

Operating Manual for Model :

Model 4006

Programmable
High Voltage / Current
AC or DC Indicator



Safety

This equipment is supplied by a mains voltage which can cause an electric shock injury. Before removing the circuit board from its housing, switch the instrument off, isolate it from the mains power supply and make sure that it cannot be connected inadvertently by other persons.

If the circuit board is removed from its housing, do not apply power to the instrument unless specifically instructed to do so in these instructions. When working on live equipment, exercise great care, use insulated tools and test equipment, and do not work alone.

When fitting option boards, always put the circuit boards back in the housing with the back-plate securely fastened before powering up the instrument.

When handling circuit boards, ensure that full anti-static precautions are observed.

Replace external mains fuse with one of an equivalent type.

Cleaning

Do not clean the instrument while the instrument is on. Harsh abrasives, solvents, scouring cleaners and alkaline cleaning solutions, such as washing soda, should not be used especially on the display window. The outside of the instrument may be wiped down with a slightly damp clean cloth (lightly moistened with water only). Under no circumstances should you attempt to wipe the inside of the instrument.

Contents

Introduction Page 3
 Electrical specifications Page 3
 Input ranges Page 3
 Power supply Page 3
 Other specifications Page 3
 Programmable settings Page 3

Installation (panel cutout) Page 4
 Installation (fastening) Page 4
 Display & keypad (during normal display mode) Page 4
 Display & keypad (during programming mode) Page 4

Input connections Page 5
 Option connections & links Page 5
 Power supply links Page 5

Programming chart Page 6
 Display codes explained Page 7
 Programming example Page 8

Option 3001-P, 3001-M, 3002, 3003, Page 9
 Option 3004-P, 3004-M, 3006, 3007 Page 9
 Option 3008, 3009, 3012, 3013, 3017-P, 3017-M Page 10
 Option 3018-P, 3018-M, 3022, 3025, 3026 Page 11

Diagram "P" Page 12
 Diagram "M" Page 12
 Declaration of conformity Page 12
 Guarantee Page 12

See last few pages for details of options fitted / available

Introduction

The Model 4006 is a 4 digit (-1999 to 9999) LED indicator & is designed for high voltage input or high current input applications for AC or DC measurements. The housing is an industry standard DIN 48x96.

Options include programmable analog output & alarm set points up to four alarms. The display & analog output is rangeable from the front pushbuttons. The instrument is designed to European EMC directive 89/336/EEC & Low Voltage directive 73/23/EEC.

Electrical Specifications

Accuracy & linearity	: 0.5% of F.S., or 1 count
Internal resolution	: 20000 counts (bi-polar)
Temperature coeff.	: 20 ppm / °C typical
AC measurement technique	: True root mean square
Settling time	: 1 second
Operating / storage temp range	: -10 to +50°C / -40 to +80°C
Humidity	: <85% non-condensing
Warm-up time	: None required
Electro-mechanical relays	: 250V AC, 30V DC, 2A, PF=1
Solid state relays	: 400 V AC/DC, 0.5A, PF=1
Analogue output accuracy	: 0.1% of full scale, 12 bits
Current analogue output load	: 500 Ω maximum
Voltage analogue output load	: 1 k Ω minimum
Memory retention	: Full non-volatile operation
Option 3006 isolation rating	: 1500 V
Declaration of conformity	: See last page

Input Ranges

AC or DC inputs for 0 - 1A, 0 - 5A & voltage inputs up to 600V.

Power Supply

Standard

115 / 230 VAC \pm 10%, link selectable, 50/60Hz, 5VA typ
or on request : 12VDC or 24VDC non-isolated, 5VA typ

Optional

12VDC isolated power supply (Option 3008-12), 5VA typ
24VDC isolated power supply (Option 3008-24), 5VA typ
95V-265V AC/DC isolated power supply (Option 3010), 5VA typ

Other Specifications

DIN 48 x 96 housing, 147mm depth
Industrial strength single piece housing
Housing is flame retardant ABS plastic that meets UL94 V-0
Circuit board is flame retardant material that meets UL94 V-0
Front facia rating : IP65 (with o-ring seal supplied as standard)

