Digital Communication Server

DG-X1

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Copyright Information and Ownership Statement

Version Revision

Version	Date	Revision

Note: User could refer this manual for DG-Mini installation.

☆Note：Recommend that carefully read this manual after obtaining the device.

TABLE OF CONTENTS

1. Introduction and Specification

1.1 Overview

DG-X1 is a specially designed communication facility based on the Freescale PPC architecture. It can be easily deployed to collect various types of data, supervise, control and manage various IEDs in substation through its independent 3×10/100M Ethernet ports, 2×Modem ports and 8×RS-232/422/485 ports.

This manual contains the information needed to install, test, operate, and maintain any **DG-X1**. You need not review the entire manual to perform specific tasks.

1.2 Feature

Hardened design

DG-X1 is based on harden CPU module. The CPU module is based on Freescale MPC8270 Power QUICC II, a powerful PowerPC 603e CPU core provides 850 MIPS horse power, and a separate CPM (Communication Processing Machine) handles all the communications. This dual-core design enables the CPU module to support multiple Ethernet while have CPU power similar as PC, only with much higher reliability.

PowerQUICC is specially designed for communication and industrial control. For example, a common fan-less 600MHz X86 based CPU module will consume about 20W of power. While

an ePM82xx CPU module with 850MIPS horsepower needs only about 5W. The very low power consumption largely increased system reliability.

DG-X1 supports as high as 64MB/128MB NOR Flash. Besides boot loader, operating system, root file system and applications can be stored in the Flash.

CF cards can be used purely for user data. This design not only simplified the firmware/software distribution, but also increased system reliability.

Ethernet

DG-X1 supports maximum 3 independent Ethernet ports, each with separate MAC address, can be configured as 10/100BASE-FX optical-fiber based ports.

CAN

2 independent CAN controllers are implemented in the DG-X1 system. Redundant Dual-CAN bus system can be implemented.

Serial I/O

As many as 10 serial ports are implemented in the DG-X1 system. 2 of the ports are designed as complete EIA-232C ports, normal use or standard telephone MODEM can be supported. For other 8 ports, EIA-232C, EIA-422/485 can be selected by software. And loop back test mode can be supported by software.

Frequency measurement

DG-X1 supports frequency estimation. A separate frequency estimation input can be accepted from the rear panel. Standard 50Hz or 60Hz line frequencies are supported. Frequency estimation accuracy is +/-0.005Hz.

PC like functionalities

PC features, such as VGA display, USB ports, Keyboard and mouse based GUI, disk (CF card) storage, are very tempting functions even in industrial control. That is one of the reasons why even X86 based CPU modules are not harden enough for industrial, but still widely used.

DG-X1 CPU system support as high as 128MB/256MB RAM, 0~1MB NVRAM, and supports many PC like features like VGA display, USB, keyboard and

mouse based GUI. This design achieved both system reliability and functionality.

Real time capability

DG-X1 supports latest Linux 2.6 with Xenomai real time extension. System response time can reach micro-seconds with the Xenomai support. For example, DG-X1 supports Digital Inputs with SOE function on milliseconds resolution. Other real time functions can be implemented.

IT applications

With standard Linux 2.6 operating system, DG-X1 can be used as industrial server system using IT application. For this purpose, MySQL DB server, HTTP WEB server, and other applications are pre-installed.

Point of Load Power Supply

The power supply of the DG-X1 system provides 12V to each module. Then within the module, distributed converters are used to convert the 12V into 3.3V and 5V for actual load. This 2 level power supply technology can reduce the power supply impact to the system operation.

1.3 Specification

Item	Spec.	Etc.
CPU	Freescale MPC8270 450/300/100 MHz	
DRAM	256M Bytes	64bit
	128M Bytes	64bit
NVRAM	0MB~1MB, Battery and super capacitor backed	16 bit
FLASH	64MB/128MB	32 bit

10/100Base/T Ethernet	FCC Ethernet 3Ports	10/100BASE-T/FX
UART	SCC 2Port, SC16C654x2(8 ports) on X-BASE Base board	200bps~ 115.2kbps
RTC	Battery and super capacitor backed	
C/F card	Dual-C/F card, each up to 8GB	
WDT	Power PC8270 built-in	
IRIG-B/PPS input/output	Optical isolated IRIG-B or PPS input. IRIG-B generation and distribution to each of the 8 ports	
Status LED	LAN : link, active UART : Tx, Rx CF: activity Power, Run	
I/F	DB9 : Serial Port DB15: VGA USB: Keyboard or Mouse RJ45 (with transformer): Ethernets Phoenix Contact Connector: Power Supply, CAN, IRIG-B input	
Power Supply	Input 85~264V AC/ 85~300V DC	
Size(L*W)	483mm x 45mm x 280mm	
Temperature	Operating temperature -40~85 degree centigrade. Storage temperature -45~85 degree centigrade.	

2. Installation

2.1 Overview

This section describes common installation features and requirements. Dual-computer redundancy installation is also mentioned.

2.2 Installation

Desktop Installation

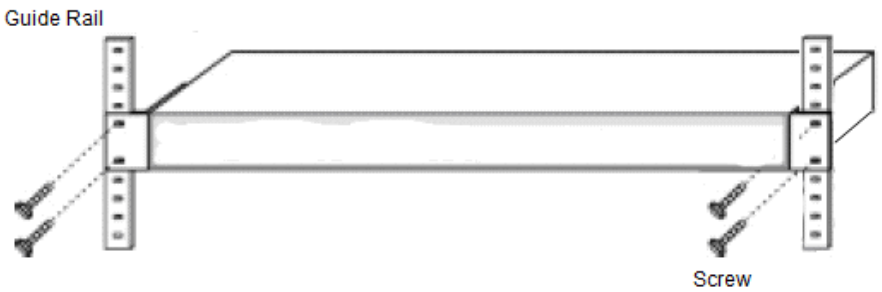
This installation requires a clean and dry desk with fresh air around. User need to stick four single-side rubber pads to the bottom of DG-X1, just four corners will be OK. Keep certain distance from DG-X1 for heat dissipation purpose.

To avoid any physical damage, do not place any goods on the top of DG-X1.

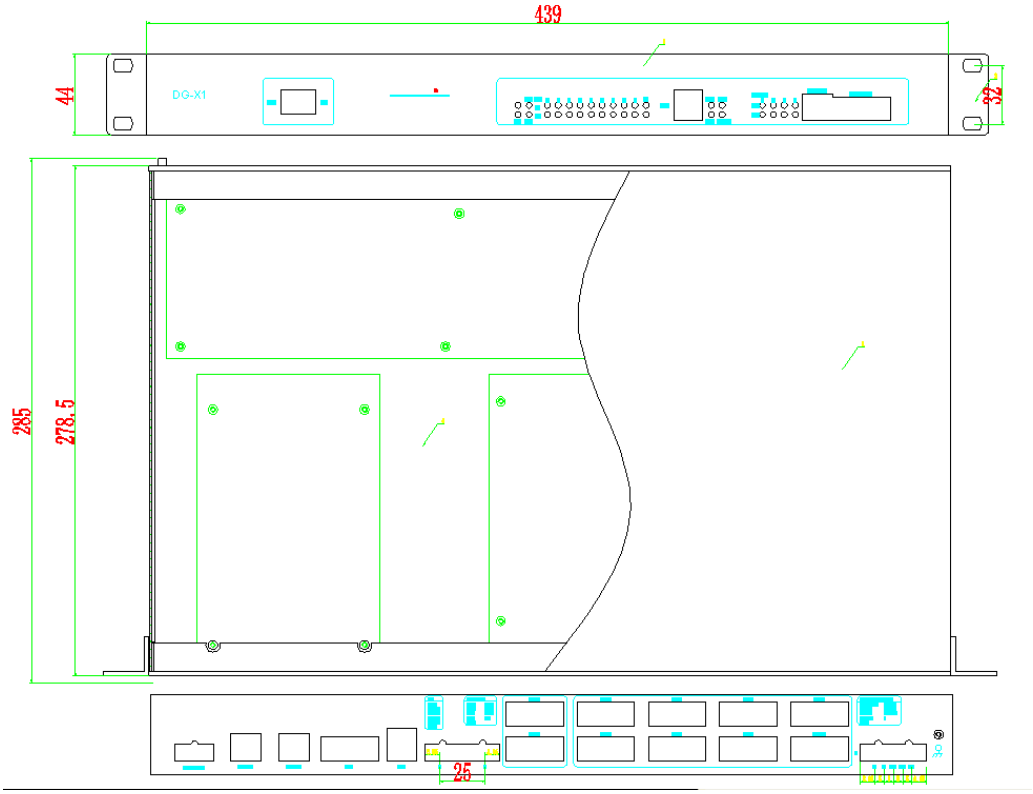
Keep away from hot objects with high temperature. Avoid tiny metal object getting into DG-X1, and avoid liquid splashing such danger events. If happens, please turn off power supply or plug out power supply wire immediately, then call our technical department for help.

Rack-mount

DG-X1 is fixed to the guide rails of standard 19 U chassis with four screws, which is shown below. Be sure that the case of DG-X1 grounds well.



Rack-mounted DG-X1 Diagram



DG-X1 Dimensions Diagram

2.3 Wiring

Power Supply Connection

Input voltage: 85~264V AC/ 85~300V DC.

☆Note：It is advised that power supply connection and debugging should be implemented before connecting to network and serial port devices.

Please heed the following steps for DG-X1 power supply connection:

Connection ➢ Ensure that power supply switch is off status (switch placed

of AC power supply	in “O” mark). If not, turn off the switch; ➢ Connect the grounding wire to the outside of DC power supply wiring terminal; ➢ Connect power supply wire to the power supply outlet of rear panel of DG-X1; ➢ Turn on power supply switch of DG-X1 front panel(placed in “|” mark); ➢ Be sure LED indicators of 12V, 5V, 3.3V operate normally; ➢ In case of any exceptions, please turn off power supply or plug out power supply wire immediately, then call our technical department for help.
Connection of DC power supply	➢ Ensure that power supply switch is off status (switch placed in “O” mark). If not, turn off the switch; ➢ Connect the grounding wire to the outside of DC power supply wiring terminal; ➢ Connect power supply wire(PWR+, PWR-, GND) to the rear panel wiring terminals with corresponding label; ➢ Turn on power supply switch of DG-X1 front panel(placed in “|” mark); ➢ Be sure LED indicators of 12V, 5V, 3.3V operate normally; ➢ In case of any exceptions, please turn off power supply or plug out power supply wire immediately, then call our technical department for help.

Network Connection

Network Connection	3×10/100BaseT Ethernet ports are provided on DG-X1 marked by “Ethernet 1”, “Ethernet 2”, and “Ethernet 3”.

Ethernet 1 is the factory default console port (IP: 192.168.0.111).

Other two ports are used for network distribution for real time data. Generally, user could insert one side of net cable into the network interface, and insert the other to network (such as: network switch, hub, router, etc.). Two network ports set on different LAN or network segment could be connected to network together.

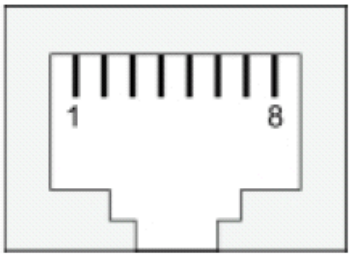
“Ethernet1” is also used to configure system communication. During DG-X1 system setting, communication analysis/debugging, user might find it convenient if DG-X1 is connected to PC. At this time, twisted pair is recommended. Insert one side to the “Ethernet 1” network interface, the other side to network interface of PC.

☆Note: The onsite operating environment is subject to interference, it is advised that turn off power supply switch before connecting to network devices.

Following is the net cable wiring.

Pin definition of 10/100BaseT network interface is shown below.

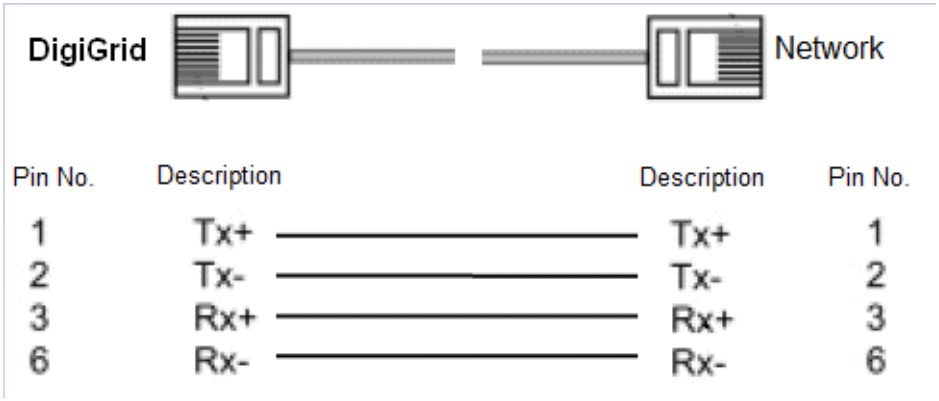
Pin No.	Description
1	Tx+
2	Tx-
3	Rx+
6	Rx-



According to use orders, network communication cables are also

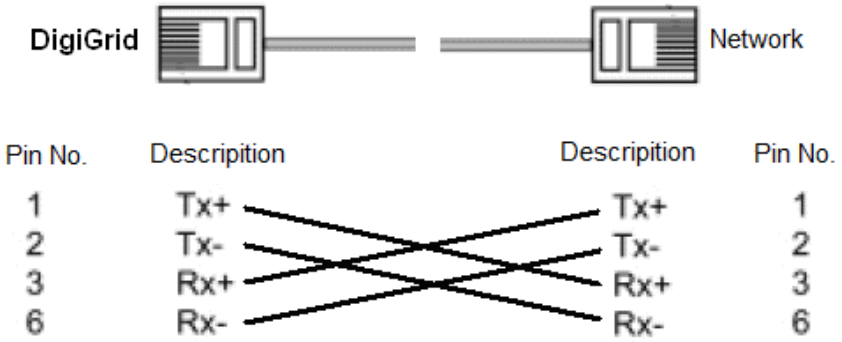
provided, including coaxial cable and twisted pair (UTP-5 types) in accordance with TIA/EIA-568B standard.

The wiring of Coaxial cable is described below:



Coaxial cables are used to connect DG-X1 network port to network switch, HUB.

The wiring of twisted pair is described below:



Twisted pair is used to connect DG-X1 network port to PC network port.

Serial Ports Connection

Serial port communication cables (DB-9 Male plug—DB-9 Male plug) are used to connect serial port devices to DG-X1, user could customize the cables.

☆Note: The onsite operating environment is subject to

interference, it is advised that turn off power supply switch before connecting to network devices.

If user wants to make serial port communication cables, refer to the following information:

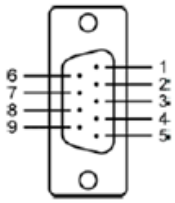
DB9- Male Plug Connection

DB9-Male plug connection is provided on RS232 serial ports of DG-X1. Pin definition is shown below:

RS-232 serial ports:

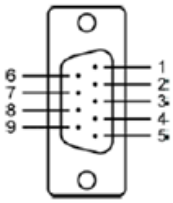
DB9

Pin No.	Signal
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	**RI**



DB9

Pin No.	Signal
1	
2	RxD
3	TxD
4	**IRIG-B+**
5	GND
6	**IRIG-B-**
7	RTS
8	CTS



Modem Wiring **RS232 Wiring**

Pin definition of DB-9 Male serial port connection is described below:

Make communication cabling 2-3 cross with Male-to-Male connection, the specific description is shown below:

RS232 (DB9 Male-Male)Communication Cable		
DB9 Male	←→	DB9 Male
1	connection	1
2	connection	3
3	connection	2
4	connection	6
5	connection	5
6	connection	4

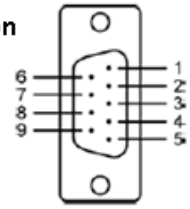
7	connection	8
8	connection	7

DB9- Male plug connection is provided on RS422/485 serial ports of DG-X1. Pin definition is shown below(set Pin 9 to idle):

RS-422/485 serial port:

DB9

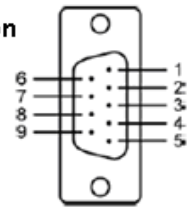
Pin No.	Signal
1	5V option
2	Data+
3	
4	IRIG-B+
5	GND
6	IRIG-B-
7	Data-
8	



RS485 Wiring

DB9

Pin No.	Signal
1	5V option
2	R+
3	T+
4	IRIG-B+
5	GND
6	IRIG-B-
7	R-
8	T-



RS422 Wiring

CAN Bus Interface

DG-X1 is provided with 2×CAN bus communication interfaces, which used for CAN bus communication. Here provides phoenix terminal connection.

The following is CAN bus terminal definitions.

6	5	4	3	2	1
GND	CAN2L	CAN2H	CAN1L	CAN1H	GND

IRIG-B Interface Connection

IRIG-B interface is used to import external GPS standard clock. User need to prepare connective cabling for IRIG-B interface. Generally, connect a cable with two wires to the IRIG-B output interface of GPS standard clock and IRIG-B terminal of DG-X1 respectively.

The definition of IRIG-B terminal is shown below.

2	1
IRIG-B+	IRIG-B-

☆Note: For all DG-X1 products, user could receive not only GPS clock signal from IRIG-B interface but also time service from upper system through communication protocols.

Event Printing Output Interface Connection

Event printing output is provided on DG-X1 with standard USB 1.1 output interface. User just need to plug printer USB data cable to DG-X1.

☆Note:1 VGA LCD interface and 2 USB interfaces are provided on DG-X1 which used to connect to mouse, keyboard, printer, etc.

Device Jumper

16 jumpers are provided on DG-X1.

JP1/JP2: CAN bus terminal resistor jumper, which equivalent to add 62Ω terminal matching resistor.

JP3-10: If selects this jumper, that means 5V independent power supply with 56Ω limiting resistor is connected to DB-9 pin 1.

J23-28: Self-loop control jumper. The settings are shown below:

Operating Mode	Jumper Setting
RS232	2-3, 4-5
RS422	2-3, 4-5
RS485 without echo signal	1-2, 3-4
RS485 with echo signal	2-3, 4-5

☆Note: DG-X1 is configured by factory default, for any changes, the operation should be executed by professional engineers.

3. Application

3.1 Protocol Conversion

3.2 Substation Automation

3.3 Virtual Port Connection

3.4 IEC61850 Communication

3.5 Advanced Calculation

4. Communication

4.1 Overview

A communications interface and protocol are required for communicating with the **DG-X1** Server. A communications interface is the physical connection on a device. Once you have established a physical connection, you must use a communication protocol to interact with the server.

The first part of this section describes communication interfaces and protocols available with the server, including communication interface connections. The remainder of the section describes the ASCII commands you can use to communicate with the server to obtain information, reports, data, or perform control functions.

4.2 Communication Interfaces

The DG-X1 physical interfaces are shown in *Table 3.1*.

Table 7.1 DG-X1 Communication Port Interfaces

Port	Communication Port Interface	Location	Feature
Port 1	10/100 BASE-T Ethernet	Front	Standard
Port 2	CONSOLE	Front	Standard
Port 3~4	USB	Front	Standard
Port 5	IRIG-B	Rear	Standard
Port 6~7	10/100 BASE-T Ethernet	Rear	Standard
Port 8	VGA	Rear	Standard
Port 9	CAN	Rear	Standard
Port 10~17	EIA-232/422/485	Rear	Standard

4.3 IEC61850 Communication Protocol

4.3.1 Overview

IEC 61850 is a standard for the design of electrical substation automation. IEC 61850 is a part of the International Electrotechnical Commission's (IEC) Technical Committee 57 (TC57) reference architecture for electric power systems. The abstract data models defined in IEC 61850 can be mapped to a number of protocols. Current mappings in the standard are to MMS (Manufacturing Message Specification), GOOSE, SMV (Sampled Measured Values), and soon to Web Services. These protocols can run over TCP/IP networks or substation LANs using high speed switched Ethernet to obtain the necessary response times below four milliseconds for protective relaying.

IEC 61850 features include:

1. *Data Modeling*— Primary process objects as well as protection and control functionality in the substation is modelled into different standard logical nodes which can be grouped under different logical devices. There are logical nodes for data/functions related to the logical device (*LLN0*) and physical device (*LPHD*).
2. *Reporting Schemes*— There are various reporting schemes (*BRCB & URCB*) for reporting data from server through a server-client relationship which can be triggered based on pre-defined trigger conditions.
3. *Fast Transfer of events*— Generic Substation Events (*GSE*) are defined for fast transfer of event data for a peer-to-peer communication mode. This is again subdivided into *GOOSE &GSSE*.
4. *Setting Groups* — The setting group control Blocks (*SGCB*) are defined to handle the setting groups so that user can switch to any active group according to the requirement.

5. *Sampled Data Transfer*— Schemes are also defined to handle transfer of sampled values using Sampled Value Control blocks (*SVCB*)
6. *Commands*— Various command types are also supported by IEC 61850 which include direct & select before operate (SBO) commands with normal and enhanced securities.
7. *Data Storage*— Substation Configuration Language (*SCL*) is defined for complete storage of configured data of the substation in a specific format.

4.3.2 Protocol Profile

4.4 Modbus Communication Protocol

4.4.1 Overview

Modbus is a serial communications protocol originally published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). Simple and robust, it has since become concerning fact standard communication protocol, and it is now a commonly available means of connecting industrial electronic devices. The main reasons for the use of Modbus in the industrial environment are:

- developed with industrial applications in mind
- openly published and royalty-free
- easy to deploy and maintain
- moves raw bits or words without placing many restrictions on vendors

Modbus enables communication between many (approximately 240) devices connected to the same network, for example a system that measures temperature and humidity and communicates the results to a computer. Modbus is often used to connect a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition (SCADA) systems. Many of the data types are named from its use in driving relays: a

single-bit physical output is called a *coil*, and a single-bit physical input is called a *discrete input* or a *contact*.

The development and update of Modbus protocols has been managed by the Modbus Organization since April 2004, when Schneider Electric transferred rights to that organization, signaling a clear commitment to openness.

The Modbus Organization is an association formed of independent users and suppliers of Modbus compliant devices that seeks to drive the adoption of the Modbus communication protocol suite, and its evolution to address architectures for distributed automation systems across multiple market segments.

4.4.2 Protocol Profile

4.5 IEC101 Communication Protocol

4.5.1 Overview

IEC 60870-5-101 [IEC101] is a standard for power system monitoring, control & associated communications for telecontrol, teleprotection, and associated telecommunications for electric power systems. This is completely compatible with IEC 60870-5-1 to IEC 60870-5-5 standards and uses standard asynchronous serial tele-control channel interface between DTE and DCE. The standard is suitable for multiple configurations like point-to-point, star, mutidropped etc.

- Supports unbalanced (only master initiated message) & balanced (can be master/slave initiated) modes of data transfer.
- Link address and ASDU (Application Service Data Unit) addresses are provided for classifying the end station and different segments under the same.
- Data is classified into different information objects and each information object is provided with a specific address.
- Facility to classify the data into high priority (class-1) and low priority (class-2) and transfer the same using separate mechanisms.

- Possibility of classifying the data into different groups (1-16) to get the data according to the group by issuing specific group interrogation commands from the master & obtaining data under all the groups by issuing a general interrogation.
- Cyclic & Spontaneous data updating schemes are provided.
- Facility for time synchronization
- Schemes for transfer of files-Example:IED's will store disturbance recorder file in the memory, When electrical disturbance is occurred in the field. This file can be retrieved through IEC104 protocol for fault analysis

4.5.2 Protocol Profile

4.6 IEC104 Communication Protocol

4.6.1 Overview

IEC 60870-5-104 (IEC 104) protocol is an extension of IEC 101 protocol with the changes in transport, network, link & physical layer services to suit the complete network access. The standard uses an open TCP/IP interface to network to have connectivity to the LAN (Local Area Network) and routers with different facility (ISDN, X.25, Frame relay etc.) can be used to connect to the WAN (Wide Area Network). Application layer of IEC 104 is preserved same as that of IEC 101 with some of the data types and facilities not used. There are two separate link layers defined in the standard, which is suitable for data transfer over Ethernet & serial line (PPP - Point-to-Point Protocol). The control field data of IEC104 contains various types of mechanisms for effective handling of network data synchronization.

