Foxboro Evo™ Process Automation System

Product Specifications

Foxboro by Schneider Electric

PSS 31H-2K11

K11 Termination Enclosure

The K11 Termination Enclosure provides termination and marshalling options for Foxboro Evo™ and I/A Series® 200 Series I/O subsystems. It can be used with the K10 and K13 system enclosures, and K12 and K14 system and termination enclosures, which are specifically designed to reduce the volume that the system requires in your plant. The K11 termination enclosure is a highly space efficient design for terminating and possibly marshalling field signal cables. Several ventilation options are available for compatibility with the enclosure's location in the plant.

OVERVIEW

The K11 enclosure is specifically designed for housing termination assemblies and additional customer-supplied terminal blocks for marshalling of the 200 Series I/O Compact or standard Fieldbus modules. It may accommodate the termination of I/O modules housed in a K10 or K13 system enclosure or K12 or K14 system and termination enclosure.

The K11 enclosure is available as a vented or sealed unit. Both types of enclosures can be configured with:

- Up to eight vertical DIN rails for mounting of termination assemblies and terminal blocks for marshalling.

- Single or redundant power supplies for field power.

The K11 vented enclosure is a free-standing, floor mounted unit with an IP 43/55 rating for location in mild (ordinary) environmental areas.

The K11 sealed enclosure is a free-standing, floor mounted unit, for an IP 55 rating for locations in harsh environments.

Multiple IP 43/55 rated K-Series enclosures, including this enclosure and the K10 or K13 system enclosure, can be installed connected to one another to optimize the use of floor space. The enclosures can be bayed together using baying kits as discussed in the *K- Series Enclosures Site Planning and Installation User's Guide* (B0700GN).

The K11 enclosure can be set up in the following basic configurations:

- Termination only - all DIN rails are allocated for the mounting of termination assemblies only, where the customer terminates field signals directly to the termination assemblies.
- Marshalling - all DIN rails are set up in pairs of termination assemblies and terminal blocks to provide additional functionality (such as fusing, disconnects, and lock-out validation) or where customers wish to terminate field cable bundles to dedicated terminal blocks and marshall signals to the appropriate termination assemblies.
- A mix of the previous two options, such as the first in the front and the second in the rear.

This enclosure and its configurations have been tested and qualified by Foxboro® for use with standard 200 Series I/O subsystem termination assemblies.

FEATURES

The Foxboro Evo K11 termination enclosure offers the following features:

- Up to eight 1900 mm vertical DIN rails for mounting of termination assemblies and terminal blocks for marshalling, to provide a total of 15.2 m of linear rail space
- Vented or sealed enclosure selection for use in ordinary (IP 43/55) or harsh (IP 55) rated environments
- Available PVC or non-PVC wireways for field I/O cabling, with optional signal segregation barrier plate for isolation
- Generous 76 mm x 102 mm (3 in x 4 in) wire ducts with adequate capacity for most wire management
- Compact design to minimize use of floor space with both front and rear access that allow maximum packaging density of control equipment
- Options for single or redundant power supplies for field power and power distribution terminal block assemblies for customer-supplied power
- Bottom or top cable entry for termination assembly cables and power wiring, but can be customer configured for both top and bottom cable entry
- Conveniently placed eyebolts for transporting and lifting the enclosures
- A 100 mm (4 in) plinth increases total enclosure height to 2156 mm (85.0 in)
- Door handles with push-button or keylocks
- Standard safety earthing (grounding) studs.

INGRESS PROTECTION

The metal enclosures provide the outer layer of protection for the control electronics. Other layers are provided by the module covers and built into the modules. This approach to protection means that a minimum of contaminants in the plant environment reaches the control components, thus greatly extending the life of the equipment.

For sealed IP 55 certified enclosures, heat is transferred through conduction from the interior surfaces of the enclosure and then dissipated by the enclosure's exterior surfaces into the plant environment. (IP is an acronym for Ingress Protection) Air is not exchanged between the enclosure's interior and the outside environment; therefore, contaminants are minimized inside the enclosure. Sealed IP 55 versions can be used outdoors in sheltered locations.

