



NEW CINGULAR WIRELESS PCS, LLC (AT&T)

**Application to the
State of Connecticut Siting Council**

**For a Certificate of
Environmental Compatibility and Public Need**

–SALISBURY FACILITY–

**Docket No. 501
BULK FILING
D&M PLAN
VERTIV WALK-IN-CABINET (WIC)
SPECIFICATIONS**

**NEW CINGULAR WIRELESS PCS, LLC (AT&T)
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT 06067**



XTE 801 Series

Walk-In-Cabinet (WIC)

Description and Installation Manual (631-205-530), Revision B

Specification Number: F2018001-WIC

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ADMONISHMENTS USED IN THIS DOCUMENT



DANGER! Warns of a hazard the reader *will* be exposed to that will *likely* result in death or serious injury if not avoided. (ANSI, OSHA)



WARNING! Warns of a potential hazard the reader *may* be exposed to that *could* result in death or serious injury if not avoided. This admonition is not used for situations that pose a risk only to equipment, software, data, or service. (ANSI)



CAUTION! Warns of a potential hazard the reader *may* be exposed to that *could* result in minor or moderate injury if not avoided. (ANSI, OSHA) This admonition is not used for situations that pose a risk only to equipment, data, or service, even if such use appears to be permitted in some of the applicable standards. (OSHA)



ALERT! Alerts the reader to an action that *must be avoided* in order to protect equipment, software, data, or service. (ISO)



ALERT! Alerts the reader to an action that *must be performed* in order to prevent equipment damage, software corruption, data loss, or service interruption. (ISO)



FIRE SAFETY! Informs the reader of fire safety information, reminders, precautions, or policies, or of the locations of fire-fighting and fire-safety equipment. (ISO)



SAFETY! Informs the reader of general safety information, reminders, precautions, or policies not related to a particular source of hazard or to fire safety. (ISO, ANSI, OSHA)

IMPORTANT SAFETY INSTRUCTIONS

Safety Precautions Definitions

Definitions of the safety admonishments used in this document are listed under “Admonishments Used in this Document” on page 5.

General Safety Precautions

The following precautions shall be observed at all time when handling and installing the WIC:

- Observe all safety precautions against personal injury and equipment damage.
- The procedures outlined in this manual are only recommended guidelines. Ensure that all NEC (National Electric Code) and local codes for safety and wiring are followed.
 - Use listed two-hole compression connectors (lugs) to terminate all ground connections. Selected lug shall match wire and type, and crimped applied as specified by the lug manufacturer.
 - Apply NO-OX-ID-A to all ground connections.
 - Insulation of field-wire conductors should be rated no less than 105 °C, and gauge in a manner that is consistent with the NEC and local codes.
- Always use a non-contact voltage detector, when approaching a WIC, to verify no leaks or shorts are presents on the external body.
- Read “WIC Placement” on page 32 in its entirety prior to attempting to handle or secure the WIC.
- A minimum of two persons are required to safely install the WIC.
- Hard hats and steel-toed boots should be worn while maneuvering the WIC.
- Safety glasses should always be on while on-site.
- Safety gloves should be on when working in temperature extremes, with batteries, or with sharp objects.
- All electricians, operators, and technicians have been trained for the task at hand.
- Keep bystanders away.
- Ensure that all personnel on site are familiar with the first-aid kit location and emergency procedures in the event of an injury.
- Never leave the WIC unattended. If leaving the site, close and secure the WIC.

You Must Follow Approved Safety Procedures



DANGER! Performing the following procedures may expose you to hazards. These procedures should be performed by qualified technicians familiar with the hazards associated with this type of equipment. These hazards may include shock, energy, and/or burns. To avoid these hazards:

- a) The tasks should be performed in the order indicated.
- b) Remove watches, rings, and other metal objects.
- c) Prior to contacting any uninsulated surface or termination, use a voltmeter to verify that no voltage or the expected voltage is present. Check for voltage with both AC and DC voltmeters prior to making contact.
- d) Wear eye protection.
- e) Use certified and well maintained insulated tools. Use double insulated tools appropriately rated for the work to be performed.

Voltages

AC Input Voltages



DANGER! This system operates from AC input voltage capable of producing fatal electrical shock. AC input power must be completely disconnected from the branch circuits wiring used to provide power to the system before any AC electrical connections are made. Follow local lockout/tagout procedures to ensure upstream branch circuit breakers remain de-energized during installation. DO NOT apply AC input power to the system until all electrical connections have been completed and checked.

DC Output and Battery Voltages



DANGER! This system produces DC power and may have a battery source connected to it. Although the DC voltage is not hazardously high, the rectifiers and/or battery can deliver large amounts of current. Exercise extreme caution not to inadvertently contact or have any tool inadvertently contact an output terminal or battery terminal or exposed wire connected to an output terminal or battery terminal. NEVER allow a metal object, such as a tool, to contact more than one termination or battery terminal at a time, or to simultaneously contact a termination or battery terminal and a grounded object. Even a momentary short circuit can cause sparking, explosion, and injury.

Battery

Refer to the battery manufacturer documentation for specific battery safety instructions. The following are general guidelines.



WARNING! Correct polarity must be observed when connecting battery leads.



WARNING! Special safety precautions are required for procedures involving handling, installing, and servicing batteries. Observe all battery safety precautions in this manual and in the battery instruction manual. These precautions should be followed implicitly at all times.



WARNING! A battery can present a risk of electrical shock and high short circuit current. Servicing of batteries should be performed or supervised only by properly trained and qualified personnel knowledgeable about batteries and the required precautions.

The following precautions should be observed when working on batteries:

- Remove watches, rings, and other metal objects.
- Eye protection should be worn to prevent injury from accidental electrical arcs.
- Use certified and well maintained insulated tools. Use double insulated tools appropriately rated for the work to be performed. Ensure that wrenches with more than one working end have only one end exposed.
- Do not lay tools or metal parts on top of batteries.
- Disconnect charging source prior to connecting or disconnecting battery terminals.
- Risk of explosion if battery is replaced with an incorrect type or if polarity is reversed. Recommended to replace batteries with the same manufacturer and type, or equivalent.
- Dispose of used batteries according to the instructions provided with the batteries. Do not dispose of batteries in a fire. They may explode.
- ALWAYS FOLLOW THE BATTERY MANUFACTURER'S RECOMMENDATIONS AND SAFETY INSTRUCTIONS.



DANGER! This equipment may be used in conjunction with lead-acid batteries. Working near lead-acid batteries is dangerous!

In addition to the hazard of electric shock, gas produced by batteries can be explosive and sulfuric acid can cause severe burns.

- Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes, and is toxic.
- Batteries contain sulfuric acid.
- Batteries generate explosive gases during normal operation. Systems containing batteries should never be installed in an airtight room or space. Only install in a ventilated environment.
- Batteries are an energy source that can produce high amounts of electrical current.

FOR THESE REASONS, IT IS OF CRITICAL IMPORTANCE THAT YOU READ THESE INSTRUCTIONS AND FOLLOW THEM EXACTLY.

WHEN WORKING WITH LEAD-ACID BATTERIES:

- Follow the recommended PPE requirements per the SDS for the battery to be used.
- If battery acid enters your eye, immediately flush your eye with running cold water for at least 15 minutes. Get medical attention immediately.
- If battery acid contacts skin or clothing, wash immediately with soap and water.



ALERT! Performing maintenance and/or troubleshooting procedures may interrupt power to the loads, if battery reserve is not sufficient.

Specific Safety Precautions



DANGER! RISK OF ELECTRICAL SHOCK, GENERAL

All ground connections must be installed and verified prior to connecting any power cables (AC or DC) and turning-up of the WIC.

When connecting any discrete power connection, make the connection first with the ground/return and break last with ground/return.

Do not install equipment showing any physical damage.



DANGER! RISK OF ELECTRICAL SHOCK, AC

Proper actions, include, but not limited to:

- a) Verify before contacting the WIC that no current leakage or ground fault condition is present.
- b) Verify a proper ground is in place.
- c) Verify for AC hook-up, all WIC circuit breakers are OFF and the utility incoming feed is OFF.

Use a trained licensed electrician.



DANGER! RISK OF ELECTRIC SHOCK

The DC bus is powered by DUAL power sources – Rectifiers and DC Batteries.

To properly work on the system, de-energize by disconnecting BOTH power sources. Even with the batteries turned off by using a local battery (circuit breaker) disconnect, batteries are still “LIVE” and hazardous, including a voltage >50 VDC, and a source of high short circuit current.

Use extreme caution around the batteries and terminals.



DANGER! RISK OF ELECTRICAL SHOCK, OSP CABLES

If joint buried cables are used, check the cable sheath for voltage in accordance with local standards. If voltage is detected, do not proceed with the installation. Contact the supervisor and do not proceed until the voltage hazard is eliminated.



DANGER! RISK OF CHEMICAL EXPOSURE

A battery can present harmful chemicals. Refer to the Battery Installation Manuals and MSDS supplied with the batteries. Work in a ventilated area and follow all safety procedures.

At a minimum, wear safety glasses and gloves when working with batteries.

Do not smoke.



WARNING! PREVENT INJURIES, FROM LIFTING THE WIC

Follow all local safety practices while lifting the WIC. Wear all locally approved safety gear. All persons working with lifting equipment must wear standard safety headgear, eye protection, and (when required) gloves.

Keep bystanders away from work operations at all times.

Do not lift the WIC over people. Do not let anyone work, stand, or pass under a lifted WIC.

Use all four points (eyebolts) to lift the WIC.

Do not move or lift the WIC with a door open.

Do not allow the lifting equipment or WIC to touch any electrical wiring or equipment.

Operate all lifting equipment within safety constraints, as defined by the manufacturer and local practices; for example, do not exceed the capacity of reach.

Do not use slings, clevises or shackles of insufficient capacity.

Crane Operation:

Only properly trained operators shall operate the crane.

Do not operate the crane until all stabilizers are extended. The stabilizers must be in firm contact with the ground or other adequate support structure. Do not retract or extend the stabilizers when the WIC is suspended from the crane.

Do not lift the WIC over people. Do not let anyone work, stand, or pass under a lifted WIC.

Only the crane rigging crew should set up the crane and rigging.

Do not exceed the lifting capacity of the crane.

Forklift Operation:

The forklift must be rated for a lifting capacity of 10,000 lbs (4536 kg), or greater.

Required Equipment:

One hoist, crane, or forklift capable of lifting 10,000 lbs (4536 kg).

Four wire-rope slings, 8-ft. (2.44 m) long (minimum). Each sling should have 8,000 lb. (3629 kg) capacity.

Four connecting links (clevises) (rated for a minimum of 8,000 lb), to attach the wire-rope slings to the WIC lifting eyes.

A 75-ft (20 m) rope, 5/8" (1.5 cm) in diameter, to use as a tagline. A tagline is used to guide the WIC into position while it is lifted and lowered.

**CAUTION!** PREVENT EQUIPMENT DAMAGE, PROPER HANDLING

Do not stack nor lay the WIC on its side.

Similarly, do not stack batteries or lay them on their side. Do not tip batteries -- keep in upright position at all times.

**DANGER!** PREVENT EQUIPMENT DAMAGE, MAINTAIN VENTILATION

To optimize the service life of this equipment, make sure there are no obstructions in front of the ventilation openings.

**WARNING!** RISK OF INJURY TO EYES AND SKIN, FROM OPTIC DEVICES

Do not look into a fiber cable or device, nor hold such cable or device against body, fabric or other material.

**WARNING!** RISK OF HAZARDOUS SUBSTANCES

After handling of the WIC or any such component, such as batteries, cables, busbars, etc., always wash hands immediately after.

**WARNING!** RISK OF EXPLOSION

For safety reasons, never restrict or block the airflow through the door or entry panel ventilation openings.

**CAUTION!** PREVENT EQUIPMENT DAMAGE, FROM CONDENSATION

Until the WIC is turned up for service, the bags of desiccant shipped with the WIC must remain in the WIC to prevent condensation.

Once service is in-place, remove the desiccant.

**CAUTION!** PREVENT EQUIPMENT DAMAGE, OPERATING TEMPERATURE

The WIC is approved for operation in an environment with an expected temperature range of -40 °F to +115 °F (-40 °C to +46 °C) and 5% to 95% relative humidity range, condensing. Do not use at temperatures or humidity exceeding these ranges.

The WIC is not for indoor use.

**CAUTION!** PREVENT DAMAGES CAUSED BY ELECTROSTATIC DISCHARGES (ESD)

When handling equipment containing static sensitive components, wear an appropriate antistatic device (a wrist strap for example) that is properly connected to a designated antistatic grounding point (on a framework, on an anti-static floor mat, etc.). ESD-protective packaging material shall also be used when carrying/shipping equipment containing static sensitive components.

Personal Protective Equipment (PPE)



DANGER! ARC FLASH AND SHOCK HAZARD.

Appropriate PPE and tools required when working on this equipment. An appropriate flash protection boundary analysis should be done determine the “hazard/risk” category, and to select proper PPE.



Only authorized and properly trained personnel should be allowed to install, inspect, operate, or maintain the equipment.

Do not work on LIVE parts. If required to work or operate live parts, obtain appropriate Energized Work Permits as required by the local authority, per NFPA 70E “Standard for Electrical Safety in the Workplace”.

Hazardous Voltage



DANGER! HAZARD OF ELECTRICAL SHOCK.

More than one disconnect may be required to de-energize the system before servicing.

Handling Equipment Containing Static Sensitive Components



ALERT! Installation or removal of equipment containing static sensitive components requires careful handling. Before handling any equipment containing static sensitive components, read and follow the instructions contained on the Static Warning Page.

Maintenance and Replacement Procedures



CAUTION! When performing any step in procedures that requires removal or installation of hardware, use caution to ensure no hardware is dropped and left inside the unit; otherwise service interruption or equipment damage may occur.



NOTE! When performing any step in procedures that requires removal of existing hardware, retain all hardware for use in subsequent steps, unless otherwise directed.

STATIC WARNING



This equipment contains static sensitive components. The warnings listed below must be observed to prevent damage to these components. Disregarding any of these warnings may result in personal injury or damage to the equipment.

1. Strictly adhere to the procedures provided in this document.
2. Before touching any equipment containing static sensitive components, discharge all static electricity from yourself by wearing a wrist strap grounded through a one megohm resistor. Some wrist straps have a built-in one megohm resistor; no external resistor is necessary. Read and follow wrist strap manufacturer's instructions outlining use of a specific wrist strap.
3. Do not touch traces or components on equipment containing static sensitive components. Handle equipment containing static sensitive components only by the edges that do not have connector pads.
4. After removing equipment containing static sensitive components, place the equipment only on conductive or anti-static material such as conductive foam, conductive plastic, or aluminum foil. Do not use ordinary Styrofoam™ or ordinary plastic.
5. Store and ship equipment containing static sensitive components only in static shielding containers.
6. If necessary to repair equipment containing static sensitive components, wear an appropriately grounded wrist strap, work on a conductive surface, use a grounded soldering iron, and use grounded test equipment.

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PURPOSE OF THIS DOCUMENT

This document provides description and installation instructions for the XTE 801 Series Walk-In-Cabinet (WIC).

When using this document, consider the footprint for the XTE 801 Series Walk-In-Cabinet (WIC) you are installing as well as any installed options when determining which procedures contained within this document will be applicable for your installation.

Procedures related to the provisioning, start-up, and acceptance of associated telecom equipment are not covered in this document.

Documents that supplement the information in this document are referenced in “Sequence of Procedures” on page 30.

PRODUCT DESCRIPTION

General

The XTE 801 Series Walk-In-Cabinet (WIC) ensures vital electronic equipment is protected from vandalism and environmental damage. The XTE 801 Series Walk-In-Cabinet (WIC) comes with a NetSure™ 7100 Power System; -48V, 2 row distribution, and offer an array of climate control, remote monitoring and control, power, mounting and configuration options.



Perspective Views

Refer to **Figure 1** for WIC perspective views with major features identified.

Part Numbers

Refer to **Table 1** for applicable product part numbers.

