

**SIEMENS**

*Ingenuity for life*



## Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

Selection and Application Guide

[usa.siemens.com/switchgear](http://usa.siemens.com/switchgear)

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear



## Table of Contents

General Information	2
Construction Details	3 - 4
WL Circuit Breaker Electronic Trip Unit Options	5
Breaker Technical Data	6
Main Section Configurations, Non-Fused Breakers	7
Tie Section Configurations, Non-Fused Breakers	8
Feeder Section Configurations, Non-Fused Breakers	9 - 10
Incoming Section Configurations, Non-Fused Breakers	10
Dimensional Information	11 - 19
Shipping Weights and Dimensional Information	20

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## General Information

What is front connected low voltage metal-enclosed switchgear and how is it different from traditional rear connected low voltage switchgear?

With traditional rear connected low voltage switchgear, each vertical section contains the following three compartments:

1. Front compartment containing breakers and/or auxiliary components
2. Middle compartment containing vertical and horizontal bus
3. Rear compartment containing breaker connection (line and/or load). Typically the breaker connections are cables but could be busway.

With front connected low voltage switchgear, the rear breaker connection compartment is physically relocated to a separate vertical section beside the vertical section containing the breakers. All incoming and outgoing breaker connections are accessible from the front of the vertical section. Using feeder breakers with load side cable connections as an example, the runbacks coming off the load side of the feeder breakers run over to a separate section and the breaker connections are accessible from the front of the switchgear.

With front connected low voltage switchgear, all customer connections (incoming cable lugs, outgoing cable lugs, ground lugs, neutral disconnect, etc.) are front accessible.

Front connected low voltage switchgear is typically wider than a comparable rear connected low voltage switchgear lineup, but it isn't as deep and doesn't require rear working space. While the front connected low voltage switchgear footprint may be larger than a comparable rear connected switchgear lineup, the total required electrical room space (including working space) is typically smaller. Siemens front

connected low voltage switchgear combines the robust design, serviceability, safety and flexibility of UL1558 metal-enclosed low voltage switchgear in a product that is completely front accessible and front connected.

All of the features that have historically only been available in a rear connected low voltage switchgear product are now available in a front connected low voltage switchgear product. These features include:

- 4 cycle short-circuit withstand bus structure
- 60 cycle short-time withstand bus structure
- Compartmentalization
- Insulated/isolated bus
- Drawout low voltage power circuit breakers

### Product Scope:

- Equipment ratings  
635VAC Maximum  
3 Phase 3 Wire,  
3 Phase 4 Wire  
50/60 Hz  
5000 amp maximum horizontal bus  
5000 amp maximum vertical bus
- Enclosure options  
NEMA 1 Indoor

### Industry Standards

Type WL switchgear with power circuit breakers are designed, tested and constructed in accordance with:

- UL 1558 — Metal-Enclosed Low Voltage Power Circuit Breaker Switchgear
- ANSI C37 .20 .1 — Metal-Enclosed Low Voltage Power Circuit Breaker Switchgear
- ANSI C37 .50 — Test Procedure for Low Voltage AC Power Circuit Breakers Used in Enclosures
- ANSI C37 .51 — Conformance Testing of Metal-Enclosed Low Voltage AC Power Circuit Breaker Switchgear Assemblies



- NEMA SG5 - Power Switchgear Assemblies
- Applicable requirements of the National Electric Code (NEC)

WL drawout circuit breakers are in accordance with:

- UL 1066 — Low Voltage AC and DC Power Circuit Breakers Used in Enclosures
- ANSI C37 .13 — Low Voltage AC Power Circuit Breakers Used in Enclosures
- ANSI C37 .16 — Preferred Ratings, Related Requirements, and Application for Low Voltage Power Circuit Breakers and AC Power Circuit Protectors

### UL Listing

Underwriters' Laboratories listing mark (UL) is supplied for each vertical section provided all devices within a vertical section are UL Listed or UL Recognized and suitable for the intended use. All circuit breaker drawout elements are UL Listed.

Optional CSA compliance with cUL labeling is available.

### Seismic Qualification

Seismic qualification to all major seismic construction standards (IBC, CBC, OSHPD, UBC, SBC, BOCA and IEEE 693) is available.

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Construction Details

### General

The Siemens Type WL switchgear assembly consists of one or more metal-enclosed vertical sections. The end sections are designed to allow installation of future sections.

Included in each assembly are various components such as circuit breakers, instrumentation and control equipment, transformers, relays, three-phase bus work, and all internal wiring, connectors, and other supporting equipment.

In accordance with ANSI C37.20 .1, the maximum temperature for parts that are handled is 50°C. The main bus maximum temperature rise is 65°C above 40°C ambient. The temperature rise of cable connection points is limited to 45°C above 40°C ambient.

### Finish

During construction, the structural steel parts, panels, and compartments are all prepared for painting by a five-stage wash system.

Standard finish color is light gray ANSI 61. The standard painting process is a UL approved electrostatic powder coat paint system utilizing a polyester powder coat paint. The completed finish has a nominal 2 mils dry film thickness.

### Assembly Construction

Siemens Type WL metal-enclosed low voltage switchgear is constructed of a rigid internal frame structure that minimizes the possibility of damage during shipment and supports multiple installation methods – rolling or lifting. Lifting eyes are integrated into the internal frame design and ensure the structural integrity of the lifting assembly is always adequate for the weight of the total structure.

Each breaker is barriered and compartmented from all other breakers in the front compartment. This design also isolates the breakers in the front compartment from the bus compartment.

Optional barriers can be supplied to isolate the bus compartment from the cable compartment. Other optional barriers include: (1) Full depth section barriers to isolate one section from the adjacent section(s). (2) Barriers to isolate the incoming line side connections to the main breaker(s) from the load side bus and connections in the switchgear section. (Line/load barriers are provided as a standard feature for service equipment main breakers.)

### Optional Features

Siemens front connected low voltage switchgear comes with the following optional features:

- Insulated/isolated bus
- Section barriers
- Line/load barriers
- Tin plated copper bus
- Special exterior paint color
- Space heaters
- Channel sills
- OEM shipping skid
- Mimic bus
- Breaker test cabinet
- Breaker portable test unit
- Remote breaker operator
- Remote breaker racking device
- Breaker portable hoist
- Gasketed exterior covers and doors
- Ventilation filters
- Ventilation screens
- Floor plates
- Undercoating
- Fungus resistant
- Certified test reports
- Factory acceptance test
- Infrared viewport
- Bus temperature monitoring
- Cable temperature monitoring
- Environmental monitoring (temperature, humidity, smoke, etc)

### Unusual Environment and Operating Conditions

If any of the following conditions exist at equipment installation site, Siemens should be advised during the specification requirements review.

- Ambient air temperature below -30 degree C or above 40 degree C
- Exposure to prolonged high humidity (above 80% humidity)
- Altitude greater than 2000 meters
- Exposure to damaging fumes, vapors, steam or salt
- Exposure to excessive dust (abrasive, magnetic or metallic)
- Exposure to abnormal vibration, shock or tilting

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Construction Details

### Main and Ground Bus

The standard main bus is silver-plated copper. Tin-plated copper bus is optionally available. Vertical and horizontal bus bar utilize a channel shape design to maximize short circuit withstand capability and minimize heat rise. All bus joints include zinc-plated Grade 5 bolts and conical spring washers. Provisions for future extension of the main bus include plated joints and high tensile strength steel hardware.

The main three-phase horizontal bus is arranged vertically one phase above the other with edge-to-edge alignment to provide high short circuit strength. Insulated main bus with isolated vertical bus is optional. Vertical bus ratings available are 1600, 2000, 3200, 4000, and 5000 amperes continuous current. Horizontal and Vertical bus ratings available are 1600, 2000, 3200, 4000, and 5000 amperes continuous current. A neutral bus is furnished when specified, and can be rated 1600, 2000, 3200, 4000, or 5000 amperes continuous current.

Two laminations of 1/4" X 1.5" standard copper ground bus extend through all sections. Cable lugs are mounted to the ground bus in each section.

Standard short-circuit withstand (4 cycle) and short-time withstand (60 cycle) bus bracing is 100,000 amperes.

Load side runbacks for feeder circuits are copper construction, are insulated with sleeve tubing in the main bus area, and are supported by high-strength bus bracing.

### Control and Communication Wiring

Standard control and communication wiring is #14 AWG extra-flexible, stranded copper type SIS Control and communication wiring is installed and accessed from the front of the switchgear structure. Each breaker compartment has a dedicated horizontal and vertical wireway.

For devices not having screw-type terminals, pressure terminals are used.

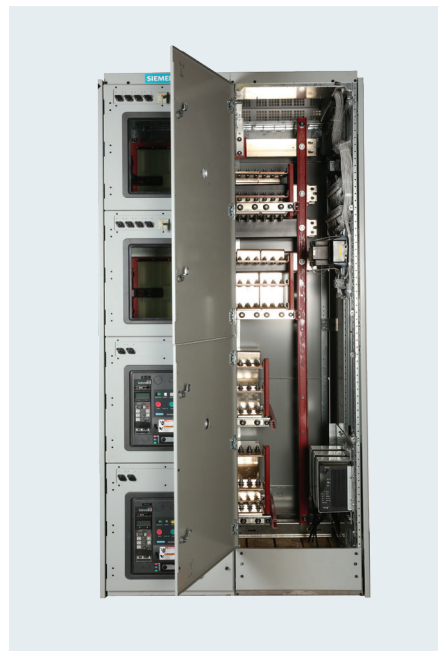
### Insulation

The insulation system used is a UL recognized thermoset/thermoplastic material that has excellent heat resistance, flame retardance, dimensional stability and low moisture absorption.

