

Mining Controls



Gilbert Electrical Systems

“Meeting the electrical needs of Mining and Industry”



Products And Services

Power Distribution Equipment



MCI offers a full line of electrical products for mining including power substations, power centers, AC switchgear, rectifiers, transformers, longwall controls and ground relays.

Industrial/Utility Equipment



Gilbert Electrical Systems (GES) can analyze your system and develop an optimal solution to your unique electrical power system power factor or harmonics problem.

Transformers & Reactors



MCI manufactures dry-type and oil-filled transformers up to 5,000 kVA.

Lighting & Camera Products



MCI designs and manufactures the most complete line of mine lighting and camera systems for mobile and stationary equipment used in surface or underground mining.

Explosion Proof Enclosures



A wide variety of MSHA certified explosion proof enclosures and controls are available.

The Commitment and Capabilities to Meet the Electrical Needs of the Mining Industry... Today and Tomorrow

Overview

Mining Controls (MCI) is a custom job shop situated on a 16 acre site near Beckley, WV. Our 56,000 square foot facility includes 45,000 square feet of manufacturing space and 11,000 square feet for administrative and technical staff.



Our manufacturing and service staff encompasses certified welders, electricians, transformer winders and assemblers, painters, explosion proof lighting and enclosure assemblers, and field service/test personnel. Included in the MCI engineering staff are electrical



engineers and mechanical/electrical draftsmen that currently use Autocad 2009.

In-House Capabilities

We have in-house capabilities to engineer, design and build electrical equipment to customer specifications. Other MCI specialized capabilities include:

- Specification development assistance
- Experienced service personnel for on site installation and repairs
- Complete design and fabrication of welded or bolted enclosures
- Powder coat paint system for finishing new enclosures



- Wet painting if required
- Transformer and reactor design and build
- Experienced electrical assemblers for HV and control wiring
- "Quick ship" capability from extensive inventory of MSHA-certified explosion proof (XP) enclosures
- Excellent working relationship with MSHA on certifications and designs if needed

Manufacturing Facility

Enclosure Fabrication

The enclosure fabrication area houses shearing, bending and punch press capabilities that allow the manufacture of custom design enclosures of virtually any size that can ship via common carrier.



A new turret punch allows punching up to 1/4" metal with complex designs and shapes.

New pulse welders located throughout the manufacturing area provide the capability to weld mild steel, stainless steel and aluminum. A number of certified welders are employed by MCI. All welders have been through extensive training with Ojett, Inc., an outside consulting firm.

Powder Coating

Our powder coating facility, in operation since 2007, is one of the largest in the Eastern United States. It can



handle enclosures up to 27' long, 9' wide and 10' high. DuPont paint products are employed as a standard, providing virtually unlimited color finishes.

Powder coated finishes are the MCI standard. They provide a much more durable and longer lasting finish than wet painting. Wet painting is an option should it be required.

Transformers and Reactors

MCI has modern coil winding machines manned by experienced employees. In addition, there are insulation and core steel cutting machines. After the final assembly process, the transformer or reactor is varnish impregnated and oven-cured.



The final step in the process entails baking the product to provide waterproofing and additional thermal stability. Extensive testing of every unit is performed prior to shipment to assure the highest quality and reliability of the final product.

Final Assembly & Testing

Once an enclosure is completed and painted, it moves to the

electrical area with its completed transformer or reactor for final assembly. Ten (10) fully equipped bays are available to perform final assembly.



Our trained electricians then mount all the components and wire the high-voltage, low-voltage and control sections of the final product.

Once completed, the final product is moved to the test area where all components are tested and overall functionality tests are performed to ensure proper performance. If PLC programming is involved the programs are loaded and tested at this time.

Explosion Proof Lighting, Cameras and Enclosures

An area of the plant is dedicated to the manufacture of MSHA certified explosion proof lighting, pump enclosures and electrical control enclosures. Camera systems, ground monitors and low-voltage cable connectors are also manufactured in this area.



