Filnor Inc.

- Company Introduction
- Quality & Production Capabilities
- Technical Information
- Photos and Descriptions

ISO 9001
Quality System Certified

Filnor Inc.

Corporate Headquarters

Filnor, Inc.
227 North Freedom Ave.
Alliance, OH 44601
United States

Major markets located nearby:

- Pittsburgh - 76 miles
- Cleveland - 57 miles
- Columbus - 147 miles
- Akron/Canton Airport - 16 miles

Filnor Inc.

Four buildings combine to 45,000 square feet for all of our manufacturing, engineering and office personnel

Filnor Inc.

Since 1970, Filnor has designed and manufactured products for industries worldwide:

- Paper Mills
- Aluminum Plants
- Ship Building
- Automotive
- Construction
- Mining
- Mass Transit
- Utilities
- Power Generation
- Steel
- Telecommunications

Filnor Inc.

Filnor's Product Groups

- Power Resistors
- Disconnect Switches
- AC & DC Power Distribution Equipment & Controls

Filnor Inc.

Power Resistor Applications

- Neutral Grounding Resistors
- AC & DC Motor Acceleration
- Dynamic Braking
- Load Banks
- Harmonic Filtering
- Crane Control
- Transit
- Mining Equipment

Filnor Inc.

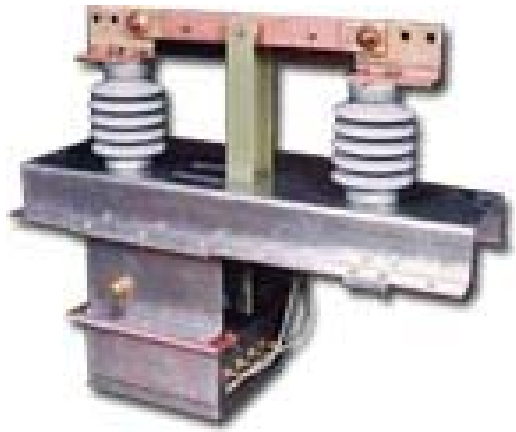
Disconnect Switch Capabilities

- Current Ratings: 30 ampere- 20 kA
- Voltage Ratings AC/DC: 250 to 38 kV
- Open Panel Mounting
- Enclosed: Nema 1 - Nema 4X, IP23 – IP66

Filnor Inc.

Switch Designs

- Knife Switches
- Bolted Pressure Contact Switches
- High Current DB Switches
- Medium Voltage Switches - Up to 38 kV
- Transfer Switches
- Special Design Switches



Filnor Inc.

Capabilities

- AC and DC panelboard
- AC and DC switchboards
- Custom power distribution equipment
- Custom control equipment

Filnor Inc.

Filnor's partial customer list:

- **ABB**
- **AK Steel**
- **Alcoa**
- **Algoma Steel**
- **Alstom**
- **Bombardier**
- **Bucyrus International**
- **Chicago Transit Authority**
- **Detroit Edison**
- **Eaton**
- **Electric Boat**
- **Electro-Motive/GM**
- **First Energy**
- **Florida Power Light**
- **Hydro Quebec**
- **General Electric**
- **Graybar Electric Company**
- **ISG Steel Group**
- **Illinois Power Company**
- **Joy Mining**
- **Powell Electrical Mfg.**
- **Siemens**
- **Square D Company**
- **The Timken Company**
- **Toshiba**
- **US Steel Corp.**
- **Wesco Distribution**
- **Wisconsin Power & Light**

Filnor Inc.

Transit Projects Sample Listings

Contract Name	Customer	Product Description
DFW – Airport	Powell Traction [Bombardier]	A & B Switchgear Line Up Switch, Fuse, Contactor Assembly
MARTA – North Line	Powell Traction	Switch, Fuse, Contactor Assembly
LIRR M7	Bombardier	Intercar Bus Line Fuse & Enclosure
NYCTA R142 NYTCA R160	Alstom Alstom	Main Vehicle Disconnect Main Vehicle Disconnect
CTA Series 3200	General Electric	Switch, Rev Contactor, Resistors
WMATA 3000 WMATA 6000	Alstom Alstom	Main Vehicle Disconnect Main Vehicle Disconnect
Las Vegas Monorail	Bombardier	Power Switches, Wayside Switchgear
Vancouver Skytrain	Bombardier	Main Rail Disconnects & Wayside Switches
MARTA	Bombardier	Main Vehicle Disconnects
SEPTA	Bombardier	Main Vehicle Disconnects
San Francisco Muni LRV	General Electric	Main Vehicle Disconnects
Ten Urbano Puerto Rico	Siemens	Fuse Box Assembly
BART	Air Research	Main Vehicle Disconnects
NYCTA R62	General Electric	Main Vehicle Disconnects
MTA BARTA	AAI / Alstom	Dynamic Braking Resistors, Main Vehicle Disconnects, Line Charging Resistors, & Battery Disconnects

Filnor Inc.

Quality & Production Capabilities

- Quality System and Testing
- Production Capabilities
- Experience and Product Deliveries
- Service and Warranties

Filnor Inc.

ISO9001 certified since August of 1999

Smithers Quality Assessments, Inc.

CERTIFICATE OF APPROVAL

This is to Certify that the Quality Management System of:

FILNOR, INC.

227 N. Freedom, Alliance, Ohio 44601

has been assessed and approved by Smithers Quality Assessments, Inc., to the following quality management system standards and requirements:

ISO 9001:2000 With Design

The Quality Management System is Applicable to:

The design and manufacture of power resistors, disconnect switches and motor control for industry.

