59615-1 MaxVU Rail Standard Controller Concise Manual

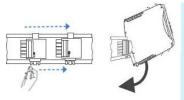
1. INSTALLATION

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)

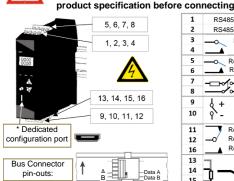
Mounting & Unmounting





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



00	necting.	
1	RS485 Data A (Rx/Tx+)	Communications
2	RS485 Data B (Rx/Tx-)	Communications
3	Relay COM / Linear +	Output 3
4	Relay NO / Linear -	
5	Relay COM / SSR -	Output 2
6	Relay NO / SSR +	output 2
7		Power
8	~ ~ N-	
9	+ Volt-free or TTL	D: :::::::::::::::::::::::::::::::::::
10	Compatible	Digital Input
11	Relay COM / SSR -	
12	_O Relay NO / SSR +	Output 1
16	Relay NC	Output i
13	RTD	
14	TC / RTD / Linear +	Input
15	TC / RTD / Linear -	iiiput

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

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

Navigation & Editing

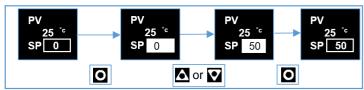
Press

or

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

Press \(\textstyle \) or \(\textstyle \) to change the parameter value, then press \(\textstyle \) 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 ☑ & ☑.

Advanced Configuration - press O & .

Returning to Operator Mode: Press 2 & to move back one level. After 120 seconds without key presses the unit returns automatically to the first Operator Mode screen.

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 exits Setup.

Some parameters may be hidden depending on configuration & hardware

Alternatively press • & to enter Setup from Operator screen and • & to exit.

, ,	' '	
etup Lock	Enter code & press	Default 1

Setup Lock	Enter code & press		Default 10	
Parameter	Descr	iption	Default Value	
	J Thermo	<u> </u>		
	-200 – 1200°C	-128.8 – 537.7°C		
	-328 – 2192°F -199.9 – 999.9°F			
	K Thermo	ocouple * -128.8 – 537.7°C		
	-400 – 2503°F	-126.6 – 537.7°C -199.9 – 999.9°F		
	PT1	00 *		
	-199 – 800°C	-128.8 – 537.7°C		
	-328 – 1472°F R Therm	-199.9 – 999.9°F nocouple		
		1824°C		
	211 – 3	3315°F		
		nocouple		
	0 – 23 32 – 4			
	L Thermo			
>Input	0 - 762°C	0.0 - 537.7°C		
Туре	32 – 1403°F	32.0 – 999.9°F	K Thermocouple	
		ocouple 399°C		
		551°F		
		nocouple		
	0 – 17 32 – 3	795°C		
		nocouple		
		762°C		
	32 – 3	204ºF		
		ocouple *		
	-240 – 400°C -400 – 752°F	-128.8 – 400.0°C -199.9 – 752.0°F		
		ar dc		
	0 - 20mA	4 - 20mA		
	0 - 50mV 0 - 5V	10 - 50mV 1 - 5V		
	0 - 10V	2 - 10V		
>Input	°C or °F (hidden when	a linear input is used)	°C	
Units				
" Maximum	of 1 decimal place for	temperature inputs ma 00 *	гкеа.	
>Input		0.0 *		
Decimal Place		.00	0000	
		000		
Scale Range	e max & min only visible	e when input is a linear	type.	
Scale Range Maximum	Maximum for application	ation working range.	1000	
>Input	Maria de Constantino			
Scale Range Minimum	Minimum for applica	ation working range.	0	
		lone		
>Input		ears latched alarms)	~	
Digital I/P Action	Ctrl Enable/Disable (disables control) Ctrl Auto/Manual		Ctrl Enable/Disable	
g		e Start/Stop		
		Start/Stop		
		Power		
>Output 1		Power m 1		
Usage		m 2	Heat Power	
		1or2		
Control I can Alam (*		Alarm	mode is On Off)	
>Output 2	ne is 2x Integral (PID) o			
Usage	Same options as	Output 1 Usage	Alarm 1	
>Output 3	Same options as	Output 1 Usage.	Alarm 2	
Usage or		eat		
>Linear Outp	ear Outp Cool Retx PV		Retx SP	
Usage	_	CPV CSP		
>Linear Outp			0-10V	
Туре			3 101	
	_	5V 5V		
<u> </u>	· · · · · · · · · · · · · · · · · · ·			

