JY9 Series Intelligent Reactive Compensator User Manual
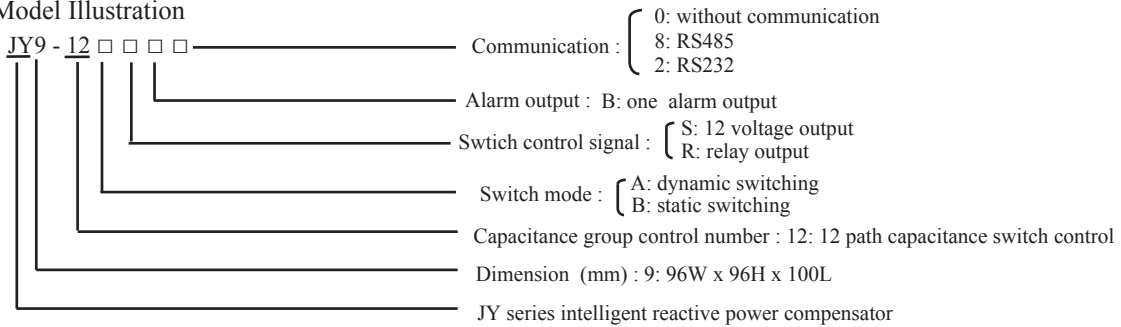

Features:

⊙Measuring parameters:voltage/current/active power/reactive power/power factors/frequency etc

⊙12 capacitance group control switch output,output isolation completely

⊙True effective value measurement

⊙RS485 communication, Modbus RTU communication protocol

⊙Switching capacitance group automatically or by manual

⊙Adopting advanced control algorithm,reactive power as control object, power factor affect to switch on or off the threshold

⊙Integrated protection function,with overvoltage and undervoltage protection .

JY9 Series Meter is widely apply for control system、 SCADA system and energy management system 、 substation automation、 power distribution network automation、 community electric power monitoring、 industrial automation、 intelligent buildings、 intelligent power distribution plate 、 switch cabinet 、 conveniently mounting&maintenance 、 easy connecting 、 enable to set & program input parameter in spot etc.

⚠ Pls kindly operation according to the manual to avoide accident & broken products.

1 .Model Illustration

JY9 - 12 □ □ □ □

Communication :
- 0: without communication
- 8: RS485
- 2: RS232

Alarm output : B: one alarm output

Swtich control signal :
- S: 12 voltage output
- R: relay output

Switch mode :
- A: dynamic switching
- B: static switching

Capacitance group control number : 12: 12 path capacitance switch control

Dimension (mm) : 9: 96W x 96H x 100L

JY series intelligent reactive power compensator

2. Ordering Model

Model	Alarm Mode	Switch Groups	Communication	Switch Mode	Switching Input
JY9-12BRB8	1	12 group	RS485	static	no
JY9-12BRB	1	12 group	no		
JY9-12BSB8	1	12 group	RS485		
JY9-12BSB	1	12 group	no		

3.Technical Specification

Network	3 phase 4wire
Voltage measuring rage	AC 380±15%(using B、C wire voltage and A path current)
Voltage over load	continuous:1.2 times instance: 2times/10s
Voltage consumption	＜1VA (each path)
Voltage resistance	≥300KΩ
Voltage accuracy	RMS measurement accuracy : 0.5%F.S
Current measuring rage	AC 0.050~5A
Current over load	continute :1.2times instance: 10times/10s
Current consumption	<0.4VA (each phase)
Current resistance	<20mΩ
Current accuracy	RMS measurement accuracy : 0.5 % F.S
Frequency	40~60Hz、accuracy:1Hz
Power	reactive power、 active power、 power factors、 accuracy 1%F.S
Display	TFT color display,320x240 pixel , multi-language display
Power Supply	AC/DC 100~240V
Digital output connector	RS485, Modbus-RTU
Alarm output	1 loop switch output, 250VAC/3A or 30VDC/5A
Control output	12 groups capacitance control switch output, relay output AC250V/3A or 30VDC/5A

Working environment	temperature: 0~50'C humidity: <85% RH
Storage environment	-20 ~ 75'C
Isolation & withstand voltage	signal input VS power AC2000V, signal input VS output AC 2000V
Insulation	input、output、power to meter cover >5MΩ
Dimension	96Wx96Hx100L (mm)
Weight	0.6kg
Standard Ref.	JB/T 9663-1999 <<low voltage reactive power automatic compensation controller>>

4. Panel Specification
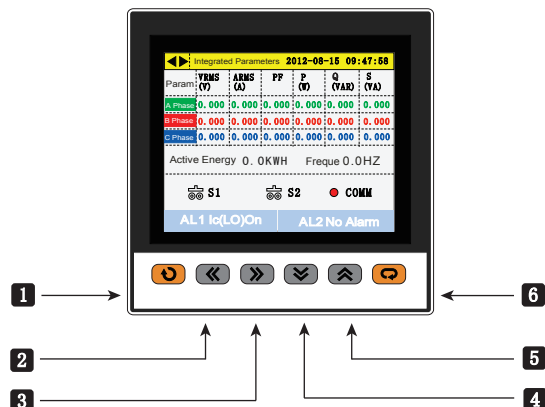
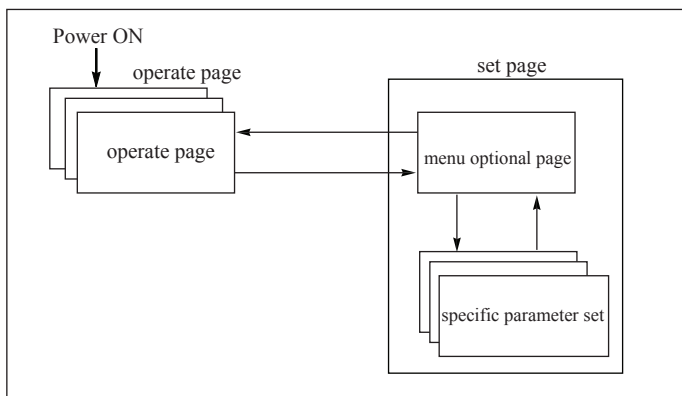| No.	Sign	Name	Function Specification
1	↻	input setting interface key、confirm key	enter setting interface: longly press " ↻ " 3minutes, remove to enter into setting interface confirm key function: confirm amendment
2	≪	cursor left moving key、page down key	cursor left moving: press this key to left moving cursor page down: page down on operating interface
3	≫	Cursor right moving key、page up key	cursor right moving :press this key to right moving cursor page up: page up on operating interface
4	�	Cursor moving down、modify parameter & decreasing key	Modify parameter: decreasing parameter value when modifying parameters.
6	≫	Cursor moving up , modify parameter&increasing key	Modify parameter: increasing parameter value when modifying parameters.
7	↩	Exit key	Exit the operation interface

5.Menu amending specification

Checking measuring value & working status specification:

1.On measuring status, press key "≪ ／ ≫" to operate automatically、current voltage interface、 power factor interface switching display .

2. On operating status, C1-C12 as the output indicator of capacitance , red light means capacitance output, gray light means without output.

3.On the row of operating page is the current system ampere、voltage、active power、reactive power、frequency、power factors parameters ,ect.

4. On automatic operation page, press key " ↻ " to enter manual operation page, on manual operation page, status bar indicates " manual operation page" . on "manual operation" status, press "≪ ／ ≫" to switch cursor, such as : when cursor is on"C1", press " ↻ " to shift C1 thresh by manual or C1 cut off by manual. It is the same operation when cursor is on C2-C12.
In manual operation page, press ↩ to exit manual operation page based on the remind.

5. The last line of operating page indicates capacitance switching status & alarm status.
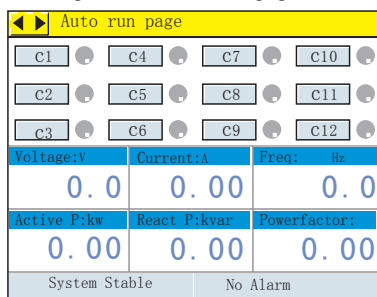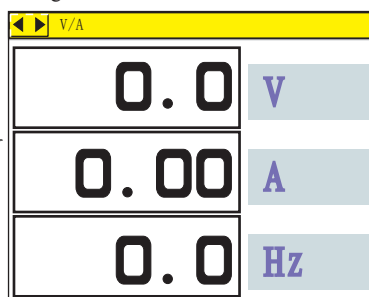
6. Menu Flowchart

■ Total Interface Flowchart

Power ON

operate page

operate page

operate page → menu optional page

set page

menu optional page

specific parameter set

■ Operation Page

1. electric parameter indication page

electric parameter indication page

C1	C4	C7	C10
C2	C5	C8	C11
C3	C6	C9	C12

Voltage:V   Current:A   Freq: Hz
0.0   0.00   0.0

Active P:kw   React P:kvar   Powerfactor:
0.00   0.00   0.00

System Stable   No Alarm

» «

voltage current measurement indication

V/A

0.0   V
0.00   A
0.0   Hz

» «

power measurement indication

POWER

0.00   kW
0.00   kvar
0.00   PF
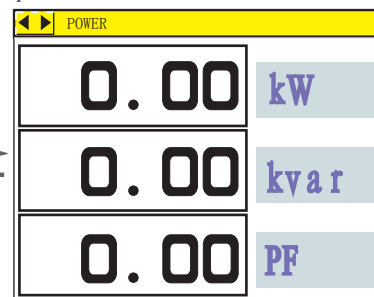
■ Setting Page

system setting

Sys setting

Def page: Auto run page
Language: ENGLISH
Backlight: 10
Password: 0

Initial

Exit

signal set

Signal Set

CT : 1.0

Exit

alarm set

Alarm Set

Alarm mode: 0
Alarm unit: 1
Alarm value: 250.0
Hysteresis: 10.0

Exit

setting

SETTING

System Set   Signal Set
Alarm Set   Comm Set
Thres Set   Capacitor Set

Exit

communication set

Comm Set

Comm addr: 1
Comm baud: 9600

Exit

threshold set

Thres Set

Inp Thr Dly	30	S	Thres Md	0	
Cut Thr Dly	30	S	Act cap	1	kVA
Reinput Dly	30	S	Targer PF	0.90	
Fastcut Dly	10	S	Less Volt	200.0	V
Volt Hyst	10	V	Over Volt	300.0	V

Exit

capacity set

Cap Set

Group1	15	kvar	Group7	15	kvar
Group2	15	kvar	Group8	15	kvar
Group3	15	kvar	Group9	15	kvar
Group4	15	kvar	Group10	15	kvar
Group5	15	kvar	Group11	15	kvar
Group6	15	kvar	Group12	15	kvar

Exit

Menu & function specification

No.	1st class	2nd class	Default value	specification	optional range
1	(Sys setting) system setting	Def page	default interface	defaulting power on page is "automatic main page"	
		date and time	yyyy-mm-dd hh:mm:ss	year-month-date hour:minute:second	
		language	chinese	chinese&english page setting	
		back light brightness	10	back light brightness class No.	1~10 class
		password	0	setting password of entering menu, four digits,customers can amend automatically	0～9999
		ex-factory setting		recovering to the ex-factory setting	
2	signal set	current ratio	1.0	setting current signal ratio =primary side current/secondary side current	0.1～1000.0
3	alarm set	alarm mode	0	refer to "table 1" for alarm mode	
		alarm value unit	1	1: on behalf of international standard unit, K: representing 1000times of international standard unit, alarm value is as same as alarm hystersis value unit	
		alarm value	250.0	alarm value setting	0.1～999.9
		hystersis	10.0	hystersis value setting	0.1～999.9
4	(Comm set) communication setting	comm address	1	meter address	1～255
		comm baud rate	9600	4800 or 9600 bps	
5	(Thres set) Threshold setting	Inp Thr Dly	30	capacity group intput delay time unit: second	0~999S
		Cut Thr Dly	30	capacity group switch off delay time unit: second	0~999S
		Reinput Dly	30	capacity group discharging time unit: second	0~999S
		Fastcut Dly	10	over voltage or under voltage cutting off delay unit: second	0~999S
		volt hyst	10	over voltage or under voltage voltage hystersis unit: V	0~99V
		Thres Md	0	threshold mode : switch capacitance control group	0～12
		Act capacity	2.0	begin switching control while apperant power bigger than this value unit:kVA	0~999.9KVA
		Target PF	0.90	aim power factor	0～1.00
		Lesss Volt	300.0	undervoltage threshold value unit:V(capacitance group totally switch off while measure voltage is lower than undervoltage threshold	100~400V
		Over Volt	500.0	overvoltage value unit:V(capacitance group totally switch off while measure voltage is higher than overvoltage threshold.)	200~600V
6	capacity setting	Group1	15	1st group capacitor power unit: Kvar	0~999Kvar
		Group2	15	2nd group capacitor power unit: Kvar	0~999Kvar
		Group3	15	3rd group capacitor power unit: Kvar	0~999Kvar
		Group4	15	4th group capacitor power unit: Kvar	0~999Kvar
		Group5	15	5th group capacitor power unit: Kvar	0~999Kvar
		Group6	15	6th group capacitor power unit: Kvar	0~999Kvar
		Group7	15	7th group capacitor power unit: Kvar	0~999Kvar
		Group8	15	8th group capacitor power unit: Kvar	0~999Kvar
		Group9	15	9th group capacitor power unit: Kvar	0~999Kvar
		Group10	15	10th group capacitor power unit: Kvar	0~999Kvar
		Group11	15	11th group capacitor power unit: Kvar	0~999Kvar
		Group12	15	12th group capacitor power unit: Kvar	0~999Kvar

7. Output Function

12 loops capacitance group output: according to system power factor to compensate&realize common compensation.

8. Communication Agreement

Meters use Modbus RTU communication agreement to operate RS485 half duplex communication, reading function code:0x03,written function code:0x10.
Data frame format:

start bit	data bit	stop bit	check bit
1	8	1	No

Communication abnormal handling:

while the abnormal answere, the highest bit of function No. is 1.

For example: if the host computer requesting function No. is 0x04,then vice machine returning function No. is 0x84.

Error type codes:

0x01---function code error : Meter doesn't support the function code it recieve.

0x02---data bit error: Data position assigned by host computer is out of meter rage.

0x03---data value error: data value sent by host computer is out of meter data rage

1. Read multi-register

Example : Master computer read Ua (A phase voltage)

Ua add. code is 0x0000, because Ua is the fixed data(4byte), occupys 2data register.

220.0V corresponding data is 0x00000898

Master request(Read multi-register)							
1	2	3	4	5	6	7	8
meter address	function code	start address high bit	start address low bit	data byte lengt high bit	data byte length low bit	CRC code low bit	CRC code high bit
0x01	0x03	0x00	0x00	0x00	0x02	0xC4	0x0B

Slave normal answer (Read multi-register)								
1	2	3	4	5	6	7	8	9
meter address	function code	data byte No.	data1 high bit	data1 low bit	data2 high bit	data2 low bit	CRC code low bit	CRC code high bit
0x01	0x03	0x04	0x00	0x00	0x08	0x98	0xFC	0x59

function code abnormal answer(such as master computer request function code 0x04)

Slave computer abnormal answere(Read multi-register)				
1	2	3	8	9
meter address	function code	error code	CRC code low bit	CRC code high bit
0x01	0x84	0x01	0x82	0xC0

2. Write multi-register

such as: Master computer fixed data current ratio CT

If CT address code is 0x00A0, because CT is fixed data, occupys 1 data register. Decimalist 11 corresponds to 0x000B.

Master computer request(write multi-register)										
1	2	3	4	5	6	7	8	9	10	11
meter address	function code	start address high bit	start address low bit	data byte length high bit	data byte length low bit	data byte length	data 1 high bit	data 1 low bit	data 2 high bit	data 2 low bit
0x01	0x10	0x00	0xa0	0x00	0x01	0x02	0x00	0x0B	0xFF	0x37

Slave computer normal answere (write multi-register)							
1	2	3	4	5	6	7	8
meter address	function code	Start address high 8 bit	Start address low 8 bit	Data byte length high bit	Data byte length low bit	CRC code low bit	CRC code high bit
0x01	0x10	0x00	0xa0	0x00	0x01	0x01	0x1B

data position error answere(such as master computer request writing address index is 0x0050)

Slave computer abnormal answere(write multi-register)				
1	2	3	4	5
meter address	function code	error code	CRC code low bit	CRC code high bit
0x01	0x90	0x02	0xCD	0xC1

Note : address code is equal to analog groups index

No.	Add. reflection	Analog name	Indicate default	Byte	Optional value rage	Analog attributes	Remarks
1	0x0000	line voltage		2	long	R	0.1V
2	0x0001	line current		2	long	R	0.001A
3	0x0002	active power		2	long	R	0.001kW
4	0x0003	reactive power		2	long	R	0.001kvar
5	0x0004	apparent power		2	long	R	0.001kVA
6	0x0005	power factor		2	long	R	0.01
7	0x0006	network frequency		2	long	R	0.1Hz
		reserve					
8	0x0050	starting threshold capacity	2.0	1	int	R/W	0.1kVA
9	0x0051	current ratio	1.0	1	int	R/W	0.1
10	0x0052	wire connection mode	0	1	int	R/W	remark
11	0x0053	alarm mode	0	1	int	R/W	table 1
12	0x0054	alarm value	250.0	1	int	R/W	0.1
13	0x0055	hystersis value	10.0	1	int	R/W	0.1
14	0x0056	alarm unit	0	1	int	R/W	note ②
15	0x0057	meter address	1	1	int	R/W	
16	0x0058	baud rate	1	1	int	R/W	note ①
17	0x0059	input threshold delay	30	1	int	R/W	1S
18	0x005A	Cut threshold delay	30	1	int	R/W	1S
19	0x005B	re-input delay	30	1	int	R/W	1S
20	0x005C	Fastcut delay	10	1	int	R/W	1S
21	0x005D	voltage hystersis	10	1	int	R/W	1V
22	0x005E	switch mode	0	1	int	R/W	remark
23	0x005F	Threshold code	1	1	int	R/W	remark
24	0x0060	Target Power factor	0.90	1	int	R/W	0.01
25	0x0061	undervoltage threshold	300.0	1	int	R/W	0.1V
26	0x0062	overvoltage threshold	500.0	1	int	R/W	0.1V
27	0x0063	group 1 capacity	15	1	int	R/W	1 Kvar
28	0x0064	group 2 capacity	15	1	int	R/W	1 Kvar
29	0x0065	group 3 capacity	15	1	int	R/W	1 Kvar
30	0x0066	group 4 capacity	15	1	int	R/W	1 Kvar
31	0x0067	group 5 capacity	15	1	int	R/W	1 Kvar
32	0x0068	group 6 capacity	15	1	int	R/W	1 Kvar
33	0x0069	group 7 capacity	15	1	int	R/W	1 Kvar
34	0x006A	group 8 capacity	15	1	int	R/W	1 Kvar
35	0x006B	group 9 capacity	15	1	int	R/W	1 Kvar
36	0x006C	group 10 capacity	15	1	int	R/W	1 Kvar
37	0x006D	group 11 capacity	15	1	int	R/W	1 Kvar
38	0x006E	group 12 capacity	15	1	int	R/W	1 Kvar

note ① : bauld rate

communication value	0	1
menu indication	4.8	9.6

note ②:alarm/analog value unit

communication value	0	1
menu indication	1	K

16 digit CRC verify program

```
unsigned int Get_CRC (uchar*pBuf,uchar num)
{
    unsigned i,j;
unsigned int wCrc=0xFFFF;
for(i=0;i<num;i++)
    {
wCrc^=(unsigned int)(pBuf[i]);
for(j=0;j<8;j++)
        {
if(wCrc &1){wCrc>>=1;   wCrc=0xA001;}
else wCrc>>=1;
        }
    }
    return wCrc;
}
```

Attached table 1: alarm output and analog output electric parameter comparison table

No.	Parameters	Switch output(low limit alarm)code	Switch output(high limit alarm)code
1	U (line voltage)	1	2
2	I(line current)	3	4
3	P(active power)	5	6
4	Q(reactive power)	7	8
5	S(apparent power)	9	10
6	PF(power factors)	11	12
7	F(frequency)	13	14

9. Apperance& Mounting Dimension

panel size

side face size
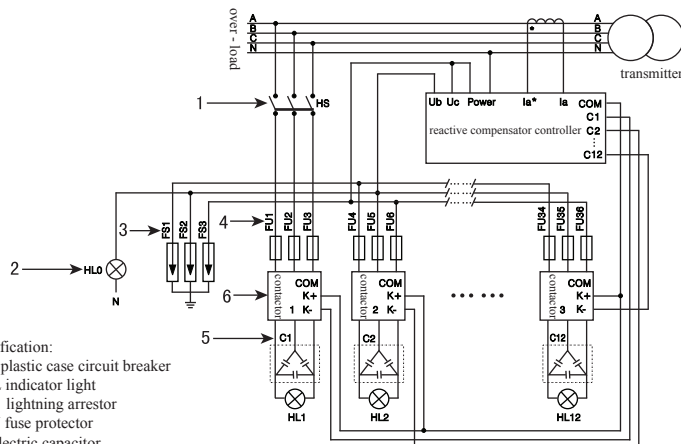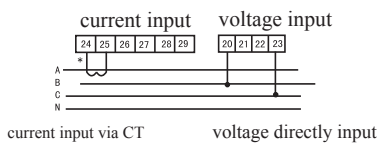
mounting size
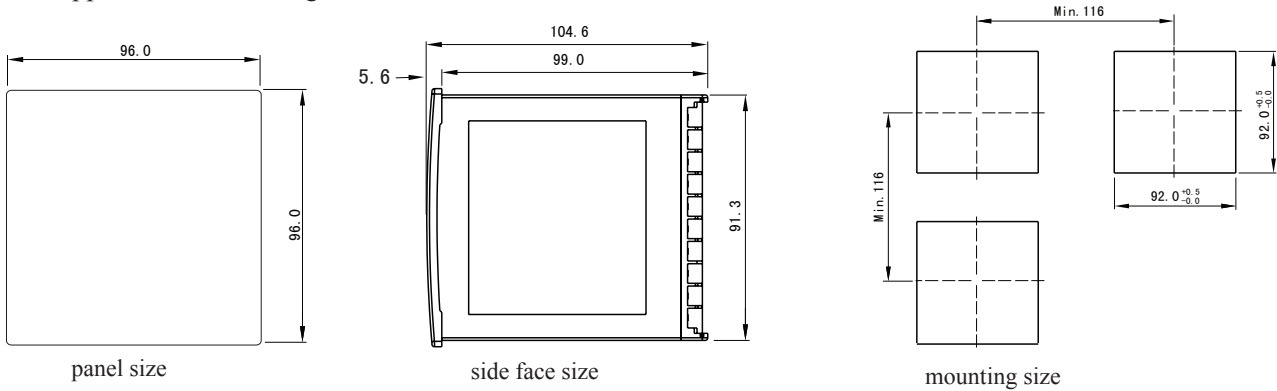
10. Connection Drawing
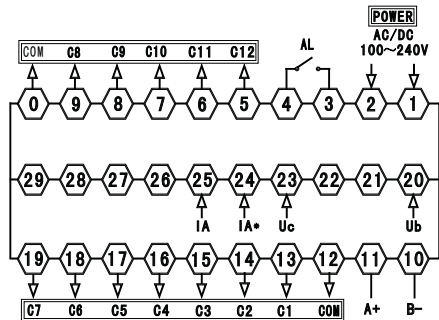
Noted:1.COM as common connector of relay ,
2 COM need to connect outside.

2.Communication connects by 2 wires, COM
is not the communication ground wire.

current input   voltage input

current input via CT   voltage directly input

Specification:
1.HS plastic case circuit breaker
2. HL indicator light
3. FS lightning arrestor
4. FU fuse protector
5.C electric capacitor
6. contactor

KKJY9C01-A0-7