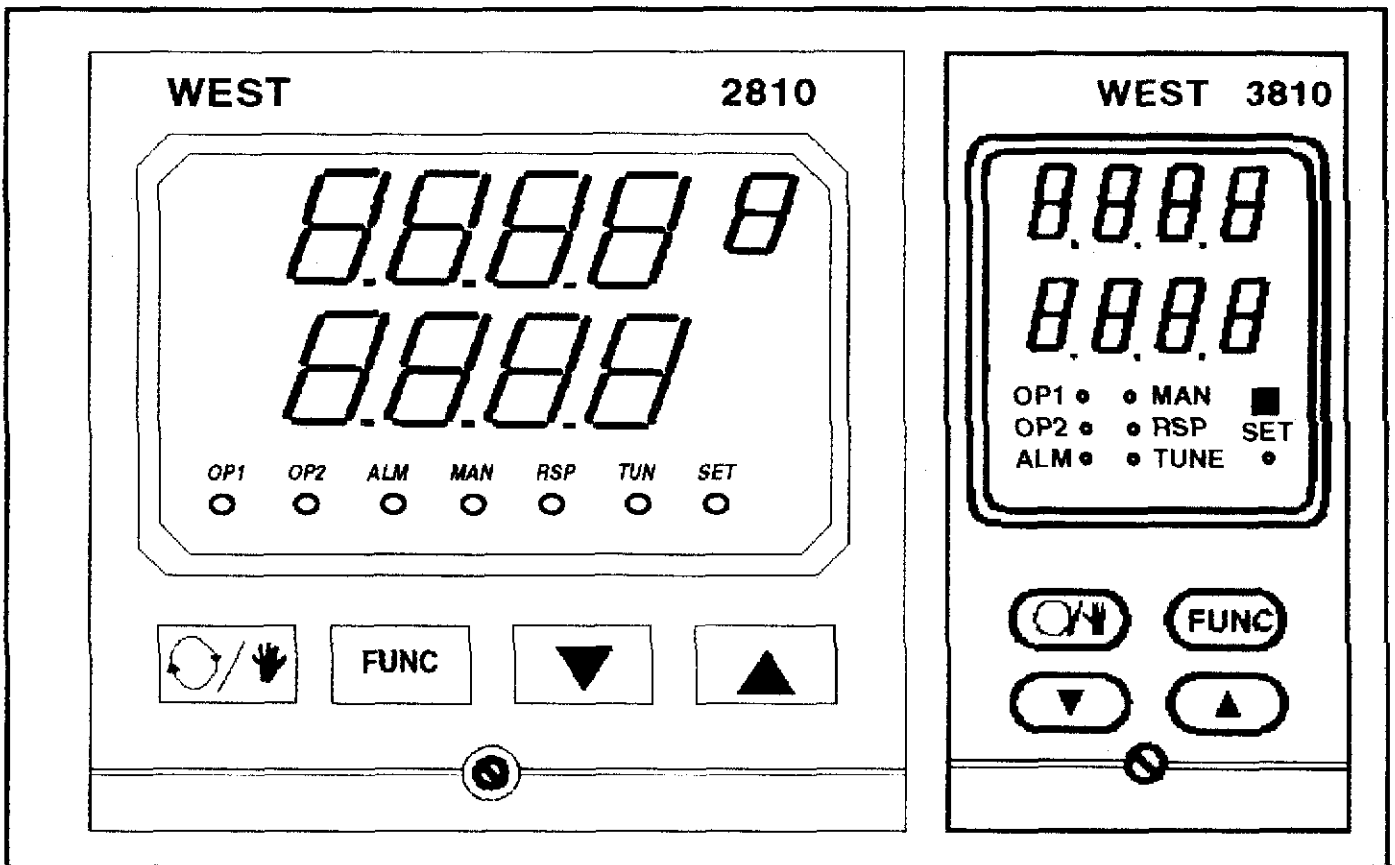


WEST 2810/3810 CONTROLLERS

Installation & Operation Instructions



WEST

Dynapar, Veeder Root, and Eagle Signal Brands:

Sales, Repair, and Application Support:
1675 Delany Rd.
Gurnee, IL. 60031
847-662-4150 Sales/Order Entry Fax
847-782-5277 Applications Support Fax
800-873-8731 Sales/Order Entry
800-234-8731 Applications Support

NorthStar Brand:

Sales, Repair, and Application Support:
1675 Delany Rd.
Gurnee, IL. 60031
847-782-5288 Sales/Order Entry Fax
847-782-5277 Applications Support Fax
800-326-6216 Sales/Order Entry
800-326-6216 Applications Support

Partlow, West, Rustrak, and LFE Brands:

Sales, Repair, and Application Support:
1675 Delany Rd.
Gurnee, IL. 60031
847-662-4150 Sales/Order Entry Fax
847-782-5277 Applications Support Fax
800-873-8731 Sales/Order Entry
800-866-6659 Applications Support

Please disregard all phone numbers and addresses in this manual. The phone numbers and address on this page are the correct phone number and addresses to use for sales, repair, and application support.

WEST 2810/3810 CONTROLLERS INSTALLATION AND OPERATING INSTRUCTIONS

IM-0048-A0

Our policy is one of continued improvement and, consequently, the information contained in this publication may differ in some respects from the instrument in question. Therefore, this document does not constitute an offer or part of an offer for sale.

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SECTION 1 INTRODUCTION

The WEST 2810 and 3810 Controllers are "proportional plus integral plus derivative" (PID) controllers with a self-tuning facility. The facilities on both controllers include a wide range of inputs, proportional cooling output and auto/manual operation. The options available include the capability to operate as a slave via an RS485-compatible serial communications link. The front panel is equipped with red light-emitting diode (LED) displays. The 3810 Controller housing conforms to 1/8-DIN measurements and the 2810 Controller housing conforms to 1/4-DIN measurements. Controllers may be mounted conveniently side-by-side in multiple installations. Power consumption is only 3 VA (3810) or 5VA (2810) approximately; therefore minimum ventilation is required.

1.1 OPERATOR CONTROLS AND INDICATORS

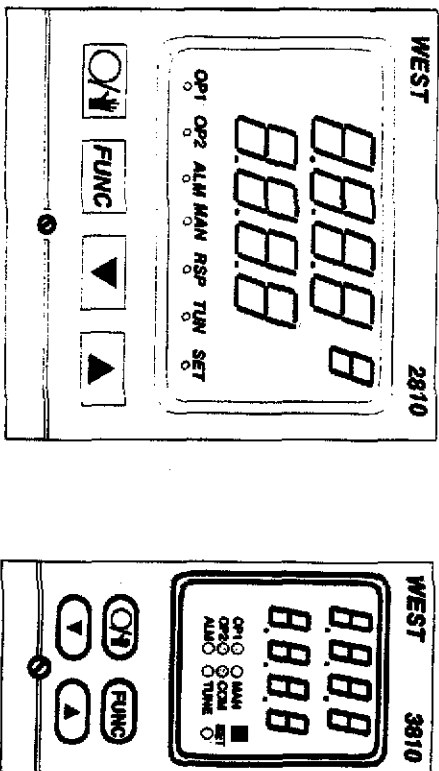


Figure 1-1 2810/3810 Controllers - Front Panels

The Controllers operate in any one of three modes: User Mode, Set-Up Mode or Configuration Mode. In User Mode, the operator may adjust the set point value and monitor the Controller outputs. In Set-Up Mode, all control parameters can be reviewed and adjusted. In Configuration Mode, the operator may select (a) input range; (b) Control Output 1 action (reverse or direct), (c) alarm type and (d) secondary output usage i.e. Output 2 (Cool) or Alarm 2. The 2810 and 3810 front panels are shown in Figure 1-1; each has a number of operator controls and indicators to serve the following functions:

Upper display: Comprises four digits with decimal points, display numbers from 9999 to -1999. In User Mode, displays the value of the process variable. In Set-Up Mode, set point and other control parameter values are displayed after selection by means of the front panel keys. In Configuration Mode, displays the input code (numeric part of the T.... code for the input), Output 1 Action, Alarm 1 Type or Secondary Output Usage.

Lower display: Comprises four digits with decimal points or up to four alphanumeric characters. In User Mode, displays the set point value. In Set-Up Mode, displays a legend which identifies the control parameter being viewed/adjusted. In Configuration Mode, indicates the parameter being configured (Input Code, Control Output 1 Action, Alarm Type or Secondary Output Usage).

SECTION 2 INSTALLATION

LED Indicators: The 2810 and 3810 front panels are equipped with seven LEDs which indicate the various output states and Controller functions.

Controls: Four pushbuttons are provided for parameter entry and for selection of control parameter or Controller functions and Configuration operations.

Full details of the use of these controls and indicators can be found in Section 3.

1.2 OPTIONS AND VARIANTS

There is a wide range of options and variants available for the 2810 and 3810 Controllers. The variants and options fitted to each controller are indicated by the product codes shown on the product code label affixed to the Controller housing. Space is available on the label for alteration of these codes should any of the variants or options be changed subsequently. Full details of the options and variants available and guidance on interpretation of the product code label are given in Appendix B.

2.1 UNPACKING PROCEDURE

1. Remove the Controller from its packaging. The Controller is supplied with a mounting clamp and two screws. If a Remote Front Panel option (X74, X75 or X79) has been ordered (3810 Controller only), the package should also contain the remote front panel and the connecting cable with terminating plugs. The length of this cable is dependent upon the product code:

Product Code	Cable Length (meters)
X74	2
X75	5
X79	0.5

NOTE

Retain the packing for future use, should it be necessary to transport the controller to another site or to return it to the supplier for repair.

