CSC-861 Distribution Automation System
Main Unit
Technical Manual
## Title 1 Technical specification

1. Summary
   1.1 Applicable scope
   1.2 Product application
   1.3 Technical characteristics
   1.4 Model specification
   1.5 Executive standard

2. Technical conditions
   2.1 Environmental conditions
   2.2 Electrical insulation
   2.3 Mechanical properties
   2.4 Electromagnetic compatibility
   2.5 Security
   2.6 Technical parameters

3. Hardware
   3.1 Structure
   3.2 Plug-in board
   3.3 Panel and terminals of CSC-861A
   3.4 Panel and terminals of CSC-861B
   3.5 Panel and terminals of CSC-861C
   3.6 Panel and terminals of CSC-861D

4. Functions
   4.1 Distributed SCADA function
   4.2 The communicate interfaces and protocols
   4.3 DCS communication functions
   4.4 Parallel node functions
   4.5 Programmable logic controller
   4.6 Control right switching function
   4.7 Redundancy function
   4.8 Self-checking function
   4.9 GPS timing function
   4.10 Debugging function

5. Capacity and performance of the system
   5.1 Communication resources
Title 1 Technical specification

1 Summary

CSC-861 Distribution Automation System Main Unit is the core equipment of the communication control layer of CSPA-2000 system, setting all the functions of monitoring sub-station, terminal equipment management machine, communication manager and so on into an organic whole. Hierarchical and distributed monitoring system structure is fully embodied. Not only the design idea of the DCS distributed control system is kept well, but also the realization principle of the FCS system is adopted. The device can be placed down to the worksite and installed in the switch cabinet in place. Group screen installation can also be done.

1.1 Applicable scope

CSC - 861 Distribution Automation System Main Unit is a new type of electric automation information comprehensive management equipment, applicable to all kinds of electrical automation systems with various voltage levels, different scales and different functional requirements.

CSC - 861 Distribution Automation System Main Unit contains four models of the master control units; CSC - 861A, CSC - 861B, CSC - 861C, CSC - 861D. The functions and the using methods of the four master control units are exactly the same except for the different communication interfaces and the different number of them.

1.2 Product application

Along with the rapid development and the widespread application of the computer technology, communication technology and network technology, profound changes are taking place to the power system communication. The traditional concentration low-speed special enclosed dynamic system will be far from the direction to open, high-speed, integrated network development. On the worksite all kinds of equipments from different manufacturers will be connected to the master station to process the information such as monitoring, remote control, etc. But at present interconnected cannot be done in accordance with the same standard by all the manufacturers and protocol converters are still needed to realize the information exchange between the different mediums and the different protocol devices.
In order to meet the development requirements above, Sifang Company has opened CSC - 861 Distribution Automation System Main Unit. CSC - 861 Distribution Automation System Main Unit not only upholds Sifang product characteristics of reliable operation, strong anti-interference etc, but also has the advantages like more fast response, flexible operation modes, easily expanding, more adaptive protocols, convenient debugging maintenance, etc. Its functions cover remote control, protection management, media conversion and protocol conversion, which can be equipped according to the project needs. It is a new type of electrical automation information comprehensive management equipment with strong functions.

In the automation system solutions by Sifang Company, CSC-861 Distribution Automation System Main Unit in a transitional level is the information hub of the entire system. CSC-861 Distribution Automation System Main Unit connects down to all kinds of intelligent protection measurement devices via the field bus of RS-485, LonWorks, Profibus DP, Ethernet etc, and up to ECS main station system via Ethernet. In addition, each main control unit can connect to controller DPU of DCS system by the way of RS-485 bus to communicate with the DCS system and send the real-time data to the DCS system. The performance of the main control unit can concern the success or failure of the whole ECS system.