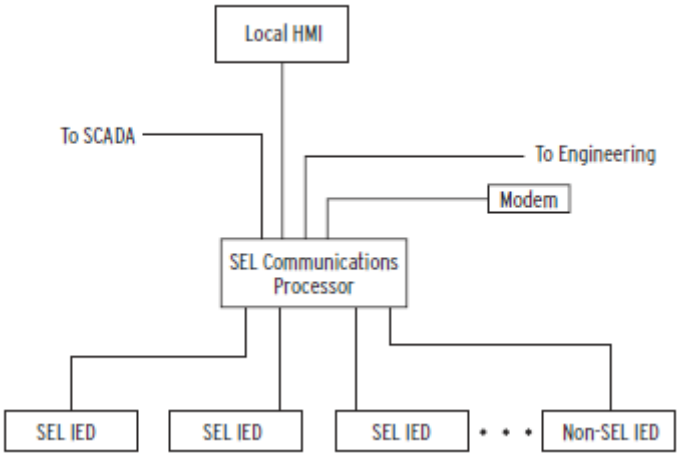
4.6.2 Protocol Profile

4.7 SEL Communication Protocol

4.7.1 Overview

SEL Fast Meter is a binary message that you solicit with binary commands. Fast Operate is a binary message for control. The relay can also send unsolicited Fast SER messages automatically. If the relay is connected to an SEL communications processor, these messages provide the mechanism that the communications processor uses for SCADA or DCS functions that occur simultaneously with ASCII interaction.

SEL offers SEL communications processors, powerful tools for system integration and automation. The SEL-2030 series and the SEL-2020 communications processors are similar, except that the SEL-2030 series has two slots for network protocol cards. These devices provide a single point of contact for integration networks with a star topology, as shown in *Figure C.1*.



In the star topology network in *Figure C.1* the SEL communications processor offers the following substation integration functions:

➢ Collection of real-time data from SEL and non-SEL IEDs

➢ Calculation, concentration, and aggregation of real-time IED data into databases for

SCADA, HMI, and other data consumers

➢ Access to the IEDs for engineering functions including configuration, report data retrieval, and control through local serial, remote dial-in, and Ethernet network connections

➢ Distribution of IRIG-B time synchronization signal to IEDs based on external IRIG-B input, internal clock, or protocol interface

➢ Simultaneous collection of SCADA data and engineering connection to SEL IEDs over a single cable

➢ Automated dial-out on alarms

4.7.2 Protocol Profile

4.8 DNP Communication Protocol

4.8.1 Overview

DNP (Distributed Network Protocol) is a set of communications protocols used between components in process automation systems. Its main use is in utilities such as electric and water companies. Usage in other industries is not common. It was developed for communications between various types of data acquisition and control equipment. It plays a crucial role in SCADA systems, where it is used by SCADA Master Stations (aka Control Centers), Remote Terminal Units (RTUs), and Intelligent Electronic Devices (IEDs). It is primarily used for communications between a master station and RTUs or IEDs. ICCP, the Inter-Control Center Communications Protocol (a part of IEC 60870-6), is used for inter-master station communications.

4.8.2 Protocol Profile

DNP Device Profile Document - Master

DNP3 **DEVICE PROFILE DOCUMENT**	
Vendor Name: Shanghai Digigrid Information Technology Co., Ltd.	
Device Name: DG-X1	
Highest DNP Level Supported: For Requests Level 2 For Responses Level 2	Device Function: ☐Master ☐Slave
Notable objects, functions, and/or qualifiers supported in addition to the Highest DNP Levels Supported (the complete list is described in the attached table): Function code 14 (warm restart) Function code 20 (Enable Unsolicited Messages) for class 1, 2, 3 objects only. Function code 21 (Disable Unsolicited Messages) for class 1, 2, 3 objects only. Object 41, variation 1 (32-bit analog output block)	
Maximum Data Link Frame Size (octets): Transmitted 292 Received (must be 292)	Maximum Application Fragment Size (octets): Transmitted 2048 Received 2048
Maximum Data Link Re-tries: ☐None ☐Fixed at ☐Configurable, range 0 to 255	Maximum Application Layer Re-tries: ☐None ☐Configurable, range 0 to 255

Requires Data Link Layer Confirmation:

☐Never

☐Always

☐Sometimes If 'Sometimes', when? _____

Configurable for Always or Never

Requires Application Layer Confirmation:

☐Never

☐Always (not recommended)

☐When reporting Event Data (Slave devices only)

☐When sending multi-fragment responses (Slave devices only)

☐Sometimes If 'Sometimes', when?

_____

☐Configurable for always or only when Reporting Event Data and Unsolicited Messages

---

Timeouts while waiting for:

Data Link Confirm ☐None ☐Fixed at _____ ☐Variable ☐Configurable

Complete Appl. Fragment ☐None ☐Fixed at _____☐Variable ☐Configurable

Application Confirm ☐None ☐Fixed at _____☐Variable ☐Configurable

Complete Appl. Response ☐None ☐Fixed at _____☐Variable ☐Configurable

Others _____

Sends/Executes Control Operations:

WRITE Binary Outputs ☐Never ☐Always ☐Sometimes ☐Configurable

SELECT/OPERATE ☐Never ☐Always ☐Sometimes ☐Configurable

DIRECT OPERATE ☐Never ☐Always ☐Sometimes ☐Configurable

DIRECT OPERATE - NO ACK ☐Never ☐Always ☐Sometimes ☐Configurable

Count > 1 ☐Never ☐Always ☐Sometimes ☐Configurable

Pulse On ☐Never ☐Always ☐Sometimes ☐Configurable

Pulse Off ☐Never ☐Always ☐Sometimes ☐Configurable

Latch On ☐Never ☐Always ☐Sometimes ☐Configurable

Latch Off ☐Never ☐Always ☐Sometimes ☐Configurable

Queue ☐Never ☐Always ☐Sometimes ☐Configurable

Clear Queue ☐Never ☐Always ☐Sometimes ☐Configurable

FILL OUT THE FOLLOWING ITEM FOR MASTER DEVICES ONLY:

Expects Binary Input Change Events:

☐Either time-tagged or non-time-tagged for a single event

☐Both time-tagged and non-time-tagged for a single event

☐Configurable (attach explanation)

FILL OUT THE FOLLOWING ITEM FOR SLAVE DEVICES ONLY:	
Reports Binary Input Change Events when no specific variation requested: ☐Never ☐Only time-tagged ☐Only non-time-tagged ☐Configurable to send both, one or the other (attach explanation)	Reports time-tagged Binary Input Change Events when no specific variation requested: ☐Never ☐Binary Input Change With Time ☐Binary Input Change With Relative Time ☐Configurable (attach explanation)
Sends Unsolicited Responses: ☐Never ☐Configurable by class ☐Only certain objects ☐Sometimes (attach explanation) ☐ENABLE/DISABLE UNSOLICITED	Sends Static Data in Unsolicited Responses: ☐Never ☐When Device Restarts ☐When Status Flags Change No other options are permitted.
Default Counter Object/Variation: ☐No Counters Reported ☐Configurable (attach explanation) ☐Default Object 20 Default Variation 05 ☐Point-by-point list attached	Counters Roll Over at: ☐No Counters Reported ☐Configurable (attach explanation) ☐16 Bits ☐32 Bits ☐16 Bits for 16-bit counters 32 Bits for 32-bit counters ☐Point-by-point list attached
Sends Multi-Fragment Responses: ☐Yes ☐No	

DNP3

DEVICE PROFILE DOCUMENT

IMPLEMENTATION OBJECT

This table describes the objects, function codes and qualifiers used in the device:

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes	Qual Codes (hex)
1	0	Binary Input - All Variations	1	06		
1	1	Binary Input			129,130	00,01
1	2	Binary Input with Status			129,130	00,01
2	0	Binary Input Change-All Variations	1	06,07,08		
2	1	Binary Input Change Without Time	1	06,07,08	129,130	17,28
2	2	Binary Input Change with Time	1	06,07,08	129,130	17,28
2	3	Binary Input Change with Relative Time	1	06,07,08	129,130	17,28
10	0	Binary Output-All Variations	1	06		
10	1	Binary Output				
10	2	Binary Output Status			129,130	00,01
12	0	Control Block-All Variations				
12	1	Control Relay Output Block	3,4,5, 6	17,28	129	echo of request
12	2	Pattern Control Block				
12	3	Pattern Mask				
20	0	Binary Counter-All Variations	1,7,8, 9,10	06		
20	1	32-Bit Binary Counter			129,130	00,01

20	2	16-Bit Binary Counter			129,130	00,01

DNP3

DEVICE PROFILE DOCUMENT

IMPLEMENTATION OBJECT

This table describes the objects, function codes and qualifiers used in the device:

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
Obj	Var	Description	Func Codes (dec)	Qual Codes (hex)	Func Codes	Qual Codes (hex)
20	5	32-Bit Binary Counter without Flag			129,130	00,01
20	6	16-Bit Binary Counter without Flag			129,130	00,01
20	7	32-Bit Delta Counter without Flag				
20	8	32-Bit Delta Counter without Flag				
21	0	Frozen Counter-All Variations	1	06		
21	1	32-Bit Frozen Counter			129,130	00,01
21	2	16-Bit Frozen Counter			129,130	00,01
21	3	32-Bit Frozen Delta Counter				
21	4	16-Bit Frozen Delta Counter				
21	5	32-Bit Frozen Counter with Time of Freeze				
21	6	16-Bit Frozen Counter with Time of Freeze				
21	7	32-Bit Frozen Delta Counter with Time of Freeze				
21	8	16-Bit Frozen Delta Counter with Time of Freeze				

DNP3

DEVICE PROFILE DOCUMENT

IMPLEMENTATION OBJECT

This table describes the objects, function codes and qualifiers used in the device:

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
21	9	32-Bit Frozen Counter without Flag			129,130	00,01
21	10	16-Bit Frozen Counter without Flag			129,130	00,01
21	11	32-Bit Frozen Delta Counter without Flag				
21	12	16-Bit Frozen Delta Counter without Flag				
22	0	Counter Change Event-All Variations	1	06,07,08		
22	1	32-Bit Counter Change Event without Time			129,130	17,28
22	2	16-Bit Counter Change Event without Time			129,130	17,28
22	3	32-Bit Delta Counter Change Event without Time				
22	4	16-Bit Delta Counter Change Event without Time				
22	5	32-Bit Counter Change Event with Time				
22	6	16-Bit Counter Change Event with Time				
22	7	32-Bit Delta Counter Change Event with Time				
22	8	16-Bit Delta Counter Change Event with Time				

DNP3

DEVICE PROFILE DOCUMENT

IMPLEMENTATION OBJECT

This table describes the objects, function codes and qualifiers used in the device:

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
23	0	Frozen Counter Event - All Variations				
23	1	32-Bit Frozen Counter Event without Time				
23	2	16-Bit Frozen Counter Event without Time				
23	3	32-Bit Frozen Delta Counter Event without Time				
23	4	16-Bit Frozen Delta Counter Event without Time				
23	5	32-Bit Frozen Counter Event with Time				
23	6	16-Bit Frozen Counter Event with Time				
23	7	32-Bit Frozen Delta Counter Event with Time				
23	8	16-Bit Frozen Delta Counter Event with Time				
30	0	Analog Input - All Variations	1	06		
30	1	32-Bit Analog Input			129,130	00,01
30	2	16-Bit Analog Input			129,130	00,01
30	3	32-Bit Analog Input without Flag			129,130	00,01
30	4	16-Bit Analog Input without Flag			129,130	00,01
30	5	Short Floating Point Analog Input			129,130	00,01
31	1	32-Bit Frozen Analog Input				
31	2	16-Bit Frozen Analog Input				
31	3	32-Bit Frozen Analog Input with Time of Freeze				
31	4	16-Bit Frozen Analog Input with Time of Freeze				

DNP3

DEVICE PROFILE DOCUMENT

IMPLEMENTATION OBJECT

This table describes the objects, function codes and qualifiers used in the device:

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
31	5	32-Bit Frozen Analog Input without Flag				
31	6	16-Bit Frozen Analog Input without Flag				
32	0	Analog Change Event - All Variations	1	06,07,08		
32	1	32-Bit Analog Change Event without Time			129,130	17,28
32	2	16-Bit Analog Change Event without Time			129,130	17,28
32	3	32-Bit Analog Change Event with Time			129,130	17,28
32	4	16-Bit Analog Change Event with Time			129,130	17,28
32	5	Short Floating Point Analog Change Event without Time			129,130	17,28
33	0	Frozen Analog Event - All Variations				
33	1	32-Bit Frozen Analog Event without Time				
33	2	16-Bit Frozen Analog Event without Time				
33	3	32-Bit Frozen Analog Event with Time				
33	4	16-Bit Frozen Analog Event with Time				
40	0	Analog Output Status - All Variations	1	06		
40	1	32-Bit Analog Output Status			129,130	00,01
40	2	16-Bit Analog Output Status			129,130	00,01
40	3	Short Floating Point Analog Output Status			129,130	00,01

DNP3

DEVICE PROFILE DOCUMENT

IMPLEMENTATION OBJECT

This table describes the objects, function codes and qualifiers used in the device:

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
41	0	Analog Output Block - All Variations				
41	1	32-Bit Analog Output Block	3,4,5, 6	17,28	129	Echo of request
41	2	16-Bit Analog Output Block	3,4,5, 6	17,28	129	Echo of request
41	3	Short Floating Point Analog Output Block	3,4,5, 6	17,28	129	Echo of request
50	0	Time and Date - All Variations				
50	1	Time and Date	2(see 4.14)	07 where quantity= 1		
50	2	Time and Date with Interval				
51	0	Time and Date CTO - All Variations				
51	1	Time and Date CTO			129, 130	07, quantity=1
51	2	Unsynchronized Time and Date CTO			129, 130	07, quantity=1
52	0	Time Delay - All Variations				
52	1	Time Delay Coarse			129, 130	07, quantity=1
52	2	Time Delay Fine			129, 130	07, quantity=1
60	0					
60	1	Class 0 Data	1	06		
60	2	Class 1 Data	1 20,21	06,07,08 06		
60	3	Class 2 Data	1 20,21	06,07,08 06		
60	4	Class 3 Data	1 20,21	06,07,08 06		

DNP3

DEVICE PROFILE DOCUMENT

IMPLEMENTATION OBJECT

This table describes the objects, function codes and qualifiers used in the device:

OBJECT			REQUEST (slave must parse)		RESPONSE (master must parse)	
70	1	File Identifier				
80	1	Internal Indications	2	00 index=7		
81	1	Storage Object				
82	1	Device Profile				
83	1	Private Registration Object				
83	2	Private Registration Object Descriptor				
90	1	Application Identifier				
100	1	Short Floating Point				
100	2	Long Floating Point				
100	3	Extended Floating Point				
101	1	Small Packed Binary-Coded Decimal				
101	2	Medium Packed Binary-Coded Decimal				
101	3	Large Packed Binary-Coded Decimal				
No Object			13			
No Object			14			
No Object			23(see 4.14)			

DNP3

TIME SYNCHRONISATION PARAMETERS

This table describes the worst-case time parameters relating to time synchronization, as required by DNP Level 2 Certification Procedure section 8.7

PARAMETER	VALUE
Time base drift	+/- 1 minute/month at 25℃ +1/-3 minutes/month 0 to 50℃
Time base drift over a 10-minute interval	+/- 14 milliseconds at 25°C +14 / -42 milliseconds 0 to 50°C
Maximum delay measurement error	+/- 100 milliseconds
Maximum internal time reference error when set from the protocol	+/- 100 milliseconds
Maximum response time	100 milliseconds

4.9 Courier Communication Protocol

4.9.1 Overview

The Courier communication language was created by Alstom for communicating with their K-series range of protection relays. It provides a means of retrieving and setting data cells in the relay's menu system. In the context of Veesta-Automation, the Courier protocol is mainly used to exchange real-time values between menu cells of the protection relays and RTD elements. It is based on the ISO-OSI enhanced performance architecture (EPA). The Courier protocol layers correspond to the application layer of this model. For Veesta-Automation, the IEC 60870-5 standard is used for the link layer and physical connection. The Courier protocol implementation runs on Communication boards. Communication with the relays is performed via a KITZ conversion unit for each communications line which translates the IEC 60870-5 frame format into the K-BUS format that the relays use. Up to 32 relays per serial line can be supported with this configuration. The implementation of the COURIER protocol makes it possible to map relay menu cells on RTD elements. The COURIER menu cells to be mapped may be of the following value types:

• Binary flags

• Unsigned integer

• Signed integer

• Numeric Number

• IEEE floating point number

Read-only menu cells can be mapped on input RTD elements. Settings cells and password protected setting cells can be mapped on input and/or output RTD elements. For cells that can be reset, the reset cell function can be mapped on an output RTD element. Changing this element from 0 to 1 will trigger the reset cell.

The RTD elements that are updated by the protocol can be used in the same way as other I/O elements (e.g. digital inputs, analog inputs, read from conventional i/o boards). They

can be used for:

- Alarming
- Display on graphical user interface
- Input or output for (composed) objects
- Transfer to the RCC through the RCC protocol

4.9.2 Protocol Profile

4.10 Customized Protocols

5 Configuration Software

5.1 Overview

EDPS is an embedded product with independent intellectual property rights which is designed by Shanghai Digigrid Information Technology Co., Ltd. The ability of powerful data processing and applications can meet digital requirements for more and more power customers.

ICE, the integrated configuration environment, based on the EDPS. The function configuration and management of ***EDPS*** products are implemented via ***ICE***.

A set of standard edit mode provided by ***ICE*** helps user deploy easily.

5.2 Setup

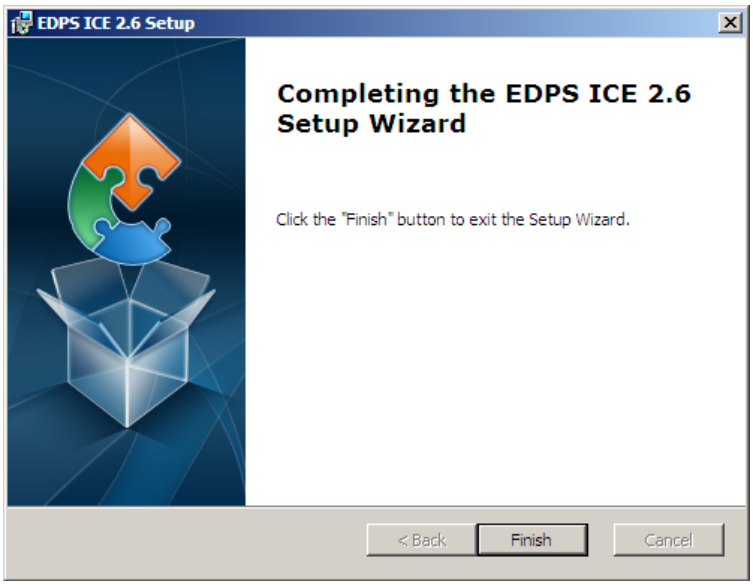
A CD-ROM is equipped with EDPS ICE which can help user implement "single-click installation". Currently support the OS, including WIN2000/WINXP/WINNT. EDPS include the executive files, configuration files, language package and firmware package. Firmware package is the operating file which provided for the target equipment by system. By the firmware management tools of EDPS ICE, firmware can be transmitted to any target device as long as the one meets the conditions.

Program Installation:

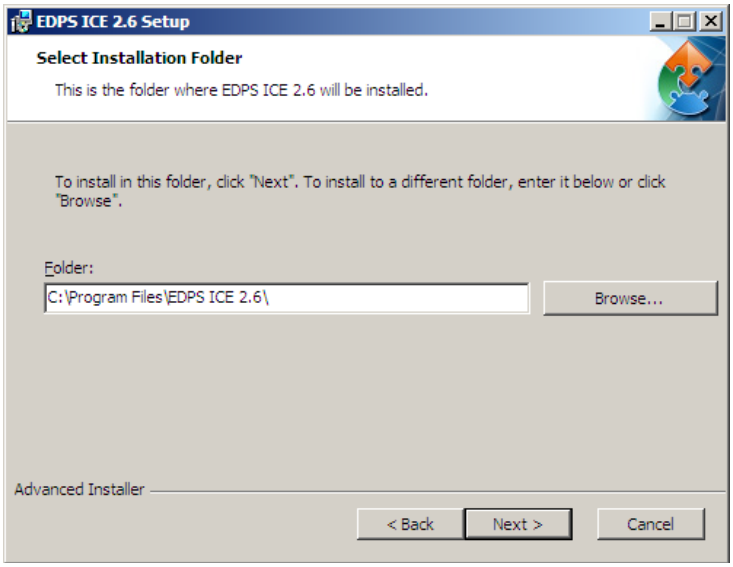
Step 1: Open the CD-ROM directory, find installation file edpsices.msi and execute the file.

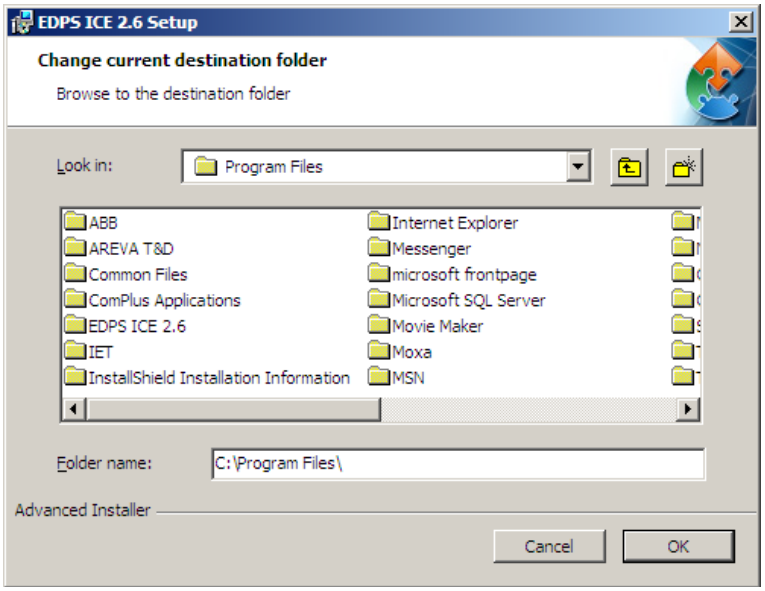
edpsices.msi

Step 2: Enter into welcome guide page.

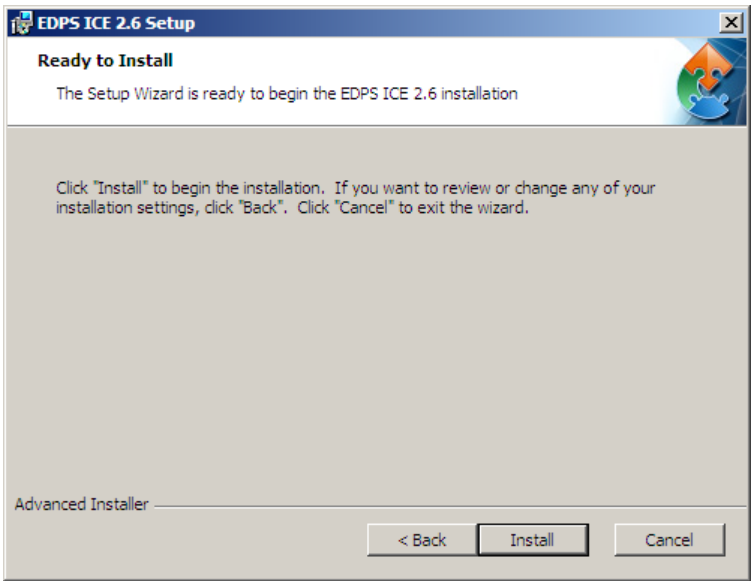


Step 3: The software installation path is ***C:\Program Files*** by default, and user-defined installation path is also provided.