Programmable Settings

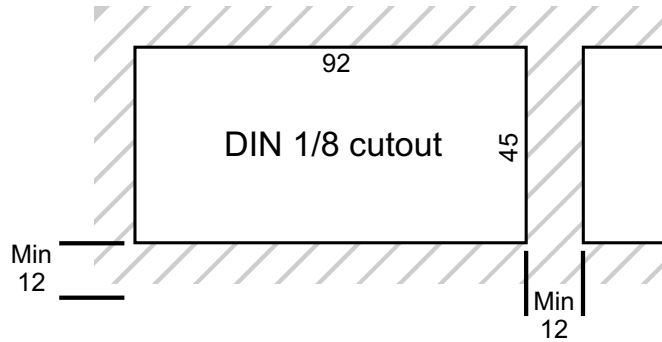
Zero & full scale setting	: -1999 to 9999
Decimal point	: Adjustable on all digits
Filter	: 0.0 to 10.0 seconds

Options :

Analog output zero & span	: -1999 to 9999
Alarm setpoint values	: -1999 to 9999
Alarm hysteresis	: 0 to 255 (default 1)
Alarm delay	: 0 to 255 seconds (default 0)
Alarm relay settings	: Selectable HIGH or LOW alarm
Alarm relay state	: Selectable NO or NC
Unit address	: 1 to 127 (0 is for factory use)
Baud rate	: 2400, 4800, 9600, 19200

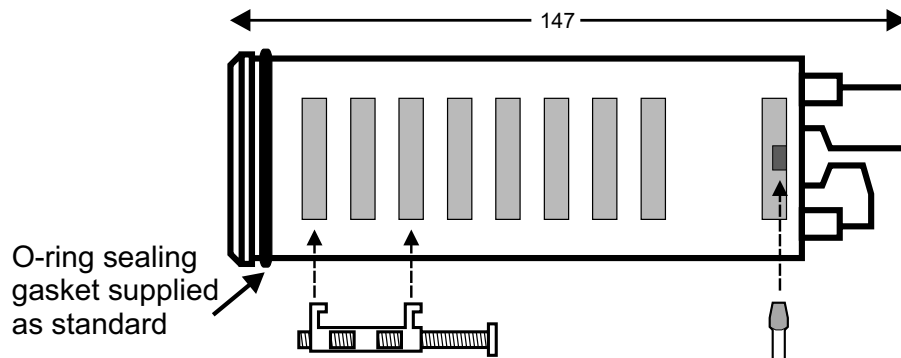
Installation

Panel Cutout



Installation

Fastening



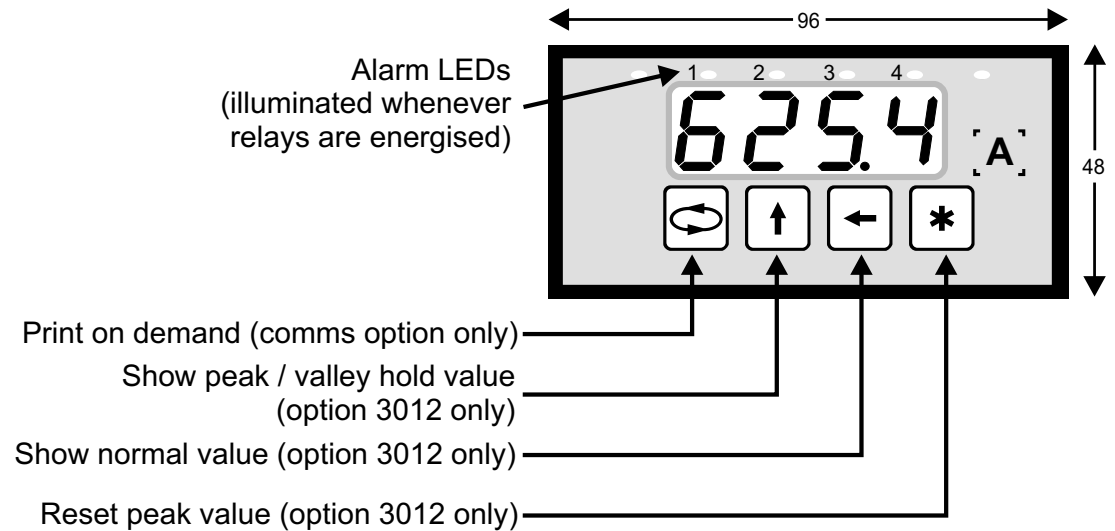
The supplied fastening clips may be fitted on **the side** or the **top / bottom** of the housing. Ensure that the clip & screw is mounted as shown here.