Electrical Products for Mining

- **Power Substations**

- Stationary
- Portable
- Mobile

- **Power Centers**

- AC
- DC
- Combination

- **AC Switchgear**

- Surface
 - Air, vacuum or gas insulated
- Underground
 - Air or vacuum insulated

- **Motor Controllers**

- Full Voltage
- Reduced Voltage
 - Reactor/Auto Transformer
 - Solid State Soft Start
- Conventional Control or PLC/Computer Control

- **Rectifiers**

- Haulage
- Production

- **Transformers**

- Dry type
 - Open
 - Metal enclosed
 - Convection or nitrogen cooled
- Liquid filled
 - Mineral oil or hi-temp fluid

- **Longwall controls**

- Open type
- Power centers
- MSHA XP Type
- XP face controls
- XP junction boxes

- **Components**

- Personnel safety
- Ground fault, ground check monitors
- LV cable connectors
 - Gear mounted, cable mounted
- Replacement parts

Electrical Power Distribution Products from Substation to Mineral Extraction

Electrical Power Distribution Equipment

The MCI product line includes electrical power distribution equipment for all types of underground mining. We take great pride in the diversity of our power distribution products... from the substation distributing incoming power to the mine all the way to the mine face where the actual mineral extraction occurs. MCI is known throughout the industry for its commitment to service, quality and product reliability.



The MCI line of electrical power distribution products for mining includes:

- Substations (up to 345 kV)
- Portable substations
- AC switchgear
- Motor controllers
- Belt starters
- Rectifiers
- Speciality Transformers
- Power centers
- Vacuum switch houses
- Longwall controls



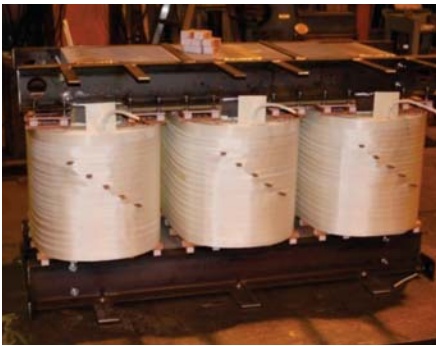
All MCI electrical power distribution equipment is custom built to customer specifications and mine conditions. Our engineering staff can provide technical expertise to small companies that don't have the personnel resources to design what they need. Also, MCI will rebuild a customer's existing electrical equipment or offer reconditioned equipment as a low cost alternative to new equipment.



Custom Built to Customer Specs and Demanding Mine Conditions

Specialty Transformers

MCI manufactures both dry-type and oil-filled specialty transformers up to 5000 kVA. We custom design our transformers to meet specific customer needs.



MCI transformers complement and support our mining and tunneling applications. Typical



mining applications call for 5 kV to 23 kV inputs with 995V, 480V or 240V outputs. 120/240V also supplied for convenience.



AC Switchgear

Utilizing in-house engineering capabilities, MCI designs and manufactures high-quality low and medium-voltage metal-enclosed custom switchgear.



Our line of custom switchgear includes low and medium voltage vacuum reclosers and interrupters, and also metal-enclosed breaker assemblies.



Supporting Products

To more fully support its power distribution product line, MCI manufactures MSHA-certified low and medium voltage cable connectors, ground monitors, ground fault relays and capacitor trip devices.



HV and LV Electrical Equipment

- **Metal Enclosed HV Capacitor Banks**
Stationary, portable, mobile
- **HV, MV, LV Reactors**
AC, DC, combination
- **Reactors**
Dry type
Air core, iron core
Liquid cooled
- **Metal Enclosed Automatic Voltage Regulators**
Conventional
Full voltage
Reduced voltage
Reactor/auto transformer or soft start
PLC/Computer
Full voltage
Reduced voltage
Reactor/auto transformer or soft start
- **Metering cabinets, metal enclosed**
- **Junction enclosures, LV and MV, up to 6000 A**
- **Specialty Enclosures for HV, MV Applications**
- **Capacitor Controls**
- **Engineering Services**
Power system analysis
Power system design engineering
Harmonic mitigation studies
Power factor & harmonic filter design



Gilbert Electrical Systems Industrial and Utility Products

Overview

Gilbert Electrical Systems (GES) has been a part of MCI for over twenty years. The acquisition of GES in 1989 provided MCI instant access to the industrial and utility markets for capacitor banks and harmonic filtering banks, primary products of GES.

The acquisition in 1994 of K & M Electrical Products expanded the MCI product line to include empty electrical enclosures then referred to in the industry as transclosures.

GES does business with a diverse range of utility and industrial customers. Utilities we serve range from small cooperatives to large investor-owned electric and gas utilities.

