BJ195PUI DC Panel Meter

User Manual

Version：1.11

Revision 2023-7

Read me

When you use BJ195-X Series Digital Meter, be sure to carefully read this user manual, 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 BJ193 series Digital 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 (RS485 or Ethernet) is strictly prohibited to impose 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 carefully before using this user manual**
- **Please save this document**

Directory

1. - SUMMARIZE

BJ195-X Series Digital Meter is used for power quality monitoring, factory automation and building automation.

These series can measure the power parameters in power grid:

Current, Voltage, RMS power load, Energy consumption.

It can replace many of a traditional analog measurement instruments, improve system accuracy and reliability.

APPLICATIONS

-. Measure all power parameters;

-. Monitor and control, energy measurement and electrical fire;

-. Replace the three-phase power meter, three phase electricity transmitter;

-. Transformers, generators, capacitors and electric motors distributed detection;

-. Medium and low pressure systems;

-. SCADA, EMS, DCS integrators.

2. - SPECIFICATIONS

1.- Reference standard

Basic electricity	GB/T13850-1998 (IEC688-1992)
Active power	GB/T17215-2002 (IEC61036:2000)
Reactive power	GB/T17882-1999 (IEC61268:1995)

2.- Accuracy standards

Parameter	Accuracy
Voltage	0.2%fs
Current	0.2%fs (depends on Shunt)
Power	0.5%fs
Energy	1.0%fs

3.- Input

Voltage: Rated 300/ 600/ 1000V
Current: Rated 75mVA (optional 50mV / 100mV or customized)

4.- Load

Voltage: <0.5VA / phase (rated 300V)
Current: <0.5VA / phase (rated 5A)

5.- Overload

Current: 1.2 times rated continuous; 10 seconds for 10 times the rated.
Voltage: 1.2 times the rated continuous; 10 seconds for 2 times.

6.- Dielectric strength

IEC 688 / IEC 255-3 (1989)
2kV AC RMS 1 minute, between input / output / case / power supply.

7.- 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

8.- Work environment

Temperature: -20℃~ +60℃

Humidity: RH 20%～95%（No condensation）

9.- Protection

Panel: IP40

10.- Storage conditions

Temperature：-25℃~+70℃

Humidity: RH 20%～95%

11.- Power supply

AC /DC 85-265V
Maximum power consumption 3W

3.- INSTALLATION AND START-UP

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

Whether the instrument is not used as manufacturer's specifications, the protection of the instrument can 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 panel. All connections keep inside the cabinet.

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. Therefore, the instrument must not be used until this is completely installed.
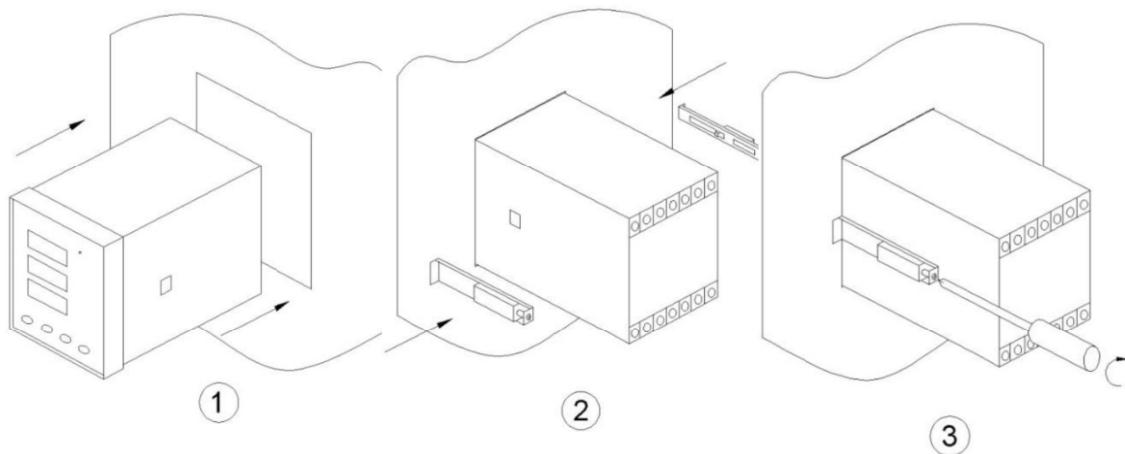
Notes:

Input signal: BJ195-X Series 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 2.5 square mm.

