User's Manual

LN01
Piezoelectric Accelerometer
(for FN series)

IM 01W03H01-01EN

3rd Edition: June 2026 (YK)
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YOKOGAWA

IM 01W03H01-01EN
3rd Edition

YOKOGAWA

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Apr. '24

1. Introduction

This manual describes how to use the LN01 Piezoelectric Accelerometer (hereafter simply referred to as LN01). LN01 is designed to connect to Field Wireless Multi-Function Module FN510 as a receiver. Your LN01 was precisely calibrated at the factory before shipment. To ensure both safety and efficiency, please read this manual carefully before you operate the LN01.

Table 1.1 Related Document List

Title	Document No.
LN01 Piezoelectric Accelerometer (for FN series)	GS 01W03H01-01EN
FN510 Field Wireless Multi-Function Module (Accelerometer Input)	IM 01W03E03-01EN

■ Regarding This Manual

- This manual should be provided to the end users.
- This manual is an essential part of the product; keep it in a safe place for future reference.
- The contents of this manual are subjected to change without prior notice.
- All rights reserved. No part of this manual may be reproduced in any form without Yokogawa's written permission.
- Yokogawa makes no warranty of any kind with regard to this manual, including, but not limited to , implied warranty of merchantability and fitness for a particular purpose.
- If any question arises or errors are found, or if any information is missing from this manual, please inform the nearest Yokogawa sales office.
- The specifications covered by this manual are limited to those for the standard type under the specified model number break-down and do not cover custom-made products.
- Please note that changes in the specifications, construction, or component parts of the instrument may not immediately be reflected in this manual at the time of change, provided that postponement of revisions will not cause difficulty to the user from a functional or performance standpoint.

■ Safety, Protection, and Modification of this Product

- In order to protect the operator, product, and system controlled by the product, observe the safety precautions described in this manual. If users handle contrary to these instructions, we cannot guarantee the safety.
- Modification of the product is strictly prohibited.
- The following safety symbols are used in this manual:

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or physical damage. It may also be used to alert against unsafe practice.

IMPORTANT

Indicates that operating the hardware in this manner may damage it or lead to system failure.

NOTE

Draws attention to information essential for understanding the operation and features.

■ Control of Pollution Caused by the Product

Please refer to the IM 01C00A20-01ZH for information on our management status pursuant to "Control of Pollution caused by Electronic Information Products" of the People's Republic of China. Please search for the IM number in the Yokogawa library " https://www.yokogawa.com/library/ ".

1.1 Safe Use of This Product

For the safety of the operator and to protect this product and the system, please be sure to follow this manual's safety instructions when handling this product. If these instructions are not heeded, the protection provided by this product may be impaired. In this case, Yokogawa cannot guarantee that this product can be safely operated. Please pay special attention to the following points:

(a) Installation
- This product may only be installed by an engineer or technician who has an expert knowledge of this product. Operators are not allowed to carry out installation unless they meet this condition.
- All installation shall comply with local installation requirements and the local electrical code.

(b) Wiring
- This product must be wired by an engineer or technician who has an expert knowledge of this product. Operators are not permitted to carry out wiring unless they meet this condition.

(c) Maintenance
- Care should be taken to prevent the buildup of dust or other materials on the Name Plate. To clean these surfaces, use a soft cloth.

(d) Explosion Protected Type instrument
- Users of explosion protected instruments should refer first to "8. Explosion Protected Instrument".
- The use of this instrument is restricted to those who have received appropriate training the device.
- Take care not to create sparks when accessing the instrument or peripheral devices in a hazardous location.
- Repair or modification to this instrument by customer will cause malfunction of explosion protect function and hazardous situation. If you need to repair or modification, please contact the nearest Yokogawa office.

(e) Modification
- Yokogawa will not be liable for malfunctions or damage resulting from any modification made to this product by the customer.

(f) Product Disposal
- This product should be disposal of in accordance with local and national legislation/ regulations.

(g) Authorized Representative in EEA
- The authorized representative for this product in the EEA is:
  Yokogawa Europe B.V.
  Euroweg 2, 3825 HD Amersfoort, THE NETHERLANDS.

