

COMMANDER 1900 Series
Circular Chart Recorders

Installation Guide

All Versions

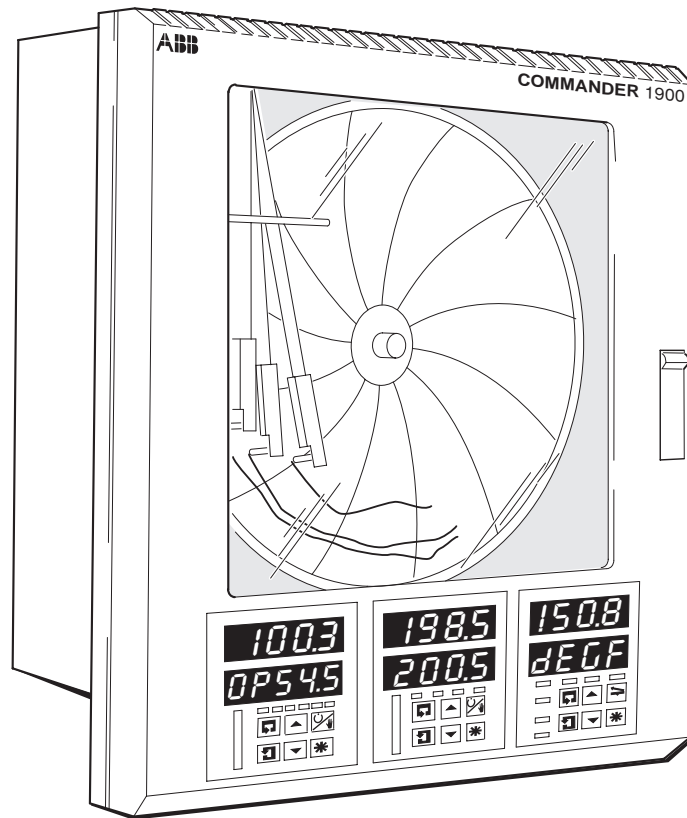


ABB AUTOMATION

The Company

ABB Automation is 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 ABB Automation's dedication to quality and accuracy.

BS EN ISO 9001



St Neots, U.K. – Cert. No. Q5907
Stonehouse, U.K. – Cert. No. FM 21106

EN 29001 (ISO 9001)



Lenno, Italy – Cert. No. 9/90A



Stonehouse, U.K.

Use of Instructions



Warning.

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



Caution.

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



Note.

Clarification of an instruction or additional information.



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 Marketing Communications Department, ABB Automation.

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

1	INTRODUCTION	1
2	PREPARATION	2
2.1	Accessories	2
2.2	Checking the Code Number	2
2.2.1	Non-upgradeable Version	2
3	MECHANICAL INSTALLATION	4
3.1	Siting	4
3.2	Mounting	5
3.2.1	Wall-/Pipe-Mounting	5
3.2.2	Panel Mounting	5
4	ELECTRICAL INSTALLATION	6
4.1	Identifying the Input/Output Modules	6
4.2	Channel Connections	6
4.2.1	Selecting the Analog Input Type(s)	7
4.2.2	Voltage and Current	8
4.2.3	2-wire Transmitter Input	8
4.2.4	Thermocouple	8
4.2.5	Resistance Thermometer (RTD)	8
4.2.6	Logic Inputs	8
4.2.7	Analog Output	8
4.2.8	Relay Output	8
4.2.9	Motorized Valve	9
4.3	Module Connections	9
4.3.1	Standard I/O or Analog + Relay (Module Types 1, 2 and 7)	9
4.3.2	Four Relay Module (Module Type 3) ..	9
4.3.3	Eight Digital Inputs or Outputs (Module Types 4 and 5)	10
4.4	Power Supply Selection and A.C. Connections	10
5	INSTALLATION RECORD	11

1 INTRODUCTION

The series of COMMANDER 1900 instruction manuals is shown in Fig. 1.1. The **Standard Manuals**, including the specification sheet, are supplied with all instruments. The **Supplementary Manuals** supplied depend on the specification of the instrument.

This manual includes an **Installation Record** which should be completed as a log of the electrical installation. The record is useful when carrying out initial instrument programming and can be retained for future reference.

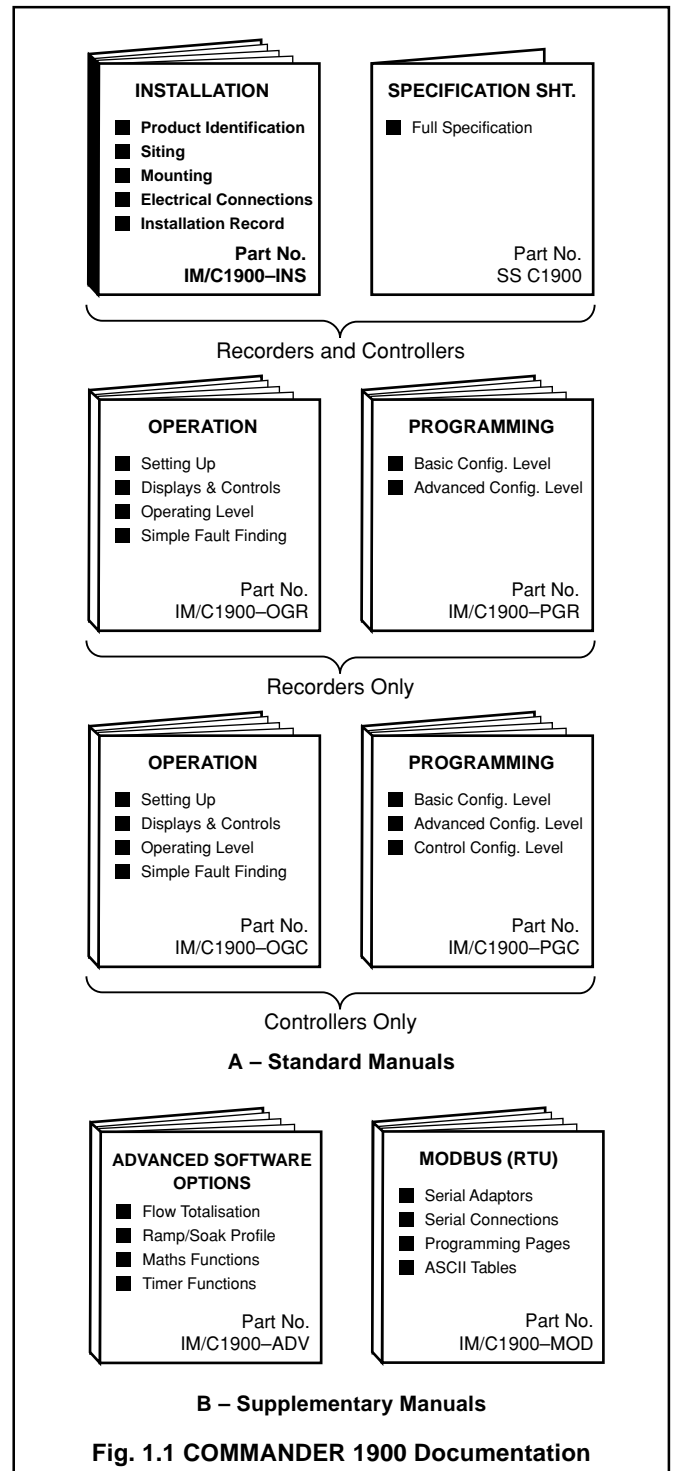
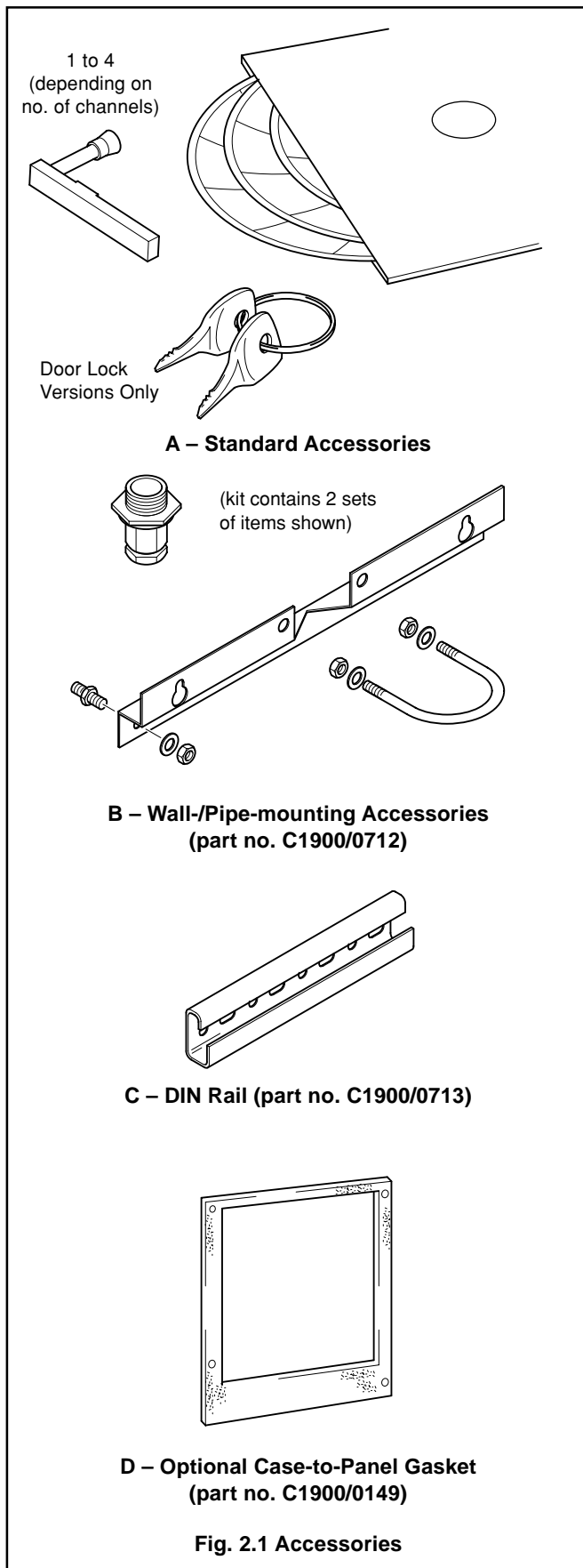


