DATA PANEL
POWERED BY MURRELEKTRONIK

Quickstart Guide xDB -3-200

Prerequisites:

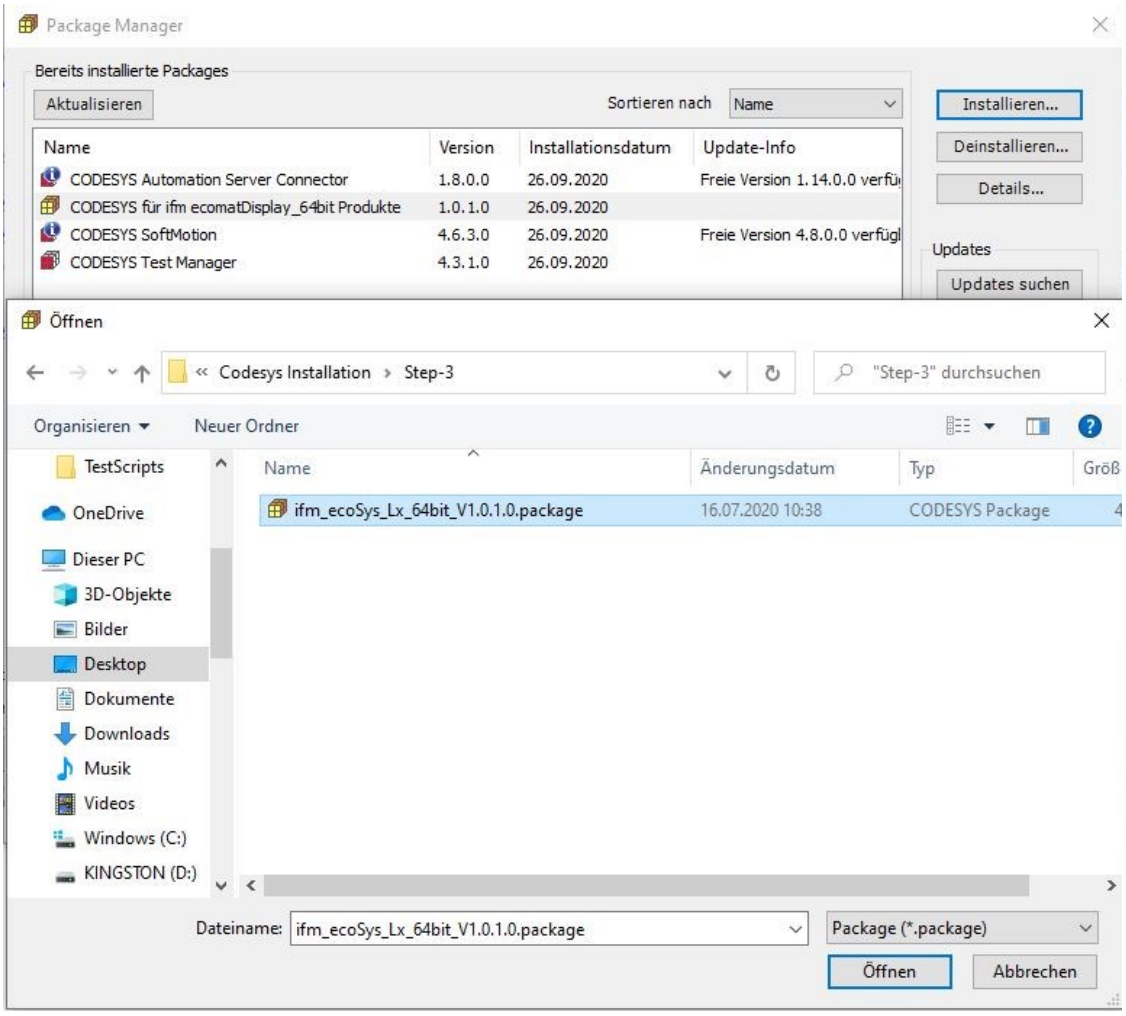
- IFM control / display control
- CODESYS 3.5 with necessary packages
- DATA PANEL xtremeDB (DP-34044-3-200) module + accessories
- DC 12 / 24 V supply

CODESYS PREPARATION

Depending on the type of controller you are working with, the corresponding packages must be installed in CODESYS.

The packages for the respective controller are supplied or you can obtain them from the manufacturer's website or the CODESYS Store. A login may be required for the download.

- Open CODESYS
- Open the package manager via the task bar "**Tools -> Package Manager... "**
- Right click on **"Install..."** and install the corresponding package
- In the following example the integration of an ifm display control is described



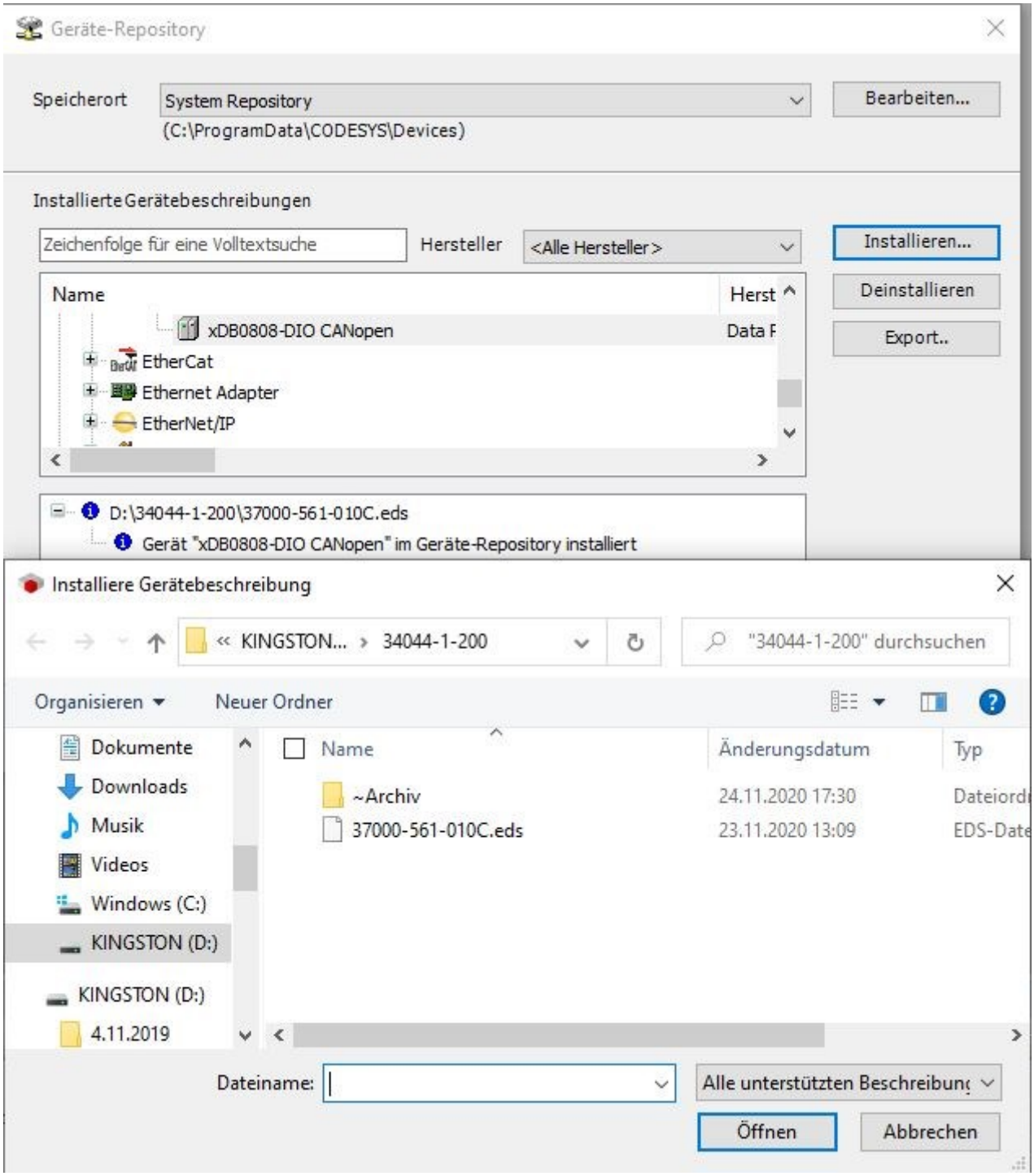
- Double-click or "Open" to install the package (this may take a moment)
- If the installation was successful, a corresponding message appears

