PROCUREMENT SPECIFICATION

Bulletin 290/291 ArmorStart® LT Distributed Motor Control with Full Voltage/Full Voltage Reversing Motor Starting

NOTICE: The specification guidelines in this document are intended to aid in the specification of products. Specific installations have specific requirements, and Rockwell Automation does not recommend or intend any specific application based solely upon the guidelines provided here. Because of the variety of uses for this information, the user of, and those responsible for applying this information, are responsible for ensuring the acceptability of each application and appropriate use of the guidelines. In no event will Rockwell Automation be liable for misuse, misapplication or reliance on these guidelines in connection with any specific application. Rockwell Automation also disclaims indirect or consequential damages resulting from the use or application of this information.

Note: To download or view a .doc file version of this procurement specification, please visit:
www.rockwellautomation.com/industries/procurement-specifications

TABLE OF CONTENTS

SECTION XX XX XX

DISTRIBUTED MOTOR CONTROL WITH
FULL VOLTAGE/FULL VOLTAGE REVERSING MOTOR STARTING

PART 1 GENERAL

1.01 QUALIFICATIONS

A. Manufacturer

1. The manufacturer shall have a minimum of 25 years of experience in the manufacture of distributed motor control.
2. The approved manufacturers are:

a) Rockwell Automation Allen-Bradley
b) Substitutions: None permitted

B. Support

1. The manufacturer shall maintain factory trained and authorized service facilities within 100 miles of the project and shall have a demonstrated record of service for at least the previous ten years.
2. Support personnel are to be direct employees of the manufacturer and be available 24 hours per day through a toll-free number.
3. The manufacturer shall provide all required start-up and training services.
4. The approved manufacturers are:

a) Rockwell Automation Customer Support & Maintenance
b) Substitutions: None permitted

C. Certification

1. To ensure all quality and corrective action procedures are documented and implemented, all manufacturing locations shall be certified to the ISO-9001 Series of Quality Standards.
2. Third-party manufacturers and brand labeling shall not be allowed.

1.02 REFERENCES

A. The distributed motor control shall be designed to meet or exceed the applicable requirements to comply with the standards:

1. UL/CSA

a) UL 508 Industrial Control Equipment – Suitable for Group Installation
b) CSA C22.2, No. 14

2. EN/IEC

a) EN 60947-4-1 Low Voltage Switchgear
b) CE Marked per Low Voltage Directive 2006/95/EC and EMC Directive 2004/108/EC

3. CCC
4. KCC
5. C-Tick
6. ODVA for EtherNet/IP and DeviceNet

B. The distributed motor control shall be certified cULus (File No. E3125, Guide NLDX, NLDX7).

1.03 ENVIRONMENTAL REQUIREMENTS

A. The supplier shall confirm specified service conditions during and after installation of products.
B. The supplier shall maintain the area free of dirt and dust during and after installation of products.

1.04 PRE-MANUFACTURE SUBMITTALS

A. Refer to Section _____ for submittal procedures.
B. Product Data

1. Publications on distributed motor control.
2. Data sheets on all furnished options.

C. Specification Response

1. Detailed response to this specification showing where in the literature each requirement is satisfied.
2. Clearly identified clarifications and exceptions.

D. Installation Instructions

1. A copy of the manufacturer's installation instructions, including receiving, handling and storage instructions.

E. Testing and Test Reports

1. Testing per manufacturer's standard.
2. A copy of the test reports, if available, shall be provided as part of the final documentation.

1.05 FINAL SUBMITTALS

A. Refer to Section _____ for procedure on submittal of final documentation.
B. Supplier Certification

1. The supplier shall provide certification that the distributed motor control has been installed in accordance with the manufacturer's instructions.

    2. The supplier shall provide certification that the distributed motor control settings have been properly adjusted.

C. Final Drawings

    1. The manufacturer shall provide final drawings reflecting the "As-Shipped" state of the installed equipment.
    2. Manufacturer drawings shall be provided in DWG format.
    3. Manufacturer drawings do not need to be stamped if a drawing schedule is provided that lists the drawing numbers, revision levels, and status of drawings (Preliminary, Approval, Final, etc.).
    4. The supplier shall be responsible for making any changes to the "As-Shipped" drawings from the manufacturer to reflect any field modifications.

