netway SP4BT Series 4 Port Hardened 802.3bt 4PPoE Switches Layer 2 Installation Guide

Fiber Solution
NetWaySP4BT Series
4-port Hardened 802.3bt
4PPoE Switches (Layer 2)

Contents

SP4BT Series 4 Port Hardened 802.3bt 4PPoE Switches Layer 2

Models Include:

NetWaySP4BTWP
– 4-port Hardened 802.3bt 4PPoE Switch and Power Supply/Charger
– NEMA4/4X, IP66-rated Outdoor enclosure.

NetWaySP4BTWPX
– 4-port Hardened 802.3bt 4PPoE Switch and Power Supply/Charger
– NEMA4/4X, IP66-rated Outdoor enclosure.
– Accommodates up to four (4) 12VDC/4AH batteries.

NetWaySP4BTWPN
– 4-port Hardened 802.3bt 4PPoE Switch (uses external power supply).
– NEMA4/4X, IP66-rated Outdoor enclosure.

NetWaySP4BTX
– 4-port Hardened 802.3bt 4PPoE Switch and Power Supply/Charger
– NEMA1-rated Indoor enclosure.

NetWaySP4BTPL
– 4-port Hardened 802.3bt 4PPoE Switch and Power Supply/Charger
– Backplane version.

NetWaySP4BTB
– 4-port Hardened 802.3bt 4PPoE Switch
– Board Only

Installation Guide

CE

Altronix®

More than just power.™

DOC#: NetWaySP4BT Rev. 120920
Installing Company: _____ Service Rep. Name: _____
Address: _____ Phone #: _____

Overview:

Altronix NetWaySP4BT Series Hardened 802.3bt 4PPoE Layer 2 Switches are equipped with two (2) 1Gb SFP ports and four (4) 802.3bt compliant Ethernet ports rated at 90W each, limited to 240W total power. Embedded LINQ Technology enables monitoring, control, and reporting from anywhere over the network.

Features

Agency Listings:

- CE European Conformity.

Input

- NetWaySP4BTWP/NetWaySP4BTWPX/NetWaySP4BTPL/ NetWaySP4BTX: 115VAC, 60Hz, 1.8A or 230VAC, 50/60Hz, 1A.
- NetWaySP4BTB/NetWaySP4BTWPN: 48-56V UL Listed ITE power supply.

Output

- NetWaySP4BTWP/NetWaySP4BTWPX/NetWaySP4BTPL/ NetWaySP4BTX: Four (4) 10/100/1000 Mbps Ethernet ports rated at 90W each (limited to 240W total power).
- NetWaySP4BTB/NetWaySP4BTWPN: Four (4) 10/100/1000 Mbps Ethernet ports rated at 90W each (depending on the power supply employed, limited to 320W total power).
- IEEE 802.3af, 802.3at, 802.3bt compliant.

SFP Ports:

- Two (2) Gigabit SFP ports.

Ethernet Ports:

- Four (4) 10/100/1000 Mbps ports.
- Connectivity: RJ45, auto-crossover.
- Wire type: 4-pair CAT5e or higher structured cable.
- Speed: 10/100/1000 Mbps, half/full duplex, auto negotiation.

VLAN:

- Multiple management VLAN assignments.
- 802.1Q Tagged VLAN.
- Up to 10 VLAN groups. ID Range 2-4095.

Battery Backup:

- NetWaySP4BTWP/NetWaySP4BTWPX/NetWaySP4BTPL/ NetWaySP4BTX:
- 24VDC charging circuit charges LiFePO4 (Lithium Iron Phosphate) or sealed lead acid* or gel type* batteries.
- Automatic switch over to stand-by battery when AC fails.

Indicators (LED)

- Individual PoE On LEDs for each port.

- Individual IP Link status, 10/100/1000 Base-T/active LEDs for each port.
- ALOS LED indicates fiber connection for SFP port.
- Heartbeat LED indicates proper operation of the unit.

LINQ Technology:

- Remote network management allows for camera/device reset and diagnostic monitoring.
- Provides local and/or remote access to critical information via LAN/WAN.
- Email and Windows Dashboard Alert notifications report real-time events.
- Event log tracks history.

Mechanical:
NetWaySP4BTB:

- Dimensions (L x W x D approx.): 5.625” x 4.5” x 0.625” (158.8mm x 142.9mm x 15.9mm).

NetWaySP4BTPL:

- Dimensions (H x W x D approx.): 10.75” x 8.875” x 2.375 (273.1mm x 225.4mm x 60.3mm). NetWaySP4BTWP, NetWaySP4BTWPN:
- NEMA4/4X, IP66 Rated enclosure for outdoor use.
- Dimensions (H x W x D approx.): 13.31” x 11.31” x 5.59” (338.1mm x 287.3mm x 142mm).

NetWaySP4WPX:

- NEMA4/4X, IP66 Rated enclosure for outdoor use.
- Accommodates sealed lead acid or gel type or LiFePO4 (Lithium Iron Phosphate) 12VDC batteries.
- Dimensions (H x W x D approx.): 17.53” x 15.3” x 6.67” (445.3mm x 388.6mm x 169.4mm).

NetWaySP4BTX:

- NEMA1-rated indoor enclosure
- Dimensions (H x W x D approx.): 13.5” x 13” x 3.25” (342.9mm x 330.2mm x 83mm).

***CAUTION:** When using lead acid or gel-type batteries, the enclosure must be properly ventilated.

Recommended Altronix Power Sourcing Equipment:

NetWaySP4P	Ethernet to Fiber Media Converter with Integral Power Supply/Charger. Four (4) 56VDC non-power-limited outputs up to 120W max. full power per port (240W to tal power). Four (4) 1Gb SFP ports.
NetWaySP4PX	Ethernet to Fiber Media Converter with Integral Power Supply/Charger. Four (4) 56VDC non-power-limited outputs up to 120W max. full power per port (480W to tal power). Four (4) 1Gb SFP ports.
NetWaySP4P2	Ethernet to Fiber Media Converter with Integral Power-Limited Power Supply/Charger. Four (4) 56VDC power-limited outputs up to 60W max. full pow er per port (240W total power). Four (4) 1Gb SFP ports.
WayPoint562	High Current Outdoor Power Supply/Charger. 56VDC/120W output. Filtered and electronically regulated output. Short circuit and thermal overload protection.
Vertiline563	EIA 19” 1U Rack Mountable Dual Independent Power Supply/Charger. 56VDC @ 3A each output. Filtered and electronically regulated output. Short circuit and thermal overload p rotection.
PoE240	Power Supply/Charger Board. 56VD/240W output. Filtered and electronically re gulated output. Short circuit and thermal overload protection.

