59615-3 MaxVU Rail Standard Controller Concise Manual

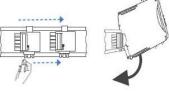
1. INSTALLATION

Installation Guidance

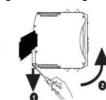
- Installation should only be performed by technically competent personnel.
- Standards compliance shall not be impaired when fitting into the final installation
- It is the responsibility of the installing engineer to ensure that the configuration is safe. Local regulations regarding the electrical installation & safety must be observed.
- Impairment of protection will occur if the product is used in a manner not specified by the
- Due to the low weight of this instrument there are no special lifting or carrying considerations.
- Designed to offer a minimum of Basic Insulation only.
- Ensure that supplementary insulation suitable for Installation Category II is achieved when fully
- To avoid possible hazards, accessible conductive parts of the final installation should be protectively earthed in accordance with EN61010 for Class 1 equipment.
- Output wiring should be within a Protectively Earthed cabinet.
- Sensor sheaths should be bonded to protective earth or not be accessible
- Live parts should not be accessible without the use of a tool.
- When fitted to the final installation, an IEC/CSA APPROVED disconnecting device should be used to disconnect both LINE and NEUTRAL conductors simultaneously.
- Do not position the equipment so that it is difficult to operate the disconnecting device.
- Ventilation slots must not be covered and adequate air circulation must be allowed. Use conductor sizes 30-12 AWG, minimum temp rating of cables to be 80c.

Bus Connector (optional)

Mounting & Unmounting



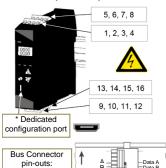




Terminal Wiring

CAUTION: Check information label on housing for correct operating voltage before connecting supply to Power Inputs.

Diagrams show all possible option combinations, check your exact product specification before connecting



necung.	
RS485 Data A (Rx/Tx+)	Communications
RS485 Data B (Rx/Tx-)	Communications
Relay COM / Linear +	Output 3
Relay NO / Linear -	•
o_ Relay COM / SSR -	Output 2
Relay NO / SSR +	ouqui 2
	Power
~ N-	
t + Volt frag or TTI	D'-'I
Compatible	Digital Input
Relay COM / SSR -	
-0 Relay NO / SSR +	Output 1
Relay NC	Output 1
RTD	
TC / RTD / Linear +	Input
TC / RTD / Linear -	put
	RS485 Data A (Rx/Tx+) RS485 Data B (Rx/Tx-) Relay COM / Linear + Relay NO / Linear - Relay NO / SSR - Relay NO / SSR + Volt-free or TTL Compatible Relay NO / SSR - Relay NO /

NEVER DIRECTLY CONNECT DEDICATED CONFIGURATION SOCKET TO A USB PORT.

2. FRONT PANEL

Up 🔼 Select Down

Display turns off after 5, 15 or 30 minutes without key presses.

Display shows PV (process variable). units, SP (setpoint), alarm/latch

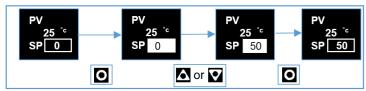
statuses, error & warning messages. LEDs show respective output state: 1 2 3

Navigation & Editing

Press or well keys to navigate between parameters or menu items. Press to highlight and edit a parameter value.

Press or to change the parameter value, then press o within 60 seconds to confirm change.

For example, changing the setpoint (SP).



Navigating to Setup Mode or Advance Configuration from Operator Mode: Setup Mode - press 2 & .

Advanced Configuration - press O & .

unit returns automatically to the first Operator Mode screen.

3. SETUP (& FIRST POWER UP)

Important Note: When powered up for the first time, or after a factory reset (default) the instrument enters Setup

The device remains in Setup, or will keep powering up back into Setup, until all parameters have been reviewed and the user <u>exits</u> Setup. Some parameters may be hidden depending on configuration

