

## **FnIO M - series :**

### ***M5914***

***M5914 (4 channels, Current Input, 4-20mA with HART)***

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# Specification

## History

REV.	PAGES	REMARKS	DATE	Editor
1.00	All	Initial document release.	09, 09, 2019	CW SEO
1.01		Image, Torque, Hotswap Function	2020/04/21	CW SEO
1.02		Vibration specification, Product certification changed	2020/04/27	CW SEO
1.03	13~17	Added ATEX certificate	2020/05/07	BS HA
1.04		Remove Description pages of Hot Swap Function, Use in Hazardous Environments and Caution(Before using the unit)	2020/12/09	SJ LIM

# Specification

## 1. ENVIRONMENT SPECIFICATION

Environmental specification	
Operation Temperature	-25°C to 60°C
UL Temperature	-20 °C~60 °C
Storage Temperature	-40°C to 85°C
Relative Humidity	5% to 90% Non-condensing
Operating Altitude	2,000m
Mounting	DIN Rail
General specification	
Shock Operating	IEC 60068-2-27
Vibration Resistance	Based on IEC 60068-2-6 DNVGL-CG-0039 : Vibration Class B, 4g
Industrial Emissions	EN 61000-6-4/A11 : 2011
Industrial Immunity	EN 61000-6-2 : 2005
Installation Position	Vertical and horizontal installation is available.
Product Certifications	CE, UL, FCC, ATEX, DNV

# Specification

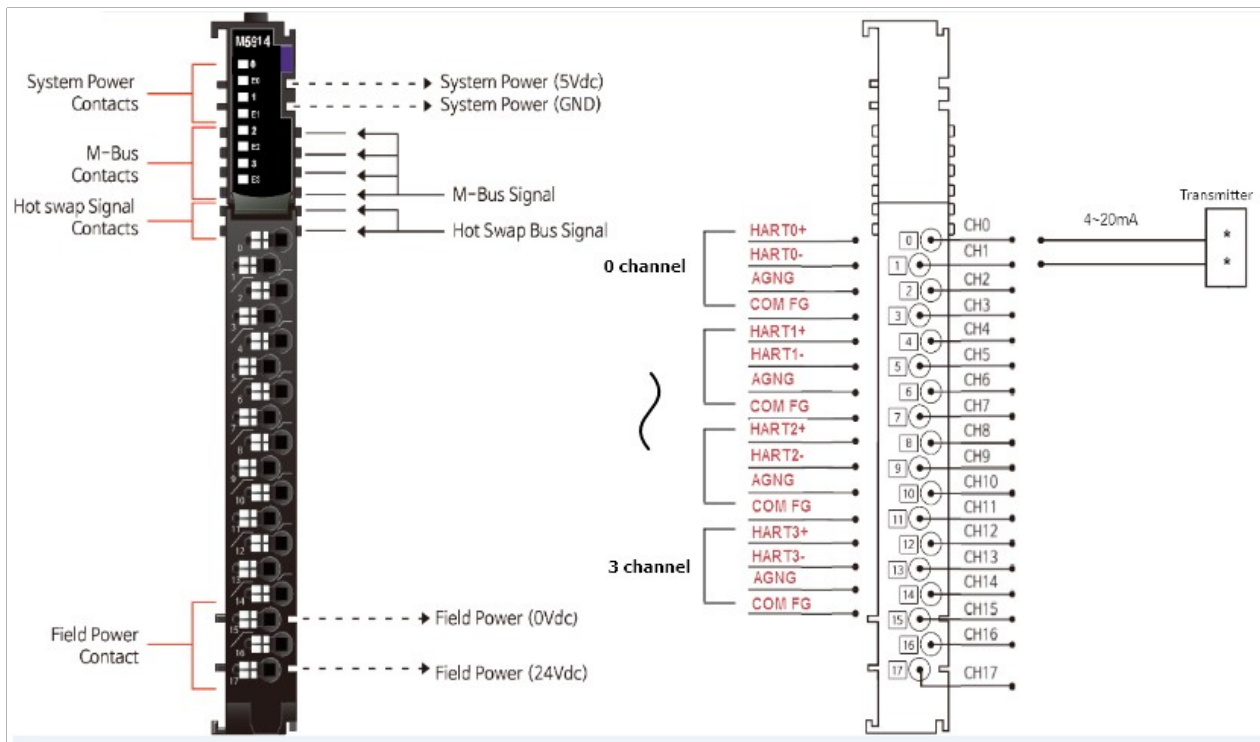
## 2. M5914(4ch 4-20mA with HART Module)

