

METER HUB™

Communication Hub



Model: HUB-1



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Dimensions in millimeters [inches]

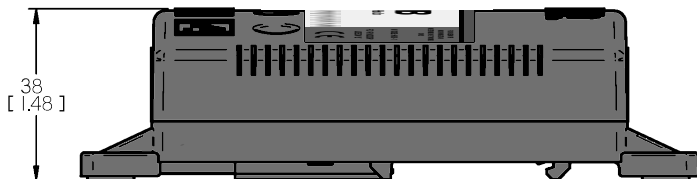
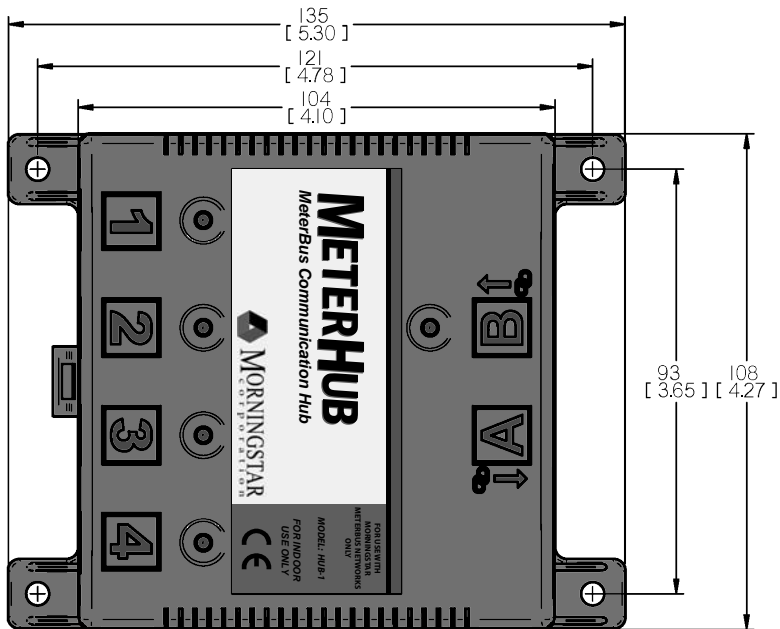


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Save These Instructions

This manual contains important safety, installation and operating instructions for the Meter Hub.

The following symbols are used throughout this manual to indicate potentially dangerous conditions or mark important safety instructions.



WARNING: Indicates a potentially dangerous condition. Use extreme caution when performing this task.



CAUTION: Indicates a critical procedure for safe and proper operation.



NOTE: Indicates a procedure or function that is important for safe and proper operation.

General Safety Information

- Read all of the instructions and cautions in the manual before beginning installation.
- There are no user serviceable parts inside the Meter Hub. Do not disassemble or attempt to repair the controller.
- There are no fuses or disconnects inside the Meter Hub.
- Do not allow water to enter the product.

1.0 Getting Started

1.1 What's in the Box?

- ✓ Meter Hub
- ✓ Operator's Manual
- ✓ Five MeterBus™ RJ-11 Cables, 1 meter (3 ft) in length
- ✓ Four Mounting Screws