D. Maintenance Data

    1. Distributed motor control installation instructions and User Manual.
    2. Parameter listing with final settings.
    3. Field service report from start-up service.
    4. Name and phone number for a local distributor for the spare parts.

PART 2 PRODUCTS

2.01 DESCRIPTION

A. Allen-Bradley – Bulletin 290/291 ArmorStart LT Distributed Motor Control with Full Voltage/Full Voltage Reversing Motor Starting (No substitutions)

2.02 RATINGS

A. The distributed motor control (DMC) shall support a three-phase induction motor. DMC power circuit ratings:

    1. Horsepower range of 0.5 to 2 HP (or 3 to 5 HP).
    2. Operating voltage of 400Y/230 to 480Y/277 VAC (-15%, +10%).
    3. Operating frequency of 50/60 Hz (±10).

B. The DMC shall accept 24 VDC control power externally or through an internal power supply and have an operating range of 20.4 to 26.4 VDC.
C. The DMC shall have a minimum SCCR of 10 kA @ 480Y/277 VAC. The DMC shall be equipped with a Short Circuit Protection Device (SCPD).
D. The DMC shall be UL Listed for Group Motor Applications, sized per NFPA 70 (NEC) or NFPA 79.
E. The DMC's environmental ratings include:

    1. Enclosure rating of Type 4 or Type 4/12 and IP66.
    2. Operating temperature range of -20 to +50°C (-4 to +122°F).
    3. Relative humidity range of 0 to 95%, non-condensing.
    4. Operating shock resistance to 30 G (exceeds IEC 60947-1).
    5. Operating vibration resistance to 2.5 G, MIL-STD-810G (exceeds IEC 60947-1).
    6. Ability to operate without de-rating to an elevation of 2000 m.
    7. Application in Pollution Degree 3 environments.

2.03 CONSTRUCTION

   A. The distributed motor control (DMC) shall have a compact footprint, single-box
       construction and offer direct on-line (DOL) or direct on-line reversing (DOLR) control of a
       three-phase AC squirrel cage induction motor.
   B. The DMC shall be designed for EtherNet/IP or DeviceNet network support.
   C. The DMC shall provide a local, lockable disconnect that supports a Lockout/Tagout
       (LOTO) provision.
   D. All connections shall be made from the bottom of the unit.

       1. 3-phase power, control power and motor connections shall be made via a gland
           plate:

           a) Conduit/cord-ready power options with 3/4 and 1 in. conduit holes:

               i. Trunk and drop
              ii. Daisy chain

           b) ArmorConnect® media option. The media shall be:

               i. produced by the DMC manufacturer, or
              ii. UL 2237 and approved for use by the DMC manufacturer.

       2. The DMC shall support two 10 AWG conductors for power and control, stranded and
           solid copper.
       3. The DMC shall provide fixed pipe or cord power connectivity or quick disconnect
           power features meeting UL 2238 for incoming control power.
       4. The DMC shall provide fixed pipe or cord power connectivity or quick disconnect
           power features meeting UL 2237 for AC motor connection.
       5. The DMC shall have quick connection for the network.
       6. The DMC shall have 12 mm 5 pin micro quick connection for inputs and outputs.
       7. The DMC shall have internal and external protective earth connections.

   E. An internal power supply (IPS) shall eliminate the need for separate control power and
       I/O power (option).
   F. The electronic control module (ECM) shall include externally accessible node address
       switches, a local fault reset button, and status and diagnostic LEDs that include the
       following:

       1. Power status
       2. Network status
       3. Run/Fault status
       4. I/O status
       5. Module status (EtherNet/IP versions)
       6. Link status (EtherNet/IP versions)

   G. The DMC shall have local control (option) with field-disable capability (except OFF):

       1. HAND – OFF – AUTO keypad (DOL)
       2. FORWARD – REVERSE – OFF – AUTO keypad (DOLR)

H. The DMC shall offer 6 user-configurable I/O points to be used with sensors and actuators.

1. 24 VDC nominal – 0.5 A outputs per point (max 1.5 total outputs).
2. 24 VDC nominal – 50 mA input per point (300 mA total inputs).
3. Outputs shall satisfy DC1 and DC13 utilization category.
4. The DMC shall have integrated suppression to protect output from switching loads.

