Model RM4-RS
Serial Input
DIN Rail Mount Display/Controller
Operation and Instruction Manual

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1 Introduction

This manual contains information for the installation and operation of the RM4 serial communications monitor. The RM4 will accept inputs from either RS232, RS485, RS422 or serial current loop inputs (input type is factory configured). The digital display will indicate numeric and some alpha characters (when alpha function is selected).

There are six main modes in which the RM4-RS will operate, these are detailed below. If the mode is changed it is necessary to remove power from the RM4 then reapply power in order to reset the mode:

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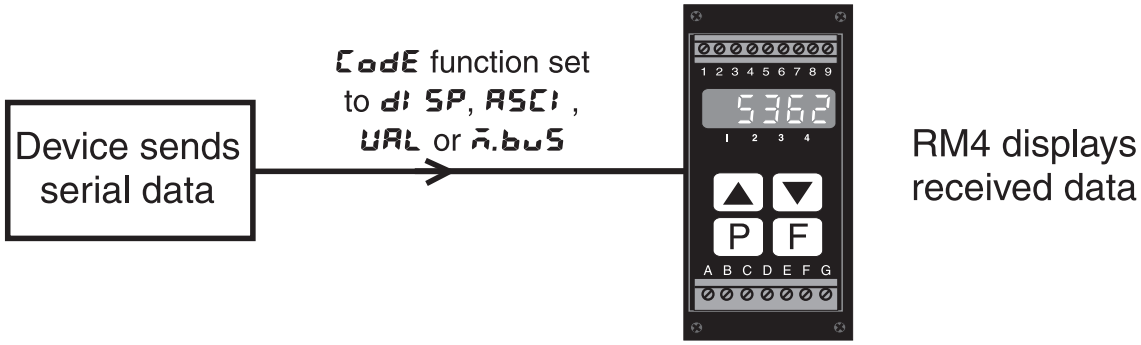
1. Direct display of input. The RM4 is sent an ASCII or Modbus RTU function 6 or 16 string and displays the characters. To operate in this mode the **POLL INPt** function must be set to **OFF**.



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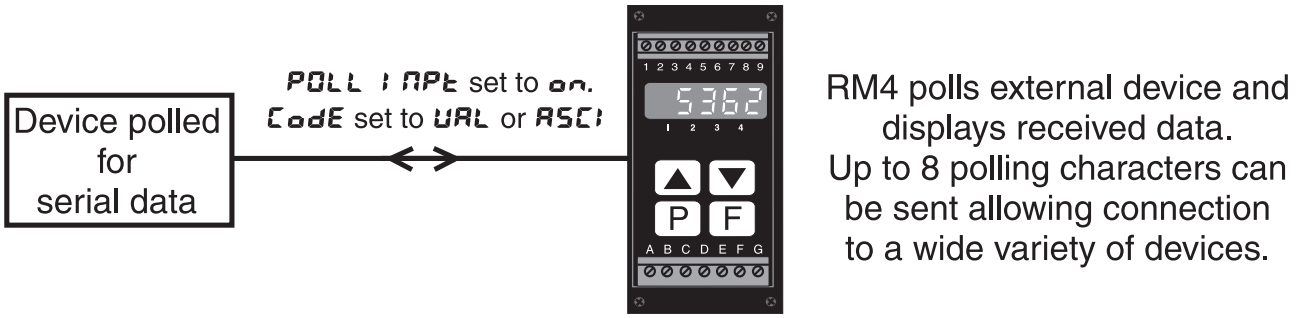
2. Poll mode. RM4 sends a poll command of up to 8 characters to request data. To operate in this mode the **POLL INPt** function must be set to **on**.



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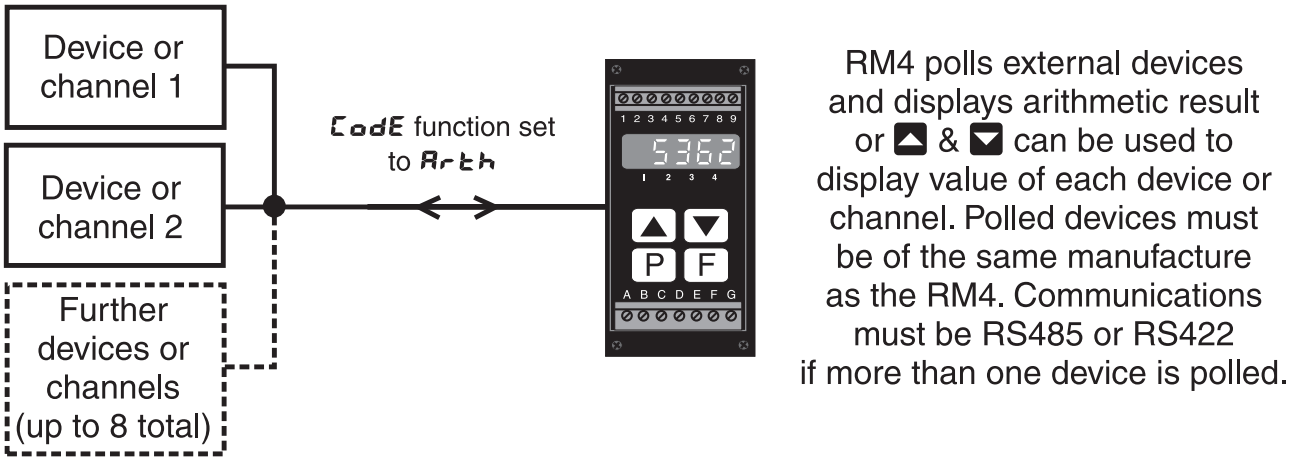
3. Arithmetic mode. The instrument can be programmed to accept input from up to eight RS485 or RS422 sources and combine these arithmetically. The time between polling requests is programmable from 0.0 to 20.0 seconds. The instruments polled for arithmetic operation must be of the same manufacture as the RM4 instrument. To operate in this mode the CodE function must be set to ArtH. Refer to the separate Addendum booklet for details of ArtH operation.



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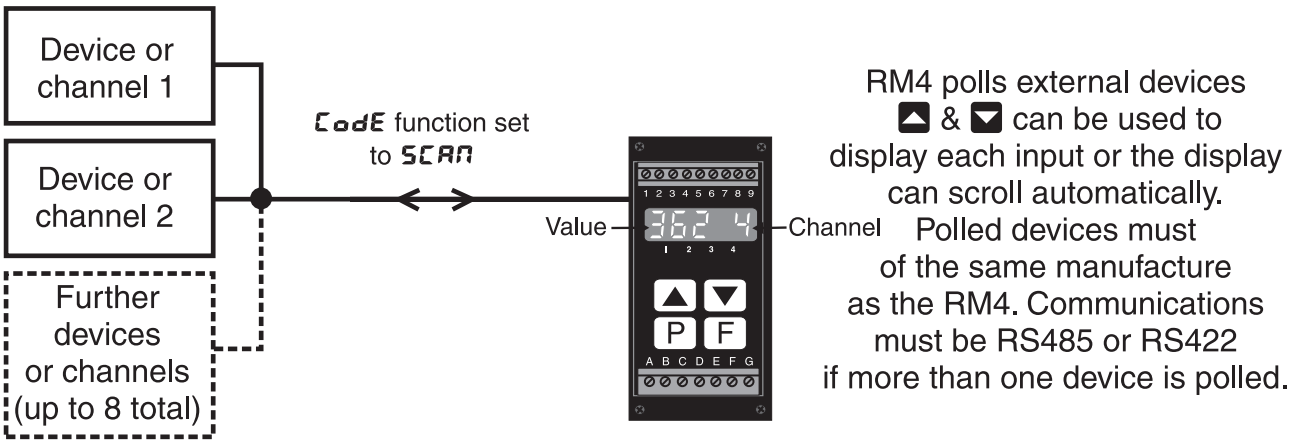
4. Scanning mode. Allows the RM4-RS to scan up to 8 inputs from other devices and display the value together with an indication of which input is being viewed. The input devices must be of the same manufacture as the RM4 and the serial communications must be via RS485. A special mode allows the RM4-RS to act as a slave display when connected to a model TP488 eight channel scanning monitor equipped with a serial output.



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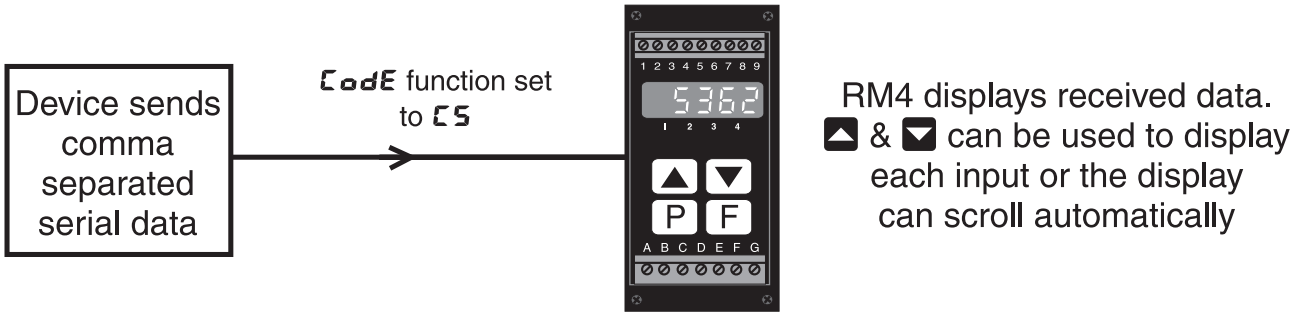
5. Comma separated mode. This mode allows the RM4-RS to accept up to eight display values sent sequentially, separated by a comma. The number of channels is selected at the **SCAN CH** function.



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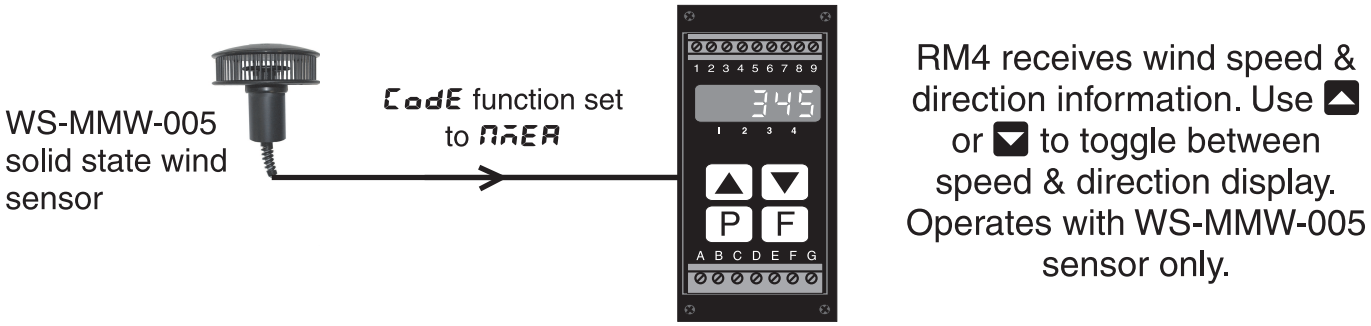
6. Wind speed and direction (NMEA). This mode is used only with instruments using NMEA (National Marine Electronics Association) serial code such as model WS-MMW-005 wind speed and direction sensor. Refer to the separate Addendum booklet for details of **nMEA** operation.



Two standard inbuilt relays are provided alarm in some modes this can be used as a high or low value alarm or can be programmed to activate on "timeout" if the input ceases.

