ELECTRICAL PARAMETER DIGITAL TRANSDUCER

Series HJ—A

**“Green is the symbol of life,
HJ is pledge of reliability”**

Introduction

Series HJ-A digital electrical parameter Transducer is intelligent AC/DC parameters measuring device. There are many single or multi-parameter part numbers. For DC part numbers, they can measure voltage and current. For AC part numbers, they can be used in 3-phase 3-wire or 3-phase 4-wire systems to measure up to 15 parameters simultaneously including true RMS of voltage Ua, Ub and Uc, true RMS of current Ia, Ib and Ic, frequency F, active power P, reactive power Q, power factor Cosφ, total active energy Kwh, total reactive energy Kvarh and Pa, Pb and Pc indicating the active power of each of 3 phases. Of course, there are also part numbers for single phase AC circuit.

Their measuring range (input) covers most of common used industrial power system and laboratory applications. Digital output communication interface is RS-485 or RS-232C optionally. The communication is ASCII format or MODBUS protocol. Some of the transducers are of double isolation. It means that the output of the transducer is electrically isolated from its input. Some of transducers are of treble isolation. It means that the input, output and power source of the transducer are isolated each from others. The isolation voltage is up to 2500V/1 min. The transducers provide reliable and stable performance with its MTBF more than 30000 hours. Also it combines many attractive features including high accuracy, easy to program, small size, easy to install, less power consumption, and wide operation temperature etc.

The series HJ-A digital electrical parameter Transducer can be applied in many industrial automatic control systems and equipments to measure, monitor and control their operation.

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1. Part Numbers

Please follow the instruction blow to fix the full part number, one square one code, from left to right.

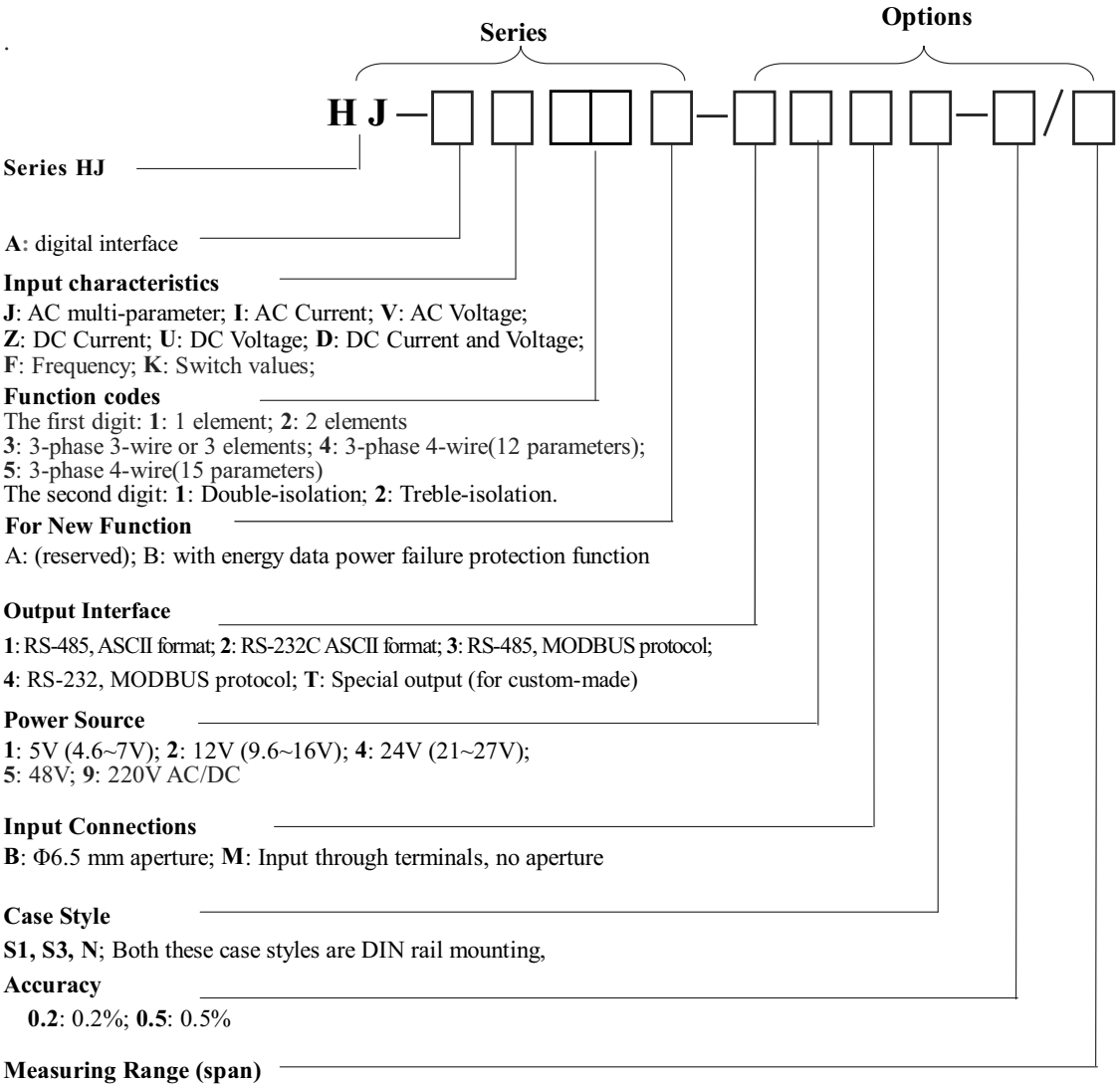


Fig. 1.1 The rule for part numbers of HJ-A transducer

When you select a part number according to above-mentioned rule, please specify the measuring range (span) you require.

Typical Example :

HJ-AJ11-12BS3-0.5/110V*5A: 1 element AC multi-parameter Digital Electrical Transducer; double isolation; output: ASCII format, RS-485 interface; power source: +12V; aperture: Φ6.5mm; Case style: S3; accuracy: 0.5%; measuring range: voltage: 0～110V, current: 0～5A.

2. List of main functional part numbers and specifications

2.1 List of main functional part numbers

No.	Functions					Part Number	Page
	Input		Case Style	Isolation	Output		
1	Multi-parameter	Single phase	S3	Double	ASCII format RS485	HJ-AJ11-1XBS3-0.5/XXXV*XXA	4
					MODBUS RS485	HJ-AJ11-3XBS3-0.5/XXXV*XXA	
				Treble	ASCII format RS485	HJ-AJ12-1XBS3-0.5/XXXV*XXA	
					MODBUS RS485	HJ-AJ12-3XBS3-0.5/XXXV*XXA	
			N	Treble	ASCII format RS485	HJ-AJ12-1XMN-0.5/XXXV*XXA	
					MODBUS RS485	HJ-AJ12-3XMN-0.5/XXXV*XXA	
		3-phase 3-wire	S3	Double	ASCII format RS485	HJ-AJ31-1XBS3-0.5/XXXV*XXA	5
					MODBUS RS485	HJ-AJ31-3XBS3-0.5/XXXV*XXA	
				Treble	ASCII format RS485	HJ-AJ32-1XBS3-0.5/XXXV*XXA	
					MODBUS RS485	HJ-AJ32-3XBS3-0.5/XXXV*XXA	
			N	Treble	ASCII format RS485	HJ-AJ32-1XMN-0.5/XXXV*XXA	
					MODBUS RS485	HJ-AJ32-3XMN-0.5/XXXV*XXA	
		3-phase 4-wire	S3	Double	ASCII format RS485	HJ-AJ41-1XBS3-0.5/XXXV*XXA HJ-AJ51-1XBS3-0.5/XXXV*XXA	6
					MODBUS RS485	HJ-AJ41-3XBS3-0.5/XXXV*XXA HJ-AJ51-3XBS3-0.5/XXXV*XXA	
				Treble	ASCII format RS485	HJ-AJ42-1XBS3-0.5/XXXV*XXA HJ-AJ52-1XBS3-0.5/XXXV*XXA	
					MODBUS RS485	HJ-AJ42-3XBS3-0.5/XXXV*XXA HJ-AJ52-3XBS3-0.5/XXXV*XXA	
			N	Treble	ASCII format RS485	HJ-AJ42-1XMN-0.5/XXXV*XXA HJ-AJ52-1XMN-0.5/XXXV*XXA	
					MODBUS RS485	HJ-AJ42-3XMN-0.5/XXXV*XXA HJ-AJ52-3XMN-0.5/XXXV*XXA	
2	AC Current	1 element	S3 or N	Treble	ASCII format RS485	HJ-AI12-1XXX-0.5/XXA	7
					MODBUS RS485	HJ-AI12-3XXX-0.5/XXA	
		2 elements		Treble	ASCII format RS485	HJ-AI22-1XXX-0.5/XXA	
					MODBUS RS485	HJ-AI22-3XXX-0.5/XXA	
		3 elements		Treble	ASCII format RS485	HJ-AI32-1XXX-0.5/XXA	
					MODBUS RS485	HJ-AI32-3XXX-0.5/XXA	
3	AC Voltage	1 element		Treble	ASCII format RS485	HJ-AV12-1XMX-0.5/XXXV	8
					MODBUS RS485	HJ-AV12-3XMX-0.5/XXXV	
		3-phase 3-wire		Treble	ASCII format RS485	HJ-AV32-1XMX-0.5/XXXV	
					MODBUS RS485	HJ-AV32-3XMX-0.5/XXXV	
		3-phase 4-wire		Treble	ASCII format RS485	HJ-AV42-1XMX-0.5/XXXV	
					MODBUS RS485	HJ-AV42-3XMX-0.5/XXXV	
4	DC Current	1 element	S3	Double	ASCII format RS485	HJ-AZ11-1XMS3-0.5/XXA	9
					MODBUS RS485	HJ-AZ11-3XMS3-0.5/XXA	
5	DC Voltage	1 element		Double	ASCII format RS485	HJ-AU11-1XMS3-0.5/XXXV	9
					MODBUS RS485	HJ-AU11-3XMS3-0.5/XXXV	
6	Switch Values Data Logger	8-channel	S1	No	MODBUS RS485	HJ-AK10-34MS1	10
		16-channel	N	Treble	MODBUS RS485	HJ-AK22-34MN	10
7	Ethernet Converter		S3	Double	RS485/RS232	HJ-485B/CE-232B	11