The location of the main control unit in a power plant automation system is shown in Figure 1:

![Figure 1 Position of the main control unit in the power plant automation system](image-url)
1.3 Technical characteristics

CSC-861 Distribution Automation System Main Unit connects down to a variety of intelligent protection monitoring control devices, receives the reports sent by the devices and then sends them to the backstage monitoring control system through Ethernet, adopts redundancy mechanism and adopts Ethernet between the spot and the control centre room to comminute with the backstage monitoring control system. The computer cost of investment of the system can be reduced when CSC-861 Series main control unit is used on the scene and the consumption of communication cable laying is also reduced in the transformer substation layer.

CSC-861 Distribution Automation System Main Unit has the following technical characteristics:

- **Unique hardware design structure**
  Adopt the Multi-CPU parallel processing mode, and high-performance PowerPC processor communications is used as the main CPU. It is supported by a special communication coprocessor and high-capacity program memory, data storage, so the processing is high-speed and the computing ability is strong.

- **Strong communication processing ability**
  It has a large capacity real-time database and industrial communication mechanism, ensuring data processing and real-time communication, rich flexibly configured communication interfaces and communication protocols to meet the needs of engineering real-time and flexibility.

- **Node communication function**
  Parallel node data transmission function is provided and the data is shared by multiple main control units to make the control of the whole system more flexible and convenient.

- **Strong logic control function**
  Programmable control logic, flexible implementation of the control logic functions as logic blocking, sequence control, misoperation prevention, etc, logic development and debugging easy to use.

- **Main standby redundancy design**
  The dual network redundancy design can realize the fast dual-network switch to ensure the data reliability and integrity and the stable operation of the
system.
- Reliable control authority switching function
Reliably switching of ECS and DCS system control rights can ensure a reliable operation of ECS system and the DCS system.
- Perfect comprehensive self-checking function
Diagnosis hardware failures of each module of the device is very fast, reliably monitor the operation situation of the device. Monitor the connection status of the intelligent device connected by each channel, reliably monitoring the operation situation of the system.
The communication events recorded wave function is used to record the important communication events.
- Powerful electromagnetic compatibility performance
The device adopts a fully enclosed metal shell; a unique anti-jamming design and the advanced surface mount installation technology, making high reliability of the system. Various communication ports isolated, strong anti-interference ability, anti-electromagnetism interference, ground ring interference and thunder destroy. Good shock resistant performance, adapting to bad environmental requirements and the device can be directly down the field use.
- Good open module structure
Software in accordance with the highly modular design, providing easy to use API interfaces, with a good open.
- Convenient and easy auxiliary tool software
Flexible configuration communication ports and communication protocols, edit of programmable logic controller, downloading and debugging easy to use. It is convenient for the engineering personnel and field personnel to realize a distant maintenance, work load reduced and the system extension is flexible and convenient.

1.4 Model specification

CSC-861 Distribution Automation System Main Unit includes the four types of equipment, such as CSC-861A, CSC-861B, CSC-861C, CSC-861D. In addition to the different communication port, function and use are exactly the same.

<table>
<thead>
<tr>
<th>Type</th>
<th>Ethernet (RJ45)</th>
<th>RS-485 (Uplink)</th>
<th>RS-485 (Downlink)</th>
<th>LonWorks</th>
<th>Profibus-DP</th>
<th>RS-232</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC-861A</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>
1.5 Executive standard

Q/HDSFE004-2009.

2 Technical conditions

2.1 Environmental conditions

Device can work normally in the following conditions:

a) Operating temperature: -10°C~+55°C. When transported the short-term storage temperature -25°C~+70°C. If there is no exerted incentive quantity in this limit, the device cannot appear irreversible changes. When the temperature is recovered, the device should be able to work normally.

b) Relative humidity: in the wettest month, the monthly average maximum relative humidity is 90%, while the monthly average minimum the monthly temperature is 25°C and no condensation surface;

c) The atmospheric pressure: 80kPa ~ 110kPa;

d) At the place there shall be no fire, explosion, corrosion and the risk of endangering the safety of the device and the vibration, impact and collision beyond this manual regulation.