Table 1: WIC Part Numbers and Descriptions

Part Number	Description	NEQ
XTE 801 Series Walk-In-Cabinet (WIC)		
F2018001-WIC	ATT 6X6 WIC e/w the following:	NEQ.20060
Electrical Service Entrance		
PTLC-MTS-12200-CL	UL 891 Listed, 32x22"x10 cabinet with CamLok Connector Panel, 240 VAC / 120 VAC, 200 A Power Transfer Load Center with mechanically interlocked "mains" enabling manual transfer between Utility and an Alternative Power Source connected via CamLok style connectors. PTLC includes Strikesorb surge protection, a 30-position Square D QO panelboard, and an alarm monitor for utility power loss.	NEQ.19706
F1010923	350 Amp Generator Disconnect Kit, NS15KWGENINPUTASM.	N/A
DC Power System		
582127000203	NetSure™ 7100 SERIES -48V DC Power System sized at 1,000 Amp on the -48 VDC side and 520 A on the +24 VDC side with 3 factory-installed and wired battery trays.	NEQ.20068
Options		
PTS 3703-WIC WOF	Rack CommBay-WIC-without Fiber Panel.	NEQ.19678
PTS3704-WIC-WF	Rack CommBay-WIC-with Fiber Panel.	NEQ.19679
AF000135	Direct Air Cooling (DAC) system. Dual Fan -48 VDC powered fresh air cooling kit with HVAC control for low voltage (24 VAC) controlled HVAC unit.	BLD.10558
ECUA12ACA036S-A5-100	1 TON WALL MOUNTED HVAC, with Controller, supply and return grills and remote sensor.	N/A
F1011119	WIC Single-Point Helical Foundation Kit – (4) WIC Corner Plates, (1) Two Step Stair, and (4) 6" x 7' Helical Piers with Leveling Hardware.	NEQ.20061

Figure 1: Major Components in the WIC (cont'd on next page)

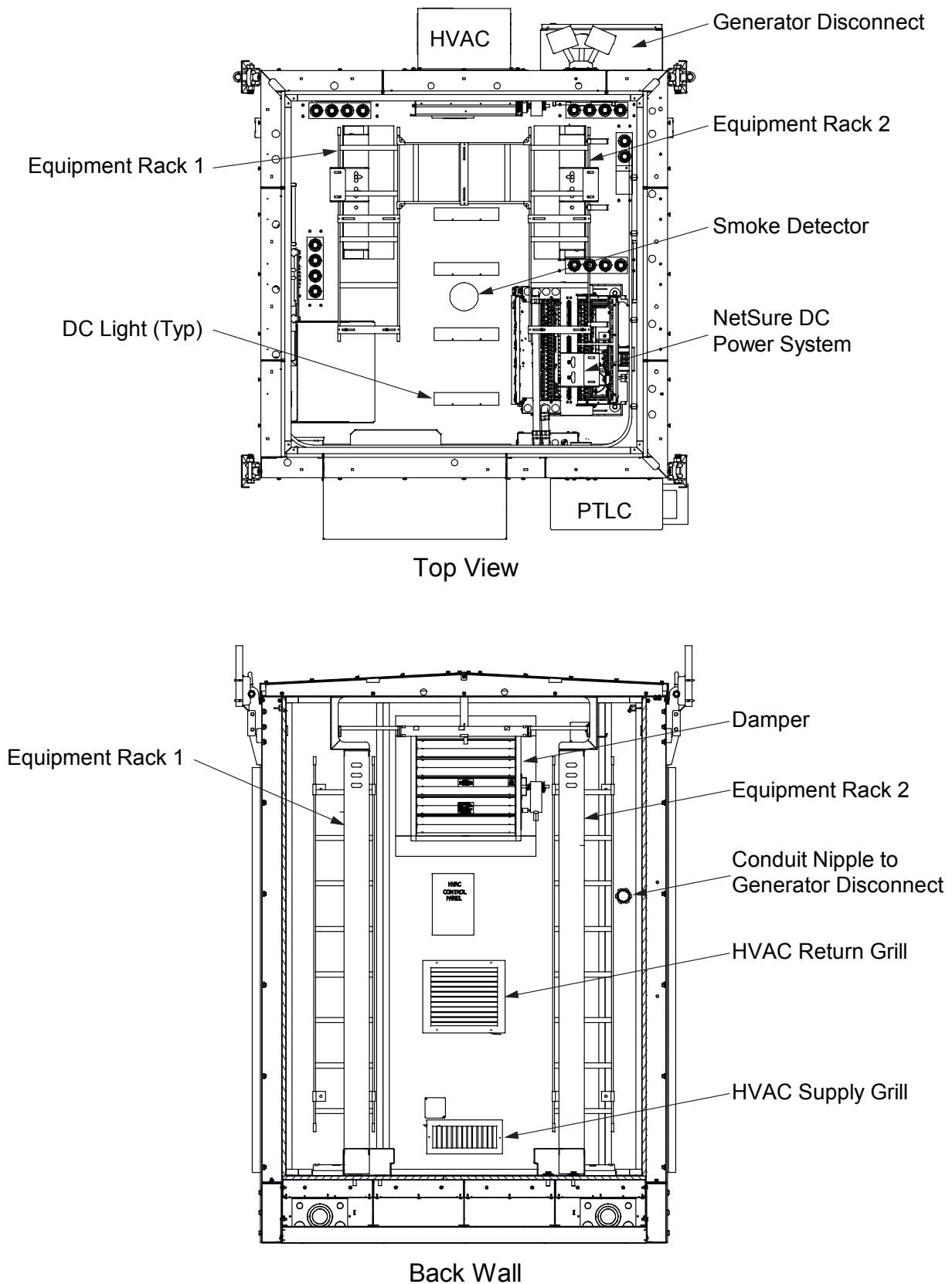
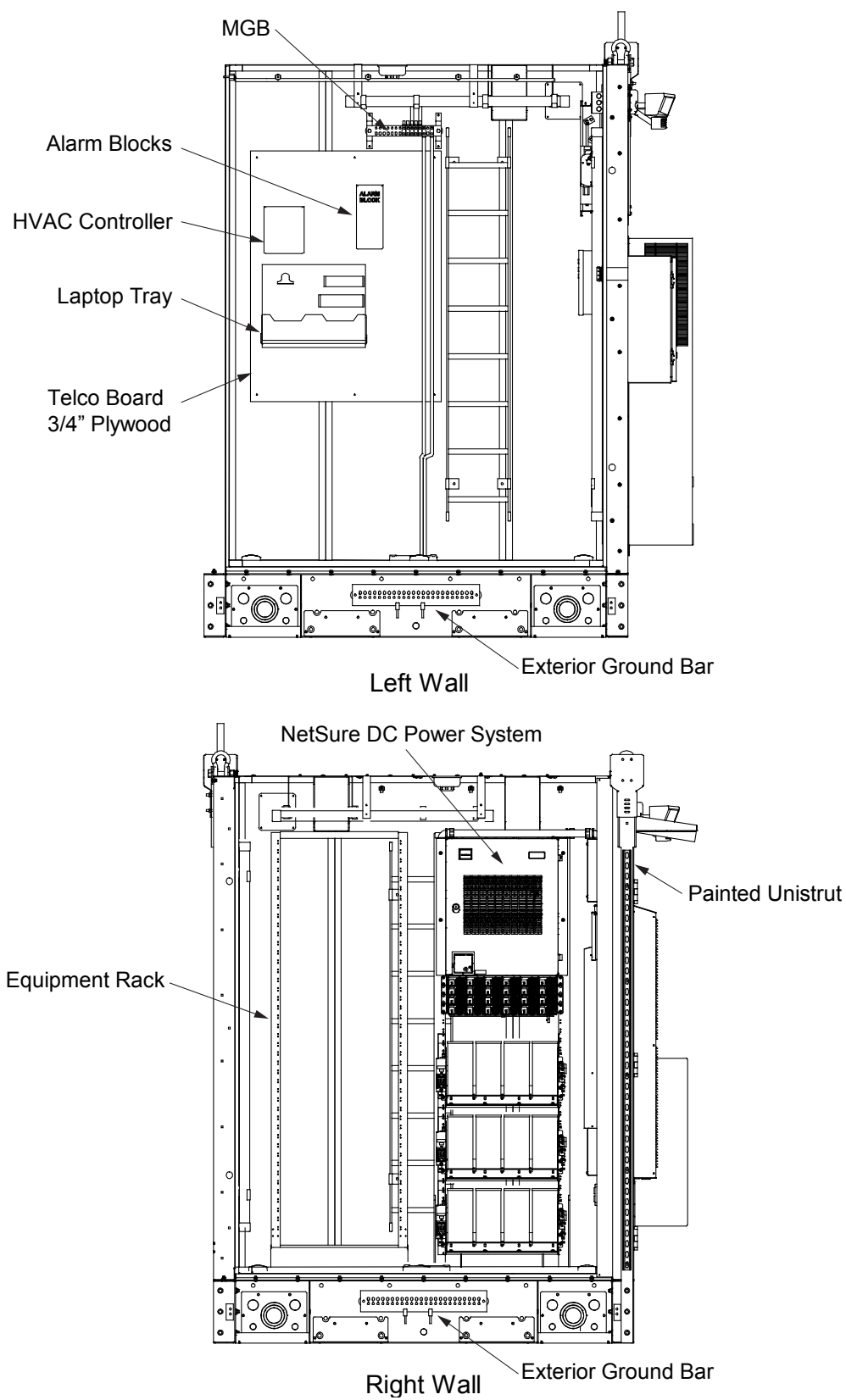


Figure 1: Major Components in the WIC (cont'd from previous page)



Application

The XTE 801 Series Walk-In-Cabinet (WIC) is designed to house and protect environmentally sensitive electronics at telecommunications sites including cellular, microwave radio, BBU pools for CRAN, and edge applications with virtualized networks.

- The XTE 801 Series Walk-In-Cabinet (WIC) is designed to provide secure and water-tight housing for equipment, power and batteries supporting wireless and wireline telecommunications applications.
- The XTE 801 Series Walk-In-Cabinet (WIC) depends upon a proven structural system, integrated mechanical components, and a sealing system that withstands rain, dust, snow and hurricane winds.
- The XTE 801 Series Walk-In-Cabinet (WIC) has several mounting options, primarily helical and concrete pier.

Standards Compliance

The XTE 801 Series Walk-In-Cabinet (WIC) is designed to meet the following standards where applicable:

- CSA Certificate of Compliance #70096774
 - CLASS - C321111 - INDUSTRIAL CONTROL EQUIPMENT-Enclosures for Electrical Equipment
 - CLASS - C321191 - INDUSTRIAL CONTROL EQUIPMENT-Enclosures for Electrical Equipment –US
 - Enclosure Type 3R



NOTE! The WIC is intended for industrial and/or power distribution equipment applications. These components are intended for the installation of industrial electrical equipment and/or power distribution equipment where the complete assembly is approved for installation in non-hazardous locations in accordance with the National Electric Code (NEC), Canadian Electric Code (CEC).

APPLICABLE REQUIREMENTS

- a) CSA C22.2 No. 94.1-07 / UL 50 12th Ed (Harmonized) Enclosures for Electrical Equipment, Non-Environmental Considerations
- b) CSA C22.2 No. 94.2-07 / UL 50E 1st Ed (Harmonized) Enclosures for Electrical Equipment, Environmental Considerations
- National Building Code - Canada, 2005
- National Building Code - USA, 2009
- ASTM A653 - Galvanized Steel
- Welding Conformance to CWB - CSA Standard W47.1 and AWS – D1.2, D1.3 and D1.6
- Designed to Meet Seismic Zone 4
- Telcordia GR487 compliant for corrosion, water intrusion, ultraviolet radiation, and designed to meet impact resistance
- DC Power System - UL Listed 1801, cUL, NEBS Level 3

- Power Transfer Load Center (PTLC) – UL891 and UL1008 compliant, Dead front switch boards – Suitable for use as Service Entrance
- UL/CSA Compliant Climate and other miscellaneous electrical equipment
- Electrical certification as per CSA and NFPA70 (NEC) requirements
- Installation method compliant to AT&T TP76300

Safety Listed AC or DC Components

A typical XTE 801 Series Walk-In-Cabinet (WIC) only utilizes listed or recognized components for the United States and/or Canada. The following examples of these may or may not be included in the WIC:

- AC Terminal Blocks
- Liquid Tight Flexible Non-Metallic Conduit
- GFI AC Receptacle
- AC-DC Rectifiers
- AC or DC Circuit Breakers

Commercial AC Service

AC power to be provided by customer via an upstream power source load center or power pedestal.

Power Service Required: 120 VAC / 240 VAC, 1 phase, 60 Hz with upstream fuse protection and upstream surge protection.

The service entrance system will consist of the following:

- 200 Amp, 120 VAC / 240 VAC, Single Phase, 30 Circuit Distribution Panel

Manual transfer switch with generator Camlock box:

- Main Breakers – Square-D, Series QO, Slide Link Interlock Bar
- Load Breaker Panel – Square D, 30 Position, Type QO
- GFCI Convenience Outlets – (1) 5-20R Input Box – equipped with Camlock style connectors (4)
- SPD – Strikesorb 40-A, 120 V Modules, UL1449, 3rd Edition (or current), CE, VDE
- Alarms – Utility Loss Alarm Monitoring

Only load circuits to be brought into AC entry facility. Overcurrent devices are not provided in the WIC.

Load circuits in the WIC requiring power as per the WIC AC schematic.

WIC Dimensions, Weights, and Physical Specifications

Standard Racks

The XTE 801 Series Walk-In-Cabinet (WIC) is equipped with two 19" wide equipment bays and each provides 45 rack units (RU). One (1) rack comes equipped with a fiber patch panel and the other does not.

Dimensions

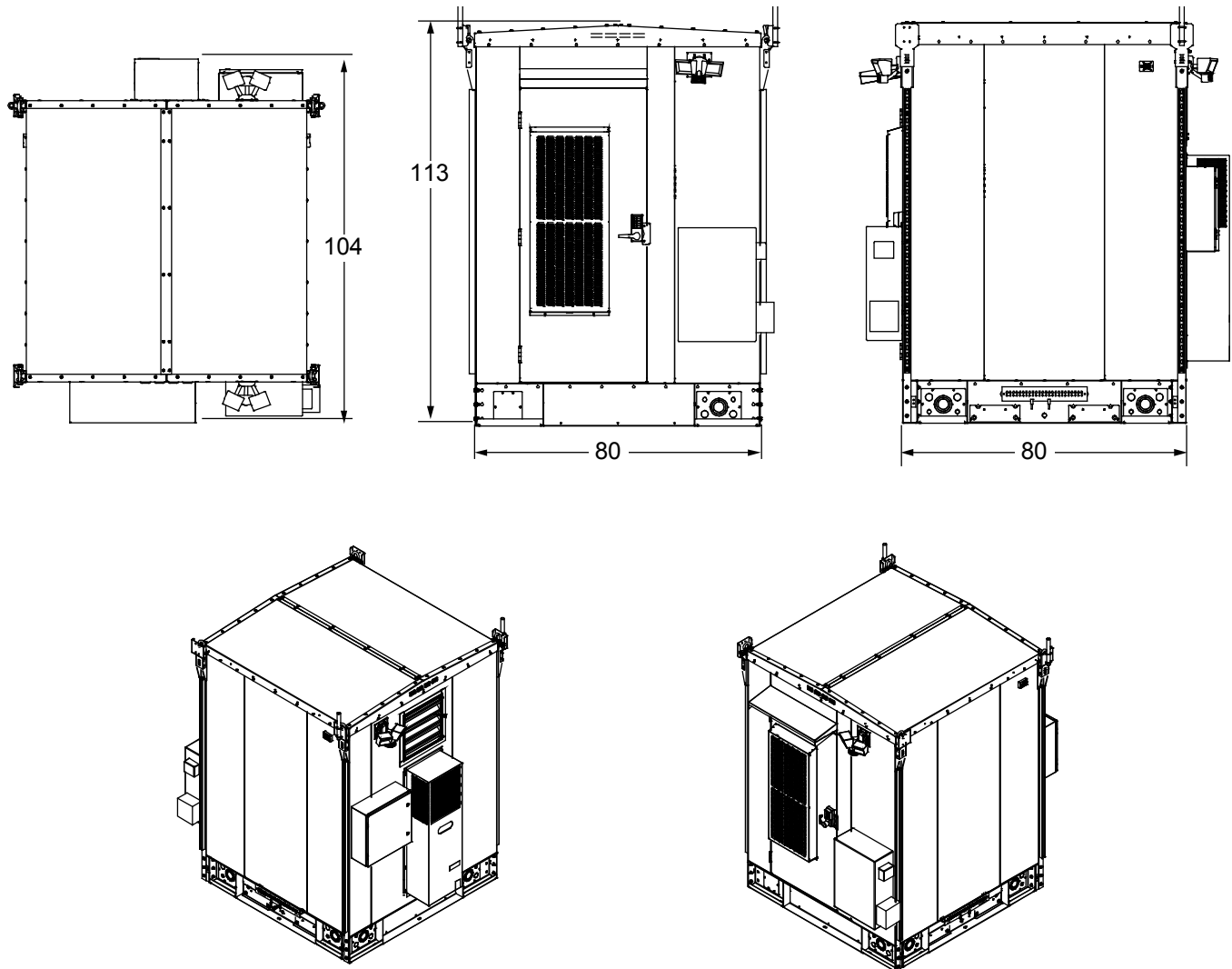
See **Figure 2**.