Note: All listed part numbers are of RS485 output interface. All part numbers with N case style have RS232C output interface options. But all part numbers with S3 case style have only RS485 output interface. For users requiring RS232C output interface, we can provide a RS485 to RS232C converter to meet your requirement.

2.2 General specifications

No.	Item	Data	Unit	Remarks
1	Accuracy	0.2, 0.5	%	0.2% for voltage & current measuring
2	Baud rate	19.2K, 9600(default), 4800, 2400, 1200	bps	
	Communication	RS-485 twisted pair line RS-232C Treble-line, only for N case style parts		
	Communication distance	1200(RS-485); 100 (RS232C)	m	Repeater can be used to extend communication distance for RS485
	Max. number of nodes	64	node	Only for RS485
	Bus protection	400W transient voltage		ESD protection and thermosnap
3	A/D speed	100	mS	
4	Working temperature	-10℃ – +55℃		
5	Isolation	Input/output: 2500V DC for 1 min Input/power supply: 2500V DC for 1 min Output/power supply: 2500V DC for 1 min	V	For double isolation part numbers, their output and power supply are grounded together. Only 2500V DC for 1 min. between input and output applicable. Leakage current: choose 0.5mA item.
6	Overload	2 x Voltage span for 1 sec. 10 times with interval of 10 sec. 10 x Current span for 1 sec. 5 times with an interval of 300 sec (only for hole thru. parts).		The input outside the linear range will result in poor accuracy.
7	MTBF	>30000	Hour	
8	Auxiliary power supply	+5V/+12V/+24V/+48V/ AC220V	V	220VAC/DC only for N case parts
9	Power consumption	≤250mW (+12V), ≤500mW (+24V)	mW	Power consumption depends on power supply to be used.
10	Temperature drift	≤300	Ppm/℃	-10 ℃ ~ + 55℃

Note: The red LED blink while there is power on, and the green LED blink when the data communicate**.**

3. Product tree

3.1 1 element AC Electrical Multi-parameter Digital Transducer

3.1.1 Part numbers

HJ-AJ11——1 phase, double isolation, S3 case style.
HJ-AJ12——1 phase, treble isolation, S3 or N case style.

3.1.2 Features

Series	Output*		Power Supply	Case Style	Accuracy %**	Input(measuring range)		
	Interface	Parameters				V	I	F
HJ-AJ11 HJ-AJ12	**1**:RS-485, ASCII format **3**:RS-485, MODBUS	Voltage: UA(TRMS) Current: IA (TRMS) Frequency: F Active Power: P Reactive Power: Q Power Factor: Cosφ Active energy: Kw/h Reactive energy: Kvar/h (positive or negative)	**1**:5V **2**:12V **4**:24V **5**: 48V	BS3 (Φ 6.5mm Hole-Thru.)	0.5 F: 0.05Hz	110V 220V 380V 500V	1A 5A 15A 25A 50A	45-65 Hz
HJ-AJ12	**1**:RS-485, ASCII format **2**:RS-232C ASCII format **3**:RS-485, MODBUS **4**:RS-232C MODBUS		**9**:220V AC/DC	MN (Terminal Connect)			1A 5A	

* Output data of F and Cosφ indicate the real value of the frequency and power factor measured. Output data of other parameters are shown in the form of a percentage as the ratio of the real value to the maximum value of its measuring range.

It provides accumulative energy data power failure protection function. They can save the accumulated active and reactive energy data into ferroelectric RAM inside the transducer when power is removed, and when power is reconnected to the transducer the transducer begins accumulating energy from where it left off when power was removed.

** Linearity and quotation error are ignored when the input voltage is below 5% of span.

3.1.3 Case Style

See 7.2 on page 23 for case styles.

3.1.4 Connections

3.1.4.1 The terminal No. 7 can supply +5V power for RS485/RS-232C converter. Its max output current is 20mA

3.1.4.2 The terminal No. 7 Vss is the ground for RS485

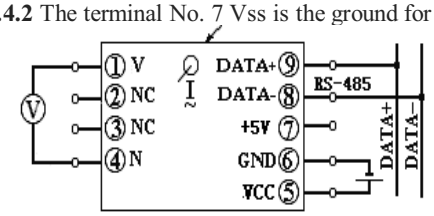


Fig. 3.1.4.1 Connections of 1 element, double isolation, S3 case style.

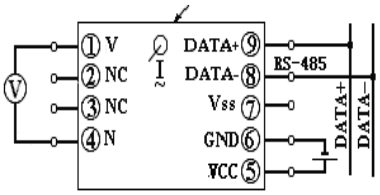


Fig.3.1.4.2 Connections of 1 element, treble isolation, S3 case style.

3.1.4.3

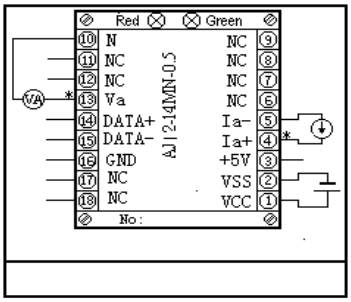


Fig.3.1.4.3 Connections of 1 element, treble isolation, S3 case style.

3.2 3-phase 3-wire (Two-wattmeter method) Electrical Multi-parameter Digital Transducer

3.2.1 Part numbers

HJ-AJ31——3-phase 3-wire (two-wattmeter method), double isolation, S3 case style.
HJ-AJ32——3-phase 3-wire (two-wattmeter method), treble isolation, N and S3 case style.

3.2.2 Features

Series	Output*		Power Supply	Case Style	Accuracy %**	Input(measuring range)		
	Interface	Parameters				V	I	F
HJ-AJ31 HJ-AJ32	**1**:RS-485, ASCII format **3**:RS-485, MODBUS	Voltage: Uab, Ucb (TRMS) Current: Ia,Ic (TRMS) Frequency: F Active Power: P Reactive Power: Q Power Factor: Cosφ Active energy: Kw/h Reactive energy: Kvar/h (positive or negative)	**1**:5V **2**:12V **4**:24V **5**: 48V	BS3 (Φ 6.5mm Hole-Thru.)	0.5 F: 0.05Hz	110V 220V 380V 500V	1A 5A 15A 25A 50A 1A 5A	45-65 Hz
HJ-AJ32	**1**:RS-485, ASCII format **2**:RS-232C ASCII format **3**:RS-485, MODBUS **4**:RS-232C MODBUS		**9**:220V AC/DC	MN (Terminal Connect)				

* Output data of F and Cosφ indicate the real value of the frequency and power factor measured. Output data of other parameters are shown in the form of a percentage as the ratio of the real value to the maximum value of its measuring range.

It provides accumulative energy data power failure protection function. They can save the accumulated active and reactive energy data into ferroelectric RAM inside the transducer when power is removed, and when power is reconnected to the transducer the transducer begins accumulating energy from where it left off when power was removed.

** Linearity and quotation error are ignored when the input voltage is below 5% of span.

3.2.3 Case Style

See 7.2 on page 23 for case styles.

3.2.4 Connections

3.2.4.1 The terminal No. 7 can supply +5V power for RS485/RS-232C converter. Its max output current is 20mA.

3.2.4.2 Terminal 7 Vss is the Ground of RS-485 bus.

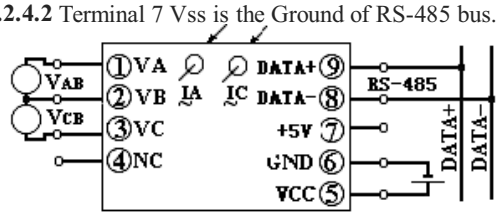


Fig. 3.2.4.1 Connections of 3-phase 3-wire, double isolation, S3 case style.