Approval
Certificate Number: 99.243.1

Original Approval: August 31, 1999
Current Certificate: August 31, 2005
Certificate Expires: August 30, 2008

on behalf of SQA - J. Michael Hochschwender, President

The use of the accreditation mark indicates accreditation in respect of those activities covered by The Accreditation Certification Number 99.243.1

The approval is subject to the company maintaining its system to the required standards which will be monitored by Smithers Quality Assessments, Inc., 425 W. Market St., Akron, Ohio 44303-2099

MGMT. SYS. RvA C 059

ANAB ACCREDITED

Form SQA 13-5 (4035-Q-313)

"Quality Products and Services Delivered On Time"

Filnor Inc.

ELECTRICAL TEST EQUIPMENT

- HIGH POT- 2,000 to 100,000 volts AC @ 50 mA max with computer interface and graphic/memory capability
- HIGH POT- 0 to 16,000 volts AC or DC
- THERMOCOUPLE MONITOR- 16 channel thermocouple recorder with printer interface
- MEGGER- measures insulation strength at working voltages- 0 to 15,000 volts
- (2) MICRO-OHM-METER- to measure micro-ohms

Filnor Inc.

ELECTRICAL TEST EQUIPMENT

- (6) DIGITAL MULTIMETERS- measures volts/amps/ohms
- RESISTANCE BRIDGE- used to accurately measure resistance
- HIGH CURRENT TRANSFORMER- used to heat run/test resistors and switches up to 1200 amps (150Kva)
- AMMETER- measure currents to 1000 amps

Filnor Inc.

ELECTRICAL TEST EQUIPMENT

- INFRARED THERMOMETER- remotely measures temperatures to 1000 degrees C.
- FLUKE SCOPEMETER- measure/captures/records AC waveforms
- LCR METER- measures inductance/capacitance/resistance

Filnor Inc.

MECHANICAL ITEMS

- OPTICAL COMPARATOR- optically measures distance, angle and radius
- (2) FORCE GAUGE- measures tension or compression forces to 500 lbs. w/computer interface
- (3) SURFACE PLATES- flat surface to accurately measure heights
- (6) TORQUE WRENCHES- accurately torque hardware from 0-250 ft/lbs

Filnor Inc.

MECHANICAL ITEMS

- (32) DIAL CALIPERS (0-8”)- accurately measure inside/outside distances
- (18) MICROMETERS (0-12”)- accurately measure outside distances
- DEPTH- measure bore depths
- DIGITAL HEIGHT VERNIER (0-12”)- measure object height from surface plate

Filnor Inc.

Resources

- Excellent Trained Staff
- Certified Welders and Machinists
- Mechanical and Electrical Engineering
- Years of Experience
- Great Location for Skilled Labor
- Very well maintained working Environment and Equipment

Filnor Inc.

Resources

Complete In-house Machine Shop

- Quality
- Delivery
- React to Emergency Situations and unique requirements

Filnor Inc.

Experience, Expectation and Delivery

Warranty

- Standard One Year
- Special Customer Agreement Warranties

Service Team

- Very Well-Trained Staff – Hands On Experience
- Engineering and Technicians

Filnor Inc.

Transit Trackside Switches and Switchboards

Technical Presentation

- Bolted Pressure Contact Switches Overview
- Projects and Photos

Filnor Inc.

What is a Bolted Pressure Contact Switch ?

The switch consists of two parallel movable blades with stationary contacts at each end.

A bolt passes through the blades, hinge and clip stationary contacts and a fixed clamping nut.

Pressure is applied on the contacts by rotating the clip and hinge bolts, connected together by a linkage assembly, effectively tightening the joint.

The result is a joint current carrying capacity similar to bolted bus bar.

Filnor Inc.

Design Criteria and Features

Engineered to ensure reliability, safety, ease of operation, and low maintenance.

Switch Current Carrying Materials & Features:

- Switch current carrying members are ETP 110 Copper Bar
- Terminals and Contact interface Silver Plated - .0005 minimum
- Silver Plating ensures low contact resistance and is not affected by oxidation
- Current Density designed to1kA amps per square inch
- Switch designed for current flow straight through switch to reduce overloa stresses
- Vertical Terminals with Standard Nema hole pattern

Filnor Inc.

Design Criteria and Features

- GPO-3 insulating base – ease of mounting
- Spacing per UL977
- Switches can be supplied open frame or enclosed
- Manual or Motor operated
- Mechanical Interlock
- Options supplied are Auxiliary Switches, Key interlock Provisions and Specific Customer custom features.

Filnor Inc.

Design Criteria and Features

Switch Testing:

- Individual units prior to shipment are factory tested for dielectric withstand, contact resistance, dimensional outline, and build configuration.
- A copy of factory test report is included with each switch
- Each unit is date coded on label for tracking purposes
- Applicable warning signs applied

Filnor Inc.

Design Criteria

Engineered to ensure reliability, safety and ease of installation.

- Filnor Bolted Pressure Switches are designed and tested in strict accordance with the following standards as applicable, UL, CUL, Nema, ANSI, IEEE.

- Custom designed per customer specifications

Filnor Inc.

Filnor
Inc.

Quality Products And Services
. . . Delivered On Time

Filnor Inc. is a designer and manufacturer of Power Resistors, Disconnect Switches, Control Equipment and Transit Products.

Filnor has been manufacturing industrial electrical products and controls since 1970.

ISO 9001
Quality System Certified

Filnor Inc.

