cold junction temperature is to be measured by an external device connected to the instrument. An extra picklist appears which allows the user to select any input or maths channel to act as the cold junction temperature source channel. The temperature units displayed here, are those of the channel being configured, not those of the CJ source channel. The CJ source channel must be configured appropriately for the external device, and must provide a value which is consistent with the configured channel's units.



DESCRIPTOR

Allows a text string of up to 20 characters (including spaces) to be entered for the channel descriptor. (E.G. 'Turbine 2 tempA').

A/B SWITCHING

If enabled, this function allows alternative Span, Zone and Trace Colour values to be entered. 'A' values are used during normal operation. 'B' values are switched to by job action, as described in section 4.7

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4.3.3 CHANNEL/ALARM CONFIGURATION (Cont.)

SPANNED

This box, when selected, allows span low and high values to be entered. For example, in an input range of 0 to 600 deg C, it may be that the temperature range between 500 and 600 degrees is of most interest. In such a case, setting span low to 500 and span high to 600 will cause the recorder to display only that part of the input range, and this will fill the zone width which is selected next, effectively magnifying the area of interest.

If A/B switching is enabled, a second set of span low and span high values can be entered. 'A' values are used during normal operation. 'B' values are switched to by job action, as described in section 4.7.

ZONE

This allows the portion of the chart which the channel occupies to be defined in terms of percent, where the left edge of the chart is 0% and the right hand edge is 100%. For example, setting a low value of 50 and a high value of 100 causes the channel trace to be confined to the right hand half of the chart.

If A/B switching is enabled, a second set of zone low and zone high values can be entered. 'A' values are used during normal operation. 'B' values are switched to by job action, as described in section 4.7.

PV FORMAT

This allows the PV value, alarm setpoints, hysteresis values etc. to be displayed as normal numeric values (Numeric) or in 'Scientific' format (Scientific). When 'Scientific' is selected, values are displayed and entered as a decimal number between 1 and 10† (the mantissa), followed by a multiplier (the exponent). E.G. to enter a value of 1244.5678, the value entered would be 1.2445678E3, where 3 represents the number of places that the decimal point must be shifted to the left in order to convert the value to a number between 1 and 10†. To enter a value of 0.0004196, the entry would be 4.196E-4.

† Notes
1. Strictly this is a number less than 10, as 10 would be 1.0E1.
2. There must be at least one number after the decimal point.

MAXIMUM DECIMAL DIGITS

This defines the number of decimal places in the process value. Settable between zero and nine. Leading and trailing zeros are not displayed. Values too long for the available displaying width are truncated as described in section 3.

COLOUR

Allows the trace colour to be selected from a colour chart. Each of the 56 available colours is displayed with a number, and it is this number which is entered. The background colour to the selection box changes to the selected colour.

If A/B switching is enabled, a second colour selection can be entered. Colour 'A' is used during normal operation. Colour 'B' is switched to by job action, as described in section 4.7

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4.3.3 CHANNEL/ALARM CONFIGURATION (Cont.)

ALARM NUMBER

Allows an alarm to be selected for configuration. (1 or 2 for 16MB DRAM recorders, 1 to 4 for 32MB versions.)

ENABLE

Allows the alarm to be defined as Off, Unlatched, Latched or Trigger

Off	Alarm is disabled and the remainder of the alarm configuration is hidden.
Unlatched	Unlatched alarms become active when the trigger source becomes active and remain active until the source returns to a non-active state. The indicator is on (flashing before acknowledgment - steady after acknowledgement) until the alarm clears. Alarm messages are printed if enabled in group configuration.
Latched	Latched alarms become active when the trigger source becomes active and remain active until the alarm is acknowledged AND the trigger source has returned to a non-active state. The indicator is on (flashing before acknowledgment - steady after acknowledgement) until the alarm has been acknowledged AND the trigger source has returned to a non-active state. Alarm messages are printed if enabled in group configuration. Continuous jobs remain active only whilst the alarm trigger source is active. I.E. the job finishes when the alarm clears, whether acknowledged or not.
Trigger	When triggered all associated jobs are initiated, and continuous jobs remain active until the alarm clears. There is no alarm indication, and no messages are printed.

TYPE

This field appears only when the alarm Enable is not selected Off. Each alarm can be defined as absolute high, absolute low, deviation-in, deviation-out, rate-of-change rise or rate-of-change fall.

Absolute High	As shown in figure 4.3.3d, an absolute high alarm becomes active when the channel value exceeds the threshold value. The alarm remains active until the channel value falls below (Threshold minus hysteresis). If a dwell value is defined, the alarm does not become effective until this dwell time has been exceeded.
Absolute Low	As shown in figure 4.3.3d, an absolute low alarm becomes active when the channel value falls below the threshold value. The alarm remains active until the channel value exceeds (Threshold + hysteresis). If a dwell value is defined, the alarm does not become effective until this dwell time has been exceeded.
Deviation in	As shown in figure 4.3.3e, a deviation-in alarm becomes active whenever the channel value enters the band: Reference ± Deviation. It remains active until the channel value leaves the band: Reference ± (Deviation+ Hysteresis). If a dwell value is defined, the alarm does not become effective until this dwell time has been exceeded.
Deviation out	As shown in figure 4.3.3e, a deviation-out alarm is active whenever the channel value leaves the band Reference ± Deviation. It remains active until the channel value enters the band: Reference ± (Deviation - Hysteresis). If a dwell value is defined, the alarm does not become effective until this dwell time has been exceeded.
Rate of change	As shown in figure 4.3.3f, rate of change alarms become active whenever the signal value changes by more than a specified amount within a specified period. If a dwell value is defined, the alarm does not become effective until this dwell time has been exceeded. An averaging period can be set to remove the effects of sudden, but short-lived changes, such as noise spikes on the signal.

Note: Alarm icons appear at the display, as described in section 3 of this manual.

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4.3.3 CHANNEL/ALARM CONFIGURATION (Cont.)

PARAMETERS

Figures 4.3.3d, e and f illustrate the following terms for the different alarm types.

Threshold — For Absolute alarms, this defines the value (in engineering units) at which an alarm is triggered. The alarm also returns to its non-active state at this value unless a threshold value has been set, If a dwell value is set, the alarm does not become active until this dwell time has elapsed.

Hysteresis — Defines a 'deadband' (in engineering units) to eliminate spurious triggering if the signal value is hovering around the trigger point. The deadband lies:
Below Absolute High thresholds
Above Absolute Low thresholds
Outside the deviation band for Deviation-in alarms
Inside the deviation band for Deviation-out alarms.

Dwell — Allows a dwell period to be entered in seconds. The alarm does not take effect until this period has expired. If an alarm clears before the dwell period has expired, the alarm is ignored.

EXAMPLE
Threshold = 100 units; Hysteresis = 5 units
A high alarm becomes active when its input rises above 100 and remains active until its value falls below 95 units. A low alarm becomes active when its input falls below 100 units, and remains active until its input rises above 105 units.

Reference — For Deviation alarms, this is the central value of the deviation band.

Deviation — For Deviation alarms, this value defines the width of the deviation band, each side of the reference value. I.E. the total width of the deviation band is 2 x Deviation value.

Amount — For Rate-of-change alarms, this value defines the amount by which the signal value would have to change, within the 'Change Time' period (below), in order for the alarm to become active.

Change Time — For Rate-of-change alarms, this selects the time period (Per second, Per minute, Per hour) within which the change in signal value must exceed the Amount value (entered in the preceding field) in order for the alarm to become active.

Average time — For rate-of-change alarms, this allows an average period to be entered for signal smoothing.

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4.3.3 CHANNEL/ALARM CONFIGURATION (Cont.)

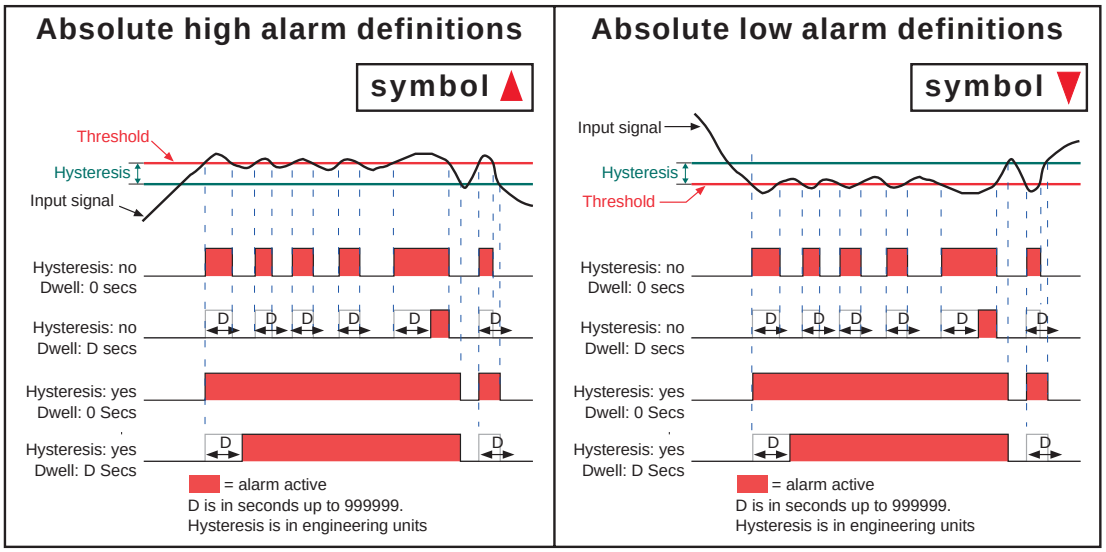


Figure 4.3.3d Absolute alarm definitions

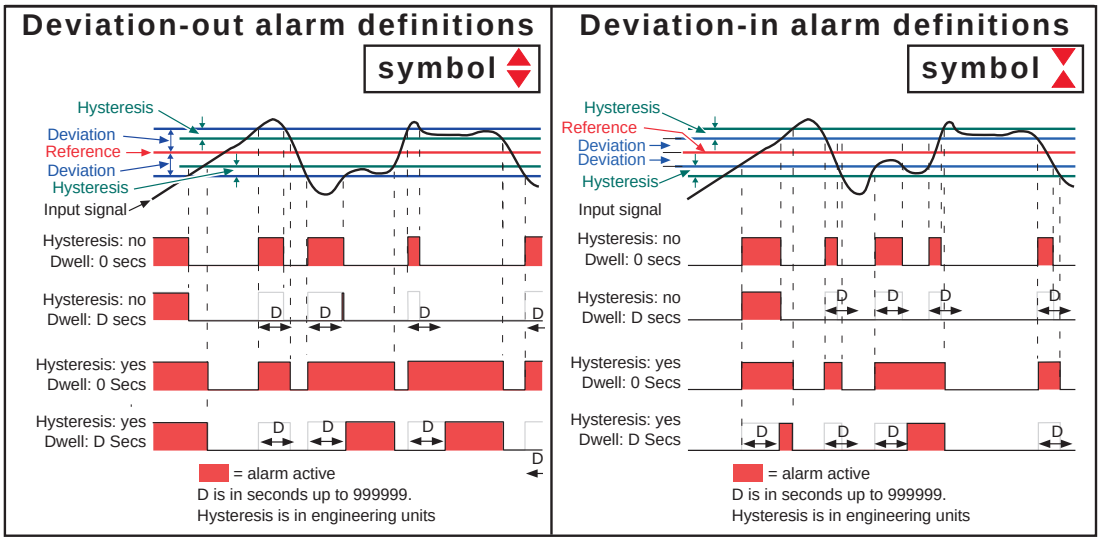


Figure 4.3.3e Deviation alarm definitions

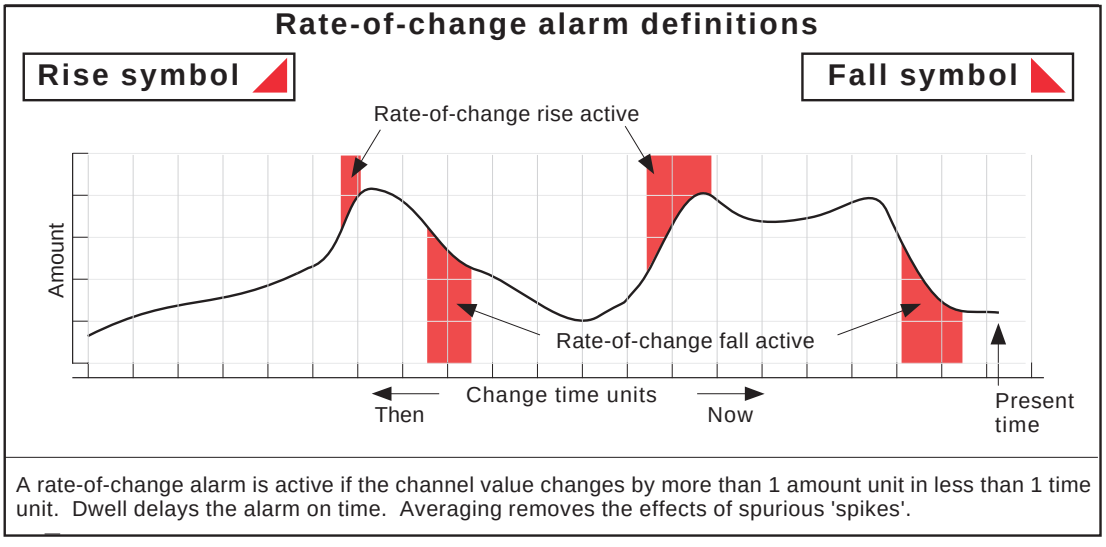


Figure 4.3.3f Rate-of-change alarm definitions

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4.3.3 CHANNEL/ALARM CONFIGURATION (Cont.)

JOB NUMBER

Select the required job number.

CATEGORY

Select the required job to be carried out when the channel is in alarm (e.g. Drive relay) See section 4.7 for a description of job categories.

WHILE/ON

Allows the action of the alarm job to be chosen as

a. whilst active, whilst inactive or whilst unacknowledged for continuous jobs (e.g. drive relay), or,
b. on going active, on going inactive or on acknowledgement for 'one-shot' jobs (e.g. increment counter).

Figure 4.3.3g, below, shows the various actions graphically. For 'While unacknowledged' and 'on acknowledgement' settings, two cases are shown, one where the alarm goes inactive before acknowledgedment; the other where the alarm is acknowledged whilst the alarm is still active. The coloured (shaded) areas show the duration for which continuous jobs run; the down arrows show trigger points for 'one-shot' jobs. See section 3.1.3 for details on how to acknowledge alarms.

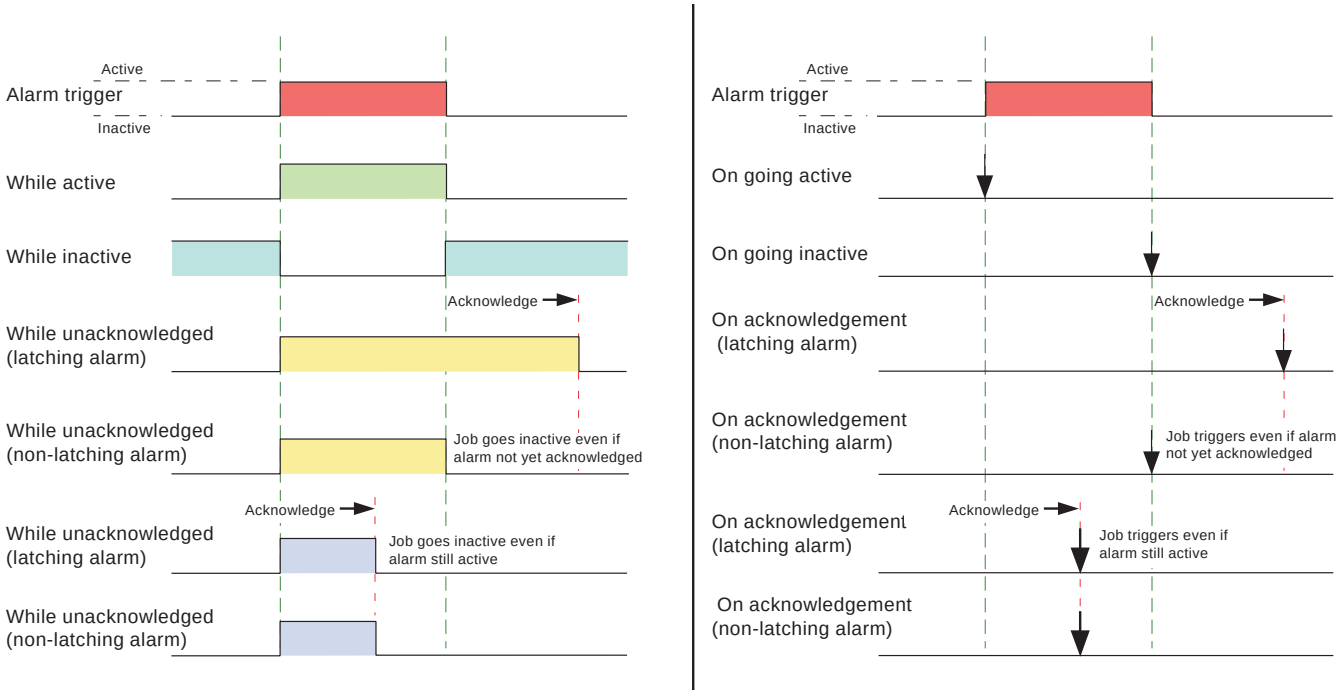


Figure 4.3.3g Graphical representation of job actions

ALARM MESSAGES

Alarm on/off and alarm acknowledge message printing on the chart can be enabled/disabled as a part of 'Group configuration' described below. See section 3.1.3 for details on how to acknowledge alarms.

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4.3.4 Views Configuration

This part of the recorder's configuration allows groups to be set up (either individually, or globally) to include the various display modes described in section 3.4, above, and user screens (if fitted). When enabled, a display mode is added to the Group's 'Goto View' menu and to the up/down arrow scroll list.

Home Group and Home Page picklists allow a group and display mode to be defined for display when the Home key is pressed in the Root menu.

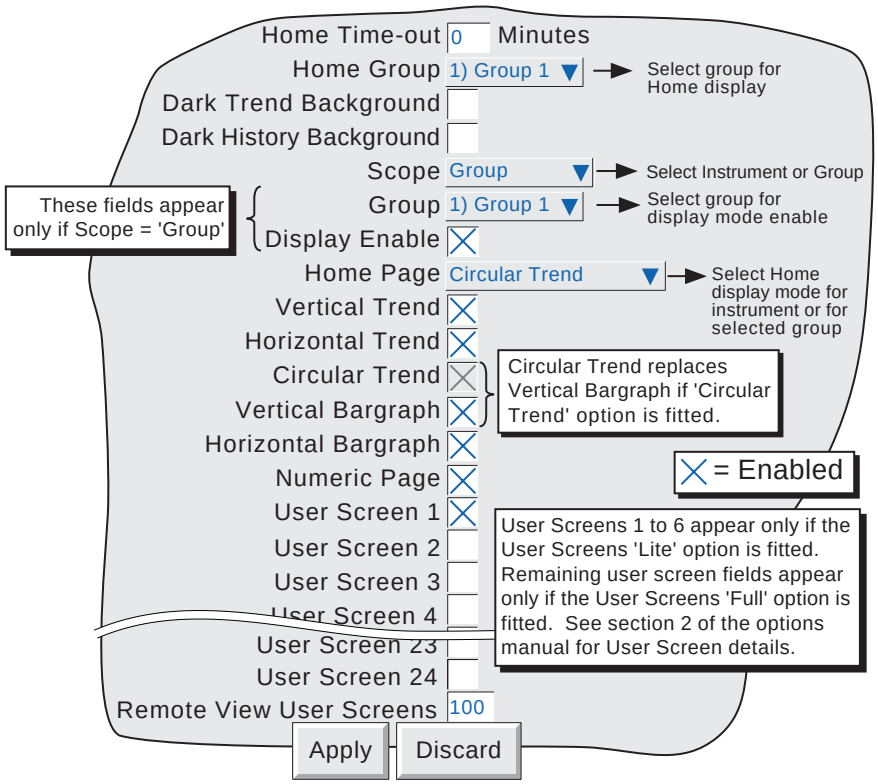


Figure 4.3.4a Views Configuration menu

HOME TIMEOUT

The recorder returns to the specified home page after the timeout value of minutes has elapsed since the last touch on the display. Timeout action is inhibited if a configuration is incomplete (there are changes which have not been 'Applied'), or if a system-generated message (e.g. 'Clock Failure') is on display. User displays (e.g. Root menu) are timed-out after approximately 50 seconds.

A value of zero disables the time-out function. Valid entries are between 1 and 99 minutes

HOME GROUP

This picklist allows a particular group to be selected for display when the root menu 'Home' key is pressed.

DARK TREND/DARK HISTORY BACKGROUND

These tick boxes allow the user to select a black 'chart' for normal trending and/or trend history mode. These selections act globally (i.e. on all groups) and are alternatives to the normal white-chart trend displays, not additional to them.

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4.3.4 VIEWS CONFIGURATION (Cont.)

SCOPE

The remaining items of Views configuration can be selected to act globally (Instrument) or to act on individual groups (Group). When 'Instrument' is selected, enabled display modes appear in all groups' up/down arrow scroll lists and are active in the Root Menu 'Goto View' menu (figure 4.3.4b). When 'Group' is selected, each group can be set up with individual display mode lists. For the particular group on display, the up and down arrow keys can be used to scroll through the enabled display modes, or a particular mode can be selected using the 'Goto View' menu.

GROUP

This field appears only if 'Scope' is set to 'Group', and allows each group to be selected for display configuration. For other items of Group configuration, see Section 4.3.2.

Note: Group 1 is a standard recorder feature. The supply of groups two to six (Multiple groups) is an optional extra.

DISPLAY ENABLE

This field appears only if 'Scope' is set to 'Group', and allows the selected group to be enabled or disabled for display. When enabled, the group can be displayed either by using the 'Root menu/Goto screens/Group N' selection (figure 4.3.4b) or can be scrolled-to using the right/left arrow keys. When disabled, the group is 'greyed' in the 'Root menu/ Goto screens/Group N' selection and is skipped when using the right/left arrow keys. It is not possible to disable the Home group.

HOME PAGE

Allows a particular display mode to be selected as the default display, either for all groups (Scope = instrument) or on a group-by-group basis (Scope = group).

DISPLAY MODE ENABLING

A series of check boxes allow the various display modes to be added to (or removed from) the up/down arrow scroll list and to be activated/deactivated in the Root menu 'Goto View' menu, either for all groups (Scope = instrument) or on a group-by-group basis (Scope = group). It is not possible to disable the selected Home page mode.

Notes:

1 If the Circular Trend option is fitted, this replaces Vertical Bargraph display mode. For illustrative purposes, figure 4.3.4a, above, shows both, but only one or the other may appear.

2 If Circular Trend view is enable here in Views configuration, but the 'Circular settings' checkbox is not enabled in Group configuration (section 4.3.2), then, although the circular chart will appear, it is unlikely that the chart will contain any trends.

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4.3.4 VIEWS CONFIGURATION (Cont.)

USER SCREENS 1 to N

This field appears only for recorders with the User Screens Option fitted. This option is fully described in section 2 of the Options Manual . Allows up to N user screens to be included in the up/down arrow scroll list and to be active in the Root menu 'Goto View' menu (figure 4.3.4b), where N is 6 for the User Screens 'Lite' option, or 24 for the 'Full' Version. Full version users also can define a number of extra user screens (User screens 25 onwards) which can be created only by using Remote Viewer software. Once created these screens can be copied to normal user screens if required.

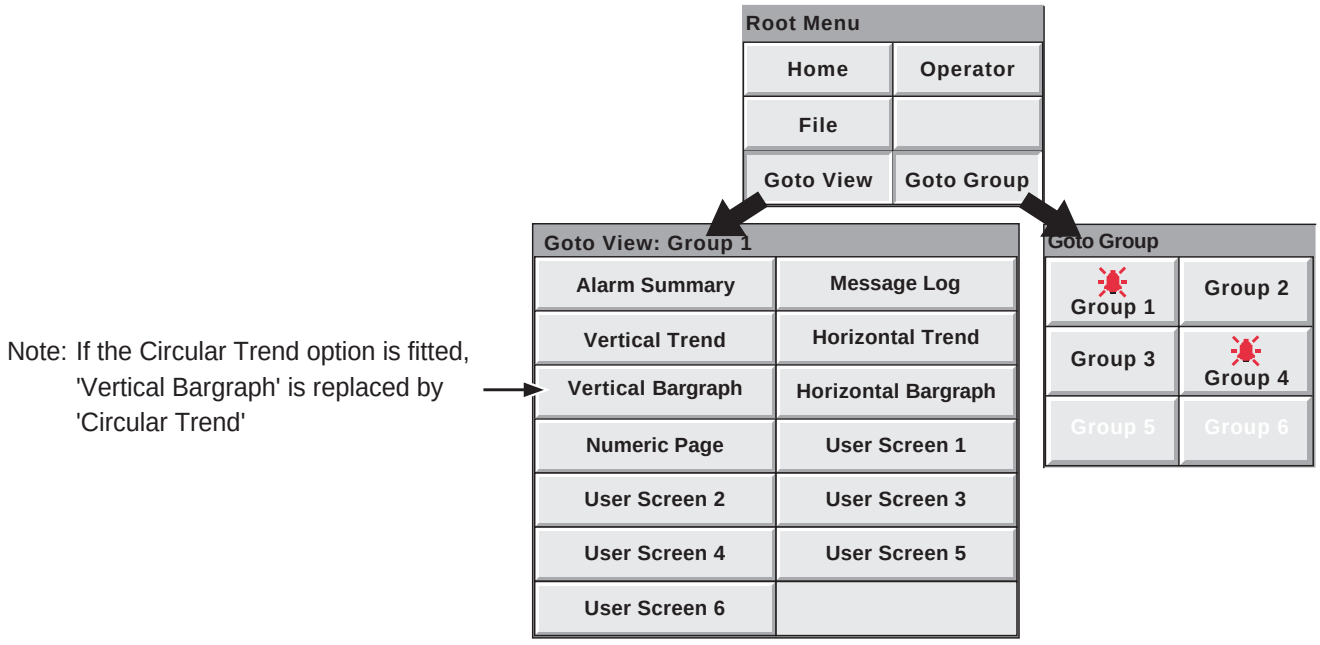


Figure 4.3.4b Goto View and Goto Group submenus
(User Screens 'Lite' option fitted; Groups 5 and 6 disabled)

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4.3.5 Archive configuration

Notes:
1. For the sake of brevity, the word 'disk' is used for whatever mass-storage medium is fitted to the recorder.
2. The Media/FTP File Format fields appear only if the CSV option is fitted. The option is described later in this section.
3. CSV format files are not as secure as Packed Binary format files..

This allows an archive strategy to be set up for saving data to disk or to a remote PC. The disk strategy includes archive period, disk full operation, compression factor and an estimate of the maximum-time-to-next-archive to avoid data being overwritten in memory (Duration). This period is almost always greater than the space available on a floppy disk.

The recorder uses a dedicated area of its Flash memory as an archive data buffer, which means that data is written to the disk or remote PC only when required, rather than continuously.

In order to carry out a successful remote archive, details of the remote host must be entered both in this Archive section of the 'Config' menu, and in Network configuration (section 4.5). Further, the current access level must have 'Connect from remote' enabled in the Security/Access menu (section 4.4.1).

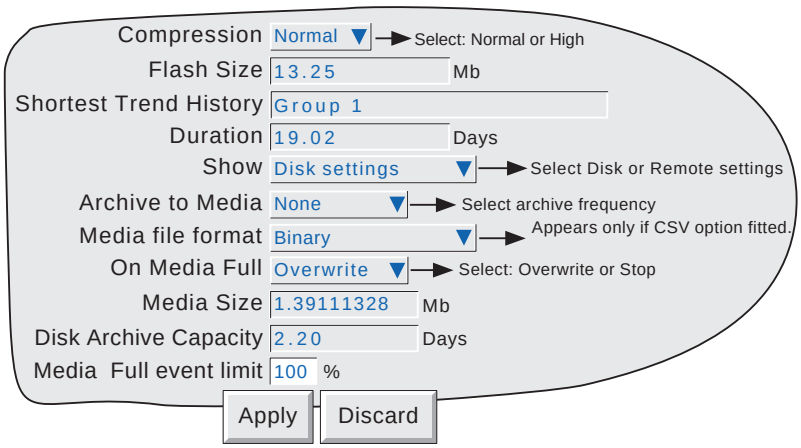


Figure 4.3.5a Archive configuration menu (Disk settings)

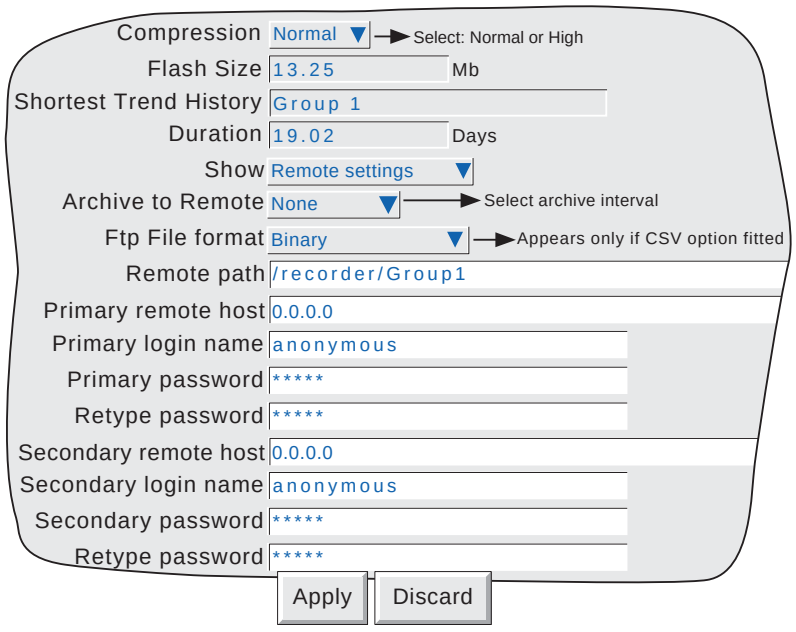


Figure 4.3.5b Archive configuration menu (Remote settings)

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4.3.5 ARCHIVE CONFIGURATION (Cont.)