2.04 COMMUNICATIONS OPTIONS

A. EtherNet/IP versions:

1. EtherNet/IP versions of the distributed motor control (DMC) shall allow the integration of I/O control, device configuration and data collection across multiple networks, enabling internet connectivity.
2. The EtherNet/IP DMC shall include a dual port 10/100mb/s embedded Ethernet switch that supports linear, star or device level ring (DLR) topology.
3. EtherNet/IP addressing shall be by:

a) Auto addressing via DHCP utility
b) Local node switch
c) Static IP address

4. The EtherNet/IP DMC shall support the IEEE 1588 transparent clock.
5. The EtherNet/IP DMC shall support DeviceLogix™, which allows local control using simple embedded logic.

B. DeviceNet versions:

1. DeviceNet versions of the distributed motor control (DMC) shall allow efficient data handling on the device-level DeviceNet network.
2. DeviceNet addressing shall be by:

a) Hard set node address switches
b) Software node addressing

3. The DeviceNet DMC shall support DeviceLogix, which allows local control using simple embedded logic.
4. The DeviceNet DMC shall provide peer-to-peer zone interlocking parameters (ZIP) to allow direct communication with up to 4 other DeviceNet nodes.

2.05 CONFIGURATION

A. The distributed motor control (DMC) shall have the capability to be programmed by:

1. Add-On Profile (AOP) for CompactLogix and ControlLogix Controllers – The AOP is used for the Logix Designer programming tool in Studio 5000™ software, which is a single control platform. The AOP simplifies setup and commissioning via predefined tags and commissioning wizards and allows automatic tag generation and copy and paste functionality for quick setup and configuration of multiple DMCs. The Logix Designer programming tool is also used by the DMC's DeviceLogix program to perform configuration locally.

    2.   RSNetWorx™ – For the DeviceNet version, the device configuration tool RSNetWorx can configure the DMC, using the embedded electronic data sheet (EDS).

    3.   Internal Webpage – For the EtherNet/IP version, the DMC's web interface can be used to configure the DMC when the AOP is not available.

B. The DMC's embedded web server shall be able to be configured for:

    1.   Login and password protection.
    2.   Sending an e-mail when a fault or warning occurs. E-mail supports Simple Mail Transfer Protocol (SMTP).
    3.   Uploading EDS files.
    4.   Status and diagnostics read/write.
    5.   Administrative tasks.

2.06 FUNCTIONS

A. Motor control shall be:

    1.   0.5 - 2 HP – AC squirrel cage induction motor.
    2.   3 - 5 HP – AC squirrel cage induction motor.

B. Electronic motor overload protection shall be accomplished with an I^2t algorithm.

    1.   Solid-state overload

       a)   2 HP – current setting of 0.24 A to 3.5 A
       b)   5 HP – current setting of 1.1 A to 7.6 A

    2.   Selectable trip class of 10, 15 or 20

C. Fault diagnostics shall include:

    1.   Overload
    2.   Phase Loss
    3.   Under Power
    4.   Sensor Short
    5.   Phase Imbalance
    6.   NonVolatile Memory
    7.   Jam
    8.   Stall
    9.   Underload
    10. Output Short

D. Device status parameters shall include:

1. Phase L1 Current
2. Phase L2 Current
3. Phase L3 Current
4. Average Current
5. Percent Thermal Utilized
6. Starter Status
7. Starter Command
8. Auxiliary I/O Status
9. Network Status
10. Trip Status
11. Warning Status
12. Trip Log 0-4
13. Diagnostic Snap Shot L1, L2, L3 Amps, and percent thermal