Specifications

- External Dimensions – 6.6' x 6.6' x 9.5'
- Internal Height – 96"
- Internal Width – 70.5"
- Internal Length – 70.5"
- Weight – Empty: 5,500 lbs.
Fully Loaded (as specified): 7,500 lbs.
- R13 Insulation for floors, walls and ceiling.
- One (1) hour fire rating.
- Common equipment kit (lighting, cable rack, etc.).
- Primary DC powered high efficiency thermal management system.
- 12K BTU backup air conditioner.
- Heater system.
- 200 A AC electrical system with power transfer and Cam-lock generator connection.
- Fully integrated internal grounding system.
- NetSure™ 7100 DC Power System in 23" rack with three (3) battery trays.
- NCU system and generator control.
- (2) 19" equipment welded frame installed. One with fiber patch panel and the other without.
- Thermal management and HVAC control.
- 66 type contact alarm consolidation point.
- Wall mounted fold down desk.
- Externally mounted color matched unistrut channels on each lifting strap for mounting external equipment.
- Externally mounted GPS antenna mounting brackets.
- Color – Pebble-Gray, RAL7032.

- Finish – Standard finish is multistage dry powder polyester paint for maximum durability and performance against corrosion. Optional exterior finishes also available upon request.

Figure 2: WIC Dimensions



WIC Features and Options

Construction

- Welded galvanized steel construction with outstanding impact and corrosion resistance.
- Interlocking steel panels construction.
- Walls, floor and ceiling are made of 14 gauge steel.
- Ceiling joists with 12 gauge steel.

- Floor Load: 200 pounds per square foot minimum (uniform with full-support foundation).
- Roof Live and Impact Load: 300 PSF (maximum).
- Wind Speed: 155 mph.

Protection

- Powder coat finish. Meets GR487 Telcordia mechanical and environmental standards for telecom cabinets.
- Protects against rain, sleet, snow, splashing water and damage from external ice formation.
- Optional exterior finishes including brick, stone and exposed aggregate are available upon request.
- Base includes steel cover plates front and back to accommodate cabling.
- Fork lift tubes on front and back.

Lifting

The XTE 801 Series Walk-In-Cabinet (WIC) is equipped with one lifting lug at the top of each corner that allow it to be lifted and lowered into position. The base is also equipped with fork lift pockets that allow the use of a forklift to offload and lower to the mounting base at the site.

Insulation

- Floor: R-13 fiberglass batt in floor cavities.
- Walls: R-13 fiberglass batt with vapor barrier in wall cavities.
- Roof: R-13 fiberglass batt with vapor barrier in cavities between ceiling and roof.

Radiant Barrier Roof

- Roof: 12 gauge galvanized, seams will be taped and rubberized roof coating applied (Garna-White) after powder coating.
- Garna-White is a high-solids, high-tensile, heat-resistant, single component water-borne liquid applied acrylic elastomeric coating.
- A conservative life span is 10 years.
- If inspection reveals that the coating has started to fade or check after that time, another application will restore the membrane performance.
- A recoat may be indicated after 12 to 15 years in outdoor service.
- Garna-White can be brush, roller or spray applied at 1.5 gallons per 100 square feet for desired results.
- Garna-White is available to certified contractors and installers, and not through supplier retail channels (reference www.roofrmi.com).
- Roof Trusses: four (4) trusses design – 12 gauge galvanized - powder coat finish.
- Integrated with 1/4" steel lifting brackets at the top.
- Center pitched for water run-off.

Interior Finish

- Walls and Ceiling: White-textured Melamine panels over 3/4" gypsum board (1-hour fire-rated).

Access Doors and Hardware

- Type: 18 gauge galvanized steel commercial grade insulated door.
- Size: 36" x 84" outward opening.
- Frame: 16 gauge galvanized steel frame.
- Door Lock: KABA Simplex L1000 Series, Model 1021B, Mechanical w/Best core.
- Hinges: (3) stainless steel with non-removable pin (per door).
- Weather Strip: adjustable brush weather seal.
- Threshold: stainless steel with brush sweep.
- Pick Plate: stainless steel latch guard.
- Door Holder: positive engagement latch with rubber bumper stop.
- Closer: adjustable-hydraulic.
- Drip Cap: 6" aluminum drip cap above doorway.

Door Lock Set

- See **Figure 3**.

Figure 3: Door Lock Set



Convenience Outlet

The WIC is equipped with two 20 A convenience outlets on the interior front wall and one 20 A GFCI on the exterior PTLC.

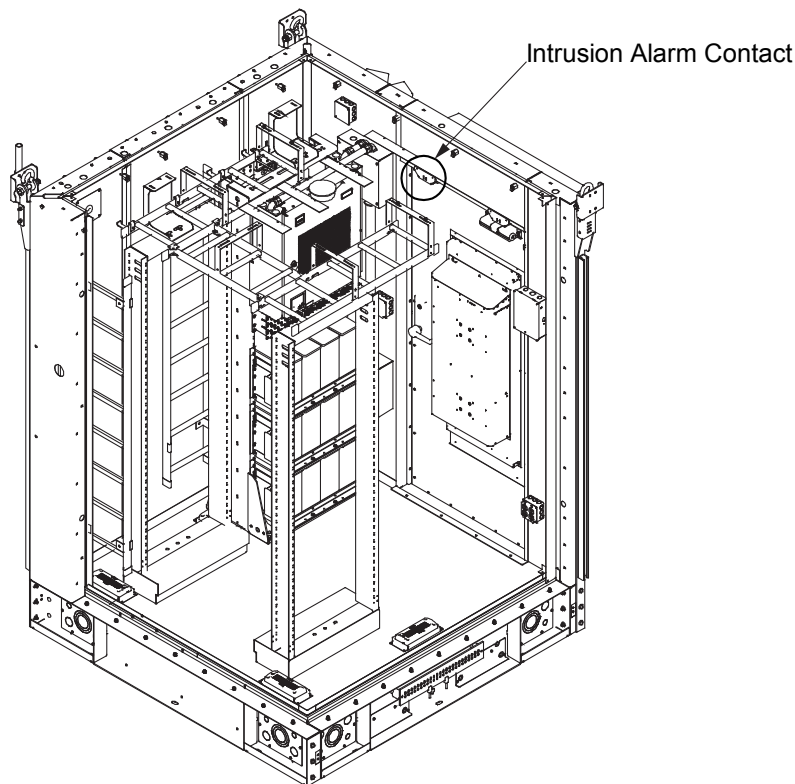
Ground Bar

The WIC contains one (1) 24-position galvanized steel ground bar mounted to the outside of both the right and left sides of the base assembly and one (1) 1/4" x 4" copper MGB located on the interior. The all-metal structure of the WIC is bonded together using the PANI method for grounding.

Door Intrusion Switch

See **Figure 4**.

Figure 4: Door Intrusion Switch (view from the inside)



Alarms

- The XTE 801 Series Walk-In-Cabinet (WIC) is equipped with intrusion, HVAC, various commercial AC power and DC power alarms.
- An alarm block is provided on the Telco Board inside the equipment chamber for alarm connections.
- An alarm pinout is specified in the schematic drawings shipped with the WIC.
- The intrusion alarm triggers whenever the door is opened. It can be disabled by pulling the alarm plunger completely forward.

Light Switch

Located to the right of the door as you enter and switches the four (4) ceiling mounted LED lights.

Rack Sizes

Accommodates both 19" and 23" width equipment racks with EIA hole spacing.

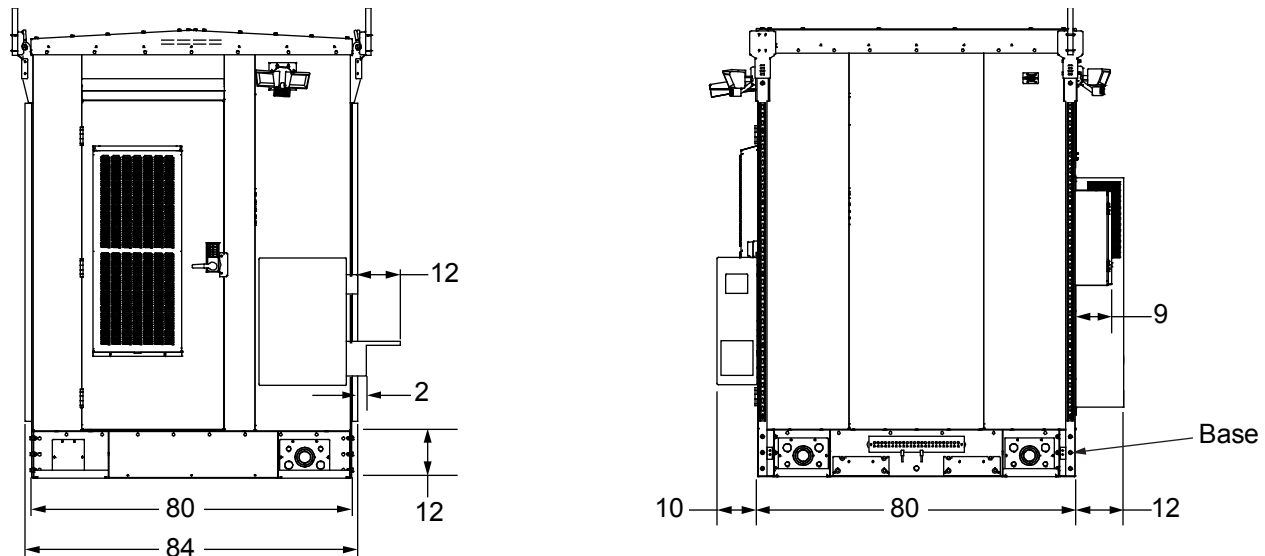
Fold Down Laptop Tray with Document Holder

The XTE 801 Series Walk-In-Cabinet (WIC) is equipped with a fold down laptop tray with document holder.

Mounting Base

Cable mounting base with 360 degree access to floor penetrations for easy conduit and cable entries into the XTE 801 Series Walk-In-Cabinet (WIC). See **Figure 5**.

Figure 5: Base



Climate Control

The XTE 801 Series Walk-In-Cabinet (WIC) is offered with the following climate controls (**Table 2**):

Table 2: Climate Control Configuration

Thermal System Element	Mounting	Power	Controls
HVAC Unit <ul style="list-style-type: none"> – Cooling, 12K BTU/Hr – Integral Electric heat elements 	Rear Wall	240 VAC Circuit	RA-ECU and Thermostat
Filtered Vent Fans (2 Radial Fans) / Power Louver Exhaust Vent Free Air Cooling	Door / Rear Wall	48 VDC Power / ECU	RA-ECU

HVAC Units

AC heaters are included with each air conditioning unit to maintain internal WIC temperatures during cold climate conditions. Air conditioners are AC powered, and are refrigerant-based vapor compression devices. The heaters are electric strip type, integral to the a/c unit.

Thermal Controller

Microprocessor based Remote Access-Environmental Control Unit (RA-ECU) for climate control and alarming functions.

48 VDC Battery Option

The -48 VDC NetSure™ 7100 power bay contains three (3) battery shelves equipped with three (3) strings of -48 VDC batteries connected in parallel.

Rack Units

Accommodates up to two 84" tall, 45 RU relay racks for 19" or 23" wide equipment mounting.

Master Ground Bus (MGB)

- One (1) 4" X 16" X 1/4" Main Ground Busbar is included as standard in the XTE 801 Series Walk-In-Cabinet (WIC).
- The MGB will accommodate twenty-four (24) 2 hole lugs with 3/8" studs on 1" centers. Maximum lug width is 1.200".



NOTE! Two (2) hole lugs are required on all ground bar terminations.

Mounting Options

Steel Helical Piers

Utilizes four (4) self-drilling steel piers that are 6 inches in diameter and 7 feet in length. One pier will be located at each corner and will be drilled into the ground to within 11 inches of grade. The WIC will then be bolted to the mounting plate that is attached to the top of the helical pier using the appropriate bolting material.



NOTE! For grounding purposes, NEC requires a minimum of 10 vertical feet of helical in the ground. A combination of Helical and Concrete Pier is allowed as long as the grounding requirement is met.

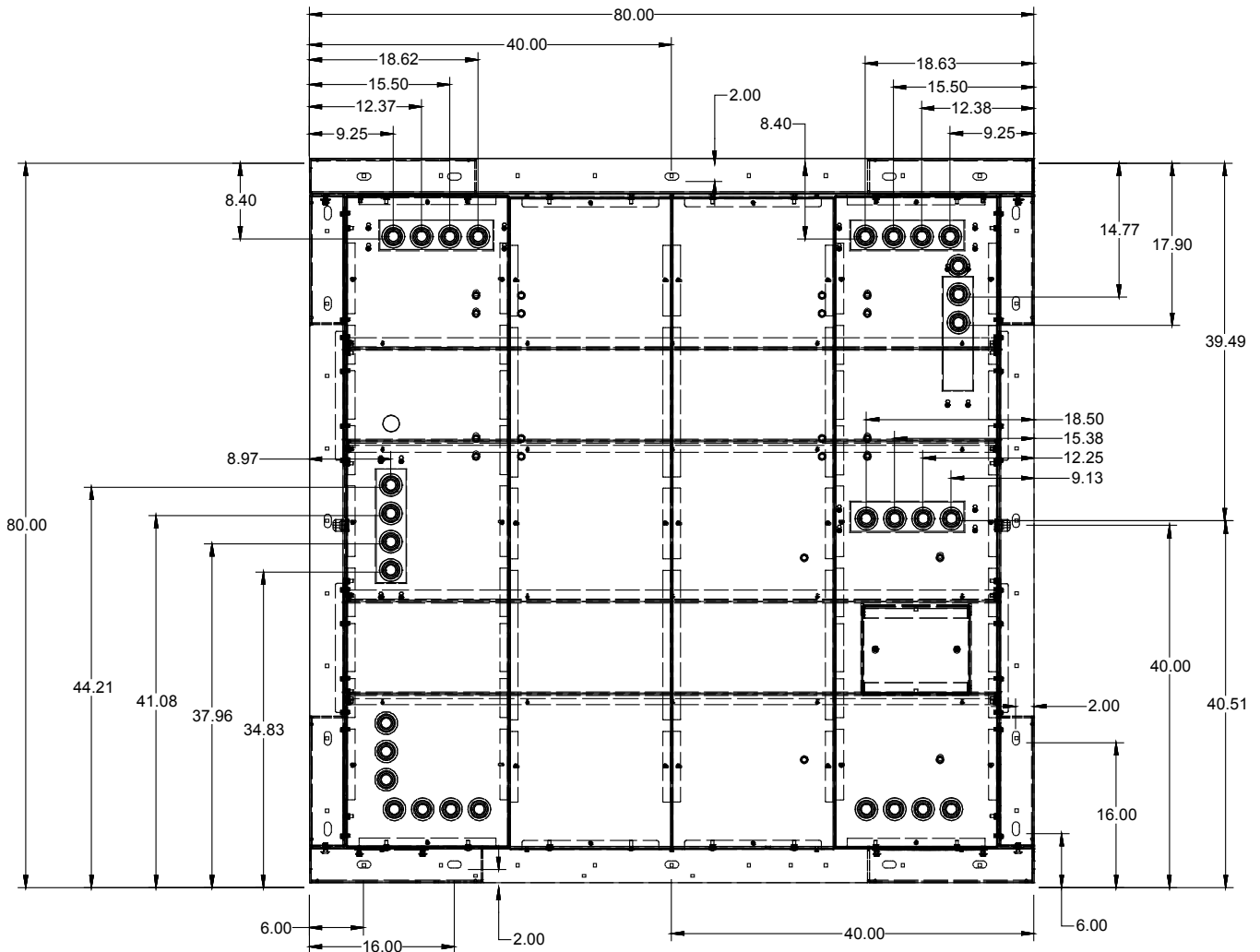
Concrete Piers (with proper approval from your company)

Requires (4) concrete piers and associated footers of the appropriate height to meet the local freeze penetration depth requirements. The concrete piers will be placed, one at each of the (4) corners of the WIC and the WIC will be attached using the slotted holes in the mounting plates. Galvanized concrete anchors are required and must be used in all accessible holes that are pre-drilled into the mounting plates. An optional attachable step is also available.

Working Space Requirements

See **Figure 6** for working space requirements.

Figure 8: Conduit Knockout Locations in WIC Base Pan under Roxtec Ports (Bottom View)



Schematic Diagrams

Refer to the wiring diagrams on the Signal Wire and AC/DC Single Line Wiring drawings and labels located within the WIC, as well as on the WIC door or walls for information regarding your specific WIC's wiring.

