

59621-4

MaxVU Rail Limiter Concise Manual

1. INSTALLATION

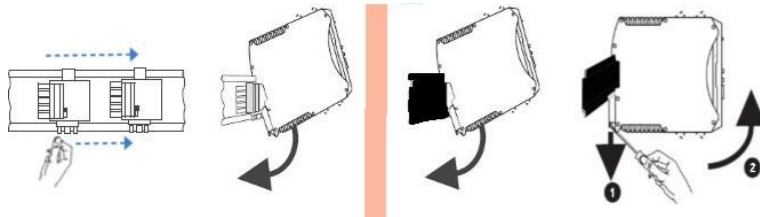
Installation Guidance

- 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.



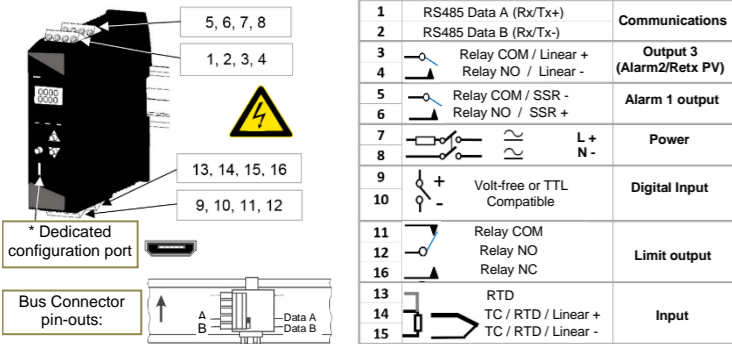
Bus Connector (optional)

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.



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

2. FRONT PANEL

Ok / Up Select 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 * | K Thermocouple | |
| | -200 – 1200°C | | -128.8 – 537.7°C |
| | -328 – 2192°F | | -199.9 – 999.9°F |
| | K Thermocouple * | | |
| | -240 – 1373°C | | -128.8 – 537.7°C |
| | -400 – 2503°F | | -199.9 – 999.9°F |
| | PT100 * | | |
| | -199 – 800°C | | -128.8 – 537.7°C |
| | -328 – 1472°F | | -199.9 – 999.9°F |
| | B Thermocouple | | |
| | 100 – 1824°C | | |
| | 211 – 3315°F | | |
| | C Thermocouple | | |
| | 0 – 2320°C | | |
| 32 – 4208°F | | | |
| L Thermocouple * | | | |
| 0 – 762°C | 0.0 – 537.7°C | | |
| 32 – 1403°F | 32.0 – 999.9°F | | |
| N Thermocouple | | | |
| 0 – 1399°C | | | |
| 32 – 2551°F | | | |
| R Thermocouple | | | |
| 0 – 1759°C | | | |
| 32 – 3198°F | | | |
| S Thermocouple | | | |
| 0 – 1762°C | | | |
| 32 – 3204°F | | | |
| T Thermocouple * | | | |
| -240 – 400°C | -128.8 – 400.0°C | | |
| -400 – 752°F | -199.9 – 752.0°F | | |
| Linear dc | | | |
| 0 - 20mA | 4 - 20mA | | |
| 0 - 50mV | 10 - 50mV | | |
| 0 - 5V | 1 - 5V | | |
| 0 - 10V | 2 - 10V | | |
| >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 * | 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 Retrains parameters only visible if Output 3 is Linear. | | | |
| >PV Retrains Type | 0-10V 2-10V 0-20mA 4-20mA 0-5V 1-5V | 0-10V | |
| >PV Retrains Scale Range Maximum | Maximum PV value corresponding to maximum linear output. | Input type Max | |
| > PV Retrains 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. |
| Latch State | | Output Latched Press to accept. |
| Maximum PV | To clear press then to select Yes. Press to accept. | Screens show the Maximum & Minimum PV reached. |
| Minimum PV | | |

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, <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, activates Limit exceed state.. |
| ERROR | Selected input range is not calibrated. Shows ERROR until resolved, activates 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. 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: >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)

- Signal: Non-isolated version - Open or Closed contacts only. Isolated version - Open (2 to 24Vdc) or Closed (<0.8Vdc).
- Functions: **Reset Limit Output & Latched Alarms.** A Closed condition detected at power-on, or an Open to Closed transition during operation = **Reset**. Reset occurs only if the Limit Exceed/Alarm condition is not present at time of reset. Annunciator outputs always 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 | Config 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 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 |

| Parameter | Description | Default Value |
|--|--|--------------------|
| 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 | Reset 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 | | 1 |
| Action | | Direct |
| Output Latching | | OFF |
| Startup latch | Reset Latch Always Latch Last Latch | Reset 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 | ON - triggers Alarm outputs when sensor break is detected. | OFF |

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 (<i>mmyy</i>). |
| FW Version | The firmware version number & code type. |
| FW Type | |
| Serial | Instrument serial number. |
| Out1 | Relay SSR (SSR driver) or Relay . None, SSR (SSR driver), Relay or Linear . |
| Out2 | |
| Out3 | |
| Comm DI | Comms option - Fitted or None . 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.