SIEMENS

WL Low Voltage Metal-Enclosed Switchgear

Selection and Application Guide

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Type WL Low Voltage Metal-Enclosed Switchgear

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Type WL Low Voltage Metal-Enclosed Switchgear

General Information

Siemens Type WL low voltage metal-enclosed switchgear is designed, constructed and tested to provide superior power distribution, power monitoring and control. At the heart of the Type WL low voltage switchgear is the World Class Siemens WL breaker.

Siemens Type WL low voltage switchgear can be utilized in the following applications:

- **Industrial**
  Heavy assembly
  Semiconductor
  Petrochemical
  Automotive
  Biotech
  Pharmaceutical
- **Institutional**
  Water treatment
  Airports
  Universities
  Medical facilities
  Correctional facilities
- **Critical Power**
  Data Processing
  Continuous industrial process
  Hospitals
- **Utility and co-generation**
- **Commercial**
  Large office buildings
  Distribution centers
  Large warehouses

Product Scope:

- **Equipment ratings**
  635VAC Maximum
  3 Phase 3 Wire,
  3 Phase 4 Wire
  50/60 Hz
  6000 amp maximum horizontal bus
  6000 amp maximum vertical bus
- **Enclosure options**
  NEMA 1 Indoor
  NEMA 3R Outdoor Walk-In
  NEMA 3R Outdoor Non Walk-in

Siemens WL breakers can be manually or electrically operated, fused or unfused and are available in the following rating designations – N, S, H, L, M and F. Refer to tables on Page 13 for interrupt and withstand ratings for each rating designation.

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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 Protector
- ANSI C37.17 – Trip Devices for AC and General Purpose DC Low-Voltage Power Circuit Breakers
- NEMA SG3 - Low Voltage Power Circuit Breakers

Features and modifications required by NEC are incorporated when the assembly is designated as “Service Equipment.”

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.

Arc Resistant
Optional Type WL arc resistant low voltage switchgear is available and is UL listed to ANSI/IEEE C37.20.7. Type 2B arc resistant accessibility rating with maximum internal arcing short-circuit current rating of 100kA @508V and 85kA @ 635V.

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

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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.

Each vertical section consists of up to four individually enclosed breaker or auxiliary compartments which are sized to provide uniform height.

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 the air surrounding the 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.

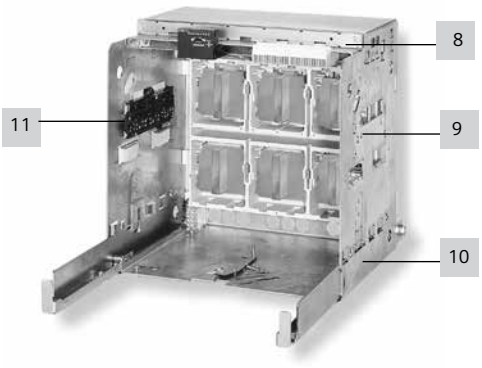
If requested in advance, the switchgear structure can be shipped so that the unit can be tilted onto its back during installation. This is an option that must be specified at order entry.

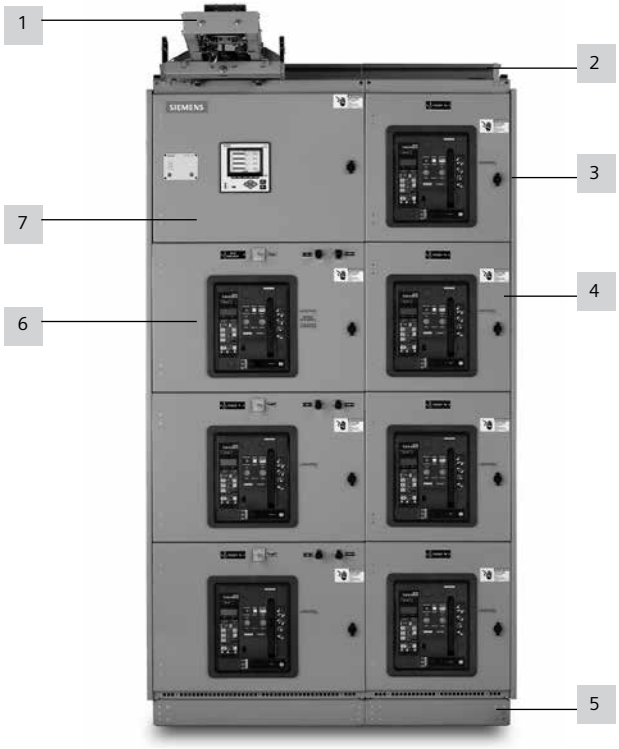
Each complete vertical section contains three compartments.
(1) Front compartment containing breakers and/or auxiliary equipment
(2) Bus compartment containing horizontal and vertical bus
(3) Rear cable compartment containing the load side runbacks connecting the load side of the breaker to the load cable terminals

Within the front compartment, 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 rear 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.)

1. Breaker Hoist and Track
2. Ventilation and Lifting Structure
3. Quarter Turn Door Latch
4. Secondary Disconnect Access Door
5. Riser Base (Optional)
6. Breaker Compartment
7. Auxiliary Instrument Compartment
8. Secondary Disconnect
9. Breaker Cradle (Guide Frame)
10. Breaker Drawout Rail
11. TOC Switch Operator





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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 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, 5000 and 6000 amperes continuous current. Horizontal bus ratings available are 1600, 2000, 3200, 4000, 5000 and 6000 amperes. A neutral bus is furnished when specified, and can be rated 1600, 2000, 3200, 4000, 5000 or 6000 amperes continuous current.

A 1/4" X 3" standard copper ground bus extends 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. Higher shortcircuit withstand bus bracings (150kA and 200kA) are available.

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.

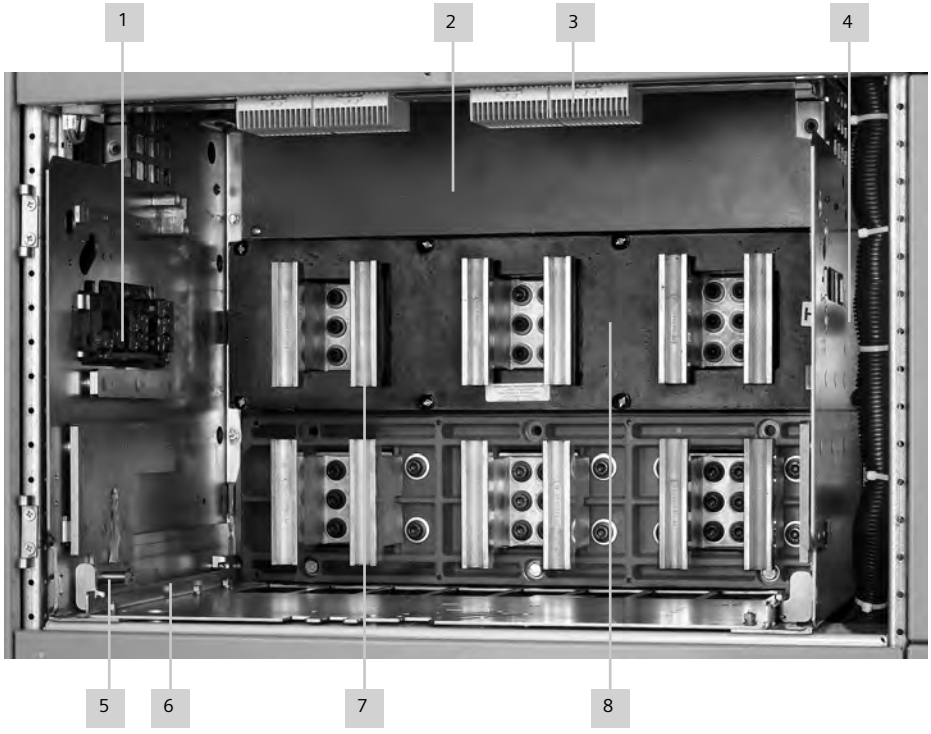
Control and Communication Wiring
Standard control and communication wiring is #14 AWG extra-flexible, stranded copper type SIS. Control and communication wiring is installed and accessed from the front of the switchgear structure. Each breaker compartment has a dedicated horizontal and vertical wireway.

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

Insulation
The insulation used is a UL recognized thermoset 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.



1. TOC Switch Operator
2. Breaker Compartment Rear Barrier
3. Secondary Disconnect
4. Vertical Wireway
5. Interference Interlock
6. Drawout Rails
7. Primary Disconnect
8. Cradle Mounted Current Transformer

Circuit breaker cell interior

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Construction Details

Options

Switchgear Mounted Hoist
The integrally mounted hoist, standard on walk-in outdoor and optional on indoor switchgear enclosures, travels along rails on top of the switchgear to assist in breaker handling.

TOC and MOC Switches
The Truck Operated Cell (TOC) Switch provides interlocking control or remote indication of the breaker racking position. The cubicle mounted auxiliary switch or Mechanism Operated Cell (MOC) switch provides interlocking control or remote indication based on the main contact position (open or closed).

Shutters
These provide protection against accidental contact with primary disconnects in a compartment when the breaker is removed. Shutters automatically close when the breaker is withdrawn and are pad-lockable and field installable.

Key Interlock
This provides a mechanical means for operating circuit breakers and other devices only when predescribed conditions are met.

Test Set
A portable breaker test set is available as an option and supports testing the full range of functions and protective settings supplied with the breaker trip unit.

Metering and Auxiliary Compartments
Compartments are available to house devices such as voltage transformers, metering, control power transformers, and supervisory devices.

Instrument and Control Transformers
Voltage transformers and control power transformers are mounted in auxiliary compartments. These transformers are protected by primary pull-out type current-limiting fuses and secondary fuses. Current transformers are normally mounted on the compartment primary disconnect studs where they are readily accessible. See Tables on Page 31 for available ratings.

Miscellaneous
- Each switchgear lineup includes a breaker lifting device that is adjustable for use with Size II and Size III breakers.
- An optional portable breaker hoist is available if the integrated breaker hoist and track is not specified.
- A test cabinet is also available as an option. The test cabinet is wall mounted necessary equipment for testing electrically-operated breakers that have been removed from the breaker compartment. The test cabinet doesn't include or replace a breaker trip unit tester.
- A WL remote breaker racking device (RBRD) is available as an optional accessory that allows maintenance personnel to safely rack Siemens Type WL breakers into the Connect, Test and Disconnect positions from up to 30 feet away from the breaker. This allows the operator to be outside the arc flash hazard boundary and thereby providing additional personnel protection.
- 4" high formed steel riser bases are available for indoor switchgear enclosures.

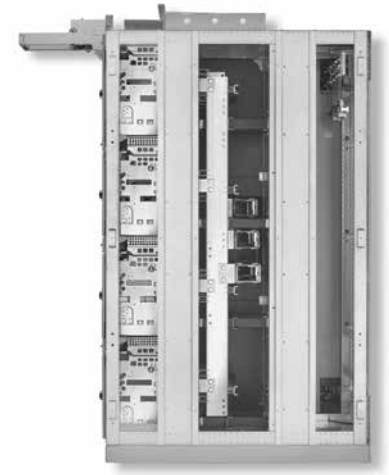
Outdoor Switchgear
Type WL switchgear is available in two outdoor (NEMA 3R) enclosures. Walk-in and non walk-in versions are available to meet your particular application.

For protection from snow, rain and other foreign matter, both outdoor enclosures rest on a six-inch high, formed steel base which provides rigid support and a tight bottom seal. A heavy duty protective under-coating is applied to the underside of all outdoor enclosures to protect against moisture and corrosion. Shielded ventilation housings permit proper air circulation while excluding dirt and foreign matter.

In the walk-in outdoor enclosure a lighted, unobstructed service aisle is provided at the front of the switchgear allowing inspection and maintenance without exposure to the elements. An access door equipped with an emergency bar release is located at each end of the aisle in a lineup of more than two sections.

The following features are standard with walk-in outdoor enclosures.
(1) Space heaters in breaker compartment and bus compartment.
(2) Screens and filters for exterior door ventilation louvers.
(3) Incandescent or LED lighting receptacle with three-way switch at each aisle access door.
(4) Duplex receptacle with ground fault protection at each aisle access door.
(5) Load center for power distribution to lights, receptacles, switches and heaters.

For non walk-in outdoor enclosures, space heaters and screens/filters for ventilation louvering are standard with lighting, receptacles, switches and load centers offered as options.



