Westell® Boxer® BXM1019-NHE5 Outdoor Cabinet with -48/+24VDC Heat Exchanger

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1. GENERAL

1.1 Document Purpose

This document provides general, installation, and specification information for the Westell Boxer® BXM1019-NHE5 Outdoor Cabinet with -48/+24VDC Heat Exchanger (shown in Figure 1). This product is designed to provide Network equipment protection in outdoor environments while providing a quick and easy customer hand-off. The intended audience for this document is engineering, operations, and installation personnel of MSO, Telco, and utility companies. See Table 4 for product ordering information and available options, as well as information on the companion but optional battery box or skirt that can be mounted under the Boxer cabinet.

- NOTE -
Hereafter, the BXM1019-NHE5 Boxer cabinet may be referred to as the "Boxer" or "cabinet."

1.2 Document Status

Whenever this practice is updated, the reason will be stated in this paragraph.

1.3 Product Purpose and Description

Boxer is a compact, actively-cooled, NEMA 4 outdoor cabinet that can house and protect a wide range of electronic equipment. Up to 10 vertical RUs (17.5") of 19-inch wide internal rack space is available to house Network equipment such as (but not limited to) multiplexers, copper bonding solutions, Ethernet switches and media converters, xDSL boxes, and DS3 hand-offs.

Protectively mounted on the Boxer front door, separate from the interior rack space, is a heat exchanger and fan unit. Also mounted on the door, a controller card features internal factory-installed wiring for the fans, temperature alarm, door alarm, and a 5A fan fuse. External wiring from the card to the power source and alarm monitoring equipment is accomplished using "Euro-connector" snap-in terminal blocks which

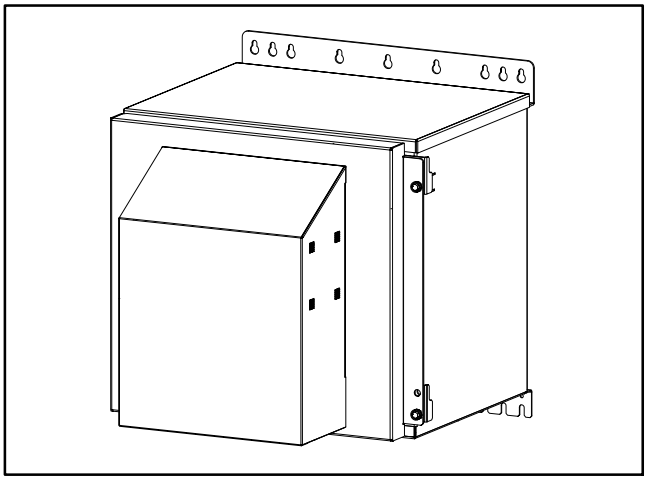


Figure 1. Isometric Closed View of Boxer Cabinet

can be quickly disconnected from the controller card, and later re-attached for easy connections.

Boxer supports rapid equipment installation and wiring through the use of adjustable and removable 19" rack channels. To ensure easy access for input and out cabling, Boxer includes ample room below the rack space as well as various sized conduit knock-outs.

1.4 Product Mounting

The Boxer cabinet is typically mounted outdoors, above ground, on an H-frame, or wall. Optional mounting kits are available to support a round pole (from 8" to 20" in diameter) or a square pedestal or post (minimum 8" wide). Concrete pad mounting is supported when used with the optional Boxer battery box or skirt. All mounting hardware must be capable of supporting the weight of the Boxer cabinet (approximately 70 pounds) plus the weight of any equipment mounted in it. The Boxer cabinet is typically located at the customer premises but can be located anywhere a compact, weather-tight, outdoor cabinet is required.

1.5 Product Features

Each Boxer cabinet comes fully assembled, pre-wired, tested, and ready for field-provided customer equipment installation, and includes the following features and capabilities.

- NEMA 4 compliant
- Conforms to ANSI/UL 60950-1 and certified to CAN/CSA C22.2 No. 60950-1
- Conforms to ANSI/UL 60950-22 and certified to CAN/CSA C22.2 No. 60950-22
- FCC Part 15
- Actively cooled with heat exchanger
  - Dissipates up to 400 watts of internally-generated heat

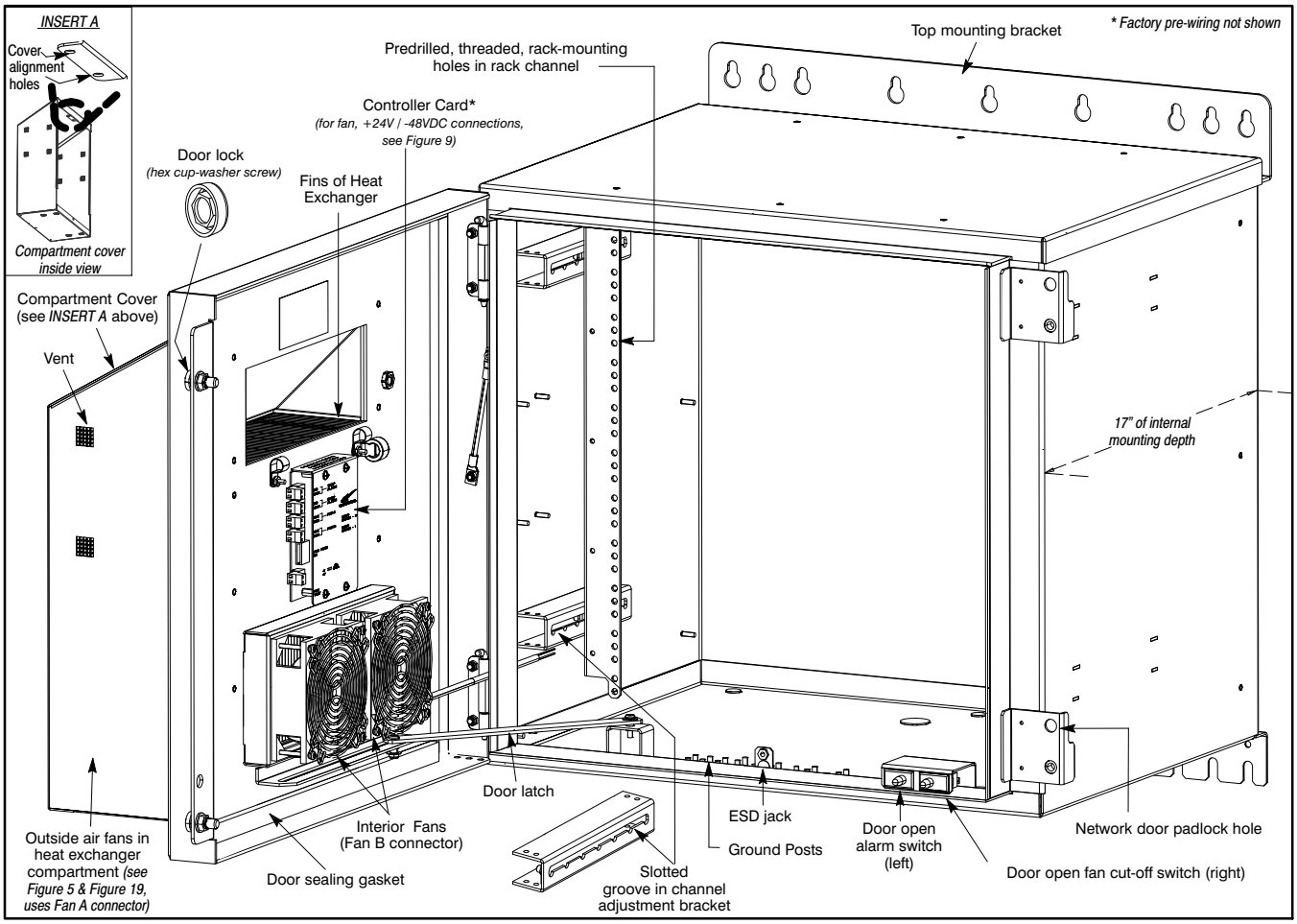


Figure 2. Isometric Open View of Boxer Cabinet

- Field-replaceable door-mounted fans
- -48VDC or +24VDC powered
- Low noise level

- Temperature-controlled heat exchanger fans
- Door open heat exchanger fan shut-off
- Fan test button
- Compact size (24” W x 22.5” H x 27.75” D, approx.)
- Weather-tight cabinet
- Interior area provides 10 RUs of 19” rack mounting space
- Removable/adjustable rack channels
- Ample space for tie-downs and cable management
- Numerous ground/bond posts on interior ground plate
- Knock-outs at cabinet bottom accept a variety of cable, conduit, and connector sizes and types
- Door security via:
  - locking, hex, cup-washer screws
  - a hole for a padlock
- Vents in fan compartment cover for air circulation
- Interior sliding wind latch
- Door open alarm switch & door open fan cut-off switch
- Built-in mounting brackets allow H-frame, wall, pole, or post mounting
- Pole or pedestal mounting via optional pole-mount kit
- Pad mount using the optional battery box or skirt
- Optional battery backup box available (knock-out hole patterns match in both units)
- Bagged parts: vent cap, cable ties, and this document
- Light-weight aluminum construction (0.125” thick wall, 70 pounds) with powder-coat finish

2. FEATURES

This section describes the exterior and interior features of the Westell Boxer® outdoor cabinet in more detail. Refer to Figure 2 through Figure 7 as needed while reading this section.

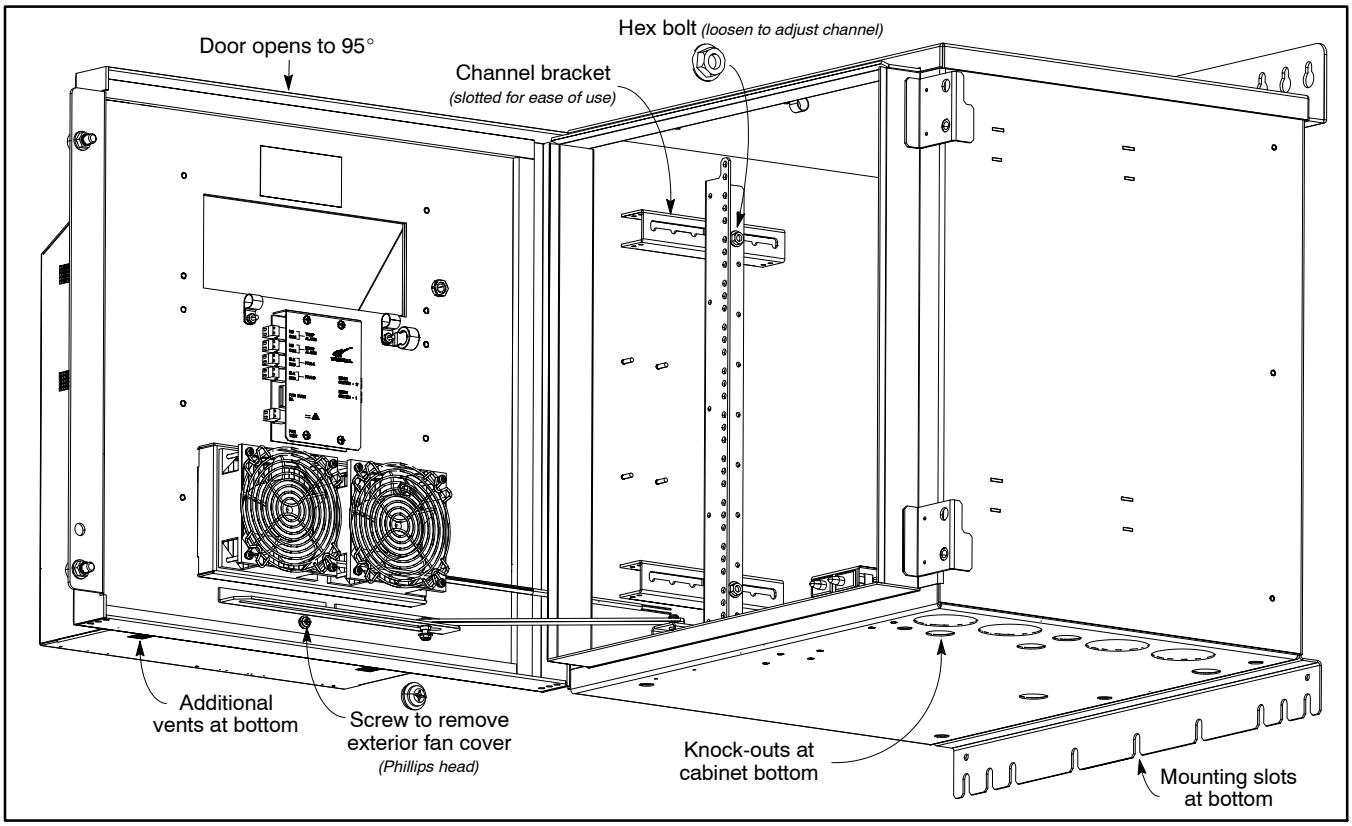


Figure 3. Interior View of Cabinet Door and Left Wall

2.1 Exterior Features

The features located outside the large main cabinet are described hereunder. See Paragraph 2.2 for the interior features.

2.1.1 Construction and Materials

The Boxer cabinet is designed to be weather-tight for above-ground applications. As such, the powder-coat painted aluminum cabinet withstands many harsh weather conditions such as rain, snow, and sleet.

2.1.2 Cabinet

The cabinet utilizes an "in-the-door" heat exchanger design. Cabinet cooling is accomplished through the front-door-mounted heat exchanger, fans, and vents. Security is provided via cup-washer screws. Mounting flanges (Paragraph 2.1.2.2) are attached at the top and bottom of the back wall for permanent mounting. The bottom floor of the cabinet contains numerous, differently-sized, intact knock-outs (Paragraph 2.1.2.4) to accommodate a variety of cable, fitting, or conduit sizes and types.

2.1.2.1 Large Cabinet Door

A full-size locking door provides ample technician and equipment access to the interior of the cabinet and also helps protect the cabinet from tampering and vandalism. A full-length hinge supports the door in the open position. When the cabinet is mounted and the door is open, the minimum clearance or distance from the back of the mounting brackets to the outer edge of the door's lock flange is 43.4" (as shown in Figure 23). At the inside bottom of the door, near the hinge, a wind-latch, shown in Figure 2 and Figure 3, protects the door (and technician) from possible wind damage. The wind latch restricts the door's swing-out angle to a safe but functional opening (105 degrees). When the door is closed, an automotive-grade sealing gasket installed around the interior perimeter of the cabinet door provides a weather-tight seal to protect all equipment installed in the cabinet. Both hex cup-washer screws (door locks, see Figure 2) can be loosened or tightened with a standard telco can wrench or 216 tool. Additional door security is offered via holes in the door flanges which accept a field-provided lock or padlock. The door sensors are described in Paragraph 2.2.1.

2.1.2.2 Mounting Brackets

Full-width mounting brackets are provided at the back wall of the Boxer cabinet, one at the top and one at the bottom. Each bracket has nine mounting holes (top bracket) or slots (bottom bracket). Use mounting fasteners with a diameter of up to $^{3}/_{8}$". The horizontal distance between holes is shown in Figure 10. The vertical distance between the top and bottom mounting bracket hole centers is 25.2".

2.1.2.3 Heat Exchanger Compartment

The cabinet's cooling system is based in the door, in a heat exchanger compartment (see Figure 5). The compartment has vent holes, a heat exchanger, and fans. To access the heat exchanger compartment, loosen the hex nut that secures it which is located at the bottom, center, interior surface of the door (shown in Figure 3), then lift up the compartment cover to clear the cover-alignment posts at the top of the compartment.

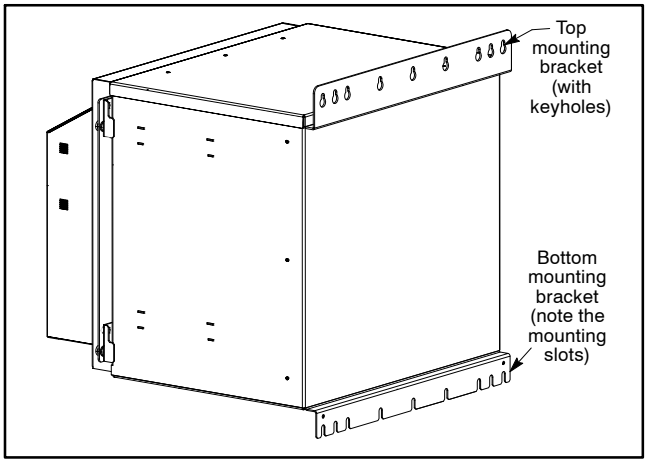


Figure 4. Rear Isometric View of BXM1019-NHE5

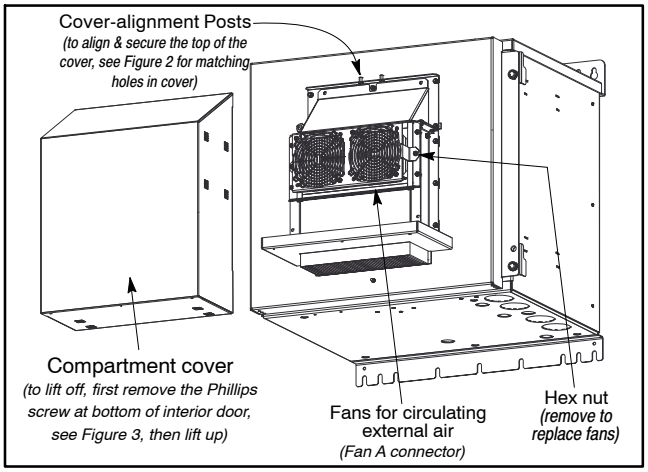


Figure 5. Heat Exchanger Compartment, Cover Off

2.1.2.4 Bottom Floor Knock-outs

Multiple knock-outs are provided on the floor of the cabinet. One near the center rear of the floor is for cable ingress and egress for an optional battery cabinet that can be mounted below the Boxer cabinet (or for Network cables). Provided on the right side of the cabinet floor are multiple intact knock-outs, for easy Network and Customer cable access. The front ones are typically for customer cable access, and the rear-most knock-outs are typically for Network cable access. The knock-out sizes and quantities are shown in Table 1 and Figure 6. Do not remove a knock-out unless it is absolutely necessary to do so for cable ingress and egress, and use either tight-fitting rubber grommets or liquid-tight fittings, or other proper and approved knock-out hole sealants, to assure the best internal air quality and weather-resistance. Always use proper and company-approved tools to remove knock-outs.

Battery Box Knock-outs. There are five, small, 0.575" diameter knock-outs in the floor of the Boxer cabinet where an optional battery box attaches to the cabinet (hole patterns of both units match).

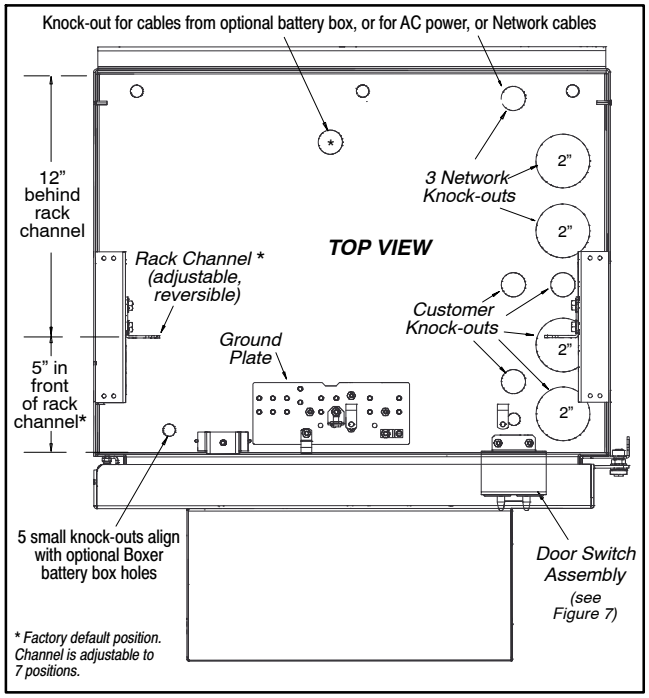


Figure 6. Knock-out Layout ***("See-Through" Top View of Cabinet)***

- KNOCK-OUT REMOVAL NOTE -
Always remove knock-outs where holes are desired before mounting the cabinet or the optional battery box, regardless of the type of knock-out and the order of the mounting steps.

Function	Qty	Description
Customer	2	2.5" knock-out for 2" conduit
	3	1.125" knock-out, for 1/2" or 3/4" conduit
Network	2	2.5" knock-out for 2" conduit
	2	1.125" knock-out, for 1/2" or 3/4" conduit
Battery Box	5	0.585" knock-outs for attaching an optional battery box below the cabinet

Table 1. Knock-out Sizes and Quantities

2.2 Interior Features

The interior cabinet features are described hereunder.

2.2.1 Door Sensor Switches

Two door sensor switches are located at the bottom right corner of the cabinet door opening (Figure 7). The switches are factory-prewired to the Controller Card. The left door switch will trigger a door open alarm when the door is opened. The right door switch will turn off the fans when the door is opened. To temporarily disable a sensor, pull out the cylindrical door switch actuator until it clicks. To re-activate a sensor, either gently push the actuator back in until a click is heard, or simply close the cabinet door.

2.2.2 Internal 19" Rack Channels

Two removable/adjustable rack channels inside the cabinet provide 19" relay rack mounting for equipment that is to be mounted in the cabinet. Each channel is installed so approximately 5" of equipment space is available from the inside of the

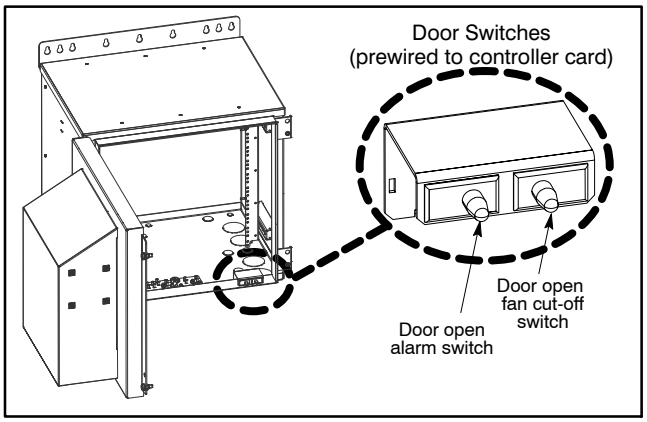


Figure 7. Location/Function of Door Sensor Switches

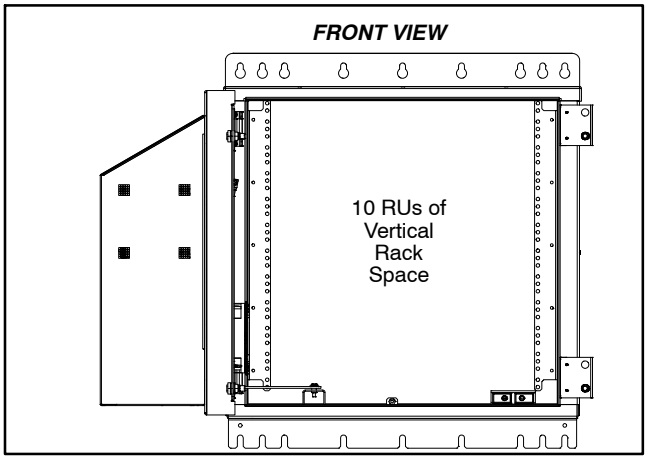


Figure 8. Front View, Door Off, Showing Rack Channels

closed front door to the channel (for up to a 5" equipment projection), and approximately 12" of equipment space is available behind the channel to the rear cabinet wall. The slotted channel bracket allows both channels to be easily moved forward 2" or backward 3", if a few additional inches of equipment depth is needed at either the front or back of the channel. Six channel positions are provided in the channel bracket. Simply loosen the hex nut, lift and slide the channel backward or forward the next slot position, then tighten the nut. Both vertical rack channels contain predrilled holes, with standard hole spacings (either 1", 1.75", or 2" rack hole patterns), for mounting customer-supplied equipment in the cabinet. Network equipment up to 10 Rack Units (10 RUs = 17.5") high can be mounted on the rack inside the cabinet, either as a single piece or as multiple pieces of equipment.

2.2.3 Cooling System

The Boxer cabinet features an active heat-exchange system that compensates for the effects of internal equipment heat and external solar and temperature loading inside the cabinet. The heat exchanger fans are temperature activated. The fans turn on when the interior of the cabinet reaches 35° C (95° F) and turn off when the internal cabinet temperature cools to 25° C (77° F). At the core of the heat exchange system are numerous aluminum fins (best seen in Figure 2) on each "side" of a sealed divider wall within the heat exchanger. The dual air-

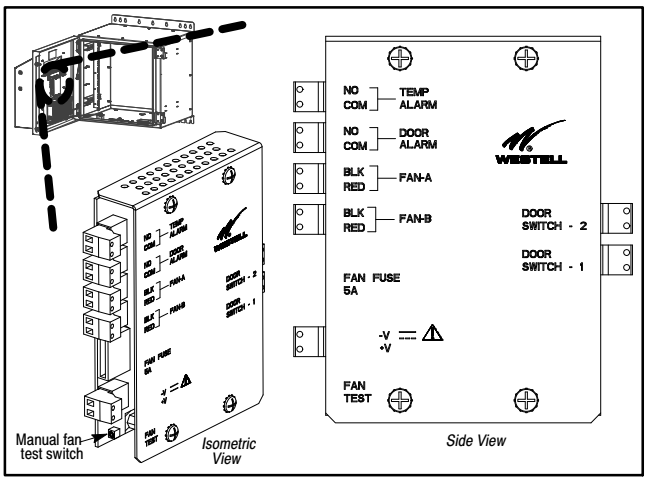


Figure 9. Controller Card (Showing Euro-connectors)

path exchanger uses one set of fans (shown in Figure 5) to blow cool outside air past the "exterior air side" fins of the heat exchanger and to direct the heated air out the vent on the sides of the fan cover. Conversely, a second set of fans (shown in Figure 2 and Figure 7) circulates warm inside air down past the "interior air side" fins of the heat exchanger and blows cooled air back through the main cabinet compartment. Both sets of fans are field-replaceable (see Paragraphs 5.2 and 5.3, Figure 19, and Table 4 for part numbers).

2.2.4 External-Air Fans ("FAN A" Connector)

Two, factory-installed, temperature-controlled fans (shown in Figure 5) to circulate cooler exterior air up through the heat exchanger are located under the cover for the heat exchanger compartment. These fans are factory-wired to the "FAN-A" connector on the Controller Card mounted on the inside of the cabinet door, and are powered from either a field-provided -48VDC power source or a +24VDC power source. To access or view the fans, loosen the Phillips-head screw at the *interior* bottom of the main door (see Figure 3), then lift the cover off the two alignment posts (Figure 5) near the top of the cover.

- DOOR SENSOR NOTE -
The door sensor will turn off the fans when the door is opened.

2.2.5 Internal-Air Fans ("FAN B" Connector)

Two, factory-installed, temperature-controlled fans (shown in Figure 2) to circulate warm interior air down through the heat exchanger and back into the cabinet are are located on the inside of the cabinet door. These fans are factory-wired to the "FAN-B" connector on the Controller Card mounted on the inside of the cabinet door, and are powered from either a field-provided -48VDC power source or a +24VDC power source.

2.2.6 Controller Card

Boxer includes a factory-wired controller card (Figure 9) located on the inside of the cabinet door. The card includes connections for the fans, door alarm, temperature alarm, a 5A fan fuse, and a fan test button. Internal wiring for the fans and door alarm has been factory-wired. External wiring to the power source and alarm monitoring equipment is done using "Euro-connector" snap-in terminal blocks which can be disconnected from the controller card, and later re-attached for quick and easy connections. Table 2 lists all of the connectors and positions on the controller card. The only installer connec-

tions are the TEMP ALARM, DOOR ALARM, and power connections (BLK -V and RED +V). To make the power connections, uncoil the wires attached at the left interior wall of the cabinet to expose the stub ends (the other end is factory-wired to the controller card). To make the TEMP/DOOR ALARM connections to the Euro-connector, pull-off the Euro-connector, strip approximately 3/8" off the end of each field-provided wire, insert wire(s) into hole(s), tighten screws, and push-on the Euro-connector.

Name	# of Positions	Position Name	Description
TEMP ALARM	2	NO	Normally Open. *(Installer connects to field-provided equipment.)*
		COM	Common. *(Installer connects to field-provided equipment.)*
DOOR ALARM	2	NO	Normally open. *(Installer connects to field-provided equipment.)*
		COM	Common. *(Installer connects to field-provided equipment.)*
FAN – A* *(2 External Air Fans)*	2	RED	+ voltage. Factory connected to Fan A.
		BLK	– voltage. Factory connected to Fan A.
FAN – B* *(2 Internal Air Fans)*	2	RED	+ voltage. Factory connected to Fan B.
		BLK	– voltage. Factory connected to Fan B.
FAN TEST			Momentary push-button to test fan operation.
+24V Power Operation Only Power Connections	2	BLK -V	System Ground *(Installer connects to field-provided DC power.)*
		RED +V	Apply +24V *(Installer connects to field-provided DC power.)*
—48V Power Operation Only Power Connections	2	BLK -V	Apply -48V *(Installer connects to field-provided DC power.)*
		RED +V	System Ground *(Installer connects to field-provided DC power.)*
DOOR FAN CUT-OFF SWITCH	2	DOOR SWITCH-1	Door open fan off switch. Factory wired.
DOOR ALARM SWITCH	2	DOOR SWITCH-2	Door open alarm. Factory wired.

**Two fans are wired to each set of terminals.*
Shaded rows indicate installer connections (TEMP ALARM, DOOR ALARM, and Power)

Table 2. Controller Card Connectors — Front Access

1. ***Fan Terminal Block***. The internal temperature-controlled fans require a -48VDC, 1.75A or +24V, 3.5A power source to be wired to the Euro-connector located at the bottom left corner of the Controller Card.

2. ***Temperature Alarm Terminal Block***. A Normally Open Temperature Alarm thermostat contact closes when the internal cabinet temperature exceeds 65° C and will remain on until the temperature drops below 55° C. For temperature alarm connections, connect alarm wiring from the field-provided alarm equipment to the 2-position Euro-connector at the top left of the controller card.

3. ***Door Alarm Terminal Block***. A Normally-Open Door Alarm contact closes when the door is opened. For door alarm connections, connect wiring from the field-provided alarm equipment to the 2-position Euro-connector at the top left of the controller card.

4. ***Power connections.*** A Euro connector is prewired to a 48" red and black cable stub. For +24V power applications, connect the red wire to the +24V source and connect the black wire to ground. For -48V power applications, connect the black wire to the -48V source and the red wire to ground.

2.2.7 Grounding and Bonding Center

Boxer's grounding and bonding center is located on the bottom interior surface of the cabinet, close to the front door. A ground plate is provided that contains eight sets of ground posts and one copper ground lug, for cable and chassis/earth ground. Bond equipment/cables to the ground posts per company practice, and connect a #6 AWG chassis or earth ground wire to the ground lug. Ground lug hardware should be tightened to 20 inch-pounds. An Electro-Static Discharge (ESD) wrist-strap jack is also located on the ground plate.

3. INSTALLATION

Use and follow local codes and company practices to install the Westell Boxer® cabinet. If none exist, use the instructions contained herein. Installation consists of:

- inspecting the unit for damages that may have incurred during shipping,
- following proper safety precautions,
- reviewing pre-mounting considerations, such as selecting the mounting type and location, and preparing the mounting site,
- gathering all tools, materials, and equipment,
- removing any knock-outs where access holes are required,
- mounting the cabinet,
- making ground and all power connections,
- powering up the cabinet (system power-up),
- mounting any customer-supplied equipment inside the cabinet,
- making communication cable connections,
- making any desired alarm connections,
- optioning the installed equipment and placing it in service, and
- performing cabinet housekeeping, and closing and locking the cabinet.

The following paragraphs provide detailed instructions for performing these procedures.

3.1 Inspecting the Equipment

- DESICCANT NOTE -

To prevent condensation during shipment and storage, Westell includes a desiccant pack within the Boxer cabinet. Once the electronic equipment is installed and turned-up, the internal power dissipation reduces the likelihood of condensation within the cabinet. However, follow company practices for desiccant maintenance procedures to prevent internal condensation.

- INSPECTION NOTE -

Visually inspect the unit for damages prior to installation. If the equipment was damaged in transit, immediately report the damage to the transportation company and to Westell (see Part 6).

3.2 Following Proper Safety Precautions

The cabinet should be installed only by authorized and trained personnel. Always exercise caution and follow all safety precautions.

Important Safety Instructions (Please Save)

When using your telephone/telecommunications equipment, follow basic safety instructions to reduce the risk of fire, electric shock, and injury to person(s), including the following:

A. Read and understand all instructions.

B. Follow all warnings and instructions marked on product.

C. Do not place this product on an unstable cart, stand or table: the product may fall, causing serious damage to product.

D. Slots and openings in the cabinet are provided for ventilation. To protect it from overheating, these openings must not be blocked or covered. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.

E. This product should be operated only from the type of power source indicated on the marking label.

F. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in the risk of fire or electrical shock. Never spill liquids of any kind on the product.

CAUTION - STATIC-SENSITIVE

This product contains static-sensitive components! Proper electrostatic discharge procedures must be followed to maintain personal and equipment safety. Do not store units near magnetic, electromagnetic or electrostatic fields. Always store or ship units in the original static-protective packaging from Westell. Use anti-static mats when working on units.

- PRECAUTIONARY STATEMENT -

Never install telephone wiring during a lightning storm.

Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.

Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.

Use caution when installing or modifying telephone lines.

3.3 Selecting and Preparing the Mounting Type and Site *(Pre-Mounting Considerations)*

Mount the cabinet in a location with an adequate earth ground and power access, with unobstructed cabinet access, and which insures the best lighting, ventilation, heat dissipation, and equipment access. Verify sufficient space exists to allow the opening of the left-hinged large door, to access and mount the cabinet, to mount and access the optional battery box if it will be mounted below it, and to adequately access, prepare, and dress all cables. Adequate horizontal and vertical space should be be left between any multiple installations to allow for cabinet opening, equipment access, and cable routings and preparations. Follow company practice for the proper distance from the cable entry point or from upstream or downstream equipment.

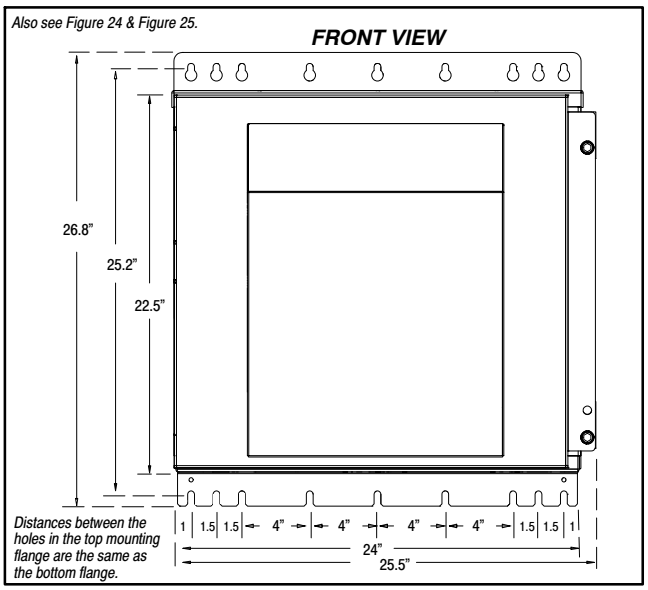


Figure 10. Front View, With Dimensions

3.4 Gathering all Tools and Equipment

The following tools and supplies (not provided) are required to mount the Boxer cabinet.

Door Opening/Locking Tools

- ☐ 7/16" can wrench or 216 tool
- ☐ Padlock (optional)

Knock-Out Removal Tools

- ☐ Hammer
- ☐ Punch
- ☐ Pliers

Cabinet Mounting Tools, Equipment, and Hardware

- ☐ Tape measure
- ☐ Marking utensil (to mark mounting hole locations)
- ☐ Level (optional)
- ☐ Power or hand drill with assorted bits, plus long bits or drill bit extensions if pole mounting
- ☐ Socket driver and sockets, or wrenches
- ☐ Wall- or pole-mounting hardware, such as 3/8" diameter wood-type lag screws or bolts
- ☐ H-frame mounting hardware (for H-frame mounting)
- ☐ Optional pole-mount kit (for pole mounting)
- ☐ Outdoor site preparation tools
- ☐ Safety gloves and glasses (optional)
- ☐ Power hoist or lifting equipment and cables (optional)
- ☐ Assorted screwdrivers
- ☐ Appropriate ground wire and equipment

Cable Preparation Tools and Equipment

- ☐ Cable opening and preparation tools
- ☐ Proper lengths and types of communications cables
- ☐ Proper lengths and types of power cables and fittings
- ☐ Cable management supplies (ties, clips, markers, etc.)
- ☐ Power installation and testing equipment

□ ESD protection

3.5 Removing the Knock-outs

Knock-outs should be removed prior to mounting the cabinet. See Figure 6 or Table 1 for knock-out sizes, quantities, and locations, and follow the steps below to remove the knock-outs.

1. **Open the cabinet door.** If knock-outs will need to be removed, using a 216 tool or can wrench, open the large front door of the Boxer cabinet to access the knock-outs.
2. **Remove knock-out(s).** Prior to mounting the cabinet, per company practice, remove as many appropriately-sized knock-outs at the bottom of the cabinet as needed for the specific application (consider ground, power, and communication cable access needs, venting, and whether optionally mounting a battery box with the cabinet).
3. **Install rubber grommets or conduit fittings.** Install either a heavy-duty rubber grommet or the conduit fitting of choice (liquid-tight recommended) in each selected knock-out hole. If an optional vent is desired, the provided vent cap can be installed in one of the smaller knock-outs.
4. **Close the cabinet door.** Once the knock-outs are removed, lock the door using the 216 tool or can wrench, to minimize possible product damage and personal injury.

3.6 Mounting the Cabinet

The Boxer cabinet is typically mounted outdoors, above ground, on an H-frame, a wall, a concrete pad, or a pole. Optional mounting kits are available to support a round pole (from 8" to 20" in diameter) or a square pedestal or post (minimum 8" wide). Concrete pad mounting is supported when used with the optional Boxer battery box or skirt. All mounting hardware (not provided) must be capable of supporting the weight of the Boxer cabinet (approximately 70 pounds) plus the weight of any equipment mounted in it (up to 50 pounds). Run all cables to the mounting location, perform any trenching, trench cable placements, and backfilling prior to the cabinet mounting, and clear the installation area of any debris, vegetation, and unneeded equipment or obstacles.

- WEIGHT NOTE -

The Boxer cabinet weighs 68 pounds. The weight of the internal equipment installed in the Boxer should not exceed 50 pounds. The mounting surface, structure, and hardware must be able to support the combined weight (118 pounds).

- KNOCK-OUT REMOVAL NOTE -

Always remove knock-outs where holes are desired before mounting cabinet or securing the battery box, regardless of the knock-out type and regardless of the order of the mounting steps. All knock-outs should be knocked out from the inside of the cabinet, except for the small 0.575" knock-outs,which are to be knocked out from the outside of the cabinet.

3.6.1 Mounting on an H-Frame

Follow company practice or the steps below to mount the Boxer cabinet on an H-frame. See Figure 11 for an H-frame mounting drawing. If the installation includes the battery box, attach the battery box and the H-Frame mounting kit to the cabinet prior to mounting to the H-Frame.

1. **Determine exact mounting location in H-frame.** Select and mark the exact horizontal and vertical final mounting location within the H-frame. The spacing between the top and bottom horizontal-rail mounting holes should be 25.2" (on centers, see Figure 10). Westell recommends a height of 30" from the ground. In addition to leaving a comfortable installer working height, leave adequate space under Boxer for cable access (or an optional battery box), as stated in Paragraph 3.3, as well as in front of the mounting to allow the door to open (see Figure 3), and at the sides in the event of any multiple installations.
2. **Remove knock-outs.** See the steps in Paragraph 3.5 (*Removing the Knock-outs*) to remove the knock-outs where any cable access holes (or holes for mounting the optional battery box) are desired.
3. **Prepare the mounting hardware.** Bring the appropriate mounting hardware to the installation site. The hardware must be able to support the weight of the cabinet plus the weight of the added internal equipment. Insert at least three rail nuts into each rail (compress the spring on the nuts as needed) and slide them over to the desired mounting location.
4. **Lift cabinet.** Lift the cabinet to the mounting height.
5. **Attach cabinet to H-frame rails.** Align the holes in the cabinet's top mounting bracket with the holes in the inserted rail nuts in the H-frame rails, then insert and install an appropriate bolt through each set of aligned holes. Westell recommends a minimum of 3 mounting bolts per mounting flange (top and bottom). Tighten hardware appropriately. Repeat for the bottom mounting bracket and H-frame rail. Verify the cabinet is in the proper horizontal position, make any needed adjustments, then securely tighten all mounting hardware.
6. **Test installation firmness.** Test the installation by attempting to move the cabinet. Correct any looseness, if detected. Tighten all bolts again.
7. **Determine next step.** If ground, power, and communications cables and internal equipment will not be connected and mounted at this time, proceed to the next step to finalize the cabinet installation. If ground, power, and communications cables and internal equipment will be connected, mounted, and powered-up at this time, skip the next step and proceed to Paragraphs 3.7 through Paragraph 3.14 for those procedures.
8. **Close up cabinet and clean the site.** Close the Boxer door, and lock it using a can wrench or 216 tool and an optional padlock. Pick up any tools and materials at the installation site, and clean the site of any trash or debris.

3.6.2 Mounting on a Wall

Follow company practices or the steps below to mount the Boxer cabinet to an approved wall (Figure 12). The approved wall and hardware used must be able to support the combined weight of the cabinet, the equipment mounted inside the cabinet, plus the optional battery box (and batteries), if installed. Westell recommends a minimum cabinet installation height of 30" from the ground. See Figure 10 for cabinet and mounting hole dimensions.

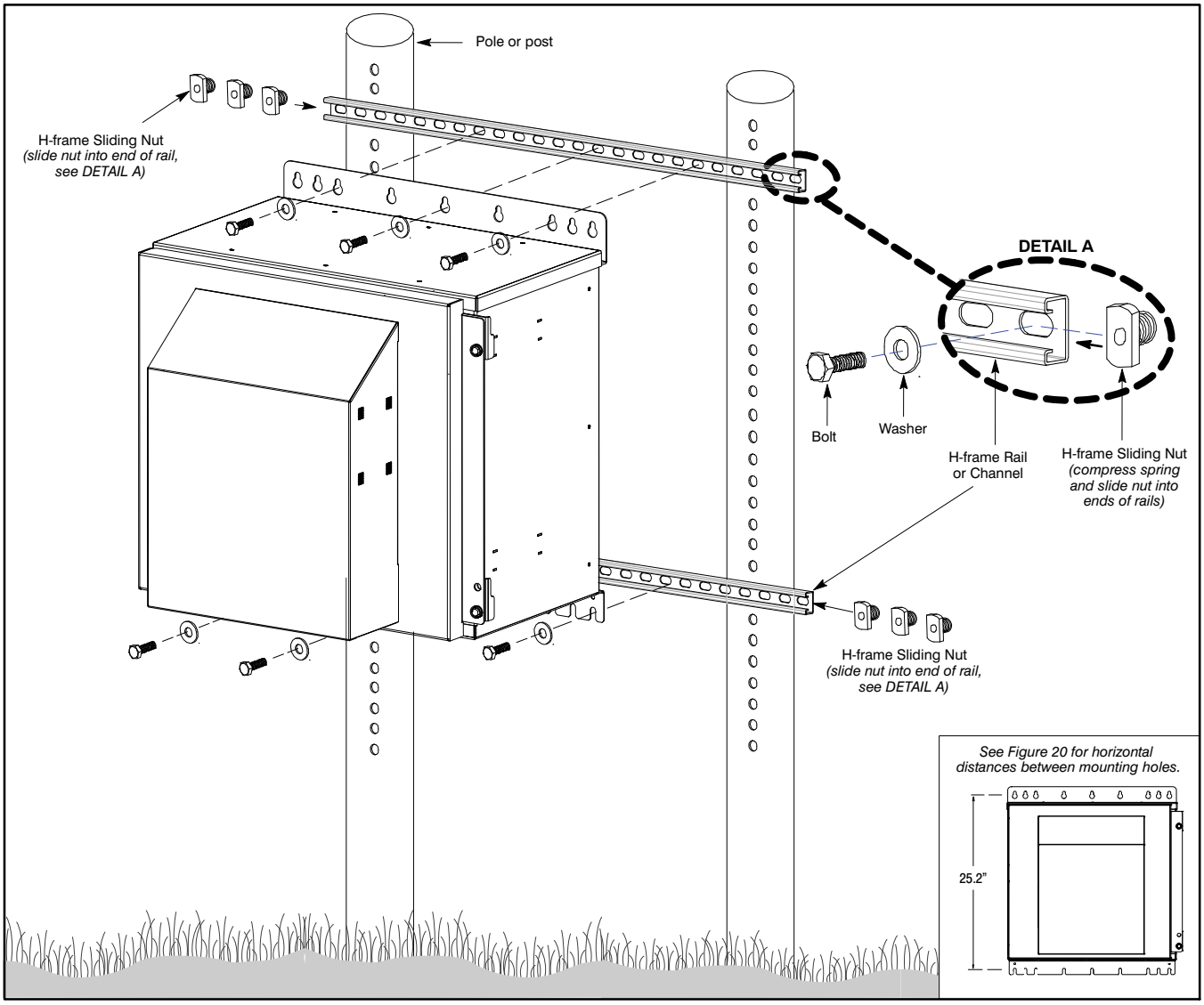


Figure 11. H-Frame Mounting

1. **Find best wall position.** Locate the best mounting position for the cabinet on the wall. Verify this location meets all cabinet spacing requirements and company practices.

2. **Remove knock-outs.** See Paragraph 3.5 (*Removing the Knock-outs*) to remove the knock-outs where any cable access holes are desired.

3. **Prepare the mounting hardware.** Bring the appropriate mounting hardware to the installation site. The hardware must be capable of supporting the weight of the cabinet plus the weight of the added internal equipment. Use a minimum of 6 mounting fasteners (such as lag bolts).

4. **Determine mounting height and mark top hole locations.** Measure and mark the top mounting hole locations on the wall, in a straight level line. This can be done by lifting and leveling the cabinet then marking the mounting hole locations, or without lifting and using the equipment as a template. The horizontal distance between the holes in the mounting flanges is shown in Figure 10. Two of the holes are 16" apart on centers, to facilitate mounting on standard walls with studs 16" apart on centers. The vertical distance between the holes in the top and bottom mounting flanges is 25.2" (Figure 10). Westell recommends a minimum of 3 mounting bolts in each mounting flange. In addition to allowing for a comfortable installer working height (leave about 30" under the cabinet), leave adequate space under Boxer for cable access (or an optional battery box), as stated in Paragraph 3.3, as well as in front of the mounting to allow the door to open and at the sides in the event of any multiple installations. With a marking utensil, mark the top mounting holes to be drilled, in a level horizontal line, at the desired wall height.

5. **Drill top mounting holes.** Drill appropriately-sized pilot holes, slightly smaller than the width and depth of the mounting bolts, screws or fasteners, at the marked locations. ***Do not drill the holes too large.***

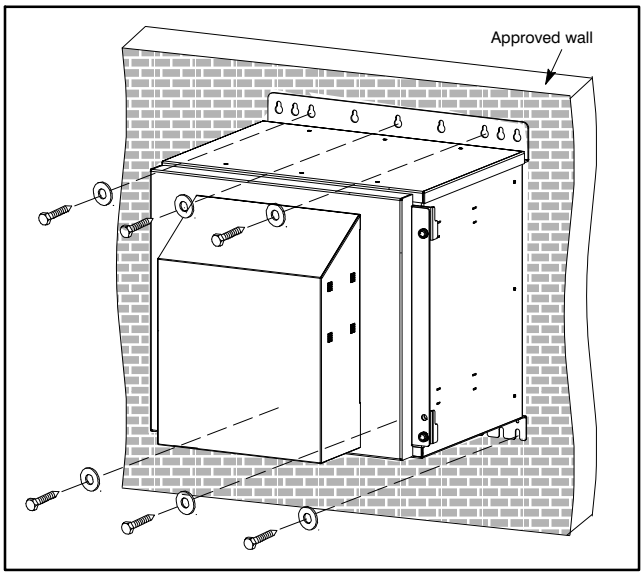


Figure 12. Wall Mounting

6. **Partially install bolts.** Partially install the bolts until only 1/2" remains.
7. **Lift cabinet, and align mounting holes.** Lift the cabinet to the protruding bolts, align the top mounting flange keyholes with the bolts, then hang the cabinet from the bolts.
8. **Fully install the top mounting bolts.** Verify the cabinet is level. Finish driving the top mounting bolts until they are snug and the cabinet is flush and tight against the wall. Manually test the bolt tightness to verify the bolts will support the cabinet weight before the next step. Correct any level or mounting bolt discrepancies.
9. **Mark and drill bottom mounting holes.** Mark the exact locations for the bottom bracket's mounting bolts through the predrilled slotted holes in the bottom mounting bracket. Drill appropriately-sized pilot holes, slightly smaller than the width and depth of the bolts, at the marked locations. ***Do not drill the holes too large.***
10. **Install bottom mounting bolts.** Insert and drive all bottom bolts completely in to their final seated position. Finish the installation by verifying all bolts are firm and snug.
11. **Determine next step, or close up cabinet and clean the site.** Repeat Steps 6-8 of Paragraph 3.6.1 to determine the next step or finish the physical cabinet installation.

3.6.3 Mounting on a Pole or Post

Order the optional A90-BXA-PM02 pole mount kit (shown in Figure 13 and listed in Table 4) for details and instructions on pole-mounting the Boxer cabinet. See Figure 14 for a brief installation procedure. If mounting both the Boxer cabinet and the Boxer battery box, use pole mount kit A90-BXA-PM03.

3.6.4 Mounting on a Concrete Pad

When mounted on an optional battery cabinet or skirt, the boxer cabinet can be mounted on a concrete pad. Order the optional A90-BXA19-PT1 pad mount kit (listed in Table 4) for details on pad-mounting the Boxer cabinet.

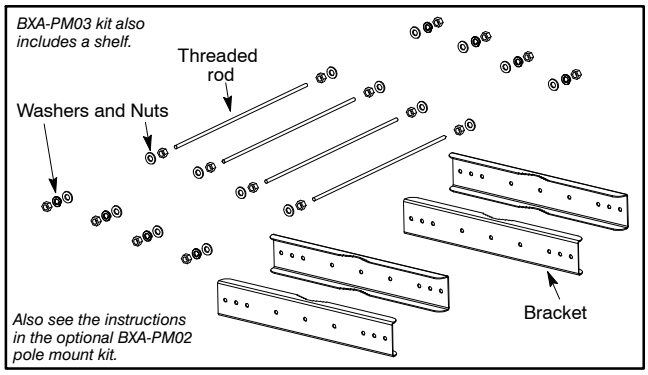
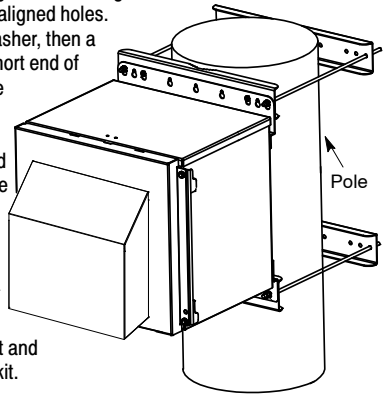


Figure 13. Pole Mount Kit (BXA-PM02) Contents

1. **Attach one bracket and rod to top cabinet mounting bracket.** Thread a washer and a nut about 1.5" onto one end of a rod (hereafter called "the short end"). Abut the flat side of a kit bracket against the back of the cabinet's top mounting bracket and align the mounting holes. Insert the short end of the rod through the selected aligned holes. Thread a washer, lock washer, then a nut onto the protruding short end of the rod from the front side of the cabinet's mounting bracket and tighten the nut. Repeat with a second rod at the other side of the top mounting bracket.



2. **Attach lower bracket.** Repeat the step above for the cabinet's bottom mounting bracket and another mounting bracket and rod from the pole-mount kit.
3. **Pre-thread inner nuts for rear brackets.** Thread a nut and washer onto the long end of each rod; stop threading when the nut appears to be about 1/4 of the distance into the pole depth (from the rear).
4. **Lift, level, and secure cabinet to pole.** Lift the cabinet to the desired mounting height, straddle the pole with the protruding rods, press the cabinet and the serrated edge of the attached brackets against the pole, and level the cabinet. Hold the cabinet in place, and from behind the cabinet and pole, hang another kit bracket from the top protruding rods, being careful to select and align the holes correctly (select the same holes that were used for the bracket attached to the cabinet) and also being sure to face the serrated edge of the kit's bracket toward the pole. Thread a washer, lock washer, and a nut onto each rod and alternately tighten each rod's nut firmly against the bracket (so the lengths of the two rods left protruding are equal). When tight, back-thread the nuts previously threaded onto the rod (from Step 3 above) backwards to abut the inside edge of the kit's rear mounting bracket.
5. Repeat above step for the lower, rear, mounting bracket.

Also see the instructions in the optional BXA-PM02 pole mount kit.

Figure 14. Boxer Mounted on Pole with Pole Mount Kit

- NOTE -

Always follow local safety precautions and standard operating procedures for grounding the equipment when installing, upgrading, repairing or maintaining equipment. Any instructions or information contained herein is subordinate to local codes, operating procedures or practices.

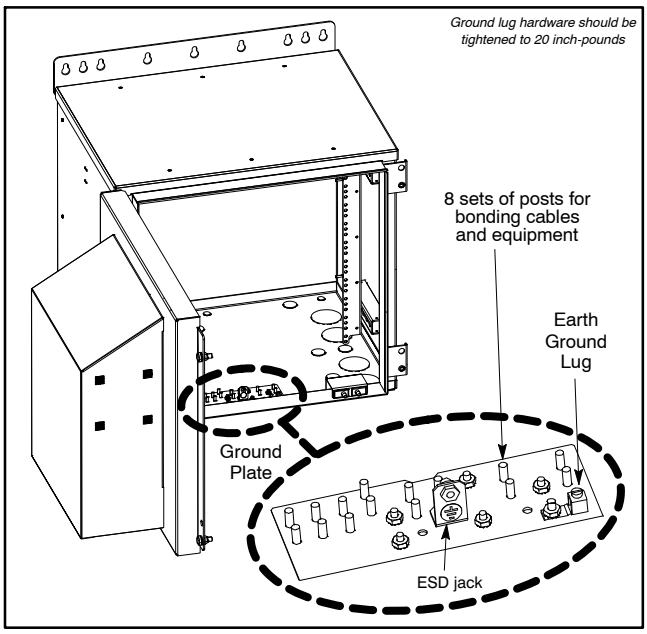


Figure 15. Ground Plate Location in Boxer Cabinet

3.7 Making Ground Connections

Eight sets of bond/ground posts, a ground lug, and an ESD jack are provided on a ground plate on the interior floor of the cabinet (see Figure 15). The posts are provided to bond both network and customer equipment or communications cables. An external earth ground rod or wire (#6 AWG) must enter the cabinet and be connected to the ground lug located on the interior ground plate. Ground lug hardware should be tightened to 20 inch-pounds. **Make all ground connections prior to any telecommunications cable connections.**

1. **Locate or establish an external earth ground.** Find or create an external and appropriate earth ground, per company practice and local codes.
2. **Remove a knock-out for the earth ground wire.** Per company practice, determine which cabinet knock-out hole location should be used for earth ground wire entrance (a small forward knock-out is recommended). If not already removed, remove the selected knock-out.
3. **Install a rubber grommet or liquid-tight fitting.** Install either conduit and an appropriate and liquid-tight fitting or a rubber grommet in the knock-out hole.
4. **Route ground wire through knock-out hole.** Run the approved ground wire through the grommet or conduit to the ground lug.
5. **Connect earth ground wire.** Connect the earth ground wire to the #6 AWG ground lug on the ground plate, per company practice. Ground lug hardware should be tightened to 20 inch-pounds.
6. **Seal the earth ground entrance hole.** Depending on the type of fitting or grommet used, it may be necessary to seal the ground wire entrance hole, as stated in the note below.

- NOTE -

To improve the integrity of the cable entries seal when rubber grommets are used, a water-proof foam or silicone sealant should be used on the interior side of the cabinet, around the exposed grommet and cable entry.

7. **Ground installed equipment and cables.** As each cable and piece of equipment is mounted inside the cabinet (in the following sections), connect it to a ground lug or post provided on the ground plate, per company practice.
8. **Use ESD ground jack.** Whenever installing equipment or performing system testing or maintenance, use the provided ESD ground jack also provided on the cabinet's interior ground plate.

3.8 Making Fan Power Connections

To power the factory-prewired Boxer cooling fans, an external +24V (3.5A) or -48VDC (1.75A) power source must be connected to the power terminals of the Controller Card mounted on the inside of the cabinet door.

- NOTE -

Ensure that the power source has sufficient power to support the 84 watts required to operate the Boxer fans plus the power required for the telecommunications equipment that is being installed in the cabinet.

Connecting Fan Power

Follow the steps below to connect +24V or -48VDC fan power to the Euro-connector in the Controller Card in the Boxer cabinet. Always follow local codes and company practices, and see Figure 9 and Figure 16 as necessary.

1. **Verify the power source.** Verify the power source is in good working condition.
2. **Remove or disable power.** Disable power at the power source before proceeding (power is re-applied in Paragraph 3.8).
3. **Remove knock-out for power wires.** Select the best knock-out for power cable ingress and egress, and remove the knock-out per Paragraph 3.5, and prepare any grommet placement and conduit fittings per company practice.
4. **Route wires into cabinet.** Extend and route the DC wires from the power source into the Boxer cabinet through the knock-out hole. Fish enough wire to reach the Controller Card on the inside of the door with adequate slack (route wires through provided clips/tie-downs).
5. **Strip power wires.** Strip off approximately 3/16" from the end of the wires for DC power.
6. **Pull out power Euro-connector.** Remove the 2-position Euro-connector at the bottom left corner of the Controller Card (pull it out, as shown in Figure 16). Loosen the small screws in the connector, to accept the wires.
7. **Connect power wires to loose Euro-connector.** Insert each stripped wire into the proper position (in the rectangular hole, see Figure 16) provided for it in the Euro-connector, holding each wire in place while tightening each screw.

   - **+24VDC operation.**
     Connect the negative power wire: Connect the negative

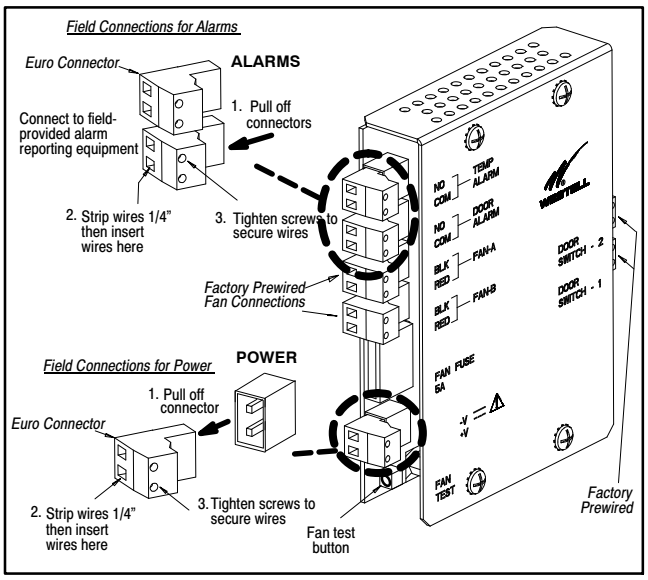


Figure 16. Euro-Connectors for Field-Connections

power wire to the -V terminal.
Connect the positive power wire: Connect the positive +24VDC power wire to the +V terminal.

- **−48VDC operation.**
Connect the negative power wire: Connect the -48VDC power wire to the -V terminal.
Connect the positive power wire: Connect the positive power wire to the +V terminal.

8. **Re-install Euro-connector.** After the power wires are properly positioned and secured in the Euro-connector, re-insert the fan power 2-pin Euro-connector back into its receptacle in the lower left corner of the controller card.
9. **Perform wire management.** Perform cable management per company practice.
10. **Proceed to Paragraph 3.10.** Proceed to Paragraph 3.10 for system power-up.

3.9 Optionally Connecting External AC Power

For customer convenience, a knock-out for AC power is provided on the interior floor of the cabinet near the rear right corner (see Figure 17). Use external 120 VAC power source to power any equipment that will be installed in the Boxer cabinet, per company practice. A co-located pedestal with common access to Boxer shall be used to deliver AC power. The pedestal shall contain a distribution panel, 20 amp circuit breaker, and gapless suppressors. The pedestal shall be capable of accepting 120/240 volts, single phase, and provide hardware for mounting a power meter. However, Boxer must only be supplied with 120 volts.

Follow the steps below to connect an external 120 VAC power source to the Boxer cabinet. ***All components in the pedestal must be listed by a Nationally Recognized Testing Laboratory (NRTL), all company practices, local codes, and National Electric Codes must be followed, and only a qualified electrician should perform the AC electrical installation.***

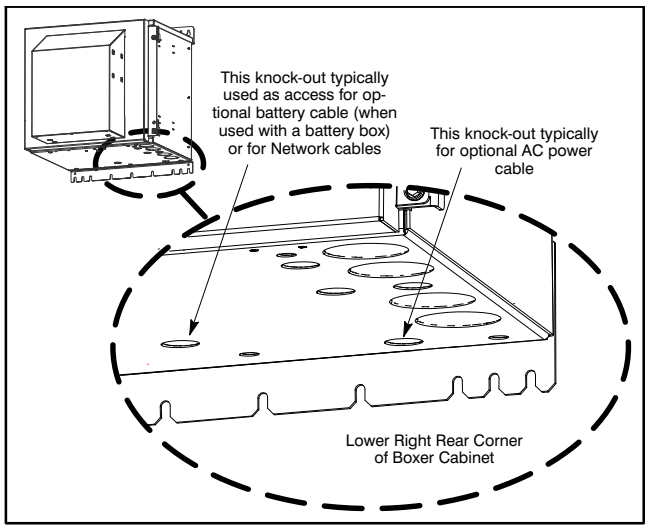


Figure 17. Bottom Isometric View Showing Knock-outs for Power Cables/Wiring

1. **Verify the power source.** Verify the power source is in good working condition.
2. **Remove or disable power.** Disable the power at the power source before proceeding (power is re-applied in Paragraph 3.10).
3. **Verify the knock-outs are removed.** Perform the steps in Paragraph 3.5 to remove any appropriate cabinet hole knock-out(s), and to install an appropriate fitting or grommet in the knock-out hole (if needed).
4. **Install conduit.** Install all required fittings/conduit from the power source to the hole on the bottom of the cabinet.
5. **Fish or route wires.** Fish or route the AC wires from the power source through the conduit and into the Boxer cabinet.
6. **Make the AC electrical wire connections.** Perform the electrical wire connections.
7. **Perform housekeeping.** Perform any needed wire management, per company practice, the NEC, and local codes.
8. **Proceed to Paragraph 3.10.** Proceed to Paragraph 3.10 for system power-up.

- WARNING -

All cabinet AC/DC power wiring, cabling, and installation methods, both externally to the cabinet and installation and wiring of internal cabinet equipment, must be performed by a qualified electrician in accordance with the National Electrical Code (NEC) rules and local codes and practices.

3.10 Performing System Power-Up

Before mounting any field-provided communications equipment in the cabinet, verify all internal Boxer equipment and power connections are functional. Follow the steps below to perform a Boxer system power-up procedure.

1. **Verify all power and ground connections are complete.** Examine the earth ground and all power connections inside

and outside the Boxer cabinet and verify they are safe, secure, and complete.

2. **Turn on the external power source.** Apply the power from the external power source.

3. **Verify internal fans are operational.** Verify the internal fans are properly working by detecting air circulation directly in front of the fans when the FAN TEST switch on the fan control module is pressed.

3.11 Mounting Equipment Inside Boxer

Boxer utilizes a 10 RU high and 19" wide rack with adjustable/removable rack channels. Two slotted channel adjustment brackets on each side wall allow the channel to be easily moved to one of 7 "grooved hole" mounting positions (channels can be adjusted forward or backward as needed to support Network equipment). The channels' rack-hole pattern accommodates a wide variety of equipment and mounting bracket hole patterns.

Always follow company practices and the guidelines below when mounting equipment inside the cabinet.

1. Verify the combined equipment height does not exceed 10 RUs.

2. Verify the combined weight of all customer-supplied equipment installed inside Boxer does not exceed 50 pounds.

3. Verify any equipment to be installed in the cabinet will not extend into or past the fan guards or grills on the door of the cabinet. Slightly deeper equipment can be mounted in the lower positions of the channels (below the fans).

4. Verify each piece of equipment does not exceed the cabinet's interior width or depth.

5. Determine the best mounting location for each piece of equipment, for maximum capacity.

6. Verify the combined wattage of all equipment installed in the cabinet does not exceed 400 watts.

7. *Determine/adjust* the rack channel depth (optional). The channels are factory installed for 5" of clearance in front of the rack and 12" of clearance behind the rack. If a different clearance is required, remove the bolts from each channel (best shown in Figure 3), position the channels as needed, and re-install the bolts into each rack channel.

8. Use the bond posts provided on the ground plate as needed for bonding or grounding any cables or equipment installed inside the cabinet.

3.12 Connecting Communication Cables

The types of communication cables used and their connector types (if any) vary per the application and the equipment installed inside the cabinet. To accommodate a variety of cable and connector sizes, the Boxer cabinet has a variety of cable-hole knock-outs, as shown in Table 1 and Figure 6.

1. Run the communications cables to the Boxer cabinet.

2. Insert and route the cable through the desired grommet.

3. Attach the cable's connector to the appropriate connector of the targeted equipment.

4. Repeat for each cable.

5. Make any desired connections between pieces of equipment.

6. Use the bond posts and ground lugs provided on the ground plate as needed for bonding and grounding any communications cables brought into the Boxer cabinet.

3.13 Making Alarm Connections

The high temperature alarm and door alarm connections are located on the Controller Card located on the inside of the cabinet door. Easy pull-off/push-on Euro-connectors are provided for these installer connections. To make connections to the Euro-connectors, pull-off the Euro-connector, strip ¼" off the end of each wire to be connected, insert the wire into the provided hole, tighten the screw to secure the wire, repeat for each wire, then push-on the Euro-connector.

1. **Temperature Alarm Terminal Block.** Connect the Temperature Alarm Normally Open contact terminal to the Alarm input of the field-provided alarm monitoring device. Connect the common contact terminal to the common input of the alarm monitoring device. For reference, the Normally Open Temperature Alarm thermostat contact closes when the internal cabinet temperature exceeds 65° C.

2. **Door Alarm Terminal Block.** Connect the Door Alarm Normally Open Door Alarm contact terminal to the Alarm input of the alarm monitoring device. Connect the common contact terminal to common input of the alarm monitoring device. For reference the Normally Open contact closes when the door is opened.

- DEACTIVATING THE DOOR ALARM -

The door alarm sensors can be temporarily disabled during equipment installation or maintenance by gently pulling out the cylindrical-shaped switch actuator until it clicks. Closing the door automatically resets and enables the sensor. To manually enable a door alarm sensor, gently push the switch actuator back in until a click is heard.

3.14 Optioning Installed Equipment

Make all option settings on the installed equipment per equipment manufacturer instructions and company practices.

3.15 Performing Cabinet Housekeeping

Verify all equipment is secure, verify all wires and cables are neatly organized and managed, verify all bonding and grounding connections are made at the ground plate, and ***verify no equipment, tie-downs, cables, or wires will interfere with the closing of the door***. Clean up the installation site per company practice.

3.16 Closing and Locking the Cabinet

Upon completion, the installer should close and lock the cabinet by tightening both cup-washer screws. The customer may optionally lock the door with a padlock (customer supplied) through the holes provided for it at the bottom of the door-lock flanges.

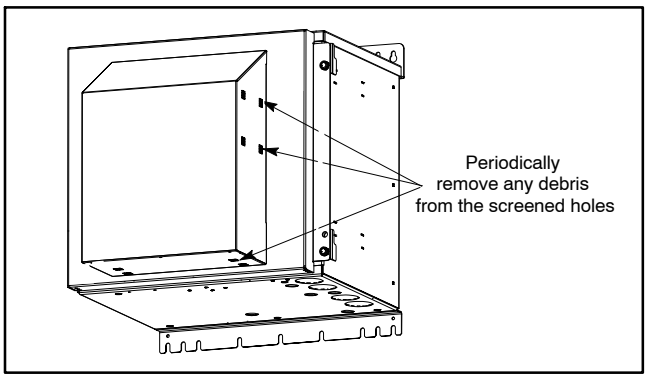


Figure 18. Clean the Air Intake/Exhaust Screened Holes

4. MAINTENANCE

The Westell Boxer® components are maintenance-free, however, please note the following item.

- At least once every six months, periodic inspections should be performed on the Boxer cabinet to remove any debris from the fan cover's screened holes (Figure 18). This facilitates proper operation of the cabinet and allows unobstructed air flow.

5. SERVICE AND REPAIRS

Replacing parts is the only recommended type of field repair for the Westell Boxer® cabinet. The list below contains the only Boxer parts which may be ordered and field-replaced (see Part 6 for a telephone number, Table 4 for part numbers, and Paragraph 7.2 for the return procedure). See Paragraph 5.1 through 5.4 for detailed steps to remove and replace these parts.

Field-replaceable parts:

- Controller Card
- Internal Fans
- Door Alarm Sensor Assembly

- CAUTION -

To avoid electrical shock, turn off any DC or AC power feeds to the panel before removing or replacing the controller card.

5.1 Replacing the Controller Card

The Controller Card cannot be field *repaired*. Should a problem be suspected with the card, it must be removed and returned to Westell for service, then re-installed or *replaced*. Follow the steps below to replace the controller card.

1. **Disconnect power.** Disconnect power to the card by removing the power Euro-connector block (labeled "-48V" and "GND". Pull the connector forward.
2. **Remove all connectors.** Disconnect all other wire connections in the card by simply pulling off each Euro-connector in the controller card (on the card's left and bottom edges, see Figure 16) in similar fashion, and labelling each connector as it is removed, to facilitate re-connection with the replacement card. It is not necessary to remove any wires from the connectors (unless a fan is suspected of being faulty and is also being replaced).
3. **Remove card.** Remove the old card by unscrewing the nuts that secure the card to the cabinet door, then pulling the card off the studs.
4. **Install new card.** Replace the old card with the new card, ordered and received from Westell. Be sure the GMT fuse faces to the left, and that the card labelling is visible and not upside-down, align the mounting holes in the card with the posts on the cabinet door, then tighten the nuts onto the studs to secure the card. Re-insert or snap-on all connectors in their proper positions in the card, connecting the power connector block last.
5. **Test.** Verify the alarms and fans work.

- CAUTION -

To avoid electrical shock, turn off any DC or AC power feeds to the controller before beginning this procedure.

5.2 Replacing the "Outside Air" Fans

Fans cannot be field *repaired* but are field replaceable. Should a problem be suspected with an "outside air" fan, remove the fan and return it to Westell for service, then replace it. See Table 4 for ordering information. To remove and replace an "outside air" fan, proceed with the following instructions.

1. **Remove cover.** Remove the cover for the heat exchanger compartment by: 1) loosening the Phillip-head screw located at the bottom of main door (interior side of door), then 2) from the outside of the cabinet, lift the cover up off the two cover alignment posts located at top of the cover.
2. **Open the cabinet.** Open the cabinet door by loosening the two cup-washer screws.
3. **Remove fuse.** Remove the 5A fan fuse from the controller card (see Figure 9 or Figure 16 for fuse location).
4. **Disconnect fan power.** Disconnect the FAN A connector at the controller card.
5. **Remove wires from connector.** Remove the red and black wires from the connector. Make a note of which wires (red or black) were inserted into which holes in the connector.
6. **Replace connector.** Insert the empty connector back into the controller card.
7. **Pull wires through door.** Remove wires from the ferrite toroid, and note the direction the wires are wrapped through the toroid. Pull the disconnected wires to the fan side through the hole in door (connector will not fit through the hole).
8. **Verify fan is off.** Visually check to ensure that the fan blades are NOT rotating.
9. **Remove bracket.** Loosen and remove the two hex-nuts on either side of the front bracket that secures the fans. Remove the bracket.

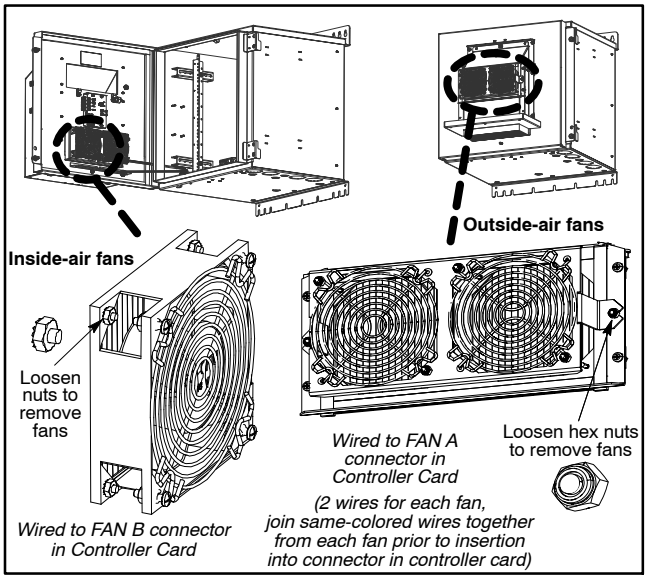


Figure 19. Field Replacement of Fans

10. **Remove fans.** Lift the old faulty fan off the mounting studs.

11. **Store bracket.** Replace the bracket and thread the wing-nuts back onto their posts.

12. **Return fans.** Return the fan(s) to Westell for repair or replacement (see Paragraph 7.2).

13. **Install replacement fan(s).** Mount the replacement fan(s) onto their mounting studs and reverse the steps above, and also read the note below to secure the fan(s) and make wire connections. Route the twisted fan wire through the ferrite toroid in the same manner as the other wires are routed, two turns.

- FAN WIRING IN EURO-CONNECTOR NOTE -

One euro-connector serves two fans: there is one connector for the two external air fans (connector labeled "FAN A") and one connector for the two internal air fans ("FAN B"). Each fan has a black wire and a red wire. When wiring a new or replacement fan, the same colored wire from each fan should first be twisted together as a single wire unit prior to insertion into its proper termination hole in the connector.

14. **Apply power and test.** If not already installed, re-install the fuse in the controller card, and apply power to the cabinet. Verify the fans are working properly by pressing the fan test button (see Figure 16 for location).

5.3 Replacing the "Inside Air" Fans

Fans cannot be field *repaired*. Should a problem be suspected with an "inside air" fan, remove the fan and return it to Westell for service, then *replace* it. See Table 4 for ordering information. To remove and replace an "inside air" fan, proceed with the following instructions.

- CAUTION -

To avoid electrical shock, turn off any DC or AC power feeds to the controller before beginning this procedure.

1. **Open the cabinet.** Open the cabinet door by loosening the two cup-washer screws with a can wrench or 216 tool.
2. **Remove fuse.** Remove the 5A fan fuse from the controller card (see Figure 9 or Figure 16 for fuse location).
3. **Disconnect fan power.** Disconnect the FAN B connector at the controller card.
4. **Remove wires from connector.** Remove the red and black wires from the connector. Make a note of which wires (red or black) were inserted into which holes in the connector.
5. **Replace connector.** Insert the empty connector back into the controller card, remove the fan wires from the ferrite toroid, and note the directions the wires are wrapped through the toroid.
6. **Verify fan is off.** Visually check to ensure that the fan blades are NOT rotating.
7. **Remove fan mounting nuts.** Remove the nuts that secure the fans to the inside of the cabinet door.
8. **Remove fans.** Lift the old fans off their mounting studs.
9. **Store nuts.** Replace the nuts back onto their posts.
10. **Return fans.** Return the fan(s) to Westell for repair or replacement (see Paragraph 7.2).
11. **Install replacement fan(s).** Mount the replacement fan(s) onto their mounting studs and reverse the steps above, and also read the note below to secure the fan(s) and make wire connections. Route the twisted-pair wires through the ferrite toroid in the same direction as the other wires, then connect to the Euro connector.