### Circuit Breaker Compartments

Typical circuit breaker compartments include primary disconnects, drawout rails, secondary disconnects, vertical wireway, horizontal wireway and, if applicable, TOC switch operator, MOC switch operator and associated interlocks. Draw-out rails allow the breaker to be withdrawn from the compartment without additional extensions or adapters. Up to six (2 sets of three) current transformers for metering or relaying can be mounted in each compartment.

A variety of auxiliary devices such as breaker control switches, indicating lights and pushbuttons can be mounted on the breaker compartment door.



Feeder Breaker Section with Cable Pull Doors Open

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## WL Circuit Breaker Electronic Trip Unit Models and Features



Features and characteristics	ETU745	ETU776
Long-time overcurrent protection (L)	X	X
Short-time delayed overcurrent protection (S)	X	X
Instantaneous overcurrent protection (I)	X	X
Neutral conductor protection (N)	X	X
Ground fault protection (G)	X	X
Selectable neutral protection	X	X
Defeatable short-time protection	X	X
Defeatable instantaneous protection	X	X
Selectable thermal memory	X	X
Zone selective interlocking	X	X
Selectable I <sup>2</sup> t or I <sup>4</sup> t long-time delay	X	X
Adjustable instantaneous pick-up	X	X
Selectable I <sup>2</sup> t or I <sup>4</sup> t long-time delay		X
Adjustable short-time delay and pick-up	X	X
Selectable and adjustable neutral protection	X	X
Dual protective setting capability		X
Dynamic arc-flash sentry (DAS)		X
Extended instantaneous protection (EIP)	X	X
Parameterization by rotary switches	X	
Parameterization by communication (absolute values)		X
Parameterization by menu/keypad (absolute values)		X
Remote parameterization of the alarm functions		X
Remote parameterization of the relay functions		X
Alphanumeric display	O	X
Graphical display		X
Power meter function	O	O
Communication via PROFIBUS-DP	O	O
Communication via MODBUS-RTU	O	O
Communication via MODBUS TCP / PROFINET IO	O	O

(X) = standard feature, (O) = optional feature

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Breaker Technical Data

### WL Circuit Breakers ANSI / UL 1066

Frame Rating Rating Class		Frame Size II													
		800				1600				2000			3200		
		N	S	H	L	N	S	H	L	S	H	L	S	H	L
Instantaneous Short-circuit Current ① (kA RMS) 50/60 Hz	254V AC	50	65	85	100	50	65	85	100	65	85	100	65	85	100
	508V AC	50	65	85	100	50	65	85	100	65	85	100	65	85	100
	635V AC	50	65	65	85	50	65	65	85	65	65	85	65	65	85
Short-time Withstand Current $I_{cw}$ (kA RMS) 50/60 Hz	1.0s	50	65	65	85	50	65	65	85	65	65	85	65	65	85
Extended Instantaneous Protection (kA RMS -0% to +20%)		50	65	65	85	50	65	65	85	65	65	85	65	65	85
Close and Latch Ratings (kA RMS) 50/60 Hz		50	65	65	85	50	65	65	85	65	65	85	65	65	85
Rating Plug Range		200 - 800 amps				200 - 1600 amps				200 - 2000 amps			200 - 3200 amps		
Endurance Rating (switching operations with maintenance) ②	Mechanical	15,000				15,000				15,000			15,000		
	Electrical	15,000				15,000				15,000			15,000		

Frame Rating Rating Class		Frame Size III					
		4000			5000		
		H		L	H		L
Instantaneous Short-circuit Current ① (kA RMS) 50/60 Hz	254V AC	85		100	85		100
	508V AC	85		100	85		100
	635V AC	85		85	85		85
Short-time Withstand Current $I_{cw}$ (kA RMS) 50/60 Hz	1.0s	85		100 <sup>③</sup>	85		100
Extended Instantaneous Protection (kA RMS -0% to +20%)	254V AC 508V AC 635V AC	85		100	85		100
Close and Latch Ratings (kA RMS) 50/60 Hz		85		85	85		85
Rating Plug Range		800 - 4000 amps			800 - 5000 amps		
Endurance Rating (switching operations with maintenance) ②	Mechanical	10,000			10,000		
	Electrical	10,000			10,000		

① Maximum rated voltage for fused breakers is 600VAC.

② Maintenance means: replacing main contacts and arc chutes (see operating instructions).

③ Short-time withstand rating is 85kA RMS at 635V AC.



# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Main Section Configurations, Non-Fused Breakers

### Note 1

- Main breaker can mount in compartment B or compartment C - not in compartment A or compartment D.
- Feeder breakers and HRG can't go in same section as main breaker.
- Cable incoming (top or bottom) can be in the same section as main breaker except for the following applications which require a separate incoming cable pull section.
  - FS2 3200A main breaker in 22" wide section.
  - 5000A main breaker
- Busway incoming always requires a separate incoming section (32" wide).
- HRG can go in the cable or busway standalone incoming section.

### Note 2

- Tie breaker can mount in compartment B or compartment C - not in compartment A or compartment D.
- Feeder breakers and HRG can't go in same section as tie breaker.
- Tie breakers are typically through bus connected on the line and load side but can be cable or busway fed also.
- Cable incoming (top or bottom) can be in the same section as tie breaker except for the following applications which require a separate incoming cable pull section.
  - FS2 3200A tie breaker in 22" wide section.
  - 5000A tie breaker
- Busway incoming always requires a separate incoming section (32" wide).
- HRG can go in the cable or busway incoming section.

### Note 3

- Feeder breakers greater than 2000A must use main breaker design and application guidelines. Consult factory for application support.

### Note 4

- Auxiliary compartment may have reduced height and/or depth.

### Note 5

- Minimum cable pull section width for 5000A feeder breaker with load side cable going out the top of the cable pull section is 40"

### Note 6

- This main/tie breaker section design is only applicable when incoming is in a separate section or main/tie breaker section is close coupled to a transformer. It doesn't support cable incoming in the same section as the main/tie breaker.

## Main Sections

Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers
Blank or Instrument Compartment (22.5") Refer to Note 4	Blank or Instrument Compartment (45.0") Refer to Note 4	Blank or Instrument Compartment (22.5") Refer to Note 4	Blank or Instrument Compartment (45.0") Refer to Note 4	Blank or Instrument Compartment (22.5") Refer to Note 4	Blank or Instrument Compartment (45.0") Refer to Note 4
Main Breaker 800, 1600, 2000 (22.5") Refer to Note 1	Main Breaker 800, 1600, 2000 (22.5") Refer to Note 1	Main Breaker 3200 (22.5") Refer to Note 1 Refer to Note 6	Main Breaker 3200 (22.5") Refer to Note 1 Refer to Note 6	Main Breaker 3200 (22.5") Refer to Note 1	Main Breaker 3200 (22.5") Refer to Note 1
Blank or Instrument Compartment (45.0")	Main Breaker 800, 1600, 2000 (22.5") Refer to Note 1	Unusable Space (7.5")	Main Breaker 3200 (22.5") Refer to Note 1 Refer to Note 6	Blank or Instrument Compartment (45.0")	Main Breaker 3200 (22.5") Refer to Note 1
	Blank or Instrument Compartment (22.5")	Blank or Instrument Compartment (30.0") Refer to Note 4	Unusable Space (7.5")	Unusable Space (7.5")	Blank or Instrument Compartment (22.5")
		Unusable Space (7.5")	Unusable Space (15.0)		
22" Wide	22" Wide	22" Wide	22" Wide	32" Wide	32" Wide

Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers
Blank or Instrument Compartment (22.5") Refer to Note 4	Blank or Instrument Compartment (45.0") Refer to Note 4	Blank or Instrument Compartment (37.5") Refer to Note 4	Blank or Instrument Compartment (22.5") Refer to Note 4	Blank or Instrument Compartment (45.0") Refer to Note 4
Main Breaker 4000 (22.5") Bus-in/Bus-out or Cable Feed Bottom Refer to Note 1	Main Breaker 4000 (22.5") Refer to Note 4	Main Breaker 4000 (22.5") Cable Feed Top Only Refer to Note 1	Main Breaker 5000 (22.5") Refer to Note 1 Refer to Note 6	Main Breaker 5000 (22.5") Refer to Note 1 Refer to Note 6
Blank or Instrument Compartment (37.5")	Main Breaker 4000 (22.5") Bus-in/Bus-out Only - No Cable Feed Refer to Note 6	Blank or Instrument Compartment (22.5") Refer to Note 4	Unusable Space (7.5")	Main Breaker 5000 (22.5") Refer to Note 1 Refer to Note 6
Unusable Space (7.5")	Blank or Instrument Compartment (15.0")	Unusable Space (7.5")	Blank or Instrument Compartment (30.0") Refer to Note 4	Unusable Space (7.5")
	Unusable Space (7.5")	Unusable Space (7.5")	Unusable Space (7.5")	Unusable Space (15.0")
32" Wide	32" Wide	32" Wide	32" Wide	32" Wide

### General Notes:

- All compartments are 22.5" high unless noted otherwise.
- A blank/instrument compartment can always be substituted for a feeder breaker compartment.
- For close coupled dry type transformer connections, Compartment A must be blank/instrument.
- High resistance grounding (HRG) can't be located in the same section as the main breaker. HRG can be located in incoming cable or busway pull section.
- Transformer incoming can be located in the same section as the main breaker - no separate cable pull section is required.

