SET501/SET503 AC input transmitter

version ：V1.1 (20170919)

Description

SET501/SET503 AC input transmitter is a device that converts the AC voltage, current and power into a linear analog output by isolation. The mode of analog output is voltage signal (default 0 ~ 5V) or current signal (default 4 ~ 20mA), and the mode of digital output is RS485. It can be widely used in electrical devices, automatic control and scheduling system of electric power, petroleum, coal, metallurgy, electrical installations of railway and other departments.

Executive standard

GB/T 50063-2008 Code for design of electrical measuring instrument for electric power plan
GB/T 13850-1998 Electric measuring transmitter for converting AC power to analog or digital signal
DLT 1075-2007 General specification for digital protection and measurement and control device

Parameters

Auxiliary power：85～265VAC(47～63HZ) or 88～370VDC、24VDC、48VDC

Power consumption：≤5VA

Power protection：Anti-surge, over-voltage protection

Overload capacity：Voltage 1.2 times sustained, 2 times 1s, current 1.2 times sustained, 10 times 1s

Accuracy：0.5 grade（default）or 0.2 grade

Response time：≤300mS

Load impedance：

When outputting analog voltage signal（as 0～5V），Load impedance≥10KΩ

When outputting analog current signal（as 4～20mA），Load impedance≤500Ω

Insulation resistance：input , output and power supply circle ≥20MΩ ；on shell ≥ 100MΩ

Withstand voltage：

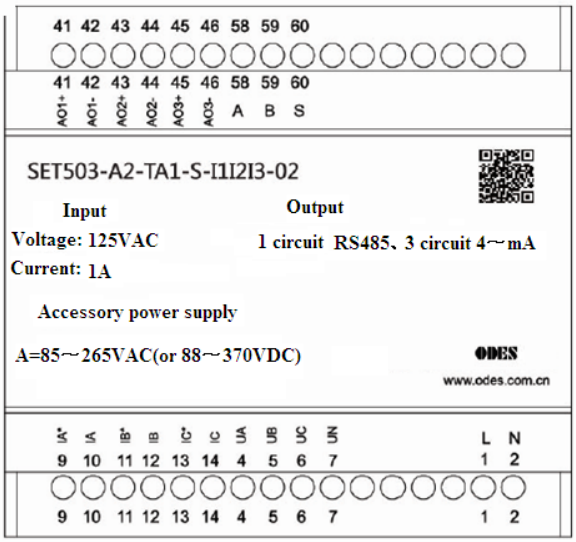
power supply with input or output≥AC 2KV，

input with out put≥AC 1KV

Work environment：-40℃～+70℃，≤95% without condensation.

Storage environment：-40℃～+85℃，≤95% without con-

Terminal definition diagram



02 Accuracy

parameters	accuracy
voltage	0.2%
current	0.2%
frequency	0.2%
active power	0.5%
reactive power	0.5%
apparent power	0.5%
power factor	0.5%

0.5 Accuracy

parameters	accuracy
voltage	0.5%
current	0.5%
frequency	0.5%
active power	1%
reactive power	1%
apparent power	1%
power factor	1%

Naming and selection rules

Typical model	SET503	-A	2	0	-S	0	U2	I3	-2

Series
SET501=Single phase AC transmitter
SET503=Three phase variable AC feeder

Accessory power supply
A=85～265VAC(47～63HZ) or 88～370VDC；
B=48VDC；C=24VDC

Shell type
2=EMG32

Detection type
Y=voltage；L=current；F=frequency；R= power factor ； P=active power ； Q=reactive power；S=apparent power ； T=Total electric quantity；NY=Negative sequence voltage ； NL=negative sequence current ； NY=zero sequence voltage ； ZL=zero sequence current

Voltage input range
A=125V；B=220V；C=380V；D=100V

Current input range
1=1A；2=5A；5=0C～1～0L；6=0.5C～1～0.5L；7=0～1

RS485 communication
S=1 RS485; blank = no RS485 function

First channel analog output and its corresponding relationship
I=4～20mA；I'=4～12～20；U=0～5V；U'=0～2.5～5V；The blank = no function
1=A phase voltage UA；2=B phase voltage UB；3=C phase voltage UC；4=A phase current IA；5=B phase current IB；6=C phase current IC；7=active power P；8=reactive power Q；9=apparent power S；10=frequency F；11=power factor 0～1R；12=Negative sequence voltage ZY；13=negative-sequence current NL；14=zero sequence voltage ZY；15=zero sequence current ZL；16=power factor 0C~1~0L R；17=power factor 0.5C~1~0.5L R；18=line voltage UAB；19=line voltage UBC; 20=line voltage UCA

Second channel analog output and its corresponding relationship
I=4～20mA；I'=4～12～20；U=0～5V；U'=0～2.5～5V；The blank = no function
1=A phase voltage UA；2=B phase voltage UB；3=C phase voltage UC；4=A phase current IA；5=B phase current IB；6=C phase current IC；7=active power P；8=reactive power Q；9=apparent power S；10=frequency F；11=power factor 0～1R；12=Negative sequence voltage ZY；13=negative-sequence current NL；14=zero sequence voltage ZY；15=zero sequence current ZL；16=power factor 0C~1~0L R；17=power factor 0.5C~1~0.5L R；18=line voltage UAB；19=line voltage UBC; 20=line voltage UCA

Third channel analog output and its corresponding relationship
I=4～20mA；I'=4～12～20；U=0～5V；U'=0～2.5～5V；The blank = no function
1=A phase voltage UA；2=B phase voltage UB；3=C phase voltage UC；4=A phase current IA；5=B phase current IB；6=C phase current IC；7=active power P；8=reactive power Q；9=apparent power S；10=frequency F；11=power factor0～1R；12=Negative sequence voltage ZY；13=negative-sequence current NL；14=zero sequence voltage ZY；15=zero sequence current ZL；16=power factor 0C~1~0L R；17=power factor 0.5C~1~0.5L R；18=line voltage UAB；19=line voltage UBC; 20=line voltage UCA

Accuracy
02=0.2 grade；05=0.5 grade

Note: single phase no NL, NY, ZY, ZL optional, 5=0c ~ 1 ~ 6=0.5c; 0.5L ~ 1 ~ 7=0; 0l ~ 1 for the power factor range

RS485 Communication protocol

1、Communication data structure

frame start	address field	function code	data domain	CRC check	Frame end

address field ： Slave address　　data domain：Data to be transmitted

function code：03H is reading data　　CRC check ： 16 bit CRC check

2、data domain format

Information is transmitted in an asynchronous manner，and in bytes, the communication information is transmitted between the host and the machine is the 11 bit frame format.

Start bits	Data bits	Parity bits	Stop bits	Type
1	8	Odd	1	O81
1	8	Even	1	E81
1	8	None	2	N82

3、information frame format

1）Read register data

Address	Function code	Start address		Register number		CRC check	
		High byte	lower byte	High byte	lower byte	lower byte	High byte
01～F7H	03H	00H	10H	00H	03H		
1byte	1byte	1byte	1byte	1byte	1byte	1byte	1byte

Answer from the slave computer:

Address	Function code	Number of data bytes	Data（High byte in front）	CRC check	
01～F7H	03H	06H	Register content	Lower byte	High byte
1byte	1byte	1byte	6byte	1byte	1byte

Note: the AC input transmitter is only read function, because there are three way to measure the parameters, so the starting address is 0010H, the number of registers is 0003H, when the address is 01, the CRC calibration value is 040E. when slave computer`s answer data for 16 Decimal，First, it is converted to a 10 system, and the different input corresponding to different range.

STTD Input signal expansion ratio

Voltage				
Input line voltage	100VAC	125VAC	220VAC	380VAC
Input phase voltage	57.74VAC	72.17VAC	127.02VAC	219.40VAC
Expansion ratio	100	100	100	100
Electric current				
Input range	1A	5A		
Expansion ratio	10000	10000		

2）returned error communication information from the machine

Device address	Function code	Error code	Check code	
01～F7H	83H/86H	01H/02H/05H	Lower byte	High byte
1byte	1byte	1byte	2bytes	

A）function code ： Host read error：83H

B）Error code meaning：01H ： Error in function code
02H ： Address or data length error
05H ： Checking data

