3 ELC-CAPBDP

The ELC-CAPBDP is a PROFIBUS DP Slave Communication Module. To ensure correct installation and operation of the product, please read this operation information below carefully before using it. ELC-CAPBDP is a PROFIBUS DP slave communication module for connecting ELC series special I/O modules, digital I/O modules and standard Modbus devices to PROFIBUS DP network.

3.1 Features

- Supports PROFIBUS DP cyclic data transmission.
- Auto-detects baud rates; supports max. 12Mbps.
- Self-diagnosis
- Able to connect to max. 8 special I/O modules (i.e. analog I/O, temperature measurement, counter and positioning modules) and 16 digital I/O modules (max. 256 digital I/O points).
- The RS-485 COM port is able to connect to max. 16 standard Modbus slave stations.

3.2 Specifications

PROFIBUS DP Port

Interface	DB9 connector
Transmission method	High-speed RS-485
Transmission cable	Shielded twisted pair cable
Electrical isolation	500VDC

Communication

Message type	Cyclic data exchange
Module name	ELC-CAPBDP
GSD file	EATN09B9.GSD
Product ID	09B9 (HEX)
Serial transmission speed supported (auto-detection)	9.6kbps; 19.2kbps; 93.75kbps; 187.5kbps; 500kbps; 1.5Mbps; 3Mbps; 6Mbps; 12Mbps (bits per second)

Environment

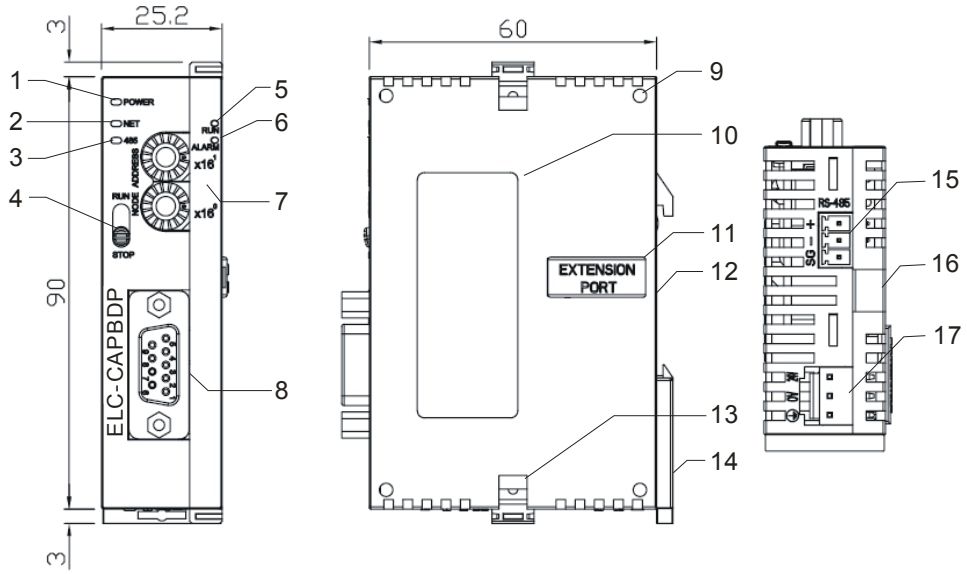
Noise immunity	ESD (IEC 61131-2,IEC 61000-4-2): 8kV Air Discharge EFT (IEC 61131-2,IEC 61000-4-4): Power Line:±2kV,Digital Input:±2kV Communication I/O: ±2kV Conducted Susceptibility Test (EN61000-4-6, IEC 61131-2 9.10): 150kHz ~ 80MHz,10V/m RS (IEC 61131-2, IEC 61000-4-3): 26MHz ~ 1GHz, 10V/m
Storage/operation	Operation: 0°C ~ 50°C (temperature), 50 ~ 90% (humidity), pollution degree 2 Storage: -25°C ~ 70°C (temperature), 5 ~ 95% (humidity)

Shock/vibration immunity	International standards: IEC 61131-2,IEC 68-2-6 (TEST Fc)/IEC 61131-2& IEC 68-2-27 (TEST Ea)

- **Electrical specification**

Power supply voltage	24VDC
Insulation voltage	500VDC
Power consumption	2.5W
Weight	90g

3.3 Product Profile and Outline



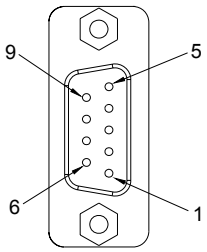
Unit: mm

1. POWER indicator	10. Nameplate
2. NET indicator	11. I/O module connection port
3. RS-485 indicator	12. DIN rail (35mm)
4. RUN/STOP switch	13. I/O module fixing clip
5. RUN indicator	14. DIN rail fixing clip
6. ALARM indicator	15. RS-485 COM port
7. Address setup switch	16. I/O module fixing notch
8. PROFIBUS DP COM port	17. DC24V power supply interface
9. I/O module positioning hole	

3.4 Installation and wiring

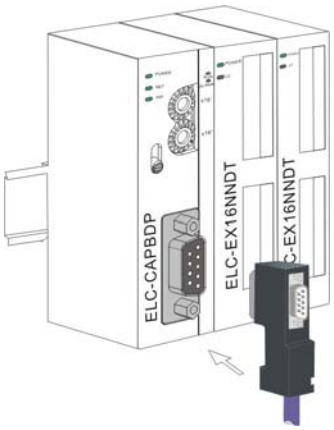
- **Definition of PROFIBUS DP Port**

PIN	PIN name	Definition
1	--	N/C
2	--	N/C
3	RxD/TxD-P	Sending/receiving data P(B)
4	--	N/C
5	DGND	Data reference potential (C)
6	VP	Power voltage – positive
7	--	N/C
8	RxD/TxD-N	Sending/receiving data N(A)
9	--	N/C

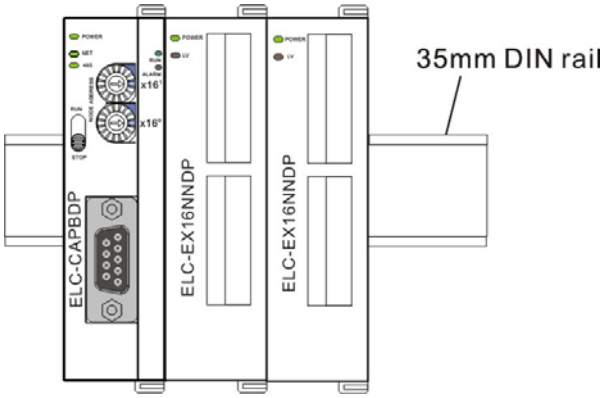


- **Connecting to PROFIBUS DP Port**

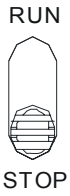
  Connect the PROFIBUS DP bus connector to the PROFIBUS DP port on the ELC-CAPBDP (see the figure below) Screw it tight to ensure ELC-CAPBDP and PROFIBUS DP bus are properly connected.



- **Installing ELC-CAPBDP and I/O Module on DIN Rail**
  - Use 35mm DIN rail.
  - Open the DIN rail clips on ELC-CAPBDP and I/O module. Insert ELC-CAPBDP and I/O module on the DIN rail.
  - Clip up the DIN rail clips on ELC-CAPBDP and I/O module to fix them on the DIN rail (see the figure below).



- **RUN/STOP Switch**

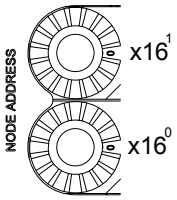


Status	Description
RUN => STOP	1. Special I/O module switches from RUN to STOP.
	2. All Y points on digital output module turn OFF.
	3. Modbus function disabled
	4. RUN LED turns off.
STOP => RUN	1. ELC-CAPBDP re-detects the number of digital I/O points and special I/O modules.
	2. Special I/O module switches from STOP to RUN.
	3. Enable digital I/O modules.
	4. Enable Modbus function.
	5. RUN LED turns on.

- **Address Setup Switch**

The two rotary address setup switches, $x16^0$ and $x16^1$, set up the node address of ELC-CAPBDP on PROFIBUS DP network in hex form. The range for rotation is 0 ~ F.

Address	Definition
H'1~ H'7D	Valid PROFIBUS address
H'0 or H'7E ~ H'FF	Invalid PROFIBUS address. NET LED will flash in red color if the node address falls within this range.



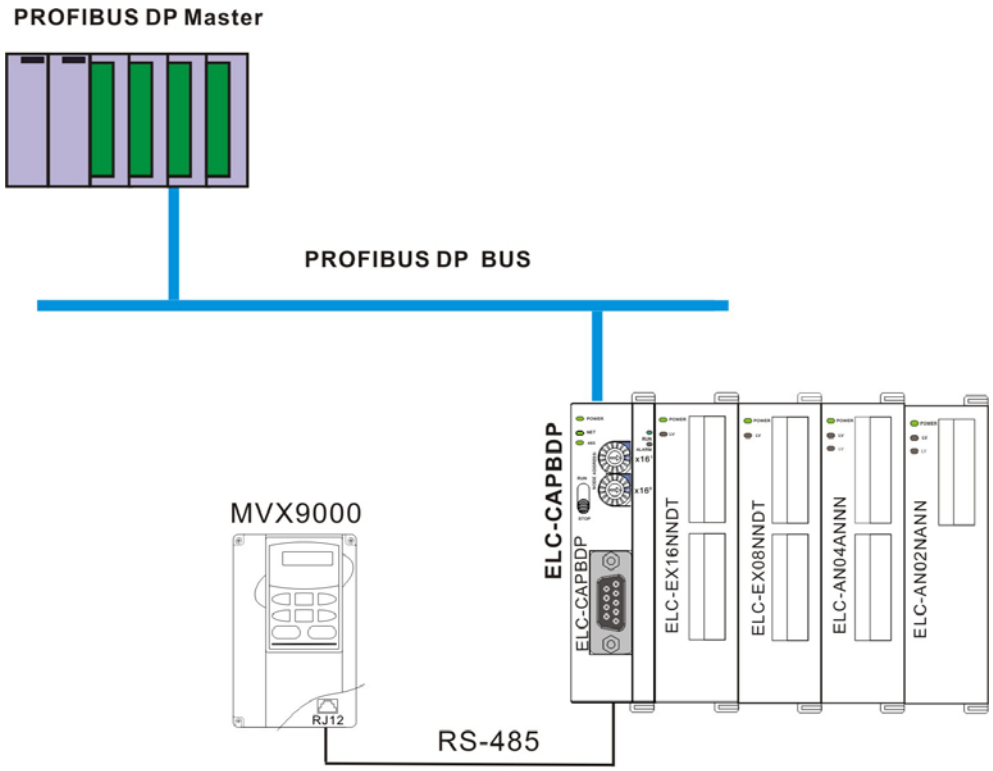
Example: If you need to set the node address of ELC-CAPBDP to 26 (decimal), simply switch $x16^1$ switch to "1" and $x16^0$ to "A". 26 (decimal) = 1A (hex) = $1x16^1 + Ax16^0$.

Note:

- Switch off the power supply before setting up the node address of ELC-CAPBDP. Re-power the module after the setup is completed.
- Changing the value on the switch during the operation of ELC-CAPBDP is invalid.
- Use slot type screwdriver to set up the switch.

- **Connecting to a PROFIBUS DP Network**

  See the figure below for the connection of ELC series I/O modules and Modbus devices into a PROFIBUS DP network.



- **Transmission Distance and Baud Rate**

  The baud rate range for PROFIBUS DP is 9.6kbps ~ 12Mbps, and the length of transmission cable varies with the transmission speed. The cable length ranges from 100m to 1,200m. See the table below for the baud rates ELC-CAPBDP supports and their corresponding cable lengths.

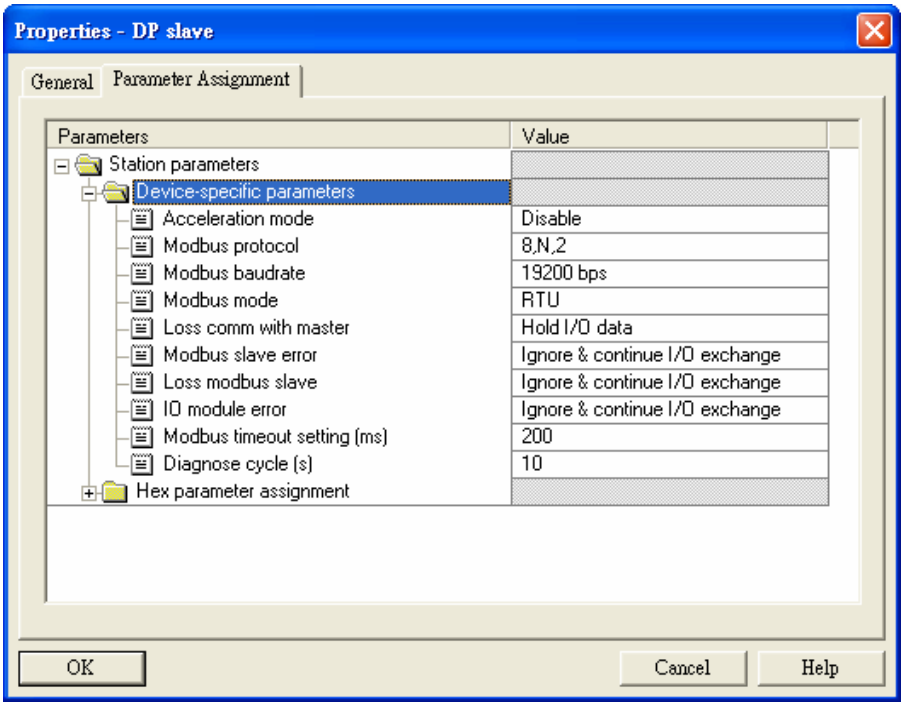
Baud rate (bps)	9.6k	19.2k	93.75k	187.5k	500k	1.5M	3M	6M	12M
Cable Length (m)	1,200	1,200	1,200	1,000	400	200	100	100	100

3.5 ELC-CAPBDP Settings and Configurations

The GSD file is a text file used to describe a PROFIBUS DP device (master or slave). A GSD file usually contains the supplier's information, baud rates supported and applicable I/O messages. When using the ELC-CAPBDP, import the ELC-CAPBDP GSD file into the configuration software for the PROFIBUS DP master you are using. After the file is imported, the configuration software for the master will display the ELC-CAPBDP and its configuration settings.

■ **ELC-CAPBDP Settings**

When you set up the ELC-CAPBDP in the configuration software for PROFIBUS DP master, you will be presented with multiple configuration settings, which adds flexibility to the use of the ELC-CAPBDP. See the figure below for ELC-CAPBDP settings.



Definitions of settings:

Setup item	Setting	Definition
Acceleration mode	Enable	When the Modbus device is configured with many addresses and the addresses are consecutive, all contents in the consecutive addresses can be read or written at a time.
	Disable	When the Modbus device is configured with many addresses, only contents in a single address can be read or written.
Modbus protocol	7, E, 1 7, O, 2 8, N, 1 7, O, 1 8, E, 1 8, N, 2 7, E, 2 8, O, 1	Modbus communication format (including data bit, stop bit and parity bit)
Modbus Baudrate	1,200bps 19,200bps 2,400bps 38,400bps 4,800bps 57,600bps 9,600bps 115,200bps	Modbus serial transmission speed
Modbus mode	RTU/ASCII	Modbus communication mode
Loss communication with master	Hold I/O data	ELC-CAPBDP retains the I/O data last received from the master.
	Clear I/O data	ELC-CAPBDP reset all the I/O data to 0 after communication from the master is lost.