### Switchgear Depth Dimensional Information:

(Dimensions below are for internal frames - not total structure depth)

- Indoor - 39.2"

### Section Compartment Arrangement:

A Compartment
B Compartment
C Compartment
D Compartment

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Tie Section Configurations, Non-Fused Breakers

### Note 1

- Main breaker can mount in compartment B or compartment C - not in compartment A or compartment D.
- Feeder breakers and HRG can't go in same section as main breaker.
- Cable incoming (top or bottom) can be in the same section as main breaker except for the following applications which require a separate incoming cable pull section.
  - FS2 3200A main breaker in 22" wide section.
  - 5000A main breaker
- Busway incoming always requires a separate incoming section (32" wide).
- HRG can go in the cable or busway standalone incoming section.

### Note 2

- Tie breaker can mount in compartment B or compartment C - not in compartment A or compartment D.
- Feeder breakers and HRG can't go in same section as tie breaker.
- Tie breakers are typically through bus connected on the line and load side but can be cable or busway fed also.
- Cable incoming (top or bottom) can be in the same section as tie breaker except for the following applications which require a separate incoming cable pull section.
  - FS2 3200A tie breaker in 22" wide section.
  - 5000A tie breaker
- Busway incoming always requires a separate incoming section (32" wide).
- HRG can go in the cable or busway standalone incoming section.

### Note 3

- Feeder breakers greater than 2000A must use main breaker design and application guidelines. Consult factory for application support.

### Note 4

- Auxiliary compartment may have reduced height and/or depth.

### Note 5

- Minimum cable pull section width for 5000A feeder breaker with load side cable going out the top of the cable pull section is 40"

### Note 6

- This main/tie breaker section design is only applicable when incoming is in a separate section or main/tie breaker section is close coupled to a transformer. It doesn't support cable incoming in the same section as the main/tie breaker.

## Tie Sections

Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers
Blank or Instrument Compartment (22.5") Refer to Note 4	Blank or Instrument Compartment (45.0") Refer to Note 4	Blank or Instrument Compartment (22.5") Refer to Note 4	Blank or Instrument Compartment (45.0") Refer to Note 4	Blank or Instrument Compartment (22.5") Refer to Note 4	Blank or Instrument Compartment (45.0") Refer to Note 4
Tie Breaker 800, 1600, 2000 (22.5") Refer to Note 2		Tie Breaker 3200 (22.5") Refer to Note 2 Refer to Note 6		Tie Breaker 3200 (22.5") Refer to Note 2	
Blank or Instrument Compartment (45.0")	Tie Breaker 800, 1600, 2000 (22.5") Refer to Note 2	Unusable Space (7.5")	Tie Breaker 3200 (22.5") Refer to Note 2 Refer to Note 6	Unusable Space (7.5")	Blank or Instrument Compartment (45.0")
	Blank or Instrument Compartment (22.5")	Blank or Instrument Compartment (30.0") Refer to Note 4			
		Unusable Space (7.5")			
22" Wide	22" Wide	22" Wide	22" Wide	32" Wide	32" Wide

Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers	Non-Fused Breakers
Blank or Instrument Compartment (22.5") Refer to Note 4	Blank or Instrument Compartment (45.0") Refer to Note 4	Blank or Instrument Compartment (37.5") Refer to Note 4	Blank or Instrument Compartment (22.5") Refer to Note 4	Blank or Instrument Compartment (45.0") Refer to Note 4
Tie Breaker 4000 (22.5") Bus-in/Bus-out or Bottom Cable Feed Refer to Note 2			Tie Breaker 5000 (22.5") Refer to Note 2 Refer to Note 6	
Blank or Instrument Compartment (37.5")	Tie Breaker 4000 (22.5") Bus-in/Bus-out Only - No Cable Feed Refer to Note 2	Tie Breaker 4000 (22.5") Cable Feed Top Only Refer to Note 2	Unusable Space (7.5")	Tie Breaker 5000 (22.5") Refer to Note 2 Refer to Note 6
	Blank or Instrument Compartment (15.0")	Blank or Instrument Compartment (22.5") Refer to Note 4		
Unusable Space (7.5")	Unusable Space (7.5")	Unusable Space (7.5")	Unusable Space (7.5")	Unusable Space (15.0")
32" Wide	32" Wide	32" Wide	32" Wide	32" Wide

### General Notes:

1. All compartments are 22.5" high unless noted otherwise.
2. A blank/instrument compartment can always be substituted for a breaker compartment.
3. For close coupled dry type transformer connections, Compartment A must be blank/instrument.
4. High resistance grounding (HRG) can't be located in the same section as the main breaker – it must be located in a separate section. HRG can be located in incoming cable or busway pull section.
5. Transformer incoming can be located in the same section as the main breaker – no separate cable pull section is required.

### Switchgear Depth Dimensional Information:

(Dimensions below are for internal frames – not total structure depth)

- Indoor – 39.2"

### Section Compartment Arrangement:

A Compartment
B Compartment
C Compartment
D Compartment

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Feeder Section Configurations, Non-Fused Breakers

### Note 1

- Main breaker can mount in compartment B or compartment C - not in compartment A or compartment D.
- Feeder breakers and HRG can't go in same section as main breaker.
- Cable incoming (top or bottom) can be in the same section as main breaker except for the following applications which require a separate incoming cable pull section.
  - FS2 3200A main breaker in 22" wide section.
  - 5000A main breaker
- Busway incoming always requires a separate incoming section (32" wide).
- HRG can go in the cable or busway standalone incoming section.

### Note 2

- Tie breaker can mount in compartment B or compartment C - not in compartment A or compartment D.
- Feeder breakers and HRG can't go in same section as tie breaker.
- Tie breakers are typically through bus connected on the line and load side but can be cable or busway fed also.
- Cable incoming (top or bottom) can be in the same section as tie breaker except for the following applications which require a separate incoming cable pull section.
  - FS2 3200A tie breaker in 22" wide section.
  - 5000A tie breaker
- Busway incoming always requires a separate incoming section (32" wide).
- HRG can go in the cable or busway standalone incoming section.

### Note 3

- Feeder breakers greater than 2000A must use main breaker design and application guidelines. Consult factory for application support.

### Note 4

- Auxiliary compartment may have reduced height and/or depth.

### Note 5

- Minimum cable pull section width for 5000A feeder breaker with load side cable going out the top of the cable pull section is 40".

### Note 6

- This main/tie breaker section design is only applicable when incoming is in a separate section or main/tie breaker section is close coupled to a transformer. It doesn't support cable incoming in the same section as the main/tie breaker.

### General Notes:

- All compartments are 22.5" high unless noted otherwise.
- A blank/instrument compartment can always be substituted for a breaker compartment.
- For close coupled dry type transformer connections, Compartment A must be blank/instrument.

- High resistance grounding (HRG) can't be located in the same section as the main breaker – it must be located in a separate section. HRG can be located in incoming cable or busway pull section.
- Transformer incoming can be located in the same section as the main breaker – no separate cable pull section is required.

### Switchgear Depth Dimensional Information: (Dimensions below are for internal frames – not total structure depth)

- Indoor – 39.2"

## Feeder Sections

Refer to Note 3 for feeder breakers greater than 2000A

Non-Fused Breakers		Non-Fused Breakers
Feeder Breaker 800, 1600, 2000 (22.5")	Feeder Breaker Load Side Cable Pull Section Hinged Door (45.0")	Blank or Instrument Compartment (22.5")
Feeder Breaker 800, 1600, 2000 (22.5")		Feeder Breaker 3200 (22.5") Refer to Note 3
Feeder Breaker 800, 1600, 2000 (22.5")	Hinged Door (37.5") Unusable Space (7.5")	Blank or Instrument Compartment (45.0") Refer to Note 4
Feeder Breaker 800, 1600, 2000 (22.5")		
22" Wide	22"/30"/40" Wide	32" Wide

Non-Fused Breakers		Non-Fused Breakers
Blank or Instrument Compartment (45.0") Refer to Note 4	Feeder Breaker 3200 (22.5") Refer to Note 3	Blank or Instrument Compartment (22.5")
Feeder Breaker 4000 (22.5") Cable Feed Bottom Only Refer to Note 3		Blank or Instrument Compartment (37.5") Refer to Note 4
Blank or Instrument Compartment (22.5")		Unusable Space (7.5")
32" Wide		32" Wide

### Section Compartment Arrangement:

A Compartment
B Compartment
C Compartment
D Compartment

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Feeder and Incoming Section Configurations, Non-Fused Breakers

### Note 1

- Main breaker can mount in compartment B or compartment C - not in compartment A or compartment D.
- Feeder breakers and HRG can't go in same section as main breaker.
- Cable incoming (top or bottom) can be in the same section as main breaker except for the following applications which require a separate incoming cable pull section.
  - FS2 3200A main breaker in 22" wide section.
  - 5000A main breaker
- Busway incoming always requires a separate incoming section (32" wide).
- HRG can go in the cable or busway standalone incoming section.

