

The Company

We are an established world force in the design and manufacture of instrumentation for industrial process control, flow measurement, gas and liquid analysis and environmental applications.

As a part of ABB, a world leader in process automation technology, we offer customers application expertise, service and support worldwide.

We are committed to teamwork, high quality manufacturing, advanced technology and unrivalled service and support.

The quality, accuracy and performance of the Company's products result from over 100 years experience, combined with a continuous program of innovative design and development to incorporate the latest technology.

The NAMAS Calibration Laboratory No. 0255 is just one of the ten flow calibration plants operated by the Company, and is indicative of our dedication to quality and accuracy.

BS EN ISO 9001



St Neots, U.K. – Cert. No. Q5907

EN 29001 (ISO 9001)



Lenno, Italy – Cert. No. 9/90A



Use of Instructions



Warning.

An instruction that draws attention to the risk of injury or death.



Note.

Clarification of an instruction or additional information.



Caution.

An instruction that draws attention to the risk of damage to the product, process or surroundings.



Information.

Further reference for more detailed information or technical details.

Although **Warning** hazards are related to personal injury, and **Caution** hazards are associated with equipment or property damage, it must be understood that operation of damaged equipment could, under certain operational conditions, result in degraded process system performance leading to personal injury or death. Therefore, comply fully with all **Warning** and **Caution** notices.

Information in this manual is intended only to assist our customers in the efficient operation of our equipment. Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval of the Marketing Communications Department.

Health and Safety

To ensure that our products are safe and without risk to health, the following points must be noted:

1. The relevant sections of these instructions must be read carefully before proceeding.
2. Warning labels on containers and packages must be observed.
3. Installation, operation, maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
4. Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5. Chemicals must be stored away from heat, protected from temperature extremes and powders kept dry. Normal safe handling procedures must be used.
6. When disposing of chemicals ensure that no two chemicals are mixed.

Safety advice concerning the use of the equipment described in this manual or any relevant hazard data sheets (where applicable) may be obtained from the Company address on the back cover, together with servicing and spares information.

CONTENTS	Page
1(F) INTRODUCTION	1
2(F) PREPARATION	2
2.1(F) Identification	2
2.2(F) Code Number Example	2
3(F) INSTALLATION	2
4(F) ELECTRICAL CONNECTIONS	3
4.1(F) Counter Drive Module	3
4.2(F) Frequency Input Module	4
5(F) FAMILIARISATION WITH CONTROLS, DISPLAY AND L.E.D. INDICATION	4
6(F) SETTING UP	4
7(F) OPERATION	5
7.1(F) Operating Page 1	5
7.2(F) Operating Page 2	6
8(F) PROGRAMMING	7
8.1(F) Set Up Input Page	8
8.2(F) Set Up Display Page	10
8.3(F) Totaliser Set Up Page	12
8.4(F) Set Up Module Page	14
8.4.1(F) Module Positions 1,2,3	14
8.4.2(F) Module Positions 4,5,6	15
9(F) SIMPLE FAULT FINDING	18
10(F) CALIBRATION	18
11(F) SPECIFICATION	18
APPENDIX	19
A1(F) Calculation of Pulse Rate and Total Count	19

1(F) INTRODUCTION

This supplement provides instructions on the features of PX105/51, /52 and /53 Flow Recorders which differ from those of the basic PX105 recorders described in instruction booklet PX105/0011.

The Flow Recorders provide indication and recording of flow rates from input signals with linear, square law or power law characteristics or of the pulse frequency type.

Totalisation is available for each channel and may be switched on or off as required.

The flow total for any channel may be viewed on the digital display and reset via the front panel controls. An additional internal 'Secure' total is also provided which can only be reset after gaining access to the Programming Pages.

External counters with their own power supplies can be driven using any of the standard relay module options. Alternatively, a counter drive module is available for which no external power supply is needed.

This manual must be read in conjunction with the PX105 Standard Options Operating Instructions – PX105/0011, Issue 4 onwards.

2(F) PREPARATION

The procedure is as detailed in Sections 2.1 to 2.2 in PX105/0011 but refer **also** to Table 1(F) when checking the instrument code number.

3(F) INSTALLATION

As detailed in Section 3 of PX105/0011.

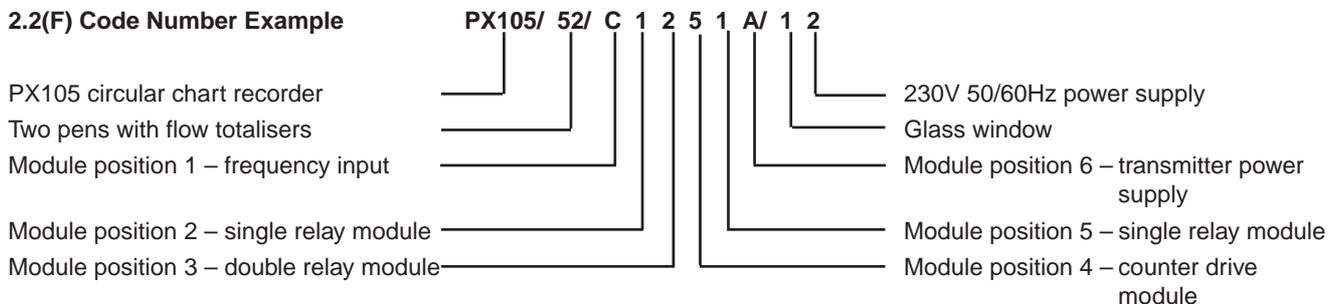
2.1(F) Identification

Code Digits 1,2,3,4,5/	6,7/	8	9	10	11	12	13/	14	15	
Basic Type	Function	Modules in Position						Window Material	Power Supply	
		1	2	3	4	5	6			
PX105 micro-processor based circular chart recorder with 105mm pen travel	51 Single pen recorder with flow totaliser	0 None	0 None	0 None	0 None	0 None	0 None	1 Glass	1 110V 50/60 Hz 2 230V 50/60 Hz	
		1 One relay	1 One relay	1 One relay	1 One relay	1 One relay	1 One relay	2 Poly-carb.		
		2 Two relays	2 Two relays	2 Two relays	2 Two relays	2 Two relays	2 Two relays			
		A Transmitter power supply	A Transmitter power supply	A Transmitter power supply	5 External counter drive	5 External counter drive	5 External counter drive	3 10 to 30V d.c.		
		52 Two pen recorder with flow totalisers	53 Three pen recorder with flow totalisers	C Frequency input	C Frequency input	C Frequency input	7 Isolated analogue output	7 Isolated analogue output		7 Isolated analogue output
				J Solid state relay output	J Solid state relay output	J Solid state relay output	8 Isolated analogue outputs + relay outputs	8 Isolated analogue outputs + relay outputs		8 Isolated analogue outputs + relay outputs
	K Isolated analogue input			K Isolated analogue input	K Isolated analogue input	A Transmitter power supply	A Transmitter power supply	A Transmitter power supply		
						J Solid state relay output	J Solid state relay output	J Solid state relay output		

Note. The table is for identification purposes only. Not all code combinations are available.

Table 1(F) Identification of Instrument Code Number

2.2(F) Code Number Example



4(F) ELECTRICAL CONNECTIONS

As detailed in Section 4 of PX105/0011.

External counters with their own power supply can be driven using any of the standard relay outputs in module positions 4,5 and 6 – see Section 4.5 in PX105/0011 for connection details.

4.1(F) Counter Drive Module – Fig. 4.1(F)

A counter drive module may only be fitted in module positions 4, 5 and 6 – refer to Fig. 4.1 in PX105/0011.