COMPRESSION

Select Normal or high compression. 'Normal' compresses the data but still provides an exact copy. 'High' compresses more, but channel values are saved only to 1 part in 10^8 resolution. This field does not apear if 'CSV' is selected as file format (see below)

FLASH SIZE

Allows the size of the Flash memory to be viewed by the user.

SHORTEST TREND HISTORY / DURATION

This shows which group has the shortest amount of Flash memory allocated to its history record. Providing the archive period is less than the value displayed in the Duration window, no data will be lost from any group. If the archive period is greater than this value, then some of the data in one or more groups will have been overwritten and therefore lost.

If there is more than one group with the same Shortest Trend History Duration, the group with the lowest number is displayed. (E.G. If groups two and four both have the same duration, 'Group 2' will appear in this window.)

Note: Trend history duration depends on many factors, as described in Group Configuration (section 4.3.2) above.

CSV CHECKBOXES, DATE/TIME FORMAT

These appear only if the CSV option is fitted, and the 'Media File Format' or 'FTP file format' are set to either 'CSV' or 'Binary and CSV'. Refer to the CSV option description at the end of this subsection (4.3.5)

SHOW

This allows the fields which are to appear below 'Show' to be applicable to disk (Disk Settings), or to the setting up of a remote host path for archiving purposes (Remote settings). The following descriptions contain all the fields which may appear in either menu.

ARCHIVE TO MEDIA

For Disk Settings only:

None	Archive to disk is initiated by the operator (section 4.1)
Hourly	Archive to disk occurs on the hour every hour
Daily	Archive to disk occurs at 00:00* hrs each day
Weekly	Archive to disk occurs at 00:00* hrs every Monday
Monthly	Archive to disk occurs at 00:00* hrs on the 1st of each month
Automatic	The recorder selects the slowest out of Hourly, Daily, Weekly or Monthly, which is guaranteed not to lose data. This is calculated according to which of the trend history buffer or the disk is the smaller. The recorder assumes that the disk is 'empty' when making these calculations.

If the recorder has been powered down prior to archive time, the archive takes place the next time the unit is powered up.

*Note: Archive times are not adjusted for Daylight Saving hour changes. Thus if the archive is set to 'daily', 'weekly' or ' monthly' then, during 'Summer Time', the archive will occur an hour late (i.e. at 01:00 hrs. instead of midnight).

MEDIA FILE FORMAT/FTP FILE FORMAT

These configuration items appear only if the CSV option is fitted. Allows 'Binary' (.uhh) files, 'CSV' (.csv) files or 'Binary and CSV' to be chosen for FTP transfer. Please see the CVS option description at the end of this subsection (4.3.5).

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4.3.5 ARCHIVE CONFIGURATION (Cont.)

MEDIA FULL OPERATION

For Disk Settings only:

Overwrite Oldest data replaced with latest data when disk is full.

Stop Archiving stops when the disk is full.

Notes

1 For floppy disk recorders, the maximum number of history files (total for all groups) is 750 per directory. For PCMCIA (memory card) recorders, the maximum number of history files per directory is 750 for each group.

2 When in 'Overwrite' mode, the recorder will overwrite only those files which it has itself created. Thus, if a disk is inserted which contains history files from another recorder, these cannot be overwritten. The file names are of the form UUU....UUUIIIIIIIFFGGSSSSSS, where IIIIII represent the lowest three bytes of MAC address of the recorder which created the file (see section 4.5.1). It is not possible for the user to delete files created by another instrument (i.e. one with a different MAC address).

MEDIA SIZE

For Disk Settings only, this displays the capacity of the Disk or PC card.

DISK ARCHIVE CAPACITY

For Disk Settings only, this gives an estimated time to fill the disk/pc card, based on the archive rate, the compression ratio, the disk size and on the exact nature of the data. (Rapidly changing values use more space than static/slowly changing values.)

MEDIA FULL EVENT LIMIT

For disk settings only, this allows the user to specify a percentage-full value for the disk or pc card, at which the event source 'Archive media % full' is triggered. The event remains active until the disk or pc card is replaced, or has data removed from it to make more room available.

ARCHIVE TO REMOTE

For Remote settings only:

None	Archive to host is initiated by the operator (section 4.1.2)
Hourly	Archive to host occurs on the hour every hour
Daily	Archive to host occurs at 00:00* hrs each day
Weekly	Archive to host occurs at 00:00* hrs every Monday
Monthly	Archive to host occurs at 00:00* hrs on the 1st of each month
Automatic	The recorder selects the slowest out of ‘Hourly’, Daily, Weekly or Monthly, which is guaranteed not to lose data (depends on the size of the Trend History Buffer).

*Note: Archive times are not adjusted for Daylight Saving hour changes. Thus if the archive is set to 'daily', 'weekly' or ' monthly' then, during 'Summer Time', the archive will occur an hour late (i.e. at 01:00 hrs. instead of midnight).

REMOTE PATH

For Remote settings only:

The route to a folder or directory on the remote host, set up as a part of that host’s FTP configuration

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4.3.5 ARCHIVE CONFIGURATION (Cont.)

PRIMARY REMOTE HOST

For Remote settings only:

If a Domain Name Server (DNS) is specified in the Network key 'Name' page (fig 4.5.2), then the Primary Remote Host is the server name. If DNS is not selected, then the Primary Remote Host is the IP address of the remote host, set up in the host's Control Panel\Network.

PRIMARY LOGIN NAME/PASSWORD

For Remote settings only:

Login name and password of the remote host account assigned either by the Network administrator, or in the Guest account of the remote host's FTP Server or User Manager configuration. The password, which must be of between eight and 20 characters, must be entered twice to ensure integrity.

SECONDARY REMOTE HOST/LOGIN/PASSWORD

For Remote settings only:

As for primary versions, but for a secondary host. The secondary route is used only if the primary route fails.

CSV OPTION

This allows archive files to be transferred in comma-separated-values (CSV) format, to PC card or via FTP to a remote host computer.

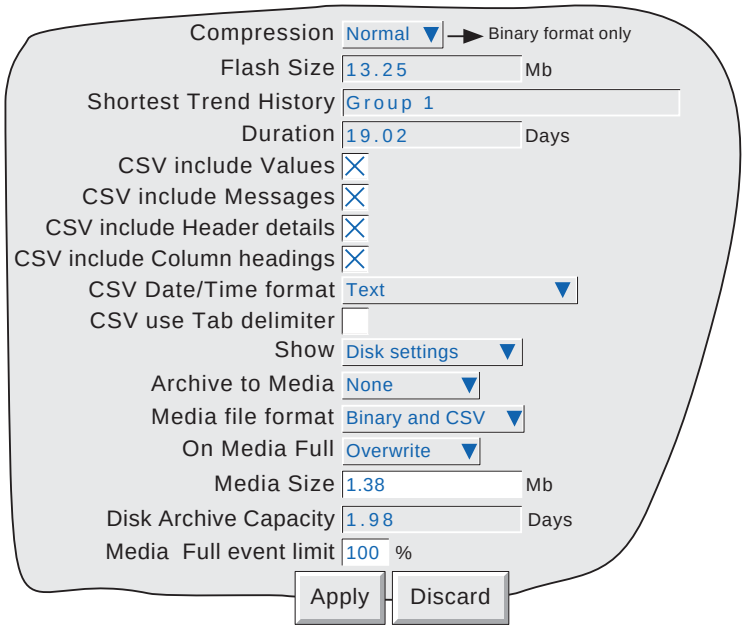


Figure 4.3.5c Archive menu items - CSV option fitted.

MEDIA FILE FORMAT

For Disk settings only, this allows 'Binary', 'CSV' or both to be selected for file type when archiving. 'Binary' is the proprietary format used by the instrument and it requires other software (e.g. Review Software) to interpret the data, before it can be presented in spreadsheets, shown as if on a chart etc. Binary files have the extension '.uhh'.

CSV format is a standard open-file format for numeric data. A simple ASCII-based format, it is readable by a wide range of PC applications as well as being suitable for direct import into many commercial databases. CSV files have the extension '.csv'.

> Note: CSV is ASCII based, and cannot interpret Unicode characters. Some characters available to the user will therefore be displayed incorrectly in CSV files.

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4.3.5 ARCHIVE CONFIGURATION (Cont.)

MEDIA FILE FORMAT (Cont.)

If 'CSV' or 'Binary and CSV' is selected, a number of extra checkboxes appear. Figure 4.3.5c above, shows a typical menu page. Figure 4.3.5d below, shows the effects of enabling the CSV checkboxes, with the exception of 'CSV use Tab delimiter' the use of which is as follows:

CSV USE TAB DELIMITER

Despite its name, CSV does not always use commas as separators.

For example, in some countries, the decimal point is represented by a full stop (period), whilst in other areas, a comma is used. In order to avoid confusion between the comma as a decimal point and the comma as a separator, a different separator is used, usually the semicolon.

The instrument automatically chooses a separator suitable for use with the 'Locale' selected in System Configuration (section 4.6.2). 'CSV Use Tab delimiter' allows the user to override this choice, and force the instrument to use tabs as separators. This can be particularly useful when moving the data from one locale to another.

CSV DATE/TIME FORMAT

Allows 'Text' or Spreadsheet numeric to be selected. Text causes a time/date to appear in the spreadsheet. Spreadsheet numeric displays the number of days since December 30th 1899. The decimal part of the value represents the latest 6 hours, so DDD---DDD.25 represents 0600 hrs, DDD---DDD.5 represents noon etc. Numeric format is more easily interpretable by some spreadsheets, than Text format is.

FTP FILE FORMAT

For Remote settings only, this field appears only if the CSV option is fitted. See the MEDIA FILE FORMAT description for other details

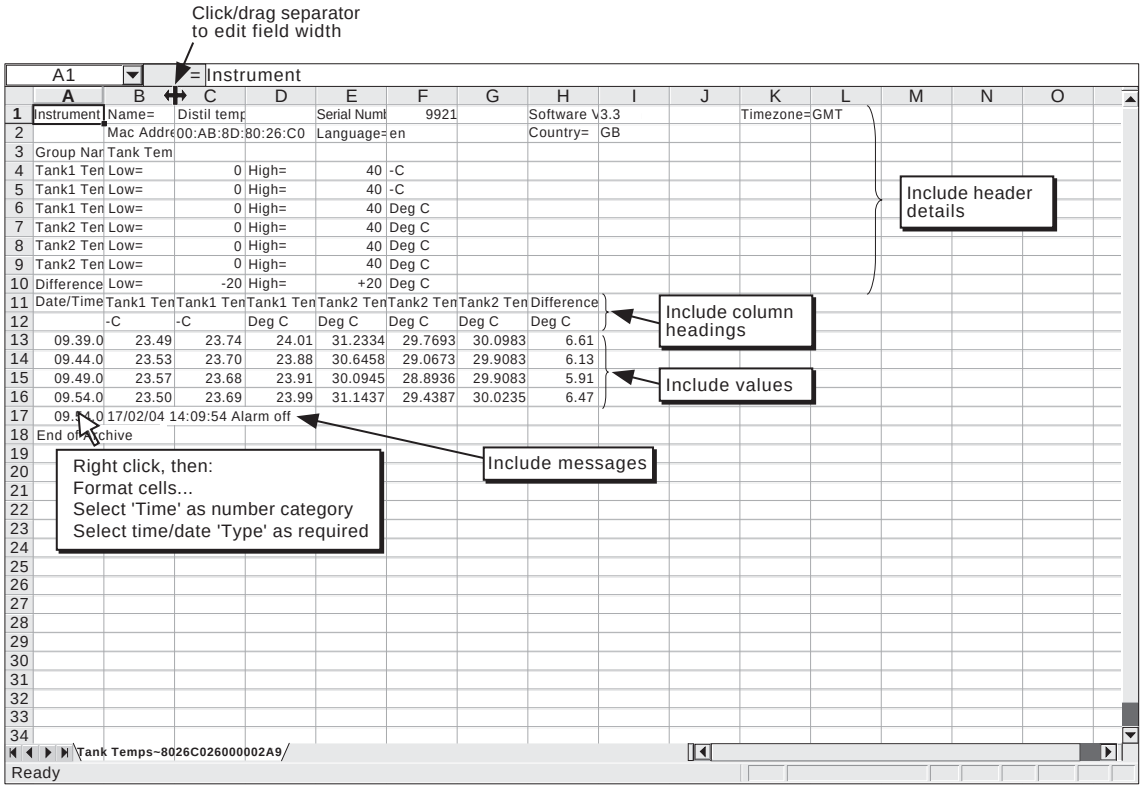


Figure 4.3.5d CSV data example

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4.3.6 Event configuration

A number of internal and external (Event input option) triggers are available for use in initiating Events which will then run job lists. Events can have up to two sources each, but can themselves be used as sources allowing a large number of inputs to be used. Input sources can be logically combined, and can be inverted if required.

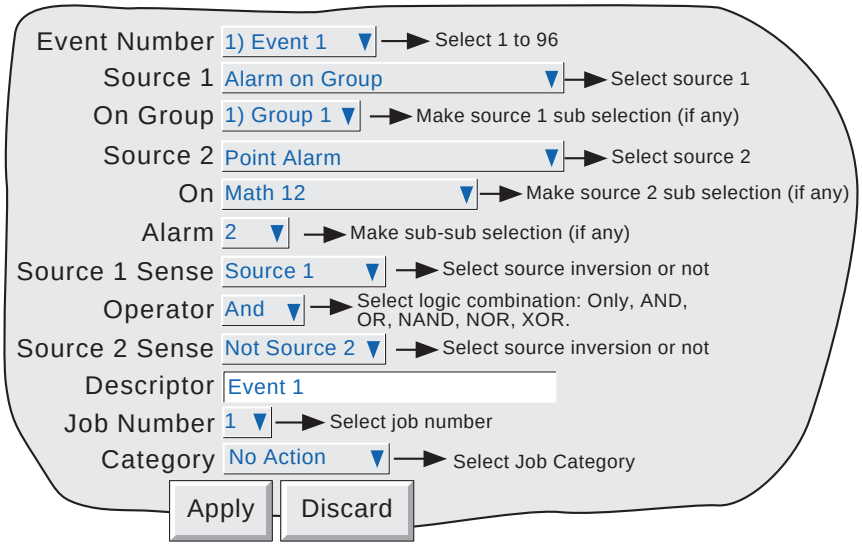


Figure 4.3.6 Event configuration menu layout (typical)

EVENT NUMBER

Allows the required event (1 to 96) to be selected for configuration.

SOURCE TYPES

Off	The event is disabled
Global alarm	The event is active whilst any one or more alarms is active
Global Unack'd alarm	The event is active as long as there is an unacknowledged alarm present.
Comms channel timeout	The event is set if no communication has been made with 'Comms' channels within the Comms channel timeout period set in Instrument configuration (section 4.3.1). The source is reset when the next communication occurs.
Timer active	The event is triggered when a specified timer becomes active (section 6 of the Options Manual). If the Timers option is not fitted, 'Timer Active' does not appear in the picklist.
Batch Running	The event is triggered when a batch is started and remains active until the batch stops. If Scope = 'Group' in Batch configuration (section 1.2 of the Options Manual) then a group can be specified. If Scope = 'Instrument', the group select field does not appear. If the Batch option is not fitted, 'Batch running' does not appear in the picklist.
Batch Start	The event is triggered, fleetingly, when a batch is started If Scope = 'Group' in Batch configuration (section 1.2 of the Options Manual) then a group can be specified. If Scope = 'Instrument', the group select field does not appear. If the Batch option is not fitted, 'Batch running' does not appear in the picklist.
Event	Allows another event to be specified as a source.
Point alarm	Triggered by the specified alarm on the specified point.
Unack'd point alarm	Triggered by the specified alarm on the specified point. Remains active until the alarm is acknowledged (section 3.1.3).
Alarm on Group	Triggered if any alarm in the specified group becomes active
Unack'd Alarm on Group	Triggered if any alarm in the specified group becomes active. The event remains active until the alarm is acknowledged.

(Continued)

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4.3.6 EVENT CONFIGURATION (Cont.)

EVENT SOURCES (Cont.)

Instrument alarm	This source triggers an event if any of the following becomes active: Any, Input channel failure, Removable media failure, Removable media full, No removable media fitted, FTP primary server failure, FTP secondary server failure, Maths channel failure, Clock failure, Unrecognised PC card, Recording failure - overflow, Floppy disk worn, Floppy disk corrupt, Network Boot failure, SNTP server failure, Time Synchronisation Failure, Battery backed RAM cleared. See section 3.1.3 for Instrument alarm details. The event remains active until the instrument alarm clears.
Power up	A transient event is triggered at power up.
Maths channel partial failure	For recorders fitted with the Maths pack option, this event is set if, say, one of the inputs to a group averaging function becomes invalid. In such a case, the average will be calculated on the remaining input values, but the result may not be as accurate as expected. Loss of one input can also be important in functions such as Fvalue, where several sensors may be distributed within the load and their outputs used in a group minimum calculation for input into the Fvalue equation.
Battery Low	This event is set when the battery is reaching the end of its useful life. The event remains active until the battery is replaced.
Archive media % full	Triggered when the floppy disk or PC card has reached the % fullness defined in Archive configuration (section 4.3.5).
Invalid Password Entry	Transient event at the point of an invalid password entry attempt
User Login Account Disabled	Transient event at the point when an account is disabled because the number of password re-tries has been exceeded (Section 4.4.2). Not available if Auditor pack not fitted.
User Logged In	This event becomes active whenever a user with the specified Event Permission logs in. The event remains active until all local and remote users, with the specified permission, have logged out. See also section 4.4.1 (Access levels).
Event Button	Allows the operation of an event button (if User Screens option fitted) to be used as an event source. See section 4.3.7 for Event Button details.
Master Comms Slave Failure	If the Master Comms option is fitted, this event source allows either a communications failure with a specifiable remote device, or communications failure with 'Any' connected remote device to be used as an event source. See section 3 of the Communications Manual for more details.
Event input board	If one or more Event Input option boards are fitted, this allows a contact closure or negative going voltage signal to be used as an event source. The required input is defined by specifying a Board number and an Input number. Refer to 'Event Inputs' in the Options manual for more details. The menu item does not appear if Event input boards are not fitted.
Email Failure	This event source appears only if the e-mail option is fitted (options manual section 11), and is triggered if an attempt to send an e-mail is unsuccessful.
Batch Stop	The event is triggered, fleetingly, when a batch is stopped If Scope = 'Group' in Batch configuration (section 1.2 of the Options manual) then a group can be specified. If Scope = 'Instrument', the group select field does not appear. If the Batch option is not fitted, 'Batch Stop' does not appear in the picklist..

SOURCE 1 SENSE

Allows source 1 to be used in its normal sense (Select 'Source 1') or inverted (Select 'Not Source 1').

Example: Source 1 is alarm 1 on channel 3
With Source 1 Sense = Source 1, the event is active whenever channel 3 alarm 1 is active.
With Source 1 Sense = Not Source 1, the event is active whenever the alarm is not active.

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4.3.6 EVENT CONFIGURATION (Cont.)

OPERATOR

This allows a logical combination of input sources to be used to trigger an event. The selections and their definitions are shown in table 4.3.6, below.

Operator	Event active when:	Event not active when:
Only	S1 Active	S1 not active
AND	S1 and S2 both active	S1 and/or S2 not active
OR	S1 and/or S2 active	S1 and S2 both not active
NAND	S1 and/or S2 not active	S1 and S2 both active
NOR	S1 and S2 both not active	S1 and/or S2 both active
XOR	S1 or S2 active	S1 and S2 both active or both not active
S1 = Source 1; S2 = Source 2		

Table 4.3.6 Logical operators for event sources

SOURCE 2 SENSE

Allows source 2 to be used in its normal sense (Select 'Source 2') or inverted (Select 'Not Source 2').

Example: Source 2 is Group 1 Batch Running
With Source 2 Sense = Source 2, the event is active whilst the batch is running.
With Source 2 Sense = Not Source 2, the event is active whilst the batch is not running.

DESCRIPTOR

Allows a text string to be entered as the event title. See section 3.3.1 for text entry techniques.

JOB NUMBER

Select the required job number for this event.

CATEGORY

Select the required job to be carried out when the channel is in alarm (e.g. Drive relay) See section 4.7 for a description of job categories.

WHILE/ON

Allows the action of the alarm job to be chosen as

a. whilst active, whilst inactive or whilst unacknowledged for continuous jobs (e.g. drive relay), or,
b. on going active, on going inactive or on acknowledgement for 'one-shot' jobs (e.g. increment counter).

See also figure 4.3.3g and associated text.

EVENT EXAMPLE

An event is to be active whenever Channel 1 Alarm 1 is active whilst Channel 3 alarm 2 is not active.

Source 1 = Point alarm (On = Channel 1; Alarm = 1)
Source 2 = Point alarm (On = Channel 3; Alarm = 2)
Source 1 Sense = Source 1
Operator = And
Source 2 Sense = Not Source 2

It is possible to achieve the same result by inverting both Source senses and using the Nor operator.

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4.3.7 Event Buttons

This configuration item appears only if the User Screens Option is fitted. With this software version, the only places at which buttons can be displayed and operated is in User Screens.

The Event Button configuration menu allows a number of 'Push-Buttons' to be set up for use as event sources. Buttons can be defined as 'Unlatched' (push = on; release = off) or 'Latched' (push once = on; push again = off etc.).

Note: momentary button action occurs when the button is released.

Momentary types have a single text string associated with them. Latching types have two text strings, one for the 'On' (latched) state; the other for the 'Off' state. Figure 4.3.7 shows the configuration menu.

Event buttons are independent of the Security Management option, described in section 4.4.2. This allows individual buttons to be a) entirely open to the user, b) to require signing, or c) to require both signing and authorization, as required.

For further details see the User Screens description in section 2 of the Options Manual.

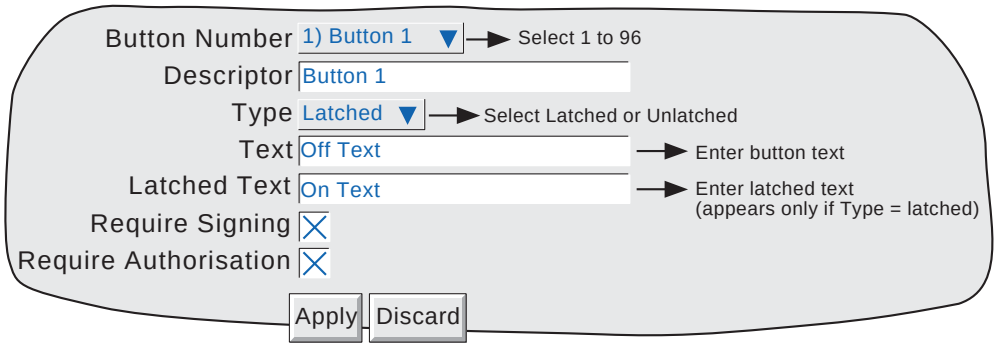


Figure 4.3.7 Event Button option configuration menu

Button number	Allows selection of the button (1 to 96) which is to be configured.
Descriptor	Allows a button name, of up to 20 characters, to be entered.
Type	Select Latched or Unlatched, as defined above.
Text	For unlatched buttons, this allows entry of the legend which is to appear on the button when displayed. For latched buttons, this is the legend which appears when the button is in its non-active (off) state.
Latched Text	This field appears only if Type = Latched, and allows entry of the legend which is to appear on the button when in its active (on) state.
Require Signing	If this field is enabled, then the button can be used only by those whose 'Can Sign' permission is enabled in the 'Access' menu described in section 4.4.1 above. When the button is operated in the User screen, a 'signature' page appears which requires the entry of the correct password for the selected user, and of a note which would normally be used to give the reason for the operation.
Require Authorisation	This field appears only if 'Require Signing' is enabled. If Require Authorisation is enabled, then the button can be used only by those whose 'Can Authorize' permission is enabled in the 'Access' menu described in section 4.4.1 above. When button operation is attempted, a 'signature' page (figure 4.4.2b) appears which requires the entry of the correct password for the selected user, and a note which would normally be used to give the reason for the change.

Notes:

1 'Require Signing' and 'Require Authorisation' appear only if the Auditor pack option is fitted.

2. If the Auditor pack option is fitted, a message appears on the chart after authorization and/or signing are complete. The example below shows the message when both Signing and Authorisation are enabled.
DD/MM/YY HH:MM:SS Button Descriptor,Signed:Engineer,Authorised:Engineer,Note

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4.3.8 Messages

This feature allows messages to be sent, by job action (section 4.7), to the display, to a specified group or to all groups. Messages can also be included in e-mails (Options manual, section 11) if the relevant option is fitted. The messages are of the form: Date, Time, Message. The message can be just text (up to 80 characters), or it can include up to nine embedded items which are typed into the message as {1} to {9}. The embedded values represented by {1} to {9} are selected from picklists.

If a Group-destination message contains more characters than can be displayed on the screen (depends on recorder model), the right-hand part of the message is invisible to the user. The message appears in full in the message log and when Review Software is used. Display-destination messages are always fully visible.

MESSAGE ENTRY

The message configuration page is shown below in figure 4.3.8 The page is accessed from the Root menu/Operator/ Config menu.

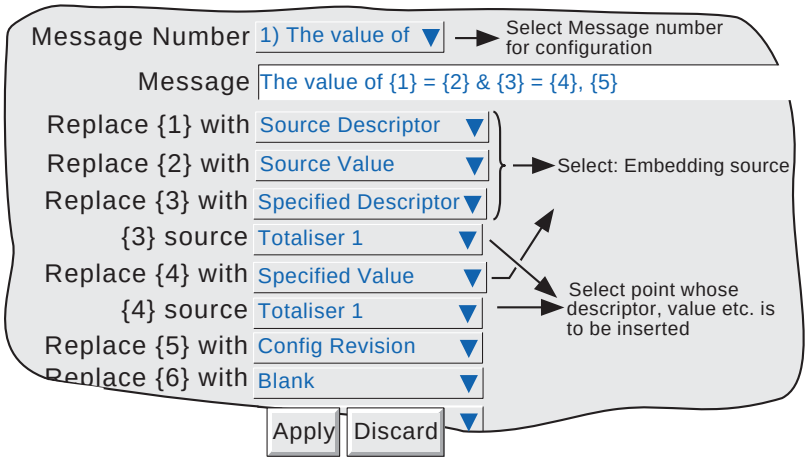


Figure 4.3.8 Message entry configuration page.

CONFIGURABLE PARAMETERS

Message Number — Select the required message from the picklist.

Message — Enter the message by using the pop-up keyboards (section 3.1.1)

Replace {n} with — A picklist allowing the user to select data to be embedded in the message:

Source Descriptor: The descriptor of the source which triggers the job message.

Source Value: The instantaneous value of the source at trigger time.

Source Alarm Data: Details (see table 4.3.8) of the source alarm at message trigger time.

Alarm Type	Embedded details
Absolute	Enable, Type (high or low), Threshold, Status
Deviation	Enable, Type (in or out), Reference, Deviation, Status
Rate of change	Enable, Type (rise or fall), Amount, Change time, Status

Table 4.3.8 Alarm details *versus* alarm type

Note: If any of 'Source Descriptor', 'Source Value' or 'Source Alarm Data' are embedded in a message which is triggered by a job which cannot be associated with a specific source (e.g. event, timer), then the embedded value will be: ?????.

(Continued)

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4.3.8 MESSAGES (Cont.)

Replace {n} with (Cont.)

Specified Descriptor, Specified Value, Specified Alarm data: Produces a further field '{n} source', described below.
Batch Status: Causes the status ('Active' or 'Inactive') of the current batch to be embedded. See Section 1 of the Options manual for Batch details.
Batch Field data: Allows a selected batch field to be included in the message. If a batch is not running at the time the message is triggered, the Batch field data is replaced by '?????'. See Section 1 of the Options manual for Batch details.

Note: Group number must be entered if the batch is configured for Group mode.

Instrument Name: Allows the Instrument Name (as entered in Configuration/Instrument - section 4.3.1) to be included in the message.
Instrument Number: Causes the instrument number (Network/Address - Section 4.5.1) to be embedded.
Config Revision: Embeds the Config File Version number (System/About - section 4.6.5) in the message

{n} source — This field appears only if the previous field (Replace {n} with) is selected as 'Specified Descriptor', 'Specified Value' or 'Specified alarm data'. The associated picklist(s) allow a specific point, and a specific alarm (if appropriate) to be selected. It is thus possible to configure, say alarm 1 on channel 2, to produce a message giving the descriptor and/or value of, say, totaliser 1.

Notes:
1. n = 1 to 9
2. The example below is intended to clarify message entry techniques.

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4.3.8 MESSAGES (Cont.)

