DS9L Series 3 Phase Inteligent Coulometer User Manual

This series meters are widely applied to control system, SCADA system and energy management system, transformer substation automation, distributing net automation, small district electrical power monitor, industrial automation, intelligent construction, intelligent switchboard, switch cabinet, etc. It is easy to install and maintain, simple connection, field programmable setting input parameters.
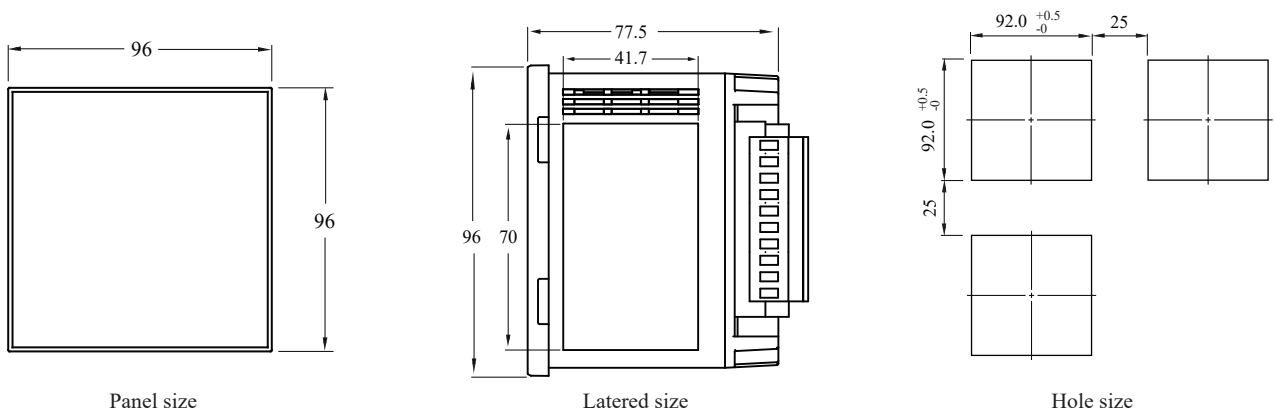
Features:
⊙Measuring Items: 3 phase power network Voltage/Current/Active Power/Reactive Power/Frequency/Power Factor etc, totally 28 parameters
⊙Two ON/OFF input and two ON/OFF output (optional four ON/OFF input)
⊙TRMS measurement
⊙With RS485 interface，Modbus RTU communication protocol
⊙One active energy pulse output
⊙With Power fail memory function for Kwh / KvarH

⚠ Warning   An accident may happen and product may be damaged if the operation does not comply with the instruction.
Declaration: The information provided in this manual can be revised without prior notice.We reserve the interpretation right to the provided information.
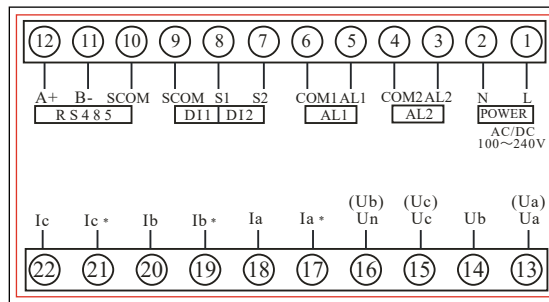
■ Specification

Connection	3 Phase 3 Wires, 3 Phase 4 Wires
Voltage measuring range	AC 3×220V/380V (3x57.7V/100V)
Voltage overload	Continuous: 1.2 times Instantaneous: 2 times/10S
Voltage consumption	<1VA (each phase)
Voltage impedance	≥300KΩ
Voltage accuracy	RMS measurement, accuracy class 0.5
Current measuring range	AC 0.025~5A
Current overload	Continuous: 1.2 times Instantaneous: 10 times/10S
Current consumption	<0.4VA (each phase)
Current impedance	<20mΩ
Current accuracy	RMS measurement, accuracy class 0.5
Freqency	45~60Hz, accuracy 0.01Hz
Power	Active / Reactive / Apparent power, accuracy 0.5 class
Energy	Active Energy 1 class, Reactive Energy 2 class
Display	LCD display (optional blue backlight, default white backlight)
Power supply working range	AC/DC 100~240V (85~265V)
Power supply consumption	≤5VA
Output digital interface	RS-485, MODBUS-RTU Protocol
ON/OFF input	2 ON/OFF input (Dry contact)
Alarm output	2 ON/OFF output, 250VAC/3A or 30VDC/5A
Working environment	Temperature: -10~50℃ Humidity:<85% RH; Non-corrosive Gas; altitude ≤2500m
Storage environment	-40~70℃
Withstand voltage	Power supply and 485 interface, DI interface, pulse output interface≥DC 2000V
Isolation	Input/ Output/ Power supply to meter cover>5MΩ
Dimension	96W×96H×61.5L(mm)
Weight	0.6kg

