iDCS-8000 Series User's Manual

Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year from the date of delivery to the original purchaser.

Warning

ICP DAS assumes no liability for damages resulting from the use of this product. ICP DAS reserves the right to change this manual at any time without notification. The information is furnished by ICP DAS is believed to be accurate and reliable. However, no responsibility is assumed by ICP DAS for its use, or for any infringements of patents or other rights of third parties resulting from its use.

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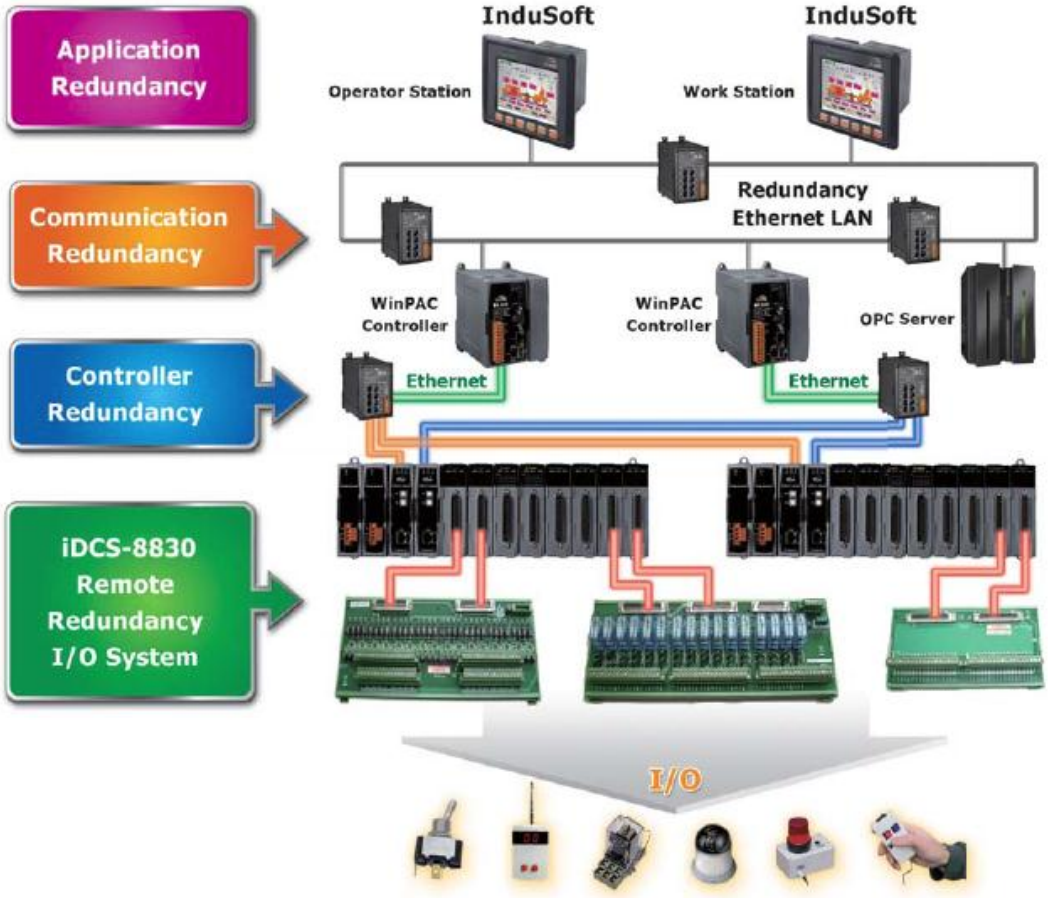
目錄

1. Summary

1.1 Introduction

Modbus is very wide known protocol in the industrial manufacturing and environment monitoring fields. It is suit master-slave or query-response distributed I/O applications. iDCS-8830/iDCS-8830R is a Modbus/TCP based Ethernet I/O unit. It is pre-installed a Modbus firmware and can arrange in pair or groups of I/O modules, like analog input, analog output, digital input, digital output and counter modules. Via Ethernet method, it can be used on industrial control areas, like remote data acquisition, factory automation, monitor system and power management…etc.



iDCS-8830R supports duplex MCU module and duplex power module and maximum eight IO modules. Each iDCS-8000 Series supports maximum eight single IO modules or four groups of redundant IO modules for users to program the redundant system. The main controllers, like PC, HMI or PLC, can use Modbus/TCP protocol to communicate with I/O modules in the unit via the Ethernet interface.

1.2 Feature

● Compact design

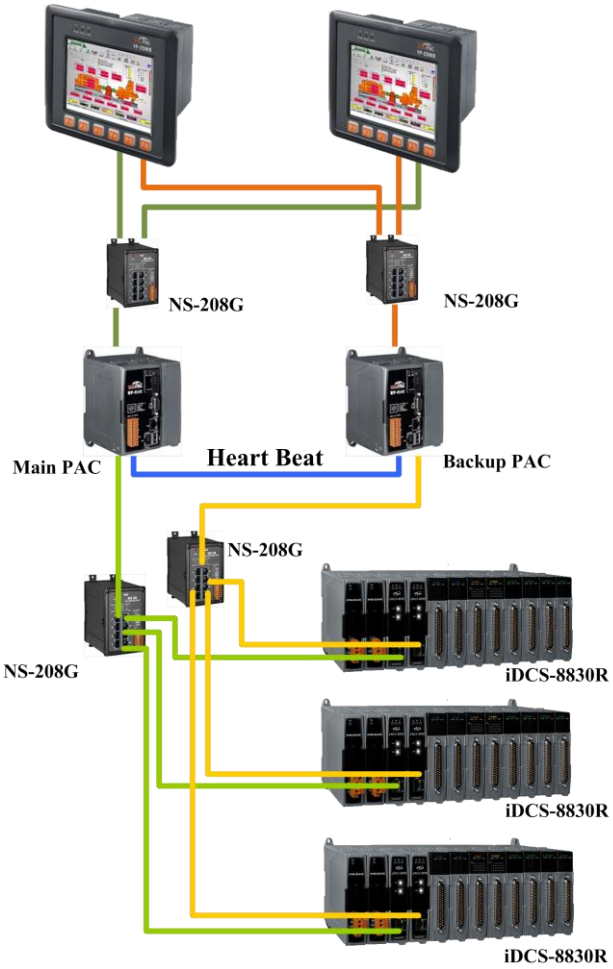
iDCS-8000 Series is a centralized and high-density remote I/O unit. It not only increases the mount efficiency but also reduce the mount space and construction costing.

● Ethernet based data acquisition I/O unit

iDCS-8830/iDCS-8830R is remote Ethernet I/O unit and it supports Modbus/TCP protocol. The specific of the unit is it can be used on industrial environment to control and acquire remote I/O device. Dependent on effective demand, it can be expanded to multiple remote I/O units.

● Reliable, secure, flexible and high-efficiency to mounting I/O device

iDCS-8000 Series remote I/O unit supports 8 I/O slots. Via this unit, the layout between the I/O modules will become simply. And there support various kinds of I/O module, like DO, DI, AO, AI and Counter modules. I/O modules can easily be inserted into the slot and difficultly to be fetched away.



● Three-way isolated and protected hardware circuit

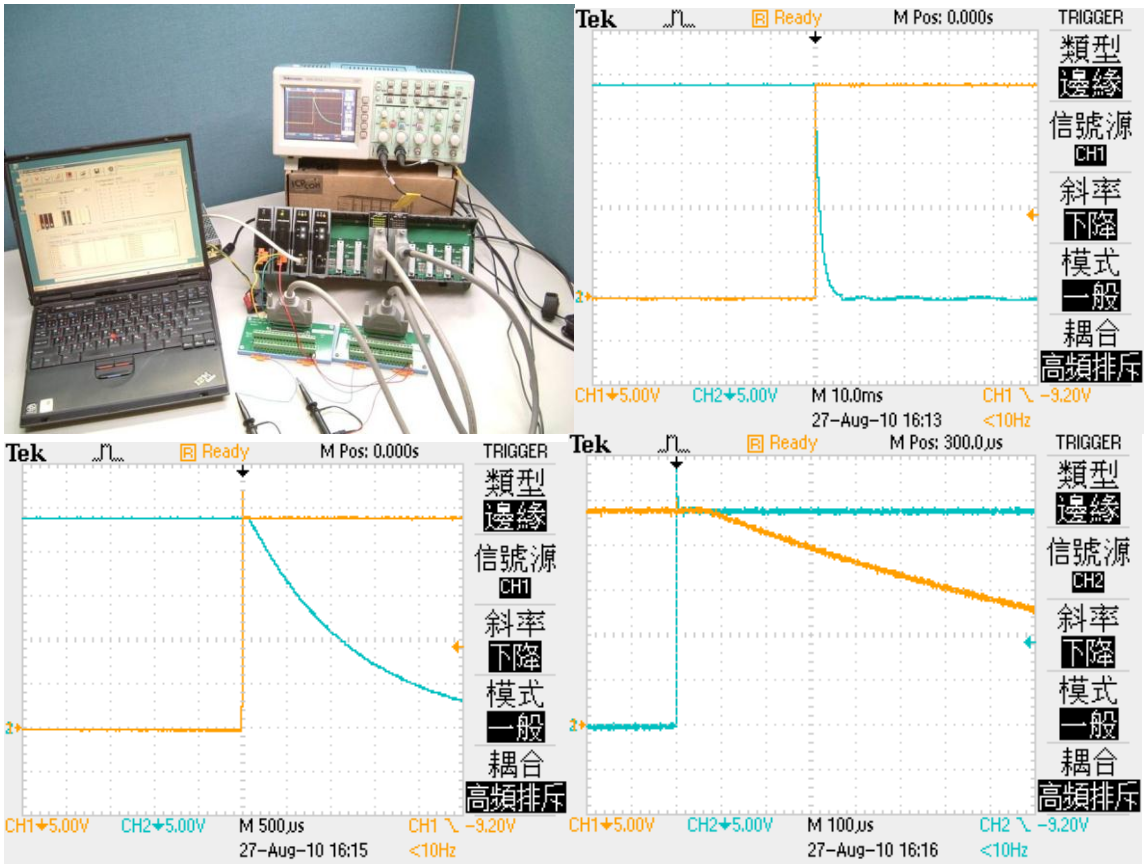
In order to prevent the hardware from interfere of external noise and surge, there exists isolated hardware circuit on the I/O, power module and communication module.

●Refresh time of I/O

The time of data interchange between the communication module and I/O module is dependent on the sampling rate of the I/O module.

●High Speed for I/O Switch

iDCS-8000 Series output module support high speed take over function.



1.3 Hardware Structure

iDCS-8000 series is made by the combination of components of the power modules, communication modules, I/O modules and an external terminal board, etc..

(1) Backplane

Support maximum eight I/O slots. Via the backplane, the wiring between I/O modules will become simply and modules can easy to insert into the slot and difficultly to fetch away.

(2) Power Module

Support external power input and supply 5VDC and external voltage to backplane. Support hot-swap and redundant function.

(3) Communication Module

Support CPU, RAM, ROM and Ethernet communication interface. Support hot-swap and redundant function.

(4) I/O Module

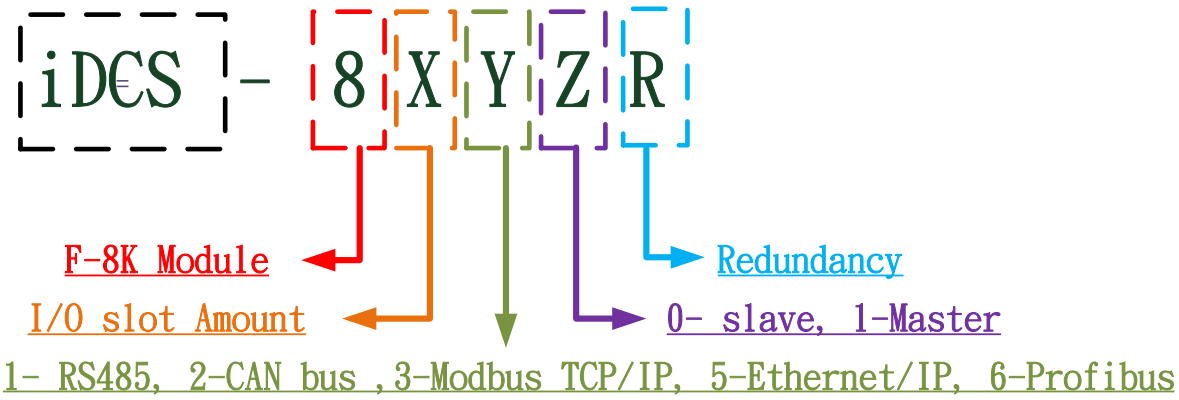
DI、DO、AI、AO、TC、RTD、Counter modules. Support hot-swap and redundant function.

(5) Termination Board (Daughter Board)

I/O module has a dedicated external terminal board and the cable which can reduce wiring time. Every Daughter Board have EMS protection.

1.4 Hardware List

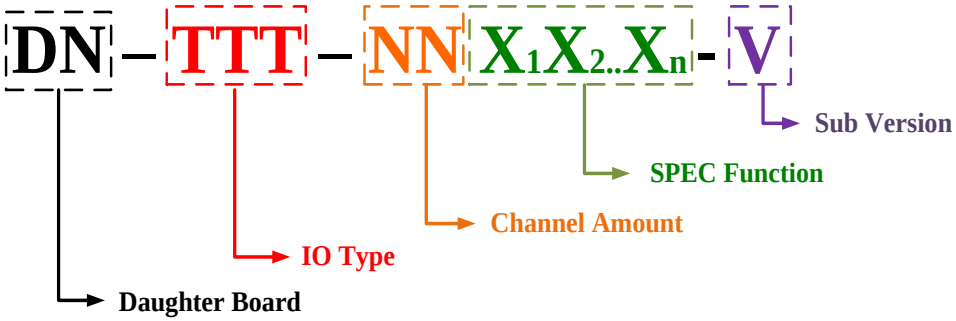
- System Units Model Name Rules：



- Module Model Name Rules：

Model Class	Discription
FB-xxx	Fieldbus Backplane
FPM-xxxx	Fieldbus Power Module
FCM-xxxx	Fieldbus Communication Module
F-8xxx	Fieldbus I/O Module
DN-xxx	IO Connector Block

- Daughter Board Model Name Rulse：



IO Type	DI、DO、AI、AO、AIO、TC、RTD etc…
SPEC Function	D：Dry Contact
	W：Wet Contact
	F：EMS Protect (Surge, ESD, EFT etc…)
	R：Relay Board

1.4.1 System Unit List：

TYPE	型　號	說 明
Single Unit	iDCS-8830	 1*Power(FPM-D2440) + 1*Communication Module(FCM-MTCP) + 1*12 slot Backplane
Redundancy Unit	iDCS-8830R	 2*Power(FPM-D2440) + 2*Communication Module(FCM-MTCP) + 1*12 slot Backplane

1.4.2 Module List：

- **Module Selection Guide**

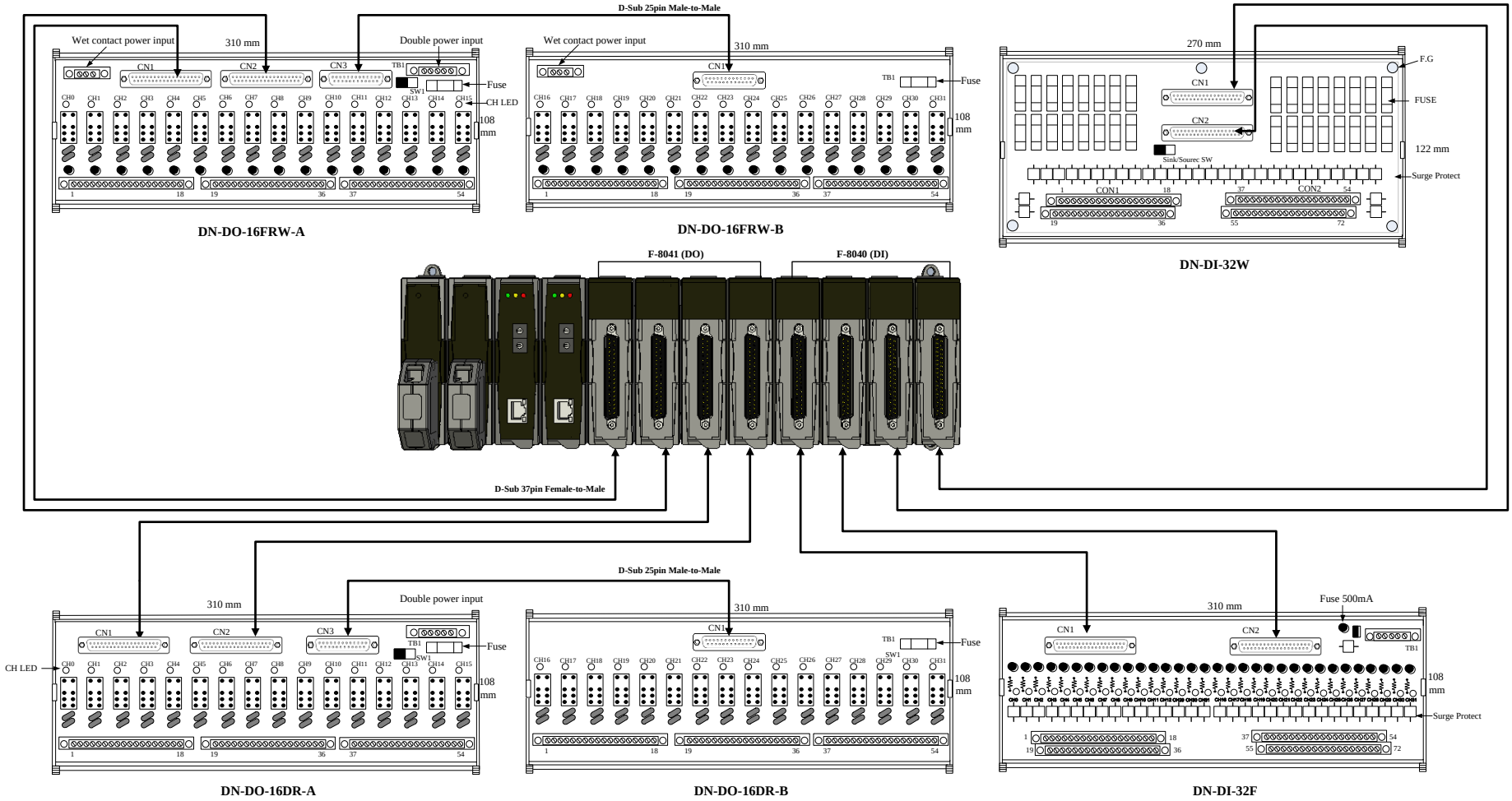
TYPE		Model Name	Discription
Power Module		FPM-D2440	24VDC Input，35W@5VDC Output and 120W@24VDC Output.
Communication Module		FCM-MTCP	Support Modbus TCP/IP Protocol and Module Auto-configuration.
Digital I/O	DI	F-8040	32 Ch DI(Sink/Source Type) Module，One Common for 32 ch,LED Display.
	DO	F-8041	32 Ch DO(Sink Type) Module，Open-collector(NPN),LED Display.
		F-8041P	16 ch ONESHOT Mode /Continuous Mode，One COM for 32 ch.
Pulse	PI	F-8084	8 Ch PI(Source/Sink Type) Module, ，Maximunm input Frequrency: Single 500KHz /Duplex 10KHz.
Analog I/O	AII	F-8017C1	8 Ch Single-End/Differentia Current Input Module，Support 24V_{DC} Power Output.
		F-8017C2	16 Ch Differential Current Input.
		F-8017CH	8 Ch Single-End/Differential Current Input Module，Support 24V_{DC} Power Output and HART Protocol.
	AIV	F-8017V	8 Ch Differential Voltage Input
	AO	F-8028CV	8 Ch Voltage/Current Output Module, One GND for 8 ch.
		F-8028CH	8 Ch Current Output Module，Support 24V_{DC} Power Output and HART Protocol.
Temperature (溫度)	RTD	F-8015	8 Ch RTD(3-Wire) Module，Support Sensor Type:Pt100、 Pt1000、 JPt100
	TC	F-8019	8 Ch Differential Thermocouple (J、K、T、E、R、S、B、N、C) and Voltage Input.

※PS 1：All module support single or redundant system.

※PS 2：All module support hot-swap.

1.4.3 Termination Board List

- **Digital I/O Module & Termination Board**

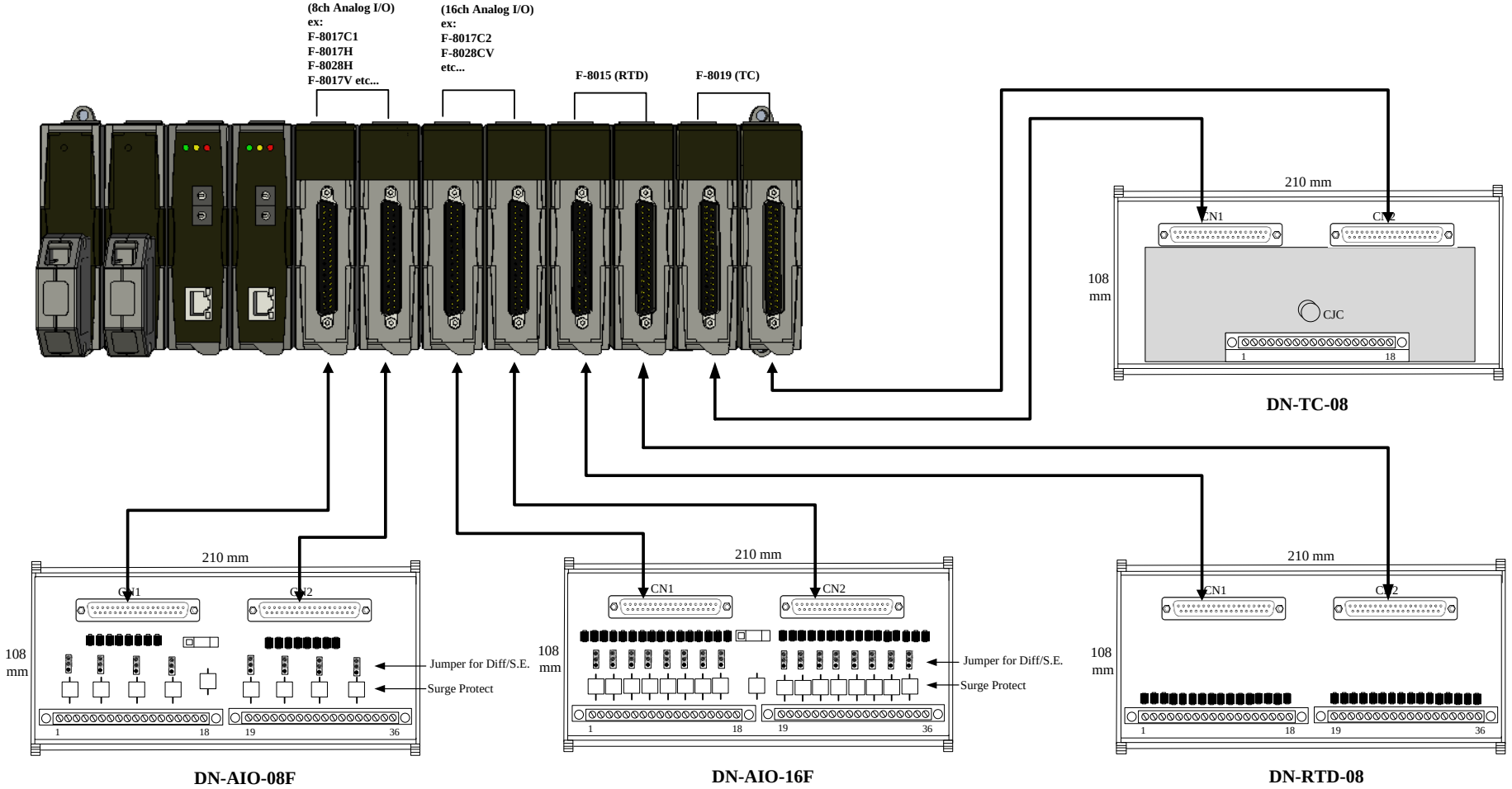


● Termination Board for Digital I/O Selection Guide

Model Name	Function Description	Support I/O
DN-DI-32F	● 32 channel Digital Input(Source Type) ● All of channels have the LED to display that's status. ● EMS Protect (Include >4KV Surge, ESD, etc..) ● All of channels have the 100mA fuse to protect overload and it can be replace.	F-8040
DN-DI-32W	● 32 channel Digital Input.(Both of Sink and Source Type) ● EMS Protect (Include >4KV Surge, ESD, etc…) ● All of channels have the 320mA fuse to protect overload ● The fuse have the broke alarm and can be replace.	F-8040
DN-DO-16DR-A	● 16 channel Relay Output (Form C, AC/DC , 6A/per channel)(Dry Contact) ● Support F-8041's channel 0 ~ 15. ● All of channels have the LED to display that's status. ● EMS Protect (Include >4KV Surge, ESD, etc..)	F-8041
DN-DO-16DR-B	● 16 channel Relay Output (Form C, AC/DC , 6A/per channel)(Dry Contact) ● Support F-8041's channel 16 ~ 31 ● This Board is must attached to DN-DO-16DR-A or DN-DO-16FRW-A. ● Other spec are as same as DN-DO-16DR-A.	-
DN-DO-16FRW-A	● 16 channel Relay Output (Form C, AC/DC, 2A/per channel) (Wet Contact) ● Support F-8041's channel 0 ~ 15 ● All of channels have the 2A fuse in the secondary side to protect overload and it can be replace. ● The wet power input support AC and DC. ● EMS Protect (Include >4KV Surge, ESD, etc..)	F-8041
DN-DO-16FRW-B	● Support F-8041's channel 16 ~ 31. ● This Board is must attached to DN-DO-16DR-A or DN-DO-16FRW-A. ● Other spec are as same as DN-DO-16FRW-A.	-

※PS 1：All boards support single or redundant system. ※PS2：All boards used the DIN-Rail Mounting.

- Analog I/O Module & Termination Board



Termination Board for Analog I/O Module Selection Guide

Model Name	Description	Support I/O
DN-AIO-08F	● 8 channel Analog Input or Output. ● EMS Protect (Include >4KV Surge, ESD, etc..) ● Jumper select channel Differential or Single End	F-8017C1 F-8017H F-8017V F-8028CH
DN-AIO-16F	● 16 channel Analog Input or Output. ● EMS Protect (Include >4KV Surge, ESD, etc..) ● Jumper select channel Differential or Single End	F-8017C2 F-8028CV

※PS 1：All boards support single or redundant system. ※PS2：All boards used the DIN-Rail Mounting.

Termination Board for Temperature I/O Module

Model Name	Description	Support I/O
DN-TC-08	● 8 channel TC. ● CJC Compensate.	F-8019
DN-RTD-08	● 8 channel 3wire RTD .	F-8015

※PS 1：All boards support single or redundant system. ※PS2：All boards used the DIN-Rail Mounting.

Termination Board for Pulse I/O Module

Model Name	Description	Support I/O
DN-PI-08	● 8 channel pulse input ● Support 2wire, 3wire ,4 wire connection	F-8084

※PS 1：All boards support single or redundant system. ※PS2：All boards used the DIN-Rail Mounting.

General Termination Board

Model Name	Description	Support I/O
DN-37-A	● D-Sub 37pin Connector to I/O Connector Block	ALL

※PS 1：All boards support single or redundant system. ※PS2：All boards used the DIN-Rail Mounting.

1.4.4 Components

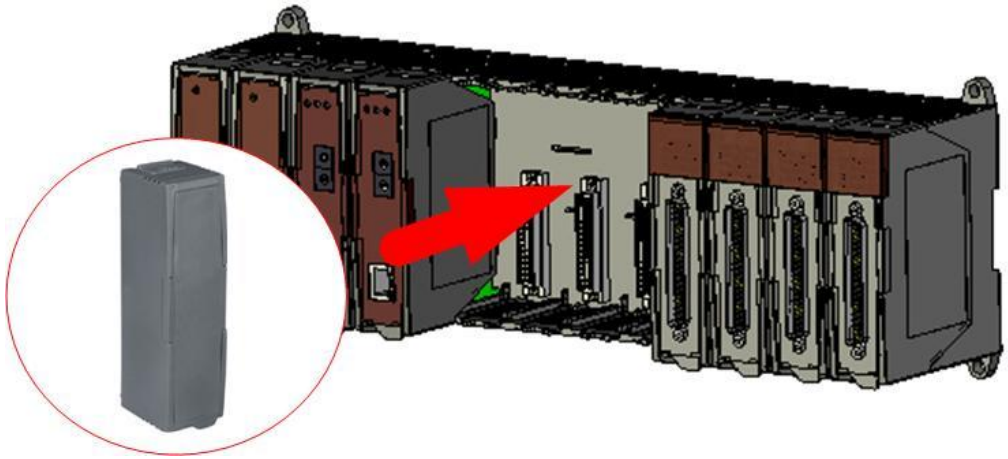
- **Components Selection Guide**

Type Name	Model Name	Description
Blank I/O Module	4SIPP-801W-CAG	Blank I/O Module
Rackmount kit	FRMK	Install iDCS-8000 Series in the 19 inch-rack.
Cable	CA-03	D-Sub 37pin Female-Male 3m Cable，24AWG，180° UL-2464
	CA-05	D-Sub 37pin Female-Male 5m Cable，24AWG，180° UL-2464
	CA-10	D-Sub 37pin Female-Male 10mCable，24AWG，180° UL-2464
	CA-3710A	D-Sub 37pin Female-Male 1m Cable，45°

※線材規格請參考章節 1.5.5.2

- **Blank Module**

Module Name	4SIPP-801W-CAG
Dimensions	30mm x 60mm x 115mm (W x L x H)
Weight	0.1 kg



1.5 Mounting

1.5.1 Environment Specification

The following table is the mounting environment specification of the iDCS-8000 Series

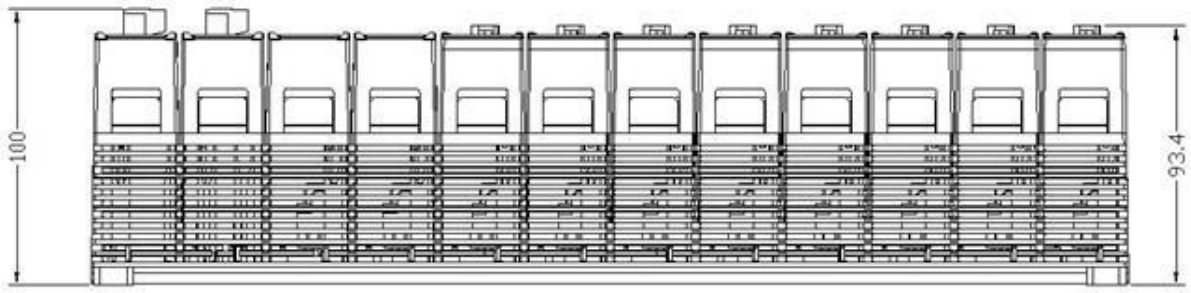
Item	SPEC	Standard
Operating Temperature	-25℃~75℃	
Storage Temperature	-40℃~85℃	
Operating Temperature Variation	±10℃/hour	JEIDA29 Class B
Storage Temperature Variation	±10℃/hour	JEIDA29 Class B
Operating Humidity	5 ~ 95 % RH (Non-condensing)	
Storage Humidity	5 ~ 95 % RH (Non-condensing)	
Dust Fall	0.3mg/m^3 以下	
Corrosion Resistance	G3	ISA S71.04
Vibration Resistance	0.15mmpp(5~58Hz) 1G(58~150Hz)	IEC 68-2-6
Shock Resistance	15G, 11ms(不通電，三方向正弦半波)	IEC 68-2-27
Elevation	2000m 以下	
Operating Voltage	$24V_{DC}$	
Maximal Range of Operating Voltage	$24V_{DC}$±10%	
Maximal Time of Voltage Interruption	10ms	
Current Input	5A	
Inrush Current	5ms 以內 80A	
Leakage current	0.1mA/60s	
Withstand voltage Protection	3000VAC/min	
Over Voltage Protection (F.G-S.G.)	3 kV	
Anti-interference ability of power	EN61000-4-11	EN6 1000-4-11
Voltage of external power supply	24VDC±10% (註 1)	
Current of external power supply	5A	
Pollution Level	等級 2	IEC 1010-1

※Note1: In order to reduce the noise between modules, the external power supply for each PWM module must be different to each other and ripple voltage must less than 50mVp-p.

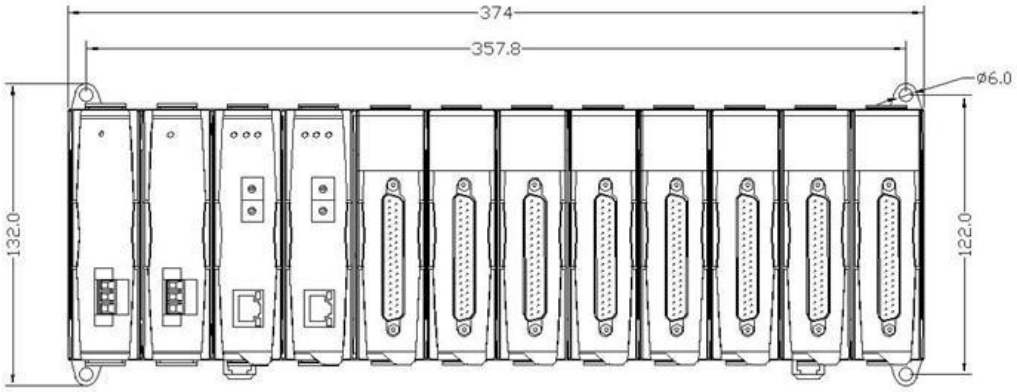
1.5.2 iDCS-8000 Series Dimensions

1.5.2.1 iDCS-8830 Dimensions

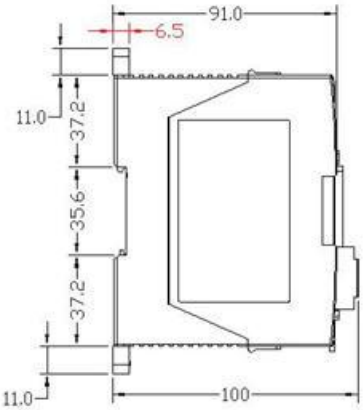
Units: mm



Top View



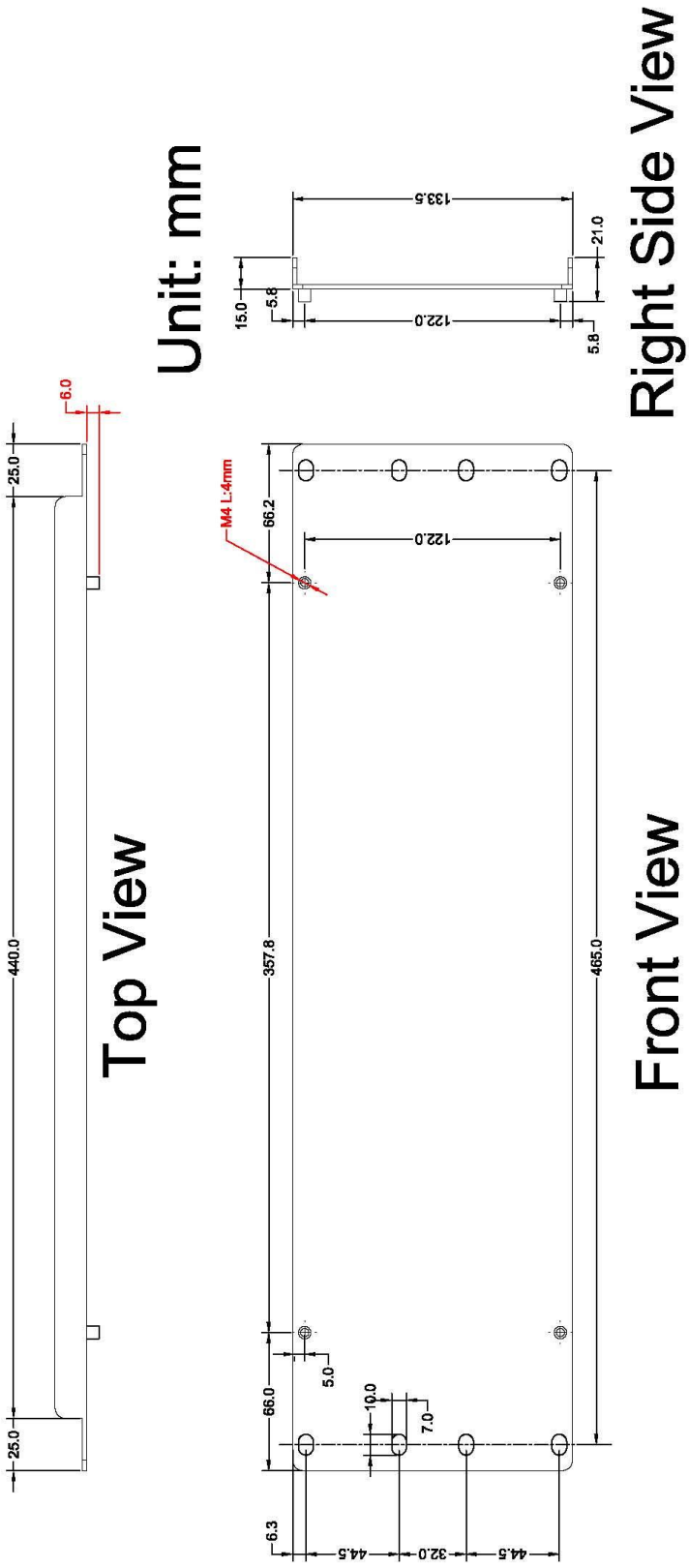
Front View



Left Side View

1.5.2.2 FRMK

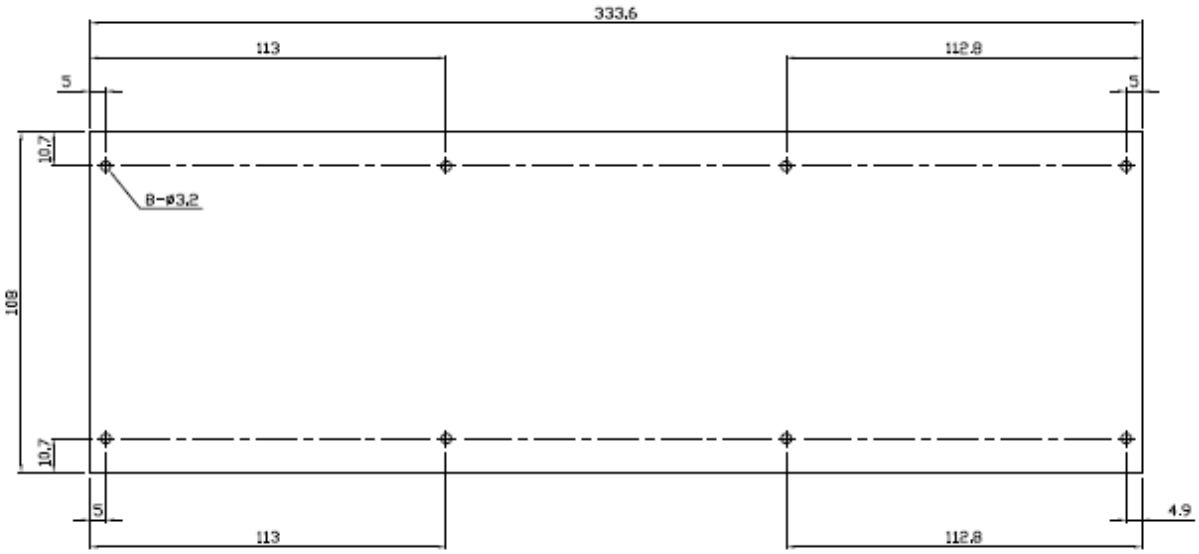
Units: mm



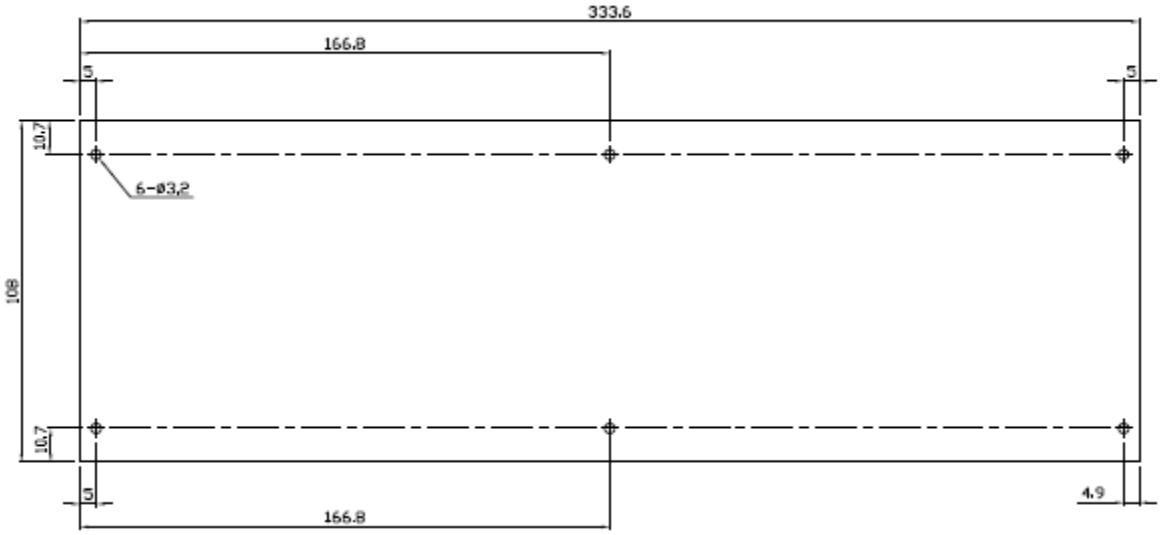
1.5.2.3 Daugther Board Size

Units: mm

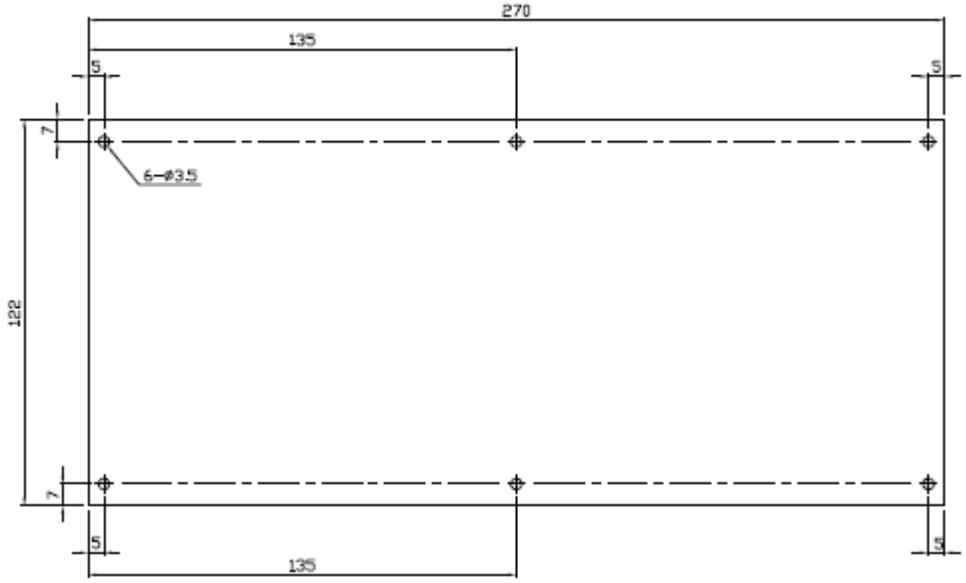
- DN-DO-16DR-A / DN-DO-16DR-B / DN-DO-16FRW-A / DN-DO-16FRW-B：



