Mining Controls

Gilbert Electrical Systems

“Meeting the electrical needs of Mining and Industry”
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.
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.
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.
**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
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.

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

**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.
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

**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

**Warning Enclosures**
Explosion proof
Model LW
Visible Strobe & LEDs
Model MCI 50 XP
Visible Strobe & LEDs
Model 35455 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 Draglines
Plant surveillance
Production monitoring
Shuttle car offside
Wireless remote monitoring

**Explosion proof Enclosures**
Large
Models 3090, 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

**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 Draglines
    - Plant surveillance
    - Production monitoring
    - Shuttle car offside
    - Wireless remote monitoring

- **Explosion proof Enclosures**
  - Large
    - Models 3090, 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
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

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 lenses
- Windows
- Hinged covers
- Strain clamps

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

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.

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.

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.
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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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