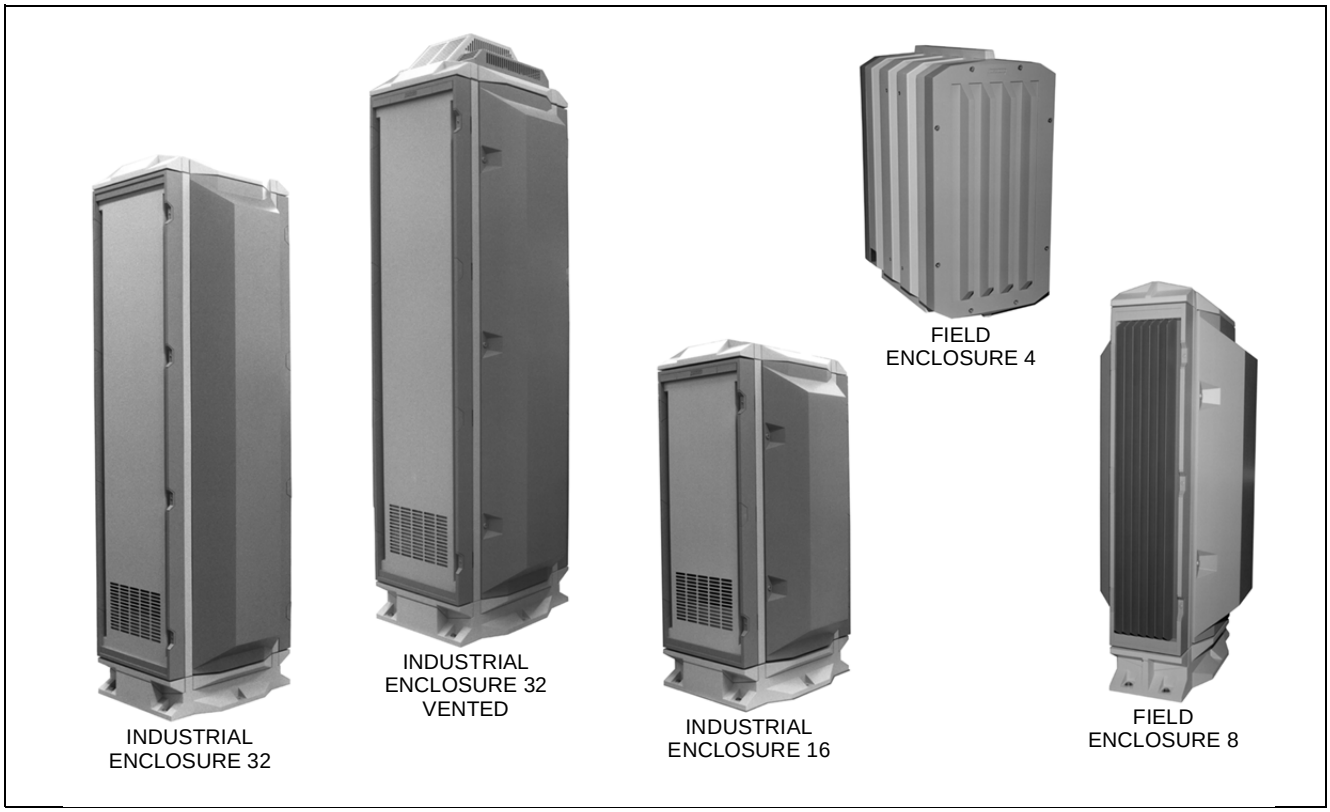
FOXBORO®

PSS 21H-5B1 B3

I/A Series® Hardware
Molded Structural Foam Enclosures



The I/A Series system structural foam enclosures extend the modular design of the system by providing a range of mounting capacities to match the application requirements. The innovative design of the packaging allows the control processor and Fieldbus Modules to be distributed closer to the process without the need for special environmentally conditioned control or equipment rooms.

I/A Series system enclosures offer the following features/options:

- Rugged protection to permit mounting into harsher environments
- Compact design to minimize use of floor space
- Modular design for distribution to reduce wiring costs
- Moisture and contaminant protection using noncorrosive structural foam construction and sealed doors.

ENVIRONMENTAL PROTECTION

The system enclosures provide the outer layer of protection for the control electronics. Other layers are provided by the module covers and protection within the module. 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.

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. Approximately 10 watts of heat is dissipated by each module, which can be removed via natural or forced convection, depending on the type of enclosure and plant safety requirements.

Vented doors can be installed for aesthetic purposes or other reasons, if desired. In severely contaminated environments, sealed doors can be installed. When this option is chosen, fans circulate the air within the enclosure to remove heat and transfer it to the interior surfaces of the doors. Heat is then dissipated by the door's exterior surfaces into the plant environment. Air is not exchanged between the enclosure's interior and the outside environment; therefore, contaminants are not brought inside the enclosure.

