

ES921 Series Three Phase Intelligent Power Meter Operation Manual



This series meters are widely applied to control system, SCADA system and energy management system, transformer substation automation, distributing net automation, residence community electrical power monitor, industrial automation, intelligent construction, intelligent switchboard, switch cabinet, etc. It is easy to install and maintain, simple connection, programmable setting parameters on meters or computer.

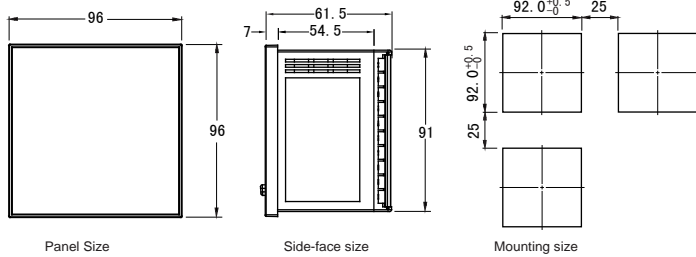
Features:

- Measuring Items: Voltage/Current/Active Power/Reactive Power/Frequency/ Power Factor
- Two DI and two DO , with remote communication and remote control function
- Output and input are completely isolated
- True effective value measurement
- With RS485 interface/Modbus RTU communication protocol
- With two programmable alarm

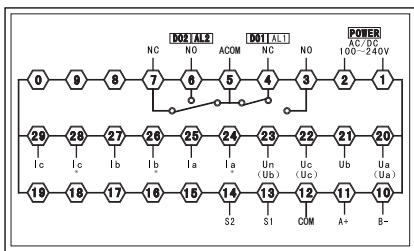
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Withstand voltage	Current VS 485 connection, DI connection ≥ DC 2000V
Isolation	Input/ Output/ Power supply to meter cover>5MΩ
Size	96Hx96Wx61.5L (mm)
Weight	0.5kg

Dimension and Mounting Size

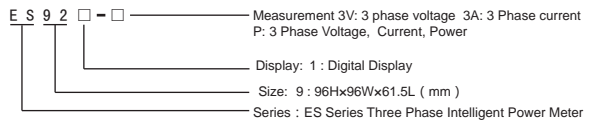


Connection Drawing



Note: Please subject to the connection drawing on the meter if have any changes.
Voltage input wire terminals with bracket indicate 3 phase 3 wire connection method.

Model

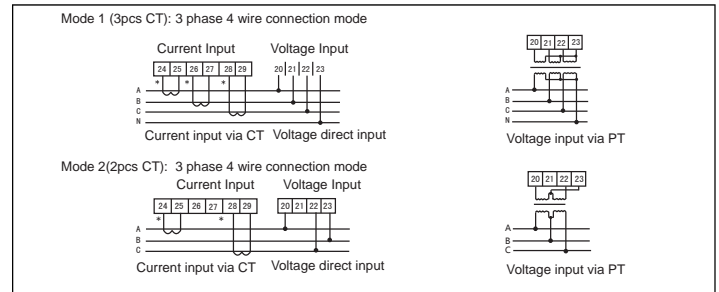


Model Indication

Model	DI(digital input)	DO(digital output)	Communication	Function Measure
ES921-P	2	2	One	Voltage, current,Power
ES921-3A	2	2	One	current
ES921-3V	2	2	One	voltage

Main Technical Parameters

Connection	3 Phase 3 Wires, 3 Phase 4 Wires
Voltage Range	AC:10-480V(L-L)
Voltage Overload	Continuous:1.2times Instantaneous:2times/2S
Voltage Consumption	<0.5VA (each Phase)
Voltage impedance	≥300KΩ
Voltage accuracy	RMS measurement accuracy class 0.5
Current range	AC 0.025 ~ 5A
Current Overload	Continuous:1.2times Instantaneous:2times/2S
Current Consumption	<0.5VA (each phase)
Current impedance	<20mΩ
Current accuracy	RMS measurement accuracy class 0.5
Frequency	45 ~ 60Hz accuracy 0.01Hz
Power	Active/Reactive/Apparent Power, Accuracy Class 0.5
Display	LCD light display
Power Supply	AC/DC 100 ~ 240V (85 ~ 265V)
Current Consumption	≤ 5VA
Switch Output	RS-485, MODBUS-RTU Protocol
Alarm Output	2 DO, AC250V/3A or DC30V/5A
Working environment	Temperature : -10 -50 °C Humidity: < 85%RH. Non-corrosive Gas; altitudes2500m
Storage environment	-40 ~ 70°C