### Note 2

- Tie breaker can mount in compartment B or compartment C - not in compartment A or compartment D.
- Feeder breakers and HRG can't go in same section as tie breaker.
- Tie breakers are typically through bus connected on the line and load side but can be cable or busway fed also.
- Cable incoming (top or bottom) can be in the same section as tie breaker except for the following applications which require a separate incoming cable pull section.
  - FS2 3200A tie breaker in 22" wide section.
  - 5000A tie breaker
- Busway incoming always requires a separate incoming section (32" wide).
- HRG can go in the cable or busway standalone incoming section.

### Note 3

- Feeder breakers greater than 2000A must use main breaker design and application guidelines. Consult factory for application support.

### Note 4

- Auxiliary compartment may have reduced height and/or depth.

### Note 5

- Minimum cable pull section width for 5000A feeder breaker with load side cable going out the top of the cable pull section is 40".

### Note 6

- This main/tie breaker section design is only applicable when incoming is in a separate section or main/tie breaker section is close coupled to a transformer. It doesn't support cable incoming in the same section as the main/tie breaker.

### General Notes:

1. All compartments are 22.5" high unless noted otherwise.
2. A blank/instrument compartment can always be substituted for a breaker compartment.
3. For close coupled dry type transformer connections, Compartment A must be blank/instrument.

## Feeder Sections

Refer to Note 3 for feeder breakers greater than 2000A

Non-Fused Breakers	
Blank or Instrument Compartment (37.5") Refer to Note 4	Feeder Breaker 4000 (22.5") Cable Feed Top Only Refer to Note 3
Blank or Instrument Compartment (22.5")	
Unusable Space (7.5")	
32" Wide	

Non-Fused Breakers	
Blank or Instrument Compartment (22.5")	Feeder Breaker Load Side Cable Pull Section Refer to Note 5 Hinged Door (45.0")
Feeder Breaker 5000 (22.5") Refer to Note 3	
Unusable Space (7.5")	
Blank or Instrument Compartment (30.0")	Hinged Door (37.5")
Unusable Space (7.5")	
32" Wide	30"/40" Wide

Non-Fused Breakers	
Blank or Instrument Compartment (45.0")	Feeder Breaker Load Side Cable Pull Section Refer to Note 5 Hinged Door (45.0")
Feeder Breaker 5000 (22.5") Refer to Note 3	Hinged Door (37.5")
Unusable Space (7.5")	
Unusable Space (15.0")	Unusable Space (7.5")
32" Wide	30"/40" Wide

## Incoming Sections

Blank or Instrument Compartment (45.0") Refer to Note 4
Blank or Instrument Compartment (37.5") Refer to Note 4
Unusable Space (7.5")
32" Wide

4. High resistance grounding (HRG) can't be located in the same section as the main breaker – it must be located in a separate section. HRG can be located in incoming cable or busway pull section.
5. Transformer incoming can be located in the same section as the main breaker – no separate cable pull section is required.

**Switchgear Depth Dimensional Information:**  
(Dimensions below are for internal frames – not total structure depth)

- Indoor – 39.2"

**Section Compartment Arrangement:**

A Compartment
B Compartment
C Compartment
D Compartment

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Wall Mount

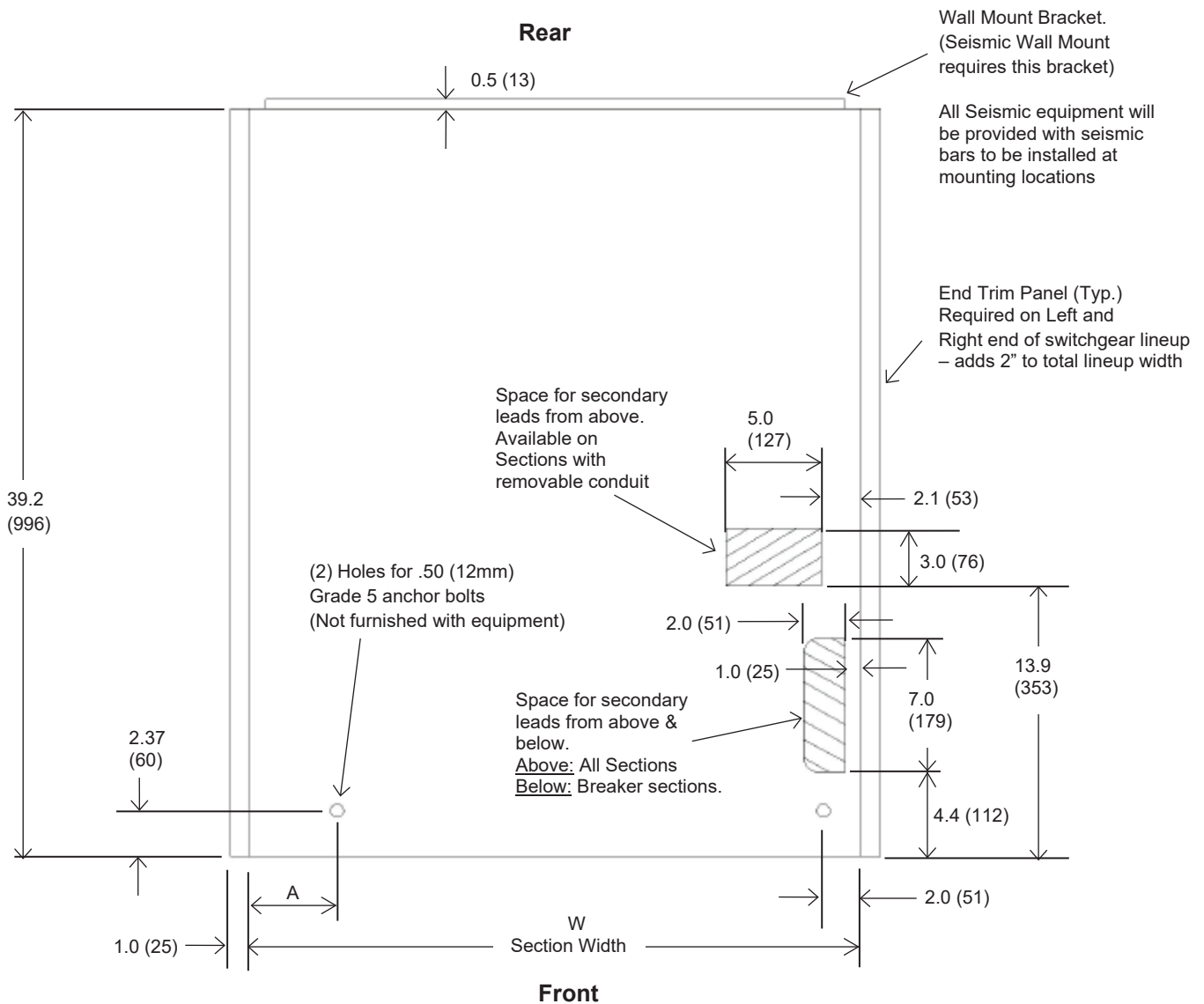


Fig- 1

Plan View

	Breaker Sections									Cable Sections		
	3 Pole FS2					3 Pole FS3						
	Bus In/Out	Cable Feed Top	Cable Feed Bottom	Cable Feed Top	Cable Feed Bottom	Bus In/Out	Cable Feed Top	Cable Feed Bottom				
	Incoming Section	800A-3200A	800A-3200A	800A-2000A	3200A	3200A	4000A-5000A	4000A	4000A			
Section Width, W	32 (813)	22 (559)	22 (559)	22 (559)	32 (813)	32 (813)	32 (813)	32 (813)	32 (813)	22 (559)	30 (762)	40 (1016)
Front Left Hole, A	2.0 (51)	4.09 (104)	4.09 (104)	2.0 (51)	2.61 (66)	2.0 (51)	2.61 (66)	2.61 (66)	2.0 (51)	2.0 (51)	2.0 (51)	2.0 (51)