2. Examine the delivered items to check for damage or deficiency. If any is found, notify the carrier immediately. Check that the product code shown on the product code label (affixed to the side of the controller) corresponds to the controller ordered.

2.2 PANEL-MOUNTING A STANDARD CONTROLLER

2.2.1 Pre-Requisites

The panel on which the Controller is to be mounted must be rigid and may be up to 6.00 mm (0.25 inches) thick. The cut-out required for a single 2810 or 3810 Controller is as shown in Figure 2-1.

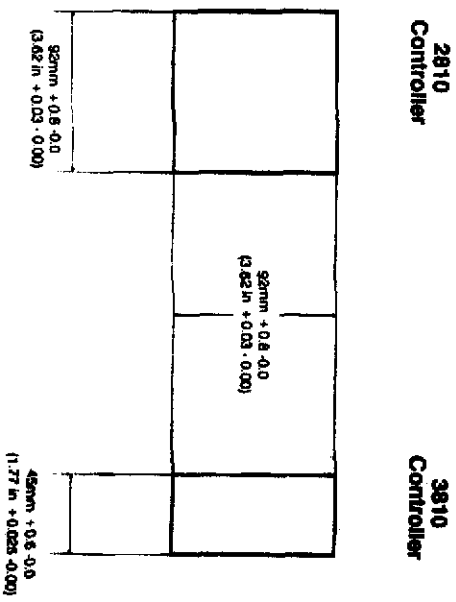


Figure 2-1 Panel Cut-out Dimensions

Several Controllers may be mounted side-by-side in a continuous cut-out, in which case the width of the cut-out (for a Controller) should be:

For 2810 Controllers:

- (96n - 4) millimetres
or
(3.78n - 0.16) inches

For 3810 Controllers:

- (48n - 4) millimetres
or
(1.89n - 0.16) inches

The Controller is 150mm (5.90 in) deep, measured from the rear face of the front panel. The front panel is 96.00mm (3.80 in) high. The 2810 Controller is 96.00mm (3.78 in) wide and the 3810 Controller is 48.00mm (1.89 in) wide. When panel-mounted, the Controller projects out 6.00mm (0.25 in) from the panel.

2.2.2 Panel-Mounting Procedure

1. Insert the rear of the Controller housing through the cut-out (from the front of the panel) and hold the Controller lightly in position against the panel.
2. Slide the mounting clamp into place on the Controller (see Figure 2-2) and push it forward until it touches the rear face of panel. Teeth on the arms which project to the rear of the clamp will engage with the ratchets moulded into the top and bottom surfaces of the Controller housing.
3. Gently tighten the screws in the clamp till the front panel is fitted snugly in the cut-out in the mounting panel.

CAUTION

Do not over-tighten the screws; this will distort the mounting clamp.

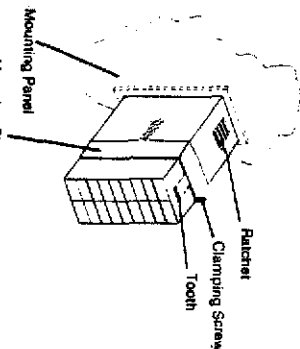


Figure 2-2 Panel-mounting a Controller

2.3 PANEL-MOUNTING A 3810 CONTROLLER WITH A REMOTE FRONT PANEL

The Remote Front Panel may be mounted on a rigid panel in the same manner as the standard Controller. The Remote Front Panel is 28.00mm (1.10 in) deep, measured from the rear face of the front panel. It is 96.00mm (3.8 in) high, 48.00mm (1.89 in) wide and, when panel-mounted, it projects 6.00mm (0.25 in) out from the mounting surface.

2.3.1 Mounting the Remote Front Panel

1. Remove the mounting clamp from the Front Panel by extracting the screw which holds it in place.
2. Insert the Remote Front Panel into the cut-out in the mounting panel.
3. Holding the Front Panel in position, re-attach the mounting clamp, securing the Front Panel in position.

2.3.2 Mounting the Controller

The Controller may be mounted in the same manner as the standard 3810 Controller (see Subsection 2.2.2 and Figure 2-2) or it may be secured with a Chassis Mounting Bracket (Product Code X76) as described in the following procedure (see also Figure 2-3):

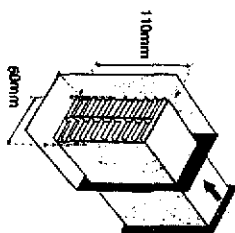


Figure 2-3 Chassis Mounting Bracket

1. Attach the Chassis Mounting Bracket to the mounting panel by means of suitable screws or bolts (maximum thread diameter = 4mm). Note that the Chassis Mounting Bracket may be positioned such that the Controller may be mounted either upright or on its side; in the latter case, the right side (as viewed from the front of the Controller) should be lowermost.
2. Insert the rear of the Controller housing through the aperture in the Chassis Mounting Bracket and attach it to the bracket by means of the mounting clamp, in the same manner as for mounting a standard Controller to a mounting panel (see Subsection 2.2.2).

2.3.3 Connecting the Controller to the Remote Front Panel

The Controller is connected to the Remote Front Panel by the cable supplied. *This cable should not run in close proximity to any power-carrying cables.*

1. Plug the two ends of the cable into the IDC sockets on the Remote Front Panel and the Controller (with the square plastic key on each cable plug engaging in the keyway in each socket).
2. Press the two plastic retainer clips together to secure the cable connector at each end of the cable.

2.4 REMOVAL OF THE CONTROLLER FROM ITS HOUSING

The Controller can be removed from its housing (for servicing purposes or to replace sub-assemblies), leaving the housing and back-wiring attached to the mounting panel.

WARNING

The mains (line) supply must be disconnected from the controller before any attempt is made to remove the controller from its housing.

CAUTION

The Controller contains a lithium battery and devices which are sensitive to electrostatic discharge. Whilst handling the Controller, precautions should be taken to minimise the risk of electrostatic discharge or short-circuiting of the battery.

To remove the Controller from its housing, proceed as follows:

1. With a flat-bladed screwdriver of appropriate size (1/4-inch), rotate the retaining screw (see Figure 2-4) anticlockwise until the screw thread is completely dis-engaged. This will partially move the Controller out of the housing and dis-engage the connections at the rear of the Controller (inside the housing).
2. Carefully pull the Controller forwards clear of the housing.

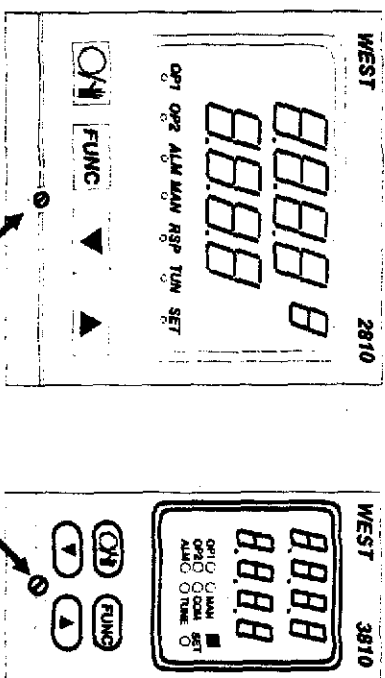


Figure 2-4 Location of Locking Screw

2.5 REPLACEMENT OF THE CONTROLLER IN ITS HOUSING

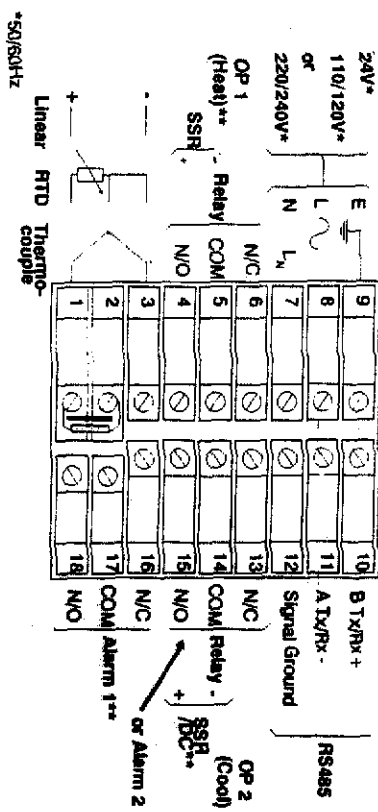
1. Carefully slide the Controller into its housing, ensuring that the Controller PCB(S) locate against the outside of the card guides moulded in the top and bottom of the housing.
2. Push the Controller firmly into place such that sound connection is made between the Controller PCB(S) edge connectors and the rear connections inside the housing.
3. Engage the thread of the retaining screw and tighten the screw until the Controller is securely in position in the housing.

2.6 CONNECTIONS AND WIRING

Connections for outputs and inputs are provided at the rear of the Controller housing. The connections to the rear terminals are shown in Figure 2-5 (for Controllers not equipped with Remote Set Point input) and Figure 2-6 (for Controllers equipped with Remote Set Point input).

CAUTION

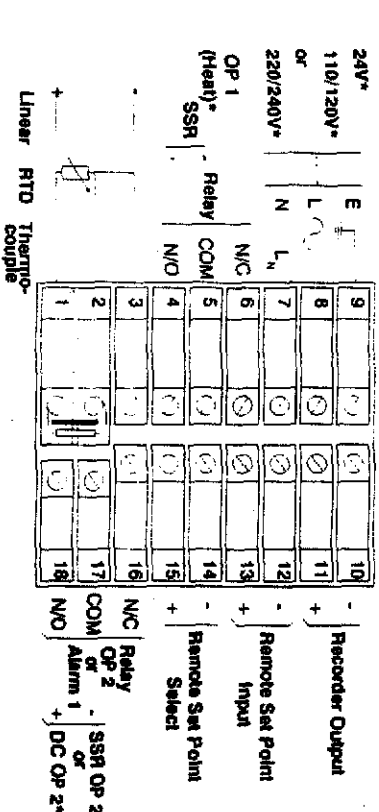
This equipment is designed for installation in an enclosure which provides adequate protection against electric shock.



