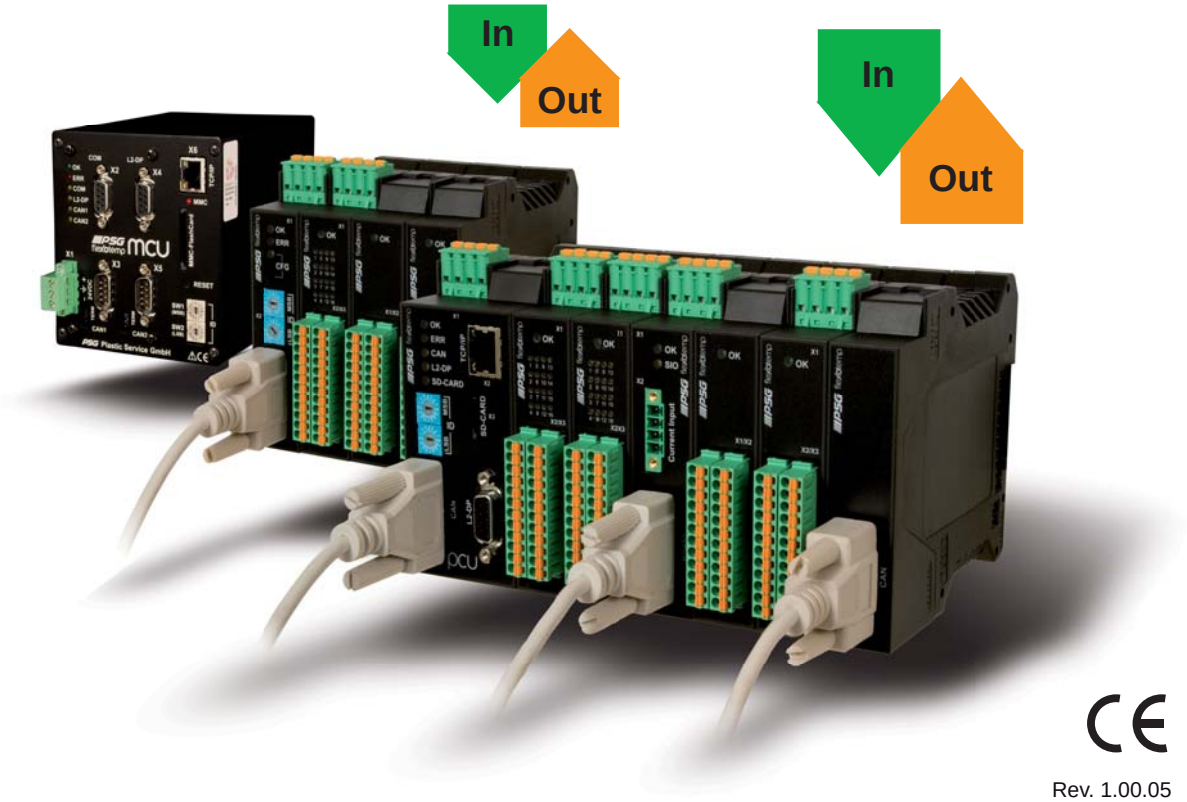
neusburger

PSG

Operating Instructions

System Configuration & Project Setup

flexotemp



CE

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Translation of original
operating instructions

1 Introduction

This operating instructions introduces the multi loop control system flexotemp® with its components. The system structure and the project planning/configuration is described by practical examples completely. The necessary steps, to work with the system safely and quickly, can easily be derived by these specific applications.

Multi loop temperature control system flexotemp®
based on the controller and open loop control units

flexotemp® MCU 128
flexotemp ® PCU 128
flexotemp® PCU 48
flexotemp® PCU 24
flexotemp® PCU 128 PNIO
flexotemp® PCU 48 PNIO
flexotemp® PCU 24 PNIO

allows an optimal adaptation for each requirement.

Consequent modular design of intelligent IOs,
the possibility of peripheral configuration in I/O nodes,
universal function range
are guarantors for this.

The available digital interfaces

- serial data interface COM
- CANopen slave CAN1 for controller internal network and network to superior control
- CANopen master CAN2 (field bus) for external I/O modules
- Profibus DP interface L2-DP
- Ethernet interface TCP/IP

provide easy internal and external connection possibility.

PROFINET IO is available for the controller and open loop unit labeled with the mnemonic PNIO . The interfaces are:

- CANopen master CAN2 (field bus) for external I/O modules
- Ethernet interface TCP/IP
- Ethernet interface PROFINET IO

The ways of communication and the system structure are defined by the project planning and configuration tool flexotempMANAGER.

These directions assist, both in case of the initial installation and operational startup, and in case of changes and adaptations to existing control systems. Status and fault signals are described and remedial actions proposed for their removal.

The protocol descriptions for PSGII, PSGII Ethernet (ASCII), Profibus DP, Modbus, Modbus TCP/IP, Profibus DPEA, CANopen, Send/Receive, PROFINET IO are not a component part of the operating manual. You are provided with these on request or directly as a download from the home page of PSG Plastic Service GmbH (www.meusburger.com).

1.1 Typographical Conventions

Symbols and conventions are used in this manual for faster orientation for you.

Symbols

	Caution	With this symbol, references and information are displayed which are decisive for the operation of the device. In case of non-compliance with or inaccurate compliance there can result damage to the device or injuries to persons.
	Note	The symbol refers to additional information and declarations, which serve for improved understanding.
	Example	With the symbol, a function is explained by means of an example.
	Reference	With this symbol, information in another document is referred to.
	FAQ	Here FAQ (Frequently Asked Questions) are answered.
↗		Cross references are marked with the character f. In the pdf version of the document the objective of the cross reference is reached via the link.
`Equations`		Calculation specifications and examples are represented in this way.
<View>		Menu points (e.g. view) are represented in this way.
|Project|		Windows (e.g. project) are represented in this way.
n.a.		Not applicable, not existing

1.2 Additional and continuative documents

Parameters	Information on this topic are in the operating instructions **Temperature Control System flexotemp® Parameter** zu entnehmen.
Operation	Information on this topic are in the operating instructions **Project Planning and Configuration Tool flexotempMANAGER Operation** zu entnehmen.
Protocol PSG II	Information on this topic are in the protocol description **PSG II** and the corresponding object lists.
Protocol PSG II Ethernet (ASCII)	Information on this topic are in the protocol description **PSG II Ethernet (ASCII)** and the corresponding object lists.
Protocol Profibus DP	Information on this topic are in the protocol description **Profibus DP** and the corresponding object lists.
Protocol Modbus	Information on this topic are in the protocol description **Modbus** and the corresponding object lists.
Protocol Modbus/TCP	Information on this topic are in the protocol description **Modbus/TCP** and the corresponding object lists.
Protocol Profibus DPEA	Information on this topic are in the protocol description **Profibus DPEA** and the corresponding object lists.
Protocol PROFINET IO	Information on this topic are in the protocol description **PROFINET IO** and the corresponding object lists.
Protocol CANopen	Information on this topic are in the protocol description **CANopen** and the corresponding object lists.
Data sheet	The data sheets can be accessed in Internet by www.meusburger.com, and/or are available under menu bar →<Extras> →<Options> →<Update> in flexotempMANAGER in the project view below each flexotemp® component (see operating instructions **Project Planning and Configuration Tool flexotempMANAGER Operation**).

2 Prerequisites

For installation and project setup of flexotemp® components, the following prerequisites must be fulfilled:

the project setup and configuration tool flexotempMANAGER is installed on a PC as standard installation

the flexotempMANAGER and the communication server (PSGCommServer) are running on the same computer hardware.

Are other communication concepts employed, one has to answer the following questions -

where is the flexotempMANAGER running?
where is the communication server (PSGCommServer) running?
how are the controllers connected?

In chapter **Communication concepts of flexotempMANAGER** in the operating instructions **Project setup and configuration tool flexotempMANAGER Operation** (see ↗Additional and continuative documents) is described, which settings must be made in the flexotempMANAGER for PSGCommServer and master components (MCU/PCU).

2.1 Order of addressing

At project setup of flexotemp® components in flexotempMANAGER, the addresses are assigned like the order of the single planned components, that is

- CAN-NodeID
- Slot number
- PSG bus addresses

flexotempMANAGER addresses are sequential, but allows the operator to make changes.

The CAN components have a CAN NodeID, which has to be adjusted identical by rotary switch on the device.

The PCU components get a consecutive slot number according to their arrangement in the project setup. The PCU components must be installed according to this order. Before writing the project data to the controller, take care, that the slot numbers are addressed without gaps (otherwise operator gets a notice).

The RS485 components get a consecutive slot number according to their arrangement in the project setup. This has to be adjusted identical by rotary/DIP switch for the RS485 components.

At transfer of project into controller, an address scan in the controller checks, that all components respond with the addresses, slot numbers and PSG bus addresses, specified in the project setup. If this is not the case, error messages are displayed and the project setup, as well as the setting of the rotary and/or DIP switch must be checked and corrected.

In case of replacement of defective components, it is absolutely necessary to adopt the setting adjustments of the replaced component.
The project setup has to be adapted, when components are completely removed or newly added.

2.1.1 Activate address scan manually

In case of replacement of defective components, it is absolutely necessary to adopt the setting adjustments of the replaced component. To do so activate address scan manually.

Address scan for controller/master component

An address scan can

- be activated by controller/master component in flexotempMANAGER (see context menu for master component on project level, address scan).
- be activated by code number 700 in flexotempMANAGER (see context menu for master component on project level, code number).
- be activated by rotary switch on the controller. To do so, turn the rotary switch on the controller to „FE“, wait 5 seconds, wait for alternate flashing and turn rotary switch to starting position.

Is no flexotempMANAGER in use, the address scan can also be activated by the operation software programs like TEMPSoft1 (see chapter on code number in the related operating instructions) and/or TEMPSoft2 (see chapter service portal, setup in the related operating instructions).

All connected components on the controller/master component are readdressed (from software version flexotemp-MANAGER 1.2.20; before only to CANBC).

Address scan for bus coupler CANBC

An address scan can

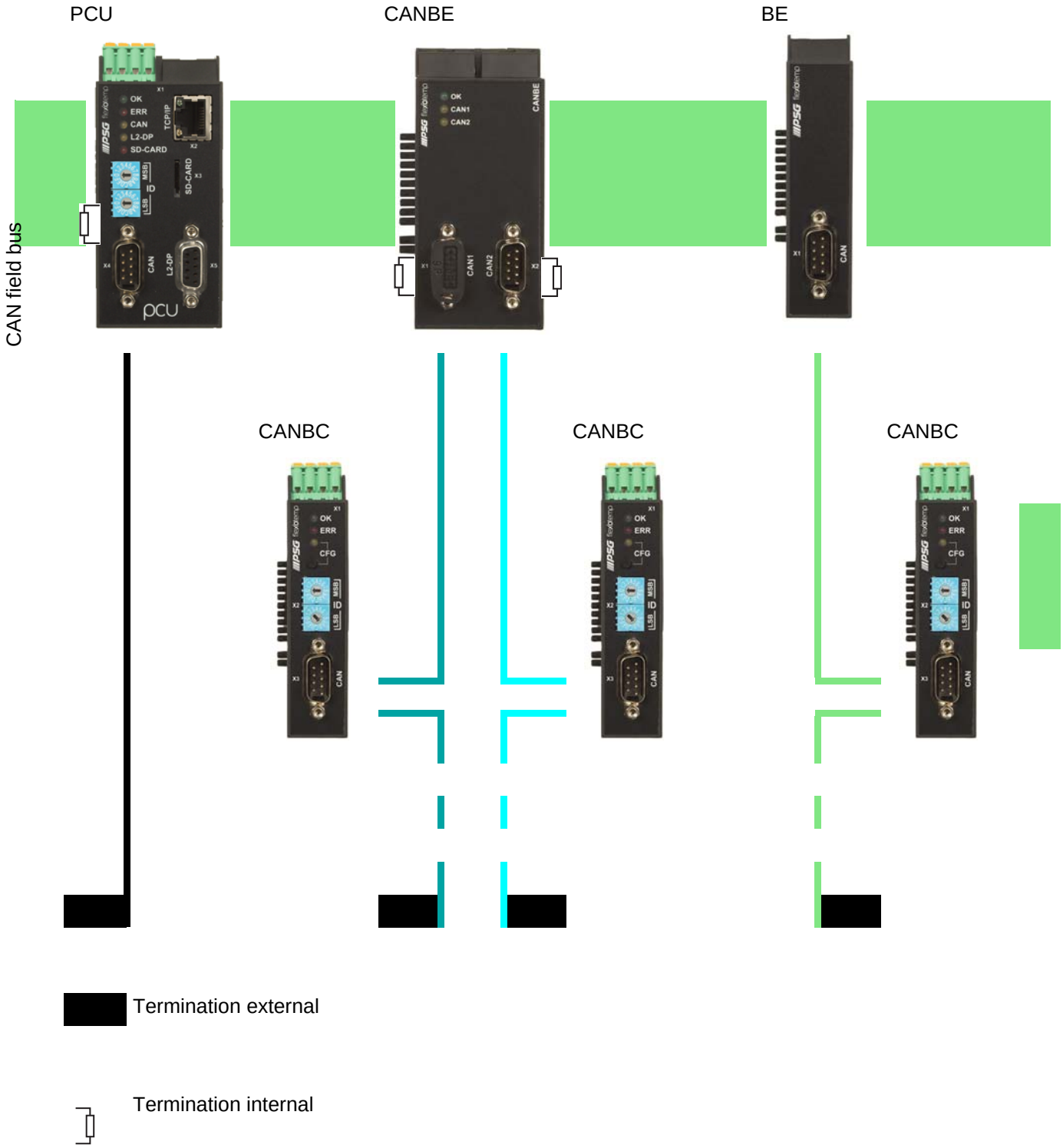
- be activated by CANBC in flexotempMANAGER (see context menu for CANBC on project level, address scan).
- be activated by **key** directly on component CANBC.

Only components connected to the bus coupler CANBC are readdressed.

2.2 CAN bus termination

For flexotemp® components, that are at the begin or the end of the bus, the terminating resistor is activated ex-works.

- Peripheral Control Unit flexotemp® PCU48 (controller)
- CAN-Bus Extension Interface flexotemp® CANBE
- Bus Extension Interface flexotemp® BE



3 Examples

In the following example a project is described, with the target, to realize it with the flexotemp® components and the project setup/configuration in flexotempMANAGER.

Each example is divided by the following points

- **Target**: Description of the project
- **Necessary components**: List of the required flexotemp® components for the project
- **Installation**: the configuration and wiring of the flexotemp® components
- **Interface connections**: establishing of connection between flexotemp® components with flexotempMANAGER serial/per Ethernet
- **Project setup and configuration**: the settings for the project in flexotempMANAGER, the parameters to configure, inclusive addressing of components

The necessary steps for own applications, to work with the system safely and quickly, can easily be derived by these exemplary configuration and project setup.

3.1 Example_1 - PCU-System

3.1.1 Example1-Target

Project setup of a control system with

- 20 zones (10 Heating, 10 Heating/Cooling)
- 4 zones with measurement inputs resistance thermometer Pt100
- remaining zones with measurement inputs thermocouple TC
- Outputs Heating, SSR, zero-crossing switching
- 2 outputs Cooling, analog outputs for control of servo valves
- remaining outputs Cooling, SSR, zero-crossing switching activation for fan, drive
- 2 analog inputs for recording of process factors (RPM)x
- Heating Current Monitoring

The planned control system should be represented in a table, e.g. in the way shown, to deduce the number of components and the project setup.

Explanation of the table contents

ℹ	Prerequisite	The standard names of flexotempMANAGER are used.
	Z	Number of zone
	M/C	Measurement/Control
	SSR	Solid State Relay
	e.g. 004DIO16_CI.DIO7	flexotemp® component DIO16_CI, 7th DIO (004 is an internal consecutive number, which is assigned by the program, to identify the flexotemp® component)
	S-Type	Sensor Type

Z	M/ C	Output type Switching SSR **Heating *)**	Output type Switching SSR **Cooling**	Output type Analog signal	Measurement input Analog signal	S-Type	Measurement input Sensor Type
1	C	004DIO16_CI.DIO1				PT	002TCPT08.AI1
2	C	004DIO16_CI.DIO2				PT	002TCPT08.AI2
3	C	004DIO16_CI.DIO3				PT	002TCPT08.AI3
4	C	004DIO16_CI.DIO4				PT	002TCPT08.AI4
5	C	004DIO16_CI.DIO5				J	002TCPT08.AI5
6	C	004DIO16_CI.DIO6				J	002TCPT08.AI6
7	C	004DIO16_CI.DIO7				J	002TCPT08.AI7
8	C	004DIO16_CI.DIO8				J	002TCPT08.AI8
9	C	004DIO16_CI.DIO9				J	003TC12.AI1
10	C	004DIO16_CI.DIO10				J	003TC12.AI2
11	C	004DIO16_CI.DIO11	005DIO16_CI.DIO5			J	003TC12.AI3
12	C	004DIO16_CI.DIO12	005DIO16_CI.DIO6			J	003TC12.AI4
13	C	004DIO16_CI.DIO13	005DIO16_CI.DIO7			J	003TC12.AI5
14	C	004DIO16_CI.DIO14	005DIO16_CI.DIO8			J	003TC12.AI6
15	C	004DIO16_CI.DIO15	005DIO16_CI.DIO9			J	003TC12.AI7
16	C	004DIO16_CI.DIO16	005DIO16_CI.DIO10			J	003TC12.AI8
17	C	005DIO16_CI.DIO1	005DIO16_CI.DIO11			J	003TC12.AI9
18	C	005DIO16_CI.DIO2	005DIO16_CI.DIO12			J	003TC12.AI10
19	C	005DIO16_CI.DIO3		006AIO04.AO1		J	003TC12.AI11
20	C	005DIO16_CI.DIO4		006AIO04.AO2		J	003TC12.AI12
21	M				006AIO04.AI1		
22	M				006AIO04.AO2		

*) In the current example, the heating current monitoring is done for all Heating outputs, which are distributed to the both modules DIO 16 CI, so the flexotemp® component DIO16CI is connected each with 3 external current transformers. The PSG current transformer module ESW75 is used. The control outputs Heating are of type <Heating with current measurement>. Further details on heating current monitoring see operating instructions **Temperature Control System flexotemp® Parameter**.

