

FAQ-4400

Question:

Siemens保护装置IEC61850入门配置指南。

Answer:

保护装置从 p-set V4.60 及以后开始支持 IEC61850 协议

保护配置

1 创建与装置 MLFB 相同的 p-set，设置 IP 地址及 IEC name

Properties - SIPROTEC device

General | MLFB | Communication modules | DIGSI Manager | **Communication parameters**

General

VD address: Mirror VD: red. Mirror VD:

Channel switch: Port number:

System interface [Ethernet]

IP address: Important: There is no consistency check here for manually entered settings!

Subnet mask:

Standard gateway:

UDP port:

IED name:

OK Cancel Help

| | | | | | | | |
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2 离线模式打开装置，进行相应的配置

2.1 CF_D2

Object properties - DF1T1C DP - DP

Chatter blocking and filter IEC 61850

This information is routed to the system interface.
Thus, it is assigned to the following IEC61850 objects (LD / LN):

XCBR
CSWI

CTRL /

名称可自定义 ←

Switch type:

Cycle counter:

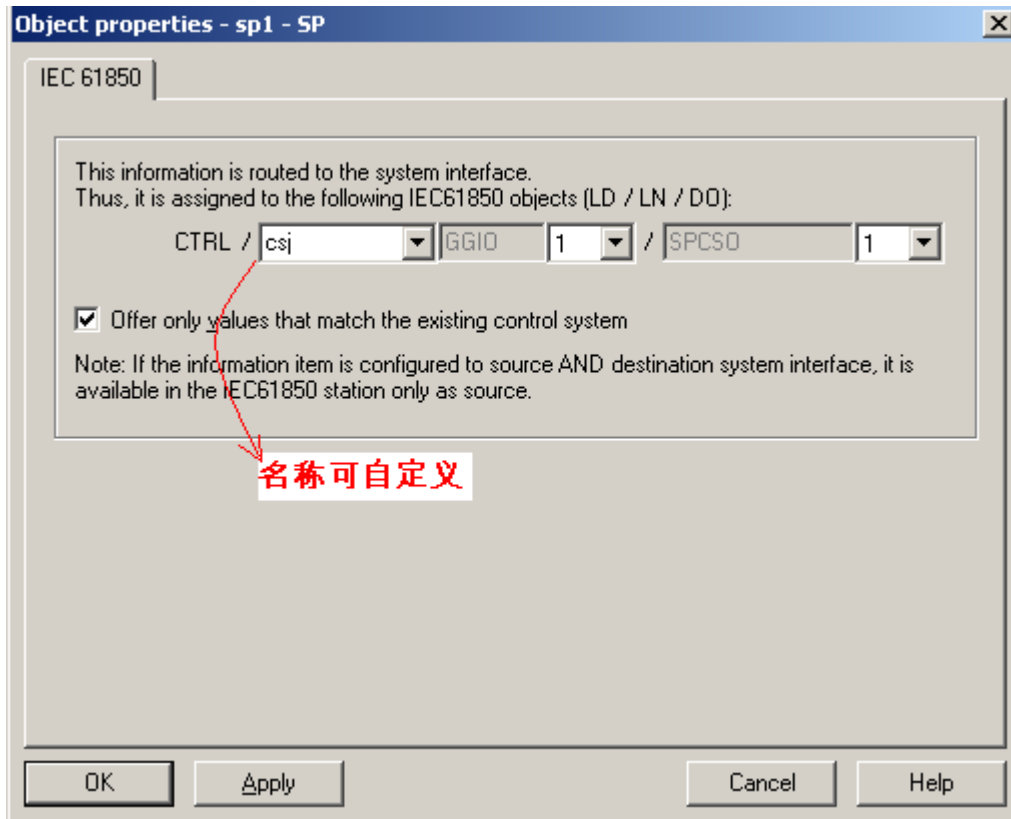
Offer only values that match the existing control system

Note: If the information item is configured to source AND destination system interface, it is available in the IEC61850 station only as source.

OK Apply Cancel Help

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2.2 SP



2.3 ExSP, ExDI, external operating value

此类信号用于接收由其它装置发过来的信息，即 GOOSE 信息，配置是这些信号的来源是 system

| Settings - Masking I/O (Configuration Matrix) - Digs483 / Folder / 6MD664 V4.8 1/ | | | | | | | |
|---|-------------|--------------|---|------|--------|---|---|
| | Information | | | | Source | | |
| | Number | Display text | L | Type | Bl | F | S |
| Device, General | | | | | | | * |
| P.System Data 1 | | | | | | | * |
| Osc. Fault Rec. | | | | | | | |
| goose | | external | | ExSP | | | X |
| P.System Data 2 | | | | | | | |
| EN100-Modul 1 | | | | | | | |

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2.4 时钟同步设置

如果要使用 IEC61850 协议对时，按下图设置

Time Synchronization & Time Format

Source of time synchronization:
 Ethernet NTP
 Internal Clock
 IRIG B
 DCF77
 Synch.Box
 External Impulse via Binary Input
 Ethernet NTP

Monitoring
 Fault indication after: 10 (>1/min)

Pulse
 via binary input: Not configured

Time format for display
 dd.mm.yy
 mm/dd/yy
 yy-mm-dd

Time Correction
 Offset to time signal: 00:00 hh:mm

Time zone and summer time
 Use PC time zone and summer time
 Time zone offset to GMT: +08:00 hh:mm
 No summer time switchover
 Summer time offset to GMT: +08:00 hh:mm
 Start of summer time: [] Sunday in [] at 00:00 o'clock
 End of summer time: [] Sunday in [] at 00:00 o'clock

OK DIGSI -> Device Cancel Help

设置完成保存后，再次打开此界面，use PC time zone and summer time 前会显示未选中，不用理会。

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2.5 端口类型，interface 设置，网络拓扑

Interface 设置界面

Interface Settings

Serial port on PC | VD Addresses | Operator Interface | Service interface | **Ethernet on device** | Ethernet on PC

IP address: 192 . 168 . 0 . 15
 Subnet mask: 255 . 255 . 255 . 0
 Standard gateway: 0 . 0 . 0 . 0
 Link layer: Ethernet

These parameters are taken from the DIGSI Manager (Object properties > Communications).

Access authorization at interface for
 Customize Test and diagnostics
 Web monitor operation: Reading

Services

| | ON | OFF |
|--|----------------------------------|----------------------------------|
| SNMP (Simple Network Management Protocol): | <input checked="" type="radio"/> | <input type="radio"/> |
| Web server (http): | <input checked="" type="radio"/> | <input type="radio"/> |
| Web server (https): | <input type="radio"/> | <input checked="" type="radio"/> |
| IEC61850: | <input checked="" type="radio"/> | <input type="radio"/> |
| Additional protocol EN100 module: | <input type="radio"/> | <input type="radio"/> |
| DIGSI over EN100 module: | <input checked="" type="radio"/> | <input type="radio"/> |

Disabling of services depends on the module firmware version.