^{***}50/60Hz

**Where DC Output 1 is fitted (Product Codes H21, H24, H61 and H64), this is connected to Terminals 14 & 15 and Output 2 Relay (Product Code C10) or Alarm 2 (Product Code C00---) is connected to Terminals 4, 5 & 6. Output 2 SSR (Product Code C50) uses Terminals 4 & 5. If DC Output 1, RS485 Communications and the Alarm 1 option are fitted, the Alarm output uses Terminals 4, 5 & 6.

Figure 2-5 Rear Terminal Connections (Standard)



^{*}50/60Hz

**Where DC Output 1 is fitted (Product Codes H21, H24, H61 and H64), this is connected to Terminals 17 & 18; Output 2 Relay (Product Code C10) or Alarm 1 (Product Code C000) is connected to Terminals 4, 5 & 6; Output 2 SSR (Product Code C50) uses Terminals 4 & 5.

Figure 2-6 Connections (RSP and/or Recorder O/P)

2.6.1 Mains (Line) Input

The controller is supplied to operate on 24V, 10W, 132V or 193 - 264V AC supplies (50/60Hz). Check that the installation mains voltage corresponds to that indicated on the product code label before connecting power to the controller. Local requirements regarding electrical installation should be rigidly observed. Ground terminals must be connected separately and must not be made common to the neutral termination. Consideration should be given to the prevention of access by unauthorised personnel to the power connections. The Ground terminal (Terminal 9) should be connected to a protective ground conductor before any other connections are made; this should remain connected at all times. Power should be connected via a two-pole switch and a fuse (1A for 110V - 132V and 193V - 264V, 5A for 24V operation) as shown in Figure 2-7.

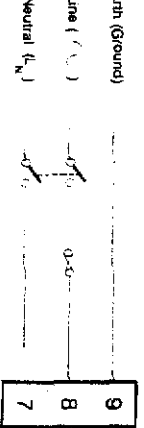


Figure 2-7 Mains (Line) Supply Connections

CAUTION

This equipment is designed for installation in an enclosure which provides adequate protection against electric shock. Local requirements regarding electrical installation should be rigidly observed. Ground terminals must be connected separately and must not be made common with the neutral connection. Consideration should be given to the prevention of unauthorised personnel from gaining access to the power terminations. The Ground terminal (9) should be connected to a protective ground conductor before any other connections are made and should remain connected at all times. Power should be connected via a two-pole isolating switch and a 1A (193 - 264V supply), 2A (100 - 132V supply) or 5A (24V supply) fuse, as shown in Figure 2-7.

2.6.2 Thermocouple Input

Thermocouple input connections are shown in Figure 2-8. The correct type of thermocouple extension leadwire or compensating cable must be used for the entire distance between the controller and the thermocouple, ensuring that the correct polarity is observed throughout. Joints in the cable should be avoided, if possible. All controllers supplied with a thermocouple input have a cold junction compensation unit connected across terminals 1 and 2. This unit should not be removed whilst the Controller is required to operate with a thermocouple input.

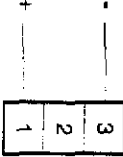


Figure 2-8 Thermocouple Input Connections

NOTE

Do not run thermocouple cables adjacent to power-carrying conductors. If the wiring is run in a conduit, use a separate conduit for the thermocouple wiring. If the thermocouple is grounded, this must be done at one point only. If the thermocouple extension lead is shielded, the shield must be grounded at one point only.

The colour codes used on the thermocouple extension leads are shown in Table 2-1.

2.6.3 Three-wire Resistance Temperature Detector (RTD) Input

RTD input connections are shown in Figure 2-9, with the compensating lead connected to Terminal 3. For two-wire RTD inputs, Terminals 2 and 3 should be linked. The extension leads should be of copper and the resistance of the wires connecting the resistance element should not exceed 5 ohms per lead (the leads should be of equal length).

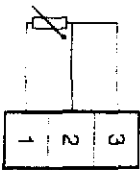


Figure 2-9 Three-wire RTD Input Connections

Table 2-1 Thermocouple Cable Colour Codes

Thermocouple Type	Cable Material	British (BS)	American (ASTM)	German (DIN)	French (NFE)
T	Copper Constantan	+ White - Blue	+ Blue - Red	+ Red - Brown	+ Yellow - Blue
J	Iron/Constantan	+ Yellow - Blue	+ White - Red	+ Red - Blue	+ Yellow - Black
K	Nickel Chromium Nickel Aluminium	+ Brown - Blue * Red	+ Yellow - Red * Yellow	+ Red - Green * Green	+ Yellow - Purple * Yellow
R	13% Copper 10% Copper Nickel	+ White - Blue * Green	+ Black - Red * Green	+ Red - White * White	+ Yellow - Green * Green
B	Platinum/Rhodium		+ Grey - Red * Grey		

* Colour of overall sheath.

2.6.4 DC Linear Inputs

Any one of a range of linear inputs can be accommodated on the Controller (see Appendix B). Connections for linear inputs are as shown in Figure 2-10.

2.6.5 Output 1 (Heat)

2.6.5.1 RELAY OUTPUT 1 (PRODUCT CODE H18-)

The Output 1 relay has contacts connected to the rear terminals on the Controller. The contacts are rated at 5A 240V AC with a resistive load. When the relay is energised, the front panel (1P) indicator is illuminated. The connections for the Output 1 relay are as shown in Figure 2-11. Refer also to Subsection 2.7.

2.6.5.2 SSR DRIVE OUTPUT 1 (PRODUCT CODE H5P-)

Controllers fitted with the SSR Output 1 produce a time-proportioned non-isolated DC signal (0V - 12V nominal, output impedance 250 ohms). This is suitable for driving the WEST 2210 Series Thyristor Units or other solid state relays with an isolated input. When Output 1 is ON, the front panel (1P) indicator will be illuminated. The connections are as shown in Figure 2-12.

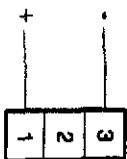


Figure 2-10 DC Linear Input Connections

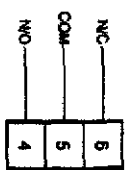


Figure 2-11 Relay Output 1 Connections

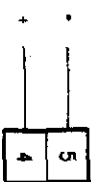
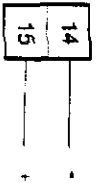


Figure 2-12 SSR Drive Output 1 Connections

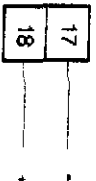
2.6.5.3 DC OUTPUT 1 (PRODUCT CODES H21, H24, H61 & H64)

Refer to Appendix B for details of these outputs.

Standard Controllers
Controllers with RSP Input and/or Recorder Output



NOTE: When this output is fitted to a Controller, Output 2 or Alarm 1 uses Terminals 4, 5 and 6.



NOTE: When this output is fitted to a Controller, Output 2 or Alarm 1 is connected to Terminals 4, 5 and 6.

Figure 2-13 DC Output 1 Connections

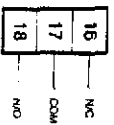
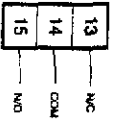
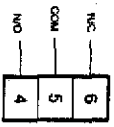
2.6.6 Output 2 (Cool)

If Output 1 is reverse-acting, Output 2 is direct-acting and vice versa.

NOTE

2.6.6.1 OUTPUT 2 RELAY (PRODUCT CODE --(C10--))

The Output 2 relay has single-pole double-throw contacts connected to the rear terminals as shown in Figure 2-14. The contacts are rated at 2A 240V AC with a resistive load. When the relay is energised, the front panel OP 2 indicator is set ON. Refer also to Subsection 2.7.



Controllers with DC Output 1

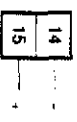
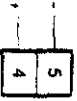
Standard Controllers

Controllers with Relay/SSR Input and/or Recorder Output

Figure 2-14 Relay Output 2 Connections

2.6.6.2 OUTPUT 2 SSR DRIVE (PRODUCT CODE --(C3H--))

Controllers with this output produce a time-proportioned non-isolated DC signal (0V/12V nominal, output impedance 250 ohms). This is suitable for driving the WEST 2200 Series Thyristor Units or other solid state relays with an isolated input. When Output 2 is ON, the front panel OP 2 indicator will be illuminated. The connections are as shown in Figure 2-15.



Controllers with DC Output 1

Standard Controllers

Controllers with Relay/SSR Output 1 + RSP Input and/or Recorder Output

Figure 2-15 Output 2 SSR Drive Connections

2.6.6.3 DC OUTPUT 2 (PRODUCT CODES C21, C24, C61 OR C64)

Refer to Appendix B for details of these outputs.

Standard Controllers
Controllers with RSP Input and/or Recorder Output

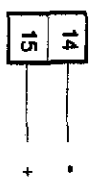


Figure 2-16 DC Output 2 Connections

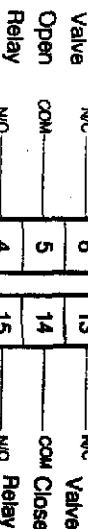
2.6.7 VMD Open Loop Output

When this output is fitted, the Pre-Tune/Self-Tune facilities are not available. The following additional options are available:
RS485 Serial Communications only
Alarm 1 only
Remote Set Point Input and/or Recorder Output

NOTE

This output cannot be re-configured to any other type of output. The connections for a VMD Open Loop Output are shown in Figure 2-17. The Controller is designed to switch on either the Output 1 relay or the Output 2 relay (i.e. to open or close the valve). However, under fault conditions, both relays can be switched on simultaneously. An interlock can be provided for safety purposes (see Figure 2-18). This connects the supply to the motor via the "normally-closed" contacts on the relays. Refer also to Subsection 2.7.