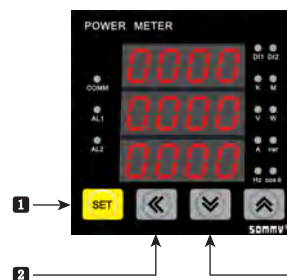
Explanation:

- A. Voltage input: Input voltage should be not higher than the rated input voltage of meter, otherwise a PT should be used.
- B. Current input: Standard rated input current is 5A. A CT should be used when the input current is bigger than 5A. If some other meters are connected with the same CT, the connection should be serial for all meters.
- C. Please make sure that the input voltage is corresponding to the input current, they should have the same phase sequence and direction, otherwise data and sign error may occur (power and energy).
- D. The connection mode of meter which is connected to power network should depend on the CT quantity. For 2pcs of CT, it should be 3 phase 3 wire connection. For 3 pcs of CT, it should be 3 phase 4 wire connection. Meter wire connection, the input network Link setting in the software menu should according to the connection mode of the measured load. Otherwise, the measured voltage or power is incorrect.

Caution:

1. Power supply connection must be correct.
2. Pay attention on the phase sequence of voltage signal input.
3. Current signal input should be connected with same name terminal as per the connection drawing.
4. Connection mode should be consistent with the "LIN" menu setting. (3 phase 3 wire or 3 phase 4 wire)
5. Isolation between power supply and main measurement circuit, in cause of leakage switch wrong action

Panel Indicate



Symbol	Function
DI1	DI1 input indication
DI2	DI2 input indication
K	K Unit indication light
M	M Unit indication light
V	Voltage display
W	Active power display
A	Current display
Var	Reactive power display
Hz	Frequency display
cosφ	Power factor display
COMM	Communication light
AL1	Alarm 1 indication light
AL2	Alarm 2 indication light

Item	Symbol	Name	Function
1	SET	Set Key	Press this key for 3 seconds to enter menu ; to confirm the modified menu value
2	←	Left Key	Act as return key in menu operation; used as shift key in menu modification status
3	↘	Decrease Key	Enter data modification in menu operation; Decrease the value
4	↗	Increase Key	Enter data modification in menu operation; Increase the value

Measure and display Indication:

1. In 3 phase 4 wire measure status , press “↗/↘” key to shift display of 3 phase voltage , 3 phase current , 3 phase active power , 3 phase reactive power , 3 phase apparent power , 3 phase power factor , total power , frequency , etc .

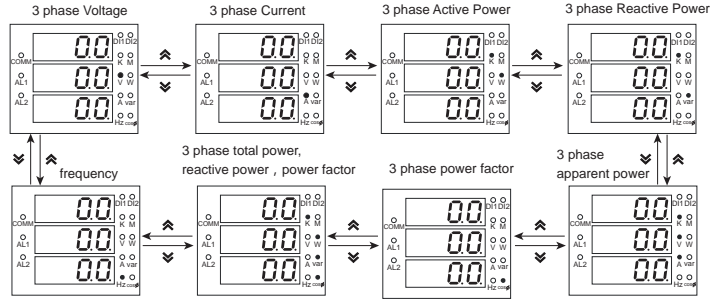
2. DO1 , DO2 used as alarm output status indication in alarm mode ; used as switch output status indication in remote control mode .

