User Manual

19D-NX

Modular Multifunction Energy Meter

Multi-Channel Energy Meter
CH1:Voltage
Ua 0000 V
Ub 0000 V
Uc 0000 V
POWER/
COMM/
ON
OFF
11 12 13 14
UA UB UC UN
V- V+ IC IC* IB IB* IA IA*
IA* IA IB* IB IC* IC A-3 B-3

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Read me

When you use 19D-NX modular multifunction energy meter, be sure to read this user manual carefully, and be able to fully understand the implications, the correct guidance of operations in accordance with user manual, which will help you make better use of 19D-NX modular multifunction energy meter, and help to solve the various problems at the scene.

1. Before the meter turning on the power supply, be sure that the power supply within the provisions of the instrument;

2. When installation, the current input terminal must non-open, voltage input terminals must Non-short circuit;

3. Communication terminal (RS232/RS485) is strictly prohibited to impose on high pressure;

4. Be sure the instrument wiring consistent with the internal system settings;

5. When communicating with the PC, instrument communication parameters must be consistent with the PC.

- **Please read this user manual carefully**
- **Please save this document**

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1. - SUMMARIZE

19D-NX Modular Multifunction Energy Meter adopts a dedicated dot-matrix LCD full Chinese display module and a well-designed Chinese graphic display interface, which can display multiple information in real time. With bright backlight, the operator can read accurately even in poor light conditions data. The operation mode is humanized, and the operator can master the operation of reading data and parameter setting in a short time

This flexible modular design product can expand up to 64 channels of metering points, plus 16 I/O ports for field control. Optional 100mA or 333mV CT connect, provide max 0.5 class metering accuracy. RS485 Modbus-RTU port or Ethernet port or extra IoT module valid for different project.

FEATURES

- Class 0.2/0.5 basic parameter and class 1 for active energy
- Flexible combination of up to 40*3P3P/3P4W or 120*1P2W branch circuit metering
- Standard 35mm DIN rail mounting: 4M width (core unit), 3N width (expand circuit unit)
- 1.6’’ dot matrix LCD screen
- RS-485 Modbus/RTU Communications
- Optional IoT expand module
- Optional Ethernet expand module

APPLICATIONS

- All power parameter measurement;
- Energy measurement and electrical fire monitor and control;
- Transformers, generators, capacitors and electric motors distributed detection;
- Medium and low pressure systems;
- SCADA, EMS, DCS integrators.

2. - TECHNICAL PARAMETERS

Current measurement on inputs (TRMS)	
Rating of CT secondary	100mA, 50mA, 2.5mA
Measurement range	0 ... 11 kA
Input consumption	<0.4VA
Accuracy	0.5% (IEC61557-12)
Impedance	<10mΩ
Overload capacity	1.2 times of rating, continuous 10 times of rating, 5s
Voltage measurement (TRMS)	
Measurement range	18 ... 300 VAC
PT secondary	100VAC / 400VAC
Input consumption	<0 .1 VA
Accuracy	0.5% (IEC61557-12)
Impedance	>1MΩ
Overload capacity	1.2 times of rating, continuous 2 times of rating, 1s
Frequency measurement	
Measurement range	45 - 65 Hz
Accuracy	±0.02Hz
Energy accuracy	
Active energy	Class 1.0 (IEC 62053-22)
Reactive energy	Class 2.0 (IEC 62053-23)
Auxiliary power supply	
Rating	DC/AC 85~265 ± 10 %
Frequency	50 / 60 Hz
Consumption	< 10 VA
Auxiliary power supply (Expand unit)	
Rating	12Vdc
Consumption	<0.9W
Communication	
Link	RS485 (2/3 wires half duplex)
Protocol	Modbus RTU mode
MODBUS speed	4800/9600bauds
Safety	
Isolation withstand voltage	AC 1KV/1min

3. - INSTALLATION AND START-UP

The manual you hold in your hand contains information and warnings that the user should respect in order to guarantee a proper operation of all the instrument functions and keep it in safety conditions. The instrument must not be powered on and used until its definitive assembly is on the cabinet’s door.

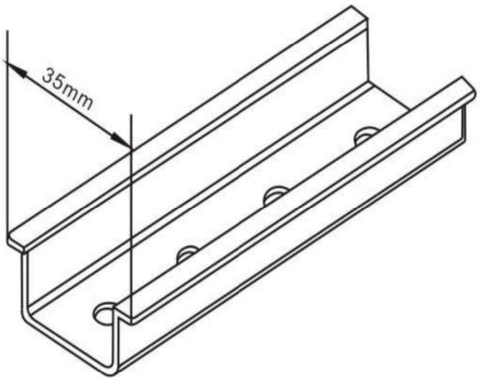
If the instrument is not used as manufacturer’s specifications, the protection of the instrument will be damaged.

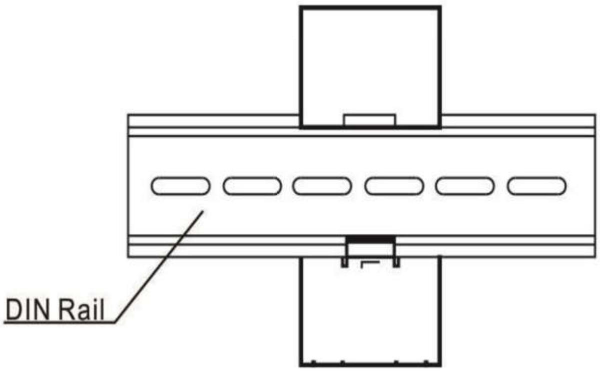
When any protection failure is suspected to exist (for example, it presents external visible damages), the instrument must be immediately powered off. In this case contact a qualified service representative.

3.1.- Installation

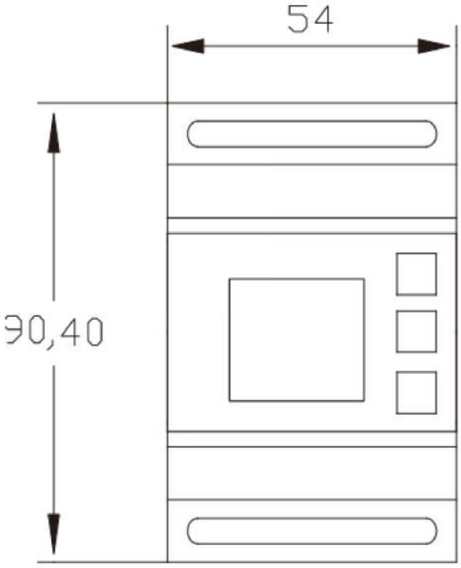
Mounting

Instrument is to be mounted on 35mm Din-rail. Keep all connections into the cabinet. Please note that with the instrument powered on, the terminals could be dangerous to touch and cover opening actions or elements removal may allow accessing dangerous parts. Therefore, the instrument must not be used until this is completely installed.