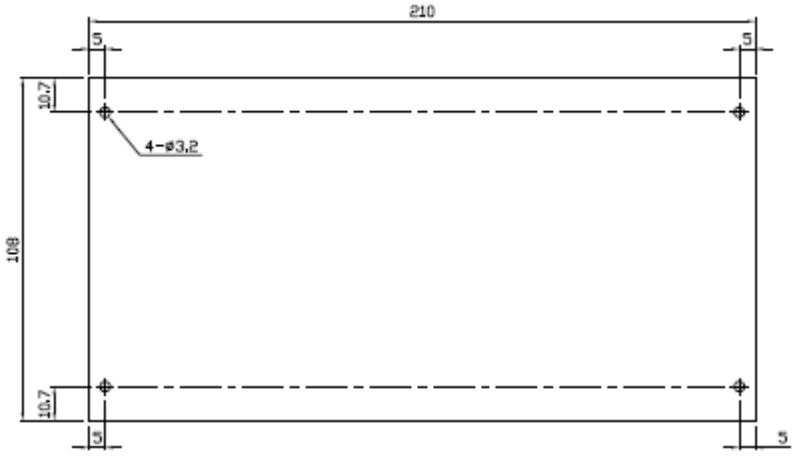
- DN-DI-32F：



- DN-DI-32W：



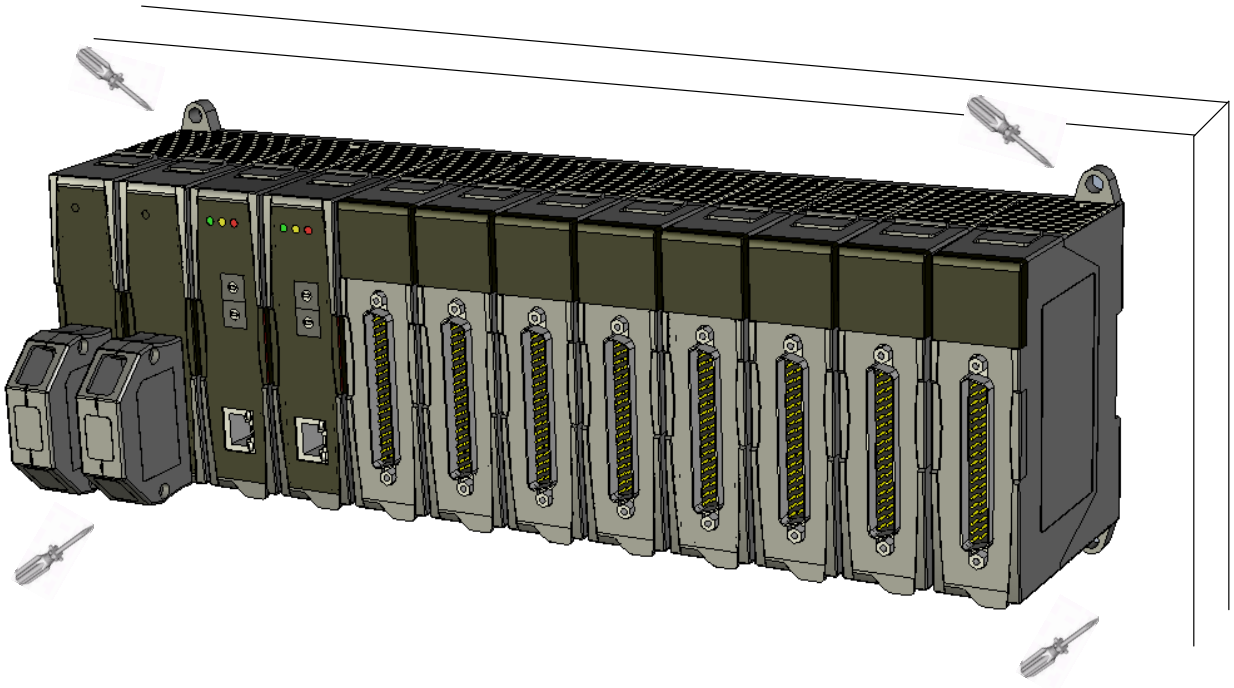
- DN-AIO-08F / DN-AIO-16F / DN-TC-08 / DN-RTD-08



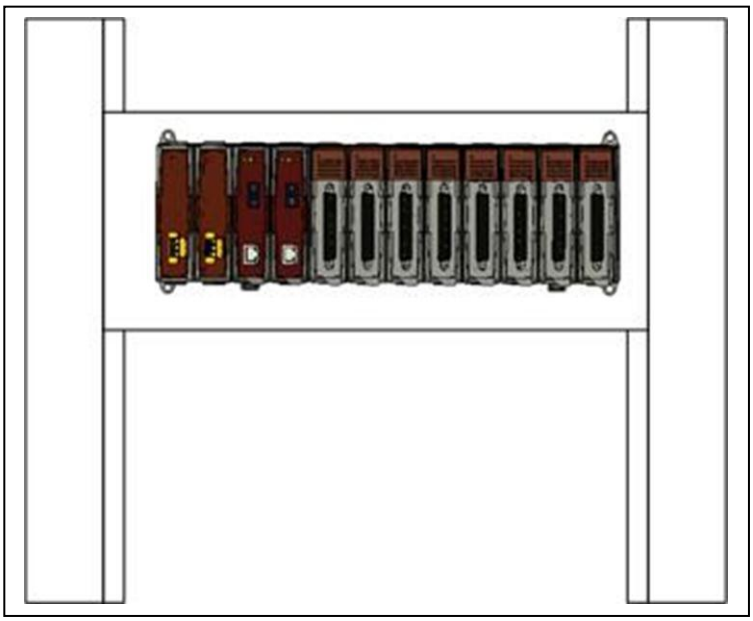
1.5.3 Hardware Mounting

1.5.3.1 Main Units Mounting

- Use screws to mount the unit to the fixed-panel (FMARK).

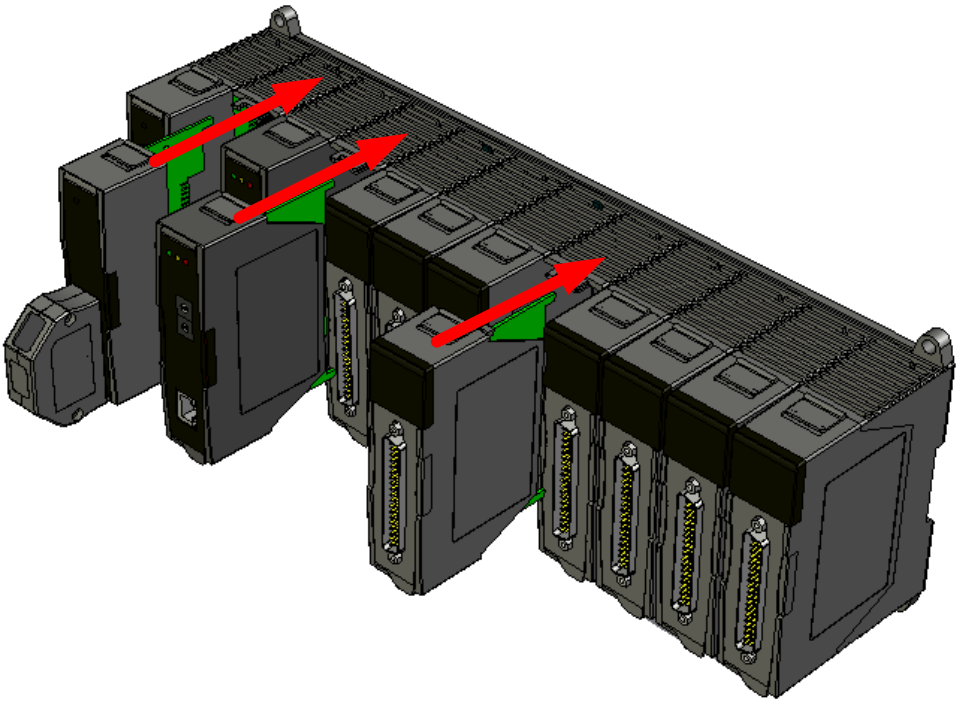


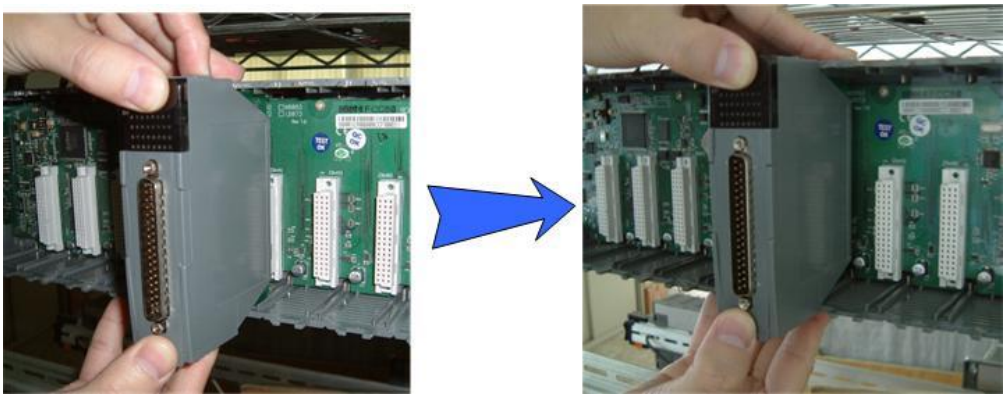
- Then mount the fixed-panel on the mechanism.



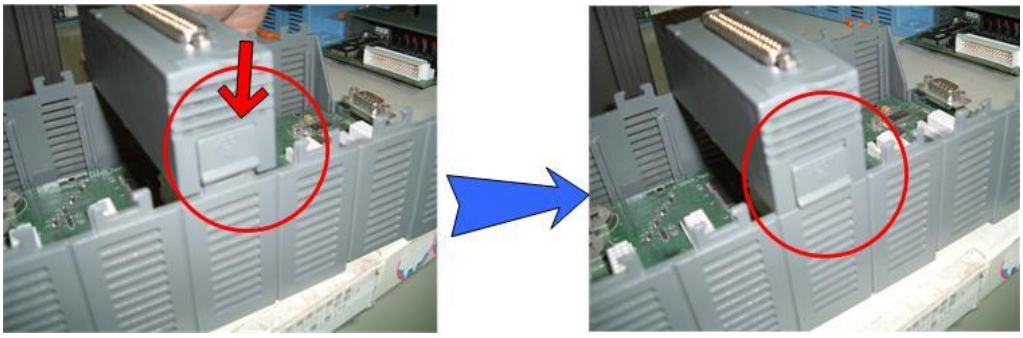
1.5.3.2 Module Install

- Module Insatll



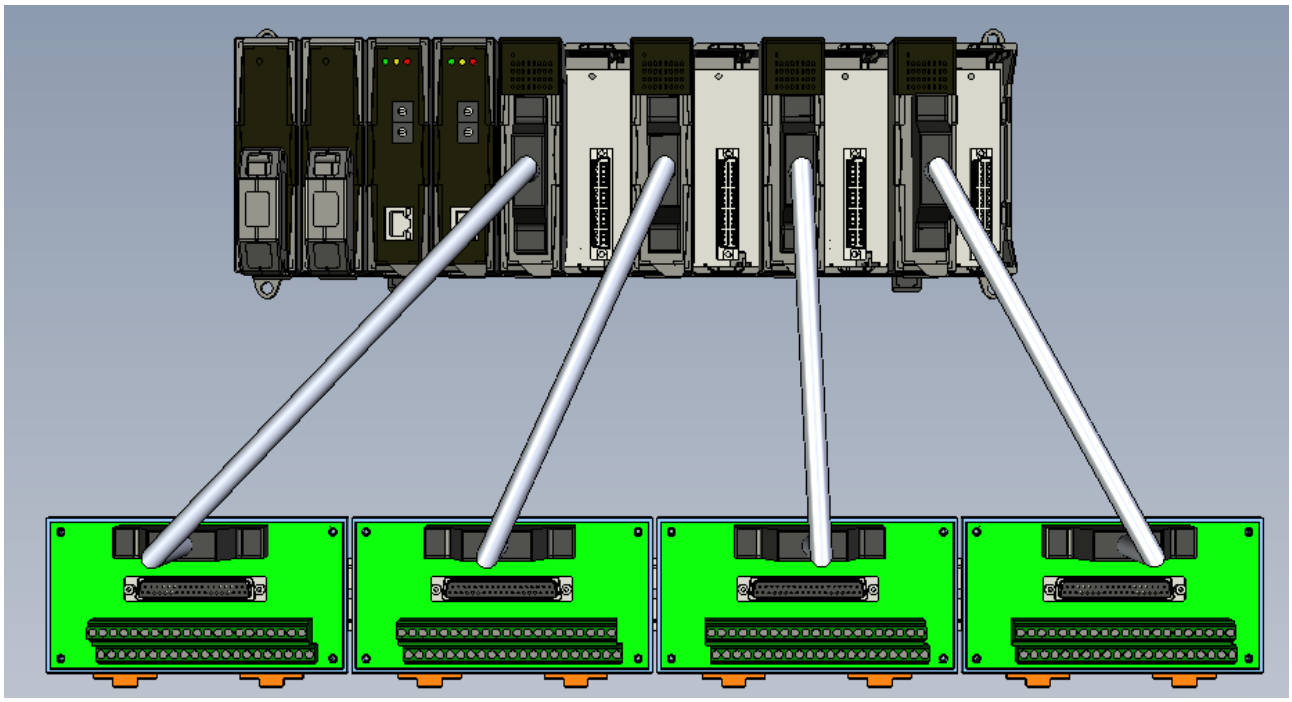


- Module Locker

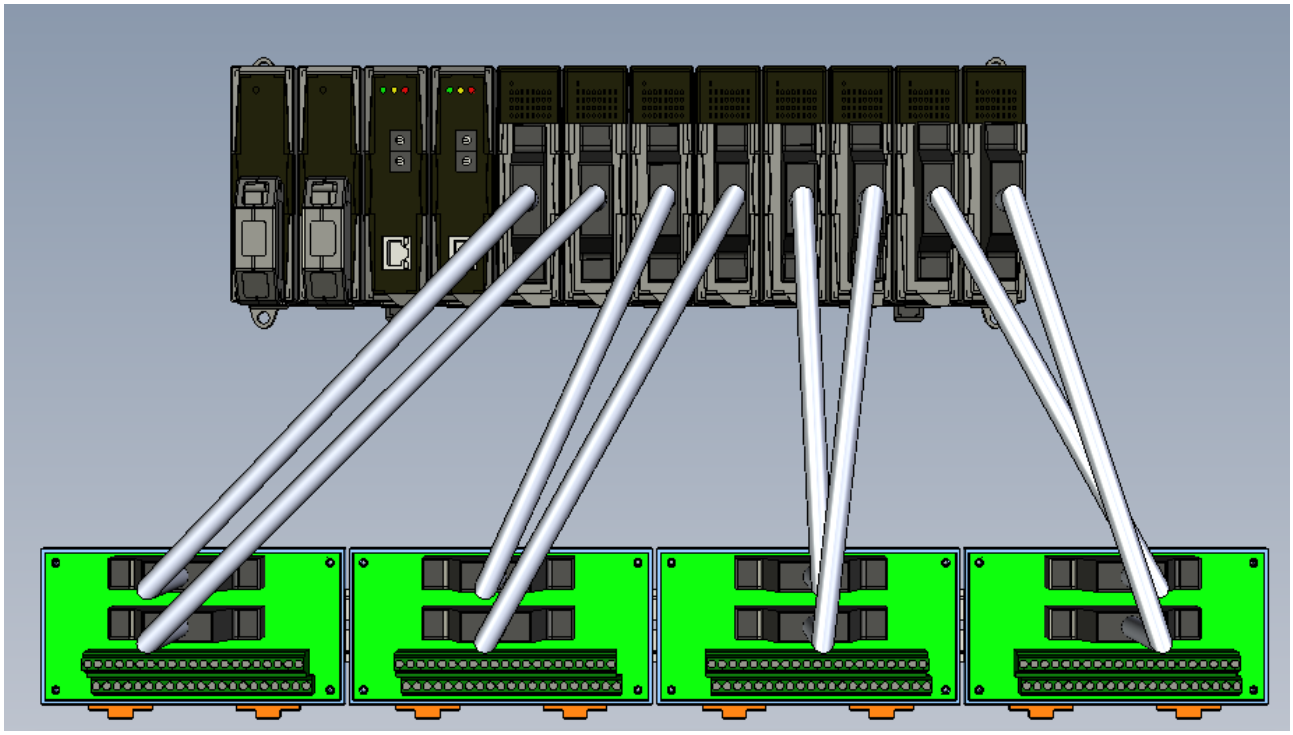


1.5.3.3 Wiring

- Single Module Wiring Diagram (Each I/O Module connected to daughter board by itself.)



- Redundant I/O Module Wiring Diagram (The same two redundant I/O module both connected to the daughter board.)

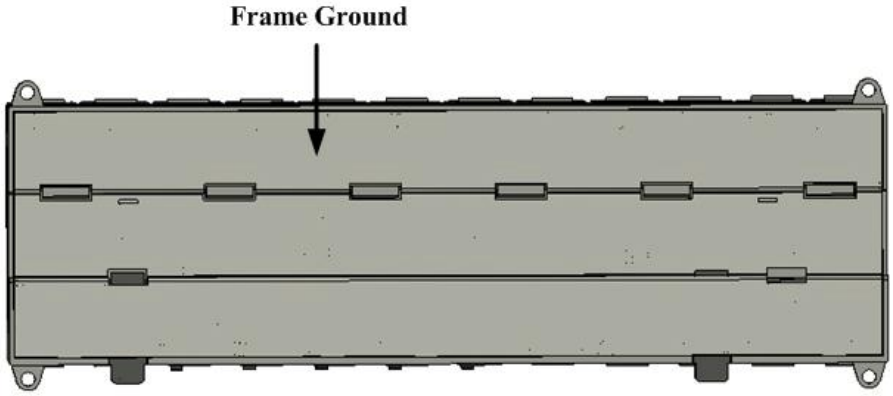


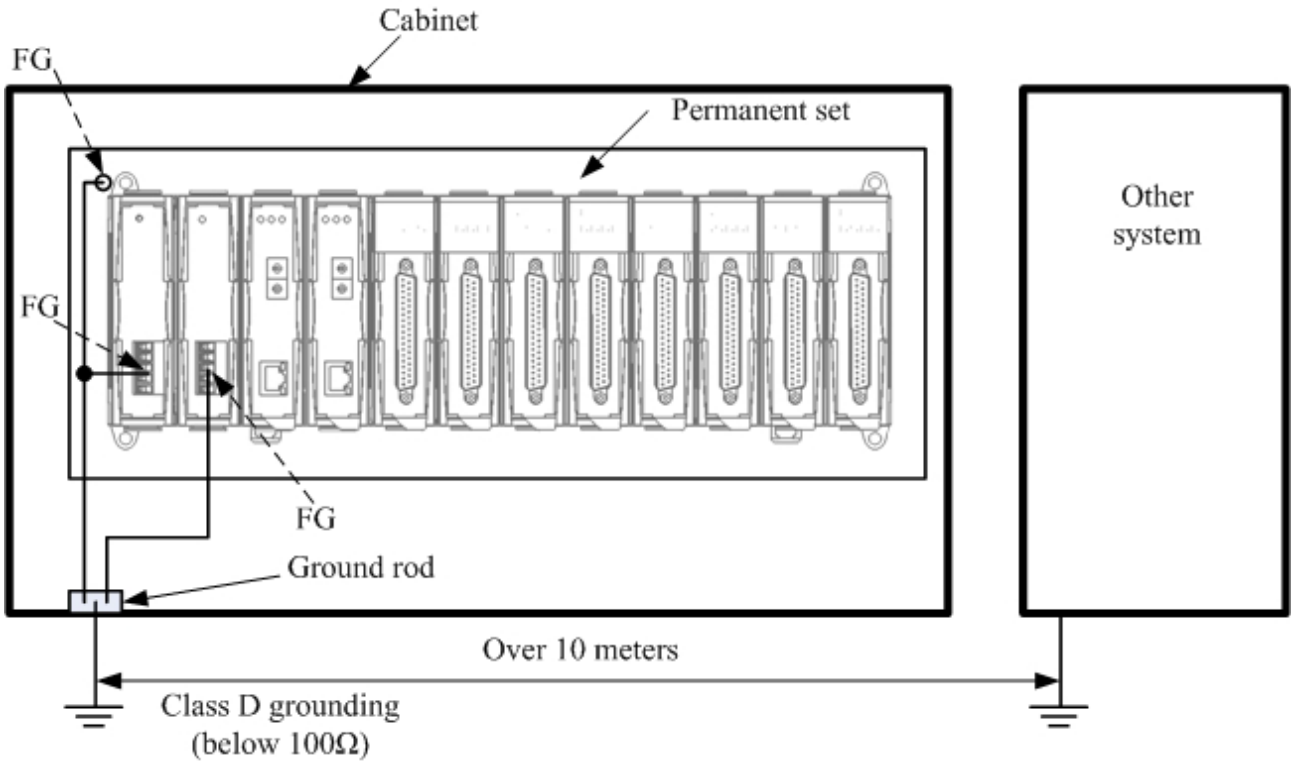
1.5.4 Frame Grand

The hardware circuit is easy to be broken by ESD (Electrostatic Discharge) under some areas. So there design some frame ground on the iDCS-8830 to lead the ESD into the earth. It can prevent the modules to be broken by the ESD and can increase the operating stability of the module.

There exists sheet metal under the iDCS-8830. When mounting the iDCS-8830 under cabinet, the sheet metal can be attached with the cabinet. So that the earth lead can connect with iDCS-8830.

The frame ground diagram between the iDCS-8830 and earth lead are listed below.

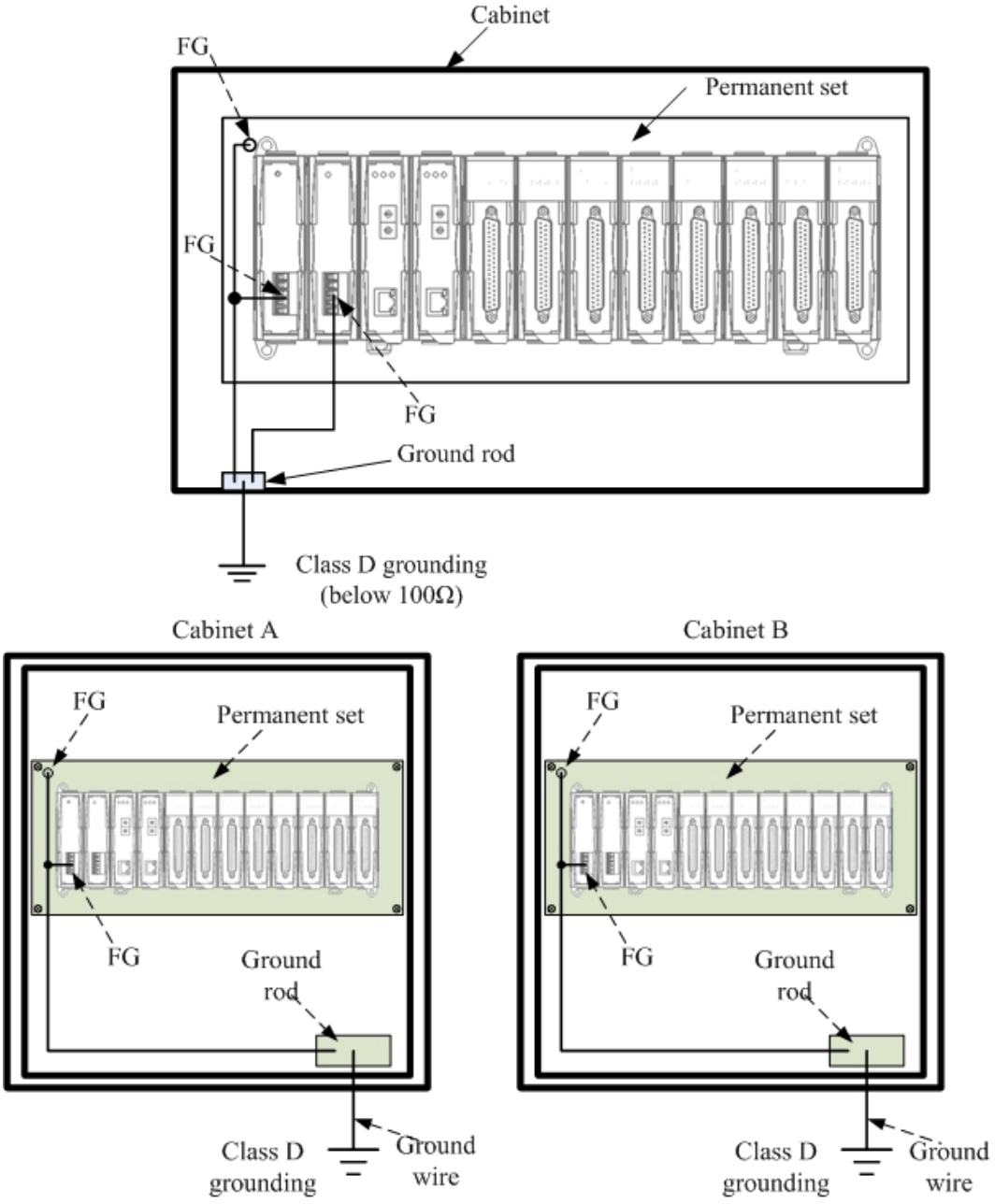


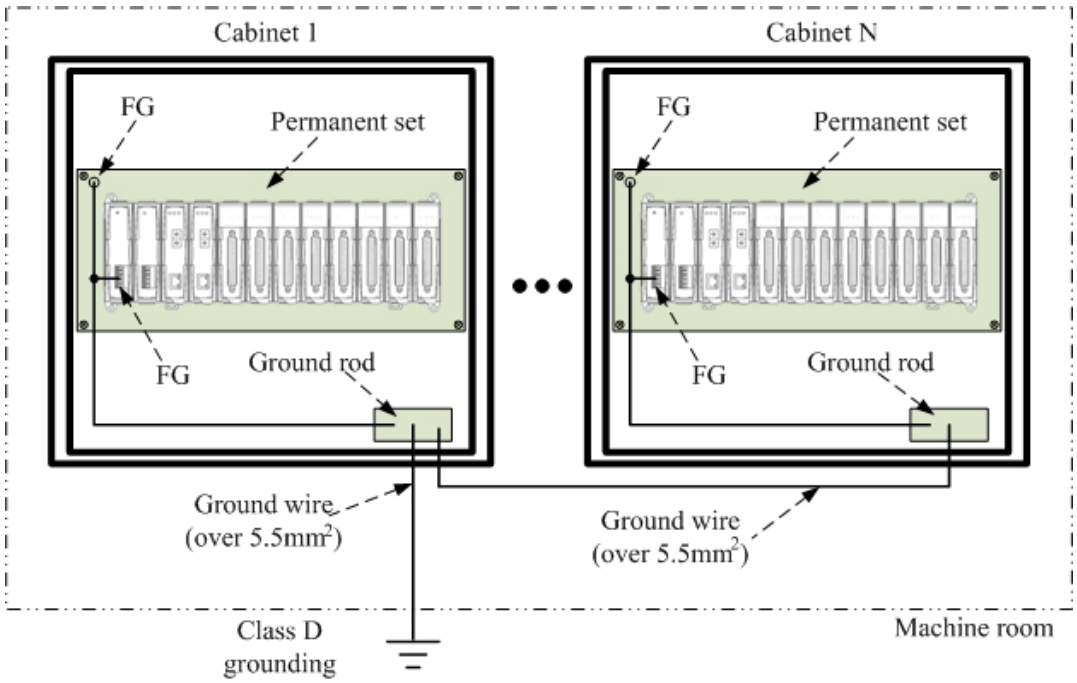


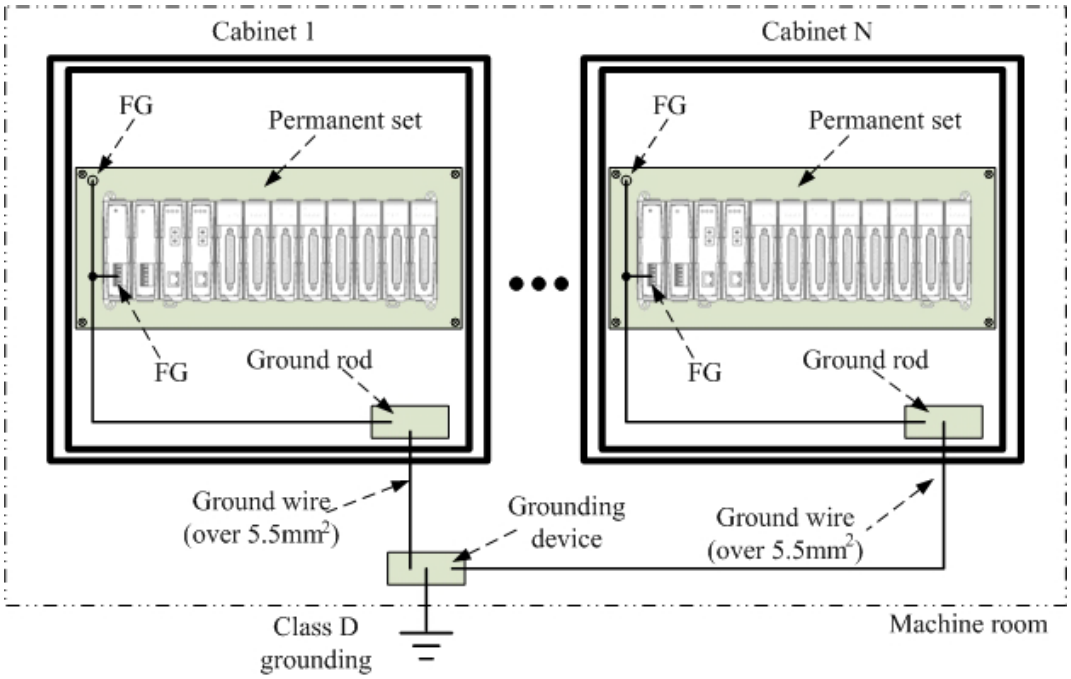
1.5.4.1 Ground Specification

In order to prevent the operators to get an electric shock and external noise to affect iDCS-8830 system, the cabinet of the iDCS-8830 must set earthed. And all the metal that the operators might touch must set earthed. The grounded system must follow "Electrical Equipment Technical Standard" Class D specification and the earth resistance must be below 100Ω. (Note: There is a 3 kVDC high-tension condenser between the S.G and F.G of iDCS-8830).

The grounded system of the iDCS-8830 must follow Class D specification. When grounding, please do not share the ground point of the iDCS-8830 with other power system. And the distance between two ground points must greater than 10 meters.




Cabinet 1
Cabinet N
FG
Permanent set
FG
Ground rod
Ground wire
(over 5.5mm²)
Class D
grounding
Machine room


Cabinet 1
Cabinet N
FG
Permanent set
FG
Ground rod
Ground wire
(over 5.5mm²)
Grounding
device
Class D
grounding
Machine room

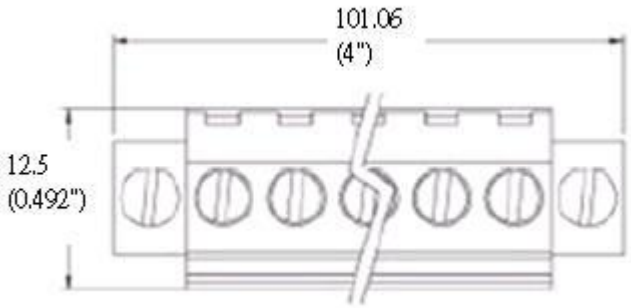
1.5.5 Terminal Connecter And Cable

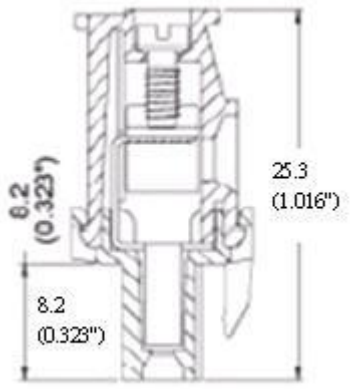
1.5.5.1 Terminal Connecter

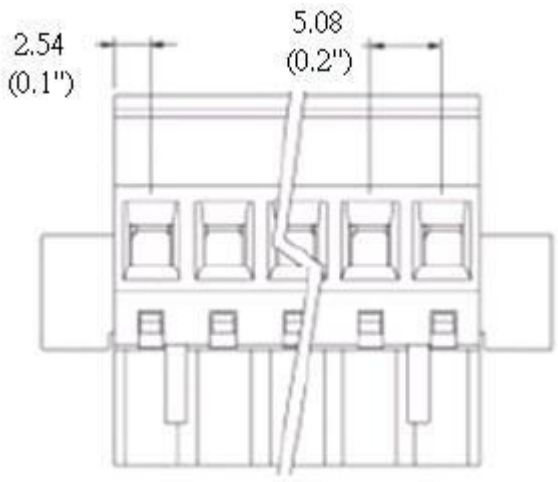
- Terminal Connecter Specifications(5.08mm screw terminal)

	CUL	VDE
Rated Voltage	AC 300V	AC 380V
Rated Current	16A	16A
Wire Size	24~12AWG	0.2~4mm^2
Terminal type	MC201-F118 101.6mm (4.000 inch)	
Housing Material	Polyamide66(UL94V-0)	
Cage Clamp	Brass, Ni plated	
Contact	Phosphor bronze, Tin plated	
Screw Size	M2.6, steel, Zinc plated	
Operating Temperature	-40℃ to +105℃	
Torque	7.0 lb-inch	
UL File No.	E167040	

- Terminal Connector Size

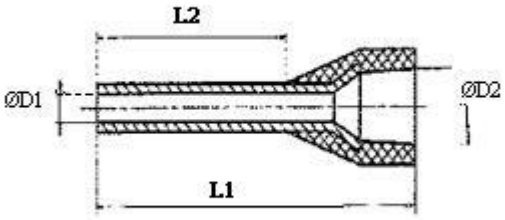






- Suitable terminal block

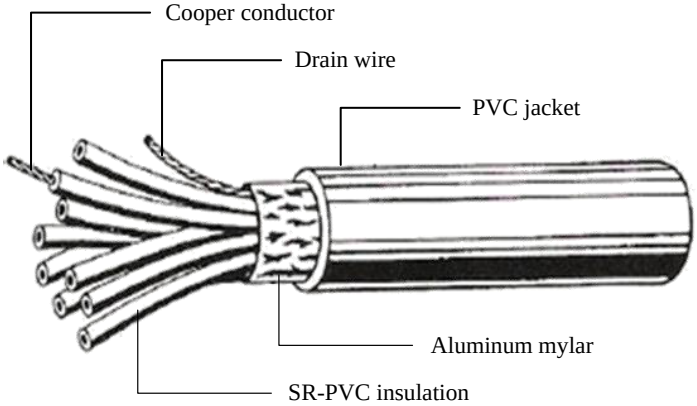
Cable connection to terminal block	2P Connector	Recommended sleeve type	Wire size(mm^2)	AWG	L1	L2	D1	D2	Bare length of wire(mm)
◯	◯	H0.5/16	0.5	20	16	10	1	2.6	12
◯	◯	H0.75/18	0.75	18	18	12	1.2	2.8	14



1.5.5.2 Cable

There are three types of the cable can be used between the I/O modules and the external board.

Model	Length	AWG	Material	Rated Temperature	Rated Current	Connector Type
CA-03	3m	24	Semi-rigid PVC	80	2A/per wire	37P D-Sub Male Cable
CA-05	5m	24	Semi-rigid PVC	80	2A/per wire	37P D-Sub Male Cable
CA-10	10m	24A	Semi-rigid PVC	80	2A/per wire	37P D-Sub Male Cable



Description:

- Solid or stranded, thinned copper conductor
- UL 1061 style, Semi-rigid PVC insulation
- Thinned copper wire spiral shield
- Rated temperature: 80℃, Voltage Rating: 300V
- Passes UL VW-1SC vertical flame test

2. Power Module

2.1. 24Vto5V Power Supply

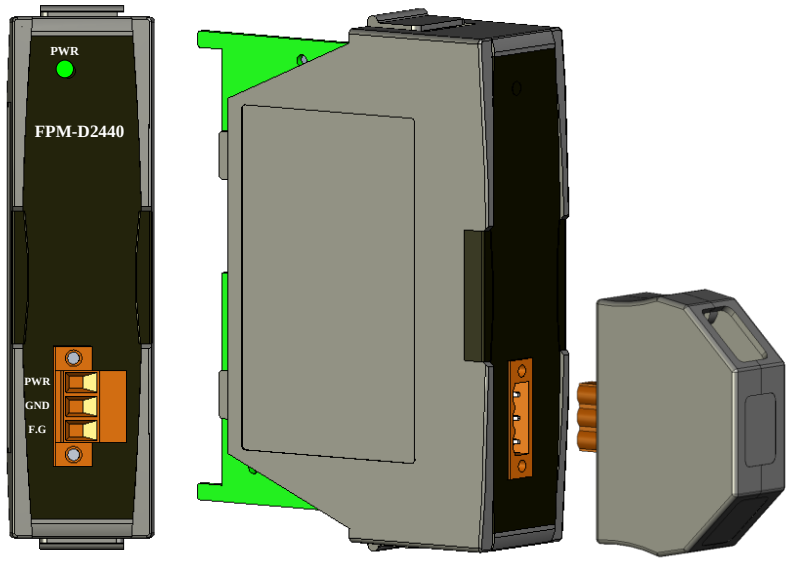
2.1.1 FPM-D2440 Introduction

- **Profile**

Module Name	CPWM-01
Voltage Input	24V DC±10%
Voltage Output	5 VDC±2% 24V DC±10%
Current Output	5V: 7A max 24V: 5A max (By Pass)
Maximum Watts	5VDC: 35W 24VDC: 120W
Insulation Resistance	100MΩ
MTBF	170,000 Hours at AMBIENT 50 ℃
Isolate ($24V_{DC}$/$5V_{DC}$)	1 kV

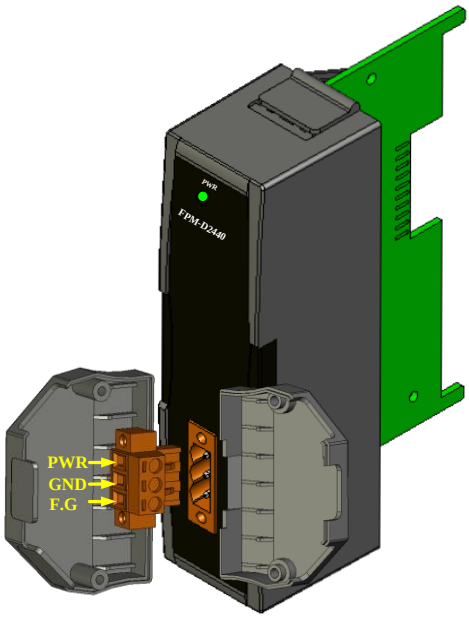
Module Name	CPWM-01
Withstand F-S.G (Field to Signal Ground)	1 kV
Fuse Rating	5A@24V
Fail Protect	Over Current Protection 9A, When Current less than 8A and Power Module's Temperature over than 100 degree, the module will stop to output until the temperature returen to normal.
Redundancy	Yes
Operating Temperature	-25°C ~ +75°C
Dimensions	31mm x 91mm x 115mm (W x L x H)

- LED Status Discription



LED	Status	Discription
PWR	On	■ Voltage input between $19V_{DC}$ ~ $30V_{DC}$ ■ Voltage output between $5V_{DC}$ ±10%
	Off	■ Voltage output low than $4.5V_{DC.}$ ■ Voltage Input low than $19V_{DC.}$ ■ Power supply fail. ■ Current overload.