To gain access to the circuit boards, switch power off and remove terminals from the back of the housing. Observe safety precautions. Use a screwdriver to clip the back-plate off.

Caution : Do not overtighten the screws.

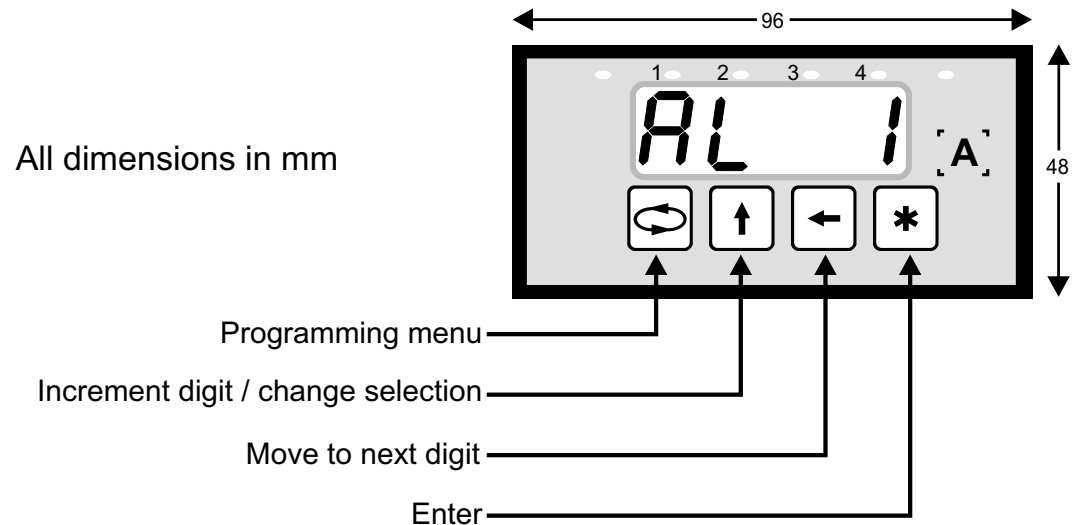
During normal display mode

Display & Keypad

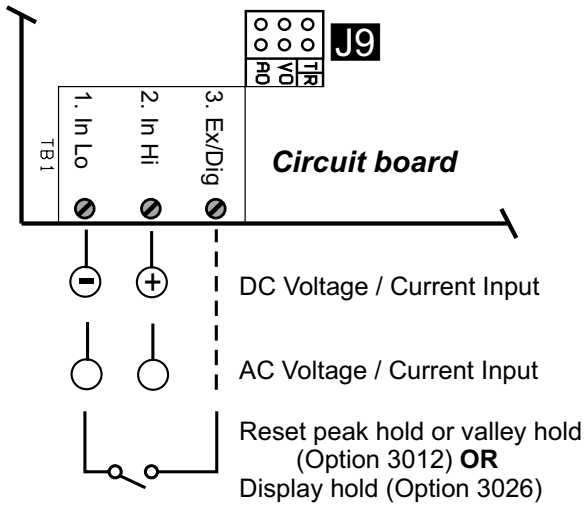


During programming mode

Display & Keypad



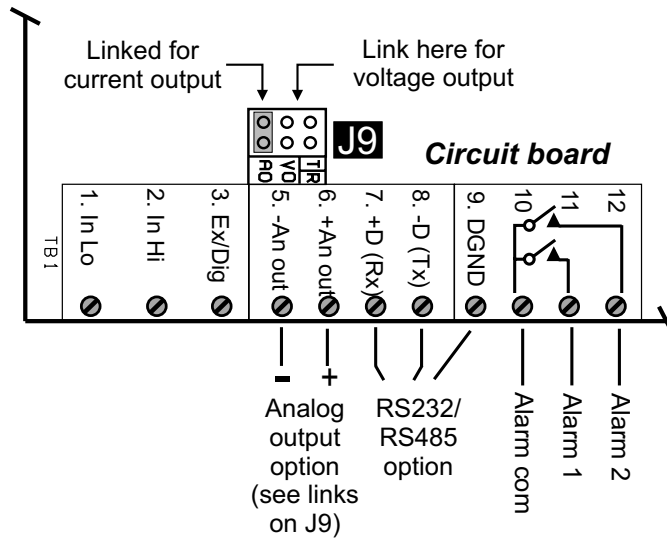
Input Connections



PLEASE NOTE :