CODESYS PREPARE

Install EDS device file

The permalink below always points to the latest firmware and *. eds file:
https://drive.google.com/file/d/1EpLsbH6_-dCNHN4p33LIck5KjBTa8ahq/view

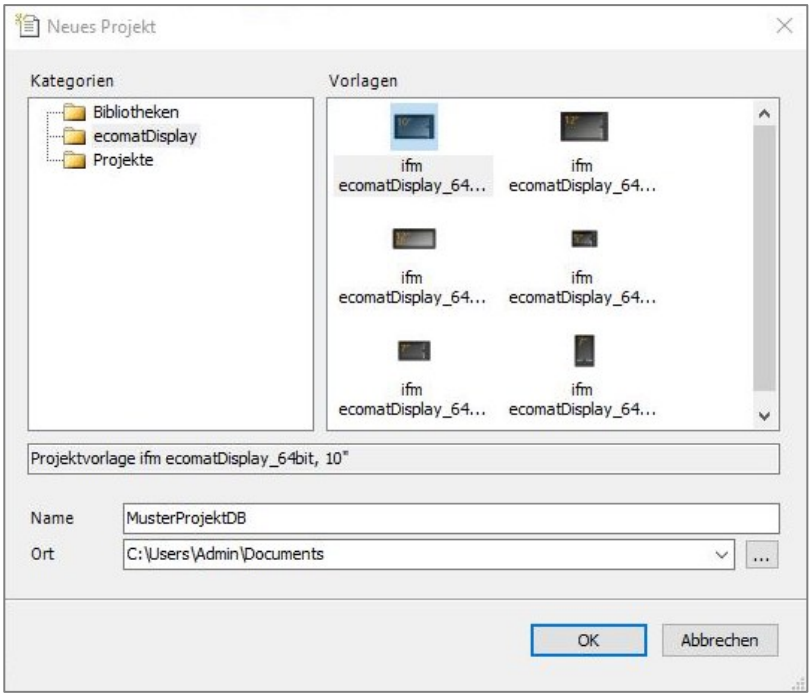
- Open the device repository via **"Tools->Device Repository"** at the top of the taskbar.
- A new device can be installed via the **"Install..."** button
- **Double click** on the desired file, alternatively select and **open** the ***. eds file** manually**.** The device appears in the list of added devices.



CODESYS PREPARE

CODESYS project

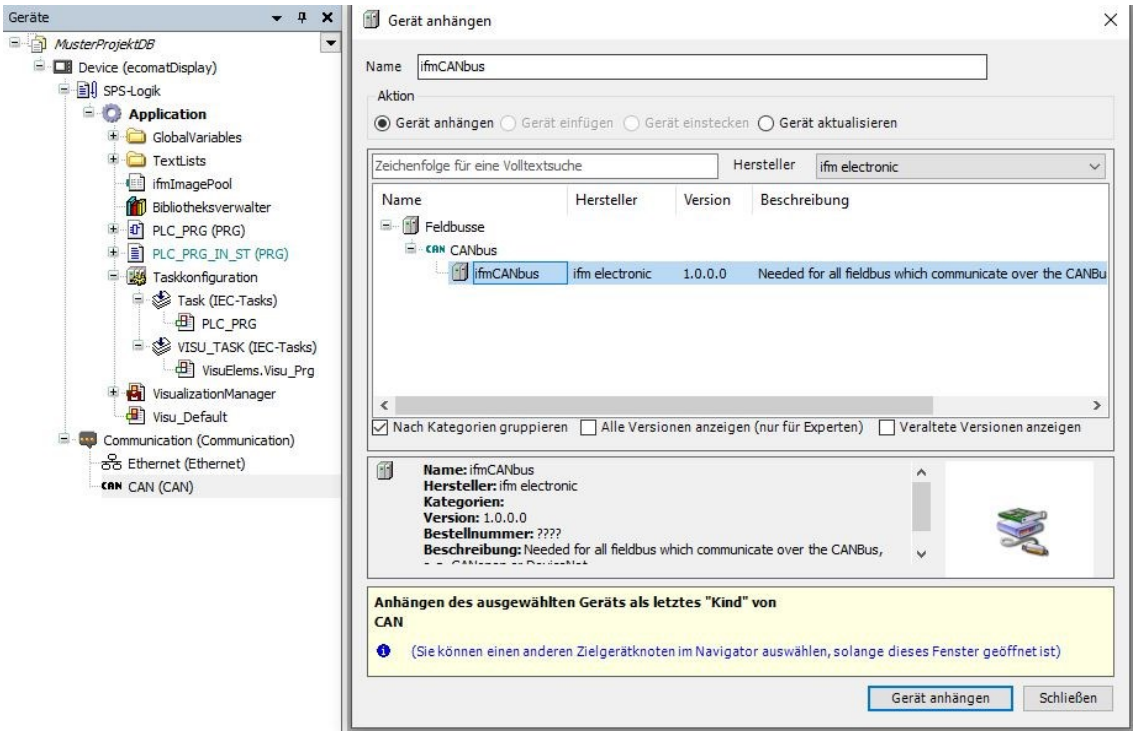
- Open CODESYS
- Create a new project via **File -> New** project
- Select the corresponding control via the library and confirm with **OK.** The action may take some time.



CAN communication

- Open the communication path and right click on "CAN -> Attach device".
- Select "ifm" under the manufacturer and append the "ifmCANbus
- Close window

