

**Low Voltage Products &  
Systems  
Automation Technology**



***MaxSG  
Low Voltage Switchgear***

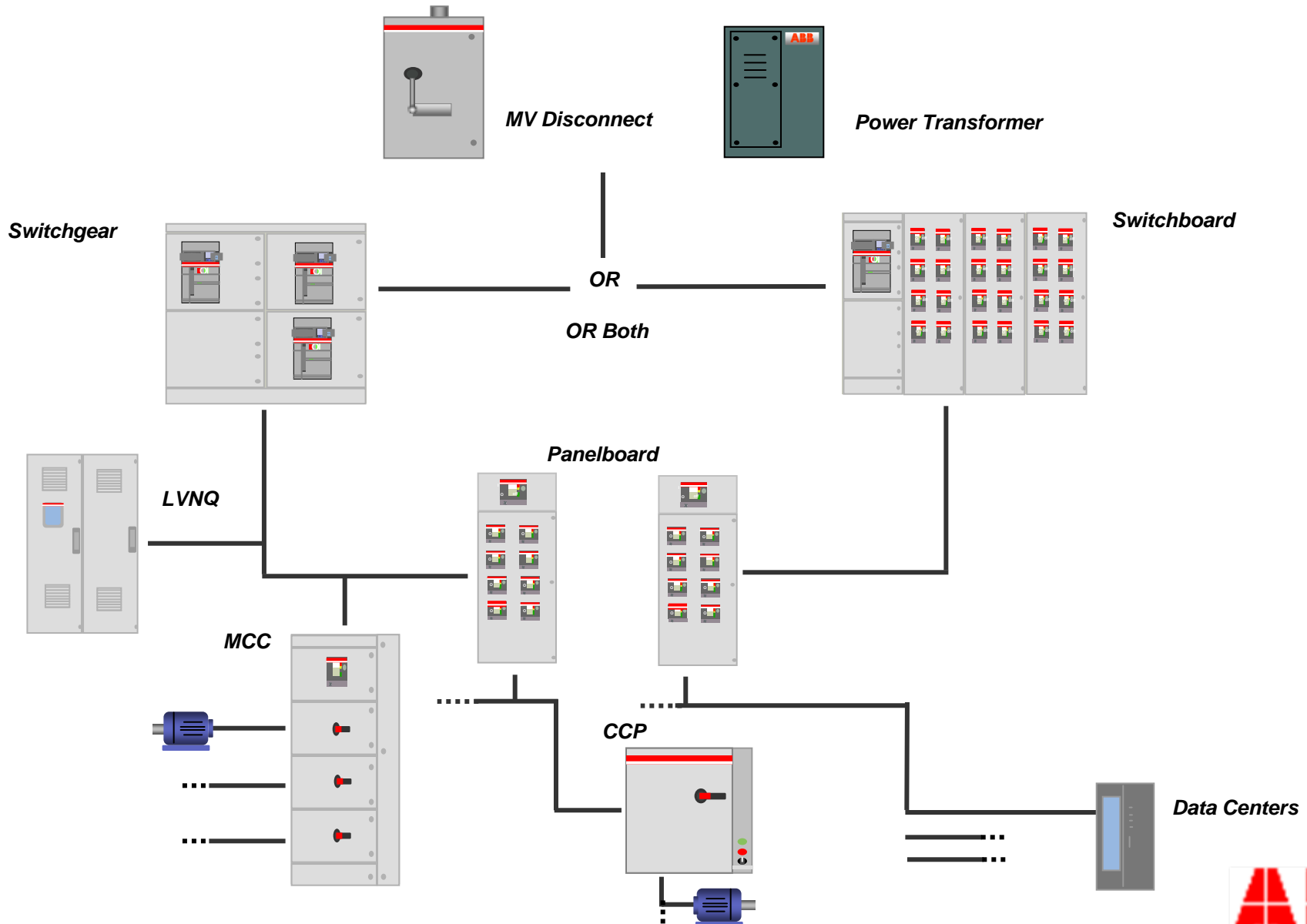


# MaxSG



- Product Overview
- Key Features and Benefits
- Construction
- Instrumentation
- Applications
- Summary

# Low Voltage Systems Scenario



# MaxSG



## ■ Product Overview

■ Features and Benefits

■ Construction

■ Instrumentation

■ Applications

■ Summary

# Product Overview

## ■ Definition

- **Switchgear** – A switching/interrupting device used in combination with generation, transmission, distribution, and conversion of electrical power for controlling, metering protecting and regulating devices.
- **Where can they be found?** – Substations (downstream from medium voltage electrical equipment and transformer) and inside electrical equipment rooms such as in hospitals, power plants, and oil and gas refineries.