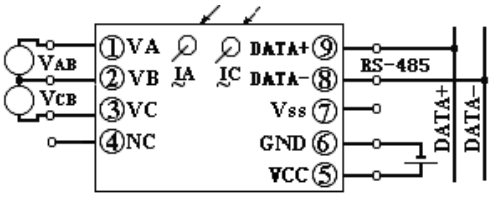


Fig. 3.2.4.2. Connections of 3-phase 3-wire, treble isolation, S3 case style

3.2.4.3 The terminal No. 3 can supply +5V power for RS485/RS-232C converter; its max current output is 20mA.

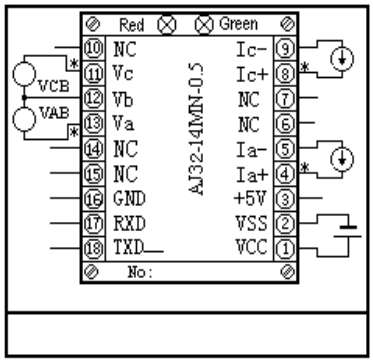


Fig. 3.2.4.3 RS-232C interface

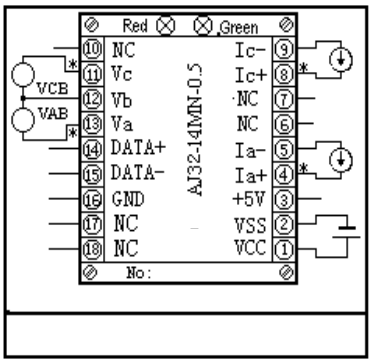


Fig. 3.2.4.4 RS-485 interface

Connections of 3-phase 3-wire treble isolation N case style

3.3 3-phase 4-wire Electrical Multi-parameter Digital Transducer (12 or 15 parameter outputs optional)

3.3.1 Part numbers

HJ-AJ41——3-phase 4-wire, double isolation, S3 case style only (12 parameter outputs).
HJ-AJ42——3-phase 4-wire, treble isolation, S3 or N case style (12 parameter outputs).
HJ-AJ51——3-phase 4-wire, double isolation, S3 case style only (15 parameter outputs).
HJ-AJ52——3-phase 4-wire, treble isolation, S3 and N case style (15 parameter outputs).

3.3.2 Features

Series	Output*		Power Supply	Case Style	Accuracy %**	Input (measuring range)		
	Interface	Parameters				V	I	F
HJ-AJ41 HJ-AJ42 HJ-AJ51 HJ-AJ52	**1**:RS-485, ASCII format **3**:RS-485, MODBUS	Voltage: Ua,Ub,Uc (TRMS) Current: Ia,Ib,Ic (TRMS) Frequency: F; Active Power: P Reactive Power: Q Power Factor: Cosφ Active energy: Kw/h Reactive energy: Kvar/h (positive or negative)	**1**:5V **2**:12V **4**:24V **5**: 48V	BS3 (Φ 6.5mm Hole-Thru.)	0.5 F: 0.05Hz	110V 220V 380V 500V	1A 5A 15A 25A 50A	45-65 Hz
HJ-AJ42 HJ-AJ52	**1**:RS-485, ASCII format **2**:RS-232C ASCII format **3**:RS-485, MODBUS **4**:RS-232C MODBUS		**9**:220V AC/DC	MN (Terminal Connect)			1A 5A	

* Output data of F and Cosφ indicate the real value of the frequency and power factor measured. Output data of other parameters are shown in the form of a percentage as the ratio of the real value to the maximum value of its measuring range.
The total outputs are 12 parameters. If it is requested, the 3-phase 4-wire transducers can provide Pa, Pb and Pc output indicating the active power of each of 3 phases besides total active power. Then total outputs are15 parameters.
It provides accumulative energy data power failure protection function. They can save the accumulated active and reactive energy data into ferroelectric RAM inside the transducer when power is removed, and when power is reconnected to the transducer the transducer begins accumulating energy from where it left off when power was removed.

** Linearity and quotation error are ignored when the input voltage is below 5% of span.

3.3.3 Case style

See 7.2 on page 23 for case styles.

3.3.4 Connections

3.3.4.1 The terminal No. 7 can supply +5V power for RS485/RS-232C converter. Its max output current is 20mA.

3.3.4.2 Terminal 7 Vss is the Ground of RS-485 bus.

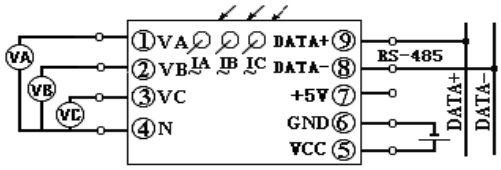


Fig. 3.3.4.1 Connections of 3-phase 4-wire double isolation S3 case style.

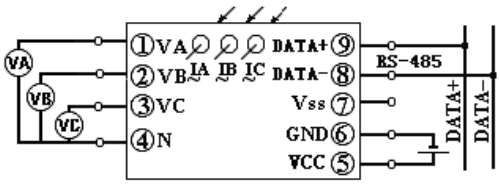


Fig. 3.3.4.2 Connections of 3-phase 4-wire treble isolation S3 case style.

3.3.4.3 The terminal No. 3 can supply +5V power for RS485/RS-232C converter; its max output current is 20mA.

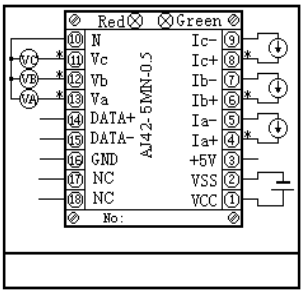


Fig.3.3.4.3 RS-485 interface

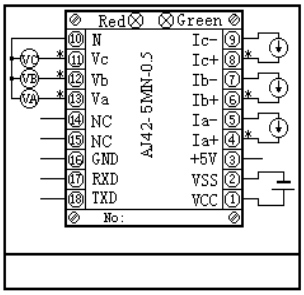


Fig. 3.3.4.4 RS-232C interface

Connections of 3-phase 4-wire N case style transducer

3.4 AC Current Single Parameter Digital Transducer

3.4.1 Part numbers

HJ-AI12——1 element treble isolation AC current digital transducer. S3 and N case style.
HJ-AI22——2 elements treble isolation AC current digital transducer. S3 and N case style.
HJ-AI32——3 elements treble isolation AC current digital transducer. S3 and N case style.

3.4.2 Features

Series	Output*		Power Supply	Case Style	Accuracy %	Input(measuring range)
	Interface	Parameters				
HJ-AI12	**1**:RS-485, ASCII format **3**:RS-485, MODBUS	IA (TRMS)	**1**:5V **2**:12V **4**:24V **5**:48V	BS3 (Φ 6.5mm Hole-Thru.)	0.2	1A,， 5A， 15A 25A，50A
HJ-AI22		IA,IC (TRMS)				
HJ-AI32	**1**:RS-485, ASCII format **2**:RS-232C ASCII format **3**:RS-485, MODBUS **4**:RS-232C MODBUS	IA,IB,IC (TRMS)	**9**:220V AC/DC	MN (Terminal Connect)		1A，5A

*All the output data are shown in the form of a percentage as the ratio of the real value to the maximum value of its measurable range

3.4.3 Case style

See 7.2 on page 23 for case styles.

3.4.4 Connections

3.4.4.1 The terminal No. 7 can supply +5V power for RS485/RS-232C converter. Its max output current is 20mA.

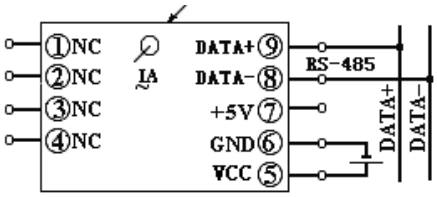


Fig. 3.4.4.1 Connections of HJ-AI12 S3 case style.

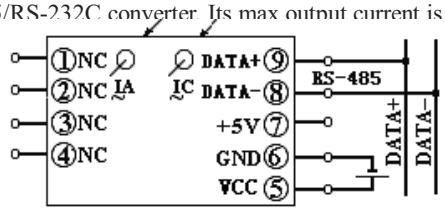


Fig. 3.4.4.2 Connections of HJ-AI22 S3 case style.

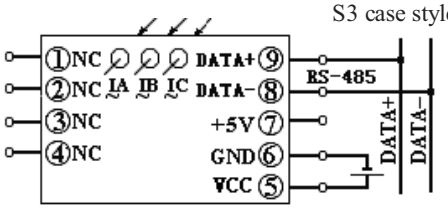


Fig. 3.4.4.3 Connections of HJ-AI32, S3 case style.

3.4.4.2 All current inputs are through terminals. Output of HJ-AI22 —— 2 elements treble isolation AC current digital transducer, N case style are Ia and Ic.

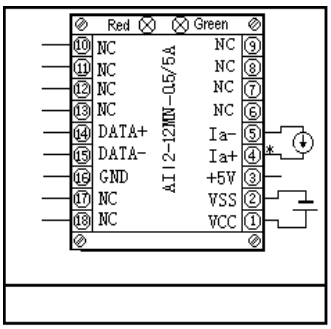


Fig. 3.4.4.4 Connections of HJ-AI12 N case style.

