

# M2L SERIES MEDIUM VOLTAGE VFD - Application Checklist



Completed by \_\_\_\_\_ Date \_\_\_\_\_  
 Company \_\_\_\_\_ Quote due date \_\_\_\_\_  
 Project name \_\_\_\_\_ Project location \_\_\_\_\_  
 Type of customer:  OEM  Distributor  End User Project Status:  Budgetary  Funded  
 Est. purchase date \_\_\_\_\_ Est. installation / commissioning date \_\_\_\_\_  
 Your ref. no. \_\_\_\_\_ Competitor(s) \_\_\_\_\_  
 Attached documents \_\_\_\_\_ Quantity of identical drives \_\_\_\_\_  
 Existing Benschaw customer:  Yes  No

Key: \*Requires engineering review      Standard/default option      Complete all fields if parent object is selected

Item	Specifications
1. Type of application	<input type="checkbox"/> Pump (centrifugal) <input type="checkbox"/> Compressor (reciprocating) <input type="checkbox"/> Fan <input type="checkbox"/> Pump (positive displacement) <input type="checkbox"/> Compressor (centrifugal) <input type="checkbox"/> Blower <input type="checkbox"/> Other (specify) _____
2. Load characteristics	<input type="checkbox"/> Variable torque <input type="checkbox"/> Proportional torque <input type="checkbox"/> Constant HP <input type="checkbox"/> Constant torque* Speed range _____ - _____ %
3. Input power supply	Power supply voltage _____ VAC _____ Hz <i>(Does not need to match motor nameplate voltage or frequency)</i>
4. Motor specifications	Power _____ HP <b>OR</b> _____ kW Voltage _____ VAC      Frequency _____ Hz      Current _____ FLA Type: <input type="checkbox"/> Squirrel-cage induction <input type="checkbox"/> Synchronous* <input type="checkbox"/> Wound-rotor* <input type="checkbox"/> Other Describe: _____
5. Drive transformer	<input type="checkbox"/> <b>Indoor transformer (dry-type)</b> <input type="checkbox"/> <b>18-pulse secondary</b> <input type="checkbox"/> Outdoor transformer <input type="checkbox"/> 24-pulse secondary <sup>1</sup> Type: <input type="checkbox"/> NEMA 3R <input type="checkbox"/> Other _____ <input type="checkbox"/> Oil/liquid-filled <input type="checkbox"/> Customer supplied*
6. Operating conditions	<input type="checkbox"/> <b>Continuous duty (motor will run continuously at any chosen speed)</b> <input type="checkbox"/> Synchronous transfer to line (continuous duty) <sup>2</sup> Number of motors _____ Protection for line-connected motor(s): <input type="checkbox"/> <b>Benschaw MX3</b> <input type="checkbox"/> Other (specify) _____ <input type="checkbox"/> Synchronous transfer to line (starting duty only) <sup>3</sup> Number of motors _____ Total number of starts/hr. _____      Maximum accel. time _____ Total number of stops/hr. _____      Maximum decel. time _____ Protection for line-connected motor(s): <input type="checkbox"/> <b>Benschaw MX3</b> <input type="checkbox"/> Other (specify) _____

<sup>1</sup> Benschaw's M2L VFD exceeds IEEE 519-1992 requirements for input harmonic current using an 18-pulse transformer (standard).

<sup>2</sup> Continuous duty sync transfer allows for a motor to be run continuously, usually to "trim" a process output after other motors have been started.

<sup>3</sup> May allow for reduced drive/transformer requirements and therefore cost/space savings.

**Please complete all fields on page 1 of this form for a budgetary quotation, and fields on all pages for a firm quotation.**

7. Control/auxiliary power

- Customer supplied 240VAC, 60Hz, 1φ** (10 kVA typical - varies with drive size)
- Customer supplied (other voltage/freq) \_\_\_\_\_

Benschaw supplied (from medium voltage feed)  
 Additional power required for customer use: \_\_\_\_\_ kVA, \_\_\_\_\_ VAC (if any)

- Incoming control power wire location  Bottom  Top  
 Outgoing control power wire location  Bottom  Top

8. Speed reference/range

- 4 - 20 mA signal**  **0-10 VDC signal**  **-10 to +10 VDC signal**
  - Manual speed potentiometer
  - Other \_\_\_\_\_
- Required range: \_\_\_\_\_ to \_\_\_\_\_ RPM **OR** \_\_\_\_\_ to \_\_\_\_\_ Hz

9. Accel / decel ramps

- Internal accel time \_\_\_\_\_ sec./ \_\_\_\_\_ RPM Decel time \_\_\_\_\_ sec./ \_\_\_\_\_ RPM
- External (customer control of ramps) Describe: \_\_\_\_\_

10. Overload capacity

- Not needed (100% rated output current continuous)**
- Needed when motoring: \_\_\_\_\_ % rated output current for \_\_\_\_\_ sec. / \_\_\_\_\_ min.