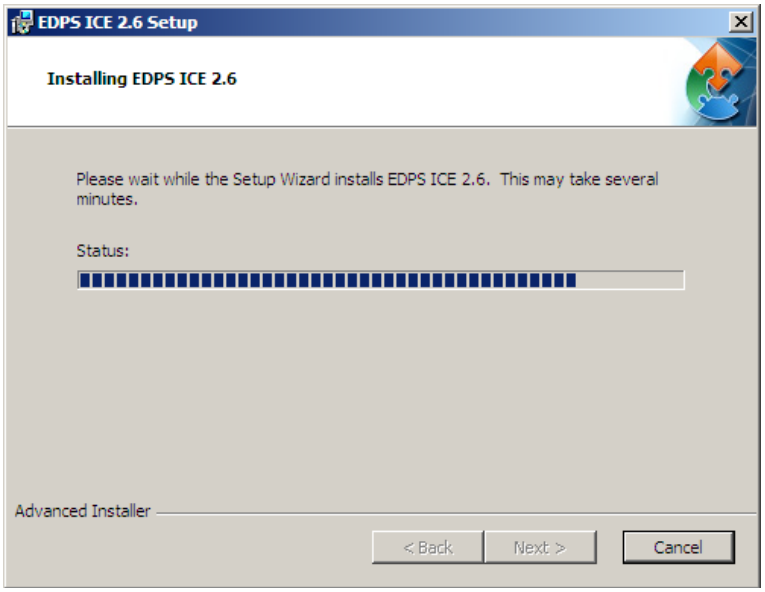




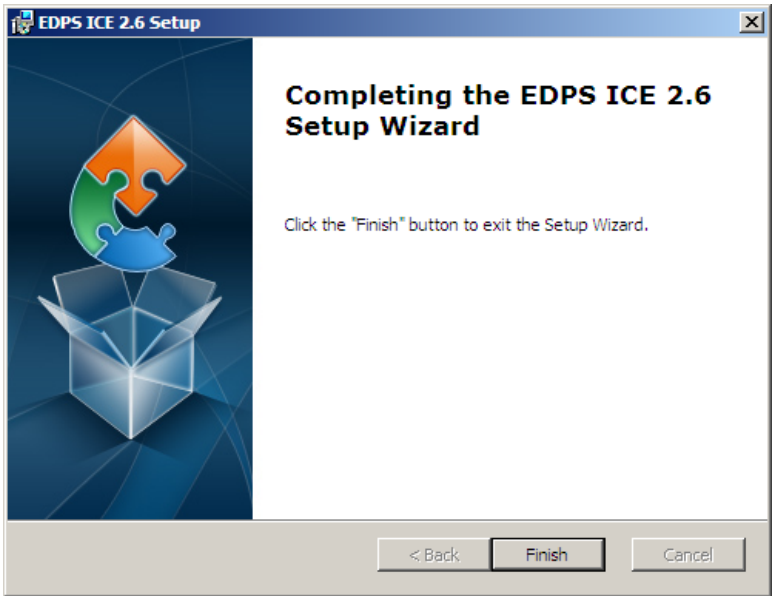
Step 4: In the “Setup” page, click “Install” button for typical installation, otherwise click “Cancel” button.



Step 5: Enter the installation process page.



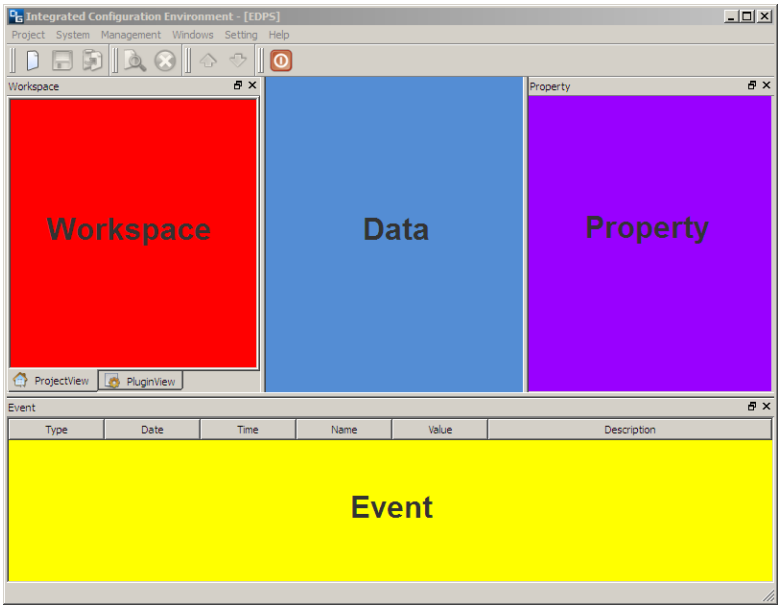
Step 6: After finishing successfully, the following page will be displayed.



5.3 Interface Layout

It is necessary for user to know the whole layout before using the software. Multiple application configuration and operating management can be implemented by the layout structure.

EDPS ICE chooses the classical dock window structure which locates at the area in the main window composing of four areas, east, west, south, and north. User may feel three dimensional visual sense and flexible operation.



Menu Bar	Provide basic operating menu.
Tool Bar	Provide basic operating tools.
Management Area	Manage data information.
Data Area	Display data information.
Property Area	Display property information.
Event Area	Display event information.

5.4 Firmware Upgrade

5.4.1 Required Equipment

Gather the following equipment before starting this firmware upgrade:

- Personal computer(PC)
- DG-X1
- WinSCP software
- Disk containing the firmware upgrade file

5.4.2 Approach of Viewing Device Firmware

- **EDPS ICE**

Make sure there is a communication between PC and the device.

Step 1: open **EDPS ICE**, select **Management** from the EDPS ICE main menu bar, as shown in Figure 5.1.

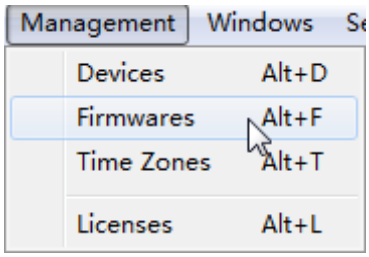


Fig 5.1

Step 2: select the Firmware submenu to display the screen.

Step 3: Type the IP address, user name: root, password: root, as shown in Figure 5.2.

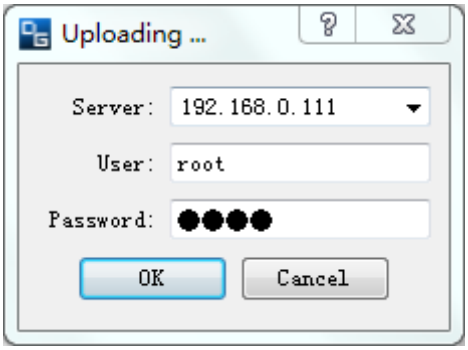
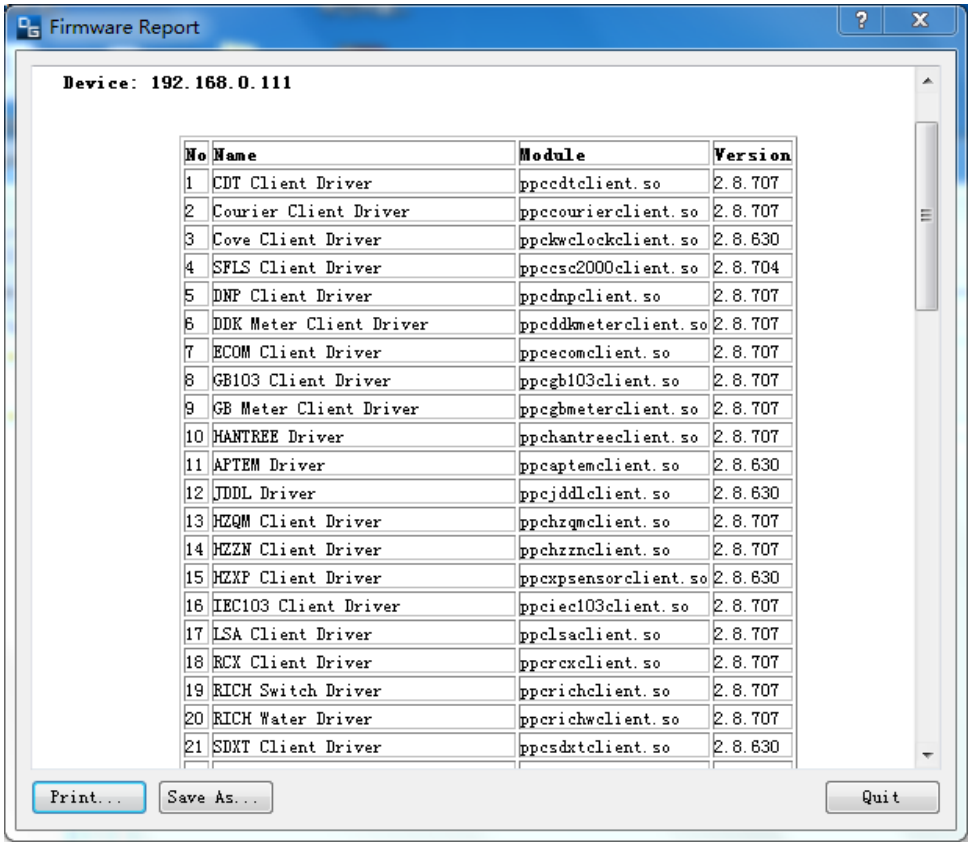


Fig 5.2

Step 4: After click **OK** button, you can see the firmware information shown in Figure 5.3.



No	Name	Module	Version
1	CDT Client Driver	ppccdtclient.so	2.8.707
2	Courier Client Driver	ppccourierclient.so	2.8.707
3	Cove Client Driver	ppckwclockclient.so	2.8.630
4	SFLS Client Driver	ppccsc2000client.so	2.8.704
5	DNP Client Driver	ppcdnpclient.so	2.8.707
6	DDK Meter Client Driver	ppcddkmeterclient.so	2.8.707
7	ECOM Client Driver	ppcecomclient.so	2.8.707
8	GB103 Client Driver	ppcgb103client.so	2.8.707
9	GB Meter Client Driver	ppcgbmeterclient.so	2.8.707
10	HANTREE Driver	ppchantreeclient.so	2.8.707
11	APTEM Driver	ppcaptemclient.so	2.8.630
12	JDDL Driver	ppcjddlclient.so	2.8.630
13	HZQM Client Driver	ppchzqmclient.so	2.8.707
14	HZZN Client Driver	ppchzznclient.so	2.8.707
15	HZXP Client Driver	ppcxpsensorclient.so	2.8.630
16	IEC103 Client Driver	ppciec103client.so	2.8.707
17	LSA Client Driver	ppclsaclient.so	2.8.707
18	RCX Client Driver	ppcrcxclient.so	2.8.707
19	RICH Switch Driver	ppcrichclient.so	2.8.707
20	RICH Water Driver	ppcrichwclient.so	2.8.707
21	SDXT Client Driver	ppcsdxtclient.so	2.8.630

Fig 5.3

- **Login specific device**

Use the telnet command to login device. Type the command ***cd /appl/edps/driver*** after the command line ***/home/user#***.

Then you can see the specific device firmware shown in figure 5.4.

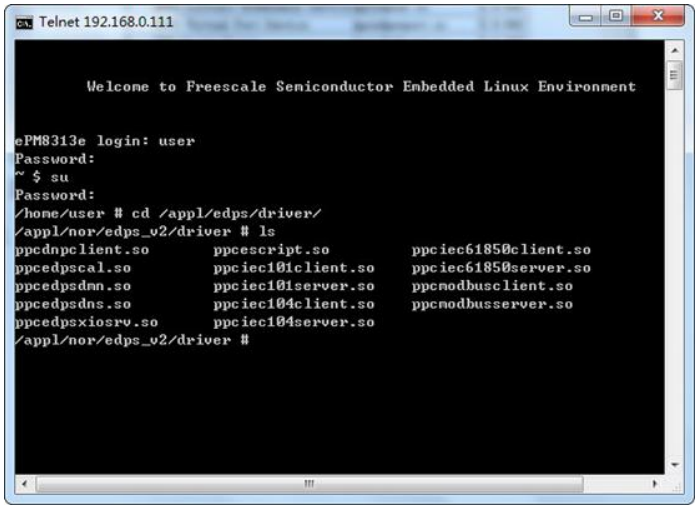


Fig 5.4

5.4.3 Firmware Upgrade

- EDPS ICE(recommend)

Step 1: open EDPS ICE, select **Management** from the EDPS ICE main menu bar.

Step 2: select the Firmware submenu to display the folder **linux_pcc** with stored firmware shown in figure 5.5.

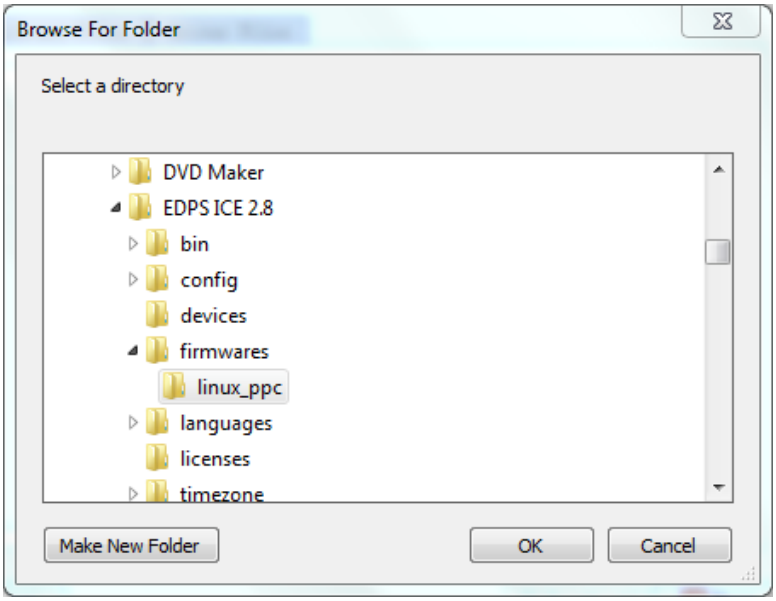


Fig 5.5

Step 3: after clicking **OK** button, you can see the detailed information for firmware. Then click the target file, type IP address, user name and password.

Step 4: restart the device.

Note: Select all the library and system files, but the driver files may depend on corresponding driver. Generally, firmware package are customized by our technical engineers. User need to select all driver files and restart the device.

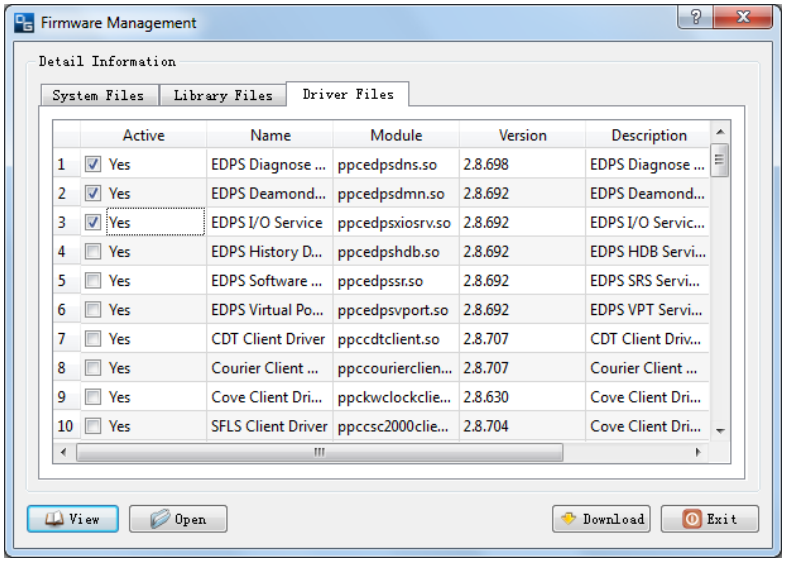
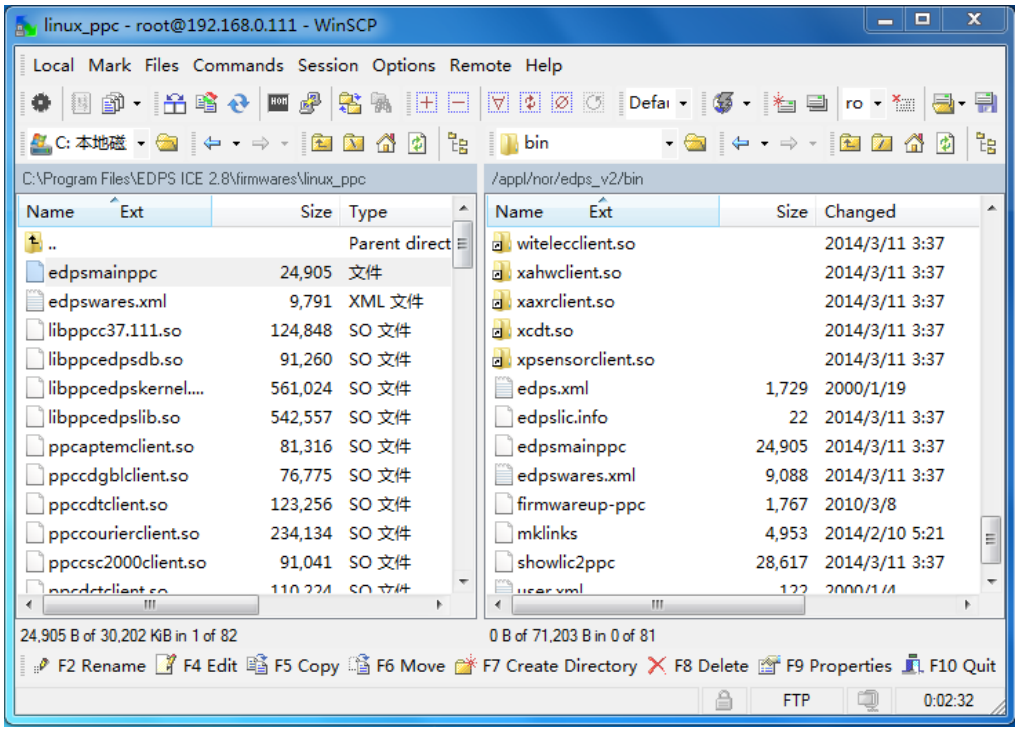


Fig 5.6

- Telnet Login(not recommend)

After the login, you can see the target file. Remove file **edpsmainppc** to folder **bin**, the same operation remove file **libppc***.so to** folder **lib,** remove file **ppc***.so** to folder **driver**. Replace the same name file shown in figure 5.7.



6. Testing and Troubleshooting

6.1 Overview

DG-X1 testing is typically divided into two categories:

- Tests performed at the time the communication server is installed or commissioned;
- Tests performed periodically once the communication server is in service

This section provides the testing and troubleshooting for DG-X1.

6.2 Testing Tools

6.3 Self-Test

Step 1: Import the configuration file into DG-X1 by Ethernet port(make sure there is a connection between the PC and Ethernet port)

Step 2: After the import, restart DG-X1. You'll see the **RUN** indicator light twinkling. This means DG-X1 is operating normally, main program **edpsmainppc** is running.

Otherwise, possible cause are the followings: 1)**RUN** indicator light is broken; 2)Main program is not running. Use Telnet command to verify this cause. Command ps is used to check whether main program is running or not.

Step 3: After that, you can see the two lights of TX and RX are flashing alternately.

Step 4: For some special situations, users could check the DG-X1 by ICE. Click the  button, type correct server IP address, user(admin) and leave the password blank. Then you'll see whether drivers have been loaded successfully on the event area. For successfully loading, data value are not correct, you need to check the wiring.

Step 5: If the data are not correct, check the configuration parameters.

6.4 Troubleshooting

6.4.1 Hardware

Start power supply, front-panel light is off.

Check order：

- **The voltage of power supply is lower than the starting voltage**

  Use multi-purpose meter to measure the voltage over power supply terminal PWR+ and PWR- before turn on power supply switch. If fails to reach starting voltage, there needs to check out input power supply.

PIN	PS-T 引脚定义
5	GND
4	PWR−
3	PWR+
2	F−
1	F+

Voltage range of operating power supply is shown below:

Type	Standard Voltage	Operating Range
AC/DC	110/220VAC	85～265VAC
	110/220VDC	85～265VDC

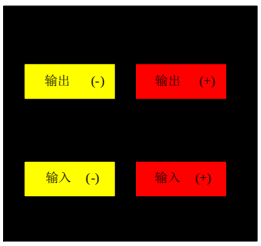
- **Fuse Burnout**

  Turn off power supply, open the case to check out whether the

fuse has been burned out. If so, change a new fuse, then check out whether there is a short circuit over PWR+ and PWR-.

- **Switch Fault of Power Supply**

Use multi-purpose meter to check the input and output of power supply switch, turn off power supply switch to check switch input and output conduction.



Note: There is a potential danger when the switch is working. So the operation must be carried out by qualified engineer.

Power supply is operating normally, main board faults

- **Loose connection between CPU board and main board**

Plug CPU board again to make the bus connection close.

- **Mainboard power supply faults**

Measure the conversion from 12VDC to 5VDC or 3.3VDC with multi-purpose meter.

Disconnect of network and device

- **Network cable faults**

Check out whether the connection of network cable is correct.

PIN	10/100M	1000M	分类	
			568B	568A
1	TX+	BI_DA+	橙白	绿白
2	TX-	BI_DA-	橙	绿
3	RX+	BI_DB+	绿白	橙白
4	NC	BI_DC+	蓝	蓝
5	NC	BI_DC-	蓝白	蓝白
6	RX-	BI_DB-	绿	橙
7	NC	BI_DD+	棕白	棕白
8	NC	BI_DD-	棕	棕

- **Network connection error**

  If laptop network port is not adaptive, twisted pair is selected to connect the device. Use 2 coaxial wires to connect device via Switch or Hub.

- **Network setting**

  Check out whether local network is located in 192.168.0.XXX.

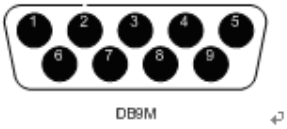
- **Wireless network interference**

  Check out whether wireless network is located in the same address with local network address. If so, disconnect wireless network connection or change into other address.

Serial ports communication faults

- **Incorrect serial port definitions**

  The correct definitions are listed below:



PIN	RS232	RS485 (4wire)	RS422	RS485 (2wire)	Modem
1		5V option	5V option	5V option	DCD
2	RXD	R+	R+	Data+	RXD
3	TXD	T+	T+		TXD
4	IRIG-B+	IRIG-B+	IRIG-B+	IRIG-B+	DTR
5	GND	GND	GND	GND	GND
6	IRIG-B-	IRIG-B-	IRIG-B-	IRIG-B-	DSR
7	RTS	T-	T-	Data-	RTS
8	CTS	R-	R-		CTS
9					RI

- **Communication wire selection error**

In order to meet harsh on-site communication environment, only enhanced Cat5 meets technical requirement. Other communication wires may cause unsteady communication and error-code.

- **Long communication distance, more devices**

Communication wire length is strictly requested for each communication modes, the technical parameters are listed below:

Type	RS-232	RS485	RS422
Distance(m)	15(max)	1200(max)	1200(max)
Quantity	1	32(max)	32(max)

Note: For RS422/485, the ideal communication distance is 1200 miles within 32 devices. Due to the complicated on-site environment, communication limitation is 400 miles or 500 miles within 10 devices.

- **Lack of terminal resistor**

In order to eliminate capacitor interference and echo, a 120Ω terminal resistor is required to place on the last device of communication link.

- **Mismatched level**

  If TTL level is applied to RS485 serial ports, here needs a converter. Differential level is recommended.

- **Power supplement**

  For some protection devices, 5V or 12V power supply is needed to provide power.

- **Incorrect jumper**

  DG-X1 provides optional communication mode, so appropriate jumper is required as required.

- **Incorrect software serial ports configuration**

  Serial ports configuration is depended on the actual condition, user should configure RS232/RS422/RS485 serial ports according to actual links.

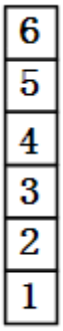
- **Mismatching of serial port attribute configuration and device**

  Serial port communication attributes are different because of different manufacturer and protocol, user should configure serial port attributes according to IED.

CAN Bus Communication Faults

- **Incorrect pin wiring**

  The correct definition of communication port pins:



PIN	CAN 引脚定义
6	GND
5	CAN2L
4	CAN2H
3	CAN1L
2	CAN1H
1	GND

- **Communication wire selection error**

  In order to meet harsh on-site communication environment, only enhanced Cat5 meets technical requirement. Other communication wires may cause unsteady communication and error-code.

- **Long communication distance, more devices**

  The communication distance should be less than the actual distance of CAN bus.

- **Lack of terminal resistor**

In order to eliminate capacitor interference and echo, a 120Ω terminal resistor is required to place on the last device of communication link.