The enclosures support convenient top or bottom cable entry for field cabling and power wiring. Vented enclosures with roof-mounted fans are not recommended with top cable entry.

THERMAL PROTECTION

Ventilation fans along with vented doors increase circulation for convective heat removal and can be used:

- At installations with only moderate levels of airborne contaminants, exposed enclosure interiors can be exposed to allow plant air to circulate and remove the heat generated within the modules
- In areas where there are no requirements to filter the air to which the modules in the enclosure are exposed (such as office areas).

Vented enclosures contain a dual fan assembly located at the top of the enclosure or single fan assemblies located on the enclosure front and rear doors. Enclosures with vented doors can be located in main equipment areas or in an environment with office air quality.

DUAL TEMPERATURE THERMOSTAT

An optional dual (high/low) thermostat is available to monitor enclosure temperature extremes, with the exception of Zone 2/Class I, Division 2 applications.

VENTED ENCLOSURE DESIGN OPTIONS

The K11 vented enclosure is available with either roof-mounted or door-mounted fans.

Roof-mounted fans provide the best performance for cooling, and provide a lower noise-level than the door-mounted fans, at the cost of restricting top-entry cable access to the enclosure and reducing the overall ingress protection rating. For customers who plan to modify the swing direction of their enclosure doors, fans mounted on the roof allow the process to proceed more smoothly.

Door-mounted fans are desirable for top entry cable access configurations, and provide the highest level of ingress protection for vented enclosures.

TERMINATION ASSEMBLY MOUNTING

The K11 termination enclosure has up to eight vertical DIN rails for mounting termination assemblies and customer-supplied terminal blocks for marshalling. Four of the DIN rails are accessible from the rear of the enclosure and four from the front. For each set of four DIN rails, two are mounted in the center of the enclosure, and two are mounted on the sides.

Be aware that it may not be possible to add all the marshalling to this enclosure, depending on the size of the termination assemblies required in this enclosure.

Optional bus bars for field wiring shields and DIN rail isolation are available. These are used when customer field shields are terminated on dedicated terminal blocks that ground to the DIN rail. Isolation allows rails to be isolated from the enclosure earth.

An optionally redundant 100-250 V ac/125 V ac, 50-60 Hz field power supply is available for field power, and is mounted on side rails of the enclosure (see Figure 2 and Figure 3). When using field power supplies, one of the eight DIN rails must be allocated for these supplies only. Both vented and sealed enclosures have a limited thermal load (see "Operating Temperatures" on page 10).

For more information on the various types of termination assemblies in a Foxboro Evo or I/A Series system, refer to the Fieldbus Module (FBM) Product Specification Sheets (PSSes) listed in *Compact 200 Series I/O Subsystem Overview* (Reference 1) and *Standard 200 Series Subsystem Overview* (Reference 2). (See Table 2, "Reference Documents," on page 13 at the end of this document.) Since the DIN rail mounted termination assemblies support different levels of thermal loading, refer to these PSSes to determine the enclosure's loading.

TERMINATION ASSEMBLY/INPUT POWER CABLING AND WIREWAYS

The enclosures can be ordered for bottom cable entry or top cable entry or modified by the customer for simultaneous top and bottom cable entry.

For the top cable entry version, the termination assembly cables and/or customer power feeds enter through customer-configured cable glands. Any customizations made must follow the enclosure manufacturer's guidelines to preserve the enclosure's ingress protection rating. Vented enclosures with roof fans are not recommended for top cable entry.

For the vented bottom entry version, the termination assembly cables and power cables enter through removable gland plates, located at the bottom (inside) of the enclosure, which can be removed, drilled, or punched for cable routing.

For the sealed bottom entry version, the termination assembly cables and power cables enter through removable gland plates located at the bottom (inside) of the enclosure, which can be removed, drilled, or punched for cable routing. Users must provide their own cable glands (for top or bottom cable entry), in keeping with maintenance of the enclosure's ingress protection.

An optional signal segregation barrier plate provides isolation between the two interior adjacent wireways.