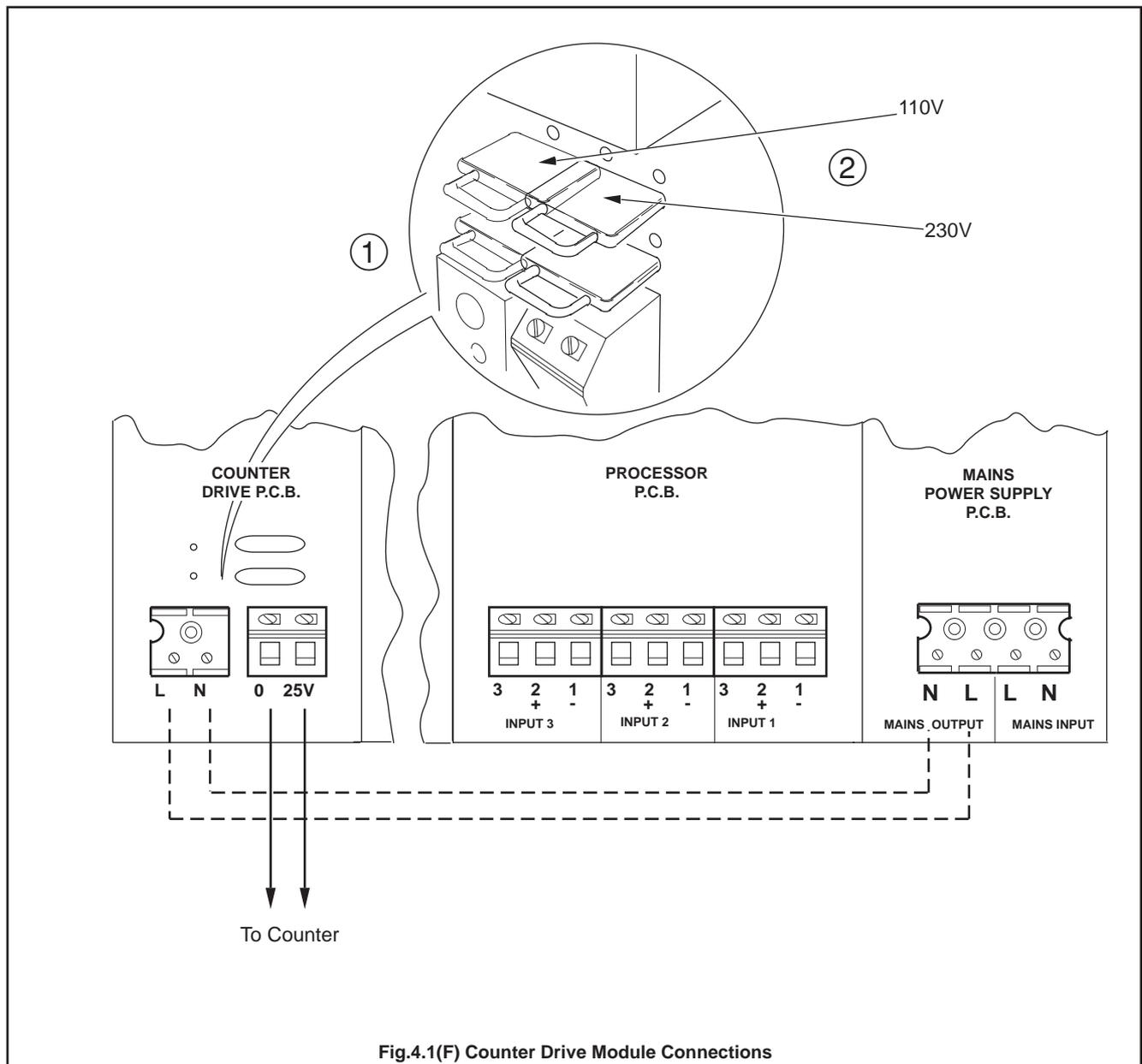
Make connections as detailed in Fig. 4.1(F).

The positioning of two plug-in 'handbag' links on the counter drive board determines the 110V or 230V operation of the module.

With reference to Fig. 4.1(F):

- 1 Identify the links.
- 2 Set the link positions for the mains power supply used – refer to Section 4.6 in PX105/0011.

For a volt-free pulse output, fit a single, or double, relay module and allocate the relay(s) as shown in Section 8.4.2(F).



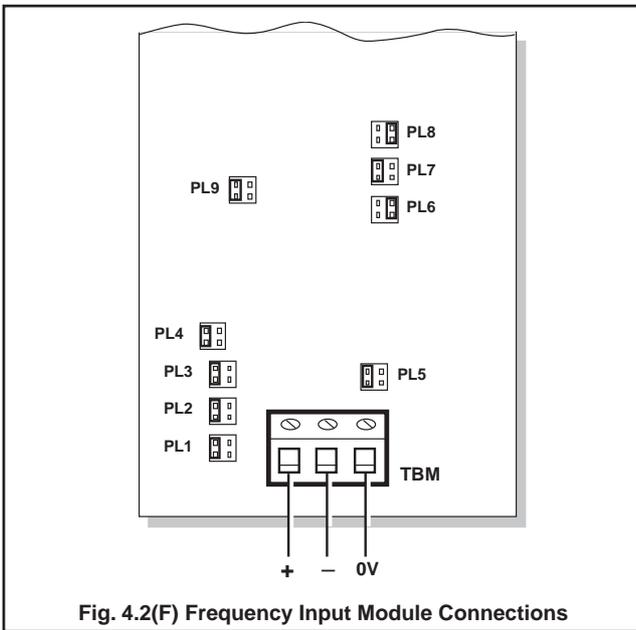


Fig. 4.2(F) Frequency Input Module Connections

4.2(F) Frequency Input Module

A frequency input module may only be fitted in module positions 1,2 or 3 for channels 1,2,3 respectively – refer to Fig. 4.1 in PX105/0011.

Make connections and links as detailed in Fig. 4.2(F) and Table 2(F). The module is for frequency inputs only and Input Type FREQ should be selected – see Section 8.4.

Ensure that plug-in links PL1 to PL9 are configured to suit the frequency input – see Table 2(F).

5(F) FAMILIARISATION WITH CONTROLS, DISPLAY AND L.E.D. INDICATION

As detailed in Section 5 of PX105/0011.

6(F) SETTING UP

As detailed in Section 6 of PX105/0011

Input Type	TBM		PL1	PL2	PL3	PL4	PL5	PL6	PL7	PL8	PL9	Valid range
	Connections		3 4 2 1									
TTL square wave and Voltage input Lo -50V to +1V Hi +2V to +50V	+	0V										0.003 to 0.1Hz to 4kHz
Open collector (2mA) and Dry contact (2mA)	+	0V										0.003 to 0.1Hz to 4kHz
Vortex, VKA/B 4mA & 16mA systems	+	- *										0.003 to 4kHz
Turbine, Rotary Shunt Meter	+	- *										3Hz to 3kHz
General purpose A.C. coupled. D.C. offset max. ±50V	+	- *										3Hz to 4kHz
General purpose D.C. coupled	+	- *										0.003Hz to 4kHz