6.4.2 Software

- **如何查看设备主程序运行、当前运行工程名称**
  - 查看设备主程序运行

通过 Telnet 访问方式登录到设备，在/home/user#后输入 ps，按<回车>键后出现如图 2-1 所示部分，则表示主程序已经启动。

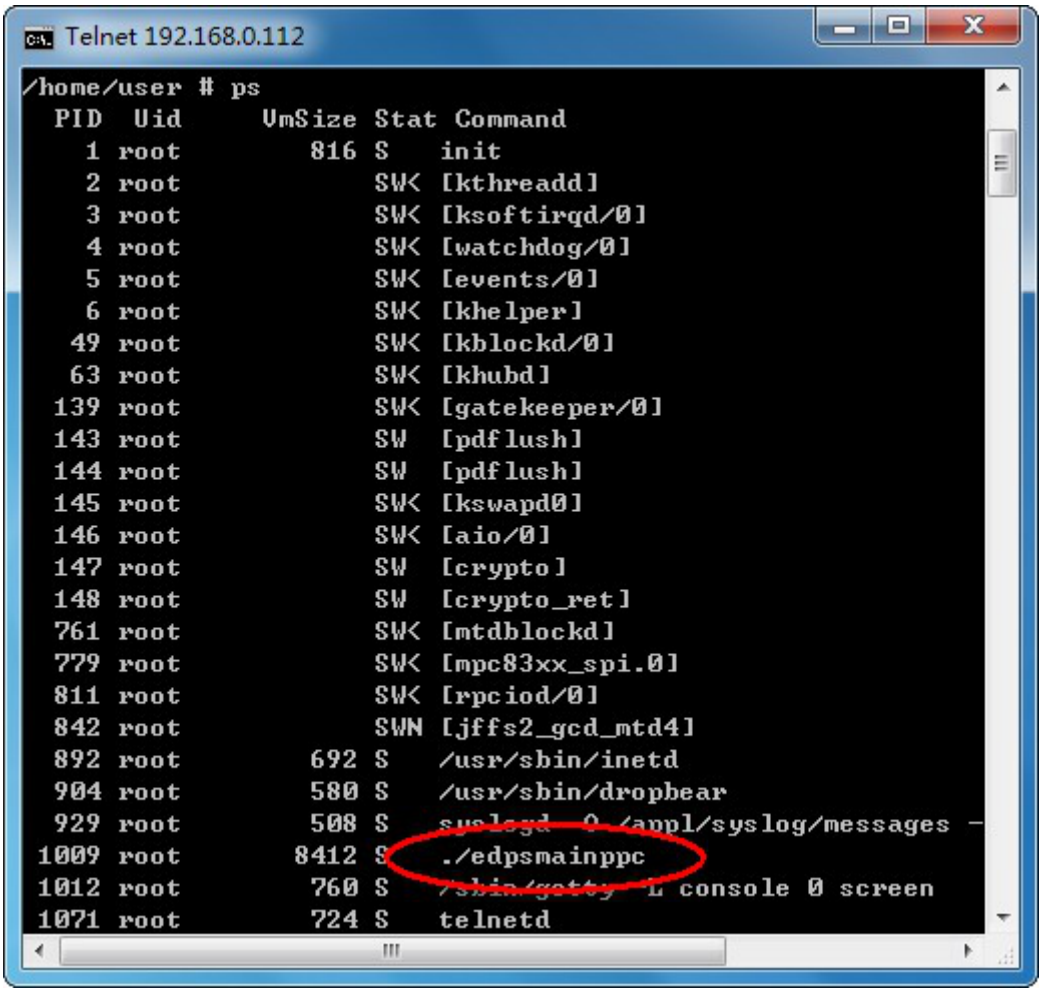


图 2-1 查看主程序启动

■ 查看当前运行工程名称

通过 Telnet 访问方式登录到设备，在/home/user#后输入 cat /appl/edps/project/edpsrun.xml，按<回车>键后出现如图 2-2 所示部分，”active=1”是当前正在运行的工程。

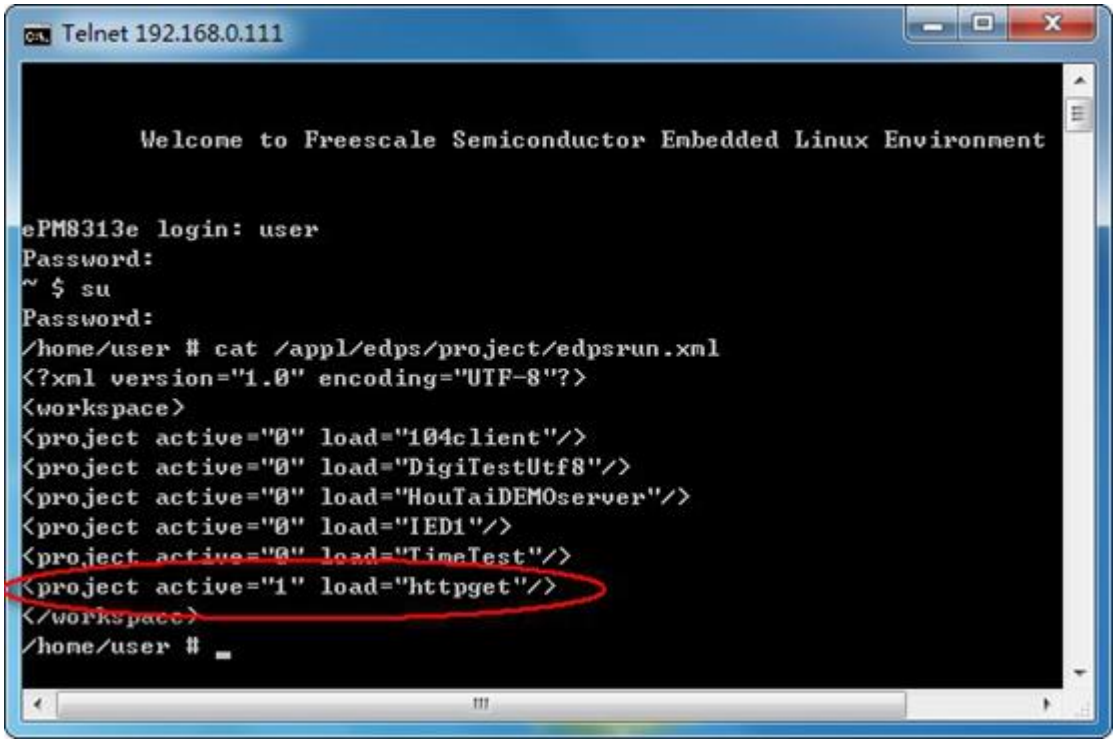


图 2-2 当前运行工程

●

6.4.3 Factory Assistance

We appreciate your interest in DG products and services. If you have questions or comments, please contact us at: Shanghai Digigrid Information Technology Co., Ltd.

No.2 Building #1295 Xinjingqiao Road

Pudong, Shanghai, P.R. China

Tel: +86-21-6162-9***

Fax:+86-21-6162-9213

Website: www.digigrid.com cn

Appendix A

A.1 Firmware and Manual Versions

我们公司的固件是否有版本号。

Table A.1 lists the instruction manual release dates and a description of modifications. The most recent instruction manual revisions are listed at the top.

Revision Date	Summary of Revisions
20140303	Initial Release

Appendix B

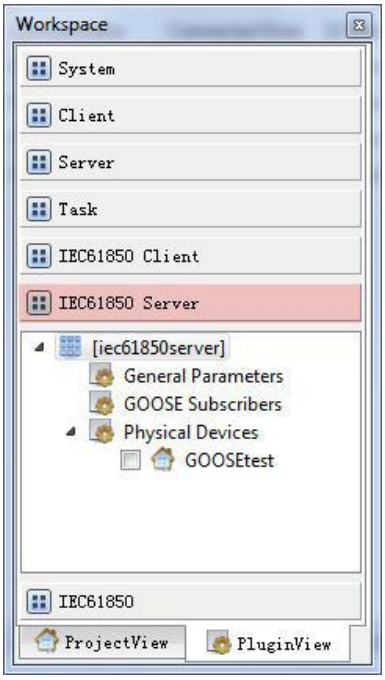
B.1 IEC61850 Configuration

B.1.1 Driver Information

Summary IEC61850 Client/Proxy Application.

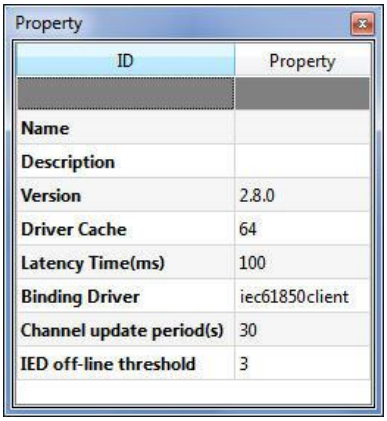
Operation View driver information.

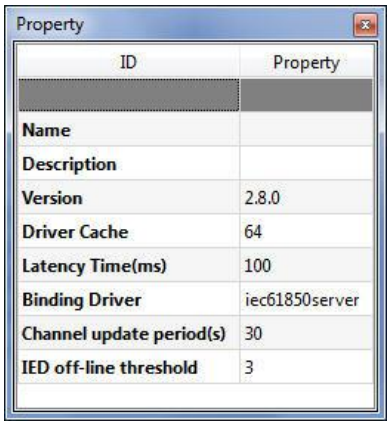
1. Open the project and choose plugin viewer on the **EDPS ICE** management area.
2. Click the **IEC61850 Client/Proxy** plugin.



3 Click any root node on the management area.

Property View property area of EDPS ICE.





No.	Name	Description
1	Name	Specify driver name.
2	Description	Specify driver description.
3	Version	Specify driver version information.
4	Driver Cache	Specify the size of driver cache, 64k bytes by default, up to128k bytes.
5	Latency Time(ms)	Specify delay time of updating real-time data, unit in millisecond.
6	Binding Driver	Specify the unique and read-only driver name.
7	Channel Update Period	Specify the period to update channel.
8	IED Off-line Threshold	Specify threshold to process IED off-line status.

Pseudo Point View data area of EDPS ICE.

Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEC61850STA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	IEC61850AUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

No.	Name	Description
1	Running Status	View operating status information.
2	Authority	View authorized status.

B.1.2 General Parameters

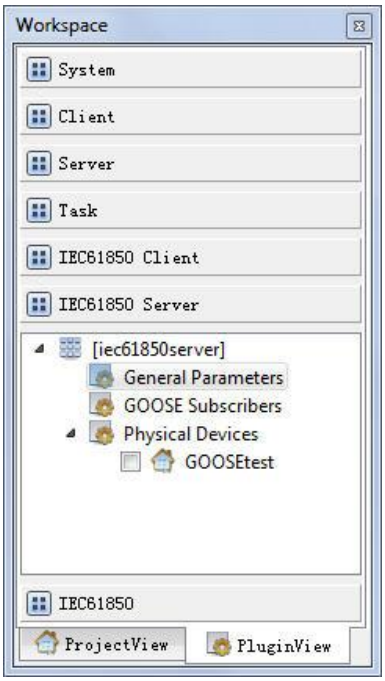
Summary Set General parameters for IEC61850 configuration.

Operation View general parameters.

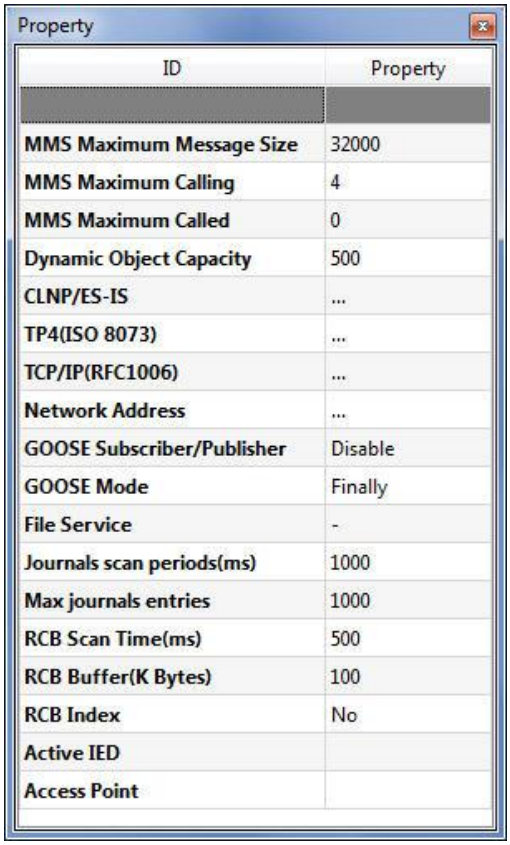
1 Open the project and choose plugin viewer on the EDPS ICE management area.

2 Click **IEC61850 Client/Proxy** plugin.

3 Choose **General Parameters** node on the EDPS ICE management area.



Property View property area of EDPS ICE.



Property

ID	Property
MMS Maximum Message Size	32000
MMS Maximum Calling	4
MMS Maximum Called	0
Dynamic Object Capacity	500
CLNP/ES-IS	...
TP4(ISO 8073)	...
TCP/IP(RFC1006)	...
Network Address	...
GOOSE Subscriber/Publisher	Disable
GOOSE Mode	Finally
File Service	-
Journals scan periods(ms)	1000
Max journals entries	1000
RCB Scan Time(ms)	500
RCB Buffer(K Bytes)	100
RCB Index	No
Active IED	
Access Point	

No.	Name	Description
1	MMS Maximum Message Size	Specify the maximum message size.

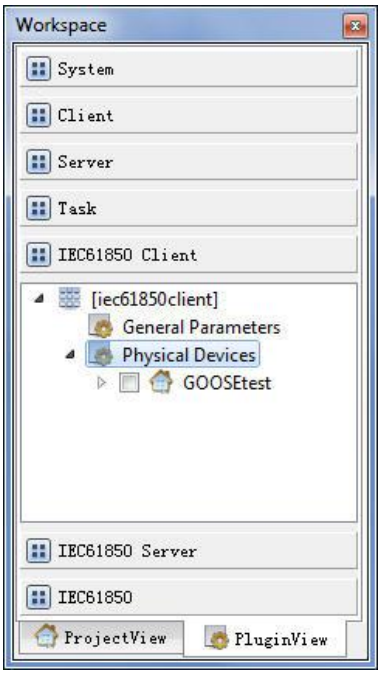
2	MMS Maximum Calling	Specify the maximum calling connections of the client.
3	MMS maximum Called	Specify the maximum called connections of the server.
4	Dynamic Object Capacity	
5	CLNP/ES-IS	Specify the configuration of OSI network layer.
6	TP4(ISO 8073)	Specify the configuration of OSI transport layer.
7	TCP/IP(RFC1006)	Specify the configuration of TCP/IP stack.
8	Network Address	Specify the configuration of local network address.
9	GOOSE Subscriber/Publisher	
10	GOOSE Mode	
11	File Service	
12	Journals scan periods(ms)	
	Max journals entries	
	RCB Scan Time(ms)	Specify the scan time of the report.
	RCB Buffer(K Bytes)	Specify the default buffer size of the buffer report.
	RCB Index	Specify whether or not to add the suffix of RCB reference.
	Active IED	Specify the activated device name which generally is the iedName property of ConnectedAP of the CID instance file.
	Access Point	Specify the access point name which is generally the apName property of ConnectedAP of the CID instance file.

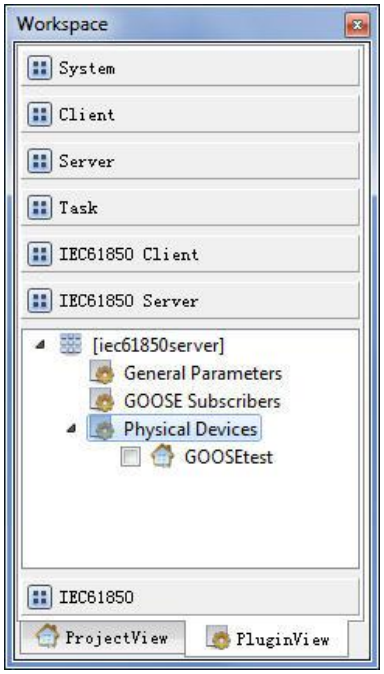
B.1.3 Device Parameters

Summary Set physical device parameters for IEC61850 driver.

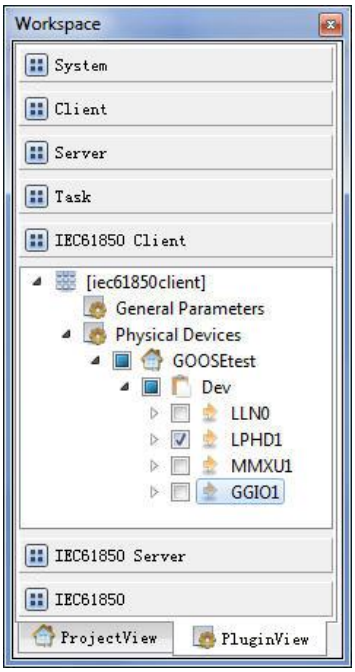
Operation View device parameters.

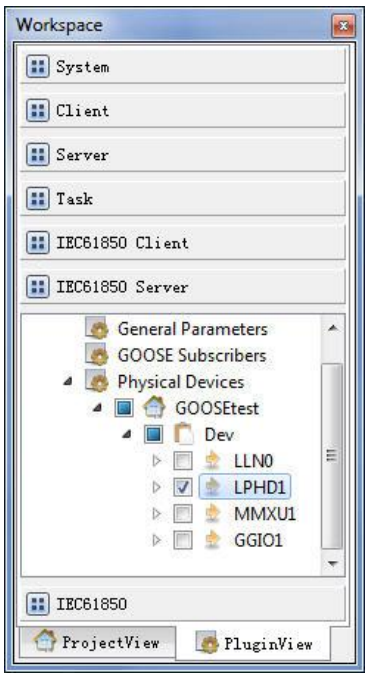
1. Open the project and choose plugin viewer on the EDPS ICE management area.
2. Click the **IEC61850 Client/Proxy** plugin.



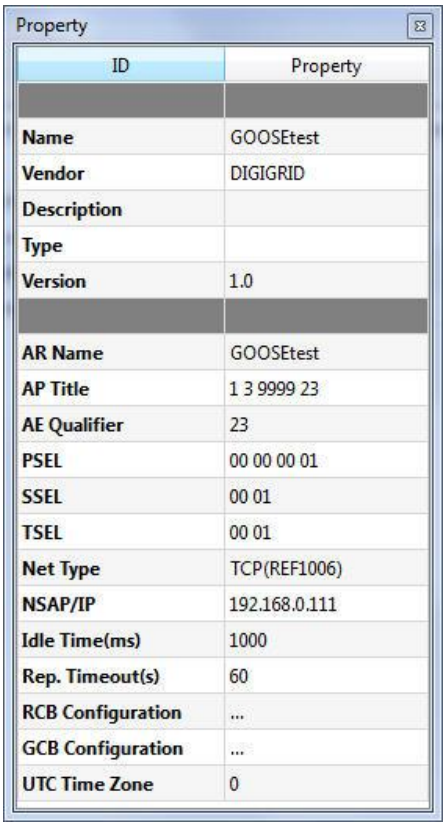


3 Click the sub-node that is subordinate to “Physical Devices” node.





Property View property area of EDPS ICE.

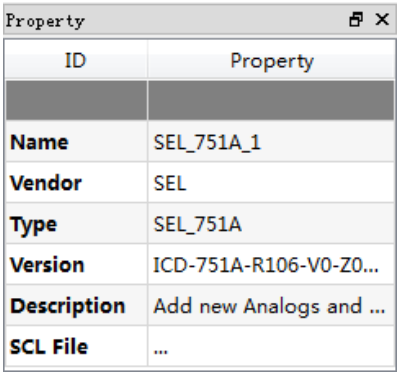


Property

ID	Property
Name	GOOSEtest
Vendor	DIGIGRID
Description	
Type	
Version	1.0
AR Name	GOOSEtest
AP Title	1 3 9999 23
AE Qualifier	23
PSEL	00 00 00 01
SSEL	00 01
TSEL	00 01
Net Type	TCP(REF1006)
NSAP/IP	192.168.0.111
Idle Time(ms)	1000
Rep. Timeout(s)	60
RCB Configuration	...
GCB Configuration	...
UTC Time Zone	0

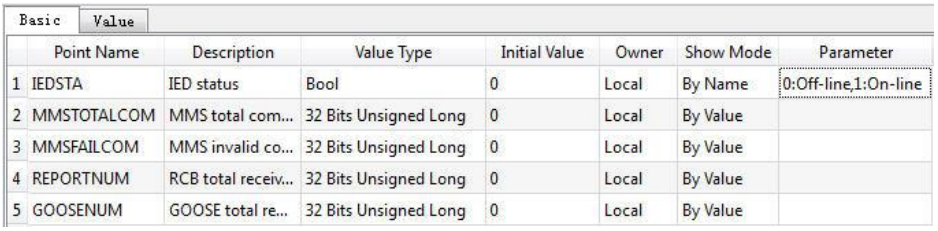
No.	Name	Description
1	Name	Specify device name.
2	Vendor	Specify device vendor.
3	Description	Specify description.
4	Type	Specify device type.
5	Version	Specify device version.
6	AR Name	Application reference name is an alias for the P-Address. It may be up to 64 characters in length.
7	AP Title	This is an Object Identifier assigned by the network naming authority, representing the Application Process Title for your particular application process.
8	AE Qualifier	This is an optional integer value used to qualify the Application Entity.
9	PSEL	Specify the access point of OSI presentation layer.(default: 4 bytes)
10	SSEL	Specify the access point of OSI session layer.(default:2 bytes)
11	TSEL	Specify the access point of OSI transport layer.(default:2 bytes)
12	Net Type	Two optional types: TP4 and TCP.
13	NSAP/IP	Specify network address. ● TP4 is composed of 20 characters of ASCII encoded hex ● TCP is composed of alias name or IP address

14	Idle Time (ms)	Specify the idle interval time of MMS enquiry, unit in millisecond.
15	Rep. Timeout(s)	Specify the timeout interval of MMS request, unit in second.
16	RCB Configuration	Specify configuration information of Report Control Block.
17	GCB Configuration	Specify configuration information of GCB.
18	UTC Time Zone	



No.	Name	Description
1	Name	Specify device name.
2	Vendor	Specify device vendor.
3	Description	Specify description information.
4	Type	Specify device type.
5	Version	Specify device version.
6	File	Specify the related SCL file for physical device.

Pseudo Point View data area of EDPS ICE.



	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	MMSTOTALCOM	MMS total com...	32 Bits Unsigned Long	0	Local	By Value	
3	MMSFAILCOM	MMS invalid co...	32 Bits Unsigned Long	0	Local	By Value	
4	REPORTNUM	RCB total receiv...	32 Bits Unsigned Long	0	Local	By Value	
5	GOOSENUM	GOOSE total re...	32 Bits Unsigned Long	0	Local	By Value	

No.	Name	Description
1	IEDSTA	View device communication status currently
2	MMSTOTALCOM	MMS communication numbers
3	MMSFAILCOM	MMS communicate failure numbers
4	REPORTNUM	Report receiving numbers
5	GOOSENUM	GOOSE receiving numbers

B.1.4 Basic Parameters

Summary View basic parameters for information point through the IO page of different types of data. The device name and point name are not allowed to edit depending on IEC61850 device.

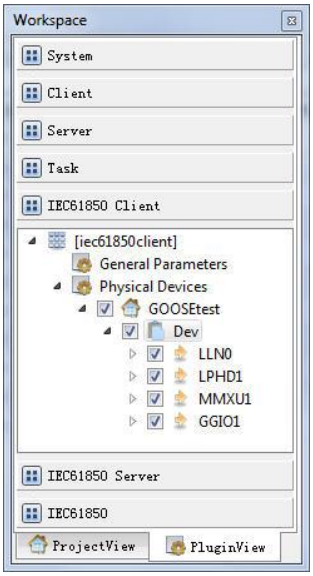
Note: For more information, refer to “EDPS ICE V2.x User Guide” for more details.

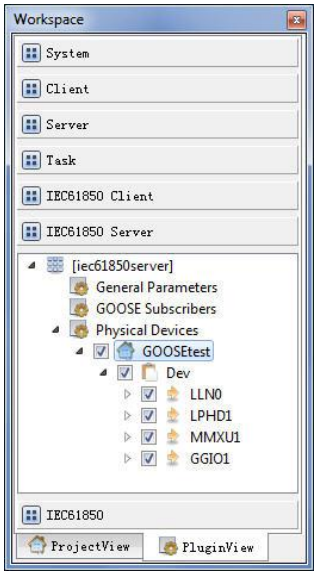
B.1.5 IO Parameters

Summary IO parameters are viewed through the IO page of different data types. The IO parameters in IEC61850 plugin are disabled in edit depending on IEC61850 device.

Operation View IO parameters by the following steps.

1. Open the project and choose plugin viewer on the EDPS ICE management area.
2. Click **IEC61850 Client/Proxy** plugin.
3. Click any sub-node that is subordinate to **Physical Devices** node.