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Wall Mount

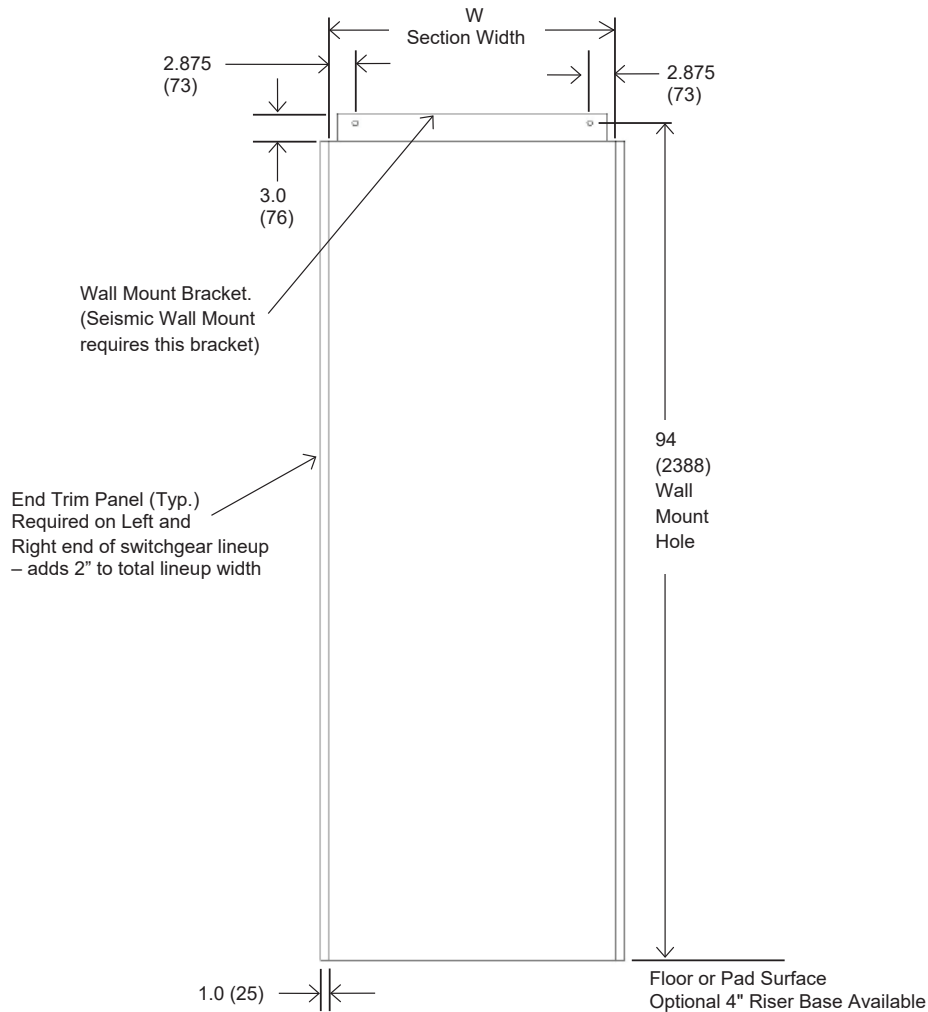


Fig- 2

Front View

Incoming Section	Breaker Sections									Cable Sections		
	3 Pole FS2					3 Pole FS3						
	Bus In/Out	Cable Feed Top	Cable Feed Bottom	Cable Feed Top	Cable Feed Bottom	Bus In/Out	Cable Feed Top	Cable Feed Bottom				
	800A-3200A	800A-3200A	800A-2000A	3200A	3200A	4000A-5000A	4000A	4000A				
Section Width, W	32 (813)	22 (559)	22 (559)	22 (559)	32 (813)	32 (813)	32 (813)	32 (813)	32 (813)	22 (559)	30 (762)	40 (1016)

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Floor Mount (Requires Rear Access)

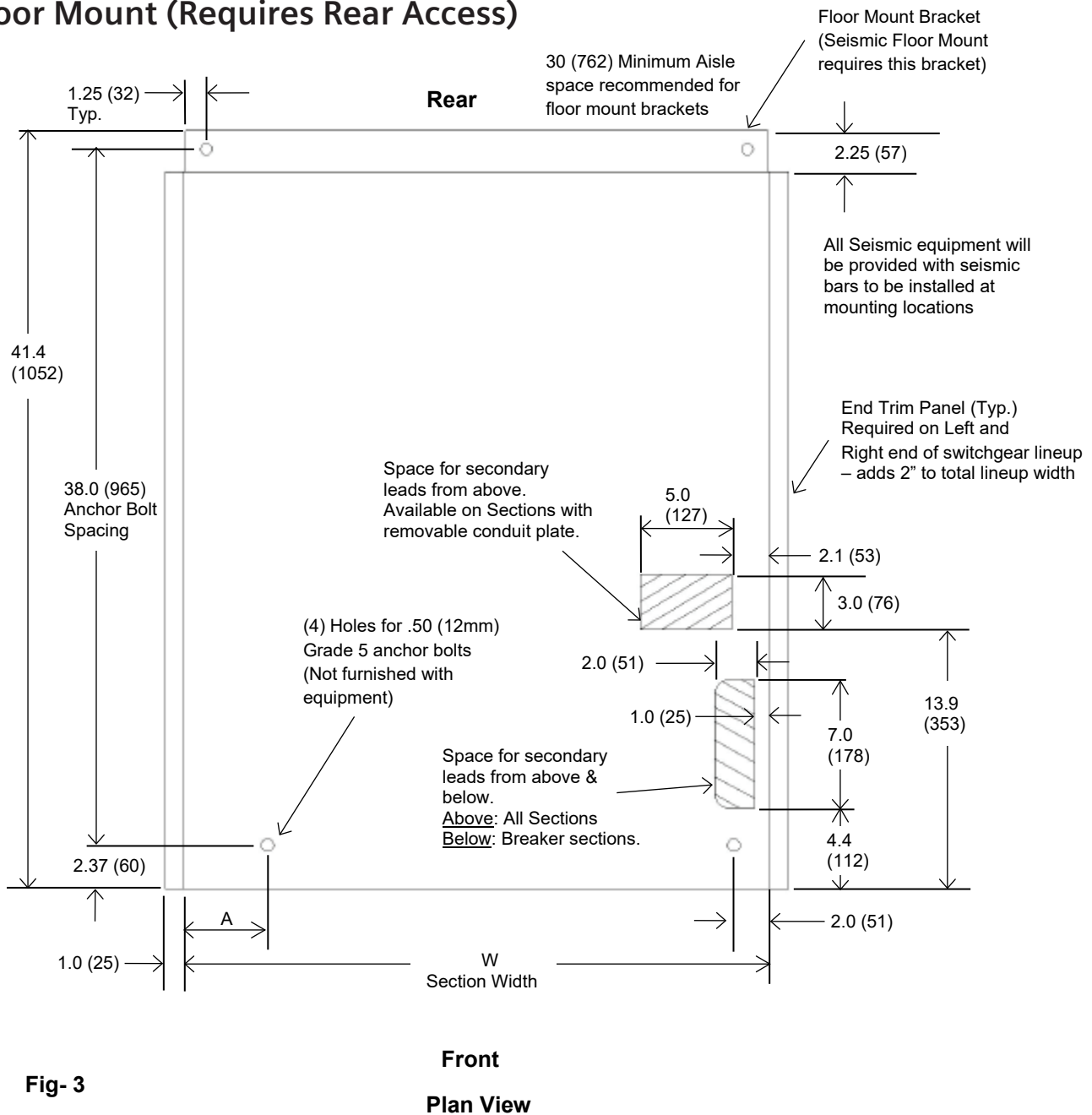


Fig- 3

	Breaker Sections									Cable Sections		
	3 Pole FS2					3 Pole FS3						
	Bus In/Out	Cable Feed Top	Cable Feed Bottom	Cable Feed Top	Cable Feed Bottom	Bus In/Out	Cable Feed Top	Cable Feed Bottom				
	Incoming Section	800A-3200A	800A-3200A	800A-2000A	3200A	3200A	4000A-5000A	4000A	4000A			
Section Width, W	32 (813)	22 (559)	22 (559)	22 (559)	32 (813)	32 (813)	32 (813)	32 (813)	32 (813)	22 (559)	30 (762)	40 (1016)
Front Left Hole, A	2.0 (51)	4.09 (104)	4.09 (104)	2.0 (51)	2.61 (66)	2.0 (51)	2.61 (66)	2.61 (66)	2.0 (51)	2.0 (51)	2.0 (51)	2.0 (51)