# Product Overview

Description	Value
Rated Main bus current	2000, 3200, and 4000A
Rated Vertical bus	2000A
Rated tested maximum voltage	254Vac, 508Vac, 635Vac
Rated voltage	240Vac, 480Vac, 600Vac
Phases	3 phase 3 wire, 3 phase 4 wire
Neutral	100% rated
Frequency	50/60 Hz
Short circuit current	65 kA, 100 kA
Max peak short circuit current	149.5 kA, 230 kA
Enclosure	NEMA 1 (with Gasket doors), and N3R Walk In



# Product Overview

## ■ Standards

### ■ SWITCHGEAR

- ANSI C37.20.1 -Metal Enclosed LV Power Circuit Breaker Switchgear
- ANSI C37.51 -Testing of Metal Enclosed LV AC Power Circuit Breaker Switchgear
- UL 1558 -Switchgear Assemblies
- CSA -Canadian Standard Assemblies
- IBC-2006 - Seismic Qualification  
& CBC-2007

### ■ CIRCUIT BREAKER

- ANSI C37.13 – LV AC Power Circuit Breakers Used in Equipment
- ANSI C37.16 – Preferred Rating, Related Requirement, Application Recommendations For LV Power Circuit Breakers and AC Power Circuit Protectors
- ANSI C37.50 – Testing of Low Voltage AC Power Circuit Breakers
- UL 1066 – Low Voltage Power Circuit Breakers



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# Key Features and Benefits

## Emax Power Circuit Breakers – Best of the Breed

1. Trademark, size of CB
2. Trip unit
3. PB for manual opening
4. PB for manual closing
5. Lever to manually charge closing spring
6. Label with electrical characteristics
7. Mechanical device to signal CB open “O” and Closed “I”
8. Signal for springs charged or discharged
9. Mechanical indication of trip
10. Key lock in open position
11. Key lock and padlock in racking-in, racking-out position
12. Racking-in, racking-out device
13. Terminal box
14. Sliding contacts
15. CB position indicator



# Key Features and Benefits

## Three Trip Units

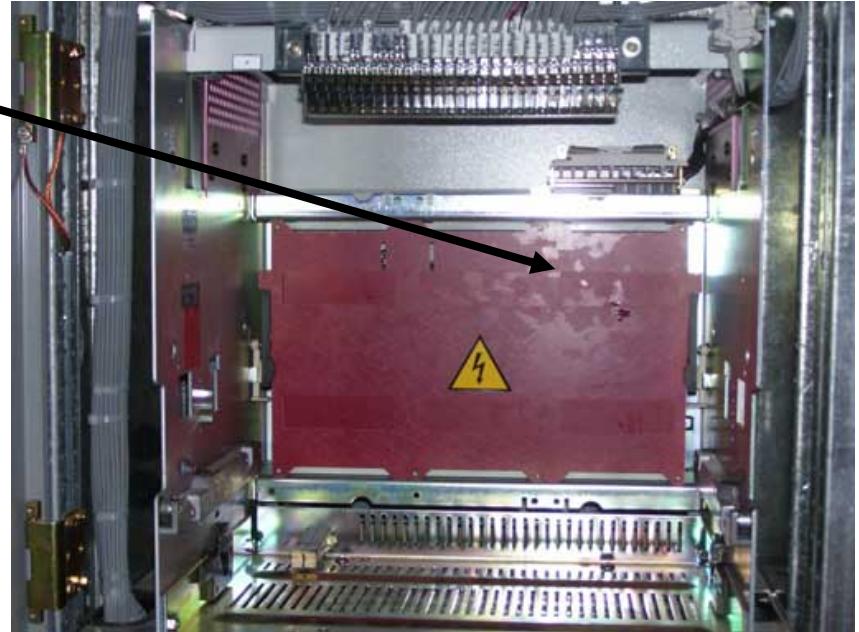
- PR121
  - Protection Features Only
- PR122
  - Protection Features
  - LCD Display
  - Current Measurement
  - Contact Wear
  - Communications option
- PR123
  - PR122 Features
  - Harmonic Measurements
  - Communications option