TRANSIT TRACKSIDE EQUIPMENT

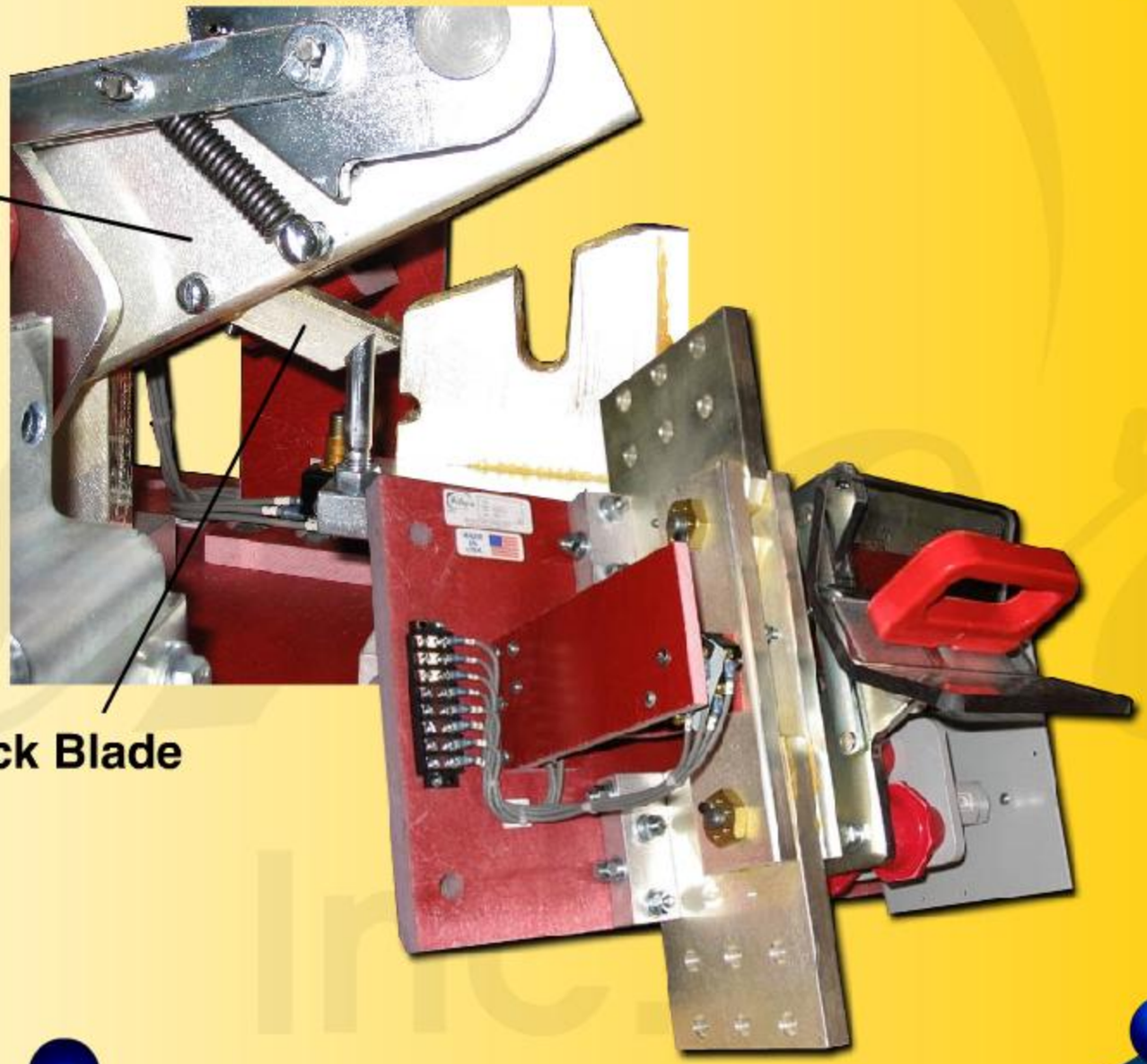
- THIRD RAIL ISOLATION SWITCHES
- SUBSTATION SWITCHES
- EARTHING SWITCHES
- TROLLEY DISCONNECT
- TRANSFER SWITCHES
- DC SWITCHBOARDS
- RECTIFIER DISCONNECT SWITCHES

Filnor Inc.

RAIL ISOLATION SWITCH

St. Louis Transit

- 4000 Amp
- 1000 Volt
- Manual Operated
- Auxilliary Contacts
- Quick Blade Feature



Filnor Inc.

