
FnIO G – Series :

GT-5904

GT-5904 (4 Channels IO-Link Master, 4 Points Sink Input, IP20)

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Specification

History

Rev	Pages	Remarks	Date	Editor
1.00			2023/07/28	Suna, Hwang
1.01	4,5,6	Edit Certification, Specification / Change Diagram, Description	2024/05/22	Suna, Hwang
1.02	1,8,9,11, 12,13	Edit Module Description, Mapping data table, Supported Commands table / Add Error Types (IO-Link Spec)	2024/06/04	Suna, Hwang
1.03	5	Edit Specification	2024/10/10	Suna, Hwang
1.04	10	Edit Configuration Parameter Data Size Mode	2025/04/28	Suna, Hwang
1.05	10	Delete Parameter Data Size Mode - Max 2ch	2025/09/03	Suna, Hwang
1.06	8,9,11	Add description for Error Code, Attribute ID 0xF / Edit Communication Format ACK/REQ	2025/12/22	Suna, Hwang

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	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, UKCA

Specification

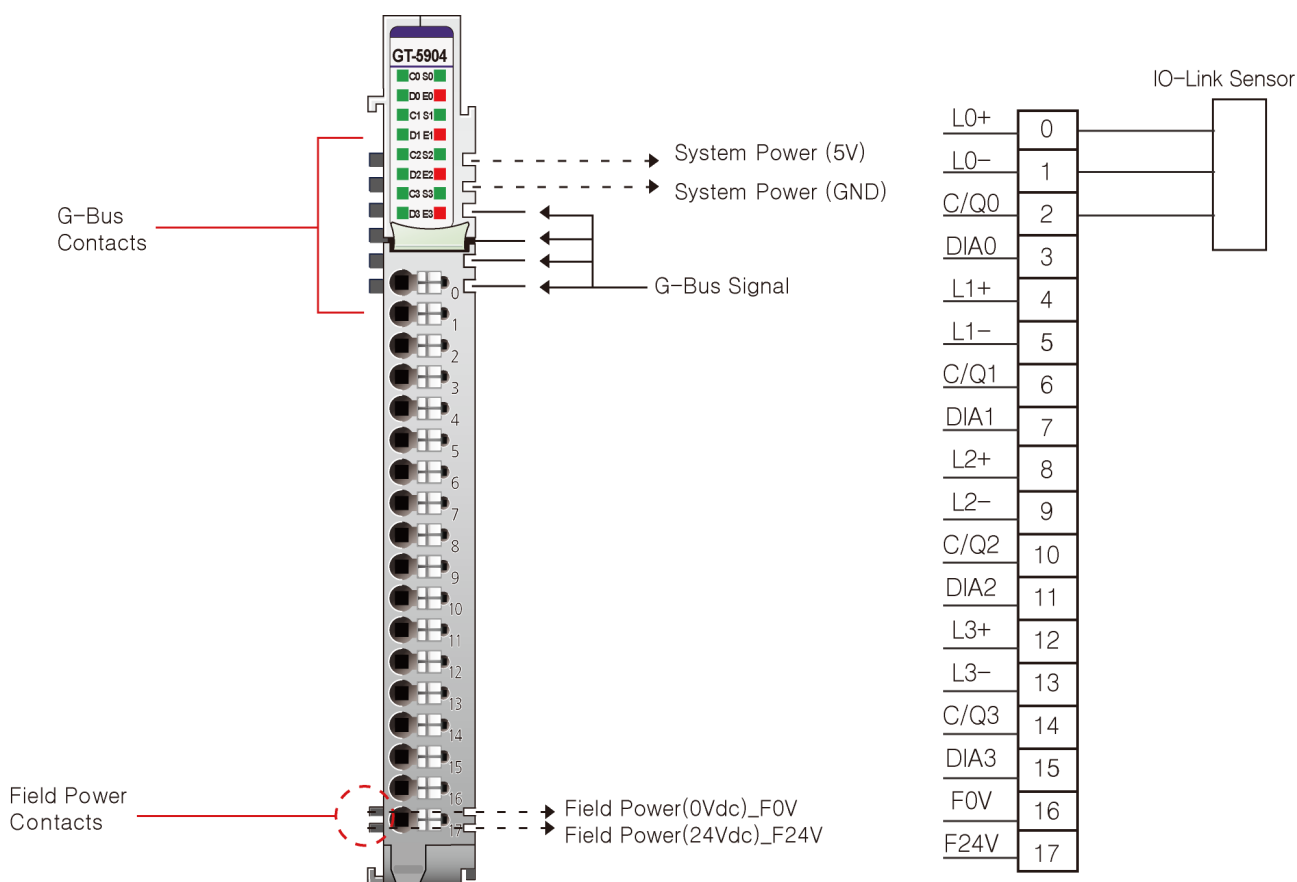
2. GT-5904 (4 Channels IO-Link Master, 4 Points Sink Input, IP20)

