iR Series

Remote I/O Product Specification



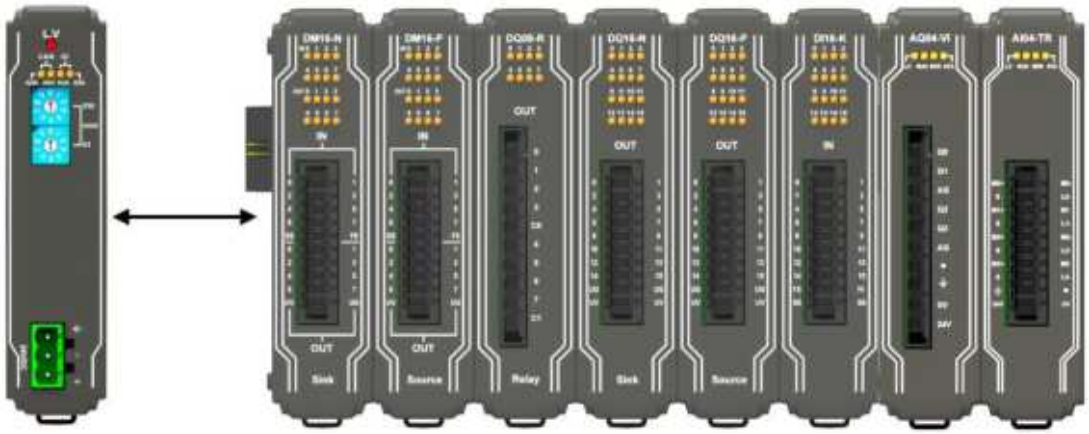
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1. Product Overview



Coupler Modules

1.1 Product List:

1.1.1 Coupler List:

Coupler	Fieldbus
iR-COP	CANopen Slave
iR-ETN	Modbus TCP/IP Server, EtherNet/IP
iR-ECAT	EtherCAT® Slave
iR-ETN40R/P	Modbus TCP Server, EtherNet/IP

(See iR-ETN40X Datasheet for more info)

1.1.2 Digital I/O List:

Part Number		iR-DI16-K	iR-DM16-P	iR-DM16-N	iR-DQ16-P	iR-DQ16-N	iR-DQ08-R
Input Point	Point	16	8	8	0	0	0
	Type	Sink/Source	Sink/Source	Sink/Source	N/A	N/A	N/A
Output Point	Point	0	8	8	16	16	8
	Type	N/A	Source	Sink	Source	Sink	Relay

1.1.3 Analog I/O List:

Part Number	iR-AI04-VI	iR-AM06-VI	iR-AQ04-VI	iR-AI04_TR
Type	±10v ±20mA			RTD thermocouple
Input Point	4	4	0	4
Output Point	0	2	4	0

1.1.4 Motion List:

Part Number	iR-PU01-P
Differential Output	2 (A/B)
Differential Input	3 (A/B/Z)
Input Point	4
Output Point	4

2. Fieldbus Coupler

2.1 CANopen Specifications

Communication Interface Specifications							
Model	iR-COP						
Expansion I/O Module	No. of Bus Terminals	Depends on Power Consumption					
	Digital Input Point	Max. 256					
	Digital Output Point	Max. 128					
	Analog Input Channel	Max. 64					
	Analog Output Channel	Max. 64					
Indicators	CAN RUN (Green)	CANopen Status Indicator					
	CAN ERR (Red)	CANopen Error Indicator					
	L.V (Red)	Low Voltage Status Indicator					
	IO RUN (Green)	Module Status Indicator					
	IO ERR (Red)	Module Error Indicator					
Data Transfer Rate	1M	800k	500k	250k	125k	100k	50k
Length of the Cable	20m	50m	100m	250m	500m	600m	1,000m
Node ID	1~99						
Number of PDOs (CANopen)	8 Transmit PDOs / 8 Receive PDOs						
Process Data Operating Modes	synchronous, event-driven ,event timer, polling						
Number of SDOs Available	1 Standard SDOs						
Bus Connection	1 x open style connector, 5-pole, plug included						
Additional CANopen Features	life/node guarding, heartbeat, emergency object, variables mapping, store/restore, output error mode.						
General Specification							
Power	Power Supply	24 VDC (-15%/+20%)					
	Power Dissipation	Nominal 100mA@24VDC					
	Current for Internal Bus	Max 2A@5VDC					
	Current Consumption	170mA@5VDC					
	Electrical Isolation	Isolated CANopen: Yes Isolated power: Yes					
	Back-up Fuse	≤ 1.6A Self-recovery					
Specification	PCB Coating	Yes					
	Enclosure	Plastic					
	Dimensions W x H x D	27 x 109 x 81 mm					
	Weight	Approx. 0.15 kg					
	Mount	35mm DIN rail mounting					
Environment	Protection Structure	IP20					
	Storage Temperature	-20° ~ 70°C (-4° ~ 158°F)					
	Operating Temperature	0° ~ 55°C (32° ~ 131°F)					
	Relative Humidity	10% ~ 90% (non-condensing)					
	Altitude (Air Pressure)	Below 3,000 meters (70.1 kPa)					
Connection	Cross-section	0.5 mm²…..2.5 mm², stranded, solid wire, AWG 26-12					
Certification	EMC Immunity	Conforms to EN 55032: 2012+AC: 2013, Class A EN 61000-6-4: 2007+A1:2011 EN 55024: 2010+A1: 2015 EN 61000-6-2:2005					

2.2 Ethernet TCP/IP Specifications

Communication Interface Specifications		
Model	iR-ETN	
Expansion I/O Module	Number of Bus Terminals	Depends on Power Consumption
	Digital Input Point	Max. 256
	Digital Output Point	Max. 128
	Analog Input Channel	Max. 64
	Analog Output Channel	Max. 64
Indicators	ENET ACK (Green)	Device Status Indicator
	ENET ERR (Red)	Device Error Indicator
	L.V (Red)	Low Voltage Status Indicator
	IO RUN (Green)	Module Status Indicator
	IO ERR (Red)	Module Error Indicator
Data Transfer Rate	10/100 Mbps	
Data Transfer Medium	4 x 2 twisted pair copper cable; category 3 (10 Mbps), category 5 (100 Mbps)	
Distance Between Stations	100 m between hub/switch and Bus Coupler or between Bus Coupler and Bus Coupler	
Protocol	Modbus TCP/IP Server EtherNet/IP Adapter	
Max. Number of TCP/IP Connections	8 connections	
Topology	line or star wiring	
General Specification		
Power	Power Supply	24 VDC (-15%/+20%)
	Power Dissipation	Nominal 100mA@24VDC
	Current for-Internal Bus	Max 2A@5VDC
	Current Consumption	220mA@5VDC
	Electrical Isolation	Network to Logic : Isolation Logic to Field power : Isolation
	Back-up Fuse	≤ 1.6A Self-recovery
Specification	PCB Coating	Yes
	Enclosure	Plastic
	Dimensions W x H x D	27 x 109 x 81 mm
	Weight	Approx. 0.15 kg
	Mount	35mm DIN rail mounting
Environment	Protection Structure	IP20
	Storage Temperature	-20° ~ 70°C (-4° ~ 158°F)
	Operating Temperature	0° ~ 55°C (32° ~ 131°F)
	Relative Humidity	10% ~ 90% (non-condensing)
Certification	EMC Immunity	Conforms to EN 55032: 2012+AC: 2013, Class A EN 61000-6-4: 2007+A1:2011 EN 55024: 2010+A1: 2015 EN 61000-6-2:2005

2.3 EtherCAT Specifications

Communication Interface Specifications		
Model	iR-ECAT	
Expansion I/O Module	Number of Bus Terminals	Depends on Power Consumption
	Digital Input Point	Max. 256
	Digital Output Point	Max. 128
	Analog Input Channel	Max. 64
	Analog Output Channel	Max. 64
Indicators	ECAT Run (Green)	Device Status Indicator
	ECAT ERR (Red)	Device Error Indicator
	L.V (Red)	Low Voltage Status Indicator
	IO RUN (Green)	Module Status Indicator
	IO ERR (Red)	Module Error Indicator
Data Transfer Rate	100 Mbps	
Data Transfer Medium	4 x 2 twisted pair copper cable; category 5 (100 Mbps)	
Distance Between Stations	100 m between hub/switch and Bus Coupler or between Bus Coupler and Bus Coupler	
Protocol	EtherCat Slave	
MailBox	COE -SDO requests, SDO responses.	
ETG Standards	ETG 5001	
General Specification		
Power	Power Supply	24 VDC (-15%/+20%)
	Power Dissipation	Nominal 100mA@24VDC
	Current for-Internal Bus	Max 2A@5VDC
	Current Consumption	270mA@5VDC
	Electrical Isolation	Network to Logic : Isolation Logic to Field power : Isolation
	Back-up Fuse	≤ 1.6A Self-recovery
Specification	PCB Coating	Yes
	Enclosure	Plastic
	Dimensions W x H x D	27 x 109 x 81 mm
	Weight	Approx. 0.15 kg
	Mount	35mm DIN rail mounting
Environment	Protection Structure	IP20
	Storage Temperature	-20° ~ 70°C (-4° ~ 158°F)
	Operating Temperature	0° ~ 55°C (32° ~ 131°F)
	Relative Humidity	10% ~ 90% (non-condensing)
Certification	EMC Immunity	Conforms to EN 55032: 2012+AC: 2013, Class A EN 61000-6-4: 2007+A1:2011 EN 55024: 2010+A1: 2015 EN 61000-6-2:2005

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3. Digital Input/Output

3.1 Digital Input / Output Modules

Module Name		iR-DI16-K	iR-DM16-P	iR-DM16-N	iR-DQ16-P	iR-DQ16-N	iR-DQ08-R
Specification	PCB Coating	No					
	Enclosure	Plastic					
	Dimensions W x H x D	27 x 109 x 81 mm					
	Weight	Approx. 0.12 kg					Approx. 0.13 kg
	Mount	35mm DIN rail mounting					
Environment	Protection Structure	IP20					
	Storage Temperature	-20° ~ 70°C (-4° ~ 158°F)					
	Operating Temperature	0° ~ 55°C (32° ~ 131°F)					
	Relative Humidity	10% ~ 90% (non-condensing)					
Connection	Cross-section	AWG 28-16					AWG 24-16
Certification	EMC Immunity	Conforms to EN 55032: 2012+AC: 2013, Class A EN 61000-6-4: 2007+A1:2011 EN 55024: 2010+A1: 2015 EN 61000-6-2:2005					

3.2 Digital Input Specifications

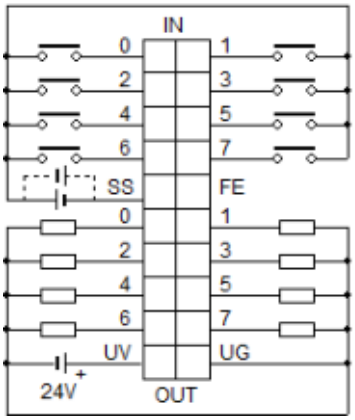
Module Name		iR-DI16-K	iR-DM16-P	iR-DM16-N
Number of Inputs		16	8	8
Input Logic		Sink or Source		
Current Consumption		83mA@5VDC	130mA@5VDC	130mA@5VDC
HIGH Level Input Voltage		15~28 VDC		
LOW Level Input Voltage		0~5 VDC		
Response Time	OFF->ON	5 ms		
	ON->OFF	1 ms		
Input Impedance		5.6 KΩ		
System Indicators		Red LED Input State		

3.3 Digital Output Specifications

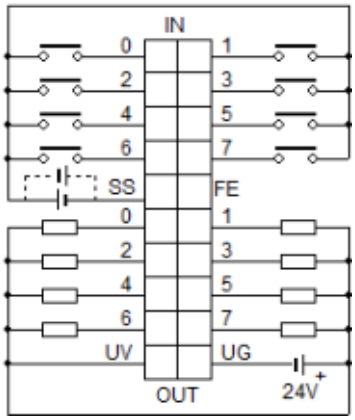
Module Name		iR-DM16-P	iR-DQ16-P	iR-DM16-N	iR-DQ16-N	iR-DQ08-R
Number of Outputs		8	16	8	16	8
Output Logic		Source		Sink		Relay
Current Consumption		130mA@5VDC	196mA@5VDC	130mA@5VDC	205mA@5VDC	220mA@5VDC
Output Voltage		11~28VDC		11~28VDC		250VAC/ 30VDC
Output Current		0.5A per channel Max 4A)		0.5A per channel (Max 4A)		2A per channel (Max 8A)
Response Time	OFF→ON	300µs		300µs		10ms
	ON→OFF					

3.4 Wiring

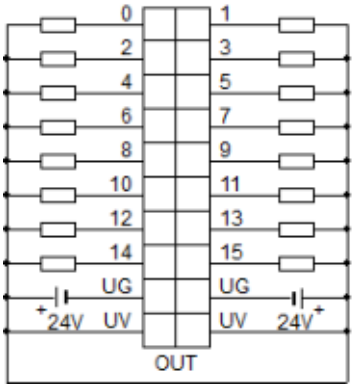
iR-DM16-P



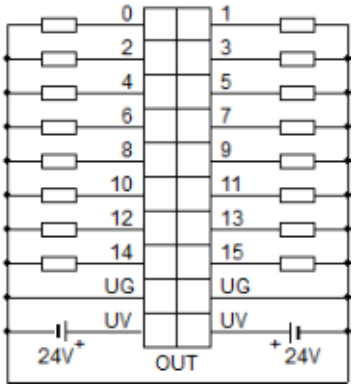
iR-DM16-N



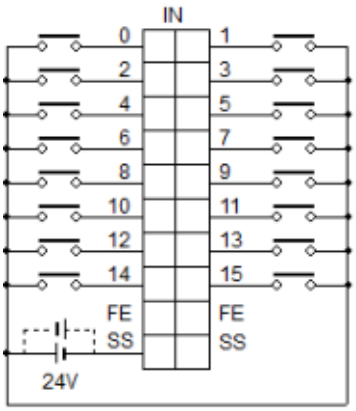
iR-DQ16-N



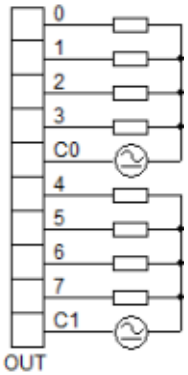
iR-DQ16-P



iR-DI16-K



iR-DQ08-R



250VAC/30VDC, 2A

4. Analog Input/Output

4.1 Analog Input / Output Modules

Module Name		iR-AI04-VI	iR-AM06-VI	iR-AQ04-VI
Number of Analog Inputs		4 (±10V/ ±20mA)	4 (±10V/ ±20mA)	0
Number of Analog outputs		0	2 (±10V/ ±20mA)	4 (±10V/ ±20mA)
Current Consumption		70mA@5VDC	70mA@5VDC	65mA@5VDC
Analog Power Supply		24 VDC（20.4 VDC~28.8 VDC）（-15%~+20%）		
Specification	PCB Coating	Yes		
	Enclosure	Plastic		
	Dimensions W x H x D	27 x 109 x 81 mm		
	Weight	Approx. 0.12 kg		
	Mount	35mm DIN rail mounting		
Environment	Protection Structure	IP20		
	Storage Temperature	-20° ~ 70°C (-4° ~ 158°F)		
	Operating Temperature	0° ~ 55°C (32° ~ 131°F)		
	Relative Humidity	10% ~ 90% (non-condensing)		
Connection	Cross-section	AWG 28-16		AWG 24-16
Certification	EMC Immunity	Conforms to EN 55032: 2012+AC: 2013, Class A EN 61000-6-4: 2007+A1:2011 EN 55024: 2010+A1: 2015 EN 61000-6-2:2005		

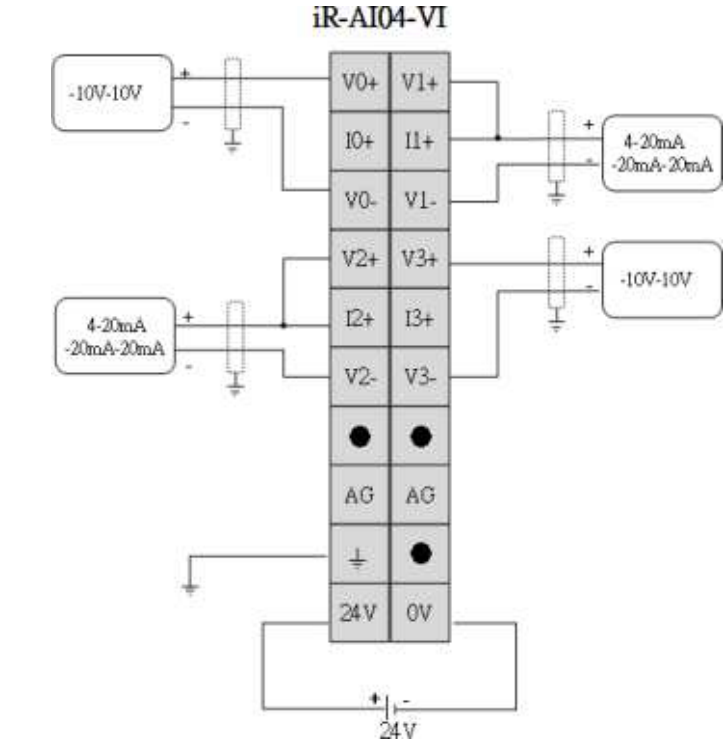
4.2 Analog Input Specification

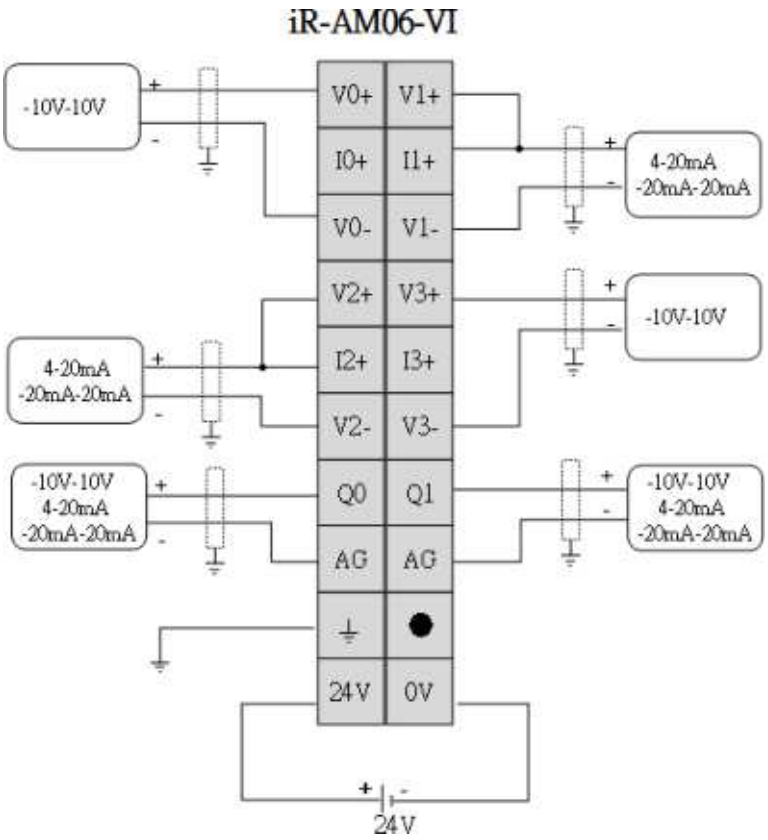
Input Range	-10V~10V、 -20mA~20mA				
Conversion Time	2ms/Channel				
Isolation	500 VDC：(Analog / Digital)				
Data Format	-10~10V	-5V~5V	1~5V	-20~20mA	4~20mA
	±32000	±32000	0~32000	±32000	0~32000
Resolution	0.312mV	0.156mV	0.156mV	0.625uA	0.625uA
	16 bit	16 bit	15 bit	16 bit	15 bit
Input Impedance	1MΩ			250 Ω	
Diagnose	Supply Voltage Wire break (1~5V & 4~20mA) Overflow/underflow				
Accuracy	± 0.2 % Full Scale@25° C ± 0.3 % Full Scale@0° ~ 55°C				

