



## Multi-Purpose Medium Voltage VFD



### FULL-SIZE PERFORMANCE ... COMPACT DESIGN

Benshaw MVH2 Series Medium Voltage VFDs utilize H-Bridge multi-level and overlapping wave technology for low harmonic content and a nearly perfect sine wave output. The latest in phase-locked loop technology is used to adjust drive output ... providing an ideal solution for soft start, speed control, energy savings and intelligent control of any MV induction or synchronous motor.

Offering the performance of a full-size standard drive in a small footprint layout, MVH2 Series drives are ideal for retrofit projects or any installation with space constraints.

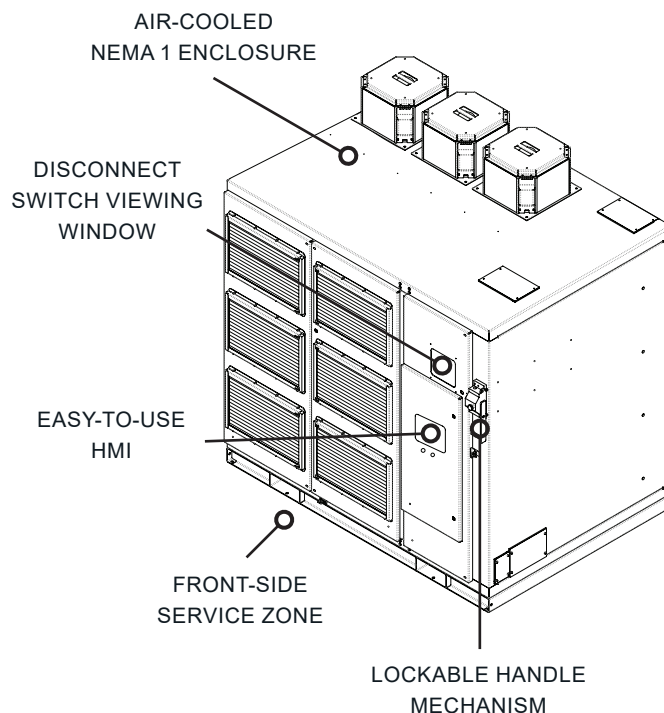
- UL Listed to 205A @ 4160V
- NEMA 1 forced air, front access, welded enclosure
- Fully integrated, packaged VFD:
  - Load break fused disconnect (up to 154A)
  - Inline contactor (up to 154A)
  - Built in dry type transformer
- Door-mounted touch screen HMI
- IEEE 519 compliant, 24 pulse design
- V/Hz, open or closed loop, vector control
- No cable length restrictions
- Standalone or integrated into an MCC (optional)
- Synchronous transfer up to 4 motors (optional)

**Rapid | Rugged | Global**

## MVH2 Series | Multi-Purpose Medium Voltage VFD

### KEY FEATURES

- Fully integrated, packaged drive
- 50 kAIC short circuit fault rating
- 60kV BIL
- 400 A load break, 5 kV rated disconnect switch, mechanically interlocked (up to 154A)
- Standalone or integrated into an MCC (future)
- Top or bottom entrance for both incoming and outgoing power
- Voltage source multi-cell inverter
- Modbus RTU standard, DeviceNet, Profibus, Ethernet optional
- Class H dry type transformer (AI windings) with embedded RTDs



### COMMON APPLICATIONS

- Pumps
- Blowers
- Fans
- Compressors
- Chillers
- Test stands
- Kiln drives
- Conveyors

