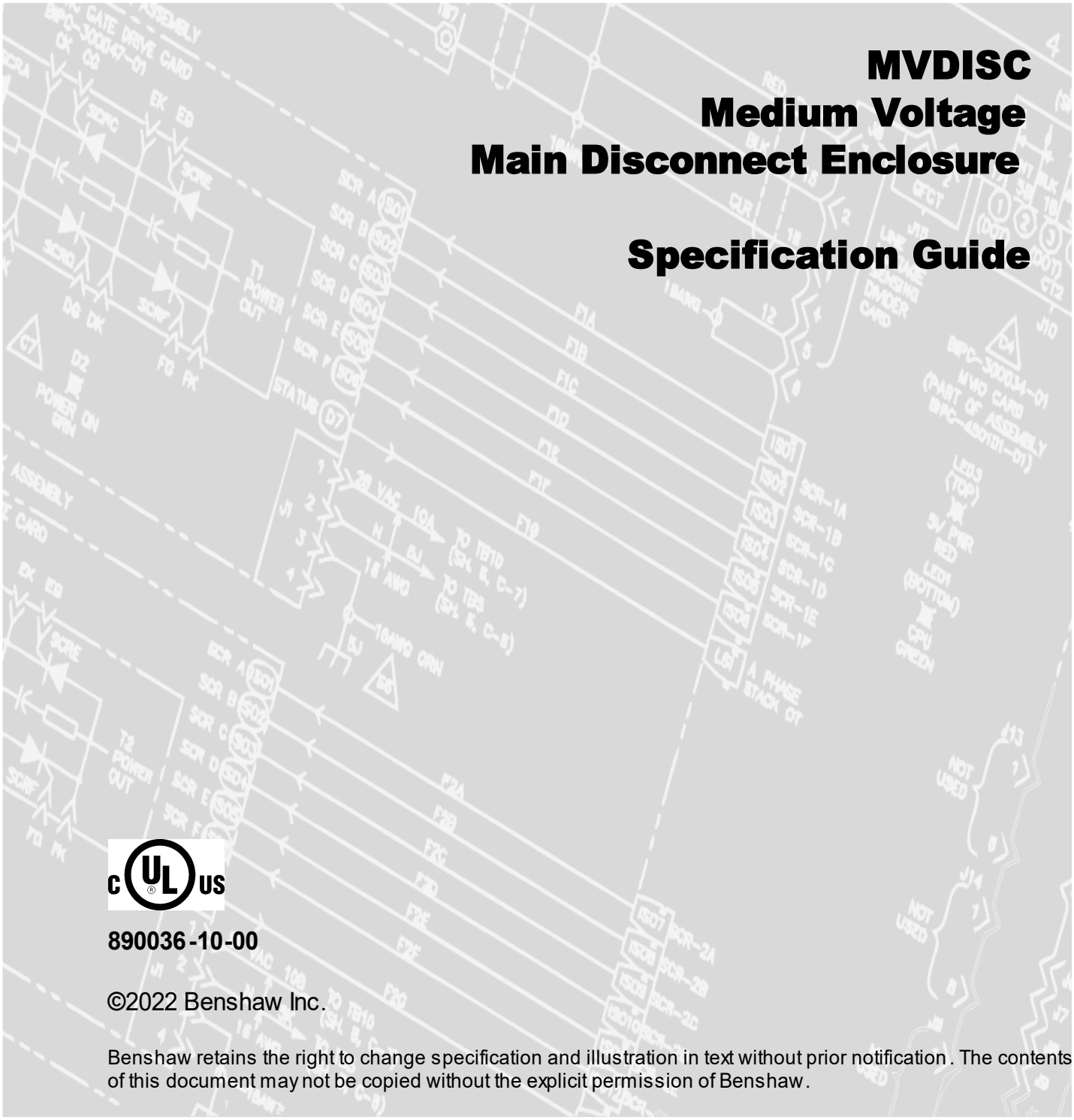
MVDISC
Medium Voltage
Main Disconnect Enclosure

Specification Guide



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BENSHAW
Applied Motor Controls

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1 INTRODUCTION

Benshaw has prepared this Specification Guide for engineers, plant maintenance personnel, and electrical consultants who need to specify and describe an MV Main Disconnect.

1.1 DESCRIPTION

The Benshaw MV Main Disconnect is used for primary protection for three-phase MV MCC Line-ups, for single large AC Induction motor applications and for primary protection of power transformers. The MV Main Disconnect can be custom designed for specific applications.

1.2 SCOPE

General Information

The MV Main Disconnect specification guide outlines the fabrication, performance, and functional specifications for the main disconnect designed and manufactured by Benshaw, Inc. The MV Main Disconnect shall meet the requirements as specified herein.

