

Multi-channel Circuit Metering System

BJ-MCM1100

User Manual

Version: 1.41

Revision 2023-5

Read me

When you use BJ-MCM1000 series Multi-Channel Circuit Metering system, 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 BJ-MCM1000, 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 or Ethernet) 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

The MCM1000 Series provides a compact and robust metering solution, enable reliable monitoring of building electrical loads with a low installation cost-per-point by combining sub-metering. The unit performs real-time metering, measures energy consumption for max 18 channels circuits for single phase or 6 channel for three phase circuits.

Advanced communications options including Modbus via RS485, I/O communications provide for extensive reliable data exchange. Multiple units can be connected together to meter unlimited number of circuits. The versatility of MCM1000 meters are ideal for multi-tenant or departmental metering applications within office towers, condominiums, apartment buildings, shopping centers and other multi-user environments.

Measurement Function

Voltage: Line Voltage; Phase Voltage

Current: Total Current; Current per channel

Power and Power Factor: Total power Reactive Power, Apparent Power, Power Factor and for per channel

Frequency: System Frequency

Energy Function

Energy (kWh) measurement meeting international standards, accuracy is Class 1.0

Over/Under Limit Alarming

Users can select parameters and set their set points. An alarm will be triggered when the setpoint is reached. At the same time, sound and light signals could be sent out via relay output. The time and reason of an alarm event will be recorded.

I/O Option

Standard output ports provide energy (kWh) pulse output and time pulse output; optional 6 channel digital inputs (DI) provide pulse counting from water, electricity and gas meter, and monitor switch status; optional 2 channel relay outputs (DO) react upon alarming conditions.

Communication and Network

Supports RS485 communication open protocol: Modbus RTU;

2. - ELECTRICITY METERING

MCM1000 series has two models:

MCM13xx - three phase measurement, max connect 6 channel three phase circuit

MCM11xx -single phase measurement, max connect 18 channel single phase circuit.

The MCM delivers the of parameters listed by RS485 ports, Blue Jay Technology also provide advanced model can connect display unit show visualization information, and do configuration of the MCM device. In the main display area shows 4 power parameters, with other display area show the various parameters and state of meter on each page jump. For more details of measurement parameters please refer to the subsequent for displays introduction.

Metering parameter overall

Function		Parameter	MCM1110	MCM1120
Real-time Parameter	Voltage	per channel V	●	●
	Current	per channel A	●	●
	Power	per channel W	●	●
	Reactive Power	per channel var	●	●
	Apparent Power	per channel VA	●	●
	Power Factor	per channel COS	●	●
	Frequency	per channel Hz	●	●
Energy	Active Energy +	per channel	●	●
	Reactive Energy +	per channel	●	●
	Active Energy -	per channel	●	●
	Reactive Energy -	per channel	●	●
Alarming	Over/Under Limit Alarm		○	●
I/O	6DI & 2DO		○	●
Display	External LCD display	(RS485 connection)		●
Communication	RS485	Modbus-RTU	●	●

Notes: "●" for Standard; "○" for Optional; Blank means Not Available

3. - SPECIFICATIONS

Reference standard:

Basic electricity: IEC 61557-12:2007

Active energy: IEC 62053-21:2003

Reactive energy: IEC 62053-23:2003

Accuracy standards

Parameter	Accuracy	A phase	B phase	C phase	All
Voltage	0.2	V1	V2	V3	
Current	0.2	A1	A2	A3	
Active Power	0.5	W1	W2	W3	W
Reactive Power	0.5	var1	var2	var3	var
Apparent power	0.5	VA1	VA2	VA3	VA
Power Factor	0.5	PF1	PF2	PF3	PF
Active Energy	1				Wh
Reactive Energy	2				varh
Frequency	0.1				Hz

Input

Voltage: Rated 40~400V

Current: Rated 5A (optional 1A)

Frequency: 45-65Hz

Overload

Current: 1.2 times rated continuous; 5 seconds for 10 times the rated

Voltage: 30 seconds for 2 times the rated

Dielectric strength

IEC/EN 61010-1:2010

2kV AC RMS 1 minute, between input / output / case / power supply

EMC Test

	standard	Test voltage
Electrostatic discharge immunity test:	IEC-61000-4-2 level 4	8Kv
Electrical fast transient burst immunity test	IEC61000-4-4 level 3	Input 1kV; Power supply 2kV
Surge (Shock) immunity test	IEC61000-4-5 level 4	common mode test voltage 4kV

Work environment

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Temperature: -15C~ +55C

Humidity: RH 20%~95% (No condensation)

Storage Conditions

Temperature: -25C~+70C

Humidity: RH 20%~95%

Working Power

AC 80-265V, 45-65Hz, DC 100-350V

DC 20-60V (Optional)

Maximum power consumption 6W

Dimensions

L × H × D =180mm×122mm×48mm

Installation

35mm Din-Rail

4.- 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.