Optical module

Operating mode: Switch
 Line
 Switch

Redundancy type:

Further...

OK | DIGSI -> Device | Cancel | Help

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2.5.1 光口模块类型



Ethernet module EN100 with ST interfaces for internal installation

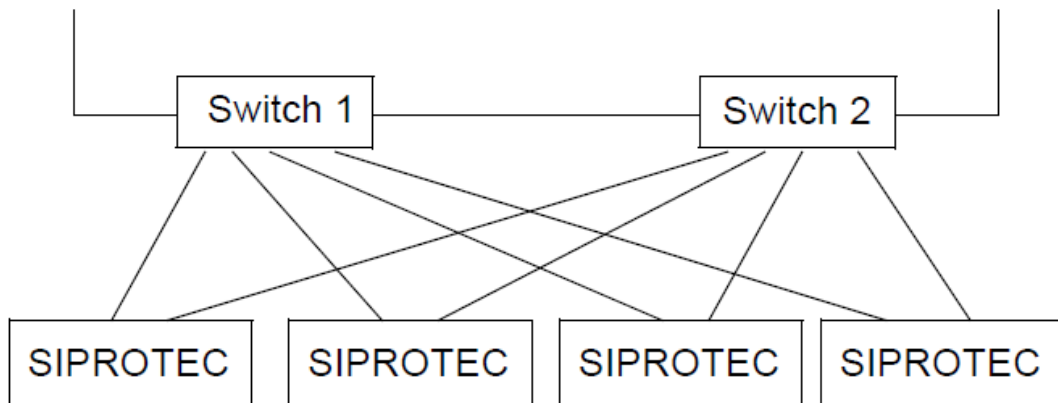
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Ethernet module EN100 with Duplex-LC interfaces for internal installation

2.5.1.1 光口的装置可以用星型结构组网

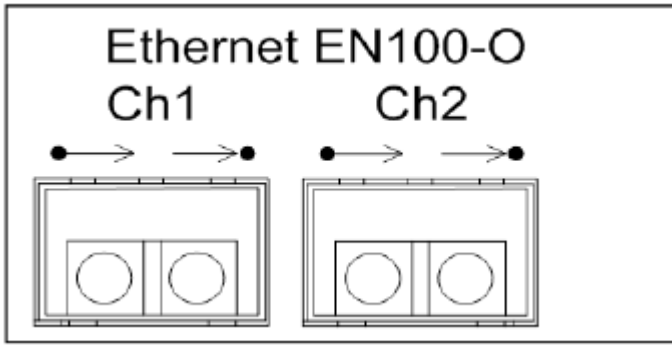
Network



此时 operating mode 要选择 line 方式。

在光纤连接时，只需把各个装置

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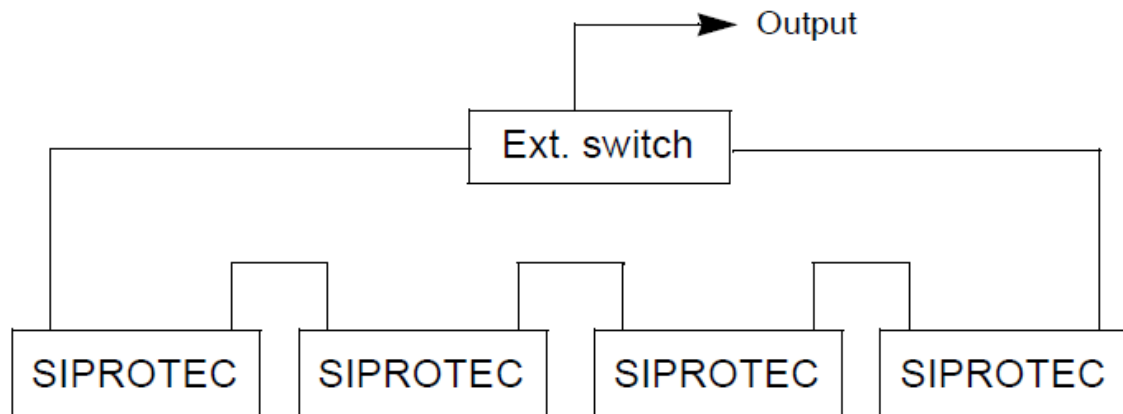
通道 1 的收端接到交换机的发端，通道 1 的发端接到交换机的收端；

通道 2 的收端接到交换机的发端，通道 2 的发端接到交换机的收端。

网络特性：使用星型组网时，在同一时刻，只有一个通道处于激活的状态，只有检测到当前通道通讯终端时，才会切换到另外一个通道。

2.5.1.2 光口的装置也可以用环网结构组网

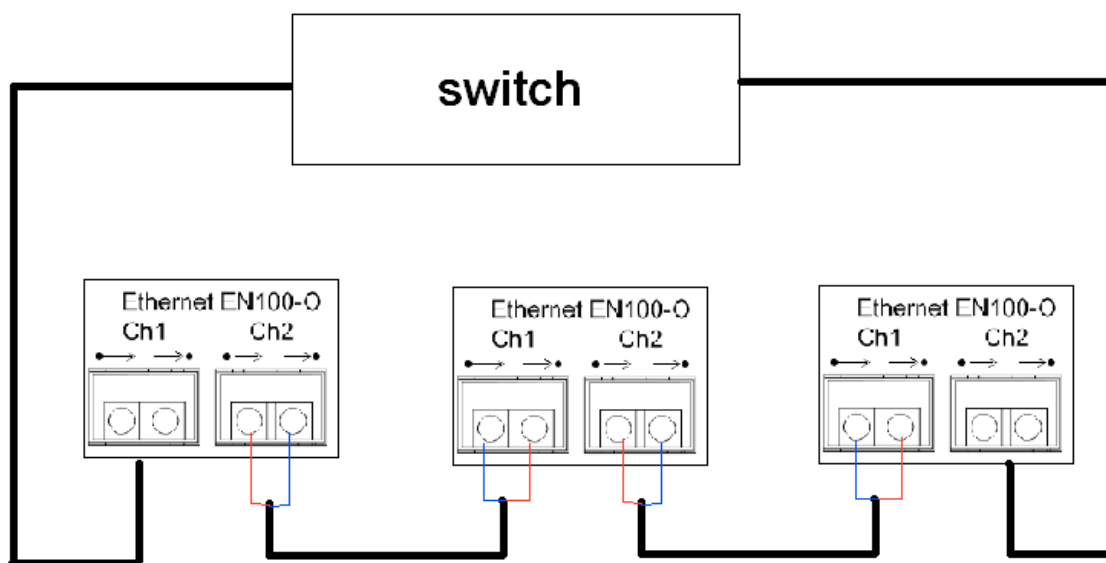
Network



此时 operating mode 要选择 switch 方式。

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在光纤连接时，把各个装置之间的通道相连（收发相连），最后与交换机连接到交换机组成闭合的环网。