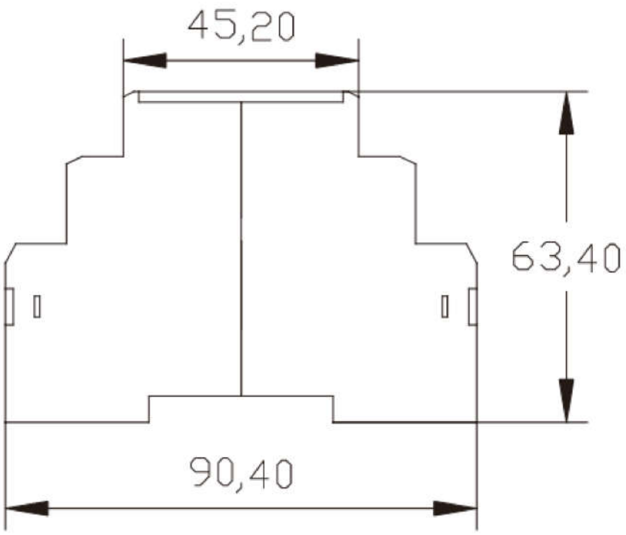




Dimension: **Unit: mm**



Front view



Side view

Notes:

Input signal: 19D-NX using a separate acquisition calculate for each measurement channel, to ensure consistent in use, for different load forms, it's a variety of connection mode. Access wire shall be met the current is 2.5 square millimeters, and the voltage is 1.5 square millimeters.

A. Voltage input

Input voltage should not exceed the rated input voltage products 450V.
Otherwise, you should use external VT. Suggest 1A fuse be installed in the voltage input side.

B. Current Input

Standard input current is 5A or 1A, if greater than 5A/1A should use external CT.
When the CT is connected with other meters, make sure wiring methods be used in series.

Warning: Forbid to install a CT on the live feeder wire with open secondary leads. This can be extremely dangerous!

Before remove the current input connection, must be sure to disconnect the primary circuit or shorted secondary circuit of CT.

C. Sequence of wire

Warning: Please make sure that the input voltage and current corresponding to the same phase, sequence, and the same direction; Otherwise, the Values and symbols will be wrong! (Power and Energy)

Always observe the physical orientation of CT (P1 - P2) when installing on the feeder wire.
Always pay attention to wiring polarity and phasing when terminating the CT leads to the 19D-NX. S1 connect to Ix*, S2 connect to Ix.

The input network configuration of instrument depends on the CT number of the system:
in the condition of 2 CT, select the three-phase, three-lines two components;
in the condition of 3 CT, select the three-phase, four-lines three component mode.

Instrument connection mode, set of the instrument (programming input network NET) should be the same load wiring as measured wiring. Otherwise, the measurement instrument will lead to incorrect voltage or power.

In three-phase 3 wire mode, measurement and shows the line voltage;
In three-phase 4 wire mode, measurement and shows the phase voltage and line voltage both.

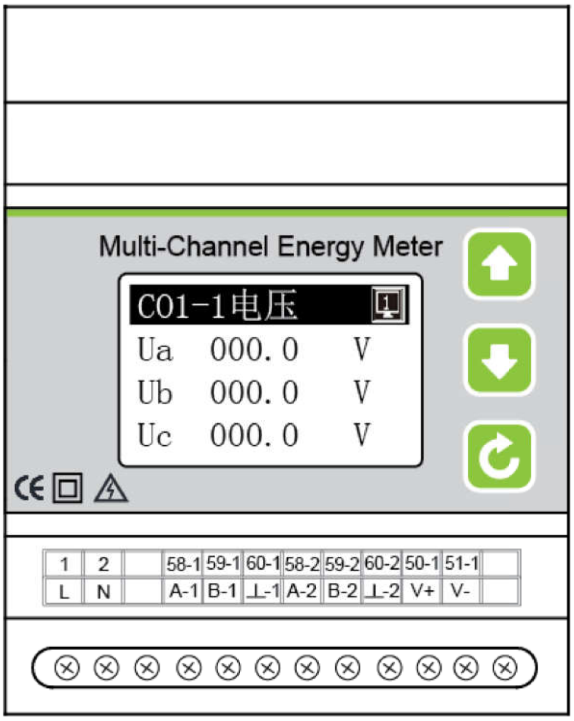
D. Auxiliary power

19D-NX with universal (AC / DC) power input, if not for a special statement, we provide the 90-240AC/DC power interface for standard products, please ensure that the auxiliary power can match with meter to prevent unexpected damage.

A. Suggest install 1A fuse in the fire line side.
B. For the areas with poor power quality, suggest install lightning surge suppressor and rapid burst suppressor to prevent lightning strikes.

3.2. - Connection Terminal

3.2.1. - Monitor connection terminal

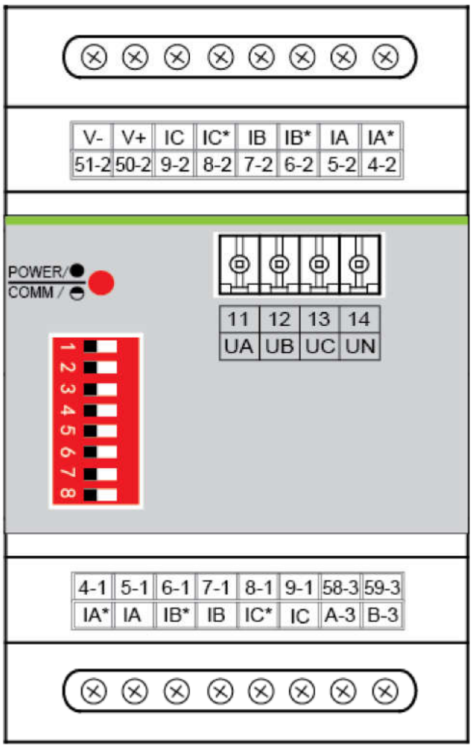

Multi-Channel Energy Meter
C01-1电压
Ua 000. 0 V
Ub 000. 0 V
Uc 000. 0 V
1 2 58-1 59-1 60-1 58-2 59-2 60-2 50-1 51-1
L N A-1 B-1 ⊥-1 A-2 B-2 ⊥-2 V+ V-

