# Decoder Features

## Chapter Objectives

This chapter describes features of the Dual-Head Bar Code Decoders, including available options and accessories. It covers:

- NEMA type enclosures
- scanner ports
- power supply
- LED indicators
- serial communication ports (HOST port and AUX port)
- LCD display
- discrete input/output modules

## NEMA Type Enclosures

The 2755-DS1_ and -DD1_ decoders have NEMA Type 1 enclosures. The 2755-DS4_ and 2755-DD4_ decoders have NEMA Type 4 enclosures. All connections and ports on the NEMA Type 4 enclosure comply with NEMA 4 standards.

Although the installation varies for the NEMA Type 1 and Type 4 decoders, they have the same features and operate identically.

## Scanner Ports

Single-head decoders have one port for connecting a scanner. That port is designated Scanner Port A. Dual-head decoders have two ports for connecting scanners. They are designated Scanner Port A and B.

Both ports support scanners from the 2755-L4/L5, -L7/L9, –LD4 and –LD8[①] families with the appropriate cables. The scanners do not require a separate power supply. They receive power from the decoder through the cable. The NEMA Type 1 decoder also supports the 2755-G3 and –G6 Hand-Held Scanners and 2755–LD1 and –LD2 Scanners.[②]

① Catalog Numbers are incomplete. The 2755-L4/L5, –L7/L9, –LD4 and LD8 scanners are available in different configurations.

② The 2755-G3 and –G6 Hand-Held Scanners and 2755–LD1 and –LD2 Scanners require the 2755-NC16 Gun Adapter.

Dual-head scanners can operate in two modes:

- **Independent Mode**

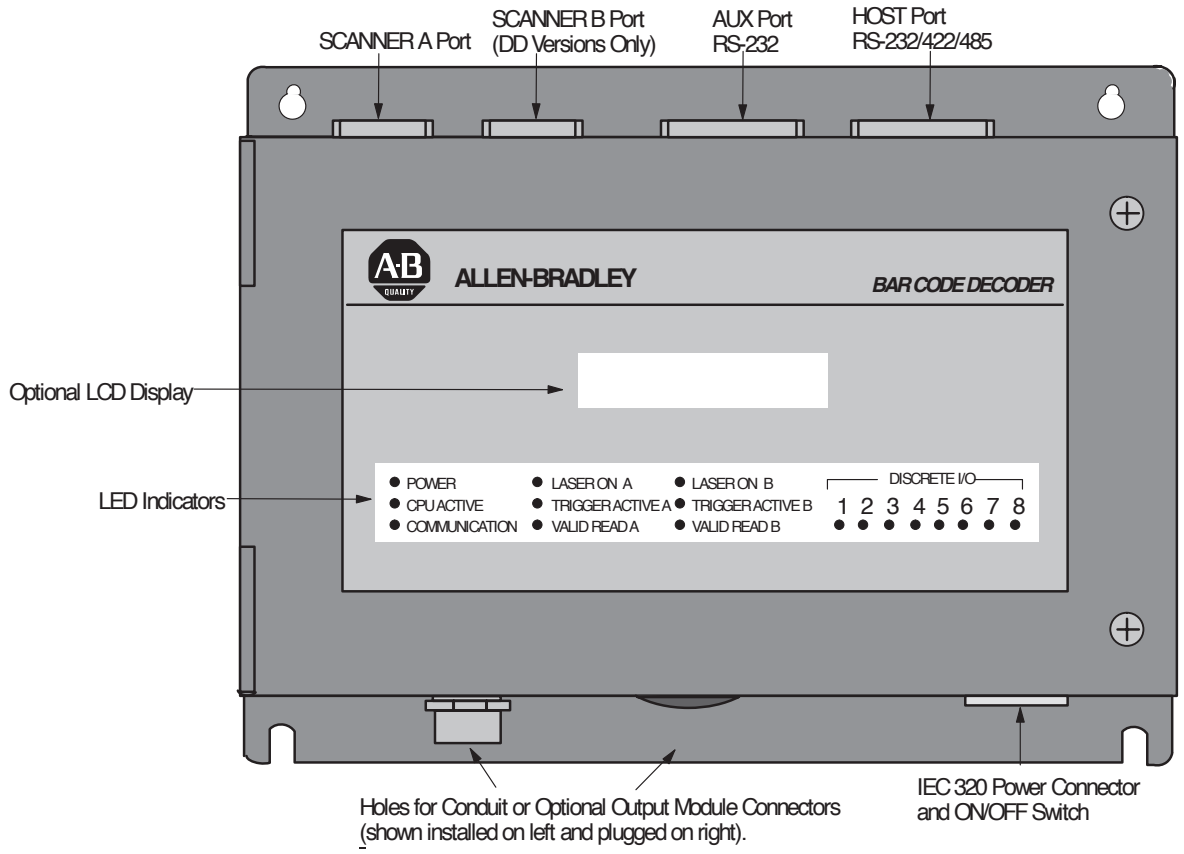
  Both scanners operate independently of one another, each using a separate trigger source (Scanner A and Scanner B).
- **Coordinated Mode**

