

FnIO M – Series :

M3708

M3708 (8 Channels, RTD/RESISTANCE INPUT)

Date: 2019.09.04

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History

REV.	PAGES	REMARKS	DATE	Editor
1.00				
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	5	Deleted Accuracy PT100, PT1000	2020/07/15	CW SEO
1.05		Remove Description pages of Hot Swap Function, Use in Hazardous Environments and Caution(Before using the unit)	2020/12/08	SJ LIM
1.06	5	Power dissipation changed	2021/04/13	BS HA

1. ENVIRONMENT SPECIFICATION

Environmental specification	
Operating Temperature	-25°C~60°C
UL Temperature	-20°C~60°C
Storage Temperature	-40°C~85°C
Relative Humidity	5% ~ 90% non-condensing
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

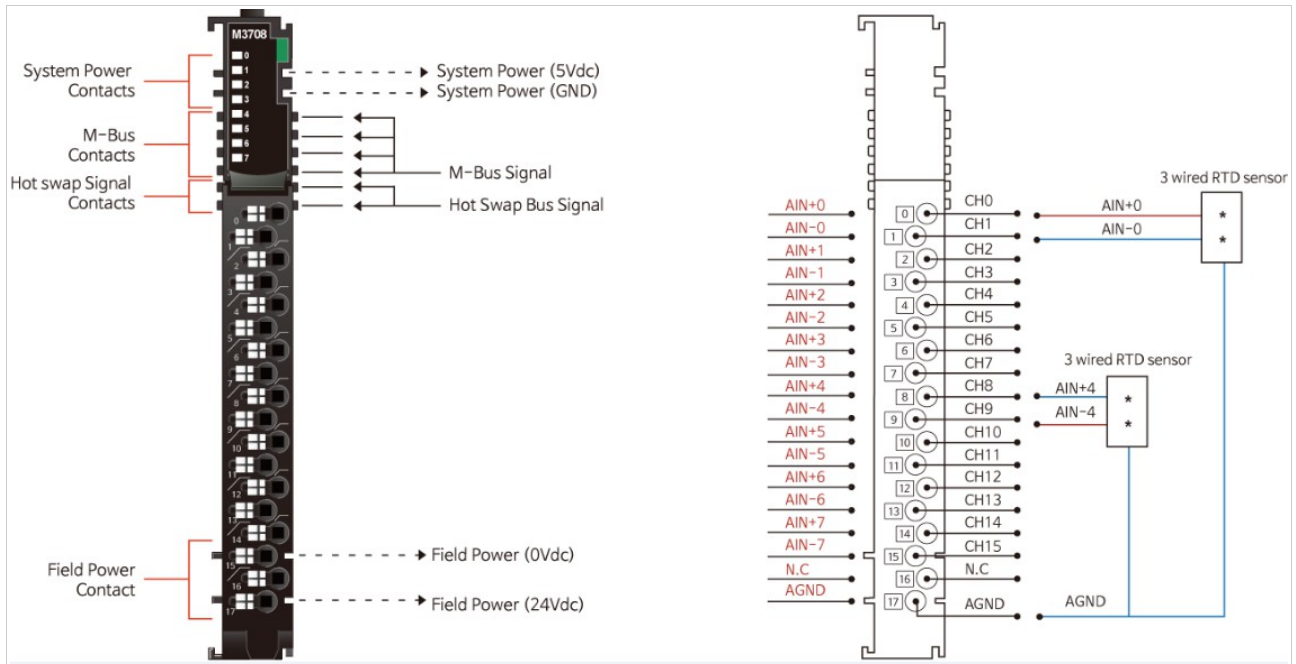
2. M3708 (8 CHANNELS RTD/RESISTANCE INPUT)