Setup Lock	Enter code	& press O	Default 10		
Parameter	Descr	Default Value			
		ocouple *			
	-200 – 1200°C -328 – 2192°F	-128.8 – 537.7°C -199.9 – 999.9°F			
		ocouple *	-		
	-240 – 1373°C	-128.8 – 537.7°C	-		
	-400 – 2503°F				
	PT1				
	-199 − 800°C	-128.8 – 537.7°C			
	-328 – 1472°F	-199.9 − 999.9°F			
		nocouple			
		1824ºC 3315ºF			
		nocouple	1		
		320°C	-		
	32 – 4	1208°F			
	L Thermo	ocouple *			
Input	0 - 762°C	0.0 - 537.7°C	/ Thomassauri		
уре	32 – 1403°F	32.0 – 999.9°F	K Thermocouple		
		nocouple 399°C	-		
		399°C 2551°F			
		nocouple			
		795°C			
	32 – 3	3198°F			
		nocouple			
		762°C			
		3204°F	-		
	-240 – 400°C	ocouple * -128.8 – 400.0°C	-		
	-240 − 400°C -400 − 752°F	-128.8 – 400.0°C -199.9 – 752.0°F			
		ar dc			
	0 - 20mA	4 - 20mA			
	0 - 50mV	10 - 50mV			
	0 - 5V 0 - 10V	1 - 5V 2 - 10V			
Input		ı			
Inits	°C or °F (hidden when	a linear input is used)	°C		
* Maximur	n of 1 decimal place for	temperature inputs ma	rked.		
		00 *			
Input		0.0 *	0000		
Decimal Place		00.00			
0 1 5		000	<u> </u>		
Input	ge max & min only visible	-	r type.		
cale Range Maximum	Maximum for applica	ation working range.	1000		
Input	1				
cale Range Minimum	Minimum for applica	ation working range.	0		
	1	None			
lanet	,	ears latched alarms)			
Input Digital I/P Action		ble (disables control) ito/Manual	Ctrl Enable/Disable		
rigital I/F ACUUN		ito/Manuai e Start/Stop	Elignio/Disable		
		Start/Stop			
		eat			
	Co	ool			
Output 1	_	rm 1	Heat		
Isage	1	rm 2	Heat		
	1	1or2			
Control Loop Alarra	me is 2x Integral (PID) of	Alarm	mode is On Off		
Output 2			1		
sage	Same options as	Output 1 Usage	Alarm 1		
	Same options as	Output 1 Usage.	Alarm 2		
Output 3 Isage					
r <u>r</u>	1	eat			
Linear Outp		ool	PV Retx		
Isage	1	Retx			
		Retx IOV			
		10V			
Linear Outp	0-20				
		oma Oma	0-10V		
·Linear Outp 「ype	4-20		0-10V		

1-5V

a Lina a m Outra	Maniana DV and a name and discrete	
>Linear Outp	Maximum PV value corresponding to maximum linear output.	Input type Max
Scale Range Maximum	maximum imear output.	
>Linear Outp	Minimum PV value corresponding to	Innut turna Min
Scale Range Minimum	minimum linear output.	Input type Min
>Alarm 1 Value	Range minimum to range maximum, or OFF (maximum +1). OFF disables alarm. Default PV High alarm type.	1373
>Alarm 2	Same options as Alarm 1.	240
Value	Default PV Low alarm type.	-240
Setpoint	Target setpoint.	0
>Coms Unit Address	Modbus address from 1 to 255	1
>Coms Baud Rate	1200, 2400, 4800, 9600, 19200 & 38400	9600
>Coms Parity Odd, Even or None		None
>Control Automatic Tuning	Off, Start Pre-Tune or Start Tune at SP *	Off

*Start Tune at SP not available for Heat & Cool processes. When you exit if necessary, press and to clear Control is Enabled Pop Up Alert.

4. OPERATOR MODE

Name		Details
User Screen	PV °c 25 SP 37	PV - top SP - bottom Temperature Unit - right.
Manual control	PV 25 °c P% 50	Manual Power is shown as P% .
Transmitter view enabled	PV °c 25	Transmitter parameter = Enable, SP is hidden. Important: The device still functions as a controller, using the local Setpoint.

pertanti rioisiii	., ioi paramotoro zoion		on an operator cas mona.	
Alarm State	Alarm State Alarm 1 (4) Alarm 2 4 Loop –	To clear	Alarm active Alarm set, but not active Alarm not set	
Latch State	Latch State Out 1 then to select Yes. Out 2 then to select Out 3 - Out 3 cept.		☐ Output Latched☐ Latch set, but output not Latched - Latch not set	
Maximum PV	To clear press the		Screens show the Maximum & Minimum PV	
Minimum PV	Yes. Press 1 to acc	cept.	reached.	
Control Enable	OFF - Control output(s) disabled. (Ignored when in manual mode). ON - Control output(s) enabled.			
Manual Control Enable	OFF - Automatic control, PID or On-Off control available. ON - Manual control, Manual Power shown as P% xxx.			
	_			

Warnings & Error Messages

Time On Remaining

Delay Time

Caution: Do not continue your process until any issues are resolved.

