Magnum DS, SB and IEC low voltage power circuit breakers
Technical product guide

Powering Business Worldwide

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Overview of the Magnum low voltage circuit breaker

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Eaton's Magnum low voltage power circuit breakers have set industry standards for decades for the global market. The broad and powerful circuit breaker offering provides comprehensive solutions to meet and/or exceed the unique and wide-ranging requirements of today's power distribution systems.

This innovative circuit breaker offering is designed for ultimate performance, custom configuration, and application flexibility. Magnum circuit breakers combine many years of successful circuit breaker protection experience with the latest technological advances in circuit breaker, trip unit, and communications performance.

Ever since introducing the first microprocessor-based trip unit, Eaton has advanced the technology with its versatile family of Digitrip RMS trip units designed exclusively for Magnum circuit breakers. Customers have the capability of providing an electrical distribution system with:

- Superior programmable protection/coordination
- Advanced warning capabilities
- System diagnostics/ monitoring/communications

Eaton's Magnum family address the needs of a wide range of varying global application requirements. You will find product details, dimensional information, maintenance recommendations, and more when you take a closer look within this Magnum product guide.

Magnum consists of four product families. Each provides specific ratings, features and approvals to optimize performance in concert with the application:

- Magnum DS for ANSI rated switchgear applications
- Magnum SB for UL rated switchboard applications
- Magnum IEC for power distribution and switchboard applications
- Magnum DC switches for demanding UL or IEC rated DC applications

Magnum DS family

Magnum DS low voltage power circuit breakers are UL listed, designed, tested and certified to all applicable ANSI, NEMA, UL, CSA, IEC, EC and IEEE standards. Specifically, the circuit breakers meet or exceed the following:

- UL 1066
- ANSI C37.13
- ANSI C37.16
- ANSI C37.17
- ANSI C37.50
- IEC 60947-2 (ed.4)
- GB14048.2-2008
- CSA TIL No. D-34
  "Interim certification requirements for low voltage power circuit breakers".

In addition, Magnum DS is suitable for use in: UL 1558 "Certified Magnum DS low voltage metal-enclosed switchgear", UL 891 "Standard for LV switchboards", UL CSA TIL No. D-34. Refer to Figure 1 for a visual reference and Table 1 for a quick ratings reference.

Product family characteristics:

- Up to 635 Vac operating voltage
- Up to 200 kA interruption ratings
- Up to 130 kA short time withstand ratings
- 200–5000A continuous current
- Three- and four-pole configurations
- Fixed and drawout

Magnum DS low voltage circuit breakers

Table 1. Magnum DS ANSI breaker family ratings (Class UL 1066)

Interruption rating (kA) @ 508 Vac	800 Amp Frame	1200 Amp Frame	1600 Amp Frame	2000 Amp Frame	2500 Amp Frame	3200 Amp Frame	4000 Amp Frame	5000 Amp③ Frame
200								
130								
100								
85								
65								
50								
42								

① Interruption rating shown based on breaker equipped with integral Digitrip RMS trip unit.
② Refer to Section 2 for a detailed ratings table.
③ 6000A is available in fan cooled switchgear. See www.eaton.com/lva

= Magnum DS standard frame
= Magnum DS narrow frame
= Magnum DS double narrow frame
= Magnum DS double standard frame

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Magnum SB family

Magnum SB low voltage insulated case power circuit breakers are certified by UL 1066. The SB Family was designed for the performance and economic requirements of UL891 switchboard class applications overall. Refer to Figure 2 for a visual reference and Table 2 for a quick ratings reference.

Product family characteristics:

- Switchboard class
- Up to 635 Vac
- Three- and four-pole configurations
- Drawout and fixed mounted
- 200A to 5000A continuous current
- 50 kA to 150 kA interrupting ratings
- Short-time withstand up to 100 kA

Magnum SB insulated case circuit breakers

Table 2. Magnum SB insulated case breaker family ratings (Class UL 891)

Interruption rating (kA) @ 440 Vac Icu =Ics	800 Amp Frame	1200 Amp Frame	1600 Amp Frame	2000 Amp Frame	2500 Amp Frame	3000 Amp Frame	4000 Amp Frame	5000 Amp③ Frame
150								
130								
100								
85								
65								
50								

① Interruption rating shown based on breaker equipped with integral Digitrip RMS trip unit.
② Refer to Section 2 for a detailed ratings table.
③ 6000A is available in fan cooled switchgear. See www.eaton.com/lva

= Magnum SB standard frame
= Magnum SB narrow frame
= Magnum SB double narrow frame
= Magnum SB double standard frame

Magnum IEC family

Magnum IEC low voltage air circuit breakers are designed, tested and certified for IEC rated switchboards. They meet or exceed all applicable standards including EN/IEC 60947-2. Refer to Figure 3 for a visual reference and Table 3 for a quick ratings reference.

Product family characteristics:

- Up to 690 Vac operating voltage
- Up to 125 kA Icu =Ics at 440 Vac
- 200–6300A continuous current
- Three- and four-pole configurations
- Fixed and drawout

Magnum IEC low voltage fixed and drawout breakers

Table 3. Magnum IEC 60947-2 rated air circuit breakers

Interruption rating (kA) @ 440 Vac Icu =Ics	800 Amp Frame	1250 Amp Frame	1600 Amp Frame	2000 Amp Frame	2500 Amp Frame	3200 Amp Frame	4000 Amp Frame	5000 Amp Frame	6300 Amp Frame
125									
100									
85									
65									
50									
40									

① Interruption rating shown based on breaker equipped with integral Digitrip RMS trip unit.
③ Refer to Section 2 for a detailed ratings table.

= Magnum IEC standard frame
= Magnum IEC narrow frame
= Magnum IEC double narrow frame
= Magnum IEC double standard frame

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Magnum DC switch family

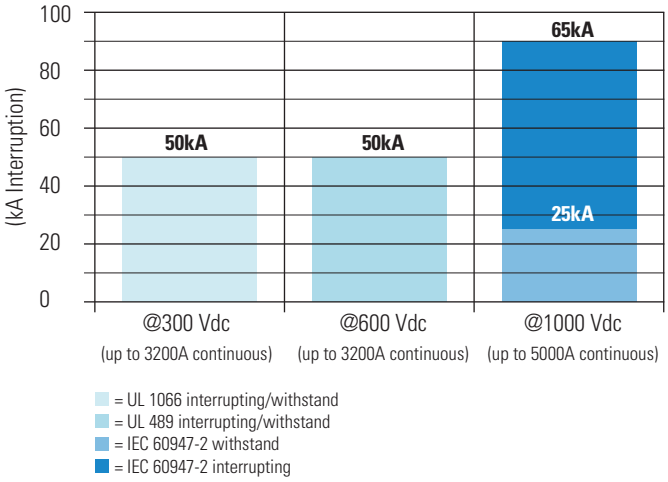
Magnum DC switches provide disconnect and switching capabilities to meet UL 1066, UL 489 and IEC 60947-2 standards. The switches share the same frames and accessories as the circuit breakers, but do not include trip units. Refer to Figure 4 for a visual reference and Figure 5 for a quick ratings reference.

Product family characteristics:

- Up to 1000 Vdc
- 800–3200A continuous current
- 50 to 65 kA withstand rating
- Fixed and drawout

Magnum DC switches

Magnum DC switch ratings



Universal family features

As mentioned, Magnum low voltage power circuit breakers consist of four product families. Although each family has its own unique performance and features, each Magnum breaker boasts a wide array of common design elements. These common design elements deliver proven performance with expanded capabilities, no matter which product family is applied. To fulfill the latest market needs with proven reliability and performance, Magnum is the clear choice for low voltage applications.

High performance interruption & withstand levels

Magnum provides Magnum provides large range withstand and interrupting ratings to maximize selectivity and system coordination.

- A range from 42kA up to 200 kA interrupting - application on power distribution systems with higher available fault currents.
- Up to 130 kA withstand (short-time) - total selectivity/selective coordination/discrimination between main, feeder, and branch circuit breakers.
- Current limiting performance - lower let-through currents for superior equipment protection.
- Optional Arc Flash Reduction Maintenance System (ARMS™) - reduces arc flash hazards and improves operator and maintenance safety.
- Circuit breakers performance tested - meet or exceed all applicable ANSI, NEMA, UL, CSA, IEC, EC and IEEE standards. Specifically, the circuit breakers meet or exceed the following: UL 1066, ANSI C37.13, ANSI C37.16, ANSI C37.17, ANSI C37.50, IEC 60947-2, GB14048.2-2008, and CSA TIL No. D-34.

Continuous current ratings

- 800 to 5000A (UL1066), 800 to 6300A (IEC) - ensuring maximum uptime over expansive frame rating range.
- 100% rated – designed for continuous operation at 100% of current rating.
- Reverse feed capable - top or bottom feed for multiple source applications.

Sizes, dimensions, weights and configurations

Magnum circuit breakers are available in four physical frame sizes, all centered around a modular design approach. The versatile Magnum design concept maximizes enclosure density with the same basic height and depth, differing only in width.

Note: For detailed Magnum breaker outline drawings, please refer to Section 11: Magnum drawings and outlines

- Narrow frame (800 – 2000 Amps): Promoting the most compact modular enclosures.

- Standard frame (800 – 3200 Amps): Ideally suited for vertically stacked modular construction.

- Double narrow frame (4000 Amps): Decreased footprint when space is at a premium.

- Double standard frame (3200 – 5000A): Ideal for main and tie applications.

Increased ratings in less space provide the flexibility to design more robust electrical distribution systems, capable of handling larger available fault currents while providing better coordination with downstream devices.

Table 4. Magnum family dimensions & weights

	Dimension type	Narrow frame	Standard frame	Double narrow frame	Double standard frame
Drawout version - (D/O in cass w/terminals) (mm/in)	Vol (dm^3/ft^3)	83.5/2.94	107.3/3.79	165.7/5.86	225.8/7.98
	Width (mm/in)	336/13.2	432/17.0	667/26.3	909/35.8
	Height (mm/in)	524/20.6	524/20.6	524/20.6	524/20.6
	Depth - w/o adapters (mm/in)	474/18.7	474/18.7	474/18.7	474/18.7
	Adapters are part of Cassette				
	Bkr + Cass=Total Wgt (lbs)	108 + 61 = 169	138 + 117 = 255	214 + 106 = 320	303 + 199 = 502
Pole spacing	Distance (mm/ in)	95/3.75	127/5.0	95/3.75	127/5.0
Fixed dimensions mm/in	Vol (dm^3/ft^3)	50.4/1.77	65.1/2.3	109.5/3.86	139.6/4.93
	Width (mm/in)	318/12.5	411.5/16.2	633/24.9	823/31.1
	Height (mm/in)	426/16.8	426/16.8	426/16.8	426/16.8
	Depth (mm/in)	371/14.6	371/14.6	415/16.3	415/16.3
	Weight - Fixed bkr (lbs)	95	118	177	237 253

Table 5. 4 Pole type

	Dimension type	Narrow frame	Standard frame	Double narrow frame	Double standard frame
Drawout version - (D/O in cass w/terminals) (mm/in)	Vol (dm^3/ft^3)	83.5/2.94	107.3/3.79	165.7/5.86	225.8/7.98
	Width (mm/in)	432/17.0	559/22.0	844/33.2	1163/45.8
	Height (mm/in)	524/20.6	524/20.6	524/20.6	524/20.6
	Depth - w/o adapters (mm/in)	474/18.7	474/18.7	474/18.7	474/18.7
	Adapters are part of Cassette				
	Bkr + Cass=Total Wgt (lbs)	136 + 70 = 206	194 + 123 = 317	214 + 106 = 320	366 + 250 = 616
Pole spacing	Distance (mm/ in)	95/3.75	127/5.0	95/3.75	127/5.0
Fixed dimensions mm/in	Vol (dm^3/ft^3)	50.4/1.77	65.1/2.3	109.5/3.86	139.6/4.93
	Width (mm/in)	413/16.3	538/21.2	824/32.4	1120/44.1
	Height (mm/in)	426/16.8	426/16.8	426/16.8	426/16.8
	Depth (mm/in)	371/14.6	371/14.6	415/16.3	415/16.3
	Weight - Fixed bkr (lbs)	120	160	177	319

Design configuration flexibility

The modular Magnum design affords customers the opportunity to meet the increasingly complex requirements of modern distribution systems.

- Fixed mounting: Standard horizontally mounted primary connections with vertical adapters available for other bus configurations. Integral mounting feet firmly secure the breaker in position.

- Drawout mounting: Zero clearance mounting provides for vertical stacking economy. DISCONNECT, TEST and CONNECT positions can be accessed with the door closed with clear visual indication of position.

- 3-Pole/4-Pole Configurations: Allows application to any system configuration and requirement.

- Through-the-door design: Provides access to trip unit, controls, indicators, and other operational functions with the door closed for operator safety and convenience.

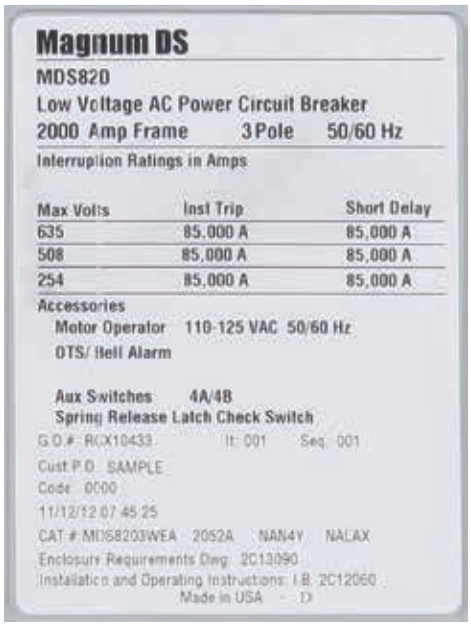
- Drawout breaker levering: Can be accomplished with compartment door closed using a standard 3/8 drive extension, without the need for special levering tool.

- Manually or electrically operated: The closing spring on all breakers can be charged manually. A stored energy spring can be charged by an optional electrical charging motor. Electrically operated Magnum breakers allow operation without manual charging which can allow application to remote switching, automatic transfer, load shed/add, and other advanced applications. The charging motor can be factory or field installed in a manually operated breaker.

User friendly front cover features

The front cover contains a conveniently accessible operating panel with clear words and symbols identifying functions while guiding operations. This intuitive interface permits an authorized operator to proceed with confident control and precise configurations.

- Prominently displayed nameplate provides important circuit breaker specific information. Magnum breakers must be applied within their nameplate ratings.



- Some field installable accessories easily identified by name and rating through viewing windows. They are the shunt trip, spring release and undervoltage release.

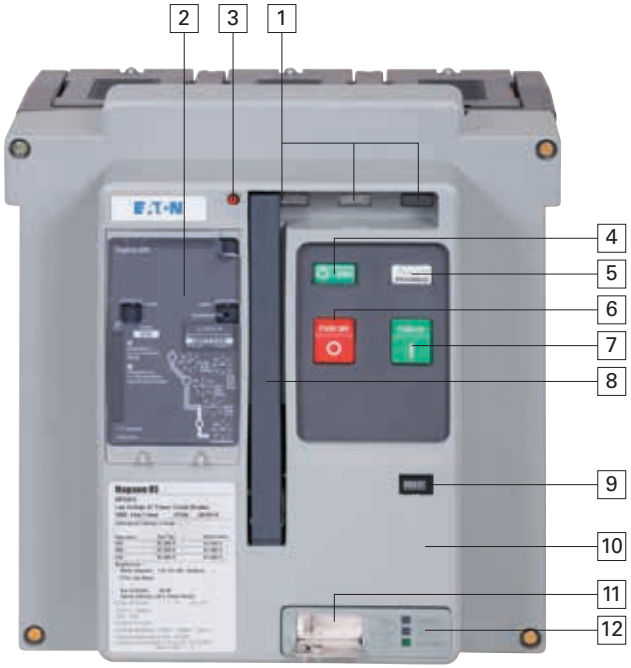
- Optional padlockable cover limits access to “ON” and “OFF” pushbuttons.

- Complete access to the “ON” pushbutton can be prevented with optional prevent close cover.
- Programmable Digitrip microprocessor-based true rms sensing trip unit, which provides protection, information, and communication choices.

Note: Non-automatic breakers (AC OR DC type disconnect switches) do not contain a trip unit or current sensors. They are covered in more depth later in this section. Refer to Section 7 for specific Digitrip trip unit and communication information.

Front cover details

Controls and indicators are functionally grouped on the breaker faceplate to optimize the user interface, visibility and ease of use. The modern, through-the-door design delivers maximum safety and convenience.



1. Accessory Viewing Windows for:
   - Shunt Trip Attachment (ST)
   - Spring Release Device (SR)
   - Undervoltage Release (UVR) Device or Second ST
2. Digitrip RMS Trip Units protected by clear cover, with thumb screw knobs that give provisions to wire tie the cover shut for extra security
3. Red Mechanical Trip Flag Pop-out Indicator (Optional)—Interlocked Indicator Requiring Manual Reset is also Available
4. Contact Status Indicators:
   - OPEN (Green)
   - CLOSED (Red)
5. Spring Status Indicators:
   - Charged (Yellow)
   - Discharged (White)
6. Push OFF (Open) Pushbutton (Red)
7. Push ON (Close) Pushbutton (Green)
8. Manual Spring Charging Handle: to charge stored energy springs
9. Mechanical Operations Counter (Optional)
10. Key Off Lock (Optional, not shown)
11. Padlockable Levering Device Shutter: for drawout breakers only
12. Color-Coded Position Indicator for drawout breakers:
    - CONNECT (Red)
    - TEST (Yellow)
    - DISCONNECT (Green)

Construction characteristics

From the inside out, safety is of paramount importance with special attention given to live parts insulation and segregation between phases. Careful selection of materials, meticulous assembly, rigorous testing, and unsurpassed experience make Magnum a proven reliable product.

Rigid frame housing

Magnum circuit breakers use a rigid frame housing construction of durable engineered thermoset composite resins.

- Strong and lightweight material with strength to weight ratio twice that of steel. Proven able to withstand high dynamic and thermal stresses.
- Excellent dielectric characteristics, resisting arc tracking.

Three piece construction

The 3-piece construction (rear housing, front housing, and cover) provides support while isolating and insulating power conductors

- A 2-piece case encloses current paths and arc chambers. Chambers act to channel arc gases up and out during interruption.
- The operating mechanism and accessories sit on the front of the case. Only the insulating front cover needs to be removed to access mechanism and/or accessories .
- The operating mechanism achieves a longer life as a result of reduced frame deflection during operation along with stiff component mounting.

Two-step stored energy mechanism

Magnum circuit breakers are equipped with a true 2-step stored energy mechanism.

- Closing springs can be charged manually or electrically.
- 5 to 7 downward strokes on the charging handle completes charging process.
- Mechanism provides for a complete OPEN – CLOSE – OPEN cycle.

Unsurpassed performance design

The performance characteristics of the Magnum breaker are attributed in many ways to a C-loop current path design and movement. Contact fingers perform both the main and arcing contact functions on different parts of the same finger. A complete movable contact assembly is a combination of a number of single contact fingers. The exact number of contact fingers required depends upon the frame size and interrupting rating of the breaker. Braided connectors (flexible shunts) are used to attach each contact finger. The result is an efficient and uniquely functional main contact system with the following advantages:

- Eliminate bolted joints reducing hot spots.
- Reduced mounting space for primary contacts.
- Smaller and lighter operating mechanism for longer life.
- Higher interrupting and short time (withstand) ratings.
- 5-cycle or less closing.
- Improved contact material.
- Contact wear indicator for each primary contact structure.
- Individually removable arc chambers insulate/isolate each pole.
- Able to withstand high dynamic and thermal stresses.

Value added features

Magnum provides numerous other internal and external features that further enhance the reliability, maintenance and safety of this industry leading product offering. A number of additional common features are highlighted below. See Section 7 for trip units, and Section 8 for accessories, for more in-depth information.

- Available Arcflash Reduction Maintenance System™ on Digitrip 520MC and 1150, to lower personnel risk and PPE levels in the arcflash boundary.
- Field installable trip units, sensors and accessories.
- Mechanical and electrical anti-pump features.
- Easily removable arc chutes for inspection.
- Common accessories for all frame sizes (electrical and mechanical).
- Automatic drawout primary shutters.
- Conveniently located finger proof secondary contacts.
- Will accommodate a variety of primary terminal types/ configurations.

Breaker mounting configurations

Most Magnum circuit breakers are available in both fixed and drawout configurations. In a small number of instances, however, only a fixed configuration is available.

Fixed mounted breakers

All Magnum circuit breakers, except for the MDSL breaker, can be fixed mounted. The breaker bolts directly to the enclosure main bus, which allows for efficient current transfer under loaded conditions. Metal mounting feet are provided as a standard feature for use in securely bolting the breaker to the enclosure. Fixed circuit breaker construction is simple and economic because there are no drawout system components.

A fixed circuit breaker is supplied with horizontal, pre-drilled primary terminal pads for terminating the breaker to the bus.

Note: Optional vertical primary adapters are available to accommodate different bus configurations. See Section 11 for a complete overview of detailed dimensions.

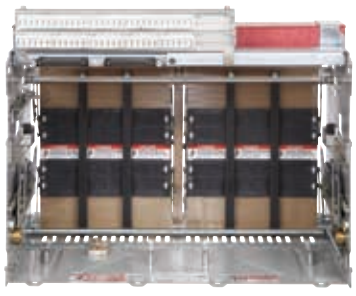
Drawout mounting

A drawout circuit breaker is used in combination with a cassette. The cassette provides for all the required drawout features for both primary and secondary connections. Mounting locations for cassette mounted cell switches, primary safety shutters and various key interlocks are part of the cassette design, to allow for customized customer options. Refer to Section 11 for specific drawout circuit breaker and cassette dimensions.

Cassettes – Available styles

Narrow frame Cassettes (for narrow frame and double narrow frame breakers)

For narrow frame circuit breakers, there is one type of cassette design, which uses horizontal stabs. Horizontal customer busbar terminals are available (sold separately). Optional bolt-on 90-degree adapters can be used to rotate the cassette's primary terminals to a vertical orientation as required.



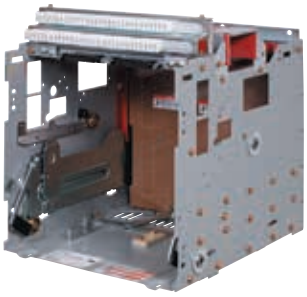
Standard frame Cassettes (for standard frame and double standard frame breakers)

For standard and double frame circuit breakers, there are three cassette styles, all with vertical stabs available:

- **Basic Cassette with copper stabs** - This cassette comes with factory installed copper stab/terminals on the cassette.

- **Basic Cassette without copper stabs** - The basic cassette can also be ordered without factory supplied copper stab/terminals. Ordering without stabs allows the switchgear builder to integrate the cassette by using their vertical busbars.

- **Universal Cassette** - A set of flat pad terminals on the rear of the cassette are provided. They can be adapted to vertical, horizontal, or front connection.



Note: The MDSL circuit breaker with integral current limiters is 6.00 inches (152.4 mm) deeper than the MDS or MDSX circuit breaker. Therefore, the MDSL cassette is 6.00 inches (152.4 mm) deeper than the standard MDS cassette. It is available in drawout only.

Renewal parts for extended life and longevity

There are many parts and kits available to assist customers to maintain and increase the life of their investment in their Magnum low voltage breakers. Please refer to the Renewal Parts Guide found here or in the documents section on www.eaton.com/magnum.

Standards and certifications

The Magnum DS family (identified as a medium gray front cover) of low voltage power circuit breakers is ANSI designed, tested and certified to UL 1066. UL 1066 Listed type DS low voltage power circuit breakers are intended to provide main and feeder circuit protection in accordance with UL1066 "Standard for Safety for Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures".

UL and ANSI test certifications

Magnum DS meets or exceeds the applicable ANSI, NEMA®, UL and CSA® standards, including:

- ANSI C37.13 "Low Voltage AC Power Circuit Breakers Used in Enclosures"
- ANSI C37.16 "Preferred Ratings, Related Requirements, and Application Recommendations for Low Voltage Power Circuit Breakers and AC Power Circuit Breakers"
- ANSI C37.17 "Trip Devices for AC and General Purpose DC Low Voltage Power Circuit Breakers"
- ANSI C37.50 "Test Procedures for Low Voltage AC Power Circuit Breakers Used in Enclosures"
- UL 1066 "Standard for Low Voltage AC and DC Power Circuit Breakers Used in Enclosures"
- CSA TIL No. D-34 "Interim Certification Requirements for Low Voltage Power Circuit Breakers".

Comprehensive enclosure solutions

Magnum DS has proven performance in Eaton manufactured switchgear with the following test certifications:

- UL 1558 "Certified Magnum DS Low Voltage Metal-Enclosed Switchgear"
- UL 1008 "Standard for Safety Transfer Switch Equipment"
- C22.2 No. 31-14 Switchgear Assemblies

Approvals and marks

- UL listed: Magnum DS Breaker UL File No. E52096 and Cassette UL File No. E204565
- ABS (American Bureau of Shipping) Type Listed Certificate Number 04-HS422844A-DUB
- Additional Magnum DS approvals and certificates can be found on www.eaton.com

Magnum DS family

Selection and identification of ratings for Magnum DS

Nameplate identification and markings

It is always advisable to be familiar with the location and information provided on a breaker's nameplate. All low voltage power circuit breakers must be applied within their nameplate ratings. Nameplates are prominently displayed on the front of the circuit breaker, and provide important information relative to that specific circuit breaker.

A Magnum DS circuit breaker is easily identified by its specific nameplate designation. Review the nameplate example provided below.

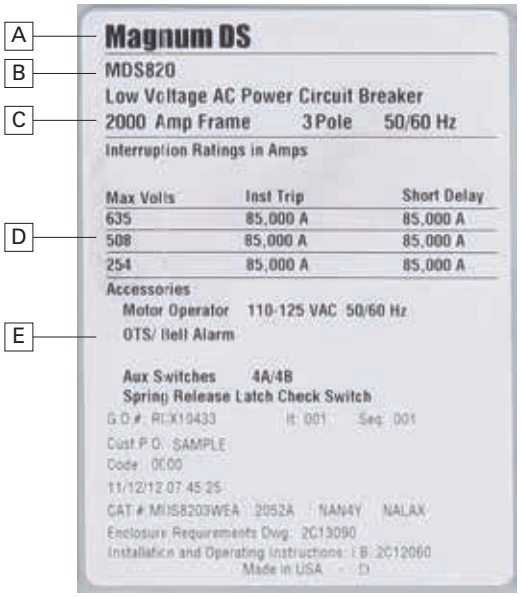
A. Low voltage power circuit breaker family name

B. Breaker family designation number

C. Breaker frame size in amperes

D. Interrupting capacity rating

E. Factory equipped accessories



Catalog number selection

A Magnum DS circuit breaker is defined by a 25 character catalog number created through a simple selection process from to these applicable tables. If the breaker is a drawout breaker, the associated drawout cassette would be defined by a 15 character catalog number. The cassette selection process is similar with selections made from cassette configuration table.

Note: The selection examples shown at the top of each table. UL and ANSI test certifications.

Magnum DS ANSI breaker product family
(first 14 of 25 digits, see next page for 15-25 digits)

MD S 4 12 3 V E A 06 MU

Breaker type
MD = Magnum DS

Frame type
S = Standard or double
N = Narrow or double = narrow
D = MDDX only
E = High endurance

Interrupting/ withstand rating
4 = 42
5 = 50
6 = 65
8 = 85
C = 100
H = 130 (DSH)
E = 150 (DSE)
X = 200 (DSX/DDX)
L = 200 (DSL)

Continuous amperes and phasing (facing front of breaker)
08 = 800 ABC
12 = 1200 ABC
16 = 1600 ABC
20 = 2000 ABC
25 = 2500 ABC
30 = 3000 ABC
32 = 3200 ABC or ABCABC
3N = 3200 AABBCC
4N = 4000 AABBCC
5N = 5000 AABBCC
40 = 4000 ABCABC
50 = 5000 ABCABC

Poles and neutral (facing front of breaker)
3 = Three
4 = Four (neutral left)

Mounting configuration and load terminals
H = Fixed horizontal
V = Fixed vertical
L = Drawout (MDN)
W = Drawout (MDS)

Nameplate language
E = English
A = Spanish

Sensor and rating plug rating

NN	= None	**12**	= 1200
01	= 100	**13**	= 1250
02	= 200	**16**	= 1600
05	= 250	**20**	= 2000
03	= 300	**25**	= 2500
04	= 400	**30**	= 3000
06	= 600	**32**	= 3200
08	= 800	**40**	= 4000
10	= 1000	**50**	= 5000

Current limiter selection
A = Non-DSL (no limiter)
D = MA250
E = MA300
F = MA400
G = MA600
H = MA800
K = MB1200
L = MB1600
M = MB2000
N = MD2500
P = MD3000

Trip unit and protection, and external control voltage when required
NN = Non-automatic (no trip unit)
52 = 520 LSI
5G = 520 LSIG
M2 = 520M LSI
MT = 520M LSI (24/48 Vdc)
MU = 520M LSI (120 Vac)
MV = 520M LSI (240 Vac)
MQ = 520M LSI (125 Vdc)
MG = 520M LSIG
MH = 520M LSIG (24/48 Vdc)
MM = 520M LSIG (120 Vac)
MN = 520 LSIG (240 Vac)
MX = 520M LSIG (125 Vdc)
ME = 520M LSIA (24/48 Vdc)
MC = 520 LSIA (120 Vac)
MF = 520M LSIA (240 Vac)
MZ = 520M LSIA (125 Vdc)
CT = 520MC LSI (24/48 Vdc)
CU = 520MC LSI (120 Vac)
CV = 520MC LSI (240 Vac)
CQ = 520MC LSI (125 Vdc)
CH = 520MC LSIG (24/48 Vdc)
CM = 520MC LSIG (120 Vac)
CN = 520MC LSIG (240 Vac)
CX = 520MC LSIG (125 Vdc)
CE = 520MC LSIA (24/48 Vdc)
CC = 520MC LSIA (120 Vac)
CF = 520MC LSIA (240 Vac)
CY = 520MC LSIA (125 Vdc)
1A = 1150 LSI (24/48 Vdc)
1C = 1150 LSI (120 Vac)
1E = 1150 LSI (240 Vac)
1Q = 1150 LSI (125 Vdc)
1F = 1150 LSIG (24/48 Vdc)
1G = 1150 LSIG (120 Vac)
1H = 1150 LSIG (240 Vac)
1X = 1150 LSIG (125 Vdc)
1J = 1150 LSIA (24/48 Vdc)
1K = 1150 LSIA (120 Vac)
1M 1150 LSIA (240 Vac)
1Y = 1150 LSIA (125 Vdc)

Magnum DS ANSI breaker product family continued (15 through 25)

A W C H N E H K L A X

Shunt Trip (ST)

- **N** = None
- **A** = 110–127 Vac/Vdc
- **R** = 208–240 Vac/Vdc
- **C** = 24 Vdc
- **H** = 48 Vdc
- **B** = 110–127 Vac/Vdc (100% duty)
- **S** = 220–250 Vac/Vdc (100% duty)
- **D** = 24 Vdc (100% duty)
- **K** = 48 Vdc (100% duty)
- **J** = 60 Vdc (100% duty)
- **6** = 60 Vdc

Motor operator

- **M** = Manual operated
- **N** = 110–125 Vac (5-sec)
- **W** = 110–125 Vdc (5-sec)
- **T** = 220–250 Vdc (5-sec)
- **P** = 208–277 Vac (5-sec)
- **L** = 24 Vdc (5-sec)
- **K** = 48 Vdc (5-sec)
- **S** = 60 Vdc (5-sec)
- **1** = 110–125 Vac (3-sec)
- **2** = 220–250 Vac (3-sec)
- **4** = 24 Vdc (3-sec)
- **8** = 48 Vdc (3-sec)
- **5** = 110–125 Vdc (3-sec)
- **9** = 220–250 Vdc (3-sec)

Spring Release Device (SRD)

- **N** = None
- **A** = 110–127 Vac/Vdc
- **R** = 208–240 Vac/Vdc
- **C** = 24 Vdc
- **H** = 48 Vdc
- **S** = 60 Vdc

Undervoltage Release (UVR) or 2nd Shunt Trip (ST)

- **N** = None
- **A** = UVR (110–127 Vac)
- **R** = UVR (208–240 Vac)
- **C** = UVR (24 Vdc)
- **H** = UVR (48 Vdc)
- **D** = UVR (60 Vdc)
- **E** = UVR (110–125 Vdc)
- **F** = UVR (220–250 Vdc)
- **G** = UVR (32 Vdc)
- **X** = UVR (380–415 Vac)
- **J** = UVR (480 Vac)
- **K** = UVR (600 Vac)
- **1** = 2nd ST (110–127 Vac Vdc)
- **2** = 2nd ST (208–250 Vac Vdc)
- **3** = 2nd ST (24 Vdc)
- **4** = 2nd ST (48 Vdc)
- **6** = 2nd ST (60 Vdc)
- **B** = 2nd ST (110–127 Vac/Vdc 100% duty)
- **O** = 2nd ST (220–250 Vac/Vdc 100% duty)
- **I** = 2nd ST (24 Vdc 100% duty)
- **Q** = 2nd ST (48 Vdc 100% duty)
- **9** = 2nd ST (60 Vdc 100% duty)

Auxiliary switch

- **N** = None
- **2** = 2A/2B
- **4** = 4A/4B
- **6** = 6A/6B

Bell Alarms Switch (OTS) with 2a/2b contacts and/or mechanical trip indicator

	Mech. trip indicator	Mech. inter-lock for manual reset	OTS switch with two form C contacts
E =	No	—	No
N =	Yes	No	No
Y =	Yes	No	Yes
M =	Yes	Yes	No
L =	Yes	Yes	Yes
F =	Yes	No	Yes with 24V reset
G =	Yes	No	Yes with 120V reset
H =	Yes	No	Yes with 240V reset
I =	Yes	Yes	Yes with 24V reset
J =	Yes	Yes	Yes with 120V reset
K =	Yes	Yes	Yes with 240V reset

Padlock provisions for blocking close and/or open ACB manual pushbuttons

- **N** = None
- **M** = Metal (block close and open)
- **P** = Plastic (block close and open)
- **C** = Metal (block close only)
- **H** = Plastic (block close only)
- **S** = Metal swbd lock-off (block close, depress open)

Operations counter and/or keylock provisions

	Counter	Keylock provisions
N =	No counter	No locks
K =	No counter	Kirk lock
C =	No counter	Castell lock
R =	No counter	Ronis lock
S =	No counter	CES lock
A =	Counter	No lock
Y =	Counter	Kirk lock
L =	Counter	Castell lock
H =	Counter	Ronis lock indicator
E =	Counter	CES lock

Latch check switch/trip unit metering voltage connection for digitrip 1150 trip unit

	Latch check switch	1150 voltage connection
N =	None	Upper terminals
M =	None	Lower terminals
L =	LCS wired to SRD	Upper terminals
Y =	LCS Wired to SRD	Lower terminals
C =	LCS Wired External	Upper terminals
D =	LCS Wired External	Lower terminals

Frame use

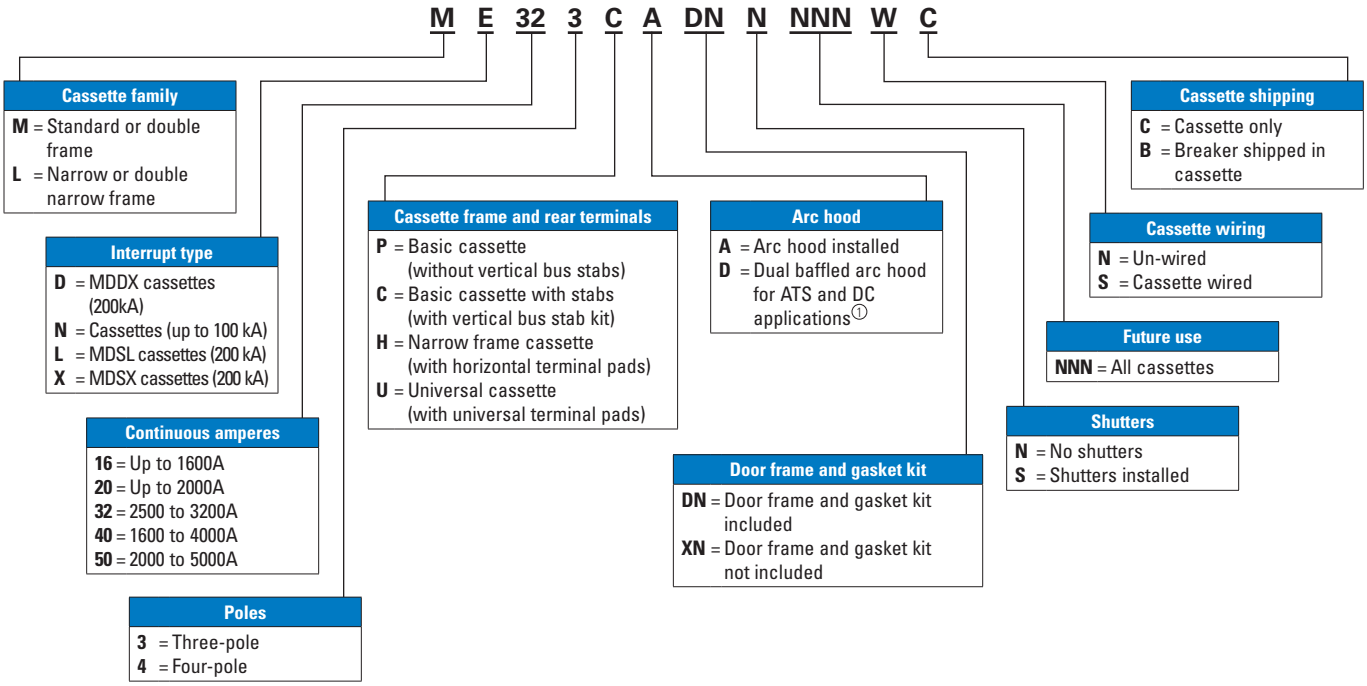
- **X** = All breakers

Breaker shipping options and instructions

- **A** = Fixed breaker alone with door kit
- **B** = Fixed breaker alone with door kit and pre-wired
- **F** = Fixed breaker alone without door kit
- **A** = Drawout breaker alone without door frame kit
- **C** = Drawout breaker in cassette (un-wired)
- **P** = Drawout breaker in cassette (shutters)
- **S** = Drawout breaker in cassette (shutters)
- **W** = Drawout breaker in cassette (pre-wired and shutters)

Double frame drawout breakers cannot ship in cassette without cassette drawout.

Cassette Magnum DS ANSI breaker product family



① The arc hood option 'D' is recommended for use of ATS applications as well as on Magnum ANSI DC breakers, 'DAS' and 'DBS' configurations

Magnum DS - Continuous amperage, interruption and withstand ratings tables

Table 6. Magnum DS switchgear class UL 1066 low voltage power circuit breakers ANSI

			rms Symmetrical current ratings kA 50/60 Hz①						Available current sensor and rating plugs for digitrip rms trip unit (establishes breaker I_n rating)	
Frame amperes	Breaker type catalog position 1–6	Frame type	Interruption rating at 254 Vac	Interruption rating at 508 Vac	Interruption rating at 635 Vac	Short time withstand rating @254/ 508Vac	Short time withstand rating @635Vac	Fixed internal inst trip		Poles available
800	MDN-408	Narrow	42	42	42	42	42	n/a	200, 250, 300, 400, 600, 800	3 & 4
	MDN-508	Narrow	50	50	50	50	50	n/a		3 & 4
	MDN-608	Narrow	65	65	65	65	65	n/a		3 & 4
	MDN-C08	Narrow	100	100	65	20	20	18xIn		3 & 4
	MDS-408	Standard	42	42	42	42	42	n/a		3 & 4
	MDS-508	Standard	50	50	50	50	50	n/a		3 & 4
	MDS-608	Standard	65	65	65	65	65	n/a		3 & 4
	MDS-808	Standard	85	85	85	85	85	n/a		3 & 4
	MDS-C08	Standard	100	100	100	85	85	85		3 & 4
	MDS-H08	Standard	130	130	130	85	85	85		3
	MDS-L08②	Standard	200	200	200	②	②	n/a		3
	MDS-X08③⑥	Standard	200	200	65	30	30	30		3
1200	MDN-412	Narrow	42	42	42	42	42	n/a	200, 250, 300, 400, 600, 800, 1000, 1200	3 & 4
	MDN-512	Narrow	50	50	50	50	50	n/a		3 & 4
	MDN-612	Narrow	65	65	65	65	65	n/a		3 & 4
	MDN-C12	Narrow	100	100	65	25	25	18xIn		3 & 4
	MDS-X12	Standard	200	200	65	30	30	30		3 & 4
	MDS-512	Standard	50	50	50	50	50	n/a		3 & 4
	MDS-612	Standard	65	65	65	65	65	n/a		3 & 4
	MDS-812	Standard	85	85	85	85	85	n/a		3 & 4
	MDS-C12	Standard	100	100	100	85	85	n/a		3 & 4
	MDS-H12	Standard	130	130	130	85	85	85	200, 250, 300, 400, 600, 800, 1000, 1200, 1600	3
1600	MDN-416	Narrow	42	42	42	42	42	n/a		3 & 4
	MDN-516	Narrow	50	50	50	50	50	n/a		3 & 4
	MDN-616	Narrow	65	65	65	65	65	n/a		3 & 4
	MDN-C16	Narrow	100	100	65	30	30	18xIn		3 & 4
	MDS-516	Standard	50	50	50	50	50	n/a		3 & 4
	MDS-616	Standard	65	65	65	65	65	n/a		3 & 4
	MDS-816	Standard	85	85	85	85	85	n/a		3 & 4
	MDS-C16	Standard	100	100	100	85	85	85		3 & 4
	MDS-H16	Standard	130	130	130	85	85	85		3
	MDS-L16②	Standard	200	200	200	②	②	n/a		3
	MDS-X16③	Standard	200	200	65	30	30	30		3

① Interrupting ratings shown based on breaker equipped with integral Digitrip™ rms trip unit. Interruption ratings for non-automatic breakers are equal to the published withstand rating.

② Magnum MDSL current limiting power circuit breaker with integral current limiters. Current limiter selected determines short time and fixed instantaneous trip rating.

③ Magnum MDSX current limiting power circuit breaker with fast opening contacts.

④ Product to be tested. Contact Eaton for product rating.

⑤ Breaker applied in a tested fan cooled enclosure.

⑥ Not released.

Table 6. Magnum DS switchgear class UL 1066 low voltage power circuit breakers ANSI continued

			rms Symmetrical current ratings kA 50/60 Hz①							
Frame amperes	**Breaker type catalog position 1–6**	**Frame type**	**Interruption rating at 254 Vac**	**Interruption rating at 508 Vac**	**Interruption rating at 635 Vac**	**Short time withstand rating @254/ 508Vac**	**Short time withstand rating @635Vac**	**Fixed internal inst trip**	**Available current sensor and rating plugs for digitrip rms trip unit (establishes breaker I_n rating)**	**Poles available**
2000	MDN-620	Narrow	65	65	65	65	65	n/a	200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000	3 & 4
	MDN-C20	Narrow	100	100	65	35	35	18xIn		3 & 4
	MDS-620	Standard	65	65	65	65	65	n/a		3 & 4
	MDS-820	Standard	85	85	85	85	85	n/a		3 & 4
	MDS-C20	Standard	100	100	100	85	85	85		3 & 4
	MDS-H20	Standard	130	130	130	85	85	85		3
	MDS-L20②	Standard	200	200	200	②	②	n/a		3
	MDS-X20③	Standard	200	200	65	30	30	30		3
2500	MDS-625	Standard	65	65	65	65	65	n/a	200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000, 2500	3 & 4
	MDS-825	Standard	85	85	85	85	85	n/a		3 & 4
	MDS-C25	Standard	100	100	100	100	85	85		3 & 4
	MDS-H25	Standard	130	130	130	85	85	85		3
3200	MDS-632	Standard	65	65	65	65	65	n/a	200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000, 2500, 3200	3 & 4
	MDS-832	Standard	85	85	85	85	85	n/a		3 & 4
	MDS-C32	Standard	100	100	100	85	85	85		3 & 4
	MDS-H32	Standard	130	130	130	85	85	85		3
	MDS-X32③	Double	200	200	④	50	50	50		3
4000	MDS-840	Double	85	85	85	85	85	n/a	2000, 2500, 3200, 4000	3 & 4
	MDS-C40	Double	100	100	100	100	100	n/a		3 & 4
	MDS-H40	Double	130	130	130	130	130	n/a		3
	MDS-X40③	Double	200	200	④	50	50	50		3
	MDN-640	Double Narrow	65	65	65	65	65	n/a		3 & 4
	MDN-840	Double Narrow	85	85	65	85	65	n/a		3 & 4
	MDN-C40	Double Narrow	100	100	65	100	65	n/a		3 & 4
	MDD-X40	Double	200	200	100	100	100	n/a		3
5000	MDS-850	Double	85	85	85	85	85	n/a	2500, 3200, 4000, 5000	3 & 4
	MDD-X50	Double	200	200	100	100	100	n/a		3
	MDS-C50	Double	100	100	100	100	100	n/a		3 & 4
	MDS-H50	Double	130	130	130	130	130	n/a		3
	MDS-X50③⑤	Double	200	200	④	50	50	50		3

① Interrupting ratings shown based on breaker equipped with integral digitrip rms trip unit. Interruption ratings for non-automatic breakers are equal to the published withstand rating.

② Magnum MDSL current limiting power circuit breaker with integral current limiters. Current limiter selected determines short time and fixed instantaneous trip rating.

③ Magnum MDSX current limiting power circuit breaker with fast opening contacts.

④ Product to be tested. Contact Eaton for product rating.

⑤ Breaker applied in a tested fan cooled enclosure.

⑥ Not released.

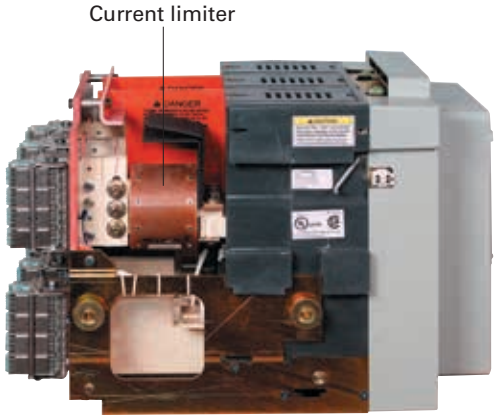
Magnum DS - Current limiting circuit breakers

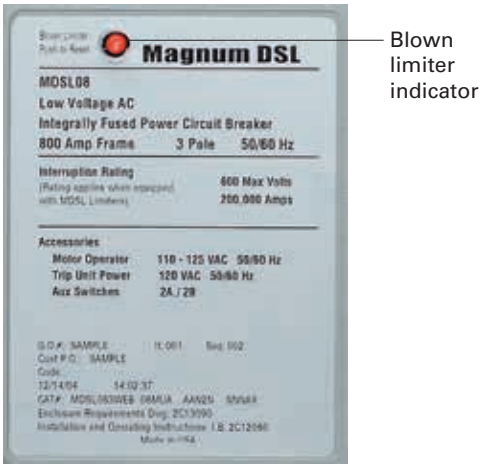
MDSL circuit breaker

Magnum MDSL current limiting power circuit breakers utilize integral current limiters to provide interruption ratings of 200 kA at 600 Vac with continuous limitation with lower let through currents for superior protection of downstream equipment. The MDSL breaker is available only in a drawout configuration.

Current limiters are held in place in a 6 inch (152.4 mm) extension provided on the back of the circuit breaker. The current limiters can only be removed from the breaker and replaced when the MDSL breaker is removed from its associated compartment.

A blown limiter indicator provides a visual indication on the front of the MDSL when a current limiter in any phase has interrupted a short circuit. The indicator itself is a red pop-out button located on the lower left portion of the breaker's front cover. The direct trip actuator trips the circuit breaker, and an output to the indicator causes the button to pop out.





Current limiter selection

Current limiters can be selected from the current limiter selection table (Table 7) and are categorized for selection in three ways:

- Minimum current limiter
- Recommended current limiter
- Maximum current limiter

The selection of a suitable limiter rating for a given application is generally governed by a choice of the following two types of protection:

(A) Maximum protection of downstream components:

Type MDSL breakers are often used for this purpose even when the maximum available fault currents are within the interruption rating of the corresponding unfused Magnum breakers.

(B) Protection of circuit breaker only:

Case A would tend to use the smallest available limiter; Case B the largest.

Table 7. Magnum MDSL sensor/rating plug vs. Current limiter selection①

Sensor and Rating plug I_n	MDSL current limiter selection chart②									
200	MA250	MA300	MA400	MA600③	MA800	MB1200	MB1600	MB2000	MD2500	MD3000
250			MA400	MA600	MA800③	MB1200	MB1600	MB2000	MD2500	MD3000
300			MA400	MA600	MA800③	MB1200	MB1600	MB2000	MD2500	MD3000
400				MA600	MA800	MB1200③	MB1600	MB2000	MD2500	MD3000
600					MA800	MB1200	MB1600	MB2000③	MD2500	MD3000
800						MB1200	MB1600	MB2000	MD2500③	MD3000
1000							MB1600	MB2000	MD2500③	MD3000
1200								MB2000	MD2500③	MD3000
1600										MD3000③
2000										MD3000③

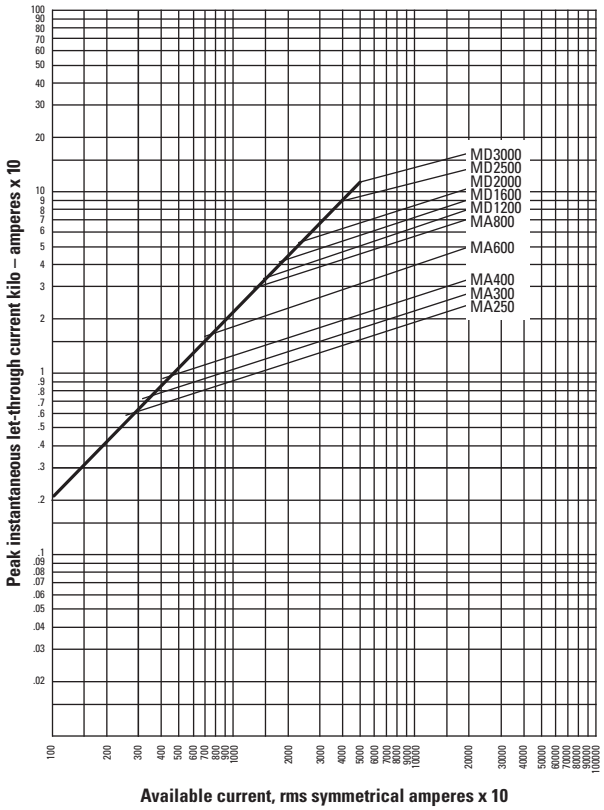
① Select the current limiter based on the Magnum breaker frame and current sensor and rating plug as shown.

② Refer to MDSL current limiter curves for let-through and time characteristics.

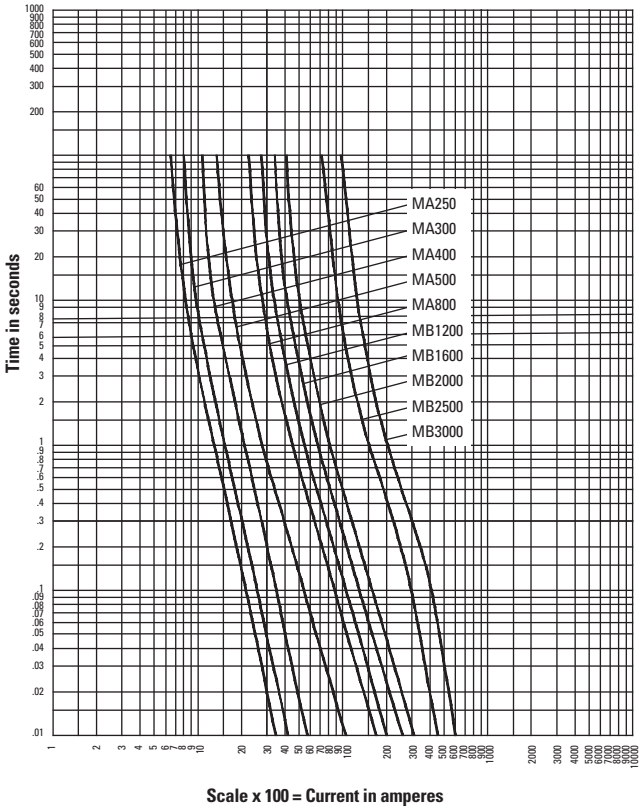
③ The recommended ratings provide for reduced current let-through and breaker coordination within the trip unit settings. Selection of current limiters below the recommended ratings shown provides lower current let-through, however, trip unit settings must be considered to avoid nuisance operation.

Trip curve charts

Type Magnum DSL limiters, peak let-through current characteristics



Type Magnum DSL limiters average melting time-current characteristics



Note: For time/current curves, see www.eaton.com/tcc

MDSX circuit breaker

The Magnum MDSX is a current limiting circuit breaker of the Magnum DS Family. It has a 200 kA interrupting rating without the need for current limiters at 480 Vac with continuous current ratings up to 5000A. MDSX circuit breakers utilize fast opening contacts, and are available in both drawout and fixed mounting configurations.

Current limiting performance of the MDSX family of current limiting circuit breakers is shown in above. The label on the breaker indicates its current-limiting characteristics. The MDSX provides all the same operational features normally associated with Magnum DS.

Non-automatic breaker (switch)

The non-automatic Magnum DS breaker (switch) shares the same frame and accessories as the circuit breaker. It does not, however, have the following:

- Trip Unit
- Sensors
- Overcurrent Release

The switch is available in both three-pole and four-pole fixed and drawout configurations.

A non-automatic power circuit breaker includes separable contacts for movement between a closed position and an open position, and an operating mechanism for moving the separable contacts between the two positions. This breaker can be applied where a local means of disconnect or isolation is required. It can be operated either manually or electrically. It should be noted, since the Magnum Non-Automatic Breaker (switch) does not include any overcurrent protection, it cannot be used in branch or feeder circuit protection applications.

MDE circuit breaker

The Magnum DS Family includes the MDE High Endurance Circuit Breaker. The MDE circuit breaker is rated for 15,000 Open-Close operating cycles between scheduled maintenance periods. It is a specially designed and manufactured Magnum DS Circuit Breaker intended for especially robust applications that require a higher than normal number of operating cycles without maintenance. Contact Eaton for additional details.

Special customer requests

The 25th digit in the catalog number configurator now offers several special customer designs, for very specific environments or applications. Please click here or search 'Volume 4 Tab 3' on www.eaton.com

Standards and certifications

The Magnum SB low voltage insulated case power circuit breaker is certified to UL 1066, but is specifically designed for the performance requirements of UL 891 switchboard class applications.

UL and ANSI test certifications

Magnum SB meets or exceeds all applicable ANSI, NEMA, UL and CSA standards, including:

- ANSI C37.13 (low voltage AC power circuit breakers used in enclosures)
- ANSI C37.16 (preferred ratings, related requirements, and application recommendations for low voltage power circuit breakers and AC power circuit breakers)
- ANSI C37.17 (trip devices for AC and general purpose DC low voltage power circuit breakers)
- ANSI C37.50 (test procedures for low voltage AC power circuit breaker used in enclosures)
- UL 1066 (standard for low voltage AC and DC power circuit breakers used in enclosures)

Comprehensive enclosure solutions

Magnum SB has proven performance in Eaton manufactured switchboards with the following test certifications:

- UL 891 (certified Pow-R-Line C low voltage switchboards)
- C22.2 No. 31-14 Switchgear assemblies

Approvals and marks

- UL listed: Magnum SB breaker UL file E52096 and Cassette UL file E204565
- Additional Magnum SB approvals and certificates can be found on www.eaton.com/magnum

Magnum SB circuit breaker details

Magnum SB is a low voltage insulated-case circuit breaker family designed for the performance requirements of UL 891 switchboards. These characteristics are:

- Magnum SB breakers have short time current ratings and fixed internal instantaneous trip ratings, which is characteristic of UL 489 molded-case breakers commonly used in UL 891 switchboards. This provides for improved coordination and selectivity for most commercial switchboard applications.

  The instantaneous trip function facilitates feeder circuit breaker protection in UL 891 switchboards with 3-cycle bus bracing. This yields reduced energy let through to downstream circuits by eliminating the fault current above the fixed instantaneous trip point.
- Magnum SB insulated-case circuit breakers have Interruption ratings up to 150 kA with continuous current ratings up to 5000A.

Magnum SB non-automatic breaker (switch)

The non-automatic Magnum SB breaker (switch) shares the same frame and accessories as the circuit breaker. It does not, however, have the following:

- Trip unit
- Sensors
- Overcurrent release

Like the Magnum SB breaker, the switch is available in both three-pole and four-pole, fixed and drawout configurations.

A non-automatic circuit breaker includes separable contacts for movement between a closed position and an open position, and an operating mechanism for moving the separable contacts between the two positions. It cannot be used for branch-circuit protection.

Magnum SB family

Selection and identification of ratings for Magnum SB

Nameplate identification

Nameplates are prominently displayed on the front of the circuit breaker, and provide important information relative to that specific circuit breaker. All low voltage circuit breakers must be applied within their nameplate ratings. It is always advisable to be familiar with the location and information provided on a breaker's nameplate.

A Magnum SB circuit breaker is easily identified by its specific nameplate designation. Review the nameplate example provided below.

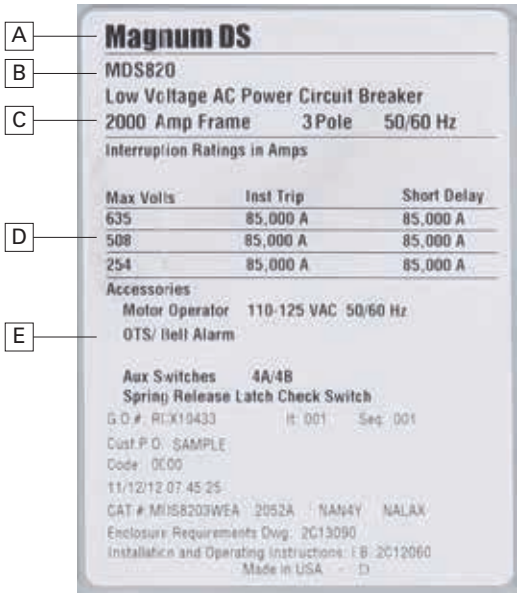
A. Low voltage power circuit breaker family name

B. Breaker family designation number

C. Breaker frame size in amperes

D. Interrupting capacity rating

E. Factory equipped accessories



Catalog number selection

Just like the Magnum DS, the Magnum SB circuit breaker is defined & ordered by a 25 character catalog number created through a simple selection process from two configuration tables. If the breaker is a drawout breaker, the associated cassette would be defined by a 15 character catalog number. The cassette selection process is similar to that of the circuit breaker.

Note: The selection examples shown at the top of each table, and that all combinations are not possible.

Magnum SB breaker product family (first 14 of 25 digits, see next page for 15-25 digits)

SB S 4 12 3 V E A 06 MU

Breaker type

SB = Magnum switchboard

Frame type

S = Standard or double
N = Narrow or double = narrow
D = MDDX only
E = High endurance

Interrupting/ withstand rating

4 = 42
5 = 50
6 = 65
8 = 85
C = 100
H = 130 (DSH)
E = 150 (DSE)
X = 200 (DSX/DDX)
L = 200 (DSL)

Continuous amperes and phasing (facing front of breaker)

08 = 800 ABC
12 = 1200 ABC
16 = 1600 ABC
20 = 2000 ABC
25 = 2500 ABC
30 = 3000 ABC
32 = 3200 ABC or ABCABC
3N = 3200 AABBCC
4N = 4000 AABBCC
5N = 5000 AABBCC
40 = 4000 ABCABC
50 = 5000 ABCABC

Poles and neutral (facing front of breaker)

3 = Three
4 = Four (neutral left)

Mounting configuration and load terminals

H = Fixed horizontal
V = Fixed vertical
L = Drawout (SBN)
W = Drawout (SBS)

Nameplate language

E = English
A = Spanish

Sensor and rating plug rating

NN	= None	**12**	= 1200
01	= 100	**13**	= 1250
02	= 200	**16**	= 1600
05	= 250	**20**	= 2000
03	= 300	**25**	= 2500
04	= 400	**30**	= 3000
06	= 600	**32**	= 3200
08	= 800	**40**	= 4000
10	= 1000	**50**	= 5000

Current limiter selection

A = Non-DSL (no limiter)
D = MA250
E = MA300
F = MA400
G = MA600
H = MA800
K = MB1200
L = MB1600
M = MB2000
N = MD2500
P = MD3000

Trip unit and protection, and external control voltage when required

NN = Non-automatic (no trip unit)
52 = 520 LSI
5G = 520 LSIG
M2 = 520M LSI
MT = 520M LSI (24/48 Vdc)
MU = 520M LSI (120 Vac)
MV = 520M LSI (240 Vac)
MQ = 520M LSI (125 Vdc)
MG = 520M LSIG
MH = 520M LSIG (24/48 Vdc)
MM = 520M LSIG (120 Vac)
MN = 520 LSIG (240 Vac)
MX = 520M LSIG (125 Vdc)
ME = 520M LSIA (24/48 Vdc)
MC = 520 LSIA (120 Vac)
MF = 520M LSIA (240 Vac)
MZ = 520M LSIA (125 Vdc)
CT = 520MC LSI (24/48 Vdc)
CU = 520MC LSI (120 Vac)
CV = 520MC LSI (240 Vac)
CQ = 520MC LSI (125 Vdc)
CH = 520MC LSIG (24/48 Vdc)
CM = 520MC LSIG (120 Vac)
CN = 520MC LSIG (240 Vac)
CX = 520MC LSIG (125 Vdc)
CE = 520MC LSIA (24/48 Vdc)
CC = 520MC LSIA (120 Vac)
CF = 520MC LSIA (240 Vac)
CY = 520MC LSIA (125 Vdc)
1A = 1150 LSI (24/48 Vdc)
1C = 1150 LSI (120 Vac)
1E = 1150 LSI (240 Vac)
1Q = 1150 LSI (125 Vdc)
1F = 1150 LSIG (24/48 Vdc)
1G = 1150 LSIG (120 Vac)
1H = 1150 LSIG (240 Vac)
1X = 1150 LSIG (125 Vdc)
1J = 1150 LSIA (24/48 Vdc)
1K = 1150 LSIA (120 Vac)
1M 1150 LSIA (240 Vac)
1Y = 1150 LSIA (125 Vdc)

Magnum SB breaker product family continued (15 through 25)

A W C H N E H K L A X

Shunt Trip (ST)
- **N** = None
- **A** = 110–127 Vac/Vdc
- **R** = 208–240 Vac/Vdc
- **C** = 24 Vdc
- **H** = 48 Vdc
- **B** = 110–127 Vac/Vdc (100% duty)
- **S** = 220–250 Vac/Vdc (100% duty)
- **D** = 24 Vdc (100% duty)
- **K** = 48 Vdc (100% duty)
- **J** = 60 Vdc (100% duty)
- **6** = 60 Vdc

Motor operator
- **M** = Manual operated
- **N** = 110–125 Vac (5-sec)
- **W** = 110–125 Vdc (5-sec)
- **T** = 220–250 Vdc (5-sec)
- **P** = 208–277 Vac (5-sec)
- **L** = 24 Vdc (5-sec)
- **K** = 48 Vdc (5-sec)
- **S** = 60 Vdc (5-sec)
- **1** = 110–125 Vac (3-sec)
- **2** = 220–250 Vac (3-sec)
- **4** = 24 Vdc (3-sec)
- **8** = 48 Vdc (3-sec)
- **5** = 110–125 Vdc (3-sec)
- **9** = 220–250 Vdc (3-sec)

Spring Release Device (SRD)
- **N** = None
- **A** = 110–127 Vac/Vdc
- **R** = 208–240 Vac/Vdc
- **C** = 24 Vdc
- **H** = 48 Vdc
- **S** = 60 Vdc

Undervoltage Release (UVR) or 2nd Shunt Trip (ST)
- **N** = None
- **A** = UVR (110–127 Vac)
- **R** = UVR (208–240 Vac)
- **C** = UVR (24 Vdc)
- **H** = UVR (48 Vdc)
- **D** = UVR (60 Vdc)
- **E** = UVR (110–125 Vdc)
- **F** = UVR (220–250 Vdc)
- **G** = UVR (32 Vdc)
- **X** = UVR (380–415 Vac)
- **J** = UVR (480 Vac)
- **K** = UVR (600 Vac)
- **1** = 2nd ST (110–127 Vac Vdc)
- **2** = 2nd ST (208–250 Vac Vdc)
- **3** = 2nd ST (24 Vdc)
- **4** = 2nd ST (48 Vdc)
- **6** = 2nd ST (60 Vdc)
- **B** = 2nd ST (110–127 Vac/Vdc 100% duty)
- **O** = 2nd ST (220–250 Vac/Vdc 100% duty)
- **I** = 2nd ST (24 Vdc 100% duty)
- **Q** = 2nd ST (48 Vdc 100% duty)
- **9** = 2nd ST (60 Vdc 100% duty)

Auxiliary switch
- **N** = None
- **2** = 2A/2B
- **4** = 4A/4B
- **6** = 6A/6B

Bell Alarms Switch (OTS) with 2a/2b contacts and/or mechanical trip indicator

	Mech. trip indicator	Mech. inter-lock for manual reset	OTS switch with two form C contacts
E =	No	—	No
N =	Yes	No	No
Y =	Yes	No	Yes
M =	Yes	Yes	No
L =	Yes	Yes	Yes
F =	Yes	No	Yes with 24V reset
G =	Yes	No	Yes with 120V reset
H =	Yes	No	Yes with 240V reset
I =	Yes	Yes	Yes with 24V reset
J =	Yes	Yes	Yes with 120V reset
K =	Yes	Yes	Yes with 240V reset

Padlock provisions for blocking close and/or open ACB manual pushbuttons
- **N** = None
- **M** = Metal (block close and open)
- **P** = Plastic (block close and open)
- **C** = Metal (block close only)
- **H** = Plastic (block close only)
- **S** = Metal swbd lock-off (block close, depress open)

Operations counter and/or keylock provisions

	Counter	Keylock provisions
N =	No counter	No locks
K =	No counter	Kirk lock
C =	No counter	Castell lock
R =	No counter	Ronis lock
S =	No counter	CES lock
A =	Counter	No lock
Y =	Counter	Kirk lock
L =	Counter	Castell lock
H =	Counter	Ronis lock indicator
E =	Counter	CES lock

Latch check switch/trip unit metering voltage connection for digitrip 1150 trip unit

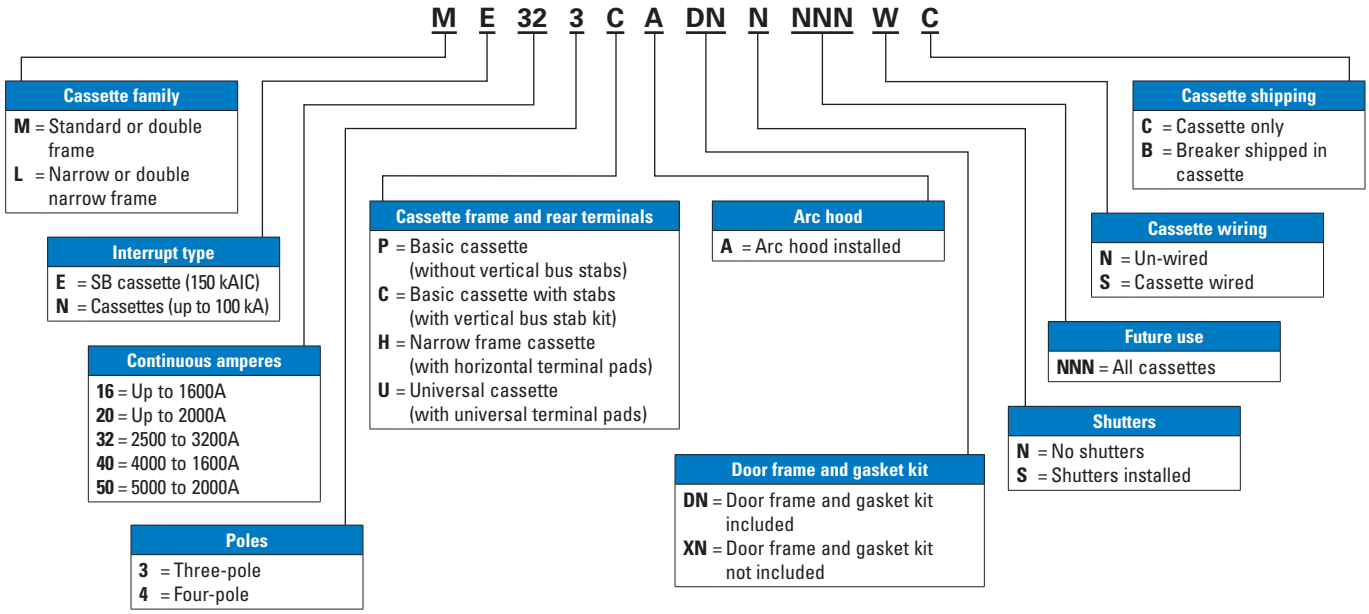
	Latch check switch	1150 voltage connection
N =	None	Upper terminals
M =	None	Lower terminals
L =	LCS wired to SRD	Upper terminals
Y =	LCS Wired to SRD	Lower terminals
C =	LCS Wired External	Upper terminals
D =	LCS Wired External	Lower terminals

Frame use
- **X** = All breakers

Breaker shipping options and instructions
- **A** = Fixed breaker alone with door kit
- **F** = Fixed breaker alone without door kit
- **A** = Drawout breaker alone without door frame kit
- **C** = Drawout breaker in cassette (un-wired)
- **P** = Drawout breaker in cassette (shutters)
- **S** = Drawout breaker in cassette (shutters)
- **W** = Drawout breaker in cassette (pre-wired and shutters)

Double frame drawout breakers ship without cassette drawout. ACBs ship in narrow and universal cassettes only.