EXAMPLE

To configure Message 2 to read “The value of Chan two = (*Value channel 2*) & Tot one = (*Value totaliser 1*)”

Before configuring the message:
In channel configuration:

Set channel 2 descriptor to:	Chan two
Set Channel 2 alarm job to:	
Category:	Message
Send message(s) to:	All Groups
First message:	2) Message 2
Last Message:	2) Message 2
On:	Active

In Totaliser configuration:

Set Totaliser 1 descriptor to:	Tot one

In Messages configuration:

1. Select Message 2.
2. Access the Symbols keyboard (section 3.3.1) and enter, without spaces, `{ } ={ } &{ } ={ }`
3. Access the Numeric keyboard and insert 1, 2, 3, 4 within the braces to give: `{ 1} ={ 2} &{ 3} ={ 4}`
4. Access the Alphabet keyboard, and insert text and spaces: `The value of{ 1} = { 2} & { 3} = { 4}`
5. Set ‘Replace {1}’ to “Source Descriptor’
6. Set ‘Replace {2}’ to ‘Source Value’
7. Set ‘Replace {3}’ to ‘Specified Descriptor’
8. Set ‘{3} source’ to Tot one
9. Set ‘Replace {4}’ to ‘Specified Value’
10. Set ‘{4} source’ to ‘Tot one’

The result of this is that, should the channel 2 alarm go active, the following message would be sent to all groups, appear on the ‘chart’ and become part of all groups’ histories:

```
18/10/01 11:19:58  The value of Chan two = 6.0˚C & Tot one = 3383.8073 Units
```

Note: On some models, the message may be wider than the screen. If necessary, the message can be shortened (e.g. use 'Ch2' instead of 'Chan two'), or it can be viewed in full, either in Message log, (section 3.2.1) or by using Review Software, if available.

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4.3.9 User Linearisation Tables

The Channel configuration item 'Lin Type' includes four linearisation tables called, initially, UserLin1 to UserLin4. This User Linearisation part of the instrument configuration allows the user to enter a linearisation look-up table of between two and 66 pairs of points.

The pairs of points are entered as X1Y1, X2Y2... ...XnYn,
where 'n' is the specified number of points.
X1 to Xn represent the inputs to the function.
Y1 to Yn represent the corresponding outputs from the function.

Notes:
1. Each Y value must be unique - i.e. there cannot be more than one X value with the same Y value assigned to it.
2. Each X value (other than the first) must be greater than the previous one.
3. Each Y value (other than the first) must be greater than the previous one.
4. To specify units other than temperature units, the channel 'scale' facility must be used. The scale low/high values should be set to be the same as the range low/high values, and the required units entered

The import/export Linearisation tables feature described in 'Save/Restore' (section 4.2) offers an alternative way of entering linearisation tables.

Figure 4.3.9a shows the default configuration page. Figure 4.3.9b shows a simple table for relating water depth to water volume for a cylindrical tank with a conical bottom.

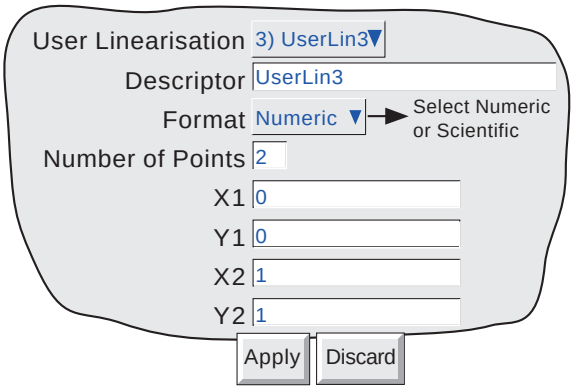


Figure 4.3.9a User linearisation configuration page

CONFIGURATION PARAMETERS

User Linearisation	Allows one of the four user linearisation tables to be selected for configuration.
Descriptor	Allows the user to enter a name of up to 20 characters (including spaces) for the table.
Format	This allows the point pair values to be entered as normal numeric values (Numeric) or in 'Scientific' format (Scientific). When 'Scientific' is selected, values are displayed and entered as a decimal number between 1 and 10† (the mantissa), followed by a multiplier (the exponent). E.G. to enter a value of 1244.5678, the value entered would be 1.2445678E3, where 3 represents the number of places that the decimal point must be shifted to the left in order to convert the value to a number between 1 and 10†. To enter a value of 0.0004196, the entry would be 4.196E-4. Figure 4.3.9b, below, gives further examples.

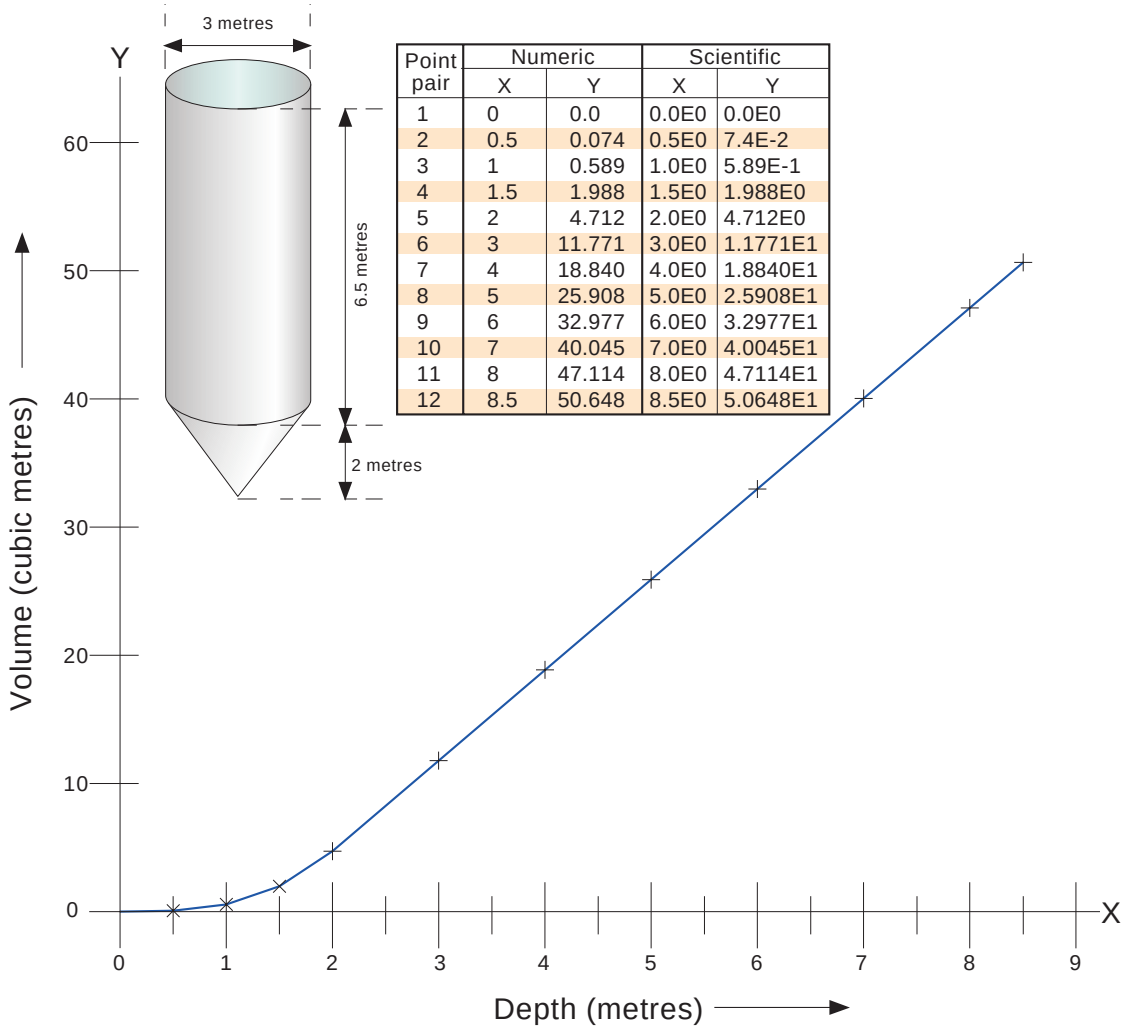
† Notes
1. Strictly this is a number less than 10, as 10 would be 1.0E1.
2. There must be at least one number after the decimal point.

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4.3.9 USER LINEARISATION TABLES (Cont.)

CONFIGURATION PARAMETERS (Cont.)

Number of points	This is used to enter the total number of point pairs in the table. The following XY fields increase in number up to the entered value. (A scroll bar appears if there are more points than can be displayed in the available screen height.)
X1 to XN	The input values to the table, where N is the 'Number of Points' entered above.
Y1 to YN	The resulting, corresponding output values from the look-up table.



Point pair	Numeric X	Numeric Y	Scientific X	Scientific Y
1	0	0.0	0.0E0	0.0E0
2	0.5	0.074	0.5E0	7.4E-2
3	1	0.589	1.0E0	5.89E-1
4	1.5	1.988	1.5E0	1.988E0
5	2	4.712	2.0E0	4.712E0
6	3	11.771	3.0E0	1.1771E1
7	4	18.840	4.0E0	1.8840E1
8	5	25.908	5.0E0	2.5908E1
9	6	32.977	6.0E0	3.2977E1
10	7	40.045	7.0E0	4.0045E1
11	8	47.114	8.0E0	4.7114E1
12	8.5	50.648	8.5E0	5.0648E1

Figure 4.3.9b Sample User Linearisation table

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4.3.10 Options

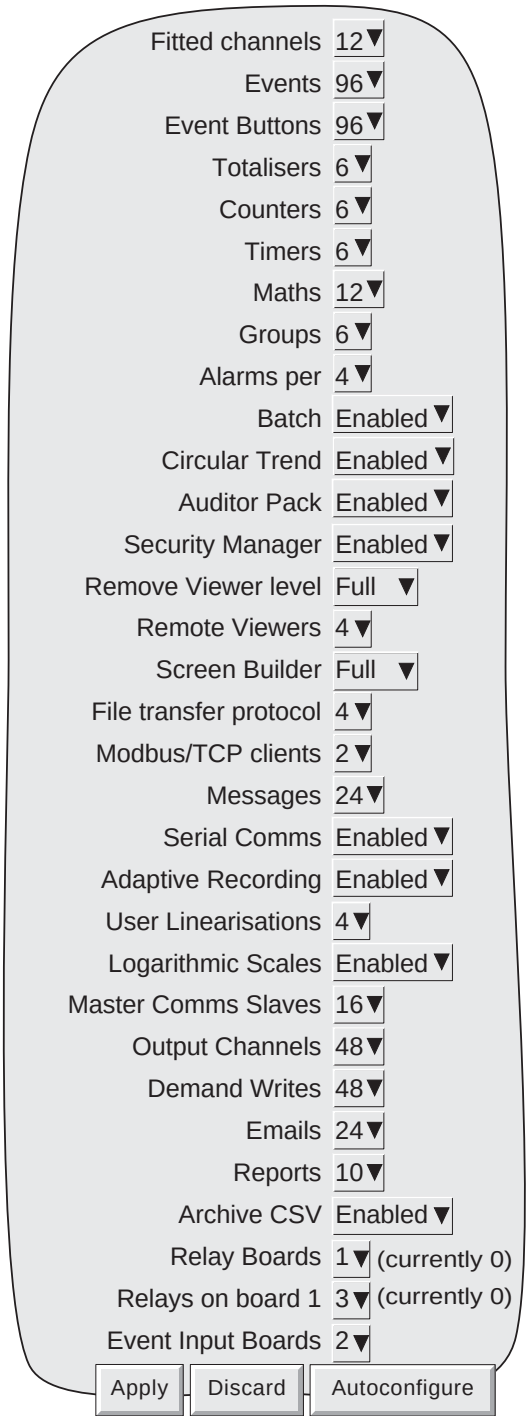


Figure 4.3.10 Options menu layout

Touching this key calls a display showing the current recorder hardware/software setup, for example the number of input channels fitted, the number of output relay boards fitted, and how many relays are fitted per card. Subsequently, should further options be fitted (relay board three in the above example), this page shows the difference between the hardware actually fitted and the hardware the recorder software is configured for (currently ...). Whenever there is a difference, the 'Autoconfigure' key can be pressed to alert the recorder to the fact that extra options have been added (or taken away). If no changes have occurred since last switch-on, then the '(currently ...)' fields and the 'Autoconfigure' key do not appear.

Note: The options which can appear and their maximum 'quantities' depend on the recorder model.

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4.4 SECURITY

Touching this key allows the operator to select 'Login' (described in section 3.3.1) 'Access' or 'Add/Remove User' for configuration. Selecting 'Access' displays the current user level. Touching this area allows the user to select 'Logged out', 'Operator', 'Engineer' or any of the added users. The user may also go directly to logged out mode by operating the 'Logout' key.

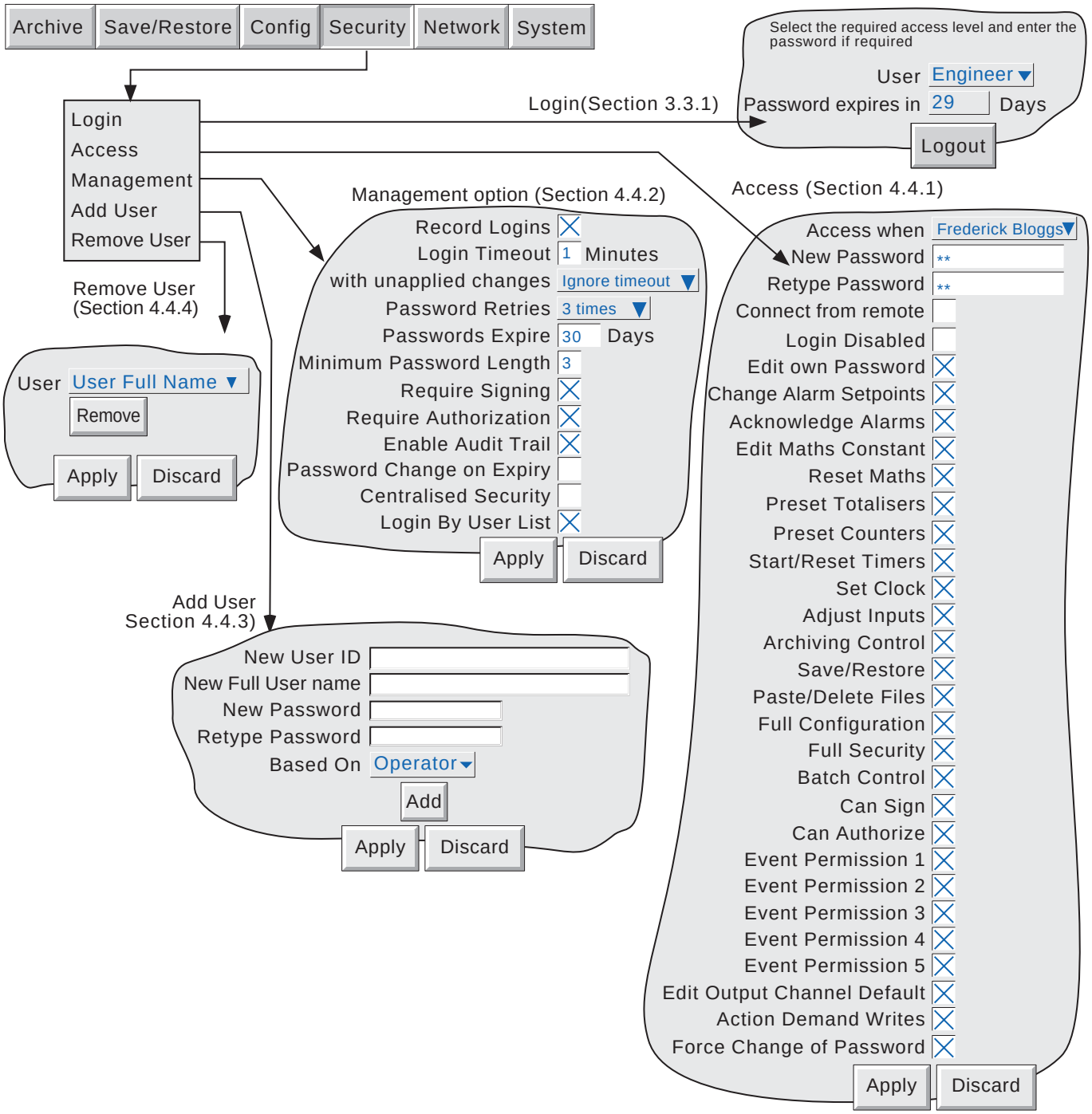


Figure 4.4 Security configuration menus

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4.4.1 Access levels

There are essentially three levels of security associated with the recorder viz: Engineer, Operator and Logged out. (The fourth level - Service - is available only to service engineers). When logged-in at engineer level, the user can set access permissions for other levels, and can enter or edit passwords for Operator and Engineer levels. For recorders with the Auditor Pack Option enabled and software version 3.1 or higher, the default passwords for Engineer and Operator level access are both '100'. Otherwise, the default password for Engineer level is set to 10 and the default password for operator level is 'blank'

> Note: To allow free access to the recorder configuration, the password can be set to 'blank'. This allows subsequent access without a password having to be entered (not for recorders with the Audit Pack option).

Users with Full Security permission can Add (and Delete) users (sections 4.4.3, 4.4.4) and assign them individual passwords and access permissions.

SETTING PERMISSIONS

Once logged in at Engineer level, operate the Security key and select Access. A page similar to that shown in figure 4.4.1 appears, allowing the permissions to be set for the various access levels and for individual users. The list of parameters is the same for all access levels except for 'Logged out', for which the password parameters and 'login disabled' items do not appear.

> Note: If the Security management option is fitted, and 'Centralised Security' is enabled in the Security/Management system (section 4.4.2), permissions are 'Read Only' (i.e., not editable) at the recorder.
> In such a case permissions can be changed only by using the Security Management software.

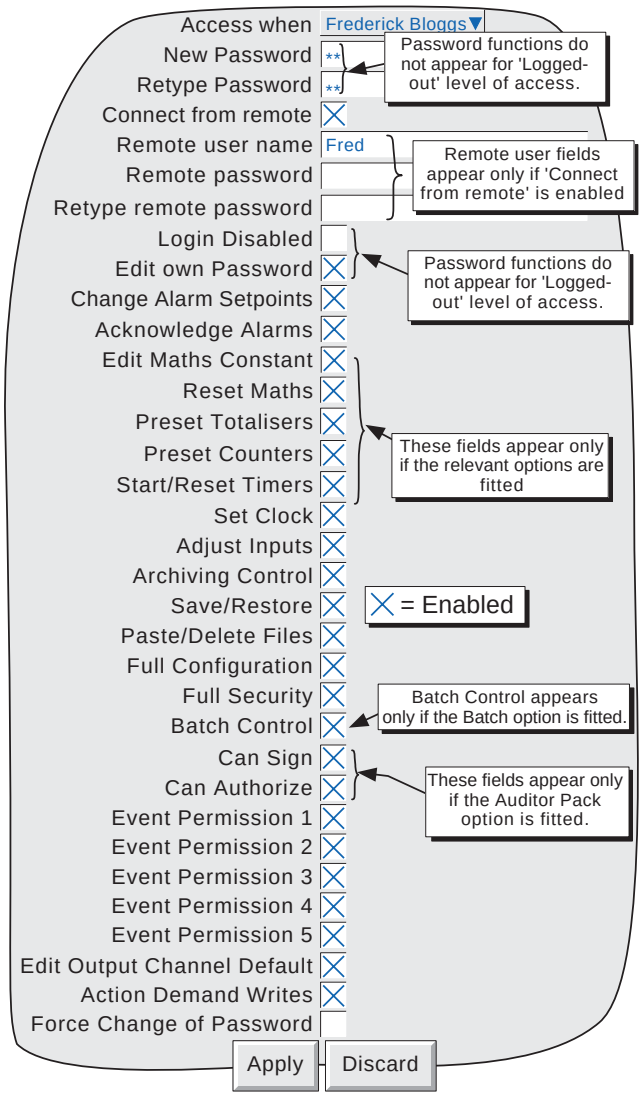


Figure 4.4.1 Access permissions menu

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4.4.1 ACCESS LEVELS (Cont.)

ACCESS WHEN:

Allows an access level or an individual user name to be selected from a pick list.

NEW PASSWORD/RETYPE PASSWORD

For all levels except Logged Out, these fields allow a new password to be entered for the selected access level or User. The password must be entered in the 'Re-type Password' field. If the two differ, a warning message (Passwords did not match) appears when the APPLY key is operated, and password entry must be repeated. If the password does not comply with the minimum length requirements in Security Management (if fitted) (section 4.4.2), a warning message (Invalid Password) appears when the 'Apply' key is operated, and password entry must be repeated.

CONNECT FROM REMOTE

Enabling this field, calls the Remote user name and Remote user password entry boxes.

REMOTE USER NAME/PASSWORD

These two entry boxes allow user name and password to be entered for use by the remote host operator. The remote user will be able to access the recorder configuration according to the other access permissions enabled in this page. The password must be entered twice to ensure integrity.

To allow unrestricted view-only to the host, 'Logged out' permission level should be selected and then a user name of ‘anonymous’ entered, and the password field left blank.

Notes:
1. Remote login will be refused if the user account is disabled for any reason.
2. For maximum security, it is recommended that the remote password and the 'local' password are non-identical.

LOGIN DISABLED

For all levels except Logged Out, This allows any one or more of the access levels to be removed from the 'Access when' picklist.

Note: This feature should be used with discretion, or the situation might arise in which the recorder cannot be logged onto, either at a particular access level or at all. It is recommended that at least one user with Engineer-level access is retained with login enabled, or it may become necessary to return the recorder to the manufacturer, or to arrange for a service visit.

Auditor Pack notes:
1 If the Auditor Pack option is fitted, and the number of Password Retries is exceeded the relevant login is disabled. A user with Engineer level access can re-enable the login.
2. If the Auditor Pack option is fitted, and the Password Expire time has been exceeded, all logins are disabled. In order to reconfigure the recorder, it is necessary to use the Service password - please contact the recorder supplier or the nearest service centre for advice.

EDIT OWN PASSWORD

Allows each user, with this permission enabled, to edit his/her password.

CHANGE ALARM SETPOINTS

Allows each user with this permission enabled, to edit alarm parameters under Configuration/Channel

ACKNOWLEDGE ALARMS

Allows each user with this permission enabled, to acknowledge alarms (section 3.1.3)

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4.4.1 ACCESS LEVELS (Cont.)

EDIT MATHS CONSTANT

For recorders fitted with the Maths option only. If one or more maths channels are configured with function 'Constant', then with this permission set, the user may edit the constant value(s).

RESET MATHS

Allows the user to reset applicable maths function either directly from the maths channel configuration page or by setting a maths job.

PRESET TOTALISERS

Allows the user to preset totaliser values (if the option is fitted) either directly from the configuration page or by setting a totaliser job. See section 4 of the Options Manual for further details of totalisers.

PRESET COUNTERS

Allows the user to preset counter values (if the option is fitted) either directly, from the configuration page, or by setting a counter job. See section 5 of the Options Manual for further details of Counters.

START/RESET TIMERS

Allows the user to start and reset the timer value (if the option is fitted) either directly from the configuration page or by setting a timer job. See section 6 of the Options Manual for further details of timers.

SET CLOCK

Allows each user with this permission enabled, to set the recorder time and date functions under System/Clock

ADJUST INPUTS

Allows the user to adjust recorder readings as described in section 4.6.4, below

ARCHIVING CONTROL

Allows each user with this permission enabled full access to disk archive control.

SAVE/RESTORE

Allows each user with this permission enabled, full access to saving and restoring functions as described in section 4.2, above. Without this permission, the SAVE/RESTORE key does not appear.

PASTE/DELETE FILES

Allows each user with this permission enabled, to Paste and Delete files as described in section 5 of this manual.

FULL CONFIGURATION

Allows each user with this permission enabled, full access the recorder configuration.

FULL SECURITY

Allows each user with this permission enabled, full access to all recorder security functions.

BATCH CONTROL

This field appears only if the Batch Option is fitted - Refer to section 1 of the Options Manual for further details.

CAN SIGN

This appears only if the Auditor Pack option is fitted. If the field is enabled it allows the user to change the configuration of the recorder (according to the other permissions set for the login), providing the security management system 'Require Authorization' is not enabled. If it is, changes can be made only if the correct password for a user with 'Can Authorize' permission is entered. See section 4.4.2 for details

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4.4.1 ACCESS LEVELS (Cont.)

CAN AUTHORIZE

This appears only if the Auditor Pack option is fitted. If the field is enabled it allows the user to change the configuration of the recorder according to the permissions set for the login. See section 4.4.2 for details of the Auditor pack (Security Management) option.

EVENT PERMISSION 1

If this is enabled, then this login will trigger an event source which remains active for as long as the login is active. See section 4.3.6 (Event Sources: User Logged In) for further details.

EVENT PERMISSION 2 TO 5

As for Event permission 1, above.

EDIT OUTPUT CHANNEL DEFAULTS

Appears only if the Master Comms option is fitted. Master comms is described in section 3 of the Communications Manual.

When enabled, this allows a user with this login to edit the default value of any output channel. Normally the defaults are used only when the source channel is 'In Error'.

ACTION DEMAND WRITES

Appears only if the Master Comms option is fitted. Master comms is described in section 3 of the Communications Manual.

When enabled, this allows a user with this login to write values manually over master comms either directly, by job action or (if the option is fitted), by using the User Screens 'Operator' key. Where Demand Writes are initiated by Job action, the job will be carried out whether or not this login has permission to action Demand Writes.

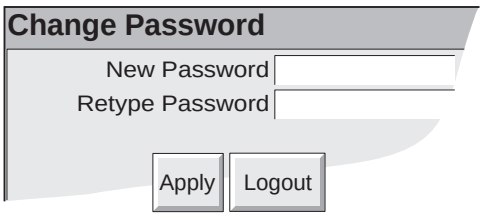
Note:

When Audit trail is enabled, only the newly written value appears in the audit trail messages. This is because the instrument has no way of determining what the value of the parameter was before the write occurred.
The messages are of the form:

```
12/06/03 10:14:30 Auto Mode wrote 19.37
12/06/03 10:14:29 Demand write Auto Mode, Signed Engineer, No Auth. Reqd., Note
```

where 'Auto Mode' is the descriptor associated with the demand write, and '19.37' is the value written.

FORCE CHANGE OF PASSWORD



When this checkbox is enabled for a user, it means that that user will have to change password at his/her next login. At next log in, a pop-up dialogue box requests that a new password be entered. If a new password is not entered, login is denied.

Entering the new password clears the checkbox, so this is a 'one-shot' operation, until the checkbox is enabled again by a user with 'Engineer' level access.

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4.4.2 Management (option)

This menu selection appears only if the Auditor Pack option and/or Security Management option is fitted.

This option allows the recorder to be set up so that all changes to configuration (with the exceptions listed below) are added to the history files and also allows certain constraints to be placed on the recorder passwords. Once these items of configuration are set up, they apply to all groups. Figure 4.4.2a, below, shows the configuration menu.

CHANGES NOT RECORDED

Changes to configuration made via MODBUS/TCP are not recorded. It is up to the user to write the identity, time/date, reason for change etc. as text messages, which when sent via MODBUS/TCP, become part of the relevant history file.

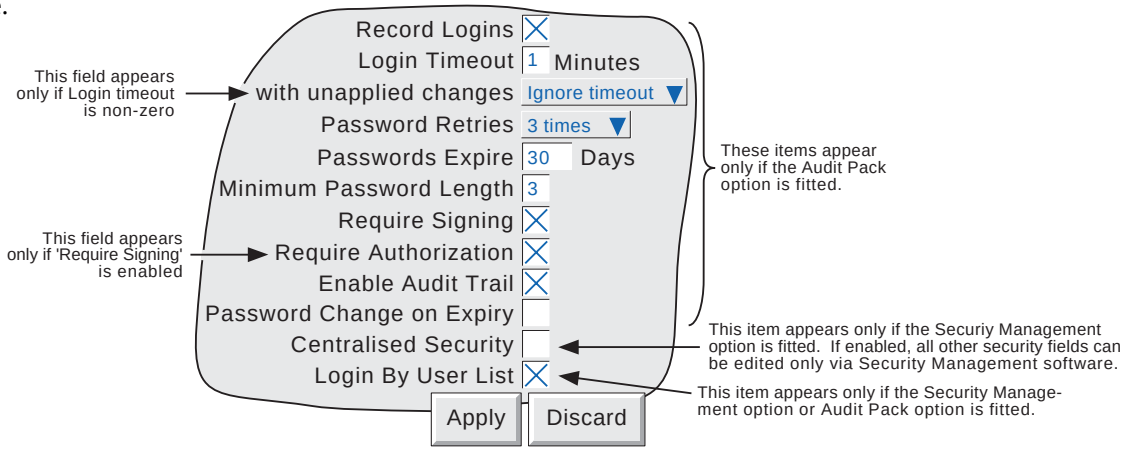


Figure 4.4.2a Management menu structure

CONFIGURABLE PARAMETERS

Notes:
1. Unless otherwise indicated, the following parameters appear only if the Auditor Pack option is fitted.
2. If Centralised Security is enabled, none of the other parameters in this menu can be edited at the recorder. Changes can be made only using Security Management software.