Standard Controllers



Controllers with RSP Input and/or Recorder Output

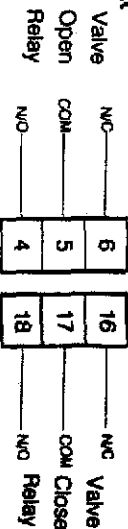
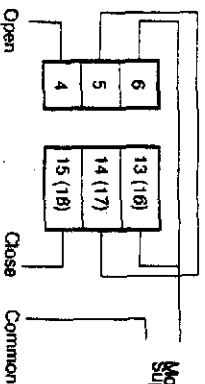


Figure 2-17 VMD (Open Loop) Connections



Terminal numbers shown in brackets are the variations for Controllers with Remote Set Point Input and/or Recorder Output.

Figure 2-18 VMD (Open Loop) - with Interlock

2.6.8 Alarm 1 Output - Optional (Product Codes C-46 to C-51)

The relay connections for the Alarm 1 output are shown in Figure 2-19. Details of the operations of the various types of alarms may be found in Subsection 4.6.

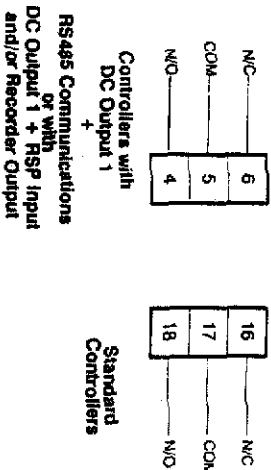


Figure 2-19 Alarm 1 Output Connections

2.6.9 Alarm 2 Output - Optional (Product Codes C00-46 to C00-51)

The relay connections for the Alarm 2 output are shown in Figure 2-20. Details of the operations of the various types of alarms may be found in Subsection 4.6.

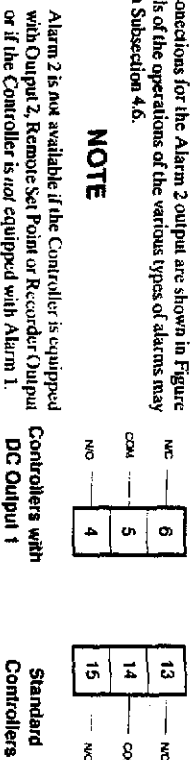


Figure 2-20 Alarm 2 Output Connections

2.6.10 Remote Set Point Input - Product Codes X04(40), X05(40), X37(40) and X38(40)

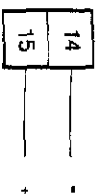
REMOTE SET POINT INPUT SELECTION

The connections for the Remote Set Point Input Selection are shown in Figure 2-21. The Remote Set Point input is selected by applying 5V DC to Terminals 14 and 15.

NOTE

Do not run leads adjacent to any power-carrying conductors. If the wiring is run in a conduit, use a separate conduit for the input wiring. If the input wiring is earthed, this should be done at one point only.

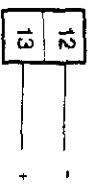
Figure 2-21 Remote Set Point Selection Connections



2.6.10.2 REMOTE SET POINT INPUT

The connections for the Remote Set Point input are shown in Figure 2-22. This input is used to receive the voltage or current level which defines the Remote Set Point value. The device connected to this input may be either a current source or a voltage source. Refer to Appendix B for details of the range of Remote Set Point inputs available.

Figure 2-22 Remote Set Point Input Connections



2.6.11 Recorder Output (Product Codes X12, X18, X19 and X20)

NOTE

This Option is not available with RS485 Communications (Product Code X00). Also, when this option is fitted, it is possible to have either Output 2 or Alarm 1 output but not both. The connections for the Recorder Output are shown in Figure 2-23.

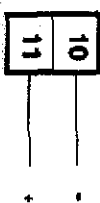


Figure 2-23 Recorder Output Connections

2.6.12 RS485-Compatible Serial Communications Link

Controllers which are fitted with the RS485 Communications Option use terminals 10, 11 and 12 as shown in Figure 2-24.

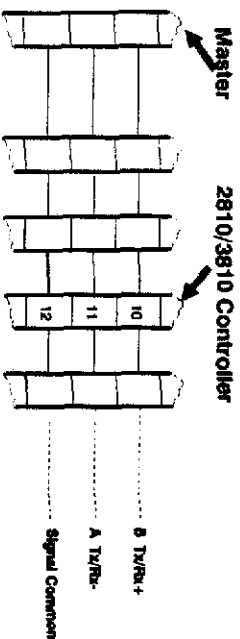


Figure 2-24 RS485 Connections

2.7 INDUCTIVE LOADS; EXTERNAL CONTACTORS AND MAINS-OPERATED RELAYS

WARNING

Operating the Controller with inductive loads and without the appropriate protection components may give rise to a hazard owing to high-voltage transients which may occur during the switching cycles. Removal of the Controller's internal snubber components could give rise to a serious hazard. Mark IV Industries do not accept responsibility for any damage which may occur as a consequence of the unauthorised removal of these components.

2.7.1 General Notes

The standard relay contacts fitted in the Controller are suitable for AC supply voltages in the range 24V to 240V. The Output 1 relay is rated at up to 5A with a resistive load and up to 1A with an inductive load. The Alarm and Output 2 relays are rated at up to 2A with a resistive load and up to 1A with an inductive load. The Model 2810 and 3810 Controllers contain voltage-dependent resistors (VDRs) across all relay contacts; these protect the internal circuits for all loads up to the maximum rating. No external protection components are necessary unless an external switch or contact is fitted in series with the Controller relay contacts (see Subsection 2.7.2).

2.7.2 An External Switch in Series with an External Inductive Load

Damage may be caused to the Controller if the contacts of a switch, relay or contactor are connected externally in series with the Controller relay contacts, as shown in Figure 2-25.

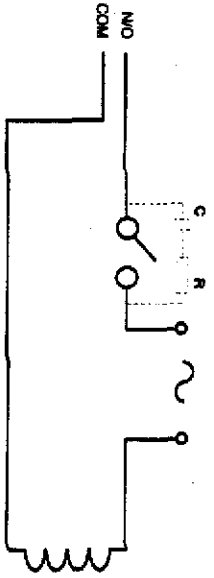


Figure 2-25 External Switch/Inductive Load in Series

Under these conditions, the external contacts may operate whilst the Controller relay contacts are closed (i.e. when the internal protection components are short-circuited and, therefore, ineffective).

In applications in which it is necessary to fit the contacts of an external switch, relay or contactor in series with the Controller relay, a suitable VDR or a snubber network must be fitted, either across the inductive load or across the unprotected contacts (the components shown in dotted outline in Figure 2-25). The values shown in Table 2-2 may be used for these components.

Table 2-2 Protection Network Component Values

Load Current	Value of C ₁ (F)	West Part No.	Value of R(Ω)	West Part No.
70mA	0.047	22206	22	23220-304
150mA	0.100	22207	47	23470-304
500mA	0.220	22208	47	23470-304
1A	0.470	22209	47	23470-304

NOTE

All capacitors should conform to VDE (Class X) and should be suitable for operation at 260V AC. All resistors (wiredwound or Allen Bradley Type HB) should have a minimum rating of 2 watts.

SECTION 3

OPERATING INSTRUCTIONS

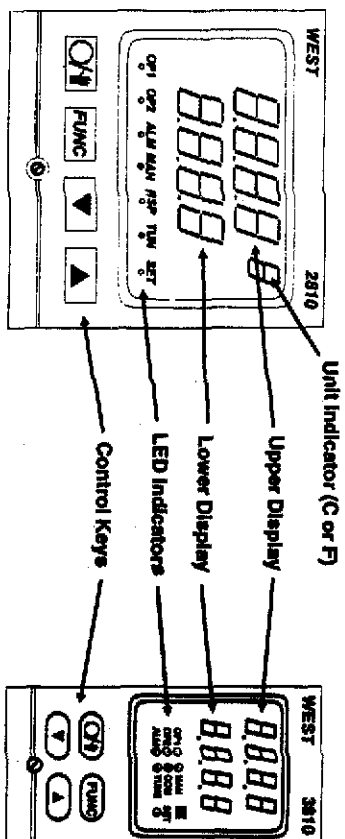


Figure 3-1 2810/3810 Controllers - Front Panels

3.1 INTRODUCTION

These instructions are based on the assumption that the controller has been set up and configured and is in User Mode. In User Mode, both the process variable value (shown in the upper display) and the set point value (shown in the lower display) may be viewed. The set point value may be adjusted; the process may also be brought under manual control (unless Auto/Manual selection has been disabled).

3.2 DISPLAYS (USER MODE)

Upper Display: This displays the value of the process variable or (if Set Point adjustment is selected) the current value of the Set Point.

Lower Display: This displays the set point value. It is used alternatively to display parameter legends:

- SP - set point adjustment (if this facility is selected)
- Pxxx - for Manual Control (xxx indicates the power output). This parameter is skipped if Auto/Manual selection is disabled.

NOTE

On the 3810 Controller, the units for the process variable (e.g. °F or °C) are shown on a label visible through a window on the lower right of the display group.

3.3 FRONT PANEL INDICATORS

OP 1 This indicates the state of the Output 1 relay or SSR drive:

- ON = relay energised or SSR drive ON
 - OFF = relay de-energised or SSR drive OFF
- or (on Controllers fitted with the VMD Output Option) this indicator being ON indicates that the valve is opening.

