INSTRUCTION MANUAL

CURRENT LOOP SUPPLY
(applicable to HART signal)

MODEL **A3DYH**

BEFORE USE ....

Thank you for choosing M-System. Before use, please check the contents of the package you received as outlined below. If you have any problems or questions with the product, please contact M-System's Sales Office or representatives.

■ PACKAGE INCLUDES:

Signal conditioner ..... (1)

■ MODEL NO.

Check that model No. described on the specification label is exactly what you ordered.

■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

POINTS OF CAUTION

■ POWER INPUT RATING & OPERATIONAL RANGE

• Check the power rating for the unit on the specification label.

Rating 24V DC: 24V ±10%, approx. 3W

■ SAFETY PRECAUTION

• Before you remove the unit or mount it, turn off the power supply and input signal for safety.

■ ENVIRONMENT

• Indoor use

• When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.

• Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.

• Environmental temperature must be within -5 to +55°C (23 to 131°F) with relative humidity within 0 to 95% RH in order to ensure adequate life span and operation.

■ WIRING

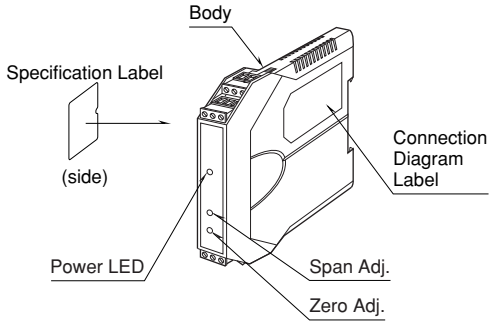
• Do not install cables (power supply, input and output) close to noise sources (relay drive cable, high frequency line, etc.).

• Do not bind these cables together with those in which noises are present. Do not install them in the same duct.

■ AND ....

• The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

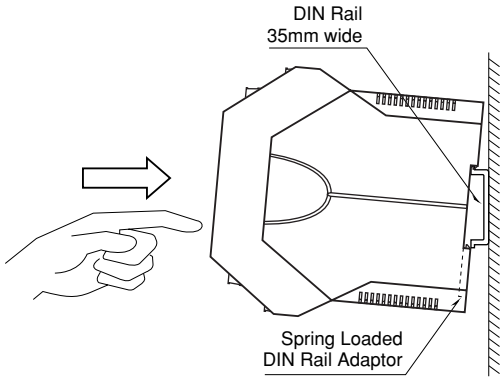
COMPONENT IDENTIFICATION



INSTALLATION

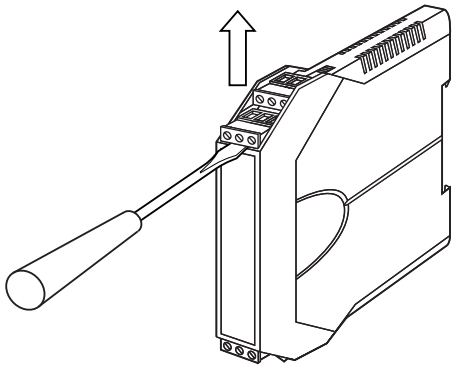
■ DIN RAIL MOUNTING

Set the unit so that its DIN rail adaptor is at the bottom. Position the upper hook at the rear side of the unit on the DIN rail and push in the lower. When removing the unit, push down the DIN rail adaptor utilizing a minus screwdriver and pull.



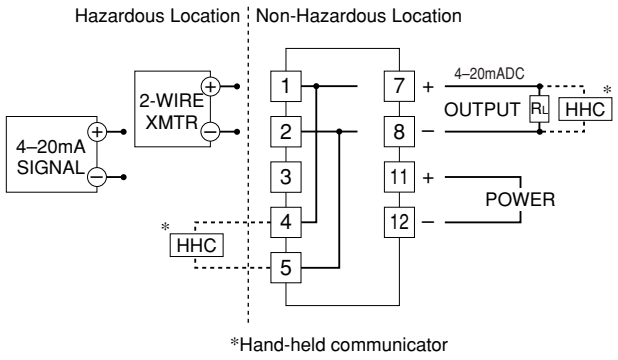
■ HOW TO SEPARATE THE TERMINAL BLOCKS

When you need to separate the terminal blocks from the transmitter body for wiring, insert a minus driver between the terminal block and the housing body, pull up the driver and pull out the terminal block.