1.2 Warranty

- The warranty shall cover the period noted on the quotation presented to the purchaser at the time of purchase. Problems occurring during the warranty period shall basically be repaired free of change.
- If any problems are experienced with this product, the customer should contact the Yokogawa representative from which this product was purchased or the nearest Yokogawa office.
- If a problem arises with this product, please inform us of the nature of the problem and the circumstances under which it developed, including the model specification and serial number. Any diagrams, data and other information you can include in your communication will also be helpful.
- The party responsible for the cost of fixing the problem shall be determined by Yokogawa following an investigation conducted by Yokogawa.

1.3 Trademark

In this document, trademarks or registered trademarks are not marked with "™" or "®". Product names and company names in this document are trademarks or registered trademarks of the respective companies.

2. Notes on Handling

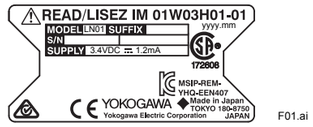
The LN01 is fully factory-tested before shipment. When the LN01 delivered, check the appearance for damage, and also check that the bundled items are included with your shipment.

■ Bundled items

- LN01
- Mounting stud
- User's manual (IM 01W03H01-01)
- EU DECLARATION OF CONFORMITY (F9091RX), if optional specification /KS27 is specified.

2.1 Check the Model Name and Configuration

The model name and configuration are indicated on the nameplate. Verify that configuration indicate in the "Model" and "Suffix Code" on the Nameplate. A manual number omitting the language code at the end is printed on the nameplate.



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Figure 2.1 Name Plate

MODEL: Specified model code.
SUFFIX: Specified suffix code.
S/N: Serial number.
SUPPLY: Supply voltage.
yyyy.mm: Date of manufacture.
TOKYO 180-8750 JAPAN: The manufacturer name and the address*1.

*1 "180-8750" is a zip code which represents the following address. 2-9-32 Nakacho, Musashino-shi, Tokyo Japan

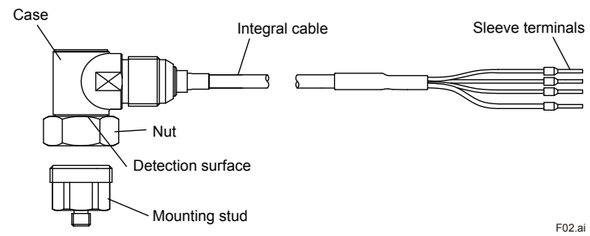
2.2 Transport

To prevent damage while in transit, leave the product in the original shipping container until it reaches the installation site.

2.3 Storage

1. Choose a storage location that satisfies the following requirements.
   - A location that is not exposed to rain or water.
   - A location subject to a minimum of vibration or impact.
2. The temperature and humidity limits refer to "7. Specification" .

3. Component Names



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4. Installation

4.1 Precautions

Before installing this product, please refer to the instruction manual of the receiver.
For additional information on the ambient condition allowed at the installation location, refer to subsection 7.1 "Standard Specification".

CAUTION

- When installing LN01 or the mounting stud, be careful not to pinch your finger.
- LN01 should be fixed to proper mounting stud by tighten with specified torque.
- Fix the integral cable to the structure to avoid that vibration of the cable affects the measurement.
- Deformation, scratch and dirt on the detection surface and the mounting stud may affect a frequency response of the LN01. Please check the detection surface and the mounting stud before installing. Apply the silicone grease on the detection surface and the mounting stud.

4.2 Mounting

The installation procedure is as follows.

1. Select the mounting location which provides a flat surface of at 20 mm in diameter and a case thickness exceeding 6 mm. Drill a vertical hole in the surface and tap it to a minimum depth of 6 mm with a proper thread type.
2. Tighten the mounting stud to the surface.
3. Tighten a nut of LN01 with a torque of 5.1 N·m to fix to the mounting stud.

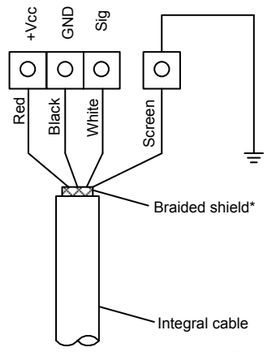
Removal is the reverse of the above.

5. Wiring

IMPORTANT

- Before installing, turn off the receiver.
- The wire is placed as far as possible from a large transformer, motor, power supply, such as distant electrical noise sources.
- Please keep a bending radius more than 50 mm and a margin for tension at wiring to prevent deterioration of the integral cable.