- FAN WIRING IN EURO-CONNECTOR NOTE -

One euro-connector serves two fans: there is one connector for the two external air fans (connector labeled "FAN A") and one connector for the two internal air fans ("FAN B"). Each fan has a black wire and a red wire. When wiring a new or replacement fan, the same colored wire from each fan should first be twisted together as a single wire unit prior to insertion into its proper termination hole in the connector.

12. **Apply power and test.** If not already installed, re-install the fuse in the controller card, and apply power to the cabinet. Verify the fans are working properly by pressing the fan test button (see Figure 16 for location).

5.4 Replacing the Door Alarm & Fan Cut-off Switch

The door sensor switches cannot be field repaired. Should a problem be suspected with the door sensor switch, remove the entire door alarm switch assembly and return it to Westell for service, then replace it. To remove and replace the door alarm switch assembly, proceed with the following instructions.

- WIRE AND BLOCK DISCONNECTION NOTE -

The Euro-connector blocks used for making DC distribution and alarm wire connections facilitate a simple group disconnection of <u>all</u> alarm and dc distribution wire connections; there's no need to unscrew each wire. Simply remove the entire block by pulling the blocks away from the panel.

- CAUTION -

To avoid electrical shock, turn off any DC or AC power feeds to the controller before beginning this procedure.

1. **Open the cabinet.** Open the cabinet door.

2. **Remove door sensor assembly mounting screws.** Remove the nuts that attach the door alarm sensor assembly to the threaded posts in the lower, right, inside corner of the open cabinet (see Figure 7 for the switch location, Figure 6 to see the nuts).

3. **Partially pull out door sensor assembly to disconnect cable.** Lift and slightly pull out the door sensor assembly to access the cable wires. Carefully disconnect each wire one at a time, noting which terminal was used and noting or labelling the color or polarity of each connector, for easy re-connection to the new assembly.

4. **Remove the door sensor assembly.** Fully remove the old door sensor assembly.

5. **Install the new door sensor assembly.** Reverse the steps above to install the replacement door alarm sensor assembly. When re-attaching the door alarm cable's two connectors to the new door switch sensor assembly, verify the following:

   - verify the connectors are routed so that they reach the back of the door sensor,
   - verify that the door alarm cable's black wire connects to the door switch terminal lug labelled "COM," and that the cable's red wire connects to the terminal lug labelled "NO", and
   - after re-attaching the entire door sensor assembly to the cabinet via the two hex nuts, verify that the door alarm is not present when installation is complete and power is re-applied.

5.5 Touch-up Paint

If needed, touch-up paint for exterior and interior cabinet wall surfaces is available from Westell. Follow the steps below to order and apply touch-up paint (or follow company practices).

1. **Order paint.** Contact Westell Customer Service at the phone number in Part 6 to order the paint part number shown in Table 4.

2. **Clean cabinet surface(s).** Clean and dry the cabinet surface(s) to be painted.

3. **Apply paint.** Apply paint using a clean, dry, nylon bristle brush. The paint must be applied in dry weather conditions, the relative humidity should be below sixty (60%) percent, and the temperature should be between sixty five (65°) and ninety (90°) degrees Fahrenheit or 19° to 35° Celsius. Allow to dry for 24 hours before touching or applying a second coat.

6. CUSTOMER & TECHNICAL SERVICES

6.1 Customer Service & Technical Assistance

If technical or customer assistance is required, contact Westell by calling or using one of the following options:

Voice: (800) 377-8766
email: *global_support@westell.com*

For additional information about Westell, visit the Westell World Wide Web site at http://**www.Westell.com.**

6.2 Part Numbers

This equipment is identified by a product number (A90-BXM1019-NHE5), which consists of three parts: the issue letter of the equipment (A), the assembly type (90), and the specific model number (BXM1019-NHE5). Each time a change is made to the product which changes the form, fit, or function of the product, the issue letter is incremented or advanced by one. Be sure to indicate the issue level as well as the model number when making inquiries about the equipment.

- TL9000 RECYCLING NOTE -

Westell recommends that its products be recycled at the end of their product life. For Westell products that have reached their product End Of Life (EOL), please recycle and dispose of the products per your company practice, per local recycling programs and local codes, and per state statutes.

7. WARRANTY & RETURNS

7.1 Warranty

Westell warrants this product to be free of defects at the time of shipment. Westell also warrants this product to be fully functional for the time period specified by the terms and conditions governing the sale of the product. Any attempt to repair or modify the equipment by anyone other than an authorized Westell representative will void the warranty.

7.2 Return and Replacement Policy

Westell will repair or replace any defective Westell equipment without cost during the warranty period if the unit is defective for any reason other than abuse, improper use, or improper installation. Before returning the defective equipment, first request a Return Material Authorization (RMA) number from Westell. Once an RMA number is obtained, return the defective unit, freight prepaid, and a brief problem description to:

Voice: (630) 375-4457
email: rgmdept@westell.com

Replacements will be shipped in the fastest manner consistent with the urgency of the situation. Westell will continue to repair or replace faulty equipment beyond the warranty period for a nominal charge. Contact Westell for details.

Physical Feature	U.S.	Metric
Height *(including mounting brackets)*	26.8 in.	68.07 cm
Height *(between mounting hole centers)*	25.2 in.	64 cm
Height *(cabinet only, exterior)*	22.5 in.	57.2 cm
Width *(exterior)*	25.5 in.	64.8 cm
Width *(interior)*	21 in.	53.3 cm
Width *(interior, between channels)*	17.85 in.	45.3 cm
Depth *(door closed)*	27.75 in.	70.5 cm
Depth *(door open 90°)*	43.4 in.	110.2 cm
Depth *(internal)*	17.5 in.	44.45 cm
Weight *(cabinet, approx.)*	68 lbs.	30.87 kg
Weight Load *(Max.)*	50 lbs.	23 kg
Operating Temp	-40° to 115°F	-40° to 46°C
Humidity	0 to 95% (non-condensing)	
Mounting*	H-Frame, wall, pole & pad	

** Boxer can be pad-mounted when mounted and mated with an optional battery box, and pole mounted with the pole mount kit (see Table 4).*

Table 3. Boxer Cabinet Physical Specifications

8. SPECIFICATIONS

8.1 Electrical and Physical Specifications

The Westell Boxer® electrical and signalling specifications are listed below, and the physical specifications are shown in Table 3.

Power Specification

A. Fan power: -56 W typical, 84 W max when powered from a +24V or -48V source

Controller Card Specifications

B. Provisions for +24V or -48VDC inputs to power the fans

C. 5 Amp GMT Fan fuse

D. Provisions for 65° C Temperature Sensor contacts (Normally Open)

E. Provisions for door open contacts (Normally Open)

F. **Heat exchanger fans.** Turn on at 35° C (95° F), turn off at 25° C (77° F)

Cooling

G. 400W Heat exchanger

8.2 Regulatory/Agency Specifications

The Boxer cabinet is designed to meet the following regulatory, safety or environmental specifications or requirements:

- NEMA 4 compliant
- FCC Part 15
- Conforms to ANSI/UL 60950-1 and certified to CAN/CSA C22.2 No. 60950-1
- Conforms to ANSI/UL 60950-22 and certified to CAN/CSA C22.2 No. 60950-22

8.3 Ordering Specifications

To order units, call the telephone number in Paragraph 6.1 and please specify a specific model number shown in Table 4.

Boxer Ordering Information				
A90-BXM1019-NHE5	Westell® Boxer® cabinet, 400W, -48/+24VDC heat exchanger cooling, temperature-controlled, controller card, single full-size door, built-in 10-RU 19" rack, door switch, numerous knock-outs.			
Other Boxer Family Outdoor Cabinets				
Series	**Description**	**Cooling**	**Power**	**Part Number**
Boxer 5 *(5-RU 19" tall* rack)*	Main Cabinet	Passive cooling	N/A	A90-BXM05V19-NMT
		150W fan-cooled, always-on	-48VDC	A90-BXM05V19-NAF
		200W heat exchanger, always-on	-48VDC	A90-BXM05V19-2HE
		200W heat exchanger, temp-controlled	+24 or -48VDC	A90-BXM05V19-2HE3
		Same as -2HE3 but GR-487 Issue 4 compliant	+24 or -48VDC	A90-BXM05V19-2HE3G
Boxer 10 *(10-RU 19" wide rack)*	Main Cabinet	Passive cooling	N/A	A90-BXM1019-NMT
		400W heat exchanger, always-on	-48VDC	A90-BXM1019-NHE
		400W heat exchanger, temp-controlled	+24 or -48VDC	A90-BXM1019-NHE3
		Same as -NHE3 but GR-487 Issue 4 compliant	+24 or -48VDC	A90-BXM1019-NHE3G
		600W fan-cooled, always-on, cust. access door	-48VDC	A90-BXM1019-CAF
	Main Cabinet+SideCar+Battery Box	400W heat exchanger, always-on	-48VDC	A90-BXSC1019-4H
Boxer 16 *(16-RU 19" wide rack)*	Main Cabinet	400W heat exchanger, always-on	-48VDC	A90-BXM1619-4HE
		700W heat exchanger, temp-controlled	-48VDC	A90-BXM1619-7HE
		Same as the -7HE but GR-487 Iss. 4 compliant	-48VDC	A90-BXM1619-7HEG
		4K BTU air conditioner, temp-controlled	120VAC	A90-BXM1619-4KAC
	Main Cabinet+SideCar+Battery Box	400W heat exchanger, always-on	-48VDC	A90-BXSC1619-4H
Boxer 20 *(20-RU 19" wide rack)*	Main Cabinet	400W heat exchanger, always-on	-48VDC	A90-BXM2019-4HE
		400W heat exchanger, temp-controlled	+24 or -48VDC	A90-BXM2019-4HE3
		Same as the -4HE but GR-487 Issue 4 compliant	+24 or -48VDC	A90-BXM2019-4HE3G
	Main Cabinet+SideCar+Battery Box	400W heat exchanger, always-on	-48VDC	A90-BXSC2019-4H
Boxer 30 *(30-RU 19" wide rack)*	Main Cabinet	1000W heat exchanger, temp-controlled	-48VDC	A90-BXM3019-10HE
	Main Cabinet+SideCar+Battery Box	1000W heat exchanger, temp-controlled	-48VDC	A90-BXSC3019-10H

** In the Boxer 5 cabinet, the 19" wide rack is vertical (rotated 90 degrees, with channels at top and bottom).*

Table 4. Boxer Cabinet Ordering Information

Boxer Battery Boxes, Accessories, and Options							
Type	**Part Number**	**Description**	**Supported Models**				
			Boxer 5	**Boxer 10**	**Boxer 16**	**Boxer 20**	**Boxer 30**
Battery Boxes & Skirts	A90-BXB05V-A	Battery box standard	✓				
	A90-BXB19-A			✓	✓	✓	✓
	A90-BXB19-B	Battery box with heater pad		✓	✓	✓	✓
	A90-BXB19-D	Battery box wide for Boxer with SideCar		✓	✓	✓	✓
	A90-BXS19-14	Skirt box for boxer, 14" high		✓	✓	✓	✓
Accessories	A90-BXA-HP01	Battery heater pad		✓	✓	✓	✓
	A90-BXA-PM02	Pole mount kit: main cabinet		✓	✓	✓	
	A90-BXA05V-PM2	Pole mount kit: main cabinet only	✓				
	A90-BXA05V-PM3	Pole mount kit: main cabinet + battery box	✓				
	A90-BXA-PM03	Pole mount kit: main cabinet + standard battery box		✓			
	A90-BXA-PM05	Pole mount kit: main cab. + standard & wide battery box			✓	✓	✓
	A90-BXA-WH01	Wall/H-frame mount kit: main cab. + std & wide battery box		✓	✓	✓	✓
	A90-BXA05V-WH1	Wall mount kit: main cabinet + battery box	✓				
	A90-BXA-PT1	Pad mount template: standard battery box		✓	✓	✓	✓
	A90-BXA-PT2	Pad mount template: wide battery box		✓	✓	✓	✓
	A90-BXA-CK01	Coupler kit (2) ½", (2) ¾", (4) 2"	✓	✓	✓	✓	✓

Table 5. Boxer Orderable Options and Accessories

Appendix A – Product Views

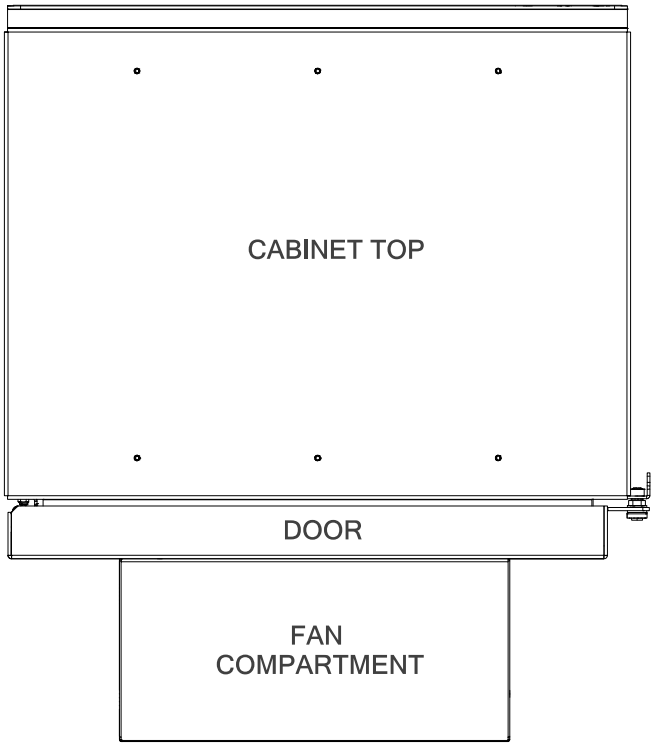


Figure 20. Top Exterior View of Boxer Cabinet (Door Facing Down/Forward)