2.1. GT-5904 Specification

Items	Specification
IO-Link Specification	
Number of Channel	4 channels IO-Link
Specification version	IO-Link V1.1
Transmission rate	4.8kbps (COM1), 38.4kbps (COM2), 230.4kbps (COM3)
Sensor power(L+) current rating	Max. 0.5A per channel / Max. 2A per unit @ 25°C
Input Specification	
Input per module	8 points sink type (SIO 4 points + DIA 4 points)
Indicators	8 green input status (SIO 4 green + DIA 4 green)
On-state voltage	24Vdc nominal 15 ~ 30Vdc @ 25°C
On-state current	2.5mA @ 15~30Vdc
Off-state voltage	9Vdc @ 25°C
Input signal delay	OFF to ON : 0.4ms Max ON to OFF : 0.3ms Max
Common type	8 points / 1 COM (Sink)
Output Specification	
Output per module	4 points source type (SIO 4 points)
Indicators	4 green output status (SIO 4 green)
Output voltage range	24Vdc nominal 15Vdc ~ 30Vdc @ 25°C
On-state voltage drop	0.8Vdc @ 25°C 1.5Vdc @ 60°C
Off-state leakage current	Max. 10uA
Output signal delay	OFF to ON : 0.2ms Max ON to OFF : 0.2ms Max
Output current rating	Max. 0.5A per channel / Max. 2.0A per unit @ 25°C
Protection	Over current limit : 0.6A @ 25°C per each channels Thermal shutdown : Typical. 160°C @ 25°C per each channels Short circuit protection
Common type	4 points / 1 COM (Source)
General Specification	
Power Dissipation	Max. 85mA @ 5Vdc
UL Field Power	Supply voltage : 24Vdc nominal, Class 2
Field Power	Supply voltage : 24Vdc nominal Voltage range : 15~30Vdc Power Dissipation : Max. 20mA @ 24Vdc
Wiring	I/O Cable Max. 0.823mm ² (AWG 18)
Weight	63g
Module Size	12mm x 109mm x 70mm
Environment Condition	Refer to 'Environment Specification'

Specification

2.2. GT-5904 Wiring Diagram

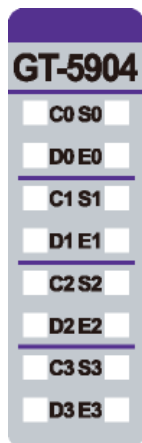


Pin No.	Signal Description
0	Power Supply 24V, Channel #0
1	Power Supply 0V, Channel #0
2	IO-Link / SIO Channel #0
3	Digital Input Channel #0
4	Power Supply 24V, Channel #1
5	Power Supply 0V, Channel #1
6	IO-Link / SIO Channel #1
7	Digital Input Channel #1
8	Power Supply 24V, Channel #2
9	Power Supply 0V, Channel #2
10	IO-Link / SIO Channel #2
11	Digital Input Channel #2
12	Power Supply 24V, Channel #3
13	Power Supply 0V, Channel #3
14	IO-Link / SIO Channel #3
15	Digital Input Channel #3
16	Field Power 0V, Common
17	Field Power 24V

Specification

2.3. GT-5904 LED Indicator

2.3.1. LED Indicator



LED No.	LED Function / Description	LED Color
C0	IO-Link Run / SIO Value #0	Green
D0	DIA Digital Input #0	Green
S0	Mode Status #0	Green
E0	Communication Error #0	Red
C1	IO-Link Run / SIO Value #1	Green
D1	DIA Digital Input #1	Green
S1	Mode Status #1	Green
E1	Communication Error #1	Red
C2	IO-Link Run / SIO Value #2	Green
D2	DIA Digital Input #2	Green
S2	Mode Status #2	Green
E2	Communication Error #2	Red
C3	IO-Link Run / SIO Value #3	Green
D3	DIA Digital Input #3	Green
S3	Mode Status #3	Green
E3	Communication Error #3	Red

● IO-Link Run / SIO Value LED (C0~3)

Status	LED	To Indicate
Operation Signal	Green	IO-Link mode : Device connected
		SIO mode : High State
	Off	IO-Link mode : No device connected
		SIO mode : Low State

● DIA Digital Input LED (D0~3)

Status	LED	To Indicate
On Signal	Green	Input Signal detected
No Signal	Off	No Input Signal

● Mode Status LED (S0~3)

Status	LED	To Indicate
IO-Link Mode Status	Green	IO-Link Mode : PREOPERATE or OPERATE state
	Flashing Green	IO-Link Mode : WAKE-UP or STARTUP state
	Off	IO-Link Communication did not start.

● Communication Error LED (E0~3)

Status	LED	To Indicate
IO-Link Communication	Red	An error occurred that disconnected IO-Link communication.
	Off	Normal operation without IO-Link communication errors.

Specification

2.4. Mapping data into the image table

● Input Image Value (Default : 14 Byte)

Bit No	Output Image Data							
	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Communication Format								
Byte0	-	-	-	CMD	ATTRIBUTE (Supported Commands)			
Byte1	ACK	-	-	*ALL	*CH (0 : Ch0 / 1 : Ch1 / 2 : Ch2 / 3 : Ch3)			
Byte2	Attribute Data (LL)							
Byte3	Attribute Data (LH)							
Byte4	Attribute Data (HL)							
Byte5	Attribute Data (HH)							
IO-Link Data								
Byte6	IO-Link Data Byte #0							
Byte7	IO-Link Data Byte #1							
Byte8	IO-Link Data Byte #2							
Byte9	IO-Link Data Byte #3							
Byte10	IO-Link Data Byte #4							
Byte11	IO-Link Data Byte #5							
Byte12	IO-Link Data Byte #6							
Byte13	IO-Link Data Byte #7 (Variable Mode : Default)							
...	...							
Byte36	IO-Link Data Byte #30							
Byte37	IO-Link Data Byte #31 (Variable Mode : Max)							
...	...							
Byte52	IO-Link Data Byte #46							
Byte53	IO-Link Data Byte #47 (Fixed Mode)							

* 'ALL' has higher priority than 'CH'.

● Communication Format

Communication Format	Value (DEC)	Meaning
ACK	0	Communication Format Disable
	1	Communication Format Enable
CMD	0	Attribute Data Read
	1	Attribute Data Write
*ATTRIBUTE	0 - 7, 10	Attribute ID
	8-9, 11-15	Reserved
ALL	0	Write the command for only one channel.
	1	Write the same command to all channels.
**CH	0 - 3	Each channel can be controlled.
	4 - 14	Reserved
	15	All channels can be controlled at once. (Reserved when ATTRIBUTES = 2)

* If you set 'ATTRIBUTE' to the reserved value, Error Code (0xFFFF 0xAAAA) is displayed in Attribute Data.

** If you set 'CH' to the reserved value, Error Code (0xFFFF 0xCCCC) is displayed in Attribute Data.

Specification

● Output Image Value (Default : 8 Byte)

When the field power is turned off, the previous 'Attribute' settings are initialized.

Bit No	Output Image Data							
	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Communication Format								
Byte0	-	-	-	CMD	ATTRIBUTE (Supported Commands)			
Byte1	REQ	-	-	*ALL	*CH (0 : Ch0 / 1 : Ch1 / 2 : Ch2 / 3 : Ch3)			
Byte2	Attribute Data (LL)							
Byte3	Attribute Data (LH)							
Byte4	Attribute Data (HL)							
Byte5	Attribute Data (HH)							
IO-Link Data								
Byte6	IO-Link Data Byte #0							
Byte7	IO-Link Data Byte #1 (Variable Mode : Default)							
Byte8	IO-Link Data Byte #2							
Byte9	IO-Link Data Byte #3							
Byte10	IO-Link Data Byte #4							
Byte11	IO-Link Data Byte #5							
Byte12	IO-Link Data Byte #6							
Byte13	IO-Link Data Byte #7							
...	...							
Byte36	IO-Link Data Byte #30							
Byte37	IO-Link Data Byte #31 (Variable Mode : Max)							
...	...							
Byte52	IO-Link Data Byte #46							
Byte53	IO-Link Data Byte #47 (Fixed Mode)							

* 'ALL' has higher priority than 'CH'.

● Communication Format

Communication Format	Value (DEC)	Meaning
REQ	0	Communication Format Disable
	1	Communication Format Enable
CMD	0	Attribute Data Read
	1	Attribute Data Write
*ATTRIBUTE	0 - 7, 10	Attribute ID
	8-9, 11-15	Reserved
ALL	0	Write the command for only one channel.
	1	Write the same command to all channels.
**CH	0 - 3	Each channel can be controlled.
	4 - 14	Reserved
	15	All channels can be controlled at once. (Reserved when ATTRIBUTES = 2)

* If you set 'ATTRIBUTE' to the reserved value, Error Code (0xFFFF 0xAAAA) is displayed in Attribute Data.

** If you set 'CH' to the reserved value, Error Code (0xFFFF 0xCCCC) is displayed in Attribute Data.

2.5. Configuration Parameter Data

- Valid Parameter length: 4 Bytes
- Parameter Data

Bit No	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	*Setting Input Size (**IO-Link Data Byte) (**H00: Default Size(8byte) / H00~H20: 0~32byte)							
Byte1	*Setting Output Size (**IO-Link Data Byte) (**H00: Default Size(2byte) / H00~H20: 0~32byte)							
Byte2	Reserved						Size Mode 0 : Variable 1 : Fixed	
Byte3	Reserved							

Size Mode 0 : Variable Mode (IO-Link Data Size : 0~32 byte) – Apply 'Setting Input / Output Size'

Size Mode 1 : Fixed Mode (IO-Link Data Size : 48 byte) – Ignore 'Setting Input / Output Size'

Note: Users using EtherCAT, Profibus and Profinet protocols should contact us, as they will need to modify the XML, GSD and GSDML file when changing the 'Setting Input/Output Size (IO-Link Data Byte)' value.

*** If you changed 'Setting Input/Output Size (IO-Link Data Byte)', you must RESET Module.**

** The Input/Output size is the 'IO-Link Data Byte' Size, and the 'Communication Format' Size has nothing to do with this setting.

*** If both 'Setting Input IO-Link Data Byte Size' and 'Setting Output IO-Link Data Byte Size' are 0x00, they are set as default values.

Specification

2.6. Supported Commands

When the field power is turned off, the previous 'Attribute' settings are initialized.

Attr ID	Access	Name	ALL	Data Size	Data Position
0x0	R	IO-Link Data PDIn	Unavailable	Depends on device specification	IO-Link Data Byte #0 ~
0x1	R/W	IO-Link Data PDOut	Available		
0x2	R/W	Device Parameter Index	Unavailable	2byte	Data (LL/LH)
	R/W	Device Parameter SubIndex		1byte	Data (HL)
	W	* Write Data Length		1byte	Data(HH)
0x3	R	Status	Unavailable	1byte	Data (LL)
0x4	R/W	Operation Mode	Unavailable	1byte	Data (LL)
0x5	R/W	SIO Bit	Unavailable	1byte	Data (LL)
0x6	R/W	IO-Link Data PDIn Size of each channel	Unavailable	4byte	Data (LL-HH)
0x7	R/W	IO-Link Data PDOut Size of each channel	Unavailable	4byte	Data (LL-HH)
0xA	R	Communication Error Count	Unavailable	4byte	Data (LL-HH)
0xF	R/W	Input Image Value : PDIn Read	Unavailable	Depends on device specification	IO-Link Data Byte #0 ~
		Output Image Value : PDOut Write	Available		

* In case of CMD Read, this value is ignored.

* When Attribute 0xF, it means that PDIn Read and PDOut Write are performed simultaneously.

● IO-Link Data PDIn (Default Size : 8Byte)

IO-Link Data PDIn	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
IO-Link Data Byte #0	IO-Link Data of Input Value are bytes that indicate PDIn. All channels can be read sequentially.							
IO-Link Data Byte #1								
...								
IO-Link Data Byte #7								

● IO-Link Data PDOut (Default Size : 2Byte)

IO-Link Data PDIn	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
IO-Link Data Byte #0	IO-Link Data of Output Value are bytes that indicate PDOut. The same value can be written to all channels, and all channels can be read/write sequentially.							
IO-Link Data Byte #1								

● Device Parameter Index / SubIndex

Device Parameter Index/SubIndex	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Data (LL)	Device Parameter Index (ex. Index = 0x0015 → Data(LH) : 0x00 / Data(LL) : 0x15)							
Data (LH)								
Data (HL)	Device Parameter SubIndex							
Data (HH)	Write Data Length (Write-Only. Ignored when reading.)							

Write Complete - Input IO-Link Data Byte #0 : 0x52 / Read/Write Error – [Error Types](#) Check

● Status

Status	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Data (LL)	Reserved			Size_WARN	Ch3_ERR	Ch2_ERR	Ch1_ERR	Ch0_ERR
	Size_WARN - 0 : When the In/Output Size is the same as the connected Device Size - 1 : When the In/Output Size is not the same as the connected Device Size							
				Ch3~0_ERR - 0 : No Fault, No Error - 1 : Device Fault, IO-Link Communication Error				

Specification

● Operation Mode

Operation Mode	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Data (LL)	Ch3		Ch2		Ch1		Ch0	
	Size Mode (Parameter Data)							
	Variable - 0 : Inactive (default) / 1 : Digital Input / 2 : Digital Output / 3 : IO-Link							
	Fixed - 0 : IO-Link (default) / 1 : Digital Input / 2 : Digital Output / 3 : Inactive							

● SIO Bit / DIA Bit

SIO Bit	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
	DIA Bit (Only Input Value)				SIO Bit (Input or Output Value)			
Data (LL)	Ch3	Ch2	Ch1	Ch0	Ch3	Ch2	Ch1	Ch0
	0 : Low Value / 1 : High Value							

● IO-Link Data PDIn Size of each channel

SIO Bit	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Data (LL)	Ch0 (*Default value: 'Setting Input Size' ÷ 4 / **H00~H20: 0~32byte)							
Data (LH)	Ch1 (*Default value: 'Setting Input Size' ÷ 4 / **H00~H20: 0~32byte)							
Data (HL)	Ch2 (*Default value: 'Setting Input Size' ÷ 4 / **H00~H20: 0~32byte)							
Data (HH)	Ch3 (*Default value: 'Setting Input Size' ÷ 4 / **H00~H20: 0~32byte)							

* If 'Setting Input Size' is 12byte, the default value of each channel is $12 \div 4 = 3$ byte.

If 'Setting Input Size' is 13byte, the default value of Ch0 is 4byte and the default value of Ch1,2,3 is 3byte.

** The sum of 4 channels is the maximum value of 'Setting Input Size'.

● IO-Link Data PDOOut Size of each channel

SIO Bit	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Data (LL)	Ch0 (*Default value: 'Setting Output Size' ÷ 4 / **H00~H20: 0~32byte)							
Data (LH)	Ch1 (*Default value: 'Setting Output Size' ÷ 4 / **H00~H20: 0~32byte)							
Data (HL)	Ch2 (*Default value: 'Setting Output Size' ÷ 4 / **H00~H20: 0~32byte)							
Data (HH)	Ch3 (*Default value: 'Setting Output Size' ÷ 4 / **H00~H20: 0~32byte)							

* If 'Setting Output Size' is 12byte, the default value of each channel is $12 \div 4 = 3$ byte.

If 'Setting Output Size' is 13byte, the default value of Ch0 is 4byte and the default value of Ch1,2,3 is 3byte.

** The sum of 4 channels is the maximum value of 'Setting Output Size'.

● IO-Link Communication Error Count

Status	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Data (LL)	IO-Link Communication Error Count – Ch0							
Data (LH)	IO-Link Communication Error Count – Ch1							
Data (HL)	IO-Link Communication Error Count – Ch2							
Data (HH)	IO-Link Communication Error Count – Ch3							

● Input : PDIn Read / Output : PDOOut Write (Default Size : 32Byte)

- This setting allows PDIn to read while PDOOut writes.

- When the user performs a PDOOut write in the Output Image Value, the PDIn read is always displayed in the Input Image Value.

2.7. Error Types (IO-Link Spec)

- If an error occurs when device parameter read/write, you can check the ErrorCode in the IO-Link Data area of the Input Image Value.

Incident	Error Code	Additional Code	Name	Definition
Device application error – no details	0x80	0x00	APP_DEV	This ErrorType shall be used if the requested service has been refused by the Device application and no detailed information of the incident is available.
Index not available	0x80	0x11	IDX_NOTAVAIL	This ErrorType shall be used whenever a read or write access occurs to a non-existing Index with or without Subindex access.
Subindex not available	0x80	0x12	SUBIDX_NOTAVAIL	This ErrorType shall be used whenever a read or write access occurs to a non-existing Subindex of an existing Index.
Service temporarily not available	0x80	0x20	SERV_NOTAVAIL	This ErrorType shall be used if a parameter is not accessible for a read or write service due to the current state of the Device application.
Service temporarily not available – local control	0x80	0x21	SERV_NOTAVAIL_LOCCTRL	This ErrorType shall be used if a parameter is not accessible for a read or write service due to an ongoing local operation at the Device (for example operation or parameterization via an on-board Device control panel).
Service temporarily not available – Device control	0x80	0x22	SERV_NOTAVAIL_DEVCTRL	This ErrorType shall be used if a parameter is not accessible due to a remote triggered state of the device application (for example parameterization during a remote triggered teach-in operation or calibration).
Access denied	0x80	0x23	IDX_NOT_ACCESSIBLE	This ErrorType shall be used if a Write service tries to access a read-only parameter or if a Read service tries to access a write-only parameter.
Parameter value out of range	0x80	0x30	PAR_VALOUTOFRNG	This ErrorType shall be used for a write service to a parameter outside its permitted range of values. Example: enumerations (list of single values), combination of value ranges and enumeration.
Parameter value above limit	0x80	0x31	PAR_VALGTLIM	This ErrorType shall be used for a write service to a parameter above its specified value range.
Parameter value below limit	0x80	0x32	PAR_VALLTLIM	This ErrorType shall be used for a write service to a parameter below its specified value range.
Parameter length overrun	0x80	0x33	VAL_LENVERRUN	This ErrorType shall be used when the content of a write service to a parameter is greater than the parameter specified length. This ErrorType shall also be used, if a data object is too large to be processed by the Device application (for example ISDU buffer restriction).
Parameter length underrun	0x80	0x34	VAL_LENUNDRUN	This ErrorType shall be used when the content of a write service to a parameter is less than the parameter specified length (for example write access of an Unsigned16 value to an Unsigned32 parameter).
Function not available	0x80	0x35	FUNC_NOTAVAIL	This ErrorType shall be used for a write service with a command value not supported by the Device application (for example a SystemCommand with a value not implemented).
Function temporarily unavailable	0x80	0x36	FUNC_UNAVAILTEMP	This ErrorType shall be used for a write service with a command value calling a Device function not available due to the current state of the Device application (for example a SystemCommand).
Invalid parameter set	0x80	0x40	PAR_SETINVALID	This ErrorType shall be used if values sent via single parameter transfer are not consistent with other actual parameter settings (for example overlapping set points for a binary data setting; see 10.3.4).
Inconsistent parameter set	0x80	0x41	PAR_SETINCONSIST	This ErrorType shall be used at the termination of a Block Parameter transfer with ParamDownloadEnd or ParamDownloadStore if the plausibility check shows inconsistencies (see 10.3.5 and B.2.2).
Application not ready	0x80	0x82	APP_DEVNOTRDY	This ErrorType shall be used if a read or write service is refused due to a temporarily unavailable application (for example peripheral controllers during startup).
Vendor specific	0x81	0x00	UNSPECIFIC	This ErrorType will be propagated directly to upper level processing elements as an error (no warning) by the Master.
Vendor specific	0x81	0x00 to 0xFF	VENDOR_SPECIFIC	

