3.4 channel analog input/voltage type/current type (DF50-M-4AI-UI-6)

➢ The analog input module can receive voltage and current standard signals.

➢ 4 channel analog input, voltage type, current type.

➢ Two LED indicators indicate that the module is operating normally and
communication is normal.

➢ Electric isolation between the on-site layer and the system layer.

➢ Transmit in 16 bit resolution.

➢ Protection level IP20


3.4.1 Specification parameters

Technical Information	
Product Description	Analog input module, 4 inputs, voltage type, current type

Number of signal channels	4
Input method	Voltage type, current type
Number of channels	four
Conversion time	60us/channel
Voltage measurement range	± 10V, 0-10V, 2-10V, ± 5V, 0-5V, 1-5V
Voltage input impedance	>100K Ω
Voltage input accuracy (25 ℃)	0.1% (full range)
Voltage input accuracy (full temperature range)	0.2% (full range)
Voltage input limit	± 15V
Voltage input diagnosis	support
Current measurement range	0-20mA, 4-20mA
Current acquisition impedance	250 Ω
Current input accuracy (25 ℃)	0.1% (full range)
Current input accuracy (full temperature range)	0.2% (full range)
Current input limit	Instantaneous ± 30mA, average ± 24mA
Current input diagnosis	Support for wire breakage detection
Is it isolated	No isolation between interface channels, power supply and interface isolation, interface and bus isolation
Independent channel enable configuration	support
Diagnostic reporting function configuration	support
Diagnostic detection enable configuration	Voltage measurement short circuit, current measurement broken wire, output range including 0 mode not supported
Conversion Mode Configuration	± 10V, 0-10V, 2-10V, ± 5V, 0-5V, 1-5V,
Filter parameter configuration	0-20mA, 4-20mA
Peak Hold Enable Configuration	The software filtering time can be configured through the upper computer,
Overlimit detection enable configuration	support
Sampling time	support
Sampling refresh	4-channel 250us
Stop mode	Asynchronous refresh according to sampling time, does not require synchronous refresh according to bus cycle
Signal type	Keep the current value and do not refresh again
Isolation method	Single ended
data size	Electrical isolation or galvanic isolation
resolving power	8 Byte
sampling frequency	16 Bit
working voltage	24V DC +20 %/ -15 %
System feed current	<120mA
Wiring parameters	
Connection technology: input end	PUSH-IN type wiring port
line type	Input
Crimping area of wire	0.14～1.5mm²/26～16AWG

| Strip length	8～10mm
Installation method	DIN-35 type guide rail
Material parameters	
Colour	Black
Housing material	PC plastic,PA66
Consistency flag	CE
Environmental requirements	
Permissible ambient temperature (during operation)	-25～60℃
Permissible ambient temperature(storage)	-40～85℃
Protection type	IP20
Pollution leve	2.Comply with IEC 61131-2 standard
Working altitude	Without temperature influence:0～2000m
Relative humidity (non condensing)	5～95%RH
Anti vibration	4g, Complies with IEC 60068-2-6 standard
Impact resistance	15g,Complies with IEC 60068-2-27 standard
EMC - Immunity	Complies with EN 61000-6-2 standard
EMC-Radiated Interference	Complies with EN 61000-6-3 standard
Corrosion resistance	Complies with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S pollutant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

3.4.2 Hardware interface

3.4.2.1 Definition of wiring port
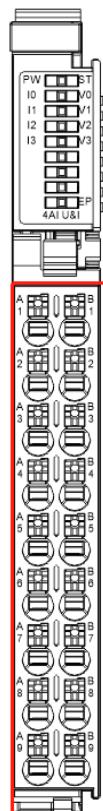
| Serial Number	Signal	Serial Number	Signal	Explanatory note
A1	24Vo	B1	GND	Load power supply
A2	I0+	B2	V0+	Current/Voltage input channel
A3	24Vo	B3	GND	Load power supply
A4	I1+	B4	V1+	Current/Voltage input channel
A5	24Vo	B5	GND	Load power supply
A6	I2+	B6	V2+	Current/Voltage input channel
A7	24Vo	B7	GND	Load power supply
A8	I3+	B8	V3+	Current/Voltage input channel
A9	24V	B9	0V	External input 24V voltage

3.4.2.2 Definition of LED indicator lights
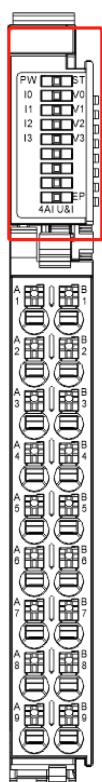
LED indicator light	Explanatory note
V0~V3, I0~I3	Green flashing: Analog Input value larger than 0 (tested, starts flashing when input value > 0x0080)
	Off: Abnormal analog signal input
PW	On: Internal bus power supply is normal
	Off: Abnormal internal bus power supply

	Power on stage:
ST	green light on: module initialization abnormal, green off: module initialization normal
	Operation phase: Green light flashing: module internal bus working normally, green off: module internal bus working abnormally
EP	Green light on: module external interface power supply is normal
	Green light off: Abnormal power supply to the external interface of the module