3. COM flashing means in communication status .

Note : 26 English letters display mode :

English letters	A	B	C	D	E	F	G	H	I	J	K	L	M
Display mode	A	b	c	d	E	F	G	H	I	J	K	L	M
English letters	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Display mode	n	o	p	q	r	s	t	u	v	w	x	y	z

Illustration for measure interface shift display:



(Note: In 3 phase 3 wire measure status , it only display 3 phase line voltage , 3 phase current , total active power , total reactive power , total power factor , frequency)

Menu modification instructions

Measurement Status

- In 3 phase 4 wire status, press ↗ or ↘ key, it can shift display 3 phase voltage, 3 phase current, 3 phase active power 3 phase reactive power, 3 phase power factor , total active power , total reactive power and total power factor, frequency.
- In 3 phase 4 wire status, press SET key to shift display of phase voltage and line voltage. But in 3 phase 3 wire status, only display line voltage.
- Press SET key more than 5 seconds to enter the user menu . please refer to the menu structure for the operation process.

Under user menu status

- If current menu is first or second level menu display, press SET key to enter next level menu display. Press ↘ or ↗ for short time to modify the menu or submenu .
- If the current menu is second or third level display, press ← key for short time to return to previous menu .
- If the current menu is third level display, press ↘ or ↗ for short time to flash modified value, and then press ↘ or ↗ to modify. Press ← to shift flashing position , and press SET key to confirm the modified value.
- After the modification, press SET key more than 5 seconds to exit the user menu, enter measure status. You also can press ← to exit the menu level by level.

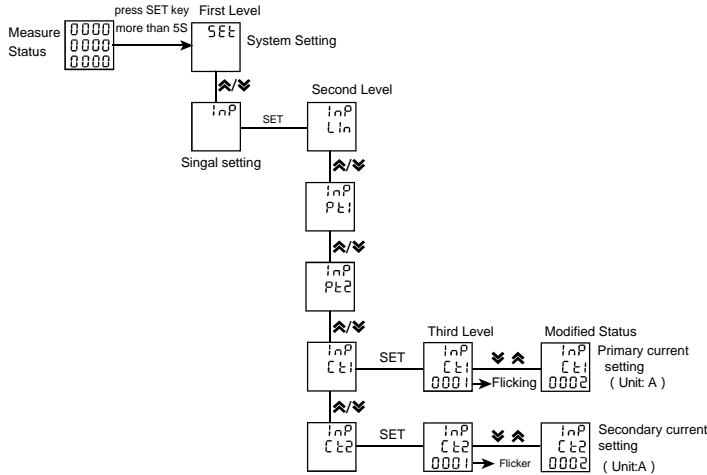
Menu structure and function description (Note: the decimal point of the parameter in the menu is fixed decimal point)

1st level	2nd level	3rd level	Description
System Setting SEt	Reset	CLrE 0000	input 1234 ,the menu can be used to reset default setting.
	User Password	USEr 0000	Modify password, default setting 0000, no password.
	Page Shift Time	PGCH 0000	measure interface page shift time. If set as 0 , means no page shift function.
Signal Setting InP	software version	VEr 1.1	Software version, read only
	Net	Lin 3-3 / 3-4	Set input mode, 3 phase 3 wire or 3 phase 4 wire
	Voltage ratio	Pt1 0.1-999.9	Primary voltage, unit KV
	Voltage ratio	Pt2 10.0-999.9	Secondary voltage, unit KV
Communication Setting CoN	Current Ratio	Ct1 1-9999	Primary current, unit A
	Current Ratio	Ct2 1.0-999.9	Secondary current, unit A
	Address	AdD 1-247	Meter address range
	Baud Rate	brd 122/224/428/926	Baud Rate: 1k2 : 1200, 2k4 : 2400, 4k8: 4800, 9k6 : 9600
Alarm Setting AL	Data Sequence	dTF H-L / L-H	High register is in front or low register is in front
	Parity bit	PrtY no/E/En/odd	No parity / even parity / odd parity
	Alarm mode	Ad1 0-58	When value is DO, it is remote control mode, otherwise it is alarm mode, please refer to alarm parameter table .
	Alarm value unit	Uti 1/E/M	1: means international standard unit, K: 1000 times of standard unit, M: 1000000 times of standard unit.
	Alarm value	AL1 0-999.9	1st alarm value setting (unit is standard display unit)
	Alarm hysteresis value	HY1 0-999.9	1st alarm hysteresis value setting
Alarm relay selection	oUt1	rL1/rL2	1st alarm relay function
	dLR1	0-99.9	Alarm action delay time, unit: second
Alarm reset time	dLb1	0-99.9	Alarm action reset time, unit: second