1	2		58-1	59-1	60-1	58-2	59-2	60-2	50-1	51-1	
L	N		A-1	B-1	⊥ -1	A-2	B-2	⊥ -2	V+	V-	

1. Auxiliary power
2. Auxiliary power

58-1.RS485A-1
59-1.RS485A-1
60-1.RS485A⊥-1
58-.RS485A-1
59-2.RS485A-1
60-2.RS485A⊥-2
50-1. V+, DC 12V
51-1. V+, DC 12V

3.2.2 - Controller connection terminal


V-
V+
IC
IC*
IB
IB*
IA
IA*
51-2
50-2
9-2
8-2
7-2
6-2
5-2
4-2
POWER/●
COMM/
1
2
3
4
5
6
7
8
11
12
13
14
UA
UB
UC
UN
4-1
5-1
6-1
7-1
8-1
9-1
58-3
59-3
IA*
IA
IB*
IB
IC*
IC
A-3
B-3

Upper connection terminal

51-2	50-2	9-2	8-2	7-2	6-2	5-2	4-2
V+	V-	IC	IC	IB	IB	IA	IA

51-2. V+, DC 12V
50-2. V-, DC 12V
9-2. The second C-phase current input
8-2. The second C-phase current input
7-2. The second channel B phase current input
6-2. The second channel B phase current input
5-2. The second channel A phase current input
4-2. The second channel A phase current input

Middle connection terminal

11	12	13	14
UA	UB	UC	UB

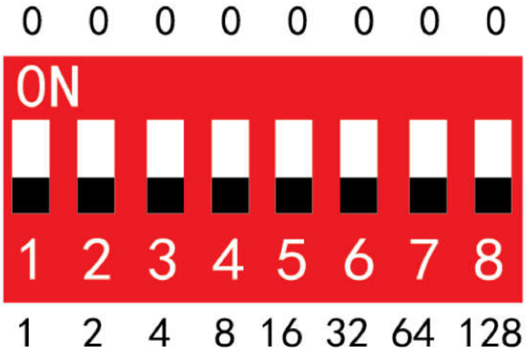
11.A phase voltage input
12.A phase voltage input
13.A phase voltage input
14.A phase voltage input

Lower connection terminal

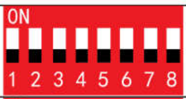
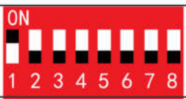
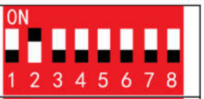
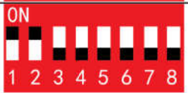
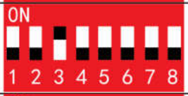
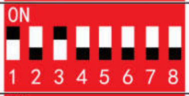
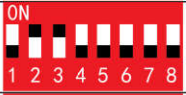
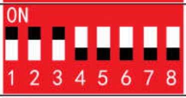
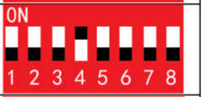
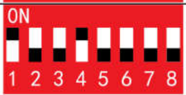
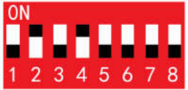
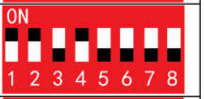
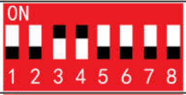
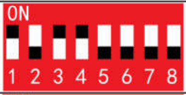
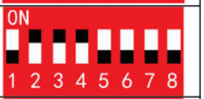
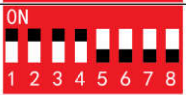
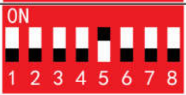
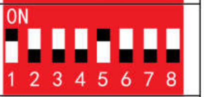
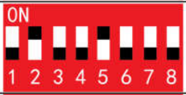
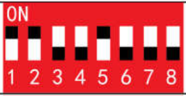
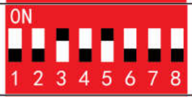
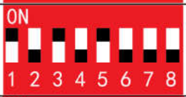
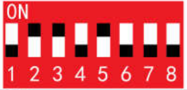
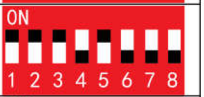
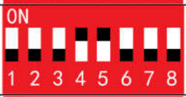
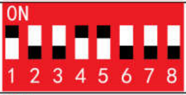
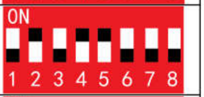
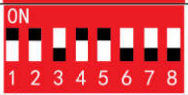
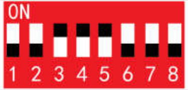
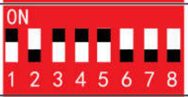
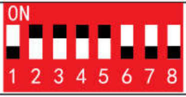
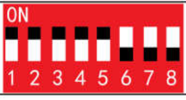
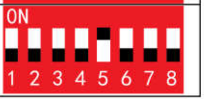
4-1	5-1	6-1	7-1	8-1	9-1	58-3	59-3
IA	IA	IB	IB	IC	IC	A-3	B-3

4-1. The first A-phase current input
5-1. The first A-phase current input
6-1. The first B-phase current input
7-1. The first B-phase current input
8-1. The first C-phase current input
9-1. The first C-phase current input
58-3. RS485A-3
59-3. RS485B-3

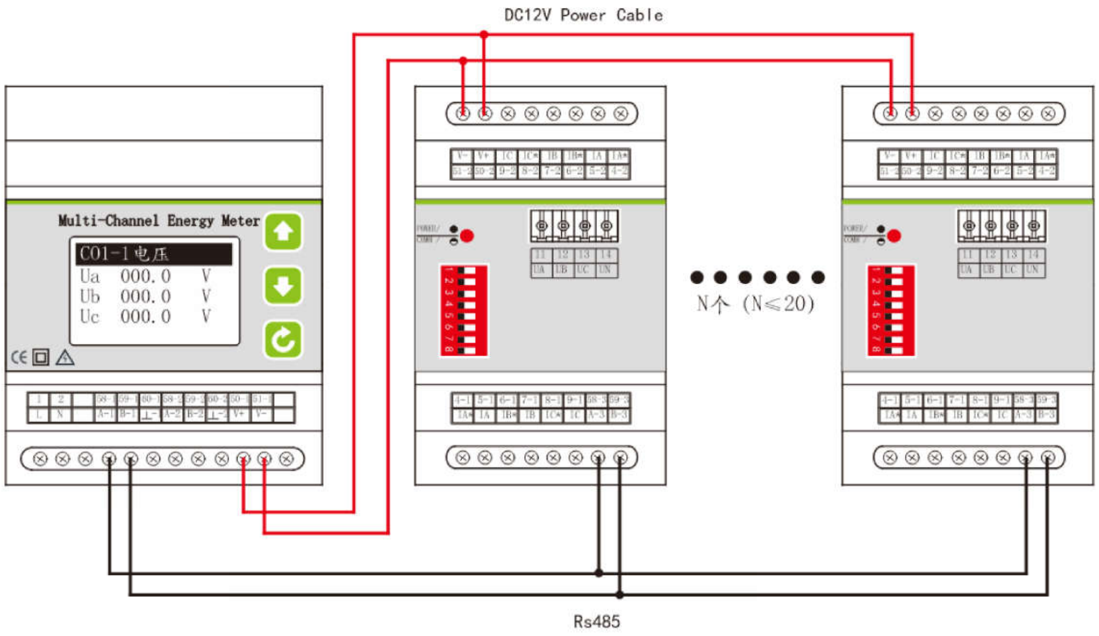
3.3. – DIP Switch Instructions



The DIP switch has 8 digits in total, 1, 2, 3, 4., 5, 6, 7, 8. Each digit represents a numerical value. Pushing to the ON position is 0, and dialing to the bottom represents 1, 2, 4 in turn., 8, 16, 32, 64, 128, add the values represented by dialing the digits below, which is the address code of the machine, (as shown in the figure, number 11 is: 1+2+8=11, number 30 is: 2+4+8+16=30) The maximum address code is 128, and the following are the first 32 commonly used address dial codes