3.1.2 Example1-Necessary components

The following flexotemp® components are required:

- 1 Peripheral Control Unit flexotemp® PCU48 (controller)
- 1 Thermocouple Interface flexotemp® TCPT08
- 1 Thermocouple Interface flexotemp® TC12
- 2 Digital In-/Output Interface, Current Input flexotemp® DIO16CI
- 6 current transformer modules ESW75
- 1 Analog In-/Output Interface flexotemp® AIO04
- 8 output modules sysTemp® SMS01

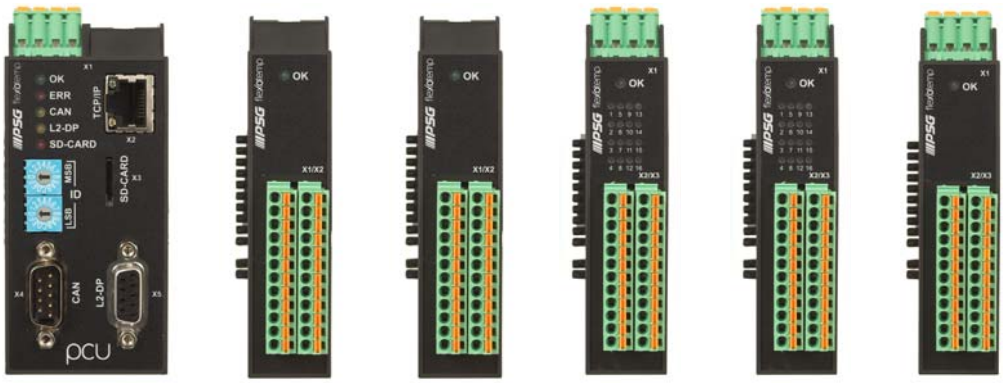
3.1.3 Example1-Installation

At all installation work, note the current data sheets for each flexotemp® component.

The data sheets can be accessed in Internet by www.meusburger.com, and/or are available under menu bar →<Extras> →<Options> →<Update> in flexotempMANAGER in the project view below each flexotemp® component (see operating instructions **Project setup and Configuration Tool flexotempMANAGER Operation**, see ↗Additional and continuative documents).

The flexotemp® components are added from the right side, starting from the controller, as shown. The cross connections click into place for automatic parallel bus contact in the housing, that builds a block of flexotemp® components.

Power unit



Output voltage 24 VDC

PCU 48 ÙTCPT08 ÙTC12 ÙDIO16CI ←DIO16CI ÙAIO04

ÙClick into place

Rated voltage	18...30 VDC	18...30 VDC	18...30 VDC	18...30 VDC	18...30 VDC	18...30 VDC
Power consumption	6 W	2 W (Electronics)	2 W (Electronics)	2 W (Electronics)	2 W (Electronics)	2 W (Electronics)
ℹ	See current data sheets					

Starting with the power unit, the flexotemp® components must be connected with the 24 VDC power supply.

Component	PCU 48	TCPT 08	TC12	DIO 16 CI	DIO 16 CI	AIO 04
Terminal	X1	<n.a.>	<n.a.>	X1	X1	X1
ℹ	See current data sheets					

The in-/outputs of the flexotemp® components must be wired accordingly.

Component	PCU 48	TCPT 08	TC12	DIO 16 CI	DIO 16 CI	AIO 04
Terminal	<n.a.>	X1, X2	X1, X2	X2, X3	X2, X3	X2, X3
ℹ	See current data sheets					

Three current transformers ESW75 have to be connected to the flexotemp® component DIO16CI, for heating current monitoring.

Component	DIO 16 CI	DIO16CI
Terminal	X2, X3	X2, X3

Current transformer	3 x ESW75	3 x ESW75
See current data sheets		

The outgoing control lines for the Heating actuators on DIO16CI, have to be led through the connected current transformer.

An output module SMS01 has to be connected to the digital outputs (see ↗Example1-Specify Cooling outputs) (in terminal design), e.g. for control of a three phase fan.

Component	DIO 16 CI	DIO 16 CI
Terminal	X2, X3	X2, X3
	SMS01(X5)	SMS01(X5)
See current data sheets		

3.1.4 Example1-Create serial interface connection to controller

A serial connection to PC, where flexotempMANAGER is installed, is created from the flexotemp® component PCU48.

	Prerequisite	flexotempMANAGER and the communication server (PSGCommServer) are running on the same computer hardware.
	Prerequisite	flexotemp® component PCU48 has the option COM interface RS232/ RS422.
	PC side	
	Interface converter	Due the fact, that a PC has no standard RS485 interface, an interface converter is required (see data sheet SK232485). Take care of the pin assignment and the correct connection.
	Controller side	The RS232 cable must be connected to the connection X5 COM of the flexotemp® component PCU48.
	PSGCommServer	Create a serial interface (operating instructions **Project setup and Configuration Tool flexotempMANAGER Operation** chapter 3.1.2, see ↗Additional and continuative documents).
	flexotempMANAGER	Check on the side of the communication server, that the setting <The PSGCommServer runs on the same computer as flexotempMANAGER> is selected. By the key <Read setting of interface manually by PSGCommServer>, the settings of the serial interface are taken from the previous step and can be selected.

3.1.5 Example1-Create interface connection to controller per Ethernet

A connection to PC, where flexotempMANAGER is installed, is created from the flexotemp® component PCU48 per Ethernet.

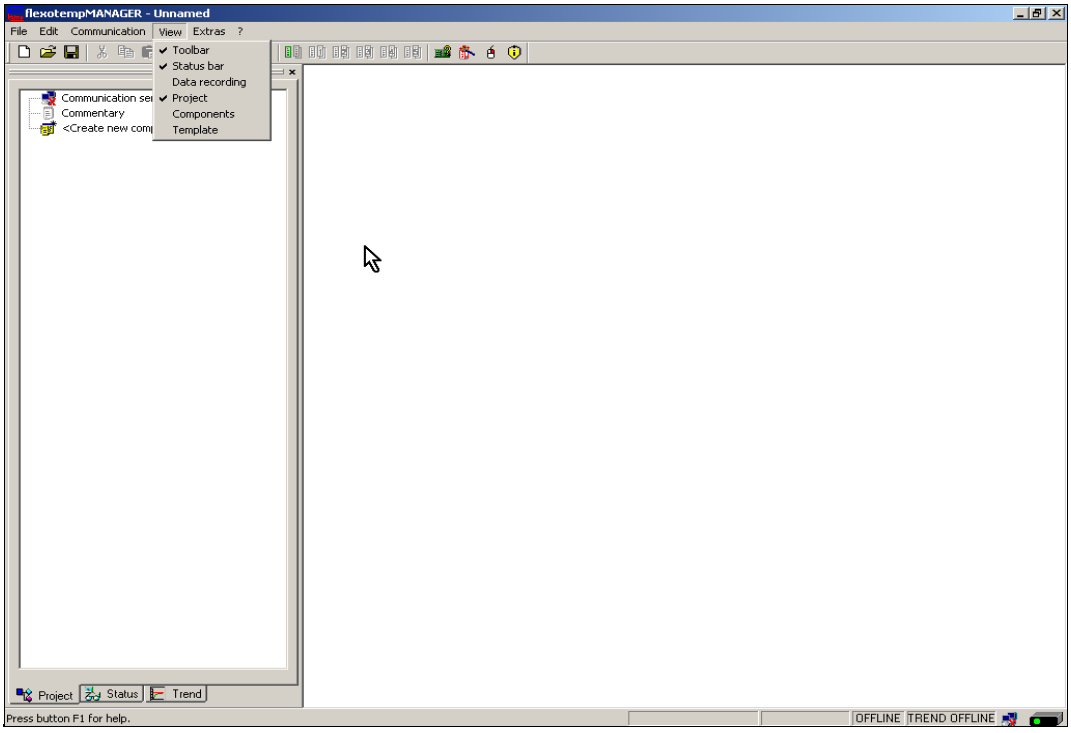
	Prerequisite	flexotempMANAGER and the communication server (PSGCommServer) are running on the same computer hardware.
	PC side	
	LAN connection	For direct coupling from PC and controller, use a cross-over cable. Using a Fast-Ethernet-Switch, use a standard Ethernet network cable.
	Controller side	The Ethernet network cable must be connected to the connection X2 TCP/IP of the flexotemp® component PCU48.
	flexotempMANAGER	Check on the side of the communication server, that the setting <The PSGCommServer runs on the same computer as flexotempMANAGER> is selected.

3.1.6 Example1-Project setup and configuration

Further details, how the project setup and configuration tool flexotempMANAGER should be used and operated, as well as further explanations of the parameters, please see the operating instructions (see chapter ↗Additional and continuative documents).

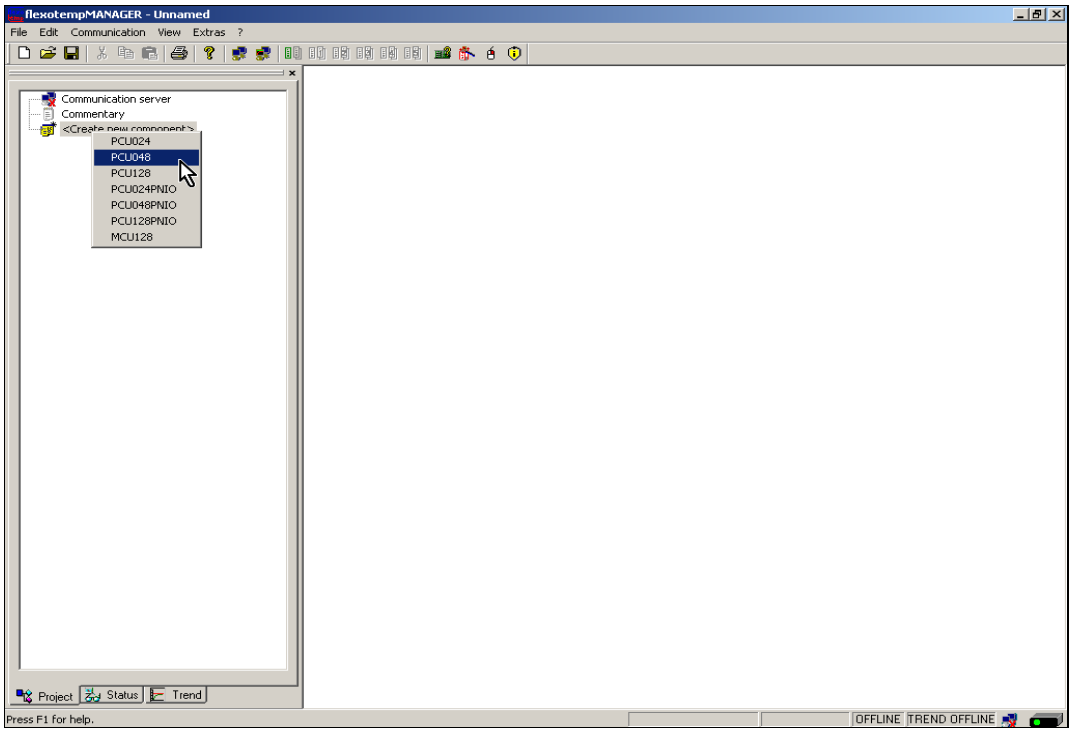
3.1.6.1 Example1-Create controller and components

ℹ	Prerequisite	flexotempMANAGER is installed on PC.
ℹ	Prerequisite	flexotempMANAGER and the communication server (PSGCommServer) are running on the same computer hardware.
ℹ		The flexotemp® components are configured in the order shown in ↗Example1-Installation (from the left, starting from the controller, to the right).
	PC side	
	flexotempMANAGER start	Symbol bar: <View> Symbol bar, Status bar, Project are active. Menu bar: <File> <New>. No project (<Unnamed>) is displayed.



Create controller

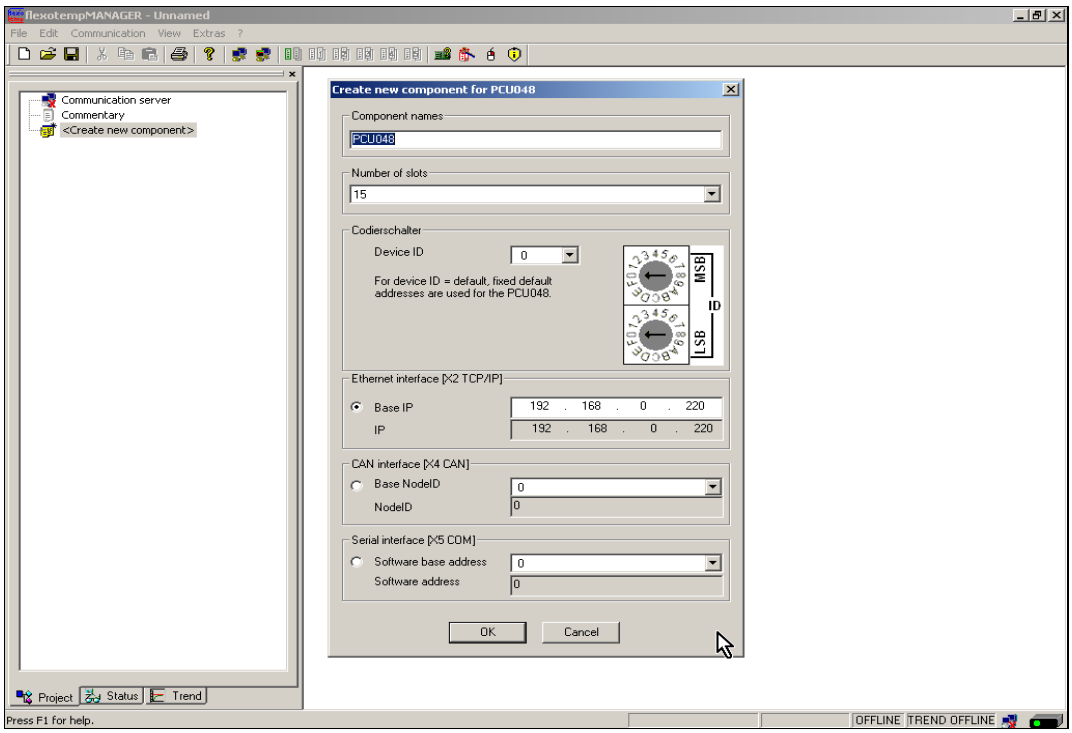
Create controller PCU048 by <Create new component>.



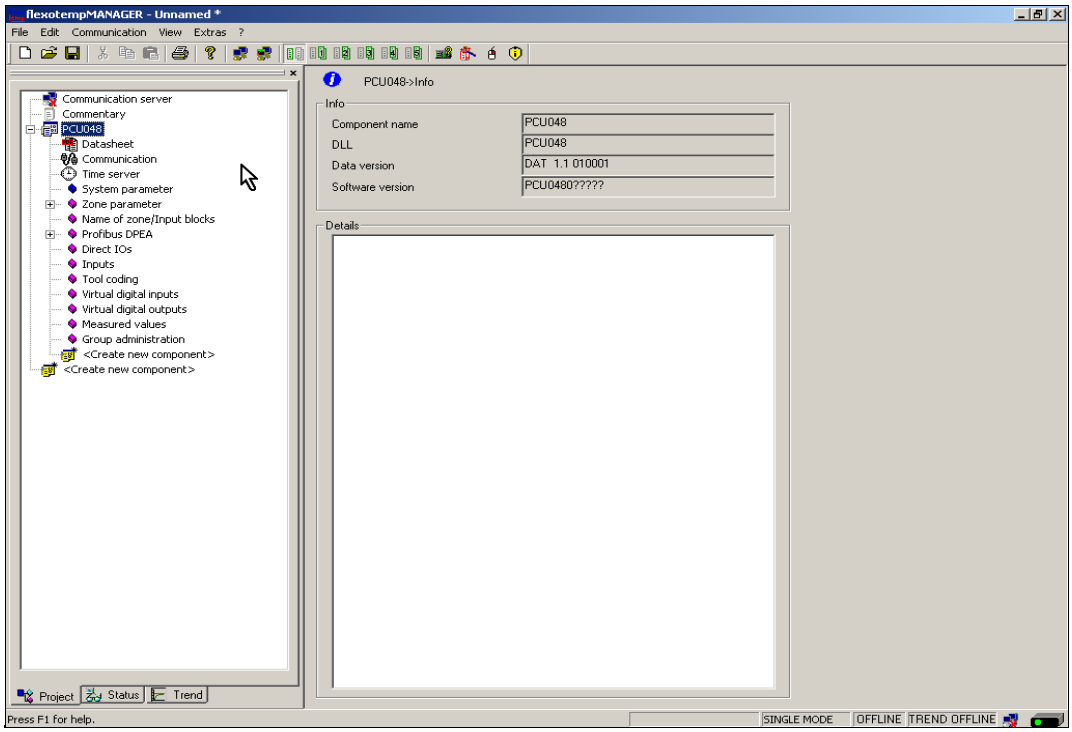
Address setting

The setting of the device ID on the coding switch here and on the rotary switch on the controller must fit.

At communication by Ethernet, the PC must have the same subnet like the controller (subnet mask: 255.255.255.0).

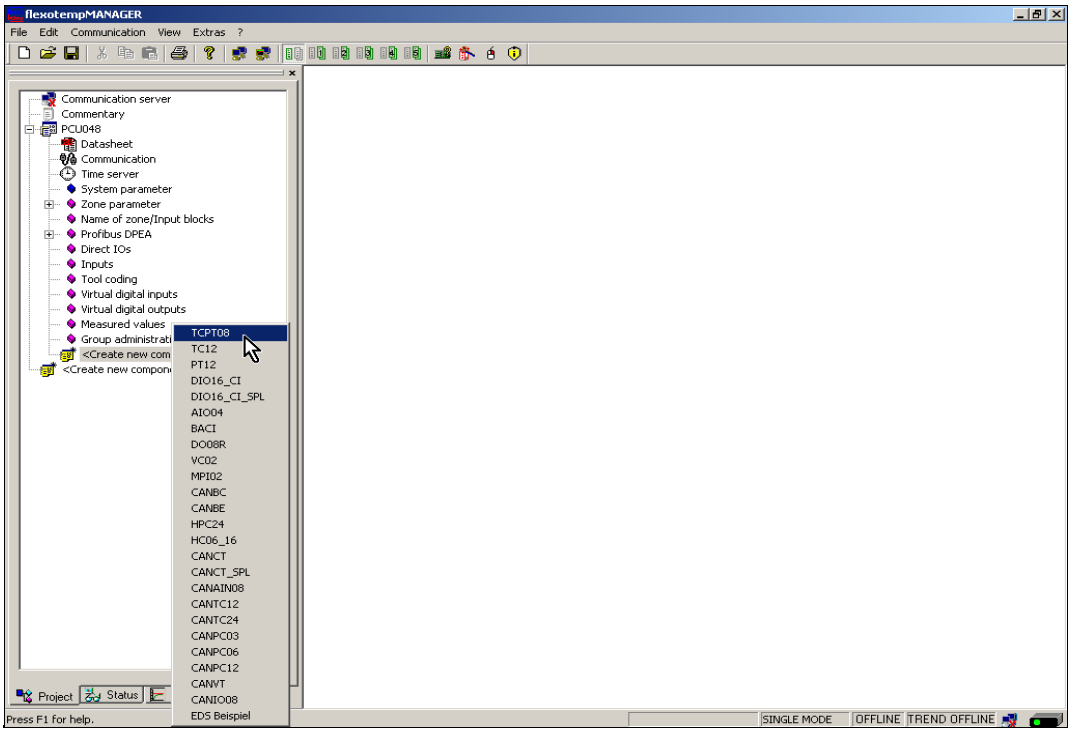


Controller PCU048 is created.