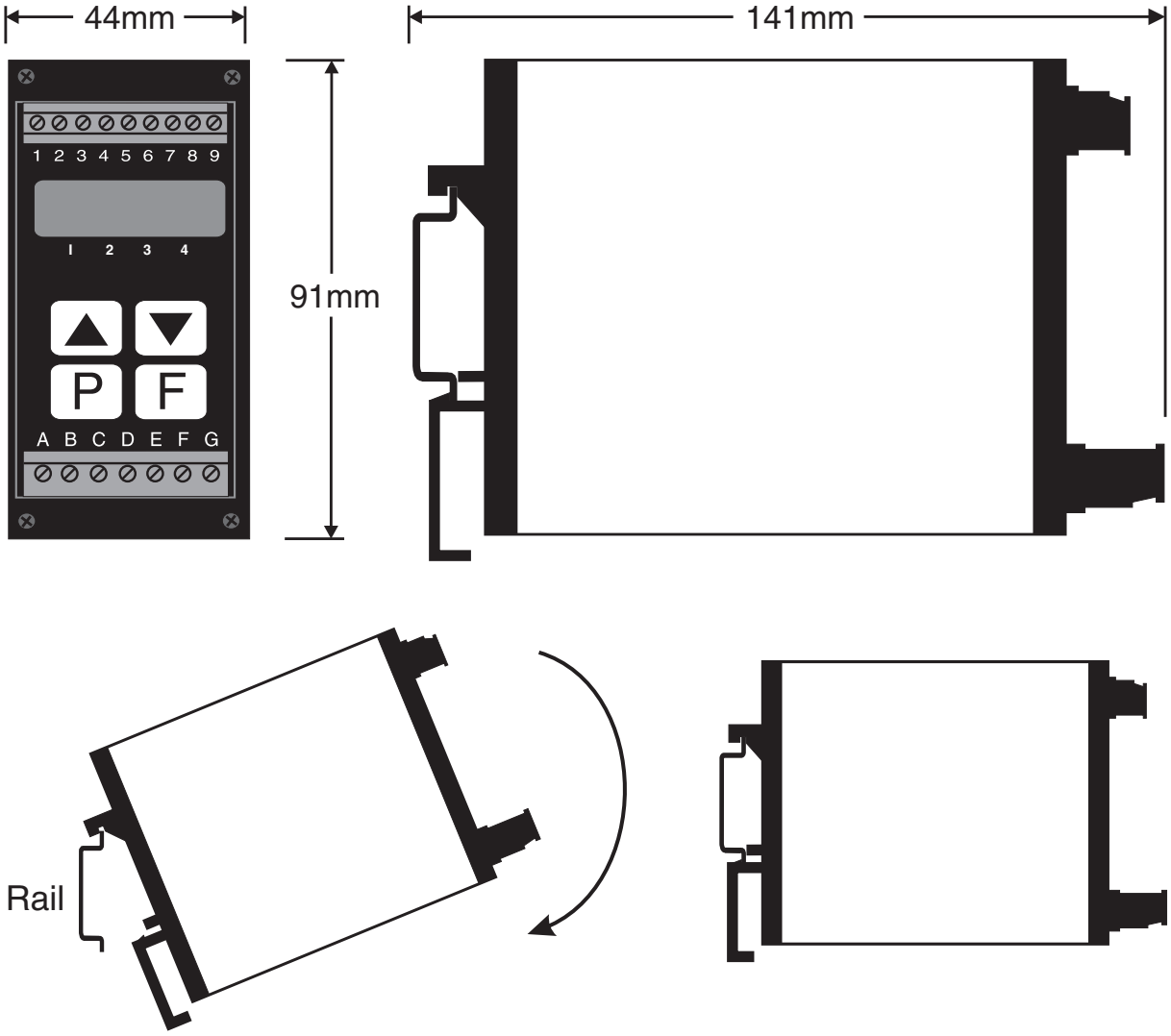
Unless otherwise specified at the time of order, your RM4 has been factory set to a standard configuration. Like all other RM4 series instruments the configuration and calibration is easily changed by the user. Initial changes may require dismantling the instrument to alter PCB links, other changes are made by push button functions.

Full electrical isolation between power supply, input voltage or current and optional retransmission output is provided by the RM4, thereby eliminating grounding and common voltage problems. This isolation feature makes the RM4 ideal for interfacing to computers, PLCs and other data acquisition devices.

The RM4 series of DIN Rail Process Modules are designed for high reliability in industrial applications. The 5 digit LED display provides good visibility, even in areas with high ambient light levels. A feature of the instrument is the programmable display brightness function, this allows the unit to be operated with low display brightness to reduce the instrument power consumption and to improve readability in darker areas. To reduce power consumption in normal use the display can be programmed to automatically dim or blank after a set time, the display will return to its normal brightness level if any of the pushbuttons are pressed or if an alarm relay is activated.

2 Mechanical installation

The RM4 is designed for DIN rail, horizontal mounting. The instrument clips on to 35mm DIN standard rails (EN50022). Cut the DIN rail to length and install where required. To install the RM4 simply clip onto the rail as shown below. To remove the RM4 lever the lower arm downwards using a broad bladed screwdriver to pull the clip away from the DIN rail.



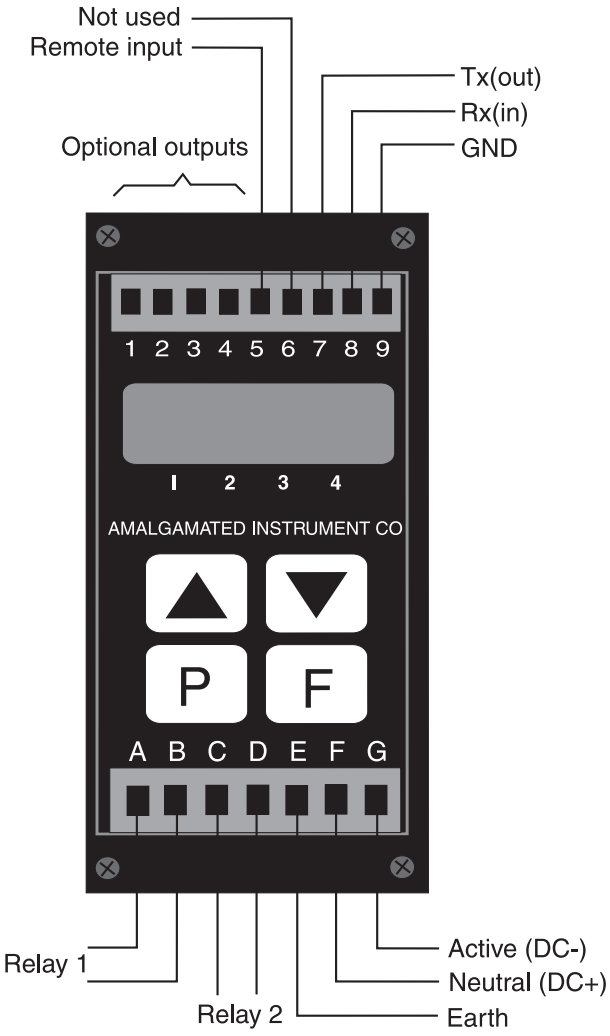
3 Electrical installation

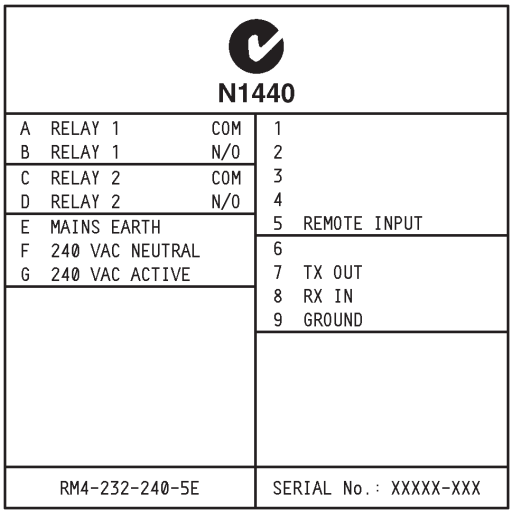
The RM4 Meter is designed for continuous operation and no power switch is fitted to the unit. It is recommended that an external switch and fuse be provided to allow the unit to be removed for servicing. The terminal blocks allow for wires of up to 2.5mm^2 to be fitted for power supply and relays 1 and 2 or 1.5mm^2 for input connections and optional outputs. Connect the wires to the appropriate terminals as indicated below.

Refer to connection diagrams provided in this manual to confirm proper selection of voltage, polarity and input type before applying power to the instrument. When power is applied the instrument will cycle through a display sequence, indicating the software version and other status information, this indicates that the instrument is functioning. Acknowledgement of correct operation may be obtained by applying an appropriate input to the instrument and observing the resultant reading.

Note that the power supply type is factory configured. Check power supply type before connecting. Relay outputs are voltage free contacts.

Electrical connections and data label (RS232 input 240VAC supply example)



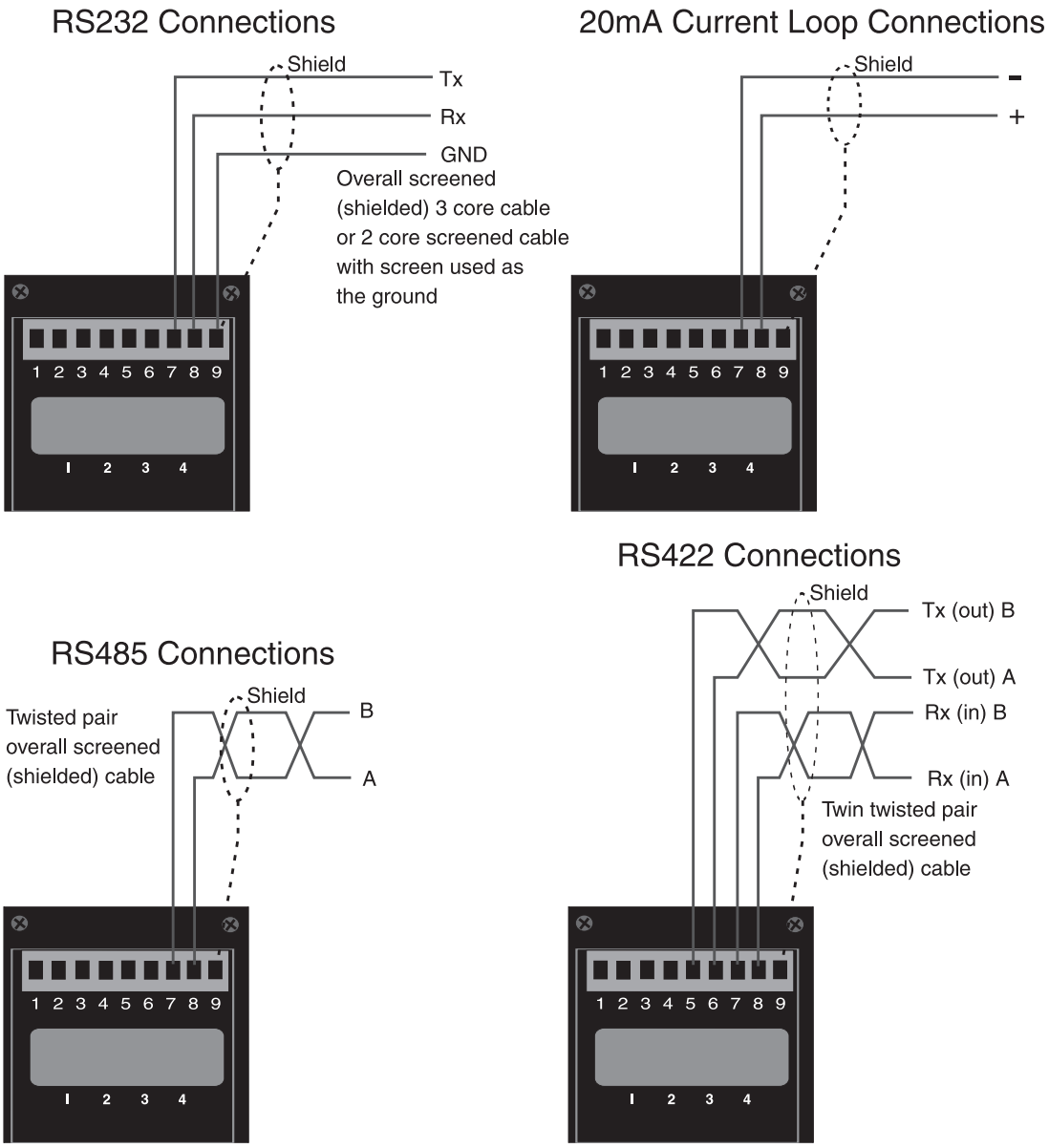


3.1 Power supply connections

AC supply connections use terminal G (Active), terminal F (Neutral) and terminal E (Case earth).

DC supply connections (12 to 48VDC) use terminal G (DC-), terminal F (DC+) and terminal E (Case earth).

3.2 Serial input connections



Note: the serial connections are isolated, therefore the screen should be connected to ground at both ends

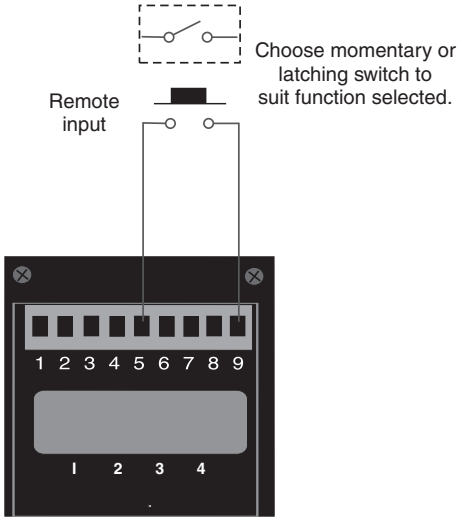
Terminating resistors: If long cable runs are used in RS485 or RS422 installations reflections of data signals along the line can in some situations cause corruption of the signal. Fitting a 150Ω (nominal) resistor across the A and B terminals will help to absorb reflected signals and may fix the problem.

3.3 Relay connections

Relays are voltage free rated at 240VAC 5A resistive load. Terminals A and B are used for relay 1, terminals C and D are used for relay 2.

3.4 Remote input connections

The selected remote input function can be operated via an external contact closure via a switch, relay or open collector transistor switch.



3.5 Optional outputs

Refer to the separate "RM4 Din Rail Meter Optional Output Addendum" for connection details of optional outputs fitted.

3.6 Configuring the input board

There are no user configurable links on the input circuit boards. Refer to the separate RM4 DIN Rail Meter Optional Output Addendum booklet supplied if options are fitted.