2.2 Electrical insulation

2.2.1 Medium strength

The device can withstand GB/T14598.3-2006 (eqv IEC60255-5). The required AC voltage is 2kV (strong electrical circuit) or 500V (weak loop). The frequency is 50Hz. After 1min duration medium strength test, there are no breakdown and flash regular phenomenon.

2.2.2 Insulation resistance

The device insulation resistance measurement, which is measured by the measurement device with an open circuit voltage of 500V, is not less than 100MΩ, and meets the requirements IEC60255-5: 2000.

2.2.3 Impulse voltage

The device can withstand the impulse voltage test of the peak 5kV (strong
electrical circuit) of the GB/T14598.3-2006 (eqv IEC60255-5) regulation or 1kV (elv loop) standard lightning wave.

2.3 Mechanical properties

2.3.1 Vibration

Device can withstand the GB/T 11287 (idt IEC60255-21-1) specified level-I vibration response and vibration resistance test.

2.3.2 Impact and collision

Device can withstand the GB/T 14537 (idt IEC60255-21-2) regulation level-i shock response and level-i impact resistance test, as well as class I crash test.

2.4 Electromagnetic compatibility

2.4.1 Burst interference

The device can withstand the burst disturbance tests of 1MHZ and 100kHZ (the first half-wave voltage amplitude common-mode is 2.5kV, and the differential mode is 1kV) provided by standard GB/T 14598.13 (eqv IEC60255-22-1).

2.4.2 Electrostatic discharges

The device can withstand the electrostatic discharges tests of GB/T 14598.14 (idt IEC60255-22-2) level III (the contact discharge is 6kV).

2.4.3 Radiated electromagnetic interference

The device can withstand the radiated electromagnetic interference tests of GB/T 14598.9 (idt IEC60255-22-3) level III (10V/m).

2.4.4 Fast transient disturbance

The device can withstand the fast transient disturbance tests of GB/T 14598.10 (idt IEC60255-22-4) level IV级 (2kV for the communication ports, and 4kV for others).

2.5 Security

The device complies with the standard GB 16836, so that the shell protection grade is no less than IP20, and the safety category can meet class 1.

2.6 Technical parameters

2.6.1 Rated voltage: AC/DC220V or AC/DC110 V

2.6.2 Power consumption: <10W

2.6.3 Multimode fiber Ethernet interface parameters
a) Fiber type: 62.5/125 μm, 50/125 μm (Multimode fiber);
b) Optical wavelength: 1310nm;
c) Optical transmits power: > -16dbm;
d) Optical receiver sensitivity: -34dbm;
e) Optical transmission distance: \(\leq\) 2km (Multimode fiber);
f) Fiber connector type: SC;
g) Interface rate: 100M.

2.6.4 Single-mode fiber Ethernet interface parameters

a) Fiber type: 62.5/125 μm (single-mode fiber);
b) Optical wavelength: 1310nm;
c) Optical transmits power: > -4dbm;
d) Optical receiver sensitivity: -34dbm;
e) Optical transmission distance: \(\leq\) 80km (single-mode fiber);
f) Fiber connector type: SC;
g) Interface rate: 100M.

2.6.5 Ethernet electrical interface parameters

a) Connector type: RJ45;
b) Interface rate: 10/100Mbps.

2.6.6 Profibus DP interface parameters

a) Connector type: twisted pair interfaces
b) Interface rate: 9.6kbps~1.5Mbps

2.6.7 RS-485 interface parameters

a) Connector type: twisted pair interfaces
b) Interface rate: 9.6kbps~230.4kbps

2.6.8 Operating temperature: -10°C~+55°C, storage temperature: -25°C~+70°C.

3 Hardware

3.1 Structure

The installation method of CSC-861A、CSC-861B、CSC-861C master control unit is rail mounting and front connection mode. The appearance size and external terminals of the three types of master units are the same. The installation drawing is shown as Figure 2, CSC-861A for example.

Installation drawing: （unit: mm）
The installation method of CSC-861D Distribution Automation System Main Unit is rail mounting and front connection mode. The installation drawing is shown as the figure 3 (unit: mm):

3.2 Plug-in board

The terminals of CSC-861 Distribution Automation System Main Unit are Ethernet terminals, Weidmuller serve terminals, power terminals.

1) Power terminals

The power supply of CSC-861 Distribution Automation System Main Unit can be 220V (or 110), AC or DC. When the access is DC, the positive and negative will be regardless, and it can be any access. The power supply of CSC-861A/B/C
(110V or 220V) should be provided in the order information. For the type of CSC-861D, it is compatible with 110V and 220V.

2) Weidmuller serve terminals

Weidmuller serve terminals used for the CSC-861A/B/C Distribution Automation System Main Unit. The functions and define of terminal 1~10 are exactly the same, and the definition of terminals 11~26 for the downlink communication are different for the three devices.

The heartbeat of CSC-861 Distribution Automation System Main Unit is reverse connected through two main control unit of transceiver terminal, that is, a 232-TXD of one main control unit is connected to a 232-TXD of the other unit, and the VSS terminals should be docked.

The SMC-TXD, SMC-RXD, VSS of CSC-861A/B/C is the RS-232 debugging interfaces. And the debugging interfaces of CSC-861D is different. It is designed on the CPU plug-in board.

The VSS terminal can be used as a shield ground of RS-485.

3) Ethernet terminals

CSC-861A/B/C has only one photoelectric optional Ethernet interfaces. CSC-861D has three Ethernet interfaces, which Ethernet port 1 and 2 are photoelectric optional ports, and Ethernet port 3 is electric port.
3.3 Panel and terminals of CSC-861A

1） Front panel and terminal definition

![Diagram of CSC-861A panel and terminals]

<table>
<thead>
<tr>
<th>Front panel and terminal definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPS +</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>GPS -</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>SMC-TXD</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>VSS</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>232-TXD (Com1-T)</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>485-A (Com2-A)</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>LON1-A</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>LON2-A</td>
</tr>
<tr>
<td>13</td>
</tr>
<tr>
<td>14</td>
</tr>
<tr>
<td>LON1-B</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>16</td>
</tr>
<tr>
<td>LON2-B</td>
</tr>
<tr>
<td>17</td>
</tr>
<tr>
<td>18</td>
</tr>
<tr>
<td>RX1</td>
</tr>
<tr>
<td>19</td>
</tr>
<tr>
<td>20</td>
</tr>
<tr>
<td>RX2</td>
</tr>
<tr>
<td>21</td>
</tr>
<tr>
<td>22</td>
</tr>
<tr>
<td>LON1~LON2</td>
</tr>
<tr>
<td>23</td>
</tr>
<tr>
<td>24</td>
</tr>
<tr>
<td>Preparation1~4</td>
</tr>
<tr>
<td>25</td>
</tr>
<tr>
<td>26</td>
</tr>
</tbody>
</table>

2） Indicator definition

<table>
<thead>
<tr>
<th>Operation</th>
<th>Operation indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>Operation indicator</td>
</tr>
<tr>
<td>Alarm</td>
<td>Failure alarm indicator</td>
</tr>
<tr>
<td>Standby</td>
<td>Master/Slave device indicator. For master lamp lights.</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Ethernet receiving indicator</td>
</tr>
<tr>
<td>RX1</td>
<td>Receiving heartbeat indicator</td>
</tr>
<tr>
<td>RX2</td>
<td>Uplink channel RS-485 receiving indicator</td>
</tr>
<tr>
<td>LON1~LON2</td>
<td>LONWorks receiving indicator</td>
</tr>
<tr>
<td>Preparation1~4</td>
<td>Standby indicator</td>
</tr>
</tbody>
</table>