Record logins

If this field is enabled (cross appears), then each time a new login occurs a message appears, giving the date, time and login name. E.G.

```
02/10/03 15:32:20 Login by Frederick Bloggs
```

Logouts are recorded in a similar way - e.g.

```
02/10/03 15:49:43 Logout by Frederick Bloggs
```

If the login or logout is from a 'Remote Viewer' (section 1 of the Communications Manual), the IP address of that viewer appears in the login/logout message - e.g.

```
02/10/03 15:58:03 Login by (149.121.130.126)Engineer
```

Login Timout

When set to zero, the login remains valid until changed. For any other value, the user is logged out after the number of minutes entered here has elapsed since the last time the screen was touched.

with unapplied changes

This field does not appear if the Login Timeout has been set to zero. For non-zero time-out values, this allows the user to choose whether

a any unapplied changes are lost when the Login Timeout period has elapsed, or

b the login timeout is ignored if there are any unapplied configuration changes.

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4.4.2 MANAGEMENT (Cont.)

CONFIGURABLE PARAMETERS (Cont.)

Password Retries

This allows the user to set the number of retries allowed after a failed attempt to enter a password. The choices are '3 times' and 'unlimited'. When set to 3 times, the user login is disabled after four incorrect attempts to enter the password have been made. A 'System Message' appears on the screen and is also sent to the 'chart':
`02/10/03 13:20:42 User Frederick Bloggs, login disabled, invalid password`
In order to re-enable the login, a user with Engineer access level must deselect 'Login Disable' in the 'Access' menu described in section 4.4.1, above.

Passwords expire

This field allows the user to set an expiry period of up to 999 days which applies to all passwords. The number of days remaining to expiry is shown in the login page. If set to zero, then the expiry period does not apply.

Note: All required passwords MUST be changed within this number of days or all logins will be disabled In this situation, the configuration of the recorder will be available only to those with Service Level access and in most cases, a call will have to be made to the recorder supplier or service agency. (But see 'Password Change on Expiry', below)

Minimum Password Length

This allows a minimum length of password to be entered. If an attempt is made to enter a new password with fewer characters than the minimum, a warning message appears on the screen (Invalid Password Length) and the new password is ignored. For units with the Auditor Pack option fitted, the minimum password length cannot be set to less than 3.

Require Signing

If this field is enabled, then changes to the recorder operation, configuration (or any other item included in the history file) can be made only by those users whose 'Can Sign' permission is enabled in the 'Access' menu described in section 4.4.1 above. When 'Apply' is attempted, a 'signature' page appears which requires the entry of the correct password for the selected user, and of a note which would normally be used to give the reason for the change.

Require Authorization

This field appears only if 'Require Signing' is enabled. If Require Authorization is enabled, then changes to the recorder operation, configuration (or any other item included in the history file) can be made only by those users whose 'Can Authorize' permission is enabled in the 'Access' menu described in section 4.4.1 above. When 'Apply' is attempted, a 'signature' page (figure 4.4.2b) appears which requires the entry of the correct password for the selected user, and a note which would normally be used to give the reason for the change.

Note: If neither 'Require Signing' nor 'Require Authorization' is enabled, then any user can make changes to the recorder operation, configuration etc. and the 'signature' page does not appear.

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4.4.2 MANAGEMENT (Cont.)

CONFIGURABLE PARAMETERS (Cont.)

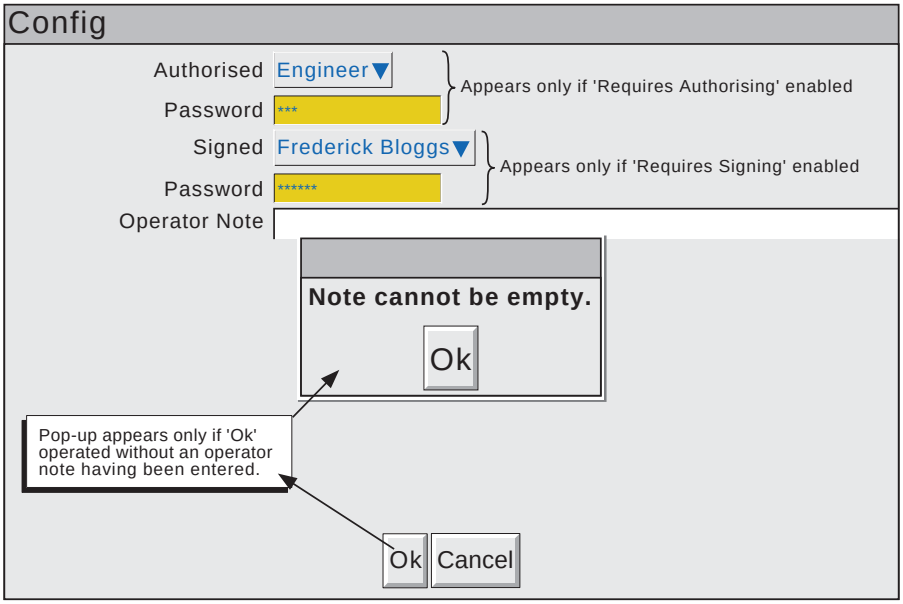


Figure 4.4.2b Signature page

Enable Audit trail

If this field is enabled, then all changes to configuration are displayed on the 'chart' and become part of the history file for each enabled group. The following is an example of how these changes would appear on the screen for an imaginary set up for channel 8. 'New T/C type chan 8' is the note entered in the Signature page, and 'Kiln8 temp' is the channel descriptor.

```
19/10/03 11:53:01 Configuration Revision 486,144 was 486,143
19/10/03 11:52:57 Kiln8 temp Alarm Number 1, Job Number 1 Drive Relay 1 on board 7 while Unacknowledged was No action
19/10/03 11:52:57 Kiln8 temp Alarm Number 1 Threshold 530.0 ˚C was 500
19/10/03 11:52:57 Kiln8 temp Alarm Number 1 Type Absolute Low was Absolute High
19/10/03 11:52:57 Kiln8 temp Cold Junction Type Internal was External
19/10/03 11:52:57 Kiln8 temp Scale High 1000.0˚C was 900.0
19/10/03 11:52:57 Kiln8 temp Scale Low 450.0˚C was 300.0
19/10/03 11:52:57 Kiln8 temp Lin Type Type K was Type J
19/10/03 11:52:57 Config,Signed:Engineer,Authorized:Engineer,New T/C type chan 8
```

Notes:

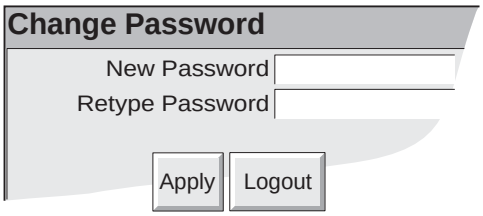
1. The Configuration Revision (and for changes in the Security menus - the Security Revision) are incremented every time the recorder configuration (security configuration) is changed. The current values can be viewed in the System/About menu (section 4.6.5).
2. All configuration and security changes must be made either at the recorder operator interface, or using the Remote Viewer. Use of the configuration editor is not permitted if traceability is to be maintained.
3. If fitted, Event buttons (section 4.3.7) are not included in the Require Signing/Require Authorization regime described above. Instead, each individual button can be configured to require signing or to require both signing and authorization.

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4.4.2 MANAGEMENT (Cont.)

CONFIGURABLE PARAMETERS (Cont.)

Password Change on Expiry



If this check-box is enabled, then the first time a user tries to login, after his or her password has expired, a dialogue box appears asking the user to enter a new password. Only when this new password has been entered and confirmed, will the user be able to access the recorder configuration.
Security Management Option. The new password is not written to the Security Manager until the next 'deploy', after which the expiry period configured for the user (within Security Management), is restored. The interim expiry period is set to 24 hours, and the 'deploy' must be carried out within this period, or password expiry will recur.

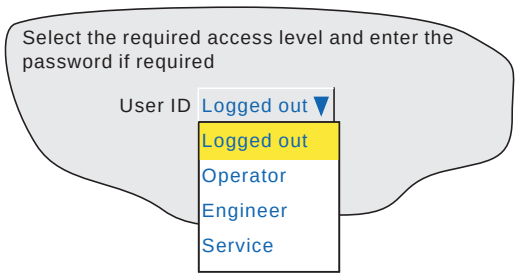
Centralised Security

This checkbox occurs only if the Security Management option is fitted.
If this checkbox is enabled, none of the other parameters in the Management menu can be edited at the recorder (i.e. they become 'Read Only'). Changes can be made only by means of Security Management software. At the recorder, the following menu items also become 'read only', or do not appear as menu items or are not selectable, even if the checkbox appears:
Access level permissions (section 4.1.1) (Read Only)
Add User/ Remove User (section 4.4.3) (Do not appear as menu items)
Restore configuration/Security data (section 4.2.2) (Not selectable)
New configuration/Security data (section 4.2.3) (Not selectable)

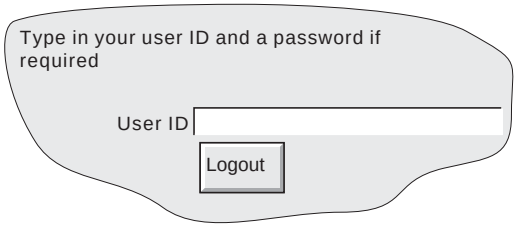
The Security Revision (previously Security Version) is initially set to -1 when Centralised Security is enabled. It will remain at this value until a successful download has been performed via Security Manager Software. The Security Revision will then take the downloaded value (e.g. 139). Any local security revision changes (e.g. max. number of logins exceeded) cause the value to have a 'local change count', starting at 001 appended to it (e.g. 139.001, 139.002 and so on). The local change count is reset to 000 (and no longer displayed) when the next download occurs (e.g. 140). Downloads can occur automatically when the Security Manager detects that a local change has occurred, or manually, as and when required.

Login by User List

This checkbox appears if either or both of the Audit pack and Security management options are fitted.
When enabled, the normal login window appears, with a pull down list of users. Once a user has been selected the correct password for that user must be entered in order to log in.
When disabled, the user must enter a user name and associated password in order to log in.



'Login By User List' enabled



'Login By User List' not enabled

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4.4.3 Add user

Figure 4.4.3 shows that the selecting of 'Add User' from the SECURITY picklist allows new user IDs to be entered, together with passwords, and a chosen set of access permissions, which can subsequently be edited under Security/ Access. The ADD key and the APPLY key must both be used to write the change to the recorder data base. The user must have Full Security access in order to add a new user. If the Auditor pack option is fitted, the new user's access permission list is printed on the chart.

NEW USER ID

This field allows a User ID of up to 20 characters to be entered for a new user. This ID is used when logging in using ID/password entry technique (that is, when 'Login by user list' is disabled, as described in section 4.4.2 above).

NEW FULL USER NAME

This field allows a User name of up to 25 characters to be entered. This name appears in the 'current access level' pushbutton at the top left corner of the display screen, in operator notes and so on.

NEW PASSWORD/RETYPE PASSWORD

These fields allow a password to be entered and confirmed. If the password does not comply with the minimum length requirements in Security Management (if fitted) (section 4.4.2), a warning message (Invalid Password) appears when the 'Apply' key is operated, and password entry must be repeated.

BASED ON

This picklist allows another user or access level to be used as a permissions template, to simplify the configuration if several operators are to have identical permissions.

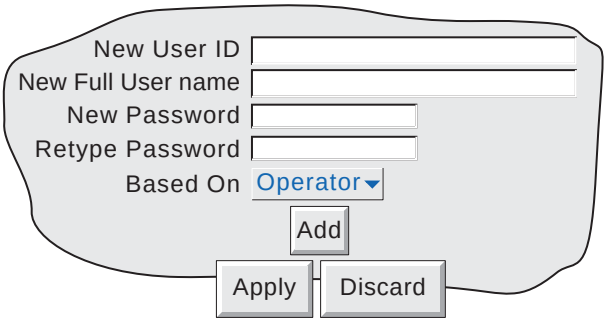


Figure 4.4.3 Add User display page

4.4.4 Remove user

Selecting 'Remove User' from the SECURITY picklist allows users to be removed from the user list. The 'Remove' key and the 'Apply' key must both be used to write the change to the recorder data base. Figure 4.4.4 depicts the display page. The User Full Name appears in this page.

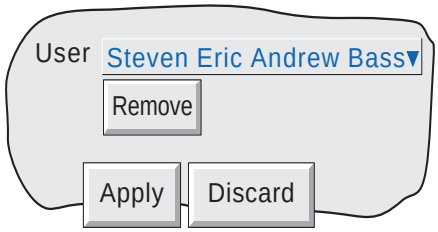


Figure 4.4.4 Remove User display page

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4.5 NETWORK KEY

Note: This manual does not describe network setup in detail, as each network is different. In most cases, the help of the network administrator or supervisor will be required, for example, in the allocation of valid addresses and passwords.

Operating the Network key calls a selection box to the display, allowing ‘Address’ or ‘Name’ to be selected for configuration.

4.5.1 Address

Figure 4.5.1 shows the address menu fields.

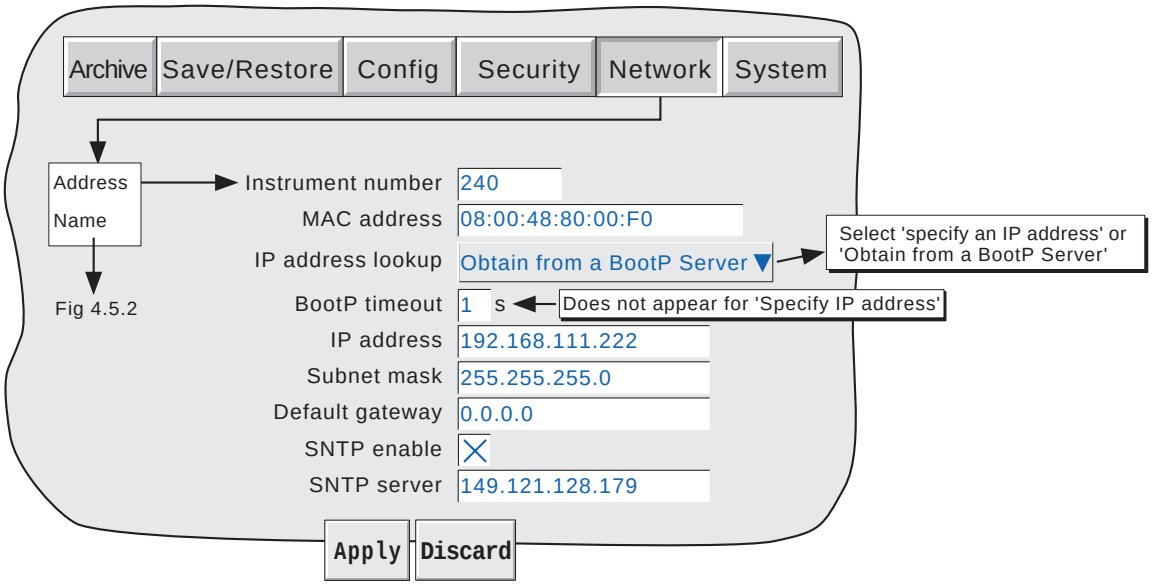


Figure 4.5.1 Network addressing

INSTRUMENT NUMBER/MAC ADDRESS

Unique numbers set up during manufacture to identify the recorder to a remote host, or to the recorder manufacturer/distributor, in case of query.

IP ADDRESS LOOKUP

This field allows an address to be entered for the recorder. This can be done either by manually entering an address (IP address field - below), or the network service BootP can be used to assign an IP address to the recorder.

BOOTP TIMEOUT

This is the maximum time the recorder will wait, at power-up, for a response from the BootP server. If no response is received within this time, the IP address, Subnet mask and Default gateway are all set to, or remain at 0.0.0.0

IP ADDRESS

Allows manual entry of the recorder’s internet protocol (IP) address only if ‘Specify an IP address’ is selected in the ‘IP address lookup’ picklist above.

SUBNET MASK

This field is editable only if ‘Specify an IP address’ is selected in the ‘IP address lookup’ picklist above. The subnet mask is the network address plus the bits in the host address reserved for sub-network identification. By convention, all the network address bits are set to 1. The subnet mask is used to identify the subnet to which an IP address belongs by performing a bitwise AND on the mask and the IP address.

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4.5.1 NETWORK ADDRESS (Cont.)

DEFAULT GATEWAY

To deliver traffic from one subnet to another, devices called ‘routers’ or ‘gateways’ are placed between segments. The default gateway address informs each network device where to send data if the target station does not reside on the same subnet as the source.

SNTP ENABLE

This tick box allows time synchronisation from a Simple Network Time Protocol (SNTP) server to be enabled and disabled. When enabled, the instrument time is updated every 15 minutes.

SNTP SERVER

If 'Obtain from BootP server' is selected as the IP address look-up (see above), then this address appears automatically. Otherwise this area allows an IP address to be entered for the SNTP server.

Notes:

1 SNTP is a protocol that allows clients on a TCP/IP network to set their times to that of a server - port number 123. The recorder can act both as a client and as a server; when acting as a server, the resolution is 1 msec.

2. SNTP time is based on elapsed seconds since 00:00 hrs on 1st January 1900. The time is not affected by time zones or daylight saving adjustments.

3. If the instrument time differs from the SNTP time by less than 2 seconds, the instrument time is updated gradually (1 msec 8 times a second) to prevent time change events being recorded. If the difference is greater than 2 seconds, this is defined as a 'time change event', the results of which are that the recorder time is immediately updated, and a green line is drawn across the chart (vertical trend/history only) to indicate the time change.

4. If more than 5 time change events occur within 24 hours, a 'Time Synchronisation failure' instrument alarm is set 24 hours after the first event. Once synchronisation is re-established, the alarm self-clears within 24 hours.

5. An 'SNTP server failure' instrument alarm is flagged if the configured server cannot be accessed, or if the year received from the server is less than 2001 or more than 2035.

6. When the instrument is acting as a server and a "Clock Failure' instrument alarm is active, the server time is set to 1/1/1900 which is ignored by clients.

7. Servers such as Microsoft 'TimeServ' cannot be used with this series of instruments because they are not SNTP servers.

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4.5.2 Name

Figure 4.5.2 shows the 'Name' fields

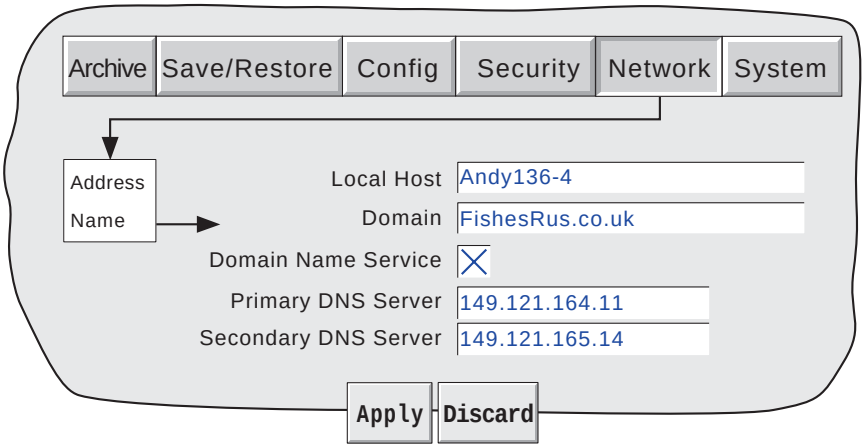


Figure 4.5.2 network name fields

LOCAL HOST

English language name for the recorder - Assigned to the IP Address

DOMAIN

The name of the Group or area of networked units which contains the recorder

DOMAIN NAME SERVICE (DNS)

Enables the mapping of host names to IP addresses and *vice-versa.*

PRIMARY/SECONDARY DNS SERVER

IP addresses supplied by IT department or the Domain manager or Supervisor.

> Note: Any one or more of the above items may be overwritten if 'IP address lookup' is set to 'Obtain from BootP Server' as described under 'Address' above.

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4.6 SYSTEM

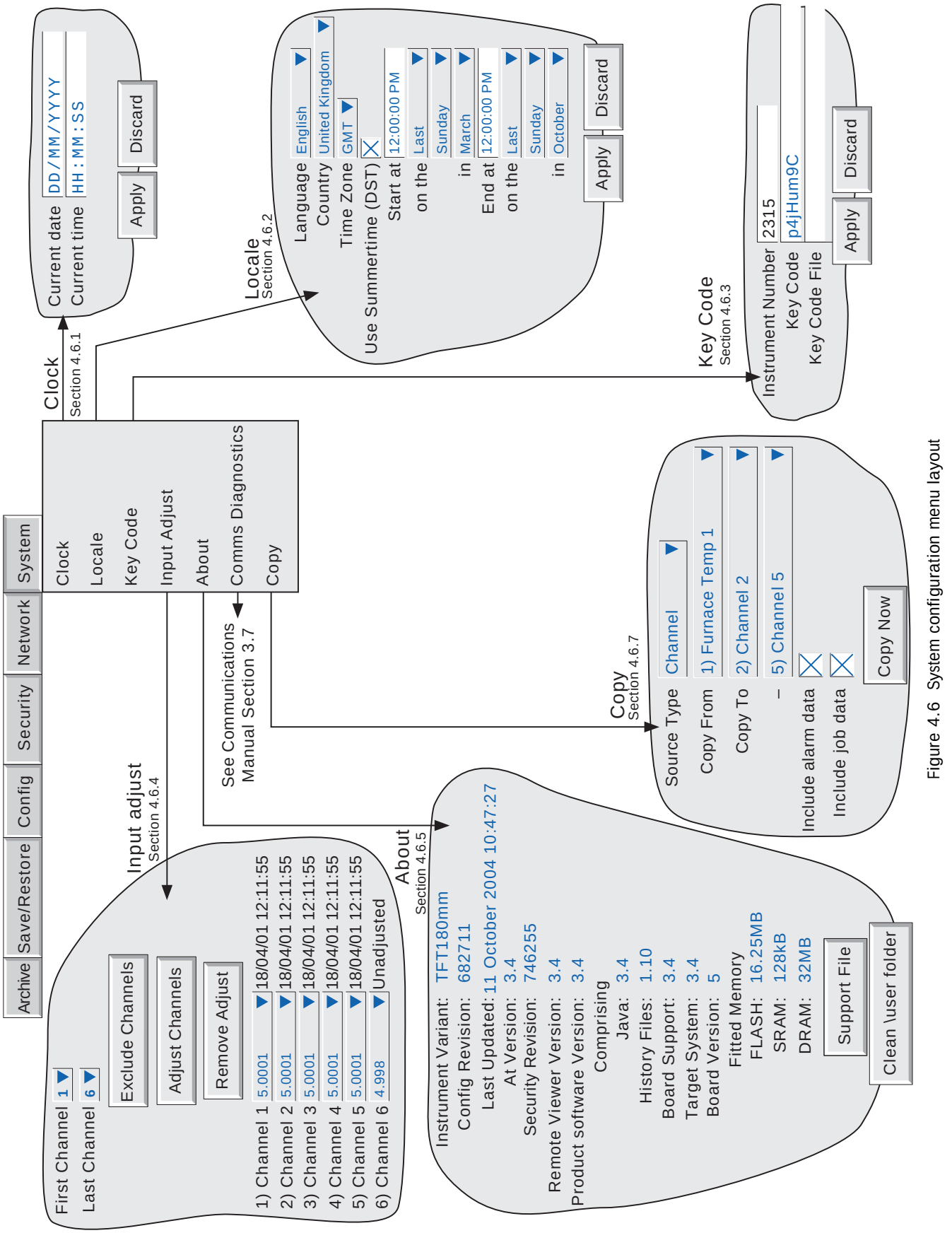


Figure 4.6 System configuration menu layout

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4.6 SYSTEM (Cont.)

Touching the System key calls the pick list: Clock, Locale, Keycode, Input adjust About

Figure 4.6 above, shows an overview of the System Menus.

4.6.1 Clock

Selecting 'clock' causes the recorder's date and time to be displayed. To edit the date, touch the current date area, to call the keyboard and enter the new numbers. The date is edited in a similar way. The settings apply as soon as the 'Apply settings' button is touched. See also SNTP details in section 4.5.1.

4.6.2 Locale

This allows the setting of the following items:

Language	Choose the required language from the picklist
Country	Displays a pick list of countries associated with the selected language
Time zone*	Select GMT, UTC, ECT, EET, ART, EAT, MET, NET, PLT, IST, BST, VST, CTT, JST, ACT, AET, SST, NST, MIT, HST, AST, PST, PNT, MST, CST, EST, IET, PRT, CNT, AGT, BET, CAT from picklist.
Use Summertime (DST)*	Select box if daylight saving is to be used, If 'Use Summertime (DST)' is selected, the times and dates for the start and end of summertime can be entered using picklists - see figure 4.6

Notes

1 Date format DD/MM/YY or MM/DD/YY is defined by the language and country selected. Time format (e.g. 12/24 hr. clock) is defined by the country selected.

2. When using Bridge 5000, the host PC's locale information and the recorder locale information should match, or the displayed time will not be correct.

*Note: For more information, see B8 Annex B and/or http://www.timeanddate.com

4.6.3 Keycode

This is a means of allowing new options to be enabled, by the entering of a code, using standard text entry techniques, or by reading a file from a floppy disk or other source. If a File is specified, the first line of the file must be the Key Code. To select the file for reading, the Key Code File field is touched, to display the file list - if necessary, refer to section 5, below, for more details

The Instrument Number, which must be quoted if ordering upgrades, is unique to the instrument and is not user editable.

4.6.4 Input adjust

This facility allows the user to compensate for tolerance errors etc. The technique used is to select those channels to which adjust is to be applied, then for each channel:

a apply a known low level signal (at or close to the low input range value) to the relevant input. When the recorder reading is steady, press 'Apply'.

b. apply a known high level signal (at, or close to, the high input range value) to the relevant input. When the recorder reading is steady, press 'Apply'.

Note: Input adjust cannot be applied to input channels with input type of 'Digital', 'Test' or 'comms'.

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4.6.4 INPUT ADJUST (Cont.)

Figure 4.6.4a shows the initial display which appears when 'Input adjust' is first selected from the SYSTEM menu. Channels 1 to 6 are selected by default.

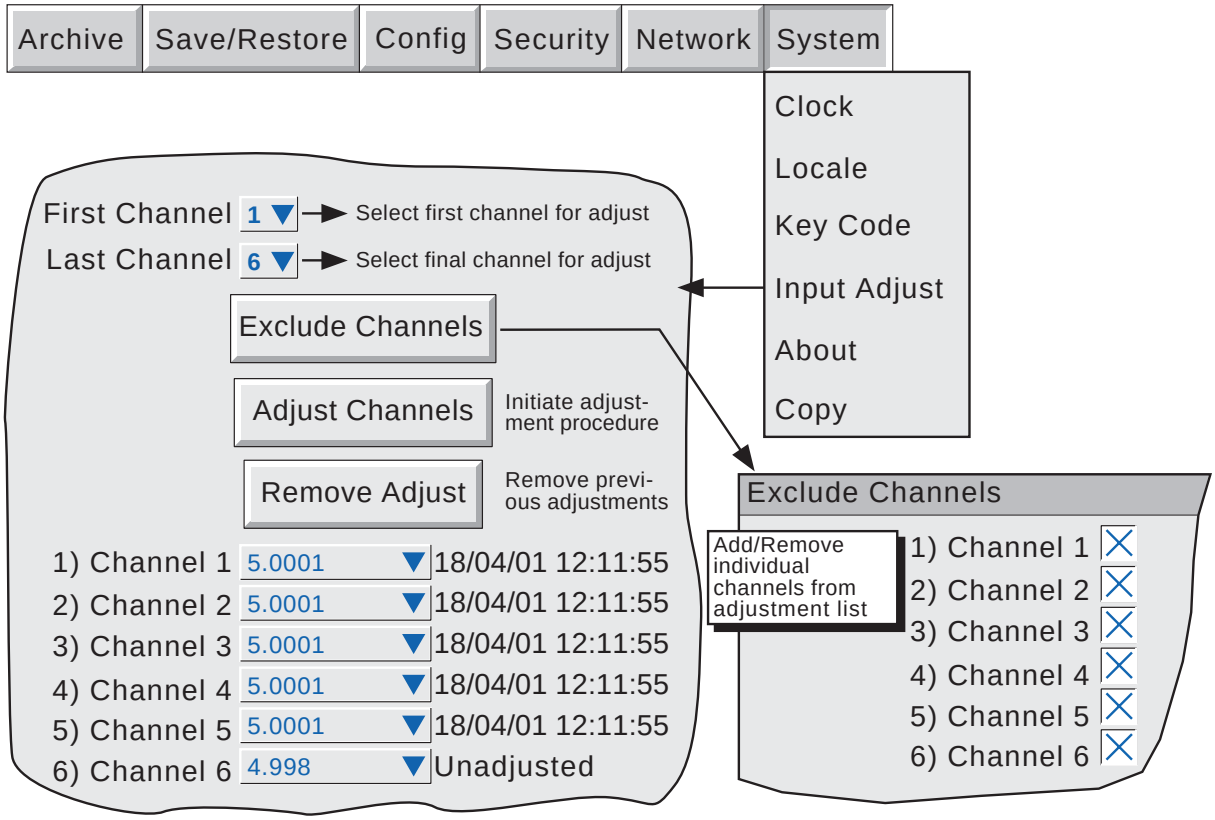


Figure 4.6.4a Input adjust status page

First channel	Allows the user to select the lowest channel number of all the channels to be adjusted.
Last channel	Allows the user to select the highest channel number of all the channels to be adjusted.
Exclude Channels	Presents a list of all the channels from the First channel to the Last channel inclusive, each of which can be removed from the list by 'unchecking' its check box. The channels displayed in the status page reflect this selection.
Adjust channels	Initiates the adjustment procedure to all the channels from the First channel to the Last channel inclusive, unless the effectivity is modified using the Select Channels key.
Remove Adjust	Returns the selected channels to factory calibration
1) Channel 1 etc.	A list of channels required to be susceptible to the adjustment procedure, together with their current values and their adjustment status (i.e. Unadjusted or, the time/date of the previous adjustment (if any)).