Side view

Rear view

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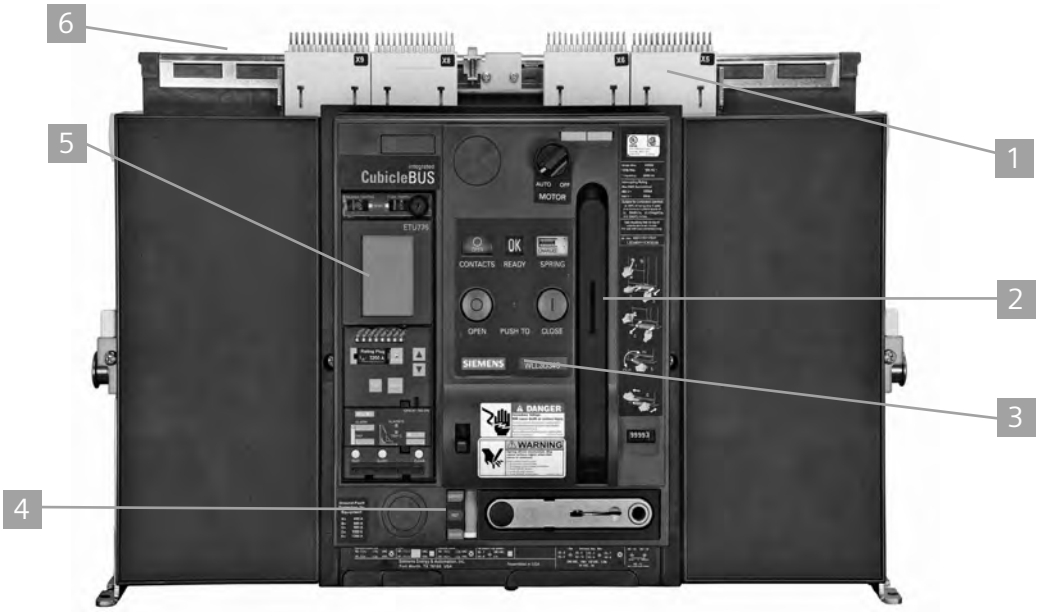
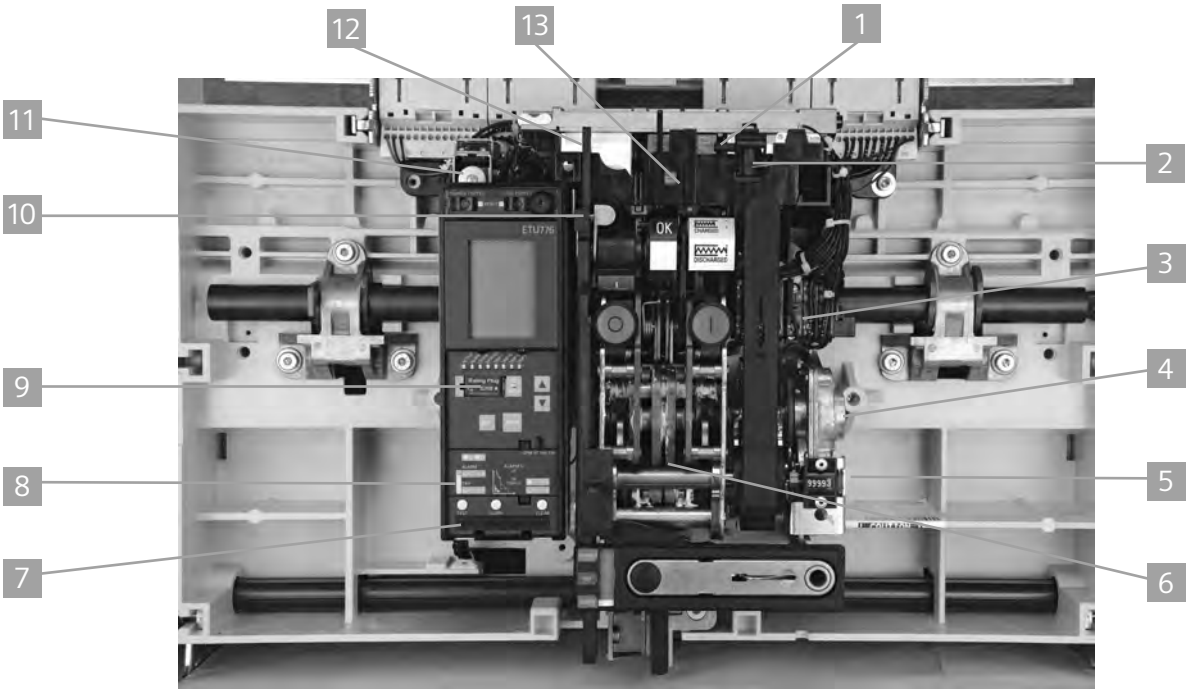
Breaker Assembly View



Exterior breaker features

1. Secondary contacts
2. Charging handle
3. Centralized operator panel
4. Integral racking handle with position indicator
5. Trip unit with LCD
6. Arc chutes



Interior breaker features

1. Remote closing coil
2. Second shunt trip or UV release
3. Auxiliary switch
4. Automatic charging motor
5. Operation counter
6. Operating mechanism
7. Electronic trip unit (ETU)
8. Optional ground fault module with alarm and trip functions
9. Interchangeable current rating plug
10. Breaker status sensor (BSS)
11. Bell alarm contact with remote reset
12. Shunt trip coil
13. Ready-to-close-contact

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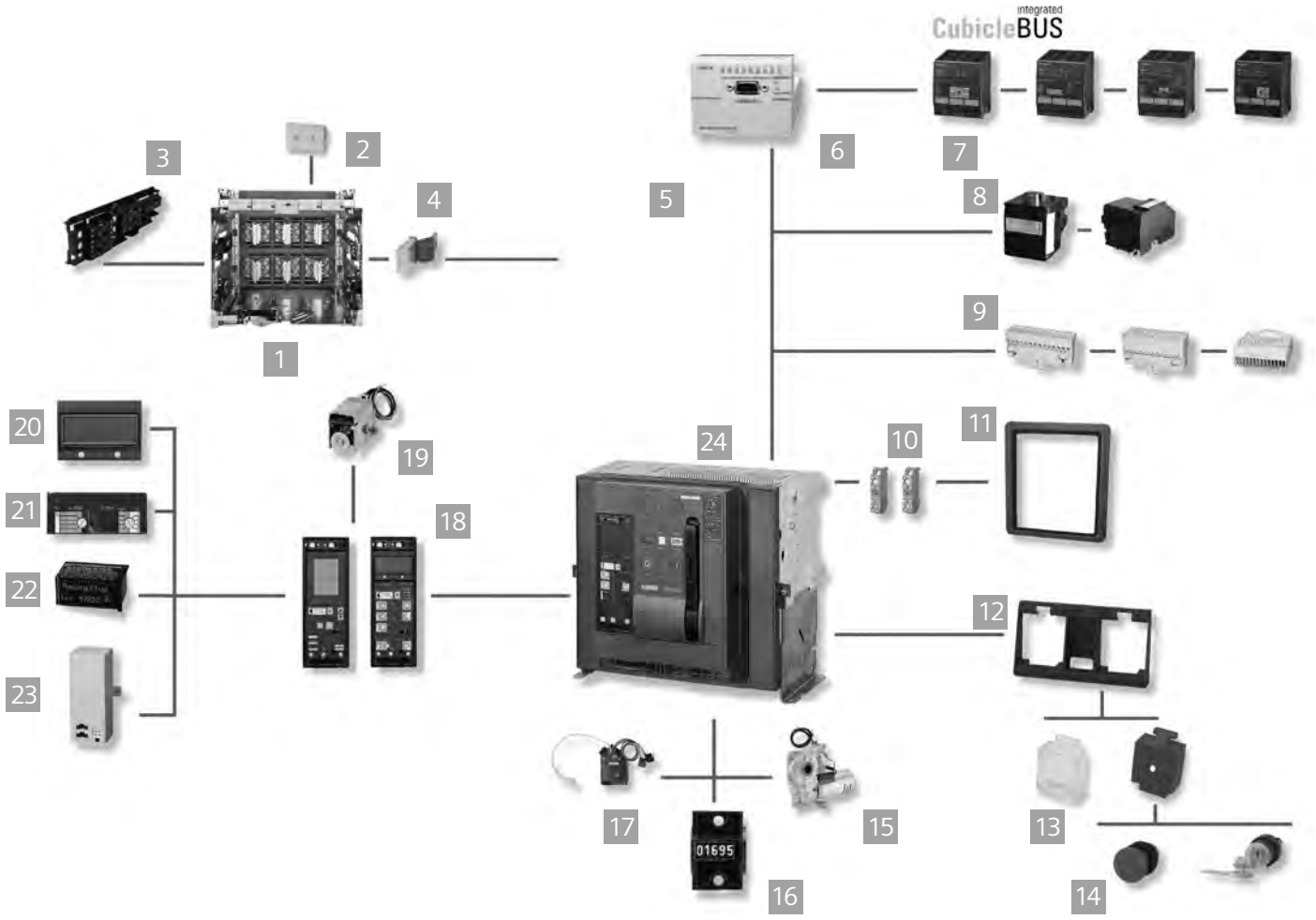
Superior individual products for low-voltage power distribution systems



1.Guide Frame (for drawout version only)
2. Vertical to Horizontal BUS Connector
3. Position Signaling Switch
4. Breaker / Guide Frame Grounding Contact
5. Shutter (locking)
6. Communications module
7. External CubicleBUS I/O Module
8. Plug-In Open and Closed Solenoids)
9. Multiple Secondary Connections
10. Auxiliary Switch Block
11. Door Sealing Frame
12. Interlocking Set Base Plate
13. Protective Cover for OPEN/CLOSE Buttons
14. Multiple Key Locking Accessories
15. Single Bolt Motor Operator Installation
16. Operations Counter
17. Breaker Status Sensor (BSS)
18. Complete Trip Unit Family
19. Remote Reset
20. Multi Angle LCD Module
21. Ground Fault Protection Module
22. Rating Plug
23. Metering Function (+ wave forms and harmonics)
24. Circuit Breaker

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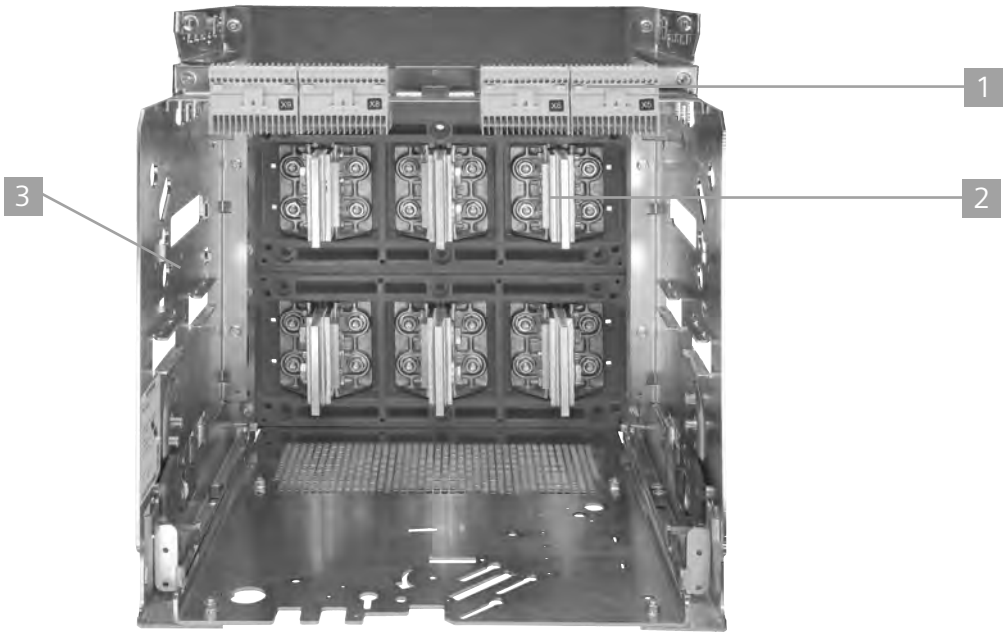
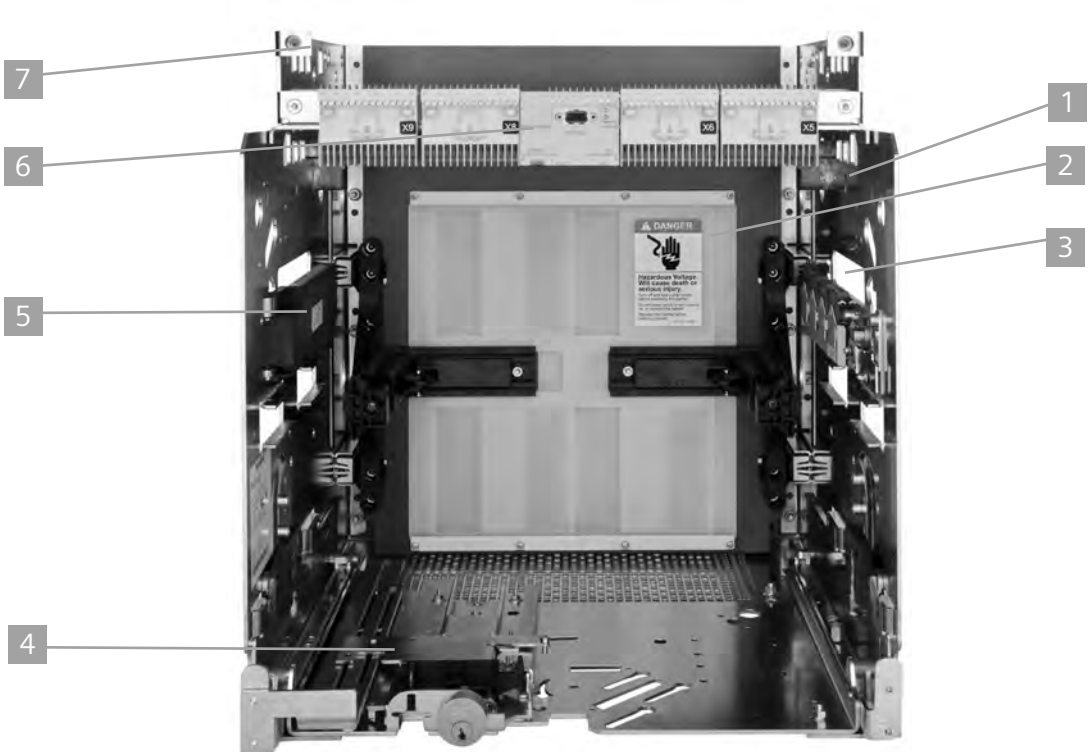
Draw-out Cradle Assembly View