Parameters View data area of EDPS ICE.

Analog Input | Digital Input | Counter | Analog Output | Digital Output

Basic | IO | Value

	Device Name	Point Name	LDRef	LNRef	FC	DORef	DARef	BType	CDC
1	GOOSEtestDev	GGIO1STBeh$stVal	Dev	GGIO1	ST	Beh	stVal	INT32	INS
2	GOOSEtestDev	GGIO1STMod$stVal	Dev	GGIO1	ST	Mod	stVal	INT32	INC
3	GOOSEtestDev	GGIO1STHealth$stVal	Dev	GGIO1	ST	Health	stVal	INT32	INS
4	GOOSEtestDev	LPHD1STPhyHealth...	Dev	LPHD1	ST	PhyHealth	stVal	INT32	INS
5	GOOSEtestDev	MMXU1MXA$phsA...	Dev	MMXU1	MX	A.phsA	cVal.mag.f	FLOAT32	WYE
6	GOOSEtestDev	MMXU1STBeh$stVal	Dev	MMXU1	ST	Beh	stVal	INT32	INS
7	GOOSEtestDev	MMXU1STMod$stVal	Dev	MMXU1	ST	Mod	stVal	INT32	INC
8	GOOSEtestDev	MMXU1STHealth$s...	Dev	MMXU1	ST	Health	stVal	INT32	INS
9	GOOSEtestDev	LLN0STBeh$stVal	Dev	LLN0	ST	Beh	stVal	INT32	INS
10	GOOSEtestDev	LLN0STMod$stVal	Dev	LLN0	ST	Mod	stVal	INT32	INC
11	GOOSEtestDev	LLN0STHealth$stVal	Dev	LLN0	ST	Health	stVal	INT32	INS

No.	Name	Description
1	Device Name	Specify instance name of logical device.
2	Point Name	Specify whole reference name of MMS.
3	LDRef	Specify reference name of logical device.
4	LNRef	Specify reference name of logical node.
5	FC	Specify functional constraint of data.
6	DORef	Specify reference name of data object.
7	DARef	Specify reference name of data attribute.
8	BType	Specify basic type of point.
9	CDC	Specify common data class of point.

Appendix C

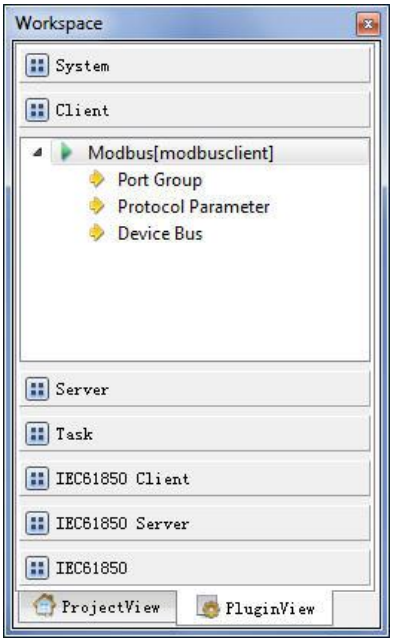
C.1 Modbus Configuration

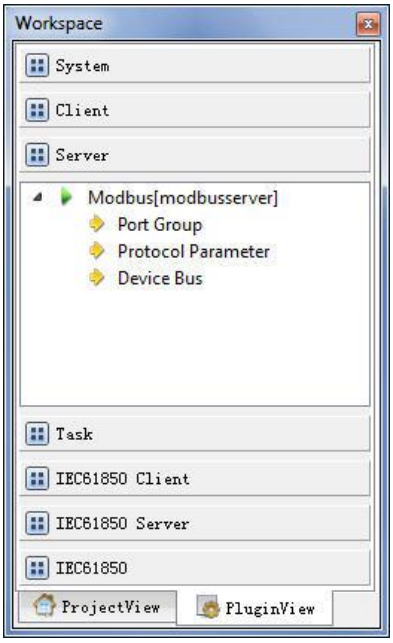
C.1.1 Driver Information

Overview Describe the detail information of the client/Server driver.

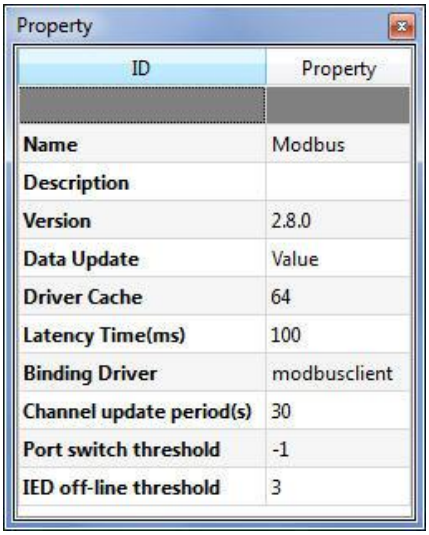
Operation Look over the driver information.

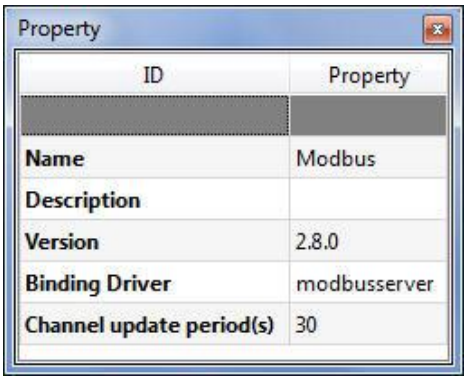
1. Open project, then select plug-in management page on ***EDPS ICE*** management area.
2. Click **Client/Server** plug-in.
3. Click any of the root nodes of the directory tree on the management area.





Property View the property area of the ***EDPS ICE.***





No.	Name	Declaration
1	Name	User-defined name
2	Description	Set up the name description information.
3	Version	Set up the version information of the module.
	Data Update	
4	Driver Cache	Set up the volume of the buffer. Default 64KB, maximum128KB.
5	Latency Time(ms)	
6	Binding Driver	
7	Chanel	Set up the update information of the cycle of

	Update Period	communication channels. The unit is second.
8	Port Switching Threshold	Set up the statistical threshold carried on in the port. The port will be switched when the continuous fault times exceed the threshold values. -1 means no port switch.
9	IED Off-line Threshold	Set up the statistical threshold of the device state. The device will in off-line state when the continuous fault times exceed the threshold values.

Pseudo Point View the data area of ***EDPS ICE***.

Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

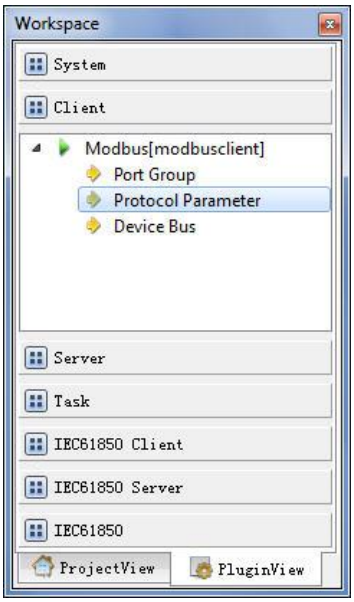
No.	Name	Declaration
1	Running Status	View the diver running status information
2	Authority	View the authorization status of the diver.

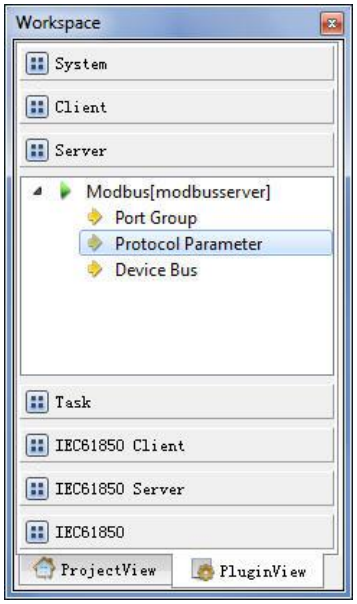
C.1.2 Protocol Parameters

Overview Define the communication protocol parameter of the protocol.

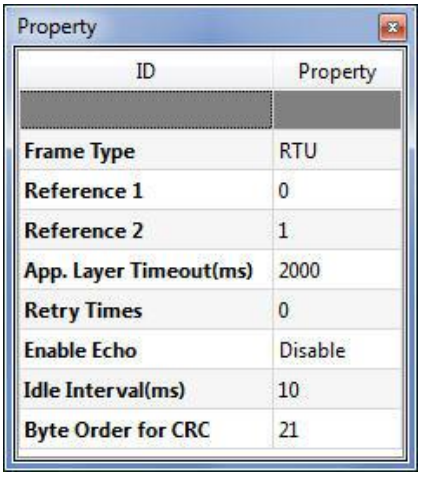
Operation View protocol parameters.

1. Open project， then select plug-in management page on ***EDPS ICE*** management area.
2. Click the **Client/Server** plug-in.
3. Select the **protocol parameters** node on the management area.





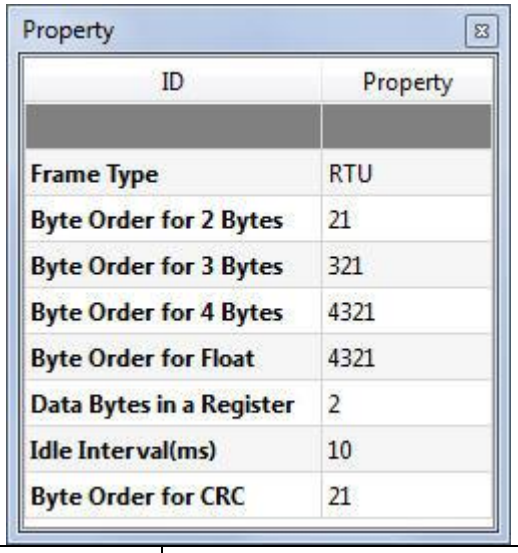
Property View the property area of ***EDPS ICE***.



Property

ID	Property
Frame Type	RTU
Reference 1	0
Reference 2	1
App. Layer Timeout(ms)	2000
Retry Times	0
Enable Echo	Disable
Idle Interval(ms)	10
Byte Order for CRC	21

No.	Name	Declaration
1	Frame Type	Specify the data frame type, The default is RTU.
2	Reference 1	Specify the first reference parameter in TCP transmission type.
3	Reference 2	Specify the second reference parameter in TCP transmission type.
4	App. Layer Timeout(ms)	Specify the timeout interval waiting for the response of the application layer. If there is no response within the period, then the device will be conformed as no response.
5	Retry Times	Specify the retransmission requirement times in condition of ineffective reception of the data.
6	Enable Echo	Specify whether the Echo data will be taken as effective data. The received Echo data frame will be taken as communication error frame when the Echo is not to be handled.
7	Idle Interval(ms)	Specify the interval needed between the finish of the communication processes. Complete communication process begins with the send of the data request and ends with the reception of all the valid data.
8	Byte Order for CRC	



Property

ID	Property
Frame Type	RTU
Byte Order for 2 Bytes	21
Byte Order for 3 Bytes	321
Byte Order for 4 Bytes	4321
Byte Order for Float	4321
Data Bytes in a Register	2
Idle Interval(ms)	10
Byte Order for CRC	21

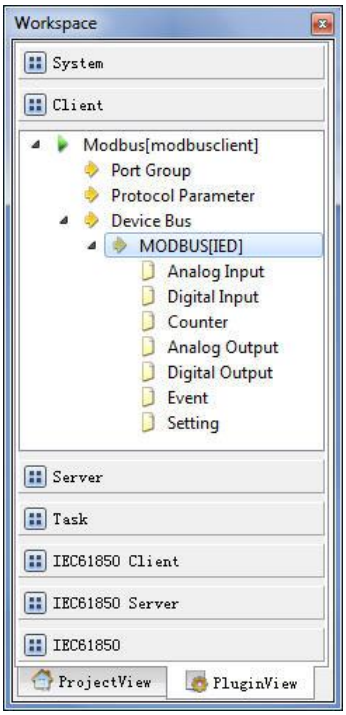
No.	Name	Declaration
1	Frame Type	Specify the data frame type, The default is RTU.
2	Byte Order for 2 Bytes	
3	Byte Order for 3 Bytes	
4	Byte Order for 4 Bytes	
5	Byte Order for Float	
6	Data Bytes in a Register	
7	Idle Interval(ms)	
8	Byte Order for CRC	

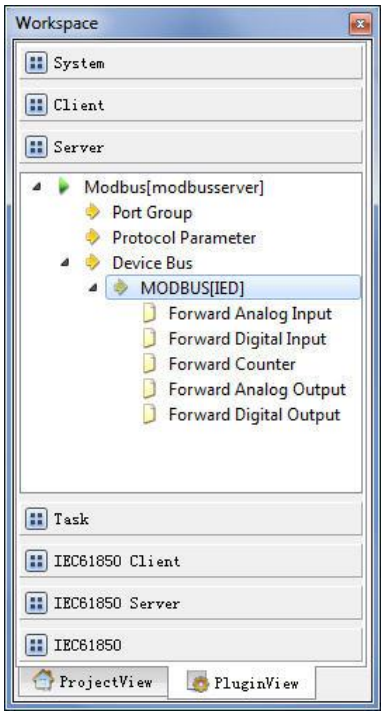
C.1.3 Device Parameters

Overview Specify device parameter for communication.

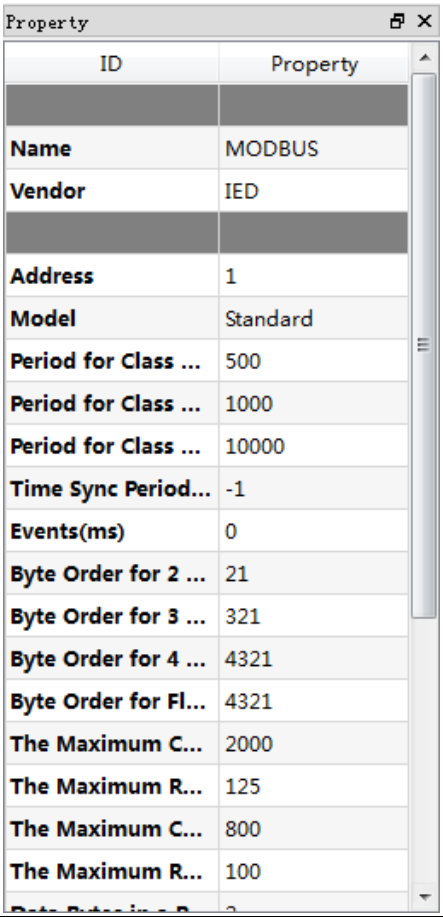
Operation View device parameters.

1. Open project，then select plug-in management page on ***EDPS ICE*** management area.
2. Click **Client/Server** plug-in.
3. Click any sub-node under **Device Bus** node on the management area.





Property View the property area of ***EDPS ICE***.



No.	Name	Declaration
1	Name	Specify the name of the device.
2	Vendor	Specify the device manufacturer.
3	Address	Specify the address information of the device.

4	Model	Specify the model information of the device. ● Standard ● AREVA Px2x ● AREVA Px3x ● AREVA Px4x ● WIT Mx
5	Period for Class 1 Data(ms)	Specify the polling period of the 1 class data. The unit is millisecond.
6	Period for Class 2 Data(ms)	Specify the polling period of the 1 class data. The unit is millisecond.
7	Period for Class 3 Data(ms)	Specify the polling period of the 1 class data. The unit is millisecond.
8	Time Sync. Period(s)	Specify the time sync. Period of the device. The unit is second.
9	Events(ms)	Specify the event read period. The unit is millisecond. Min：0ms Max：3600000ms
10	Byte Order for 2 Bytes	Specify how to order 2 bytes in register.
11	Byte Order for 3 Bytes	Specify how to order 3 bytes in register.
12	Byte Order for 4 Bytes	Specify how to order 4 bytes in register.
13	Byte Order for Float	Specify how to order float data in register.
14	The Maximum Coils for Polling	Specify maximum reading coils
15	The Maximum Registers for Polling	Specify maximum reading registers.
16	The Maximum Coils for Writing	Specify maximum writing coils.
17	The Maximum Registers for Writing	Specify maximum writing registers.
18	Data Bytes in a Register	Specify data length of each register.
19	Event Mode	Specify event confirm mode for AREVA Px2x.
20	Setting Mode	Specify configuration parameters for settings.。
21	Fault Records(ms)	Specify period for reading fault records from device.
22	Fault Description	Specify description for fault.
23	Dist. Mode	Specify configuration parameters for COMTRADE.
24	Dist. Channels	Specify channel parameters for COMTRADE.
25	Dist. Sample Rates	Specify channel parameters for COMTRADE.
26	Channel Mode	Specify channel read mode for AREVA Px2x.

Pseudo Point View the data area of ***EDPS ICE.***

Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	ACTPORT	Current active port number	16 Bits Signed S...	-1	Local	By Value	
3	TOTALCOM	Total communication times	32 Bits Unsigne...	0	Local	By Value	
4	FAILCOM	Failed communication times	32 Bits Unsigne...	0	Local	By Value	

No.	Name	Declaration
1	IED Status	View device communication status.
2	Current Active Port Number	View which Port be used.
3	Total Communication Times	View total communication times.
4	Failed communication Times	View failed communication times.

C.1.4 IO Parameters

Overview The IO Page of **EDPS ICE** data area displays all IO parameters of each point.

C.1.4.1 Analog Input

Function Code Specify function code for this point.

- 3—Holding Register
- 4—Input Register

Address Specify register address for this point.

Start Byte Specify start byte of this point in register.

Data Length Specify data length for this point in register.

Value Type Specify value type for this point in register.

- Discrete
- Signed Integer
- Unsigned Integer
- Float

Offset Specify offset for calculating raw value.

Divisor Specify divisor for calculating raw value.

C.1.4.2 Digital Input

Function Code Specify function code for this point.

- 1—Coil Status
- 2—Input Status
- 3—Holding Register
- 4—Input Register
- 7—Exception Status

Address	Specify register address for this point.
Position	Specify bit position for this point in register.

C.1.4.3 Counter

Function Code	Specify function code for this point. ● 3－Holding Register ● 4－Input Register
Address	Specify register address for this point.
Start Byte	Specify start byte of this point in register.
Data Length	Specify data length for this point in register.
Value Type	Specify value type for this point in register. ● Discrete ● Signed Integer ● Unsigned Integer ● Float
Offset	Specify offset for calculating raw value.
Divisor	Specify divisor for calculating raw value.

C.1.4.4 Analog Output

Function Code	Specify function code for this point. ● 3－Holding Register ● 4－Input Register
Address	Specify register address for this point.
Start Byte	Specify start byte for this point in register.
Data Length	Specify data length for this point.
Value Type	Specify value type for this point in register. ● Discrete ● Signed Integer ● Unsigned Integer ● Float
Offset	Specify offset for calculating raw value.
Divisor	Specify divisor for calculating raw value.

C.1.4.5 Digital Output

Function Code	Specify function code for this point. ● 5－Force Coil ● 15－Force Multiple Coils
Address	Specify register address for this point.

C.1.4.6 Status Output

Function Code Specify function code for this point.

- 5－Force Coil
- 15－Force Multiple Coils
- 6－Force Register
- 10－Force Multiple Register

Register Address Specify register address for this point.

Start Byte Specify start byte of this point in register.

Control Mode Specify the control output mode of the point.

- Tripping/Closing
- Pulse

Pulse Frequency Specify the pulse frequency, maximum 1000. Effective in the pulse control mode.

High Time Specify the hold time of the high level in the pulse output mode.

Low Time Specify the hold time of the low level in the pulse output mode.

C.1.4.7 Event

Event Code Specify the number of the event code. Used in the search of the event information.

C.1.4.8 Setting Value

Function Code Specify function code for this point.

- 3－Holding Register
- 4－Input Register

Register Address Specify register address for this point.

Start Byte Specify start byte of this point in register.

Priority Specify the priority of data handling.

- 1 class data
- 2 class data
- 3 class data

Data Length Specify data length for this point.

Value Type Specify value type for this point in register.

- Discrete
- Signed Integer
- Unsigned Integer
- Float

Write Function Specify the write function of the information point.

- 6- Force Register

Appendix D

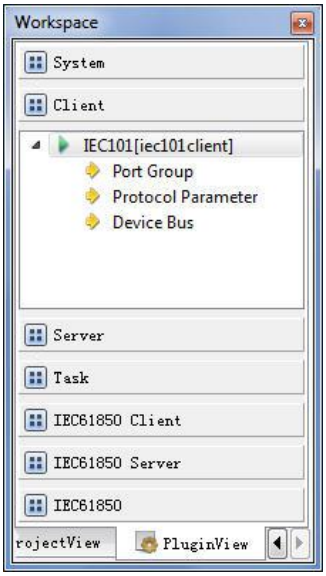
D.1 IEC101 Configuration

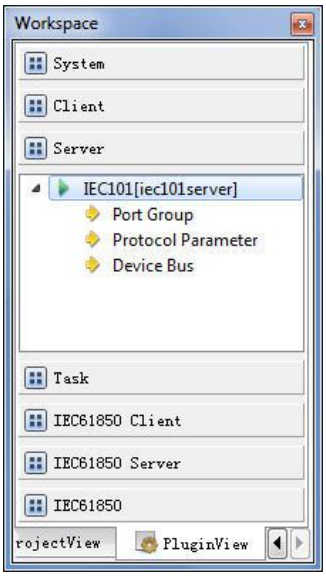
D.1.1 Driver Information

Summary Describe the detailed information of driver.

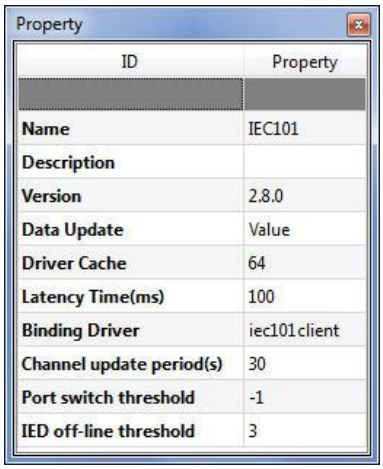
Step View driver information.

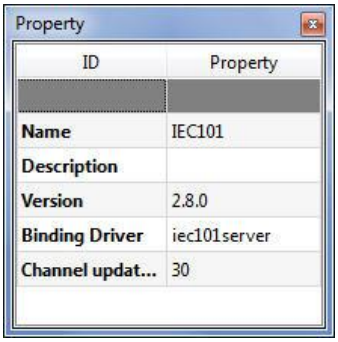
1. Open project, select plug-in viewer on **EDPS ICE** management area.
2. Click the **Client/Server** plug-in.
3. Click any root node on the management area.





Property View the property area of EDPS ICE.





No.	Name	Spec.
1	Name	User-defined name.

2	Description	Name description information.
3	Version	Module version information.
4	Driver Cache	Set driver cache, take 64kB by default, up to 128kB.
5	Latency Time(ms)	Set latency time of updatd real-time data, unit in millisecond.
6	Binding Driver	Read only.
7	Channel Update Period(s)	Set the period of updated channel communication status, unit in second.
8	Port Switch Threshold	Set ports threshold, there will be a port switch if continuous error times exceed the threshold, “-1” represents no port switch.
9	IED Off-line Threshold	Set device status threshold, there will be off-line status if continuous error times exceed the threshold.

Pseudo Point View the data area of EDPS ICE.

Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

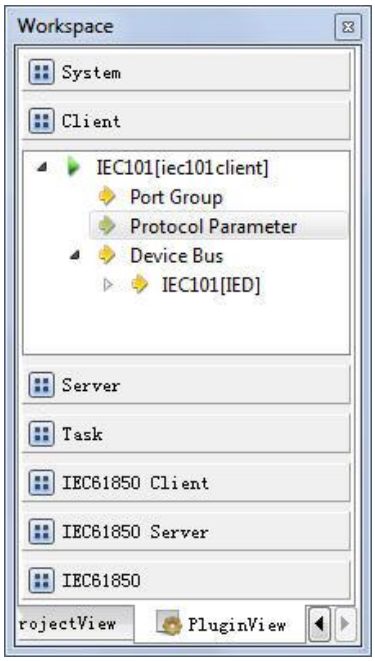
No.	Name	Spec.
1	Running Status	View driver running status information.
2	Authority	View driver working status.