OP 2

Optional - This indicates one of:

- (a) the state of the Output 2 relay or SSR drive:

ON = relay energised or SSR drive ON
OFF = relay de-energised or SSR drive OFF

- (b) flashes to indicate an Alarm 2 condition, or

(c) (on Controllers fitted with the VMD Output Option) this indicator being ON indicates that the valve is closing.

ALARM

(Optional) This indicator flashes to indicate an Alarm condition (see Subsection 4.6 for details of alarm operation).

RSP

Optional - This indicator is ON when the Remote Set Point input is selected.

MAN

Not applicable if Auto/Manual selection is disabled - This flashes when Manual Control has been selected. In this mode, the power output value (in the range 0% - 100% for Controllers with Output 1 only, or -100% - +100% for Controllers with Output 1 and Output 2) is shown on the lower display.

SET

This indicates that Set-Up Mode is selected (see Section 4 for details of Set-Up Mode).

TUNE

Self-Tune and Pre-Tune indicator - see Subsection 4.5.

3.4 FRONT PANEL CONTROLS



Raise key: Used to increase the value of the Set Point or (in Manual Control Mode) the value of output power.



Lower key: Used to decrease the value of the Set Point or (in Manual Control Mode) the value of output power.



Auto/Manual Control Key: Used to select/de-select Manual Control of power output.



In User Mode, used to select or de-select adjustment of the Set Point.

3.5 SELF-TEST PROCEDURE

When the Controller is powered-up, a self-test procedure is automatically started, during which all LED segments in the two front panel displays appear and all LED indicators for the facilities fitted are ON. When the self-test procedure is complete, the controller reverts to normal operation.

3.6 NORMAL DISPLAY

On completion of the self-test procedure, the Controller is in normal display mode. The upper display indicates the current value of the process variable and the lower display indicates the current value of the Set Point.

3.7 SET POINT ADJUSTMENT

3.7.1 Set Point or (on Controllers with RSP Input) Local Set Point

To adjust the value of the set point, proceed as follows:

1. Depress the FUNC key. The lower display will show the legend:

SP

on standard Controllers, or

LSP

on Controllers fitted with RSP input. The upper display will show the current value of the set point.

2. Adjust the set point value using the Raise and Lower keys as applicable.

NOTE

When either the Raise or Lower key is depressed momentarily, the set point value will be incremented or decremented (as appropriate) by one unit in the least significant digit. If the key is held depressed for longer than one second, the least significant digit of the set point value is incremented or decremented (as appropriate) at the rate of 25 per second. If the key is held depressed for longer than 10 seconds, the second least significant digit of the set point value will change at the rate of 25 per second.

3. When the set point has been adjusted to the required value, return to the normal display mode by depressing the FUNC key.

3.7.2 Remote Set Point

When the Remote Set Point input is selected, the lower display will show the legend:

rSP

and the upper display will show the value of the Remote Set Point, as defined by the value of the voltage/current received at Terminals 12 and 13. This is a Read Only display and cannot be adjusted by the Controller.

3.8 RAMPING SET POINT

This facility, when enabled, is activated at start-up (ramping from the Process Variable) and thereafter whenever

SRP

the Set Point value is changed. The ramp rate is defined by the value of the Ramping Set Point Rate (RP) parameter (see Section 4)

NOTES

1. If $RP > 9999$, the Ramping Set Point facility is disabled; at start-up, the internal set point will go immediately to its final value.
2. The Auto Pre-Tune facility is disabled whilst the Ramping Set Point facility is enabled. If both modes are selected on power-up, the Controller will enter Ramping Set Point mode and the Auto Pre-Tune facility will be inhibited. If the Self-Tune facility has been selected, it will commence only after the set point has finished ramping.

NOTE

Manual Control is not applicable if the Auto/Manual selection facility is disabled.

CAUTION

Extreme caution should be exercised in the use of the Manual Control facility to avoid the possibility of damage to either the process or the process equipment.

3.9.1 Entering and Leaving Manual Control

To select Manual Control, press the Auto/Manual key:



During Manual Control, the MAN front panel indicator will flash continuously. The lower display will show the current value of power output in the form:

P 100

and the upper display will show the current value of the process variable. The value of output power may be adjusted using the Raise and Lower keys as required. The output power value can be varied in the range 0% - 100% for controllers fitted with Output 1 only, or in the range -100% - +100% for controllers fitted with both Output 1 and Output 2.

NOTES

1. On Controllers with the VMD Output Option, in Manual Control Mode, the Raise and Lower keys are used as follows:

(a) The Raise key is used to energise the Output 1 relay and will cause the OP 1 indicator to go ON.

(b) Depression of the Lower key will energise the Output 2 relay and will cause the OP 2 indicator to go ON.

Output 2 (the Lower key) will be used in the reverse sense to Output 1 (the Raise key) i.e. either one is used to open the valve, the other is used to close the valve.

2. If the Controller is powered-down whilst in Manual Control mode, it will remain in Manual Control mode when power is restored to the Controller. The power output level will be as it was at the instant of power-down.

To exit from Manual Control, depress the Auto/Manual key, whereupon the Controller will return to Automatic Control.

3.9.2 Manual Control Displays

Whilst the process is under Manual Control, the displays described above will be shown. If the FUNK key is depressed, the upper display will show the current set point value which may be adjusted as described in Subsection 3.7.

Depressing the FUNK key a second time causes the display to revert to showing the power output value.

3.10 DEFAULT PARAMETER INDICATION

If the Controller is operating with all control parameters set to their default values, the upper display will show a decimal point after each digit of the displayed value.

See Section 4 for details of setting up control parameter values.

3.11 REMOTE CONTROL VIA THE RS485-COMPATIBLE LINK

If the Controller is fitted with the RS485-compatible serial communications facility (Option X00) and this has been enabled (see Section 5), parameters may be changed via this communications link.

SECTION 4 SET-UP MODE

4.1 CONTROLS AND DISPLAYS

4.1.1 Displays

Upper Display: This shows the current value/setting of the selected parameter.

Lower Display: This shows the legend for the currently-selected parameter (see Table 4-1).

4.1.2 Controls



Raise Key: Used to increment (raise) the value of the selected parameter. Depression of this key will either increment the value by 1 or will cause the parameter to be set to the next higher value in a pre-defined set of values. If this key is held down for longer than one second, a continuously-variable parameter will be incremented by 25 units per second; if the key is held down for longer than ten seconds, the parameter will be incremented at the rate of 250 units per second. This key and the Lower Key are also used to enter/leave Set Up Mode. During power-up, this key and the FUNC key are used to select Configuration Mode (see Section 5).



Lower Key: Used to decrement (lower) the value of the selected parameter. Depression of this key will either decrement the value by 1 or will cause the parameter to be set to the next lower value in a pre-defined set of values. If this key is held down for longer than one second, a continuously-variable parameter will be decremented by 25 units per second; if the key is held down for longer than ten seconds, the parameter will be decremented at the rate of 250 units per second. This key and the Raise key are also used to enter/leave Set Up Mode.



Auto/Manual Key: This key serves no function in Set Up Mode, but is used with the FUNC key to activate the Pre-Tune facility (see Subsection 4.6.1).



This key is used to select the parameter to be viewed/adjusted. Successive depressions of this key cause the Controller to display the parameters in the sequence shown in Table 4-1. It is also used with the Auto/Manual key to activate the Pre-Tune facility (see Subsection 4.6.1).

4.2 TO ENTER SET-UP MODE

With the Controller in User Mode, the upper display showing the current value of the process variable and the lower display showing the current value of the set point, proceed as follows:

1. Depress and hold down the Raise and Lower pushbuttons simultaneously until the front panel SET indicator starts to flash.
2. Within 3 seconds of the SET indicator starting to flash, depress and hold down the FUNC pushbutton until the SET indicator is continuously ON.

The Controller is now in Set-Up Mode.

NOTE

When the Controller is in Set-Up Mode, if one minute elapses during which no key is operated, the Controller will return automatically to User Mode.

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Section 4
Setup Mode

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This parameter is used to set the VM which the VM is to be ignored.

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The Model 3 parameter is used to set the model of the VM.

4.4.34

This parameter is used to set the VM.

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of the oscillation
small?

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No

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adjusted until the oscil-
lation ceases.