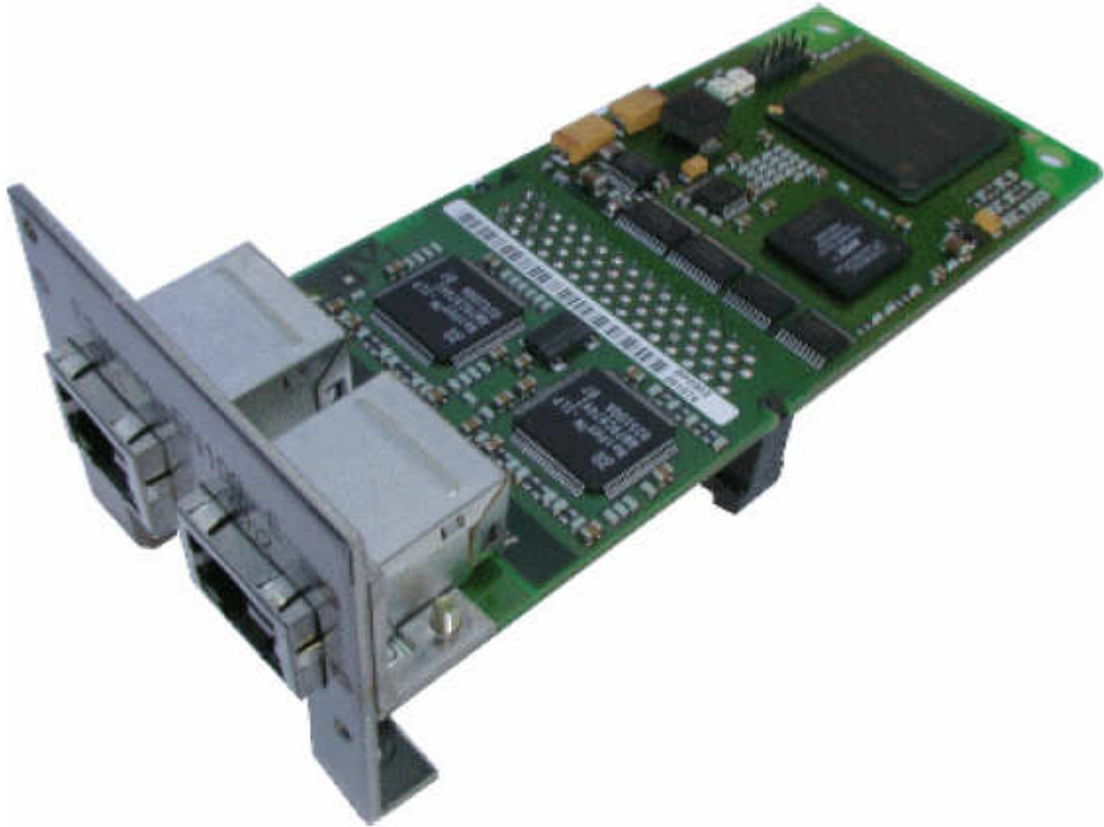
网络特性：

- a 环网上出现一个断点，装置不会出现通讯中断
- b 每台装置的 EN100 模块扮演着交换机的角色
- c 每个环的最大装置数目可用下面公式计算得出

$$\text{Number of SIPROTEC 4 devices} + 3 * \text{number of ext. switches} < 34$$

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2.5.2 电口模块



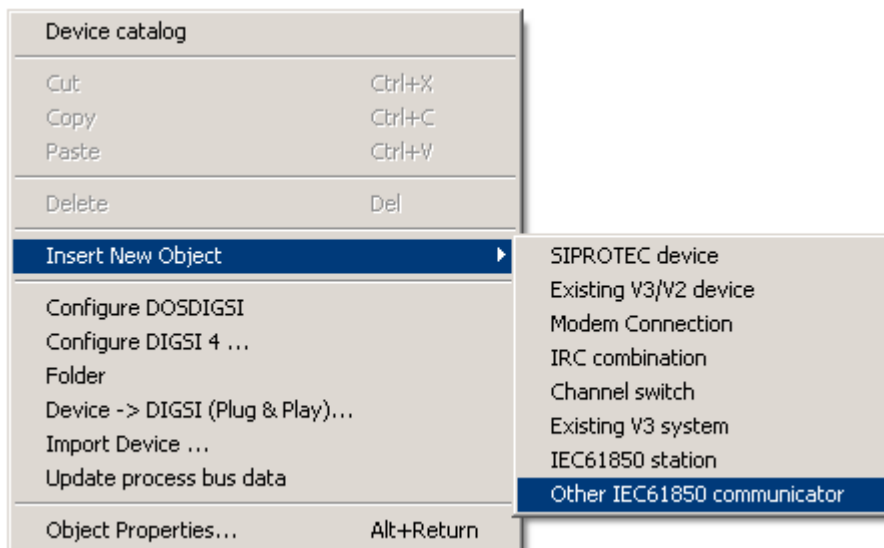
Ethernet module EN100 with RJ45 interfaces for internal installation

电口的装置只能用星型结构组网，operating mode 为 line 模式。网络特性与光口星型结构相同

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3 其它 ICD 文件的导入

3.1 SNTP 时钟服务器

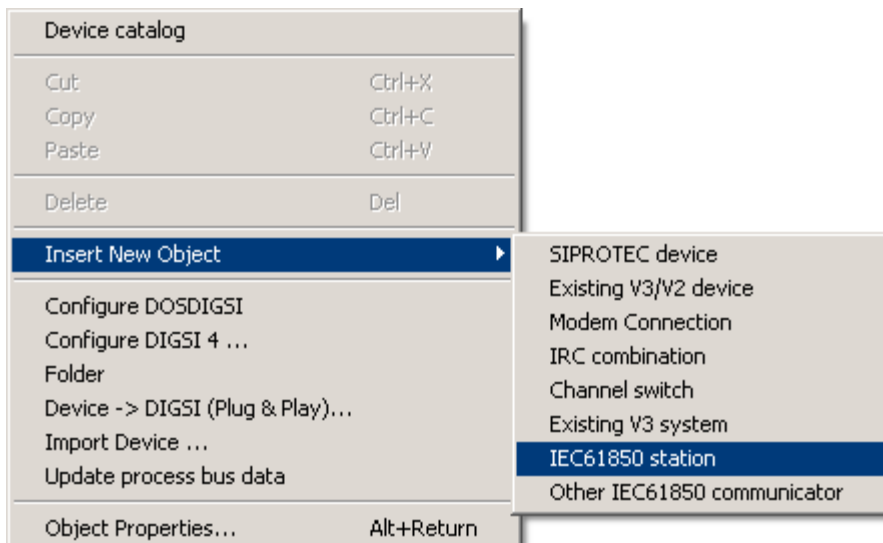


时钟服务器 ICD 文件默认路径 (C:\Siemens\Digsi4\Utilities\IEC61850\ICD\sntp.icd)