- Connector & Pin Assignment:



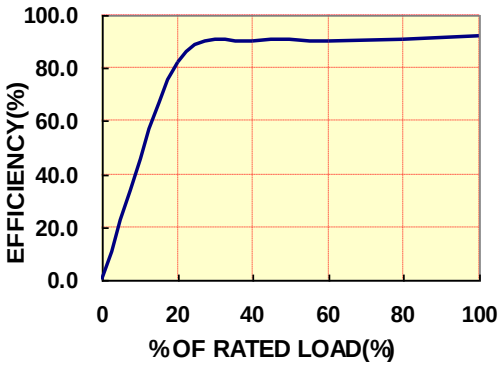
Pin	Discription
PWR	24 VDC Input
P.GND	Power Ground
F.G	Frame Ground

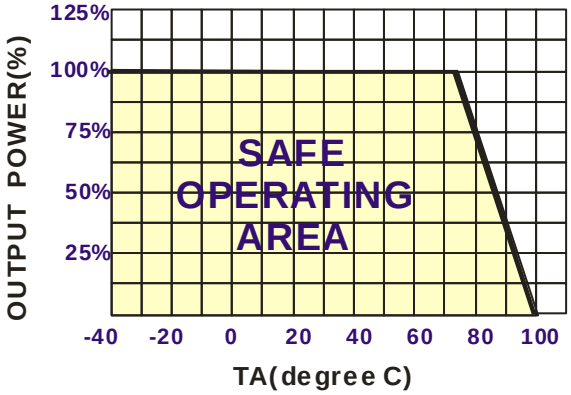
※附註：

F.G = Frame Ground

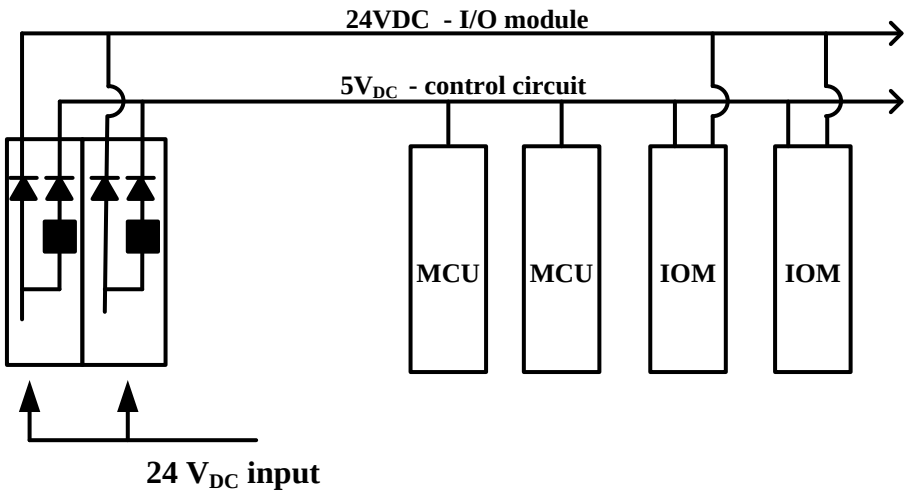
S.G = Signal Ground

- Temperature Curved Shape





- Power Module Structure



- Current Consumption of I/O Module

Model Name	Maximum Ouput Current		Remarks
	5 V	24 V	
F-8040	0.4A	-	
F-8041	0.45A	-	
F-8017C1	0.18A	-	Module itself doesn't consume 24V，but it support 24V/1A output.
F-8017C2	0.2A	-	
F-8017V	0.2A	-	
F-8017CH	0.31A	-	Module itself doesn't consume 24V，but it support 24V/1A output.
F-8028CV	0.5A	0.4A	
F-8028CH	0.5A	0.35A	
F-8015	0.15A	-	
F-8019	0.22A	-	
F-8084	0.22A	0.1A	

3. Communication Module

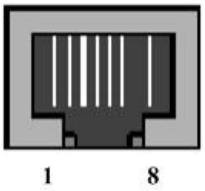
Module Name	CMCU-01
LAN Port	Ethernet: RJ-45 10/100Base-TX Ethernet Controller (Auto negotiating, Auto MDIX, LED indicator)
Protocol	Modbus TCP/IP Protocol
ESD Protection	4 kV, Contact for each terminal
Isolation F.G-S.G	3 kV
Current Consumption	0.5 A max
Power Consumption	2 W
Redundant Load balancing.	Yes
Operation Temperature	-25°C ~ +75°C
Dimension	31mm x 91mm x 115mm (W x L x H)

- LED Status Description

LED	Status
HF	ON：Heavy fault OFF：MCU Function Normal
RUN	ON：MCU Power On OFF：MCU Power Off
LF	ON：Light fault OFF：MCU Function Normal
LNK	ON：Ethernet Connected. OFF：Ethernet Break line.
ACT	ON：Ethernet Communicating. OFF：Ethernet pending.

- Ethernet Connector Description

Meets or exceeds TIA/EIA-568-B Enhanced Category 5 and ISO 11801: 2002 Class D specifications



568B 接腳定義

Pin	Name	Color	Description
1	TX+	Clear white	Transmit Data +
2	TX-	Clear	Transmit Data -
3	RX+	Green white	Receive Data +
4	N.C.	Blue	Not Connected
5	N.C.	Blue white	Not Connected
6	RX-	Green	Receive Data -
7	N.C.	Brown white	Not Connected
8	N.C.	Brown	Not Connected

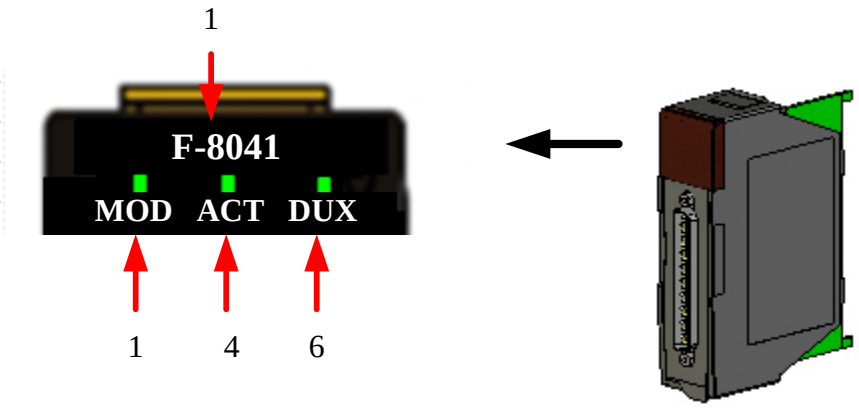
• Ethernet Switch

Access Method	10/100Mbps (CSMA/CD)
Supported Standards	IEEE802.3 :10 BASE-T IEEE802.3u :100 BASE-TX IEEE802.3x
Supported Media	UTP/STP Cable 10Mbps :Category 3 or greater , 100Mbps :Category 5 or greater
Port Configuration	10/100BASE-T(RJ-45)x 10 ports *all ports support Auto MDI/MDI-X
Power Supply	Dual 12~48 VDC power input
Operating Temperature	0-60°C
Operating Humidity	10 % ~ 90 % (non- condensing)
Processing Type	Store forward, with IEEE802.3x full duplex
Mounting	DIN-Rail or 19" Rack mount
Power Consumption	6.5W Max
Storage temperature	-40 ~ 85°C
EMI	FCC Class A,CE Mark Class A,VCCI Class A
Safety	UL 60950-1

4. I/O Module And I/O Terminal Board

4.0 I/O Module Functions Discription.

- I/O Module LED Discription



Item	Display Status	Discripteion	
1	MOD ON	Operation Mode	
2	MOD OFF	Halt Mode (Heavy Fault)	
3	Only MOD Flashing	Stop Mode (Light Fault)	
4	ACT ON	Single	Output/Input Enable
		Redundant	Master I/O Output/Input Enable
5	ACT OFF	Single	I/O Output/Input Disable
		Redundant	Slave I/O and Output/Input Disable
6	DUX On	Setting to the Redundancy I/O function	
7	DUX OFF:	Setting to the Single I/O function.	
8	Three LED Flashing At the same time	Module bootloader starting and updating.	

● 機能一覽

IOM 機能一覽主要區分: Analog IOM、Sensor IOM、Digital IOM、Pulse IOM，再者功能區分共通、入力、出力。

● I/O Module Command Functions List

IOM Type	I/O Class	Functions	設定情報
All	Commom	Single/Redundant	Single/Redundant Setting
		CheckSum	CheckSum Setting
		MCU Timeout	通信斷監視設定(內定)
			通信斷監視Timer(內定:300msec)
			ON/OFF

● Digital Module Function List

IOM 區分	機能區分	機能項目	設定情報
Digital	共通	Digital mode	(內定一次讀取32bit)
		Digital表示型式	(內定Little end)
	Digital 入力	取樣時間設定	(內定 2msec)
	Digital 出力	開放檢出	入力開放檢出(內定:Enable 整埠)
		重故障異常保護	Reset mode
			Hold mode
			SetPoint mode

● Analog Module 機能一覽表

IOM 區分	機能區分	機能項目	設定情報
Analog	共通	入出力Data Type	(內定0～10000d)
		Scaling 機能	(內定0～10000d)
	HART	Hart modem	FSK Physical layer, multiplexed.
		Hart command	Universal commands, Common practice commands, Device-specific commands.
		Hart mode	0.8sec per channel
	Analog 入力	開放檢出設定	(內定端子脫落檢出)
		CH H/L alarm檢知	Enable/Disable
		HART transmitters	2- or 4- wire transmitters
	Analog 出力	重故障異常保護	Reset mode
			Hold mode
			SetPoint mode
		通電立上時出力設定	Power on出力設定
		CH H/L alarm檢知	Enable/Disable
		HART transmitters	2- or 4- wire transmitters

- **Sensor Module 機能一覧表**

IOM 區分	機能區分	機能項目	設定情報
Sensor	Sensor 入力	開放檢出	入力開放檢出(內定:Enable 整埠)
		Rangcode	RTD:JPT100, Pt100, Pt1000
			TC: J, K, T, E. R. S, N, B, C
		Scaling 機能	(內定0～10000d)
		冷接點補償	冷接點補償(CJC, Cold Junction Compensation)
		CH H/L alarm檢知	Enable/Disable
		CH 斷線檢知	Enable/Disable

- **PI Module 機能一覧表**

IOM 區分	機能區分	機能項目	設定情報
PI	共通	PI mode	(內定一次讀取32bit)
		PI表示型式	(內定Little end)
	Up counter	Up counter	Edge trigger
			Impedance
			LPF mode
			Counter type
			LPF Interval(us)
	Frequency	Frequency	-

- **PO Module 機能一覧表**

IOM 區分	機能區分	機能項目	設定情報
PO	共通	PO mode	(內定一次讀取32Word)
		PO表示型式	(內定Little end)
	ONESHOT mode	ONESHOT	-
	Continuous mode	Continuous	Ref-Time(ms)
			Cycle steps
			Duty steps
			Offset(ms)

● RAS 仕樣

診斷項目		對應模組		檢出時間	二重化切換時間
類別	項目				
上位側診斷	CHECKSUM	全 IOM 模組		-	上位側決定
	通訊斷			500ms	
IOM 診斷	Watchdog	全 IOM 模組		800ms	<1ms
	MCU 與 IOM 間通訊			預設 45ms (可用命令設定)	
	模組與對應外接板專用接線	全 IOM 輸出模組		50ms	
	Hi/Low Alarm	全 IOM 類比模組	AO	<1ms	
			AI	<11ms	
			TC/RTD	<1.2s	
現場側診斷	CJC 偵測	TC 模組		<100ms	
	CH 斷線偵測	TC/RDT 模組		<1.2s	

4.1 Digital Module & Dougther Board

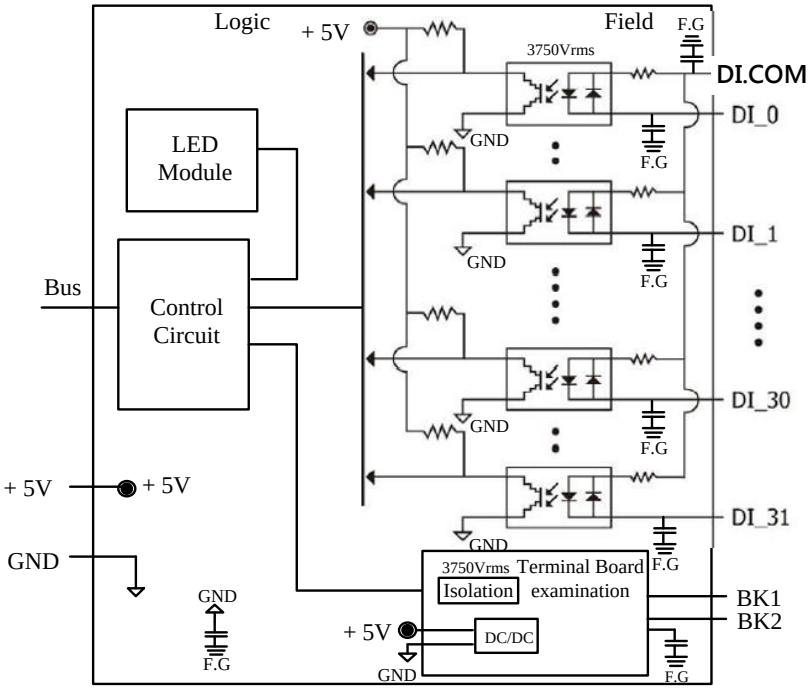
Model Name	Function Description
F-8040	● 32 Channel Digtal Input Module (Wet Contact) ● DC 24V IN 5.1mA Per Channel ● One Common for 32 Channel ● 32 Channel LED Display
F-8041	● 32 Channel Digtal Output Module (Wet Contact) ● One Common for 32 Channel ● Each Channel Maximum 100mA Ouput ● 32 Channel LED Display
F-8041P	● 16 ch ONESHOT Mode /Continuous Mode ● 16 Channel LED Display.

4.1.1 F-8040

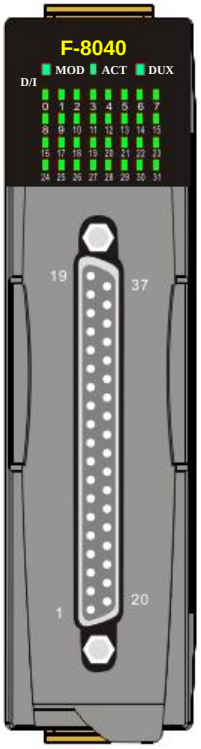
- Profile

Model Name	F-8040
Operation Mode	Single/Duplex
Specific External Terminal Board	DN-DI-32F / DN-DI-32W
Terminal Drop off Detection	Yes
Channel LED Display	Yes
Channel Amount	32
Common & Wiring	Single-End P-COM or N-COM for 32 channel
Input Voltage	$24V_{DC}$
Voltage Range	$20.4\sim26.4V_{DC}$
Maximum Input Voltage	$30.0\ V_{DC}$
ON Voltage Level	$18.0\ V_{DC}$
OFF Voltage Level	$11.0\ V_{DC}$
Minimum ON diction time	50 us for pushbutton input
Maximum ON/OFF cycle	500 Hz for pushbutton input
Input Impedance	4.7KΩ/per channel
Input Current	5.1mA@24VDC /per channel
Digital Filter	1ms~32767ms
Field to Logic Isolation	S.G：$3750V_{rms}$
DC/DC Isolation	$3000V_{DC}$
SG-FG high-tension condenser	$3000V_{DC}$
Timer of Duplex Switch	<1 ms
Timer of data response	<3 ms
Maximum Power consumption	2.1W
DI.COM 最大消耗功率	3.92W@24V
Operating Temperature	-25°C ~ +75°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	0.3 kg
Dimensions	30mm x 85mm x 115mm (W x L x H)

- F-8040 Internal I/O structure



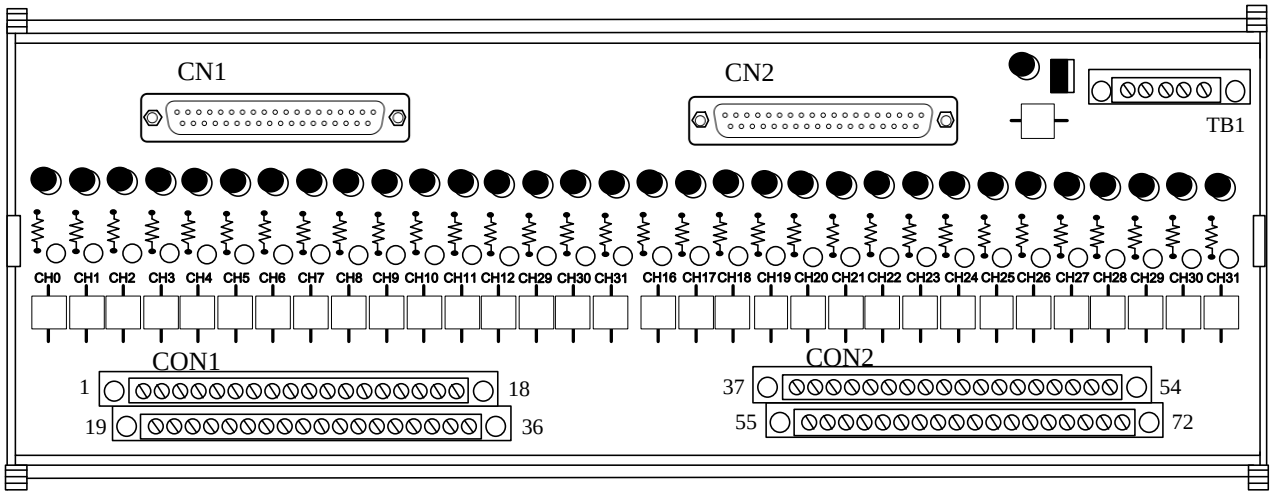
- F-8040 Pin Assignment



Pin Assignment Name	Terminal No.		Pin Assignment Name
DI.COM	19	37	BK2
X	18	36	X
DI_15	17	35	DI_31
DI_14	16	34	DI_30
DI_13	15	33	DI_29
DI_12	14	32	DI_28
DI_11	13	31	DI_27
DI_10	12	30	DI_26
DI_9	11	29	DI_25
DI_8	10	28	DI_24
DI_7	09	27	DI_23
DI_6	08	26	DI_22
DI_5	07	25	DI_21
DI_4	06	24	DI_20
DI_3	05	23	DI_19
DI_2	04	22	DI_18
DI_1	03	21	DI_17
DI_0	02	20	DI_16
BK1	01		

37-pin male D-Sub Connector

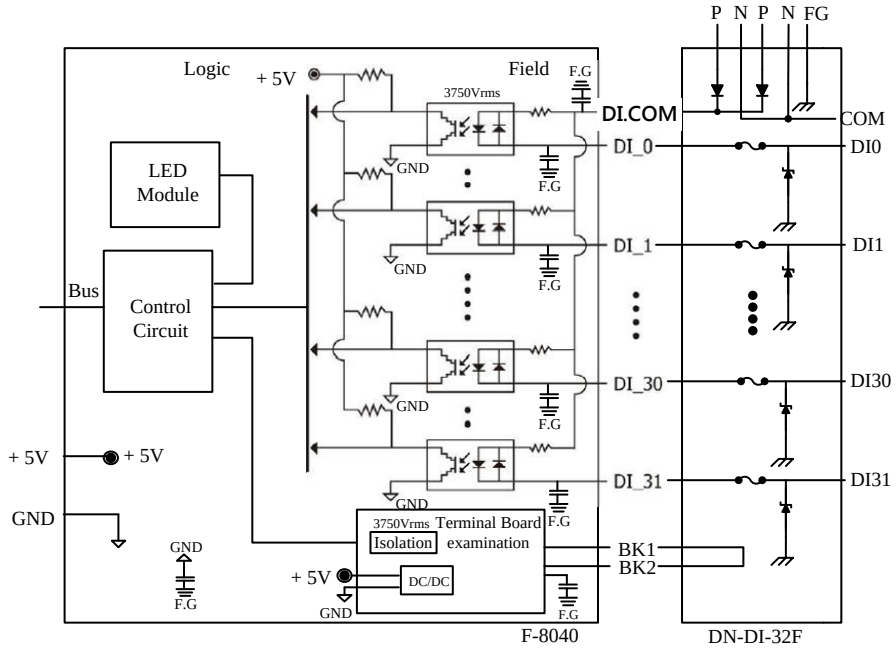
4.1.2 DN-DI-32F (DI Dry Contact Daughter Board)



- DN-DI-32F Profile

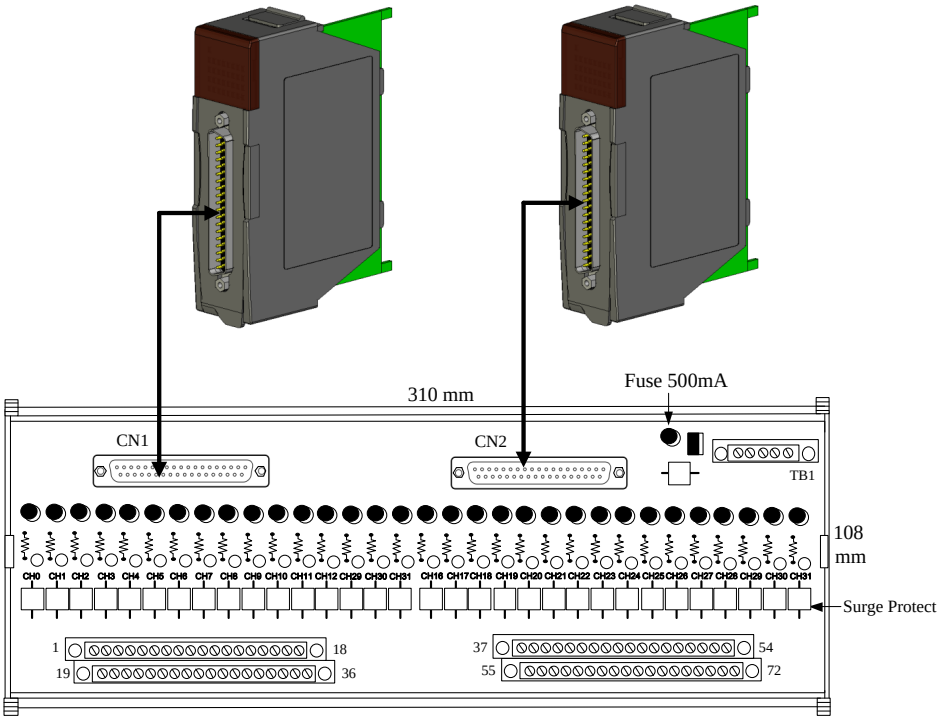
Model Name	DN-DI-32F	
Description	32-ch DI Dry Contact Daughter Board(Soure Type) Every channls have the LED display to show the status Support Single/Duplex and there are the Surge protection.	
Support IO	F-8040	
I/O range	Channel	32
	Digital Input	24VDC
Dimension	W x L x H (mm)	118 x 320 x 65
Mounting	DIN Rail	35 mm
Power Input	Voltage input	$24V_{DC}$ ± 10%
	current consumption	550mA@24V
Fuse Ratings	individual channel	50 mA
	Module	1.0A
Transient voltage Suppressor	Peak pulse power Dissipation	3000W
	Peak forward Surge Current	250A
Environment	Ambient Temperature	-25 ~ 75℃
	Humidity	5 ~ 95 % RH, Non-condensing

- F-8040 with DN-DI-32F Internal I/O structure



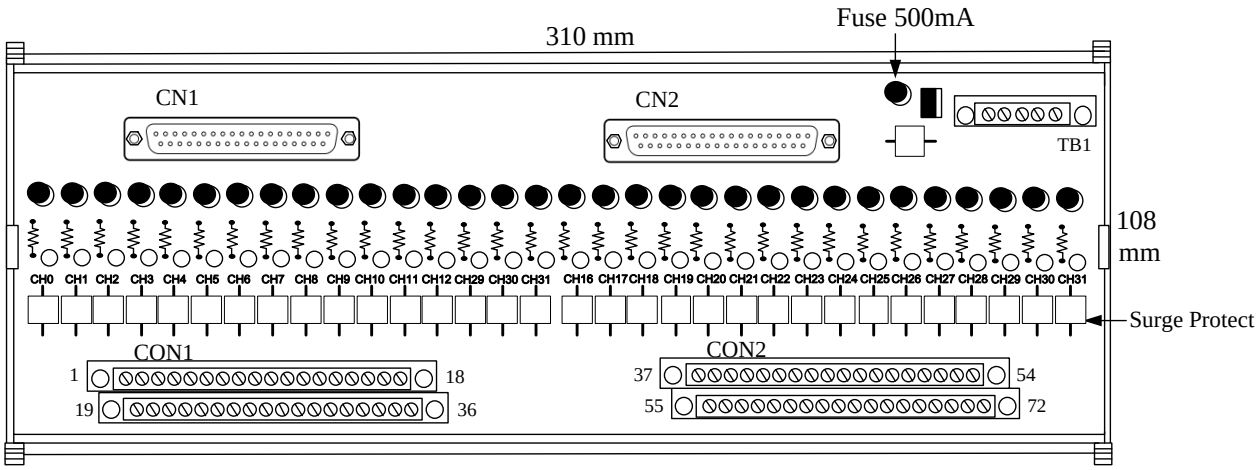
- DN-DI-32F Daugther Board Wiring Diagram

1. CN1, CN2 are used to connect to the F-8041
2. Support single or duplex。



DN-DI-32F

DN-DI-32F Pin Assignment



DN-DI-32F

CON1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	DI_0	COM	DI_2	COM	DI_4	COM	DI_6	COM	DI_8	COM	DI_10	COM	DI_12	COM	DI_14	COM	
19	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**
DI_1	COM	DI_3	COM	DI_5	COM	DI_7	COM		DI_9	COM	DI_11	COM	DI_13	COM	DI_15	COM	

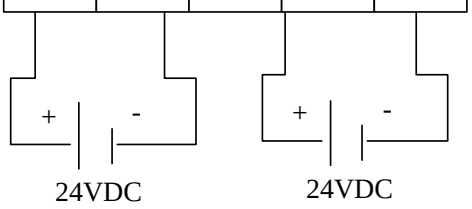
CON2

37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
	DI_16	COM	DI_18	COM	DI_20	COM	DI_22	COM	DI_24	COM	DI_26	COM	DI_28	COM	DI_30	COM	
55	**56**	**57**	**58**	**59**	**60**	**61**	**62**	**63**	**64**	**65**	**66**	**67**	**68**	**69**	**70**	**71**	**72**
DI_17	COM	DI_19	COM	DI_21	COM	DI_23	COM		DI_25	COM	DI_27	COM	DI_29	COM	DI_31	COM	FG

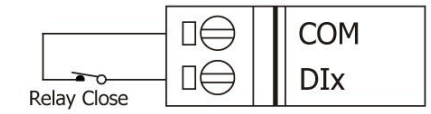
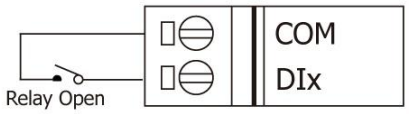
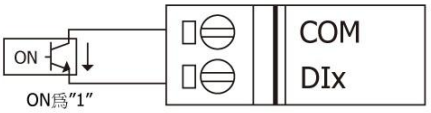
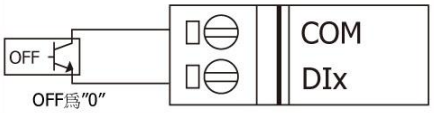
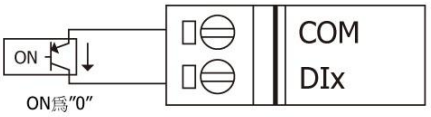
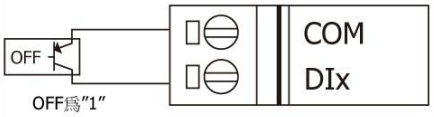
TB1

TB1

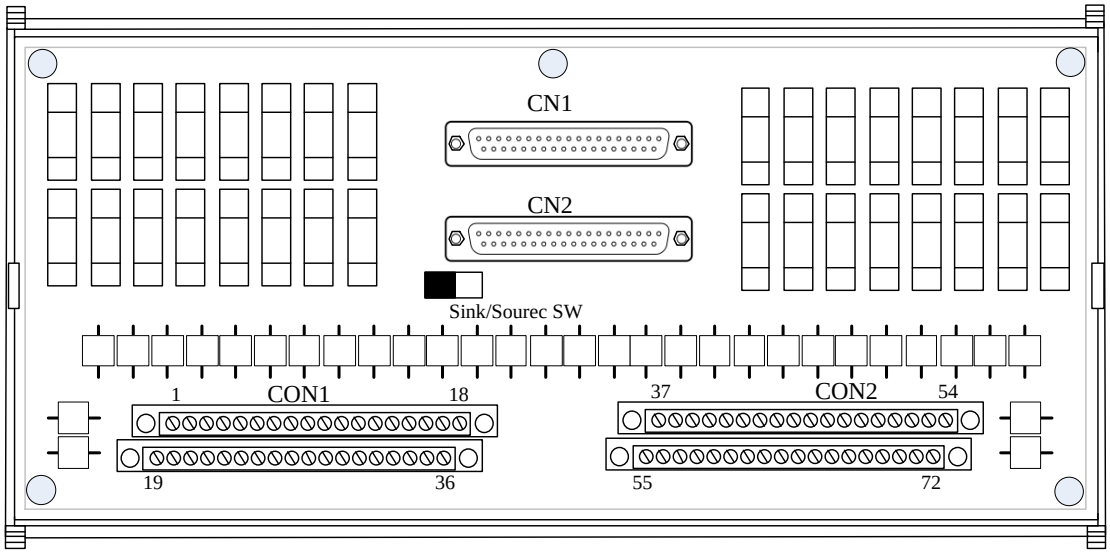
1	2	3	4	5
P	N	F.G	P	N



- I/O Wire Connection

Input Type	ON State LED ON Readback as 0	OFF State LED OFF Readback as 1
Relay Contact	Relay ON	Relay Off
		
NPN Output	Open Collector On	Open Collector Off
		
PNP Output	Open Collector On	Open Collector Off
		

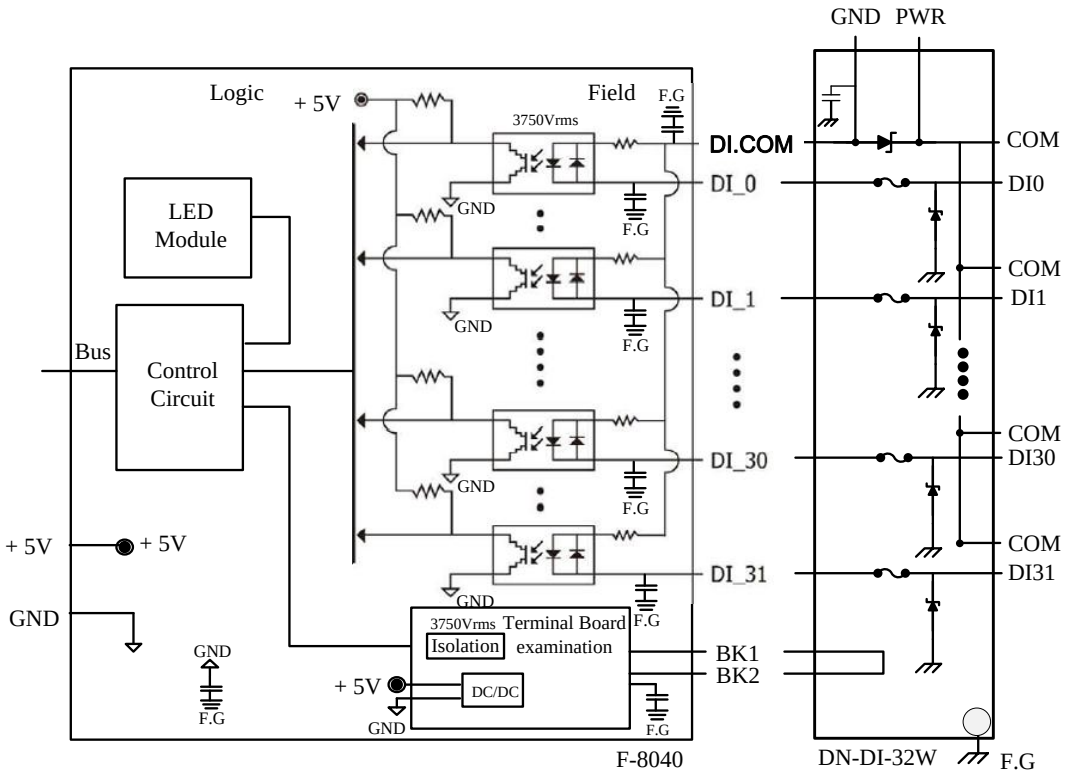
4.1.3 DN-DI-32W (DI Wet/Dry Daughter Board)



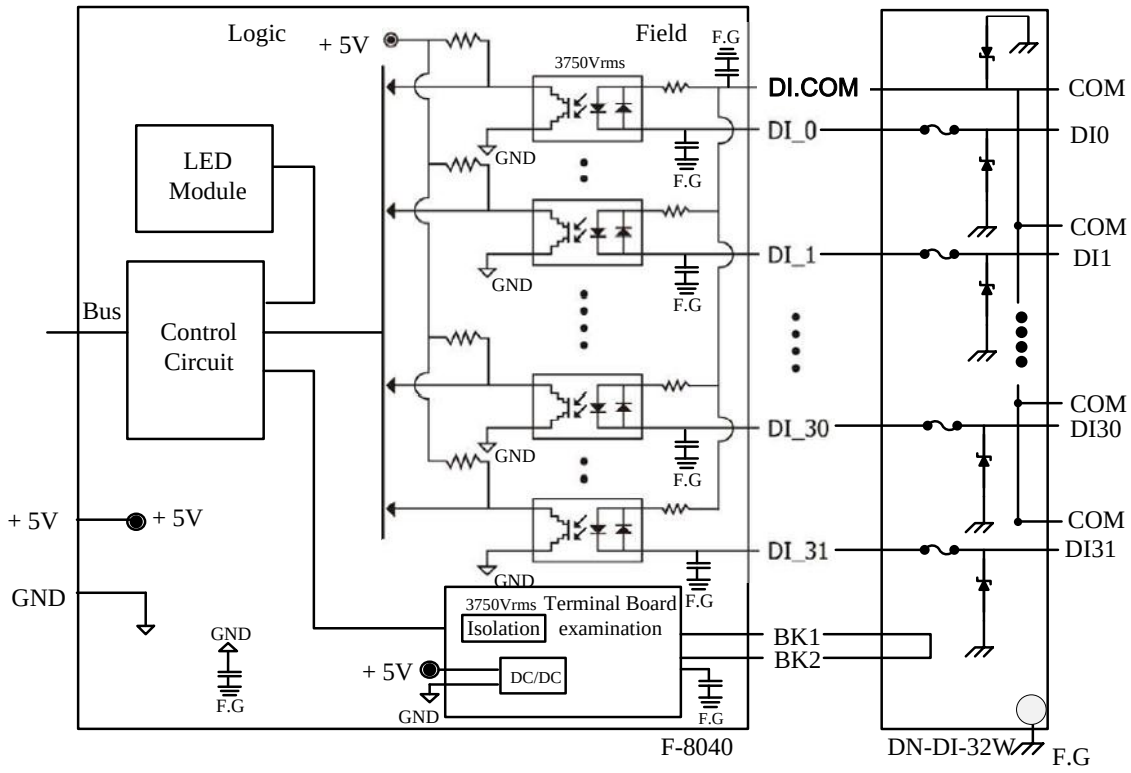
- Profile

Model Name	DN-DI-32W	
Description	32-ch DI Wet or Dry Contact Daughter Board (Soure/Sink Type, Jumper Seleted) The Fuse have the Mechanical break dectection. Support Single/Duplex and there are the Surge protection.	
Support I/O	F-8040	
I/O range	Channel	32
	Digital Input	24VDC
Dimension	W x L x H (mm)	122 x 270 x 65
Mounting	DIN Rail	35 mm
Fuse Ratings	individual channel	350mA
Transient voltage Suppressor	Peak pulse power Dissipation	3000W
	Peak forward Surge Current	250A
Environment	Ambient Temperature	-25 ~ 75℃
	Humidity	5 ~ 95 % RH, Non-condensing

- F-8040 with DN-DI-32W (Source Type)Internal I/O structure

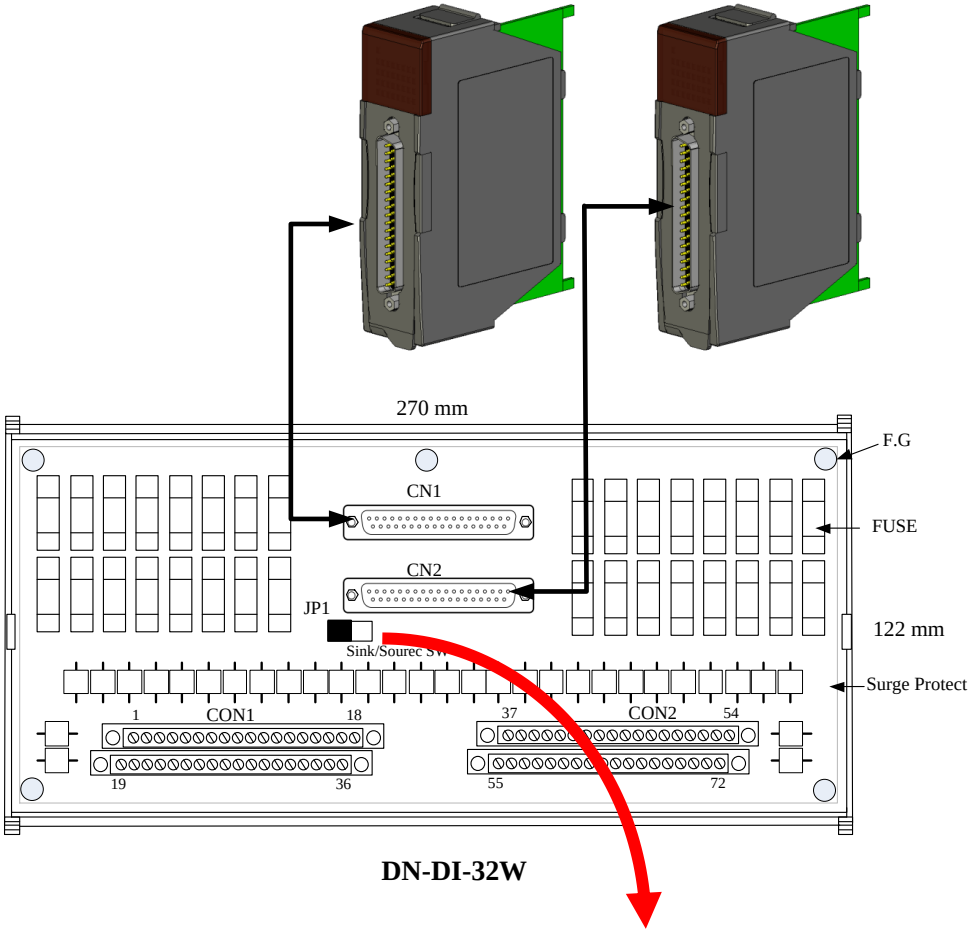


- F-8040 with DN-DI-32W (Sink Type)Internal I/O structure

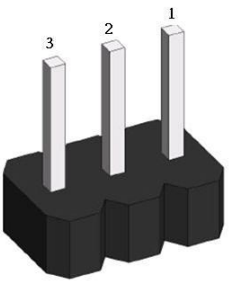


- ## DN-DI-32W Daugther Board Wiring Diagram

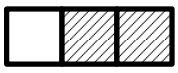
1. CN1, CN2 are used to connect to F-8040.
2. Screw holes are connected to the FG.
3. Select Sink or Source Type by JP1.



