

K21 Termination Enclosure



The Foxboro Evo™ K21 Termination Enclosure provides termination and marshalling options for Foxboro Evo standard 200 Series I/O subsystems.

OVERVIEW

The K21 enclosure is specifically designed for housing standard 200 Series I/O subsystem termination assemblies and additional customer-supplied terminal blocks for marshalling. It may accommodate the termination of I/O modules which are housed in a K20 system enclosure or K22 system and termination enclosure.

The K21 enclosure is available as a vented enclosure or sealed enclosure. Both types of enclosures can be configured with:

- ▶ Up to four vertical DIN rails for mounting of termination assemblies and terminal blocks for marshalling.
- ▶ Single or redundant power supplies for field power.

The K21 vented enclosure is a free-standing, floor mounted unit with an IP 43/55 rating for location in mild (ordinary) environmental areas.

The K21 sealed enclosure is a free-standing, floor mounted unit, with an IP 55 rating for location in harsh environments.

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

The K21 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 K21 termination enclosure offers the following features:

- ▶ Up to four 1800 mm vertical DIN rails for mounting of termination assemblies and terminal blocks for marshalling, to provide a total of 7.2 m of linear rail space
- ▶ Vented or sealed 800w x 600d x 2000mm high 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
- ▶ Generous 76 mm x 102 mm (3 in x 4 in) wireways 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 environment
- ▶ 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 simultaneous top and bottom cable entry
- ▶ Conveniently placed eyebolts for transporting and lifting the enclosures
- ▶ A 100 mm (4 in) plinth increases total enclosure height of 2156 mm (85.0 in)
- ▶ Comfort 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 from the interior surfaces of the enclosure and then dissipated by the enclosure's exterior surfaces into the plant environment. 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 termination assembly 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 heat removal and can be used:

- ▶ At installations with only moderate levels of airborne contaminants, 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 door. 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, but not for use in Class 1, Division / Zone 2 hazardous locations.

VENTED ENCLOSURE DESIGN OPTIONS

The K21 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 K21 termination enclosure has up to four vertical DIN rails for mounting termination assemblies and customer-supplied terminal blocks for marshalling. Two of the DIN rails are accessible from the rear of the enclosure and two of the DIN rails are accessible from the front of the enclosure. The front and rear-mounted DIN rails are mounted in the center of the enclosure - two accessible from the front, and two accessible from the rear.

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

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). The right side DIN rail

accessed from the front of the enclosure is allocated for field power supplies only. Both vented and sealed enclosures have a limited thermal load (see “Operating Temperatures” on page 9).

For more information on the various types of termination assemblies in an Foxboro Evo system, refer to the Fieldbus Module (FBM) Product Specification Sheets listed in *Standard 200 Series Subsystem Overview* (PSS 31H-2SOV). Since the DIN rail mounted termination assemblies support different levels of thermal loading, refer to these PSSes to determine the enclosure’s loading.

Due to the thermal load and the reliance on conductive cooling, the sealed version of this enclosure has a limited loading capacity.

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-mounted fans are not recommended for top cable entry.

For the vented bottom entry version, the termination assembly cables and power cable 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 cable 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.

Cabling is restricted to preconfigured wireways, available in PVC or non-PVC versions.

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

POWER AND EARTHING (GROUNDING)

The K21 enclosure supports an optional redundant power system, in which dual power distribution (two power supplies fed by independent entry sources) provides redundancy protection against power failures.

Power wiring to the enclosure is routed through the bottom or top of the enclosure. Optional dual power input feeds terminate at dedicated primary and secondary power distribution terminal blocks.