  Both scanners operate in a coordinated mode, each using the same trigger source (Scanner A).

## Power Supply

An internal power supply provides power to both the laser scanner(s) and the decoder. The source voltage may range from 100 to 240 volts AC nominal (50 to 60 Hz). The power supply automatically adjusts to the input voltage.

**Figure 2.1**
**NEMA Type 1 Decoder (Catalog No. 2755-DD1A)**



## LED Indicators

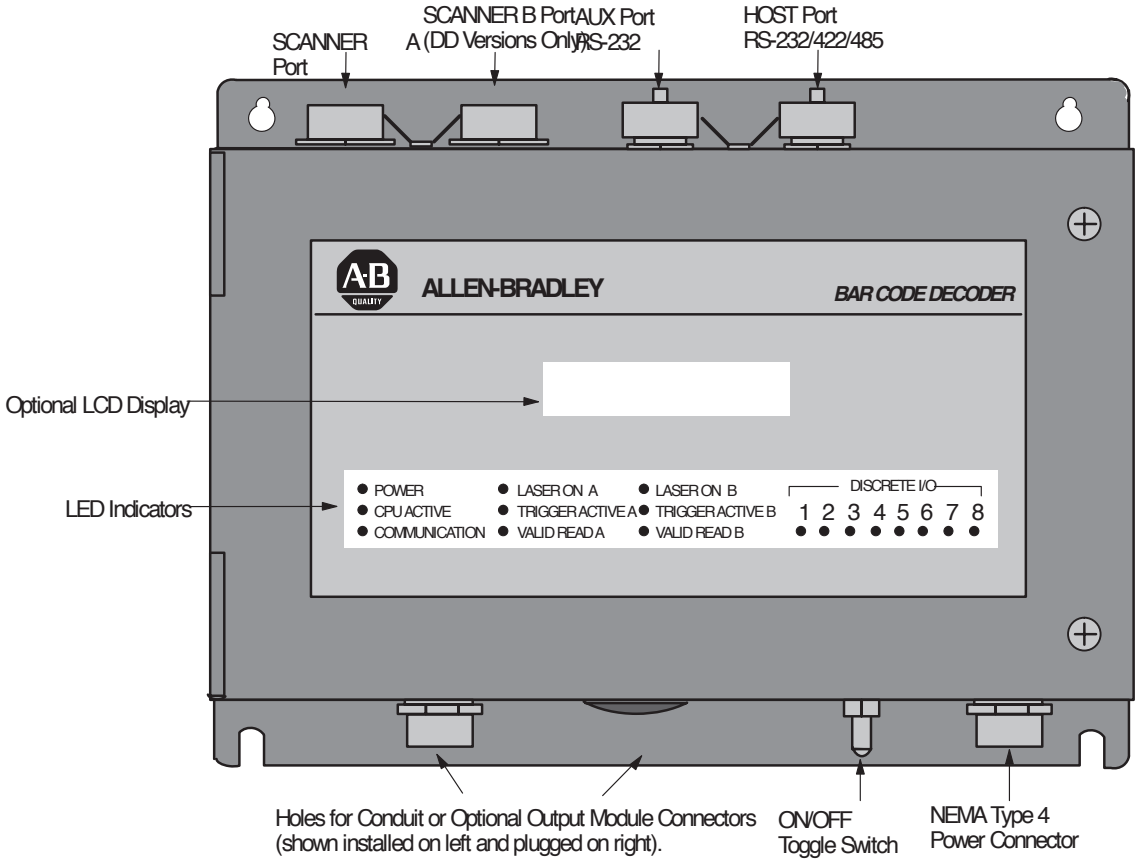
Seventeen front panel indicators provide a visual indication of the operating status of the dual-head decoders. There are fourteen front panel indicators on single-head decoders. Table 2.A defines the color and function of each LED.