ELECTRONIC PACKAGING

The conversion, control, and communication circuits of the system are packaged in units referred to as modules. Each module performs a complete specific function (e.g., application processor or RTD interface), so that the repair of a failed function is localized to the single on-line, replaceable module, greatly reducing troubleshooting and repair time.

Modules are packaged distinctly as a 10, 20, 30, and 40 Series product (X- and Z-size modules), P-adaptors for mounting peripheral devices (e.g., floppy and hard drives), Fieldbus Modules (Y-size modules), 50 Series product (A-, B-, and D-size data storage devices, and Model 50/51, Style A, B, C, D, and E processors), and 70 Series processors. These modules have hardened exteriors for physical protection of the circuits. Heat generated within X-, Y-, and Z-size modules is conducted out of these modules via a heat sink, which is also the mounting surface for circuit components. Air is not passed over the components for cooling, but over the heat sinks, thus isolating them from possible contamination attack and early failure. Heat generated within the other modules is dispersed with a series of internal fans.

The Fieldbus Modules may be mounted indirectly via a Y-adaptor or directly into FBM mounting structures. They are intelligent field input/output modules, extenders and isolators.

The 50 Series A-, B-, D-size modules (data storage peripherals in rectangular shaped packaging) and Model 50/51 Style A, B, C, D, and E processors can be placed on a desktop or be mounted into an Industrial Enclosure via a Modular Mounting Structure (single or double height, depending on the unit size).

The 70 Series processors can be placed on a desktop or be mounted into an Industrial Enclosure via a dual-height Modular Mounting Structure.

ENCLOSURE TYPES

- Field Enclosure 4
- Field Enclosure 8
- Industrial Enclosure 16, Vented or Sealed
- Industrial Enclosure 32, Vented or Sealed
- Multiple (Bridged) Industrial Enclosure 32, Vented or Sealed

Field Enclosures

The molded structural foam field enclosures come in two types: the Field Enclosure 4 (FE4) which mounts directly on a pipe structure; and the Field Enclosure 8 (FE8) which mounts on a wall with a wall mounting unit or on the floor with a base unit.

Field Enclosure 4

The FE4, smallest of the enclosure types, contains four slots that accept from one to four Fieldbus Modules or three Fieldbus Modules and a pair of Fieldbus isolators. This enclosure mainly outputs into a remote field environment where the modules acquire input data, such as pressure and temperature measurements, or output signals to manipulate actuator devices at a remote site area.

The FE4 contains up to four power modules, all receiving power via wiring through its bottom section. Field I/O wires enter the enclosure in a similar manner and attach to Termination Cable Assemblies (TCAs) also residing in the bottom section.

The FE4 is available with two temperature range options—standard and extended range. Both options may be used outdoors in sheltered locations, and are also available for hazardous locations CSA/FM (Class 1, Division 2). A sheltered location is one in which the enclosure may be exposed to rain, but is sheltered from direct sunlight.

Field Enclosure 8

The FE8 contains eight slots which accept both processor and Fieldbus Modules. It distributes the outputs of the Fieldbus Modules and supports 10, 20, 30, and 40 Series processor modules used for local control of process units in remote areas.

The FE8 contains up to four power modules, all receiving power via wiring through its top or bottom section. Field I/O wires enter the enclosure in a similar manner, attach to TCAs mounted at the sides and are accessed via side doors. Bracket mounting of the field enclosure on a wall permits both top and bottom entry of field wiring via the bracket.

The FE8, a harsh environment type, is available with two temperature range options—standard and extended range. Both options may be used outdoors in sheltered locations and are also available for hazardous locations CSA/FM (Class 1, Division 2).

Industrial Enclosures

Industrial Enclosures are capable of supporting 70 Series, 50 Series, and 10, 20, 30, and 40 Series type processors and Fieldbus Modules; they contain TCAs mounted in the side areas that accept field signal wires which are accessible via the enclosure's side doors. These enclosures provide the user with medium to large application capabilities and increased modularity, and may be located in main equipment areas or be used as a node on a distributed control system. Industrial Enclosure 32 and Multiple (Bridged) Industrial Enclosure 32 are larger capacity types that provide greater packaging convenience. All the industrial enclosures are designed to be floor-mounted units.

Industrial Enclosure 16

The Industrial Enclosure 16 is a free standing, floor-mounted type containing 16 slots for mounting processor and Fieldbus modules; or 16 slots for containing Fieldbus modules only; or a dual-height Modular Mounting Structure (vented enclosures only) which accepts combinations of 50 Series Model 50/51, Style A, B, B1, and C processors and associated peripheral storage devices (A-, B-, and D-size modules).