3.4 Panel and terminals of CSC-861B

1） Front panel and terminal definition
2) Indicator definition

<table>
<thead>
<tr>
<th></th>
<th>Operation indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>Failure alarm indicator</td>
</tr>
<tr>
<td>Standby</td>
<td>Master/Slave device indicator. For master lamp lights.</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Ethernet receiving indicator</td>
</tr>
<tr>
<td>RX1</td>
<td>Receiving heartbeat indicator</td>
</tr>
<tr>
<td>RX2</td>
<td>Uplink channel RS-485 receiving indicator</td>
</tr>
<tr>
<td>RX3~RX6</td>
<td>Profibus channel 1~4 receiving indicator</td>
</tr>
<tr>
<td>Preparation1~2</td>
<td>Standby indicator</td>
</tr>
</tbody>
</table>

3.5 Panel and terminals of CSC-861C

1) Front panel and terminal definition
Figure 10 Front panel of CSC-861C

Figure 11 Terminal definition of CSC-861C

2) Indicator definition

<table>
<thead>
<tr>
<th>Operation</th>
<th>Operation indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>Failure alarm indicator</td>
</tr>
<tr>
<td>Standby</td>
<td>Master/Slave device indicator. For master lamp lights.</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Ethernet receiving indicator</td>
</tr>
<tr>
<td>RX1</td>
<td>Receiving heartbeat indicator</td>
</tr>
<tr>
<td>RX2–RX8</td>
<td>Channel RS-485 receiving indicator. Channel 7 and 8 used as a standby channel. Receive status are not displayed.</td>
</tr>
</tbody>
</table>

3.6 Panel and terminals of CSC-861D

1) Front panel and terminal definition
2) Indicator definition

<table>
<thead>
<tr>
<th>Operation</th>
<th>Operation indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alarm</td>
<td>Failure alarm indicator</td>
</tr>
<tr>
<td>Standby</td>
<td>Master/Slave device indicator. For master lamp lights.</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Ethernet receiving indicator</td>
</tr>
<tr>
<td>RX1</td>
<td>Receiving heartbeat indicator</td>
</tr>
<tr>
<td>RX2~RX8</td>
<td>Channel RS-485 COM2~COM10 receiving indicator.</td>
</tr>
</tbody>
</table>

4 Functions

CSC-861 Distribution Automation System Main Unit functions include a distributed SCADA function, communication function, control function, redundancy function etc. Distributed SCADA function is the management function to complete high-capacity real-time data management; Communication function can convert the information of various communication interfaces and communication protocols into unified station control layer communication protocols and meanwhile exchange a
small amount of important information with the DPU Information of DCS; Control function can achieve the control logic associated with auxiliary power in this layer.

### 4.1 Distributed SCADA function

Complete functions of four remotes (remote measure, remote communication, remote control, remote adjustable) with large capacity and real-time database. The contents of the database can be flexibly set by supporting software. Sub-station functions, as the communication sub-station of CSPA-2000 system.

- **Real-time data processing functions:** dam capacity, remote measure, remote communication, remote control, pulse electric degrees, SOE which can be configured according to the user’s needs.
- **Terminal equipment management functions:** one is responsible for sending the data of the terminal equipment after processing and aggregation to the main station system and distributed control systems (DCS) to complete the sending of remote measure, remote communication, and remote pulse. The other is receiving the orders issued by the backstage main station or other backend systems and then translating them to the terminal equipment to realize the remote control.
- **Statute conversion function:** Convert the different communication protocols of different manufacturer intelligent devices into a unified form of the statute sent to the main station system.