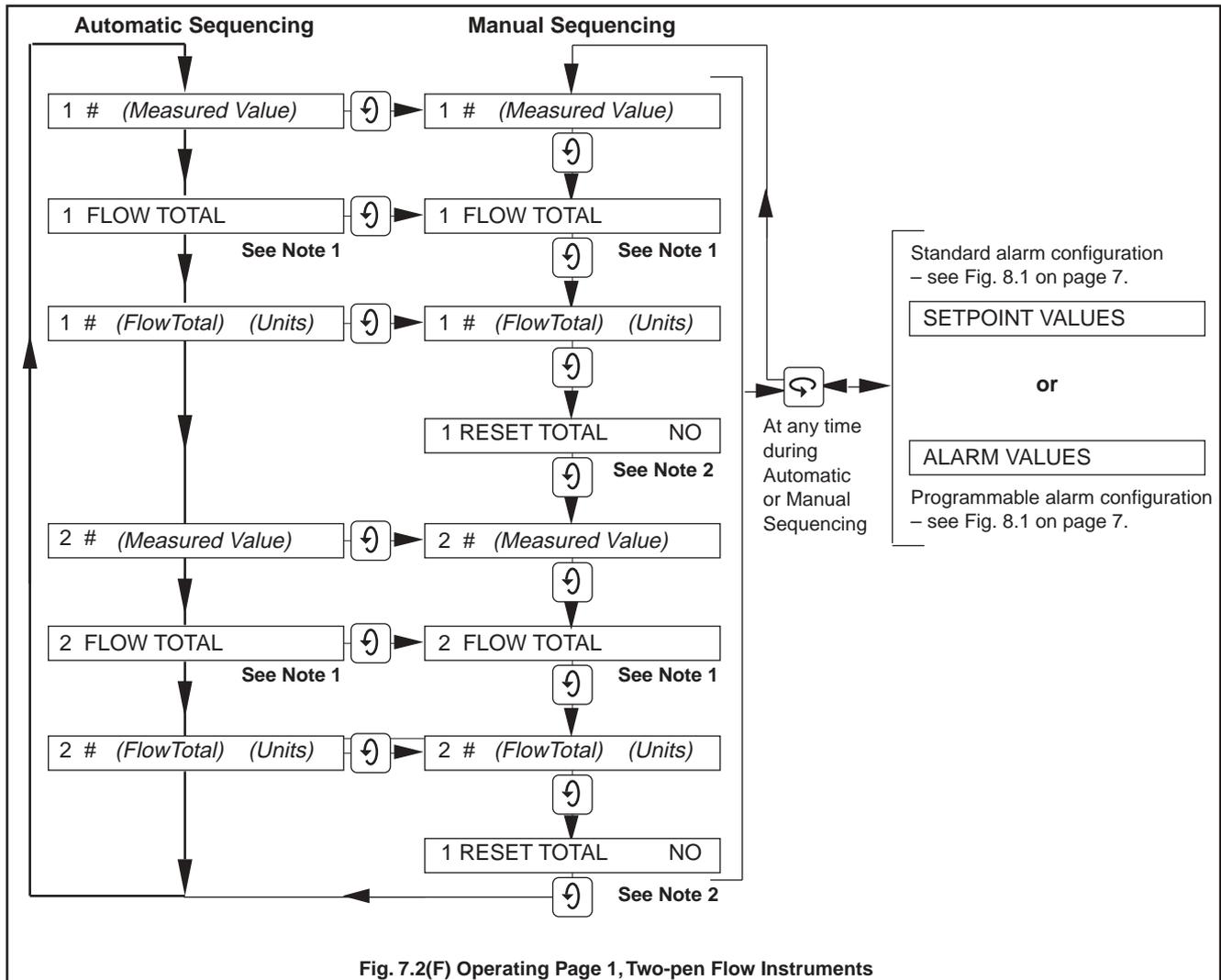
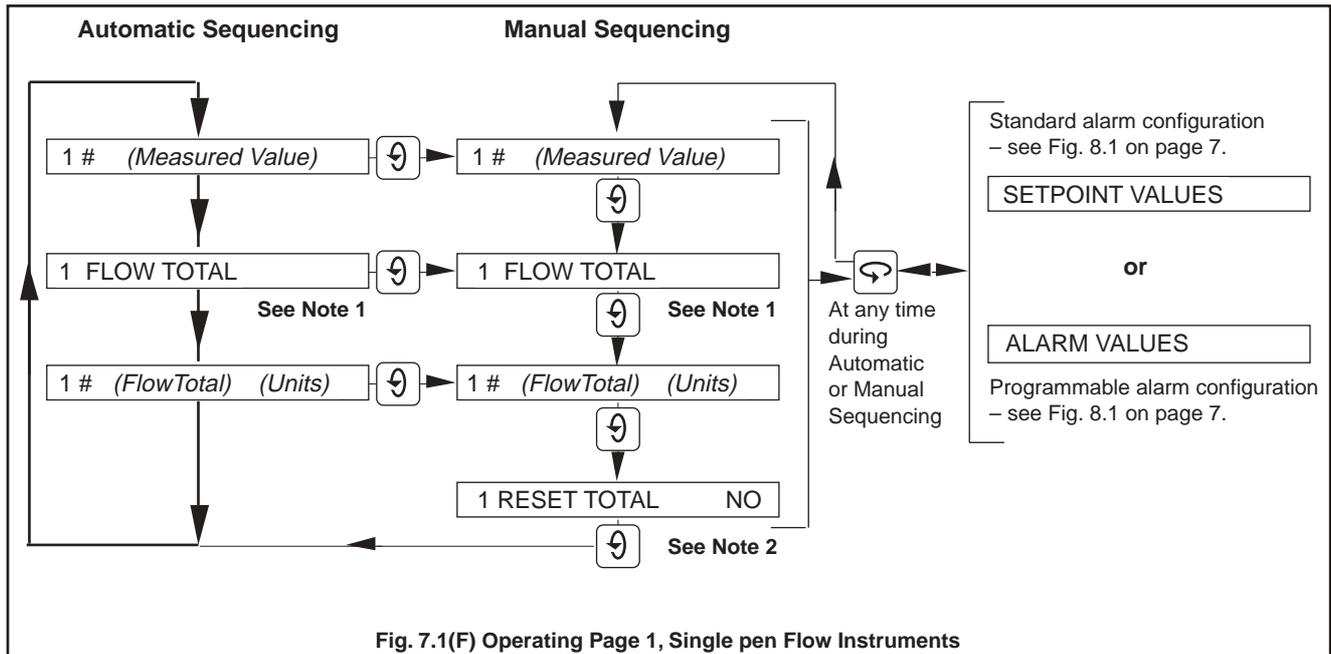
* Shield connection if required.
 ** Move PL7 to if frequency compensation required at 1mV/Hz. At high frequency the internal frequency compensation limits the amplitude of the input signal avoiding saturation of the internal frequency measurement circuitry and should be used if the applied input waveform increases in amplitude with increasing frequency.

Table 2(F) Frequency Input Board Plug-in Link Selection

7(F) OPERATION

7.1(F) Operating Page 1

As detailed in Section 7 of PX105/0011 but with the following additional flow total information.



Note 1. 'FLOW TOTAL', its measured value and 'RESET TOTAL' are not displayed when 'TOTALISER' is turned off in the **Totaliser Set Up Page** – see page 12.

Note 2. 'RESET TOTAL' is not displayed during automatic sequencing, and only during manual sequencing when the reset function is enabled in the **Totaliser Set Up Page**. The total is reset to the **Preset Value** by selecting 'Yes' and pressing the 'Enter' switch – see Section 8.3(F).

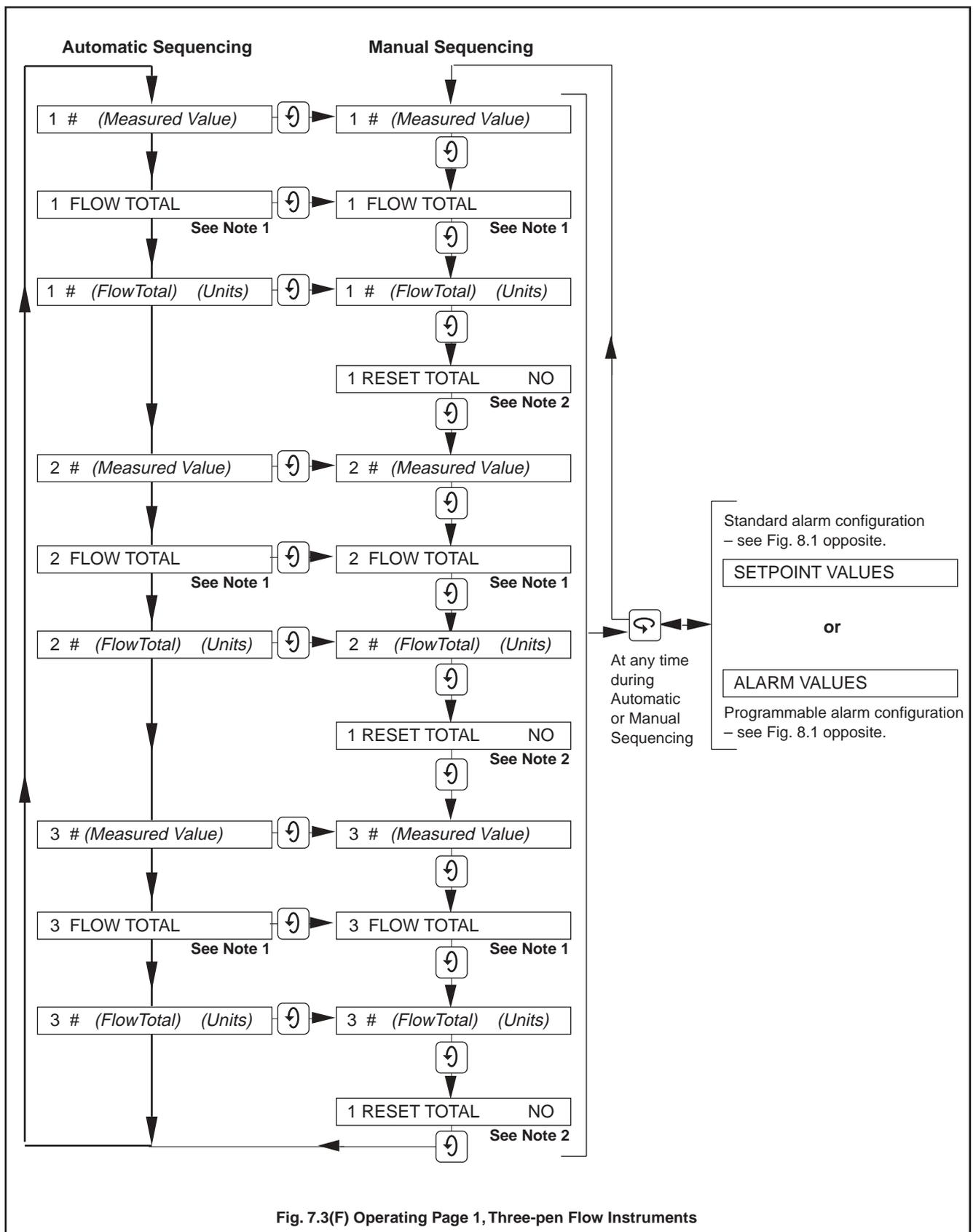


Fig. 7.3(F) Operating Page 1, Three-pen Flow Instruments

Note 1. 'FLOW TOTAL' and its measured value are not displayed when 'TOTALISER' is turned off in the **Totaliser Set Up Page** – see page 12.