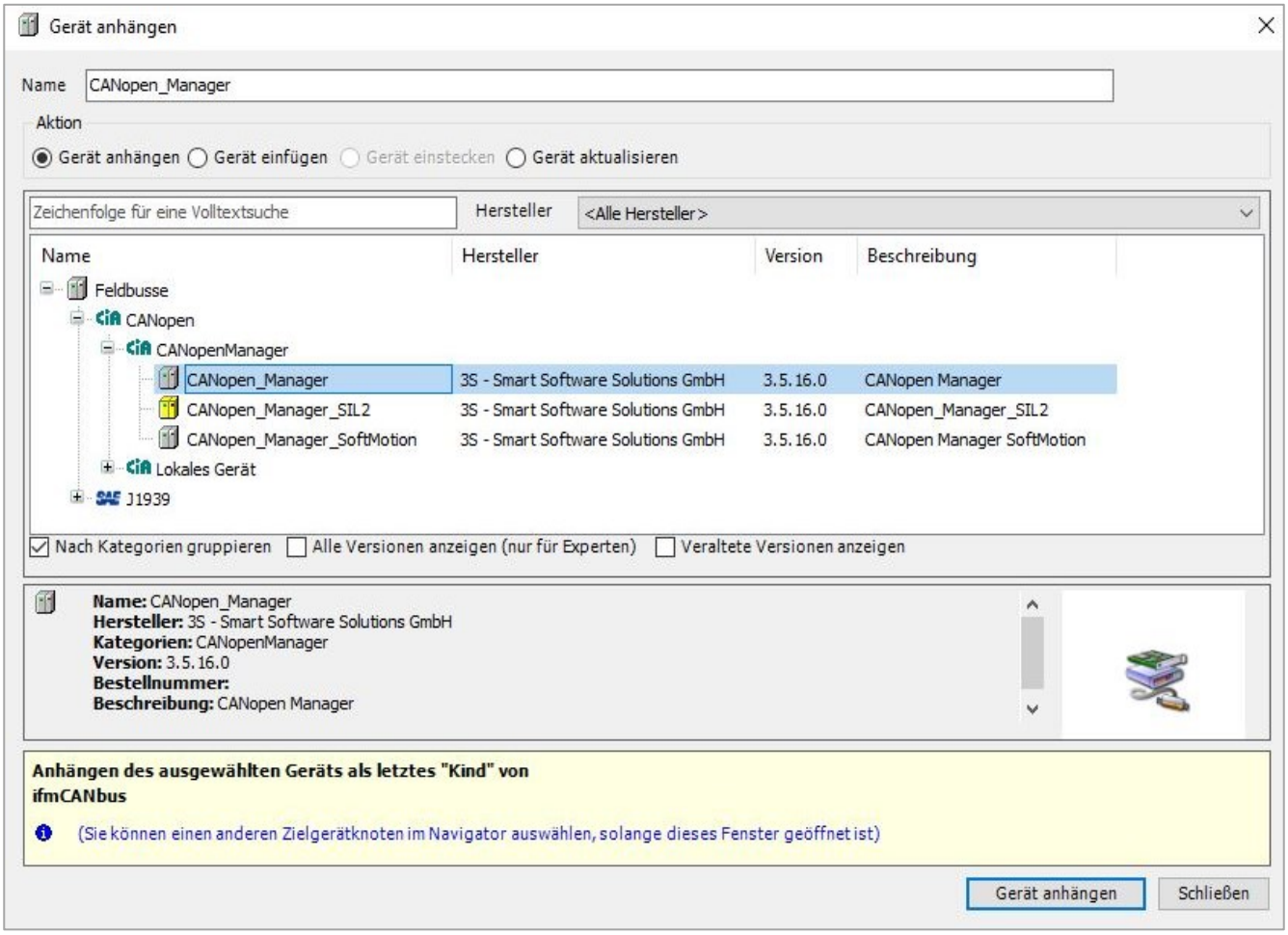
The controller must be CANopen capable. If you want to work with SAE J1939, you can find a CODESYS function block for our modules under the following links:
V2.3: https://www.data-panel.eu/media/archive/CODESYS-23-Demo-DP-34044-x-000.zip
V3.5: https://www.data-panel.eu/media/archive/CODESYS-35-Demo-DP-34044-x-000.zip



CODESYS PREPARE

CANopen Manager

- Right click on the just inserted **"ifmCANbus -> Attach device".**
- Change manufacturer filter to **<all manufacturers>.**
- Select the device via **"CANopen -> CANopenManager -> CANopenManager"** and attach it.



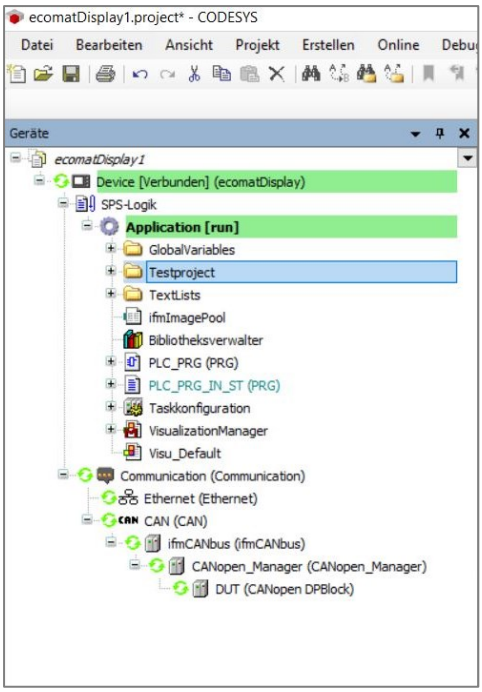
CODESYS PREPARE

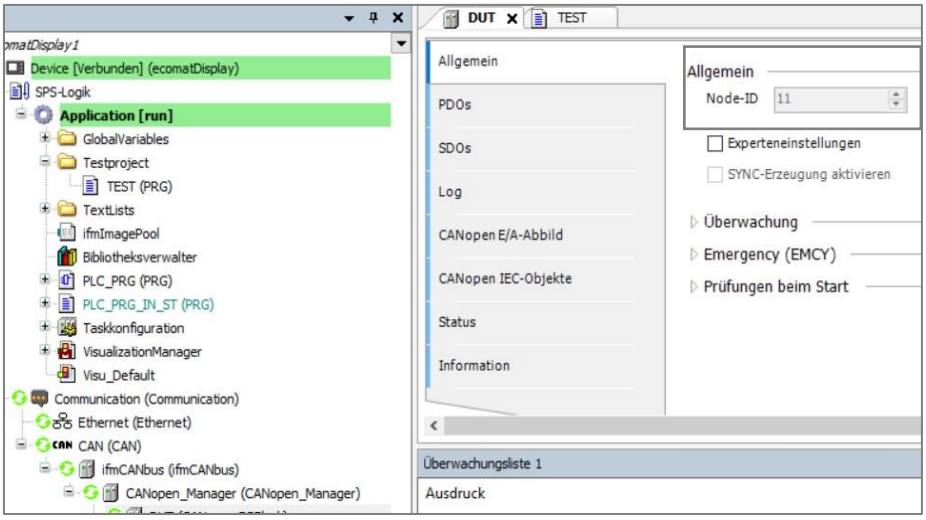
STEP 1

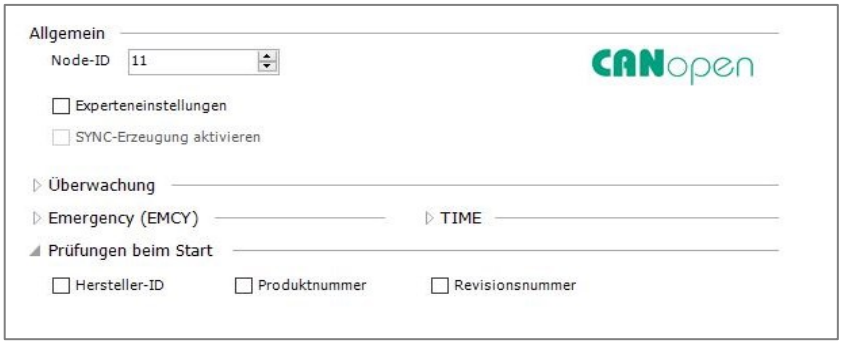
- Append a new device to the CANopen_Manager (right click -> Append device)
- Select the correct module based on the *. eds file and close it

STEP 2

- Open the configuration of the new device and set the node ID.
- Then go online, no errors should appear in CODESYS, the **COM LED** on the module should be permanently green.