>Linear Outp Scale Range Maximum	Maximum PV value corresponding to maximum linear output.	Input type Max
>Linear Outp Scale Range Minimum	Minimum PV value corresponding to 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 Value	Same options as Alarm 1. 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
±0 T	.00 . "	

*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.	

Important: Visibility for parameters below must be set to Show in Operator sub-menu.				
Alarm State	Alarm State Alarm 1 (4) Alarm 2 & Loop –	To clear latches press then to select Yes. Press to to accept.	Alarm active Alarm set, but not active Alarm not set	
Latch State	Latch State Out 1 & Company Out 2 & Company Out 3 -		⚠ Output Latched⚠ Latch set, but output not Latched– Latch not set	
Maximum PV	To clear press the	en 🖴 to select	Screens show the Maximum & Minimum PV	
Minimum PV	Yes. Press 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.			
Time On Pemaining	Visible when On Timer is active.			

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.

See Ramp & Timers diagram.

See Ramp & Timers diagram.

Visible when Delay Timer is active.

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.	

	Display alternates between Tune Error & Setpoint. Remains visible until Automatic Tuning is turned Off .		
	tErr1	PV within 5% of SP (for pre-tune)	
	tErr2	Setpoint is ramping	
Tune Errors	tEm3	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.

BS1904 & DIN43760 (0.00385Ω/Ω/°C).

PROCESS INPUT

Thermocouple

±0.25% of full range, ±1LSD & ±1°C for Thermocouple CJC

Calibration: BS4937, NBS125 & IEC584. PT100 Calibration: $\pm 0.25\%$ of full range, $\pm 1LSD$.

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.

Signal: Non-isolated - Open or Close only. Isolated - Open (2 to 24Vdc) or Closed (<0.8Vdc).

Closed to Open transition = Reset. Enabled. Auto or Start

OUTPUTS

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)

Types: 0 to 20mA, 4 to 20mA, 0 to 5V, 0 to 10V or 2 to 10V Load Resistance: Current Output 500Ω max, Voltage Output 500Ω min.

8 bits in 250ms (10 bits in 1s typical, >10 bits in >1s typical). Resolution:

RS485 SERIAL COMMUNICATIONS (Modbus RTU)

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

OPERATING CONDITIONS

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

Relative Humidity: 20% to 95% non-condensing.

Altitude

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

CE. UL & cUL. Standards

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

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:

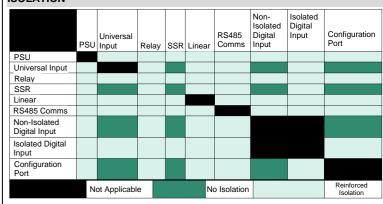
Pollution Degree 2 & Installation Class 2. Protection Rating: IP20

PHYSICAL

Unit Size: Height - 99mm; Width - 22.5mm; Depth - 121mm Ventilation: A space of 80mm must be allowed above & below each unit.

Weight: 0.20kg maximum

ISOLATION



6. SAFETY & WARNING SYMBOLS Risk of electric shock. Caution, refer to the manual. Alternating or direct current could be present. Equipment protected through-out 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 **△** or **③** to navigate to the required menu, then press **③** to enter.

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 main menu

Advanced Lock	Enter code & press	Default 20			
Menus	Menus Description				
User	Includes Status, Control & Manual Mode et	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.				