Cassette Magnum SB breaker product family



Magnum SB - Continuous amperage, interruption and withstand ratings tables

Table 8. Magnum DS switchgear class UL 1066 low voltage power circuit breakers ANSI

			rms Symmetrical current ratings kA 50/60 Hz①					Available current sensor and rating plugs for digitrip rms trip unit (establishes breaker I_n rating)	
Frame amperes	Breaker type catalog position 1–6	Frame type	Interruption rating at 254 Vac	Interruption rating at 508 Vac	Interruption rating at 635 Vac	Short time Withstand rating	Fixed internal inst trip		Poles available
800	SBN-508	Narrow	50	50	35	20	18xI_n	200, 250, 300, 400, 600, 800	3 & 4
	SBN-608	Narrow	65	65	42	20	18xI_n		3 & 4
	SBN-C08	Narrow	100	100	65	20	18xI_n		3 & 4
	SBS-608	Standard	65	65	65	20	18xI_n		3 & 4
	SBS-808	Standard	85	85	85	20	18xI_n		3 & 4
	SBS-C08	Standard	100	100	85	20	18xI_n		3 & 4
	SBS-H08	Standard	130	130	130	20	18xI_n		3
	SBS-E08④⑥	Standard	200	150	65	30	30		3
1200	SBN-512	Narrow	50	50	35	25	18xI_n	200, 250, 300, 400, 600, 800, 1000, 1200	3 & 4
	SBN-612	Narrow	65	65	42	25	18xI_n		3 & 4
	SBN-C12	Narrow	100	100	65	25	18xI_n		3 & 4
	SBS-612	Standard	65	65	65	25	18xI_n		3 & 4
	SBS-812	Standard	85	85	85	25	18xI_n		3 & 4
	SBS-C12	Standard	100	100	85	25	18xI_n		3 & 4
	SBS-H12	Standard	130	130	130	25	18xI_n		3
	SBS-E12④	Standard	200	150	65	30	30		3
1600	SBN-516	Narrow	50	50	35	30	18xI_n	200, 250, 300, 400, 600, 800, 1000, 1200, 1600	3 & 4
	SBN-616	Narrow	65	65	42	30	18xI_n		3 & 4
	SBN-C16	Narrow	100	100	65	30	18xI_n		3 & 4
	SBS-616	Standard	65	65	65	30	18xI_n		3 & 4
	SBS-816	Standard	85	85	85	30	18xI_n		3 & 4
	SBS-C16	Standard	100	100	85	30	18xI_n		3 & 4
	SBS-H16	Standard	130	130	130	30	18xI_n		3
	SBS-E16④	Standard	200	150	65	30	30		3
2000	SBN-620	Narrow	65	65	65	35	18xIn	200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000	3 & 4
	SBN-C20	Narrow	100	100	65	35	18xIn		3 & 4
	SBS-620	Standard	65	65	65	35	18xIn		3 & 4
	SBS-820	Standard	85	85	85	35	18xIn		3 & 4
	SBS-C20	Standard	100	100	85	35	18xIn		3 & 4
	SBS-H20	Standard	130	130	130	35	18xIn		3
	SBS-E20	Standard	200	150	65	30	30		3

① Interrupting ratings shown based on breaker equipped with integral digitrip rms trip unit.

These interruption ratings are based on the standard duty cycle consisting of an open operation, a 15 second interval and a close-open operation, in succession, with delayed tripping in case of short-delay devices. The standard duty cycle for short time ratings consists of maintaining the rated current for two periods of 1/2 seconds each, with a 15 second interval of zero current between the two periods.

③ Product to be tested. Contact Eaton for product rating

④ Magnum SBSE current limiting power circuit breaker with fast opening contacts.

⑤ Breaker applied in a tested fan cooled enclosure

⑥ Not released

Table 8. Magnum DS switchgear class UL 1066 low voltage power circuit breakers ANSI continued

			rms Symmetrical current ratings kA 50/60 Hz①						
Frame amperes	**Breaker type catalog position 1–6**	**Frame type**	**Interruption rating at 254 Vac**	**Interruption rating at 508 Vac**	**Interruption rating at 635 Vac**	**Short time Withstand rating**	**Fixed internal inst trip**	**Available current sensor and rating plugs for digitrip rms trip unit (establishes breaker I_n rating)**	**Poles available**
2500	SBS-625	Standard	65	65	65	45	18xI_n	200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000, 2500	3 & 4
	SBS-825	Standard	85	85	85	45	18xI_n		3 & 4
	SBS-C25	Standard	100	100	85	45	18xI_n		3 & 4
	SBS-H25	Standard	130	130	130	45	18xI_n		3
	SBS-E25④	Double	200	150	③	50	50		3
3000	SBS-630	Standard	65	65	65	50	18xI_n	200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000, 2500, 3000	3 & 4
	SBS-830	Standard	85	85	85	50	18xI_n		3 & 4
	SBS-C30	Standard	100	100	85	50	18xI_n		3 & 4
	SBS-H30	Standard	130	130	130	50	18xI_n		3
	SBS-E30④	Double	200	150	③	50	50		3
4000	SBS640	Double	65	65	65	65	18xI_n	2000, 2500, 3000, 4000	3 & 4
	SBN640	Double Narrow	65	65	65	65	18xI_n		3 & 4
	SBS-840	Double	85	85	85	72	18xI_n		3 & 4
	SBS-C40	Double	100	100	100	72	18xI_n		3 & 4
	SBS-H40	Double	130	130	130	72	18xI_n		3
	SBN-840	Double Narrow	85	85	65	72/65	18xI_n		3 & 4
	SBN-C40	Double Narrow	100	100	65	72/65	18xI_n		3 & 4
	SBS-E40④	Double	200	150	③	50	50		3 & 4
5000	SBS-850	Double	85	85	85	85	18xI_n	2500, 3000, 4000, 5000	3
	SBS-C50	Double	100	100	100	90	18xI_n		3 & 4
	SBS-H50	Double	130	130	130	90	18xI_n		3
	SBS-E50④⑤	Double	200	150	③	50	50		3

① Interrupting ratings shown based on breaker equipped with integral digitrip rms trip unit.

② These interruption ratings are based on the standard duty cycle consisting of an open operation, a 15 second interval and a close-open operation, in succession, with delayed tripping in case of short-delay devices. The standard duty cycle for short time ratings consists of maintaining the rated current for two periods of 1/2 seconds each, with a 15 second interval of zero current between the two periods.

③ Product to be tested. Contact Eaton for product rating

④ Magnum SBSE current limiting power circuit breaker with fast opening contacts.

⑤ Not released

Standards and certifications

Magnum IEC breakers are tested by a third party, DEKRA.

IEC test certifications

Magnum air circuit breakers meet or exceed the applicable IEC standards, including:

- IEC 60947-2
- DEKRA third-party witness

Comprehensive enclosure solutions

Magnum air circuit breakers have proven performance in IEC switchboards and custom enclosures manufactured by Eaton and Low Voltage Systems Builders (OEMs) to the following standards:

- IEC 60947-1
- IEC 61439-2

Approvals and marks

Magnum air circuit breakers carry the following approvals and approval marks:

- CE
- ABS (American Bureau of Shipping) Type Approval Certificate Number 14-HS1228512B-PDA
- CCC (Certificate for China Compulsory Product Certification) to GB14048.2-2001
- Certificate Numbers:
  - 2005010307139381
  - 2003010307094561
  - 2003010307094558
- American Bureau of Shipping (ABS)
- Det Norske Veritas (DNV)
- Lloyds of London
- South African Bureau of Standards (SABS)

For a complete and comprehensive listing of all low voltage power breaker certifications, please visit www.eaton.com/magnum

MWK circuit breaker for 1100VAC

The Magnum MWK is a specially designed breaker to meet 1100 volt IEC rated applications. It is a 3200 ampere frame size breaker with thermal trip ratings from 600A to 3200A. Fixed and drawout mountings are available for both 3 and 4-pole breakers.

At 1100 volts the Icu is 25kA. A special cassette with a specifically designed arc barrier must be chosen to use with this breaker for an 1100 volt application. Like all other Magnum breakers, the MWK breaker is also 100% rated, requiring no thermal derating when applying the breaker in an enclosure.

IEC non-automatic breaker (switch)

The non-automatic Magnum IEC breaker (switch) shares the same frame and accessories as the circuit breaker. It does not, however, have the following:

- Trip Unit
- Sensors
- Overcurrent Release

The switch is available in both three-pole and four-pole fixed and drawout configurations.

One typical application would be as a tie in systems with parallel feeds. A non-automatic power circuit breaker includes separable contacts for movement between a closed position and an open position, and an operating mechanism for moving the separable contacts between the two positions. No matter how much it might look like circuit breaker, it can't be used for branch-circuit protection.

Magnum IEC family

Selection and identification of ratings for Magnum IEC

Nameplate identification

It is always advisable to be familiar with the information provided on a circuit breaker's nameplate. All low voltage power circuit breakers must be applied within their nameplate ratings. Nameplates are prominently displayed on the front of the circuit breaker, and provide important information relative to that specific circuit breaker.

A Magnum IEC circuit breaker is easily identified by its specific nameplate designation. Review the nameplate example provided below.

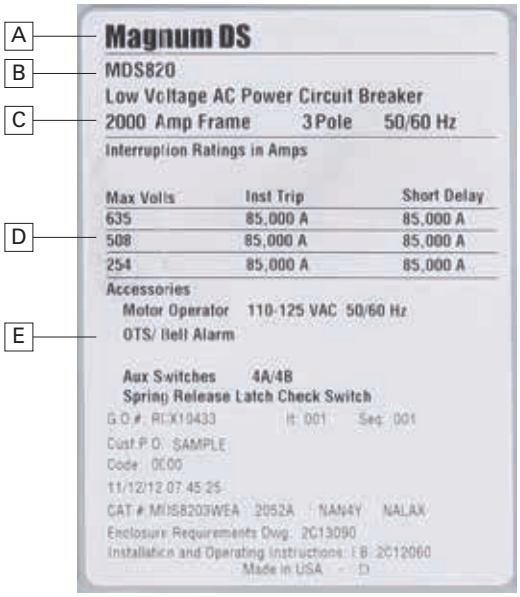
A. Low voltage power circuit breaker family name

B. Breaker family designation number

C. Breaker frame size in amperes

D. Interrupting capacity rating

E. Factory equipped accessories



Catalog number selection

Like the Magnum DS and SB, the Magnum IEC circuit breaker is described and ordered by a 25 character catalog number created through a simple selection process from two applicable tables. If the breaker is a drawout breaker, the cassette features would be selected by a 15 character catalog number. The cassette selection process is similar with selections made from one table.

5

Note: The selection examples shown at the top of each table.

Magnum IEC breaker product family (first 14 of 25 digits, see next page for 15-25 digits)

MW N 5 12 4 V E A 03 MT 6 M C J 2 Y C N M W X

Breaker frame

I	= Standard or double
N	= Narrow or double = narrow
K	= Special 1100 Vac ACB

Interrupting I_{cu}

4	= 40 kV
5	= 50 kV
6	= 65 kV
8	= 85 kV
Z	= 100 kV
H	= 25 kV (1100 Vac MWK)

Continuous amperes and phasing (facing front of breaker)

08	= 800 ABC
10	= 1000 ABC
12	= 1250 ABC
16	= 1600 ABC
20	= 2000 ABC
25	= 2500 ABC
32	= 3200 ABC
41	= 4000 ABC (standard drawout only)
4N	= 4000 AABBCC
5N	= 5000 AABBCC
6N	= 6300 AABBCC
40	= 4000 ABCABC
50	= 5000 ABCABC
60	= 6300 ABCABC

Poles and neutral (facing front of breaker)

3	= Three
4	= Four (neutral left)
R	= Four (reserved for neutral right)

Mounting configuration and load terminals

H	= Fixed horizontal
V	= Fixed vertical
L	= Drawout horizontal

Nameplate language

E	= English
A	= Spanish

Sensor and rating plug rating

NN	= None	**13**	= 1250
01	= 100	**16**	= 1600
02	= 200	**20**	= 2000
05	= 250	**25**	= 2500
03	= 300	**30**	= 3000
04	= 400	**32**	= 3200
06	= 600	**40**	= 4000
08	= 800	**50**	= 5000
10	= 1000	**63**	= 6300
12	= 1200		

Trip unit and protection, and external control voltage when required

NN	= Non-automatic (no trip unit)
22	= 520 LI
52	= 520 LSI
5W	= 520i LSIG
M2	= 520M LSI
MT	= 520M LSI (24–48 Vdc)
MU	= 520M LSI (120 Vac)
MV	= 520M LSI (240 Vac)
MW	= 520Mi LSIG
MJ	= 520Mi LSIG (24–48 Vdc)
MK	= 520Mi LSIG (120 Vac)
ML	= 520Mi LSIG (240 Vac)
ME	= 520M LSIA (24–48 Vdc)
MC	= 520M LSIA (120 Vac)
MF	= 520M LSIA (240 Vac)
CT	= 520MC LSI (24–48 Vdc)
CU	= 520MC LSI (120 Vac)
CV	= 520MC LSI (240 Vac)
CE	= 520MC LSIA (24–48 Vdc)
CC	= 520MC LSIA (120 Vac)
CF	= 520MC LSIA (240 Vac)
CJ	= 520MCi LSIG (24–48 Vdc)
CK	= 520MCi LSIG (120 Vac)
CF	= 520MCi LSIG (240 Vac)
C1	= 520MC ARMS LSI (24–48 Vdc)
C2	= 520MC ARMS LSI (120 Vac)
C3	= 520MC ARMS LSI (240 Vac)
C4	= 520MC ARMS LSIA (24–48 Vdc)
C5	= 520MC ARMS LSIA (120 Vac)
C6	= 520MC ARMS LSIA (240 Vac)
C7	= 520MC ARMS LSIG (24–48 Vdc)
C8	= 520MC ARMS LSIG (120 Vac)
C9	= 520MC ARMS LSIG (240 Vac)
1W	= 1150i LSI (24–48 Vdc)
1N	= 1150i LSI (120 Vac)
1P	= 1150i LSI (240 Vac)
1R	= 1150i LSIG/A (24–48 Vdc)
1S	= 1150i LSIG/A (120 Vac)
1T	= 1150i LSIG/A (240 Vac)

Magnum IEC breaker product family continued[1] (15 through 25)

MW N 5 12 4 V E A 03 MT 6 M C J 2 Y C N M W X

Shunt Trip Attachment (STA)
- **N** = None
- **A** = 110–127 Vac/Vdc
- **R** = 208–240 Vac/Vdc
- **C** = 24 Vdc
- **H** = 48 Vdc
- **B** = 110–127 Vac/Vdc (100% duty)
- **S** = 220–250 Vac/Vdc (100% duty)
- **D** = 24 Vdc (100% duty)
- **K** = 48 Vdc (100% duty)
- **J** = 60 Vdc (100% duty)
- **6** = 60 Vdc

Motor operator
- **M** = Manual operated
- **N** = 110–125 Vac (5-sec)
- **W** = 110–125 Vdc (5-sec)
- **T** = 220–250 Vdc (5-sec)
- **P** = 208–277 Vac (5-sec)
- **L** = 24 Vdc (5-sec)
- **K** = 48 Vdc (5-sec)
- **S** = 60 Vdc (5-sec)
- **1** = 110–125 Vac (3-sec)
- **2** = 220–250 Vac (3-sec)
- **4** = 24 Vdc (3-sec)
- **8** = 48 Vdc (3-sec)
- **5** = 110–125 Vdc (3-sec)
- **9** = 220–250 Vdc (3-sec)

Spring Release Device (SRD)
- **N** = None
- **A** = 110–127 Vac/Vdc
- **R** = 208–240 Vac/Vdc
- **C** = 24 Vdc
- **H** = 48 Vdc
- **S** = 60 Vdc

Undervoltage Release (UVR) or 2nd Shunt Trip (ST)
- **N** = None
- **A** = UVR (110–127 Vac)
- **R** = UVR (208–240 Vac)
- **C** = UVR (24 Vdc)
- **H** = UVR (48 Vdc)
- **D** = UVR (60 Vdc)
- **E** = UVR (110–125 Vdc)
- **F** = UVR (220–250 Vdc)
- **G** = UVR (32 Vdc)
- **X** = UVR (380–415 Vac)
- **J** = UVR (480 Vac)
- **K** = UVR (600 Vac)
- **1** = 2nd ST (110–127 Vac Vdc)
- **2** = 2nd ST (208–250 Vac Vdc)
- **3** = 2nd ST (24 Vdc)
- **4** = 2nd ST (48 Vdc)
- **6** = 2nd ST (60 Vdc)
- **B** = 2nd ST (110–127 Vac/Vdc 100% duty)
- **O** = 2nd ST (220–250 Vac/Vdc 100% duty)
- **I** = 2nd ST (24 Vdc 100% duty)
- **Q** = 2nd ST (48 Vdc 100% duty)
- **9** = 2nd ST (60 Vdc 100% duty)

Auxiliary switch
- **N** = None
- **2** = 2A/2B
- **4** = 4A/4B
- **6** = 6A/6B

Bell Alarms Switch (OTS) with 2a/2b contacts and/or mechanical trip indicator

	Mech. trip indicator	Mech. inter-lock for manual reset	OTS switch with two form C contacts
E =	No	—	No
N =	Yes	No	No
Y =	Yes	No	Yes
M =	Yes	Yes	No
L =	Yes	Yes	Yes
F =	Yes	No	Yes with 24V reset
G =	Yes	No	Yes with 120V reset
H =	Yes	No	Yes with 240V reset
I =	Yes	Yes	Yes with 24V reset
J =	Yes	Yes	Yes with 120V reset
K =	Yes	Yes	Yes with 240V reset

Padlock provisions for blocking close and/or open ACB manual pushbuttons
- **N** = None
- **M** = Metal (block close and open)
- **P** = Plastic (block close and open)
- **C** = Metal (block close only)
- **H** = Plastic (block close only)

Operations counter and/or keylock provisions

	Counter	Keylock provisions
N =	No counter	No locks
K =	No counter	Kirk lock
C =	No counter	Castell lock
R =	No counter	Ronis lock
S =	No counter	CES lock
A =	Counter	No lock
Y =	Counter	Kirk lock
L =	Counter	Castell lock
H =	Counter	Ronis lock indicator
E =	Counter	CES lock

Latch check switch/trip unit metering voltage connection for digitrip 1150 trip unit

	Latch check switch	1150 voltage connection
N =	None	Upper terminals
M =	None	Lower terminals
L =	LCS wired to SRD	Upper terminals
Y =	LCS Wired to SRD	Lower terminals
C =	LCS Wired External	Upper terminals
D =	LCS Wired External	Lower terminals

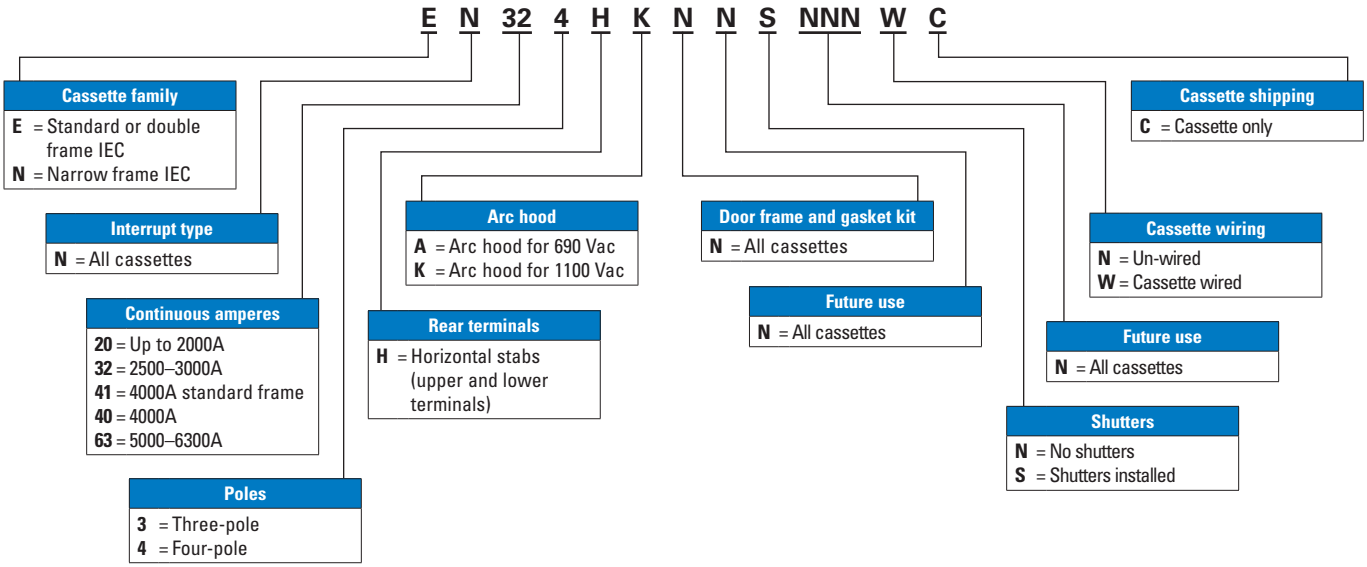
ACB shipping instructions
- **A** = Fixed breaker alone with door kit
- **B** = Fixed breaker alone with door kit and pre-wired
- **F** = Fixed breaker alone without door kit
- **A** = D/O ACB only without door kit
- **C** = D/O ACB in cassette (un-wired)
- **P** = D/O ACB in cassette (pre-wired)
- **S** = D/O ACB in cassette (shutters)
- **W** = D/O ACB in cassette (pre-wired and shutters)

Double frame D/O ACBs ship without cassette.

Future use
- **X** = All ACBs

[1] Exclusionary rules apply. Refer to price list. Confirm all final part numbers with Eaton. Format structures subject to modifications and additions without notice.

Cassette Magnum IEC breaker product family①



① Exclusionary rules apply. Refer to price list. Confirm all final part numbers with Eaton. Format structures subject to modifications and additions without notice.

Magnum IEC - Continuous amperage, interruption and withstand ratings tables

Table 9. Magnum IEC 60947-2 rated air circuit breakers

			rms symmetrical current ratings kA①						Available current sensor and rating plugs for digitrip rms trip unit (establishes breaker I_n rating)			
Frame amperes	Breaker type	Frame type	Interrupting @ 240 Vac Icu = Ics	Interrupting @ 440 Vac Icu = Ics	Interrupting @ 690 Vac Icu = Ics	Withstand rating Icw 1-Sec @ 440V/ 690V	Withstand rating Icw 3-Sec	Fixed internal inst trip		KEMA/ KEUR	CCC	Poles available
	MWN-508	Narrow	50	50	50	50	n/a		200, 250, 300, 400, 630, 800	X②	X	3 & 4
	MWN-608	Narrow	66	66	65	66	40			X②	X	3 & 4
	MWI-608	Standard	65	65	65	65	n/a			X	X	3 & 4
	MWI-808	Standard	85	85	85	85	65			X	X	3 & 4
	MWI-C08	Standard	100	100	85	85	65	85		X	X	3 & 4
1000	MWN-410	Narrow	40	40	40	40	n/a		200, 250, 300, 400, 630, 800, 1000	X②		3 & 4
	MWN-510	Narrow	50	50	50	50	n/a			X②		3 & 4
	MWN-610	Narrow	66	66	65	66	40			X②		3 & 4
	MWI-610	Standard	65	65	65	65	n/a			X		3 & 4
	MWI-810	Standard	85	85	85	85	65			X		3 & 4
	MWI-C10	Standard	100	100	85	85	65	85		X		3 & 4
1250	MWN-412	Narrow	40	40	40	40	n/a		200, 250, 300, 400, 630, 800, 1000, 1250	X②	X	3 & 4
	MWN-512	Narrow	50	50	50	50	n/a			X②	X	3 & 4
	MWN-612	Narrow	66	66	65	66	40			X②	X	3 & 4
	MWI-612	Standard	65	65	65	65	n/a			X	X	3 & 4
	MWI-812	Standard	85	85	85	85	65			X	X	3 & 4
	MWI-C12	Standard	100	100	85	85	65	85		X	X	3 & 4
1600	MWN-516	Narrow	50	50	50	50	n/a		200, 250, 300, 400, 630, 800, 1000, 1250, 1600	X②	X	3 & 4
	MWN-616	Narrow	66	66	65	66	40			X②	X	3 & 4
	MWI-616	Standard	65	65	65	65	n/a			X	X	3 & 4
	MWI-816	Standard	85	85	85	85	65			X	X	3 & 4
	MWI-C16	Standard	100	100	85	85	65	85		X	X	3 & 4
2000	MWN-520	Narrow	50	50	50	50	30		200, 250, 300, 400, 630, 800, 1000, 1250, 1600, 2000	X②	X	3 & 4
	MWN-620	Narrow	66	66	65	66	40			X②	X	3 & 4
	MWI-620	Standard	65	65	65	65	50			X	X	3 & 4
	MWI-820	Standard	85	85	85	85	65			X	X	3 & 4
	MWI-C20	Standard	100	100	85	85	65	85		X	X	3 & 4

① Interrupting ratings shown based on breaker equipped with integral digitrip rms trip unit. Interruption ratings for non-automatic breakers are equal to the published withstand rating.

② 690V rating is not certified Kema/KEUR.

③ 1100V Icu rating is 25kA.

Table 9. Magnum IEC 60947-2 rated air circuit breakers continued

			rms symmetrical current ratings kA①						Available current sensor and rating plugs for digitrip rms trip unit (establishes breaker I_n rating)			
Frame amperes	Breaker type	Frame type	Interrupting @ 240 Vac Icu = Ics	Interrupting @ 440 Vac Icu = Ics	Interrupting @ 690 Vac Icu = Ics	Withstand rating Icw 1-Sec @ 440V/ 690V	Withstand rating Icw 3-Sec	Fixed internal inst trip		KEMA/ KEUR	CCC	Poles available
2500	MWI-625	Standard	65	65	65	65	n/a		200, 250, 300, 400, 630, 800, 1000, 1250, 1600, 2000, 2500	X	X	3 & 4
	MWI-825	Standard	85	85	85	85	65			X	X	3 & 4
	MWI-C25	Standard	100	100	85	85	65	85				3 & 4
	MWI-H25	Standard	125	125	125	85	65			X	X	3 & 4
3200	MWK-232②	Standard	85	85	85	85	65		3200			3 & 4
	MWI-632	Standard	65	65	65	65	50		200, 250, 300, 400, 630	X	X	3 & 4
	MWI-832	Standard	85	85	85	85	65			X	X	3 & 4
	MWI-C32	Standard	100	100	85	85	65	85		X	X	3 & 4
	MWI-H32	Standard			125							3 & 4
4000	MWI-64N	Double	65	65	65	65	n/a		2000, 2500, 3200, 4000	X	X	3 & 4
	MWN-64N	Double Narrow	66	66	66	66	n/a			X	X	3 & 4
	MWI-641	Standard	66	66	66	66	n/a			X	X	3 & 4
	MWI-84N	Double	85	85	85	85	n/a			X	X	3 & 4
	MWN-84N	Double Narrow	85	85	66	85/66	66			X	X	3 & 4
	MWI-841	Standard	85	85	85	85	66			X	X	3 & 4
	MWI-C4N	Double	100	100	100	100	n/a			X	X	3 & 4
	MWN-C4N	Double Narrow	105	105	66	105/66	66			X	X	3 & 4
	MWI-C41	Standard	105	105	85	85	n/a			X	X	3 & 4
5000	MWI-85N	Double	85	85	85	85	n/a		2500, 3200, 4000, 5000	X	X	3 & 4
	MWI-C5N	Double	100	100	100	100	n/a			X	X	3 & 4
6300	MWI-86N	Double	85	85	85	85	n/a		3200, 4000, 5000, 6300	X	X	3 & 4
	MWI-C6N	Double	100	100	100	100	n/a			X	X	3 & 4

① Interrupting ratings shown based on breaker equipped with integral digitrip rms trip unit. Interruption ratings for non-automatic breakers are equal to the published withstand rating.

② 690V rating is not certified Kema/KEUR.

③ 1100V Icu rating is 25kA.

Standards and certifications

Eaton Magnum DC switches provide DC disconnect, isolation and switching technology in a Magnum power breaker platform. They feature load-switching capability and high withstand ratings in each voltage class. There are switch versions that can be applied in both grounded and ungrounded systems.

Eaton Magnum DC switches are a comprehensive offering of third-party and globally certified DC switches that are designed to provide excellent safety with a high level of performance that meets the demands of a global market.

UL and ANSI test certifications

Magnum DC switches meet or exceed the applicable ANSI, NEMA, UL and CSA standards, including:

- ANSI C37.14 (low voltage DC power circuit breakers used in enclosures)
- ANSI C37.16 (preferred ratings, related requirements, and application recommendations for low voltage power circuit breakers and AC and DC power circuit breakers)
- ANSI C37.17 (trip devices for AC and general purpose DC low voltage power circuit breakers)
- UL 1066 (standard for low voltage AC and DC power circuit breakers used in enclosures)
- UL 489 molded case switches

IEC test certifications

Magnum Air Circuit Breakers meet or exceed the applicable IEC standards:

- IEC 60947-2

Approvals and marks

- UL listed: Magnum DS Breaker UL File No. E52096 and Cassette UL File No. E204565
- ABS (American Bureau of Shipping) Type Approval
- CE
- CCC (Certificate for China Compulsory Product Certification) to GB14048.2-2001
- Det Norske Veritas (DNV)
- Lloyds of London
- South African Bureau of Standards (SABS)
- Additional Magnum DS approvals and certificates can be found on www.eaton.com

Magnum DC family

Magnum DC switches selection

There are several versions available of Magnum DC switches, with defined voltage classes for each one, based on certifications. These are defined by the first 3 letters in their 25 digit catalog number:

Magnum DC for UL1066 applications - Type DAS (medium gray cover)

- Standard Frame only, up to 3200 A Continuous
- 3-pole Drawout Configuration
- 300 Vdc, 50 kA Withstand/ Interruption,
- All other Factory/Field Installable Accessories are available (please see the Magnum DS catalog number selector in section 3)

Magnum DC for UL489 molded case type applications - Type DBS (white cover)

- Standard frame only, Up to 3200 A continuous
- 3-pole fixed/drawout configurations
- 600 Vdc, 50 kA withstand/ interruption
- All other Factory/Field Installable Accessories are available (please see the Magnum DS catalog number selector in section 3)

Magnum DC for IEC applications - Type DEK, DEM, DGK, DGM (dark gray cover)

- Type DEK - Standard frame, for ungrounded applications
- Type DEM - Narrow frame, for ungrounded applications
- Type DEK - Standard frame, for grounded applications
- Type DEM - Narrow frame, for grounded applications
- 3-pole and 6-pole Fixed and Drawout Configurations available
- 1000 VDC, 25 kA Interruption, 65 kA Withstand
- Up to 5000 A continuous
- All other Factory/Field Installable Accessories are available (please see the Magnum DS catalog number selector in section 3)

Mounting configurations

The Magnum DC switch is built with the same general frame construction as the other Magnum frames, therefore it mounts just as a size equivalent Magnum circuit breaker would mount. Refer to the appropriate Magnum circuit breaker dimensional drawings and/or appropriate drawout cassette drawings for specific mounting details.

- Drawout switch – Used in combination with fixed drawout cassette which provides primary and secondary connections
- Fixed Switch - supplied with horizontal, pre-drilled primary terminal pads with optional vertical primary adapters available

Typical industry applications

- Utility companies incorporating DC facility power and control for emergency or redundant power
- Backup UPS power systems requiring means to disconnect the battery for isolation and maintenance
- SCR and drive isolation switches for maintenance and emergency disconnect

Table 10. Magnum DC ratings

Catalog type/standard	Frame type	Number of poles	Frame rating	DC voltage/ interrupt rating/ withstand rating	Load switching	For use in grounded systems	Connection type	Fixed/ drawout	Certification
ANSI/UL® 1066 ratings at 300 Vdc									
DAS	Standard	3	1600 A	300 V/50 kA/50 kA	Yes	Yes	Two-pole in series	Drawout	UL 1066
DAS	Standard	3	2000 A	300 V/50 kA/50 kA	Yes	Yes	Two-pole in series	Drawout	UL 1066
DAS	Standard	3	3200 A	300 V/50 kA/50 kA	Yes	Yes	Two-pole in series	Drawout	UL 1066
UL 489 ratings at 600 Vdc									
DBS	Standard	3	3200 A	600 V/50 kA/50 kA	Yes	Yes	Three-pole in series	Both	UL 489
IEC ratings at 1000 Vdc A①									
DEM/DGM	Narrow	3	800 A	1000 V/25 kA/65 kA	Yes	No/Yes①	Three-pole in series	Both	IEC 60947-2
DEM/DGM	Narrow	3	1000 A	1000 V/25 kA/65 kA	Yes	No/Yes	Three-pole in series	Both	IEC 60947-2
DEM/DGM	Narrow	3	1250 A	1000 V/25 kA/65 kA	Yes	No/Yes	Three-pole in series	Both	IEC 60947-2
DEM/DGM	Narrow	3	1600 A	1000 V/25 kA/65 kA	Yes	No/Yes	Three-pole in series	Both	IEC 60947-2
DEM/DGM	Narrow	3	2000 A	1000 V/25 kA/65 kA	Yes	No/Yes	Three-pole in series	Both	IEC 60947-2
DEK/DGK	Standard	3	2500 A	1000 V/25 kA/85 kA	Yes	No/Yes	Three-pole in series	Both	IEC 60947-2
DEK/DGK	Standard	3	3200 A	1000 V/25 kA/85 kA	Yes	No/Yes	Three-pole in series	Both	IEC 60947-2
DEM/DGM	Double narrow	6	4000 A	1000 V/25 kA/100 kA	Yes	No/Yes	Three-pole in series	Both	IEC 60947-2
DEM/DGM	Double narrow	6	5000 A	1000 V/25 kA/100 kA	Yes	No/Yes	Three-pole in series	Both	IEC 60947-2
DEK/DGK	Double standard	6	4000 A	1000 V/25 kA/100 kA	Yes	No/Yes	Three-pole in series	Both	IEC 60947-2
DEK/DGK	Double standard	6	5000 A	1000 V/25 kA/100 kA	Yes	No/Yes	Three-pole in series	Both	IEC 60947-2

① DE is for use in ungrounded applications; DG is for use in grounded applications.

Overview of Digitrip™ electronic trip units

Ever since introducing the first microprocessor-based trip unit, Eaton has advanced the technology into a complete family of Digitrip RMS trip units designed and engineered exclusively for Magnum circuit breakers. Magnum circuit breakers can use any one of the four models of Digitrip electronic trip units. Each trip unit is microprocessor-based and a true rms sensing device:

Digitrip 520

Digitrip 520M

Digitrip 520MC

Digitrip 1150+

For IEC applications, Digitrip 520i, Digitrip 520Mi, Digitrip 520MCi or Digitrip 1150i are to be ordered. These trip unit model numbers carries a lower case "i" in the model designation. This simply indicates that the trip unit complies with IEC requirements in the area of ground fault (earth fault) pickup. Ground fault pickup is limited to 1200A for UL rated devices. This limitation does not apply to IEC rated devices.

The different models within the family provide for increasing levels of protection and feature options for coordination, information, diagnostics, and communications:

Table 11. Digitrip functionality – Summary of key features and capabilities

Functions	520	520M ①	520MC ①	1150+ ①
LSIG protection	Yes	Yes	Yes	Yes
Disable (I)	Yes	Yes	Yes	Yes
GF protection	Yes	Yes	Yes	Yes
GF alarm	No	Yes	No	Yes
Display	No	Yes②	No②	Yes③
Programmable	No	No	No	Yes
Metering	No	Yes④	No④	Yes
Power and energy values	No	No	No	Yes
Power quality	No	No	No	Yes
Communication	No	No	No	Yes

① Available control voltages are 24/48 Vdc, 125 Vdc, 120 Vac and 240 Vac.
② One-line (four characters per line) LCD display.
③ Three-line (eight characters per line) LED display.
④ Phase, neutral, ground and high load current only.

The trip units themselves are self-powered; no external power is required to operate the protective systems. Current signal levels and the control power are derived from integrally mounted toroidal wound current sensors. The use of toroidal wound sensors reduces magnetizing currents, resulting in improved metered value accuracy over a broad range of sensor ratings.

Note: Auxiliary power is required for all Digitrip 520MC and Digitrip 1150+ models for powering the display, communications, metering, alarming, and auxiliary relay functions.

All three parts of the tripping system are discussed in this section. For additional information pertaining to the different trip unit models available for all Magnum circuit breakers, refer to the specific trip unit instructional leaflet (IL70C1036 for 1150+ models and IL70C1037 for 520 models).

Common Digitrip trip unit features

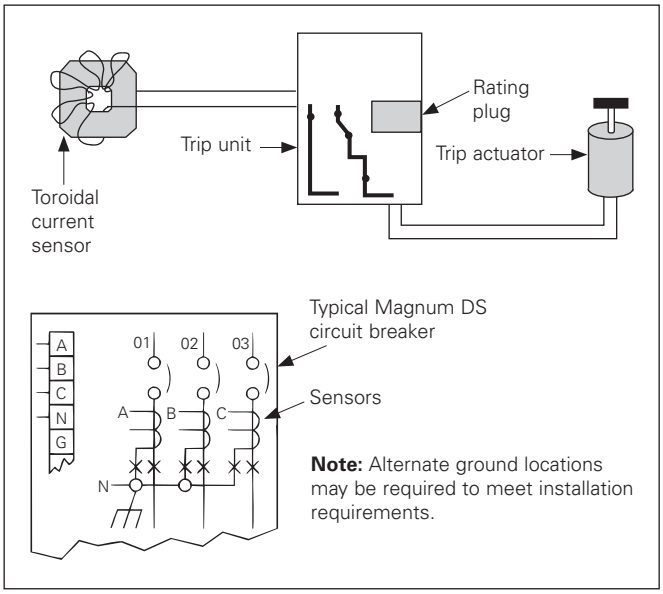
All Digitrip RMS models offer a wide array of common features. These common features ensure unsurpassed versatility, no matter which trip unit model is selected.

- Current Sensors: Three toroidal wound current sensors are installed at the rear of the circuit breaker on the lower terminals. The sensors produce an output current proportional to the load current. Under preselected conditions of current magnitude and time, the sensors furnish the trip unit with a signal and the energy required to trip the circuit breaker.
- Rating Plug: All Magnum circuit breakers use a fixed type rating plug. The current rating (also known as In) of the rating plug must match the current rating of the integrally mounted current sensors. As a safety feature, if the rating plug is removed from the trip unit, the circuit breaker will trip if it sees load current. There is a viewing window on the back of the breaker that displays the current rating of the installed rating plug. The rating plug performs several functions:
  1. It tells the trip unit the rating of the current sensors.
  2. It determines the maximum instantaneous setting, which is a function of the current sensor rating.
  3. Identifies the trip unit as a UL rated device or IEC rated device.①
- Intuitive operator interface
- Interchangeable models
- Self powered device
- Hand held functional test kit (Digitrip RMS 1150 Model also has integral testing capabilities)
- Status LED: A green light emitting diode (LED), labeled Status, blinks approximately once each second to indicate that the trip unit is operating normally. This Status LED will also blink at a faster rate if the Digitrip is in a pickup, or overload, mode.
- Cause of trip LED: A red LED on the face of the trip unit flashes red next to the protection feature to indicate the cause for an automatic trip operation, for example earth fault, overload or short circuit. A battery in the trip unit maintains the trip indication until the Reset/Battery Test button is pushed. The battery is satisfactory if its LED lights green when the Battery Check button is pushed.
- Security cover: A tamper-proof Plexiglas® cover sits on the front of the circuit breaker over the trip unit. The cover is held in place by two cover screws. Security is insured by the insertion of a standard meter seal through the holes in both of the cover retention screws.

Note: Refer to the Table 12 for specific programming details associated with a particular UL or IEC rated Digitrip model.

① The National Electrical Code (NEC) requires that the maximum ground fault pickup value not exceed 1200A for UL rated breakers. IEC rated breakers do not have this current limitation.

Diagram of typical Magnum current sensing, processing, and tripping system



Current sensors (rear view)

Digitrip trip units – Features

Digitrip 520

The Digitrip 520 trip unit is designed to provide basic overcurrent protection with maximum economy. It is a versatile trip unit with features designed to provide flexibility in overcurrent protection and coordination. The Model 520 is available on all Magnum circuit breakers. Model features include the following:

- LI, LSI and LSIG Protection Options with adjustable Instantaneous Off Setting
- Adjustable Long Delay Pick-up Setting
- Adjustable Long Delay Time Setting
- Long Time (Thermal) Memory Trip
- Over temperature Trip when temperature exceeds 85°C
- Adjustable Short Delay Pick-up Setting
- Adjustable Short Delay Time Setting
- Adjustable Instantaneous Pick-up Settings
- Adjustable Ground Pick-up Setting
- Adjustable Ground Time Setting (limited to 1200A for UL rated device)
- Zone Interlocking of Short Time and Ground Fault Time Delay Functions
- Test Port with Cover to receive Hand Held Tester
- Battery Included to Power cause-of-trip LEDs after a trip

Click here or search for '70C1037' on www.eaton.com, for more detailed information on Magnum Digitrip 520, 520M, and 520MC trip unit

Digitrip 520

Digitrip 520M

Digitrip 520M includes all the features of the Digitrip 520 while adding phase, neutral, and ground fault (earth fault) current metering with a four-character LCD display window. The additional features are as follows:

- LSI, LSIG and LSIA Protection Options with adjustable Instantaneous Off Setting
- 4 Digit LCD Display
- Step Pushbutton to Scroll through LCD Display Data:
  - PH1 Phase 1 (A) Current
  - PH2 Phase 2 (B) Current
  - PH3 Phase 3 (C) Current
  - PH4 Neutral Current
  - PH5 Ground Current
  - HI Highest Phase Current
  - OL Overload Condition
  - HELP Trip Unit Error
  - Magnitude of Trip Current
- Optional Ground (Earth) Fault Alarm/Power Supply Module: (Powers 4 digit LCD display using customer voltage source of 24-48 Vdc, 110 Vac, or 220 Vac)
  - Provides ground fault alarm contact (when used with LSIA)
  - Provides ground fault trip contact (when used with LSIG)
  - Provides a High Load Alarm contact (when used with LSI)
  - Alarm Contact rating (with resistive load): (0.5 Amp at 220 Vac , 1.0 Amp at 110 Vac , or 1.0 Amp at 24-48 Vdc
  - High Load Red LED Indicator (LSI Trip Units)
  - Provides power to keep the 4-digit LCD display functional when breaker is open or lightly loaded.

Note: If a ground alarm/power supply module is not provided, the 4 Digit LCD Display will power up when the 3-phase currents reach approximately 20% of the sensor rating or 30% of a single phase current.

Click here or search for '70C1037' on www.eaton.com, for more detailed information on Magnum Digitrip 520, 520M, and 520MC trip units

Digitrip 520M

Digitrip 520MC

Digitrip 520MC includes all the features of the Digitrip 520M plus an ampere-based communications capability and the Arc-flash Reduction Maintenance System (ARMS). The additional features are the following:

- Communications functions and data:
  - Transmit LED (Red) indicates trip unit transmitting INCOM signal
  - Device Settable INCOM communication Address from 001 to 999 hexadecimal
  - Bkr Status (Open, Closed, Tripped)
  - PH1 Phase 1 (A) Current
  - PH2 Phase 2 (B) Current
  - PH3 Phase 3 (C) Current
  - PH4 Neutral Current
  - PH5 Ground Current
  - LDPU Long Delay Pick-up
  - SDT Short Delay Trip
  - INST Instantaneous Trip
  - GNDT Ground Fault Trip
  - PLUG Plug Trip
  - MCR Making Current Release
  - OTEMP Over Temperature
  - HL High Load (LSI only)
  - Arc-flash Reduction Maintenance System (ARMS) Functionality- On/Off Pickup Levels

Note: Ground (Earth) Alarm/Power Supply Module is supplied as standard to power trip unit communications functions.

The 520MC is designed for applications where some communication capability of load and status is required. The 520MC trip unit communicates current-based information and breaker status.

The 520MC is ideally suited for application on feeder breakers and can be used in tandem with mains and tie breakers that are equipped with the full metering and monitoring capability of the 1150+ trip unit. The communication feature requires customer supplied auxiliary power and the Ground (Earth) Alarm/Power Supply Module in order to function.

Note: Refer to pictures and/or graphics in this section for additional information and/or assistance.

Click here or search for '70C1037' on www.eaton.com, for more detailed information on Magnum Digitrip 520, 520M, and 520MC Digitrip trip units

Digitrip 520MC

Digitrip 1150+

The Digitrip 1150+ trip unit offers advanced protection and power monitoring including harmonics, breaker health, waveform capture, and advanced communications options. It eliminates the need for separate metering packages which saves cost, space and installation effort. Extensive operational information is available across the INCOM communications for increased remote monitoring and control capability. The Digitrip 1150+ includes the Eaton's Arc-flash Reduction Maintenance System (ARMS). For a complete discussion of Digitrip 1150+ Trip Unit capabilities, refer to its instruction leaflet IL70C1036.

The following is a summary of the 1150+ product features:

- LSI, LSIG and LSIA Protection
- Arc-flash Reduction Maintenance System (ARMS) functionality- On/Off Pickup Levels
- 24 Character, 3-line Digital LED Display
- Unit Status LED (Green) Indicator
- Programmable Protective Settings:
  - I2t and I4t Curves
  - Adjustable Long Time and Short Time Pick-up / Delay
  - Moderately Inverse, Very Inverse and Extremely Inverse IEEE Curves
  - IEC Curves
  - Neutral Protection (Model LSIG and LSIA Trip Unit)
  - Adjustable Instantaneous Pick-up with Instantaneous Off Setting
  - Adjustable Ground Fault Pick-up / Delay (Trip or Alarm)
  - Undervoltage and Overvoltage Protection (Trip or Alarm)
  - Underfrequency and Overfrequency Protection (Trip or Alarm)
  - Reverse Power (Trip)
  - Voltage Unbalance Protection (Trip or Alarm)
  - Phase Rotation (Alarm)
- Long Time (Thermal) Memory Trip
- Overtemperature Trip when the temperature exceeds 85°C
- Power and Energy Metering Display:
  - Current (±1% 3-phase, neutral and ground)
  - Voltage L-L (±1%)
  - Frequency (±0.05 Hz)
  - Power & Energy (±2%)
  - Kilowatts (kW)
  - Kilowatt Hours (kWH)
  - Kilovoltamperes (kVAR)
  - Power Factor
  - kVA Hours
  - Fixed 15 Minute Demand for kW, kVAR & kVA
  - Sliding 15 Minute Demand for kW or kVA
- Power Quality and Breaker Health Metering and Monitoring:
  - Waveform Capture
  - % Total Harmonic Distortion
  - Programmable Alarm Contacts
  - Breaker Control (Remote Open & Close via Communications)
  - Operations Counter
  - Test Port with Cover to receive Digitrip Hand Held Tester
  - Power Receptacle for Auxiliary Power Module to power up Trip Unit when Breaker in Disconnect or Remove position
  - Integral Self-Test
  - Accessory Bus for Additional Programmable Contacts
  - Battery Included to Power LEDs
  - Reset/Battery Test Pushbutton
  - Communications Functions and Data

Note: The Digitrip 1150+ family of trip units incorporates two microprocessors in their design. One processor is devoted fully to the task of current protection functions. The second microprocessor provides the voltage protection, display, communications, metering, harmonic calculations, alarming, and auxiliary relay functions. These advanced features and the communications capability require that auxiliary power be provided by the customer to the circuit breaker Power Relay Module.

Click here or search for '70C1036' on www.eaton.com, for more detailed information on Magnum Digitrip 1150 trip units

Digitrip 1150+

Digitrip trip units – Comprehensive features

Table 12. Digitrip trip units for Magnum DS and SB ANSI/UL rated power circuit breaker




Trip unit type		Digitrip 520	Digitrip 520M	Digitrip 520MC	Digitrip 1150+①
Ampere range		200–5000A	200–5000A	200–5000A	200–5000A
Interruption rating at 480V		42–200 kA	42–200 kA	42–200 kA	42–200 kA
rms sensing		Yes	Yes	Yes	Yes
Protection and coordination					
Protection	Ordering options	LI, LSI, LSIG, LSIA	LSI, LSIG	LSI, LSIG	LSI, LSIG, LSIA
	Fixed rating plug (I_n)	Yes	Yes	Yes	Yes
	Overtemperature trip	Yes	Yes	Yes	Yes
Long delay protection (L)	Long delay pickup	0.4–1.0 x (I_n)	0.4–1.0 x (I_n)	0.4–1.0 x (I_n)	0.4–1.0 x (I_n)
	Long delay time I^2t at 6 x I_r	2–24 sec	2–24 sec	2–24 sec	2–24 sec
	Long delay time I^4t	No	No	No	1–5 sec
	IEEE curves	No	No	No	Yes
	Long delay thermal memory	Yes	Yes	Yes	Yes
	High load alarm	No	No	No	0.5–1.0 x (I_r)
Short delay protection (S)	Short delay pickup	200–1000% x (I_r) & M1	200–1000% x (I_r) & M1	200–1000% x (I_r) & M1	200–1000% x (I_r) & M1
	Short delay time I^2t at 8 x I_r	100–500 ms	100–500 ms	100–500 ms	100–500 ms
	Short delay time flat	100–500 ms	100–500 ms	100–500 ms	100–500 ms
	Short delay time ZSI	Yes	Yes	Yes	Yes
Instantaneous protection (I)	Instantaneous pickup	200–1000% x (I_n) & M1	200–1000% x (I_n) & M1	200–1000% x (I_n) & M1	200–1000% x (I_n) & M1
	Making current release	Yes	Yes	Yes	Yes
	Off position	Yes	Yes	Yes	Yes
Ground fault protection (G)②	Ground fault alarm	No	Yes	Yes	Yes
	Ground fault pickup	25–100% x (I_n)	25–100% x (I_n)	25–100% x (I_n)	24–100% x (I_n)
	Ground fault delay I^2t at 0.625 x I_n	100–500 ms	100–500 ms	100–500 ms	100–500 ms
Disable ground fault protection		No	No	No	No
Neutral protection (N)		Model LSI only	Model LSI only	Model LSI only	Model LSI only
System diagnostics					
Cause of trip LEDs		Yes	Yes	Yes	Yes
Magnitude of trip information		No	Yes	Yes	Yes
Remote signal contacts		No	Yes	Yes	Yes
Programmable contacts		No	No	No	Yes
Electronic operations counter		No	No	No	Yes

① Over and undervoltage alarm or trip, over and underfrequency alarm or trip, voltage unbalance a larm or trip, reverse power trip and phase rotation alarm are included.

② 1200A maximum ground fault setting per UL/NEC.

I_n = Rating plug and sensor rating.

I_r = Long delay pickup setting.

Table 12. Digitrip trip units for Magnum DS and SB ANSI/UL rated power circuit breaker continued

Trip unit type	Digitrip 520	Digitrip 520M	Digitrip 520MC	Digitrip 1150+①
System monitoring				
Digital display	No	4-Character LCD	4-Character LCD	24-Character LED
Current (%) full scale sensor	No	Yes +/– 2%	Yes +/– 2%	Yes +/– 1%
Voltage (%) L to L	No	No	No	Yes +/– 1%
Power and energy (%)	No	No	No	Yes +/– 2%
Apparent power kVA and demand	No	No	No	Yes
Reactive power kVAR	No	No	No	Yes
Power factor	No	No	No	Yes
Crest factor	No	No	No	Yes
System communications				
Type	—		INCOM/PowerNet/ Modbus②/ PROFIBUS②	INCOM/PowerNet/ TripLink②/ Modbus/PROFIBUS②
Power supply in breaker	N/A	Optional	Standard	Standard
Additional features				
Trip log (three events)	No	No	No	Yes
Electronic operations counter	No	No	No	Yes
Testing method③	Test set	Test set	Test set	Integral and test set
Waveform capture	No	No	No	Yes
ARMs (Arcflash Reduction Maintenance System Mode)	No	No	Yes	Yes④
Breaker health monitor	No	No	No	Yes④
Programmable relay functions	No	No	No	Yes

① Over and undervoltage alarm or trip, over and underfrequency alarm or trip, voltage unbalance a larm or trip, reverse power trip and phase rotation alarm are included.

② Requires externally mounted MMINT or PMINT module.

③ Test set for secondary injection.

④ Contact Eaton for availability.

I_n = Rating plug and sensor rating.

I_r = Long delay pickup setting.

Additional modules for Digitrip 1150 trip units

- **Power relay module:**

  Provides a power supply to power the Digitrip 1150+ trip unit's 24 Character LED display and communications functions. The Power Relay Module also provides (3) programmable relay contacts for interface with external equipment. The power relay module requires an external customer supplied voltage source.

  Programmable Relay Contacts via the Digitrip 1150+ trip unit trip and alarm programming menus:

  - Contact A - Pulse Initiator or Alarm and Trip output relay
  - Contact B - Alarm and Trip output relay. ARMS remote indication
  - Contact C - Latching type Alarm and Trip output relay that holds status upon loss of auxiliary power.

  Alarm Contact Ratings (resistive load):

  - 0.5 Amp at 230 Vac
  - 1.0 Amp at 120 Vac
  - 1.0 Amp at 24-48 Vdc

- **Potential Transformer Module (PTM):**

  The PTM module provides system line voltage information to the Digitrip 1150+ trip unit. It provides signal data to calculate:

  - Voltage
  - Power
  - Energy
  - Related Data

  The PTM is internally hard wired in the breaker, normally to the line side breaker terminals, except for a reverse feed configuration. A white disconnecting plug is provided to disconnect the PT Module circuit from the line voltage during dielectric testing.

- **Accessory bus:**

  The accessory bus feature on the Digitrip 1150+ permits the application of additional discrete programmable relay contacts by using one or more Digital Relay Modules. The accessory bus is connected to secondary terminals A17 and A18 for external connections to the Digital Relay Modules via twisted pair communications cable.

- **Digital relay module:**

  Digital relay modules are mounted by DIN Rail, separate from the circuit breaker. Up to 4 Digital Relay Modules (addresses 001 to 004) can be applied per circuit breaker. Each Digital Relay Module has relays with form C contacts rated at 10 amps maximum at 250 Vdc. A control voltage source of 120 Vac ±20% or 38-125 Vdc is required to power each unit.

  The Digitrip 1150+ trip unit can be programmed to change state of the Digital Relay Module relay contacts for any combination of the following:

  - Auxiliary Switch
  - Bell Alarm
  - Long Delay Trip
  - Short Delay Trip
  - Instantaneous Trip
  - Ground Fault Trip
  - Ground Fault Alarm
  - High Load Alarm
  - Deadman
  - Watchdog
  - Arc-flash Reduction Maintenance System (ARMS) status indication

- **Communication systems and protocols:**

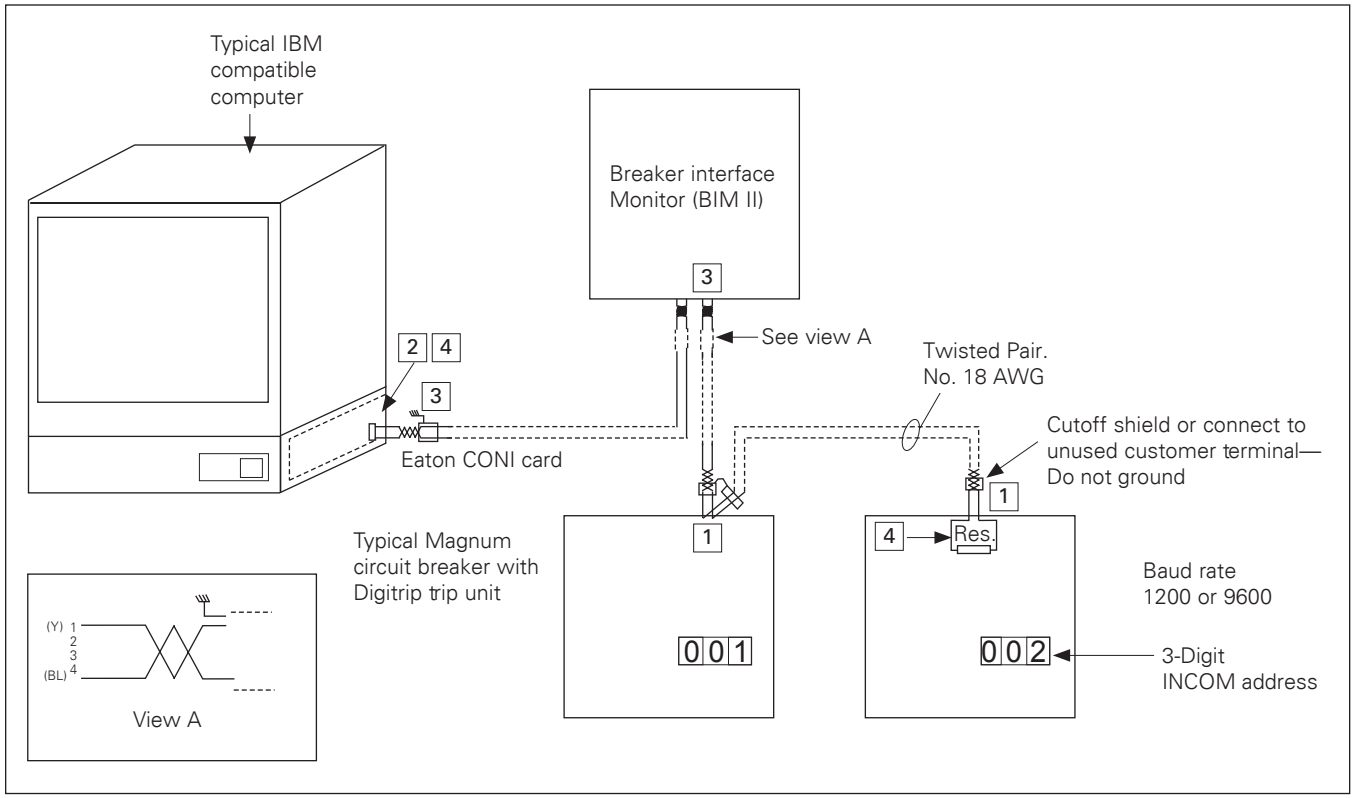
  Communication to a host computer or a Breaker Interface Module (BIM) is possible with both the Digitrip 520MC and Digitrip 1150+ trip units. Network command and control communications is achieved with translators to common protocols, such as Modbus® INCOM™ and Profibus® and Ethernet. External power must be supplied to the breaker.

  Trip unit data is communicated using the appropriate protocol and interface. Modules catalog numbers PMINT and MMINT are compact devices that support common interfaces, and are DIN rail mounting. They output all information available in the trip unit to the field bus including:

  - Status
  - Current
  - Voltage
  - Power
  - Energy
  - Diagnostic information (such as overcurrent, phase asymmetry and overvoltage)

Power relay module

INCOM network



1. Refer to master circuit breaker connection diagrams in Appendix C.
2. Modular telephone connector, Type RJ11, supplied by user.
3. Ground shielding at computer BIM II as shown. Where devices are daisy-chained, interconnect shielding, but do not ground the connection.
4. 100 ohm ½ watt carbon resistor required at last breaker. See T.D. 17-513. Also insert 100 ohm resistor to terminator at CONI card (via switch on CONI).
5. See page 55 for programming INCOM function.
6. AEM II is compatible with Digitrip 1150 with AEM II firmware Version 7.1 and the Digitrip 1150 set in the DT 910 COMM mode (see page 55).
7. Breaker Interface Module (BIM II) Version 3.12 is compatible with Digitrip 1150 Cat. No. 11 ****. BIM II Version 3.20 or greater is compatible with Digitrip 1150 Cat. No. 11 **** and Cat. No. 11P ****.