**Table 2.A**
**LED Indicators (NEMA Type 1 and Type 4 Decoders)**

| LED Label | Color | Lights when |
|---|---|---|
| Power | Green | The decoder is receiving power. |
| CPU Active | Green | The CPU is active and running. The LED turns off if a fault condition is detected. |
| Communications | Yellow | Data is transmitting to or from the AUX port or HOST port. |
| Laser On A | Red | Scanner A is activated to turn on its laser light source. ① |
| Trigger Active A | Yellow | The decoder is in triggered mode and scanning has been triggered for Scanner A or Scanner B. |
| Valid Read A | Green | A valid read occurs from Scanner A. |
| Laser On B | Red | Scanner B is activated to turn on its laser light source. ①. (Dual-head versions only) |
| Trigger Active B | Yellow | The decoder is in triggered mode and scanning has been triggered for Scanner A or B. (Dual-head versions only) |
| Valid Read B | Green | A valid read occurs from Scanner B. (Dual-head versions only) |
| Discrete I/O (1-8) | Red | Input/output module in position 1,2, 3, 4, 5, 6, 7, or 8 is active. |

① The LED will light even if the scanner is disconnected or the Laser On switch for the scanner is in the OFF position.

**Figure 2.2**
**NEMA Type 4 Decoder (Catalog No. 2755-DD4A)**



## LCD Display

The decoders support an optional 2 line x 20 character per line alphanumeric LCD Display for viewing:

- bar code data
- output counter values
- decoder performance values

The format of the display data is under user control via the configuration screens or host commands.

The LCD Display can be factory installed or ordered as a separate component for customer installation.

## AUX Port

The AUX port communicates with a standard ASCII terminal using the RS-232 interface. We refer to this terminal as the AUX terminal. The AUX port can switch between two modes of operations.

### Decoder Configuration

The AUX terminal is used to configure and monitor decoder operations.

### Manual Data Entry

The AUX terminal is used to:

- enter data at the keyboard when the unattended scanners cannot read a label

  This feature is useful when labels are damaged or missing.
- display messages from the host
- display bar code data, output counters, and decoder status

The decoder features an AUX Terminal jumper on the main logic board to switch between configuration and manual data entry operations. Another way to switch between these two modes is to connect specific pins in the AUX port connector. The port and logic board jumpers are initially set for decoder configuration operations.

**Important:** The two operational modes described above are mutually exclusive. You can use the port for **either** decoder configuration **or** for manual data entry functions, but not both. Refer to Chapter 13 for additional information.

## Host Port

The HOST port supports RS-232, RS-422, and RS-485 (using Allen-Bradley DH485 protocol) interfaces. The HOST port allows the exchange of data between the decoder and a host computer or Allen-Bradley PLC controller.

## Power Connector and On/Off Switch

The NEMA Type 1 decoder uses an IEC 320 power entry connector.

The NEMA Type 4 decoder uses a standard 3-pin connector with a separate ON/OFF toggle switch (that is sealed to comply with NEMA Type 4 standards).

Power cord options are available for each decoder and are listed in the Decoder Options section.

## Memory Backup

The decoders are designed to retain configuration during short term power interruptions. Controlled discharge of an on-board capacitor supports configuration retention for 6 hours at an ambient temperature of 50°C (122°F), or 50 hours at 30°C (86°F). The capacitor accumulates a charge when power is restored.

An optional battery (catalog number 1747-BA) may be used to retain the configuration without outside power for up to five years. When the optional battery is used, power interruptions (whether intentional or resulting from power supply “glitches”) will have no affect on operating memory.

If the battery is not used, long term power loss (see above) will result in the loss of the Extended Match Code Table configuration, the Primary and Extended Match Code Counters, and the text examples contained in the Host Replacement Rules. Note that the Replacement Rules themselves will *not* be lost, but the test examples you have entered at the bottom of each rule page *will* be lost.