Recommended Altronix SFP Modules:
Altronix P1MM, P1SM10, P1AB2K, and P1GCE are hot-pluggable SFP fiber transceiver modules and are readily usable with all Altronix Spectrum fiber optic equipment for 1Gb transmission rates.

P1MM	For use with Multi-Mode Fiber for distances up to 550m.
P1SM10	For use with Single-Mode Fiber for distances up to 10km.
P1AB2K	For use with Single Strand Single-Mode Fiber for distances up to 2km.
P1GCE	For use with CAT5e or better for distances up to 100m.

Installation Instructions:

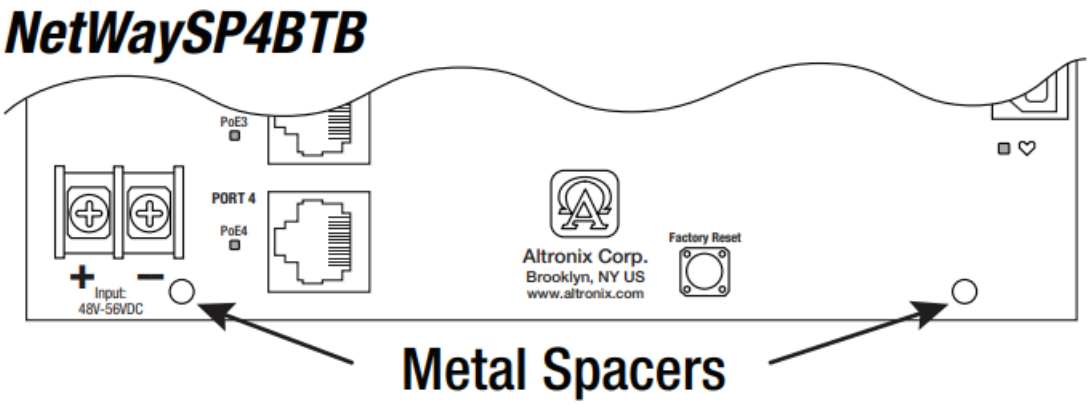
Wiring methods shall be in accordance with the National Electrical Code/NFPA 70/ANSI, and with all local codes and authorities having jurisdiction. All units should be installed by trained service personnel.

Mounting Instructions:

NetWaySP4BTB:

1. Mount board in the desired location/enclosure with hardware supplied.
   Note: For proper earth ground connections on NetWaySP4BTB fasten metal spacers (provided) to threaded studs at indicated board mounting holes (shown on the right). This is recommended for better environmental immunity.

Fig. 1



2. Connect the external 48V-56V UL Listed ITE power source to the terminal marked [+] and [–], carefully observing the correct polarity (Fig. 2, pg. 6).

NetWaySP4BTWPN/NetWaySP4BTWP/NetWaySP4BTWPX:

1. Remove the backplane from the enclosure prior to drilling. Do not discard hardware.
   Note: Make sure that hardware will not interfere with the components of the circuit board.
2. Mark and drill desired inlets on the enclosure to facilitate wiring. Maximum NEMA type 4X rated fittings to be used are 0.5". Follow the manufacturer's specifications for the appropriate size opening.
   Note: Inlets for conduit fittings should only be made on the bottom of the enclosure. To facilitate wire entry utilize weather-tight NEMA-rated connectors (supplied), bushings, and cable.
3. Clean out the inside of the enclosure before remounting circuit boards/backplanes.
4. NetWaySP4BTWPN: Connect the external 48V-56V UL Listed ITE power source to the terminal marked [+] and [–], carefully observing the correct polarity (Fig. 2, pg. 6).
5. Mounting NEMA4/4X rated enclosure (Enclosure Dimensions, pg. 13-16):
   Wall mount:
   Mount the unit in the desired location. Mark and drill holes to line up with the top and bottom holes of the enclosure flange. Secure enclosure with appropriate fasteners (e. g. screws and anchors; bolts and locking nuts, etc.) that are compatible with the mounting surface and are of sufficient length/construction to ensure a secure mount (Fig. 6, pg. 12).
   Pole Mount:
   Refer to Fig. 7 – 11, pg. 12.
6. Mount the backplane in an enclosure with hardware.

NetWaySP4BTX:

1. Mount the unit in the desired location. Mark and predrill holes in the wall to line up with the top two keyholes in the enclosure. Install two (2) upper fasteners and screws in the wall with the screw heads protruding. Place the enclosure's upper keyholes over the two (2) upper screws; level and secure. Mark the position of the lower two (2) holes. Remove the enclosure. Drill the lower holes and install two fasteners. Place the enclosure's upper keyholes over the two (2) upper screws. Install the two (2) lower screws and make sure to tighten all screws (Enclosure Dimensions, pg. 10). Secure the enclosure to earth ground.

NetWaySP4BTPL:

1. Mount the backplane in the desired enclosure with the hardware supplied (Backplane Dimensions, pg. 11).

Power Connection:

Use 14AWG or larger for all power connections.
Keep power-limited wiring separate from non-power-limited wiring by utilizing separate knockouts/inlets. Minimum 0.25” spacing must be provided.
CAUTION: Do not touch exposed metal parts. Shut branch circuit power before installing or servicing equipment. There are no user-serviceable parts inside. Refer installation and servicing to qualified service personnel.

Input/Data Connections:

1. Connect structured cables from port marked [Port 1] to [Port 4] on the NetWare unit to PoE-compliant cameras/edge devices (Fig. 2, pg. 6).
2. Insert the SFP module into port(s) marked [SFP], then connect the cable to the SFP module on NetWaySP4BTB to the corresponding input of an SFP switch (Fig. 2, pg. 6).

Battery Backup (if desired):
NetWaySP4BTWP/ NetWaySP4BTWPX/NetWaySP4BTX/NetWaySP4BTPL:

1. Connect two (2) 12VDC batteries wired in series or one (1) 24V battery to terminals marked [– BAT +] (Fig. 3, pg. 7), carefully observing polarity. When use of stand-by batteries is desired, they can be LiFePO4 (lithium iron phosphate), lead acid or gel type.
   Note: When batteries are not used, a loss of AC will result in the loss of output voltage.
   Note: When using two 12V LiFePO4 (lithium iron phosphate) batteries, check with manufacturer specifications that batteries can be connected in series.
   For outdoor battery backup, the battery enclosure must have sufficient ventilation.

Security:
Please ensure that the cover is secured with:
Key lock and screws for NetWaySP4BTX, Security Bolt for NetWaySP4BTWP(X) and NetWaySP4BTWPN.