Notice: 100 ohm 1/2W terminating resistor required on network even if network is unused

Other communication related devices

Most Digitrip trip units can be simply integrated with additional features provided by other closely associated communication related devices and/or external accessories. A Digitrip tripping system is extraordinarily versatile, capable of providing a complete set of functions for protection, measurement, signaling, data storage and control of the circuit breaker.

- **Mechanical trip flag pop-out indicator:**
  The mechanical trip flag pop-out indicator is an overcurrent indication feature that can be supplied as an option on Magnum breakers with integral trip units. This device is located just above the trip unit on the breaker's front faceplate. In the event the trip unit trips the breaker on an overcurrent condition, the red trip flag releases and pops out to give local visual indication. This trip indication is in addition to any LED trip indication next to the protection feature.

  The red flag can be reset by manually pushing it back in. The breaker can be reclosed, even if the flag is not reset. An optional Overcurrent Trip Switch (OTS) is available should an electrical lockout be required on an overcurrent trip condition.

- **Making current release:**
  The Making Current Release (MCR) is a standard safety feature provided on all Magnum breakers equipped with integral trip units. The MCR provides an instantaneous trip when closing on a fault current, which exceeds a specified magnitude. The MCR is non-adjustable, preset to trip the breaker when the peak instantaneous current exceeds 25 x In (In is established by the breaker's current sensors and rating plug). The MCR is enabled for only the first two cycles following the breaker closing operation. When the MCR trips the breaker, the red trip flag of the mechanical indicator will pop out and the red Instantaneous LED, labeled (Inst.), of the trip unit will flash if the breaker is so equipped.

- **Bell alarm/Overcurrent Trip Switch (OTS):**
  The Bell Alarm/Overcurrent Trip Switch (OTS) is an overcurrent indication feature that can be supplied as an option on Magnum breakers with integral trip units. The OTS Switch includes 2 Form C contacts that are wired to the breaker secondary terminals. These contacts are available for external wiring to provide remote trip indication or for electrical lock-out of a breaker.

  If the trip unit trips the breaker on an overcurrent condition:

  - Red mechanical trip flag indicator pops out
  - OTS contacts change state

  The OTS Switch is reset by manually pushing in the red trip flag. When the trip flag is reset, the OTS switch contacts return to their normal state.

- **High instantaneous trip:**
  Magnum breakers that are rated 100kA and manufactured in the standard frame with 800 to 3200 ampere continuous current ratings (MDSC08 to MDSC32) are equipped with a high instantaneous trip. This instantaneous trip system consists of small air core sensors (one per phase) which produce a signal and transmit it back to the trip unit. When the fault current approaches the 85kA withstand rating of the circuit breaker, the trip unit trips the breaker instantaneously. This allows the breaker to be applied on a power distribution system with a 100kA available fault current while maintaining selectivity up to 85kA.

- **Long Time Memory (LTM):**
  Long Time Memory (thermal memory) is a standard feature on Magnum breakers supplied with integral trip units. The thermal memory function provides overtemperature protection on load circuits against the effects of repeated overload conditions.

  If a breaker is closed soon after an overload trip and the current again exceeds the Long Delay Setting, the LTM reduces the time to trip. This allows for the fact that the load circuit temperature is higher than normal due to the previous overload condition. If the breaker continues to be closed into repeated overload conditions, the breaker will trip in successively shorter times to allow for the cooling of the load circuit. When the overload condition returns to normal, the LTM function begins to slowly reset. It will fully reset back to the normal Long Delay Time setting after about 10 minutes, provided that another overload is not experienced.

  In some applications, for example fire pumps, electric welders or during primary injection current testing, it may be desirable to defeat the LTM. This can be accomplished at the trip unit by moving a jumper located inside the cavity behind the test port cover. to the inactive position. The LTM can be reactivated by returning the jumper to the active position.

- **Over temperature trip:**
  Magnum breakers equipped with integral trip units are provided with a standard over temperature trip function. It is designed to trip the breaker when the internal temperature of the trip unit exceeds 85°C. This is the approximate manufacturer's published maximum temperature rating for the trip unit electronic components. An 85°C temperature inside the trip unit indicates that there are much higher temperatures and potentially significant heating problems elsewhere in the circuit breaker enclosure.

  When the over temperature function trips the breaker, the red trip flag of the mechanical indicator will pop-out and the red Long Time Delay LED of the trip unit will flash if the breaker is so equipped.

Ground fault provisions and protective schemes

Ground fault sensing options and zone selective interlocking schemes relative to Digitrip trip units are offered here as a general introduction. For more detailed information and applicable wiring diagrams, refer to trip unit Instruction Leaflet 70C1037 (Digitrip 520) or instruction leaflet 70C1036 (Digitrip 1150).

As a standard feature, Magnum circuit breakers are internally wired with provisions for ground fault protection. However, ground fault protection is provided only if the breaker's trip unit is equipped with optional LSIG protection.

Ground fault protection can be added to breakers not originally equipped with a ground fault trip unit. This can be accomplished by simply replacing the existing trip unit with a like model trip unit that has LSIG protection.

To provide for maximum application flexibility, breaker ground fault provisions are wired out to the breaker secondary terminals for external use. The secondary terminals can be easily configured to accommodate the most common ground fault schemes.

- **Residual sensing:**
  This is the standard or default wiring configuration. It is also the industry's most common mode of ground fault sensing used in 3-pole and 4-pole breaker applications. One current sensor per pole on each phase conductor is provided internal to the circuit breaker. When 3-pole breakers are applied on 3 phase, 4 wire systems, an external sensor matched to the breaker sensor ratio is mounted on the switchgear neutral bus. It is then wired to the breaker secondary contacts to connect all sensors in the residual circuit.

Note: For a main-tie-main system, current sensors and rating plugs must be the same rating for the system to work properly.

- **Source ground sensing:**
  Source ground sensing is commonly found on 3 pole breakers applied as a main breaker on single-ended radial or on double-ended systems where a mid-point grounding electrode is employed. To configure a breaker for source ground sensing, a shorting jumper is applied to breaker secondary contacts B6 and B7 to defeat the residual sensing mode. An external current sensor is mounted directly on the bonding conductor to ground to measure the ground current flowing in the grounding electrode conductor and all other grounding conductors. The sensor is then wired to the breaker secondary contacts B4 and B5. The secondary current rating of the sensors must be 1 ampere.

- **Zero sequence sensing:**
  Zero sequence is applied on main and feeder breakers, and other breakers employed in zone interlocking ground protection schemes. To configure a breaker for zero sequence sensing, a shorting jumper is applied to breaker secondary contacts B6 and B7 to defeat the residual sensing mode. Zero sequence sensors with 1000:1 and 100:1 ratios are available for mounting in the switchgear cable compartment. The sensor internal window dimensions are 4.5 x 13.5 inches (114 x 342 mm) for accommodating power cables. The zero sequence sensors are wired to breaker secondary contacts B4 and B5.

- **Multiple source/Multiple ground:**
  Multiple source/multiple ground sensing schemes are also possible on systems with multiple sensors.

- **Zone selective interlocking:**
  Zone interlocking is a hard wired communication scheme used with circuit breakers to improve the level of protection in a power distribution system. This is achieved through communication between downstream and upstream breakers in a system continuously sending signals to each other to help identify the location of a fault condition so the appropriate breaker isolates the fault.

  Zone Selective Interlocking is a standard feature provided on Magnum breakers that are supplied with Digitrip 520 or higher trip units. The trip unit Short Time and Ground Fault Time Delay Zone Interlock function is wired out to breaker secondary terminals B8 and B9 for customer use. The zone interlock function provides for hard-wired selective circuit breaker coordination in the power distribution system.

  In the event that a fault current on the system exceeds the trip unit Short Time or Ground Fault pick-up settings or the Short Delay Setting 2xIr is exceeded, the breaker nearest to the fault trips instantaneously. At the same time the trip unit sends a logic signal to the connected upstream trip unit to restrain it from tripping immediately and follow its protective delay settings. Coordination is maintained, the breaker closest to the fault trips first and power is only selectively disrupted.

Note: When zone interlocking is not employed, it may be defeated by installing a shorting jumper across breaker secondary terminals B8 and B9.

Note: For IEC circuit breakers with Digitrip trip units, the zone interlocking function is not wired out to the breaker secondaries. The trip unit will always follow the programmed short time or ground time setting. This is accomplished via a wiring harness internal to the circuit breaker. If the zone interlocking function is desired for IEC breakers with Digitrips trip units, please refer to Eaton for appropriate instructions on how to adjust the internal wiring harness to activate the zone interlocking function

Click here or search for '70C1037' on www.eaton.com, for more detailed information on Magnum Digitrip 520, 520M, and 520MC trip unit

Click here or search for '70C1036' on www.eaton.com, for more detailed information on Magnum Digitrip 1150 trip units

Overview of Magnum accessories

A variety of accessory devices are available for use with Magnum circuit breakers. Unless otherwise stated, they are all considered optional devices in the sense that they are not provided as standard on a manually operated circuit breaker. Available accessories are identified here and discussed in general terms. For more detailed information and/or installation instructions, refer to the individual instruction leaflets available on www.eaton.com/magnum.

Magnum circuit breaker accessories are designed to fit all frame sizes. The accessories fall into one of three categories:

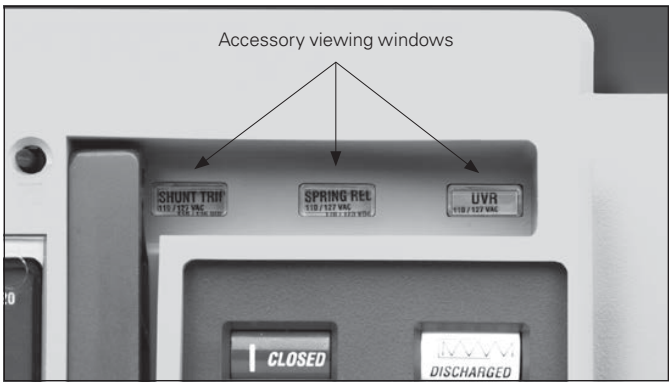
- Plug-in Electrical
- Internal Electrical
- Mechanical P

Plug-in electrical accessories

There are several Magnum plug-in electrical accessories. Three types (ST, SR, UVR) can be viewed for identification by name and rating through viewing windows located in the right front of the breaker.

All of these below are plug-in type and can be factory installed or field installed using a UL Listed kit. The plug-in accessories are:

1. Shunt Trip (ST) (Through the window)
2. Spring Release (SR) (Through the window)
3. Undervoltage Release (UVR) (Through the window)
4. Auxiliary Switch
5. Latch Check Switch



Through-the window electrical accessories

- **Shunt Trip (ST)**

  The shunt trip is an optional device on circuit breakers. It opens the circuit breaker instantaneously when its coil is energized by a voltage input. A total of two shunt trips can be mounted on a Magnum breaker. Two different shunt trip types are available:

  - The continuous duty coil (or 100% rated) type can be continuously energized. It is useful in applications where it is desired to keep the breaker tripped open.
  - The shunt trip type that has a cutoff switch removes voltage from the coil once the breaker contacts are opened.

  Note: Do not use a shunt trip monitoring circuit with a continuous duty shunt trip.

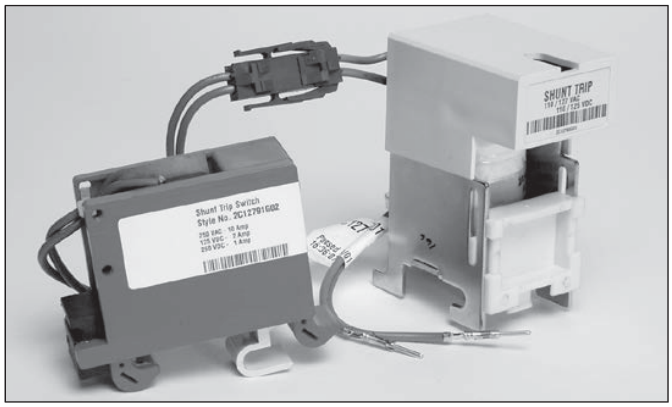
Table 13. Shunt trip ratings ①

Control voltages	Operational voltage range 70–110%	Inrush power consumption	Opening time (ms)
24 Vdc	17–26 Vdc	250 W	35
48 Vdc	34–53 Vdc	250 W	35
60 Vdc	42–66 Vdc	300 W	35
110–125 Vdc	77–138 Vdc	450 W	35
220–250 Vdc	154–275 Vdc	450 W	35
110–127 Vac ①	77–140 Vac	450 VA	35
208–240 Vac	146–264 Vac	450 VA	35

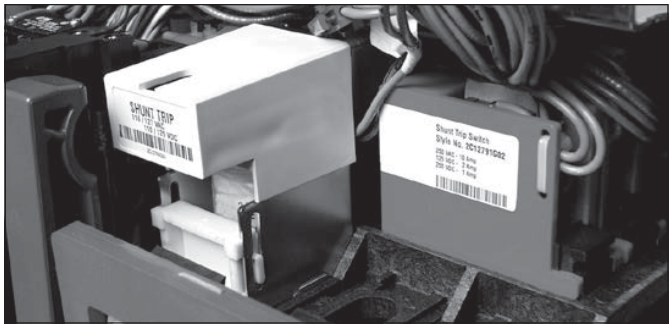
① Required for less than 35 ms.

Table 14. Continuous duty shunt trip

Control voltages	Operational voltage range 70–110%	Inrush/ continuous power consumption	Opening time
24 Vdc	17–26	250 W/18 W	35
48 Vdc	34–53	275 W/18 W	35
60 Vdc	42–66	275 W/18 W	35
110–125 Vdc	77–138	450 W/10 W	35
220–250 Vdc	154–275	450 W/10 W	35
110–127 Vac	77–140	450 VA/10 VA	35
208–240 Vac	146–264	400 VA/10 VA	35



Shunt trip with cutoff switch



Shunt trip switch installed

• Spring Release (SR)

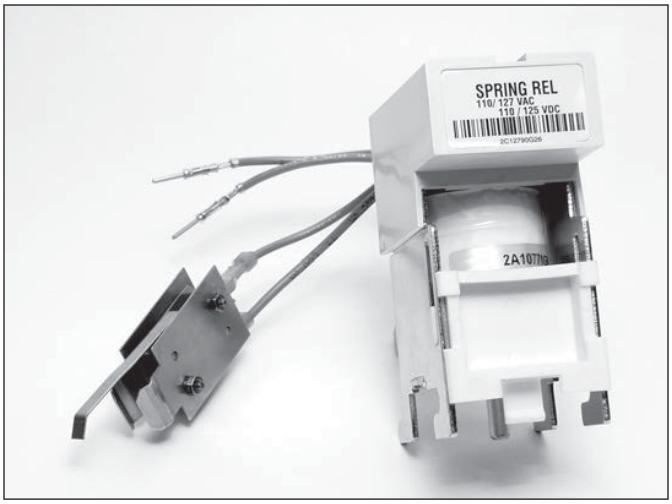
The spring release is an optional device. It remotely closes the circuit breaker when the coil is energized by a voltage input. The closing spring must be fully charged and the trip latch reset (not held in the tripped position) for the spring release to operate. If these two conditions are not met, the close signal will be ignored until it is removed and re-applied.

An optional Latch Check Switch (LCS) can be installed to indicate when the breaker is "ready to close." The LCS wired to the spring release will not permit activation of the spring release until the breaker is fully charged and the trip latch is reset. If power is applied and maintained to the spring release, activation will occur when the breaker is "ready to close."

The LCS for remote indication consists of one Form C contact wired to the circuit breaker secondary contacts for integration into external control schemes.

Note: Wiring the LCS for remote indication directly in series with the SR accessory is not recommended, as this will override the "anti-pump" feature of the electrical charging/closing system.

Note: Do not use a monitoring circuit on a spring release.



Spring release with optional latch switch

Table 15. Spring release ratings

Control voltages	Operational voltage range 85–110%	Inrush/ continuous power consumption	Opening time
24 Vdc	20–26 Vdc	250 W	40
48 Vdc	41–53 Vdc	250 W	40
60 Vdc	51–66 Vdc	300 W	40
110–125 Vdc	93–138 Vdc	450 W	40
220–250 Vdc	187–275 Vdc	450 W	40
110–127 Vac	93–140 Vac	450 VA	40
208–240 Vac	177–264 Vac	450 VA	40

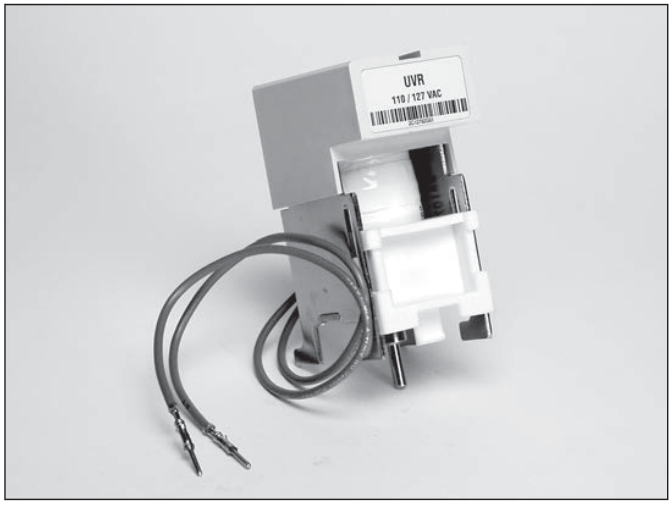
• Undervoltage Release (UVR)

The undervoltage release is an optional device on both manually and electrically operated circuit breakers. It opens the breaker when its supply voltage falls to between 35–60% of rated voltage. If the release is not energized to 85% of its supply voltage, the circuit breaker cannot be closed electrically or manually.

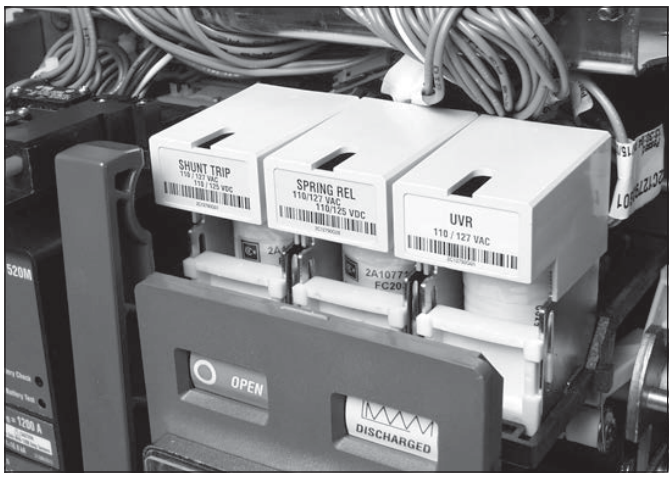
Table 16. Undervoltage release ratings

Control voltages	Operational voltage range 85–110%	Dropout voltage 30–60%	Inrush/ continuous power consumption①②	Opening time (ms)
24 Vdc	20–26 Vdc	7–14 Vdc	250 W/18 W	70
32 Vdc	27–35 Vdc	10–19 Vdc	275 W/15 W	70
48 Vdc	41–53 Vdc	14–29 Vdc	275 W/18 W	70
60 Vdc	51–66 Vdc	18–42 Vdc	275 W/18 W	70
110–125 Vdc	94–138 Vdc	33–75 Vdc	450 W/10 W	70
220–250 Vdc	187–275 Vdc	66–150 Vdc	450 W/10 W	70
110–127 Vac ②	94–140 Vac	33–76 Vac	450 VA/10 VA	70
208–240 Vac ②	177–264 Vac	62–144 Vac	400 VA/10 VA	70
380–415 Vac ②	323–457 Vac	114–249 Vac	480 VA/10 VA	70
480 Vac ②	408–528 Vac	144–288 Vac	400 VA/10 VA	70
600 Vac ②	510–660 Vac	180–360 Vac	400 VA/10 VA	70

① Required for 200 ms
② Required for 400 ms



Undervoltage release



All Three Accessories (ST, SR, UVR) Installed

8

- **Auxiliary switch**

  An auxiliary switch is an optional device providing remote electrical indication if the circuit breaker is open or closed. Up to three auxiliary switches can be mounted in one breaker. Each switch has two normally open ("A") and two normally closed ("B") contacts for a total of 12 available contacts.

Table 17. Auxiliary switch, overcurrent trip switch, and cell switch contact ratings

Control voltages	Contact rating inductive load (amperes)
250 Vac	10
125 Vdc	0.5
250 Vdc	0.25

Auxiliary switch (2A/2B)

Internal electrical accessories

Other electrical accessories are mounted inside the circuit breaker. They can be factory or site installed. There are three different internally mounted accessories:

1. Overcurrent Trip Switch (Bell Alarm)
2. Mechanical Trip Flag Pop-out Indicator
3. Motor Operator

- **Overcurrent trip switch (bell alarm)**

  An overcurrent trip switch (bell alarm) is an optional device. It provides an electrical indication when a circuit breaker trips as a result of the trip unit reacting to an overcurrent condition. Opening as a result of a circuit breaker's manual open button, shunt trip, or undervoltage release does not cause the overcurrent trip switch to operate.

  The status of the contacts changes when the trip indicator pops out. This permits the switch to be used as an alarm or in conjunction with a spring release to block a subsequent remote electrical closing signal. Refer to Section 3 for available options.

- **Mechanical trip flag pop-out indicator**

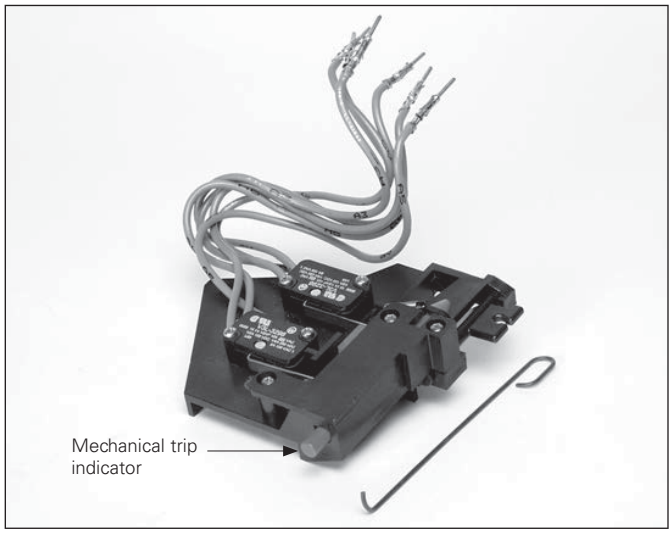
  The mechanical trip flag pop-out indicator is an overcurrent indication feature that can be supplied as an option on Magnum breakers with integral trip units. This device is located just above the trip unit on the breaker's front faceplate. In the event the trip unit trips the breaker on an overcurrent condition, the red trip flag releases and pops out to give local visual indication. This trip indication is in addition to any LED trip indication next to the protection feature.

  The red flag can be reset by manually pushing it back in. The breaker can be reclosed, even if the flag is not reset. An optional Overcurrent Trip Switch (OTS) is available should an electrical lockout be required on an overcurrent trip condition.

  If the trip unit trips the breaker on an overcurrent condition:

  - Red mechanical trip flag indicator pops out
  - OTS contacts change state

  The OTS Switch is reset by manually pushing in the red trip flag. When the trip flag is reset, the OTS switch contacts return to their normal state.



Mechanical trip indicator with associated overcurrent trip switch

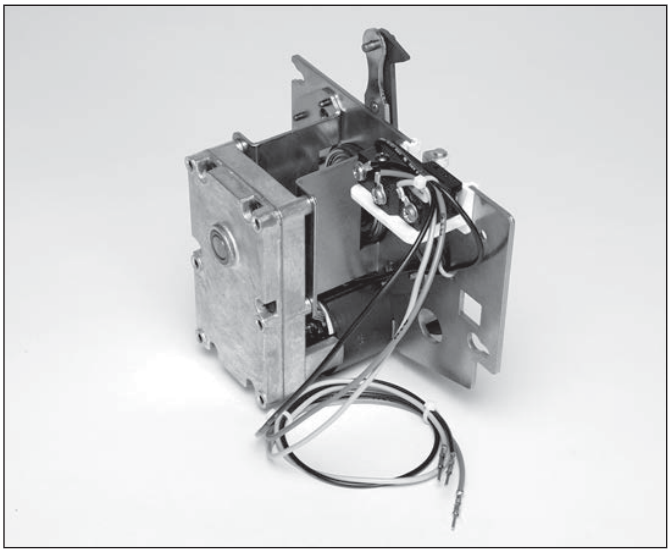
- **Motor operator**

  A motor operator is an electric motor assembly internally mounted in the circuit breaker. It charges the closing springs electrically for remote or local operation. It can be factory or site installed. A UL Listed motor operator kit is available to make the conversion from a manually operated breaker to an electrically operated breaker.

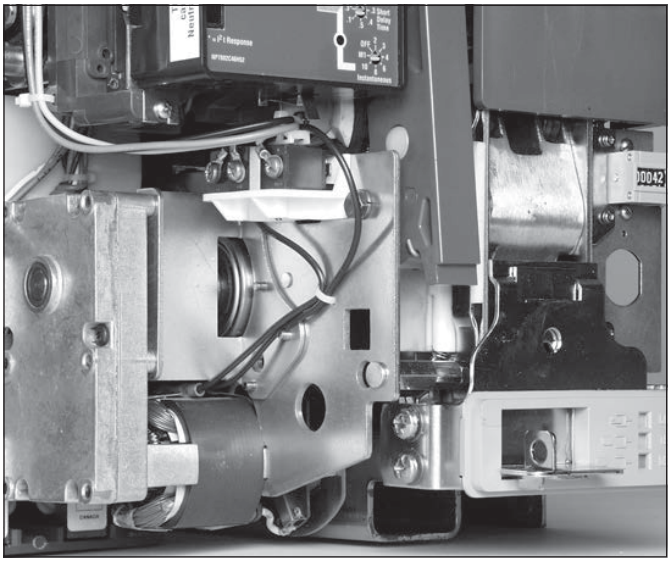
Table 18. Motor operator ratings

Control voltages ①	Operational voltage range 85–110%	Running current (A. avg.)	Typical inrush current	Power consumption (W or VA)	Maximum charging time (seconds)
24 Vdc	20–26	12	300% of running	300	5
48 Vdc	41–53	5	500% of running	250	5
60 Vdc	51–66	3	600% of running	250	5
110–125 Vdc	94–138	2	600% of running	250	5
220–250 Vdc	187–225	1	600% of running	250	5
110–127 Vac	94–140	2	600% of running	250	5
208–277 Vac	177–305	1	600% of running	250	5

① AC voltages are 50/60 Hz.



Motor operator kit



Motor operator installed in narrow frame circuit breaker

Mechanical accessories

There are numerous optional mechanical type accessories:

1. Operations Counter
2. Off Key Lock
3. Cassette Lock
4. Pushbutton Cover
5. Prevent Close Cover
6. Lockout Cover
7. Cassette Safety Shutters
8. Cassette Cell Switch
9. Door Escutcheon
10. Waterproof Cover
11. Mechanical Interlock

- **Operations counter**

  The operations counter is a mechanical device used to provide a record of the number of circuit operations. It is mounted in the lower right portion of the breaker and can be viewed through the front cover.

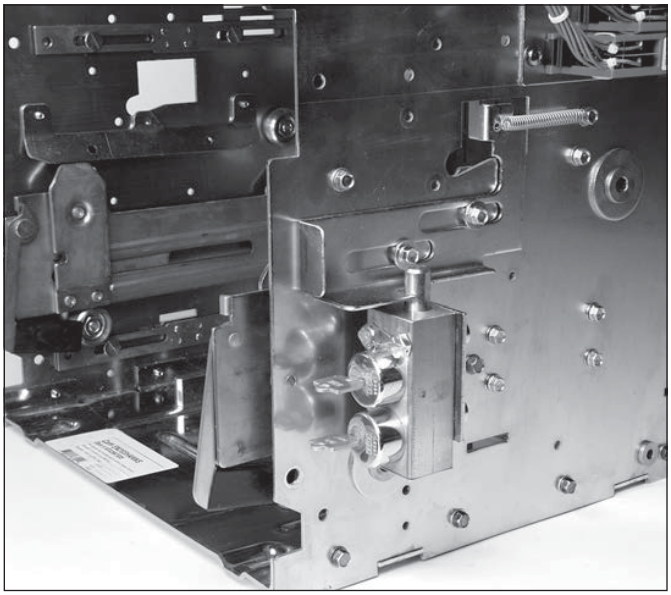
- **Off key lock**

  The off key lock secures the breaker in the OFF position. It is mounted in the lower right portion of the breaker and can be viewed through the front cover. The customer supplies the key lock. The provisions available are for Kirk, Castell, Ronis, CES or Superior.

Cover mounted key lock and operations counter

- **Cassette lock**

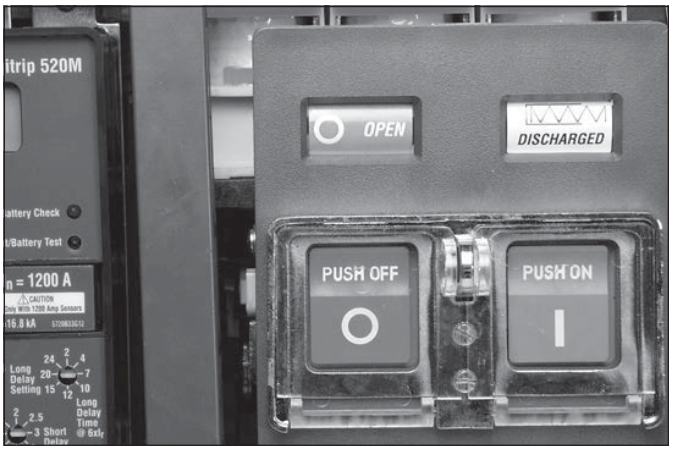
  A cassette-mounted lock can be used in conjunction with different interlocking schemes, such as main-tie-main. The lock holds the breaker open in the CONNECTED position, preventing it from being closed. Up to three lock cylinders can be installed on one cassette. Eaton supplies the lock provisions only. The customer is responsible for the locks, which can be Kirk or Castell.



Cassette-mounted key lock

- **Pushbutton cover**

  Padlockable covers are available to limit access to the ON and OFF pushbuttons. They can be installed with either or both pushbutton covers in place.



ON–OFF pushbutton lockable cover plate

- **Prevent close cover**

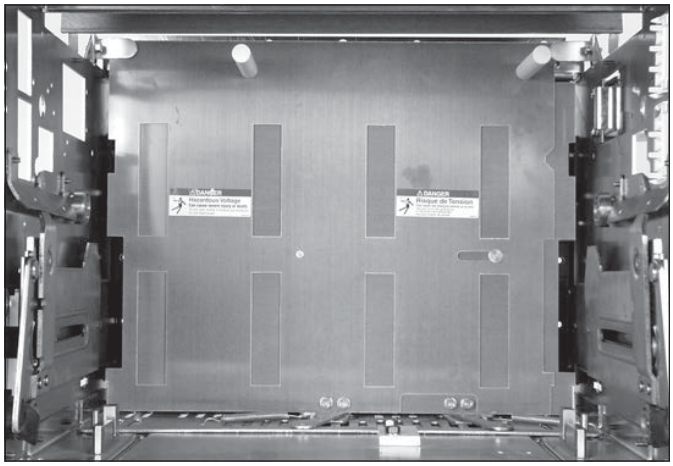
  All access to the ON pushbutton can be prevented by adding the fixed prevent close cover to the pushbutton cover.

- **Lockout cover**

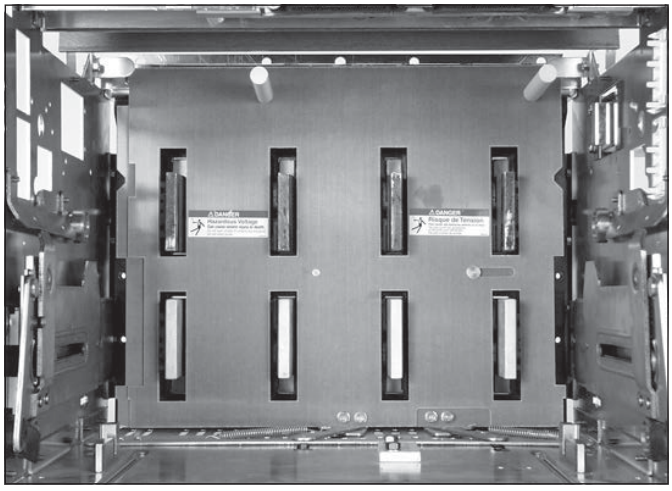
  When padlocked, a lockout cover maintains the OFF button in the ACTUATED position, preventing breaker closure..

- **Cassette safety shutters**

  Automatically operated insulating type safety shutters are available for use with the drawout cassette. When a drawout breaker is levered from the CONNECT position, the shutters automatically close to cover the fixed primary contacts. When the breaker is levered into the cassette, the shutters automatically open, permitting primary connections to be made.



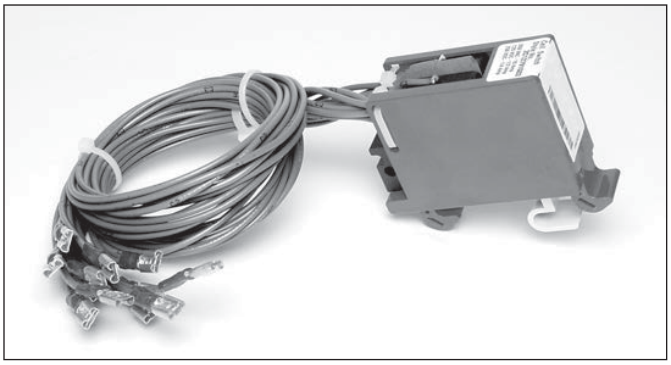
Typical safety shutters in CLOSED position



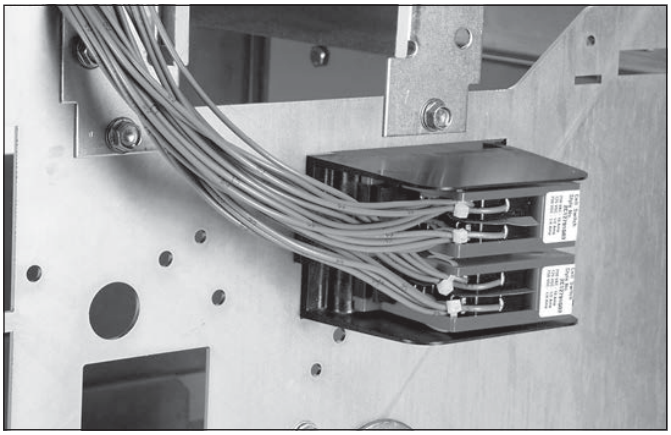
Typical safety shutters in OPEN position

- **Cassette cell switch**

  The cassette cell switch is a compartment position switch for drawout breakers. It is available in a 2a2b or 4a4b contact configuration, and mounts on the right side of the cassette. Refer to the ratings table presented earlier in this section near the auxiliary switch discussion for cell switch contact information. The cell switch changes status between the TEST and CONNECT positions.



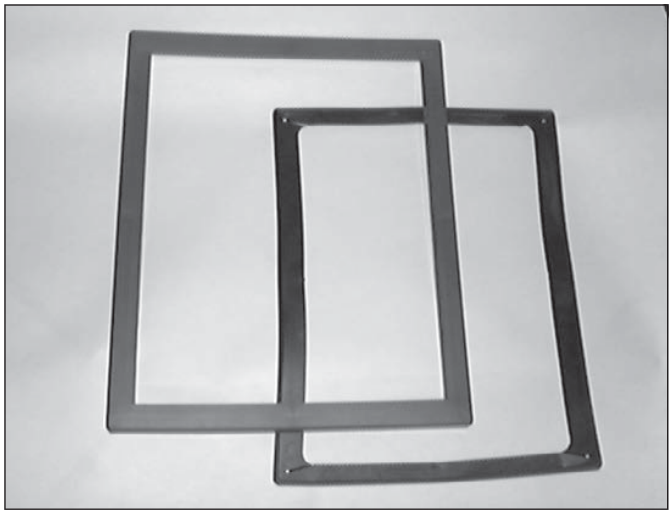
Cell switch (drawout position indicator) unmounted



Cell switches mounted on cassette

- **Door escutcheon**

  The door escutcheon is a molded frame used to seal the space between the breaker and the compartment door cutout. It is supplied with a mounting gasket. The door escutcheon and gasket have an IP41 rating.



Door escutcheon and gasket

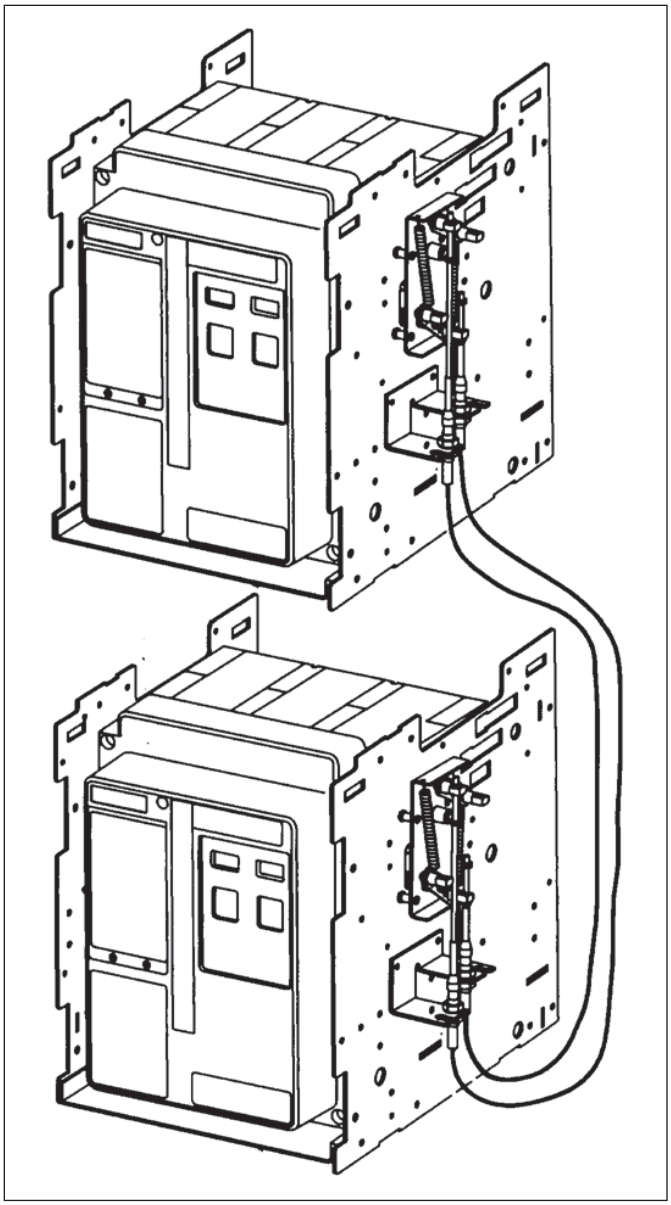
- **IP55 waterproof cover**

  A hinged dome-shaped waterproof cover attaches to the metal compartment door to provide waterproof protection for the breaker.

IP55 waterproof cover

- **Mechanical interlock**

  A family of mechanical interlocks are available to interlock the closing of two or three Magnum breakers. The mechanical interlock holds one or more breakers tripped (prevents closure) when others are closed. A lever assembly is mounted on each breaker, which interfaces with the pole shaft and the tripper bar. The lever assemblies are interconnected with either cables or rods, depending upon the relative orientation of the breakers. Rods can be used only when the breakers to be interlocked are vertically stacked. Cables can be used for any orientation of the breakers. Mechanical interlocks are available for both fixed and drawout breakers, and in both two-way and three-way versions.



Cassette-mounted two-way cable interlock

Technical data for usual service conditions (0°C to 40°C)

- **Ambient temperatures & thermal derating tables**

  Magnum breakers are tested and fully rated for use in ambient temperatures from 0°C to 40°C. Thermal de-rating tables are provided for different Magnum breakers operating in switchboards at various ambient temperatures above 40°C. The switchboard's ambient should be estimated using an industry accepted calculation method.

Magnum DS and SB ANSI temperature derating tables

Table 19. Calculated de-rated capacity ANSI standard

Frame	Actual ambient temperature (°C)					
	40	45	50	55	60	70
800	800	800	800	794	738	612
1600	1600	1600	1600	1600	1592	1321
2000	2000	2000	1995	1869	1735	1439
2500	2500	2395	2259	2116	1965	1630
3000	3000	2845	2684	2514	2334	1936
3200	3200	3098	2922	2737	2541	2108
4000	4000	4000	3815	3574	3318	2752
5000	5000	5000	4716	4417	4101	3402

Table 20. Calculated de-rated capacity ANSI narrow

Frame	Actual ambient temperature (°C)					
	40	45	50	55	60	70
800	800	800	800	800	800	800
1200	1200	1200	1200	1200	1200	1101
1600	1600	1600	1526	1429	1327	1101
2000	2000	1916	1807	1693	1572	1304

Table 21. Calculated de-rated capacity ANSI MDSL Magnum

Frame	Actual ambient temperature (°C)					
	40	45	50	55	60	70
800	800	800	800	800	800	763
1600	1600	1600	1600	1521	1413	1172
2000	2000	2000	1976	1851	1718	1425

Shaded means no loss in derating

Magnum IEC temperature derating tables

Table 22. Calculated de-rated capacity for IEC standard Magnum

Frame	Actual ambient temperature (°C)					
	40	45	50	55	60	70
800	800	800	800	800	800	800
1000	1000	1000	1000	1000	1000	1000
1250	1250	1250	1250	1250	1250	1250
1600	1600	1600	1600	1600	1600	1600
2000	2000	2000	2000	2000	2000	2000
2500	2500	2500	2500	2500	2500	2482
3200	3200	3109	2992	2871	2746	2482
4000SW	4000	4000	4000	4000	4000	3615
4000DW	4000	4000	4000	4000	4000	4000
5000	5000	5000	5000	5000	5000	5000
6300	6300	6300	6260	6008	5747	5193

Table 23. Calculated de-rated capacity for IEC narrow Magnum

Frame	Actual ambient temperature (°C)					
	40	45	50	55	60	70
800	800	800	800	800	800	800
1000	1000	1000	1000	1000	1000	1000
1250	1250	1250	1250	1250	1100	1000
1600	1600	1600	1600	1600	1500	1350
2000	2000	2000	2000	2000	1800	1650
4000 NDW	4000	4000	4000	4000	3928	3549

Shaded means no loss in derating

• Altitude factors

All Magnum breakers, including IEC rated breakers, can be applied at their full voltage and current ratings up to a maximum altitude of 2000 meters above sea level. When installed at higher altitudes, the ratings are subject to correction factors. Short circuit current is not affected as long as the voltage is rated in accordance with the information shown in the table.

Table 24. Altitude rating factors

Altitude (meters)	Voltage correction	Current correction
2000	1.000	1.000
2150	0.989	0.998
2300	0.976	0.995
2450	0.963	0.993
2600	0.950	0.990
2750	0.933	0.987
2900	0.917	0.983
3050	0.900	0.980
3200	0.883	0.977
3350	0.867	0.973
3500	0.850	0.970
3650	0.833	0.967
3800	0.817	0.963
3950	0.800	0.960
5000	0.700	0.940

• Test bus configuration

The bus bar size examples shown here are those specified by ANSI, IEC 947-1 and/or used by Eaton in their breaker type testing. They are for 3 meter long bus bar with the faces vertical and painted flat black. For other bus bar configurations, larger bus bar sizes may be required or the breaker may have to be de-rated. Refer to the tables presented earlier in this section for de-rating information at higher ambient temperatures

Table 25. ANSI Bus Bar sizes and quantities

Maximum services current, amperes (40°C ambient)	Circuit breaker frame (MDS, MDN, SBS, SBN)	Recommended Bus Bar quantities and sizes	
		(in)	(mm)
800	08	(1) .25x3.0	(2) 5x50
1000	10	(2) .25x2.0	(2) 5x60
1200	12	(2) .25x3.0	(2) 5x80
1600	16	(2) .25x3.0	(2) 5x100
2000	20	(3) .25x3.0	(3) 5x100
2500	25	(4) .25x3.0	(4) 5x100
3200	32	(3) .25x6	(3) 10x100
4000	40	(4) .25x6	(4) 10x100
5000	50	(5) .25x6	(5) 10x100
6300①	63	(6) .25x6	(6) 10x100

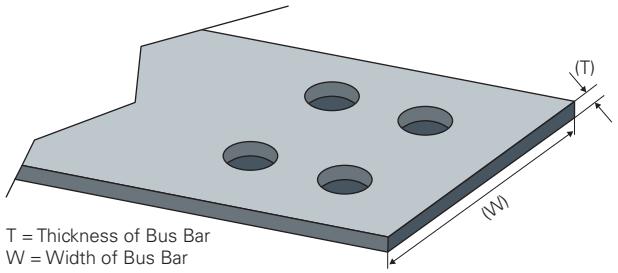
① 6300A only available in Magnum IEC frame

Table 26. IEC Bus Bar sizes and quantities

Maximum service current, amperes (40°C ambient)	Circuit breaker frame (MWN & MWI)	Recommended Bus Bar quantities and sizes	
		(in)	(mm)
800	08	(2) 5x50	(1) .25x3.0
1000	10	(2) 5x60	(2) .25x2.0
1250	12	(2) 5x80	(2) .25x3.0
1600	16	(2) 5x100	(2) .25x3.0
2000	20	(3) 5x100	(3) .25x3.0
2500	25	(4) 5x100	(4) .25x3.0
3200	32	(3) 10x100	(3) .25x6
4000	40	(4) 10x100	(4) .25x6
5000	50	(5) 10x100	(5) .25x6
6300①	63	(6) 10x100	(6) .25x6

① 6300A only available in Magnum IEC frame

Example 1



T = Thickness of Bus Bar
W = Width of Bus Bar

Example 2

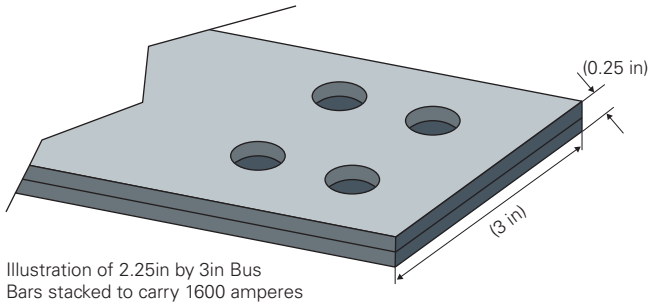


Illustration of 2.25in by 3in Bus Bars stacked to carry 1600 amperes

Example 3

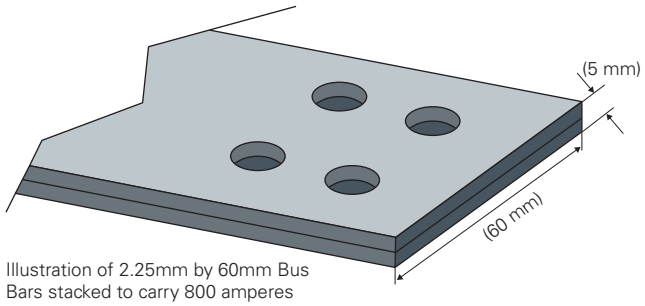


Illustration of 2.25mm by 60mm Bus Bars stacked to carry 800 amperes

• Recommended electrical clearances

The following electrical clearance information is provided as guidance when installing drawout or fixed breakers in an enclosure. Refer to the graphic representations and the associated dimensional tables.

Table 27. ANSI Electrical clearance dimensions (in)

Breaker mounting	Enclosure dimensions	To insulated surface	To grounded metal surface	With cell switch or key lock
Drawout	A	0	0	0
	B	1.0	1.0	1.0/2.9
Fixed	A	5.9	9.8	-
	B	1.2	2.8	-

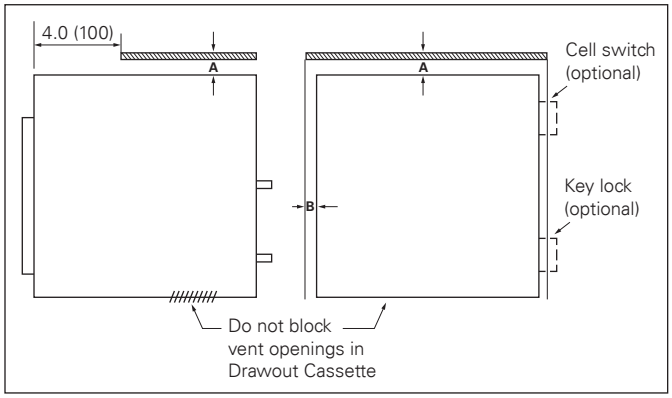
Table 28. IEC Electrical clearance dimensions (mm)

Breaker mounting	Enclosure dimensions	To insulated surface	To grounded metal surface	With cell switch or key lock
Drawout	A	0	0	0
	B	25	25	25/75
Fixed	A	150	250	-
	B	30	70	-

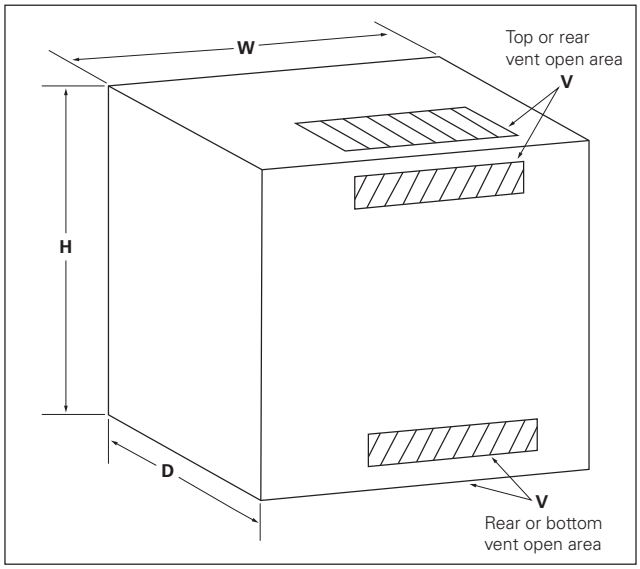
• Recommended enclosure size/ventilation

Graphics of typical enclosures with associated dimensions are provided as guidance for breaker enclosure designs with respect to the enclosure size and required amounts of ventilation space.

Recommended enclosure electrical clearances inches (mm)



Minimum enclosure size/ventilation



W	**-**	**Cassette width**	+3.0 in	+75 mm
H	**-**	**Height**	21.7 in	550 mm
D	**-**	**Front compartment depth**	17.7 in	450 mm
V	**-**	**Ventilation (800-3200A)**	25 in^2	160 cm^2
		Ventilation (4000-6300A)	50 in^2	320 cm^2

Quick reference for other documents and information - outlined drawings

Table 29. Reference drawings (as found on www.eaton.com/magnum, documents section)

Drawing #	Certification	Description
Fixed breaker		
6D33092	ANSI-IEC	800/1600 Standard Frame Fixed
6D33093	ANSI-IEC	2000 Standard Frame Fixed
6D33094	ANSI-IEC	2500 - 3200 Standard Frame Fixed
6D33090	ANSI-IEC	4000-6300 Standard Frame Fixed 4P
2C14095	ANSI-IEC	800-2000 Narrow Fixed 3P/4P
6D33045	ANSI-IEC	4000 Narrow Fixed breaker 6P/8P
2C15001	ANSI	1200-5000 MDSX Fixed
Drawout breaker		
6D33190	ANSI	4000-5000 Drawout Vertical
6D33195	IEC	4000-5000 Drawout Horizontal
2C14090	ANSI	800-1600 Drawout Vertical 3P/4P
2C14091	ANSI	2000 Drawout Vertical 3P/4P
2C14092	ANSI	3200 Drawout Vertical 3P/4P
2C14093	IEC	800-2000 Drawout Horizontal 3P/4P
2C14094	IEC	2500 - 3200 Drawout Horizontal 3P/4P
2C14096	ANSI-IEC	800-2000 Narrow Drawout 3P/4P
6D33040	ANSI-IEC	4000A Narrow Drawout 6P/8P
2C15000	ANSI	MDSL Breaker 3P Drawout
Cassette		
6D33095	ANSI	800-5000 Inter-Unit Cassette 3P
6D33096	IEC	800-4000 Standard Cassette 3P/4P
6D33097	ANSI	4000-5000 Basic/Standard Cassette 3P
6D33098	IEC	4000-6300 Cassette 3P/4P
6D32603	ANSI	800-3200 Universal Cassette 3P/4P
6D32604	ANSI	4000-5000 Universal Cassette 6P/8P
6D32605	ANSI-IEC	800-2000 Narrow Cassette 3P/4P
6D33041	ANSI-IEC	4000 Narrow Cassette 6P/8P
6D33002	ANSI	800-3200 Basic Cassette 3P
6D33600	ANSI	MDSL Cassette 3P

By utilizing this reference list above, you can find many PDF, .dwg, or .stp drawings. To access, please visit www.eaton.com/magnum, click on Magnum DS/SB, and review the 'Drawings' tab.

Or use the drawing number as a search item on www.eaton.com

Magnum renewal or replacement parts

Click here or visit www.eaton.com/magnum and search 'Magnum Renewal Parts', for a comprehensive list of renewal or field installable parts.

Time current curves

Click here or visit www.eaton.com/tcc and select 'Low Voltage and Medium Voltage Power Breakers' from the dropdown.

Wiring diagrams

Search 'Magnum User Manual' on www.eaton.com, for up to date Wiring Diagrams on the Magnum IB (Installation Bulletin).

Magnum instruction leaflets (for field replacement accessories)

Visit www.eaton.com/magnum, click on Magnum DS/SB, and review the Instructions section on the 'Documents' tab.

Applications for Magnum circuit breakers

- **Zone selective interlocking**

  Zone interlocking is a communication scheme used with circuit breakers and protective relays to improve the level of protection in a power distribution system. This is achieved through transmission of a restraint signal between the downstream and upstream devices in the system. The word "zone" is used to refer to the part of an installation between two circuit breakers in series. The zones are classified by their location downstream of the main circuit protective device, which is generally defined as zone 1.

  Zone selective interlocking (or zone interlocking) is available with the Digitrip family of trip units on the Short Delay and Ground Fault protection functions. The Zone Selective Interlocking function on the Digitrip family of breakers has combined the logic interlocking of short delay and ground fault. It provides the fastest possible tripping for faults within the zone of protection of the breaker, and yet also allows selective positive coordination among all breakers in the system (mains, ties, feeders, and downstream breakers) to limit a power outage to only the affected parts of the system. For IEC Digitrip trip units, the zone selective interlocking feature between breakers is defeated.

  When zone interlocking is employed, a fault within the zone of protection of the breaker will cause the Digitrip trip unit to:

  - Trip the affected breaker immediately and, at the same time...
  - ...Send a signal to upstream Digitrip units to restrain them from reducing their programmed trip times.

  The restraining signal causes the upstream breakers to follow their set coordination times, so that the service is only minimally disrupted while the fault is cleared in the shortest time possible.

- **Low voltage high resistance ground fault sensing**

  Where continuity of service is a high priority, high-resistance grounding can add the safety of a grounded system while minimizing the risk of service interruptions due to grounds. The concept is a simple one: provide a path for ground current via a resistance that limits the current magnitude, and monitor to determine when an abnormal condition exists. This provides for maximum continuity of service, because no tripping occurs for the resistance limited ground fault.

  The ground current path is provided at the point where the service begins, by placing resistance in the connection from system neutral to ground.

- **Phasing on double-wide application**

  Magnum circuit breakers manufactured in the double-wide frame have two available phasing configurations which must be confirmed when the breaker is ordered.

  The phasing convention is determined facing the front of the breaker from left to right. For 4-pole applications, the neutral is located on the left and is rated 100% of the breaker continuous current rating.

  The following phasing configurations are available:

  - 3-Pole AABBCC
  - 4-Pole NNAABBCC
  - 3-Pole ABCABC
  - 4-Pole NNABCABC
  - 4-Pole NABCNABC

The type of phasing selected depends on how the circuit breaker will be applied in the enclosure and the type of Eaton power distribution enclosure that it will be applied in.

AABBCC or NNAABBCC phasing

AABBCC phasing is the convention commonly used in Eaton switchboards using Magnum breakers, including IEC switchboards. The AABBCC convention is recommended for most OEMs manufacturing their own power distribution enclosures. It is ideal for applications where the breaker is mounted single high (one breaker in a structure).

ABCABC or NABCNABC phasing

ABCABC phasing is the convention commonly used in Eaton Magnum UL1558 switchgear. Double-wide breakers with this type of phasing are designed to accommodate 2 sets of vertical risers in the same structure. This provides for significant space savings because two or more standard frame feeder breakers can be mounted above or below the double-wide breaker in the same structure.

The ABCABC convention is more difficult for OEMs who manufacture their own power distribution enclosures to apply. Switchgear bus design and testing as well as placement and balance of the feeder breaker loads are very important to assure that phase currents divide evenly through the double-wide breaker. ABCABC phasing is available, but not common in IEC switchgear applications. Contact Eaton for more information.