Storage memory configuration is transferred into operating memory on restart if power is lost for a period longer than the on-board capacitor (and, if installed, optional battery) can support. Refer to Chapter 3 for an explanation of decoder memory architecture.

## Discrete I/O Modules

The decoders support an optional I/O Module Board with eight positions for output modules. These I/O modules are used to control external AC or DC devices. Conditions that activate the outputs are under user control via the configuration screens or host commands.

All positions accept an output module. Position eight also accepts an input module. You can configure the input module (in position 8) to automatically load scanned bar code data into the match code table. This function is referred to as Autoload Input. Match code functions are described in detail in Chapters 7 and 8.

Each decoder has two conduit holes or optional connectors for wiring the I/O modules.

The I/O Module Board is available in several variations for factory or customer installation. You can order the decoder with the I/O Module Board only for customer installation of specific modules, or with 2 DC outputs and 1 DC input for ”out of the box” applications.

The options available for the NEMA Type 1 and Type 4 decoders are:

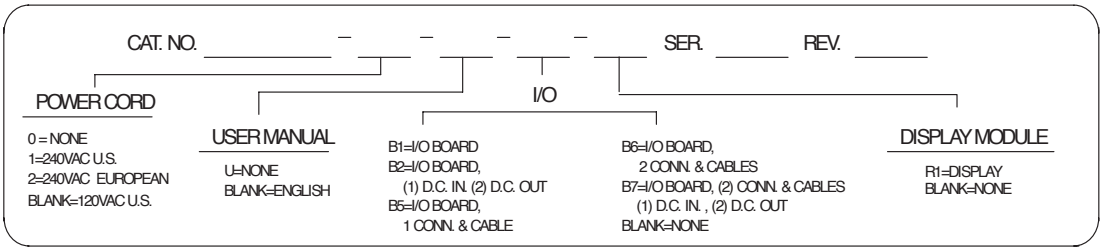
- I/O board without modules
- I/O board with 2 DC output modules and 1 DC input module
- I/O board with 1 NEMA Type 4 connector and cable for installing up to 4 modules in positions 1-8.
- I/O board with 2 NEMA Type 4 connectors and cables for installing up to 8 modules in positions 1-8.
- I/O board with 2 DC output modules, 1 DC input module and 2 NEMA Type 4 connectors/cables for installing up to 8 modules in positions 1-8.

Each option is listed under Decoder Options in this chapter.

## Decoder Options (NEMA Type 1 Decoders)

Options available when ordering the NEMA Type 1 decoder are listed inside the decoder's cover as shown below. Note that on actual production labels:

- the base catalog number will appear in the first field following the words "Cat No."
- the series letter will appear in the field following "Ser."
- the revision letter will appear in the field following "Rev.".




### Power Cords

Power cords available when ordering the NEMA Type 1 decoder are:

| Option | Power Cord Description |
|---|---|
| Blank | 120 VAC, IEC 320, terminated three prong, U.S. style power cord, 6 ft. (1.83 m)① |
| -0 | No power cord (User must supply appropriate power cord) |
| -1 | 240 VAC, IEC 320, three wire (U.S. Color Code) unterminated power cord, 6 ft. (1.83 m) |
| -2 | 240 VAC, IEC 320, three wire (European Harmonized) unterminated power cord, 2.5 m (8 ft. 2 in)② |

① Supplied with decoder if alternate power cord is not specified in catalog number.

② The decoder is not UL listed/CSA approved when used with European Harmonized power cords.

To order a replacement power cord for the NEMA Type 1 decoder, use the following replacement part numbers.

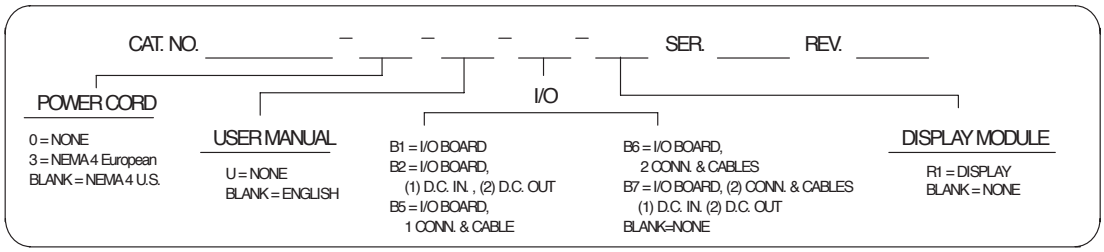
| Replacement Part No. | Power Cord Description |
|---|---|
| 77121-801-01 | 120 VAC, IEC 320, terminated, 6 ft. three prong, U.S. style power cord, 6 ft. (1.83 m) |
| 77121-801-02 | 240 VAC, IEC 320, three wire (U.S. Color Code) unterminated power cord, 6 ft. (1.83 m) |
| 77121-801-03 | 240 VAC, IEC 320, three wire (European Harmonized) unterminated power cord, 2.5 m (8 ft. 2 in)① |