0		1		2	
3		4		5	
6		7		8	
9		10		11	
12		13		14	
15		16		17	
18		19		20	
21		22		23	
24		25		26	
27		28		29	
30		31		32	

3.4. – Typical Wiring


DC12V Power Cable
Multi-Channel Energy Meter
C01-1 电压
Ua 000.0 V
Ub 000.0 V
Uc 000.0 V
N个 (N≤20)
Rs485

Note:

The main body can be connected to N (N≤20) splits

Item	Number	Number
Split acquisition module	≤6 circuits	≤2 circuits
Main body + N split acquisition modules	N×6≤120 circuits	N×6≤40 circuits

This connection drawing is for reference only; the actual connecting terminal please refer to the label on the rear part.

WARNINGS!

If power = -0.01 is shown for any of the phases and voltage and current are not zero for this phase, check out following points:

- Assure that A, B and C phases coincide in voltage and current.
- Correct polarity? Reverse the current transformer placed at this phase.

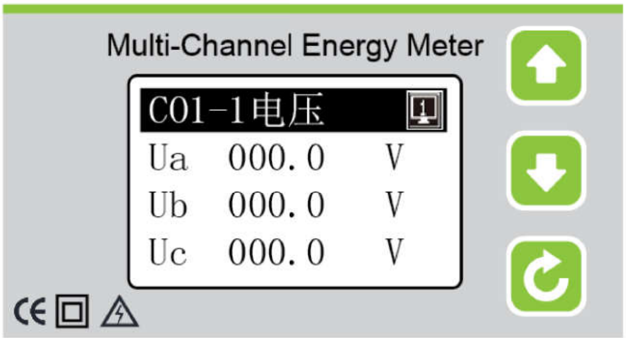
4. - SCREEN DISPLAY

4.1.- Screen description:

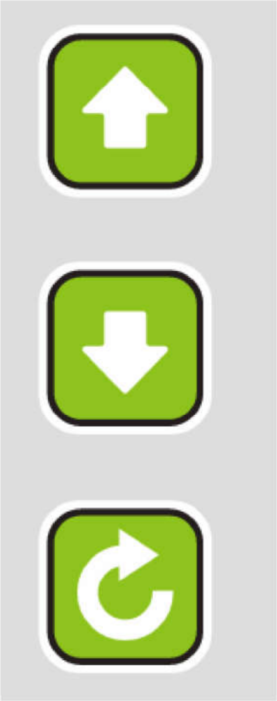
1. The top row is reverse display information characters

2. Channel C01-1" indicates the main display parameters of the current screen; indicates that the device is communicating with the host computer.

3.The three rows in the middle are real-time display of measurement data.



4.2 Button description:



Short press is the up key, switch circuit channel data display: 1st channel (C01-1) - Nth channel (C0N-2)

Short press is the down button to turn the page and display the measurement data, displaying voltage, current, power, electric energy and other measurement data;

Long press is the menu key to enter the programming menu, and it is also a function key to exit the menu step by step.

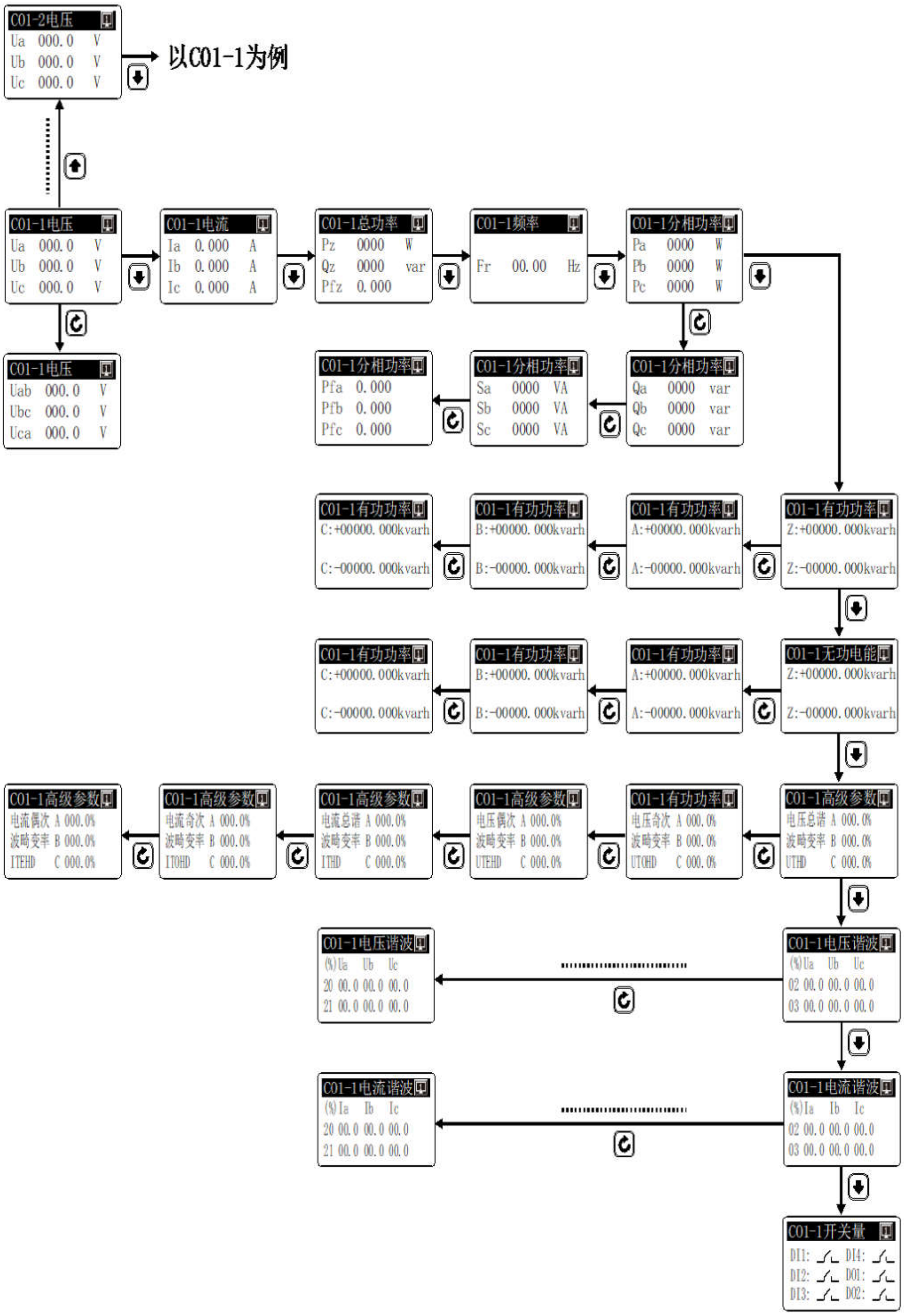
On the voltage, power, electric energy, harmonic interface, short press to switch the page display.