3）CRC check way: check table method

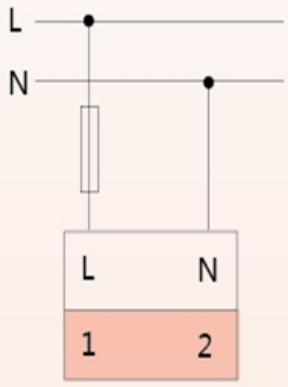
4）Register address ：

0010	0011	0012	0013	0014	0015	0016	0017	0018	0019	001A
First input current	First input voltage	Second input current	Second input voltage	Third input current	Third input voltage	Active power	Reactive power	Apparent power	frequency	Power factor

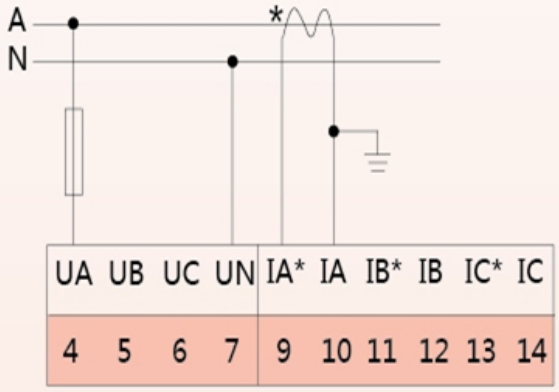
The relationship between the input value and the output analog quantity

Input value	Output value
Voltage（V）：0～Y	0～5V/4～20mA
current（A）：0～Y	0～5V/4～20mA
Power factor：x C～1～Xl,0～1(x=0or0.5)	0～2.5～5V/4～12～20mA
Apparent power 0～3*Y*L	0～5V/4～20mA
Active power 0～3*Y*L*COSφ	0～5V/4～20mA
Reactive power0～3*Y*L*SINφ	0～5V/4～20mA
Frequency（Hz）:40～F	0～5V/4～20mA
Negative sequence voltage （V）:0～NY	0～5V/4～20mA
Zero-sequence voltage （V）:0～ZY	0～5V/4～20mA
Negative-sequence current（A）:0～NL	0～5V/4～20mA
Zero-sequence current（A）:0～ZL	0～5V/4～20mA