Note 2. 'RESET TOTAL' is not displayed during automatic sequencing, and only during manual sequencing when the reset function is enabled in the **Totaliser Set Up Page**. The total is reset to the 'PRESET' value by selecting 'Yes' and pressing the 'Enter' switch – see Section 8.3(F) on page 12.

7.2(F) Operating Page 2

The procedure is as detailed in Section 7.2 of PX105/0011.

8(F) PROGRAMMING

Generally as detailed in Sections 8.1 to 8.10 in PX105/0011 and including the following modifications and additions.

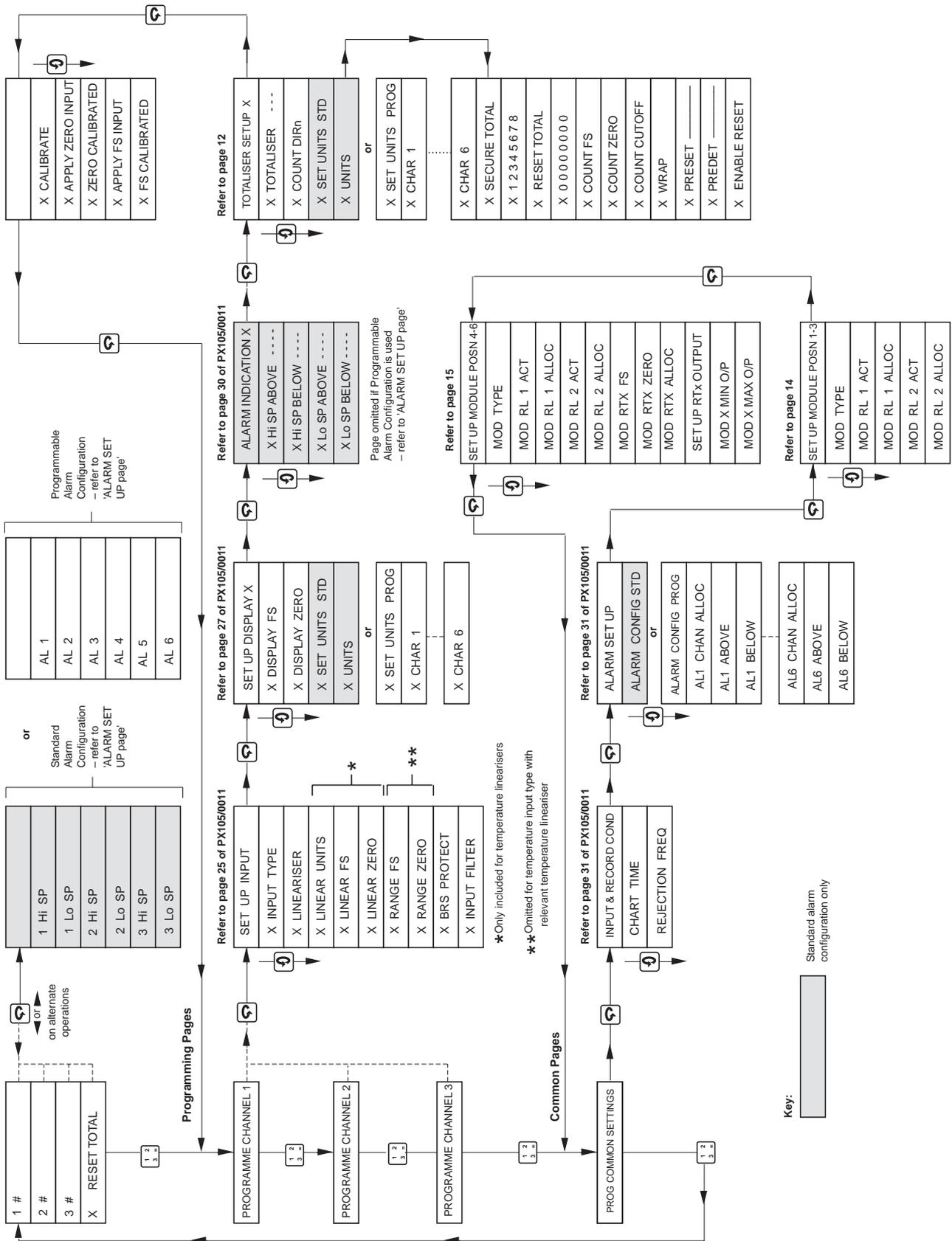
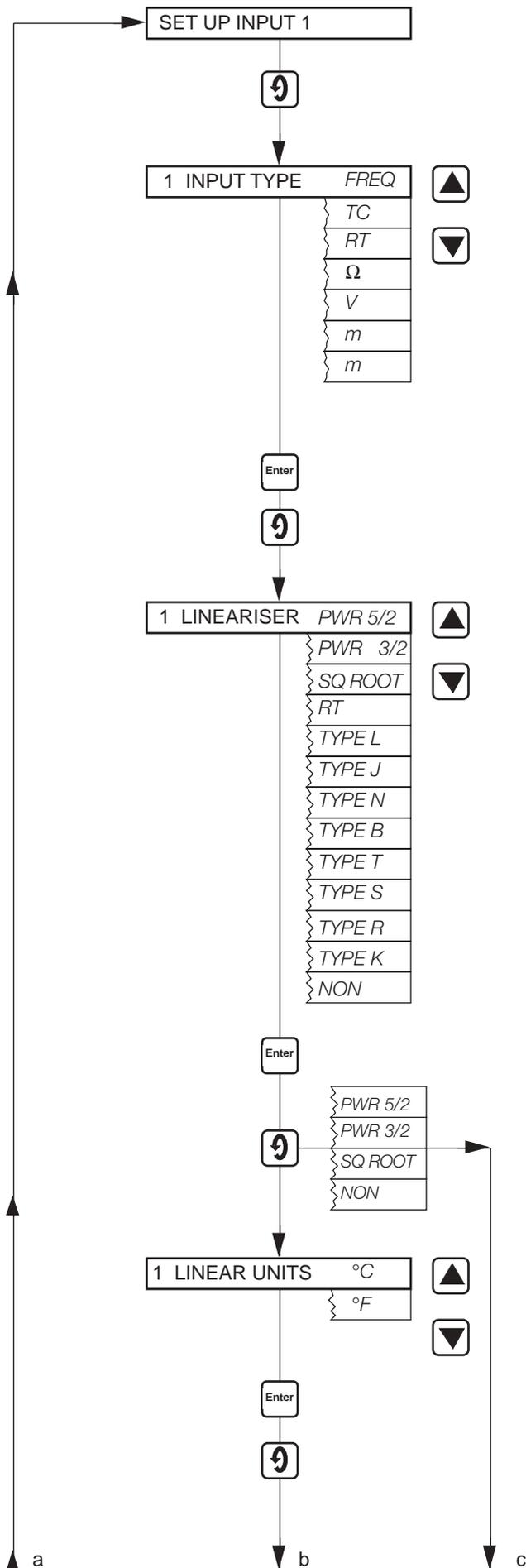


Fig. 8.1 Overall Program Chart, Flow Recorders

8.1(F) Set Up Input Page



Advance to next parameter.

Input Type

Ensure that the Signal Input links are in the correct positions for the required input type for the channel -see Fig. 4.2 of PX105/0011.

Apply an input signal appropriate to (or compatible with) the input type selected and having an approximate mid-scale value of the range to be set below.

Select the desired input. The display flashes until the 'Enter' switch is pressed to store the selected input into the memory.

Store.

Advance to next parameter.

Lineariser

Select the desired lineariser, or NONE, to suit the applied input.

Store.

Advance to next parameter.

Lineariser Units

Select either °C or °F as required.