Short press on the menu interface as the confirmation key to confirm and save the entered information or displayed settings

5. OPERATION DESCRIPTION

5.1 Main menu

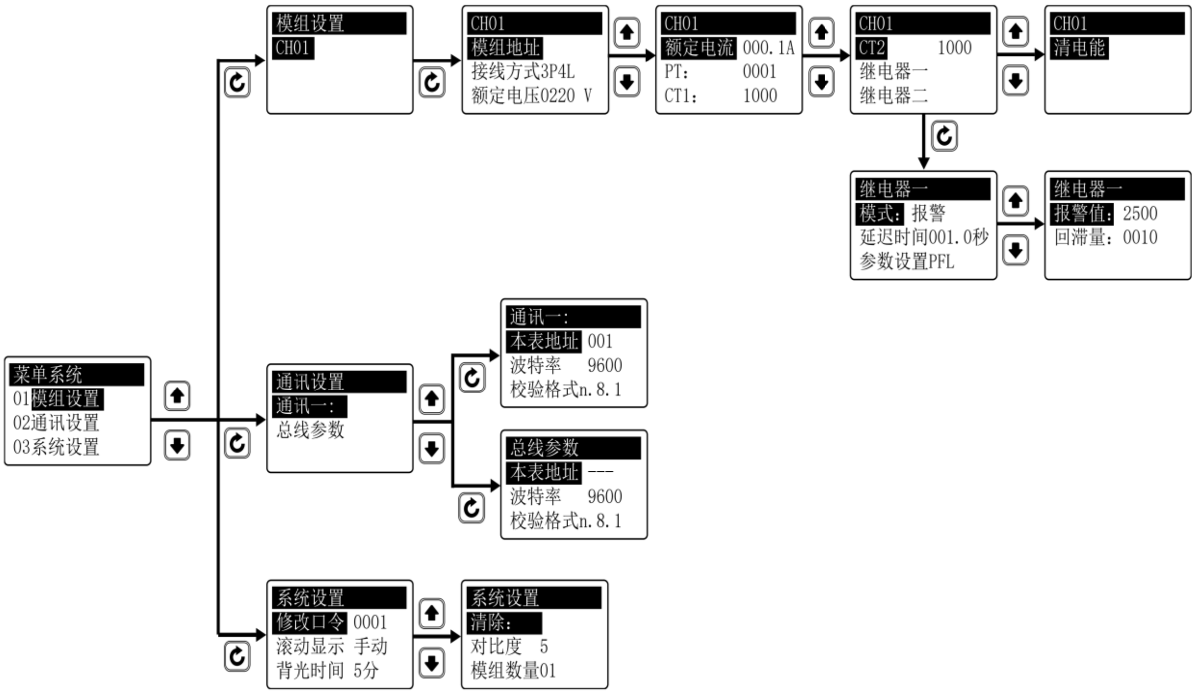
Press the page-turning key in any display interface, and the measurement data display area will display the corresponding data. Each time the page-turning key is pressed, it will scroll down one screen, and it will automatically return to the first screen after reaching the last screen. As shown below:


C01-2电压
Ua 000.0 V
Ub 000.0 V
Uc 000.0 V
以C01-1为例
C01-1电压
Ua 000.0 V
Ub 000.0 V
Uc 000.0 V
C01-1电流
Ia 0.000 A
Ib 0.000 A
Ic 0.000 A
C01-1总功率
Pz 0000 W
Qz 0000 var
Pfz 0.000
C01-1频率
Fr 00.00 Hz
C01-1分相功率
Pa 0000 W
Pb 0000 W
Pc 0000 W
C01-1电压
Uab 000.0 V
Ubc 000.0 V
Uca 000.0 V
C01-1分相功率
Pfa 0.000
Pfb 0.000
Pfc 0.000
C01-1分相功率
Sa 0000 VA
Sb 0000 VA
Sc 0000 VA
C01-1分相功率
Qa 0000 var
Qb 0000 var
Qc 0000 var
C01-1有功功率
C:+00000.000kvarh
C:-00000.000kvarh
C01-1有功功率
B:+00000.000kvarh
B:-00000.000kvarh
C01-1有功功率
A:+00000.000kvarh
A:-00000.000kvarh
C01-1有功功率
Z:+00000.000kvarh
Z:-00000.000kvarh
C01-1有功功率
C:+00000.000kvarh
C:-00000.000kvarh
C01-1有功功率
B:+00000.000kvarh
B:-00000.000kvarh
C01-1有功功率
A:+00000.000kvarh
A:-00000.000kvarh
C01-1无功电能
Z:+00000.000kvarh
Z:-00000.000kvarh
C01-1高级参数
电流偶次 A 000.0%
波畸变率 B 000.0%
ITEHD C 000.0%
C01-1高级参数
电流奇次 A 000.0%
波畸变率 B 000.0%
ITOHD C 000.0%
C01-1高级参数
电流总谐 A 000.0%
波畸变率 B 000.0%
ITHD C 000.0%
C01-1高级参数
电压偶次 A 000.0%
波畸变率 B 000.0%
UTEHD C 000.0%
C01-1有功功率
电压奇次 A 000.0%
波畸变率 B 000.0%
UTOHD C 000.0%
C01-1高级参数
电压总谐 A 000.0%
波畸变率 B 000.0%
UTHD C 000.0%
C01-1电压谐波
(%)Ua Ub Uc
20 00.0 00.0 00.0
21 00.0 00.0 00.0
C01-1电压谐波
(%)Ua Ub Uc
02 00.0 00.0 00.0
03 00.0 00.0 00.0
C01-1电流谐波
(%)Ia Ib Ic
20 00.0 00.0 00.0
21 00.0 00.0 00.0
C01-1电流谐波
(%)Ia Ib Ic
02 00.0 00.0 00.0
03 00.0 00.0 00.0
C01-1开关量
DI1: DI4:
DI2: DO1:
DI3: DO2:

5.2 Setup procedure

Long press the "Down" button in the measurement interface to enter the menu system, prompting to enter the password, enter the user-level password (default is 0001), press the confirmation button to enter the programming menu, the instrument provides detailed menu items, the user can follow the prompts programming.