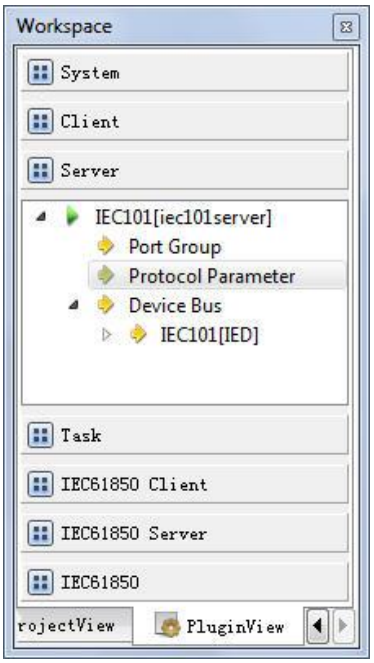
D.1.2 Protocol Parameters

Summary Define communication protocol parameters.

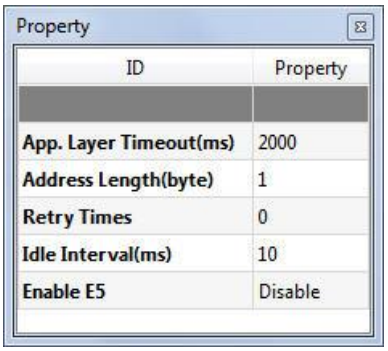
Step View protocol parameters.

1. Open the project, select plug-in management page on **EDPS ICE** management area.
2. Click **Client/Server** plug-in.
3. Click **Protocol Parameter** node on the management area.

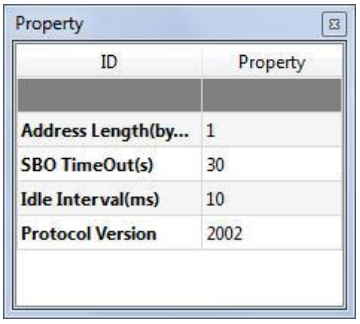




Property View the property area of EDPS ICE.



No.	Name	Spec.
1	App. Layer Timeout	Specify timeout interval, if has not received App. Layer response, system considers no response by default.
2	Address Length(byte)	Specify idle time for communication.
3	Retry Times	Specify the specific retry times if failed to transmit data.
4	Idle Interval(ms)	Specify the required idle interval during communication. The full communication process is defined from transferring data request to receiving valid data.
5	Eable E5	Specify whether to handle E5 during IEC60870-5-101 data processing.



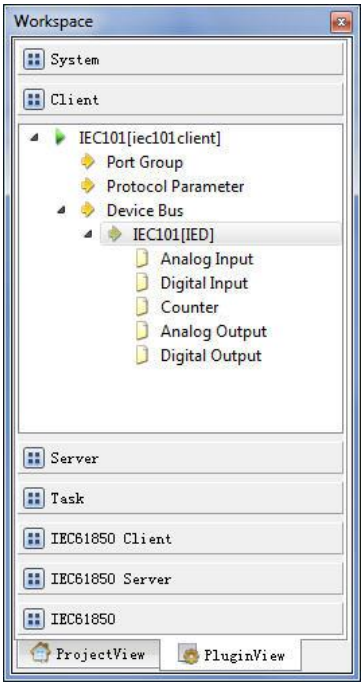
No.	Name	Spec.
1	Address length(byte)	Specify the length of link address, which used to enhance the compatibility of driver.
2	SBO Timeout(s)	After receiving the select command of SBO control, remote control select command would be automatically cancelled in case of no command request during the time interval.
3	Idle Interval(ms)	Specify idle time for communication.
4	Protocol Version	Specify the protocol version.

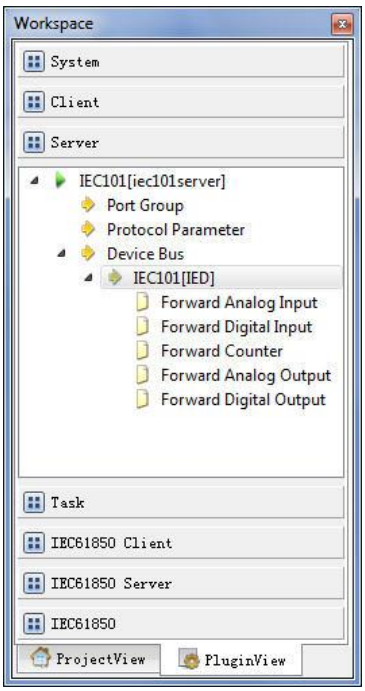
D.1.3 Device Parameters

Summary Define the device parameters for communication.

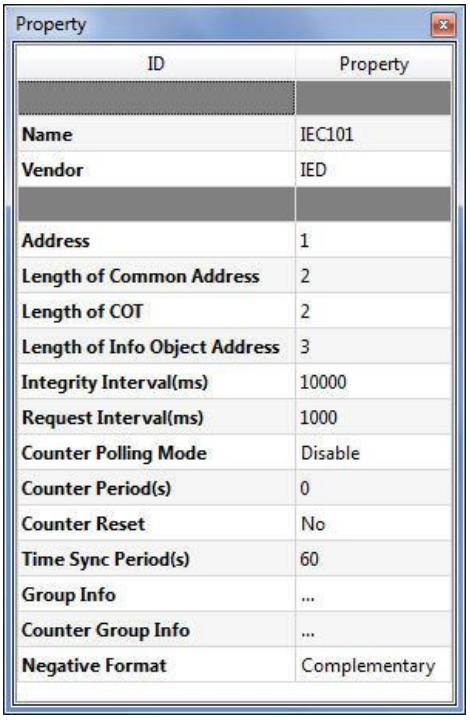
Step View device parameters.

1. Open project, select the plug-in management page on **EDPS ICE** management area.
2. Click **Client/Server** plug-in.
3. Select any sub-node on **Device Bus** node.



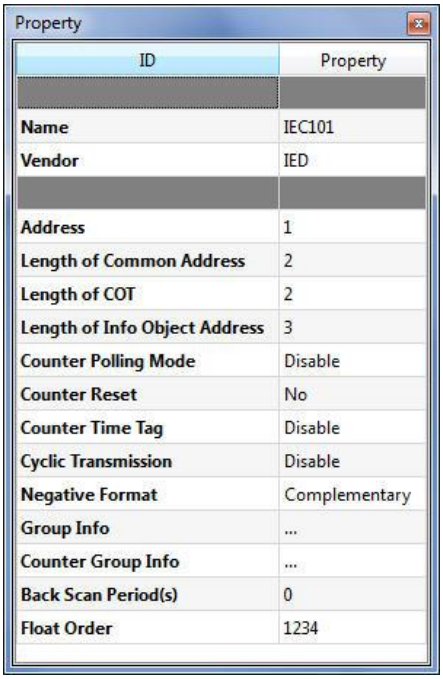


Property View the property area of EDPS ICE.



No.	Name	Spec.
1	Name	Specify device name.
2	Vendor	Specify device vendor.
3	Address	Specify device physical address.
4	Length of Common Address	Specify the length of common address on IEC101 communication byte stream.
5	Length of COT	Specify the length of COT on IEC101 communication byte stream.

6	Length of Info Object Address	Specify the length of Info object address on IEC101 communication byte stream.
7	Integrity Interval(ms)	Specify device integrity interval.
8	Request Interval(ms)	Specify the class 2 request interval on non-balanced Mode.
9	Counter Polling Mode	Specify device counter polling mode. Divide into four modes: A/B/C/D. Refer to protocol 101 for details.
10	Counter Period(s)	Specify the transmitted counter period. Only valid on mode B/C/D. “0” represents no period calling.
11	Counter Reset	Specify whether to execute counter reset when calling counter.
12	Time Sync Period(s)	Specify the period of transmitting time sync command. “-1”: invalid; “0”: implement time sync when system starts.
13	Group Info	Specify the detailed group information when executing group calling.
14	Counter Group Info	Specify the detailed group information when executing Counter group calling.
15	Negative Format	Specify the decoding method when the analog is negative.



No.	Name	Spec.
1	Name	Specify device name.
2	Vendor	Specify device vendor.
3	Address	Specify device physical address.
4	Length of Common	Specify the length of common address on

	Address	IEC101communication byte stream.
5	Length of COT	Specify the length of COT on IEC101 communication byte stream.
6	Length of Info Object Address	Specify the length of Info object address on IEC101 communication byte stream.
7	Counter Polling Mode	Specify device counter polling mode. Divide into mode A/B/C/D. Refer to protocol 101 for details.
8	Counter Reset	Specify whether to allow counter reset.
9	Counter Time Tag	Specify whether to add counter time tag.
10	Cyclic Transmission	Specify whether to transmit cyclic data according to group definition information.
11	Negative Format	Specify the decoding method in case of negative.
12	Group Info	Specify the detailed group information when executing group calling, refer to the appendix for table information.
13	Counter Group Info	Specify the detailed group information when executing counter group calling, refer to the appendix for table information.
14	Back Scan Period(s)	Specify period when transmitting back data frame. “0” means no transmitting.
15	Float Order	

Pseudo Point

View the data area of EDPS ICE.

Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	ACTPORT	Current active port number	16 Bits Signed Short	-1	Local	By Value	
3	TOTALCOM	Total communication times	32 Bits Unsigned Long	0	Local	By Value	
4	FAILCOM	Failed communication times	32 Bits Unsigned Long	0	Local	By Value	

No.	Name	Spec.
1	IED State	View device communication status.
2	Current active port number	View which Port be used.
3	Total communication times	View total communication times.
4	Failed communication times	View failed communication times.

D.1.4 IO Parameters

Summary

User could view the detailed IO parameters in IO page of EDPS ICE data area. For each type of IO parameters, EDPS ICE is provided corresponding user input method by the edit means. Precise boundry checkout and data verification have been given to IO parameters by the setting parameters, so the error rate of data configuration would reduce during user input.

D.1.4.1 Analog Input

Common Address	Specify the common address in the process of communication.
Point Index	Specify the point number of information point.
ASDU Type	Specify the application types for information point. ● M_ME_NA_1(normalized value) ● M_ME_NB_1(scale value) ● M_ME_NC_1(short float) ● M_ME_ND_1(normalized value with character) ● M_ST_NA_1(Step information)
Operating Mode	Specify the operating mode for information point. ● Cyclic ● Burst
Time Tag	Specify whether there is a time tag in the transmitted frame.
Offset	Specify the original data offset for information point.
Divisor	Specify the divisor factor when information point calculates original data.
Dead Zone Value	Specify the dead zone value when generating event data. The absolute value, that is the difference between current transmitting value and current value should be greater than dead zone value.

D.1.4.2 Digital Input

Common Address	Specify the common address in the process of communication.
Point Index	Specify the point number of information point.
ASDU Type	Specify the ASDU transmission types for information point. ● M_SP_NA_1(single point) ● M_DP_NA_1(double points)
Operating Mode	Specify the operating mode for information point. ● Cyclic ● Burst
Auto SOE	Specify whether or not automatic generate SOE according to changed value. ● Diable ● Enable when open ● Enable when close ● Enable when changed
SOE	Specify whether or not transmit SOE to client.

D.1.4.3 Counter

Common Address	Specify the common address in the process of communication.
Point Index	Specify the point number of information point.

Min. Value	Specify minimum value to calculate current value.
Max.Value	Specify maximum value to calculate current value.
Offset	Specify offset for calculating the raw value.
Divisor	Specify divisor for calculating the raw value.

D.1.4.4 Analog Output

Common Address	Specify the common address in the process of communication.
Point Index	Specify the point number of information point.
ASDU Type	Specify the application types for information point. ● normalized value ● scale value ● short float
Offset	Specify offset for calculating the raw value.
Divisor	Specify divisor for calculating the raw value.

D.1.4.5 Digital Output

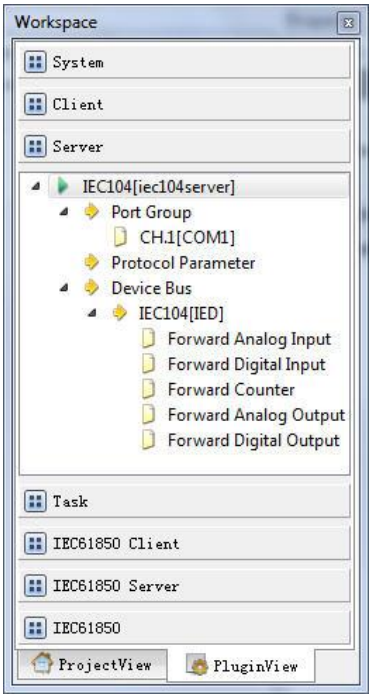
Common Address	Specify the common address in the process of communication.
Point Index	Specify the point number of information point.
Control Mode	Specify the control mode for information point. ● Direct execution ● Select remote control

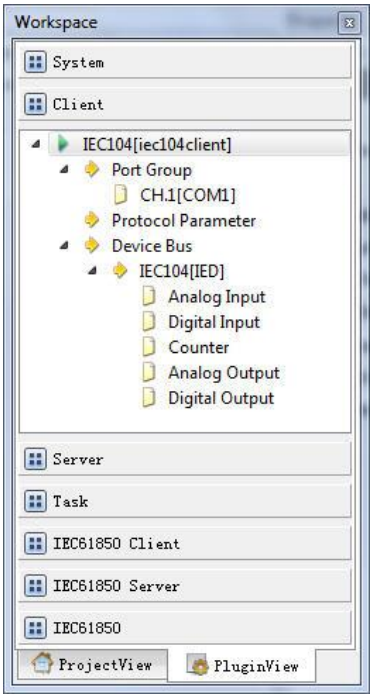
Appendix E

E.1 IEC104 Configuration

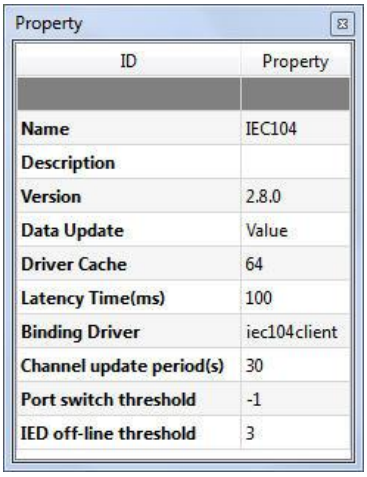
E.1.1 Driver Information

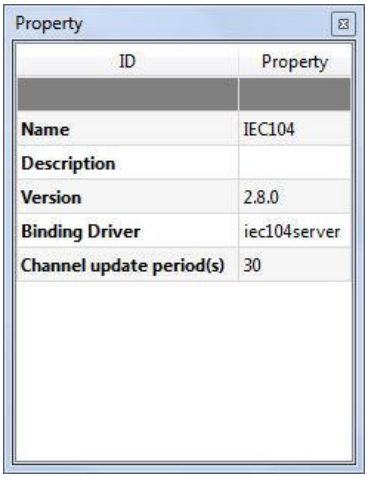
Summary	Describe the detailed information of driver.
Operation	View driver information. **1** Open project, select plug-in viewer on EDPS ICE management area. **2** Click **Client/Server** plug-in. **3** Click any root node on the management area.





Property View the property area of EDPS ICE.





No.	Name	Spec.
1	Name	User-defined name.
2	Description	Name description information.
3	Version	Module version information.
4	Driver Cache	Set driver cache, take 64kB by default, up to 128kB.
5	Latency Time(ms)	Set latency time of updated real-time data, unit in millisecond.
6	Binding Driver	Read only.
7	Channel Update Period(s)	Set the period of updated channel communication status, unit in second.
8	Port Switch Threshold	Set ports threshold, there will be a port switch if continuous error times exceed the threshold, “-1” represents no port switch.

9	IED Off-line Threshold	Set device status threshold, there will be off-line status if continuous error times exceed the threshold.

Pseudo Point View the data area of EDPS ICE.

Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsigned Short	0	Local	By Name	0:Exit,1:Running,2:Paused,3:StandBy
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Authority

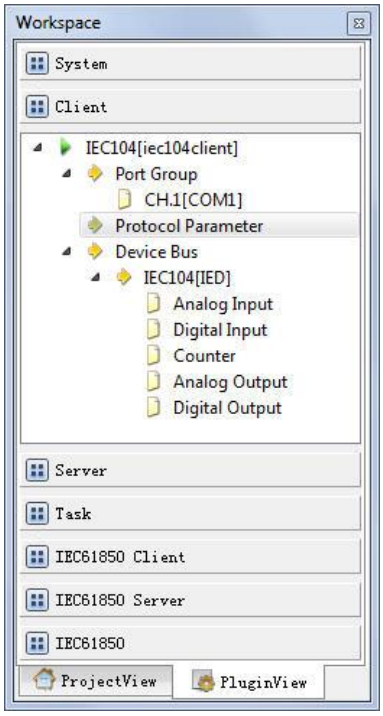
No.	Name	Spec.
1	Running Status	View driver running status information.
2	Authority	View driver working status.

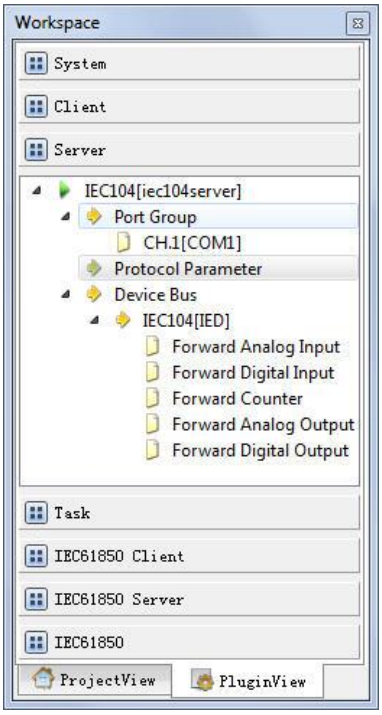
E.1.2 Protocol Parameters

Summary Define communication protocol parameters.

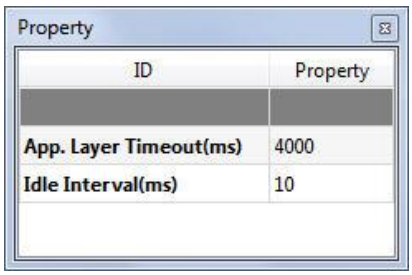
Operation View protocol parameters.

1. Open project, select plug-in viewer on **EDPS ICE** management area.
2. Click the **Client/Server** plug-in.
3. Click **Protocol Parameter** node on the management area.

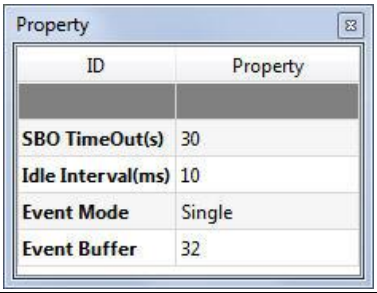




Property View property area of **EDPS ICE.**



No.	Name	Spec.
1	App. Layer Timeout(ms)	Specify timeout interval, if has not received App. Layer response, system considers no response by default.
2	Idle Interval(ms)	Specify idle time for communication.



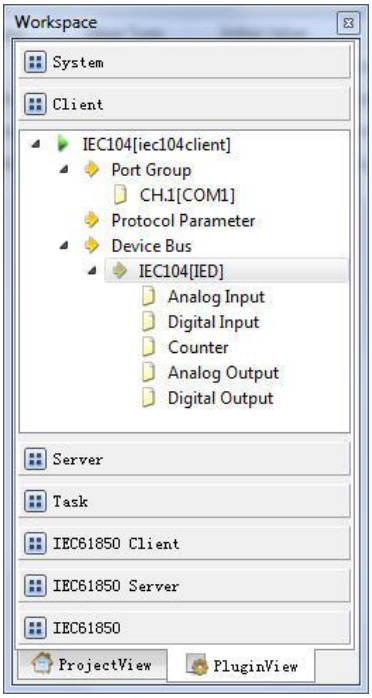
No.	Name	Description
1	SBO TimeOut(S)	Specify timeout while waiting for select command finished.
2	Idle Interval	Specify idle time for communication.
3	Event Mode	
4	Event Buffer	

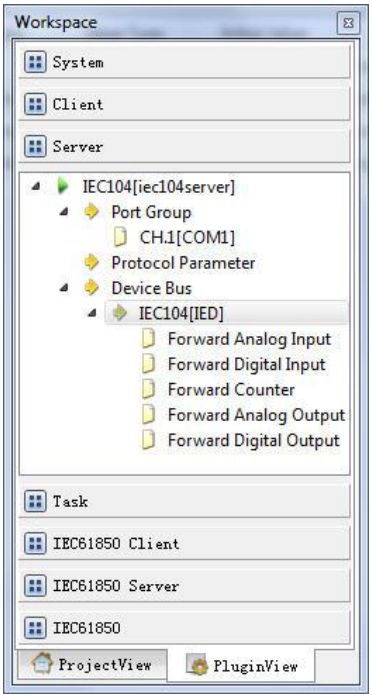
E.1.3 Device Parameters

Summary Define device parameters for communication.

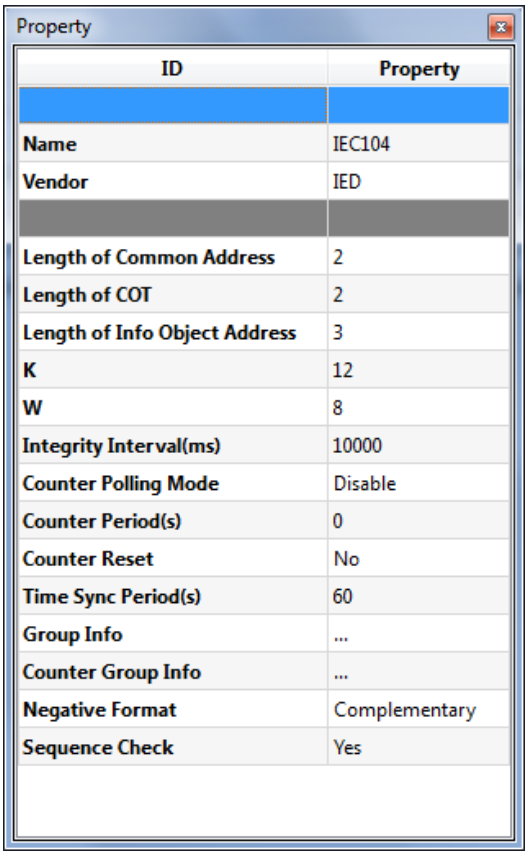
Operation View device parameters.

1. Open project and select plug-in viewer on the **EDPS ICE** management area.
2. Click the **Client/Server** plug-in.
3. Click any sub-node under **Device Bus** node on the management area.





Property View property area of **EDPS ICE**.



Property

ID	Property
Name	IEC104
Vendor	IED
Length of Common Address	2
Length of COT	2
Length of Info Object Address	3
K	12
W	8
Integrity Interval(ms)	10000
Counter Polling Mode	Disable
Counter Period(s)	0
Counter Reset	No
Time Sync Period(s)	60
Group Info	...
Counter Group Info	...
Negative Format	Complementary
Sequence Check	Yes

No.	Name	Spec.
1	Name	Specify device name.
2	Vendor	Specify device vendor.
3	Length of Common Address	Specify how many bytes of Common Address.

4	Length of COT	Specify how many bytes of COT.
5	Length of Info Address	Specify how many bytes of Info Object Address.
6	K	Specify maximum number of unconfirmed frame saved in buffer.
7	W	Specify maximum received number of I frame before waiting for confirm from client.
8	Integrity Interval(ms)	Specify device integrity interval.
9	Counter Polling Mode	Specify method used to polling Counter. Divide into four modes: A/B/C/D. Refer to protocol 104 for details.
10	Counter Period(s)	Specify the transmitted counter period. Only valid on mode B/C/D. “0” represents no period calling.
11	Counter Reset	Specify whether to execute counter reset when calling counter.
12	Time Sync Period	Specify the period of transmitting time sync command. “-1”: invalid; “0”: implement time sync when system starts.
13	Group Info.	Specify info object address range and polling period of AI, DI, AO and DO.
14	Counter Group Info	Specify info object address range and polling period of Counter.
15	Negative Format	Specify the decoding method when the analog is negative.
16	Sequence Check	Specify whether or not check valid sequences for receiving frame from client.

Pseudo Point

View data area of **EDPS ICE**.

Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On-line
2	ACTPORT	Current active port number	16 Bits Signed Short	-1	Local	By Value	
3	TOTALCOM	Total communication times	32 Bits Unsigned Long	0	Local	By Value	
4	FAILCOM	Failed communication times	32 Bits Unsigned Long	0	Local	By Value	

No.	**Name**	**Spec.**
1	IED State	View device communication status.
2	Current active port number	View which Port be used.
3	Total communication times	View total communication times.
4	Failed communication times	View failed communication times.

E.1.4 IO Parameters

Summary The IO Page of **EDPS ICE** data area displays all IO parameters of each point.