1.2 Features

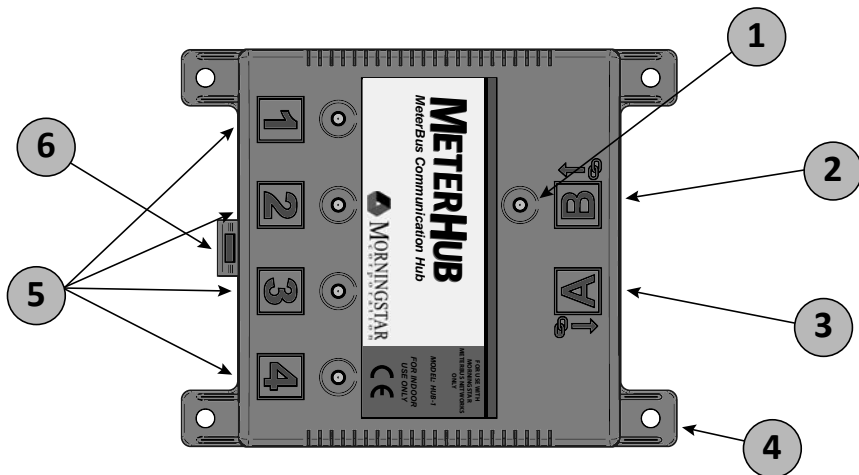


Figure 1. Features of the Meter Hub

1- Port Status LEDs

Indicates network connection status for each port

2- Input Power Port B (Link In)

Input power for the Meter Hub, provided by a device

3- Output Power Port A (Link Out)

Power output for meters or linking Meter Hubs

4- Mounting Feet

For wall mounting the Meter Hub

5 - Ports 1 - 4

Isolated network ports

6- DIN Rail Release Tab

Snap on / Release from DIN rail

2.0 Mounting

2.1 Required Tools

- ✓ Philips screw driver
- ✓ Wire strippers
- ✓ Wire clippers
- ✓ If wall mounting - Drill
- ✓ If wall mounting - 3 mm (1/8") drill bit

2.2 Wall Mounting

Step 1

Locate a suitable mounting surface that is protected from direct sun, high temperatures, corrosive fumes, and water. Do not install in a confined area where battery gasses can accumulate.

Step 2

Place the Meter Hub on the surface where it will be mounted and determine where the cables will enter/exit. Be sure there is sufficient bending room for the communication cables. Verify that the mounting screws will not penetrate wires or other objects located on the opposite side of the surface.

Step 3

Hold the Meter Hub in place and use a pencil or pen to mark the surface at the location of each of the four mounting holes. Remove the Meter Hub and drill 3 mm (1/8") pilot holes at each mark.

Step 4

Place the Meter Hub onto the surface and align the mounting feet holes with the four pilot holes. Use #10 screws (included) to secure the Meter Hub to the surface.

2.3 DIN Rail Mounting

The Meter Hub mounts to standard 35 mm (1-3/8") DIN rail.

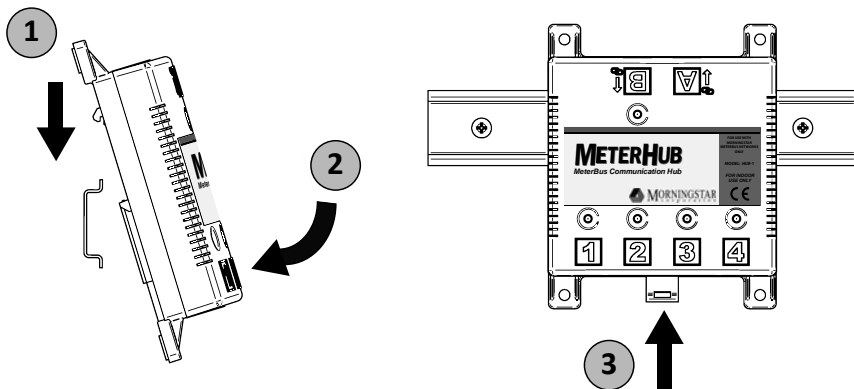


Figure 2. Mounting the Meter Hub on DIN rail.

Step 1

The DIN rail location should be protected from direct sun, high temperatures, corrosive fumes, and water. Do not install in a confined area where battery gasses can accumulate.

Step 2

Place the Meter Hub over the DIN rail in the location where it is to be mounted. Make sure there is sufficient room above and below the Meter Hub for wire connections.

Step 3

The Meter Hub was designed for installation onto a DIN rail without the

need for tools. On the bottom of the Meter Hub, there are three hooks that catch the upper lip of the DIN rail and one wide tab that snaps over the bottom lip of the DIN rail. Hold the Meter Hub at an angle and gently slide the three upper hooks on the back of the Meter Hub over the upper lip of the DIN rail as shown in figure 2 (action #1).