# Key Features and Benefits

## Safety Features

- Safety shutters (standard)



# Key Features and Benefits

## Safety Features

- Breaker compartment keyed cells



# Key Features and Benefits

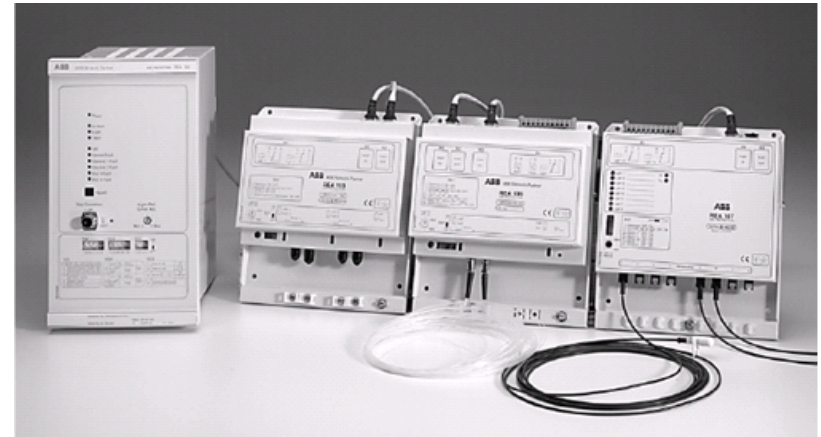
## Safety Features

- Padlocking provisions
  - Anti-insertion lock
  - Disconnect, connect, and test position



# Key Features and Benefits

- Maintenance Switch Option
  - Provides option to dial down to a lower instantaneous setting on trip unit for performing instantaneous
- REA Relay Arc Flash System
  - Detects an arc anywhere in the bus compartment and cable compartment utilizing long-fiber sensor system, tripping upstream main breaker in order to provide minimal damage to equipment



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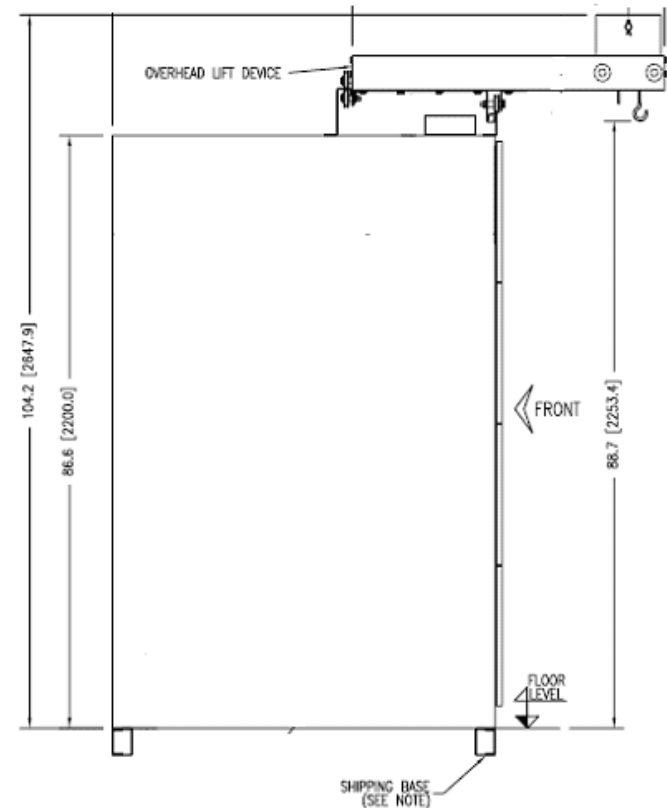
# Construction

## ■ Structure

- Depth: 68.9" (Standard),  
59.1" (Optional)
- Widths: 39.4", 31.5", 23.6", 19.7"