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4.6.4 INPUT ADJUST (Cont.)

ADJUST PROCEDURE

Operation of the Adjust Channels key calls the low-end adjust page, as shown in figure 4.6.4b.

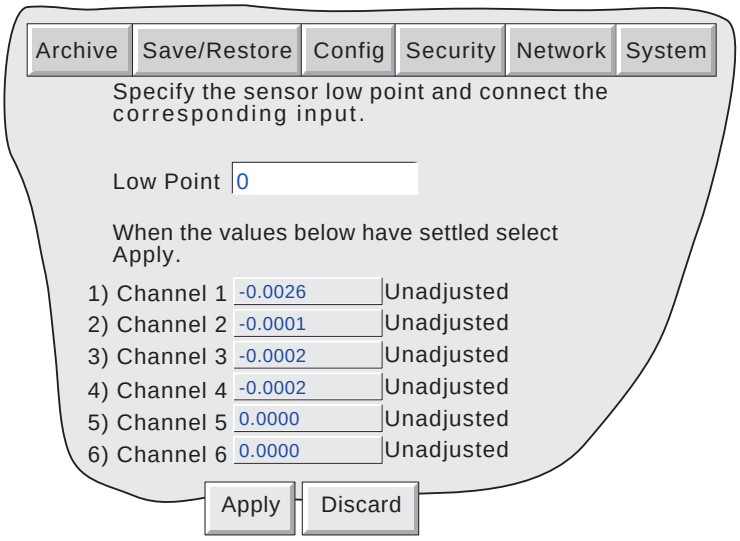


Figure 4.6.4b Typical low-end input adjust page

Low Point Usually 0, but a different value can be entered here, if required.

Apply the Low point value to the relevant input channels, and wait some minutes for the recorder readings to become stable. When the readings are stable, press the Apply key, to call the High-end page depicted in figure 4.6.4c, below.

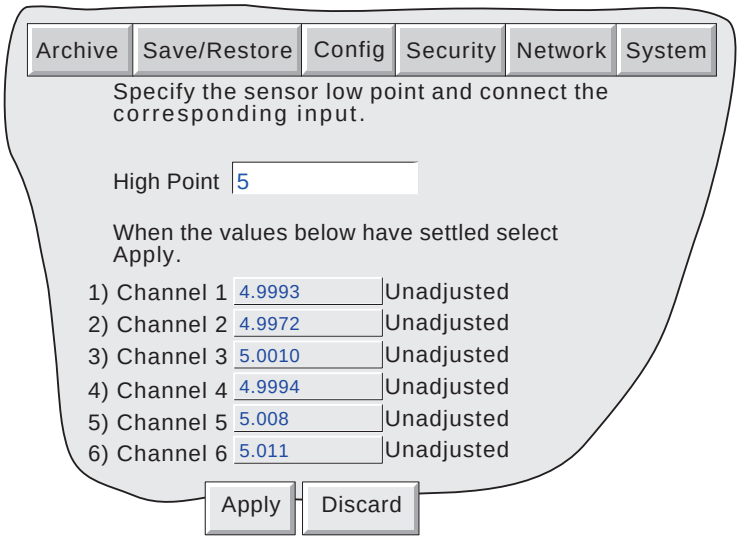


Figure 4.6.4c Typical high-end input adjust page

High Point Default value displayed, but a different value can be entered here, if required.

Apply the High point value to the relevant input channels, and wait some minutes for the recorder readings to become stable. When the readings are stable, press the Apply key, to return to the status page.

Note: Adjusting a channel invalidates the accuracy values given in the specification in Annex A for that channel.

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4.6.5 About

Selecting 'About' gives details of the version numbers of different aspects of the recorder, and details of the amount of memory fitted. Figure 4.6.5 shows a typical 'About' display page.

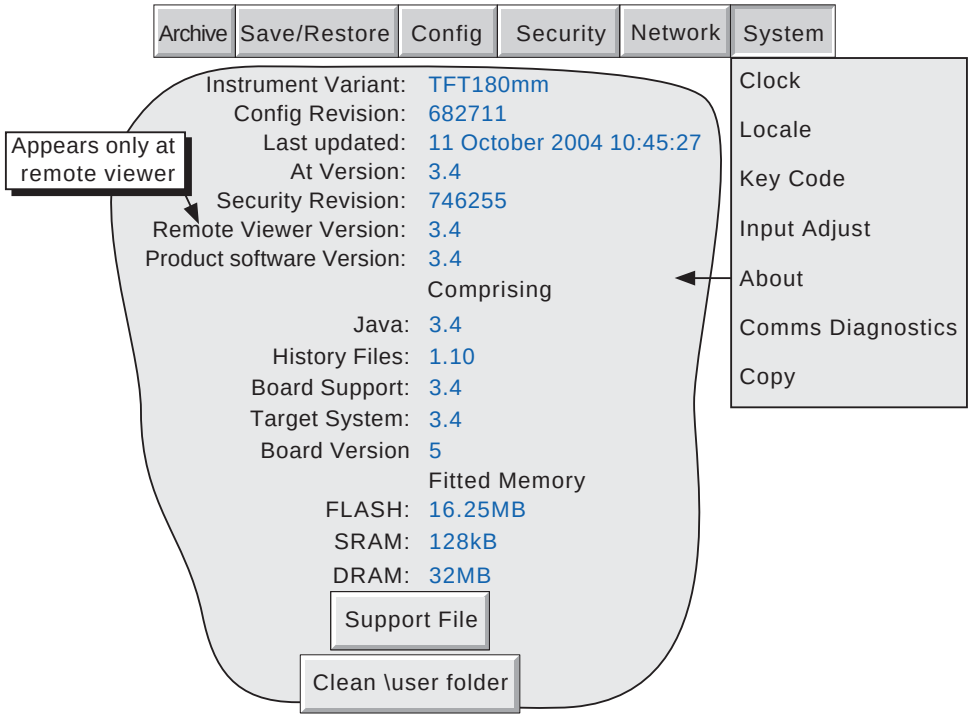


Figure 4.6.5 About display (typical).

INSTRUMENT VARIANT

Displays an instrument type code.

CONFIG REVISION

Whenever a change to the Configuration of the recorder is applied the 'Config Revision' is incremented. For these purposes, Configuration is defined as including all items within the menu structures of the Config and Network keys, and includes User Screens. It does not include those items associated with the Security key. Config Revision is printed on the 'chart' at power up, and if the Auditor Pack option or the Batch option is fitted, Config Revision is included in the messages associated with these options.

Notes:

1. Config Revision can be used as an input to one or more maths channels. If such a maths channel is included in one or more groups, the revision number can be determined for any time/date, when Trend History mode is invoked for the group(s) in question. See the Options Manual for maths option details.
2. Config Revision can be embedded in one or more messages, as described in section 4.3.8.

LAST UPDATED

The time and date at which the configuration was last edited.

AT VERSION

The version number at the time of the last configuration update.

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4.6.5 ABOUT (Cont.)

SECURITY REVISION

Whenever a change is made to an item within the Security menus, the Security revision is incremented. Security Revision is printed on the 'chart' at power up, and if the Auditor Pack option or the Batch option is fitted, Security Revision is included in the messages associated with these options. See notes 1 and 2, below.

Notes:
1 Security Revision can be used as an input to one or more maths channels. If such a maths channel is included in one or more groups, the revision number can be determined for any time/date, when Trend History mode is invoked for the group(s) in question. See the Options Manual for maths option details.
2. If 'Centralised Security' is enabled, the Security Revision is in a different format (e.g. 15.001) see section 4.4.2.

SUPPORT FILE

If the unit is not performing as it should (e.g. it resets itself unexpectedly), the Support File key allows the user to save 'critical system files' into a single file (SupportInfo.uhq*) to the instrument's floppy disk/pc card, or to the remote viewer's PC, for despatch to the manufacturer for analysis. For security reasons, this file cannot be viewed by anyone other than the manufacturer or his agents.

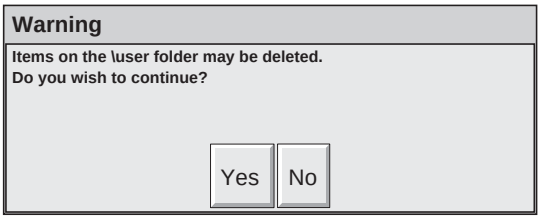
Once the save operation is complete, a 'Support' message appears on the screen giving details of where to send the file. More information is held in the file 'SupportInfo.txt' which is also saved to the disk. This file can be opened, and the information within it read, by inserting the disk into a PC, clicking on the floppy disk icon (A drive) in 'My Computer' and then double clicking on the file icon when it appears.

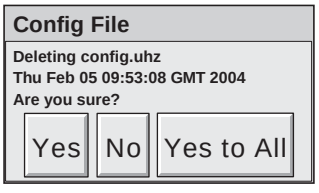
* 'SupportInfo' is the default name. This name may be edited by the user before saving to disk or pc. The .uhq suffix is automatically appended to the new name.

CLEAN \USER FOLDER

Notes:
1. This button appears only for users with 'Full Configuration' access permission.
2. Before carrying out this operation, it is recommended that all required files are saved to disk, or pc card.

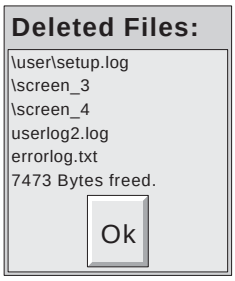
Operating this button causes the instrument to delete 'unnecessary' files from the \user folder, and to compress (zip) others such as user screens. Permission is asked before configuration files, user screens etc. are deleted.





Note: 'Yes to All' applies only to 'remaining' files. It does not delete files for which delete permission has previously been denied by operation of the 'No' button.

Once all deletions are complete, a list of deleted items is displayed.



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4.6.6 Comms Diagnostics

This menu item is concerned only with Master comms diagnostics, and is fully described in Section 3 of the Communications Manual.

4.6.7 Copy

This facility allows the user to copy a point or group configuration from one point, group etc. to one or more others. The user may choose whether or not to include alarm and (if applicable) job data when copying point configurations. Descriptors and colour selections are not copied.

Figure 4.6.7 shows a typical configuration page for copying the configuration of channel 1 (Furnace Temp1) to channels 2 to 5 inclusive.

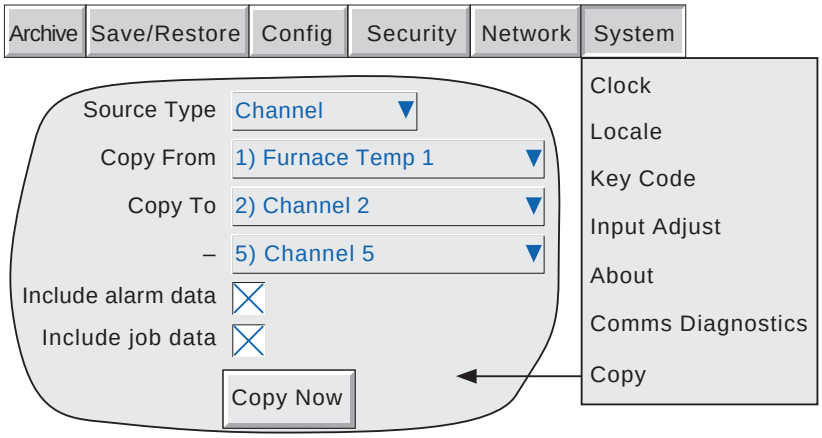
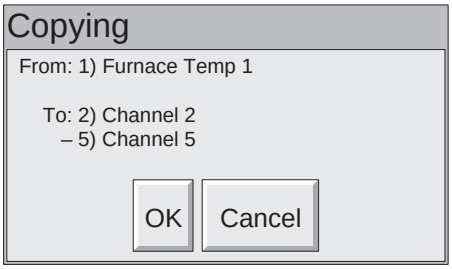


Figure 4.6.7 Copy configuration page (typical)

When 'Copy Now' is operated, a confirmatory dialogue box opens, to allow the user to check the source and destination entries.



CONFIGURABLE PARAMETERS

Source Type	Picklist allows selection of Group, Channel, Event, Message, Maths Channel, Totaliser, Counter, Timer, Output or Demand Write, as the type of source to be copied.
Copy From	Allows the user to select a specific point, group etc. to be copied
Copy To	Allows the first destination point to be selected, for the source to be copied to.
–	Allows the final destination point to be selected for the source to be copied to.
Include alarm data	This field appears only for source types which support alarms. If this box is 'selected', then alarm data is included in the copy process.
Include job data	This field appears only for source types which support jobs. If this box is 'selected', then jobs data is included in the copy. For source types that support both alarms and jobs, it is not possible to include job data, without including alarm data as well.

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4.6.7 COPY (Cont.)

Once the copy is complete, the user should enter the configuration area of the items that have been copied, and edit/ apply the changes etc.

COPY RULES

1. The first channel on any input card may not be a digital input type.
2. If a destination channel was a digital input, AND the source channel is an analogue input AND 'include alarm data' is not selected, the destination channel alarm settings will be set as:
   Enable = Off; Type = Absolute high; Threshold = 0.0; Dwell = 0.0.
3. If a destination channel was an analogue input, AND the source channel is a digital input AND 'include alarm data' is not selected, the destination channel alarm settings will be set as:
   Enable = Off; Type = Digital; Threshold = Closed; Dwell = 0.0.
4. Descriptors and Colours are never copied.

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4.7 JOBS

A number of sources (e.g. channel, event, totaliser) can be set up to trigger one or more jobs. The following description includes all possible job categories, but which jobs are available on any particular recorder depends on the options fitted to that recorder. Many job categories require the relevant access level permission to be set, as described in section 4.4.1, above.

The type of action (continuous or 'single-shot'), available for selection, depends on the type of trigger source. Continuous actions are selected from: Whilst active, Whilst inactive or Whilst unacknowledged. The available single-shot actions are: On becoming active, On becoming inactive, On acknowledgement.

Note: It is recommended that a 'job list' be kept during configuration. A sample template appears in Annex B.

4.7.1 No Action

This means that no job action is configured for the trigger source.

4.7.2 Drive relay

Allows a specific relay to be set up to change state whilst the trigger source is active, inactive or whilst it remains unacknowledged. Relays are normally energised i.e. 'common' (c) is shorted to 'normally open' (no). When in alarm, the relay is de-energised i.e. 'common' (c) is shorted to 'normally closed' (nc). Thus, if power is removed from the recorder, all relays automatically 'fail safe' to their alarm conditions. See section 2.2.1 for details of relay output board connector location(s) and pinout.

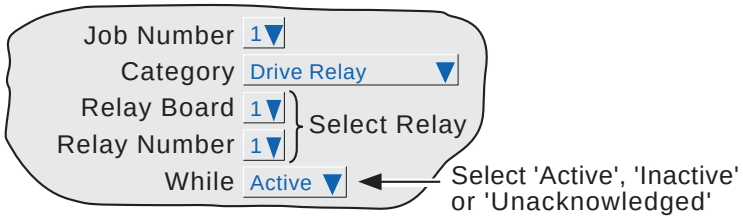


Figure 4.7.2 Relay job menu layout

4.7.3 Totaliser category

If the Totaliser option is fitted (section 4 of the Options Manual), the following jobs become available:

Preset	Loads the selected totaliser with the value set up in 'Preset' in the totaliser's configuration menu.
Preset Group	Loads all the totalisers in the specified group with their 'Preset' values.
Disable	Stops the specified totaliser accumulating.
Disable Group	Stops all totalisers in the specified group.

Note: If more than one job is set up to disable a particular totaliser, then any of these jobs going active will disable the totaliser, unless the software version is prior to version 1.7, in which case, all relevant jobs have to be active simultaneously in order to disable the totaliser.

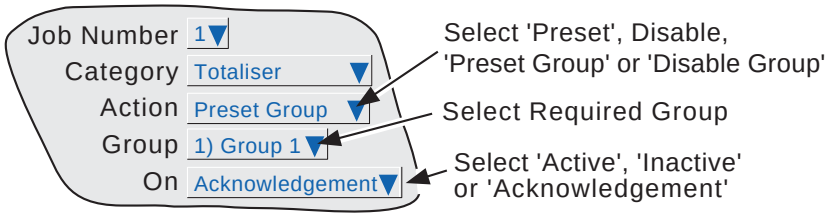


Figure 4.7.3 Totaliser job menu layout (group action)

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4.7.4 Message category

If the message option is fitted (section 4.3.8), one or more messages can be directed to the display, to 'All groups' or to a 'Specified Group'. The messages must be contiguous - e.g. messages 2, 3 and 4 may be sent, but messages 1, 3 and 4 cannot be sent, without message 2 as well. Group selection fields do not appear for single-group recorders.

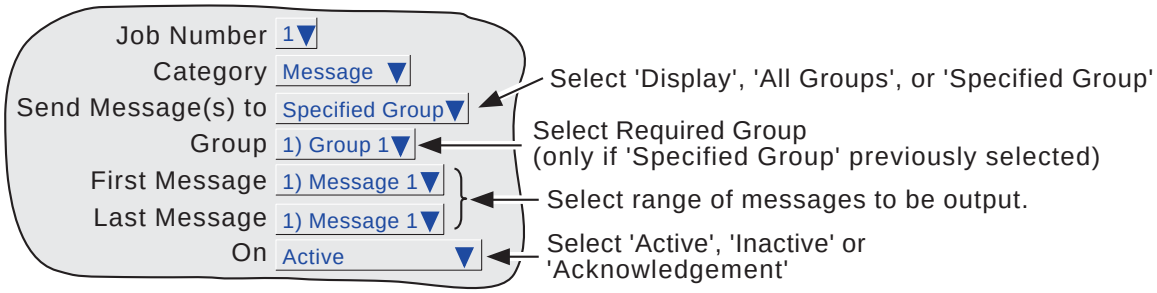
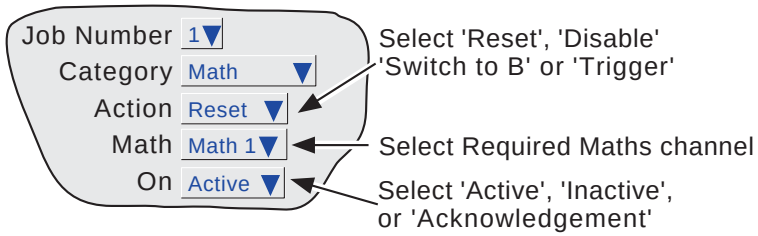


Figure 4.7.4 Message job menu layout

4.7.5 Maths category

If the Maths option is fitted (section 3 of the Options Manual), the following jobs become available to applicable functions:

Reset	Sets the selected maths channel value to zero.
Disable	Stops historical functions such as Fvalue, Stopwatch and Rolling Average from accumulating further values. When the function is subsequently re-enabled, the function re-starts from its pre-disabled value. 'Disable' has no effect on other functions.
Switch to B	Causes the relevant maths channel to copy source B instead of its normal source A - see section 3.1.4 of the Options Manual for further details. This function is not related to the 'A/B Switching' function.



Trigger	Used to initiate a 'Sample and hold' function - see section 3.1.4 of the Options Manual for further details.

Figure 4.7.5 Maths job menu layout

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4.7.6 Clock category

This job causes the System Clock to be Preset to the value entered in Instrument Configuration (Preset Hour, Preset Minute) (Section 4.3.1). This job can be used to synchronise a number of recorders as follows:

a. For each recorder, set up one input channel as

Input Type	Digital
Closed String	Synch (for example)
Enable	Trigger
Active when	Synch
Job 1 category	Clock
Job 1 action	Preset
Job 1 On	Active

b. For each recorder, set the same preset hour and minute in Instrument Configuration.

c. For each recorder provide a simultaneous pulse or contact closure to the digital input previously set up.

The recorders will all be automatically set to the preset time on receipt of the input.

An alternative way of synchronising recorders is via an SNTP time server as described in section 4.5.1.

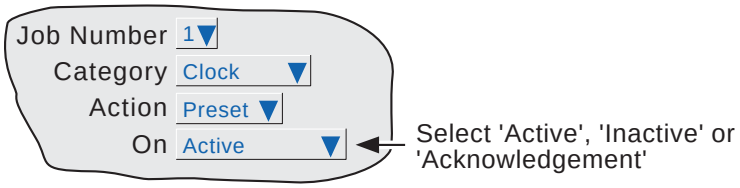


Figure 4.7.6 Clock job menu layout

Note: Whenever a time change occurs, a green line is drawn across the chart in vertical trend mode

4.7.7 Counter category

If the Counter option is fitted (section 5 of the Options Manual), the following jobs become available:

Preset counter	Loads the selected counter with the preset value set in the configuration for that counter.
Disable counter	Stops the selected counter.
Increment	Adds 1 to the selected counter's value.
Decrement	Subtracts 1 from the selected counter's value.
Preset group	Loads all the counters in the specified group with their 'Preset' values.
Disable group	Stops all counters in the specified group.

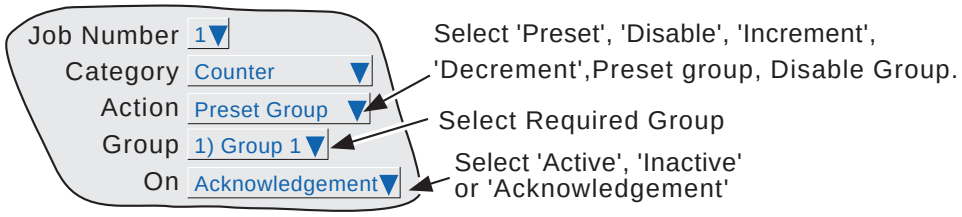


Figure 4.7.7 Counter job menu layout (group action)

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4.7.8 Timer jobs

If the Timer option is fitted (section 6 of the Options Manual), the following jobs become available:

1. Reset timer - sets the timer to zero
2. Start timer - causes the timer to start.
3. Disable timer - stops the timer.

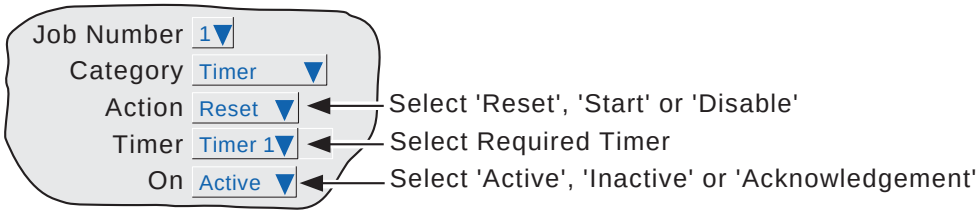


Figure 4.7.8 Timer job menu layout

4.7.9 Batch Jobs

If the Batch option (section 1 of the Options Manual) is fitted, a previously 'Stored' batch can be started by job action or by a Batch Start command sent via MODBUS/TCP (section 2.4.4 of the Communications Manual). If a batch is already running, it will be restarted. In Batch configuration, if Scope = Group, then a specific group can be selected for the batch job to act on; if Scope = Instrument, the Group selection field does not appear.

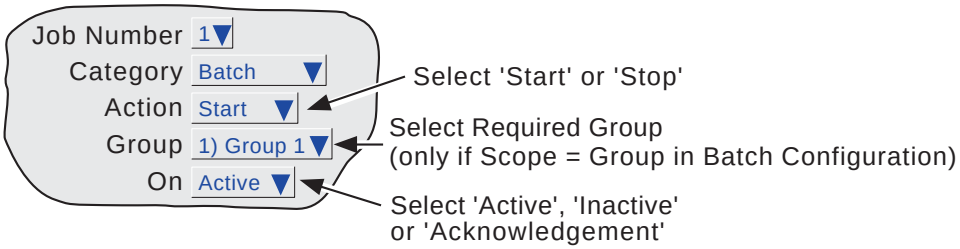


Figure 4.7.9 Batch job menu layout

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4.7.10 Recording jobs

A Recording job:

a) allows the user to record to a specified group's history file, only by job initiation.

b) allows the recording speed/interval B to be selected for use, for the duration of the job. See 'Group configuration for A/B switching details.

Notes:

1 The group in question will be recorded only if Recording Enable selected in group Configuration (section 4.3.2) and the job is active.

2. If the Auditor Pack option is fitted, then in order to preserve the audit trail, messages will be saved in the group's history files even when recording is not enabled by job.

3. A blue line is drawn across the 'chart' whenever a recording job is used to disable/enable recording.

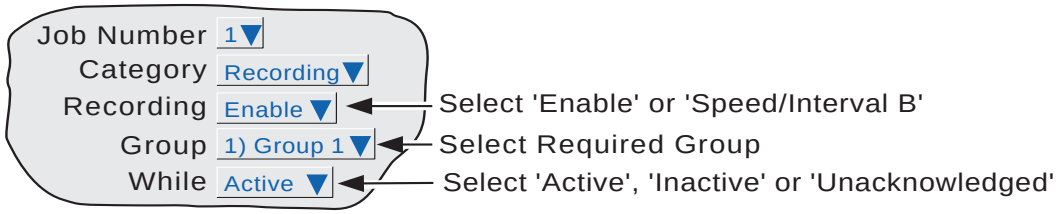


Figure 4.7.10 Recording job menu layout

4.7.11 Trend jobs

Trend jobs allow the following actions to occur:

Span B	Switches the point being configured to span B and zone B, for as long as the job is active.
Span B Group	Switches all the points in the selected group to their individual spans and zones B, for as long as the job is active.
Colour B	Switches the point being configured to colour B, for as long as the job is active.
Colour B Group	Switches all the points in the selected group to their individual colours B, for as long as the job is active.
Speed/Interval B	Switches Trend Speed/Interval for the selected group to Speed/Interval B, for as long as the job is active.

Note: Default B values are the same as the initial default 'A' Values. Thus, if a 'B' value has not been set, the default 'A' value will be used.

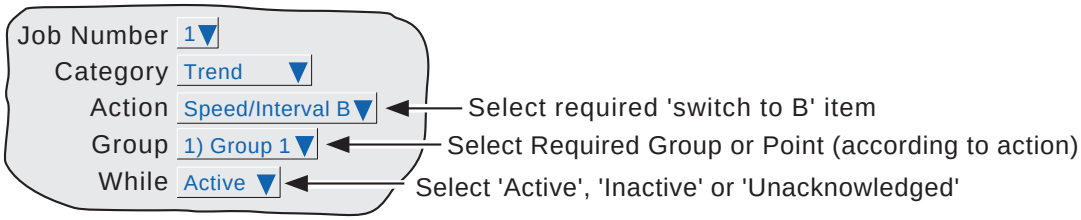


Figure 4.7.11 Trend job menu layout

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4.7.12 Output jobs

Applies only to recorders with Modbus master option fitted.

Output jobs allow specific analogue output writes to be disabled from the recorder when it is acting as a modbus master.

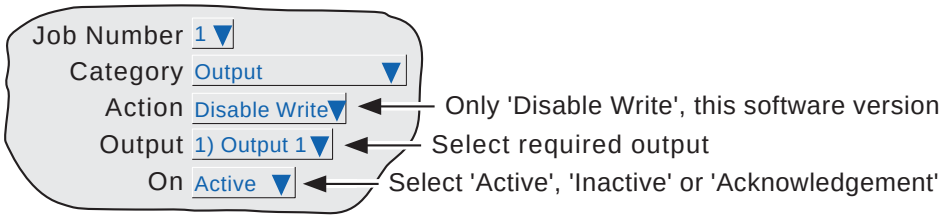


Figure 4.7.12 Output Job menu layout

4.7.13 Demand Writes jobs

Applies only to recorders with Modbus master option fitted.

Demand Writes jobs allow the user to set up the recorder so that, when the job is triggered, it initiates the selected Demand Write. The write action is performed to the remote device as defined in Demand Write Configuration described in section 3.4 of the Communications Manual.

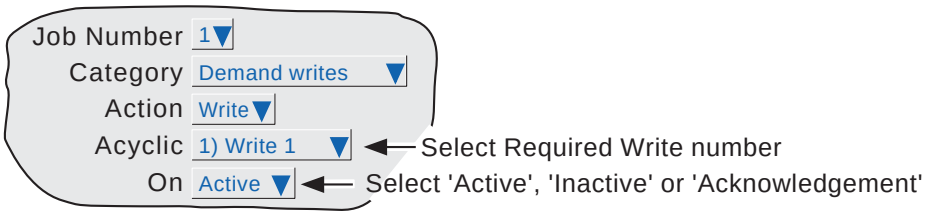


Figure 4.7.13 Demand write jobs menu layout

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4.7.14 Alarm jobs

This allows the user to set up a job to acknowledge or disable point alarms as follows:

Acknowledge All Alarms	Acknowledges all alarms
Acknowledge Alarms on Group	Acknowledges all alarms in the specified group
Acknowledge Alarms on Point	Acknowledges all alarms associated with the specified point
Acknowledge Alarm	Acknowledges specific alarm
Disable All Alarms	Disables all alarms
Disable Alarms on Group	Disables all alarms in the specified group
Disable Alarms on Point	Disables all alarms associated with the specified point
Disable Alarm	Disables a specific alarm

Further selection boxes allow a group or point, respectively, to be defined.

