Network Analyzer with LCD Screen User Manual



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V.25.1

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PROPER USE AND SAFETY REQUIREMENTS



Cut all the power when connecting and disconnecting the device to a panel.



Do not clean the device with a solvent or similar material. Only use a dry cloth.



Please do not intervene to the device when a technical problem is encountered and get in contact with a technical service within the shortest time.



If the warnings are not taken into account, our company or the authorized dealer shall not be held responsible for the negative consequences.



Do not dispose in the trash, the device must be delivered to the collection centers (electronic device recycling centers). It should be recycled or disposed of without harming human health and environment.



The installation, assembly, activation and operation of the device should be done and used by only expert professionals and in accordance with safety regulations and instructions.

1. General Features

Network Analyzers with LCD Screen comply with the IEC 61557-12 standard and are capable of performing functions such as full power parameter measurement, power monitoring, harmonic analysis, limit alarms, and grid status monitoring. These features enable users to accurately track power consumption data and meet their energy management requirements.

2. Technical Features

Environmental Characteristics	
Operating Temperature:	-25°C...+70°C
Storage Temperature:	-25°C...+70°C
Relative Humidity:	%5...%95 RH, No Condensation
Operating Altitude:	≤ 2000m CAT III
Class of Pollution:	2
Mechanical Properties	
Overall Dimensions:	96mm × 96mm × 83mm
Protection Class:	Front Case IP54, Rear Case IP20
Security Features	
Measurement Category:	300V (CAT III)
Security Standard:	IEC 61010-1, Double Insulation
Auxiliary Power Supply	
Voltage:	AC/DC 80V...270V
Frequency:	50/60Hz ± 5Hz
Power Consumption:	≤ 5VA
Voltage Input	
Nominal Value:	230/400 VAC
Start Value:	10V
Resolution:	0.1 V
Impedance:	≥ 1.7 M Ω / Phase
Power Consumption:	≤ 0.1 VA / Phase
Overload:	Continued: 1.2Vn, Instantaneous: 2Vn / 1 Min
Frequency:	45Hz...65Hz
Current Input	
Nominal Value:	1A or 5A
Start Value:	10 mA
Resolution:	1 mA
Impedance:	≤ 20m Ω / Phase
Power Consumption:	≤ 0.2 VA / Phase
Overload:	Continued: 2In, Instantaneous: 20In/1s
Communication Interface	
Channels:	1
Interface:	RS485
Baud Rate:	1.2kbps...38.4kbps
Communication Protocol:	Modbus-RTU
Terminal	
Tightening Torque:	0.5 Nm
Standards	
IEC 61557-12	Performance Measurement and Monitoring Device
IEC 61326-1	Electromagnetic Compatibility
IEC 61010-1	Electrical Safety

3. Measurement Parameters and Accuracy Classes

The following table details the electrical parameters measured by the device, their respective accuracy classes in compliance with international IEC 61557-12 standards, and the measurement types (instantaneous, demand, cumulative) along with their corresponding units. Please refer to these technical specifications to verify the device's performance and data-tracking capabilities.

Measured Value	Accuracy Class	Instantaneous	Demand	Cumulative	Unit
Va / Vb / Vc	0.2 (IEC 61557-12)	✓			[V,kV]
Uab / Ubc / Uca	0.2 (IEC 61557-12)	✓			[V,kV]
Ia / Ib / Ic	0.2 (IEC 61557-12)	✓	✓		[A,kA]
Inc	0.5 (IEC 61557-12)	✓			[A,kA]
F	0.1 (IEC 61557-12)	✓			[Hz]
P / Pa / Pb / Pc	0.5S (IEC 61557-12)	✓			[kW,MW]
Q / Qa / Qb / Qc	2 (IEC 61557-12)	✓			[kVAr,MVAr]
S / Sa / Sb / Sc	0.5S (IEC 61557-12)	✓			[kVA,MVA]
PF / Pfa / PFb / PFc	0.5 (IEC 61557-12)	✓			—
EP+ / EP-	0.5S (IEC 61557-12)			✓	[kWh,MWh]
EQ+ / EQ-	2 (IEC 61557-12)			✓	[kVArh,MVArh]
EQ1 / EQ2 / EQ3 / EQ4	2 (IEC 61557-12)			✓	[kVArh,MVArh]
ES	0.5S (IEC 61557-12)			✓	[kVAh,MVAh]
THDu	1 (IEC 61557-12)	✓			[%]
THDi	1 (IEC 61557-12)	✓			[%]
Harmonic Ratio-U (2...31st)	1 (IEC 61557-12)	✓			[%]
Harmonic Ratio-I (2..31st)	1 (IEC 61557-12)	✓			[%]
Vnb/Inb	0.5 (IEC 61557-12)	✓			[%]

4. Measurable Line Parameters

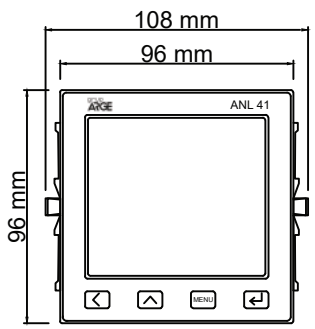
- Phase-to-Neutral Voltages (V11, V12, V13)
- Phase-to-Phase Voltages (V12, V23, V13)
- Phase Currents: (I1, I2, I3, ΣI)
- Neutral Current: (In)
- Frequency
- Active Power: (P1, P2, P3, ΣP)
- Reactive Power
- Capacitive Reactive Power: (ΣQ(cap), Q1(cap), Q2(cap), Q3(cap))
- Inductive Reactive Power
- Apparent Power: (ΣS, S1, S2, S3)
- Power Factors: (PF1, PF2, PF3)
- Active Energy: (Import / Export, ΣWh)
- Reactive Energy: (Import / Export, ΣVARh)
- Min/Max Values: (Import / Export)
- Demand Values: (Import / Export)
- Voltage and Current Harmonics per Phase: (Up to 31st Harmonic)
- Voltage Crest Factor
- Voltage K-Factor
- Total Harmonic Distortion for Current and Voltage: (THDV and THDI)
- Voltage Unbalance (%)
- Current and Voltage Phase Angles

4.1. Measurable Parameter Functions

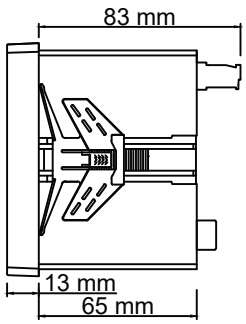
Type	Parameters	Phase Separation	Total	Average	Sequence Component
Voltage	Phase Voltage	✓		✓	✓
	Line Voltage	✓		✓	
	Voltage Unbalance		✓		
	Phase Angle	✓			
	Fundamental Voltage	✓			
	Voltage Crest Factor	✓			
Current	Current	✓		✓	✓
	Neutral Line Current		✓		
	Current Unbalance		✓		
	Phase Angle	✓			
	Fundamental Current	✓			
	Current Crest Factor	✓			
	Current Percentage	✓			
Power	Active Power	✓	✓	✓	
	Reactive Power	✓	✓	✓	
	Apparent Power	✓	✓	✓	
	Power Factor	✓	✓		
	Load Percentage	✓	✓		
Frequency	Frequency (A-Phase Voltage)		✓		
Harmonic	THDV	✓			
	THDI	✓			
	Voltage Harmonic Content	✓			
	Current Harmonic Content	✓			
	2-31st Voltage Harmonic	✓			
	2-31st Current Harmonic	✓			

5. Technical Drawing

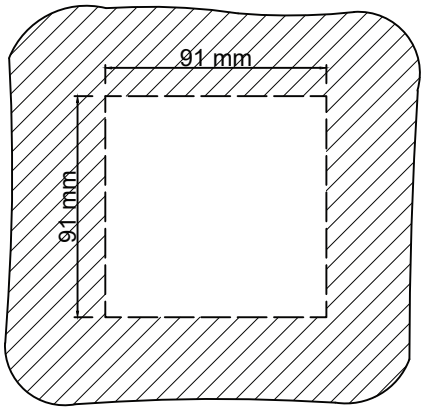
5.1. Technical Drawing



Front View

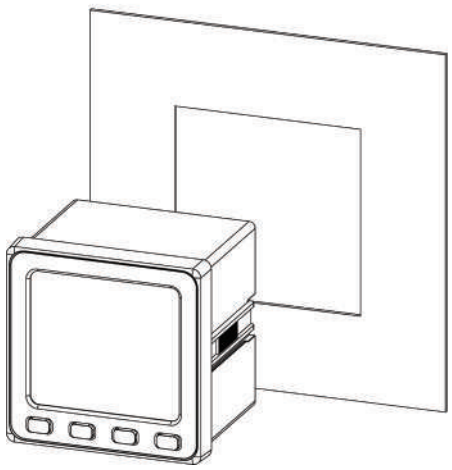


Side View

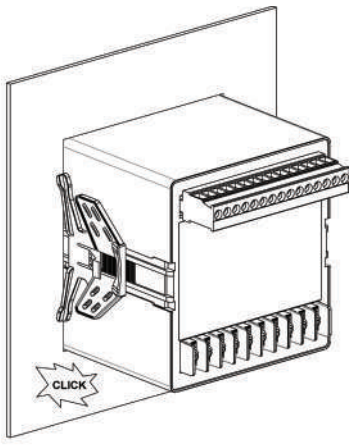


Panel Cut-Out

5.2. Mounting Dimensions



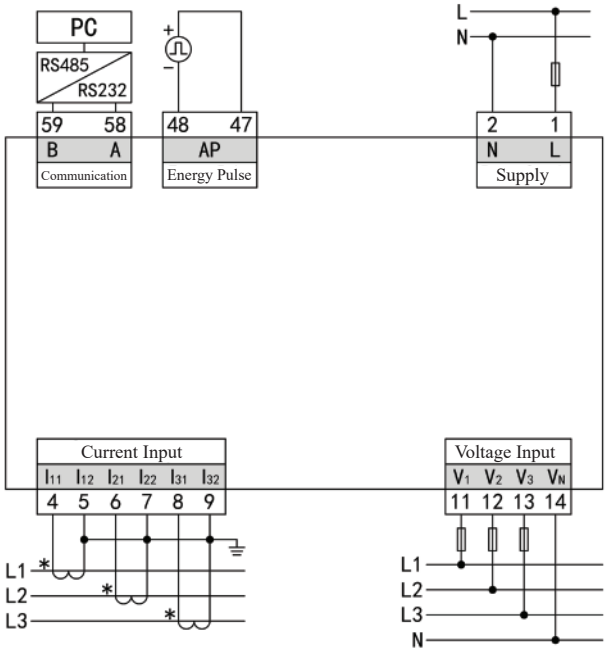
Panel Size: 96×96 (mm)



