

# MVMLO Medium Voltage Main Lugs Only 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 MV MLO enclosures.

## 1.1 DESCRIPTION

The MV MLO enclosure consists of power bus work and landing pads for incoming cable terminations. The enclosure can be custom designed for specific applications.

## 1.2 SCOPE

### General Information

The MV MLO enclosure specification guide outlines the fabrication, performance, and functional specifications used for the design and manufacturing of the MV MLO by Benshaw, Inc. The MV MLO 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 MLO(s).
- The MV MLO(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 MLO enclosure shall be the product of a manufacturer who has produced MV MLO enclosures 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 furnished for 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 MLO enclosures 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, cable exit/entry areas, lifting provisions, etc.
  - Nameplate information
- C. Product Data:
  - Manufacturer's product data sheets if applicable
- 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 MLO enclosure 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 and installation of the MV MLO enclosure.
  - Provide user's manual, along with installation/operation instructions for (Optional) major components.
  - Include (Optional) 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.
- Assembly 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 MLO enclosure.

## **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 MLO is:

Example Part Numbering scheme: **MVMLO-BUS RATING-V-ENC.**

**MV** = Medium Voltage

**MLO** = Main Lug Only

**BUS RATING** = 800, 1200, 1600 AMP

**V** = Line Voltage, 2300, 3300, 4160, 4800, 6000, 6600, 6900 VAC

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

### 2.2 DESIGN SPECIFICATIONS

#### General Information

These MV MLO are medium voltage termination enclosures. Termination enclosures are to be used as a dedicated area for incoming power Cables.

#### Power Requirements

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

- Line Voltage: 2300 through 6900 VAC, 3 phase, specific to order
- Ambient temperatures of up to 40 C

DESCRIPTION	SPECIFICATION
MV MLO Enclosure type	Nema 1, 3R, 12
Bus Rating	800, 1200, 1600 AMP
Maximum BIL rating	60KV
Nominal ratings	2300, 3300, 4160, 4800, 6000, 6600, 6900 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

### **3 MECHANICAL SPECIFICATIONS**

#### **3.1 OPTIONAL FEATURES**

##### **Options**

Benshaw can build custom MV MLO Enclosures 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 MLO enclosures have a Short Circuit Current Withstand Rating of 50KARMS up to 4800V.

#### **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, lift-off or 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.

##### **MV MLO Construction**

The three-phase MV MLO contains Power Bus, landing pads for incoming power cables and a ground bus.

The MV MLO will be supplied in an enclosure with available types in NEMA 1, NEMA 3R or NEMA 12 configurations. For special / custom enclosures and voltages –consult factory.

## 4 ENVIRONMENTAL SPECIFICATIONS

### Operating Requirements

The MV MLO 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

If the MV MLO enclosure 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

5.9m/s<sup>2</sup> (19.2ft/s<sup>2</sup>) [0.6G]



## **5 BENSRAW QUALITY**

### **5.1 QUALITY INSPECTION**

#### **Quality Inspection**

All incoming material will be inspected and/or tested for conformance to quality assurance specifications. All assemblies 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 installation of the MV MLO enclosure. 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 may be 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 MLO enclosure. This training will provide operating and instruction manuals.

### **5.4 DOCUMENTATION**

#### **Documentation**

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

- Complete schematics and wiring diagrams if applicable
- Instruction Manuals (if applicable)

If required, special documentation can also be provided. This documentation may include component layout drawings and wiring diagrams. 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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