### 4.2 The communicate interfaces and protocols

- **Rich communication interfaces:** They are divided into uplink ports and downlink ports from the interface functions. The communication main station and DPU of DCS system can be connected via the uplink ports and multiple intelligent devices can be connected via the downlink ports. From the interface types, CSC-861 Distribution Automation System Main Unit provides multiple Lonworks, Profibus DP, RS-485 and Ethernet interfaces. The appropriate models can be elected according to the needs of the project.
- **Rich communication protocols:** Uplink ports can choose CSPA2004, IEC60870-5-101, IEC60870-5-103, 104 and IEC60870-5 - Modbus statute, etc. Downlink port statutes include communication protocols CSC2000,
IEC60870-5-101, IEC60870-5-102, IEC60870-5-103, IEC60870-5-104, CDT, Profibus DP, Modbus, etc. The secondary development of the protocols can be done in accordance with the need of the project.

4.3 DCS communication functions

- The communication between CSC - 861 Distribution Automation System Main Unit and the DPU of DCS system adopts the standard Modbus-RTU protocols, via the RS-485 interface;
- Communication baud rate can be configured between 4.8kbps ~ 230.4kbps;
- Up sending data points and the initial address can be configured and downloaded by the configuration software;
- Measuring artificial number set via the configuration software and proofreading point via DCS.

4.4 Parallel node functions

- ECS requires providing data transmission function of the parallel node between multiple main control units and each main control unit can refer to the data of other main control units.
- The function of parallel node is realized via Ethernet and multicast way of communication is adopted.
- Data reference points can be flexibly configured via the maintaining software.

4.5 Programmable logic controller

Programmable logic controller can be downloaded to the main control unit by using the PC PLE software edit logic diagram, to achieve the functions of sequential control and logic closed, etc according to the actual site needs of the users.

On the engineer station PLE logic editing software is running and defines the logic process by means of function block and meanwhile produces data report to describe the logic processing flow. The logic can be downloaded to the main control unit running via the Ethernet cable connecting with the backstage. The functions of logic real-time updating of online debugging, single-step debugging etc can be
realized via PLE software.

4.6 Control right switching function

Control right switching: A considerable level operations management personnel, with electrical system operation ability of arbitrary system (such as: ECS, DCS, NCS etc), can switch the device control right in the electrical system from one system to another. Only one system has control right over at the same time and the control right can be reliably switched between systems.

4.7 Redundancy function

The redundancy of CSC-861 Distribution Automation System Main Unit is achieved between the two main control units and connected via the UART mode heart beating cable for a switch use. As a redundant configuration, the two main control units are separately connected to the main station and the dual net of the intelligent devices.

- Upstream direction: When the failure of the main channel happens, the main control unit can automatically switch to the standby channel or send the order of switching channels in the background monitoring system to change the current operating channel.
- Downstream direction: The main control unit automatically detects the connection status of the intelligent devices. When communication failure of the intelligent devices occurs, the main control unit can decide whether to need to switch to the standby arbitration channel according to the connection status.

4.8 Self-checking function

CSC-861 Distribution Automation System Main Unit has perfect functions of self-diagnosis, self-recovery and system status detection and can timely diagnose and recover the procedure to the normal operation with the hardware reset circuit

- Quickly and accurately locate the hardware failures of ROM, RAM, FLASH, and communication interface;
- Accurately and quickly locate the software failures of real-time library Settings, communication parameter Settings, point table configuration, etc;
- Monitoring the communications state of each intelligent device on the
channel. Once the device is detected running offline, alarming information is sent to the background main station and meanwhile redundancy switching arbitration is made.

- When a hardware failure and configuration errors appear or the data of the intelligent device cannot be received through the configured channel, the warning light on the panel will be on. The source of the fault can be located by remote communication via the virtual device of the background main station.

- Communication event wave record function; Record the important communication events such as the operations of control right switching, remote control, etc, to ensure the safe and reliable operation of the system.

4.9 GPS timing function

GPS time setting is done by the combined way of net time setting and pulse time setting. The clocks of the whole net can be effectively synchronized. Second pulse and minute pulse can be selected for pulse time setting. The function has a perfect anti-disturbance and jitter-removing design to ensure the accuracy of the time.