Standard cradle

1. Stationary secondary disconnect
2. Primary disconnects
3. Cradle frame assembly for draw-out breakers



Cradle accessories

1. Mechanical interlock (not shown)
2. Isolation shutters
3. Mechanism operated contact switches (MOC)
4. Dual key-lock location
5. Breaker position switches (TOC)
6. Communication module location (COM 16 or COM 15)
7. Optional arc chute cover (not shown)

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Electronic Trip Unit (ETU)

Electronic trip units (ETUs)
Power system protection is necessary to treat common types of abnormal occurrences, such as overloads or faults that can lead to electrical power system failure.

The methods for detecting and clearing such abnormalities and restore to normal operation is an engineered technique. Adequate protection requires constant measurements of certain system quantities, such as voltages and currents, comparing those system quantities, or some combination of the quantities, to a threshold setting computed by a systems engineer and set into an electronic trip unit like those available on the WL breakers. It's equally important for power system protection to perform under normal operating conditions. If the above thresholds are set too low the power may be interrupted unnecessarily causing loss of productivity or safety provisions. The WL circuit breaker offers a practical means of setting power system protection through vast selectivity available in its Electronic Trip Unit (ETU). WL ETUs have a wide range of protective settings for implementing simple or complex coordination schemes and configuring reliable system protection.

ETU enhanced features
- Extended Instantaneous Protection (EIP): Allows the entire range of WL ampacities to be applied at the withstand rating of the breaker with minus 0% tolerance; that means no instantaneous override whatsoever. EIP further enables the circuit breaker to be applied up to the full interrupting rating of the breaker on systems where the available fault current exceeds the withstand rating, even with LS-only trip units.
- Dynamic Arc-Flash Sentry (DAS): Allows you the ability to execute a faster coordinated trip condition should an arc fault event occur while personnel are within the arc flash boundary. When the presence of personnel is no longer in the arc flash boundary, DAS will default back to maintaining your selective trip coordination through time delay functions. This is like toggling between two trip units on one breaker. DAS can be activated by a simple contact closer, so a wide range of activation devices can be used to enable DAS.
- Selectable I^4t: ETU745 and 776 make it possible to switch over from an I^2t to an I^4t inverse-time function for overload protection. This selectivity increases optimization of coordinated overload protection when overload fuse protection is also provided.

ETU basic functions
Long-time trip
The long-time delay adjustment is used to set the tripping delay of the circuit breaker based on the magnitude of the overcurrent condition (6 times I_r). For example if the rating plug is 2000 amps and the long-time delay is set to 10 seconds, a fault current of 12,000 amps (6 x 2000) will cause the breaker to trip after 10 seconds. Long-time is an inverse of I^2t ramp function. This means the higher the current, the shorter the time the circuit breaker will remain closed. An Alarm LED indicator will flash during the delay period and a separate "Trip L" indicator may turn on if the breaker trips on long-time function.

Short-time trip
The short-time pickup adjustment is used to set the level of high current the breaker will carry for a short period of time without tripping. This adjustment is set in multiples of the value of the rating plug (Ir). Together with the short-time delay, this adjustment allows downstream breakers time to clear short circuit faults without tripping upstream breakers. Short-time delay is used to set the time interval the breaker will wait before responding to the current value selected by short-time pickup. There are two modes of operation: fixed and I^2t. The I^2t delay has the characteristic of being inversely proportional to the square of the magnitude of the current. This means higher overcurrent conditions have shorter delays. An Alarm LED indicator may flash during the delay period and a separate "Trip S" indicator will turn on if the breaker trips on short-time function.

Instantaneous trip
The instantaneous pickup adjustment is used to set the current level at which the breaker will trip without an intentional time delay. Non-delayed tripping as a result of severe over-current minimizes potential damage to the electrical system and equipment.

Ground fault
The ground fault pickup adjustment is used to set the level of ground current at which circuit interruption will be initiated. Together with ground fault delay, this adjustment allows selective tripping between main and feeder or downstream breakers.

The ground fault delay adjustment is used to set the time interval (in seconds) the breaker will wait before responding once the ground fault pickup level has been reached. The available ground fault delay settings available are: inverse time (I^2t) or fixed delay.

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Electronic Trip Unit (ETU)

ETU 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^2t or I^4t long-time delay	X	X
Adjustable instantaneous pick-up	X	X
Selectable I^2t or I^4t 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

ETU communication
The ETU uses a Siemens proprietary communication network called CubicleBus. The CubicleBus network ensures all Siemens devices are able to transmit data reliably and efficiently. The ETU can not be connected directly any other network so the use of converters are necessary to allow communication between the ETU and the outside world. The WL has three types of converters to allow communication between the ETU |and computer type equipment. The three converts are:

- PROFIBUS (COM15)
- Modbus (COM16)
- MODBUS-TCP / PROFINET IO (COM35)

The WL PROFIBUS converter is model 'COM15.' The COM15 device acts as an interface between the WL breaker and the information environment. A joint device master file (GSD) can be used for integrating WL circuit breakers in a PROFIBUS-DP network. The advantage of this joint communication profile is that the same software can be used for automation, monitoring and control systems.

The WL ModBus converter is model 'COM16'. The COM16 device enables the WL breaker to be connected to any Modbus master network. Universal Modbus mapping can be used to allow custom monitoring and controls with a centralized monitoring system. The Modbus port is configured for RS485 connectivity and can easily be daisy-chained to several WL breakers to create a serial-network suitable for connecting to a LAN or WAN network.

The WL MODBUS TCP and PROFINET IO converter is model 'COM35'. This device can communicate PROFINET IO and MODBUS TCP simultaneously over Ethernet, and is capable of supporting dual masters. The datasets are structured identical to the COM15 and COM16 communications devices for easy integration in existing SCADA systems.

All three converters require a 24VDC Class 2 power supply. See External Accessories for more information on available power supplies.

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Electronic Trip Unit (ETU)

Power metering function
In addition to excellent protection capabilities, the WL ETU has unparalleled power metering functionality. True RMS current sensing for metering is obtained from the same current sensors used for overload protection. ETU power metering can measure the following:

Measured value	Value range	Accuracy
Currents Ia, Ib, Ic, In	30 ... 8000A	± 1%
Ground-fault current Ig (measure with external Gnd transformer)	100 ... 1200A	± 5%
Line-to-line voltages Vab, Vbc, Vca	80 ... 120% Vn	± 1%
Line-to-neutral voltages Van, Vbn, Vcn	80 ... 120% Vn	± 1%
Average value of phase-to-phase voltages V L-L AVG	80 ... 120% Vn	± 1%
Apparent power kVA per phase	13 ... 8000kVA	± 2%
Total apparent power KVA	13 ... 24000kVA	± 2%
Active power kW per phase	-8000 ... 8000kW	± 3% (power factor > 0.6)
Total active power kW total	-24000 ... 24000kVA	± 3% (power factor > 0.6)
Reactive power kvar	-6400 ... 6400kvar	± 4% (power factor > 0.6)
Total reactive power kvar	-20000 ... 20000kvar	± 4% (power factor > 0.6)
Power factor per phase	-0.6 ... 1 ... 0.6	± 0.04
Power factor total	-0.6 ... 1 ... 0.6	± 0.04
Demand of currents Ia, Ib, Ic	30 ... 8000A	± 1%
Average demand of 3-phase current	30 ... 8000A	± 1%
Demand kWD per phase	13 ... 8000kW	± 3% (power factor > 0.6)
kW demand 3-phase active power kWD total	13 ... 8000kW	± 3% (power factor > 0.6)
kVA demand kVA total	13 ... 8000kVA	± 2%
kVAR demand kVAR per phase	13 ... 8000kVA	± 2%
kVAR demand total	-24000 ... 24000kvar	± 4% (power factor > 0.6)
kWhr imported	1 ... 10000MWh	± 2%
kWhr exported	1 ... 10000MWh	± 2%
kVARh imported	1 ... 10000Mvarh	± 4%
kVARh exported	1 ... 10000Mvarh	± 4%
Frequency	15 ... 440 Hz	± 0.1 Hz
Total harmonic distortions for current and voltage	2 ... 100%	± 3% from the meas. range up to the 29th harmonic
Phase unbalance for current and voltage	2 ... 150%	± 1%

Potential transformers (PTs) are required to step down the supply voltage to a level that is suitable for local input connection to the breaker. PTs must be wired to the secondary connections of the breaker and configured for three-phase, three-wire or three-phase, four-wire supply system. The measured values can be sent to a central database for future power analysis or consumption reports.

Metering is not field installable – it must be configured in the initial breaker purchase.

Event log
The event log is very extensive. Information regarding the list of events can be found in the WL operation manual or communication guide. Some of the event log categories are:
- Warnings
- Trip Logs
- Set-points
- Maintenance Detail
- CubicleBus Conditions
- Waveform Displays

Alarm parameters
The metering function includes the following alarm set-point functions:

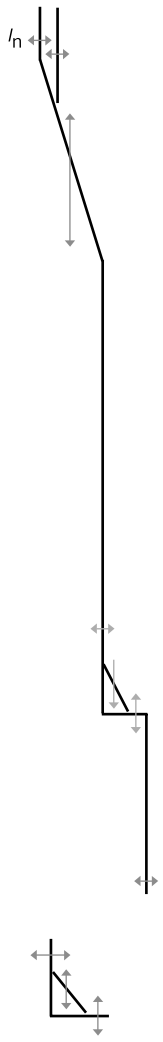
Alarm function	Setting range	Possible delay
Overcurrent	3 ... 10000A	0 ... 255 s
Overcurrent – ground fault	3 ... 10000A	0 ... 255 s
Overcurrent – N-conductor	3 ... 10000A	0 ... 255 s
Phase unbalance – current	5 ... 50%	0 ... 255 s
Demand – current	3 ... 10000A	0 ... 255 s
Total harmonic distortion – current	0 ... 50%	5 ... 255 s
Undervoltage	100...1200V	0 ... 255 s
Overvoltage	200...1200V	0 ... 255 s
Phase unbalance – voltage	5 ... 50%	0 ... 255 s
Total harmonic distortion – voltage	0 ... 50%	5 ... 255 s
Crest factor	0.01 ... 25.5%	0 ... 255 s
Form factor	0.01 ... 25.5%	0 ... 255 s
Active power in normal direction	1 ... 10000kW	0 ... 255 s
Active power in reverse direction	1 ... 10000kW	0 ... 255 s
Leading power factor	-0.999 ... 1	0 ... 255 s
Lagging power factor	-0.999 ... 1	0 ... 255 s
Demand – active power	1 ... 10000kW	0 ... 255 s
Apparent power	1 ... 10000kVA	0 ... 255 s
Reactive power in normal direction	1 ... 10000kvar	0 ... 255 s
Reactive power in reverse direction	1 ... 10000kvar	0 ... 255 s
Demand – reactive power	1 ... 10000kvar	0 ... 255 s
Underfrequency	40 ... 70 Hz	0 ... 255 s
Overfrequency	40 ... 70 Hz	0 ... 255 s

Extended relaying
Protective relays included with the metering function can monitor the following criteria and initiate a trip if the values are exceeded.