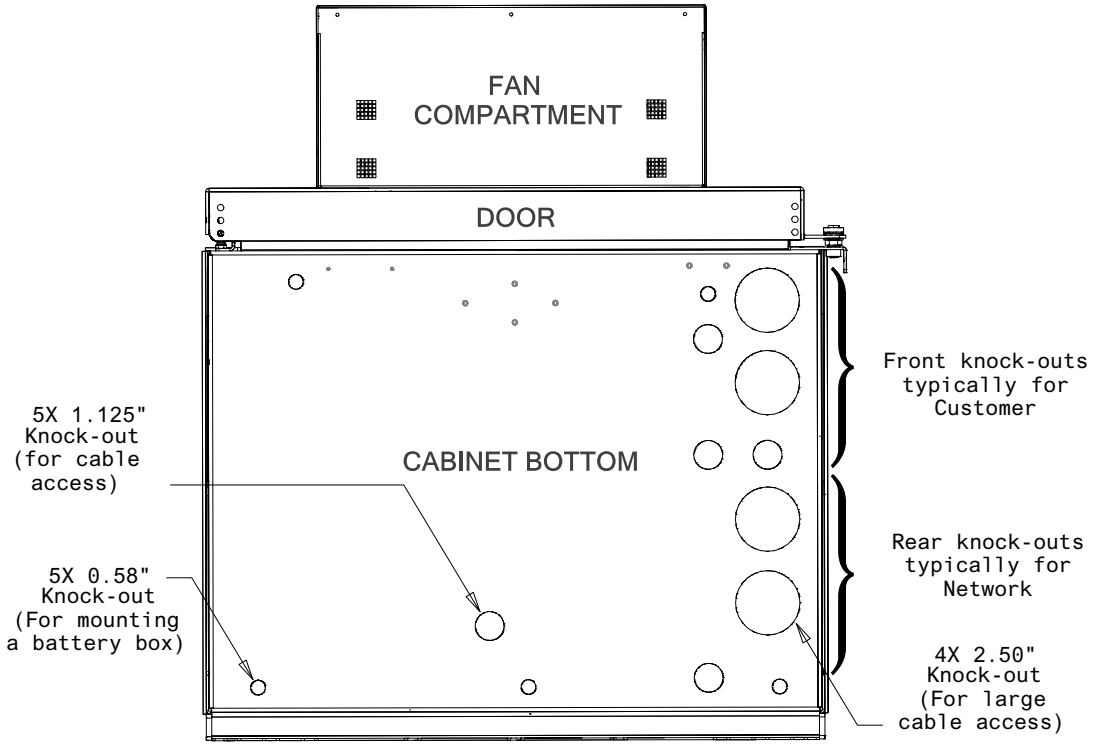


Figure 21. Bottom Exterior View of Boxer Cabinet (Door Facing Up)

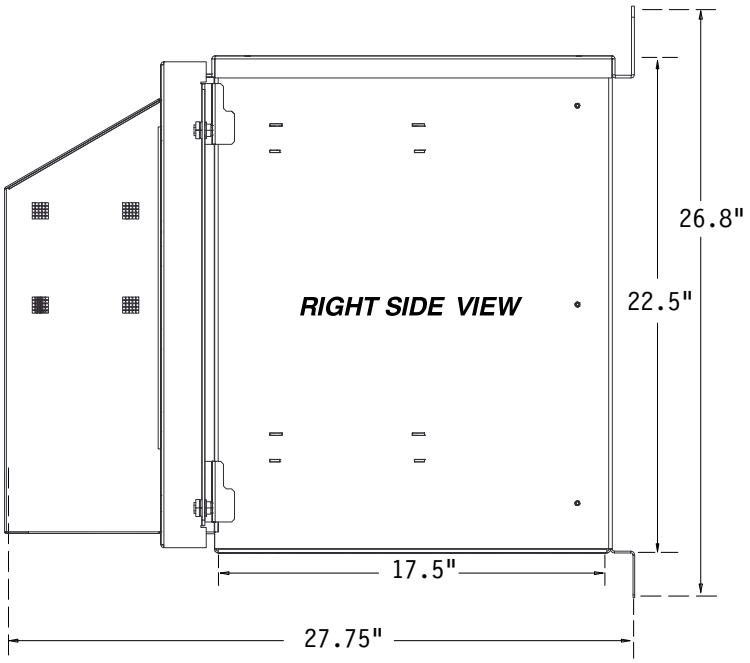


Figure 22. Right Side Exterior View of Boxer Cabinet, Door Closed

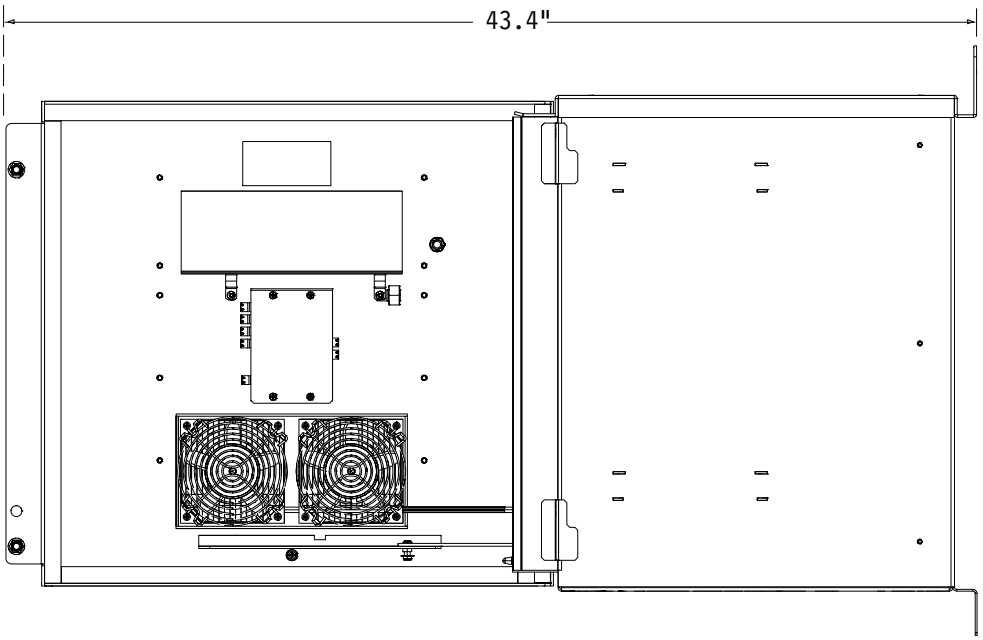


Figure 23. Right Side Exterior View of Boxer Cabinet, Door Open

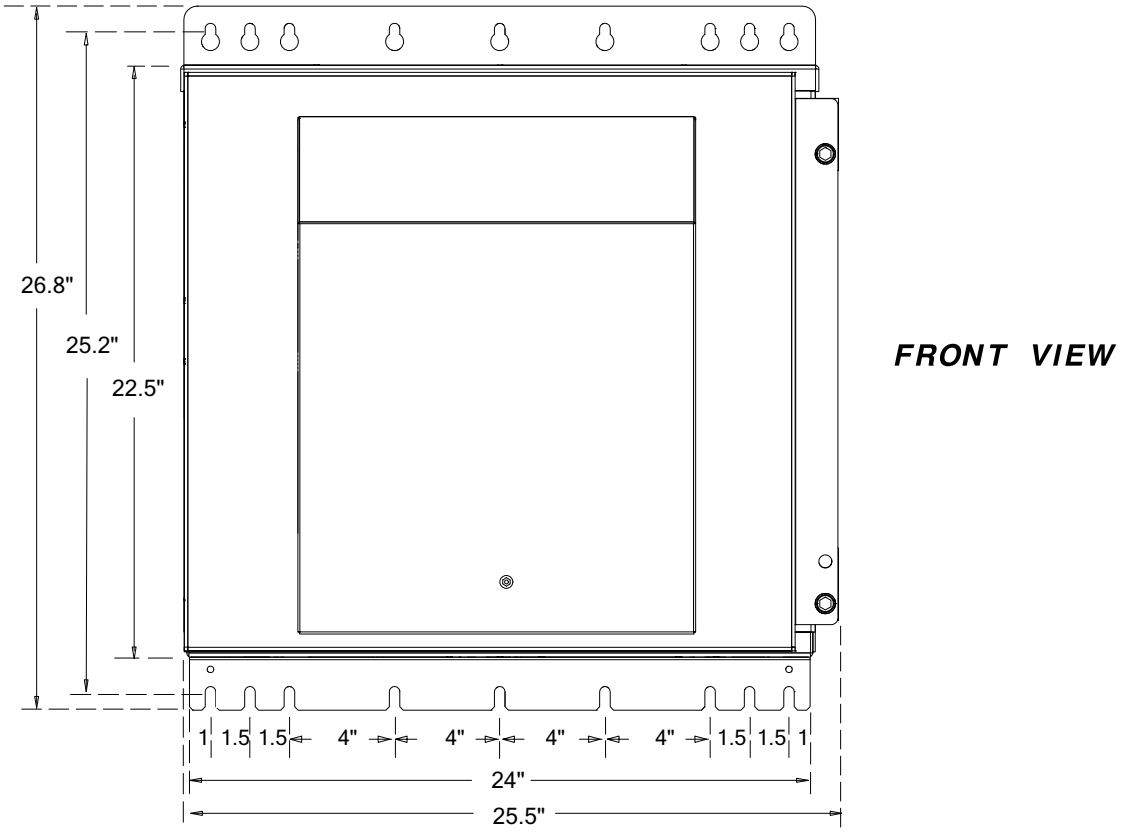


Figure 24. Front Door Closed View of Boxer Cabinet with Mounting Hole Spacings

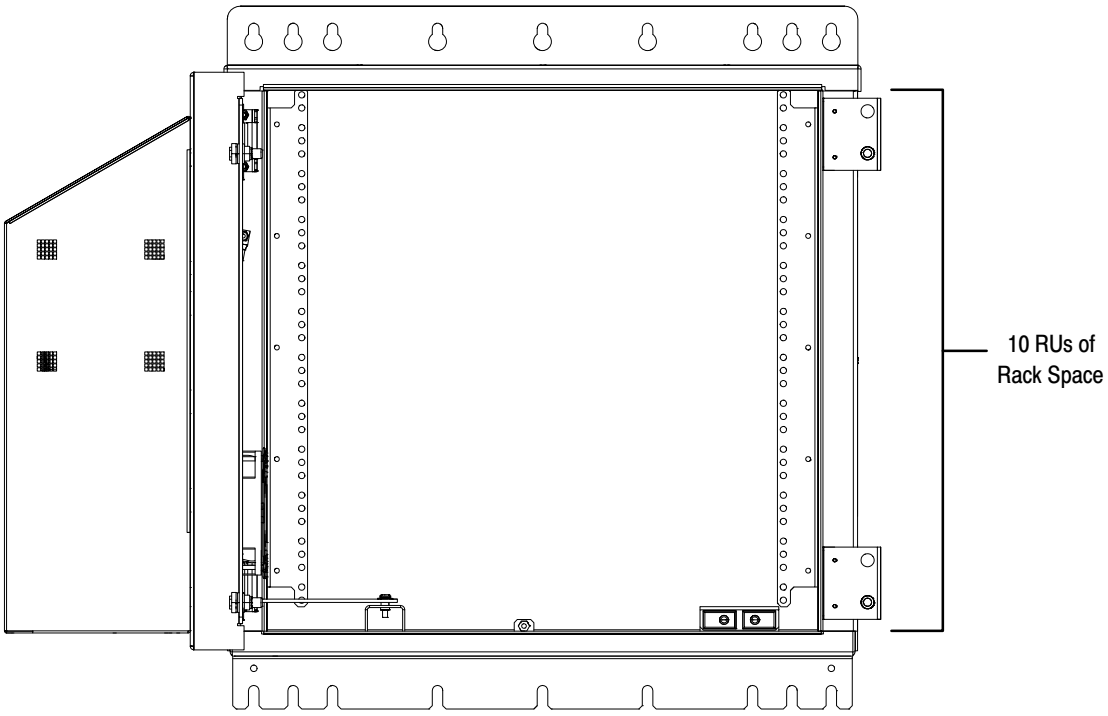


Figure 25. Front Door Open View of Boxer Cabinet