2.1. M3708 Specification

Items																													
Input Specification																													
Inputs per module	8 Channels																												
Indicators(Logic side)	8 Green Input status																												
Sensor Types	RTD Input Range <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>RTD Input</th> <th>Input Range</th> </tr> </thead> <tbody> <tr> <td>PT100, PT200, PT500, PT50</td> <td>-200~850°C</td> </tr> <tr> <td>PT1000</td> <td>-200~350°C</td> </tr> <tr> <td>JPT100, JPT200, JPT500, JPT50</td> <td>-200~640°C</td> </tr> <tr> <td>JPT1000</td> <td>-200~350°C</td> </tr> <tr> <td>NI100, NI200, NI500</td> <td>-60~250°C</td> </tr> <tr> <td>NI1000</td> <td>-60~180°C</td> </tr> <tr> <td>NI120</td> <td>-80~260°C</td> </tr> <tr> <td>NI1000LG</td> <td>-50~120°C</td> </tr> <tr> <th>Resistance Input</th> <th>Input Range</th> </tr> <tr> <td>100mΩ/bit</td> <td>0~2000Ω</td> </tr> <tr> <td>10mΩ/bit</td> <td>0~327Ω</td> </tr> <tr> <td>20mΩ/bit</td> <td>0~620Ω</td> </tr> <tr> <td>50mΩ/bit</td> <td>0~1200Ω</td> </tr> </tbody> </table>	RTD Input	Input Range	PT100, PT200, PT500, PT50	-200~850°C	PT1000	-200~350°C	JPT100, JPT200, JPT500, JPT50	-200~640°C	JPT1000	-200~350°C	NI100, NI200, NI500	-60~250°C	NI1000	-60~180°C	NI120	-80~260°C	NI1000LG	-50~120°C	Resistance Input	Input Range	100mΩ/bit	0~2000Ω	10mΩ/bit	0~327Ω	20mΩ/bit	0~620Ω	50mΩ/bit	0~1200Ω
RTD Input	Input Range																												
PT100, PT200, PT500, PT50	-200~850°C																												
PT1000	-200~350°C																												
JPT100, JPT200, JPT500, JPT50	-200~640°C																												
JPT1000	-200~350°C																												
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Resistance Input	Input Range																												
100mΩ/bit	0~2000Ω																												
10mΩ/bit	0~327Ω																												
20mΩ/bit	0~620Ω																												
50mΩ/bit	0~1200Ω																												
Excitation Current	About 1mA																												
Connection Method	3-Wire																												
Conversion Time	< 280ms, All Channel																												
Data Format	16bits signed Integer (2' complement)																												
Module Accuracy	All type Input Range <ul style="list-style-type: none"> • ±0.1% Full Scale @ 25°C ambient • ±0.3% Full Scale @ -25°C~60°C 																												
Resolution of Data	RTD Type : ±0.1°C / F , Resistance Type : 100mΩ, 10mΩ, 20mΩ, 50mΩ																												
Calibration	Not Required																												
Diagnostic	Sensor open or range over, then conversion data = 0x8000(-32768)																												
General specification																													
Power dissipation	Max. 130mA @ 5.0Vdc																												

Isolation	I/O to Logic : Isolation Field power : Not Connected
Field Power	Not used, Field power bypass to next expansion module
Single Wiring	0.205mm ² - 1.3mm ² (24-16 AWG)
Torque	0.8Nm(7 lb-in)
Weight	72g
Module Size	12mm x 110mm x 75mm
Environment Condition	Refer to '1. Environment Specification'

2.2. M3708 Wiring Diagram



Pin No.	Signal Description
0	RTD Channel 0+
1	RTD Channel 0-
2	RTD Channel 1+
3	RTD Channel 1-
4	RTD Channel 2+
5	RTD Channel 2-
6	RTD Channel 3+
7	RTD Channel 3-
8	RTD Channel 4+
9	RTD Channel 4-
10	RTD Channel 5+
11	RTD Channel 5-
12	RTD Channel 6+
13	RTD Channel 6-
14	RTD Channel 7+
15	RTD Channel 7-
16	N.C
17	ANGD

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.

2.3. M3708 LED Indicator

2.3.1. LED Indicator



LED No.	LED Function / Description	LED Color
0	INPUT Channel 0	Green
1	INPUT Channel 1	Green
2	INPUT Channel 2	Green
3	INPUT Channel 3	Green
4	INPUT Channel 4	Green
5	INPUT Channel 5	Green
6	INPUT Channel 6	Green
7	INPUT Channel 7	Green

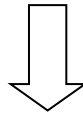
2.3.2. Channel Status LED

Status	LED	To indicate
Not Signal, Normal Operation	Off	Input Sensor Open or Input Range Over Normal Operation
On Signal Normal Operation	Green	Sensor Connected and Input Range Valid Normal Operation

2.4. Mapping data into the image table

- **Input Module Data**

	Analog Input Ch0
	Analog Input Ch1
	Analog Input Ch2
	Analog Input Ch3
	Analog Input Ch4
	Analog Input Ch5
	Analog Input Ch6
	Analog Input Ch7



