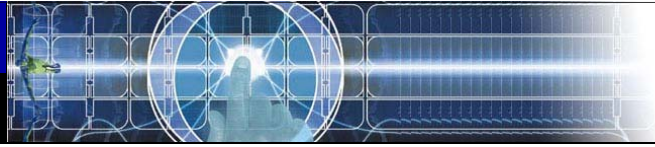


User Manual
FnIO S-Series
Discrete Output Module



List of Revisions

No.	Date	Version	Revision
1	2007.12.15	1.00	Created

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- 1) ST-2742
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1. Product Specifications

1) Environment Specifications

Item		Specifications	Remarks
Temperature	Operating	-20°C to +60°C (-4°F to 140°F)	
	Storage	-40°C to +85°C (-40°F to 185°F)	
Humidity	Operating	5 to 90% RH (Non-condensing)	
	Storage	5 to 90% RH (Non-condensing)	
Operating Altitude		2,000m	
Mounting		DIN Rail	

2) General Specifications

Item		Specifications	Remarks
Wiring I/O Cable		Max. 2.0m ² , AWG 14	
Shock Operating		10G	
Shock Non-Operating		30G	
Vibration/Shock Resistance	Displacement	0.012 Inch p-p from 10~57Hz	
	Acceleration	2G's from 57~500Hz	
	Sweep Rate	1 octave per Minute	
	Axes to test	X, Y, Z	
	Frequency Sweep per Axis	10	
EMC		Confirms to EN-61000-6-2	
EMI		Confirms to EN-61000-6-4	
Installation Pos. / Protect. Class		Variable / IP20	
Certifications		UL, cUL, CE	

2. Discrete 5VDC Output Module

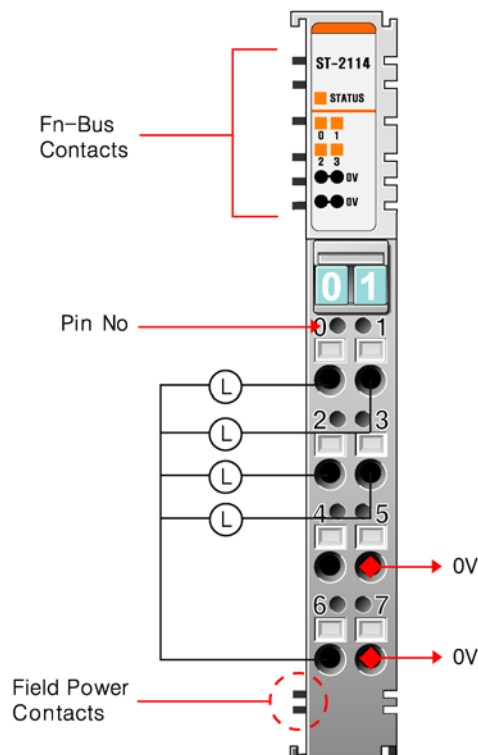
Description

- ST-21xx Series is TTL Inverting, Non-Inverting Output module and provide DC 5V/20mA. Connected Load is connected via Digital Output from Control System.
- It has all 5 LEDs for Status indication. One indicates FnBus status, the others indicate output Status of Output.
- Prevention circuit of electric leakage is applied to all outputs.
- It is isolated between Field I/O and FnBus by using Photo-coupler.
- Field Power required for Field Device is supplied to the Module placed in the very left and automatically connected via Field Power Contact of the each Module. If Filed Power has changed, Expansion Field Power Supply (ST-7241) must be used.

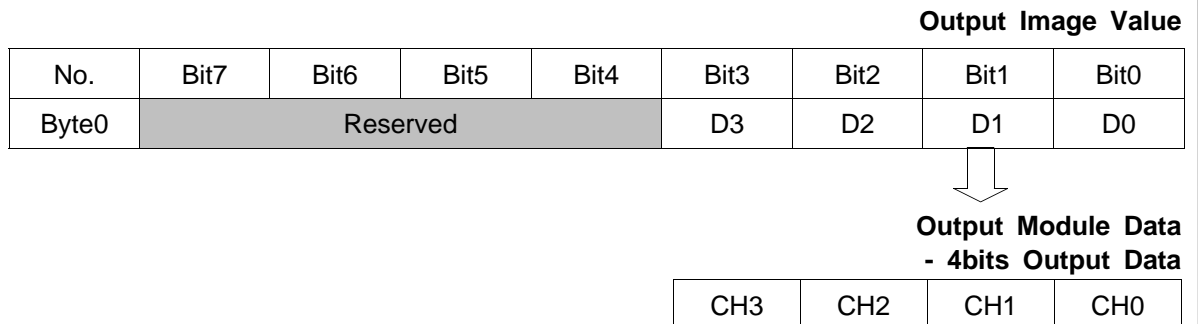
1) ST-2114

- 5VDC/20mA 4 points TTL Inverting Output Terminal Type

◆ Module View



◆ Mapping Data into the image table



◆ Specification

Output Specification	
Outputs per Module	4 points TTL Inverting Type
Indicators	4 Green Output State, 1 Green/Red FnBus State
Output Voltage Range	5Vdc nominal, Min. 4.5Vdc to Max. 5.5Vdc
Operating Frequency	DC to 50kHz
High-Level Output Voltage	Min. 4.8Vdc @ 5Vdc, 5mA
Low-Level Output Voltage	Max. 0.3Vdc @ 0Vdc, 5mA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 20mA per Channel
	Max. 80mA All Common
Protection	Output Short-Circuit protection
	Field Power Over Voltage Protection (6.7Vdc)
	Field Power Reverse Voltage Protection
Surge Current	40mA for 10ms, Repeatable Every 1 Sec.
Common Type	4 points / 1 COM (Single Common)
Module Specification	
Power Dissipation	Max. 50mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 5Vdc nominal
	Voltage Range : 4.5 ~ 5.5 Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

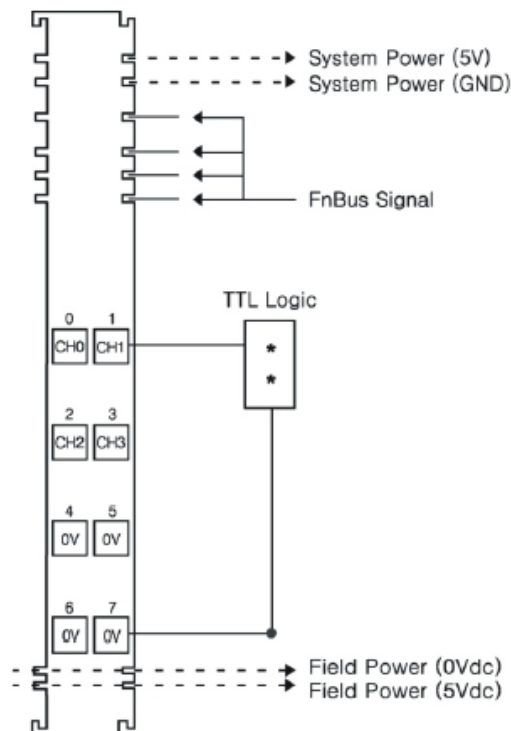
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation

◆ Module Wire Diagram



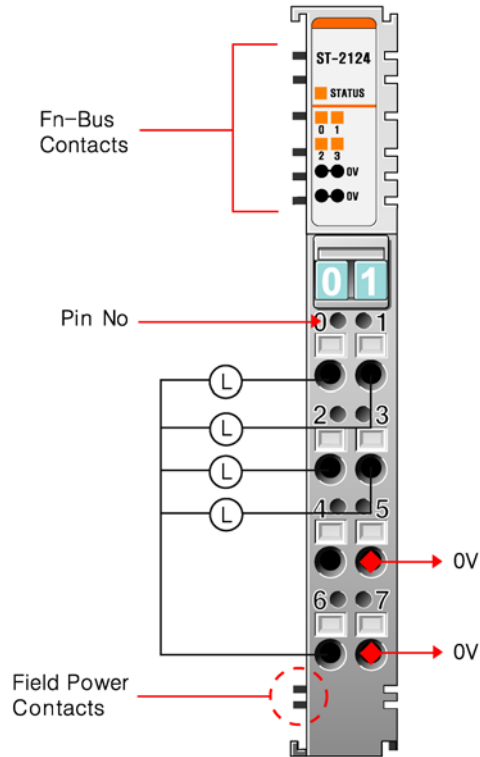
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Field Ground (0VDC)	5	Field Ground (0VDC)
6	Field Ground (0VDC)	7	Field Ground (0VDC)

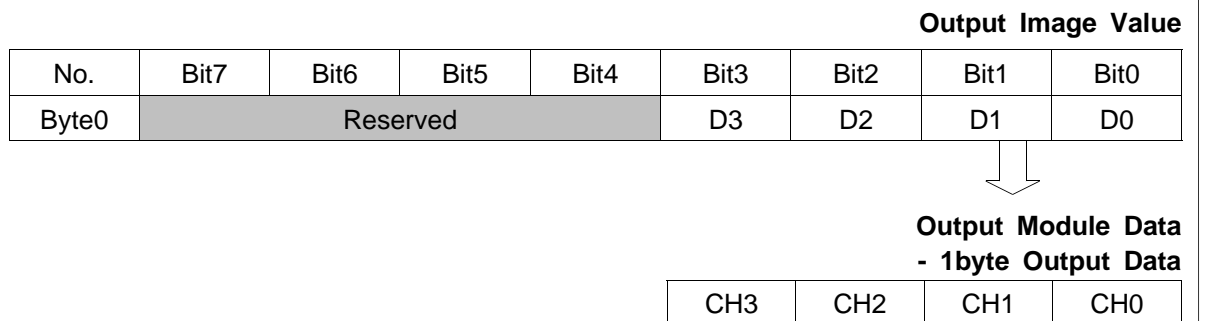
2) ST-2124

- 5VDC/20mA 4 points TTL Non-Inverting Output Terminal Type

◆ Module View



◆ Mapping Data into the image table



◆ Specification

Output Specification	
Outputs per Module	4 points TTL Non-Inverting Type
Indicators	4 Green Output State, 1 Green/Red FnBus State
Output Voltage Range	5Vdc nominal, Min. 4.5Vdc to Max. 5.5Vdc
Operating Frequency	DC to 50kHz
High-Level Output Voltage	Min. 4.8Vdc @ 5Vdc, 5mA
Low-Level Output Voltage	Max. 0.3Vdc @ 0Vdc, 5mA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 20mA per Channel
	Max. 80mA All Common
Protection	Output Short-Circuit protection
	Field Power Over Voltage Protection (6Vdc)
	Field Power Reverse Voltage Protection
Surge Current	40mA for 10ms, Repeatable Every 1 Sec.
Common Type	4 points / 1 COM (Single Common)
Module Specification	
Power Dissipation	Max. 50mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 5Vdc nominal
	Voltage Range : 4.5 ~ 5.5Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

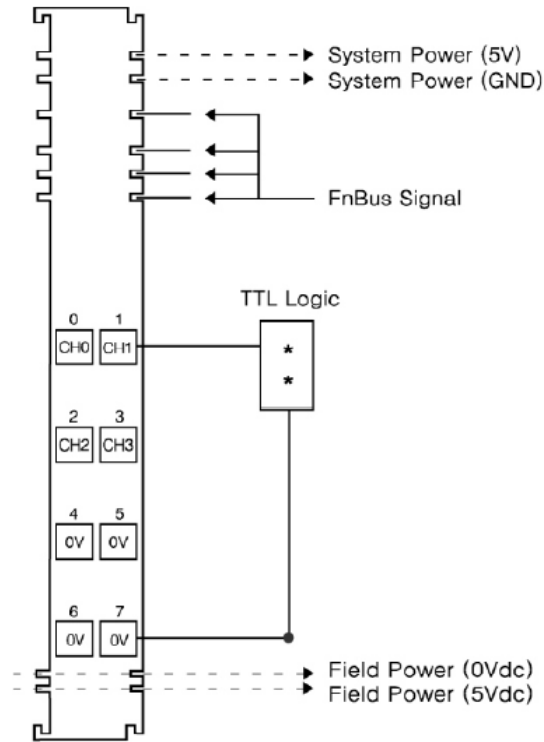
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation

◆ Module Wire Diagram



- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Field Ground (0VDC)	5	Field Ground (0VDC)
6	Field Ground (0VDC)	7	Field Ground (0VDC)

3. Discrete 24VDC Output Module

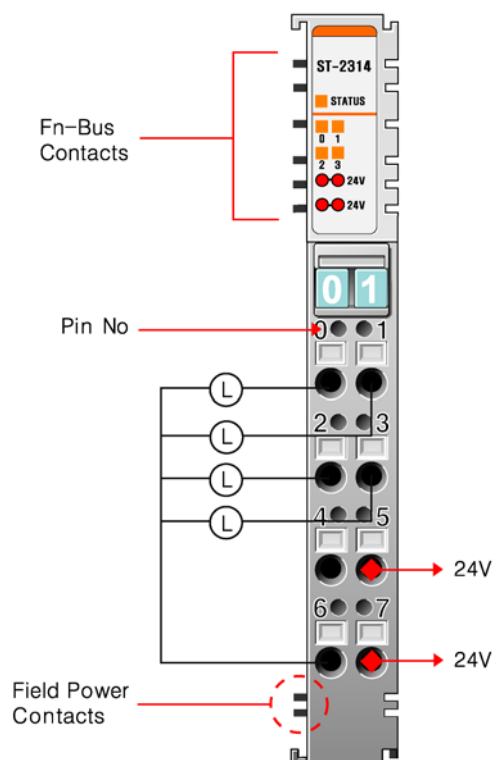
Description

- ST-23xx, 24xx, 25xx and 26xx Series provide DC 24V/0.3, 0.5, 2A. Connected Load is connected via Digital Output from Control System.
- It has all 5~17 LEDs for Status indication. One indicates FnBus status, the others indicate output Status of Output.
- Prevention circuit of electric leakage is applied to all outputs.
- It is isolated between Field I/O and FnBus by using Photo-coupler.
- Field Power required for Field Device is supplied to the Module placed in the very left and automatically connected via Field Power Contact of the each Module. If Filed Power has changed, Expansion Field Power Supply (ST-7241) must be used.

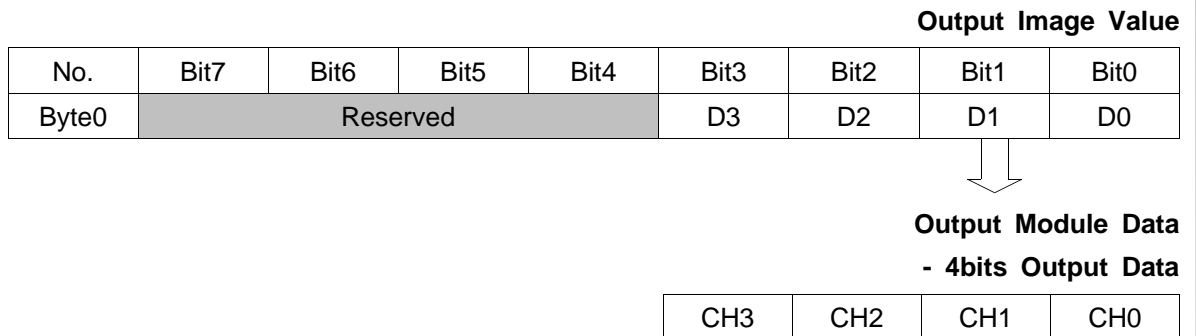
1) ST-2314

- 24VDC/0.5A 4 points Sink Output (Negative Logic) Terminal Type

◆ Module View



◆ Mapping Data into the image table



◆ Specification

Output Specification	
Outputs per Module	4 points Sink Type (Negative Logic)
Indicators	4 Green Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 0.3Vdc@25℃
Off-state Leakage Current	Max. 50uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 0.5A per Channel
	Max. 2.0A per Common
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 3.5A / Max. 7A Per Channel
	ESD Protection : 16.5Kv
Common Type	4 points / 1 COM (Single Common)
Module Specification	
Power Dissipation	Max. 45mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8 Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

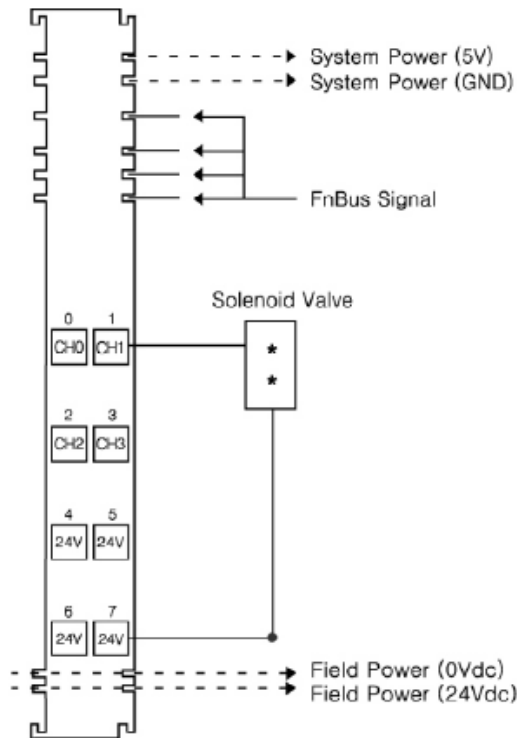
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
		Off	Output Protection

◆ Module Wire Diagram



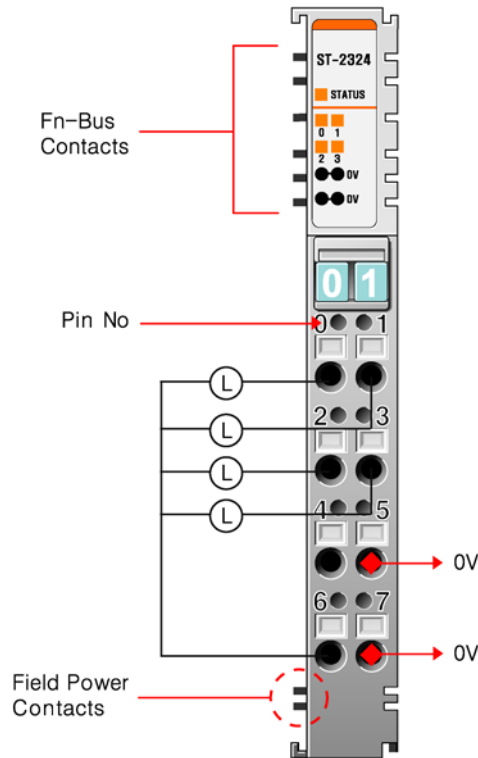
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Field Ground (24VDC)	5	Field Ground (24VDC)
6	Field Ground (24VDC)	7	Field Ground (24VDC)

2) ST-2324

- 24VDC/0.5A 4 points Source Output (Positive Logic) Terminal Type

◆ Module View



◆ Mapping Data into the image table

Output Image Table

No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	Reserved				D3	D2	D1	D0



Output Module Data
- 4bits Output Data

CH3	CH2	CH1	CH0
-----	-----	-----	-----

◆ Specification

Output Specification	
Outputs per Module	4 points Source Type (Positive Logic)
Indicators	4 Green Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 0.3Vdc@25℃
Off-state Leakage Current	Max. 50uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 0.5A per Channel
	Max. 2.0A per Common
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 3.5A / Max. 7.5A Per Channel
	ESD Protection : 5.0Kv
Common Type	4 points / 1 COM (Single Common)
Module Specification	
Power Dissipation	Max. 45mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

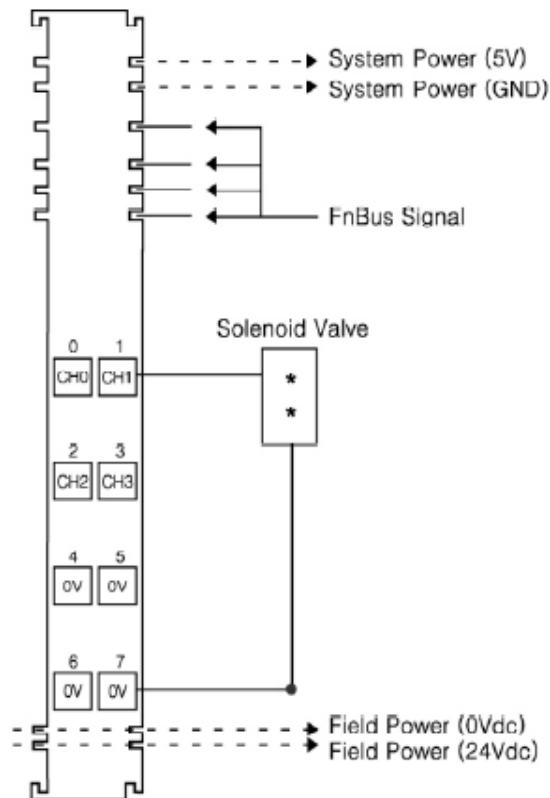
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
		Off	Output Protection

◆ Module Wire Diagram



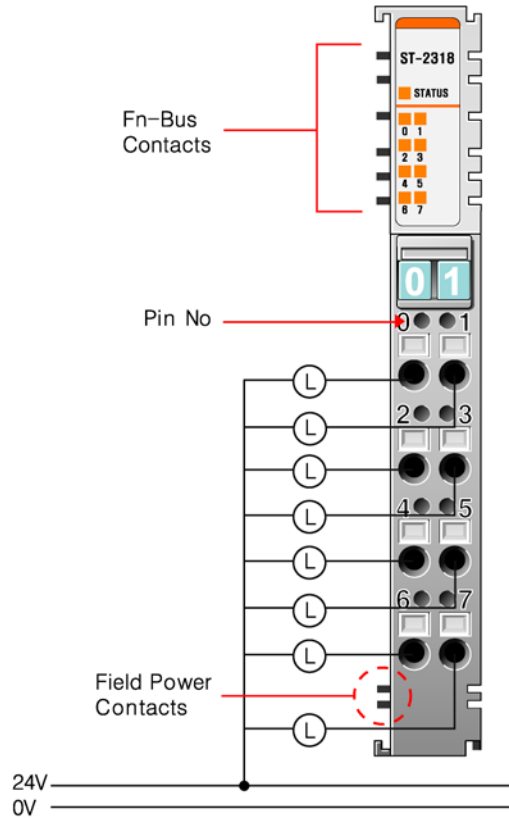
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Field Ground (0VDC)	5	Field Ground (0VDC)
6	Field Ground (0VDC)	7	Field Ground (0VDC)

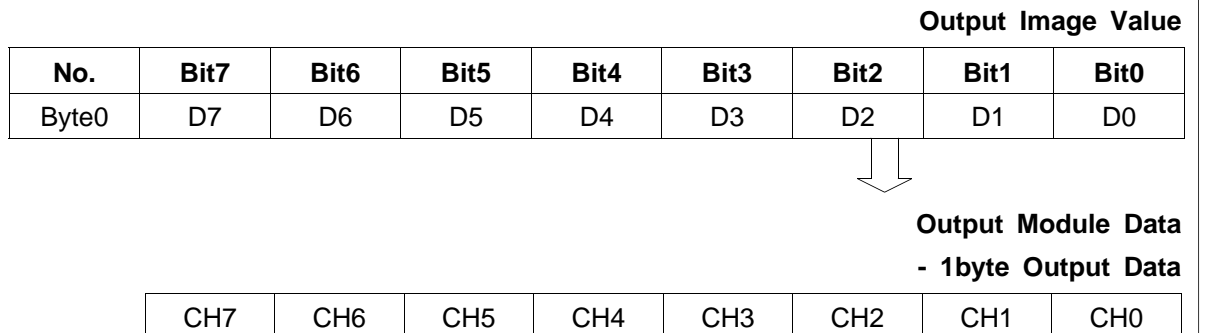
3) ST-2318

- 24VDC/0.5A 8 points Sink Output (Negative Logic) Terminal Type

◆ Module View



◆ Mapping Data into the image table



◆ Specification

Output Specification	
Outputs per Module	8 points Sink Type (Negative Logic)
Indicators	8 Green Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 0.3Vdc@25℃
Off-state Leakage Current	Max. 50uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 0.5A per Channel/Max. 4.0A per Unit
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 3.5A / Max. 7A Per Channel
	ESD Protection : 16.5Kv
Common Type	8 points / External Common
Module Specification	
Power Dissipation	Max. 60mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