DN-DI-32W

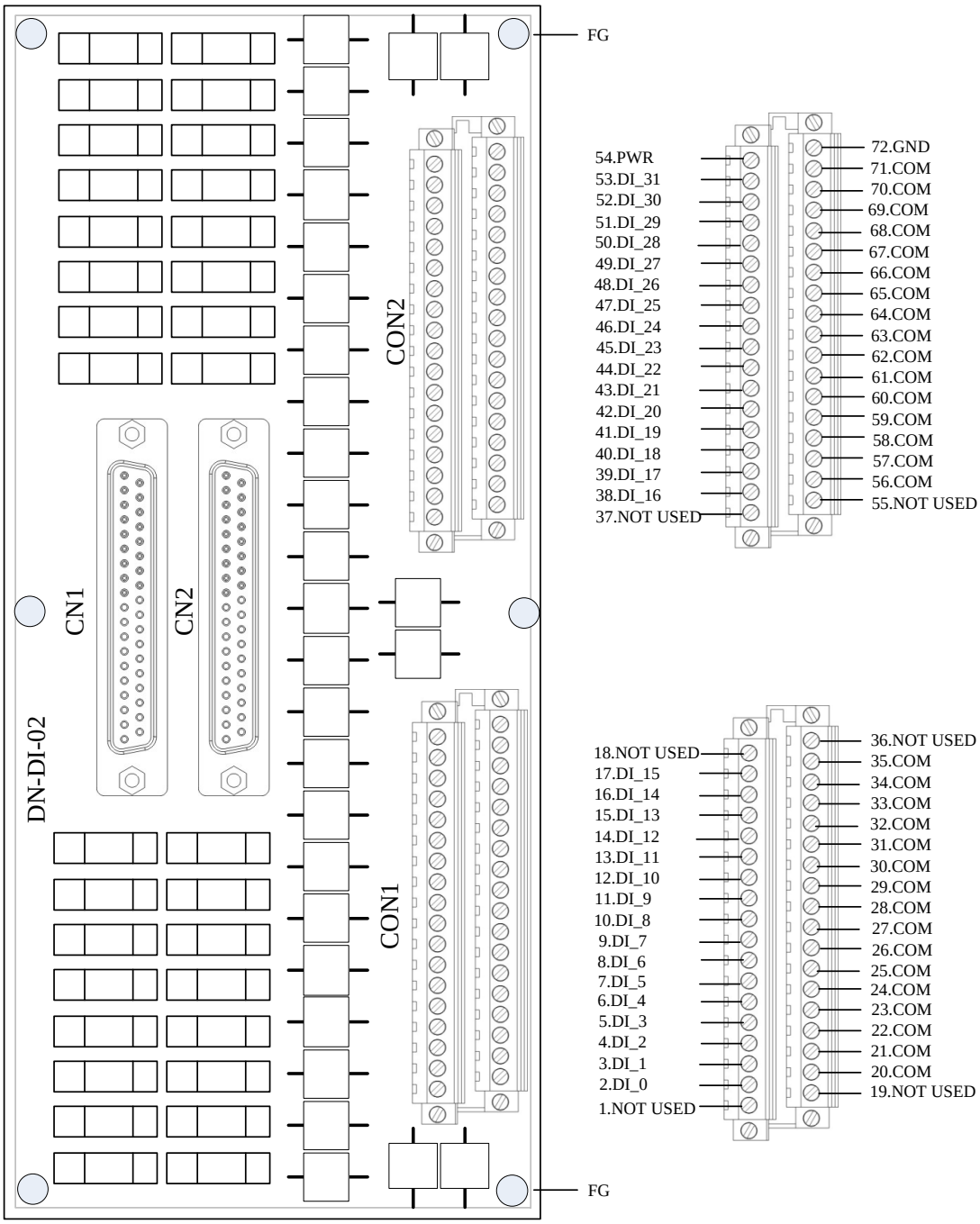


Sink Type

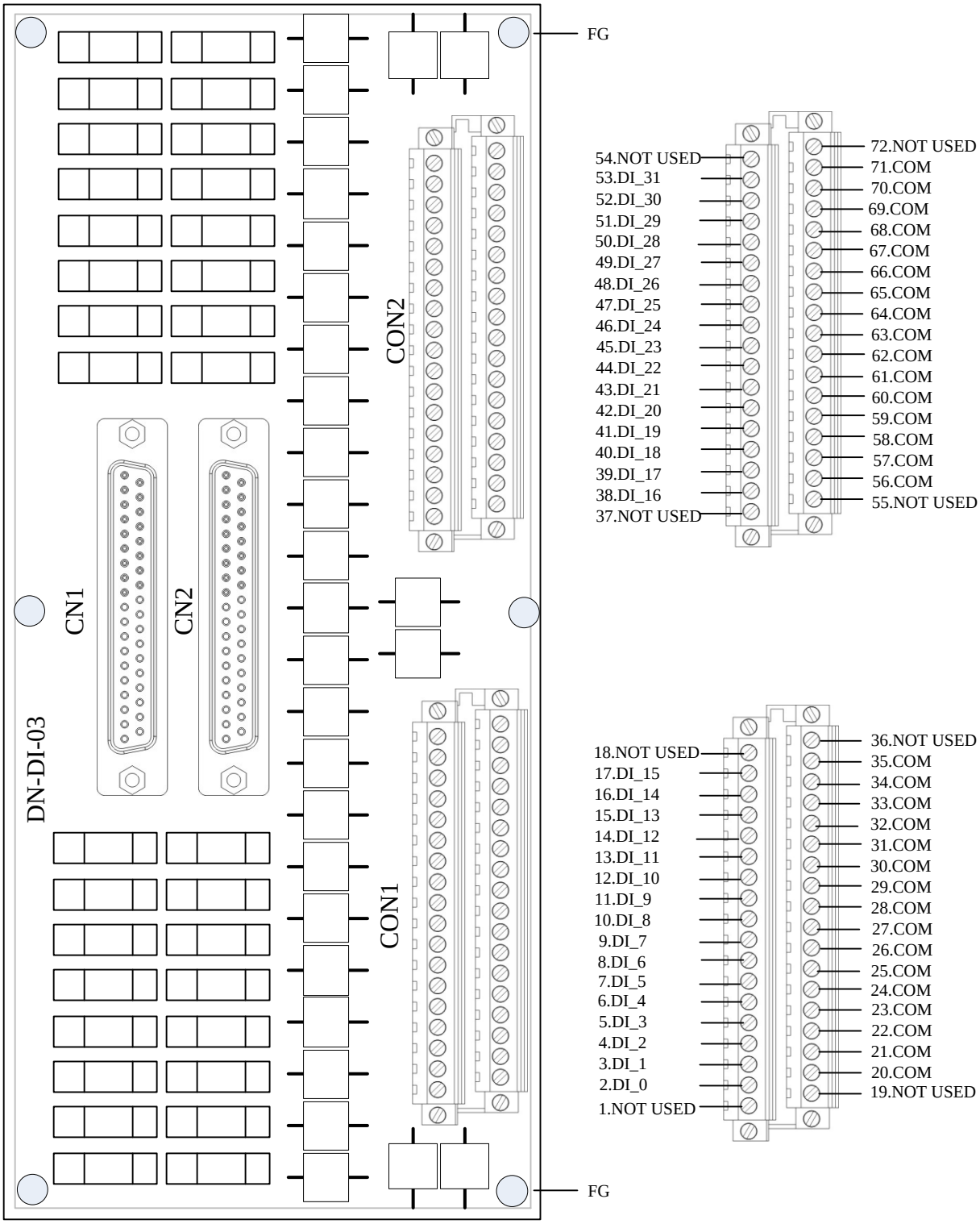


Source Type

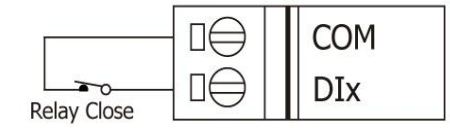
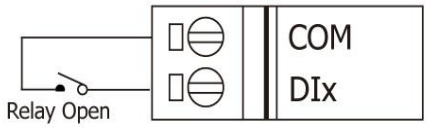
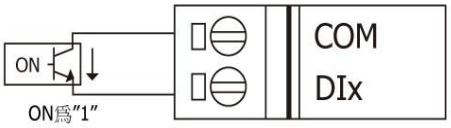
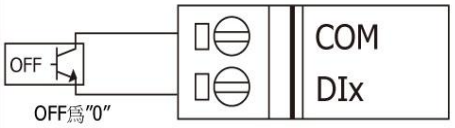
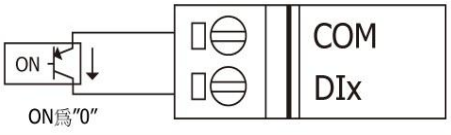
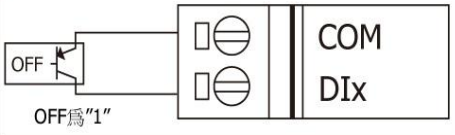
- Pin Assignment (Source Type)



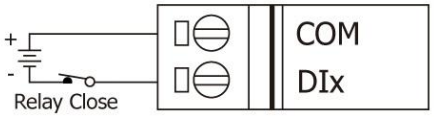
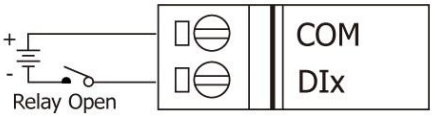
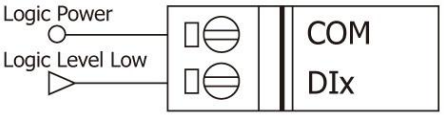
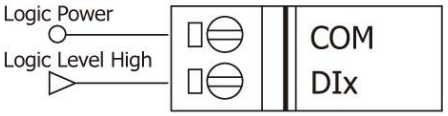
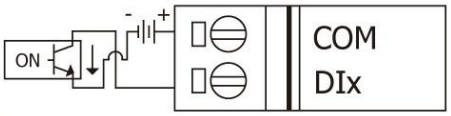
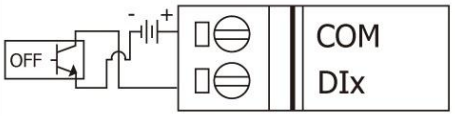
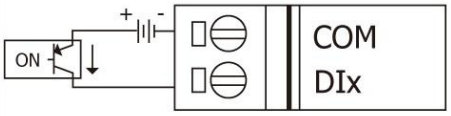
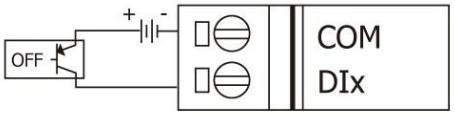
- Pin Assignment(Sink Type)



- DN-DI-32W Wiring Connection(Source Type)

Input Type	ON State LED ON Readback as 0	OFF State LED OFF Readback as 1
Relay Contact	Relay ON	Relay Off
		
NPN Output	Open Collector On	Open Collector Off
		
PNP Output	Open Collector On	Open Collector Off
		

- DN-DI-32W Wiring Connection(Sink Type)

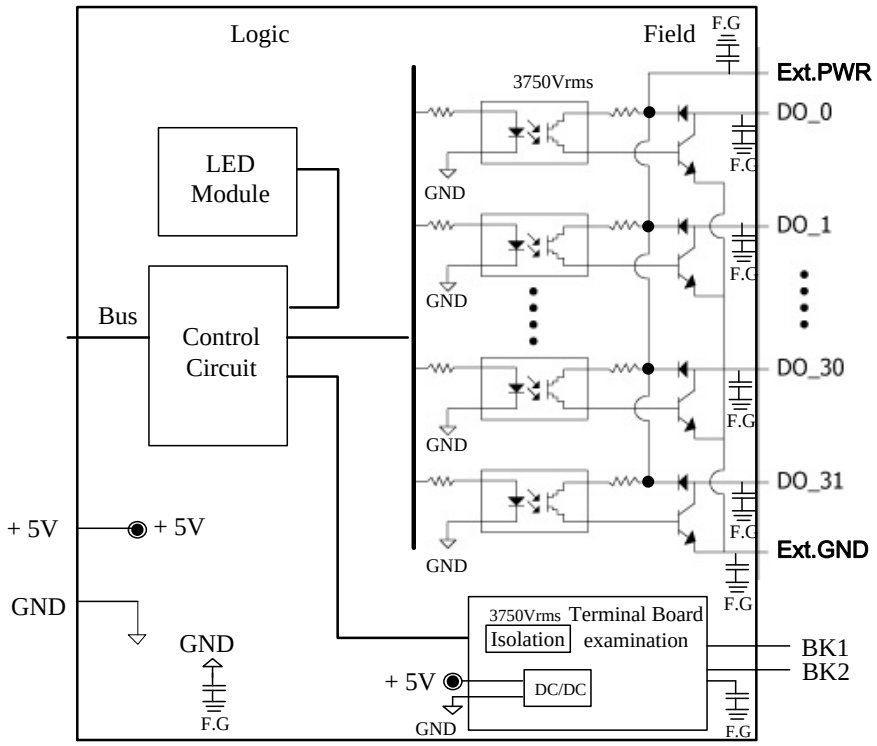
Input Type	ON State LED ON Readback as 0	OFF State LED OFF Readback as 1
Relay Contact	Relay ON	Relay Off
		
TTL/CMOS Logic	Voltage > 3.5V	Voltage < 1V
		
NPN Output	Open Collector On	Open Collector Off
		
PNP Output	Open Collector On	Open Collector Off
		

4.1.4 F-8041

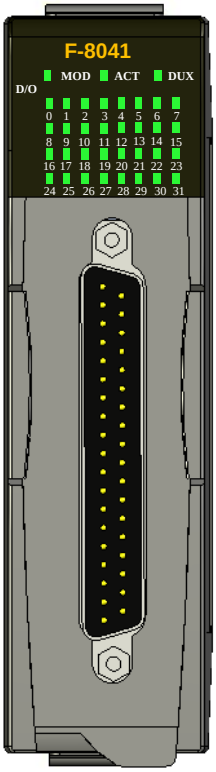
- Profile

Model Name	F-8041
Operation Mode	Single/Duplex
Specific External Terminal Board	DN-DO-16DR-A / DN-DO-16DR-B DN-DO-16FRW-A / DN-DO-16FRW-B
Terminal Drop off Detection	Yes
Channel LED Display	Yes
Channel Amount	32
Common & Wiring	Single-End P-COM or N-COM for 32 channel
Input Voltage	5 ~ 30V_{DC}
Onput Voltage	5 ~ 30V_{DC}
Maximum Ontput Current	100mA/ch@24VDC，total 3.2A
Minimum Ontput Impedance	240Ω@24V_{DC}
Field to Logic Isolation	S.G：3750V_{rms}
DC/DC Isolation	3000V_{DC}
SG-FG Isolation	3000V_{DC}
Timer of Duplex Switch	<1 ms
Timer of data response	<3 ms
Safe Mode	Reset/ Hold/ Pre Set
Maximum Power consumption	2.9W
Ext.PWR Maximum Onput consumption	76.8W@24V_{DC} (100mA*32ch*24V_{DC})
Operating Temperature	-25°C ~ +75°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	0.3 kg
Dimensions	30mm x 85mm x 115mm (W x L x H)

- F-8041 Internal I/O structure



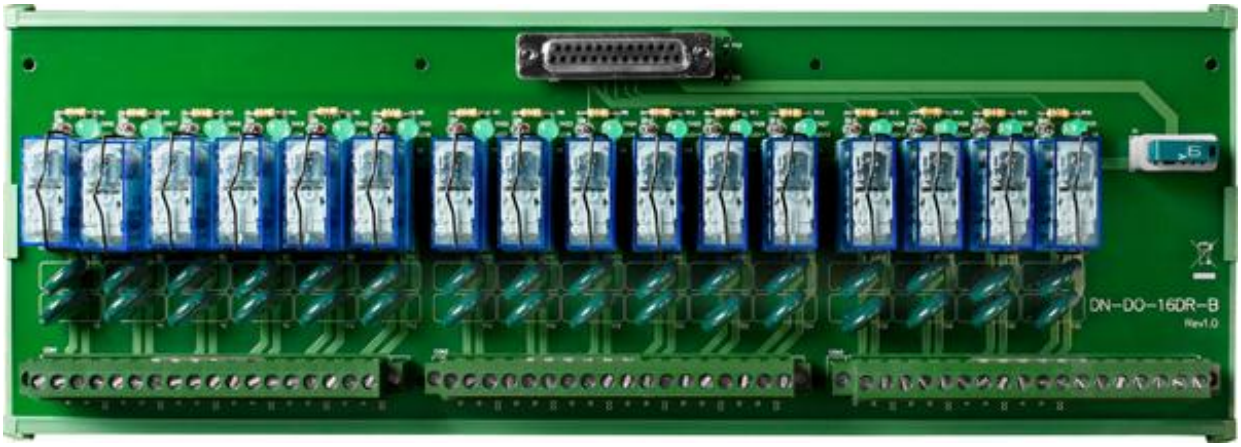
- F-8041 Pin assignments



Pin Assignment Name	Terminal No.		Pin Assignment Name
Ext.PWR	19	37	BK2
Ext.GND	18	36	Ext.GND
DO_15	17	35	DO_31
DO_14	16	34	DO_30
DO_13	15	33	DO_29
DO_12	14	32	DO_28
DO_11	13	31	DO_27
DO_10	12	30	DO_26
DO_9	11	29	DO_25
DO_8	10	28	DO_24
DO_7	09	27	DO_23
DO_6	08	26	DO_22
DO_5	07	25	DO_21
DO_4	06	24	DO_20
DO_3	05	23	DO_19
DO_2	04	22	DO_18
DO_1	03	21	DO_17
DO_0	02	20	DO_16
BK1	01		

37-pin male D-Sub Connector

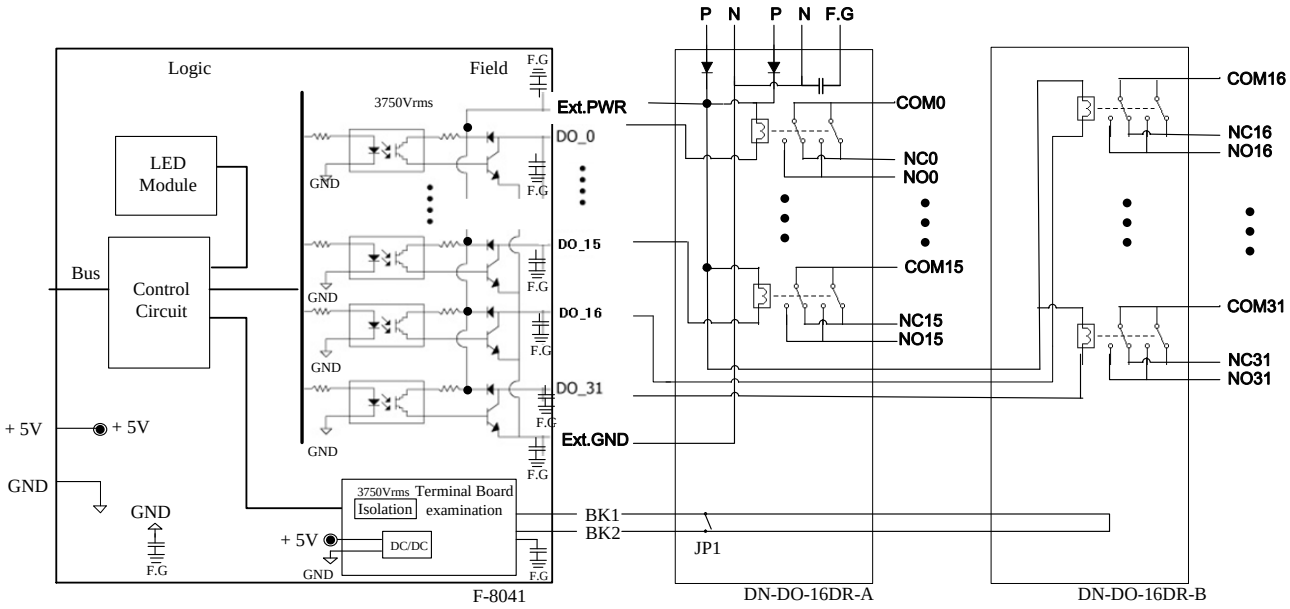
4.1.5 DN-DO-16DR-A and DN-DO-16DR-B (Dry Contact)



- Profile

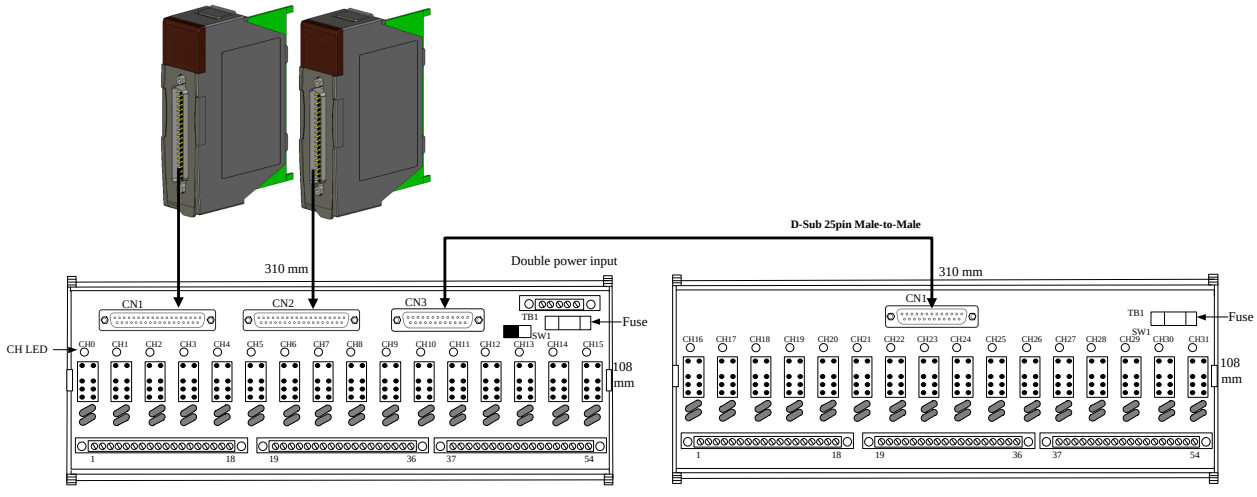
Model Name		DN-DO-16DR-A	DN-DO-16DR-B
Description		Support Single/Duplex DO Relay Dry Contact. (DN-DO-16DR-B have the D-SUB 25 pin cable)	
Support IO		F-8041	
I/O range	Channel	16ch(ch0~15)	16ch(ch16~31)
	Digital Output	Relay (Form C)	
Dimension	W x L x H (mm)	118 x 320 x 65	
Mounting	DIN Rail	35 mm	
Power input	Voltage input	$24V_{DC}$ ± 10%	
	Current consumption	400mA@$24V_{DC}$	
Fuse Ratings	Module	1A/16ch	
Environment	Ambient Temperature	-25 ~ 75℃	
	Humidity	5 ~ 95 % RH, Non-condensing	
Relay Contacts	Contact Configuration	2CO	
	Rated current	6A	
	rated voltage	$250V_{AC}$	
	Minimum switching Load	300 mW	
	Max switched power	$400V_{DC}$	
	Max switched current	$10V_{DC}$	
Minimum operations	Mechanical (cycles)	AC/DC：$20*10^6$ (AC：250VA)	
	Electrical (cycles)	AC1：$150*10^3$ (AC1：1500VA)	
Surge Protector	Max Peak current	4500A/1 time, 2500A/2 times	
	Max Allowable Voltage	300Vrms, 385 V_{DC}	
	Varistor Voltage	470Vrms	

- F-8041 with DN-DO-16DR-A & DN-DO-16DR-B Internal I/O structure

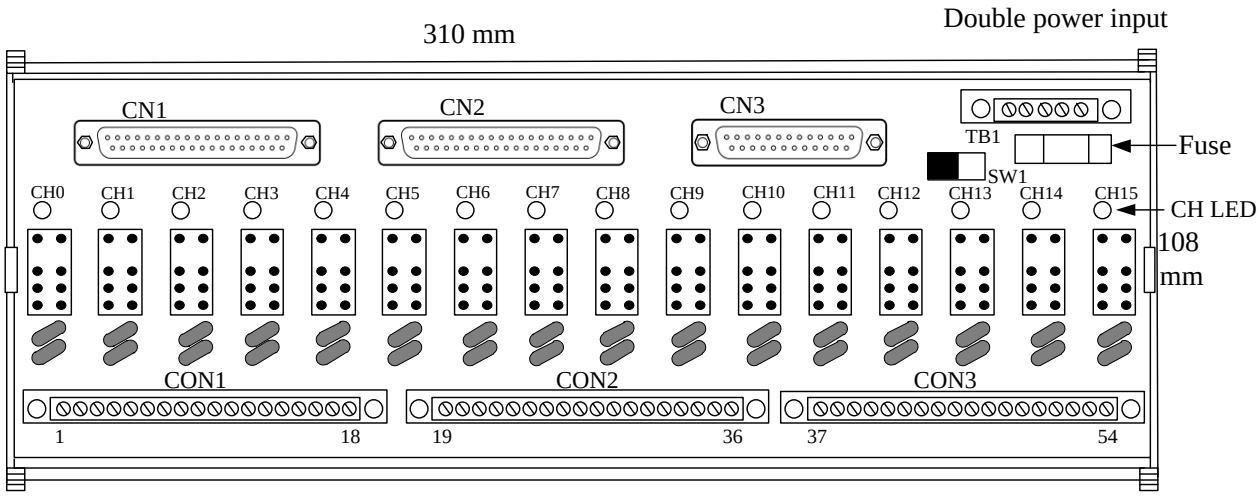


- 端子板外觀

1. DN-DO-16DR-A：CN1、CN2 are connected to DO Module.
2. DN-DO-16DR-A：CN3 is connected to DN-DO-16DR-B.
3. DN-DO-16DR-A:JP1 is the terminal drop off detection.（16→when used A board alone；32→Used both A and B board.）
4. DN-DO-16DR-B：CN1 is connected to DN-DO-16DR-A or DN-DO-16FRW-A.



Pin Assignment



DN-DO-16DR-A

CON1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
NO0	NC0	COM0	NO1	NC1	COM1	NO2	NC2	COM2	NO3	NC3	COM3	NO4	NC4	COM4	NO5	NC5	COM5

CON2

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
NO6	NC6	COM6	NO7	NC7	COM7	NO8	NC8	COM8	NO9	NC9	COM9	NO10	NC10	COM10	NO11	NC11	COM11

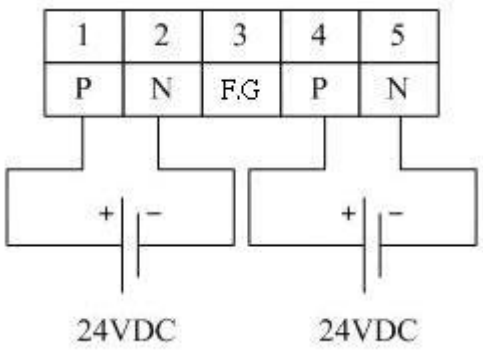
CON3

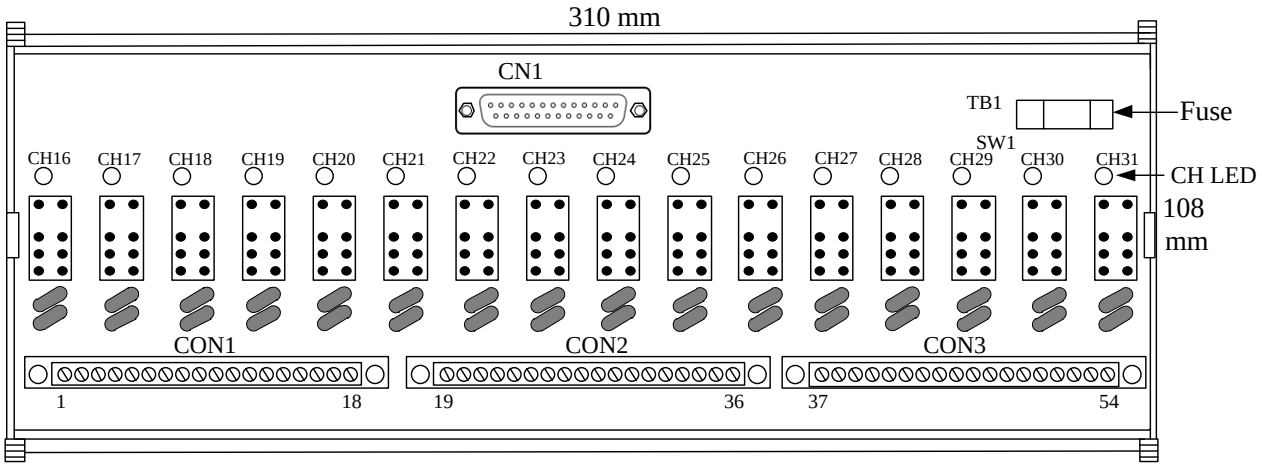
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
NO12	NC12	COM12	NO13	NC13	COM13	NO14	NC14	COM14	NO15	NC15	COM15						

TB1

1	2	3	4	5
P	N	FG	P	N

Power Wiring Diagram





DN-DO-16DR-B

CON1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
NO16	NC16	COM16	NO17	NC17	COM17	NO18	NC18	COM18	NO19	NC19	COM19	NO20	NC20	COM20	NO21	NC21	COM21

CON2

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
NO22	NC22	COM22	NO23	NC23	COM23	NO24	NC24	COM24	NO25	NC25	COM25	NO26	NC26	COM26	NO27	NC27	COM27

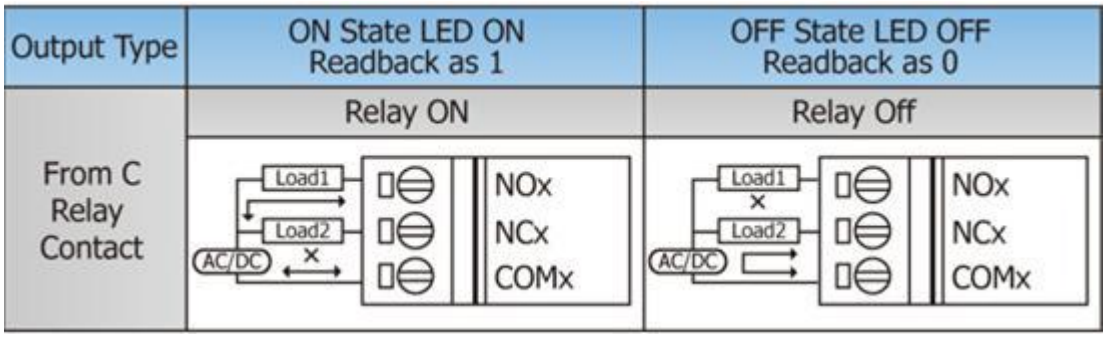
CON3

37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
NO28	NC28	COM28	NO29	NC29	COM29	NO30	NC30	COM30	NO31	NC31	COM31						

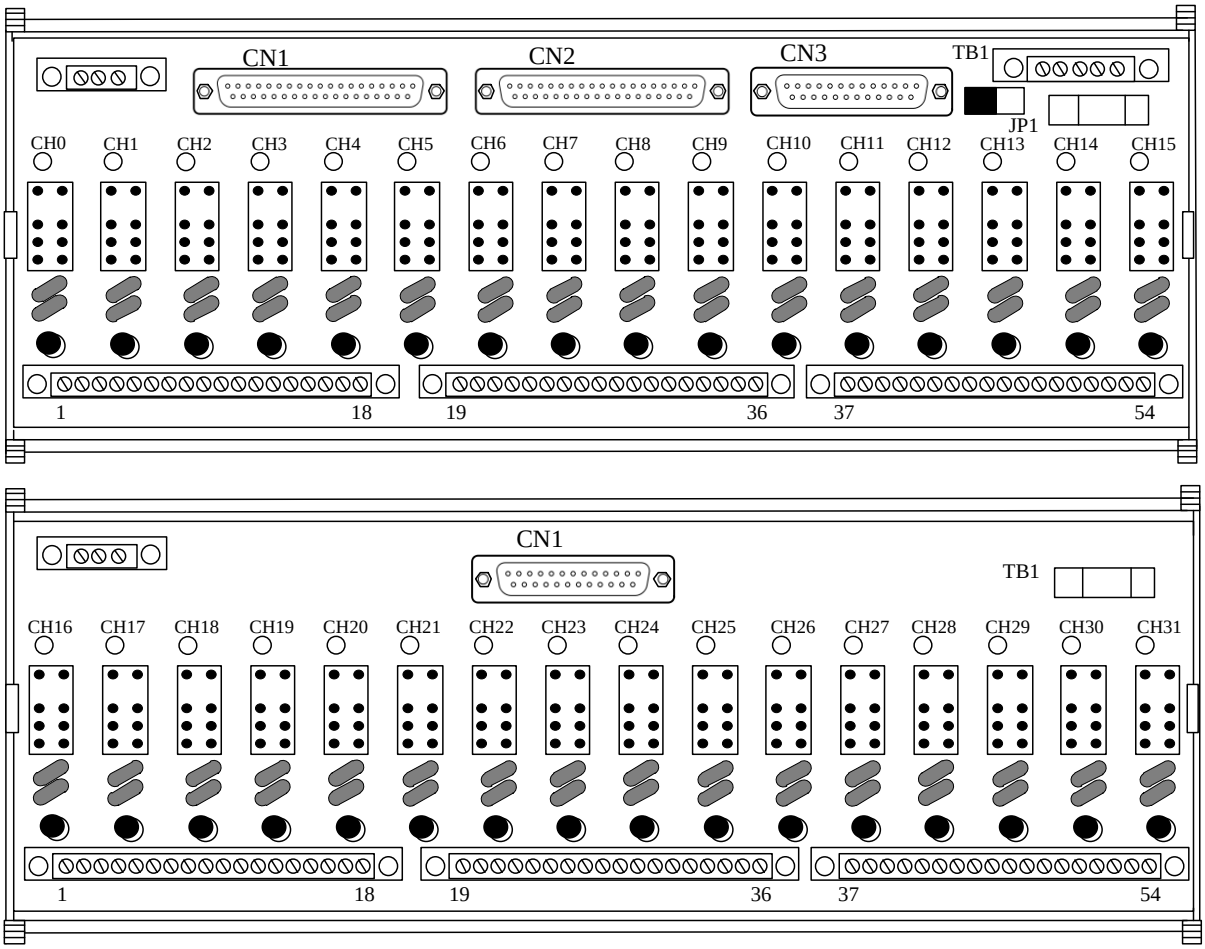
※Note:

1. This Board can't work alone, it must be connected to A board.

- I/O Wiring Connection



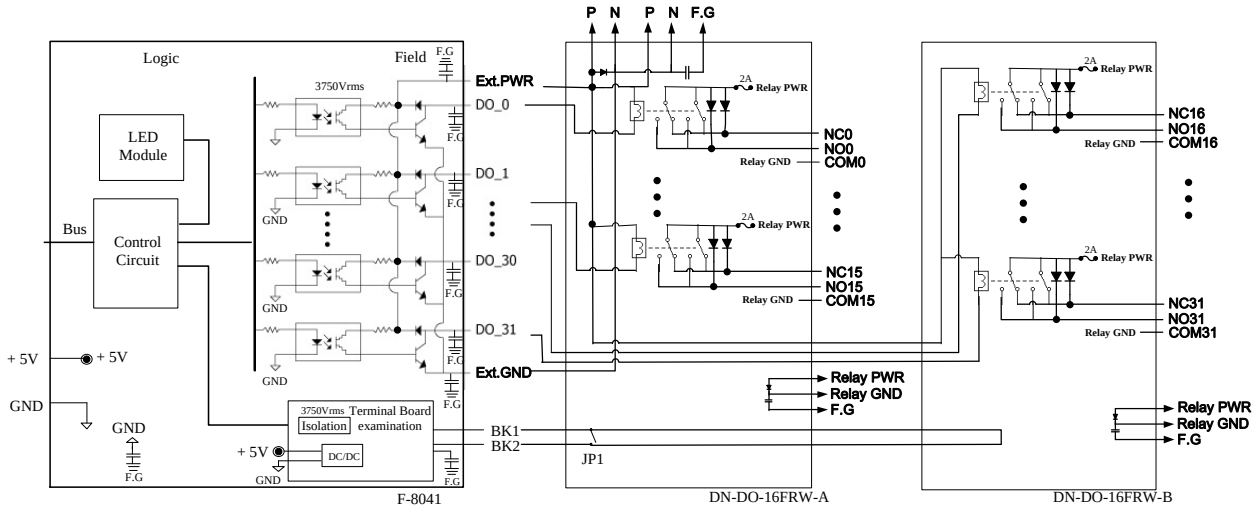
4.1.6 DN-DO-16FRW-A 與 DN-DO-16FRW-B (Wet Contact)



- Profile

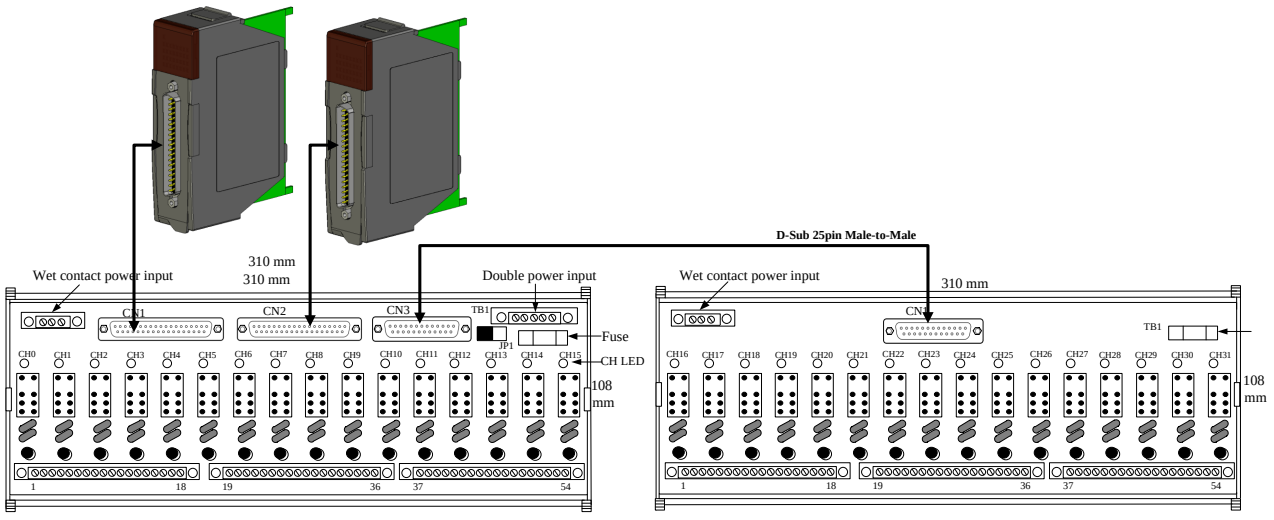
Model Name		DN-DO-16FRW-A	DN-DO-16FRW-B
Description		Support Single/Duplex DO Relay Wet Contact(AC/DC). (DN-DO-16FRW-B have the D-SUB 25 pin cable)	
Support IO		F-8041	
I/O range	Channel	16ch(DO CH 0~15)	16ch(DO CH 16~31)
	Digital Output	Relay	
Dimension	W x L x H (mm)	118 x 320 x 65	
Mounting	DIN Rail	35 mm	
Power input	Voltage input	24V_{DC} ± 10%	
	Current consumption	400mA@24V_{DC}	
Fuse Ratings	Module	1A/16ch	
Environment	Ambient Temperature	-25 ~ 75℃	
	Humidity	5 ~ 95 % RH, Non-condensing	
Relay Contacts	Contact Configuration	2CO	
	Rated current	6A	
	rated voltage	250V_{AC}	
	Minimum switching Load	300 mW	
	Max switched power	400V_{DC}	
	Max switched current	10V_{DC}	
Relay Contact Restrictions	Relay output Fusing	2A	
Minimum operations	Mechanical (cycles)	AC/DC：$20*10^6$ (AC：250VA)	
	Electrical (cycles)	AC1：$150*10^3$ (AC1：1500VA)	
Surge Protector	Max Peak current	4500A/1 time, 2500A/2 times	
	Max Allowable Voltage	300Vrms, 385 V_{DC}	
	Varistor Voltage	470Vrms	

- F-8041 with DN-DO-16FRW-A & DN-DO-16FRW-B Internal I/O structure

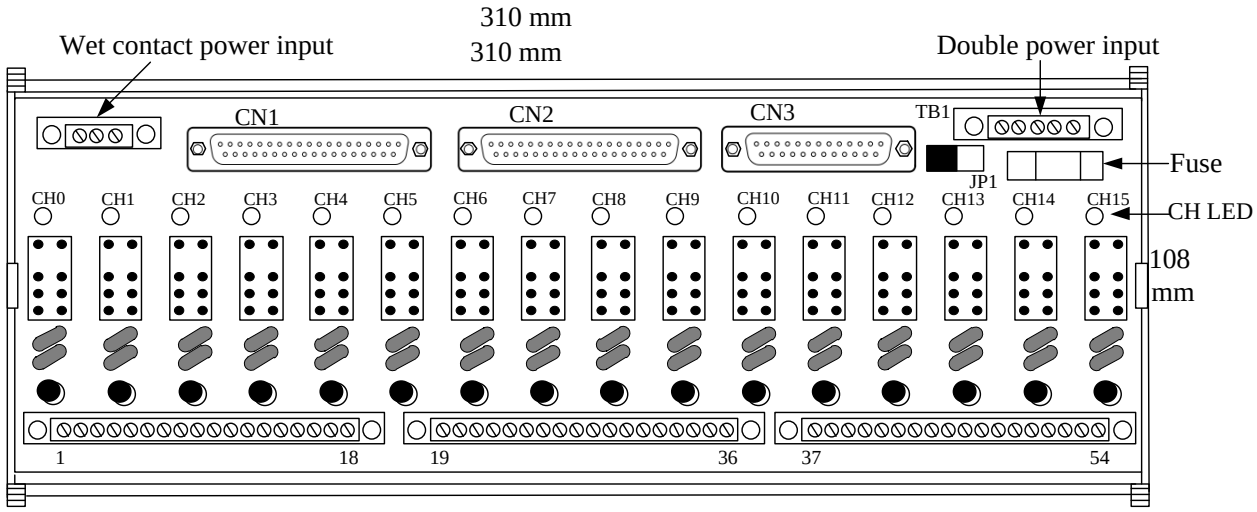


- 端子板外觀

1. DN-DO-16FRW-A：CN1、CN2 are connected to DO Module.
2. DN-DO-16FRW-A：CN3 is connected to DN-DO-16DR-B.
3. DN-DO-16FRW-A:JP1 is the terminal drop off detection.（16→when used A board alone; 32→Used both A and B board.）
4. DN-DO-16FRW-B：CN1 is connected to DN-DO-16FRW-A or DN-DO-16DR-A.



