

Applications:

- Custom engineered solutions for a wide variety of industrial and commercial applications
- Hazardous and non-hazardous products engineered to application-specific designs and customer requirements

Capabilities:

- Product selection and application-specific support, including recommendations for material selection, ratings and protection
- Project bid support
- Engineering design services
- Custom product design
- Value-add packages for: ease of installation, ease of maintenance, labor savings, integrated packages and portable products

Certifications and compliances^A:

NEC:

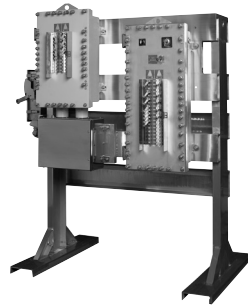
- Class I, Divisions 1 & 2, Groups A, B, C, D
- Class II, Divisions 1 & 2, Groups E, F, G
- Class III

Environmental ratings:

- NEMA 3, 3R, 4, 4X, 7BCD, 9EFG, 12

Ease of installation solutions:

- Rack assemblies – control, distribution, protection, monitoring
- Skid assemblies
- Pre-wired products



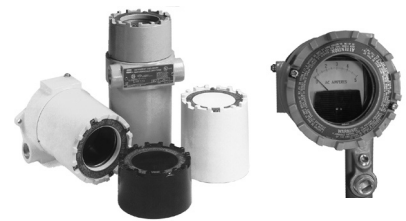
Labor saving solutions:

- Product sub-assemblies and sub-systems
- Pre-fixture products, pre-terminated cables, plugs, fittings and glands



Integrated solutions:

- Enclosed metering and instrumentation
- Component populated enclosures
- Custom machining, painting and legend
- Installed fittings and seals



Portable solutions:

- Power distribution
- Lighting products
- Plugs
- Protection equipment



Interested in a custom engineered product? Contact your local Eaton's Crouse-Hinds sales representative to see how we can design a solution for you. Fill out the request form on the following page to receive a custom quote for your inquiry.

^ARatings may not be available or relevant for every proposal.

Request a quote

Customer: _____
Project: _____
Prepared By: _____
Quotation For: Estimate/Budget Bid
Quotation Required By (Date): _____

Engineering Firm: _____
Location: _____
Date: _____
 Immediate Buy
Material Required By (Date): _____

Is a current copy of plant STDS/SPECS available to Eaton's Crouse-Hinds? _____

Area Classification:

HAZARDOUS - Circle all that apply:

- Class I Div. 1 Div. 2
Groups A, B, C, D B C D
- Class II Div. 1 Div. 2
Groups E, F, G E F G
- Class III

NON-HAZARDOUS

- Ordinary Locations

NEMA Rating 3R 4 4X

Dimension Restrictions:

- Width _____ Height _____
 Depth _____

Service System: (i.e. 480V, 3PH, 3W, 60 Hz)

____ VOLT ____ PH ____ W ____ HZ ____ AMP

Products Involved (Select all that apply):

- Control & Apparatus Plugs & Receptacles
 Fittings & Glands Commercial Products
 Lighting Other

Description: _____

Please attach any supporting documentation to this form, including: sketches, single line diagrams, drawings, bill of materials, specifications, etc.

CONTACT: E-mail: crousecustomerctr@eaton.com
Phone: (866) 764-5454

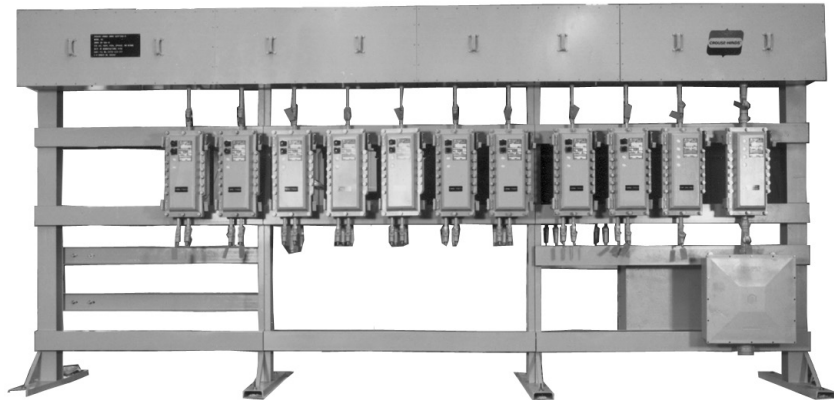
Applications:

Free standing switch rack assemblies are used:

- To provide a complete motor control center in one integrated package
- Outdoors and indoors
- In damp, wet or corrosive locations, such as sewage treatment plants, lumber mills, marine installations and food preparation areas
- In areas made hazardous due to the presence of flammable vapors or gases, such as petroleum refineries, chemical and petrochemical plants, gas gathering plants, pipeline compressor stations and drilling rigs, both onshore and offshore
- In areas where hazardous dusts are present, such as coal handling facilities, grain processing and handling plants and certain food process industries

Features:

- Complete factory assembled and wired switch racks
- Pre-drilled bus boxes allow for quick and easy changing or adding of components
- Complete assembly covered under one order eliminates engineering costs, additional costs of placing separate orders with several vendors for various components, and assembly and scheduling problems at job site
- Wiring is simple; after switch rack is in place, feeders are connected to the main bus and connections made from starters motors; no other field wiring is necessary
- Maintenance time and costs are reduced by having controls grouped; work is performed in one location instead of moving from one control to another in various locations
- Major components are standard – EBM, EPC, NMC, NMG, NCB, FLB, D2PB, EXD, D2D, EPL and D2L enclosures featuring ready access to starters and breakers for inspection and maintenance
- Custom-built racks to meet your exact requirements are an Eaton's Crouse-Hinds specialty; complete quotations will be supplied for any job, large or small (38' length maximum)



Certifications and compliances:

NEC:

- Class I, Divisions 1 & 2, Groups C, D (Group B optional)
- Class II, Division 1, Groups E, F, G
- Class II, Division 2, Groups F, G
- Class III

Environmental ratings:

- NEMA 3, 4X (optional), 7B (optional) CD, 9EFG, 12

Standard materials:

- Rack frames – structural steel or aluminum channel members, bolted and welded
- Components – see individual catalog sections for materials

Standard finishes:

- Rack frame – hot dip galvanized steel or natural aluminum
- Components – see individual catalog sections for finishes

Options:

- Rack frame finish – corrosion-resistant primer with air dry epoxy
- Options listed for individual components can be incorporated in complete switch racks

Construction:

General:

- All construction to be in accordance with current National Electrical Code (NEC), National Electrical Manufacturers' Association (NEMA) and state and local standards as designated by the purchaser
- All hazardous area enclosures for motor starters, combination motor starters, circuit breakers, motor circuit protectors, instrument enclosures, panelboards, main bus, fittings, receptacles and lighting fixtures shall be made and supplied by the manufacturer
- All explosionproof threaded enclosures for combination starters, circuit breakers, motor circuit protectors and starters shall be UL classified
- All other standard hazardous area enclosures shall be UL Listed or UL classified
- Manufacturer shall retain permanent records of all motor control racks and shall have the capability of duplicating, or replacing, any fully assembled rack or rack component
- Manufacturer to assume responsibility for construction, purchase/manufacturer of components, complete circuit continuity testing and testing of mechanical functions of components

Rack frame design:

Structure:

- Switch rack, either single or double face as required, shall be rigid, free standing structures; racks shall be factory welded, assembled and fabricated from standard rolled structural steel or aluminum shapes
- Vertical risers will be 6" I-beam and horizontal members shall be 6" channel
- Mounting feet shall be 6" channel; width of such feet for single-sided racks shall be 41 inches
- End mounting feet will be braced (welded) to the upright with 6" T member
- Mounting feet shall be anchored at the job site with 1" diameter bolts; anchor bolts and mounting pads will be the responsibility of the user
- Maximum horizontal spacing between mounting legs shall not exceed 6 feet (specific dimensions to be determined by the manufacturer)
- Racks longer than 20 feet will be supplied as bolt together sections (specific section dimensions to be determined by the manufacturer)

Grounding:

- A pressure-type grounding lug with appropriate wire capacity will be provided at each end of frame

Finish:

- Rack frame shall be hot dip galvanized after fabrication or natural aluminum

Main bus equipment:

Class I, Division 1:

- Main bus material shall be copper only and capable of withstanding up to 65K amperes fault current. Cable bus will be wired to terminal blocks enclosed in cast copper-free aluminum, explosionproof junction boxes, Eaton's Crouse-Hinds series EJB. Such junction boxes for incoming power and distribution wiring shall be provided at either the top or bottom of the rack. Enclosures shall be connected by rigid conduit with conduit seals installed in accordance with the NEC. Load conduit or cable will leave rack either below or above. Manufacturer shall provide conduit layouts.