① The decoder is not UL listed/CSA approved when used with European Harmonized power cords.

## Decoder Options (NEMA Type 4 Decoders)

Options available when ordering the NEMA Type 4 decoder are listed inside the decoder's cover. Note that on actual production labels:

- the base catalog number will appear in the first field following the words "Cat No."
- the series letter will appear in the field following "Ser."
- the revision letter will appear in the field following "Rev.".




### Power Cords

Power cords available when ordering the NEMA Type 4 decoder include:

| Option | Power Cord Description |
|---|---|
| Blank | 120/240 VAC, three wire (US Color Code) unterminated power cord, 6 ft. (1.83 m)① |
| -0 | No power cord (User must supply appropriate power cord) |
| -3 | 240 VAC, three wire (European Harmonized) unterminated power cord, 6 ft. (1.83 m)② |

① Supplied with decoder if alternate power cord is not specified in catalog number.

② The decoder is not UL listed/CSA approved when used with European Harmonized power cords.

To order a replacement power cord for the NEMA Type 4 decoder, use the following replacement part numbers.

| Replacement Number | Power Cord Description |
|---|---|
| 77121-801-04 | 120/240 VAC, three wire (US Color Code) unterminated power cord |
| 71721-801-05 | 240 VAC, three wire (European Harmonized) unterminated power cord① |

① The decoder is not UL listed/CSA approved when used with European Harmonized power cords.

## Input/Output Modules

The optional I/O Module Board supports the following I/O modules:

| **Output Modules** (function as a switch not a power source) | | | |
|---|---|---|---|
| **Catalog Number** | **2755-OB5S** | **2755-OA5S** | **2755-OM5S** |
| Nominal Line Voltage | — | 120 VAC | 240 VAC |
| Maximum Line Voltage | 60 VDC | 140 VAC | 280 VAC |
| Minimum Line Voltage | 3.0 VDC | 12 VAC | 24 VAC |
| Maximum Peak Off State Voltage | 60 VDC | 400 V peak | 600 V peak |
| Maximum Peak Off State Leakage | 1.0 mA | 2.5 mA RMS | 4.5 mA RMS |
| Static off-state dv/dt | — | 200 V/usec | 200 V/usec |
| Maximum On-State Current | 0.5 A DC | 0.5 A RMS | 0.5 A RMS |
| Minimum On-State Current | 10 mA DC | 50mA RMS | 50mA RMS |
| Maximum 1 Cycle Surge | — | 4.0 A peak | 4.0 A peak |
| Maximum 1 Second Surge | 1.5 A DC | — | — |
| Peak On-State Voltage | 1.5 V DC | 1.6 V peak | 1.6 V peak |

| **Input Modules** (require voltage source for activation) | | | |
|---|---|---|---|
| **Catalog Number** | **2755-IB5S** | **2755-IA5S**① | **2755-IM5S**① |
| Maximum Input Voltage | 32 VDC | 140V RMS/VDC | 280V RMS/VDC |
| Minimum Input Voltage | 3.3 VDC | 90V RMS/VDC | 180V RMS/VDC |
| Input Resistance | 1 k ohm | – | – |
| Maximum Input Current | 32mA DC @32VDC | 10mA RMS @140V RMS | 8mA RMS @280V RMS |
| Drop Out Current | 1.0 mA DC | 2.5 mA RMS | 1.5 mA RMS |
| Allowable Off-State Input Current | 1.0 mA DC | 3.0 mA RMS | 2.0 mA RMS |
| Allowable Off-State Input Voltage | 2.0 VDC | 50 VRMS/VDC | 120 VRMS/VDC |