4 Functions available for each mode

The table below shows which functions are applicable to modes **di SP**, **ASCI** , **UAL**, **SCAN**, **CS** and **n.bus**. Refer to a separate Addendum booklet for details or **ARth** and **nnEA** modes.

Function	di SP	ASCI	UAL	SCAN	CS	n.bus
Ax Lo	No	No	Yes	Yes	Yes	Yes
Ax Hi	No	No	Yes	Yes	Yes	Yes
Ax HY	No	No	Yes	Yes	Yes	Yes
Ax tt	No	No	Yes	Yes	Yes	Yes
Ax rt	No	No	Yes	Yes	Yes	Yes
Ax n.o or **Ax n.c**	No	No	Yes	Yes	Yes	Yes
Ax SP or **Ax t 1** etc.	No	No	Yes	Yes	Yes	Yes
br9t	Yes	Yes	Yes	Yes	Yes	Yes
dull	Yes	Yes	Yes	Yes	Yes	Yes
d.oFF SECS	Yes	Yes	Yes	Yes	Yes	Yes
rEC_	No	No	Yes	Yes	Yes	No
rEC¯	No	No	Yes	Yes	Yes	No
rEC	No	No	Yes	Yes	Yes	No
rEC_ Ch2	No	No	Yes	Yes	Yes	No
rEC¯ Ch2	No	No	Yes	Yes	Yes	No
rEC2	No	No	Yes	Yes	Yes	No
drnd	No	No	Yes	No	No	No
dCPt	No	No	Yes	No	No	No
FLtr	No	No	Yes	No	No	No
bAUd rAtE	Yes	Yes	Yes	Yes	Yes	Yes
PrtY	Yes	Yes	Yes	Yes	Yes	Yes
dAtA	Yes	Yes	Yes	Yes	Yes	Yes
inPt	Yes	Yes	Yes	Yes	Yes	Yes
CodE	Yes	Yes	Yes	Yes	Yes	Yes
A1 OPEr	No	No	Yes	Yes	Yes	Yes
A2 OPEr	No	No	Yes	Yes	Yes	Yes
n.bus Addr	No	No	No	No	No	Yes
SCAN CH	No	No	No	Yes	Yes	No
SCAN SECS	No	No	No	Yes	Yes	No
Ch1 Addr	No	No	No	Yes	No	No
Ch2 Addr	No	No	No	Yes	No	No
Ch3 Addr	No	No	No	Yes	No	No

Function	dISP	ASCI	URL	SCAN	CS	n.bus
Ch4 Addr	No	No	No	Yes	No	No
Ch5 Addr	No	No	No	Yes	No	No
Ch6 Addr	No	No	No	Yes	No	No
Ch7 Addr	No	No	No	Yes	No	No
Ch8 Addr	No	No	No	Yes	No	No
Ch 1 dCPt	No	No	No	Yes	Yes	No
Ch2 dCPt	No	No	No	Yes	Yes	No
Ch3 dCPt	No	No	No	Yes	Yes	No
Ch4 dCPt	No	No	No	Yes	Yes	No
Ch5 dCPt	No	No	No	Yes	Yes	No
Ch6 dCPt	No	No	No	Yes	Yes	No
Ch7 dCPt	No	No	No	Yes	Yes	No
Ch8 dCPt	No	No	No	Yes	Yes	No
Ch 1	No	No	No	No	Yes	No
Ch2	No	No	No	No	Yes	No
Ch3	No	No	No	No	Yes	No
Ch4	No	No	No	No	Yes	No
Ch5	No	No	No	No	Yes	No
Ch6	No	No	No	No	Yes	No
Ch7	No	No	No	No	Yes	No
Ch8	No	No	No	No	Yes	No
SCH 1	No	Yes	Yes	No	No	No
SCH2	No	Yes	Yes	No	No	No
SCH3	No	Yes	Yes	No	No	No
tchr	No	Yes	Yes	No	No	No
dLAY	No	Yes	Yes	No	No	No
bAct	No	Yes	Yes	No	No	No
n.Chr	No	Yes	Yes	No	No	No
1.dPt	No	Yes	Yes	No	No	No
ALPH	No	Yes	Yes	No	No	No
POLL 1nPt	No	Yes	Yes	No	No	No
POLL dLAY	No	Yes	Yes	No	No	No

Function	dISP	ASCI	URL	SCAN	CS	n.buS
P.ch.1	No	Yes	Yes	No	No	No
P.ch.2	No	Yes	Yes	No	No	No
P.ch.3	No	Yes	Yes	No	No	No
P.ch.4	No	Yes	Yes	No	No	No
P.ch.5	No	Yes	Yes	No	No	No
P.ch.6	No	Yes	Yes	No	No	No
P.ch.7	No	Yes	Yes	No	No	No
P.ch.8	No	Yes	Yes	No	No	No
dS.to	Yes	Yes	Yes	Yes	Yes	Yes
t.out	Yes	Yes	Yes	Yes	Yes	Yes
P.but	Yes	Yes	Yes	Yes	Yes	Yes
r.1 nP	Yes	Yes	Yes	Yes	Yes	Yes
ACCS	Yes	Yes	Yes	Yes	Yes	Yes
SPAC	No	No	Yes	No	No	No
A1	No	No	Yes	Yes	Yes	No
A2 to A7	No	No	Yes	Yes	Yes	No
CLr 2Er0	No	No	Yes	No	No	No
r.trn bAUd	Yes	Yes	Yes	Yes	Yes	Yes
r.trn PrtY	Yes	Yes	Yes	Yes	Yes	Yes
r.trn 0.Put	Yes	Yes	Yes	Yes	Yes	Yes
r.trn Addr	Yes	Yes	Yes	Yes	Yes	Yes

5 Function tables - summary of setup functions

Note: the order in which the functions appear on the display may not be exactly as shown below. The availability and order of functions is determined by choice of function settings and options fitted.

Functions in this first table are available in **FUNC** or **CAL** mode

Display	Function	Range	Default	Your record	Ref/Page
Ax Lo	Low setpoint value for designated alarm relay *x*	Any display value or **OFF**	**OFF**	See 5.1	6.1 / 21
Ax Hi	High setpoint value for designated alarm relay *x*	Any display value or **OFF**	**OFF**	See 5.1	6.2 / 21
Ax HY	Hysteresis value for the designated alarm relay *x*.	**0** to **9999**	**10**	See 5.1	6.3 / 22
Ax tt	Trip time delay for the designated alarm relay *x*.	**0** to **9999**	**0**	See 5.1	6.4 / 23
Ax rt	Reset time delay for the designated alarm relay *x*.	**0** to **9999**	**0**	See 5.1	6.5 / 23
Ax n.o or **Ax n.c**	Alarm relay *x* action to normally open (de-energised) or normally closed (energised)	**Ax n.o** or **Ax n.c**	**Ax n.o**	See 5.1	6.6 / 23
Ax SP or **Ax t 1** etc.	Relay operation independent setpoint or trailing setpoint (*__Optional__)	**Ax SP** or **Ax t 1** etc.	**Ax SP**	See 5.1	6.7 / 24
br gt	Display brightness level	**1** to **15**	**15**		6.8 / 24
dull	Display remote brightness switching	**0** to **15**	**1**		6.9 / 24
d.oFF SECS	Auto display dimming timer	**0** to **9999**	**0**		6.10 / 25

(*__Optional__)—this function will only be accessible if the relevant option is fitted

Functions in this second table are available only in **CAL** mode or if **ACCS** is set to **ALL**

Display	Function	Range	Default	Your record	Ref/Page
rEC_	Analog output option low display value (*__Optional__)	Any display value	**0**		6.11 / 25
rEC¯	Analog output option high display value (*__Optional__)	Any display value	**1000**		6.12 / 25
rEC	Analog output 1 channel (*__Optional__)	**ch0** to **ch8**	**ch0**		6.13 / 26

(*__Optional__)—this function will only be accessible if the relevant option is fitted

rEC_ Ch2	Second analog output option low display value (*Optional)	Any display value	0		6.14 / 26
rEC^ Ch2	Second analog output option high display value (*Optional)	Any display value	1000		6.15 / 26
rEC2	Analog output 2 channel (*Optional)	ch0 to ch8	ch0		6.16 / 26
drnd	Display rounding	1 to 5000	1		6.17 / 27
dCPt	Decimal point	0, 0.1 etc.	0		6.18 / 27
FLtr	Digital filter	0 to 8	2		6.19 / 27
bAUd rAtE	Baud rate for serial communications	300.600. 1200.2400. 4800.9600. 19.2 or 38.4	9600		6.20 / 28
PrtY	Parity for serial input	nonE.EUEn or Odd	nonE		6.21 / 28
dAtA	Data type	8.bit or 7.bit	8.bit		6.22 / 28
inPt	Input type	r232, r422, r485 or i 20	r232		6.23 / 28
CodE	Data type for display	diSP, ASCI , UAL, ArtH, n.buS, SCAn, nnEA or CS	diSP		6.24 / 29
P.but	P button function	nonE.Hi . Lo.HiLo. tArE or 2Er0	nonE		6.25 / 31
r.in P	Remote input (external input) one function	nonE. P.HLd. d.HLd.Hi . Lo .Hi Lo. tArE.2Er0. SP.Ac .no.Ac or duLL	nonE		6.26 / 31
ACCS	Access mode	OFF.EASY. nonE or ALL	OFF		6.27 / 32
SPAC	Setpoint access mode	A1.A1-2 etc.	A1		6.28 / 32
A1 OPEr	Alarm relay 1 operation mode	inPt, t.out or both	inPt		6.29 / 33
A2 OPEr	Alarm relay 2 operation mode	inPt, t.out or both	inPt		6.30 / 33

(*Optional)—this function will only be accessible if the relevant option is fitted

n.bus Addr	Modbus address	0 to 255	1		6.31 / 33
SCH 1	Address character 1	-2 to 255	- 1		6.32 / 33
SCH2	Address character 2	-2 to 255	- 1		6.33 / 34
SCH3	Address character 3	-2 to 255	- 1		6.34 / 34
tchr	Terminating character	- 1 to 255	13		6.35 / 34
dLAY	Number of characters to skip	0 to 255	0		6.36 / 35
bAct	Number of characters back	0 to 24	0		6.37 / 35
n.Chr	Number of characters to skip from SCH	0 to 10	0		6.38 / 35
I .dPt	Input string decimal point	- 1 to 8	- 1		6.39 / 36
ALPH	Alphabetic characters on or off	on or OFF	OFF		6.40 / 36
POLL InPt	Polling function	on or OFF	OFF		6.41 / 36
POLL dLAY	Polling delay time	0.0 or 20.0	0.0		6.42 / 37
P.ch. 1	First polling character	- 1 to 255	- 1		6.43 / 37
P.ch.2	Second polling character	- 1 to 255	- 1		6.44 / 37
P.ch.3	Third polling character	- 1 to 255	- 1		6.45 / 37
P.ch.4	Fourth polling character	- 1 to 255	- 1		6.46 / 38
P.ch.5	Fifth polling character	- 1 to 255	- 1		6.47 / 38
P.ch.6	Sixth polling character	- 1 to 255	- 1		6.48 / 38
P.ch.7	Seventh polling character	- 1 to 255	- 1		6.49 / 38
P.ch.8	Eighth polling character	- 1 to 255	- 1		6.50 / 38
dS.to	Display timeout	0 to 9999	10		6.51 / 39
t.out	Data string timeout	0.0 to 10.0	1.0		6.52 / 39
A 1	Alarm relay 1 operation channel	ch0 to ch8	ch0		6.53 / 39
A2 to A4	Alarm relay 2 to 4 operation channel	ch0 to ch8	ch0		6.54 / 39
CLr ZEr0	Clear zero	n/a	n/a		6.55 / 40
SCAN CH	Number of channels to scan	0 to 8	0		6.56 / 40
SCAN SECS	Number of seconds between scans	0 to 255	0		6.57 / 40
Ch 1 Addr	Channel 1 address	P 1 to P8 or S 1 to S8 or t 1 to t8	P 1		6.58 / 40

(*__Optional__)—this function will only be accessible if the relevant option is fitted

Ch2 Addr	Channel 2 address	P 1 to P8 or S 1 to S8 or t 1 to t8	P 1		6.59 / 41
Ch3 Addr	Channel 3 address	P 1 to P8 or S 1 to S8 or t 1 to t8	P 1		6.60 / 41
Ch4 Addr	Channel 4 address	P 1 to P8 or S 1 to S8 or t 1 to t8	P 1		6.61 / 41
Ch5 Addr	Channel 5 address	P 1 to P8 or S 1 to S8 or t 1 to t8	P 1		6.62 / 41
Ch6 Addr	Channel 6 address	P 1 to P8 or S 1 to S8 or t 1 to t8	P 1		6.63 / 42
Ch7 Addr	Channel 7 address	P 1 to P8 or S 1 to S8 or t 1 to t8	P 1		6.64 / 42
Ch8 Addr	Channel 8 address	P 1 to P8 or S 1 to S8 or t 1 to t8	P 1		6.65 / 42
Ch 1 dCPt	Channel 1 decimal point	0, 0. 1 etc.	0		6.66 / 42
Ch2 dCPt	Channel 2 decimal point	0, 0. 1 etc.	0		6.67 / 43
Ch3 dCPt	Channel 3 decimal point	0, 0. 1 etc.	0		6.68 / 43
Ch4 dCPt	Channel 4 decimal point	0, 0. 1 etc.	0		6.69 / 43
Ch5 dCPt	Channel 5 decimal point	0, 0. 1 etc.	0		6.70 / 43
Ch6 dCPt	Channel 6 decimal point	0, 0. 1 etc.	0		6.71 / 43
Ch7 dCPt	Channel 7 decimal point	0, 0. 1 etc.	0		6.72 / 44
Ch8 dCPt	Channel 8 decimal point	0, 0. 1 etc.	0		6.73 / 44
Ch0	Channel 0 polarity	both, POS or NEG	both		6.74 / 44
Ch 1	Channel 1 polarity	both, POS or NEG	both		6.75 / 44