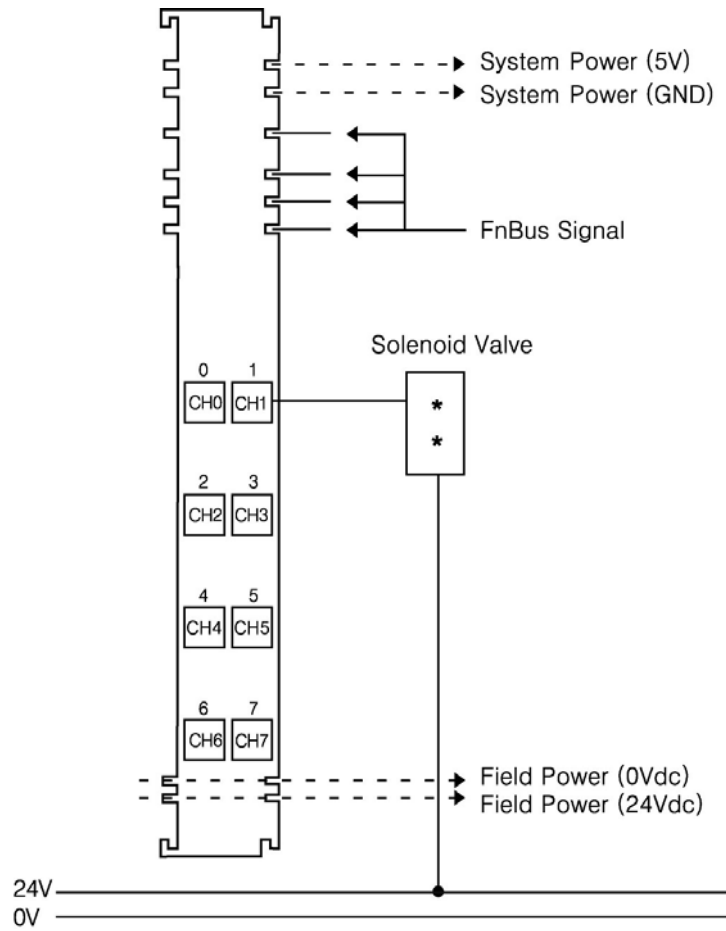
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
		Off	Output Protection

◆ Module Wire Diagram



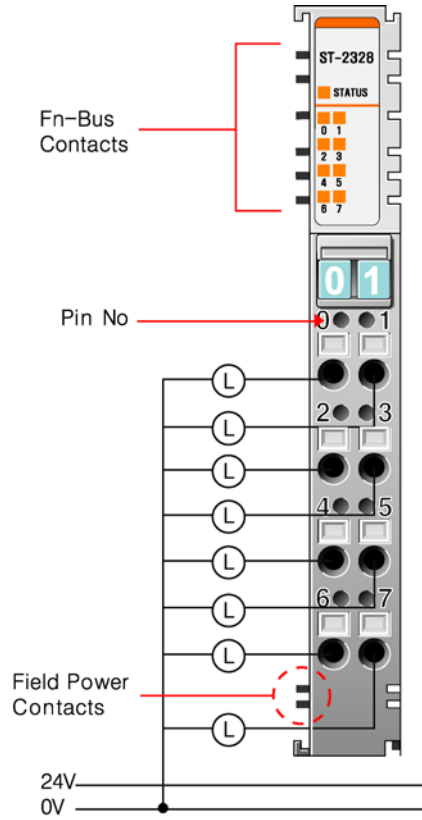
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Output Channel 4	5	Output Channel 5
6	Output Channel 6	7	Output Channel 7

4) ST-2328

- 24VDC/0.5A 8 points Source Output (Positive Logic) Terminal Type

◆ Module View



◆ Mapping Data into the image table

									Output Image Value
No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	
Byte0	D7	D6	D5	D4	D3	D2	D1	D0	
									Output Module Data - 1byte Output Data
	CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH0	

◆ Specification

Output Specification	
Outputs per Module	8 points Source Type (Positive Logic)
Indicators	8 Green Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 0.3Vdc@25℃
Off-state Leakage Current	Max. 50uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 0.5A per Channel/Max. 4.0A per Unit
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 3.5A / Max. 7.5A Per Channel
	ESD Protection : 5.0Kv
Common Type	8 points / External Common
Module Specification	
Power Dissipation	Max. 60mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

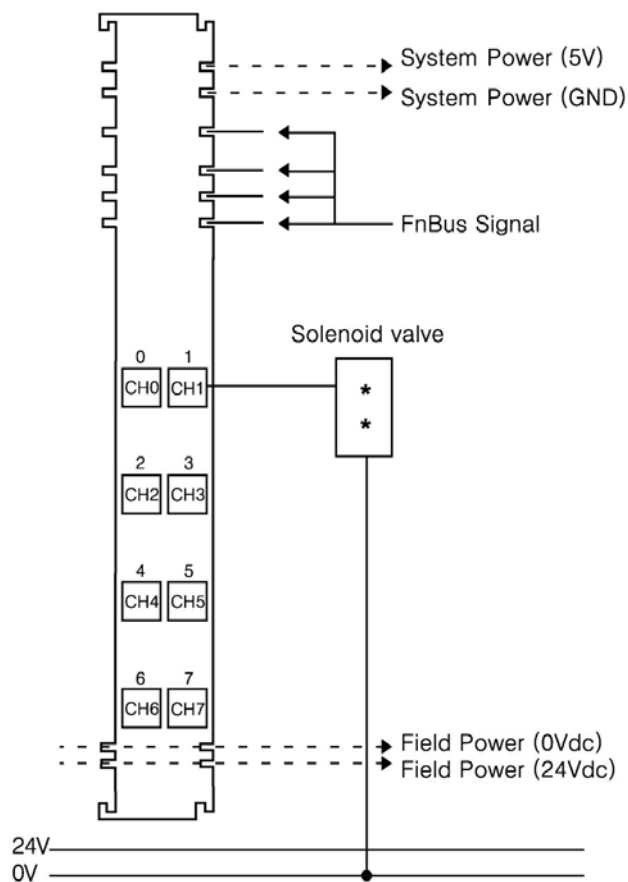
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
		Off	Output Protection

◆ Module Wire Diagram



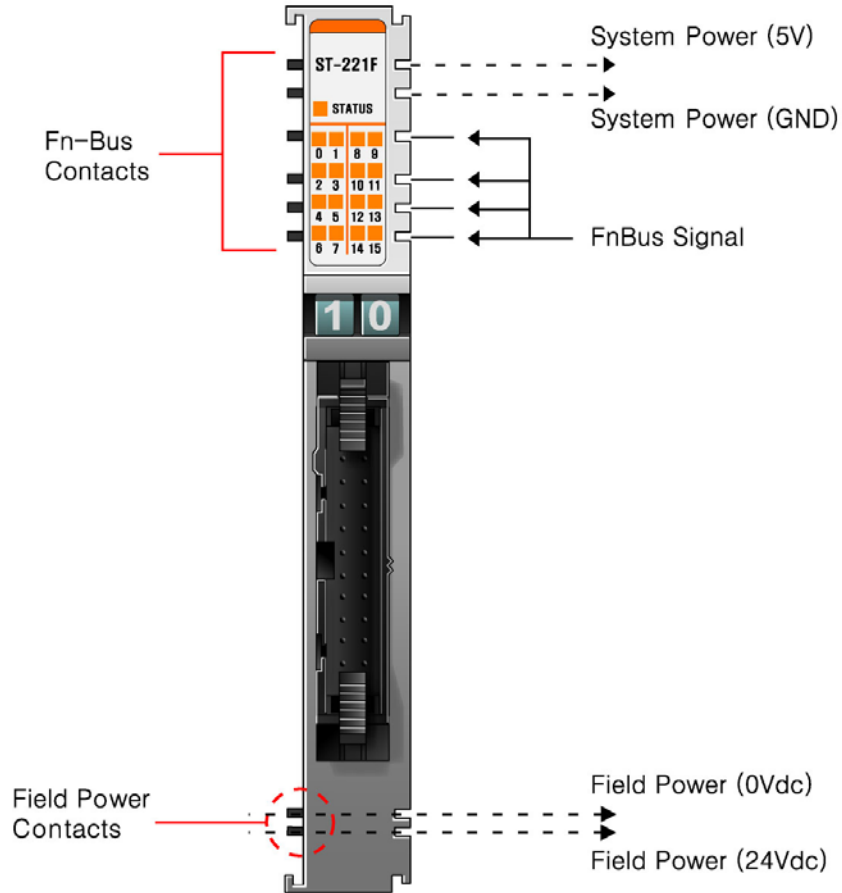
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Output Channel 4	5	Output Channel 5
6	Output Channel 6	7	Output Channel 7

5) ST-221F

- 24VDC/0.3A 16 points Sink Output (Negative Logic) 20P Connector Type

◆ Module View



◆ Mapping Data into the image table

									Output Image Value
No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	
Byte0	D7	D6	D5	D4	D3	D2	D1	D0	
Byte1	D15	D14	D13	D12	D11	D10	D9	D8	



Output Module Data - 2bytes Output Data							
CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH0
CH15	CH14	CH13	CH12	CH11	CH10	CH9	CH8

◆ Specification

Output Specification	
Outputs per Module	16 points Sink Type (Negative Logic)
Indicators	16 Green Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 0.3Vdc@25℃
Off-state Leakage Current	Max. 50uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 0.3A per Channel
	Max. 4.0A per Common
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 3.5A / Max. 7A Per Channel
	ESD Protection : 16.5Kv
Common Type	16 points / 1COM
Module Specification	
Power Dissipation	Max. 80mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

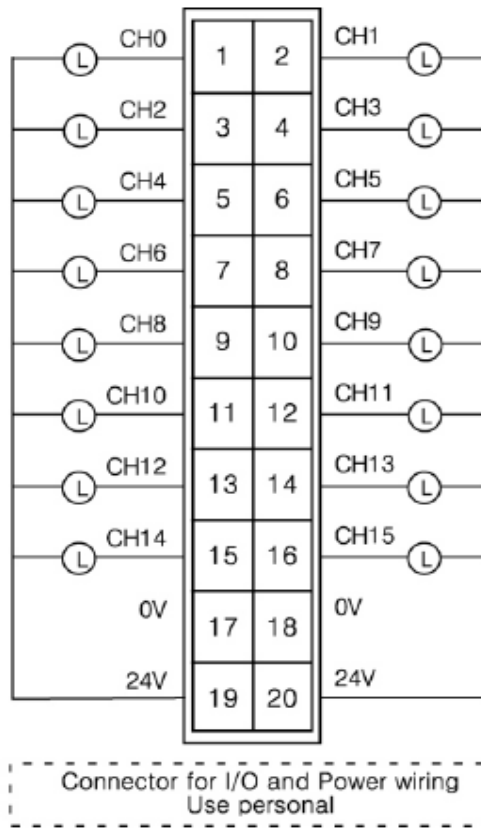
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
		Off	Output Protection

◆ Module Wire Diagram



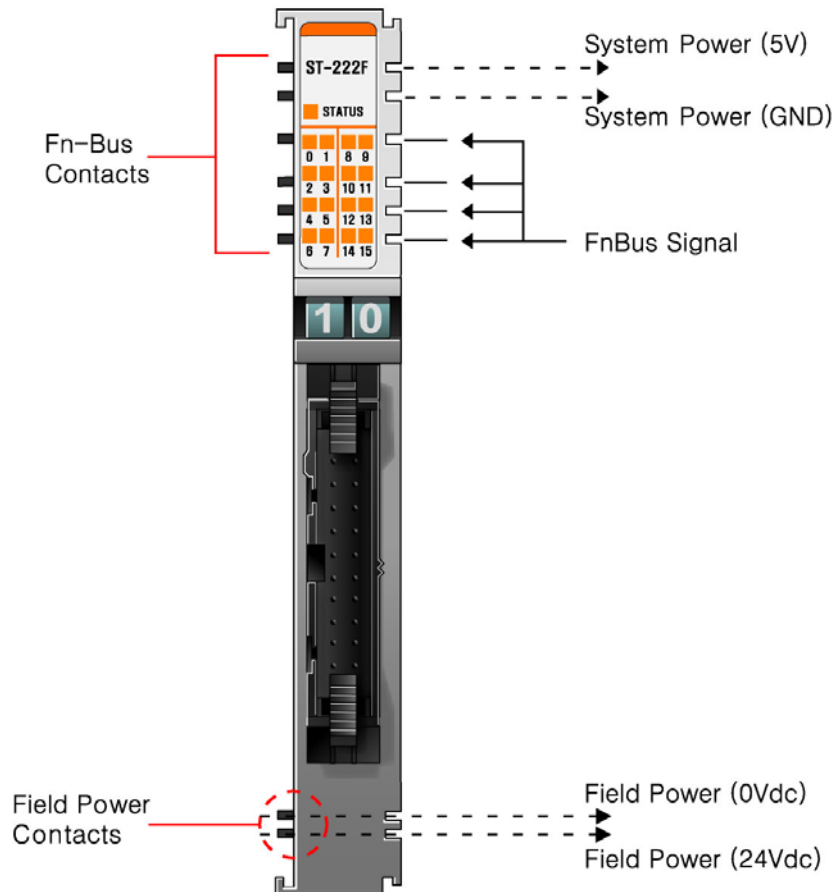
- Wiring Description

Pin No.	Description	Pin No.	Description
1	Output Channel 0	2	Output Channel 1
3	Output Channel 2	4	Output Channel 3
5	Output Channel 4	6	Output Channel 5
7	Output Channel 6	8	Output Channel 7
9	Output Channel 8	10	Output Channel 9
11	Output Channel 10	12	Output Channel 11
13	Output Channel 12	14	Output Channel 13
15	Output Channel 14	16	Output Channel 15
17	Field Ground (0VDC)	18	Field Ground (0VDC)
19	Field Power (24VDC)	20	Field Power (24VDC)

6) ST-222F

- 24VDC/0.3A 16 points Source Output (Positive Logic) 20P Connector Type

◆ Module View



◆ Mapping Data into the image table

		Output Image Value						
No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	D7	D6	D5	D4	D3	D2	D1	D0
Byte1	D15	D14	D13	D12	D11	D10	D9	D8

↓

Output Module Data - 2bytes Output Data							
CH7	CH6	CH5	CH4	CH3	CH2	CH1	CH0
CH15	CH14	CH13	CH12	CH11	CH10	CH9	CH8

◆ Specification

Output Specification	
Outputs per Module	16 points Source Type (Positive Logic)
Indicators	16 Green Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 0.3Vdc@25℃
Off-state Leakage Current	Max. 50uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 0.3A per Channel
	Max. 4.0A per Common
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 3.5A / Max. 7.5A Per Channel
	ESD Protection : 5.0Kv
Common Type	16 points / 1COM
Module Specification	
Power Dissipation	Max. 80mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

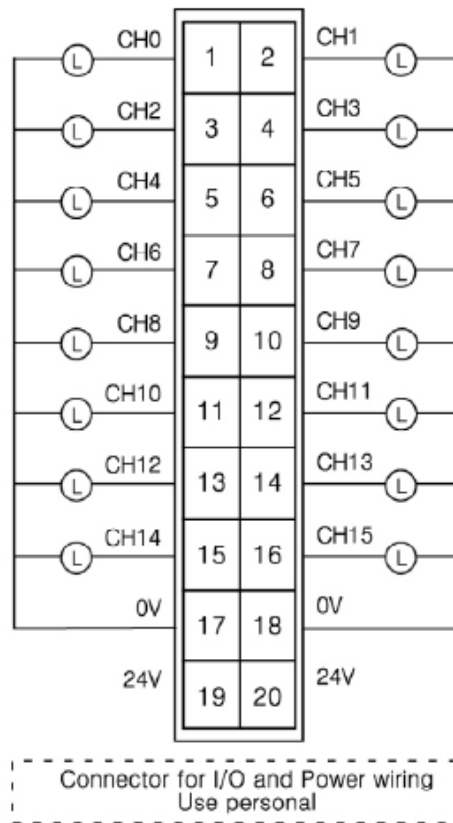
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
		Off	Output Protection

◆ Module Wire Diagram



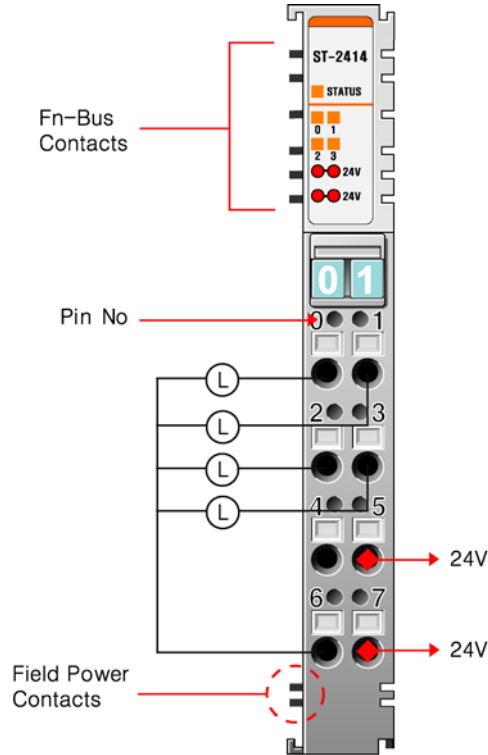
- Wiring Description

Pin No.	Description	Pin No.	Description
1	Output Channel 0	2	Output Channel 1
3	Output Channel 2	4	Output Channel 3
5	Output Channel 4	6	Output Channel 5
7	Output Channel 6	8	Output Channel 7
9	Output Channel 8	10	Output Channel 9
11	Output Channel 10	12	Output Channel 11
13	Output Channel 12	14	Output Channel 13
15	Output Channel 14	16	Output Channel 15
17	Field Ground (0VDC)	18	Field Ground (0VDC)
19	Field Power (24VDC)	20	Field Power (24VDC)

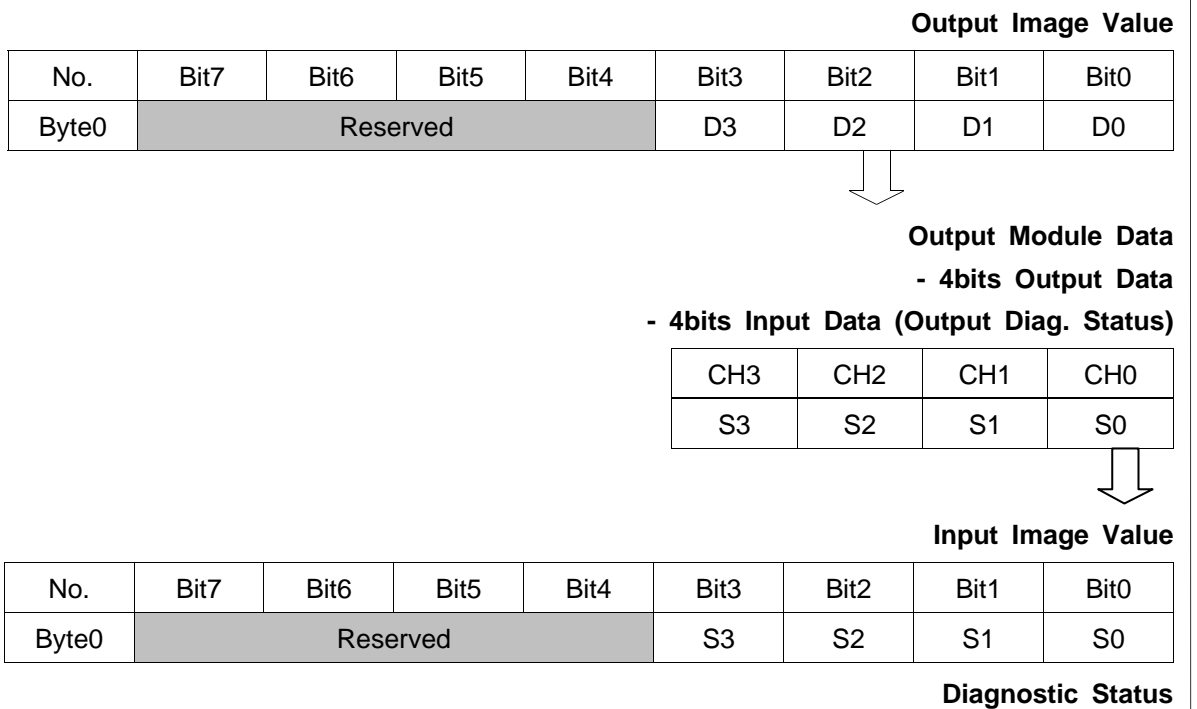
7) ST-2414

- 24VDC/0.5A 4 points Diagnostic Sink Output (Negative Logic) Terminal Type

◆ **Module View**



◆ **Mapping Data into the image table**



◆ Specification

Output Specification	
Outputs per Module	4 points Sink Type (Negative Logic)
Indicators	4 Green/Red Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 0.3Vdc@25℃
Off-state Leakage Current	Max. 50uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 0.5A per Channel / Max. 2.0A per Common
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 3.5A / Max. 7A Per Channel
	ESD Protection : 16.5Kv
Common Type	4 points / 1 COM (Single Common)
Module Specification	
Power Dissipation	Max. 45mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

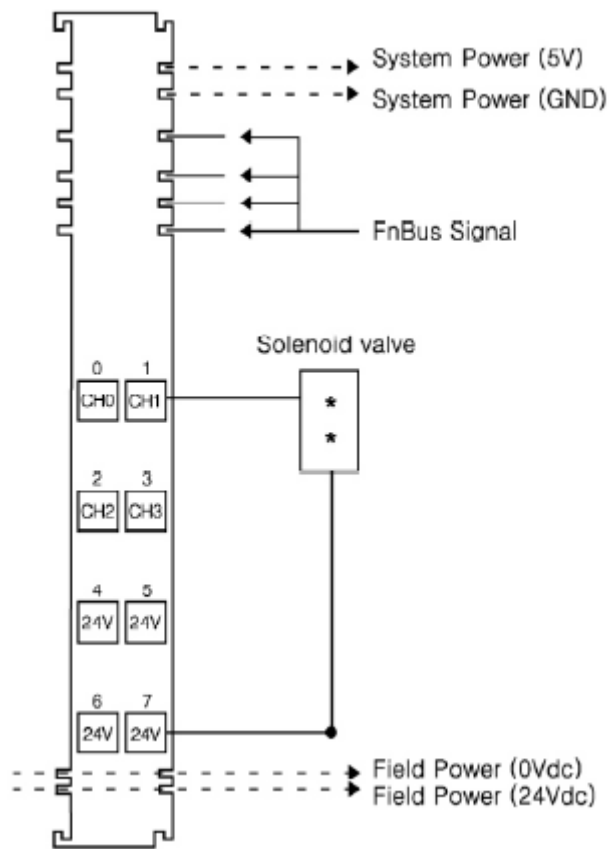
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
	Red	On	Output Protection

◆ Module Wire Diagram



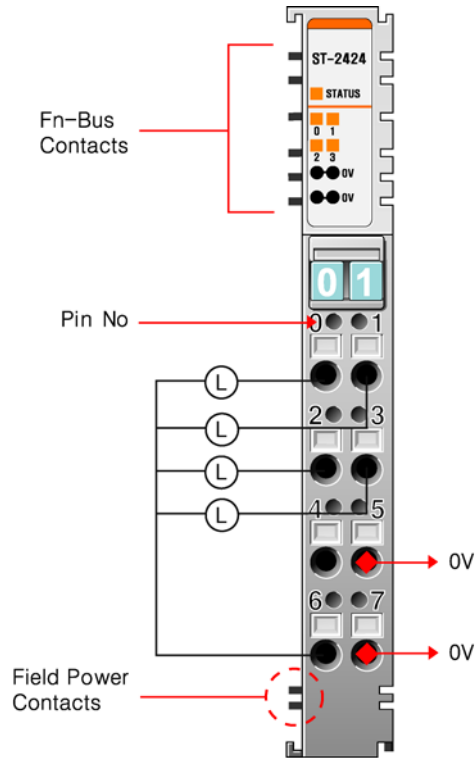
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Field Ground (24VDC)	5	Field Ground (24VDC)
6	Field Ground (24VDC)	7	Field Ground (24VDC)

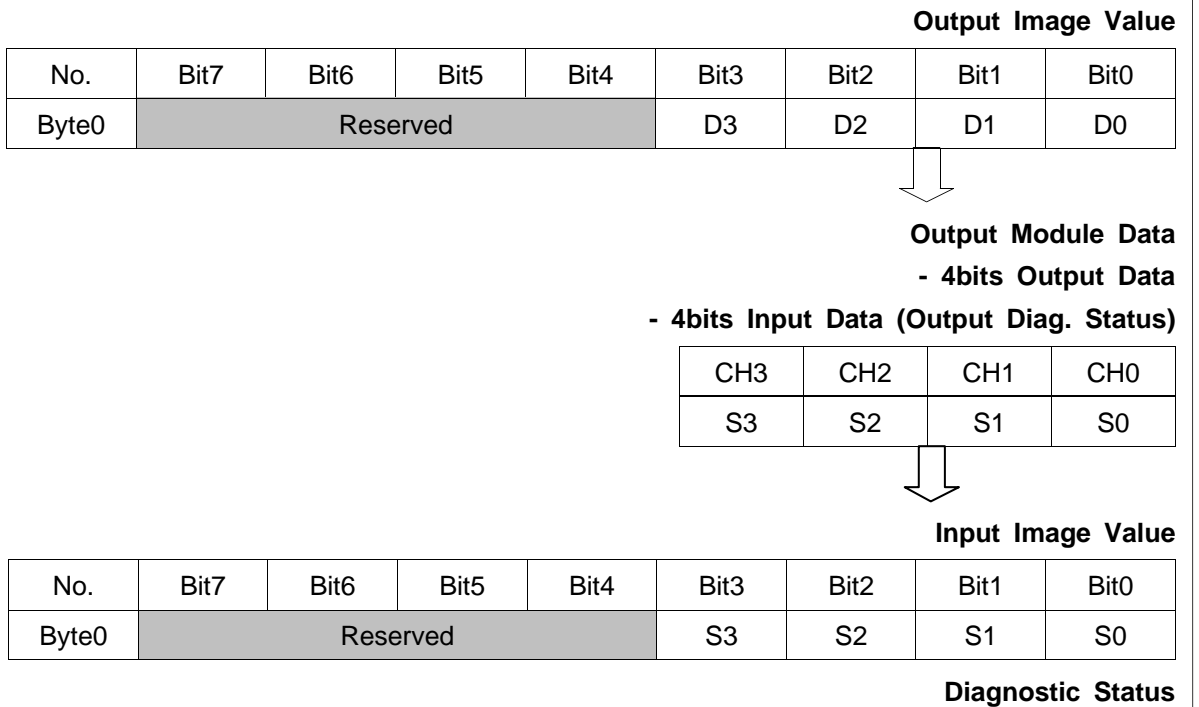
8) ST-2424

- 24VDC/0.5A 4 points Diagnostic Source Output (Positive Logic) Terminal Type

◆ **Module View**



◆ **Mapping Data into the image table**



◆ Specification

Output Specification	
Outputs per Module	4 points Source Type (Positive Logic)
Indicators	4 Green/Red Output State, Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 0.3Vdc@25℃
Off-state Leakage Current	Max. 50uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 0.5A per Channel / Max. 2.0A per Common
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 3.5A / Max. 7.5A Per Channel
	ESD Protection : 5.0Kv
Common Type	4 points / 1 COM (Single Common)
Module Specification	
Power Dissipation	Max. 45mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8 Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

- Expansion Module Status LED

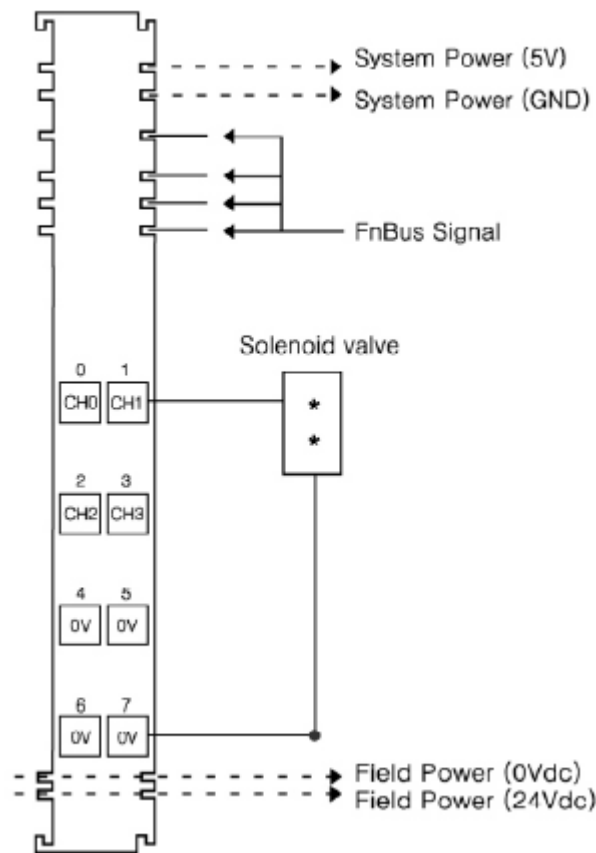
State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication

Device Fault	Red	Device fault
--------------	-----	--------------

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
	Red	On	Output Protection

◆ Module Wire Diagram



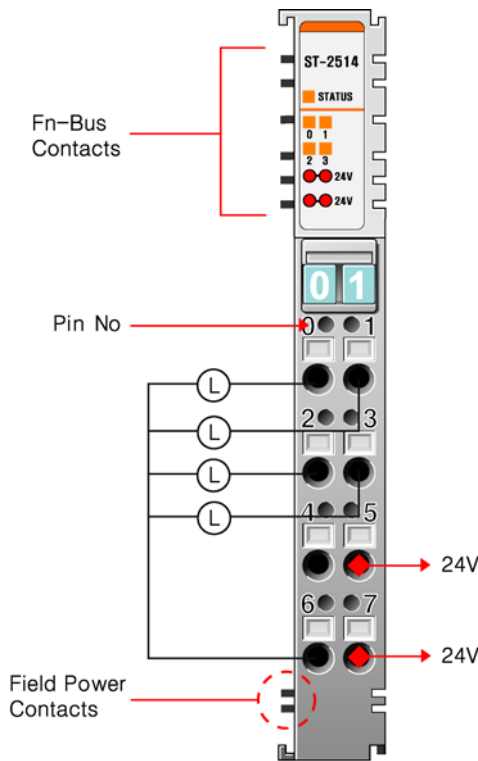
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Field Ground (0VDC)	5	Field Ground (0VDC)
6	Field Ground (0VDC)	7	Field Ground (0VDC)

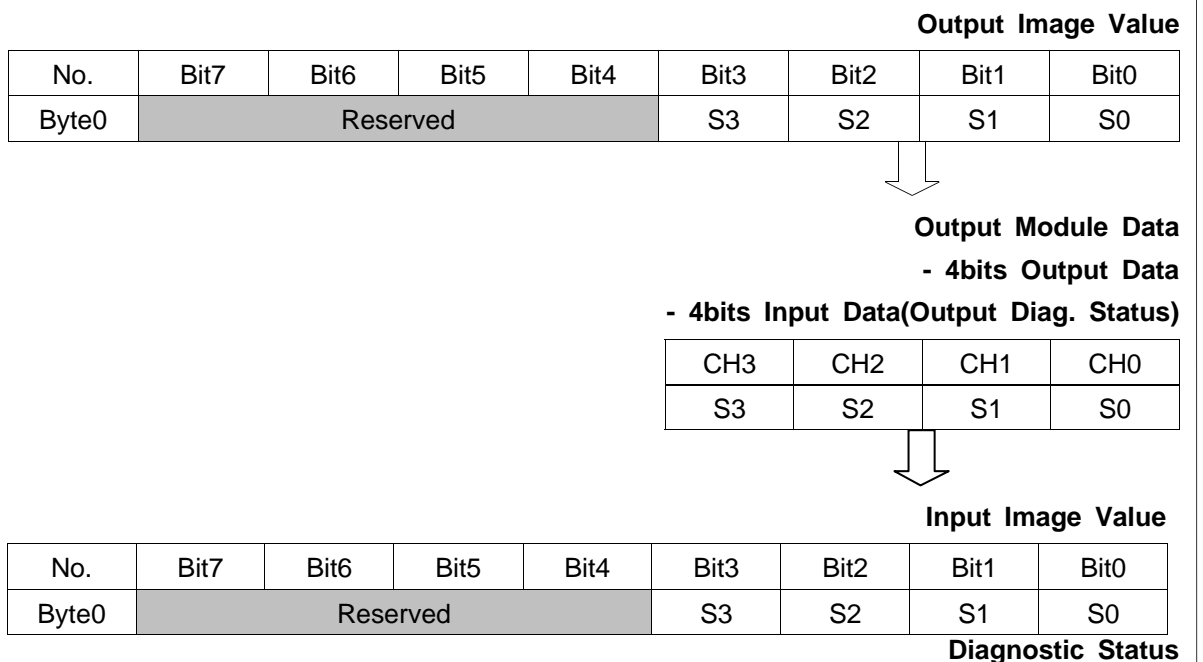
9) ST-2514

- 24VDC/2A 4 points Diagnostic Sink Output (Negative Logic) Terminal Type

◆ Module View



◆ Mapping Data into the image table



◆ Specification

Output Specification	
Outputs per Module	4 points Sink Type (Negative Logic)
Indicators	4 Green/Red Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 0.5Vdc@25℃
Off-state Leakage Current	Max. 150uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 2A per Channel / Max. 8.0A per Common
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 6A / Max. 15A Per Channel
	ESD Protection : 16.5Kv
Common Type	4 points / 1 COM (Single Common)
Module Specification	
Power Dissipation	Max. 45mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8 Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

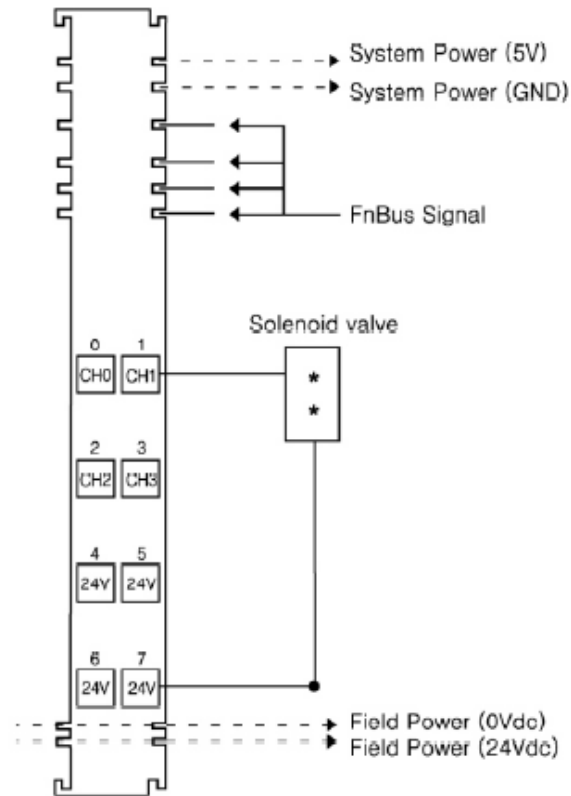
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
	Red	Off	Output Protection

◆ Module Wire Diagram



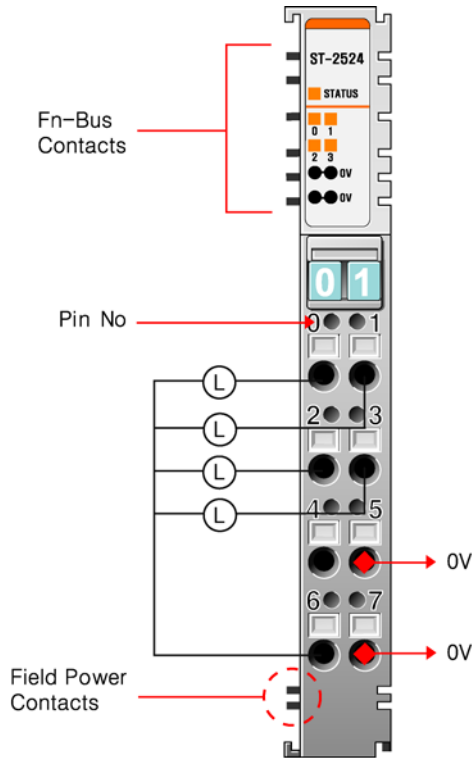
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Field Ground (24VDC)	5	Field Ground (24VDC)
6	Field Ground (24VDC)	7	Field Ground (24VDC)