### PART NUMBER ASSEMBLER

|                                  |  |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|----------------------------------|--|---|---|---|---|-----|---|-----|---|------|---|---|----|---|---|---|----|---|-----|---|----|----------------------------------|
| MVH2                             | -  | A | U | 6 | - | 042 | - | 042 | - | 0048 | A | - | CF | - | I | - | NB | - | FSO | - | N1 | N1 = NEMA 1 Enclosure (standard) |
|                                  | FSO = Front Service Only / DSO = Double Side Access (e.g. front & rear access) |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|                                  | NB = No cell bypass / CB = Cell Bypass / RB = Redundant Cell Bypass            |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|                                  | I = Inline Contactor (up to 154A) / N = No Inline Contactor                    |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|                                  | CF = Fusible Disconnect (up to 154A) / ND = No Disconnect                      |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|                                  | A = Air Cooling / W = Water Cooling  |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|                                  | Rated Unit Amps rms  |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|                                  | Output Rated Voltage Vrms 023 = 2300V, 042 = 4160V                             |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|                                  | Input Rated Voltage Vrms 023 = 2300V, 042 = 4160V                              |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|                                  | 5 = 50Hz Input Frequency / 6 = 60Hz Input Frequency                            |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|                                  | I = IEC / U = UL   |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
|                                  | A = Asynchronous Motor / S = Synchronous                                       |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |
| Benshaw MV Drive H2 Product Type |  |   |   |   |   |     |   |     |   |      |   |   |    |   |   |   |    |   |     |   |    |                                  |

## MODEL SELECTOR / RATINGS

| MODEL NUMBER                          | APPROX<br>MAX<br>HP* | FLA | DIMENSIONS (IN)** |    |    | APPROX<br>WEIGHT<br>(lbs) | LIST<br>PRICE |
|---------------------------------------|----------------------|-----|-------------------|----|----|---------------------------|---------------|
|                                       |                      |     | H                 | W  | D  |                           |               |
| 2300V                                 |                      |     |                   |    |    |                           |               |
| MVH2-AU6-023-023-0077A-CF-I-NB-FSO-N1 | 300                  | 77  | 91.5              | 86 | 60 | 5200                      | \$306,596     |
| MVH2-AU6-023-023-0154A-CF-I-NB-FSO-N1 | 600                  | 154 | 91.5              | 86 | 60 | 5250                      | \$327,653     |
| MVH2-AU6-023-023-0205A-ND-N-NB-FSO-N1 | 900                  | 205 | 91.5              | 86 | 60 | 8000                      | \$450,450     |
| 4160V                                 |                      |     |                   |    |    |                           |               |
| MVH2-AU6-042-042-0031A-CF-I-NB-FSO-N1 | 200                  | 31  | 91.5              | 86 | 60 | 3820                      | \$277,000     |
| MVH2-AU6-042-042-0040A-CF-I-NB-FSO-N1 | 300                  | 40  | 91.5              | 86 | 60 | 4280                      | \$281,155     |
| MVH2-AU6-042-042-0048A-CF-I-NB-FSO-N1 | 350                  | 48  | 91.5              | 86 | 60 | 4740                      | \$285,372     |
| MVH2-AU6-042-042-0061A-CF-I-NB-FSO-N1 | 450                  | 61  | 91.5              | 86 | 60 | 5660                      | \$289,653     |
| MVH2-AU6-042-042-0077A-CF-I-NB-FSO-N1 | 600                  | 77  | 91.5              | 86 | 60 | 6120                      | \$290,000     |
| MVH2-AU6-042-042-0096A-CF-I-NB-FSO-N1 | 700                  | 96  | 91.5              | 86 | 60 | 6580                      | \$314,178     |
| MVH2-AU6-042-042-0104A-CF-I-NB-FSO-N1 | 800                  | 104 | 91.5              | 86 | 60 | 7500                      | \$317,853     |
| MVH2-AU6-042-042-0115A-CF-I-NB-FSO-N1 | 850                  | 115 | 91.5              | 86 | 60 | 7500                      | \$321,773     |
| MVH2-AU6-042-042-0130A-CF-I-NB-FSO-N1 | 1000                 | 130 | 91.5              | 86 | 60 | 7500                      | \$325,203     |
| MVH2-AU6-042-042-0154A-CF-I-NB-FSO-N1 | 1200                 | 154 | 91.5              | 86 | 60 | 7500                      | \$327,653     |
| MVH2-AU6-042-042-0165A-ND-N-NB-FSO-N1 | 1250                 | 165 | 91.5              | 86 | 60 | 8000                      | \$422,250     |
| MVH2-AU6-042-042-0205A-ND-N-NB-FSO-N1 | 1500                 | 205 | 91.5              | 86 | 60 | 8000                      | \$450,450     |

Note: 4160V models UL listed. UL testing of 2300V units TBD.