3.4.2.3 Wiring diagram
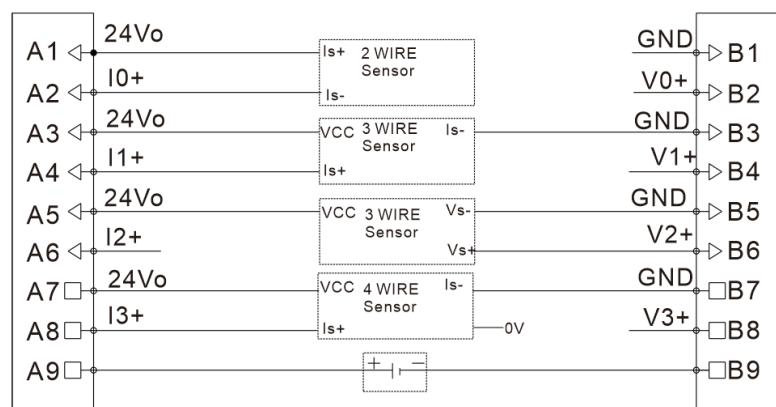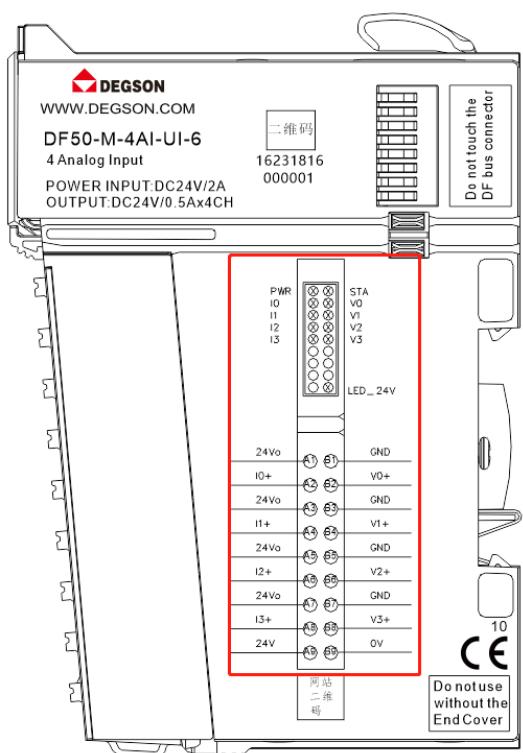
Note: The 24V power supply for A9 and B9 is provided externally.

3.4.3 Process Data Definition

Data in：4 Word	
Word 1	AD Value CH1：First channel input data
Word 2	AD Value CH2：Second channel input data
Word 3	AD Value CH3：Third channel input data
Word 4	AD Value CH4：Fourth channel input data

Process Data Definition Description:

Process data description (voltage type)					
Signal Range	Voltage value（U）	Decimal data	Hexadecimal data	Scope	Transformation elationship relationship
±10V	>11.76V	32767	0x7FFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit value	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
	−5V	−13824	0xCA00		
	−10V	−27648	0x9400		
	−11.76V	−32511	0x8100	Lower limit value	
	<−11.76V	−32768	0x8000	Underflow	
0−10V	>11.76V	32767	0x7FFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper limit value	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
2−10V	>11.41V	32767	0x7FFF	Overflow	D = 27648 x (U − 2) / 8 U = D x 8 / 27648 + 2
	11.41V	32511	0x7EFF	Upper limit value	
	10V	27648	0x6C00	Normal range	
	6V	13824	0x3600		
	2V	0	0x0000		
	0.59 V	−4864	0xED00	Lower limit value	
	<0.59 V	−32768	0x8000	Underflow	
	>5.88V	32767	0x7FFF	Overflow	

Signal range	Voltage	Decimal data	Hexadecimal data	Scope	Transformation relationship
±5V	5.88V	32511	0x7EFF	Upper limit value	
	5V	27648	0x6C00	Normal range	D = 27648 x U / 5 U = D x 5 / 27648
	2.5V	13824	0x3600		
	0V	0	0x0000		
	-2.5V	-13824	0xCA00		
	-5V	-27648	0x9400		
	-5.88V	-32511	0x8100	Lower limit value	
	<-5.88V	-32768	0x8000	Underflow	
0-5V	>5.88V	32767	0x7FFF	Overflow	
	5.88V	32511	0x7EFF	Upper limit value	D = 27648 x U / 5 U = D x 5 / 27648
	5V	27648	0x6C00	Normal range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
1-5V	>5.7V	32767	0x7FFF	Overflow	
	5.7V	32511	0x7EFF	Upper limit value	D = 27648 x (U - 1) / 4 U = D x 4 / 27648 + 1
	5V	27648	0x6C00	Normal range	
	3V	13824	0x3600		
	1V	0	0x0000		
	0.3V	-4864	0xED00	Lower limit value	
	<0.3V	-32768	0x8000	Underflow	

Process data description (current type)					
Signal range	Current (I)	Decimal data	Hexadecimal data	Scope	Transformation relationship
0 - 20 mA	>23.52 mA	32767	0x7FFF	Overflow	
	23.52 mA	32511	0x7EFF	Upper limit value	

20 mA	27648	0x6C00		$D = 27648 \times I / 20$
10 mA	13824	0x3600	Normal range	
0 mA	0	0		$I = D \times 20 / 27648$

>22.81 mA	32767	0x7FFF	Overflow	
22.81 mA	32511	0x7EFF	Upper limit value	
20 mA	27648	0x6C00		$D = 27648 \times (I - 4) / 16$
12 mA	13824	0x3600	Normal range	
4 mA	0	0		$I = D \times 16 / 27648 + 4$
1.19 mA	-4864	0xED00	Lower limit value	
<1.19 mA	-32768	0x8000	Underflow	

4 – 20 mA

3.4.4 Mechanical Installation

Installation dimensions

The installation size information is shown in the following figure.