① AC or DC Input Module

## Replacement Fuses (for decoders with I/O Module Board options)

| Replacement Number | Description |
|---|---|
| 77104-899-01 | 1.6 A plug-in fuse for output modules provide overload protection for decoder. |

## I/O Module Board Options (available when ordering either the NEMA Type 1 or Type 4 decoder)

| Option | Module I/O Board | Output Modules | | | Input Module | | | I/O Connector/ Cables① |
|---|---|---|---|---|---|---|---|---|
| | | Qty | Positions | Type | Qty | Position | Type | |
| -B1 | Yes | 0 | — | — | 0 | — | — | None |
| -B2 | Yes | 2 | 1, 2 | 3 - 60 VDC at 0.5 amps | 1 | 8 | 3.3 - 32 VDC | None |
| -B5 | Yes | 0 | — | — | 0 | — | — | 1 set |
| -B6 | Yes | 0 | — | — | 0 | — | — | 2 sets |
| -B7 | Yes | 2 | 1, 2 | 3 - 60 VDC at 0.5 amps | 1 | 8 | 3.3 - 32 VDC | 2 sets |

① The I/O connector(s) wire to modules in positions 1-8 of the I/O board and comply with NEMA Type 4 standards. Six foot (1.83 meter) cables are supplied with each connector for wiring to the modules.

There are three I/O Module Board options available for **customer installation** in any 2755 decoder.

Catalog number 2755-NB0 includes a NEMA Type 4 connector and a 6 foot (1.83 meter) unterminated cable. Each connector and cable combination can connect to as many as four modules.

Catalog number 2755-NB1 includes an I/O Board (without modules).

Catalog number 2755-NB2 is a kit including two DC output modules (3 to 60 VDC at 0.5 amps), one input module (3.3 to 32 VDC), and the I/O board.

| Catalog Number | Module I/O Board | Output Modules | | | Input Module | | | I/O Connector/ Cables[1] |
|---|---|---|---|---|---|---|---|---|
| | | Qty | Positions | Type | Qty | Position | Type | |
| 2755-NB0 | No | 0 | — | — | 0 | — | — | 1 set |
| 2755-NB1 | Yes | 0 | — | — | 0 | — | — | None |
| 2755-NB2 | Yes | 2 | 1, 2 | 3 - 60 VDC at 0.5 amps | 1 | 8 | 3.3 - 32 VDC | None |

[1] The I/O connector(s) wire to modules in positions 1-8 of the I/O board and comply with NEMA Type 4 standards. Six foot (1.83 meter) cables are supplied with each connector for wiring to the modules.

## LCD Display

The optional 2 line by 20 character LCD backlit display is available when ordering the NEMA Type 1 or Type 4 decoder by specifying display option R1 in the catalog number.

The display is also available for customer installation as Catalog No. 2755-NR1.

## Scanners

The following table provides a quick reference guide to the Allen-Bradley scanners that are available for use with the decoders.

| Catalog No. | Description |
|---|---|
| 2755-LD8① | **High Performance Visible Laser Diode Bar Code Scanner.** 500 scan per second fixed mount scanners with read distances up to 50 inches (1.27 meters) depending on the symbol size and quality. |
| 2755-LD4① | **High Performance Visible Laser Diode Bar Code Scanner.** 200 scan per second fixed mount scanners with read distances up to 84 inches (2.13 meters) depending on the symbol size, quality, and scanner range selected. |
| 2755-L9① | **Industrial NEMA Type 4 High Speed Bar Code Scanner.** 800 scan per second raster and side scanning device with read distances up to 30 inches (76 cm) depending upon symbol size and quality. |
| 2755-L7① | **Industrial NEMA Type 4 Bar Code Scanner.** 350 scan per second raster and side scanning device with read distances up to 50 inches (1.27 meters) depending upon symbol size and quality. |
| 2755-L4F① -L4R① | **Enhanced NEMA Type 12 Bar Code Scanner.** 200 scan per second front or side scanning device with read distances up to 50 inches (1.27 meters) depending upon symbol size and quality. |
| 2755-L5R① | **Enhanced NEMA Type 12 Raster Scanner.** 200 scan per second raster scanner with read distances up to 45 inches (1.14 meters) depending on symbol size and quality. |
| 2755-G3①② | **Hand-Held Laser Scanner.** Non-contact scanners that can read bar code symbols at distances of 1 inch to 30 inches (2.5 to 76.2 cm). |
| 2755-G6①② | **Hand-Held Laser Scanner.** Non-contact scanners that can read bar code symbols at distances of 8 to 66 inches (20.3 to 167.6 cm). |
| 2755-LD1①② | **Standard Range Fixed Mount Laser Scanner.** 36 scan per second "stop and scan" scanners that can read bar code symbols at distances from 1 inch to 30 inches (2.5 to 76.2 cm) depending upon symbol size and quality. |
| 2755-LD2①② | **Long Range Fixed Mount Laser Scanner.** 36 scan per second "stop and scan" scanners that can read bar code symbols at distances from 8 to 66 inches (20.3 to 167.7 cm) depending upon symbol size and quality. |