Specification

2.8. Command Example

2.8.1. Example of IO-Link Data Setup (PDIn / PDOOut)

- It is assumed that the input / output size is 2 bytes.

- IO-Link Data PDIn / PDOOut Read (CMD = 0 / Attribute = 0 or 1 / CH = 3)

Byte	Input Image Data								Byte	Output Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Communication Format									Communication Format							
0	-	-	-	0	0 or 1 (* Note 1)				0	-	-	-	0	0 or 1 (* Note 1)			
1	1	-	-	0	3				1	1	-	-	0	3			
2	X								2	X							
3	X								3	X							
4	X								4	X							
5	X								5	X							
	IO-Link Data									IO-Link Data							
6	0x12								6	X							
7	0x34								7	X							

- IO-Link Data PDOOut One Channel Write (CMD = 1 / Attribute = 1 / CH = 3)

Byte	Output Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Communication Format							
0	-	-	-	1 (* Note 2)	1			
1	1	-	-	0	3			
2	X							
3	X							
4	X							
5	X							
	IO-Link Data							
6	0x56							
7	0x78							

- IO-Link Data PDOOut All Channel Write (CMD = 1 / Attribute = 1 / CH = X)

Byte	Output Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Communication Format							
0	-	-	-	1 (* Note 2)	1			
1	1	-	-	1 (* Note 3)	X			
2	X							
3	X							
4	X							
5	X							
	IO-Link Data							
6	0x56							
7	0x78							

Specification

- As an exception, only this example assumes that the output size is 8 bytes.

● **IO-Link Data PDIn / PDOOut Sequentially Read (CMD = 0 / Attribute = 0 or 1 / CH = 0xF)**

Byte	Input Image Data								Byte	Output Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Communication Format									Communication Format								
0	-	-	-	0	0 or 1 (* Note 1)				0	-	-	-	0	0 or 1 (* Note 1)			
1	1	-	-	0	0xF (* Note 4)				1	1	-	-	0	0xF (* Note 4)			
2	X								2	X							
3	X								3	X							
4	X								4	X							
5	X								5	X							
IO-Link Data									IO-Link Data								
6	0x12								6	X							
7	0x34								7	X							
8	0x56								8	X							
9	0x78								9	X							
10	0x90								10	X							
11	0xAB								11	X							
12	0xCD								12	X							
13	0xEF								13	X							

● **IO-Link Data PDOOut Sequentially Write (CMD = 1 / Attribute = 1 / CH = 0xF)**

Byte	Output Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Communication Format							
0	-	-	-	1 (* Note 2)	1			
1	1	-	-	0	0xF (* Note 4)			
2	X							
3	X							
4	X							
5	X							
	IO-Link Data (* Note 5)							
6	0x12							
7	0x34							
8	0x56							
9	0x78							
10	0x90							
11	0xAB							
12	0xCD							
13	0xEF							

* Note 1 : 'Attribute=0' setting is IO-Link Data PDIn and 'Attribute=1' setting is IO-Link Data PDOOut.

* Note 2 : When set to 'CMD=1', it does not affect the command value of Input Image Data.

* Note 3 : When set to 'ALL=1', the same command is written to all channels.

* Note 4 : When set to 'CH=0xF', commands are sequentially written from Ch0 to Ch3.

* Note 5 : The read/write data is ch0:0x1234 / ch1:0x5678 / ch2:0x90AB / ch3:0xCDEF.

Specification

2.8.2. Example of Device Parameter Setup

- It is assumed that the input / output size is 2 bytes.

- Device Parameter Read (CMD = 0 / Attribute = 2 / CH = 1 / Index = 0x1234 / SubIndex = 0x56)

Byte	Input Image Data								Byte	Output Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Communication Format									Communication Format							
0	-	-	-	0		2			0	-	-	-	0		2		
1	1	-	-	X		1			1	1	-	-	X		1		
2	0x34								2	0x34							
3	0x12								3	0x12							
4	0x56								4	0x56							
5	X								5	X							
	IO-Link Data									IO-Link Data							
6	0xAA								6	X							
7	0xBB								7	X							

- Device Parameter Write (CMD = 1 / Attribute = 2 / CH = 1 / Index = 0x7890 / SubIndex = 0x00)

Byte	Output Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Communication Format							
0	-	-	-	1 (* Note 1)		2		
1	1	-	-	X		1		
2	0x90							
3	0x78							
4	0x00							
5	0x02							
	IO-Link Data							
6	0xCC							
7	0xDD							

* Note 1 : When set to 'CMD=1', it does not affect the command value of Input Image Data.

Specification

2.8.3. Example of Status / Operation Mode / SIO Bit / PDIn/PDOut Size Setup

- It is assumed that the input / output size is 2 bytes.
- It can be set only with data (Byte 0 ~ Byte 3).
- 'ALL' and 'CH=0xF' settings are ignored, and data types are fixed as in 2.6.4 ~ 2.6.6.

● Status Read (CMD = 0 / Attribute = 3 / CH = X)

Byte	Input Image Data								Byte	Output Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Communication Format									Communication Format							
0	-	-	-	0	3				0	-	-	-	0	3			
1	1	-	-	X	X				1	1	-	-	X	X			
2	0x12 (* Note 1)								2	X							
3	0x00								3	X							
4	X								4	X							
5	X								5	X							
	IO-Link Data									IO-Link Data							
6	0xZZ (* Note 2)								6	X							
7	0xZZ (* Note 2)								7	X							

● Operation Mode Write (CMD = 1 / Attribute = 4 / CH = X)

Byte	Output Image Data							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	Communication Format							
0	-	-	-	1				4
1	1	-	-	X				X
2	0xC9 (* Note 3)							
3	0x00							
4	X							
5	X							
	IO-Link Data							
6	X							
7	X							

* Note 1 : Input Image Data Byte 2 means Size_WARN and Ch1_ERR status. (0x12 = 0b0001_0010)

* Note 2 : When reading attributes that do not use IO-Link Data Bytes, the current or previous IO-Link Data PDIn value is displayed.

* Note 3 : Output Image Data Byte 2 means ch3:IO-link / ch2:Inactive / ch1:DO / ch0:DI.
(0xC9 = 0b1100_1001)