Protective relay function	ANSI device number	Setting range	Possible delay
Current unbalance	46	5 ... 50%	1 ...15 s
Total harmonic distortion - current	81 THDC	0 ... 50%	5 ...15 s
Voltage unbalance	47	5 ... 50%	1 ...15 s
Undervoltage	27	100 ... 1100V	1 ...15 s
Overvoltage	59	200 ... 1200V	1 ...15 s
Total harmonic distortion - voltage	81 THDV	0 ... 50%	5 ...15 s
Direction of phase rotation	47N		
Active power in normal direction	32	1 ... 10000kW	1 ...15 s
Active power in reverse direction	32R	1 ... 10000kW	1 ...15 s
Under frequency	81U	40 ... 70 Hz	1 ...15 s
Over frequency	81O	40 ... 70 Hz	1 ...15 s

Type WL Low Voltage Metal-Enclosed Switchgear

Electronic Trip Unit (ETU)



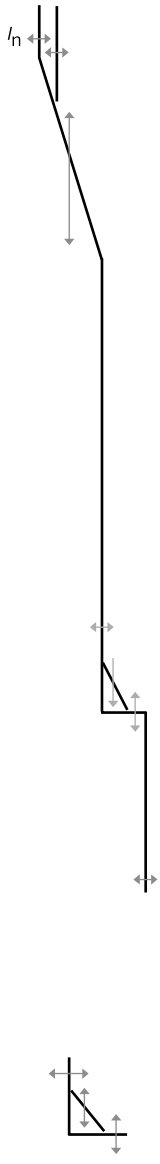
Basic functions		ETU745
L	**Long-time overcurrent protection**	✓
	Function can be disabled	–
	Setting range $I_R = I_n$ x ...	0.4, 0.45, 0.5, 0.55, 0.6, 0.65, 0.7, 0.8, 0.9, 1
	Switch-selectable overload protection (I^2t or I^4t dependent function)	✓
	Setting range of time delay class t_R at I^2t (seconds)	2, 3.5, 5.5, 8, 10, 14, 17, 21, 25, 30
	Setting range of time delay t_R at I^4t (seconds)	1, 2, 3, 4, 5
	Thermal memory	✓ (via slide switch)
	Phase loss sensitivity	set t_{sd} =20 ms (M)
N	**Neutral protection**	✓
	Function can be disabled	✓ (via slide switch)
	N-conductor setting range $I_N = I_n$ x ...	0.5 ... 1
S	**Short-time overcurrent protection**	✓
	Function can be disabled	✓ (via rotary switch)
	Setting range $I_{sd} = I_n$ x ...	1.25, 1.5, 2, 2.5, 3, 4, 6, 8, 10, 12
	Setting range of time delay t_{sd}, fixed (constant time in seconds)	0.02 (M), 0.1, 0.2, 0.3, 0.4, OFF
	Setting range of time delay I_{sd} at I^2t (seconds)	0.1, 0.2, 0.3, 0.4
	Zone Selective Interlocking (ZSI) function	per CubicleBUS module
I	**Instantaneous overcurrent protection**	✓
	Function can be disabled	✓
	Extended Instantaneous Protection	Instantaneous is active when disabled
	Setting range $I_i = I_n$ x ...	1.5, 2.2, 3, 4, 6, 8, 10, 12 0.8 x I_{cw} = Max,
G	**Ground fault protection**	o (field installable module)
	Trip and alarm function	✓
	Detection of the ground fault current by residual summing method	✓
	Detection of the ground fault current by direct sensing method	✓
	Setting range of the I_g for trip	A, B, C, D, E (100 ... 1200A)
	Setting range of the I_g for alarm	A, B, C, D, E (100 ... 1200A)
	Setting range of the time delay t_g (fixed seconds)	0.1, 0.2, 0.3, 0.4, 0.5
	Setting range time delay t_g at I^2t	0.4, 0., 0.3, 0.4, 0.5
	ZSI ground function	per CubicleBUS module

[1] Extended Instantaneous Protection (EIP) allows the WL breaker to be applied at the withstand rating of the breaker with minus 0% tolerance; that means no instantaneous override whatsoever. EIP further enables the circuit breaker to be applied up to the full instantaneous rating of the breaker on systems where the available fault current exceeds the withstand rating.

✓ available
– not available
o optional

Type WL Low Voltage Metal-Enclosed Switchgear

Electronic Trip Unit (ETU)



Basic function		ETU776
L	**Long-time overcurrent protection**	✓
	Function can be disabled	–
	Setting range $I_R = I_n$ x ...	40-100% of I_n (Adjustable in Amps[1])
	Switch-selectable overload protection (I^2t or I^4t dependent function)	✓
	Setting range of time delay class t_R at I^2t (seconds)	2...30 (step; 0.1s)
	Setting range of time delay t_R at I^4t (seconds)	1...5 (step; 0.1s)
	Thermal memory	✓ (on/off via keypad or communications)
	Phase loss sensitivity	✓ (on/off via keypad or communications)
N	**Neutral protection**	✓
	Function can be disabled	✓ (on/off via keypad or communications)
	N-conductor setting range $I_N = I_n$ x ...	0.5 ... 2 OFF
S	**Short-time delayed overcurrent protection**	✓
	Function can be switched ON/OFF	✓ (on/off via keypad or communications)
	Setting range $I_{sd} = I_n$ x ...	1.25... 0.9 x I_{cw} = max (step: 10A)
	Setting range of time delay t_{sd}, fixed (seconds)	M, 0.08... 04, OFF (step: 0.001s)
	Switch-selectable short-time delay short-circuit protection (I^2t dependent function)	✓ (via keypad or communications)
	Setting range of time delay I_{sd} at I^2t (seconds)	0.1... 0.4 (step 0.001s)
	Zone Selective Interlocking (ZSI) function	per CubicleBUS module
I	**Instantaneous overcurrent protection** [2]	
	Function can be disabled, Extended Instantaneous Protection is enabled when OFF	✓ (via keypad or communications)
	Setting range I_i = In x ...	1.5 ... 0.8 x I_{cs} = MAX OFF = I_{cw} = EIP
G	**Ground fault protection**	o (field installable module)
	Trip and alarm function	✓
	Detection of the ground fault current by residual summing method	✓
	Detection of the ground fault current by direct summing method	✓
	Setting range of the I_g for trip	A... E (step: 1A)
	Setting range of the I_g for alarm	A... E (step: 1A)
	Setting range of the time delay t_g (seconds)	0.1...0.5 (step: 0.001s)
	Switch-selectable ground fault protection (I^2t / fixed)	✓
	Setting range time delay t_g at I^2t	0.1...0.5 (step: 0.001s)
	ZSI ground function	per CubicleBUS module

[1] **Note:** Note: ETU776 settings via powerconfig or Communications module (MODBUS, MODBUS TCP, PROFIBUS, PROFINET IO): 1A steps (10A steps for Short-Time and Instantaneous)

[2] Extended Instantaneous Protection (EIP) allows the WL breaker to be applied at the withstand rating of the breaker with minus 0% tolerance; that means no instantaneous override whatsoever. EIP further enables the circuit breaker to be applied up to the full instantaneous rating of the breaker on systems where the available fault current exceeds the withstand rating.

✓ available
– not available
o optional

[3] **Notes:**
M = indicates phase loss sensitivity is enabled. LT pick-up reduced 80% when phas e unbalance > 50%. ST = 20 ms
Key pad = Direct input at the trip unit.

Type WL Low Voltage Metal-Enclosed Switchgear

Ratings for UL 1066 Listed (ANSI C37) Breakers

WL frame ratings – Frame size 2		800A					1600A				
Rating Class		**N**	**S**	**H**	**L**	**F**	**N**	**S**	**H**	**L**	**F**
Interrupting current frame Ics (kAIC RMS) 50/60 Hz	254VAC	50	65	85	100	200	50	65	85	100	100
	508VAC	50	65	85	100	200	50	65	85	100	200
	600VAC	—	—	—	—	200	—	—	—	—	200
	635VAC	50	65	65	85	—	50	65	65	85	—
Short-time current *I*cw (kA RMS)	1 sec.	50	65	65	85	—	50	65	65	85	—
Close and latch rating (ka RMS)		50	65	65	85	—	50	65	65	85	—
Applicable rating plug range		200 - 800A					200 - 1600A				
Mechnical make-time (ms)		35					35				
Mechanical break-time (ms)		34					34				
Electric close make-time (ms)		50					50				
Electric trip / UV break-time (ms)		40/73					40/73				
Electric trip and reclose interval (ms)		80					80				
Mechanical duty cycles (with maint.)[1]		15,000					15,000				
Electrical duty cycles (with maint.)[1]		15,000					15,000				
Draw-out breaker efficiency (Watts loss at rated I_n)		700					320				
Draw-out fused breaker efficiency (Watts loss a rated I_n)		Consult factory					Consult factory				
Ambient operating temperature (°C)		-25 to 40					-25 to 40				

WL frame ratings – Frame size 2		2000A				3200A		
Rating Class		**S**	**H**	**L**	**F**	**S**	**H**	**L**
Interrupting current frame *I*cs	254VAC	65	85	100	200	65	85	100
(kAIC RMS) 50/60 Hz	508VAC	65	85	100	200	65	80	100
	600VAC	—	—	—	200	—	—	—
	635VAC	65	65	85	—	65	65	85
Short-time current *I*cw (kA RMS)	1 sec.	65	65	85	—	65	65	85
Close and latch rating (ka RMS)		65	65	85	—	65	65	85
Applicable rating plug range		200 - 2000A				200 - 3200A		
Mechanical make-time (ms)		35				35		
Mechanical break-time (ms)		34				34		
Electric close make-time (ms)		50				50		
Electric trip / UV break-time (ms)		40/73				40/73		
Electric trip and reclose interval (ms)		80				80		
Mechanical duty cycles (with maint.)[1]		15,000				15,000		
Electrical duty cycles (with maint.)[1]		15,000				15,000		
Draw-out breaker efficiency (Watts loss at rated *I*n)		700				1650		
Draw-out fused breaker efficiency (Watts loss a rated *I*n)		Consult factory				Consult factory		
Ambient operating temperature (°C)		-25 to 40				-25 to 40		

Type WL Low Voltage Metal-Enclosed Switchgear

Ratings for UL 1066 Listed (ANSI C37) Breakers

WL frame ratings – Frame size 3		3200A		4000A				5000A			
Rating Class		**M**	**F**	**H**	**L**	**M**	**F**	**H**	**L**	**M**	**F**
Interrupting current frame *I*cs	254VAC	150	200	85	100	150	200	85	100	150	200
(kAIC RMS) 50/60 Hz	508VAC	150	200	85	100	150	200	85	100	150	200
	600VAC	—	200	—	—	—	200	—	—	—	200
	635VAC	85	—	85	85	85	—	85	85	85	—
Short-time current *I*cw (kA RMS)	1 sec.	100[2]	—	85	100[2]	100[2]	—	85	100[2]	100[2]	—
Close and latch rating (ka RMS)		100[2]	—	85	100[2]	100[2]	—	85	100[2]	100[2]	—
Applicable rating plug range		800 - 3200A		800 - 4000A				800A - 5000A			
Mechnical make-time (ms)		35		35				35			
Mechanical break-time (ms)		34		34				34			
Electric close make-time (ms)		50		50				50			
Electric trip / UV break-time (ms)		40/73		40/73				40/73			
Electric trip and reclose interval (ms)		80		80				80			
Mechanical duty cycles (with maint.)[1]		10,000		10,000				10,000			
Electrical duty cycles (with maint.)[1]		10,000		10,000				10,000			
Draw-out breaker efficiency (Watts loss at rated *I*n)		700		1100				1650			
Draw-out fused breaker efficiency (Watts loss a rated *I*n)		Consult factory		Consult factory				Consult factory			
Ambient operating temperature (°C)		-25 to 40		-25 to 40				-25 to 40			

Ratings for UL 1066 Listed Non-automatic Switches

WL frame ratings		Frame size 2 800A - 3200A[4]		Frame size 3 3200A - 5000A[4]	
Rating Class		**L**	**F**[3]	**L**	**F**[3]
Breaking capacity with external relay (kA RMS)	254VAC	100	200	100	200
50/60 Hz, instantaneous trip	508VAC	100	200	100	200
	635VAC	85	200	85	200
Short-time current Icw (kA RMS)	1 sec.	65	N/A	100[2]	N/A

1 Maintenance means: replacing main contacts and arc chutes (see operating instructions).
M-Class main contacts can be replaced by Siemens personnel only. Do not apply switch or breaker rated at 635VAC to a system with fault current > 85kA RMS.