TERMINAL CONNECTION

Connect the unit as in the diagram below or refer to the connection diagram label on the side of the unit.



*Hand-held communicator

CHECKING

1) Terminal wiring: Check that all cables are correctly connected according to the connection diagram.
2) Power input voltage: Check voltage across the terminal 11 – 12 with a multimeter.
3) Input: Check that the input signal is within 0 – 100% of the full-scale.
4) Output: Check that the load resistance meets the described specifications.
   For HART communication, the resistance must be within 230 to 550Ω.

ADJUSTMENT PROCEDURE

This unit is calibrated at the factory to meet the ordered specifications, therefore you usually do not need any calibration.
For matching the signal to a receiving instrument or in case of regular calibration, adjust the output as explained in the following.

■ HOW TO CALIBRATE THE OUTPUT SIGNAL

Use a signal source and measuring instruments of sufficient accuracy level. Turn the power supply on and warm up for more than 10 minutes.
1) ZERO: Apply 0% input and adjust output to 0%.
2) SPAN: Apply 100% input and adjust output to 100%.
3) Check ZERO adjustment again with 0% input.
4) When ZERO value is changed, repeat the above procedure 1) – 3).

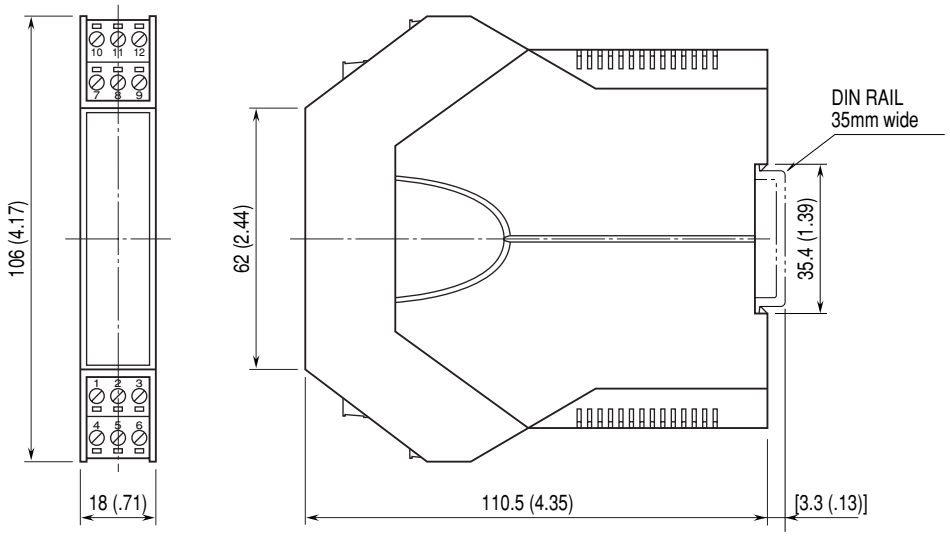
MAINTENANCE

Regular calibration procedure is explained below:

■ CALIBRATION

Warm up the unit for at least 10 minutes. Apply 0%, 25%, 50%, 75% and 100% input signal. Check that the output signal for the respective input signal remains within accuracy described in the data sheet. When the output is out of tolerance, recalibrate the unit according to the "ADJUSTMENT PROCEDURE" explained earlier.

EXTERNAL DIMENSIONS mm (inch)



M-System Co., Ltd., 5-2-55, Minamitsumori, Nishinari-ku, Osaka 557-0063 JAPAN, Phone: (06) 6659-8201, Fax: (06) 6659-8510, E-mail: info@m-system.co.jp

SAFE INSTALLATION MANUAL (FM APPROVAL)

CURRENT LOOP SUPPLY
(applicable to HART signal, IS associated apparatus)

MODEL **A3DYH**

BEFORE USE ....

■ SAFETY PRECAUTIONS

This manual describes important points of caution for safe use of this product in Safe Area / Non-hazardous Locations and its protective apparatus in Hazardous Locations.
Please read this manual carefully before installing and operating both apparatuses.

■ SPECIAL CONDITION OF USE

The equipment shall be installed in compliance with the enclosure, mounting, spacing and segregation requirements of ultimate application, including a tool removable cover.

■ MODEL NUMBER IDENTIFICATION

Model No. A3DYH – 1 2 – 3 4

1) SAFETY APPROVAL
   0 : None
   1 : FM IS associated apparatus
2) OUTPUT
   A : 4 – 20mA DC
3) POWER INPUT
   R : 24V DC
4) OPTIONS
   -X : Special specification

■ MANUFACTURED DATE CODE IDENTIFICATION

The manufactured year and month can be identified by the serial number described on the specification label.

Serial No. Y M xxxxxx

YEAR

P : 2006	1 : 2013
U : 2007	: :
V : 2008	9 : 2021
: :	
Z : 2012	

MONTH
A : January
B : February
C : March
: :
L : December

⚠ WARNING

SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY.

Explosions could result in death or serious injury:

• DO NOT remove the housing cover when the circuit is alive.
• Whenever you need to measure voltage across the terminals or apply a simulated input signal to the terminals, make sure that there is no danger of explosion in the atmosphere.
• Verify the certification of the product described on the specification label on the product.
• Verify that the atmosphere of the hazardous location where the Hazardous Area Apparatus is installed is consistent with the appropriate gas group certifications of the product.
• Installation or connection of Hazardous Area Apparatus or HHC (Hand Held Communicator) should be in accordance with their safe installation manuals.
• Particular care shall be given to segregation and clear identification of IS conductors from non-IS ones.

Failure to follow these installation guidelines could result in death or serious injury:

• Make sure only qualified personnel perform the installation.

⚠ SAFETY FEATURES & CAUTIONS

■ IS ASSOCIATED APPARATUS APPROVAL

• Intrinsically Safe Circuits (Terminals 1, 2, 3, 4 and 5)
Class I, Division 1, Groups A, B, C and D
Class II, Division 1, Groups E, F, and G
Class III, Division 1
Class I, Zone 0, [AEx ia] IIC

• Entity Parameters
Terminals 1(+) / 4(+) – 2(–) / 3 / 5(–)
Uo / Voc = 27.5V
Io / Isc = 93mA
Po / Pt = 640mW

Groups	A, B	C, E	D, F, G
	IIC	IIB	IIA
Co / Ca	0.075 µF	0.65 µF	2.15 µF
Lo / La	4.0 mH	16.2 mH	32.5 mH

Terminals 2 / 5 – 3
(Non-energy storing apparatus connection)
Uo / Voc = 1.1V
Io / Isc = 45mA
Po /Pt = 13mW

• Maximum Non-hazardous Location Voltage
Terminals 11 – 12 and 7 – 8
Um = 250V rms

• Ambient temperature
Ta = -5 to +55°C

• Prior to installation, check that the safety class of this product satisfies the system requirements.

• The model A3DYH must be installed in Safe Areas / Non-hazardous Locations.

• Verify that the environmental temperature is within the specified operating temperature limits.

• The Non-hazardous Location (or Control Room) equipment connected to the A3DYH must not use or generate more than 250V rms.

• Verify the system's safety before installation or connection of Hazardous Area Apparatus or HHC. Refer to "Installation Diagram" attached at the end of this manual.

• The wiring method must be in accordance with the electrical parameters described in this manual.

• Installation should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (classified) Locations" and the National Electrical Code (ANSI/NFPA 70).

• DO NOT RUB the surface of the plastic with a dry cloth. Electrostatic charge generated by the friction may cause an explosion.

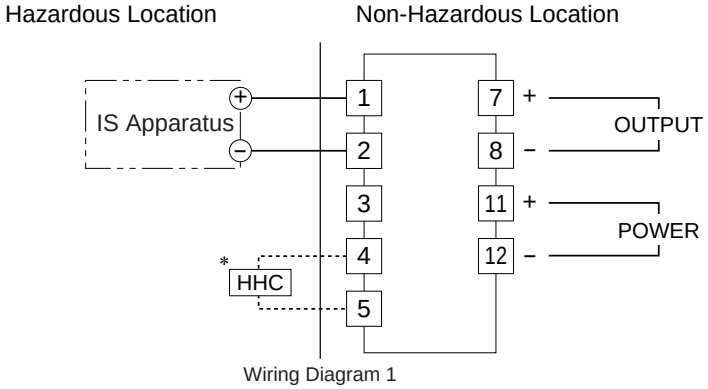
• Substitution of components may impair intrinsic safety and may cause an explosion in hazardous locations.

• When metal particles are present in the air, install the A3DYH inside an enclosure with proper ventilation.

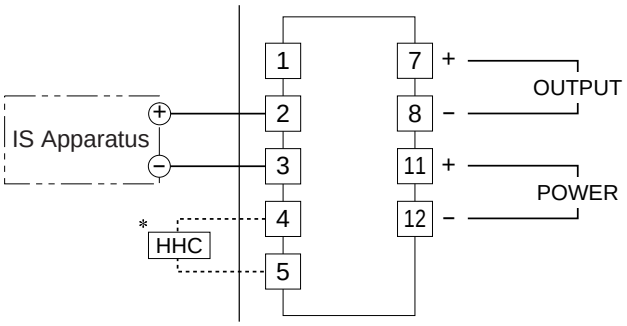
• For installing the A3DYH in an environment with a high relative humidity exceeding 0 to 95% RH or in a condensing atmosphere, install the unit inside an appropriate enclosure.

M-SYSTEM CO., LTD.	TITLE	A3DYH Intrinsic Safety	Page
	DOC NO	20063-33-N6	4

6.6 Installation Diagram



Wiring Diagram 1



Wiring Diagram 2

*Hand-held communicator

Entity Parameters

Terminal Number	Voltage, Current and Power	Group (NEC 500)	Group (NEC 505)	Ca (Co) [μF]	La (Lo) [mH]	La/Ra (Lo/Ro) [μH/Ω]
1 or 4 to 2, 3 or 5	Voc (Uo) = 27.5 V Isc (Io) = 93 mA Po = 640 mW	A and B	IIC	0.075	4	54
		C and E	IIB	0.650	16.2	220
		D, F and G	IIA	2.150	32.5	442
2 or 5 to 3	Voc (Uo) = 1.1 V Isc (Io) = 45 mA Po = 13 mW	Non energy storing apparatus connection				
7 to 8 and 11 to 12	Um = 250 Vrms	——				

NOTES

1. The intrinsically safe apparatus and HHC must be approved by NRTL.
2. Installation should be in accordance with ANSI/ISA-RP12.06.01 "Recommended Practice for Wiring Methods for Hazardous (Classified) Locations Instrumentation Part 1: Intrinsic Safety" and the National Electrical Code (ANSI/NFPA 70).

REV.	DATE	CHANGE ORDER NO. / CONTENTS / etc	APPROVED	REVIEWED	ISSUED
	Jun. 13, 2006		H. Murachi	H. Murachi	Q. Pang

SAFE INSTALLATION MANUAL (CENELEC APPROVAL)

CURRENT LOOP SUPPLY
(applicable to HART signal, IS associated apparatus)

MODEL **A3DYH**

BEFORE USE ....

■ SAFETY PRECAUTIONS

This manual describes important points of caution for safe use of this product to connect an apparatus in potentially explosive atmosphere.
Please read this manual carefully before installing and operating the product.

■ MODEL NUMBER IDENTIFICATION

Model No. A3DYH – 1 2 – 3 4

1) SAFETY APPROVAL
   0 : None
   2 : CENELEC IS associated apparatus (ATEX)
2) OUTPUT
   A : 4 – 20mA DC
3) POWER INPUT
   R : 24V DC
4) OPTIONS
   -X : Special specification

■ MANUFACTURED DATE CODE IDENTIFICATION

The manufactured year and month can be identified by the serial number described on the specification label.