- Pin Assignment



DN-DO-16FRW-A

CON1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
NO0	NC0	COM	NO1	NC1	COM	NO2	NC2	COM	NO3	NC3	COM	NO4	NC4	COM	NO5	NC5	COM

CON2

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
NO6	NC6	COM	NO7	NC7	COM	NO8	NC8	COM	NO9	NC9	COM	NO10	NC10	COM	NO11	NC11	COM

CON3

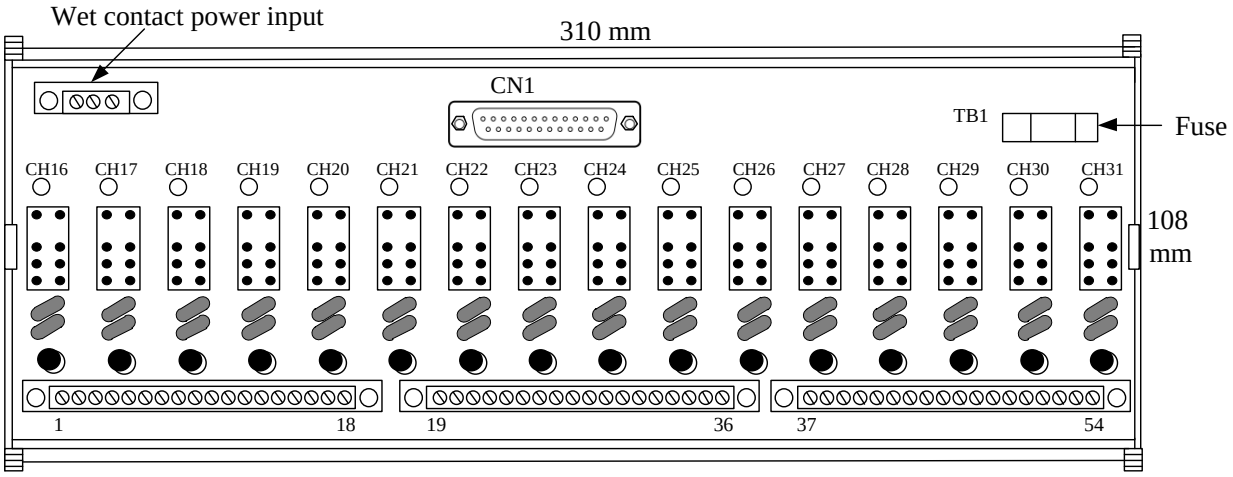
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
NO12	NC12	COM	NO13	NC13	COM	NO14	NC14	COM	NO15	NC15	COM						

TB1(兩組電源作二重化用)

1	2	3	4	5
P	N	FG	P	N

TB2

1	2	3
Relay PWR	Relay GND	FG



DN-DO-16FRW-B

CON1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
NO16	NC16	COM	NO17	NC17	COM	NO18	NC18	COM	NO19	NC19	COM	NO20	NC20	COM	NO21	NC21	COM

CON2

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
NO22	NC22	COM	NO23	NC23	COM	NO24	NC24	COM	NO25	NC25	COM	NO26	NC26	COM	NO27	NC27	COM

CON3

37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
NO28	NC28	COM	NO29	NC29	COM	NO30	NC30	COM	NO31	NC31	COM						

TB2

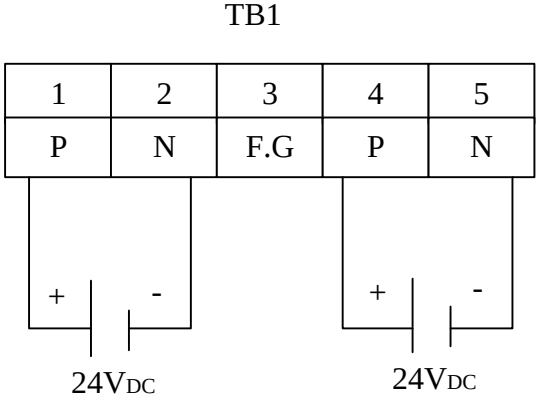
1	2	3
Relay PWR	Relay GND	FG

- Power Wiring Diagram

  - DN-DO-16FRW-A

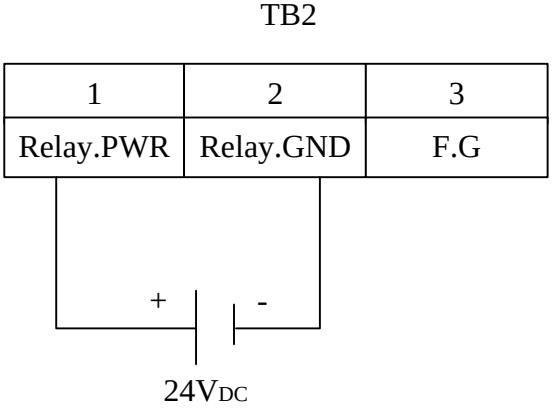
TB1

1	2	3	4	5
P	N	F.G	P	N



TB2

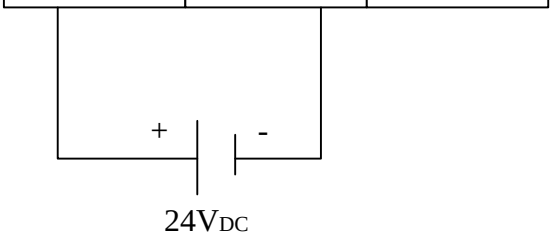
1	2	3
Relay.PWR	Relay.GND	F.G



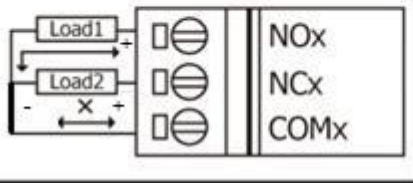
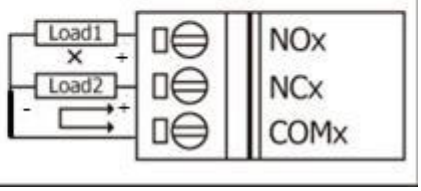
  - DN-DO-16FRW-B

TB1

1	2	3
Relay.PWR	Relay.GND	F.G



- I/O Wiring Connection

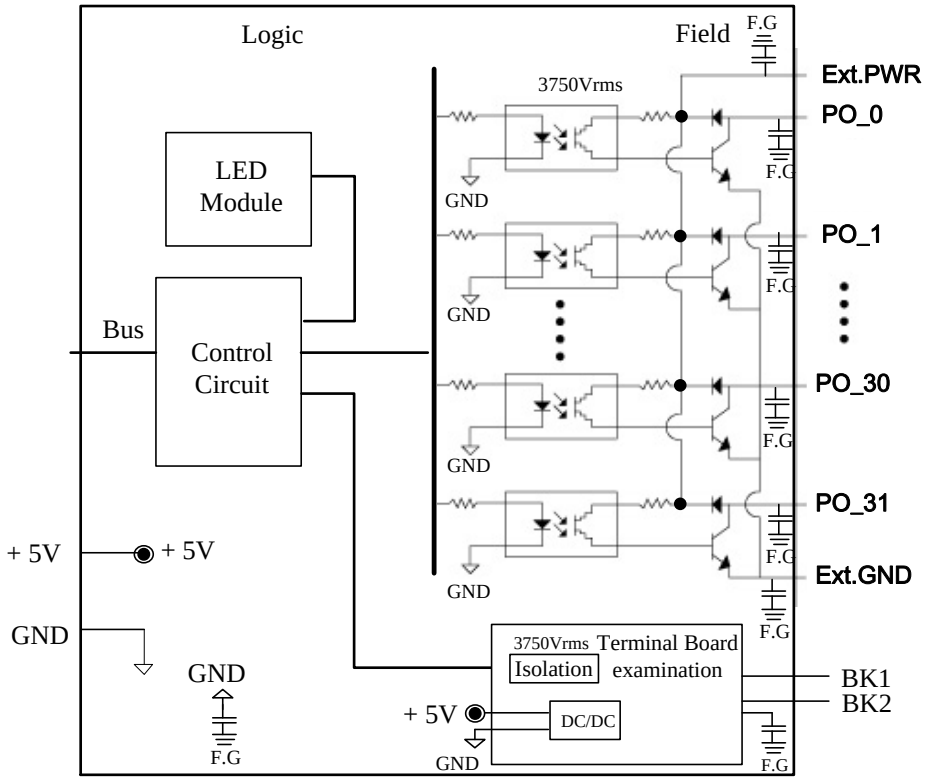
Output Type	ON State LED ON Readback as 1	OFF State LED OFF Readback as 0
From C Relay Contact	Relay ON	Relay Off
		

4.1.7 F-8041P

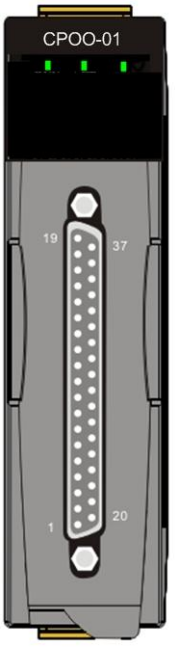
- F-8041P Profile

Module Name	F-8041P
Operation Mode	Single/Duplex
Specific External Terminal Board	DN-DO-16DR-A / DN-DO-16DR-B DN-DO-16FRW-A / DN-DO-16FRW-B
Terminal Drop off Detection	有
Channel Amount	ONESHOT Mode 16 CH / Continuous Mode 16CH
Common & Wiring	Single-End One Common for all channel
Input Voltage	20.4~30VDC
Onput Voltage	5 ~ 30V_{DC}
Maximum Onput Current	100mA/ch@24VDC，total 3.2A
Minimum Onput Impedance	240Ω@24V_{DC}
Output Mode	ONE SHOT Mode / Continuous Mode
PLUSE Output SET	16bit , Default 20ms (Mix: 5ms)
PLUSE Output cycle setting	1~65536 [ms]
PLUSE Output offset setting	1~65536 [ms]
Output Frequence Range	10Hz~500KHz(non-continuous)
Output Respon Time	<3 ms
Output signal level	VH(high level) 18 to 30V DC VL(low level) 0 to 5 V DC
Field to Logic Isolation	S.G：2500V_{rms}
DC/DC Isolation	3000V_{DC}
SG-FG Isolation	3000V_{DC}
Timer of Duplex Switch	<1 ms
Timer of data response	<3 ms
Maximum Power consumption	2.9W
Operating Temperature	-25°C ~ +75°C
Humidity	5 ~ 95%, Non-condensing
Weight	0.3 kg
Dimensions	30mm x 85mm x 115mm (W x L x H)

- F-8041P Internal I/O structure



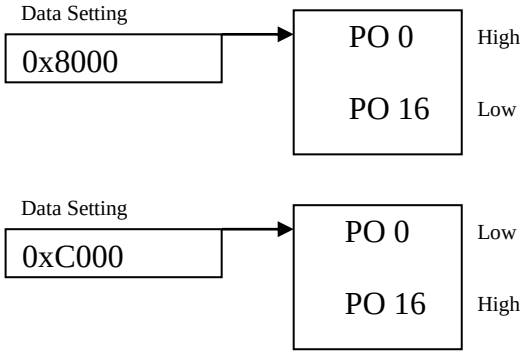
- F-8041P Pin Assignments



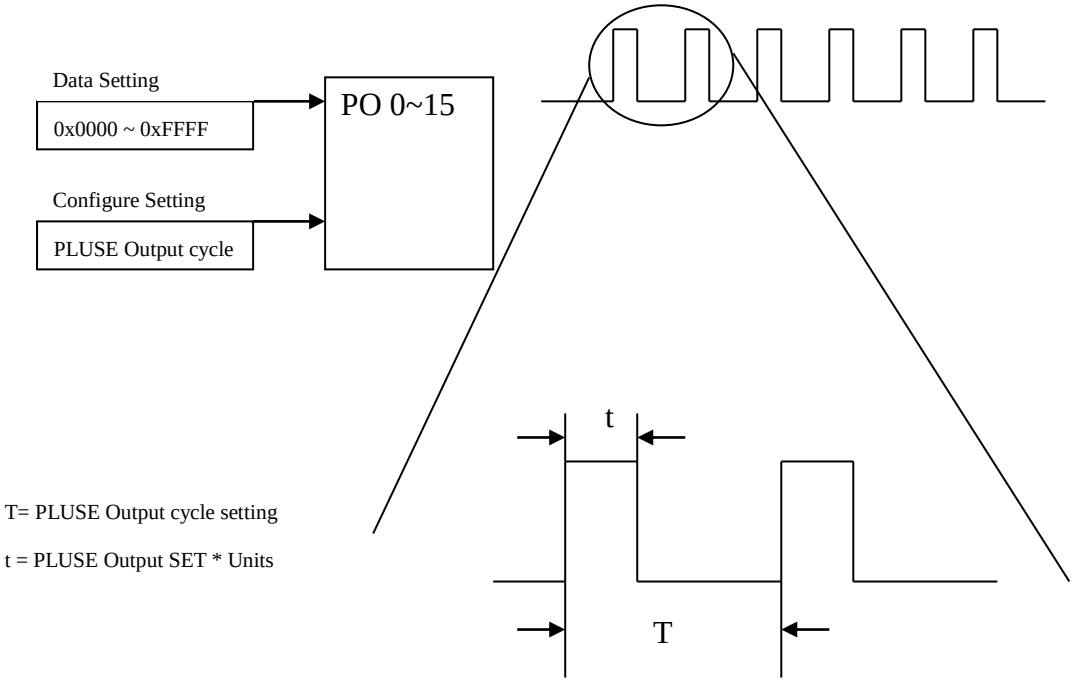
Pin Assignment Name	Terminal No.		Pin Assignment Name
Ext.PWR	19	37	BK2
Ext.GND	18	36	Ext.GND
PO_15	17	35	PO_31
PO_14	16	34	PO_30
PO_13	15	33	PO_29
PO_12	14	32	PO_28
PO_11	13	31	PO_27
PO_10	12	30	PO_26
PO_9	11	29	PO_25
PO_8	10	28	PO_24
PO_7	09	27	PO_23
PO_6	08	26	PO_22
PO_5	07	25	PO_21
PO_4	06	24	PO_20
PO_3	05	23	PO_19
PO_2	04	22	PO_18
PO_1	03	21	PO_17
PO_0	02	20	PO_16
BK1	01		

37-pin male D-Sub Connector

- ONE SHOT Mode：(PO_0&PO_16 ~ PO_15&PO_31)



- Continuous Mode：(PO_0 ~ PO_15)



4.1.3.1 F-8041P Terminal Board

- Use the DN-DO-16DR-A、DN-DO-16DR-B

  1. Please Reference to chapter 4.1.1.1

- Use the DN-DO-FRW-A、DN-DO-FRW-B

  1. Please Reference to chapter 4.1.1.2

4.2 Analog Input Module

- SPEC List

●:Yes ○:None

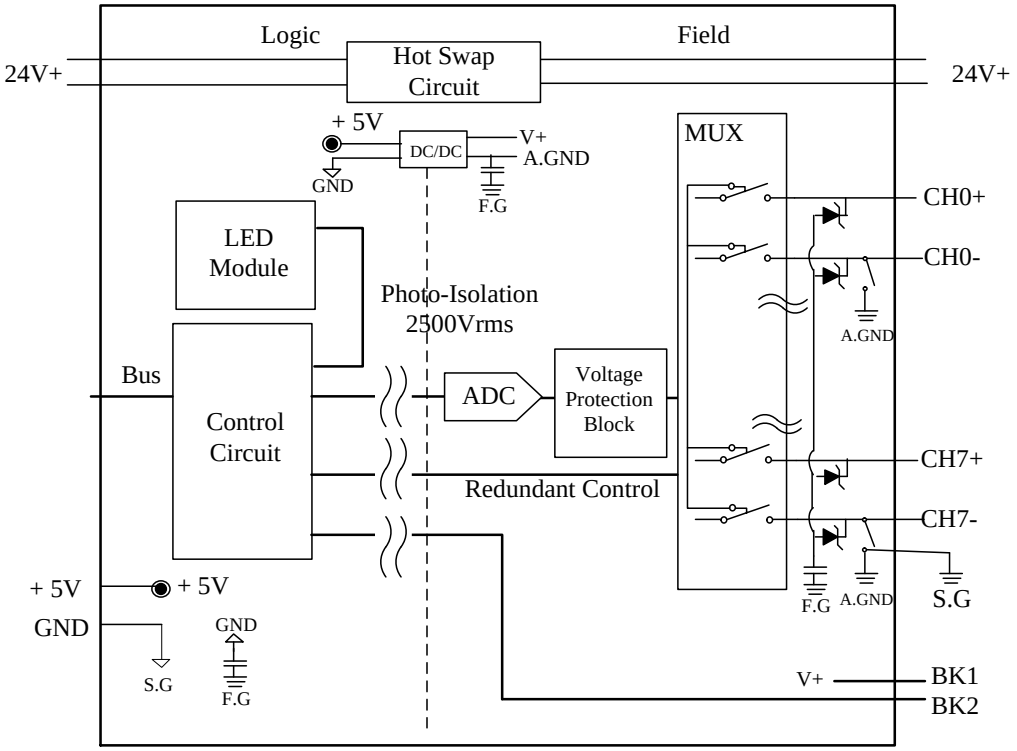
Module Name		F-8017C1	F-8017C2	F-8017CH	F-8017V
Single		●	●	●	●
Duplex		●	●	●	●
Specific External Terminal Board	DN-AIO-08F	●	○	●	●
	DN-AIO-16F	○	●	○	○
Channel Amount		8	16	8	8
Terminal Drop off Detection		●	●	●	●
Single-End		●	○	●	○
Differential		●	●	●	●
$24V_{DC}$ Power Ouput		●	○	●	○
Input Range (Precision Guarantee)		4~20mA (±0.1% FSR)			1~5V ±10V
Input Range (Linearity)		0~24mA (0-4mA, 20-24mA Linearity)			±11V (-11~-10V, 10V~11V Linearity)
Input Impedance (power on)		200Ω	200Ω	240Ω	2MΩ
Input Impedance (power off)		10^{10}Ω			
Current Consumption		1.2W	1.2W	1.2W	1.1W
HART		○	○	●	○

4.2.1 F-8017C1

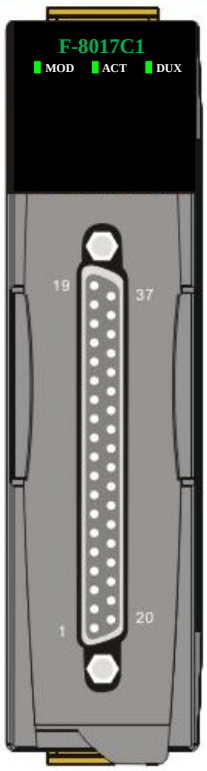
- **F-8017C1 規格 (Profile)**

Module Name		F-8017C1
Operation Mode		Single/ Duplex
Terminal Board		DN-AIO-08F
Channel Amount		8
Terminal Drop off Detection		Yes
Common & Wiring		Single End Or Differential
$24V_{DC}$ Power Ouput		Yes
Current Input (Precision Guarantee)		4~20mA (±0.1 % FSR)
Current Input Range		0~24mA (0-4mA, 20-24mA Linearity)
Input Impedance (power on)		200Ω
Input Impedance (power off)		10^{10}Ω
Input Data (Precision Guarantee)		0~10000 (4-20mA)
Input Data Range		-2500~12500 (0~24mA)
Sampling Rate		<16ms /8 channel
Support Maximum Input		50 mA@$24V_{DC}$
Over Current Protection		Yes, Maximum
ADC	Resolution	15 bit
	Accuracy	0.3 uA/bit
	Zero Drift	±20μV/°C
	Span Drift	±25 μV/°C
	Common Mode Rejection	86dB
	Normal Mode Rejection	100 dB
Field to Logic Isolation		$2500V_{rms}$
DC/DC Isolation		$3000V_{DC}$
SG-FG Isolation		$3000V_{DC}$
Timer of Duplex Switch		<1 ms
Timer of data response		<3 ms
Current Consumption		<1.2W
Operating Temperature		-25°C ~ +75°C
Humidity		5 ~ 95 % RH, Non-condensing
Weight		0.3 kg
Dimensions		30mm x 85mm x 115mm (W x L x H)

- F-8017C1 Internal I/O structure



- F-8017C1 Pin assignments



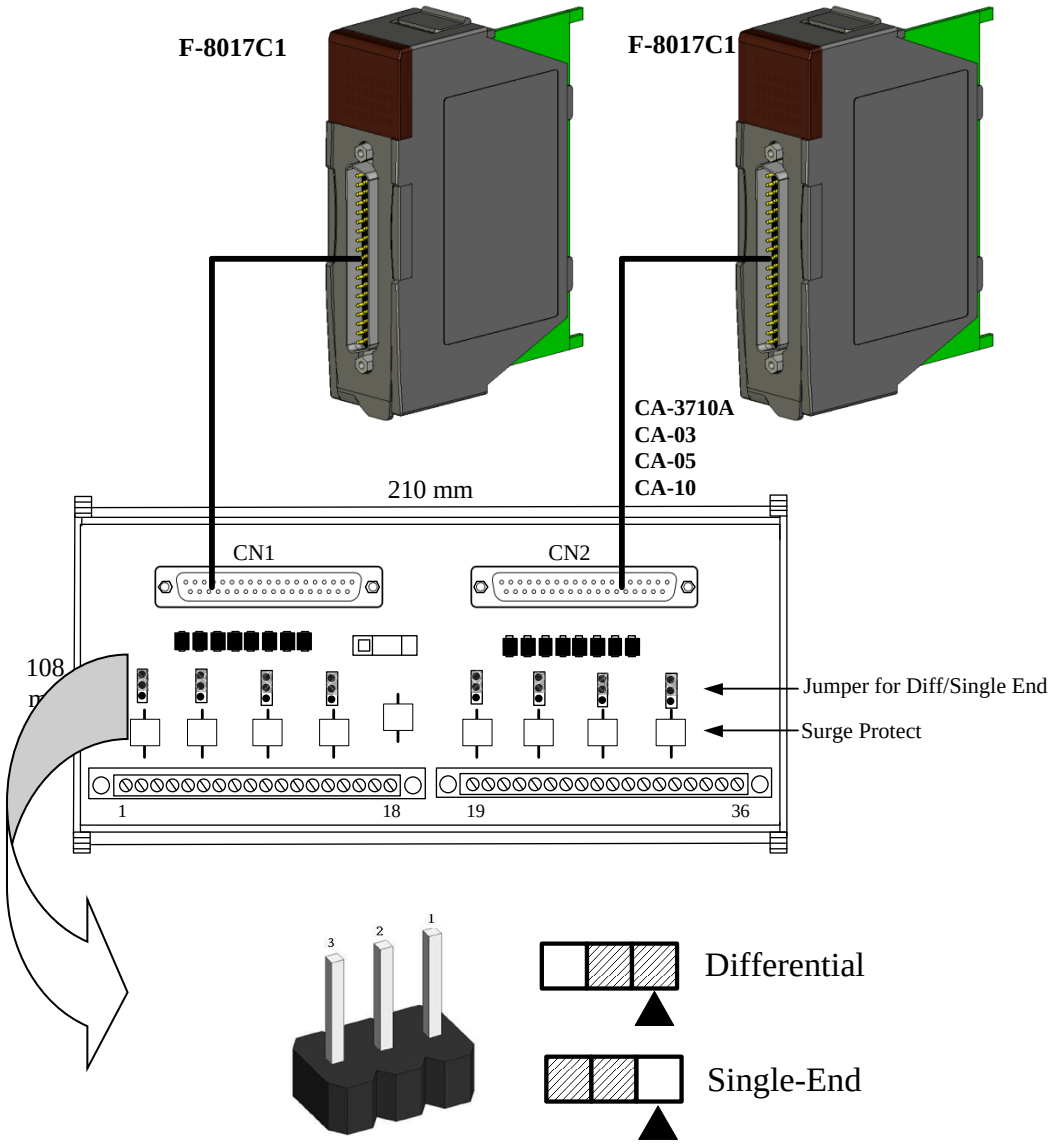
Pin Assignment Name	Terminal No.		Pin Assignment Name
PWR	19	37	BK2
X	18	36	A.GND
X	17	35	X
X	16	34	X
X	15	33	X
X	14	32	X
X	13	31	X
X	12	30	X
X	11	29	X
X	10	28	X
CH7-	09	27	CH7+
CH6-	08	26	CH6+
CH5-	07	25	CH5+
CH4-	06	24	CH4+
CH3-	05	23	CH3+
CH2-	04	22	CH2+
CH1-	03	21	CH1+
CH0-	02	20	CH0+
BK1	01		

37-pin male D-Sub Connector

4.2.2.1 F-8017C1 with DN-AIO-08F

- **F-8017C1 with DN-AIO-08F Diagram**

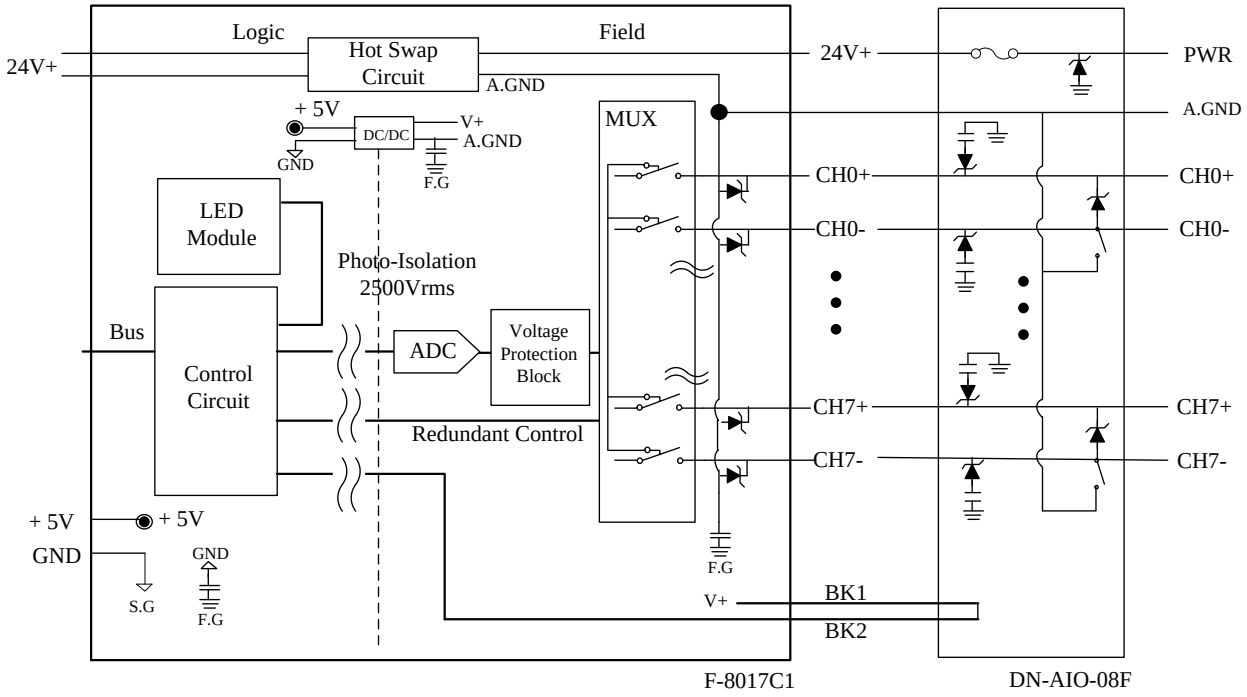
  1. CN1, CN2 are connected to F-8017C1。
  2. About the DN-AIO-08F spec or deteil, please reference the chapter 4.5.1 .



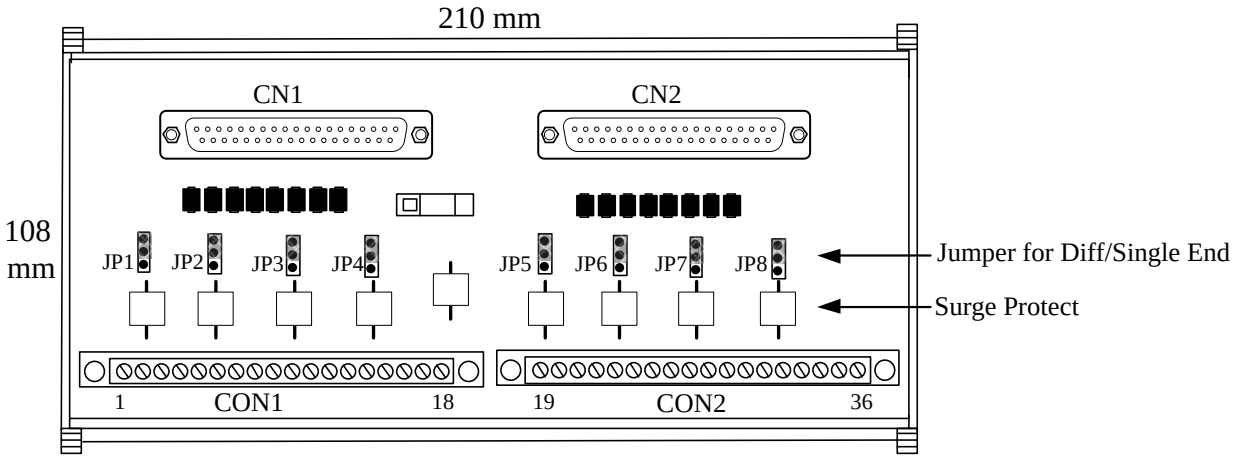
- **F-8017C1 with DN-AIO-08F Jumper Setting**

  1. When the Jumpers (JP1~JP8) were set in the Pin 2-3, the channel would be the Single-End Mode. If you want to use the originating wiring, must be seting like that.
  2. The opposite setting in the Pin 1-2, it would be the Differential Mode.

- F-8017C1 with DN-AIO-08F Internal I/O structure



- DN-AIO-08F Pin Assignment



CON1

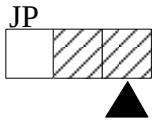
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	CH0+	CH0-	PWR	GND	CH1+	CH1-	PWR	GND	CH2+	CH2-	PWR	GND	CH3+	CH3-	PWR	GND	FG

CON2

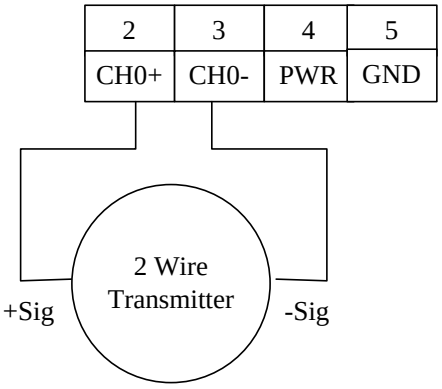
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	CH4+	CH4-	PWR	GND	CH5+	CH5-	PWR	GND	CH6+	CH6-	PWR	GND	CH7+	CH7-	PWR	GND	FG

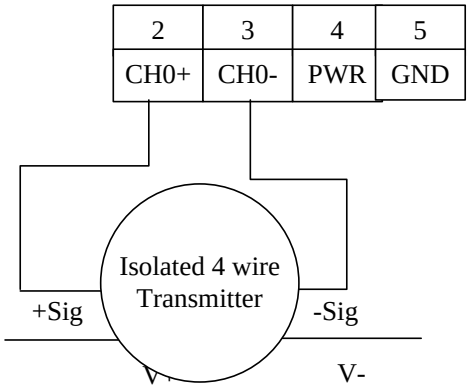
- F-8017C1 Wiring Connection with DN-AIO-08F

Terminating

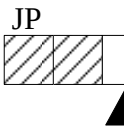


Differential

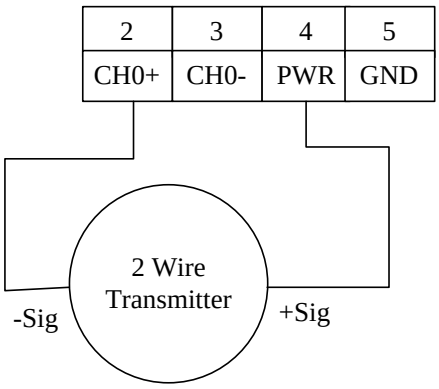


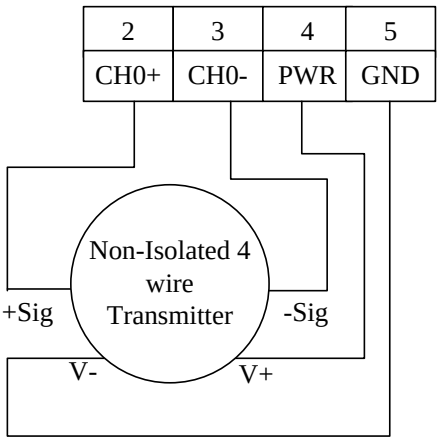


Originating



Single-End



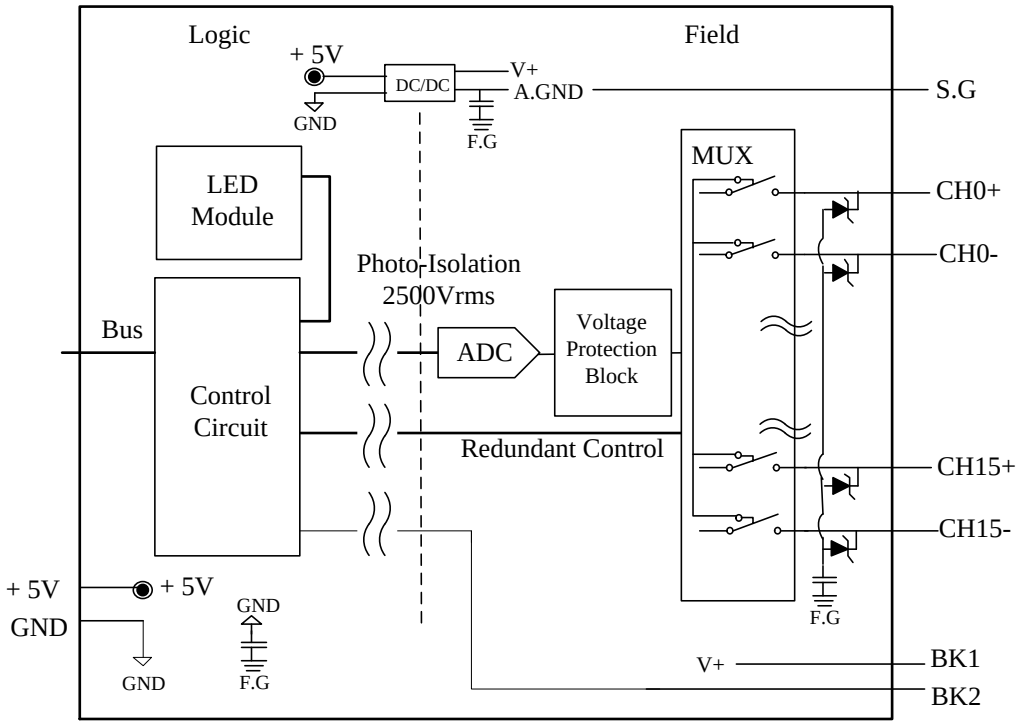


4.2.2 F-8017C2

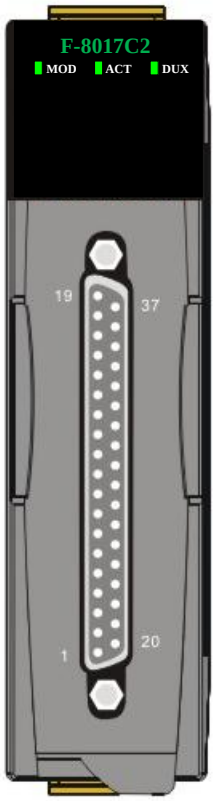
- **F-8017C2 Profile**

Module Name		F-8017C2
Operation Mode		Single/ Duplex
Terminal Board		DN-AIO-16F
Channel Amount		16
Terminal Drop off Detection		Yes
Common & Wiring		Differential
Current Input (Precision Guarantee)		4~20mA (±0.1 % FSR)
Current Input Range		0~24mA (0-4mA, 20-24mA Linearity)
Input Impedance (power on)		200Ω
Input Impedance (power off)		10^{10}Ω
Input Data (Precision Guarantee)		0~10000 (4-20mA)
Input Data Range		-2500~12500 (0~24mA)
Sampling Rate		10ms or less
Support Maximum Input		50mA@24V_{DC}
ADC	Resolution	15 bit
	Accuracy	0.3 uA/bit
	Zero Drift	±20μV/°C
	Span Drift	±25 μV/°C
	Common Mode Rejection	86dB
	Normal Mode Rejection	100 dB
Field to Logic Isolation		2500V_{rms}
DC/DC Isolation		3000V_{DC}
SG-FG Isolation		3000V_{DC}
Channel/Channel Isolation		450V_{DC}
Timer of Duplex Switch		<1 ms
Timer of data response		<1.2W
Current Consumption		1.2W
Operating Temperature		-25°C ~ +75°C
Humidity		5 ~ 95 % RH, Non-condensing
Weight		0.3 kg
Dimensions		30mm x 85mm x 115mm (W x L x H)

- F-8017C2 Internal I/O structure



- F-8017C2 Pin assignments



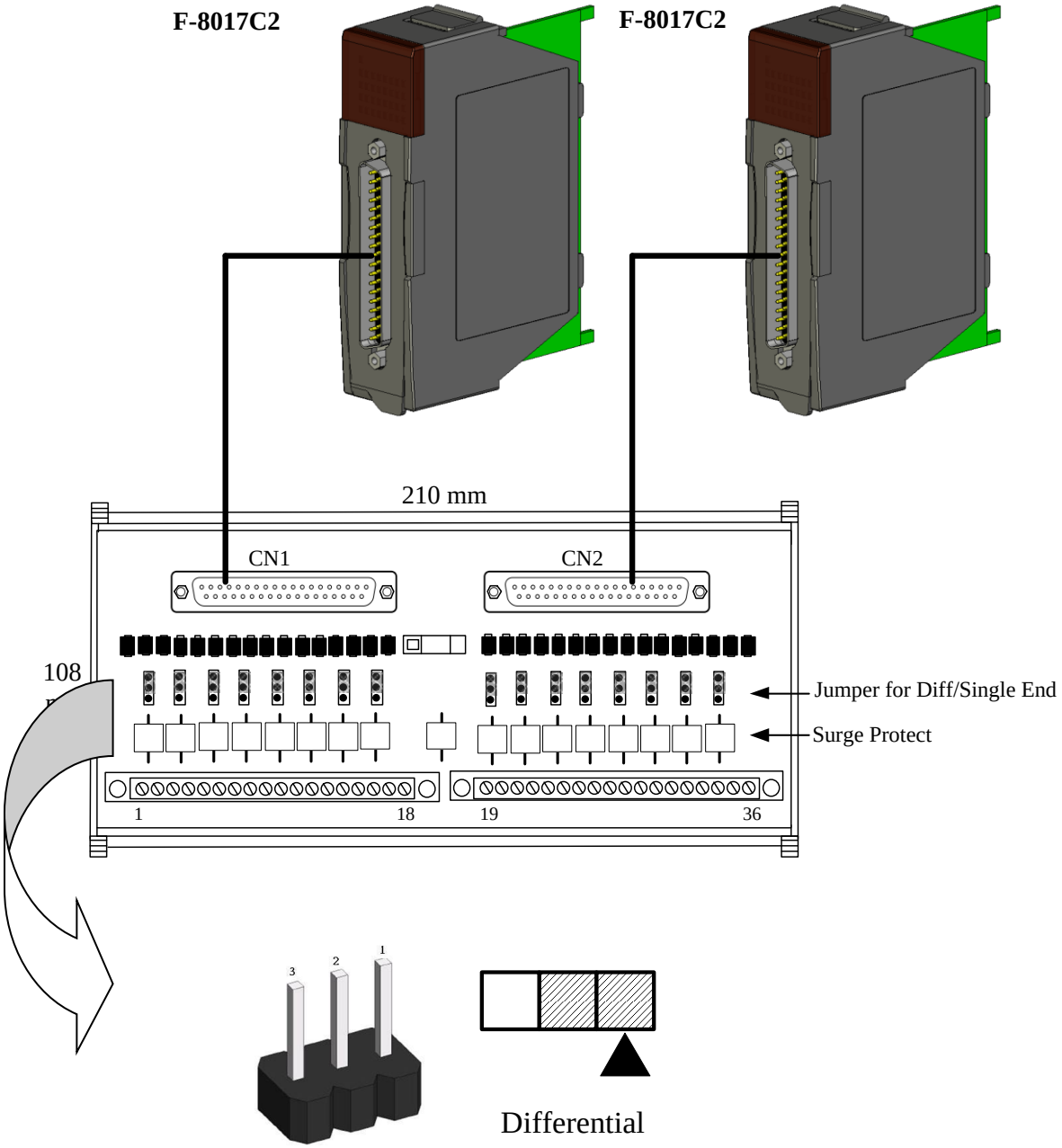
Pin Assignment Name	Terminal No.		Pin Assignment Name
PWR	19	37	BK2
X	18	36	A.GND
CH15-	17	35	CH15+
CH14-	16	34	CH14+
CH13-	15	33	CH13+
CH12-	14	32	CH12+
CH11-	13	31	CH11+
CH10-	12	30	CH10+
CH9-	11	29	CH9+
CH8-	10	28	CH8+
CH7-	09	27	CH7+
CH6-	08	26	CH6+
CH5-	07	25	CH5+
CH4-	06	24	CH4+
CH3-	05	23	CH3+
CH2-	04	22	CH2+
CH1-	03	21	CH1+
CH0-	02	20	CH0+
BK1	01		

37-pin male D-Sub Connector

4.2.2.1 F-8017C2 with DN-AIO-16F

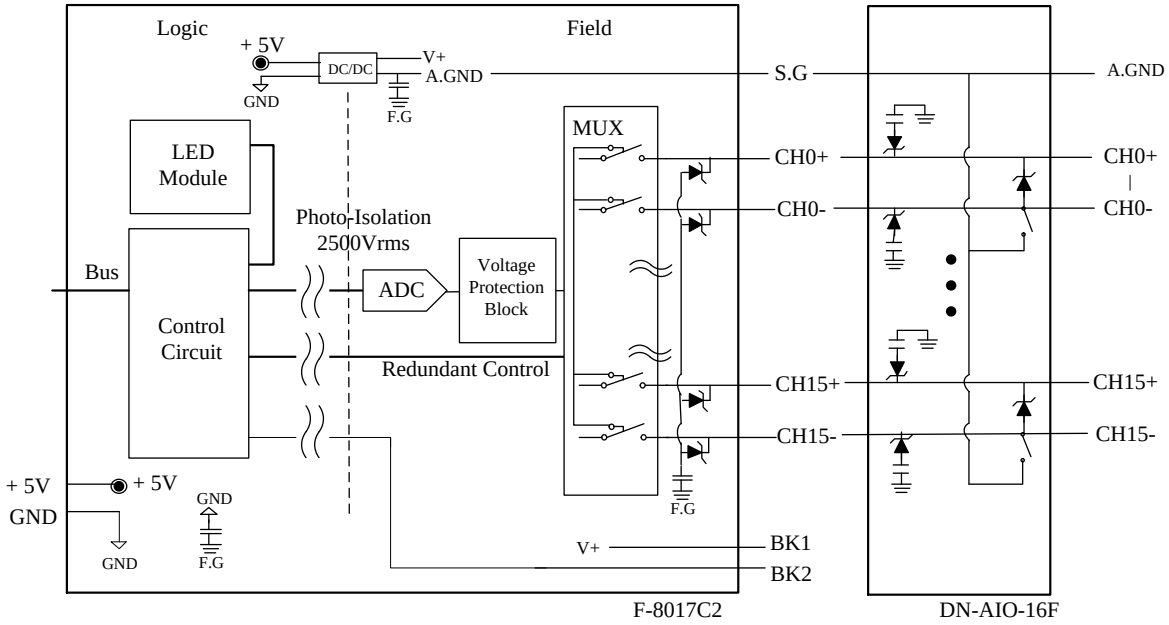
- **F-8017C2 with DN-AIO-16F Diagram**

1. CN1, CN2 are connected to F-8017C2 .
2. About the DN-AIO-16F spec or deteil, please reference the chapter 4.5.2 .

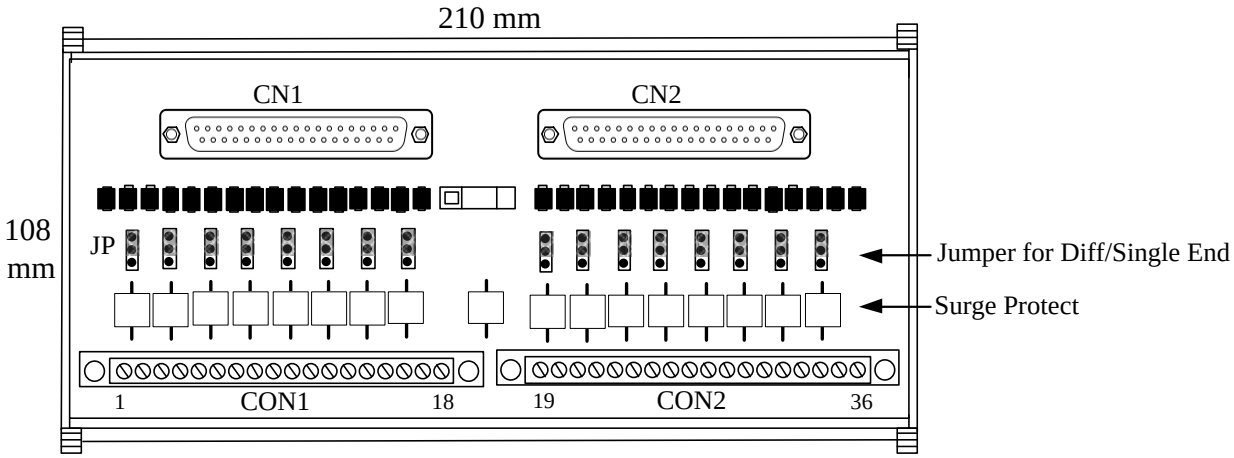


※When F-8017C2 connected to DN-AIO-16F, the Jumpers (JP1~JP8) must be set to Differential mode.