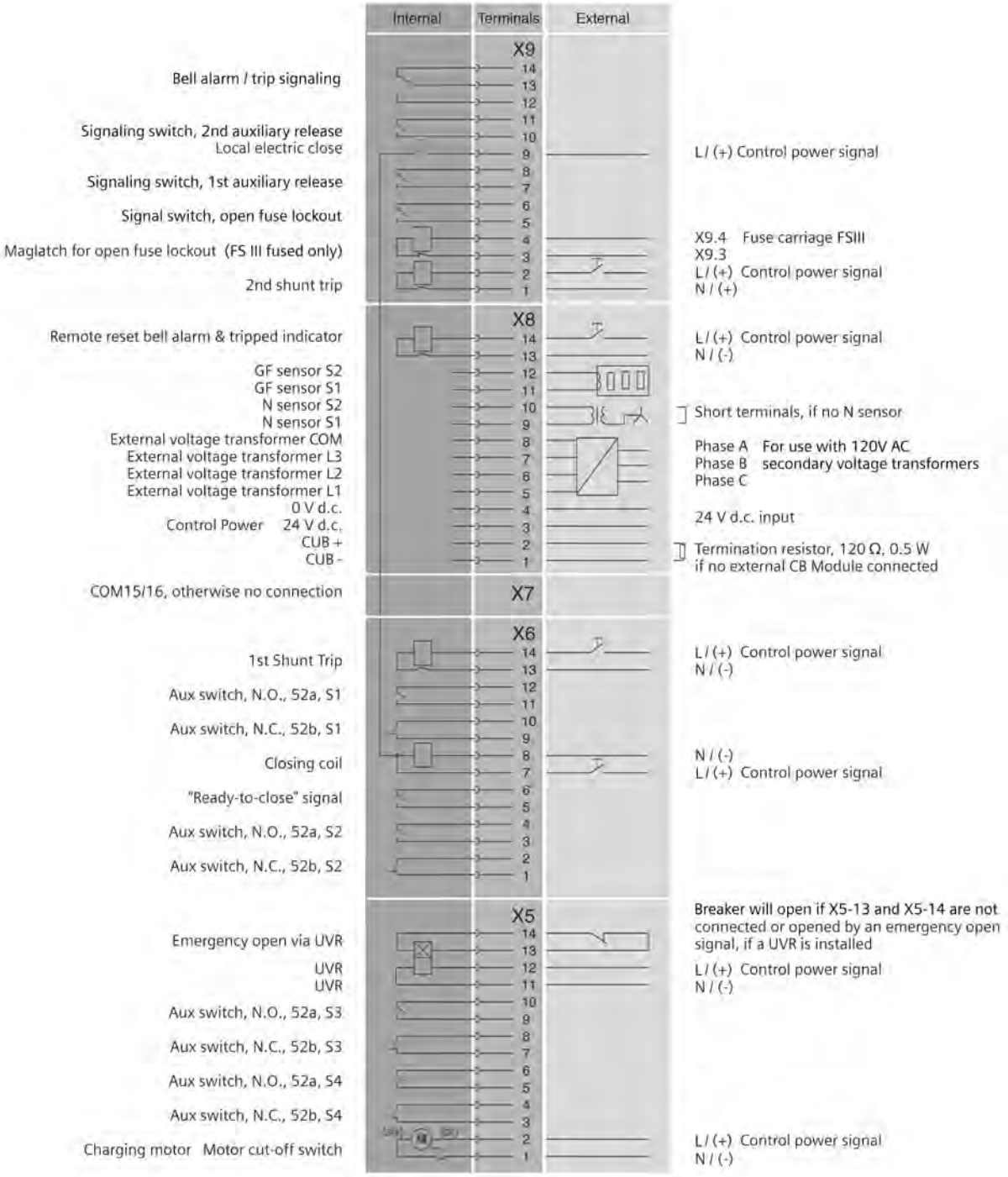
2 Short-time withstand current (Icw) at 635 VAC is kAIC RMS.

3 Max. 600 VAC.

4 3200A frame rating is only available in L-Class in Frame Size 2. 3200A frame rating is not available in L-Class in Frame Size 3.

Type WL Low Voltage Metal-Enclosed Switchgear

WL Secondary Terminal Assignments



Type WL Low Voltage Metal-Enclosed Switchgear

Section Configurations

General Notes:

- A blank/instrument compartment can always be substituted for a breaker compartment.
- Any 22" wide section can be 32" wide if more conduit working room is needed.
- For bus duct connections – if incoming is top, Compartment A must be blank/ instrument, if incoming is bottom, Compartment D must be blank/ instrument.
- Bussed transition section is 22" wide
- For close coupled transformer connections, Compartment A must be blank/instrument.
- Utility metering is always in a separate section. Section width is dependent on utility.

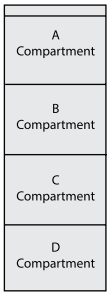
Switchgear Depth Dimensional Information

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

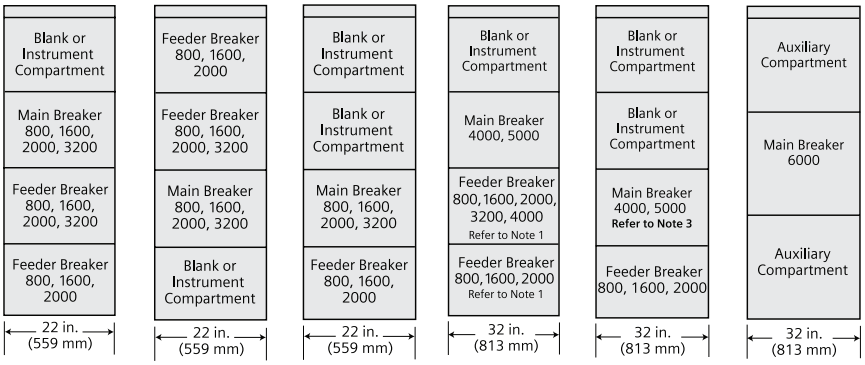
- Non-fused indoor – 60" standard, 70" and 80" optional
- Fused indoor – 65" standard, 75" and 80" optional
- Non-fused non-walk-in outdoor – 60" standard and 75" optional
- Fused non-walk-in outdoor – 65" standard and 75" optional
- Non-fused walk-in outdoor – 75" standard
- Fused walk-in outdoor – 75" standard
- Walk-in outdoor aisle is 58" deep
- Sections with cable connected main, tie and/or feeder breakers that are 3200 amp or greater must be minimum depth of 70" for unfused breakers and 75" for fused breakers.

Note 1 – If a 4000 or 5000 amp feeder breaker is installed in Compartment C, then Compartment D must be a Blank or Instrument Compartment and the bottom level through bus isn't available.
Note 2 – If a 4000 amp breaker is installed in Compartment B, Compartment A must be a Blank or Instrument Compartment.
Note 3 – If incoming is bottom, feeder breakers can mount in compartments A and/or B.
Note 4 – If a 3200 amp breaker is installed in Compartment B, the middle level through bus is not available.
Note 5 – If a 3200 amp breaker is installed in Compartment D, the lower level through bus is not available.
Note 6 – Only one 800, 1600, 2000 amp feeder breaker can be mounted per section. If the horizontal main bus is at the top of the section, the 800, 1600, 2000 amp feeder breaker can go in the A compartment and a blank/ instrument compartment must go in the D compartment. If the horizontal main bus is a the bottom of the section, the 800, 1600, 2000 amp feeder breaker can go in the D compartment and a blank/ instrument compartment must go in the A compartment.

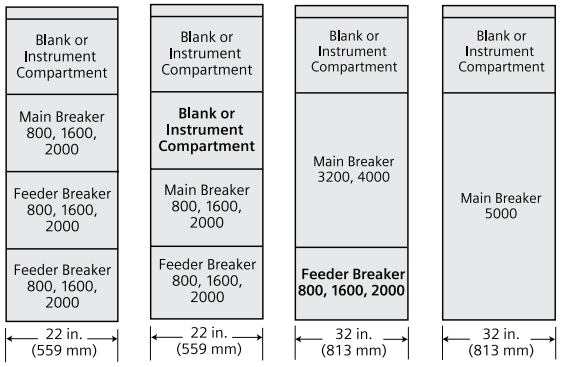
Section Compartment Arrangement



Main Sections – Non-Fused Breakers



Main Sections – Fused Breakers



Note 7 – Any feeder section (or bus transition section) with 6000 amp vertical bus must be 32" wide.

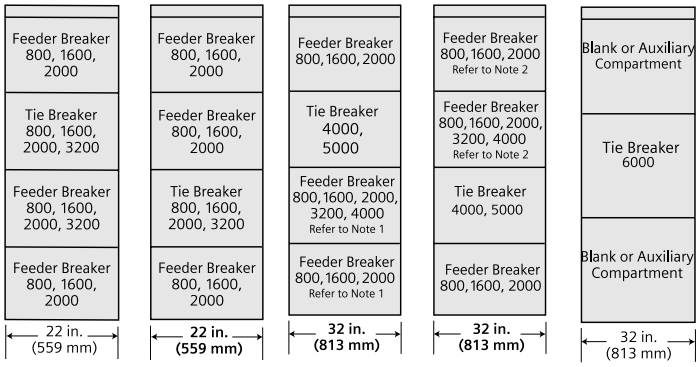
Note 8 - Contact factory for layout guidelines and assistance with this vertical section design.

Note 9 - This vertical section design is based on the assumption that the section will be fed by middle level through bus and the top breaker will be bottom fed and the bottom breaker will be top fed. Additionally, the combined load of the two 5000A breakers can't exceed the incoming service and horizontal bus rating.

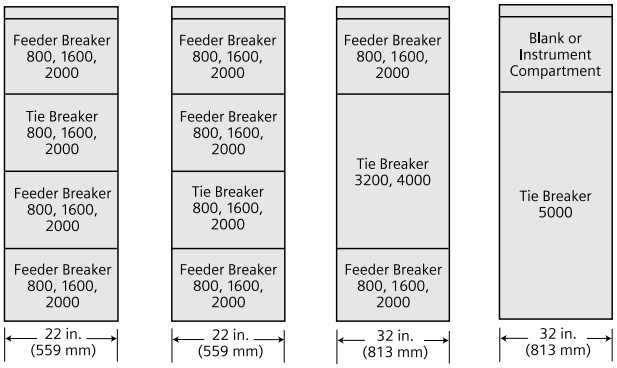
Type WL Low Voltage Metal-Enclosed Switchgear

Section Configurations

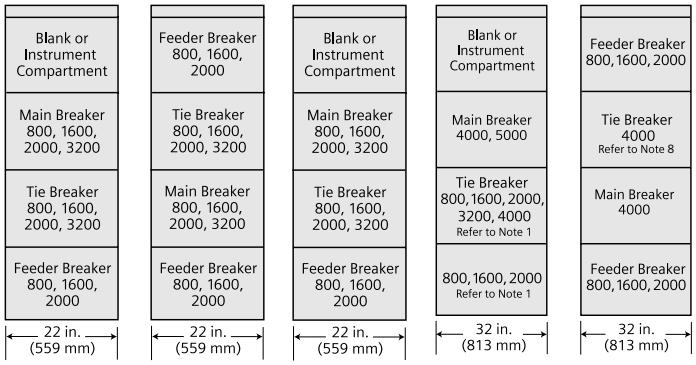
Tie Sections – Non-Fused Breakers



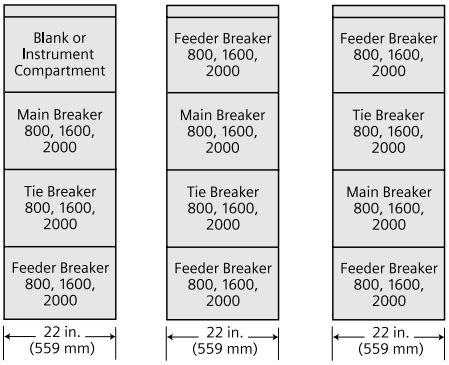
Tie Sections – Fused Breakers



Main and Tie Sections – Non-Fused Breakers

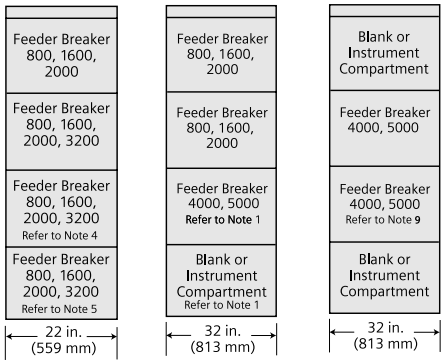


Main and Tie Sections – Fused Breakers



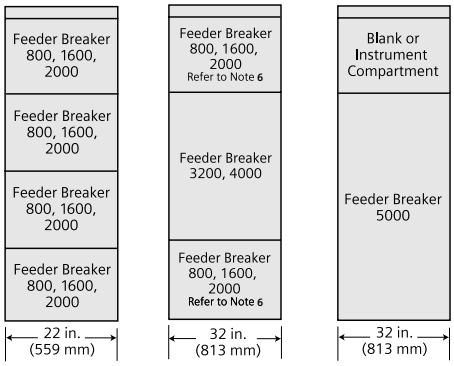
Feeder Sections – Non-Fused Breakers

(see Note 7 on page24)



Feeder Sections – Fused Breakers

(see Note 7 on page24)



Type WL Low Voltage Metal-Enclosed Switchgear

Shipping Weights and Dimensional Information

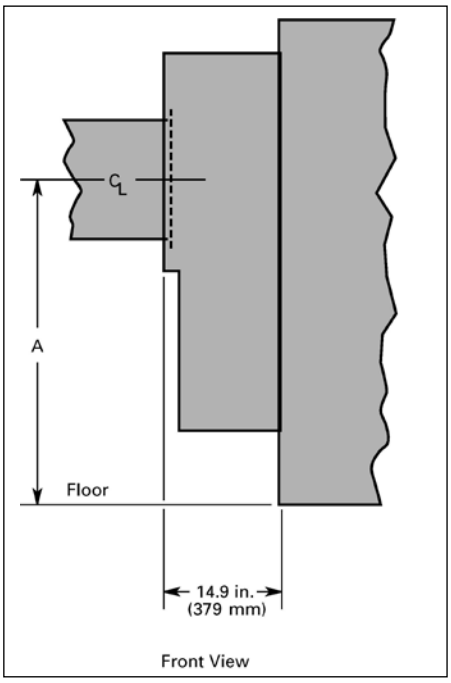
Siemens Type WL Low Voltage Switchgear can be configured in many ways by combining different section types. Up to five vertical sections plus a transition section can be shipped together as a unit. Maximum shipping split length for indoor structures is 110 in. (2794 mm). If all vertical sections are not to be shipped as a unit, specifications need to be provided that describe the limiting factors (e.g., low door or narrow hallway).