Node ID	Jumper Config1 A (PIN2)/ B (PIN8)	Jumper Config2 A (Pin3) / B (Pin9)	Jumper Config3 A (Pin4)/ B (Pin10)	Jumper Config4 A(Pin5)/ B(Pin11)
1				
2	x			
3		x		
4	x	x		
8	x	x	x	
9				x
15		x	x	x
16	x	x	x	x

ADDRESS

- The module has the base node ID 1 preset
- The offset set by means of wire jumpers on the module is added to the base node ID. If the node ID 2 is set in CODESYS, the offset 1 must therefore be jumpered on the module.

VENDOR ID

For the first series modules, the vendor ID was not stored in the firmware. In this case please either update the firmware of the module or deactivate the check of the vendor ID.

SDO GLOBAL / INDIVIDUAL

There are two possibilities to configure the signal pins of the module. The **global** configuration by means of index **2000:3** or alternatively the **individual** configuration by means of index **2001**.

Example of global configuration:
If e.g. a 1 is stored in index **2000:3**, all signal pins are configured as digital outputs (DO).

2000		Spare			5,6	Spare
		Spare			7,8	Spare
	3	Output Mode	Byte	3	-	Sets the global configuration of ALL the outputs. Overrides Index 2001. 0=Mode 1 Not Used, 1=ON/OFF, 2=Data 0-4000, 3=Percent 0-100.0% (0-1000) (4=Amps (0-4000 mA) cannot be used in this mode)

Only digital outputs can be parameterized via the global configuration. For other signal types (PWM, PWMi or DO 10A) the individual configuration must be carried out.

Individual configuration:

The index **2001:x is** used for the individual configuration. The subindex **2001:1** is used among others for the individual configuration of port 1 (A & B). The configuration values are identical to index 2000. The parameterization is done in hex code, the first digit is valid for port 1 pin B (2) and the second digit for port 1 pin A (4).

The first digit configures pin 2 (signal B), the second digit the pin 4 (signal A) of the respective port. For an individual configuration the index 2000:3 must be set to "0".

Global configuration

Individual configuration

Select Item from Object Directory

Index:Subindex	Name	AccessType	Type	Default
16#2000	Module Global Configuration			
:16#00	Highest sub-index supported	RW	USINT	16#4
:16#01	d1 - d8_Enable	RW	USINT	0
:16#02	d9 - d16_Enable	RW	USINT	0
:16#03	Output_Mode	RW	USINT	0
:16#04	ID	RW	USINT	0
16#2001	Module Output Configuration			
:16#00	Highest sub-index supported	RW	USINT	16#8
:16#01	OUTMODE_1	RW	USINT	0
:16#02	OUTMODE_2	RW	USINT	0
:16#03	OUTMODE_3	RW	USINT	0
:16#04	OUTMODE_4	RW	USINT	0
:16#05	OUTMODE_5	RW	USINT	0
:16#06	OUTMODE_6	RW	USINT	0
:16#07	OUTMODE_7	RW	USINT	0
:16#08	OUTMODE_8	RW	USINT	0
16#2002	Module PWMi PID Configuration			

Name: Unknown Object
Index: 16#0 Bit length: 8
Subindex: 16#0 Value: 0

OUTPUT DO - GLOBAL

For the global configuration of all outputs as DO (black and white) normally no configuration steps in the SDO are necessary. If the entire module is to be configured as DO, it is necessary to write the value 11 to index 2000:3. Thereby all signal pins are configured as DO.

53	16#180B:16#02	Set transmission type	16#FE	8	☐	☐
54	16#180B:16#03	Set inhibit time	16#0000	16	☐	☐
55	16#180B:16#05	Set event time	16#0000	16	☐	☐
56	16#180B:16#01	Set and enable COB-ID	16#000003C1	32	☐	☐
57	16#2000:16#03	Output_Mode	16#11	8	☐	☐

The CANopen I/O image can be used to declare and activate the variables for ports 1 to 8. Either the entire integer variable **Output_1** can be used for this, alternatively the individual bits can also be declared.

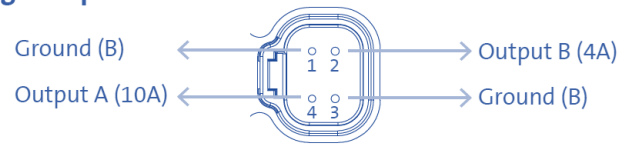
Find | Filter Show all | Add FB for IO Channel... | Go to Instance

Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value	Unit
		Output_1	%QB20	USINT	2#00010001		
D3OutputB0		Bit0	%QX20.0	BOOL	TRUE	P1A	
D3OutputB1		Bit1	%QX20.1	BOOL	FALSE	P1B	
		Bit2	%QX20.2	BOOL	FALSE	P2A	
		Bit3	%QX20.3	BOOL	FALSE	P2B	
		Bit4	%QX20.4	BOOL	TRUE	P3A	
		Bit5	%QX20.5	BOOL	FALSE	P3B	
		Bit6	%QX20.6	BOOL	FALSE	P4A	
		Bit7	%QX20.7	BOOL	FALSE	P4B	
Dash3Output2		Output_2	%QB21	USINT	2#11111111		
		Bit0	%QX21.0	BOOL	TRUE	P5A	
		Bit1	%QX21.1	BOOL	TRUE	P5B	
		Bit2	%QX21.2	BOOL	TRUE	P6A	
		Bit3	%QX21.3	BOOL	TRUE	P6B	
		Bit4	%QX21.4	BOOL	TRUE	P7A	
		Bit5	%QX21.5	BOOL	TRUE	P7B	
		Bit6	%QX21.6	BOOL	TRUE	P8A	
		Bit7	%QX21.7	BOOL	TRUE	P8B	
		Port_1A	%QW11	UINT	2#0000000000000000		

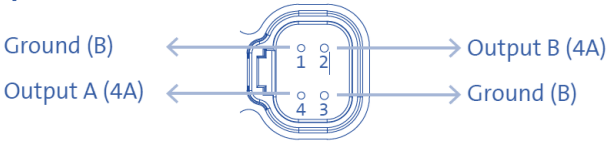
Go online with the controller and download the program. Force the variable **D3OutputB0** to "True". Alternatively, store a value in the **Dash3Output2** variable.