RAIL ISOLATION SWITCH

St. Louis Transit

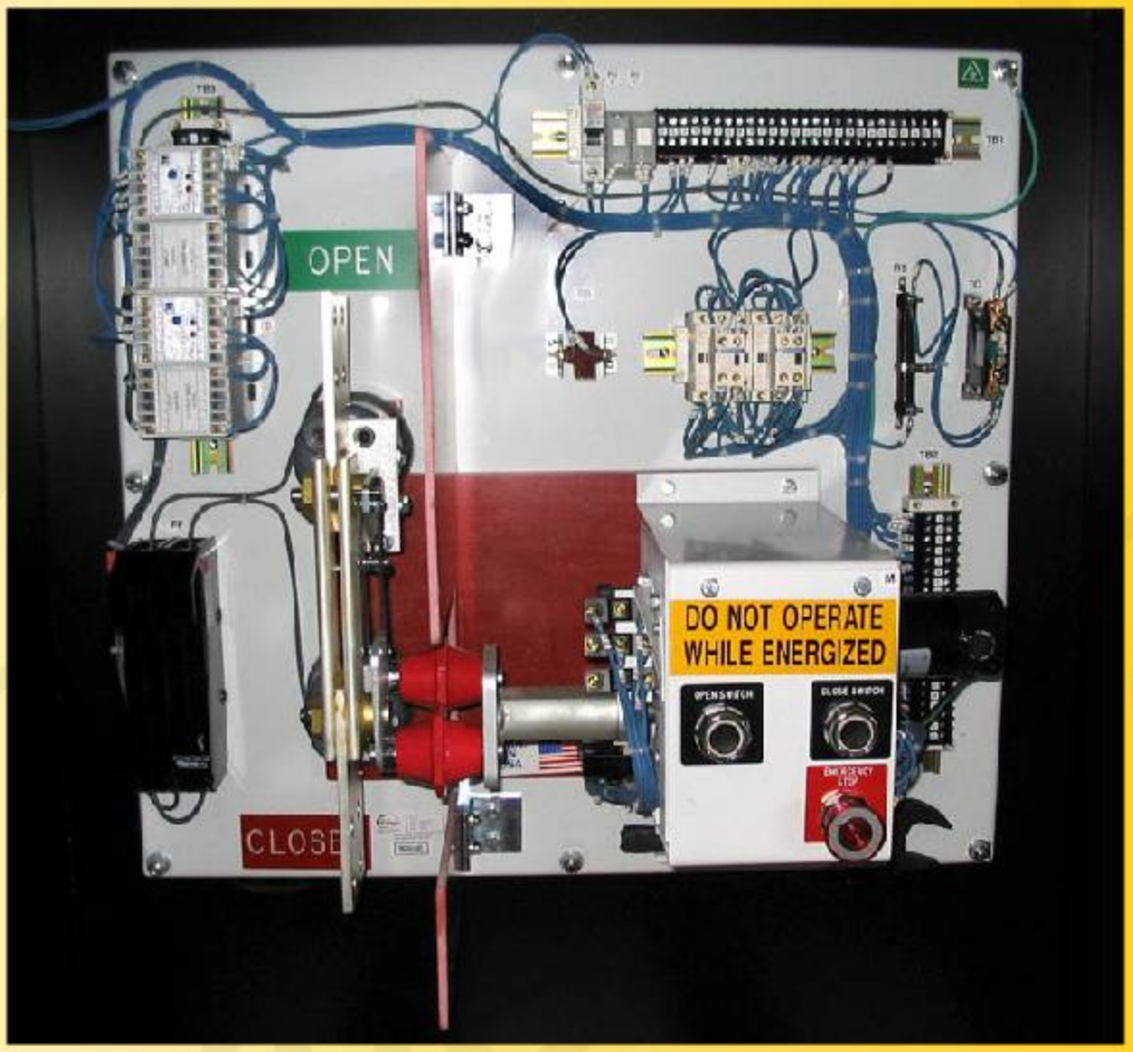
- 4000 Amp
- 1000 Volt
- Motor Operated
- Auxilliary Contacts
- Quick Blade Feature

Filnor Inc.

RAIL ISOLATION SWITCH

DART

- 1200 Amp
- 1000 Volt
- Motor Operated
- Voltage Sensing Circuit
- NEMA 4X Enclosure



Filnor Inc.

RAIL ISOLATION SWITCH

Vancouver Sky Train

- 4500 Amp
- 1000 VDC
- 2 -Pole, Single Throw
- 200 Amp
- 4-Pole, Single Throw
- Auxiliaries
- Motor Operated
- Voltage Sensing Circuitry
- Viewing Windows

Filnor Inc.

RAIL ISOLATION SWITCH

Vancouver Sky Train

- 4500 Amp
- 1000 VDC
- 2 -Pole, Single Throw
- 200 Amp
- 4-Pole, Single Throw
- Auxiliaries
- Motor Operated
- Voltage Sensing Circuitry
- Viewing Windows

Filnor Inc.