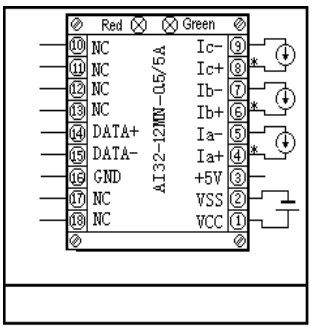


Fig. 3.4.4.5 Connections of HJ-AI32 N case style.

3.5 AC Voltage Single Parameter Digital Transducer

3.5.1 Part numbers

HJ-AV12——1 element, treble isolation, AC voltage digital transducer. S3 and N case style.
HJ-AV32——3-phase 3-wire (two-wattmeter method), treble isolation, AC voltage digital transducer. S3 and N case style.
HJ-AV42——3-phase 4-wire, treble isolation, AC voltage digital transducer. S3 and N case style.

3.5.2 Features

Series	Output*		Power Supply	Case Style	Accuracy %	Input (measuring range)
	Interface	Parameters				
HJ-AV12	**1**:RS-485, ASCII format **2**:RS-232C ASCII format** **3**:RS-485, MODBUS **4**:RS-232C MODBUS**	UA (TRMS)	**1**:5V **2**:12V **4**:24V **5**:48V	MS3 MN (Terminal Connect)	0.2	110V, 220V, 380V, 500V
HJ-AV32		UAB,UCB (TRMS)				
HJ-AV42		UA,UB,UC (TRMS)	**9**:220V AC/DC	MN (Terminal Connect)		

*All output data are shown in the form of a percentage as the ratio of the real value to the maximum value of its measurable range.
**It is only available for N case style product.

3.5.3 Case style

See 7.2 on page 23 for case styles.

3.5.4 Connections

3.5.4.1 Connections of HJ-AV12,HJ-AV32,and HJ-AV42.

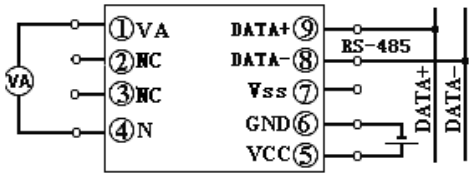


Fig. 3.5.4.1 Connections of HJ-AV12, S3 case style.

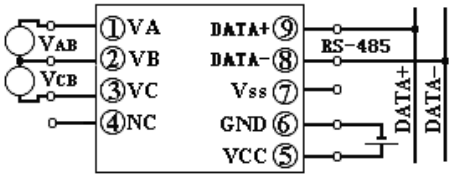


Fig. 3.5.4.2 Connections of HJ-AV32, S3 case style

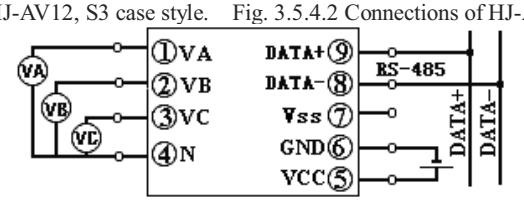


Fig. 3.5.4.3 for connections of HJ-AV42, S3 case style

3.5.4.2 Connections of HJ-AV32, HJ-AV42 and HJ-AV12.For connections of HJ-AV12, N case style. Its input is Va only.

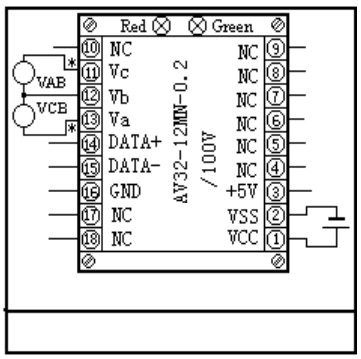


Fig. 3.5.4.4 Connections of HJ-AV32, N case style.

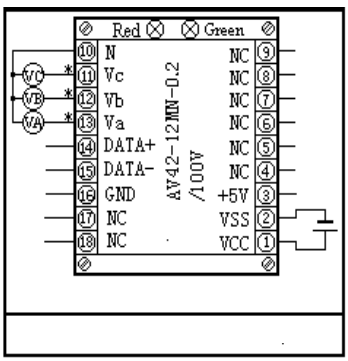


Fig. 3.5.4.5 Connections of HJ-AV42, N case style

3.6 DC Current / Voltage Single Parameter Digital Transducer

3.6.1 Part numbers

HJ-AZ11——1 element (double isolation) DC current digital transducer. S3 case style only.
HJ-AU11 —— 1 element(double isolation) AC voltage digital transducer. S3 case style only.

3.6.2 Features

Series	Output**		Power Supply	Case Style	Accuracy %	Input (measuring range)
	Interface	Parameters				
HJ-AZ11*	**1**:RS-485, ASCII format **3**:RS-485, MODBUS	One element current	**1**:5V **2**:12V **4**:24V **5**:48V	MS3 (Terminal Connect)	0.2	4-20mA,20mA, 5A,50A
HJ-AU11		One element voltage				75mV, 5V, 100V, 220V, 300V, 500V

* For HJ-AZ11, when the span is over 1A, a current divider must be used.

**All output data are shown in the form of a percentage as the ratio of the real value to the maximum value of its measurable range.

3.6.3 Case style

See 7.2 on page 23 for case styles.

3.6.4 Connections

3.6.4.1 Connections of HJ-AU11.

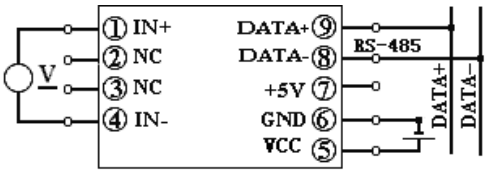


Fig. 3.6.4.1 Connections of HJ-AU11. S case style.

3.6.4.2 Connections of HJ-AZ11 with a current divider.

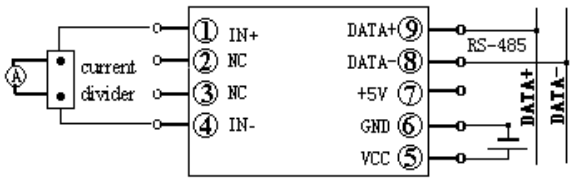


Fig. 3.6.4.2 Connections of HJ-AZ11 with current divider. S3 case style.

3.7 Switch Values Data Logger

3.7.1 Part numbers

HJ-AK10—— 8 switch value inputs, RS-485 output interface, MODBUS, no isolation, S case style.

HJ-AK22 —— 16 switch value inputs, RS-485 output interface, MODBUS, treble isolation, N case style

3.7.2 Features

Series	Input (measuring range)*	Output**	Power Supply
HJ-AK10	Switch value input(8-channel)	1 byte	+24VDC
HJ-AK22	Switch value input(16-channel)	2 bytes	

* Input with Passive contacts (Dry contacts). And the withstand voltage of the passive contacts can be over 24VDC

** One bit one “on-off state”, “1” means “on”, “0” means “off”

3.7.3 Case style

See 7.2 on page 23 for case styles.

3.7.4 Connections

3.7.4.1 Connections of HJ-AK10. Pin 1～8: Eight inputs. Com: the common input.

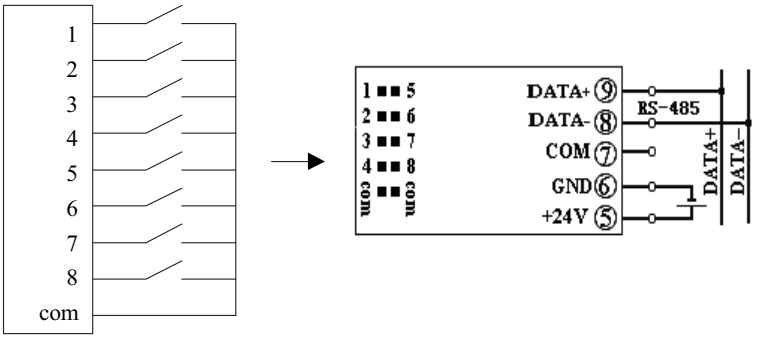


Fig. 3.7.4.1 Connections of AK10 with 8 switch values input,S1 case style

3.7.4.2 Connections of HJ-AK22.

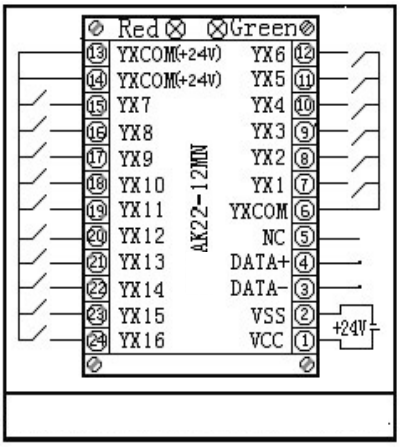


Fig. 3.7.4.2 Connections of AK22 with 16 switch values input,N case style

3.8 Ethernet Converter

3.8.1 Part numbers

HJ-485B—— RS-485 to TCP/IP converter, double isolation, S3 case style.