DP 1 & DP 2 Fitted

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Figure 4-3

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1/e devt

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direct:ac

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C--evation /
direct:ac

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1/e devt

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direct:ac

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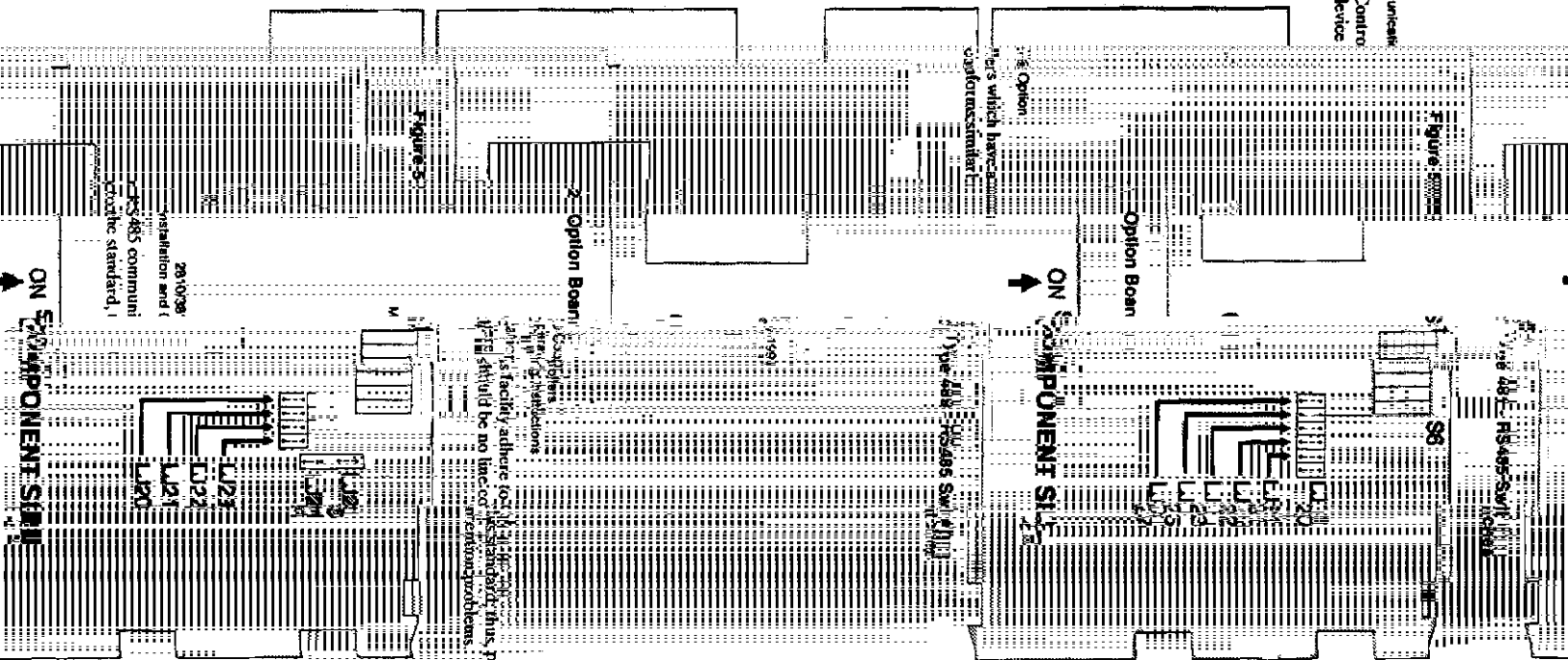


Figure 5-10

Option Board
Please refer to the RS485 communication standard, and the master device, for the details of the RS485 communication standard. The master device should be installed in the master device location. The master device should be installed in the master device location. The master device should be installed in the master device location.

MA-0048

MA-0045

Channel No.	S4	S3	S2	S1
1	X	X	X	X
2	X	X	X	X
3	X	X	X	X
4	X	X	X	X
5	X	X	X	X
6	X	X	X	X
7	X	X	X	X
8	X	X	X	X
9	X	X	X	X
10	X	X	X	X
11	X	X	X	X
12	X	X	X	X
13	X	X	X	X
14	X	X	X	X
15	X	X	X	X

Section 5
RS485 Communications Option

Switch

S4 S3 S2 S1

Section 5
RS485 Command

(P) $\{P\}$ 5 A *

(C) $\{C\}$ $\{data\}$ L (N)

No spaces are permitted in the message.

Type 1 Message

This message is used to address a controller.

An inactive controller will respond with a Type 2 Message.

Type 2 Message

This type of message is used to address a controller.

(Hex) $\{data\}$ L (N)

(Hex) $\{data\}$ L (N)

The reply from the controller will be a Type 3 Message.

(Hex) $\{data\}$ L (N)

A parameter check will be performed on the message from the controller.

(Hex) $\{data\}$ L (N)

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Table 5-3 (data) Field Format/Decimal Point Posn.

First Four Digits	Fifth Digit
+abcd	0
+abc.d	1
+ab.cd	2
+a.bcd	3
+a.b.c.d	4*
-abcd	5
-abc.d	6
-ab.cd	7
-a.bcd	8
-a.b.c.d	9*

* These values indicate that default parameter values are being used.

SECTION 6, CONFIGURATION MODE

In this mode, the operator may perform the following functions:

- Select input range
- Select Output 1 action (reverse-acting or direct-acting)
- Select alarm type
- Select secondary output usage (either as an alarm output or as Output 2 (Cool))

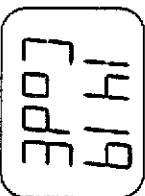
All parameters defined in this mode are stored in a high-integrity EEPROM.

6.1 ENTERING CONFIGURATION MODE

Configuration Mode may be selected as follows:

1. If the Controller is powered up, power-down.
2. Power Up and, during the power-up and self-test routine, depress and hold the FUNC and Raise keys simultaneously.

Upon completion of the self-test routine, the Controller will enter Configuration Mode and will initially display the *currently-configured* input range. For example::



This is one of the displays for Input Range Selection (see Subsection 6.2.1). Release the FUNC and Raise keys. Each depression of the FUNC key will now cause the displays to step through the sequence of Configuration Mode functions:

- Input Range selection
- Output 1 action
- Alarm 1 type selection
- Secondary output usage
- Alarm 2 type selection (if Output 2 usage is set to Alarm)

These functions are accessed in a cyclic manner i.e. depression of the FUNC key when the last function in the sequence is selected will cause the Input Range Selection displays to appear again.

6.2 CONFIGURATION MODE FUNCTIONS

6.2.1 Input Range Selection

When this function is selected, the initial display will be of the form:



where the upper display shows the numeric part of a T-.... product code. This will be for a Thermocouple/DC Linear input, or an RTD input - dependent upon the setting of the switch S1 on the CPU Board (see Subsection 7.2 and Table 7-1). The input ranges available are:

Thermocouple-1/DC Linear-22 Input		RTD Input **	
Type	Range	Code	Code **
R	0 to 1650°C	T1127	T2221
R	32 to 3000°F	T1128	T2222
S	0 to 1650°C	T1227	T2229
S	32 to 3002°F	T1228	T2230
J	0 to 205°C	T1315	T2231
J	32 to 401°F	T1416	T2234
J	0 to 450°C	T1417	T2295
J	32 to 842°F	T1418	T2296
J	0 to 760°C	T1419	T2297
J	32 to 1400°F	T1420	T2298
T	-200 to + 260°C	T1525	T7201
T	-328 to + 500°F	T1526	T7202
T	0 to 360°C	T1541	
T	32 to 500°F	T1542	
K	0 to 760°C	T1710	
K	32 to 1400°F	T1720	
K	0 to 1371°C	T1723	
K	32 to 2500°F	T1724	
L	0 to 205°C	T1815	
L	0 to 450°C	T1817	
L	0 to 760°C	T1819	
B	212 to 3300°F	T1934	
B	100 to 1830°C	T1938	
DC	0 - 20mA	T3413	
DC	4 - 20mA	T3414	
DC	0.2 - 1V	T4415	
DC	1 - 5V	T4418	
DC	0 - 50mV	T4413	
DC	0 - 1V	T4414	
DC	0 - 5V	T4415	
DC	10 - 50mV	T4499	

** For break protection selection, see Table 7-1.

** For CPU Board switch settings, see Table 7-1.

The operator may select the required input product code as follows:

1. Use the Raise/Lower keys to step through (on the upper display) the input product codes available in numerical order of product code and in a cyclic manner. As soon as the upper display is changed, it will flash (indicating that the code shown has not been confirmed for selection).
2. When the desired product code is displayed, depress the Auto/Manual key to confirm selection. The upper display will cease to flash.

NOTE

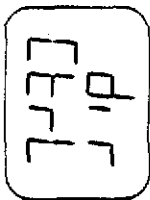
If the upper display flashes for more than ten seconds without any key activity, it will revert to its original (static) display.
 Whilst this function's displays are shown, depression of the FUNC key will cause selection of the Output 1 Action function.

6.2.2 Output 1 Action

Selection of this function will cause the displays to show initially:



Depression of the Raise or Lower key will cause the Controller to show a flashing display:



Subsequent repeated depressions of the Raise or Lower key will cause the Controller to alternate between these two displays. When the required action is displayed, depress the Auto/Manual key to confirm selection. The upper display will cease to flash.

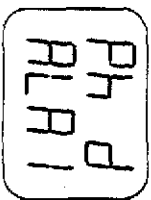
NOTE

If the upper display flashes for more than ten seconds without any key activity, it will revert to its original (static) display.

Whilst this function's displays are shown, depression of the FUNC key will cause selection of the Alarm 1 Type function.

6.2.3 Alarm 1 Type

Selection of this function will cause an initial (static) display:



The alarm type may be selected as follows:

1. Use the Raise/Lower keys to step through, in a cyclic manner, the following sequence on the upper display:

Ph d	Process High Alarm - Direct-acting (C-48 or C00-48)
Ph r	Process High Alarm - Reverse-acting (C-49 or C00-49)
DE d	Deviation Alarm - Direct-acting (C-50 or C00-50)
DE r	Deviation Alarm - Reverse-acting (C-51 or C00-51)
BR d	Band Alarm - Direct-acting (C-47 or C00-47)
BR r	Band Alarm - Reverse-acting (C-46 or C00-46)
none	No alarm type set

As soon as the upper display is changed, it will flash (indicating that the displayed alarm type has not been confirmed for selection).

2. When the desired alarm type is displayed, confirm the selection by depressing the Auto/Manual key, whereupon the upper display will become static.

NOTE

If the upper display flashes for more than ten seconds without any key activity, it will revert to its original (static) display.

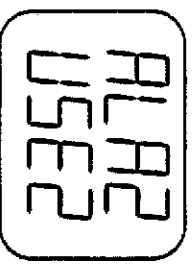
Whilst this function's displays are shown, depression of the FUNC key will cause selection of the Secondary Output Usage function.

6.2.4 Secondary Output Usage

Selection of this function will cause an initial (static) display:



indicating that the secondary output is to be used as Output 2 (Cool). Depression of the Raise or Lower key will cause the Controller to show the flashing display:



this display indicating that the secondary output is to be used for Alarm 2. Subsequent depressions of the Raise or Lower key will cause the Controller to alternate between these two flashing displays. When the required usage is shown, depress the Auto/Manual key to confirm selection, whereupon the display will cease to flash.