3.2 其它厂家的 ICD 文件的导入与 3.1 步骤相同。

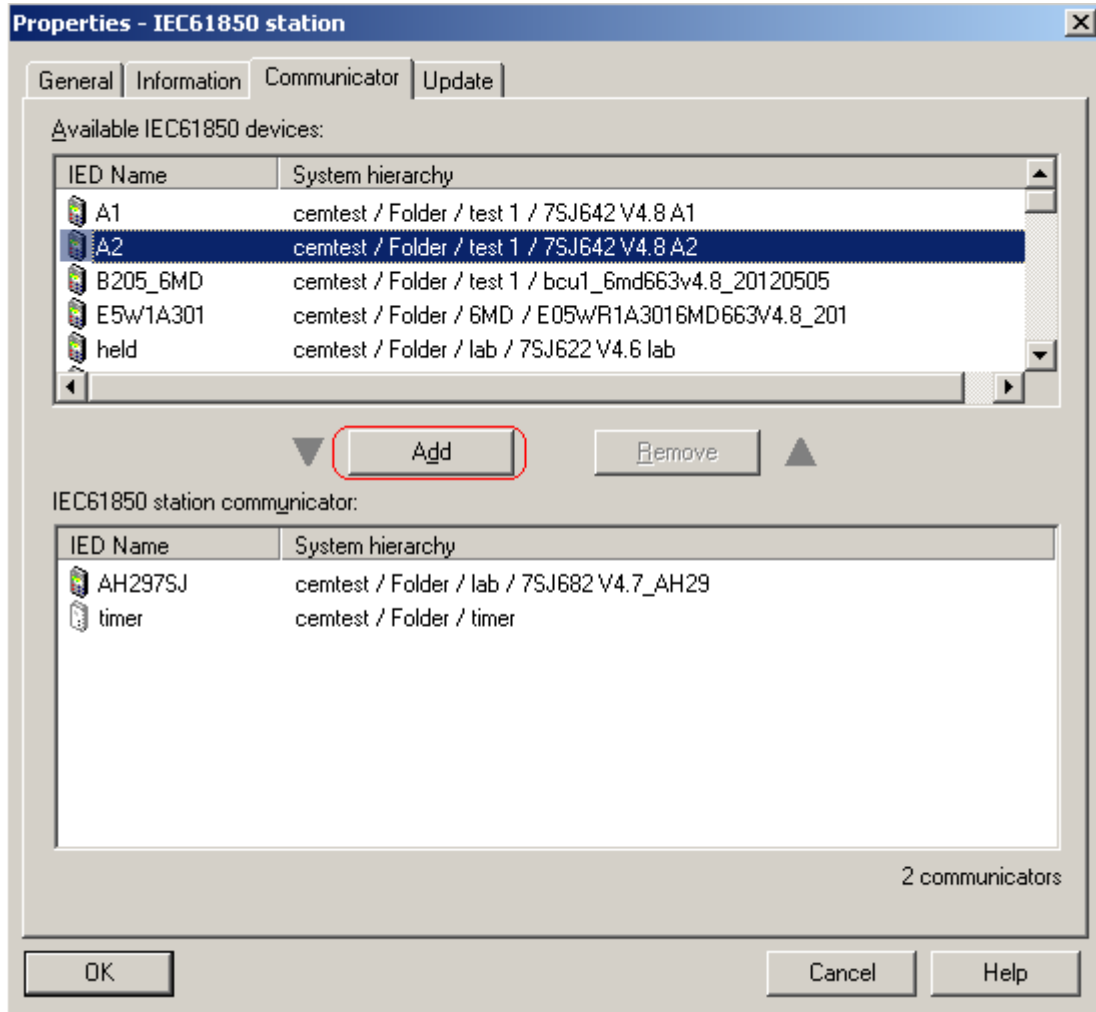
4 IEC61850 station 的配置

4.1 创建 IEC61850 station



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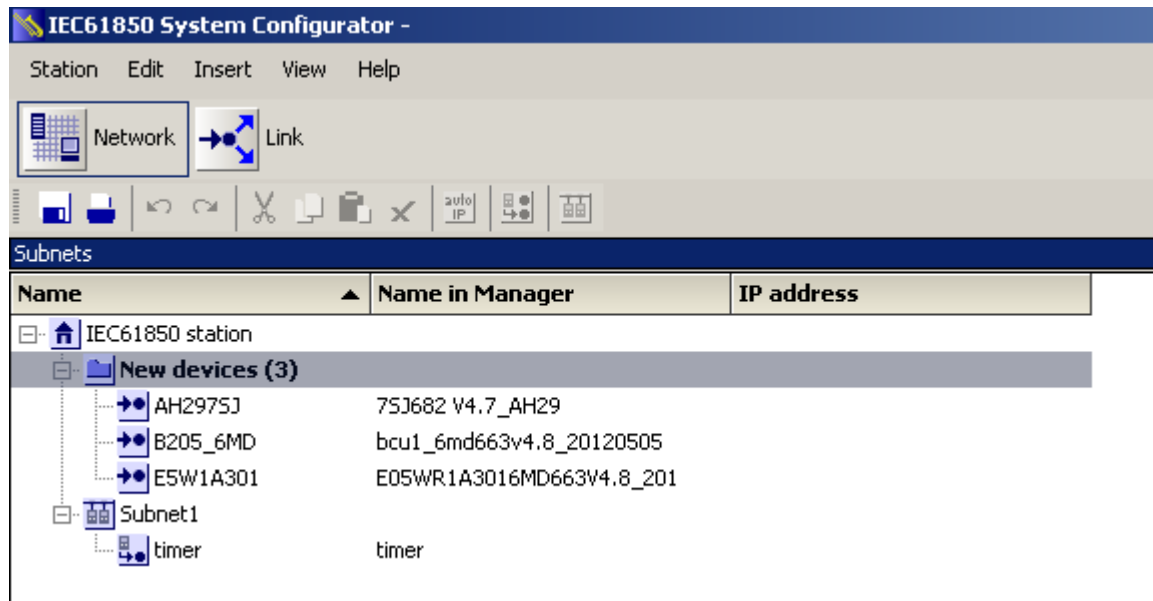
4.2 右键 IEC61850station，选择 object properties→communicator，将相应的 IED 添加到 IEC61850 station，然后点击确定。