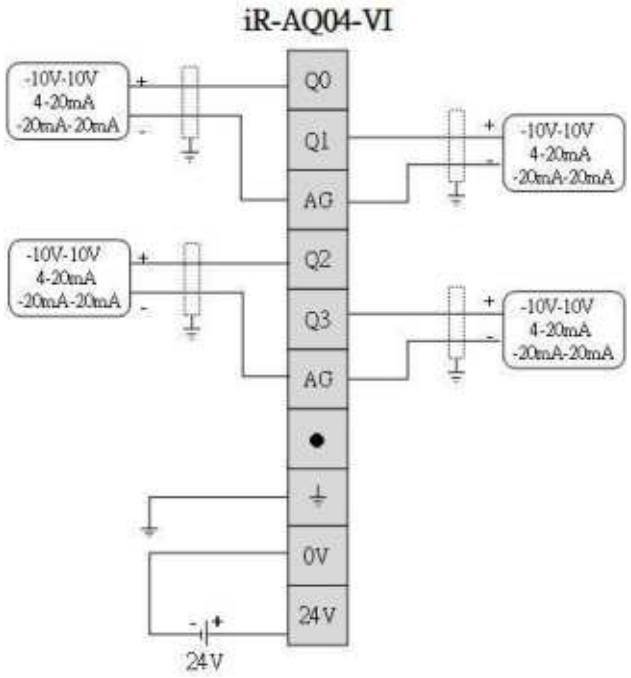
4.3 Analog Output Specification

Output Range	-10V~10V、-20mA~20mA				
Conversion Time	1.6ms/4 channels 1.3ms/3 channels 1ms/2 channels 700us/1 channel				
Isolation	500 VDC：(Analog / Digital)				
Data Format	-10~10V	-5V~5V	1~5V	-20~20mA	4~20mA
	±32000	±32000	0~32000	±32000	0~32000
Resolution	5mV	5mV	5mV	10uA	10uA
	12bit	11bit	10bit	12bit	11bit
Output Impedance	≧1kΩ			≦500Ω	
Diagnose	Supply Voltage Wire break				
Accuracy	± 0.2 % Full Scale@25° C ± 0.3 % Full Scale@0° ~ 55°C				

4.4 Wiring


iR-AI04-VI
-10V-10V
4-20mA
-20mA-20mA
4-20mA
-20mA-20mA
-10V-10V
V0+
V1+
I0+
I1+
V0-
V1-
V2+
V3+
I2+
I3+
V2-
V3-
AG
AG
24V
0V
24V


iR-AM06-VI
-10V-10V
4-20mA
-20mA-20mA
-10V-10V
4-20mA
-20mA-20mA
-10V-10V
4-20mA
-20mA-20mA
V0+
V1+
I0+
I1+
V0-
V1-
V2+
V3+
I2+
I3+
V2-
V3-
Q0
Q1
AG
AG
24V
0V
24V


iR-AQ04-VI
-10V-10V
4-20mA
-20mA-20mA
+
-
Q0
Q1
AG
Q2
Q3
AG
0V
24V
24V

5. Temperature

5.1 Temperature Module

Module Name		iR-AI04-TR
Number of Input Channels		4 (RTD/Thermocouple)
Current Consumption		65mA@5VDC
Analog Power Supply		24 VDC（20.4 VDC~28.8 VDC）（-15%~+20%）
Specification	PCB Coating	Yes
	Enclosure	Plastic
	Dimensions W x H x D	27 x 109 x 81 mm
	Weight	Approx. 0.12 kg
	Mount	35mm DIN rail mounting
Environment	Protection Structure	IP20
	Storage Temperature	-20° ~ 70°C (-4° ~ 158°F)
	Operating Temperature	0° ~ 55°C (32° ~ 131°F)
	Relative Humidity	10% ~ 90% (non-condensing)
Connection	Cross-section	AWG 28-16
Certification	EMC Immunity	Conforms to EN 55032: 2012+AC: 2013, Class A EN 61000-6-4: 2007+A1:2011 EN 55024: 2010+A1: 2015 EN 61000-6-2:2005