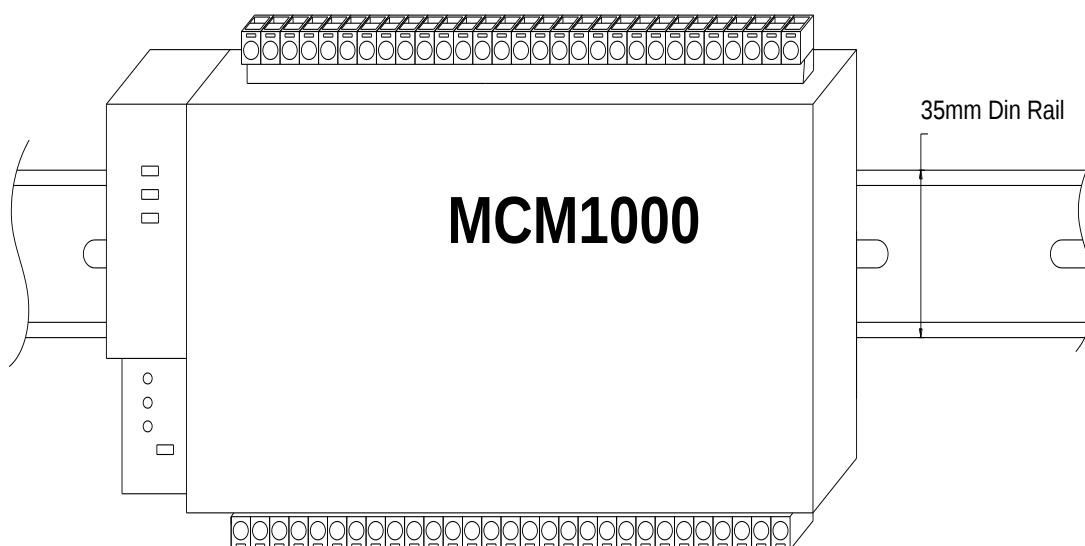
If the instrument is not used as manufacturer's specifications, the protection of the instrument will be damaged.

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.

4.1.- Installation

Mounting

This meter is DIN rail mounted, which fits 35 mm standard rails. Keep all connections into the cabinet. 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.



Notes:

Input signal: MCM1000 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 2.5 square mm, voltage of 1.5 square millimeters.

A. Voltage input:

Input voltage should not exceed the rated input voltage products (100V or 400V), Otherwise, you should use external CT. Suggest 1A fuse be installed in the voltage input side.

B. Current Input:

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

Before remove the current input connection, must be sure to disconnect the primary circuit or shorted secondary circuit of CT. In order to facilitate disassembly, please do not connect to CT directly, and the terminal block is suggested.

C. 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)

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 three-wire mode, the measurement and shows the line voltage;
In three-phase four-wire mode, the measurement and shows the phase voltage.

Auxiliary power:

MCM1000 Series with universal (AC / DC) power input, if not for a special statement, we provide the 220VAC or 110V/DC power interface for standard products. Instruments limit work power supply: AC: 85-265V / DC: 100~300V, please ensure that the auxiliary power can match with MCM1000 series meter to prevent damage to the product.

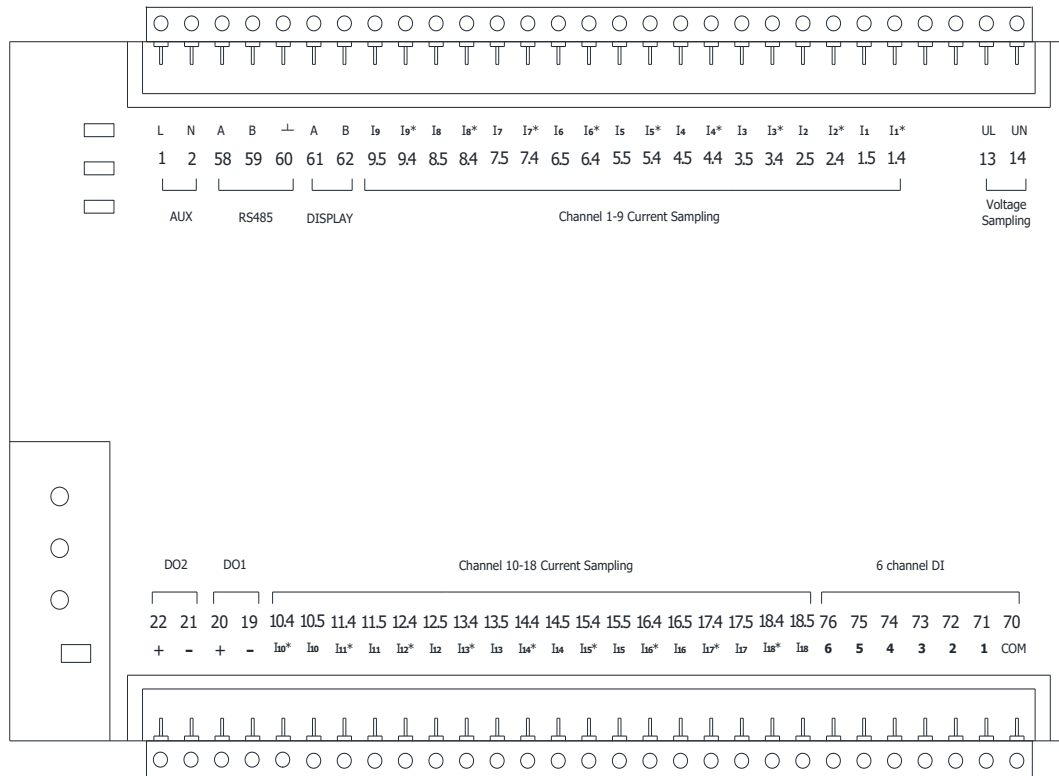
- A. Suggest install 1A fuse in the fire line side.
- B. For the areas with poor power quality, suggest install lightning surge suppressor and rapid burst suppressor to prevent lightning strikes.