- F-8017C2 with DN-AIO-16F Internal I/O structure



- DN-AIO-16F Pin Assignment



CON1

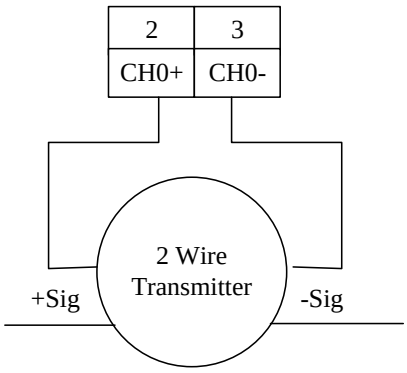
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CH0+	CH0-	CH1+	CH1-	CH2+	CH2-	CH3+	CH3-	CH4+	CH4-	CH5+	CH5-	CH6+	CH6-	CH7+	CH7-	N/A	N/A

CON2

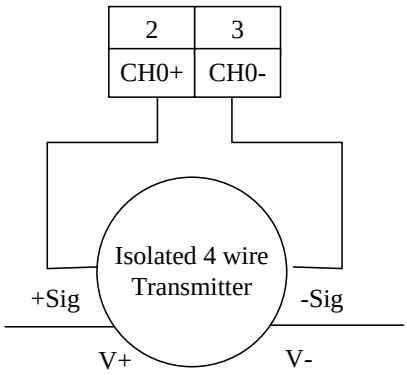
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
CH8+	CH8-	CH9+	CH9-	CH10+	CH10-	CH11+	CH11-	CH12+	CH12-	CH13+	CH13-	CH14+	CH14-	CH15+	CH15-	N/A	N/A

F-8017C1 Wiring Connection With DN-AIO-08F

● Terminating



● Originating

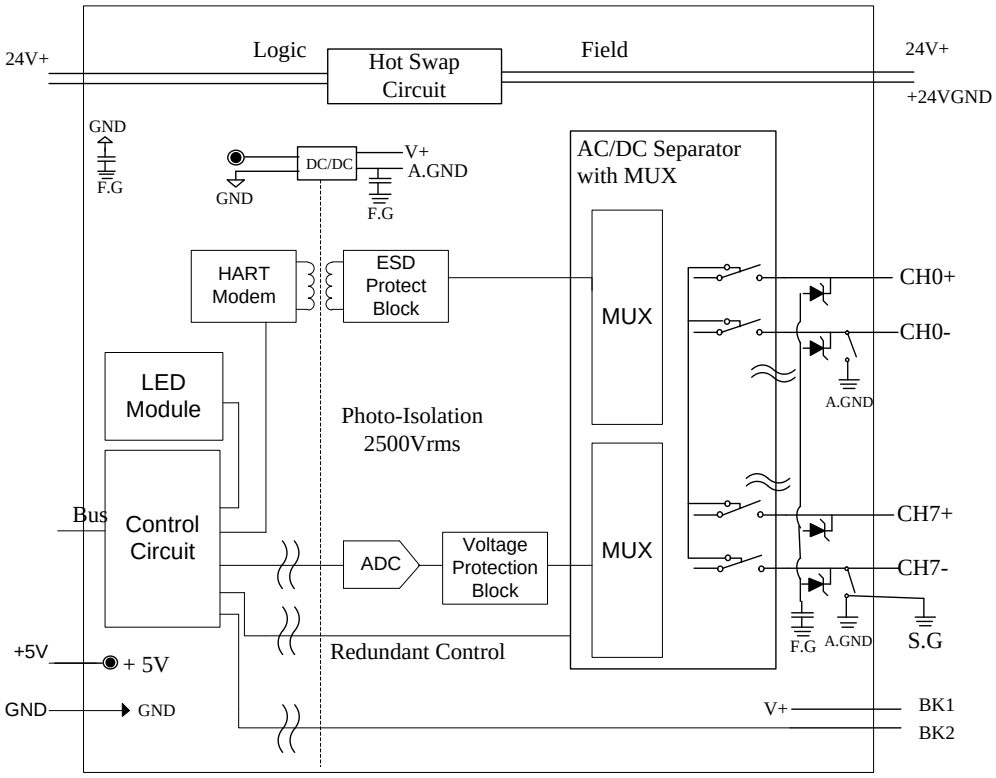


4.2.3 F-8017CH (HART AI)

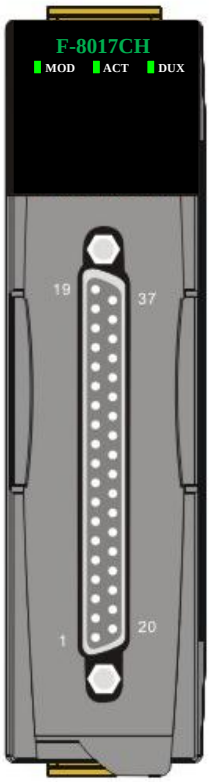
- **F-8017CH Profile**

Module Name		F-8017CH
Operation Mode		Single/ Duplex
Terminal Board		DN-AIO-08F
Channel Amount		8
Terminal Drop off Detection		Yes
Common & Wiring		Single End、Differential
Current Input (Precision Guarantee)		4~20mA (±0.1% FSR)
Current Input Range		0~24mA (0-4mA, 20-24mA Linearity)
Input Impedance (power on)		240Ω
Input Impedance (power off)		10^{10}Ω
Input Data (Precision Guarantee)		0~10000 (4-20mA)
Input Data Range		-2500~12500 (0~24mA)
Sampling Rate		10ms or less
Support Maximum Input		30 mA@24V_{DC}
ADC	Resolution	15 bit
	Accuracy	0.3 uA/bit
	Zero Drift	±20μV/°C
	Span Drift	±25 μV/°C
	Common Mode Rejection	86dB
	Normal Mode Rejection	100 dB
Field to Logic Isolation		2500V_{rms}
DC/DC Isolation		3000V_{DC}
SG-FG Isolation		3000V_{DC}
Channel/Channel Isolation		450V_{DC}
Timer of Duplex Switch		<1 ms
Timer of data response		<3 ms
Current Consumption		<1.2W
Operating Temperature		-25°C ~ +75°C
Humidity		5 ~ 95 % RH, Non-condensing
Weight		0.3 kg
Dimensions		30mm x 85mm x 115mm (W x L x H)

- F-8017CH Internal I/O structure



- F-8017CH Pin assignments



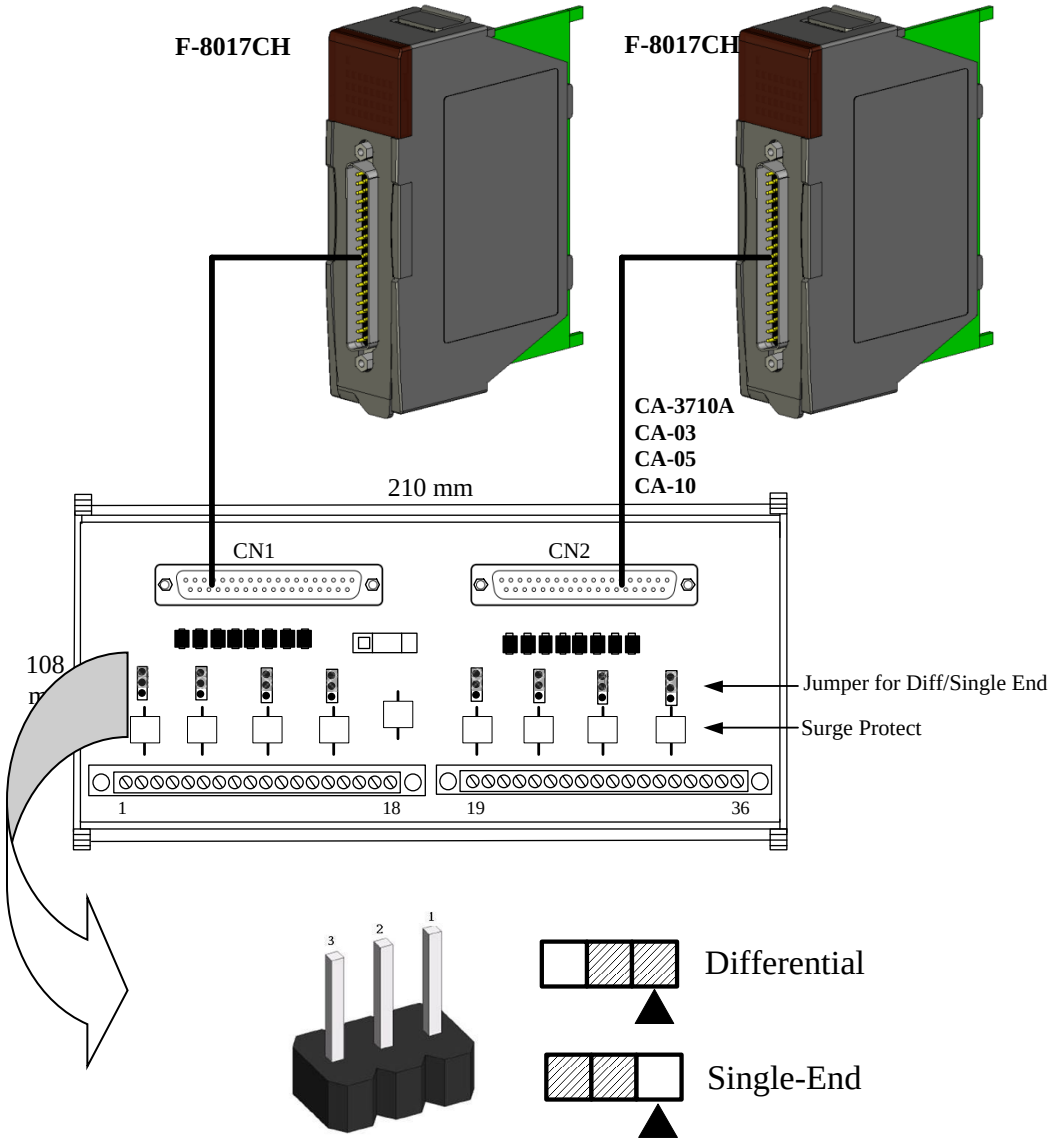
Pin Assignment Name	Terminal No.		Pin Assignment Name
PWR	19	37	BK2
X	18	36	A.GND
X	17	35	X
X	16	34	X
X	15	33	X
X	14	32	X
X	13	31	X
X	12	30	X
X	11	29	X
X	10	28	X
CH7-	09	27	CH7+
CH6-	08	26	CH6+
CH5-	07	25	CH5+
CH4-	06	24	CH4+
CH3-	05	23	CH3+
CH2-	04	22	CH2+
CH1-	03	21	CH1+
CH0-	02	20	CH0+
BK1	01		

37-pin male D-Sub Connector

4.3.3.1 F-8017CH with DN-AIO-08F

- **F-8017CH with DN-AIO-08F Diagram**

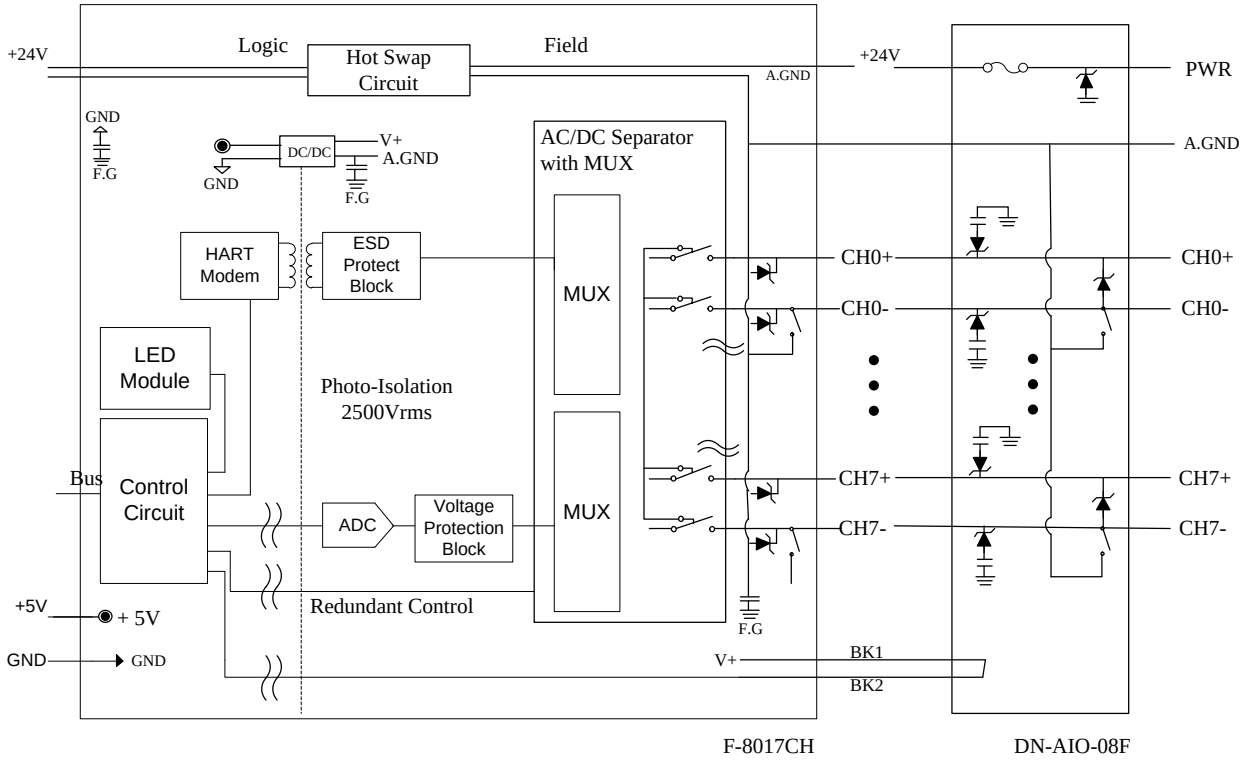
  1. CN1, CN2 are connected to F-8017CH。
  2. About the DN-AIO-08F spec or deteil, please reference the chapter 4.5.1 .



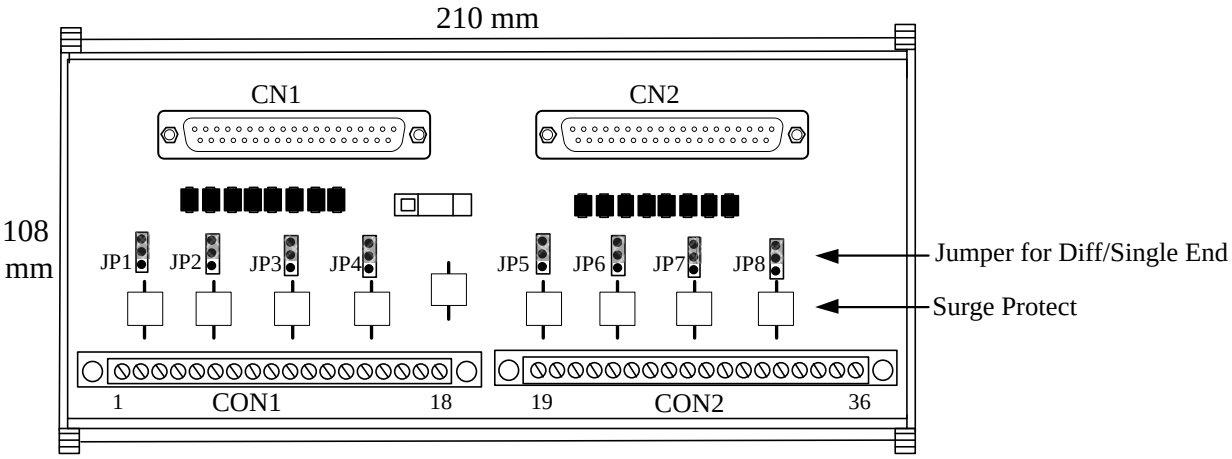
- **F-8017CH with DN-AIO-08F Jumper Setting**

  1. When the Jumpers (JP1~JP8) were set in the Pin 2-3, the channel would be the Single-End Mode. If you want to use the originating wiring, must be seting like that.
  2. The opposite setting in the Pin 1-2, it would be the Differential Mode.

- F-8017CH with DN-AIO-08F Interal I/O structure



- F-8017CH 使用 DN-AIO-08F 端子板 Pin Assignment



CON1

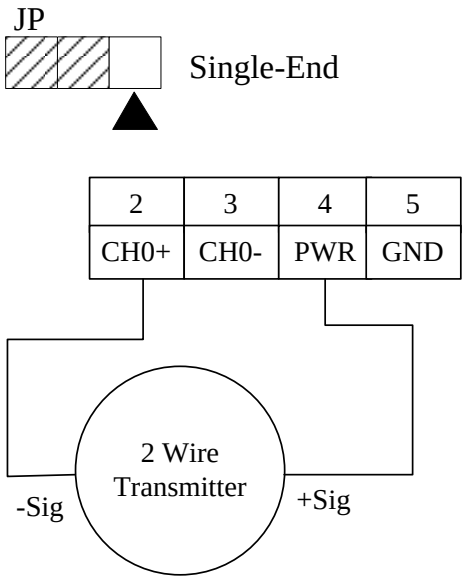
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	CH0+	CH0-	PWR	GND	CH1+	CH1-	PWR	GND	CH2+	CH2-	PWR	GND	CH3+	CH3-	PWR	GND	FG

CON2

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	CH4+	CH4-	PWR	GND	CH5+	CH5-	PWR	GND	CH6+	CH6-	PWR	GND	CH7+	CH7-	PWR	GND	FG

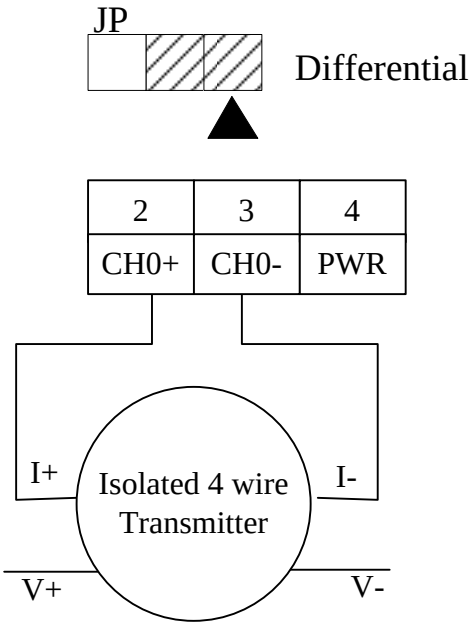
- F-8017CH HART 2 線式接線方式-使用 DN-AIO-08F

● Originating

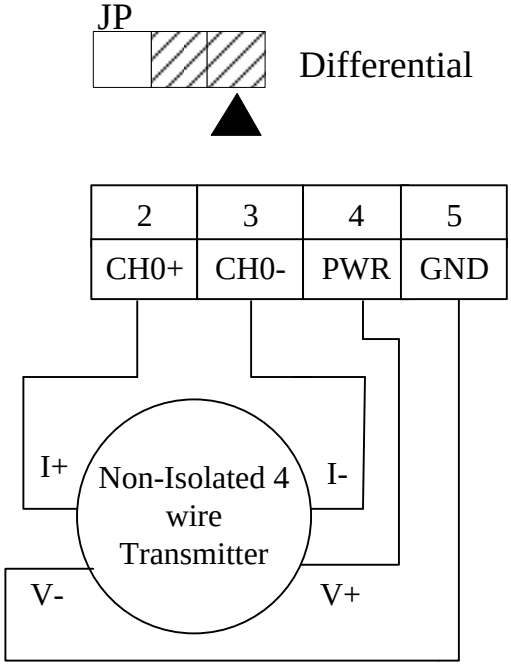


- F-8017CH HART 4 線式接線方式-使用 DN-AIO-08F

● Terminating



● Originating

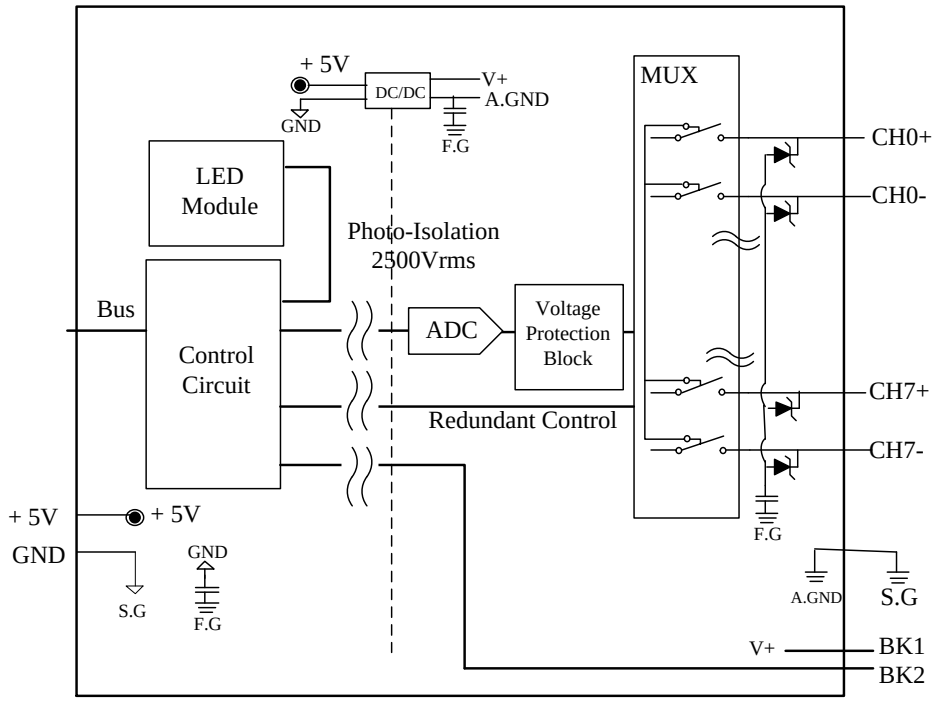


4.3.4 F-8017V

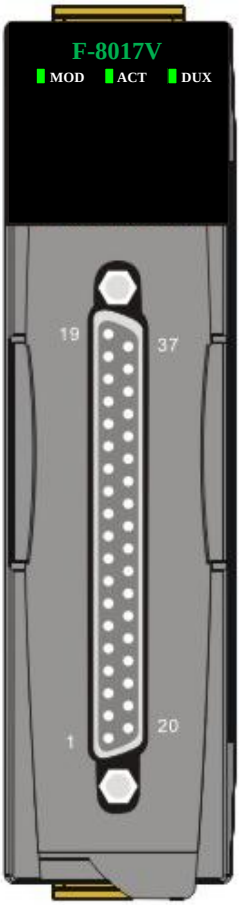
- F-8017V 規格 (Profile)

Module Name		F-8017V	
Operation Mode		Single/Duplex	
Terminal Board		DN-AIO-08F	
Terminal Drop off Detection (專用接線脫落檢出)		Yes	
Channel Amount		8	
Common & Wiring		Differential	
Voltage Input (Precision Guarantee)		+1 ~ +5VDC	-10 ~ +10VDC
Voltage Input Range		0 ~ 6VDC	-11 ~ +11VDC
Input Impedance (power on)		2MΩ	
Input Impedance (power off)		10^{10}Ω	
Input Data (Precision Guarantee)		0~10000	
Input Data Range		-2500~12500	-500~10500
Resolution		15bit	15 bit
Sampling Rate		<3 ms	
Accuracy		0.07 mV/bit (+-0.1 % FSR)	0.35 mV/bit (+-0.1 % FSR)
Support Maximum Input		$12V_{DC}$	$12V_{DC}$
Over Voltage Input Protection		200Vrms Over voltage Protection.	
ADC	Zero Drift	± 20μV/ °C	
	Span Drift	± 25 μV/ °C	
	Common Mode Rejection	86dB	
	Normal Mode Rejection	100 dB	
Field to Logic Isolation		S.G：$2500V_{rms}$	
DC/DC Isolation		$3000V_{DC}$	
SG-FG Isolation		$3000V_{DC}$	
Timer of Duplex Switch		<1 ms	
Timer of data response		<3 ms	
Current Consumption		<1.2W	
Operating Temperature		-25°C ~ +75°C	
Humidity		5 ~ 95 % RH, Non-condensing	
Weight		0.3 kg	
Dimensions		30mm x 85mm x 115mm (W x L x H)	

- F-8017V Internal I/O structure



- F-8017V Pin assignments



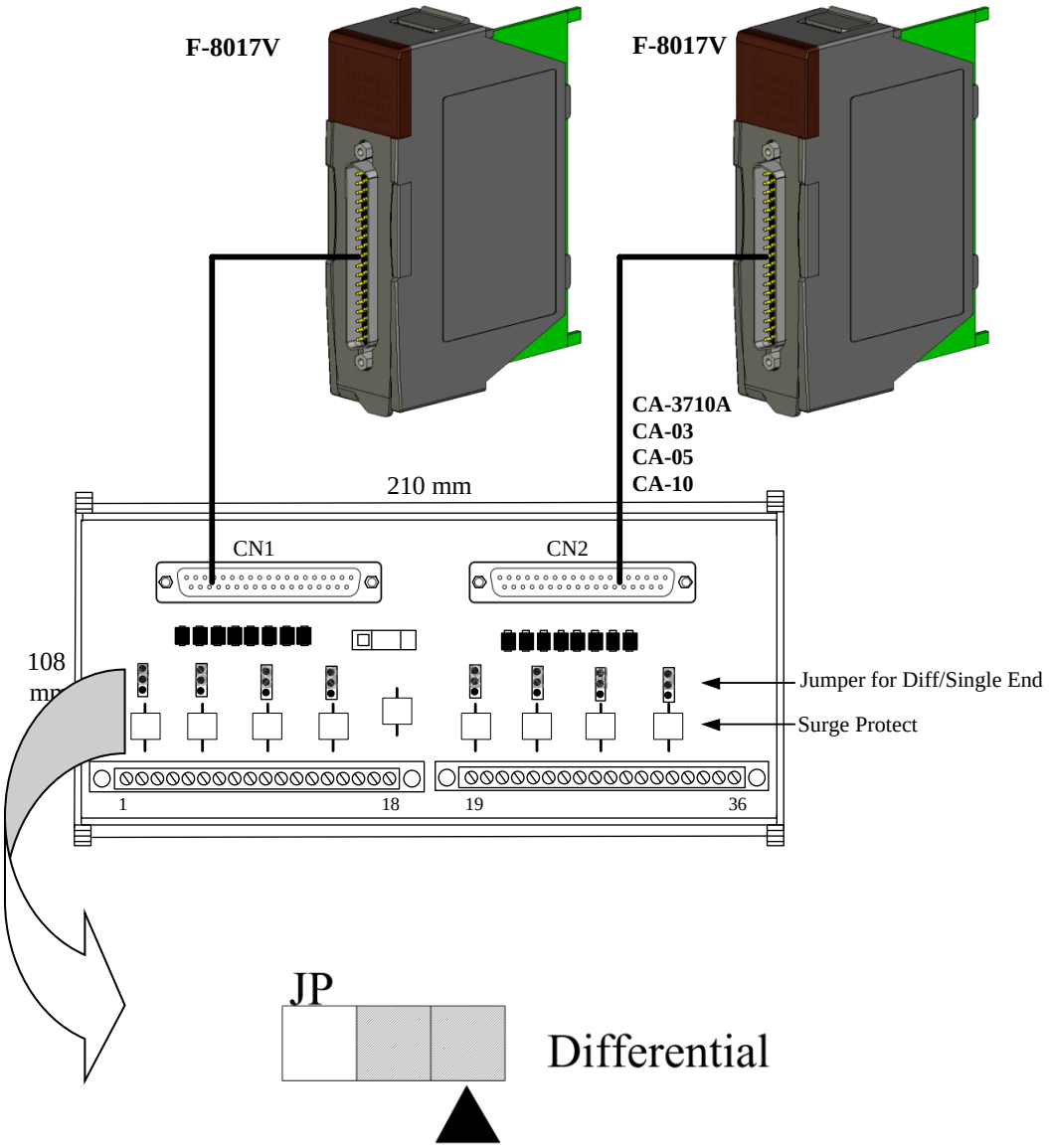
Pin Assignment Name	Terminal No.		Pin Assignment Name
X	19	37	BK2
X	18	36	X
X	17	35	X
X	16	34	X
X	15	33	X
X	14	32	X
X	13	31	X
X	12	30	X
X	11	29	X
X	10	28	X
CH7-	09	27	CH7-
CH6-	08	26	CH6-
CH5-	07	25	CH5-
CH4-	06	24	CH4-
CH3-	05	23	CH3-
CH2-	04	22	CH2-
CH1-	03	21	CH1-
CH0-	02	20	CH0-
BK1	01		

37-pin male D-Sub Connector

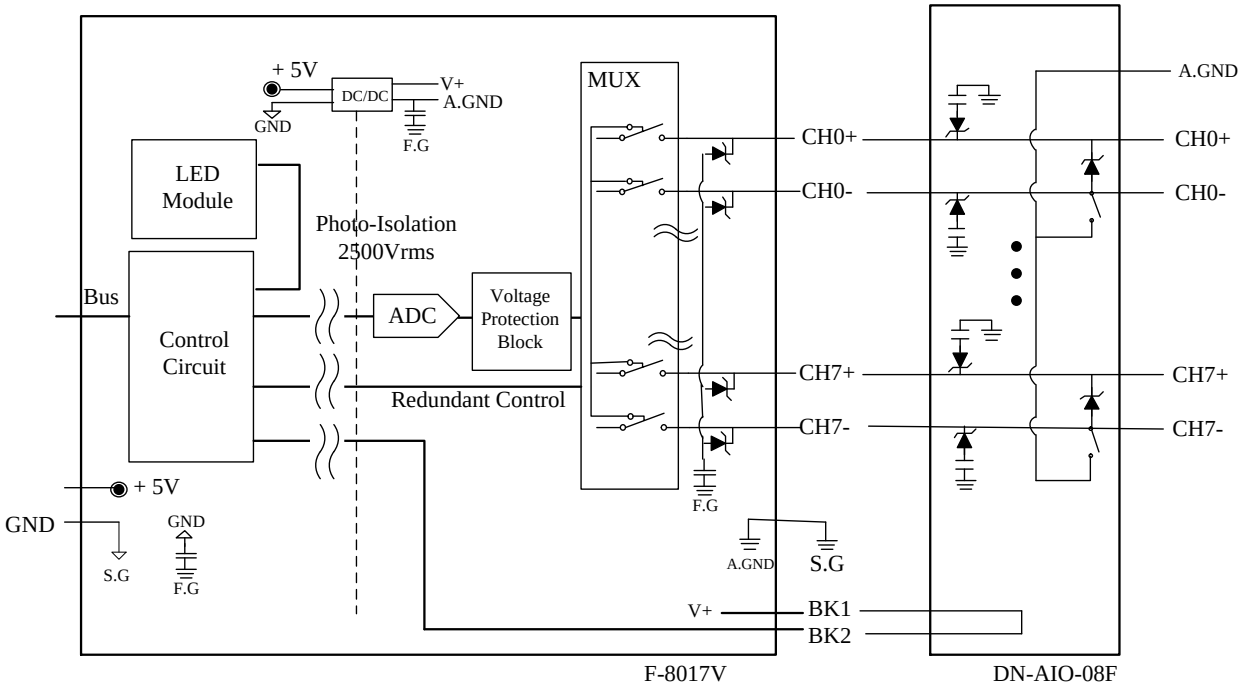
4.4.1.1 F-8017V with DN-AIO-08F

- **F-8017V with DN-AIO-08F Diagram**

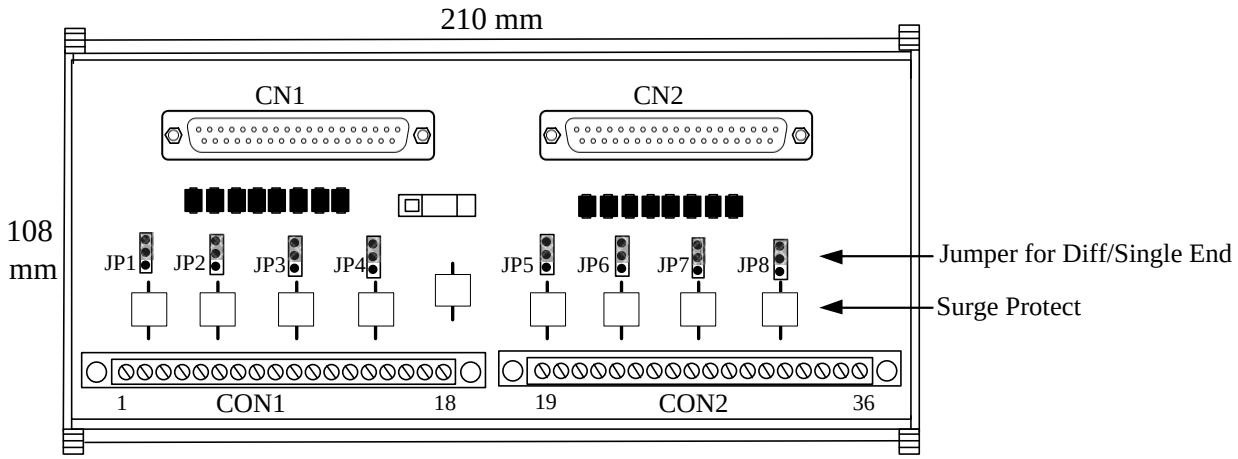
  1. CN1, CN2 are connected to F-8017V。
  2. About the DN-AIO-08F spec or deteil, please reference the chapter 4.5.1 .
  3. The jumpers always set in the Differential.



- F-8017V with DN-AIO-08F Internal I/O structure



- DN-AIO-08F Pin Assignment



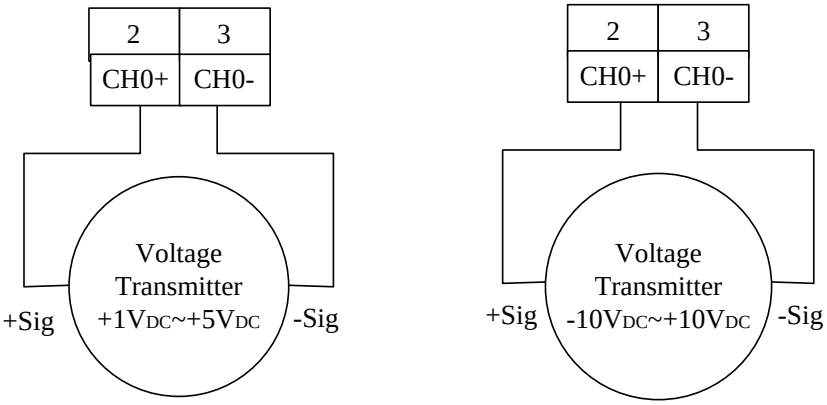
CON1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	CH0+	CH0-	PWR	GND	CH1+	CH1-	PWR	GND	CH2+	CH2-	PWR	GND	CH3+	CH3-	PWR	GND	FG

CON2

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	CH4+	CH4-	PWR	GND	CH5+	CH5-	PWR	GND	CH6+	CH6-	PWR	GND	CH7+	CH7-	PWR	GND	FG

- I/O Wiring Connection



4.3 Analog Output Module

- SPEC List

Module Name	F-8028CV	F-8028CH
Operation Mode	Single/Duplex	
Terminal Board	DN-AIO-16F	DN-AIO-08F
Terminal Drop off Detection	Yes	
Channel Amount	8	
Common & Wiring	共 N-COM/Single-Ended(單點接線)	
Maximum Ontput Impedance	895Ω	895Ω
Output Range	4~20mA	
Output Full Range	0~24mA	
Resolution	14 bit	
HART Protocol	None	Yes

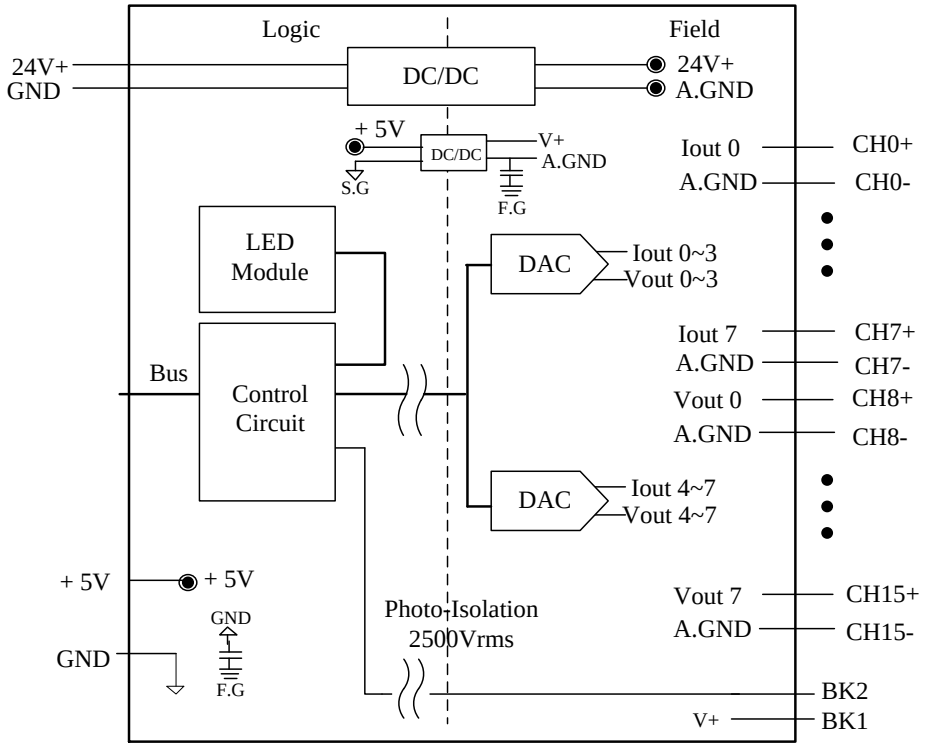
4.3.1 F-8028CV

- F-8028CV Profile

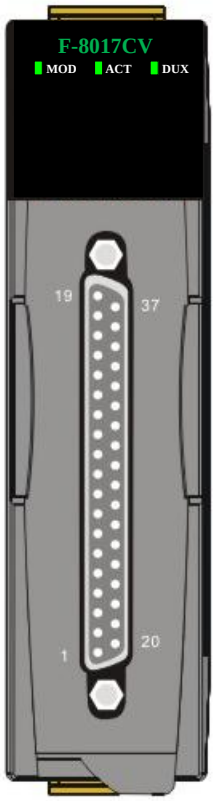
Module Name	F-8028CV		
Redundancy	Single/Duplex		
Terminal Board	DN-AIO-16F		
Terminal Drop off Detection	Yes		
Channel Amount	8		
Common & Wiring	Single-End(N-COM)		
Maximum Ontput Impedance	895Ω		
Output Range (Precision Guarantee)	4~20mA	1~5V	-10~+10V
Output Full Range	0~24mA	0~6V	-11~+10V
Input Data (Precision Guarantee)	0~10000		
Input Data Range	-2500~12500	-2500~12500	-500~10500
Resolution	14 bit		
Output Time	< 3 ms		
Accuracy	5.8 uA/bit (+-0.1 %FSR)		
Zero Drift	30μV/°C		
Span Drift	20ppm/°C		
Field to Logic Isolation	S.G：2500Vrms		
DC/DC Isolation	3000VDC		
SG-FG Isolation	3000VDC		
Timer of Duplex Switch	<1 ms		
Timer of data response	<3 ms		
Safe mode	Reset/ Hold(預設)/ PreSet		
5V Maximum Current Consumption	1.5W		
24V Maximum Current Consumption	5.3W		
Operating Temperature	-25°C ~ +75°C		
Humidity	5 ~ 95 % RH, Non-condensing		
Weight	0.4 kg		
Dimensions	30mm x 85mm x 115mm (W x L x H)		

※CH0 and CH8, at the same time, only one configuration could be used to output and so on.