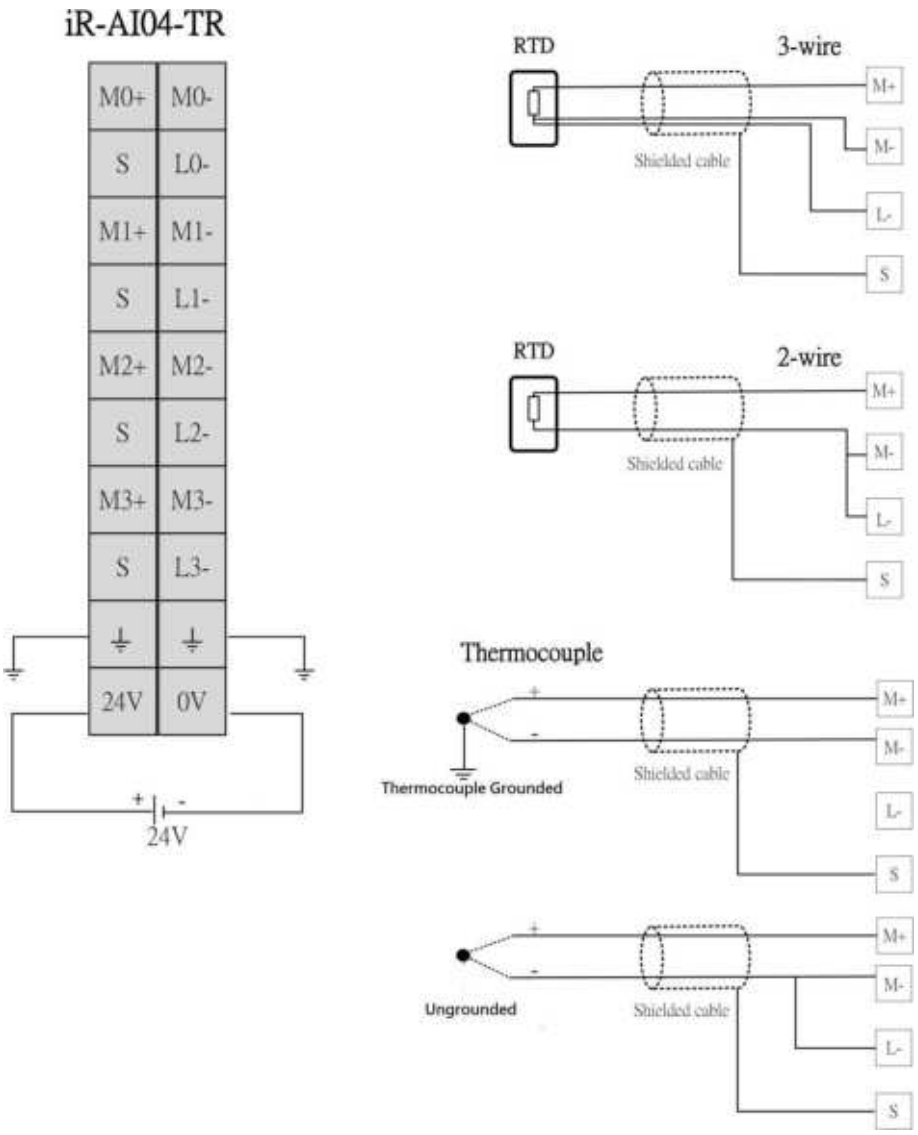
5.2 Temperature Specification

	Type	Standard	Material	Temperature Range
Thermocouple	J	IEC 60584	Fe-CuNi	-210 °C - 1200 °C
	K		NiCr-Ni	-270 °C - 1370 °C
	R		PtRh-Pt (Pt 13%)	-50 °C - 1760 °C
	S		PtRh-Pt (Pt 10%)	-50 °C - 1760 °C
	T		Cu-CuNi	-270 °C - 400 °C
	E		NiCr-CuNi	-200 °C - 1000 °C
	N		NiCrSi-NiSi	-270 °C - 1300 °C
	B		PtRh-PtRh	200 °C - 1820 °C
	C		W-Re(IEC 584)	0 °C - 2320 °C
	L	DIN 43714	Fe-CuNi	0 °C - 900 °C
	U		Cu-CuNi	-200 °C - 600 °C
	TXK/XK(L)	P8.585-2001	Ni-9.5%Cr/Cu-44%Ni-13% Rh	-200 °C - -800 °C
	TBP / BP(A)–1		W-5%Re/W-20%Re	0-2500
	TBP / BP(A)–2		W-5%Re/W-20%Re	0-1800
	TBP / BP(A)–3		W-5%Re/W-20%Re	0-1800
	M		Cu-CuNi	-200-100
	Conversion Time		100ms/channel	
	Resolution		0.1°C/0.1°F	
	Accuracy		± [0.4 % + 3°C] Full Scale @ 25° C ± [0.6 % + 3°C] Full Scale @ 0° ~ 55°C	

	Type	Temperature Coefficient	Temperature Range
RTD	Pt100	α: 0.00385	-200°C ~850°C
		α: 0.00392	-200°C ~660°C
	Pt1000	α: 0.00385	-200°C ~850°C
		α: 0.00392	-200°C ~660°C
	LG-Ni1000	--	- 60~250
	Ni100	0.00617	-100~180
	Ni1000	0.00617	-100~180
	CU50	0.00428	-50°C ~150°C
	CU100	0.00428	-50°C ~150°C
	Conversion Time	200ms/channel	
	Resolution	0.1°C/0.1°F	
	Accuracy	± 0.2 % Full Scale @ 25° C	

		± 0.3 % Full Scale @ 0° ~ 55°C	
Voltage	**Type**	**Conversion Time**	**Resolution**
	±2V	100ms/channel	16bit
	±1V		
	±500mV		
	±250mV		
	±125mV		
	±62.5mV		
	±31.25mV		
Resistance	**Type**	**Conversion Time**	**Resolution**
	0-5000Ω (0-30000)	200ms /channel	0.167 Ω
	0-500Ω (0-30000)		0.0167 Ω
Isolation	500 VDC：(Analog / Digital)		
Diagnose	Supply Voltage Wire break Overflow/underflow		

5.3 Wiring



6. Motion Control

6.1 Modules Specifications

Module Name		iR-PU01-P
Number of Axis		1- Axis
Specification	PCB Coating	Yes
	Enclosure	Plastic
	Dimensions W x H x D	27 x 109 x 81 mm
	Weight	Approx. 0.12 kg
	Mount	35mm DIN rail mounting
Environment	Protection Structure	IP20
	Storage Temperature	-20° ~ 70°C (-4° ~ 158°F)
	Operating Temperature	0° ~ 55°C (32° ~ 131°F)
	Relative Humidity	10% ~ 90% (non-condensing)
Connection	Cross-section	AWG 28-16
Certification	EMC Immunity	Conforms to EN 55032: 2012+AC: 2013, Class A EN 61000-6-4: 2007+A1:2011 EN 55024: 2010+A1: 2015 EN 61000-6-2:2005

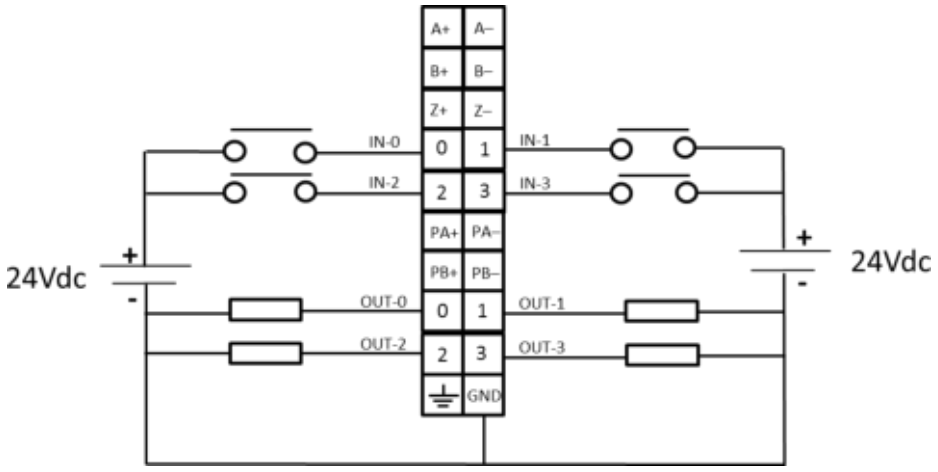
6.2 Digital Input Specifications

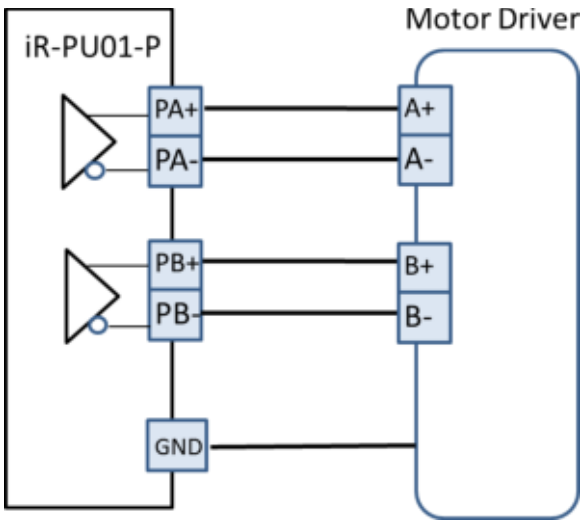
Item	Sink Input	Differential Input
Number of Inputs	4	3 (A/B/Z phase)
Input current	24 VDC, 5 mA	Meets the Requirements of ANSI Standards TIA/EIA-485-A
HIGH Level Input Voltage	15~28 VDC	-
LOW Level Input Voltage	0~5 VDC	-
Maximum input frequency	200KHz	2MHz
Input Impedance	3 KΩ	-
Indicators	Red LED Input State	