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 provides 100-250 V ac, 50-60Hz, 125 V dc. The power supply uses a diode redundancy module and is agency certified for use in Class 1, Division /Zone 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

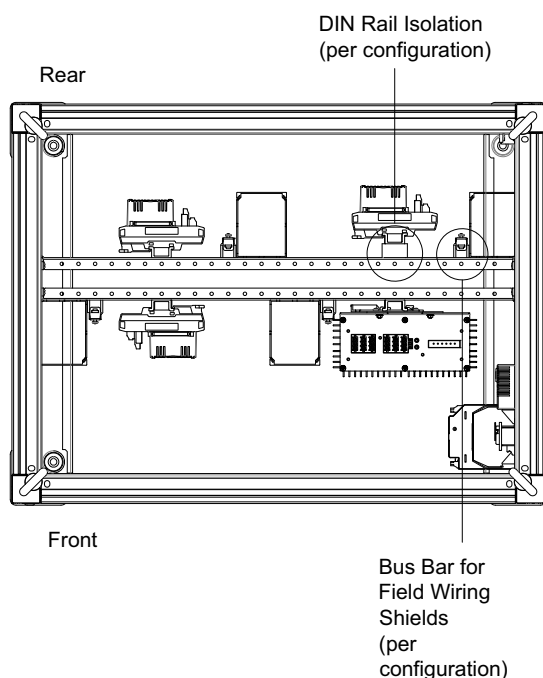
Each power distribution terminal block assembly (primary, secondary or utility for powering fans and lights, see Figure 2) has dedicated ring lug assembly terminal blocks for customer main power. Each also has fusible, knife disconnect terminal blocks for

interrupting the main power, as well as independent knife disconnect terminal blocks for each device, for ease of service.

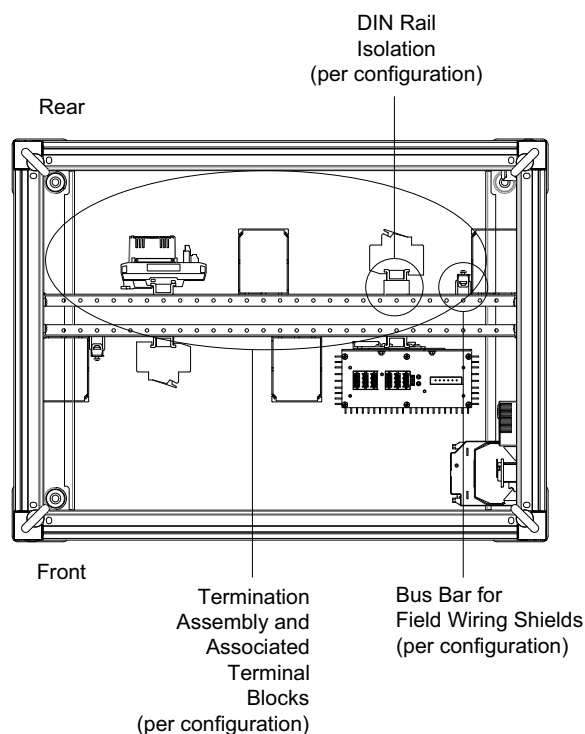
Additional blocks are provided for the customer to install utility outlets.

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

K21 Termination Layout



K21 Marshalling Layout



Note: For both setups, the front right and front right side DIN rails are reserved for terminal blocks and power supplies associated with single or redundant 24 V dc field power per configuration.

Figure 1. K21 Enclosure Termination and Marshalling Layouts and DIN Rail Identification