Industrial Enclosure 32

The Industrial Enclosure 32 is a taller, free-standing, floor-mounted type that accepts processor and Fieldbus Modules. The Enclosure 32 can contain any of the following four configurations:

- 32 slots for processor and Fieldbus Modules only

or

- 32 slots for Fieldbus Modules only

or

- 16 slots for processor and Fieldbus Modules and 16 slots for Fieldbus Modules only or dual-height Modular Mounting Structure (vented enclosure only) which contain combinations of 70 Series and 50 Series processors (all styles) and associated peripheral storage devices (A-, B-, and D-size modules), and 16 slots for other processors and Fieldbus Modules

or

- Two dual-height Modular Mounting Structures (vented enclosure only) which contain only combinations of 70 Series processors, and 50 Series processors (all styles) and associated peripheral storage devices (A-, B-, and D-size modules).

Multiple (Bridged) Industrial Enclosure 32

The Multiple (Bridged) Industrial Enclosure 32 consists of two or more Industrial Enclosure 32 units, joined together with a bridging structure. It is a free-standing, floor-mounted type that supports all Termination Cable Assembly configurations.

POWER DISTRIBUTION ARCHITECTURE

The system enclosures support three types of power configurations with an optional power redundant system using the same modules, cabling, and buses as the nonredundant system. For critical loops which can be hazardous to a process or personnel, the most securely configurable power distribution is the nonstop power configuration. It has a dual-power feed feature providing redundancy protecting against any single-point power failures and additionally protecting all modules against mains, power modules, or internal shorts.

For process loops where continued operation on power module failure is necessary, the backup power configuration may be considered. It is a single power feed type with a single power module providing redundancy for up to four other power modules and a required battery memory backup. In this configuration, the battery memory backup provides up to 30 minutes of stand-by memory power for Fieldbus modules should the factory power fail.

The system also offers a single power feed battery backup configuration, which typically is used in non-critical loop applications. The main power is nonredundant, and includes a required battery memory backup. In this configuration, as in the previous one, the battery memory backup provides up to 30 minutes of stand-by memory power for Fieldbus Modules should the factory power fail.

Additionally, a single ac power transfer switch supports continuous operation of 50 Series devices within an enclosure by providing access to a reliable ac power source.

FIELD ENCLOSURES FUNCTIONAL SPECIFICATIONS

Enclosures (Note 1)
FE4
Sealed doors

Enclosures (Cont.)
FE8
Sealed doors

FIELD ENCLOSURES ENVIRONMENTAL SPECIFICATIONS

Operating Temperatures
FE4 (NOTE 7)
0 to 50°C (32 to 122°F)
FE4 W/EXTENDED TEMPERATURE RANGE (NOTES 2,3,7)
-30 to +50°C (-22 to +122°F)
FE8 W/EXTENDED TEMPERATURE RANGE (NOTES 2,4,6)
-30 to +50°C (-22 to +122°F)
FE8 STANDARD TEMPERATURE RANGE
0 to 50°C (32 to 122°F)
FE8 STANDARD TEMPERATURE RANGE W/PERIPHERALS (NOTE 5)
0 to 30°C (32 to 86°F)

Storage Temperature (All Enclosures)
-40 to +70°C (-40 to +158°F)

Contamination Class
FE4
Class GX (Severe) as defined in ISA Standard, S71.04
FE8
Class GX (Severe) as defined in ISA Standard, S71.04

Agency Certification
FE4/FE8 - FM/CSA Class 1, Division 2 with proper FBM selections (refer to Agency Certification PSS 21H-5E1 B3)

Relative Humidity
FE4
5 to 100% (condensing)
FE8
5 to 100% (condensing)

NOTES:
1. Sealed doors provide NEMA 4 moisture protection.
2. The extended temperature range option requires ac power.
3. The Field Enclosure 4 requires a 1/2 hour warm-up period from cold start at -30°C (-22°F).
4. The Field Enclosure 8 requires a 1 hour warm-up period from cold start at -30°C (-22°F).
5. Sealed doors provide peripheral devices with additional protection from airborne contamination.
6. Peripheral devices are not permitted in enclosures with extended temperature range.
7. Peripheral devices are not permitted in the FE4.

FIELD ENCLOSURES PHYSICAL SPECIFICATIONS

Mass (Fully Loaded)
FIELD ENCLOSURE 4
34 kg (75 lb)
FIELD ENCLOSURE 8
72.5 kg (160 lb)

Mounting
FIELD ENCLOSURE 4
Pipe or wall
FIELD ENCLOSURE 8
Wall; floor (with base)