4.2. - Connection Terminal

Meter Base Terminals:

Upper row: Digital input, Current Sampling (4-6) Pulse Output, Relay Output

Lower row: Voltage sampling, Current Sampling (1-3), Display port, Communication, Power Supply



Notes: The terminal pin will change depends on customer order; please refer to the label on the meter!

The diagram illustrates the wiring for the 1000 Series PSU. It shows the connection of a Power Supply to the unit's terminals. The unit features a terminal block with 59, 58, 2, and 1 pins. The wiring is organized into several sections:

- Power Supply:** Connected to the 59, 58, 2, and 1 pins.
- AUX:** Connected to the 1, 2, 58, and 59 pins.
- RS485:** Connected to the 61, 62, 95, and 94 pins.
- DISPLAY:** Connected to the 65, 64, 55, 54, 45, 44, 35, 34, 25, 24, 15, and 14 pins.
- Channel 1-9 Current Sampling:** Connected to the 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 7

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.

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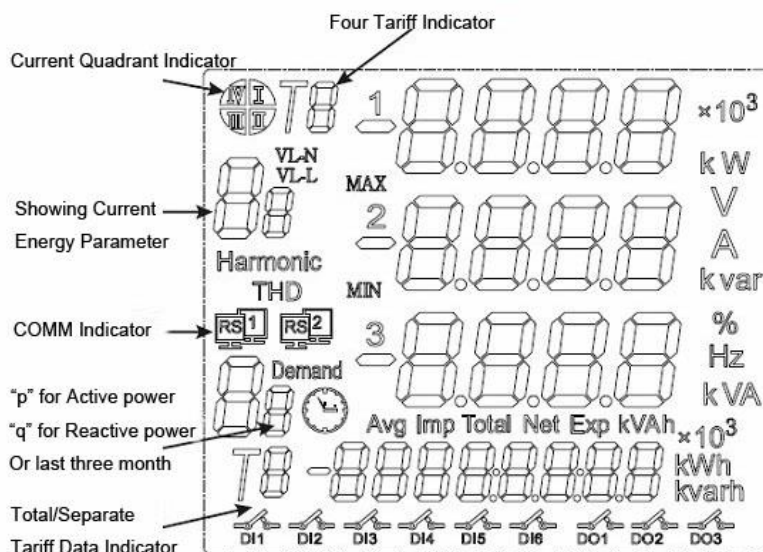
Email:tech@cqbluejay.com

5. SCREEN DISPLAY

5.1. - Panel Diagram

MCM1000 optional LCD screen module, connect to RS485 wire to MCM body "DISPLAY" pin, provide electrical data display and on-site configuration.

Note: If your MCM do not have external display unit, please skip chapter 5 and chapter 6, and use RS485 port for operation.



5.2.- Display unit

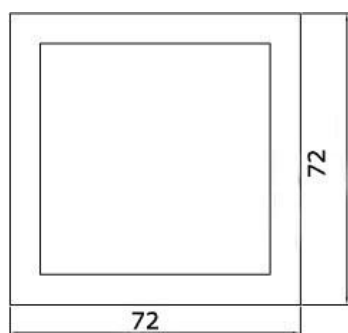
connection

Display unit shape and size are same as 194 series power meter. need 85~265VAC/DC AUX power, RS-485 cabling must be carried out with a meshed screen cable (minimum 3 wire), diameter of not less than 0.5mm², with a maximum distance of 50m between the MCM1000 and the display unit

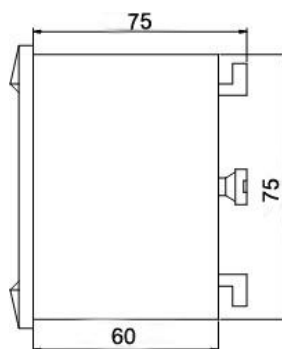
This unit is to be mounted on panel (cut-out 70+0.8 x 70+0.8 mm). Keep all connections into the cabinet.