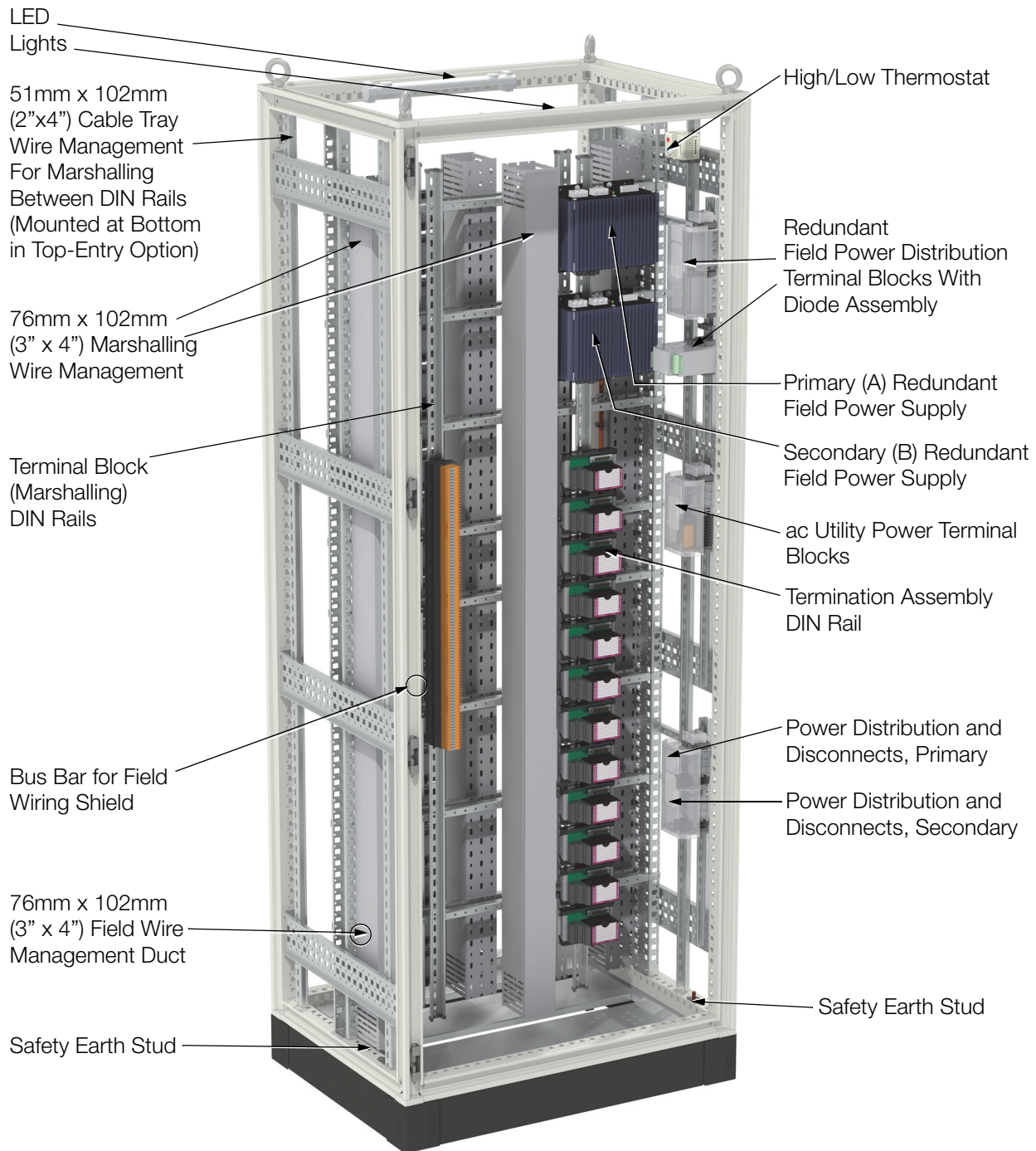


Figure 2. K21 Termination Enclosure with Marshalling Option, Front View, Bottom Entry