11. Ambient conditions

- Indoor  Outdoor (no building)
- Other (Provide details in "Other required specifications" section on pg. 3)
- Heated  Air conditioned Atmosphere: \_\_\_\_\_
- Ambient temperature: \_\_\_\_\_ to \_\_\_\_\_ °C Humidity: \_\_\_\_\_ % max, non-condensing
- Altitude:  **1000m or below**  Above 1000m\*

12. Reliability/performance enhancement

- Emergency drive bypass
  - RVSS (Reduced Voltage Solid State) starter
  - ATL (Across-the-Line/full voltage) starter
 (If bypass option is selected, additional inverter output isolation disconnect is highly recommended in order to allow servicing of VFD. If desired, add to "Other required specifications" section on pg. 3)
- Uninterruptible control power supply\*  Input isolation contactor
- Lightning arrestors (transformer primary) Location: \_\_\_\_\_
- Copper transformer windings (aluminum standard)
- Premium efficiency transformer (+0.65% efficiency)

13. Cabling requirements

- DC link cable:
- Customer supplied cable between converter and inverter**
  - Pass-through DC link (converter and inverter directly adjacent)
  - Benschaw supplied cable  
Cable length required: \_\_\_\_\_
- Input cables: \_\_\_\_\_ /phase      Motor leads: \_\_\_\_\_ /phase  
 Quantity \_\_\_\_\_ /phase      Quantity \_\_\_\_\_ /phase  
 Size \_\_\_\_\_      Size \_\_\_\_\_  
 Type \_\_\_\_\_      Type \_\_\_\_\_

14. Enclosure

a. Converter

- NEMA Type:  **1**  1 (gasketed)  3R\*      Dimensional restrictions: \_\_\_\_\_ H x \_\_\_\_\_ W x \_\_\_\_\_ D  
 Space heater\*  **No restrictions**
- Incoming medium voltage wire location  Bottom  Top  
 Outgoing medium voltage wire location  Bottom  Top
- Customer specific nameplate (Provide details in "Other required specifications" section on pg. 3)
  - Standard color (ANSI 61 Gray)**  Non-standard color \_\_\_\_\_

b. Inverter

- NEMA Type:  **1**  1 (gasketed)  3R\*      Dimensional restrictions: \_\_\_\_\_ H x \_\_\_\_\_ W x \_\_\_\_\_ D  
 Space heater\*  **No restrictions**
- Incoming medium voltage wire location  Bottom  Top  
 Outgoing medium voltage wire location  Bottom  Top
- Customer specific nameplate (Provide details in "Other required specifications" section on pg. 3)
  - Standard color (ANSI 61 Gray)**  Non-standard color \_\_\_\_\_

c. HMI

- Touchscreen size:  **7" (17.8 cm)**  12" (30.5 cm)
- Location:  
 Disconnect section (disconnect req'd, provide details in "Other required specifications" section, pg. 3)
- Wall mounted (please complete enclosure details below)**

NEMA Type:  **1**  12  3R\*      Dimensional restrictions: \_\_\_\_\_ H x \_\_\_\_\_ W x \_\_\_\_\_ D  
 Other: \_\_\_\_\_  **No restrictions**

  - Space heater\*
  - Customer specific nameplate (Provide details in "Other required specifications" section on pg. 3)
  - Standard color (ANSI 61 Gray)**  Non-standard color \_\_\_\_\_

15. Certifications  UL Listing\*  CE Conformity\*  CSA Certification\*  ETL Certification\*  None

16. Communication  Modbus TCP/IP  Profibus DP  Ethernet IP  DeviceNet\*  
 Other\* \_\_\_\_\_

17. Motor control type  V/Hz control  Four quadrant control\*  Vector control w/encoder\*  
 Sensorless vector control

18. Control Accessories  Hand-off-auto selector  Local-off-remote selector  
 Keyed hand-off-auto selector  Keyed local-off-remote selector  
 Pushbutton control (Provide details in "Other required specifications" section on pg. 3)  
 None (touchscreen only)

19. Miscellaneous options

a. Digital outputs  Quantity (4): Relay N.O.  Other\* Describe: \_\_\_\_\_

b. Digital inputs  Quantity (5): 120VAC  Other\* Describe: \_\_\_\_\_

c. Analog inputs  Quantity (1): -10 to +10 VDC (4): 4 to 20mA  Other\* Describe: \_\_\_\_\_

d. Analog outputs  Quantity (4): -10 to +10 VDC (4): 4 to 20mA  Other\* Describe: \_\_\_\_\_

e. Motor protection and monitoring  Integral M2L inverter motor overload protection  
 GE Multilin 469 MPR  Output PQM (Multilin/equiv. req'd)\*  
 GE Multilin 369 MPR  Input PQM (Multilin/equiv. req'd)\*  
 GE Multilin 369 MPR w/metering kit  
 HMI-integrated RTD monitoring & protection (100Ω Pt)  
Number of channels:  8  16  
Display units:  °F  °C  
 Other\* \_\_\_\_\_

f. Output reactor  Yes  No *Note: Output reactor is required/included when synchronous transfer option is selected*

g. Recommended spare parts  Yes  No

h. Witness testing (factory standard)  Yes  No

i. Documentation

	(List quantity of each)		
	<u>Electronic</u>	<u>Hard copy</u>	<u>CD-ROM</u>
<input type="checkbox"/> Preliminary drawings	_____	_____	_____
<input type="checkbox"/> Partial approval (release long lead items for purchase)	_____	_____	_____
<input type="checkbox"/> Full approval drawings	_____	_____	_____
<input type="checkbox"/> Submittal package (full approval w/cut sheets)	_____	_____	_____
<input type="checkbox"/> Final as-built drawings	_____	_____	_____
<input type="checkbox"/> O&M manuals (not for approval)	_____	_____	_____

**Other required specifications** (disconnect switches, circuit breakers, additional fusing, etc.):

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**For lineups of drives, disconnects, starters, MLO cabinets, etc., sketch lineup in space below, including shipping splits:**