See also "Appendix A – One Line Schematic Diagram" on page 66 and "Appendix B – Signal Line Schematic Diagram" on page 68.

SEQUENCE OF PROCEDURES

General

The following procedures are required to be performed in the order listed to fully install the WIC.

Other practices and manufacturer's documents will be required to complete the installation of the system. This includes, but is not limited to:

- Setup and maintenance of rectifiers, controller, and batteries.
- OSP cable fishing, sealing, grounding, splicing, and termination.
- Equipment manufacturer's drawings and documentation

Table 3: Sequence of Procedures

Section in this Document	Starting on Page	Description
Product Description	15	Provides information that will help the project engineer determine an appropriate use and location for the WIC.
Installation Considerations	31	Provides installation overview.
WIC Placement	32	Describes the transportation and storage requirements, the safe handling of the WIC, and the procedures to install the WIC.
Sealing Cable Entries	45	Provides methods for sealing cable entries.
Grounding the WIC	46	Describes the grounding requirements for the WIC.
AC Power	51	Provides wiring information for the electrician.
DC Power	56	Provides information regarding the DC power system and distribution.
OSP Cables	58	Provides procedures for preparing the cable sheaths and routing the cables within the WIC.
Alarm Wiring	59	Describes the wiring for the WIC alarms.
Initial Power Up	60	Describes the power up sequence for the AC power, the DC power, and the batteries.
Direct Air Cooling (DAC) and HVAC	61	Describes the WIC thermal components.

INSTALLATION CONSIDERATIONS



NOTE! If holes are drilled into the exterior of this WIC and not filled using a seal tight connector, the manufacturer's warranty will be void.

Important Safety Instructions



DANGER! Adhere to the “Important Safety Instructions” presented at the front of this document.

Installation Overview

The following is the recommended sequence for the installation and start-up procedures. The sequence may change according to job and site conditions.

- Ensure all site drawings and approvals are in place.
- Read “Important Safety Instructions” starting on page 6 carefully.
- Check that all the equipment and materials have been delivered.
- Proceed with the physical installation of the WIC.
- Install and verify ground cables.
- Install and verify the AC power.
- Install and verify the DC power.
- Route, splice, and verify the OSP cables.
- Install and verify the alarm cables.
- Turn-up, verify, and adjust the system.

WIC PLACEMENT

Overview

This section contains the procedures required for physical installation of the WIC.

Site Selection

Obtain rights-of-way and other permits (building permit, electrical permit, etc.), depending on local codes and authorities, prior to installing the WIC.

The WIC is to be installed using a “Helix Pier Foundation”.

With approval from your company, the WIC may be installed on any approved foundation with focus on keeping an 18" height between grade and the WIC base.

The piers must be installed prior to installing the WIC.

Site Location Considerations

Consider the following when deciding on the location for the WIC.

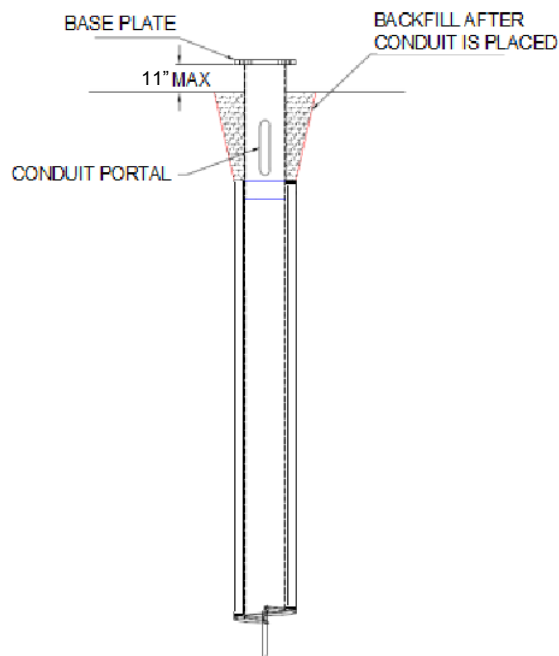
- Place the WIC on servitudes, on dedicated (recorded) easements, or on property owned by the company. Avoid any unrecorded easements.
- Use public road and street rights of way only where there is enough space to place the WIC and provide safe working conditions. The WIC should be easily accessible with adequate parking to ensure safety for people and vehicles. Place the WIC where it will not create a visual or physical obstruction to either vehicles or pedestrians.
- Select locations that will minimize accidental or intentional vandalism. Consider the use of protective posts/bollards when the WIC is located near parking areas where vehicles could back into it.
- Do not place the WIC in ditches or areas subject to flooding.
- **Figure 6** on page 28 shows the minimum working space allowed between the WIC and any obstruction including fences, hedges, etc. Working space consists of adequate area for craft personnel to perform work and maintenance procedures as defined in the National Electric Code (NEC).
- Where ordinances or other standards require that the WIC be placed behind vegetation, preference should be given to evergreens that will not produce leaves, sticky pollen or waste that could fall and clog the heat exchanger intakes.
- If the area is subject to freezing temperatures, be sure to comply with the local building codes and footing requirements to eliminate the possibility of frost heave.
- Minimize snow buildup around the WIC and its externally mounted components.
- Placement should support access for snow removal equipment in the event of a snow/ice storm.

Helical Pier Foundation Installation

Standard Installation Procedure

1. Assemble the universal driving tool on the correct Kelly bar adapter.
2. Connect Kelly bar adapter to Kelly bar on the drive head.
3. Move drive tool assembly to first helical and attach universal driving tool to helical plate.
4. Lift helical upright allowing it to swing free of the ground.
5. Maneuver the foundation directly over the installation point.
6. Lower the Kelly bar until the point of the foundation is forced into the ground and the helix is flush with grade.
7. Screw foundation 12" into the ground and plumb using a level on 2 sides 90 degrees from each other.
8. Continue screwing the foundation into the ground while correcting the Kelly bars orientation so the foundation embeds itself straight in a smooth constant motion. A ground man can be of assistance in keeping the foundation plumb during the installation.
9. Drive the foundation until the helical plate is 11" above grade, stop the driving tool assembly. Disconnect the universal driving tool from the helical plate. Repeat steps 3 - 9 for all helicals.
10. Install leveling hardware on each helical. Each helical has four sets of leveling hardware. Each set of leveling hardware has one threaded rod and four nuts and washers. Two nuts and washers sandwich the helical plate and the other two nuts and washers will sandwich the WIC plate. Leave the top nut and washer off the threaded rods until after the WIC is set. Also, level the hardware on all helicals prior to setting the WIC.

Figure 9: Diagram of Properly Installed Pier



The drilled pier foundation is designed to minimize soil disturbance and time involved for installation compared to other types of foundations. The minimum requirements for properly installed helical pier are 1) to achieve penetration so the pier's top base plate is 11" above grade and 2) achieve a minimum torque value of 3,000 foot-pounds. A maximum torque value of 15,000 foot-pounds should be used. In the event the helical pier foundations cannot be installed per the standard procedure above, one of the following Alternative Procedures should be used.

Alternative Installation Procedure #1 (6" Auger)

1. Using a 6" auger, drill to a depth of 5 to 7 feet while minimizing enlargement of the bore. Drill the pier into the hole using the standard methodology and parameters.
2. Fill and tamp any space around the top of the helical with dirt or small gravel.

Alternative Installation Procedure #2 (New Location)

In the event the base-plate is more than 11" above grade, due to subsurface conditions including bedrock, boulders and other immovable objects;

1. Consider changing the location several feet while maintaining the required minimum antenna separation requirements. Follow the steps of appropriate procedures above.
2. Cut the top plate off the helical, cut the helical at the appropriate height, and weld the top plate back to the helical.
3. Cut the helical at the appropriate height and install a fitted cap plate onto helical. Holes will need to be drilled to secure the cap plate to the helical.

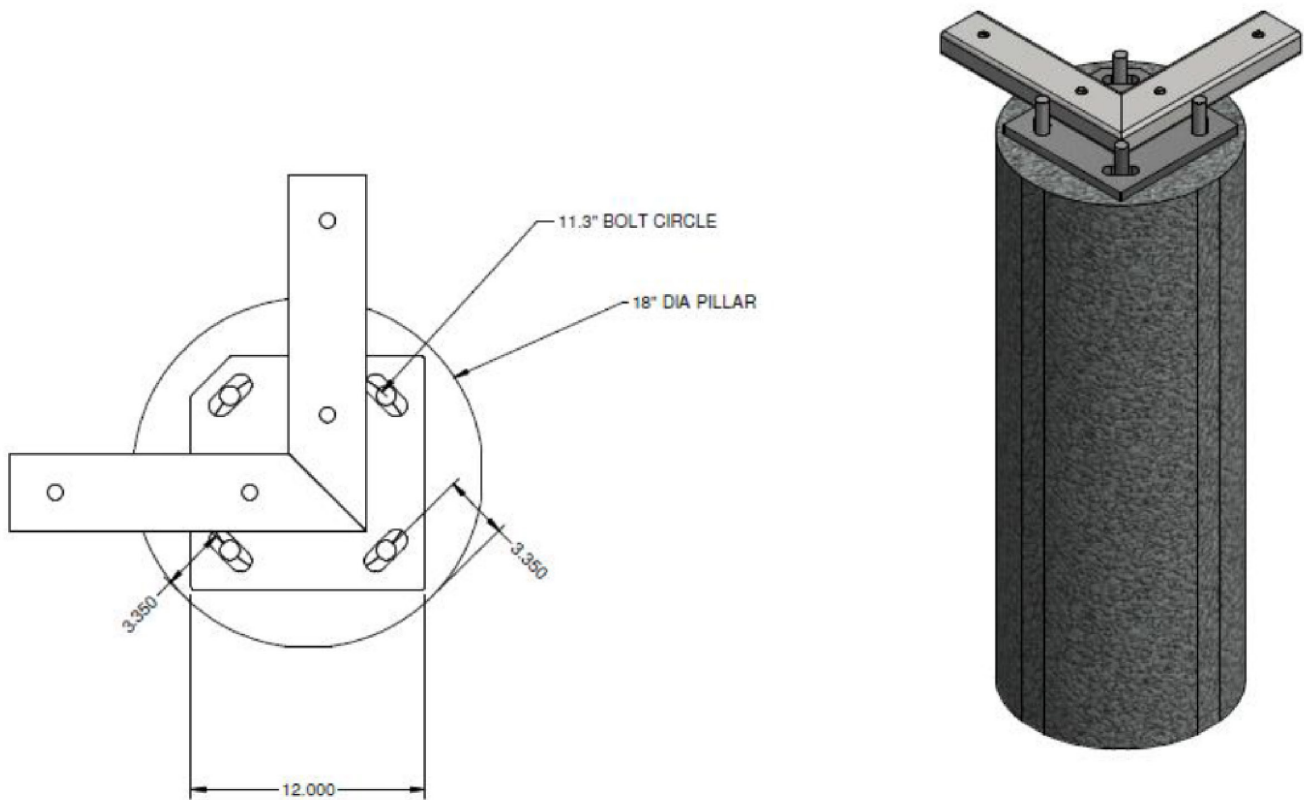
Alternative Installation Procedure #3 (Concrete Pier)

See **Figure 10**.

- Concrete piers must be constructed to allow walk in cabinet to sit above grade 18". WIC plate assembly is 2.75" tall and plate is 1" thick. Leave enough room for leveling and enough height on leveling hardware for nut above plate. If grade is level concrete pier should be 11" above grade, no more than 12".
- Depth of pier must be determined by region and take into consider such items but not limited to depth of frost line, soil type, general climate conditions and site drainage.
- 4000PSI concrete strength should be considered as a minimum type for pier construction, but can vary based on the local architectural standards and approvals.
- Maximum pier size: 30 inches.
- Minimum pier size: 18 inches*.

* Recommended pier size is 18 inches to maximize bottom cable access and ability to mount WIC (2) stair system. Larger size will inhibit ability of bottom cable access.

Figure 10: Alternative Installation Procedure #3 (Concrete Pier)



Step Grade Layout

See **Figure 11**.

Figure 11: Step Grade Layout (cont'd on next page)

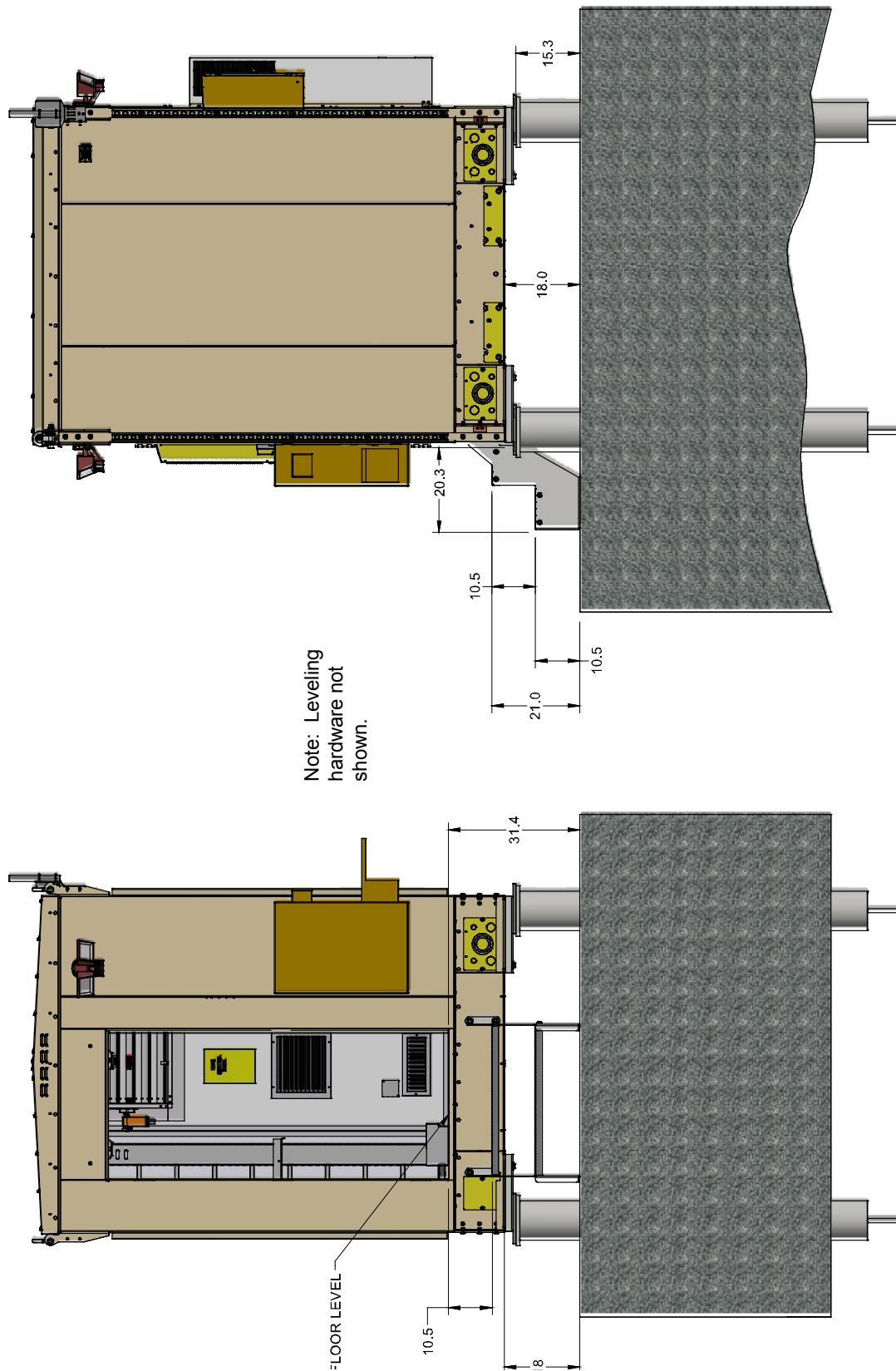
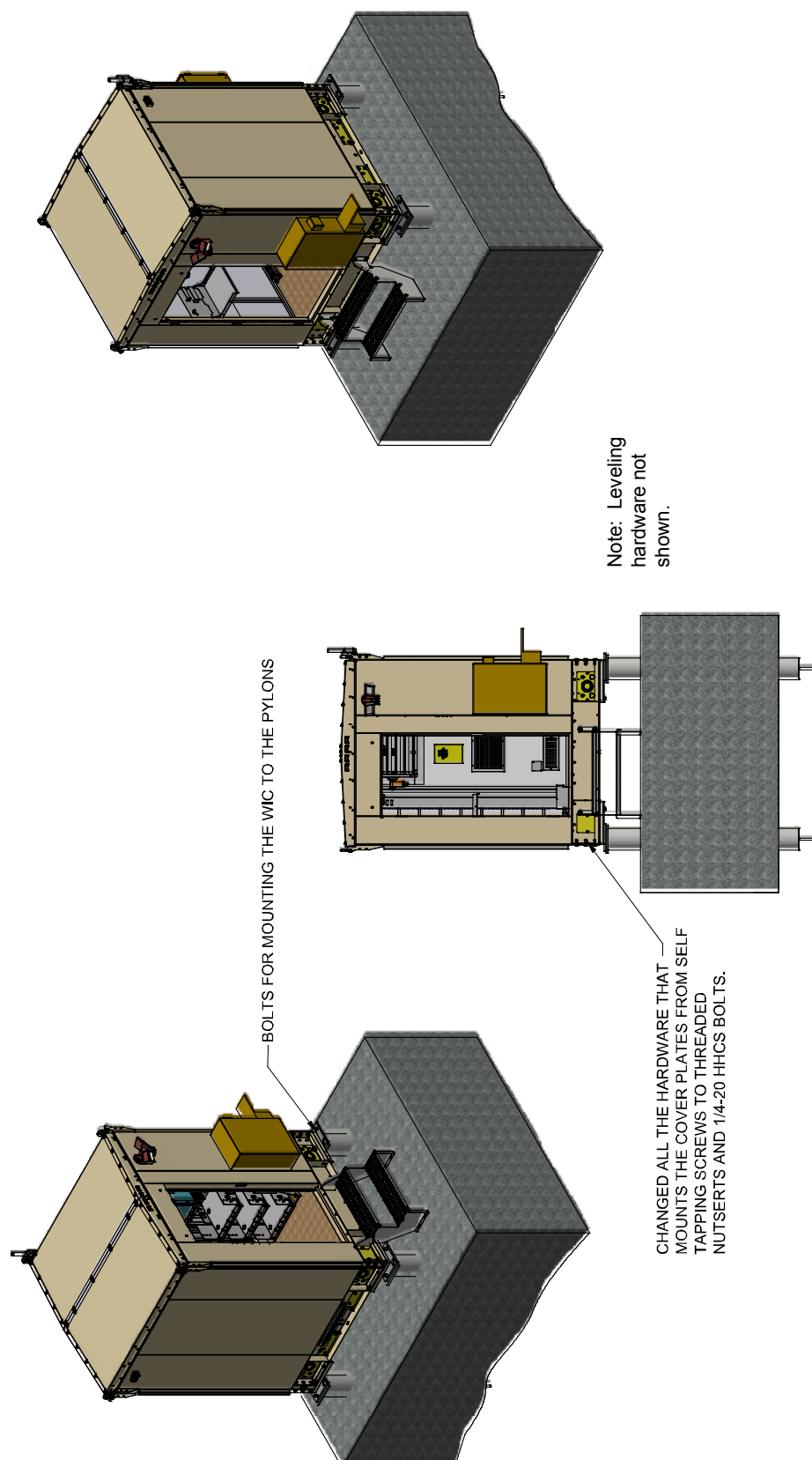