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## FCLVS – Side View

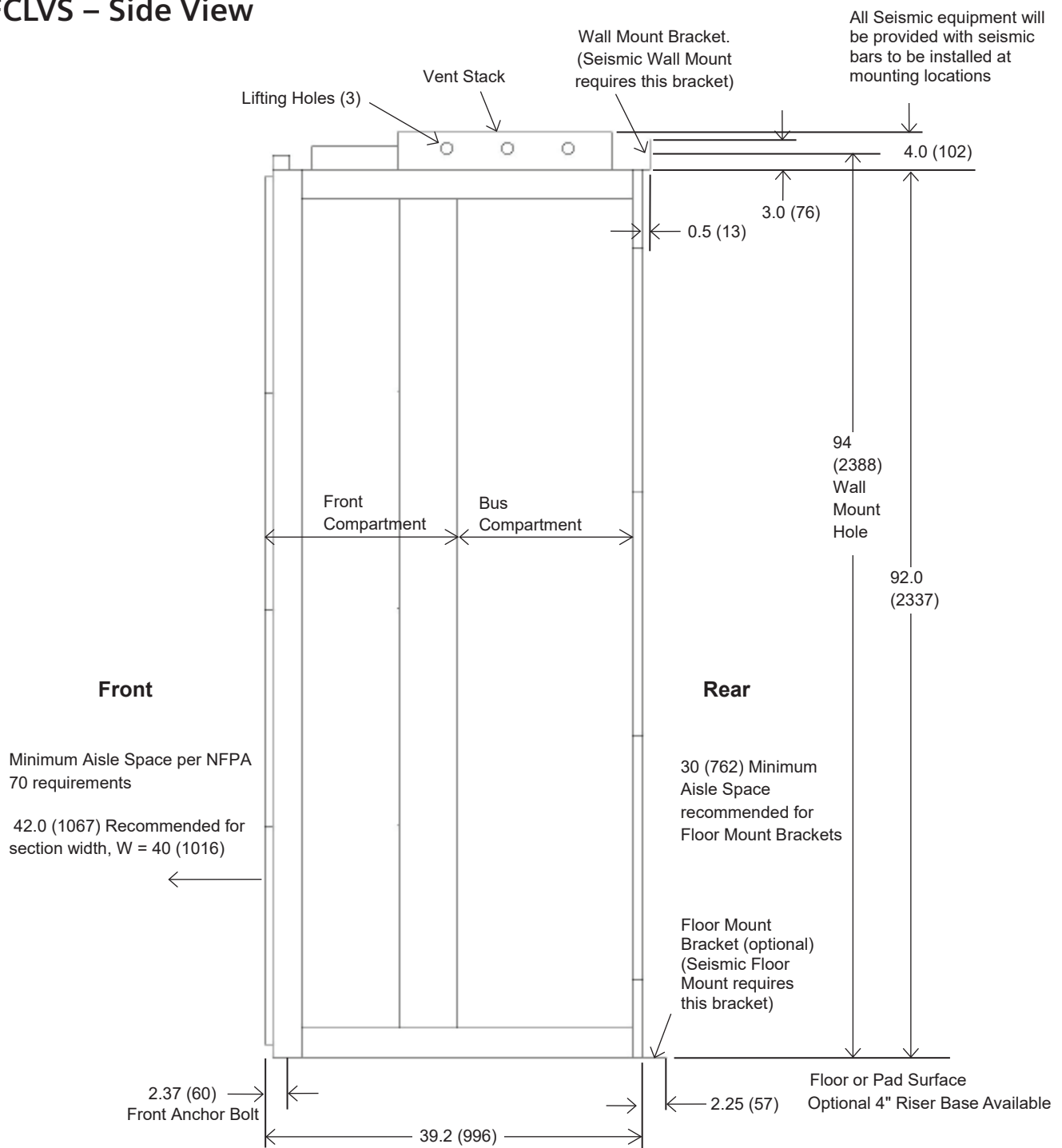


Fig- 4

Section Compartment Type	Front Compartment Depth	Bus Compartment Depth
Breaker	19.8 (503)	19.4 (493)
Feeder Cable	28.7 (729)	10.5 (267)



# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Incoming Section – Cable Entry Top

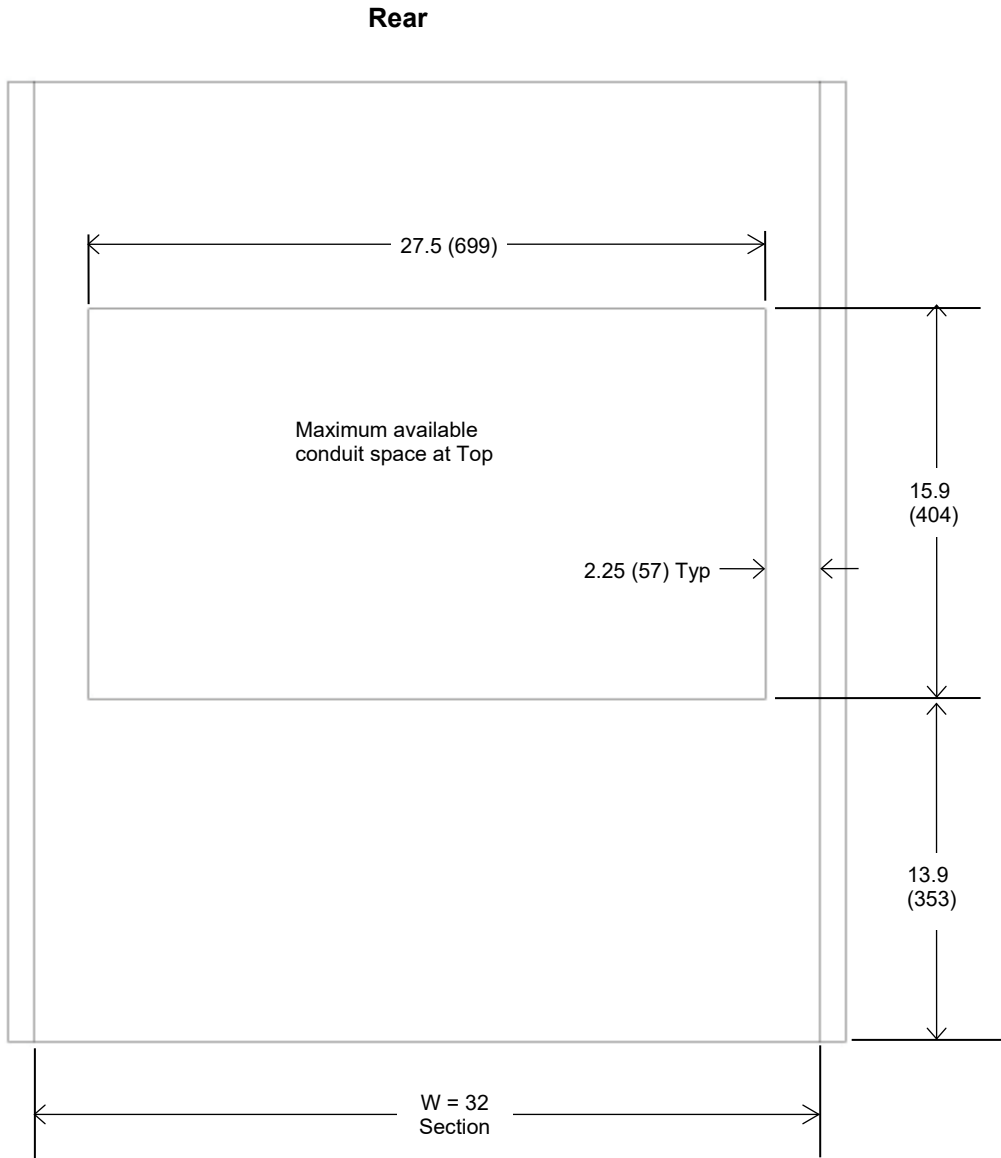


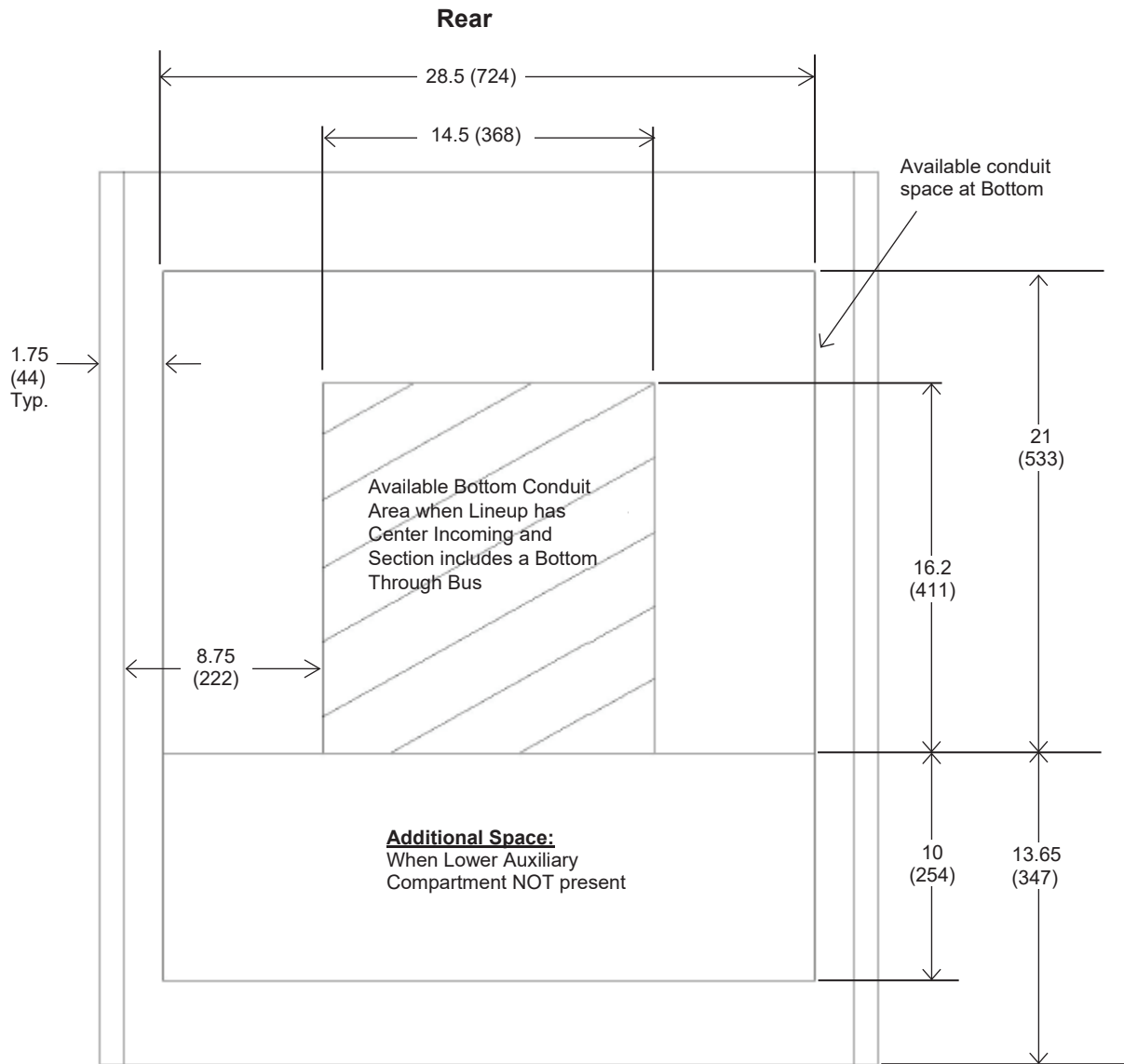
Fig - 5

Front

Plan View

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Incoming Section – Cable Entry Bottom