Magnum double-wide frame breaker with AABBCC phasing (front and rear views)

Table of contents

Document references

Table 30. Engineering document references chart

Reference #	Product description
2A12996	ANSI Cassette cell switch
2A10895	Face Plate IL
8700C39	Eaton DigiTrip RMS and DigiTrip OPTIM Trip Units with Types DSII and DSLII low voltage power circuit breakers
2A11851	Center pull handle replacement parts kit
2A11893	Drawout Magnum breaker standard/double frame rejection bracket replacement kit
2A129991	CES key interlock kit in Magnum low voltage circuit breakers
2C12060	Magnum DS, DSX, DC, and DSL low voltage power circuit breakers - ANSI only
2C12701	(External) Remote latch check switch (LCS) for Magnum (IZM) low voltage circuit breaker
2C12702	Compact motor operator in Magnum (IZM) low voltage circuit breakers
2C12760	Breaker stationary contact replacement kit
2C12761	Breaker moving contact replacement kit
2C12762	Replace fixed breaker secondary disconnect block in Magnum low voltage circuit breakers
2C12764	Breaker accessory tray replacement
2C12766	Two-way cable interlock kit for Magnum fixed circuit breakers
2C12767	Two-way rod interlock kit for Magnum fixed circuit breaker
2C12768	Two-way rod interlock kit for Magnum drawout circuit breaker
2C12769	(Internal) Remote latch check switch (LCS) for Magnum (IZM) low voltage circuit breaker
2C12860	Two-way cable interlock kit for Magnum drawout circuit breakers
2C12861	Three-way cable interlock kit for Magnum drawout circuit breaker (type 31 and 33 interlock)
2C12862	Three-way cable interlock kit for Magnum fixed circuit breaker (type 31 and 33 interlock)
2C12863	Three-way cable interlock kit for Magnum drawout circuit breaker (type 32 interlock)
2C12864	Three-way cable interlock for Magnum fixed circuit breaker (type 32 interlock)
2C12865	Charging handle replacement parts kit for Magnum low voltage circuit breakers
2C12866	Levering mechanism assembly for replacement parts kit in Magnum low voltage draw out circuit breakers
2C12867	Levering door mechanism replacement parts kit in drawout Magnum low voltage circuit breakers
2C12870	Front mounted narrow terminal kits on Magnum (IZM) low voltage circuit breakers and Cassettes
2C12894	Door escutcheon with gasket for Magnum (IZM) low voltage circuit breakers
2C12895	Pushbutton cover field option kit for Magnum (IZM) low voltage circuit breakers
2C12896	Instructions for installation of 2A10800G01 and 2A10800G02, arc hood barrier kit (1000V)
2C12896	Instructions for installation of 2A10800G11 (3-Pole) and 2A10800G12 (4-pole), fixed arc hood barrier kit
2C12896	Magnum low voltage draw out circuit breaker Cassette arc hood barrier kit 1100V
2C12897	Drawout 2500-3200A breaker vertical adapter replacement
2C12897	Vertical adapter kit for Magnum (IZM) fixed low voltage circuit breakers or IEC Cassettes
2C12899	Draw out breaker standard/double frame rejection bracket replacement kit
2C12901	Center pull handle replacement parts kit
2C12999	Door escutcheon with gasket for Magnum low voltage circuit breakers
2C13060	Operation and maintenance of Magnum low voltage air circuit breakers
2C13760	HF securite (ronis) key interlock for Magnum (IZM) low voltage circuit breakers
2C13761	Kirk key interlock field option kit (2C13761H01)
2C13762	Breaker current sensor and rating plug replacement kit
2C13763	Castell key interlock kit in Magnum KLP-SO-CASTELL
2C13764	Non-automatic trip unit cover in Magnum low voltage circuit breakers
2C13765	Magnum (IZM) low voltage draw out circuit breaker IEC horizontal stab cassette shutter kit (double wide 4000-6300A Cassette)
2C13766	OTS/Bell alarm in Magnum (IZM) low voltage circuit breakers
2C13767	Cassette standard/double frame rejection bracket replacement kit
2C13768	Horizontal stab Cassette shutter kit IEC
2C13768	Magnum low voltage drawout circuit breaker IEC horizontal stab cassette shutter kit (narrow up to 2000A, standard up to 4000A)
2C13769	Standard motor operator in Magnum low voltage circuit breakers
2C13795	Fixed breaker terminal mounting bracket in Magnum low voltage circuit breakers
2C13820	Front mounted standard terminal kits on Magnum (IZM) low voltage fixed circuit breakers and Cassettes
2C13860	Cassette universal bus adapter

Table 31. Engineering document references chart continued

Reference #	Product description
2C13863	Magnum Cassette narrow/double narrow frame rejection bracket replacement kit
2C13990	Interlocking trip indicator field option kit in Magnum low voltage circuit breakers
2C14691	Magnum (IZM) Cassette key interlock provision field option kit
2C14694	Magnum (IZM) IEC Cassette cell switch field option kit
2C14695	Six point secondary terminal blocks used with Magnum (IZM) low voltage circuit breakers
2C14760	Undervoltage release in Magnum (IZM) low voltage circuit breakers
2C14761	Spring release kit in Magnum (IZM) low voltage circuit breakers
2C14762	Shunt trip in magnum low voltage (IZM) circuit breakers
2C14763	Vertical adapters 800/1600A on fixed Magnum (IZM) low voltage circuit breakers
2C14764	Vertical adapter kit for Magnum (IZM) fixed low voltage circuit breakers or IEC Cassettes (narrow and standard frame to 2000A; Double wide frame to 4000A)
2C14766	Auxiliary switch kit in Magnum (IZM) low voltage circuit breakers
2C14767	Breaker operations counter in Magnum (IZM) low voltage circuit breakers
2C14892	IP55 dust and water-resistant cover for Magnum low voltage fixed or drawout circuit breaker
2C14896	Magnum low voltage fixed circuit breaker arc hood barrier kit 1100V
2C14899	Drawout cassette door latch interlock kit for Magnum drawout circuit breaker (ANSI)
2C15600	Magnum (IZM) narrow frame Cassette rejection bracket kit
2C15660	Drawout cassette door latch interlock kit for Magnum drawout circuit breaker
2C15860	Draw out Magnum breaker narrow frame rejection bracket kits
2C15861	Lubricating cable interlocks for Magnum circuit breakers
66A7508	mMINT - Modbus translator module - installation and use
66A7686	PMINT—PROFIBUS DP translator module—installation and use
6D33993	Magnum (IZM) low voltage draw out circuit breaker shutter kit for double wide narrow frame Cassettes
70C1036	DigiTrip models 1150, 1150i, 1150+, and 1150i+ trip units for use only in Magnum and Magnum DS circuit breakers
70C1037	Digitrip models 520, 520i; and 520M, 520Mi, 520MC, 520MCi trip units for use only in Magnum and Magnum DS circuit breakers
PG01301001	Magnum DS ANSI/UL low voltage power circuit breakers - product focus
PG01301002	Magnum IEC low voltage power circuit breakers - product focus
B44A01SE	Magnum low voltage power circuit breakers and metal enclosed switchgear
BR01301001U	Magnum IEC low voltage air circuit breakers up to 690 Vac, 42 ka to 100 ka Icu, 800 to 6300 amperes, EN 60947-2 -product focus
BR01301003E	Magnum IEC low voltage air circuit breakers product focus
BR01301008E	Series NRX low voltage power circuit breaker
CA01301002E	Series NRX catalog supplement
PA01301010E	DigiTrip Magnum trip units retrofit kits product focus
PA01301019	Magnum MDSX current limiting power circuit breaker
PA01301022E	Magnum IEC low voltage power air circuit breakers - new 4000A continuous current frame rating for standard magnum frame
PA22F01SE	Magnum DS low voltage power circuit breakers -product aid
PA44A01SE	Magnum DS low voltage metal enclosed switchgear -product aid
RP01301001E	Magnum DS low voltage power circuit breakers (ANSI) - renewal parts and accessories
RP01301002E	Magnum air circuit breakers (IEC) - renewal parts and accessories
TB01300001E	Tab 13 - power breakers, contactors & fuses

Figure 1. 800-2000A Narrow frame Cassette (Mounting locations)

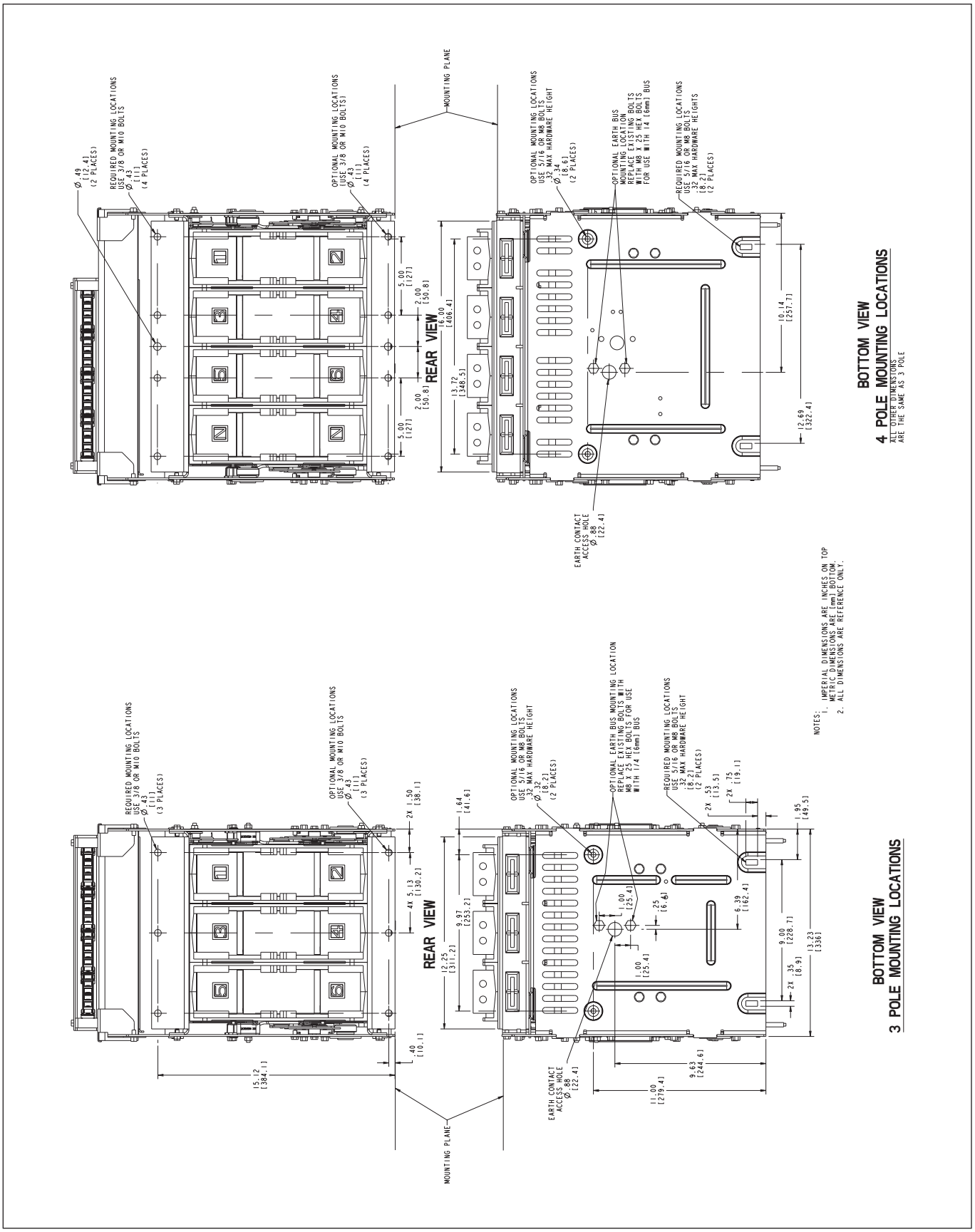


Figure 2. 800-2000A Narrow frame Cassette (Overall dimensions)

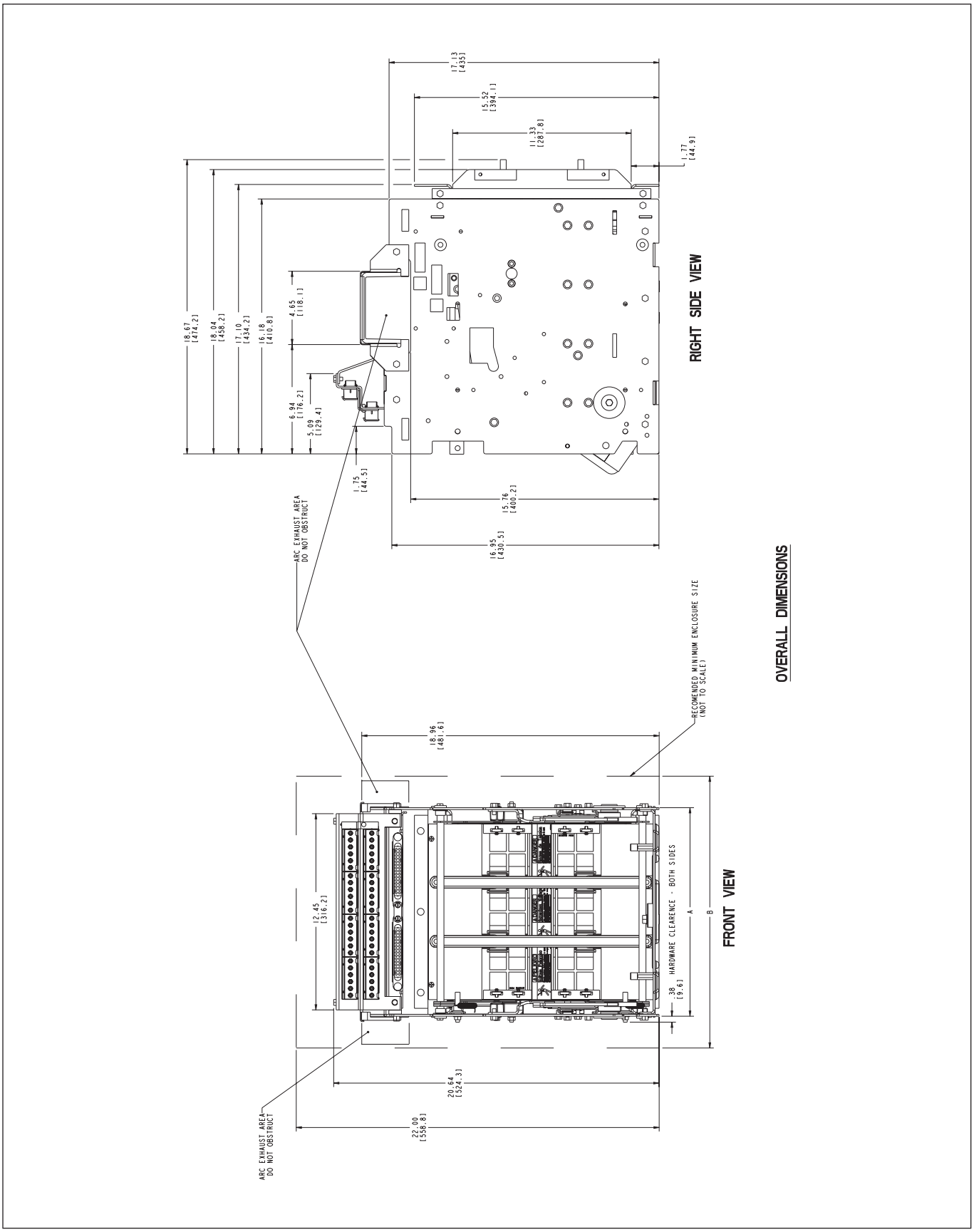


Figure 3. 800-2000A Narrow frame Cassette (Accessory dimensions)

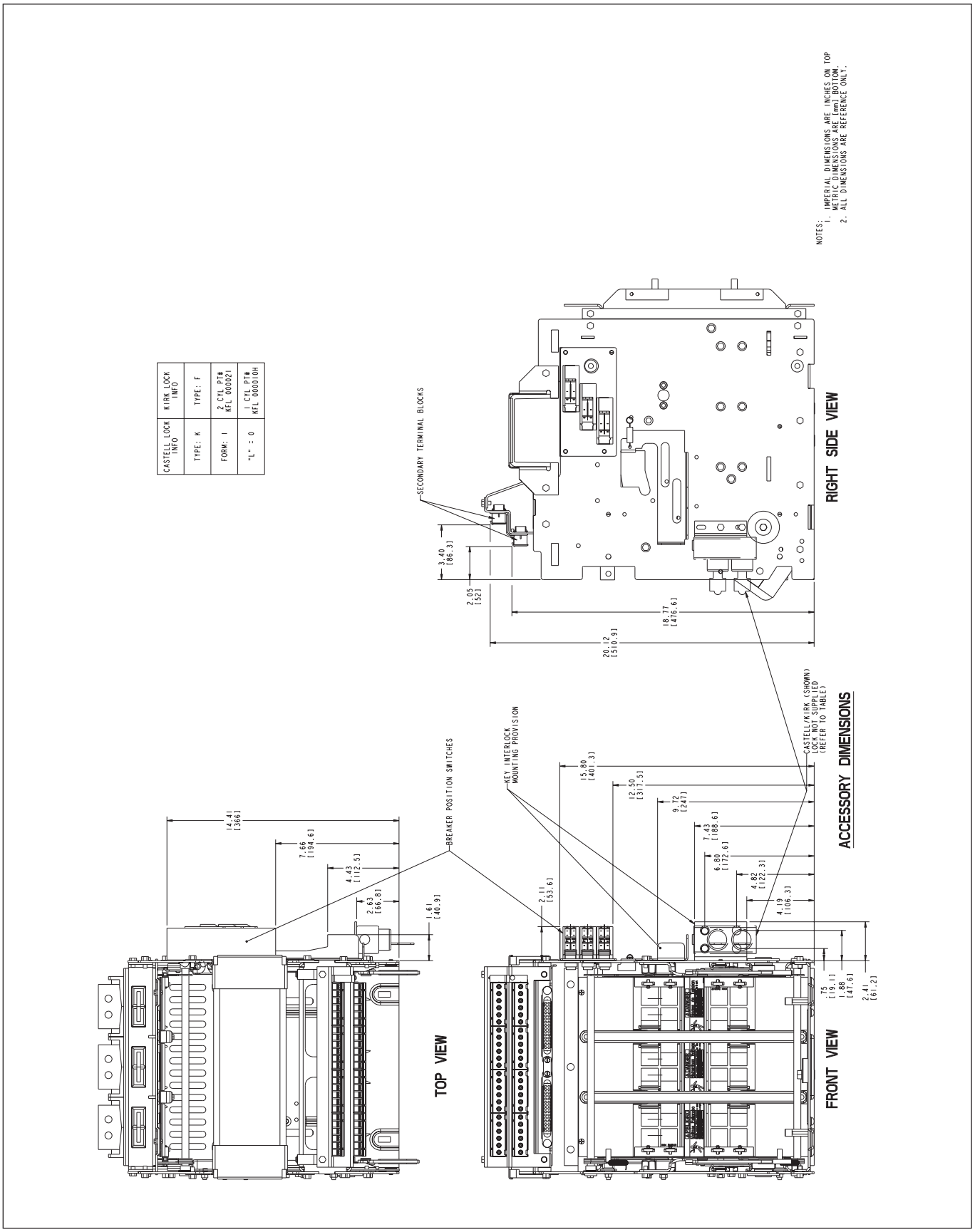


Figure 4. 800-2000A Narrow frame Cassette (3-pole stab and stab bracing)

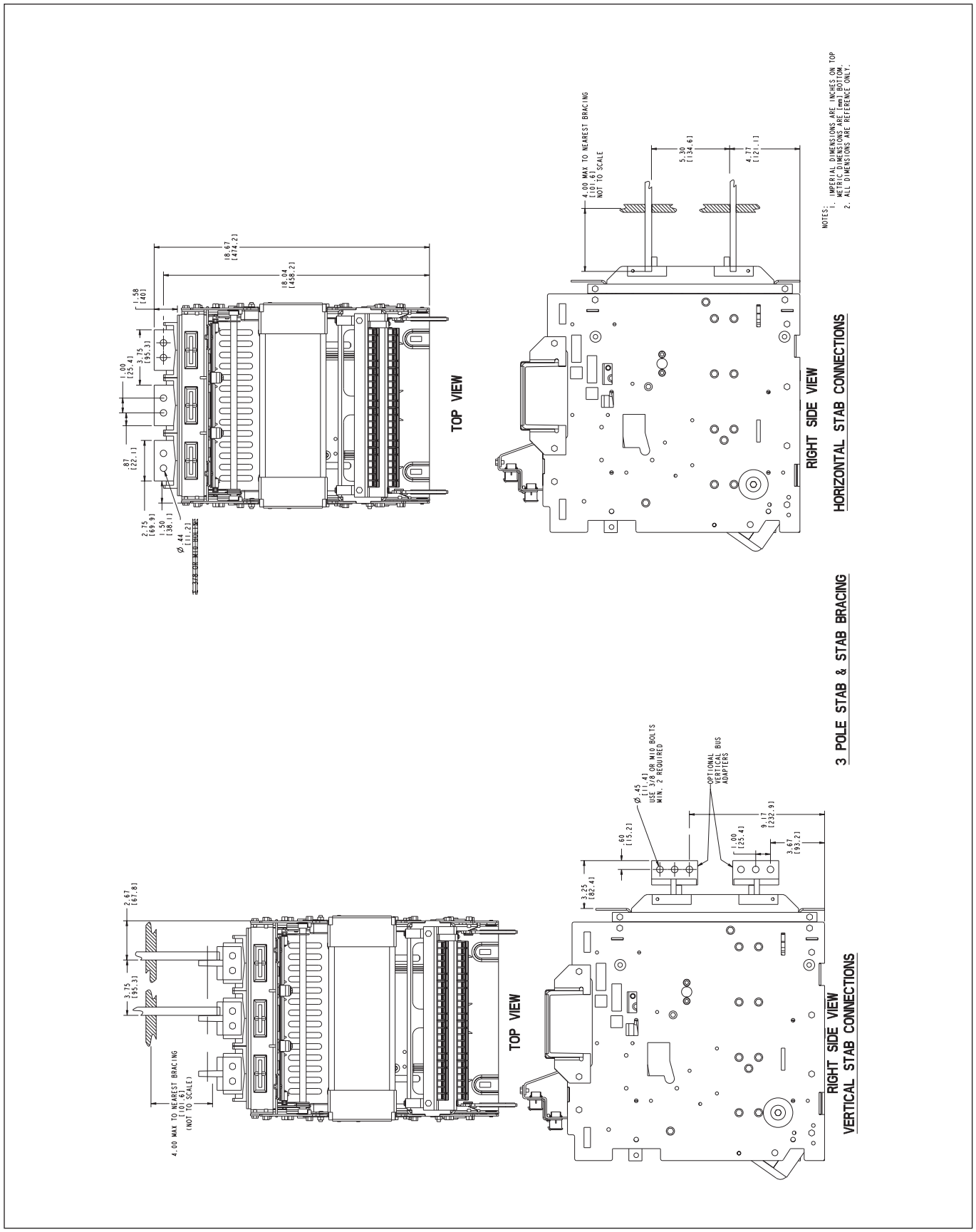


Figure 5. 800-2000A Narrow frame Cassette (Door cutout and breaker positions)

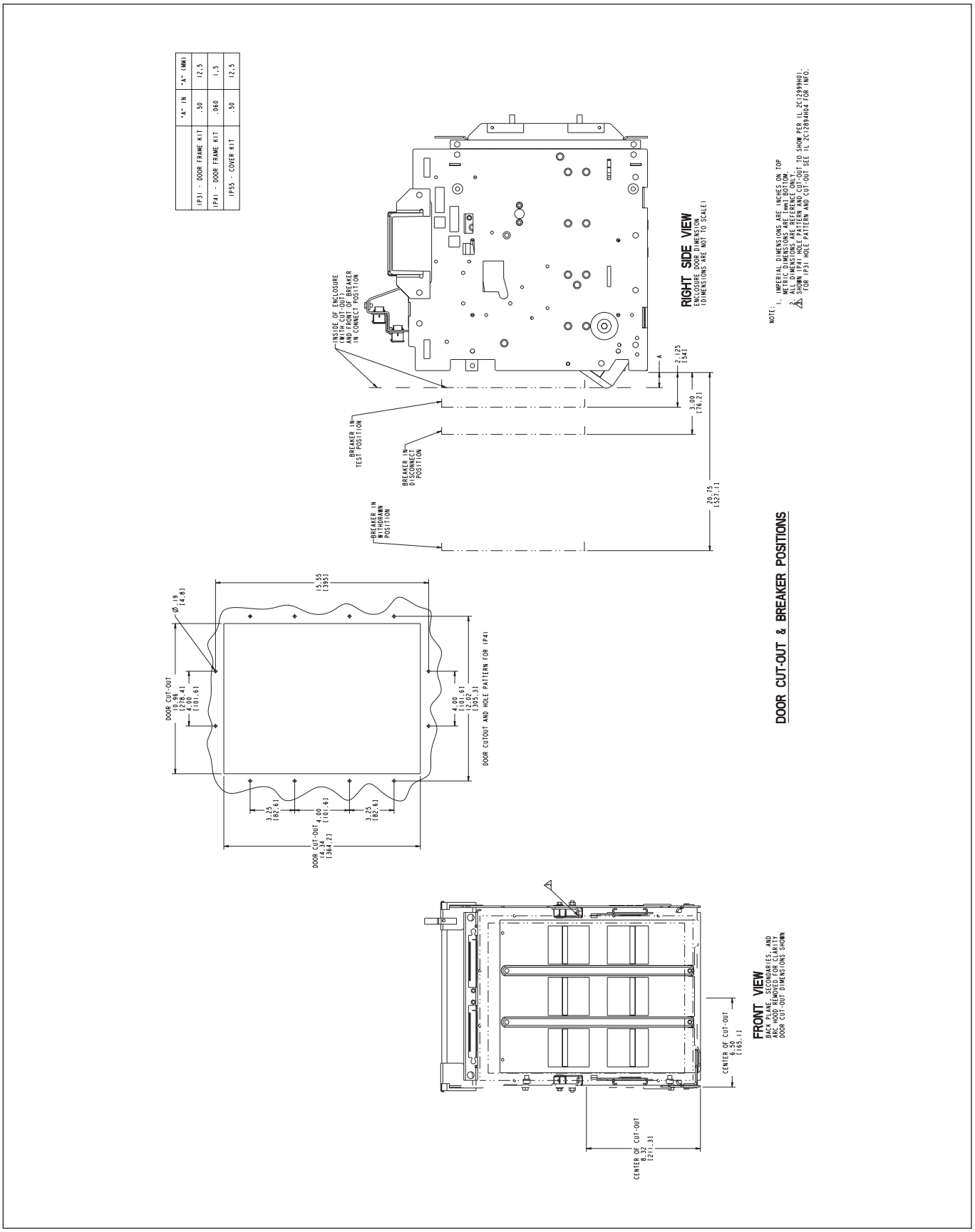


Figure 6. 800-2000A Narrow frame Cassette (Front mount terminal locations)

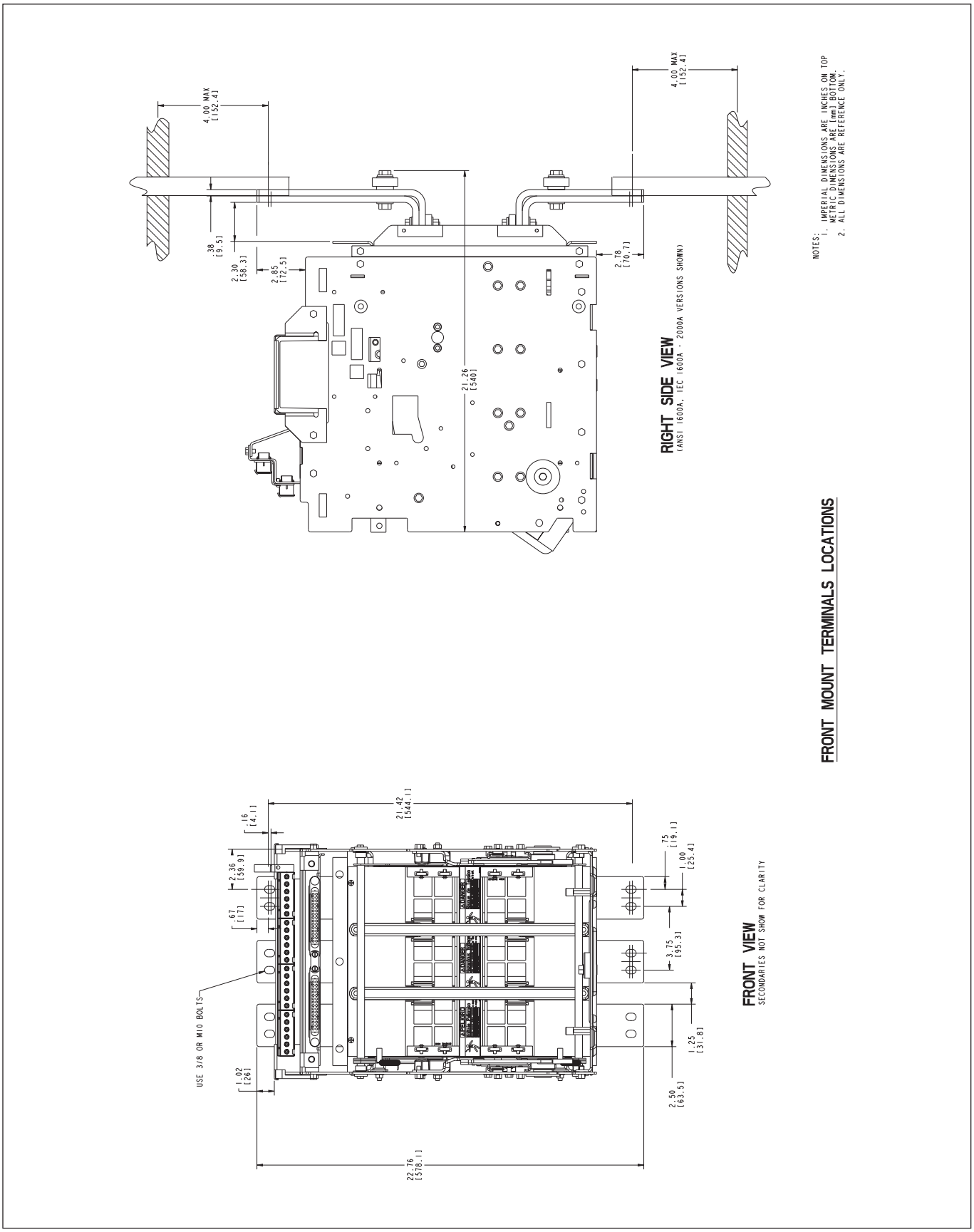


Figure 7. 800-2000A Narrow frame fixed breaker (Overall dimensions and mounting locations)

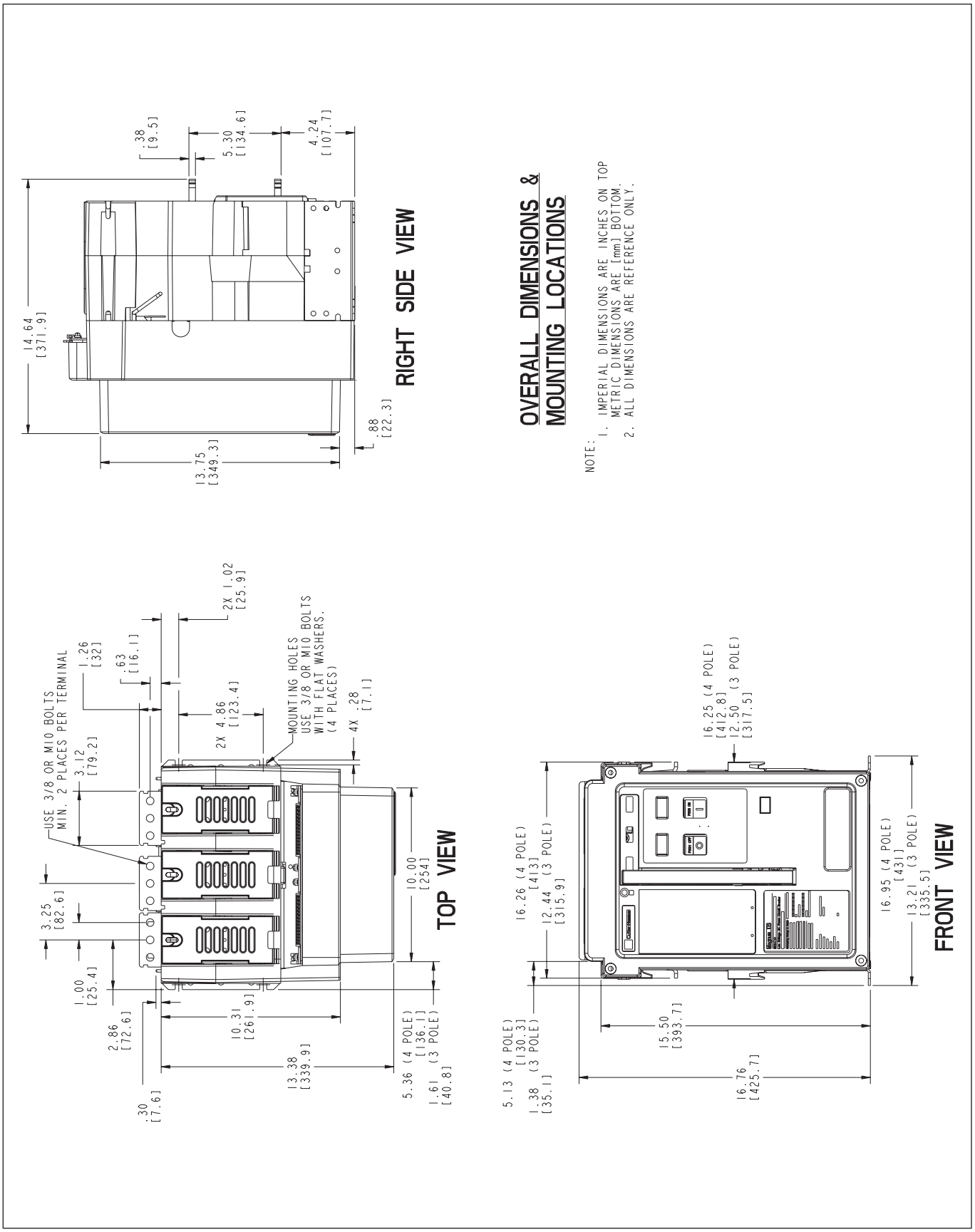


Figure 8. 800-2000A Narrow frame fixed breaker (Door cutout and vertical terminals)

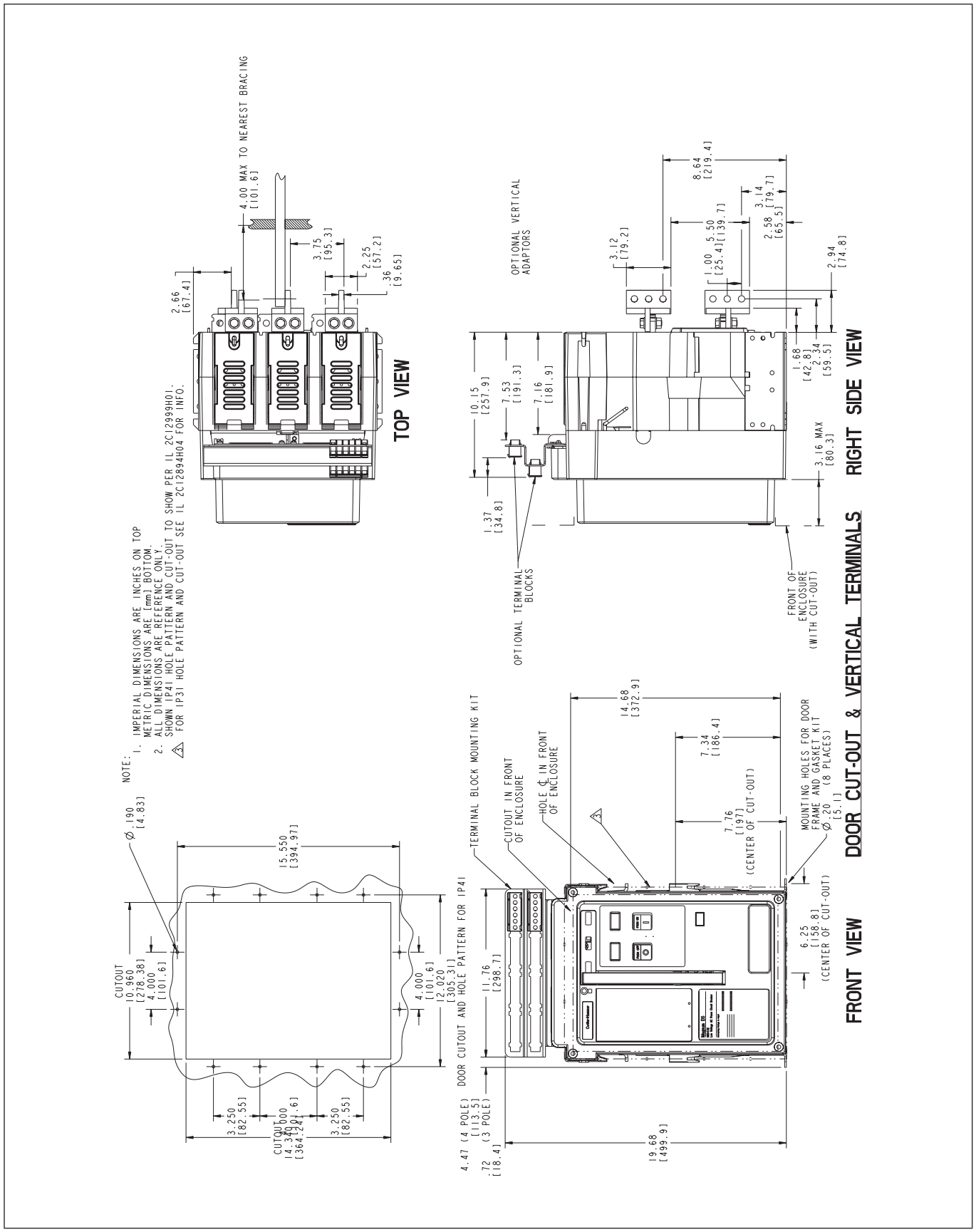


Figure 9. 800-2000A Narrow frame fixed breaker (Enclosure and horizontal terminals)

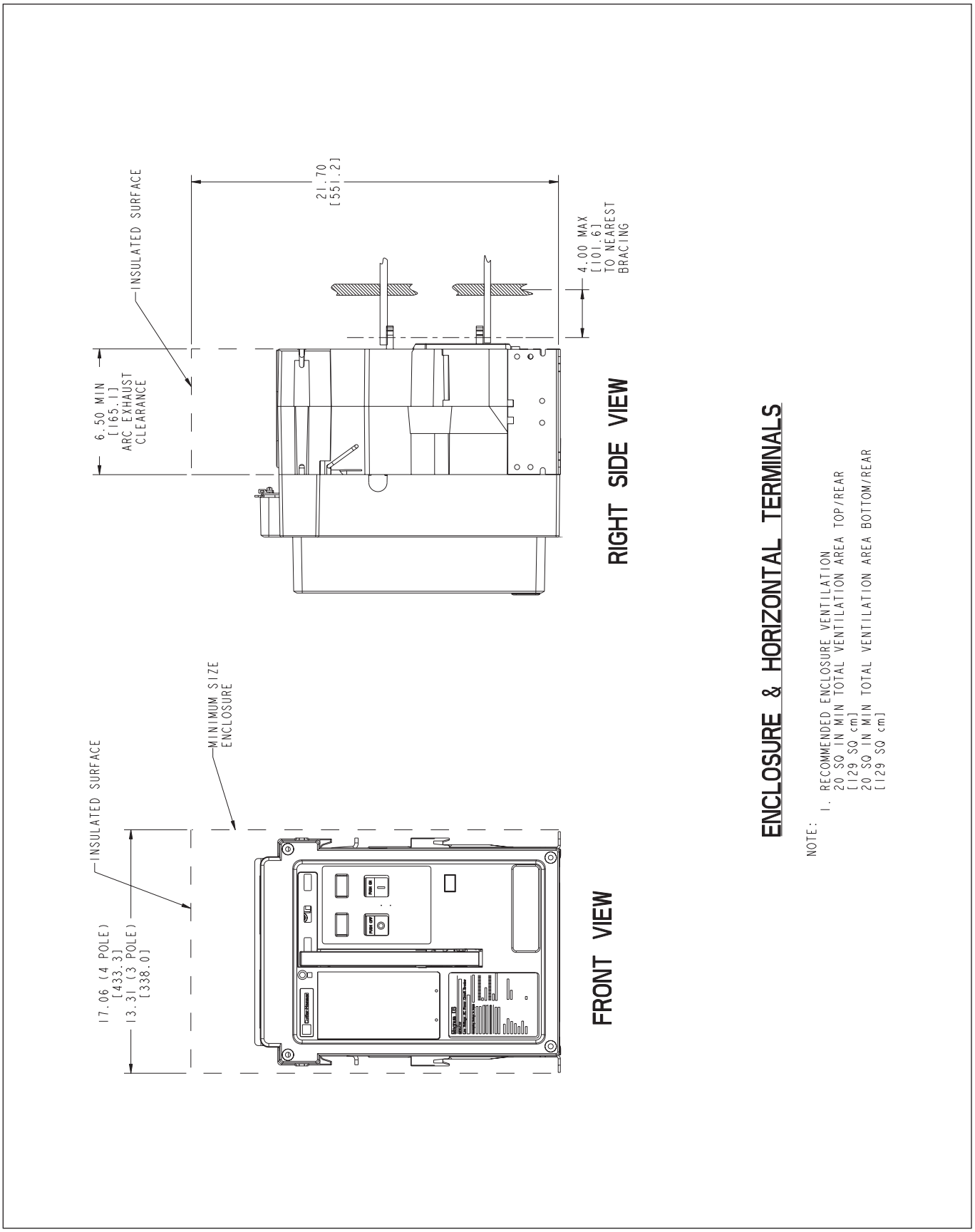


Figure 10. 800-2000A Narrow frame fixed breaker (Optional arc hood)

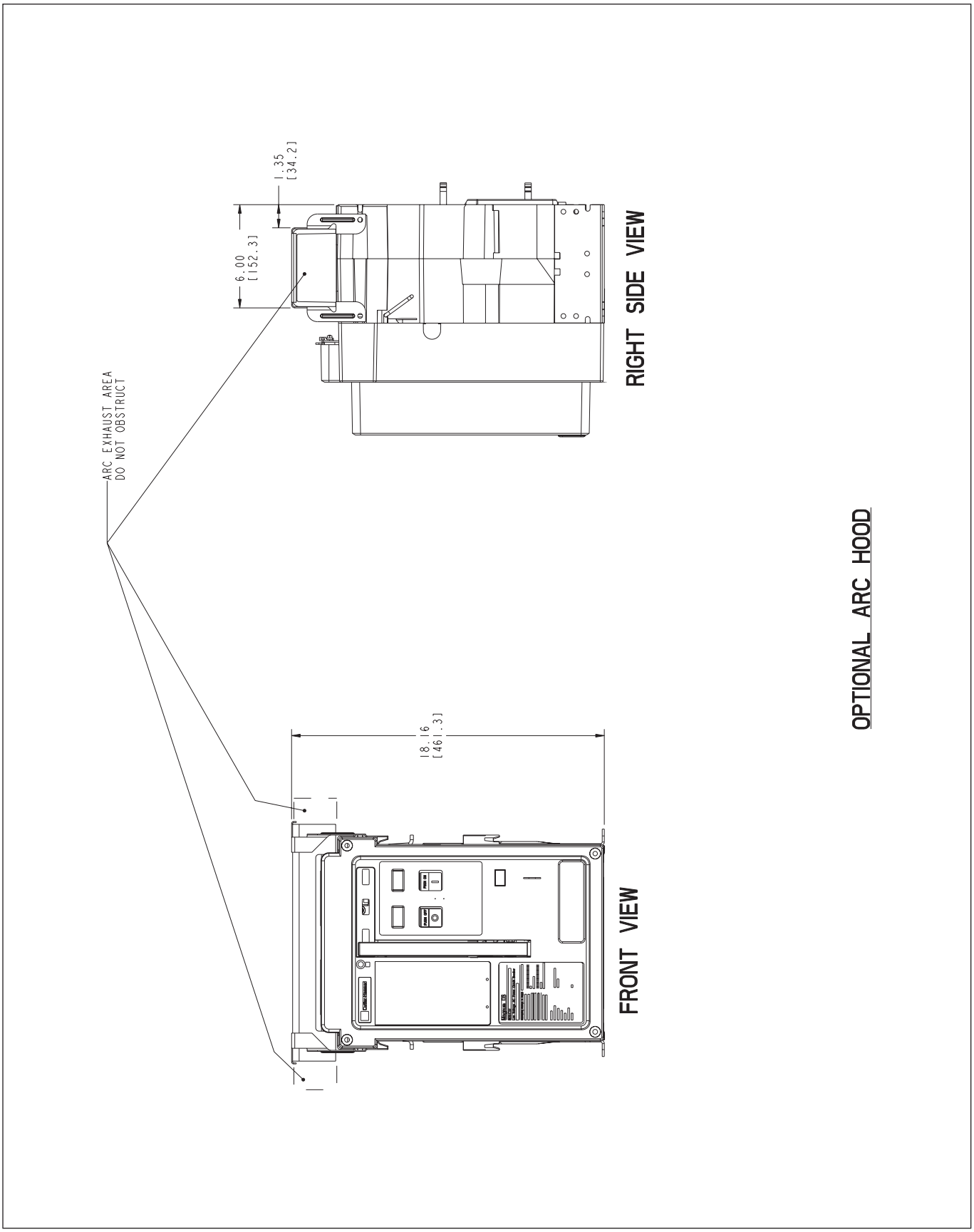


Figure 11. 800-2000A Narrow frame fixed breaker (Optional front mount terminals)

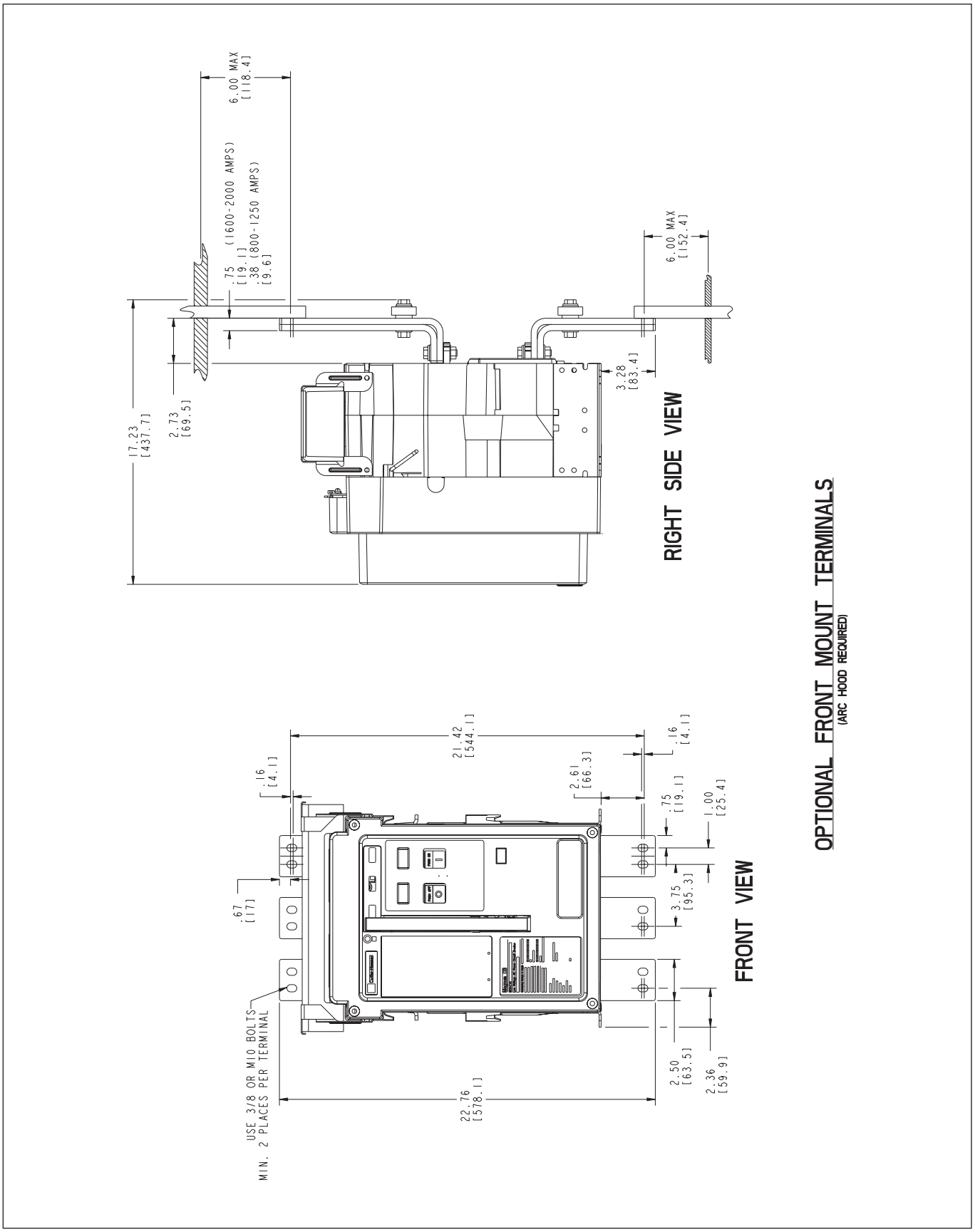


Figure 12. 800-2000A MDSL Cassette overall dimensions

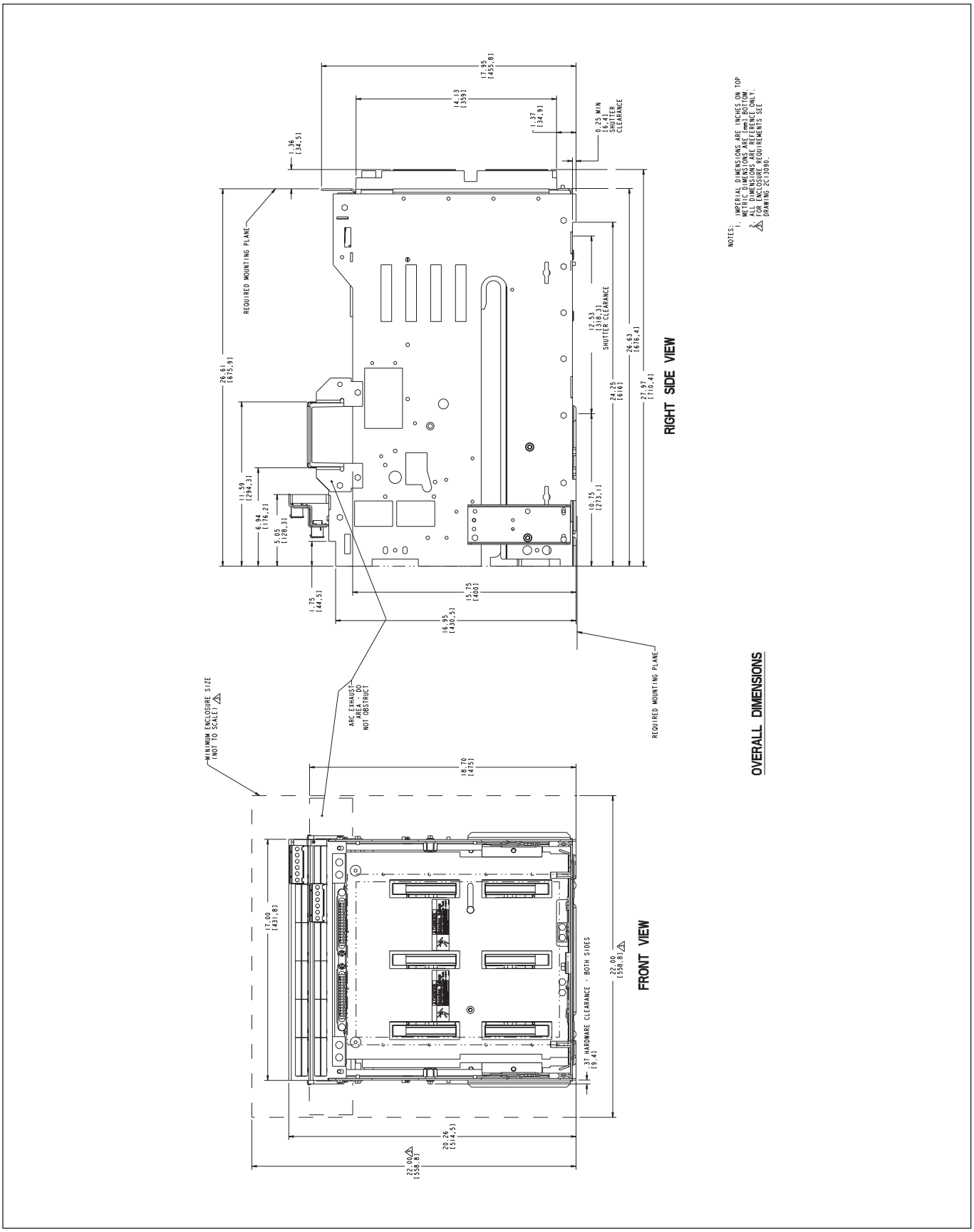


Figure 13. 800-2000A MDSL Cassette 3-pole mounting locations dimensions

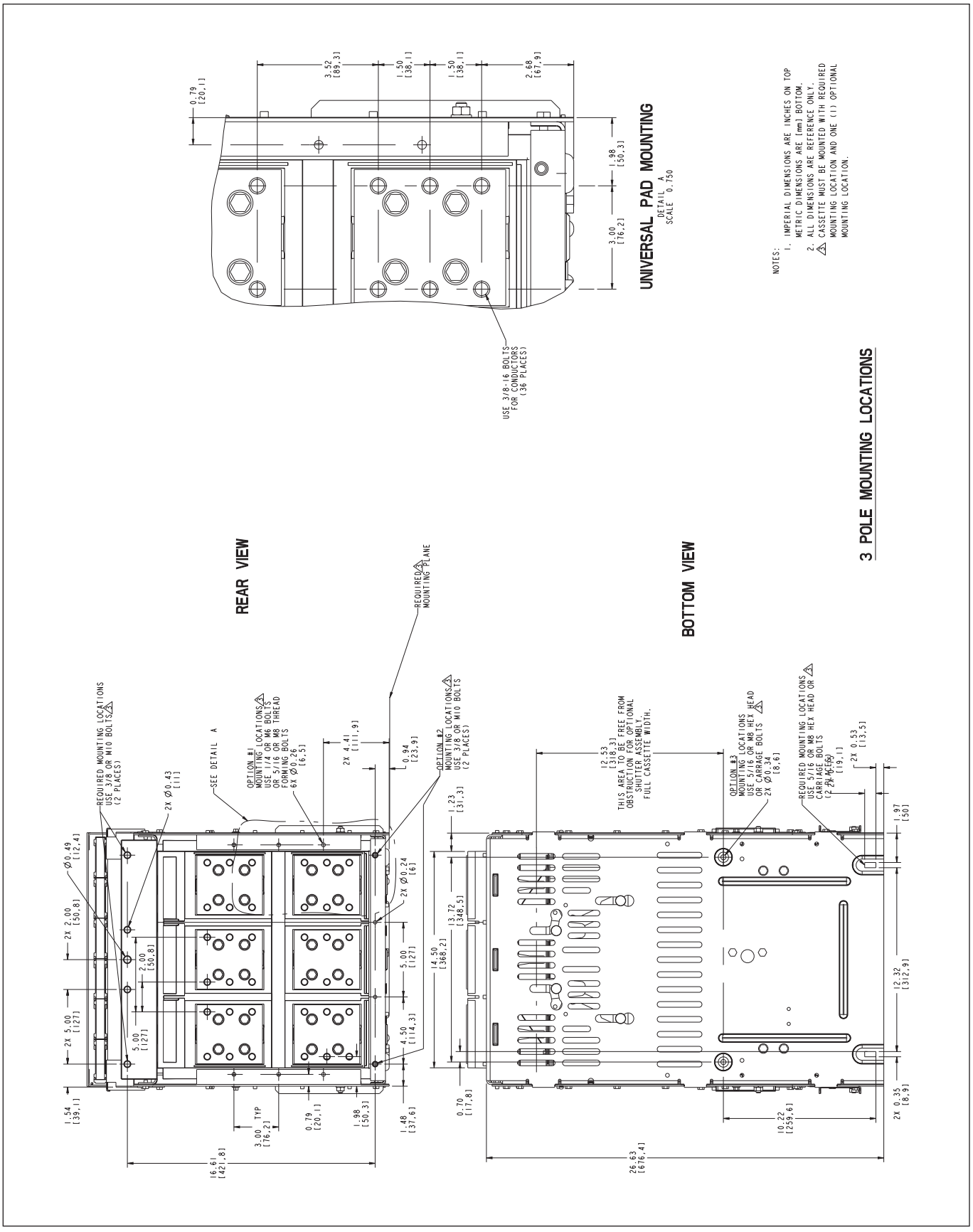


Figure 14. 800-2000A MDSL Cassette 3-pole vertical stab dimensions

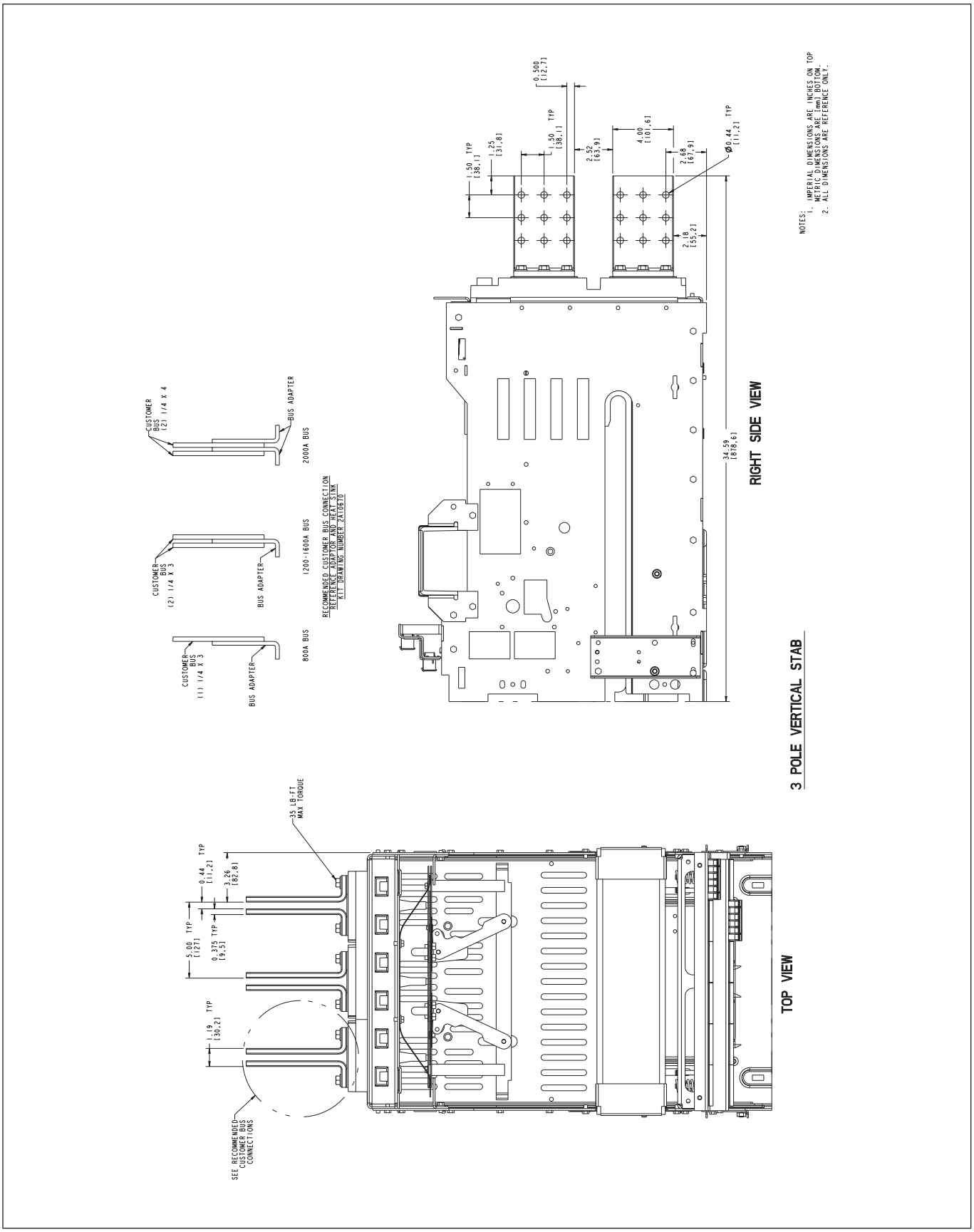
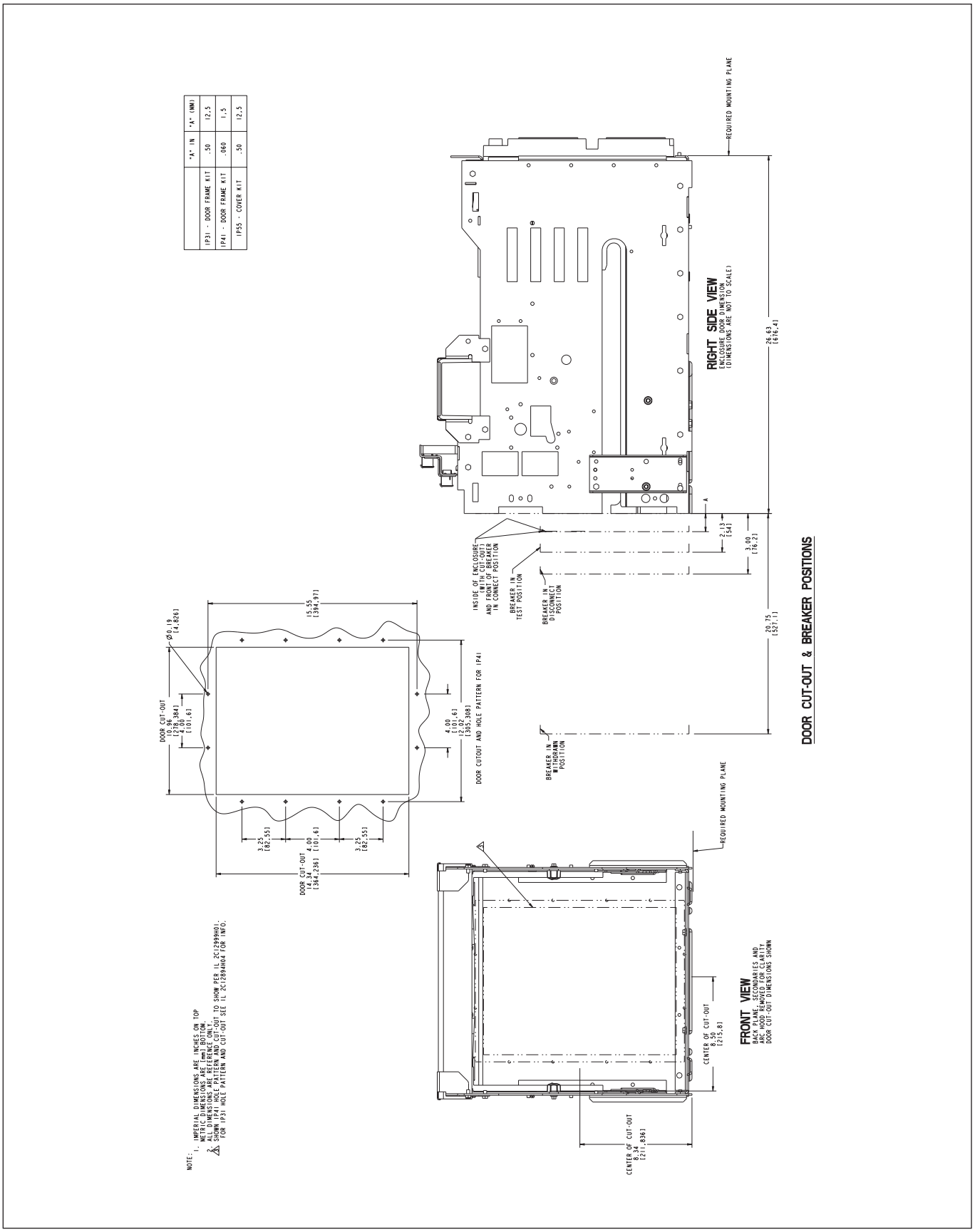


Figure 15. 800-2000A MDSL Cassette door cutout and breaker positions dimensions



	"A" IN	"A" (MM)
IP31 - DOOR FRAME KIT	.50	12.5
IP41 - DOOR FRAME KIT	.060	1.5
IP55 - COVER KIT	.50	12.5

Figure 16. 800-2000A MDSL Cassette accessory dimensions

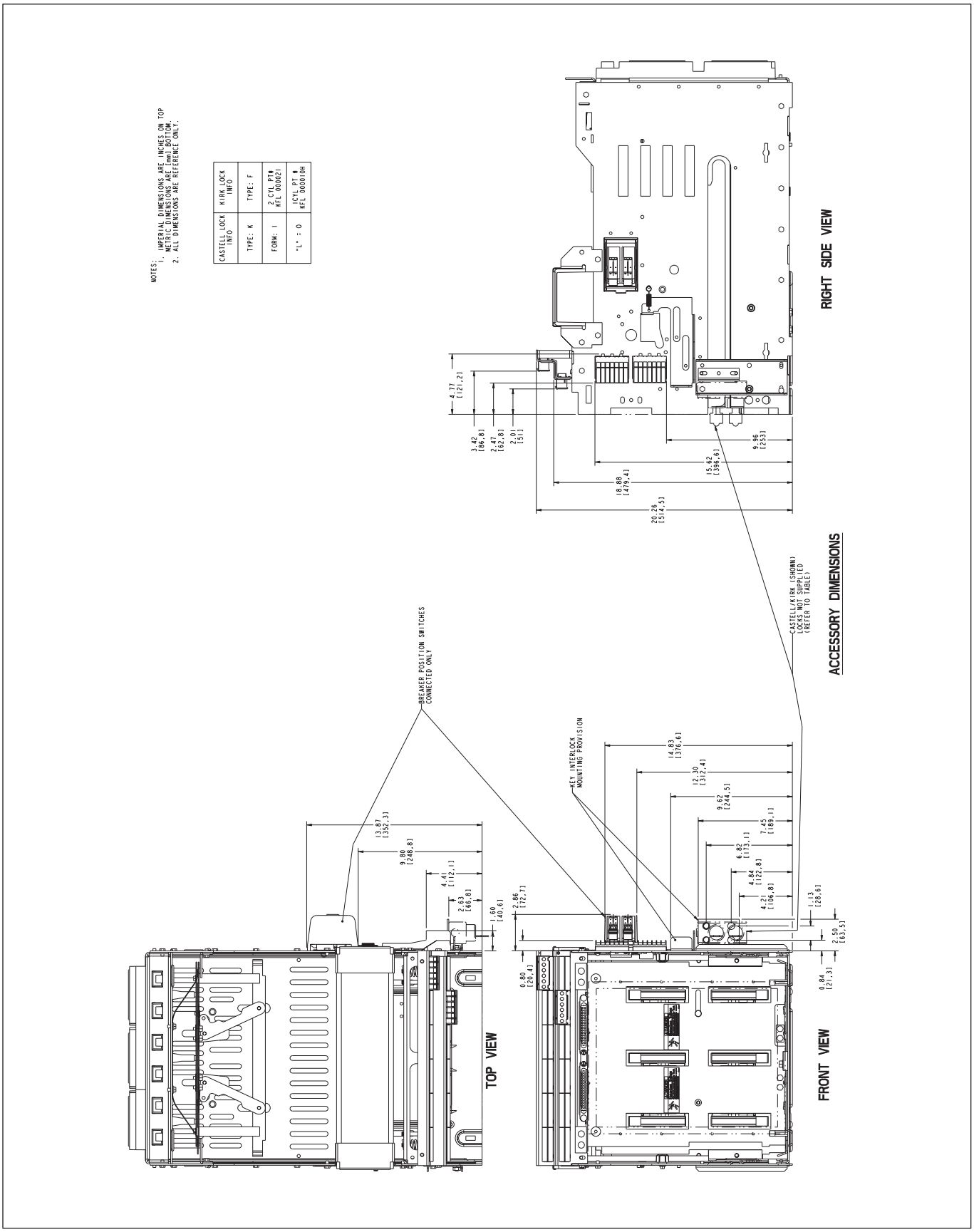


Figure 17. 800-3200A Standard frame universal Cassette (3-pole mounting locations)

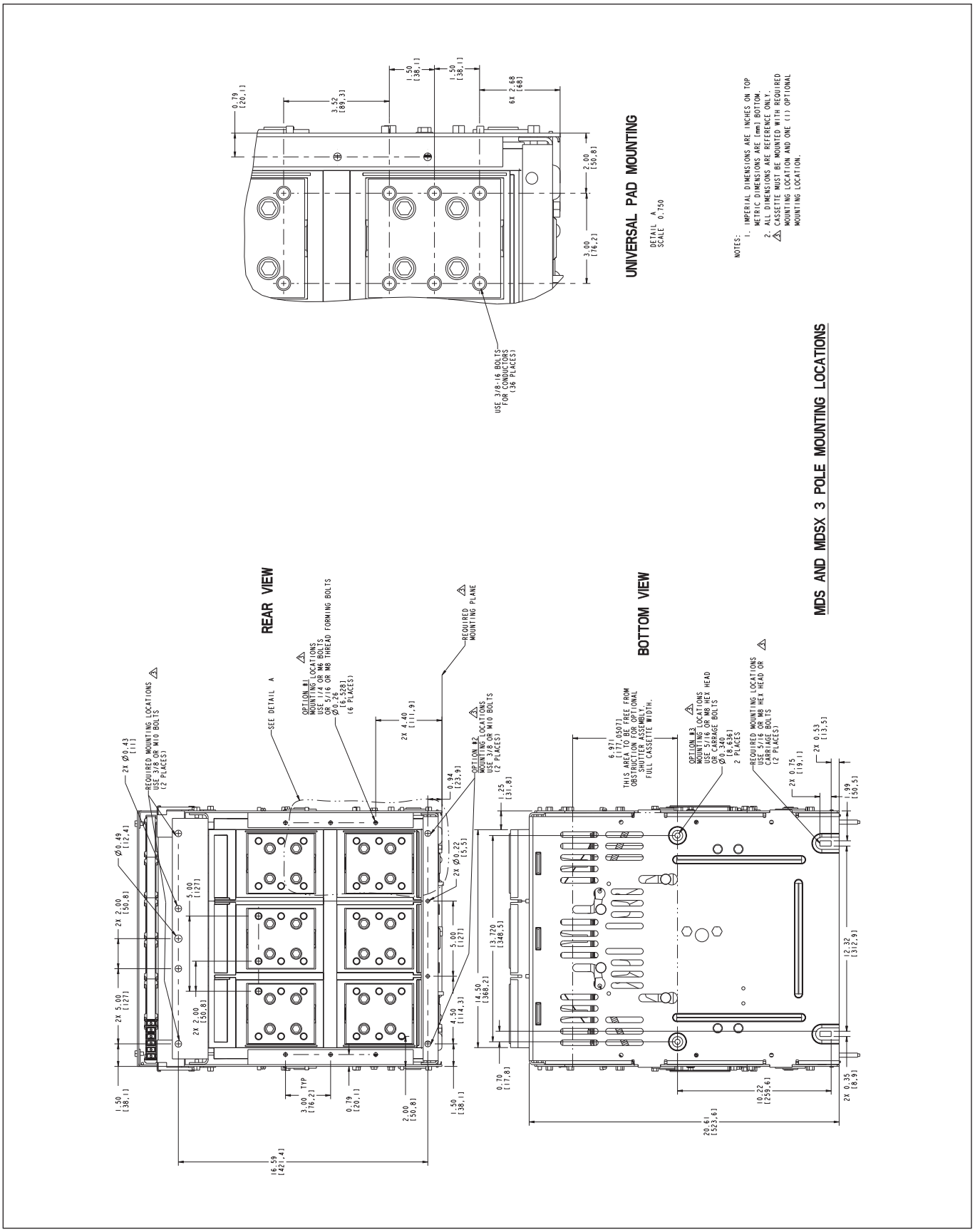


Figure 18. 800-3200A Standard frame universal Cassette (Overall dimensions)