Cabling is restricted to preconfigured wireways, available in PVC or non-PVC versions. It is not recommended to use any wireways in the K11 termination enclosure when it is fully loaded or used with the K13 or K14 enclosures.

Cable straps are provided in the enclosure to dress and support the termination assembly cables.

POWER AND EARTHING (GROUNDING)

The K11 enclosure supports an optional single or redundant power system for field power to protect against power failures.

Power wiring to the enclosure is routed through the bottom or top of the enclosure. Optional customer-supplied dual power input feeds terminate at dedicated single or redundant power distribution terminal block assembly.

All enclosure structural elements are integrally earthed by the enclosure design to meet the appropriate industry regulations and standards.

Field power may be provided by a single or redundant standard 200 Series power supply that uses 100-250 V ac, 50-60Hz, 125 V dc. The power supply uses a diode redundancy module and is agency certified for use in Zone 2/Class I, Division 2 applications.

Earthing (Grounding)

Two M8 studs (one for each enclosure side) provide a central earth (ground) point and dedicated earthing points when baying enclosures together.

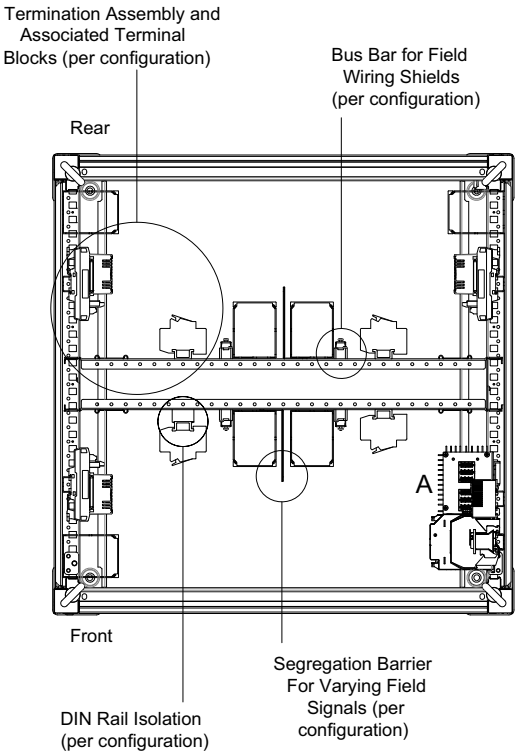
Power Distribution

Each power distribution terminal block assembly (primary, secondary or utility for powering fans and lights, see Figure 2) has dedicated ring lug assembly terminal blocks for customer main power. Each also has fusable, knife disconnect terminal blocks for interrupting the main power, as well as independent knife disconnect terminal blocks for each device, for ease of service.

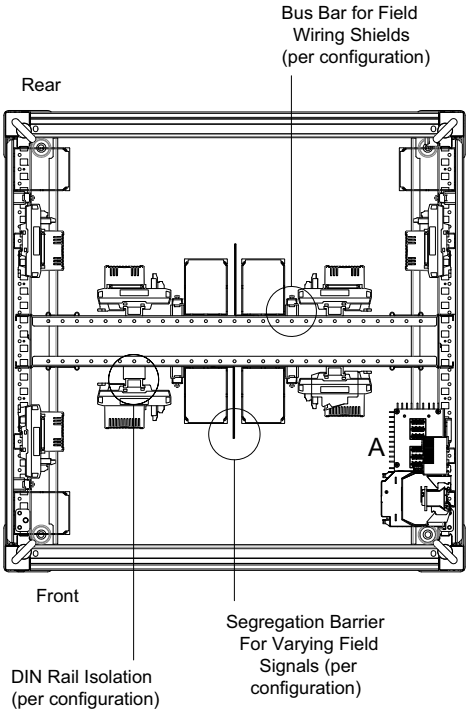
Additional blocks are provided for the customer to install utility outlets.

The enclosure is available without these power distribution terminal blocks when the customer has requirements for power distribution specific to regional electrical codes.

