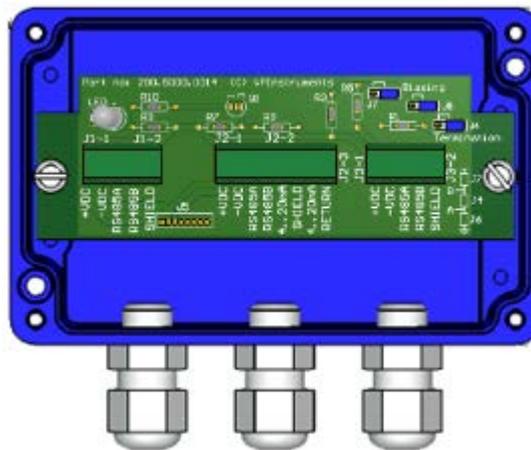


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# Modbus Junction Box

User manual

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# Modbus Junction Box

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# 1 General Warnings

	Keep the housing closed during normal operation. Check the cable glands on water tightness.
	All electrical installations to be carried out by authorized electrical installation engineers only.
	Read and understand user manuals of all equipment before commencing installation or use.
	Avoid direct sunlight
	<b>Feedback leads to product improvement.</b> Please share your experience with us, as we are continuously improving our products in our commitment to quality, reliability and ease of use. Let us know via <a href="mailto:sales@vpinstruments.com">sales@vpinstruments.com</a> !

## 2 Introduction

Thank you for choosing VPInstruments. This manual provides information about the Modbus junction box. The Modbus junction box is a real time saver. You can create a daisy chain of VPFlowScopes without mixing up the wires. The Modbus junction box also includes termination and biasing for the RS485 connection. A LED indicator is available which tells you that the minimum voltage (12VDC) is met.

## 3 Mechanical Installation



Do not install the junction box upside down



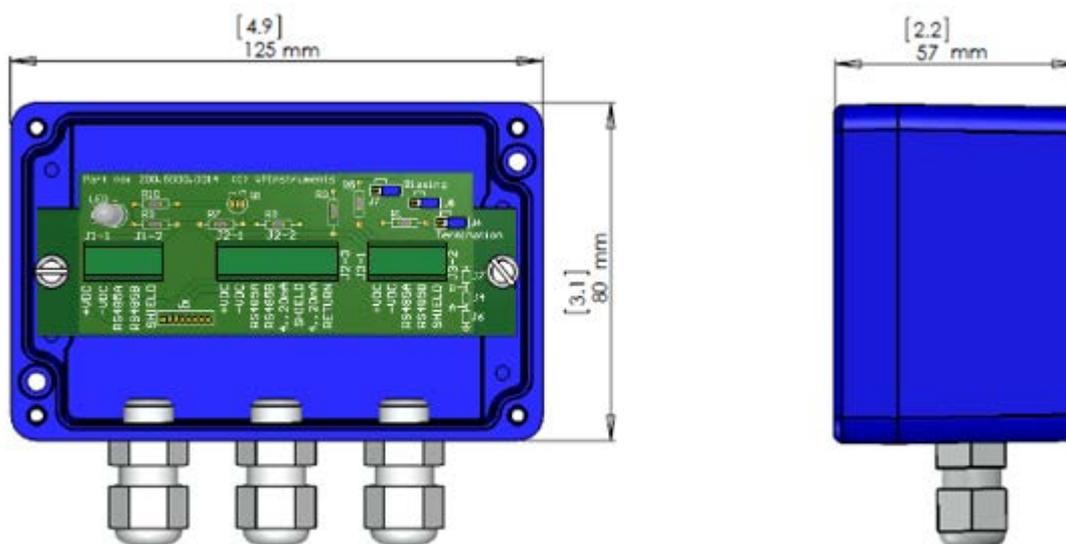
Do not drill through the installation holes, use a pencil to mark the position holes and drill afterwards!



Although the box is IP65 rated, do not install the junction box in an environment where fluids can permanently leak on it.

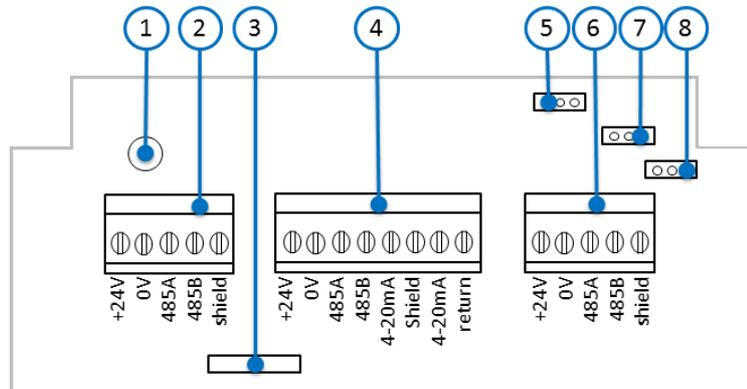
### Installation procedure

1. Remove the four screws and lift the cover
2. Take out the cable glands and mount them into the 3 screw holes
3. Hold the box at the preferred position on the wall and mark the four installation holes with a pencil.
4. Lay the box aside and drill the marked points.
5. Insert a jack in each hole.
6. Hold the junction box in front of the drilled holes and screw it through the connection holes to the wall.