4.10 Debugging function

- The device is equipped with a powerful software tool for debugging. The device functions of statute selection, parameter configuration, on-line monitoring etc, can be realized by the graphical way on a PC and the device debugging work is greatly simplified.

- The device debugging can be done in the local and afar via the serial ports and Telnet respectively including displaying device information of the main control unit, heart beating information, remote control right information and displaying the remote communication, remote measure, remote pulse data and remote status, etc.

5 Capacity and performance of the system

5.1 Communication resources

From the functions the ports of CSC-861 Distribution Automation System Main
Unit can be divided into two types: downlink ports and uplink ports. Downlink ports are used for collecting information of the site intelligent device and the operations of the remote control, adjust, reset time setting, etc to the device. Uplink ports are used for communicating with the main station via the remote control protocols.

The main control units CSC-861A, CSC-861B, CSC-861C have the same uplink ports, including the Ethernet ports and RS-485 ports, and different downlink ports. Among them uplink ports RS-485 of CSC-861C can match any of the whole 9 RS-485 in communication. CSC-861D main control unit has three Ethernet ports and the serial interfaces are all the same with CSC - 861C, summarized below:

- CSC - 861A uplink ports for single Ethernet and RS-485. Downlink ports for 2 channel LonWorks interfaces;
- CSC - 861B uplink ports for single Ethernet and RS-485. Downlink ports for four channel Profibus DP interfaces;
- CSC - 861C uplink ports for single Ethernet and RS-485. Downlink ports for 8 channel RS-485 interfaces;
- CSC-861D has three Ethernet ports and 9-channel RS-485 interfaces, which can be flexible configured uplink and downlink.

### 5.2 Interface capacity

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Maximum of units</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC-861A</td>
<td>LonWorks Ethernet port 1</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LonWorks Ethernet port 2</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>CSC-861B</td>
<td>Profibus DP channel 1</td>
<td>32</td>
<td>The number of connected devices per channel can be set according to the data refresh requirements. If more real-time is demanded, reduce the</td>
</tr>
</tbody>
</table>
CSC-861D

<table>
<thead>
<tr>
<th>Channel type</th>
<th>Communication rate</th>
<th>Maximum transmission distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>LonWorks</td>
<td>78kbps</td>
<td>2700m</td>
</tr>
<tr>
<td>Profibus DP</td>
<td>9.6kbps、19.2kbps</td>
<td>1200 m</td>
</tr>
<tr>
<td></td>
<td>93.75kbps、187.5kbps</td>
<td>200m</td>
</tr>
<tr>
<td></td>
<td>500kbps、1.5Mbps</td>
<td>100 m</td>
</tr>
<tr>
<td>RS-485</td>
<td>9.6kbps、19.2kbps</td>
<td>1200 m</td>
</tr>
<tr>
<td></td>
<td>38.4kbps、57.6kbps</td>
<td>500 m</td>
</tr>
<tr>
<td>Ethernet</td>
<td>100M</td>
<td>120 m</td>
</tr>
</tbody>
</table>

5.3 Communication performance

6 Ordering Information

In order to better serve customers better, improve the development efficiency, shorten delivery cycle, and ensure device security and stability and reliable operation, in purchasing products please pay attention to the following matters:

a) Determine product type, function and provide the detailed communication protocols

### Ordering information code

<table>
<thead>
<tr>
<th>Brand</th>
<th>Series</th>
<th>Type</th>
<th>Separator</th>
<th>Power$^1$</th>
<th>Communication Interface$^2$</th>
<th>Port type$^3$</th>
<th>Explication</th>
</tr>
</thead>
</table>

Of CSC-861A/B/C/D Distribution Automation System Main Unit of the distributed automation system
<table>
<thead>
<tr>
<th>CSC</th>
<th>861</th>
<th>*</th>
<th>_</th>
<th>P*</th>
<th>K**</th>
<th>Ethernet (electric)</th>
<th>Ethernet (optical)</th>
<th>O*</th>
<th>Code example:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CSC861C_P2K01O2</td>
</tr>
<tr>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CSC861D_K30O2</td>
</tr>
<tr>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Code example: CSC861C_P2K01O2 CSC861D_K30O2**