Setup item	Setting	Definition
Modbus slave error	Ignore & continue I/O exchange	ELC-CAPBDP continues exchanging data with the master even when Modbus read/write error occurs.
	Stop I/O exchange &report fault	ELC-CAPBDP stops exchanging data with the master when Modbus read/write error occurs.
Loss Modbus slave	Ignore & continue I/O exchange	ELC-CAPBDP continues exchanging data with the master even when the Modbus slave is disconnected.
	Continue & report alarm	ELC-CAPBDP continues exchanging data with the master and alarms it when there is Modbus slave getting disconnected.
	Stop I/O exchange & report fault	ELC-CAPBDP stops exchanging data with the master and reports error to it when there is Modbus slave getting disconnected.
IO module error	Ignore & continue I/O exchange	ELC-CAPBDP continues exchanging data with the master even when error occurs in the right-side special I/O module.
	Continue & report alarm	ELC-CAPBDP continues exchanging data with the master and alarms it when error occurs in the right-side special I/O module.
IO module error	Stop I/O exchange & report fault	ELC-CAPBDP stops exchanging data with the master and reports error to it when error occurs in the right-side special I/O module.
Modbus timeout setting (ms)	0 ~ 65535	Modbus communication timeout. Unit: ms
Diagnose cycle (s)	1 ~ 20	Cycle for ELC-CAPBDP to diagnose the right-side special I/O module. Unit: s

- **Configuration Items**

ELC-CAPBDP offers flexible configuration when being configured in PROFIBUS DP master configuration tool, for example, you can configure digital I/O modules or special I/O modules by the actual name of the module, or self-define the configuration.

Configuration item	Configurable device	Configuration method
Modbus 1 read address	Modbus devices connected to ELC-CAPBDP	Modbus
Modbus 2 read address		
Modbus 4 read address		
Modbus 8 read address		
Modbus 1 write address		
Modbus 2 write address	Modbus devices connected to ELC-CAPBDP	Modbus

Configuration item	Configurable device	Configuration method
Modbus 4 write address	Modbus devices connected to ELC-CAPBDP	Modbus
Modbus 8 write address		
Modbus 1 read & write address		
Modbus 2 read & write address		
Modbus 4 read & write address		
Modbus 8 read & write address		
ELC-EX08NNDN	ELC-EX08NNDN connected to ELC-CAPBDP	Standard configuration method for digital I/O module
ELC-EX08NNNT	ELC-EX08NNNR or ELC-EX08NNNT connected to ELC-CAPBDP	
ELC-EX08NNDR/T	ELC-EX08NNDR or ELC-EX08NNDT connected to ELC-CAPBDP	
ELC-EX16NNDR/T	ELC-EX16NNDR or ELC-EX16NNDT connected to ELC-CAPBDP	
ELC-EX08NNSN	ELC-EX08NNSN module connected to ELC-CAPBDP	
8 DI	Digital I/O modules connected to ELC-CAPBDP	Self-defined configuration method for digital I/O module
8 DO		
8 DIDO		
16 DI		
16 DO		
16 DIDO		
32 DI		
32 DO		
32 DIDO		
64 DI		
64 DO		
64 DIDO		
ELC-AN04ANNN	ELC-AN04ANNN connected to ELC-CAPBDP	Standard configuration method for special I/O module
ELC-AN06ANNN	ELC-AN06ANNN connected to ELC-CAPBDP	
ELC-AN02NANN	ELC-AN02NANN connected to ELC-CAPBDP	
ELC-AN04NANN	ELC-AN04NANN connected to ELC-CAPBDP	Standard configuration method for special I/O

Configuration item	Configurable device	Configuration method
ELC-AN06AANN	ELC-AN06AANN connected to ELC-CAPBDP	module
ELC-PT04ANNN	ELC-PT04ANNN connected to ELC-CAPBDP	
ELC-TC04ANNN	ELC-TC04ANNN connected to ELC-CAPBDP	
1 AI	Special I/O modules connected to ELC-CAPBDP	Self-defined configuration method for special I/O module
2 AI		
4 AI		
8 AI		
1 AO		
2 AO		
4 AO		
8 AO		
1 AIAO		
2 AIAO		
4 AIAO		
8 AIAO		

- **Settings of Configuration Items**

  - Settings of Configuration Items for Digital I/O Modules

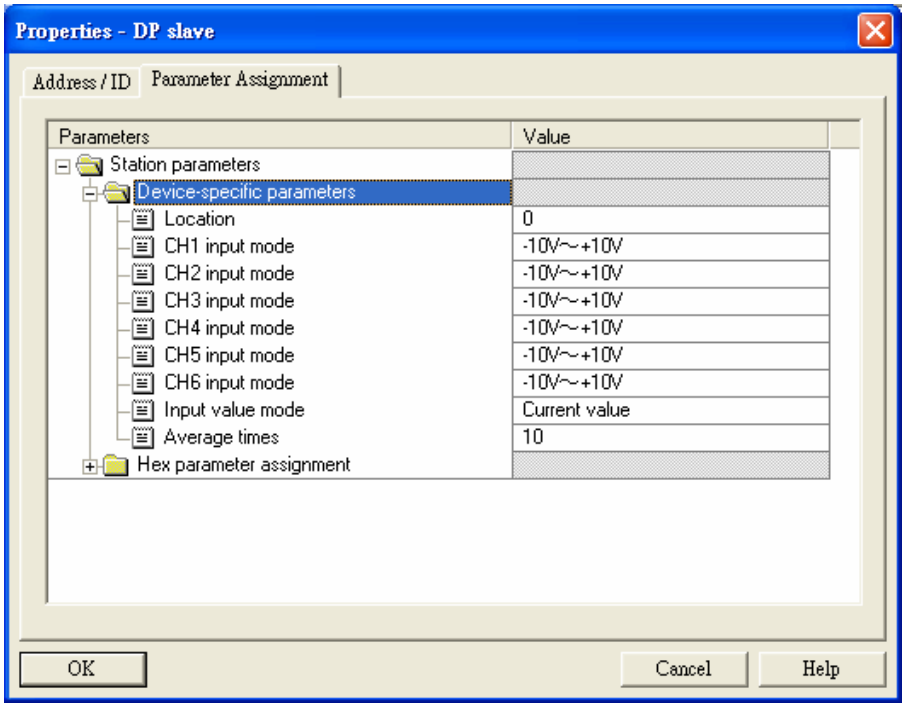
    There are 2 types of configuration items for digital I/O modules, standard configuration and self-defined configuration. By standard configuration, the digital I/O module is named after its actual name, whereas it is named after the number of points by self-defined configuration. You do not have to set up parameters in the configuration. The digital I/O can correspond to the master directly after the configuration

  - Settings of Configuration Items for Special I/O Modules

    The special I/O module is named after its actual name in the configuration. You can configure special I/O module by standard configuration items. Detailed configuration methods will be explained in the following paragraphs.

    (1) Configuration method for ELC-AN06ANNN and ELC-AN04ANNN

    Refer to the figure below for the relevant parameters to configure ELC-AN06ANNN. ELC-AN04ANNN and ELC-AN06ANNN have the same parameters to set, except that ELC-AN06ANNN has two more parameters for output channels to set than does ELC-AN04ANNN (Therefore, only the parameter settings for ELC-AN06ANNN are introduced in this section).



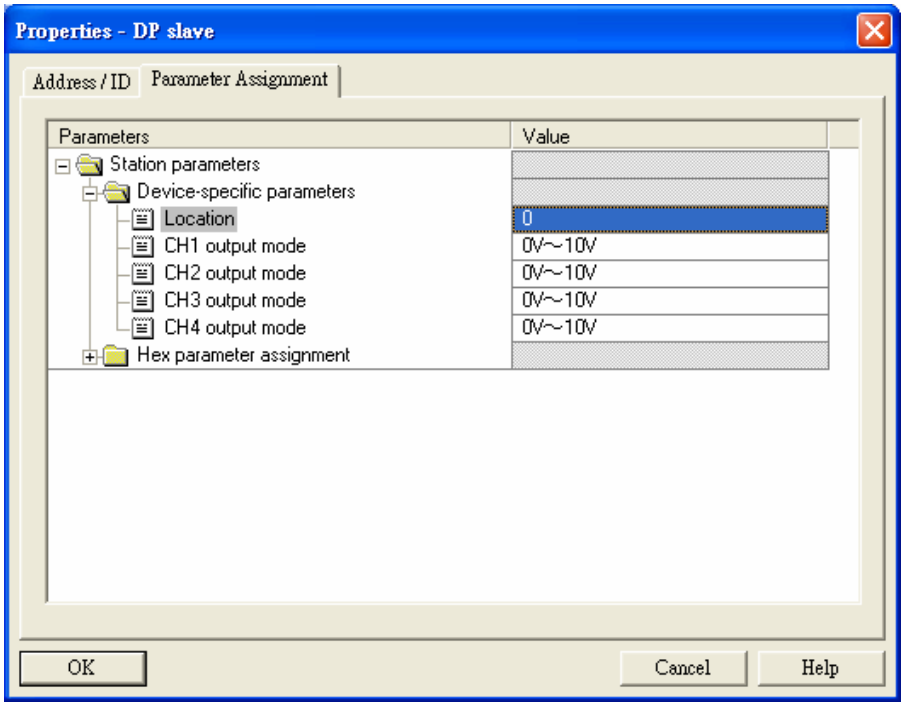
Definitions of configuration items:

Parameter	Value	Definition
Location	0 ~ 7	The location of ELC-AN06ANNN at the right side of ELC-CAPBDP. The location of the first special I/O module at the right side of ELC-CAPBDP is 0, the second is 1 and so forth. This rule is only applicable on special I/O modules.
CH1 input mode CH2 input mode CH3 input mode CH4 input mode CH5 input mode CH6 input mode	-10V ~ +10V	The input channel on ELC-AN06ANNN is set to mode 0: Voltage input mode. Input range: -10V ~ +10V
	-6V ~ +10V	The input channel on ELC-AN06ANNN is set to mode 1: Voltage input mode. Input range: -6V ~ +10V.
	-12mA ~ +20mA	The input channel on ELC-AN06ANNN is set to mode 2: Current input mode. Input range: -12mA ~ +20mA
	-20mA ~ +20mA	The input channel on ELC-AN06ANNN is set to mode 3: Current input mode. Input range: -20mA ~ +20mA
Input value mode	Current value	Current value of the input signal in all channels on ELC-AN06ANNN
	Average value	Average value of the input signals in all channels on ELC-AN06ANNN
Average times	1 ~ 4,096	The average times

(2) Configuration method for ELC-AN04NANN and ELC-AN02NANN

Refer to the figure below for the relevant parameters to configure ELC-AN04NANN. ELC-AN04NANN and ELC-AN02NANN have the same parameters to set, except that ELC-AN04NANN has two more parameters for input channels to set than does

ELC-AN02NANN (Therefore, only the parameter settings for ELC-AN04NANN are introduced in this section).

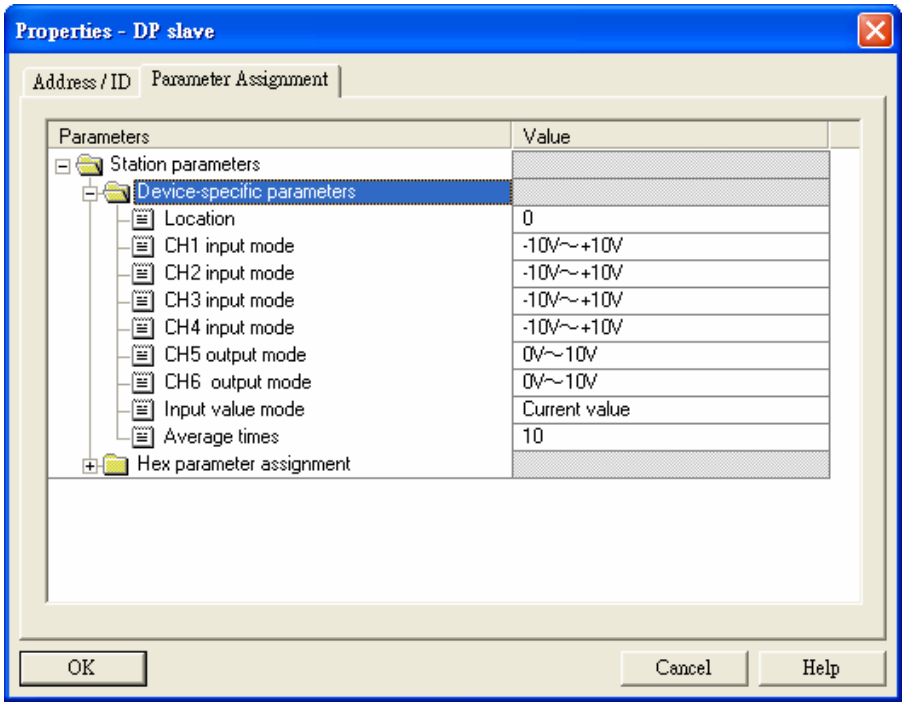


Definitions of configuration items:

Parameter	Value	Definition
Location	0 ~ 7	The location of ELC-AN04NANN at the right side of ELC-CAPBDP. The location of the first special I/O module at the right side of ELC-CAPBDP is 0, the second is 1 and so forth. This rule is only applicable on special I/O modules.
CH1 output mode CH2 output mode CH3 output mode CH4 output mode	0V ~ 10V	The output channel on ELC-AN04NANN is set to mode 0: Voltage output mode. Output range: 0V ~ +10V
	2V ~ 10V	The output channel on ELC-AN04NANN is set to mode 1: Voltage output mode. Output range: 2V ~ 10V
	4mA ~ 20mA	The output channel on ELC-AN04NANN is set to mode 2: Current output mode. Output range: 4mA ~ 20mA
	0mA ~ 20mA	The output channel on ELC-AN04NANN is set to mode 3: Current output mode. Output range: 0mA ~ 20mA

(3) Configuration method for ELC-AN06AANN

Refer to the figure below for the relevant parameters to configure ELC-AN06AANN.



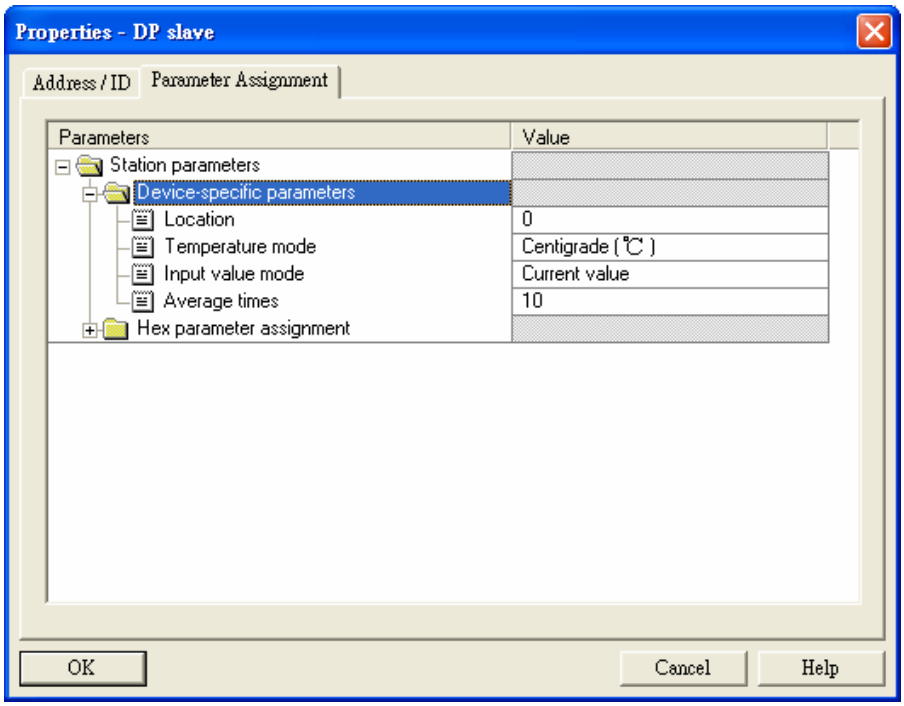
Definitions of configuration items:

Parameter	Value	Definition
Location	0 ~ 7	The location of ELC-AN06AANN at the right side of ELC-CAPBDP. The location of the first special I/O module at the right side of ELC-CAPBDP is 0, the second is 1 and so forth. This rule is only applicable on special I/O modules.
CH1 input mode CH2 input mode CH3 input mode CH4 input mode	-10V ~ +10V	The input channel on ELC-AN06AANN is set to mode 0: Voltage input mode. Input range: -10V ~ +10V
	-6V ~ +10V	The input channel on ELC-AN06AANN is set to mode 1: Voltage input mode. Input range: -6V ~ +10V
	-12mA ~ +20mA	The input channel on ELC-AN06AANN is set to mode 2: Current input mode. Input range: -12mA ~ +20mA
	-20mA ~ +20mA	The input channel on ELC-AN06AANN is set to mode 3: Current input mode. Input range: -20mA ~ +20mA
CH5 output mode CH6 output mode	0V ~ 10V	The output channel on ELC-AN06AANN is set to mode 0: Voltage output mode. Output range: 0V ~ +10V
	2V ~ 10V	The output channel on ELC-AN06AANN is set to mode 1: Voltage output mode. Output range: 2V ~ 10V
	4mA ~ 20mA	The output channel on ELC-AN06AANN is set to mode 2: Current output mode. Output range: 4mA ~ 20mA
	0mA ~ 20mA	The output channel on ELC-AN06AANN is set to mode 3: Current output mode. Output range: 0mA ~ 20mA

Parameter	Value	Definition
Input value mode	Current value	Current value of the input signal in CH1 ~ CH4 on ELC-AN06AANN
	Average value	Average value of the input signals in CH1 ~ CH4 on ELC-AN06AANN
Set average times	1 ~ 4,096	The average times

(4) Configuration method for ELC-PT04ANNN

Refer to the figure below for the relevant parameters to configure ELC-PT04ANNN.

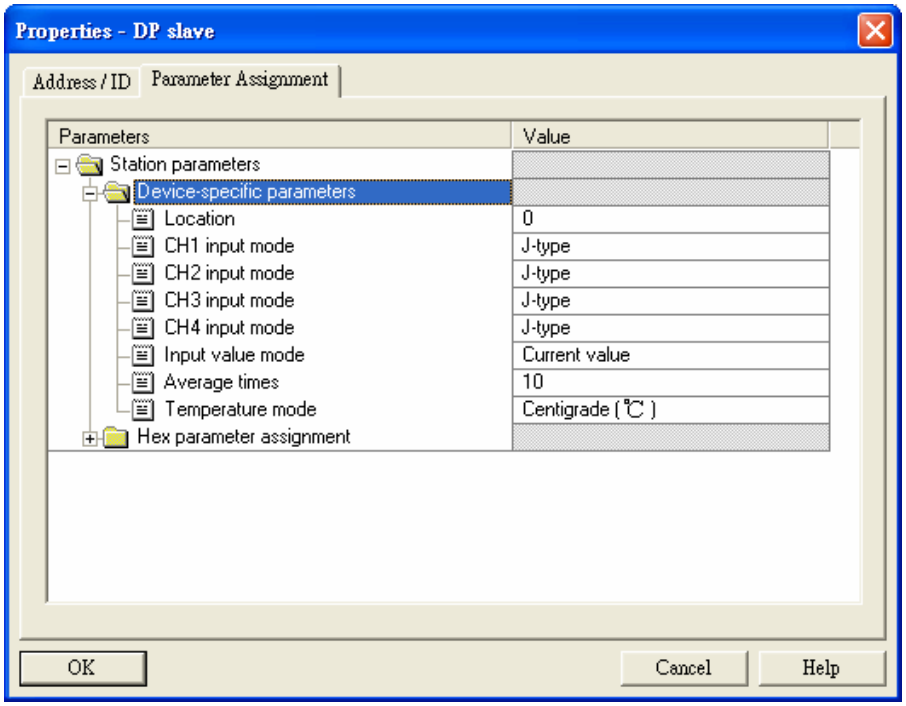


Definitions of configuration items:

Parameter	Value	Definition
Location	0 ~ 7	The location of ELC-PT04ANNN at the right side of ELC-CAPBDP. The location of the first special I/O module at the right side of ELC-CAPBDP is 0, the second is 1 and so forth. This rule is only applicable on special I/O modules.
Temperature mode	Centigrade (°C)	Collecting temperature in Centigrade by CH1 ~ CH4 on ELC-PT04ANNN
	Fahrenheit (°F)	Collecting temperature in Fahrenheit by CH1 ~ CH4 on ELC-PT04ANNN
Input value mode	Current value	Current value of the collected temperature at CH1 ~ CH4 on ELC-PT04ANNN
	Average value	Average value of the collected temperatures at CH1 ~ CH4 on ELC-PT04ANNN
Average times	1 ~ 4,096	The average times.

(5) Configuration method for ELC-TC04ANNN

Refer to the figure below for the relevant parameters to configure ELC-TC04ANNN.



Definitions of configuration items:

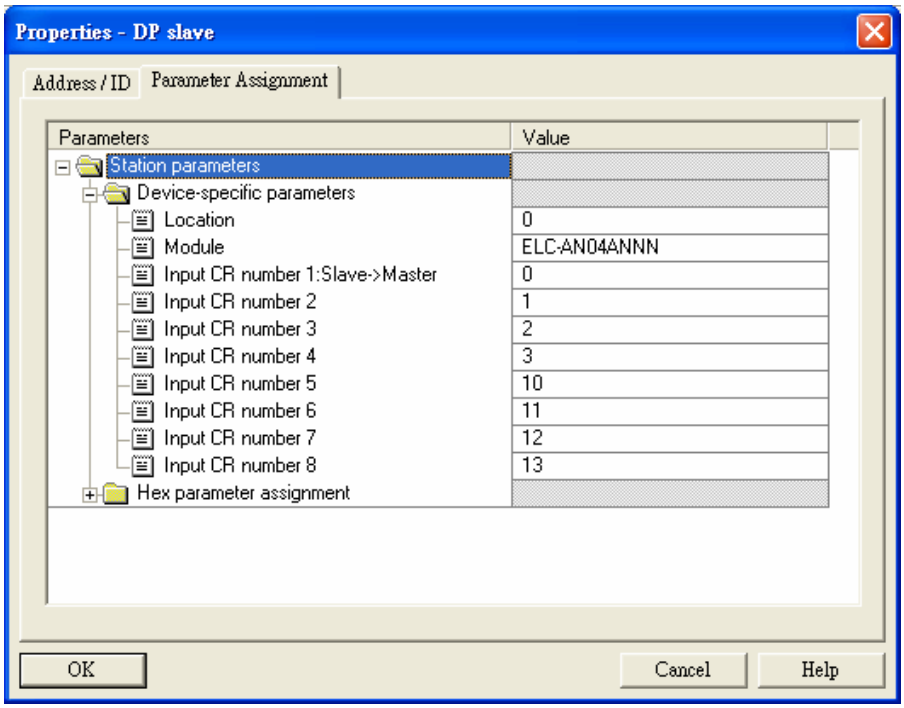
Parameter	Value	Definition
Location	0 ~ 7	The location of ELC-TC04ANNN at the right side of ELC-CAPBDP. The location of the first special I/O module at the right side of ELC-CAPBDP is 0, the second is 1 and so forth. This rule is only applicable on special I/O modules.
CH1 input mode	J, K, R, S, T	Thermocouple type for CH1 on ELC-TC04ANNN
CH2 input mode	J, K, R, S, T	Thermocouple type for CH2 on ELC-TC04ANNN
CH3 input mode	J, K, R, S, T	Thermocouple type for CH3 on ELC-TC04ANNN
CH4 input mode	J, K, R, S, T	Thermocouple type for CH4 on ELC-TC04ANNN
Input value mode	Current value	Current value of the collected temperature at CH1 ~ CH4 on ELC-TC04ANNN
	Average value	Average value of the collected temperatures at CH1 ~ CH4 on ELC-TC04ANNN
average times	1 ~ 4,096	The average times
Temperature mode	Centigrade (°C)	Collecting temperature in Centigrade by CH1 ~ CH4 on ELC-TC04ANNN
	Fahrenheit (°F)	Collecting temperature in Fahrenheit by CH1 ~ CH4 on ELC-TC04ANNN

- Self-Defined Configuration Settings for Special I/O Modules

  In self-defined configuration, special I/O modules are named after their configurable number of control registers (CR). You can choose the CR in the special I/O module to be read or written when configuring. See the following paragraphs for the meanings of each configuration item.

  (1) Configuration method for 8AI, 4AI, 2AI and 1AI modules

  Refer to the figure below for the relevant parameters to configure an 8AI module. 8AI, 4AI, 2AI and 1AI modules have the same parameters to set, except that the number of configurable CRs in 1AI, 2AI and 4AI modules is different from that of 8AI module (Therefore, only the parameter settings for 8AI are introduced in this section).



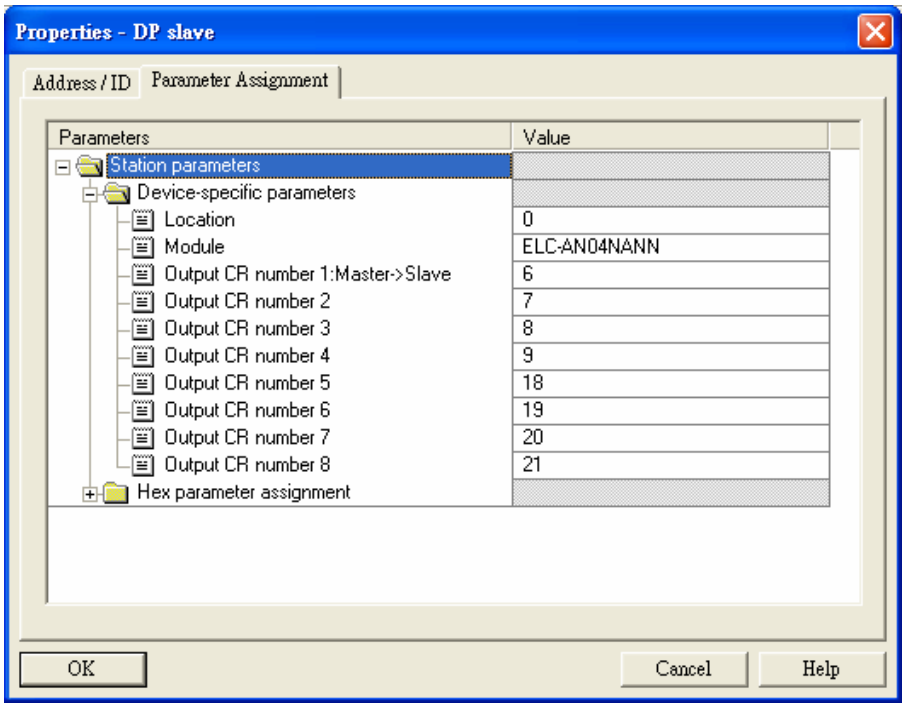
Definitions of configuration items:

Parameter	Value	Definition
Location	0 ~ 7	The location of the special I/O module at the right side of ELC-CAPBDP. The location of the first special I/O module at the right side of ELC-CAPBDP is 0, the second is 1 and so forth. This rule is only applicable on special I/O modules.
Module	ELC-AN04ANNN ELC-AN06ANNN ELC-AN02NANN ELC-AN04NANN ELC-AN06AANN ELC-PT04ANNN ELC-TC04ANNN ELC-MC01	Special I/O module in use

Parameter	Value	Definition
Input CR number 1: Slave → Master	0 ~ 48	No. of the CR in special I/O module to be read by PROFIBUS DP master
Input CR number 2	0 ~ 48	
Input CR number 3	0 ~ 48	
Input CR number 4	0 ~ 48	
Input CR number 5	0 ~ 48	
Input CR number 6	0 ~ 48	
Input CR number 7	0 ~ 48	
Input CR number 8	0 ~ 48	

(2) Configuration method for 8AO, 4 AO, 2AO and 1AO modules

Refer to the figure below for the relevant parameters to configure an 8AI module. 8AO, 4AO, 2AO and 1AO modules have the same parameters to set, except that the number of configurable CRs in 1AO, 2AO and 4AO modules is different from that of 8AO module (Therefore, only the parameter settings for 8AO are introduced in this section).



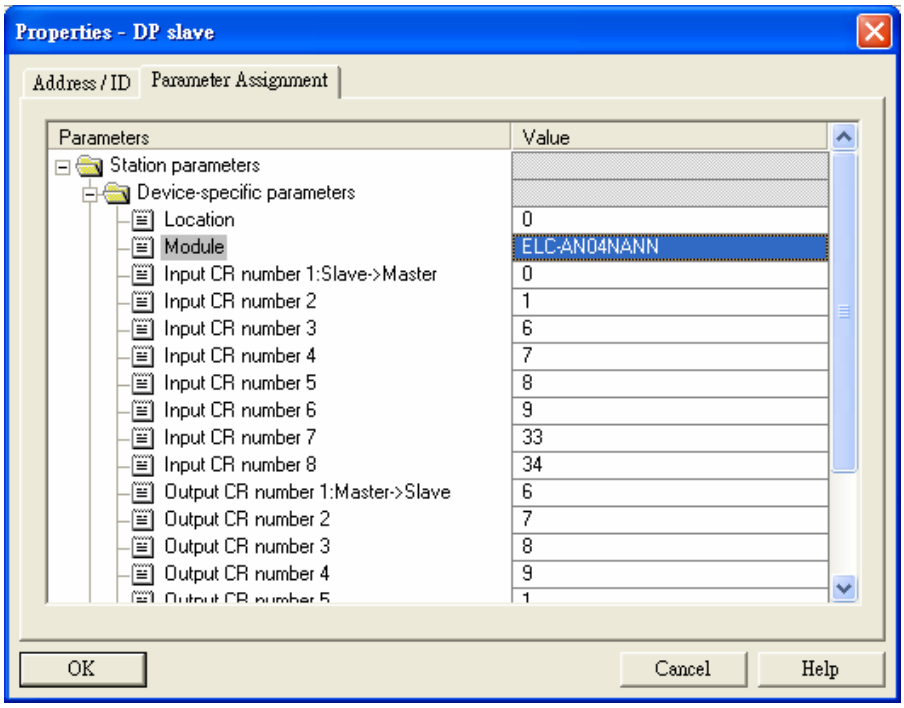
Definitions of configuration items:

Parameter	Value	Definition
Location	0 ~ 7	The location of the special I/O module at the right side of ELC-CAPBDP. The location of the first special I/O module at the right side of ELC-CAPBDP is 0, the second is 1 and so forth. This rule is only applicable on special I/O modules.

Parameter	Value	Definition
Module	ELC-AN04ANNN ELC-AN06ANNN ELC-AN02NANN ELC-AN04NANN ELC-AN06AANN ELC-PT04ANNN ELC-TC04ANNN ELC-MC01	Special I/O module in use
Output CR number 1: Master → Slave	0 ~ 48	No. of the CR in special I/O module to be written by PROFIBUS DP master
Output CR number 2	0 ~ 48	
Output CR number 3	0 ~ 48	
Output CR number 4	0 ~ 48	
Output CR number 5	0 ~ 48	
Output CR number 6	0 ~ 48	
Output CR number 7	0 ~ 48	
Output CR number 8	0 ~ 48	

(3) Configuration method for 8AIAO, 4AIAO, 2AIAO and 1AIAO modules

Refer to the figure below for the relevant parameters to configure an 8AIAO module. 8AIAO, 4AIAO, 2AIAO and 1AIAO modules have the same parameters to set, except that the number of configurable CRs in 1AIAO, 2AIAO and 4AIAO modules is different from that of 8AIAO module (Therefore, only the parameter settings for 8AIAO are introduced in this section).



Definitions of configuration items:

Parameter	Value	Definition
Location	0 ~ 7	The location of the special I/O module on the right side of ELC-CAPBDP. The location of the first special I/O module on the right side of ELC-CAPBDP is 0, the second is 1 and so forth. This rule is only applicable on special I/O modules.
Module	ELC-AN04ANNN ELC-AN06ANNN ELC-AN02NANN ELC-AN04NANN ELC-AN06AANN ELC-PT04ANNN ELC-TC04ANNN ELC-MC01	Special I/O module in use
Input CR number 1: Slave → Master	0 ~ 48	No. of the CR in special I/O module to be read by PROFIBUS DP master
Input CR number 2	0 ~ 48	
Input CR number 3	0 ~ 48	
Input CR number 4	0 ~ 48	
Input CR number 5	0 ~ 48	
Input CR number 6	0 ~ 48	
Input CR number 7	0 ~ 48	
Input CR number 8	0 ~ 48	
Output CR number 1: Master → Slave	0 ~ 48	No. of the CR in special I/O module to be written by PROFIBUS DP master
Output CR number 2	0 ~ 48	
Output CR number 3	0 ~ 48	
Output CR number 4	0 ~ 48	
Output CR number 5	0 ~ 48	
Output CR number 6	0 ~ 48	
Output CR number 7	0 ~ 48	
Output CR number 8	0 ~ 48	

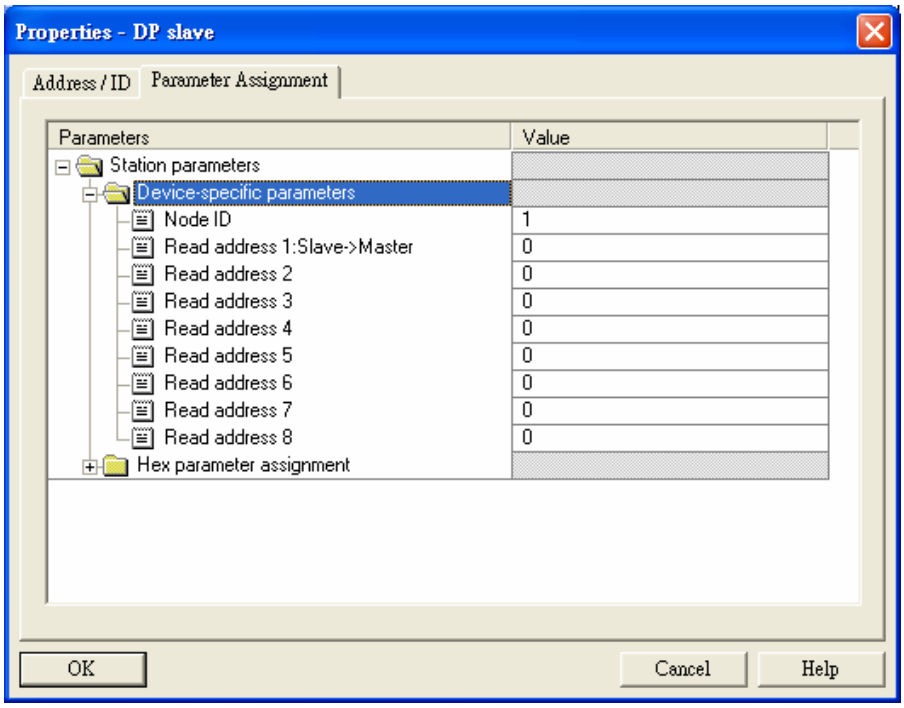
- Modbus Configuration Settings

  In Modbus configuration, parameters are named after the address of configurable Modbus device. See the following paragraphs for the meanings of each configuration item.

  (1) Configuration method for Modbus 8 read address, Modbus 4 read address, Modbus 2 read address and Modbus 1 read address

  Refer to the figure below for the relevant parameters to configure Modbus 8 read address. Modbus 8 read address, Modbus 4 read address, Modbus 2 read address

and Modbus 1 read address have the same parameters to set, except that the addresses of configurable Modbus device for Modbus 4 read address, Modbus 2 read address and Modbus 1 read address are different from that of Modbus 8 read address (Therefore, only the parameter settings for Modbus 8 read address are introduced in this section).



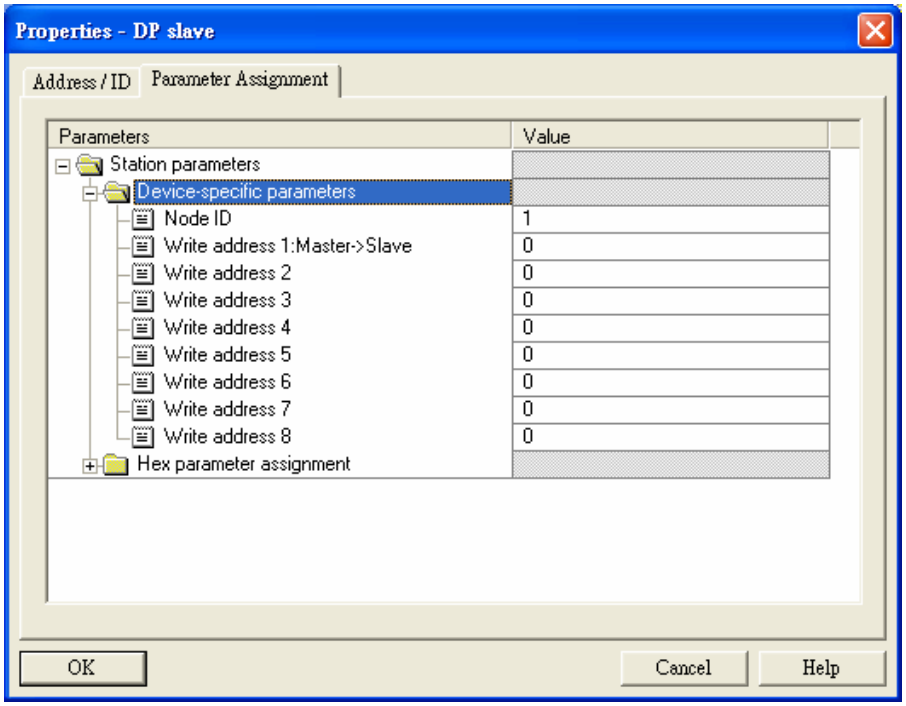
Definitions of configuration items:

Parameter	Value	Definition
Node ID	1 ~ 254	Address of Modbus device connected to ELC-CAPBDP
Read address 1: Slave → Master	0 ~ 65535	Parameter address of Modbus device to be read by PROFIBUS DP master
Read address 2	0 ~ 65535	
Read address 3	0 ~ 65535	
Read address 4	0 ~ 65535	
Read address 5	0 ~ 65535	
Read address 6	0 ~ 65535	
Read address 7	0 ~ 65535	
Read address 8	0 ~ 65535	

(2) Configuration method for Modbus8 write address, Modbus 4 write address, Modbus 2 write address, and Modbus 1 write address

Refer to the figure below for the relevant parameters to configure Modbus 8 write address. Modbus 8 write address, Modbus 4 write address, Modbus 2 write address and Modbus 1 write address have the same parameters to set, except that the addresses of configurable Modbus device for Modbus 4 write address, Modbus 2 write address and Modbus 1 write address are different from that of Modbus 8

write address (Therefore, only the parameter settings for Modbus 8 write address are introduced in this section).



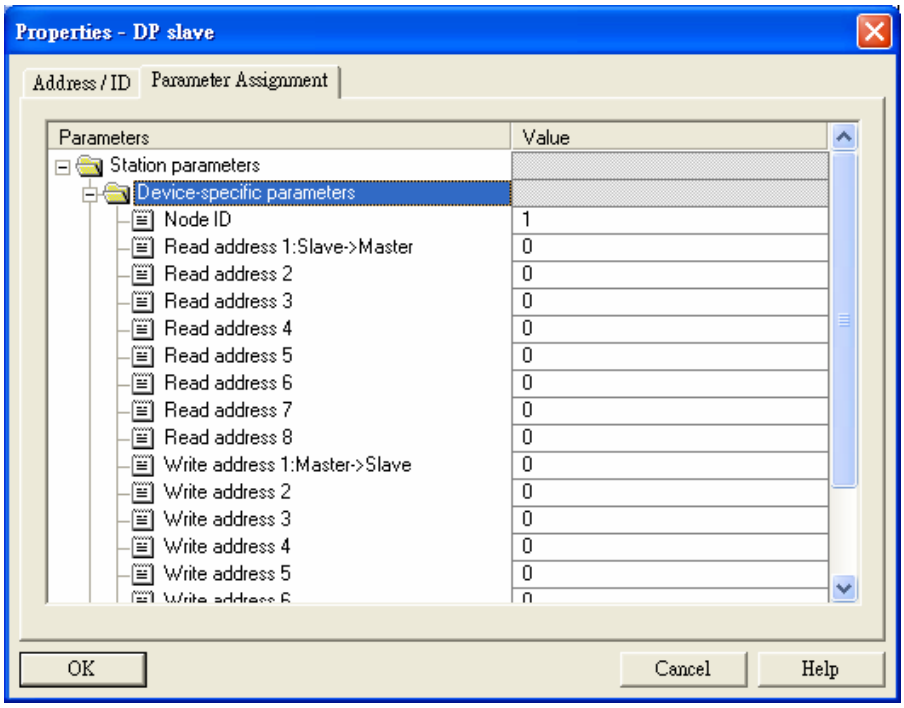
Definitions of configuration items:

Parameter	Value	Definition
Node ID	1 ~ 254	Address of Modbus device connected to ELC-CAPBDP
Write address 1 : Master → Slave	0 ~ 65535	Parameter address of Modbus device to be written by PROFIBUS DP master
Write address 2	0 ~ 65535	
Write address 3	0 ~ 65535	
Write address 4	0 ~ 65535	
Write address 5	0 ~ 65535	
Write address 6	0 ~ 65535	
Write address 7	0 ~ 65535	
Write address 8	0 ~ 65535	

(3) Configuration method for Modbus 8 read & write address, Modbus 4 read & write address, Modbus 2 read & write address and Modbus 1 read & write address

Refer to the figure below for the relevant parameters to configure Modbus 8 read & write address. Modbus 8 read & write address, Modbus 4 read & write address, Modbus 2 read & write address and Modbus 1 read & write address have the same parameters to set, except that the addresses of configurable Modbus device for Modbus 4 read & write address, Modbus 2 read & write address and Modbus 1 read & write address are different from that of Modbus 8 read & write address (Therefore, only the parameter settings for Modbus 8 read & write address are introduced in

this section).

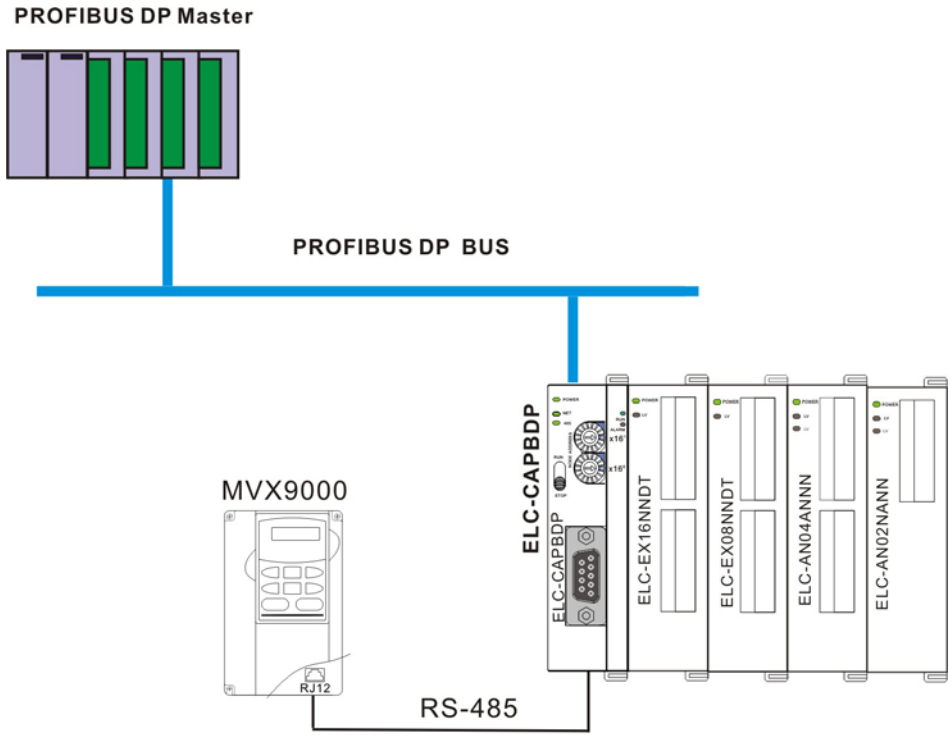


Definitions of configuration items:

Parameter	Value	Definition
Node ID	1 ~ 254	Address of Modbus device connected to ELC-CAPBDP
Read address 1: Slave → Master	0 ~ 65535	Parameter address of Modbus device to be read by PROFIBUS DP master
Read address 2	0 ~ 65535	
Read address 3	0 ~ 65535	
Read address 4	0 ~ 65535	
Read address 5	0 ~ 65535	Parameter address of Modbus device to be read by PROFIBUS DP master
Read address 6	0 ~ 65535	
Read address 7	0 ~ 65535	
Read address 8	0 ~ 65535	
Write address 1: Master → Slave	0 ~ 65535	Parameter address of Modbus device to be written by PROFIBUS DP master
Write address 2	0 ~ 65535	
Write address 3	0 ~ 65535	
Write address 4	0 ~ 65535	
Write address 5	0 ~ 65535	
Write address 6	0 ~ 65535	
Write address 7	0 ~ 65535	
Write address 8	0 ~ 65535	

3.6 Application example: Exchange data with Siemens S7-300 PLC

S7-300 as the PROFIBUS DP master; ELC-CAPBDP as the slave. See the PROFIBUS DP network in the figure below.