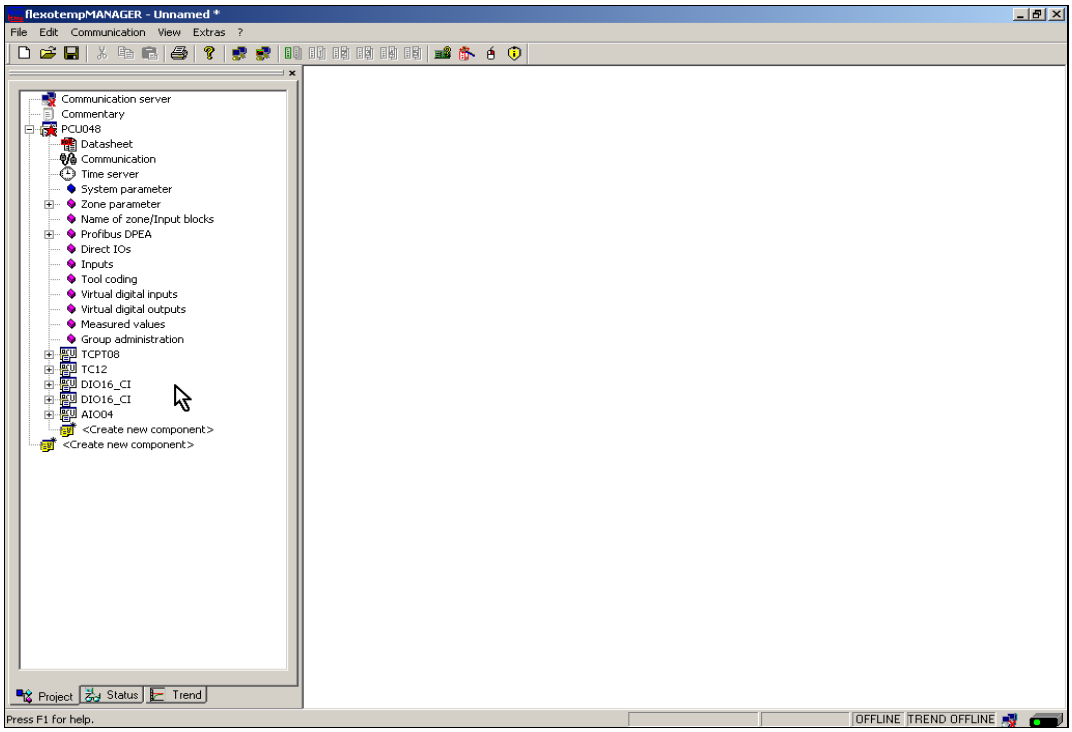


Create further components

Beneath the controller, the further components (TCPT08, TC12, DIO16 CI, AIO04) are selected out of a list and created.



The controller and the components are created in the project.

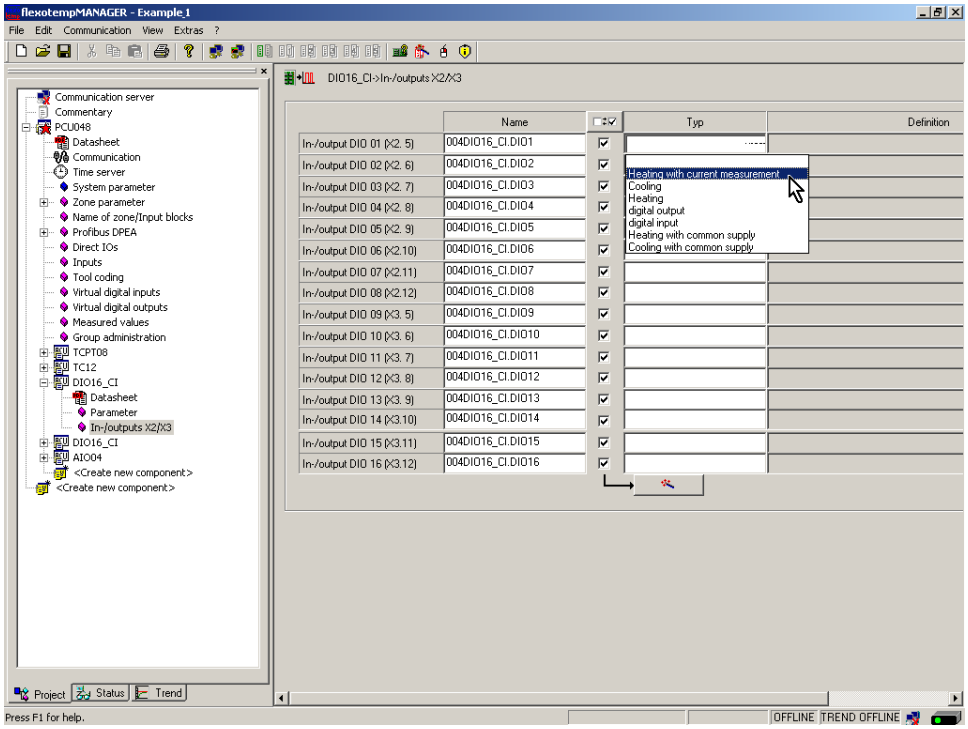


The project is stored with the name Example_1.

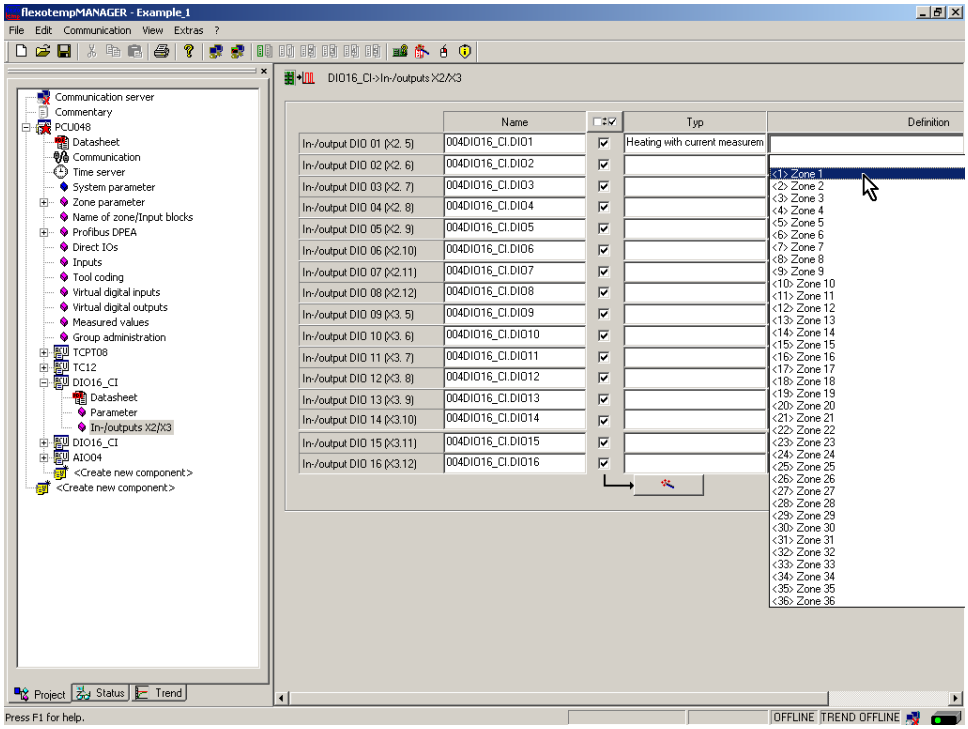
3.1.6.2 Example1-Specify Heating outputs

Specify 20 Heating outputs

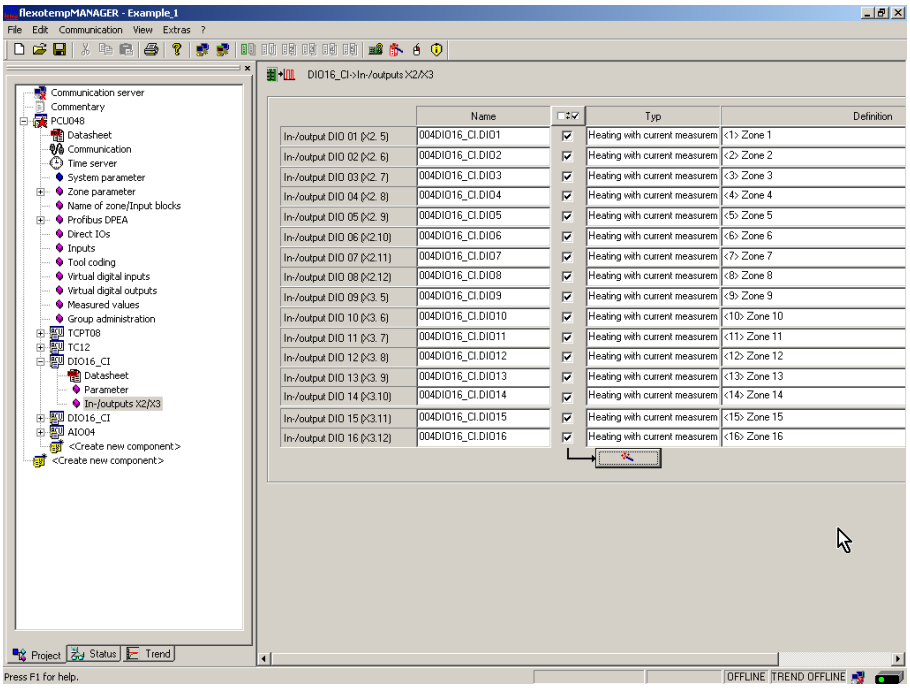
At the first (004)DIO16_CI: for DIO1...DIO16 select and set the type <Heating with current measurement>.



At the first (004)DIO16_CI: for DIO1...DIO16 of type <Heating with current measurement> assign zone 1...16.



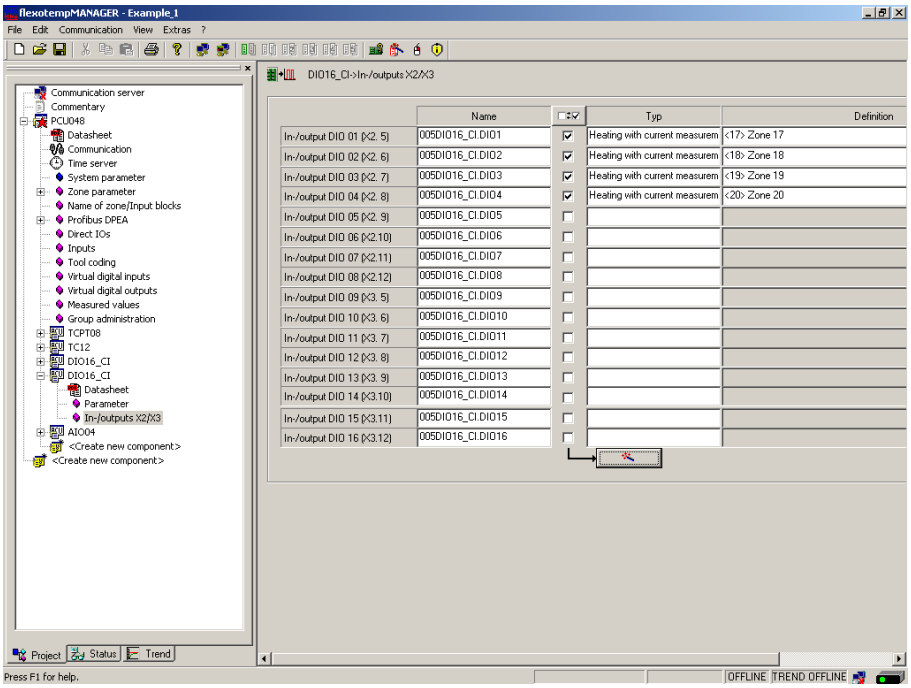
16 Heating outputs are defined for zone 1...16.



At the second (005)DIO16_CI: for DIO1...DIO4 select and set the type <Heating with current measurement>.

At the second (005)DIO16_CI for DIO1...DIO4 of type <Heating with current measurement> assign zone 17...20.

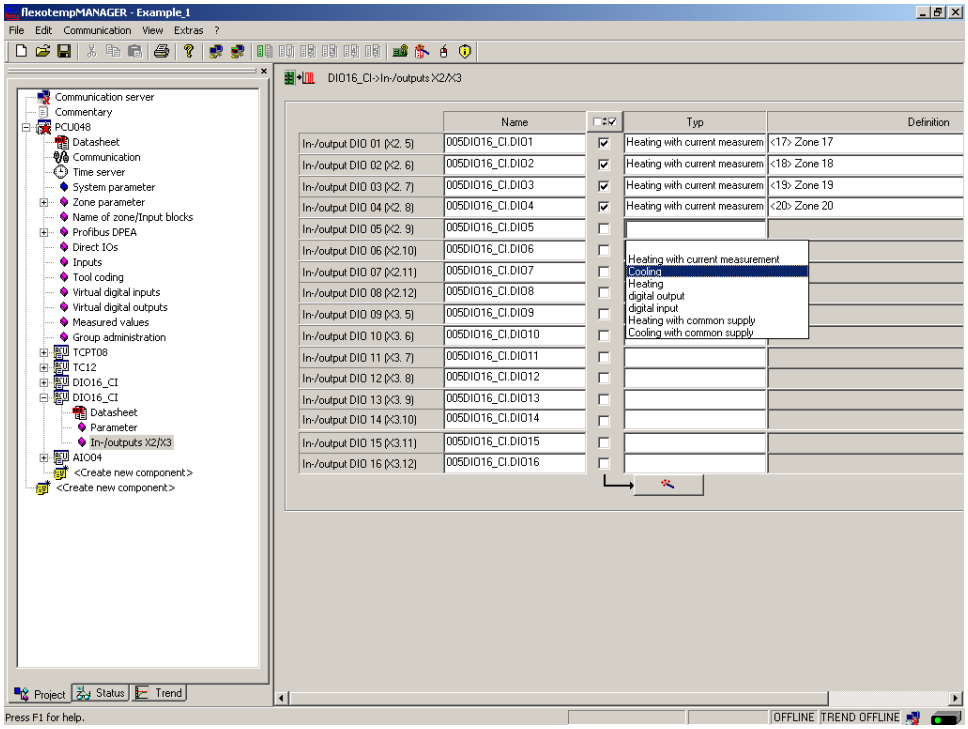
All 20 Heating outputs with heating current monitoring are defined for zone 1...20.



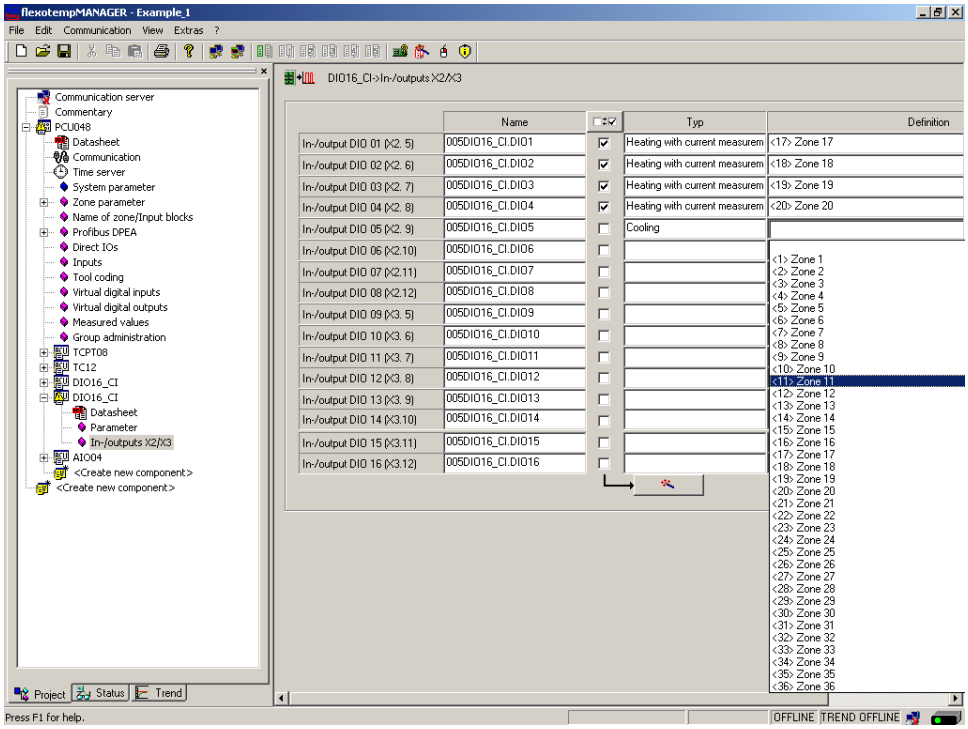
3.1.6.3 Example1-Specify Cooling outputs

Specify 8 Cooling outputs

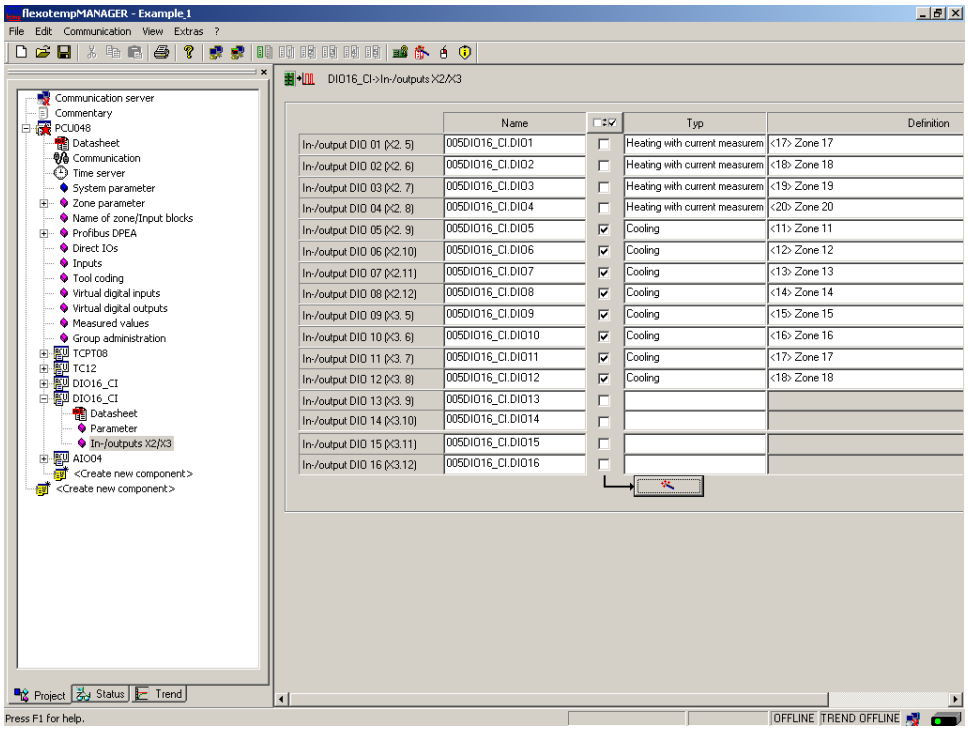
At the second (005)DIO16_CI for DIO5...DIO12 select and set the type <Cooling>.