K11 Marshalling Layout and DIN Rail Identification



K11 Termination Layout and DIN Rail Identification



Note: For both setups, Rail A is reserved for terminal blocks and power supplies associated with single or redundant 24 V dc field power per configuration.

Figure 1. K11 Enclosure Termination and Marshalling Layouts and DIN Rail Identification

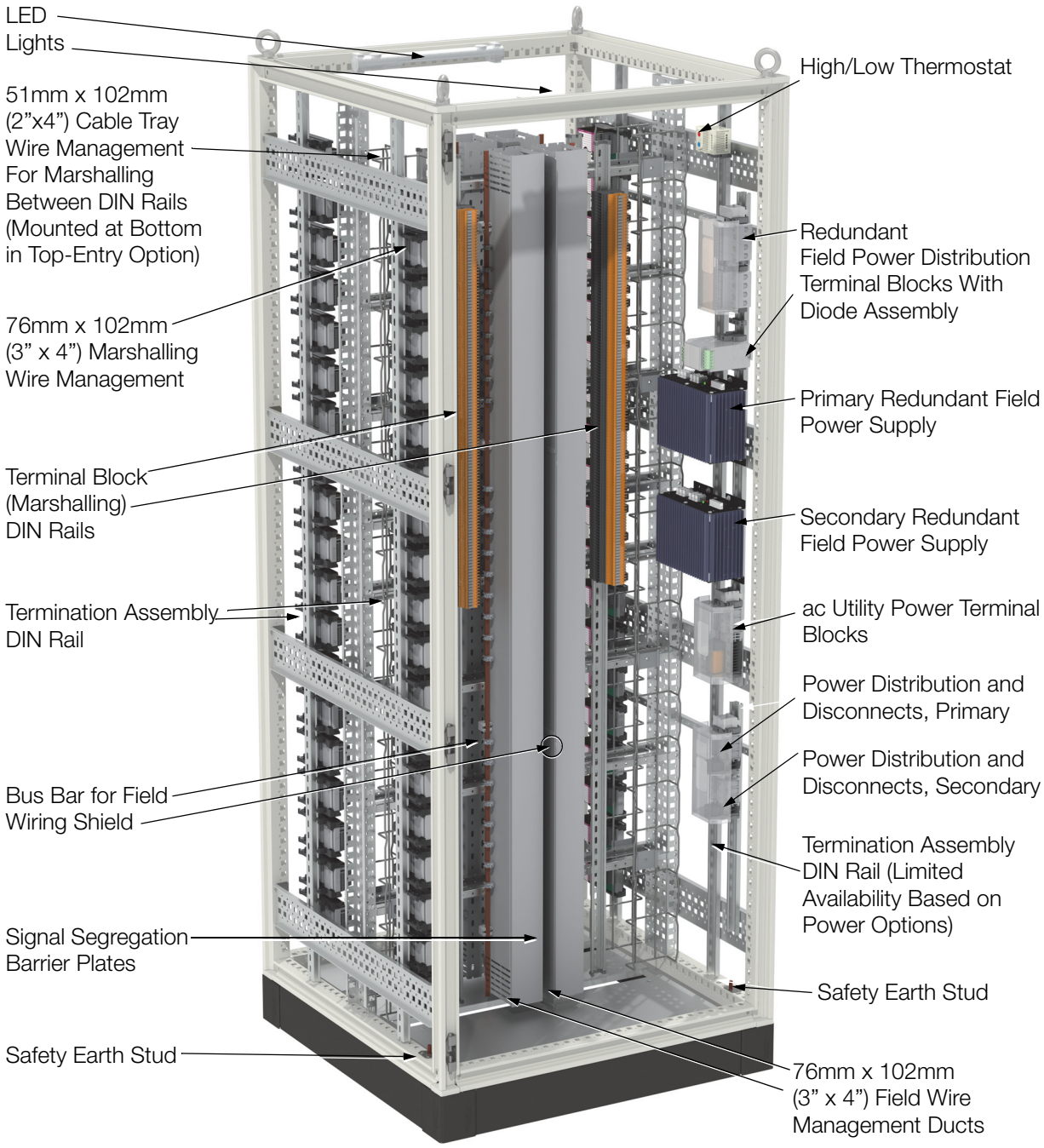


Figure 2. K11 Termination Enclosure with Marshalling Option, Front View, Bottom Entry