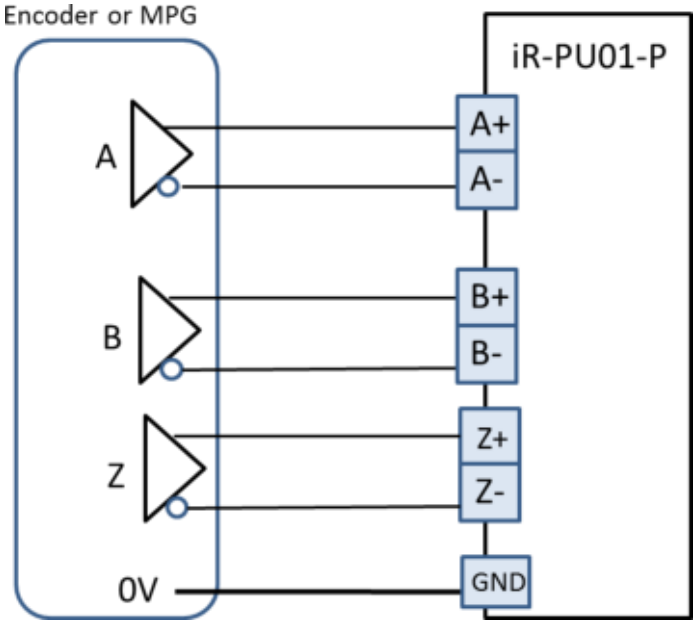
6.3 Digital Output Specifications

Item	Source Output	Differential Output
Number of Outputs	4	2(A/B phase)
Output Voltage	24VDC , 50 mA	Meets the Requirements of ANSI Standards TIA/EIA-485-A
Maximum Output frequency	40KHz	2MHz
Indicators	Red LED Input State	