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.

size of display unit



Front view



Side view

6. - OPERATION MODE

When the MCM1000 and display unit are powered up, the entire symbol will be on, and the meter starts to self- test. After some seconds, the meter is ready for operation and shows one of the available screens.



Parameters on display can be switched by pressing key  or  LCD shown on screen at any moment

When the key  is pressed, the screen CURRENT values of each phase are now showing.

Pressing again the key , the screen will show the following parameters successively.

In setting menu, pressing key  move the setting cursor to left;

Pressing  can enter the number 0 ~ 9.



This key named "SET" key, pressing it can open the programming menu and return to previous menu.



This key named "Enter" key, pressing this key you can exit it with saving any modification that you might have done, in menu operation press "Enter" key, and user can go to the next menu.

Note:

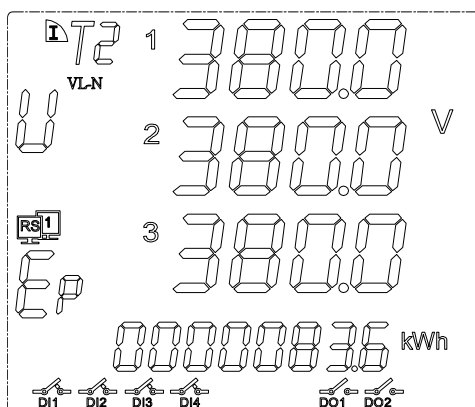
Press key  or  in normal standby status, and the meter will show different data in main screen:

In the menu set mode, when changes the parameter and exit setting, the meter will ask to "SAVE",

press  *exit without saving*

press  *save and exit.*

Screen 1: Displays the three phase voltage U_a , U_b , U_c ;
 As shown: $U_a = 380.0V$; $U_b = 380.0V$; $U_c = 380.0V$;



In the bottom character “Ep” show **total active energy** is 83.6KWh.

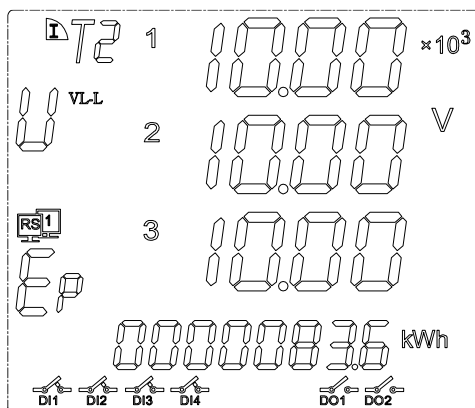
In other display area region show the system information:

DI1, DI2, DI3, DI4 in the close state;

DO1, DO2 in the open state;

Communication transceiver normal;

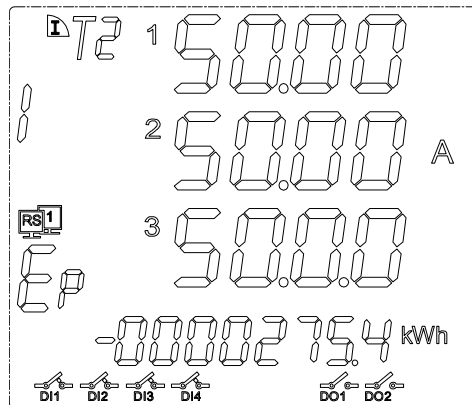
Note: Detail information for each symbol, please refer **chapter 5**, following sections as same



Note: in the high voltage measurement, $X10^3$ mean the showing voltage value multiplied by 1000, in the screen diagram mean the voltage is $10 \times 1,000 = 10,000$ volt

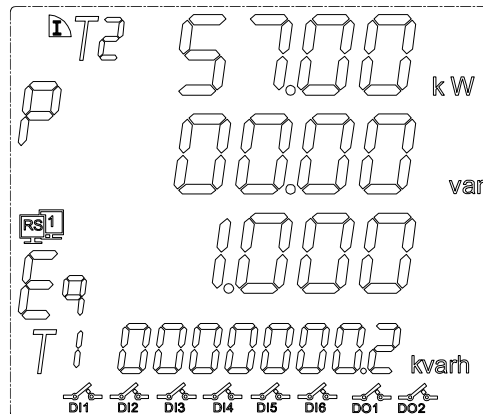
Screen 2: Display the three-phase current I_a , I_b , I_c .

In the bottom **Ep** shows **total negative active energy**.