Wiring to receiver is as follows.



*** Screen line is connected to the braided shield.**

6. Operation

6.1 Preparation of operation

NOTE

An ambient temperature affects a sensitivity of accelerometer. If a high accuracy measurement is required, please install LN01 to a location where a temperature change is small.

6.2 Start of operation

1. Connect LN01 to the receiver. Make sure the supply voltage of the receiver meets the specification.
2. Turn on the receiver, then LN01 starts measurement. Make sure a measurement value of the receiver is around 0 when LN01 is not fixed to the mounting stud.
3. Fix LN01 to the mounting stud.
4. LN01 outputs a signal that proportional to the vibration.

7. Specification

7.1 Standard Specification

□ **MEASUREMENT RANGE**

Frequency Range(Refer to 100 Hz):
10 Hz to 3000 Hz (±1dB)
5 Hz to 10000 Hz (±3dB)
Operation Acceleration Range: ±300 m/s² (Peak)

□ **PERFORMANCE SPECIFICATIONS**

Sensitivity : 2.0 mV/m/s² ±10% (at 100 Hz)
Temperature Characteristics:

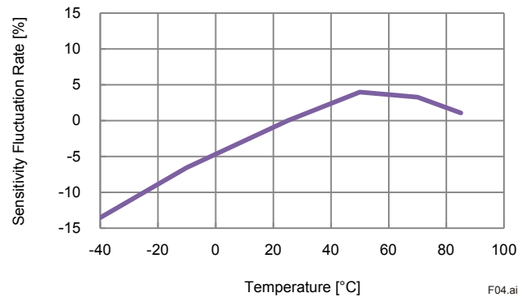


Figure 7.1. Sensitivity Fluctuation Rate (typical) v.s. Temperature

Transverse Sensitivity: ≤ 5%
Mounted Resonant Frequency: ≥ 30000 Hz
Power Supply Voltage: 3.4 V
Consumption Current: 1.2 mA

□ **NORMAL OPERATING CONDITION**

Ambient Temperature Range: –40 to 85°C (altitude up to 3000 m)
Ambient Humidity Range: 0 to 100% RH (non-condensation, excluding the end of cable)
Shock Resistance: > 10,000 m/s²

□ **REGULATORY COMPLIANCE STATEMENTS**

CE Conformity:
EMC: EN61326-1 Class A Table 2
* The instrument continues to operate at a measurement accuracy of within ±20% of the range during testing.
Safety: EN61010-1
(1) Pollution Degree 2
"Pollution degree" describes the degree to which a solid, liquid, or gas which deteriorates dielectric strength or surface resistivity is adhering. "2" applies to normal indoor atmosphere. Normally, only non-conductive pollution occurs. Occasionally, however, temporary conductivity caused by condensation must be expected.
(2) Installation Category I
"Overvoltage category (Installation category)" describes a number which defines a transient overvoltage condition. It implies the regulation for impulse with stand voltage. "I" applies to electrical equipment which is supplied from the circuit when appropriate transient overvoltage control means (interfaces) are provided.
(3) Indoor/Outdoor use
It can be used in indoors and outdoors.
(4) Altitude of installation site
Max. 3,000 m above sea level
RoHS Directive: EN IEC 63000
Canadian Safety Standards:
CAN/CSA-C22.2 No. 61010-1,
CAN/CSA-C22.2 No. 94.2, IEC60529
Degrees of Protection:
IP66, IP67 and Type 4X applied when the end of cable properly protected from ingress of dust and water.