### 2.1.M5914 Specification

Items	Specification
<b>Analog Input</b>	
Number of Channel	4 Channels single ended, non-isolated between channels
Indicators	4 Green & 4 Red Input status
Resolution in Ranges	16 bits (Include Sign) 15 bits : 0.49uA/Bit(4~20mA)
Module Error	±0.1% Full Scale @ 25°C ambient ±0.3% Full Scale @ -25°C, 60°C
Input Impedance	270Ω
Conversion Time	30msec / All channel
Field calibration	Not Required
Common Type	4 Common, Field Power 0V is Common(AGND)
<b>HART Specification</b>	
HART Version	Revision 5
Open circuit detection	I <sub>meas</sub> < 3.5mA
Short circuit detection	I <sub>meas</sub> > 22mA
<b>General Specification</b>	
Power Dissipation	Max. 30mA @ 5.0Vdc
Isolation	I/O to Logic : Isolation
UL Field Power	Supply voltage : 24Vdc nominal, Class 2
Field Power	Supply voltage : 24Vdc nominal Voltage range : 18~28.8Vdc, Power Dissipation : Max. 10mA @ 24Vdc
Single Wire	0.205mm <sup>2</sup> - 1.3mm <sup>2</sup> (24-16 AWG)
Torque	0.8Nm(7 lb-in)
Weight	72g
Module Size	12mm x 110mm x 75mm
Hot Swap	Possible
<b>Environment Condition</b>	<b>Refer to 'Environment Specification'</b>

\* Class 2, adjacent to voltage rating (30Vmax)

## 2.2. M5914 Wiring Diagram



Pin No.	Signal Description
0	HART0 +
1	HART0 -
2	ANGD
3	F.G
4	HART1 +
5	HART1 -
6	ANGD
7	F.G
8	HART2 +
9	HART2 -
10	ANGD
11	F.G
12	HART3 +
13	HART3 -
14	ANGD
15	F.G
16	N.C
17	N.C

Series No	Through Air	Over Surface	CTI
RTB18C	1.5mm	1.5mm	175≤CTI≤400

Spacings : The following minimum spacing in inches (millimeters) shall be maintained between uninsulated live parts of opposite polarity; and between an uninsulated live part and a grounded Part including any mounting surface or exposed metal part.

# Specification

## 2.3. M5914 LED Indicator

### 2.4. Led Indicator



LED No.	LED Function / Description	LED Color
0	Analog Input 4~20mA	Green
E0	0ch : Hart Communication Error	Red
1	Analog Input 4~20mA	Green
E1	1ch : Hart Communication Error	Red
2	Analog Input 4~20mA	Green
E2	2ch : Hart Communication Error	Red
3	Analog Input 4~20mA	Green
E3	3ch : Hart Communication Error	Red

#### 2.4.1. Channel Status LED

Status	LED	To Indicate
Analog Signal	On	Analog input data range is within 4 ~ 20mA.
	Off	The analog input data range does not fall within 4 ~20mA or disconnection.

#### 2.4.2. Error Status LED

Status	LED	To Indicate
Hart Communication	On	Hart communication does not work.
	Off	Hart communication works normally.