Fig. 1.1 COMMANDER 1900 Documentation

2 PREPARATION

2.1 Accessories – Fig. 2.1



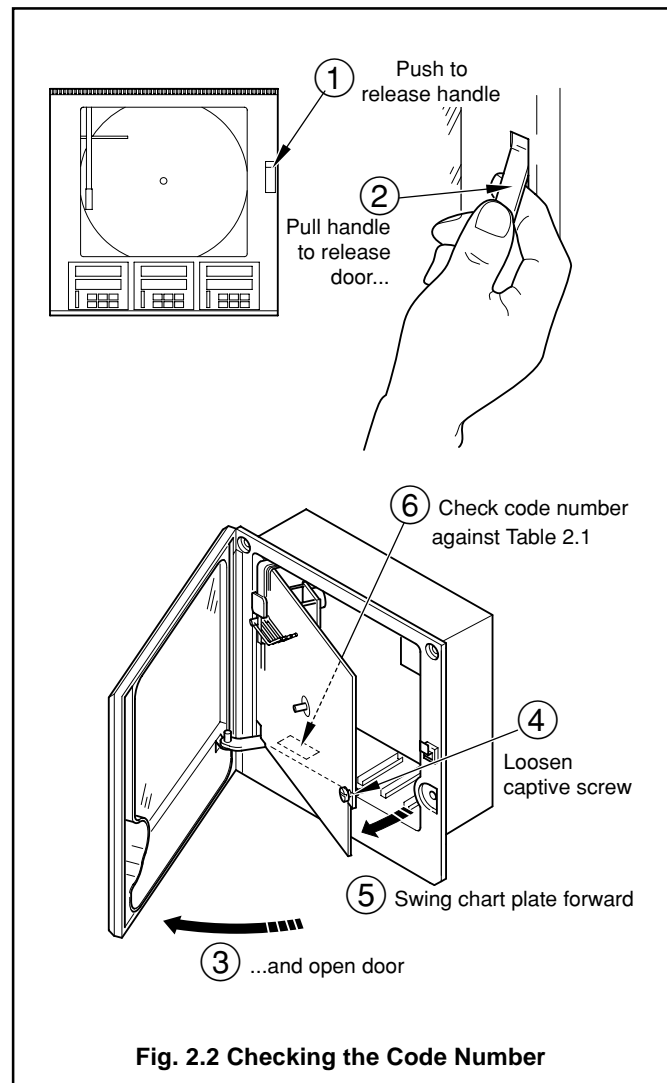
2.2 Checking the Code Number – Fig. 2.2

2.2.1 Non-upgradeable Version

i Information.

The 1901J is a basic, non-upgradeable single pen recorder. This version is not fitted with an analog output, relay, transmitter power supply unit or digital inputs and no additional modules can be fitted. The full identification code is shown below.

	1901J	A	0	0	1	1	0000	STD
COMMANDER 1900 single pen recorder	1							
Electrical code – standard		1						
Option module – none			1					
Options – none				1				
Door lock – not fitted					1			
Power supply – 115V a.c.						1		
Modules fitted in module positions 2 to 6 – none							1	
Special Settings – company standard								1



...2.2 Checking the Code Number

1900 Recorder/Controller		19 XX	X	X	X	X	X	X	X	X	X	X	X	XXX
Recorders	One Pen (Red)	11												
	Two Pens (Red & Green)	12												
	Three Pens (Red, Green, Blue)	13												
	Four Pens (Red, Green, Blue, Black)	14												
Recorder/Controllers	One Control Unit One Pen (Red)	11												
	One Control Unit, Two Pens (Red & Green)	12												
	One Control Unit, Three Pens (Red, Green, Blue)	13												
	One Control Unit, Four Pens (Red, Green, Blue, Black)	14												
	Two Control Units, Two Pens (Red & Green)	22												
	Two Control Units, Three Pens (Red, Green, Blue)	23												
	Two Control Units, Four Pens (Red, Green, Blue, Black)	24												
Chart Type	Recorder Standard (ER/C Type Chart)		J											
	Recorder KPC (PX105 and PXR105 Type Charts)		K											
	Recorder Special (Special Charts)		C											
	Controller Standard (ER/C Type Chart)		R											
	Controller KPC (PX105 and PXR105 Type Charts)		S											
	Controller Special (Special Charts)		D											
Electrical Code	Standard		A											
	CSA		B											
Option Module	None		0											
	Additional Modules		A											
Options	None		0											
	Totalizer		3											
	Ramp/Soak Profile (Recorder/Controller versions only)		5											
	Maths & Timer		A											
	Totalizer, Maths & Timer		B											
	Totalizer, Ramp/Soak, Profile, Maths & Timer (Recorder/Controller versions only)		C											
Door Lock	Not Fitted							1						
	Fitted							2						
Power Supply	115V A.C.											1		
	230V A.C.											2		
	24V A.C.											3		
	115V A.C. with On/Off Switch											4		
	230V A.C. with On/Off Switch											5		
	24V A.C. with On/Off Switch											6		

Module Position 2*	0	1	2											
Module Position 3**	0	1	2											
Module Position 4***	0	1	2	3	4	5	6							
Module Position 5	0	2	3	4	5									
Module Position 6	0	2	4	5			8							
Special Settings	Company Standard													STD
	Customer Setting													CUS
	Special													SXX

Table 2.1 Code Number Interpretation

Key to Module Types

- 0 No module fitted
- 1 Standard Input/Output
- 2 Analog Input + Relay
- 3 Four Relays
- 4 Eight Digital Inputs
- 5 Eight Digital Outputs
- 6 True Time Event Pen (Violet)
- 8 MODBUS RS485 Communications

Refer to Fig. 4.2 on page 6 for module positions and identification.