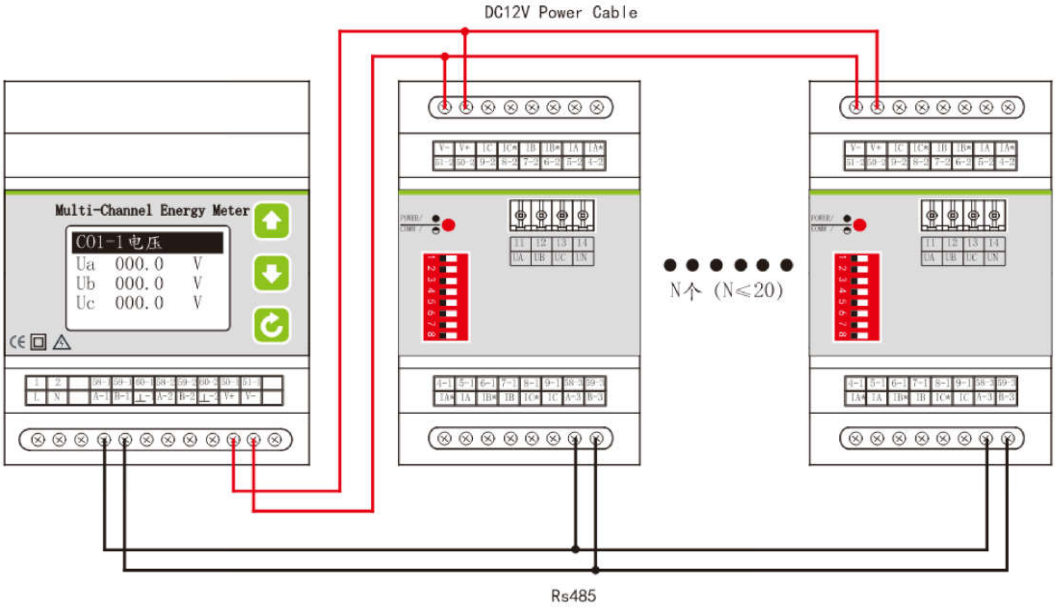
Menu Flowchart:


模组设置
CH01
CH01
模组地址
接线方式3P4L
额定电压0220 V
CH01
额定电流 000.1A
PT: 0001
CT1: 1000
CH01
CT2 1000
继电器一
继电器二
CH01
清电能
继电器一
模式: 报警
延迟时间001.0秒
参数设置PFL
继电器一
报警值: 2500
回滞量: 0010
菜单系统
01模组设置
02通讯设置
03系统设置
通讯设置
通讯一:
总线参数
通讯一:
本表地址 001
波特率 9600
校验格式n.8.1
总线参数
本表地址 ---
波特率 9600
校验格式n.8.1
系统设置
修改口令 0001
滚动显示 手动
背光时间 5分
系统设置
清除:
对比度 5
模组数量01

6 - COMMUNICATION INTERFACE

6.1.- Connection for RS485 BUS

The composition of the RS-485 cabling must be carried out with a meshed screen cable (minimum 3 wire), diameter of not less than 0.5mm^2, with a maximum distance of 1,200 m between the 19D-NX… and the master unit. This Bus may connect a maximum of 32pcs



Notes:

-. For communication with the master unit, user can choose RS-485 to RS-232 converter or RS485 to USB adapter to use.

-. For expand the number of devices in the communication network, a signal repeater can be used.

-. RS485 PIN number is 58,59,60

-. Due to product modifications or special requirements, the interface pin place may be change. For details, please refer to product label on the rear side

6.2.- MODBUS © Protocol

Modbus RTU Frame Format:

Address code	**1 BYTE**	*Slave device address* ***1-247***
Function code	**1 BYTE**	*Indicates the function codes like read coils / inputs*
Data code	**4 BYTE**	*Starting address, high byte* *Starting address, low byte* *Number of registers, high byte* *Number of registers, low byte*
Error Check code	**2 BYTE**	*Cyclical Redundancy Check (**CRC**)*

MODBUS FUNCTIONS:

Code	**Meaning**	**Description**
FUNCTION 03	Reading of n Words	*This function permits to read all the electrical parameters*
FUNCTION 06	Preset Single register	***Disable in default*** *If need valid this code, please contact Blue Jay Sales Team before your order!*

Note: Float data follow **IEEE754**, float low bit first, high bit next. (**CD AB**)

6.3.- Register Map

6.3.1- primary parameter

Register	Data	Byte mode		Instruction
0	Module 1-1 way Ua	float	2	Three-phase phase voltage data, unit V
2	Module 1-1 way Ub	float	2	
4	Module 1-1 way Uc	float	2	
6	Module 1-1 way Uab	float	2	Three-phase line voltage data, unit V
8	Module 1-1 way Ubc	float	2	
10	Module 1-1 way Uca	float	2	
12	Module 1-1 way Ia	float	2	Three-phase current data, unit A
14	Module 1-1 way Ib	float	2	
16	Module 1-1 way Ic	float	2	
18	Module 1-1 way Pa	float	2	Split-phase and total active power, unit kW
20	Module 1-1 way Pb	float	2	
22	Module 1-1 wayPc	float	2	
24	Module 1-1 wayP∑	float	2	
26	Module 1-1 wayQa	float	2	Split phase and total reactive power, unit kvar
28	Module 1-1 wayQb	float	2	
30	Module 1-1 wayQc	float	2	
32	Module 1-1 wayQ∑	float	2	
34	Module 1-1 waySa	float	2	Split phase and total apparent power KVA
36	Module 1-1 waySb	float	2	
38	Module 1-1 waySc	float	2	
40	Module 1-1 wayS∑	float	2	
42	Module 1-1 wayPFa	float	2	Split phase and total power factor 0~1.000
44	Module 1-1 wayPFb	float	2	
46	Module 1-1 wayPFc	float	2	
48	Module 1-1 wayPF∑	float	2	
50	Module 1-1 wayFR	float	2	Voltage frequency 0.01Hz
52	Module 1-1 way EpZ+	float	2	Total forward active energy, unit kWh
54	Module 1-1 way EpZ-	float	2	Total reverse active energy (two-way metering energy-conveying active energy)
56	Module 1-1 way EqZ+	float	2	Total inductive reactive energy, unit kVarh
58	Module 1-1 way EqZ-	float	2	Total capacitive reactive energy
60	Module 1-1 way EpA+	float	2	Phase A forward active energy, unit kWh
62	Module 1-1 way EpA-	float	2	A-phase reverse active energy (two-way metering electric energy-transmitting active electric energy)
64	Module 1-1 way EqA+	float	2	Phase A inductive reactive energy, unit kVarh