There are no user configurable input links due to the high voltages and currents that is measured by the instrument.

Option Connections & Links

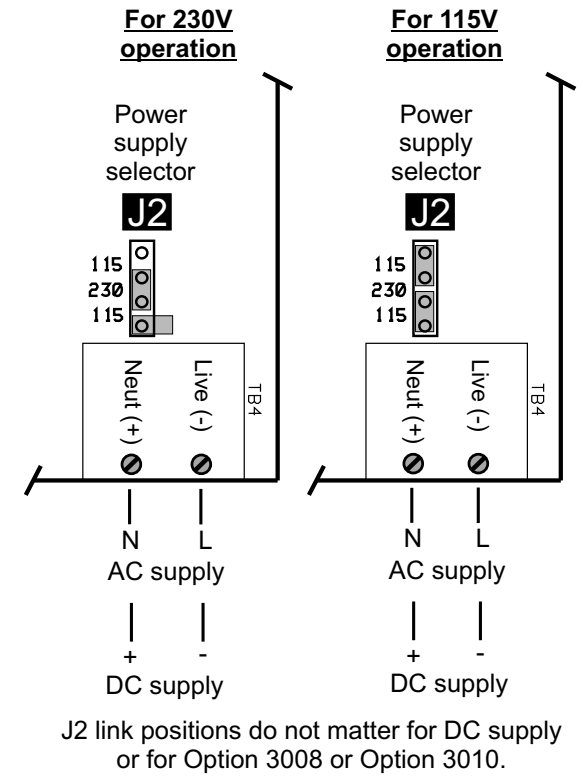


Alarm connections for 3001/4-P only.

Solid state relays, 400V AC/DC, 0.5 A max, PF=1

Interposing relays recommended for heavy duty applications

Power Supply Links



***** External 0.5A fuse recommended *****

Note: Some hardware revisions contain a 3-way power terminal. The terminal assignments in this case is shown below. The earth wire need not be connected.