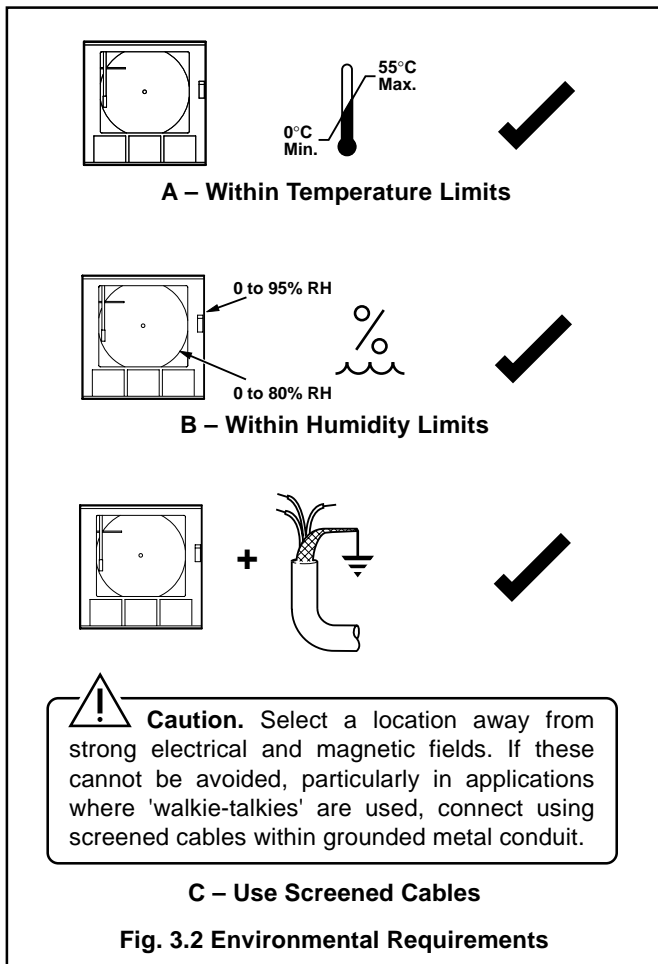
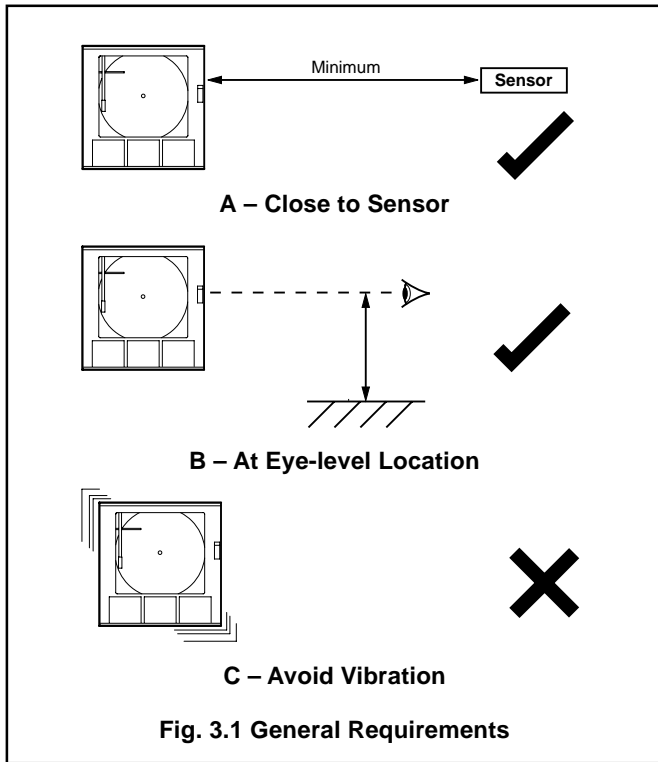
* On 2, 3 and 4 pen instruments standard I/O module is always fitted in this position for the Channel 2 input.

** On 3 and 4 pen instruments standard I/O module is always fitted in this position for the Channel 3 input.

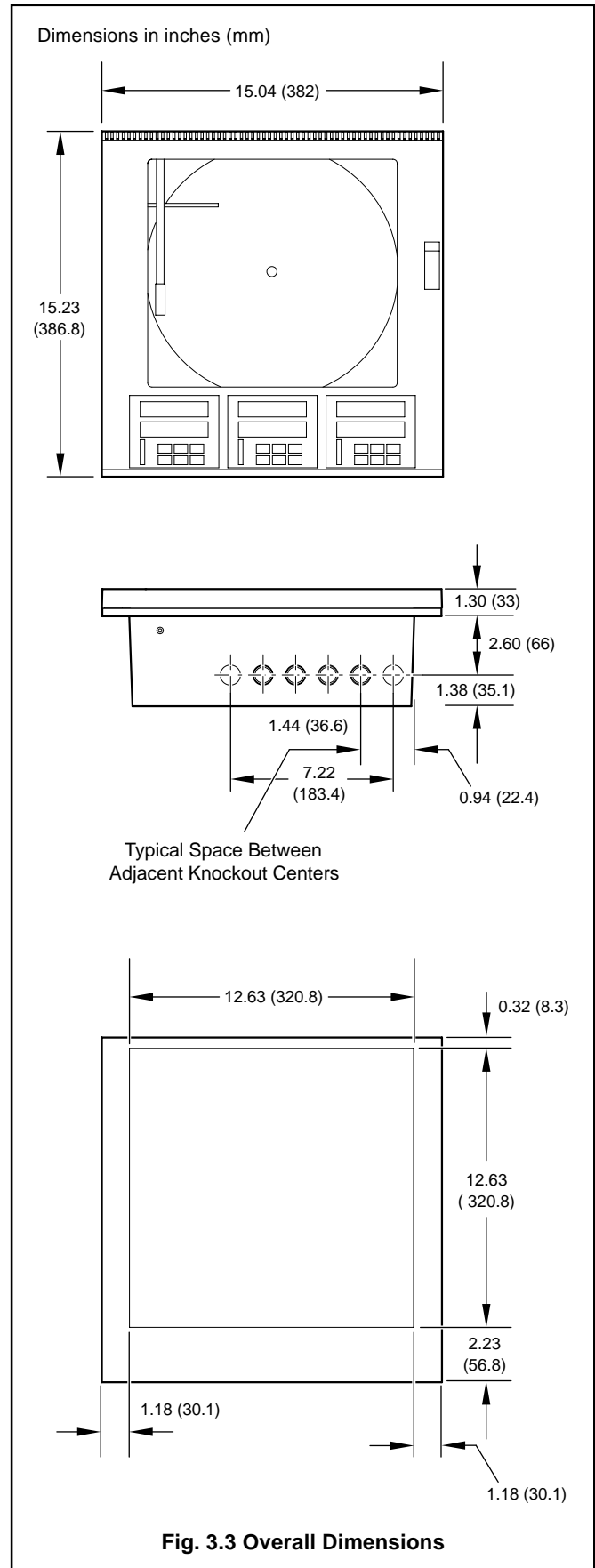
*** On 4 pen instruments standard I/O module is always fitted in this position for the Channel 4 input.