□ **PHYSICAL SPECIFICATIONS**

Housing Material: SCS14 stainless steel
Weight: 73 g (without the integral cable and the mounting stud)
Integral Cable: Length: 10 m, Outer diameter: 4.3 ± 0.2 mm
Mounting: M20 female screw for the mounting stud

7.2 Model and Suffix Code

Model	Suffix Codes		Description
LN01			Piezoelectric Accelerometer (for FN series)
General Specification	Mounting stud	**-A**	M6 male
		-B	1/4-28 UNF male
	-	**0**	Always 0
Optional Codes			/□ Optional specification

■ OPTIONAL SPECIFICATIONS (For Explosion Protected Types)

Item		Description	Code
Factory Mutual (FM)	United States	FM Intrinsically safe Approval (United States) Applicable Standards: FM 3600, FM 3610, FM 3810, ANSI/UL 60079-0 Ed. 7 (2020), ANSI/ISA-60079-11:2014, ANSI/UL 61010-1 Ed. 3 (2012), NEMA 250-2014, ANSI/IEC 60529:2004 Certificate: FM16US0143X Intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F and G Class I; Zone 0,in Hazardous Locations AEx ia IIC Enclosure: IP66/IP67 and Type 4X, Temperature Class: T4, Amb.Temp.: –40 to 100°C (–40 to 212°F) *1 Electrical Parameters: Ui = 5.88 V, Ii = 150 mA, Pi = 221 mW (linear source), Ci = 11.2 µF, Li = 38.3 µH Dielectric strength: ≥ 500 V a.c. r.m.s., 1 minute	**FS17**
	Canada	FM Intrinsically safe Approval (Canada) Applicable Standards: C22.2 No. 60079-0:19, CAN/CSA-C22.2 No. 60079-11:14, CAN/CSA-C22.2 No. 61010-1-12, CAN/CSA-C22.2 No. 94-M91, CAN/CSA-C22.2 No. 60529:05 Certificate: FM16CA0082X Ex ia IIC T4 Ga Intrinsically safe for Class I, II, III; Division 1; Groups A, B, C, D, E, F and G; Enclosure: IP66/IP67 and Type 4X, Temperature Class: T4, Amb.Temp.: –40 to 100°C (–40 to 212°F) *1 Electrical Parameters: Ui = 5.88 V, Ii = 150 mA, Pi = 221 mW (linear source), Ci = 11.2 µF, Li = 38.3 µH Dielectric strength: ≥ 500 V a.c. r.m.s., 1 minute	**CS17**
ATEX		ATEX Intrinsically safe Approval Applicable Standards: EN IEC 60079-0, EN 60079-11 Certificate: FM16ATEX0066X II 1 G Ex ia IIC T4 Ga Degrees of Protection: IP66/IP67 in accordance with only EN 60529 Amb.Temp.(Tamb): –40 to 100°C (–40 to 212°F) *1 Electrical Parameters: Ui = 5.88 V, Ii = 150 mA, Pi = 221 mW (linear source), Ci = 11.2 µF, Li = 38.3 µH Dielectric strength: ≥ 500 V a.c. r.m.s., 1 minute	**KS27**
IECEx		IECEx Intrinsically Safe Approval Applicable Standards: IEC 60079-0, IEC 60079-11 Certificate: IECEx FMG 16.0027X Ex ia IIC T4 Ga Degrees of Protection: IP66/IP67 in accordance with only IEC 60529 Amb.Temp.(Tamb).: –40 to 100°C (–40 to 212°F) *1 Electrical Parameters: Ui = 5.88 V, Ii = 150 mA, Pi = 221 mW (linear source), Ci = 11.2 µF, Li = 38.3 µH Dielectric strength: ≥ 500 V a.c. r.m.s., 1 minute	**SS27**

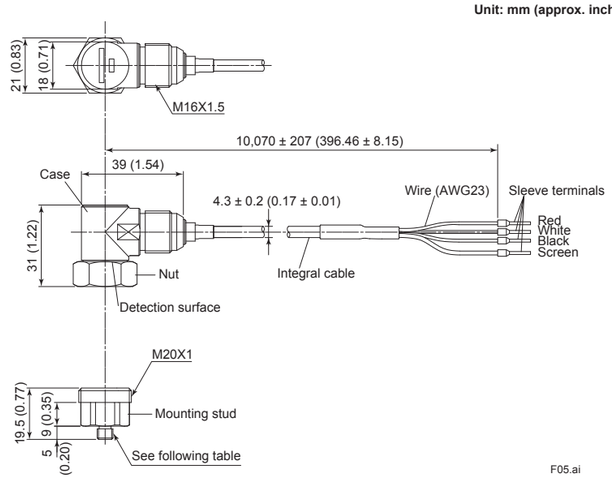
*1: This ambient temperature range is for intrinsic safety certification. Regarding the actual operational temperature, refer to "NORMAL OPERATING CONDITION" section.