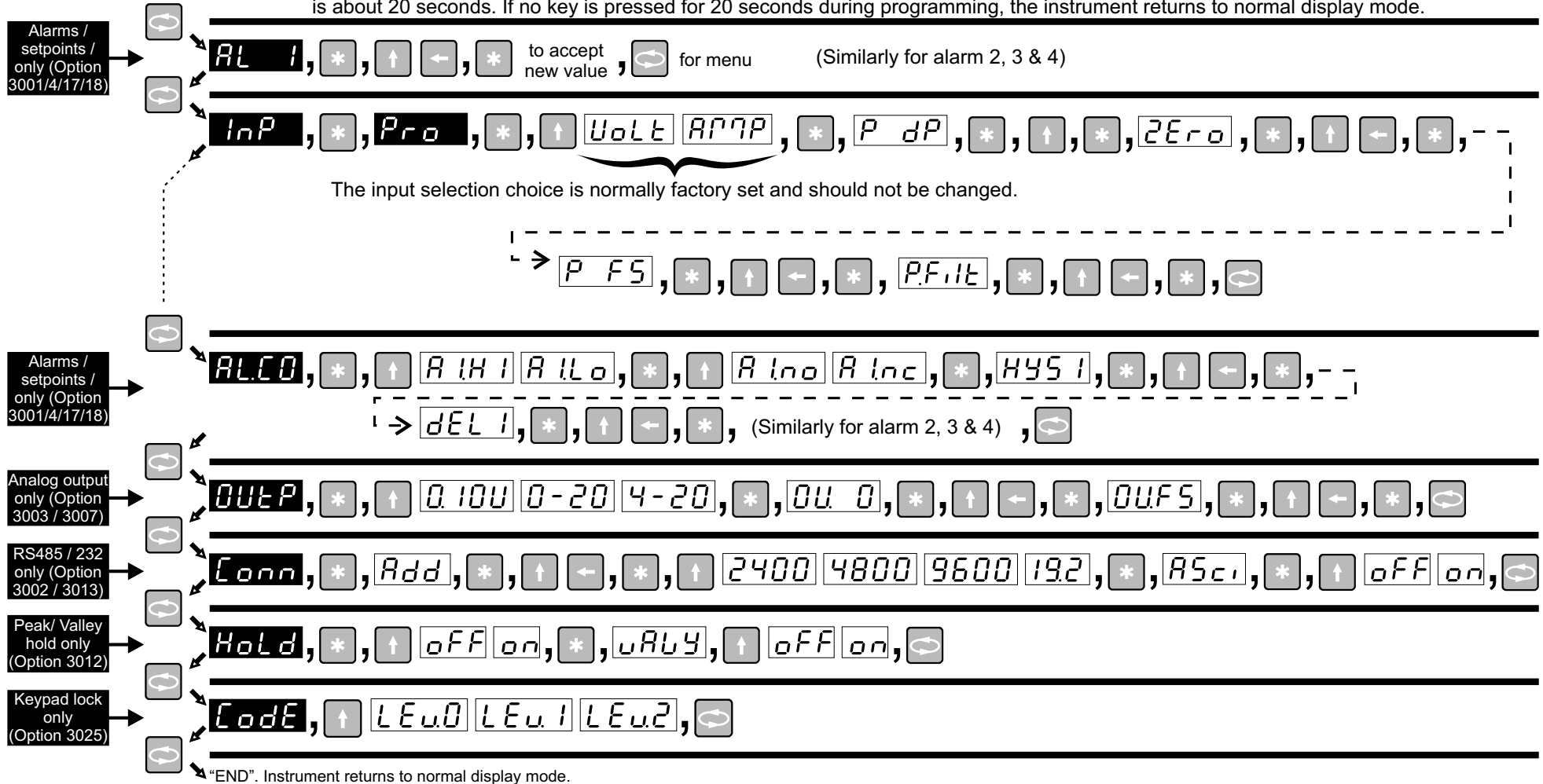


Programming Chart

READ ME FIRST !

**START
HERE**

- Note 1 : This programming chart is a simplified flowchart for users that have previous experience with this instrument. A programming example is available in the next few pages to assist new users in understanding this programming chart.
- Note 2 : Because this instrument has many options, all possible option menus are shown. Options that are not ordered will not appear in the programming sequence.
- Note 3 : Configuring this instrument requires two steps. (A) Select the correct hardware links (page 5). (B) Program the instrument with this chart.
- Note 4 : To enter programming mode, press the menu key for a few seconds (unless the optional keypad lock has been set). Programming mode timeout is about 20 seconds. If no key is pressed for 20 seconds during programming, the instrument returns to normal display mode.



Display Codes Explained

AL 1 AL 2 AL 3 AL 4	1st, 2nd, 3rd, 4th setpoint value
ALCO	Alarm configuration menu (shown for 1st alarm only)
ALHI ALLO	1st alarm setpoint select HIGH / LOW alarm
ALNO ALNC	1st alarm setpoint normally OPEN / CLOSED contact
HYS 1	1st alarm setpoint hysteresis
dEL 1	1st alarm setpoint delay
OUTP	Analogue output menu
0.10V 0-20 4-20	Output selection (0-10V, 0-20mA, 4-20mA)
OU 0	Output zero selection
OUFS	Output full scale selection
Conn	Communications menu (RS232 / RS485)
Add	Unit address (default 0)
2400 4800 9600 192	Available baud rate values
ASc 1 oFF on	Protocol selection. On = AsciiBus. Off = DigiBus.
HoLd	Peak / valley hold menu (min / max hold)
oFF on	Turn the peak / valley hold feature on or off
uALY	Peak / valley hold selector
oFF on	If "off", peak hold mode. If "on", valley hold mode
Code	Keypad lock security menu. See Option 3025 for more information.
LEu0 LEu1 LEu2	Keypad lock security level. Level 0 = none, Level 1 = alarm value changes, Level 2 = full

