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# **FnIO G – Series :**

## ***GT-1658***

***GT-1658 (8 Points Digital Input, 8.2Vdc NAMUR Sensor Type,  
Detecting Open, Short, On/Off States)***

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History

Rev	Pages	Remarks	Date	Editor
1.00			2022/01/22	Byungsoon, Ha
1.01	5	Modify GT-1658 Specification	2022/12/28	Sejin, Lim
1.02	5, 7, 9	Page5. Modify GT-1658 Specification description Page7. Channel Status LED description Page9. Mapping data description	2023/01/03	Sejin, Lim
1.03	4,6,7	Edit Certification / Change Diagram, Status LED	2023/08/08	Suna, Hwang
1.04	7,9	Edit LED, Mappling data description	2025/08/21	Soyeong, Park

# Specification

## 1. ENVIRONMENT SPECIFICATION

Environmental specification	
Operation Temperature	-40°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, 4g
Industrial Emissions	EN61000-6-4/All : 2011
Industrial Immunity	EN 61000-6-2 : 2019
Installation Position	Vertical and horizontal installation is available
Product Certifications	CE, UL, UKCA

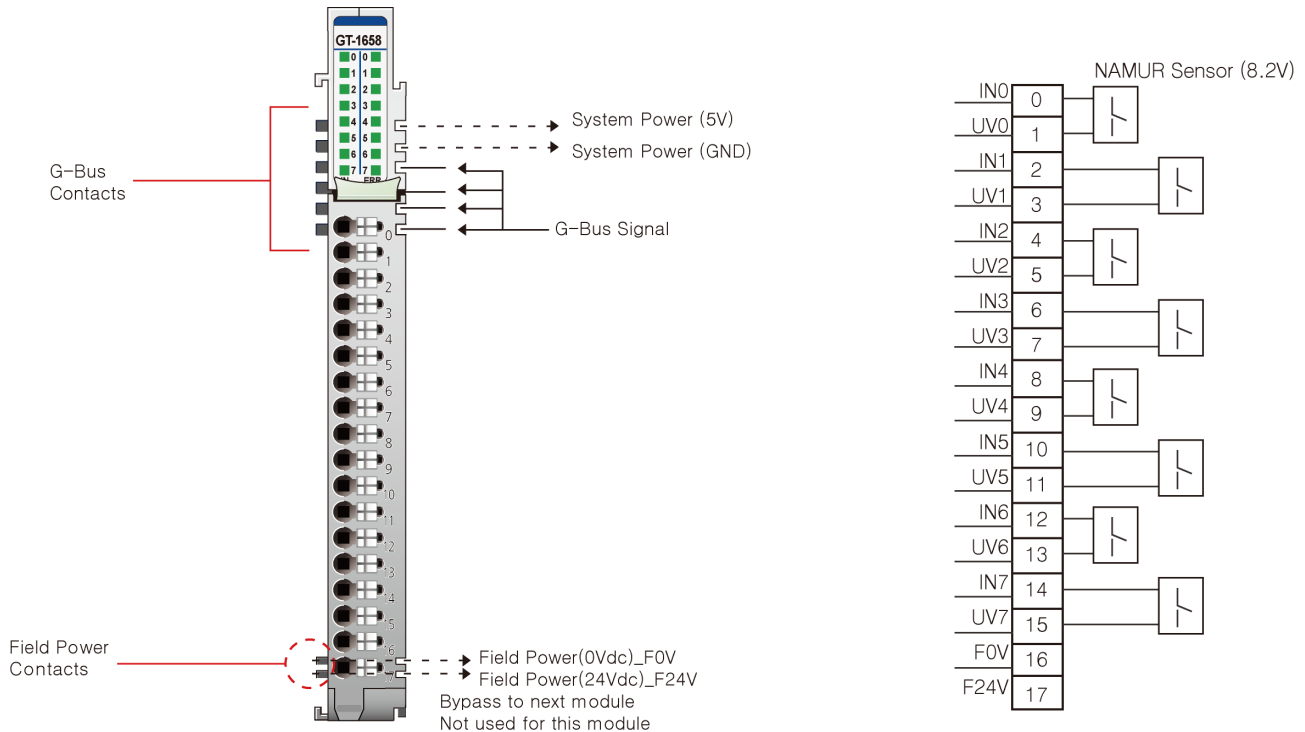
# Specification

## 2. GT-1658(8 Points Digital Input, 8.2Vdc NAMUR Sensor Type, Detecting Open, Short, On/Off States)

### 2.1. GT-1658 Specification

Items	Specification
<b>Input specification</b>	
Inputs per module	8 points
Indicators	8 input status(green) / 8 error status(green)
Sensor supply voltage	8.2 Vdc( $\pm 0.2V$ ); short-circuit-protected
Sensor connection	2x (2-wire)
“0” Signal current	$I \leq 1.2mA$
“1” Signal current	$I \geq 2.1mA$
Diagnostics	Open-circuit, Short-circuit
Open-circuit detection(Line break)	$I \leq 0.1mA$ Typ.
Short-circuit detection	$I \geq 7.0mA$
Short-circuit current	$I < 8.2mA$ Typ.
Max. switching frequency	1kHz
Input impedance	1.0K $\Omega$ Typ.
Output impedance(F8.2V)	0.1K $\Omega$ Typ. (Uv0~8)
<b>General specification</b>	
Power dissipation	Max. 50mA @ 5Vdc
Isolation	I/O to Logic : photocoupler isolation
UL field power	Supply voltage : 24Vdc nominal, Class 2
Field power	Supply voltage : 24Vdc nominal Input Voltage range : 15~30Vdc Power dissipation: 15mA + Load @ 24Vdc Output impedance : 100 $\Omega$ Output Voltage: 8.2V Typ.(Uv0~8)
Single wiring	I/O cable max. 0.823mm <sup>2</sup> (AWG 18)
Weight	64g
Module size	12mm x 109mm x 70mm
<b>Environment condition</b>	<b>Refer to ‘1. Environment specification’</b>

## 2.2. GT-1658 Wiring Diagram

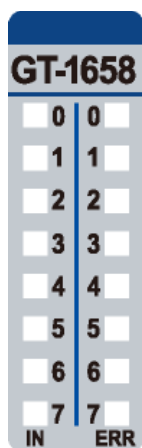


Pin No.	Signal Description
0	Input Channel 0
1	Sensor supply channel 0 (Uv0 / 8.2V)
2	Input Channel 1
3	Sensor supply channel 1 (Uv1 / 8.2V)
4	Input Channel 2
5	Sensor supply channel 2 (Uv2 / 8.2V)
6	Input Channel 3
7	Sensor supply channel 3 (Uv3 / 8.2V)
8	Input Channel 4
9	Sensor supply channel 4 (Uv4 / 8.2V)
10	Input Channel 5
11	Sensor supply channel 5 (Uv5 / 8.2V)
12	Input Channel 6
13	Sensor supply channel 6 (Uv6 / 8.2V)
14	Input Channel 7
15	Sensor supply channel 7 (Uv7 / 8.2V)
16	Common (Field Power 0V)
17	Common (Field Power 24V)

# Specification

## 2.3. GT-1658 LED Indicator

### 2.3.1. LED Indicator



LED No.	LED Function / Description	LED Color
0(Left Side)	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
0(Right Side)	ERROR Channel 0	Green
1	ERROR Channel 1	Green
2	ERROR Channel 2	Green
3	ERROR Channel 3	Green
4	ERROR Channel 4	Green
5	ERROR Channel 5	Green
6	ERROR Channel 6	Green
7	ERROR Channel 7	Green

### 2.3.2. Channel Status LED

\* NO Type (Parameter Data (NC\_ENA) :0)

Input LED	Error LED	Explanation
OFF	OFF	Usual operation: "0" Sensor Signal ( $I \leq 1.2\text{mA}$ ) NAMUR sensor on channel in non-conductive state("0"; according to IEC 60947-5-6)
ON	OFF	Usual operation: "1" Sensor Signal ( $I \geq 2.1\text{mA}$ ) NAMUR sensor on channel in conducting state ("1"; according to IEC 60947-5-6)
OFF	ON	Error detection: open- circuit on channel ( $I < 0.1\text{mA typ.}$ )
ON	ON	Error detection: short-circuit on channel ( $I > 7.1\text{mA typ.}$ )

\* NC Type (Parameter Data (NC\_ENA) :1)

Input LED	Error LED	Explanation
OFF	OFF	Usual operation: "1" Sensor Signal ( $I \geq 2.1\text{mA}$ ) NAMUR sensor on channel in conducting state ("1"; according to IEC 60947-5-6)
ON	OFF	Usual operation: "0" Sensor Signal ( $I \leq 1.2\text{mA}$ ) NAMUR sensor on channel in non-conductive state ("0"; according to IEC 60947-5-6)
OFF	ON	Error detection: short-circuit on channel ( $I > 7.1\text{mA typ.}$ )
ON	ON	Error detection: open- circuit on channel ( $I < 0.1\text{mA typ.}$ )

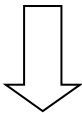
2.4. Mapping data into the image table

<Input Byte 0 (Signal Status)>

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
IN 7	IN 6	IN 5	IN 4	IN 3	IN 2	IN 1	IN 0
IN 0		Digital Input 0					
IN 1		Digital Input 1					
IN 2		Digital Input 2					
IN 3		Digital Input 3					
IN 4		Digital Input 4					
IN 5		Digital Input 5					
IN 6		Digital Input 6					
IN 7		Digital Input 7					

<Input Byte 1 (Error Status)>

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
DIA 7	DIA 6	DIA 5	DIA 4	DIA 3	DIA 2	DIA 1	DIA 0
DIA 0		Diagnostic 0					
DIA 1		Diagnostic 1					
DIA 2		Diagnostic 2					
DIA 3		Diagnostic 3					
DIA 4		Diagnostic 4					
DIA 5		Diagnostic 5					
DIA 6		Diagnostic 6					
DIA 7		Diagnostic 7					



● Input Image Value

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	IN 7	IN 6	IN 5	IN 4	IN 3	IN 2	IN 1	IN 0
Byte1	DIA 7	DIA 6	DIA 5	DIA 4	DIA 3	DIA 2	DIA 1	DIA 0



# Specification

**When sensor type NO (“Normally Open”, make contact) is enabled, the following logic applies:**

Bit Combination with a Connected Sensor Functioning as a Make Contact

Input Byte 0 (0 ... 7)	Input Byte 1 (0 ... 7)	Explanation
Signal Status	Error	
0	0	Usual operation: “0” Signal ( $I \leq 1.2\text{mA}$ ) NAMUR sensor on channel in non-conducting state ("0"; according to IEC 60947-5-6)
1	0	Usual operation: “1” Signal ( $I \geq 2.1\text{mA}$ ) NAMUR sensor on channel in conducting state("1"; according to IEC 60947-5-6)
0	1	Error detection: open- circuit on channel ( $I < 0.1\text{mA typ.}$ )
1	1	Error detection: short-circuit on channel ( $I > 7.0\text{mA typ.}$ )

**When sensor type NC (“Normally Closed”, break contact) is enabled, the following logic applies:**

Combinations with a Connected Sensor Functioning as a Break Contact

Input Byte 0 (0 ... 7)	Input Byte 1 (0 ... 7)	Explanation
Signal Status	Error	
0	0	Usual operation: “1” Signal ( $I \geq 2.1\text{mA}$ ) NAMUR sensor on channel in conducting state("1"; according to IEC 60947-5-6)
1	0	Usual operation: “0” Signal ( $I \leq 1.2\text{mA}$ ) NAMUR sensor on channel in non-conductive state("0"; according to IEC 60947-5-6)
0	1	Error detection: short-circuit on channel ( $I > 7.0\text{mA typ.}$ )
1	1	Error detection: open- circuit on channel ( $I < 0.1\text{mA typ.}$ )

# Specification

## 2.5. Parameter Data

- **Valid Parameter length: 2 Bytes**
- **Parameter Data**

Parameter Byte 0 (Enable Sensor Type NC) : Parameter Byte 0 is used to determine whether a make contact or a break contact should be processed as sensor.

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
NC_ENA 7	NC_ENA 6	NC_ENA 5	NC_ENA 4	NC_ENA 3	NC_ENA 2	NC_ENA 1	NC_ENA 0
NC_ENA x (x = 0 ... 7)		Sensor Type IN x (x = 0 ... 7)					
		0 : NO(Default)					
		1 : NC					

ENA : “enabled”

NC : Break Contact(“Normally Closed”)

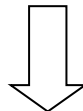
NO : Make Contact(“Normally Open”)

Parameter Byte 1 (Diagnostic Status) : Parameter Byte 1 is used to determine channel by channel whether diagnostics should be evaluated.

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
DIA_DIS 7	DIA_DIS 6	DIA_DIS 5	DIA_DIS 4	DIA_DIS 3	DIA_DIS 2	DIA_DIS 1	DIA_DIS 0
DIA_DIS x (x = 0 ... 7)		Diagnostic Blocking IN x (x = 0 ... 7)					
		0 : Diagnostics Switched ON(Default)					
		1 : Diagnostics Switched OFF					

DIA: “Diagnostics”

DIS: “Disabled”



Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
<b>Byte0</b>	NC_ENA 7	NC_ENA 6	NC_ENA 5	NC_ENA 4	NC_ENA 3	NC_ENA 2	NC_ENA 1	NC_ENA 0
<b>Byte1</b>	DIA_DIS 7	DIA_DIS 6	DIA_DIS 5	DIA_DIS 4	DIA_DIS 3	DIA_DIS 2	DIA_DIS 1	DIA_DIS 0