66	Module 1-1 way EqA-	float	2	A compatible reactive energy
68	Module 1-1 way EpB+	float	2	Phase B forward active energy, unit kWh
70	Module 1-1 way EpB-	float	2	B-phase reverse active energy (two-way metering electric energy-transmitting active electric energy)
72	Module 1-1 way EqB+	float	2	Phase B inductive reactive energy, unit kVarh
74	Module 1-1 way EqB-	float	2	B compatibility reactive energy
76	Module 1-1 way EpC+	float	2	Phase C forward active energy, unit kWh
78	Module 1-1 way EpC-	float	2	C-phase reverse active energy (two-way metering electric energy-transmitting active electric energy)
80	Module 1-1 way EqC+	float	2	Phase C inductive reactive energy, unit kVarh
82	Module 1-1 way EqC-	float	2	C Compatibility Reactive Energy
100-182	Primary parameter of module 1-2	float		The data format corresponds to the module 1-1 channel one-to-one
200-282	Primary parameter of module 2-1	float		The data format corresponds to the module 1-1 channel one-to-one
200-282	Primary parameter of module 2-2	float		
300-382	Primary parameter of module 3-1	float		
. .	. .	. .	. .	
3800-3882	Module 20-1 primary parameter	float		
3900-3982	Module 20-2 primary parameter	float		

6.3.2- Status and setting parameters (DO and DI status cannot be changed, other parameters can be modified by command 06)

Register	Data	Byte mode		Instruction
6400	Module 1 DO status	int	1	Remote control relay output status Bit0~1 1st~2nd output status
6401	Module 1 DO status	int	1	Switch input information Bit0~3 Channel 1~4 switch-in state
6402-6419	Module 1 retains data			Reserve
6420	Module 1DO1 mode	Int	1	0 Remote Mode 1 Local Alarm Mode 2 Off
6421	Module 1DO1 action delay time	Int	1	Alarm mode: 0.0-999.9 seconds Remote control mode: 0: level mode Other values: pulse mode pulse width (0.1-999.9 seconds
6422	Module 1DO1 alarm parameters	Int	1	Any parameters of the two loops are valid beyond the limit, and the meanings are as follows: 0: UA high report 1: UB high report 2: UC high report 3: UAB high report 4: UBC high report 5: UCA high report 6: UA/UB/UC any one phase high report 7: IA high report 8: IB high report 9: IC high report 10: any 1 channel current high report 11: PA high report 12: PB high report 13: PC high report 14: total active power high report 15: QA high report 16: QB high report 17: QC High Report 18: Total Reactive Power High Report 19: SA High Report 20: SB High Report 21: SC High Report 22: Total Apparent Power High Report 23: Total Power Factor High Report 24: Frequency High Report 25: DI1 Combined report 26: DI2 combined report 27: DI3 combined report 28: DI4 combined report 29: DI5 combined report 30: DI6 combined report 31: UA low report 32: UB low report 33: UC low report.
6423	Module 1DO1 alarm value	Int	1	Alarm value, power secondary value

6424	Module 1DO1 hysteresis	Int	1	return difference
6425	Module 1DO2 mode	Int	1	DO2 setting method is the same as DO1
6426	Module 1 DO2 action delay time	Int	1	
6427	Module 1DO2 alarm parameters	Int	1	
6428	Module 1 DO2 alarm value	Int	1	
6429	Module 1 DO2 hysteresis	Int	1	
6430-6439	Module 1 Reserved	Int		Reserve
6440	Module 1 Wiring Type	Int	1	Signal type: 0 three-phase four-wire 1 three-phase three-wire 2CT 2 three-phase three-wire 3CT 0-9999, unit V 0-9999, unit 0.1A
6441	Module 1 voltage range	Int	1	
6442	Module 1 current range	Int	1	
6443	Module 1 voltage ratio	Int	1	Input range: 1-9999
6444	Module 1-1 channel current ratio	Int	1	Input range: 1-9999
6445	Module 1-2 channel current ratio	Int	1	Input range: 1-9999
6446-6447	Module 1 Reserved	Int		Reserve
6448	Module 1 clears power	Int	1	Enter hexadecimal 0x0A0A, that is, decimal 2570
6450-6498	Module 2 data	Int		The data format corresponds to module 1 one by one
6450-6498	Module 3 data	Int		
. .	. .	. .	. .	
7300-7348	Module 19 data	Int		
7350-7398	Module 20 data	Int		

6.3.3- Voltage Harmonic Data

Register	Data	Byte mode		Register
8000	module 1THDUa	int	1	Total harmonic distortion of phase A voltage, unit 0.1%
8001	module 1THDUb	int	1	Total Harmonic Distortion of Phase B Voltage
8002	module 1THDUc	int	1	Total Harmonic Distortion of Phase C Voltage
8003	module 1TOHDUa	int	1	A-phase voltage odd harmonic total distortion, unit 0.1%
8004	module 1TOHDUb	int	1	B-phase voltage odd harmonic total distortion
8005	module 1TOHDUc	int	1	C phase voltage odd harmonic total distortion
8006	module 1TEHDUa	int	1	Phase A voltage even harmonic total distortion, unit 0.1%
8007	module 1TEHDUb	int	1	B phase voltage even harmonic total distortion
8008	module 1TEHDUc	int	1	C phase voltage even harmonic total distortion
8020-8039	module 1HUa	int		Phase A voltage 2-21 harmonic component, unit 0.1%
8040-8059	module 1HUb	int		Phase B voltage 2-21 harmonic components
8060-8079	module 1HUc	int		Phase C voltage 2-21 harmonic components
8100-8179	module 2 data	Int		The data format corresponds to module 1 one-to-one
8200-8279	module 13 data	Int		
. .	. .	. .	. .	
9800-9879	module 19 data	Int		
9900-9979	module 1 data	Int		