3 MECHANICAL INSTALLATION

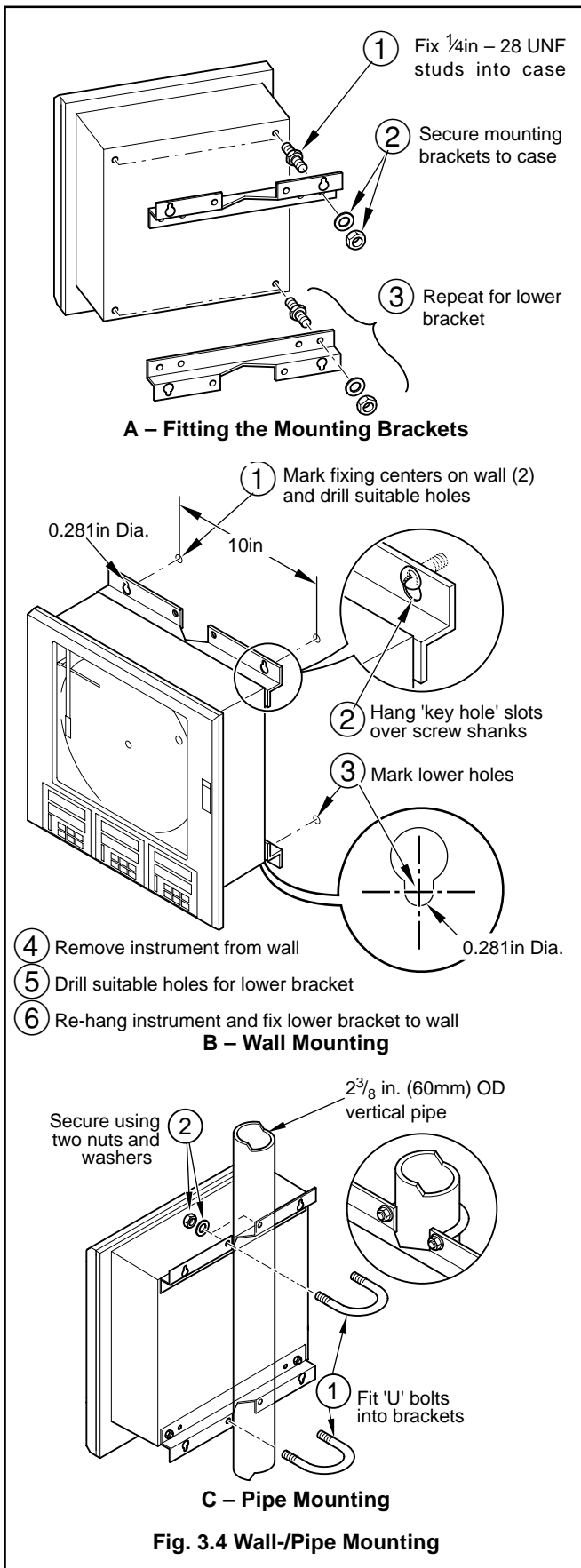
3.1 Siting – Figs 3.1 and 3.2



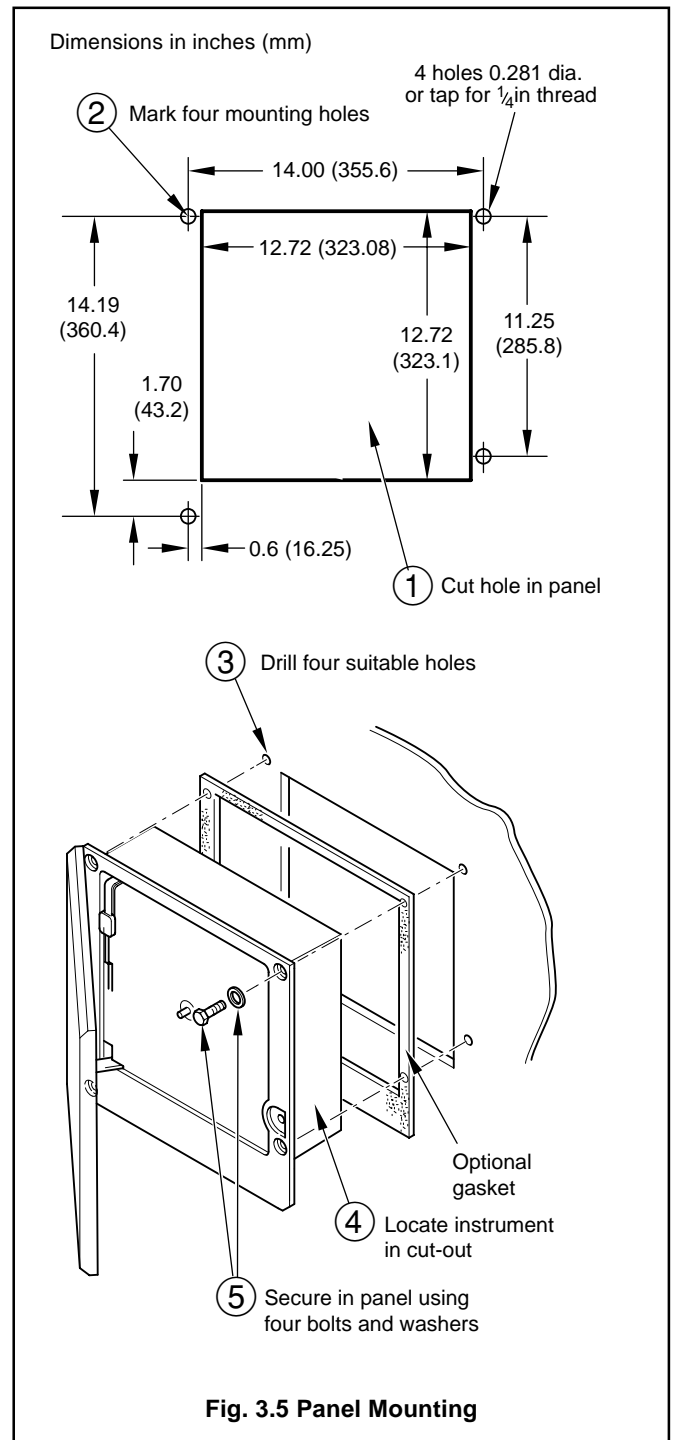
3.2 Mounting – Figs. 3.3 to 3.5



3.2.1 Wall-/Pipe-Mounting – Fig. 3.4



3.2.2 Panel Mounting – Fig. 3.5

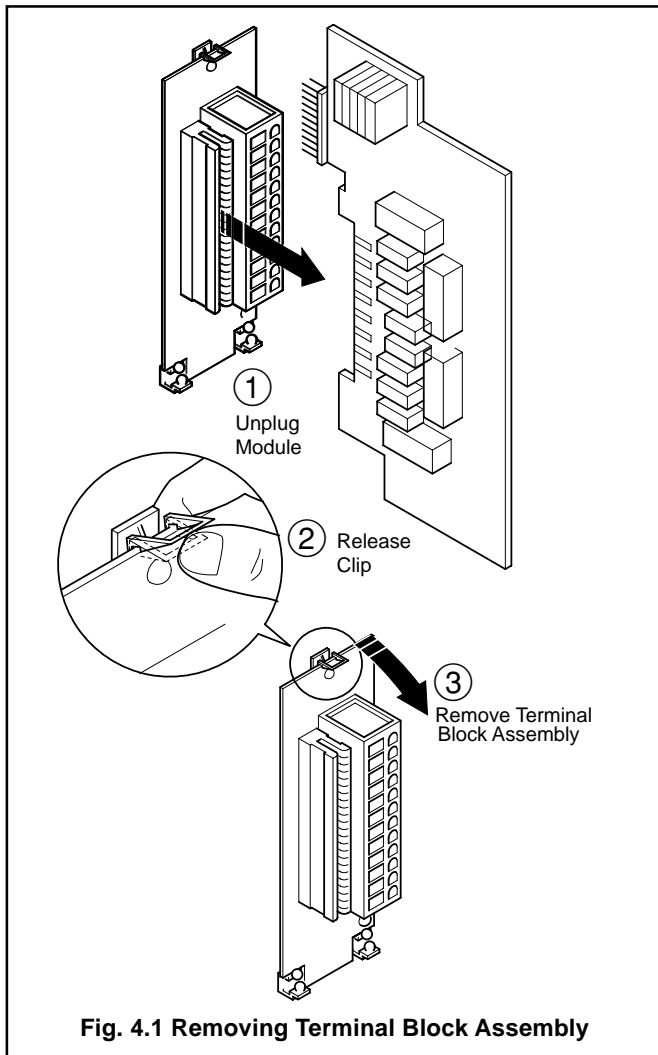


4 ELECTRICAL INSTALLATION

Warning. Before making any connections, ensure that the power supply, any high voltage-operated control circuits and high common mode voltages are switched off.

- Note.**
- To comply with Underwriter Laboratories (UL) certification, use flexible conduit for cable routing (signal and power).
 - Always route signal leads and power cables separately, preferably in earthed metal conduit.
 - Screened cable must be used for signal inputs and relay connections. Connect the screen to the ground stud.