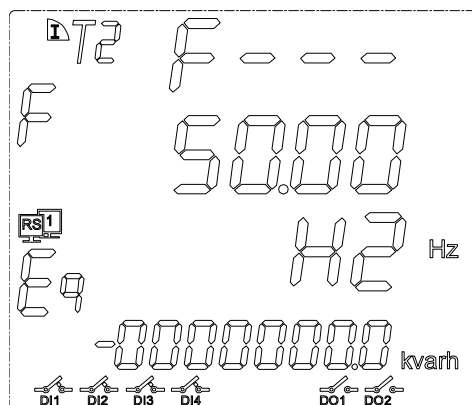
Screen 3: Display the total active power, total reactive power, and total factor.

In the bottom **“Eq”** shows **total active energy**.



Screen 4: Display the frequency of a phase.

In the bottom **“Eq”** shows **total negative reactive energy**.



Note:

Energy data is displayed in 8-digit decimal format by default.

As counter increased, the decimal point position will move right, data increased by 10 times, the unit display changing from KWh to MWh.

7. - SETUP PROCEDURE

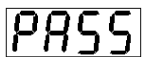
This chart just suits MCM1310 and MCM1110, or client optional display unit, other models please skip this chart to RS485 communication guide, use any series scan programming also can do same setting!!

Once into the SETUP, use the keyboard to select different options and enter required variables:

7.1.- Input Password

A 4-figure password is required to be entered (in case that in case that the meter will work without permission.)

At normal display mode, press  to enter the programming mode, meter display

Meter display “  ”,



Ask for the password. Press  to input the password number, from “0~9”. Press  to move the cursor. After password switch press  to confirm the input.

If password is correct, meter can enter next setting.

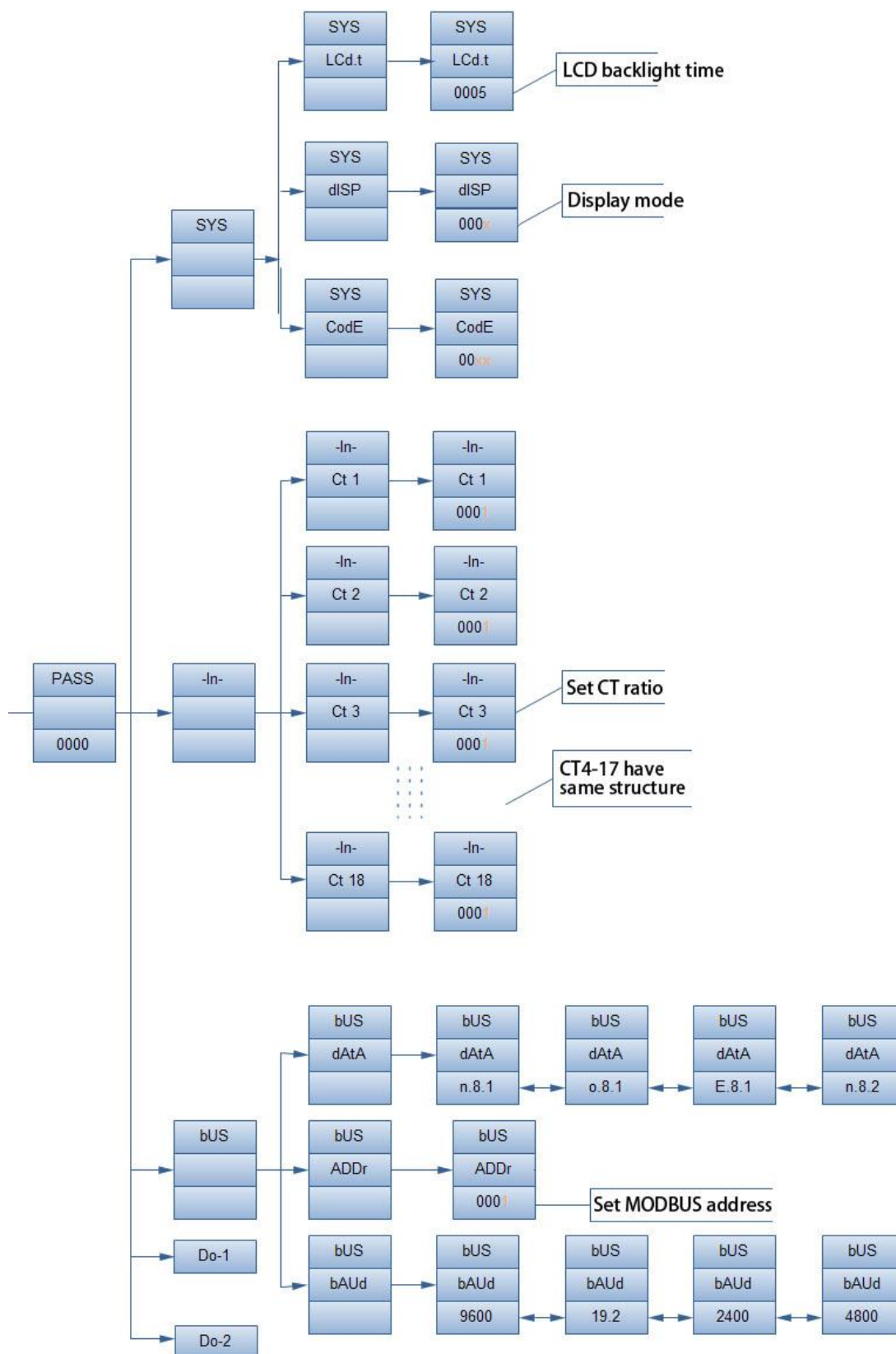
Notes: the default password is 0001.