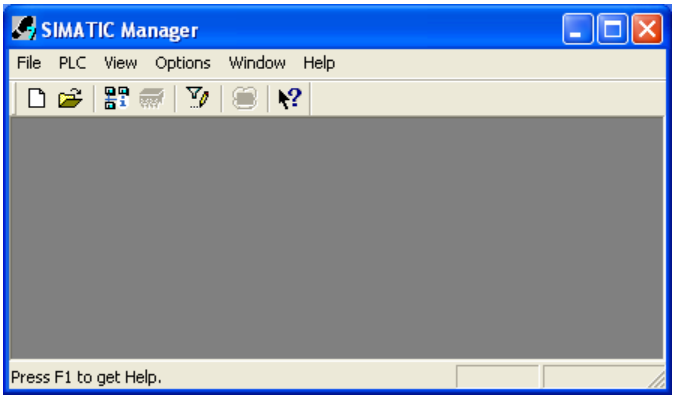


1. Set the PROFIBUS address of ELC-CAPBDP to “1”.
2. Connect ELC-CAPBDP to ELC-EX16NNDT, ELC-EX08NNDT, ELC-AN04ANNN and ELC-AN02NANN in order at its right hand side. Make sure the connection and wiring between ELC-CAPBDP and the special I/O modules and to the entire network is correct.

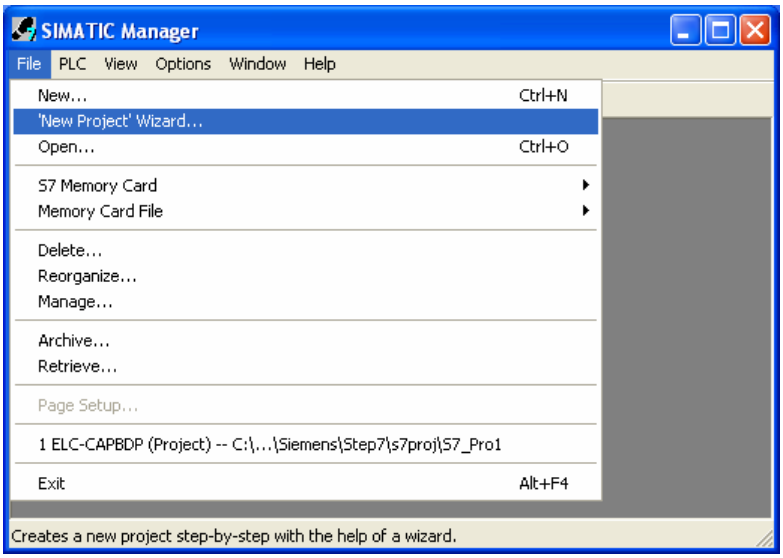
3.6.1 Configuring the ELC-CAPBDP (software configuration):

- **Create a new project**

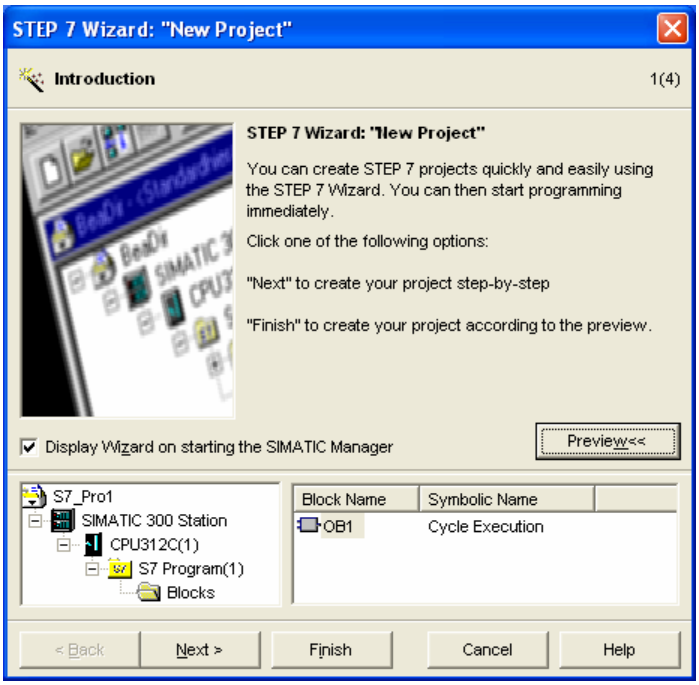
  Open SIMATIC Manager.



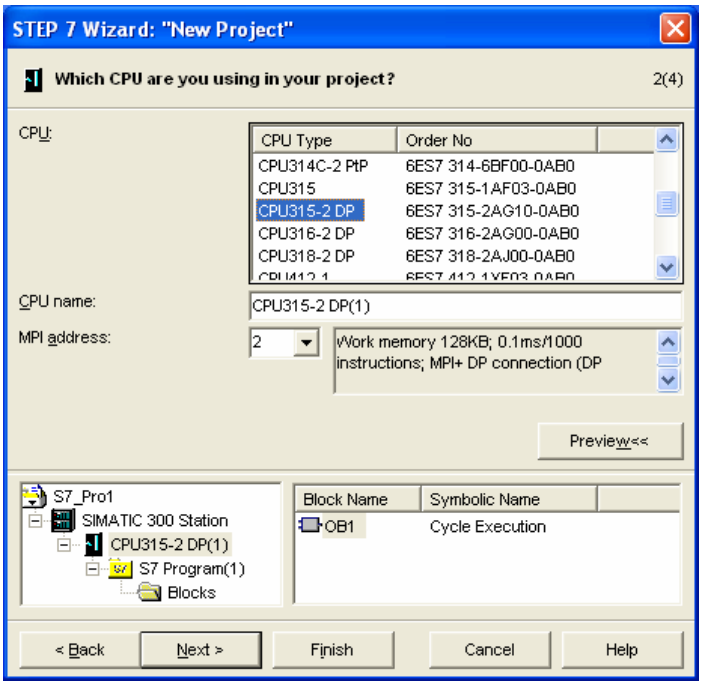
1. Select “File” => “New Project Wizard”.



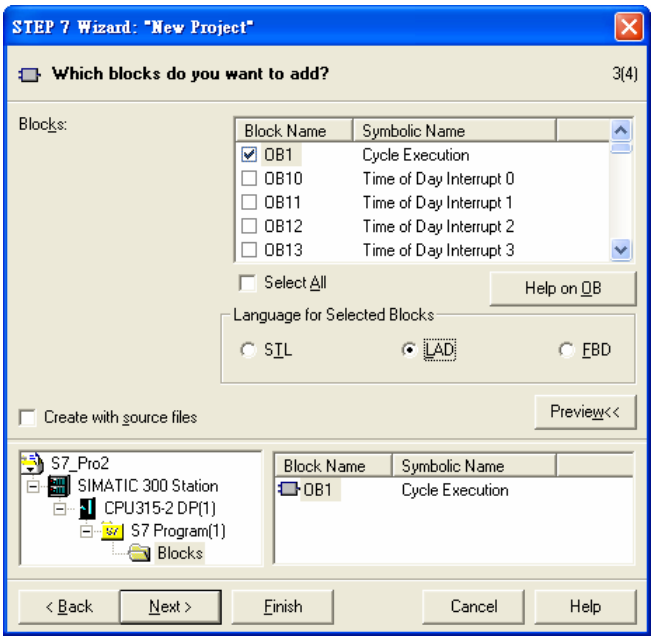
2. Click “Next” in the wizard.



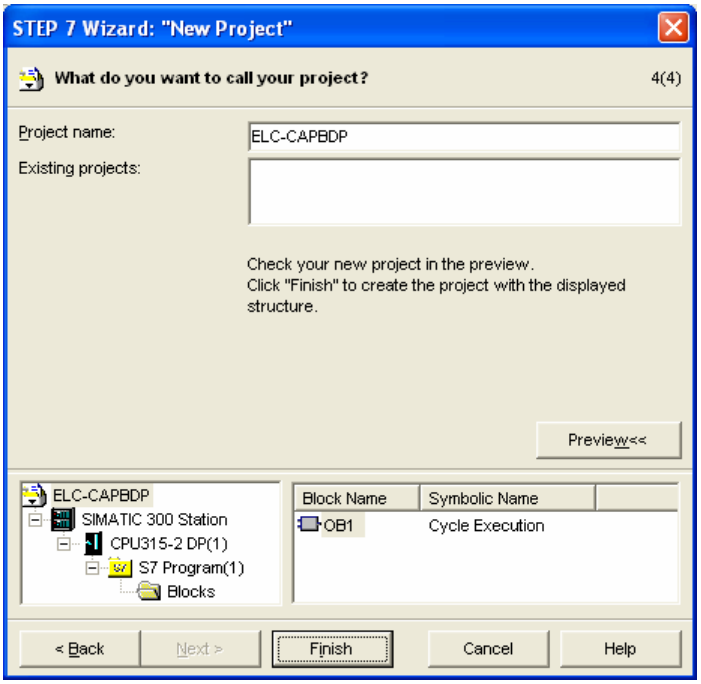
3. Select “CPU315-2 DP” for CPU as we are using the S7-300 model. Click “Next”.



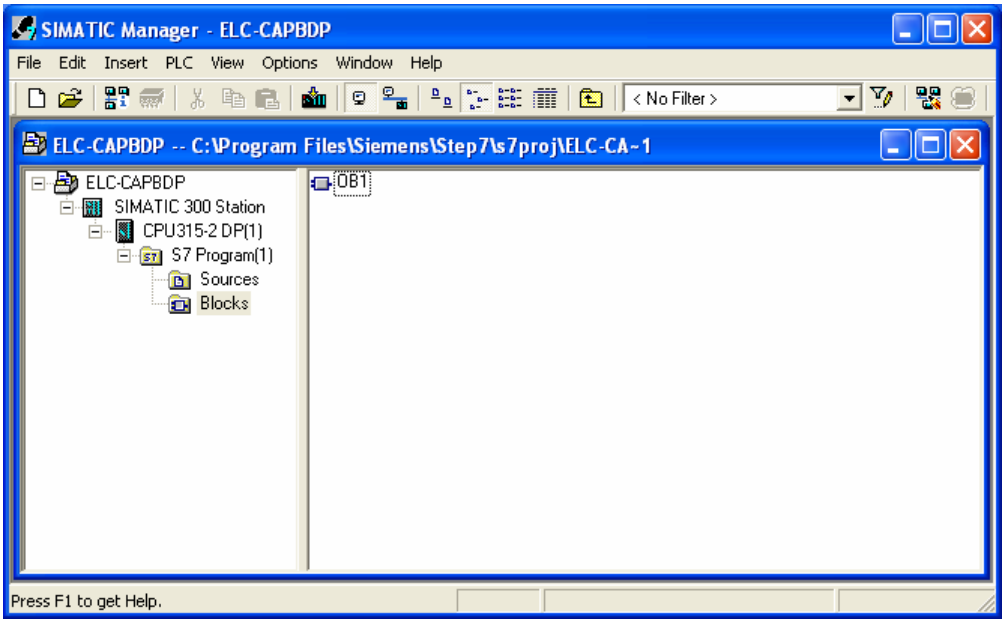
4. Select the block we need and click “Next”.