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 BJ195-X Series. 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 phase voltage and line voltage both.

D. Auxiliary power

BJ195-X Series 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.

Tel:+0086-023-67628702
Email:tech@cqbluejay.com
www.cqbluejay.com
Add: 1802,Building 2,No.88,Jianxin East Road,Chongqing,400020,China

## 3.2.- Connection terminal and drawing (details please see label on the rear part)

Terminal description

11. Positive of Voltage phase input
14. Negative of Voltage input

11	14

− | +

U
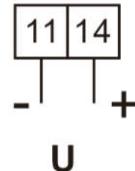
Terminal description

4. Shunt negative terminal
5. Shunt positive terminal

4	5

− | +

I
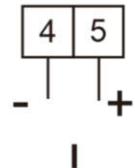
3.3.- Other terminals (optional function)
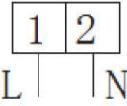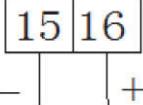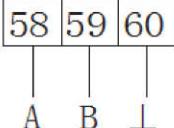
AUX	1 2 L N	Analog output	15 16 − +
RS485 port	58 59 60 A B ⊥	Digital input Digital output	72 71 70 20 19 22 21 DI2 DI1 COM DO1 DO2
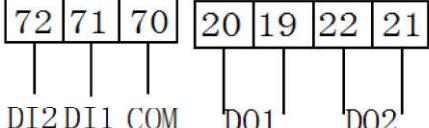
Note: This connection drawing is for reference only; the actual connecting terminal please refer to the label on the rear part.

4.- OPERATION MODE

The instrument has three line displays. Every led will be on according to the parameter presently shown in screen.

When the 195-X is powered up, all the LED indicator will on, and meter start 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 on screen at any moment

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

In setting menu, pressing key ⟪ can move the setting cursor to left;
        Pressing ⟫ can enter the number 0 ~ 9.

SET

Pressing it can open the setting menu and return to previous menu.
In setting menu for change number 0~9 (only for 48*48 size meter)

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 ⟪ 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 SET *exit without saving*
        press ↵ *save and exit.*

5.- SETUP PROCEDURE

The SETUP procedure of the BJ195-X is performed by means of several SETUP options. Once into the SETUP, use the keyboard to select different options and enter required variables:

	SYS / LCdt	SYS / LCdt / 0001	SYS / LCdt / 0001		LCD backlight, unit: min
Ao-2	SYS / dISP	SYS / dISP / 0001			Cycle display 0000 does not cycle display, 0001 cycle display for 1 second
Ao-1	SYS / CLrE				Clear energy counter
	SYS / CodE	SYS / CodE / 0001			Password
SYS	SYS / Ao-2	SYS / Ao-2 / 4nA	SYS / Ao-2 / 20nA		Analog output-2 calibrate
	SYS / Ao-1	SYS / Ao-1 / 4nA	SYS / Ao-1 / 20nA		Analog output-1 calibrate
-In-	-In- / PoLn	-In- / PoLn / 0000			Decimal point
	-In- / USCL	-In- / USCL / 2000			Primary voltage
	-In- / I.SCL	-In- / I.SCL / 0010			Primary current
bUS	bUS / Addr	bUS / Addr / 0001	bUS / Addr / 0000		Communication port
do-1	bUS / bAUd	bUS / bAUd / 9.6	bUS / bAUd / 19.20	bUS / bAUd / 2.4	bUS / bAUd / 48 — Baud ratio
do-2	bUS / dAtA	bUS / dAtA / n8.1	bUS / dAtA / o8.1	bUS / dAtA / E8.1	bUS / dAtA / n8.2 — Verify mode

MONITOR SCREEN — PASS / 0000

If meter have Ethernet port, that configuration under "Bus" menu will change to following:

Modbus-Tcp

Modbus-RTU
Meter can send data to remote IP/TCP, working logic same as standard RS485, Ethernet port work as bridge

Use Static IP
User need to set IP address and subnet mask

Use DHCP

Meter IP address
IP4.IP3.IP2.IP1 for XXX.XXX.XXX.XXX

Subnet mask
SUB4.SUB3.SUB2.SUB1 XXX.XXX.XXX.XXX

Gateway
GAT4.GAT3.GAT2.GAT1 XXX.XXX.XXX.XXX

TCP working mode
Tcp-server

TCP working mode
UDP-server

TCP working mode
UDP-Client

TCP working mode
TCP-Client

Destination IP
Meter send data to remote IP address

Meter local TCP port

Meter send data to remote TCP port
In MODBUS-TCP mode are invalid

Note:

The procedure above is for reference, not all series have the step 3 (communication preference), AO menu for D series have this function, bUS menu for K series, please contact the Technical Service.

