



M2L SERIES MEDIUM VOLTAGE VFD - Application Checklist

| | |
|---|--|
| Completed by _____ | Date _____ |
| Company _____ | Quote due date _____ |
| Project name _____ | Project location _____ |
| Type of customer: <input type="checkbox"/> OEM <input type="checkbox"/> Distributor <input type="checkbox"/> End User | Project Status: <input type="checkbox"/> Budgetary <input type="checkbox"/> Funded |
| Est. purchase date _____ | Est. installation / commissioning date _____ |
| Your ref. no. _____ | Competitor(s) _____ |
| Attached documents _____ | Quantity of identical drives _____ |
| Existing Benschaw customer: <input type="checkbox"/> Yes <input type="checkbox"/> 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* <div style="border: 1px solid black; padding: 2px;">Speed range _____ - _____ %</div> |
| 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 OR _____ 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"/> Indoor transformer (dry-type) <input type="checkbox"/> 18-pulse secondary <div style="border: 1px solid black; padding: 2px;"> <input type="checkbox"/> Outdoor transformer Type: <input type="checkbox"/> NEMA 3R <input type="checkbox"/> 24-pulse secondary¹ <input type="checkbox"/> Oil/liquid-filled <input type="checkbox"/> Other _____ <input type="checkbox"/> Customer supplied* </div> |
| 6. Operating conditions | <input type="checkbox"/> Continuous duty (motor will run continuously at any chosen speed) <div style="border: 1px solid black; padding: 2px;"> <input type="checkbox"/> Synchronous transfer to line (continuous duty)² Number of motors _____ Protection for line-connected motor(s): <input type="checkbox"/> Benschaw MX3 <input type="checkbox"/> Other (specify) _____ </div> <div style="border: 1px solid black; padding: 2px; margin-top: 5px;"> <input type="checkbox"/> Synchronous transfer to line (starting duty only)³ 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"/> Benschaw MX3 <input type="checkbox"/> Other (specify) _____ </div> |

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

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

³ 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: