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# **FnIO G-Series :**

## **GT-5114**

**GT-5114 (4Ch, High Speed Counter, 24Vdc Encoder Input)**

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**History**

REV.	PAGES	REMARKS	DATE	Editor
1.00	8	New Document	Sep 25, 2019	Soyeong, Park
1.01		Release	Apr 21, 2020	Soyeong, Park
1.10		Change Count Mode & Parameter Data size	June 05, 2020	Soyeong, Park

## 1. ENVIRONMENT SPECIFICATION

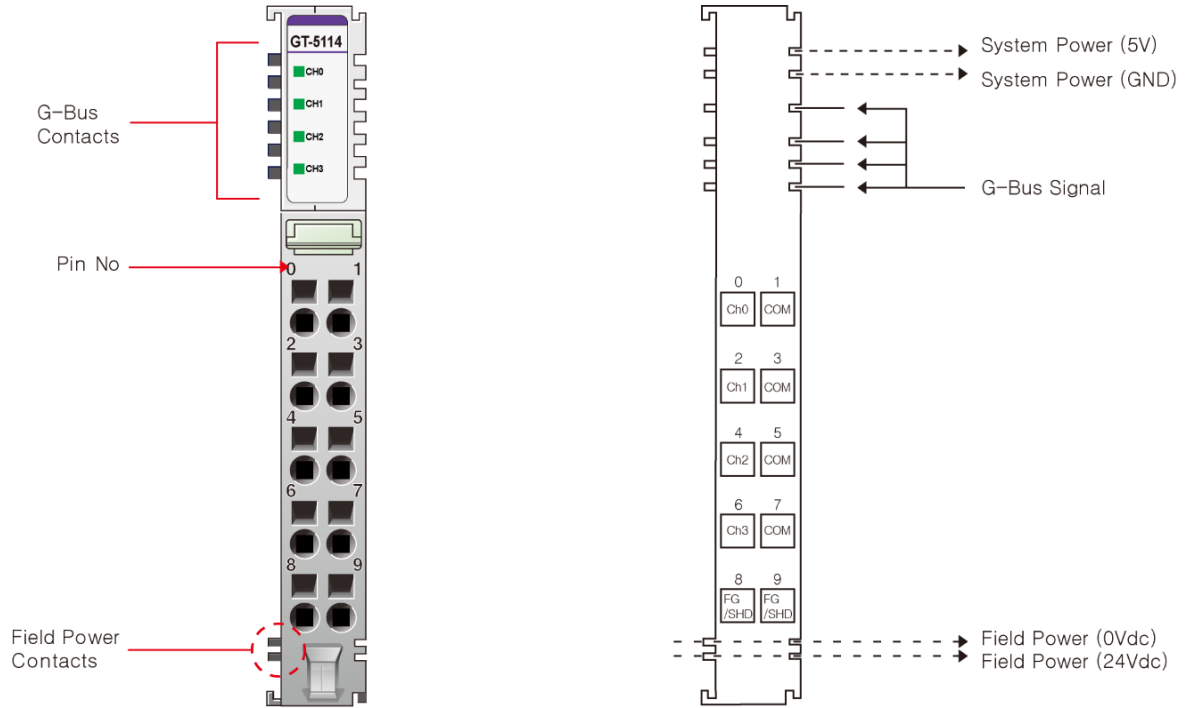
<b>Environmental specification</b>	
Operating Temperature	-20°C~70°C
UL Temperature	-20°C~60°C
Storage Temperature	-40°C~85°C
Relative Humidity	5%~90% non-condensing
Mounting	DIN rail
<b>General Specification</b>	
Chock Operating	IEC 60068-2-27
Vibration Resistance	Based on IEC 60068-2-6 DNVGL-CG-0039 : Vibration Class B, 4g
Industrial Emissions	EN61000-6-4/All : 2011
Industrial Immunity	EN61000-6-2 : 2005
Installation Position	Vertical and horizontal installation is available
Product Certifications	CE, UL, FCC

## 2. GT-5114(4CHANNELS HIGH SPEED COUNTER/ENCODER)

### 2.1. GT-5114 Specification

Items	Specification
<b>Input specification</b>	
Number of channel	4 channel - Encoder, High Speed Counter, Frequency measurement Pulse width&Period measurement
Indicators	4 green terminal input
Input voltage	24Vdc nominal (Max. 28.8Vdc)
Input current	3mA @ 24Vdc
Min on-state voltage	≥16.5Vdc
Input frequency	0~100kHz Count Mode 0~750kHz Encoder Mode
Counting mode	1-Input Mode: Up, Down, Frequency Measurement, Pulse Width&Period measurement 2-Input Mode: Encoder 4x, Encoder 2x, Up/Inhibit, Up/Reset Down/Inhibit, Down/Reset, Up/Down,Clock/Direction
Counter size	32bit-wide/channel
<b>General specification</b>	
Power dissipation	Max. 70mA @ 5Vdc
Isolation	I/O to Logic : photocoupler isolation
UL field power	Supply Voltage : 24Vdc nominal, Class 2
Field power	Not used Field power bypass to next expansion module
Wiring	I/O Cable Max. 2.0mm <sup>2</sup> (AWG 14)
Torque	0.8Nm(7 lb-in)
Weight	60g
Module size	12 mm x 99mm x 70mm
<b>Environment condition</b>	<b>Refer to 'Environment Specification'</b>

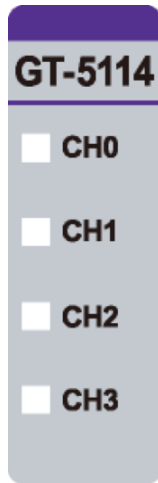
## 2.2. GT-5114 Wiring Diagram



Pin No.	Signal Description	Signal Description	Pin No.
0	Counter Input Ch#0	COM0	1
2	Counter Input Ch#1	COM1	3
4	Counter Input Ch#2	COM2	5
6	Counter Input Ch#3	COM3	7
8	Shield	Shield	9

## 2.3. GT-5114 LED Indicator

### 2.3.1. LED Indicator



LED No.	LED Function / Description	LED Color
0	Counter Input Ch#0	Green
1	Counter Input Ch#1	Green
2	Counter Input Ch#2	Green
3	Counter Input Ch#3	Green

### 2.3.2. Channel Status LED

Status	LED	To Indicate
No Signal	Off	Normal Operation
On Signal	Green	Normal Operation

## 2.4. GT-5114 IO Input Image Data - 16byte

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	Counter Value Ch#0 LL							
Byte 1	Counter Value Ch#0 LH							
Byte 2	Counter Value Ch#0 HL							
Byte 3	Counter Value Ch#0 HH							
Byte 4	Counter Value Ch#1 LL							
Byte 5	Counter Value Ch#1 LH							
Byte 6	Counter Value Ch#1 HL							
Byte 7	Counter Value Ch#1 HH							
Byte 8	Counter Value Ch#2 LL							
Byte 9	Counter Value Ch#2 LH							
Byte 10	Counter Value Ch#2 HL							
Byte 11	Counter Value Ch#2 HH							
Byte 12	Counter Value Ch#3 LL							
Byte 13	Counter Value Ch#3 LH							
Byte 14	Counter Value Ch#3 HL							
Byte 15	Counter Value Ch#3 HH							

- Each channel has 4-byte Input
- Counter value represents counter, frequency(Hz), pulse width (0.1usec) or pulse period (0.1usec).



## 2.5. GT-5114 IO Output Image Data - 4byte

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte 0	CR 0	CS 0	--	--	Count Mode Ch#0			
Byte 1	CR 1	CS 1	--	--	Count Mode Ch#1			
Byte 2	CR 2	CS 2	--	--	Count Mode Ch#2			
Byte 3	CR 3	CS 3	--	--	Count Mode Ch#3			

- CR 0~3 : Counter Reset for Ch#0~3
- CS 0~3 : Counter Stop (Inhibit Input) for Ch#0~3
- Count Mode Ch#0~3 : Count Mode for Ch#0~3 respectively

### ■ Count Mode Ch#0~3

Value	Count Mode	Description
B' 0000 (0x0)	Up	Up Counter - Counter Input CH#0~3 act as Up Clock to CH#0~3.
B' 0001 (0x1)	Down	Down Counter - Counter Input CH#0~3 act as Down Clock to CH#0~3.
B' 0010 (0x2)	-	-
B' 0011 (0x3)	-	-
B' 0100 (0x4)	Up Clock & Inhibit	Up Counter with Inhibit If CounterMode Ch#0 = 0x4, CounterMode Ch#1 is not used. - Counter Input Ch#0 acts as Up Clock Input to Ch#0. - Counter Input Ch#1 acts as Inhibit Input to Ch#0. If CounterMode Ch#2 = 0x4, CounterMode Ch#3 is not used. - Counter Input Ch#2 acts as Up Clock Input to Ch#2. - Counter Input Ch#3 acts as Inhibit Input to Ch#2.
B' 0101 (0x5)	Up Clock & Reset	Up Counter with Reset If CounterMode Ch#0 = 0x5, CounterMode Ch#1 is not used. - Counter Input Ch#0 acts as Up Clock Input to Ch#0. - Counter Input Ch#1 acts as Reset Input to Ch#0. If CounterMode Ch#2 = 0x5, CounterMode Ch#3 is not used. - Counter Input Ch#2 acts as Up Clock Input to Ch#2. - Counter Input Ch#3 acts as Reset Input to Ch#2.
B' 0110 (0x6)	Down Clock & Inhibit	Down Counter with Inhibit If CounterMode Ch#0 = 0x6, CounterMode Ch#1 is not used. - Counter Input Ch#0 acts as Down Clock Input to Ch#0. - Counter Input Ch#1 acts as Inhibit Input to Ch#0. If CounterMode Ch#2 = 0x6, CounterMode Ch#3 is not used. - Counter Input Ch#2 acts as Down Clock Input to Ch#2. - Counter Input Ch#3 acts as Inhibit Input to Ch#2.
B' 0111 (0x7)	Down Clock & Reset	Down Counter with Reset If CounterMode Ch#0 = 0x7, CounterMode Ch#1 is not used. - Counter Input Ch#0 acts as Down Clock Input to Ch#0. - Counter Input Ch#1 acts as Reset Input to Ch#0. If CounterMode Ch#2 = 0x7, CounterMode Ch#3 is not used. - Counter Input Ch#2 acts as Down Clock Input to Ch#2. - Counter Input Ch#3 acts as Reset Input to Ch#2.
B' 1000 (0x8)	Up Clock & Down Clock	Up & Down Counter If CounterMode Ch#0 = 0x8, CounterMode Ch#1 is not used. - Counter Input Ch#0 acts as Up Clock Input to Ch#0. - Counter Input Ch#1 acts as Down Clock Input to Ch#0. If CounterMode Ch#2 = 0x8, CounterMode Ch#3 is not used. - Counter Input Ch#2 acts as Up Clock Input to Ch#2. - Counter Input Ch#3 acts as Down Clock Input to Ch#2.

B' 1001 ( 0x9 )	Clock & Direction	Up & Down with Direction If CounterMode Ch#0 = 0x9, CounterMode Ch#1 is not used. - Counter Input Ch#0 acts as Clock Input to Ch#0. - Counter Input Ch#1 acts as Direction Input to Ch#0. If CounterMode Ch#2 = 0x9, CounterMode Ch#3 is not used. - Counter Input Ch#2 acts as Clock Input to Ch#2. - Counter Input Ch#3 acts as Direction Input to Ch#2. ( Direction Input : Low = Up Count, High = Down Count )
B' 1010 ( 0xA )	Encoder 1x (*1)	Encoder 1x If CounterMode Ch#0 = 0xA, CounterMode Ch#1 is not used. - Counter Input Ch#0 acts as A Phase Input to Ch#0. - Counter Input Ch#1 acts as B Phase Input to Ch#0. If CounterMode Ch#2 = 0xA, CounterMode Ch#3 is not used. - Counter Input Ch#2 acts as A Phase Input to Ch#2. - Counter Input Ch#3 acts as B Phase Input to Ch#2.
B' 1011 ( 0xB )	Encoder 2x	Encoder 2x If CounterMode Ch#0 = 0xB, CounterMode Ch#1 is not used. - Counter Input Ch#0 acts as A Phase Input to Ch#0. - Counter Input Ch#1 acts as B Phase Input to Ch#0. If CounterMode Ch#2 = 0xB, CounterMode Ch#3 is not used. - Counter Input Ch#2 acts as A Phase Input to Ch#2. - Counter Input Ch#3 acts as B Phase Input to Ch#2.
B' 1100 ( 0xC )	Encoder 4x	Encoder 4x If CounterMode Ch#0 = 0xA, CounterMode Ch#1 is not used. - Counter Input Ch#0 acts as A Phase Input to Ch#0. - Counter Input Ch#1 acts as B Phase Input to Ch#0. If CounterMode Ch#2 = 0xA, CounterMode Ch#3 is not used. - Counter Input Ch#2 acts as A Phase Input to Ch#2. - Counter Input Ch#3 acts as B Phase Input to Ch#2.
B' 1101 ( 0xD )	Frequency Measurement (*2) 1sec Update	Simple Frequency Measurement, updated by 1sec, Hz Unit - Aph Input acts as Frequency Input - Bph Input is not used - Counter Input CH#0, CH#2 act as Frequency Input to CH#0, CH#2.
B' 1110 ( 0xE )	Pulse Width Measurement (*3)	Simple Pulse Width Measurement, 0.1usec Unit - Pulse Width(32bit), if 1234, then Pulse High(On) width is 123.4usec (*3) - Counter Input CH#0, CH#2 act as Pulse Input to CH#0, CH#2.
B' 1111 ( 0xF )	Pulse Width & Period Measurement (*4)	Simple Pulse Width & Period Measurement, 0.1usec Unit, - Available in case of Pulse Input $\geq 200\text{Hz}$ ( $\leq 2.5\text{msec}$ , Pulse On Width) - Pulse Width(16bit, Low Word) + Pulse Period(16bit, High Word) (*4) - Counter Input CH#0, CH#2.act as Pulse Input to CH#0, CH#2.

- Frequency Range of the Encoder x1 mode is the same as the counting mode.

- Frequency, B'1101(0xD) can't be used with other channel's Count Mode = 0x0, 0x1, 0x4 ~ 0xA

- Pulse Width, B'1110(0xE) measures Pulse Input's High(On) Pulse Width(32bit) in 0.1usec unit.

- Pulse Width&Period, B'1111(0xF) measures Pulse Input's High(On) Width(16bit)&Period(16bit) in 0.1usec unit.

## 2.5. GT-5114 Configuration Parameter Data - 4byte

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Reserved							
1	Reserved							
2	Reserved							
3	Reserved							