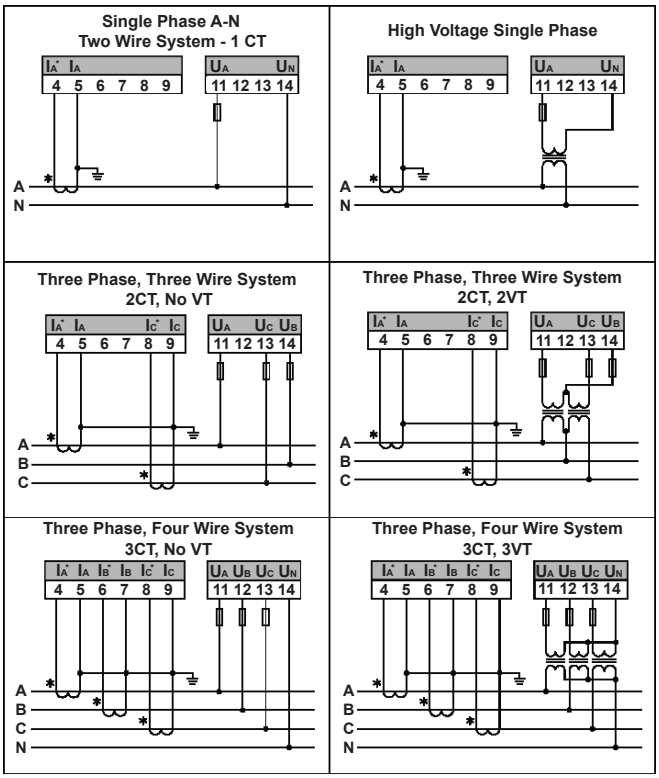
Panel Cut-Out: 91×91 (mm)

6. Connection Diagram

6.1. Standard Connection Diagram



6.2. Input Signal Connection Diagram



CT: Current Transformer
VT: Voltage Transformer

6.3. Connection Instructions

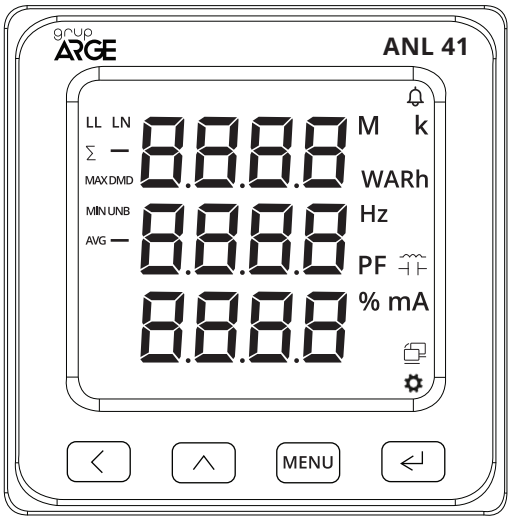
1) The input voltage shall not be higher than the rated input voltage of the product, otherwise VT shall be considered. In order to facilitate maintenance, it is recommended to use the wiring block.

2) External CT shall be used when the input current is greater than 5A. If the CT used is connected with other instruments, the wiring shall be in series; Before removing the current input wiring of the device, the CT primary circuit must be disconnected or the secondary circuit must be short circuited. For the convenience of maintenance, it is recommended to use the wiring block.

3) Ensure that the input voltage and current are corresponding, the phase sequence is consistent, and the direction is consistent, otherwise there will be errors in the values and symbols of power and energy.