6.3.4- Current Harmonic Data

Register	Data	Byte mode		Instruction
11200	Module 1-1 way THDIa1	int	1	Total harmonic distortion of phase A current of the 1st circuit, unit 0.1%
11201	Module 1-1 way THDIb1	int	1	The total harmonic distortion of the first B-phase current
11202	Module 1-1 way THDIc1	int	1	The total harmonic distortion of the first C-phase current
11203	Module 1-1 way TOHDIa1	int	1	Odd order harmonic total distortion of phase A current of the 1st circuit, unit 0.1%
11204	Module 1-1 way TOHDIb1	int	1	Odd-order harmonic total distortion of the first B-phase current
11205	Module 1-1 way TOHDIc1	int	1	Odd-order harmonic total distortion of the first C-phase current
11206	Module 1-1 way TEHDIa1	int	1	The total distortion of the even-order harmonics of the phase A current of the 1st circuit, unit 0.1%
11207	Module 1-1 way TEHDIb1	int	1	Even-order harmonic total distortion of the first B-phase current
11208	Module 1-1 way TEHDIc1	int	1	Even-order harmonic total distortion of the first C-phase current
11220-11239	Module 1-1 way HIa1	int		The 2nd-21st harmonic component of the first channel A-phase current, unit 0.1%
11240-11259	Module 1-1 way HIb1	int		The 2-21th harmonic component of the first B-phase current
11260-11279	Module 1-1 way Hic1	int		The 2-21th harmonic component of the first C-phase current
11300-11379	Module 1-2 current harmonics	int		The data format is in one-to-one correspondence with the first channel
11400-11479	Module 2-1 current harmonics	int		
. .	. .	. .	. .	
15000-15079	Module 20-1 current harmonics	int		
15100-15179	Module 20-2 current harmonics	int		

6.3.5- Display module status parameters (starting from 20032, it can be modified by command 06)

Register	Data	Byte mode		Instruction
20000	module 1 communication status	int	1	0 means the module is not online, 1 means the module is online
20001	module 2 communication status	int	1	0 means the module is not online, 1 means the module is online
. .	. .	. .	. .	
20019	module 20 communication status	int	1	0 means the module is not online, 1 means the module is online
20020-20031	reserve			
20032	number of modules	int	1	Input range: 1-20
20033	module 1 communication address	int	1	Input range: 1-247
20034	module 2 communication address	int	1	Input range: 1-247
. .	. .	. .	. .	
20052	module 20 communication address	int	1	Input range: 1-247
20053-20069	reserve			
20070	TIME.year	int	1	Internal RTC real-time time: year-month-day-hour-minute-second-week can be set
20071	TIME.month	int	1	
20072	TIME.date	int	1	
20073	TIME.hour	int	1	
20074	TIME.minute	int	1	
20075	TIME.second	int	1	
20076	TIME.day	int	1	

6.4.- Example

Host inquiry slave device

Addr.	Func.	Data Address high	Data Address low	Data Number high	Data number low	CRC16 low	CRC16 high
0CH	03H	00H	00H	00H	06H	C4H	D5H

PC user ask upload UA, UB, UC, IA, IB, IC

Slave device response

Addr.	Func.	Byte count	Data1 high	Data1 low	Data2 high	Data2 low	Data3 high	Data3 low
0CH	03H	0CH	03H	E8H	03H	E9H	03H	E8H
Data4 high	**Data4 low**	**Data5 high**	**Data5 low**	**Data6 high**	**Data6 low**	**CRC16 low**	**CRC16 high**	
13H	84H	13H	88H	13H	8AH	A6H	D6H	

Show the data:

UA=3E8H (100.0)
UB=3E9H (100.1)
UC=3E7H (99.9)
IA=1384H (4.996)
IB=1388H (5.000)
IC=138AH (5.002)

Notes:

1. Blue Jay disable the 06 function in default setting, if Activated the write command, please check the host device program to avoid the meaningless write operation, that may reduce the reduce the register working life.
2. When the write is unsuccessful, no return data from the slave device. In this addition, please re-send write inquiry again.

7. - SAFETY CONSIDERATIONS

All installation specification described at the previous chapters named: **INSTALLATION AND STARTUP, INSTALLATION MODES and SPECIFICATIONS.**

Please note that with the instrument powered on, the terminals could be dangerous to touching and cover opening actions or elements removal may allow accessing dangerous parts. This instrument is factory-shipped at proper operation condition.

- The device must have a professional installation and maintenance
- Any operation of the device, you must cut off the input signal and power;

8. - MAINTENANCE

The 19D-NX modular multifunction energy Meter does not require any special maintenance. No adjustment, maintenance or repairing action should be done when the instrument is open and powered on, should those actions are essential, high-qualified operators must perform them.

Before any adjustment, replacement, maintenance or repairing operation is carried out, the instrument must be disconnected from any power supply source.

When any protection failure is suspected to exist, the instrument must be immediately put out of service. The instrument’s design allows a quick replacement in case of any failure.

9. - TECHNICAL SERVICE

FAQ's

1.- Once cabled and connected is seen to give a correct voltage and current reading, but shows negative values for active power (generation).

This is an error with the cabling for the current transformer secondary; the direction of the transformer current has to be respected as shown in the connection diagram. The current transformers have a two face primary; the current must pass from P1 to P2 giving the result in secondary (S1 and S2) of 5 amps.

The error stems from:

a). The current transformers have been incorrectly installed. As a result, it gives the direction of the current as passing from P2 to P1; to resolve this problem, the current transformer does not have to be dismantled and installed again, but the transformer secondary (S1 and S2) just has to be inverted.

b). The connection of the current secondary in the current transformers have been incorrectly connected; to resolve this problem just connect the S1 transformer secondary to the S1 on the meter and the S2 on the current transformer to the S2 on the meter.

2.- Once cabled and connected, is seen to give an incoherent Power factor and CosΦ reading (-0.01 or similar).

This is again a current transformer and voltage phase connection error phase A, must correspond to the current transformer installed in phase A; phase B, must correspond to the current transformer installed in phase B; and phase C, must correspond to the current transformer installed in phase C.

This connection terminal is clearly shown on the area side of the device.

3.- The measuring voltage and is displaying the secondary voltage (for example 110 volts).
Ensure that the voltage Transformer ratio has been correctly set.

4.- Device does not correctly display the current reading. It shows values varying between 0 to 5 amps of current.
Ensure that the Current Transformer ratio has been correctly set.

Calculation formula of electrical parameter

Formula	Parameter
$U = \sqrt{\frac{1}{N}\sum_{n=0}^{N} u_n^2} \quad n = 0,1,2 \ldots\ldots N$	Voltage RMS value
$I = \sqrt{\frac{1}{N}\sum_{n=0}^{N} i_n^2} \quad n = 0,1,2 \ldots\ldots N$	Current RMS value
$P = \frac{1}{N}\sum_{n=1}^{N}(i_{an}u_{an} + i_{bn}u_{bn} + i_{cn}u_{cn})$	Total active power cycle average
$P_s = UI$	Single-phase apparent power cycle average
$\cos\theta = \frac{P_p}{P_S}$	Power factor
$P_q = \sqrt{P_S^2 - P_P^2}$	Reactive power (Pq is positive and the direction cannot be determined; P algorithm can be used to shift the voltage component by 90°)
$W = \int P * dt$	Electric energy

Note: In above formula, N for sampling points in one AC wave.

For any inquiry about the instrument performance or any failure, contact to Blue Jay's technical service.

Blue Jay - After-sales service

E-mail: tech@cqbluejay.com