Technical Specifications:

Parameter	Description		
Number of Ports	Four (4) 10/100/1000 Mbps Ethernet ports rated at 90W each. IEEE 802.3af, 802.3at, 802.3bt compliant. Two (2) Gigabit SFP Ports.		
Input Power Requirements	NetWaySP4BTWP/NetWaySP4BTWP/NetWaySP4BTPUNetWaySP4BTX: 115VAC, 60Hz, 1.8A or 230VAC, 50/60Hz, 1 A. NetWaySP4BTB/NetWaySP4BTWPN: 48-56V UL Listed ITE power supply.		
Environmental Conditions	Operating Ambient Temperature: 240W: – 30°C to 55°C (— 22°F to 131°F) 180W: – 30°C to 65°C (— 22°F to 149°F) 150W: – 30°C to 75°C (— 22°F to 167°F) Relative Humidity: 85%, +/— 5% Storage Temperature: — 30°C to 85°C (— 22°F to 185°F) Operating Altitude: — 304.8 to 2,000m		
Weights (approx.)	**Model**	**Product Weight**	**Shipping Weight**
	NetWaySP4BTWP NetWaySP4BTWPX NetWaySP4BTWPN NetWaySP4X NetWaySP4PL NetWaySP4BTB	10.5 lb. (4.76 kg) 15 lb. (6.8 kg) 9.5 lb. (4.3 kg) 6.85 lb. (3.11 kg) 2.6 lb. (1.18 kg) 0.4 lb. (0.18 kg)	11.9 lb. (5.4 kg) 17.5 lb. (7.9kg) 10.9 lb. (4.9 kg) 7.75 lb. (3.51 kg) 4.0 lb. (1.81 kg) 0.75 lb. (0.34 kg)