E.1.4.1 Analog Input

Common Address Specify common address to transmit this point.

Point Index Specify address of info object to transmit this point.

ASDU Type Specify ASDU type to transmit this point.

- M_ME_NA_1(Normalized Value)
- M_ME_NB_1(Scaled Value)
- M_ME_NC_1(Short Floating Value)
- M_ME_ND_1(Normalized Value without Quality)
- M_ST_NA_1(Step Position Information)

Work Mode Specify how to transmit this point.

- Cyclic
- Spontaneous

Time Tag Specify whether or not add time tag when transmitting this point.

Offset Specify offset for calculating raw value.

Divisor Specify divisor for calculating raw value.

Event Deadband Specify default dead band to generate an event and transmit it to master.

E.1.4.2 Digital Input

Common Address Specify common address to transmit this point.

Point Index Specify address of info object to transmit this point.

ASDU Type Specify ASDU type to transmit this point.

- M_SP_NA_1(Single Point)
- M_DP_NA_1(Double Point)

Work Mode Specify how to transmit this point.

- Cyclic
- Spontaneous

Auto SOE Specify whether or not automatic generate SOE according to changed value.

- Disable
- Enable when open
- Enable when close
- Enable when changed

SOE Specify whether or not transmit SOE to client.

E.1.4.3 Counter

Common Address Specify common address to transmit this point.

Point Index	Specify address of info object to transmit this point.
Min. Value	Specify minimum value to calculate current value.
Max. Value	Specify maximum value to calculate current value.
Offset	Specify offset for calculating the raw value.
Divisor	Specify divisor for calculating the raw value.

E.1.4.4 Analog Output

Common Address	Specify common address to transmit this point.
Point Index	Specify address of info object to transmit this point.
ASDU Type	Specify ASDU type to transmit this point. ● Normalized Value ● Scaled Value ● Short Floating Value
Offset	Specify offset for calculating the raw value.
Divisor	Specify divisor for calculating the raw value.

E.1.4.5 Digital Output

Common Address	Specify common address to transmit this point.
Point Index	Specify address of info object to transmit this point.
Control Flag	Specify control mode for this point. ● Direct ● SBO

Appendix F

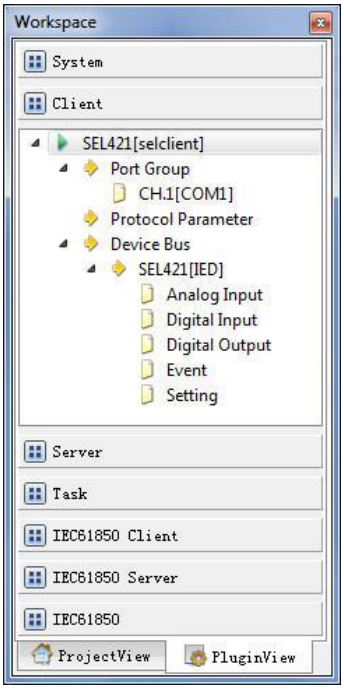
F.1 SEL Configuration

F.1.1 Driver Information

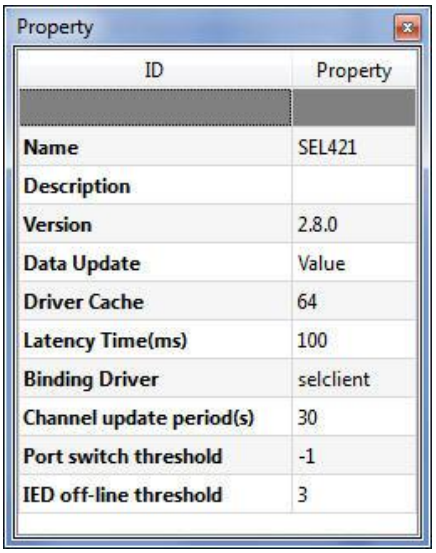
Overview Describe the detail information of the Client diver.

Operation View the diver information.

1. Open project， then select plug-in management page on ***EDPS ICE*** management area.
2. Click **Client** plug-in.
3. Click any of the root nodes of the directory tree on the management area.



Property View the property area of the ***EDPS ICE.***

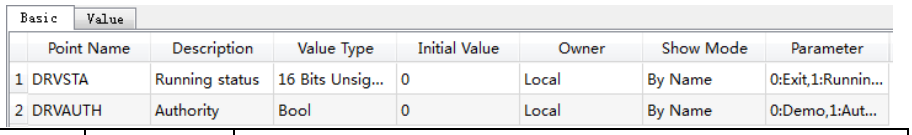


Property

ID	Property
Name	SEL421
Description	
Version	2.8.0
Data Update	Value
Driver Cache	64
Latency Time(ms)	100
Binding Driver	selclient
Channel update period(s)	30
Port switch threshold	-1
IED off-line threshold	3

No	Name	Declaration
1	Name	User-defined name.
2	Description	Set up the name description information.
3	Version	Set up the version information of the module.
4	Data Cache	
5	Driver Cache	Set up the volume of the buffer. Default 64KB，maximum128KB.
6	Latency Time(ms)	Set up the delay time of real-time database update. The unit is millisecond.
7	Binding Driver	Unique and can not be modified.
8	Chanel Update Period	Set up the update information of the cycle of communication channels. The unit is second.
9	Port Switch Threshold	Set up the statistical threshold carried on in the port. The port will be switched when the continuous fault times exceed the threshold values. -1 means no port switch.
	IED Off-line Threshold	Set up the statistical threshold of the device state. The device will in off-line state when the continuous fault times exceed the threshold values.

Pseudo Point View the data area of ***EDPS ICE***.



Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsig...	0	Local	By Name	0:Exit,1:Runnin...
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Aut...

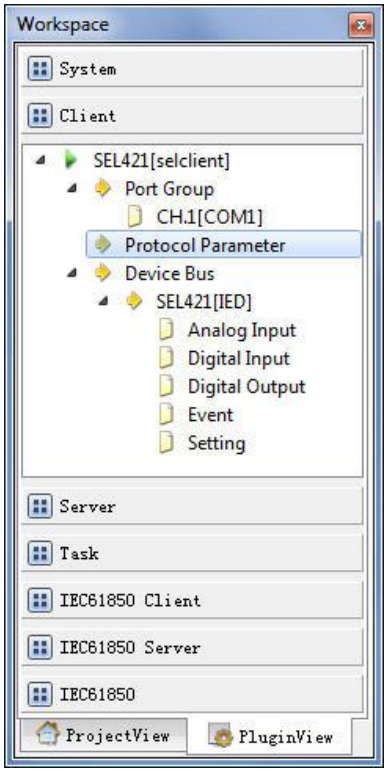
No.	Name	Declaration
1	Running Status	View the diver running status information.
2	Authority	View the authorization status of the diver.

F.1.2 Protocol Parameters

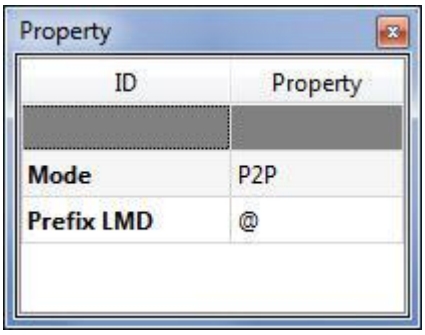
Overview Define the communication protocol parameters of the protocol.

Operation View the protocol parameter.

1. Open project， then select plug-in management page on ***EDPS ICE*** management area.
2. Click the **Client** plug-in.
3. Select the **protocol parameter** node in the management area.



Property View the property area of ***EDPS ICE***.



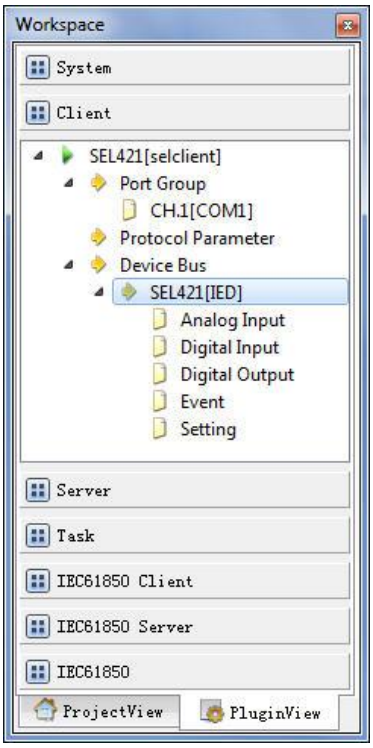
No.	Name	Description
1	Mode	Specify the communication type of the device. P2P-point to point and LMD-bus.
2	Prefix LMD	Specify the prefix character in LMD mode.

F.1.3 Device Parameters

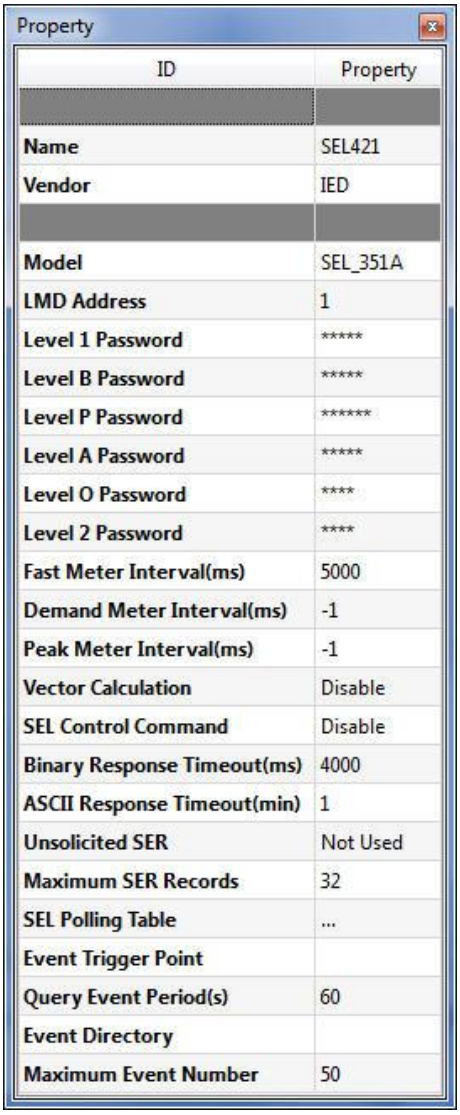
Overview Specify the device parameter of the protocol.

Operation View the device parameters.

1. Open project，then select plug-in management page on ***EDPS ICE*** management area.
2. Click the **Client** plug-in.
3. Click sub-node of the **device bus** on the management area.



Property View the property area of ***EDPS ICE***.



Property

ID	Property
Name	SEL421
Vendor	IED
Model	SEL_351A
LMD Address	1
Level 1 Password	*****
Level B Password	*****
Level P Password	******
Level A Password	*****
Level O Password	****
Level 2 Password	****
Fast Meter Interval(ms)	5000
Demand Meter Interval(ms)	-1
Peak Meter Interval(ms)	-1
Vector Calculation	Disable
SEL Control Command	Disable
Binary Response Timeout(ms)	4000
ASCII Response Timeout(min)	1
Unsolicited SER	Not Used
Maximum SER Records	32
SEL Polling Table	...
Event Trigger Point	
Query Event Period(s)	60
Event Directory	
Maximum Event Number	50

No.	Name	Description
1	Name	Specify the name of the device.
2	Vendor	Specify the device manufacturer.
3	Model	Specify SEL device type.
4	LMD Address	Specify the device address in LMD mode. Virtual values are 1~99.
5	Level 1 Password	Specify the level 1 code of SEL device loading when ASCII data reading is adopted. The default is the same with SEL default code.
6	Level B Password	Specify the level B code of SEL device loading when ASCII data reading is adopted. The default is the same with SEL default code.
7	Level P Password	Specify the level P code of SEL device loading when ASCII data reading is adopted. The default is the same with SEL default code.
8	Level A Password	Specify the level A code of SEL device loading when ASCII data reading is adopted. The

		default is the same with SEL default code.
9	Level 0 Password	Specify the level 0 code of SEL device loading when ASCII data reading is adopted. The default is the same with SEL default code.
10	Level 2 Password	Specify the level 2 code of SEL device loading when ASCII data reading is adopted. The default is the same with SEL default code.
11	Fast Meter Interval(ms)	
12	Demand Meter Interval(ms)	Specify the scanning period of demand data reading.
13	Peak Meter Interval(ms)	Specify the scanning period of device peak demand.
14	Vector Calculation	Specify whether the real-time vector RMS calculation is used in SEL Fast Meter.
15	SEL Control Command	Specify the activation or forbidden of SEL Fast Operator command.
16	Binary Response Timeout(ms)	Specify the timeout of binary number's response request.
17	ASCII Response Timeout(min)	Specify the max timeout waiting for the response after the sending of ASCII request command. If there is no response data within the period, then the device will be confirmed as no response
18	Unsolicited SER(SOE)	Specify whether to upload SER automatically.
19	Max SER Records	Specify the maximum events number in a response.
20	SEL Polling Table	Specify the order form which adopts ASCII data reading.
21	Event Trigger Point	Reserve
22	Query Event Period(s)	Reserve
23	Event Directory	Reserve
24	Maximum Event No.	Reserve

Pseudo Point View the data area of ***EDPS ICE.***

Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On...
2	ACTPORT	Current acitve...	16 Bits Signe...	-1	Local	By Value	
3	TOTALCOM	Total commun...	32 Bits Unsig...	0	Local	By Value	
4	FAILCOM	Failed commu...	32 Bits Unsig...	0	Local	By Value	

No.	Name	Spec.
1	IED State	View device communication status.
2	Current active port number	View which Port be used.
3	Total communication times	View total communication times.
4	Failed communication times	View failed communication times.

F.1.4 IO Parameters

Summary The IO Page of **EDPS ICE** data area displays all IO parameters of each point.

F.1.4.1 Analog Input

Point No.	Specify the point number of the information point.
Row No.	Specify the row number of the data which resulted from the ASCII command.
Line No.	Specify the line number of the data which resulted from the ASCII command.
ASCII Command	Specify the command ID associated with the index point.

F.1.4.2 Status Input

Point No.	Specify the point number of the information point.
Associated SER Point	Specify the associated SER point number of the information point.
Row No.	Specify the row number of the data which resulted from the ASCII command.
Line No.	Specify the line number of the data which resulted from the ASCII command.
ASCII Command	Specify the command ID associated with the index point.

F.1.4.3 Status Output

Point No.	Specify the point number of the information point.
Control Times	Specify the control time of the information point.
Close Time	Specify the lasting output time of the Close.
Trip Time	Specify the lasting output time of the Trip.

F.1.4.4 Events

SEL Flag	Specify flag bit of status.

F.1.4.5 Setting Values

Row No.	Specify the row number of the data which resulted from the ASCII command.
Line No.	Specify the line number of the data which resulted from the ASCII command.

Appendix G

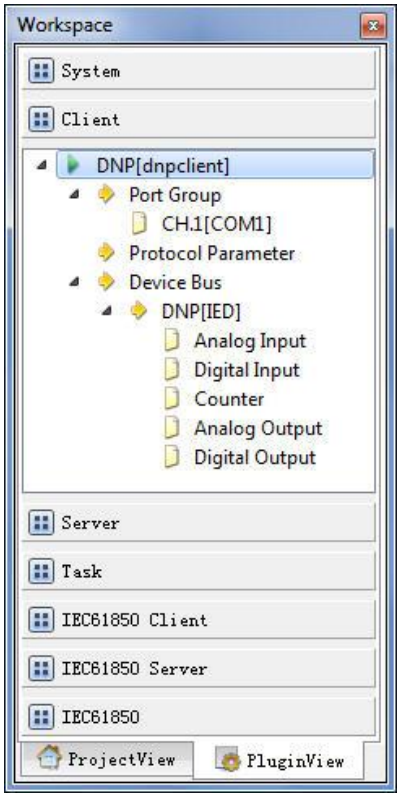
G.1 DNP Configuration

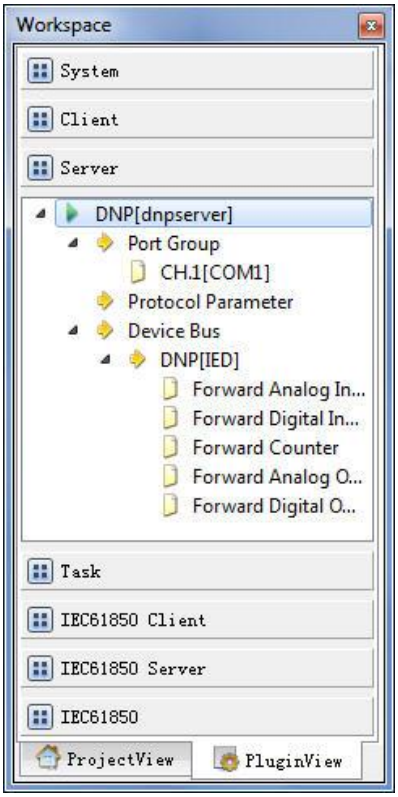
G.1.1 Driver Information

Overview Describe the detail information of diver.

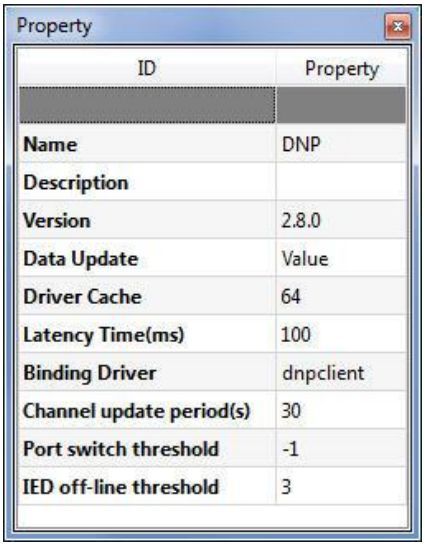
Operation View the diver information.

1. Open project, then select plug-in management page on ***EDPS ICE*** management area.
2. Click **Client/Server** plug-in.
3. Click any root node on the management area.



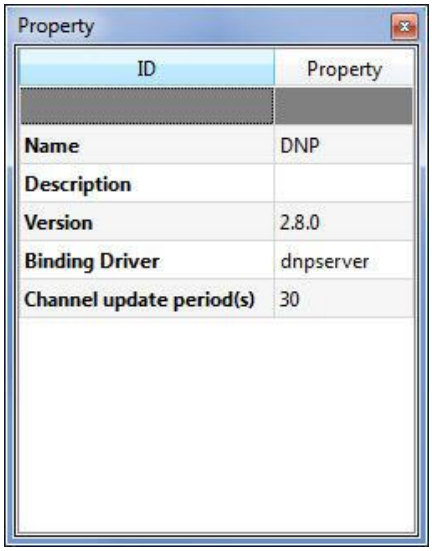


Property View property area of the ***EDPS ICE.***



Property

ID	Property
Name	DNP
Description	
Version	2.8.0
Data Update	Value
Driver Cache	64
Latency Time(ms)	100
Binding Driver	dnpclient
Channel update period(s)	30
Port switch threshold	-1
IED off-line threshold	3

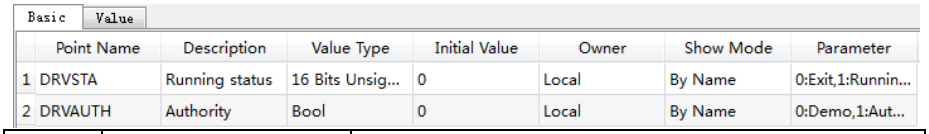


Property

ID	Property
Name	DNP
Description	
Version	2.8.0
Binding Driver	dnpserver
Channel update period(s)	30

No	Name	Declaration
1	Name	User-defined name
2	Description	Set up the name description information.
3	Version	Set up the version information of the module.
	Data Update	
4	Driver Cache	Set up the volume of the buffer. Default 64KB, maximum 128KB.
5	Latency Time(ms)	Set up the delay time of real-time database update. The unit is millisecond.
	Binding Driver	
6	Module Name	Unique and can not be modified.
7	Chanel Update Period(s)	Set up the update information of the cycle of communication channels. The unit is second.
8	Port Switching Threshold	Set up the statistical threshold carried on in the port. The port will be switched when the continuous fault times exceed the threshold values. -1 means no port switch.
9	IED Off-line Threshold	Set up the statistical threshold of the device state. The device is in off-line state when the continuous fault times exceed the threshold values.

Pseudo Point Look over the data area of ***EDPS ICE***.



Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsig...	0	Local	By Name	0:Exit,1:Runnin...
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Aut...

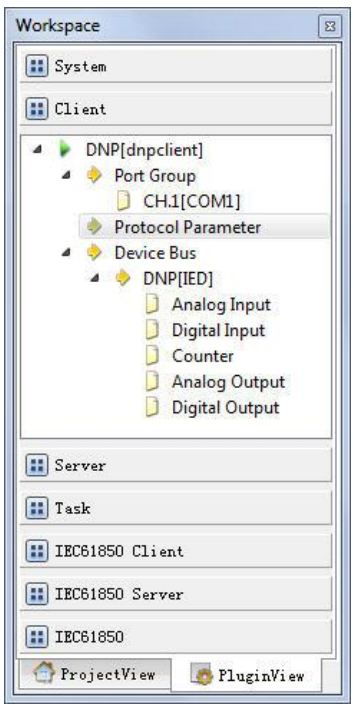
No.	Name	Declaration
1	Running Status	View the diver running status information
2	Authority	View the driver working status.

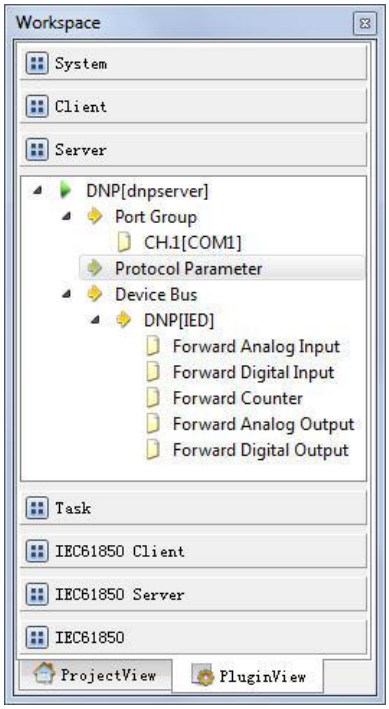
G.1.2 Protocol Parameters

Overview Define the communication protocol parameters for communication.

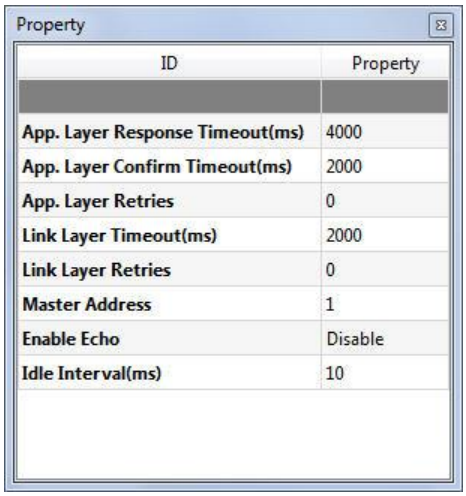
Operation View protocol parameters.

1. Open project， then select plug-in management page on ***EDPS ICE*** management area.
2. Click **Client/Server** plug-in.
3. Chose the **protocol parameter** node on the management area.





Property View the property area of ***EDPS ICE***.



No.	Name	Declaration
1	App. Layer Response Timeout(ms)	Specify the maximum timeout interval waiting for the response of the application layer after the sending of the request command. If there is no response within the period, then the device will be conformed as no response.

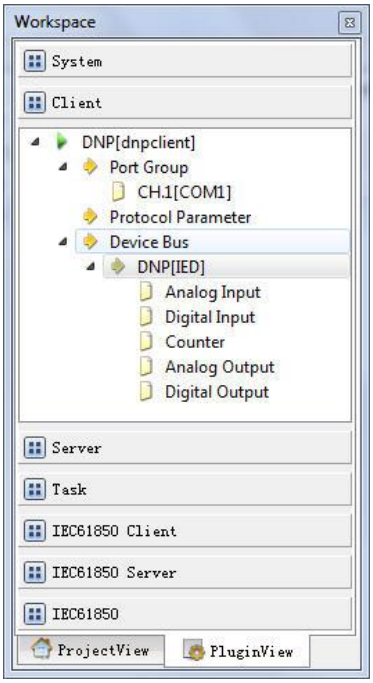
2	App. Layer Confirm Timeout(ms)	Specify the timeout interval waiting for the confirmation of the application layer. If the system did not receive the confirmation of the application layer, then the communication would be regarded as fail.
3	APP. Layer Retries	Specify the retransmission times in conditions of the failure confirmation of the application layer.
4	Link Layer Timeout(ms)	Specify the timeout interval waiting for the confirmation of the link layer. If the system did not receive the correct link layer data within the period, the communication will be considered as fail.
5	Link Layer Retries	Specify the retrying times in conditions of failure confirmation of the link layer.
6	Master Address	Specify the station address of data communication.
7	Enable Echo	Specify whether the Echo frame which might be appeared in the information and communication process will be dealt with to reduce the communicational error rate. If not handled, the received Echo data frame will be taken as communication error frame.
8	Idle Interval(ms)	Specify the interval needed between the finish of the communication processes. Complete communication process begins with the send of the data request and ends with the reception of all the valid data.