TRANSIT TRACKSIDE EQUIPMENT

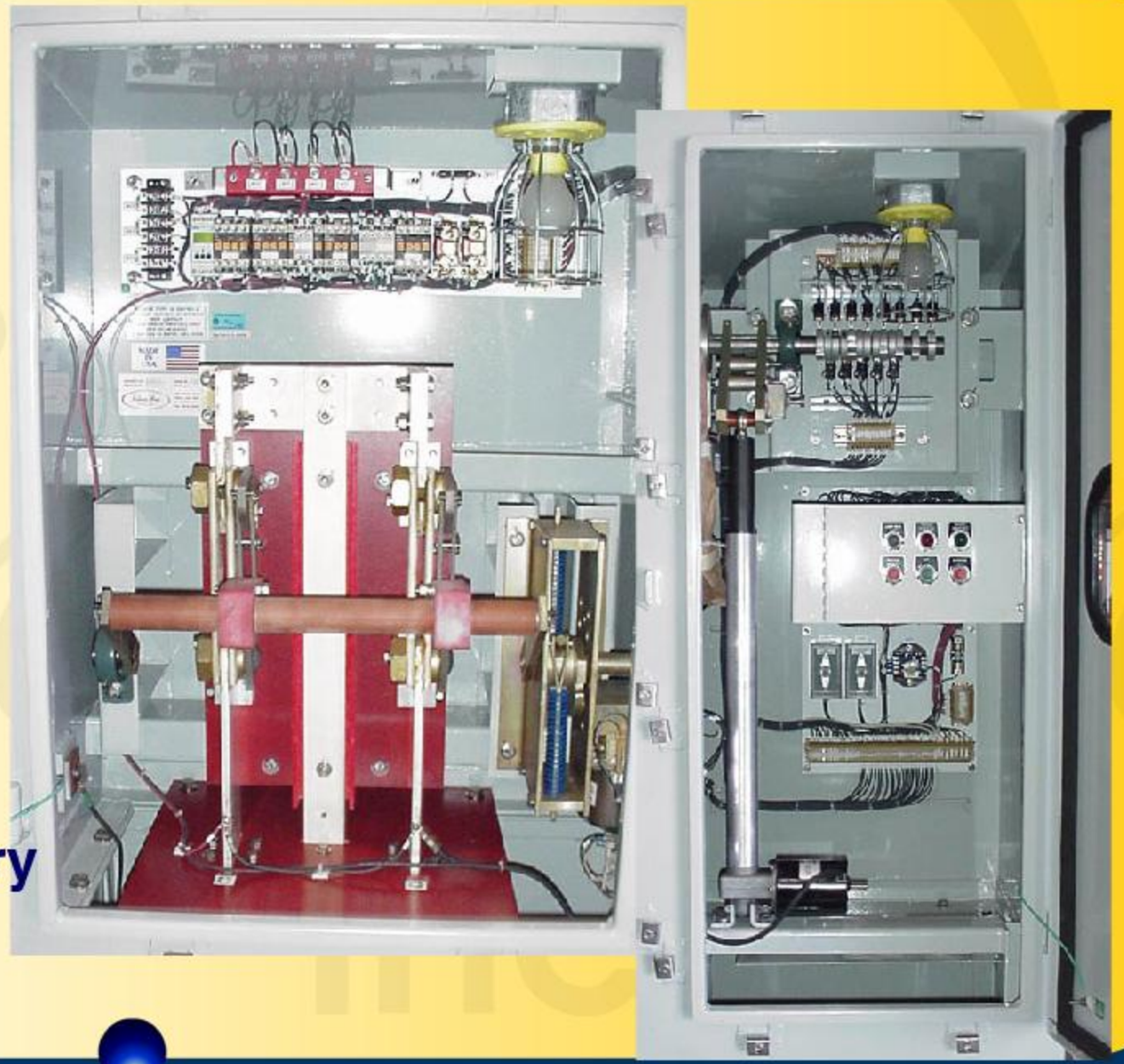
- THIRD RAIL ISOLATION SWITCHES
- SUBSTATION SWITCHES
- EARTHING SWITCHES
- TROLLEY DISCONNECT
- TRANSFER SWITCHES
- DC SWITCHBOARDS
- RECTIFIER DISCONNECT SWITCHES

Filnor Inc.

GROUNDING SWITCH

Vancouver Sky Train

- 1200 Amp
- 1000 VDC
- 2 -Pole, Single Throw
- Auxiliaries
- Motor Operated
- Voltage Sensing Circuitry
- Spring Operated
- Viewing Windows



Filnor Inc.

DC SWITCHBOARD

DFW Airport

- 1000 DC Volt
- Switchboard Lineup
- Transit Application
- Switch, Fuse, Contactor
- Key Interlock System

Filnor Inc.

DC SWITCHBOARD

DFW Airport

- 1000 DC Volt
- Switchboard Lineup
- Transit Application
- Switch, Fuse, Contactor
- Key Interlock System

Filnor Inc.

DC SWITCHBOARD

MARTA

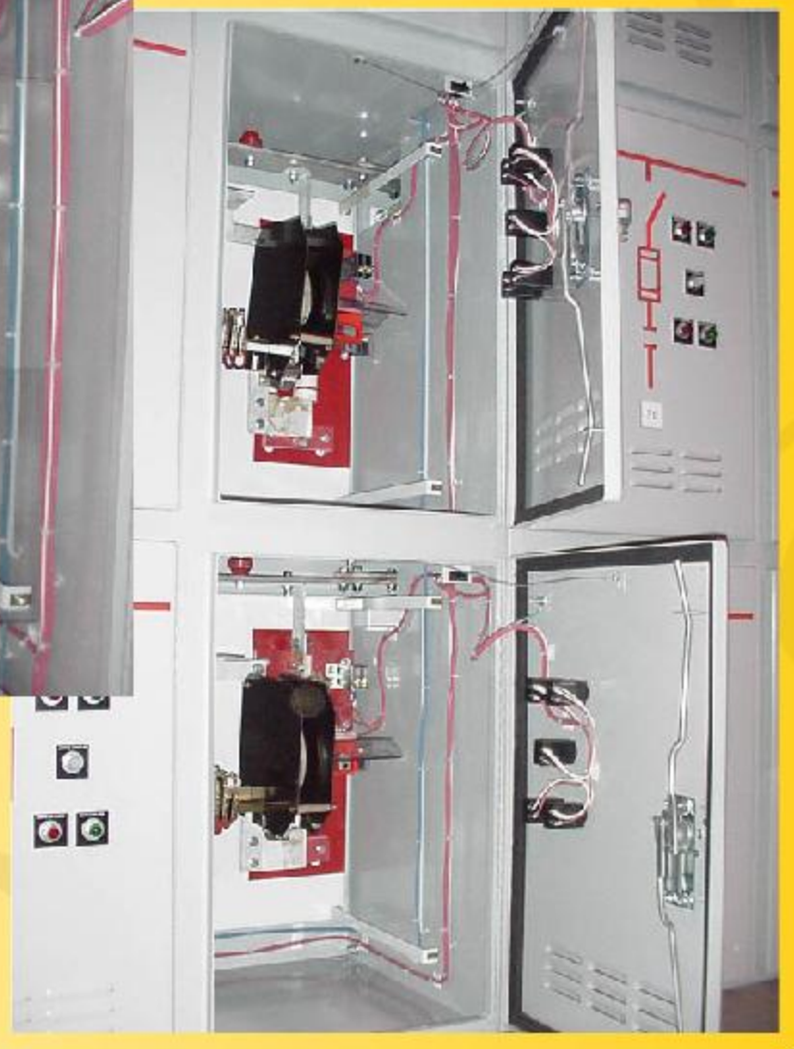
- 1000 DC Volt
- Switchboard Lineup
- Transit Application
- Switch, Fuse, Contactor

Filnor Inc.