(*__Optional__)—this function will only be accessible if the relevant option is fitted

Ch2	Channel 2 polarity	both, POS or NEG	both		6.76 / 45
Ch3	Channel 3 polarity	both, POS or NEG	both		6.77 / 45
Ch4	Channel 4 polarity	both, POS or NEG	both		6.78 / 45
Ch5	Channel 5 polarity	both, POS or NEG	both		6.79 / 45
Ch6	Channel 6 polarity	both, POS or NEG	both		6.80 / 45
Ch7	Channel 7 polarity	both, POS or NEG	both		6.81 / 46
Ch8	Channel 8 polarity	both, POS or NEG	both		6.82 / 46
r.trn bAUd	Baud rate for serial retransmission (*Optional)	300, 600, 1200, 2400, 4800, 9600, 19.2 or 38.4	9600		6.83 / 46
r.trn PrtY	Parity for serial retransmission (*Optional)	NONE, EUEN or Odd	NONE		6.84 / 46
r.trn O.Put	Output mode for serial retransmission (*Optional)	NONE, dI SP, Cont, POLL, Cont, n.buS or A.buS	NONE		6.85 / 47
r.trn Addr	Address for serial retransmission (*Optional)	0 to 31	0		6.86 / 47

(*Optional)—this function will only be accessible if the relevant option is fitted

5.1 Relay table

Record your relay settings in the table below. Note: relays 3 and 4 are optionally fitted.

Display	Relay 1	Relay 2	Relay 3	Relay 4
Rx Lo				
Rx Hi				
Rx HY				
Rx tt				
Rx rt				
Rx n.o or Rx n.c				
Rx SP or Rx t 1 etc.	n/a			
R1 OPEr		n/a	n/a	n/a
R2 OPEr	n/a		n/a	n/a
R1		n/a	n/a	n/a
R2	n/a		n/a	n/a
R3	n/a	n/a		n/a
R4	n/a	n/a	n/a	

6 Explanation of functions

The RM4 setup and calibration functions are configured through a push button sequence. The push buttons located at the front of the instrument are used to alter settings. Two basic access modes are available:

FUNC mode (simple push button sequence) allows access to commonly set up functions such as alarm setpoints.

CAL mode (power up sequence plus push button sequence) allows access to all functions including calibration parameters.

Once CAL or FUNC mode has been entered you can step through the functions, by pressing and releasing the F push button, until the required function is reached. Changes to functions are made by pressing the or push button (in some cases both simultaneously) when the required function is reached. See the flow chart example on the following page.

Entering CAL Mode

1. Remove power from the instrument. Hold in the F button and reapply power. The display will indicate CAL as part of the "wake up messages" when the CAL message is seen you can release the button.

2. When the "wake up" messages have finished and the display has settled down to its normal reading press, then release the F button.

3. Within 2 seconds of releasing the F button press, then release the ▲ and ▼ buttons together. The display will now indicate FUNC followed by the first function.

Note: If step 1 above has been completed then the instrument will remain in this CAL mode state until power is removed. i.e. there is no need to repeat step 1 when accessing function unless power has been removed.

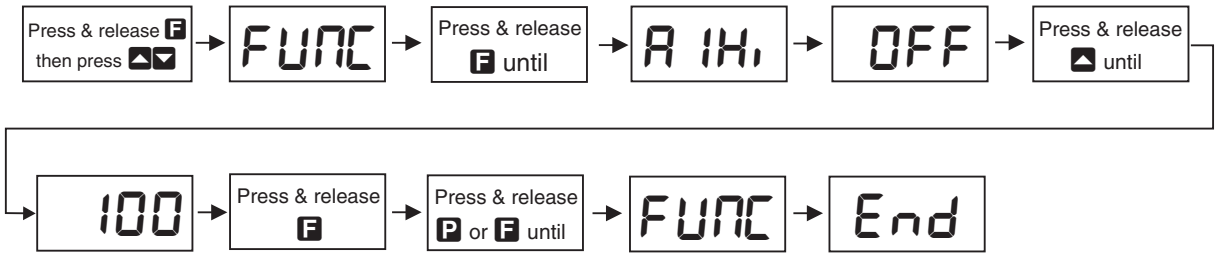
Entering FUNC Mode

No special power up procedure is required to enter FUNC mode.

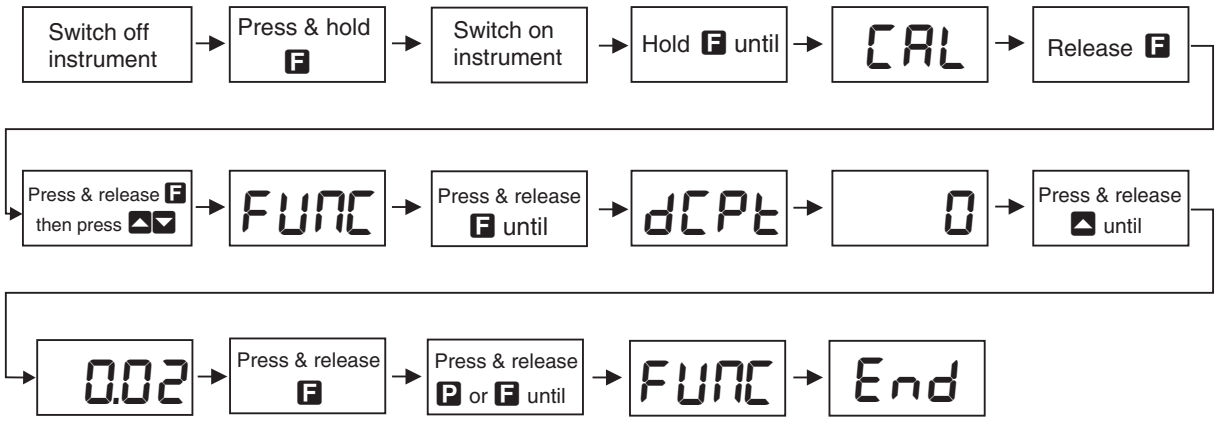
1. When the "wake up" messages have finished and the display has settled down to its normal reading press, then release the F button.

2. Within 2 seconds of releasing the F button press, then release the ▲ and ▼ buttons together. The display will now indicate FUNC followed by the first function.

Example: Entering FUNC mode to change alarm 1 high function A 1H, from OFF to 100



Example: Entering CAL mode to change decimal point function dCPt from 0 to 0.02



Easy alarm relay adjustment access facility

The display has an easy alarm access facility which allows access to the alarm setpoints simply by pressing the F button at the front of the instrument. The first setpoint will then appear and changes to this setpoint may be made to this setpoint via the ▲ or ▼ buttons. Press the F button to accept any changes or to move on to the next setpoint. Note: this easy access also functions in the same manner for the PI control setpoint (relay and/or analog PI output) if PI control is available. The instrument must be set in the manner described below to allow the easy access facility to work:

1. The F.I nP function must be set to SPAC or the ACCS function must be set to EASY.
2. At least one alarm must have a setpoint, nothing will happen if all the alarm setpoints are set to OFF.
3. The SPAC function must be set to allow access to the relays required e.g. if set to A 1-2 then the easy access will work only with alarm relays 1 and 2 even if more relays are fitted.
4. The instrument must be in normal measure mode i.e. if the instrument is powered up so that it is in CAL mode then the easy access will not function. If in doubt remove power from the instrument, wait for a few seconds then apply power again.
5. If the easy access facility is used then the only way to view or alter any other function settings is to power up via CAL mode i.e. there is no entry to FUNC mode functions unless the instrument is powered up in CAL mode.

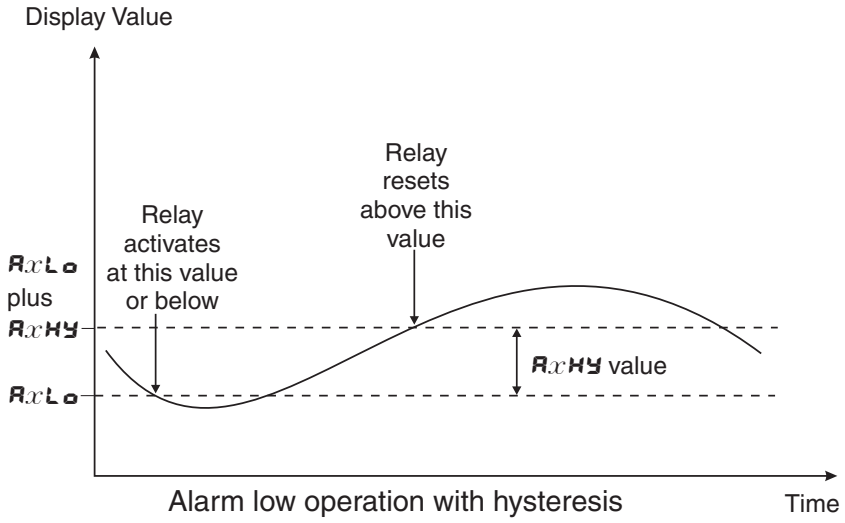
Explanation of Functions

6.1 Alarm relay low setpoint

Display: RxLo
Range: Any display value or OFF
Default Value: OFF

Displays and sets the low setpoint value for the designated alarm relay x. Note x will be replaced by the relay number when displayed e.g. R 1Lo for relay 1. Use this low setpoint function if a relay operation is required when the display value becomes equal to or less than the low setpoint value. To set a low alarm value go to the RxLo function and use the ▲ or ▼ push buttons to set the value required then press F to accept this value. The low alarm setpoint may be disabled by pressing the ▲ and ▼ push buttons simultaneously. When the alarm is disabled the display will indicate OFF. If the relay is allocated both a low and high setpoint then the relay will activate when the value displayed moves outside the band set by the low and high setpoints. The value at which the relay will reset is controlled by the RxHY function.

Example:
If R 1Lo is set to 10 then relay 1 will activate when the display value is 10 or less.



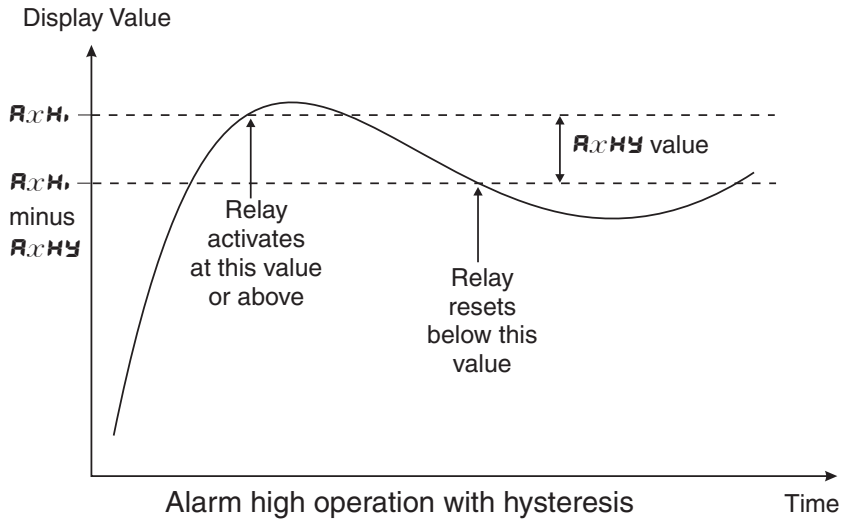
6.2 Alarm relay high setpoint

Display: RxHi
Range: Any display value or OFF
Default Value: OFF

Displays and sets the high setpoint value for the designated alarm relay x. Note x will be replaced by the relay number when displayed e.g. R 1Hi for relay 1. Use this high setpoint function if a relay operation is required when the display value becomes equal to or more than the low setpoint value. To set a high alarm value go to the RxHi function and use the ▲ or ▼ push buttons to set the value required then press F to accept this value. The high alarm setpoint may be disabled by pressing the ▲ and ▼ push buttons simultaneously. When the alarm is disabled the display

will indicate **OFF**. If the relay is allocated both a low and high setpoint then the relay will activate when the value displayed moves outside the band set by the low and high setpoints. The value at which the relay will reset is controlled by the **RxHY** function.

Example:
If **R 1H,** is set to **100** then relay 1 will activate when the display value is **100** or higher.