At the second (005)DIO16_CI for DIO5...DIO12 of type <Cooling> assign zone 11...18.



8 Cooling outputs are defined for zone 11...18.

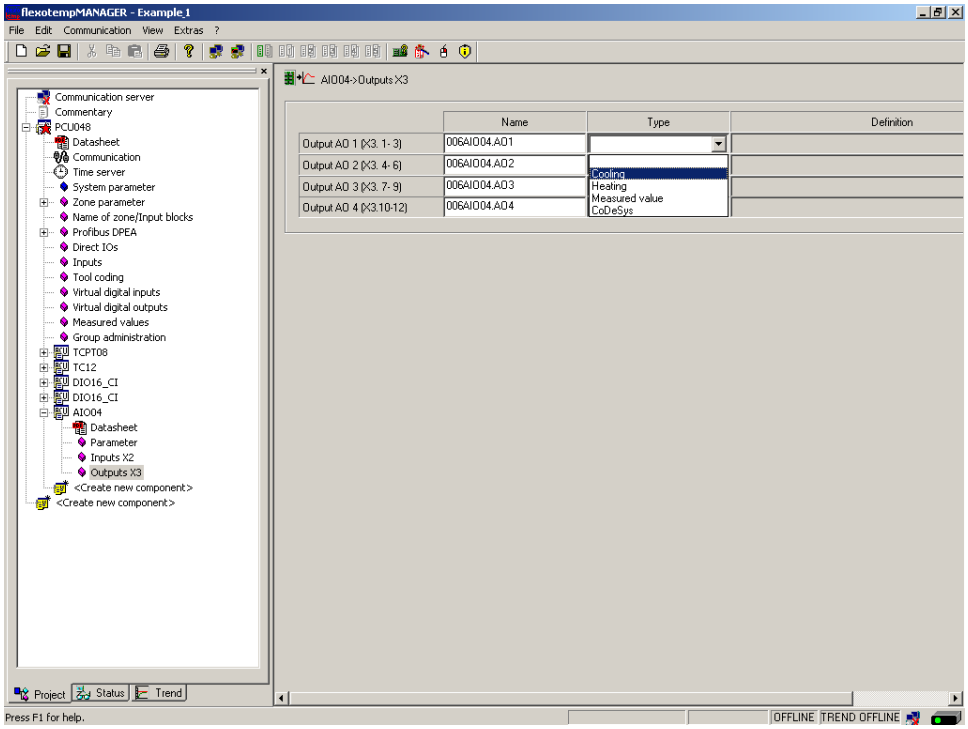


By the output module SMS01 (in terminal design) for each digital output e.g. a three phase fan can be connected. A project setup and/or configuration for the SMS01 is not necessary (see ↗Example1-Installation).

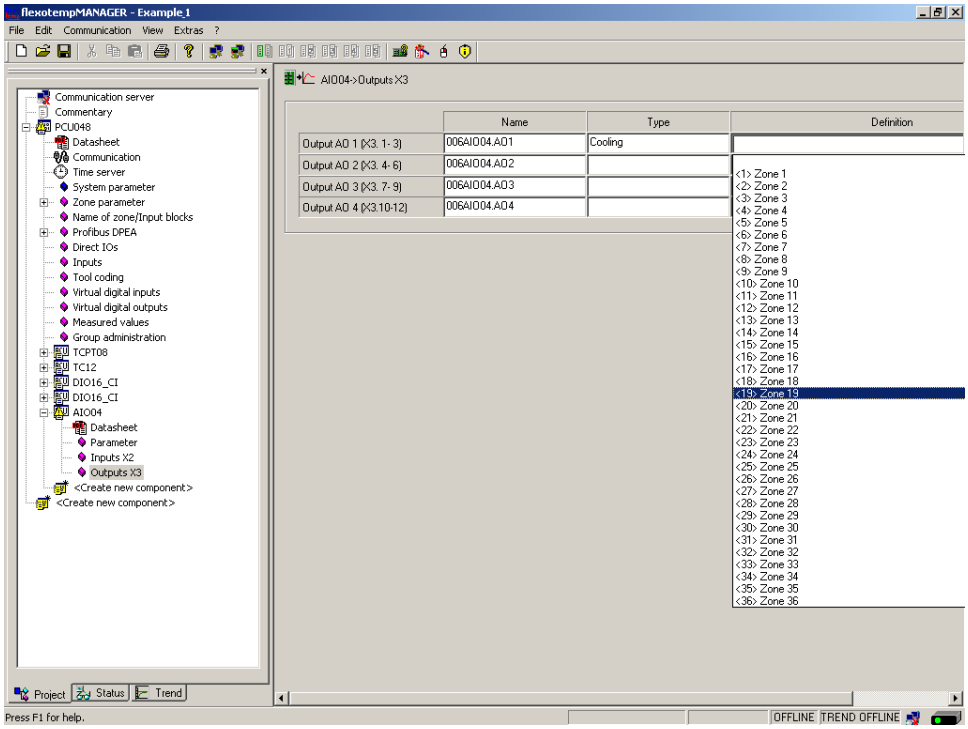
3.1.6.4 Example1-Specify Cooling outputs as analog outputs

Specify 2 Cooling outputs as analog outputs

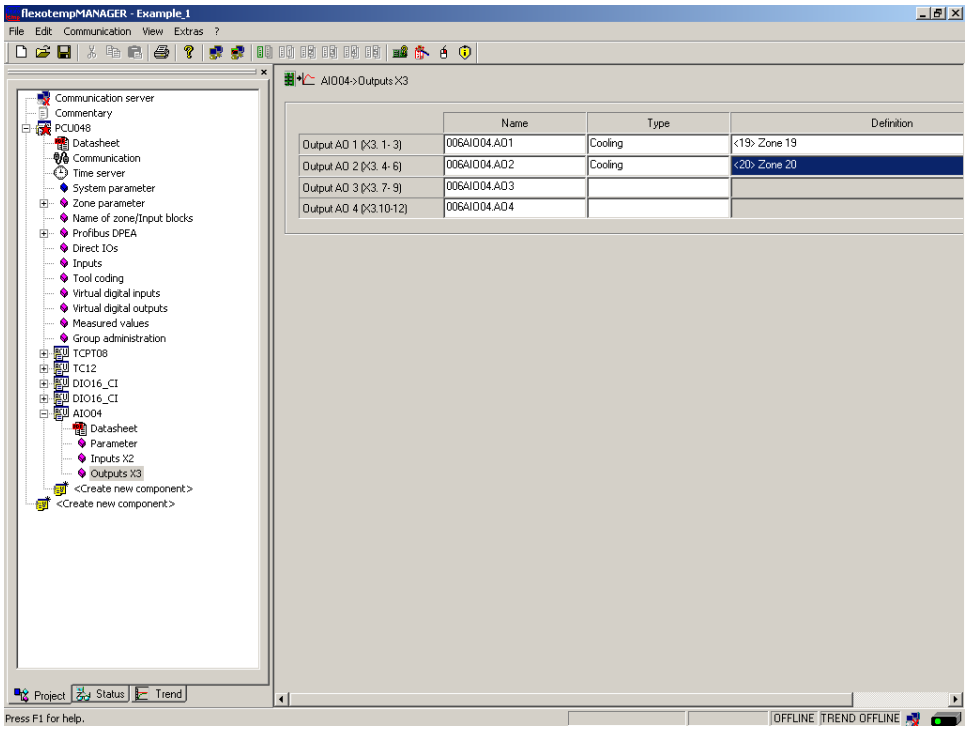
At (006)AIO04: for AO1...AO2 select and set the type <Cooling>.



At (006)AIO04: for AO1...AO2 of type <Cooling> assign zone 19...20.



2 Cooling outputs are defined as analog outputs for zone 19...20.



3.1.6.5 Example1-Parameterize Heating/Cooling outputs

Output type switching SSR (zero-crossing switching)

For zone 1...18 the parameters must be specified as follows:
[P026 RELH] = <Off>
[P027 RELC] = <Off>

Output type analog signal

For zone 19...20 the parameters must be specified as follows:
[P026 RELH] = <Off>
[P027 RELC] = <On>

Zone only Heating

For zone 1...10 the parameters must be specified as follows:
[P023 OUTH] = 100
[P024 OUTC] = 0

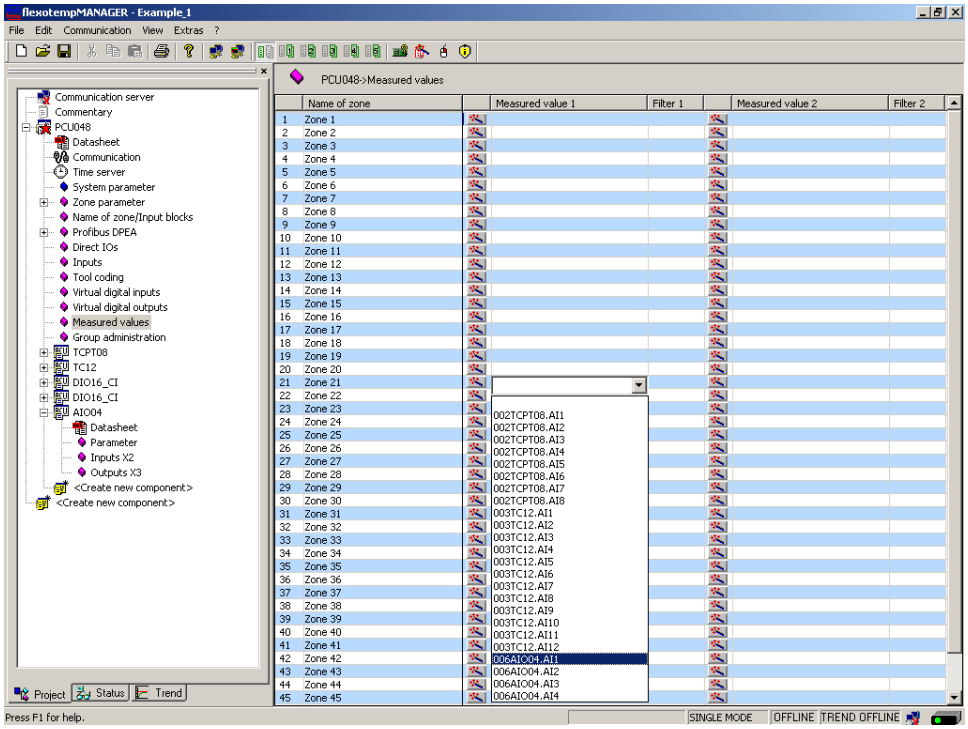
Zone Heating/Cooling

For zone 11...20 the parameters must be specified as follows:
[P023 OUTH] = 100
[P024 OUTC] = -100

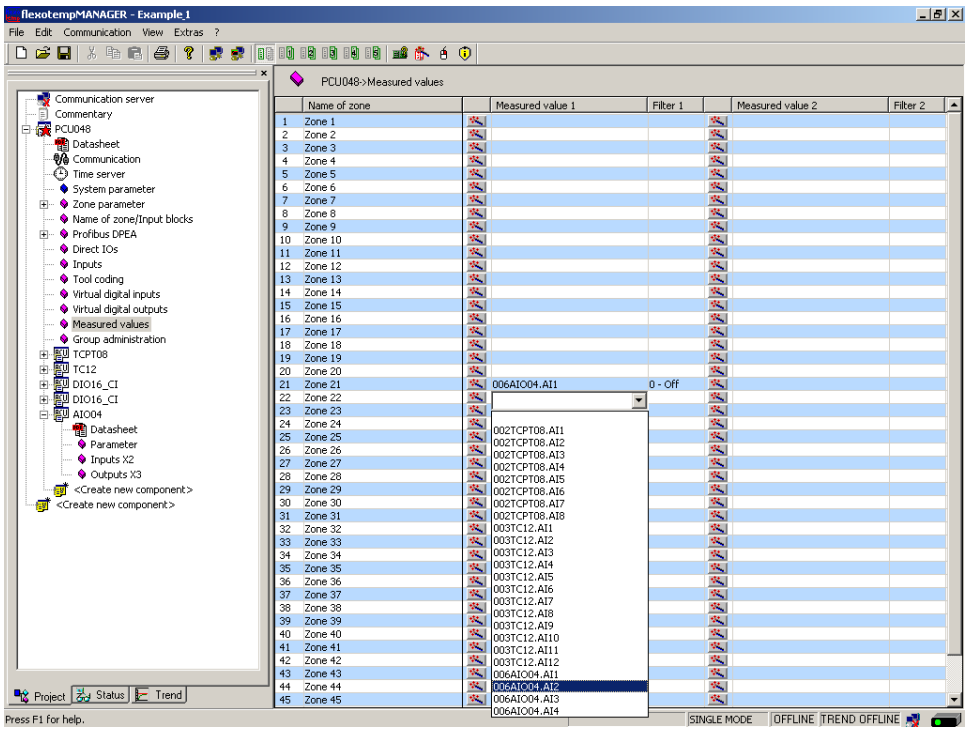
3.1.6.6 Example1-Assign analog inputs to measurement inputs

2 Analog inputs for registration of process values e.g. RPM, pressure or charging level are assigned to measurement inputs.

At the controller, under <Measured values> zone 21 is assigned to analog input 006AIO04.AI1.



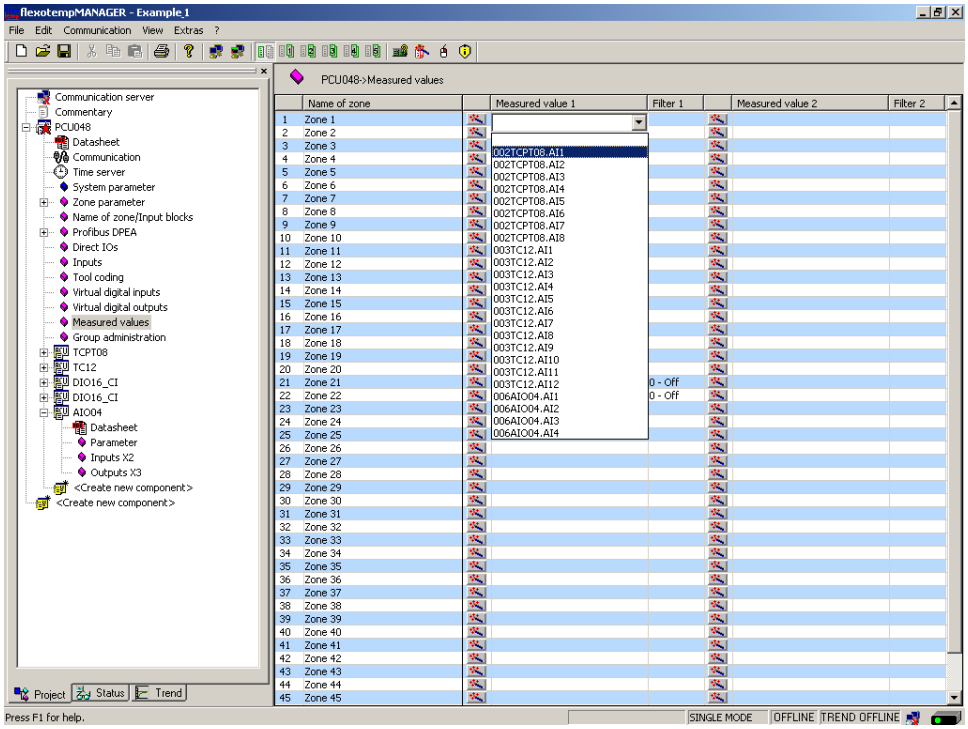
At the controller, under <Measured values> zone 22 is assigned to analog input 006AIO04.AI2.



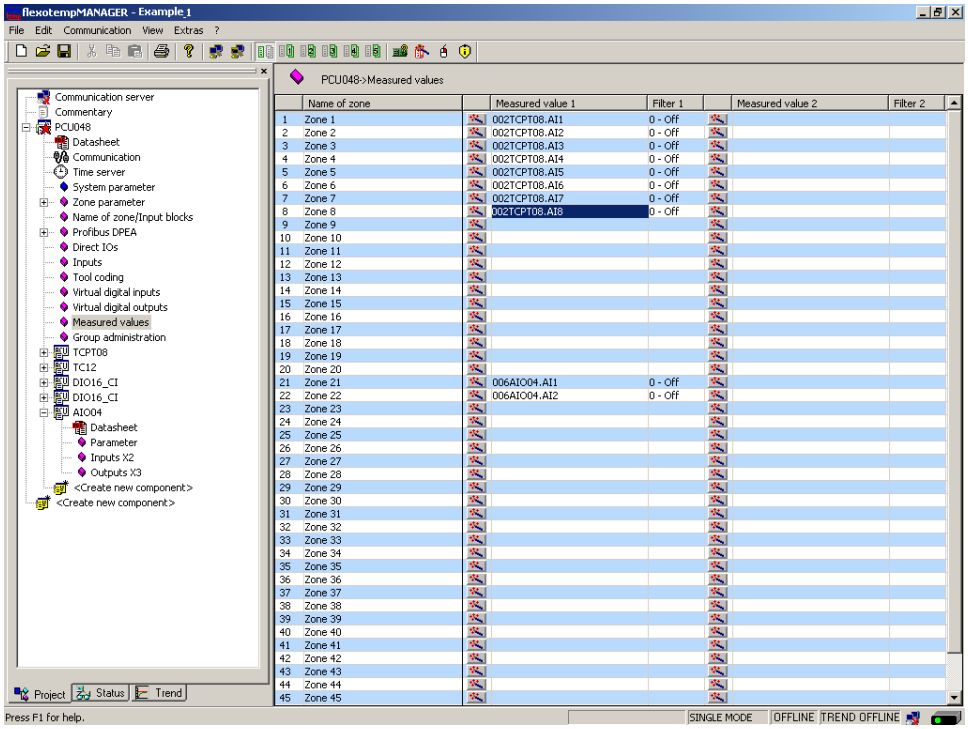
3.1.6.7 Example1-Assign analog inputs of type TC, Pt100 to measurement inputs

20 Analog inputs of type TC, Pt100 are assigned to measurement inputs

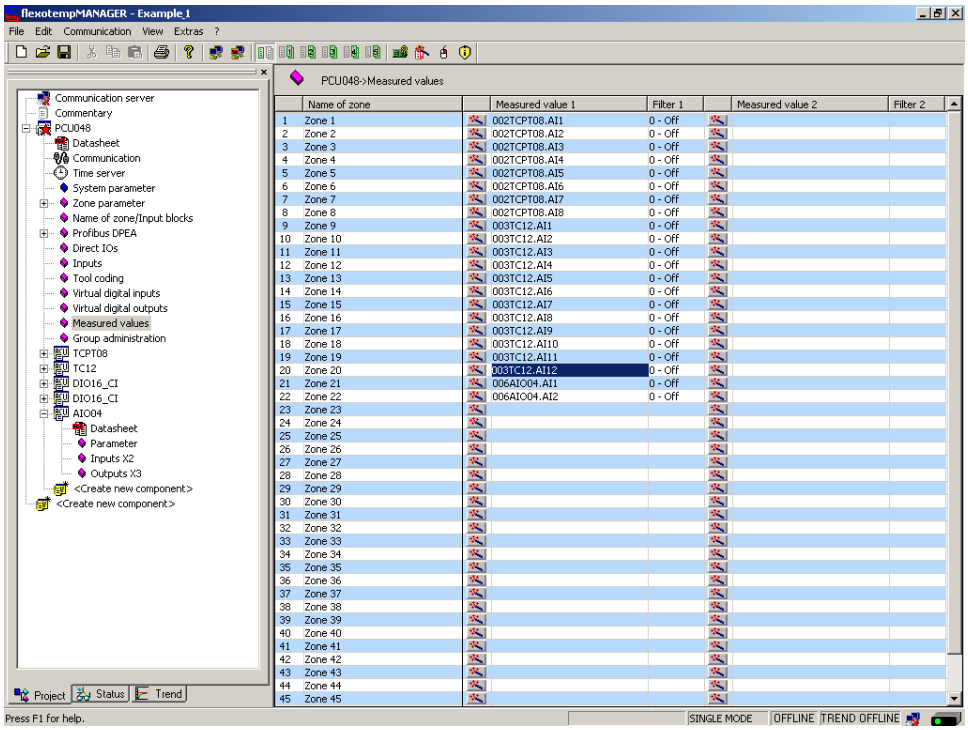
At the controller, under <Measured values> zone 1 is assigned to analog input 002TCPT08.AI1



The analog inputs 002TCPT08.AI2...8 are assigned to the further zones 2...8.