DC SWITCHBOARD

MARTA

- 1000 DC Volt
- Switchboard Lineup
- Transit Application
- Switch, Fuse, Contactor



Filnor Inc.

DC SWITCHBOARD

Las Vegas Monorail

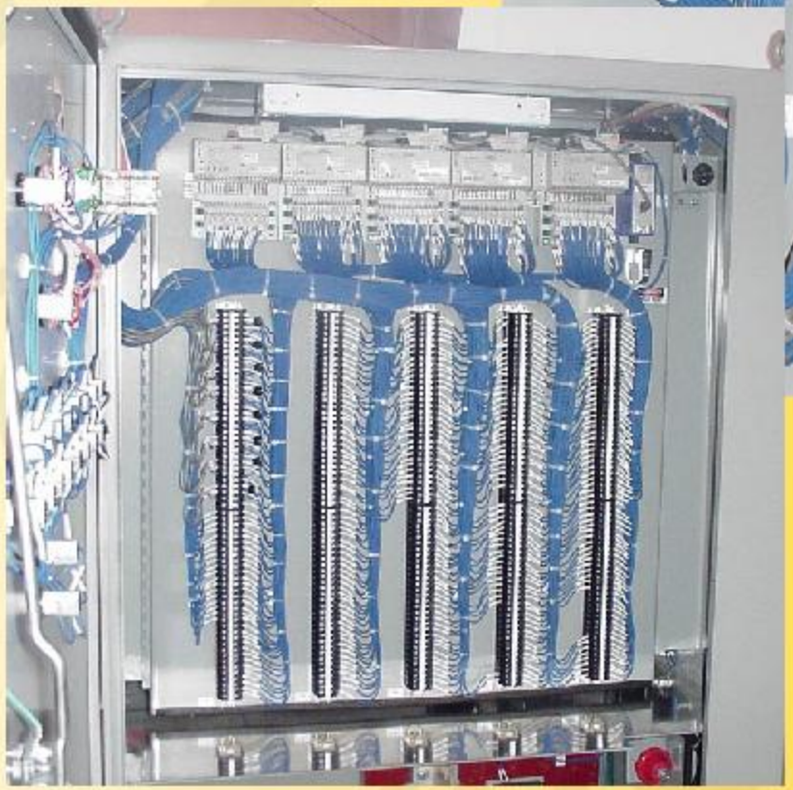
- 1000 DC Volt
- Switchboard Lineup
- Transit Application
- Maintenance Facility
- PLC Logic
- Switch, Fuse, Contactor

Filnor Inc.

DC SWITCHBOARD

Las Vegas Monorail

- 1000 DC Volt
- Switchboard Lineup
- Transit Application
- Maintenance Facility
- PLC Logic
- Switch, Fuse, Contactor



Filnor Inc.

RAIL DISCONNECT SWITCH

Las Vegas Monorail

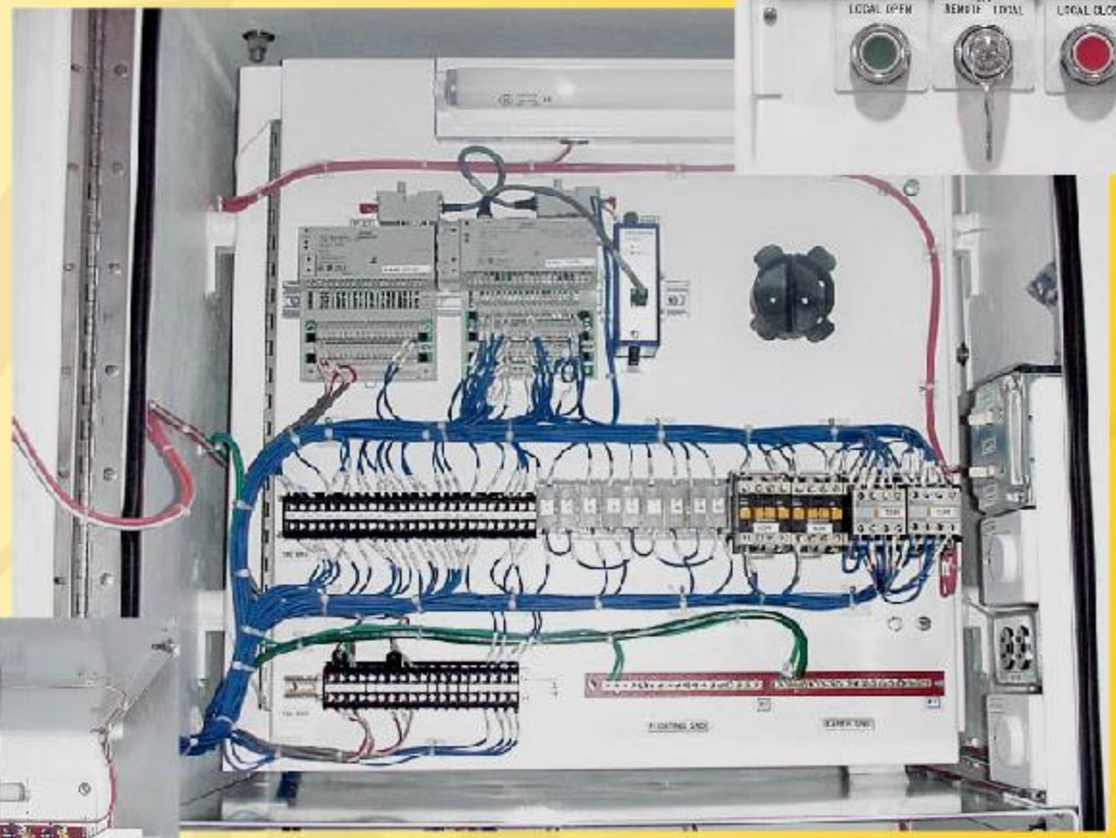
- 1000 DC Volt
- Contactor Fuse Assembly
- PLC Logic
- NEMA 4X Enclosure