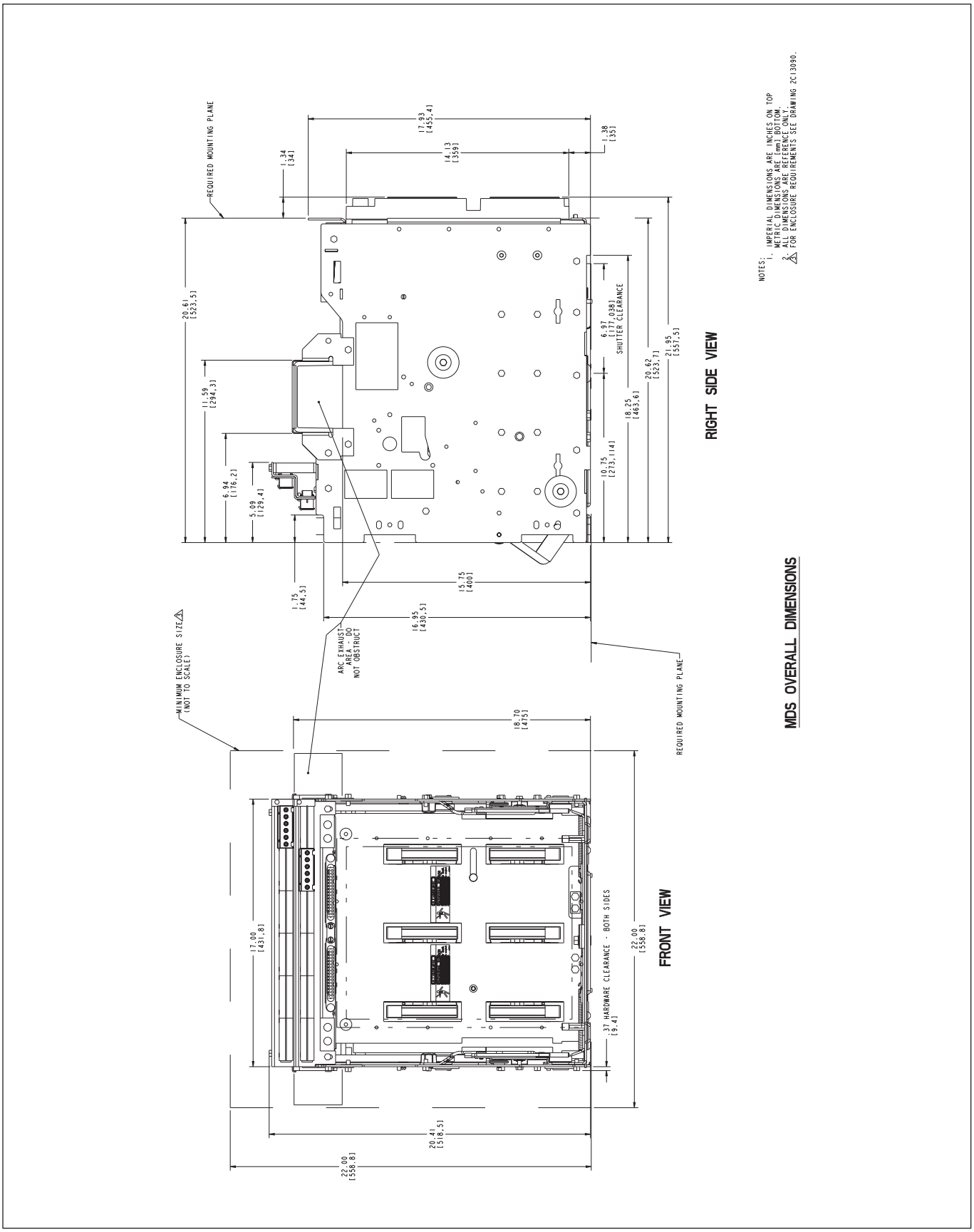


Figure 19. 800-3200A Standard frame universal Cassette (Accessory dimensions)

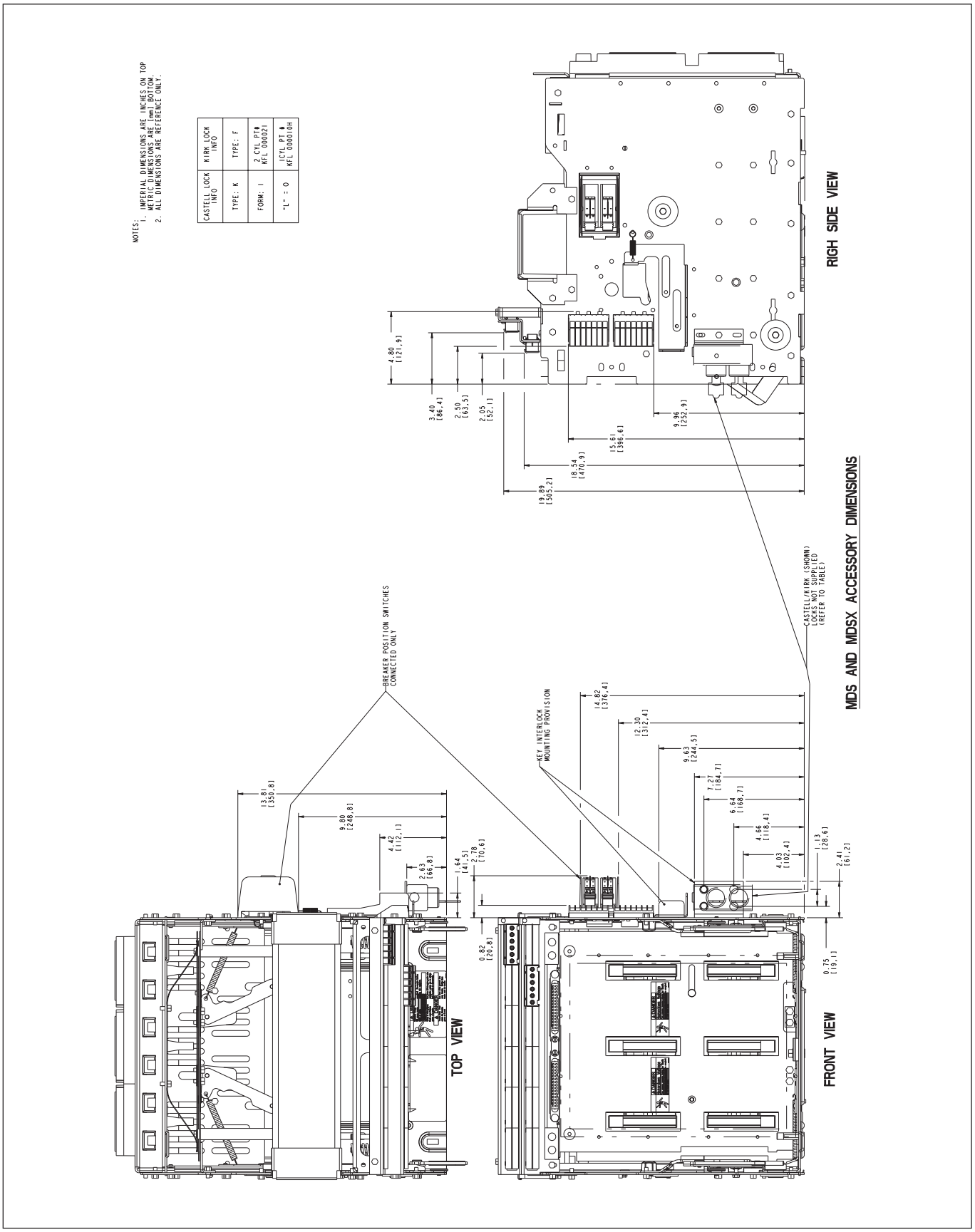


Figure 20. 800-3200A Standard frame universal Cassette (3-pole vertical stab)

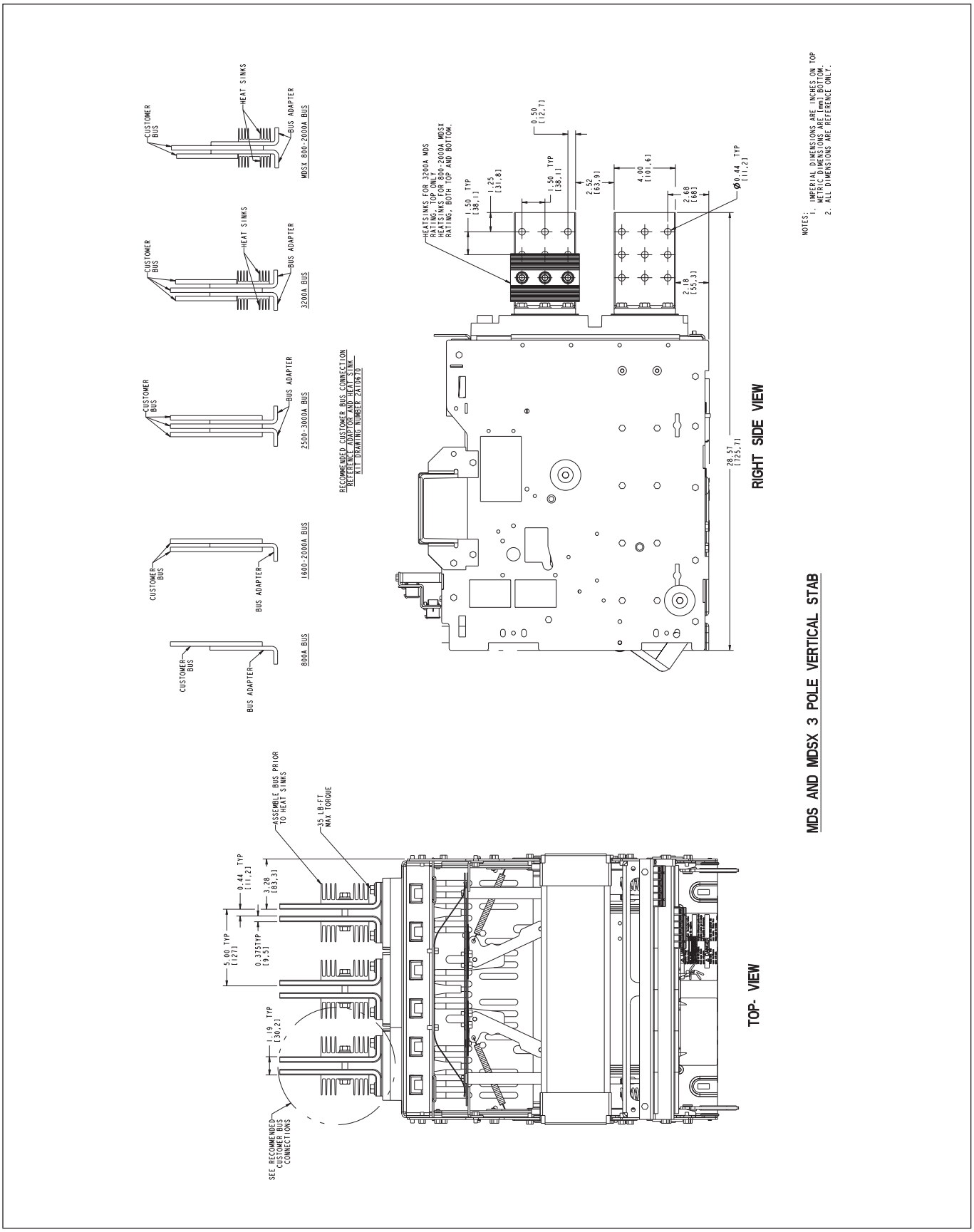


Figure 21. 800-3200A Standard frame universal Cassette (3-pole horizontal stab)

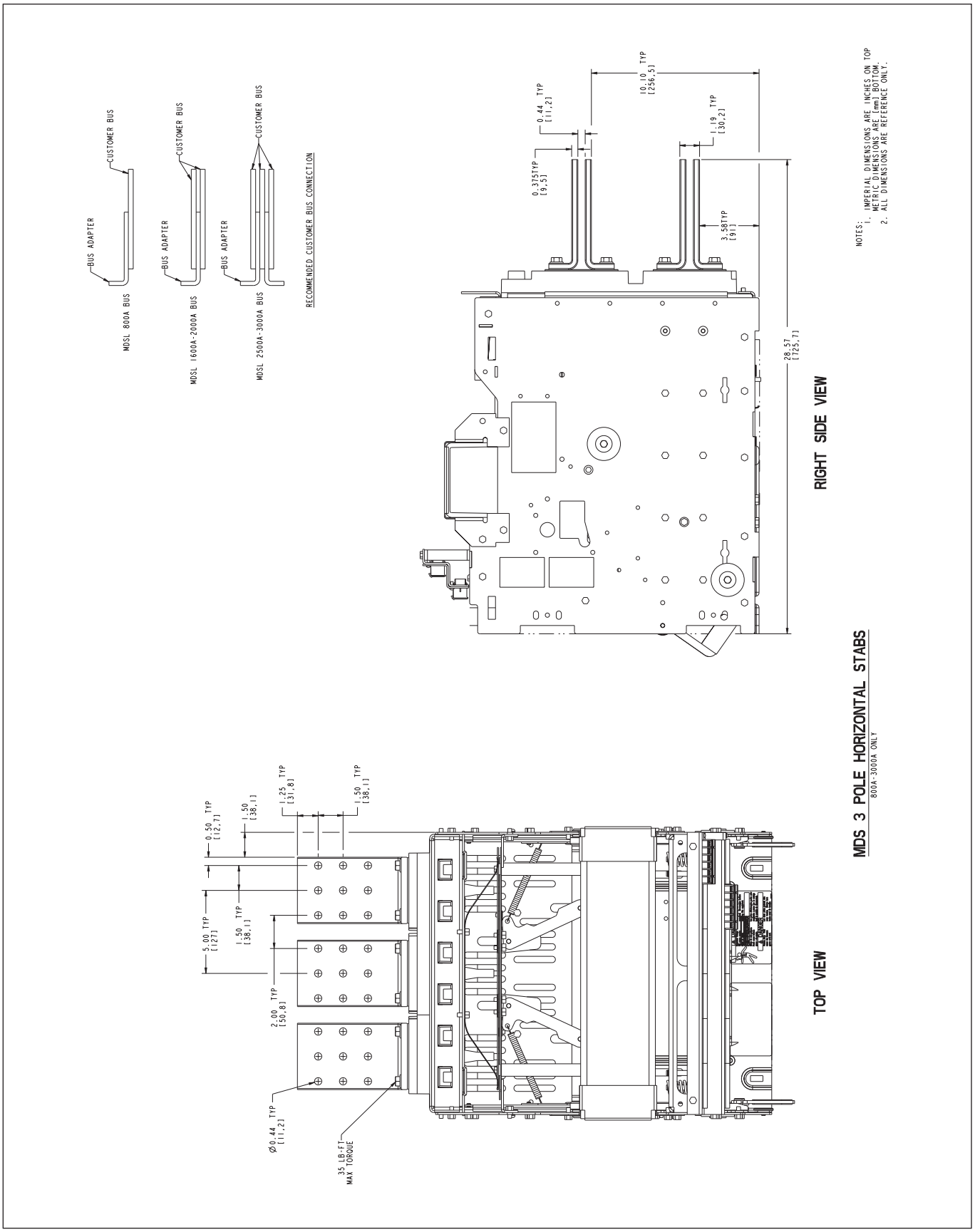


Figure 22. 800-3200A Standard frame universal Cassette (Door cutout and breaker positions)

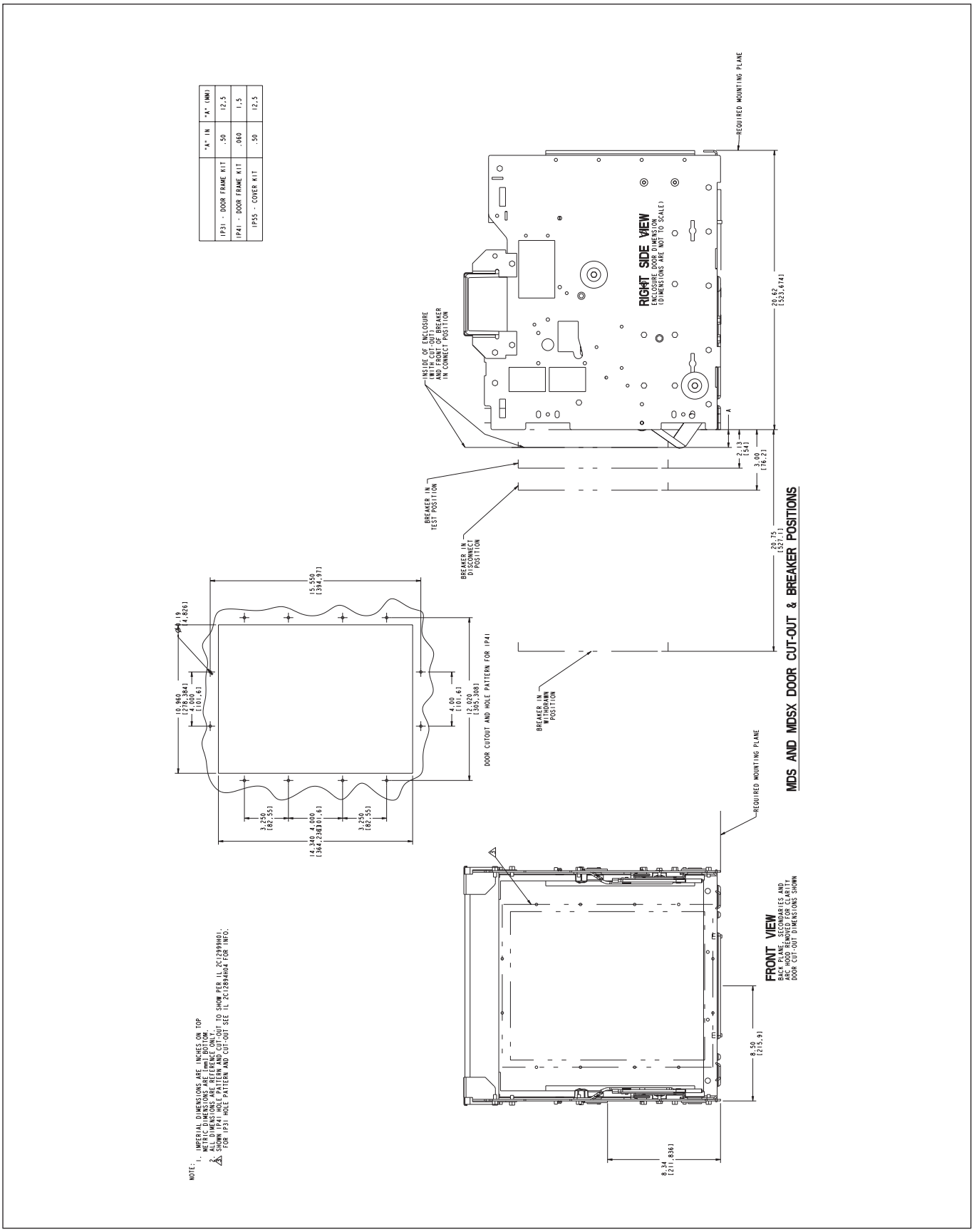


Figure 23. 800-3200A Standard frame universal Cassette (4-pole mounting locations and overall dimensions)

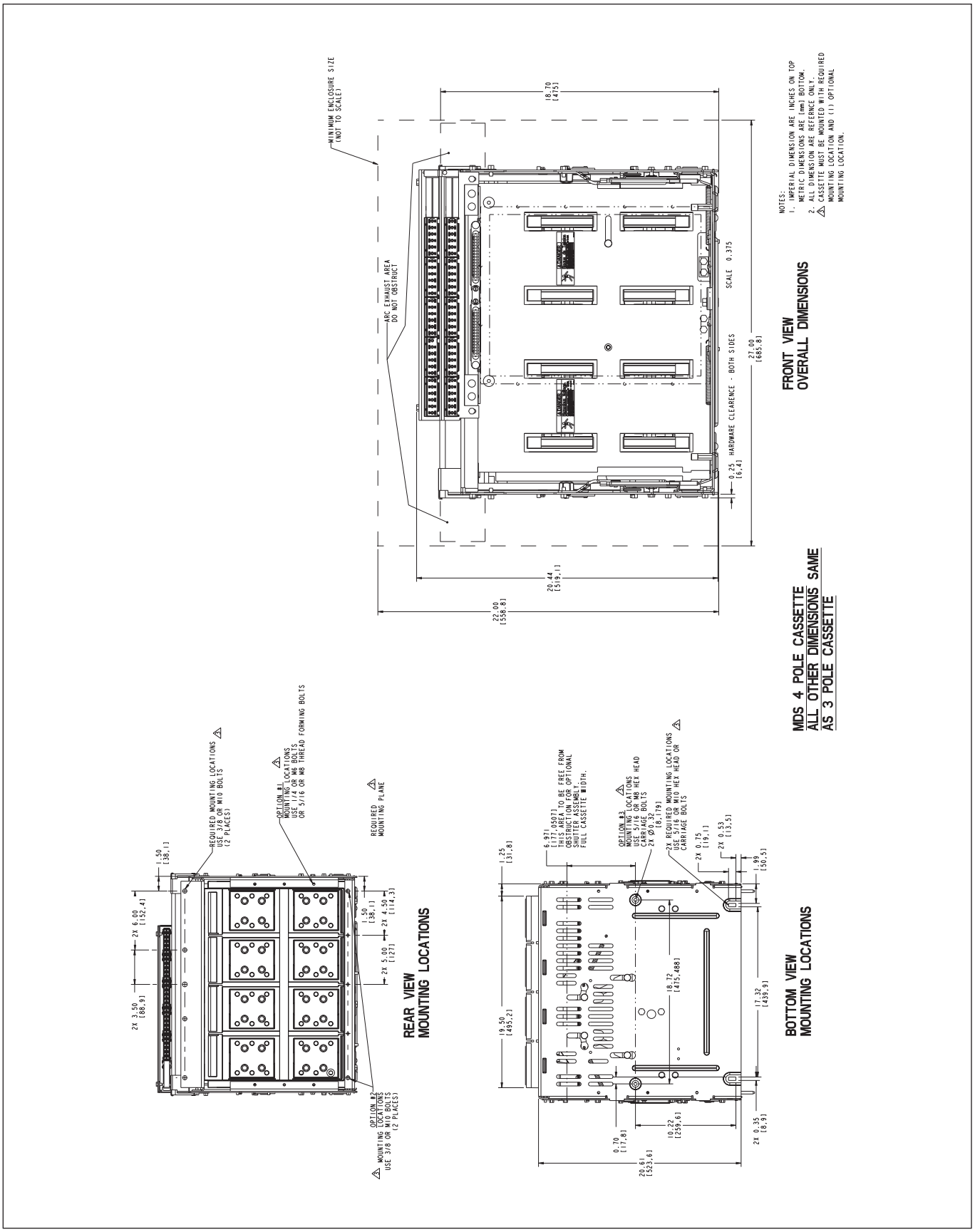


Figure 24. 800-3200A Standard frame universal Cassette (4-pole accessory information and vertical stabs)

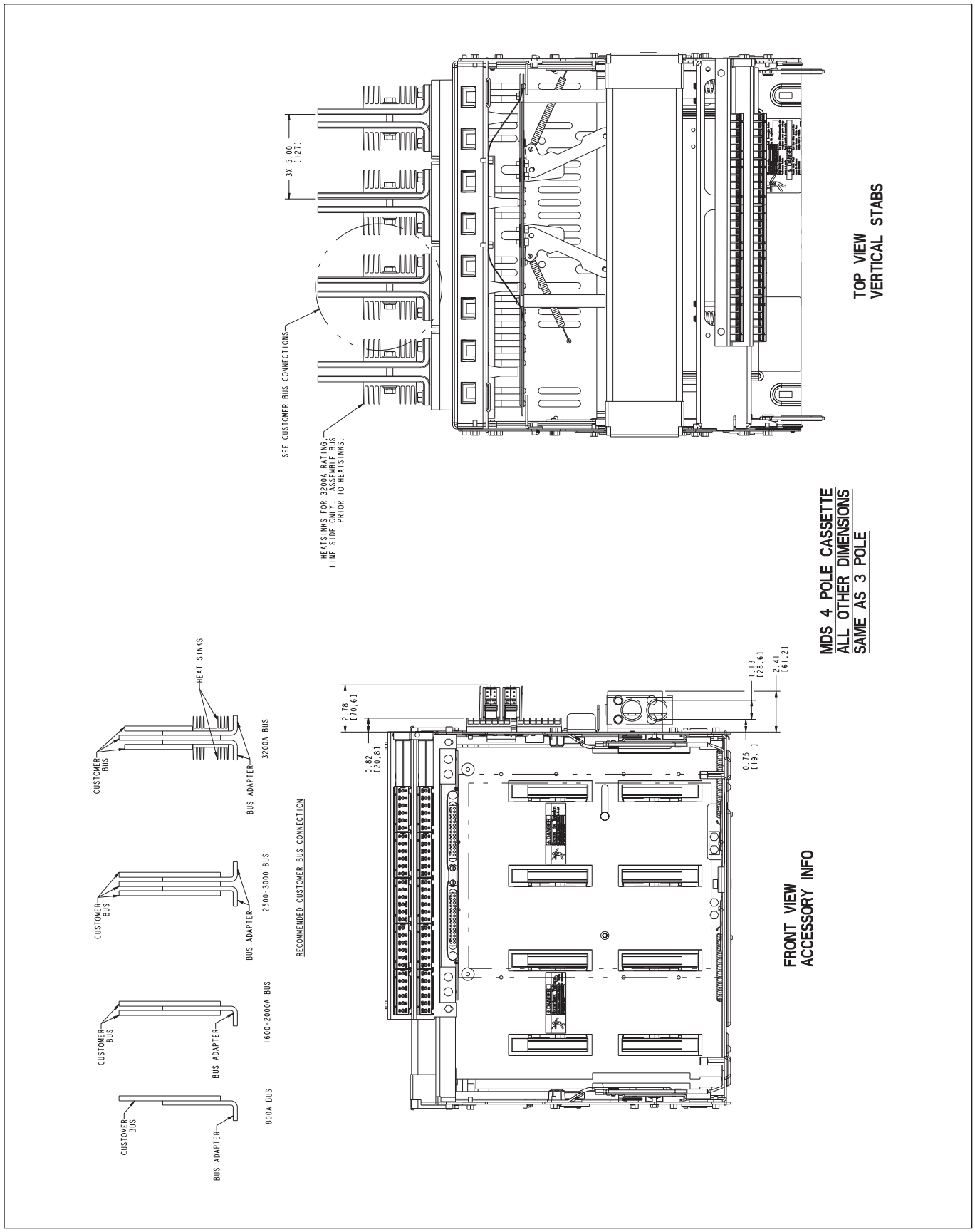


Figure 25. 800-3200A Standard frame universal Cassette (4-pole horizontal stabs and front view)

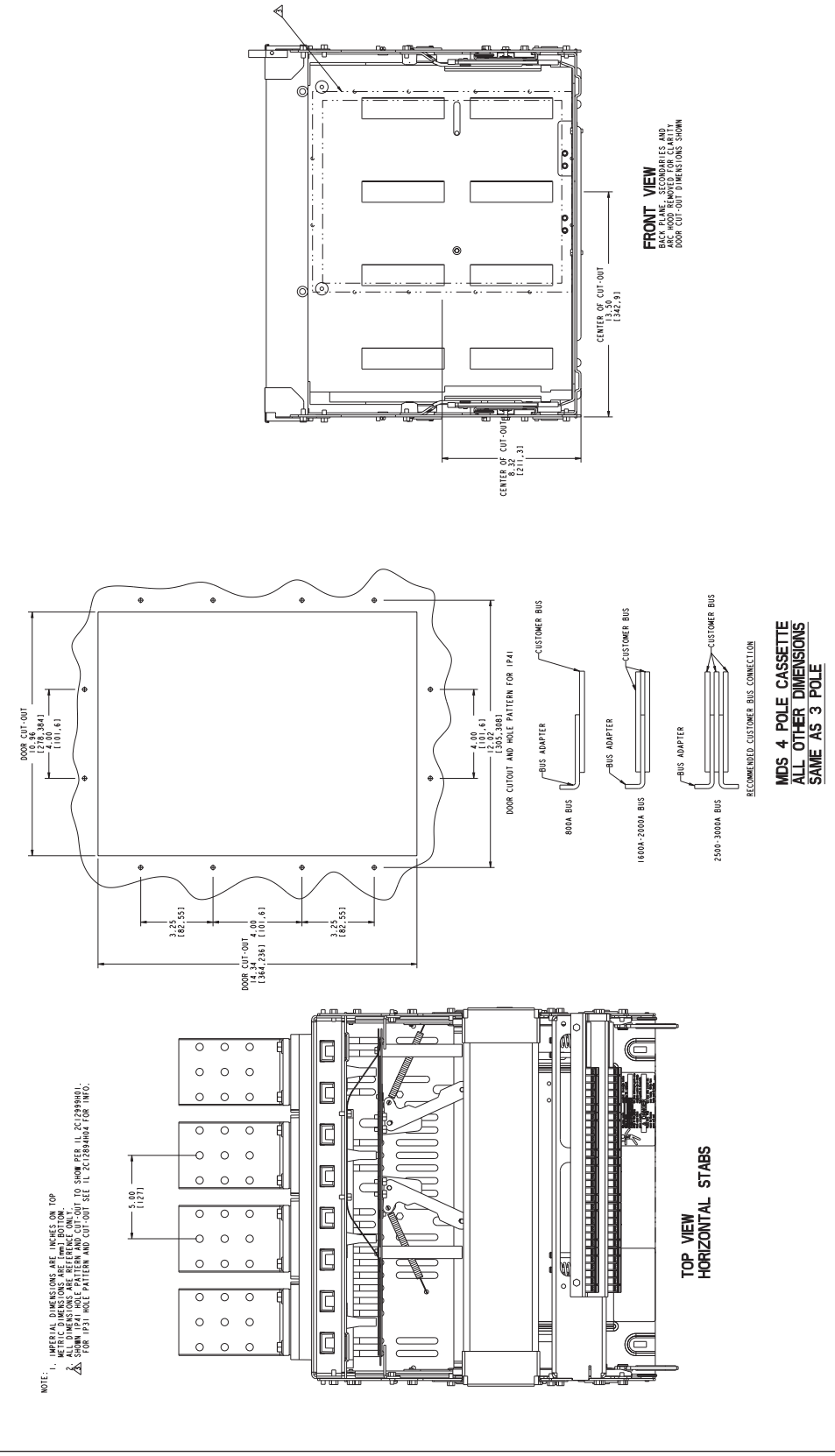


Figure 26. 800-3200A Standard frame basic Cassette (3-pole mounting locations)

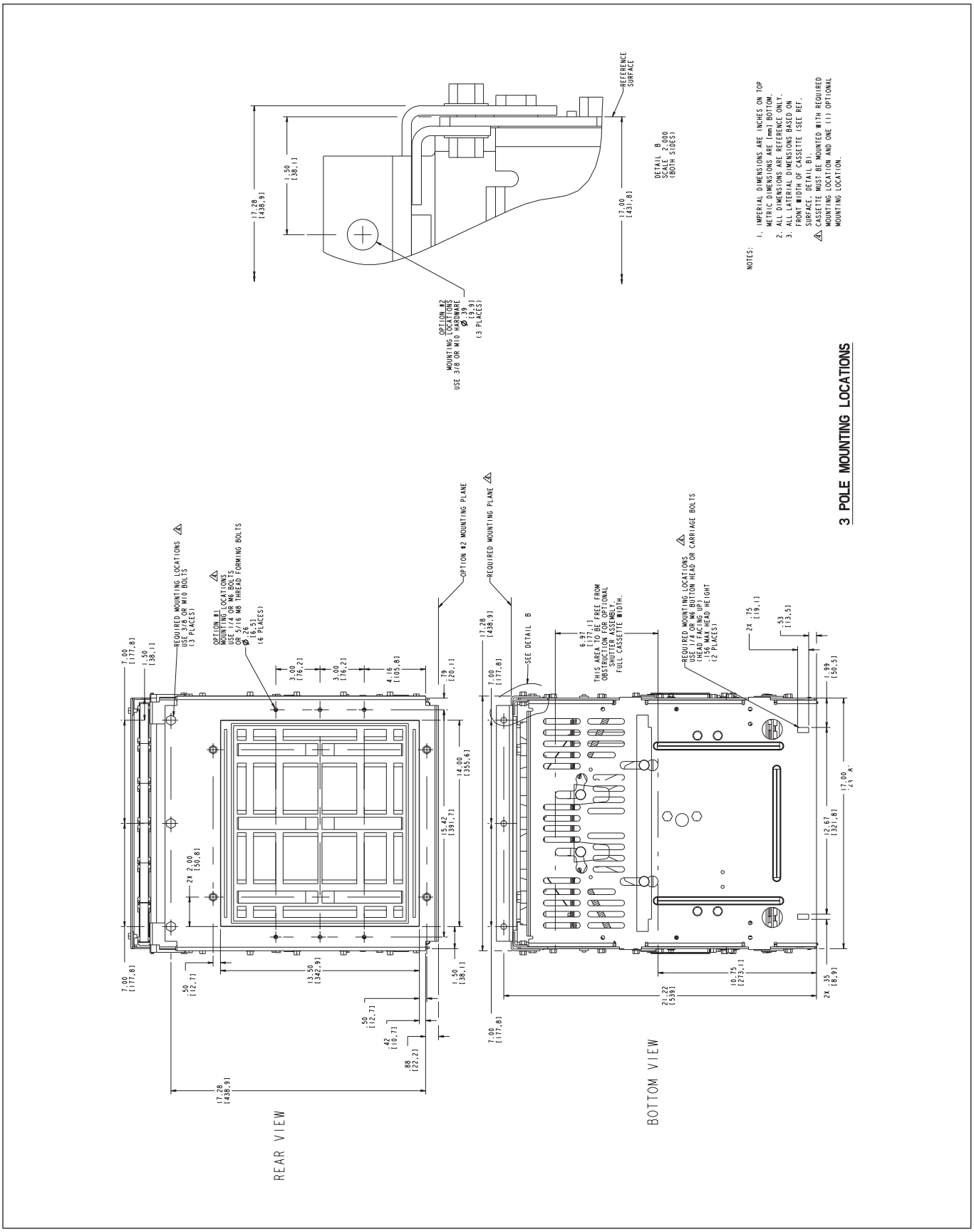


Figure 27. 800-3200A Standard frame basic Cassette (Overall dimensions)

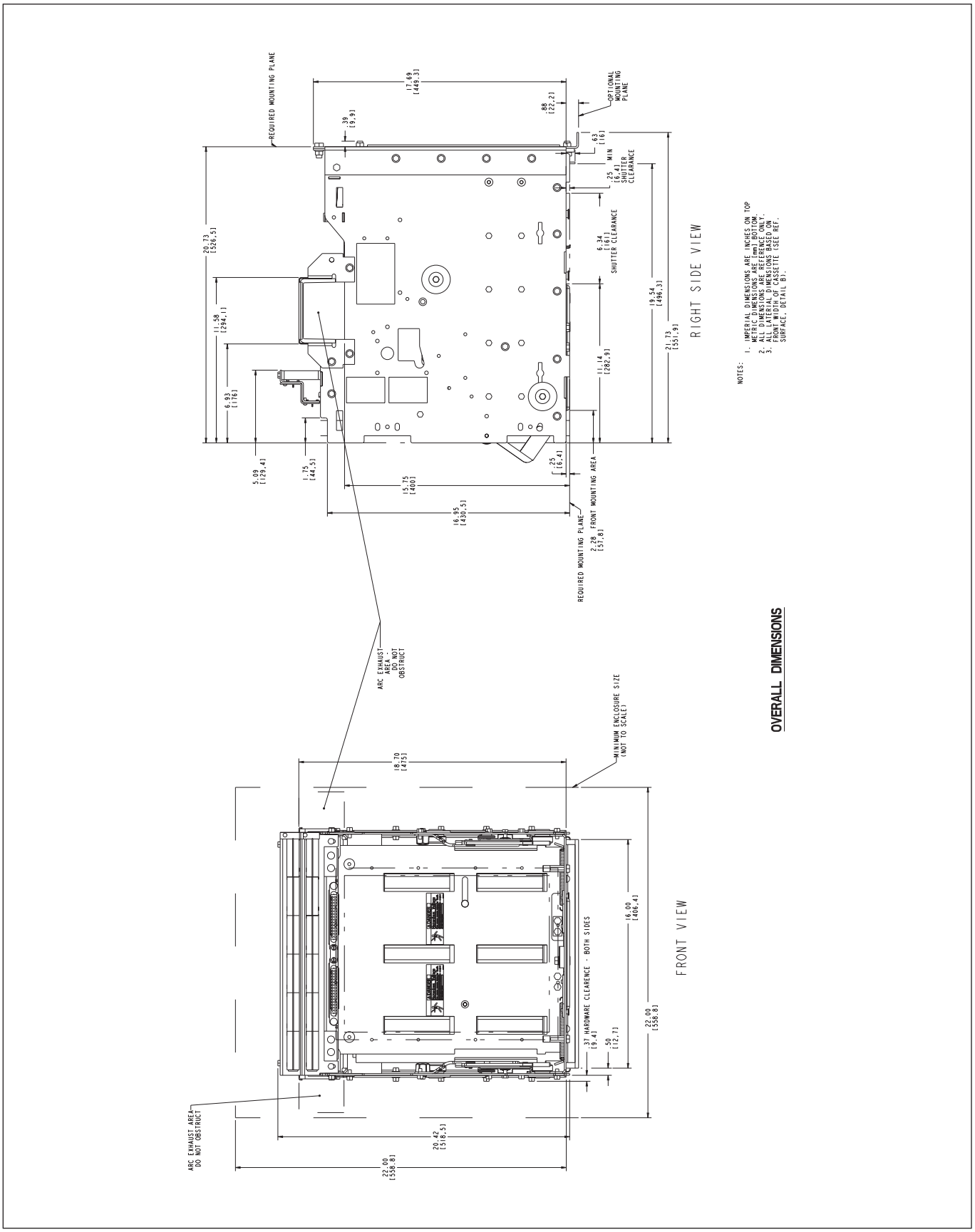


Figure 28. 800-3200A Standard frame basic Cassette (Accessory dimensions)

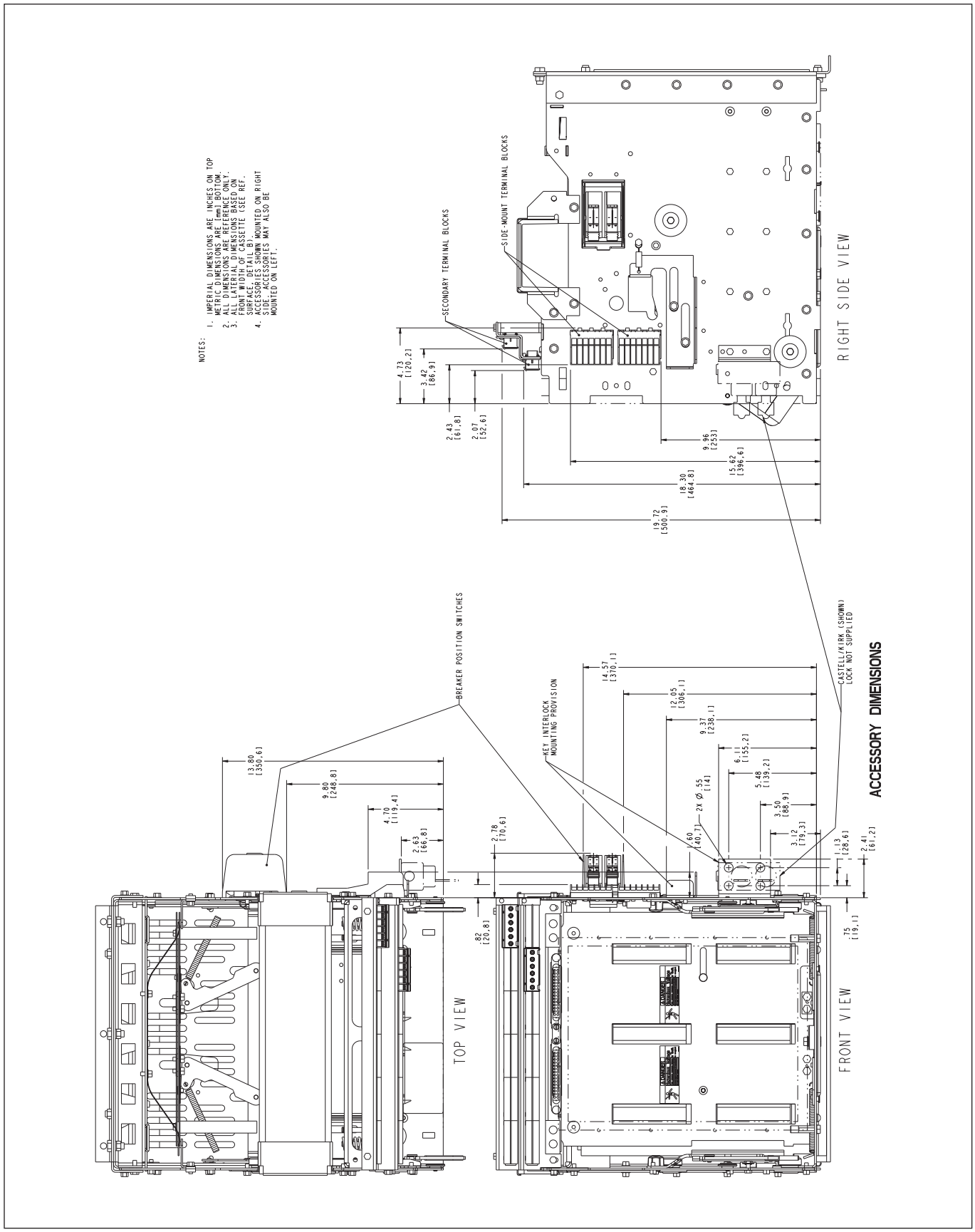


Figure 29. 800-3200A Standard frame basic Cassette (3-pole stab and stab bracing)

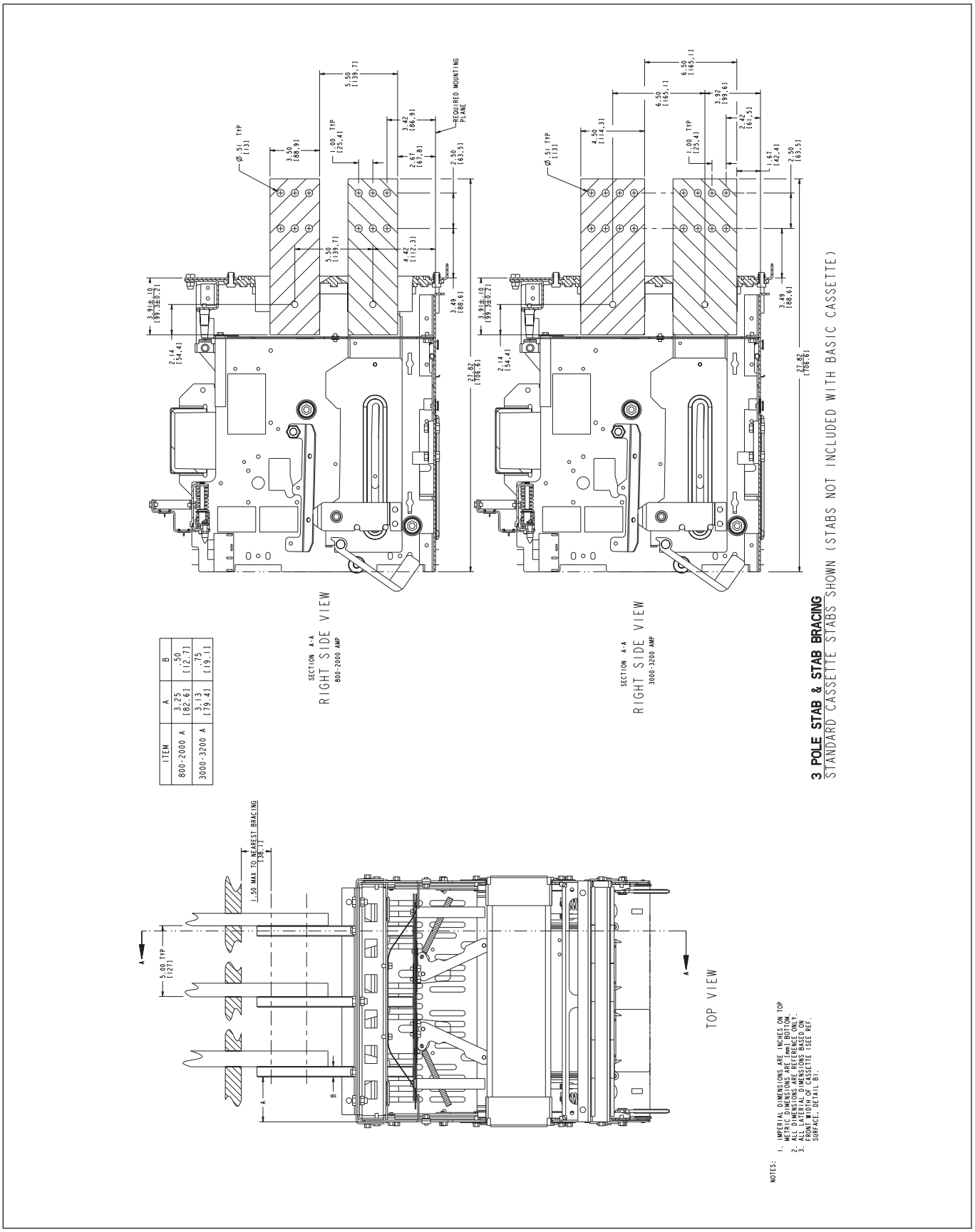


Figure 30. 800-3200A Standard frame basic Cassette (Door cutout and breaker positions)

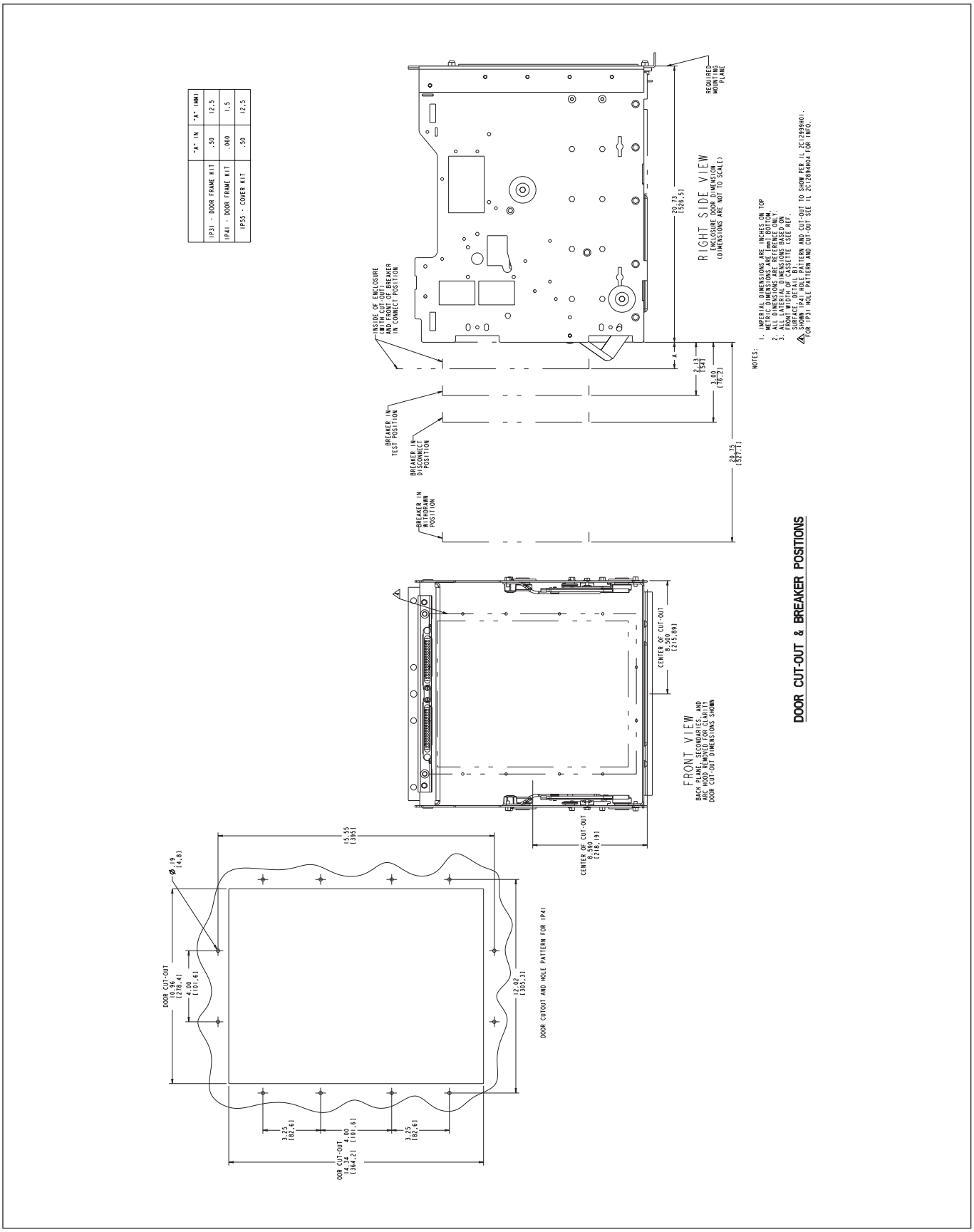


Figure 31. 800-3200A Standard frame Cassette (3-pole mounting locations)

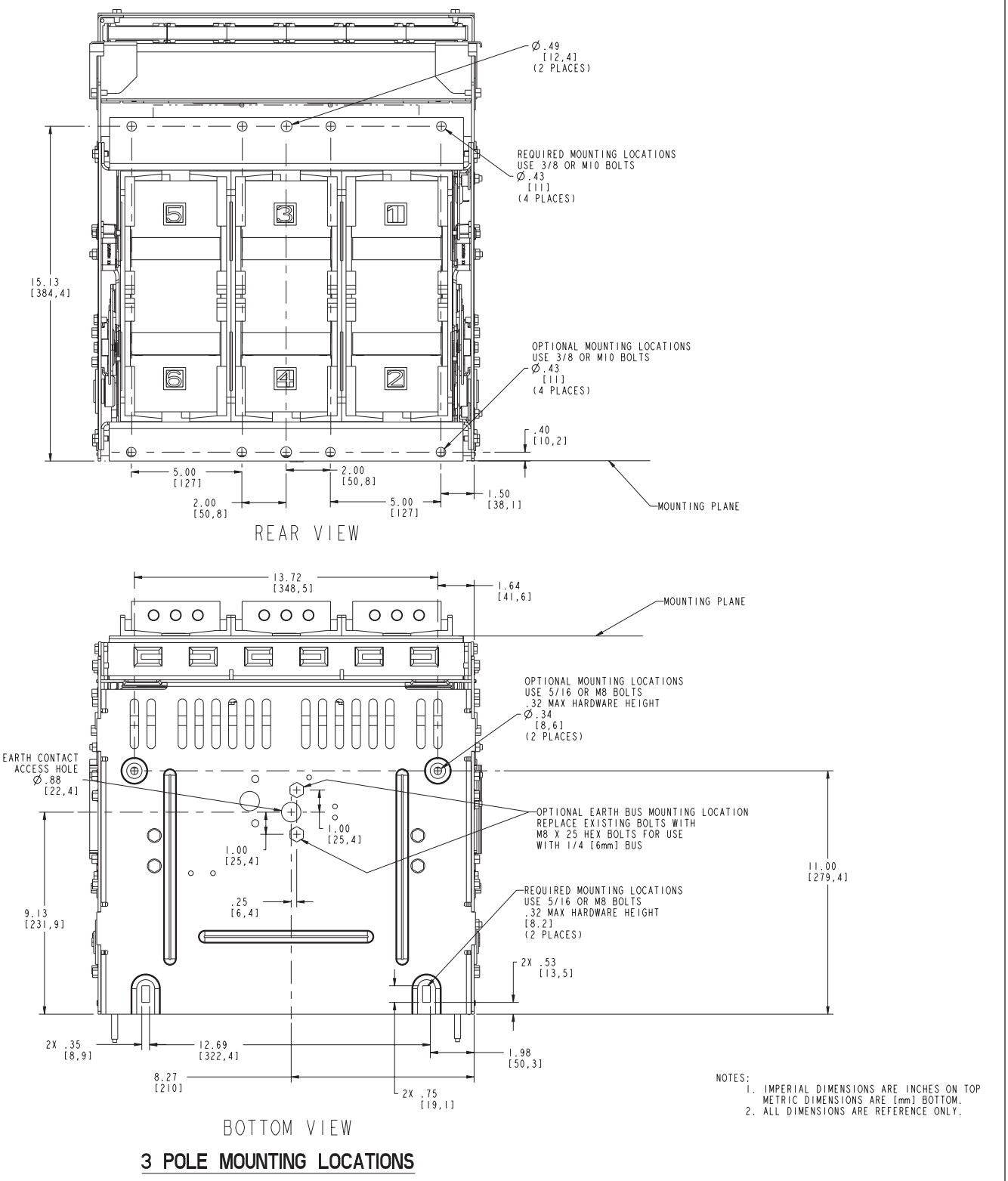


Figure 32. 800-3200A Standard frame Cassette (Overall dimensions)

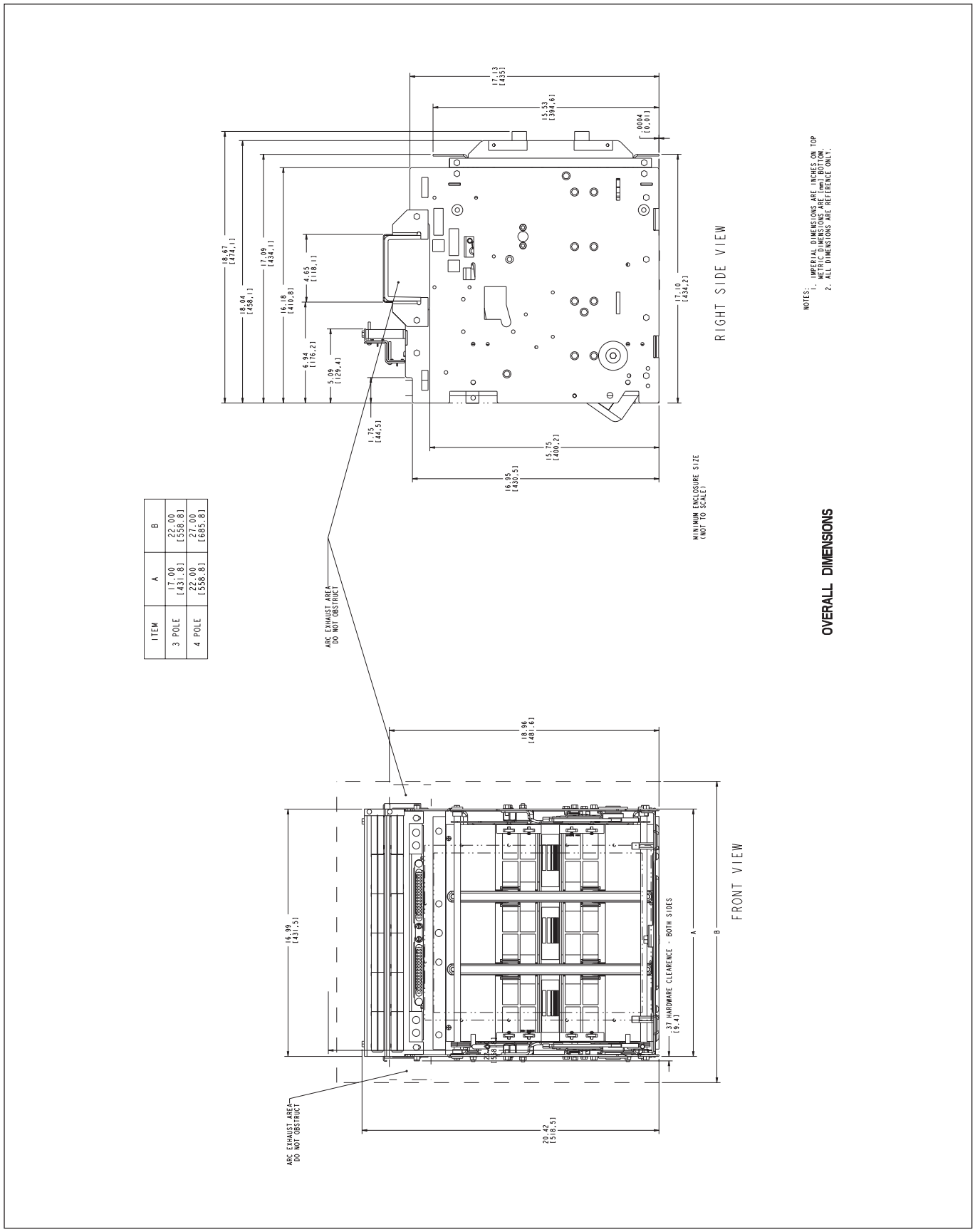


Figure 33. 800-3200A Standard frame Cassette (Accessory dimensions)

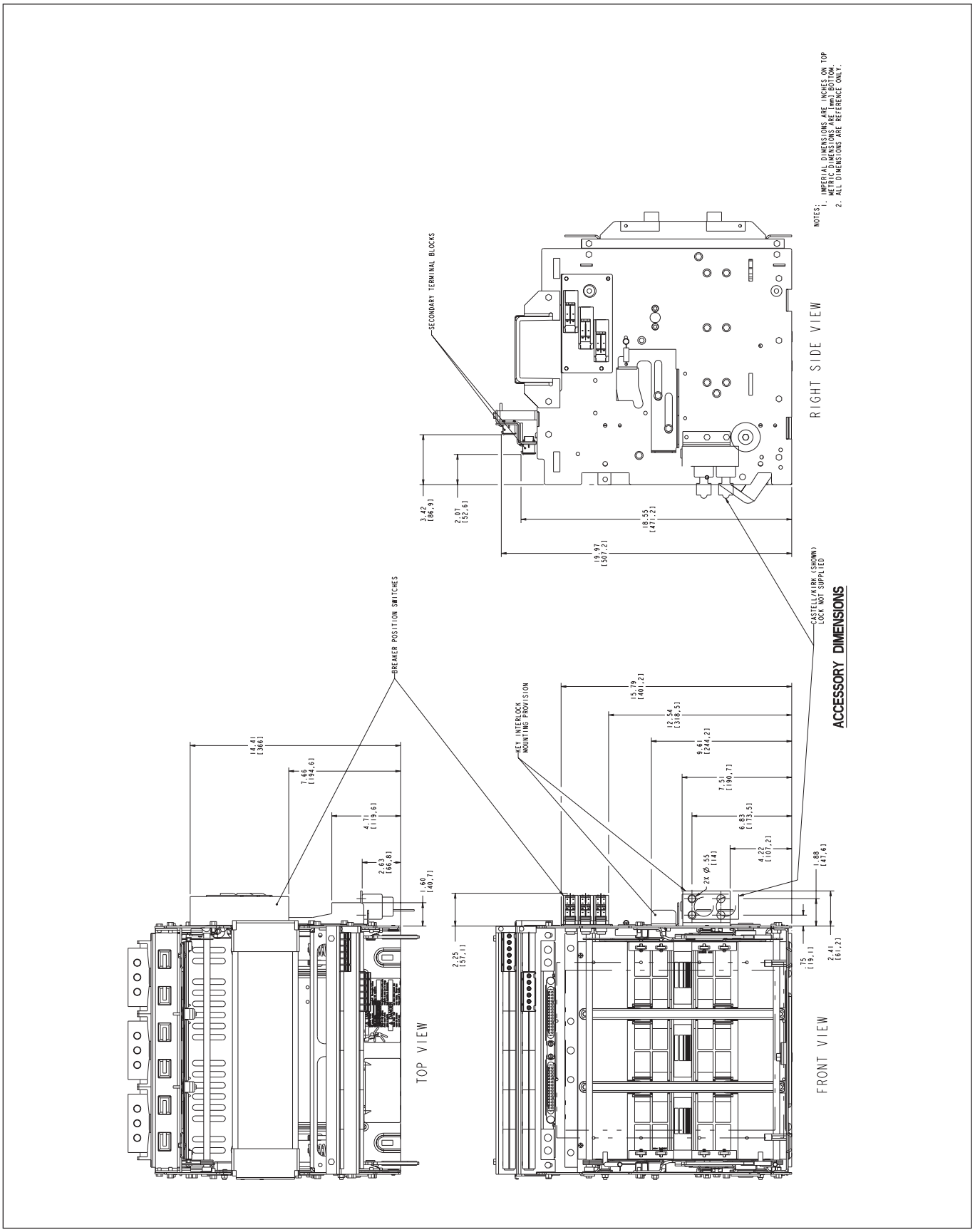
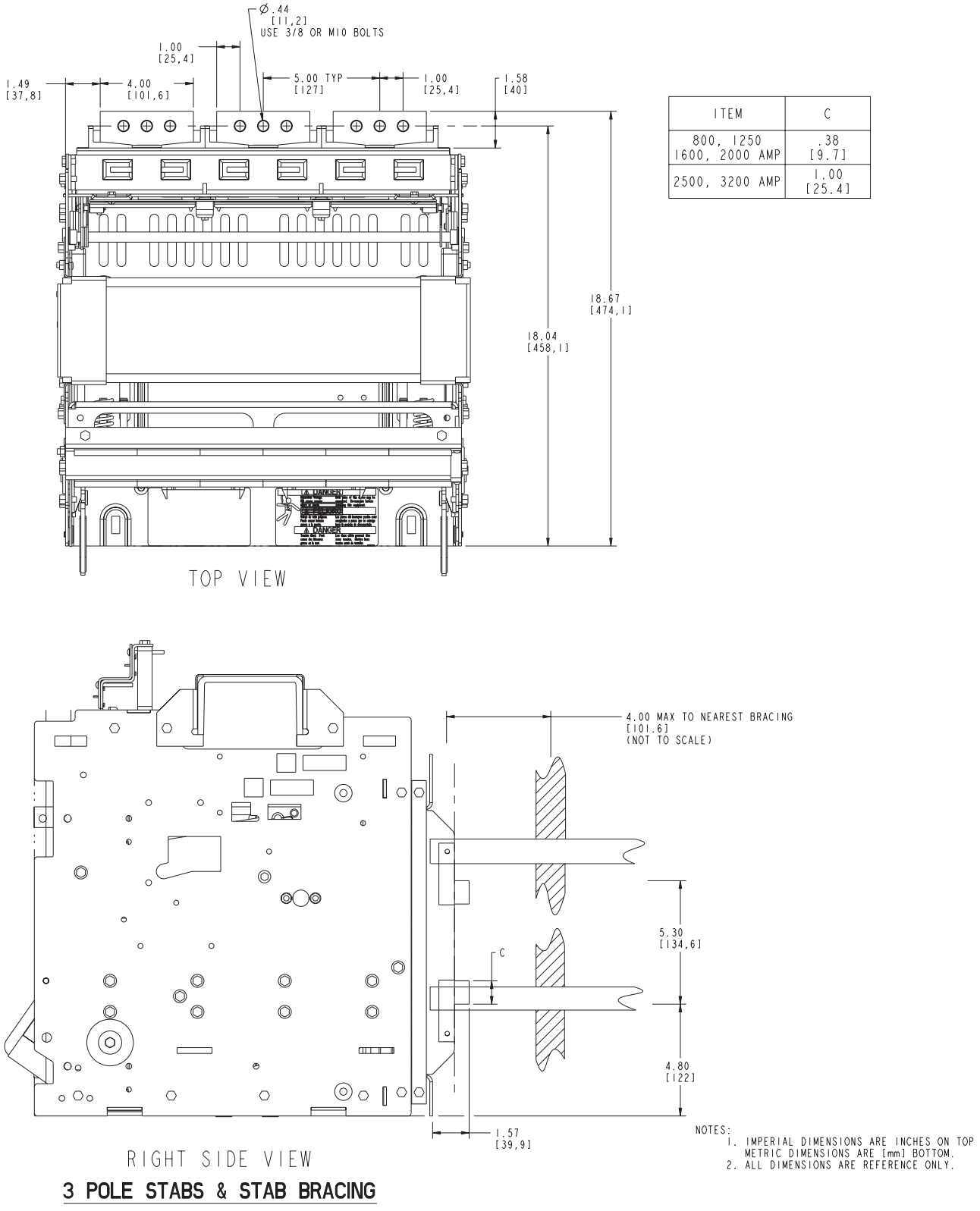
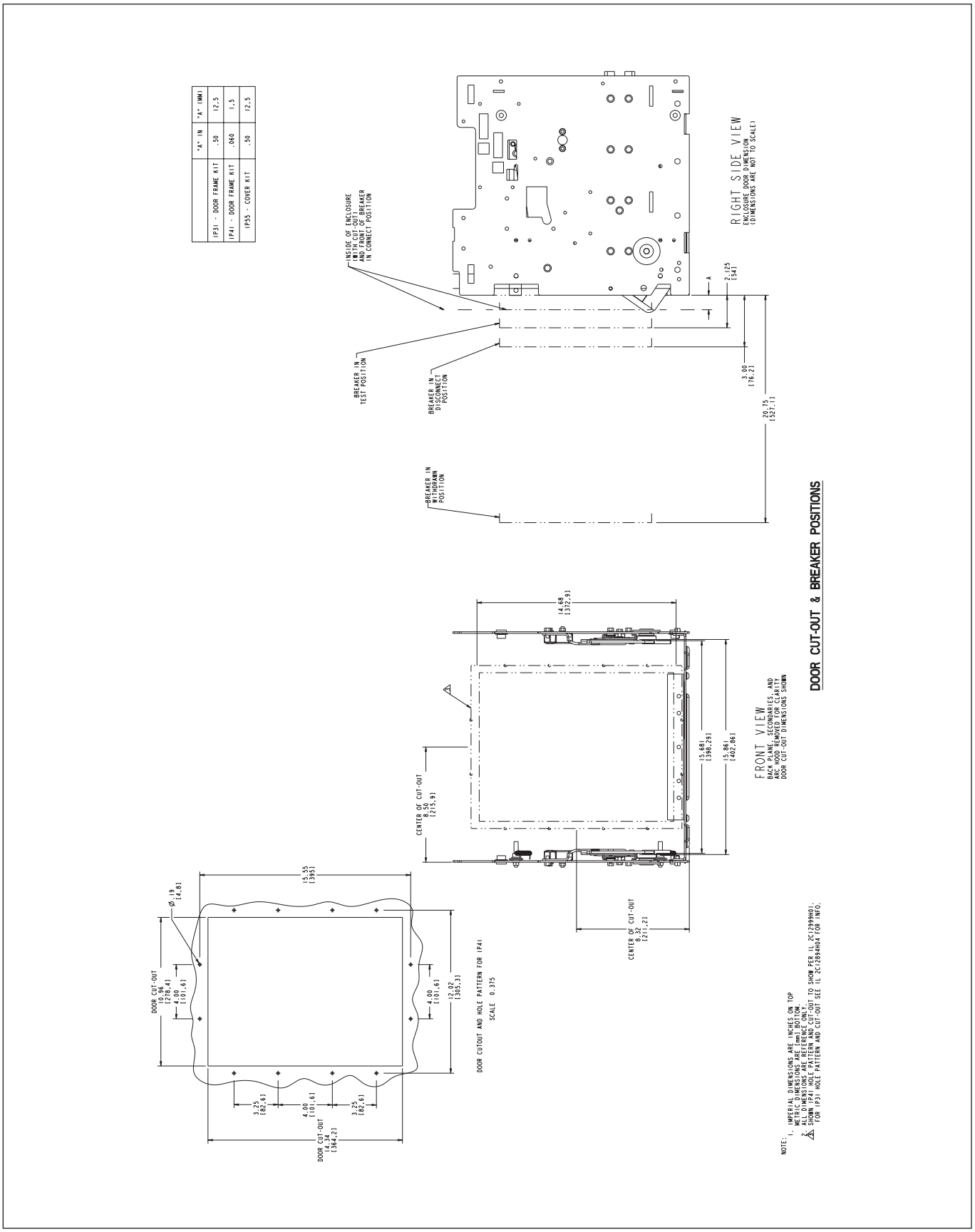


Figure 34. 800-3200A Standard frame Cassette (3-pole horizontal stabs)



ITEM	C
800, 1250 1600, 2000 AMP	.38 [9.7]
2500, 3200 AMP	1.00 [25.4]

Figure 35. 800-3200A Standard frame Cassette (Door cutout and breaker positions)



	"A" IN	"A" (MM)
IP31 - DOOR FRAME KIT	.50	12,5
IP41 - DOOR FRAME KIT	.060	1,5
IP55 - COVER KIT	.50	12,5

Figure 36. 800-3200A Standard frame Cassette (4-pole mounting locations)

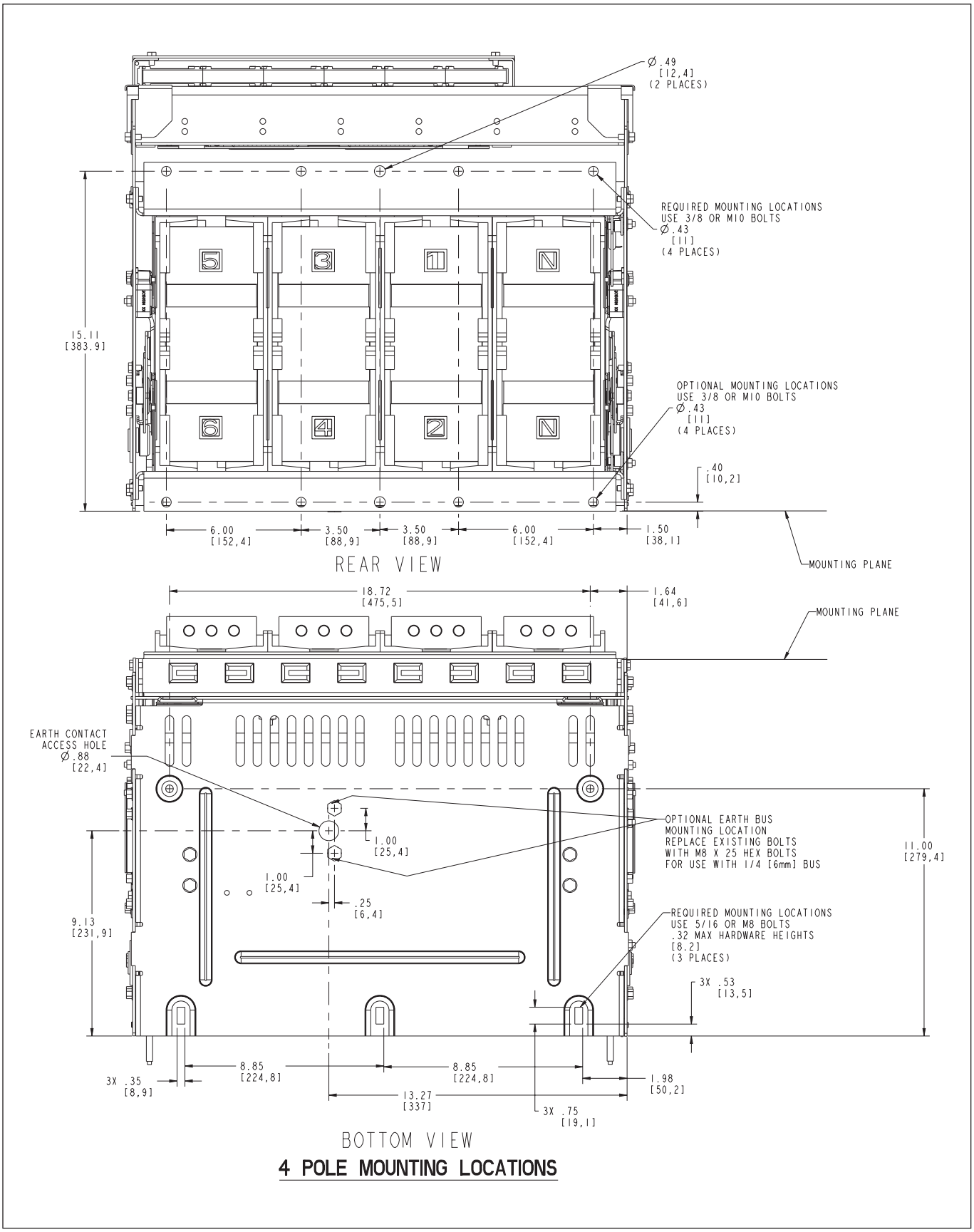


Figure 37. 800-3200A Standard frame Cassette (4-pole horizontal stabs)

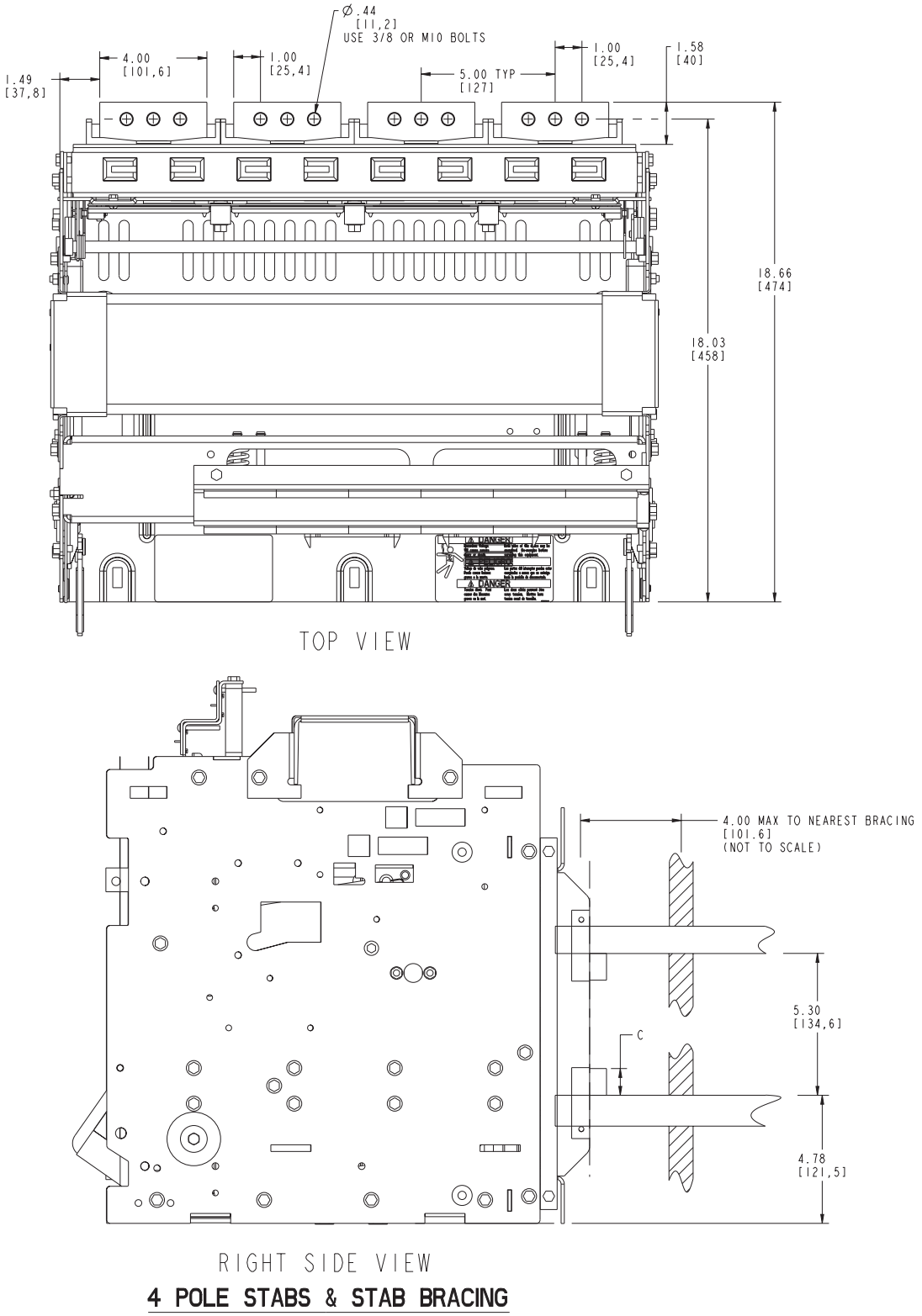


Figure 38. 800-1600A Standard frame fixed breaker (Overall dimensions and mounting locations)

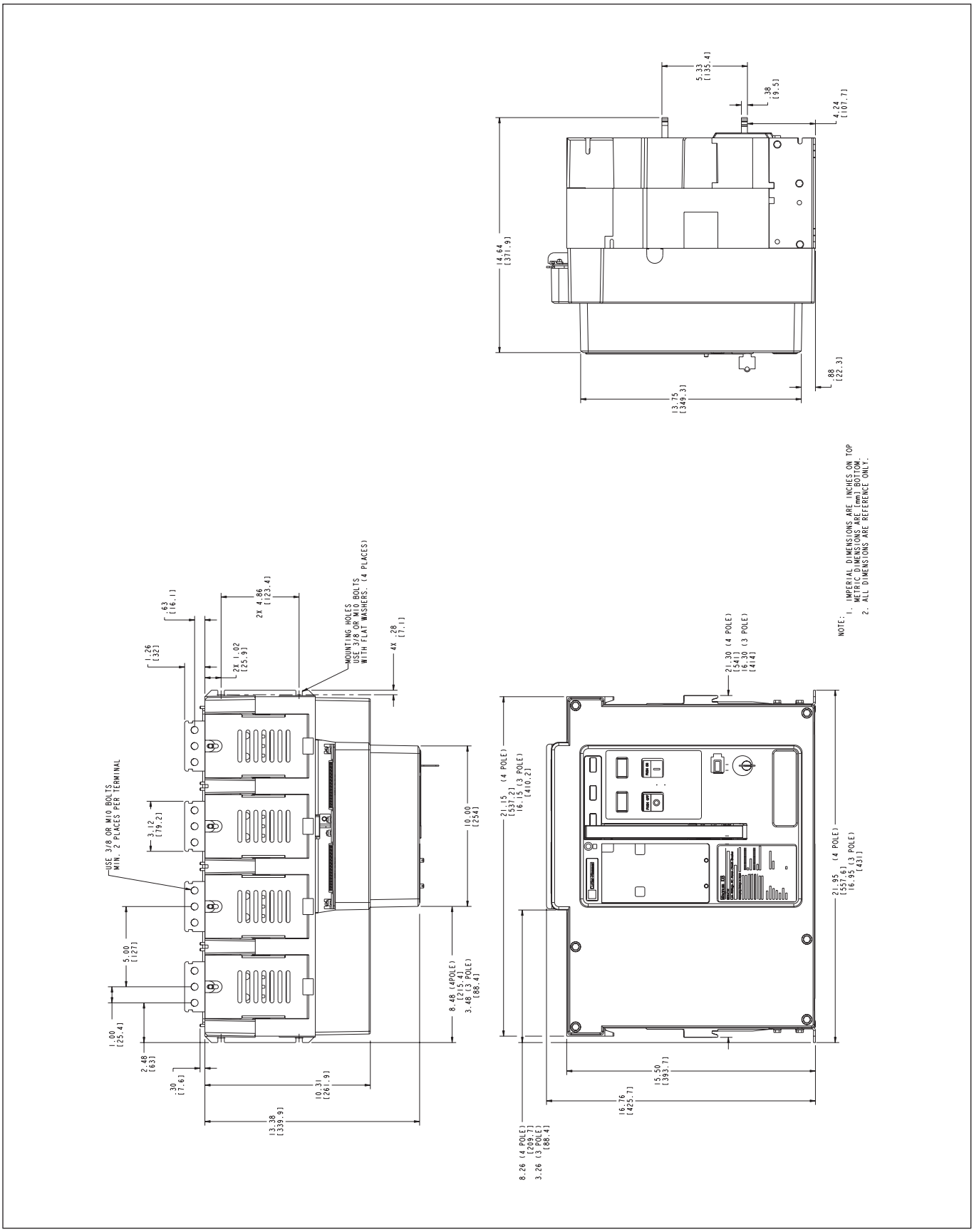


Figure 39. 800-1600A Standard frame fixed breaker (Door cutout and vertical terminals)

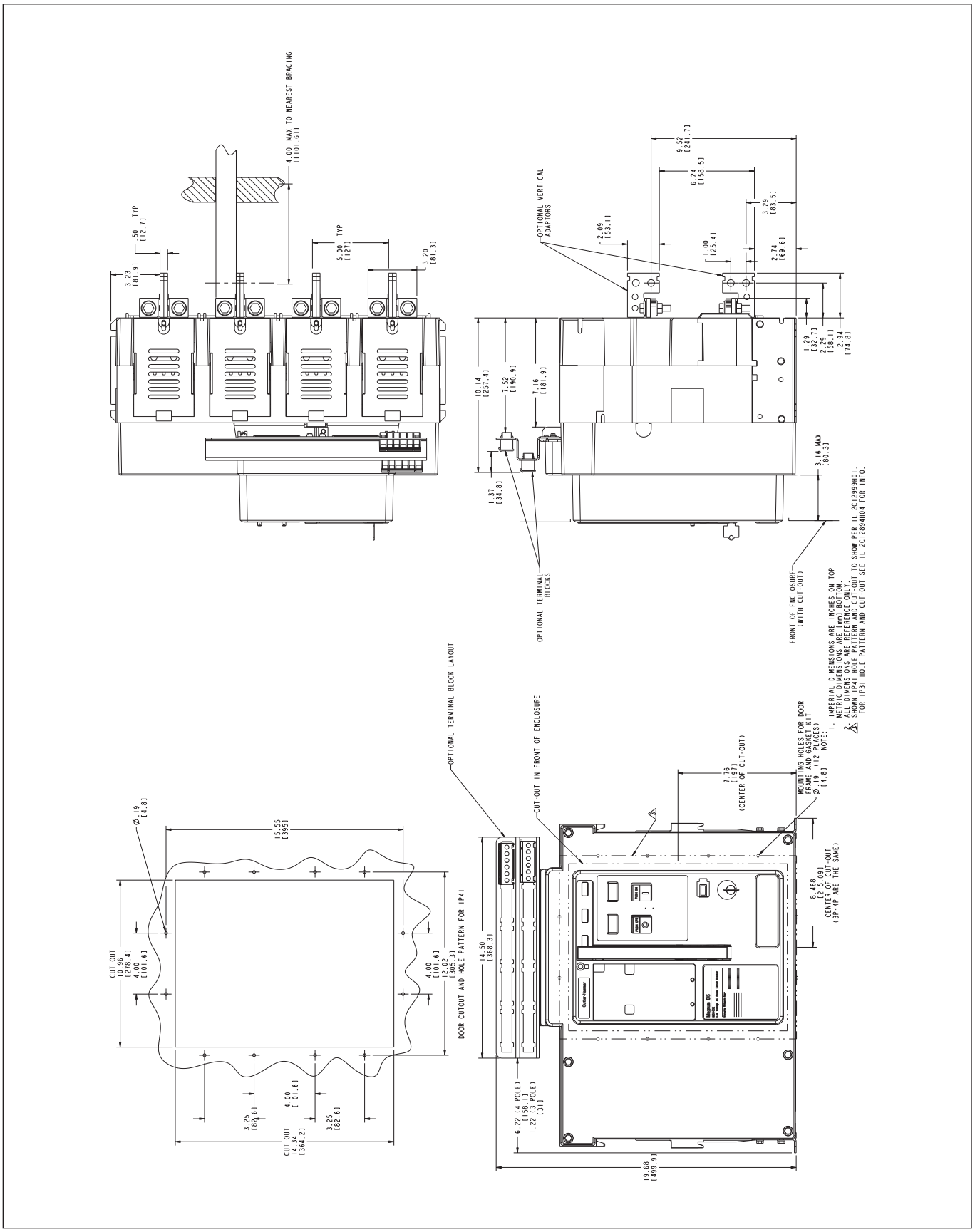


Figure 40. 800-1600A Standard frame fixed breaker (Enclosure and horizontal terminals)

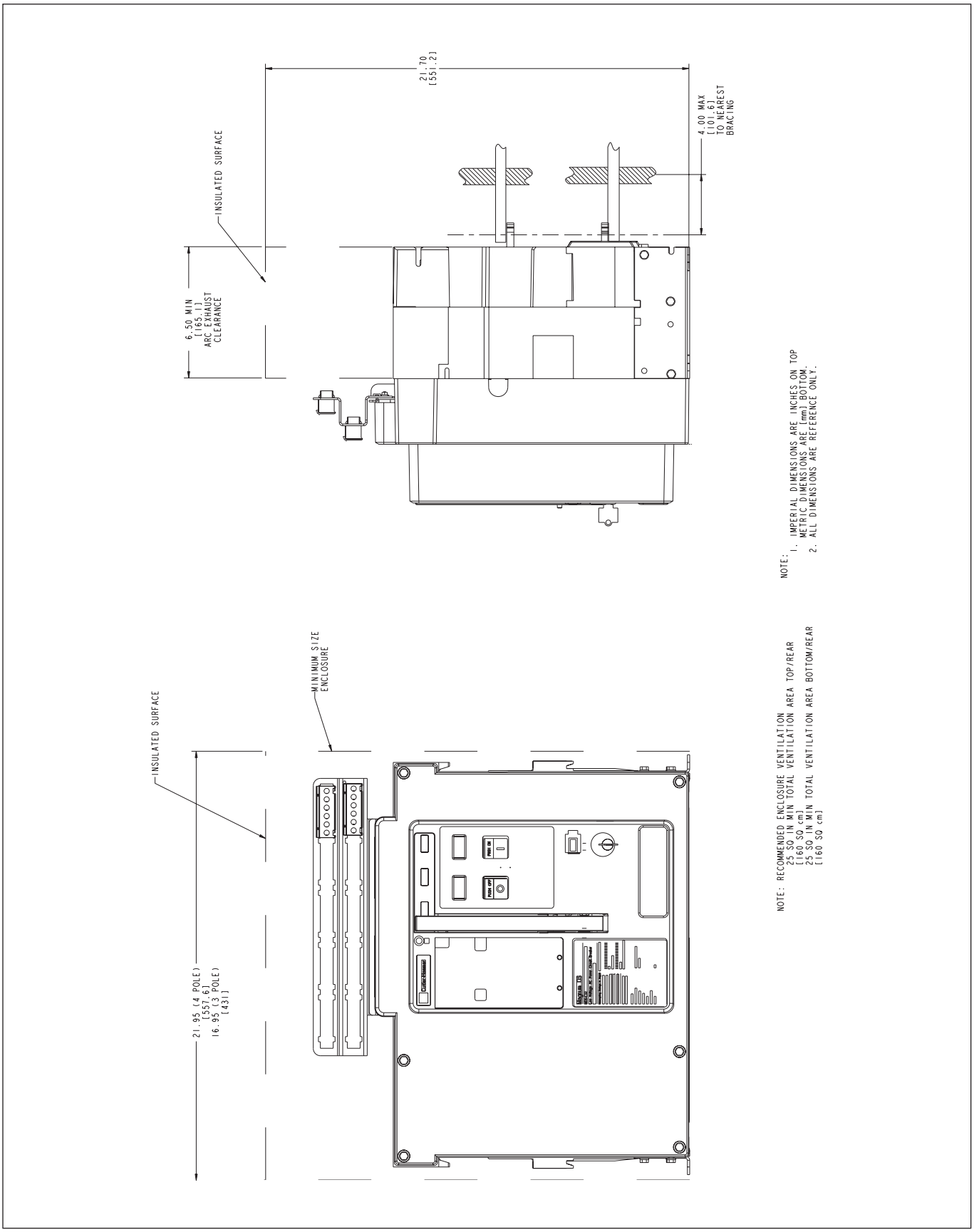


Figure 41. 800-1600A Standard frame fixed breaker (Optional front mount terminals)

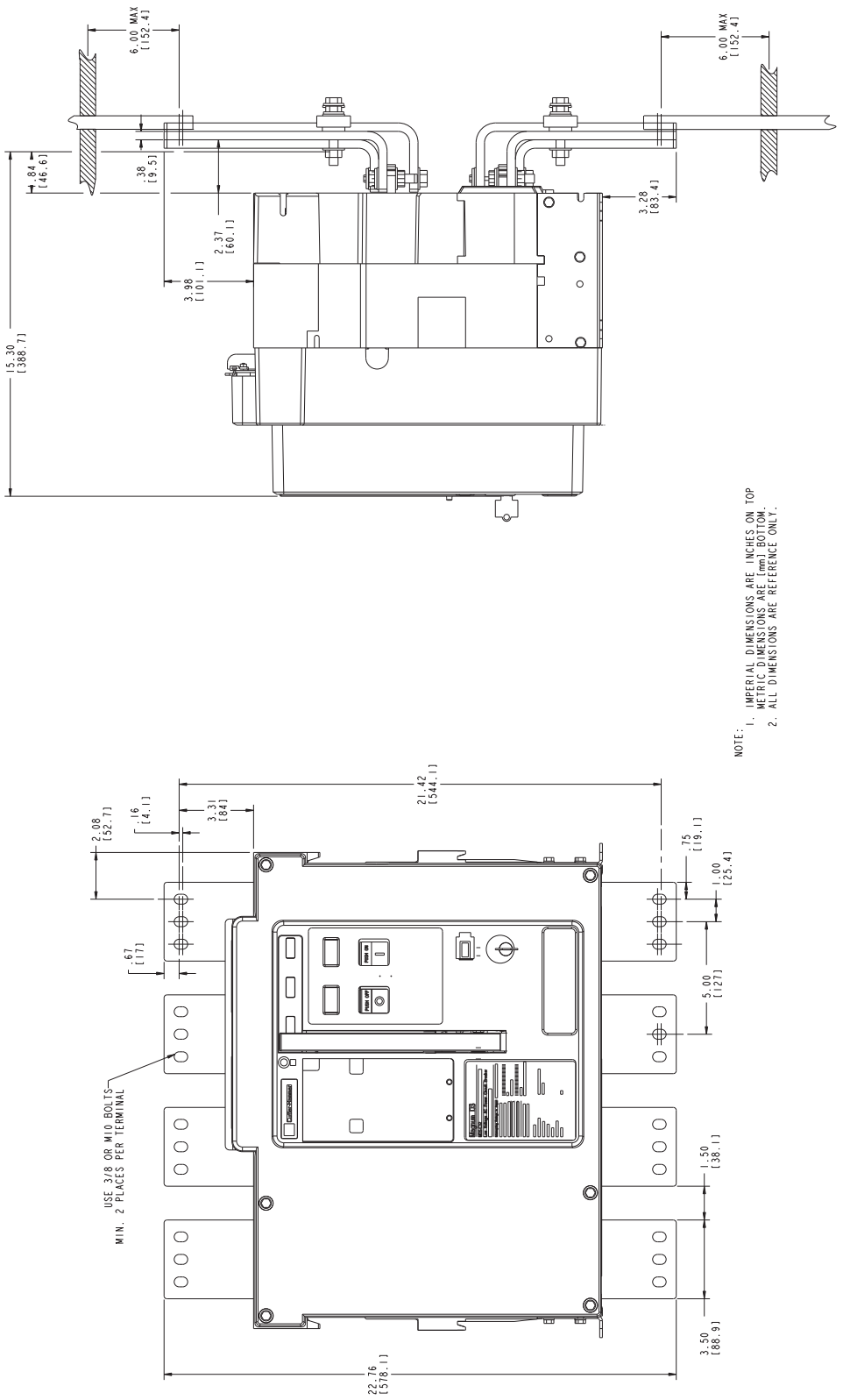


Figure 42. 2000A Standard frame fixed breaker (Overall dimensions and mounting locations)

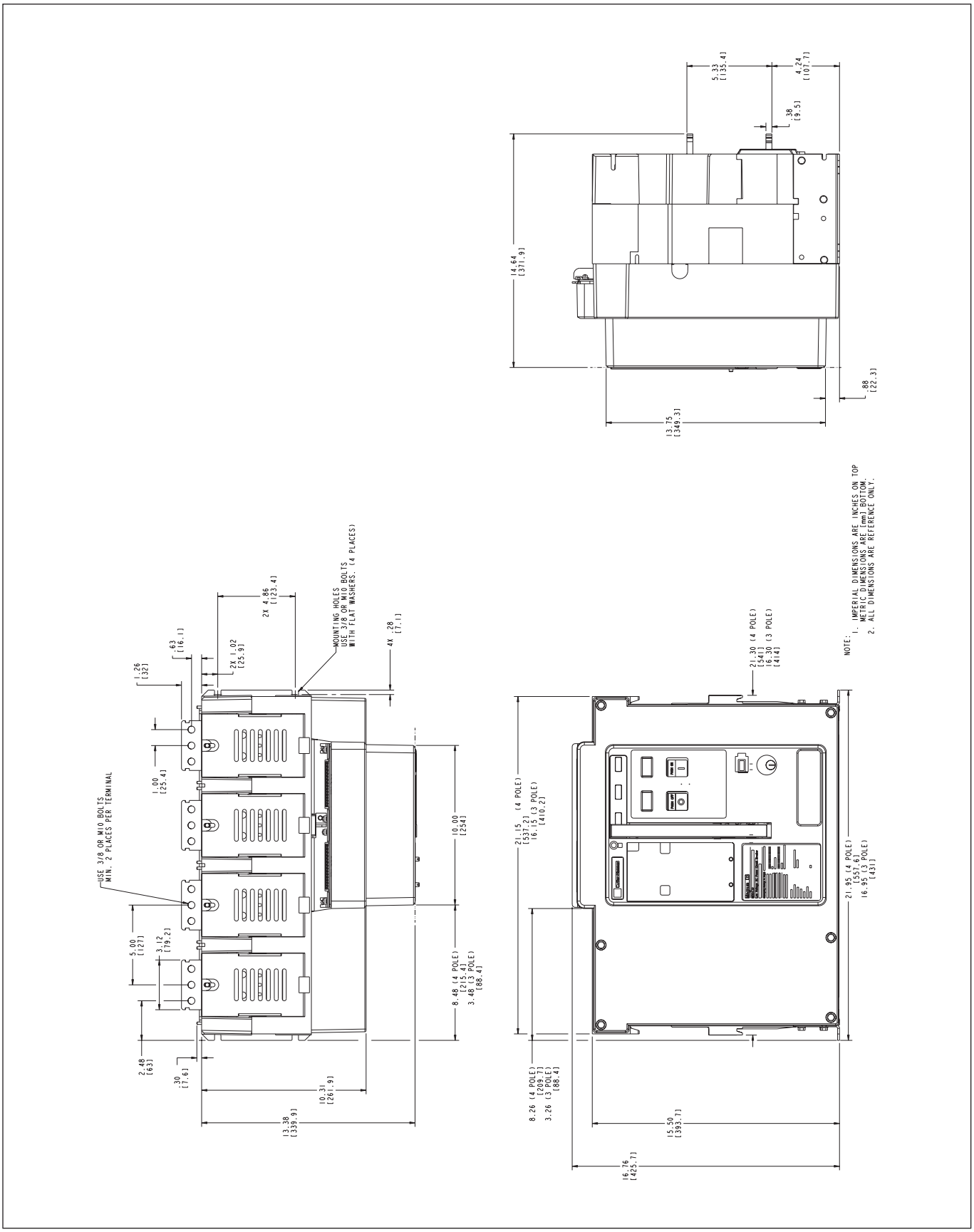


Figure 43. 2000A Standard frame fixed breaker (Door cutout and vertical terminals)

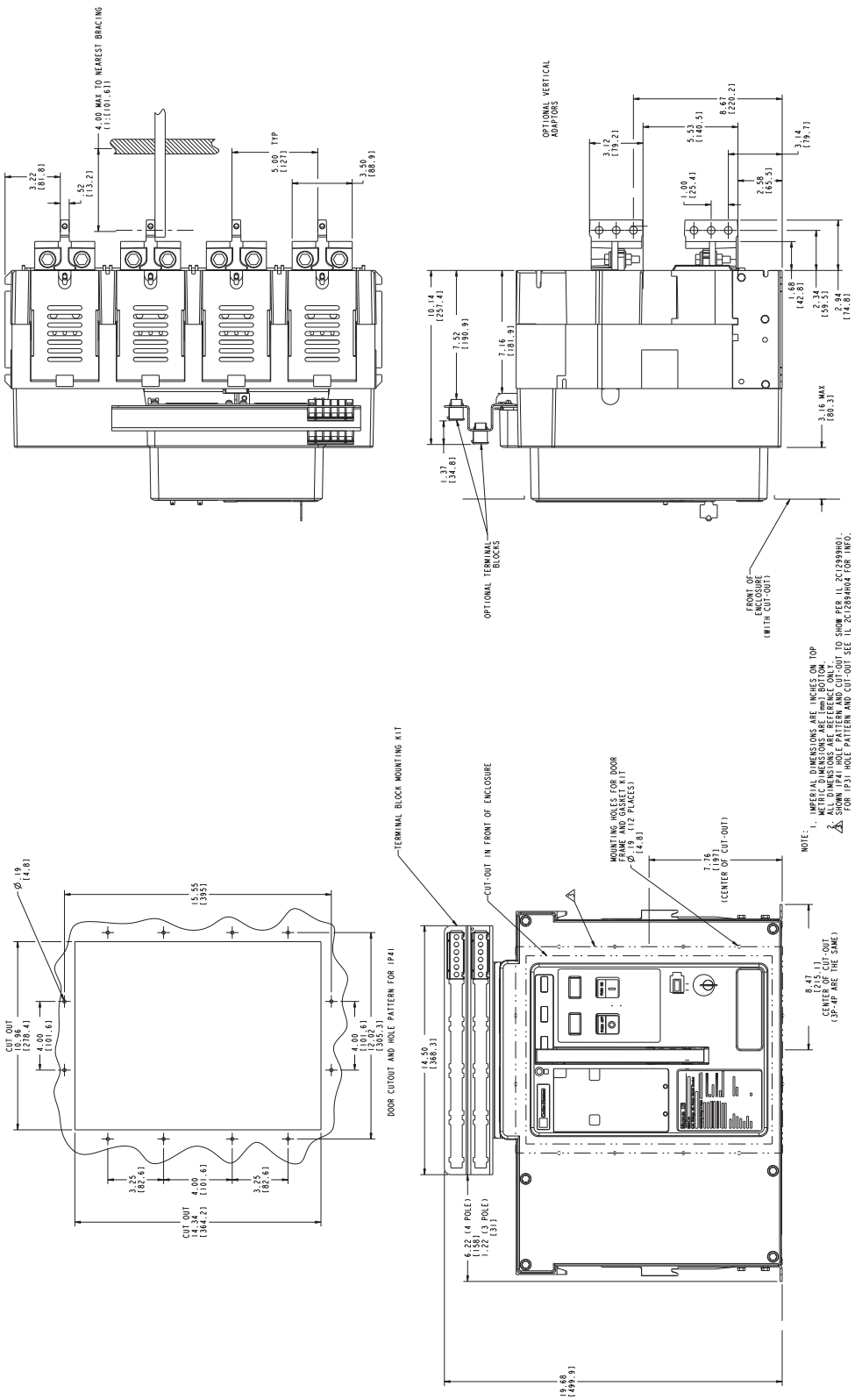


Figure 44. 2000A Standard frame fixed breaker (Enclosure and horizontal terminals)

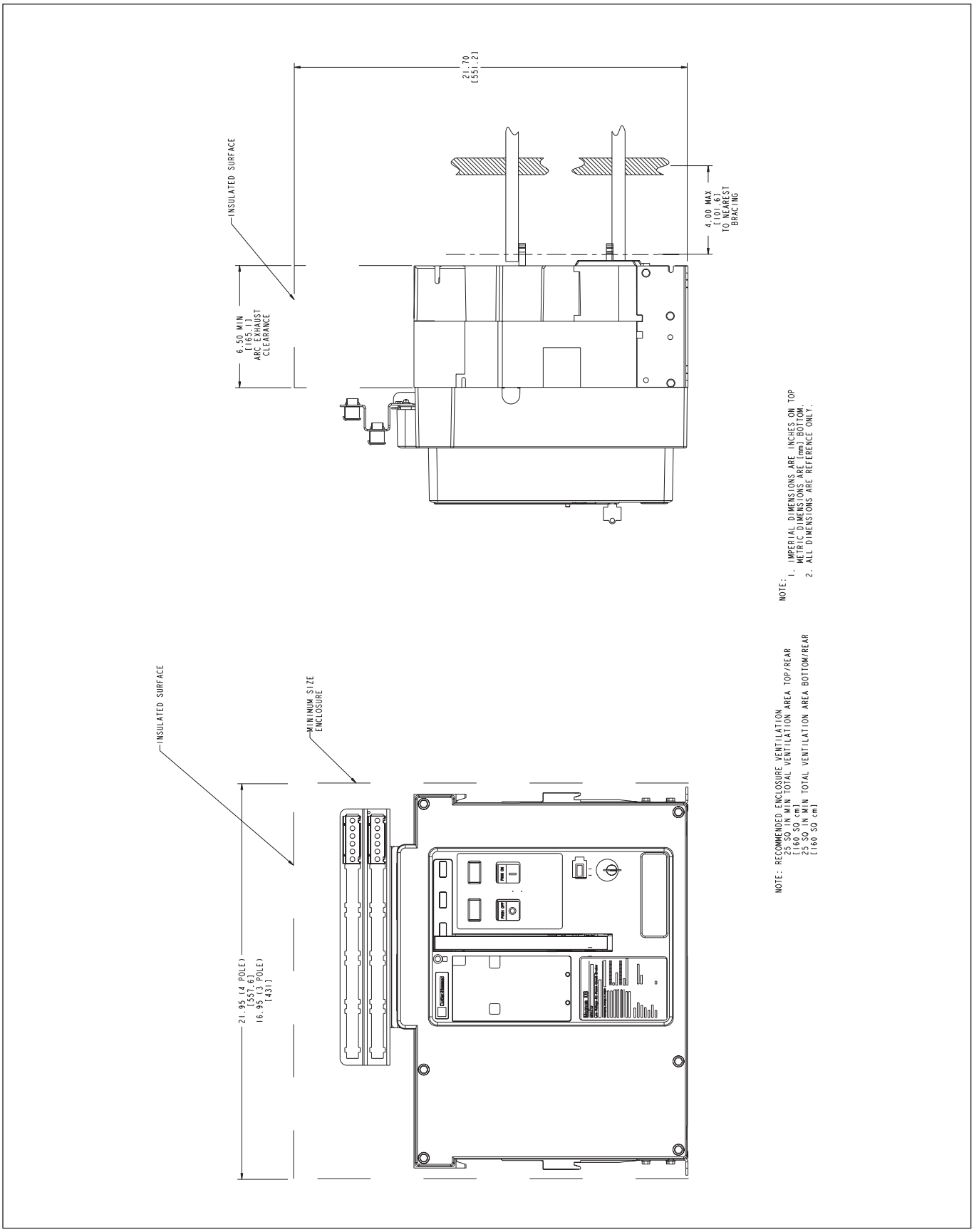


Figure 45. 2000A Standard frame fixed breaker (Optional front mount terminals)

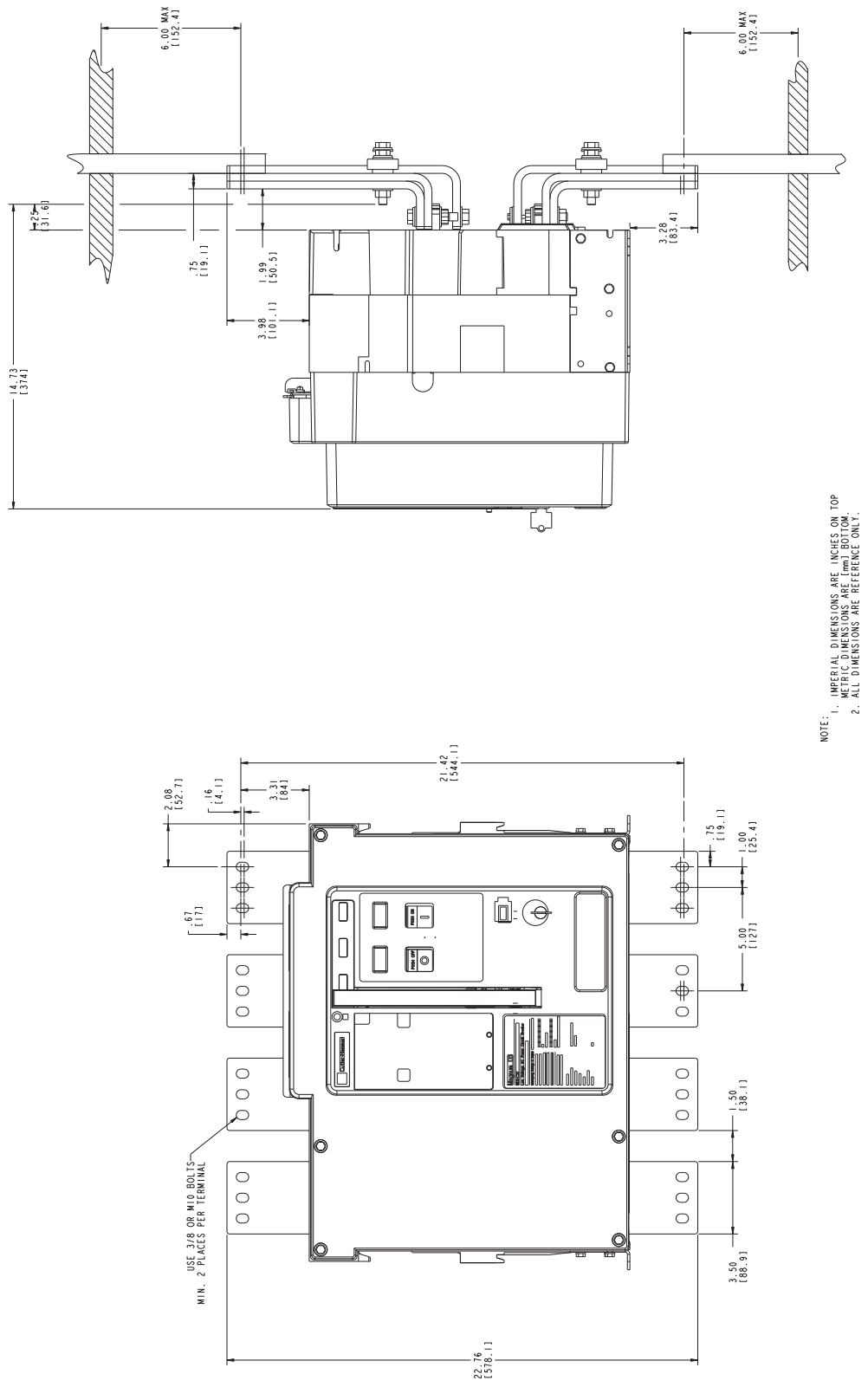


Figure 46. 2500-3200A Standard frame fixed breaker (Overall dimensions and mounting locations)

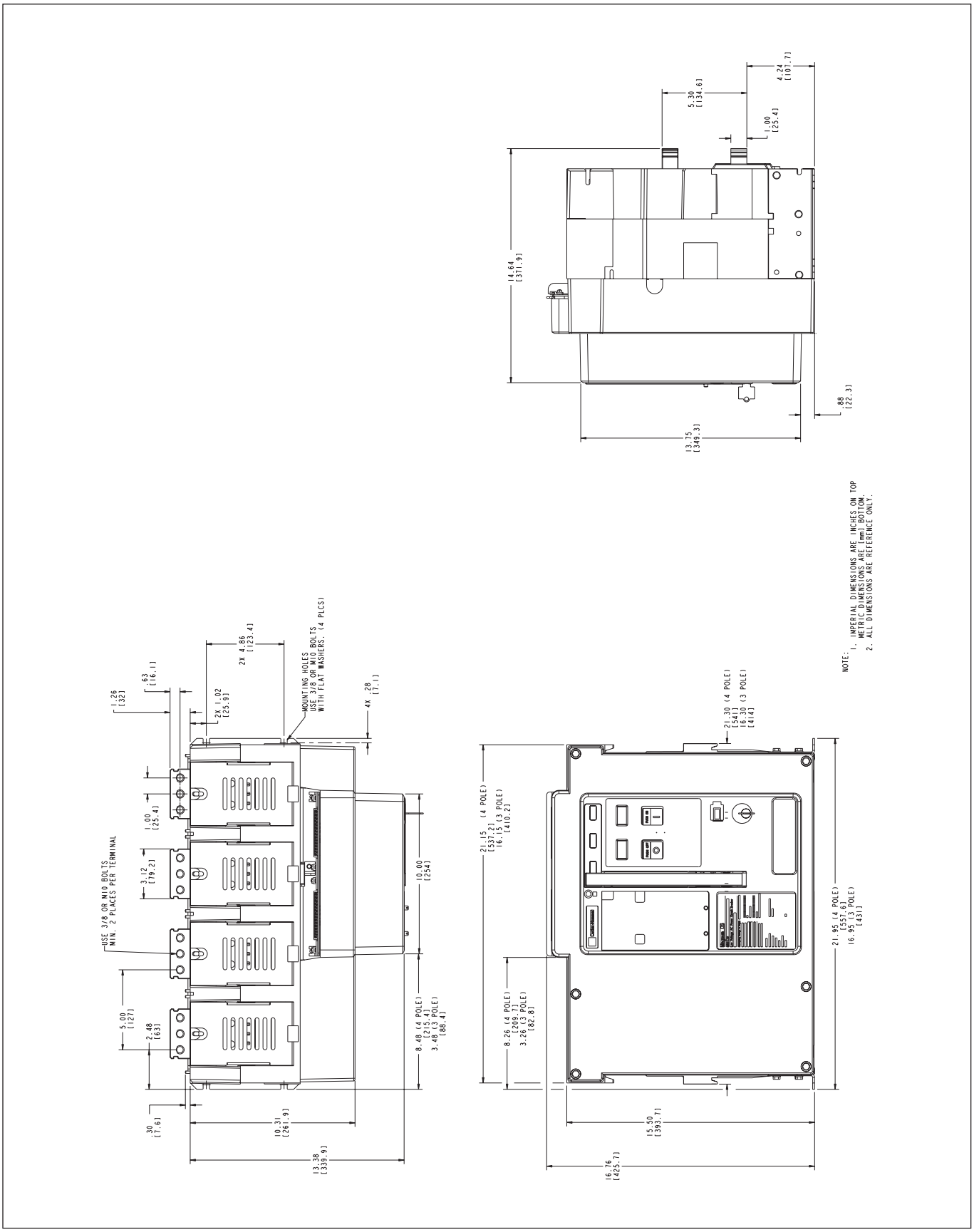


Figure 47. 2500-3200A Standard frame fixed breaker (Door cutout and vertical terminals)

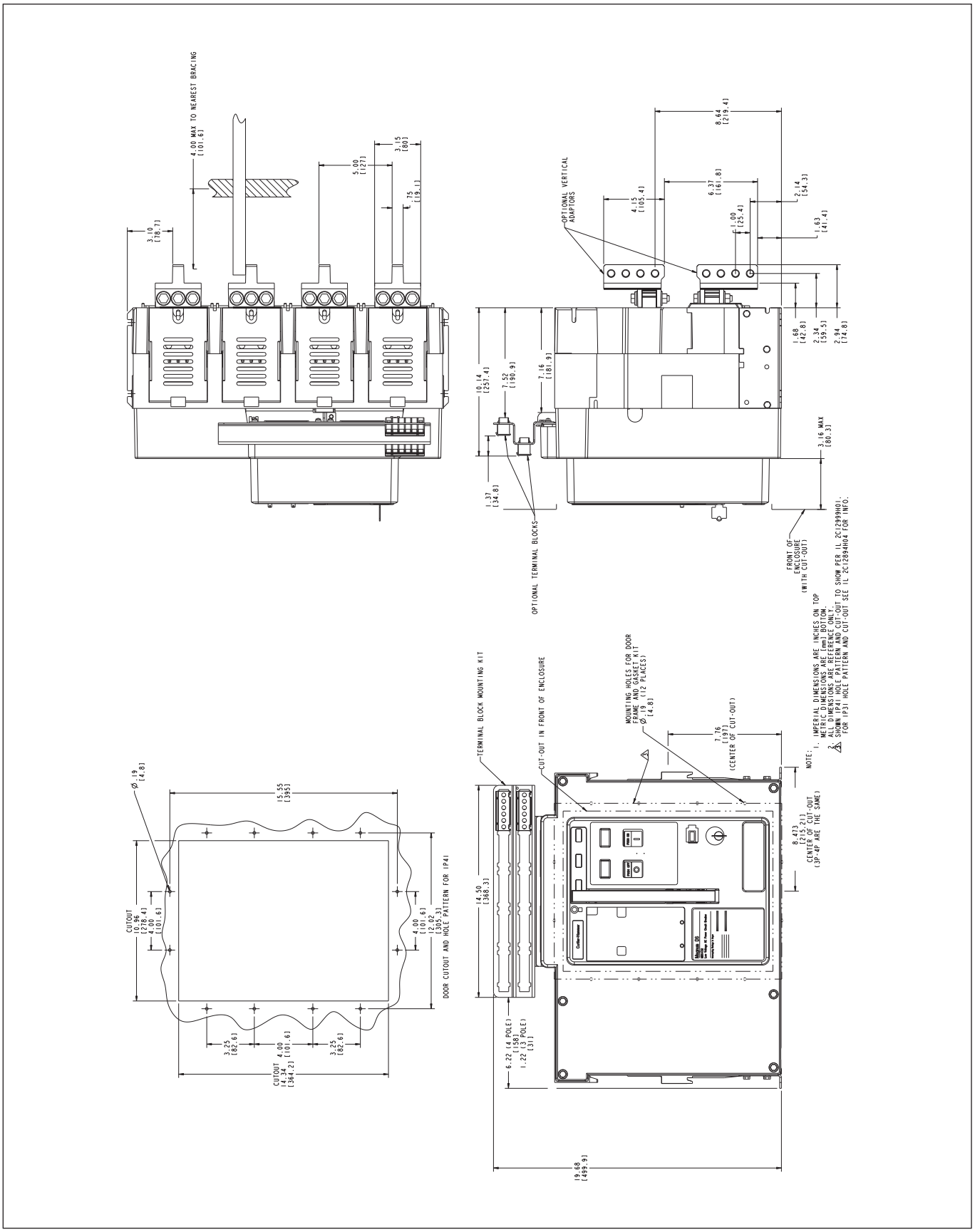


Figure 48. 2500-3200A Standard frame fixed breaker (Enclosure and horizontal terminals)

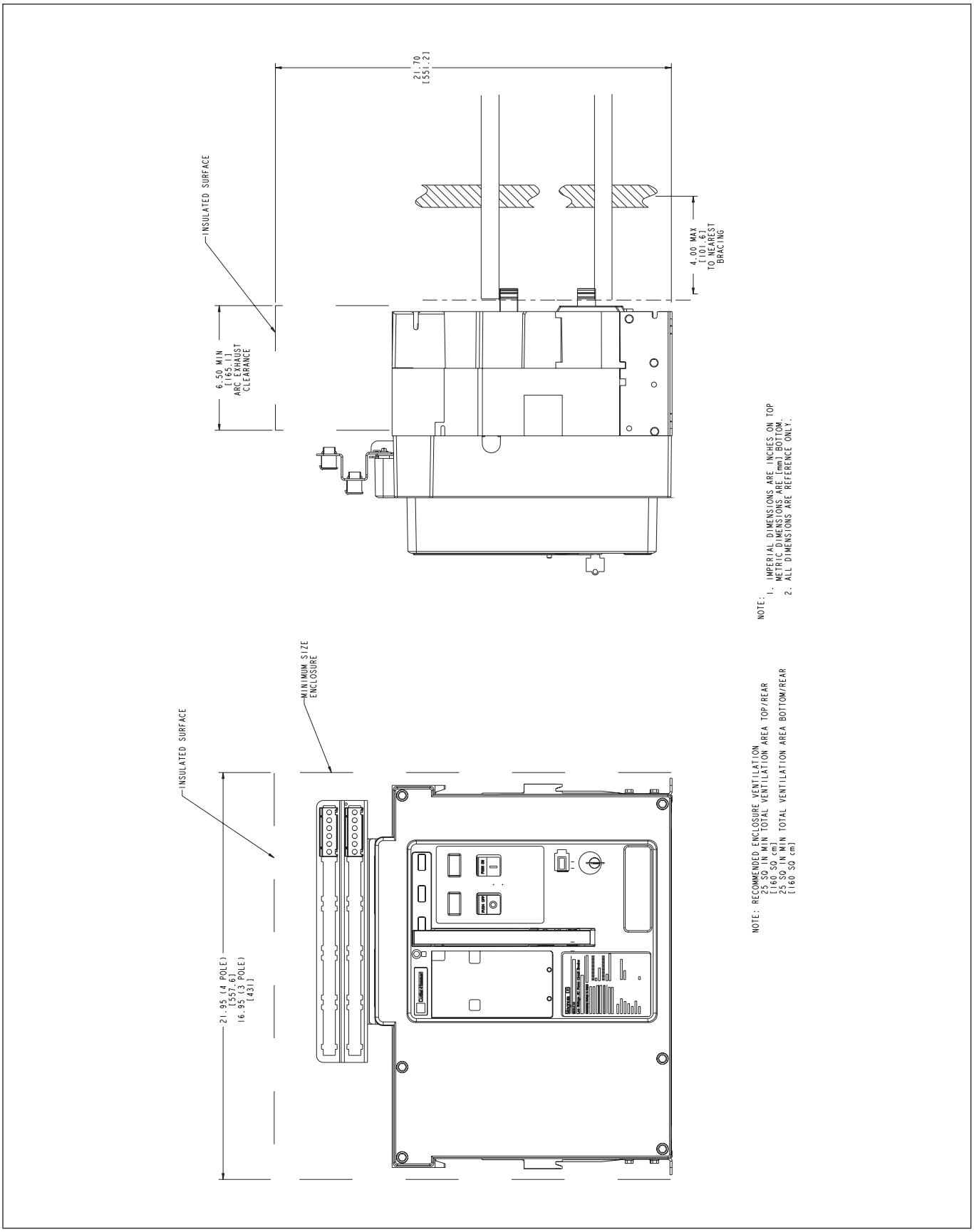


Figure 49. 2500-3200A Standard frame fixed breaker (Optional front mount terminals)

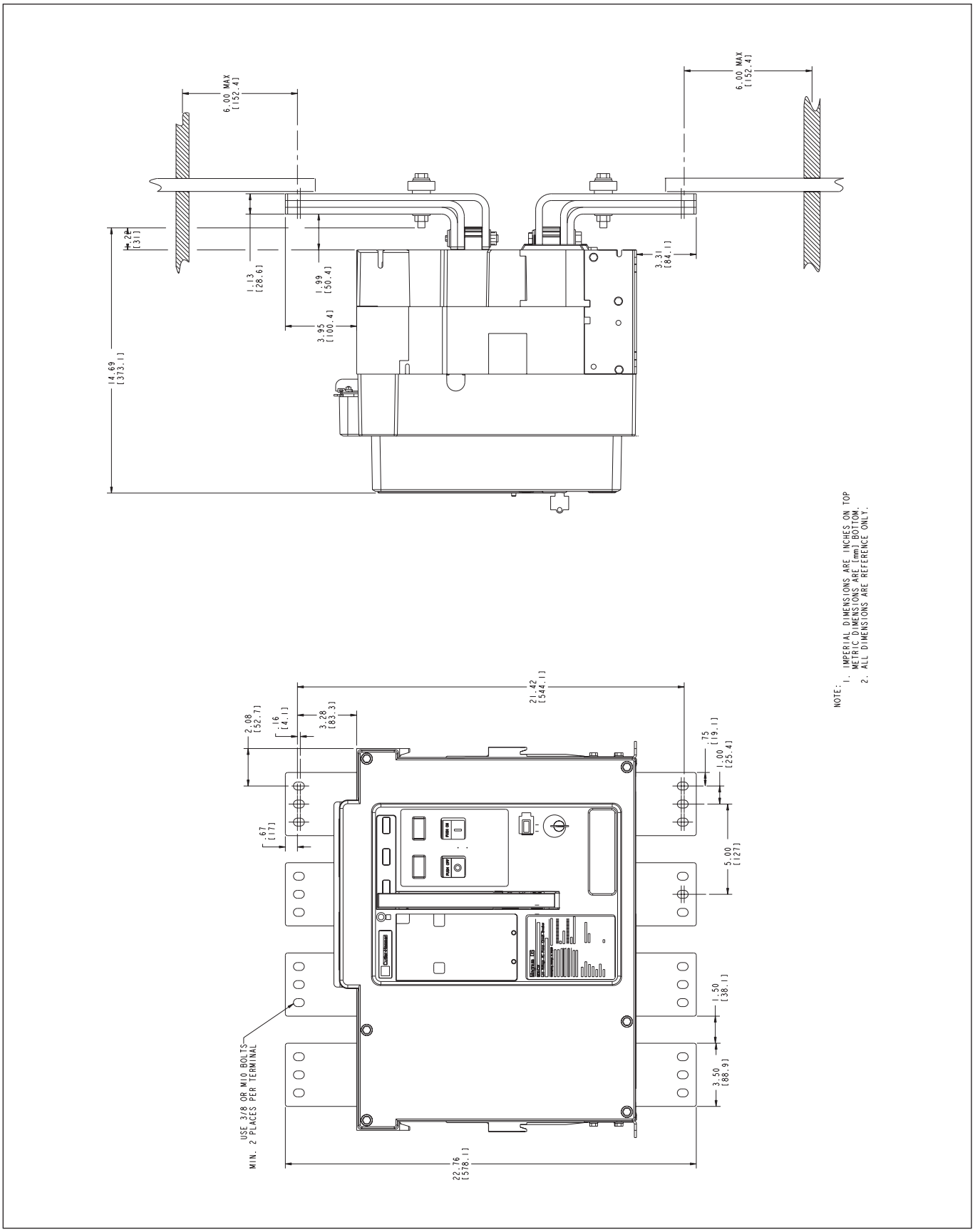


Figure 50. 4000A Double narrow frame Cassette (3-pole mounting locations)

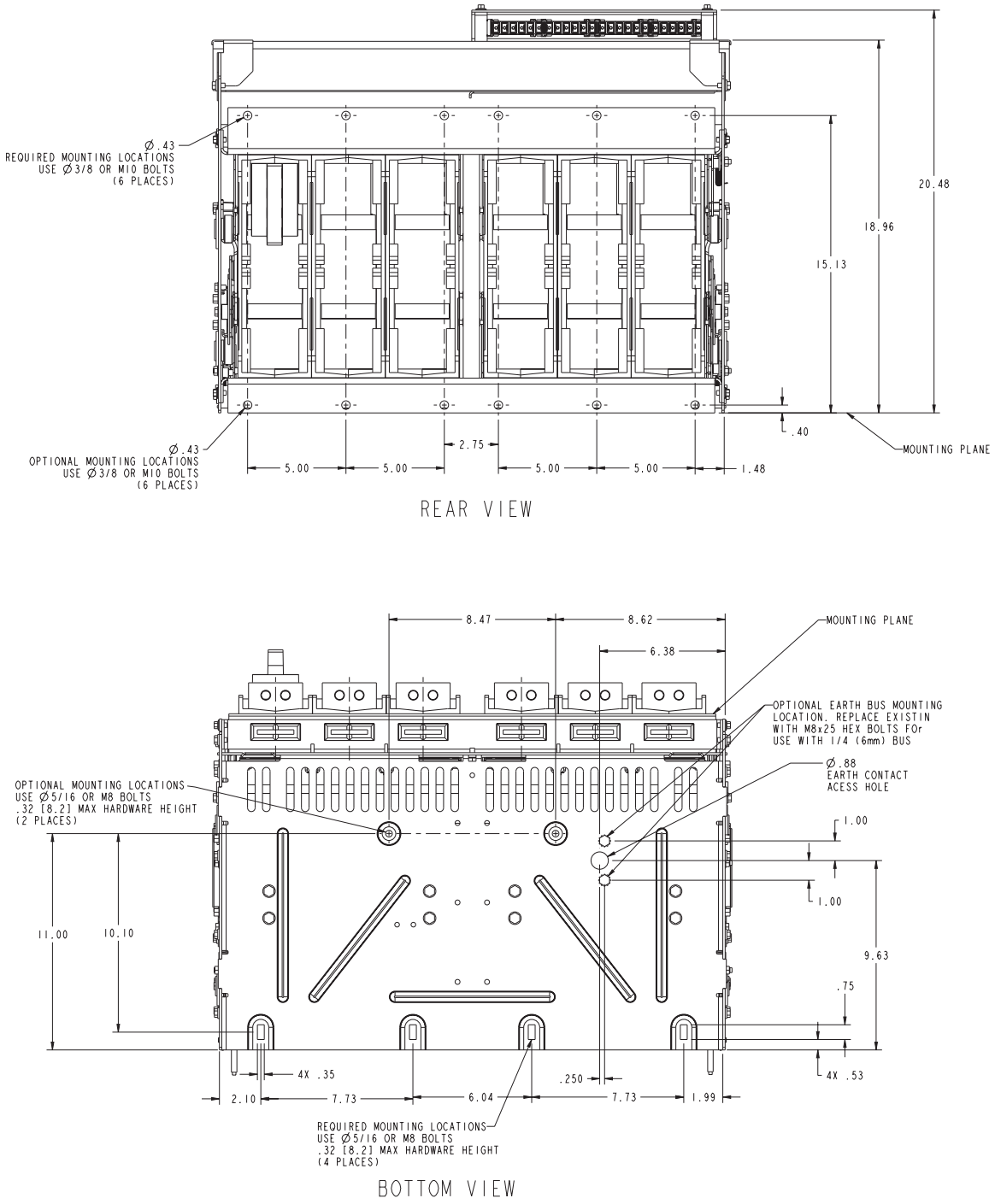


Figure 51. 4000A Double narrow frame Cassette (3-pole overall dimensions)

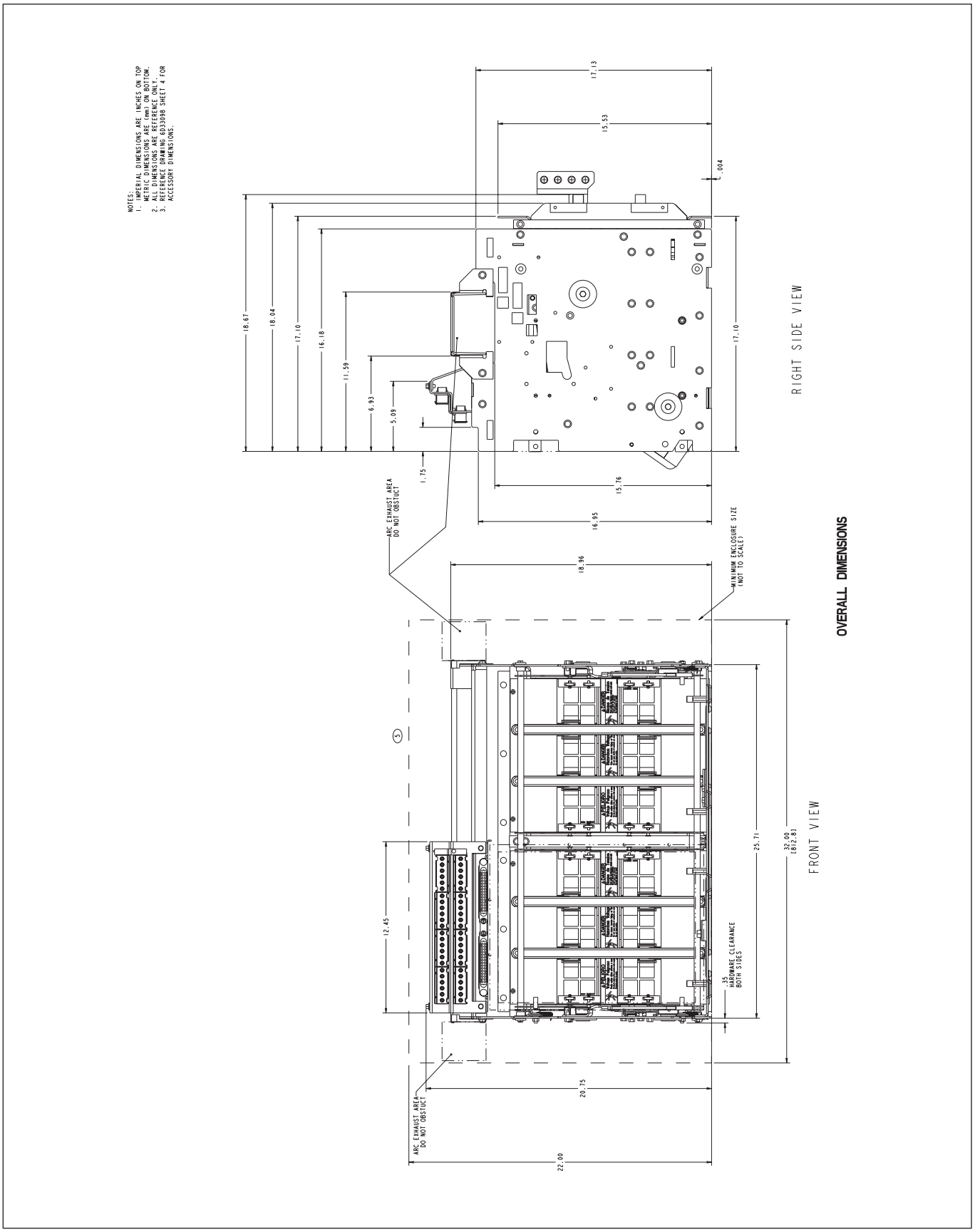


Figure 52. 4000A Double narrow frame Cassette (Accessory dimensions)