◼ Dimensions

96

96

96

Panel size

77.5
41.7
96 70

Latered size

92.0 +0.5 -0 · 25
92.0 +0.5 -0
25

Hole size

◼ Connections

| 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |

A+ B- SCOM SCOM S1 S2 COM1 AL1 COM2 AL2 N L

R S 4 8 5   DI1   DI2   AL1   AL2   POWER AC/DC 100~240V

Ic Ic * Ib Ib * Ia Ia * (Ub)Un (Uc)Uc Ub (Ua)Ua

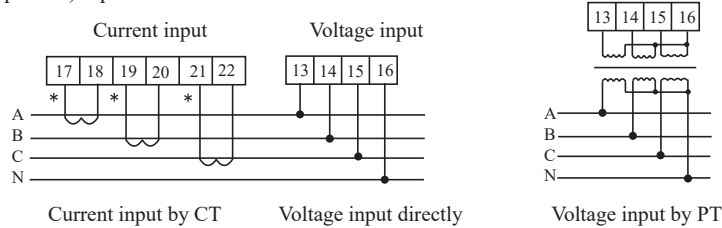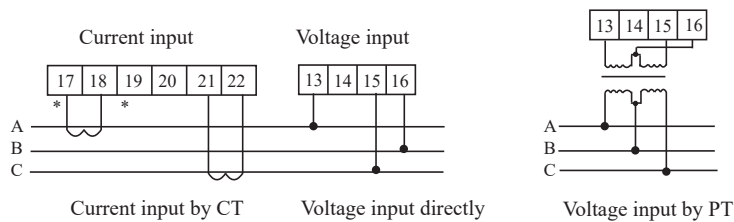| 22 | 21 | 20 | 19 | 18 | 17 | 16 | 15 | 14 | 13 |

Note: Voltage input connection terminal, labels in bracket show 3 phase 3 wire connection method;
If there is any change,please subject to the connection on the meter.

Mode 1(3pcs CT): 3phase 4wire connection

Current input   Voltage input

17	18	19	20	21	22
13	14	15	16
13	14	15	16

Current input by CT   Voltage input directly   Voltage input by PT

Mode 2(2pcs CT): 3phase 3wire connection(For Kwh)

Current input   Voltage input

17	18	19	20	21	22
13	14	15	16
13	14	15	16

Current input by CT   Voltage input directly   Voltage input by PT

Explanation：
A. Voltage input： Input voltage should not be 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 accord to the connection mode of the measured load. Otherwise, the measured voltage or power is incorrect.
E. Please pay high attention on the difference between 3 phase 3 wire and 3 phase 4 wire connection. Becasue wrong connection may lead to incorrect calculation of power factor, power and energy.

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 as per the connection drawing.
4. Connection mode should accord to the setting of user menu "LIN".
5. Energy pulse output is open collector output.
6. Isolation between power supply and circuid board, in cause of leakage switch mis-action

■ Panel Indication
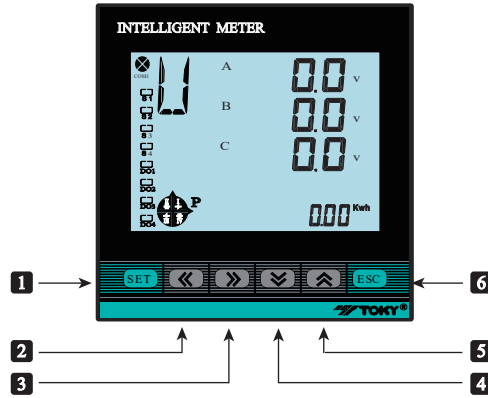
Item	Symbol	Name	Function	
1	SET	Set Key	△Press this key for 5s enter the menu	△To confirm the modified menu value
2	≪	Left Key	△Change menu and shift data in menu operation	△To shift measure page outside of the menu
3	≫	Right Key	△Change menu and shift data in menu operation	△To shift measure page outside of the menu
4	⟱	Decrease Key	△Enter data modification in menu operation	△To shift energy page outside of the menu
5	⟰	Increase Key	△Enter data modification in menu operation	△To shift energy page outside of the menu
6	ESC	Return Key	△For rollback in menu operation	△Back to previous menu