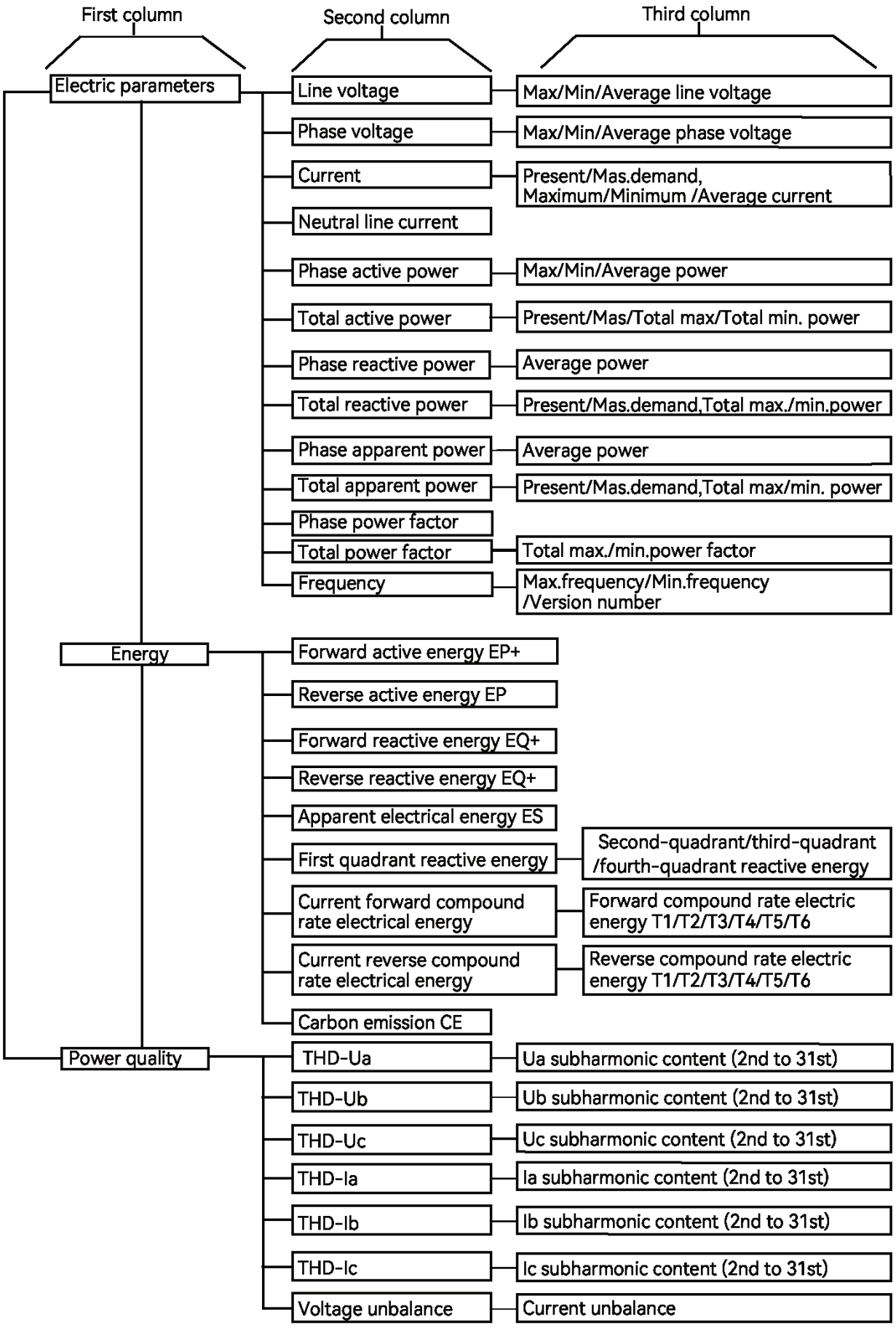
4) The meter can work in three-phase three wire or three-phase four wire mode, and the user shall select the corresponding wiring mode according to the field situation. It should be noted that the field wiring mode must be consistent with the wiring mode set in the meter, otherwise the measurement data of the instrument is incorrect.

7. Display Preview



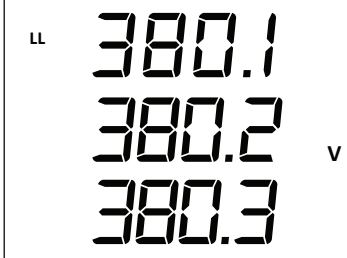
Symbol	Description	Symbol	Description
LL	Line-to-Line Voltage	**LN**	Line-to-Neutral Voltage
DMD	Demand	**UNB**	Unbalance
MAX	Maximum Value	**MIN**	Minimum Value
AVG	Average Value	🔔	Alarm
⚙	Lights up during parameter setting		Flashes during communication
•	Pulse output; flashes during energy measurement	∧	Page Up / Value Increment
<	Page Down / Cursor Shift	↵	Enter next menu. Confirm settings
MENU	Return to previous menu. Enter-Exit Settings menu		

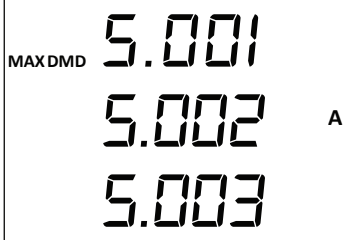
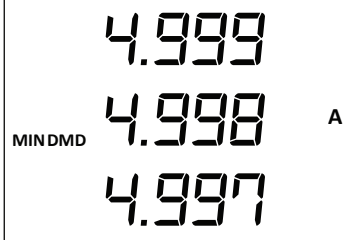
7.1. Power Display Menu

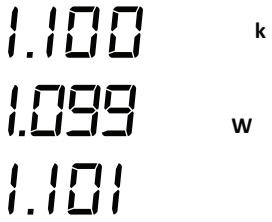


7.2. Display Interfaces

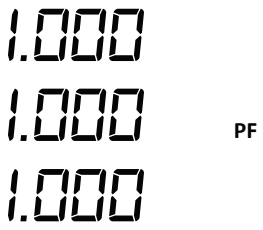
7.2.1. Power Displays

Parameter	Display Interface	Description
Line Voltage		Line Voltage: Uab= 380.1 V Ubc= 380.2 V Uca= 380.3 V
		Max. Line Voltage: Uab Max.= 380.3 V Ubc Max.= 380.4 V Uca Max. = 380.5 V
		Min. Line Voltage: Uab Min.= 100.0 V Ubc Min.= 99.9 V Uca Min. = 100.1 V
		Average Line Voltage=380.3 V
Phase Voltage		Phase Voltage: Ua= 220.1 V Ub= 220.2 V Uc= 220.3 V