■ OPTIONAL ACCESSORIES

Item	Parts Number	Description
Mounting stud	F9091RB	M6 male
	F9091RC	1/4-28 UNF male

7.3 External Dimensions

Unit: mm (approx. inch)



Mounting stud Code	Thread Type	Parts No.
-A	M6X1	F9091RB
-B	1/4-28 UNF	F9091RC

8. Explosion Protected Instrument

8.1 FM Approval (United States)

8.1.1 US Certification

(1) Technical Data

Model LN01 with optional code /FS17 for potentially explosive atmospheres:

- Applicable Standard:
  FM 3600, FM 3610, FM 3810, ANSI/UL 60079-0 Ed.7 (2020),
  ANSI/ISA-60079-11:2014, ANSI/UL 61010-1 Ed. 3 (2012), NEMA 250-2014,
  ANSI/IEC 60529:2004
- Certificate: FM16US0143X
- Intrinsically safe for Class I, II, III; Division 1, Groups A, B, C, D, E, F& G;
  Class I; Zone 0, in Hazardous Locations, AEx ia IIC
- Temperature Class: T4
- Ambient Temperature: –40 to 100°C (–40 to 212°F)
- Enclosure: IP66/IP67 and Type 4X
- Specific conditions of use
  In order to avoid a build-up of electrostatic charges, the equipment should be installed so that the resistance from the enclosure to the ground is < 10^9 Ω. When this cannot be achieved, any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on the product, must be avoided.
  Install per control drawing IIE031-A71.

(2) Electrical Parameters

Refer to the Control Drawing (IIE031-A71).

(3) Installation

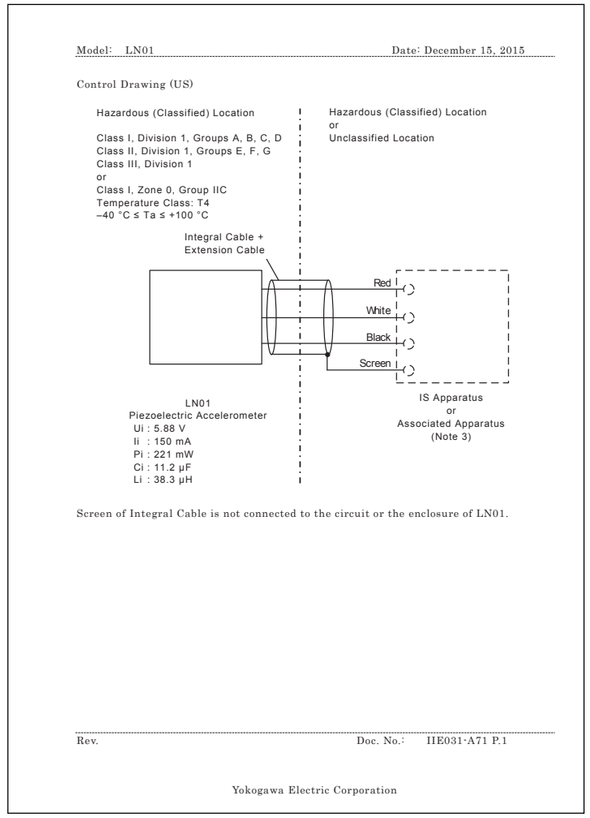
Refer to the Control Drawing (IIE031-A71).

