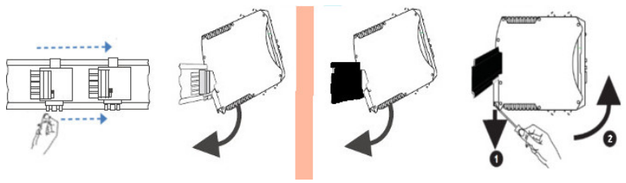
59621-1
MaxVU Rail Limiter Concise Manual

1. INSTALLATION

Installation Guidance

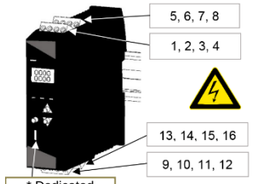
- Installation should only be performed by technically competent personnel.
- Standards compliance shall not be impaired when fitting into the final installation.
- It is the responsibility of the installing engineer to ensure that the configuration is safe.
- Local regulations regarding the electrical installation & safety must be observed.
- Impairment of protection will occur if the product is used in a manner not specified by the manufacturer.
- 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 installed.
- 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**



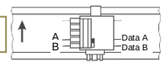
Terminal Wiring

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.



* Dedicated configuration port

Bus Connector pin-outs:



1	RS485 Data A (Rx/Tx+)	Communications
2	RS485 Data B (Rx/Tx-)	
3	Relay COM / Linear +	Output 3 (Alarm2/Retx PV)
4	Relay NO / Linear -	
5	Relay COM / SSR -	Alarm 1 output
6	Relay NO / SSR +	
7	L +	Power
8	N -	
9	+	Digital Input
10	- Volt-free or TTL Compatible	
11	Relay COM / SSR -	Limit output
12	Relay NO / SSR +	
16	Relay NC	
13	RTD	Input
14	TC / RTD / Linear +	
15	TC / RTD / Linear -	

*** NEVER DIRECTLY CONNECT DEDICATED CONFIGURATION SOCKET TO A USB PORT.**

2. FRONT PANEL

Ok / Select ◘ Up ▲ Down ▼

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

Display shows PV (process variable), units, LIM (Limit value), alarm/latch statuses, error & warning messages.

LEDs show Limit, Exceed and Alarm state: LM EX AL

Navigation & Editing

See OPERATOR MODE section for available screens in Operator Mode.

Press ▲ or ▼ 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 ◘ within 60 seconds to confirm change.

Note: For security, no parameters can be changed from the Operator Mode.

Navigating to Setup Mode or Advance Configuration from Operator Mode:
Setup Mode - press ◘ & ▲.
Advanced Configuration - press ◘ & ▼.

Returning to Operator Mode:
Press ◘ & ▲ to move back one level. After 120 seconds without key presses the 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 exits Setup.

Some parameters may be hidden depending on configuration & hardware.
Alternatively press ◘ & ▲ to enter Setup from Operator screen and ◘ & ▲ to exit.

Setup Lock	Enter code & press ◘	Default **10**

Parameter	Description	Default Value
>Input **Type**	J Thermocouple * -200 – 1200ºC / -128.8 – 537.7ºC -328 – 2192ºF / -199.9 – 999.9ºF K Thermocouple * -240 – 1373ºC / -128.8 – 537.7ºC -400 – 2503ºF / -199.9 – 999.9ºF PT100 * -199 – 800ºC / -128.8 – 537.7ºC -328 – 1472ºF / -199.9 – 999.9ºF B Thermocouple 100 – 1824ºC 211 – 3315ºF C Thermocouple 0 – 2320ºC 32 – 4208ºF L Thermocouple * 0 – 762ºC / 0.0 – 537.7ºC 32 – 1403ºF / 32.0 – 999.9ºF N Thermocouple 0 – 1399ºC 32 – 2551ºF R Thermocouple 0 – 1795ºC 32 – 3198ºF S Thermocouple 0 – 1762ºC 32 – 3204ºF T Thermocouple * -240 – 400ºC / -128.8 – 400.0ºC -400 – 752ºF / -199.9 – 752.0ºF Linear dc 0 - 20mA / 4 - 20mA 0 - 50mV / 10 - 50mV 0 - 5V / 1 - 5V 0 - 10V / 2 - 10V	**K Thermocouple**
>Input **Units**	°C or °F (hidden when a linear input is used)	**°C**
* Maximum of 1 decimal place for temperature inputs marked.		
>Input **Decimal Place**	0000 * 000.0 * 00.00 0.000	**0000**
Scaled Range only visible when input is a linear type.		
>Input **Scale Range Maximum**	Maximum for application working range.	**1000**
>Input **Scale Range Minimum**	Minimum for application working range.	**0**
>Limit **Type**	**High** - device will limit when PV is greater than the Limit value. (PV>Limit Value) **Low -** device will limit when PV is less than the Limit value. (PV<Limit value).	**High**
>Limit **Value**	The exceed value at which the Limit output will trip.	**-240**
PV Retrans parameters only visible if Output 3 is **Linear**.		
>PV Retrans **Type**	0-10V 2-10V 0-20mA 4-20mA 0-5V 1-5V	**0-10V**
>PV Retrans **Scale Range Maximum**	Maximum PV value corresponding to maximum linear output.	Input type Max
> PV Retrans **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 visible if Output 3 is **Relay** or **SSR Drive**.