Current		Phase Current: Ia= 5.001 A Ib= 4.999 A Ic= 5.000 A
		Phase Current Demand: Ia Demand= 5.001 A Ib Demand= 4.999 A Ic Demand= 5.000 A
		Max. Phase Current Demand: Max. Ia Demand= 5.001 A Max. Ib Demand= 5.002 A Max. Ic Demand= 5.003 A
		Max. Phase Current: Ia Max. = 5.001 A Ib Max.= 5.002 A Ic Max.=5.003 A
		Min. Phase Current Demand: Min. Ia Demand= 4.999 A Min. Ib Demand= 4.998 A Min. Ic Demand=4.997 A
		Average Current

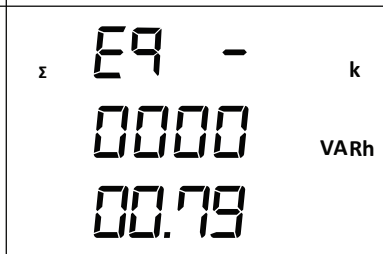
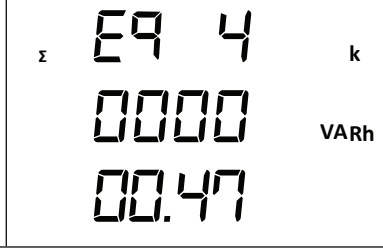
Neutral Line Current		Neutral Line Current
Active Power		Phase Active Power: Phase A Active Power=1.100 kW Phase B Active Power=1.099 kW Phase C Active Power=1.101 kW
		Average Active Power=1.100 kW
		Max. Phase Active Power: Max. Phase A Active Power=1.100 kW Max. Phase B Active Power=1.101 kW Max. Phase C Active Power=1.102 kW
		Min. Phase Active Power: Min. Phase A Active Power=1.100 kW Min. Phase B Active Power=1.101 kW Min. Phase C Active Power=1.102 kW
Total Active Power		Total Active Power=3.300 kW

Reactive Power		Phase Reactive Power: Phase A Reactive Power=0.000 kVAr Phase B Reactive Power=0.001 kVAr Phase C Reactive Power=0.002 kVAr
		Average Reactive Power:0.001 kVAr
Total Reactive Power		Total Reactive Power=0.003 kVAr
Apparent Power		Phase Apparent Power: Phase A Apparent Power=1.100 kVA Phase B Apparent Power=1.099 kVA Phase C Apparent Power=1.101 kVA
		Average Apparent Power=1.100 kVA
Total Apparent Power		Total Apparent Power=3.300 kVA

Power Factor		Phase Power Factor: Phase A Power Factor=1 Phase B Power Factor=1 Phase C Power Factor=1
Total Power Factor		Total Power Factor=1
Frequency		Frequency=50 Hz
Version No.		Version No.=1000

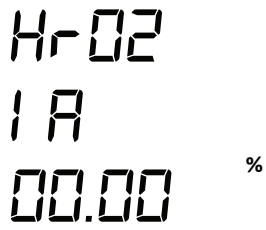
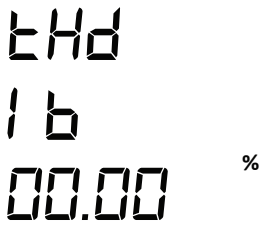
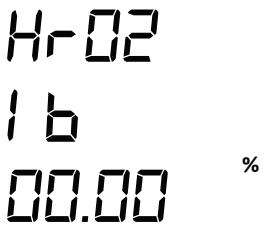
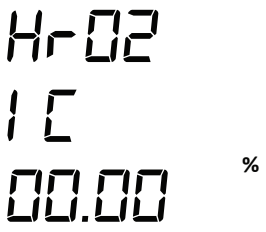
7.2.2. Energy Displays

Parameter	Display Interface	Description
Positive Active Energy		Positive Active Energy: Ep+ = 85.93 kWh
Reverse Active Energy		Reverse Active Energy: Ep- = 12.64 kWh

Positive Reactive Energy		Positive Reactive Energy: EQ+ = 40.88 kVArh
Reverse Reactive Energy		Reverse Reactive Energy EQ- = 0.79 kVArh
Apparent Energy		Apparent Energy ES = 3.25 kVAh
1st Quadrant Reactive Energy		1st Quadrant Reactive Energy EQ1 = 40.47 kVArh
2st Quadrant Reactive Energy		2st Quadrant Reactive Energy EQ2 = 0.36 kVArh
3st Quadrant Reactive Energy		3st Quadrant Reactive Energy EQ3 = 0.32 kVArh
4st Quadrant Reactive Energy		4st Quadrant Reactive Energy EQ4 = 0.47 kVArh