- Provide all labor, materials, equipment and incidentals required, and install, place in operation and field test the MV Main Disconnect(s).
- The MV Main disconnect(s) must fit in the space indicated on the drawings.

How to Use this Specification

The Specification guide is divided into four sections:

- Introduction
- Electrical Specifications
- Mechanical Specifications
- Benshaw Quality

Each section contains subsections with detailed information on the relative topics. The subsections contain general information, details, and any necessary precautions about the individual topics. The specific information contained in the subsections can be found quickly and easily by reviewing the subject headings on the left margin.

Specification Guide On-Line

The specification guide can be found on-line at:
http://benshaw.com

This manual is available in Adobe Acrobat portable document format (pdf). Adobe and Acrobat are trademarks of Adobe Systems Incorporated.

1.3 QUALIFICATIONS

Manufacturer

The MV Main Disconnect shall be the product of a manufacturer who has produced MV Main Disconnects of the same type and size for a minimum of 20 consecutive years. When requested by the Engineer, a User's List, complete with telephone numbers and contact persons shall be furnishedfor verification.

- Acceptable Manufacturers:
  Benshaw
  Substitutions: None permitted

Support

The manufacturer shall maintain factory trained and authorized service facilities and shall have a demonstrated record of service for a least the previous ten years.

- Support personnel are to be direct employees of the manufacturer.
- The manufacturer shall provide all required start-up training services. The approved manufacturers are:
  Benshaw
  Substitutions: None

Certification

cUL/UL347 *
cUL/UL508A *
* Up to 4800V

Codes & Standards

The MV Main Disconnect starters are designed and manufactured at Benshaw to conform, where applicable, to the following industry standards and specifications:

ANSI American National Standards Institute
CSA Canadian Standards Association
IEEE Institute of Electrical & Electronic Engineers
UL Underwriters Laboratories
CE Conformité Européene (European Conformity)
NEC National Electric Code
EEMAC Electrical & Electronic Manufacturers Association of Canada
NEMA National Electronic Manufacturers Association
OSHA Occupational Safety & Health Act

1.4 PRE-MANUFACTURE SUBMITTALS (OPTIONAL)

A. Submittals shall be furnished in accordance with Spec. Section_____.

B. Shop Drawings:
- Elementary wiring and interconnection diagrams in accordance with NEMA ICS standards.
- Enclosure frontal elevation and dimension drawings.
- Internal component layout diagrams.
- Available conduit entry and exit locations.
- Unit descriptions including amperage ratings, fuse sizes, etc.
- Nameplate information

C. Product Data:
- Manufacturer's product data sheets on all major components
- Publications on MV Main Disconnects

D. Specification Response:
- Detailed response to this specification showing where in the literature each requirement is satisfied.
- All clarifications and exceptions must be clearly identified.

E. Testing and Test Reports:
- Testing shall be per manufacturers standard
- A copy of the test reports shall be provided as part of the closeout documentation

1.5 CLOSEOUT SUBMITTALS

A. Refer to Spec. Section_____for procedure on submittal of closeout documentation.
B. Contractor shall provide certification that the MV Main Disconnect has been installed in accordance with the manufacturer's instructions.
C. Final Drawings:
   - The manufacturer shall provide final drawings reflecting the "As Shipped" status of the installed equipment.
   - The Contractor shall be responsible for making any changes to the "As-shipped" drawings from the manufacturer to reflect any field modifications.
D. Maintenance Data:
   - The manufacturer shall provide instructions for storage, handling, protection, examination, preparation, installation, and starting of the MV Main Disconnect.
   - Provide user's manual, along with installation/operation instructions for major components.
   - Include spare parts listing with name and phone number for a local distributor for the spare parts.

1.6 DELIVERY, STORAGE AND HANDLING

A. Handling and shipment of the equipment shall be in such a manner to prevent internal component damage, breakage, and denting and scoring of the enclosure finish.
B. Equipment shall be stored indoors in a clean, dry environment. Energize space heaters if furnished.
C. The contractor shall protect the units from dirt, water, construction debris and traffic.

1.7 EXECUTION

Testing

- All incoming material shall be inspected and/or tested for conformance to quality assurance specifications.
- All subassemblies shall be inspected and/or tested for conformance to quality assurance specifications.
- Each completed unit shall be functionally tested prior to shipment to assure conformance to the specifications.

Startup & Training

- Bid price shall include two visits, consisting of two consecutive days each, for startup and training. Services shall include startup of equipment and field/classroom training for owner's personnel. Factory direct personnel shall provide startup and training only. The use of agents, manufacturer's representatives, associated integrators or manufacturer's distributors for startup and training shall not be permitted.