- F-8028CV Internal I/O structure



- F-8028CV Pin assignments



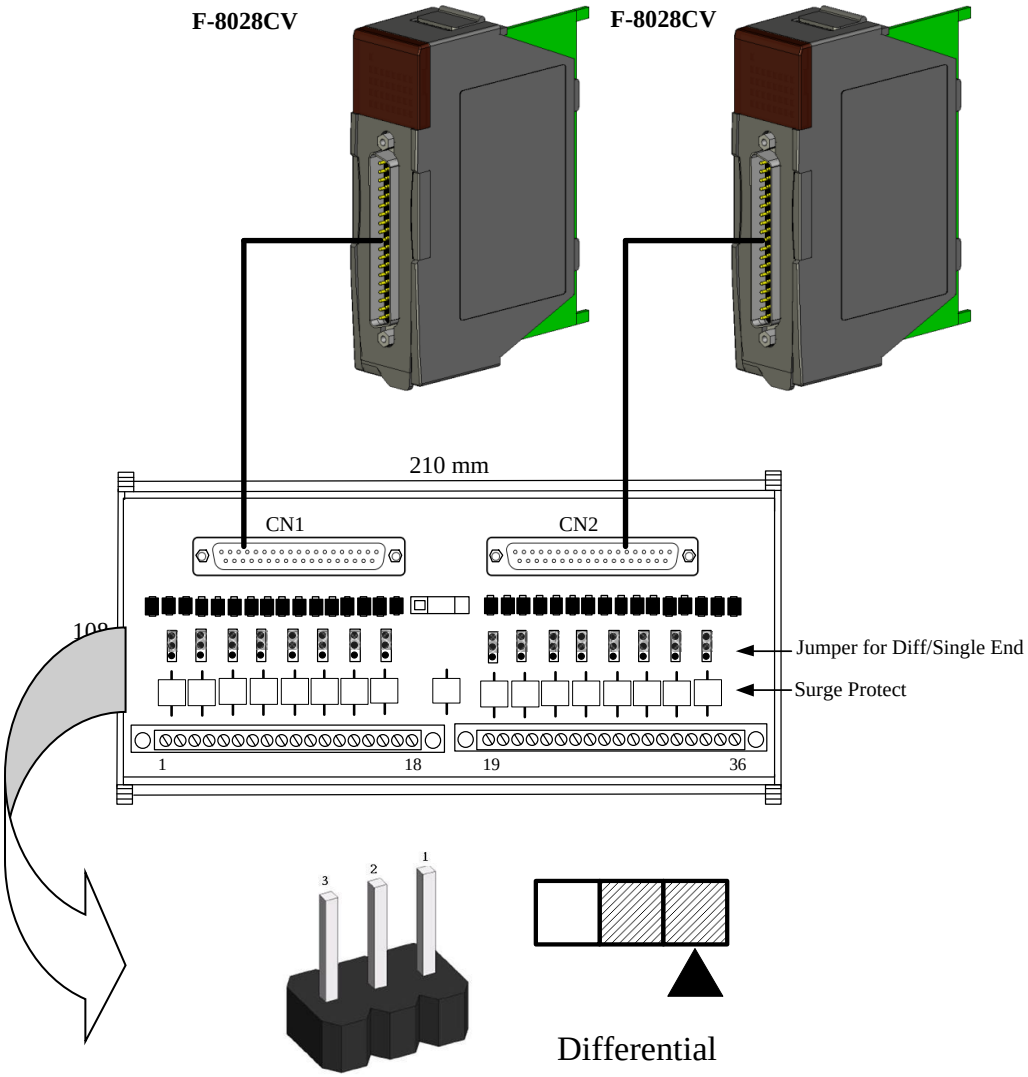
Pin Assignment Name	Terminal No.		Pin Assignment Name
X	19	37	BK2
X	18	36	X
CH15-	17	35	CH15+
CH14-	16	34	CH14+
CH13-	15	33	CH13+
CH12-	14	32	CH12+
CH11-	13	31	CH11+
CH10-	12	30	CH10+
CH9-	11	29	CH9+
CH8-	10	28	CH8+ Vout
CH7-	09	27	CH7+
CH6-	08	26	CH6+
CH5-	07	25	CH5+
CH4-	06	24	CH4+
CH3-	05	23	CH3+
CH2-	04	22	CH2+
CH1-	03	21	CH1+
CH0-	02	20	CH0+ Iout
BK1	01		

37-pin male D-Sub Connector

4.3.1.1 F-8028CV With DN-AIO-16F

- **F-8028CV with DN-AIO-16F Diagram**

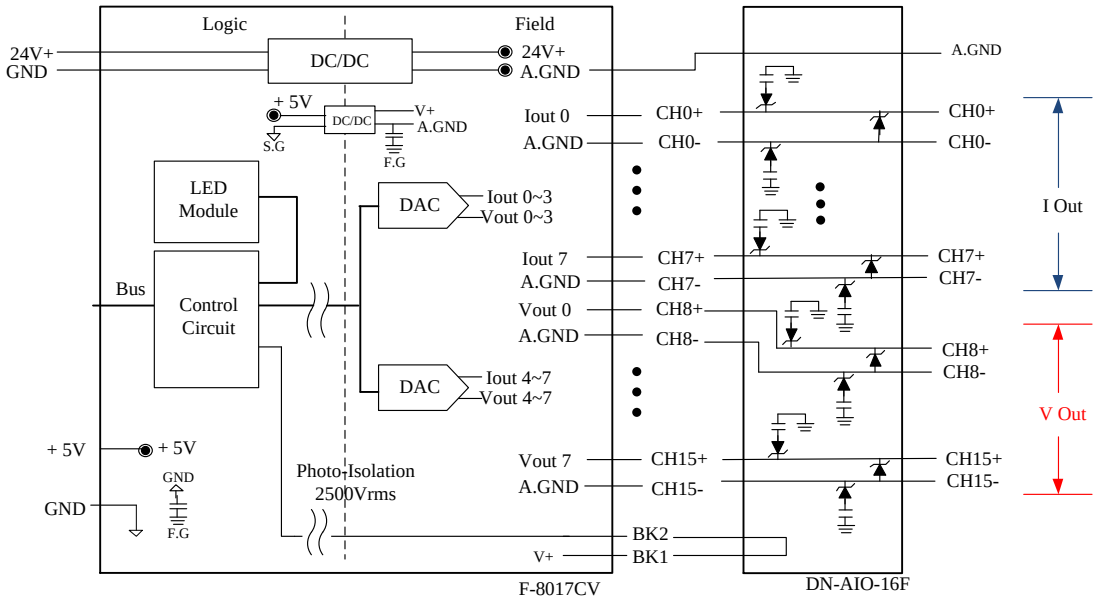
  1. CN1, CN2 are connected to F-8028CV .
  2. About the DN-AIO-16F spec or deteil, please reference the chapter 4.5.2 .



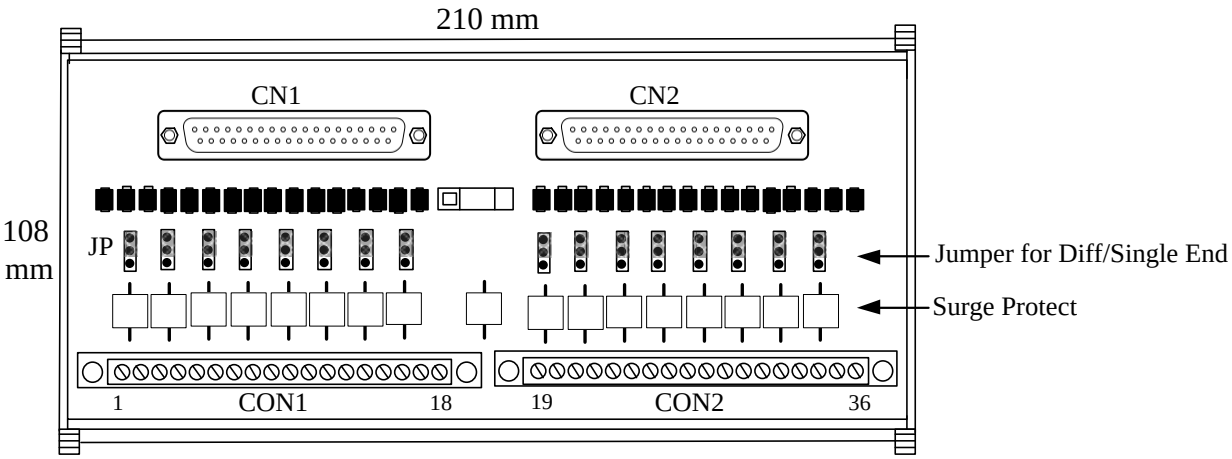
※DN-AIO-16F jumper must set in Differential Mode.
※CH0 and CH8, at the same time, only one could channel be used and so on.

- ## F-8028C with DN-AIO-16F Internal I/O structure

1. Channel 0~7 are the current output，channel 8~15 are the voltage output.
2. At the same time , only used current or voltage output.



- ## DN-AIO-16F Pin Assignment



CON1

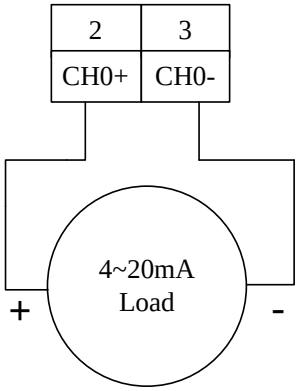
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
CH0+	CH0-	CH1+	CH1-	CH2+	CH2-	CH3+	CH3-	CH4+	CH4-	CH5+	CH5-	CH6+	CH6-	CH7+	CH7-	N/A	N/A

CON2

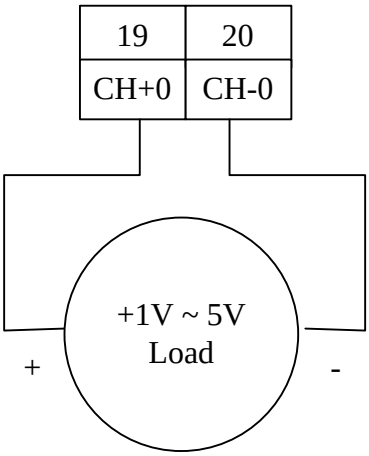
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
CH8+	CH8-	CH9+	CH9-	CH10+	CH10-	CH11+	CH11-	CH12+	CH12-	CH13+	CH13-	CH14+	CH14-	CH15+	CH15-	N/A	N/A

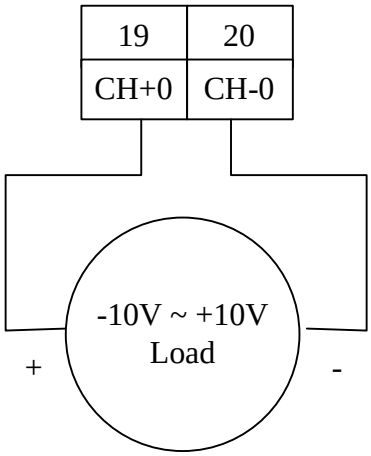
※CH0~ 7 are the Current Output.
※CH8~15 are the Voltage Output.

- I/O Wiring Connection (Current Output)



- I/O Wiring Connection (Voltage Output)



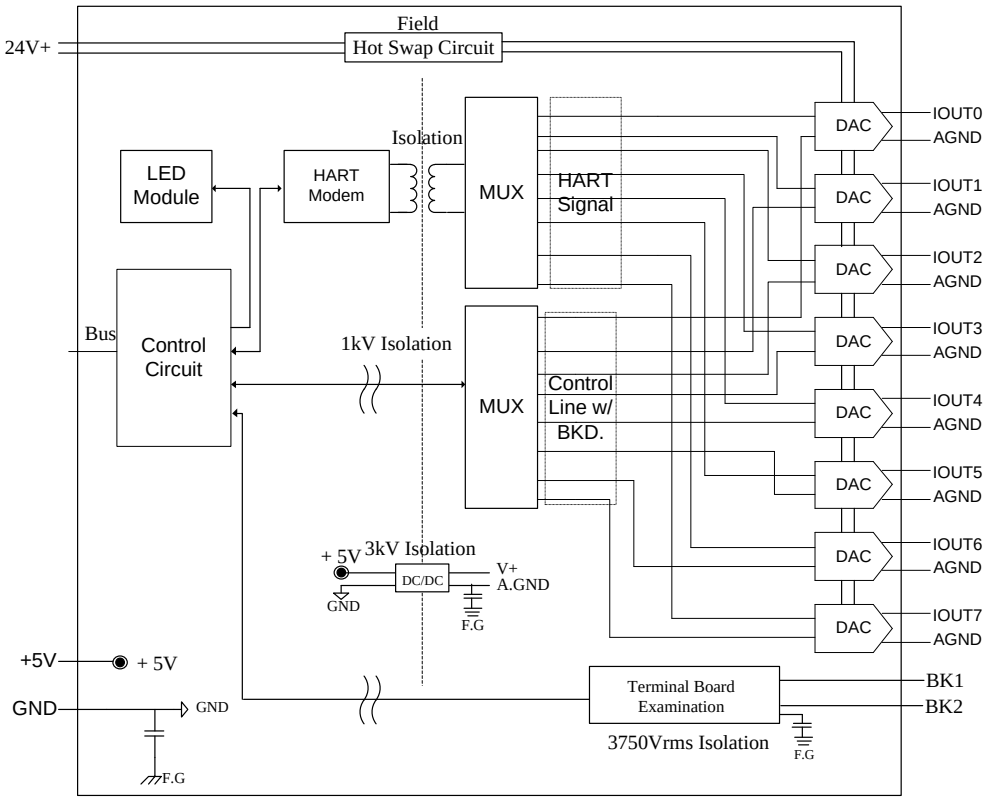


4.3.2 F-8028CH

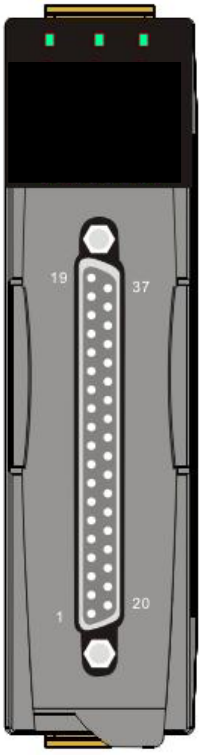
- F-8028CH 規格 (Profile)

Module Name	F-8028CH
Redundancy	Single/Duplex
Terminal Board	DN-AIO-08F
Terminal Drop off Detection	Yes
Channel Amount	8
Common & Wiring	共 N-COM/Single-Ended 單點接線
Maximum Ontput Impedance	895Ω
Output Range (Precision Guarantee)	4~20mA
Output Full Range	0~24mA
Input Data (Precision Guarantee)	0~10000
Input Data Range	-2500~12500
Resolution	14 bit
Output Time	< 3 ms
Accuracy	5.8 uA/bit (+-0.1 %FSR)
Zero Drift	30μV/°C
Span Drift	20ppm/°C
Field to Logic Isolation	S.G：2500Vrms
DC/DC Isolation	3000VDC
SG-FG Isolation	3000VDC
Timer of Duplex Switch	<1 ms
Timer of data response	<3 ms
Safe mode	Reset/ Hold(預設)/ Set
5V Maximum Current Consumption	2.5W
24V Maximum Current Consumption	5.3W
Hart Protocol	Yes
Operating Temperature	-25°C ~ +75°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	0.4 kg
Dimensions	30mm x 85mm x 115mm (W x L x H)

- F-8028CH Internal I/O structure



- F-8028CH Pin assignments



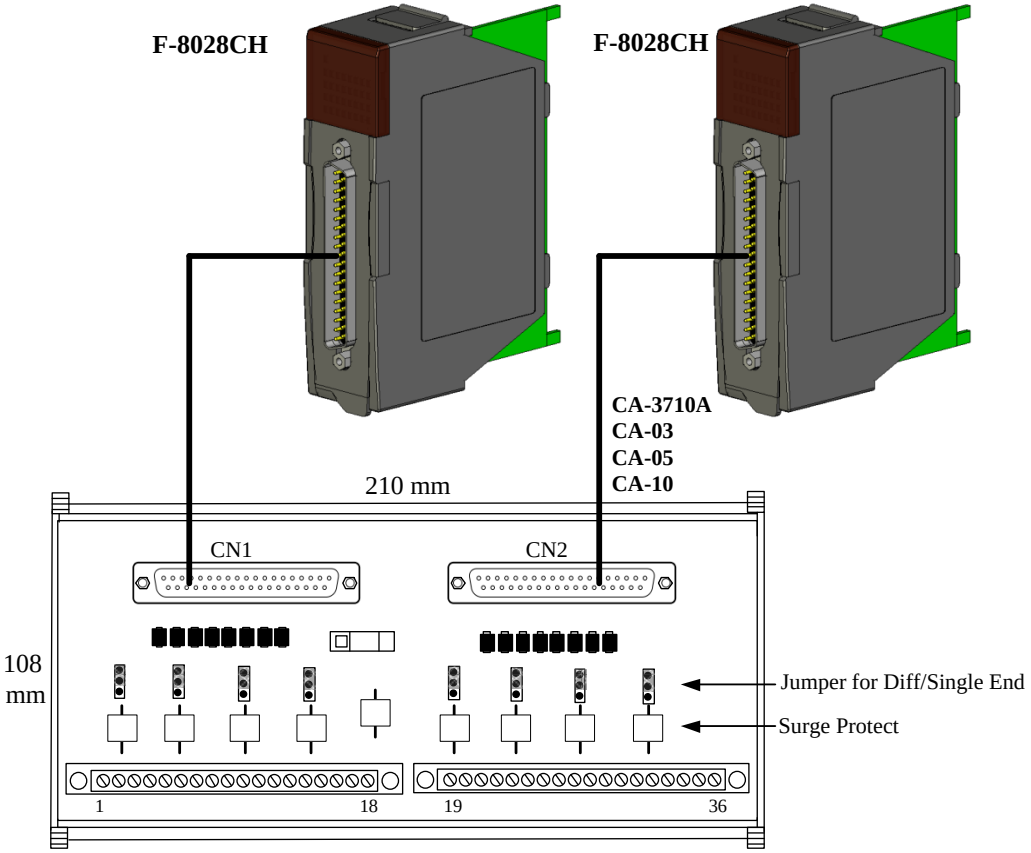
Pin Assignment Name	Terminal No.		Pin Assignment Name
+24V	19	37	BK2
X	18	36	X
X	17	35	X
X	16	34	X
X	15	33	X
X	14	32	X
X	13	31	X
X	12	30	X
X	11	29	X
X	10	28	X
AGND / H7-	09	27	IOUT7 / H0+
AGND / H6-	08	26	IOUT6 / H0+
AGND / H5-	07	25	IOUT5 / H0+
AGND / H4-	06	24	IOUT4 / H0+
AGND / H3-	05	23	IOUT3 / H0+
AGND / H2-	04	22	IOUT2 / H0+
AGND / H1-	03	21	IOUT1 / H0+
AGND / H0-	02	20	IOUT0 / H0+
BK1	01		

37-pin male D-Sub Connector

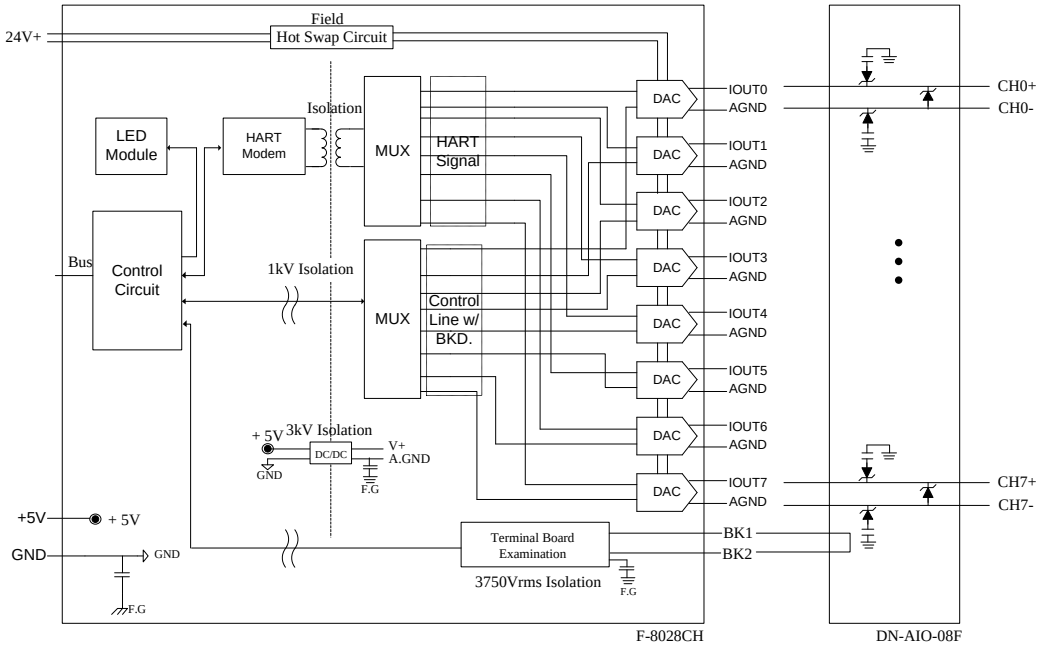
4.3.2.1 F-8028CH with DN-AIO-08F

- **F-8028CH with DN-AOI-01/02 Diagram**

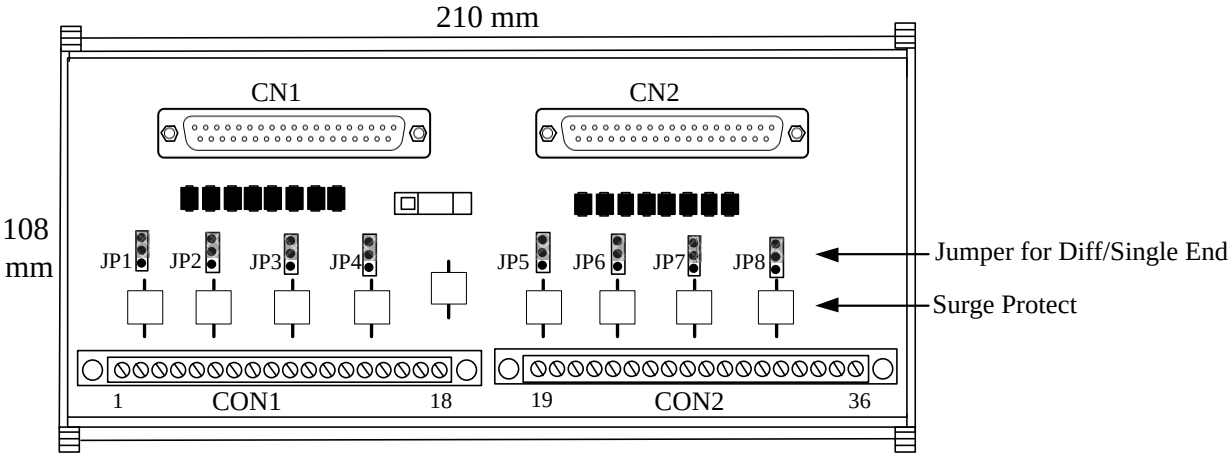
  1. CN1, CN2 are connected to F-8028CH .
  2. About the DN-AIO-08F spec or deteil, please reference the chapter 4.5.1 .
  3. When DN-AIO-08F connected to F-8028CH, it would be Single-End.



- F-8028CH with DN-AIO-08F Internal I/O structure



- DN-AIO-08F Pin Assignment



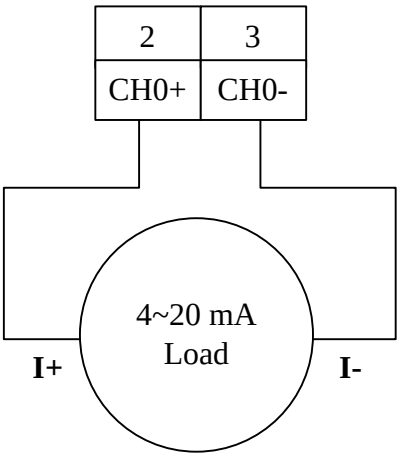
CON1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	CH0+	CH0-	PWR	GND	CH1+	CH1-	PWR	GND	CH2+	CH2-	PWR	GND	CH3+	CH3-	PWR	GND	FG

CON2

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	CH4+	CH4-	PWR	GND	CH5+	CH5-	PWR	GND	CH6+	CH6-	PWR	GND	CH7+	CH7-	PWR	GND	FG

- I/O Wiring Connection



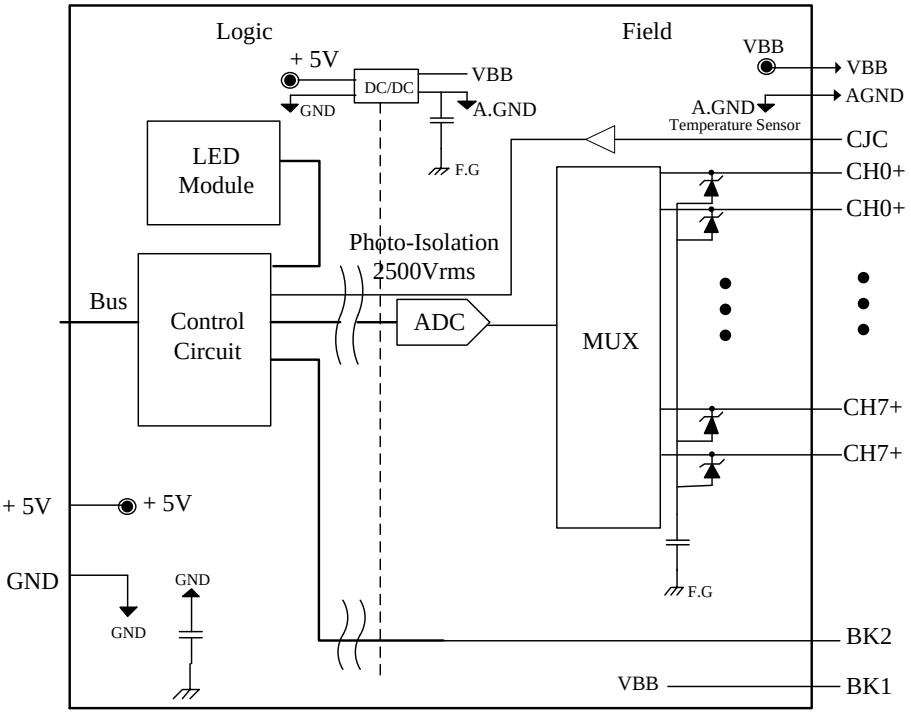
4.4 Temperature Module

4.4.1 F-8019

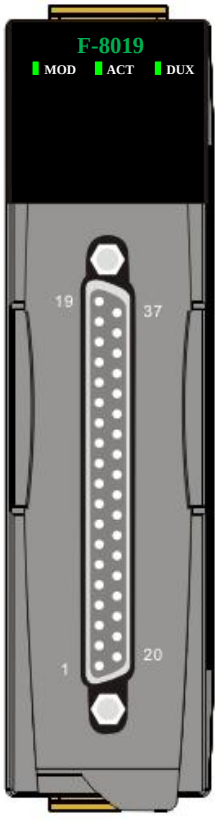
- F-8019 規格(Profile)

Module Name	F-8019
Redundancy	Single/Duplex
Terminal Board	DN-TC-08F
Terminal Drop off Detection	Yes
Channel Amount	8
Common & Wiring	共用同一個 CJC， 無共 COM，Differential 兩點接線
Sensor Input	J, K, T, E. R. S, N, B, C
Input Impedance (power on)	20MΩ
Input Data (Precision Guarantee)	0~10000
Input Data Range	-2500~12500
Resolution	16bit
Sampling Rate	8channel/1s
Accuracy	0.1% FSR (熱能電力轉換: 30 uV)
Zero Drift	± 20μV/ °C
Span Drift	± 25 μV/ °C
Common Mode Rejection	106 dB
Allowable input voltage	240Vrms Overvoltage Protection
Normal Mode Rejection	100 dB
Channel Break Line	有
Field to Logic Isolation	S.G：2500V_{rms}
DC/DC Isolation	3000V_{DC}
SG-FG Isolation	3000V_{DC}
Timer of Duplex Switch	<1 ms
Timer of data response	<3 ms
Current Consumption	1.85W
Operating Temperature	-25°C ~ +75°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	0.3 kg
Dimensions	30mm x 85mm x 115mm (W x L x H)

- F-8019 with DN-TC Internal I/O structure



- F-8019 Pin assignments



Pin Assignment Name	Terminal No.		Pin Assignment Name
CJC	19	37	BK2
VBB	18	36	AGND
X	17	35	X
X	16	34	X
X	15	33	X
X	14	32	X
X	13	31	X
X	12	30	X
X	11	29	X
X	10	28	X
CH7-	09	27	CH7+
CH6-	08	26	CH6+
CH5-	07	25	CH5+
CH4-	06	24	CH4+
CH3-	05	23	CH3+
CH2-	04	22	CH2+
CH1-	03	21	CH1+
CH0-	02	20	CH0+
BK1	01		

37-pin male D-Sub Connector

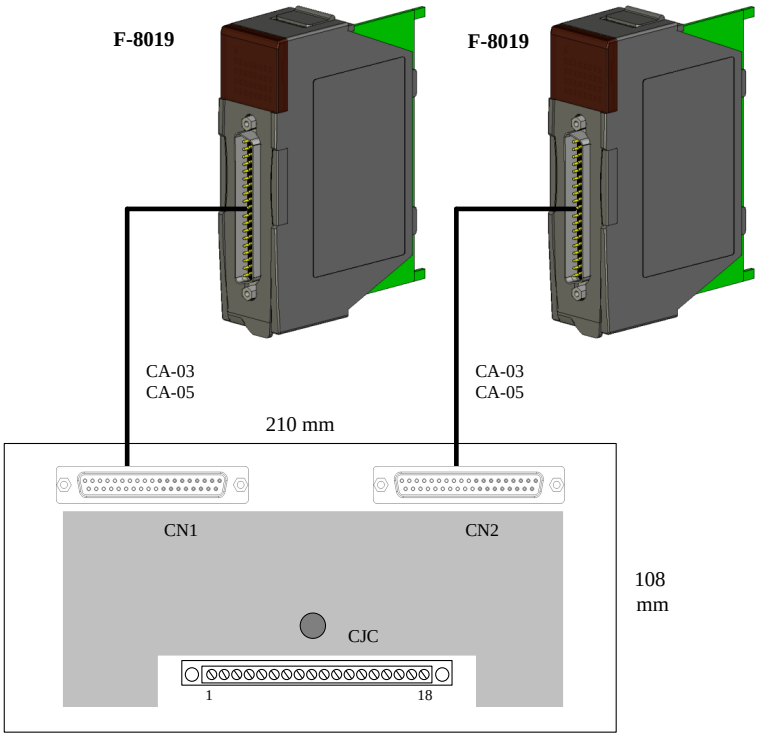
F-8019 Input Type Degree Table

Input Type	Temperature Range °C
TYPE J Thermocouple	-210 °C ~ +1200 °C
TYPE K Thermocouple	-270 °C ~ 1372 °C
TYPE T Thermocouple	-270 °C ~ 400 °C
TYPE E Thermocouple	-270 °C ~ 1000 °C
TYPE R Thermocouple	-50 °C ~ 1765 °C
TYPE S Thermocouple	-50 °C ~ 1765 °C
TYPE B Thermocouple	50 °C ~ 1820 °C
TYPE N Thermocouple	-270 °C ~ 1300 °C
TYPE C Thermocouple	0 °C ~ 2320 °C

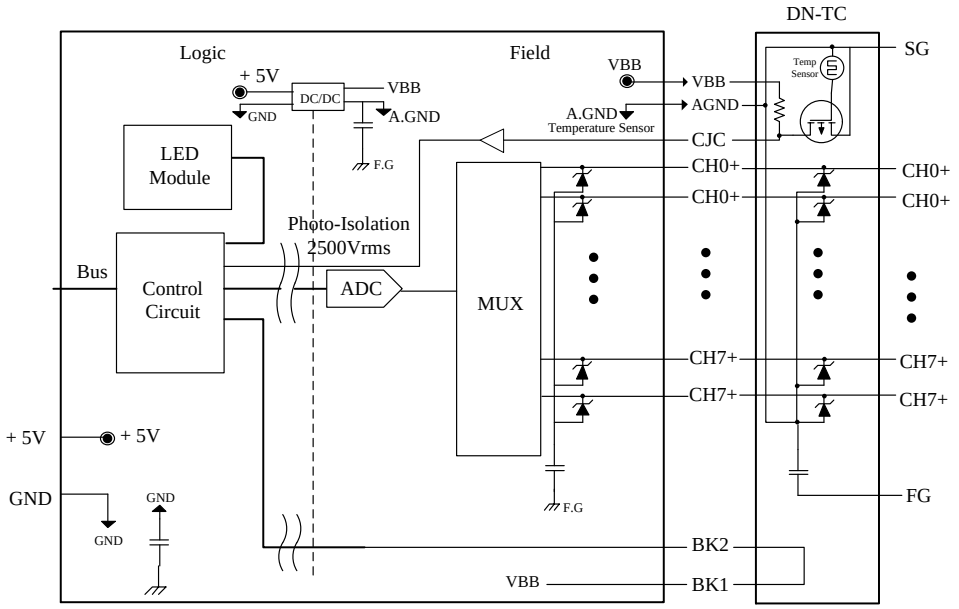
4.2.1.1 F-8019 with DN-TC-08

- **F-8019 with DN-TC-08 Diagram**

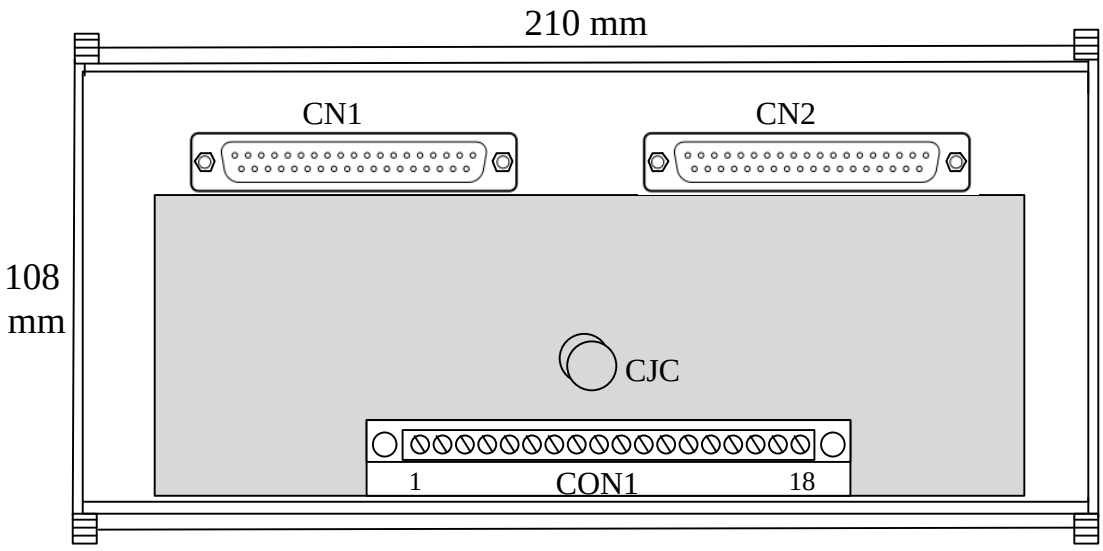
1. CN1, CN2 are connected to F-8019 .
2. About the DN-TC-08 spec or deteil, please reference the chapter 4.5.3 .