6.3 Alarm relay hysteresis (deadband)

Display: **RxHY**
Range: **0** to **9999**
Default Value: **10**

Displays and sets the alarm relay hysteresis limit for the designated relay x. Note x will be replaced by the relay number when displayed e.g. **R 1HY** for relay 1. To set a relay hysteresis value go to the **RxHY** function and use the ▲ or ▼ push buttons to set the value required then press **F** to accept this value. The hysteresis value is common to both high and low setpoint values. The hysteresis value may be used to prevent too frequent operation of the relay when the measured value is rising and falling around setpoint value. e.g. if **R 1HY** is set to zero the alarm will activate when the display value reaches the alarm setpoint (for high alarm) and will reset when the display value falls below the setpoint, this can result in repeated on/off switching of the relay at around the setpoint value.

The hysteresis setting operates as follows: In the high alarm mode, once the alarm is activated the input must fall below the setpoint value minus the hysteresis value to reset the alarm. e.g. if **R 1H,** is to **50.0** and **R 1HY** is set to **3.0** then the setpoint output relay will activate once the display value goes to **50.0** or above and will reset when the display value goes below **47.0** i.e. at **46.9** or below. In the low alarm mode, once the alarm is activated the input must rise above the setpoint value plus the hysteresis value to reset the alarm. e.g. if **R 1Lo** is to **20.0** and **R 1HY** is set to **10.0** then the alarm output relay will activate when the display value falls to **20.0** or below and will reset when the display value goes above **30.0** i.e at **30.1** or above. The hysteresis units are expressed in displayed engineering units.

Example: If **R 1H,** is set to **100** and **R 1HY** is set to **10** then relay 1 will activate when the display value is **100** or higher and will reset at a display value of **89** or lower.

6.4 Alarm relay trip time

Display: Axtt
Range: 0 to 9999
Default Value: 0

Displays and sets the alarm trip time in seconds. The trip time is common for both alarm high and low setpoint values. The trip time provides a time delay before the alarm relay will activate when an alarm condition is present. The alarm condition must be present continuously for the whole trip time period before the alarm will activate. If the input moves out of alarm condition during this period the timer will reset and the full time delay will be restored. This trip time delay is useful for preventing an alarm trip due to short non critical deviations from setpoint. The trip time is selectable over 0 to 9999 seconds. To set a trip time value go to the Axtt function and use the ▲ or ▼ push buttons to set the value required then press F to accept this value.

Example: If A 1tt is set to 5 seconds then the display must indicate an alarm value for a full 5 seconds before relay 1 will activate.

6.5 Alarm relay reset time

Display: Axrt
Range: 0 to 9999
Default Value: 0

Displays and sets the alarm reset delay time in seconds. The reset time is common for both alarm high and low setpoint values. With the alarm condition is removed the alarm relay will stay in its alarm condition for the time selected as the reset time. If the input moves back into alarm condition during this period the timer will reset and the full time delay will be restored. The reset time is selectable over 0 to 9999 seconds. To set a reset time value go to the Axrt function and use the ▲ or ▼ push buttons to set the value required then press F to accept this value.

Example: If A 1rt is set to 10 seconds then the resetting of alarm relay 1 will be delayed by 10 seconds.

6.6 Alarm relay normally open/closed

Display: Axn.o or Axn.c
Range: Axn.o or Axn.c
Default Value: Axn.o

Displays and sets the setpoint alarm relay x action to normally open (de-energised) or normally closed (energised), when no alarm condition is present. Since the relay will always open when power is removed a normally closed alarm is often used to provide a power failure alarm indication. To set the alarm relay for normally open or closed go to the Axn.o or Axn.c function and use the ▲ or ▼ push buttons to set the required operation then press F to accept this selection. **Example:** If set to A 1n.o alarm relay 1 will be open circuit when the display is outside alarm condition and will be closed (short circuit across terminals) when the display is in alarm condition.

6.7 Alarm relay setpoint or trailing operation

Display: Ax SP or Ax t 1 etc.
Range: Ax SP or Ax t 1 etc.
Default Value: Ax SP

Relay operation independent setpoint or trailing setpoint, this function will not be seen unless extra optional relays are fitted. Each alarm, except relay 1, may be programmed to operate with an independent setpoint value or may be linked to operate at a fixed difference to another relay setpoint, known as trailing operation. The operation is as follows:

Alarm 1 (A1) is always independent. Alarm 2 (A2) may be independent or may be linked to Alarm 1. Alarm 3 (A3) may be independent or may be linked to Alarm 1 or Alarm 2. Alarm 4 (A4) may be independent or may be linked to Alarm 1, Alarm 2 or Alarm 3. The operation of each alarm is selectable by selecting, for example, (Alarm 4) A4.SP = Alarm 4 normal setpoint or A4.t 1 = Alarm 4 trailing Alarm 1 or A4.t2 = Alarm 4 trailing Alarm 2 or A4.t3 = Alarm 4 trailing Alarm 3. For trailing set points the setpoint value is entered as the difference from the setpoint being trailed. If the trailing setpoint is to operate ahead of the prime setpoint then the value is entered as a positive number and if operating behind the prime setpoint then the value is entered as a negative number.

Example: With Alarm 2 set to trail alarm 1, if A 1H, is set to 1000 and A2H, is set to 50 then Alarm 1 will activate at 1000 and alarm 2 will activate at 1050 (i.e. 1000 + 50). If Alarm 2 had been set at -50 then alarm 2 would activate at 950 (i.e. 1000 – 50).

6.8 Display brightness

Display: br 9t
Range: 1 to 15
Default Value: 15

Displays and sets the digital display brightness. The display brightness is selectable from 1 to 15, where 1 = lowest intensity and 15 = highest intensity. This function is useful for improving the display readability in dark areas or to reduce the power consumption of the instrument. See also the dull function. To set brightness level go to the br 9t function and use the ▲ or ▼ push buttons to set the value required then press F to accept this value.

6.9 Display remote brightness switching

Display: dull
Range: 0 to 15
Default Value: 1

Displays and sets the level for remote input brightness switching, see r.1 nP function. When a remote input is set to dull the remote input can be used to switch between the display brightness level set by the br 9t function 6.8 and the display brightness set by the dull function. The display dull level is selectable from 0 to 15, where 0 = lowest intensity and 15 = highest intensity. This function is useful in reducing glare when the display needs to be viewed in both light and

dark ambient light levels. To set dull level go to the dULL function and use the ▲ or ▼ push buttons to set the value required then press F to accept this value. The d.oFF SECS function (automatic display blanking or dulling) will also cause the dULL function to appear if the d.oFF SECS function is enabled i.e. set to any value other than 0.

Example:
With dULL set to 4 and brgt set to 15 and the r.1 nP function set to dULL the display brightness will change from the 15 level to 4 when a switch connected to the remote input terminals is activated.

6.10 Auto display dimming timer

Display: d.oFF SECS
Range: 0 to 9999
Default Value: 0

This function allows a time to be set after which the display brightness (set by the brgt function) will automatically be set to the level set at the dULL function. The auto dimming feature can be used to reduce power consumption. The function can be set to any value between 0 and 9999 seconds. A setting of 0 disables the auto dimming. The display brightness can be restored by pressing any of the instruments front push buttons. The display brightness will also be restored whilst one or more alarm relays is activated.

6.11 Analog output option low value

Display: rEC_
Range: Any display value
Default Value: 0

Seen only when analog retransmission option fitted. Refer to the separate "RM4 Din Rail Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details and link settings. Displays and sets the analog retransmission (4–20mA, 0–1V or 0–10V, link selectable) output low value (4mA or 0V) in displayed engineering units. To set the analog output low value go to the rEC_ function and use the ▲ or ▼ push buttons to set the required value then press F to accept this selection.

Example:
If it is required to retransmit 4mA when the display indicates 0 then select 0 in this function using the ▲ or ▼ button.

6.12 Analog output option high value

Display: rEC⁻
Range: Any display value
Default Value: 1000

Seen only when analog retransmission option fitted. Refer to the separate "RM4 Din Rail Meter

Optional Output Addendum" booklet supplied when this option is fitted for wiring details and link settings. Displays and sets the analog retransmission (4–20mA, 0–1V or 0–10V, link selectable) output high display value (20mA, 1V or 10V) in displayed engineering units. To set the analog output high value go to the rEC⁻ function and use the ▲ or ▼ push buttons to set the required value then press F to accept this selection.

Example:
If it is required to retransmit 20mA when the display indicates 50 then select 50 in this function using the ▲ or ▼ button.

6.13 Analog output 1 channel

Display: rEC
Range: ch0 to ch8
Default Value: ch0

Seen only when analog retransmission option fitted. Refer to the separate "RM4 Din Rail Meter Optional Output Addendum" booklet supplied when this option is fitted for wiring details and link settings. Analog output 1 channel. Select from ch0 to ch8. In dnEA mode select ch 1 for wind direction retransmission and ch2 for wind speed. In Arth mode ch0 is the arithmetic sum. ch0 should not be selected for any mode other than Arth.

6.14 Second analog output option low value

Display: rEC_ Ch2
Range: Any display value
Default Value: 0

See rEC_ function 6.11 for description of operation.

6.15 Second analog output option high value

Display: rEC⁻ Ch2
Range: Any display value
Default Value: 1000

See rEC⁻ function 6.12 for description of operation.

6.16 Analog output 2 channel

Display: rEC2
Range: ch0 to ch8
Default Value: ch0

Seen only when analog retransmission option fitted. Refer to the separate "RM4 Din Rail Meter

Optional Output Addendum" booklet supplied when this option is fitted for wiring details and link settings. Analog output 2 channel. Select from **ch0** to **ch8**. In **MnEA** mode select **ch 1** for wind direction retransmission and **ch2** for wind speed. In **Arth** mode **ch0** is the arithmetic sum. **ch0** should not be selected for any mode other than **Arth**.

6.17 Display rounding

Display: **drnd**
Range: **1** to **5000**
Default Value: **1**

Displays and sets the display rounding value. This value may be set to 1 - 5000 displayed units. Display rounding is useful for reducing the instrument resolution without loss of accuracy in applications where it is undesirable to display to a fine tolerance. To set the display rounding value go to the **drnd** function and use the ▲ or ▼ push buttons to set the required value then press **F** to accept this selection.

Example:
If set to **10** the display values will change in multiples of 10 only i.e. display moves from **10** to **20** to **30** etc.

6.18 Decimal point

Display: **dCPt**
Range: **0**, **0.1** etc.
Default Value: **0**

Displays and sets the decimal point. By pressing the ▲ or ▼ pushbutton at the **dCPt** function the decimal point position may be set. The display will indicate as follows: **0** (no decimal point), **0.1** (1 decimal place), **0.02** (2 decimal places), **0.003** (3 decimal places) or **0.0004**(4 decimal places). Note if the decimal point is altered the display may need to be recalibrated and alarm etc. settings checked. In arithmetic mode this function sets the decimal point position for the result channel i.e. channel 0

6.19 Digital filter

Display: **FLtr**
Range: **0** to **8**
Default Value: **2**

Displays and sets the digital filter value. Digital filtering uses a weighted average method of determining the display value and is used for reducing display value variation due to short term interference. The digital filter range is selectable from **0** to **8**, where **0** = none and **8** = most filtering. Use ▲ or ▼ at the **FLtr** function to alter the filter level if required. Note that the higher the filter setting the longer the display may take to reach its final value when the input is changed, similarly the relay operation and any output options will be slowed down when the filter

setting is increased. To set the digital filter value go to the FLtr function and use the ▲ or ▼ push buttons to set the required value then press F to accept this selection.

6.20 Baud rate for optional serial communications

Display: bAUd rAtE
Range: 300, 600, 1200, 2400, 4800, 9600, 19.2 or 38.4
Default Value: 9600

Select from 300, 600, 1200, 2400, 4800, 9600, 19.2 or 38.4 baud. This must be set to match the baud rate selected at the sending device.

6.21 Parity for serial input

Display: PrtY
Range: nonE, EUEn or Odd
Default Value: nonE

Select parity check to either nonE, EUEn or Odd. This must be set to match the parity selected at the sending device.

6.22 Data type

Display: dAtA
Range: 8.bit or 7.bit
Default Value: 8.bit

Displays and selects the input data type. Select either 8.bit for 8 data bits plus 1 stop bit or 7.bit for 7 data bits plus 1 stop bit. This must be set to match the number of data bits of the sending device.

6.23 Input type

Display: inPt
Range: r232, r422, r485 or i 20
Default Value: r232

Select input type used RS232, RS422, RS485 or serial 20mA current loop. Choices appear as: r232, r422, r485 or i 20. The hardware for the input type is factory configured and changing this function does not change the input type but it is important that this function matches the hardware setup.

6.24 Data type for display

Display: CodE
Range: di SP, ASCI , UAL, ArtH, n.buS, SCAn, nnEA or CS
Default Value: di SP

One of eight different display modes can be selected in this function, namely di SP, ASCI , UAL, ArtH, n.buS, SCAn, nnEA or CS. Note: see the separate Addendum booklet for details of arithmetic mode ArtH and Wind speed/direction nnEA operation. See also the "Examples" section at the end of this chapter. Note that if the mode is altered it is necessary to switch the instrument off then on again to reset to the new mode.