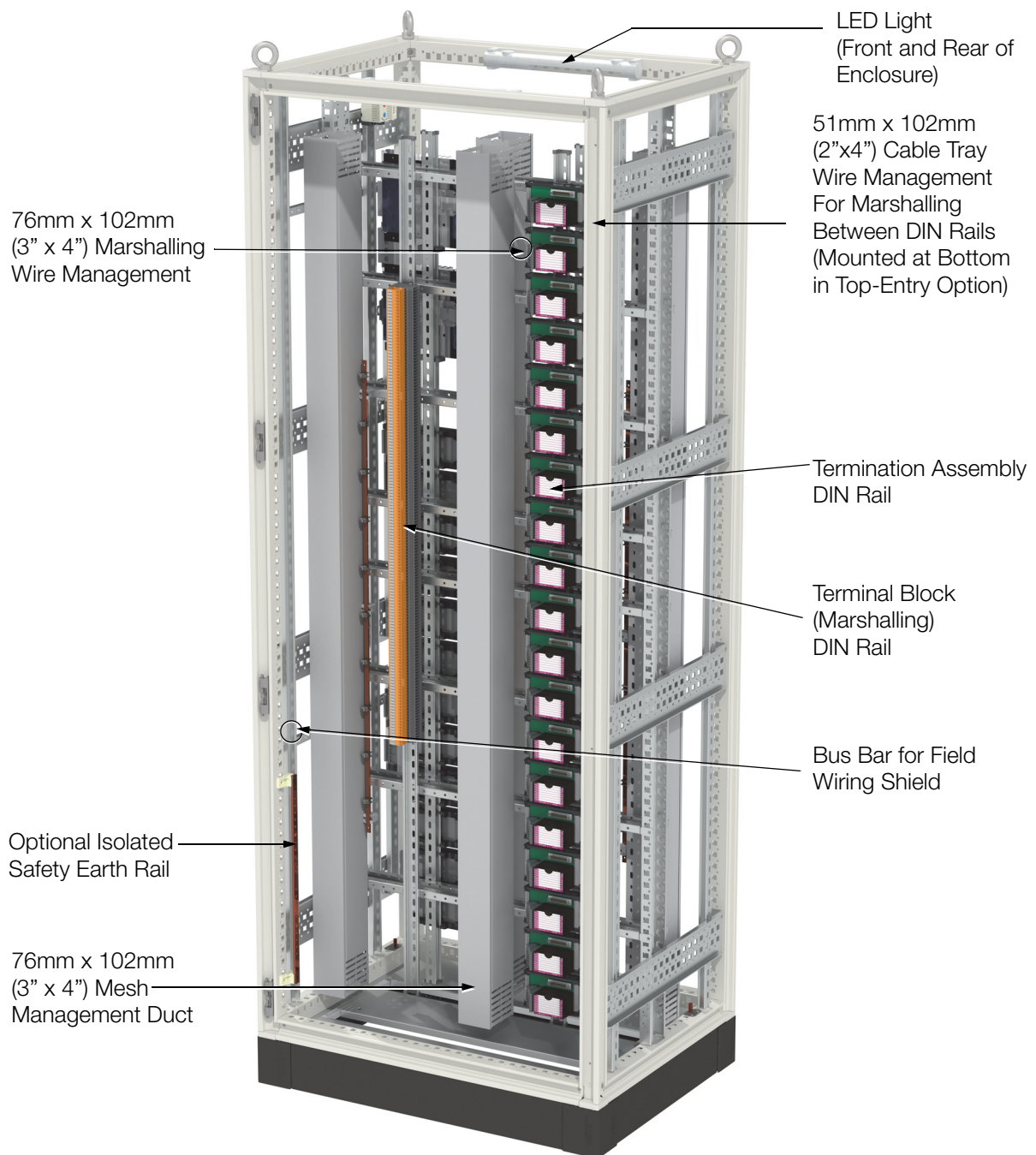


Figure 3. K21 Termination Enclosure with Marshalling Option, Rear View, Bottom Entry

ENCLOSURE OPTIONS

The K21 enclosure is provided with the following features, some of which are optional.

Table 1. K21 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	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 keylock
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 bus bars for field wiring shields and/or DIN rail isolation
Equipment Supported	Up to four DIN rails per enclosure available for mounting termination assemblies and customer-supplied terminal blocks for marshalling Optional 120 V ac or 240 V ac 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
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 (no terminal blocks supplied)
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* (PSS 31H-2CERTS) 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 PSS 31H-2W3.