## ■ Height

- 91.7" without overhead lifting device
- 104.2" with overhead lift device



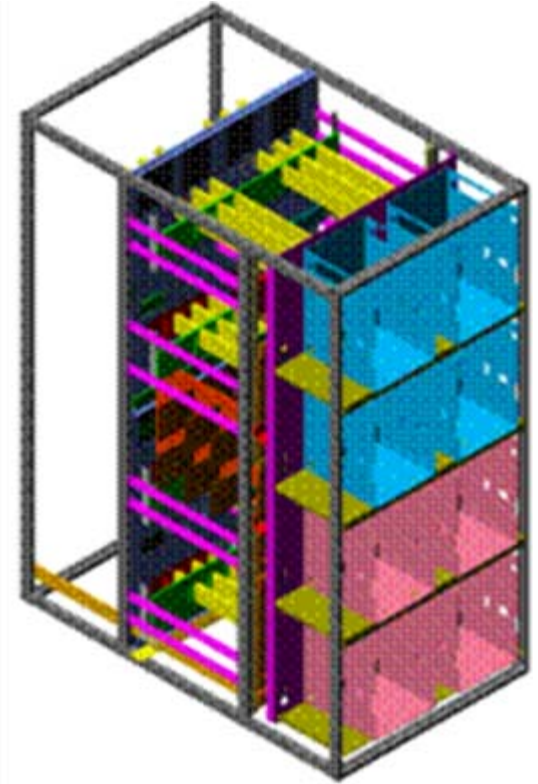
SIDE VIEW

Note: Shipping Rails to be Removed Prior to SWGR Installation.



# Construction

Front doors, rear doors, left and right side panels, rear panels (Carbon)	14 GA
Basic compartment, rear extensions (Galvanized)	14 GA
Internal Sheet Metal (Galvanized) (Instrument compartment, breaker compartment, protection panel, truck rail, overhead lift device, riser support)	11 GA
Shipping Frame (Carbon)	9 GA



# Construction

## ■ Section Dimensions

E6 4000 Amp

**39.4"**

E2/E3 800 – 2000A  
E4 3200 Amp

**31.5"**

E2/E3 800 – 2000A  
(65 & 100 kA)

**23.6"**

E2 800 - 1600A  
(65 kA)

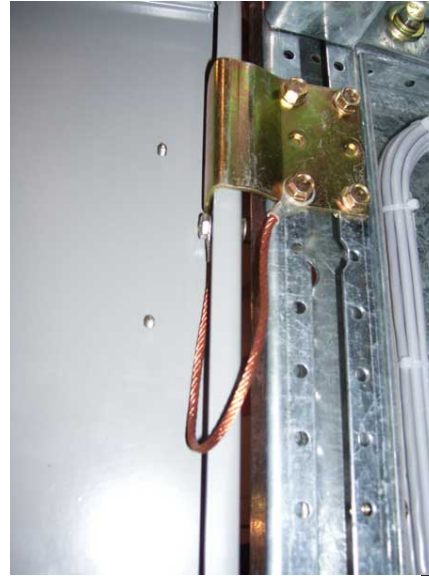
**19.7"**



# Construction

## ■ Doors:

- Front doors - Semi-concealed hinges
- Rear doors – Bolted, optional hinge, Pad-locking handles available
- Infrared Windows (Optional)



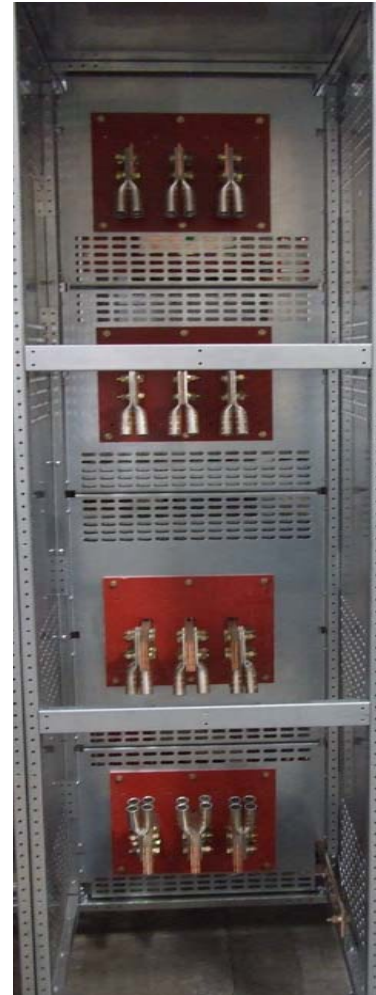
## ■ Paint

- ANSI 61 Electro static powder coat (standard)
- Other painting (Optional)