User

Parameter	De	Default Value	
Alarm State	Alarm State Alarm 1 (4) Alarm 2 4 Loop –	Alarm active Alarm set, but not active Alarm not set Alarm not	n/a
Latch State	Latch State Out 1		n/a
Maximum PV Minimum PV	Maximum and Minimum PV recorded whilst powered up or since last reset. To clear press ☐ then ☐ to select Yes. Press ☐ to accept.		n/a
Control Enable	OFF - Control output(s) disabled. (Ignored when in manual mode) SP replaced by OFF. ON - Control output(s) enabled. Setpoint visible in User screen.		ON
Manual Control Enable	OFF - Instrument in automatic control mode (PID or On-Off control). ON - Manual control ON. Power shown as Pxxx % in Operator mode, in place of SP.		OFF

Input

Parameter	Description		Default Value
Input Type		able in SETUP (& FIRST OWER UP).	K Thermocouple
Units		yed as °C or °F when a linear input is used)	°C
		0000	
Decimal Place		0.000	0000
Decimal Flace	00.00	No. 1 for a formation	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 100.0 seconds in 0.5 increments		2.0
CJC Enable	Enable Enables the internal thermocouple CJC (Cold Junction Compensation).		Enable
	Disable Disables the internal CJC. 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

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

togomor, ir roquirous		
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

Parameter		Default Value
>Output 1		
Usage	Heat Cool Alarm 1 Alarm 2 Alm. 1or2 Loop Alarm	Heat
Control Loop Alarm is	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: SP 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		

Control

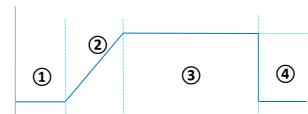
PID control tuning & configuration & Loop Alarm. Hidden if no control outputs are set.

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

Setpoint			
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 to OFF (0.00. (hour lf OFF control starts	rs & minutes)	OFF
Ramp Rate	target setpoint follor From 0.001 to 9999 or OFF (1000) (Unit		OFF
On Time	The time the target reached, from 00.0 or Off (00.00) (hour	setpoint will be maintained once 1 to 99.59	Infinite
Upper Limit	Used to limit the Ma	aximum setpoint value.	Scale Range Maximum
Lower Limit	Used to limit Minim	um setpoint value.	Scale Range Minimum
Offset	slave applications.	t. 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 (**SPr** 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).
- When the On Timer finishes the control switches off. If On Time is set to INF then the control stays on.

>Alarm 1		
Туре	None PV High PV Low Deviation Band	PV High
Value	Range minimum to range maximum, or OFF (maximum +1). OFF disables alarm.	1373

Parameter	Description	Default Value
Hysteresis	0 to full span.	1
>Alarm 2		
Туре		PV Low
Value	Same options as Alarm 1	-240
Hysteresis		1
>Options		
Alarm Inhibit temporarily d	eactivates alarms at power-up & on chang	ge in setpoint.
Alarm Inhibit	None Alarm 1 Alarm 2 Alarm 1 & 2	None
Alarm 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

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

Lock codes & Factory Defaults.

Parameter Name	Description	Default Value
Setup Unlock Code	View & adjust Setup lock code.	10
	From 1 to 9999 or Off for no lock code.	
Advanced Unlock	View & adjust Advanced lock code.	20
Code	From 1 to 9999 or Off for no lock code.	
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	Disable
	controller even though SP is hidden. For transmitter function, Linear Outp – Usage must be PV Retransmit or SP Retransmit.	
Reset to Defaults	Reset parameters back to factory defaults. To clear press ☑ then ☑ to select Yes. Press ☑ to accept.	

Operator Screens

Controls what appears in Operator Mode.

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

Information (Read-Only)

Parameter Name	Description	
PRL	The hardware/software revision level.	
DOM	Date of manufacture (mmyy).	
FW Version	The firmware version number 9 and two	
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.