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Author: Matt Nelson

Approved: Matt Nelson

Type: Engineering Document

Revision	Approved	Date	Description
A	M. Nelson	2 November 2012	Original Version

EMC Technical File

Metrix Instrument Company
8824 Fallbrook Drive
Houston, Tx 77064

Product: Digital Proximity System
Model Numbers: MX2032, MX2033, MX2034

1. EMC Technical File Summary

1.1. Object: Digital Proximity System

The Metrix MX2032, MX2033, and MX2034 Digital Proximity Systems are sensors that measure the displacement between a metal surface and the probe tip. The system consists of a Driver, a Probe, and an extension cable between the probe and driver.

Figure 1: DPS Components

1.2. Product Identification

The DPS has product labels on the top and side.

Top Label:

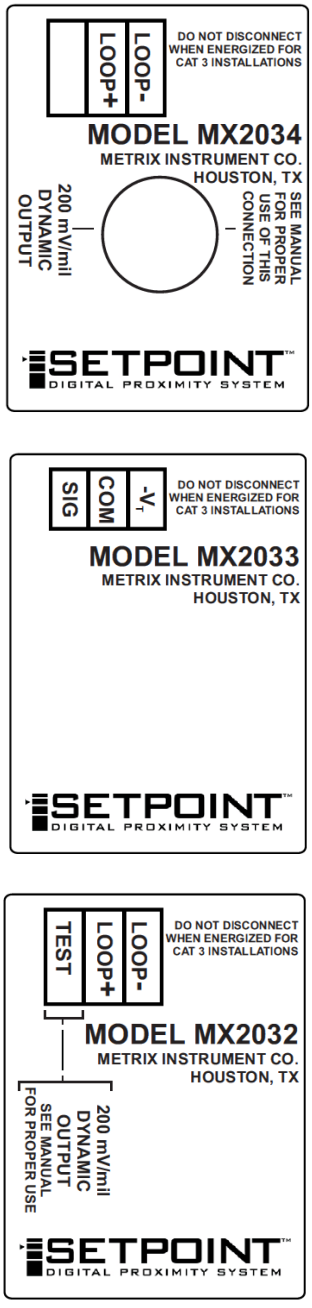


Figure 2: DPS Top Labels

Side Label:

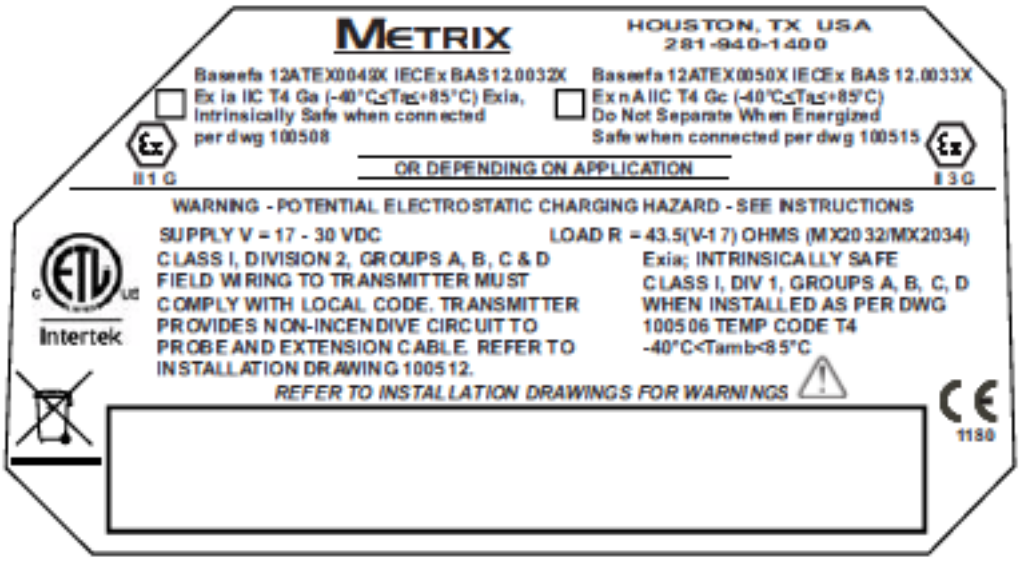


Figure 3: DPS Side Label

1.3. Environment of Use

The DPS is designed for use in industrial environment including hazardous areas up to Div 1/Zone 1.

1.3.1. Restrictions

The probe and extension cable must be located inside a shielded enclosure such as a machine casing and conduit.
The user will have to supply -24 Vdc power from a suitable power supply or monitoring system.

1.3.2. Customer Requirements and Restrictions

See Installation manual (Document number 100545). The manual includes wiring diagrams showing proper field wire connections and shielding. When installing in hazardous areas, refer to the following documents:

Installation Environment	Installation Document
North American Intrinsically Safe Installations	100506
ATEX, IECEx Intrinsically Safe Installations	100508
North American Div 2/Zone 2 Installations	100512
ATEX, IECEX Intrinsically Safe Installations	100515

Installation in Intrinsically Safe environments includes use of both passive (zener) and active (galvanic isolation) safety barriers.

1.3.3. Facilities Control Drawings/Customer Facilities Specifications:

There are no specific facilities control drawings or customer facilities specifications for the Setpoint DPS (Refer to manual 100545). Specific installations not covered in the manual, if any, are evaluated at the time of install and are addressed according to individual customer needs.

1.3.4. Technical Description

1.3.4.1. Assembly

Refer to assembly drawing 1086733.
The DPS is assembled using 3 circuit boards:

- Controller Board
- Power Supply Board
- Interconnect Board

These circuit boards can vary between the MX2032, MX2033, and MX2034 Model Numbers.