# Construction

- **Rear cable area**
  - Mechanical Lugs (standard)
  - Compression Lugs (optional)
  - Main Bus Barriers separating bus compartment from cable compartment (Standard)
  - Vertical Steel Barriers between sections in cable compartments (Optional)



# Construction

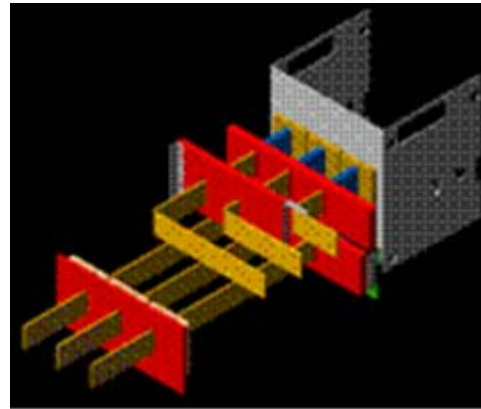
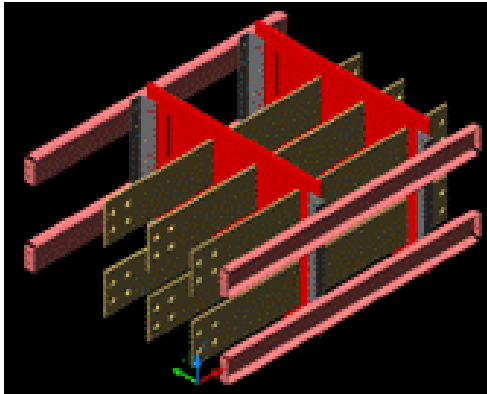
## ■ Bus Design

- Standard temperature rise Max 65°C over 40°C ambient
- Main bus amperages include: 2000A, 3200A, and 4000A with bus bracing at 65kA or 100kA.
- Vertical bus riser amperages include: 2000A for feeder sections and up to 5000A for Tie sections with bus bracing at 65kA or 100kA.
- Non-insulated silver plating bussing is standard; optional tin-plating is available.
- Optional insulated bussing consist of: thermal-contractile flame resistant non-hydroscopic tubing and boots on main horizontal and cable compartment runback bussing.