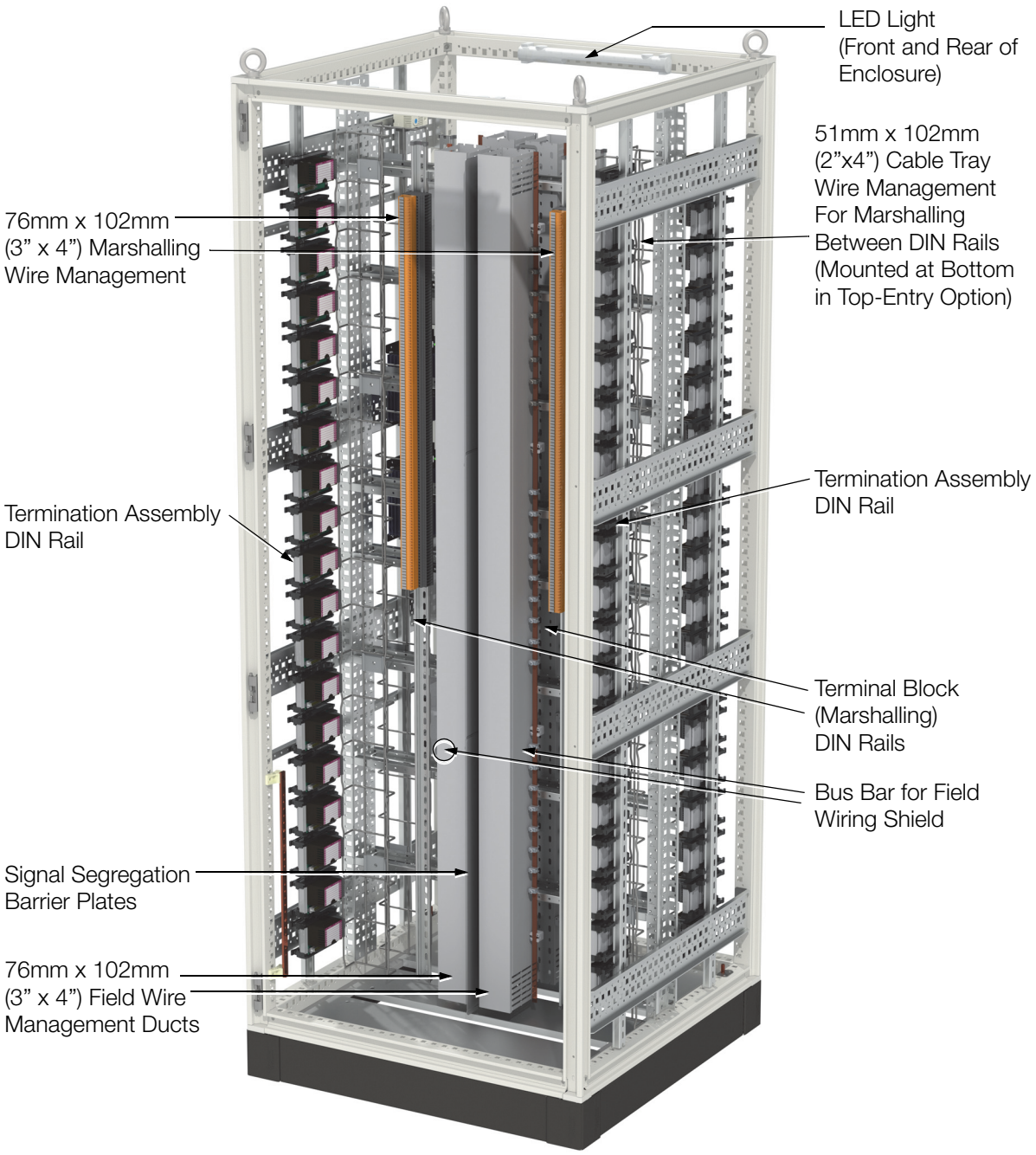


Figure 3. K11 Termination Enclosure with Marshalling Option, Rear View, Bottom Entry

ENCLOSURE OPTIONS

The K11 enclosure is provided with the following features, some of which are optional.

