Foxboro Evo™ Process Automation System

Product Specifications

Foxboro® by Schneider Electric

PSS 31H-2K12

K12 System and Termination Enclosure

The Foxboro Evo™ K12 System and Termination Enclosure provides environmental protection and housing, with termination and marshalling options for Foxboro Evo standard 200 Series I/O subsystem modules.

OVERVIEW

The K12 enclosure is specifically designed for housing standard 200 Series I/O subsystem modules and their associated termination assemblies and customer-supplied terminal blocks for marshalling. The K12 enclosure is available as a vented enclosure or sealed enclosure.

The K12 vented and sealed enclosures can be configured with:

- Up to four 8-position vertically mounted Modular Baseplates, for mounting up to 32 Fieldbus Modules (FBMs)
- Up to four vertical DIN rails for mounting of termination assemblies (TAs) and terminal blocks for marshalling
- One 2-position baseplate to support Field Control Processors (FCP280s) or Fieldbus Communications Modules (FCMs)
- Up to two FPS400-24 power supplies (redundant power) to support the Modular Baseplates.

The K12 vented enclosure is a free-standing, floor mounted unit with an IP 43/55 rating for location in mild (ordinary) environmental areas.

The K12 sealed enclosure is a free-standing, floor mounted unit, with options for an IP 55 rating for locations in harsh environments.

Multiple K-Series enclosures, including this enclosure and the K11 termination 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 rear of the K12 enclosure can be set up in one of two 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.

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

FEATURES

The Foxboro Evo K12 system and termination enclosure offers the following features:

- Accommodates one 2-position baseplate to support Field Control Processors (FCP280s) and Fieldbus Communications Modules
- (Enclosure front) Vented and sealed enclosures accommodate up to 32 Fieldbus Modules (FBMs) in up to four Modular Baseplates
- (Enclosure rear) 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 and sealed enclosure selection for use in ordinary (IP 43/55) or harsh (IP 55) rated environments
- Compact design to minimize use of floor space with both front and rear access that allow maximum density of enclosures in a control environment
- 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
- Option for single or redundant main power supplies and main/backup field I/O power supplies
- Bottom or top cable entry for field 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 - total enclosure height of 2156 mm (85.0 in)
- Door handles with push-button or keylocks

- Standard protective earth (ground) studs or optional isolated instrument earth (ground) rail.

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.

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, with the exception of Zone 2/Class I, Division 2 applications.

MODULAR BASEPLATE MOUNTING

The enclosure can contain various types of vertically mounted Modular Baseplates, which accommodate different quantities and types of modules (FCPs/FBMs/FCMs).

For the enclosure to accommodate a higher density of modules and maximize accessibility and space for termination assembly cables, the baseplates are mounted in a vertical position. Vertical cable runs minimize the need to dress and route cables at ninety-degree angles while providing a direct path for cable access to the bottom or top of the enclosure. While improving layout, vertical orientation also reduces any horizontal obstructions, thus increasing airflow and improving overall thermal performance.

For more information on the various types of Modular Baseplates in an Foxboro Evo system, refer to *Standard 200 Series Baseplates* (PSS 31H-2SBASPLT).

For more information on the various types of termination assemblies in an Foxboro Evo system, refer to the Fieldbus Module Product Specification Sheets (PSSes) listed in *Standard 200 Series Subsystem Overview* (PSS 31H-2SOV).

VENTED ENCLOSURE DESIGN OPTIONS

The K12 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.

FIELDBUS I/O GROUPS

The vented and sealed K12 system and termination enclosures have two vertical DIN rails accessed from the front of the enclosure for mounting vertically mounted baseplates and their power supplies, and up to four vertical DIN rails accessed from the rear of the enclosures for termination assemblies and customer-supplied terminal blocks for marshalling. One front-accessed DIN rail can mount up to four 8-position FBM Modular Baseplates, and the Baseplates on this rail are called a Fieldbus Input/Output (I/O) Group. This Fieldbus I/O Group has an optionally redundant FPS400 power supply associated with the group and either an optional 2-position vertically mounted baseplate for FCMs/FCP280s. These power supplies and FCMs/FCP Baseplates are mounted on the second front-accessed DIN rail (see Figure 2 and Figure 3).

The four rear DIN rails are designed for mounting termination assemblies and the customer-supplied terminal blocks.