- **di SP mode**
  With di SP selected (image mode) the display expects to see an input in raw data format from another instrument. This mode is generally only used when the display is connected to an instrument from the same manufacturer. This mode is not used with any other source. The data format expected is: <ESC>Incccc

Where:	<ESC>	is 27 Dec or 1B Hex
	I	is the ASCII character "I"
	n	is the number of image characters to follow
	cccc	are the image characters in Hex. format

- **ASCI mode**
  ASCI selects ASCII type input data, the input data will then be displayed without modification (see also ALPH function as this can also affect what is displayed). Displays of characters in ALPH mode are left justified. Any leading zeroes received will be visible in this mode e.g. data received such as 00873 will be displayed as 00873.

- **UAL mode**
  With UAL selected (numeric or value mode) the incoming characters will not be displayed unless they are numeric characters or a negative sign "-", the characters will be read until a terminating character (see tchr) is found. In circumstances, e.g. when terminating characters are not sent by the transmitting device, the instrument can be programmed to look for a constant transmitted character which occurs before to the required display values rather than at the end of the string. In this instance the SCH 1 character can be used and the display told to display a number of characters after this character (see n.Chr function). Once the tchr or SCH 1 character is found the numeric value will be updated and displayed. If a non numeric character is found then the conversion will cease at that point. Note that ASCII control characters 00 Decimal (Null) to 31 Decimal (Unit Separator) will be ignored if they are seen as part of the string and will not cause the conversion to cease when encountered, they will however not be ignored if used as a start character (SCH 1, 2 or 3) or the terminating character set at the tchr function. The numeric value is filtered after conversion the FLtr setting determines the level of filtering. Note: In UAL mode any leading zeroes transmitted will be ignored e.g. data received such as -00345 will be displayed as -345.

- **SCAn mode**
  With SCAn selected the instrument can be made to scan and display in turn values from up to 8 other devices or channels from the same manufacturer. To operate in scan mode select the number of channels to scan at the SCAn CH function then select the automatic

scanning period at the SCAN SECS function (the scanning period sets the time for the display automatic scrolling, note that the ▲ or ▼ button can also be used to manually scroll between channels) then set the address for each channel at the Ch 1Addr, Ch2Addr etc. functions. The address choices are P 1.P2.P3.P4.P5.P6.P7.P8.S 1.S2.S3.S4.S5. S6.S7 or S8. A 1 to A8 and t 1 to t8 are also choices but are only for use in polling channels 1 to 8 of a model TP488 scanning monitor. The letters P and S refer to the primary (P) or secondary (S) display values from the transmitting instrument e.g. the primary display value of a conductivity instrument will be the conductivity value on the display whilst the secondary display value would be the solution temperature. The number refers to the address of the instrument. For example if Ch 1 Addr function has P3 selected then the primary display value from the instrument with address 3 will be requested as the channel 1 input.

- **n.buS mode**
  With n.buS selected the display will accept a modbus RTU input. An address (1 to 255) must be selected at the n.buS Add function to correspond to the address selected at the host device. The instrument accepts modbus command 6 "preset single register" and command 16 "preset multiple registers". The command 6 or 16 information sent can be used to preset four registers, these are:

Register 0	Decimal point position
Register 1	Input taken as an unsigned 16 bit number (0 to 65535)
Register 2	Input taken as a signed 16 bit number (-32767 to 32767)
Register 3	Signed 32 bit number high order 16 bits
Register 4	Signed 32 bit number low order 16 bits

  Registers 3 and 4 are used together to form a 32 bit number. The display will be updated when the low order register is set.

- **nnEA mode**
  With nnEA selected the instrument must be connected to model WS-MMW-005 solid state wind speed and direction sensor or similar NMEA output sensor. See "Wind Speed and Direction NMEA mode" chapter for wiring details and communications setup requirements.

- **CS mode**
  In CS mode up to 8 values can be sent in comma separated form. The number of values to be displayed is set at the SCAN CH function. The ▲ or ▼ buttons can be used to view these values or the display can be set to scan between values automatically via the SCAN SECS function. An indicator will be displayed just prior to the values e.g. CH2 to indicate which value will appear next. The format required for this mode is:
  <value1>,<value2>,.....<value8><CR>
  Where: <CR> is the carriage return character.
  The CS mode can be used with the TP488 scanning monitor and other multi output monitors when the other units OPut function is set to Cont.

6.25 P button function

Display: P.but

Range: NONE .Hi .Lo .HI Lo .tARE or 2ERO

Default Value: NONE

P button function - The following applies only when the CodE function is set to UAL. The P button may be set to operate some of the remote input functions. With the tare and zero functions, to prevent accidental operation, the P button must be held pressed for 2-3 seconds before the display will tare or zero, momentary operation of the tare function will cause the gross value to be displayed, preceded by the message grOS. If both the remote input and P button function are operated simultaneously the P button will override the remote input. The functions below are as described in the r.i nP function below. Functions available are: NONE .Hi .Lo . Hi Lo .tARE or 2ERO

6.26 Remote input function

Display: r.i nP

Range: NONE . P.HLd . d.HLd . Hi . Lo . Hi Lo . tARE . 2ERO . SP.Ac . no.Ac or duLL

Default Value: NONE

Remote input function - When these remote input terminals are short circuited, via a switch, relay, keyswitch etc. the instrument will perform the selected remote input function. A message will flash to indicate which function has been selected when the remote input pins are short circuited. The remote input functions are as follows:

NONE - no remote function required i.e. activating the remote input has no effect.

P.HLd - peak hold. The display will show the peak value (highest positive value) only whilst the remote input terminals are short circuited i.e. the display value can rise but not fall whilst the input terminals are short circuited. The message P.HLd will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the peak hold function is active.

d.HLd - display hold. The display value will be held whilst the remote input terminals are short circuited. The message d.HLd will appear briefly every 8 seconds whilst the input terminals are short circuited to indicate that the display hold function is active.

Hi - peak memory. The peak value stored in memory will be displayed if the remote input terminals are short circuited, if the short circuit is momentary then the display will return to normal measurement after 20 seconds. If the short circuit is held for 2 to 3 seconds or the power is removed from the instrument then the memory will be reset.

Lo - valley memory. The minimum value stored in memory will be displayed. Otherwise operates in the same manner as the Hi function described above.

Hi Lo - toggle between Hi and Lo displays. This function allows the remote input to be used to toggle between peak and valley memory displays. The first operation of the remote input will cause the peak memory value to be displayed, the next operation will give a valley memory display. PHi or PLo will flash before each display to give an indication of display type.

tARE - display tare. Short circuiting the remote input pins momentarily will allow toggling between nett and gross values (shown as **NEtt** and **grOS**). If the remote input is short circuited for approx. 2 seconds the display will be tared and will show zero. The tare will be lost if power is removed.

2Er0 - display zero. Zeroes the display in same manner as the tare function except that the zero is not lost when power is removed and the display will zero as soon as the remote input is shorted. When the **2Er0** operation is used the gross value cannot be recalled and the input at the time of the **2Er0** operation will become the new zero point.

SP.Ac - setpoint access only. This blocks access to any functions except the alarm setpoint functions unless the remote input pins are short circuited or entry is made via **CAL** mode or if the **ACCS** function is set to **ALL**.

no.Ac - no access. This blocks access to all functions unless the remote input pins are short circuited or entry is made via **CAL** mode or if the **ACCS** function is set to **ALL**.

dULL - display brightness control. The remote input can be used to change the display brightness. When this mode is selected the display brightness can be switched, via the remote input terminals, between the brightness level set at the **brgt** function and the brightness level set at the **dULL** function.

6.27 Access mode

Display: **ACCS**
Range: **OFF**.**EASY**.**NONE** or **ALL**
Default Value: **OFF**

Access mode - the access mode function **ACCS** has four possible settings namely **OFF**.**EASY**.**NONE** and **ALL**. If set to **OFF** the mode function has no effect on alarm relay operation. If set to **EASY** the "easy alarm access" mode will be activated. Refer to "Easy alarm relay adjustment access facility" page 20. If set to **NONE** there will be no access to any functions via **FUNC** mode, entry via **CAL** mode must be made to gain access to alarm and calibration functions. If set to **ALL** then access to all functions, including calibration functions, can be gained via **FUNC** mode.

6.28 Setpoint access mode

Display: **SPAC**
Range: **A 1**.**A 1-2** etc.
Default Value: **A 1**

Setpoint access - sets the access via **FUNC** mode and "easy alarm access" mode to the alarm relay setpoints. Two relays are fitted as standard, two more are optionally available. The following choices are available:
A 1 - Allows setpoint access to alarm relay 1 only.
A 1-2 - Allows setpoint access to alarm relays 1 and 2 only.
A 1-3 - Allows setpoint access to alarm relays 1, 2 and 3
A 1-4 - Allows setpoint access to alarm relays 1, 2, 3 and 4

The remote input function (**r.i np**) must be set to **SP.AC** for this function to operate. Note: Only the setpoints which have been given a value will be accessible e.g. if **A 1H,** is set to **OFF** then there will be no access to the **A 1H,** function when **SPAC** is used.

6.29 Alarm relay 1 operation mode

Display: **A 1 OPEr**
Range: **i nPt**, **t.out** or **both**
Default Value: **i nPt**

Relay 1 operation mode - relay 1 can be made to operate from the input value (e.g. at the **A 1Lo** or **A 1H,** value, applicable when **CodE** is set to **URL** or **n.buS** only) or when the display blanks due to the timeout value being exceeded (timeout value set at the **dS.to** function). If set to **both** the relay will operate from the display value or if communications fails.

6.30 Alarm relay 2 operation mode

Display: **A2 OPEr**
Range: **i nPt**, **t.out** or **both**
Default Value: **i nPt**

Relay 2 operation mode - relay 2 can be made to operate from the input value (e.g. at the **A 1Lo** or **A 1H,** value, applicable when **CodE** is set to **URL** or **n.buS** only) or when the display blanks due to the timeout value being exceeded (timeout value set at the **dS.to** function). If set to **both** the relay will operate from the display value or if communications fails. Note that this function is only available for the first 2 relays fitted.

6.31 Modbus address

Display: **n.buS Addr**
Range: **0** to **255**
Default Value: **1**

Seen only when **CodE** function is set to **n.buS**. An address (0 to 255) must be selected to correspond to the address selected at the host device when Modbus communications is being used. Note: address 0 is available but should not be used with Modbus communications.

6.32 Address character 1

Display: **SCH 1**
Range: **-2** to **255**
Default Value: **- 1**

Seen only when **CodE** function = **URL** or **ASCI** . When a string is sent the instrument will look for three address characters, **SCH 1**, **SCH2** and **SCH3**. If these character do not appear, one after the

other, then the string of data will not be accepted and will not be displayed. Selecting **-1** disables the **SCH** and no matching will be required for that character. Selecting **-2** means "dont care" and any character will be taken as a match (note that a missing character will not constitute a match). Valid characters are -2 to 255 Decimal. **SCH1** is the first start of text character. The use of one or more start of text characters allows addressing of the display in multidrop applications using RS485. If data is required to be displayed by only selected displays on a multidrop line then the data can be preceded by an address which matches the **SCH** settings in the instruments required. The **SCH1** character can also be used in conjunction with the **N.Chr** function to force the display to show only a certain number of characters following the SCH1 character. This method cannot be used with either **SCH2** or **SCH3**. For example if the data string is always preceded by the letter M e.g. M345678 then setting **SCH1** to **77** (decimal form of the ASCII character M) and **N.Chr** to **3** will mean that the display will show **345** i.e. the three characters following the M character.

6.33 Address character 2

Display: **SCH2**
Range: **-2** to **255**
Default Value: **-1**

Seen only when **CodE** function = **URL** or **ASCI** . See function 6.32 for details.

6.34 Address character 3

Display: **SCH3**
Range: **-2** to **255**
Default Value: **-1**

Seen only when **CodE** function = **URL** or **ASCI** . See function 6.32 for details.

6.35 Terminating character

Display: **tchr**
Range: **-1** to **255**
Default Value: **13**

Seen only when **CodE** function = **URL** or **ASCI** . Terminating character, default is **13** (the decimal equivalent of the ASCII carriage return <CR>). This character is recognised as the end of transmission for a certain input stream. The next character received will be interpreted as the start of the next input stream. A setting of **-1** means that no terminating character is used.

6.36 Number of characters to skip

Display: dLAY
Range: 0 to 255
Default Value: 0

Seen only when CodE function = UAL or ASCI . Select the numbers of characters in front of the input string to skip before displaying (may be set from 0 to 200, default is 0 [off]). This allows the display to skip a certain number of characters in the input string before starting the display. This is useful for skipping unwanted data such as control characters etc., which may be sent by the instruments along with the display information. For example if dLAY is set to 5 then 678 will be displayed from the following example string: <STX>12345678<CR> i.e. the first 5 characters of the string will be ignored. Note that in UAL mode the values displayed will be right justified and in ASCI mode the display is left justified e.g. for this example using a 4 digit display <BLANK>678 will be seen in UAL mode whereas in ASCI mode the value will displayed as 678<BLANK> for a 4 digit display.