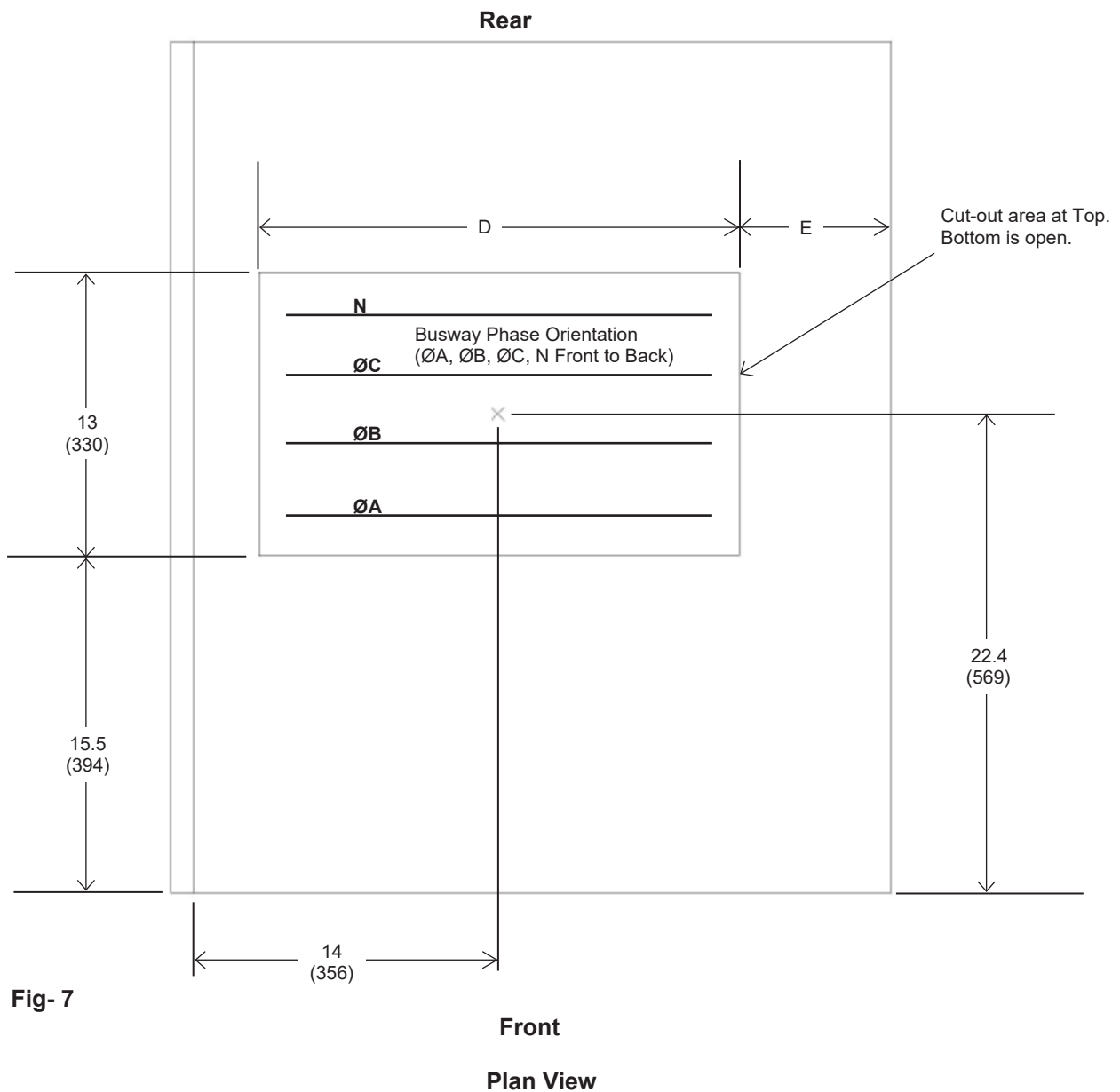


**Fig- 6** **Front**  
**Plan View**

Incoming	Conduit Area Bottom
End Section	28.5 (724) X 21 (533)
Not an End Section & Through Bus at Lower Level (Cables always connect to Top Level Through Bus)	14.5 (368) X 16.2 (411)

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Left Incoming Section – Sentron Busway Top & Bottom



Sentron Busway Plug Rating (Cu)	D	E
5000A	22 (559)	7 (178)
3000A/3200A/4000A	18 (457)	9 (229)
1600A/2000A/2500A	13.5 (343)	11.25 (286)
800A/1000A/1200A	8 (203)	14 (356)

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Right Incoming Section – Sentron Busway Top & Bottom

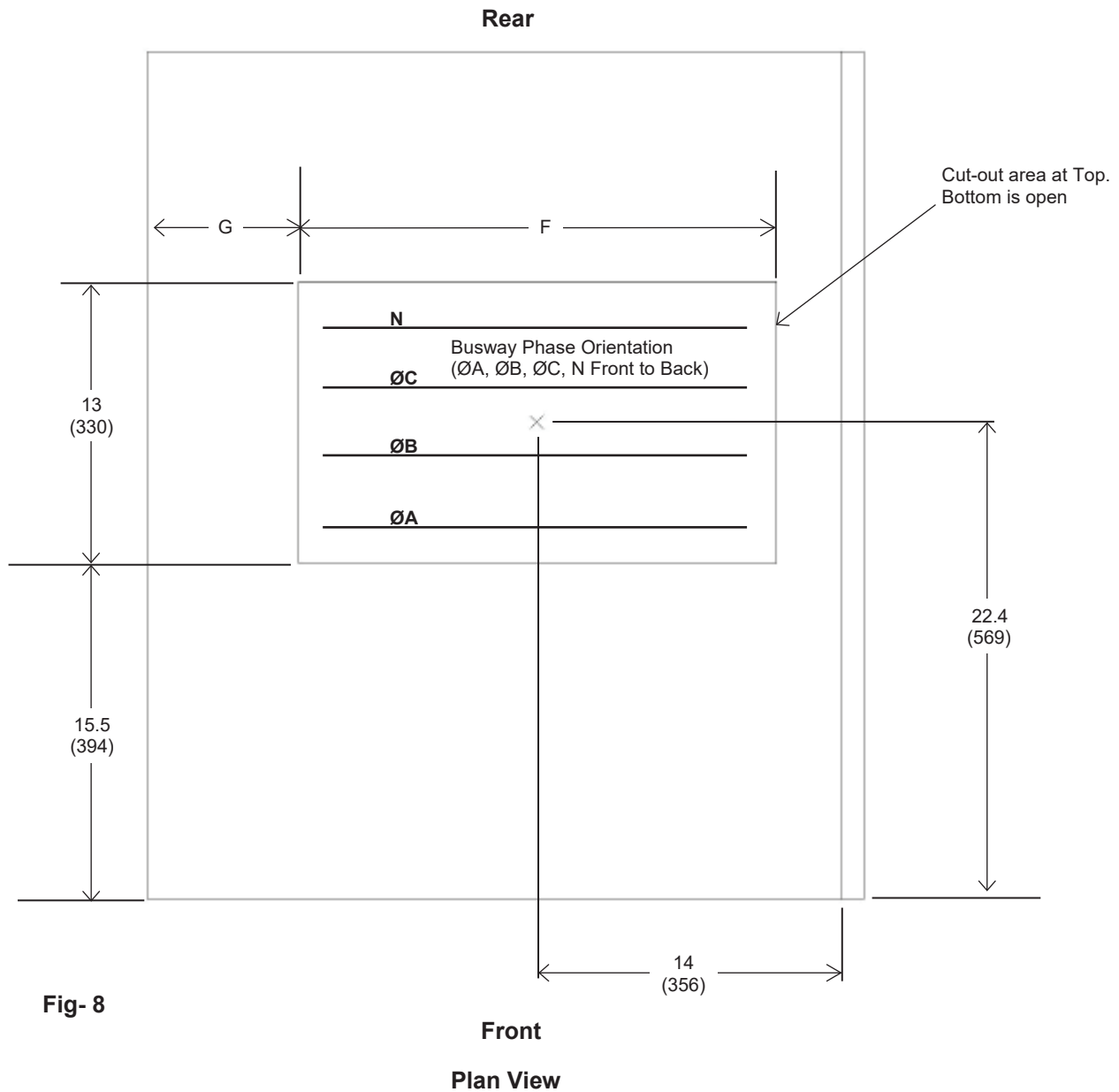
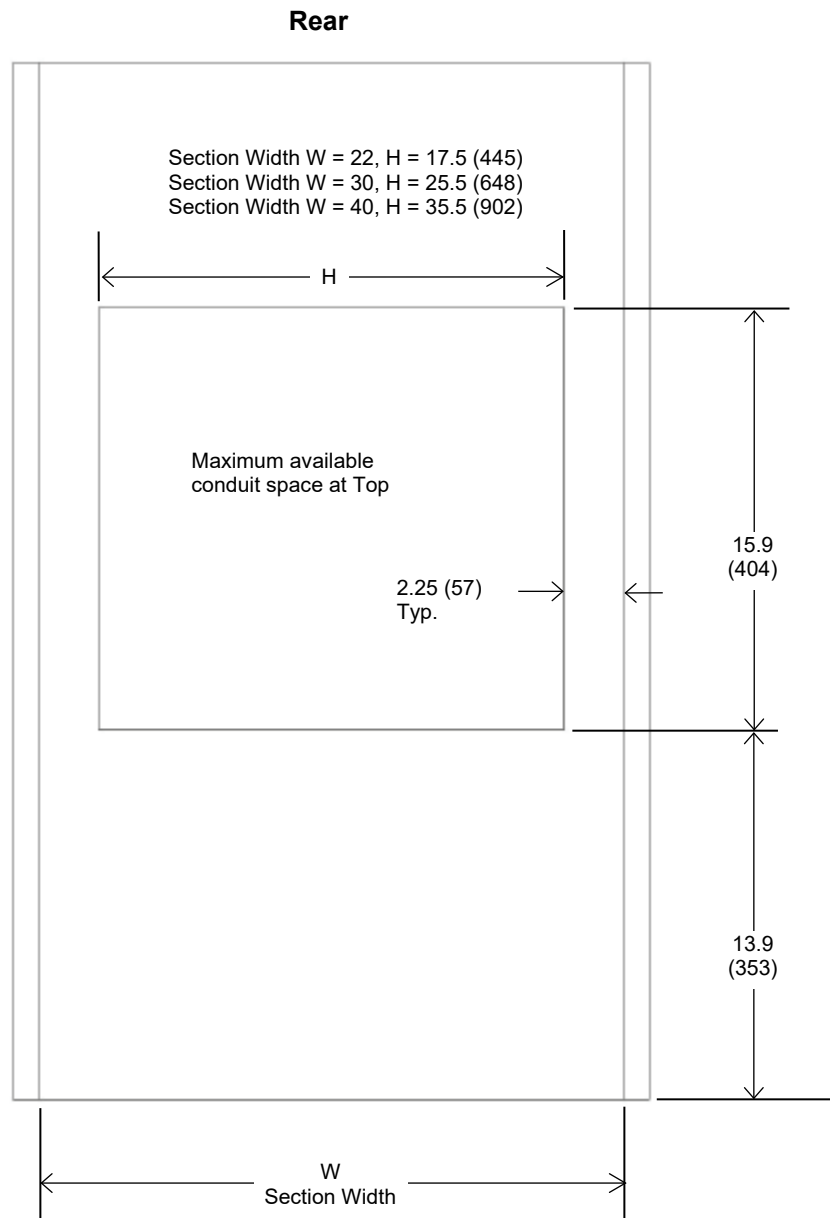