Step 4

Once the hooks have engaged the upper lip of the DIN rail, rotate the Meter Hub so that it is flush and parallel to the DIN rail as shown in figure 2 (action #2).

Step 5

Hold the Meter Hub firmly in position while pushing the DIN rail tab upwards as shown in figure 2 (action #3). The tab will firmly snap when properly engaged with the DIN rail.



CAUTION: Equipment Damage

Never attempt to remove the Meter Hub from the DIN-rail without first releasing the DIN rail tab. Damage to the Meter Hub will result!

3.0 Network Connections

The Meter Hub allows multiple Morningstar devices to communicate on a MeterBus network. Networked controllers can share data and display net system information on a TriStar Meter 2. Table 1 below lists all Morningstar Devices that can be networked using the Meter Hub. Table 1 is divided into two columns. The first column lists devices that supply power to the MeterBus Network. All devices listed in the second column require power *from* the MeterBus Network to operate. It is important to understand the power requirements of each device connected to a MeterBus network. The Meter Hub electrically isolates devices that supply power to the MeterBus, preventing grounding problems. Devices that require power from the network must be connected to devices that supply power.

(X) Supplies Power	(Y) Requires Power
SunSaver-MPPT-15L	TriStar Digital Meter 2
TriStar-45	TriStar Remote Digital Meter 2
TriStar-60	Relay Driver
TriStar-MPPT-45	
TriStar-MPPT-60	

Table 1. Morningstar Device MeterBus Power Specifications

3.1 Networking Rules

Hardware

- ✓ A maximum of 15 devices are allowed on a single MeterBus network.
- ✓ A TriStar meter is required for MeterBus network information display. A maximum of two meters are allowed on a MeterBus network. Use one of the following models:

Meter	Model
TriStar Digital Meter 2	TS-M-2
TriStar Remote Meter 2	TS-RM-2

Table 2. TriStar meters compatible with MeterBus networks

- ✓ Ports 1 - 4 on the Meter Hub are each isolated from all other ports. There is no power output on these ports.
- ✓ Ports A & B are not isolated from each other.
- ✓ One device from column X of table 1 must be connected to *Input Power Port B* to power the Meter Hub. When linking multiple Meter Hubs, *Power Out Port A* is connected to *Input Power Port B* of the following hub. (see Example Network # 3, pg. 15)
- ✓ Only one device from column X of table 1 can be connected to each port on the Meter Hub.
- ✓ Devices listed in column Y of table 1 require MeterBus power. For this reason, devices in this column cannot be the only device connected to ports 1-4.

- ✓ Multiple Meter Hubs can be connected using the *Link Out/Link In* ports A&B.

Software and Firmware

- ✓ All devices on a MeterBus network must be programmed with a unique MeterBus address. The MeterBus address of each device can be modified using a TriStar Meter 2 or MSView PC software.
- ✓ See individual product documentation for details about networking.
- ✓ Firmware updates for all products are available on our website:

<http://www.morningstarcorp.com>

3.2 Example Networks

Example Network #1: Typical Small Network

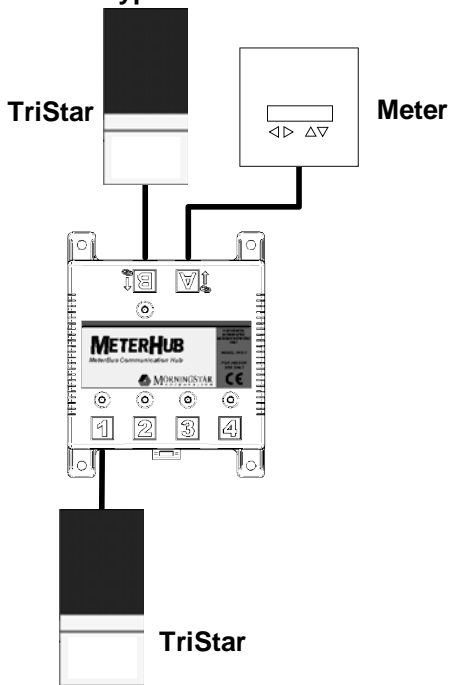


Figure 3. Small Network Diagram

A simple two TriStar system with meter is shown in figure 3 above. The TriStar on Port 1 is electrically isolated from the TriStar on Port B and meter on Port A. Differences in ground potential, disconnected grounds, and differing system voltage will not damage the network equipment or controllers.