7.2.3. Power Quality Displays

Parameter	Display Interface	Description
Phase THD Data	tHd uA 00.00 %	Total Harmonic Distortion Of Phase A Voltage: Ua THD
	Hr02 uA 00.00 %	2-31 Times Harmonic Distortion Of Phase A Voltage
	tHd ub 00.00 %	Total Harmonic Distortion Of Phase B Voltage: Ub THD
	Hr02 ub 00.00 %	2-31 Times Harmonic Distortion Of Phase B Voltage
	tHd uC 00.00 %	Total Harmonic Distortion Of Phase C Voltage: Uc THD
	Hr02 uC 00.00 %	2-31 Times Harmonic Distortion Of Phase C Voltage
	tHd IA 00.00 %	Total Harmonic Distortion Of Phase A Current: Ia THD

		2-31 Times Harmonic Distortion Of Phase A Current
		Total Harmonic Distortion Of Phase B Current: Ib THD
		2-31 Times Harmonic Distortion Of Phase B Current
		Total Harmonic Distortion Of Phase C Current: Ic THD
		2-31 Times Harmonic Distortion Of Phase C Current
Voltage Unbalance		Voltage Unbalance
Current Unbalance		Current Unbalance

7.3. Settings

7.3.1. Menu and Function Descriptions

In the display status of the meter, press and hold the "**MENU**" key to enter the password authentication interface, press the " < " or " ∧ " key to enter the password (the initial password of the system is 0001), and then press the "↵ " key to enter the programming setting interface. To make it easier to complete the password verification step, we recommend setting the device password to 0000.
(Note:If there is no action on the interface after pressing the "↵ " key, it means that the password is not entered correctly.)

Use of keys in programming operation: " < " and " ∧ " keys are used for menu switching, cursor movement and value addition and subtraction, "**MENU**" key is the up and down function key, and "↵ " key is used to enter the lower menu and confirm after modifying the value.

To increase or decrease the number of hundreds of thousands of digits: press " < " to move the cursor to the number of digits to be modified, press " ∧ " to modify the corresponding number of digits, and press "↵ " to save the current setting.

Setting method of the decimal point: move the cursor to the thousandth place of the number, press the " < " key, the decimal point on the thousandth place will flash, and then press the " ∧ " key to modify the position of the moving decimal point, and press the "↵ " key to save the current setting.

After the data (or option) of the third level menu is changed, you need to press the "↵ " key to return to the second level menu to take effect. If you press the "**MENU**" key to return to the second level menu, no change is made (that is, the change is not effective).

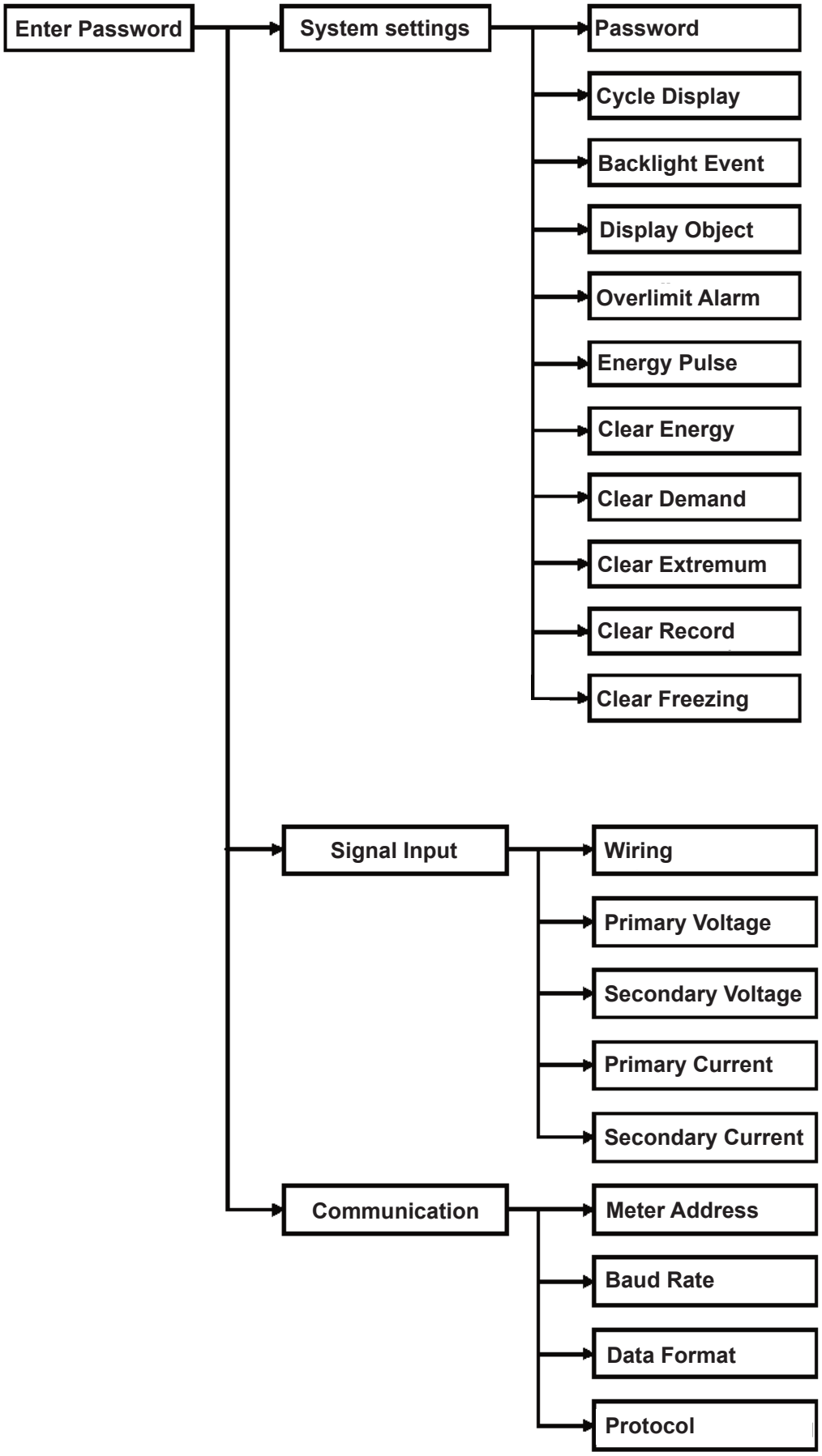
If you want to exit the programming interface, you can first exit to the first level menu of the programming interface, press the "**MENU**" key, and the instrument will prompt "save -- no". At this time, there are three options:

(1) Save to Exit: Press " < " or " ∧ " to switch to "save -- yes", and then press "↵ " to save the setting parameters to exit;

(2) Exit Without Saving: Press the " ↵ " key to exit without saving the set parameters;

(3) Keep the Programming Status: Press the "**MENU**" key to continue to maintain the programming status.

7.3.2. Setting Menu Overview



7.3.3. Character Descriptions of Settings Interface

First Level	Second Level	Third Level	Description
System Settings SYS	CodE	0000~9999	**User Password:** Device Settings Access Code
	CYC	no or YES	**Cyclic Display:** no : Non-Circular Display YES : Cyclic Display, with an Interval of 5 Seconds
	LIGH	0000~0240	**Backlight on Time (s)** 0: Always on
	dISP	Voltage, current, etc	**Power-on default display interface**
	ALr	no or YES	**Off-Limit Flashing Limit:** no : Off YES : Open
	PULS	AP or rP	**Energy Pulse:** AP: Active Energy Pulse rP: Reactive Energy Pulse
	IrvS	no or YES	**Reverse Current:** no : Off YES : On
	CEF	0000~9999	**Carbon Emission Factor (G/kWh)** Used to determine the amount of carbon Emitted per unit of energy consumed.
	CEC	0~3	**Carbon Emission Calculation Method:** Determines the energy flow direction to be used As a baseline for carbon emission calculations. **0: Forward (Import):** Calculation based on Energy drawn (consumed) from the grid. **1: Reverse (Export):** Calculation based on Energy supplied (produced) to the grid. **2: Forward + Reverse:** Calculation based on the Total of both energy drawn and energy produced. **3: Forward - Reverse:** Calculation based on net Consumption, calculated by subtracting produced Energy from energy drawn from the grid.
	CLrE	no or YES	**Clear Energy:** no : Unclear YES : Clear All Energy Data

	CLr.d	no or YES	**Clear Demand:** No : Unclear YES : Clear All Demand Data
	CLr.n	no or YES	**Clear Extremum:** no : Unclear YES : Clear All Extreme Value Data
	CLr.C	no or YES	**Clear Generated CO2 Emissions:** no : Not Clear YES : Clear
Signal Input inPt	nEt	n.12, n.33, n.34	**Wiring Mode:** n.12 : Single-Phase (1P2W) n.33 : Three-Phase Three-Wire (3P3W) n.34 : Three-Phase Four-Wire (3P4W)
	Pt .1	0000~9999 **kV**	Primary Side Voltage Value of Voltage Transformer
	Pt .2	0000~0690 **V**	Secondary Side Voltage Value of Voltage Transformer
	Ct .1	0000~9999 **kA**	Current Value at Primary Side of Current Transformer
	Ct .2	0000~0006 **A**	Current Value at Secondary Side of Current Transformer
Communication1 Con1	Addr	0001~0247	**Meter Address:** 1~247
	bAUd	0012~1152 **k**	**Baud Rate:** 2400 - 38400 bps
	dAtA	n.8.1 o.8.1 E.8.1 n.8.2	**Data Format:** n.8.1 : No Check,1 Stop Bit o.8.1 : Odd Check, 1 Stop Bit E.8.1 : Dual Check, 1 Stop Bit n.8.2 : Dual Check, 1 Stop Bit
	Prot	rtU	**Dual Check, 1 Stop Bit:** rtu: Modbus-RTU

7.3.4. Modbus Settings

If the communication address is set to 12, the baud rate is 38400, and the data format is E81 parity check, the operation steps are as follows:

	Press the "∧" key to select "com. 1"(Communication).
	Press the "↵" key to enter the secondary setting menu (the first option is "address").
	Press the "↵" key to enter the three-level setting menu and display the current address as "0001".
	Press the "＜" or "∧" key to enter the new address "0012".

	Press the "↵" key to confirm and return to the secondary setting menu.
	Press the " ∧ " key to select "baud" (baud rate).
	Press the "↵" key to enter the three-level setting menu and display the current baud rate as "9600".
	Press the " ∧ " key to select "38.4k" (38400).