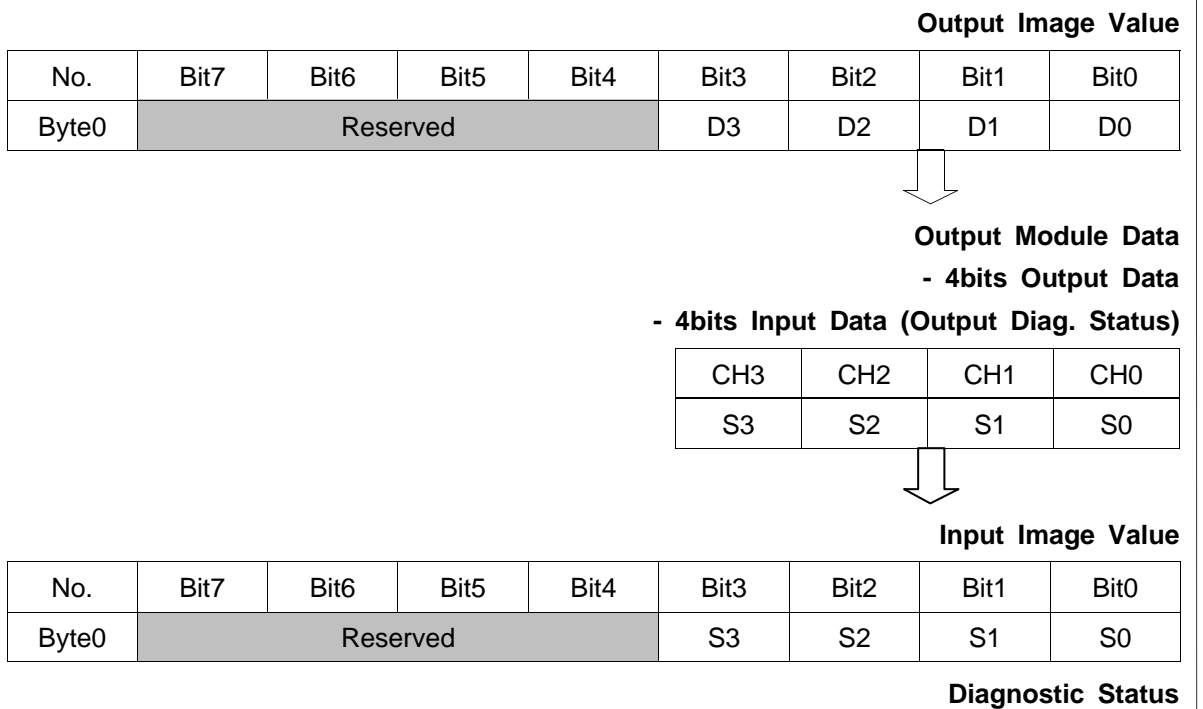
10) ST-2524

- 24VDC/2A 4 points Diagnostic Source Output (Positive Logic) Terminal Type

◆ **Module View**



◆ **Mapping Data into the image table**



◆ Specification

Output Specification	
Outputs per Module	4 points Source Type (Positive Logic)
Indicators	4 Green/Red Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 1Vdc@25℃
Off-state Leakage Current	Max. 150uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 2.0A per Channel / Max. 8.0A per Common
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 6A / Max. 15A Per Channel
	ESD Protection : 5.0Kv
Common Type	4 points / 1 COM (Single Common)
Module Specification	
Power Dissipation	Max. 45mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8 Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

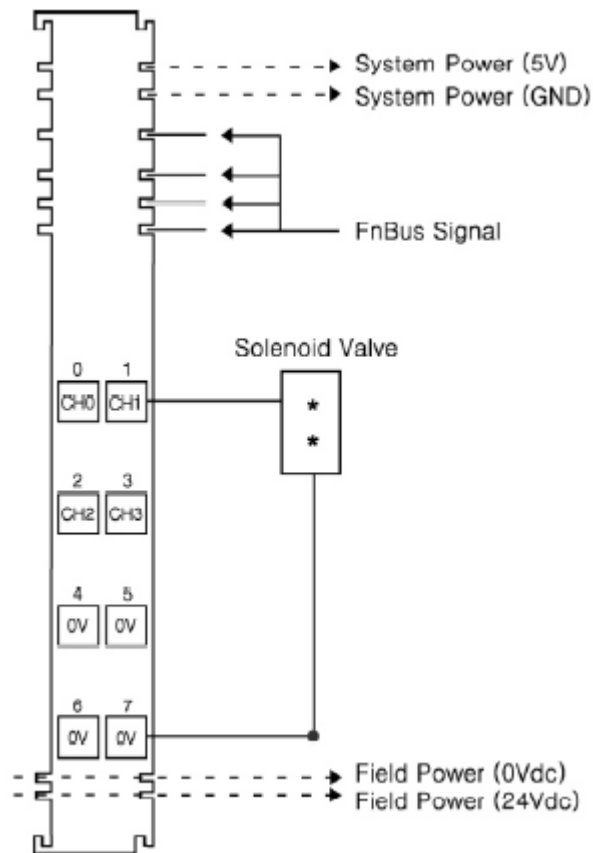
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
	Red	Off	Output Protection

◆ Module Wire Diagram



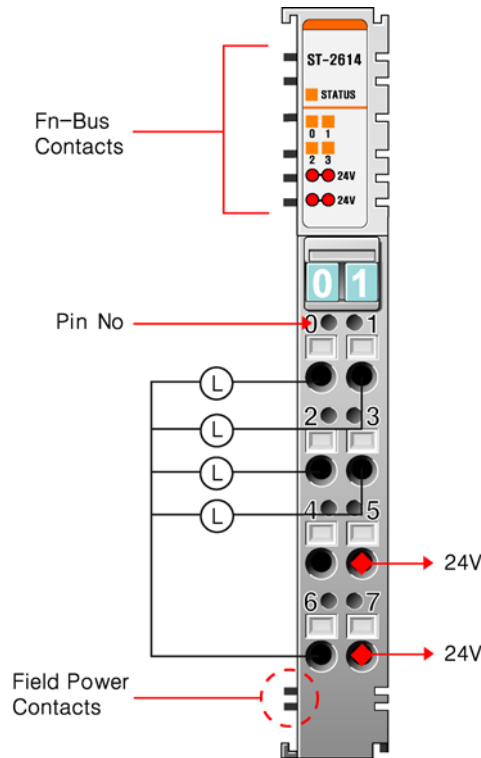
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Field Ground (0VDC)	5	Field Ground (0VDC)
6	Field Ground (0VDC)	7	Field Ground (0VDC)

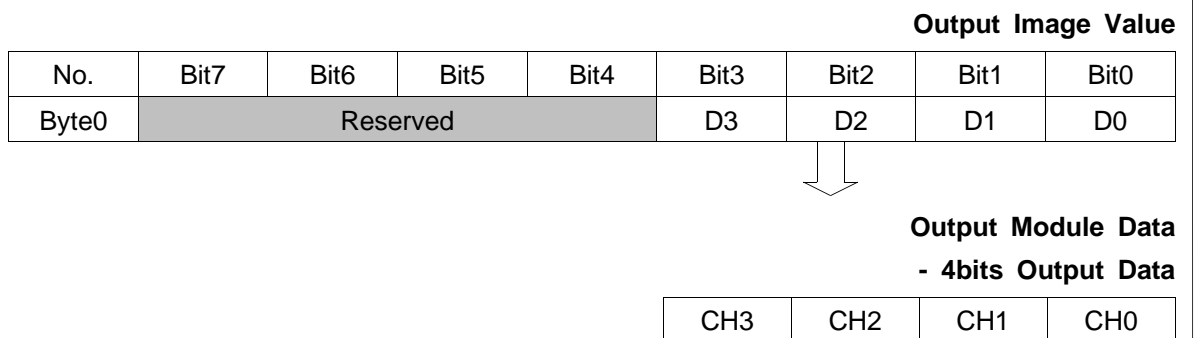
11) ST-2614

- 24VDC/2A 4 points Sink Output (Negative Logic) Terminal Type

◆ Module View



◆ Mapping Data into the image table



◆ Specification

Output Specification	
Outputs per Module	4 points Sink Type (Negative Logic)
Indicators	4 Green Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 0.5Vdc@25℃
OFF-state Leakage Current	Max. 150uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 2.0A per Channel / Max. 8.0A per Common
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 6A / Max. 15A Per Channel
	ESD Protection : 16.5Kv
Common Type	4 points / 1 COM (Single Common)
Module Specification	
Power Dissipation	Max. 45mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8 Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

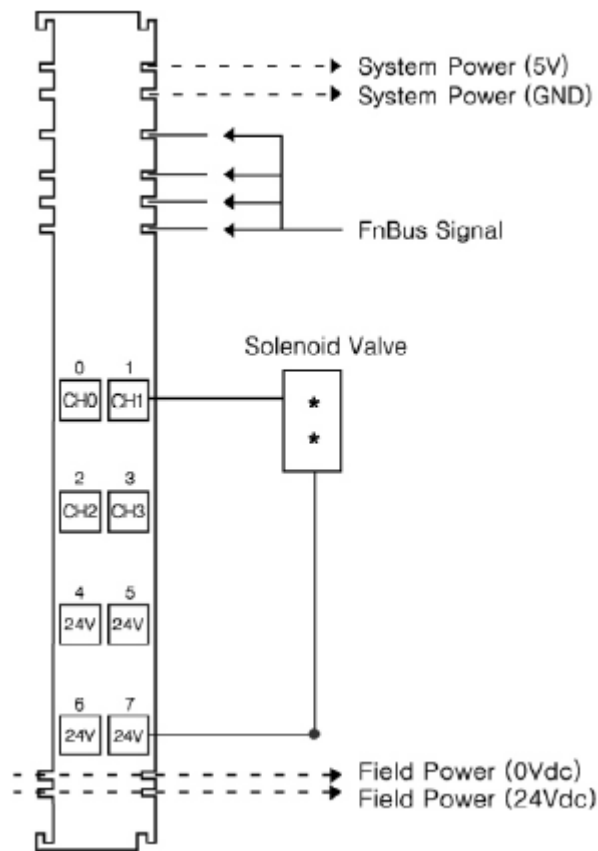
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
		Off	Output Protection

◆ Module Wire Diagram



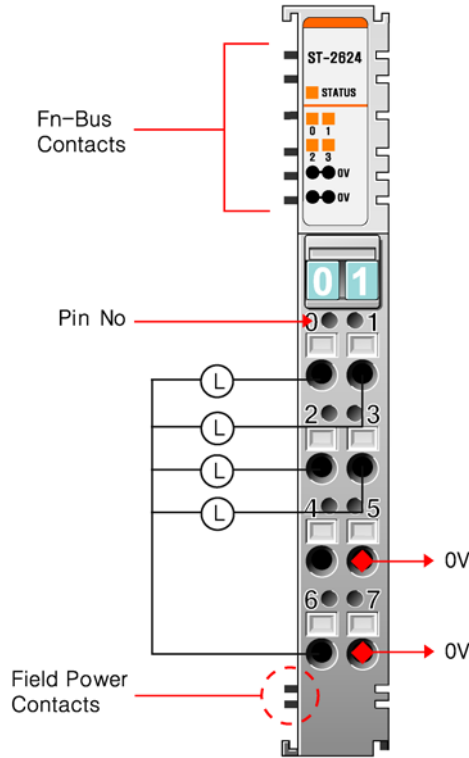
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Field Ground (24VDC)	5	Field Ground (24VDC)
6	Field Ground (24VDC)	7	Field Ground (24VDC)