Normal indoor vertical sections are 96 in. (2438 mm) high and a minimum 60 in. (1524 mm) deep for non-fused breakers and 65 in. (1651 mm) deep for fused breakers. A top-mounted hoist, which is shipped as an accessory in a separate container, adds 6.75 in. (171 mm) for a total installed height of 103 in. (2616 mm).

The outdoor switchgear assembly contains the indoor assembly in an outdoor housing. The overall height is 112.8 in. (2865 mm) for non walk-in designs and 113.6 in. (2885 mm) for walk-in designs. The depth of a non walk-in outdoor assembly with a 60 in. (1524 mm) internal structure is 82.3 in. (2090 mm) and the depth of a walk-in outdoor assembly with a 75 in. (1906 mm) internal structure is 145.6 in. (3698 mm). Maximum shipping split length for outdoor structures is 66 in. (1676 mm).

The major assembly sections include:

- Transition Sections – used as transition to liquid filled transformer or to outdoor dry type transformers.
- Auxiliary Sections – used as incoming bus duct or cable entrance when a main breaker is not used.
- Main Sections – used to contain main breaker and may house metering and feeder breakers.
- Feeder Sections – used to contain feeder breakers and other equipment such as instrumentation.
- Tie Sections – used to contain tie breaker and other equipment such as feeder breakers.



Transition Section For Liquid Filled and Outdoor Dry Type Transformers

Please refer to as-built transformer coordination drawings for exact dimensions.

	Dimension A in inches (mm)	Weight in lbs. (kg)
Indoor	55 (1397)	500 (227)
Outdoor	61 (1549)	550 (250)

Approximate Weight – Lbs.

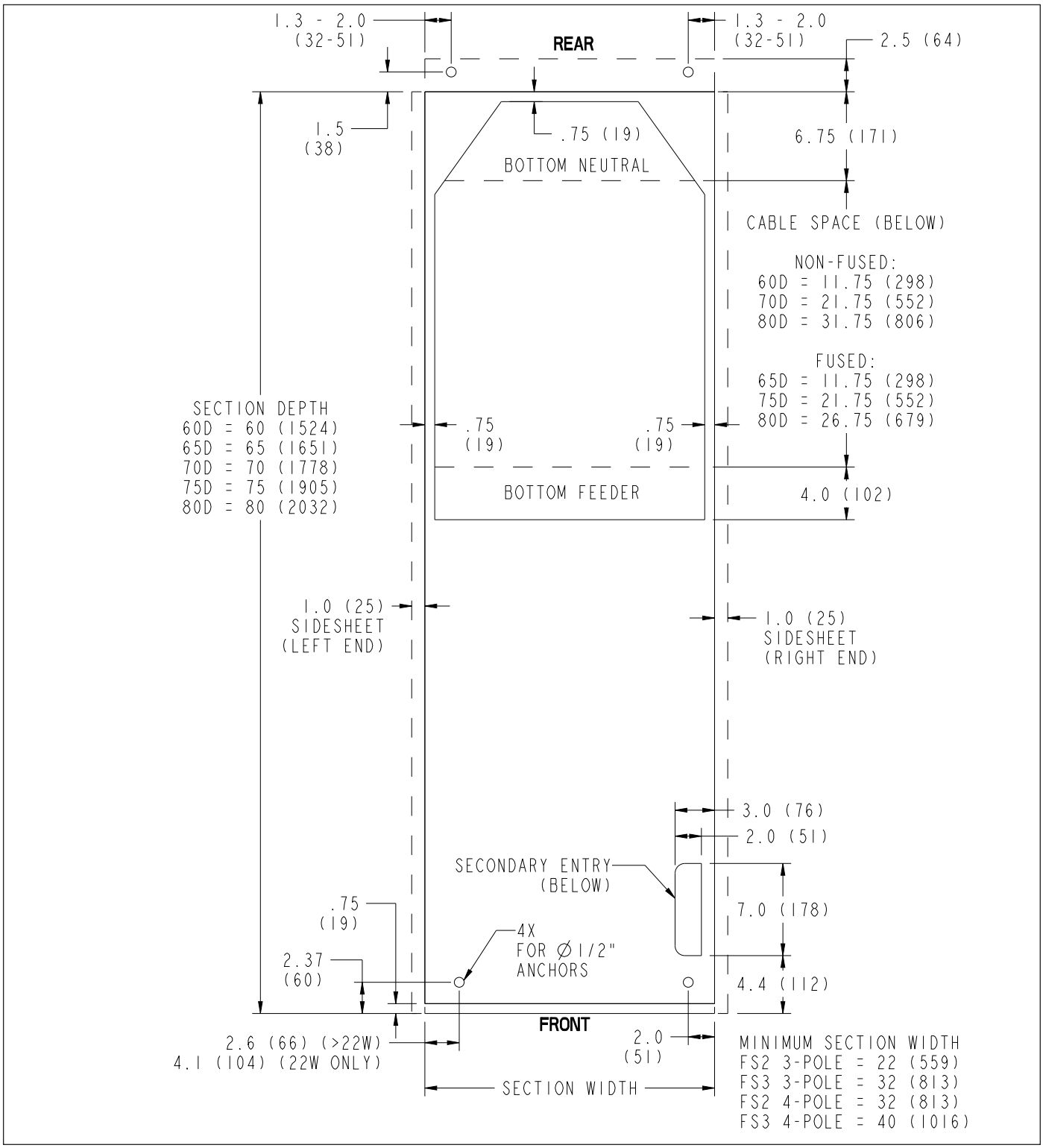
Section Type	22" Indoor	22" Outdoor	32" Indoor	32" Outdoor	38" Indoor	40" Indoor *	40" Outdoor *
Auxiliary	1000 (455)	1400 (635)	1300 (590)	1800 (820)	1500 (680)	1600 (725)	2400 (1090)
Utility Metering	N/A	N/A	N/A	N/A	1900 (865)	N/A	N/A
Breaker (Main)	1400 (635)	1800 (820)	2600 (1180)	3100 (1410)	N/A	3500 (1590)	4300 (1950)
Feeder (4H)	2200 (1000)	2600 (1180)	2500[1] (1135) 4200[2] (1905)	3000[1] (1360) 4700[2] (2135)	N/A	N/A	N/A

*40W section has 4 pole FS3 BKR
[1] 3 pole FS2
[2] 4 pole FS2
Weights shown in pounds and () kilograms.
Weights for Indoor units are based on 60 in section depth.
Add 400 lbs for hoist and track.
Weights for Outdoor units are based on 75 in section depth, walk-in only.
On outdoor switchgear, add 900 lbs for end walls (weight is for both ends). Refer to shipping documents for actual weights.
These estimates should be increased for unusual secondary or auxiliary equipment, impact loading, or for seismic conditions, if required.

Type WL Low Voltage Metal-Enclosed Switchgear

Dimensional Information

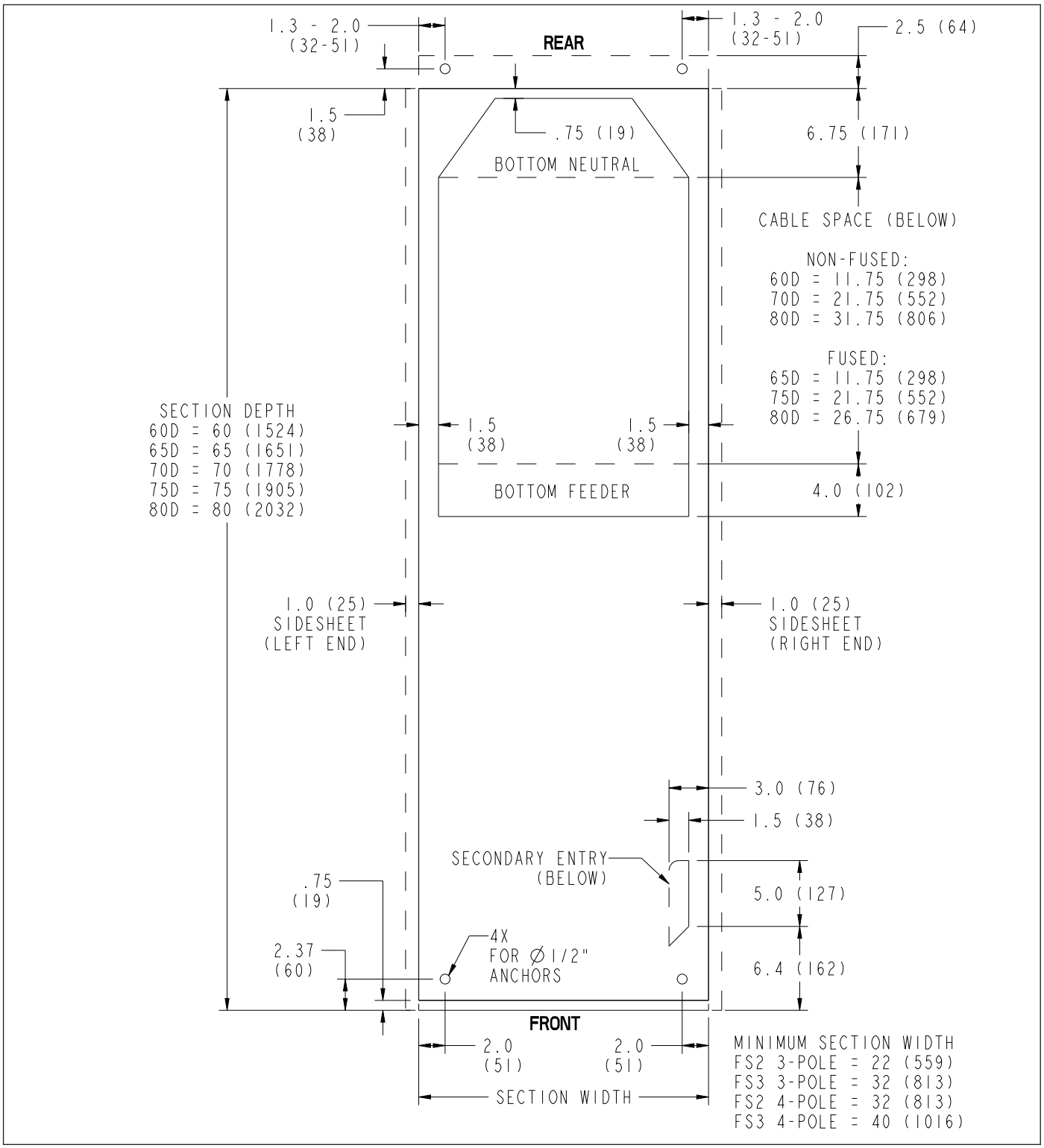
Indoor Floor Plan – View of Bottom
without optional riser base
(not applicable to arc resistant switchgear)