(4) Maintenance and Repair

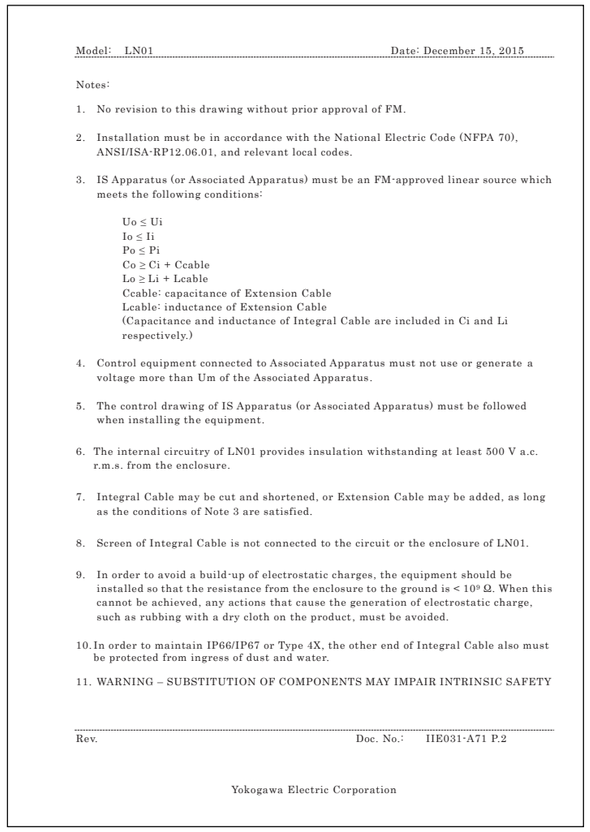
WARNING

A modification of the equipment would no longer comply with the construction described in the certificate documentation.
Only personnel authorized by Yokogawa Electric Corporation can repair the equipment.

(5) Control Drawing (IIE031-A71)



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8.1.2 Nameplate



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* yyyy.mm is date of manufacture (e.g. 2016.10)

8.2 FM Approval (Canada)

8.2.1 Canada Certification

(1) Technical Data

Model LN01 with optional code /CS17 for potentially explosive atmospheres:

- Applicable Standard:
  C22.2 No. 60079-0:19, CAN/CSA-C22.2 No. 60079-11:14,
  CAN/CSA-C22.2 No. 94-M91, CAN/CSA-C22.2 No. 60529:05,
  CAN/CSA-C22.2 No. 61010-1-12
- Certificate: FM16CA0082X
- Ex ia IIC T4 Ga
  Intrinsically safe for Class I, II, III, Division 1, Groups A, B, C, D, E, F & G
- Ambient Temperature: –40 to 100°C (–40 to 212°F)
- Enclosure: IP66/IP67 and Type 4X
- Specific conditions of use
  In order to avoid a build-up of electrostatic charges, the equipment should be installed so that the resistance from the enclosure to the ground is < 10^9 Ω.When this cannot be achieved, any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on the product, must be avoided.
  Install per control drawing IIE031-A72.

(2) Electrical Parameters

Refer to the Control Drawing (IIE031-A72).

(3) Installation

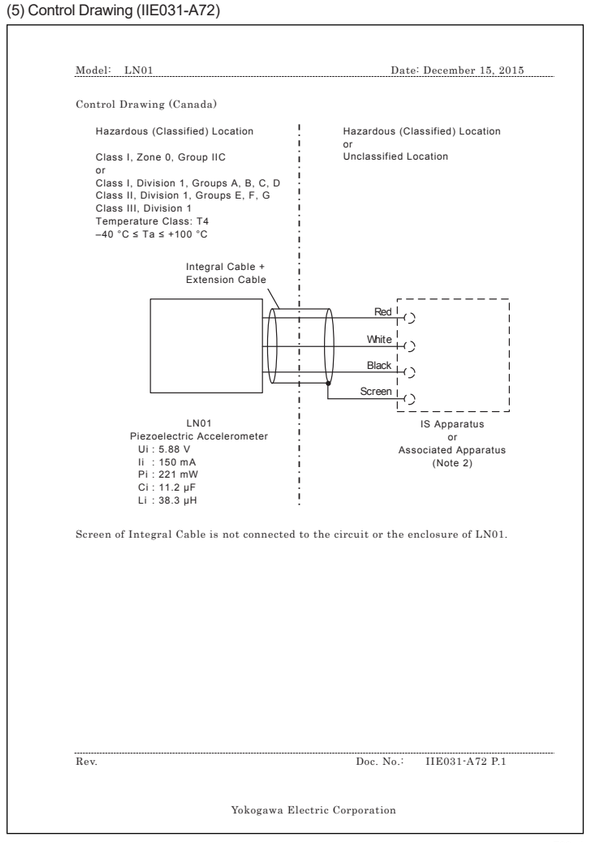
Refer to the Control Drawing (IIE031-A72).