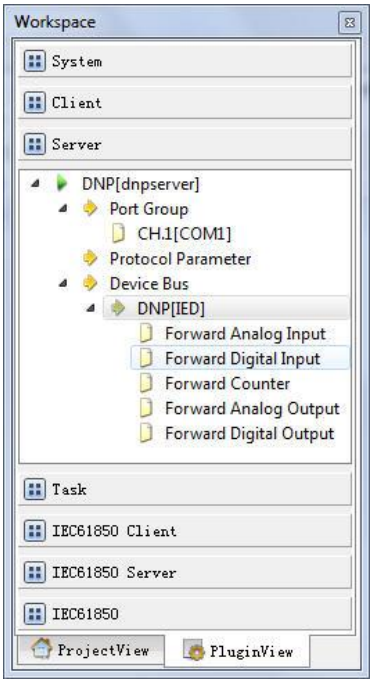
G.1.3 Device Parameters

Overview Specify the device parameter of the protocol.

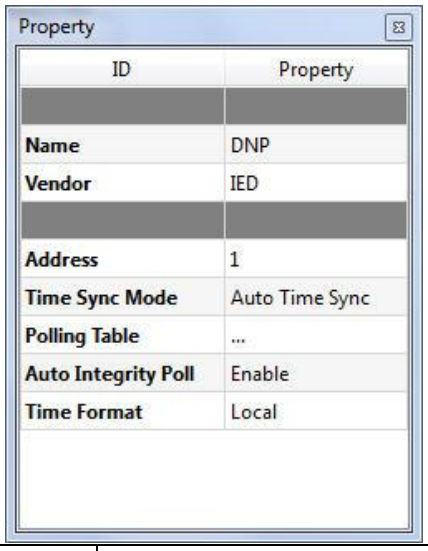
Operation View the device parameter.

1. Open project, then select plug-in management page on ***EDPS ICE*** management area.
2. Click the **Client/Server** plug-in.
3. Click any sub-node under **Device Bus** node on the management area.





Property View the property area of ***EDPS ICE***.



No.	Name	Declaration
1	Name	Specify the name of the device.
2	Vendor	Specify the device manufacturer.
3	Address	Specify the physics address of the device.
4	Time Sync Mode	● Disable ● Time Sync based on Time Change ● Time Sync based on IIN ● Auto Time Sync
5	Polling Table	
6	Auto Integrity Poll	Specify whether the general interrogation command will be sent automatically after the reconnection of link.
7	Time Format	Specify the time format of the device.

		● UTC ● Local

Pseudo Point View the data area of ***EDPS ICE***.

Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On...
2	ACTPORT	Current active...	16 Bits Signe...	-1	Local	By Value	
3	TOTALCOM	Total commun...	32 Bits Unsig...	0	Local	By Value	
4	FAILCOM	Failed commu...	32 Bits Unsig...	0	Local	By Value	

No.	Name	Description
1	IED Status	View device communication status.
2	Current Active Port Number	View which Port be used.
3	Total Communication Times	View total communication times.
4	Failed communication Times	View failed communication times.

G.1.4 IO Parameters

Summary The IO Page of **EDPS ICE** data area displays all IO parameters of each point.

G.1.4.1 Analog Input

Point Index Specify index for current point.

Event Level Specify event level for current point.

- Disable
- Class 1
- Class 2
- Class 3

Data Size Specify data size for current point. It will affect responding variation of this point.

- 16 Bits
- 32 Bits

Time Tag Specify whether or not add time tag when transmitting this point.

Offset Specify offset for calculating raw value.

Divisor Specify divisor for calculating raw value.

Event Deadband Specify default dead band to generate an event and transmit it to master.

G.1.4.2 Digital Input

Point Index Specify index for current point.

Event Level Specify event level for current point.

- Disable
- Class 1

- Class 2
- Class 3

Auto SOE Specify whether or not automatic generate SOE according to changed value.

- Disable
- Enable when open
- Enable when close
- Enable when changed

SOE Specify whether or not transmit SOE to client.

G.1.4.3 Counter

Point Index Specify index for current point.

Event Level Specify event level for current point.

- Disable
- Class 1
- Class 2
- Class 3

Data Type Specify data type for current point.

- Binary Counter
- Frozen Counter

Data Size Specify data size for current point. It will affect responding variation of this point.

- 16 Bits
- 32 Bits

Min. Value Specify minimum value to calculate current value.

Max. Value Specify maximum value to calculate current value.

Offset Specify offset for calculating the raw value.

Divisor Specify divisor for calculating the raw value.

Event Deadband Specify default dead band to generate an event and transmit it to master.

G.1.4.4 Analog Output

Point Index Specify index for current point.

Data Size Specify data size for current point. It will affect responding variation of this point.

- 16 Bits
- 32 Bits

Offset Specify offset for calculating the raw value.

Divisor Specify divisor for calculating the raw value.

G.1.4.5 Digital Output

Point Index Specify index for current point.

Appendix H

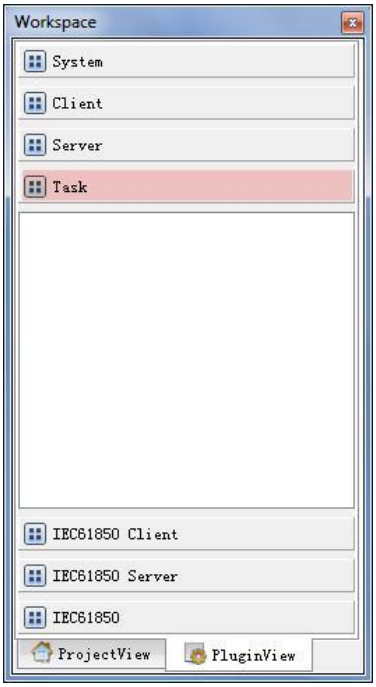
H.1 Script Calculation Advanced Application

H.1.1 Application Information

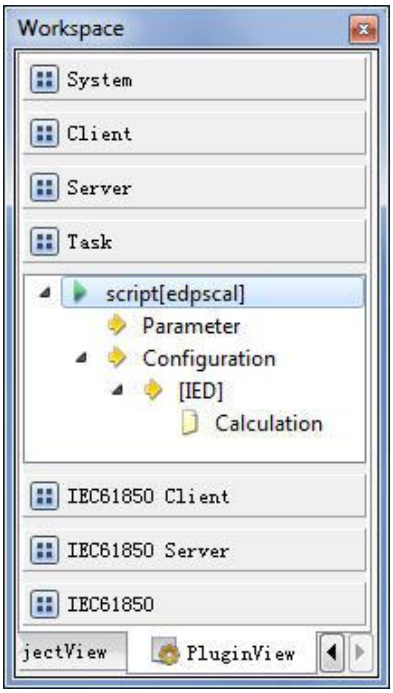
Overview Describe the basic application information of Script Calculation.

Operation View application information.

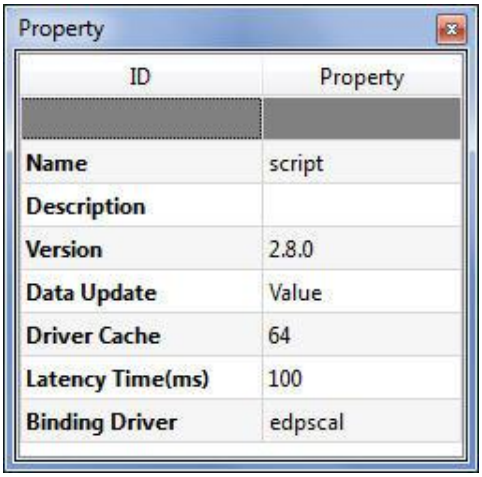
1. Open project, then select plug-in management page on **EDPS ICE** management area.
2. Click the **Task** plug-in.



4. Click any of the root nodes of the directory tree on the management area.

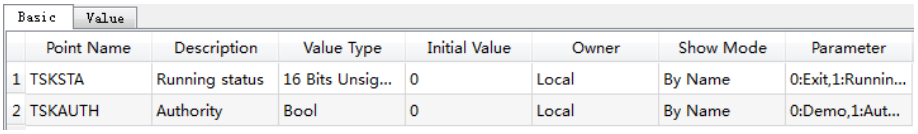


Property View the property area of **EDPS ICE**.



NO.	Name	Declaration
1	Name	Specify the name of the diver.
2	Description	Specify the diver description.
3	Version	Specify diver version information.
4	Data Update	
5	Driver Cache	Specify the volume of the buffer.
6	Latency Time(ms)	Specify the delay time of real-time database update。 For raw data, the system delays the time before writing it into the real-time database.
7	Binding Driver	Specify the name of the binding Driver. Unique and can not be modified.

Pseudo point View the data area of ***EDPS ICE***。



Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	TSKSTA	Running status	16 Bits Unsig...	0	Local	By Name	0:Exit,1:Runnin...
2	TSKAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Aut...

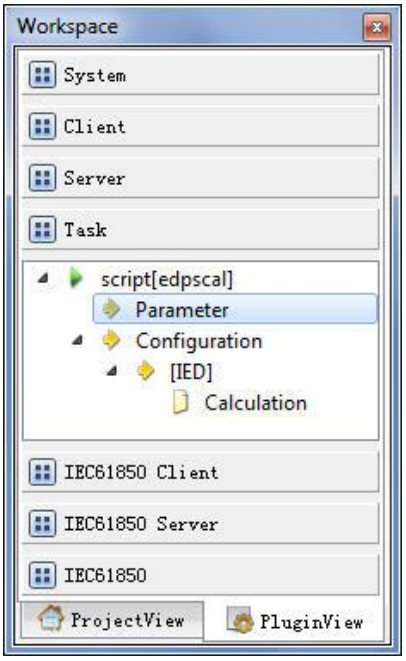
No.	Name	Declaration
1	Running Status	View the diver running status information.
2	Authority	View the authorization status of the task.

H.1.2 Parameter Information

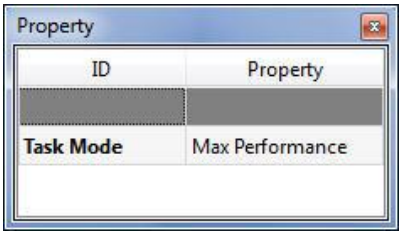
Overview Define the operate parameter for the advanced application.

Operation Check the operation parameter.

1. Open project and select plug-in viewer on the **EDPS ICE** management area.
2. Click the **Task** plug-in.
3. Select the **Parameter** node on the management area.



Property View the property area of **EDPS ICE**.



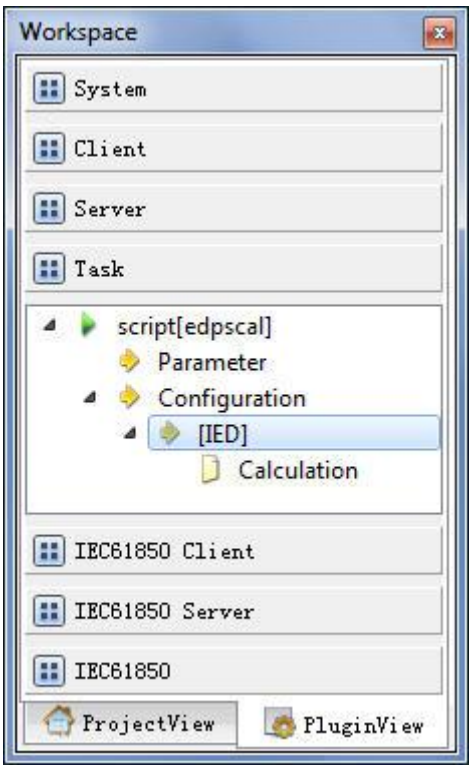
NO.	Name	Declaration
1	Task mode	Define the operational mode of the application. Default is the maximum performance. ● Normal ● Maximum performance

H.1.3 Configuration Information

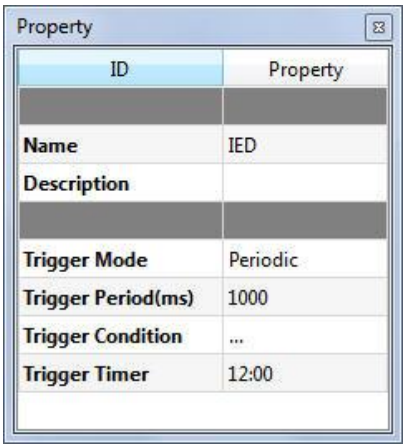
Overview Define the configuration information of the application.

Operation View the configuration parameter.

1. Open project and select plug-in viewer on the **EDPS ICE** management area.
2. Click the **Task** plug-in.
3. Select sub-node of **Configuration** on the management area.



Property View the property area of ***EDPS ICE***.



NO.	Name	Declaration
1	Name	Specify the name of script application.
2	Description	Describe the current script application.
3	Trigger Mode	● Periodic

		● Condition ● Timer
4	Trigger Period(ms)	
5	Trigger Condition	
6	Trigger Time	

Appendix I

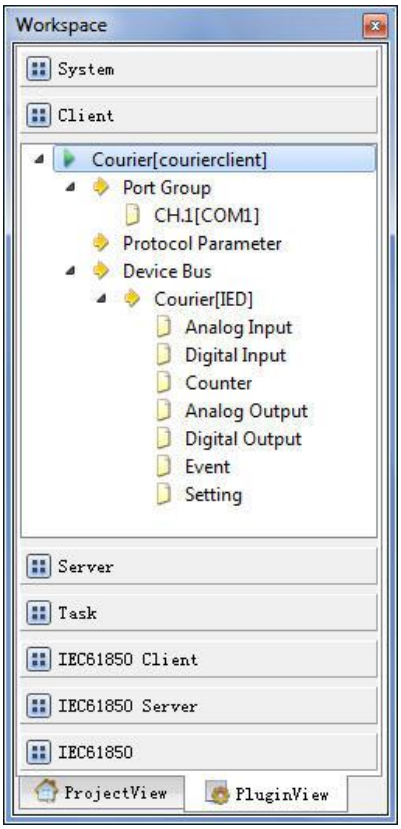
I.1 Courier Configuration

I.1.1 Driver Information

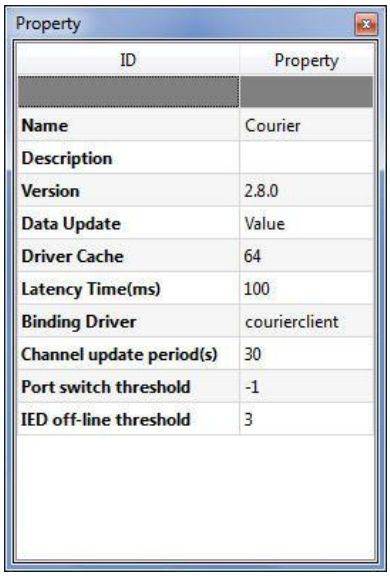
Overview Describe the detail information of diver.

Operation View the diver information.

1. Open project, then select plug-in management page on ***EDPS ICE*** management area.
2. Click **Client** plug-in.
3. Click any root node on the management area.



Property View property area of the ***EDPS ICE.***

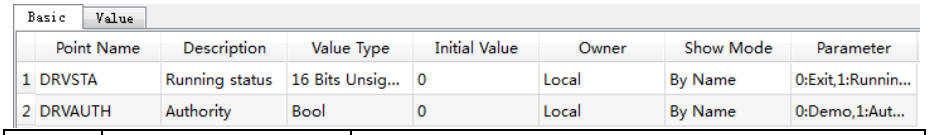


Property

ID	Property
Name	Courier
Description	
Version	2.8.0
Data Update	Value
Driver Cache	64
Latency Time(ms)	100
Binding Driver	courierclient
Channel update period(s)	30
Port switch threshold	-1
IED off-line threshold	3

No	Name	Declaration
1	Name	User-defined name.
2	Description	Set up the name description information.
3	Version	Set up the version information of the module.
4	Data Update	
5	Driver Cache	Set up the volume of the buffer. Default 64KB, maximum 128KB.
6	Latency Time(ms)	Set up the delay time of real-time database update. The unit is millisecond.
7	Binding Driver	
8	Chanel Update Period(s)	Set up the update information of the cycle of communication channels. The unit is second.
9	Port Switching Threshold	Set up the statistical threshold carried on in the port. The port will be switched when the continuous fault times exceed the threshold values. -1 means no port switch.
10	IED Off-line Threshold	Set up the statistical threshold of the device state. The device is in off-line state when the continuous fault times exceed the threshold values.

Pseudo Point Look over the data area of ***EDPS ICE***.



Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	DRVSTA	Running status	16 Bits Unsig...	0	Local	By Name	0:Exit,1:Runnin...
2	DRVAUTH	Authority	Bool	0	Local	By Name	0:Demo,1:Aut...

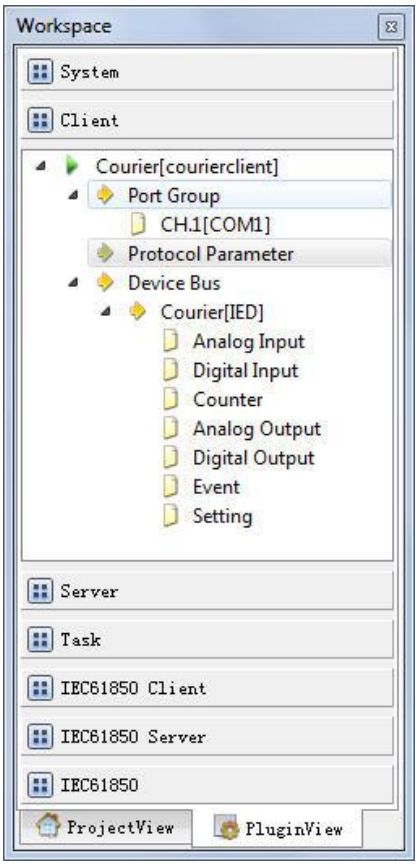
No.	Name	Declaration
1	Running Status	View the diver running status information
2	Authority	View the driver working status.

I.1.2 Protocol Parameters

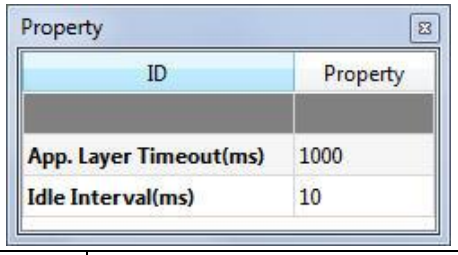
Overview Define the communication protocol parameters.

Operation View protocol parameters.

1. Open project, then select plug-in management page on ***EDPS ICE*** management area.
2. Click **Client** plug-in.
3. Chose the **protocol parameter** node on the management area.



Property View the property area of ***EDPS ICE***.



No.	Name	Declaration
1	App. Layer Timeout(ms)	Specify the maximum timeout interval waiting for the response of the application layer after the sending of the request command. If there is no response within the period, then the device will be conformed as no response.
2	Idle Interval(ms)	Specify the interval needed between the finish of the communication processes. Complete communication

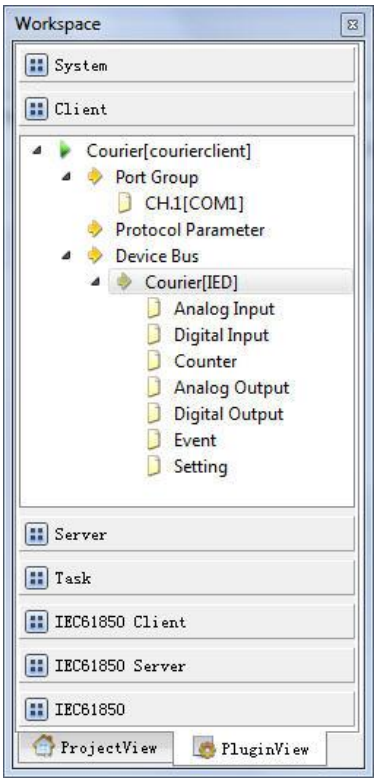
		process begins with the transmission of the data request and ends with the reception of all the valid data.

I.1.3 Device Parameters

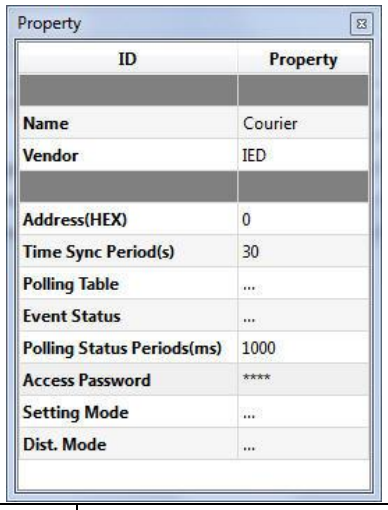
Overview Specify the device parameter of the protocol.

Operation View the device parameter.

1. Open project, then select plug-in management page on ***EDPS ICE*** management area.
2. Click the **Client** plug-in.
3. Click any sub-node under **Device Bus** node on the management area.



Property View the property area of ***EDPS ICE***.

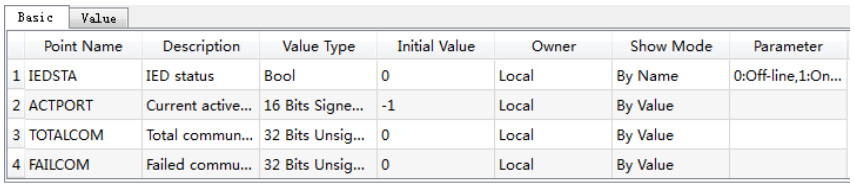


Property

ID	Property
Name	Courier
Vendor	IED
Address(HEX)	0
Time Sync Period(s)	30
Polling Table	...
Event Status	...
Polling Status Periods(ms)	1000
Access Password	****
Setting Mode	...
Dist. Mode	...

No.	Name	Declaration
1	Name	Specify the name of the device.
2	Vendor	Specify the device manufacturer.
3	Address(HEX)	Specify the physics address of the device.
4	Time Sync Period(s)	● Disable ● Time Sync based on Time Change ● Time Sync based on IIN ● Auto Time Sync
5	Polling Table	
6	Event Status	
7	Polling Status Periods(ms)	
8	Access Password	
9	Setting Mode	
10	Dist. Mode	

Pseudo Point View the data area of ***EDPS ICE***.



Basic | Value

	Point Name	Description	Value Type	Initial Value	Owner	Show Mode	Parameter
1	IEDSTA	IED status	Bool	0	Local	By Name	0:Off-line,1:On...
2	ACTPORT	Current active...	16 Bits Signe...	-1	Local	By Value	
3	TOTALCOM	Total commun...	32 Bits Unsig...	0	Local	By Value	
4	FAILCOM	Failed commu...	32 Bits Unsig...	0	Local	By Value	

No.	Name	Description
1	IED Status	View device communication status.
2	Current Active Port Number	View which Port be used.
3	Total Communication Times	View total communication times.
4	Failed communication Times	View failed communication times.

I.1.4 IO Parameters

Summary The IO Page of **EDPS ICE** data area displays all IO parameters of each point.

I.1.4.1 Analog Input

Row No	Specify the specific row number.
Col No	Specify the specific column number.

I.1.4.2 Digital Input

Row No	Specify the specific row number.
Col No	Specify the specific column number.
Position	Specify the specific offset in the byte.

I.1.4.3 Counter

Row No	Specify the specific row number.
Col No	Specify the specific column number.

I.1.4.4 Analog Output

Row No	Specify the specific row number.
Col No	Specify the specific column number.
Position	Specify the specific offset in the byte.

I.1.4.5 Digital Output

Row No	Specify the specific row number.
Col No	Specify the specific column number.

I.1.4.6 Event

Row No	Specify the specific row number.
Col No	Specify the specific column number.

I.1.4.7 Setting

Row No	Specify the specific row number.
Col No	Specify the specific column number.