On Timer

Delay Timer



For example, Pop Up Alert for Alarm 1. Pop Up Alerts need to be acknowledged. Press and to clear Pop Up Alert.

Visible when On Timer is active.

Visible when Delay Timer is active.

See Ramp & Timers diagram.

See Ramp & Timers diagram.

Pop up Alerts: Alarm 1, Alarm 2, Alarm 1 & 2, Starting Calibration, Calibration Ongoing, Calibration Fail, Control is Enabled, Tune Error messages, Tuning in progress, Setup not Completed & Offset in use (SP offset)

ALARM	Alternates with PV to show Alarm is active.		
LATCH	Alternates with PV.		
	One or more outputs are latched on <u>and</u> no alarm is active.		
HIGH	Process variable input > 5% over-range.		
LOW	Process variable input > 5% under-range.		
OPEN	Break detected in process variable input sensor, wiring or wrong input type selected. Shows OPEN until resolved, control is off.		
ERROR	Selected input range is not calibrated. Shows ERROR until resolved, control is off.		
TUNE	Alternates with SP. Auto-tuning is in progress.		
P%	Manual power value replaces setpoint, shows P% xxx of power.		
Ramp	Alternates with actual setpoint. Setpoint ramp is active.		
OFF	Control is disabled. Control output(s) are off.		
Control Delayed	Visible when Delay Timer is active. Control output(s) are off.		
Tuning in progress	Alternates with setpoint. Tuning is active.		

		alternates between Tune Error & Setpoint. visible until Automatic Tuning is turned Off .
	tErr1	PV within 5% of SP (for pre-tune)
	tErr2	Setpoint is ramping
Tune Errors	tErr3	Control is ON/OFF (not PID)
	tErr4	Control is manual
	tErr5	Tune at Setpoint not able to run
	tErr6	Sensor Break
	tErr7	Timer Running
	tErr8	Control is Disabled

5. SPECIFICATIONS

Important: Check your product code for exact hardware fitted.

PROCESS INPUT

Thermocouple $\pm 0.25\%$ of full range, ± 1 LSD & ± 1 °C for Thermocouple CJC. Calibration:

Factory calibration is accurate 0.25% of span above -100°C, below -100°C accuracy is within +/- 0.9%. To meet 0.25% accuracy below -100°C

recalibrate using procedure in full manual. BS4937, NBS125 & IEC584.

PT100 Calibration: ±0.25% of full range, ±1LSD. BS1904 & DIN43760 (0.00385Ω/Ω/°C).

DC Calibration: ±0.25% of full range, ±1LSD.

Sampling Rate: 4 per second.

Impedance: >1M Ω resistive, except dc mA (5 Ω) and V (47k Ω)

Sensor Break Detection: Thermocouple, RTD, 4 to 20mA, 10 to 50mV, 2 to 10V and 1 to

5V ranges only. Control outputs turn off at sensor break

DIGITAL INPUT (Isolated or Non-Isolated version)

Reset Alarm, Control Enable/Disable, Auto/Manual, Pre-Tune Functions: Start/Stop or Tune at SP Start/Stop.

Non-isolated - Open or Close only

Isolated - Open (2 to 24Vdc) or Closed (<0.8Vdc). Open to Closed transition = Reset, Enabled, Auto or Start.

OUTPUTS

Signal

Relay Contacts: Form C SPDT (Op 1) / Form A SPST relay (other), 2A @ 250Vac. Relay Lifetime: >150,000 operations at rated voltage/current, resistive load.

SSR Driver Capability: SSR drive voltage >10V at 20mA

Output 3 option only: DC (Linear)

0 to 20mA, 4 to 20mA, 0 to 5V, 0 to 10V or 2 to 10V Types: Load Resistance: Current Output 500Ω max, Voltage Output 500Ω min. Resolution: 8 bits in 250ms (10 bits in 1s typical, >10 bits in >1s typical).

RS485 SERIAL COMMUNICATIONS (Modbus RTU)

Data Rate 1200, 2400, 4800, 9600, 19200 or 38400 bps.