Filnor Inc.

RAIL DISCONNECT SWITCH

Las Vegas Monorail

- 1000 DC Volt
- Contactor Fuse Assembly
- PLC Logic
- NEMA 4X Enclosure



Filnor Inc.

TRANSFER SWITCH

- 1200 Amp
- 1500 Volt
- Manual Operated
- Transfer Switch
- Key Interlock System

Filnor Inc.

RAIL HEATER DISCONNECT SWITCH

WMATA

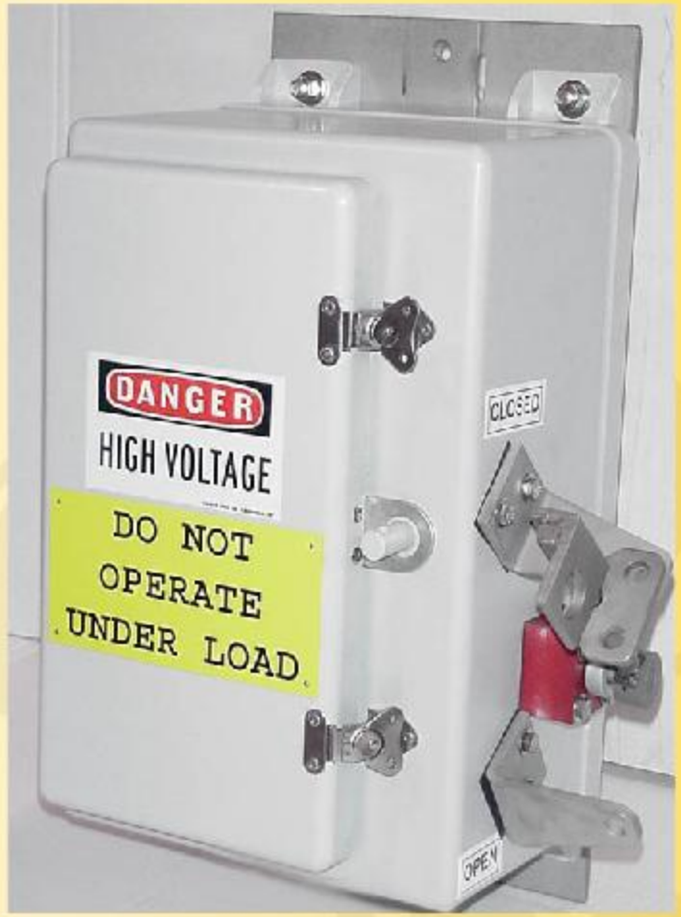
- 200 Amp
- 1000 Volt
- One Pole
- NEMA 4X Enclosure
- Viewing Window
- Spring Operated

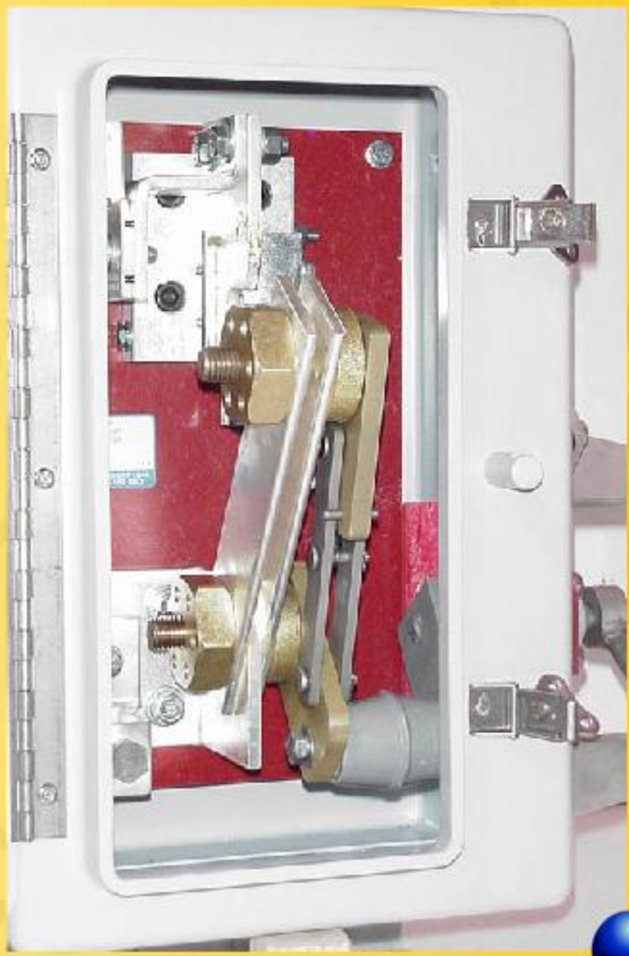
Filnor Inc.