Fig. 2 – NetWaySP4BTB/NetWaySP4BTWPN – Typical Application with Composite Cable

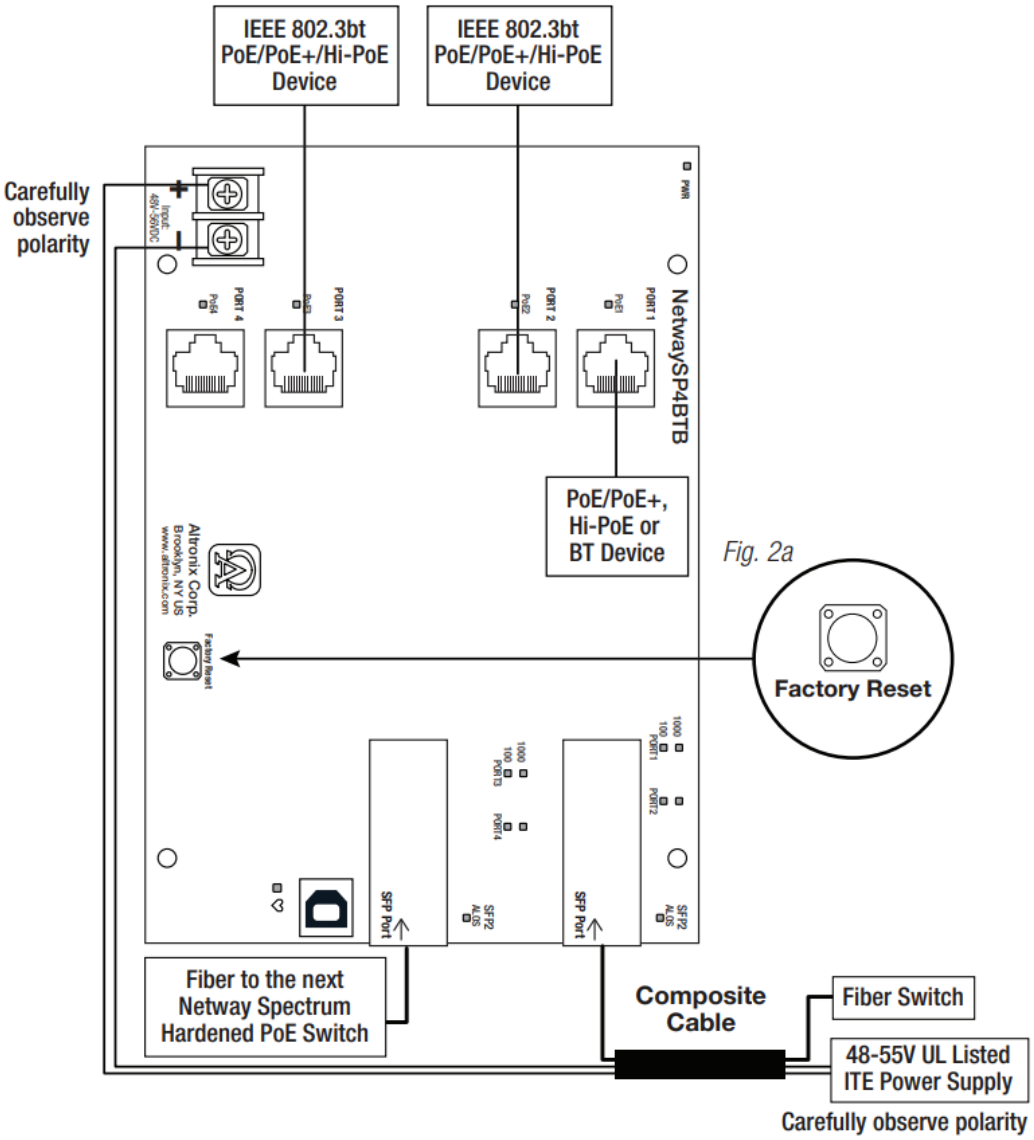


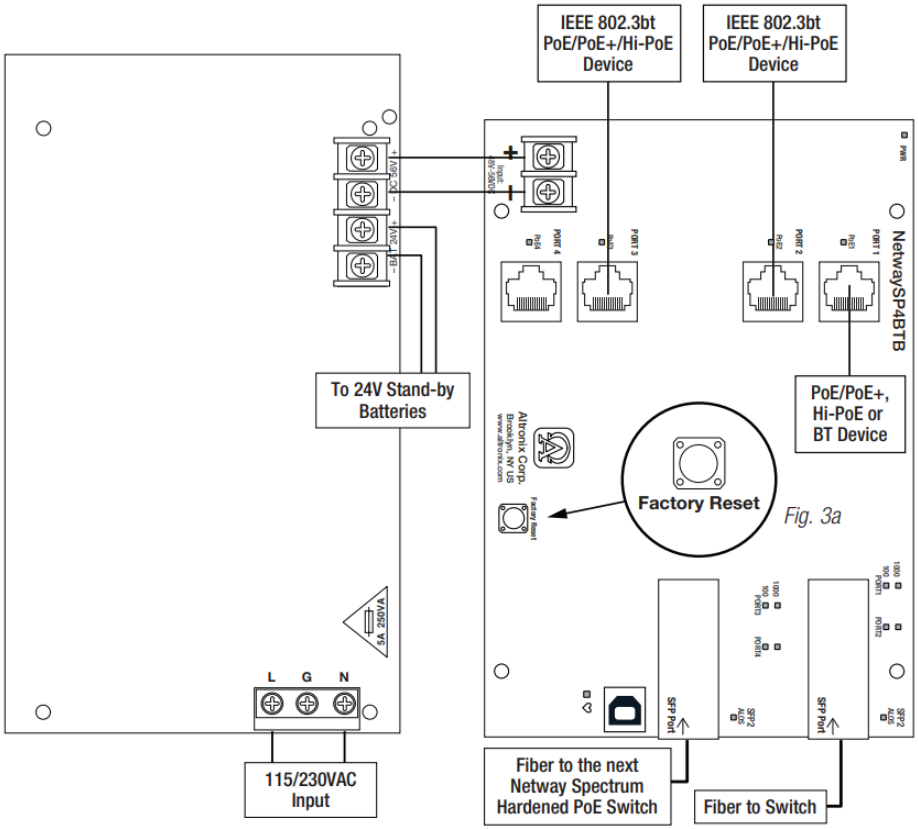
Fig. 2a

Powering Cable Distance Chart

Power Requirements	Power Cabling AWG	Maximum Distance (ft./m)	Power Requirements	Power Cabling AWG	Maximum Distance (ft./m)
15W	12/2	11,162′ / 3,403m	15W	16/2	4,4157 1,346m
30W	12/2	5,581′ / 1,702m	30W	16/2	2,207′ / 673m
45W	12/2	3,767′ / 1,148m	45W	16/2	1,490′ / 454m
60W	12/2	2,739′ / 835m	60W	16/2	1,083′ / 330m
75W	12/2	2,249′ / 686m	75W	16/2	8897 27 1m
90W	12/2	1,872′ / 571m	90W	16/2	7407 22 6m
105W	12/2	1,607′ / 490m	105W	16/2	6357 19 4m
120W	12/2	1,408′ / 429m	120W	16/2	557′ / 170m
180W	12/2		180W	16/2	

Estimated distances are based on starting voltage of 56VDC and account for a 10-volt drop.
All distances are per IEEE 802.3at standard for device power requirements of minimum 44VDC and leave an approximate 2 volts for safety and flexibility.

Fig. 3 - **NetWaySP4BTX/NetWaySP4BTWP/NetWaySP4BTWPX)/NetWaySP4BL – Typical Application with Factory Installed Power Supply**



Configuring Units for Network Connection:

Please be sure to visit altronix.com for latest firmware and installation instructions
Factory Default Settings:

• IP Address:	192.168.168.168
• User Name:	admin
• Password:	admin

1. Set the static IP address for the laptop to be used for programming to the same network IP address as the NetwaySP4BT. The default address of the NetwaySP4BT is 192.168.168.168, I.E. 192.168.168.200.
2. Connect one end of the network cable to the network jack on the NetwaySP4BT and the other to the network connection of the laptop.
3. Open a browser on the computer and enter “192.168.168.168” into the address bar.
   A dialog box Authentication Required will appear requesting both user name and password. Enter the default values here. Click on the button labeled Log In.
4. The status page of the NetWaySP4BT will appear. Click on the tab labeled Network Settings. This will open the Network Setting screen. In this screen, the MAC Address of the NetWaySP4BT module will be found along with the Network Settings and Email Settings.

Network Settings:
In the IP Address Method field, select (STATIC or DHCP), then follow the appropriate steps.

Static:
A. IP Address: Enter the IP address assigned to the NetWaySP4BT by the network administrator.
B. Subnet Mask: Enter the Subnet of the network.
C. Gateway: Enter the TCP/IP gateway of the network access point (router) being used. Gateway configuration is required to properly receive emails from the device.
D. HTTP Port: Enter the HTTP port number assigned to the NetWaySP4BT module by the network administrator to allow remote access and monitoring. The default inbound port setting is 80. HTTP is not encrypted and unsecure. Even though HTTP can be used for remote access, it is recommended primarily for use with LAN connections.
E. HTTPS Port: Enter the HTTPS port number assigned to the NetWaySP4BT module by the network administrator to allow remote access and monitoring. The default inbound port setting is 443. Being encrypted and more secure, HTTPS is highly recommended for remote access.
F. Click the button labeled Submit Network Settings.
A dialog box will display “New network settings will take effect after the server is rebooted”. Click OK.

DHCP:
A. After selecting DHCP in the IP Address Method field click the button labeled Submit Network Settings. A dialog box will display “New network settings will take effect after the server is rebooted”. Click OK. Next, click on the button labeled Reboot Server. After rebooting the NetWaySP4BT will be set in the DHCP mode. The IP address will be assigned by the router when the NetWaySP4 is connected to the network. It is recommended to have the assigned IP Address reserved to ensure continued access (see the network administrator).
B. Subnet Mask: When operating in DHCP, the router will assign the subnet mask values.
C. Gateway: Enter the TCP/IP gateway of the network access point (router) being used.
D. HTTP Port: Enter the HTTP port number assigned to the NetWaySP4BT module by the network administrator to allow remote access and monitoring. The default inbound port setting is 80. HTTP is not encrypted and unsecure. Even though HTTP can be used for remote access, it is recommended primarily for use with LAN connections.