Indication of checking the measure value and meter working status:
1. Under Measuring Status, Press " ≪ / ≫ " key to switch display 3 phase phase voltage, 3 phase line voltage, 3 phase current, 3 phase active power, 3 phase reactive power, 3 phase power factor, total power, frequency, etc.
2. Press " ⟰ / ⟱ " key to switch display total Kwh (algebraic sum), forward Kwh, backward Kwh, total Kvarh (algebraic sum), forward Kvarh, backward Kvarh.
3. DO1, DO2
   a. Under Alarm Mode: as alarm output status indicate;
   b. Under ON/OFF remote control model: as ON/OFF output status indicate;
4. S1, S2 as ON/OFF remote control input status indicate; default 2 ON/OFF input.
5. COM flash means communicating.
6. P(Kwh) means measuring Total Active Energy (algebraic sum of forward active energy and backward active energy); Q(Kvarh) means Total Reactive Energy (algebraic sum of forward reactive energy and backward reactive energy).

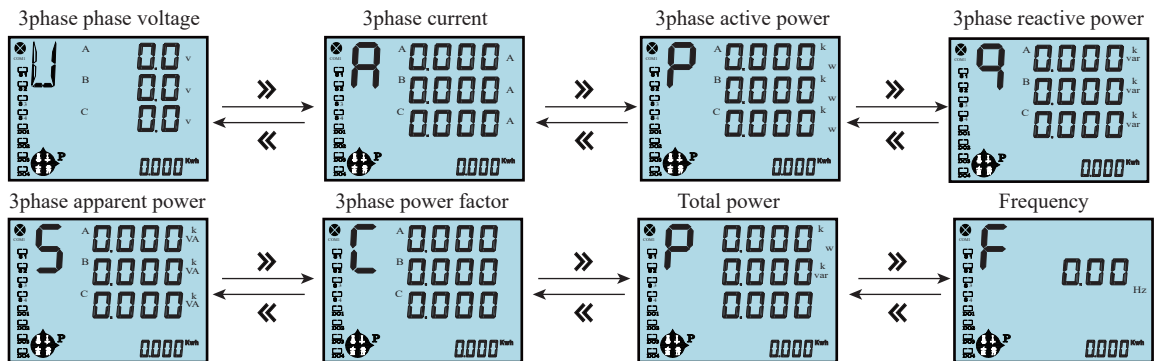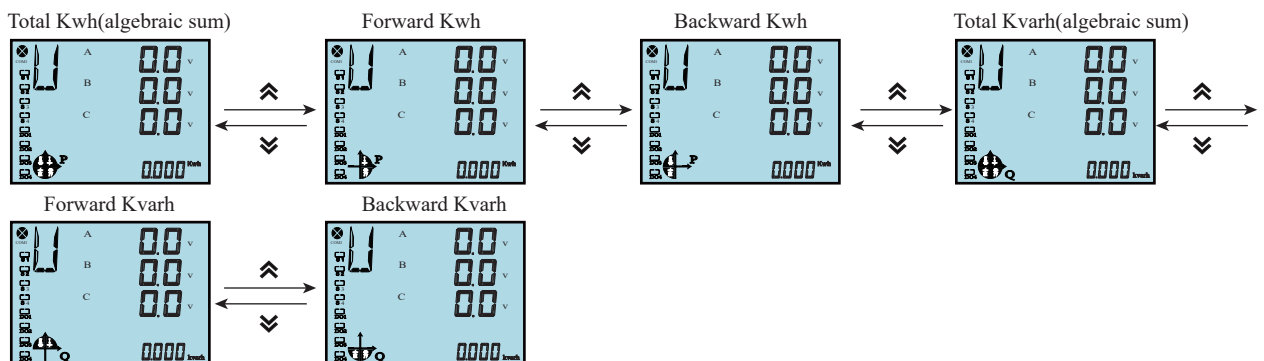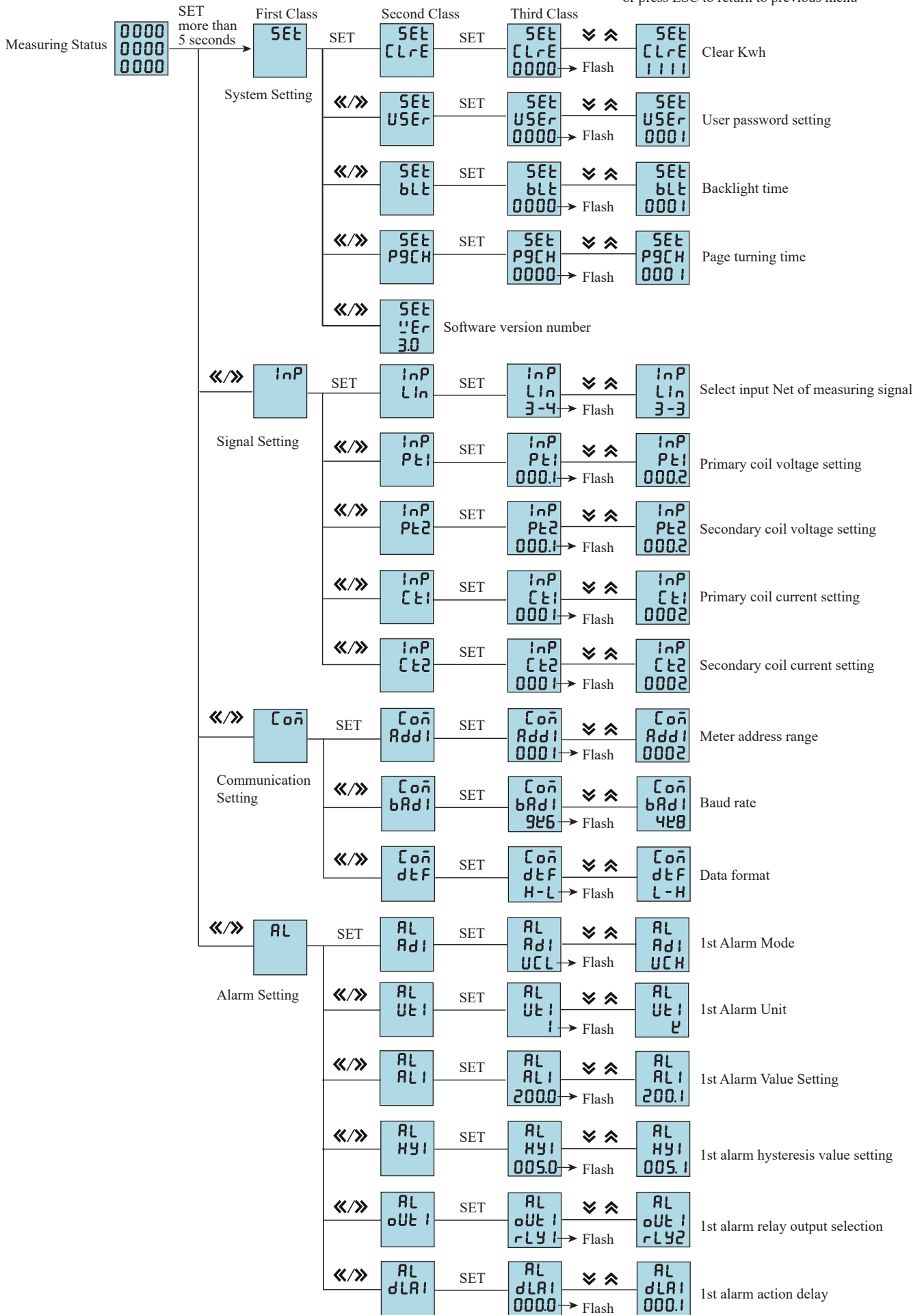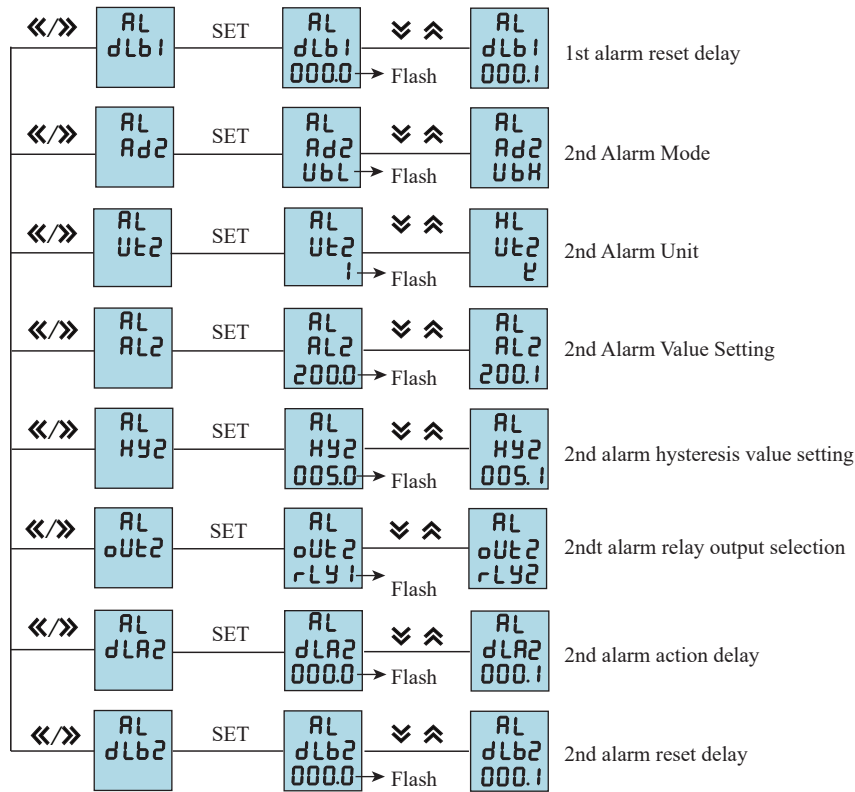Illustration for measure interface switch procedure:

Illustration for measure interface switch procedure:

KKDS9LE03-A/0-20170607

■ Operation Sequence

After modifing data, press SET to confirm or press ESC to return to previous menu

	First Class		Second Class		Third Class			

Measuring Status `0000 / 0000 / 0000` — SET more than 5 seconds →

First Class: `SEt` — System Setting

- SET → `SEt CLrE` — SET → `SEt CLrE 0000` → Flash — ≫≪ → `SEt CLrE 1111` — Clear Kwh
- ≪/≫ → `SEt USEr` — SET → `SEt USEr 0000` → Flash — ≫≪ → `SEt USEr 0001` — User password setting
- ≪/≫ → `SEt bLt` — SET → `SEt bLt 0000` → Flash — ≫≪ → `SEt bLt 0001` — Backlight time
- ≪/≫ → `SEt P9CH` — SET → `SEt P9CH 0000` → Flash — ≫≪ → `SEt P9CH 0001` — Page turning time
- ≪/≫ → `SEt ''Er 3.0` — Software version number

First Class: ≪/≫ → `InP` — Signal Setting

- SET → `InP LIn` — SET → `InP LIn 3-4` → Flash — ≫≪ → `InP LIn 3-3` — Select input Net of measuring signal
- ≪/≫ → `InP Pt1` — SET → `InP Pt1 000.1` → Flash — ≫≪ → `InP Pt1 000.2` — Primary coil voltage setting
- ≪/≫ → `InP Pt2` — SET → `InP Pt2 000.1` → Flash — ≫≪ → `InP Pt2 000.2` — Secondary coil voltage setting
- ≪/≫ → `InP Ct1` — SET → `InP Ct1 0001` → Flash — ≫≪ → `InP Ct1 0002` — Primary coil current setting
- ≪/≫ → `InP Ct2` — SET → `InP Ct2 0001` → Flash — ≫≪ → `InP Ct2 0002` — Secondary coil current setting

First Class: ≪/≫ → `Con` — Communication Setting

- SET → `Con Add1` — SET → `Con Add1 0001` → Flash — ≫≪ → `Con Add1 0002` — Meter address range
- ≪/≫ → `Con bAd1` — SET → `Con bAd1 9b6` → Flash — ≫≪ → `Con bAd1 4b8` — Baud rate
- ≪/≫ → `Con dtF` — SET → `Con dtF H-L` → Flash — ≫≪ → `Con dtF L-H` — Data format