Fig- 8

Sentron Busway Plug Rating (Cu)	F	G
5000A	22 (559)	7 (178)
3000A/3200A/4000A	18 (457)	9 (229)
1600A/2000A/2500A	13.5 (343)	11.25 (286)
800A/1000A/1200A	8 (203)	14 (356)

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Feeder Cable Section (Area) – Cable Entry Top

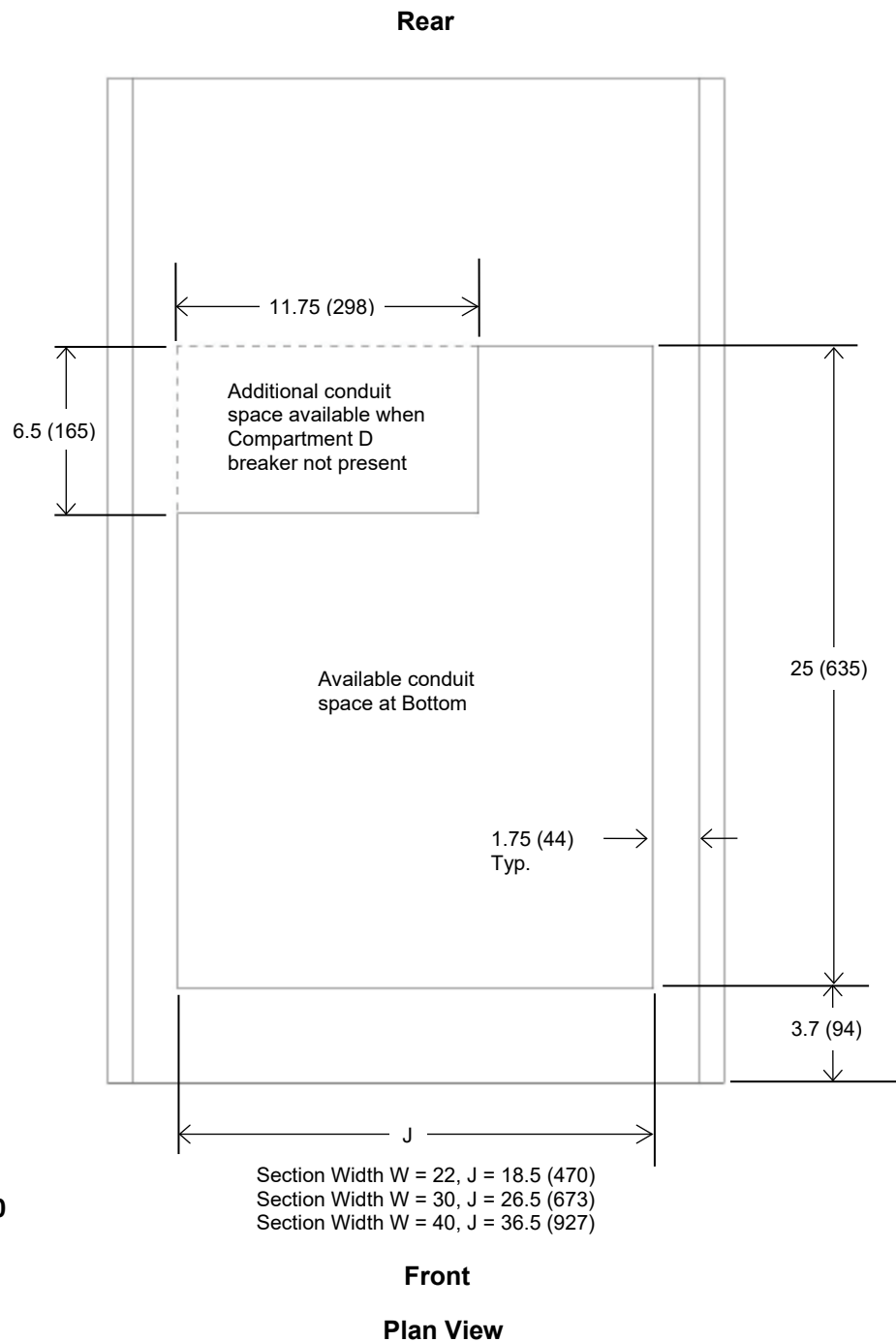


**Fig- 9**

**Front  
Plan View**

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Feeder Cable Section (Area) – Cable Entry Bottom



**Fig- 10**

# Front Connected Type WL Low Voltage Metal-Enclosed Switchgear

## Shipping Weights and Dimensional Information

Siemens Type WL Low Voltage Switchgear can be configured in many ways by combining different section types. Maximum shipping split length for indoor structures is 110 inches. If all vertical sections are not to be shipped as a unit, specifications need to be provided that describe the limiting factors (e.g., low door or narrow hallway).

Standard indoor vertical sections are 96 in. high and 39.2 in. deep.

The major assembly sections include:

- Incoming Sections — used as incoming for cable or bus duct entrance.
- Main Sections — used to contain main breaker and may house metering and feeder sections.
- Feeder Sections — used to contain feeder breakers and other equipment such as instrumentation.
- Tie Sections — used to contain tie breakers and other instrumentation.

Approximate Weight – Lbs.		
Section Type	Width	
	22" Wide	32" Wide
Auxiliary	1000	1300
Utility Metering	N/A	N/A
Main/Tie or Single Feeder *	1600	2400
FS2 Feeder - 4 High **	3200	N/A

\* Weights include the circuit breaker.

\*\* Includes 4 FS2 breakers. Subtract 270 lbs. for each breaker less than 4.

**Note:** This guide does not purport to cover all details in equipment, or to provide for every possible contingency. Should further information be desired or should particular problems arise, which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Siemens sales office. The contents of this guide shall not become part of or modify any prior or existing agreement, commitment or relationship.

**Published by  
Siemens 2020**

Siemens Industry, Inc.  
5400 Triangle Parkway  
Norcross, GA 30092

Siemens Technical Support: 1-800-333-7421  
info.us@siemens.com

Order No. LVSA-FCLVS-0320  
Printed in USA  
All Rights Reserved  
© 2020, Siemens Industry, Inc.  
[usa.siemens.com/switchgear](http://usa.siemens.com/switchgear)

The technical data presented in this document is based on an actual case or on as-designed parameters, and therefore should not be relied upon for any specific application and does not constitute a performance guarantee for any projects. Actual results are dependent on variable conditions. Accordingly, Siemens does not make representations, warranties, or assurances as to the accuracy, currency or completeness of the content contained herein. If requested, we will provide specific technical data or specifications with respect to any customer's particular applications. Our company is constantly involved in engineering and development. For that reason, we reserve the right to modify, at any time, the technology and product specifications contained herein.