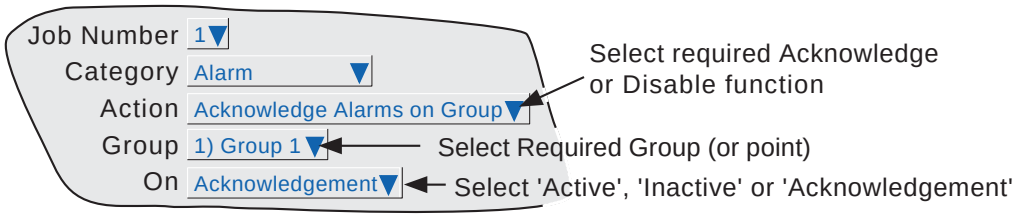


Figure 4.7.14 Alarm job menu layout

4.7.15 Archive jobs

Archive jobs allow a job to be used to trigger an archive to the mass storage medium (floppy disk or pc card) or to a host computer using FTP transfer. The following jobs are available:

Archive Last Hour, Last Day, Last 7 Days or Last 31 days to FTP
Bring FTP archive up to date
Cancel Archive to FTP
Archive Last Hour, Last Day, Last 7 Days or Last 31 days to Media
Bring Media Archive up to date
Suspend Archive to Media
Cancel Archive to Media

These jobs copy the archiving functions available from the 'Archive' key described in section 4.1 of this document. For 'FTP' items see 'Remote'; for 'Media' see 'Disk'.

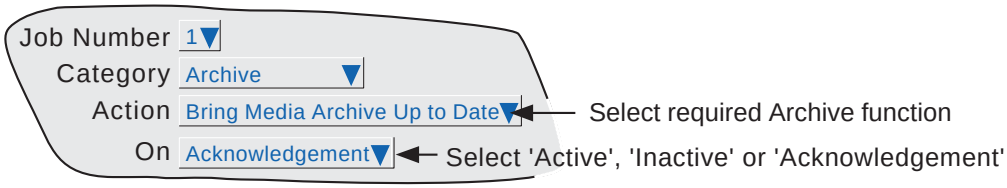


Figure 4.7.15 Archive jobs menu layout

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4.7.16 Email category

Allows the user to send a specified e-mail to the recipients set up in e-mail configuration (see options manual). A system message is generated, and displayed in all recording groups whenever an e-mail is sent.

4.7.17 Report Category

This category is available only when the ASCII Printer Output option is fitted. See the Communications manual for further details.

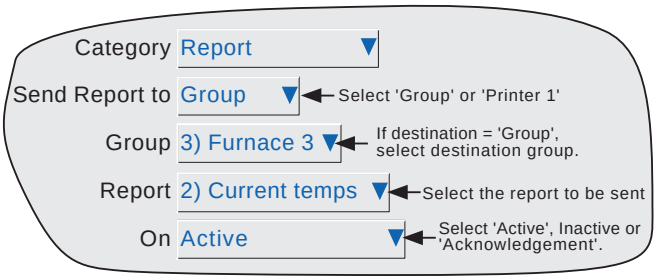


Figure 4.7.17 Report category job menu

SEND REPORT TO

Allows the user to select 'Group' or 'Printer1 / 2'. If 'Group' is selected (as in the figure above), a further field appears allowing the user to specify the group to which the report is to be sent (Group 3 in the figure above). If 'Printer 1' is selected the report is sent to a connected ASCII printer. 'Printer 2' is not supported in this software version.

GROUP

This field appears only if 'Group' has been selected as the report destination, and allows the actual destination group to be defined. If a group descriptor has been entered ('Furnace 3' in the figure above), then this descriptor appears in the field.

REPORT

This defines which of the reports is to be sent when the job is triggered. If a Report descriptor has been entered, then this appears in the field ('Current temps' in the figure above)

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5 FILE

Figure 5, below, gives an overview of the File Menus. The area is entered by touching the 'File' key of the root menu, and can be used to display the contents of directories stored both in the user area of flash memory and on any disk or memory card currently inserted.

The first display page shows the 'volume' or 'device' names associated with the various areas of memory available to the user. If one of these volume names is selected (touched), and the 'open-folder' key* operated, the contents of the selected volume is displayed. This would typically consist of a list of folders. Similarly, if a folder name is selected and the 'open folder' key* is touched, the contents of the folder is displayed and so on.

To return to higher levels, the 'close-folder' key* is used.

The path name of the current window is shown at the top of the window.

*Note: The open-folder and close-folder key functions are the same as the down arrow and up arrow key functions respectively.

5.1 FILER OPTION MENU KEYS

These keys appear in a pop-up menu when the option key is pressed. This menu appears only when an actual file has been selected (i.e. it does not appear if a directory (folder) or volume is selected.) Cut and paste functions are available only to users with the relevant access permissions (section 4.4).

Cut	Removes a file from the list, ready for 'pasting' to another destination.
Copy	Copies a file from the list, ready for 'pasting' to another destination.
Delete	Removes a file from the memory.
New	Allows a new directory (folder) to be created
Paste	Places a 'cut' or 'copy' file into the new destination.
Refresh	Refreshes the display.

A key's legend is hidden (displayed in white) if at any time its function is not applicable.

5.2 THE HIDE KEY

The Hide key at the top right corner of the display screen is used to hide (show) Type, Date and Bytes information, allowing the full filename text string to appear.

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5 FILE (Cont.)

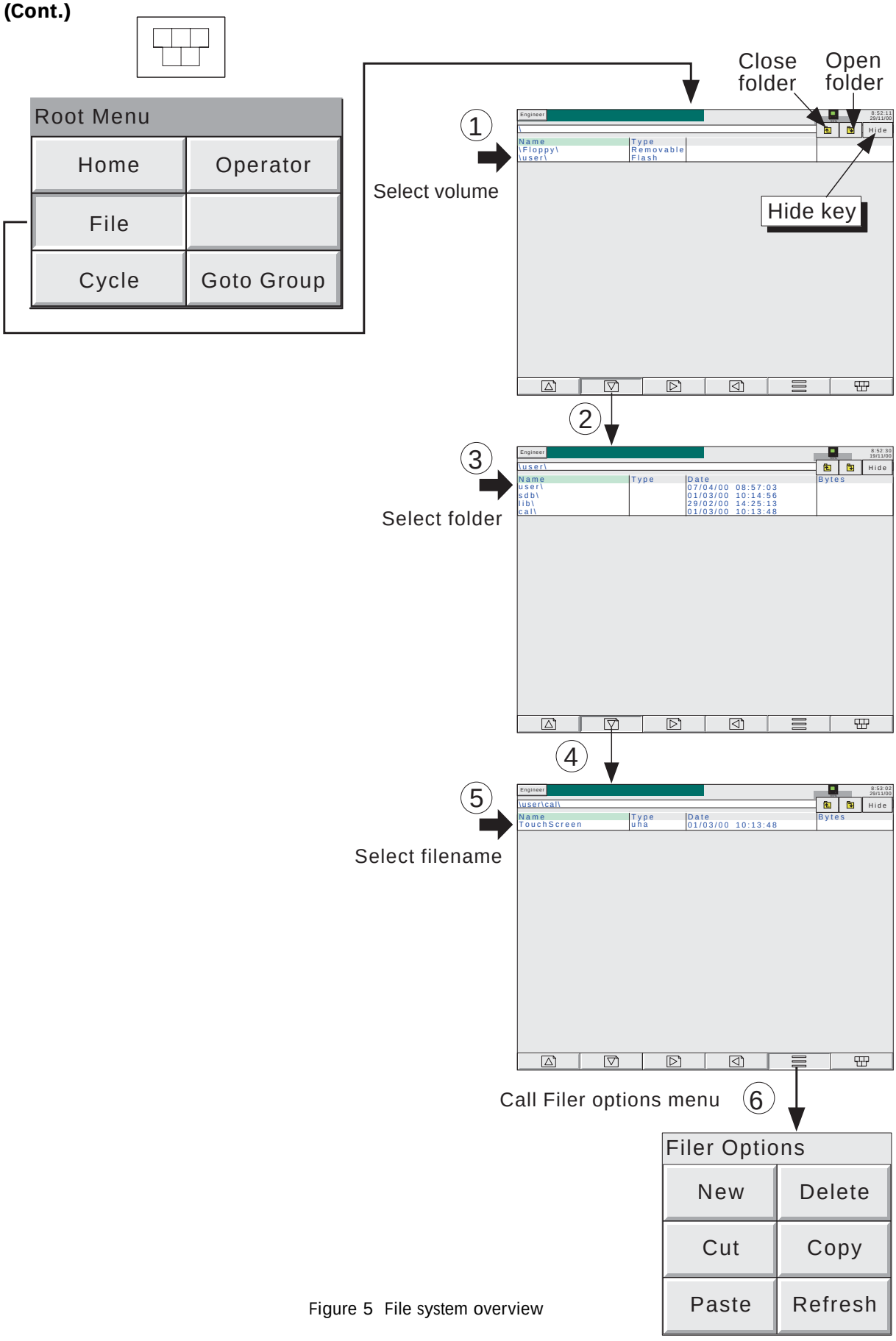


Figure 5 File system overview

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5.3 FILE STRUCTURE

5.3.1 Software versions prior to 3.1

The file structure on the floppy disk or pc card, is as depicted below in figure 5.3.1. The History folder contains one folder for each group fitted. Each Group folder contains all the history files for that group. Figure 5.3.1 illustrates this for a 6-group unit.

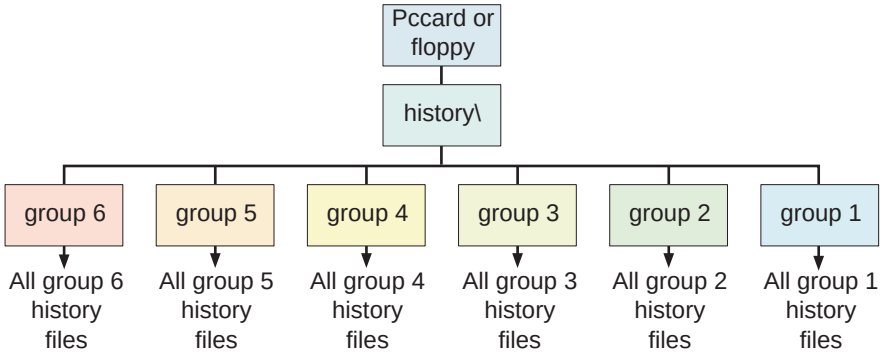


Figure 5.3.1 File structure for software versions prior to 3.1

5.3.2 Software versions 3.1 onwards

The file structure for versions 3.1 onwards is similar except in that an extra level of subdirectories has been added within the group folders. Each subdirectory contains a maximum of 32 files, there being sufficient subdirectories created, to contain all the group's history files. This is illustrated in figure 5.3.2 below.

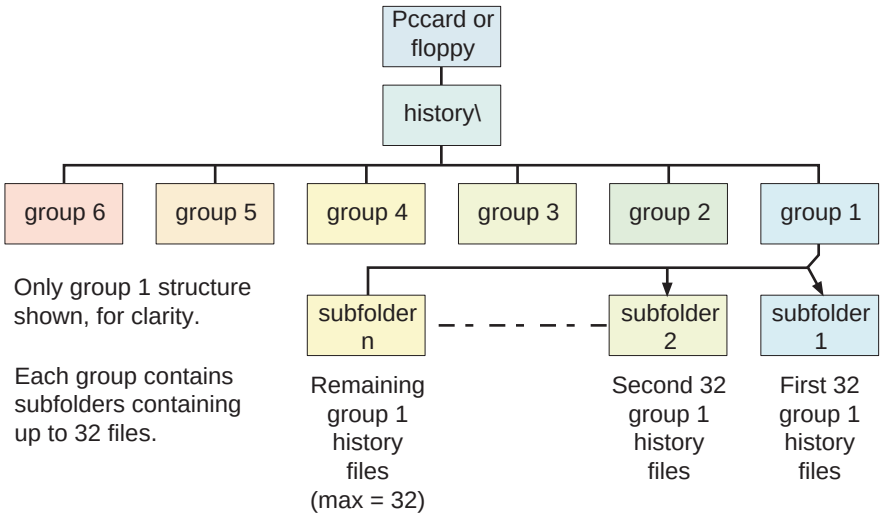


Figure 5.3.2 File structure for software versions 3.1 onwards

The subfolder names are the numerical part of the first history file that they contain. For example if the first file name is Furnace1 Temp~80155F2601000120.uhh, then the subdirectory name will be 80155F2601000120. If there are more than 32 files, the next subdirectory name is 80155F2601000140 (assuming the file names are contiguous).

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ANNEX A: SPECIFICATION

INSTALLATION CATEGORY AND POLLUTION DEGREE

This product has been designed to conform to BS EN61010 installation category II and pollution degree 2. These are defined as follows:

Installation category II

The rated impulse voltage for equipment on nominal 230V ac mains is 2500V.

Pollution degree 2

Normally, only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation shall be expected.

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TECHNICAL SPECIFICATION (Recorder)

Board types (I/O)

Universal input board (standard)
3 Change-over relay output board (option)
6 - event input board (option)
Serial communications board (option)

Standard features

File transfer protocol (FTP)
MODBUS TCP
Messages
Configuration Copy

Other options

Software:	ASCII Printer output
	Audit trail
	Batch Recording
	Circular trend (180 mm recorders only)
	CSV Archive file format
	E-mail
	Event Buttons
	Log scales
	Master Comms
	Maths/Totalisers/Counters/Timers
	Multiple Groups
	Remote viewer ('Lite' and 'Full' options available)
	Screen Builder (User screens) ('Lite' and Full versions)
	Security Manager
Hardware:	Transmitter power supply - isolated (100 mm recorders only)
	Low supply voltage
	Access cover lock

Environmental Performance

Temperature limits	Operation:	0 to 50˚C (5 to 40˚C if Floppy disk drive fitted).
	Storage:	- 25 to +70˚C (-20 to + 50˚C if floppy disk drive fitted)
Humidity limits	Operation:	5% to 80% RH (20% to 80% RH if floppy disk drive fitted) both non - condensing
	Storage:	5% to 90% RH (8% to 80% RH if floppy disk drive fitted) both non - condensing
Altitude (maximum)		<2000 metres
Protection	Standard bezel/display:	IP65 without lock; IP20 with lock (both figures for a recorder mounted in a panel).
	Standard sleeve:	IP20
	Portable case option:	IP21
Shock		BS EN61010
Vibration (10 Hz to 150Hz)		2g peak

Physical

Panel mounting		DIN43700
Bezel size	Small frame:	144mm x 144mm
	Large frame:	288mm x 288mm
Panel cutout	Small frame:	138mm x 138mm (-0.0 + 1.0) mm
	Large frame;	281mm x 281mm (-0.0 + 1.0) mm
Depth behind bezel	Small frame:	248 mm (100 mm without terminal cover)
	Large frame:	305 mm (100 mm without terminal cover)
Weight	Small frame:	3 kg. max. (5 kg. max. if fitted in portable case)
	Large frame:	7 kg. max.
Mounting angle	Hard disk option:	Vertical
	Floppy disk version:	±15 ˚ from vertical
	Other versions:	±45 ˚ from vertical

For portable case dimensions - see section 11 of the Options manual

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TECHNICAL SPECIFICATION (RECORDER) (Cont.)

Electromagnetic compatibility (EMC)

Emissions and immunity:	BS EN61326

Electrical safety

BS EN61010. Installation category II, Pollution degree 2

Power requirements

Supply voltage	Standard:	85 to 265 volts; 47 to 63 Hz or 110 to 370V dc (dc supply not to be used if isolated transmitter power supply fitted)
	Low voltage option:	20 to 42V RMS; 45 to 400 Hz, or 20 to 54V dc (option not to be used if isolated transmitter power supply fitted)
Power (max.)		60 VA (Inrush current 36A)
Fuse type		None
Interrupt protection	Standard:	Holdup >200msec. at 240V ac, with full load.
	Low voltage option:	20msec at 20Vdc or RMS, with full load

Back-up battery

Type	Current recorders:	Poly-carbonmonofluoride/lithium (BR2330). Part Number PA261095 - see Annex D .
	Older recorders:	Lithium Manganese (CR2032). Part Number PA250983 - see Annex B, section B3.2
Support time		A fully-charged, new battery supports the Real-Time Clock for a minimum of 1 year with the recorder unpowered
Replacement period		3-years
Stored data		Time; date; values for totalisers, counters and timers; batch data; values for those maths functions with history, such as Fvalue, Rolling average, Stopwatch etc.

Clock (RTC) data

Temperature stability	0 to 40˚C:	-3 to +2 ppm
	-40 to + 85 ˚C:	± 7.5 ppm
Ageing		±1 ppm per year

Touch screen

Colour TFT LCD with cold-cathode backlighting, fitted with resistive, analogue, touch panel

Screen specification	Small frame:	1/4 VGA Resolution = 320 x 240 pixels
	Large frame:	SVGA Resolution= 800 x 600 pixels

Update information

Input/relay output sample rate:	8 Hz.
Display update:	1 Hz,
Archive sample value:	Latest value at archive time
Trended/displayed value:	Latest value at display update time

Network Communications

Type		IEEE802.3 10BaseT
Cable	Type:	CAT5
	Maximum length:	100 metres
	Termination:	RJ45

Serial communications option

Isolation (dc to 65Hz BS EN61010)		Installation category II; Pollution degree 2.
	Terminals to ground:	100 V RMS or dc (basic insulation)

Transmitter power supply (Isolated) (100 mm recorders only)

Number of outputs		Three
Output voltage		25V nominal
Max. current		20mA per output
Isolation (dc to 65Hz BS EN61010)		Installation category II; Pollution degree 2.
	Channel to channel:	100V RMS or dc (double insulation)
	Channel to ground:	100V RMS or dc (basic insulation).
Fuse (20mm Type T)		
	Supply voltage = 110/120Vac:	100 mA
	Supply voltage = 220/240Vac:	63 mA

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TECHNICAL SPECIFICATION (Universal input board)

General*

Termination		Edge connector/terminal block
Max. number of inputs	Small frame:	18 (three 6-input boards)
	Large frame:	48 (eight 6-input boards)
Input ranges		-8 to +38mV; -30 to +150mV; -0.2 to +1Volt; -2 to + 10Volts (0 to 10 Volts for channels 1, 7, 13 and 19)
Input types		Dc volts, dc millivolts, dc milliamps, (with external shunt), thermocouple, 2/3 wire resistance temperature detector (RTD), Ohms, Contact closure (not channels 1, 7, 13,19, 25, 31, 37, 43) (Minimum contact closure = 60msec.)
Input type mix		Freely configurable
Sample rate		See 'Update information' above
Noise rejection (48 to 62Hz)		
	Common mode:	>140dB (Channel to channel and channel to ground)
	Series mode:	>60dB
Maximum common mode voltage		250Volts continuous
Maximum series mode voltage		45mV at lowest range; 12Volts peak at highest range
Isolation (dc to 65Hz; BS EN61010)		Installation category II; Pollution degree 2 300V RMS or dc channel to channel (double insulation), channel to common electronics (double insulation) and channel to ground (basic insulation)
Dielectric strength	Channel to ground:	1350Vac for 1 minute.
	Channel to channel:	2300Vac for 1 minute
Insulation resistance		>10MΩ at 500V dc
Input impedance	10V range:	68.8kΩ
	Other ranges:	>10MΩ
Overvoltage protection		50V peak (150V with attenuator)
Open circuit detection		± 57nA max
	Recognition time:	500mSec
	Minimum break resistance:	10MΩ

For small frame recorders only:
For 6 or12 input recorders, up to four option boards may be fitted.
For 18 channel recorders up to two option boards may be fitted.

DC input ranges

Shunt	Externally mounted resistor modules
Additional error due to shunt	0.1% of input
Performance	See table

Low Range	High Range	Resolution	Maximum error (Instrument at 20˚C)	Worst case temperature performance (Instrument at 20 C)
-8mV	+38mV	1.4µV	0.085% input + 0.073% range	80ppm of input per deg C
- 30mV	150mV	5.5µV	0.084% input + 0.053% range	80ppm of input per deg C
-0.2V	1Volt	37µV	0.084% input + 0.037% range	80ppm of input per deg C
-2V	10 Volts	370µV	0.275% input + 0.040% range	272ppm of input per deg C

* WARNING

For portable case instruments only:
All I/O connections must be SELV (33V ac RMS, 46,7V ac peak, 70Vdc) unless the integrity of the instrument safety earth is maintained for as long as the I/O is connected to the recorder.

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TECHNICAL SPECIFICATION (Universal input board) (Cont.)

Resistance inputs

Temperature scale: ITS90

Types, ranges and accuracies: See tables (values exclude influence of lead resistance)

Influence of lead resistance Error: Negligible

Mismatch: 1Ω/Ω

Low Range	High Range	Resolution	Maximum error (Instrument at 20˚C)	Worst case temperature performance
0Ω	150Ω	5mΩ	0.045% input + 0.110% range	35ppm of input per deg C
0Ω	600Ω	22mΩ	0.045% input + 0.065% range	35ppm of input per deg C
0Ω	6kΩ	148mΩ	0.049% input + 0.035% range	35ppm of input per deg C

RTD type	Overall range (˚C)	Standard	Max. linearisation error
Cu10	-20 to + 400	General Electric Co.	0.02˚C
Cu53	-70 to + 200	RC21-4-1966	< 0.01˚C
JPT100	-220 to + 630	JIS C1604:1989	0.01˚C
Ni100	-60 to + 250	DIN43760:1987	0.01˚C
Ni120	-50 to + 170	DIN43760:1987	0.01˚C
Pt100	-200 to + 850	IEC751	0.01˚C
Pt100A	-200 to + 600	Eurotherm Recorders SA	0.09˚C
Pt1000	-200 to + 850	IEC751	0.01˚C

Thermocouple data

Temperature scale: ITS90

Bias current: 0.05nA

Cold junction compensation types: Off, internal, external, remote

Remote CJC source: Any input or maths channel.

Internal CJC error: 1˚C max with instrument at 25˚C

Internal CJC rejection ratio: 50:1 minimum

Upscale/downscale drive Types: 'High'. 'low' or 'none' selectable for each thermocouple channel.

Additional error: Typically 0.01˚C - depends on wiring. (Detect current = 57nA.)

Types, ranges and accuracies: See table

T/C type	Overall range (˚C)	Standard	Max.linearisation error
B	0 to + 1820	IEC584.1	0 to 400˚C = 1.7˚C 400 to 1820˚C = 0.03˚C
C	0 to + 2300	Hoskins	0.12˚C
D	0 to + 2495	Hoskins	0.08˚C
E	-270 to + 1000	IEC584.1	0.03˚C
G2	0 to + 2315	Hoskins	0.07˚C
J	-210 to + 1200	IEC584.1	0.02˚C
K	-270 to + 1372	IEC584.1	0.04˚C
L	-200 to + 900	DIN43710:1985 (To IPTS68)	0.02˚C
N	-270 to + 1300	IEC584.1	0.04˚C
R	-50 to + 1768	IEC584.1	0.04˚C
S	-50 to + 1768	IEC584.1	0.04˚C
T	-270 to + 400	IEC584.1	0.02˚C
U	-200 to + 600	DIN43710:1985	0.08˚C
NiMo/NiCo	-50 to + 1410	ASTM E1751-95	0.06˚C
Platinel	0 to + 1370	Engelhard	0.02˚C
Ni/NiMo	0 to + 1406	Ipsen	0.14˚C
Pt20%Rh/Pt40%Rh	0 to + 1888	ASTM E1751-95	0.07˚C

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TECHNICAL SPECIFICATION (Relay output board)

General

Maximum number of relay boards	
Small-frame unit	Four (maximum no. of relay outputs = 12)
Large-frame unit	Nine (maximum no. of relay outputs = 27)
Number of relays per board	Three
Estimated mechanical life	30,000,000 operations
Update rate	See 'Update rates' in 'Recorder specification' above

AC load ratings

Derating

The figures given below are for resistive loads. For reactive or inductive loads, de-rate in accordance with graph 1, in which

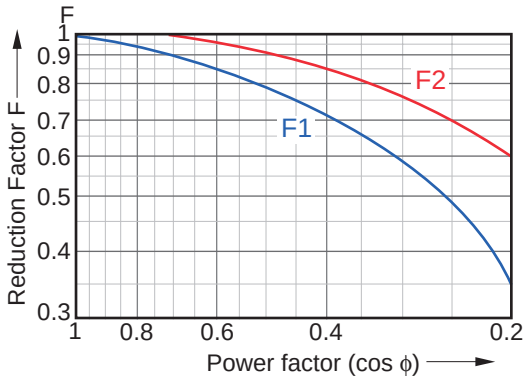
F1 =	Actually measured results on representative samples
F2 =	Typical values (according to experience)
Contact life =	Resistive contact life x reduction factor.
Maximum switching power	500VA
Maximum contact voltage	250V providing this does not cause the maximum switching power (above) to be exceeded
Maximum contact current	2 Amps providing this does not cause the maximum switching power (above) to be exceeded

DC load ratings

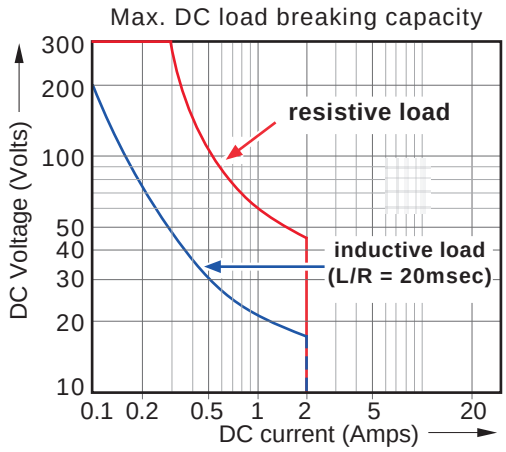
Maximum switching power	See graph 2 for operating volt/Amp envelope
Maximum contact voltage/current	See graph 2 for examples.

Safety isolation

Isolation (dc to 65 Hz; BS EN61010)	Installation category II; Pollution degree 2
Relay to relay:	300V RMS or dc (double insulation)
Relay to ground:	300V RMS or dc (basic insulation)



Graph 1 Derating curves for ac loads



Graph 2 DC load switching curves

TECHNICAL SPECIFICATION (Event input board)

Event input board

See Options manual (section 7)

TECHNICAL SPECIFICATION (ASCII printer)

ASCII printer

See the documentation supplied with the printer

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ANNEX B: REFERENCE

B1 DIAGNOSTICS DISPLAY

At power-up, continuously hold a finger in contact with the screen until (after approximately 30 seconds) the diagnostic display appears as shown in figure B1a for large frame products and B1b for small frame products. If no further action takes place within approximately five minutes, the display times-out to the calibration display described in section B2, below.

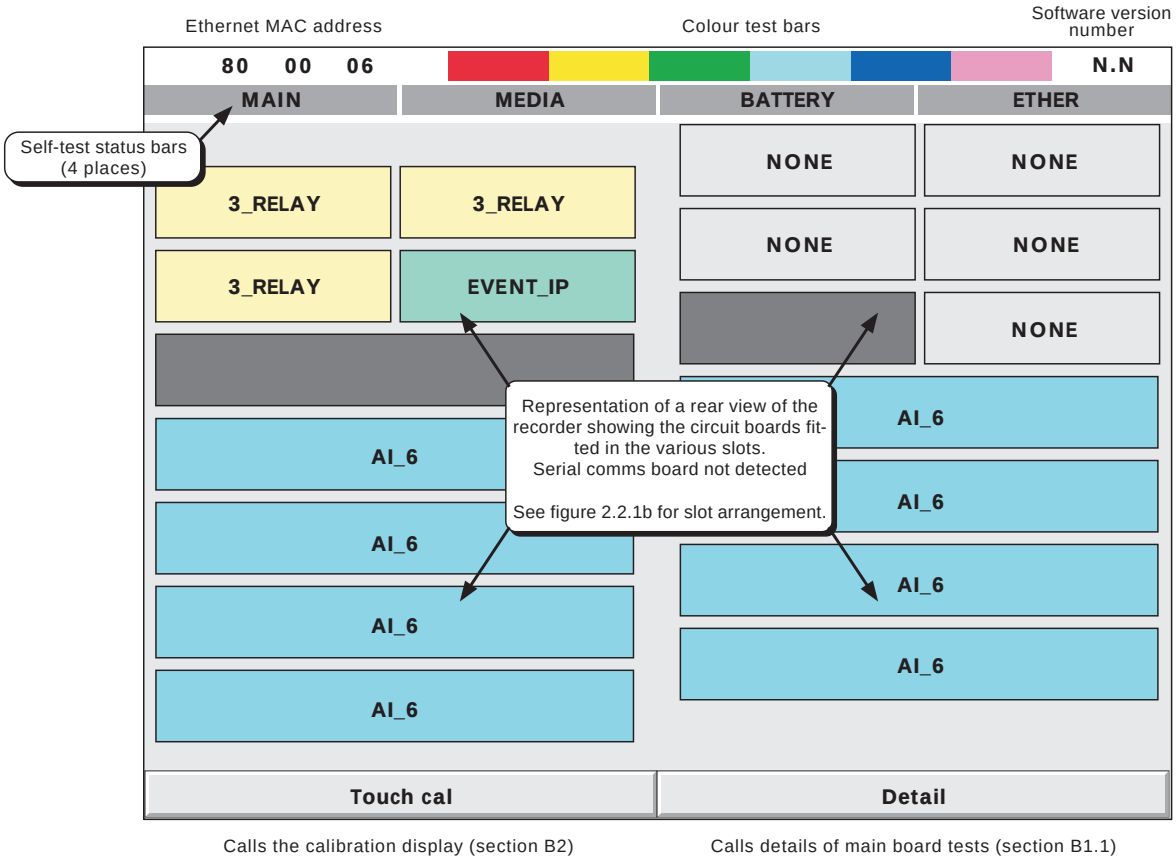


Figure B1a Top-level diagnostic display for large frame product

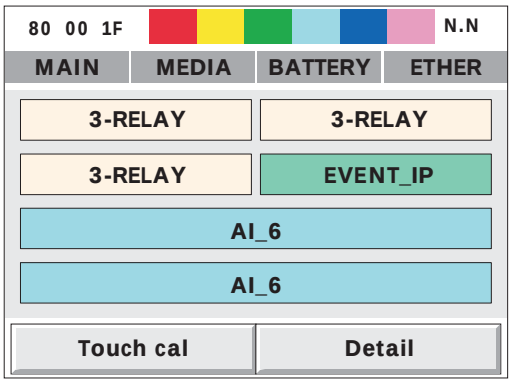


Figure B1b Top-level diagnostic display for small frame product

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B1.1 Display details

Note: The diagnostic display does not include details of the Serial Communications or Transmitter Power Supply options (if fitted).