TERMINATION ASSEMBLY MOUNTING

The K12 enclosure has up to four vertical DIN rails in the rear of the enclosure for mounting termination assemblies and customer-supplied terminal blocks for marshalling. Two are mounted in the center of the enclosure, and two are mounted on the sides.

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). Both vented and sealed enclosures have a limited thermal load (see “Operating Temperatures” on page 11).

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 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.

Cable straps are provided in the enclosure to dress and support the termination assembly cables. Field I/O signals must be connected to the TA mounted in the same enclosure or an adjoining Foxboro Evo termination enclosure.

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

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

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

POWER AND EARTHING (GROUNDING)

The K12 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.

The K12 enclosure uses a 200 Series power supply that provides 24 V dc to 200 Series baseplates. The power supply is agency certified for use in Zone 2/Class I, Division 2 applications. For more information, refer to *Standard 200 Series Power Supply - FPS400-24* (PSS 31H-2W3).

Earthing (Grounding)

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

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

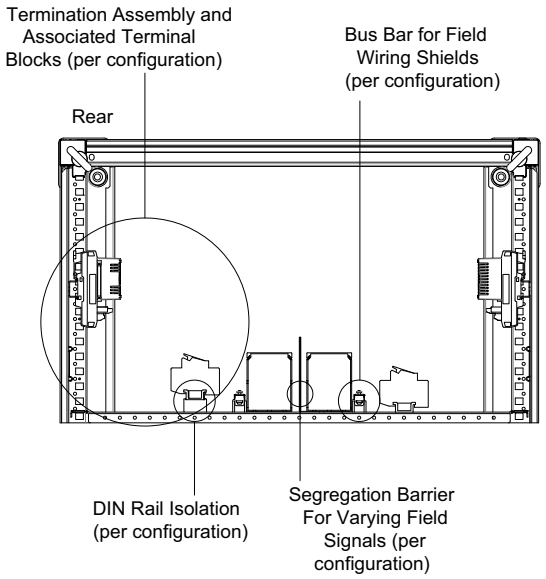
Power Distribution

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

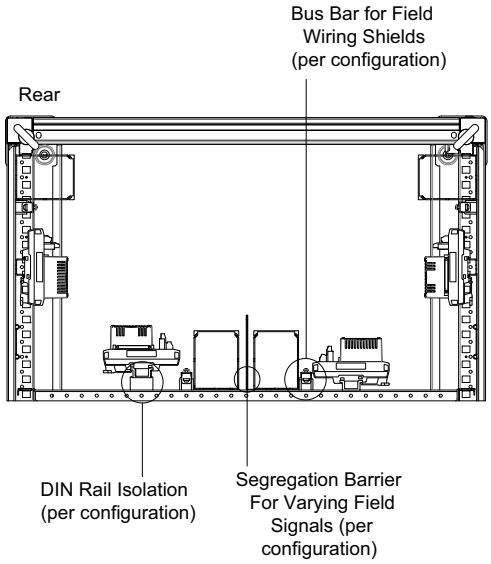
Additional blocks are provided for the customer to install utility outlets.

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

K12 Marshalling Layout and DIN Rail Identification



K12 Termination Layout and DIN Rail Identification



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

Figure 1. K12 Enclosure Termination and Marshalling Layouts and DIN Rail Identification

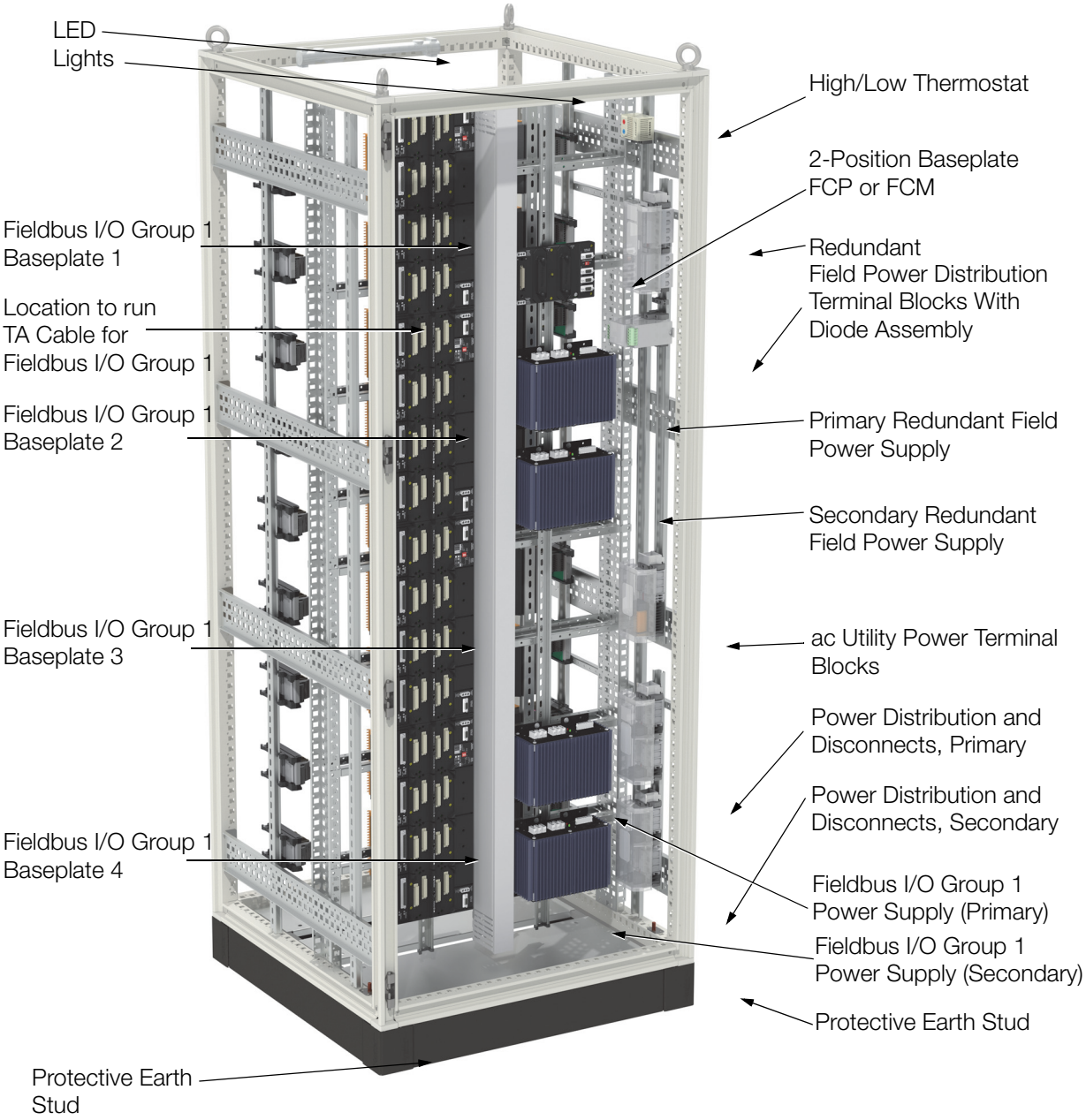


Figure 2. K12 System and Termination Enclosure, Front View

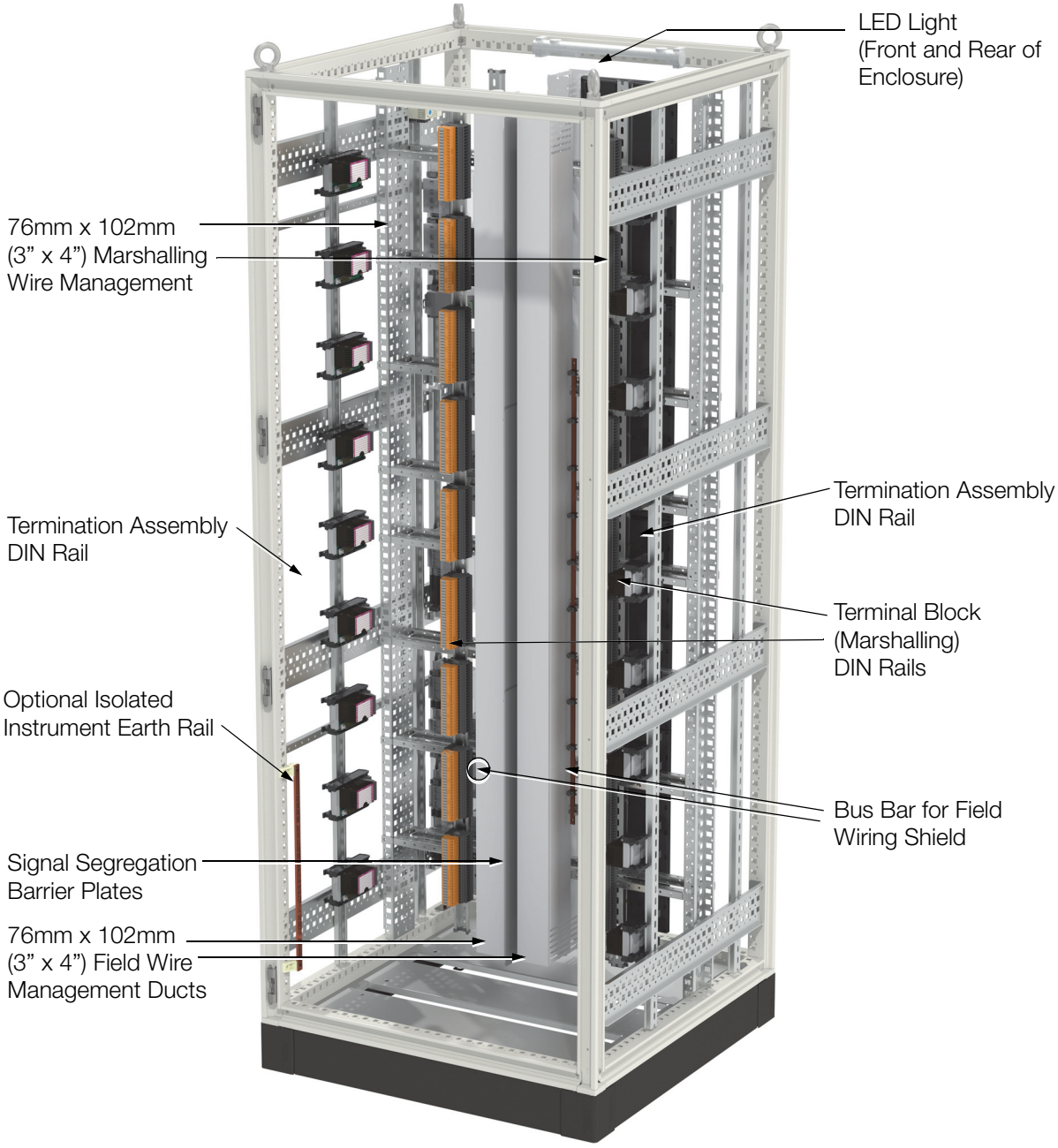


Figure 3. K12 System and Termination Enclosure, Rear View

ENCLOSURE FEATURES AND OPTIONS

The K12 enclosure is provided with the following features, some of which are optional.

Table 1. K12 Enclosure Features and Options

Feature	Availability
Base Enclosure	Vented IP 43/55 rated enclosure with single 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	Comfort handle with push-button or keylocks
Door Mounting	Universal mounting for left and right-hand door swing (left-hand is default)
Equipment Supported	Up to four 8-position Modular Baseplates for housing up to 32 FBMs One 2-position baseplate for FCMs/FCPs Single or redundant pair of FPS400-24 power supplies per Fieldbus I/O Group to support the baseplates Up to four DIN rails per enclosure available for mounting termination assemblies and customer-supplied terminal blocks for marshalling
Field Wiring	PVC or non-PVC wireways for field I/O signal cabling Optional signal segregation barrier plate for field signal isolation Optional bus bars for field wiring shields and/or DIN rail isolation
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 Optional isolated instrument rail for additional connectors

Table 1. K12 Enclosure Features and Options (Continued)

Feature	Availability
Main Power[a]	100-250 V ac, 50-60Hz, 125 V dc input primary only or primary and secondary power, or 100-250 V ac, 50-60Hz, 125 V dc input primary and 24 V dc secondary power, or 24 V dc input primary only or primary and secondary power Additionally, customer configured field power entry is supported (no terminal blocks supplied).
Field Power	Single or redundant field power supply, 100-250 V ac, 50-60Hz, 125 V dc input, or 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 sources 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 PSS 31H-2CERTS, *Standard and Compact 200 Series I/O - Agency Certification*s, 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 8-position Modular Baseplates for mounting Fieldbus Modules (FBMs)
- Vertically mounted 2-position baseplates for FCPs/FCMs
- Vertically mounted DIN rail mounted termination assemblies and customer-supplied terminal blocks for marshalling
- FPS400-24 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)
-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)
-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(1)

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 Temperature 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 for general purpose or sealed for Class 1 Division / Zone 2 Hazardous Locations.

