



320XPC Blasthole Drill – Electrical Systems Training

Course Duration

Three days, 24 hours (additional day, 8 hours, for none English speaking audience)days

Target Audience

This training is targeted for Electrical Maintenance and Supervisory personnel responsible for preventive and corrective maintenance and servicing of 320XPC blasthole drill.

Description

The course introduces the student to the operation and maintenance of 320XPC blasthole drill. It focuses on critical knowledge and skills required in supporting P&H electric mining blasthole drill. All electrical, device set-up's and adjustments are discussed. Recommended preventive and corrective maintenance procedures and practices are also discussed.

Prerequisites

Students should have an adequate level of knowledge about electrical theories and terminology and practical experience with maintenance equipment. High voltage circuits are discussed, therefore, all participants must be aware of High Voltage hazards. Only qualified and authorized personnel should be allowed to work on high voltage circuits.

Course Location

Field

Course Objectives

Upon completion of this course the student will be able to:

- Identify controls in the cab.
- Identify and explain the purpose of all the Electrical Systems utilized.
- Use GUI to locate relevant information.
- Analyze schematics and control diagrams for troubleshooting and repair of the high/low voltage electrical systems.
- Identify Profibus, CAN bus (when applicable), Ethernet and DDCS components and set them for proper operation.
- Identify and explain the purpose of all remote I/O systems on a drill.
- Follow Function Block diagrams to identify the state of inputs/outputs.
- Troubleshoot and set DCS 800 ACS 800 drives
- To locate information for proper maintenance of the main AC and pull down/rotary DC motors.

Main Concepts

- Kirk Key, Main transformer, Soft Start Auto-transformer, Main and Motor High Voltage Switches, 480/380VAC and 520VAC ground fault detection circuits.
- Main and Rotary Motors, DC Drive Modules
- AC VF Drive modules, Various starters, circuit breakers and contactors
- Profibus and CAN Bus protocols, hardware and software components, I/O systems ET-200S and ET-200S ECOfast
- CAN bus hardware and software components (UDC cab)
- DDCS protocol

Day 1

Course Introduction

- Instructor and participants introduction
- Course objectives
- General, on site safety
- Knowledge evaluation

Sources of Information

- Maintenance Manual
- LinkOne Parts Book
- Service Bulletins and Notices

Drill Safety and Systems Introduction

- General safety information, safety web sites
- Safe operating practices
- Safety decals and signs
- Introduction to drills systems, general
- Electrostatic discharge

Cab Controls

- Discuss every button, lever and display in the cab
- Touch panel and GUI. Discuss all relevant GUI screens.

High Voltage Circuitry

- High voltage disconnect switches, vacuum contactors
- Kirk key interlock system
- Main and soft start transformers
- 520 VAC and 430/380VAC GF circuitry
- Main AC motor, description, operation, maintenance.
- Hoist/pull down motor circuitry and DCS800 drives, rotary motors circuitry and DSC800 drive, DDCS network

Day 2

K-504T Motor

- Principal of operation, components
- Commutation, commutator, film, TIR, neutral plane, insulation resistance, bearing temperature
- Maintenance and preventive maintenance

Oil Cooler and Water Injection Pump

- VFD drives, ACS800 operation, set-up

Miscellaneous 480/380 VAC circuitry

- Jib crane, aux. air compressor, welder transformer, air conditioner (this module does not cover AC recharging), low pressure pump/motor, blower motors, oil circulation pump/motor.

Miscellaneous 208/120 VAC circuitry

- Various 120VAC starters and relays, heaters, lights, autolube AC motor
- Transient suppression filters, 120VAC/24VDC power supplies
- Smart UPS system, description, components, software, messages
- Air System Control
- Brake Air System
- Lube Air System

Profibus

- Protocol definition, (DP-V1), optical and copper conductors, terminators
- Ethernet network
- AC800M controller, description, set-up, troubleshooting

- OBT, ET-200S I/O (interface module, I/O modules, terminating module), ET-200S ECOfast (description, terminations, addressing)
- Resolver, vibration sensors, various pressure/temperature sensors

CAN bus (Universal Drill Cab – UDC)

- CAN bus description, protocol definition (CAN Open)
- CAN components description, set-up, troubleshooting.

Day 3

CAN bus (Universal Drill Cab – UDC)

- CAN bus description, protocol definition (CAN Open)
- CAN components description, set up, troubleshooting

Remote Propel System

- Control Chief, description, set up

Machine Visit

- On site safety
- Walk around ground level
- Walk around the platform
- Cab, cab controls, GUI
- Machinery house
- Main air system
- Valve banks
- Aux and main hydraulic systems
- MCC
- DC Drives cabinet
- HV cabinet
- Top Off system
- Aux air system
- Mast
- Rotary machinery
- Structure
- Mast cylinders
- C`balance valves
- Mast anchor cyl's

Course Evaluation and Wrap

- Miscellaneous wrap up Q and A as needed
- Transfer of knowledge questionnaire
- Reaction evaluation form