HJ-232B ——RS-232 to TCP/IP converter, double isolation, S3 case style.

3.8.2 Features

Series	Buffer	Protocol	Internet Interface	Baud rate	Flux control Information	Power supply	Consumption
HJ-485B HJ-232B	16K	ARP, IP, ICMP, UDP, DHCP, TCP, HTTP SOCK5,	10M Ethernet	1200BPS to 115200BPS	CTS/RTS, XON/XOFF	9-30 VDC	<15mA(+24V power source)

3.8.3 Case style

See 7.2 on page 23 for case styles.

3.8.4 Connections

3.8.4.1 Connections of HJ-RS232B

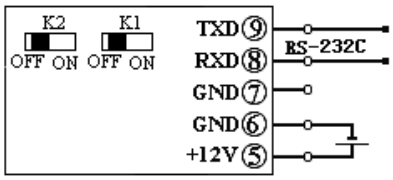


Fig. 3.8.4.1 Connections for HJ-232B, S3 case style

3.8.4.2 Connections of HJ-RS485B.

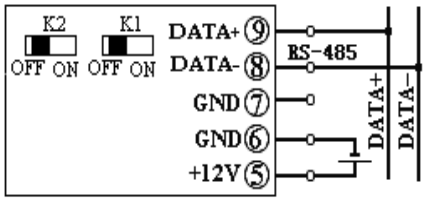


Fig 3.8.4.2 Connections for HJ-485B,S3 case style

4. ASCII format communication protocol

4.1 The command set of ASCII format for HJ-A digital transducers

There are six ASCII format commands for communications between master equipment and HJ-A transducers.

- To read the transducer's name: $(Addr)M<CR>
- To read the configuration: $(Addr)2<CR>
- To set the configuration:
  %(OldAddr)(NewAddr)(InputRange)(BaudRate) (DataFormat) <CR>
- To read all data: #(Addr) A<CR>
- To read the data of total accumulative energy: #(Addr) W<CR>
- To clear the data of energy: &(Addr) (Order) <CR>

Address (Addr): 00~FF (hex indicated by two bit ASCII code)

Data format: 1 bit for start bit "0", 8 bits for data, 1 bit for stop bit "1"

(It is supposed that the all following ID address is 01.)

4.2 To read the transducer's name (All undermentioned commands are illustrated with HJ-AJ41)

To read the transducer's name from a specified address

Command format: **$(Addr)M<CR>**

$:	Command symbol	1 byte	(24H)
(Addr):	Address of the transducer	2 bytes	(30H31H)
M:	To read the transducer's name	1 byte	(4DH)
<CR>:	Enter, end mark.	1 byte	(0DH)

Response: **!(Addr)(TransducerName)<CR>**

!:	Delimiter
(Addr):	Address of the transducer
(TransducerName):	name code of transducer
<CR>:	Enter, end mark.

Example: Command: $01M<CR> (24H 30H 31H 4DH 0DH)

Response: ! 01J411<CR> (21H 30H 31H 4AH 34H 31H 31H 0DH)

!:	Delimiter
01:	Address
J411:	The name code of transducer HJ-AJ41-12 (Different name code for different transducer)

4.3 To read the configuration

To read the configuration of a transducer by a specified address

Command format: **$(Addr)2<CR>**

$:	Command symbol	1 byte	(24H)
(Addr):	Address of the transducer	2 bytes	(30H 31H)
2:	To read the configuration	1 byte	(32H)
<CR>:	Enter, end mark	1 byte	(0DH)

Response: **!(Addr)(InputRange)(BaudRate)(DataFormat) <CR>**

Example: Command: $012<CR> (24H 30H 31H 32H 0DH)

Response: !01000601<CR>

!	Delimiter	(21H)
01	address of the transducer	(30H 31H)

00	input range (reserved codes)	(30H 30H)
06	communication Baudrate 9600bps	(30H 36H)
01	no checksum	(30H 31H)
<CR>	end mark	(0DH)

4.4 To set configuration

To set the configurations of the transducer including address and baudrate

Command: **%(OldAddr)(NewAddr)(Input Range)(BaudRate)(DataFormat)<CR>**

%:	Command Symbol	1 byte	(25H)
(OldAddr):	Old address (00~FFH)	2 bytes	(30H 31H)
(NewAddr):	New address (00~FFH)	2 bytes	(30H 32H)
(InputRange):	Must be 00	2 bytes	(30H 30H)
(BaudRate):	The communication baudrate (03~07)	2 bytes	(30H 33H——30H 37H)

No.	Baudrate code	Baudrate
03	30H 33H	1200bps
04	30H 34H	2400bps
05	30H 35H	4800bps
06	30H 36H	9600bps
07	30H 37H	19200bps

(Data Format)	Must be 01	2 bytes	(30H 31H)
<CR>	Enter, end mark	1 byte	(0DH)

Response: **!(Addr)<CR>**
Or: **?(Addr)<CR>** (Response to a wrong command received)

Example: command: %0102000701<CR> (25H 30H 31H 30H 32H 30H 30H 30H 37H 30H 31H 0DH)
Response: !02<CR> (21H 30H 32H 0DH)

This command successfully changed the address of the transducer from 01to 02; its new baudrate is 19200bps.

4.5 To read all data

To read all real-time data from a specified transducer. The sequence of data:
Ua, Ia, Ub, Ib, Uc, Ic, P, Q, Cosφ, F and Pa, Pb, Pc. Only15 parameters transducer has the last three parameters.

Command: **#(Addr)A<CR>** (23H 30H 31H 41H 0DH)
Response: **>(Data Ua)(Data Ia)(Data Ub)(Data Ib)(Data Uc)(Data Ic)(Data P)(Data Q) (Data Cosφ) (Data F) <CR>** (12 parameters CE-AJ41 transducer output)

Or: **>(Data Ua)(Data Ia)(Data Ub)(Data Ib)(Data Uc)(Data Ic)(Data P)(Data Q) (Data Cosφ) (Data F)(Data Pa)(Data Pb)(Data Pc)<CR>** (15 parameters CE-AJ41 transducer output)

Response of HJ-AJ11/2: >(Data Ua)(Data Ia)(Data P)(Data Q)(Data Cosφ)(Data F)<CR>
Response of HJ-AJ31/2: >(Data Uab)(Data Iab)(Data Ucb)(Data Icb)(Data P)(Data Q)(Data Cosφ)(Data F) <CR>
Response of HJ-AI32: >(Data Ia)(Data Ib)(Data Ic)<CR>
Response of HJ-AV42: >(Data Ua)(Data Ub)(Data Uc)<CR>

Data F: The data F consist of 5 digits of decimal value and a decimal point. This value is a real value of the frequency measured.

Data Cosφ: The data consist of a sign "+" or "–" and 5 digits of decimal value of data and a decimal point. This value is a real value of the power factor measured.

Other Data XX: The data consist of a sign "+" or "–" and 5 digits of decimal value of data and a decimal point. The data are shown in the form of a percentage as the ratio of the real value to the maximum value of its measurable range. Suppose the maximum value of its measurable range of current is 5A. If the output data is +0.6000, then the real current value is: I= 60%×5A=3.0000A

Example: Suppose: address is 01, the maximum value of its measurable range: Current Io=5A, Voltage Uo=100V, Frequency F=50Hz.

Command: #01A<CR> (23H 30H 31H 41H 0DH)

Response: >+1.0000+0.6000+1.0000+0.6000+1.0000+0.6000+0.6000+0.0000+1.000050.000<CR>

Then: Ua = +1.0000×Uo = +100%×100V = 100.00V
Ia = +0.6000×Io = +60%×5A = 3.0000A
Ub = +1.0000×Uo = +100%×100V = 100.00V
Ib = +0.6000×Io = +60%×5A = 3.0000A
Uc = +1.0000×Uo = +100%×100V = 100.00V
Ic = +0.6000×Io = +60%×5A = 3.0000A
P = +0.6000×Uo×Io×3 = +60%×100V×5A×3 = +900.00W (For 1 element and 3-phase 3wire AC Electrical Multi-parameter Digital Transducer, the calculation of P need not multiply by 3.)
Q = +0.0000×Uo×Io×3 = +0%×100×5×3 = 0Var (For 1 element and 3-phase 3wire AC Electrical Multi-parameter Digital Transducer, the calculation of Q need not multiply by 3.)
Cosφ = +1.0000
F = 50.000Hz

4.6 To read the data of total accumulative energy

[For CE-AJ11(2), CE-AJ31(2) and CE-AJ41(2) only]

Command: **#(Addr)W<CR>**
Response: **>(Order)(+)(Data Kwh)(+)(Data Kvarh)(CHK)<CR>**
Or: **?(Addr)<CR>** (response to a wrong command received)

#:	Command symbol	1 byte	(23H)
W:	To read the data of energy	1 byte	(57H)
(Order):	Frame number	2 bytes	(00~FF) (see note 1)
(+):	Sign "+" or "–"	1 byte	(2BH or 2DH)
(Data Kwh):	Data of active power	6 bytes	
(+):	Sign "+" or "–"	1 byte	(2BH or 2DH)
(Data Kvarh):	Data of reactive power	6 bytes	
(CHK):	Checksum (hex)	2 bytes	

The intelligent transducer can output the total accumulative active energy and reactive energy. It starts to accumulate immediately after power on. The data of total accumulative energy are stored in the ferroelectric RAM of the transducer. The transducer will respond the data of energy immediately after it received the command to read that data of total accumulative energy.