Port / Signal	Value	Port / Signal	Value
P1A	00 00 00 01	P3A	00 01 00 00
P1B	00 00 00 10	P3B	00 10 00 00
P2A	00 00 01 00	P4A	01 00 00 00
P2B	00 00 10 01	P4B	10 00 00 00

High Amp Ports



Output Ports



OUTPUT PWM EXAMPLE PORT 1 B & PORT 2 A&B INDIVIDUAL

To use the module with PWM outputs it is necessary that the signal pins are configured individually. For this purpose the global configuration index **2000:3** must be set to **0.**

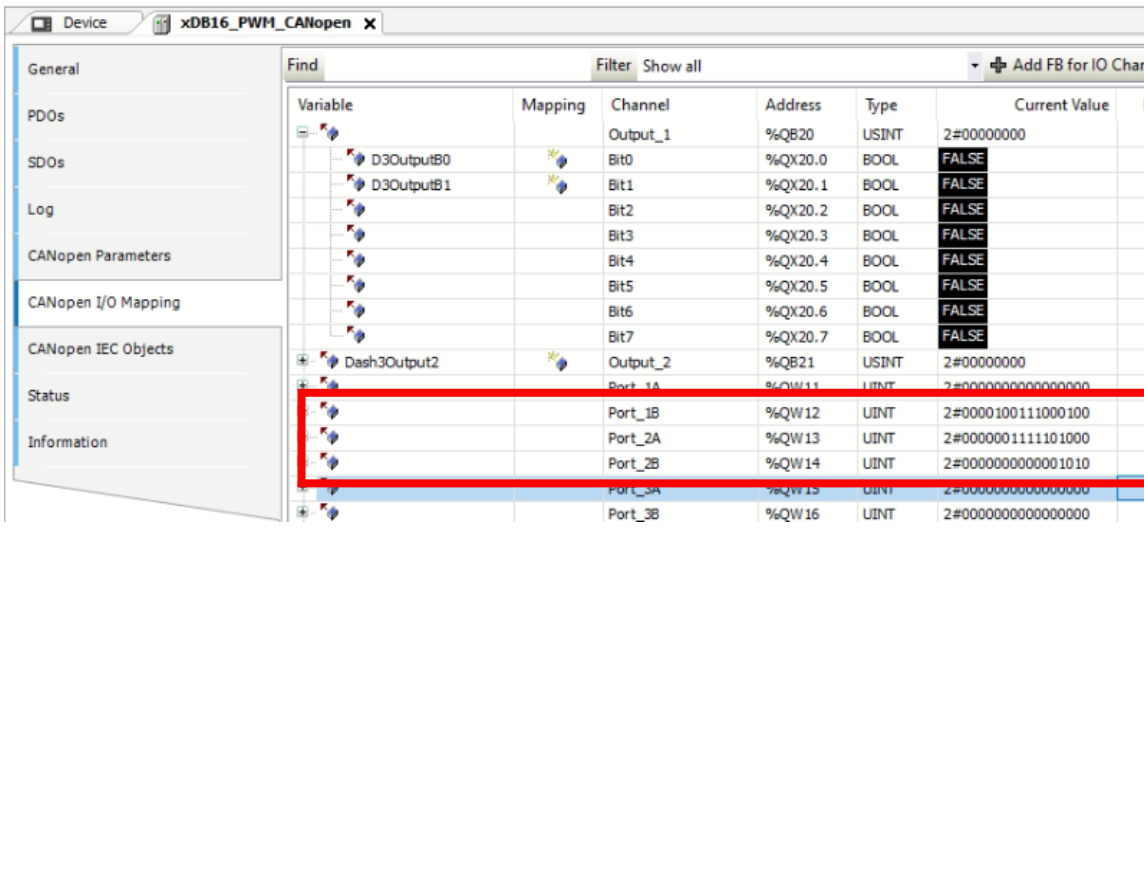
For each subindex there are 2 values for configuration. See also SDO global / individual. Example: For the configuration of signals 1B and 2AB as PWMi output, index **2001:1** must be written with **"40"** and **2001:2** with **"44".** Further configuration possibilities can be taken from the manual.

57	16#2000:16#03	Output_Mode	16#00	8	☐	☐	0
58	16#2001:16#01	OUTMODE_1	16#40	8	☐	☐	0
59	16#2001:16#02	OUTMODE_2	16#44	8	☐	☐	0

At port 1 and 3 only pin 2 (signal B) is configurable as PWM / PWMi output

Afterwards the different ports can be switched via the CANopen I/O image. For this purpose assign a value between 0-4000 (0 - 4 A) e.g. Port_1B.

If a value greater than 4000 is written, the maximum value of 4000 is set



OUTPUT DO EXAMPLE PORT 1 A & PORT 3 A&B + 10 A INDIVIDUAL

If all signal pins are to be configured as DO, the global configuration can be used (see p. 8).

For individual, pin-based configuration, the global configuration index **2000:3** must first be set to the value **"0"**.

For each subindex there are 2 values for configuration. See also SDO global / individual. E.g. for a configuration of port 1A as DO, the index **2001:1** is set with **"01"**. Further possible configurations can be found in the manual.

56	16#180B:16#01	Set and enable COB-ID	16#000003C1	32	☐	☐	0
57	16#2000:16#03	Output_Mode	16#00	8	☐	☐	0
58	16#2001:16#01	OUTMODE_1	16#10	8	☐	☐	0
59	16#2001:16#03	OUTMODE_3	16#11	8	☐	☐	0

SDO timeout (ms) 1000 ☐ Create all SDOs ☐ Write complete PDO configuration

Only outputs 1A and 3A can be loaded with output currents up to 10 A

Afterwards the outputs can be switched via the CANopen I/O image.

DOs can only be switched via the variables Output_1 & Output_2

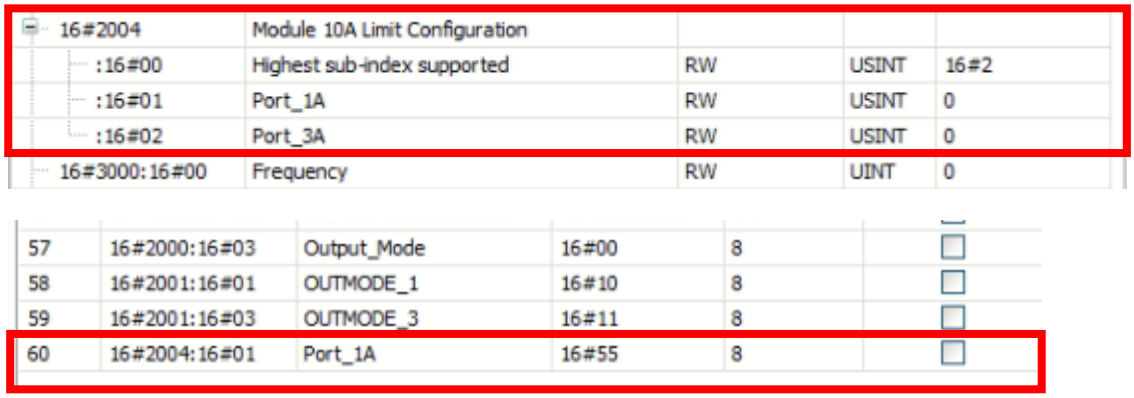
Find | Filter Show all | Add FB

Variable	Mapping	Channel	Address	Type	Current
Dash3Output1		Output_1	%QB20	USINT	2#00110001
		Bit0	%QX20.0	BOOL	TRUE
		Bit1	%QX20.1	BOOL	FALSE
		Bit2	%QX20.2	BOOL	FALSE
		Bit3	%QX20.3	BOOL	FALSE
		Bit4	%QX20.4	BOOL	TRUE
		Bit5	%QX20.5	BOOL	TRUE
		Bit6	%QX20.6	BOOL	FALSE
		Bit7	%QX20.7	BOOL	FALSE
Dash3Output2		Output_2	%QB21	USINT	2#00000000
		Bit0	%QX21.0	BOOL	FALSE
		Bit1	%QX21.1	BOOL	FALSE
		Bit2	%QX21.2	BOOL	FALSE
		Bit3	%QX21.3	BOOL	FALSE
		Bit4	%QX21.4	BOOL	FALSE
		Bit5	%QX21.5	BOOL	FALSE
		Bit6	%QX21.6	BOOL	FALSE
		Bit7	%QX21.7	BOOL	FALSE

OUTPUT DO EXAMPLE PORT 1 A +10A & PORT 3 A&B INDIVIDUAL

With the outputs 1A and 3A actuators up to a current of 10 A can be switched.