NOTE

If the upper display flashes for more than ten seconds without any key activity, it will revert to its original (static) display.

Whilst this function's displays are shown, depression of the FUNC key will cause selection of either:
(a) the Alarm 2 Type function (if Secondary Output Usage is currently set to Alarm 2), or
(b) a return to the Input Range Selection function.

6.2.5 Alarm 2 Type

Selection of this function will cause an initial static display:



The Alarm 2 Type may be selected as follows:

1. Use the Raise/Lower keys to step through, in a cyclic manner, the same sequence on the upper display as for Alarm 1 (see facing page). As soon as the upper display is changed, it will start to flash (indicating that the displayed alarm type has not been confirmed for selection).

2. When the desired alarm type is displayed, confirm the selection by depressing the Auto/Manual key, whereupon the upper display will become static.

NOTE

If the upper display flashes for more than ten seconds without any key activity, it will revert to its original (static) display.

Whilst this function's displays are shown, depression of the FUNC key will cause selection of the Input Range function.

6.3 CHANGING INPUT TYPE

If it is required to change the type of input (Thermocouple/DC Linear to RTD or vice versa), this may be achieved by altering the setting of switch S1 on the CPU Board; this switch is accessible through one of the ventilation slots on the underside of the Controller (see Figure 5-1); the setting may be changed using a thin-bladed screwdriver. The required input range may then be selected as described in Subsection 5.2.1. When changing between thermocouple, RTD and DC input, it may be necessary to alter switch settings on the CPU Board - see Table 7-1.

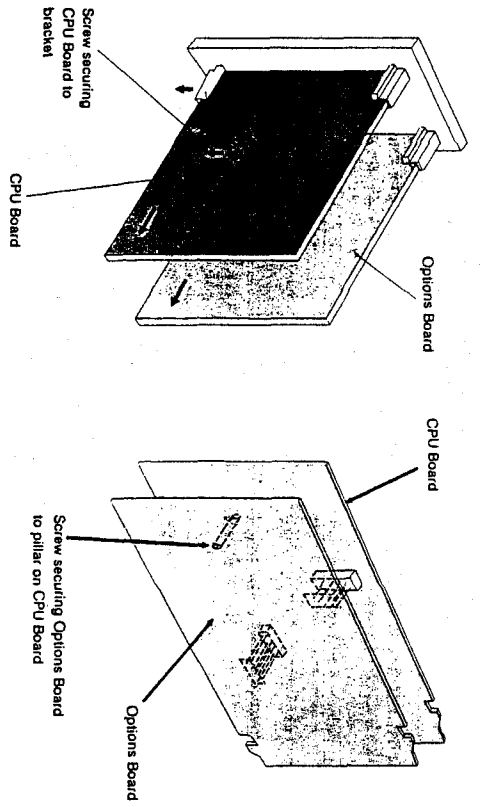


Figure 7-1 Detaching the PCBs from the Front Panel

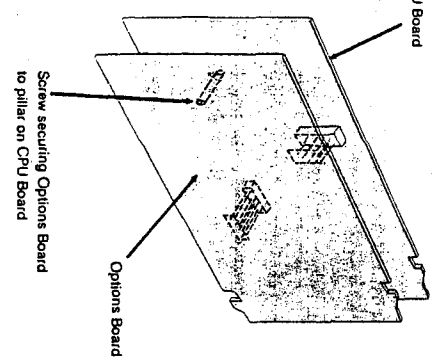


Figure 7-2 Separating the Two PCBs

7.2 SELECTING THERMOCOUPLE BREAK PROTECTION AND DC INPUT RANGE

The Thermocouple Break Protect (i.e. output action if a break is detected in the thermocouple input connection) is selected by means of the DIL switch on the CPU Board (see Figure 7-3). Switch settings are as shown in Table 7-1.

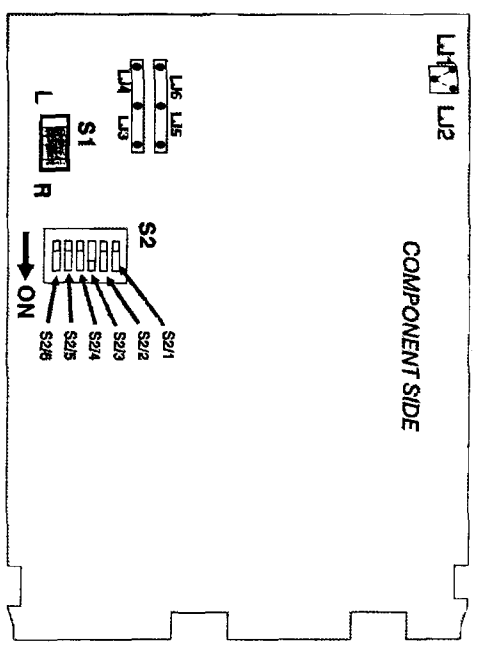


Figure 7-3 CPU Board Link Jumpers

Table 7-1 Input Type/Break Protection Selection

Product Code	Input/Break Protection Type	S1	S2/1	S2/2	S2/3	S2/4	S2/5	S2/6
T1---	Upscale	R	OFF	ON	OFF	ON	OFF	OFF
T1...21	Downscale	R	OFF	ON	ON	OFF	OFF	OFF
T1...22	No protection	R	OFF	ON	OFF	OFF	OFF	OFF

See Subsection 6.2.1 for input range selection.
See Subsection 6.3 for fitting the Cold Junction Compensation sensor.
See Subsection 7.4 for °F/°C indication.

RTD Input Selection (selected by S2/1 only):

Product Code	S1	S2/1	S2/2	S2/3	S2/4	S2/5	S2/6
T2... & T7...	L	OFF	ON	*	*	OFF	OFF

* Switches S2/3 and S2/4 may be set to either position.
See Subsection 6.2.1 for input range selection.
See Subsection 6.3 for Cold Junction Compensation sensor removal.

DC Input Selection:

Product Code	S1	S2/1	S2/2	S2/3	S2/4	S2/5	S2/6
T4415, T4434, T4444 & T4445	R	OFF	OFF	OFF	OFF	ON	OFF
T4443 & T4499 (Upscale Break Protection) *	R	OFF	OFF	OFF	OFF	ON	ON

* For Downscale and no Break Protection, see switch settings for T1...21 and T1...22 above.
See Subsection 6.2.1 for input range selection.

7.3 SELECTING OUTPUT TYPE

Selection of the required Output type and output usage is by means of link jumpers on the CPU Board (see Figure 7-3 and Table 7-2).

Table 7-2 Output Type Selection

Output Type(s)	Product Code	Usage	CPU Board Link Jumpers
SSR	H50...C...	Output 1	Fit link jumpers L4 and L5
	H2...C50..	Output 2	
	H6...C50..	Output 2	
Relay	All other codes	Output 1	Fit link jumpers L3 and L5
		Output 2	
		Alarms	

7.4 CHANGING INPUT UNITS FROM °C TO °F OR VICE VERSA

On the 2810 Controller, if, during Configuration Mode (see Section 5), an input range is changed from °C to °F or vice versa, the positions of link jumpers on the Front Panel/Display PCB (see Figure 7-4) will need to be changed. The link jumper settings are shown in Table 7-3.

On the 3810 Controller, the units indicator is a label positioned below and to the right of the displays; this is accessible from the rear of the Front Panel assembly and can be changed easily once the Controller has been withdrawn from its housing.



Figure

7.5 C

The Optio
for this Op



Section 7
Internal Link/Switch

7.7 RS485 COMMUNICATION

This Option's Board is supplied in one of four

- (1) Communications Option + Output 2 link jumper
- (2) Communications Option + Output 1 link jumper
- (3) Communications Option + Output 2 link jumper
- (4) Communications Option + Output 1 link jumper
- (5) Communications Option + All link jumpers
- (6) Communications Option only

Figure 7-7 shows the switches and link jumper is not supplied, the associated link jumpers (or reverse) is the opposite of that for Output are shown in Table 7-6. Switch functions are

Product Code	L120	L121	L122	L123	L124	L125	L126	L127	L128	L129	L130
C0930	P										
C1850	X										
C0930	X										
C1850	P										
C1850	X										
C1850	X										
C1850	X										
C1850	X										
C1850	X										
C1850	X										

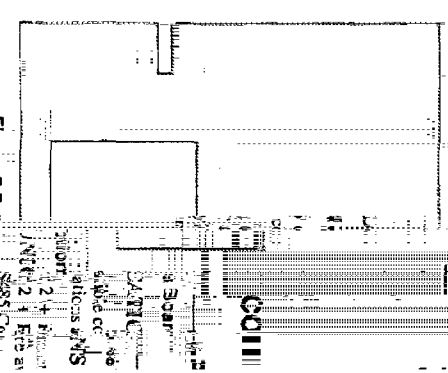


Figure 7-7

7.8 DC Output/RS485 COMM

This Option's Board includes both an RS485

- (1) DC Output 1 + Relay (or SSR)
- (2) Relay (or SSR) Output 1 + DC
- (3) DC Output 1 + Alarm 1 (Relay)
- (4) DC Output 1 + RS485 Commu

Table 7-11

Link Jumper

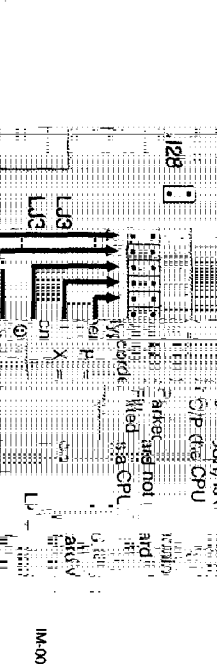
Link	J21	J22	J23	J24	J25	J26	J27	J28
Options	P	P	P	P	P	P	P	P
COMF	P	P	P	P	P	P	P	P
Serial	P	P	P	P	P	P	P	P
Relay	P	P	P	P	P	P	P	P

Table 7-12

Link Jumper

Link	J29	J30	J31	J32	J33	J34	J35	J36
Options	P	P	P	P	P	P	P	P
COMF	P	P	P	P	P	P	P	P
Serial	P	P	P	P	P	P	P	P
Relay	P	P	P	P	P	P	P	P

Figure 7-1



7.11 CHAF

On the CPU Board, locate the link jumper and the Controller Board.