OPERATING CONDITIONS

Usage: For indoor use only, DIN-rail mounted in suitable enclosure. <95% humidity 0°C to 55°C (Operating), -10°C to 80°C (Storage). Ambient Temp:

Relative Humidity: 20% to 95% non-condensing

Altitude < 2000m

Power Supply: Mains power version - 100 to 240Vac ±10%, 50/60Hz, 9VA

Low voltage version - 24Vac +10/-15% 50/60Hz 9VA or 24Vdc

+10/-15% 5W.

ENVIRONMENTAL

Standards: CE, UL & cUL.

EN61326-1:2013. Table 2 & Class A. FMI:

Warning: This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

UL61010-1 Edition 3, EN61010-1 Version 2010, Safety

Pollution Degree 2 & Installation Class 2. Protection Rating:

PHYSICAL

Height - 99mm; Width - 22.5mm; Depth - 121mm

A space of 80mm must be allowed above & below each unit. Ventilation:

Weight: 0.20kg maximum

ISOLATION

	PSU	Universal Input	Relay	SSR	Linear	RS485 Comms	Non- Isolated Digital Input	Isolated Digital Input	Config
PSU									
Universal Input									
Relay									
SSR									
Linear									
RS485 Comms									
Non-Isolated Digital Input									
Isolated Digital Input									
Configuration Port									
Not Applicable			No Is	olatio	n		Reinfor	ced Isolation	on

6. SAFETY & WARNING SYMBOLS Risk of electric shock. Caution, refer to the manual. Alternating or direct current Equipment protected through-out could be present. by double insulation.

7. ADVANCED CONFIGURATION

Advanced Configuration gives access to all possible parameters; however, the device hides parameters that are irrelevant to your exact product specification & configuration.

Advanced Configuration Navigation

Enter by pressing **2** & **2**. Press **5** or **2** to navigate to the required menu, then press

Press **②** & **™** to exit up 1 level. Depending upon which menu you enter it may be necessary to exit 2 or 3 levels for Operator Mode.

Advanced Configuration menus

Advanced Lock	Enter code & press	Default 20				
Menus	Description					
User	Includes Status, Control & Manual Mode e	nable/disable.				
Input	Configure the process input.					
User Calibration	Single or two-point calibration adjustments for the process input.					
Outputs	Configuration parameters for the outputs.					
Control	PID control tuning & configuration parameters.					
Setpoint & Timer	Setpoint & timer settings.					
Alarms	Alarm configuration.					
Communication	Modbus communications settings.					
Display	Lock codes and Factory Default.					
Operator Screens	Control what appears in Operator Mode.					
Information	View serial number & manufacturing details.					
		<u> </u>				

User menu

Parameter	De	Default Value			
Alarm State	Alarm State Alarm 1 (4) Alarm 2 & Loop –	Alarm active Alarm set, but not active Alarm not set	n/a		
Latch State Maximum PV	Latch State Out 1	Out 1 A not Latched Out 2 - Latch not set			
Minimum PV	powered up To clear press Press	n/a			
Control Enable	OFF - Control out when in manual mo ON - Control output(in U	ON			
Manual Control Enable	OFF - Instrument i (PID or (ON - Manual cont Pxxx % in Operat	OFF			

Input menu

Parameter	De	Default Value	
Input Type	See Input Type t	K Thermocouple	
Units	Displayed as °C or °F		°C
	(Units are hidden v	when a linear input is used)	ا
		0000	
Decimal Place		000.0	0000
Decimal Flace	00.00	Not for town one time	0000
	0.000	Not for temperature.	
Scale Range Maximum	Maximum for application working range		Max allowed for Input Type.
Scale Range Minimum	Minimum for application working range		Min allowed for Input Type.
Filter Time	OFF or 0.5 to	2.0	
CJC Enable	Enable Enables the internal thermocouple CJC (Cold Junction Compensation).		Enable
	Disable Disa		
	External compensation must be provided for thermocouples.		

Parameter	Description	Default Value
Digital I/P Action	None	Ctrl Enable/Disable
	Alarm Reset (clears latched alarms)	
	Ctrl Enable/Disable	
	Ctrl Auto/Manual	
	Pre-Tune Start/Stop	
	Tune at SP Start/Stop (not available for heat/cool)	

User Calibration menu

Single-point offset or two-point calibration adjustment for process input. Can be used together, if required.