6.4 Wiring

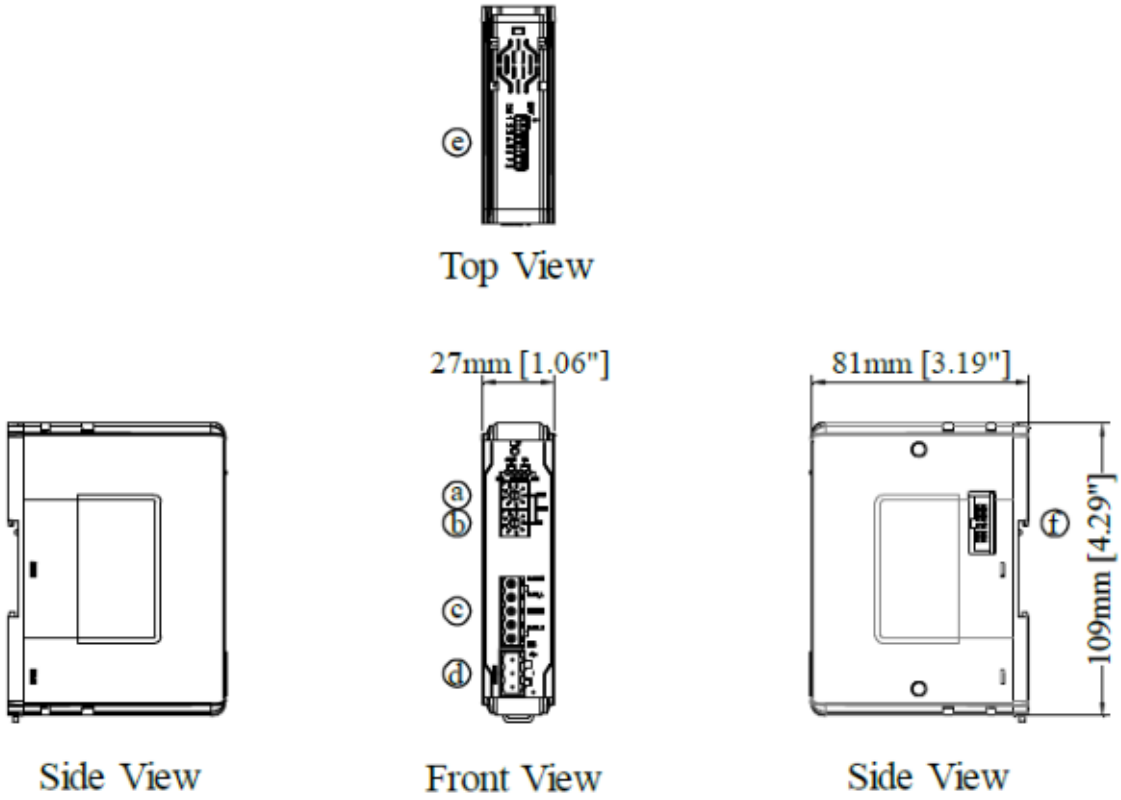



iR-PU01-P
Motor Driver
PA+
PA-
PB+
PB-
GND
A+
A-
B+
B-


Encoder or MPG
iR-PU01-P
A
B
Z
0V
A+
A-
B+
B-
Z+
Z-
GND

7. Dimensions

7.1 iR-COP

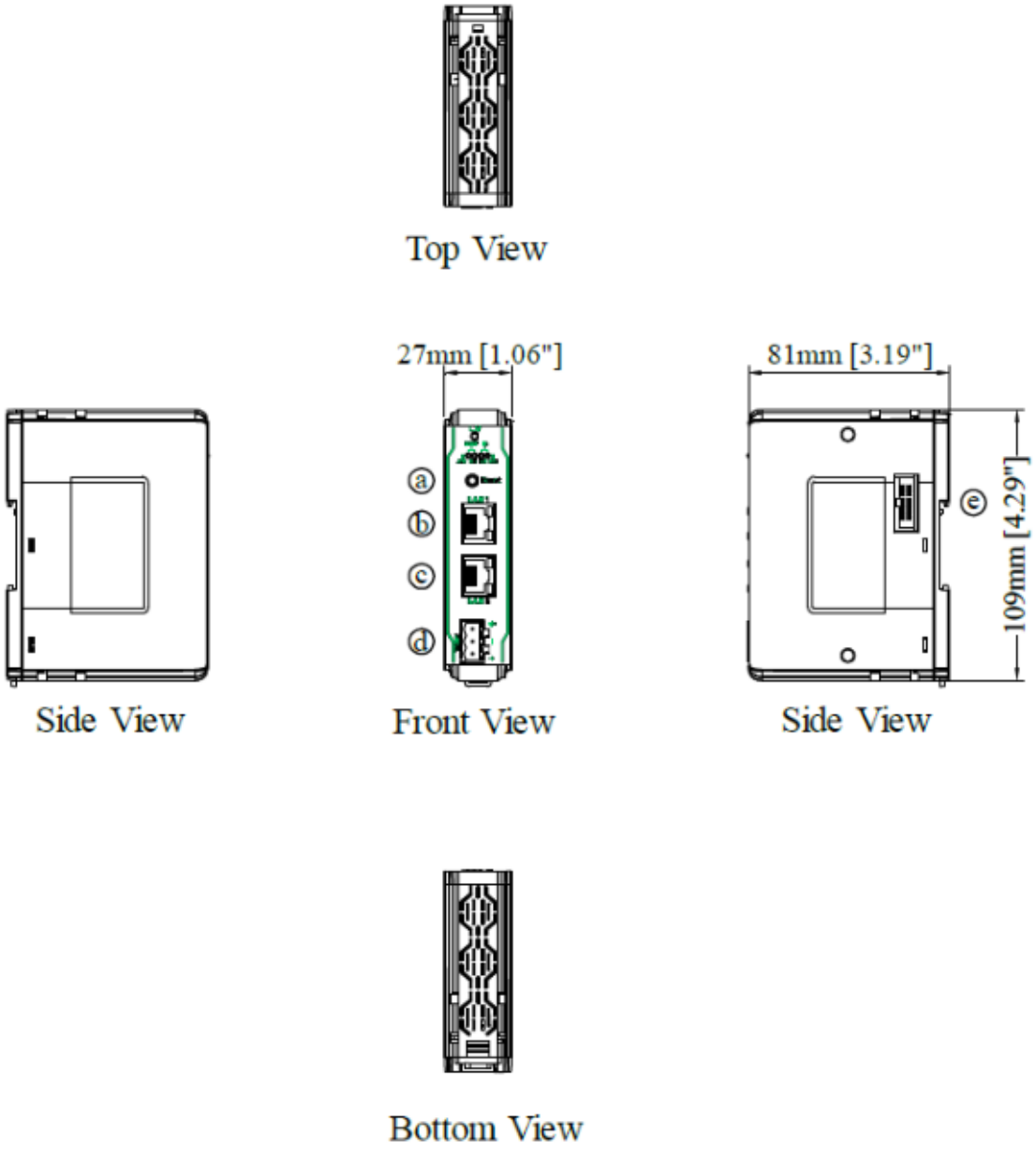




Bottom View

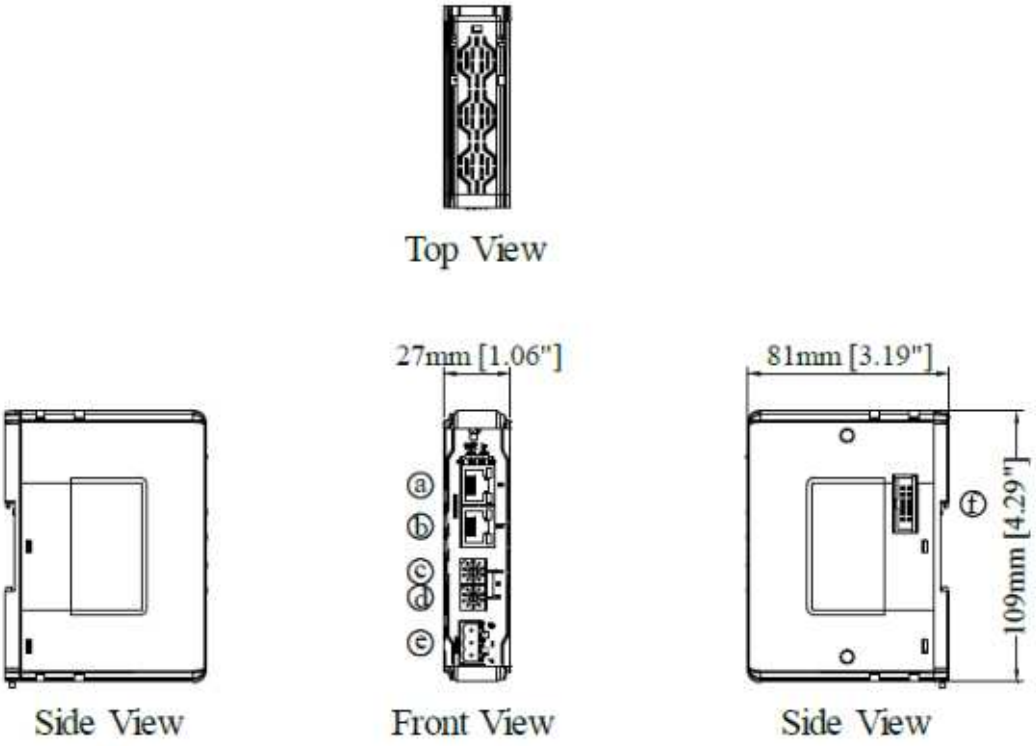
a	Node ID Rotary Switch x10	*e*	Baud Rate DIP Switch
b	Node ID Rotary Switch x1	*f*	Expansion Connector
c	CAN Bus Connector		
d	Power Connector		

7.2 iR-ETN



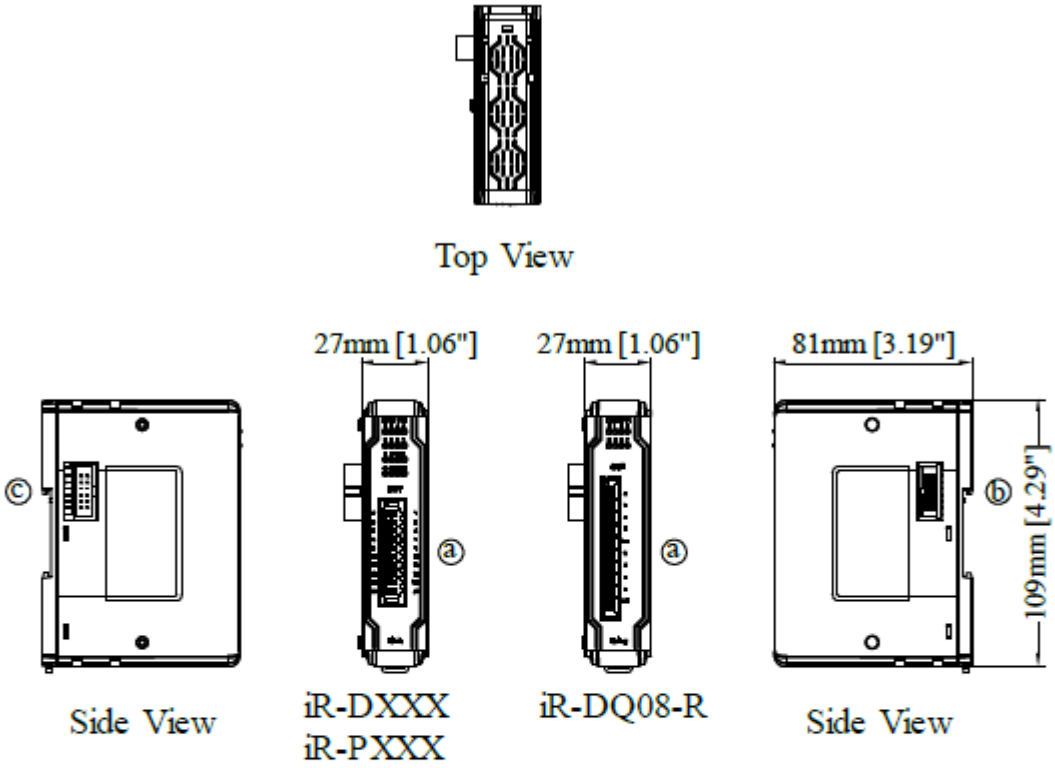
a	Reset Button	*e*	Expansion Connector
b	LAN 1		
c	LAN 2		
d	Power Connector		