6. COMMUNICATION INTERFACE

6.1.- 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 $0.5mm^2$, with a maximum distance of 1,200 m between the BJ-19… and the master unit. This Bus may connect a maximum of 32pcs BJ-19…
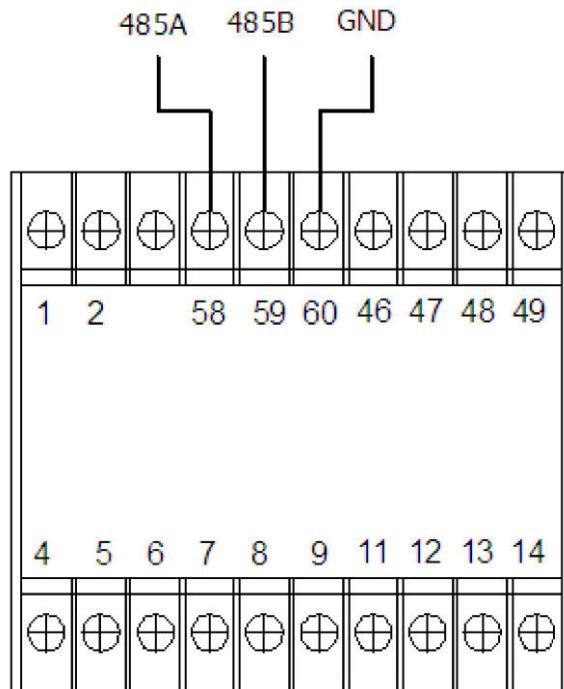
Notes:

-. 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.

-. Full range of BJ-19… meter 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 01	Read Coil Status	*Only valid when equipped DO port*
FUNCTION 02	Read Input Status	*Only valid when equipped DI port*
FUNCTION 03	Reading of n Words	*This function permits to read all the electrical parameters of the BJ194…series.* *Details see chart 6.4*
FUNCTION 05	Force Single coil	*When DO in remote control mode can work* ***Disable in default***
FUNCTION 06	Preset Single register	*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**)

Only read parameter, can be read with "03" command

Address	Data		Word byte	Description
32bit int value				
0,1	U	Voltage	0,1,2,3	Unit 0.01V
2,3	I	Current	4,5,6,7	Unit 0.1A
4,5	P	Power	8,9,10,11	Unit 0.01W
6,7	E	Energy	12,13,14,15	Unit 0.001KWh
8,9	R	Resistance		Unit 0.01Ω R-U/I
14,15	AH+			Unit 0.001Ah If Current range= 1A, minimum step = 0.001Ah; If current range = 100A, minimum step = 0.1Ah
16,17	AH-			Unit 0.001Ah
18,19	AH_SUM			Unit 0.001Ah
20,21	RIN	Internal resistor		Unit 0.01Ω
22,23	E+	Positive energy		Unit 0.001KWh
24,25	E-	Negative energy		Unit 0.001KWh

Address	Data		Word byte	Description
32bit float value				
30,31	U float	Voltage		Unit V
32,33	I float	Current		Unit A
34,35	P float	Power		Unit W
36,37	E float	Energy		Unit KWh
38,39	R	Resistance		Unit Ω R-U/I
44,45	AH+			Unit Ah Current range= 1A, minimum step = 0.001Ah; Current range = 100A, minimum step = 0.1Ah
46,47	AH-			Unit Ah
48,49	Ah_Total			Unit Ah
50,51	RIN	Internal resistor		Unit Ω
52,53	E+	Positive energy		Unit KWh

| 54,55 | E- | Negative energy | | Unit KWh |

Other				
60,61	DIDO	DO/DO status	56,57,58,59	BIT8-BIT14 for DI status BIT0-BIT7 for DO status 0 for opened, 1 for closed.

