

DATASHEET

Datasheet: DSX M12D and M12X adapters

Overview

Industrial environments, unlike traditional IT environments, expose high data rate copper ethernet connections and cable to mechanical shock and vibration, intrusion of water and other contaminants, wide temperature changes, and electromagnetic noise from motors and other industrial devices. The Industrial Ethernet environment is covered by Telecommunications Industrial Association standard TIA-1005-A and ISO11801 standards

With today's industrial networks, it is more important than ever to validate or certify and document multiple media and connector types to ensure a properly executed installation that will endure harsh industrial environments.

The DSX CableAnalyzer™ provides the most comprehensive level of testing, certifying compliance of the installed cabling with the performance levels established in the TIA-568, TIA-1005 and ISO 11801 standards.

This datasheet describes adapters that allows the user to connect a DSX CableAnalyzer directly to Industrial Ethernet cabling systems that use the M12D 4-position connectors, [M12X](#) 8-position connectors and RJ45 connectors needed to test and validate the performance of Industrial Ethernet cables used with EtherNet/IP, PROFINET™, Modbus TCP™ and other industrial ethernet protocols used to with variable speed drives, programmable logic controllers, ethernet switches and other devices used in industrial automation.



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TIA-1005-A MICE Standard

TIA-1005-A provides a method to categorize the severity of the environment the cabling system will be exposed to. The standard covers mechanical and vibration (M), ingress of water (I), chemical contaminations and temperature (C), and and electromagnetic noise (E). Level 1 is typically seen in offices, schools, commercial businesses, and level 3 is seen in industrial locations. The DSX Series, with the proper adapters, tests and certifies cable links from end to end, and separate patch cords.

Cables can easily be checked with cable continuity testers, but simple continuity tests do not test bandwidth, ability to resist Electromagnetic Interference (EMI), or loose connections that appear good but fail after a few months of vibration and other environmental factors prevalent in industry.

	M	I	C	E	
	Mechanical Shock, Vibration	Ingress Water, Dust	Chemical / Climatic (Temperature, Humidity)	Electro- magnetic	
Heavy Industrial	Level 3 MICE				Increasing Environmental Severity
Light Industrial	Level 2 MICE				
Office	Level 1 MICE				

Cabling Validation

There are many levels of testing for cabling systems, from verifying the continuity of the connection to validating or certifying compliance of an installed cabling system to applicable TIA or ISO standards. Validation or certification offers the advantage that it represents an assurance or guarantee that the cabling provides the desired bandwidth and transmission capabilities required for the operation of the industrial network. In other words, you know that the cabling system meets the transmission requirements to reliably support the industrial networks and reduce downtime related to cabling. This assurance, in advance of installing network devices (at the machine builder or plant) and turning up the machine, can save numerous labor hours and headaches during the initial installation, troubleshooting and ongoing maintenance of industrial automation devices, switches and other communications-enabled devices in the network. And its value increases as the mission-critical nature of the network increases.

Fluke Networks has offered [cabling certification](#) test tools since 1993. The [DSX CableAnalyzer™ Series](#) represents the most recent and comprehensive physical layer [test tools](#) – offering unique troubleshooting and diagnostics to identify and locate the defect in a failing cabling link.

The M12 Adapter Advantage

DSX M12 channel adapters are available for M12D (4 position) and M12X (8 position) models for use with the DSX CableAnalyzer Series. These adapters allow you to test and certify installed channel links to ensure reliable transmission of Fast Ethernet (100BASE-TX) in the demanding MICE environment of industrial networking applications.

When used together, the DSX M12 Adapters and DSX CableAnalyzer provide a complete solution that is fully compliant with industry standards. The M12 connectors support the transmission requirements for TIA Cat 5e or ISO Class D. A cabling link that passes the TIA Cat 5e or ISO Class-D requirements fully supports the deployment of Ethernet (10/100/1000BASE-TX) over a distance up to 100 m (328 ft). M12X adapters fully support TIA Cat 6 and 6A or ISO Class E and EA.

Test Configurations

Channel (End to End) Test with M12 on Each End – With a pair of M12 Channel Adapter (D or X version) on the DSX CableAnalyzer and the Smart Remote, the DSX CableAnalyzer will accurately measure the performance of the entire cable and all intermediary connectors as illustrated in *Figure 1*. Note that the standards' definition of the cable channel specifically excludes the connections to the tester at each end.

Channel (End to End) Test with M12 on One End and an RJ45 on the Other End – With one M12 Channel Adapter (D or X version) on the DSX CableAnalyzer and an RJ45 the Smart Remote, the DSX CableAnalyzer will accurately measure the performance of the entire cable and all intermediary connectors as illustrated in *Figure 2*. Note that the standards' definition of the cable channel specifically excludes the connections to the tester at each end.