At the controller, under <Measured values> zones 9...20 are assigned to analog inputs 003TC12.AI1...12.



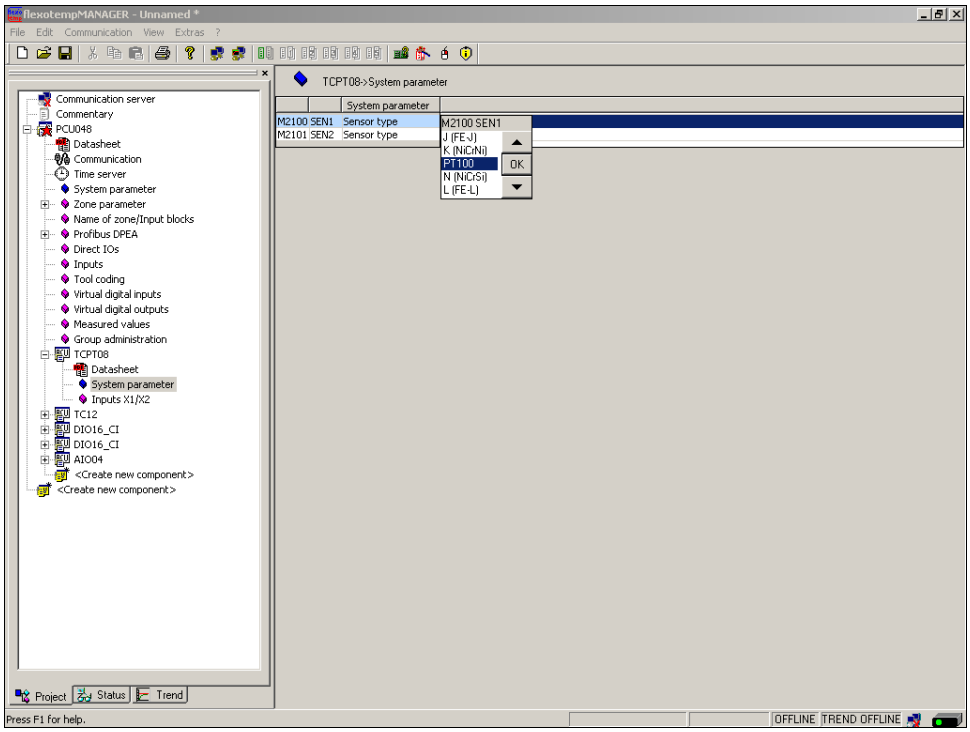
The zones 1...20 are 20 analog inputs TC, Pt100 assigned as measured value inputs.

The zones 21...22 are 2 analog inputs for registration of process values assigned as measured value inputs.

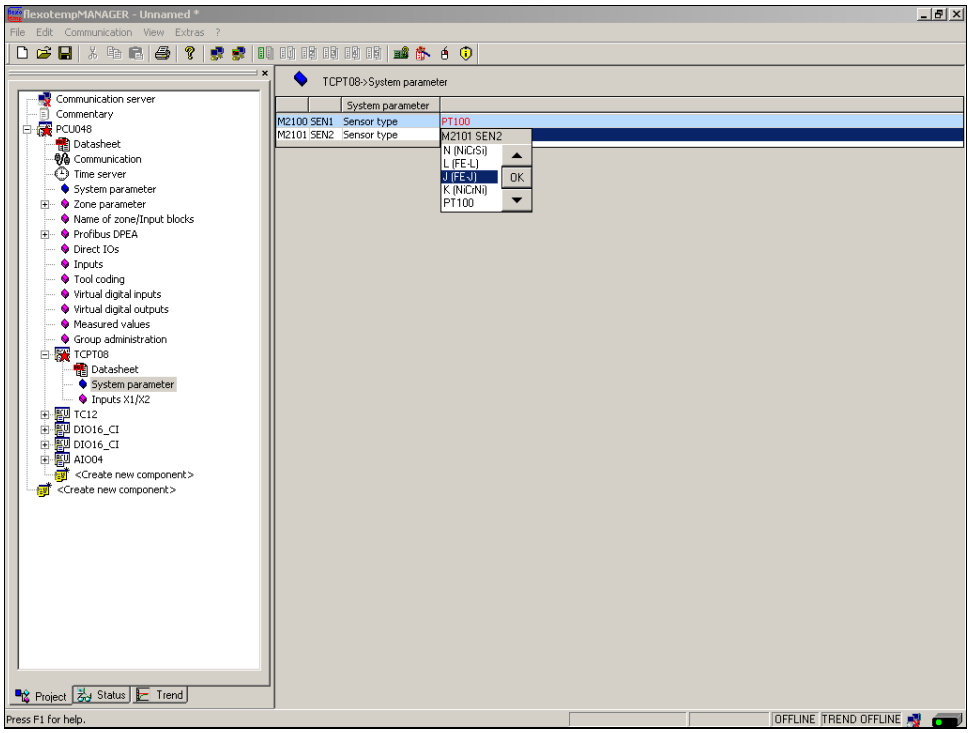
3.1.6.8 Example1-Analog inputs - specify sensor types

The sensor types are specified in groups on the input cards TCPT08 and TC12.

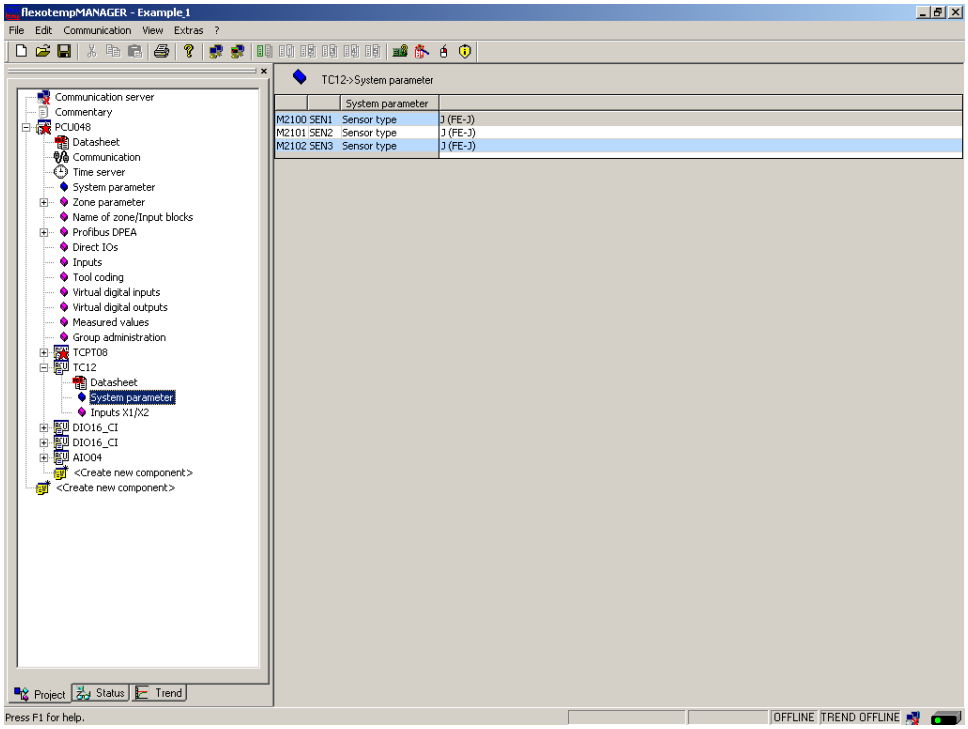
On TCPT08 the sensor type <SEN1> is set to <PT100> for the first four analog inputs.



On TCPT08 the sensor type <SEN2> is set to <J(Fe-J)> for the second four analog inputs.



On TC12 the sensor type <SEN1>...<SEN3> is set for four analog inputs.
Standard setting for the sensor type is <J(Fe-J)>.



The sensor types for the input card TCPT08 and TC12 are defined.

3.2 Example_2 - PCU system expanded by a peripheral I/O node

3.2.1 Example2-Target

The described and configured control system under Example_1, should be expanded by 8 further zones in a new project part.

This is in detail:

- 8 zones (Heating/Cooling)
- 8 zones with measurement inputs thermocouple TC
- Outputs Heating, SSR, zero-crossing switching
- Outputs Cooling, SSR, zero-crossing switching activation for fan, drive

For the distribution on two plant components, a peripheral I/O node is necessary. On the existing control system the adapter module BE is connected and from there is branched to the peripheral I/O node, the flexotemp® component CANBC. The CANBC ensures, as a base module, the communication with the controller as well, as the across communication and the power supply for further connected flexotemp® components.

The planned I/O node should be represented in a table, e.g. in the way shown, to deduce the number of components and the project setup.

Explanation of the table contents

	Prerequisite	The standard names of flexotempMANAGER are used.
	Z	Number of zone
	M/C	Measurement/Control
	SSR	Solid State Relay
	e.g. 008DIO16_CI.DIO7	flexotemp® component DIO16_CI, 7th DIO (008 is an internal consecutive number, which is assigned by the program, to identify the flexotemp® component)
	S-Type	Sensor Type

Z	M/C	Output type Switching SSR **Heating**	Output type Switching SSR **Cooling**	Output type Analog signal	Measurement input Analog signal	S-Type	Measurement input Sensor Type
23	C	008DIO16_CI.DIO1	008DIO16_CI.DIO9			J	007TC12.AI1
24	C	008DIO16_CI.DIO2	008DIO16_CI.DIO10			J	007TC12.AI2
25	C	008DIO16_CI.DIO3	008DIO16_CI.DIO11			J	007TC12.AI3
26	C	008DIO16_CI.DIO4	008DIO16_CI.DIO12			J	007TC12.AI4
27	C	008DIO16_CI.DIO5	008DIO16_CI.DIO13			J	007TC12.AI5
28	C	008DIO16_CI.DIO6	008DIO16_CI.DIO14			J	007TC12.AI6
29	C	008DIO16_CI.DIO7	008DIO16_CI.DIO15			J	007TC12.AI7
30	C	008DIO16_CI.DIO8	008DIO16_CI.DIO16			J	007TC12.AI8

3.2.2 Example2-Necessary components

The following flexotemp® components are required in addition to the components of Example_1:

- 1 Bus Extension Interface flexotemp® BE
- 1 Bus Coupler flexotemp® CANBC
- 1 Thermocouple Interface flexotemp® TCPT08
- 1 Digital In-/Output Interface, Current Input flexotemp® DIO16CI

3.2.3 Example2-Installation

The adapter module BE is connected with the last component of Example_1 from the right. For the peripheral I/O node, the flexotemp® components are added from the right side, starting from the CANBC, as shown. The cross connections click into place for automatic parallel bus contact in the housing, that builds a block of flexotemp® components.

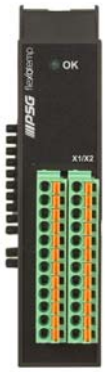
Control system
OFF
Example_1

←BE
←click into place

Power unit

Output voltage
24 VDC

CANBC



←TCPT08
←click into place

←DIO16CI

Rated voltage	18...30 VDC	18...30 VDC	18...30 VDC	18...30 VDC
Power consumption	2 W (Electronics)	2 W (Electronics)	2 W (Electronics)	2 W (Electronics)
	See current data sheets			

Starting with the power unit, the flexotemp® components must be connected with the 24 VDC power supply.

Component	BE	CANBC	TCPT 08	DIO 16 CI
Terminal	<n.a.>	X1	<n.a.>	X1
	See current data sheets			

The in-/outputs of the flexotemp® components must be wired accordingly.

Component	BE	CANBC	TCPT 08	DIO 16 CI
Terminal	<n.a.>	<n.a.>	X2, X3	X2, X3
	See current data sheets			

The interfaces of the CAN filed bus have to be connected with each other.

Component	BE	CANBC	TCPT 08	DIO 16 CI
CAN field bus	X1	X3	<n.a.>	<n.a.>
	See current data sheets			

3.2.4 Example2-Project setup and configuration

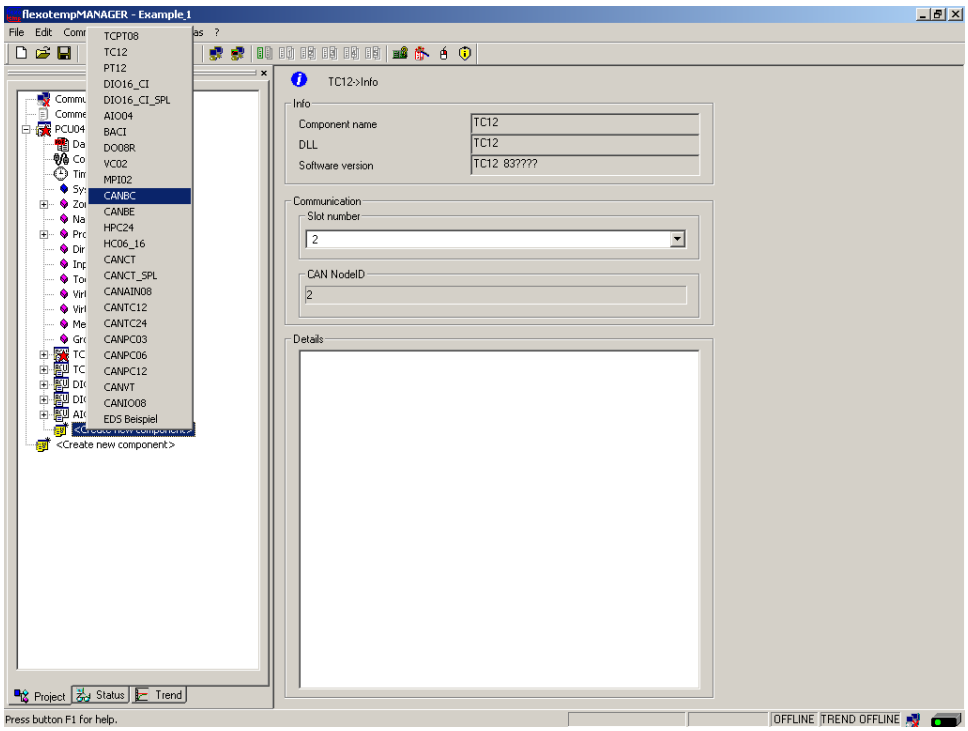
Further details, how the project setup and configuration tool flexotempMANAGER should be used and operated, as well as further explanations of the parameters, please see the operating instructions (see chapter ↗Additional and continuative documents).

3.2.4.1 Example2-Create components for peripheral I/O node

	Prerequisite	flexotempMANAGER is installed on PC.
	Prerequisite	flexotempMANAGER and the communication server (PSGCommServer) are running on the same computer hardware.
		The flexotemp® components are configured in the order shown in ↗Example1-Installation (from the left, starting with CANBC, to the right).
		The flexotemp® component BE is connected to the right side of the component of Example_1. A project setup/configuration is not necessary.
	PC side	
	flexotempMANAGER start	Symbol bar: <View> Symbol bar, Status bar, Project are active. Menu bar: <File> <Open> Project <Example_1>. The project <Example_1> is displayed.

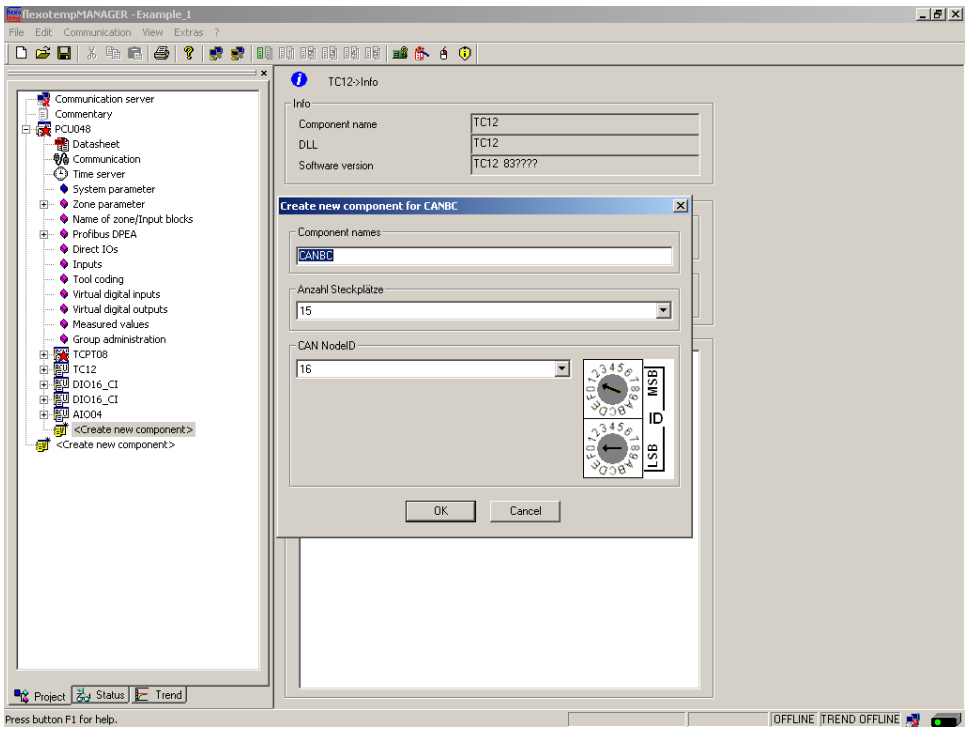
Create peripheral I/O node

The flexotemp® component CANBC is added to the existing project Example_1 as peripheral I/O node.