Table 1. K11 Enclosure Features and Options

Feature	Availability
Base Enclosure	Vented IP 43/55 rated enclosure with dual front and rear door-mounted fans (120 V ac or 240 V ac) or roof -mounted fans (120 V ac or 240 V ac - dual fans), or Sealed IP 55 rated enclosure
Enclosure Access	Front and rear access
Front Door	Solid front door with inlet vents
Cable Entry	Bottom cable entry or top cable entry (top entry not recommended for roof-mounted fans)
Sidewalls	Options configurable based on baying requirements
Door Handle	Handle with push-button or keylocks
Door Mounting	Universal mounting for left and right-hand door swing (left-hand is default)
Field Wiring Options	PVC or non-PVC wireways for field I/O signal cabling Optional signal segregation barrier plate for field signal isolation - when used with different signals, the barrier option is recommended Optional bus bars for field wiring shields and/or DIN rail isolation
Equipment Supported	Up to eight DIN rails per enclosure available for mounting termination assemblies and customer-supplied terminal blocks for marshalling Optional 120 V ac or 240 V ac input field power
Enclosure Lighting[(a)]	Single and/or dual enclosure LED lights with motion activation
Thermostat[(a)]	Dual temperature thermostat
Fans[(a)]	Door-mounted or roof-mounted fans
Earthing (Grounding)[(a)]	Two protective earth (ground) studs

Table 1. K11 Enclosure Features and Options (Continued)

Feature	Availability
Field Power Options[a]	Single or redundant field power supply, 100-250 V ac, 50-60Hz, 125 V dc input Single or redundant power distribution terminal block assemblies for customer configured power entry No option is available for 24 v dc field power - however, it can be directly sourced by the customer following local electrical guidelines. Additionally, customer-configured field power entry is supported. Terminal blocks supplied as per configuration.
Utility Power	120 V ac or 240 V ac utility power terminal block

(a) If you are installing a K-Series enclosure as part of a Class 1, Division / Zone 2 application, refer to *Standard and Compact 200 Series I/O - Agency Certifications* (Reference 3) to determine 200 Series I/O subsystem equipment hazardous location suitability. Also, be aware that optional enclosure electrical accessories such as LED lights, roof or door-mounted fans and thermostats may not be used in Class 1, Division / Zone 2 hazardous locations.

FUNCTIONAL SPECIFICATIONS

Enclosure

The enclosures are free-standing, floor mounted, steel industrial enclosures containing:

- Vertically mounted DIN rail mounted termination assemblies and terminal blocks
- 100-250 V ac, 50-60Hz, 125 V dc field power supplies (single or redundant power).

Input Power (Optionally Redundant)

Refer to *Standard 200 Series Power Supply - FPS400-24* (Reference 4) and *Compact Power Supply - FPS480-24* (Reference 5).

ENVIRONMENTAL SPECIFICATIONS

Ingress Protection Ratings

VENTED

Door-Mounted Fans
IP 55 to EN 60 529 / NEMA 12
Roof-Mounted Fans
IP 43 to EN 60 529/10.9191 / NEMA 12

SEALED
IP 55 to EN 60 529 / NEMA 12

Operating Temperatures

VENTED (THERMAL LOADING)(1)
-20 to +60°C (-4 to +140°F)
Up to 750 Watts (Average)
-20 to +55°C (-4 to +131°F)
750 to 1000 Watts (Maximum)

SEALED (THERMAL LOADING)(1)
-20 to +50°C (-4 to +122°F)
Up to 400 Watts (Average)
-20 to +45°C (-4 to +113°F)
400 to 500 Watts (Maximum)

Storage Temperature

-40 to 70°C (40 to 158°F)

Relative Humidity

5 to 95% (noncondensing)

Acoustic Noise Level(2)