For this purpose, a value between 0-100 (0 – 10,0 A / 100 mA steps) can be stored in the index **2004:1**. If, for example, **"40"** is stored, the output current is set to max. 4,0 A. Further possible configurations can be found in the manual.



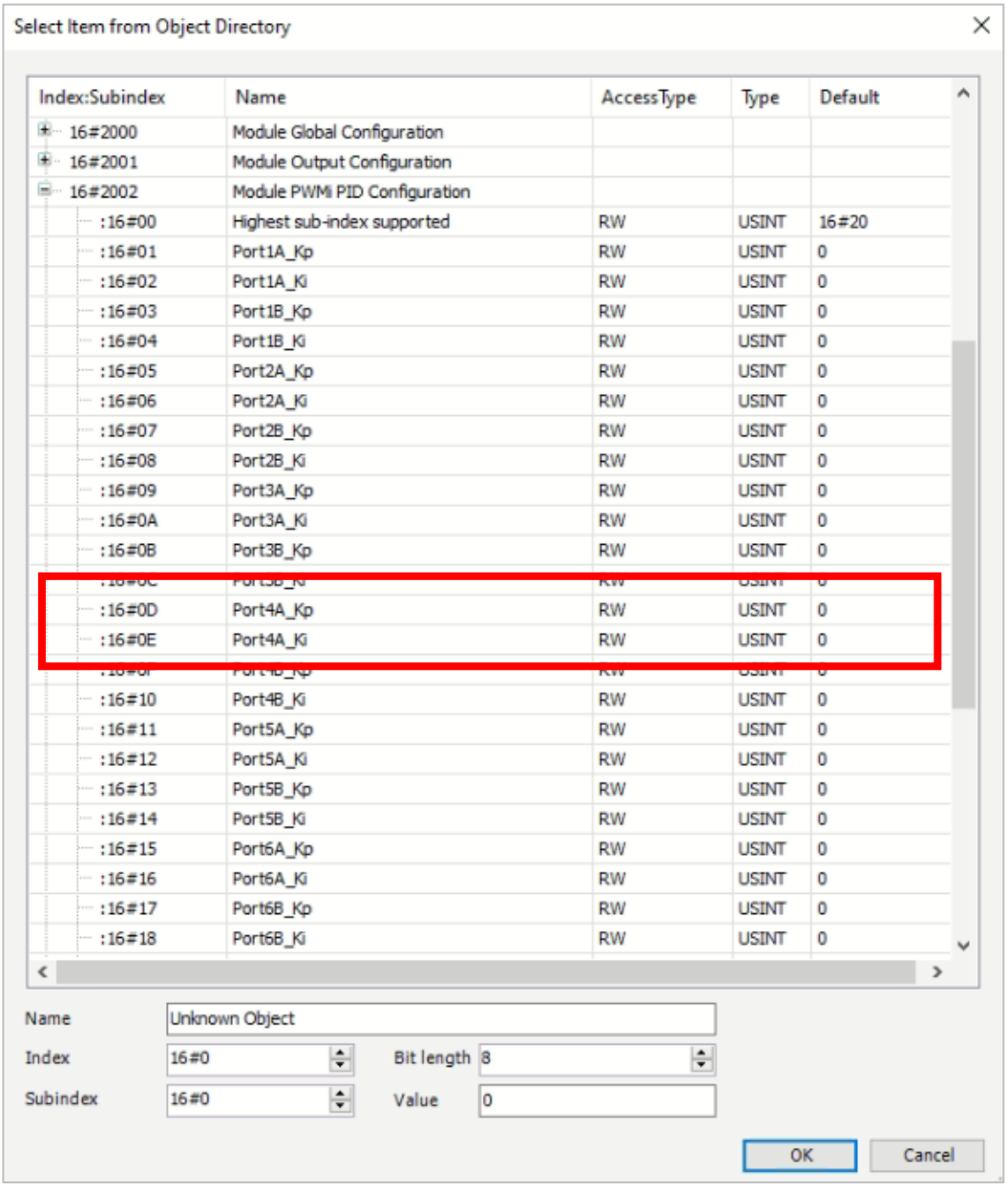
16#2004	Module 10A Limit Configuration				
:16#00	Highest sub-index supported	RW	USINT	16#2	
:16#01	Port_1A	RW	USINT	0	
:16#02	Port_3A	RW	USINT	0	
16#3000:16#00	Frequency	RW	UINT	0	

57	16#2000:16#03	Output_Mode	16#00	8	☐
58	16#2001:16#01	OUTMODE_1	16#10	8	☐
59	16#2001:16#03	OUTMODE_3	16#11	8	☐
60	16#2004:16#01	Port_1A	16#55	8	☐

OUTPUT PWMI PORT 4 A - KP & KI CONTROL BEHAVIOR

A PI controller is integrated in the module. The individual PWMi outputs can be adjusted in their control behavior. For each port (A or B) the control behavior can be configured individually.

For a control behavior at **port 4 A the** index **2002:0D & 2002:0E** should be described. Values between 0 and 250 are possible (0 - 2.5)

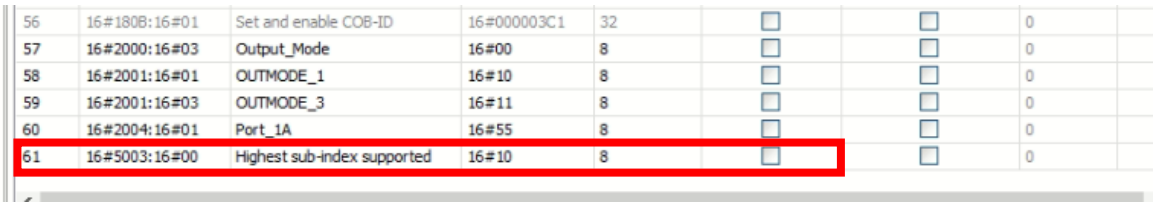


If no value is stored in the respective index, the default value of 100 applies

DIAGNOSTICS PORT 5 A & B AMP FEEDBACK

For each individual signal pin (A or B), the current currently applied can be read back. To activate the function it is necessary to activate the diagnosis via SDO:

For this purpose the index **5003:0** should be set with **"10"** (default value), then the applied current can be read back via the channel



56	16#180B:16#01	Set and enable COB-ID	16#000003C1	32	☐	☐	0
57	16#2000:16#03	Output_Mode	16#00	8	☐	☐	0
58	16#2001:16#01	OUTMODE_1	16#10	8	☐	☐	0
59	16#2001:16#03	OUTMODE_3	16#11	8	☐	☐	0
60	16#2004:16#01	Port_1A	16#55	8	☐	☐	0
61	16#5003:16#00	Highest sub-index supported	16#10	8	☐	☐	0

If no value is displayed, the index 1807 / 1808 / 1809 / 180A :5 must be written with "C0" to switch on the cyclic exchange of the signals.

If a constant load is used, the applied current is governed by Ohm's law. When using PWMi, the control behavior of the output can additionally be influenced by the proportional and integral component (see p. 12).

DIAGNOSTICS PORT 5 A & B AMP FEEDBACK

If now e.g. a **current value** is given to the channel **Port_5A** (below declared as variable **D3Output_5A**), the applied **current** on the channel **Port_5A** (below declared as variable **D3Output_5AFB**) can be read back.