MAC ETHERNET ADDRESS

This unique hex address is for factory use only. Refer to section 4.5.1 for details of how to determine the instrument's full MAC address.

COLOUR TEST BARS

This colour 'swatch' allows a judgement to be made as to the correctness of the display colour rendering

SOFTWARE VERSION NUMBER

This shows the version number of the software fitted to the recorder.

SELF-TEST STATUS BARS

These four areas show the status of the main circuit board (MAIN), the disk or Card fitted (Media) the battery and the Ethernet (not yet implemented). In each case, if the bars are grey, then no faults have been detected; if any one or more of them is flashing red/white, then a fault has been found.

MAIN

This tests the Dynamic RAM (DRAM), the Static RAM (SRAM) and the flash memory. The results can be displayed by operating the 'Detail' key. See figure B1.1.

MEDIA

This sends a message to the disk or card, and then tries to read it back. Failure to succeed might be any one or more of the following:

1. No disk/card was fitted when the test was initiated.
2. The disk/card is unformatted or incorrectly formatted.
3. The disk/card is too full (less than 1kB remaining) for the message to be written to it.

BATTERY

This area flashes when the battery needs to be replaced (section B3). The test is performed once every 15 minutes.

ETHER

Not applicable to this release.

CIRCUIT BOARD FIT

The major part of the display screen is taken up with a representation of the rear of the recorder, showing what input and output cards are fitted in each circuit board slot. 3_Relay is a three-relay output board; Event_ip is an Event input board and AI_6 is a six channel analogue input board. The serial comms board is not detected and, thus, never appears in the diagnostic display.

TOUCH CAL

This key initiates the display calibration (offset correction) procedure, described in section B2 below.

DETAIL

Touching this key causes the main board test results to be displayed, as shown in figure B1.1 below.

To quit diagnostics, switch the recorder off, then, after a few seconds, switch it back on again

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B1.1 DISPLAY DETAILS (Cont.)

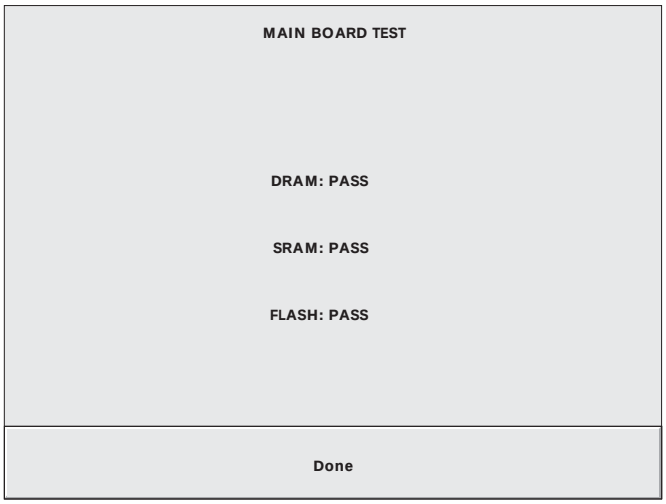


Figure B1.1 Main board self-test results display

B2 SCREEN CALIBRATION (OFFSET CORRECTION)

This procedure ensures that the display screen image is positioned correctly compared with the touch screen (so that 'what you touch is what you get'). The procedure, is necessary only rarely, if at all, and is included here only for the sake of completeness.

1. At power-up, continuously hold a finger in contact with the screen until (after approximately 30 seconds) the diagnostic display appears as shown in figures B1a/b. Operate the Touch cal key to call the first calibration screen, as depicted in figure B2
2. Using a soft point (> 1mm radius) of a material which will not damage the touch screen, touch the intersection of the upper set of crosshairs, as requested by the display and keep touching it until the next target appears..
3. Continue the process, according to the directions appearing on the screen. Once all the 'targets' have been accepted, the recorder returns to the diagnostic display.

Note: The diagnostic display times-out (to the screen calibration page) after about 5 minutes. The screen calibration pages time-out to the diagnostic page after a time which depends on how much of the calibration procedure has been completed

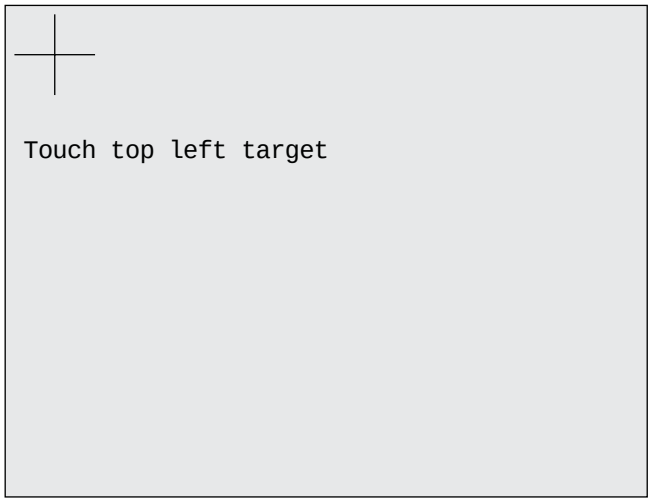


Figure B2 Initial calibration display

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B3 PREVENTIVE MAINTENANCE

B3.1 Touch Screen Cleaning

CAUTION

The touch-sensitive screen used in this product is designed for use by hand only. The use of sharp or pointed implements such as pens, keys and fingernails to operate the instrument must be avoided, or irreparable damage will be done to the surface material. When cleaning the touch-screen, a moist cloth should be used, if necessary with a minimal amount of mild soap solution.

ALCOHOLS SUCH AS ISOPROPYL ALCOHOL MUST NEVER BE USED ON THE SCREEN.

B3.2 Maintenance schedule

Battery replacement - Every three years

BATTERY REPLACEMENT PROCEDURE

During the life of this issue of the manual, the battery holder design will change. This change affects both the fitted battery and the way in which it is removed from the holder. Both versions are shown below.

Both batteries are of poly-carbonmonofluoride/lithium construction and should be disposed of according to local regulations covering this type of battery.

The battery board is located inside the recorder chassis and is accessed by removing the top plate. The battery can then be removed either by pressing down, as shown in figure B3.2a, or by pushing the battery out of its holder as shown in figure B3.2b. The new battery is installed by pushing it into position (+ uppermost).

Note: It is recommended that the recorder be switched off before the battery is replaced. All battery backed RAM data is lost during battery change.

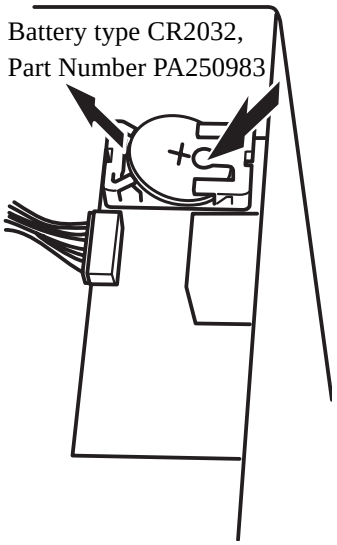


Figure B3.2a Battery removal (original design).

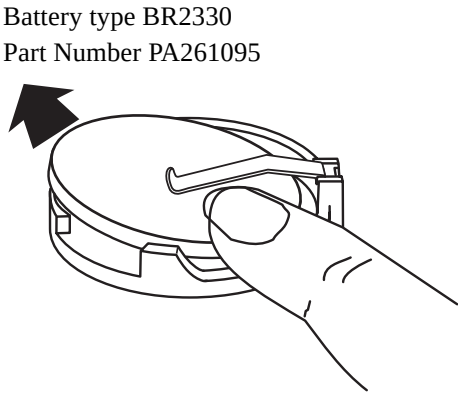


Figure B3.2b Battery removal (latest design).

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B4 OPTION ENABLING

In order to enable software functions, a key code or filename, obtained from the manufacturer, must be entered in the System/Key code page (Figure B4).

Note: The key code is related to the instrument number, as displayed on the key code page. Please ensure that this instrument number has been noted before applying for a code or filename.

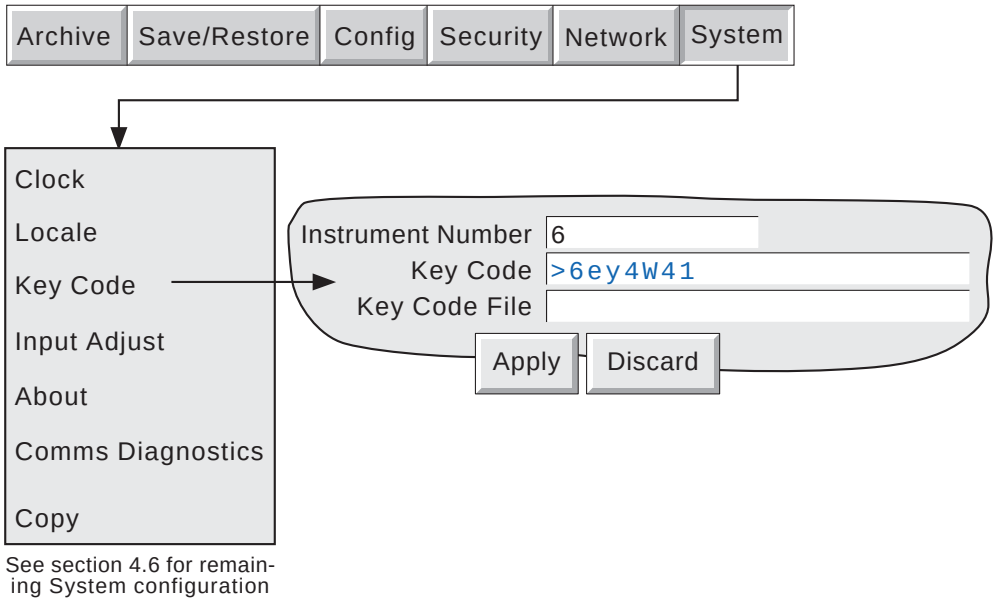


Figure B4 Option enable (key code) page

B4.1 Instrument Number

This number, unique to each recorder, is used to identify the unit should any need arise for the user to contact the manufacturer or distributor of the instrument (if, for example, the user needs to enable one or more software options.)

B4.2 Key Code

Touching this field causes a qwerty style keyboard to appear, allowing the user to enter the key code received from the manufacturer or distributor. This is an alternative to loading the Key Code File described below.

B4.3 KeyCode File

The key code may be sent to the user by, for example, e-mail. By saving the code to a floppy disk, the key code can be transferred to the recorder, and the file read from the floppy disk. Alternatively, the code can be entered manually as described above.

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B5 COLOUR SELECTION

The following table, gives RGB values and decimal and hex numbers for the available channel colours. Normally, this table is necessary only when communicating over the Modbus link.

Note: Colour representation varies from screen to screen. For this reason, it is unlikely that the colour on a PC will match those on these pages or those on the recorder display.

Colour	Red	Green	Blue	Decimal	Hex
Red	255	0	0	0	00
Blue	0	0	255	1	01
Green	0	255	0	2	02
Honey	255	191	0	3	03
Violet	170	321	153	4	04
Russet	170	95	0	5	05
Dark Blue	0	0	102	6	06
Jade	0	95	0	7	07
Magenta	255	0	102	8	08
Dusky Rose	255	95	51	9	09
Yellow	255	255	255	10	0A
Powder Blue	85	63	255	11	0B
Dark Red	170	0	0	12	0C
Avocado	0	233	102	13	0D
Indigo	85	0	102	14	0E
Dark Brown	85	63	0	15	0F
Ægean	0	63	51	16	10
Cyan	0	255	255	17	11
Aubergine	85	0	51	18	12
Dark Orange	255	63	0	19	13
Pale Yellow	255	255	51	20	14
Hyacinth	170	0	51	21	15
Dark Green	0	63	0	22	16
Sugar Pink	255	31	204	23	17
Bluebell	85	31	255	24	18
Orange	255	95	0	25	19
Pink	255	159	255	26	1A
Buttermilk	255	255	102	27	1B

Table B5, sheet 1: Colour definitions 0 to 27

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B5 COLOUR SELECTION (Cont.)

	Colour	Red	Green	Blue	Decimal	Hex
	Terracotta	170	63	0	28	1C
	Blue Babe	85	95	255	29	1D
	Lime	0	223	0	30	1E
	Blue Jive	85	31	204	31	1F
	Cucumber	0	255	153	32	20
	EuroGreen	67	107	103	33	21
	Wheatgerm	255	223	51	34	22
	Sea Blue	85	159	255	35	23
	Ginger	255	159	0	36	24
	Aqua Pool	0	63	255	37	25
	Pale Red	255	63	51	38	26
	Pale Blue	85	127	255	39	27
	Lilac	170	0	255	40	28
	Sky Blue	85	191	255	41	29
	Wild Moss	0	127	0	42	2A
	Turquoise	0	127	153	43	2B
	Pale Green	85	255	153	44	2C
	Coffee	170	127	0	45	2D
	Wicker	255	255	191	46	2E
	Black	0	0	0	47	2F
	Dark Dark Grey	48	48	48	48	30
	Dark Grey	64	64	64	49	31
	Grey	128	128	128	50	32
	Light Light Dark Grey	154	154	154	51	33
	Light Dark Grey	172	172	172	52	34
	Light Grey	192	192	192	53	35
	Light Light Grey	212	212	212	54	36
	White	255	255	255	55	37

Table B5, sheet 2: Colour definitions 28 to 55

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B6 TCP PORT NUMBERS

The following TCP ports are made use of by the recorder. (This information would be needed by anyone involved in setting up 'firewalls', which may be used selectively to block incoming or outgoing access to specific ports.)

PORT	Usage
20	File Transfer Protocol - data
21	File Transfer Protocol - control
25	E-mail
123	SNTP server
502	Modbus/TCPIP communications
1264	Remote Viewer communications - general
50010	Remote Viewer communications - trend review

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B7 ASCII CHARACTERS FOR SERIAL COMMS

This section contains details of the ASCII characters that may be used with the Serial Comms option. All the ASCII characters listed can be used as Start or End-of-message characters, but only characters with decimal codes 32 to 127 can be used in messages, as decimal codes 0 to 31 are replaced by Question marks in messages.

Character	Decimal	Hex	Character	Decimal	Hex	Character	Decimal	Hex	Character	Decimal	Hex
NUL	0	00	Space	32	20	@	64	40	‘	96	60
SOH	1	01	!	33	21	A	65	41	a	97	61
STX	2	02	"	34	22	B	66	42	b	98	62
ETX	3	03	#	35	23	C	67	43	c	99	63
EOT	4	04	$	36	24	D	68	44	d	100	64
ENQ	5	05	%	37	25	E	69	45	e	101	65
ACK	6	06	&	38	26	F	70	46	f	102	66
BEL	7	07	’	39	27	G	71	47	g	103	67
BS	8	08	(	40	28	H	72	48	h	104	68
HT	9	09	)	41	29	I	73	49	i	105	69
LF	10	0A	*	42	2A	J	74	4A	j	106	6A
VT	11	0B	+	43	2B	K	75	4B	k	107	6B
FF	12	0C	,	44	2C	L	76	4C	l	108	6C
CR	13	0D	-	45	2D	M	77	4D	m	109	6D
SO	14	0E	.	46	2E	N	78	4E	n	110	6E
SI	15	0F	/	47	2F	O	79	4F	o	111	6F
DLE	16	10	0	48	30	P	80	50	p	112	70
DC1	17	11	1	49	31	Q	81	51	q	113	71
DC2	18	12	2	50	32	R	82	52	r	114	72
DC3	19	13	3	51	33	S	83	53	s	115	73
DC4	20	14	4	52	34	T	84	54	t	116	74
NAK	21	15	5	53	35	U	85	55	u	117	75
SYN	22	16	6	54	36	V	86	56	v	118	76
ETB	23	17	7	55	37	W	87	57	w	119	77
CAN	24	18	8	56	38	X	88	58	x	120	78
EM	25	19	9	57	39	Y	89	59	y	121	79
SUB	26	1A	:	58	3A	Z	90	5A	z	122	7A
ESC	27	1B	;	59	3B	[	91	5B	{	123	7B
FS	28	1C	<	60	3C	\	92	5C	|	124	7C
GS	29	1D	=	61	3D	]	93	5D	}	125	7D
RS	30	1E	>	62	3E	^	94	5E	~	126	7E
US	31	1F	?	63	3F	_	95	5F	Not printed	127	7F

Notes:
1 All the above characters can be used as Start or End-of-message characters (entered in decimal)
2 If characters 0 to 31 (00 to 1F) are used as message characters, they will be replaced by question marks on the screen.

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B8 TIME ZONE INFORMATION

This section gives an explanation of the time zone abbreviations listed in the System/Lacale/Time Zone pick list. The list starts at GMT,travelling Eastwards round the world.

Abbre-viation	Full title	Time at noon GMT	Hours of difference
GMT	Greenwich mean time	12:00	0
UTC	Co-ordinated Universal time	12.00	0
ECT	Central European time	13:00	+1
EET	Eastern European time	13:00	+1
ART	Arabic standard time	14:00	+2
EAT	Eastern African time	15:00	+3
MET	Middle East time	15:30	+3.5
NET	Near East time	16:00	+4
PLT	Pakistan Lahore time	17:00	+5
IST	India standard time	17:30	+5.5
BST	Bangladesh standard time	18:00	+6
VST	Vietnam standard time	19:00	+7
CTT	China Taiwan time	20:00	+8
JST	Japan standard time	21:00	+9
ACT	Australia Central time	21:30	+9.5
AET	Australia Eastern time	22:00	+10
SST	Solomon standard time	23:00	+11
NST	New Zealand standard time	24:00	+12
MIT	Midway Islands time	01:00	-11
HST	Hawaii standard time	02:00	-10
AST	Alaska standard time	03:00	-9
PST	Pacific standard time	04:00	-8
PNT	Phoenix standard time	05:00	-7
MST	Mountain standard time	05:00	-7
CST	Central standard time	06:00	-6
EST	Eastern standard time	07:00	-5
IET	Indiana Eastern standard time	07:00	-5
PRT	Puerto Rico and US Virgin Islands time	08:00	-4
CNT	Canada Newfoundland time	08:30	-3.5
AGT	Argentina standard time	09:00	-3
BET	Brazil Eastern time	09:00	-3
CAT	Central African time	11:00	-1

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B9 JOB TRIGGER LIST

Even with simple configurations, it is easy to lose track of which trigger initiates which job. Tables similar to those below may be found useful, in recording job triggers (sources) during configuration.

Sheet 1

JOB No.	JOB	Source 1	Source 2	Details	Superseded by job no.
1	Relay 1, Board 1 (overload alarm)	Channel 16, Alarm 1, Job 1	Event 2	Time/date 3/12/03 12:30 Operator Andy	
2				Time/date Operator	
3				Time/date Operator	
4				Time/date Operator	
5				Time/date Operator	
6				Time/date Operator	
7				Time/date Operator	
8				Time/date Operator	
9				Time/date Operator	
10				Time/date Operator	
11				Time/date Operator	
12				Time/date Operator	
13				Time/date Operator	
14				Time/date Operator	
15				Time/date Operator	

EXAMPLE

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B9 JOB TRIGGER LIST (Cont.)

Sheet

JOB		Source 1	Source 2	Details	Superseded by job no.
No.	Category	Trigger 1	Trigger 2	Time/date Operator	
				Time/date Operator	
				Time/date Operator	
				Time/date Operator	
				Time/date Operator	
				Time/date Operator	
				Time/date Operator	
				Time/date Operator	
				Time/date Operator	
				Time/date Operator	
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				Time/date Operator	
				Time/date Operator	
				Time/date Operator	
				Time/date Operator	

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B10 MENU STRUCTURE

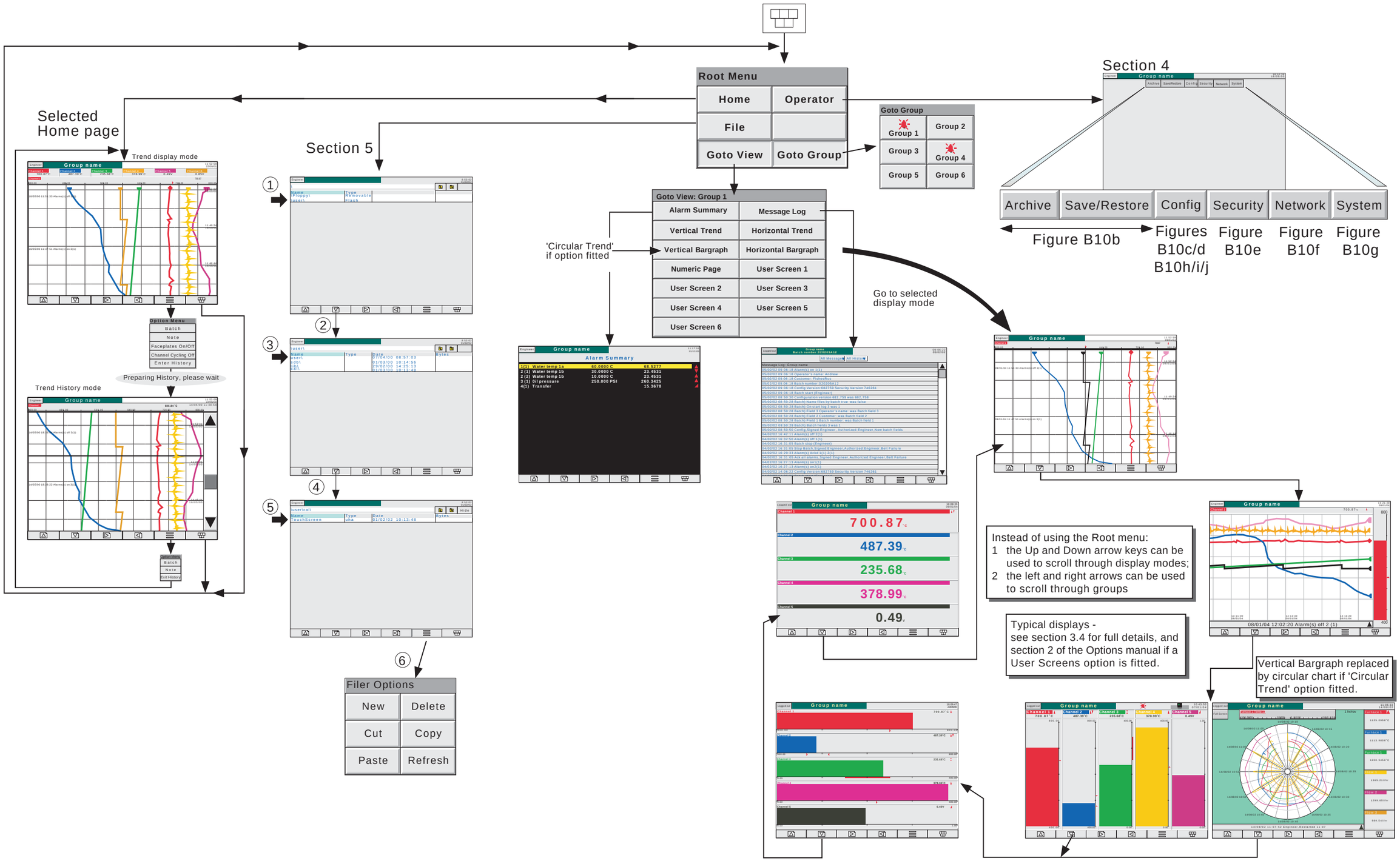


Figure B10a Menu structure sheet 1 (Root menu)

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B10 MENU STRUCTURE (Cont.)

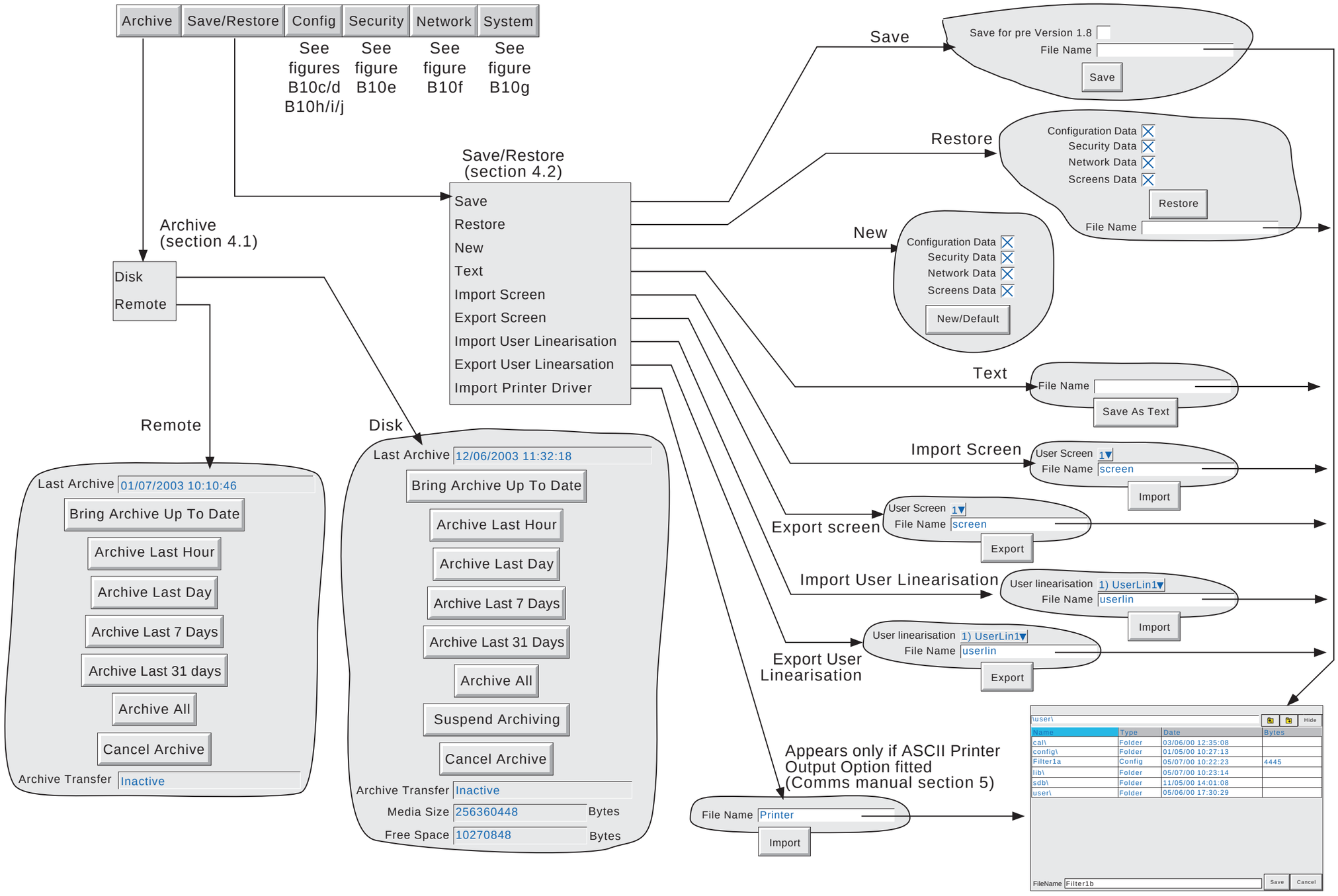


Figure B10b Menu structure sheet 2 (Archive and Save/Restore menus)

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B10 MENU STRUCTURE (Cont.)