Figure 11: Step Grade Layout (cont'd from previous page)



Transportation and Storage



DANGER! RISK OF ELECTRICAL SHOCK, GENERAL

Do not install equipment showing any physical damage. If packaging is damaged, do not accept receipt from the shipper.



CAUTION! PREVENT EQUIPMENT DAMAGE, PROPER HANDLING

Do not stack nor lay the WIC on its side.



WARNING! RISK OF INJURY, FROM UNSECURED WIC

Do not pull cables or terminate cables until WIC has been properly secured in its mounted position.



CAUTION! PREVENT EQUIPMENT DAMAGE, FROM CONDENSATION

Until the WIC is secured and sealed, weather protection shall be maintained to prevent moisture and condensation from entering ports or openings into the conditioned space within.

Use lifting equipment, such as a crane or forklift, appropriately rated for the weight of the load to move the WIC. Use crane spreader frames to prevent WIC framework warping due to side loading. Only crane lift using four (4) provided lifting eyes at the top corners of the WIC. Never route straps, cables or chains through the fork-lift channels in the base for a vertical crane lift.

When moving a WIC with a forklift, make sure that the fork or extensions are 72" (minimum) and capable of safely lifting the shipped weight of the configured WIC, plus a safety margin.

For short-term storage, the WIC should not be exposed to temperatures that exceed the temperature range of -40°C (-40°F) to $+70^{\circ}\text{C}$ ($+158^{\circ}\text{F}$).

For long-term storage, WIC and packaging should be kept dry and not be exposed to temperatures outside the range of -10°C ($+14^{\circ}\text{F}$) to $+40^{\circ}\text{C}$ ($+104^{\circ}\text{F}$).

Once packaging has been discarded and the WIC has been securely placed in its mounted position, the WIC may be exposed to conditions from -40°C (-40°F) to $+46^{\circ}\text{C}$ ($+115^{\circ}\text{F}$).

Unpacking and Preparing the WIC at the Installation Site



DANGER! Do not install any additional equipment until the WIC is secured in its mounted position.



CAUTION! TO AVOID EQUIPMENT DAMAGE:

DO NOT REMOVE the exterior packaging or wrap from the WIC until the WIC is transported to the installation site. Control moisture and condensation inside the WIC until it is turned up for service.

- These WICs are shipped from the manufacturer with plastic wrap to protect the WIC during shipment.
- If the external packaging appears excessively damaged, do not accept the unit from the shipper as interior damage may not be apparent.
- CAREFULLY remove all packaging material from around the WIC. Dispose of the packaging according to local practices.
- On receipt at the site, inspect the WIC to make sure there is no damage to equipment. Check the packing slip to make sure all components are received. If any components are damaged or not received, contact your supervisor for further instructions.
- Close and latch all doors in preparation for WIC placement.



WARNING! Do not open any doors on a WIC unless it is secured in its mounted position, or securely restrained against unexpected movement or tipping.

Preparing to Lift the WIC



WARNING! PREVENT INJURIES, FROM LIFTING THE WIC

Follow all local safety practices while lifting the WIC. Safety equipment, signage, traffic control and all required Personal Protective Equipment (PPE) shall be used.

Keep unnecessary personnel clear of work areas at all times.

Do not lift the WIC over people. Do not let anyone work, stand, or pass under a lifted WIC.

Only properly trained and certified operators shall operate any crane or lifting equipment.

Do not operate the crane until all stabilizers are extended. The stabilizers must be in firm contact with the ground or other adequate support structure. Do not retract or extend the stabilizers when the WIC is suspended from the crane.

Any crane or forklift must be rated for the shipped weight of the equipped WIC, with a safety margin. Forklifts shall have a minimum fork length of 72 inches (183 cm).

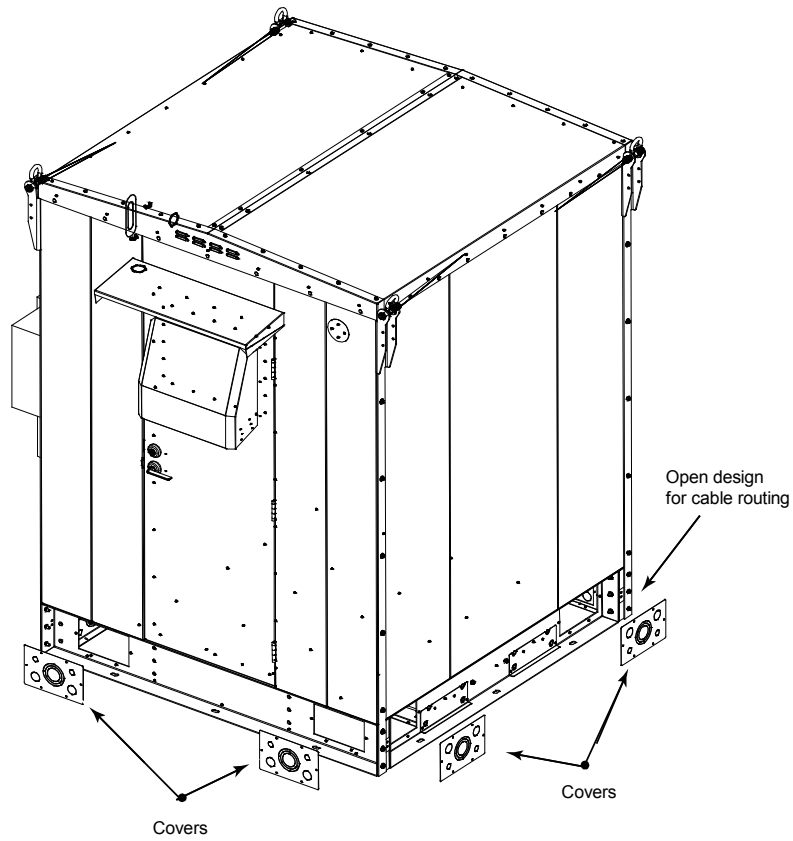
Required Equipment:

- One (1) hoist (crane) capable of lifting the shipped weight of the equipped WIC.
- Four (4) wire-rope slings, 8-ft. (2.4 m) long (minimum). Slings should each have the capacity to support the entire shipped weight of the equipped WIC to prevent potential cascading failures.
- Spreader frames are required for shorter slings to prevent WIC framework damage due to side-loading forces at the top corner lifting eyes. Lifting forces shall be vertical only and applied only at the lifting eyes.
- Four (4) connecting links (clevises), to attach the wire-rope slings to the WIC lifting eyebolts.
- One (1) 75-ft. (22.86 m) rope, 5/8 inches in diameter, to use as a tag line. A tag line controls the movement of the load during the lift.

Procedure

1. If not previously done, unpack the WIC according to the instruction in “Unpacking and Preparing the WIC at the Installation Site” on page 39.
2. If WIC base cable entry covers are installed, remove the bolts from the WIC base cable entry covers and set aside for re-use. See **Figure 12**.

Figure 12: Removing Covers



Lifting the WIC



DANGER! The maximum WIC weight when lifted shall not exceed equipment ratings!

Procedure

1. Inspect the lifting eyebolts and ensure eyebolts and roof are secure and free of damage.
2. Install a clevis and shackle or a threaded shackle in each eyebolt at the top of the WIC as shown in **Figure 13**.
3. Insert all four (4) 4 feet minimum lifting slings securely through all four clevises or shackles as shown in **Figure 13**.



NOTE! If slings are not long enough (8-ft. [2.4 m] or longer), use a spreader bar to be sure the cables pull on the lifting eyebolts in a vertical direction.



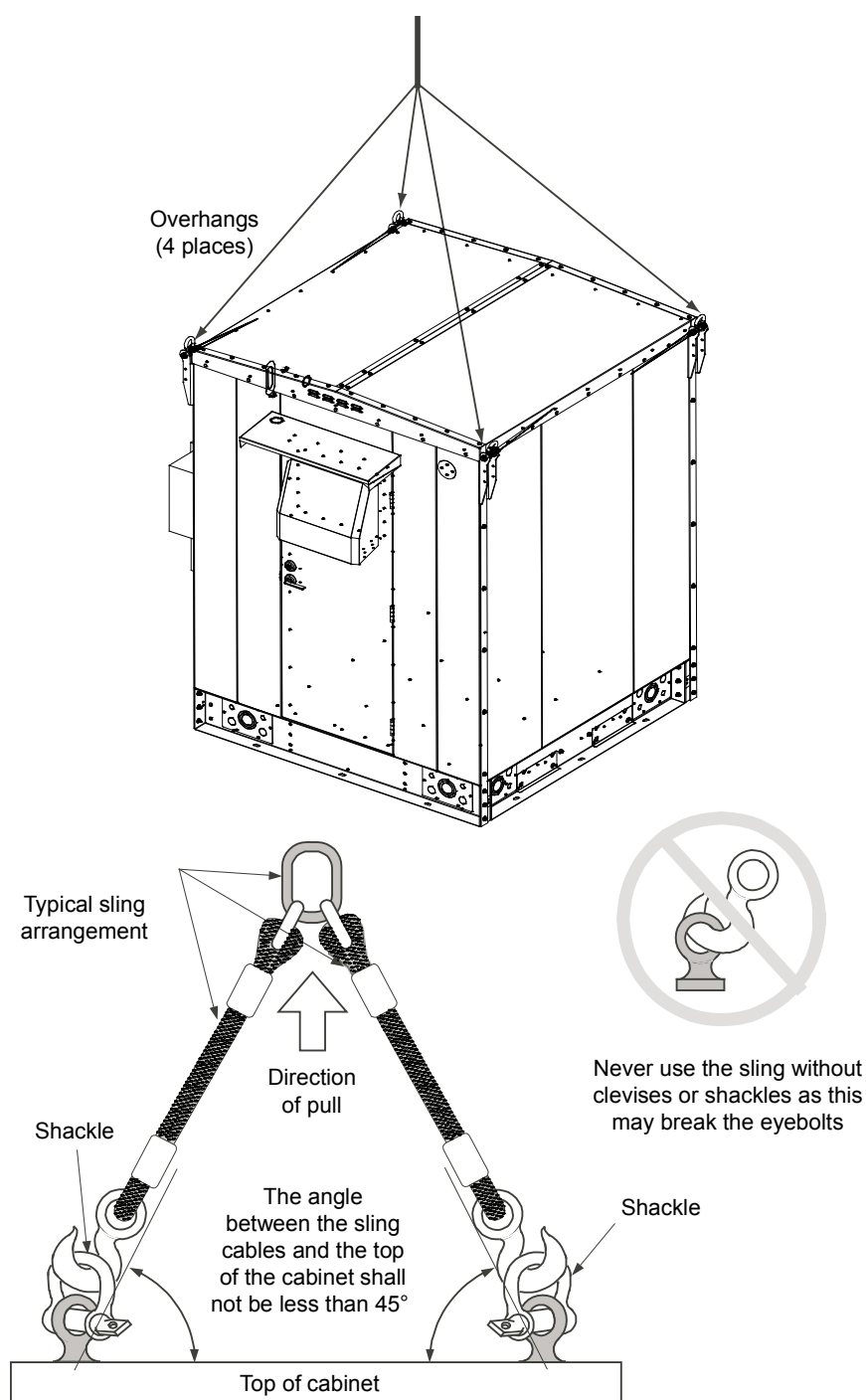
NOTE! It is important that the length of each sling allow for an angle 45 degree or more.



NOTE! Failure to maintain a 45 degree angle or greater and using all four eyebolts will void any warranty or service claim.

4. Tie a 75-ft. rope to a lifting eyebolt so it can be used as a tag line.
5. Never work under the WIC while it is suspended above the ground.
6. Close and latch all doors before lifting and placing the WIC.
7. Lift the WIC off the truck and place it into its mounted position using the tagline to guide it into position, as described in the next procedure.

Figure 13: Lifting the WIC



Placing the WIC

On Helix Pier Foundation or Concrete Piers

The following is a typical guide. Consult your company policies for your specific installation requirements.

Perform the following steps in placing and securing the WIC.

Procedure



ALERT! During lifting, the WIC must be lowered so that the WIC is level and parallel to the piers. Place the WIC so that it lines up with the bolt locations and clears any conduits.

1. Using the tagline to guide it into position, set WIC on leveling hardware.
2. Check to be sure the WIC is properly placed.
3. Loosen the slings so that the full weight of the WIC rests on the foundation.
4. Add top washers and nuts to leveling hardware and tighten.
5. Remove the slings, the spreader bars and the tagline.



ALERT! If the WIC will not be powered up for an extended period, place a heat source, such as two 120 VAC 150 W incandescent lamps inside the WIC to prevent condensation. Suspend lamps from cable racks to prevent contact with any structures or equipment inside the WIC.

SEALING CABLE ENTRIES

In keeping with best industry practices, seal all cable grommets penetrations against weather, rodent and insect intrusions.

It is extremely important to maintain a well-sealed WIC. Failure to do so can jeopardize the enclosed electronic equipment, as well as the proper functioning of the WIC systems. All cable transitions into the WIC must be properly sealed as required.

Refer to the following procedure to seal cable entries with duct sealing foam:

1. Route the cables into the WIC through bottom-entry conduits (preferred) or through side-entry conduits in the WIC base structure (if absolutely necessary). The bottom-entry and removable side-entry plates have pre-configured knockout stampings to facilitate conduit connections.
2. Route the OSP cables into the WIC conditioned space by removing a Roxtec port frame from the finished floor inside the WIC. Use a fiberglass fish tape from a side-entry port to extend to below the Roxtec port. Reach down through the finished floor to the fish tape, and use it to route pull cord or cables as required. Conduit knockouts are directly below each Roxtec port in the WIC base pan.
3. Route OSP cables to equipment through the Roxtec port frame, securing to cable rack and equipment frames as required.
4. Seal all conduit openings with Roxtec blocks, duct sealing foam or the equivalent against weather, animal and insect intrusion into the WIC.
5. Replace port covers, Roxtec port frames and any other material removed during installation.
6. Verify that cables are routed as required and that all cable entries are properly sealed.