The format of response is as follows:
>(Order)(+)(Data Kwh)(+)(data Kvarh)(CHK)<CR>

>:	Response symbol (3EH)	1 byte	
(Order):	Frame number (from 00 to FFH)	2 bytes	hex ASCII (see note 1)
(+):	Sign "+" or "–" (2BH or 2DH)	1 byte	hex ASCII
(Data Kwh):	Data of active energy	6 bytes	hex data
(+):	Sign "+" or "–" (2BH or 2DH)	1 byte	hex ASCII
(Data Kvarh):	Data of reactive energy	6 bytes	hex data
(CHK):	Checksum	2 bytes	accumulating 17 bytes given before (CHK),

then the sum is ANDed with 0FFH to get the 2 bytes of hex data.

Note 1: Each response of the accumulative total active and reactive energy data has a frame number. When the transducer is powered on, its frame number starts with zero. When the transducer receives a correct command to clear the data of energy from master equipment, the transducer clears the energy data in its ferroelectric RAM and adds 1 to the frame number (circulating 00 through FF). The output data of energy are the sum of last output plus the new accumulated energy since the last output. If the transducer did not receive the correct command to clear energy data, the frame number will not change, and the data of energy will not be cleared and the transducer will continue to accumulate.

Generally, the data of energy starts to accumulate from zero immediately after the transducer is turned on. The longest period to accumulate is 1553.4 hours when U and I of input reach the maximum value of measuring range. The data will overflow when this value is exceeded. For the part numbers with accumulative energy data power failure protection function, they can save the accumulated active and reactive energy data when power is removed, and when power is reconnected to the transducer, the transducer begins accumulating energy from where it left off when power was removed.

Calculation of energy (The Uo and Io is the maximum value of measurable range of the transducer.):

$$\text{Energy} = \pm \text{DATA N} \times \frac{Uo \times Io}{1000 \times 3600} \text{ kwh}$$

Example: Command: #01W<CR>
Response: >01-0003E8+00003A68<CR> (hex)

The frame number is: 01
Active energy: -3E8H (hex) or -1000(decimal)
Reactive energy: 3AH (hex) or 58 (decimal)
Checksum:
68=(0x3E+0x30+0x31+0x2D+0x30+0x30+0x30+0x33+0x45+0x38+0x2B+0x30+0x30+0x30+0x30+0x33+0x41) MOD 0x100

4.7 To clear the data of energy [For HJ-AJ11(2), HJ-AJ31(2) and HJ-AJ41(2)only]

Command: **&(Addr)(Order)<CR>**
Response: **!(Addr)<CR>** (21H 30H 31H 0DH)
Or: **?(Addr)<CR>** (Response to a wrong command received)
Example: Command: &0101<CR>
Response: !01<CR> (Response to command with a correct frame number)
Or: ?01<CR> (Response to command with a wrong frame number)

4.8 Internal commands

A group of internal calibrating commands was set for calibration of the HJ-AJ product: (Note: The second byte and the third byte of following four commands are address codes of transducer, the default address codes of all transducers were set to "01" before they were delivered.)

Command format: $(Addr)(Order)<CR>

- Calibrating command of zero adjusting for DC current: $010<CR> (24H 30H 31H 30H 0DH)
- Calibrating command of zero adjusting for DC voltage: $011<CR> (24H 30H 31H 31H 0DH)
- Calibrating command of zero adjusting for AC current: $013<CR> (24H 30H 31H 33H 0DH)
- Calibrating command of zero adjusting for AC voltage: $014<CR> (24H 30H 31H 34H 0DH)

For above 4 commands, 7 bytes of data will be responded from 1 element transducers, 13 bytes of data will be responded from 3-phase 4-wire transducers.

- Reset command: @CEAFW <CR> (40H 43H 45H 41H 46H 57H 0DH)

The address codes of transducers will be reset to "01" and the Baud rate will be reset to 9600 bps by the reset command whatever the previous address codes and Baud rate of the transducer are. Four bytes of data will be responded from the transducer after receiving the reset command. This command can not be used in the network; otherwise it will cause bus conflict.

Please contact your supplier when user needs recalibrate the product. Our technicians will help you to recalibrate by using other internal commands.

5. MODBUS Protocol

The MODBUS protocol for series HJ-A is completely compatible with MODBUS developed by Gould Modicon for use in Modicon PLC systems.

5.1 Format of data

5.1.1 Format of message

5.1.1.1 Function code 0x03 —— To read the contents of registers from the slave equipment.

The Message from the master equipment:

Address of the slave equipment	0x01-0xFF	1 byte
Function code	0x03	1 byte
Address of the first register	0x01-0xFF	2 bytes
Quantity of Registers		2 bytes
CRC code		2 bytes

The correct responded message from the slave equipment:

Address of the slave equipment	0x01-0xFF	1 byte
Function code	0x03	1 byte
Byte count	2 x **N***	1 byte
Data section (contents of registers)		**N*** x 2 bytes
CRC code		2 bytes

***N** = Quantity of Registers

5.1.1.2 Function code 0x10 —— To set (write) data of registers of the slave equipment

The Message from the master equipment

Address of the slave equipment	0x01-0xFF	1 byte
Function code	0x10	1 byte
Address of the first register		2 bytes
Quantity of Registers		2 bytes
Byte count	2 x **N***	1 byte
The data written to the registers		2 x **N***
CRC code		2 bytes

***N** = Quantity of Registers

The correct responded message from the slave equipment:

Address of the slave equipment	0x01-0xFF	1 byte
Function code	0x10	1 byte
Address of the first register		2 bytes
Quantity of Registers		2 bytes
CRC code		2 bytes

Note: 1. For all Address of register, Quantity of registers and Contents of register (Data), their high order byte is before their low order byte. But the low order byte of CRC code is before its high order byte.

2. The length of the register is 16 bits (2 bytes).

5.1.2 Format of commands and explanation of the registers

(All undermentioned commands are illustrated with HJ-AJ41)

5.1.2.1 List of definitions of registers for electrical parameters data

Address of register (Hex)	Contents of register	Quantity of registers	Attribute of register	Range of data
0x0010	Voltage of phase A	1	Read only	0~12000
0x0011	Current of phase A	1	Read only	0~12000
0x0012	Voltage of phase B	1	Read only	0~12000
0x0013	Current of phase B	1	Read only	0~12000
0x0014	Voltage of phase C	1	Read only	0~12000
0x0015	Current of phase C	1	Read only	0~12000
0x0016	P: active power	1	Read only	-12000~+12000
0x0017	Q: reactive power	1	Read only	-12000~+12000
0x0018	Cosφ: power factor	1	Read only	-10000~+10000
0x0019	F: frequency	1	Read only	45000~65000
0x001A	Active energy	2	Read only	0xFFFFFFFF ~0x7FFFFFFF
0x001C	Reactive energy	2	Read only	0xFFFFFFFF ~0x7FFFFFFF
The three more output of AJ51(2):				
0x001E	PA:active power of phase A	1	Read only	-12000~+12000
0x001F	PB:active power of phase B	1	Read only	-12000~+12000
0x0020	PC:active power of phase C	1	Read only	-12000~+12000

5.1.2.2 List of definitions of registers for transducer's name, address and baudrate:

Address of register (Hex)	Contents of register	Quantity of registers	Attribute of register	Range of data
0x0020	Address and baudrate	1	Read/write	Address (0-256) Baudrate (03-07)
0x0021	Transducer's name	2	Read only	Depend on part number (4 bytes)

5.1.2.3 The explanation of register "To clear the data of energy"

Address of register (Hex)	Contents of register	Quantity of registers	Attribute of register	Range of data
0x00A7	Clear the data of energy	1	Write	0x0000

5.1.2.4 Examples:

For all Address of register, Quantity of registers and Contents of register (Data), their high order byte is before their low order byte. But the low order byte of CRC code is before its high order byte.

A: Example for the command "To read the all data":

Address of slave equipment	Function code	Address of the first register		Quantity of registers		CRC-L	CRC-H
0x01	0x03	0x00	0x10	0x00	0x0E	0xC5	0xCB

Note: 1. 0x00 is the high order byte of the register, and 0x10 is the lower order byte of the register.
2. Please see above 5.1.2.1 list of definitions of register of electrical parameters data for the sequence of the output data.