Parameter	Description	Default Value
>Alarm 2 **Value**	Same options as Alarm 1. Default **PV Low** alarm type.	**-240**
>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**

Press ◘ & ▲ to exit.

When you exit, If necessary, press ◘ and ▲ to clear any Pop Up Alerts.

4. OPERATOR MODE

Name		Details	
User Screen		PV - top LIM - bottom Temperature Unit - right.	
Alarm State		To clear latches press ◘ then ▲ to select **Yes**. Press ◘ to accept.	Alarm active Alarm set, but not active – Alarm not set
Latch State			Output Latched Latch set, but output not Latched – Latch not set
Maximum PV **Minimum PV**	To clear press ◘ then ▲ to select **Yes**. Press ◘ to accept.		Screens show the Maximum & Minimum PV reached.

Warnings & Error Messages

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

Name	Details
Pop up Alerts: Warnings and Confirmations	 For example, Pop Up Alert for Alarm 1. Pop Up Alerts need to be acknowledged. Press ◘ and ▲ to clear Pop Up Alert.
Pop up Alerts: **Alarm 1**, **Alarm 2**, **Alarm 1 & 2**, **Starting Calibration**, **Calibration Ongoing**, **Calibration Fail, Setup not Completed** & **Limit Exceeded**.	

LIMIT	Alternates with PV to show Limit is active.
ALARM	Alternates with PV to show Alarm is active.
LATCH	(Alternates with PV.) One or more outputs are latched on, and 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, actives **Limit** exceed state..
ERROR	Selected input range is not calibrated. Shows **ERROR** until resolved, actives **Limit** exceed state.

5. SAFETY & WARNING SYMBOLS

Risk of electric shock.

Alternating or direct current could be present.

Caution, refer to the manual.

Equipment protected through-out by double insulation.

6. SPECIFICATIONS

Important: Check your product code for exact hardware fitted.

PROCESS INPUT

Thermocouple Calibration:	±0.25% of full range, ±1LSD & ±1°C for Thermocouple CJC. 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:	>1MΩ resistive, except dc mA (5Ω) and V (47kΩ)
Sensor Break Detection:	Thermocouple, RTD, 4 to 20mA, 10 to 50mV, 2 to 10V and 1 to 5V ranges only. Limit output triggers when a sensor break is detected.

DIGITAL INPUT (Isolated or Non-Isolated version)

Functions:	**Reset Limits** & **Alarms** only.
Signal:	Non-isolated version - Open or Close only. Isolated version - Open (2 to 24Vdc) or Closed (<0.8Vdc). Closed to Open transition = **Reset**.

OUTPUTS

Relay

Contacts:	Limit (Output 1) Form C SPDT 2A @250vac or Other (Output 2 or 3) Form A SPST relay, 2A @ 250Vac.
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) for PV Retransmit

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

RS485 SERIAL COMMUNICATIONS

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

OPERATING CONDITIONS

Usage:	For indoor use only, DIN-rail mounted in suitable enclosure
Ambient Temperature:	<95% humidity 0°C to 55°C (Operating), –10°C to 80°C (Storage).
Relative Humidity:	20% to 95% non-condensing.
Altitude:	< 2000m
Supply Voltage & Power:	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, FM 3545, UL & cUL.
EMI:	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.

Safety:	UL61010-1 Edition 3, EN61010-1 Version 2010, Pollution Degree 2 & Installation Class 2.
Protection Rating:	IP20.

PHYSICAL

Unit Size:	Height - 99mm; Width – 22.5mm; Depth - 121mm
Ventilation:	A minimum space of 80mm must be allowed above and below each unit.
Weight:	0.20kg maximum

ISOLATION

	PSU	Universal Input	Relay	SSR	Linear	RS485 Comms	Non-Isolated Digital Input	Isolated Digital Input	Configuration Port
PSU	■								
Universal Input		■		■			■		■
Relay									
SSR		■		■			■		■
Linear					■				
RS485 Comms						■			
Non-Isolated Digital Input		■		■			■	■	■
Isolated Digital Input							■	■	
Configuration Port		■		■			■		■

■ Not Applicable ■ No Isolation ■ Reinforced Isolation

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 ⊙ & ▽. Press △ or ▽ to navigate to the required menu, then press ⊙ to enter.