GROUNDING THE WIC

General



ALERT! Grounding should be accomplished according to local practices and in accordance with the latest NEC codes.

All WIC grounding must be installed prior to turn up of WIC.

- The internal WIC frame and all attached equipment are factory grounded to the WIC Master Ground Bar.
- Two (2) 2 AWG green conductors are factory connected from the WIC Master Ground Bar to two (2) external ground bus bars on the lower right and left exterior of the WIC.
- The WIC structure is separately grounded to the external ground bus bars.

Refer also to the next section “Site Ground Practices” for supporting information.

Procedure

1. Connect one provided stranded cable from each external ground bus bars to site ground per local practices.
2. The external bus bars are configured to terminate 2-hole lugs, 3/8” hardware, on 1” center spacing.
3. Allow for a 0.125” minimum space between adjacent lugs.



NOTE! If generator is being installed on a platform. The generator platform must have a 2 gauge ground wire run from it to a WIC external ground bus bar.

Site Ground Practices



DANGER! RISK OF ELECTRICAL SHOCK, GENERAL

All WIC grounding must be installed and verified prior to connecting any power cables (AC or DC) and turning-up of the WIC.

Ensure that all NEC (National Electric Code), CSA (Canadian Electric Code) and local codes for safety and wiring are followed. Consideration for corporate standards also apply.

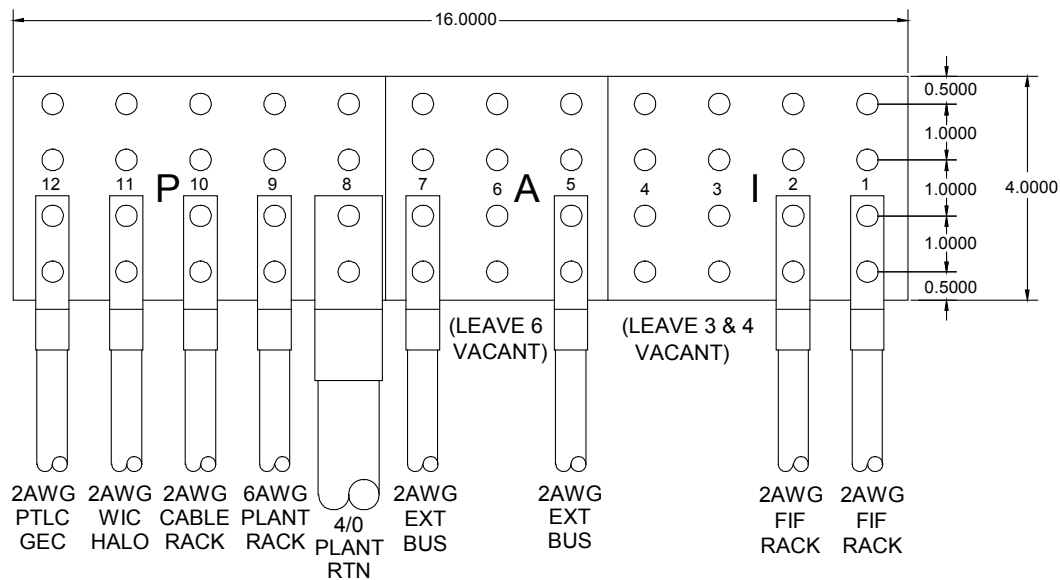
All external ground wires shall only be terminated to the externally mounted Ground Bars located at the base of the left and right sides of the WIC.

All internal ground wires shall be terminated to the Main Ground Bus as reflected in **Figure 14** prior to any externally derived electrical power being connected to the WIC.

Refer to **Figure 15**, **Figure 16**, and **Figure 17** for WIC site grounding schemes.

Figure 14: Main Ground Bus Terminations (Typical)

MAIN GROUND BAR LAYOUT AND DESIGNATION PLAN



CABLES MAY BE DRESSED
FROM TOP IF REQUIRED
BY PHYSICAL CABLE LAYOUT

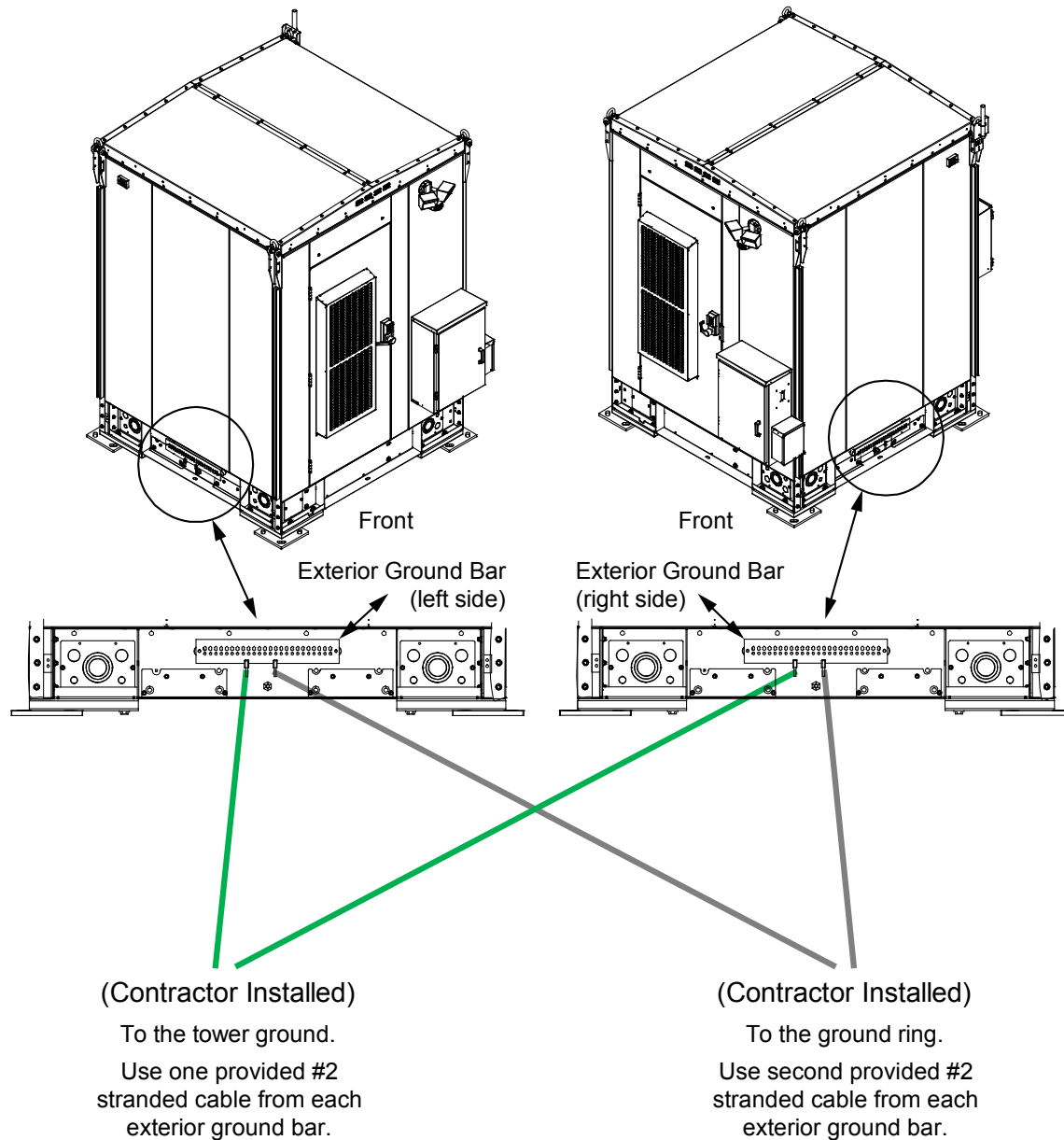
KEEP CABLES IN SAME
SECTION OF BUS BAR
AS SHOWN ABOVE

TERMINATION LOCATIONS SPACED HORIZONTALLY FOR 4/0 CABLE LUGS OF
1.200" MAXIMUM WIDTH.

ALLOW FOR 0.125" MINIMUM SPACE BETWEEN ADJACENT LUGS.
BUS BAR MOUNTING DETAILS OMITTED FOR CLARITY.

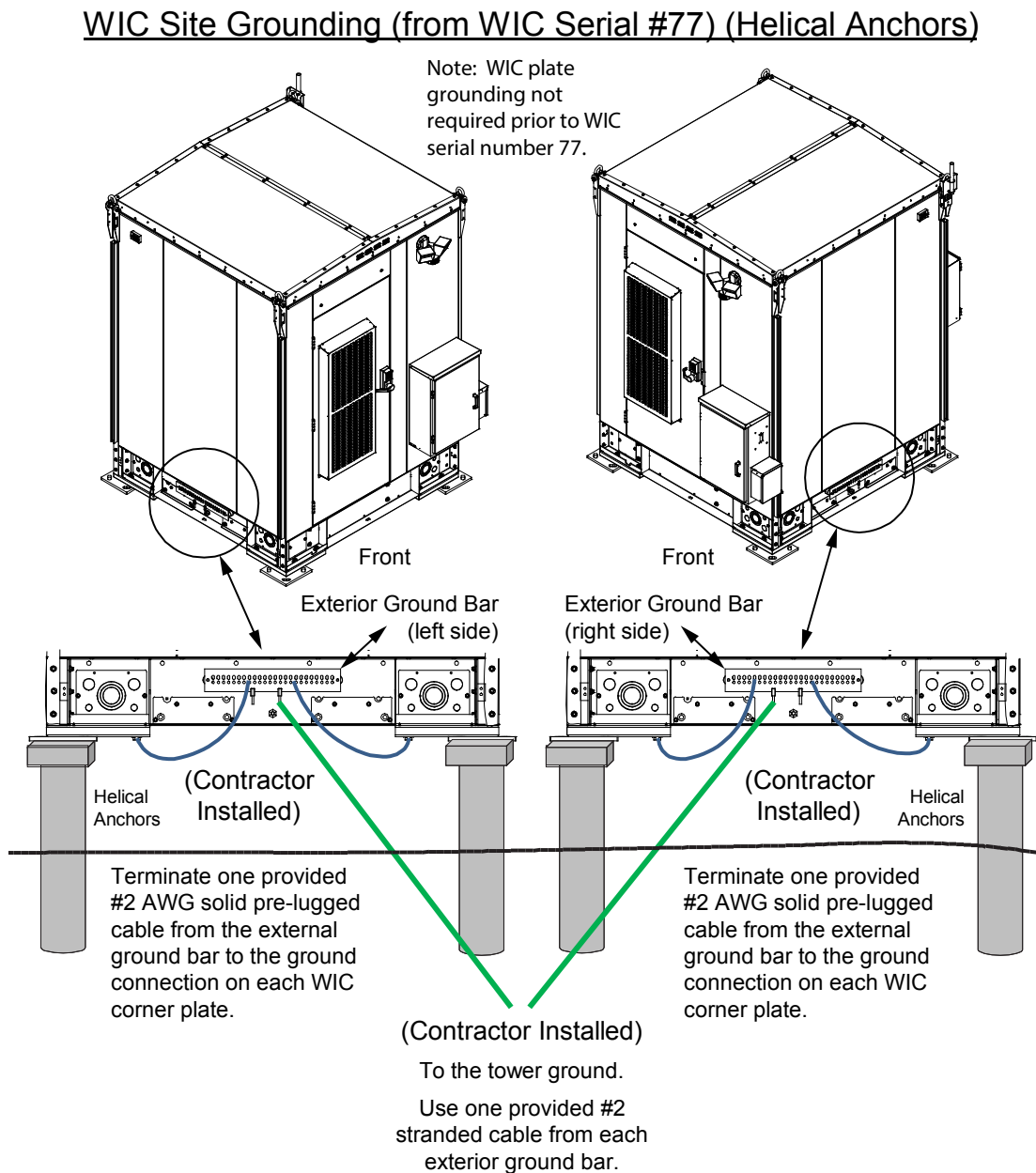
Figure 15: Site Grounding Scheme (prior WIC Serial #77) (Concrete Pad/Concrete Pier)

WIC Site Grounding (prior WIC Serial #77) (Concrete Pad/Concrete Pier)



Grounding Conductor Size	Minimum Bending Radius (inches)		
	(Insulated RHH/RHW)		Solid (Uninsulated)
	Recommended	Required	
6 AWG	12	2	1-1/2
4 AWG	12	3	na
2 AWG	12	3	2
1/0 AWG	12	4	na
4/0 AWG	12	4	na
750 kcmil	12	7	na

Figure 16: Site Grounding Scheme (from WIC Serial #77) (Helical Anchors)

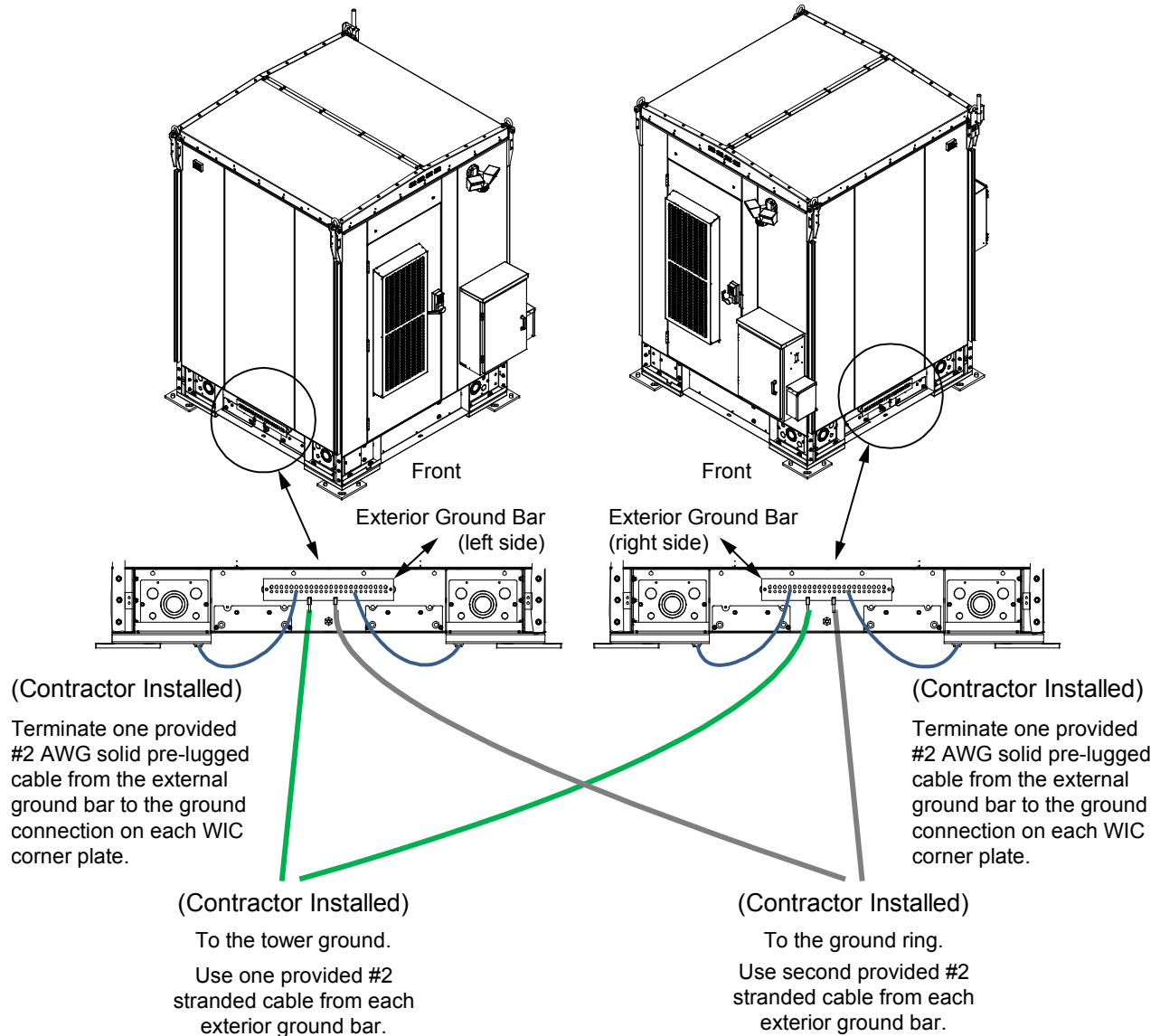


Grounding Conductor Size	Minimum Bending Radius (inches)		
	(Insulated RHH/RHW)		Solid (Uninsulated)
	Recommended	Required	
6 AWG	12	2	1-1/2
4 AWG	12	3	na
2 AWG	12	3	2
1/0 AWG	12	4	na
4/0 AWG	12	4	na
750 kcmil	12	7	na

Figure 17: Site Grounding Scheme (from WIC Serial #77) (Concrete Mount Foundation Kit or Concrete Piers)

WIC Grounding (from WIC Serial #77) (Concrete Mount Foundation Kit)

WIC Grounding (from WIC Serial #77) (Concrete Piers)



Grounding Conductor Size	Minimum Bending Radius (inches)		
	(Insulated RHH/RHW)		Solid (Uninsulated)
	Recommended	Required	
6 AWG	12	2	1-1/2
4 AWG	12	3	na
2 AWG	12	3	2
1/0 AWG	12	4	na
4/0 AWG	12	4	na
750 kcmil	12	7	na

AC POWER

Safety Precautions



DANGER! RISK OF ELECTRICAL SHOCK, GENERAL

All ground connections must be installed and verified, prior to connecting any power cables (AC or DC) and turning-up of WIC.