B: Example for the command "To modify the address and baudrate":
(Change the address from 01 to 02; set new baudrate to 9600 bps <code 06>)

Address of slave equipment	Function code	Address of the first register		Quantity of registers		Data bytes count	Data written to register		CRC-L	CRC-H
0x01	0x10	0x00	0x20	0x00	0x01	0x02	0x02	0x06	0x20	0x52

Note: Codes for baudrate setting: 03-1200bps, 04-2400bps, 05-4800bps, 06-9600bps, 07--19200bps.

C: Example for the command "To read the transducer's name and configuration":

Address of slave equipment	Function code	Address of the first register		Quantity of registers		CRC-L	CRC-H
0x01	0x03	0x00	0x20	0x00	0x03	0x04	0x01

D: Example for the command "To clear the data of energy":

Address of slave equipment	Function code	Address of the first register		Quantity of registers		Data bytes count	Data written to register		CRC-L	CRC-H
0x01	0x10	0x00	0xA7	0x00	0x01	0x02	0x00	0x00	0xBF	0x47

5.2 Data

List of the format of data responded after the read command (suppose the rated value of voltage is 380V, the rated value of current is 5A):

No.	Parameter name	Input value	Hex. Data (100%)		Decimal Data (100%)	Note
			High byte	Low byte		
1	VA	380V	27	10	10000	True RMS
2	IA	5A	27	10	10000	True RMS
3	VB	380V	27	10	10000	True RMS
4	IB	5A	27	10	10000	True RMS
5	VC	380V	27	10	10000	True RMS
6	IC	5A	27	10	10000	True RMS
7	P	5700W	27	10	10000	Pa+Pb+Pc
8	Q	5700Var	27	10	10000	Qa+Qb+Qc
9	COSφ	1.0000	27	10	10000	Average of 3 phases
10	F	50Hz	C3	50	50000	Value of phase A
11	Kwh	5.7Kw/h	4 bytes (high order ahead)		Maximum accumulative value is 0x7FFFFFFF	Active energy
12	Kvarh	5.7Kvar/h	4 bytes (high order ahead)		Maximum accumulative value is 0x7FFFFFFF	Reactive energy

5.2.1 Format of the data of current, voltage and power

2 bytes Sign + Data (No Sign for AC voltage and AC current)
Range of the data: -12000~+12000
Meaning of the data: 10000 correspond to the rated input value. For example, when the maximum value of input current is 5.000A, the expected output value is 10000D or 2710H and 2.500A correspond to 5000D or 1388H of the expected output value.

8-bit Low order byte (responded data)

7	6	5	4	3	2	1	LSB

8-bit High order byte

Sign 1=negative 0=positive	MSB	13	12	11	10	9	8

5.2.2 Calculation of power:

(For 3-phase 3 wire or 1 element transducers, their calculations need not multiply by 3.)

P=3*(Xp*(5*380))/10000 (W)

Q=3*(Xq*(5*380))/10000 (Var)

Thereinto:

Xp——The data of active power received by the master equipment. (2 bytes, high order byte ahead, the MSB is sign bit.)

Xq——The data of reactive power received by the master equipment. (2 bytes, high order byte ahead, the MSB is sign bit.)

5.2.3 Calculation of active energy:

N=n*(5*380)/(1000*3600) (kWh)

Thereinto:

n——The data of active energy received by the master equipment. (4 bytes, high order byte ahead, the MSB is sign bit.)

5.2.4 Calculation of frequency:

f=F/1000 (Hz)

Thereinto:

F—— The data of frequency received by the master equipment. (2 bytes, high order ahead, no sign bit.)

5.2.5 Calculation of current and voltage:

u = (U/10000)*380 (V)

Thereinto:

U—— The data of voltage received by the master equipment. (2 bytes, high order byte ahead, the MSB is sign bit.)

i = (I/10000)*5 (A)

Thereinto:

I—— The data of current received by the master equipment. (2 bytes, high order byte ahead, the MSB is sign.)

Please contact us if you need some internal calibrating commands for zero point calibration

5.3 Orders for other products

5.3.1、For AJ31/AJ32,to read all data：

Address of slave equipment	Function code	Address of the first register		Quantity of registers		CRC-L	CRC-H
0x01	0x03	0x00	0x10	0x00	0x0C	0x44	0x0A

Please see above 5.1.2.1 list of definitions of register of electrical parameters data for the sequence of the output data.
Without the voltage and current of phase B.
The other orders are the same.

5.3.2、For AJ11/AJ12, to read all data：

Address of slave equipment	Function code	Address of the first register		Quantity of registers		CRC-L	CRC-H
0x01	0x03	0x00	0x10	0x00	0x0A	0xC4	0x08

Please see above 5.1.2.1 list of definitions of register of electrical parameters data for the sequence of the output data.
Without the voltage and current of phase B&C,
The other orders are the same.

5.3.3、For AI32, to read all data：

Address of slave equipment	Function code	Address of the first register		Quantity of registers		CRC-L	CRC-H
0x01	0x03	0x00	0x10	0x00	0x03	0x04	0x0E

Please see above 5.1.2.1 list of definitions of register of electrical parameters data for the sequence of the output data.
Only have the current of phase A, B and C.
The other orders are the same.

5.3.4、For AI12/AU11/AK10/AK22, to read all data：

Address of slave equipment	Function code	Address of the first register		Quantity of registers		CRC-L	CRC-H
0x01	0x03	0x00	0x10	0x00	0x01	0x85	0xCF

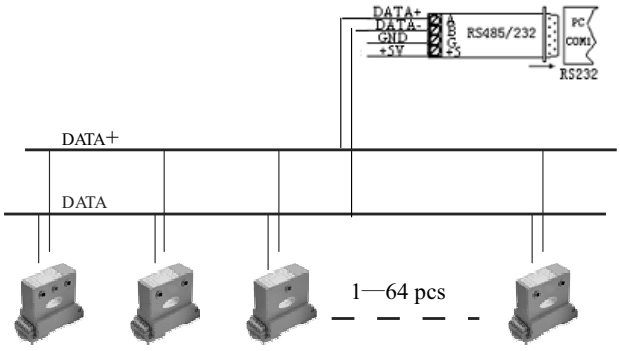
AI12: there is only one element current
AU11: there is only one phase voltage
AK10: the low byte of the return data stands for the 1~8 channel switching value data
AK22: the high byte of the return data stands for the 9~16 channel switching value, while the low byte stands for 1~8 channel, the lowest bit is for channel 1.
The other orders are the same.

The order of read all data for the unlisted products, please infer by the qty of the data.

6. System Connecting and Programming

6.1 System Connecting

When series HJ-A digital electrical parameter transducers are applied in measuring and controlling system, the RS-485 system connections are as follows:



Connections of RS-485 network

HJ-A digital transducer is able to communicate with all kinds of master equipments (computers) by appropriate connecting. The connecting method: connect pin "DATA+" of D485(RS-232/RS-485) converter of the master equipment together with the pins "DATA+" of all transducers, connect the pin "DATA–" of that of master equipment together with pins "DATA–" of all transducers, and put resistance terminators (120Ω) at two ends of the bus (it is not necessary when the distance is ≤1200m). Then connect to the power source. The measurements can work with running application software of the sensor/transducer in the master equipment.

6.2 Application and Programming

These transducers can easily measure many kinds of useful electrical parameters of 3-phase 4-wire, 3-phase 3-wire and single phase power circuits. It can be widely used in various industrial control and measuring systems. One multi-parameter digital sensor/transducer can supersede many kinds of single parameter transducers, i.e. current, voltage, frequency, power, power factor and energy transducers etc. It can reduce the cost of system and is easy to wiring at work site; especially its advanced isolation technology greatly improved the performance of system and helps to provide higher reliability and stability of the system. HJ-A is able to connect to any industrial digital control system with the RS-485 bus communication technology, ASCII and MODBUS command set. So it is convenient to program and to extend the system and let you build up your own control system easily.

The default configuration of each HJ-A transducer before delivery: transducer address is set to "01" (hex), and baud rate is 9600bps.

Note: 1. Transducer address is programmable. It can be set from 0 through 255(00-FFH) optionally.
2. Five programmable baud rates can be used: 1200bps, 2400bps, 4800bps, 9600bps and 19200 bps.
3. The configuration data will be stored in EEPROM after the transducer address and baudrate were revised.

6.2.1 Select the Measuring Range:

You may select Series HJ-A products with their measuring range of voltage (0~500V), current (1~25A). Usually 1.2 times of the maximum value of measuring range can be measured correctly. If it is necessary, you can use an external current transformer to transform heavy current into a standard input for the transducer. The transducer could not be damaged when the inputs are less than 2 times of the maximum value of measuring range of voltage or 10 times of the maximum value of measuring range of current. Pay attention to connect the polarity of power correctly with right rated voltage.

6.2.2 Configuration:

Each HJ-A sensor/transducer must be configured before it is connected to a network. The baudrate of transducer must conform to that of the network; and no address collision (no overlapping the address of any other device in the network) could be allowed. To configure a transducer you need RS-485/RS-232C converter, master equipment with RS-232 interface and application software of intelligence transducer. The configuration can be completed easily by HJ-A sensor/transducer application software. Also you could configure it by programming according to the command set of the transducer.