5. Enter the project name and click “Finish”.

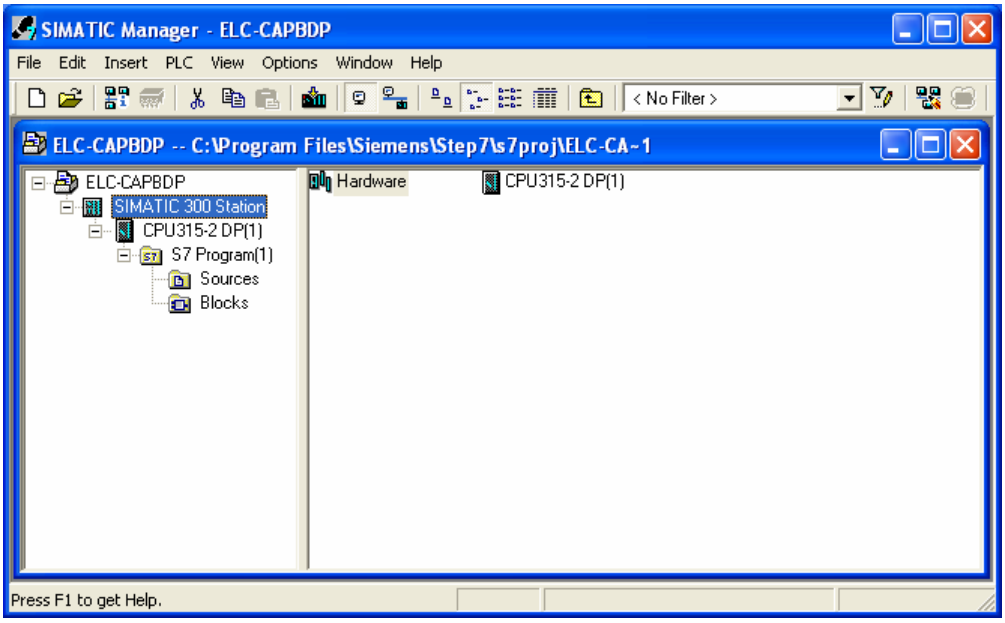


6. A new window will appear after the project is created.

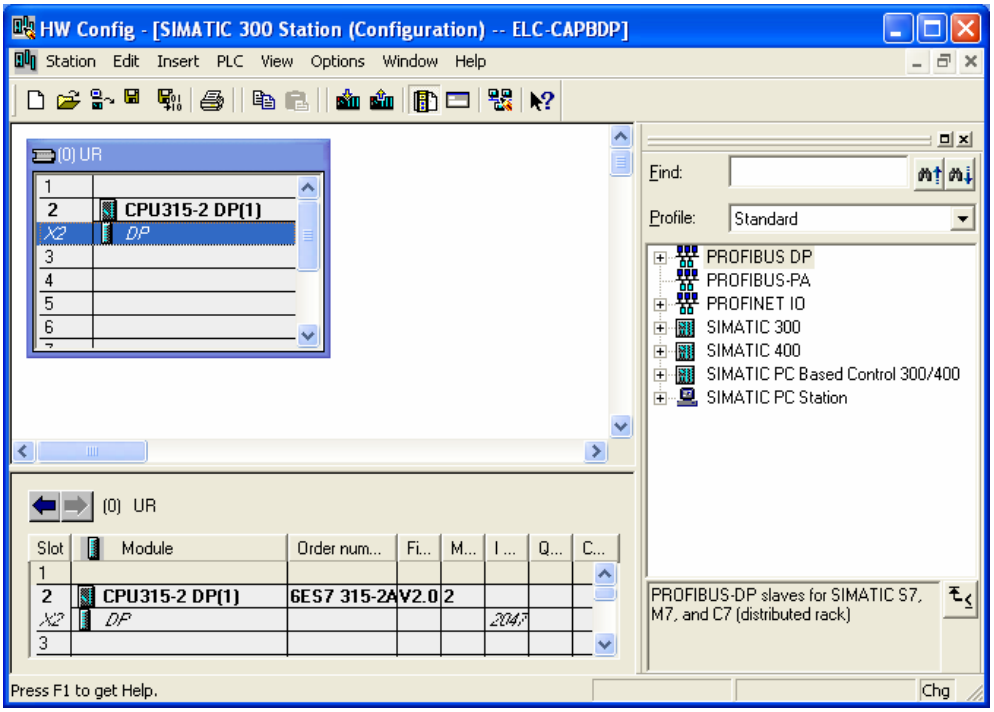


- **Add PROFIBUS DP bus**

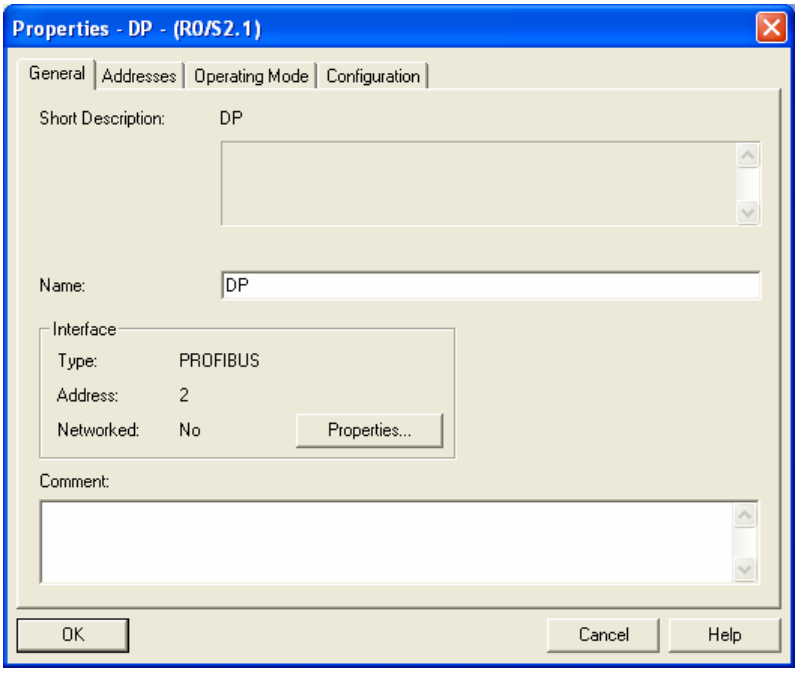
1. Select “SIMATIC 300 Station” in the project created. Double click “Hardware” and a new window (HW-Config) will appear.



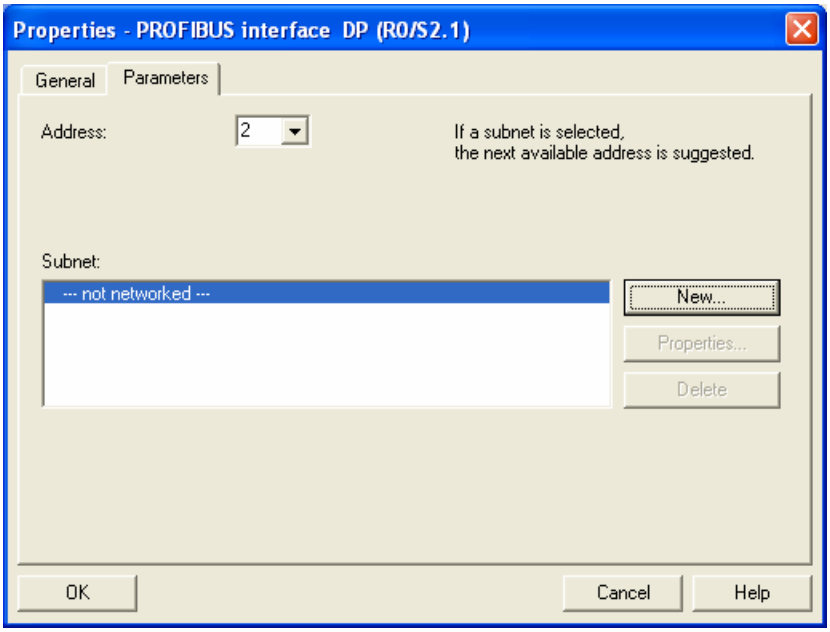
2. In the “HW Config” window, double click “DP” in the left-hand side column and a dialog box will appear.



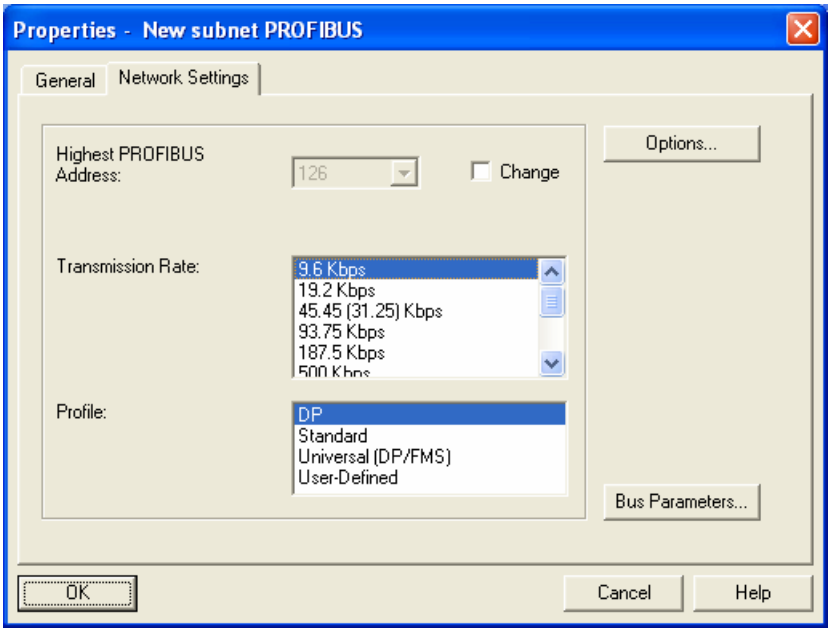
3. Click “Properties” in the dialog box, leading to another dialog box.



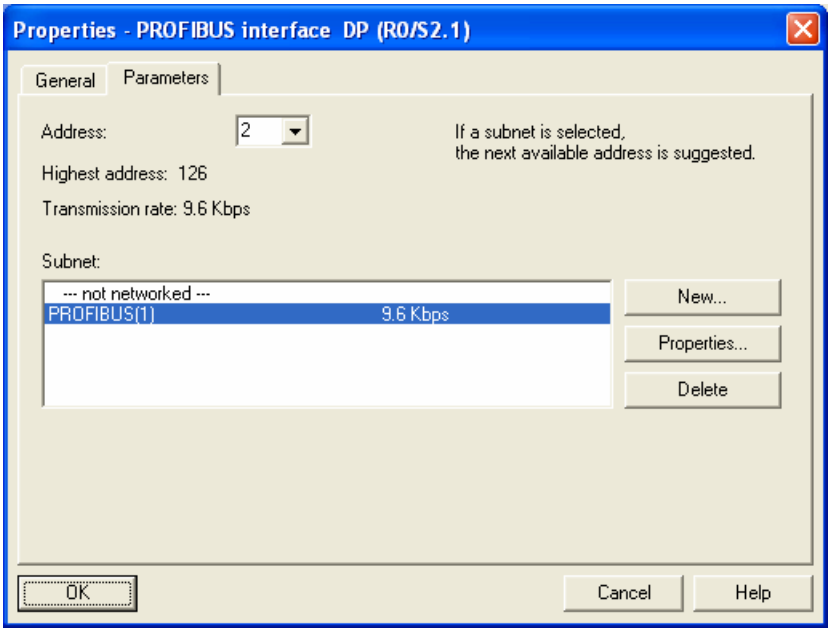
4. Select “Address” in the dialog box to be the address of the master. Then Click “New” to go to the next dialog box.



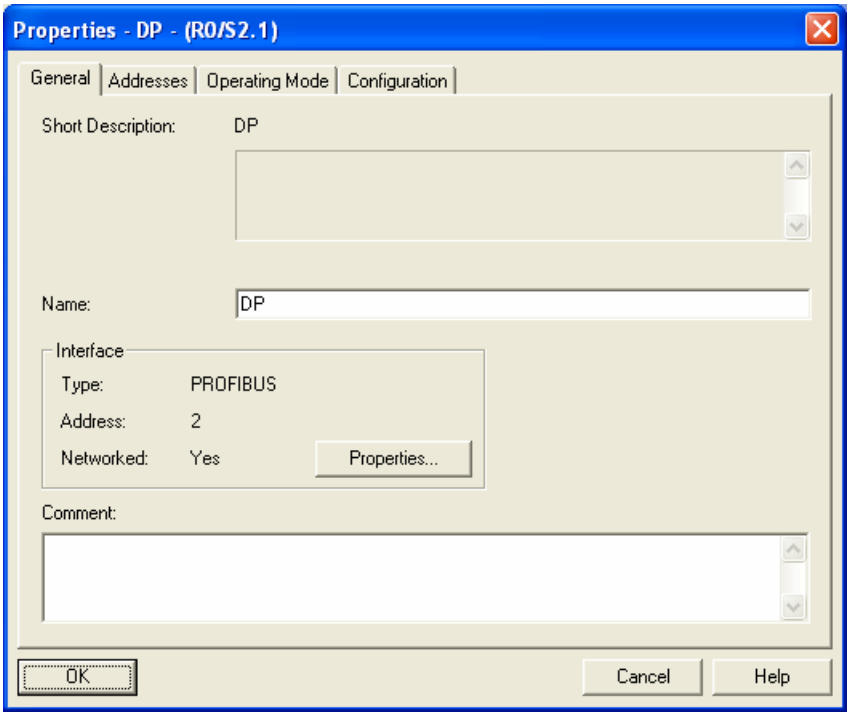
5. Select communication speed and bus type, and then click “OK”.



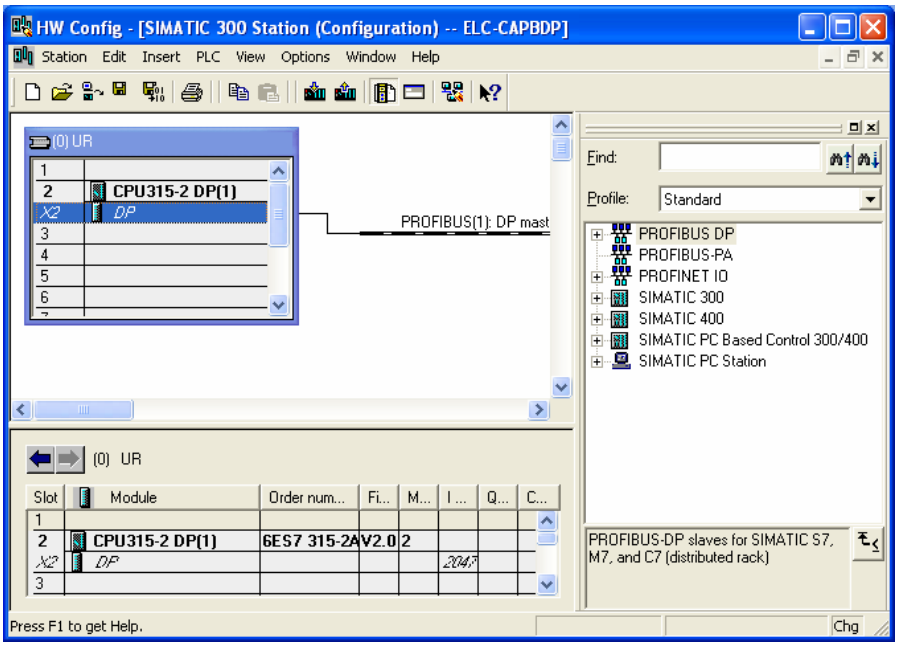
6. Confirm the communication speed and master address for PROFIBUS DP bus, then click “OK”.