Secure Network Setup (HTTPS):
In order to set up HTTPS for a Secure Network Connection, a Valid Certificate and Key must be used. Certificates and Keys should be in a “.PEM” format. Self Certifications should only be used for testing purposes as no actual authentication is being performed. In a Self-Certified mode, the connection will still state that it is unsecure. How to upload the Certificate and Key to setup HTTPS:

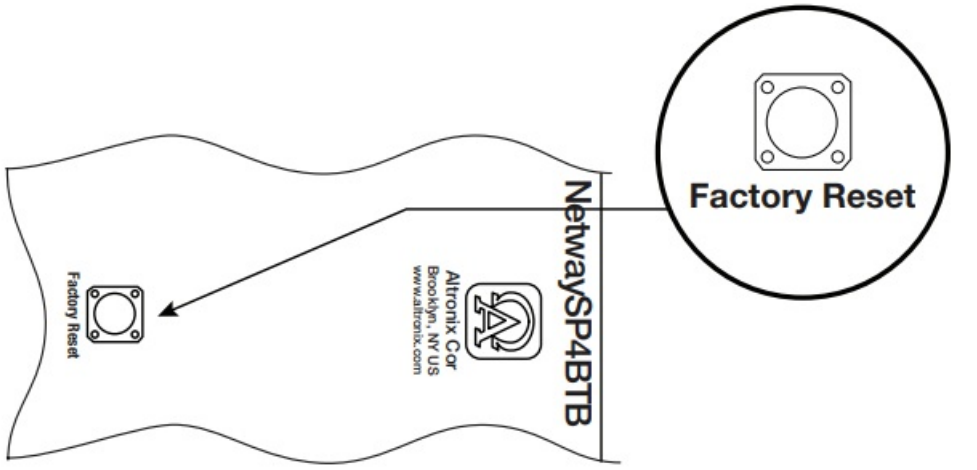
1. Open the Tab Labeled “Security”
2. Select the Tab Labeled “Email/SSL”
3. Scroll to the bottom under “SSL Settings”
4. Click “Select Certificate”
5. Browse and select a valid Certificate to upload from the server
6. Click “Select Key”
7. Browse and select a valid Key to upload from the server
8. Click “Submit Files”

Once the Certificate and Key is uploaded successfully you can proceed with setting up HTTPS in Network Settings.
A. HTTPS Port: Enter the HTTPS port number assigned to the NetWare Spectrum module by the network administrator to allow remote access and monitoring. The default inbound port setting is 443. Being encrypted and more secure, HTTPS is highly recommended for remote access.
B. Click the button labeled Submit Network Settings.
A dialog box will display “New network settings will take effect after the server is rebooted”. Click OK.

Factory Reset Option:

1. Power the unit down. Allow approximately 30 seconds for the unit to power down completely.
2. Depress the Factory Reset button on NetWaySP4BTB while reapplying power to the unit (Fig. 2a, 3a, pg. 6, 7; Fig. 4, pg. 8).
   Continue holding the button until the LEDs on board go through the start-up cycle, then release the button.
3. The unit returns to the original factory settings.

Fig. 4



VLANs
VLANs (Virtual Local Area Networks) are a subnetwork that allows for the grouping together of devices for improved network traffic as well as providing higher security by allowing greater control over which devices have access to each other. It is important to plan how you will setup your devices for each VLAN.

Configuring VLAN on the Altronix NetwaySP4BT Series Layer 2 Switch:

1. Ensure the Laptop or PC being used to program the VLAN settings is on a port that will be assigned to your first VLAN configuration. By default, the management portion of the software is assigned to VLAN-1,
   CAUTION: Changing VID=1, the industry-standard VLAN HOST address to any other VID address should be done with caution and performed only locally, since the change will drop the original HOST connection. Local access then facilitates a physical reconnection to the respective port.
   Note: Only this VLAN network allows access to IP management.
2. In Network Section click on VLAN Tab.
3. Click Add VLAN.
4. Enter a name for the VLAN.
5. Enter a VLAN ID, i.e. 10, 20, etc. Ensure this VLAN ID is associated with a VLAN setup on the main switch and that your Laptop or PC being used for programming is on this same ID.
   Note: VLAN ID could be any value 2-4094.
6. Assign VLAN QoS (Quality of Service) priority. 0 = Lowest and 7 = Highest
7. Pick a Trunk port (Tagged Ports). Trunk ports are typically the main connection for network traffic for each group. They are usually connected to a network switch, WAPs, etc.
8. Pick the Access port(s) (Untagged Ports) associated with the VLAN. Access Ports are typically used for Cameras, etc. If programming locally, ensure your laptop or PC is connected to one of these ports.
9. Save Configuration.
10. Repeat steps 2 – 9 to add another VLAN.

If the unit is accidentally programmed incorrectly and you cannot get into the NetwaySP4BT series programming, physically moving ports of your PC connected to the main switch to the correct port (when being programmed remotely), or, as a last resort, completing a factory reset locally and reprogramming the unit.

11. **Advanced Port Settings:**

    Unknown VID Packet Forwarding Configuration:

    On ingress unknown VID, Foward to a fixed set of ports. By default, no forwarding is set.

    Configuration on Ingress Untagged Traffic:

    Trunk Port action for ingress UNTAGGED packets. By default do not drop packets.

    Keep Tag on Egress:

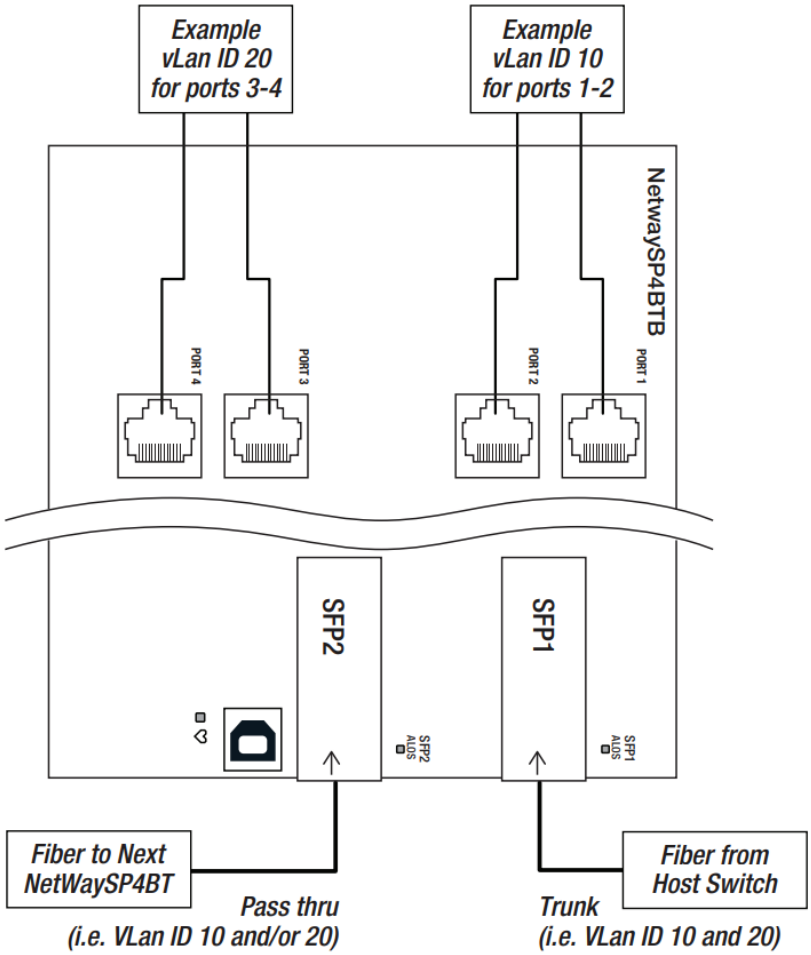
    Select if you want ACCESS Port to keep the VLAN tag when sending egress packets.