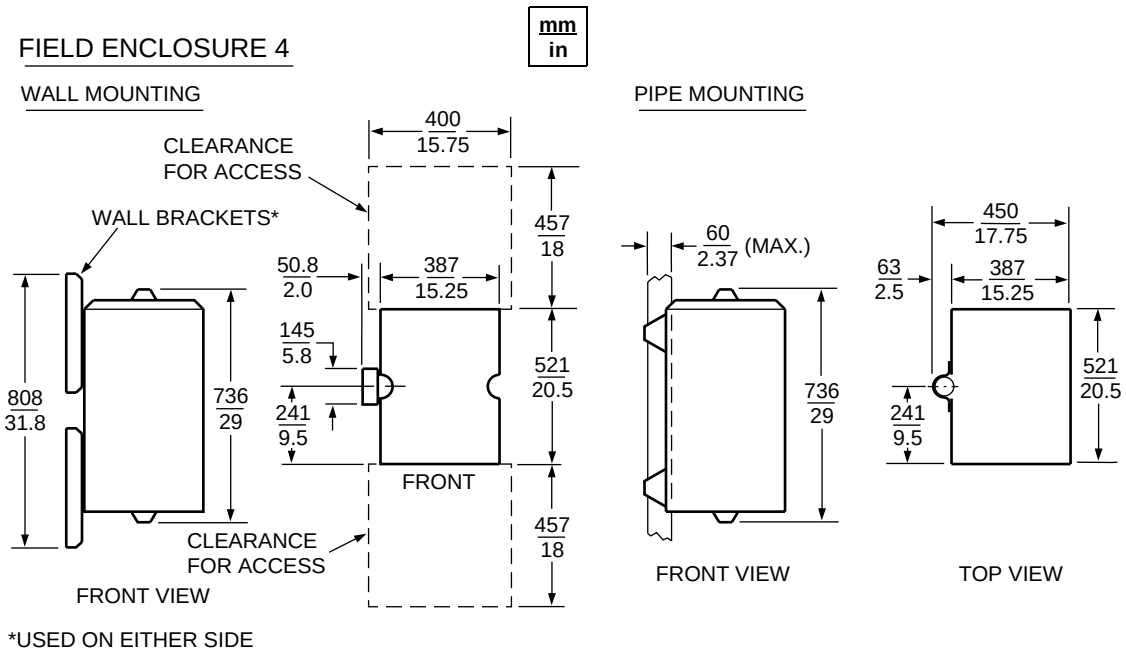
Construction
CASE (ALL ENCLOSURES)
Molded structural foam (See Note)
FIELD ENCLOSURE 4
Exterior covers—Molded structural foam with urethane top coat
FIELD ENCLOSURE 8
Door panels—Aluminum extrusions with epoxy powder top coat

Field-Wire Termination
FIELD ENCLOSURE 4
One direct termination per I/O module
FIELD ENCLOSURE 8
Floor-mounted (26 termination assemblies), wall configuration (13 termination assemblies—one side only)

Field Termination Connections
FIELD ENCLOSURE 4
Direct Connection Block
FIELD ENCLOSURE 8
Discrete wire block or 34-pin plug connector block (mates with Burndy MSD34 PM118 or equivalent)

NOTE Site chemical content levels should be evaluated prior to the selection of molded structural foam or metal enclosures. Structural foam enclosures are not recommended where there is continuous exposure to Halogenated/Aromatic Hydrocarbons, Esters, Ketones, or Amines. The steel cabinet enclosures are suited to these conditions. In contrast, the structural foam enclosures are more suited for corrosive and chloride (e.g., salt-based) environments.