Before installation, the AC grounding electrode system must be bonded to an AC main service power neutral/ground bus. Contact your local power company or local practices for information about codes or restrictions for your installation.

When connecting any discrete power connection, make the connection first with the ground/return and break last with ground/return.

Remove rings, metallic wrist bands, or bracelets, etc.



DANGER! RISK OF ELECTRICAL SHOCK, AC

Proper actions, include, but not limited to:

- a) Verify before contacting the WIC that no current leakage or ground fault condition is present.
- b) Verify a proper ground is in place.
- c) Verify for AC hook-up, all WIC circuit breakers are OFF and the utility incoming feed is OFF.

Use a trained licensed electrician.



DANGER! ELECTRICAL HAZARD

Observe all safety precautions as specified by local building codes and the National Electrical Code (NEC). All procedures should be performed by a licensed electrician. If local building codes specify procedures different from those in this section, follow local codes.

WIC AC Schematic

The complete system schematics are included with each WIC.



CAUTION! REFERENCE DIAGRAM ONLY: Refer to the diagram on the SD drawings and labels located within the WIC for information regarding your specific WIC's wiring.

AC Input Connections

Important Safety Instructions



DANGER! Adhere to the “Important Safety Instructions” presented at the front of this document.

The WIC requires separate AC feeds for the rectifiers, AC outlets, HVAC Unit and external lighting. These AC feeds are connected to the externally-mounted PTLC and fed via individual circuit breakers.

Make connections per the current edition of the American National Standards Institute (ANSI) approved National Fire Protection Association's (NFPA) National Electrical Code (NEC), and applicable local codes.

The following procedure shall be performed by a trained electrician.

Procedure

1. Use a non-contact voltage detector to verify the WIC is safe.
2. Verify that the WIC is properly grounded.
3. Verify that all breakers in the external PTLC are in the OFF position (**Figure 18**).
4. Refer to the schematic drawings shipped with your WIC for a detailed AC wiring diagram. See also **Figure 19**.
5. Open the PTLC dead front panel for access to AC utility input terminals (**Figure 20**).



CAUTION! The PTLC and the WIC are configured for a 200 A, 240 VAC single phase supply ONLY. Connection of other voltages or phase sources will cause damage to the WIC and its components.

6. Determine the AC cabling route into the PTLC for your installation site. The site installation electrician must use a suitably-sized conduit hole punch to make a sealable conduit entry into the bottom left of the NEMA 3R weatherproof PTLC cabinet to access the site utility feed terminals. Only weather-rated compression conduit fittings are permitted for use.
7. Route the site AC utility, 200 A, 240 VAC, 1-Ph, 3-wire plus ground conductors from the utility metering cabinet to the WIC external PTLC via a sealed conduit connection.



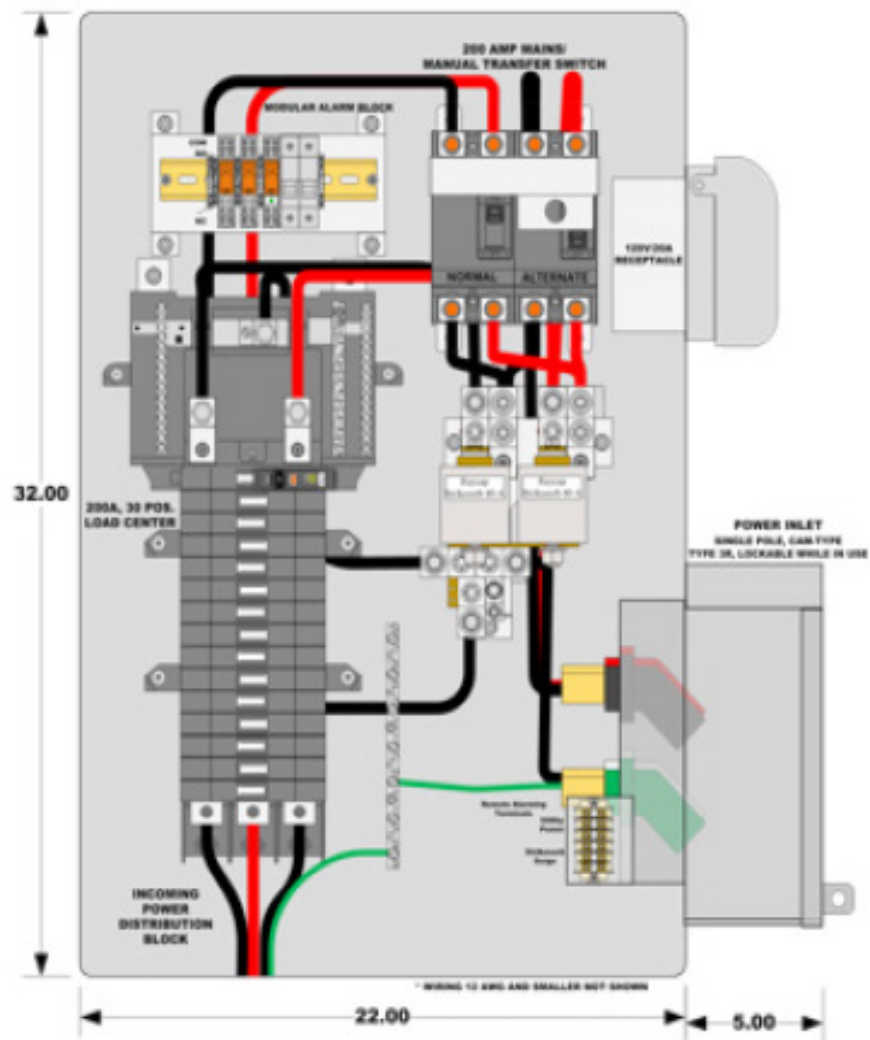
NOTE! All green/yellow terminals are bonded to the Neutral/Ground bus in the PTLC. The site electrician shall provide ground wires per NFPA 70 (NEC) and applicable codes and standards.

8. Connect the above feeds as required. Strip the leads before inserting into terminal block. Apply a coating of anti-oxidation paste (i.e.: “No-Ox”) to the conductors before inserting them into the terminal block. Torque the fasteners as required. Test the lead connections by gently pulling on them.
9. After cables are installed, refer to the “Sealing Cable Entries” on page 45 and seal all cable entries and conduits.

Figure 18: Power Transfer Load Center (Reference Only. See Caution Above.)



Figure 20: AC Input and PTLC internal layout (Reference Only)



DC POWER

Safety Precautions



DANGER! RISK OF ELECTRICAL SHOCK, GENERAL

All ground connections must be installed and verified prior to connecting any power cables (AC or DC) and turning-up of WIC.

When connecting any discrete power connection, make the connection first with the ground/return and break last with ground/return.

Remove rings, metallic wrist bands, or bracelets, etc.

Do not install equipment showing any physical damage.



DANGER! RISK OF ELECTRICAL SHOCK, DC

A maintenance Battery Switch / Breaker does NOT isolate both legs of a battery circuit, nor do the batteries have a protective fuse. Proceed with caution and use only insulated tools when working around batteries or any DC potential.

Always be sure that any connection points have been de-energized.

Fuses can produce sparks during interruption or clearing of a fault, so only use fuses provided with safety caps or enclosed holders, where applicable.

General

Refer to “Site Ground Practices” on page 46 and “Grounding the WIC” on page 46 for information on site and WIC ground, respectively.

DC Power Cabling Color Scheme

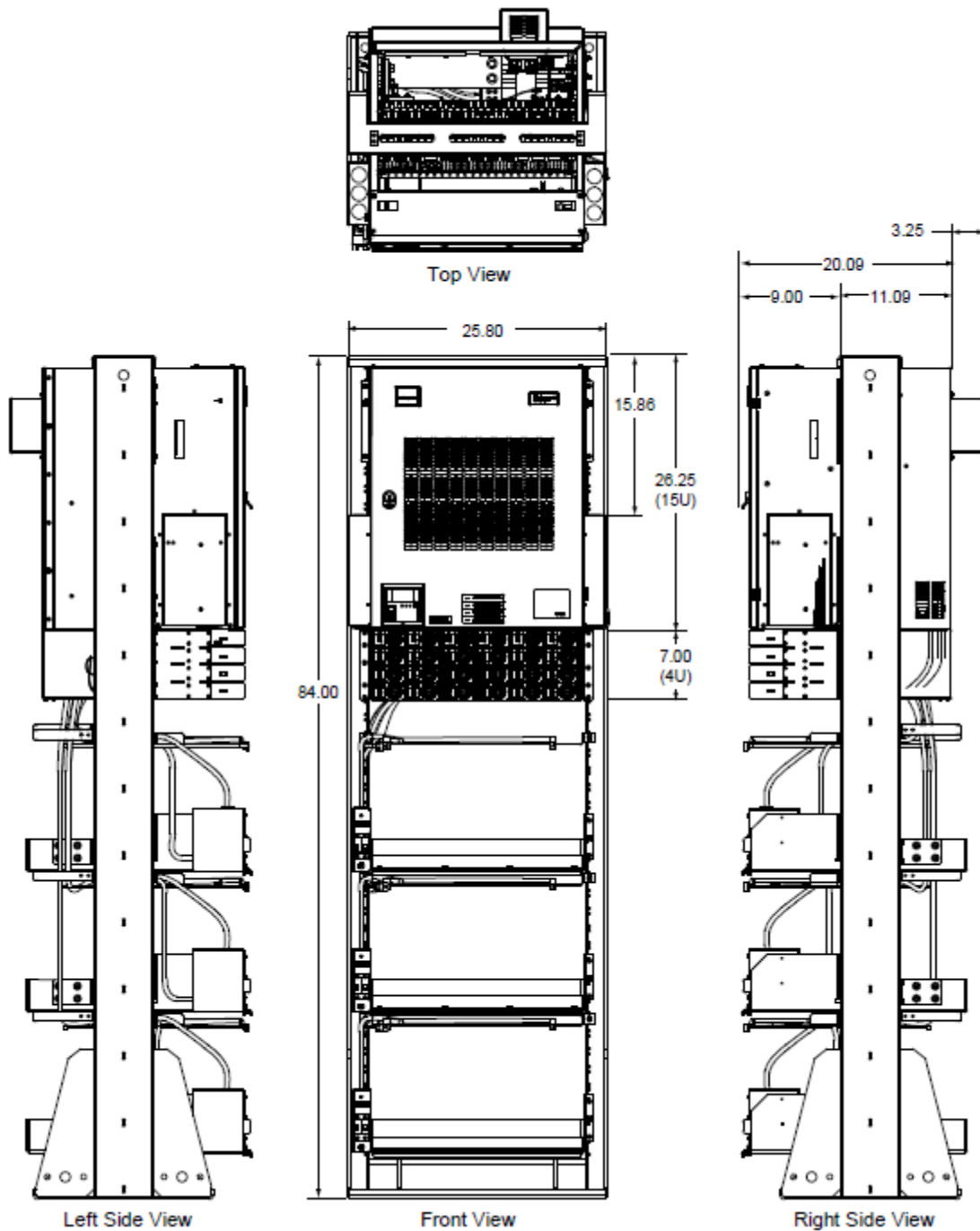
On the WIC, the DC power cabling color scheme is:

- GRAY, braided-cloth covered insulated RHH/RHW conductors for both -48V and RTN, of suitable gauge to meet or exceed the circuit protection device (fuse or breaker) rating.

Operating the Power System

Refer to the DC power system instruction manual(s) for information regarding the powering and operation of the system. See also **Figure 21**.

Figure 21: NetSure™ 7100 Specification 582127000 List 203 Configuration for the WIC.



NOTE! Refer to Appendix A for a detailed one line schematic diagram.

OSP CABLES

General



DANGER! RISK OF ELECTRICAL SHOCK, OSP CABLES

If buried cables are used, check the cable sheath for voltage in accordance with local standards. If voltage is detected, do not proceed with the installation. Contact the supervisor and do not proceed until the voltage hazard is eliminated.



NOTE! *The following procedures are recommendations only, and are performed in conjunction with the procedures and training that adhere to local practices.*

Sealing Cable Entries


After cables are installed, refer to “Sealing Cable Entries” on page 45 and seal all cable entries.

Installing Fiber Cables

Install fiber cables using a 1.5" x 1.5" fiber routing duct provided along the length of cable rack for fiber management.

ALARM WIRING

Connecting WIC Alarms

 **NOTE!** The customer-connection alarm blocks are punch-down, insulation displacement, split center, often referred to as telecommunications “66” blocks. Do not exceed the manufacturer recommended wire size. Normally, 20 AWG to 24 AWG solid twisted-pair copper conductor cables are used for alarm signals. Wire should NOT be stripped before inserting into block. Use the appropriate tools to insert wires into the connection points on the alarm blocks.

Alarm blocks are provided for the following purposes.

WIC Alarms

All alarms for customer connections are brought out to an alarm block. For alarm pinout locations on the block, refer to the Schematic Drawings (SD) either supplied in the WIC and/or as labels on the alarm block housing. The two (2) alarm blocks are punch-down, insulation displacement type, located on the plywood panel on the left as door entry is made, below the main ground bus bar. The alarms from the NetSure™ 7100 DC plant, as well as the AC utility and TVSS failure alarms from the PTLC, the auxiliary contacts on the DC generator 350 A demarcation circuit breaker, and the Direct Air Cooling (DAC) controller are all connected to the alarm blocks by the WIC manufacturer.

Site Equipment Alarms

Alarms from customer-provided equipment installed in the WIC relay racks or on the exterior of the WIC shall be cabled and connected to the alarm blocks by the customer as required for the specific site installation.

Alarm Collection and Aggregation

Equipment and connection for alarm collection and aggregation or multiplexing for remote reporting to a customer Network Operations Center (NOC) shall be specified and installed by the customer as required for the specific site capabilities and installation.

 **NOTE!** Refer to Appendix B for a detailed signal line schematic diagram.

INITIAL POWER UP

Safety Precautions



DANGER! RISK OF ELECTRICAL SHOCK, GENERAL

All ground connections must be installed and verified prior to turning-up of WIC.



DANGER! RISK OF ELECTRICAL SHOCK, AC

Proper actions, include, but not limited to:

- a) Verify before contacting the WIC that no current leakage or ground fault condition is present.
- b) Verify a proper ground is in place.



CAUTION! PREVENT EQUIPMENT DAMAGE, FROM CONDENSATION

Until the WIC is turned up for service, maintain WIC sealing to prevent weather and moisture entry. Provide humidity control (i.e.: two 150 W incandescent bulbs) as required.

Once the WIC is operational, the WIC system will maintain interior conditions.

Prerequisite

Verify that all procedures and safety notices previous to this section have been applied regarding the WIC, system grounding, AC power, DC power, and battery installation.

Verify that all procedures and safety notices accompanying customer-installed equipment have been applied.

Verify that the WIC has an approved connection to the local utility power supply.



CAUTION! Prevent Equipment Damage: connect only 200 A, 240 VAC, 1-PH, 3 wire supply.

Initial Power Up Sequence

Checks

1. Use Non-Contact Voltage Detector to verify WIC is not unsafe.
2. Verify all battery disconnect circuit breakers located in the WIC are Off.
3. Verify all other breakers inside the WIC are Off.
4. Verify no open power leads are present.
5. Verify all cables and connections are secure.
6. Verify any installed batteries, including proper matching of polarity.
7. Enable utility power into the WIC by closing the external overcurrent protective devices supplying AC input to the WIC.
8. Use Non-Contact Voltage Detector to verify WIC safety.