    By default tags are stripped.

    Preferred VLAN Forwarding:

    For ACCESS Ports that belong to more than one VLAN. Select the preferred VLAN to forward UNTAGGED ingress packets. By default preferred VLAN is the last VLAN created.

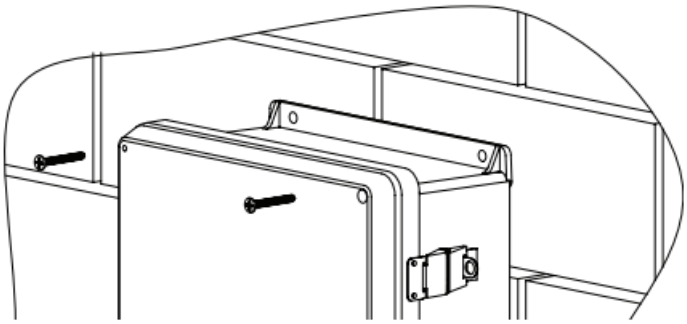
Fig. 5 – Typical VLan Setup:



Wall Mount Installation:

1. Place the unit at the desired location and secure it with mounting screws (not included) (Fig. 6, pg. 12).

Fig. 6



Pole Mounting Using Optional Pole Mount Kit PMK1 (NetWaySP4BTWP) or PMK2 (NetWaySP4BTWPX):
This installation should be made by qualified service personnel. This product contains no serviceable parts. PMK1 and PMK2 outdoor pole mount kits are designed to simplify the installation of Altronix outdoor-rated power supplies and accessories housed in models WP1, WP2, WP3, and WP4 NEMA-rated enclosures. PMK1 and PMK2 can be mounted on 2" to 8" (50.8mm to 203.2mm) diameter round or 5" (127mm) square poles. Brackets are designed for use with the Wormgear Quick Release Straps (two included).

1. Thread one (1) wormgear quick-release strap through the slots on the back of a mounting bracket (Fig. 7, pg. 12).
2. Once the desired height of the top Pole Mount bracket is achieved, tighten the straps down by sliding the open end of the strap through the locking mechanism on the strap, then tighten the screw with flat head screwdriver or 5/16" hex socket driver (Fig. 8, pg. 12 and Fig. 10, pg. 12).

Fig. 7

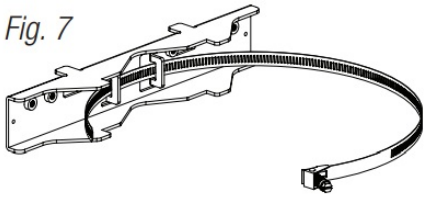


Fig. 8

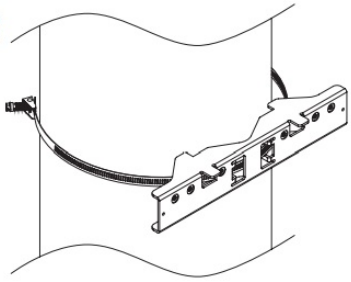
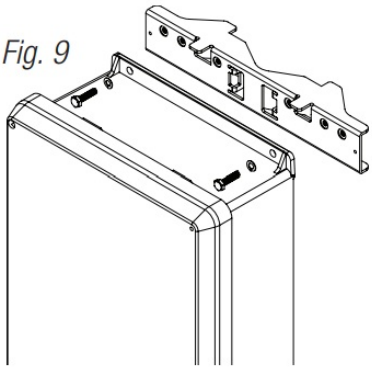


Fig. 9



3. Attach the bottom bracket to the enclosure by inserting bolts through the flange of the enclosure and into the bracket, tightening bolts with a 7/16" hex socket (Fig. 9, pg. 12).
4. Thread the second wormgear quick-release strap through the slots on the back of the bottom mounting bracket (Fig. 10, pg. 12).
5. Mount the enclosure onto the top bracket by inserting bolts through the flange of the enclosure and into the bracket, tightening bolts with a 7/16" hex socket (Fig. 8, pg. 12).
6. Tighten the straps of the bottom bracket down by sliding the open end of the strap through the locking mechanism on the strap, then tighten the screw with a flat head screwdriver or 5/16" hex socket driver (Fig. 8, pg. 12).
7. Clip excess straps.