DIMENSIONS—NOMINAL



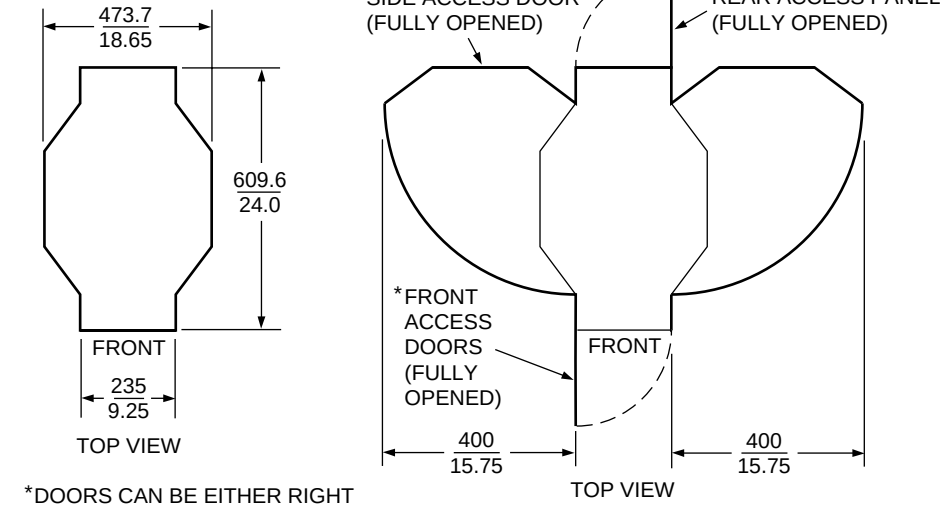
*USED ON EITHER SIDE

DIMENSIONS—NOMINAL

mm
in

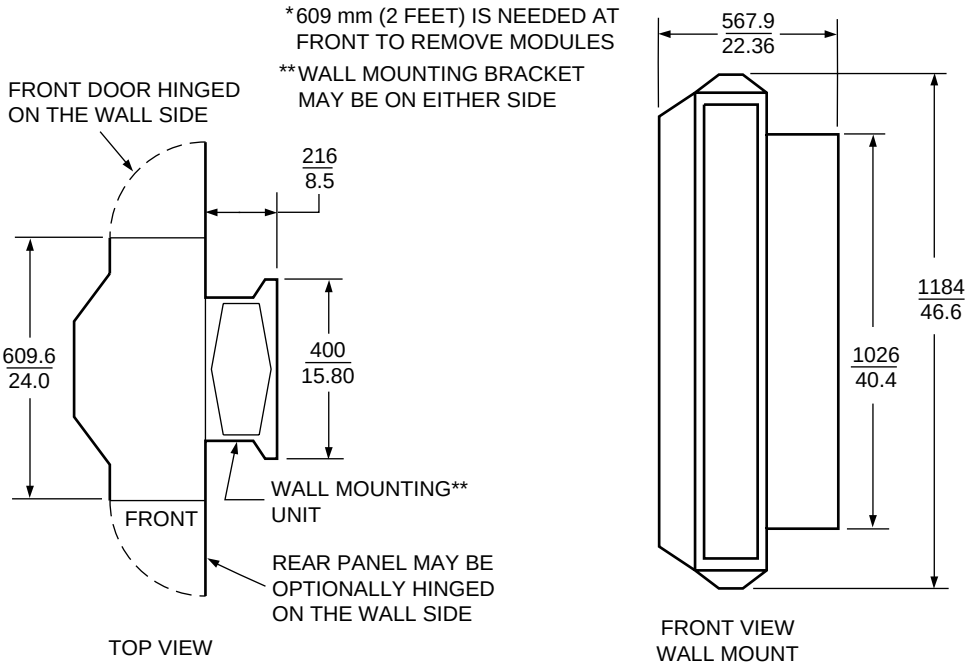
FIELD ENCLOSURE 8

BASE (FLOOR) MOUNTED:



*DOORS CAN BE EITHER RIGHT OR LEFT HAND OPENING

WALL-MOUNTED:



INDUSTRIAL ENCLOSURES FUNCTIONAL SPECIFICATIONS

Enclosures

IE16 AND IE16 W/FAN
Vented (Note 2)
IE16 W/FAN
Sealed doors (Notes 1, 3, 4)

IE32 AND IE32 W/FAN
Vented (Note 2)
IE32 W/FAN
Sealed doors (Notes 1, 3, 4)

INDUSTRIAL ENCLOSURES ENVIRONMENTAL SPECIFICATIONS

Operating Temperatures/ Max. Heat Dissipation	No Peripherals*		With Peripherals**			
			AP20 HD/ST/FD		50 Series Products	
Sealed IE16 (No ACA)	0 to 50°C (32 to 122°F)	195 W	N/A		N/A	
Sealed IE16 (W/ACA)	0 to 60°C (32 to 140°F)	195 W	0 to 35°C (32 to 95°F)	225 W	0 to 30°C (32 to 86°F)	140 W
Vented IE16	0 to 50°C (32 to 122°F)	195 W	0 to 40°C (32 to 104°F)	195 W	0 to 35°C (32 to 95°F)	250 W
Sealed IE32 (No ACA)	0 to 40°C (32 to 104°F)	420 W	N/A		N/A	
Sealed IE32 (W/ACA)	0 to 50°C (32 to 122°F)	420 W	0 to 30°C (32 to 86°F)	420 W	N/A	
Vented IE32	0 to 40°C (32 to 104°F)	420 W	0 to 40°C (32 to 104°F)	420 W	0 to 35°C (32 to 95°F)	500 W

* Total wattage and temperatures specified are the limits acceptable within an enclosure fully loaded with processor modules and/or high current Fieldbus Modules (FBM10 and FBM15, FBM11 and FBM16, FBM41 and FBM42).
**The wattage and temperature limits shown are imposed when any one peripheral is used. This limit includes the use of any other combination of modules and/or peripherals.

NOTE: Wattage listed only includes processor modules, Fieldbus Modules and peripherals.
Wattage for fans and power supply efficiencies is already included.

HD = Hard Drive; ST = Streaming Tape; FD = Floppy Disk

NOTES:

1. Sealed doors provide NEMA 12 moisture protection.
2. If peripheral devices are installed, contamination class and temperature range of the enclosure is derated to reflect specifications for these devices.
3. If peripheral devices are installed, temperature range of the enclosure is derated to reflect the specifications for these devices.
4. Sealed enclosures can optionally include Auxiliary Cooling Assemblies (ACA) on the front and rear of the enclosure. The ACA functions to cool the exterior exchanger doors without mixing external air with the enclosure's sealed interior air.

INDUSTRIAL ENCLOSURES ENVIRONMENTAL SPECIFICATIONS (CONT.)