- F-8019 with DN-TC-08 Internal I/O structure



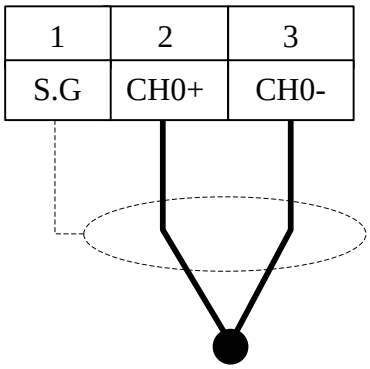
- DN-TC Pin Assignment



CON1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
SG	CH0+	CH0-	CH1+	CH1-	CH2+	CH2-	CH3+	CH3-	CH4+	CH4-	CH5+	CH5-	CH6+	CH6-	CH7+	CH7-	FG

- I/O Wiring Connection



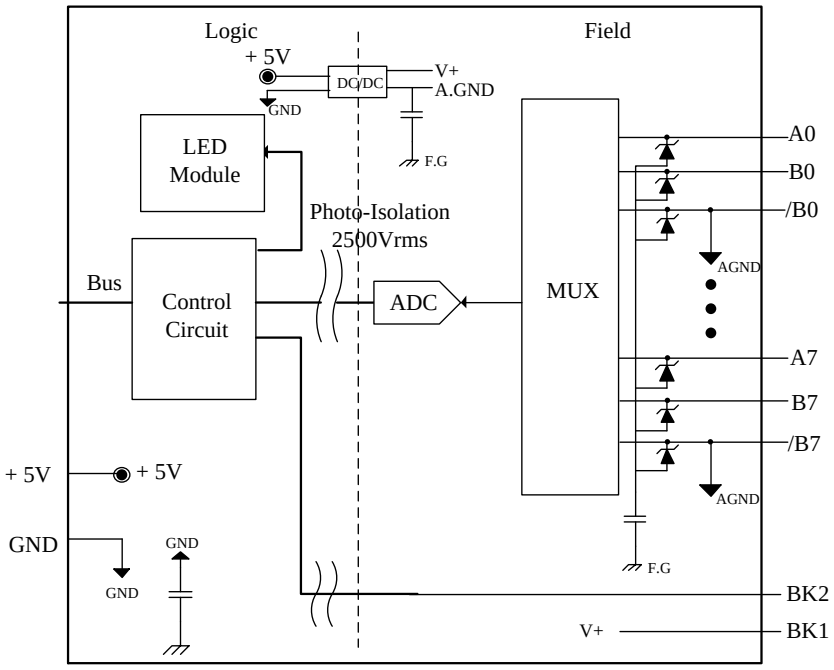
Thermocouple

4.4.2 F-8015

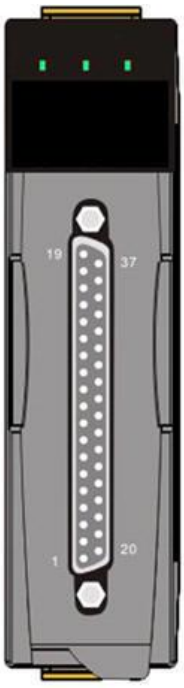
- 規格(Profile)

Module Name	F-8015
Redundancy	Single/Duplex
Terminal Board	DN-RTD-08
Terminal Drop off Detection	Yes
Channel Amount	8
Common & Wiring	Bx 共 COM， Differential 兩點接線， Differential 三點接線
Sensor Input	Pt100, Pt1000, JPt100
Input Impedance (power on)	20MΩ
Input Data (Precision Guarantee)	0~10000
Input Data Range	-2500~12500
Resolution	16bit
Sampling Rate	8channel/1s
Accuracy	± 0.05% FSR (± 250 mΩ)
Zero Drift	± 0.5μV/ °C
Span Drift	± 20μV/ °C
Common Mode Rejection	106 dB
Allowable input voltage	110Vrms Overvoltage Protection
Temperature drift	Pt100 MΩ/ C, Pt1000 MΩ/C, JPt 100 MΩ/C
Normal Mode Rejection	100 dB
Channel Break Line	有
Field to Logic Isolation	S.G：2500V_{rms}
DC/DC Isolation	3000V_{DC}
SG-FG Isolation	3000V_{DC}
Timer of Duplex Switch	<1 ms
Timer of data response	3 ms or less
Current Consumption	1.75W
Operating Temperature	-25°C ~ +75°C
Humidity	5 ~ 95 % RH, Non-condensing
Weight	0.3 kg
Dimensions	30mm x 85mm x 115mm (W x L x H)

- F-8015 with DN-RTD-08 Internal I/O structure



- F-8015 Pin assignments



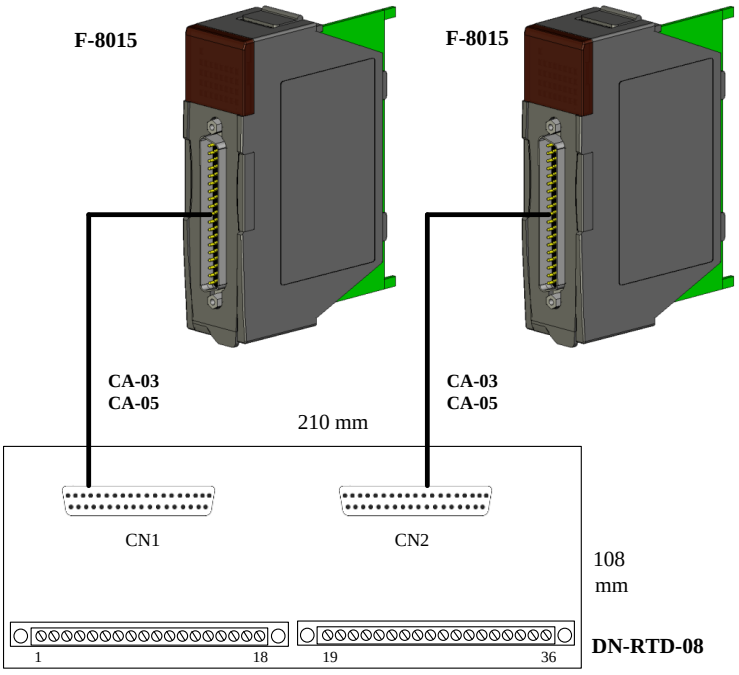
Pin Assignment Name	Terminal No.		Pin Assignment Name
X	19	37	BK2
X	18	36	/bx (AGND)
X	17	35	B7
A7	16	34	X
X	15	33	B6
A6	14	32	X
X	13	31	B5
A5	12	30	X
X	11	29	B4
A4	10	28	X
X	09	27	B3
A3	08	26	X
X	07	25	B2
A2	06	24	X
X	05	23	B1
A1	04	22	X
X	03	21	B0
A0	02	20	X
BK1	01		

37-pin male D-Sub Connector

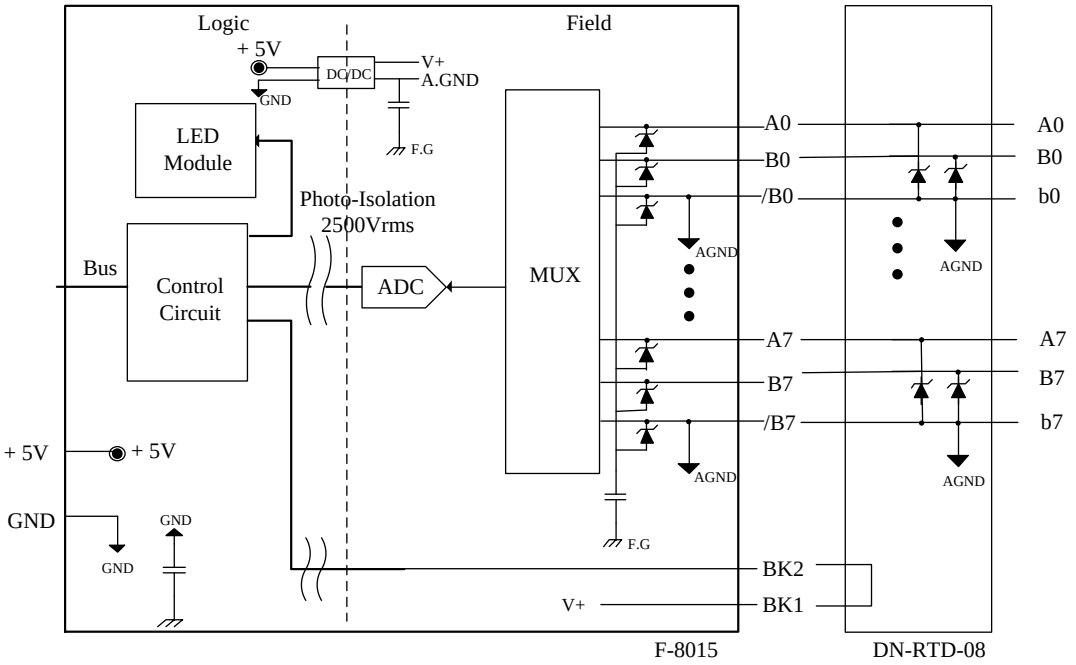
4.4.2.1 F-8015 with DN-RTD-08

- **端子板外觀**

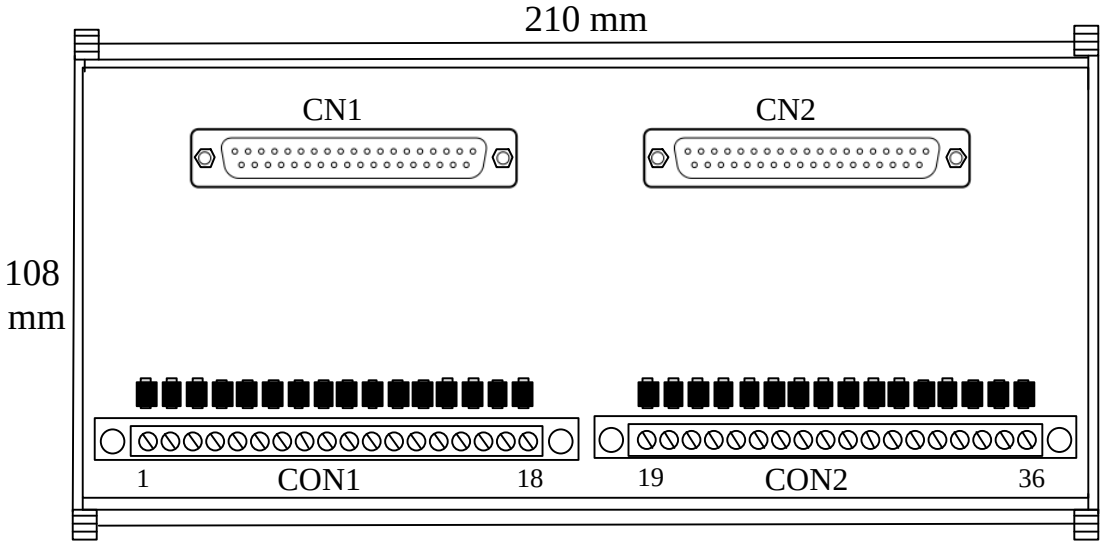
1. CN1, CN2 are connected to F-8015 .
2. About the DN-RTD-08 spec or deteil, please reference the chapter 4.5.4 .



- F-8015 with DN-RTD Internal I/O structure



- Pin Assignment



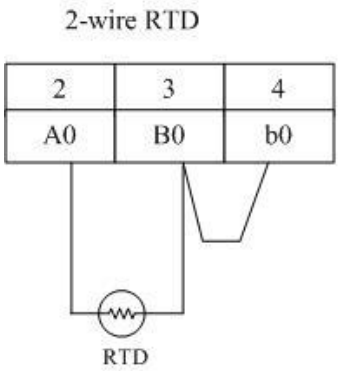
CON1

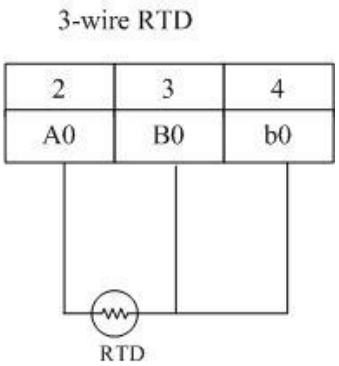
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
SG	A0	B0	b0		A1	B1	b1		A2	B2	b2		A3	B3	b3		

CON2

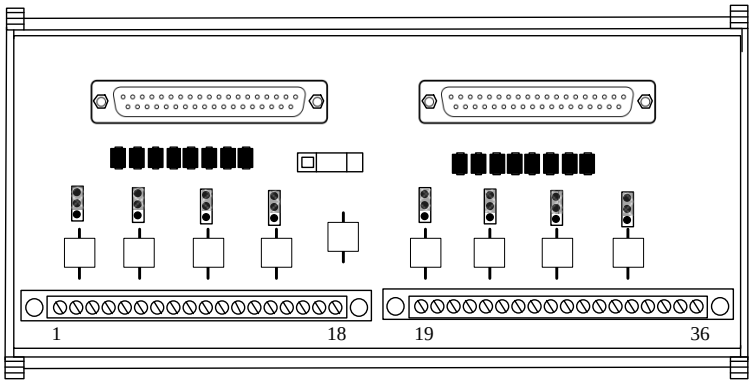
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	A4	B4	b4		A5	B5	b5		A6	B6	b6		A7	B7	b7		FG

- I/O Wiring Connection

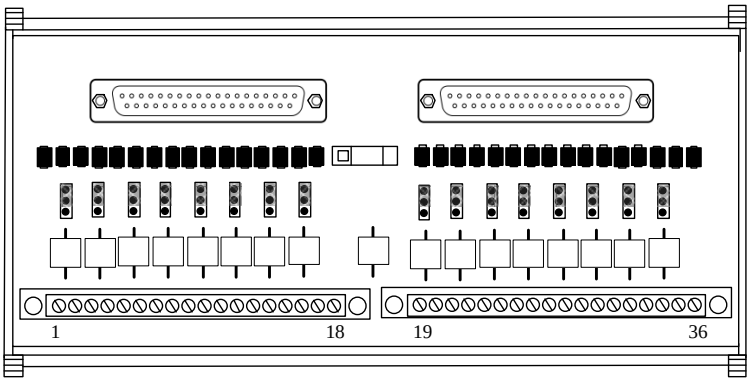




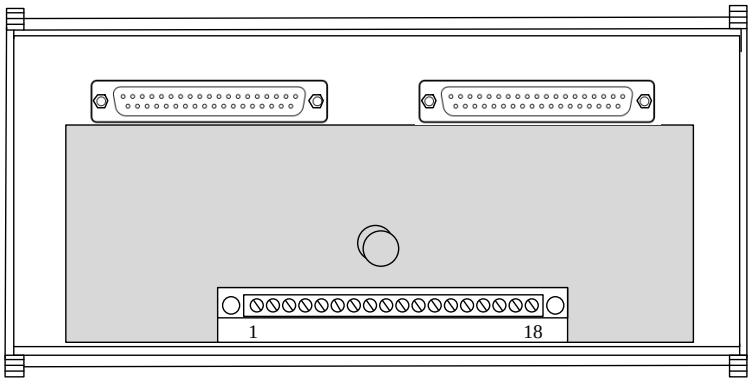
4.5 Analog I/O Dougther Board



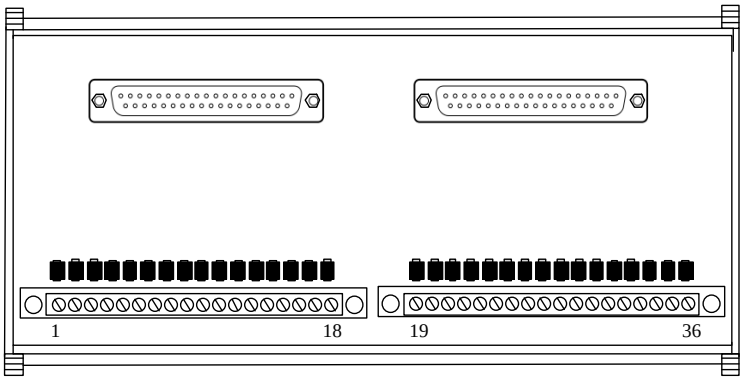
DN-AIO-08F



DN-AIO-16F



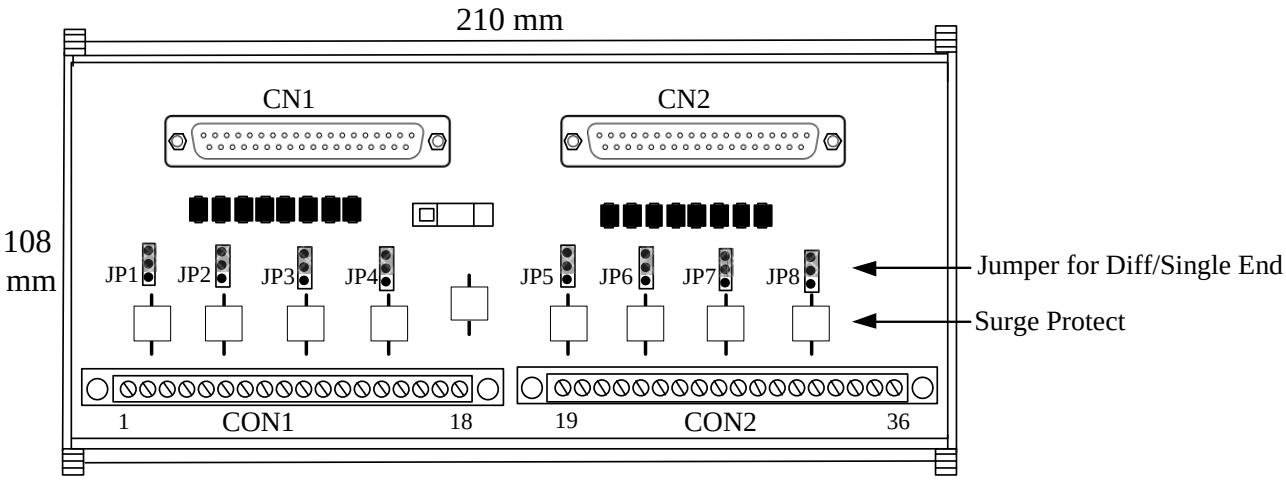
DN-TC-08



DN-RTD-08

4.5.1 DN-AIO-08F (8 channel Analog I/O Daugther Board)

- **DN-AIO-08F Diagram**

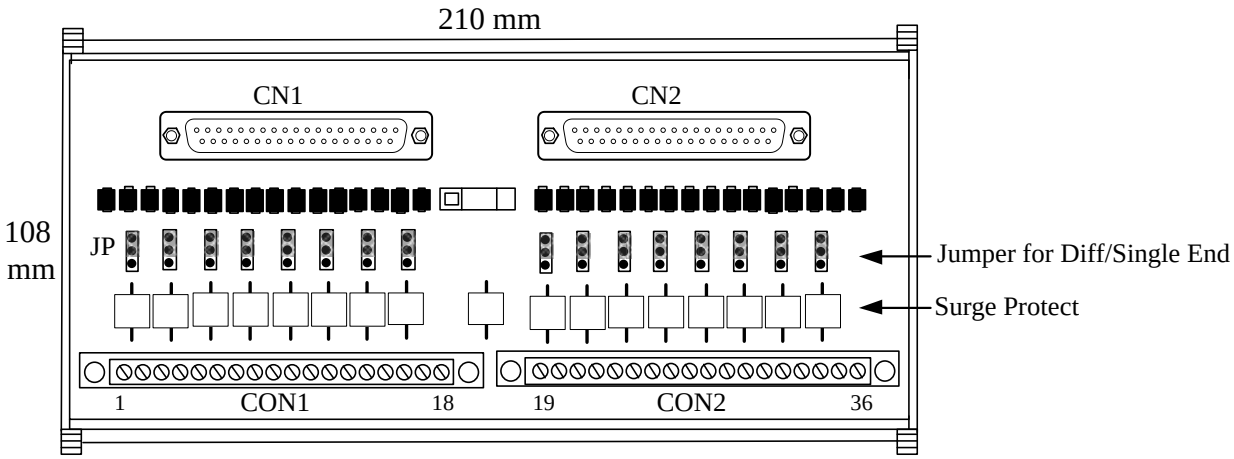


- **Profile**

Model Name		DN-AIO-08F
Description		Analog 8 channel Daugther Board
Support IO		F-8017C1、F-8017CH、F-8028CH、F-8017V
Channel		8
Dimension	W x L x H (mm)	118 x 220 x 60
Mounting	DIN Rail	35 mm
Fuse Ratings	Module	1.0A
Transient voltage Suppressor	Peak pulse power Dissipation	3000W
	Peak forward Surge Current	250A
Environment	Ambient Temperature	-25 ~ 75℃
	Humidity	5 ~ 95 % RH, Non-condensing

4.5.2 DN-AIO-16F （16 channel Analog I/O Daugther Board）

- **DN-AIO-16F Diagram**

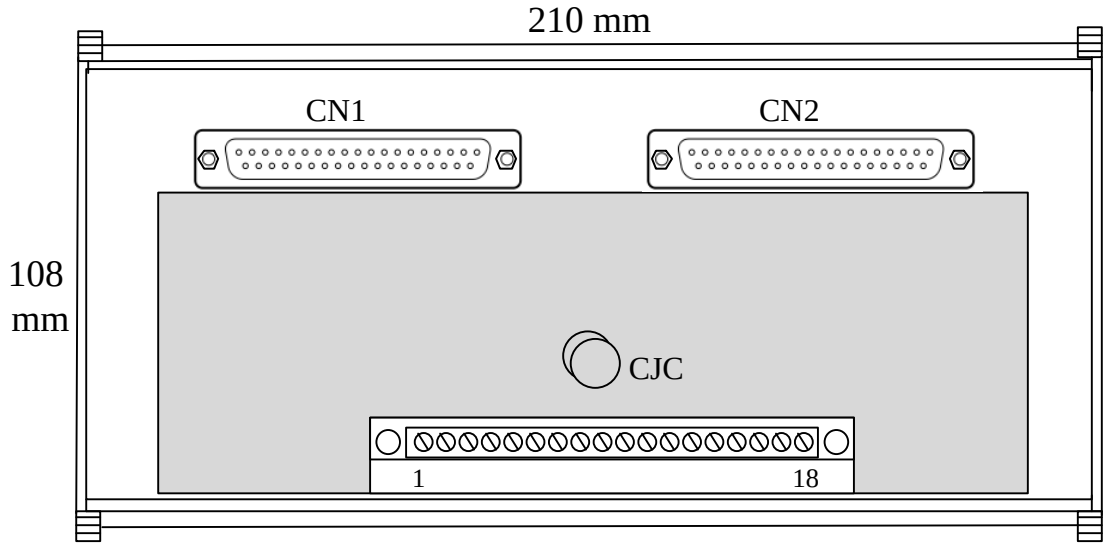


- **規格(Profile)**

Model Name		DN-AII-16F
Description		Analog 16 channel Daugther Board Surge protection, Single-End/Diff
Support IO		F-8017C2、F-8028CV
Channel		16
Dimension	W x L x H (mm)	118 x 220 x 60
Mounting	DIN Rail	35 mm
Fuse Ratings	Module	1.0A
Transient voltage Suppressor	Peak pulse power Dissipation	3000W
	Peak forward Surge Current	250A
Environment	Ambient Temperature	-25 ~ 75℃
	Humidity	5 ~ 95 % RH, Non-condensing

4.5.3 DN-TC-08(TC Daugther Board)

- DN-TC-08 Diagram

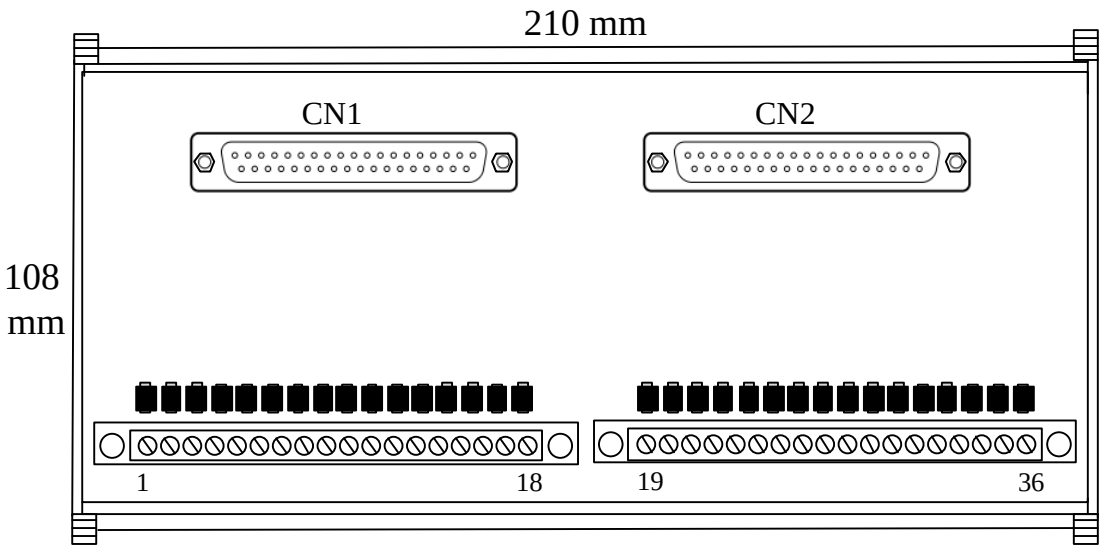


- Profile

Model Name		DN-TC
Description		8 ch Thermocouple or DC Voltage Input, include CJC.
Support IO		F-8019
Channel		8
I/O range	TC Input	J, K, T, E, R, S, N, B, C, Voltage
Accuracy	CJC compensation	±0.7℃ (工作範圍 -30 ~ 100℃)
Dimension	W x L x H (mm)	118 x 220 x 60
Mounting	DIN Rail	35 mm
Environment	Ambient Temperature	-25 ~ 75℃
	Humidity	5 ~ 95 % RH, Non-condensing

4.5.4 DN-RTD-08(RTD Daugther Board)

- DN-RTD-08 Diagram



- **DN-RTD-08 (Profile)**

Model Name		DN-RTD-08
Description		RTD，Single/Duplex 共用，8 ch
Support IO		F-8015
Channel		8
I/O range	RTD Input	Pt 100, Pt 1000, JPt 100
Dimension	W x L x H (mm)	118 x 220 x 60
Mounting	DIN Rail	35 mm
Environment	Ambient Temperature	-25 ~ 75℃
	Humidity	5 ~ 95 % RH, Non-condensing

4.6 Pulse Input Module

4.6.1 F-8084 Introduction

- **F-8084 Profile**

Module Name	F-8084
Redundancy	Single/Duplex
Terminal Board	DN-PI
Terminal Drop off Detection	Yes
Channel Amount	8
Common & Wiring	One COM for All channel，Single-Ended
Input Impedance (power on)	200, 500, 1KΩ
Power Input	20mA@24V、25mA@30V
Digital Filter	1~32767μs
Minimux Wavelength	2μs
Input Pulse Frequency Range	1Hz ~ 10K Hz
Input Responing Time	<3 ms
Input signal level	VH(high level) 4.5 to 30V DC VL(low level) 1V DC 以下
Field to Logic Isolation	S.G：2500V_{rms}
DC/DC Isolation	3000V_{DC}
SG-FG Isolation	3000V_{DC}
Timer of Duplex Switch	<1 ms
Timer of data response	<3 ms
Current Consumption	1.9W
Operating Temperature	-25°C ~ +75°C
Humidity	5 ~ 95%, Non-condensing
Weight	0.3 kg
Dimensions	30mm x 85mm x 115mm (W x L x H)

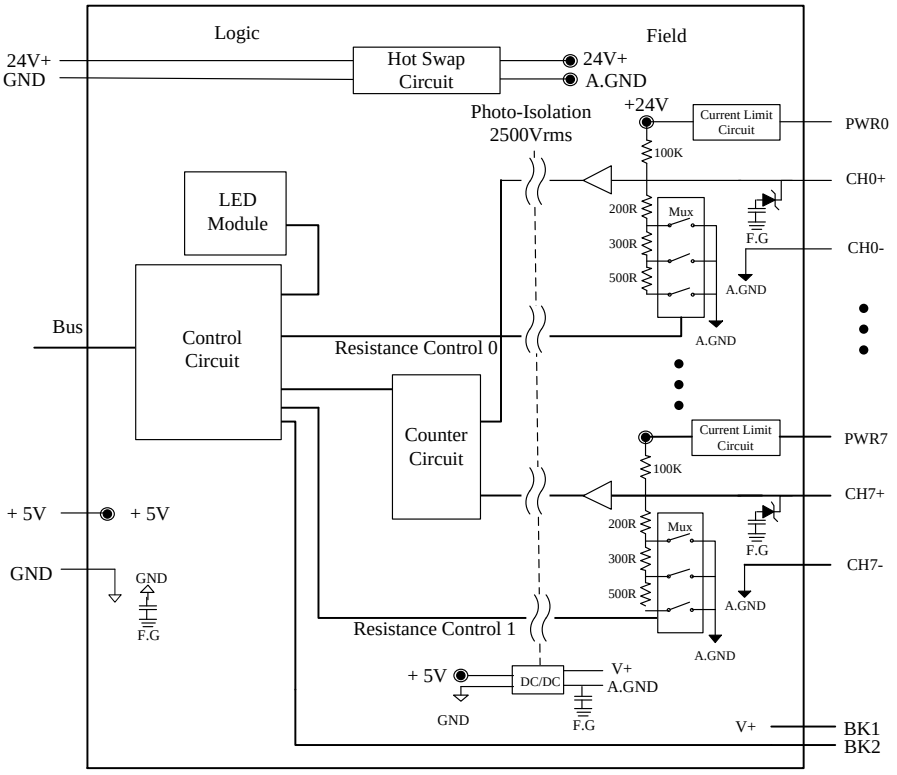
※Note 1. Just after the power to the module has been turned ON, pulse edge setting may not be stabilized and the first pulse cannot be counted.
2. On input of 1 pulse for initializing the circuit (start up pulse or start down pulse), start-up edge or start-down edge is fixed to the wait state.

● Filter Mode setting

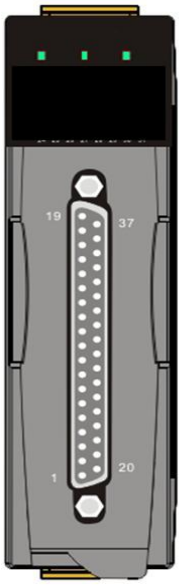
Pulse Mode	Common	Input Impedance				Filter
		None	200 Ω	500 Ω	1000 Ω	
Sink Type	ch+ - ch-	◯	X	X	X	△
Source Type	PWR - ch+	X	X	X	◯	△
	ch+ - ch-	◯	X	X	X	△
	PWR- ch+	X	◯	◯	◯	△

◯ : Yes
△ : Digital Filter
X : None

● F-8084 with DN-PI-08 Internal I/O structure



- F-8084 Pin assignments



Pin Assignment Name	Terminal No.		Pin Assignment Name
BP_24V+	19	37	BK2
X	18	36	X
X	17	35	CH7+
CH7- (BP-24V-)	16	34	X
X	15	33	CH6+
CH6- (BP-24V-)	14	32	X
X	13	31	CH5+
CH5- (BP-24V-)	12	30	X
X	11	29	CH4+
CH4- (BP-24V-)	10	28	X
X	09	27	CH3+
CH3- (BP-24V-)	08	26	X
X	07	25	CH2+
CH2- (BP-24V-)	06	24	X
X	05	23	CH1+
CH1- (BP-24V-)	04	22	X
X	03	21	CH0+
CH0- (BP-24V-)	02	20	X
BK1	01		

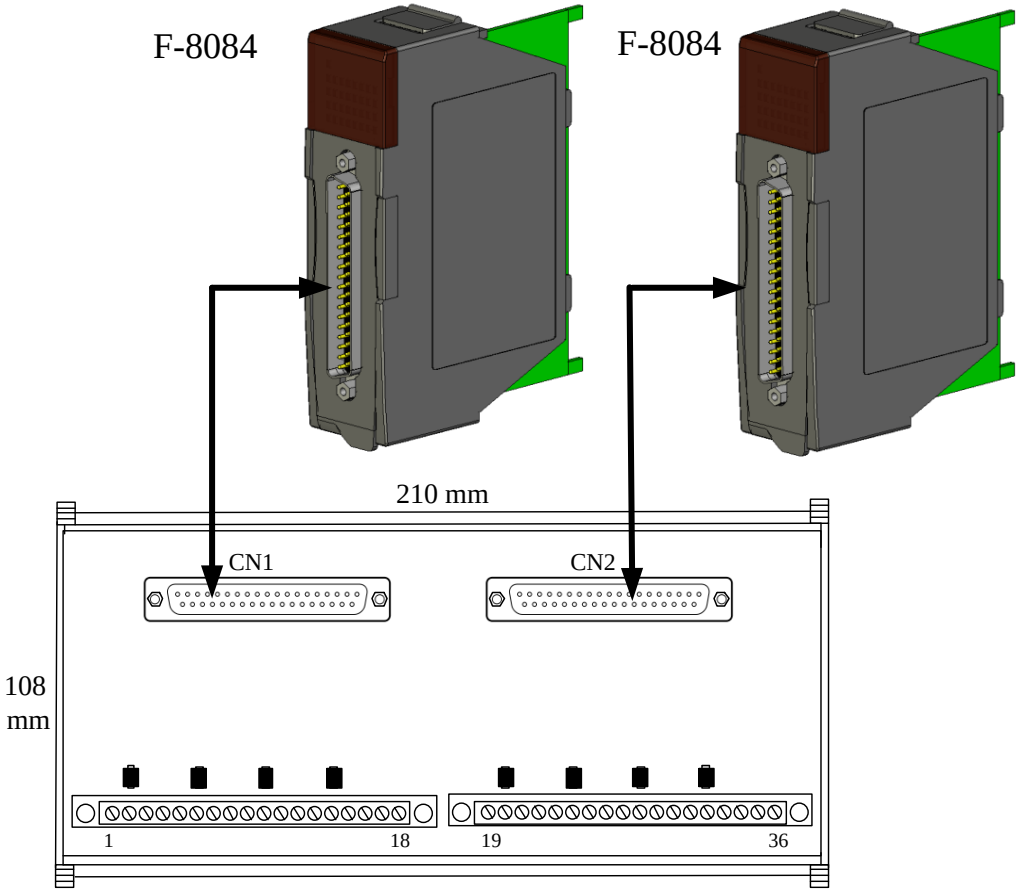
37-pin male D-Sub Connector

4.6.1.1 F-8084 with DN-PI-08

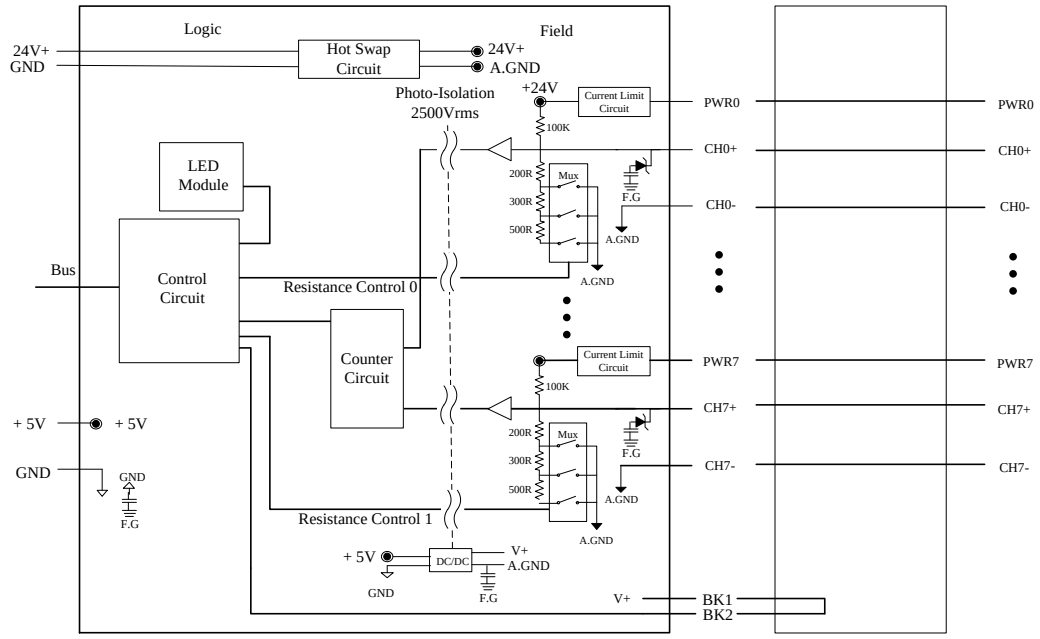
- **端子板外觀**

  1.CN1, CN2 are connected to F-8084 .

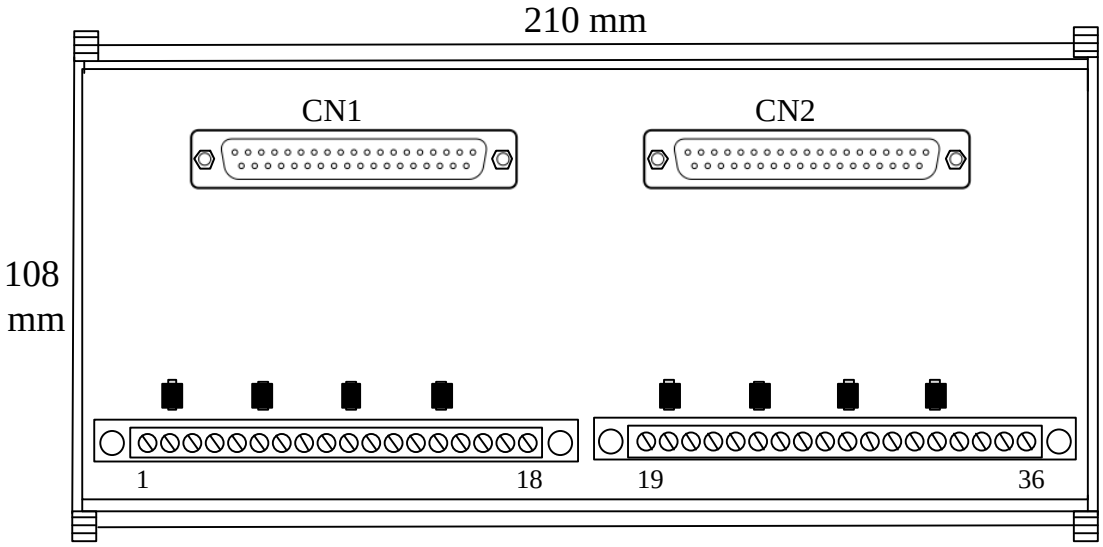
  2.About the DN-PI-08 spec or deteil, please reference the chapter 4.6.2 .



- F-8084 with DN-PI-08 Internal I/O structure



- Pin Assignment



CON1

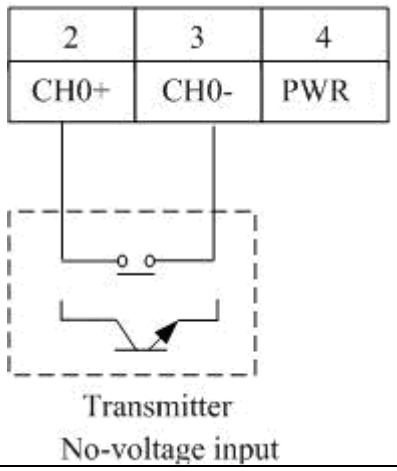
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	CH0+	CH0-	PWR		CH1+	CH1-	PWR		CH2+	CH2-	PWR		CH3+	CH3-	PWR		

CON2

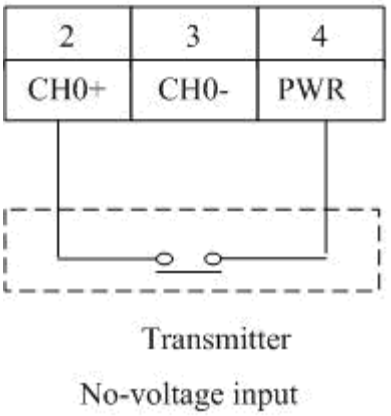
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	CH4+	CH4-	PWR		CH5+	CH5-	PWR		CH6+	CH6-	PWR		CH7+	CH7-	PWR		FG

- I/O 接線圖

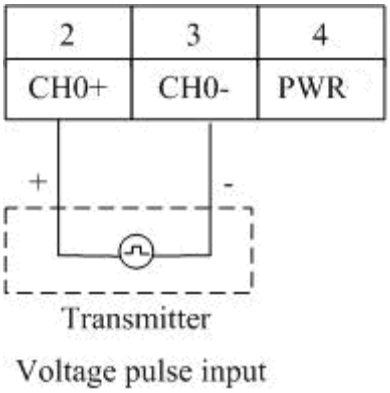
When receiving no-voltage contact signal (1)



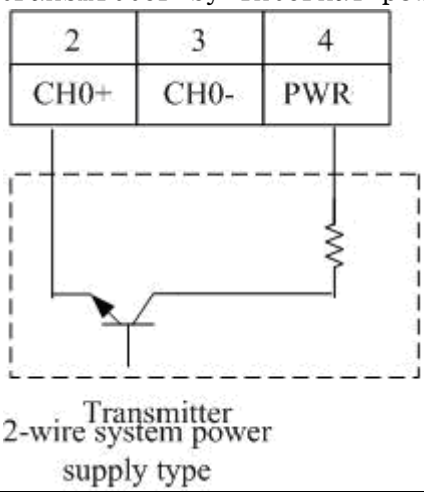
When receiving no-voltage contact signal (2)



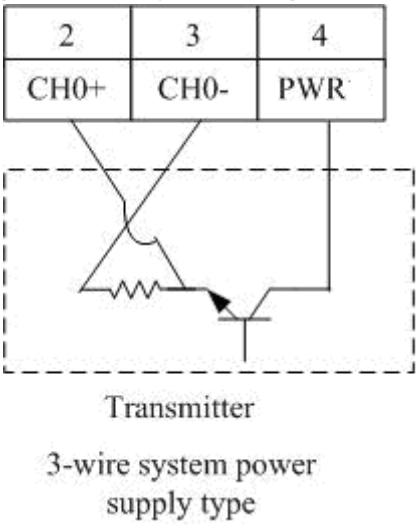
When receiving voltage pulse input



When receiving voltage pulse by driving transmitter by internal power

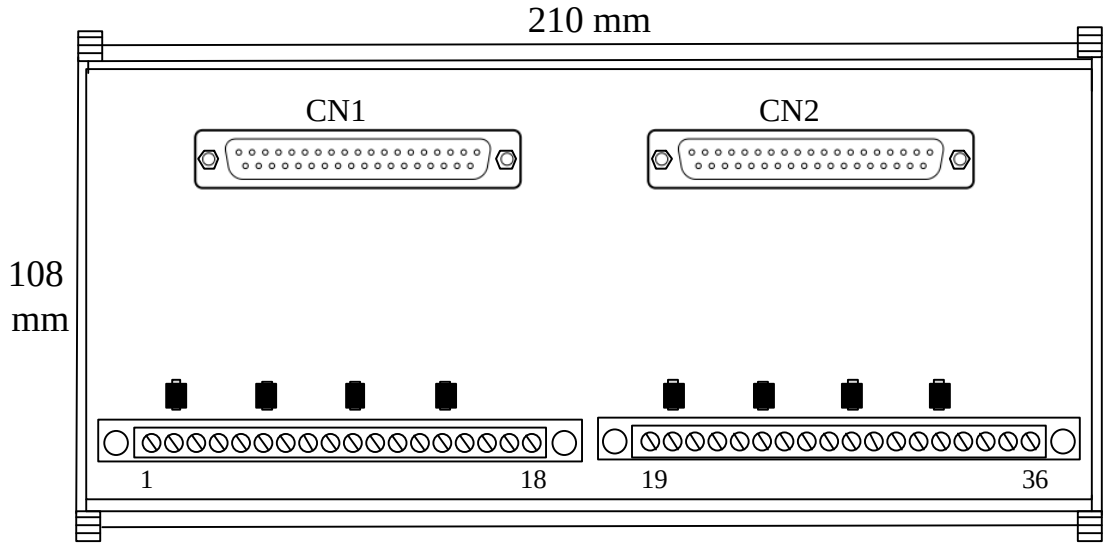


When receiving voltage pulse by driving transmitter by internal power



4.7.2 DN-PI-08 (8 channel PI Daugther Board)

- DN-PI-08 Diagram



- 規格(Profile)

Model Name		DN-PI
Description		PI，Single/Duplex 共用，8ch
Support IO		F-8084
I/O range	Channel	8
	Pulse Input	0 ~ 30V
Dimension	W x L x H (mm)	118 x 220 x 60
Mounting	DIN Rail	35 mm
Environment	Ambient Temperature	-25 ~ 75℃
	Humidity	5 ~ 95 % RH, Non-condensing