Class I, Division 2:

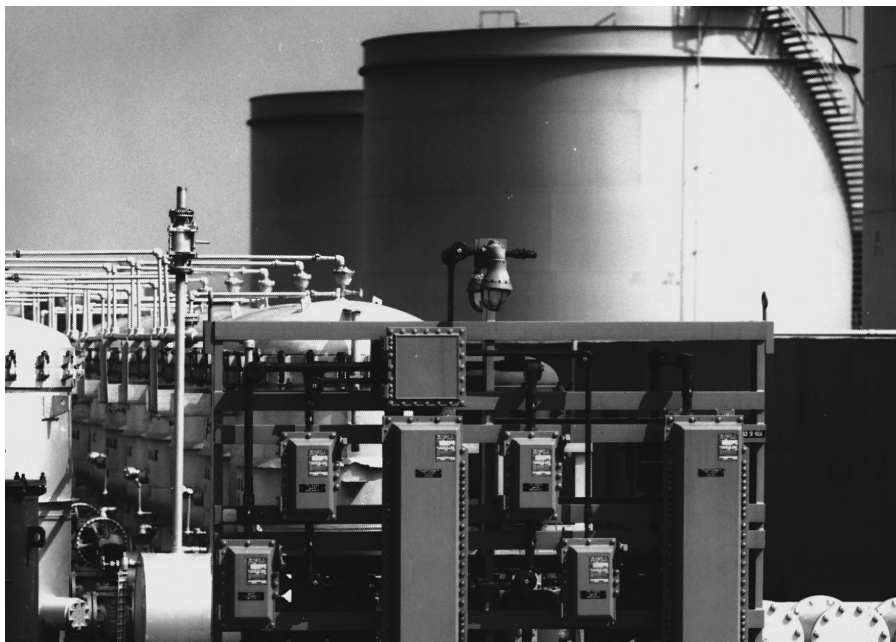
- Main bus material shall be copper only and capable of withstanding up to 65K amperes fault current. Cable bus will be wired to terminal blocks enclosed in cast copper-free aluminum weathertight junction boxes, Eaton's Crouse-Hinds series WJB. Such junction boxes for incoming power and distribution wiring shall be provided at either the top or bottom of the rack. Enclosures shall be connected by rigid conduit with conduit seals installed as required by the NEC. Load conduit or cable will leave rack either below or above. Manufacturer shall provide conduit layouts.

Bus duct in lieu of junction boxes (optional):

- Cable bus will be wired to a weathertight bus duct provided at the top or bottom of the rack

Canopy (optional):

- Single- or double-pitched canopy shall have minimum 15° pitch with a minimum 7'6" ground clearance, and 2 foot overhang
- Roofing material shall be corrugated aluminum
- Canopy roof trusses, cross channels, roof material and mounting hardware shall be shipped unassembled for quick assembly at the job site
- All holes in structure shall be provided, except for roof mounting holes, which will be drilled in the field
- Manufacturer will supply drawings and material for complete field assembly of canopy



Eaton's Crouse-Hinds switch rack installed in a fuel storage area

Motor control components:**Explosionproof quick opening enclosures:**

- All circuit breakers, motor circuit protectors and combination or across-the-line motor starters shall be enclosed in quick opening enclosures (Eaton's Crouse-Hinds series EBM or EPC)

Types:

- Ground joint bolted cover enclosure shall be Eaton's Crouse-Hinds series EBM, UL classified for use in Class I, Divisions 1 and 2, Groups C, D; Class II, Divisions 1 and 2, Groups E, F, G; and Class III hazardous locations, and shall also be suitable for Type 3, 3R and/or Type 4 (NEMA 3, 3R and 4) areas
- All enclosures shall be cast of a corrosion-resistant copper-free aluminum alloy (less than 0.4% copper), and shall be of a semi-clamshell design with external flange to promote ease of apparatus installation, adjustment and maintenance. Most importantly, enclosure inside dimensions shall conform to the wire bending space requirements of the National Electrical code NFPA70 paragraph 373-6. Enclosures with flat covers, internal flanges or those not conforming to NFPA70 paragraph 373-6 are not permitted.
- Covers shall be hinged on the left side and, when closed, shall be affixed to the body by multiple lead thread bolts to promote quick opening and closing of the enclosure
- Cover bolts shall be hex head stainless steel without screwdriver slots, to promote the use of a socket or wrench for proper tightening. They shall be captive to the cover and stainless steel spring loaded to indicate the fully unthreaded position. Spring loading shall give visual indication that the bolts are free of the body when the cover is being opened. The cover flange ground joint shall have an integral gasket to prevent the entry of windblown dust, rain or sleet.
- All enclosures shall be fitted, as standard, with adjustable, extended, corrosion-resistant copper-free aluminum hinges that shall allow the cover to swing away from the body when opened and shall permit unobstructed working space for maintenance, adjustment or replacement of the internal apparatus. Additionally, these hinges shall allow minimum enclosure-to-enclosure spacing with little interference between an open cover and an adjacent enclosure. Enclosures with hinges fabricated from steel or aluminum stampings shall not be permitted.
- All enclosures shall be provided with drilled, tapped and plugged conduit entrances suitably sized for the electrical application. Power conduit entrances shall be located one (or two) each on (or equally spaced from) the enclosure vertical centerline at top and bottom. A single, plugged 1" entrance for a control conduit shall be provided at the bottom of the enclosure. (Some enclosures can also be provided with a plugged 1" entrance for control conduit at the top).
- All conduit entrances shall be furnished with removable copper-free aluminum reducers, each with integral wire pulling bushing. All conduit entrances shall be located the same distance from the enclosure mounting surface to facilitate conduit run layout and/or stub up construction.
- All enclosures shall have rugged, cast copper-free aluminum circuit breaker and motor starter overload reset operating handles located on the right side of the enclosure. These handles shall operate the internal mechanisms via stainless steel, gasketed shafts and bearings through the side wall of the body. Correct circuit breaker and overload reset operation shall be visually confirmed with the cover open.
- Circuit breaker handles shall be padlockable in either the "OFF" or "ON" position, and shall be trip-free of the circuit breaker itself. An attached indicating plate shall give clear, visual confirmation of the circuit breaker status.
- Adjustable circuit breaker handle stops shall be provided to ensure full operation of the circuit breaker and to prevent handle overthrow that could damage the circuit breaker toggle.
- Motor starter overload reset operating mechanisms shall be field adjustable
- Threaded construction enclosures shall be Eaton's Crouse-Hinds series EPC, UL classified for use in Class I, Divisions 1 and 2, Groups C, D; Class II, Divisions 1 and 2, Groups E, F, G; and Class III hazardous locations, and shall also be suitable for Type 3, 3R and/or Type 4 (NEMA 3, 3R and 4) areas
- All enclosures shall be cast of a corrosion-resistant copper-free aluminum alloy (less than 0.4% copper), and shall be of a three section design. Multiple start straight buttress threads between the covers and the body shall ensure quick access to the interior in less than two full turns of the covers. A system of stops shall prevent overtightening and thread seizing. A system of locks shall prevent covers from loosening due to external vibration.
- Female threads on the top cover with male threads on the bottom cover shall ensure inherent water and rain shedding
- All exposed screws, bolts and hardware shall be stainless steel
- The external circuit breaker operating handle, affixed to a stainless steel shaft, shall be padlockable in either the "ON" or "OFF" position with up to three padlocks. Circuit breaker mechanisms shall be trip-free of the circuit breaker itself to allow the circuit breaker to open under overload conditions even if it is locked in the "ON" position.
- The mounting bracket shall provide a three-point suspension system for quick installation and adjustment
- Conduit entrances shall have integral wire pulling bushings and conduit stops. These openings shall be arranged two at the top and two at the bottom and shall be sized for power and control requirements.