Field Measurements

A. The contractor shall verify all field measurements prior to the fabrications of the MV Main Disconnect.

1.8 SPARE PARTS (OPTIONAL)

A. Spare parts shall include, but not be limited to:
   - One (1) of each type and size of Control Fuse if applicable.
   - Three (3) of each type and size of Power Fuse if applicable.

1.9 WARRANTY

A. The manufacturer shall provide an eighteen (18) month manufacturer's warranty (from date put into service) on all other equipment of each system.
B. The manufacturer shall confirm this warranty as part of the submittal.

2 ELECTRICAL SPECIFICATIONS

2.1 MODEL NUMBER FORMAT

Specifying Model Numbers

The starter numbering system for MV Main Disconnect is:

Example Part Numbering scheme: CFMVDISC-AMP-V-ENC.

CF = Combination Fused, Includes the main disconnect switch with medium voltage fusing. Fusing is based on the FLA and must be provided to ensure proper fuse coordination

MVDISC = Medium Voltage Disconnect

AMP= 400, 600, 1200 Amp

V = Line Voltage 2300, 3300, 4160, 4800, 6000, 6600, 6900, 7200, 10,000, 11,000, 12,470, 13,200, 13,800VAC

ENC. = Enclosure Type rating 1, 3R, and 12

2.2 DESIGN SPECIFICATIONS

General Information

The Benshaw MV Main Disconnect may be used in numerous industrial applications. Each disconnect can operate within specific voltage and frequency values of 2300 through 4800 VAC 3 phase, UL labeled and up to 13800VAC, specific to order or 50 to 60Hz.

Power Requirements

The MV Main Disconnect is designed to operate with three-phase AC power at the following nominal voltages:

- Line Voltage: 2300 through 13800VAC 3 phase, specific to order
- Control Voltage: 120VAC single phase

All MV Main Disconnects are designed for universal operation at 50Hz through 60Hz at ambient temperatures of up to 40 C. Control voltage is specified by the customer at time of order and may not be modified by the customer.

DESCRIPTION	SPECIFICATION
Voltage	UL labeled up to 4,800VAC, available up to 13800VAC
Rated Continuous Current	400, 600, 1200 Amp
Horizontal Extended Bus	800, 1200, 1600 Amp
Short time withstand current	50 kA for 2.3kV up to 7.2kV
Maximum BIL rating	60kV up to 7.2kV, 90kV up to 15kV
Nominal ratings	2300, 3300, 4160, 4800, 6000, 6600, 6900, 7200, 10,000, 11,000, 12,470, 13,200, 13,800 VAC, 50 to 60 Hz
Standard insulation test	2.25 times voltage plus 2000 VAC minimum

Audible Noise

Not to exceed 60dbA @ 1 meter at any time

2.3 PROTECTION FUNCTIONS

Power Fuses

- Current limiting type R rated minimum 50KAIC symmetrical at max. 7200V.
- Current limiting type E rated minimum 50KAIC symmetrical at max. 13,800V.
- Fuse size shall be manufacturer's standard.
- Fuses shall be vertically mounted in the front of the enclosure for ease of inspection and removal without special tools.
- Provide blown fuse indication.

2.4 CURRENT TRANSFORMERS (OPTIONAL)

- CT Type: XXX:5
- CT Class: As Specified

2.5 CONTROL DEVICES (OPTIONAL)

Control Power Transformer (Optional)

Provide an appropriately rated internal 2300-13800 VAC to 120VAC step-down transformer. Supply two fuses on primary and one fuse on secondary side with one leg grounded.

Control Wiring

Minimum 14 AWG stranded, rated for 600V 105ºC.

Terminal Strips

Rated for 600V, suitable for contractor termination of up to 10 AWG wire.

3 MECHANICAL SPECIFICATIONS

3.1 OPTIONAL FEATURES

Optional Features

Other protective devices and metering equipment may be supplied with the MV Main Disconnect. These other devices will depend on the system configuration and specific customer requirements.

MV Main Disconnect

The structure shall consist of a metal enclosed dead front vertical steel assembly. It shall contain:

- A main isolation switch (fused disconnect)
- Optional control power transformer with fusing
- Other optional devices required by the end user

Control Power Transformer

The MV Main Disconnect can be provided with a control power transformer. The transformer will usually be sized for the power requirements of the starter but can also be sized to provide power for customer controls.

Optional Protection Systems

In addition to the standard overload protection, the following systems are available for added motor and system protection:

- Motor Protection Systems
- Optional Metering Systems

Metering Packages

The MV Main Disconnect can be equipped with any optional metering packages including the following:

- Single phase Voltmeter and Ammeters
- Three-phase Voltmeters and Ammeters
- Power and Energy Monitoring Meters

Metering packages include all the necessary CTs and CPTs required for interface to the incoming line power.