InP	Input selection menu
Pro	Process input
UoLl	Voltage input selection
APpP	Current input selection
P dP	Decimal point selection (non-floating point)
ZEro	Zero input display configuration
P FS	Full scale display configuration
P FilE	Filter value. This is to smooth out noisy signals.
8888	Panel meter startup / reset sequence (shown on startup only)
oooo	Process overscale. Input has exceeded full scale value.
- - - -	Hardware overrange. Reduce input signal to reduce saturation.

} Due to the high voltages and currents within this instrument, the input range is factory configured and should not be changed.

Please Note :

PASS

If the front keypad has been locked, then the word "PASS" will appear. See option 3025 for more information.





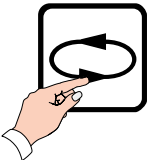

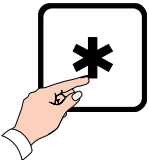

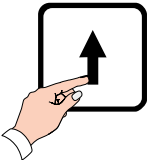

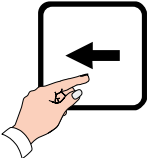

Please Note :

Display screens shown in black are to indicate the beginning of sub-menus.

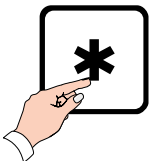

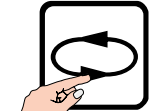

Programming Example

Setting Up Alarm Values (Option)

Remember, the symbols on the keypad have the following definitions during programming.

			
Next Menu Item	Increment digit	Next Digit	Enter / Accept value
	Press "Menu" for 3 seconds		
	Press "Enter" to see Alarm / Trip 1 value.		
	Press "Increment digit" to increase value		
	Press "Next digit" to amend the next digit		

Amend the other digits in the same way until the desired trip value is entered.

	Press "Enter" to accept Alarm 1 value.	
	Press "Menu" to proceed to next trip value.	

Use the same menu steps above to change trip levels for trip 2, 3 and 4.

The entire programming menu operates in a manner similar to the example described above.

Option 3001-P Two Set Points (Solid-State Relays)

See page 5 for connection details. Wire for AL1 & AL2 only.

Option 3001-M Two Set Points (Electro-Mechanical Relays)

This option provides two alarm setpoints with electro-mechanical relays. This option board slots into the upper slot of the panel meter box. The upper terminals are clearly numbered 13-28 to differentiate them from the lower terminals. Both normally open and normally closed contacts are provided with each relay. The relays are rated at 250VAC / 30VDC @ 2A. Visual LED alarm indication is provided on the panel meter front. For connection wiring details, see diagram "M" on page 12. Connect wires for AL1 & AL2 only.

Option 3002 RS485 Serial Interface Option

See page 5 for connection details. Select DIGIbus or ASCIIbus protocol from the program menu. See additional protocol documents.

Option 3003 0 - 20mA / 4 - 20mA Analogue Output Option

See page 5 for connection details.

Option 3004-P One Set Point (Solid-State Relay)

This option is similar to Option 3001-P but with a single alarm only. See page 5 for connection details. Wire for AL1 only.

Option 3004-M One Set Point (Electro-Mechanical Relay)

This option is similar to Option 3001-M but with a one alarm setpoint only. See diagram "M" on page 12 for connections. Wire for AL1 only.

Option 3006 Isolated Options (Analogue Output / RS232 / RS485)

This is ordered with option 3002, 3003, 3007 or 3013. It provides a minimum of 1500V isolation between input and output signal. Wiring connections are different for these isolated options. Use diagram "P" or diagram "M" on page 12 for wiring connections.