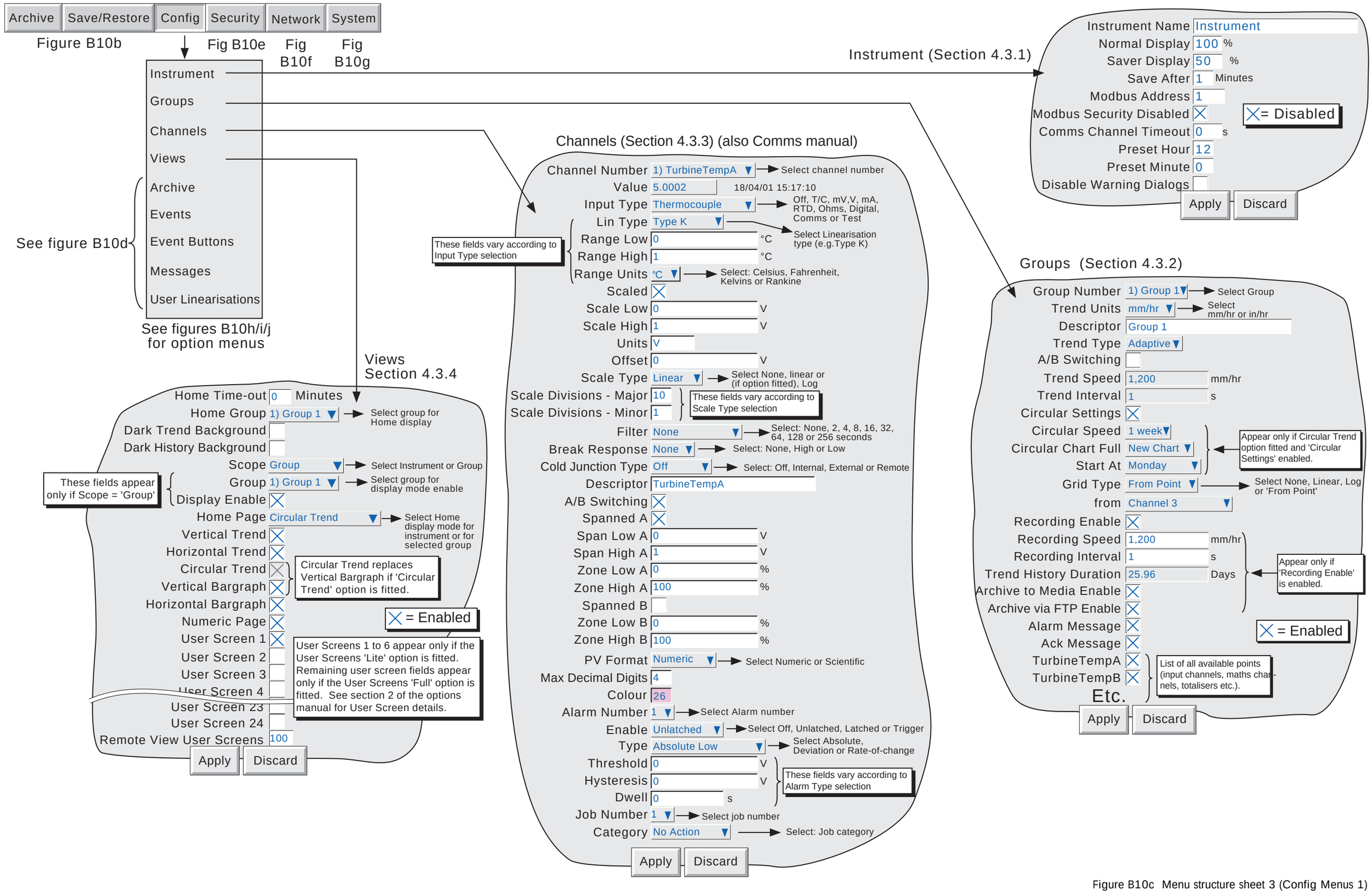


Figure B10c Menu structure sheet 3 (Config Menus 1)

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B10 MENU STRUCTURE (Cont.)

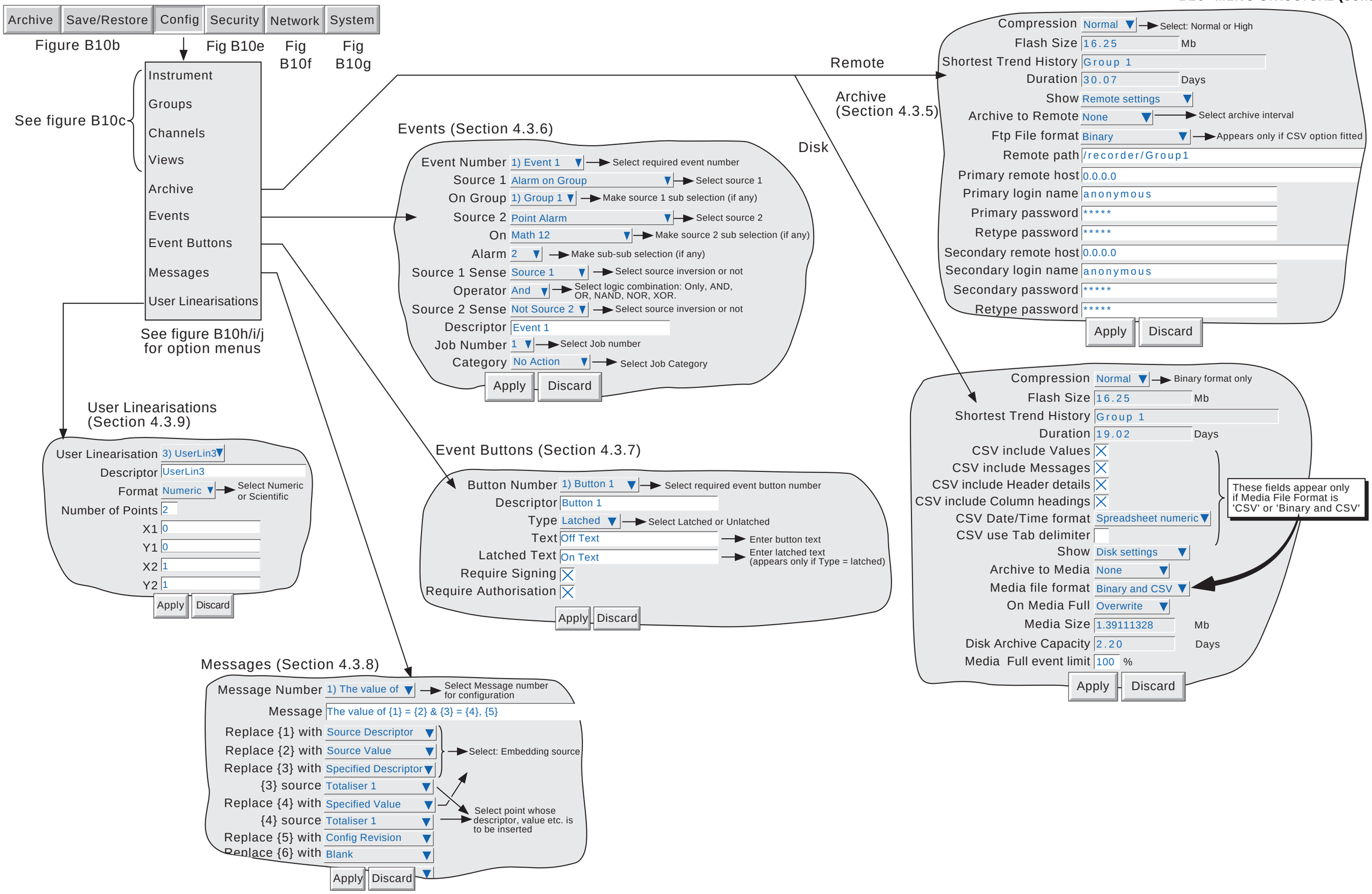


Figure B10d Menu structure sheet 4 (Config Menus 2)

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B10 MENU STRUCTURE (Cont.)

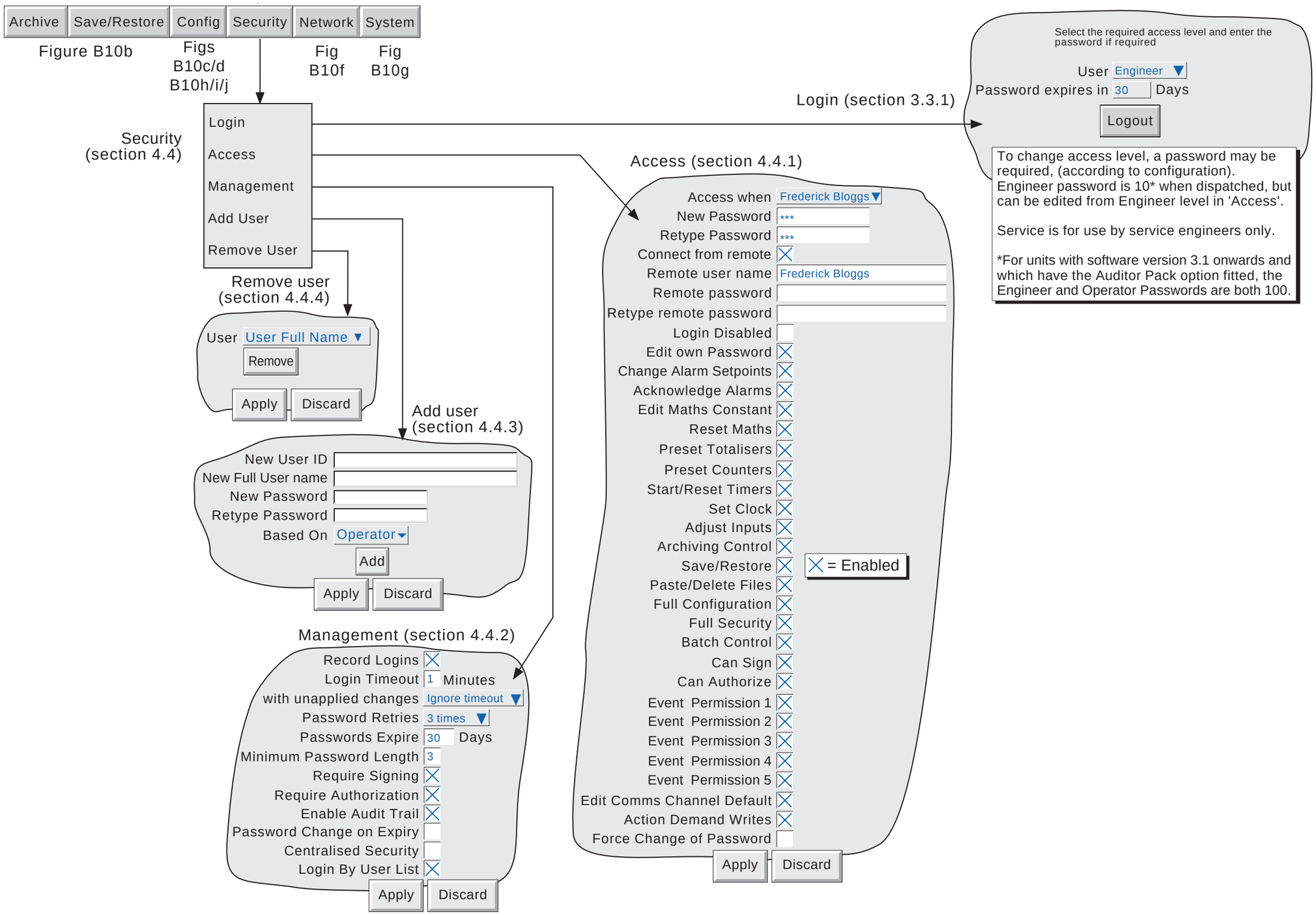


Figure B10e Menu structure sheet 5 (Security menus)

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B10 MENU STRUCTURE (Cont.)

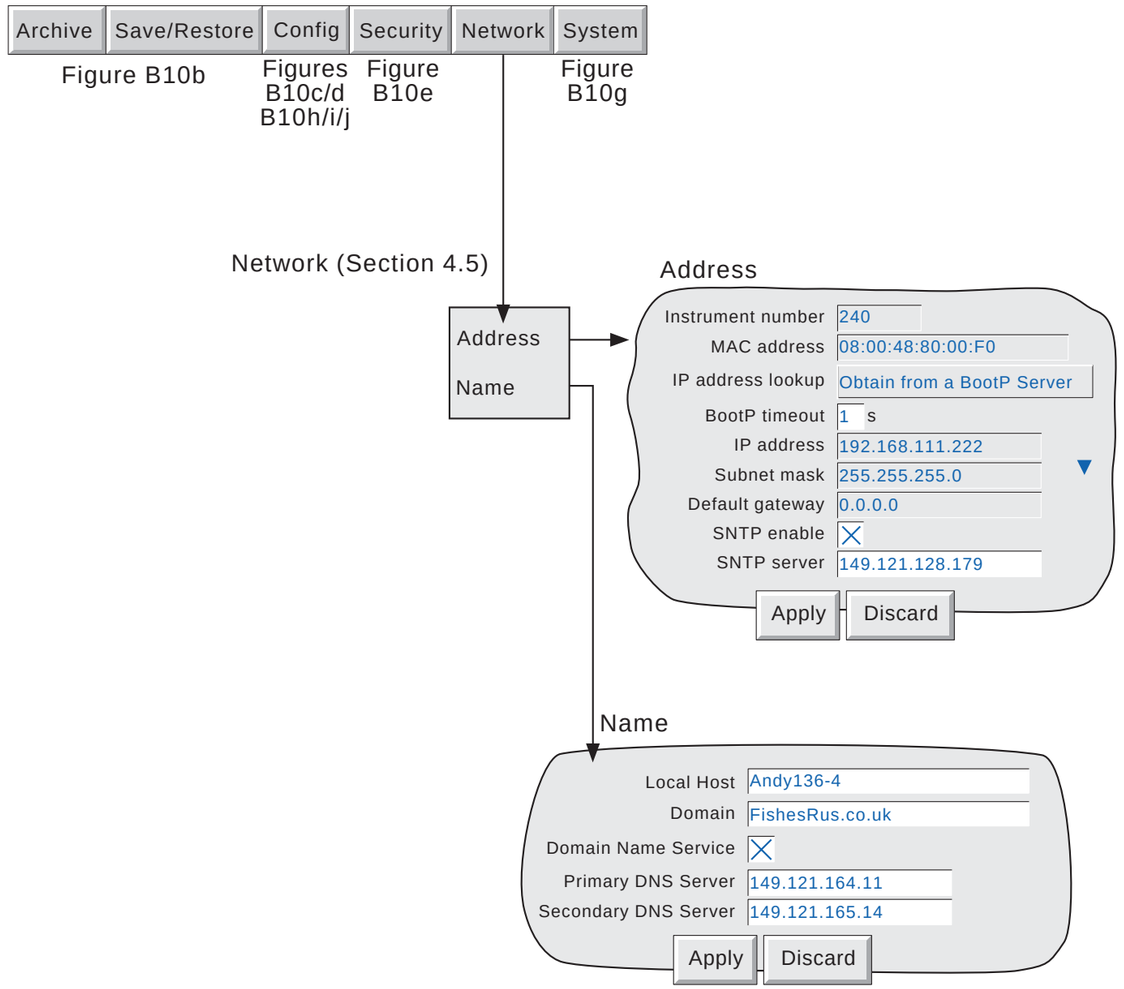


Figure B10f Menu structure sheet 6 (Network menus)

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B10 MENU STRUCTURE (Cont.)

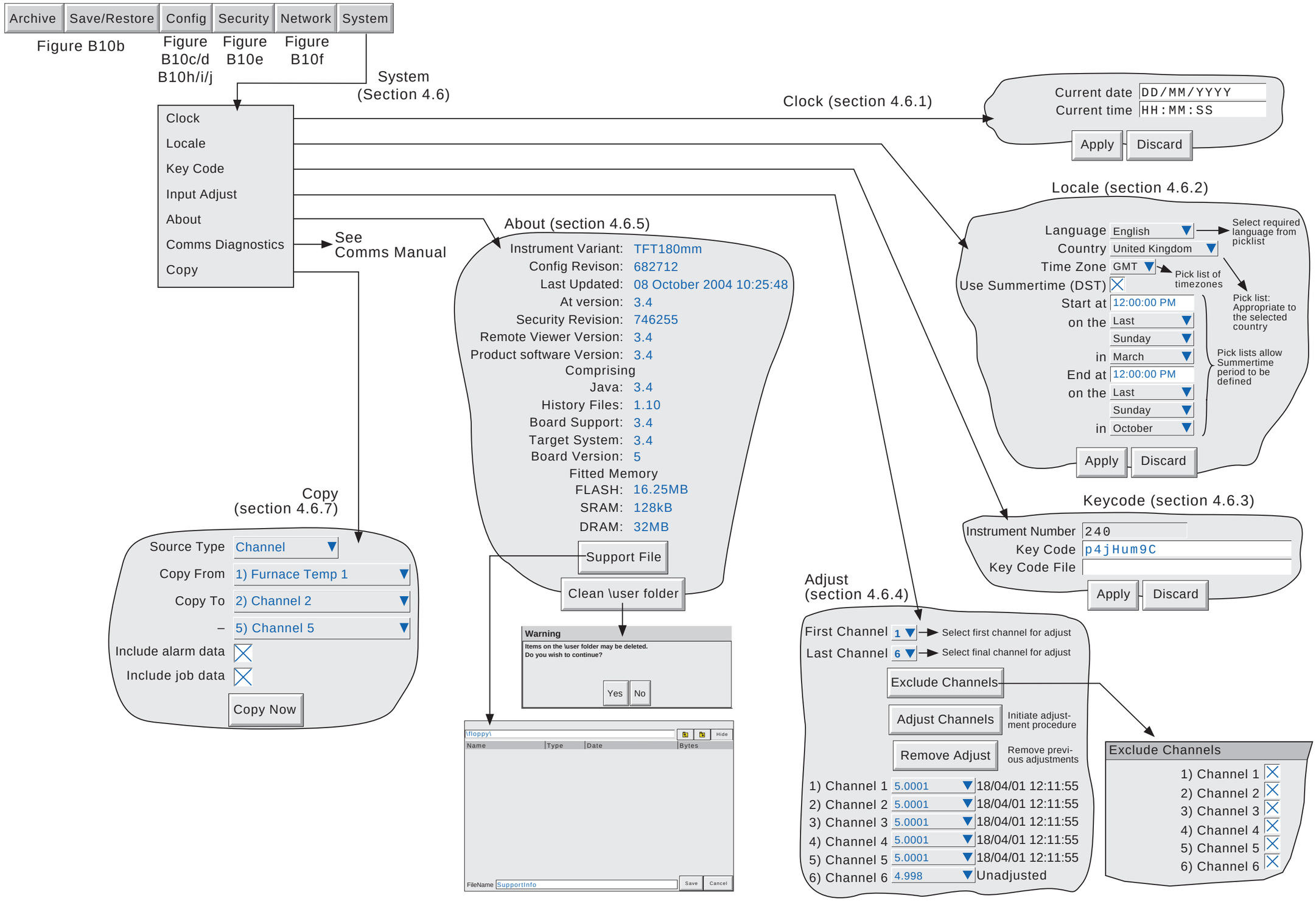


Figure B10g Menu structure sheet 7 (Systems menus)

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B10 MENU STRUCTURE (Cont.)

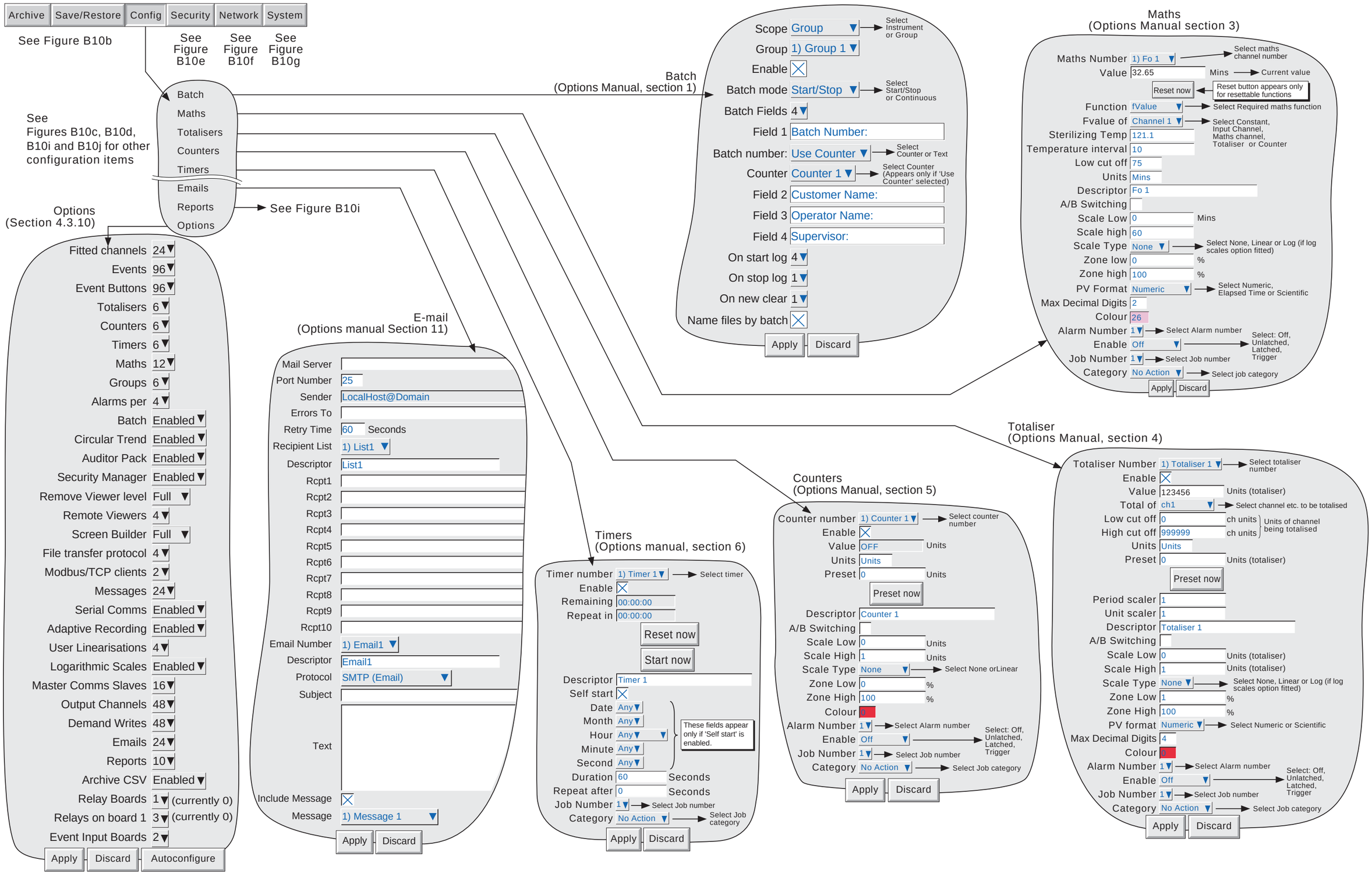


Figure B10h Menu structure sheet 8 (Options Menu 1)

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B10 MENU STRUCTURE (Cont.)

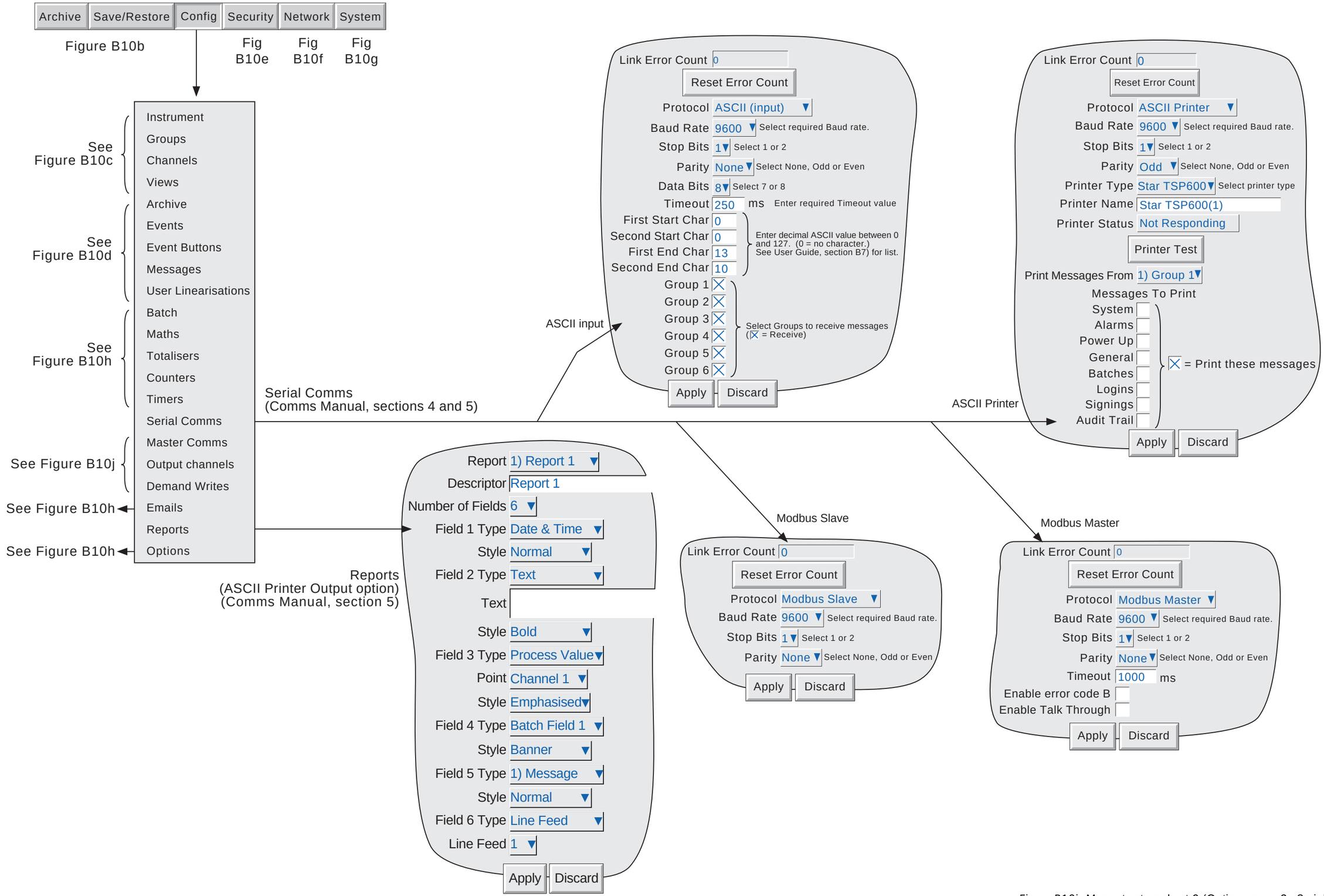


Figure B10i Menu structure sheet 9 (Options menu 2 - Serial comms)

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B10 MENU STRUCTURE (Cont.)

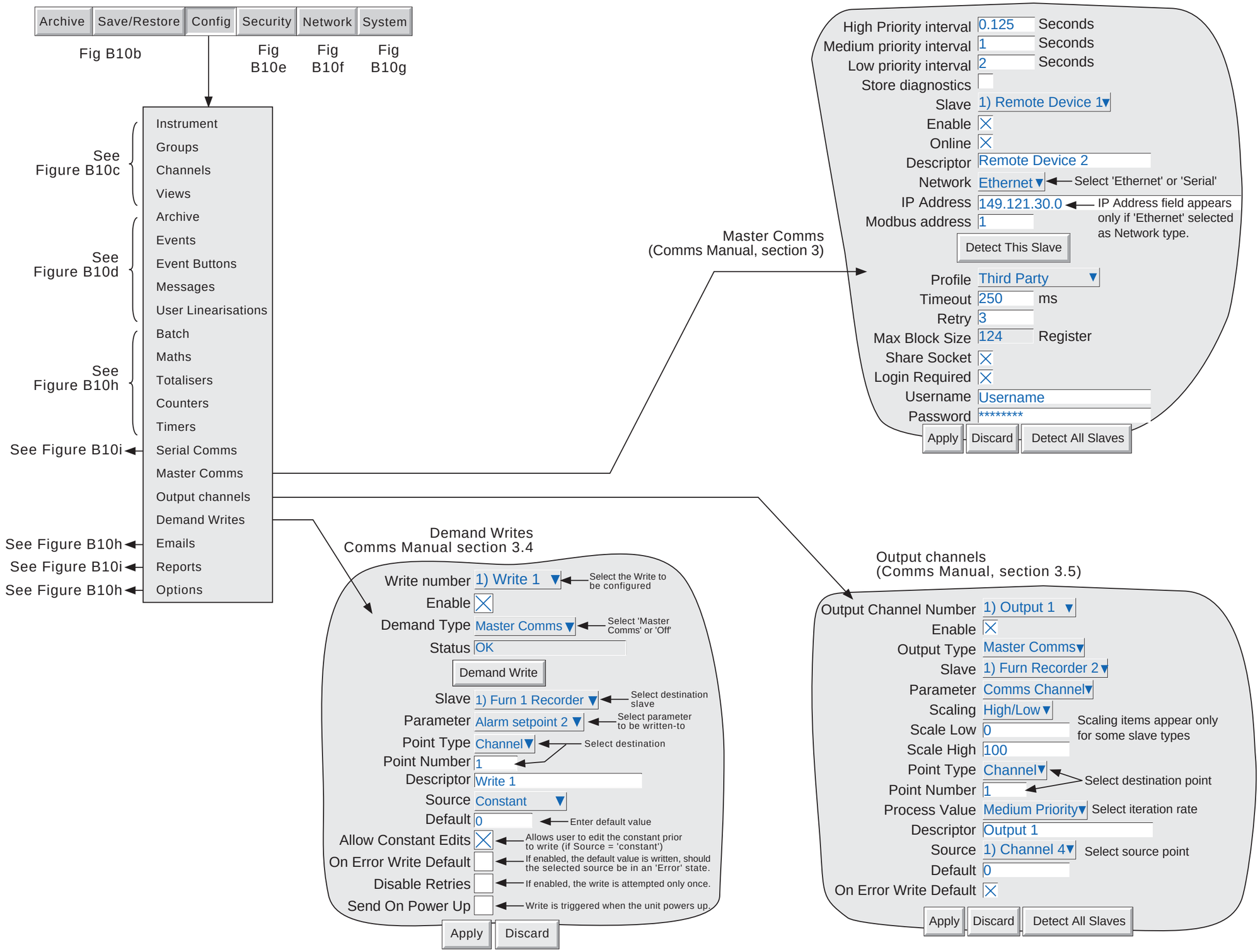


Figure B10j Menu structure sheet 10 (Options Menu 3 - Master comms)

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