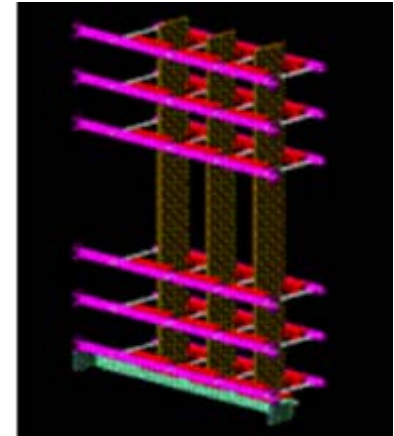
# Construction

Main Bus



Runbacks

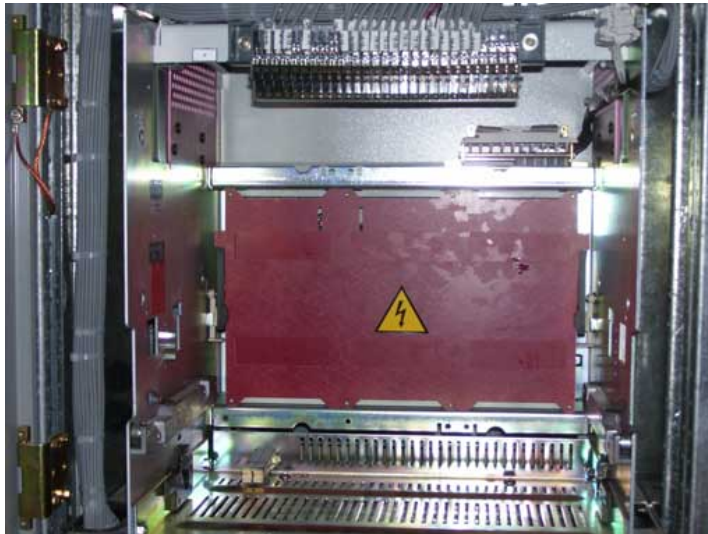
Riser Bus





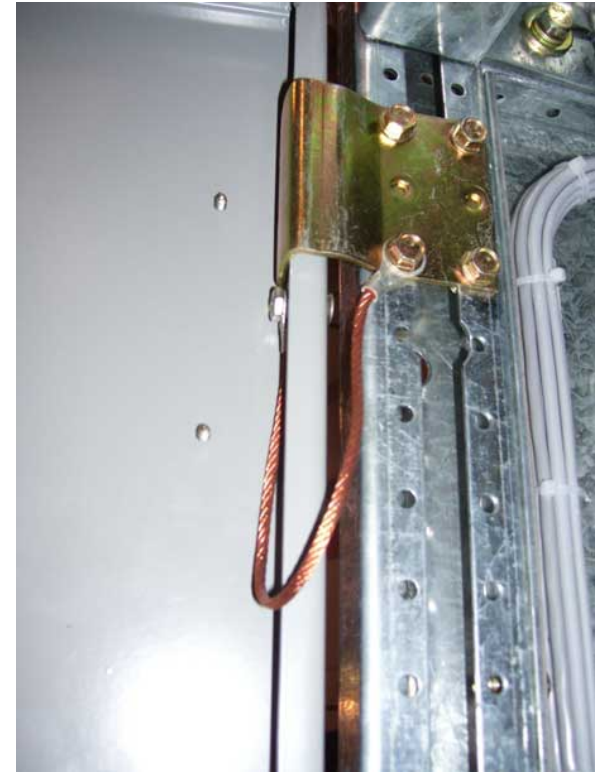
# Construction

- Control Wiring
  - Inter-cubical wiring made easy
    - Terminal strips
    - Located in wire way on top of enclosure



# Construction

**Front door grounding**



**Inter-cubicle wiring made easy**





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# Instrumentation

- **Breaker door mounted lights, meters and control**

- ABB Indicating Lights
- Volt, amp, and watt meters
- Electroswitch Series 20 and 24 control switch
- Multifunction Metering
  - Electro Industries
  - Others
- Relays
  - ABB (provided standard when required)
  - GE Multilin (Optional)
  - Basler, Schweitzer, Others (Optional)
- Surge Protectors
  - ABB TVSS (Standard)
  - Others (Optional)



# Instrumentation

- **High Resistance Ground System**
  - Post Glover (Standard)
  - Others
    - I-Gard



# Instrumentation

## ■ Software

- SD-View 2000, PC-based software system enables communication
  - Send opening/closing commands to circuit-breakers
  - Read electrical installation values (current, voltage, power factor, etc.)
  - Read and modify trip characteristics of protection units
  - Log of history of installation
  - Status of apparatus
  - Abnormal operating situation
  - Current, voltage, power measurements in real time

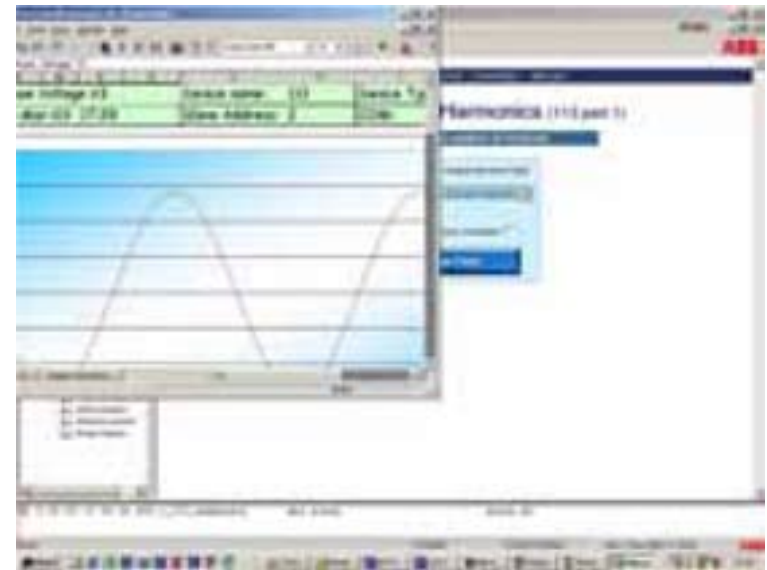


# Instrumentation

## ■ Software

### ■ SD-Pocket

- Application designed to connect new protection releases to a PDA or PC
- Enables use of wireless communication to:
- Configure protection threshold function
- Monitor measurement functions
- Verify status of the circuit-breaker
- SD-Pocket application scenarios include:
- During start-up of switchgear, with rapid and error-free transfer of the protection parameters to the releases (also using the dedicated exchange file directly from Docwin);
- During normal installation service, gathering information on the circuit-breaker and load conditions (last trip information, runtime currents, and other information)