General:

- All enclosures shall be bolted to the horizontal frame members on either the front or back or both front and back. Enclosures shall be connected to the main bus via conduit seals (to be field poured). All hardware used to mount the enclosures shall be stainless steel.

Lighting panelboards:

Class I, Division 1:

- Panelboards shall be Eaton's Crouse-Hinds series factory sealed EXD or EPL as specified, and shall meet the following electrical ratings:

EPL – 1-, 2- or 3-pole, 240 volt maximum, 100 amperes maximum branch trip rating, 10,000 AIC

EXD – 1-, 2- or 3-pole, 600 volt maximum, 100 amperes maximum branch trip rating

Class I, Division 2:

- Lighting panelboard shall be Eaton's Crouse-Hinds series factory sealed D2L 120/240 volt panelboards, and be provided with single-pole, two-pole or three-pole branch circuit breakers with up to 100 amperes trip rating. Main breaker ranging to 225 amperes. Similarly, lighting panelboard shall be factory sealed D2PB 120/240 volt panelboards and be provided with single-pole or two-pole factory sealed circuit breakers with 15, 20 or 30 amperes trip ratings and maximum 10,000 AIC. Power panelboards shall be factory sealed D2D, up to 600 volt, and provided with single-pole, two-pole or three-pole branch circuit breakers with up to 100 amperes trip ratings; main breaker rating to 225 amperes.

NEMA 4X option:

- All bus boxes, control enclosures and lighting panelboards will be made of Krydon material to meet NEMA 4X requirements

Fittings:

- All fittings shall be made and provided by the manufacturer. Seals and unions will be provided for each incoming and outgoing conduit as required. All interconnections between components shall be done by the manufacturer with galvanized rigid conduit, and conduit fittings as required to meet the hazardous classification. Interconnecting conduits to be provided with conduit seals as required. All incoming and outgoing rack conduit entrances shall include conduit seals as required by the hazardous location specified. Such seals will be provided by the manufacturer and will not be filled where field wiring is to be introduced.

Conduit boxes, outlet boxes, device boxes:

- Conduit boxes, outlet boxes and device boxes shall be Eaton's Crouse-Hinds series Condulet® fittings

Seals:

- Seals will be standard Eaton's Crouse-Hinds series Condulet EYS (Eaton's Crouse-Hinds series Condulet EYD drains to be specified as required)

Unions:

- Unions will be Eaton's Crouse-Hinds series UNY

Breathers and drains:

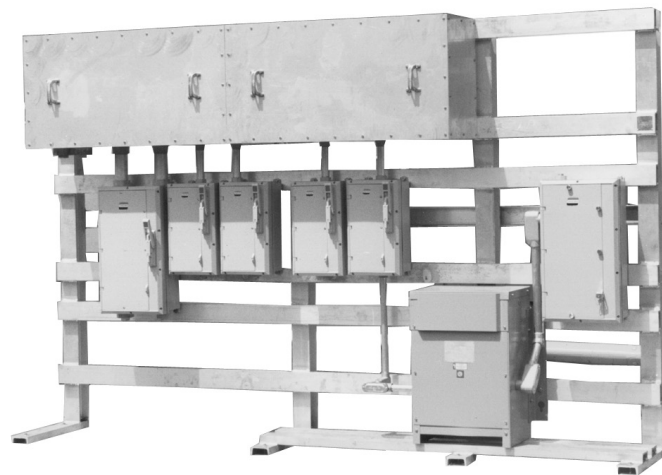
- Breathers and drains shall be Eaton's Crouse-Hinds series ECD

Wiring:

- Standard wire shall be copper only, 600 volt, 75°C minimum rating, UL listed
- No power wire less than 12 AWG shall be used
- Control wire shall be 14 AWG minimum, 7 strands, THW minimum
- Wiring shall be sized in accordance with NEC requirements

Drawings:

- Standard drawings supplied for customer approval shall include complete rack wiring diagram, component data, nominal weight of the rack and overall rack dimensions



Switch rack assemblies

Cl. I, Div. 1 & 2, Groups B, C, D
Cl. II, Div. 1, Groups E, F, G
Cl. II, Div. 2, Groups F, G
Cl. III
NEMA 3, 4X, 7BCD, 9EFG, 12

Explosionproof
Dust-ignitionproof
Raintight
Wet locations
Watertight

7C

Selection guide

Customer: _____

Engineering firm: _____

Project: _____

Location: _____

Prepared by: _____

Date: _____

Quotation for: Estimate/budget

Bid

Immediate buy

Interested in highly reliable, comprehensive communications that will improve the operating efficiency of your facility? See additional information at the end of this guide.