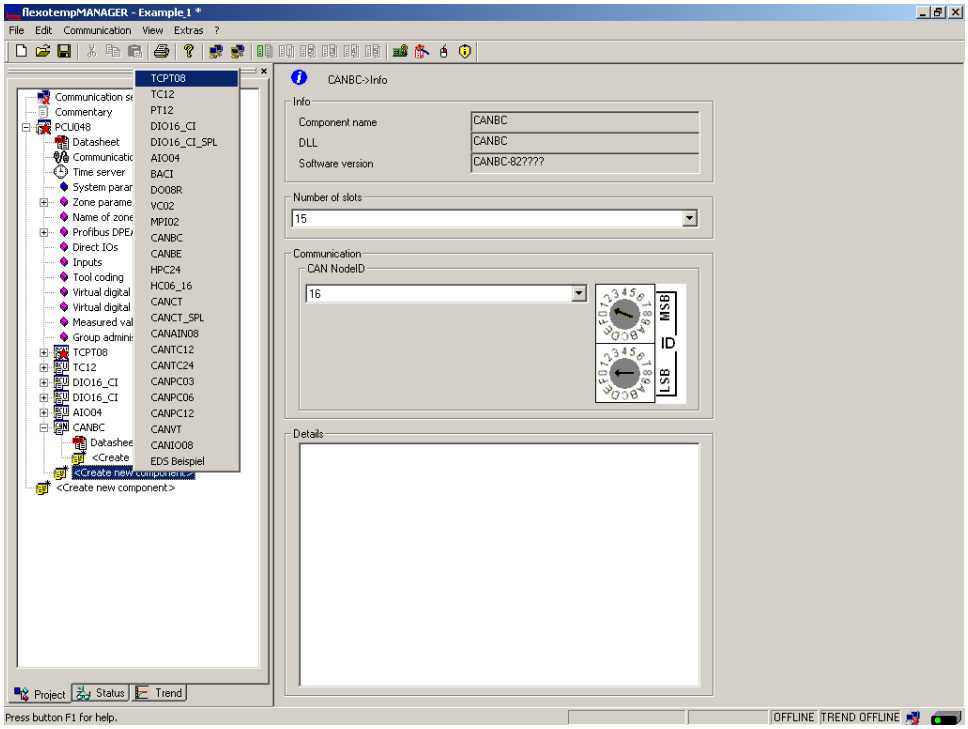
Address setting

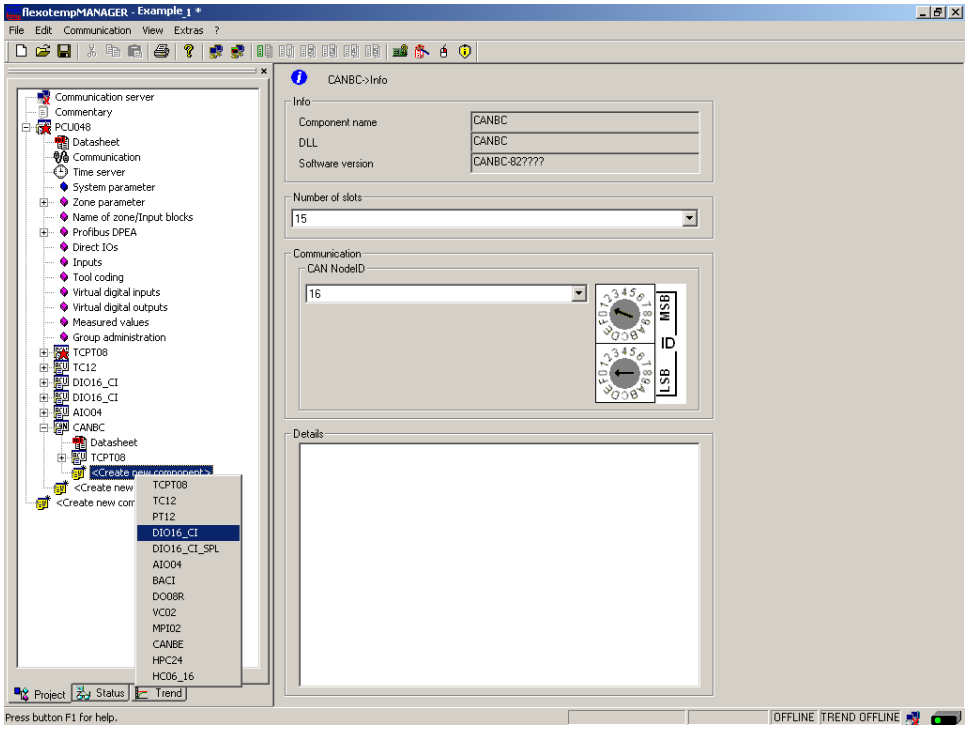
The setting of the device ID on the coding switch here and on the rotary switch on the CANBC must fit. The CANBC gets CAN NodeID 16, because the controller reserves 15 slots.



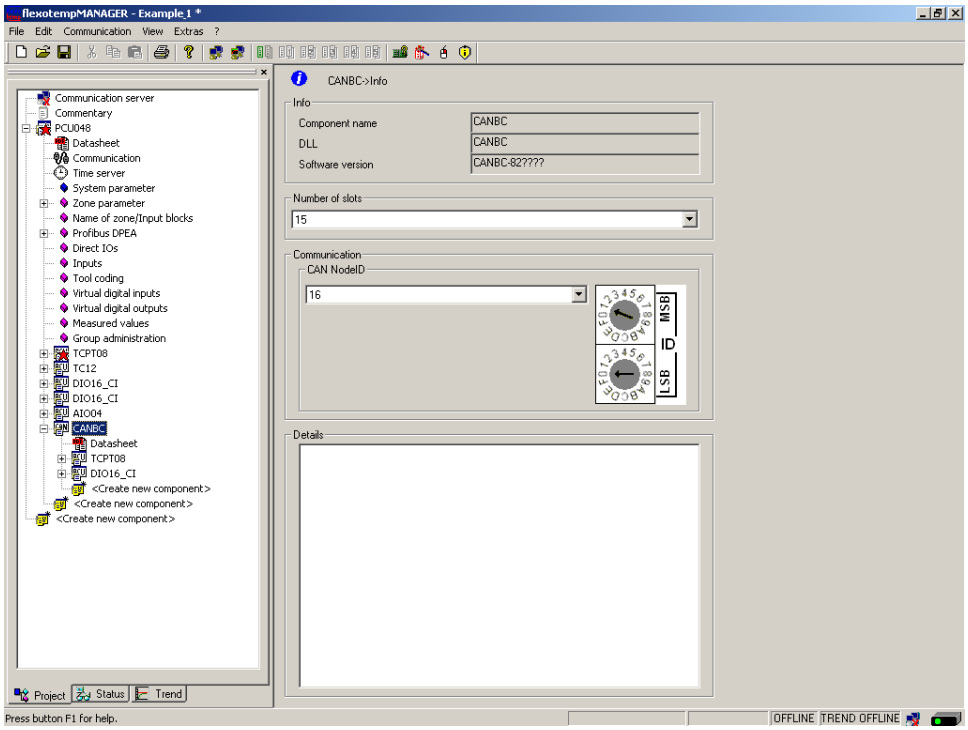
Create further components

Beneath the CANBC, the further components (TCPT08, DIO16_CI) are selected out of a list and created.





The I/O node and the components are created in the project.

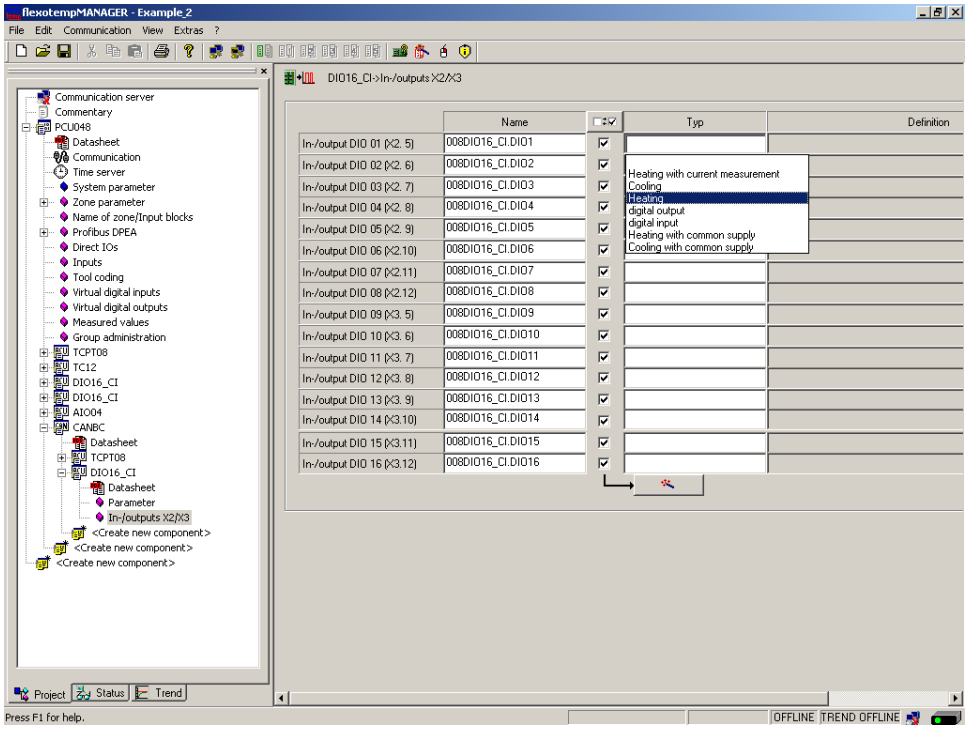


The project is stored with the name Example_2.

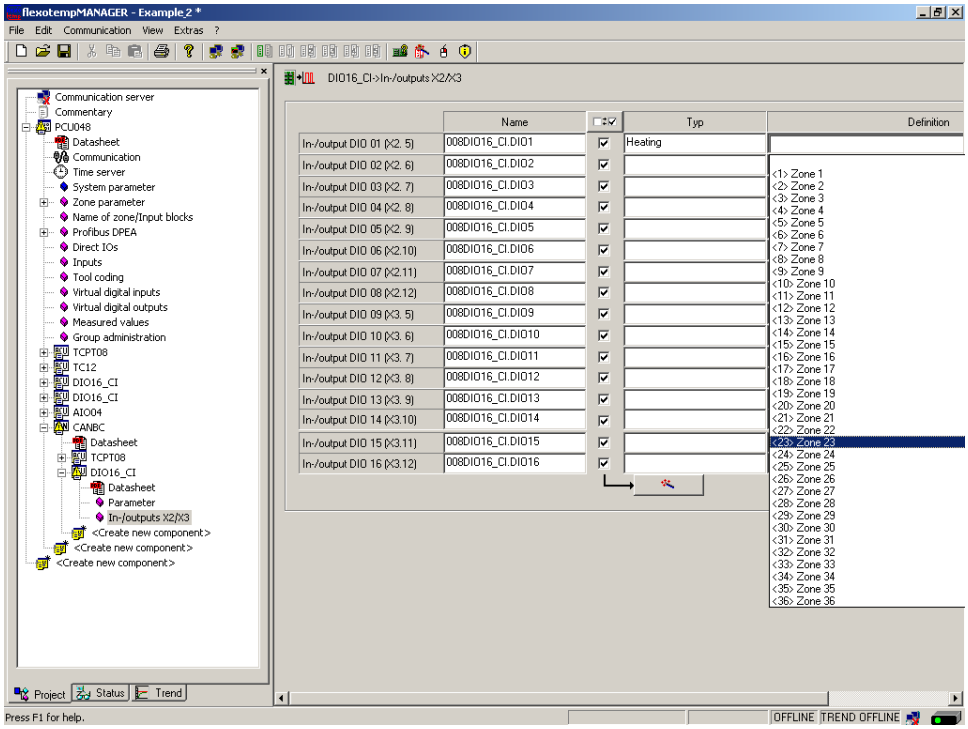
3.2.4.2 Example2-Specify Heating outputs

Specify 8 Heating outputs

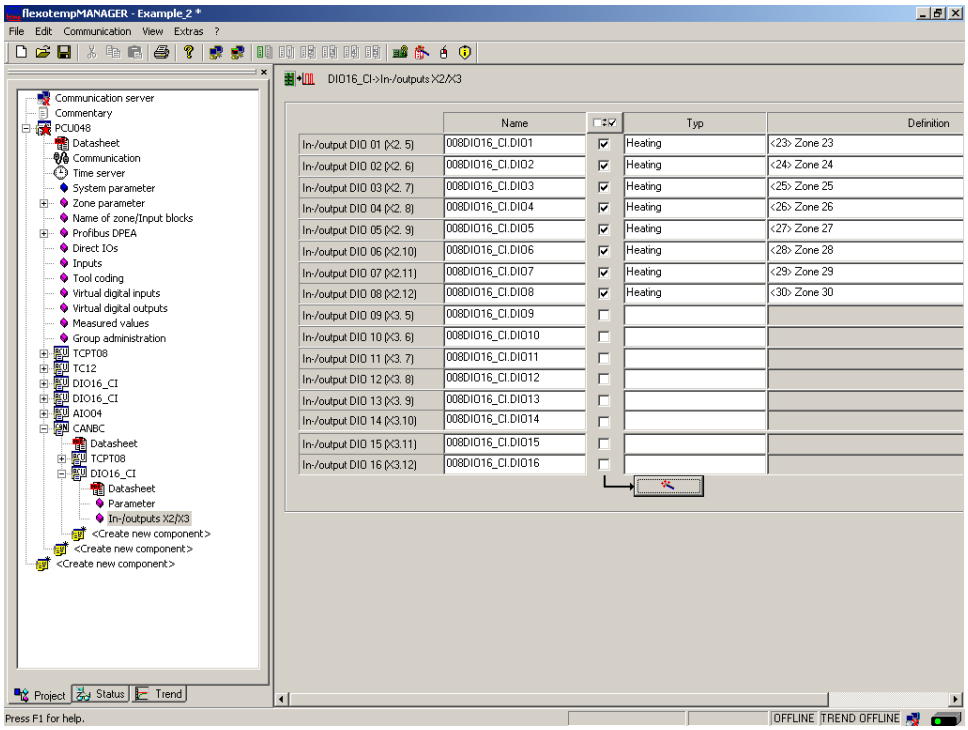
At (008)DIO16_CI on CANBC: for DIO1...DIO8 select and set the type <Heating>.



At (008)DIO16_CI on CANBC: for DIO1...DIO8 of type <Heating> assign zone 23...30.



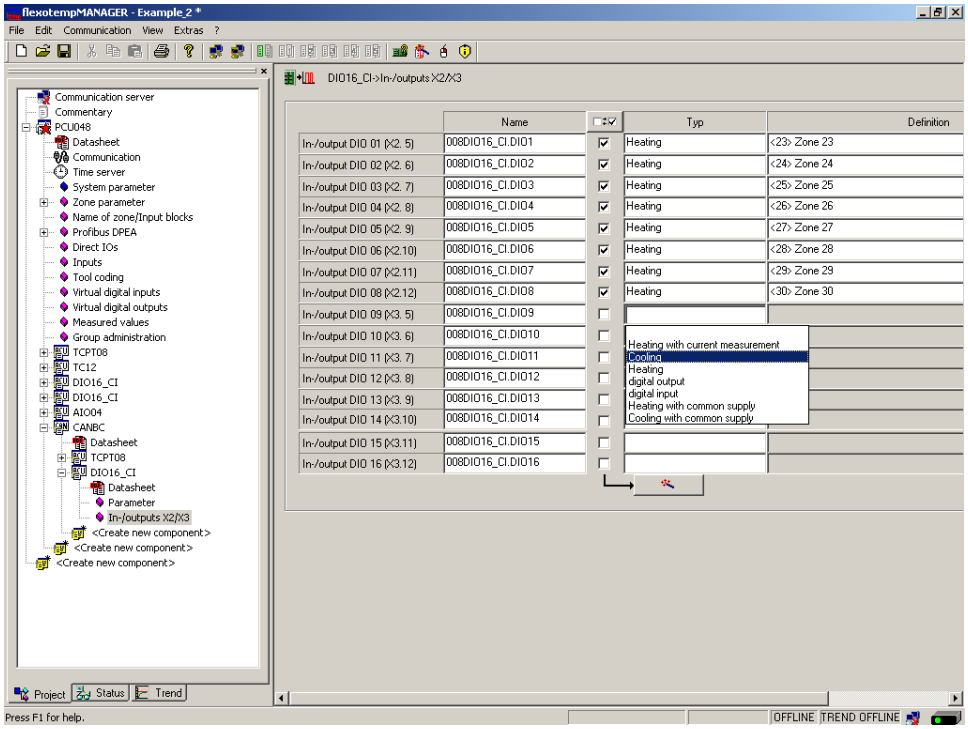
8 Heating outputs are defined for zone 23...30.