6.37 Number of characters to skip backwards

Display: bAcK
Range: 0 to 24
Default Value: 0

Seen only when CodE function = UAL or ASCI . Number of characters back from the terminating character to skip, default is 0 [off]. The display will wait for the terminating character and will then skip back over the last X characters in front to the terminating character with the X value being the value set in this function. For example if the terminating character tchr is set to 13 (i.e. carriage return <CR>) and bAcK is set to 4 then 1234 will be displayed from the example string <STX>12345678<CR>. For the same input string the display would show 12345678 if the bAcK function was set to 0 and the display had enough digits to show this value. If the number of display digits is too few the overrange message -or- will be seen in UAL mode or the most significant values which will fit on the display will be displayed in ASCI mode. Both ASCI an UAL mode values will be right justified when the bAcK function is used and the display value is less than the number of digits on the display.

6.38 Number of characters to skip from SCH character

Display: n.Chr
Range: 0 to 10
Default Value: 0

Seen only when CodE function = UAL or ASCI . Normally used only when no consistent end of text character is being transmitted and operates in a similar manner to the dLAY function. In most circumstances the dLAY or bACt function would be used in preference to this function. If the length of the input data string is likely vary, or the position of the required display data can vary in the string, but the required data to be displayed is always a set number of bytes away from a constant character which can be used as the SCH character then the n.Chr function can be used

instead of the dLAY function. This function sets the number of characters to be extracted from the data string immediately following the SCH 1 (or SCH2 if used or SCH3 if used) character. If this function is not required it should be left at the default setting of 0 which will disable the function. For example if SCH 1 is used and SCH2 and 3 are disabled and the n.Chr function is set to 3 then the 3 characters after the SCH 1 character will be displayed. See also the SCH 1, SCH2 and SCH3 functions.

6.39 Input string decimal point place

Display: 1 .dPt
Range: -1 to 8
Default Value: -1

In some systems the transmitting unit may display a decimal point position but not transmit the decimal point as part of the serial data. The 1 .dPt can be used to inform the instrument of the required position of the decimal point on the display. The decimal point position of the result shown on the display is set via the dCPt function. If the 1 .dPt function is not needed then it should be left at the default setting of -1 which will disable the function.

6.40 Alphabetic character display on or off

Display: ALPH
Range: on or OFF
Default Value: OFF

Seen only when CodE function = UAL or ASCI . Set this function to OFF to filter alpha characters from the input stream i.e. only numeric characters will be displayed and alpha characters ignored. When set to on the instrument will display both alpha and numeric characters. Note: only a limited number of alpha characters may be displayed due to the nature of 7 segment displays, non displayable characters (e.g. W and X) will be ignored.

6.41 Polling function

Display: POLL 1 nPt
Range: on or OFF
Default Value: OFF

Seen only when CodE function = UAL or ASCI . The instrument has the ability to transmit up to eight characters for polling purposes. This ability to poll is used when the instrument is to display data from a source which requires a polling command before it will communicate. The characters are set by functions P.ch. 1 to P.ch.8 and the repeat rate for this polling is set by the POLL dLAY function. If POLL 1 nPt is set to OFF then no characters will be transmitted and the other polling functions will not be seen. If set to on then the characters selected will be transmitted at the rate selected by the POLL dLAY function. This ability to poll is used when the instrument is to display data from a source which requires a polling command before it will communicate.

6.42 Polling delay time

Display: POLL dLAY
Range: 0.0 or 20.0
Default Value: 0.0

Seen only when CodE function = UAL or ASCI and POLL InPt function is set to on. When the polling facility is being used the POLL dLAY function sets the repeat rate, in seconds, of the poll command. The time may be set from 0.0 seconds (as fast as the baud rate will allow) to 20.0 seconds.

6.43 First polling character

Display: P.ch. 1
Range: -1 to 255
Default Value: -1

Seen only when CodE function = UAL or ASCI and POLL InPt function is set to on. Each of the eight poll command characters can be set from -1 to 255 decimal. If set to -1 then the character is ignored, if set to any other number then the equivalent ASCII character for that number will be sent. Characters 0 to 31 are special control characters such as "carriage return" and "start of text". Use as many "P.ch" characters as required by your system and set the remaining characters to -1 so that they are ignored.

6.44 Second polling character

Display: P.ch.2
Range: -1 to 255
Default Value: -1

Refer to function 6.43.

6.45 Third polling character

Display: P.ch.3
Range: -1 to 255
Default Value: -1

Refer to function 6.43.

6.46 Fourth polling character

Display: P.ch.4
Range: -1 to 255
Default Value: -1

Refer to function 6.43.

6.47 Fifth polling character

Display: P.ch.5
Range: -1 to 255
Default Value: -1

Refer to function 6.43.

6.48 Sixth polling character

Display: P.ch.6
Range: -1 to 255
Default Value: -1

Refer to function 6.43.

6.49 Seventh polling character

Display: P.ch.7
Range: -1 to 255
Default Value: -1

Refer to function 6.43.

6.50 Eighth polling character

Display: P.ch.8
Range: -1 to 255
Default Value: -1

Refer to function 6.43.

6.51 Display timeout

Display: dS.to
Range: 0 to 9999
Default Value: 10

This function allows the user to set a timeout value for a valid display. Valid times are 0 to 9999 seconds, a setting of 0 disables the timeout. If a new data stream is not received before the timeout value is reached then the display will be blanked.

6.52 Data string timeout

Display: t.out
Range: 0.0 to 10.0
Default Value: 1.0

This function allows the user to set a timeout value for the data stream. Valid times are 0.0 to 10.0 seconds, a setting of 0.0 disables the timeout. The timeout will cause the current data stream to be ignored if the time gap between characters in the stream exceeds the t.out value. This function helps to prevent false displays when the data stream is interrupted.

6.53 Alarm relay 1 operation channel

Display: A 1
Range: ch0 to ch8
Default Value: ch0

Alarm relay 1 allocation - applicable only to ArtH, nnEA, SCAn and CS modes. Allows relay 1 to be allocated to one channel. Settings available are ch0, ch 1, ch2, ch3, ch4, ch5, ch6, ch7 or ch8. In nnEA mode ch 1 represents wind direction and ch2 represents wind speed. In ArtH mode ch0 represents the arithmetic result. ch0 should not be selected for any other mode.

6.54 Alarm relay 2 to 4 operation channel

Display: A2 to A4
Range: ch0 to ch8
Default Value: ch0

Alarm relay allocation for relays 2, 3, and 4 - applicable only to ArtH, nnEA, SCAn and CS modes. Note: relays 3 and 4 are optional. See section 6.53

6.55 Clear zero

Display: CLr ZERO
Range: n/a
Default Value: n/a

Seen only when CodE function = UAL or ArtH. Allows any zero operations performed via the remote input or P button to be cleared. Pressing the ▲ and ▼ buttons simultaneously will clear the zero offset, the message CLrd will be seen, confirming the zero clearing operation is completed. The instrument will then return to displaying the value of the string sent.

6.56 Number of channels to scan

Display: SCAN CH
Range: 0 to 8
Default Value: 0

Seen only when CodE function = SCAN or CS. Select the number of channels from 0 to 8. The SCAN mode allows up to 8 instruments or channels from the same manufacturer as this instrument to be connected and polled individually. A different polled address must be set for each input channel and a scan period set. The display in scan mode will show the value to 3 digits followed by a space followed by the channel number being shown.

The CS mode allows up to eight values to be displayed the ▲ or ▼ button can be used to toggle between values or the display set to scan automatically (see function 6.57). An indicator e.g. CH2 will be seen prior to the value to indicate which value is being viewed.

6.57 Number of seconds between scans

Display: SCAN SECS
Range: 0 to 255
Default Value: 0

Seen only when CodE function is set to SCAN, CS or nnEA. Selects the number of seconds between channel scans or between wind speed and direction if CodE function is set to nnEA. The scan period can be set from 0 to 255 seconds. If set to 0 the display will not automatically scroll between channels and the ▲ or ▼ button must be used to change the channel displayed. Note the display will not automatically scan if it is in CAL mode.

6.58 Channel 1 address

Display: Ch 1 Addr
Range: P 1 to P8 or S 1 to S8 or t 1 to t8
Default Value: P 1

Seen only when CodE function is set to SCAN or ArtH. The instruments connected to the display for scanning purposes must be of the same manufacture this instrument. These units

allow a primary and in some cases secondary values to be sent. Refer to the separate manuals supplied when this option is fitted to see if secondary values are available for that instrument. The primary value is the main display value for that instrument e.g. For a conductivity instrument the conductivity would be the primary value and the temperature the secondary. Addresses available are **P 1** to **P8** (to poll for primary values), **S 1** to **S8** (to poll for secondary values) and **t 1** to **t8** (to poll a channel of model TP488 scanning monitor). The numerical value refers to the channel number of a TP488 scanning monitor, for other instruments the numerical value is the address which is set at the **Addr** function of the instrument being polled. For example if **Ch2 Addr** is set to **P2** then the value will be returned will be the primary display value from the instrument whose **Addr** function is set to **2**.

6.59 Channel 2 address

Display: **Ch2 Addr**
Range: **P 1** to **P8** or **S 1** to **S8** or **t 1** to **t8**
Default Value: **P 1**

Seen only when **CodE** function is set to **SCAN** or **Arth**. Scan address for channel 2, see function 6.58 for further information.

6.60 Channel 3 address

Display: **Ch3 Addr**
Range: **P 1** to **P8** or **S 1** to **S8** or **t 1** to **t8**
Default Value: **P 1**

Seen only when **CodE** function is set to **SCAN** or **Arth**. Scan address for channel 3, see function 6.58 for further information.

6.61 Channel 4 address

Display: **Ch4 Addr**
Range: **P 1** to **P8** or **S 1** to **S8** or **t 1** to **t8**
Default Value: **P 1**

Seen only when **CodE** function is set to **SCAN** or **Arth**. Scan address for channel 4, see function 6.58 for further information.

6.62 Channel 5 address

Display: **Ch5 Addr**
Range: **P 1** to **P8** or **S 1** to **S8** or **t 1** to **t8**
Default Value: **P 1**

Seen only when **CodE** function is set to **SCAN** or **Arth**. Scan address for channel 5, see function

6.58 for further information.

6.63 Channel 6 address

Display: Ch6 Addr
Range: P 1 to P8 or S 1 to S8 or t 1 to t8
Default Value: P 1

Seen only when CodE function is set to SCAN or Arth. Scan address for channel 6, see function 6.58 for further information.

6.64 Channel 7 address

Display: Ch7 Addr
Range: P 1 to P8 or S 1 to S8 or t 1 to t8
Default Value: P 1

Seen only when CodE function is set to SCAN or Arth. Scan address for channel 7, see function 6.58 for further information.

6.65 Channel 8 address

Display: Ch8 Addr
Range: P 1 to P8 or S 1 to S8 or t 1 to t8
Default Value: P 1

Seen only when CodE function is set to SCAN or Arth. Scan address for channel 8, see function 6.58 for further information.

6.66 Channel 1 decimal point

Display: Ch 1 dCPt
Range: 0, 0.1 etc.
Default Value: 0

Seen only in CodE = Arth mode. Displays and sets the decimal point for input channel 1. By pressing the ▲ or ▼ pushbuttons the decimal point position may be set. The display will indicate as follows: 0 (no decimal point), 0.1 (1 decimal place), 0.02 (2 decimal places) etc.

6.67 Channel 2 decimal point

Display: Ch2 dCPt
Range: 0, 0.1 etc.
Default Value: 0

Seen only in CodE = ArtH mode. Displays and sets the decimal point for input channel 2. See function 6.66 for further details.

6.68 Channel 3 decimal point

Display: Ch3 dCPt
Range: 0, 0.1 etc.
Default Value: 0

Seen only in CodE = ArtH mode. Displays and sets the decimal point for input channel 3. See function 6.66 for further details.

6.69 Channel 4 decimal point

Display: Ch4 dCPt
Range: 0, 0.1 etc.
Default Value: 0

Seen only in CodE = ArtH mode. Displays and sets the decimal point for input channel 2. See function 6.66 for further details.

6.70 Channel 5 decimal point

Display: Ch5 dCPt
Range: 0, 0.1 etc.
Default Value: 0

Seen only in CodE = ArtH mode. Displays and sets the decimal point for input channel 5. See function 6.66 for further details.

6.71 Channel 6 decimal point

Display: Ch6 dCPt
Range: 0, 0.1 etc.
Default Value: 0

Seen only in CodE = ArtH mode. Displays and sets the decimal point for input channel 6. See function 6.66 for further details.

6.72 Channel 7 decimal point

Display: CH7 dCPt
Range: 0, 0.1 etc.
Default Value: 0

Seen only in CodE = ArtH mode. Displays and sets the decimal point for input channel 7. See function 6.66 for further details.

6.73 Channel 8 decimal point

Display: CH8 dCPt
Range: 0, 0.1 etc.
Default Value: 0

Seen only in CodE = ArtH mode. Displays and sets the decimal point for input channel 8. See function 6.66 for further details.