7. Confirm the information on the PROFIBUS DP bus in the dialog box and click “OK”.

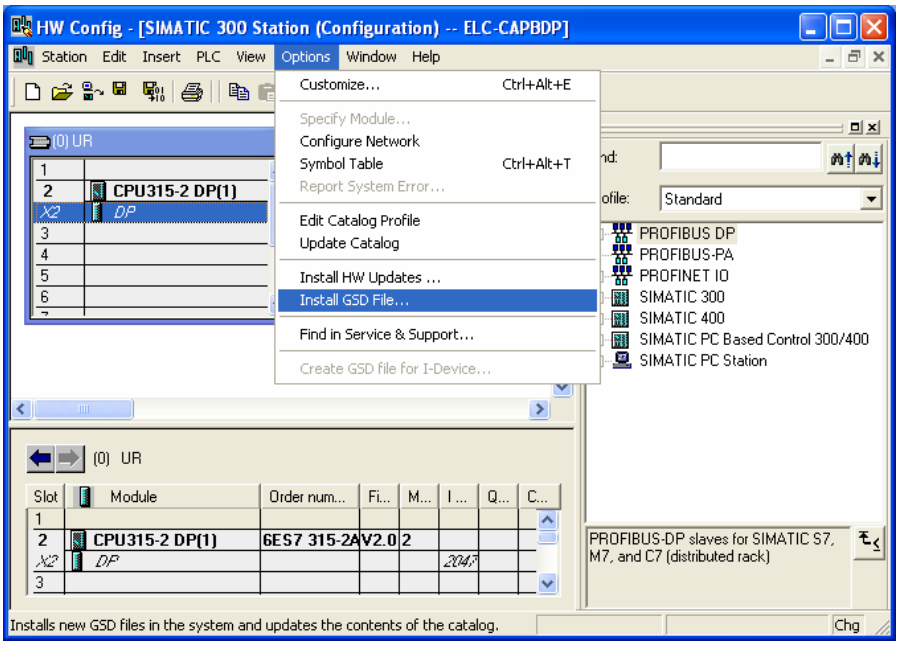


8. Once all the parameters are set, a PROFIBUS DP bus will appear after the UR window.

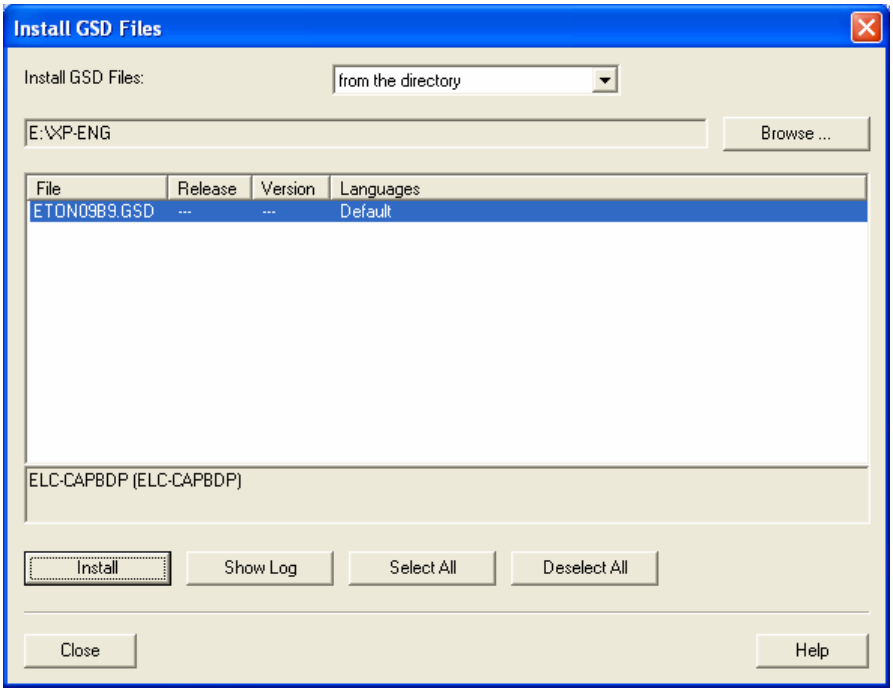


- **Add GSD file**

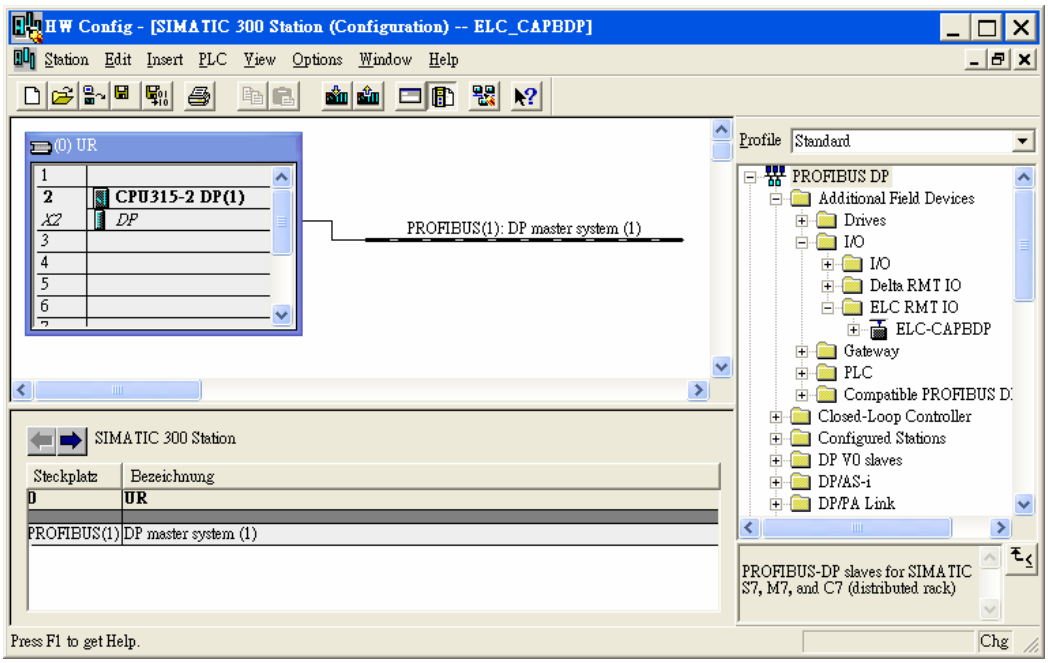
1. Select “Options” => “Install GSD File” in the HW Config window.



2. Find the path of the GSD file, select it and click “Install” to add the GSD file needed.

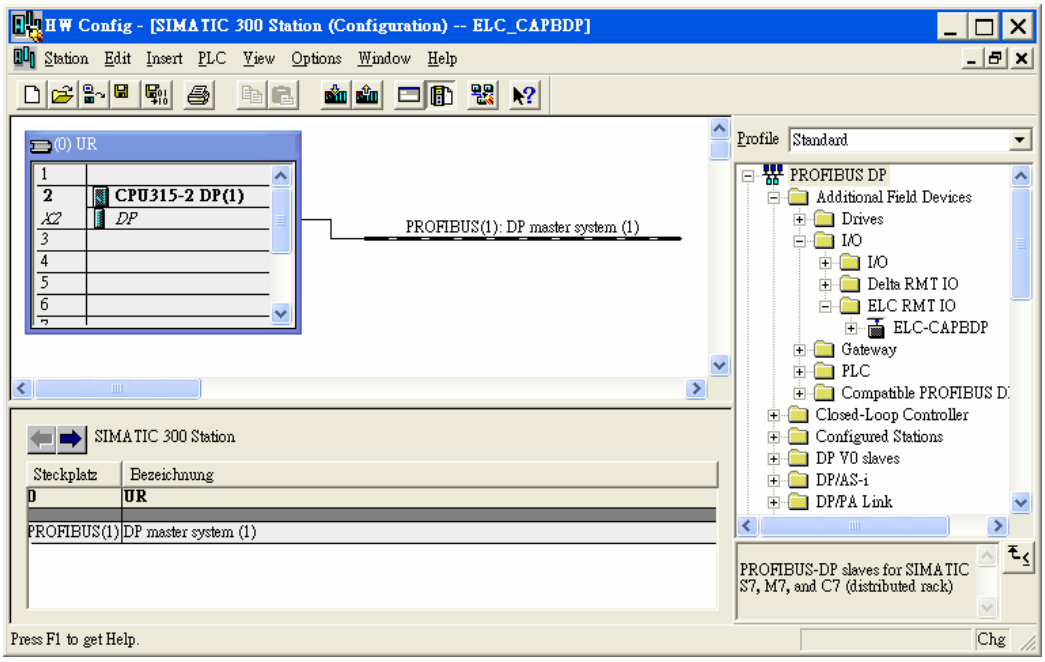


3. We can then see ELC-CAPBDP in the right-hand side column. ELC-CAPBDP is the module added.

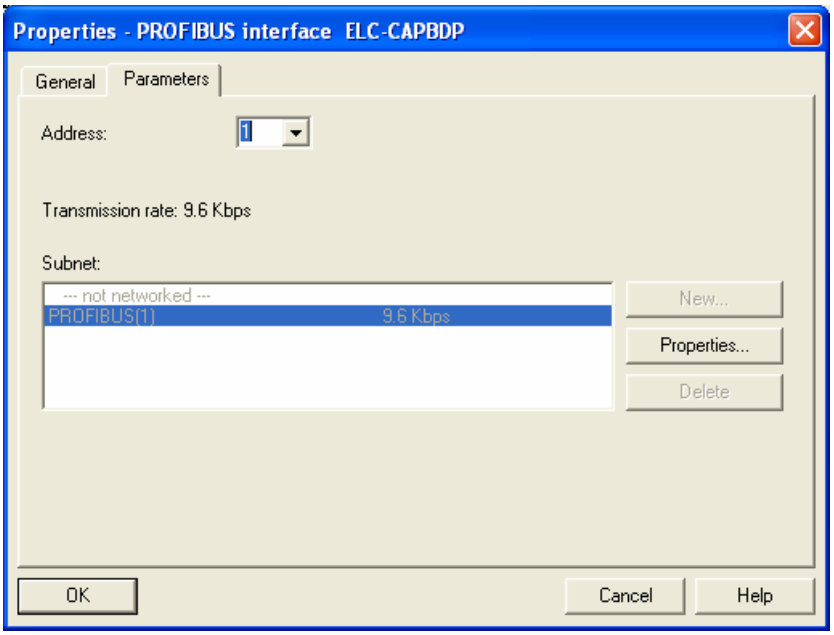


■ **Add ELC-CAPBDP slave and set up parameters**

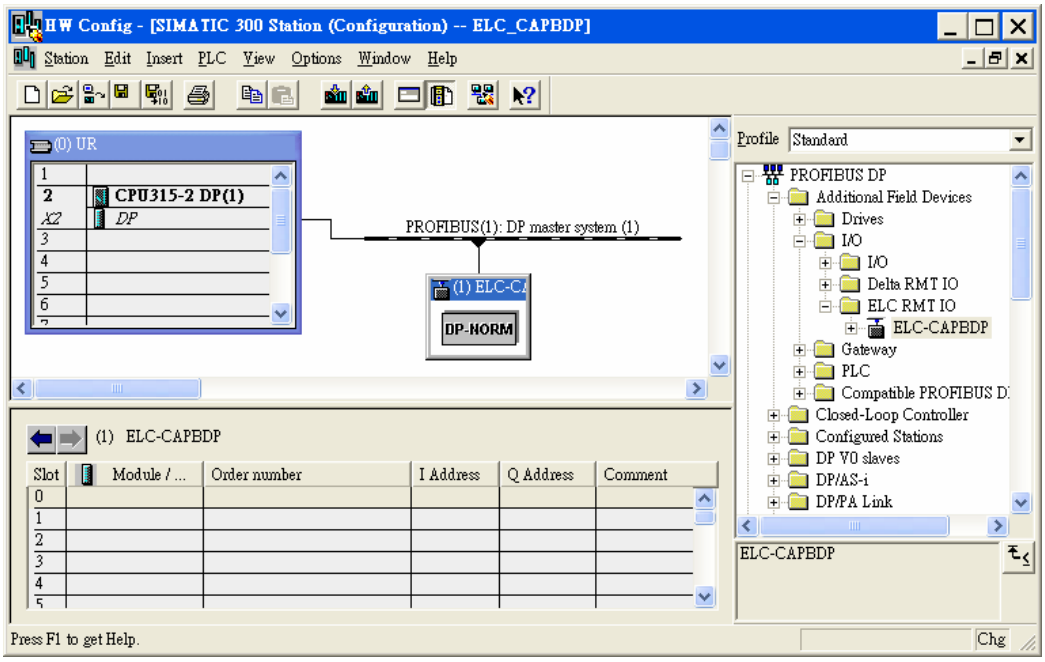
1. Select PROFIBUS DP on the right-hand side column and double click “ELC-CAPBDP” to open a dialog box.



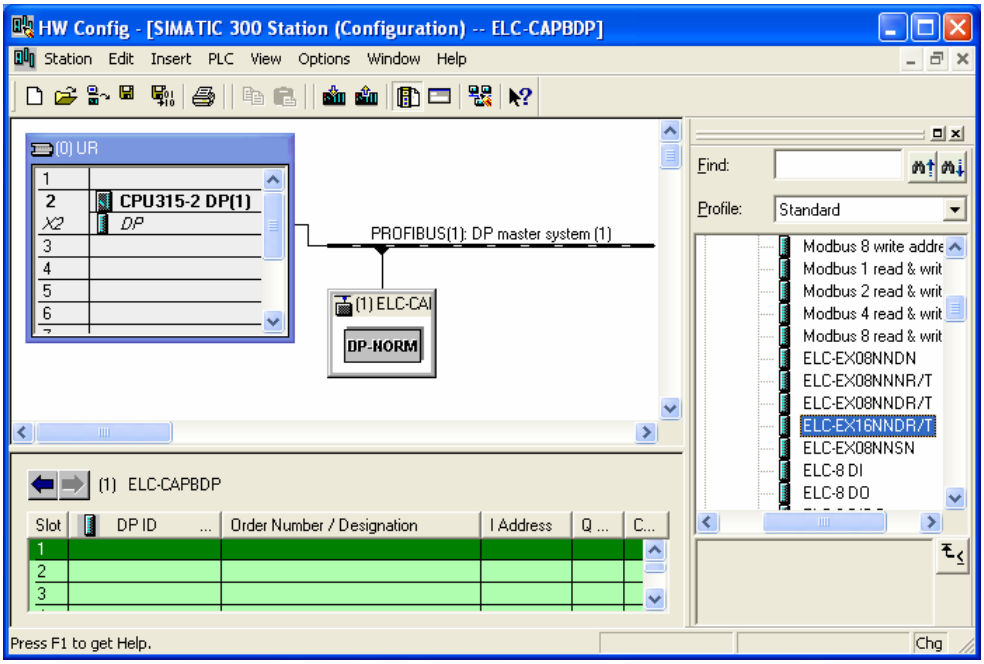
2. In the dialog box, select the address of ELC-CAPBDP slave. The address has to be the same as the setting of address setup switch on ELC-CAPBDP. Click “OK”.



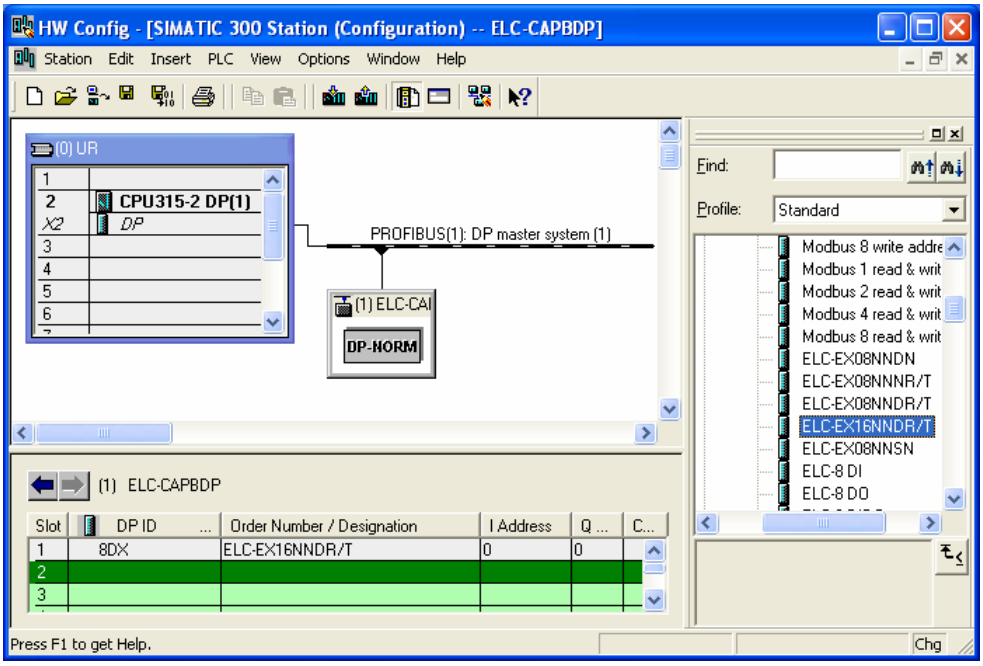
3. Add PROFIBUS DP bus to ELC-CAPBDP.