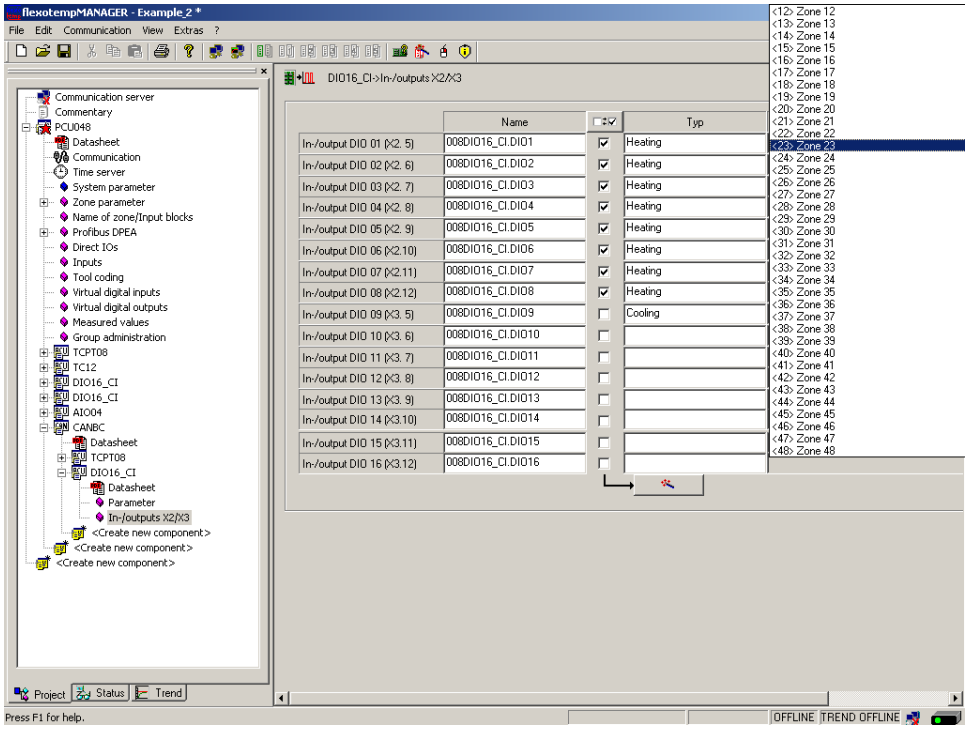
3.2.4.3 Example2-Specify Cooling outputs

Specify 8 Cooling outputs

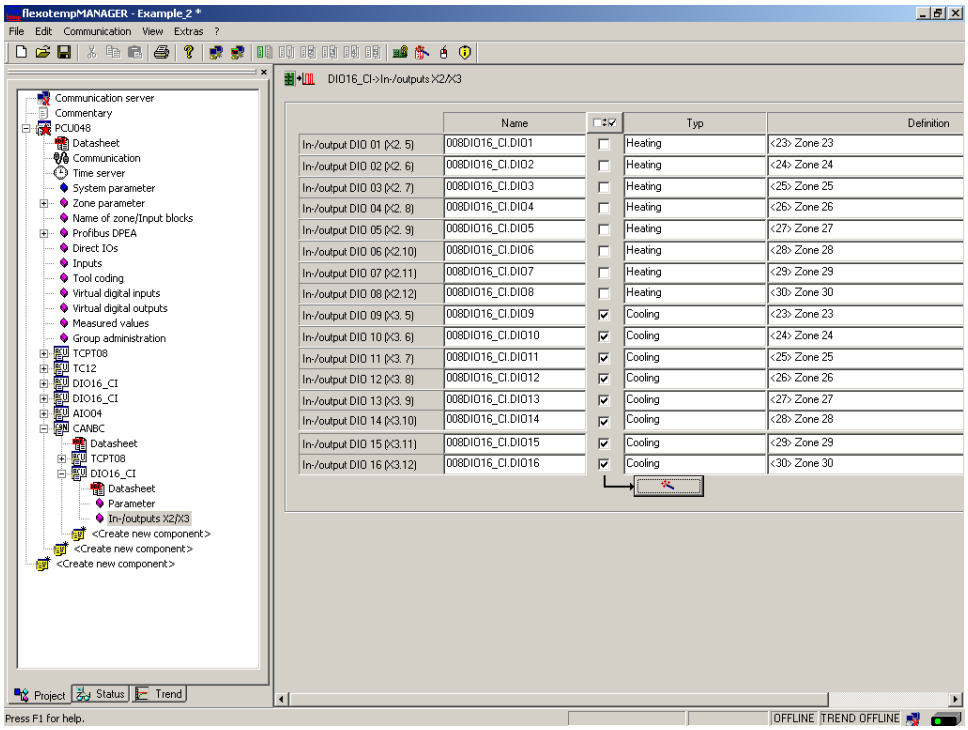
At (008)DIO16_CI on CANBC: for DIO9...DIO16 select and set the type <Cooling>.



At (008)DIO16_CI on CANBC: for DIO9...DIO16 of type <Cooling> assign zone 23...30.



8 Cooling outputs are defined for zone 23...30.



3.2.4.4 Example2-Parameterize Heating/Cooling outputs

Output type switching SSR (zero-crossing switching)

For zone 23...30 the parameters must be specified as follows:
[P026 RELH] = <Off>
[P027 RELC] = <Off>

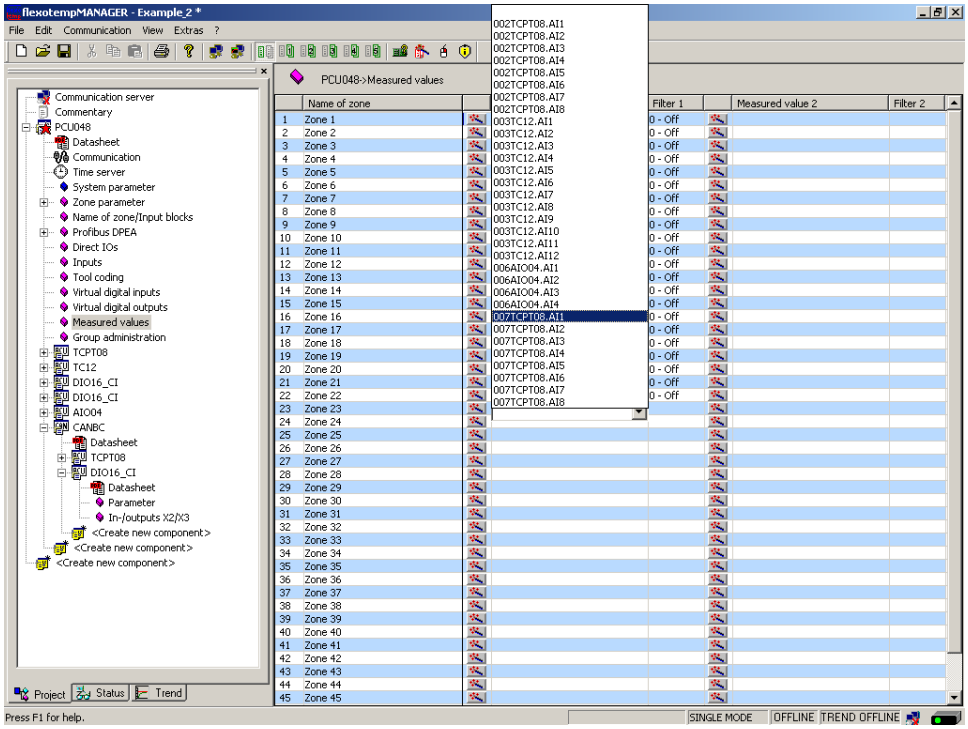
Zone Heating/Cooling

For zone 23...30 the parameters must be specified as follows:
[P023 OUTH] = 100
[P024 OUTC] = -100

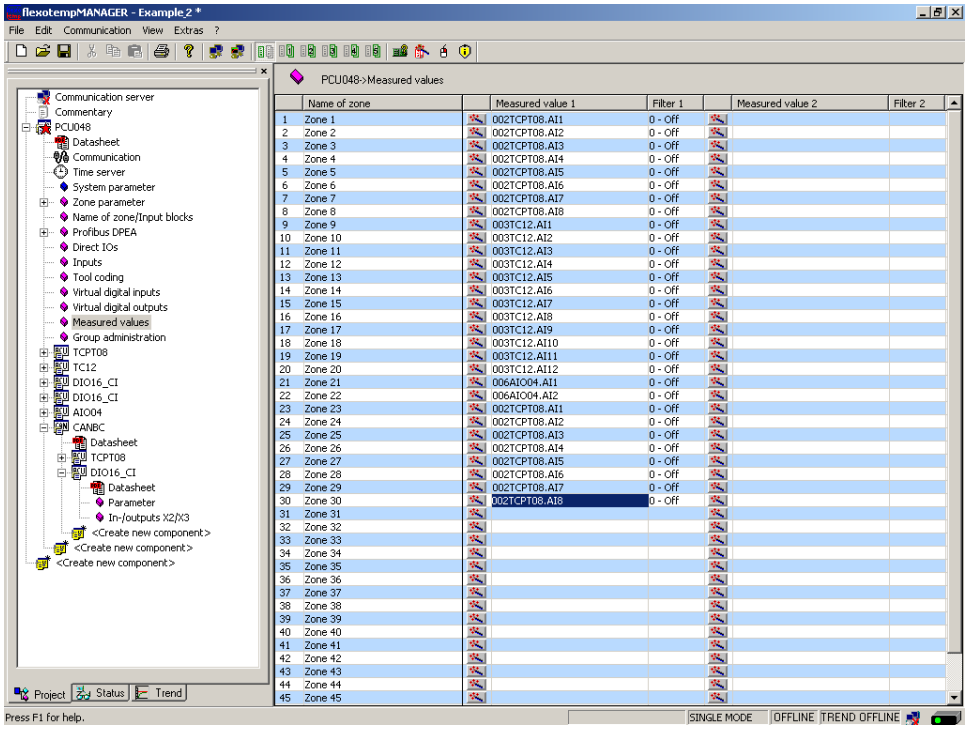
3.2.4.5 Example2-Assign analog inputs of type TC to measurement inputs

8 Analog inputs of type TC are assigned to measurement inputs

At the controller, under <Measured values> zone 23 is assigned to analog input 007TCPT08.AI1



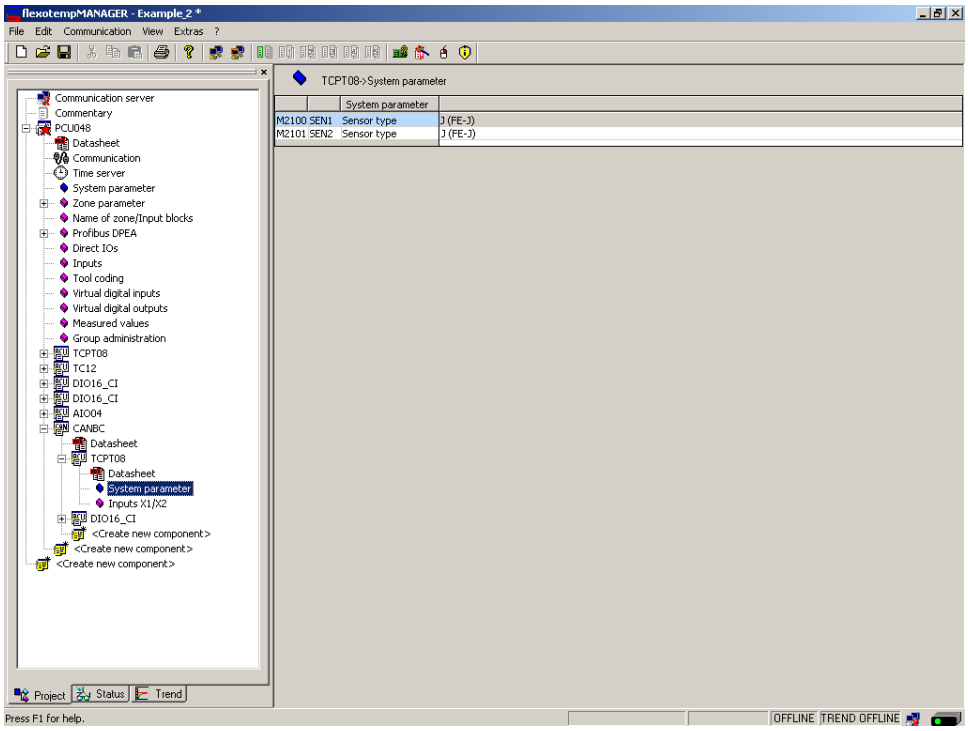
The zones 23...30 are 8 analog inputs TC assigned as measured value inputs.



3.2.4.6 Example2-Analog inputs - specify sensor types

The sensor types are specified in groups on the input card TCPT08 on CANBC.

On TCPT08 the sensor type <SEN1>...<SEN2> is set for four analog inputs. Standard setting for the sensor type is <J(Fe-J)>.



The sensor types for the input card TCPT08 are defined.

3.3 Example_3 - MCU system with peripheral CAN components

3.3.1 Example3-Target

Project setup of a control system with

- 8 zones (3 Heating, 5 Heating/Cooling)
- Zones with measurement inputs thermocouple TC
- Outputs Heating, SSR, zero-crossing switching
- Outputs Cooling, SSR, zero-crossing switching activation for fan, drive
- Heating Current Monitoring

The planned control system should be represented in a table, e.g. in the way shown, to deduce the number of components and the project setup.

Explanation of the table contents

	Prerequisite	The standard names of flexotempMANAGER are used.
	Z	Number of zone
	M/C	Measurement/Control
	SSR	Solid State Relay
	e.g. 002CANAIN08.AI3	flexotemp® component CANAIN08, 3rd AI (002 is an internal consecutive number, which is assigned by the program, to identify the flexotemp® component)
	S-Type	Sensor Type

No.	Z	M/C	Output type Switching SSR **Heating *)**	Output type Switching SSR **Cooling**	Output type Analog signal	Measurement input Analog signal	S-Type	Measurement input Sensor Type
1	1	C	003SMA09G.1				TC	002CANAIN08.AI1
2	2	C	003SMA09G.2				TC	002CANAIN08.AI2
3	3	C	003SMA09G.3				TC	002CANAIN08.AI3
4	4	C	003SMA09G.4	003SMA09G.10			TC	002CANAIN08.AI4
5	5	C	003SMA09G.5	003SMA09G.11			TC	002CANAIN08.AI5
6	6	C	003SMA09G.6	004MC08.X4.Out			TC	002CANAIN08.AI6
7	7	C	003SMA09G.7	004MC08.X4.Out2			TC	002CANAIN08.AI7
8	8	C	003SMA09G.8	004MC08.X4.Out3			TC	002CANAIN08.AI8

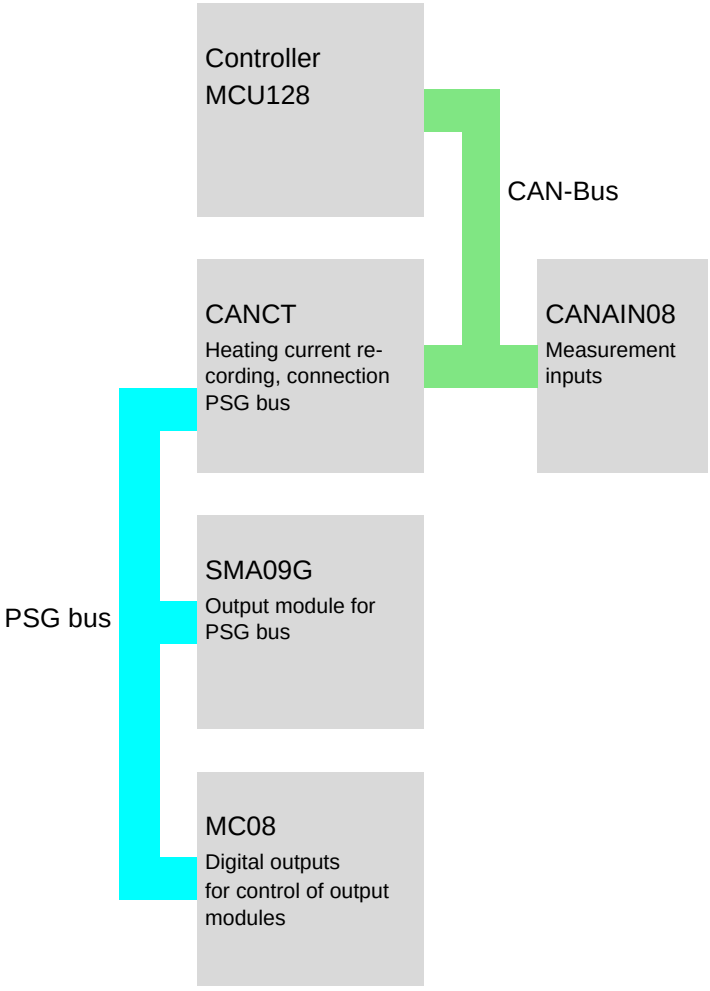
*) In the example, the heating current monitoring should be executed for all Heating outputs. The flexotemp® component CANCT with internal current transformer is used For registration. The control outputs Heating are of type <Heating with current measurement>. Further details on heating current monitoring see operating instructions **Temperature Control System flexotemp® Parameter**.

3.3.2 Example3-Necessary components

The following flexotemp® components are required:

- 1 Multi Loop Control Unit flexotemp® MCU 128
- 1 Current Transducer Interface flexotemp® CANCT
- 1 Analog Input Interface flexotemp® CANAIN 08
- 1 Digital Output Module flexotemp® SMA09G
- 1 output module flexotemp®/sysTemp® MC08
- 5 output modules sysTemp® SMS01

Components for
Project setup



3.3.3 Example3-Installation

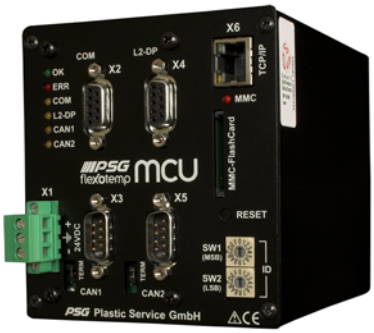
At all installation work, note the current data sheets for each flexotemp® component.

The data sheets can be accessed in Internet by www.meusburger.com, and/or are available under menu bar →<Extras> →<Options> →<Update> in flexotempMANAGER in the project view below each flexotemp® component (see operating instructions **Project setup and Configuration Tool flexotempMANAGER Operation**, see ↗Additional and continuative documents).

The flexotemp® components are connected with each other, starting from the controller, as shown.

Power unit

Output voltage 24 VDC



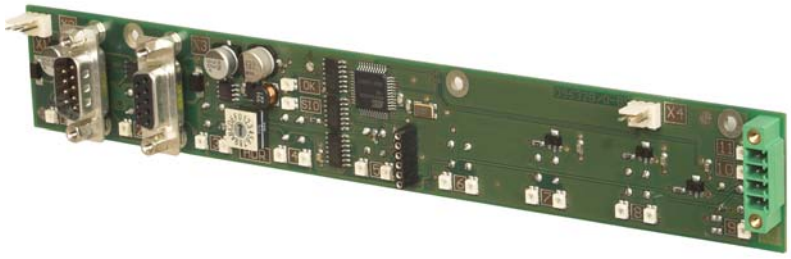
MCU128

Rated voltage	18...30 VDC
Power consumption	5 W

CANCT

CANAIN 08

Rated voltage	18...30 VDC		18...30 VDC
Power consumption	5...80 W	Current consumption	60 mA



SMA09G

Rated voltage	18...30 VDC
Power consumption	1 W

MC08

Rated voltage	18...30 VDC
Power consumption	1 W

	See current data sheets

Starting with the power unit, the flexotemp® components must be connected with the 24 VDC power supply.

Component	MCU128	CANCT	CANAIN08	SMA09G	MC08
Terminal	X1	X4	<n.a.>	<n.a.>	X4

	See current data sheets

The in-/outputs of the flexotemp® components must be wired accordingly.

Component	MCU128	CANCT	CANAIN08	SMA09G	MC08
Terminal	<n.a.>	<n.a.>	X1, X2	X5	X4
	See current data sheets				

An output module SMS01 (in terminal design) has to be connected to the digital outputs (see ↗Example3-Specify Cooling outputs).

Component	MC08
Terminal	X4
	SMS01(X5)
See current data sheets	

The interfaces of the CAN filed bus on one hand and the PSG bus on the other hand have to be connected with each other.

Component	MCU128	CANCT	CANAIN08	SMA09G	MC08
CAN field bus	X5	X1 (in)			
		X3 (out)	X3 (in)		
PSG bus		X2		X2 (in)	
				X3 (out)	X1
See current data sheets					

For the flexotemp® component CANCT an internal current transformer is available. The outgoing control lines for the Heating actuators on SMA09G, have to be led through the connected current transformer on CANCT. Further details on heating current monitoring see operating instructions **Temperature Control System flexotemp® Parameter**.

3.3.4 Example3-Create serial interface connection to controller

A serial connection to PC, where flexotempMANAGER is installed, is created from the flexotemp® component MCU128.