# Instrumentation

- **Testing and Calibration**
  - PR010/T Portable Test Unit
- **Testing and Calibration**
  - ABB FT-1 Test Switch



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# Applications

- MaxSG Market Segments
  - Oil and Gas
  - Mining and Metals
  - Utility and co-generation
  - Steel Mill
  - Pharmaceutical
  - Waste Water
  - Semiconductor Manufacturing
  - Power Generation
  - Food and Beverage
  - Aerospace
  - Critical Power and Data Centers
  - Health Care



**Oil and gas**



**Utilities**



**Critical power**



**Industrial facilities**

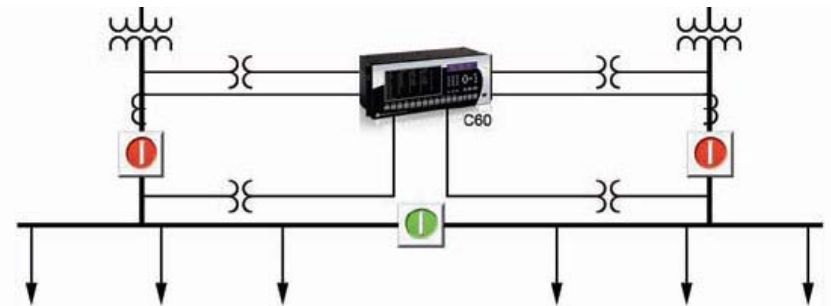
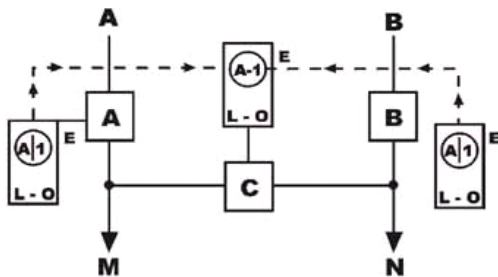
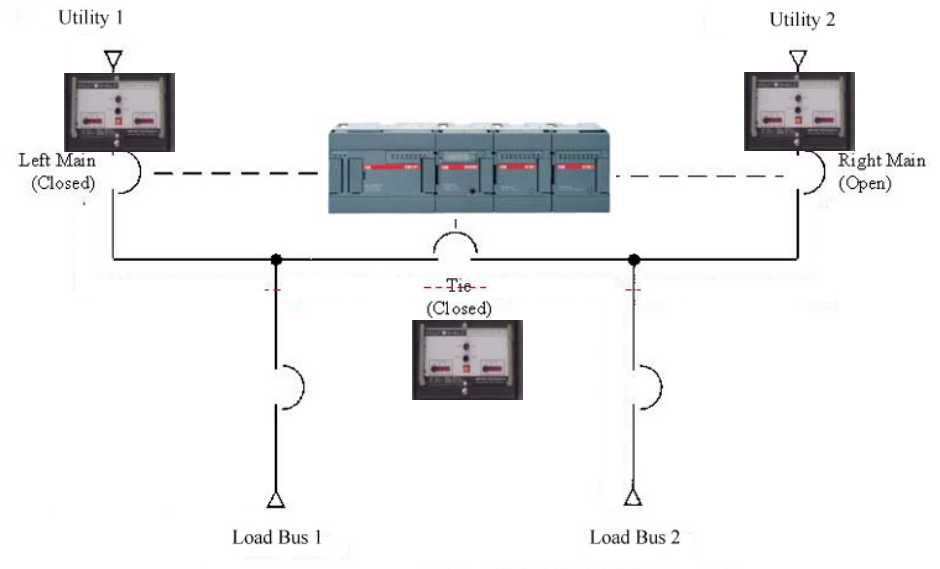