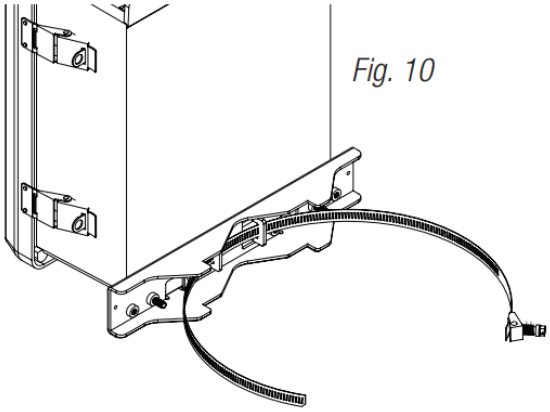


Fig. 10

Fig. 11
2" to 8"(50.8mm to 203.2mm)
diameter round pole

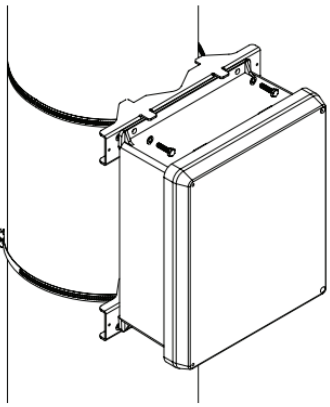
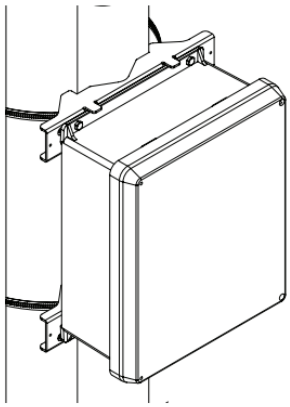
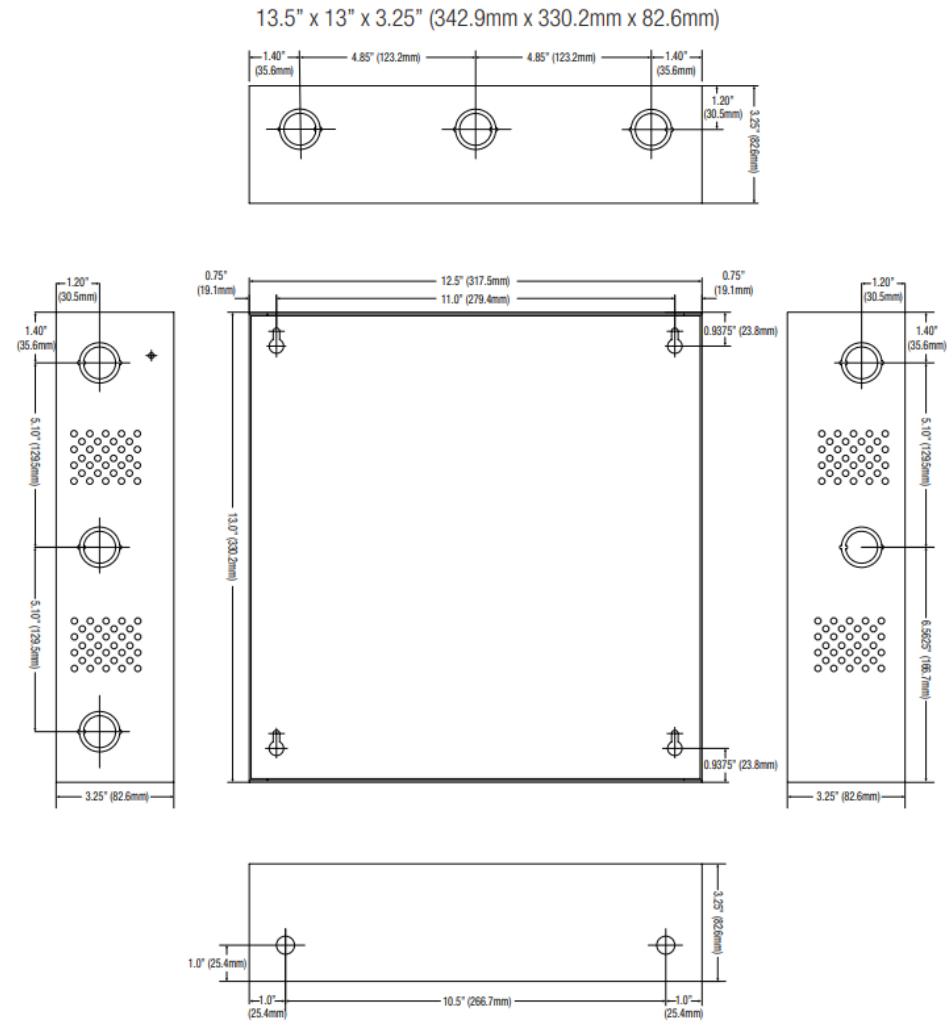