 - The terminal blocks can be removed from the main p.c.b. when making connections. Before removing any module note its position – see Fig. 4.1.

Information. Use cable appropriate for the load currents. The terminals accept cables up 12AWG for power supply connections and 14AWG for all other connections.



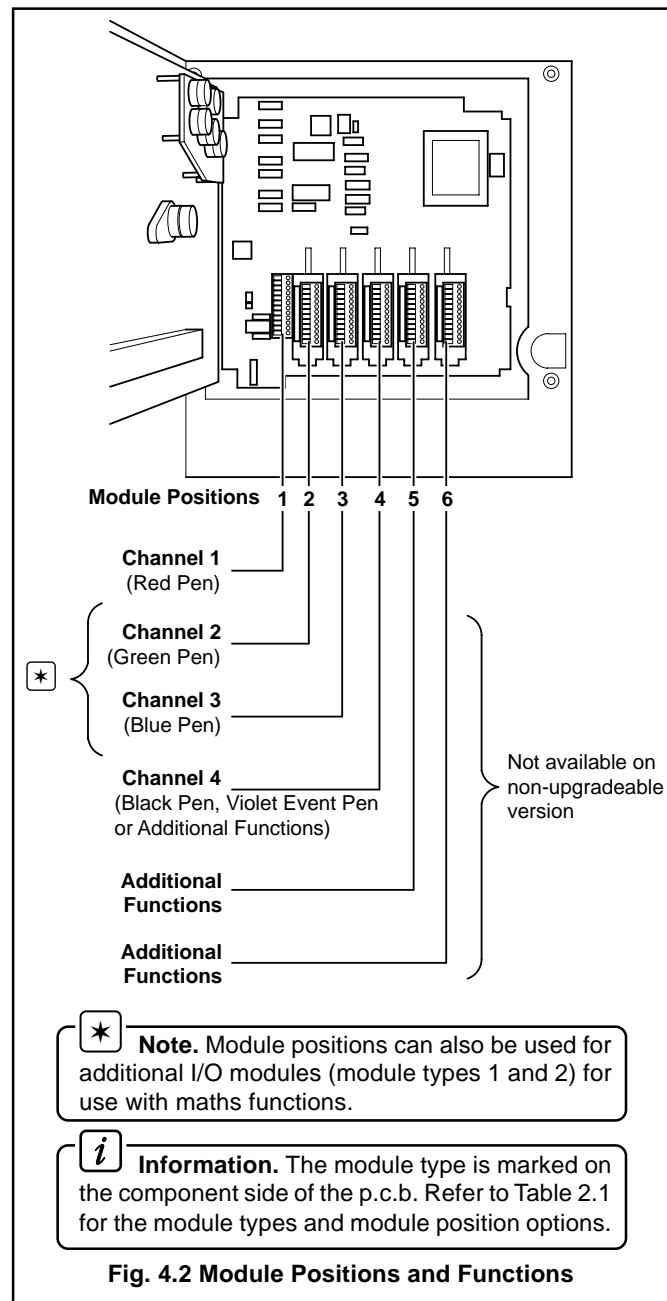
4.1 Identifying the Input/Output Modules – Fig. 4.2
To gain access to the modules, open the door and chassis – see Fig. 2.2. There are six module positions as shown in Fig. 4.2.

4.2 Channel Connections

Channel 1 connections are made directly to the terminal block mounted on the motherboard.

Other Channel connections are made to standard I/O modules, fitted in positions 2, 3 or 4 – see Fig. 4.2.

Caution.
The maximum channel to channel voltage (between any 2 channels) must not exceed 500V d.c.

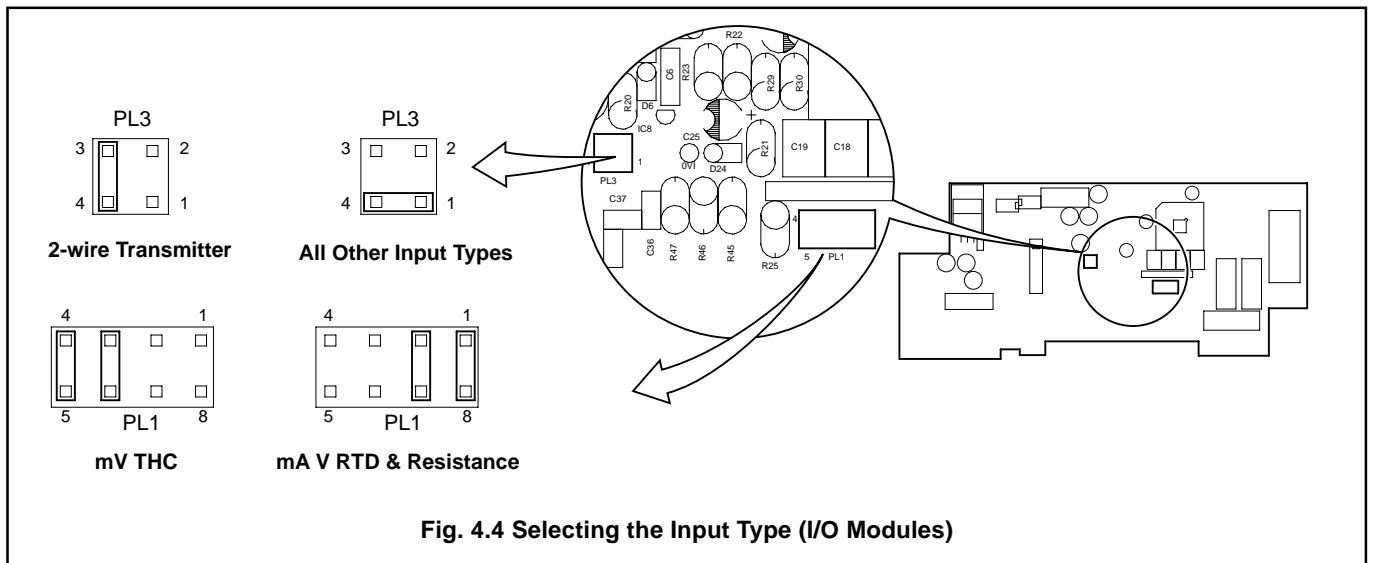
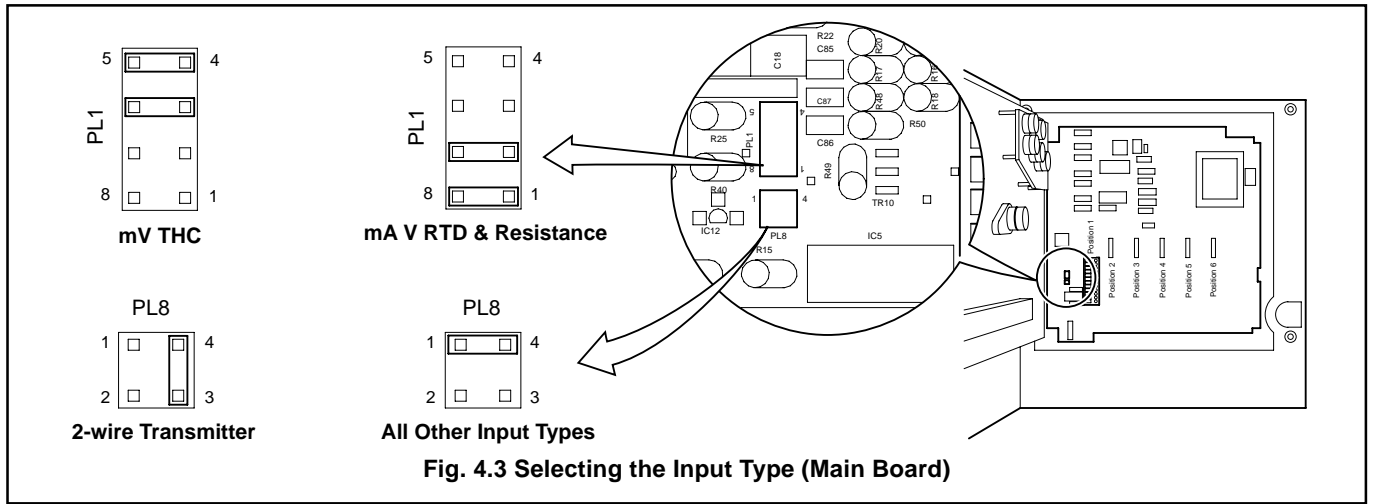