Both channels have the same channel name, the actual values are returned to the variable with the higher address and the _FB (feedback) appendix.

Variable	Mapping	Channel	Address	Type	Curre
		Port_4B	%QW18	UINT	2#0000000000000000
D3Output_5A		Port_5A	%QW19	UINT	2#0000100111000100
D3Output_5B		Port_5B	%QW20	UINT	2#0000000000000000
		Port_6A	%QW21	UINT	2#0000000000000000
		Port_6B	%QW22	UINT	2#0000000000000000
		Port_7A	%QW23	UINT	2#0000000000000000
		Port_7B	%QW24	UINT	2#0000000000000000
		Port_8A	%QW25	UINT	2#0000000000000000
		Port_8B	%QW26	UINT	2#0000000000000000
		d1-d8	%IB70	USINT	2#00000000
		d9-d16	%IB71	USINT	2#00000000
		Active_Fault_Code	%IB72	USINT	2#00000000
		Configuration_ID	%IB73	USINT	2#00000000
		d1-d8_Message	%IB74	USINT	2#00000000
		d9-d16_Message	%IB75	USINT	2#00000000
		Status_Output1-2	%IB76	USINT	2#00000000
		Status_Output3-4	%IB77	USINT	2#00000000
		Status_Output5-6	%IB78	USINT	2#00000000
		Status_Output7-8	%IB79	USINT	2#00000000
		Power	%IB80	USINT	2#00000000
		Save_Counter	%IB81	USINT	2#00000000
		VBAT	%IW41	UINT	2#0000000000000000
		TEMP	%IW42	UINT	2#0000000000000000
		CNFG1	%IW43	UINT	2#0000000000000000
		CNFG2	%IW44	UINT	2#0000000000000000
		Port_1A	%IW45	UINT	2#0000000000000000
		Port_1B	%IW46	UINT	2#0000000000000000
		Port_2A	%IW47	UINT	2#0000000000000000
		Port_2B	%IW48	UINT	2#0000000000000000
		Port_3A	%IW49	UINT	2#0000000000000000
		Port_3B	%IW50	UINT	2#0000000000000000
		Port_4A	%IW51	UINT	2#0000000000000000
		Port_4B	%IW52	UINT	2#0000000000000000
D3Output5A_FB		Port_5A	%IW53	UINT	2#0000000000011001
D3Output5B_FB		Port_5B	%IW54	UINT	2#0000000000000000
		Port_6A	%IW55	UINT	2#0000000000000000

DIAGNOSTICS PORT 5 PIN A & B STATUS / ERROR

In addition to the current values read back, the status of the individual pins can also be queried. Index **5001** must be activated for this purpose.

Then the status of the outputs on port 5 and 6 can be queried via the variable **Status_Output5-6.** If an output is activated, the first bit is set. If an error occurs at the output, the second bit is set.

If no value is displayed, the index 1805:5 must be set to "C0". This SDO takes care of the cyclic exchange of the signals.

61	16#2004:16#01	Port_1A	16#55	8	☐	☐
62	16#1809:16#05	Event Timer	16#FF	16	☐	☐
63	16#5003:16#00	Highest sub-index supported	16#10	8	☐	☐
64	16#5001:16#00	Highest sub-index supported	16#8	8	☐	☐
65	16#5002:16#00	Highest sub-index supported	16#5	8	☐	☐

D3Output_5A	Port_5A	%QW19	UINT	2#0000100111000100
D3Output_5B	Port_5B	%QW20	UINT	2#0000000000000000
	Port_6A	%QW21	UINT	2#0000000000000000
	Port_6B	%QW22	UINT	2#0000000000000000
	Port_7A	%QW23	UINT	2#0000000000000000
	Port_7B	%QW24	UINT	2#0000000000000000
	Port_8A	%QW25	UINT	2#0000000000000000
	Port_8B	%QW26	UINT	2#0000000000000000
	d1-d8	%IB70	USINT	2#00000000
	d9-d16	%IB71	USINT	2#00000000
	Active_Fault_Code	%IB72	USINT	2#00000000
	Configuration_ID	%IB73	USINT	2#00000000
	d1-d8_Message	%IB74	USINT	2#00000000
	d9-d16_Message	%IB75	USINT	2#11111100
	Status_Output1-2	%IB76	USINT	2#00000000
	Status_Output3-4	%IB77	USINT	2#00000000
	Status_Output5-6	%IB78	USINT	2#00000001
	Bit0	%IX78.0	BOOL	TRUE
	Bit1	%IX78.1	BOOL	FALSE
	Bit2	%IX78.2	BOOL	FALSE
	Bit3	%IX78.3	BOOL	FALSE
	Bit4	%IX78.4	BOOL	FALSE
	Bit5	%IX78.5	BOOL	FALSE
	Bit6	%IX78.6	BOOL	FALSE
	Bit7	%IX78.7	BOOL	FALSE
	Status_Output7-8	%IB79	USINT	2#00000000

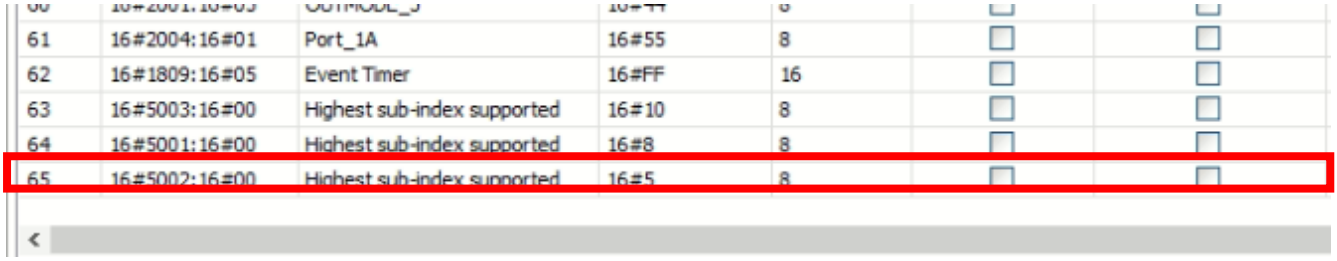
DIAGNOSIS TEMP & VOLTAGE

Further diagnostic data like e.g. the temperature of the module or the bus voltage may be read out. For this the index 5002 must be activated.

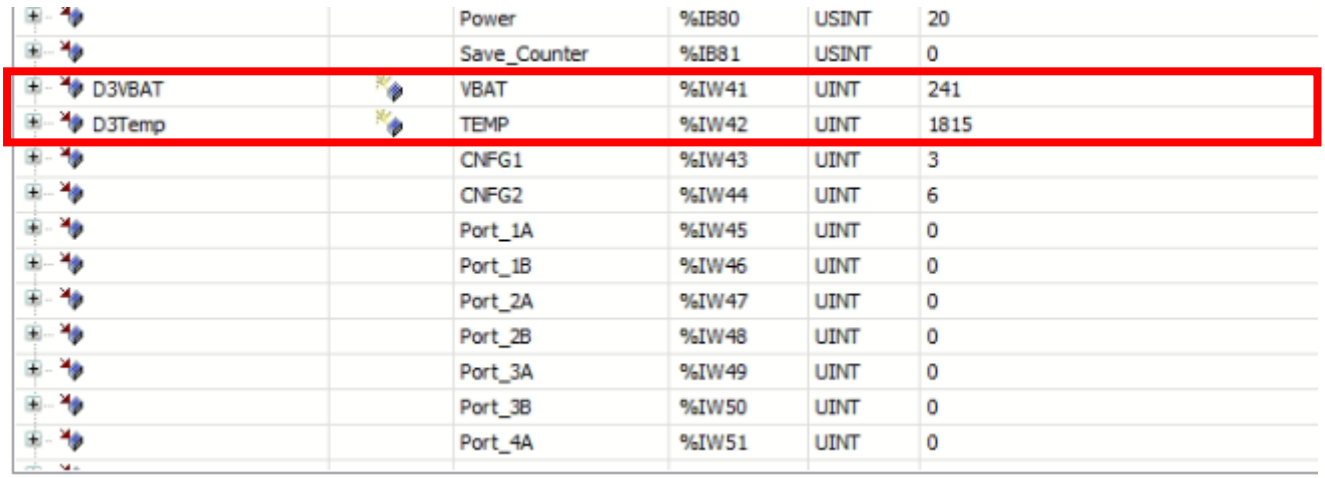
Afterwards the voltage or the module temperature can be read back in the variable VBAT or TEMP.