- **Input Image Value**

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Analog Input Ch0 Low byte							
Byte 1	Analog Input Ch0 High byte							
Byte 2	Analog Input Ch1 Low byte							
Byte 3	Analog Input Ch1 High byte							
Byte 4	Analog Input Ch2 Low byte							
Byte 5	Analog Input Ch2 High byte							
Byte 6	Analog Input Ch3 Low byte							
Byte 7	Analog Input Ch3 High byte							
Byte 8	Analog Input Ch4 Low byte							
Byte 9	Analog Input Ch4 High byte							
Byte 10	Analog Input Ch5 Low byte							
Byte 11	Analog Input Ch5 High byte							
Byte 12	Analog Input Ch6 Low byte							
Byte 13	Analog Input Ch6 High byte							
Byte 14	Analog Input Ch7 Low byte							
Byte 15	Analog Input Ch7 High byte							

- If the input of channel is open or over-ranged, its conversion data will be 0x8000(-32678)

2.5. Configuration Parameter – 18 byte

Byte	Decimal Bit	Description	Default Value
0	00-07	The selection Sensor Type =00h:PT100, 0.00385, -200~850°C, 0.1°C/count =01h:PT200, 0.00385, -200~850°C, 0.1°C/count =02h:PT500, 0.00385, -200~850°C, 0.1°C/count =03h:PT1000, 0.00385, -200~350°C, 0.1°C/count =04h:PT50, 0.00385, -200~850°C, 0.1°C/count =10h:JPT100, 0.003916, -200~640°C, 0.1°C/count =11h:JPT200, 0.003916, -200~640°C, 0.1°C/count =12h:JPT500, 0.003916, -200~640°C, 0.1°C/count =13h:JPT1000, 0.003916, -200~350°C, 0.1°C/count =14h:JPT50, 0.003916, -200~640°C, 0.1°C/count =20h:NI100, 0.00618, -60~250°C, 0.1°C/count =21h:NI200, 0.00618, -60~250°C, 0.1°C/count =22h:NI500, 0.00618, -60~250°C, 0.1°C/count =23h:NI1000, 0.00618, -60~180°C, 0.1°C/count =30h:NI120, 0.00672, -80~250°C, 0.1°C/count =53h:NI1000LG, 0.00500, -50~120°C, 0.1°C/count =80h:Resistance Input, 1~2000Ω, 100mΩ /1count =81h:Resistance Input, 1~327Ω, 10mΩ /1count =82h:Resistance Input, 1~620Ω, 20mΩ /1count =83h: Resistance Input, 1~1200Ω, 50mΩ/1count =Others: Reserved	0: PT100
1	00	Temperature Type 0: Celsius(°C), 1: Fahrenheit(°F)	0: Celsius(°C)
	01	Reserved	0
	02	Data Resolution 0: 0.1°C, °F/bit, 1: 1°C, °F/bit	0
	03	Reserved	0
	04	Filter Type 0: Normal Filter, 1: Enhanced Filter	0: Normal Filter
	05-07	Reserved	0
2~3		CH0 Offset value	0
4~5		CH1 Offset value	0
6~7		CH2 Offset value	0
8~9		CH3 Offset value	0
10~11		CH4 Offset value	0
12~13		CH5 Offset value	0
14~15		CH6 Offset value	0
16~17		CH7 Offset value	0

2.6. Data Value

Resistance Temperature Detector Input Range	
Type	Input Range
PT100	-200 ~ 850 °C
PT200	-200 ~ 850 °C
PT500	-200 ~ 850 °C
PT1000	-200 ~ 350 °C
PT50	-200 ~ 850 °C
JPT100	-200 ~ 640 °C
JPT200	-200 ~ 640 °C
JPT500	-200 ~ 640 °C
JPT1000	-200 ~ 350 °C
JPT50	-200 ~ 640 °C
NI100	-60 ~ 250 °C
NI200	-60 ~ 250 °C
NI500	-60 ~ 250 °C
NI1000	-60 ~ 180 °C
NI120	-80 ~ 260 °C
NI1000LG	-50 ~ 120 °C
Resistance Input Range	
Type	Input Range
100mΩ/bit	0~2000Ω
10mΩ/bit	0~327Ω
20mΩ/bit	0~620Ω
50mΩ/bit	0~1200Ω