6.74 Channel 0 polarity

Display: CH0
Range: both, POS or NEG
Default Value: both

Displays and sets the polarity selection for the display of the engineering value for channel 0. Channel 0 is the channel which displays the result of the arithmetic operations. If set to bOtH then the display will indicate both positive and negative values. If set to POS the display will allow only positive values with any values below zero being rounded to zero. If set to NEG then the display will allow only negative values with any value above zero being rounded to zero. Channel 0 polarity applies to Arithmetic mode ArtH only.

6.75 Channel 1 polarity

Display: CH 1
Range: both, POS or NEG
Default Value: both

Displays and sets the polarity selection for the display of the engineering value for channel 1. If set to bOtH then the display will indicate both positive and negative values. If set to POS the display will allow only positive values with any values below zero being rounded to zero. If set to NEG then the display will allow only negative values with any value above zero being rounded to zero.

6.76 Channel 2 polarity

Display: Ch2
Range: both, POS or NEG
Default Value: both

Displays and sets the polarity selection for the display of the engineering value for channel 2. See function 6.75 for further information.

6.77 Channel 3 polarity

Display: Ch3
Range: both, POS or NEG
Default Value: both

Displays and sets the polarity selection for the display of the engineering value for channel 3. See function 6.75 for further information.

6.78 Channel 4 polarity

Display: Ch4
Range: both, POS or NEG
Default Value: both

Displays and sets the polarity selection for the display of the engineering value for channel 4. See function 6.75 for further information.

6.79 Channel 5 polarity

Display: Ch5
Range: both, POS or NEG
Default Value: both

Displays and sets the polarity selection for the display of the engineering value for channel 5. See function 6.75 for further information.

6.80 Channel 6 polarity

Display: Ch6
Range: both, POS or NEG
Default Value: both

Displays and sets the polarity selection for the display of the engineering value for channel 6. See function 6.75 for further information.

6.81 Channel 7 polarity

Display: Ch7
Range: both, POS or NEG
Default Value: both

Displays and sets the polarity selection for the display of the engineering value for channel 7. See function 6.75 for further information.

6.82 Channel 8 polarity

Display: Ch8
Range: both, POS or NEG
Default Value: both

Displays and sets the polarity selection for the display of the engineering value for channel 8. See function 6.75 for further information.

6.83 Baud rate for serial retransmission

Display: r.trn bAUd
Range: 300, 600, 1200, 2400, 4800, 9600, 19.2 or 38.4
Default Value: 9600

Seen only when serial retransmission is fitted. Refer to the separate "Optional Output Addendum" booklet supplied when this option is fitted. The baud rate should be chosen to match that of the device to which this instrument is connected.

6.84 Parity for serial retransmission

Display: r.trn PrtY
Range: NONE, EVEN or Odd
Default Value: NONE

Seen only when serial retransmission is fitted. Refer to the separate "Optional Output Addendum" booklet supplied when this option is fitted. The parity should be chosen to match that of the device to which this instrument is connected.

6.85 Output mode for serial retransmission

Display: r.trn O.Put
Range: NONE, dI SP, Cont, POLL, Cont, n.buS or A.buS
Default Value: NONE

Seen only when serial retransmission is fitted. Refer to the separate "Optional Output Addendum" booklet supplied when this option is fitted. Selects the required output mode for retransmission. Note: if the CodE function is set to ASCI then only the dI SP output selection can be used.

6.86 Address for serial retransmission

Display: r.trn Addr
Range: 0 to 31
Default Value: 0

Seen only when serial retransmission is fitted. Refer to the separate "Optional Output Addendum" booklet supplied when this option is fitted. Selects the required address for retransmission when in POLL output mode using RS485 retransmission. Addressing allows several units to operate on the same RS485 interface. The host computer or PLC may poll each unit in turn, supplying the appropriate address. The unit addresses range from 0 to 31 (DEC) but is offset by 32 (DEC) to avoid clashing with special function characters such as <STX> and <CR>. For example 32 (DEC) (space in ASCII) is address 0 and 42 (DEC) (* in ASCII) is address 10.

6.87 Returning to normal measure mode

When the calibration has been completed it is advisable to return the instrument to the normal mode (where calibration functions are less likely to be tampered with). To return to normal mode, turn off power to the instrument, wait a few seconds and then restore power.

7 Error messages

- Blank display - if the display shows its normal "wake up" messages when powered up but then the display goes blank this means that the instrument does not recognise that data is being sent to it. If no data is being sent the display will blank. If data is being sent and the display is still blank then check that the correct baud rate and parity are set, if these are correct check that the remaining settings are set correctly for the input string being sent. See "Examples" section which follows for examples of function settings.

- **-or-** - this message means that the number being received is too big to display e.g. **123456** cannot be displayed on a 5 digit display. If applicable the **dLAY** or **bACt** functions can be used to force the display to ignore the unwanted display values.

- **O.run Err** - this message means that data is being received at a faster rate than it can be processed. If the display is powered up in **CAL** mode the display will show diagnostic messages not seen in normal measurement mode. Power up the display in normal measurement mode i.e. without holding any pushbuttons and if the error message persists reduce the baud rate or the rate at which data is transmitted to the display.

- **FrAE Err** - this message means that data is being received but cannot be interpreted correctly, this is normally due to electrical noise or distorted input signals due to reflections on the line (most commonly seen with RS485). See RS485 connections section for notes on RS485 terminating resistors. If the display is powered up in **CAL** mode the display will show diagnostic messages not seen in normal measurement mode. Power up the display in normal measurement mode i.e. without holding any pushbuttons and if the error message persists try fitting the terminating resistors (see section 3.2).

7.1 Examples

Example 1 Input string: <STX>Weight: +2000kg gross +12345kg tare<CR>
Required display: **12345**
One possible group of settings to achieve the required display is:-

SCH 1 set to **2** Decimal (this corresponds to <STX>)
SCH2 set to **87** Decimal (this corresponds to W)
SCH3 set to **- 1** (disabled)
codE set to **VAL**
dLAY set to **5**
tchr set to **13** (this corresponds to <CR>)

The matching of all three start of text characters is valid since <STX> appears first followed by W (from Weight) and **SCH3** is disabled. The 5 numeric characters following the W (i.e. <SPACE> and **2000**) are ignored since **dLAY** is set to **5**. The kg characters are ignored since **codE** is set to **VAL**. The + is taken as a numeric value but is not displayable. The terminating character is set to <CR>.

Example 2 Input string: <STX>XYZNNM10.05kg<ETX>
Required display: **10.05**
One possible group of settings to achieve the required display is:-

SCH 1 set to **- 1** (disabled)
SCH2 set to **- 1** (disabled)
SCH3 set to **- 1** (disabled)
dLAY set to **0**
ALPH set to **OFF**
codE set to **VAL**
dCPt set to **0.02**
tchr set to **3** (this corresponds to <ETX>)

The **SCH 1**, **SCH2** and **SCH3** characters are all disabled. The decimal point is set at two places and therefore appears between the two zeroes on the display.

Example 3 Input string: <STX>X1 ABC 12.34<CR><LF> <STX>Y2 ABC 56.78<CR><LF>
Required display: **56.8** with 5 sec. display blanking.
One possible group of settings to achieve the required display is:-

SCH 1 set to **2** Decimal (this corresponds to <STX>)
SCH2 set to **-2** (dont care)
SCH3 set to **50** (this corresponds to 2 in ASCII)
dLAY set to **1**
ALPH set to **OFF**
codE set to **VAL**
dCPt set to **0. 1**
bAct set to **0**
tchr set to **13** (this corresponds to <CR>)
dS.to set to **5**

The <STX> character corresponds to **SCH 1**, **SCH2** is set to dont care and **SCH3** is set to 2 so the first string is ignored (<STX>Y1 does not match <STX> / dont care / 2). The second string does match, all of the alpha characters which follow Y2 (ABC) are ignored since **ALPH** is set to **OFF** but the spaces are numeric values so setting **dLAY** to **1** will cause one space to be ignored. The decimal point is set at one place and therefore the displayed number is rounded and shown as one decimal place. The display will blank if there is a 5 second gap between strings due to the **dS.to** setting.

Example 4 Input string: ABCDXYZGGNNMM10A0033<CR>
Required display: **10A00**
If the status characters and desired values are sent as one string then the easiest way to recover the desired values is by using the **bAct** function.

SCH 1 set to **- 1** (disabled)
SCH2 set to **- 1** (disabled)
SCH3 set to **- 1** (disabled)
dLAY set to **0**
codE set to **ASC**
dCPt set to **0**
bAct set to **2**
tchr set to **13** (this corresponds to <CR>)
ALPH set to **on**

In this mode the last 2 characters will be discarded (because **bAcE** is set to 2) and the instrument will display up to 5 characters preceding these two.

Example 5 - Polling facility setup example. The instrument is connected to a different instrument which has serial communications and is set to a polling address of 5. The instrument is required to request a primary display value. The request is to be updated every 10 seconds. The polling command required for transmission of the primary display value from this instrument is:

<STX>P5<CR>

Where: <STX> is the start of text control character, P is the primary display request character, 5 is the unit address and <CR> is the carriage return control character. The main function settings required for this example are:

CodE set to **UAL**
POLL InPt set to **on**
POLL dLAY set to **10.0**
P.ch. 1 set to **2** (this correspond to <STX>)
P.ch.2 set to **80** (this corresponds to P)
P.ch.3 set to **37** (this corresponds to address 5 (32 is address 0))
P.ch.4 set to **13** this corresponds to <CR>
P.ch.5, **P.ch.6**, **P.ch.7** and **P.ch.8** are all set to **- 1**.

Example 6 - Polling facility setup example. The instrument is connected to a PLC via a serial link. The PLC requires a polling command of "T?" before it will transmit data to the instrument. The application requires that the PLC be polled every 2.5 seconds. The main function settings required for this example are:

CodE set to **UAL** (or ASCI depending on requirements)
POLL InPt set to **on**
POLL dLAY set to **2.5**
P.ch. 1 set to **84** (this correspond to T)
P.ch.2 set to **63** (this corresponds to ?)
P.ch.3, **P.ch.4**, **P.ch.5**, **P.ch.6**, **P.ch.7** and **P.ch.8** are all set to **- 1**

7.2 ASCII Code Conversion Listing

ASCII for control characters is shown in brackets. e.g. STX may in some cases be entered as ∧B.

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

8 Specifications

8.1 Technical specifications

Input types:	Either RS232, RS485, RS422 or 20mA serial current loop (input type is factory configured).
Baud rate:	Selectable 300, 600, 1200, 400, 4800, 9600, 19.2k or 38.4k
Microprocessor:	HC68HC11F CMOS
Ambient temperature:	-10 to 60^o C
Humidity:	5 to 95% non condensing
Display:	LED 5 digit 7.6mm + alarm annunciator LEDs
Power supply:	AC 240V, 110V 32V or 24V 50/60Hz or DC isolated wide range 12 to 48V. Note: supply type is factory configured.
Power consumption:	AC supply 4 VA max, DC supply depends on options fitted, consult supplier
Output (standard):	2 x relay, Form A, rated 5A resistive. Programmable N.O. or N.C

8.2 Optional outputs

Third relay:	Rated 0.5A resistive 30VAC or DC May be configured as form A or form C if the third relay is the only option fitted
Fourth relay:	Rated 0.5A resistive 30VAC or DC, form A
Analog output:	Isolated 4 to 20mA, 0 to 1V or 0 to 10V link selectable Single or dual 12 bit or single 16 bit versions available (4-20mA will drive into resistive loads of up to 800Ω)
Serial communications:	Isolated RS232, RS485 or RS422 (8 bit ASCII or Modbus RTU)
DC supply output:	Isolated and regulated 12VDC (50mA max) or 24VDC (25mA max)

Some combinations of optional outputs are available e.g. analog output plus extra relay. Consult supplier for available combinations.

8.3 Physical characteristics

Case size:	44mm(w) x 91mm(h) x 141mm(d)
Connections:	Plug in screw terminals (max. 2.5mm^2 wire for power and relays, max. 1.5mm^2 wire for load cell and options)
Weight:	470 gms basic model, 500 gms with option card

9 Guarantee and service

The product supplied with this manual is guaranteed against faulty workmanship for a period of two years from the date of dispatch.

Our obligation assumed under this guarantee is limited to the replacement of parts which, by our examination, are proved to be defective and have not been misused, carelessly handled, defaced or damaged due to incorrect installation. This guarantee is VOID where the unit has been opened, tampered with or if repairs have been made or attempted by anyone except an authorised representative of the manufacturing company.

Products for attention under guarantee (unless otherwise agreed) must be returned to the manufacturer freight paid and, if accepted for free repair, will be returned to the customers address in Australia free of charge.

When returning the product for service or repair a full description of the fault and the mode of operation used when the product failed must be given. In any event the manufacturer has no other obligation or liability beyond replacement or repair of this product.

Modifications may be made to any existing or future models of the unit as it may deem necessary without incurring any obligation to incorporate such modifications in units previously sold or to which this guarantee may relate.

This product is designed and manufactured in Australia.