7.2.- Menu tree quick guide

In the Setup menu, include following 4 parts:

SYS
-IN-
BUS
DO

Sub-menu please refer to following drawing:

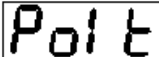
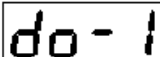
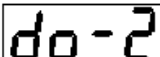
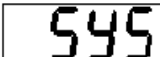
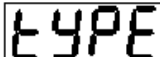
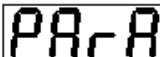


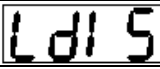


level 1	Level 2	Level 3	Description
(System setting) SYS	(LCD backlight time) LCd.t	0000~1000	Factory default is 0005
	(Clear energy counters) CLr.E		Unrecoverable for Clear data Note: Customers can write commands through RS485 or through the screen to clear the energy data to 0. Once the secondary side value of the internal memory reaches to 2 ³² (4294,967,296),counter automatically reset to 0.
	(Display mode) dISP	0-99	0 for manual switching, 1-99 for X sec auto switch to next screen Factory default is manual
	(Change the password) CodE	0000~9999	Default is 0001
(Signal input) - IN-	(Net) Lin.e	N.3.4, N.3.3, N.1	Select the input signal network measurement
	(Voltage Range) U.SCL	100V, 220V, 380V	Select the range of measured voltage signal

	(Current Range) I.SCL	5A and 1A	Select the range of measured current signal
	(Voltage transformation ratio) R.PT	1-9999	Setting voltage signal transformation ratio = 1 / 2 scale
	(Current transformation ratio) R.CT	1-9999	Setting current signal transformation ratio = 1 / 2 scale
(Communication Parameters) bUS	(Address) ADDR	1-247	Instrument address range 1-247
	(Communication speed) BAUD	4800~9600	Default is 4800
	Protocol DATA	0.8.1; e.8.1; n.8.1	Factory default communication mode for the word (n.8.1)
(Digital output setting) DO-1 to DO-2	(Output type) TYPE	r.n, Alr, OFF	Default is Alr
	(Set output delay) DELY	0000~9999	Default is 0010
	Choose the electrical parameter PArA	I3-H, PS-H...U3-H	Default is I3-H
	(Set the alarm value) VALU	0000~9999	Default is 0050
	hysteresis value HYS	4800~9600	Default is 4800

7.4.- Display Character instructions

	User passwords		Input voltage range selection
	Input error		Input current range selection
	User settings menu		Set CT ratio
	Communication settings menu		Set PT ratio
	Shows scal input value		Select phase
	Set the decimal point		Route 1 switch output settings
	Communication parameter setting		Route 2 switch output settings
	Metter address setting		System parameter settings
	Baud rate		Choose set parameter
	8 data bits, 1 stop bit, even parity		The corresponding parameters
	8 data bits, 1 stop bit, odd parity		Set the alarm value

	8 data bits, 1 stop bit, no parity		Show Low alarm setting
	Confirm the change		Show High alarm setting
	System password		

8.- COMMUNICATION INTERFACE

8.1.- Connection for the 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 0.5mm², with a maximum distance of 1,200 meters between the MCM1000 and the master unit. This Bus may connect a maximum of 247 MCM1000

Note:

1. Full range of MCM1000 meter RS485 PIN number is 58,59,60
2. Due to product modifications or custom requirements, the interface pin place may be change.
For details, please refer to product label on the rear board

8.2.- MODBUS © protocol

Modbus RTU Frame Format:

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

MODBUS FUNCTIONS

Code:	Meaning:	Description:
FUNCTION 03	Reading of n Words	<i>This function permits to read all the electrical parameters of the BJ...series.</i>
FUNCTION 06	Write of Registers	<i>Write value in to the relevant register</i>

Notes: Blue Jay Default disable the write function, if want change configuration via RS485, please contact Blue Jay Sales Team before your order.