Example Network #2: Typical Medium-sized Network

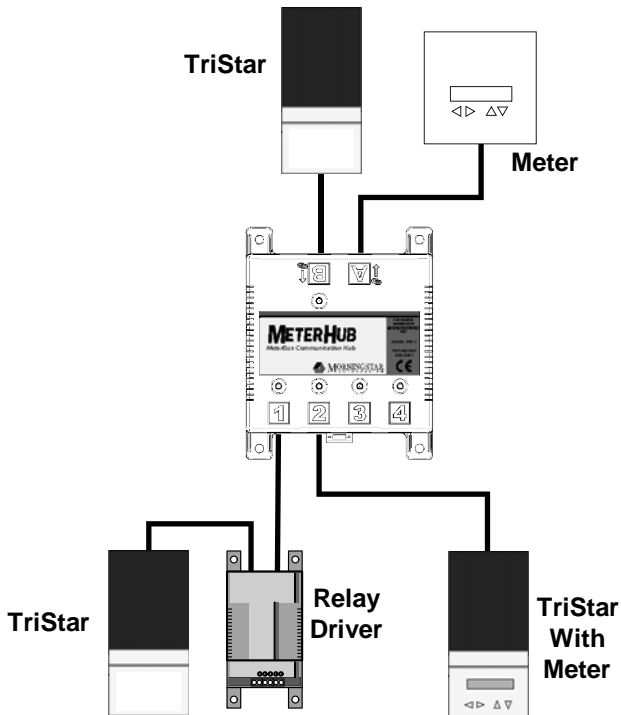


Figure 4. Medium-sized Network

The Medium-sized network shown in figure 4 includes three TriStars, one Relay Driver, and two meters. There can be a maximum of two meters on the MeterBus network. The Relay Driver requires power from the MeterBus. Since ports 1 through 4 on the Meter Hub do not provide output power, a TriStar powers the Relay Driver before connection to Port 1.

Example Network #3: Large MeterBus Network

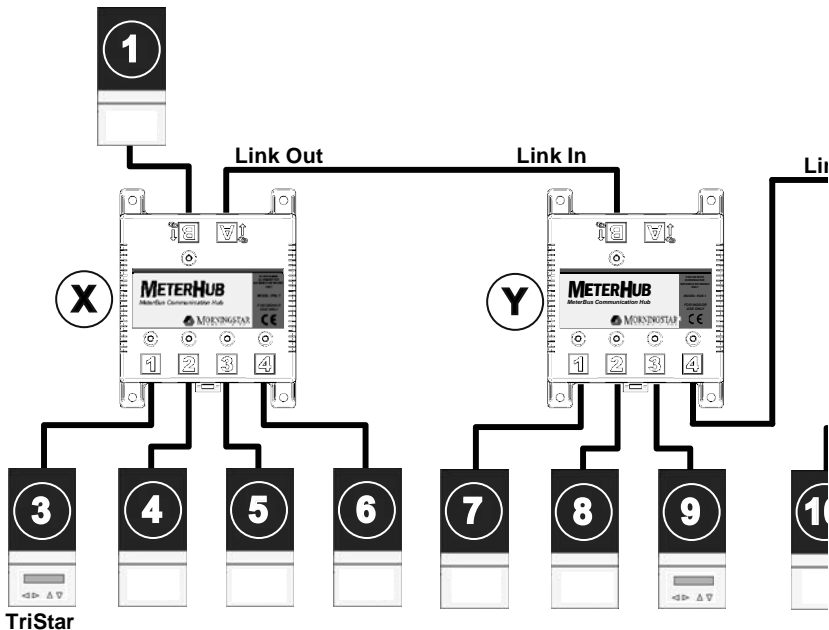


Figure 5. Multiple Meter Hub Network

For large systems, multiple Meter Hubs can be connected via the *Link In / Link Out* ports A & B to expand the number of available ports. Figure 5 above shows network connections for a system with nine TriStars and two meters. Up to four Meter Hubs can be linked together, accommodating up to 15 MeterBus devices. Each device in the network must be programmed with a unique MeterBus ID.