(4) Maintenance and Repair

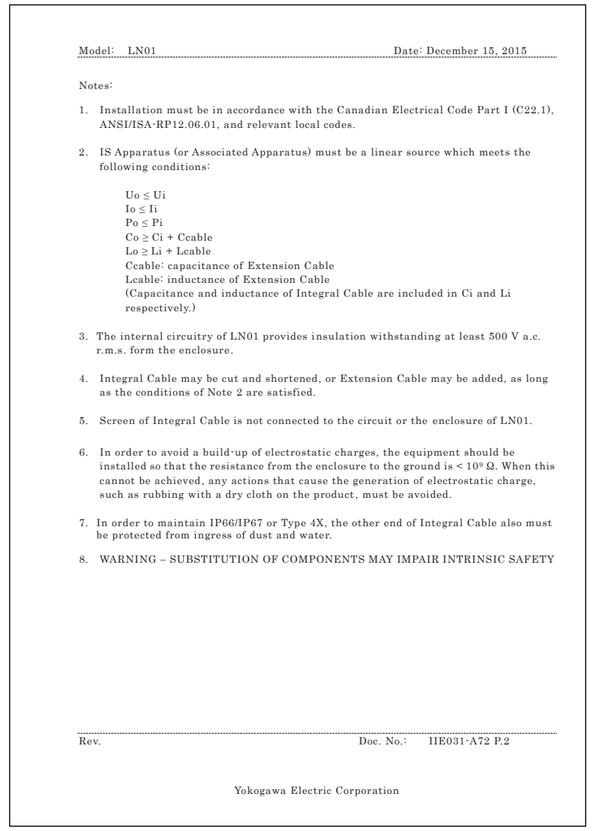
WARNING

A modification of the equipment would no longer comply with the construction described in the certificate documentation.
Only personnel authorized by Yokogawa Electric Corporation can repair the equipment.

(5) Control Drawing (IIE031-A72)



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WARNING / AVERTISSEMENT

- SUBSTITUTION DE COMPOSANTS PEUT IMPAIR LA SÉCURITÉ INTRINSÈQUE.
- La résistance de la clôture à la terre doit être <109 Ω. Quand cela ne peut pas être accompli, on doit éviter toutes actions qui provoquent la génération de charge électrostatique, telle que le frottement par un tissu sec sur le produit.

8.2.2 Nameplate



F11.ai

* yyyy.mm is date of manufacture (e.g. 2016.10)

8.3 ATEX Certificate

8.3.1 Instruction

(1) Technical Data

This chapter includes a control drawing of IIE031-A73.

Model LN01 with optional code /KS27 for potentially explosive atmospheres:

- Certificate: FM16ATEX0066X
- Applicable Standard: EN IEC 60079-0, EN 60079-11
- Type of Protection and Marking Code: Ex ia IIC T4 Ga
- Group: II
- Category: 1 G
- Ambient Temperature: –40 to 100°C (–40 to 212°F)
- Enclosure: IP66/IP67 in accordance with only EN 60529
- Specific conditions of use

  In order to avoid a build-up of electrostatic charges, the equipment should be installed so that the resistance from the enclosure to the ground is < 10^9 Ω. When this cannot be achieved, any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on the product, must be avoided.

  Install per Control Drawing (ATEX).

(2) Electrical Parameters

Refer to (5) Control Drawing (ATEX).

(3) Installation

- Installation shall be in accordance with relevant national and local installation codes. Refer to (5) Control Drawing (ATEX).
- Integral Cable may be cut and shortened, or Extension Cable may be added, as long as the conditions of Note 2 are satisfied.
- In order to maintain IP66/IP67 or Type 4X, the other end of Integral Cable also must be protected from ingress of dust and water.

Note2. IS Apparatus (or Associated Apparatus) must be a linear source which meets the following conditions.

Uo ≤ Ui, Io ≤ Ii, Po ≤ Pi, Co ≥ Ci + Ccable, Lo ≥ Li + Lcable

Ccable: capacitance of Extension Cable

Lcable: inductance of Extension Cable

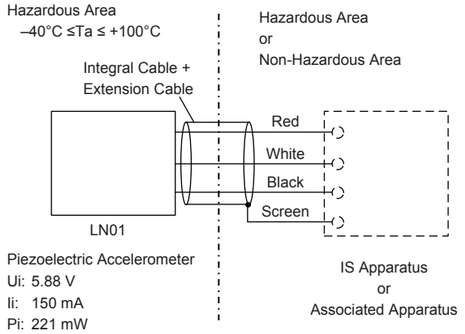
Note3. Screen of Integral Cable is not connected to the circuit or the enclosure of LN01.