Storage Temperature (All Enclosures)
-40 to +70°C (-40 to +158°F)

Relative Humidity
5 to 95% (noncondensing)

Contamination Class (See Note)
IE16 AND IE16 W/FAN - Harsh
IE16 W/FAN (SEALED) - Severe
IE32 AND IE32 W/FAN - Harsh
IE32 W/FAN (SEALED) - Severe

Agency Certification
FM/CSA (refer to Agency Cert. PSS 21H-5E1 B3)

NOTE:
Contamination Classifications:
Harsh = Class G3 as defined in ISA Standard, S71.04.
Severe = Class GX as defined in ISA Standard, S71.04.

INDUSTRIAL ENCLOSURES PHYSICAL SPECIFICATIONS

Mass (Fully Loaded)
INDUSTRIAL ENCLOSURE 16
124 kg (272.5 lb)
w/ACA* 130 kg (285.4 lb)
INDUSTRIAL ENCLOSURE 32
235.6 kg (516.1 lb)
w/ACA* 241 kg (531.1 lb)
MULTIPLE (BRIDGED) INDUSTRIAL ENCLOSURE 32
504 kg (1110 lb) - 2 units
w/ACA* 517 kg (1140 lb)

Mounting (All Enclosures)
Floor

Construction (All Enclosures)
CASE
Molded structural foam
DOOR PANELS
Steel with epoxy powder top coat

Field-Wire Termination
INDUSTRIAL ENCLOSURE 16
26 termination assemblies
INDUSTRIAL ENCLOSURE 32
44 termination assemblies
MULTIPLE (BRIDGED) INDUSTRIAL ENCLOSURE 32
32 plug connector assemblies per enclosure

Field Termination Connections
INDUSTRIAL ENCLOSURE 16 AND 32
Discrete wire block or 34-pin plug connector block (mates with Burndy MSD34 PM118 or equivalent)
MULTIPLE (BRIDGED) INDUSTRIAL ENCLOSURE 32
34-pin plug connector block (mates with Burndy MSD34 PM 118 or equivalent)

* ACA - Auxiliary Cooling Assembly optionally available for sealed enclosure only.

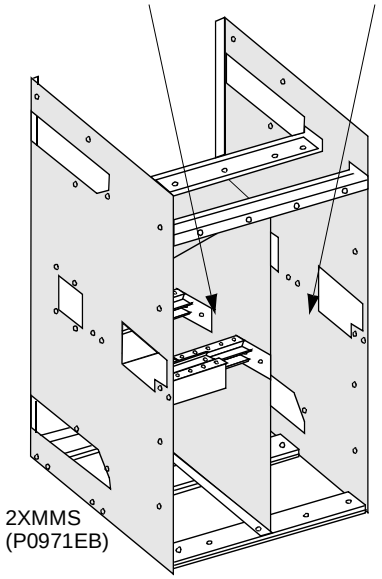
50 Series Product Configuration (Maximum Combined A-, B-, and D-size Modules per MMS)

# B[(a)] or D Modules	# A Modules
5	0
4	1
3	1
2	2
1	2
0	3

(a) * B- and D-size modules are approximately the same size.

LEFT SECTION
FOR A-SIZE, B-SIZE
AND D-SIZE MODULES

RIGHT SECTION
FOR C-SIZE, E-SIZE, F-SIZE
AND 70 SERIES* PROCESSORS



2XMMS
(P0971EB)

CONFIGURATIONS THAT OCCUPY ENTIRE 2XMMS

LEFT SECTION ONLY

A- OR D-SIZE		B- OR D-SIZE
1	AND	6
2	AND	5
2	AND	4
3	AND	3
4	AND	2
4	AND	1
4	AND	0

B- OR D-SIZE
7 OR 8

* 70 SERIES PROCESSORS ARE SIMILAR IN SHAPE TO E-SIZE PROCESSORS.

RIGHT SECTION ONLY

C-SIZE
4

C-SIZE		E-SIZE
1	AND	1

C-SIZE		F-SIZE
1	AND	2
2	AND	1

E-SIZE		F-SIZE
1	AND	1

NOTE: 50 SERIES E-SIZE AND 70 SERIES PROCESSORS CAN ONLY BE INSTALLED IN THE INDUSTRIAL ENCLOSURE 32.