CAUTION! Always allow components like rectifiers and the RA-ECU a few minutes to complete their start-up sequences.

Refer to the power system instruction manual(s) supplied with the WIC or by the manufacturer for field-installed systems.

DIRECT AIR COOLING (DAC) AND HVAC

DAC Introduction

The Direct Air Cooling (DAC) provides thermal control of fans, HVAC, and heater (if supplied) based on inside (WIC) and outside (ambient) temperature measurements. The DAC detects HVAC alarm, and smoke alarm events. It provides relay outputs to the WIC alarm collection (“66” blocks). The DAC also detects a clogged intake filter by monitoring temperature differences between ambient exterior and WIC interior, and signals an HVAC fault.

The DAC provides two user interfaces: The local Fan Tray display and web pages which can be accessed remotely. Remote web monitoring requires network cabling by the customer at site installation.

The DAC also supports remote access via Local Area Network (LAN) TCP/IP connection.

The DAC provides a locally triggered comfort mode, which will enable the HVAC to maintain a comfortable temperature within the WIC during site visits or maintenance work.

There are preconfigured set-point thresholds for temperature control.

The Configuration Drawing which accompanies the DAC unit shows the default parameters for control points and settings.

Table 4: Thermistors

Input Terminal	Designation	Description
B1	T_{Cab}	Temperature inside the WIC
B2	T_{Amb}	Ambient temperature outside the WIC
B3	T_{Fan}	Temperature inside the WIC near the fan filter, used for detecting clogged filter.



NOTE! T_{Cab} (WIC Temperature) = Inside Temperature
 T_{Amb} (Ambient Temperature) = Outside Temperature
 T_{Fan} (Fan Temperature) = Filter Temperature
 HVAC = Air conditioner Unit with internal heater.

DAC Fan and HVAC Control Scheme

The Direct Air Cooling (DAC) fans, HVAC cooling and HVAC heater elements are controlled by the temperature sensors and system programming set point thresholds.

There are two DAC fans in the door-mounted unit. Fan running hours are equalized by the controller, with no more than 24 hours total running time difference between them.

The programmed operating conditioned space temperature range is from 55 °F to 104 °F.


The Direct Air Cooling (DAC), using ambient filtered air intake, and a powered-louver exhaust vent, will operate between 77 °F and 104 °F, varying the dual fan operation and RPM to maintain the temperature range.


The refrigerant-based HVAC is inhibited below 89 °F. At 104 °F, the HVAC is on and the DAC is disabled, with the powered-louver exhaust vent closed, to maintain the conditioned space temperature.

Heating elements provided as part of the HVAC are disabled over 55 °F, and are activated if temperatures drop below 45 °F, to return the WIC temperature to the operating range.

Table 5: WIC DAC and HVAC Control

XTE 801 Series Walk-In-Cabinet (WIC) Environmental Control			
Parameter	Threshold	Mechanical	DAC
DAC		DIRECT AIR COOLING	
Ext. Temp	<90 °F (32 °C)	HVAC off	Enable DAC
Int. Temp	>77 °F (25 °C)	HVAC off	Single Fan
Int. Temp	>79 °F (26 °C)	HVAC off	Dual Fan
Int. Temp	>104 °F (40 °C)	HVAC ON	DAC off
NOTE:	DAC fan RPM for 0 to 2000 CFM (Max)	DAC fan RPM increases with interior temperature rise	
HVAC	COOLING	ONE HVAC UNIT PRESENT	
Int. Temp	>104 °F (40 °C)	HVAC ON	
Int. Temp	<=89 °F (32 °C)	HVAC inhibited	
HVAC	HEATING		
Int. Temp	<45 °F (7 °C)	HVAC heat elements ON	
Int. Temp	>55 °F (13 °C)	HVAC heat elements off	
ALARM			
HITEMP MN	>106 °F (41 °C)	Local Alarm	
HITEMP MJ	>109 °F (43 °C)	RBS High Temp (DAC pin 5 – OT)	
LOTEMP MN	<40 °F (4 °C)	Local Alarm	
LOTEMP MJ	<35 °F (2 °C)	RBS Low Temp (DAC pin 5 – OT)	

 **NOTE!** The environmental controller will continuously display indoor WIC temperature.

 **NOTE!** When the Comfort Mode button is depressed, DAC fans will shut OFF, power louvers will CLOSE and comfort mode turns ON, to target WIC temperature of 72 °F (22 °C). Comfort mode cancels after 30 Minutes. DAC and HVAC turn OFF when smoke alarm is activated.

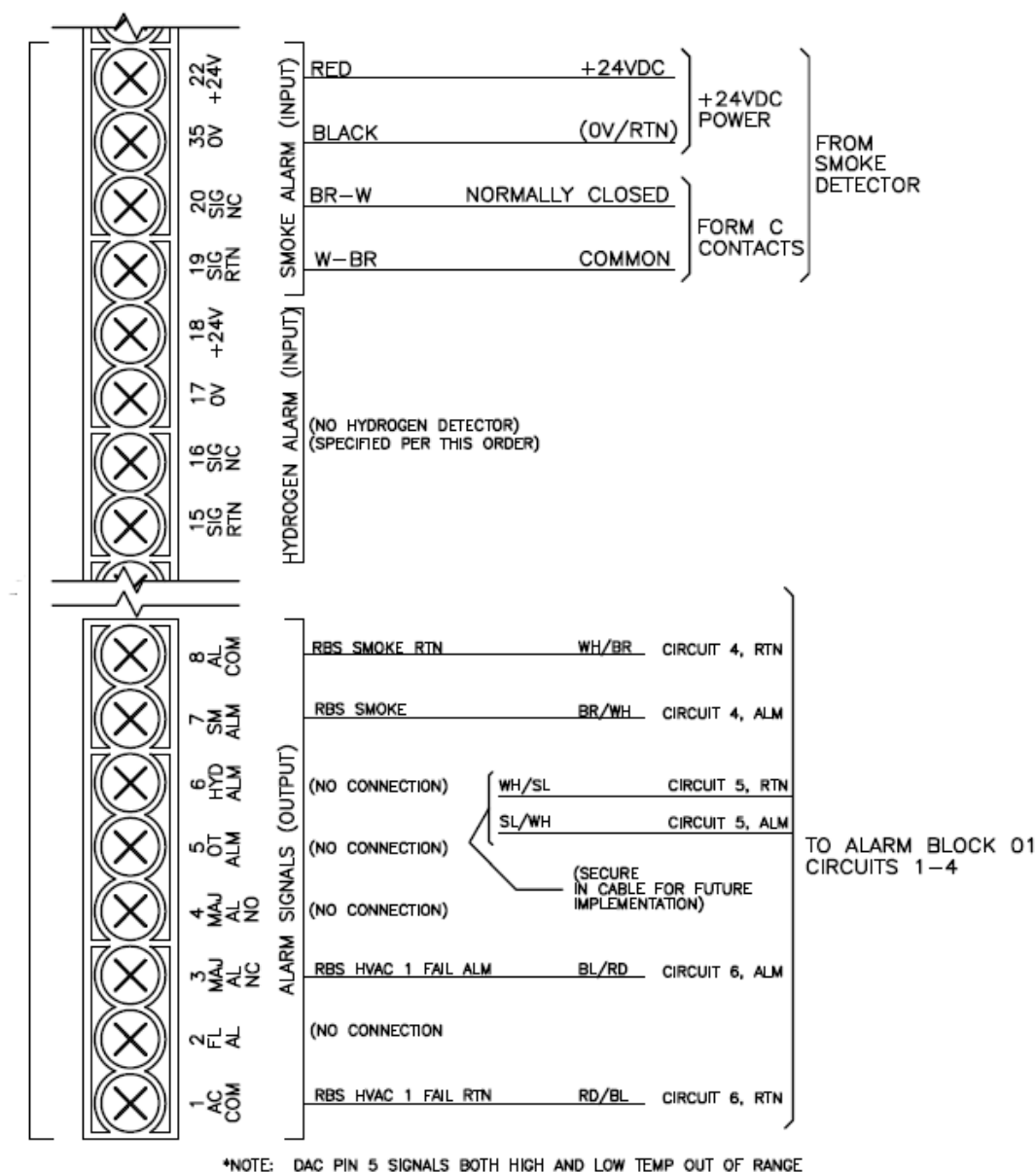
Clogged Filter Control

A clogged filter is determined when both fans are operating at FULL speed for more than 5 minutes and the exterior and fan temperature readings difference is greater than 18 °F (10 °C). Once the temperature difference is reduced, the DAC clogged filter alarm will clear.

I/O Connections to the DAC

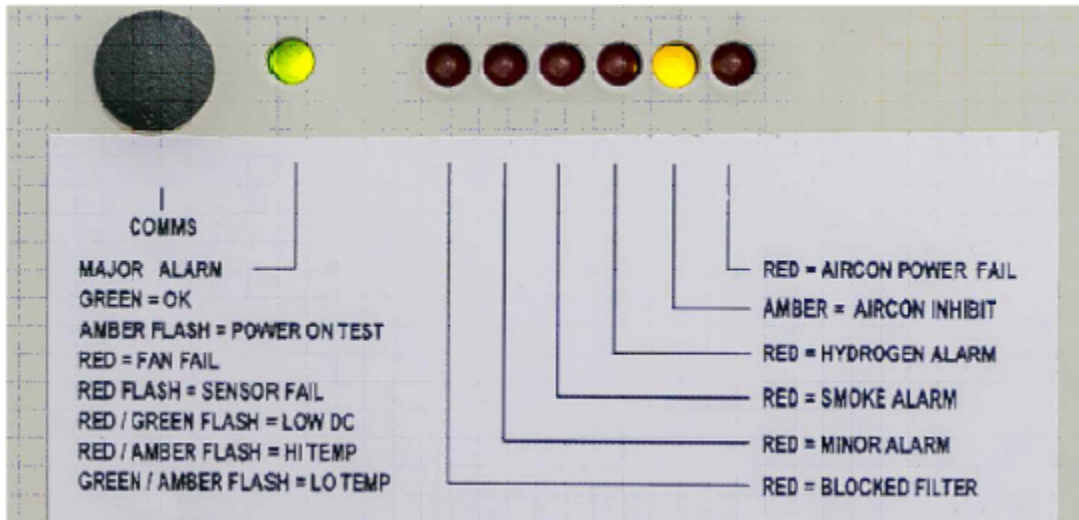
This section describes the I/O for the DAC.

Figure 22: DAC Controller Terminal Ports Description

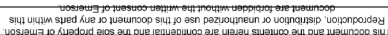


DAC Fan Tray Indicators

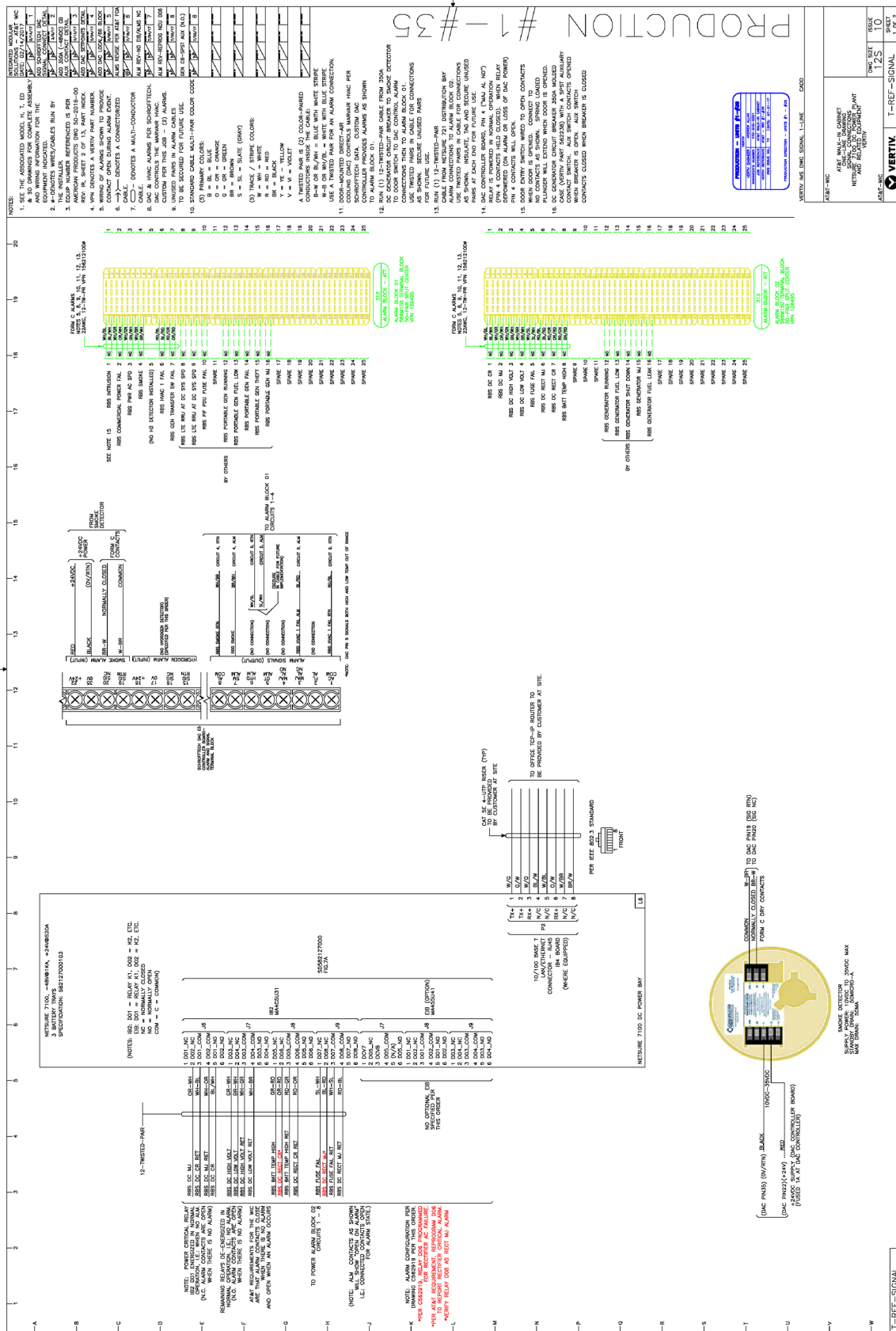
Figure 23: DAC Fan Tray Indicators



Appendix A – One Line Schematic Diagram



Appendix B – Signal Line Schematic Diagram



DC POWER, OUTDOOR ENCLOSURE & SERVICE CONTACTS

CUSTOMER SERVICE (PRE-SHIPMENT)		
Email	CustomerService.ESNA@VertivCo.com	Pricing and availability ^[1, 2] , purchase orders, expediting requests and order tracking. Ask for your company's dedicated Customer Service Associate.
Phone	1.800.800.1280 option 1	
CUSTOMER SUPPORT CENTER (POST-SHIPMENT)		
Email	ESNACustomerSupportCenter@VertivCo.com	After an order has shipped, contact our Customer Support Center with related questions, concerns or claims.
Phone	1.956.661.6867	
PRODUCTS		
Email	AccountManagement.ESNA@VertivCo.com	Provides quotes and bid responses for custom configured ^[2] DC power systems and outdoor enclosures for customers and channel partners (Reps, VARs & Distributors).
Phone	1.800.800.1280 option 2	
SPARE PARTS		
Email	DCpower.Spares@VertivCo.com OSP.Spares@VertivCo.com	Pricing and purchase orders for spare parts, including but not limited to breakers, cables, fuses, rectifier fans, misc. breaker and fuse panels, enclosure fans, doors and switches, etc.
Phone	1.800.800.1280 option 5	
DC POWER DEPOT REPAIR		
Email	DCpower.Repair@VertivCo.com	Creates and processes RMAs for depot repair and refurbishment. Determines repair and refurbishment lead times and pricing based on warranties/contractual agreements. Provides repair shipping information and status.
Phone	1.800.800.1280 option 6	
INSTALLATION & AFTER MARKET SERVICES		
Email	ESNA.FieldService@VertivCo.com	Provides quotes for engineering, furnishing and installation of DC power systems, telecom & IT equipment, cabling infrastructure, and field services of existing DC equipment.
TECHNICAL SUPPORT		
Email	DCpower.TAC@VertivCo.com OSP.TAC@VertivCo.com	Answers technical product and system questions; determines status of warranties and contractual agreements for repair.
Phone	1.800.800.5260	

[1] Contact Account Management for custom configurations.
[2] Contact Spare Parts for parts and accessories.