(4) Maintenance and Repair

WARNING

A modification of the equipment would no longer comply with the construction described in the certificate documentation.
Only personnel authorized by Yokogawa Electric Corporation can repair the equipment.

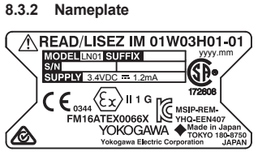
(5) Control Drawing (ATEX)



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Note. The internal circuitry of LN01 provides insulation withstanding at least 500 V a.c. r.m.s. from the enclosure.

8.3.2 Nameplate



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* yyyy.mm is date of manufacture (e.g. 2016.10)

8.4 IECEx Certificate

8.4.1 Instruction

(1) Technical Data

This chapter includes a control drawing of IIE031-A73.

Model LN01 with optional code /SS27 for potentially explosive atmospheres:

- Certificate: IECEx FMG 16.0027X
- Applicable Standard: IEC 60079-0, IEC 60079-11
- Type of Protection and Marking Code: Ex ia IIC T4 Ga
- Ambient Temperature: –40 to 100°C (–40 to 212°F)
- Enclosure: IP66/IP67 in accordance with only IEC 60529
- Specific conditions of use

  In order to avoid a build-up of electrostatic charges, the equipment should be installed so that the resistance from the enclosure to the ground is < 10^9 Ω. When this cannot be achieved, any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth on the product, must be avoided.

  Install per Control Drawing (IECEx).

(2) Electrical Parameters

Refer to (5) Control Drawing (IECEx).

(3) Installation

- Installation shall be in accordance with relevant national and local installation codes.
- Integral Cable may be cut and shortened, or Extension Cable may be added, as long as the conditions of Note 2 are satisfied.
- In order to maintain IP66/IP67 or Type 4X, the other end of Integral Cable also must be protected from ingress of dust and water.

Note2. IS Apparatus (or Associated Apparatus) must be a linear source which meets the following conditions.

Uo ≤ Ui, Io ≤ Ii, Po ≤ Pi, Co ≥ Ci + Ccable, Lo ≥ Li + Lcable

Ccable: capacitance of Extension Cable

Lcable: inductance of Extension Cable

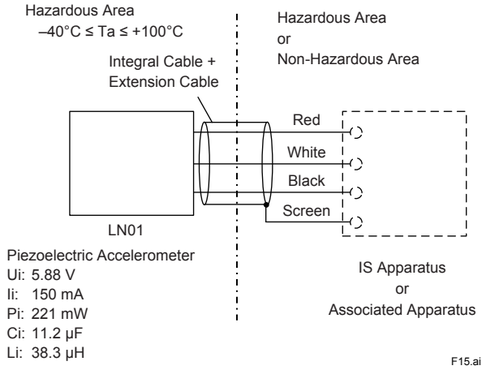
Note3. Screen of Integral Cable is not connected to the circuit or the enclosure of LN01.

(4) Maintenance and Repair

WARNING

A modification of the equipment would no longer comply with the construction described in the certificate documentation.
Only personnel authorized by Yokogawa Electric Corporation can repair the equipment.

(5) Control Drawing (IECEx)



F15.ai

Note. The internal circuitry of LN01 provides insulation withstanding at least 500 V a.c. r.m.s. from the enclosure.

8.4.2 Nameplate



F16.ai

* yyyy.mm is date of manufacture (e.g. 2016.10)

Revision Information

Title : LN01 Piezoelectric Accerometer (For FN series)
Manual No. : IM 01W03H01-01EN

Edition	Date	Page	Revised item
1st	Feb. 2017	—	New Publication
2nd	July 2021	2	7.1 Update RoHS directive. 7.2 Change applicable standards and degrees of protection for each explosion protected type.
		3	8.1.1 Change the descriptions. 8.2.1 Change the descriptions.
		4	Delete ATEX documentation. 8.3.1 Change ATEX certificate. 8.4.1 Change IECEx certificate.
3rd	June 2026	1	1. Change the description for China RoHS.