Type WL Low Voltage Metal-Enclosed Switchgear

Dimensional Information

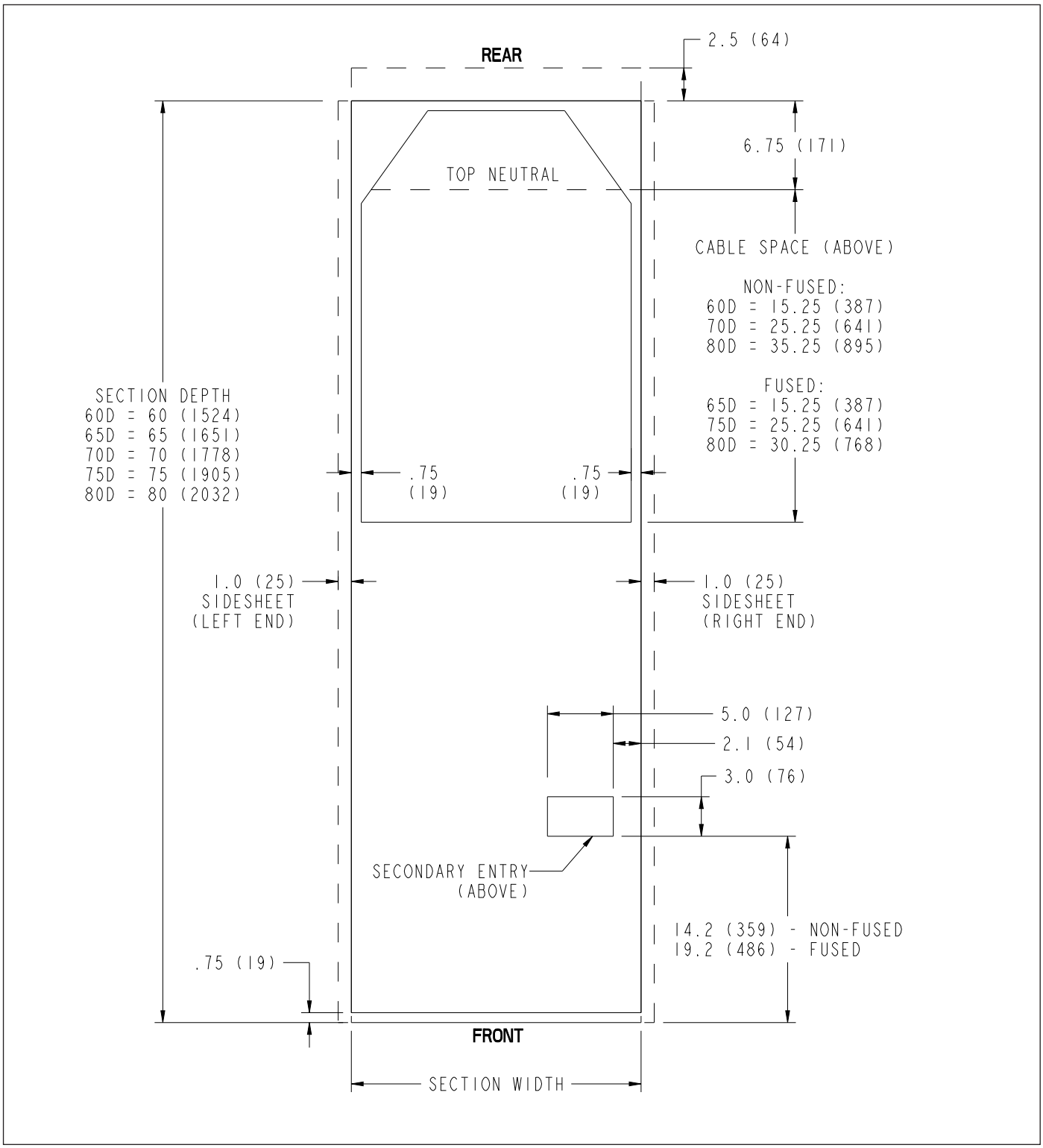
Indoor Floor Plan – View of Bottom
with optional riser base
(not applicable to arc resistant switchgear)



Type WL Low Voltage Metal-Enclosed Switchgear

Dimensional Information

Indoor Floor Plan – View of Top
(not applicable to arc resistant switchgear)

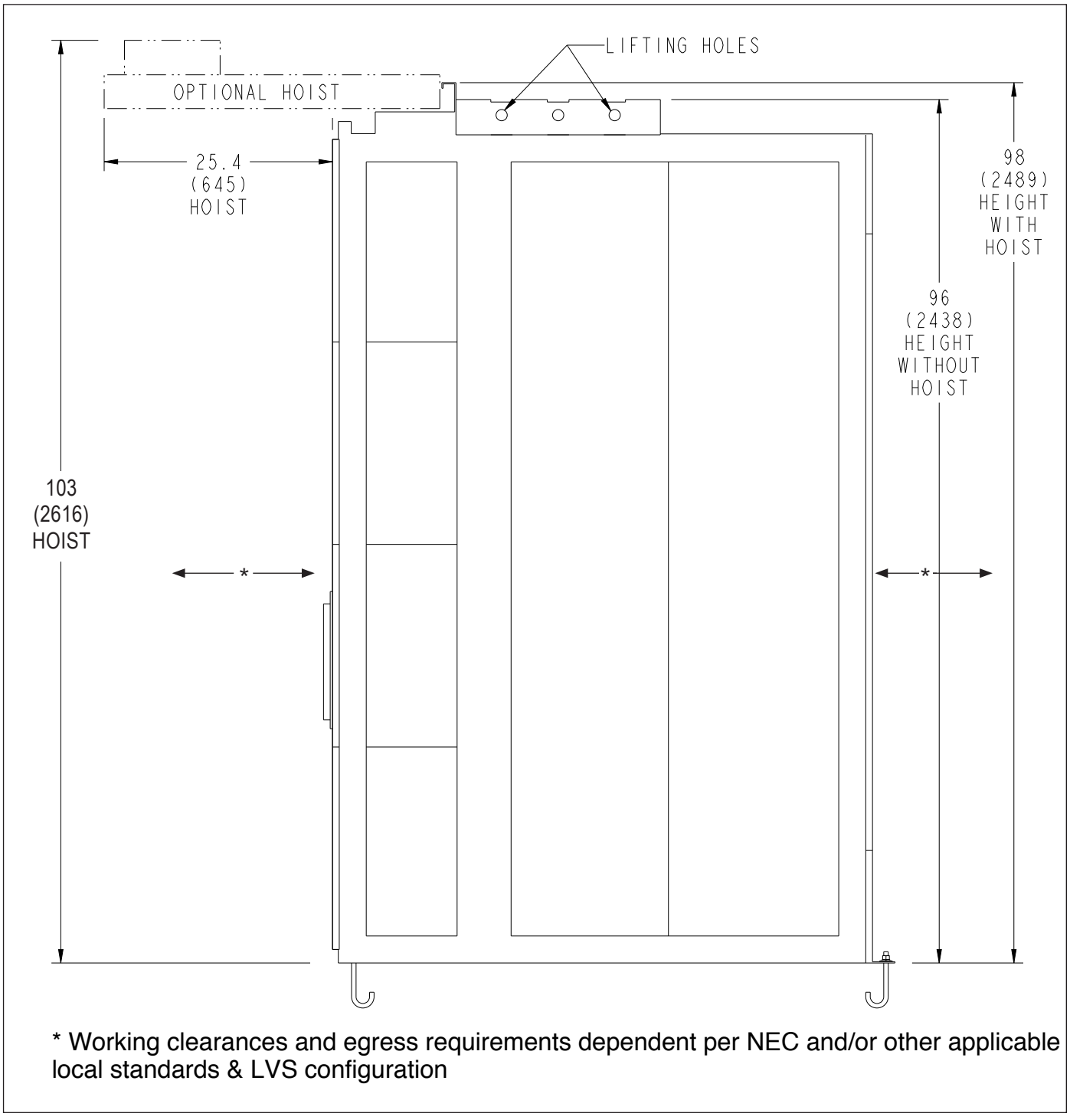


Type WL Low Voltage Metal-Enclosed Switchgear

Dimensional Information

Indoor Floor Plan – Side View, Right Side
without optional riser base
(not applicable to arc resistant switchgear)

Per NEC, minimum ceiling height is 12" above the vent stack for non-combustible ceilings (non-combustible as defined by NEC or AHJ) and 36" above the vent stack for any ceiling other than non-combustible.



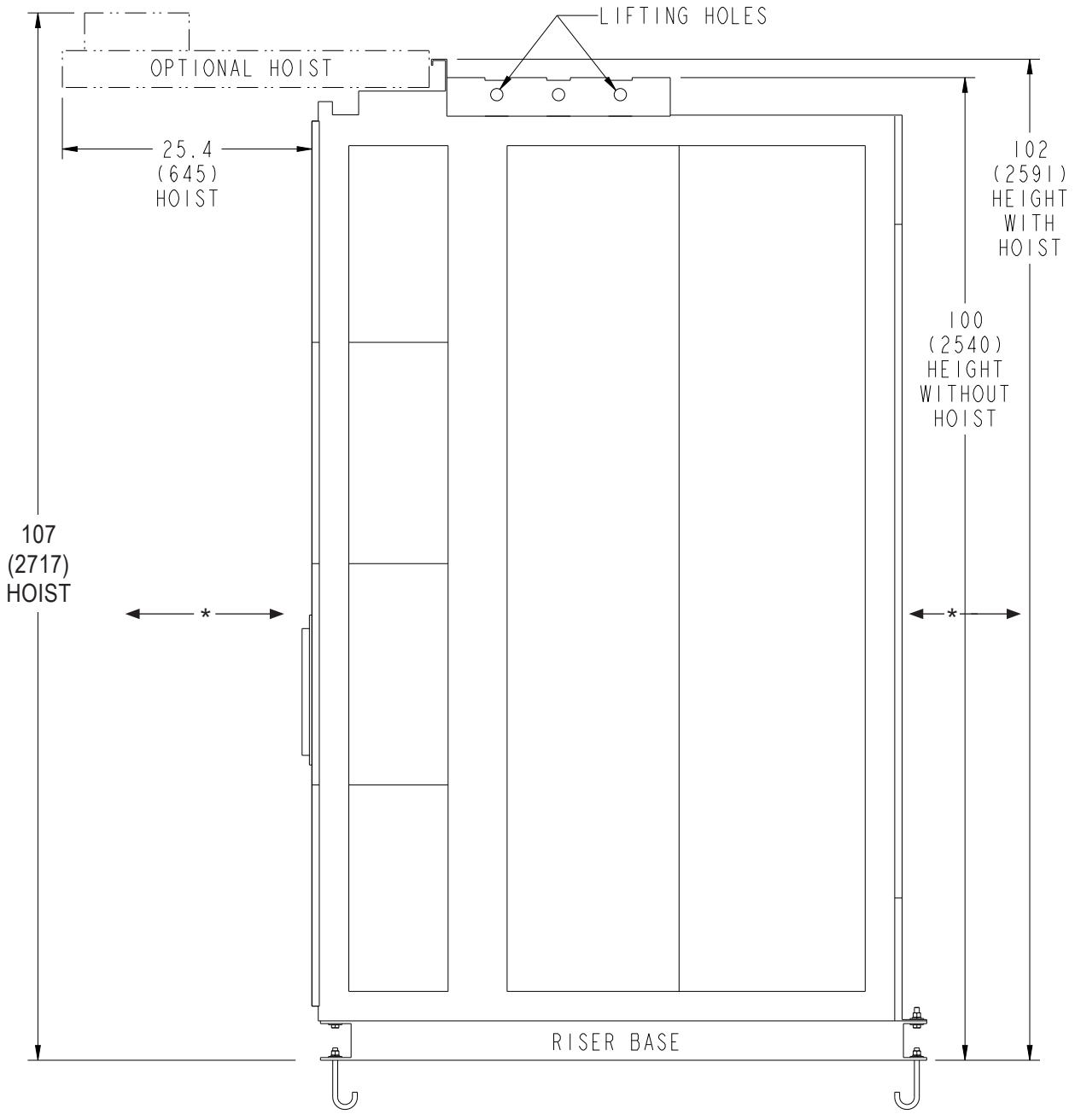
* Working clearances and egress requirements dependent per NEC and/or other applicable local standards & LVS configuration

Type WL Low Voltage Metal-Enclosed Switchgear

Dimensional Information

Indoor Floor Plan – Side View, Right Side
with optional riser base
(not applicable to arc resistant switchgear)

Per NEC, minimum ceiling height is 12" above the vent stack for non-combustible ceilings (non-combustible as defined by NEC or AHJ) and 36" above the vent stack for any ceiling other than non-combustible.