Is a current copy of plant STDS/SPECS available to Eaton's Crouse-Hinds Division? _____

AREA CLASSIFICATION:

Hazardous (circle all that apply):

- Class I
(Division 1 or 2, Groups B, C, D)
- Class II
(Division 1 or 2, Groups E, F, G)
- Class III

Non-hazardous:

- Ordinary locations
- NEMA 3R, 4, 4X (circle one)

STRUCTURAL FRAME:

Material:

Finish:

- Steel
- Aluminum
- Single face (components on ONE side only)
- Double face (components on BOTH sides)
- Other _____
- Percent spare space (%) _____

- Hot dip galvanized
- Painted

ROOF CANOPY:

- Yes No
- Corrugated aluminum
- Corrugated fiberglass

ENCLOSURE TYPE:

- Bolted Threaded
- Krydon Epoxy coated

DIMENSION RESTRICTIONS:

- Length Height

SERVICE SYSTEM: (i.e. 480V, 3PH, 3W, 60 Hz)

_____ Volt _____ PH _____ W _____ Hz

INCOMING FEEDER REQUIREMENTS:

- _____ # Conductors/phase
- _____ # AWG/MCM
- _____ # Inch conduit (size)
- Top entry
- Bottom entry

MAIN BUS ENCLOSURE:

Material:

- Steel (painted)
- Aluminum (painted)
- 316 stainless steel
- Bus location – top of rack
- Bus location – bottom of rack
- Bus bracing (25 kAIC standard) _____
- Bus amperage _____
- Other – customer to specify

Main bus characteristics:

Copper bars

- Bare (standard) Power distribution block
- Insulated Ground bus in enclosure
- Silver plated
- Tin plated

7C

Switch rack assemblies

Cl. I, Div. 1 & 2, Groups B, C, D
 Cl. II, Div. 1, Groups E, F, G
 Cl. II, Div. 2, Groups F, G
 Cl. III
 NEMA 3, 4X, 7BCD, 9EFG, 12

Explosionproof
 Dust-ignitionproof
 Raintight
 Wet locations
 Watertight

7C

Selection guide

MAIN BREAKER DISCONNECT: (3C)

- None Molded case breaker
- AIC rating _____
- Amp trip (AT) _____ Amp frame (AF) _____
- Disconnect switch
 _____ Amperage
- Fused Non-fused

EQUIPMENT REQUIREMENTS:

Combination motor starters (1C)

FVNR, reversing, 2-speed (circle one)

- Qty. _____
- _____ NEMA Size 0 with _____ AT/ _____ AF, _____ MCP
- _____ NEMA Size 1 with _____ AT/ _____ AF, _____ MCP
- _____ NEMA Size 2 with _____ AT/ _____ AF, _____ MCP
- _____ NEMA Size 3 with _____ AT/ _____ AF, _____ MCP
- _____ NEMA Size 4 with _____ AT/ _____ AF, _____ MCP
- _____ NEMA Size 5 with _____ AT/ _____ AF, _____ MCP
- _____ NEMA Size 6 with _____ AT/ _____ AF, _____ MCP

Refer to the Eaton's Crouse-Hinds Division catalog for suggested breaker or motor circuit protector sizing, if not specified above. Eaton will size accordingly.