Other Options

Benshaw can build custom starter packages for special applications. Contact your local Benshaw representative with a description of the application.

3.2 UL /CUL SHORT CIRCUIT/WITHSTAND RATINGS

All Standard Benshaw MV Main Disconnects have a Short Circuit Current Withstand Rating of 50KARMS from 2.3kV up to7.2kV.

3.3 MECHANICAL CONSTRUCTION

Enclosure Construction

- Construct to comply with NEMA Part ICS 2.
- Basic standard structure shall be welded type construction utilizing minimum 11 GA sheet metal.
- Doors shall be minimum 12 GA sheet metal, pan type with flanges formed to provide sturdy, rigid structure.
- Door latches and hinges capable of holding door closed during maximum fault condition. Provide door interlocks to prevent doors from being opened with power applied. Provide removable lifting provisions on floor mount enclosures.
- Finish:
    - Metal parts to be given thorough rust resistant treatment.
    - Primer shall be S-W recoatable epoxy primer B-67 Series
    - Finish shall be S-W high solid polyurethane Polane T plus F63 series
    - Color shall be ANSI 61 Gray unless otherwise specified.
    - Complete with internal power and control wires including terminations for external connections. Phase sequencing shall have proper identification and control wires shall have suitable markings at terminations.

MV Main Disconnect Construction

The typical three-phase main disconnect contains a Main Disconnect Switch and Medium Voltage Fusing.
Viewing window to verify switch position.
MV door interlocked to prevent opening with switch in the On position.
The MV Main Disconnect will be supplied in an enclosure with available types in NEMA 1, NEMA 3R or NEMA 12 configurations. For special / custom enclosures –consult factory.

Mechanical Layout

The Benshaw MV Main Disconnect consists of the following major components:

- A specified Main Disconnect sized per application
- Specified Main Fuses
- Grounding bar with grounding termination lugs
- Line and Load landing pads with Nema bolt hole patterns

4 ENVIRONMENTAL SPECIFICATIONS

Operating Requirements

The MV Main Disconnect is designed to operate in the following conditions;

- Ambient Temperature: 0 C (32°F) to 40 C (122 F)
- Humidity (non-condensing): 0% to 95%

Storage Requirements

The MV Main Disconnect may be stored for up to two years before being installed.

If the starter is to be stored, the following recommendations apply:

- Storage Temperature: -20 C (-4 F) to 70 C (158 F).
- Temperature Rate of Change: 6 C in 30 minutes
- Humidity (non-condensing): 0% to 95%.
- Humidity Rate of Change: 10% in 30 minutes

Operating Altitude

The operating altitude shall not exceed 3,300 feet (1000 meters) above sea level without de-rating.

Operating Orientation

Upright

Maximum Vibration

$5.9 m/s^2$ ($19.2 ft/s^2$) [0.6G]

5 BENSHAW QUALITY

5.1 QUALITY INSPECTION

Quality Inspection

All incoming material will be inspected and/or tested for conformance to quality assurance specifications. All subassemblies will be inspected and/or tested for conformance to vendors engineering and quality assurance specifications. The completed unit will be functionally tested before shipment to assure proper operation per this specification.

5.2 START-UP SERVICE

Start-Up Service

Benshaw provides complete field support for initial startup of the MV Main Disconnect. In most cases the engineering staff responsible for in-house testing will also be assigned to follow the unit into the field for startup assistance. Fees for start-up assistance maybe obtained from the current Benshaw Motor Control catalog.

This assistance is available on a daily basis and complete technical support is provided upon request. Additionally, telephone technical support is available to all customers at no charge.

5.3 TRAINING

Training

As requested, Benshaw will supply a quotation for on-site or factory training on its MV Main Disconnect. This training will provide operating and instruction manuals, training on equipment operation and troubleshooting of the Benshaw equipment.

5.4 DOCUMENTATION

Documentation

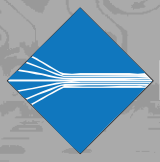
Benshaw MV Main Disconnects are shipped with a complete set of documentation that typically includes the following items:

- Complete schematics and wiring diagrams
- Instruction Manuals
- Disconnect System Data

If required, special documentation can also be provided. This documentation may include component layout drawings, wiring diagrams, and system interconnect schematics. All drawings and documentation are available to customers on flash drive or via e-mail.

6 REVISION HISTORY

Revision	ECO#	Description	Approval	Date
0		Initial Release	WGB/NMK	2/24/22



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