# MaxSG Applications

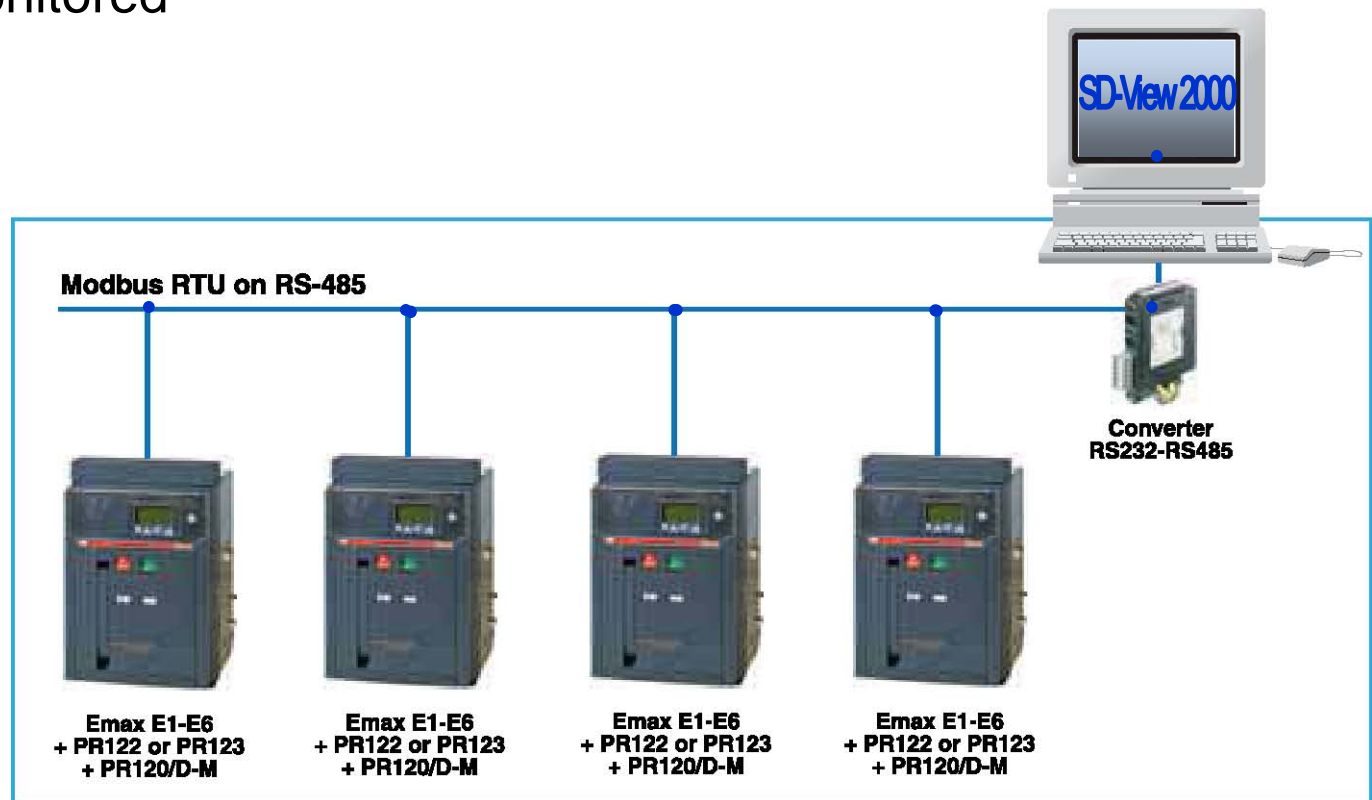
## Main-Tie-Main transfer schemes (open and close)

- Relay controlled
- PLC
- Kirk Key Interlock
- Customized



# Applications

- Main-Tie-Main Transfer Schemes
  - DCS monitored



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# ABB Competitive Aspects

- ABB MAXSG is designed, tested, and built per ANSI and UL1558 switchgear standards
- Key features include:
  - Stability and strong structure
  - Emax breaker
    - Trip Units PR121P, PR122P, and PR123P
    - Safety Features
  - Communication Capabilities (SCADA, Modbus, Ethernet, etc.)
- Provided benefits include:
  - Competitive Footprint
  - Maintenance Switch Feature Available
  - REA Relay Arc Flash System





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