## 4 Electrical Installation

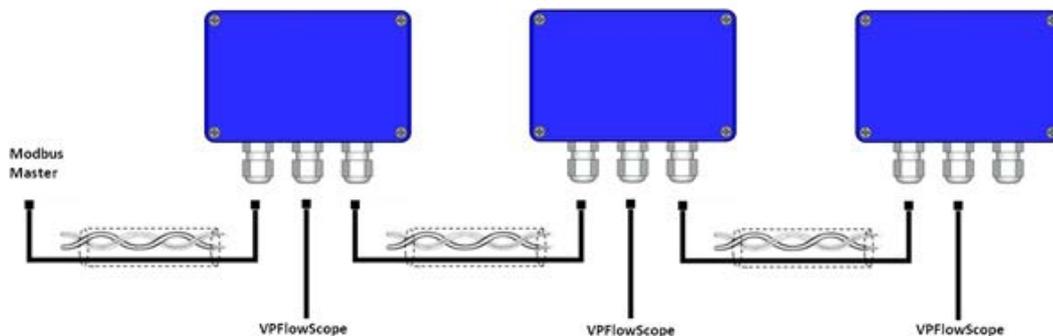
The VPFlowScope connection terminal houses the connections of the trunk line and additional inputs for the 4-20mA output from the VPFlowScope. A 4-20mA and return connector have been added to extract the 4-20mA signal. See the picture below for the terminal layout.



- |                                    |                               |
|------------------------------------|-------------------------------|
| 1. Voltage indicator LED           | 5. Biasing jumper 1           |
| 2. Trunk line input terminal       | 6. Trunk line output terminal |
| 3. Optional M12 connector output   | 7. Biasing jumper 2           |
| 4. VPFlowScope connection terminal | 8. Termination jumper         |

### Wiring

The junction boxes are installed within the trunk line. Shielded twisted pair cable should be used for the trunk line. For long distances, contact your local contractor for advise on cable type. They can make sure that the wire is rated properly for the total power consumption of all devices.



The trunk wire needs two shielded twisted pairs:

#### Pair 1

- RS485 A
- RS485 B

#### Pair 2

- Power supply +
- Power supply -

### 4.1 Termination Resistors

The last junction box MAY NEED to terminate the Modbus trunk line. Be VERY CAREFUL with termination resistors, as they can sometimes do more harm than good to your network. Make sure to consult an experienced RS485/ Modbus installation partner on this topic.

The jumper can be placed in the left position to enable the 120 Ohm resistor



Termination resistor disabled

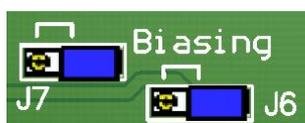
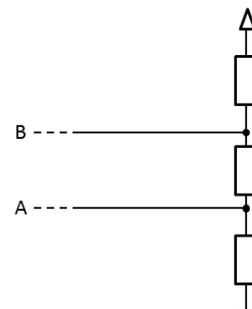


Termination resistor enabled

## 4.2 Biasing Resistors

At least 0.2V needs to be between the A and B line. If the voltage gets below 0.2V, the line state will become undefined resulting in transmission errors. Biasing can be used to create a defined state. The B line gets connected to power+ via a resistor. The A line gets connected to power- via a resistor.

There are 3 jumpers available on the circuit board. The J6 jumper can be used to connect the biasing to power-. The J7 jumper can be used to connect the biasing to power+. The J4 jumper enables termination but must also be used when applying biasing. Therefore only apply biasing to the last junction box in de daisy chain.



Biasing resistors disabled



Biasing resistors enabled

## 4.3 Power supply

A power supply needs to be added at the beginning of the trunk line. This central supply will power up all the meters connected in the daisy chain. Voltage drops may appear in long trunk lines, therefore use a 24 Volt power supply for the VPFlowScope to guarantee at least 12 Volt for the last device in the network. For cabling below 300 meter | 1000 ft, use 20 awg. For longer runs use 18 awg or better.

### Voltage indicator

The green LED on the circuit board will indicate the availability of at least 12VDC. It will turn on if at least 12VDC is available.

## 5 Specifications



Please always check the label of your product for the specifications. Specifications are subject to change as we are continuously improving our products. Please contact us to obtain the latest specification sheet.

### Mechanical

Housing type	Aluminum enclosure, powder coated	
Dimensions	l x b x h = 125 x 80 x 57 mm	l x b x h = 4.92" x 3.15" x 2.24"
Gland material	Steel, silver	
Weight	Approx. 0.5 kg	Approx. 1.1 lbs
Ambient temperature	0 .. 60 °C	32 .. 140 °F

### Electrical

Voltage range	12 .. 24 VDC
Termination resistance	120 Ohm
Biasing resistance	1500 Ohm
Voltage indicator	On >12VDC

easy insight into energy flows

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