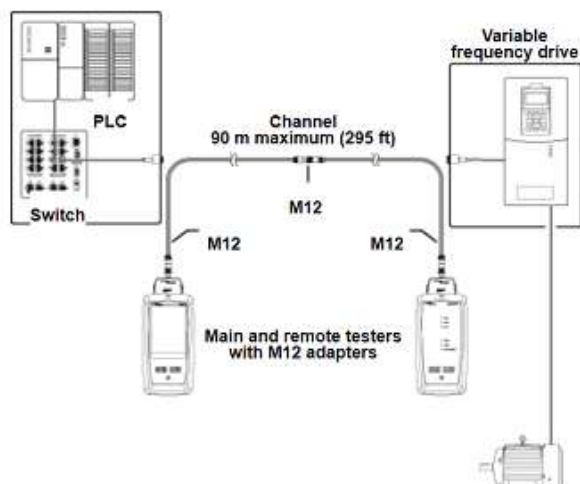


Figure 1 – M12 connectors on each end of cable.

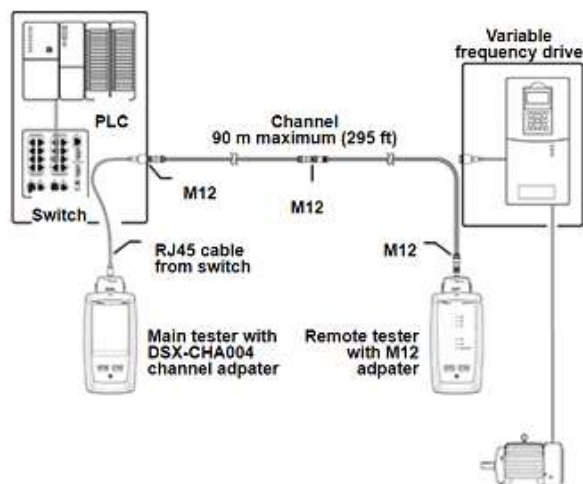







Figure 2 – M12 and RJ45 connectors.

Factory Terminated Patch Cord – Uniquely, the DSX-CHA021 (M12D) or DSX-CHA-M12-X-S (M12X) adapters also allows factory terminated patch cords to be tested as individual components. When testing patch cords, the DSX-5000 automatically adjusts the measurement reference planes to include the effect of the mated connections to the tester at each end of the patch cord, in accordance with standards' requirements. This allows certification of patch cords prior to their installation in the work area. Additionally, when used with a DSX-PC5E for CAT5e or lesser cables (use DSX-PC6S for CAT6 Cable) Patch Cord Test Adapter, the DSX Series CableAnalyzer can certify hybrid patch cords where one end is terminated with an M12 connector and the opposite end is terminated with an 8-pin modular RJ45 plug.

The DSX Series Main and Remote must have version 6.1 or greater for M12 adapters performance. Software updates are available at www.flukenetworks.com

General Specifications				
Model Number	Description	Weight, each adapter	Dimensions, each adapter	

DSX-CHA021S	DSX M12D (4 Positions) FEMALE ADAPTER SET OF 2 (Included with DSX2-5-IE-K1, Industrial Ethernet DSX Kit 1)	74 g (0.16 lb)	7.5 x 5.4 x 3.0 cm (3.0 x 2.1 x 1.2 in)	
DSX-CHA-M12-X-S	DSX M12X (8 Positions) FEMALE ADAPTER SET OF 2 (Included with DSX2-5-IE-K1, Industrial Ethernet DSX Kit 1)	74 g (0.16 lb)	7.5 x 5.4 x 3.0 cm (3.0 x 2.1 x 1.2 in)	
DSX-CHA004S	DSX CAT 6A/CLASS EA Channel Adapters Set (Included with DSX2-5-IE-K1, Industrial Ethernet DSX Kit 1)	74 g (0.16 lb)	7.5 x 5.4 x 3.0 cm (3.0 x 2.1 x 1.2 in)	
DSX-PC5ES	DSX Patch Cord Test Adapter Set for Category 5e patch cords	74 g (0.16 lb)	7.5 x 5.4 x 3.0 cm (3.0 x 2.1 x 1.2 in)	

DSX-PC6S	DSX Patch Cord Test Adapter Set for Category 6 patch cords	74 g (0.16 lb)	7.5 x 5.4 x 3.0 cm (3.0 x 2.1 x 1.2 in)	
DSX-PC6AS	DSX Patch Cord Test Adapter Set for Category 6A patch cords	74 g (0.16 lb)	7.5 x 5.4 x 3.0 cm (3.0 x 2.1 x 1.2 in)	