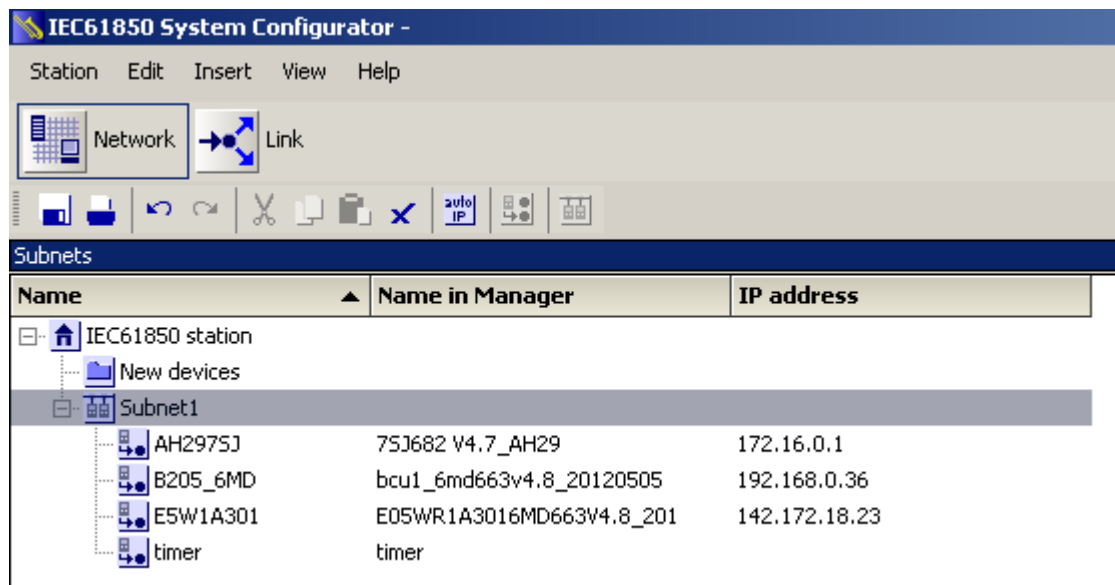
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4.3 双击打开 IEC61850 station

新增加的 IED 会显示在 network→ new devices 下

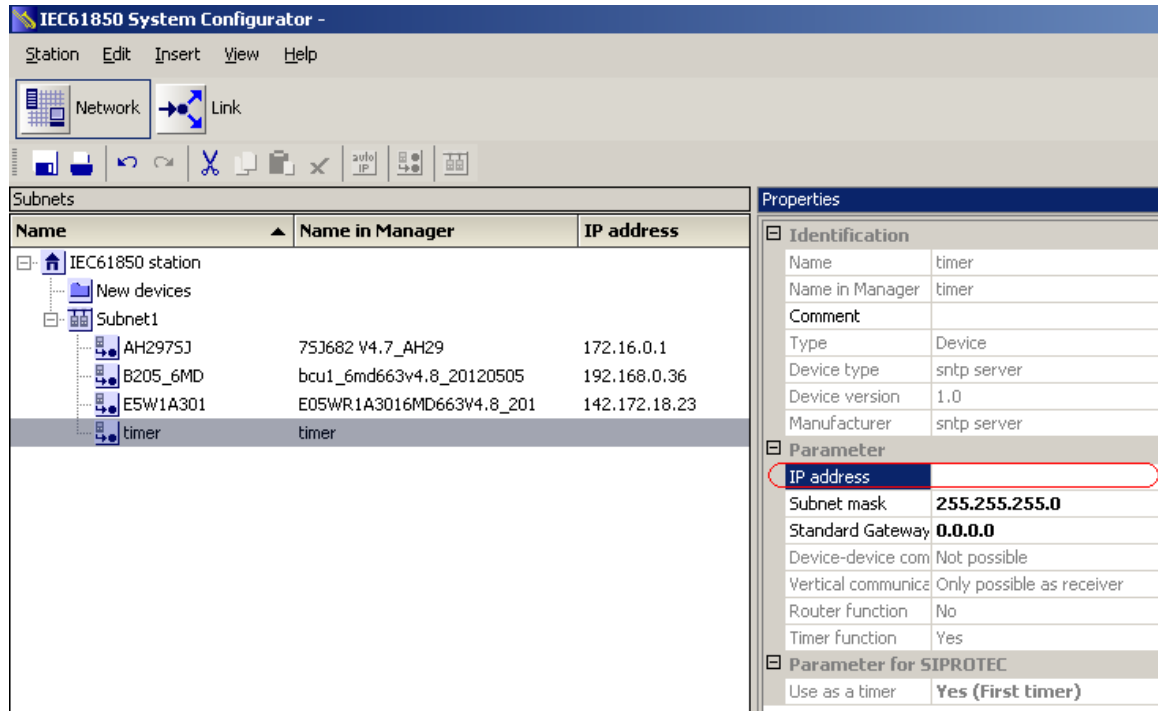


点击装置将其拖到 subnet1 下



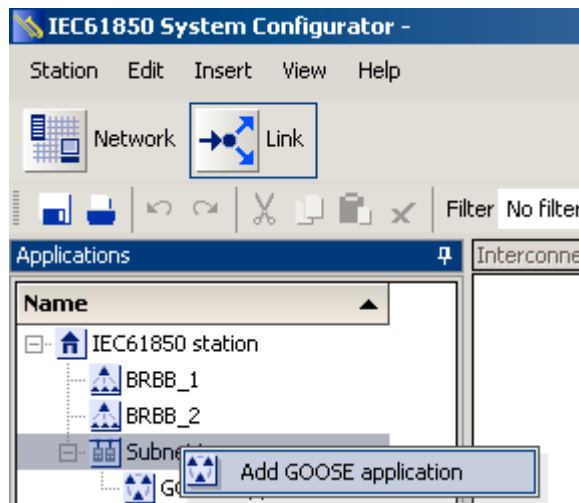
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4.4 配置时钟服务器（3.1 添加的 ICD）的 IP 地址



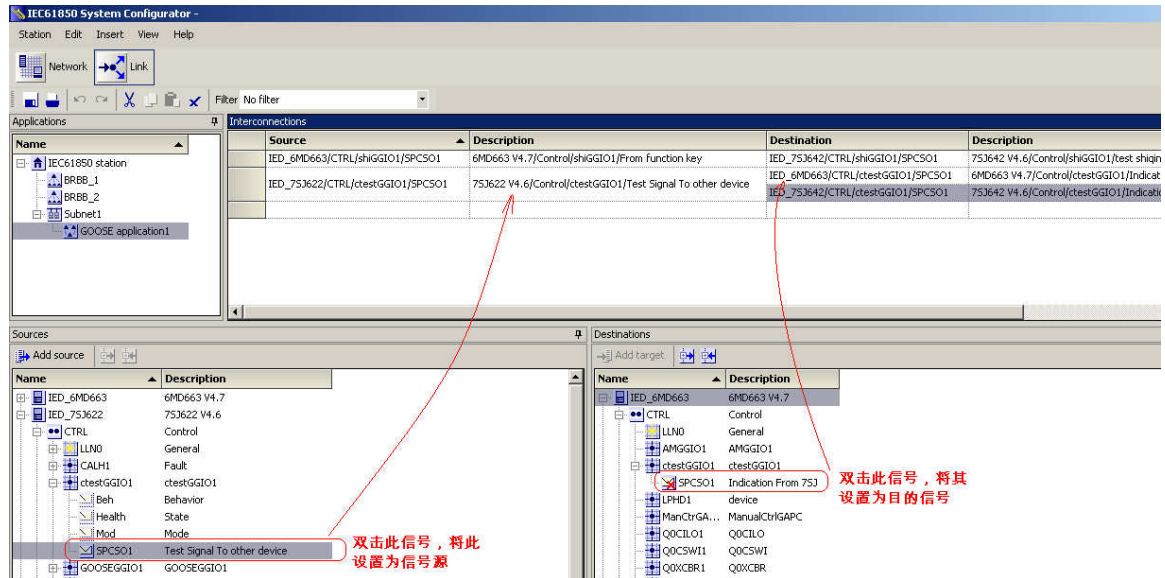
4.5 GOOSE 应用

4.5.1 增加 GOOSE 应用



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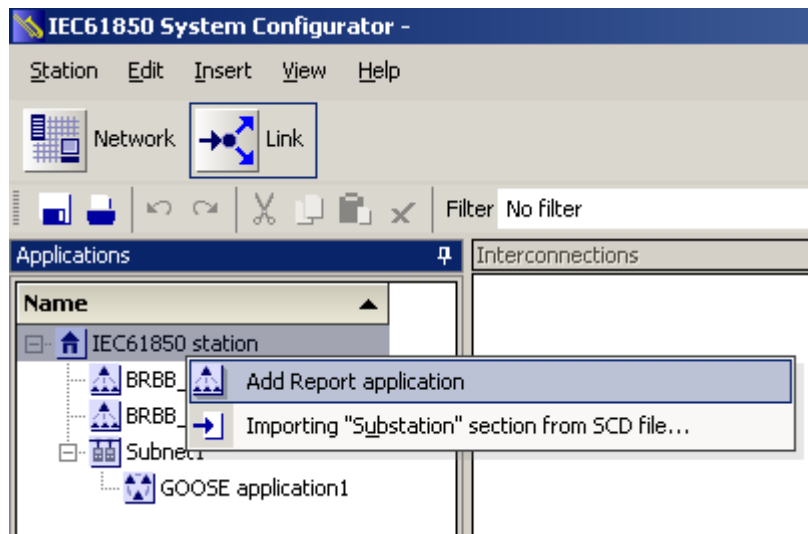
4.5.2 创建 GOOSE 关联，如下图



例图中是把 75J622 的 CTRL/ctestGGIO1/SPCSO1 信号同时送到 6MD663 的 CTRL/ctestGGIO1/SPCSO1 和 75J642 的 CTRL/ctestGGIO1/SPCSO1。

4.6 当保护装置与第三方的 IEC61850 client 通讯时，必须建立 report application。

4.6.1 增加 report application



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4.6.2 添加相应的信息到 application

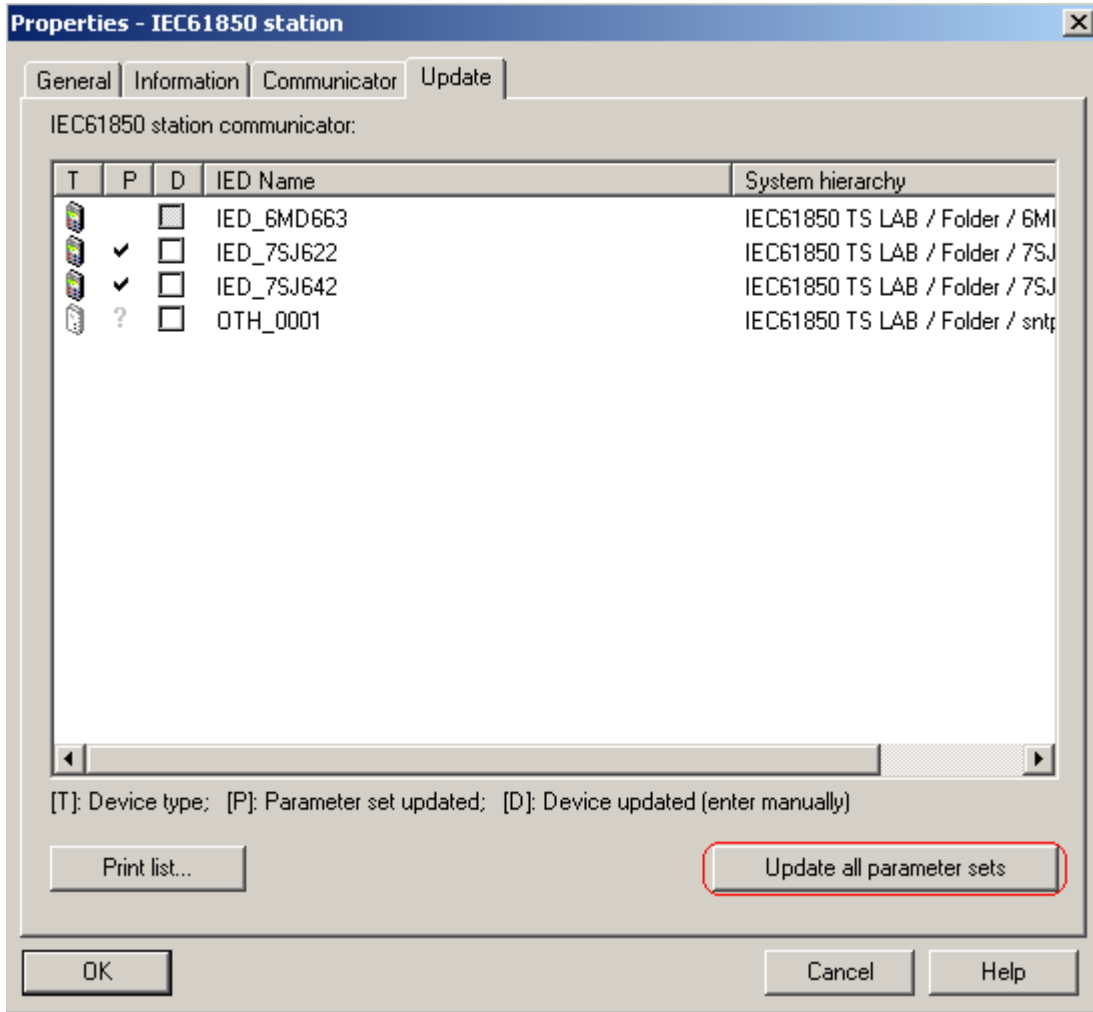
双击信号即可将其添加到report中

所有配置结束后即可关闭 IEC61850 station

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4.7 结束配置后必须更新

右键 IEC61850station, 选择 object properties→ update。



4.8 所有参数更新结束后, 初始化保护装置。

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5 调试

5.1 查看moduleB信息

通过装置面板 *Menu* → *Test/Diagnose* → *Modulinfo* → *Port B* (快捷键:*Menue-5-5-1*)