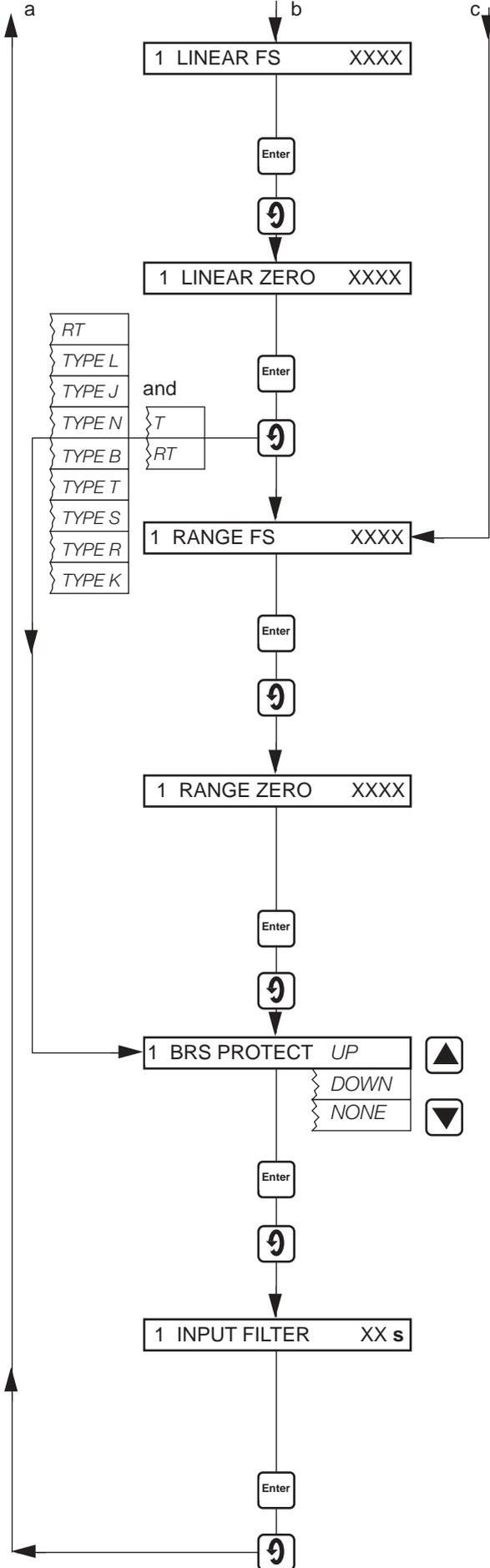
Note: If Lineariser Type L has been selected only °C is displayed.

Store.

Advance to next parameter.

Continued on following page.

Continued from previous page.



Lineariser Full Scale

Set the range maximum temperature in °C or °F as selected at LINEAR UNITS opposite within the limits detailed in **Table 4** in PX105/0011, page 24.

Store.

Advance to next parameter.

Lineariser Zero

Set the range minimum temperature in °C or °F as selected at LINEAR UNITS opposite, again within the limits detailed in **Table 4**.

Store.

Advance to next parameter.

Range Full Scale

Set the highest range value to the maximum number of decimal places possible. For **Frequency** input set the highest frequency value within the range of 0.1 to 4095.

Store.

Advance to next parameter.

Range Zero

Set the lowest range value – the decimal point is set automatically. For frequency input set the lowest frequency value within the range 0.001 to 4095. The minimum valid value for frequency is 0.003, i.e. it must be greater than zero.

Store.

Advance to next parameter.

Broken Sensor Protection

Set the broken sensor protection indication to 'UP' for upscale, 'DOWN' for downscale or to 'NONE'. In the event of a broken sensor occurring the pen moves as programmed up- or down-scale, or not at all.

Store.

Advance to next parameter.

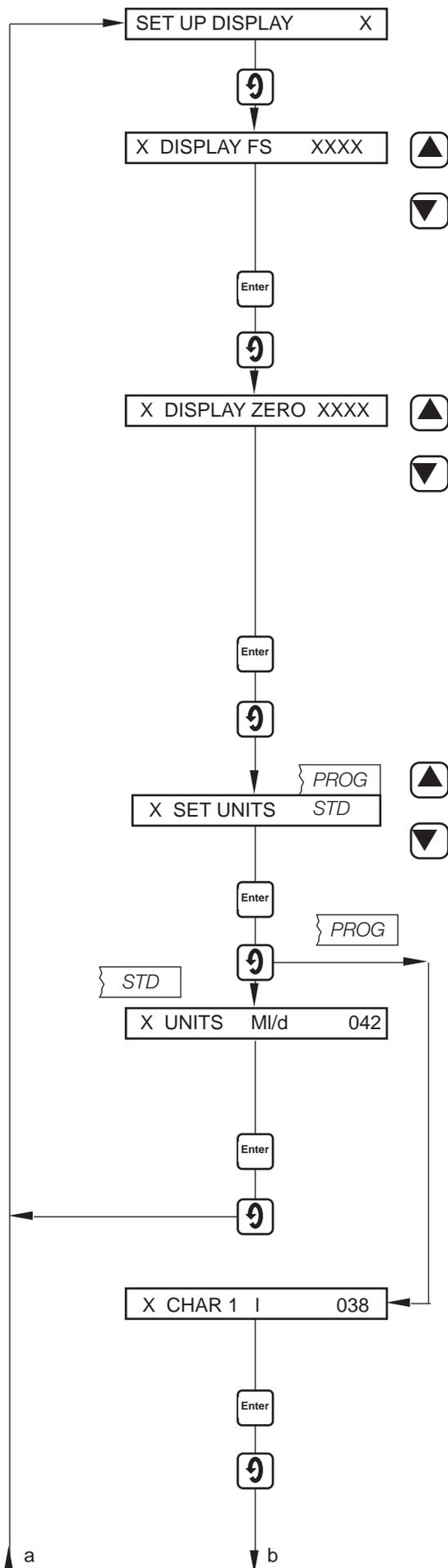
Input Filter

If the input is 'noisy' it may be desirable to modify the instrument response to fast signals. Filter time is programmable from 0 to 60s in 1s steps. The value to be set must be determined by trial and error. Enter 0 to turn the filter off.

Store.

Return to top of **Set Up Input Page**.

8.2(F) Set Up Display Page



Advance to next parameter.

Display Full Scale

Set the value of the variable represented by the maximum input signal

Example – if a 2.02 to 7.34 mV input represents a flow range of 50 to 180 MI/day set '180.0'.

Available adjustment range is –999 to 4095.

Store.

Advance to next parameter.

Display Zero

Set the value for the variable represented by the minimum input signal. Using the example above, 50.0 would be set here. The decimal point is set automatically. Available adjustment range is –999 to 4095.

Store.

Advance to next parameter.

Set Units

Select 'PROG' for a customised six-digit unit of measurement, 'STD' for standard units of measurement.

Store.

Advance to next parameter.

Units

Set the code number selected from Table 6, page 29 of PX105/0011, corresponding to the required display units. The actual display units are visually confirmed here.

Store.

Advance to next parameter.

Character 1

Set the code number corresponding to the first character of the customised six-digit unit of measurement selected from the characters listed in Table 5, Page 28 of PX105/0011.

Store.

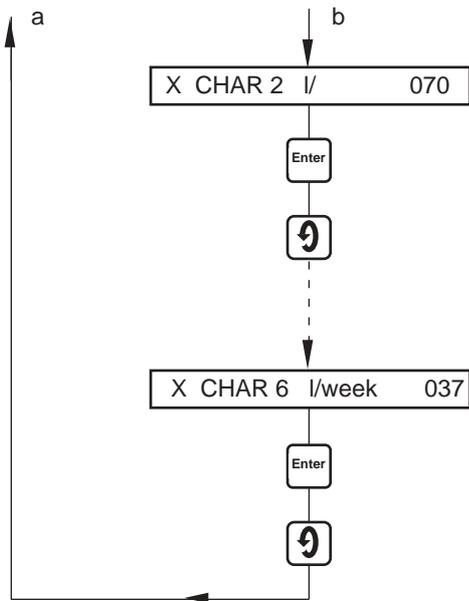
Advance to next parameter.

a

b

Continued on following page.

Continued from previous page.



Character 2

Repeat the previous step for the second character.

Store.

Advance to next parameter.