Our industrial customers typically are large manufacturers and/or big consumers of electricity interested in lowering their electrical costs through power factor correction.



Metal Enclosed Capacitor Banks

By increasing their power factor, electricity users reduce their utility bills, increase system capacity and reduce voltage drop. These are just a few of the benefits an electrical system derives from power factor correction. Additional benefits when capacitors are added to an electrical circuit include:

- Reduced power losses due to system current reduction
- Reduced kVAR losses due to system current reduction
- Improved voltage regulation when capacitors are properly switched
- Higher voltage at the load
- Additional load growth capacity through reduced kVA loading
- Reduced demand kVA loading
- Reduced system investment per kW of load supplied

Let Us Help You Lower Your Electric Costs

Harmonic Filter Banks

GES has been analyzing, engineering, designing and manufacturing harmonic filter assemblies since 1983. The need to provide solutions to power factor and harmonic problems has been long recognized. Utilities and industrials have had to address harmonics and the associated problems they create for many years.



Harmonics create many problems on customer systems:

- Abnormal equipment heating
- Premature transformer failure
- Reduced equipment life
- Excessive capacitor fuse failures
- Capacitor problems
- Communications interference
- Excessive voltage distortion
- Transformer overheating
- Potential relay and metering problems
- General equipment problems or damage

GES has a core competency in this area. Our engineering and study group possesses the technical

expertise to analyze a customer's needs and provide a well engineered package of harmonic filter/capacitor banks from 480V to 35 kV that satisfies their system objectives.

Shunt Reactors

Shunt reactors are used to provide capacitive reactance in long runs of high-voltage cables which are lightly loaded and have a leading power factor resulting from capacitance build up.



Shunt reactors will change the power factor from leading to lagging, approximately in the range of 0.95 to 0.99.

Neutral Grounding Reactors

GES manufactures neutral grounding reactors used for low impedance grounding of high-voltage systems.



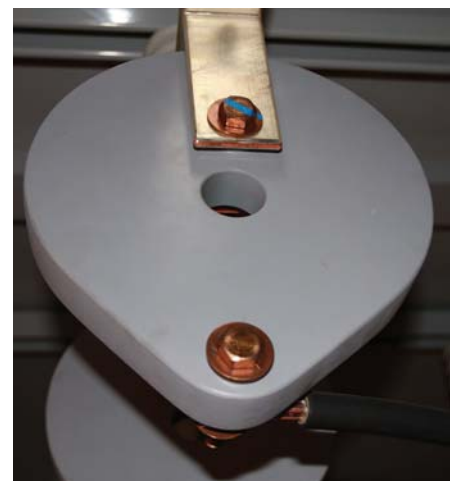
Current Limiting Reactors

GES manufactures air core and iron core reactors up to 69 kV that support the GES product line.

GES offers a line of current limiting reactors to reduce available fault current of existing switchgear to a low enough level to allow its use without having to buy new switchgear with a higher fault current rating.



Also available are a line of current limiting reactors commonly referred to as "pancake" reactors.



Mine Lighting Systems

• Head Lights

Explosion proof
Model 31678 MCI 50XP
Non-Explosion proof
Model 35870 MCI 50
Model 35880 T 50

• Area Lights

Explosion proof
Model 35777 LP, LP2 & LW
Non-Explosion proof
Model MCI 20

• Warning Enclosures

Explosion proof
Model LW
Visible Strobe & LEDs
Model 31678 MCI 50 XP
Visible Strobe & LEDs
Model 33455 LP
Audible 1-Element, 103 dB
Model 35455
Audible 5-Element, 150 dB
Model 35777 LP2
Visible/Audible
Audible 1-Element, 103 dB
Visible Strobe & LEDs

• Cameras

Explosion proof
Model 34290 MCI 50 XP
Model 34272 VFA45XP

• Monitors

Explosion proof
Model 34551 Single 7" LCD
Dual 4" LCD
Model 35400 Single 4" LCD

• Camera & Monitor Systems

Special applications
Backup systems, rock trucks
Shovels and Drag lines
Plant surveillance
Production monitoring
Shuttle car offside
Wireless remote monitoring