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 equipment, refer to PSS 31H-2CERTS.

Area Designation

Per customer order, vented and sealed are available for general purpose area; Class 1, Division / Zone 2 hazardous locations must use sealed enclosure only.

(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 (MAX. CONFIGURATION)

800 mm wide x 600 mm deep - 226 kg (498 lb)

SIDE PANEL

2000 mm high x 600 mm deep - 19 kg (42 lb)

Mounting

Floor

CAUTION

To prevent injury, this enclosure must be bolted down. Refer to the installation guide.

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 mm² (10 ga) ground strap to enclosure frame

ENCLOSURE

Two M8 studs (one for each enclosure side)

An optional isolated bus bar for additional earth (ground) points.

Power Input Terminals

TYPE

Ring Lug

WIRE SIZE

Up to 6 mm² (10 AWG)

RING LUG SIZE

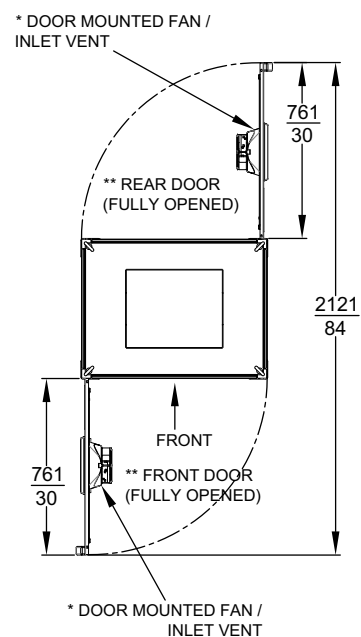
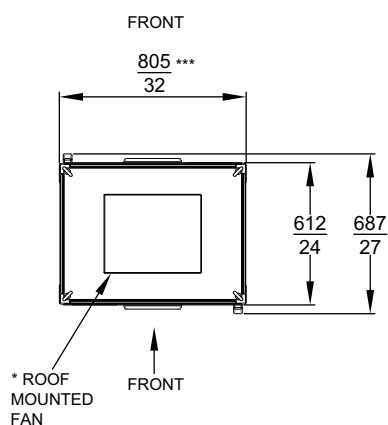
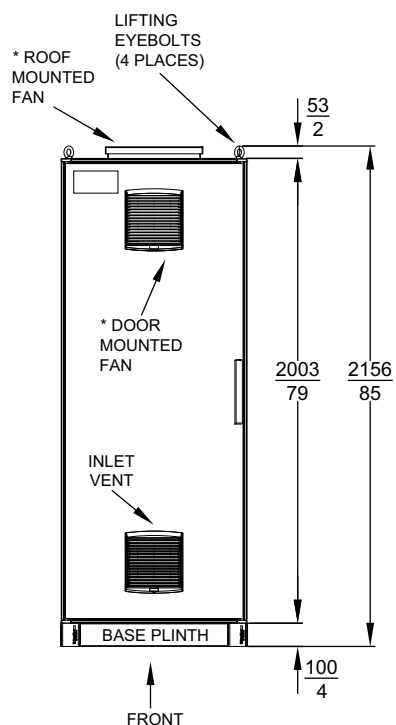
M4 Maximum (DIN 46 234/46 237), 9.6 mm maximum O.D.

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

K21 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.

FOR MORE INFORMATION

For additional information describing Foxboro Evo enclosures for DIN rail mounted termination assemblies, refer to the following documentation:

Document Number	Description
PSS 31H-2SOV	Standard 200 Series Subsystem Overview
PSS 31H-2CERTS	Standard and Compact 200 Series I/O - Agency Certifications
PSS 31H-2W3	Standard 200 Series Power Supply - FPS400-24
PSS 31H-2SBASPLT	Standard 200 Series Baseplates
PSS 31H-2KOV	K-Series Enclosures Overview
ISA-S71.04-1985 (not Foxboro-supplied)	Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants



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