4.2.1 Selecting the Analog Input Type(s) – Figs. 4.3 and 4.4

Plug-in links are used to select the input type:

Channel 1 PL1 & PL8 on the main p.c.b. (Fig. 4.3)

Channels 2 to 4 PL1 & PL3 on the module (Fig. 4.4)



Type of Thermocouple	Compensating Cable											
	BS1843			ANSI MC 96.1			DIN 43714			BS4937 Part No.30		
	+	-	Case	+	-	Case	+	-	Case	+	-	Case
Ni-Cr/Ni-Al (K)	Brown	Red	Blue	Yellow	Red	Yellow	Red	Green	Green	Green	White	Green*
Ni-Cr/Cu-Ni (E)	—	—	—	—	—	—	—	—	—	Violet	White	Violet*
Nicrsil/Nisil (N)	Orange	Blue	Blue	Orange	Red	Orange	—	—	—	Pink	White	Pink
Pt/Pt-Rh (R and S)	White	Blue	Blue	Black	Red	Green	Red	White	White	Orange	White	Orange*
Pt-Rh/Pt-Rh (B)	—	—	—	—	—	—	—	—	—	Grey	White	Grey*
Cu/Cu-Ni (T)	White	Blue	Blue	Blue	Red	Blue	Red	Brown	Brown	Brown	White	Brown*
Fe/Con (J)	Yellow	Blue	Blue	White	Red	Black	Red	Blue	Blue	Black	White	Black*
* Case Blue for intrinsically safe circuits												
Fe/Con (DIN 43710)							DIN 43710					
							Blue/Red	Blue	Blue			

Table 4.1 Thermocouple Compensating Cable

...4 ELECTRICAL INSTALLATION

4.2.2 Voltage and Current – Fig. 4.5

i **Information.** Input impedances:
Low voltage (mV) >10MΩ
Voltage >10MΩ
Current (mA) 100Ω

4.2.3 2-wire Transmitter Input – Fig. 4.5

Power for the transmitter is supplied by terminal 6.

***** **Note.** The voltage across terminals 4 and 6 is 20V (nominal). This is due to internal voltage drops across a shunt resistor and measurement circuitry.

4.2.4 Thermocouple – Fig. 4.5

Use correct compensating cable between the thermocouple and the terminals – see Table 4.1 (previous page).

Automatic cold junction (ACJC) is incorporated but an independent cold (reference) junction may be used.

4.2.5 Resistance Thermometer (RTD) – Fig. 4.5

If long leads are necessary it is preferable to use a 3-lead resistance thermometer.

If 2-lead resistance thermometers are used each input must be calibrated to take account of the lead resistance.

4.2.6 Logic Inputs – Fig. 4.5

The two logic inputs accept either volt-free (switch) or TTL (5V) input types and can be used for remote switching of many recorder functions, e.g. chart stop/go, alarm acknowledgment, totalizer reset etc. Refer to the **Programming Guide**, IM/C1900–PGR or IM/C1900–PGC.

4.2.7 Analog Output – Fig. 4.5

4.2.8 Relay Output – Fig. 4.5

i **Information.** Relay specification:
 Type – single pole changeover
 Voltage 250V a.c. 250V d.c.
 Current 5A a.c. 5A d.c.
 Loading (non inductive) 1250VA 50W
 Isolation, contacts to earth 2kV r.m.s.