8.3. - Register address table

8.3.1- Basic Power Data—Primary Side

Address	Data	Byte mode		Instruction
0	U_1	float	2	CH_1 Phase to Line Voltage, Unit: V
2	I_1	float	2	CH_1 Current, Unit: A
4	P_1	float	2	CH_1 active Power, Unit: KW
6	Q_1	float	2	CH_1 reactive Power, Unit: Kvar
8	S_1	float	2	CH_1 apparent Power, Unit: KVA
10	PF_1	float	2	CH_1 power factor, 0~1.000
12	FR_1	float	2	CH_1 frequency, Unit: 0.01Hz
14	Ep+_1	float	2	CH_1 positive active energy, unit Kwh
16	Ep-_1	float	2	CH_1 positive reactive energy, unit Kvarh
18	Eq+_1	float	2	CH_1 negative active energy, unit Kwh
20	Eq-_1	float	2	CH_1 negative reactive energy, unit Kvarh
30-50	/	float	2	CH_2 parameter, structure same as CH_1
60-80	/	float	2	CH_3 parameter, structure same as CH_1
90-110	/	float	2	CH_4 parameter, structure same as CH_1
120-140	/	float	2	CH_5 parameter, structure same as CH_1
150-170	/	float	2	CH_6 parameter, structure same as CH_1
180-200	/	float	2	CH_7 parameter, structure same as CH_1
210-230	/	float	2	CH_8 parameter, structure same as CH_1
240-260	/	float	2	CH_9 parameter, structure same as CH_1
270-290	/	float	2	CH_10 parameter, structure same as CH_1
300-320	/	float	2	CH_11 parameter, structure same as CH_1
330-350	/	float	2	CH_12 parameter, structure same as CH_1
360-380	/	float	2	CH_13 parameter, structure same as CH_1
390-410	/	float	2	CH_14 parameter, structure same as CH_1
420-440	/	float	2	CH_15 parameter, structure same as CH_1
450-470	/	float	2	CH_16 parameter, structure same as CH_1
480-500	/	float	2	CH_17 parameter, structure same as CH_1
510-530	/	float	2	CH_18 parameter, structure same as CH_1

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

8.3.2 - Basic Power Data—Secondary Side

Address	Data	Byte mode		Instruction
600	U_1#	int	1	CH_1# Phase to Line Voltage, Unit: 0.1V
601	I_1#	int	1	CH_1# Current, Unit: 0.001A
602	P_1#	int	1	CH_1# active Power, Unit: W
603	Q_1#	int	1	CH_1# reactive Power, Unit: var
604	S_1#	int	1	CH_1# apparent Power, Unit: VA
605	PF_1#	int	1	CH_1# power factor, 0~1.000
606	FR_1#	int	1	CH_1# frequency, Unit: 0.01Hz
607	Ep+_1#	int	1	CH_1# positive active energy, unit wh

609	Ep-_1#	int	1	CH_1# positive reactive energy, unit varh
611	Eq+_1#	int	1	CH_1# negative active energy, unit wh
613	Eq-_1#	int	1	CH_1# negative reactive energy, unit varh
630-643	/	int	1	CH_2# parameter, structure same as CH_1
660-673	/	int	1	CH_3# parameter, structure same as CH_1
690-703	/	int	1	CH_4# parameter, structure same as CH_1
720-733	/	int	1	CH_5# parameter, structure same as CH_1
750-763	/	int	1	CH_6# parameter, structure same as CH_1
780-793	/	int	1	CH_7# parameter, structure same as CH_1
810-823	/	int	1	CH_8# parameter, structure same as CH_1
840-853	/	int	1	CH_9# parameter, structure same as CH_1
870-883	/	int	1	CH_10# parameter, structure same as CH_1
900-913	/	int	1	CH_11# parameter, structure same as CH_1
930-943	/	int	1	CH_12# parameter, structure same as CH_1
960-973	/	int	1	CH_13# parameter, structure same as CH_1
990-1003	/	int	1	CH_14# parameter, structure same as CH_1
1020-1033	/	int	1	CH_15# parameter, structure same as CH_1
1050-1063	/	int	1	CH_16# parameter, structure same as CH_1
1080-1093	/	int	2	CH_17# parameter, structure same as CH_1
1110-1123	/	int	2	CH_18# parameter, structure same as CH_1

8.3.3- Meter status data

Address	Data	Byte mode		Instruction
1200	DO	int	1	Digital output: Bit 0~1 show channel 1and channel 2 status 0 for open, 1 for closed
1201	DI	int	1	Digital input: Bit 0~5 show channel 1 to channel 6 status 0 for open, 1 for closed

8.3.4- R/W parameters

Notes: If do not clear the MCM1000 communication parameter, please shot the "RESET" pin and hole 5sec for recover the communication to default setting