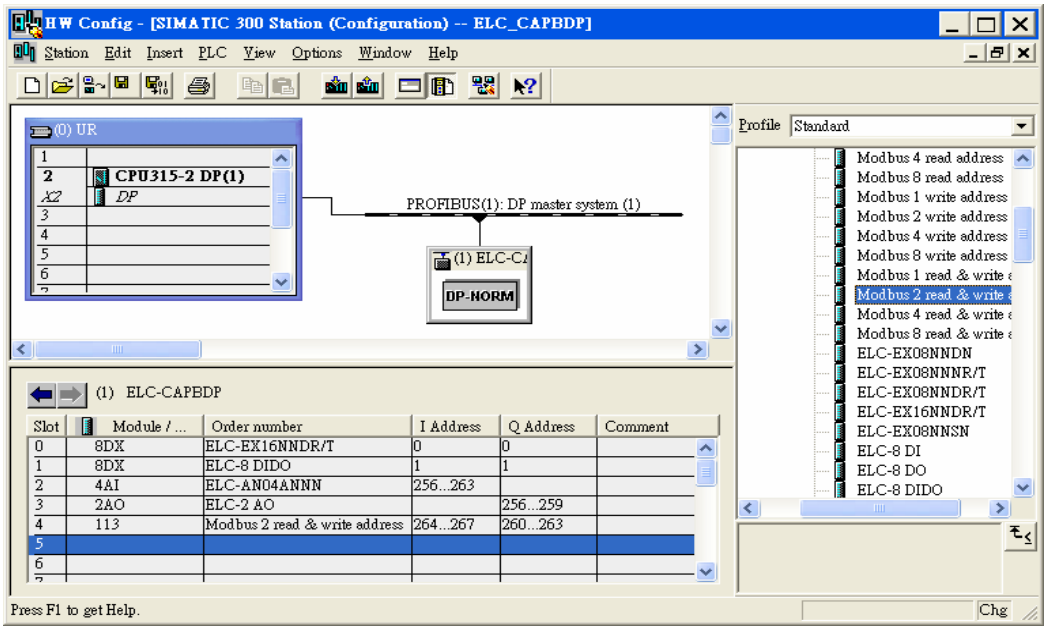
4. Select Slot 0 and double click “ELC-EX16NNDR/T” in the right-hand side column.



5. Configure ELC-EX16NNDR/T to Slot 0.

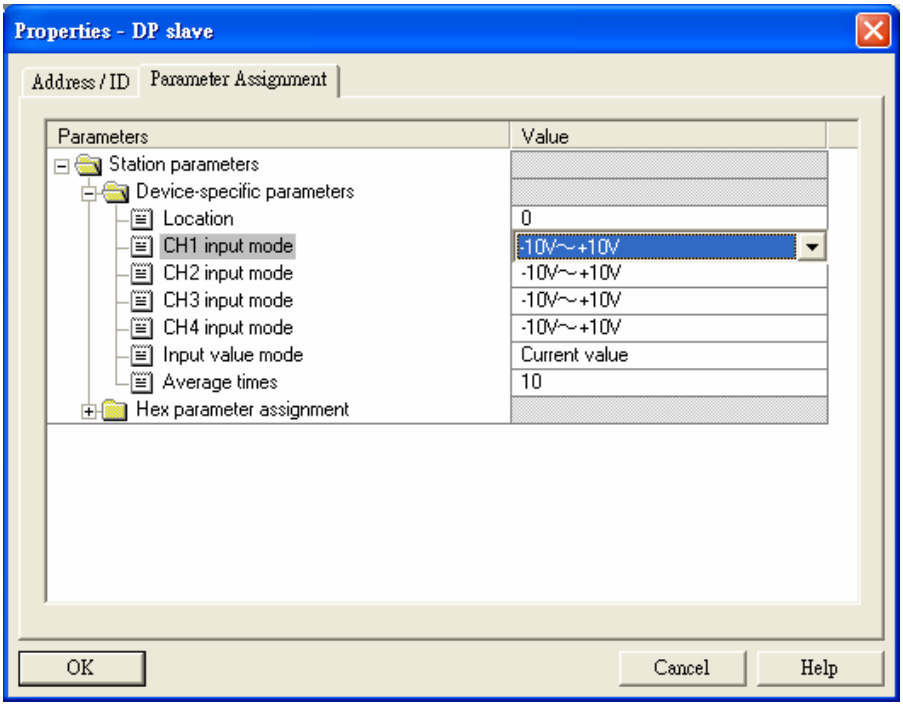


6. Configure other slots as Slot 0 was configured. To configure, select one of the slots and double click on the items to be configured in the right-hand side column. Apply it to configure Slot 0 ~ Slot 4.

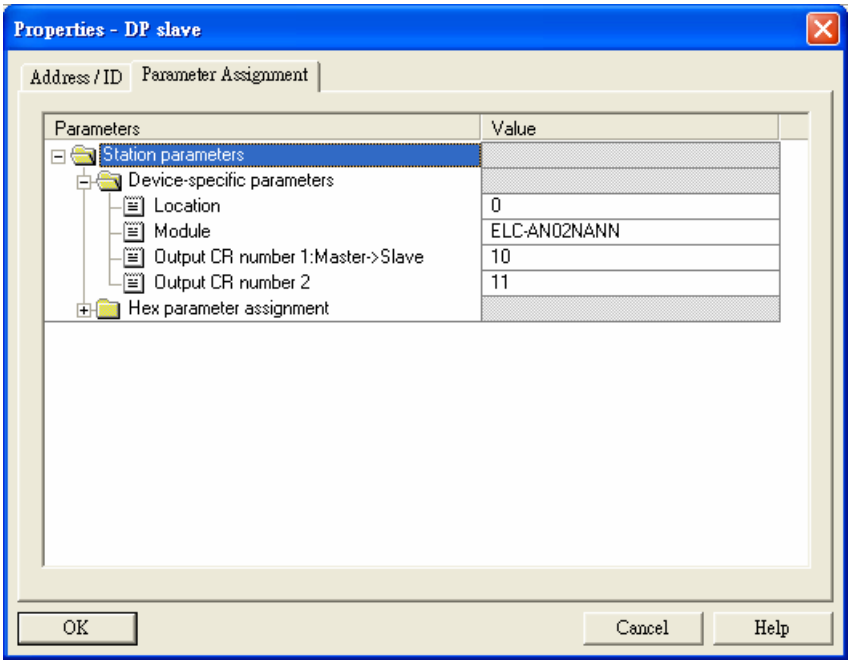


7. Slot 0 and Slot 1 are for the configuration of digital I/O modules. The configuration of digital I/O modules does not require other parameter settings. When you configure digital I/O modules by self-defined method, and if the number of I/O points is less than 8, the calculation will be based on the number 8. For example, Slot 1 is configured 8DIDO, and its corresponding digital I/O module is DVP08SP (4 input points and 4 output points). See the following paragraph for detailed corresponding relations between slots and I/O modules.

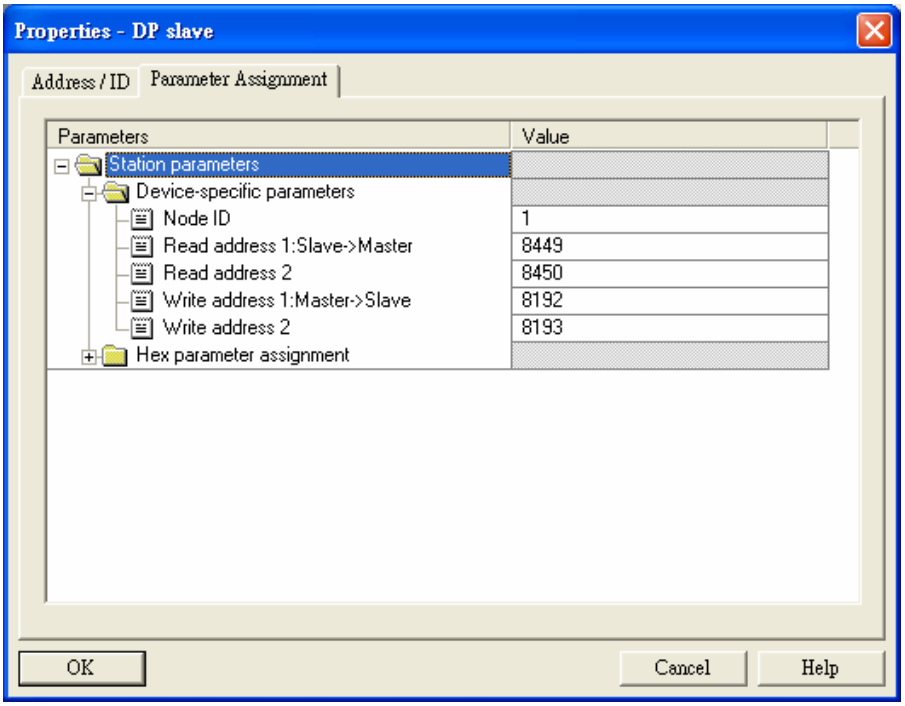
8. Double click the configured Slot 2 in “HW Config” window to open the dialog box in the figure below. Refer to the configuration chapter for the definition of every parameter in this dialog box.



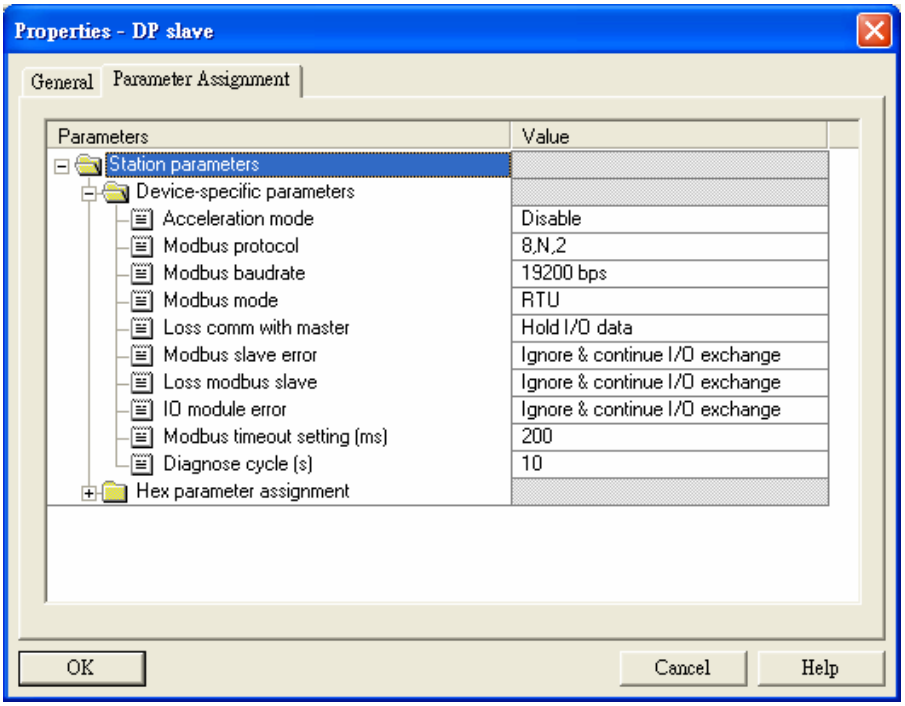
9. Double click the configured Slot 3 in “HW Config” window to open the dialog box in the figure below. Refer to the configuration chapter for the definition of every parameter in this dialog box.



10. Double click the configured Slot 4 in “HW Config” window to open the dialog box in the figure below. Refer to the configuration chapter for the definition of every parameter in this dialog box.

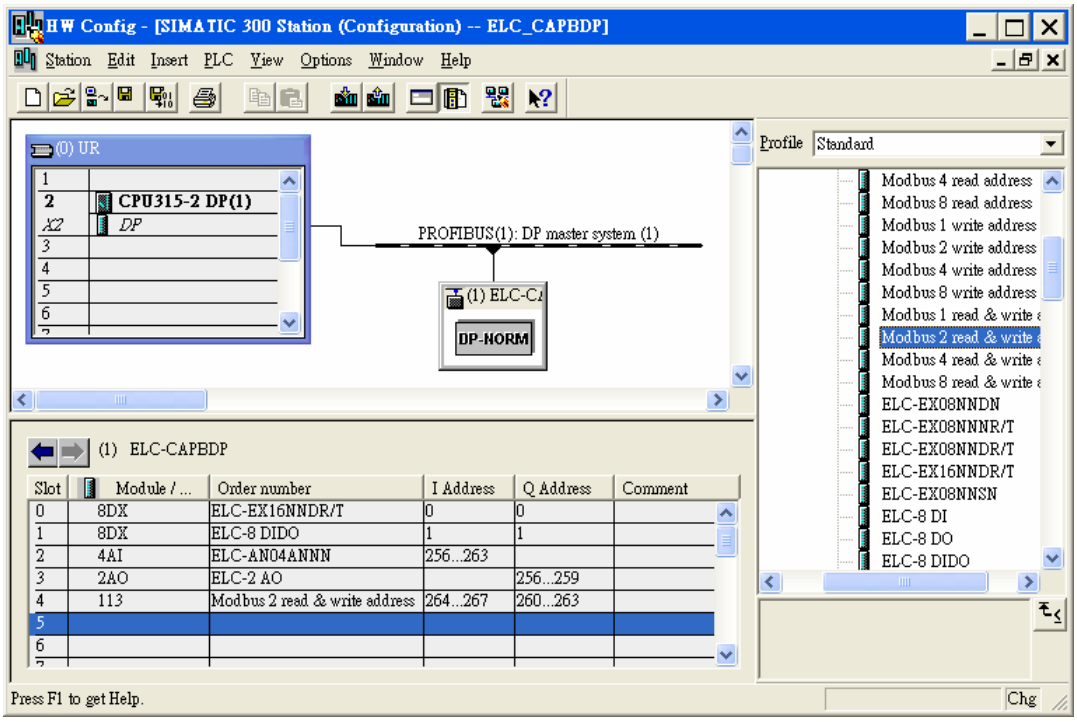


11. After all the configuration items for ELC-CAPBDP are set, double click the ELC-CAPBDP slave on the PROFIBUS DP bus in “HW Config” window to open the dialog box in the figure below. Refer to 8.1 for the definition of every parameter in this dialog box.



12. After all the parameters are set, download the parameters, and once the master is connected to ELC-CAPBDP, the NET indicator on ELC-CAPBDP will constantly be On in green color.

■ **Data Mapping**



See the table below for the data mapping relations under the parameter settings.

Register in S7-300 master	Data transmission direction in PROFIBUS DP network	Slave devices and addresses connected to ELC-CAPBDP
QB0 bit 0 ~ bit 7	⇨	Y0 ~ Y7 on ELC-EX16NNDT
QB1 bit 0 ~ bit 3		Y0 ~ Y3 on ELC-EX08NNDT
PQW256		Output value in CH1 on ELC-AN02NANN
PQW258		Output value in CH2 on ELC-AN02NANN
PQW260		Modbus address 8192
PQW262		Modbus address 8193
IB0 bit 0 ~ bit 7	⇦	X0 ~ X7 on ELC-EX16NNDT
IB1 bit 0 ~ bit 3		X0 ~ X3 on ELC-EX08NNDT
PIW256		Input value in CH1 on ELC-AN04ANNN
PIW258		Input value in CH2 on ELC-AN04ANNN
PIW260		Input value in CH3 on ELC-AN04ANNN
PIW262		Input value in CH4 on ELC-AN04ANNN
PIW264		Modbus address 8449
PIW266		Modbus address 8450

■ Program Example

- When M0.0 = ON, write 1 to Y0 ~ Y7 on ELC-EX16NNDT and Y0 ~ Y3 on ELC-EX08NNDT connected to ELC-CAPBDP.
- When M0.1 = ON, read the status on X0 ~ X7 on ELC-EX16NNDT connected to ELC-CAPBDP to MB0, and the status on X0 ~ X3 on ELC-EX08NNDT to MB1.
- You can also read or write other devices connected to ELC-CAPBDP by using MOVE instruction.