• Explosion proof Enclosures

Large
Models 31090, 34360, 34551, 34900, 35223
Small
Models 20630, 33386, 35400

• Alternator/Generator

Model 31090 Alternator
Model 31090-RB, -SRB

• Plug Breaker

Model 31923 Fig. 67
Model 32091 Fig. 64

• Low-Voltage plug & receptacles

Fig. 39 Fig. 64
Fig. 67 Fig. 84
Fig. 125 Fig. 107

A Complete Line of Lighting Fixtures, Camera and Monitoring Systems

Head Lights

A full line of underground aluminum or brass XP Head Lights with/ without heavy duty grading

MSHA and ATEX Certified



Model: MSHA Certified
31687 Head Light
Model: ATEX Certified
31678-AT Head Light



Model: MSHA Certified
35125 Head/Tail Light
Model: ATEX Certified
35125-AT Head/Tail Light

Available with LED's

A full line of above ground/underground watertight aluminum Non-XP Head Lights

UL YCFT2

Industrial Truck Accessories,
Battery Powered Component



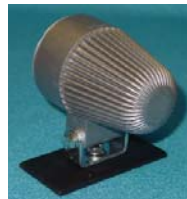
Model:
35870 MCI 50
Head Light
Surface Mount



Fixtures meet customer needs
with/without lamps and pigtails



Model:
35880 T 50 Head Light
Swivel Mount



Area Lights

A full line of underground aluminum or brass XP Area Lights with heavy duty grading

MSHA Certified for underground coal mining



Model: LP2 Dual 26 w PLT-4
Fluorescent fixture



Model: LP Single 26 w PLT-4
Fluorescent fixture



Model: LW
With: PLT-4 fluorescent
White, Colored &
Flashing LED's

Non-Explosion Proof



Model: MCI 20
With: PLT-4 fluorescent
White, Colored,
Flashing LED's

For Coal, Hard Rock Mining Above And Underground Applications

Warning Enclosures

A full line of underground steel, aluminum or brass XP Audible and Visible Warning Enclosures with heavy duty grading

Visible Warning



Model: LW Area Light with White Flashing, Colored Flashing LED's Red, Green, Amber or Blue

Non-Flashing
Red, Green & Amber

Red, Green, Amber with
White or Blue Flashing

Visible Warning in XP Head Lights



Audible Warning



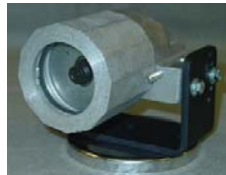
Model 33455 1-Element,
103 dB
5-30 VAC/DC
30-120 VAC
Aluminum or stainless



Model 35455 5-Element,
150 dB
5-30 VAC/DC
30-120 VAC
Aluminum or stainless

Cameras, Monitors

A full line of Cameras and Monitors for varied underground applications



Model: MSHA Certified
34290 Camera

Model: ATEX Certified
31678-AT1 Camera



Model: MSHA Certified
34270 VFA45XP Camera



Model: MSHA Certified
34551 Monitor
Single 7" Color LCD
Dual 4" Color LCD



Model: MSHA Certified
New single 4" Color
LCD Monitor
Series 35400
Coming in 2010

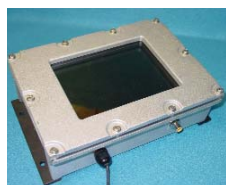
Industrial & Non-Explosion Proof



Model: 34830 Camera
Black & White:
400 Lines 0.1 lux
600 Lines 0.0003 lux
Color:
310 Lines 10.0 lux
380 Lines 0.5 lux
470 Lines 0.7 lux
12 VDC, 120 mA



Model: 34485 Monitor 7"
Color LCD
Closed cab use



Model: 33665 Monitor
Single 7" Color LCD
Dual 4" Color LCD
Open cab or
underground use

Camera & Monitor Systems

Property Surveillance,
Production Monitoring



MCI can custom engineer and install complete camera and monitoring systems for many mining and mine related applications



Truck & Large Equipment



Rock Truck



Shovel



Drag Line



MSHA Certified Explosion Proof Enclosures

MSHA Certified Enclosures

A full line of custom enclosures for many XP applications



Models: 20630 & 33386
Connection, Switch,
Push Button and
E Stop Boxes



Model: 35400
Connection, Switch,
Push Button and
E Stop Boxes



Models:
31090 (8" x 8" x 3")
34360 (9" x 7.5" x 4.3")
34551 (12" x 9" x 4")
34900 (7" x 6" x 6") with lens
35223 (14" x 10" x 6")