(1) 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 x 800 mm - 253 kg (558 lb)

SIDE PANEL
800 mm x 800 mm - 19 kg (42 lb)

Mounting
Floor

CAUTION

To prevent injury, this enclosure must be bolted down. Refer to the B0700GN 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. Color is: textured RAL 7035 gray

Doors, Roof, Side Panels
Epoxy-polyester resin paint. Color is: textured RAL 7035 gray

Base/Plinth
Epoxy-polyester resin paint. Color is: 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)
An optional isolated bus bar for additional earth (ground) points.

Power Input Terminals
TYPE
Ring Lug

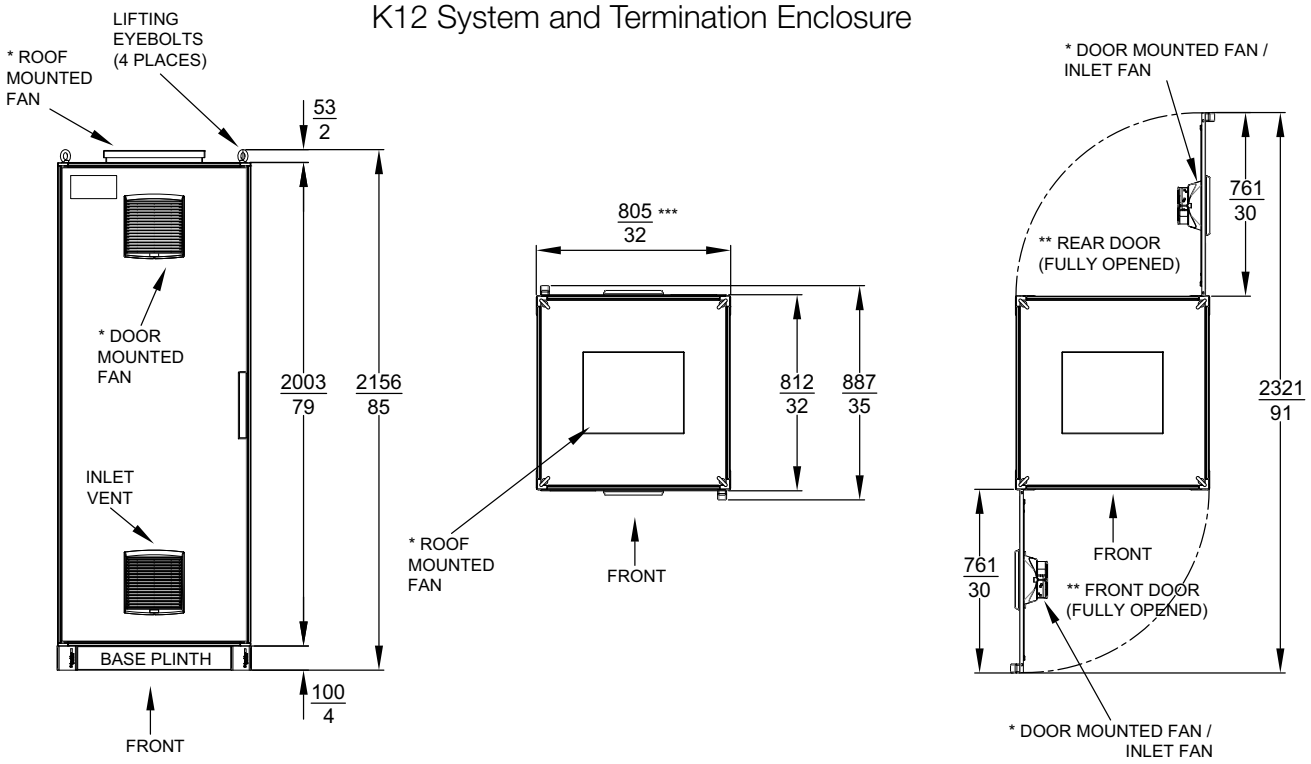
WIRE SIZE
Up to 6 mm^2 (10 AWG)

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

K12 System and 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 200 Series I/O equipment, 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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