The voltage is displayed decimally with a resolution of 0.1 V.

The temperature has the resolution -100 °F to 300 °F which is displayed in 0-4000 bit (factor 10). For the display of the temperature in this value must still be converted from driving unit to Celsius. E.g. (1815 / 10) – 100) = 81,5 °F – 32 × 5/9 = 27,5 °C



61	16#2004:16#01	Port_1A	16#55	8	
62	16#1809:16#05	Event Timer	16#FF	16	
63	16#5003:16#00	Highest sub-index supported	16#10	8	
64	16#5001:16#00	Highest sub-index supported	16#8	8	
65	16#5002:16#00	Highest sub-index supported	16#5	8	



Power	%IB80	USINT	20	
Save_Counter	%IB81	USINT	0	
D3VBAT	VBAT	%IW41	UINT	241
D3Temp	TEMP	%IW42	UINT	1815
CNFG1	%IW43	UINT	3	
CNFG2	%IW44	UINT	6	
Port_1A	%IW45	UINT	0	
Port_1B	%IW46	UINT	0	
Port_2A	%IW47	UINT	0	
Port_2B	%IW48	UINT	0	
Port_3A	%IW49	UINT	0	
Port_3B	%IW50	UINT	0	
Port_4A	%IW51	UINT	0	

If no value is displayed, the index 1805:5 must be written with "C0". This SDO takes care of the cyclic exchange of the signals

DIAGNOSIS OUTPUT VOLTAGE P1 / P2 / P3 / P4

In addition, the voltage supply of the outputs can be queried. Index **5001** must be activated for this purpose.

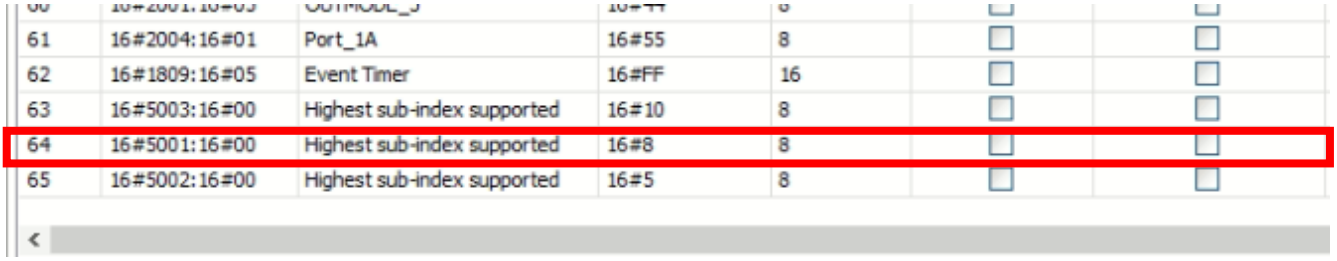
Subsequently, the status of the individual output voltage supply circuits P1 to P4 can be queried in the Power variable.

Bit 0 / 1 = Port 4

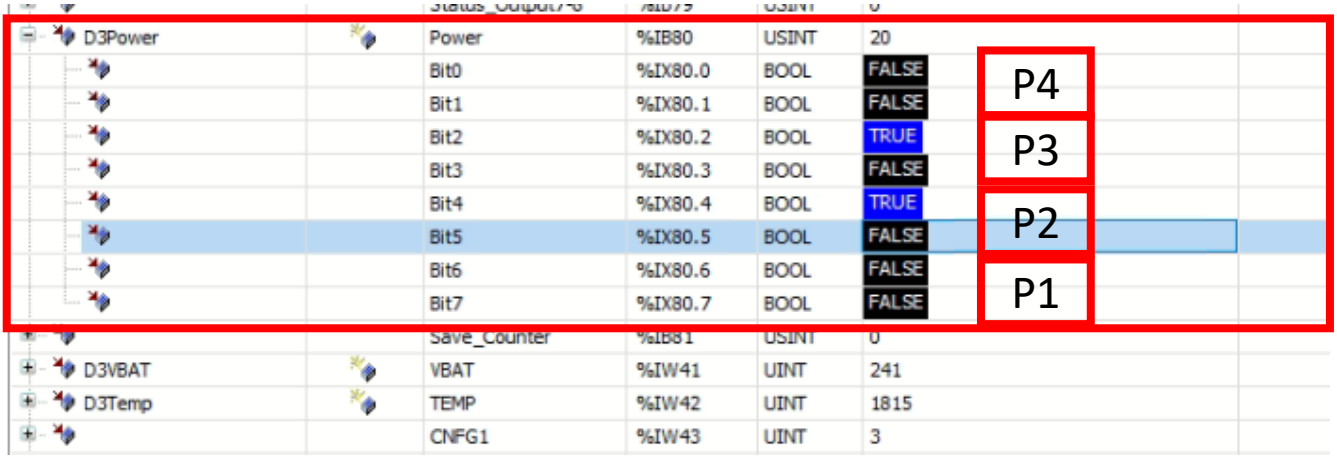
Bit 2 / 3 = Port 3

Bit 4 / 5 = Port 2

Bit 6 / 7 = Port 1



61	16#2004:16#01	Port_1A	16#55	8	☐	☐
62	16#1809:16#05	Event Timer	16#FF	16	☐	☐
63	16#5003:16#00	Highest sub-index supported	16#10	8	☐	☐
64	16#5001:16#00	Highest sub-index supported	16#8	8	☐	☐
65	16#5002:16#00	Highest sub-index supported	16#5	8	☐	☐



D3Power	Power	%IB80	USINT	20	
	Bit0	%IX80.0	BOOL	FALSE	P4
	Bit1	%IX80.1	BOOL	FALSE	
	Bit2	%IX80.2	BOOL	TRUE	P3
	Bit3	%IX80.3	BOOL	FALSE	
	Bit4	%IX80.4	BOOL	TRUE	P2
	Bit5	%IX80.5	BOOL	FALSE	
	Bit6	%IX80.6	BOOL	FALSE	P1
	Bit7	%IX80.7	BOOL	FALSE	
	Save_Counter	%IB81	USINT	0	
D3VBAT	VBAT	%IW41	UINT	241	
D3Temp	TEMP	%IW42	UINT	1815	
	CNFG1	%IW43	UINT	3	

In the example, only two of the four actuator circuits are supplied with voltage

If no value is displayed, the index 1805:5 must be written with "C0". This SDO takes care of the cyclic exchange of the signals

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