ROOF-MOUNTED FANS
61 dB (A) at 1 m / 58 dB (A) at 3 m

DOOR-MOUNTED FANS
56 dB (A) at 1 m

SEALED ENCLOSURE (NO FANS)
Ambient / Ambient

Dual Thermostat

HIGH ALARM SETTING
NC contact, Range - 0 to 60°C (32 to 140°F)

LOW ALARM SETTING
NO contact, Range - 0 to 60°C (32 to 140°F)

Agency Certification

Empty enclosure is UL and UL-C approved. Enclosure meets all applicable European Union directives and is CE compliant. Final installed enclosures populated with your equipment should be inspected by your local UL/CSA committee, or other local safety governing organization if required. A complete listing of certifications is available from enclosure vendor. For installed Foxboro Evo and I/A Series equipment, refer to PSS 31H-2CERTS.

Area Designation

Per customer order, vented for general purpose or sealed for Class 1 Division / Zone 2 Hazardous Locations

(1) Some termination assemblies have operating temperatures lower than the rated enclosure specification.
(2) Under normal operating conditions, with both fans running, at enclosure's mid-height at 46 dB (A) ambient noise level.

PHYSICAL SPECIFICATIONS

Weight
The weight of the enclosure is dependent upon the particular configuration. Consult with a Foxboro representative if precise weight figures are required.

VENTED ENCLOSURE WITH SIDE PANELS
(ALLOWABLE MAX. WEIGHT WHEN LOADED)
800 x 800 mm (31.5 x 31.5 in) - 291 kg (642 lb)

Mounting
Floor

CAUTION

To prevent injury, this enclosure must be bolted down. Refer to *Enclosures and Mounting Structures* (Reference 6).

Construction
Sheet steel with textured, powder-coated finish

Color
SIDE PANELS, ROOF, AND DOORS
RAL 7035 - light gray - textured

PLINTH
RAL 7022 - umbra gray smooth

Panel Thickness
DOORS
1.8 mm (15 ga)

SIDE PANELS, ROOF
1.5 mm (16 ga)

Construction
MATERIAL

Doors
Sheet steel, 1.8 mm (15 ga)
Frame, Roof, Side Panels, Gland Plates
Sheet steel, 1.5 mm (16 ga)
Base/Plinth
Sheet steel and plastic

FINISH

Frame
Epoxy-polyester resin paint, textured RAL 7035 gray
Doors, Roof, Side Panels
Epoxy-polyester resin paint, textured RAL 7035 gray

FINISH (CONT.)

Base/Plinth
Epoxy-polyester resin paint, textured RAL 7035 gray
Gland Plates and Internal Hardware
Zinc-plated, passivated

Cable Entry
Bottom through gland plate(s)
Top through customer cutouts in enclosure top (For enclosure with roof-mounted fans, suggested entry is bottom)

Earthing (Grounding)
ROOF, SIDEWALLS, GLAND PLATES
Automatic potential equalization built in

DOORS
Dedicated 6 mm^2 (10 ga) ground strap to enclosure frame

ENCLOSURE
Two M8 studs (one for each enclosure side)