① Catalog Number is not complete. The scanners are available in a variety of configurations. Check compatibility of new scanners with your Allen-Bradley representative.

② These scanners require the 2755-NC16 Gun Adapter to function with these decoders.

## Decoder Accessories

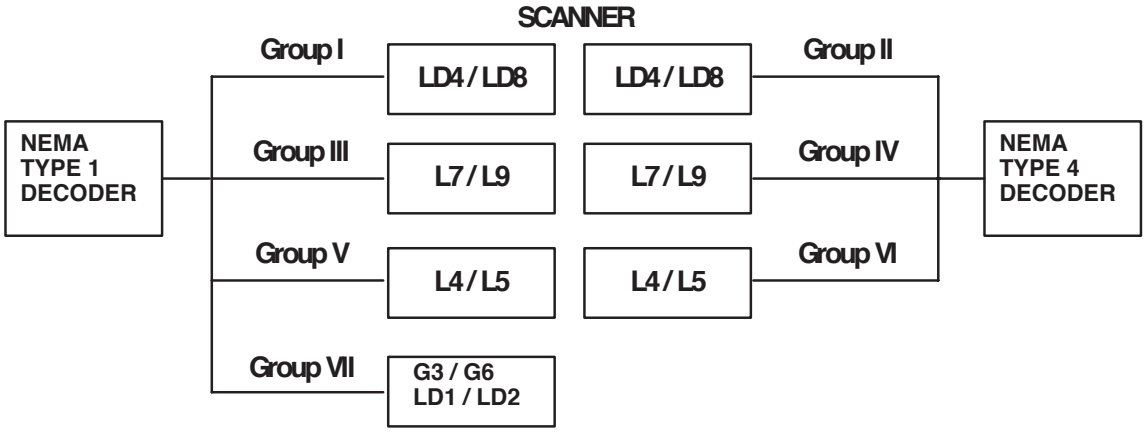
This section lists the accessories that are available for the NEMA Type 1 and Type 4 decoders.

### Configuration and Cable Group Selector

Use the chart below and the Cable Selection Guide table that follows it to determine which cables are appropriate to your own application.

To use the chart, simply identify the scanner you are using in the center column, then look to the left if you are using a NEMA Type 1 decoder, or to the right if you are using a NEMA Type 4 decoder. A cable group identification number appears over the line connecting your scanner with your decoder type. For example, if you are using an -LD4 scanner with a NEMA Type 4 decoder, you would select a Group II cable.