CONFIGURATIONS THAT OCCUPY EACH SIDE OF 2XMMS

LEFT SECTION				RIGHT SECTION
A- OR D-SIZE		B- OR D-SIZE		C-SIZE
0	AND	6	AND	1
0	AND	5	AND	1
1	AND	4	AND	1
1	AND	3	AND	1
2	AND	2	AND	1
2	AND	1	AND	1
2	AND	0	AND	1
0	AND	4	AND	2
0	AND	3	AND	2
1	AND	2	AND	2
1	AND	1	AND	2
2	AND	0	AND	2
0	AND	2	AND	3
0	AND	1	AND	3

B- OR D-SIZE		E-SIZE
1 OR 2	AND	1

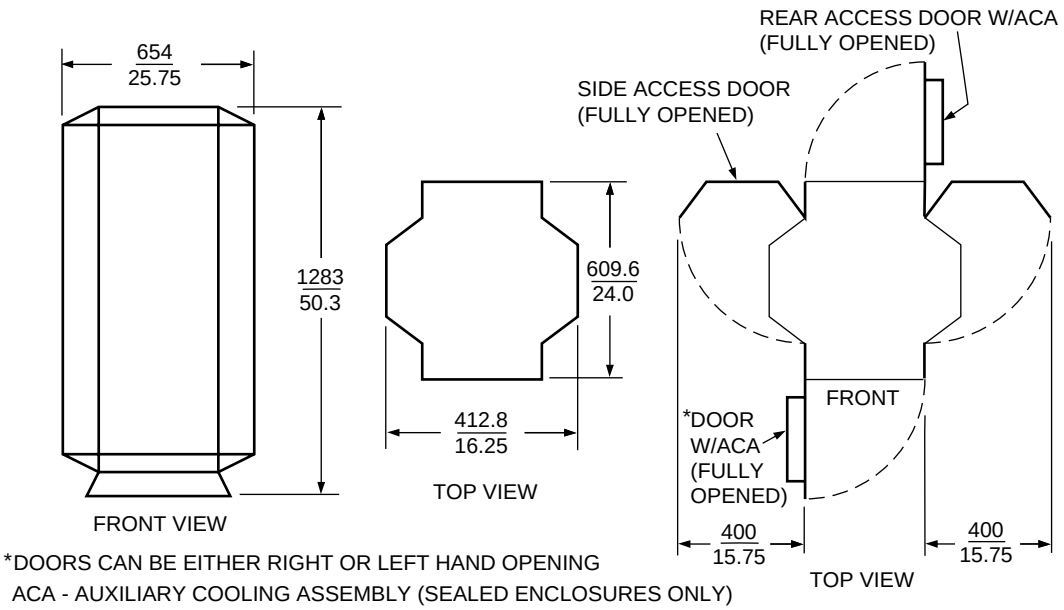
LEFT SECTION				RIGHT SECTION		
A- OR D-SIZE		B- OR D-SIZE		C-SIZE		F-SIZE
0	AND	4	AND	0	AND	1
0	AND	3	AND	0	AND	1
1	AND	2	AND	0	AND	1
1	AND	1	AND	0	AND	1
0	AND	2	AND	1	AND	1
0	AND	1	AND	1	AND	1
0	AND	2	AND	0	AND	2
0	AND	1	AND	0	AND	2

Figure 1. Maximum Number of Modules and Processors in 2xMMS in IE16/32 Enclosures