Read and write parameters, can be read with "03" command, and modified with "06" command

Address	Data	Type	Byte	Description
1000	Voltage range	Int	1	1-9999V
1001	Current range	Int	1	1-9999A
1002	Decimal point position	Int	1	0-3
1003	MODBUS Id	Int	1	1-247
1004	Baud rate	Int	1	0:1200 1:2400 2:4800 3:9600 4:19200
1005	Data format	Int	1	0:n.8.1 1:o.8.1 2:e.8.1 3:n.8.2
1006	Password	Int	1	0-9999
1007	Screen display mode	Int	1	0-9999: 0 manual switching, Other numbers for seconds of automatic switching
1008	Backlight display time	Int	1	0-9999min
1009	Reserved	/	/	/

1010	DO1 Pickup time unit DO1_UTD.p	Int	1	0: sec 1: min 2: hour
1011	DO1 Pickup time	Int	1	0-999.9
1012	DO1 Drop out time unit DO1_UTD.d	Int	1	0: sec 1: min 2: hour
1013	DO1 Drop out time	Int	1	0-999.9

1014	DO1 Action logic selection	Int	1	1: A and B and C 2: A or B or C 3: A and B or C 4: A xor B xor C	
1015	DO1 Element_A Hysteresis	Int	1	Range: 0-9999, Unit 1V, 1A, 0.1kW, 0.1AH, 0.1Ω	
1016	DO1 Element_A Alarm parameter	Int	1	0: U upper limit 1: I upper limit 2: P upper limit 3: AH+ upper limit 4: AH- upper limit 5: AH_SUM upper limit 6: R upper limit 7: Reserved 8: DI1 closed 9: DI2 closed 10: DI3 closed 11: DI4 closed 12: DI5 closed 13: DI6 closed 14: DI7 closed 15: DO1 closed 16: DO2 closed 17: DO3 closed 18: DO4 closed 19: DO5 closed 20: DO6 closed 21: DO7 closed 22: DO8 closed	23: U lower limit 24: I lower limit 25: P lower limit 26: AH+ lower limit 27: AH- lower limit 28: AH_SUM lower limit 29: R lower limit

					30: Reserved
					31: DI1 Opened
					32: DI2 Opened
					33: DI3 Opened
					34: DI4 Opened
					35: DI5 Opened
					36: DI6 Opened
					37: DI7 Opened
					38: DO1 Opened
					39: DO2 Opened
					40: DO3

				Opened 41: DO4 Opened 42: DO5 Opened 43: DO6 Opened 44: DO7 Opened 45: DO8 Opened
				46: Always Closed 47: Always Opened
1017	DO1 Element_A Alarm value	Int	1	Range: 0-9999, Unit 1V, 1A, 0.1kW, 0.1AH
1018	DO1 Element_B Hysteresis	Int	1	Range: 0-9999, Unit 1V, 1A, 0.1kW, 0.1AH
1019	DO1 Element_B Alarm parameter	Int	1	Refer to < DO1 Element_A Alarm parameter>
1020	DO1 Element_B Alarm value	Int	1	Range: 0-9999, Unit 1V, 1A, 0.1kW, 0.1AH
1021	DO1 Element_C Hysteresis	Int	1	Range: 0-9999, Unit 1V, 1A, 0.1kW, 0.1AH
1022	DO1 Element_C Alarm parameter	Int	1	Refer to < DO1 Element_A Alarm parameter >
1023	DO1 Element_C Alarm value	Int	1	Range: 0-9999, Unit 1V, 1A, 0.1kW, 0.1AH
1024	DO1 Mode	Int	1	0: OFF 1: Remote control pulse 2: Remote control Latching

1025	DO1 Pulse width	Int	1	Range: 0.1-999.9 sec
1026-1041	DO2 Setting	Int	1	Refer to DO-1 setting, reg[1010-1025]
1042-1057	DO3 Setting	Int	1	Refer to DO-1 setting, reg[1010-1025]
1058-1073	DO4 Setting	Int	1	Refer to DO-1 setting, reg[1010-1025]
2000	Reset energy counter (Unreadable)	Int	1	Write 0x0A0A,(2570 in Dec)
3000	Reset AH counter (Unreadable)	Int	1	Write 0x0A0A,(2570 in Dec)

7.- SAFETY CONSIDERATIONS

All installation specification described at the previous chapters named:

INSTALLATION AND STARTUP, OPERATION MODE 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.

8.- MAINTENANCE

The 195-X does not require any special maintenance. No adjustment, maintenance or repairing action should be done when the instrument 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

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