Option 3007 0 - 10V Analogue Output Option

See page 5 for connection details.

Option 3008

Galvanic Isolation (12V / 24V Supply) Option

This power supply option provides 12 or 24VDC supply isolation. See page 5 for connection details.

Option 3009

Parallel BCD Output Option

This option is supplied as an additional slot in card in the top part of the instrument housing. See additional documentation.

Option 3012

Peak Or Valley (Max or Min) Hold Option

This option displays and holds the max or min value (not both) of an input signal. This option is activated in the programming menu "Opt" by selecting whether "Hold" should be "On" or "Off", and selecting valley ("valy" = "On") or peak ("valy" = "Off") mode.

To show peak / valley value, press the "up" arrow for 3 seconds. To show normal display value, press the "side" arrow key for 3 seconds. To reset the peak / valley hold value, press the "star" key for 3 seconds, or use an external potential free contact (see page 5 for connection details). If analog output option is fitted, the output will hold as well.

Option 3013

RS232 Serial Interface Option

See additional documentation for protocol details & page 5 for connection details. Max cable length is 15 metres.

Option 3017-P

Three Set Points (Solid-State Relays)

This option provides three alarm setpoints with solid state relays. This option board slots into the upper slot of the panel meter box. The upper terminals are clearly numbered 13-28 to differentiate them from the lower terminals. Only normally open contacts are provided, which means that should the contacts be closed and the power fails, they will revert to a normally open condition. The relays are rated at 400V AC /DC @ 0.5A. Visual LED alarm indication is provided on the panel meter front. For connection wiring details, see diagram "P" on page 12. Connect wires for AL1, AL2 & AL3 only.

Option 3017-M

Three Set Points (Electro-Mechanical Relays)

This option provides three alarm setpoints with electro-mechanical relays. This option board slots into the upper slot of the panel meter box. The upper terminals are clearly numbered 13-28 to differentiate them from the lower terminals. Both normally open and normally closed contacts are provided with each relay. The relays are rated at 250VAC / 30VDC @ 2A. Visual LED alarm indication is provided on the panel meter front. For connection wiring details, see diagram "M" on page 12. Connect wires for AL1, AL2 & AL3 only.

Option 3018-P**Four Set Points (Solid-State Relays)**

This option is similar to option 3017-P, but contains four relays (see option 3017-P). For connection wiring details, see diagram “P” on page 12. Connect wires for AL1, AL2, AL3 & AL4.

Option 3018-M**Four Set Points (Electro-Mechanical Relays)**

This option is similar to option 3017-M, but contains four relays (see option 3017-M). For connection wiring details, see diagram “M” on page 12. Connect wires for AL1, AL2, AL3 & AL4.

Option 3022**Vertical Bar Graph Display Option**

The vertical bar-graph display option provides a graphic linear representation of the process variable being measured. The bar graph's zero and full scale setting is programmed by the 'Outp' sub-menu of the programming menu, which also controls the analogue output option. The 'Out.O' controls the zero point of the graph, and the 'Ou.Fs' controls the full scale value of the graph. See the programming menu page 6 for more information.

Option 3025**Keypad Lock Option**

The keypad lock option is used to prevent un-authorized access to the programming menu. When this option is ordered, a new sub-menu called “CODE” appears at the end of the programming sequence. See programming page 6.

Three levels of keypad lockout are available: Level 0 - Full access to programming menu. Level 1 - User only has access to alarm setpoint values. Level 2 - Total programming menu lockout.

If this option is ordered, the factory default is “Lev 0”.

If the keypad has been locked with either level 1 or 2, then the word “PASS” will appear on the display if the user attempts to enter programming mode. Pressing the menu key will return the instrument to normal display mode. However, if the user wishes to enter the programming menu, then when the word “PASS” appears, press in succession, 1 second apart, all four keys from right to left.