Default setting:

address: 1

Baud ratio: 9600

Data format: n.8.1

Address	Item	Byte mode		Description
1210	Port_1 COMM address	Int	1	Range: 1-247

1211	Port_1 Baud Ratio	Int	1	0: 2400 1: 4800 2: 9600 3: 19200
1212	Port_1 Data format	Int	1	0: n.8.1 1: o.8.1 2: e.8.1 3: n.8.2
1213	Port_2 COMM address (for DISPLAY unit)	Int	1	<u>Disallowed</u> configuration when work with DISPLAY unit! or will may display error; If done some change, please shot the "RESET" for recover the fault setting
1214	Port_2 Baud Ratio (for DISPLAY unit)	Int	1	
1215	Port_2 Data format (for DISPLAY unit)	Int	1	
1216- 1219	/	Int	1	reversed
1220	DO1 Mode	Int	1	0: Remote 1: Alarm 2: OFF
1221	DO1 Act delay	Int	1	Alarm mode: 0.0-999.9sec Remote mode: 0: Level mode Other value: 0.1-999.9sec (Pulse width)
1222	DO1 Alarm data	Int	1	0: voltage upper alarm 1: CH_1 current upper alarm 2: CH_2 current upper alarm 3: CH_3 current upper alarm 4: CH_4 current upper alarm 5: CH_5 current upper alarm 6: CH_6 current upper alarm 7: CH_7 current upper alarm 8: CH_8 current upper alarm 9: CH_9 current upper alarm 10: CH_11 current upper alarm 11: CH_11 current upper alarm 12: CH_12 current upper alarm 13: CH_13 current upper alarm 14: CH_14 current upper alarm 15: CH_15 current upper alarm 16: CH_16 current upper alarm 17: CH_17 current upper alarm 18: CH_18 current upper alarm 19: current upper alarm for any channel 20: active power upper alarm for any CHs 21: reactive power upper alarm for any CHs 22: apparent power upper alarm for any CHs 23: power factor upper alarm for any CHs 24: frequency upper alarm for any CHs 25: DI1 close alarm 26: DI2 close alarm 27: DI3 close alarm 28: DI4 close alarm 29: DI5 close alarm 30: DI6 close alarm

				31: voltage lower alarm 32: CH_1 current lower alarm 33: CH_2 current lower alarm 34: CH_3 current lower alarm 35: CH_4 current lower alarm 36: CH_5 current lower alarm 37: CH_6 current lower alarm 38: CH_7 current lower alarm 39: CH_8 current lower alarm 40: CH_9 current lower alarm 41: CH_11 current lower alarm 42: CH_11 current lower alarm 43: CH_12 current lower alarm 44: CH_13 current lower alarm 45: CH_14 current lower alarm 46: CH_15 current lower alarm 47: CH_16 current lower alarm 48: CH_17 current lower alarm 49: CH_18 current lower alarm 50: current lower alarm for any channel 51: active power lower alarm for any CHs 52: reactive power lower alarm for any CHs 53: apparent power lower alarm for any CHs 54: power factor lower alarm for any CHs 55: frequency lower alarm for any CHs 56: DI1 open alarm 57: DI2 open alarm 58: DI3 open alarm 59: DI4 open alarm 60: DI5 open alarm 61: DI6 open alarm
1223	DO1 Alarm value	Int	1	Secondary side electrical value
1224	DO1 HYS	Int	1	Hysteresis value
1225	DO2 mode	Int	1	Same as DO1 port
1226	DO2 Act delay	Int	1	
1227	DO2 Alarm data	Int	1	
1228	DO2 Alarm value	Int	1	
1229	DO2 HYS	Int	1	
1230-1240	reversed	Int	1	/
1241	Voltage measure range	Int	1	0: 100V 1: 380V
1242	Current measure range	Int	1	0: 1A 1: 5A
1243	Voltage transformation ratio	Int	1	1-9999
1244	Channel_1 CT ratio	Int	1	1-9999
1245	Channel_2 CT ratio	Int	1	1-9999
1246	Channel_3 CT ratio	Int	1	1-9999
1247	Channel_4 CT ratio	Int	1	1-9999
1248	Channel_5 CT ratio	Int	1	1-9999
1249	Channel_6 CT ratio	Int	1	1-9999

1250-1261	Channel_7~18 CT ratio	Int	1	1-9999 (only for single phase type)
3000	Clear energy counter	Int	1	Send code: 0x0A0A (or DCE 2570)

Note:

1. Not all of the data above can be read by RS485, the reading address will be unsuccessful
2. The data can be read out depends on your multi-function meter model, please refer to the corresponding product manual before build your software.
3. Some software has different definitions of the start bit of register address, there will be offset, please add 1 for the right address. To get more info, please contact technical support [**tech@cqbluejay.com**](mailto:tech@cqbluejay.com)

8.4.- Example

Host to Slave inquiry

Addr	Fun	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 to Host answer

Addr	Fun	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. User can write register data for meter testing and remote control the meter
2. When the write is unsuccessful, no return data from the slave, in this addition, user can send write inquiry again

9. - SAFETY CONSIDERATIONS



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

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.

10. - MAINTENANCE

The MCM1000 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.

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

Blue Jay - After-sales service