Parameter	Description	Default Value
Offset	Shifts the input value up or down by a single offset amount across the entire range.	0
Low Point	Enter value at which the low point error was measured.	Lower Limit
Low Offset	Enter equal, but opposite offset value to the observed low point error.	0
High Point	Enter value at which the high point error was measured.	Upper Limit
High Offset	Enter an equal, but opposite offset value to the observed high point error.	0

Outputs menu

Parameter	Description	Default Value
>Output 1		
Usage	Heat Cool Alarm 1 Alarm 2 Alm. 1or2 Loop Alarm	Heat
	set as 2x Integral (PID) or Loop Alarm Time (On.C	Off control)
Alarm Action	Direct - Output active when alarm triggers Reverse - Output active when alarm is not triggered	Direct
Latching	Off - Alarm doesn't latch On – Alarm latches & needs to be cleared	Off
LED Indicator	Direct - LED Indicator lit when output is active Reverse - LED Indicator lit when output is inactive	Direct
>Output 2		
Usage	Same options as Output 1 - Usage	Alarm 1
Alarm Action	Same options as Output 1 - Alarm Action	Direct
Latching	Same options as Output 1 - Alarm Latching	Off
LED Indicator	Same options as Output 1 - LED Indicator	Direct
>Output 3 or >Linear Outp	3 rd output - either Relay/SSR driver (Output 3)	or Linear.
>Output 3 Usage	Output 3 - same options as Output 1 - Usage	Output 3; Alarm 2
>Linear Outp Usage	Heat Cool PV Retransmit SP Retransmit	Linear: PV Retransmit
>Output 3 Alarm Action	Same options as Output 1 - Alarm Action	Direct
>Output 3 Alarm Latching	Same options as Output 1 - Alarm Latching	Off
>Output 3 LED Indicator	Same options as Output 1 - LED Indicator	Direct
>Linear Outp Type	0-10V 2-10V 0-20mA 4-20mA 0-5V 1-5V	0-10V
>Linear Outp Scale Range Maximum	Display value for maximum output, -1999 to 9999	Input type Max
>Linear Outp Scale Range Minimum	Display value for minimum output, -1999 to 9999	Input type Min
Control menu		

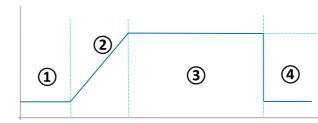
PID control tuning & configuration & Loop Alarm. Hidden if no control outputs are set.

Parameter	Description	Default Value
Proportion Heat Band	ON/OFF (0.0) or PID control in display units.	
	1 to 9999 - 0 decimal places	161
Proportion Cool Band	0.1 to 999.9 - 1 decimal place	
	0.01 to 99.99 - 2 decimal places	161
	0.001 to 9.999 - 3 decimal places	101
Auto Reset (Integral)	0.01 to 99.59.	F 00
	and OFF (0.00) (minutes & seconds).	5.00

Parameter	Description	Default Value
Rate (Derivative)	0.01 to 99.59 or OFF (0.00) (minutes & seconds).	1.15
Overlap/ Deadband	In display units, range -20 to +20% of Heat & Cool Proportional Band. 0 is Off.	0
Differential (On/Off)	Visible when using On/Off control. In display units centred about the setpoint. Range: 0.1% to 10.0% of input span	8
Loop Alarm Time	Visible when On/Off control & Loop Alarm assigned to an output. Sets time before the loop alarm triggers. (minutes & seconds)	99.59
Manual Rst (Bias)	Manual Reset 0 to 100% (-100% to 100% if heat/cool control)	25%
Heat Cycle Time Cool Cycle Time	0.1 to 512.0 seconds	32.0 32.0
Output Interlock	Prevents simultaneous activation of both heat & cool outputs. On / Off Only set to On if Overlap/Deadband = 0.	Off
Heat Power Limit	% power upper limit 0 to 100%	100%
Cool Power Limit	% power upper limit 0 to 100%	100%
Power Up Action	Last - Powers up with control enable in the same state as on power off or power failure. On - Always powers up with control enabled.	Last
Automatic Tuning	Off Start Pre-Tune Start Tune at SP *	Off
*Start Tune at SP not available for Heat & Cool process.		