First Class: ≪/≫ → `AL` — Alarm Setting

- SET → `AL Ad1` — SET → `AL Ad1 UCL` → Flash — ≫≪ → `AL Ad1 UCH` — 1st Alarm Mode
- ≪/≫ → `AL Ut1` — SET → `AL Ut1 i` → Flash — ≫≪ → `AL Ut1 ʋ` — 1st Alarm Unit
- ≪/≫ → `AL AL1` — SET → `AL AL1 200.0` → Flash — ≫≪ → `AL AL1 200.1` — 1st Alarm Value Setting
- ≪/≫ → `AL HY1` — SET → `AL HY1 005.0` → Flash — ≫≪ → `AL HY1 005.1` — 1st alarm hysteresis value setting
- ≪/≫ → `AL oUt1` — SET → `AL oUt1 rLY1` → Flash — ≫≪ → `AL oUt1 rLY2` — 1st alarm relay output selection
- ≪/≫ → `AL dLA1` — SET → `AL dLA1 000.0` → Flash — ≫≪ → `AL dLA1 000.1` — 1st alarm action delay

KKDS9LE03-A/0-20170607

	Display 1		Display 2		Display 3	Description
«/»	AL dLb1	SET	AL dLb1 000.0 →Flash	≫ ≪	AL dLb1 000.1	1st alarm reset delay
«/»	AL Ad2	SET	AL Ad2 UbL →Flash	≫ ≪	AL Ad2 UbH	2nd Alarm Mode
«/»	AL Ut2	SET	AL Ut2 I →Flash	≫ ≪	HL Ut2 ч	2nd Alarm Unit
«/»	AL AL2	SET	AL AL2 200.0 →Flash	≫ ≪	AL AL2 200.1	2nd Alarm Value Setting
«/»	AL HY2	SET	AL HY2 005.0 →Flash	≫ ≪	AL HY2 005.1	2nd alarm hysteresis value setting
«/»	AL oUt2	SET	AL oUt2 rLY1 →Flash	≫ ≪	AL oUt2 rLY2	2ndt alarm relay output selection
«/»	AL dLA2	SET	AL dLA2 000.0 →Flash	≫ ≪	AL dLA2 000.1	2nd alarm action delay
«/»	AL dLb2	SET	AL dLb2 000.0 →Flash	≫ ≪	AL dLb2 000.1	2nd alarm reset delay

■ Menu Modification Illustration

Under Customer Menu Status

1. Press SET Key more than 5 seconds, if the user pass word is set, it will pop up an input field, input the correct password to enter into user menu, to modify parameter.
2. If the current display is First Class, press SET Key, enter into next class display, press"«", "»" key, change menu subitems.
3. If the current display is Second Class or Third Class, press ESC Key, return to previous display.
4. If it is Third Class display, press "≫", "≪" Key flash the number, press"«", "»" to shift, press"≫", "≪" Key to modify value; press SET Key to save set value when it flash; if press ESC Key, the set value will not be saved and return to the Second Class display.
5. After modifying the parameters, press SET Key more than 5 seconds or press ESC Key to exit user menu and enter into measuring status.

Menu Structure and Function Description

No	Level 1	Level 2		Level 3	Description
1	SEt System setting	Clear Energy	CLrE	0000	When input 1111, energy can be cleared; When input 1234, menu will be resumed to factory default setting.
		User Password	USEr	0000	Change user password, "0000" as factory default, no password
		Backlight time	bLt	0000	Time of backlight go out delay, unit "second". When value is "0", backlight won't go out.
		Page turning time	P9CH	0000	Measuring page turning time,unit:second; when value is "0",the page is not truned
		Software Version	VEr	3.0	Software version number, read only
2	InP Signal Setting	Network	LIn	3-3 / 3-4	Optional input network of measure signal: 3phase 3wire or 3phase 4wire
		Voltage transform	Pt1	0.1-999.9	Primary rated voltage, unit KV
		Voltage transform	Pt2	10.0-999.9	Secondary rated voltage, unit KV
		Current transform	Ct1	1-9999	Primary rated current, unit A
		Current transform	Ct2	1.0-999.9	Secondary rated current, unit A
3	CoM Communication Setting	Address	Add1	1-247	Meter address range
		Baud rate	brd1	1k2/ 2k4/ 4k8 / 9k6	Baud Rate 1k2 means 1200, 2k4 means 2400, 4k8 means 4800, 9k6 means 9600
		Data sequence	dtF1	H-L / L-H	Data sequence: high register in front or low register in front