6.2.3 Data acquisition:

After you connected the transducer correctly and properly, when the master equipment sends one of read data commands, the transducer will return (respond) the measured data to the master equipment. The data inside the EEPROM of the HJ-A sensor/transducer will be refreshed every 100ms. Data of energy is accumulated since powered-on and is cleared after received a clear command.

7. Power supply and case style of transducer

7.1 Power supply

HJ-WYS-1

Model	HJ-WYS-1/1A/1B
Input Voltage	220V±10%, 50Hz
Rated Current Output	500mA
Output Voltage	DC ±12V, ±15V, +24V
Output Ripple	≤10mV

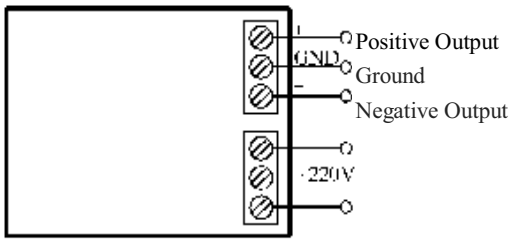
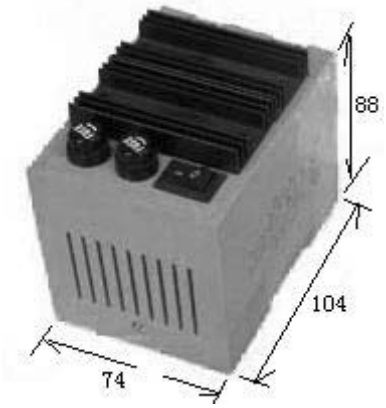
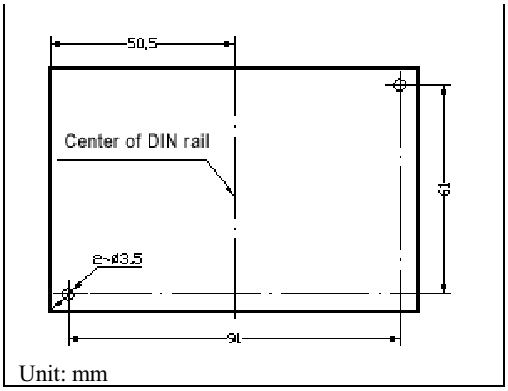


Fig.7.1 Connections for HJ-WYS-1





HJ-WYS-2:

Model	HJ-WYS-2
Input Voltage	220V±10%, 50Hz
Rated Current Output	200mA
Output Voltage	DC +12V, +15V, +24V
Output Ripple	≤10mV

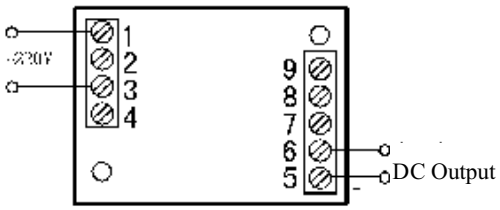
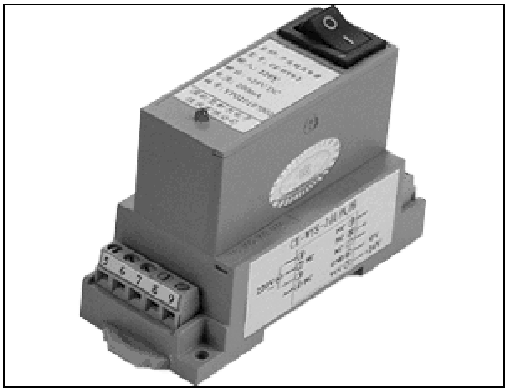
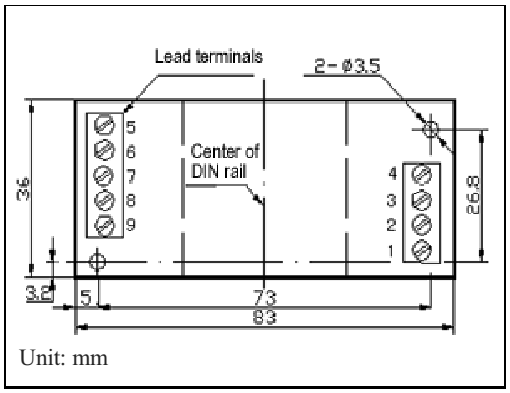


Fig. 7.2 Connections of HJ-WYS-2





Note: HJ-WYS1 and HJ-WYS-2 are switching mode regulated power supply with positive voltage output. The voltage output of HJ-WYS-1A is not adjustable. The voltage output of HJ-WYS-1B linear regulated power supply is adjustable. HJ-WYS-2 is of S3 case style.

7.2 Case style and dimensions

Fig .7.2.1, 7.2.2, 7.2.3 and 7.2.4 show S3 case style. 35mm DIN rail or PCB surface screw mounting. Their dimensions: 36(W) × 83(L) × 76(H) mm.

Fig. 7.2.1: S3
1 element

Fig. 7.2.2: S3
3-phase 3-wire

Fig. 7.2.3: S3
3-phase 4-wire

Fig. 7.2.4: S3, No aperture for Voltage input

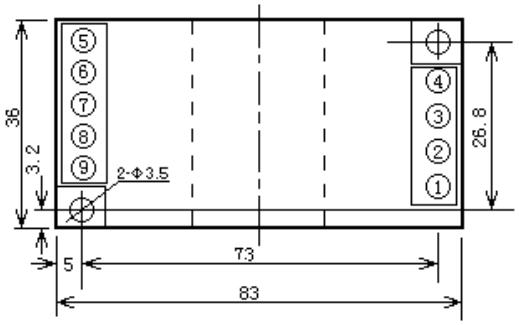


Fig. 7.2.5 Mount size of S3 case style (top view)

Fig .7.2.6 shows N case style. DIN rail or PCB surface screw mounting.

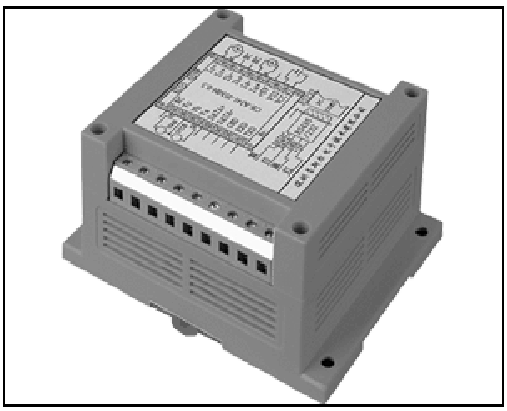


Fig.7.2.6: N case style
Dimension: 90×115×75 mm
Mounting size: 70×105 mm

8. Ordering Instructions and Notice to User

8.1 Ordering Instructions

8.1.1 Preparing your order

Please make sure that complete and correct part numbers and product descriptions are used according to abovementioned instructions. The order information must include the complete description of input and output parameters such as AC or DC, 1 element or 3-phase 3-wire or 3-phase 4-wire, measuring range, interface, power supply, case style and interface converter etc.
Part number(s), quantity, delivery and shipping requirements must be included in your order. Provide complete company name, address, fax number or email and contact person.

8.1.2 Confirmation of order

All orders must be confirmed by us through FAX or e-mail.

8.1.3 Payment

For bigger order, payment is effected by irrevocable L/C at sight. For smaller order, 50% in advance and the remaining 50% to be paid before shipment date.

8.2 Notice to User

8.2.1 Please check the part number of the products carefully in accordance with packing list and product labels before apply them in your system.

8.2.2 Make sure to connect the inputs, outputs and power supply correctly and properly before power on.

8.2.3 Requirement of power supply: accuracy 5% or better, ripple Vpp ≤0.4%.

8.2.4 For transducers with current output, open circuit output or more than 250Ω load resistance are not allowed. For transducers with voltage output, short circuit output or less than 2KΩ load resistance is not allowed.

8.2.5 Conductive dust and corroding gases may damage the circuit and connections. They are hazardous to the product. Don't operate in that environment.

8.2.6 Please ensure that the terminal screws are tightened securely and reliably before measuring with probes of meters directly on the terminals.

8.2.7 For more precise measurement, it is suggested that it can start after all circuits and the transducers had been powered on for 15 minutes.

8.2.8 When the transducers are used in an environments with strong electromagnetic interference. Standard protection should be taken. Such as input and apertures should be shielded, output wires should be as shorter as possible. If transducers are mounted together, please keep a space more than 10mm between adjacent units. 35mm (width) DIN rail mounting or M3 screws for surface mounting is available optionally.

8.2.9 The zero point and the accuracy calibration for the products have been made before delivery. Please don't readjust it. Contact the company if field readjustment is required.

8.2.10 Never remove or damage the labels on the product.

8.3 Warranty Service

8.3.1 In case the product does not operate properly, please contact our Marketing Department or Technical Department by fax or by e-mail and explain the phenomenon of the problem, your operation environment and appoint a technician to contact.

We are here for you. Addresses and Contacts.

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