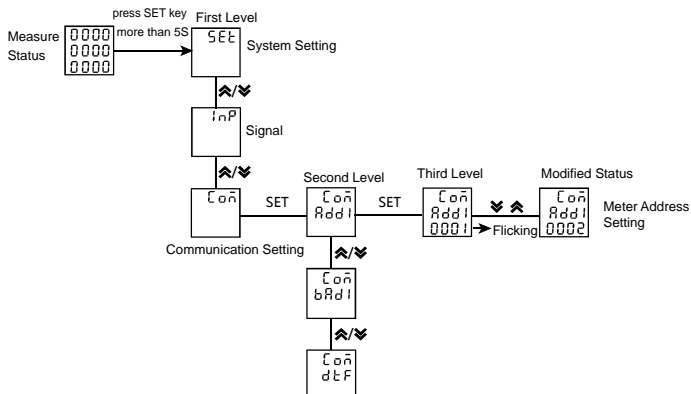
2nd alarm related parameter setting method refer to 1st alarm setting.

Note:Example of menu modification

Eg1: Method of setting current ratio



Eg 2: Method of setting communication address



Output function

- DO1, DO2 function can be used for remote control electrical equipment . If use this function, set alarm mode as 0 (DO) the alarm mode should be selected "0" (DO). otherwise DO1, DO2 act as AL1, AL2 alarm output. DO1 and DO2 function control parameter only can be set by RS485 communication.
- Communication function (communication protocol is offered separately)
- The alarm function, after power on, the meter runs stably for more than 5S, then alarm starts to operate

Alarm output parameters table

No.	Item	ON/OFF output (low alarm) code	ON/OFF output (high alarm) code
1	Ua(A phase voltage)	1 (UaL) (UabL)	2 (UaH) (UabH)
2	Ub(B phase voltage)	3 (UbL) (UcaL)	4 (UbH) (UcaH)
3	Uc(C phase voltage)	5 (UcL) (UbcL)	6 (UcH) (UbcH)
4	U(A, B, C any phase voltage)	7 (UL) (ULL)	8 (UH) (ULH)
5	Ia(A phase current)	9 (IaL)	10 (IaH)
6	Ib(B phase current)	11 (IbL)	12 (IbH)
7	Ic(C phase current)	13 (IcL)	14 (IcH)
8	I(A, B, C any phase current)	15 (IL)	16 (IH)
9	P(Total active power)	17 (PL)	18 (PH)
10	Pa(A phase active power)	19 (PaL)	20 (PaH)
11	Pb (B phase active power)	21 (PbL)	22 (PbH)
12	Pc(C phase active power)	23 (PcL)	24 (PcH)
13	Q(Total reactive power)	25 (QL)	26 (QH)
14	Qa (A phase reactive power)	27 (QaL)	28 (QaH)
15	Qb(B phase reactive power)	29 (QbL)	30 (QbH)
16	Qc(C phase reactive power)	31 (QcL)	32 (QcH)
17	S (Total apparent power)	33 (SL)	34 (SH)
18	Sa(A phase apparent power)	35 (SaL)	36 (SaH)
19	Sb(B phase apparent power)	37 (SbL)	38 (SbH)
20	Sc(C phase apparent power)	39 (ScL)	40 (ScH)
21	PF(Total power factor)	41 (PFL)	42 (PFLH)
22	PFa (A phase power factor)	43 (PfaL)	44 (PfaH)
23	PFb(B phase power factor)	45 (PfbL)	46 (PfbH)
24	PFc(C phase power factor)	47 (PfcL)	48 (PfcH)
25	F Frequency	49 (FL)	50 (FH)

The alarm codes in bracket are corresponding alarm parameters of 3 phase 3 wire . And in this status, not support single phase power parameters alarm output.