12) ST-2624

- 24VDC/2A 4 points Source Output(Pos Logic) Terminal Type

◆ **Module View**



◆ **Mapping Data into the image table**

Output Image Value

No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	Reserved				D3	D2	D1	D0



**Output Module Data
- 4bits Output Data**

CH3	CH2	CH1	CH0
-----	-----	-----	-----

◆ Specification

Output Specification	
Outputs per Module	4 points Source Type (Positive Logic)
Indicators	4 Green Output State, 1 Green/Red FnBus State
Output Voltage Range	24Vdc nominal, Min. 11Vdc to Max. 28.8Vdc
On-state Min. Current	1mA per Channel
On-state Voltage Drop	Max. 1Vdc@25℃
OFF-state Leakage Current	Max. 150uA
Output Signal Delay	Off to On : Max. 0.3ms
	On to Off : Max. 0.3ms
Output Current Rating	Max. 2.0A per Channel / Max. 8.0A per Common
Protection	Output Short-Circuit protection
	Over Temperature shut down : Min. 150℃
	Over Current Limit : Min. 6A / Max. 15A Per Channel
	ESD Protection : 5.0Kv
Common Type	4 points / 1 COM (Single Common)
Module Specification	
Power Dissipation	Max. 45mA @ 5.0Vdc
Isolation	I/O to Logic : Photo-coupler Isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : 11 ~ 28.8 Vdc
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

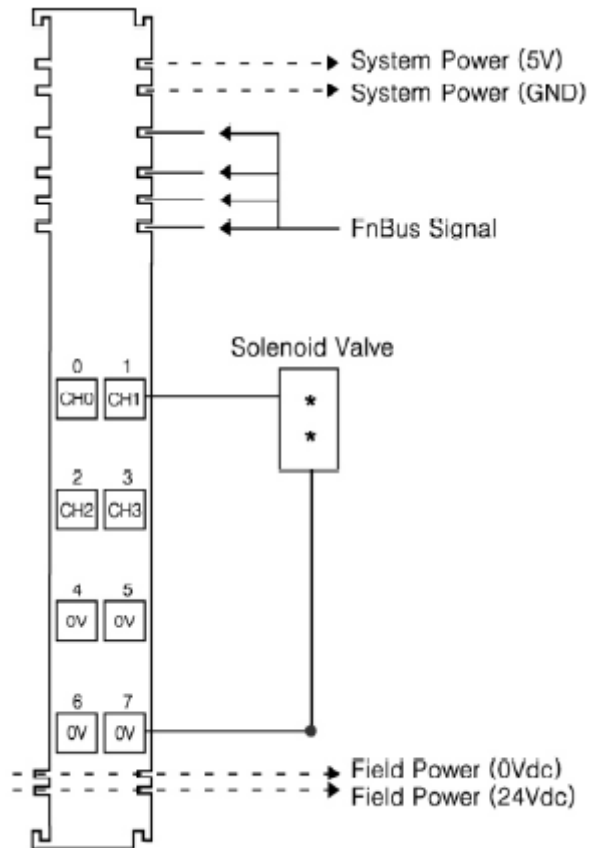
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation
		Off	Output Protection

◆ Module Wire Diagram



- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	Output Channel 2	3	Output Channel 3
4	Field Ground (0VDC)	5	Field Ground (0VDC)
6	Field Ground (0VDC)	7	Field Ground (0VDC)

4. Discrete Relay Output Module

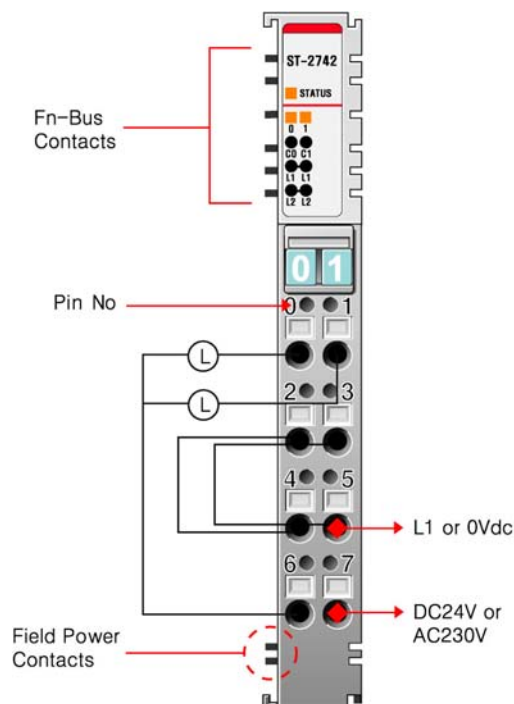
Description

- ST-27xx and 28xx series are Discrete Relay and Triac Output.
- It have all 3~9 LEDs for Status indication. One indicates Network status, the others indicate Field Device status.
- The prevention circuit of electric leakage is applied to all outputs
- Field Power required for Field Device is supplied to the Module placed in the very left and automatically connected via Field Power Contact of the each Module. If Filed Power has changed, Expansion Field Power Supply (ST-7241) must be used.
- Note : When you use Relay module, Power Distributor must be used.

1) ST-2742

- 230VAC/2A, 24VDC/2A 2 points Relay Output Terminal Type

◆ Module View



◆ Mapping Data into the image table

No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Byte0	Reserved						D1	D0



Output Module Data
- 2bits Output Data

CH1	CH0
-----	-----

◆ Specification

Output Specification	
Outputs per Module	2 points
Indicators	2 Green Output State, 1 Green/Red FnBus State
Output Voltage Range (Load Dependent)	5~28.8Vdc @2.0A Resistive 48Vdc @0.8A Resistive 110Vac @0.3A Resistive 250Vac @2.0A Resistive
Output Current Rating (at rated power)	2A @5~28.8Vdc 0.8A @48Vdc 0.5A @110Vac 2A @250Vac
Min. Load	100uA, 100mVdc Per Point
Max. On-state Voltage Drop	0.5V@2.0A, Resistive Load, 24Vdc
Relay Type	Form A, normally Open (N.O.) Single Pole, Single Throw (SPST)
Off-State Leakage Current	Max.1.5m
Output Signal Delay	On to Off:Max. 10ms, Off to On : Max. 10ms
Initial Contact Res.	30mΩ
Expected Contact Resistance	300K Cycles Resistive, 100K cycles Inductive
Common Type	1 points / 1 COM
Module Specification	
Power Dissipation	Max. 65mA @ 5.0Vdc
Isolation	Field Power : Non-isolation
Field Power	Supply Voltage : 24Vdc nominal
	Voltage Range : Min. 10Vdc to Max. 28.8Vdc
Weight	65g
Size	12mm × 99mm × 70mm

◆ Status LED Description

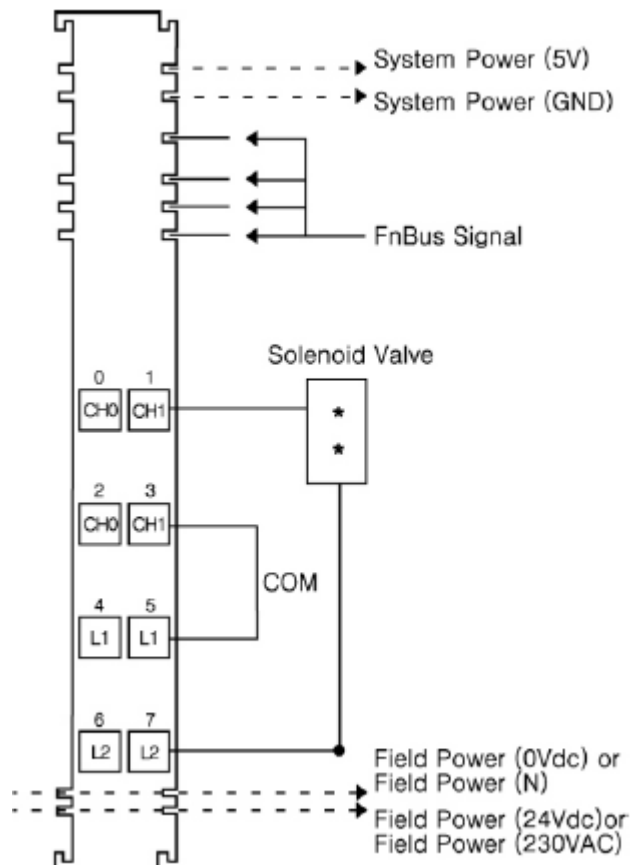
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation

◆ Module Wire Diagram



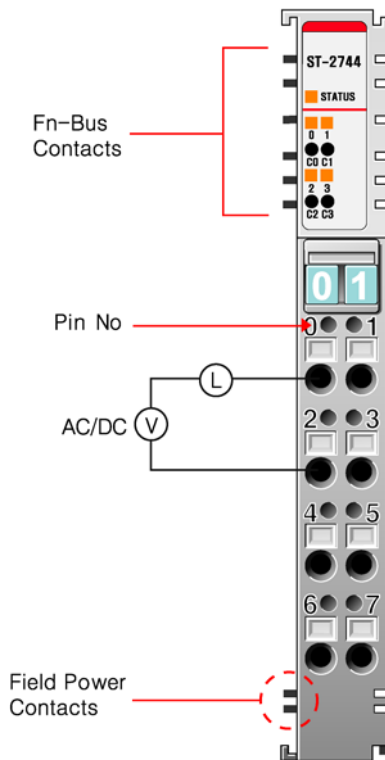
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Relay Output Channel 0_A	1	Relay Output Channel 1_A
2	Relay Output Channel 0_B	3	Relay Output Channel 1_B
4	L1/N/Field Ground (0VDC)	5	L1/N/Field Ground (0VDC)
6	L2 Output Field Power (24VDC/230VAC)	7	L2 Output Field Power (24VDC/230VAC)

2) ST-2744

- 230VAC/2A, 24VDC/2A 4 points Relay Output Terminal Type

◆ Module View



◆ Mapping Data into the image table

								Output Image Value	
No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	
Byte0	Reserved				D3	D2	D1	D0	
								Output Module Data - 4bits Output Data	
					CH3	CH2	CH1	CH0	

◆ Specification

Output Specification	
Outputs per Module	4 points
Indicators	4 Green Output State, 1 Green/Red FnBus State
Output Range	5~28.8Vdc @2.0A Resistive 48Vdc @0.8A Resistive 110Vac @0.5A Resistive 250Vac @2.0A Resistive
Min Load	100uA, 100mVdc Per Point
Max. On-state Voltage Drop	0.5V@2.0A, Resistive Load, 24Vdc
Relay Type	Form A, normally Open (N.O.) Single Pole, Single Throw (SPST)
Off-State Leakage Current	Max.1.5m
Output Signal Delay	On to Off : Max.10ms, Off to On : Max.10ms
Initial Contact Res.	20mΩ
Expected Contact Resistance	300K Cycles Resistive, 100K cycles Inductive
Common Type	1 points / 1 COM
Module Specification	
Power Dissipation	Max. 130mA @ 5.0Vdc
Isolation	I/O to Logic : Relay Coil/Contact isolation 1250Vrms tested
Field Power	No Connection with Field Power
	Field Power passes though to the next module
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

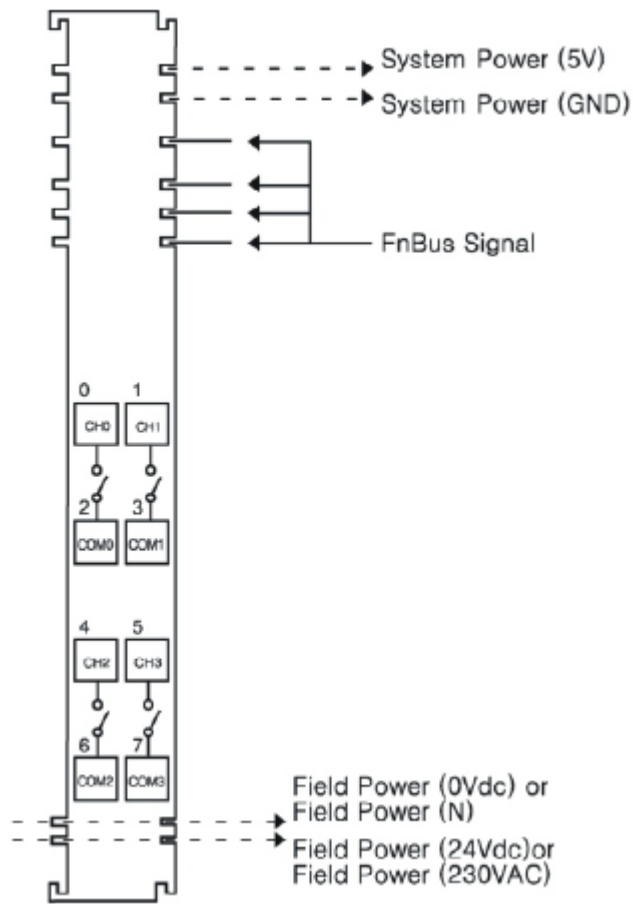
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation

◆ Module Wire Diagram



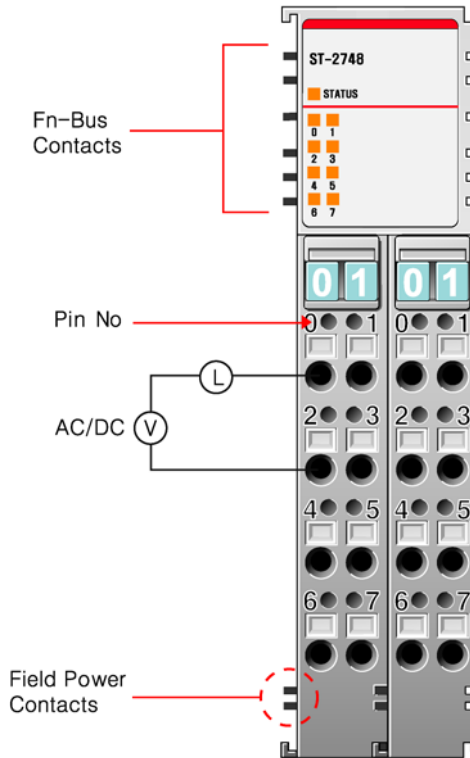
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Relay Output Channel 0_A	1	Relay Output Channel 1_A
2	COM 0	3	COM 1
4	Relay Output Channel 2_A	5	Relay Output Channel 3_A
6	COM 2	7	COM 3

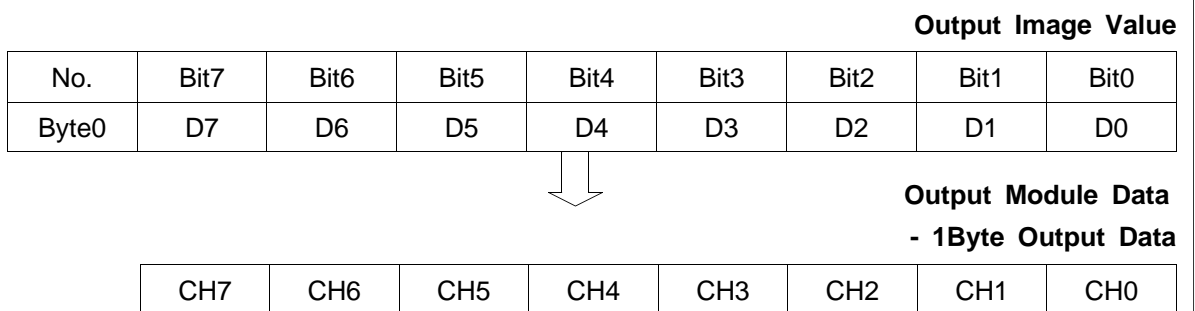
3) ST-2748

- 230VAC/2A, 24VDC/2A 8 points Relay Output Terminal Type

◆ Module View



◆ Mapping Data into the image table



◆ Specification

Output Specification	
Outputs per Module	8 points
Indicators	8 Green Output State, 1 Green/Red FnBus State
Output Range	2.0A @28.8Vdc 0.8A @48Vdc 0.5A @110Vac 2.0A @250Vac
Min. Load	100uA, 100mVdc Per Point
Max. On-state Voltage Drop	0.5V@2.0A, Resistive Load, 24Vdc
Relay Type	Form A, normally Open (N.O.) Single Pole, Single Throw (SPST)
Off-State Leakage Current	Max.1.5m
Output Signal Delay	On to Off : Max.10ms, Off to On : Max.10ms
Initial Contact Resistance	20mΩ
Expected Contact Resistance	300K Cycles Resistive, 100K cycles Inductive
Common Type	1 points / 1 COM
Module Specification	
Power Dissipation	Max. 150mA @ 5.0Vdc
Isolation	I/O to Logic : Relay Coil/Contact isolation 1250Vrms tested
Field Power	No Connection with Field Power
	Field Power passes though to the next module
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

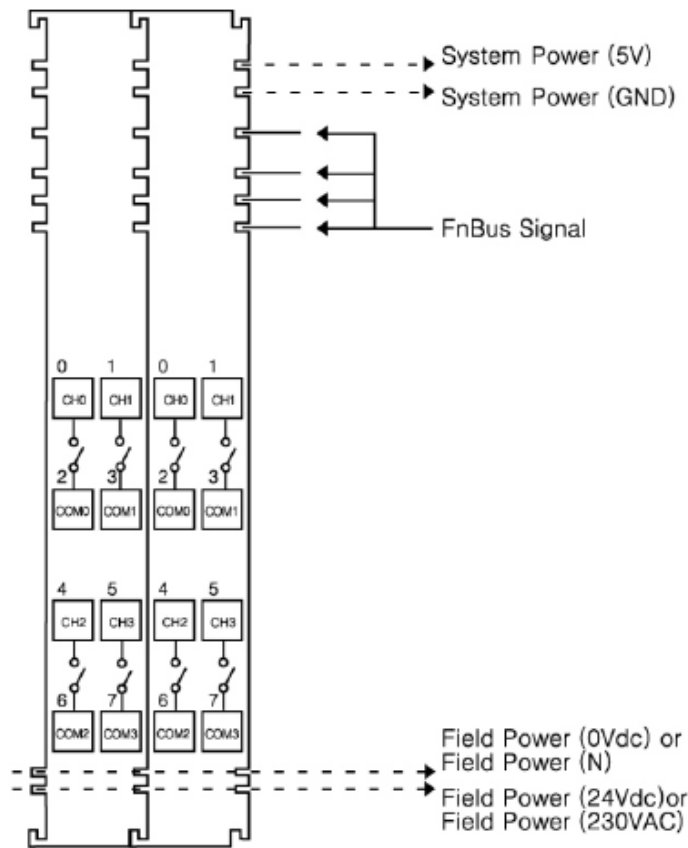
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation

◆ Module Wire Diagram



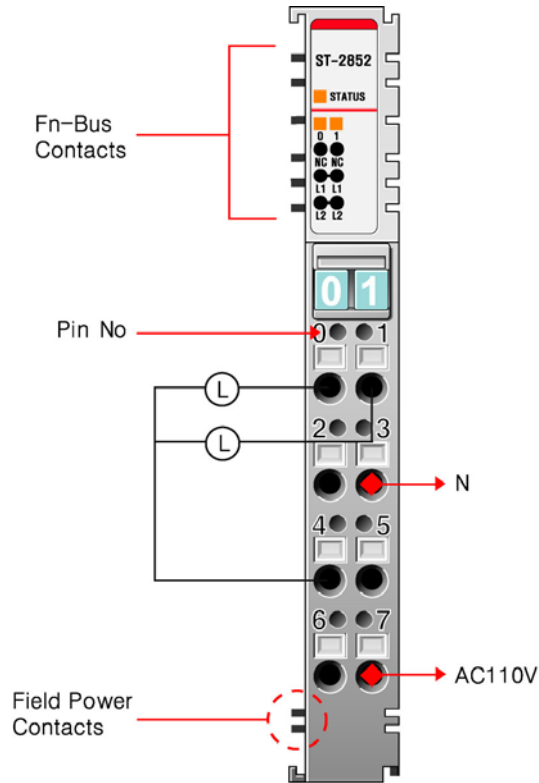
- Wiring Description

Pin No.	Description	Pin No.	Description
0	Relay Output Channel 0_A	1	Relay Output Channel 1_A
2	COM 0	3	COM 1
4	Relay Output Channel 2_A	5	Relay Output Channel 3_A
6	COM 2	7	COM 3
Pin No.	Description	Pin No.	Description
0	Relay Output Channel 4_A	1	Relay Output Channel 5_A
2	COM 4	3	COM 5
4	Relay Output Channel 6_A	5	Relay Output Channel 7_A
6	COM 6	7	COM 7

4) ST-2852

- 12~125VAC/0.5A 2 points Triac Output Terminal Type

◆ Module View



◆ Mapping Data into the image table

									Output Image Value		
No.	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0			
Byte0	Reserved						D1	D0			

Output Module Data
- 2bits Output Data

CH1	CH0
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◆ Specification

Output Specification	
Outputs per Module	2 points
Indicators	2 Green Output State, 1 Green/Red FnBus State
Switch Type	Zero Crossing
Rated Load Voltage	15~132Vac
Output Current Rating	0.05~0.5A
Frequency Range	47~63Hz
Surge Current	40A(16ms) / 40A(30s)
Output Signal Delay	OFF to ON:Max. 3ms, ON to OFF:1/2 Cycle+ 3ms
On Status Voltage Drop	1.3Vrms (Max.Load)
Off-state Leakage Current	Max.1.5mA
Common Type	2 points / 1 COM
Module Specification	
Power Dissipation	Max. 35mA @ 5.0Vdc
Isolation	Field Power : Non-isolation
Field Power	Supply Voltage : 120Vac nominal
	Voltage Range : 15 ~ 132Vac
Weight	70g
Size	12mm × 99mm × 70mm

◆ Status LED Description

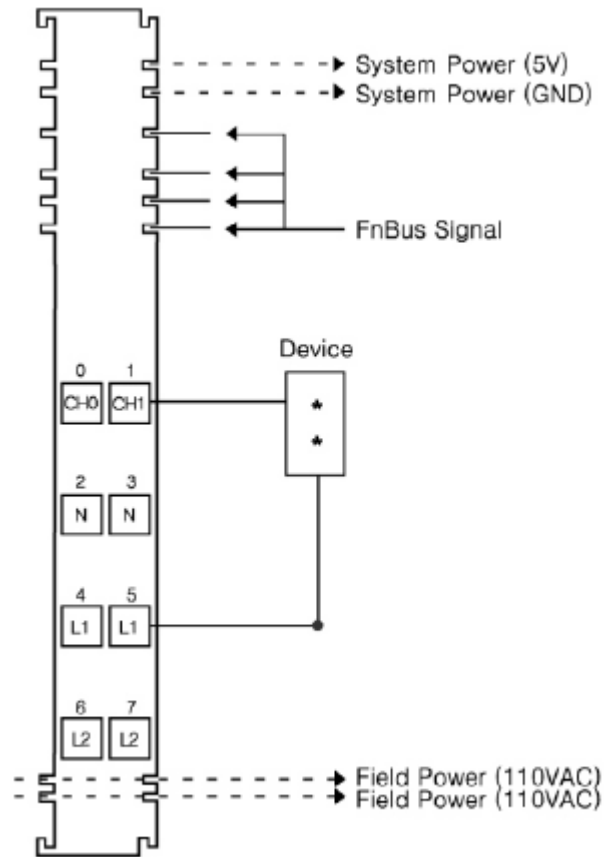
- Expansion Module Status LED

State	LED is	To Indicate
Not Powered	Off	Device has no expansion module or may be not powered
No Initialized		The parameter is not initialized yet
FnBus Connection	Green	FnBus normal operation
FnBus Ready	Flashing Green	FnBus ready
FnBus Fault	Flashing Red	FnBus time out
		FnBus failed communication
Device Fault	Red	Device fault

- Channel Status LED

Output Command	LED is	Output	Description
Off	Off	Off	Normal Operation
On	Green	On	Normal Operation

◆ Module Wire Diagram



- Wiring Description

Pin No.	Description	Pin No.	Description
0	Output Channel 0	1	Output Channel 1
2	N.C.	3	N.C.
4	L1 Output Field Power (110VAC)	5	L1 Output Field Power (110VAC)
6	L2 Output Field Power (110VAC)	7	L2 Output Field Power (110VAC)

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