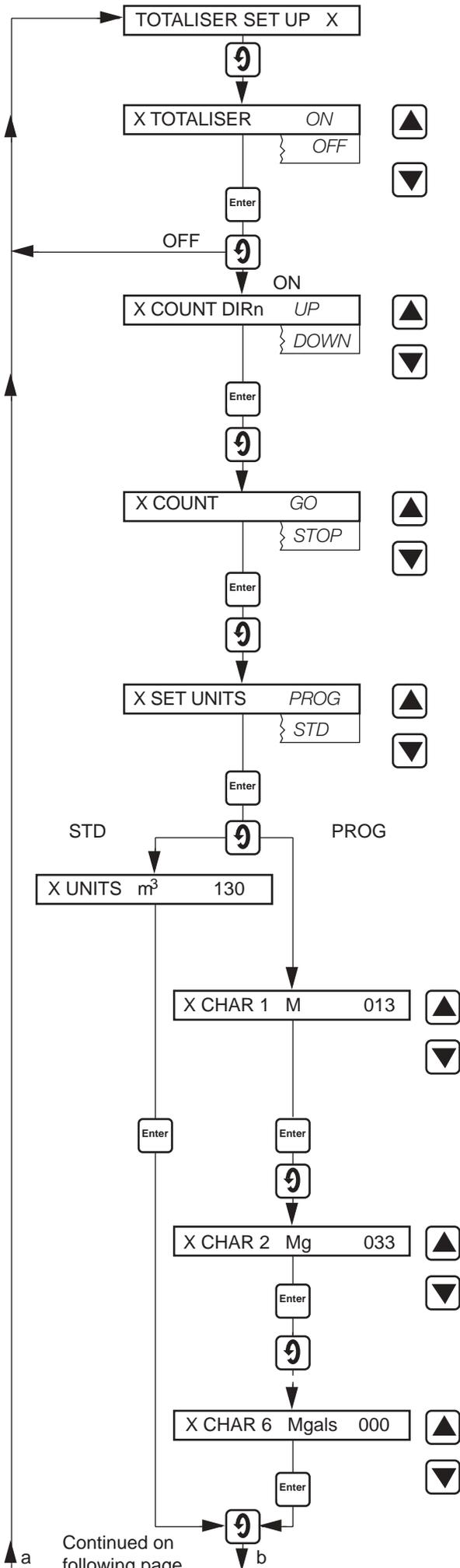
Character 6

Select characters 3 to 6 using the same method.

Store.

Return to top of **Set Up Display Page**.

8.3(F) Totaliser Set Up Page



Advance to next parameter.

Totaliser

Turn the totaliser 'On' or 'Off' as required. When turned off the Flow Total is not displayed in the Operating Page. Store.

Advance to next parameter.

Count Direction

Select either incremental (UP) or decremental (DOWN) counter.

Store.

Advance to next parameter.

Counter On/Off

Enables/disables the counter from incrementing/decrementing

Store.

Advance to next parameter.

Set Units

Select 'PROG' for a customised six-digit unit of flow measurement or 'STD' for standard units of flow.

Store.

Advance to next parameter.

Standard Units

In the example shown set the code number selected from Table 6, page 29 of PX105/0011 for the required units of measurement.

Programmable Units Character 1

In the example shown set the code number corresponding to the first character of the customised six-digit unit of measurement selected from the characters listed in Table 5, page 28 of PX105/0011.

Store.

Advance to next character.

Character 2

Repeat the previous step for the second character.

Store.

Advance to next character.

Character 6

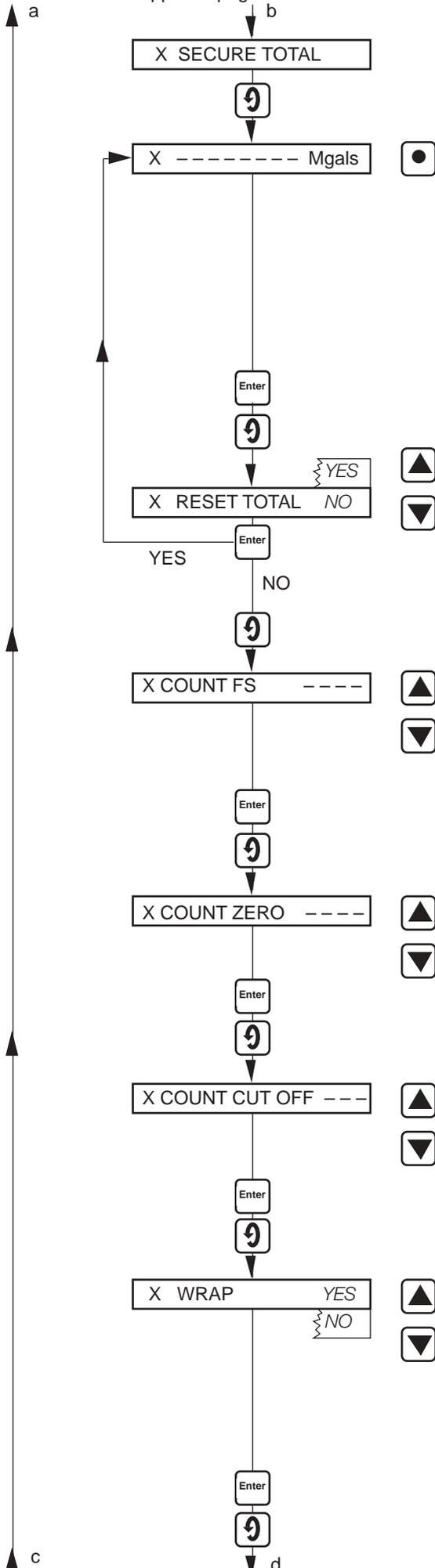
Select characters 3 to 6 by the same method as above.

Store.

Advance to next parameter.

Continued on following page.

Continued from opposite page.



Continued on following page.

Secure Total

Advance to next parameter.

Secure Total Value (independent of displayed flow total)
 This value can comprise up to 8 digits with the decimal point position selectable by operation of the Decimal Point switch from .00000000 to 00000000. Multiplication factors are available by further operations of the decimal point switch to give x10 or x100, e.g. 00000000 0 or 00000000 00.

If the total is reset in the next parameter, 00000000 or 99999999 is displayed depending on the count direction ('UP' or 'DOWN' respectively).

Store.

Advance to next parameter.

Reset Total

Select 'YES' to initiate reset of secure total.

Store

Advance to next parameter.

Count Full Scale

Set the required count rate (pulses/second) corresponding to full scale input. This is programmable from 0.00 to 10.00 in 0.01 increments, or from 0.000 to 1.000 in 0.001 increments.

Store.

Advance to next parameter.

Count Zero

Set the required count rate corresponding to zero input as for **Count Full Scale** above.

Store.

Advance to next parameter.

Count Cut-Off

Set the lowest flow value at which the totaliser is to stop counting. This is adjustable over the range 0 to 100% of maximum flow rate.

Store.

Advance to next parameter.

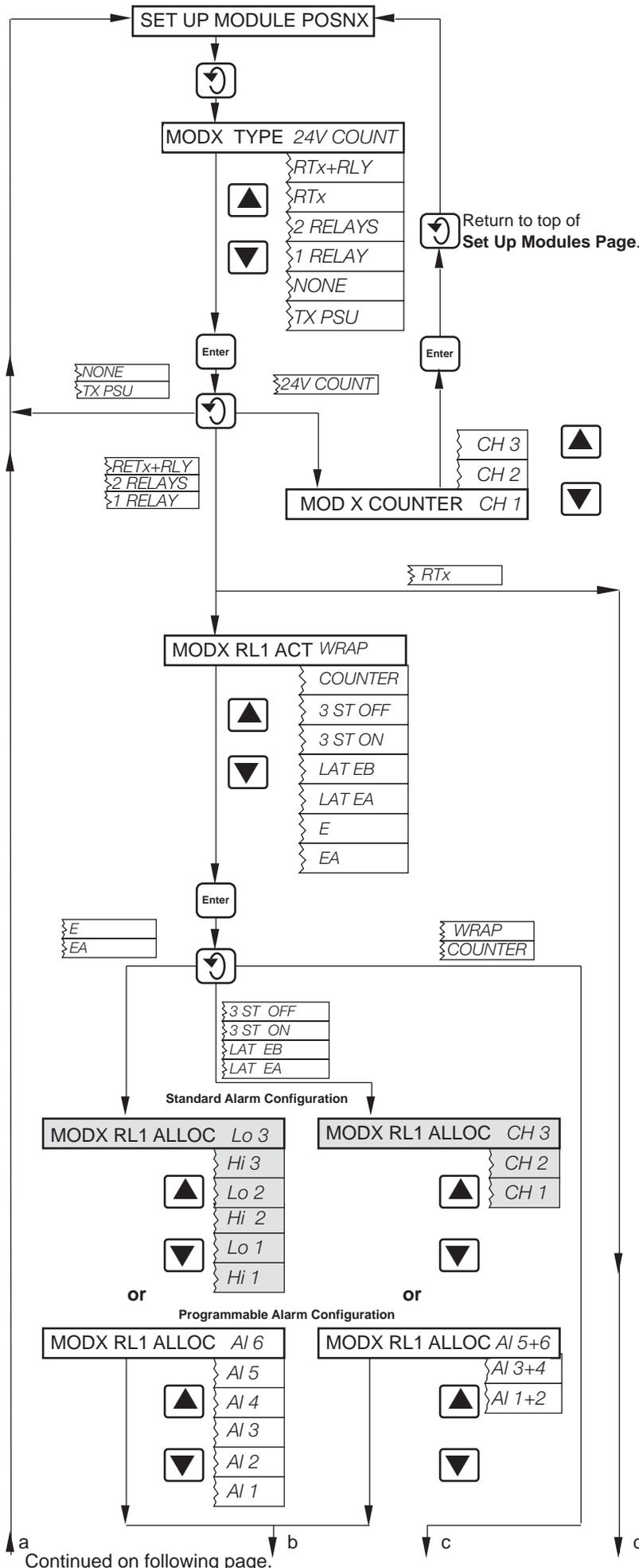
Wrap-around Feature

When the 'Wrap-around Feature' is selected, the front panel total is automatically reset to the PRESET value (see below) once the PREDETERMINED value (see below) is reached. When the 'Wrap-around Feature' is not selected the front panel total stops counting when the PREDETERMINED value is reached .

