FnIO M – Series :

M3744

M3744 (4 Channels, RTD/RESISTANCE INPUT)

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Table of Contents

Table of Contents....2
History....3
1.ENVIRONMENT SPECIFICATION....4
2.M3744 (4 CHANNELS RTD/RESISTANCE INPUT)....5
2.1.M3744 Specification....5
2.2.M3744 Wiring Diagram....7
2.3.M3744 LED Indicator....8
2.3.1.LED Indicator....8
2.3.2.Channel Status LED....8
2.4.Mapping data into the image table....9
2.5.Configuration Parameter – 18 byte....10
2.6.Data Value....11

History

REV.	PAGES	REMARKS	DATE	Editor
1.00	11		May 9, 2022	HS KIM
1.01	5	Specification Modification	Fab 10, 2023	HS KIM
1.02	5	Specification Modification	Fab 17, 2023	HS KIM
1.03	6	Power dissipation update	Fab 23, 2023	HS KIM

1. ENVIRONMENT SPECIFICATION

Environmental specification	
Operating Temperature	-25℃~60℃
UL Temperature	-25℃~60℃
Storage Temperature	-40℃~85℃
Relative Humidity	5% ~ 90% non-condensing
Mounting	DIN rail
General specification	
Shock Operating	IEC 60068-2-27
Vibration Resistance	IEC 60068-2-6, 4g
Industrial Emissions	EN 61000-6-4/A11 : 2011
Industrial Immunity	EN 61000-6-2 : 2019
Installation Position	Vertical and horizontal installation is available.
Product Certifications	CE, UL, FCC, ATEX

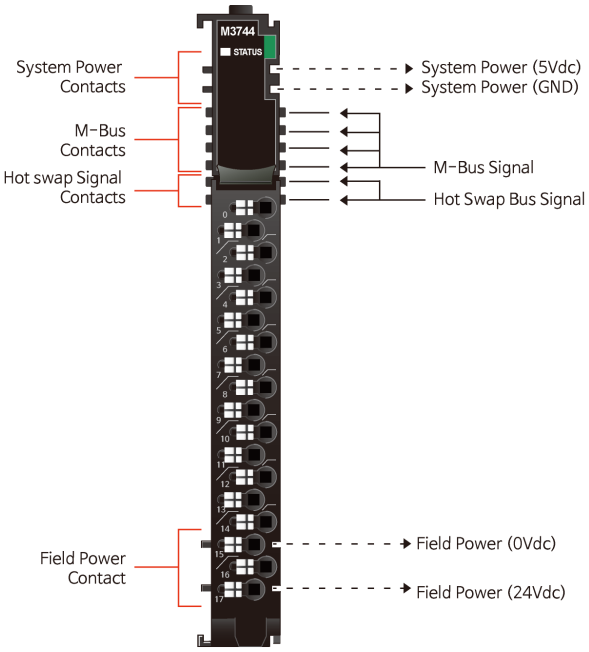
2. M3744 (4 CHANNELS RTD/RESISTANCE INPUT)

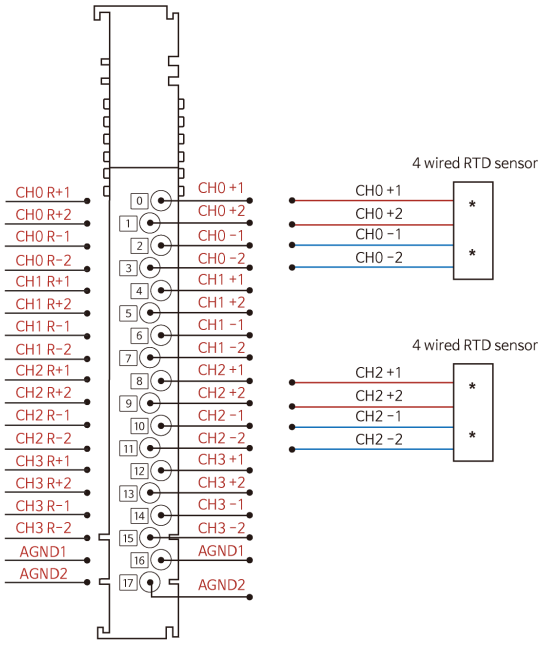
2.1. M3744 Specification

<table>
<tr><th colspan="2">Items</th></tr>
<tr><td colspan="2">Input Specification</td></tr>
<tr><td>Inputs per module</td><td>4 Channels</td></tr>
<tr><td>Indicators(Logic side)</td><td>4 Green Input status</td></tr>
<tr><td>Sensor Types</td><td>RTD Input Range
<table>
<tr><th>RTD Input</th><th>Input Range</th></tr>
<tr><td>PT50, PT100, PT200, PT500, PT1000</td><td>-200~850°c</td></tr>
<tr><td>JPT50, JPT100, JPT200, JPT500, JPT1000</td><td>-200~640°c</td></tr>
<tr><td>NI100, NI200, NI500, NI1000</td><td>-60~250°c</td></tr>
<tr><td>NI120</td><td>-80~260°c</td></tr>
<tr><td>Cu10, Cu100</td><td>-100~260°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>1Ω/bit</td><td>0~4000Ω</td></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>
</table></td></tr>
<tr><td>Excitation Current</td><td>About 0.5mA</td></tr>
<tr><td>Connection Method</td><td>4-Wire</td></tr>
<tr><td>Conversion Time</td><td>< 60ms, All Channel</td></tr>
<tr><td>Data Format</td><td>16bits signed Integer (2' complement)</td></tr>
<tr><td>Module Accuracy</td><td>PT50, JPT50, NI100, NI120 : ±0.3% Full Scale @ 25°C ambient
PT50, JPT50, NI100, NI120 : ±0.5% Full Scale @ -40,70°C ambient
PT1000 : ±0.3°C at 50~150°C @ 25°C ambient
PT1000 : ±0.5°C at 50~150°C @ -25,60°C ambient
PT1000 : ±0.5°C at -200~250°C @ 25°C ambient
Cu10 : ±2% Full Scale @ 25°C ambient
Cu10 : ±4% Full Scale @ -25,60°C ambient
Cu100 : ±0.3% Full Scale @ 25°C ambient</td></tr>
</table>

	Cu100 : ±0.5% Full Scale @ -25,60℃ ambient All type Input Range • ±0.1% Full Scale @ 25℃ ambient • ±0.3% Full Scale @ -25℃~60℃
Resolution of Data	RTD Type : ±0.1℃ / F , Resistance Type : 1Ω, 100mΩ, 10mΩ, 20mΩ, 50mΩ
Calibration	Not Required
Diagnostic	Sensor open or range over, then conversion data = 0x8000(-32768)
General specification	
Power dissipation	Max. 120mA @ 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	0.205㎟ - 1.3㎟ (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. M3744 Wiring Diagram





Pin No.	Signal Description
0	RTD Channel 0 R+1
1	RTD Channel 0 R+2
2	RTD Channel 0 R-1
3	RTD Channel 0 R-2
4	RTD Channel 1 R+1
5	RTD Channel 1 R+2
6	RTD Channel 1 R-1
7	RTD Channel 1 R-2
8	RTD Channel 2 R+1
9	RTD Channel 2 R+2
10	RTD Channel 2 R-1
11	RTD Channel 2 R-2
12	RTD Channel 3 R+1
13	RTD Channel 3 R+2
14	RTD Channel 3 R-1
15	RTD Channel 3 R-2
16	AGND1
17	AGND2

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

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

2.3. M3744 LED Indicator

2.3.1. LED Indicator

LED No.	LED Function / Description	LED Color
Status	M-Bus Status	Green

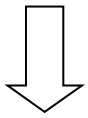
2.3.2. Channel Status LED

Status	LED	To indicate
M-Bus Status	Off Green	Disconnection Connection

2.4. Mapping data into the image table

- **Input Module Data**

Analog Input Ch0
Analog Input Ch1
Analog Input Ch2
Analog Input Ch3



- **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							

- 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, -200~850°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, -200~640°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, -60~250°C, 0.1°C/count =30h:NI120, 0.00672, -80~260°C, 0.1°C/count =40h:Cu10, 0.00427, -100~260°C, 0.1°C/count =41h:Cu100, 0.00427, -100~260°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 =84h: Resistance Input, 1~4000Ω, 1Ω/1count =Others: Reserved	0: PT100
1	00	Temperature Type 0: Celsius(°C), 1: Fahrenheit(°F)	0: Celsius(°C)
	01	Reserved	0
	02-03	Data Resolution 00: 0.1°C, °F/bit 01: 1°C, °F/bit 10: *0.01°C, °F/bit 11: Reserved	0
	04	Filter Type 0: Normal Filter, 1: Enhanced Filter	0: Normal Filter
	05-06	SW Filter 0: Nomal Filter(Filter Time = 20) 1: **Fast Filter(Filter Time = 3) 2: Enhanced Filter(Filter Time = 40) 3: More Enhanced Filter(Filter Time = 80)	0
	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

- *Data exceeding 32767 cannot be displayed.

- **If you set a fast filter, the specification accuracy may not be met.

2.6. Data Value

Resistance Temperature Detector Input Range	
Type	**Input Range**
PT100	-200 ~ 850 ℃
PT200	-200 ~ 850 ℃
PT500	-200 ~ 850 ℃
PT1000	-200 ~ 850 ℃
PT50	-200 ~ 850 ℃
JPT100	-200 ~ 640 ℃
JPT200	-200 ~ 640 ℃
JPT500	-200 ~ 640 ℃
JPT1000	-200 ~ 640 ℃
JPT50	-200 ~ 640 ℃
NI100	-60 ~ 250 ℃
NI200	-60 ~ 250 ℃
NI500	-60 ~ 250 ℃
NI1000	-60 ~ 250 ℃
NI120	-80 ~ 260 ℃
Cu10	-100 ~ 260 ℃
Cu100	-100 ~ 260 ℃
NI1000LG	-50 ~ 120 ℃
Resistance Input Range	
Type	**Input Range**
1Ω/bit	0~4000Ω
100mΩ/bit	0~2000Ω
10mΩ/bit	0~327Ω
20mΩ/bit	0~620Ω
50mΩ/bit	0~1200Ω