* Working clearances and egress requirements dependent per NEC and/or other applicable local standards & LVS configuration

Siemens RC-LVS Cable Conduit Entry – Indoor
Recommended Maximum # of 4" conduits

Section Size	Below [1, 3]		Standard Above [2, 4]		Arc Resistant Above [5]	
	Area (WxD)	Qty	Area (WxD)	Qty	Area (WxD)	Qty
22W x 60D	19 x 11.75	6	20.5 x 15.25	6	20.5 x 13.75	6
22W x 70D	19 x 21.75	9	20.5 x 25.25	12	20.5 x 23.75	12
22W x 80D	19 x 31.75	15	20.5 x 35.25	18	20.5 x 33.75	15
22W x 65D (FUSED)	19 x 11.75	6	20.5 x 15.25	6	20.5 x 13.75	6
22W x 75D (FUSED)	19 x 21.75	9	20.5 x 25.25	12	20.5 x 23.75	12
22W x 80D (FUSED)	19 x 26.75	12	20.5 x 30.25	15	20.5 x 28.75	12
32W x 60D	29 x 11.75	10	30.5 x 15.25	10	30.5 x 13.75	10
32W x 70D	29 x 21.75	15	30.5 x 25.25	20	30.5 x 23.75	20
32W x 80D	29 x 31.75	25	30.5 x 35.25	30	30.5 x 33.75	25
32W x 65D (FUSED)	29 x 11.75	10	30.5 x 15.25	10	30.5 x 13.75	10
32W x 75D (FUSED)	29 x 21.75	15	30.5 x 25.25	20	30.5 x 23.75	20
32W x 80D (FUSED)	29 x 26.75	20	30.5 x 30.25	25	30.5 x 28.75	20
38W x 60D	35 x 11.75	12	36.5 x 15.25	12	36.5 x 13.75	12
38W x 70D	35 x 21.75	18	36.5 x 25.25	24	36.5 x 23.75	24
38W x 80D	35 x 31.75	30	36.5 x 35.25	36	36.5 x 33.75	30
38W x 65D (FUSED)	35 x 11.75	12	36.5 x 15.25	12	36.5 x 13.75	12
38W x 75D (FUSED)	35 x 21.75	18	36.5 x 25.25	24	36.5 x 23.75	24
38W x 80D (FUSED)	35 x 26.75	24	36.5 x 30.25	30	36.5 x 28.75	24
40W x 60D	37 x 15.75	12	38.5 x 15.25	12	38.5 x 13.75	12
40W x 70D	37 x 25.75	24	38.5 x 25.25	24	38.5 x 23.75	24
40W x 80D	37 x 35.75	36	38.5 x 35.25	36	38.5 x 33.75	30

Note: Additional Conduit space may be available:

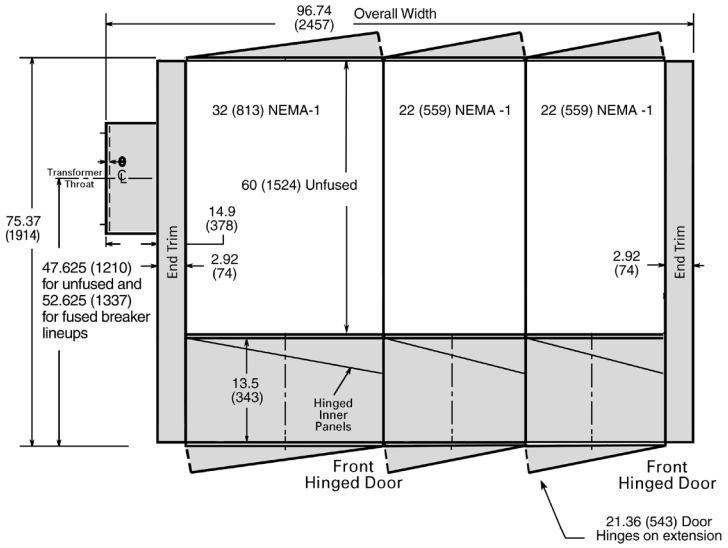
1 If No. Bottom Neutral is present
2 If No. Top Neutral is present
3 If No. Bottom Feeder is present
4 Standard & Arc Resistant (With Overhead Plenum)
5 Arc Resistant (Without Overhead Plenum)

Alternate special layouts may be able to yield additional conduit positions

Type WL Low Voltage Metal-Enclosed Switchgear

Dimensional Information

Outdoor non-walk-in floor plan

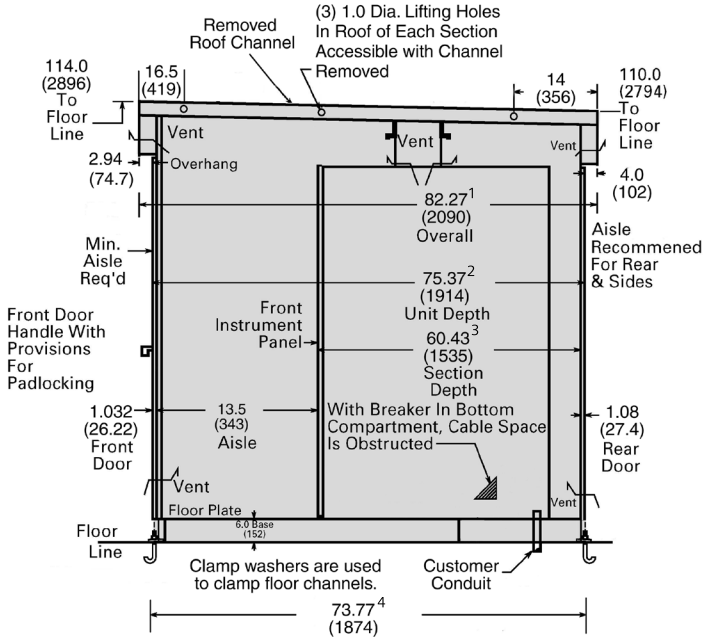


1 60″ is representative for a 60″ deep switchgear internal structure. For other internal structure depths (65 or 75) add extra depth to 60″ that is shown.

2 75.37 is representative for a 60″ deep internal structure. For other internal structure depths (65 or 75) add extra depth to 75.37 that is shown.

3 Refer to appropriate indoor plan view for available customer conduit information.

Outdoor non-walk-in side view



Dimensions shown in inches (mm)

1 82.27 dimension is based on 60″ internal frame structure and if a deeper internal frame structure is used (65 or 75) the extra depth should be added to the 82.27 dimension.

2 75.37 dimension is based on 60″ internal frame structure and if a deeper internal frame structure is used (65 or 75) the extra depth should be added to the 75.37 dimension.

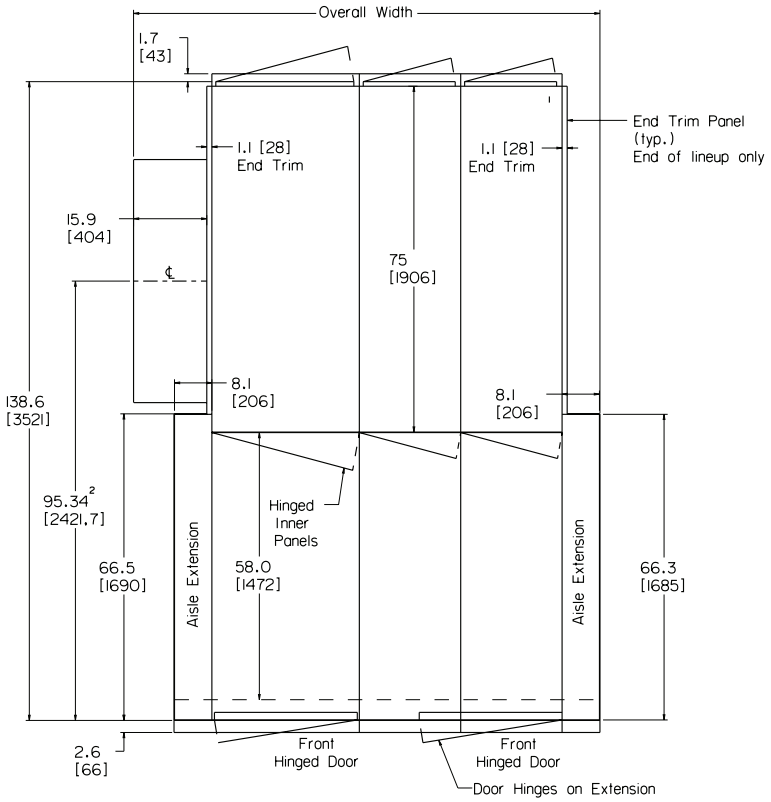
3 60.43 dimension is based on 60″ internal frame structure and if a deeper internal frame structure is used (65 or 75) the extra depth should be added to the 60.43 dimension.

4 73.77 dimension is based on 60″ internal frame structure and if a deeper internal frame structure is used (65 or 75) the extra depth should be added to the 73.77 dimension.

Type WL Low Voltage Metal-Enclosed Switchgear

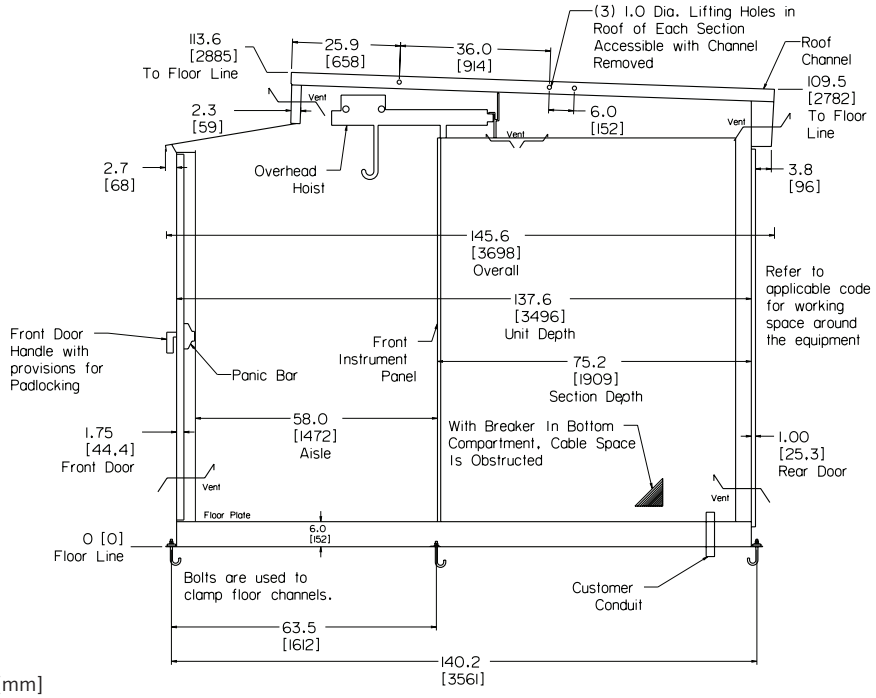
Dimensional Information

Outdoor walk-in floor plan



1 Refer to appropriate indoor plan view for available customer conduit information.
2 95.34" [2421.7] for unfused and 100.34" [2548.63] for fused breaker lineups.

Outdoor walk-in side view



Dimensions shown in inches [mm]

Type WL Low Voltage Metal-Enclosed Switchgear

VT, CPT, CT Data

Voltage Transformers – External Metering and Relaying

	Accuracy Class at 60 Hz					
	Burden					
Ratio	W	X	Y	Volt-Amp Rating	Thermal Rating VA	Hertz
600:120	0.6	1.2	1.2	100	150	50/60
480:120	0.6	1.2	1.2	100	150	50/60
288:120	0.6	1.2	1.2	100	150	50/60

Control Power Transformers – 115°C Rise

kVA	Phase	Primary Voltage	Secondary Voltage
3	Single	240 / 480	120 / 240
5			
10 [1]			
15 [1]			

Current Transformers for FSII WL Breaker Applications - External Metering and Relaying [2]

	Accuracy at 60 Hz Metering Burden (ohms)					
Ratio	B-0.1	B-0.2	B-0.5	B-0.9	B-1.8	Class
100.5	1.2	—	—	—	—	C5
150.5	1.2	—	—	—	—	C7
200.5	1.2	—	—	—	—	C9
250.5	1.2	—	—	—	—	C12
300.5	0.6	0.6	—	—	—	C15
400.5	0.6	0.6	1.2	—	—	C20
500.5	0.6	0.6	1.2	—	—	C25
600.5	0.3	0.3	0.6	1.2	1.2	C21
800.5	0.3	0.3	0.6	0.6	1.2	C29
1000.5	0.3	0.3	0.6	0.6	1.2	C35
1200.5	0.3	0.3	0.3	0.6	0.6	C20
1500.5	0.3	0.3	0.3	0.3	0.6	C25
1600.5	0.3	0.3	0.3	0.3	0.6	C27
2000.5	0.3	0.3	0.3	0.3	0.3	C34
2500.5	0.3	0.3	0.3	0.3	0.3	C20
3000.5	0.3	0.3	0.3	0.3	0.3	C21

Current Transformers for FSIII WL Breaker Applications – External Metering and Relaying [2]

	Accuracy at 60 Hz Metering Burden (ohms)					
Ratio	B-0.1	B-0.2	B-0.5	B-0.9	B-1.8	Class
2000.5	0.3	0.3	0.3	0.3	0.3	C20
2500.5	0.3	0.3	0.3	0.3	0.3	C20
3000.5	0.3	0.3	0.3	0.3	0.3	C20
3200.5	0.3	0.3	0.3	0.3	0.3	C20
4000.5	0.3	0.3	0.3	0.3	0.3	C20
5000.5	0.3	0.3	0.3	0.3	0.3	C20
6000.5	0.3	0.3	0.3	0.3	0.3	C20

1 Requires complete compartment.
2 Breaker compartment will accept 1 set of CT's each on top and bottom primary disconnects.

Type WL Low Voltage Metal-Enclosed Switchgear

Notes

Type WL Low Voltage Metal-Enclosed Switchgear

Notes

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 pirpose, 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.

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