Serial No. Y M xxxxxx

YEAR

P : 2006	1 : 2013
U : 2007	: :
V : 2008	9 : 2021
: :	
Z : 2012	

MONTH
A : January
B : February
C : March
: :
L : December

⚠ WARNING

Explosions could result in death or serious injury:

• Before you remove the unit or mount it, or before you connect or disconnect the wiring, turn off the power supply and the input signal for safety.
• Whenever you need to measure voltage across the terminals of the intrinsically safe loop, make sure that the loop is in no danger of explosion in the atmosphere.
• Before connecting a HART communicator to the intrinsically safe loop, make sure the instruments in the loop are installed in accordance with intrinsically safe field wiring practices.
• Verify the operating atmosphere of the apparatus connected to this product.
• Verify the certification of the product described on the specification label on the product.

Failure to follow these installation guidelines could result in death or serious injury:

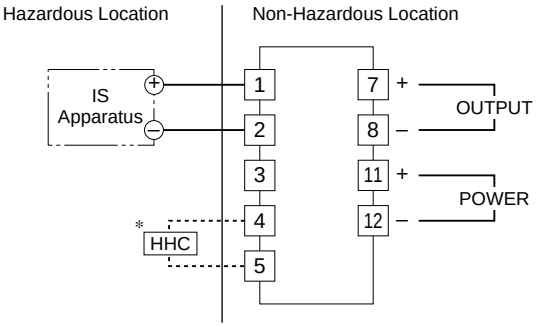
• Make sure only qualified personnel perform the installation.

⚠ SAFETY FEATURES & CAUTIONS

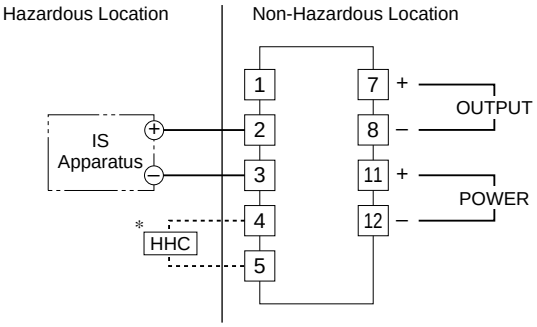
■ IS ASSOCIATED APPARATUS APPROVAL

• CENELEC / ATEX
  EC-Type Examination Certificate: KEMA 06ATEX0180
  ⟨Ex⟩ II (1) G [EEx ia] IIC
• Applicable Standards
  EN 60079-0: 2004
  EN 60079-26: 2004
  EN 50020: 2002
• IS Data
  See “Installation Diagram.”
• The galvanic isolation between intrinsically safe and non-intrinsically safe circuits is 1500V r.m.s. a.c. @1 minute.
• Prior to installation, check that the safety class of this unit satisfies the system requirements.
• When the environmental conditions are such that a higher degree in ingress protection more than IP20 is required, this shall be taken into account.
• This product must be located in a non-hazardous area.
• Operating temperature: -5 to +55°C
• Operating humidity: 0 to 95% RH (non-condensing)
• The wiring method must be in accordance with the electrical parameters described in this manual.
• Substitution of components may impair suitability for the hazardous location and may cause an explosion.

INSTALLATION DIAGRAM for CENELEC IS ASSOCIATED APPARATUS MODEL



Wiring Diagram 1



Wiring Diagram 2

*Hand-held communicator

ELECTRICAL DATA

Terminal Number	Voltages, Currents and Powers	Group	Co [μF]	Lo [mH]	Lo/Ro [μH/Ω]	Ci [μF]	Li [mH]
1 or 4 to 2, 3, or 5	Uo = 27.5 V Io = 93 mA Po = 640 mW	IIC	0.075	4	54	---	---
		IIB	0.650	16.2	220	---	---
		IIA	2.150	32.5	442	---	---
2 or 5 to 3	Uo = 1.1 V Io = 45 mA Po = 13 mW	IIC, IIB or IIA	100	17.5	---	---	---
	Ui = 30 V Ii = 250 mA Pi = 1 W	IIC, IIB or IIA	---	---	---	0	0
7 to 8 and 11 to 12	Um = 250 Vrms						