DIMENSIONS—NOMINAL

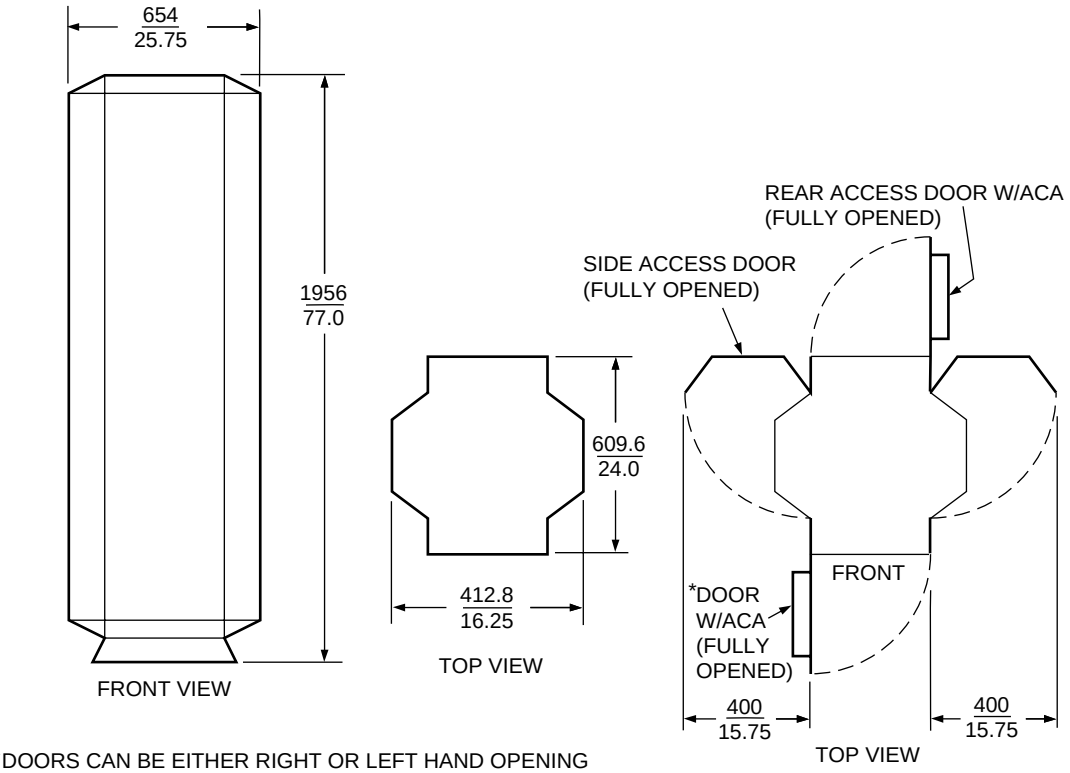
INDUSTRIAL ENCLOSURE 16

mm
in



*DOORS CAN BE EITHER RIGHT OR LEFT HAND OPENING
ACA - AUXILIARY COOLING ASSEMBLY (SEALED ENCLOSURES ONLY)

INDUSTRIAL ENCLOSURE 32

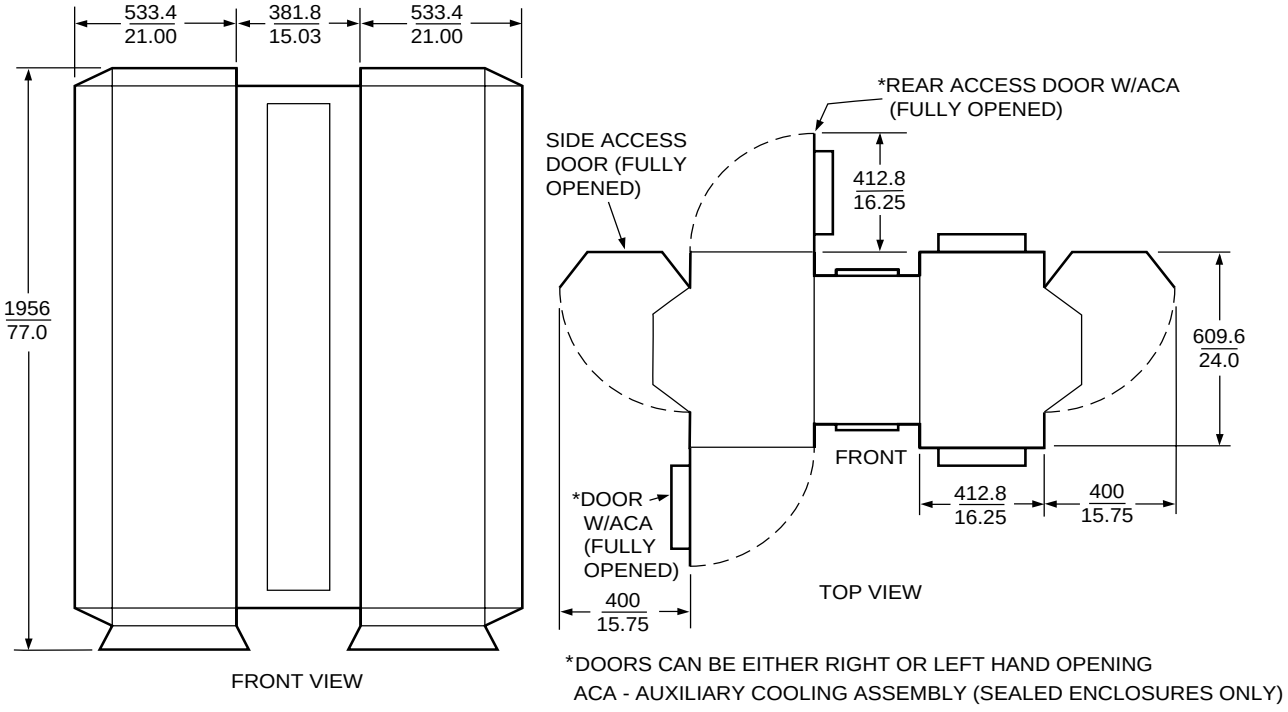


*DOORS CAN BE EITHER RIGHT OR LEFT HAND OPENING
ACA - AUXILIARY COOLING ASSEMBLY (SEALED ENCLOSURES ONLY)

DIMENSIONS—NOMINAL

mm
in

MULTIPLE (BRIDGED) INDUSTRIAL ENCLOSURE 32



*DOORS CAN BE EITHER RIGHT OR LEFT HAND OPENING
ACA - AUXILIARY COOLING ASSEMBLY (SEALED ENCLOSURES ONLY)

The Foxboro Company
33 Commercial Street
Foxboro, Massachusetts 02035-2099
United States of America
http://www.foxboro.com
Inside U.S.: 1-508-543-8750 or 1-888-FOXBORO (1-888-369-2676)
Outside U.S.: Contact your local Foxboro Representative.

MB 021 Printed in U.S.A. 1098