- **Ethernet (electric)**
- **Ethernet (optical)**
- **O**

<p>| | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>DC110V</td>
<td></td>
<td></td>
<td></td>
<td>1 electric Ethernet port</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>AC220V/DC220V</td>
<td></td>
<td></td>
<td></td>
<td>1 electric Ethernet port</td>
</tr>
</tbody>
</table>

- **Note1:** The power of CSC-861D is ADC220V/DC110V adaptive, there is no option P*;
- **Note2:** CSC-861A/B/C has only one Ethernet port. And the doesn’t support the optical Ethernet port currently. CSC-861D has three Ethernet ports.
- **Note3:** The optical port option applies only CSC-861B/C/D with optical Ethernet.

b) Determine the order quantity;

c) Determine the power supply voltage (AC/DC, 220/110V);

d) Function special request;

e) Clear shipping address and time.
Title 2 User install and use

1 Open-package inspection
   a) After unpacking, check whether the device looks in good condition.
   b) Check the qualified certificate, supporting documents, attachments, spare parts and so on. Make sure they are in accordance with the orders.
   c) Make sure the type, name, quantity, etc. of them are in accordance with the packing list and they are all there.
   d) If any problem, please contact timely with the manufacturer.

2 Installation debugging

2.1 Installation
   2.1.1 The device must be securely fixed in the plate (cabinet) and the connection screws of the device should be tightened.
   2.1.2 Each device should be reliably connected with the screen (cabinet) by ground wire, ground busbar or system ground.
   2.1.3 Device wiring should comply with the requirements of the wiring diagram.

2.2 Electrify check
   Check whether the input power supply is in accordance with the logo working power supply on the nameplate before the device electrified.
   Check whether the running lights are on after the device electrified.

3 Operating Instructions

3.1 Device information Inquiry
   Device information includes device model, IP address, software version and submit time, control right over the state and the main control unit clock. Enter the order ssh into the Telnet console and the results shown in Figure 1:
   Meanings as follows:
   Device: standing for device type. There are 4 kinds of types CSC-861A, CSC-861B, CSC-861C, CSC-861D;
   Version: standing for the software version number;
Commit: standing for software submits time;
DPU ip: standing for IP address of the main control unit;
Heart: standing for the redundancy state of the main control unit. Master/slave separately standing for the host machine running state or the standby machine running state of the main control unit
Ykright: standing for the remote control right of the main control unit, soft standing for the remote control right as a soft mode. ECS/ DCS stands for the ownership of the remote control right.
Clock: standing for the main control unit clock.

![Telnet Console Screenshot]

Figure 1 Main control unit information inquiry

### 3.2 Modify the IP address

The IP address can be modified by CSC-861 Distribution Automation System Main Unit via ipset command of the Telnet console to complete.

In the console input ipset command and tip information appears as shown below
In the cursor, input the IP address of the setting needed and enter. The successful or not information will be prompted by the setting. Successful information is shown in Figure 4.

If the input IP address is not complete, such as "192.168.4.", or IP address incorrectly, such as "192.168.3, 4", tip ‘IP address incorrectly’ will be shown and need to input information again.

Tip: before the IP set operation is completed, the input "qt", will end the setting operation of the IP. This operation is not successful and the controller will still maintain the original IP settings.

When the IP address setting is completed, restart the main control unit.
Figure 4 Modify the IP address successfully
4 Transportation and storage

The device should be stored inside a room at a temperature of -25 °C ~ +70 °C, relative humidity is not more than 80%, the surrounding air does not contain corrosive, inflammable, explosive and other dangerous articles. Handling process should avoid violent vibration, impact and collision.