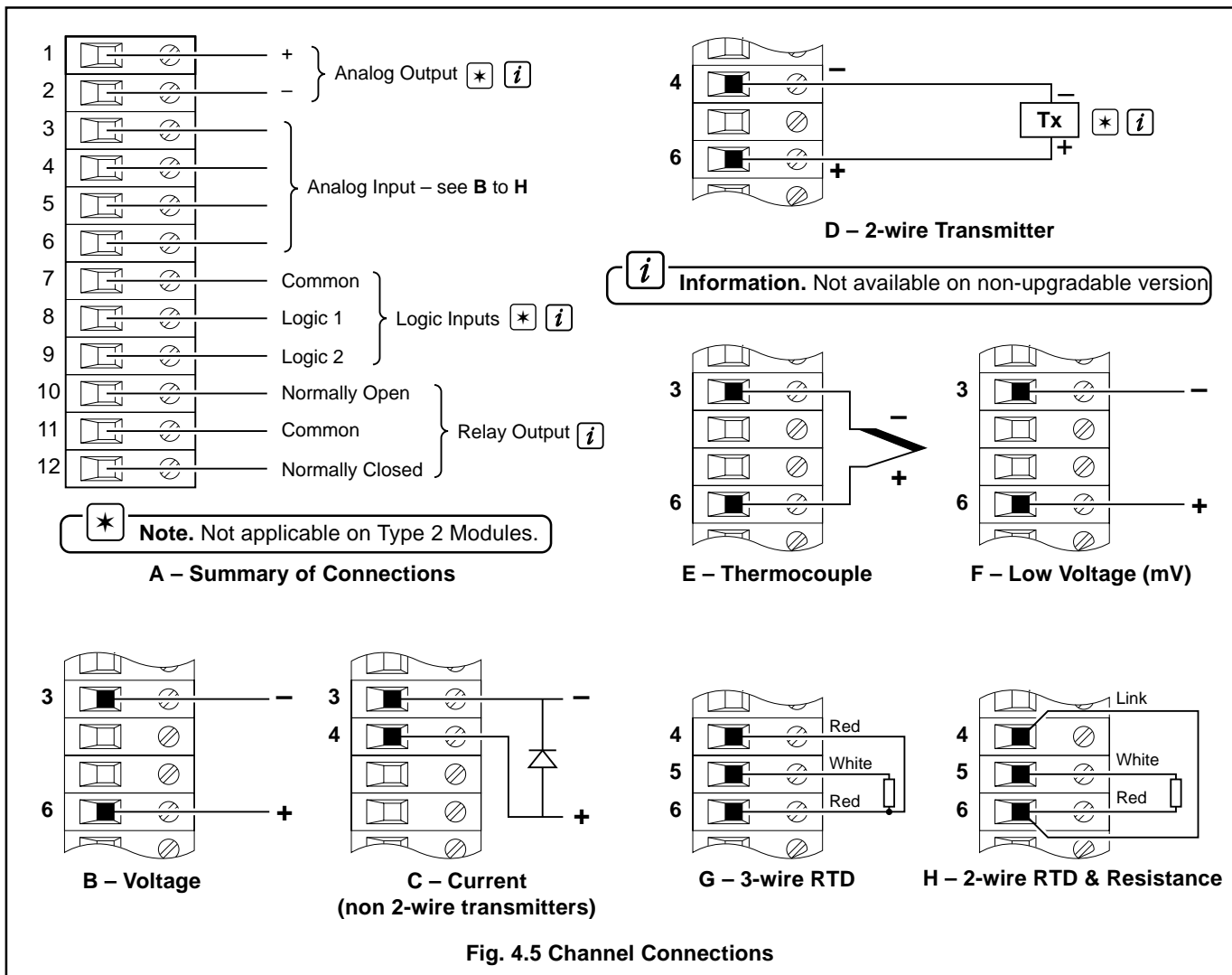
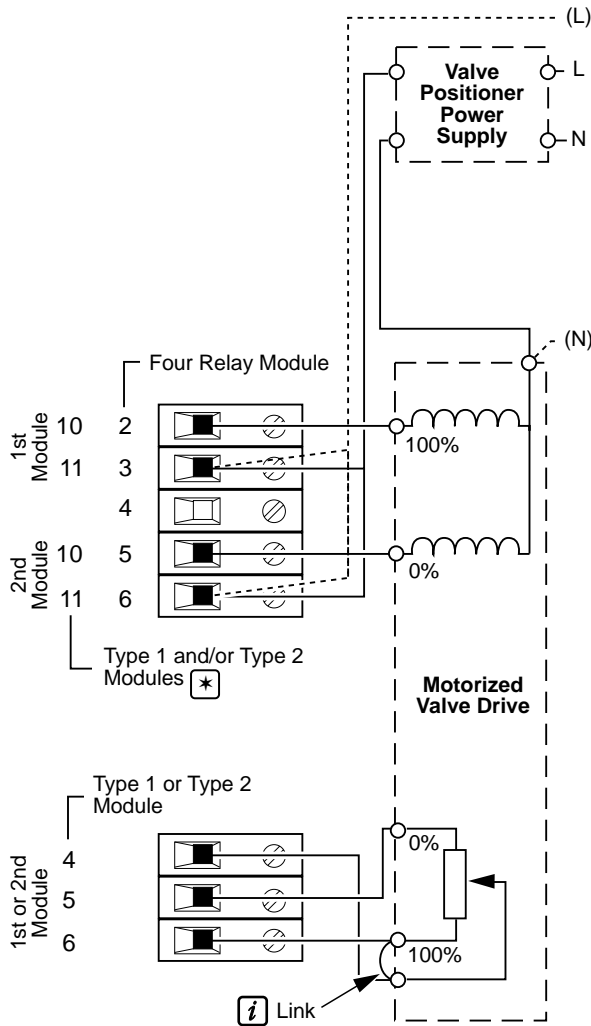


Fig. 4.5 Channel Connections

4.2.9 Motorized Valve – Fig. 4.6

A motorized valve with or without feedback requires 2 relays (common and normally open terminals) to drive the valve in either direction. Any two relays can be allocated for this function. Fig. 4.6 A shows two possible combinations.

Note. For valves with position feedback using low voltage (mV), voltage (V) or current (C), refer to Fig. 4.5 B, C and F for connections.



A – Standard Feedback Slidewire Configuration

Note. Type 1 and type 2 modules have one relay output, therefore two modules are required.

4.3 Module Connections

4.3.1 Standard I/O or Analog + Relay (Module Types 1, 2 and 7) – Fig. 4.5

The connections are the same as Channel connections to the main board. Refer to Section 4.2.

4.3.2 Four Relay Module (Module Type 3) – Fig. 4.7

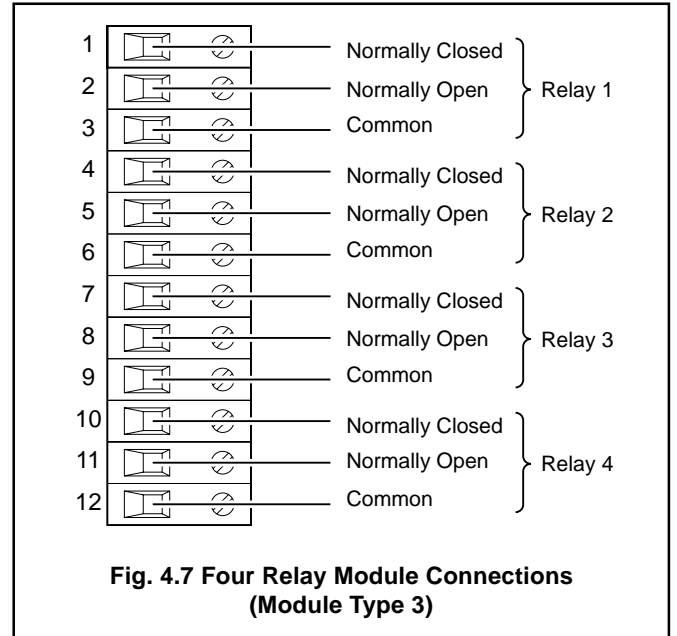
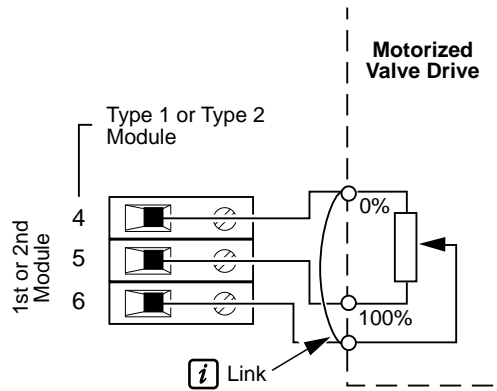


Fig. 4.7 Four Relay Module Connections (Module Type 3)