Alternators

MSHA Certified Alternator/Generator



Model: 31090
AC Generator with
12 VDC, 150 W Regulator



Model: 31090-SRB
Switch with Regulator

Plug Breakers

Type 67, 64 & 107 Line Mount Plug With Circuit Breaker



Supplied with Cutler-Hammer E2F and E2FM Molded Case Circuit Breakers
Type : Thermal Magnetic, and Magnetic Only
Mine Service and Motor Circuit Protector

Types of Explosion Proof Enclosures



- Circuit breakers
- Starter boxes
- Control stations
- Controllers
- VFD drives
- Connection boxes
- Longwall Controls
- Distribution Boxes
- Junction Boxes
- Disconnect switches

Construction



- All welded steel construction
- Covers steel or aluminum
- Single, two or three bay designs

Accessories



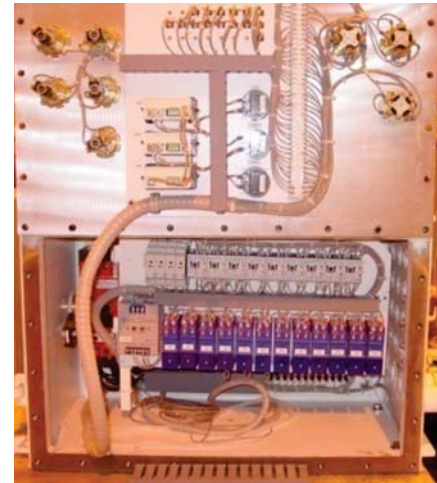
- Pushbutton operators
- Circuit breaker operators
- Rotary selector switches
- Indicating light lens
- Windows
- Hinged Covers
- Strain Clamps

A Leader In Explosion Proof Products

Many Enclosures Are Available

For over 32 years MCI has received MSHA certification for more than 85 explosion proof (XP) enclosures. These enclosures are for use in hazardous areas in underground mining.

The enclosures range in sizes from 184 to 130,000 cubic inches. We do cable gland entrances with grommets or rope packing designs for cables ranging from 0.114" to 3.75" O.D.



Custom Built To Fit Your Application

With so many enclosures available, we will find an enclosure to meet most customers' needs. Or, let MCI custom build an XP enclosure to your exacting specifications. No one does it better!

We provide not only high quality XP products but also exceptional value and dedicated customer service. Our team is ready to provide

solutions for your needs. We can provide you with assistance or manage all aspects of MSHA approvals and certifications.



Typical Applications

Our enclosures are used in a variety of underground mining applications including explosion proof pump starters, continuous miners, shuttle cars, haulage systems, scoops, roof bolters and longwall controls.



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Products and Services

Power Distribution Equipment

- **Power Substations**
Stationary, portable, mobile
- **Power Centers**
AC, DC, combination
- **AC Switchgear**
Surface
Underground
- **Motor Controllers**
Conventional
PLC/Computer
- **Rectifiers**
Haulage or production
- **Transformers**
Dry type
Liquid filled
- **Reactors**
Dry type
Liquid cooled
- **Longwall controls**
Open type
MSHA XP Type
- **Components**
Personnel safety
LV cable connectors
Replacement parts

HV and LV Electrical Equipment

- **HV Capacitor Banks**
- **Metal Enclosed Automatic Voltage Regulators**
- **Metering cabinets, metal enclosed**
- **Junction enclosures, LV and MV, up to 6000 A**
- **Specialty Enclosures for HV, MV Applications**
- **Capacitor Controls**
- **Engineering Services**

Transformers and Reactors

- **Transformers**
Dry-type and oil filled
transformers up to 5000 kVA
- **HV, MV, LV Reactors**
Shunt reactors, oil filled, single phase or three phase
pad mount, dead front,
up to 34.5 kV
Current limiting air core reactors,
0.48 kV to 69 kV

Mine Lighting Systems

- **Head lights**
Explosion proof
Non-explosion proof
- **Area lights**
Explosion proof
Non-explosion proof
- **Cameras**
Explosion proof
Non-explosion proof
- **LCD Monitors**
Explosion proof
Non-explosion proof
Special applications
- **Camera & Monitor Systems**
- **Alternator/generator explosion proof**
- **Explosion proof enclosures**
Large, small
Audible signal
- **LV plugs and receptacle**

MSHA Certified Explosion Proof Enclosures

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