Setpoint menu

Setpoint menu			
Parameter		Description	Default Value
Enable Timer	Enabled	Enables the Delay and On Timers. Applies at next power-up / control enable.	Disabled
	Disabled	Delay and On Timers ignored. (Setpoint ramping still functions.)	
Delayed Start Time	Time from power-up begins from 00.01 t or OFF (0.00 . (hour If OFF control starts	s & minutes)	OFF
Ramp Rate	Rate actual setpoint changes from current PV to target setpoint following power-up or control enable. From 0.001 to 9999. or OFF (10 000) (Units / hr). Any setpoint changes also follow this rate.		OFF
On Time	reached, from 00.0 or Off (00.00) (hour		Infinite
Upper Limit	Used to limit the Ma	aximum setpoint value.	Scale Range Maximum
Lower Limit	Used to limit Minimo	um setpoint value.	Scale Range Minimum
Offset	slave applications.	For use in multi-zone setpoint p appears when SP is changed.	0



Ramp & Timers diagram – delay, ramp and timer

- 1 From power up or control enable the unit delays process control until the Delay Timer expires (time set by Delayed Start Time).
- 2 Setpoint ramps from the current PV to the target setpoint at Ramp Rate (Ramp indicates ramping). If Ramp Rate is **OFF** the active setpoint steps directly to target setpoint.
- ③ When the active setpoint reaches the target setpoint, the On Timer counts down (time set by On Time).
- 4 When the On Timer finishes the control switches off. If On Time is set to INF then the control stays on.

Alarms menu

Parameter	Description	Default Valu
>Alarm 1		
	None	
_	PV High	
Type	PV Low	PV High
	Deviation	
	Band	

Parameter	Description	Default Value
Value	Range minimum to range maximum, or OFF (maximum +1). OFF disables alarm.	1373
Hysteresis	0 to full span.	1
>Alarm 2		
Туре		PV Low
Value	Same options as Alarm 1	-240
Hysteresis		1
>Options		
Alarm Inhibit temporarily de	activates alarms at power-up & on chang	e in setpoint.
Alarm Inhibit	None Alarm 1 Alarm 2 Alarm 1 & 2	None
Alarm PV Notification	None Alarm 1 Alarm 2 Alarm 1 & 2	Alarm 1 & 2
Sensor Break Alarm	On - activates both alarms, if configured, when a sensor break is detected.	Off

Communications menu

Modbus communications settings, only shown when RS485 option is fitted.

Parameter Name	Description	Default Value
Unit Address	Modbus address from 1 to 255	1
Baud Rate	Coms data rate in kbps 1200, 2400, 4800, 9600, 19200 & 38400.	9600
Parity	Parity checking: Odd, Even or None	None

Display menu

Parameter Name	Description	Default Value
	View & adjust Setup lock code. From 1 to 9999 or Off for no lock code.	10
Advanced Unlock Code	View & adjust Advanced lock code. From 1 to 9999 or Off for no lock code.	20
Screen Timeout	Screensaver time 5, 15 or 30 mins.	5
Selected language	Display language, 2 available – English plus either German or French .	English
Transmitter	Transmitter view Enable hides the setpoint. Important: The device still functions as a controller even though SP is hidden. For transmitter function, Linear Outp – Usage must be PV Retransmit or SP Retransmit.	Disable
Reset to Defaults	Reset parameters back to factory defaults. To clear press then to select Yes . Press to accept.	

Operator Screens menu

Controls what appears in Operator Mode.

Parameter Name	Description	Default Value
Control Enabled		Hide
Manual Ctrl Enabled	Hide or Show parameters in Operator Mode.	Hide
Alarm State		Hide
Latch State		Show
Maximum PV		Hide
Minimum PV		Hide
Remaining On Time		Hide
Remaining Delay Time		Hide

Information menu (Read-Only)

Parameter Name	Description	
PRL	The hardware/software revision level.	
DOM	Date of manufacture (mmyy).	
FW Version	The firmware version number 2 code type	
FW Type	The firmware version number & code type.	
Serial	Instrument serial number.	
Out1	SSR (SSR driver) or Relay	
Out2	SSR (SSR driver) or Relay.	
Out3	None, SSR (SSR driver), Relay or Linear.	
Comm	Comms option - Fitted or None.	
DI	Digital Input options – Iso (isolated) or NonIs (non-isolated).	

Please refer to the full manual for further information on any topic.