Table 1: Circuit Boards by Model Number

Board/Model	MX2032	MX2033	MX2034
Controller Board	100497	100500	100497
Power Supply Board	100488	100491	100494
Interconnect Board	100503	100503	100503

Each board has a schematic, layout and assembly drawing kept on file by Metrix.

Circuit Board	Schematic	Assembly	Layout (Drill)	Parts List
100488	100486-DWG	100488-DWG	100487-DWG	100488
100491	100486-DWG	100491-DWG	100487-DWG	100491
100494	100492-DWG	100494-DWG	100493-DWG	100494
100497	100495-DWG	100497-DWG	100496-DWG	100497
100500	100495-DWG	100500-DWG	100496-DWG	100500
100503	100501-DWG	100503-DWG	100502-DWG	100503

1.3.4.2. Installation Manual

Reference document 100545

1.3.4.3. Operations and Maintenance Manual

Reference document 100576

2. EMC Concepts

The DPS uses a combination of shielding and filtering to achieve EMC compliance:

- The internal surface of the DPS housing is metalized and connected to internal common.
- The outside body of the probe connector is at common.
- The outside conductor of the probe cable is at common.
- All power and signal inputs are filtered.
- All field wiring is shielded.
- Probe and Extension cable are required to be installed in a machine casing and shielded using conduit or equivalent.

The DPS includes one internal crystal (12 MHz). This frequency is multiplied internally to the microprocessor for create the processor operating frequency of 48 MHz.

2.1. Technical File Route

Metrix chose to create a technical file because the DPS hardware cannot be changed in the field in a manner that affects EMI shielding, filtering, or clock frequencies.

2.2. Change Control

1. Design changes are evaluated by the design engineer to determine if the change affects EMC performance.
2. Since EMI control is determined using shielding and filtering, retesting is generally not required unless changes are made to the shielding/grounding or input filtering design.

2.3. Tests Performed

EMC Test Performed	Type Test	Performance Criterion
IEC 61000-4-2: 2001	ESD	B
IEC 61000-4-3: 2002	Radiated Immunity	A
IEC 61000-4-4: 2004	Electrical Fast Transient	B
IEC 61000-4-5: 2001	Surge	B
IEC 61000-4-6: 2003	Conducted Immunity	A*
IEC 61000-4-8: 1993	Magnetic Immunity	A

*See justification for Criterion A when probe and cable are shielded. Without proper probe and cable shielding the criterion is B.

3. Product Specifications

Refer to document 1087015, Datasheet, Digital Proximity Transducer System

4. Declaration of Conformity

Refer to document 1138888.

5. Test Results and Justification

Refer to separate test document 13666-10 Metrix for test results.

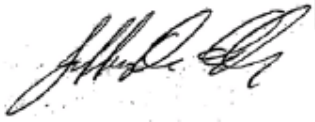
Test Summary

Applicant: Metrix
Applicant's Address: 8824 Fallbrook Drive
Houston, Texas 77064
Model: MX2033-01-01-09-00
Project Number: 13666-10

The **MX2033 3-Wire Driver** by **Metrix** was tested utilizing the following documents on the indicated test dates. Test results were as follows:

IEC 61326-1: 2005; CISPR 11: 2003; ICES 003: 2004; FCC 47 CFR Part 15, Subpart B			
Radiated Emissions	Group 1, Class A	30 MHz to 1 GHz	April 18, 2012
IEC 61000-4-2: 2001	Criterion B	Air Discharge: 8 kV Contact Discharge: 4 kV	June 15, 2012
IEC 61000-4-3: 2002	Criterion A	80 MHz to 1 GHz: 10 V/m 1.4 to 2 GHz: 3 V/m 2 to 2.7 GHz: 1 V/m	April 18, 2012
IEC 61000-4-4: 2004	Criterion B	DC: 2 kV, 5/50 ns, 5 kHz I/O: 1 kV, 5/50 ns, 5 kHz	April 19, 2012
IEC 61000-4-5: 2001	Criterion B	AC Line-to-Line: 1 kV AC Line-to-Ground: 2 kV	June 18, 2012
IEC 61000-4-6: 2003	Criterion B	AC: 3 Vrms I/O: 3 Vrms	April 19, 2012
IEC 61000-4-8: 1993	Criterion A	30 A/m	April 18, 2012

I, Jeffrey A. Lenk, for Professional Testing (EMI), Inc., being familiar with the electromagnetic compatibility rules and test procedures, have reviewed the test setup, measured data, and this report. I believe them to be true and accurate.



Jeffrey A. Lenk
President

NVLAP
lab Code 200062-0

Refer to Test Report 13666-10 from Professional Testing for more details.

5.1. Justification for determining applicability of testing

The applicability of tests for the evaluation of immunity were determined according to the DPS configuration, technology and operating conditions in

accordance with section 9 of EN61000-6-2. The tests listed in this report reflect the tests that were determined appropriate for the DPS.

5.2. Justification on selection of ESD test points

The DPS case is plastic and therefore static electricity is not readily discharged into the main body. ESD was discharged into the exposed metal parts as listed in the datasheet.

5.3. Radiated Immunity Testing

No justifications were necessary for the radiated immunity testing.

5.4. Conducted Immunity Testing

In order to pass conducted immunity, the DPS must have the probe and extension cable properly shielded. See separate justification document included in the technical file.

5.5. Electrical Fast Transient Burst Immunity Testing

No justifications were necessary for the electrical fast transient burst immunity testing.

5.6. Surge Immunity Testing

No justifications were necessary for the surge immunity testing.

5.7. Magnetic Immunity Testing

No justifications were necessary for the magnetic immunity testing.