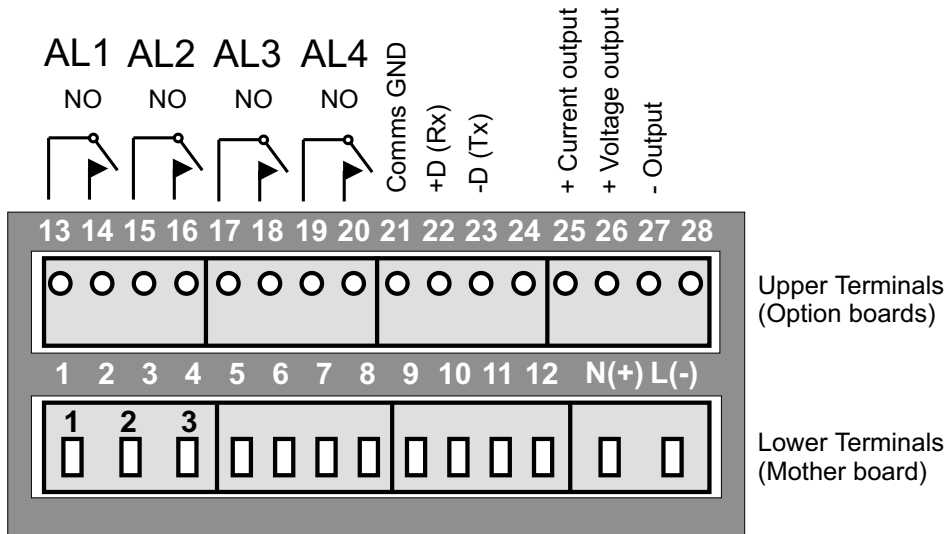
Option 3026**Display Hold Option**

The option is at no-extra charge and allows the user to freeze the display via an external potential-free contact. Closing the switch will freeze the display. The connections to the instrument for the external potential free contact vary depending on input type. See page 5 for wiring connections.



Declaration of Conformity

Diagram "P"



High Voltage / Current AC or DC Indicator

Manufacturer : DPM

Type : 4006

Options : 3000 to 3026

Corresponds to the requirements of the following EC directives:

EMC directive : 89/336/EEC

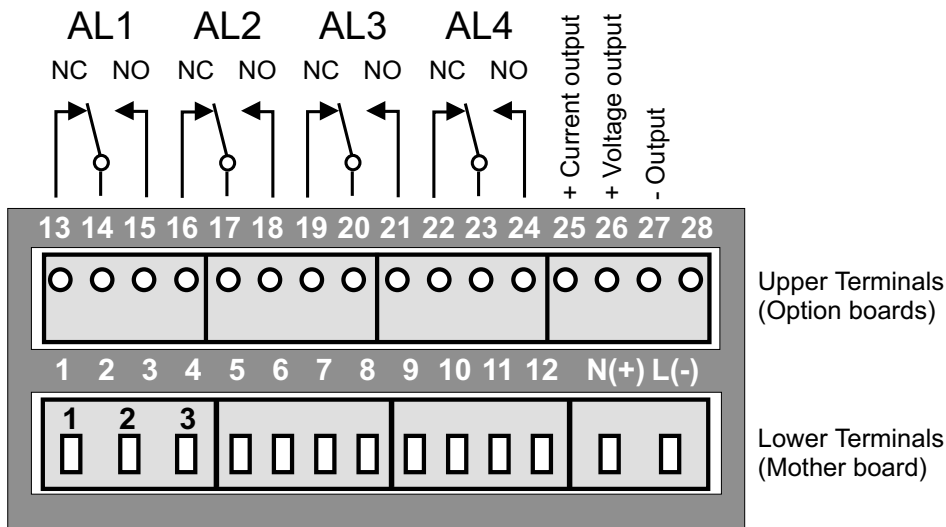
Low voltage directive : 73/23/EEC

The applicable harmonised standards are : EN 50081-1

: EN 50082-1

: EN 61010

Diagram "M"



Guarantee

This product is guaranteed against faulty workmanship or defective material, for a period of 3 (three) years from date of delivery.

The manufacturer undertakes to replace without charge all defective equipment which is returned to it (transportation costs prepaid) during the period of guarantee, provided there is no evidence that the equipment has been abused or mishandled in any way.

The manufacturer reserves the right to alter any specification without notice.