E. Basic configuration parameters shall include:

1. FLA Setting
2. OL Reset Level
3. Overload Class

2.07 DETAILED SPECIFICATION

A. All versions:

1. Rated Impulsed Voltage (U_{imp}): 4 kV
2. Dielectric Withstand: UL – 1960 VAC, IEC – 2500 VAC
3. Reset Mode: Automatic or manual
4. Overload Reset Level: 1 to 100% TCU
5. Overvoltage Category: III

B. EtherNet/IP versions:

1. EtherNet/IP ODVA – Conformance Testing: EtherNet/IP Interoperability Performance – Per A9 PF 2.1
2. Ethernet Communication Rate: 10/100 Mbps, auto-negotiate half- and full-duplex
3. Ethernet Ports: 2 (embedded switch)
4. Device Level Ring Support: Beacon Performance, IEEE 1588 Transparent Clock
5. Data: Transported over both TCP and UDP
6. Packet Rate (pps):

    a) 500 packets-per-second (2000 µs), Tx
    b) 500 packets-per-second (2000 µs), Rx

7. Message Support: Unicast or Multicast
8. Address Conflict Detection (ACD): IP v4 Address Conflict Detection for EtherNet/IP devices
9. Maximum Concurrent Explicit Messages (CIP Class 3): 6
10. Class 1 Connection API: 2 to 3200 ms
11. Class 3 Connection API: 100 to 10,000 ms
12. Request Packet Interval (RPI): 20 ms default (2 ms minimum)

C. DeviceNet versions:

1. DeviceNet Supply Voltage Rating Range: 11 to 25 VDC, 24 VDC nominal
2. DeviceNet Input Current: 50 mA @ 24 VDC
3. DeviceNet Input Current Surge: 500 mA peak inrush
4. Baud Rates: 125, 250, 500 kbps
5. Distance Maximum:

    a) 500 m (1630 ft) @ 125 kbps
    b) 200 m (656 ft) @ 250 kbps
    c) 100 m (328 ft) @ 500 kbps

6. Auto-Baud Rate Identification: Yes
7. "Group 2 - Slave Only" Device Type: Yes
8. Polled I/O Messaging: Yes
9. Change of State Messaging: Yes
10. Cyclic Messaging: Yes
11. Explicit Messaging: Yes
12. Full Parameter Object Support: Yes
13. Group 4 - Off-Line Node Recovery Messaging: Yes
14. Configuring Consistency Value: Yes
15. Unconnected Messaging Manager (UCMN): Yes

2.08 DIMENSIONS AND WEIGHT

A. The dimensions of the distributed motor control (DMC) shall not exceed 217.8 mm (8.6 in.) height x 260 mm (10.2 in.) width x 166.5 mm (6.6 in.) depth.
B. The approximate weight of the DMC shall be 4.6 kg (10 lb).

PART 3 EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. The supplier shall coordinate the shipping of equipment.
B. The supplier shall store the equipment in a clean and dry space.
C. The supplier shall protect the units from dirt, water, construction debris and traffic.

3.02 INSTALLATION

A. The supplier shall verify all distributed motor control components have been installed not exceeding the specifications or with proper derating prior to energizing.
B. The supplier shall follow local code and regulations with regard to electrical installation.
C. The supplier shall provide reasonable protection against accidental damage to component and associated cables.
D. The supplier shall ensure accessibility to diagnostic lights, communication ports and connection. These components shall be free from obstruction at all times.
E. The supplier shall verify all distributed motor control settings have been properly adjusted prior to energizing.

3.03 SPARE MATERIALS

    A. The supplier shall provide one (1) spare distributed motor control of each size utilized, including options.

3.04 WARRANTY

    A. The manufacturer shall provide their standard parts warranty for eighteen (18) months from the date of shipment or twelve (12) months from the date of being energized, whichever occurs first.
    B. The manufacturer shall confirm this warranty as part of the submittal.

<div align="center">END OF SECTION</div>