## Cable Selection Guide




| Group | Decoder / Scanner Combination | Description | Length | Catalog No. |
|---|---|---|---|---|
| I | NEMA 1 to LD4 / LD8 | Optional extension cable (there is a 10 ft. (3.05 m) cable hard-wired to the scanner) | 15 ft. (4.75 m) | 2755-C15D1 |
| | | | 40 ft. (12.19 m) | 2755-C40D1 |
| II | NEMA 4 to LD4 / LD84 | Optional extension cable (there is a 10 ft. (3.05 m) cable hard-wired to the scanner) | 15 ft. (4.75 m) | 2755-C15D4 |
| | | | 40 ft. (12.19 m) | 2755-C40D4 |
| III | NEMA 1 to L7 / L9 | Scanner Cable | 10 ft. (3.05 m) | 2755-CL10 |
| | | | 25 ft. (7.62 m) | 2755-CL25 |
| | | | 40 ft. (12.19 m) | 2755-CL40 |
| | | | 50 ft. (15.24 m) | 2755-CL50 |
| IV | NEMA 4 to L7 / L9 | Scanner Cable | 10 ft. (3.05 m) | 2755-CN10 |
| | | | 25 ft. (7.62 m) | 2755-CN25 |
| | | | 40 ft. (12.19 m) | 2755-CN40 |
| | | | 50 ft. (15.24 m) | 2755-CN50 |
| V | NEMA 1 to L4 / L5 | Scanner Cable | 10 ft. (3.05 m) | 2755-CK10 |
| | | | 25 ft. (7.62 m) | 2755-CK25 |
| VI | NEMA 4 to L4 / L5 | Scanner Cable | 10 ft. (3.05 m) | 2755-CM10 |
| | | | 25 ft. (7.62 m) | 2755-CM25 |
| VII | NEMA 1 to G3 / G6① | Hand-Held Scanner Cable – Coiled | 8 ft. (2.4 m) | 2755-CG08 |
| | | | 15 ft. (4.6 m) | 2755-CG15 |
| | | Hand-Held Scanner Cable – Straight | 20 ft. (6.1 m) | 2755-CG20 |
| | NEMA 1 to LD1 / LD2① | Scanner Cable – Straight with 9-pin connectors on each end. | 6 ft. (1.83 m) | 2755-CD06 |
| | NEMA 1 to G3 / G6① or LD1 / LD2 | Adapter that plugs directly into the scanner port of a NEMA 1 decoder and provides the circuitry necessary to connect the decoder to a handheld scanner cable. | N/A | 2755-NC16 |

① These scanners require the 2755-NC16 Gun Adapter to function with these decoders.

## Package Detectors for Scanners

| Scanner | Description | Catalog No. |
|---|---|---|
| L7 / L9 | Optional, for Catalog No. 2755-L7, -L9 Scan Head. DC retroflective detector with an operating range up to 18 feet (5.49 meters). Mounts from front or rear, plus head rotation allows additional flexibility in selecting sending direction. | 2755-NP3 |
| | Optional, for Catalog No. 2755-L7, -L9 Scan Head. Polarized beam retroflective detector has a maximum operating distance of 10 feet (3.03 meters) or 8 feet (2.43 meters) with a 2 to 1 operating margin. Includes mounting brackets for single-hole or flat surface mounting. | 2755-NP5 |
| L4 / L5 | Optional, for Catalog No. 2755-L4, -L5 Scan Head. DC retroflective detector with an operating range up to 18 feet (5.49 meters). Mounts from front or rear, plus head rotation allows additional flexibility in selecting sending direction. | 2755-NP1 |
| | Optional, for Catalog No. 2755-L4, -L5 Scan Head. Polarized beam retroflective detector has a maximum operating distance of 10 feet (3.03 meters) or 8 feet (2.43 meters) with a 2 to 1 operating margin. Includes mounting brackets for single-hole or flat surface mounting. | 2755-NP4 |

We recommend using Allen-Bradley Photoswitch® package detectors (PhotoSeries 6000 or 9000) with 2755-LD4 and -LD8 scanners. You must order a **current sinking** type sensor with the QD (Quick Disconnect) suffix that is capable of operating with a +12V DC source (pin 1) and drawing not more than 100 mA and a **sink** capability of 5 mA at +12V DC.

For example: Catalog Number 42SRU-6203-**QD** or
Catalog Number 42GRU-9200-**QD**

## Communication Cable and Connector Kit

A cable and connector kit is available for the AUX and HOST ports of the NEMA Type 4 decoder. We recommend using Catalog Number 2755-NC17 to make your own cable for RS-422 or RS-485. Pinouts can be found in Appendices D and E. Use Catalog Number 2755-CT1 *only* for RS-232. Order as separate components using the following catalog numbers.

| Catalog Number | NEMA Type | Product | Description |
|---|---|---|---|
| 2755–NC17 | 4 | Connector Kit | 19-pin NEMA 4 Host or AUX port connectors. Used to make custom NEMA 4 communication cables. |
| 2755–CT1 | 4 | Interface Cable | 10 foot cable with NEMA Type 4 connector on one end for connecting to HOST or AUX port of NEMA Type 4 Decoder and 25-pin DB connector on other end for connecting to a host device or programming terminal (for RS-232 only). |
| 2755–CY1 | 4 | Host Port Interface Cable | Multidrop interface cable for DH485 applications using NEMA Type 4 decoders. |