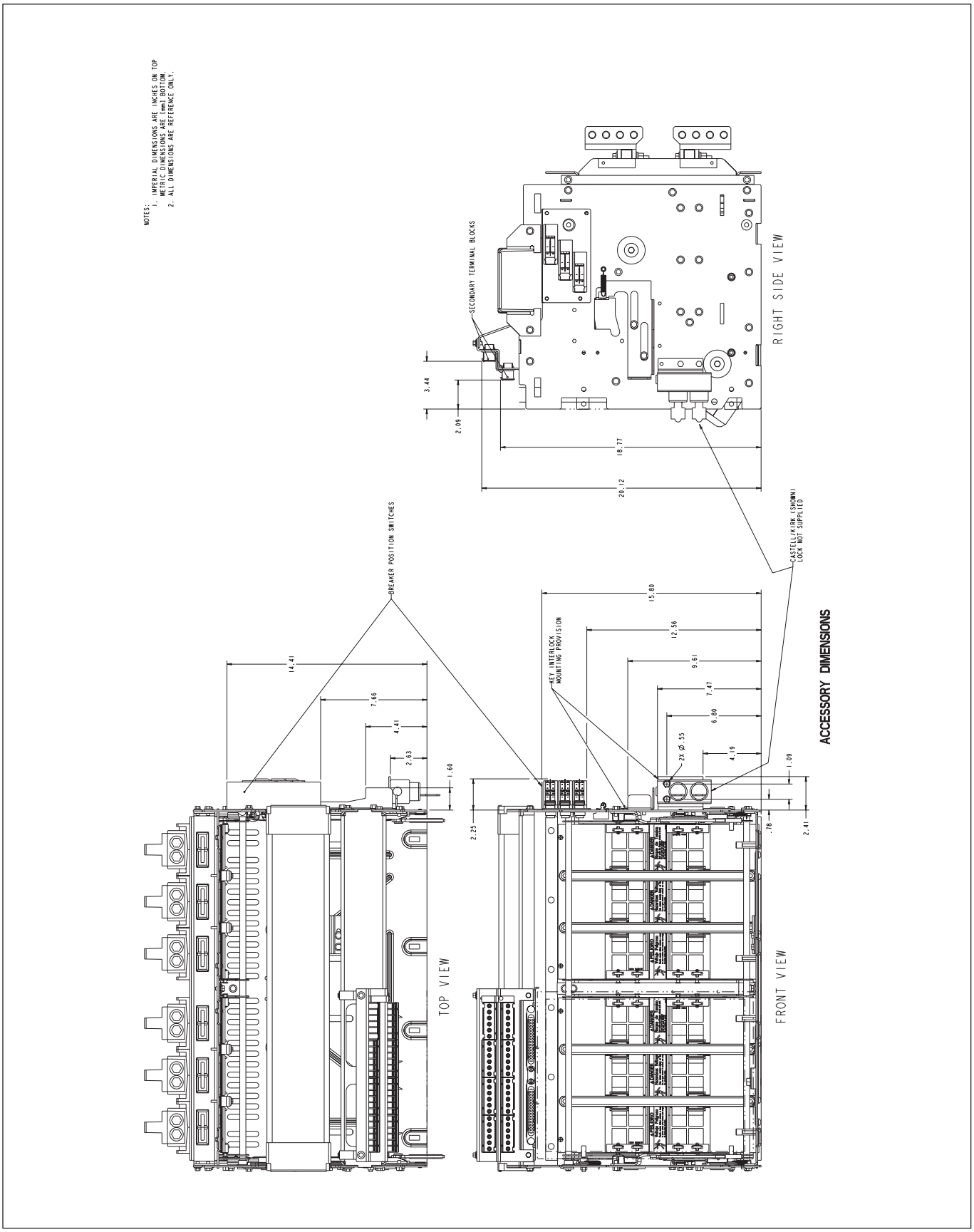


Figure 53. 4000A Double narrow frame Cassette (Vertical stabs)

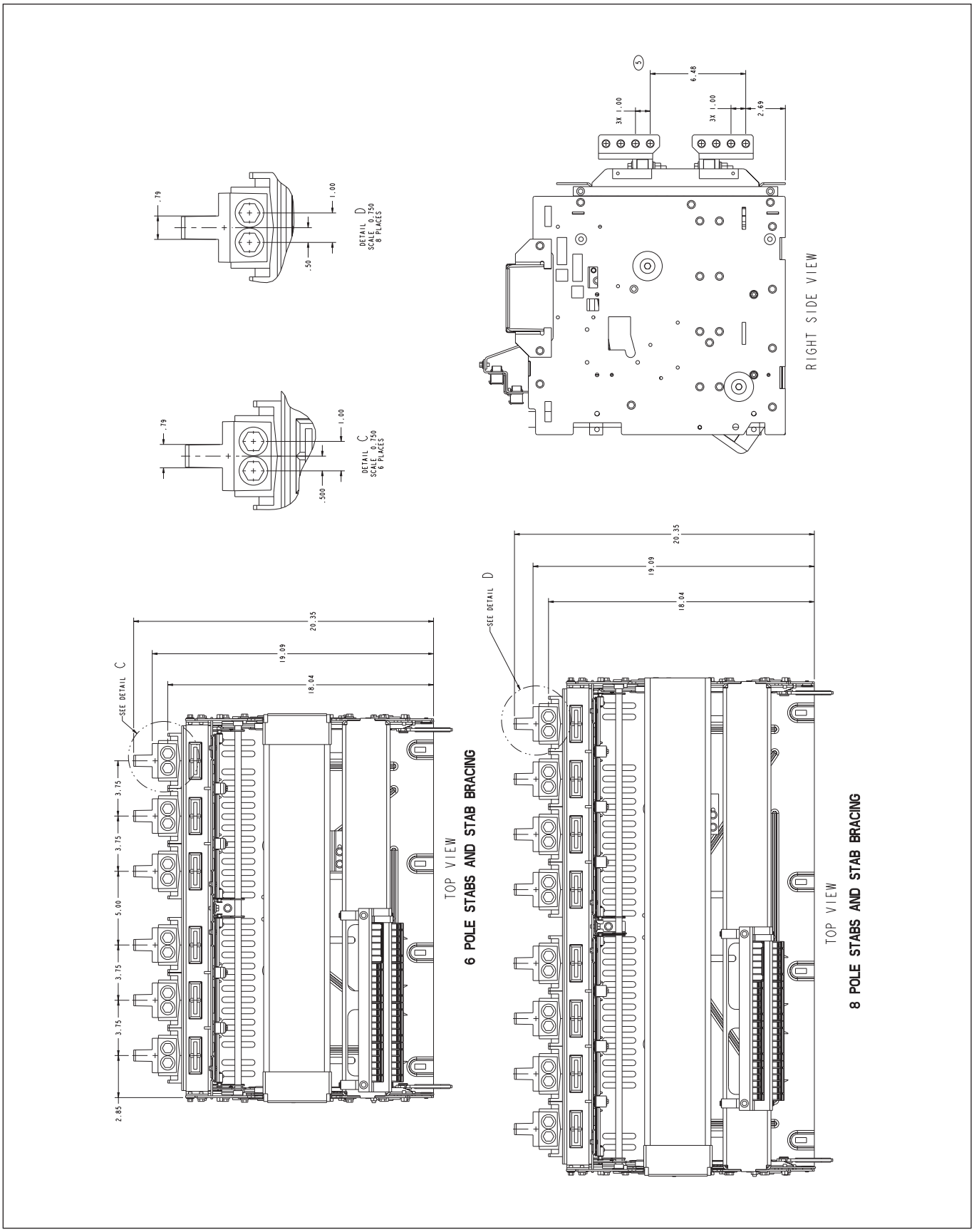


Figure 54. 4000A Double narrow frame Cassette (Horizontal stabs)

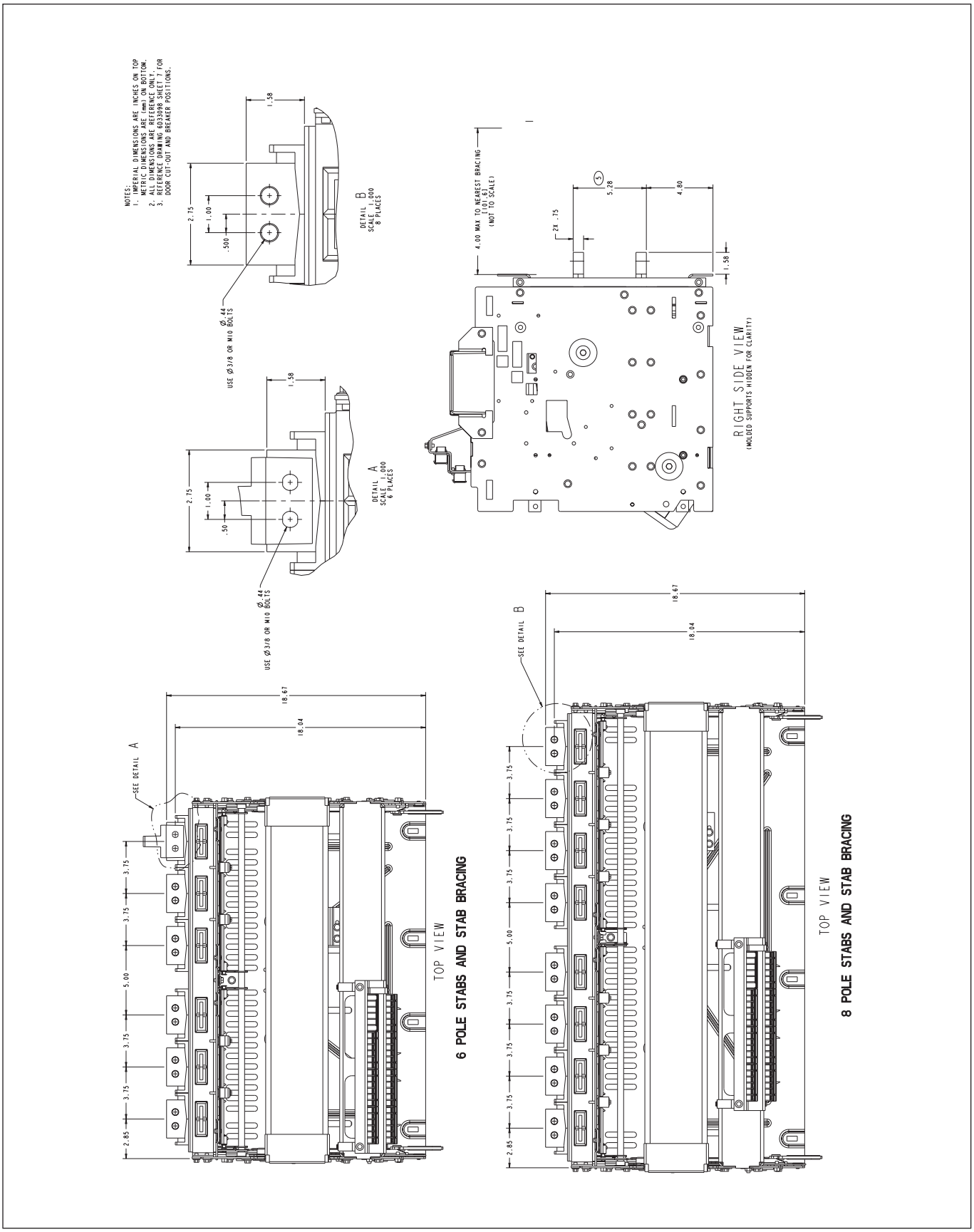


Figure 55. 4000A Double narrow frame Cassette (Door cutout and breaker positions)

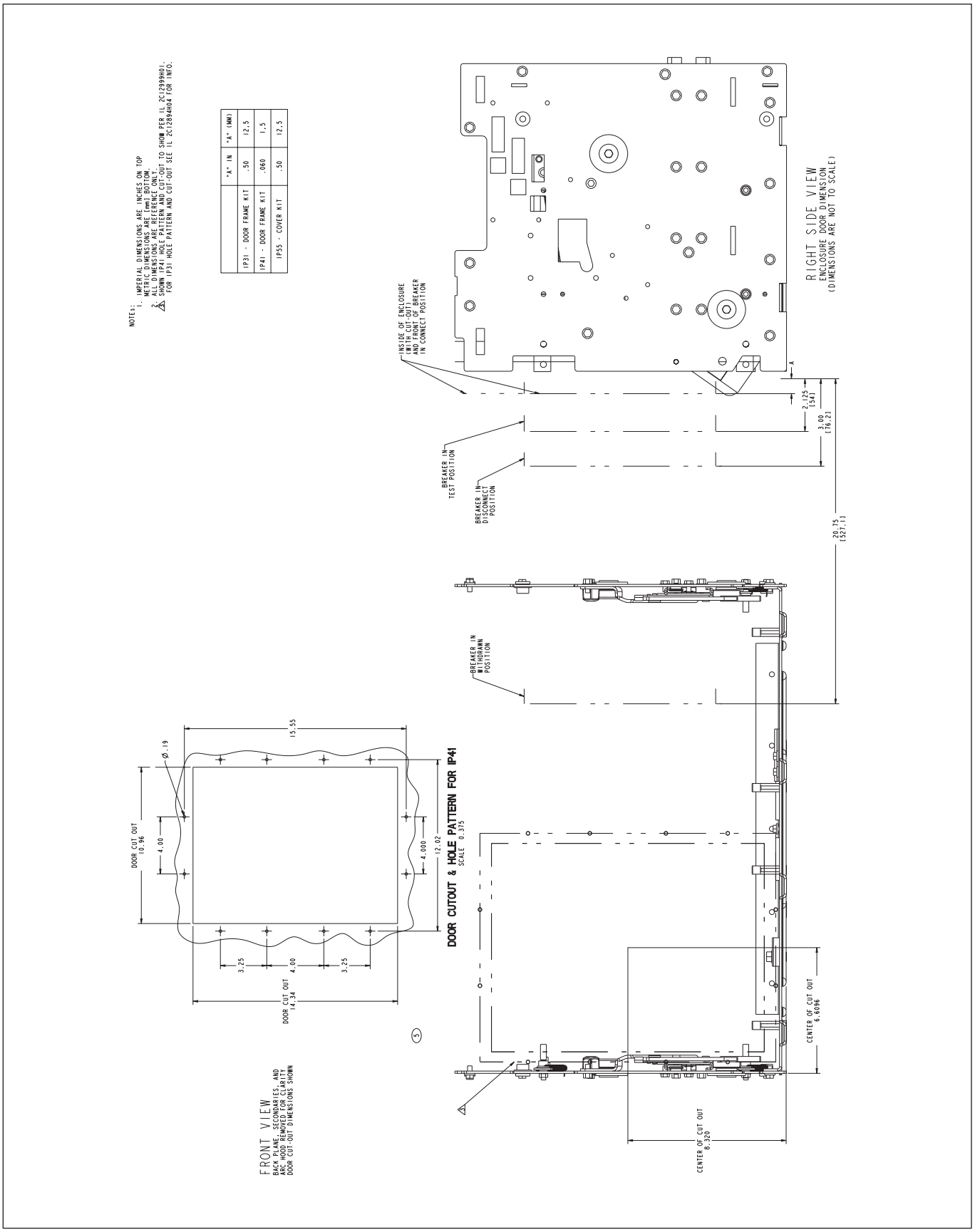


Figure 56. 4000A Double narrow frame Cassette (4-pole mounting locations)

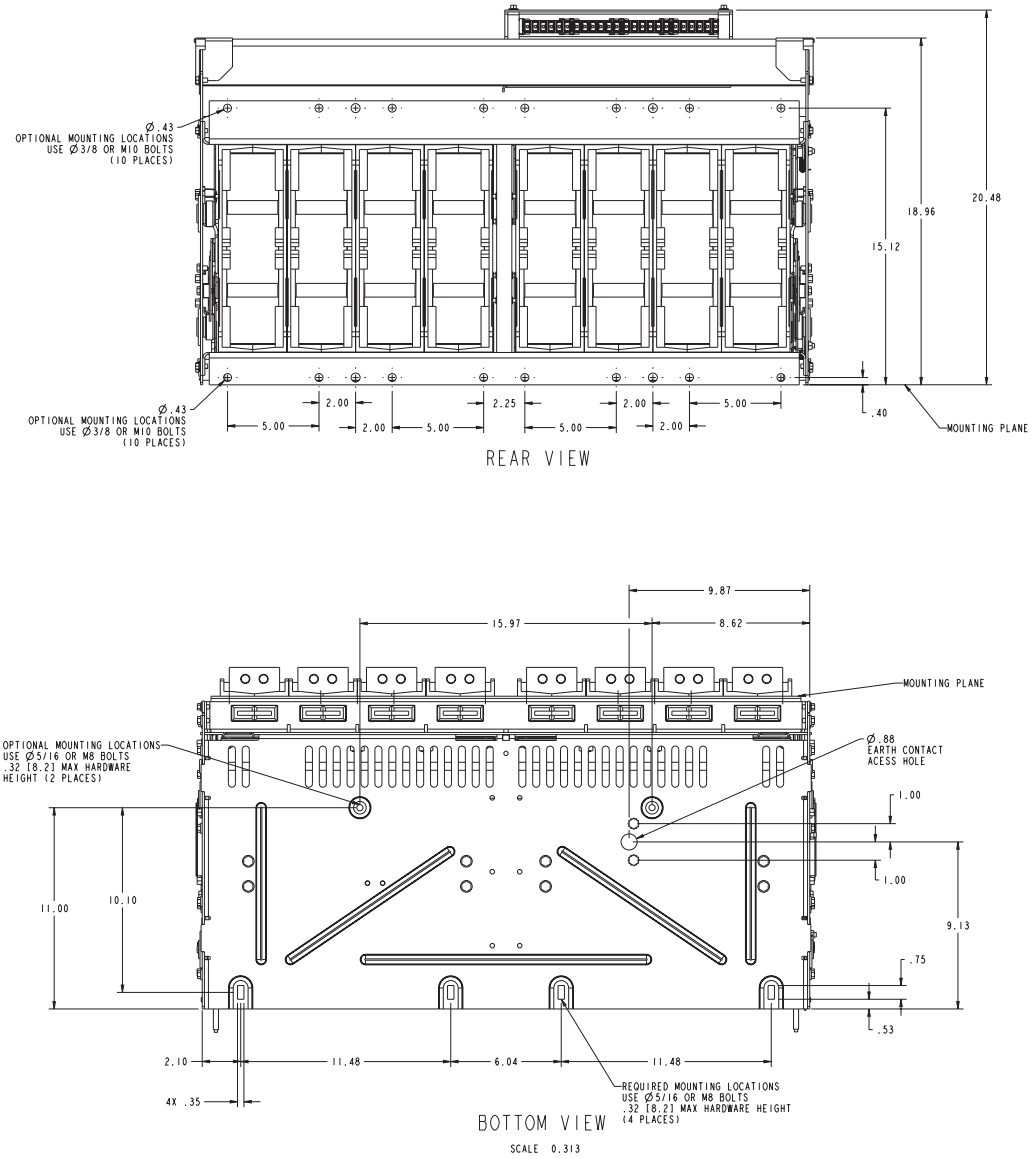


Figure 57. 4000A Double narrow frame Cassette (4-pole overall dimensions)

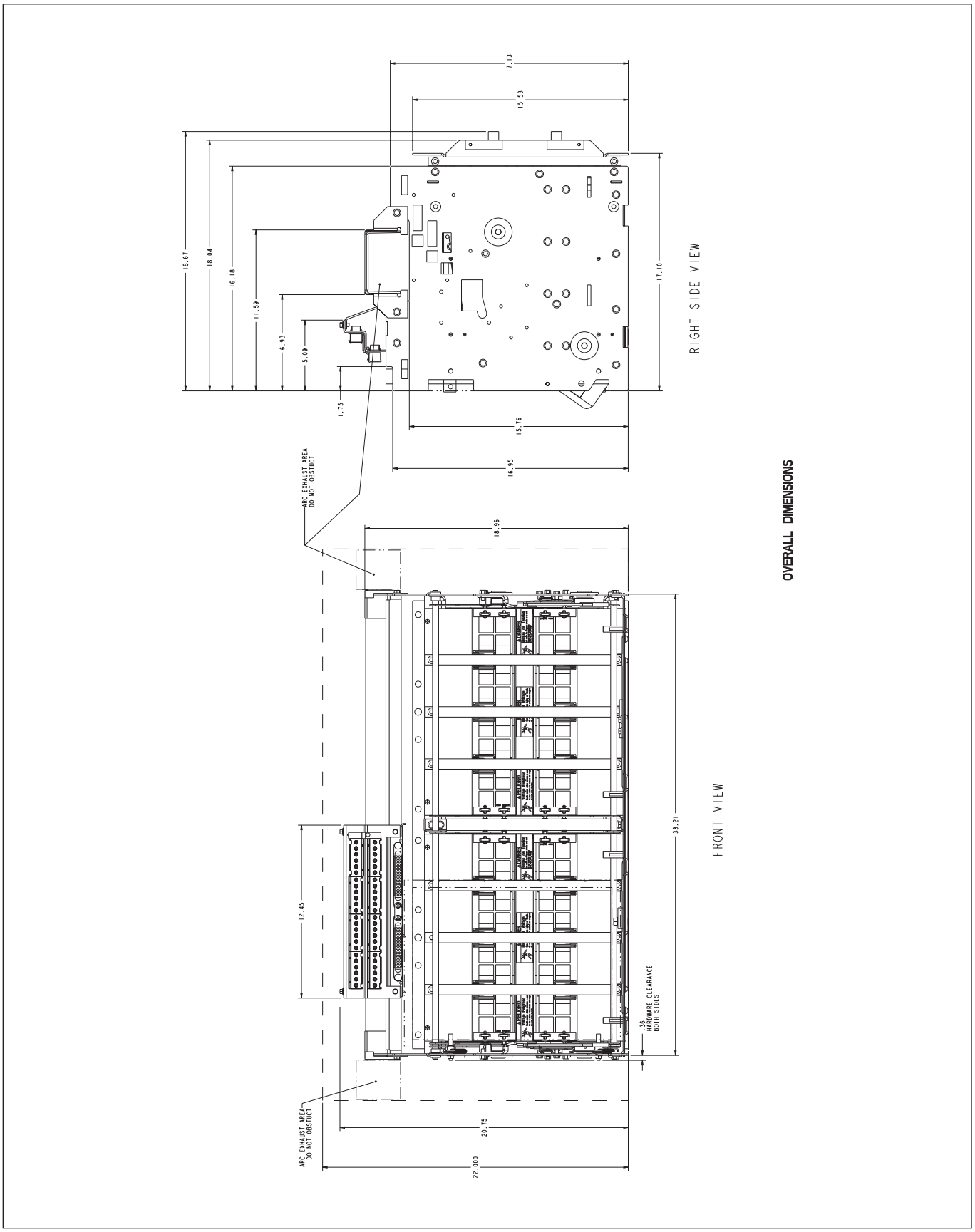


Figure 58. 4000A Double narrow frame fixed breaker (Overall dimensions and door cutout)

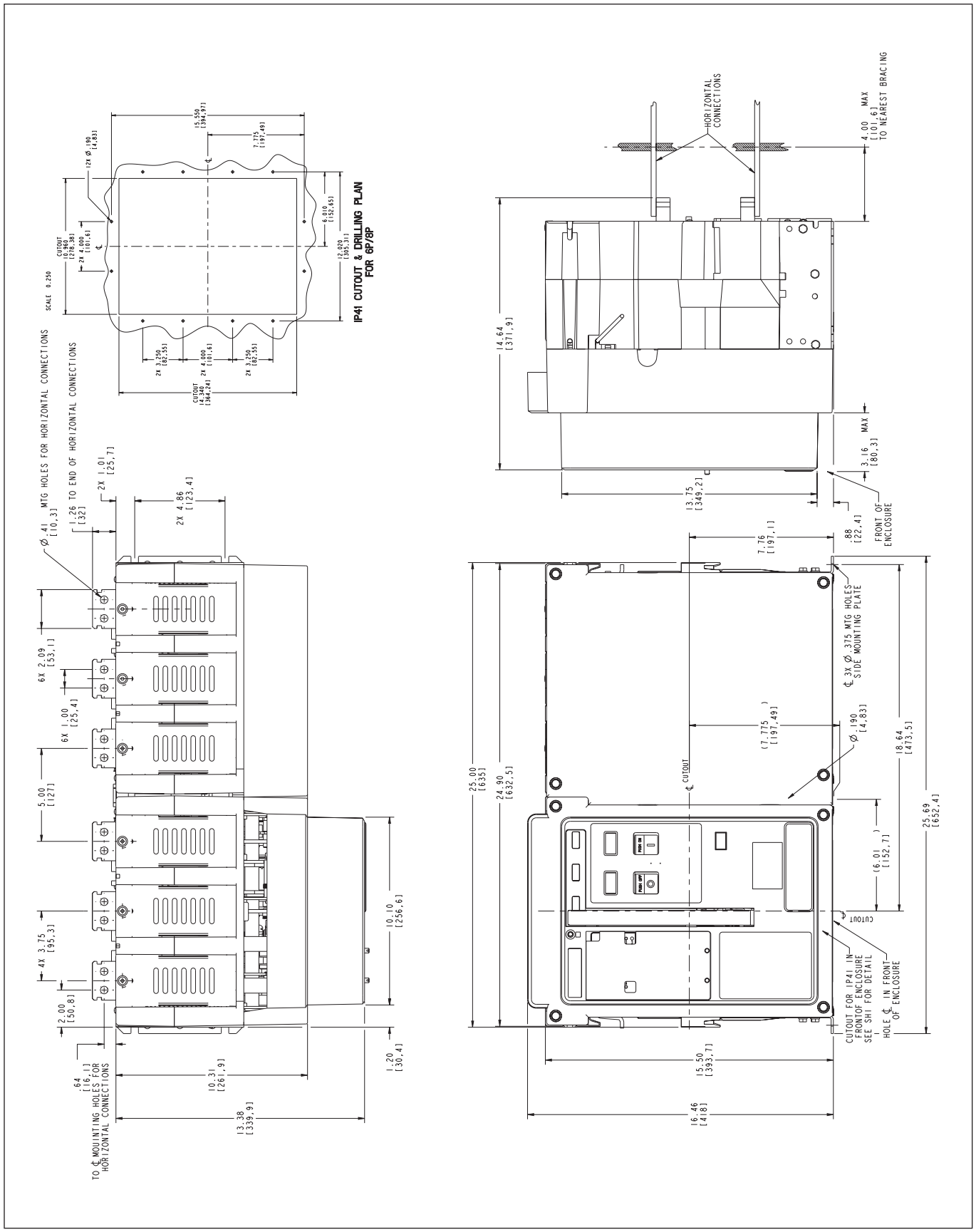


Figure 59. 4000A Double narrow frame fixed breaker (3-pole vertical stabs)

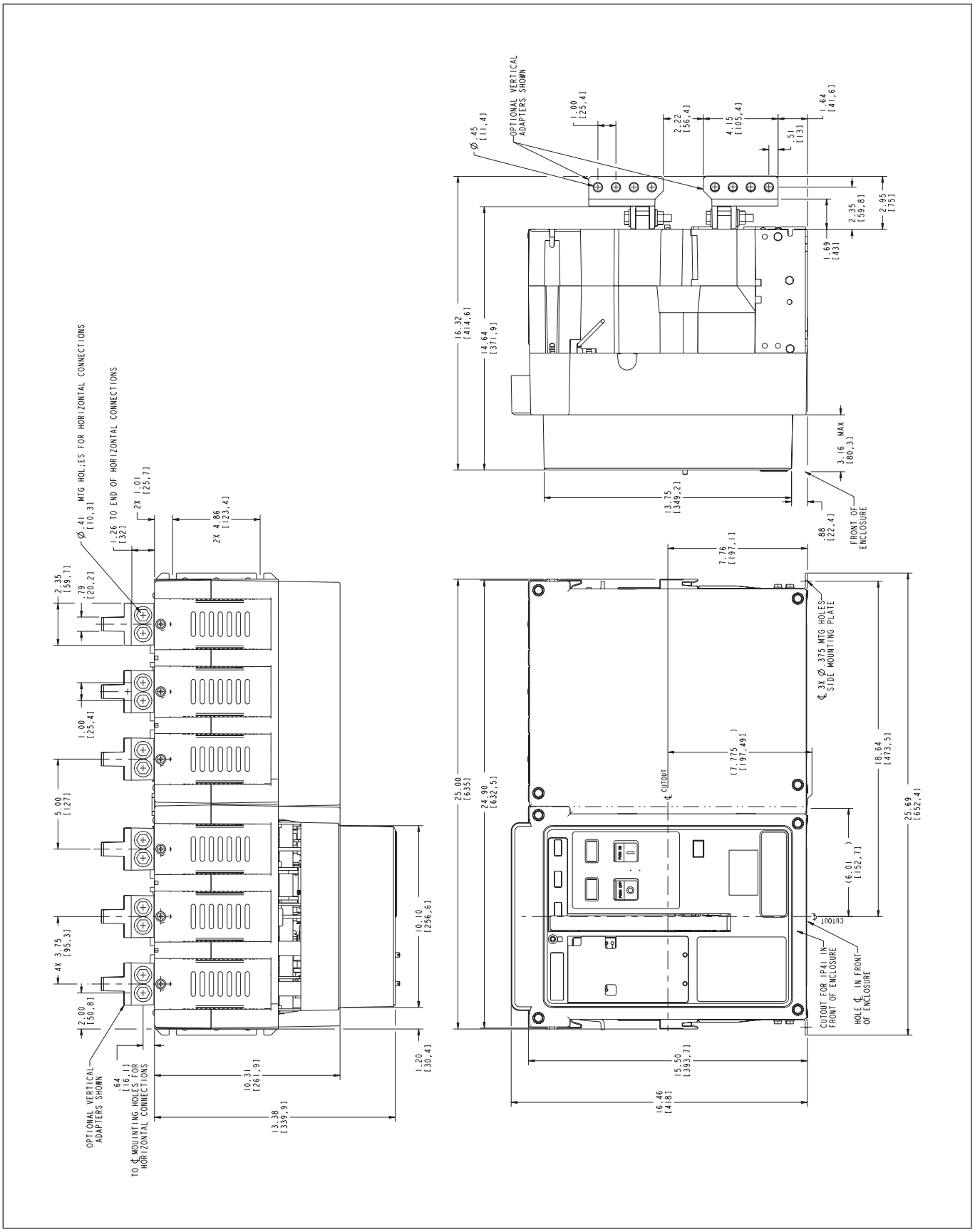


Figure 60. 4000A Double narrow frame fixed breaker (4-pole horizontal stabs)

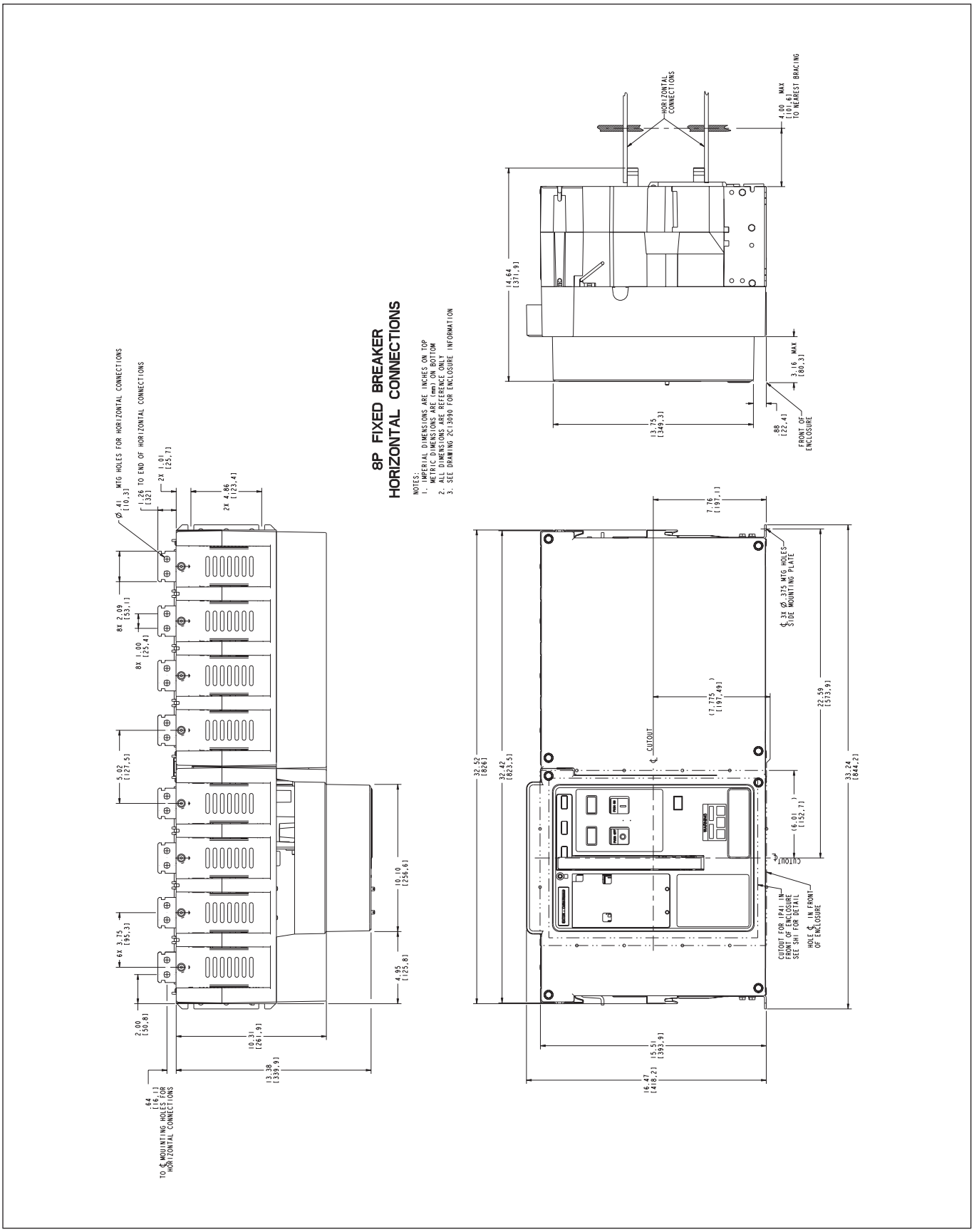


Figure 61. 4000A Double narrow frame fixed breaker (4-pole vertical stabs)

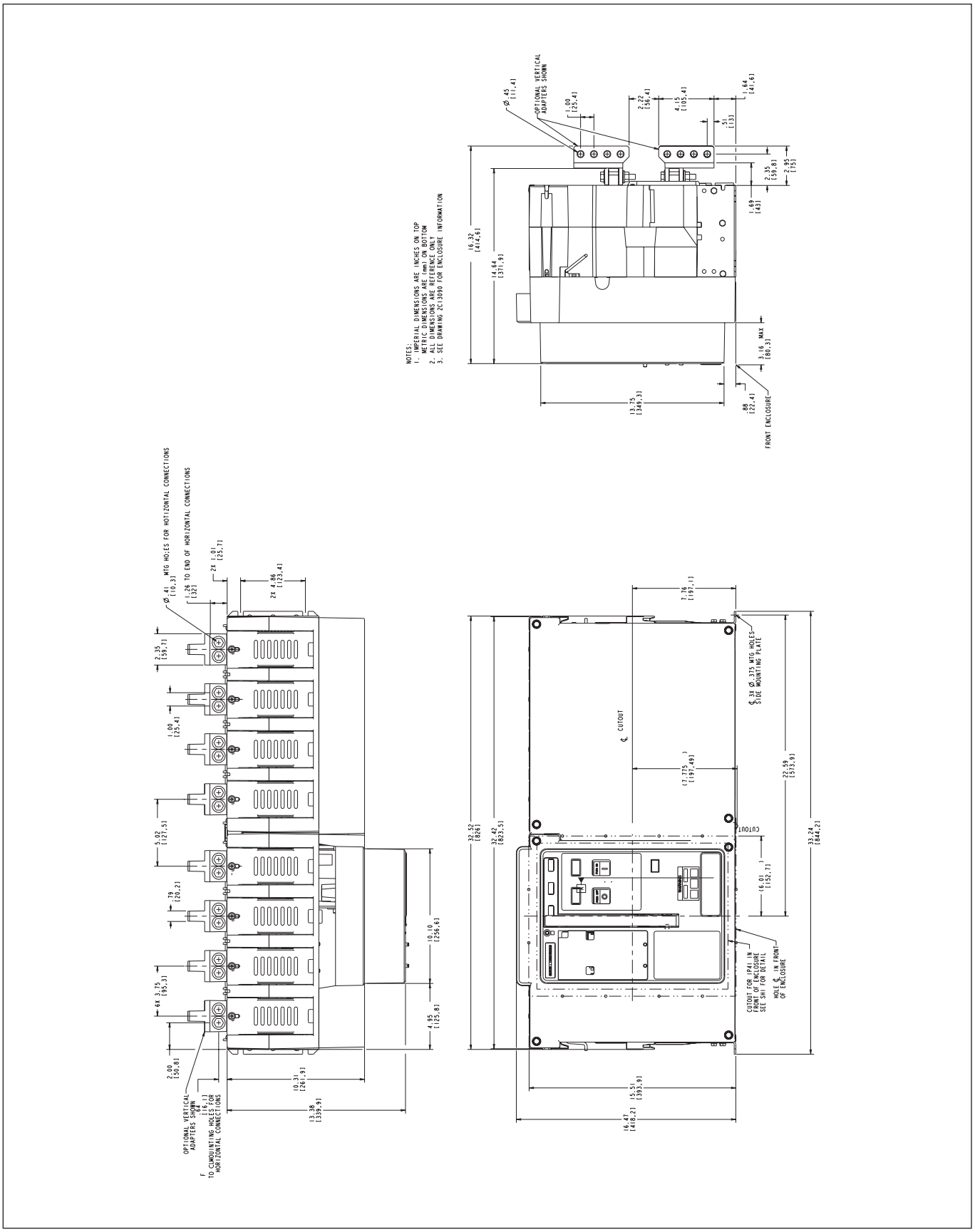


Figure 62. 4000-5000A Double-wide frame universal Cassette (3-pole mounting locations)

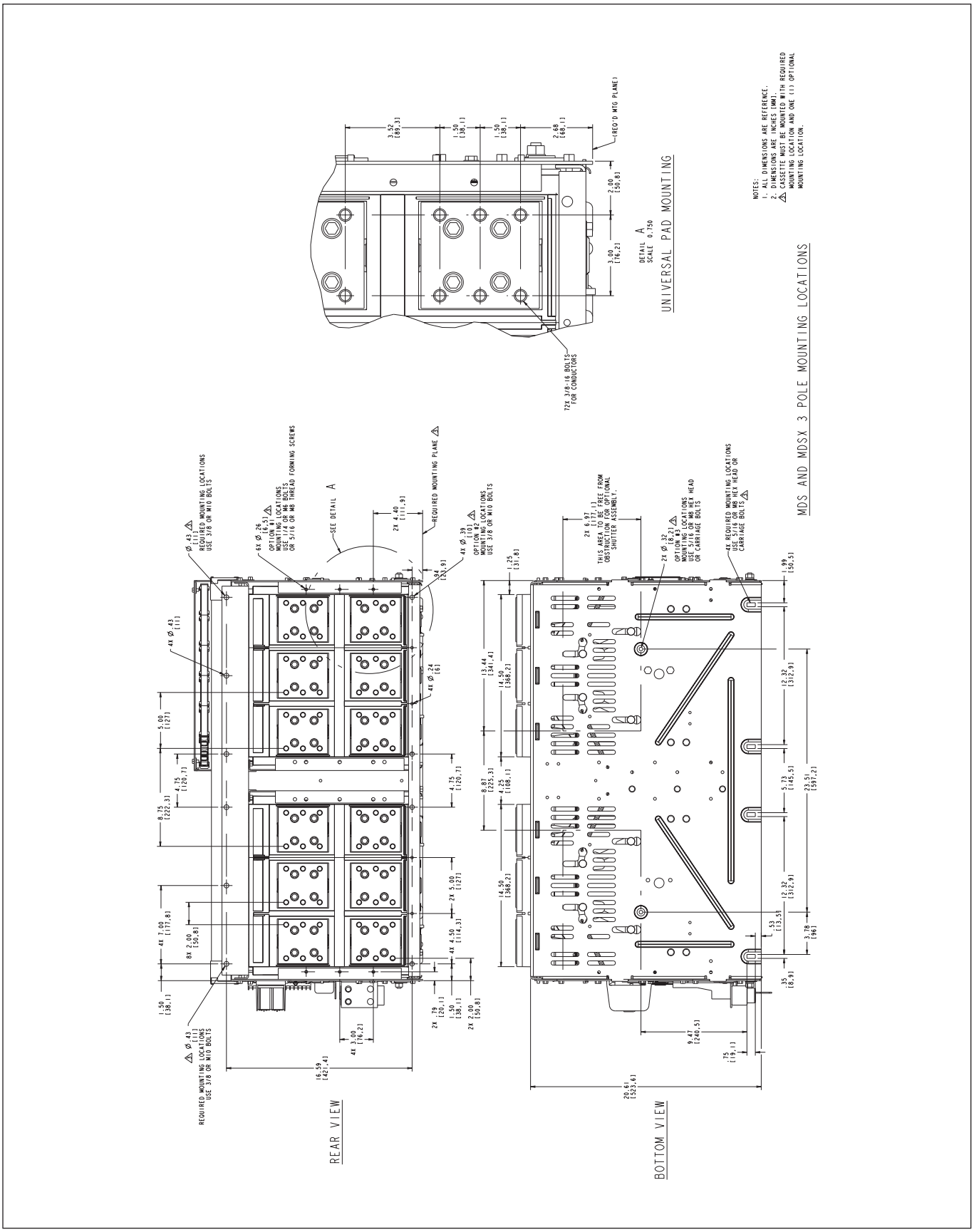


Figure 63. 4000-5000A Double-wide frame universal Cassette (Overall dimensions)

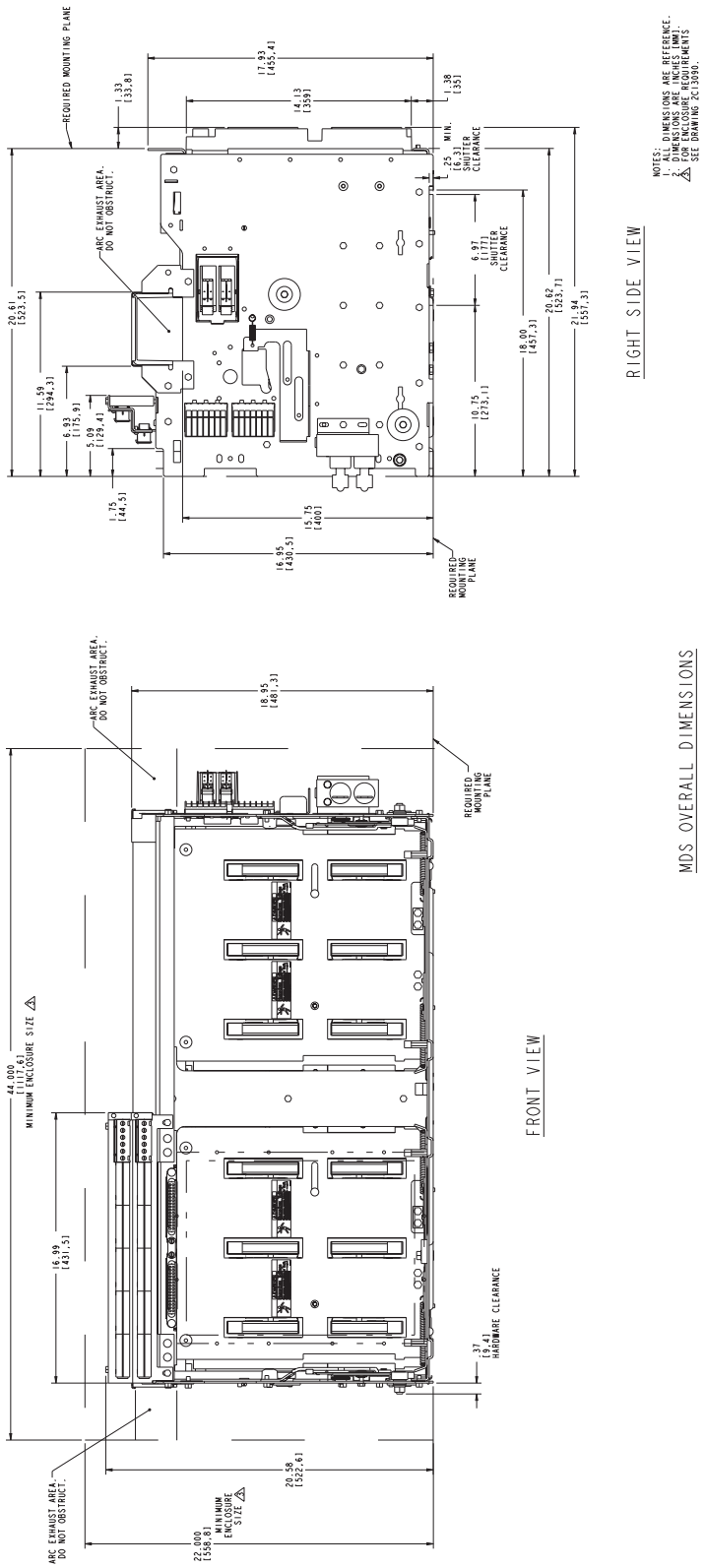


Figure 64. 4000-5000A Double-wide frame universal Cassette (Accessory dimensions)

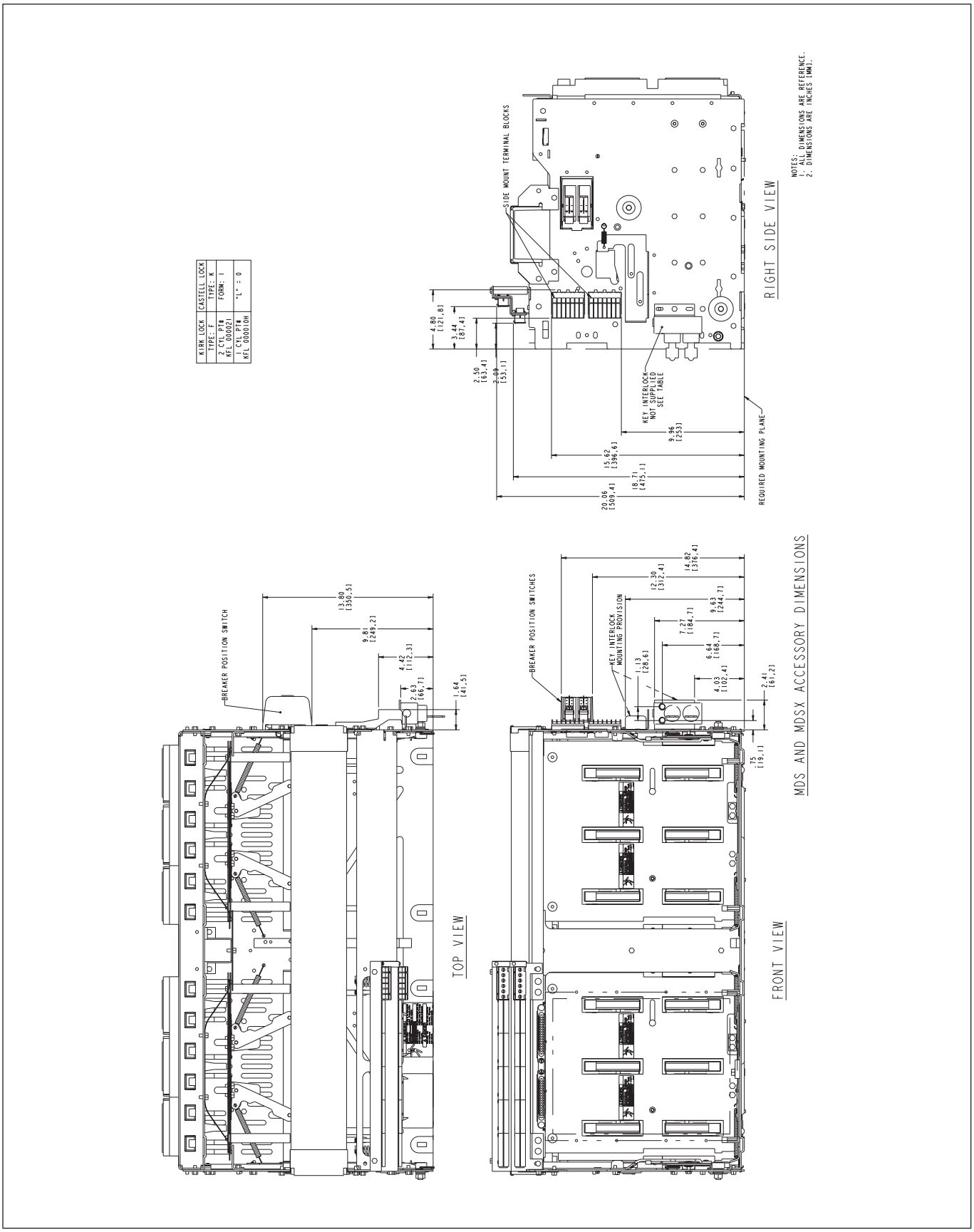


Figure 65. 4000-5000A Double-wide frame universal Cassette (3-pole vertical stabs)

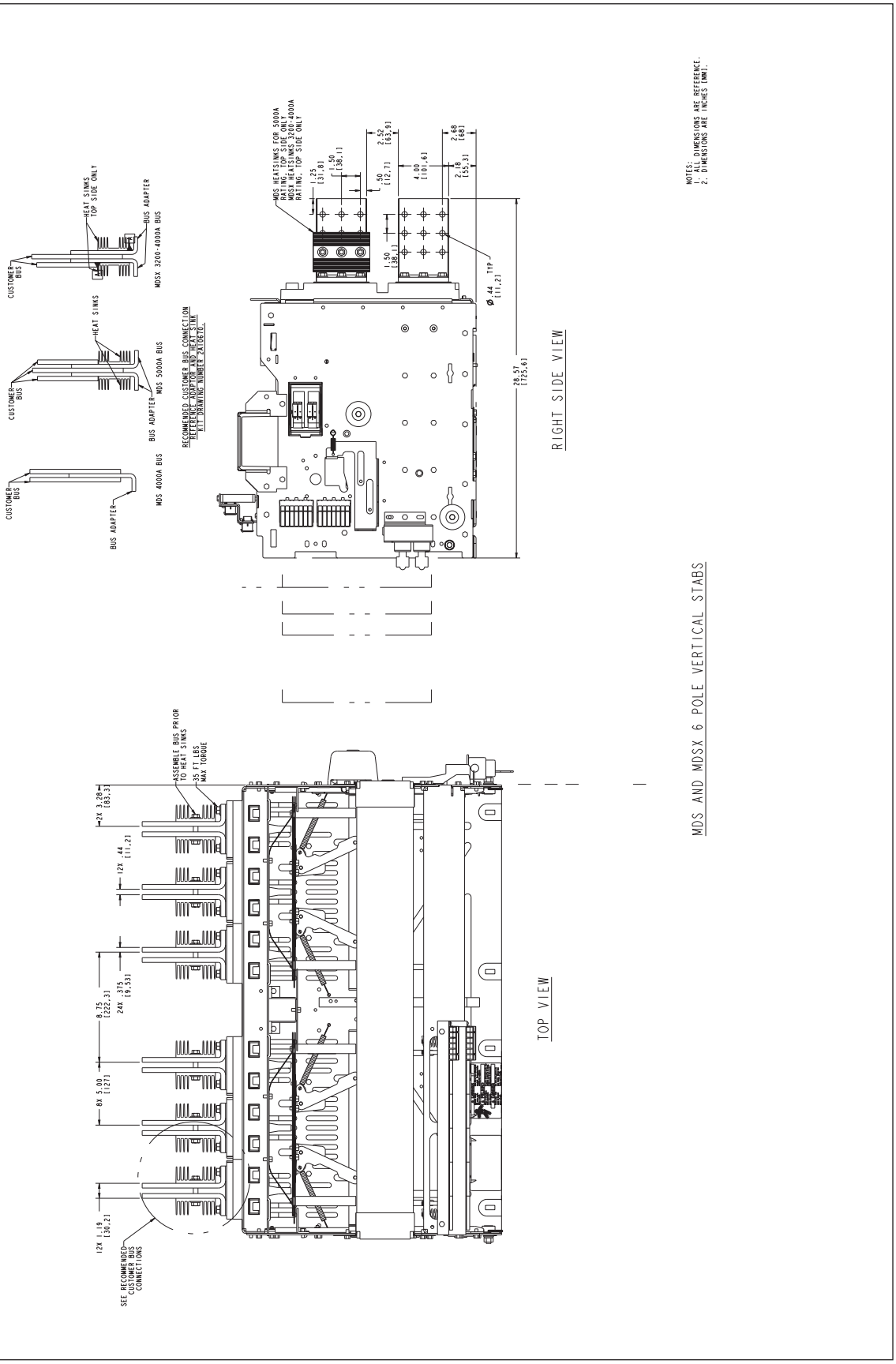


Figure 66. 4000-5000A Double-wide frame universal Cassette (3-pole horizontal stabs)

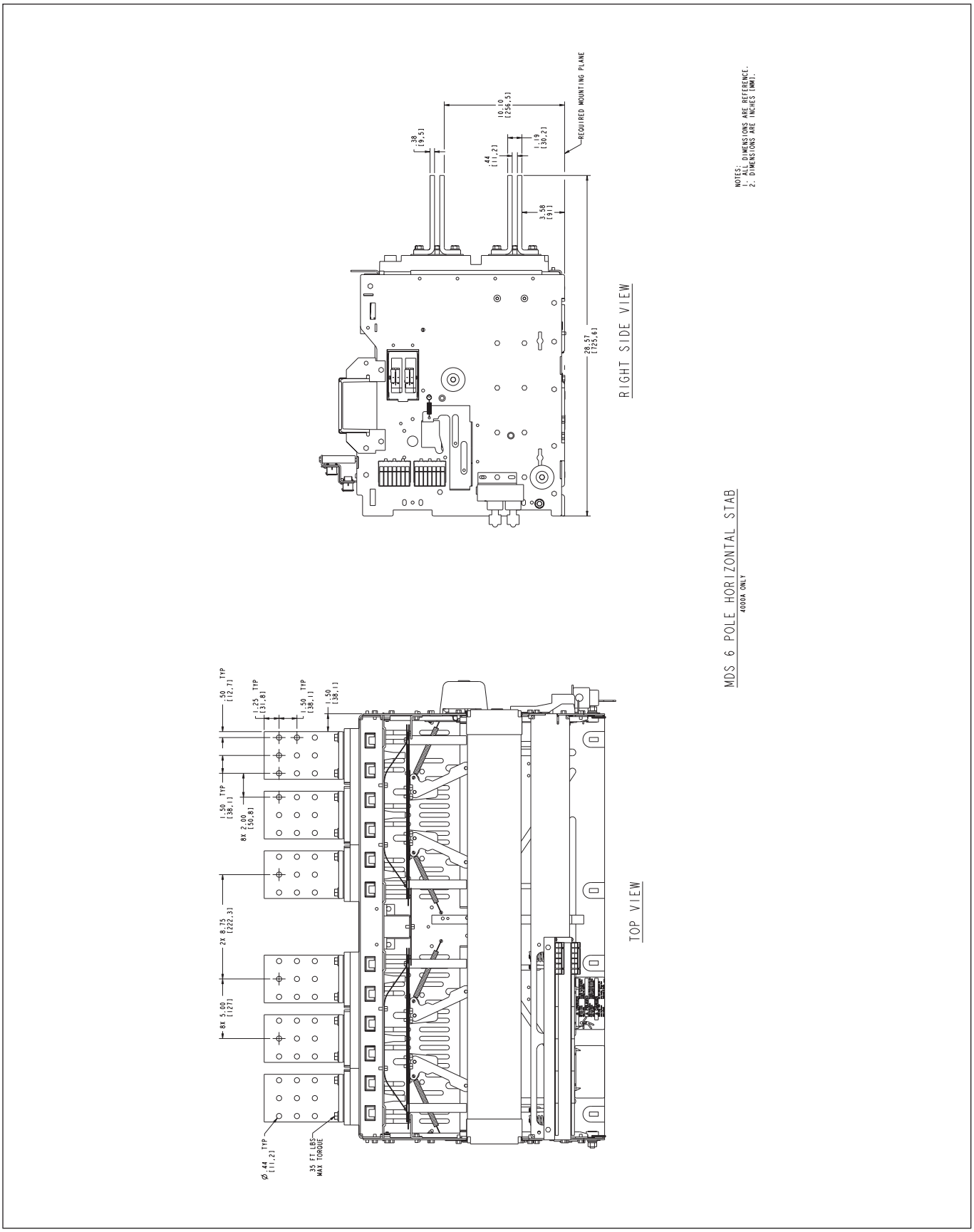


Figure 67. 4000-5000A Double-wide frame universal Cassette (Door cutout and breaker positions)

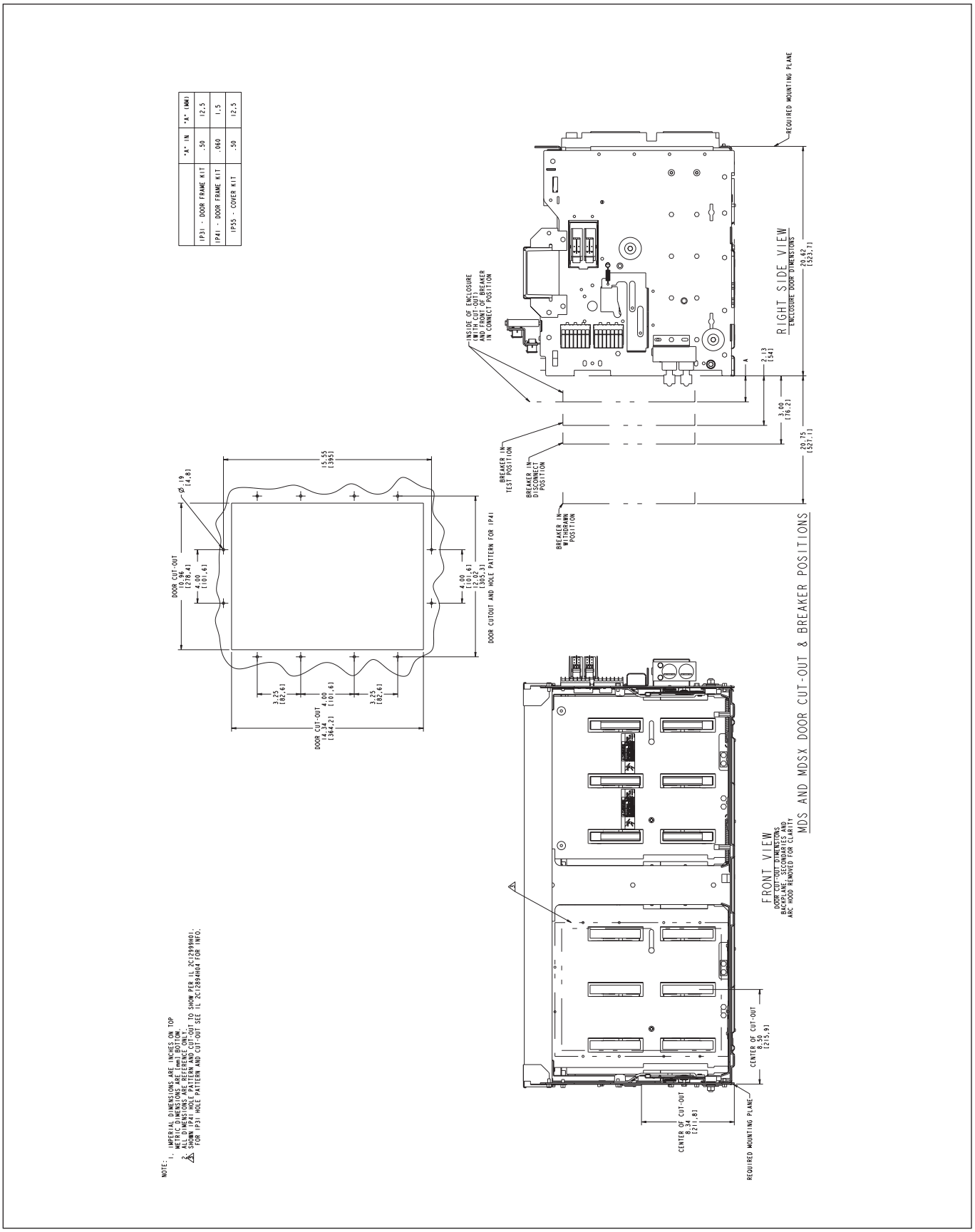


Figure 68. 4000-5000A Double-wide frame universal Cassette (4-pole mounting locations and overall dimensions)

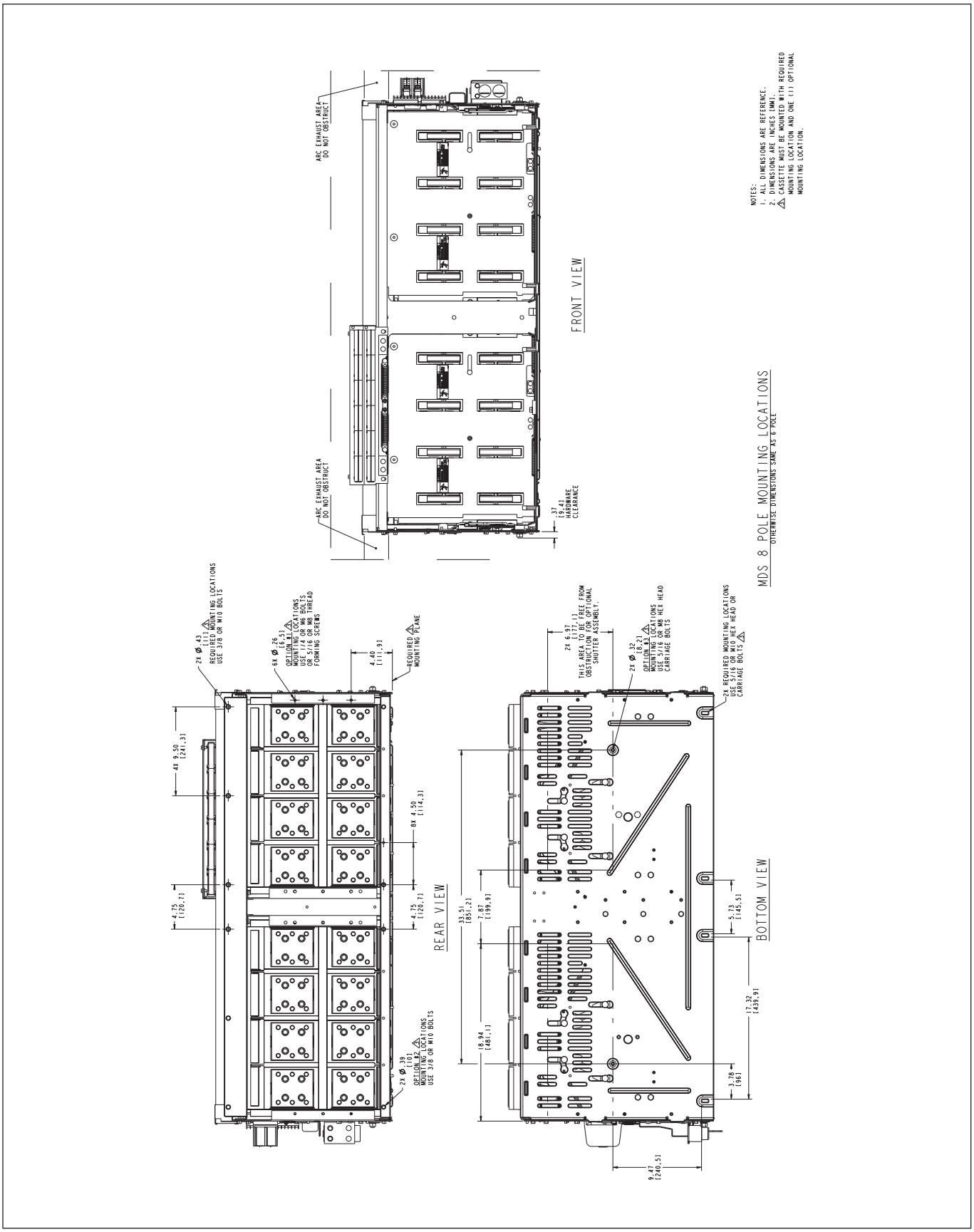


Figure 69. 4000-5000A Double-wide frame universal Cassette (4-pole accessory information and vertical stabs)

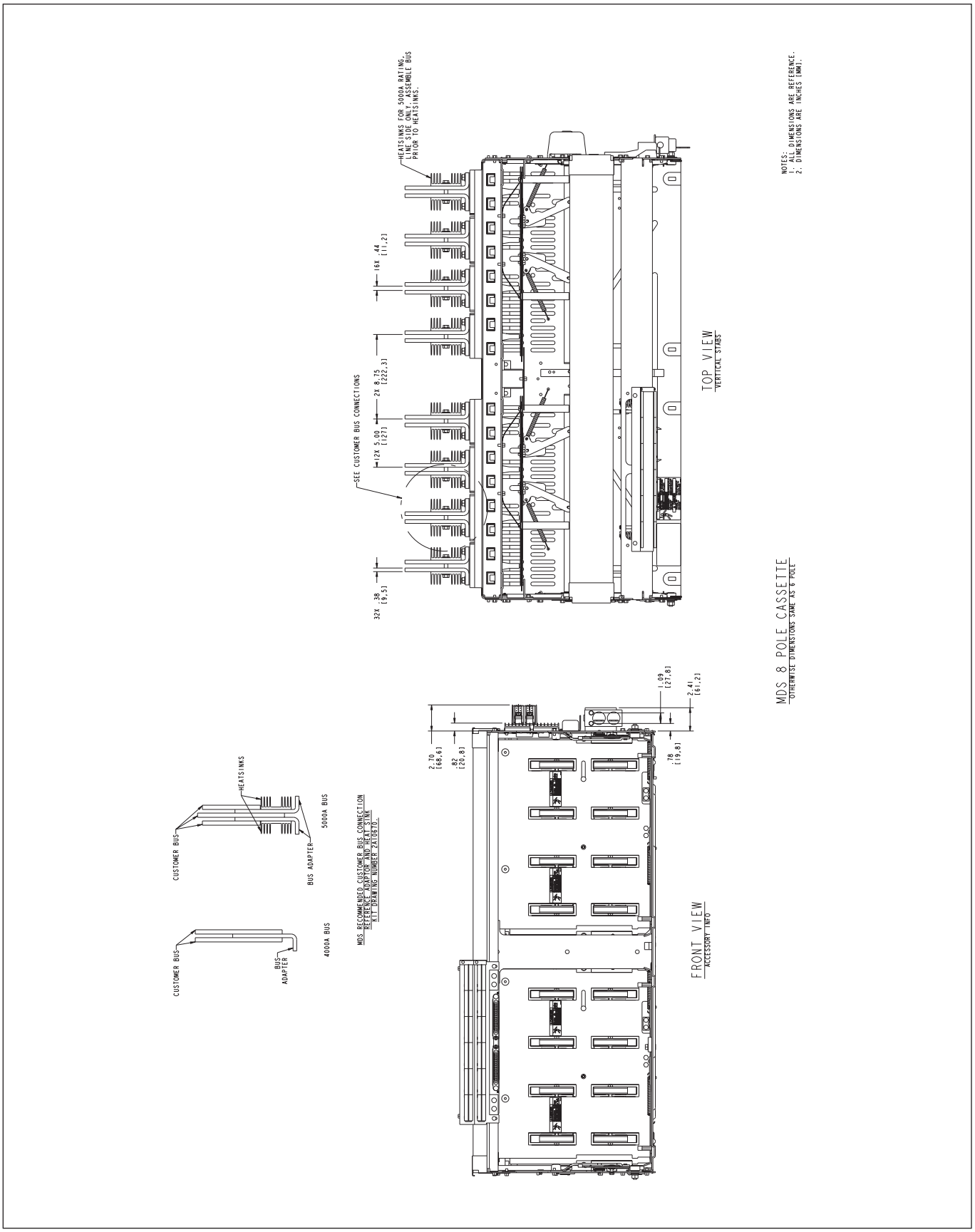


Figure 70. 4000-5000A Double-wide frame universal Cassette (4-pole horizontal stabs and front view)

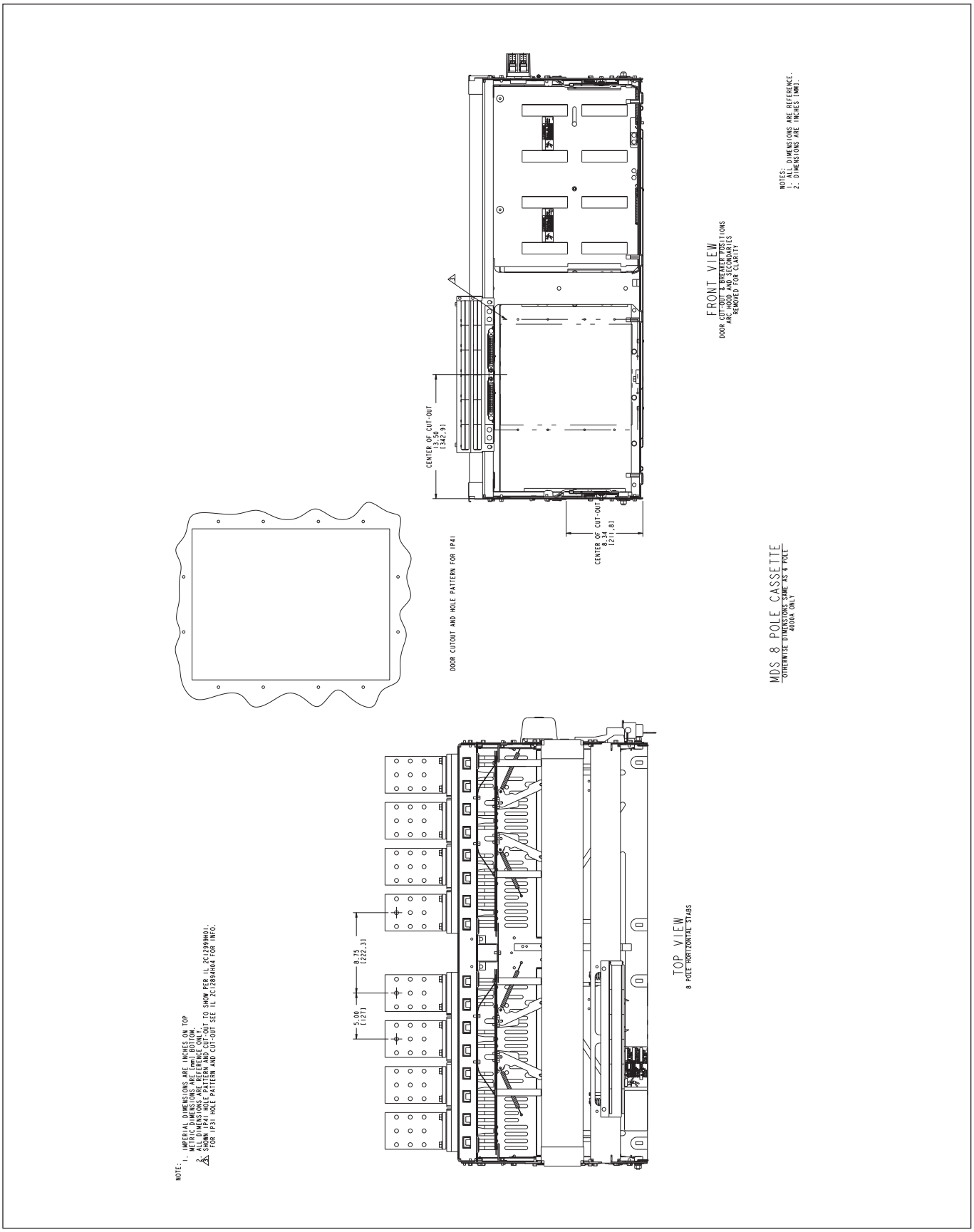


Figure 71. 4000-6300A Double-wide frame basic Cassette (3-pole mounting locations)

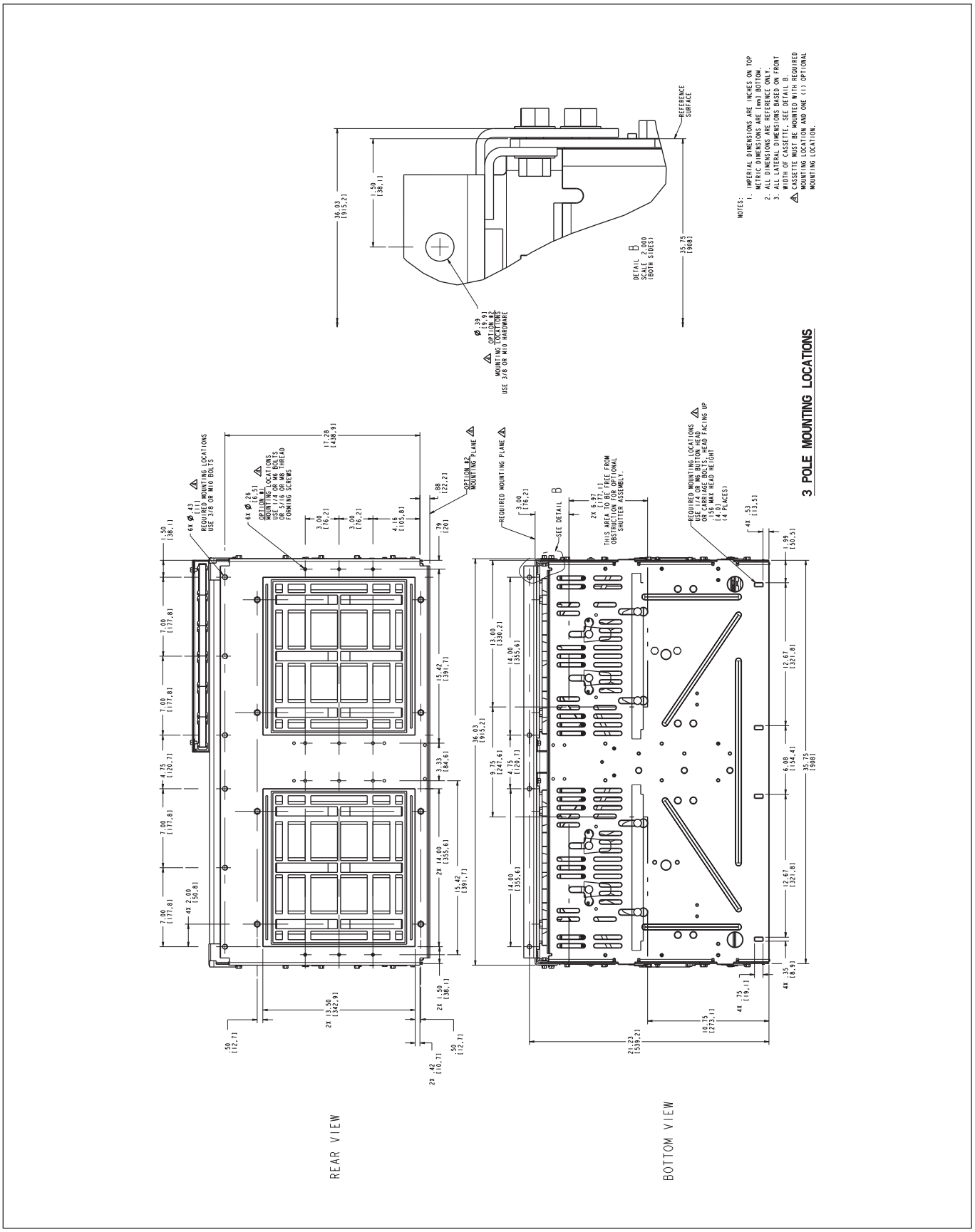


Figure 72. 4000-6300A Double-wide frame basic Cassette (Overall dimensions)

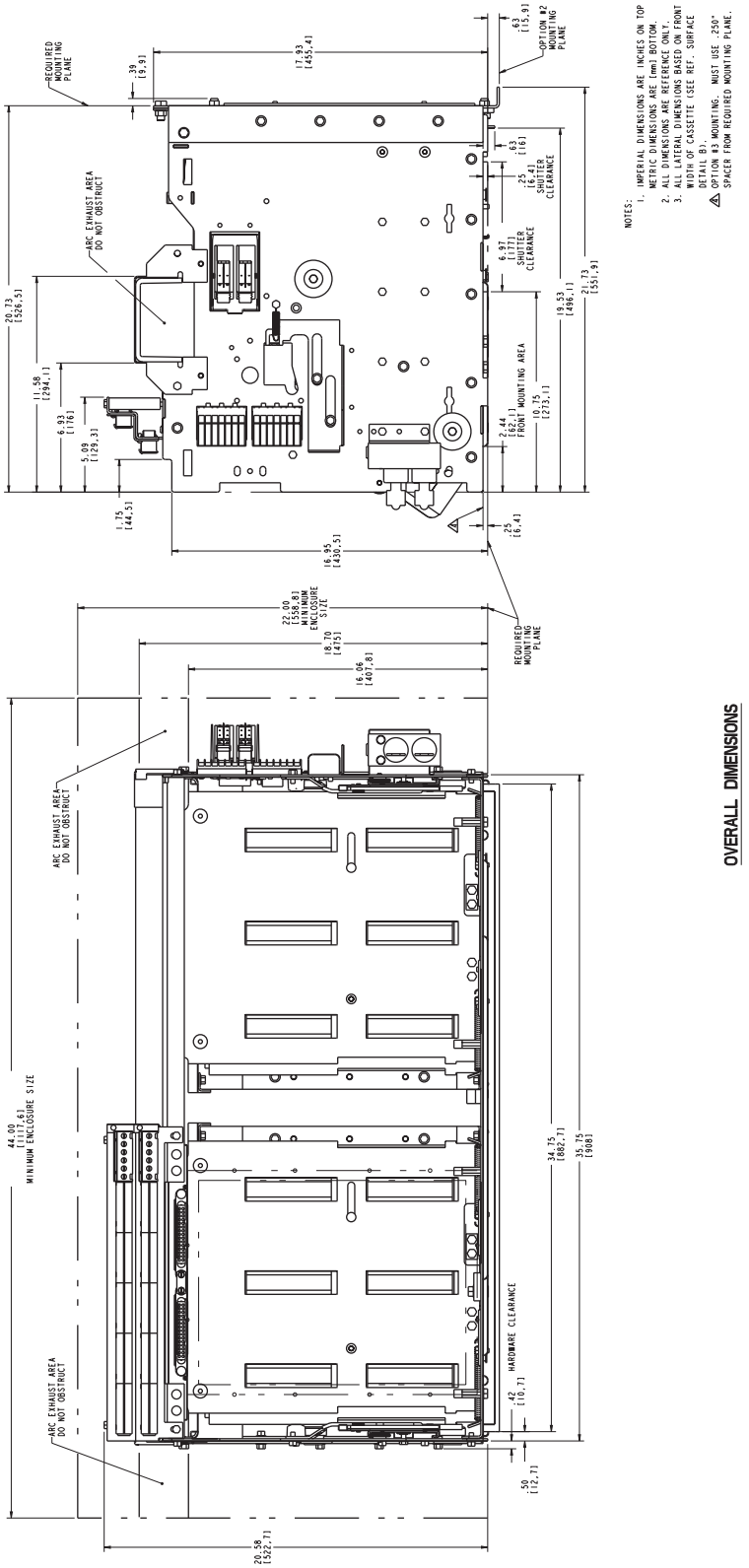


Figure 73. 4000-6300A Double-wide frame basic Cassette (Accessory dimensions)

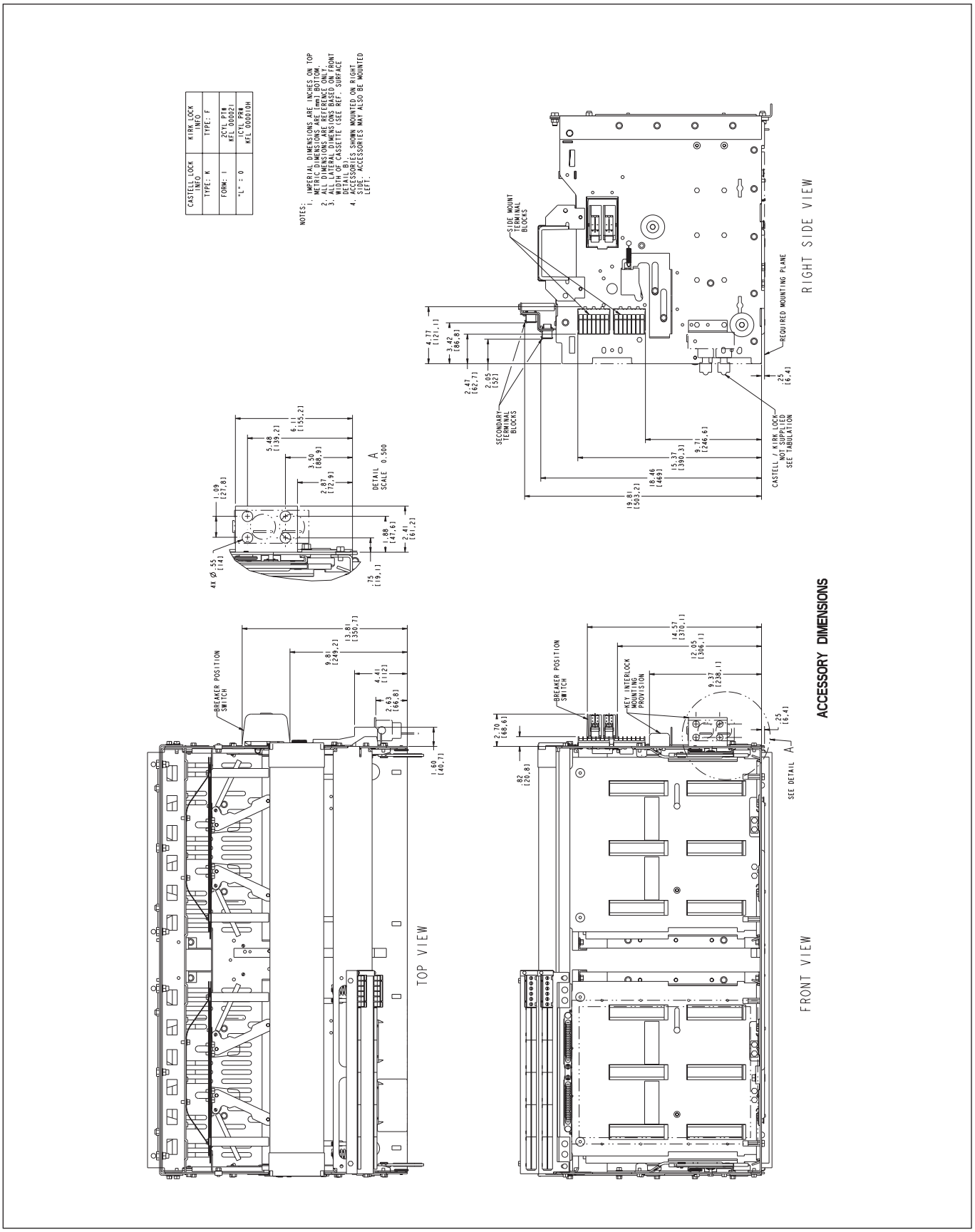


Figure 74. 4000-6300A Double-wide frame basic Cassette (3-pole stabs and stab bracing)

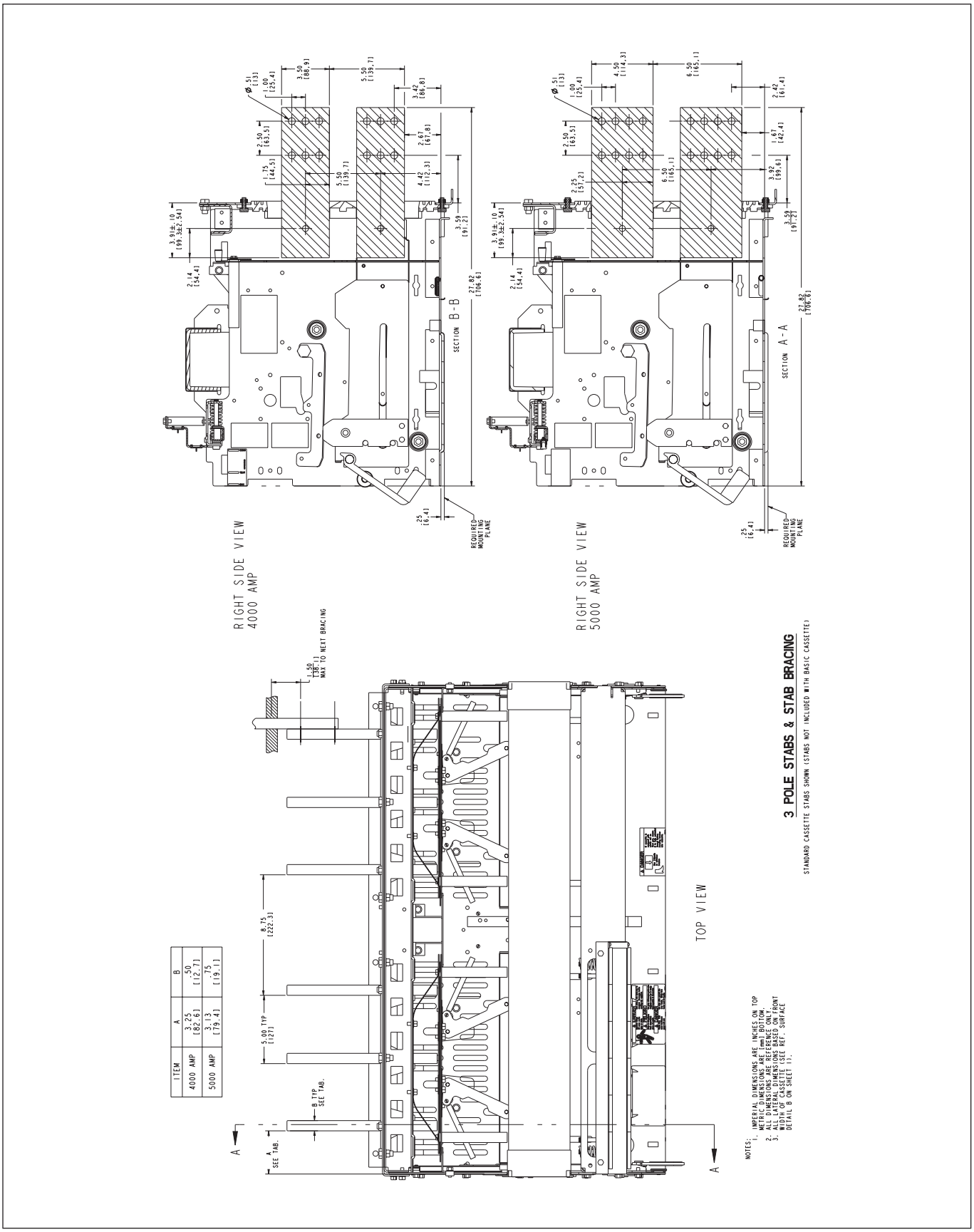
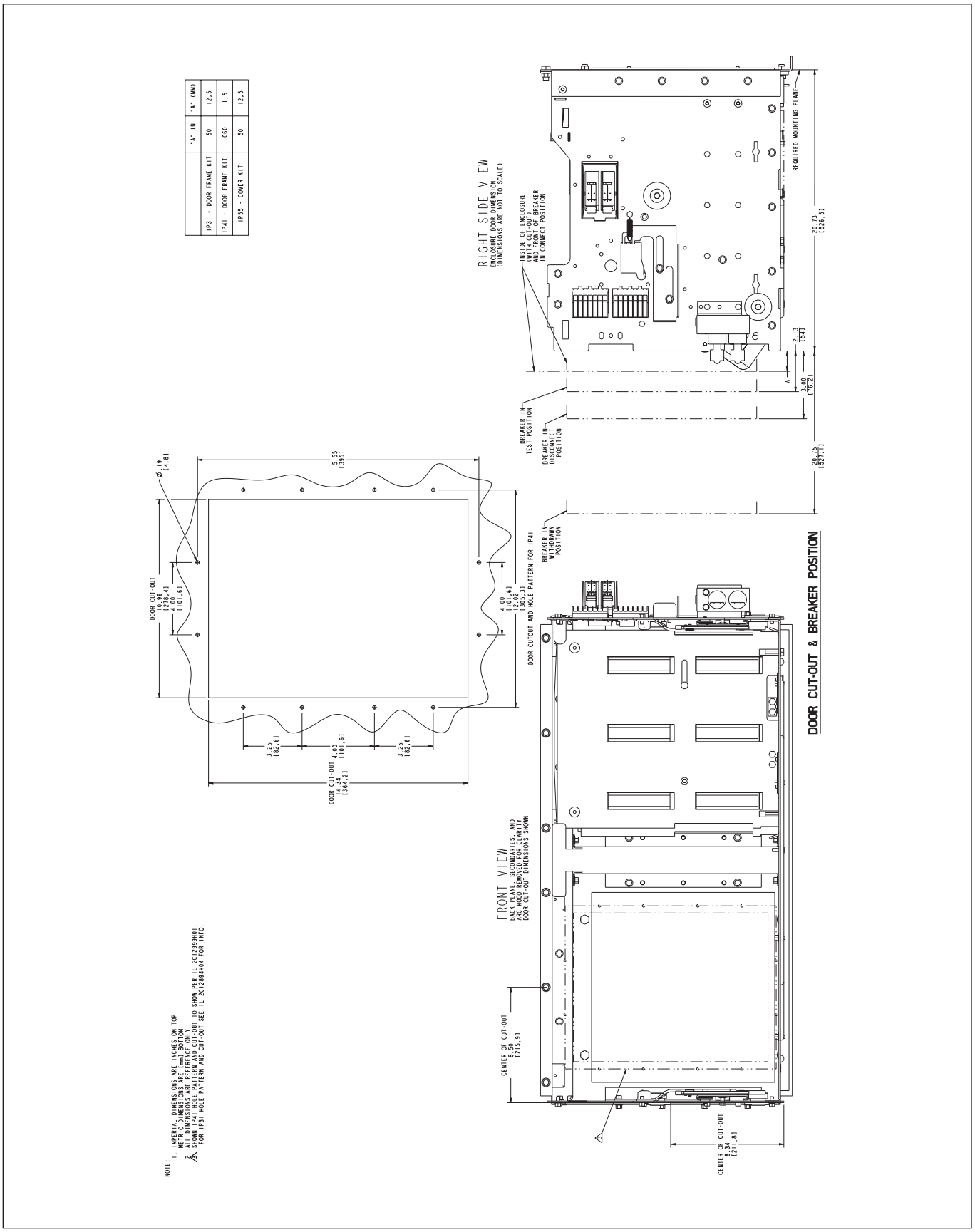


Figure 75. 4000-6300A Double-wide frame basic Cassette (Door cutout and breaker positions)



	"A" IN	"A" (MM)
IP31 - DOOR FRAME KIT	.50	12.5
IP41 - DOOR FRAME KIT	.060	1.5
IP55 - COVER KIT	.50	12.5

Figure 76. 4000-6300A Double-wide frame standard Cassette (3-pole mounting locations)

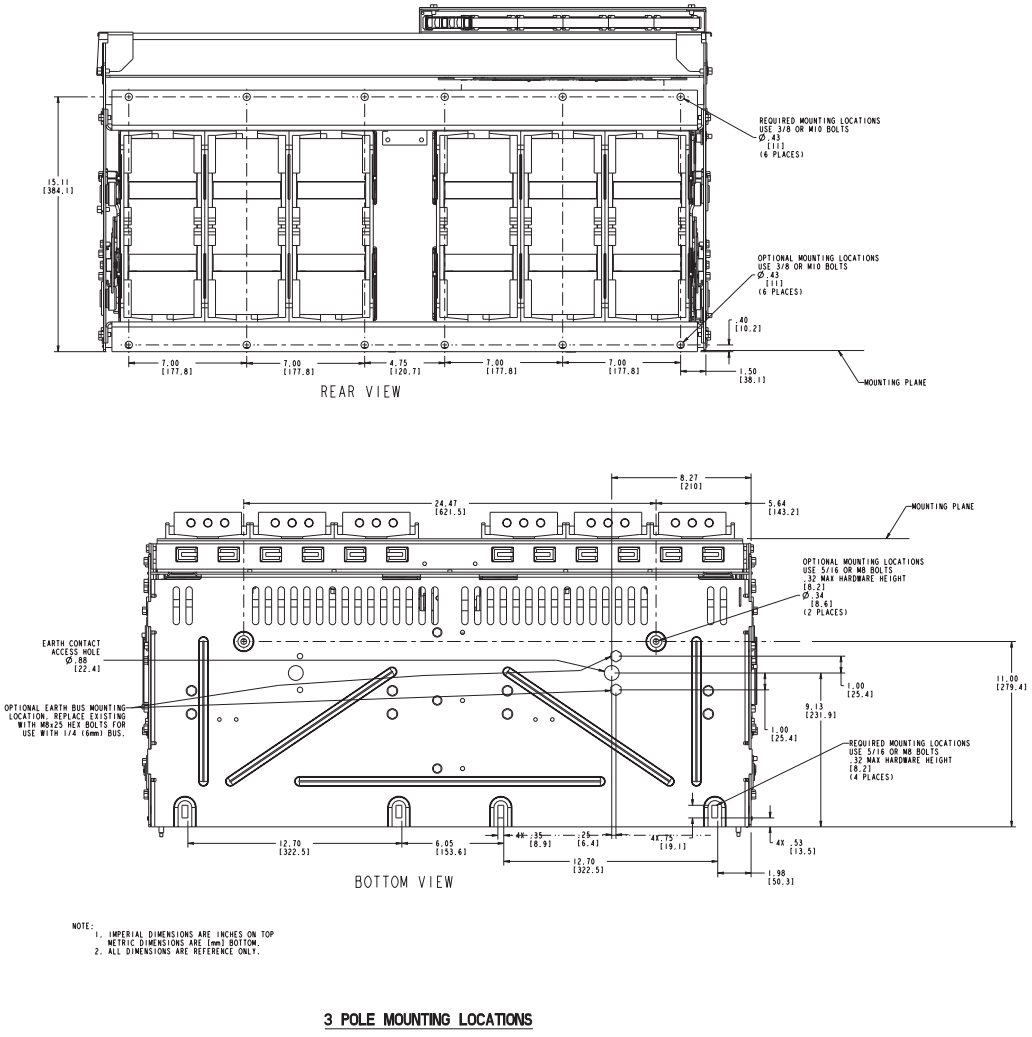


Figure 77. 4000-6300A Double-wide frame standard Cassette (Overall dimensions)

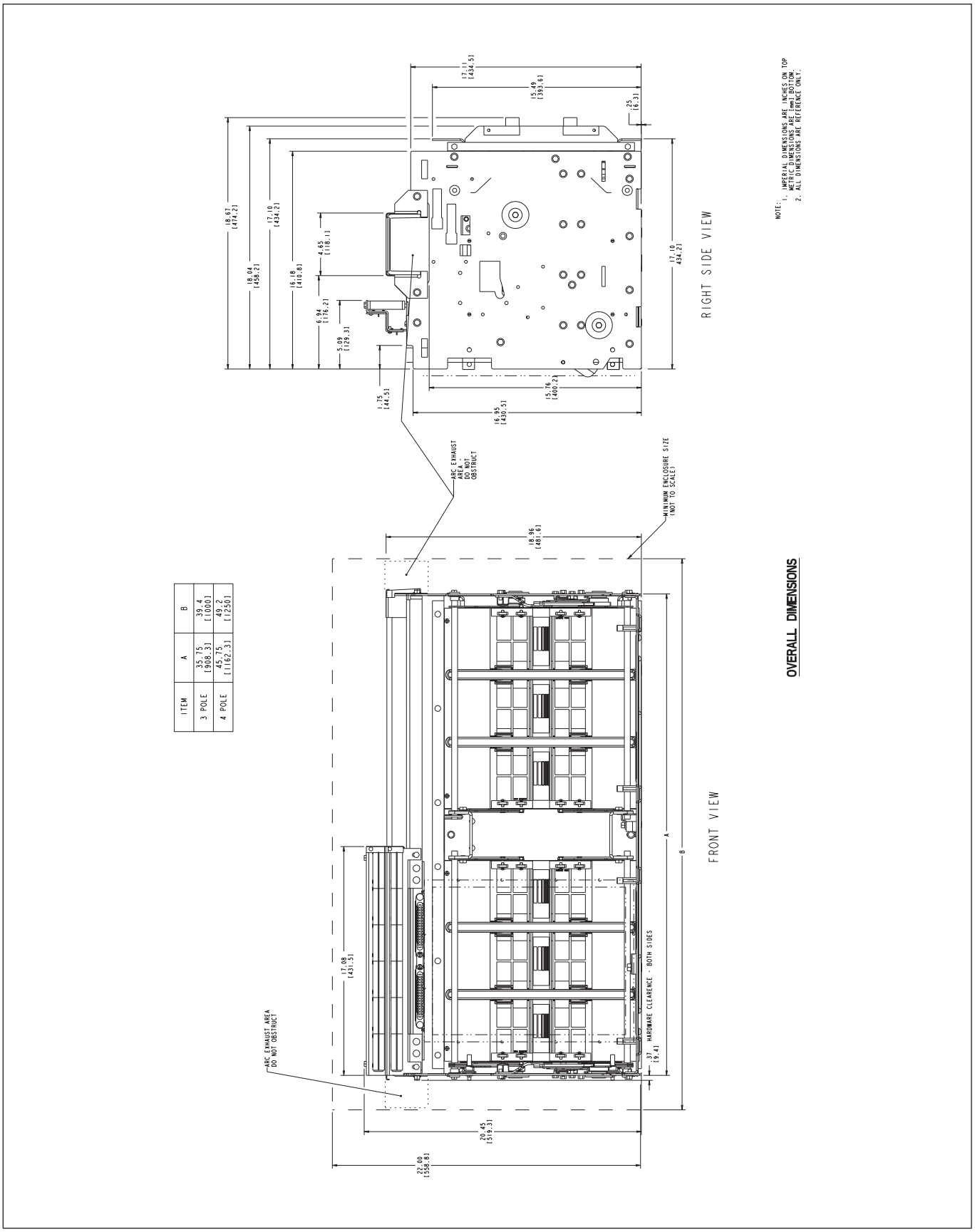


Figure 78. 4000-6300A Double-wide frame standard Cassette (Accessory dimensions)

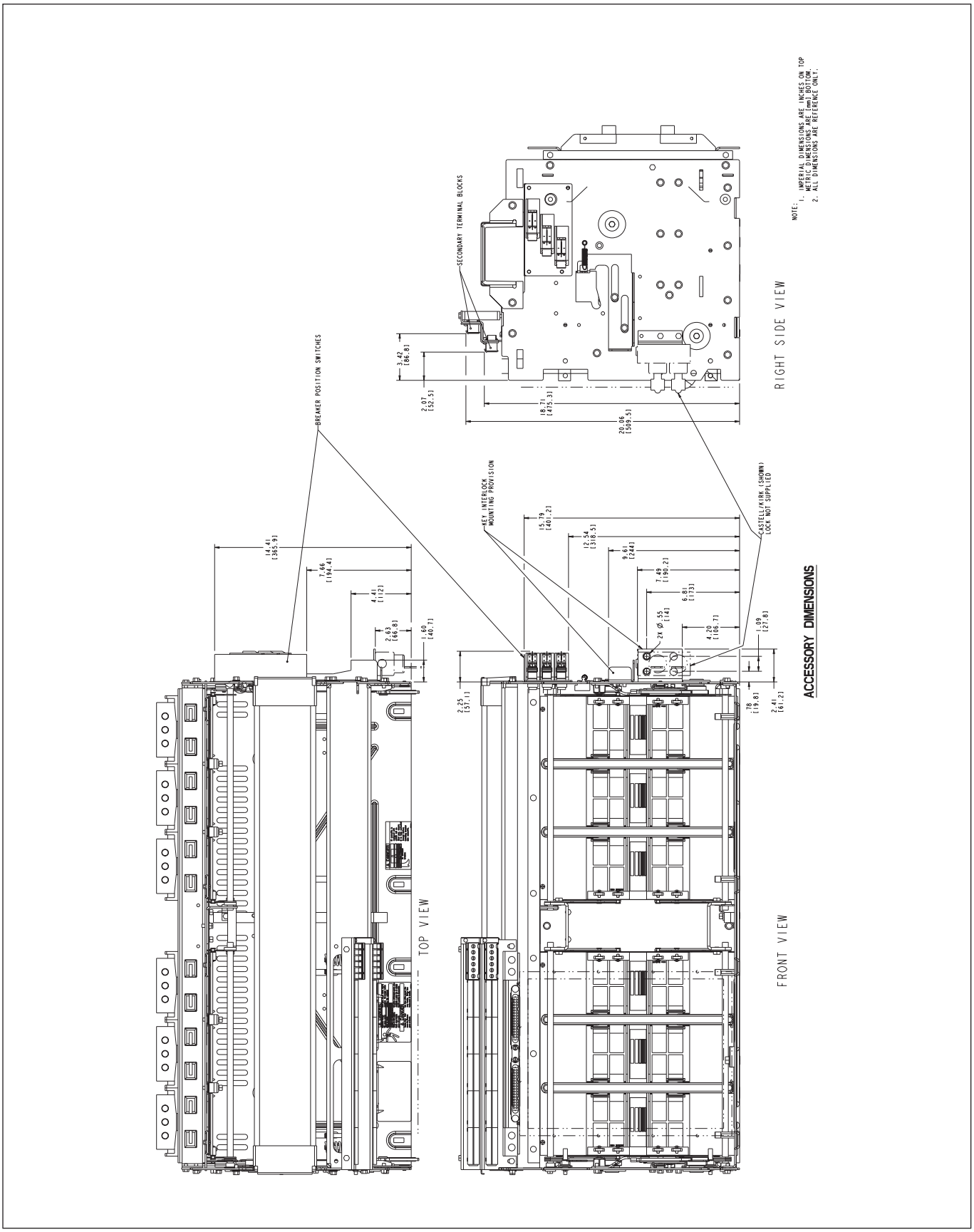


Figure 79. 4000-6300A Double-wide frame standard Cassette (Horizontal stabs)

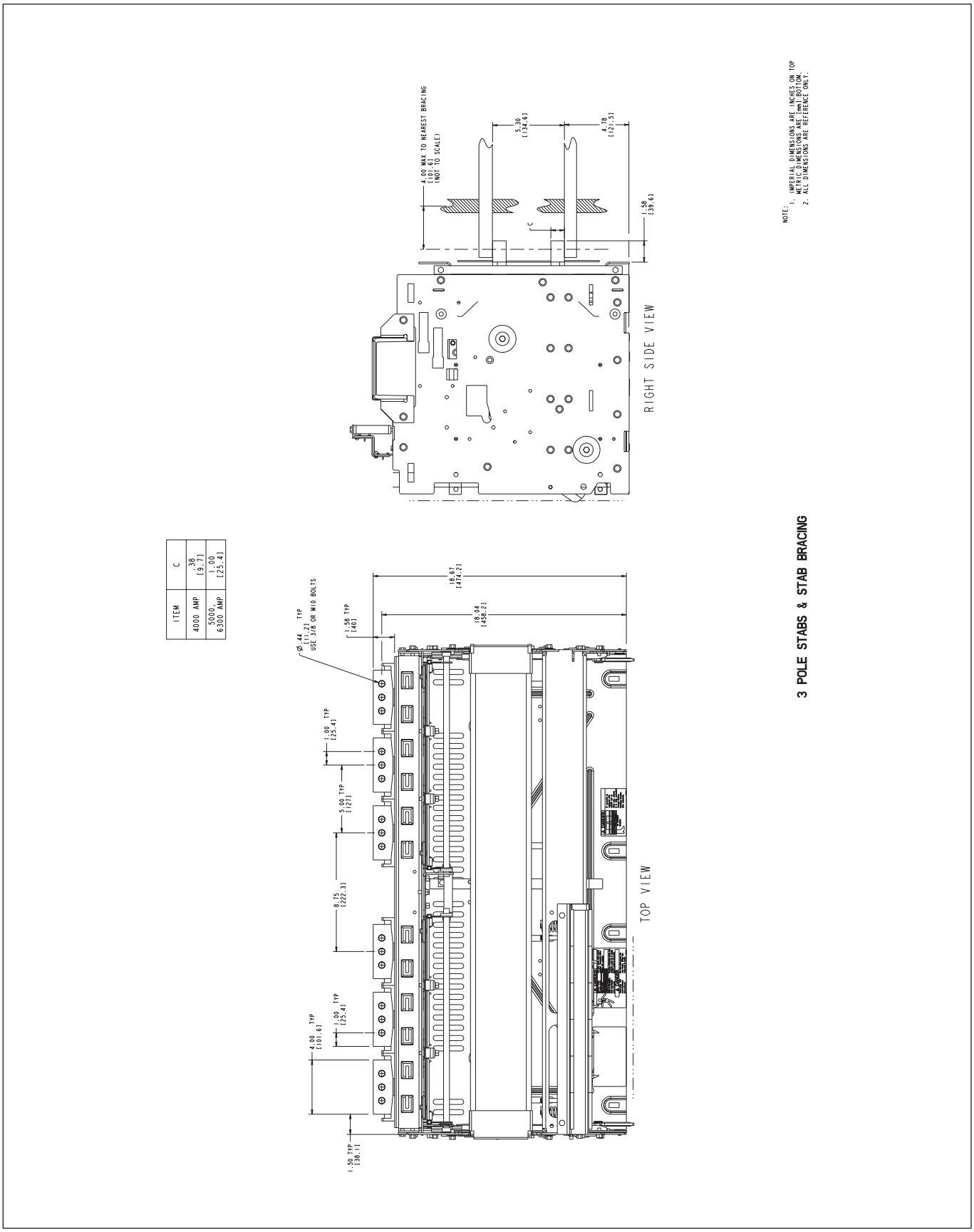
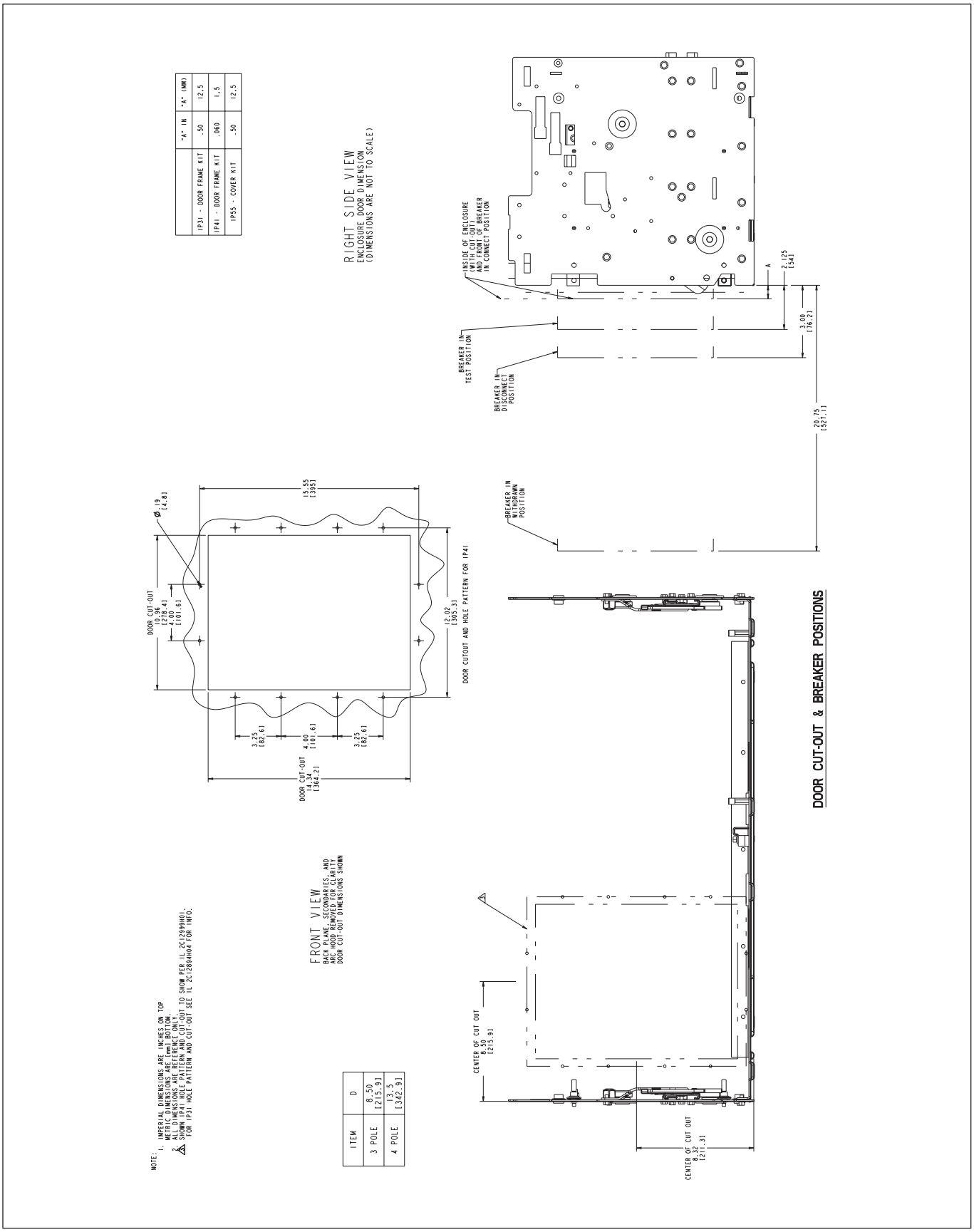


Figure 80. 4000-6300A Double-wide frame standard Cassette (Door cutout and breaker positions)



	"A" IN	"A" (MM)
IP31 - DOOR FRAME KIT	.50	12.5
IP41 - DOOR FRAME KIT	.060	1.5
IP55 - COVER KIT	.50	12.5

ITEM	D
3 POLE	8.50 [215.9]
4 POLE	13.5 [342.9]

Figure 81. 4000-6300A Double-wide frame standard Cassette (4-pole mounting locations)

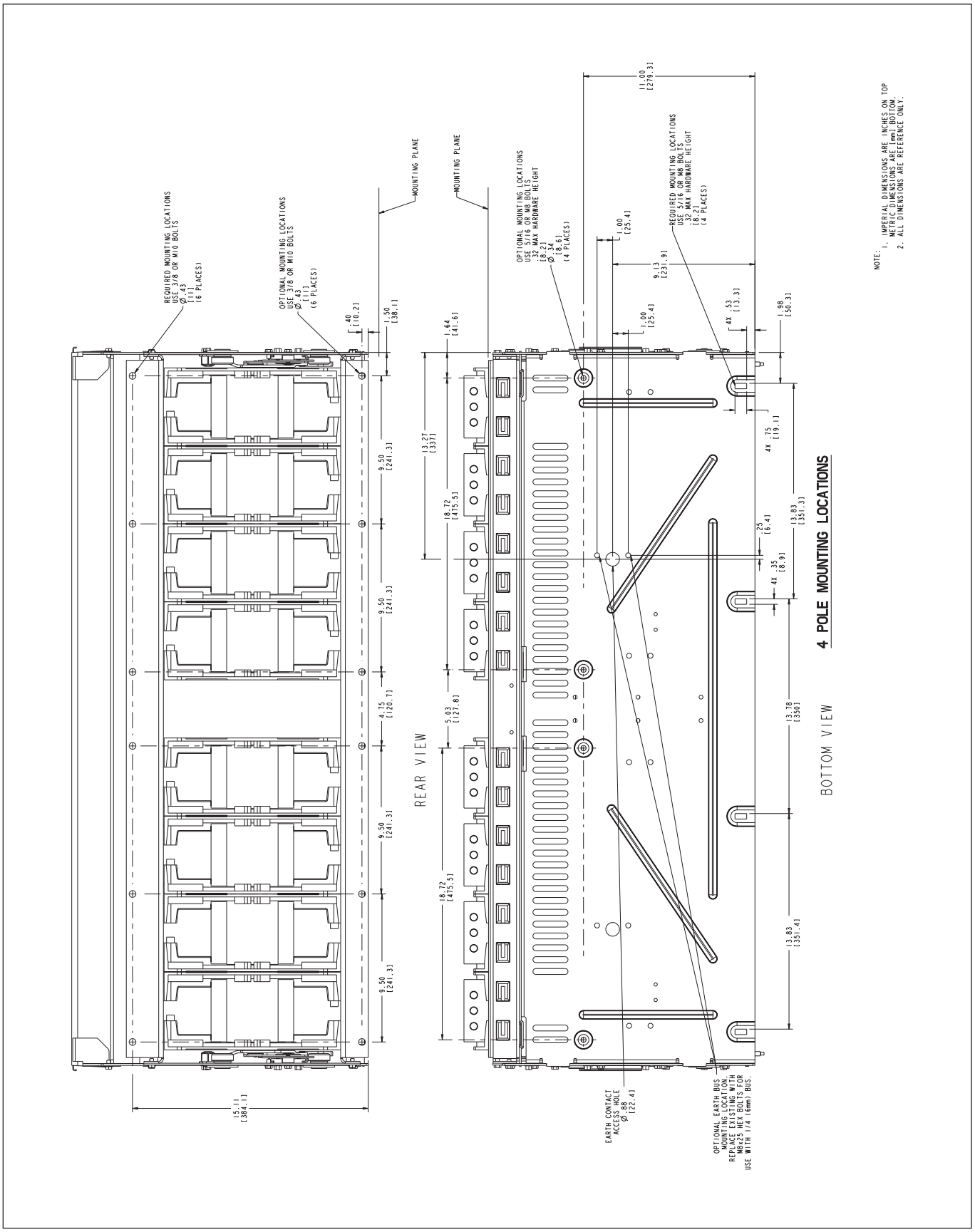


Figure 82. 4000-6300A Double-wide frame standard Cassette (4-pole horizontal stabs)

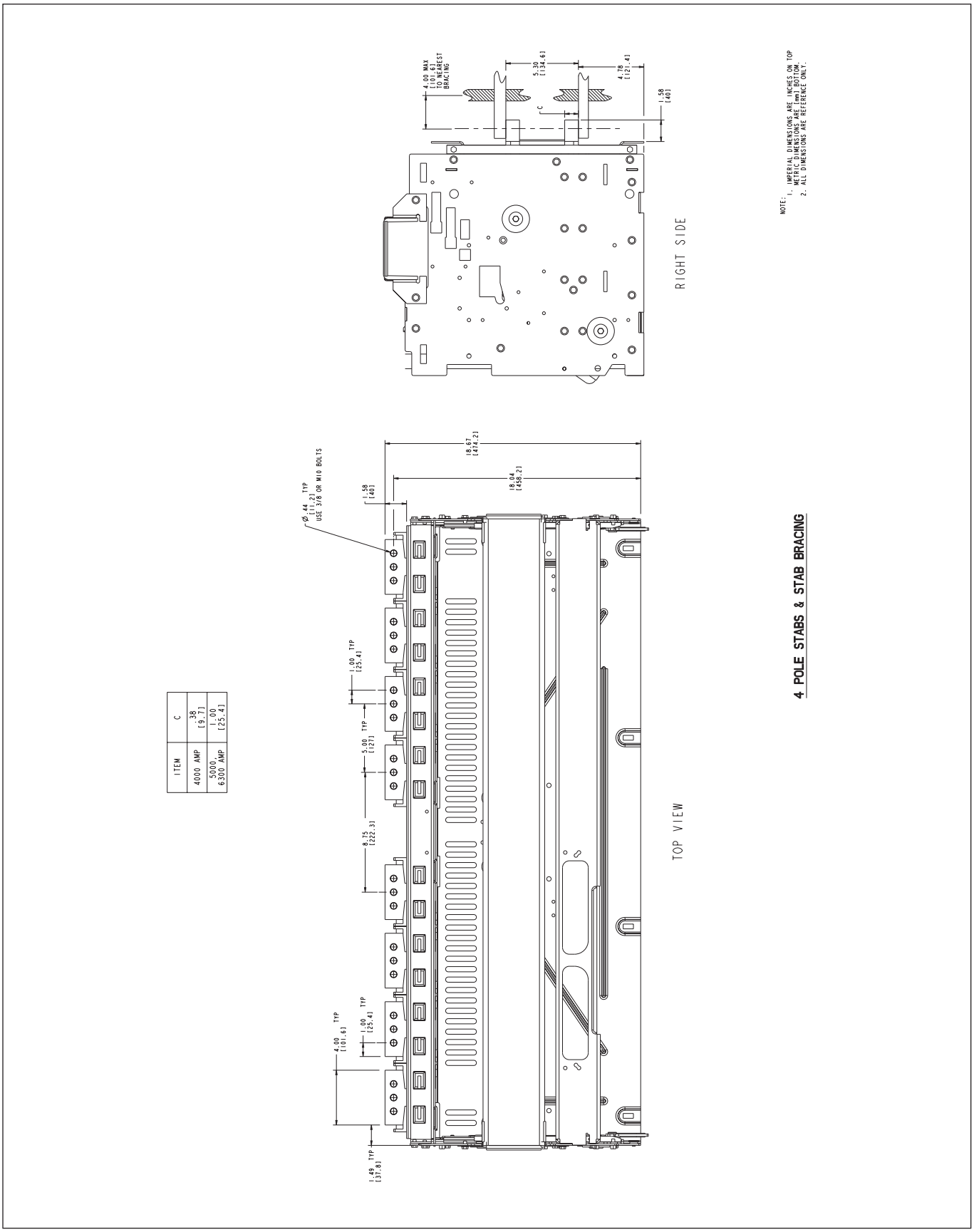


Figure 83. 4000-6300A Double-wide frame fixed breaker (Overall dimensions and mounting locations)

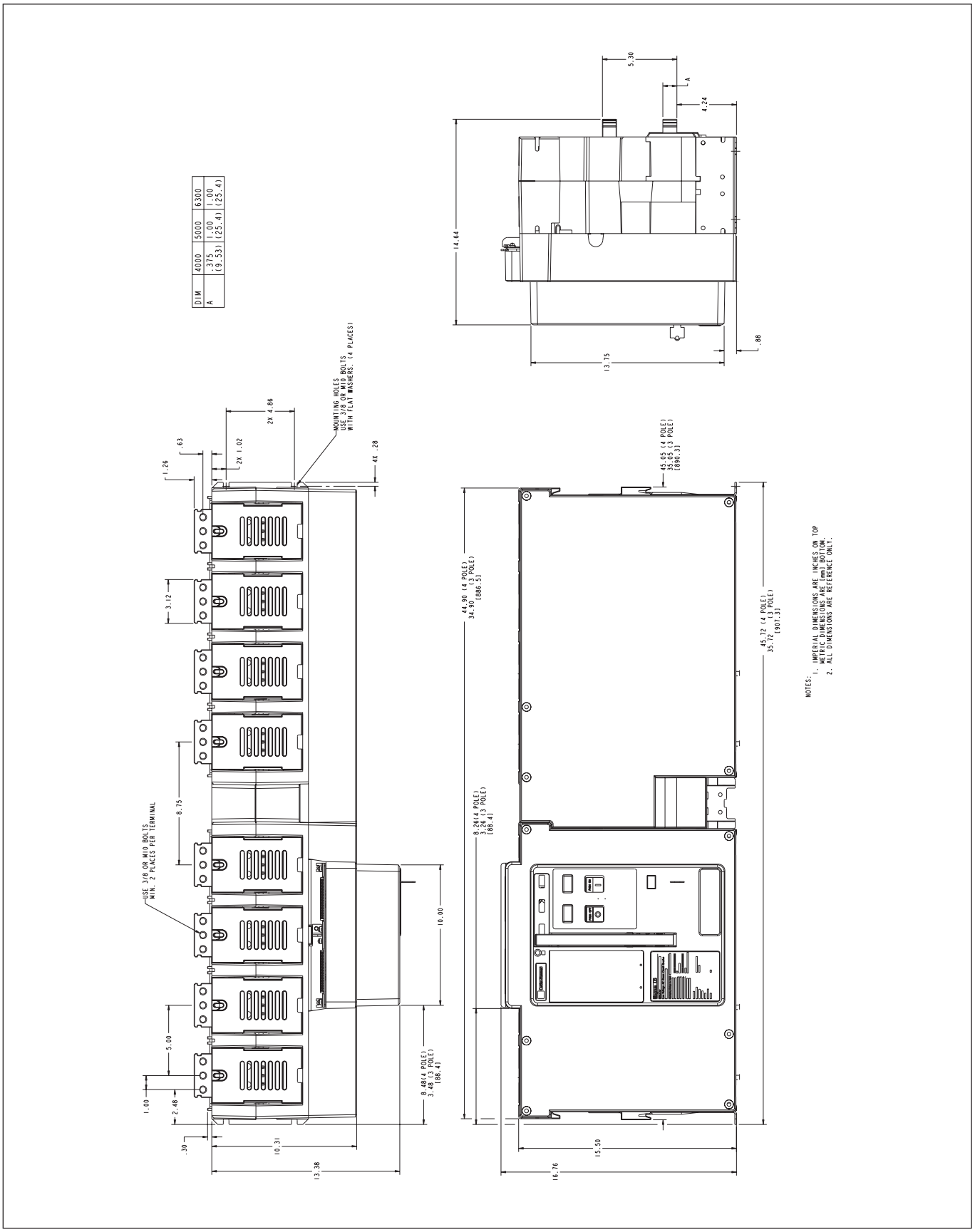


Figure 84. 4000-6300A Double-wide frame fixed breaker (Door cutout and vertical terminals)

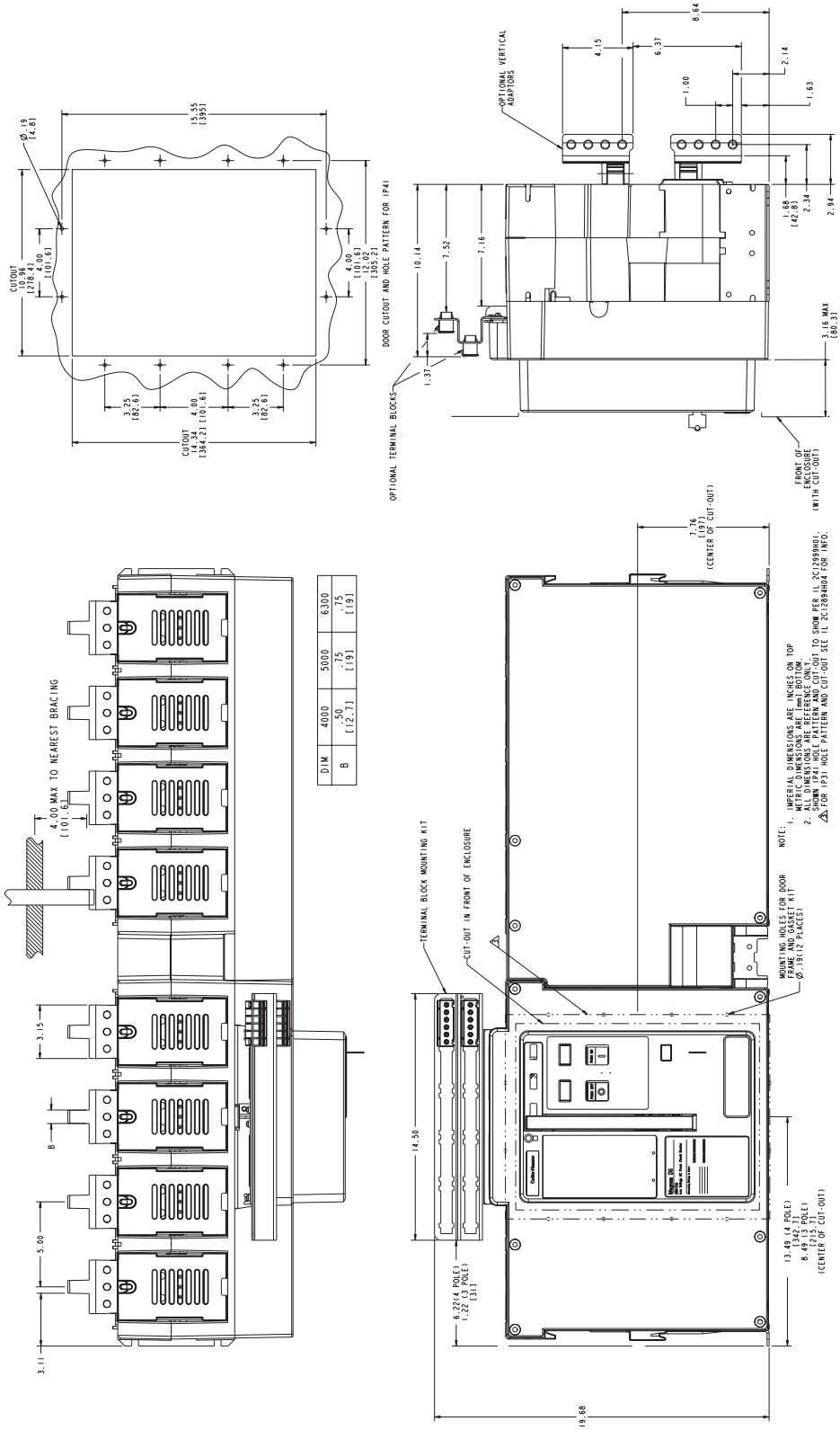
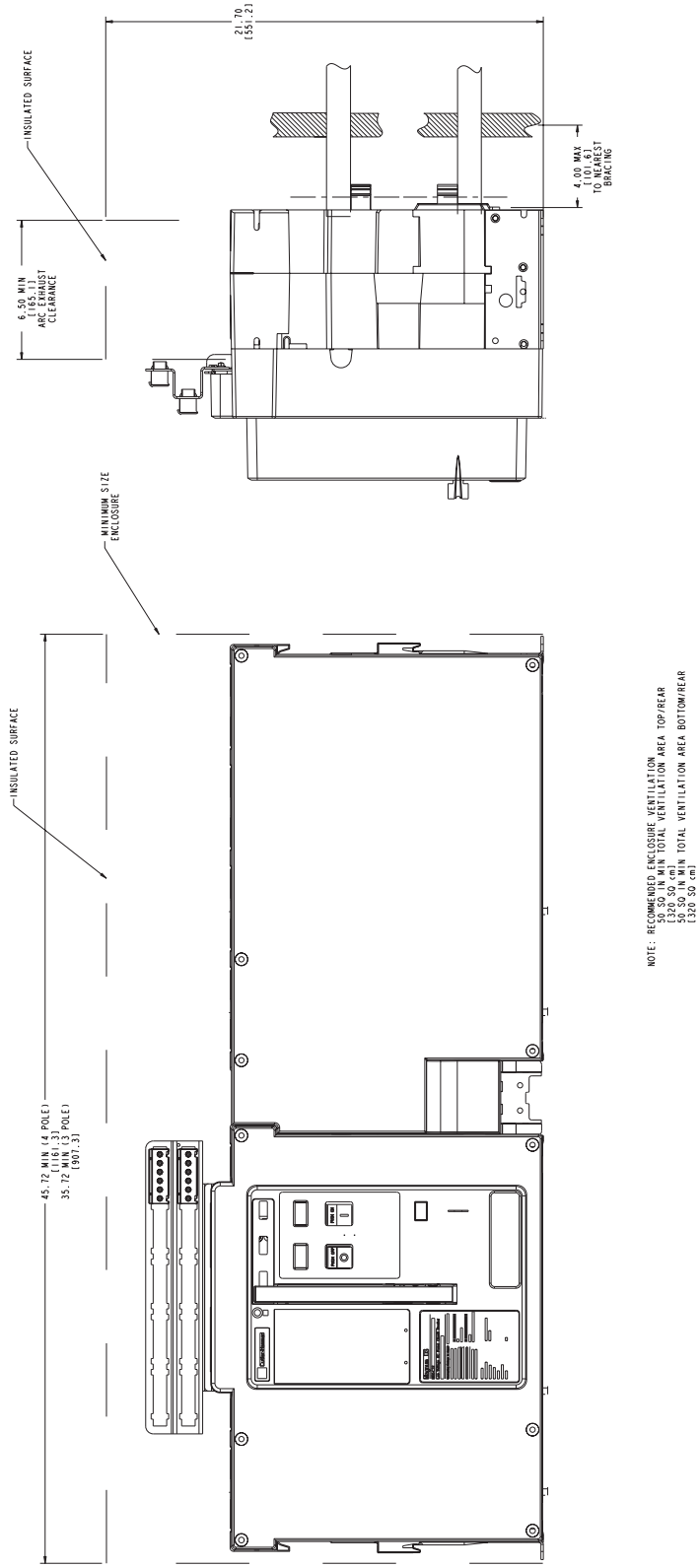


Figure 85. 4000-6300A Double-wide frame fixed breaker (Enclosure and horizontal terminals)



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