TROLLEY LINE DISCONNECT SWITCH

SEPTA

- 600 Amp
- 1000 Volt
- One Pole
- NEMA 4X Enclosure





Filnor Inc.

TRANSIT VEHICLE ELCTRICAL EQUIPMENT

- Main Vehicle Disconnect Switches
- Fuse Boxes
- Braking Resistors
- Snubber Resistors
- Truck Vehicle Disconnect Switches
- Polarity Reversing Switches

Filnor Inc.

TRANSIT MAIN VEHICLE DISCONNECT SWITCH

NEW YORK CITY

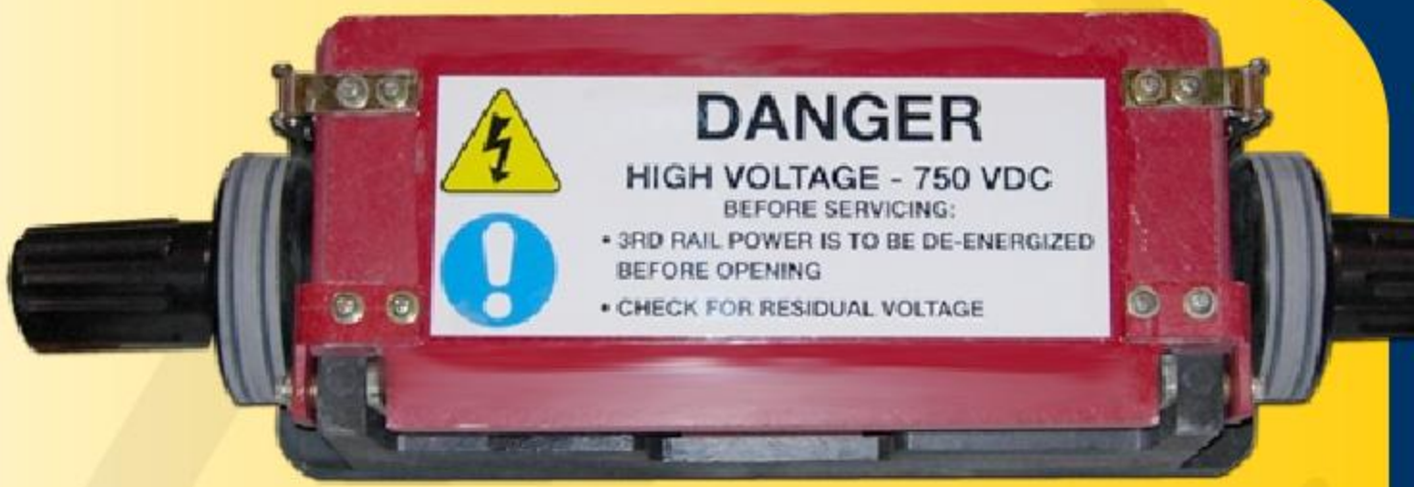
- 1200 Amp
- 1000 Volt
- One Pole
- Double Throw
- NEMA 4X Enclosure
- Four Position
  - Run
  - Auxilliary from Third Rail
  - Open
  - Shop Test

Filnor Inc.

TRANSIT VEHICLE FUSE BOXES

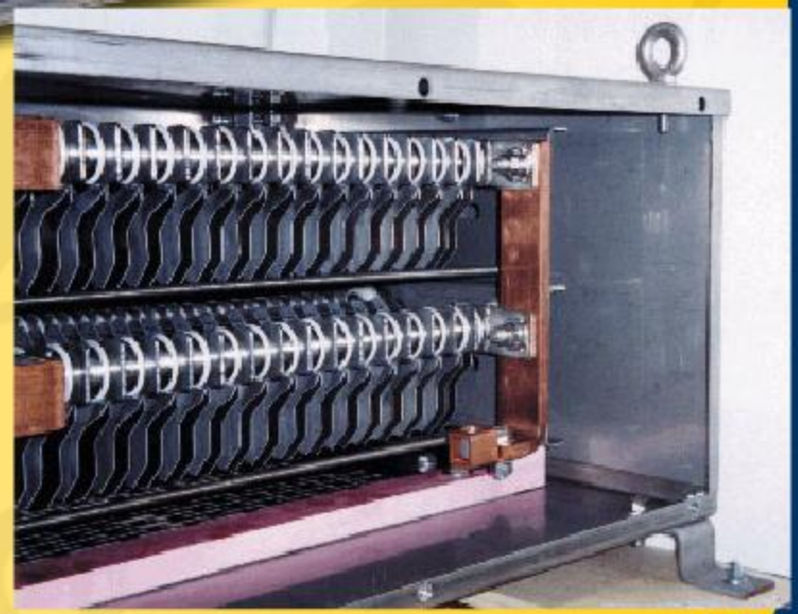
M7 & LONG ISLAND RR

- Inner Car Bus Line Fuse
- 1500 Amp
- 1500 Volt
- Ribbon Fuse
- Undercar Hung



Filnor Inc.

TRANSIT BRAKING RESISTORS



- Designed for roof mounted or under car hung
- Compact, lightweight, rugged designs for severe applications
- Filnor designs can be used on light or heavy rail vehicles or trackside braking

Filnor Inc.

TRANSIT BRAKING RESISTORS

NEW YORK CITY

- Trackside Braking Resistors
- Convection or Fan Cooled Designs