Power Input Terminals
TYPE
Ring Lug

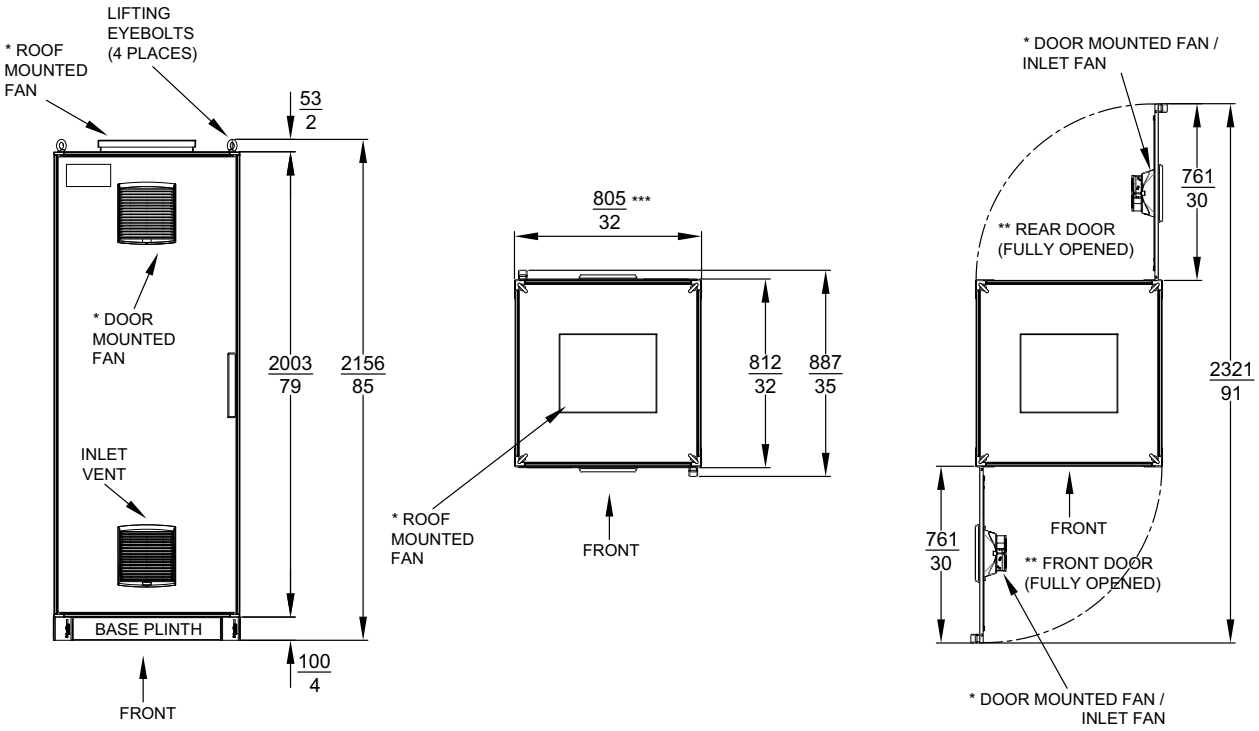
WIRE SIZE
Up to 6 mm^2 (10 AWG)

RING LUG SIZE
M4 Maximum (DIN 46 234/46 237), 9.6 mm maximum O.D.

Termination Assembly Cabling
Universal mounting straps are supplied for securing, routing and strain relieving of termination assembly cables. Each strap supports up to a 75 mm (3 in) diameter cable bundle.

DIMENSIONS - NOMINAL

K11 Termination Enclosure



* VENTED ENCLOSURES ONLY- EITHER ROOF- OR DOOR MOUNTED CONFIGURATIONS CAN BE ORDERED.
** DOORS ARE FACTORY CONFIGURED FOR LEFT-HAND SWING, BUT CAN BE RECONFIGURED AT SITE FOR RIGHT-HAND SWING.
*** WITH / WITHOUT SIDE PANELS.

RELATED PRODUCT DOCUMENTS

Table 2. Reference Documents

Reference	Document Number	Description
1	PSS 31H-2COV	Compact 200 Series I/O Subsystem Overview
2	PSS 31H-2SOV	Standard 200 Series Subsystem Overview
3	PSS 31H-2CERTS	Standard and Compact 200 Series I/O - Agency Certifications
4	PSS 31H-2W3	Standard 200 Series Power Supply -FPS400-24
5	PSS 31H-2C480 B4	Compact Power Supply - FPS480-24
6	B0700GN	K- Series Enclosures Site Planning and Installation User's Guide

Table 3. Other Related Documents

Document Number	Document Title
PSS 31H-2KOV	K-Series Enclosures Overview
ISA-S71.04-1985 (not Foxboro-supplied)	Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants

Foxboro®

by Schneider Electric

Invensys Systems, Inc
10900 Equity Drive
Houston, TX 77041
United States of America
http://www.invensys.com

Global Customer Support
Inside U.S.: 1-866-746-6477
Outside U.S.: 1-508-549-2424
Website: https://support.ips.invensys.com

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