4.0 Operation

After the Meter Hub has been mounted and wired into the network, there are few operator tasks to perform. This section provides information pertaining to the normal operation and maintenance of the Meter Hub.

4.1 Status LEDs

Five *Status LEDs* indicate proper network connection to each port. The Status LED on Port B indicates power status for the Meter Hub. The Meter Hub must be powered through Port B for correct operation.

Status LED ON (Green)

- The port is powered with a correct network connection.

Status LED OFF

- No devices are connected to the port
- A device that supplies power is not connected to the port (see table 1 on page 11)
- There is a wiring error or broken network cable



NOTE:

Devices listed in column Y of table 1 cannot be the only devices connected to ports 1-4, or port B.

4.2 Maintenance

The Meter Hub is designed to run automatically without the need for user intervention. However, the operator should perform the following tasks annually to ensure continued operation:

- ✓ Verify that the Status LEDs indicate normal operation.
- ✓ Check all network connections for corrosion or loose connections.
- ✓ Inspect the case for nesting insects

5.0 Troubleshooting

Problem:

A device is connected to a Meter Hub port, but the Status LED for the port is not ON.

- ✓ Verify that the connected device is listed in column X of table 1 on page 11. A device from column X is required to power the port.
- ✓ Try a different network cable.
- ✓ Make sure the device itself has power.
- ✓ Connect the device to a different Meter Hub port.

Problem:

The Status LED is ON for each connected port but there is no communication.

- ✓ Check Port B power. A device must be connected to Port B to power the Meter Hub circuits.
- ✓ Verify that each device has been programmed with a unique ID.
- ✓ Try different network cable(s).

6.0 Warranty

The Meter Hub is warranted to be free from defects in material and workmanship for a period of FIVE (5) years from the date of shipment to the original end user. Morningstar will, at its option, repair or replace any such defective products.

CLAIM PROCEDURE

Before requesting warranty service, check the Operator's Manual to be certain that there is a fault with the Meter Hub. Return the defective product to your authorized Morningstar distributor with shipping charges prepaid. Provide proof of date and place of purchase. To obtain service under this warranty, the returned products must include the model, serial number and detailed reason for the failure. This information is critical to a rapid disposition of your warranty claim. Morningstar will pay the return shipping charges if the repairs are covered by the warranty.

WARRANTY EXCLUSIONS AND LIMITATIONS

This warranty does not apply under the following conditions:

- Damage by accident, negligence, abuse or improper use.
- Unauthorized product modification or attempted repair
- Damage occurring during shipment

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, EXPRESS OR IMPLIED. MORNINGSTAR SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. No Morningstar distributor, agent or employee is authorized to make any modification or extension to this warranty.

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7.0 Technical Specifications

Electrical

Minimum Isolation (Ports 1-4)	500 Volts
Self-consumption (per port)	8 mA

Mechanical

Dimensions	135x108x37 mm 5.3x4.3x1.5 in
Weight	0.19 kg / 0.41 lbs
Port Connections	RJ-11, gold plated
Enclosure	Type 1, indoor rated
Compatible DIN rail	35 mm standard

Environmental

Operating Temperature	-40C to +60C
Storage Temperature	-55C to +85C
Humidity	100 % (NC)
Tropicalization	conformal coating on both sides of printed circuit board

Certifications

CE
RoHS

*Specifications subject to change without notice.
Designed in the U.S.A.
Assembled in China.
MS-ZMAN-HUB-01-B 07/09*