Store.

Advance to next parameter.

8.4.2(F) Module Positions 4,5,6



Module Position 4,5,6.

Advance to next parameter.

Module Position 4,5,6, Type

Select the module type fitted in module position 4,5 or 6 – see Fig. 4.1 in PX105/0011.

Return to top of Set Up Modules Page.

Store.

Advance to next parameter.

Module Position 4,5,6,Counter

Select the channel to which the 24V counter drive output is to be allocated. This parameter is not displayed for single pen instruments and the display returns to top of Set Up Module page.

Module Position 4,5,6, Relay 1 Action

- Select the relay 1 action required:
- 'WRAP' – volt free pulse output *
 - 'COUNTER' – volt free pulse output
 - '3 ST OFF' – 3-state off between set points
 - '3 ST ON' – 3-state on between set points
 - 'LAT EB' – latch below setpoint
 - 'LAT EA' – latch above setpoint
 - 'EB' – energised below setpoint
 - 'EA' – energised above setpoint.

* Relay is energised for 1 second when batch total is auto-reset to the preset value.

Store.

Advance to next parameter.

Module Position 4,5,6, Relay 1 Allocation (Standard Alarm Configuration)

For 'EA' or 'EB' alarm action:
Allocate the alarm to a high or low setpoint.

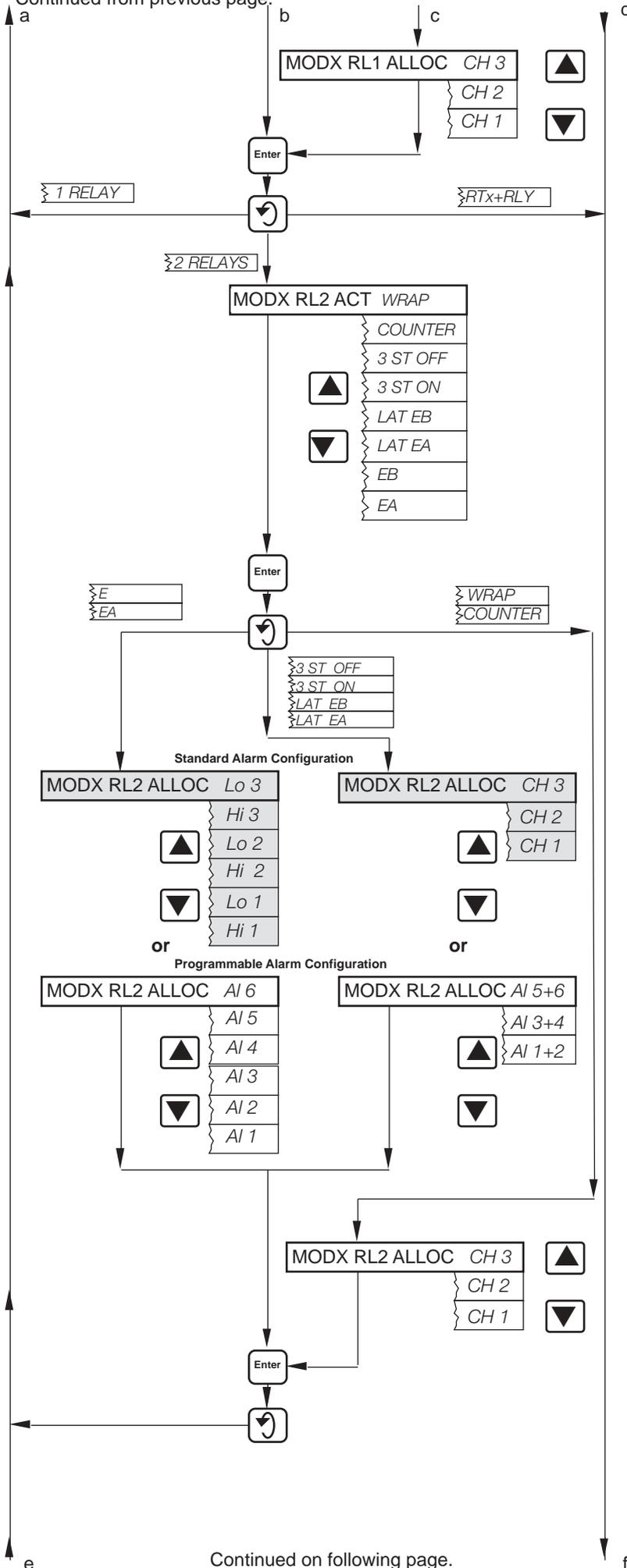
For '3 ST OFF', '3 ST ON', 'LAT EB' or 'LAT EA':
Allocate the relay to a channel.

Module Position 4,5,6, Relay 1 Allocation (Programmable Alarm Configuration)

For 'EA' or 'EB' alarm action:
Allocate the relay to an alarm point.

For '3 ST OFF', '3 ST ON', 'LAT EB' or 'LAT EA':
Allocate the relay to an alarm point pair. Alarms AI 1, AI 3 and AI 5 must be set to a value greater than alarms AI 2, AI 4 and AI 6.

a Continued on following page. b c d



Module Position 4,5,6, Counter/Wrap Relay 1 Allocation

Select the channel to which the counter relay is to be allocated.

Store.

Advance to next parameter.

Module Position 4,5,6, Relay 2 Action

Select the relay 2 action required:

- 'WRAP' – volt free pulse output *
- 'COUNTER' – volt free pulse output
- '3 ST OFF' – 3-state off between set points
- '3 ST ON' – 3-state on between set points
- 'LAT EB' – latch below setpoint
- 'LAT EA' – latch above setpoint
- 'EB' – energised below setpoint
- 'EA' – energised above setpoint.

* Relay is energised for 1second when batch total is auto-reset to the preset value.

Store.

Advance to next parameter.

Module Position 4,5,6, Relay 2 Allocation (Standard Alarm Configuration)

For 'EA' or 'EB' alarm action:

Allocate the alarm to a high or low setpoint.

For '3 ST OFF', '3 ST ON', 'LAT EB' or 'LAT EA':

Allocate the relay to a channel.

Module Position 4,5,6, Relay 2 Allocation (Programmable Alarm Configuration)

For 'EA' or 'EB' alarm action:

Allocate the relay to an alarm point.

For '3 ST OFF', '3 ST ON', 'LAT EB' or 'LAT EA':

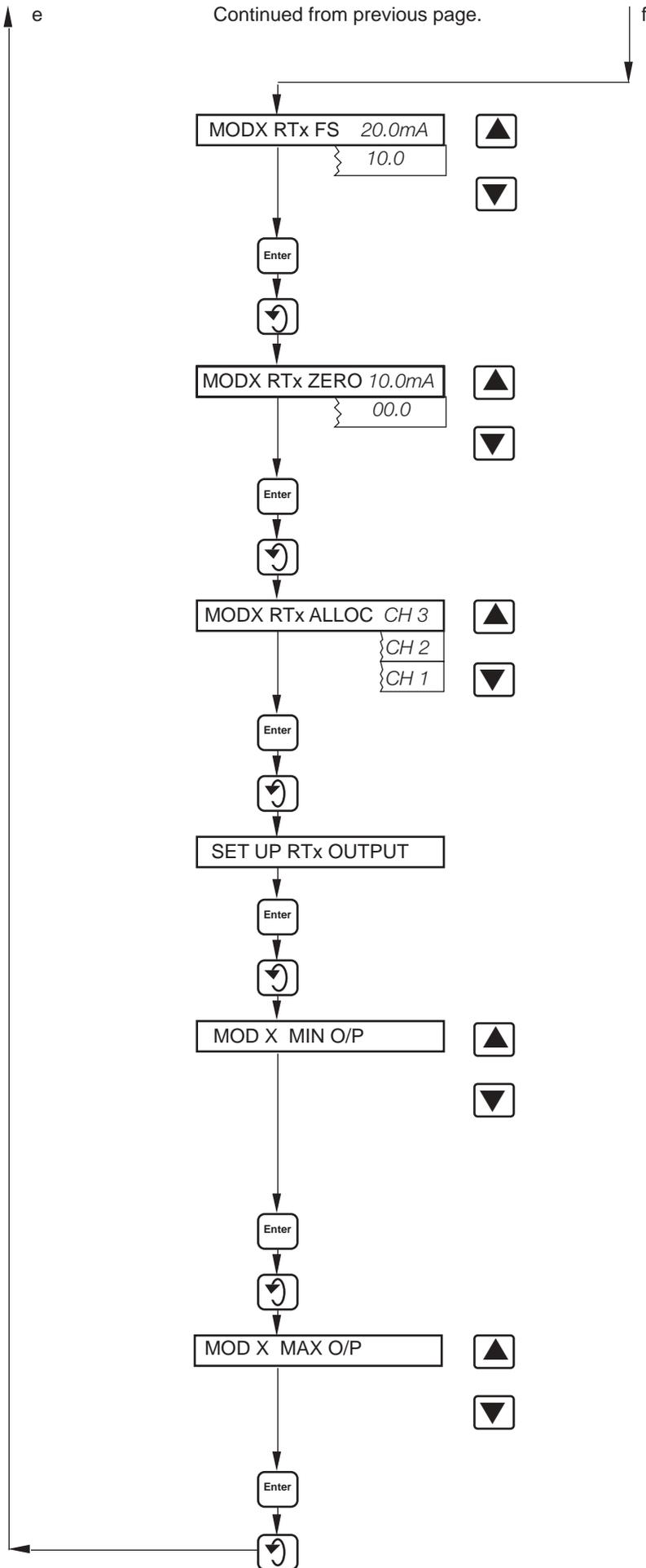
Allocate the relay to an alarm point pair. Alarms AI 1, AI 3 and AI 5 must be set to a value greater than alarms AI 2, AI 4 and AI 6.