\* Approx. Max HP based on a 4-pole motor. Size according to actual motor FLA.

\*\* Overall dimensions. Height includes fans.

## TECHNICAL DATA

| FEATURE               | SPECIFICATION/RATING |   |
|-----------------------|----------------------|---|
| Main Power Supply     | Voltage              | 2300 or 4160V (+ 5%, -20% with output power derating) |
|                       | Frequency            | 50 or 60Hz (+/- 10%)                                  |
|                       | Phase unbalance      | Less than 5%  |
|                       | True power factor    | > 0.96  |
| Control Power Supply* | Voltage              | 230V single phase*                                    |
|                       | Frequency            | 50 or 60Hz  |
| Enclosure             | Standard             | NEMA 1  |
| Control               | Control type         | Sinusoidal multilevel PWM                             |
|                       |                      | Fully digital   |
|                       | Control mode         | Open and closed loop V/F and vector control           |
|                       | Switching mode       | Multilevel IGBT                                       |
|                       | Frequency mode       | 0 ... 80Hz  |
|                       | Overload capacity    | 150% instantaneous                                    |
|                       |                      | 120% for 120 seconds, every 15 minutes                |
|                       | Efficiency           | ≥ 96%   |
| Performance           | Speed control        | 0.1% closed loop, 0.5% open loop                      |
|                       |                      | Resolution: 1 RPM                                     |

\* 230V power supply provided by others.

## TECHNICAL DATA, Continued

| FEATURE                                    |   | SPECIFICATION/RATING   |
|--|---|--|
| Control Inputs                             | Analog  | 2 x Programmable isolated input: 4-20mA, 2-10V                           |
|  |   | 1 x Excitation feedback 4-20mA, 2-10V                                    |
|  | Digital   | 14 Isolated inputs: 24Vdc  |
| Control Outputs                            | Analog  | 2 Fixed outputs: 4-20mA / 2-10V  |
|  |   | 2 Programmable outputs: 4-20mA / 2-10V                                   |
|  | Relay   | 22 Isolated outputs with dry contacts                                    |
| Communication                              | Fieldbus communication  | Standard Modbus RTU  |
|  |   | DeviceNet / Profibus / Ethernet IP (optional)                            |
| Power Cell Bypass Function (86A and below) | Allows for continued operation with 1 or 2 failed cells                                 |  |
|  | Failed cells are bypassed automatically without interruption of equipment process.**    |  |
|  | Failed cells can be replaced quickly due to draw-out construction of power cell.**      |  |
|  | High productivity and low mean time to repair (MTTR)                                    |  |
| Ambient                                    | Temperature   | 23°F ... 104°F (-5°C ... 40°C)   |
|  | Humidity  | < 95% non-condensing   |
|  | Altitude  | 0 ... 5000 ft (above 3300 ft - 1% de-rating for every additional 330 ft) |
| Finishing                                  | Color   | ANSI 61 Gray   |
|  |   | Special paint color optional   |
| Comformities Standards                     | Electromagnetic compatibility   | IEEE 519-2014  |
|  |   | IEC 61800-3  |
|  |   | UL/cUL (up to 205A) 4160V only. 2300V UL future.                         |
| Flying Start                               | Starting into spinning motor  |  |
| High Performance                           | Vector control, open & closed loop for superior dynamic speed accuracy & torque control |  |
| Motor and System Protections               | Motor overload  | Overvoltage  |
|  | Overcurrent   | Current limit  |
|  | Phase loss  | Over temperature   |
|  | Ground fault  | Cabinet door interlock (optional)  |
| Ratings                                    | Short circuit withstand   | 50kA @ 4160V   |
|  | BIL   | 60kV   |
| Standard and Approvals                     | IEC 60038   | IEC 61000  |
|  | IEC 60050-151, -551   | IEC 61800-3  |
|  | IEC 60076   | IEC 60757  |
|  | EC 60721, relevant chapters   | IEC 106  |
|  | UL 347A   | UL 508A  |

\*\* Future



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