# Specification

## 2.5. Mapping data into the image table (Basic Mode)

### ● Input Image Value ( 24 Byte )

Byte	Input Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Analog Input Data								
0	Analog Input 0							
1								
2								
3								
4	Analog Input 1							
5								
6								
7								
8	Analog Input 2							
9								
10								
11								
12	Analog Input 3							
13								
14								
15								
16	Hart Data							
17								
18								
19								
20	Variable Data 0 (PV,SV,TV,QV)							
21								
22								
23								

### ● Output Image Value ( 4 Byte )

Byte	Control Word 0							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	Variable Data 1 Select		Channel Select		Variable Data 0 Select		Channel Select	
1	Variable Data 3 Select		Channel Select		Variable Data 2 Select		Channel Select	
2	Reserved							

**Variable Data Select : 0=PV, 1=SV, 2=TV, 3=QV**

**Channel Select : 0=0ch, 1=1ch, 2=2ch, 3=3ch**

Ex) Variable Data 0 = 0ch, SV

Variable Data 0 Select : 1 → bit 01

Channel Select : 0 → bit 00

Ex) Variable Data 3 = 1ch, QV

Variable Data 3 Select : 3 → bit 11

Channel Select : 1 → bit 01



# Specification

## 2.6. Mapping data into the image table (Extend Mode)

### ● Input Image Value ( 24 Byte )

Byte	Input Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Analog Input Data							
0	Analog Input 0							
1								
2	Analog Input 1							
3								
4	Analog Input 2							
5								
6	Analog Input 3							
7								
	Hart Data							
8	Success	CMC Error	CMD Error	Run	Communication Count			
9	Response Data 0 byte							
10	Response Data 1 byte							
11	Response Data 2 byte							
12	Response Data 3 byte							
13	Response Data 4 byte							
14	Response Data 5 byte							
15	Response Data 6 byte							
16	Response Data 7 byte							
17	Response Data 8 byte							
18	Response Data 9 byte							
19	Response Data 10 byte							
20	Response Data 11 byte							
21	Response Data 12 byte							
22	Response Data 13 byte							
23	Response Data 14 byte							

### \* STATUS

**Run** = Communication Running

**CMD Error** = Command Error

**CMC Error** = Communication Error

**Success** = Communication Success

# Specification

## ● Output Image Value ( 4 Byte )

Byte	Output Image Data							
	Control Word 0							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	channel Select							
1	Command							
2	Reserved			START	Communication Count			
3	Reserved							

Example) How to Communication

Channel : 2

Command : 3

### Step#1

Byte	Hex
0	0x01
1	0x03
2	0x00
3	0x00

Output Data = 0x01, 0x03, 0x00, 0x00

### Step#2

Check Status Byte.

If Run is 1, Communication is in progress.

If Success is 1, Communication is Completed.

If Communication is completed. Go to Step#3

Byte	Hart Data						
8	Success	CMC Error	CMD Error	Run	Communication Count		

### Step#3

Output Data = 0x01, 0xFF(Read Response Data), 0x00(Communication Count), 0x00

If the number of response data exceeds 15byte, if you send the command(FF) by increasing Communication Count, you can check the response data after 15byte.

Byte	Hex
0	0x01
1	0xFF
2	0x00
3	0x00

# Specification

## 2.7. Configuration Parameter Data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Remarks(*)
0	Mode	Retry Time							WH
1	Filter Time								WH
2	Reserved								WH
3	Reserved								WH

**Mode 0 : Basic Mode**

**Mode 1 : Extend Mode**

**Retry Time : Min 5, Max 10 (Hart Communication Retry Time/If Fail)**

**Filter Time : Min 20, Max 255 (Analog Input Filter)**

## 2.8. Supported Commands

Commands		decription
<b>Universal Command</b>	0	Read Unique Identifier
	1	Read Primary Variable
	2	Read Current and Percent of Range
	3	Read all dynamic Variables and Current
	12	Read Message
	13	Read Tag, Descriptor, Date
	14	Read Primary Variable Sensor Information
	15	Read Primary Variable Output Information
	16	Read Final Assembly Number
<b>Common Practice Command</b>	48	Read Additional Transmitter Status