7.12 ASSE

7.12.1 FI

1. Hold the Controller Board in place.
2. Carefully align the pins of the Controller Board with the pins of the CPU Board.
3. Insert the Controller Board into the CPU Board.

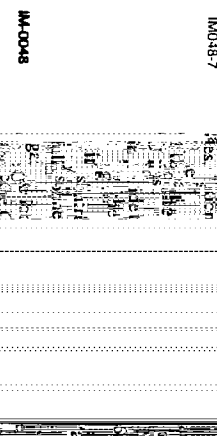
7.12.2 FFI

1. Align the pins of the FFI Board with the pins of the CPU Board.
2. Push the FFI Board into the CPU Board.
3. Insert the FFI Board into the CPU Board.

7.12.3 FI

1. Carefully align the pins of the FI Board with the pins of the CPU Board.
2. Push the FI Board into the CPU Board.
3. Engage the pins of the FI Board into the CPU Board.

Figure 7-1



Appendix A Specifications

Appendix A Specifications

Recorder Output (to Output Relay)

Resolution:

Accuracy:

Alarm 1 and Alarm Alternative config:

Alarm Type

Process High Alarm

Band Alarm

+ve deviation direct

-ve deviation direct

+ve deviation reverse

-ve deviation reverse

Relay:

RS485 COMMUNIC

Three-wire transmits Stable conform to EIA Std

CONTROL

Self-Tune/F

Proportional

Cycle Time

Relative Gain

Overlap/De

the set pt. in the range 0% - 100% Control

1/2, 1, 2, 4

1/2, 1, 2, 4

0.125 x (20)

20% to

May 1991

Installation and Operating

28 10/3810 Control

4 - 20mA or 0 - 20mA

1 - 5V or 0 - 5V output

> 10 bits

±0.5% of span

±0.025%/°C

Relay Energised

Set Point R

Proportional

Cycle Time

Relative Gain

Overlap/De

MODE-A

MODE-B

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

28 10/3810 Control
Installation and Operating

10 second

and OFF

Controlled with VMD Open Loop

no OFF setting for this configuration

10 second

0.1% - 10% of span

20°C ± 2°C

120V or 240V ± 1% 50/60Hz ± 1%

< 10Ω

< 0.1Ω per lead, both leads equal

60% - 70%

0°C + 50% (operating)

-20°C + 60% (storage)

193V - 264V @ 50/60Hz

10MV - 132V @ 50/60Hz

< 10MΩ

< 5Ω per lead (equal resistance in each lead)

Typically ±1.5% of span, ±1 lead

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

IM-0048

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IM-0048

IM-0048

IM-0048

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IM-0048

IM-0048

IM-0048

281Q281Q Controller
Installation and Operating Instructions

May 1991

Light-emitting diode (LED) display shows
 * Four-digit seven-segment display
 * parameter

Four control keys:

- Auto/Manual Select
- Function Select
- Raise
- Lower

Front Panel Controls

Dimensions

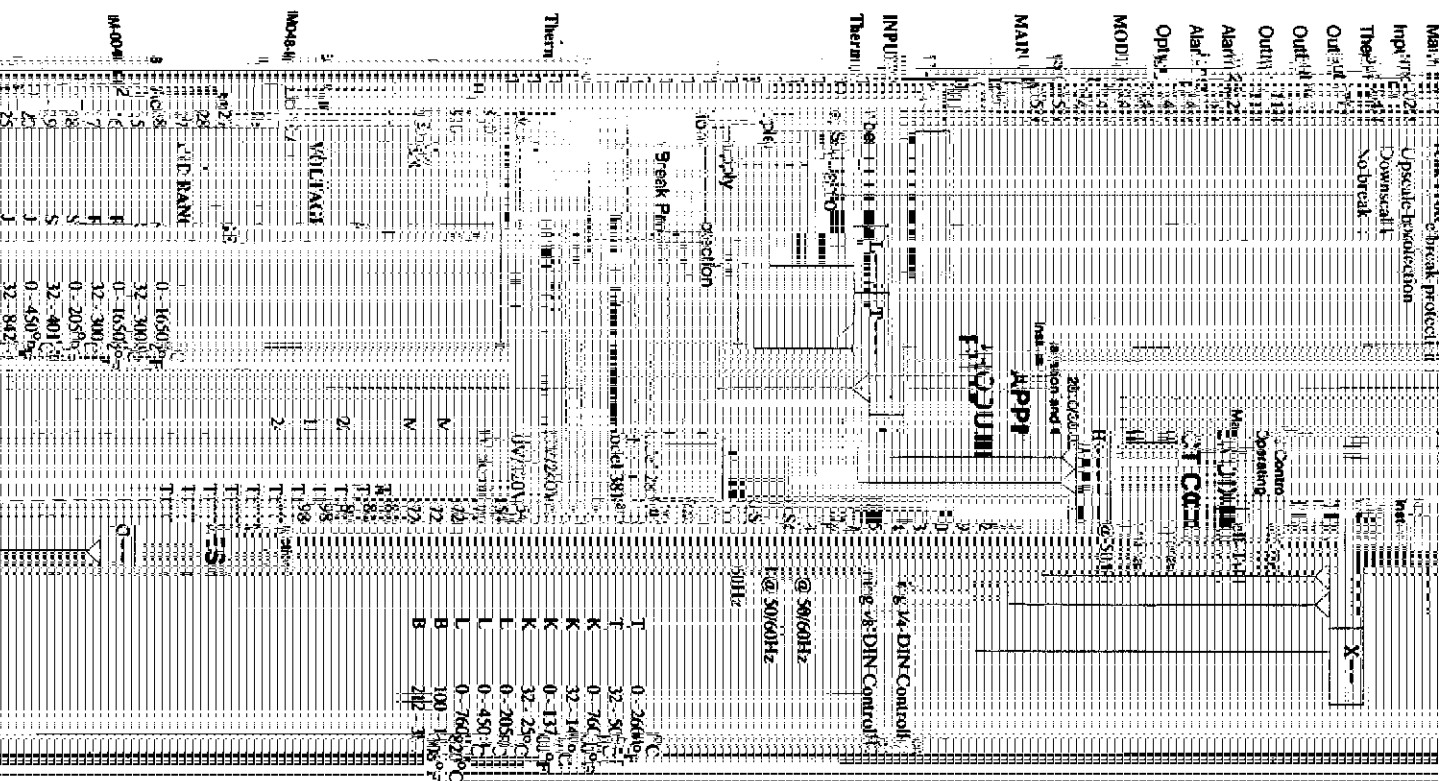
Width:	96mm (3.78 in.)
Height:	96mm (3.78 in.)
Depth:	153mm (6.02 in.)
Weight:	0.6kg (1.32 lb)

SAO Dimensions

Width:	48mm (1.89 in.)
Height:	96mm (3.78 in.)
Depth:	153mm (6.02 in.)
Weight:	0.6kg (1.32 lb)

Approximate SVA (281Q)
 Approximately 3VA (38)

IM0048
 numeric



DC Line II
Output 1
Output 2
Resistance 1
Resistance 2
Resistance 3
Resistance 4
Resistance 5
Resistance 6
Resistance 7
Resistance 8
Resistance 9
Resistance 10
Resistance 11
Resistance 12
Resistance 13
Resistance 14
Resistance 15
Resistance 16
Resistance 17
Resistance 18
Resistance 19
Resistance 20
Resistance 21
Resistance 22
Resistance 23
Resistance 24
Resistance 25
Resistance 26
Resistance 27
Resistance 28
Resistance 29
Resistance 30
Resistance 31
Resistance 32
Resistance 33
Resistance 34
Resistance 35
Resistance 36
Resistance 37
Resistance 38
Resistance 39
Resistance 40
Resistance 41
Resistance 42
Resistance 43
Resistance 44
Resistance 45
Resistance 46
Resistance 47
Resistance 48
Resistance 49
Resistance 50

DC Output 1V - 5V
DC Output 0V - 5V
VMD Open Loop Output

OTHER OPTIONS

- C-51 Factory Output
- C-46 Factory Input
- C-47 Factory Input
- C-48 Factory Input
- C-49 Factory Input

configured to any other output option.
The VMD Open Loop Output is configured to the VMD Open Loop

OUTPUTS

Output 1
Output 2

DC Output

DC Output 1
DC Output 2

For Voltage

For Voltage 1
For Voltage 2

Output 1

Output 1
Output 2

Output 2

Output 2
Output 1

DC Output

DC Output 1
DC Output 2

Output is fitted or
Recorder Output

OTHER OPTIONS

- C-51 Factory Output
- C-46 Factory Input
- C-47 Factory Input
- C-48 Factory Input
- C-49 Factory Input

configured to any other output option.
The VMD Open Loop Output is configured to the VMD Open Loop

OUTPUTS

Output 1
Output 2

DC Output

DC Output 1
DC Output 2

For Voltage

For Voltage 1
For Voltage 2

Output 1

Output 1
Output 2

Output 2

Output 2
Output 1

DC Output

DC Output 1
DC Output 2