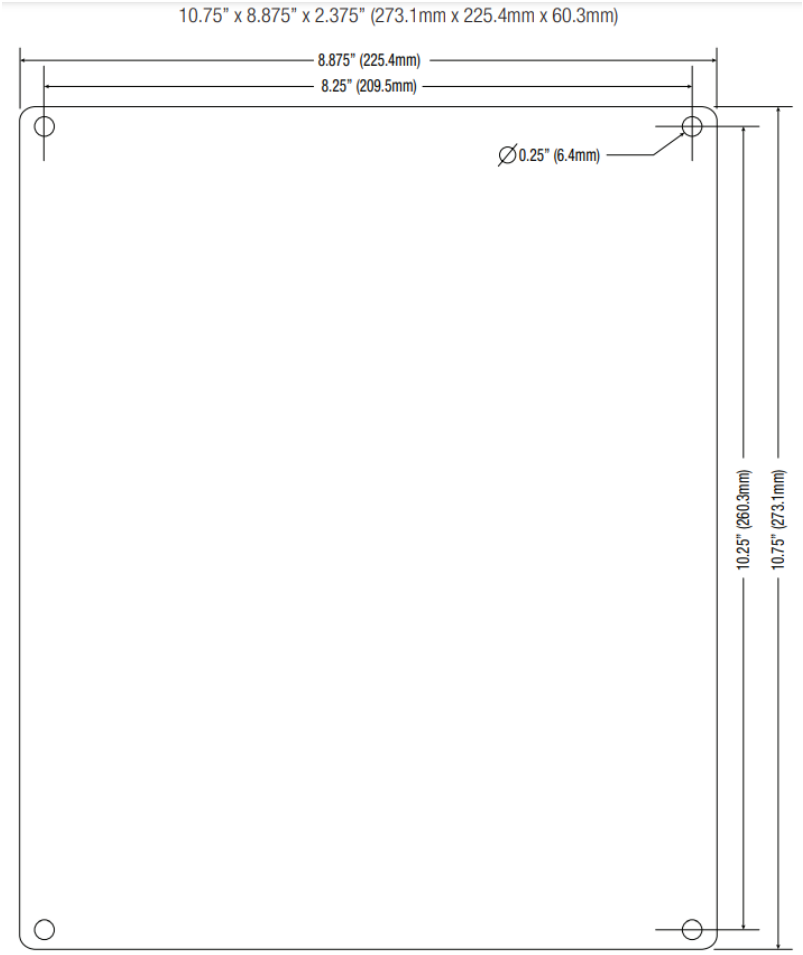
Fig. 11a
5" (127mm) square pole



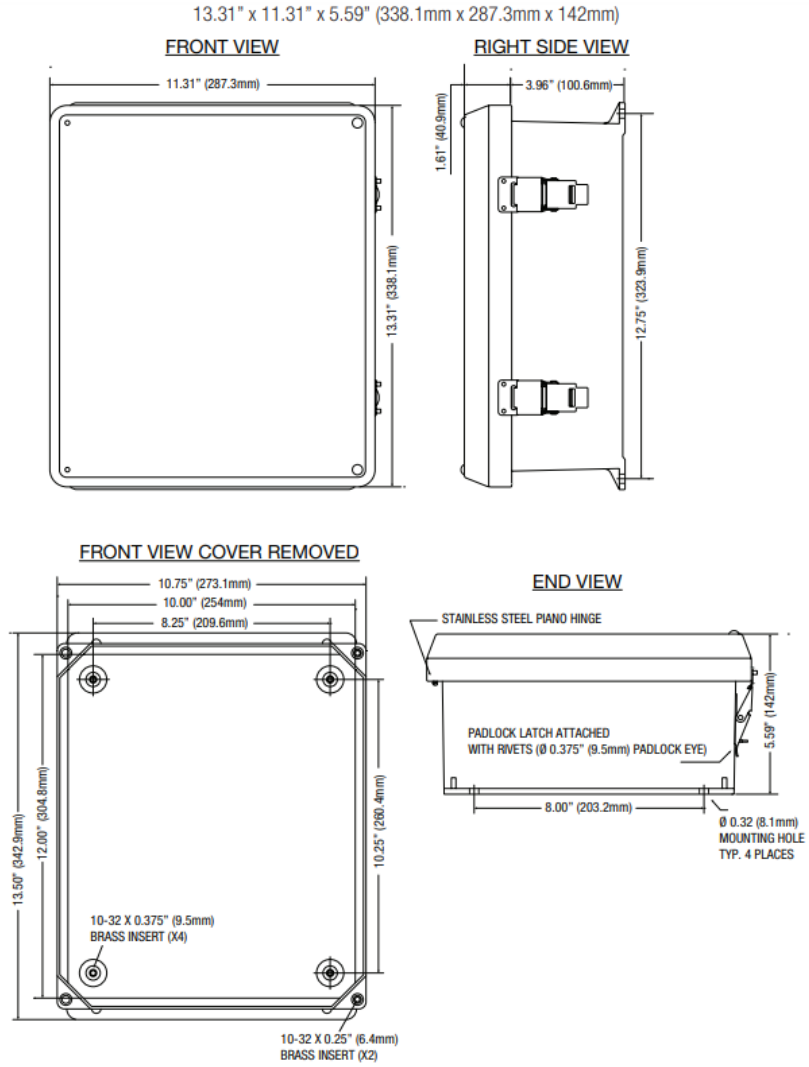
NetWaySP4BTX
Mechanical Drawing and Dimensions (H x W x D approx.):



NetWaySP4BTPL
Mechanical Drawing and Dimensions (H x W x D approx.):

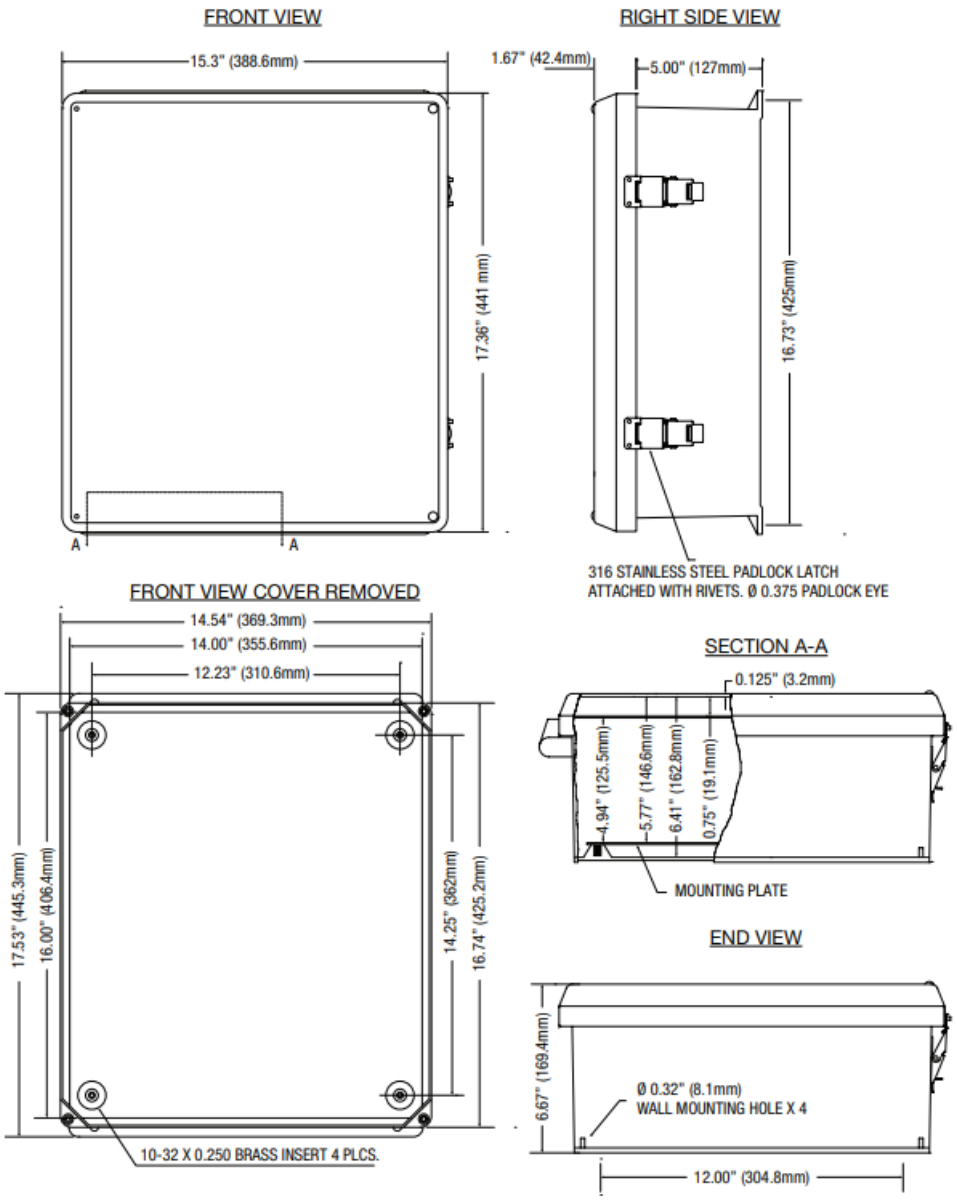


NetWaySP4BTWP and NetWaySP4BTWPN
Mechanical Drawing and Dimensions (H x W x D approx.):



NetWaySP4BTWPX
Mechanical Drawing and Dimensions (H x W x D approx.):

17.53" x 15.3" x 6.67" (445.3mm x 388.6mm x 169.4mm)



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IINetWaySP4BT Series
A17V

Documents / Resources

	netway SP4BT Series 4 Port Hardened 802.3bt 4PPoE Switches Layer 2 [pdf] Installation Guide SP4BT Series 4 Port Hardened 802.3bt 4PPoE Switches Layer 2, SP4BT Series, SP4BT, 4 Port Hardened 802.3bt 4PPoE Switches Layer 2, 802.3bt 4PPoE Switches Layer 2, 4PPoE Switches Layer 2, Switches Layer 2, Layer 2 Switches, Switches

References

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