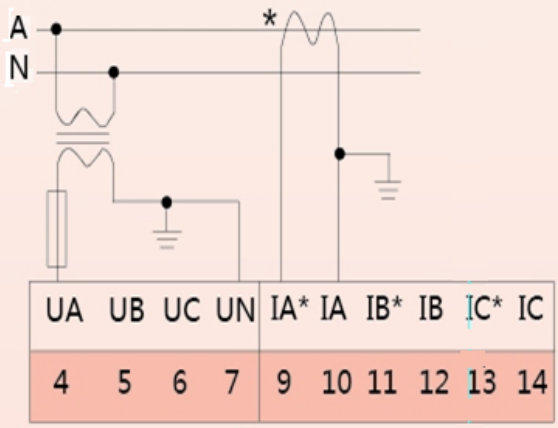
Product wiring diagram



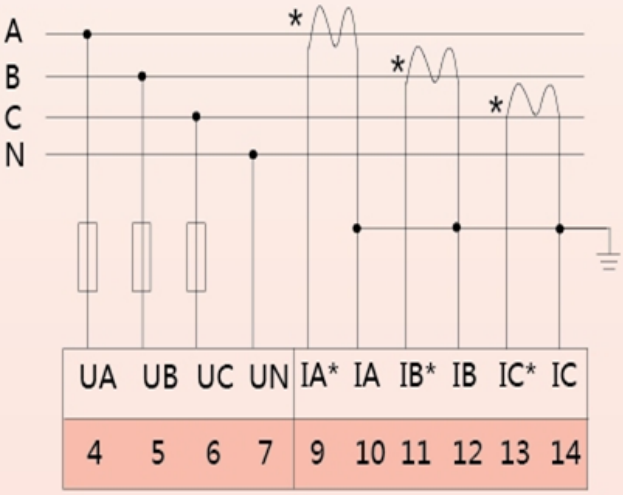
Accessory power supply



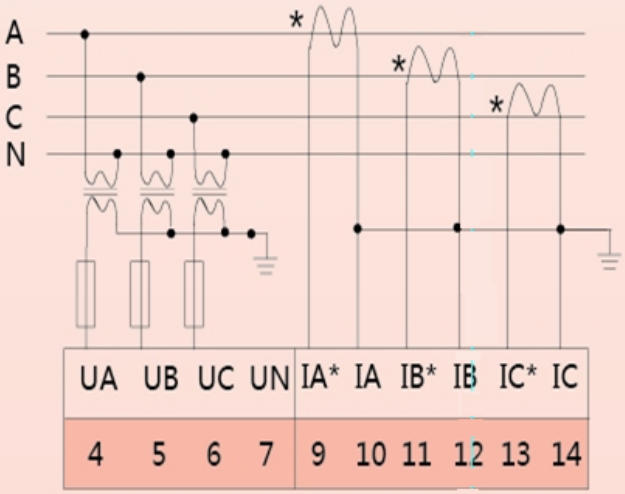
Single phase low voltage two wire system (1CT,not PT)



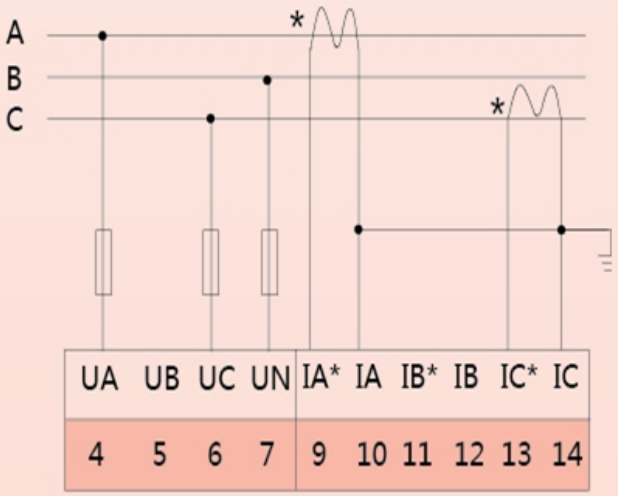
Single phase high voltage two wire system(1CT,1PT)



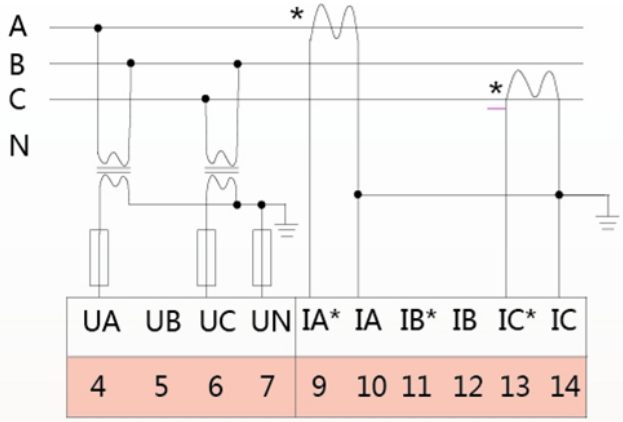
Three-phase low-voltage four wire system (3CT,notPT)



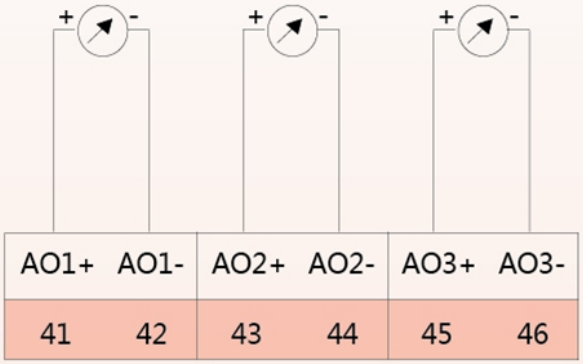
Three-phase four wire system (3CT,3PT)



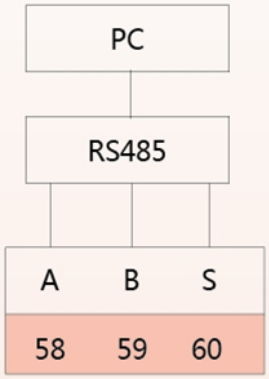
Three-phase low-voltage three wire system(2CT,not PT)



Three-phase high-voltage three-phase system (2CT,2PT)



Analog quantity output



Communication

Installation size chart (unit: mm)