OPTIONS REQUIRED:

- | | Yes | No |
|--|-------|-------|
| Fused control transformer (suffix 'FTPS') ^A | _____ | _____ |
| Space heaters (suffixes 'R11', 'R22', 'R44') | _____ | _____ |
| Start/stop pushbuttons (suffix 'PB23') | _____ | _____ |
| Hand-Off-Auto selection switch (suffix 'RR3') | _____ | _____ |
| Red indicating light (suffix 'J1') | _____ | _____ |
| Green indicating light (suffix 'J3') | _____ | _____ |
| Auxiliary contacts (2 N.O./2 N.C.) (suffix 'S782') ^A | _____ | _____ |
| Control relay (suffix 'S787') | _____ | _____ |
| Breather/drain (suffixes 'S198V', 'S756V') ^A | _____ | _____ |
| 12-point terminal block (suffix 'S786') ^A ; other – specify _____ | _____ | _____ |

FEEDER CIRCUIT BREAKER: (3C)

- AIC rating _____
- | Qty. | (AT) | (Specify) |
|-------|-------|-------------|
| _____ | _____ | /100/150 AF |
| _____ | _____ | /100/150 AF |
| _____ | _____ | /225/250 AF |
| _____ | _____ | /400 AF |
| _____ | _____ | /800 AF |
| _____ | _____ | Other |

COMPONENT PREFERENCE:

- Cutler-Hammer SQD A-B GE

(Cutler-Hammer will be used if no preference is indicated).

DISTRIBUTION TRANSFORMERS:

- _____ KVA _____ PH _____ Volt-Pri ___ / ___ Volt-Sec
- _____ KVA _____ PH _____ Volt-Pri ___ / ___ Volt-Sec
- Copper windings Stainless steel enclosure

PANELBOARDS: (1A)

Power (480V) (D2D, EXD)

- Single-phase Three-phase
- Main breaker _____ Pole _____ AT
- Branch circuits _____
- | Qty. | (AT) | No. poles |
|-------|-------|-----------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

Lighting/heat tracing (240/120V) (D2L, EPL, D2PB)

- Single-phase Three-phase
- Main breaker _____ Pole _____ AT
- Branch circuits _____
- | Qty. | (AT) | No. poles |
|-------|-------|-----------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

- GFI (5 mA)^B (# required) _____ Amperage rating _____
- EPD (30 mA)^B (# required) _____ Amperage rating _____

^A Unless specified differently, options furnished standard.

^B Not available with D2PB panelboards.

Switch rack assemblies

Cl. I, Div. 1 & 2, Groups B, C, D
Cl. II, Div. 1, Groups E, F, G
Cl. II, Div. 2, Groups F, G
Cl. III
NEMA 3, 4X, 7BCD, 9EFG, 12

Explosionproof
Dust-ignitionproof
Raintight
Wet locations
Watertight

7C

Selection guide

7C

LIGHTING CONTACTOR:

- Yes No
- No. poles _____ Amperage rating _____
- Control power transformer (suffix 'FTPS')
- Hand-Off-Auto selector switch (suffix 'RR3')

PHOTOCELL:

- Yes No

LIGHTING FIXTURES: (1L, 2L, 3L)

Quantity _____ Type _____
Wattage _____ Voltage _____

RECEPTACLES:

- Convenience receptacle
Amps _____ Poles _____ Volts _____
- Welding receptacle
Amps _____ Poles _____ Volts _____
- Integral circuit breaker
 Yes No

CONDUIT FITTINGS, SEALS, UNIONS:

- Plant standard (i.e. Form 7) _____
- Iron Aluminum
 - Type seals
 EYD EYS EZD
 - Other (specify) _____
- NOTE: Seals not poured at factory.*

CONDUIT:

- Rigid galv. steel PVC coated Aluminum

CONDUIT:

- RHW/RHH THWN/THHN (C-H std.)
- THW XHHW
- Other insulation (specify) _____

SHOP INSPECTION AND TESTS:

- Mfr. standard tests
- Customer in plant final inspection
- Yes No

Utilizing standard Eaton's Crouse-Hinds series NEMA 7 enclosures with specified internal components (mounted on your switch rack), this state-of-the-art technology is available today. IMPACC (Integrated Monitoring Protection and Control Communications) by Cutler-Hammer/Westinghouse is a unique high frequency-based communications system specially designed for electrical distribution and control applications. Providing real-time information, with an "open" protocol, allows you to manage and operate your entire electrical system, including remote hazardous areas, without leaving your office or motor control center. For more information, please contact factory.

Special requirements: _____

Authorised Distributor:



46, Jalan SS 22/21, Damansara Jaya,
47400 Petaling Jaya,
Selangor Darul Ehsan, Malaysia.
Email: ampmech@ampmech.com
Website: www.ampmech.com