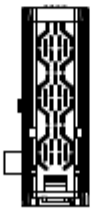
7.3 iR-ECAT



a	X1-EtherCAT IN	*e*	Expansion Connector
b	X2-EtherCAT Out	*f*	Expansion Connector
c	Node ID Rotary Switch x10		
d	Node ID Rotary Switch x1		

7.4 iR-DM16-N & P, iR-DQ16-N&P, iR-DI16-K, iR-DQ08-R, iR-PU01-P

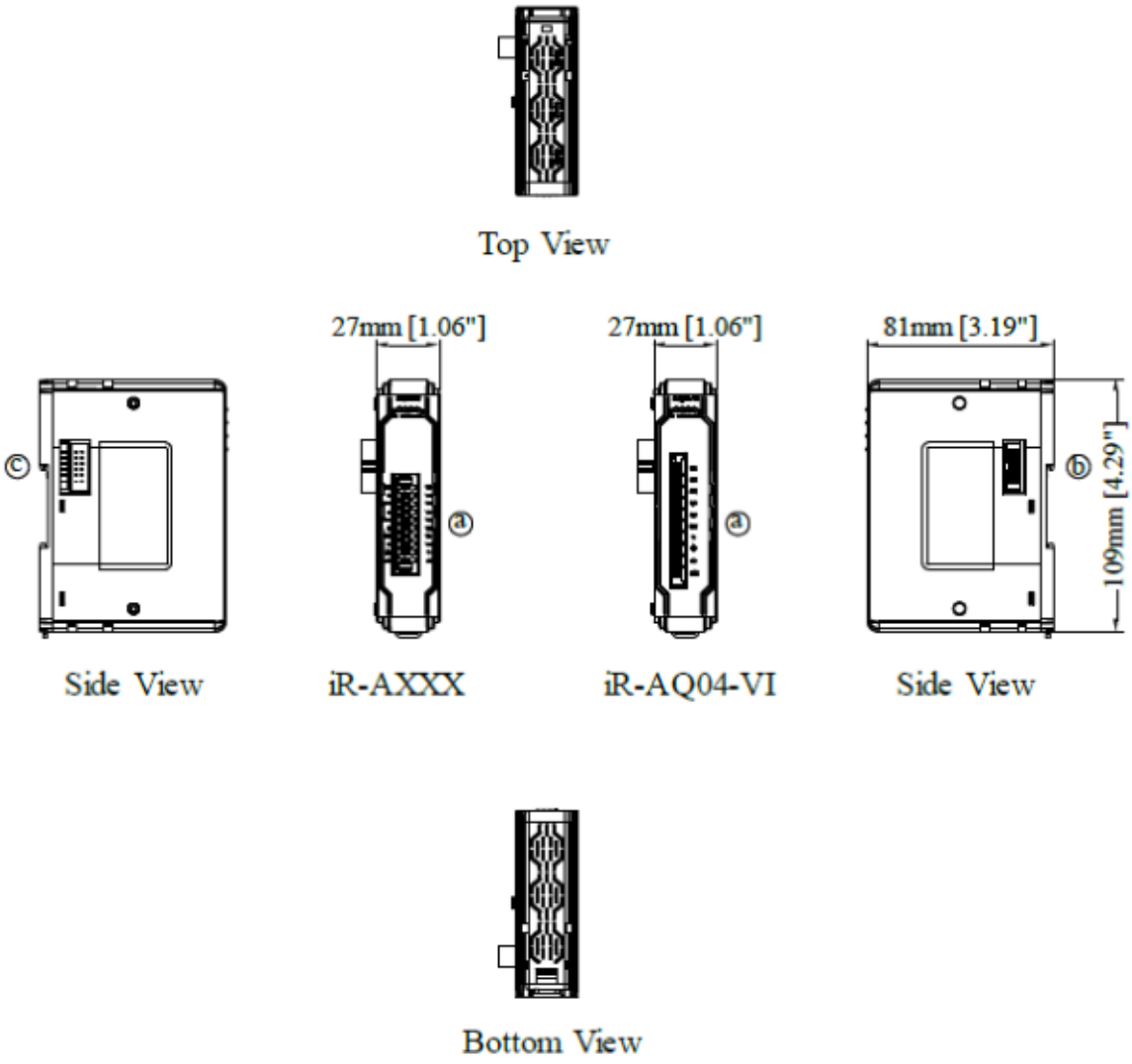




Bottom View

a	Terminal	*b.c*	Expansion Connector

7.5 iR-AI04-VI, iR-AM06-VI, iR-AQ04-VI, iR-AI04-TR



a	Terminal	*b.c*	Expansion Connector

Power Consumption

Type	Device	Consumption(5V)	Power Supply(5V)	Power Consumption(24V)
Coupler	iR-ETN	220mA/1.1 W	2A/10w	100mA/2.40W
	iR-COP	170mA/0.85 W	2A/10w	100mA/2.40W
	iR-ECAT	270mA/1.35 W	2A/10w	100mA/2.40W
Digital I/O	iR-DM16-P	130mA/0.65 W	--	53mA/1.27W
	iR-DM16-N	130mA/0.65 W	--	56mA/1.34W
	iR-DQ08-R	220mA/1.1 W	--	84mA/2.02W
	iR-DQ16-N	205mA/1.02 W	--	78mA/1.87W
	iR-DQ16-P	196mA/0.984 W	--	75mA/1.80W
	iR-DI16-K	83mA/0.418 W	--	31mA/0.74W
Analog I/O	iR-AQ04-VI	65mA/0.325 W	--	25mA/0.60W
	iR-AI04-VI	70mA/0.35 W	--	27mA/0.65W
	iR-AM06-VI	70mA/0.35 W	--	27mA/0.65W
	iR-AI04-TR	65mA/0.325 W	--	25mA/0.60W
Motion	iR-PU01-P	108mA/0.54 W	--	85mA/2.04W

Note:
The coupler is the only power supply for the modules in this system. Please consider power requirements when connecting multiple modules.

ex.1

Device	Name	Consumption	Power Supply
Coupler	iR-COP	170mA/0.85w	2A/10w
Module	iR-DQ08-R *8	220mA*8=1.76A	X
System	Power consumption：$170mA + 1.76A = 1.93$ A Power supply: $2A > 1.93A$		

Device	Name	Power Consumption
Coupler	iR-COP	100mA
Module	iR-DQ08-R *8	84mA*8=672mA
System	Power consumption：$100mA + 672mA = 772mA$ 24V Power supply should be greater than: 772mA/18.5W	

ex.2

Device	Name	Consumption	Power Supply
Coupler	iR-ETN	220mA/1.1w	2A/10w
Module	iR-DM16-P *13	130mA*13=1.69A	X
System	Power consumption：$220mA + 1.69A = 1.91$ A Power supply: $2A > 1.91A$		

Device	Name	Power Consumption
Coupler	iR-ETN	100mA
Module	iR-DM16-P *13	53mA*13=689mA
System	Power consumption：$100mA + 689mA = 789mA$ 24V Power supply should be greater than: 789mA/18.9W	