Press ⊙ & △ 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	Description
Input	Configure the process input.
User Calibration	Single or two-point calibration adjustments for the process input.
Outputs	Configuration parameters for the outputs and alarms.
Communication	Modbus communications settings.
Display	Lock codes and Factory Default.
Information	View serial number & manufacturing details.

Input

Parameter	Description	Default Value
Input Type	See Input Type table in SETUP (& FIRST POWER UP).	**K Thermocouple**
Units	Display °C or °F (hidden when a linear input is used)	**°C**
Decimal Place	**0000**	**0000**
	000.0	
	00.00 *Not for temperature.*	
	0.000	
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.	

User Calibration

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

Parameter	Description	Default Value
>Limit Output		
Type	**High** = Limit output trips when PV over Limit value. (PV>Limit Value). **Low** = Limit output trips when PV under Limit value. (PV<Limit value).	**High**
Value	The exceed value at which the Limit output will trip. Variable within the Scaled Range set in Input.	**-240**
Output Latching	**OFF** – Limit Output doesn't latch **ON -** Limit Output latches & needs to be cleared.	**ON**
Startup latch	**Reset Latch** **Always Latch** **Last Latch**	**Last Latch**
>Alarm 1		
Type	**None** **PV High** **PV Low** **Deviation** **Annunciator**	**PV High**
Value	Range minimum to range maximum, or OFF (maximum +1). **OFF** disables alarm. Default **PV High** alarm type.	**1373**
Hysteresis	**0** to full span.	**1**
Action	**Direct** - Output active when alarm is active. **Reverse** - Output active when alarm is not active.	**Direct**
Output Latching	**OFF** - Alarm doesn't latch **ON -** Alarm latches & needs to be cleared. * Default when **Annunciator** is **ON**.	**OFF ***
Startup latch	**Reset Latch** **Always Latch** **Last Latch**	**Last Latch**
>Alarm 2	**Alarm 2** visible if Output 3 is **Relay** or **SSR Drive**.	
Type	Same options as Alarm 1.	**PV Low**
Value		**-240**
Hysteresis		**Off**
Action		**Direct**
Output Latching		**OFF**
Startup latch	**Reset Latch** **Always Latch** **Last Latch**	**Last Latch**
>PV Retrans	**PV Retrans** parameters only visible if Output 3 is **Linear**.	
Output type	**0-10V** **0-5V** **2-10V** **0-20mA** **4-20mA** **1-5V**	**0-10V**
Scale Range Maximum	Display value for maximum output, -1999 to 9999	Input type Max
Scale Range Minimum	Display value for minimum output, -1999 to 9999	Input type Min
>Alarm Options		
> Alm Options **Start-up Inhibit**	Inhibit Alarms on Start up. **None** **Alarm 1** **Alarm 2** **Alarm 1 & 2**	**None**
> Alm Options **Sensor Break**	**OFF** or **ON** **ON** - triggers Alarm outputs when sensor break is detected.	**ON**

Communications

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. 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**
Reset to Defaults	Reset parameters back to factory defaults. To clear press ⊙ then ▽ to select **Yes**. Press ⊙ to accept.	

Information (Read-Only)

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

What is a Limiter / Limit Controller?

A protective device that will shut down a process at a preset Exceed Condition, in order to prevent possible damage to equipment or products. A 'fail-safe' latching relay is used, which cannot be reset by the operator until the process is back in a safe condition. This signal may be applied from the instrument keypad, digital input or command via Serial Communication.
Limit controllers work independently of the normal process controller. Limit Controllers have specific approvals for safety critical applications. They are recommended for any process that could potentially become hazardous under fault conditions.

What does Exceed Condition mean?

A state that occurs when the Process Variable exceeds the Limit Setpoint value. E.g. if the PV is above the Limit SP when set for high limit action, or below the Limit SP for low limit action. The Limit Controller can be used to shut down the process when this condition occurs, and cannot be reset until the Exceed Condition has passed.

What does 'Latching' mean?

An output that once it becomes active requires a reset signal before it will deactivate. This output is available on Limit controllers and indicator alarms. To successfully deactivate a latched output, the alarm or limit condition that caused the relay to become active must first be removed, then a reset signal can be applied. This signal may be applied from the instrument keypad, Digital Input or command via Serial Communication.

What is the PV Retransmit Output?

A linear DC Voltage or mA output signal proportional to the Process Variable (e.g. process temperature), for use by external devices, such as a Data Recorder or PLC. This output can be scaled to transmit any portion of the input, but it is normally scaled so the reading matches on the device receiving the signal.

What is an Annunciator?

A special type of alarm output that is linked to a Limit Controller's main Limit Output. An Annunciator output will activate when an Exceed condition occurs, and will remain active until a reset instruction is received, or the Exceed condition has passed. Unlike the Limit Output, an Annunciator can be reset even if the Exceed condition is present.

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