Menu Structure and Function Description

No	Level 1	Level 2		Level 3	Description
4	AL Alarm setting	Alarm mode	Ad1	1-62	When value is DO, it is remote control mode, otherwise it is alarm mode, please refer to "Table 1"
		Alarm value unit	Ut1	1/K/M	1: means international standard unit, K: 1000 times of international standard unit, M: 1000000 times of international standard unit.
		Alarm operation value	AL1	0-999.9	1st alarm value setting (the unit is standard display unit)
		Alarm hysteresis value	HY1	0-999.9	1st alarm hysteresis value setting (the unit is standard display unit)
		Alarm relay selection	oUt1	rLY1/rLY2	1st alarm relay output selection
		Operation delay	dLA1	0-9.9	Operation delay time, unit: second
		Alarm end time	dLb1	0-9.9	Operation reset time, unit: second
		Alarm mode	Ad2	1-62	When value is DO, it is remote control mode, otherwise it is alarm mode, please refer to "Table 1"
		Alarm value unit	Ut2	1/K/M	1: means international standard unit, K: 1000 times of international standard unit, M: 1000000 times of international standard unit.
		Alarm operation value	AL2	0-999.9	2nd alarm value setting (the unit is standard display unit)
		Alarm hysteresis value	HY2	0-999.9	2nd alarm hysteresis value setting (the unit is standard display unit)
		Alarm relay selection	oUt2	rLY1/rLY2	2nd alarm relay output selection
		Operation delay	dLA2	0-9.9	Operation delay time, unit: second
		Alarm end time	dLb2	0-9.9	Operation delay time, unit: second

■ Output function

1)Remote control function:2loop S1~S2 are used to remote control Electric ON/OFF status.2loop DO1,DO2 function are used to control electric devices;

  When using this function,alarm mode should be selected "0",otherwise,DO1,DO2 will be output as AL1,AL2;DO1,DO2 function comtrol is written by RS485 interface.

2)Communication:If any demand of RS485 communication,pls contact us to ask for the communication.

3)Alarm function:after power on and run steady more than 5 seconds, alarm will begin to work. (Please refer to table 1)

Reference table 1: Reference table for alarm output electric parameters

No.	Item	ON/OFF output (low alarm) code		ON/OFF output (high alarm) code	
1	Ua(A phase voltage)	1	(UaL)	2	(UaH)
2	Ub(B phase voltage)	3	(UbL)	4	(UbH)
3	Uc(C phase voltage)	5	(UcL)	6	(UcH)
4	U(A、B、C phase voltage)	7	(UL)	8	(UH)
5	Uab(AB line voltage)	9	(UabL)	10	(UabH)
6	Ubc(BC line voltage)	11	(UbcL)	12	(UbcH)
7	Uca(CA line voltage)	13	(UcaL)	14	(UcaH)
8	UL(AB、BC、CA line voltage)	15	(ULL)	16	(ULH)
9	Ia(A line current)	17	(IaL)	18	(IaH)
10	Ib(B line current)	19	(IbL)	20	(IbH)
11	Ic(C line current)	21	(IcL)	22	(IcH)
12	I(A、B、C line current)	23	(IL)	24	(IH)
13	Pa(A phase active power)	25	(PaL)	26	(PaH)
14	Pb(B phase active power)	27	(PbL)	28	(PbH)
15	Pc(C phase active power)	29	(PcL)	30	(PcH)
16	P(Total active power)	31	(PL)	32	(PH)
17	Qa(A phase reactive power)	33	(QaL)	34	(QaH)
18	Qb(B phase reactive power)	35	(QbL)	36	(QbH)

19	Qc(C phase reactive power)	37	(QcL)	38	(QcH)
20	Q(Total reactive power)	39	(QL)	40	(QH)
21	Sa(A phase apperant power)	41	(SaL)	42	(SaH)
22	Sb(B phase apperant power)	43	(SbL)	44	(SbH)
23	Sc(C phase apperant power)	45	(ScL)	46	(ScH)
24	S(Total apperant power)	47	(SL)	48	(SH)
25	PFa(A phase power factor)	49	(PFaL)	50	(PFaH)
26	PFb(B phase power factor)	51	(PFbL)	52	(PFbH)
27	PFc(C phase power factor)	53	(PFcL)	54	(PFcH)
28	PF(Total power factor)	55	(PFLL)	56	(PFLH)
29	F Frequency	57	(FL)	58	(FH)
30	EP (Total Kwh)	59	(EPL)	60	(EPH)
31	EQ (Total Kvarh)	61	(EQL)	62	(EQH)

KKDS9LE03-A/0-20170607