B – Alternative Feedback Slidewire Configuration

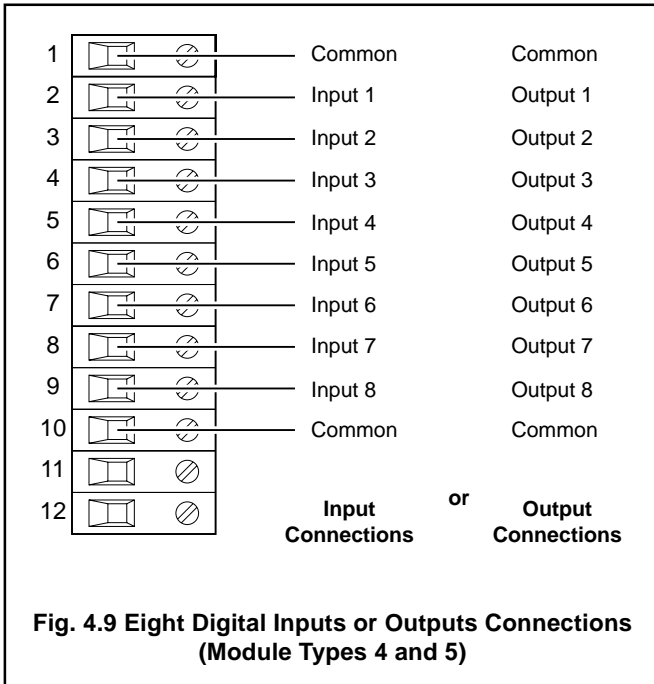
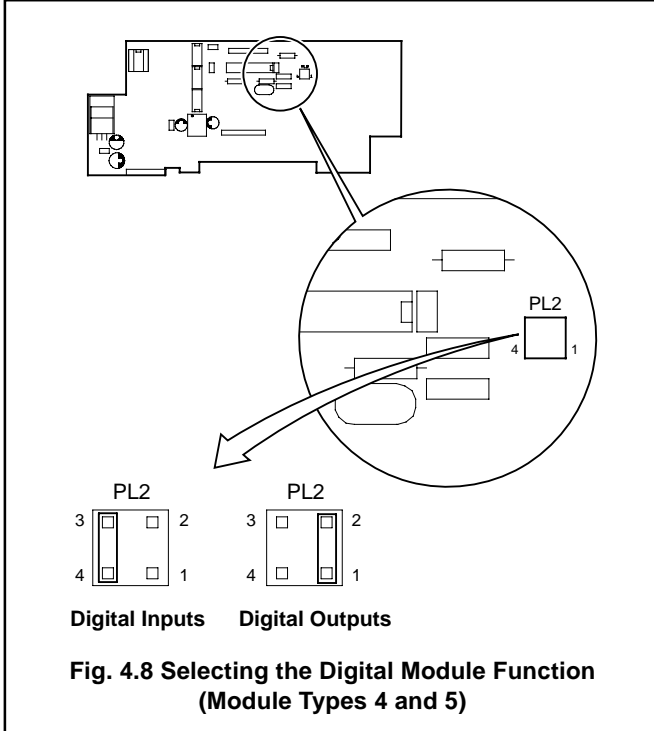
Information. Link must be connected at valve drive end, not at the controller terminals.

Fig 4.6 Motorized Valve Connections (using feedback slidewire)

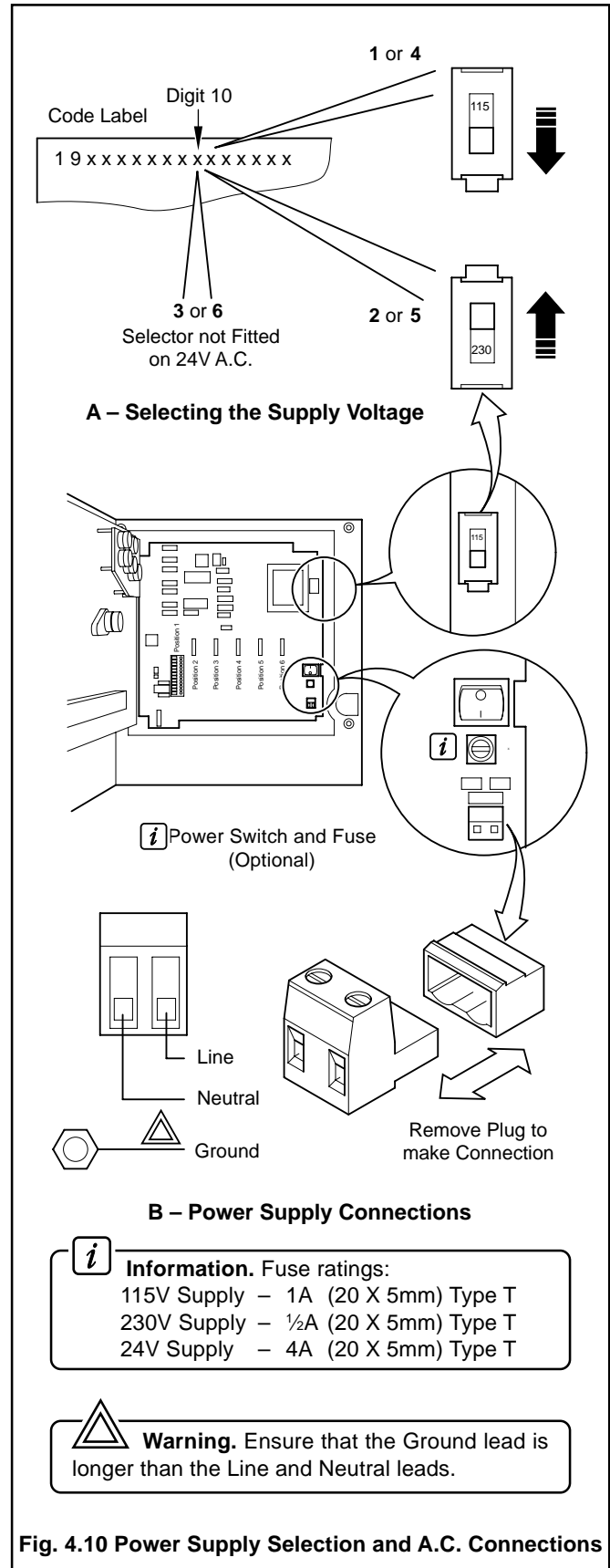
...4 ELECTRICAL INSTALLATION

4.3.3 Eight Digital Inputs or Outputs (Module Types 4 and 5 respectively) – Figs. 4.8 and 4.9

A plug-in link is used to select the board's function; digital inputs or digital outputs – see Fig. 4.8. The maximum current drain from each TTL output must not exceed 5mA.

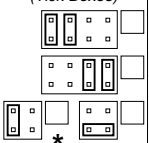


4.4 Power Supply Selection and A.C. Connections – Fig. 4.10



Position 5

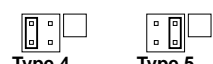
Module Type (Tick Box) 2

* Analog Output	1	+	Link Positions (Tick Boxes) 
	2	-	
Analog Input	3		
	4		
	5		
* Logic Inputs	7	C	
	8	L1	
	9	L2	
Relay Output	10	NO	
	11	C	
	12	NC	

3

Relay Output 1	1	NC
	2	NO
	3	C
Relay Output 2	4	NC
	5	NO
	6	C
Relay Output 3	7	NC
	8	NO
	9	C
Relay Output 4	10	NC
	11	NO
	12	C

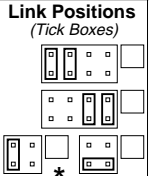
4 5

Logic I/Ps (Type 4) or Logic O/Ps (Type 5)	1	C
	2	1
	3	2
	4	3
	5	4
	6	5
	7	6
	8	7
	9	8
	10	C
Link Positions (Tick Box) 		

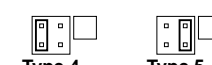
* Not available on Module Type 2

Position 6

Module Type (Tick Box) 2

* Analog Output	1	+	Link Positions (Tick Boxes) 
	2	-	
Analog Input	3		
	4		
	5		
* Logic Inputs	7	C	
	8	L1	
	9	L2	
Relay Output	10	NO	
	11	C	
	12	NC	

4 5

Logic I/Ps (Type 4) or Logic O/Ps (Type 5)	1	C
	2	1
	3	2
	4	3
	5	4
	6	5
	7	6
	8	7
	9	8
	10	C
Link Positions (Tick Box) 		

* Not available on Module Type 2

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- *Zirconia oxygen analyzers, katharometers, hydrogen purity and purge-gas monitors, thermal conductivity.*

Customer Support

ABB Automation provides 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.

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United States of America

ABB Automation Inc.
Instrumentation Division
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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.



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

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Printed in UK (02.01)

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