可看到如下内容, 关于B口信息详情可在COM_IEC61850_MODUL_A9_US文档中查到。

```

1      Network Config
2      MAC 080006865116
3      IP 172.016.052.055
4      NM 255.255.000.000
5      GW 172.016.000.001
6      NT1* 172.016.000.254
7      Chan1/2=Up/Up
8      Rx/TxCnt=23489/34403
9      Rx/TxErr=00000/00000
10     Rx/Tx10s=03221/02888
11     CPU load=68%
12     LRx1/LTx1=norm/norm
13     LRx2/LTx2=weak/----
14     Switch RSTP
15     Priority=32768
16     Bridge Id=172165255
17     Hello Time=2sec
18     Max Age Tm.=20sec
19     Forward Del=15sec
20     MaxTransmCnt=100
21     R/S1=A/D R/S2=R/F
22-26     . . .
21     ***** END *****

```

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5.1.1 第6行内容大约每隔10S变化一次，

5.1.1a 正常情况交替显示NTP服务器的IP地址以及最后一次时钟同步过去的时间，5.1.1b 如果显示Corrupt Parameter, 此时装置可以被ping通，但是可能与IEC61850 client的通讯无法建立。此时需要把IEC61850station重新更新后再次初始化装置。

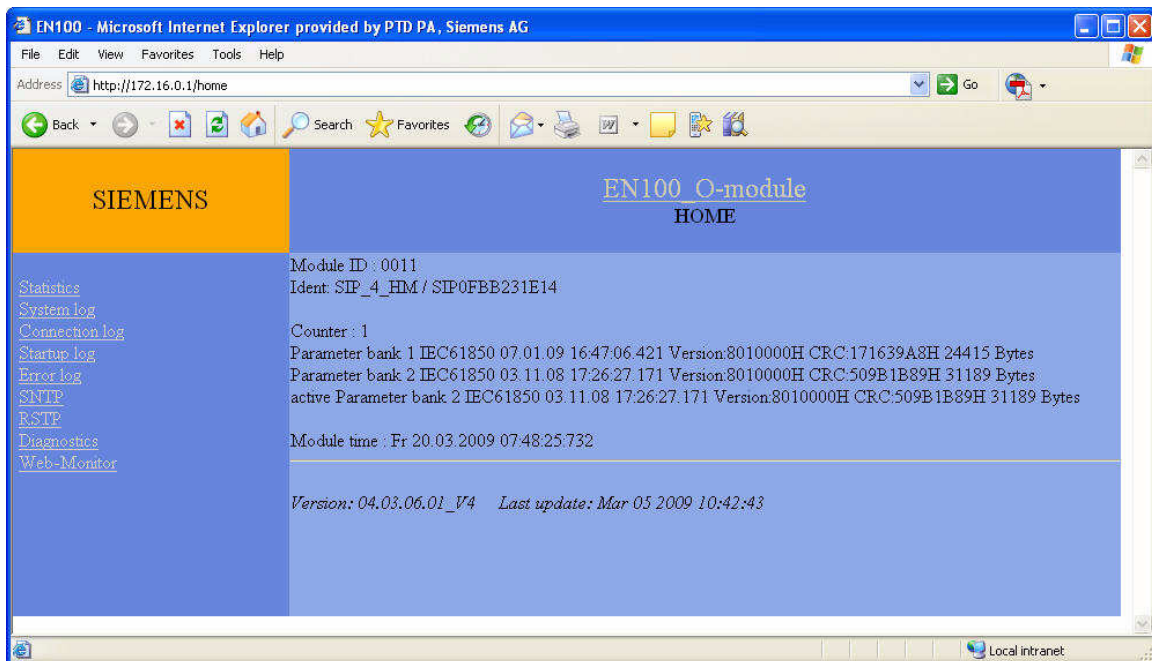
5.1.1c 如果显示!!MAC!!0007E908FCC8，原因是网络中已经有一台相同IP地址的设备

5.1.2 第7行指示通道的连接状态。

5.1.3 第14显示的是EN100的运行模式，环网结构时应显示Switch RSTP，星型结构时应显示Point to PNP

5.2 参数文件中装置IED name无法修改，保护功能无法开放，原因是此参数并非原始备份，而是使用Plug&Play从装置上读下来的参数，参考FAQ I_03986_NKG。

5.3 使用IE浏览器输入<http://172.16.52.53/home> 即可登录到此装置EN100的主页，显示如下



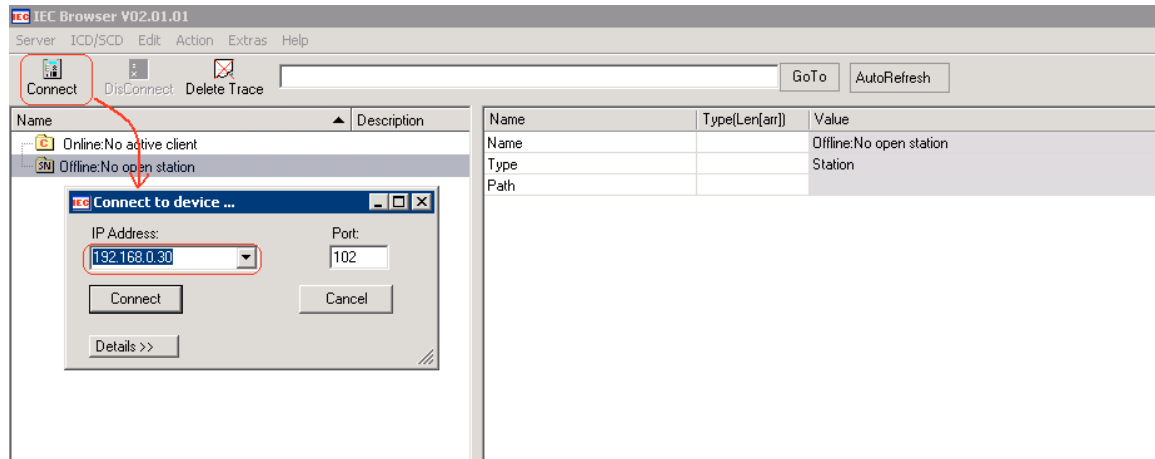
可以使用 curl 工具将所有页面保存进行通讯方面的分析。

5.4 curl 工具

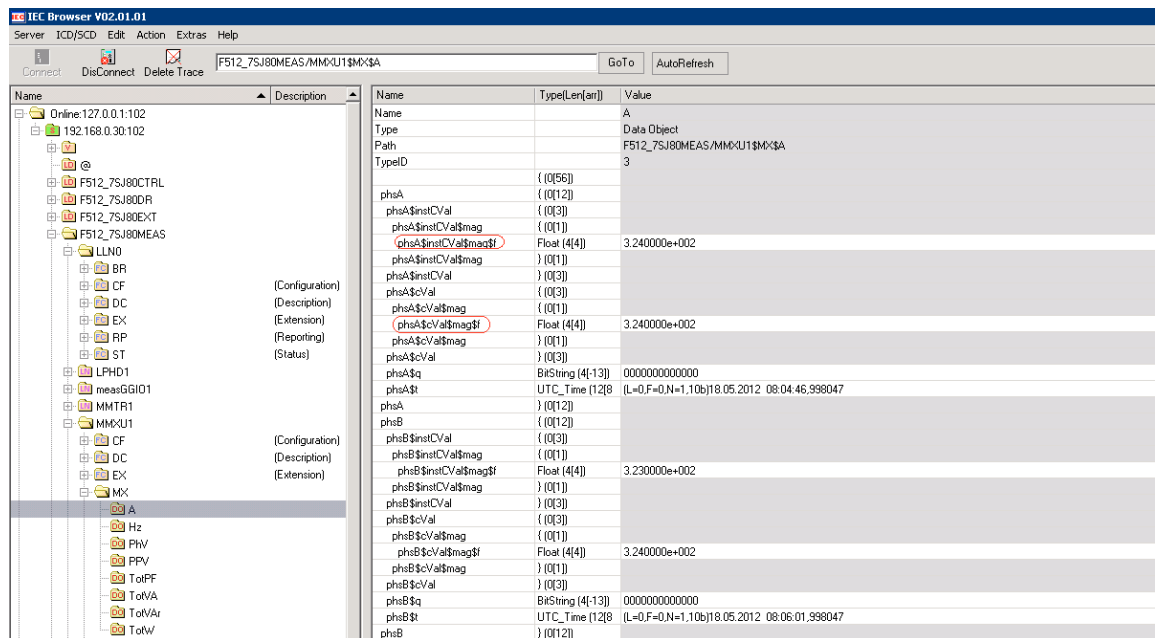
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5.5 IEC browser 的使用

5.5.1 连接装置

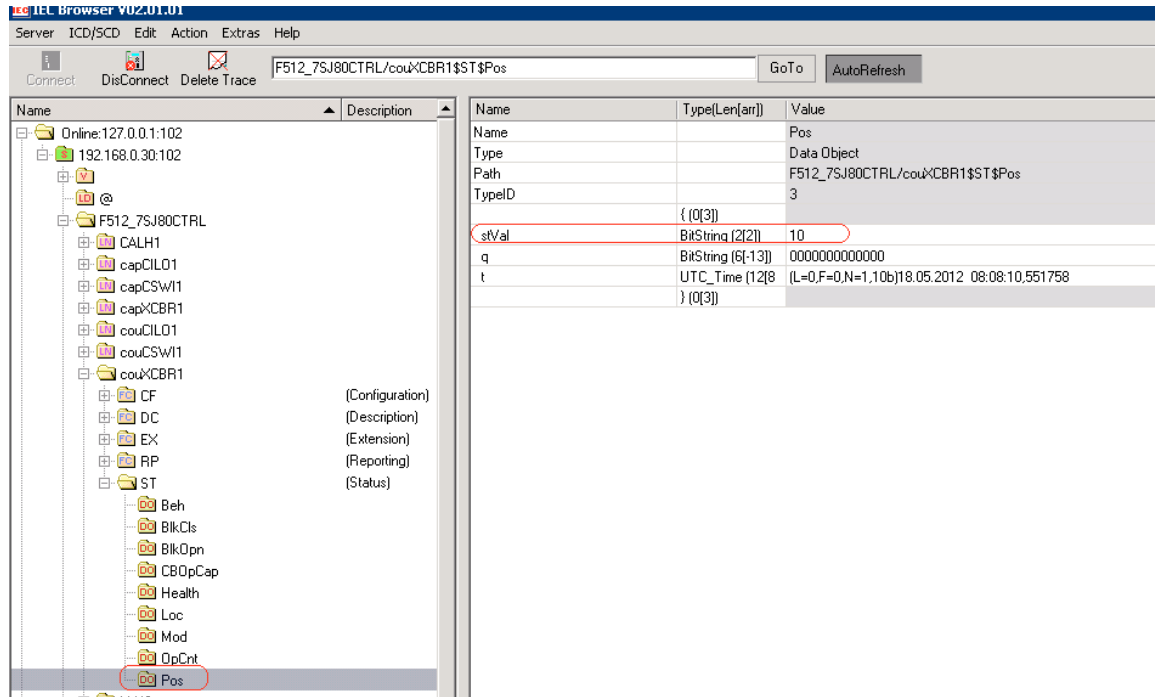


5.5.2 查看模拟量



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5.5.3 查看遥信



5.5.4 遥控开关 FAQ_4122

名词解释

ICD: IED Capability Description 装置描述文件，由装置导出

CID: Configured IED Description 装置添加到IEC61850 station后即可导出此文件，由装置导出

SCD: Substation Configuration Description 整个站的配置文件，由 IEC61850 station 导出

SSD: Substation Specification Description; here a .pure. version without IEDs, and a version with some already known IEDs is introduced.

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1 Warnings



WARNING

Dangerous voltages may occur in devices and modules during operation depending on the design and application. Incorrect use of these devices can therefore result in severe personal injury or substantial damage to property.

Only suitably qualified staff should work on this device.

Correct and safe operation of this device is dependent on proper handling, installation, operation and maintenance.

Should you require further information, or should particular problems occur which are not handled in sufficient depth in the Instructions, help can be requested through your local Siemens Office or representative.

QUALIFIED PERSON

A "qualified person" is one who is familiar with the installation, construction and operation of the device and who has the appropriate qualifications, e.g.

- is trained and authorized to operate and maintain devices/systems in accordance with established safety practices for devices with electrical circuits.
- is trained in the proper care and use of protective equipment in accordance with established safety practices.
- is trained in first aid.

Subject to change without prior notice !

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