	Press the "↵" key to confirm and return to the secondary setting menu.
	Press the " ∧ " key to select "data" (verification method).
	Press the "↵" key to enter the third setting menu, and the display is "n.8.1" (N81 has no calibration).
	Press " ∧ " key to switch to "e.8.1" (E81 parity check).

CAL1 DATA	Press the "↵ " key to confirm and return to the secondary setting menu.
CAL1	Press the "MENU" Key to return to the primary setting menu.
SAVE no	Press the "MENU" Key to enter the save interface.
SAVE YES	Press the " ∧" key to switch to "yes". Press the "↵ " key to save and return to the power interface.

7.3.5. Pulse Output Feature and Calculation

The network analyzer with LCD screen sends a digital signal (pulse) for a specific increase in the amount of energy measured. The frequency of these signals represents the rate of energy consumption in the system.

7.3.5.1. Calculation of Energy Value per Pulse

The amount of energy represented by each pulse generated by the device is directly related to the **Current Transformer Ratio (CTR)** connected to the system. The calculation formula is as follows:

Energy Value per Pulse (Wh) = Current Transformer Ratio (k) x 0.2 Wh

Where **k (Current Transformer Ratio)** is the coefficient obtained by dividing the primary current by the secondary current (k = Ip / Is).

7.3.5.2. Sample Calculation Table

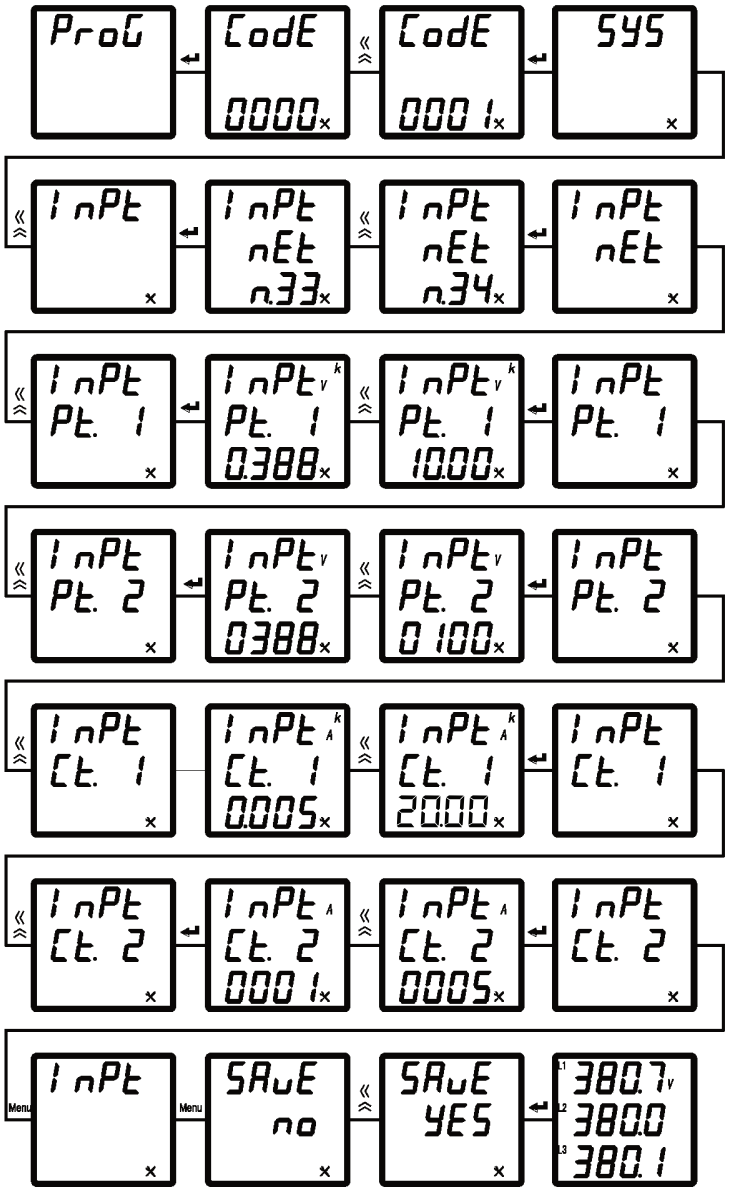
The table below illustrates the energy amounts per pulse generated by the device according to different current transformer values:

Current Transformer Value	Ratio (k)	Calculation	1 Pulse Value
100/5 A	20	20 x 0,2	4 Wh
500/5 A	100	100 x 0,2	20 Wh
1000/5 A	200	200 x 0,2	40 Wh

8. Programming Procedure and Examples

Users can modify relevant parameters and settings, including system parameters, signal input, communication settings, etc., via the keypad.

If the signal is 10 kV / 100 V, 20 kA / 5 A, the menu operation steps are as follows:



Enter Programming Interface

Enter Primary Voltage Setting Menu, k indication light is on

Change Primary Voltage Range to 10 kV

Change Secondary Voltage Range to 100 V

Change Primary Current Range to 20 kA

Change Secondary Current Range to 5 A

Save Modified Data and Exit Programming