Module Position 4,5,6, Counter Relay 2 Allocation

Select the channel to which the counter relay 2 is to be allocated.

Store.

Advance to next parameter.



Module Position 4,5,6,Retransmission Full Scale

Set the maximum value required for the retransmission signal, adjustable in 0.1mA steps in the range 10.0 to 20.0mA. Store.

Advance to next parameter.

Module Position 4,5,6,Retransmission Zero

Set the minimum value required for the retransmission signal, adjustable in 0.1mA steps in the range 00.0 to 10.0mA. This parameter is omitted on single pen instruments.

Store.

Advance to next parameter.

Module Position 4,5,6, Retransmission Allocation

Select the channel to which the retransmission signal is to be allocated. This parameter is omitted on single pen instruments. Store.

Advance to next parameter.

Set Up Retransmission Output

Store.

Advance to next parameter.

Module Position 4,5,6 Retransmission Minimum Output

Connect a 0 to 20mA milliammeter to the appropriate module output connection and using the 'Raise'/'Lower' switches adjust the milliammeter displayed value to coincide with the retransmission minimum signal specified above.

Store.

Advance to next parameter.

Module Position 4,5,6, Retransmission Maximum Output

Use the 'Raise'/'Lower' switches to adjust the milliammeter displayed value to coincide with the retransmission maximum signal specified above.

Store.

Return to top of **Set Up Modules Page.**

9(F) SIMPLE FAULT FINDING

As detailed in Section 9 of PX105/0011.

10(F) CALIBRATION

As detailed in Section 10 of PX105/0011.

11(F) SPECIFICATION

Inputs	
No. of inputs	1,2 or 3 (refer to Section 2(F) on page 2)
Flow	Analogue, linear or square law from flow rate transmitters
Frequency (PX105/51, /52, /53) High level inputs	$x^{3/2}$, $x^{5/2}$ operating range 0.003 to 0.1Hz to 4kHz TTL level square wave Open collector 2mA,5V Voltage-free contacts 2mA,5V Square wave, low level -50V to +1V, high level +2V to +50V
Low level inputs	Vortex and Electromagnetic flowmeters. Amplitude: 4mA or greater square wave, with an offset up to 20mA, e.g. 0 to 4mA, 16 to 20mA or 4 to 20mA. Voltdrop: Maximum 2V at 20mA. Frequency range: 3Hz to 4kHz. Turbine and Rotary Shunt meters. Amplitude: 12mV/Hz. Frequency range: 3Hz to 4kHz. General purpose a.c. coupled. Frequency range: 3Hz to 4kHz. Amplitude: Fixed or variable between the limits of 5mV peak to peak to 50V peak to peak. On inputs where the amplitude is proportional to frequency, automatic variable gain (maximum sensitivity 1mV/Hz) can be achieved by link positioning. General purpose d.c. coupled. Frequency range: 0.1Hz to 4kHz.

APPENDIX

A1(F) Calculation of Pulse Rate and Total Count

Pulse Rate Convert full scale flow rate into units/second (1)
Pulse rate = $\frac{\text{units/second}}{\text{counter factor}}$] Must be within the limits of (2)
10.00 to 0.001 pulses per second

Counter factor i. e. what the first digit on counter represents

Example 1 Range: 0 to 100 m³/hour
Counter factor: 1m³
From (1) = $\frac{100}{60 \times 60}$ = 0.0278 m³/second
From (2) pulse rate = $\frac{0.0278}{1}$ = **0.0278 pulses/second**

enter 0.028 at Counter FS

Example 2 Alternatively with Example 1 a counter factor of 0.1m³ could be set giving a pulse rate of 0.278 pulses/second.
The decimal point switch (see page 13) would be set to 10⁻¹.

Example 3 Range: 0 to 1000 m³/minute
Counter factor: 1m³
From (1) = $\frac{1000}{60}$ = 16.67m³/second
From (2) pulse rate = 16.67 = **16.67 pulses/second** – this is too high
If counter factor = 10m³
∴ Pulse rate = $\frac{16.67}{10}$ = **1.667 pulses/second**

enter 1.67 at Counter FS and set decimal point switch to give x10 factor (see page 13).

Notes.

PRODUCTS & CUSTOMER SUPPORT

Products

Automation Systems

- *for the following industries:*
 - Chemical & Pharmaceutical
 - Food & Beverage
 - Manufacturing
 - Metals and Minerals
 - Oil, Gas & Petrochemical
 - Pulp and Paper

Drives and Motors

- *AC and DC Drives, AC and DC Machines, AC motors to 1kV*
- *Drive systems*
- *Force Measurement*
- *Servo Drives*

Controllers & Recorders

- *Single and Multi-loop Controllers*
- *Circular Chart, Strip Chart and Paperless Recorders*
- *Paperless Recorders*
- *Process Indicators*

Flexible Automation

- *Industrial Robots and Robot Systems*

Flow Measurement

- *Electromagnetic Magnetic Flowmeters*
- *Mass Flow Meters*
- *Turbine Flowmeters*
- *Wedge Flow Elements*

Marine Systems & Turbochargers

- *Electrical Systems*
- *Marine Equipment*
- *Offshore Retrofit and Referredishment*

Process Analytics

- *Process Gas Analysis*
- *Systems Integration*

Transmitters

- *Pressure*
- *Temperature*
- *Level*
- *Interface Modules*

Valves, Actuators and Positioners

- *Control Valves*
- *Actuators*
- *Positioners*

Water, Gas & Industrial Analytics Instrumentation

- *pH, conductivity, and dissolved oxygen transmitters and sensors*
- *ammonia, nitrate, phosphate, silica, sodium, chloride, fluoride, dissolved oxygen and hydrazine analyzers.*
- *Zirconia oxygen analyzers, katharometers, hydrogen purity and purge-gas monitors, thermal conductivity.*

Customer Support

We provide a comprehensive after sales service via a Worldwide Service Organization. Contact one of the following offices for details on your nearest Service and Repair Centre.

United Kingdom

ABB Limited
Tel: +44 (0)1480 475 321
Fax: +44 (0)1480 217 948

United States of America

ABB Inc.
Tel: +1 215-674-6000
Fax: +1 215-674-7183

Client Warranty

Prior to installation, the equipment referred to in this manual must be stored in a clean, dry environment, in accordance with the Company's published specification. Periodic checks must be made on the equipment's condition.

In the event of a failure under warranty, the following documentation must be provided as substantiation:

1. A listing evidencing process operation and alarm logs at time of failure.
2. Copies of operating and maintenance records relating to the alleged faulty unit.

ABB has Sales & Customer Support
expertise in over 100 countries worldwide

www.abb.com

The Company's policy is one of continuous product
improvement and the right is reserved to modify the
information contained herein without notice.

Printed in UK (08.03)

© ABB 2003



ABB Limited

Howard Road, St Neots
Cambridgeshire
PE19 8EU

UK

Tel: +44 (0)1480 475321

Fax: +44 (0)1480 217948

ABB Inc

125 E. County Line Road
Warminster
PA 18974

USA

Tel: +1 215 674 6000

Fax: +1 215 674 7183