	Prerequisite	flexotempMANAGER and the communication server (PSGCommServer) are running on the same computer hardware.
	PC side	
	Interface Converter	Due the fact, that a PC has no standard RS485 interface, an interface converter is required (see data sheet SK232485). Take care of the pin assignment and the correct connection.
	Controller side	The RS232 cable must be connected to the connection X2 COM of the flexotemp® component MCU128.
	PSGCommServer	Create a serial interface (operating instructions **Project setup and Configuration Tool flexotempMANAGER Operation** chapter 3.1.2, see ↗Additional and continuative documents).
	flexotempMANAGER	Check on the side of the communication server, that the setting <The PSGCommServer runs on the same computer as flexotempMANAGER> is selected. By the key <Read setting of interface manually by PSGCommServer>, the settings of the serial interface are taken from the previous step and can be selected.

3.3.5 Example3-Create interface connection to controller per Ethernet

A connection to PC, where flexotempMANAGER is installed, is created from the flexotemp® component MCU128 per Ethernet.

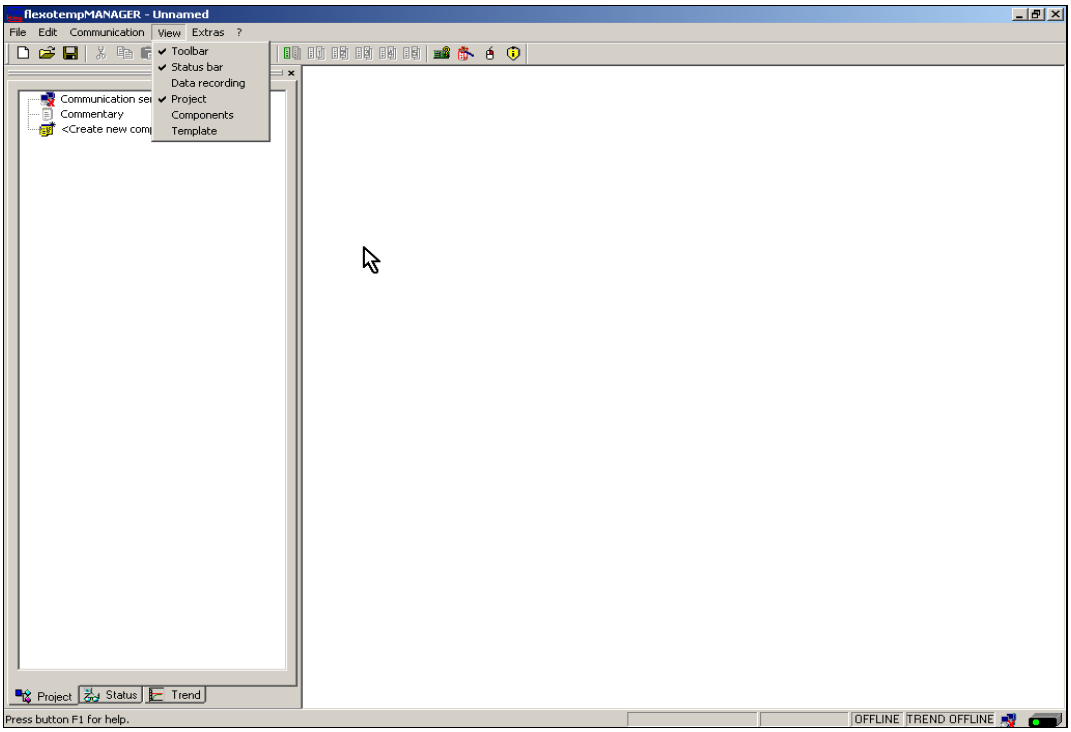
	Prerequisite	flexotempMANAGER and the communication server (PSGCommServer) are running on the same computer hardware.
	PC side	
	LAN connection	For direct coupling from PC and controller, use a cross-over cable. Using a Fast-Ethernet-Switch, use a standard Ethernet network cable.
	Controller side	The Ethernet network cable must be connected to the connection X6 TCP/IP of the flexotemp® component MCU128.
	flexotempMANAGER	Check on the side of the communication server, that the setting <The PSGCommServer runs on the same computer as flexotempMANAGER> is selected.

3.3.6 Example3-Project setup and configuration

Further details, how the project setup and configuration tool flexotempMANAGER should be used and operated, as well as further explanations of the parameters, please see the operating instructions (see chapter ↗Additional and continuative documents).

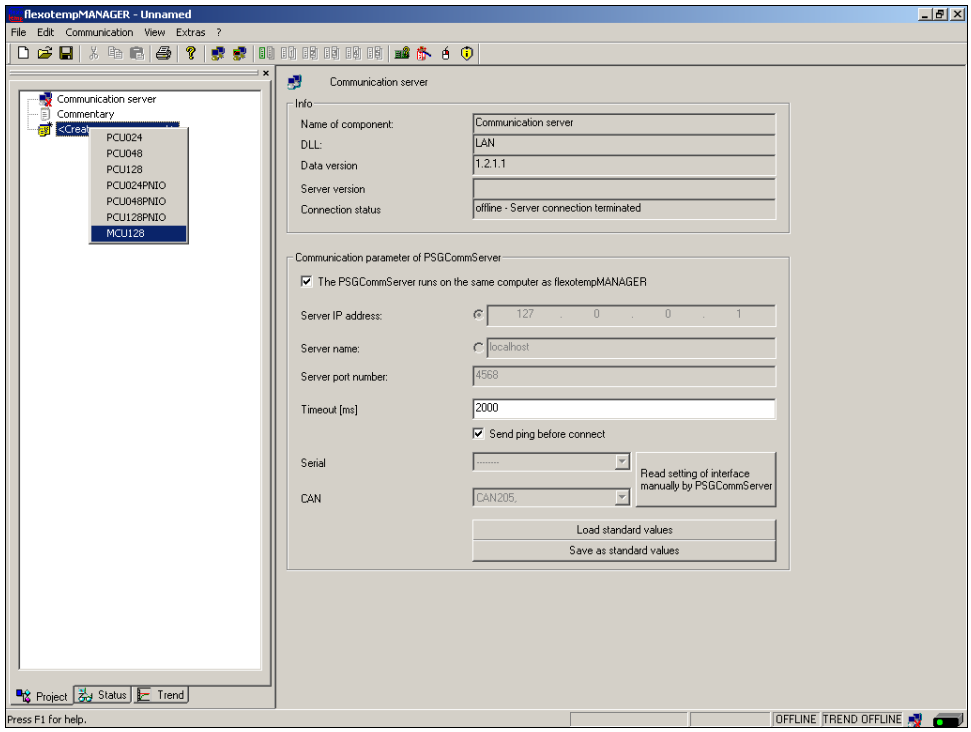
3.3.6.1 Example3-Create controller and components

	Prerequisite	flexotempMANAGER is installed on PC.
	Prerequisite	flexotempMANAGER and the communication server (PSGCommServer) are running on the same computer hardware.
		The flexotemp® components are configured in the order shown in ↗Example1-Installation (top down and from the left to the right).
	PC side	
	flexotempMANAGER start	Symbol bar: <View> Symbol bar, Status bar, Project are active. Menu bar: <File> <New>. No project (<Unnamed>) is displayed.



Create controller

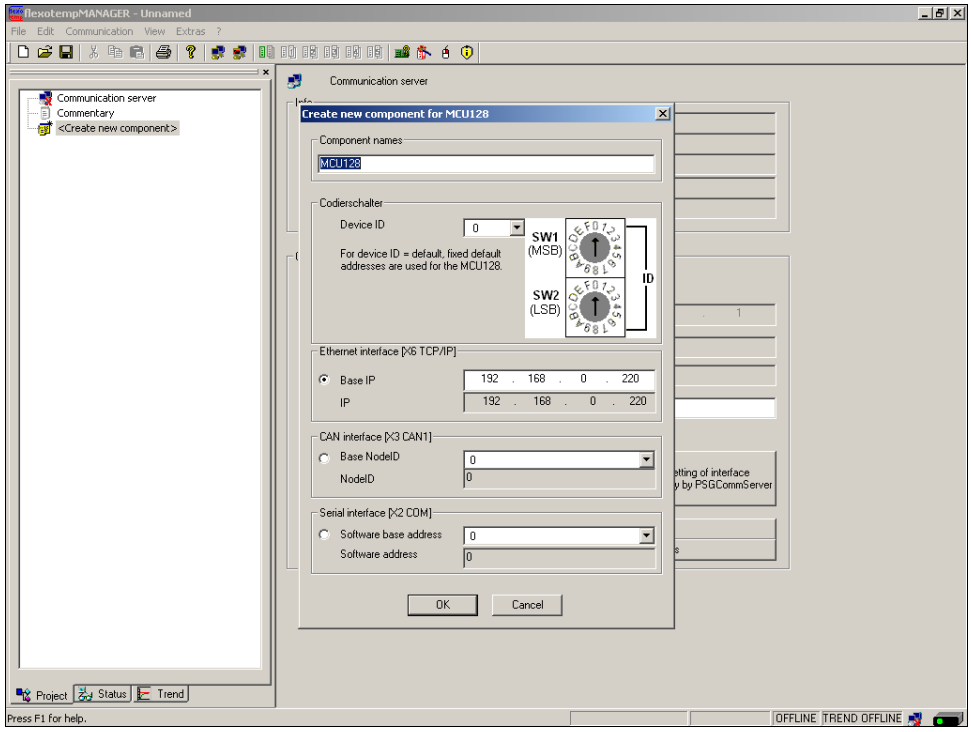
Create controller MCU128 by <Create new component>.



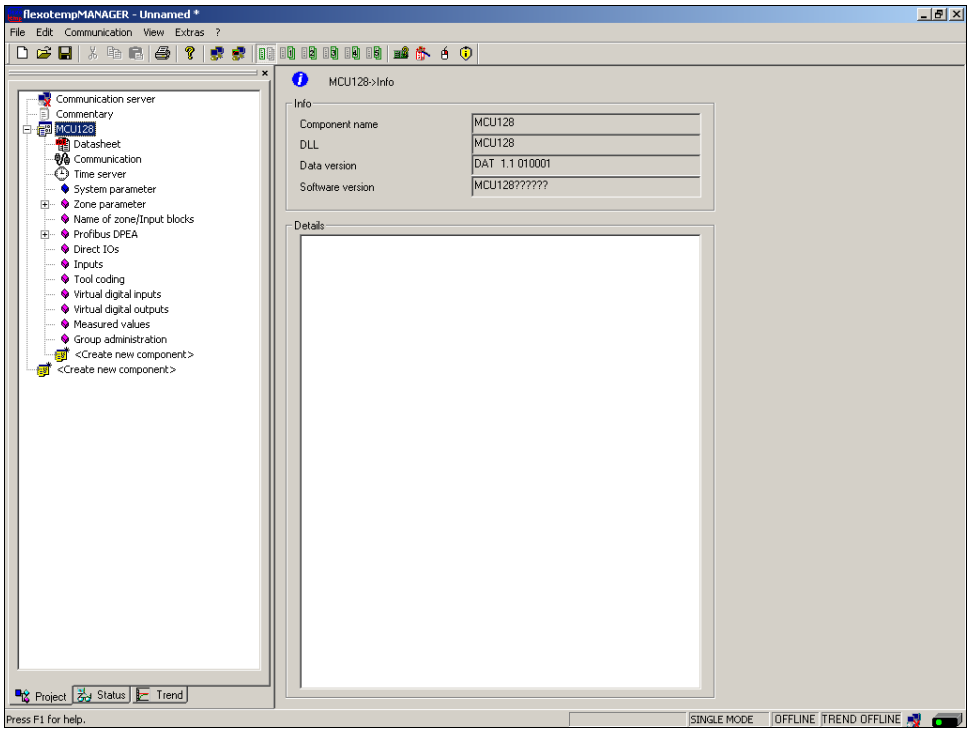
Address setting

The setting of the device ID on the coding switch here and on the rotary switch on the controller must fit.

At communication by Ethernet, the PC must have the same subnet like the controller (subnet mask: 255.255.255.0).

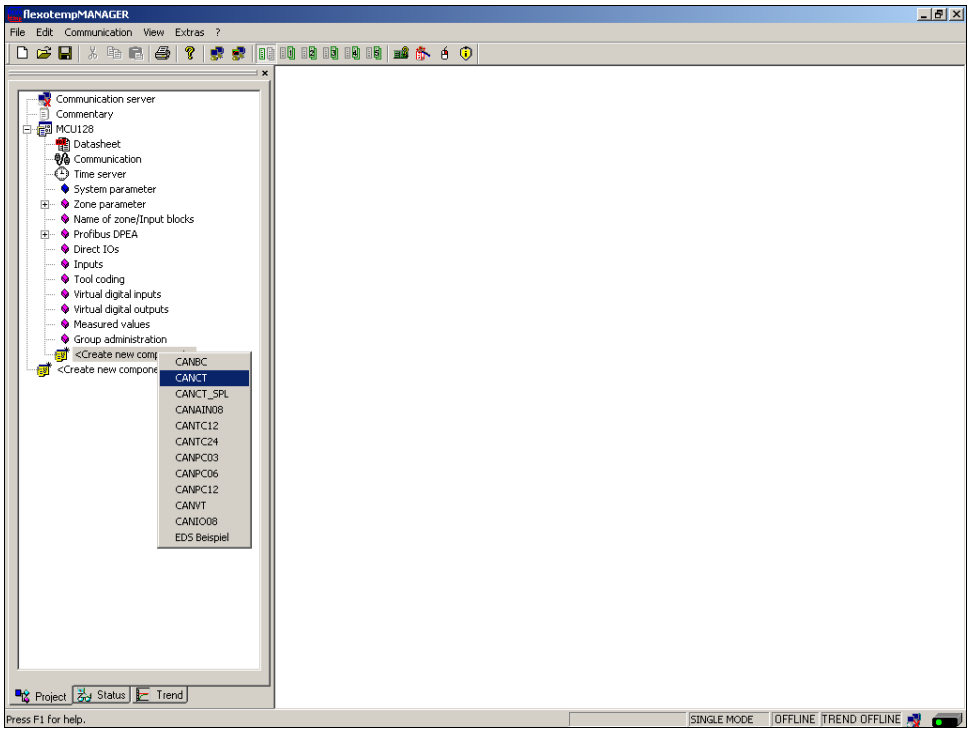


Controller MCU128 is created.

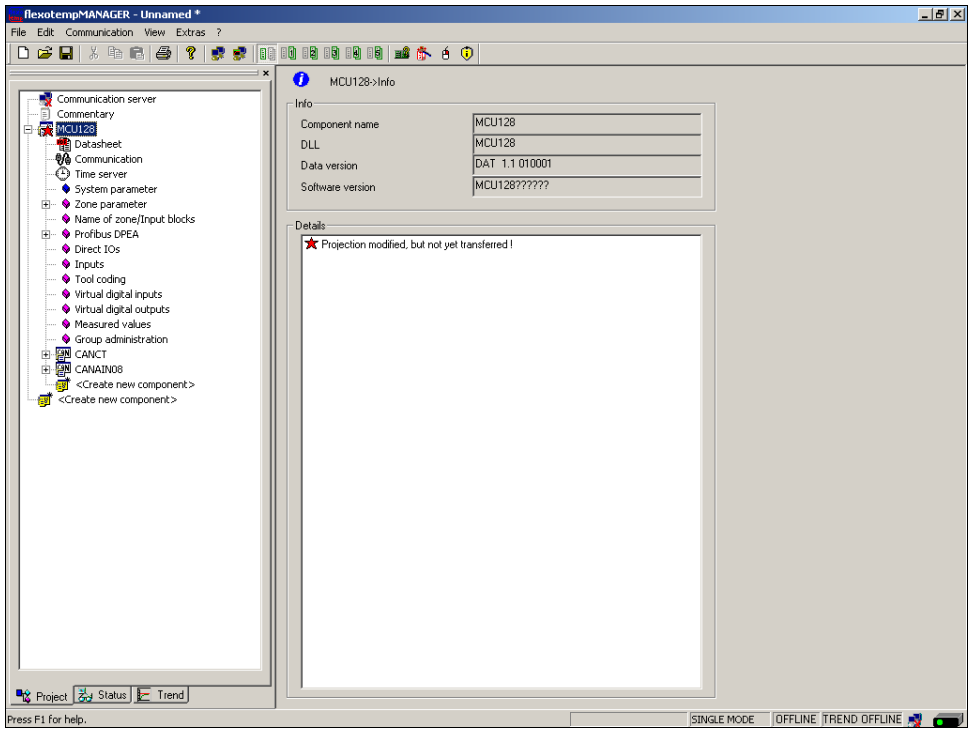


Create further components

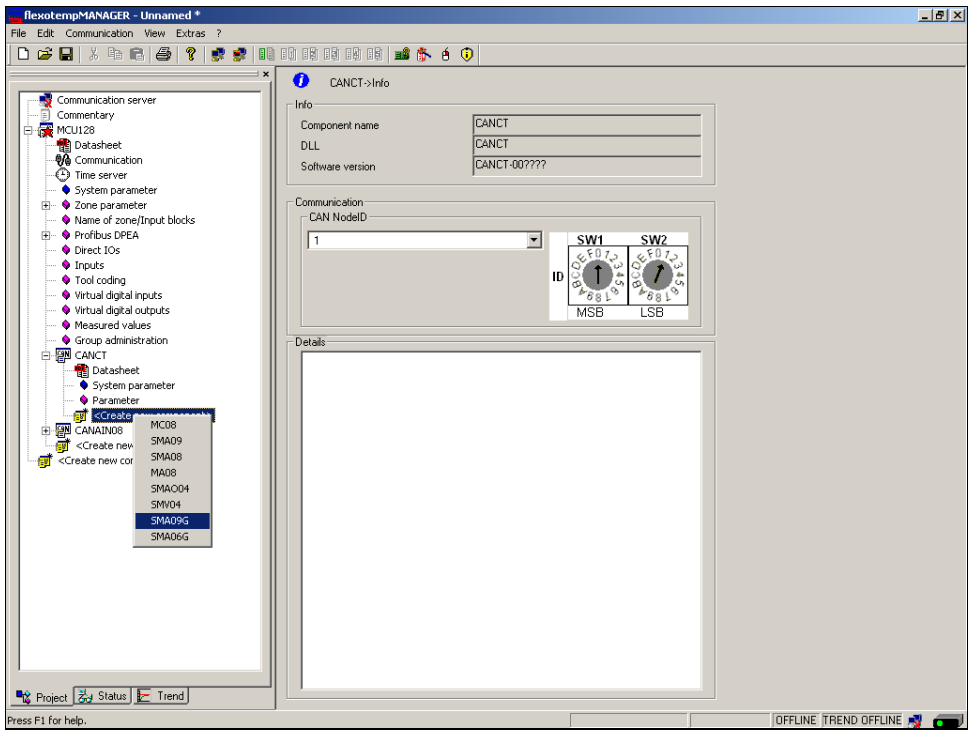
Beneath the controller, the CAN components (CANCT [bus coupler module], CANAIN08 [I/O module] are selected out of a list and created.



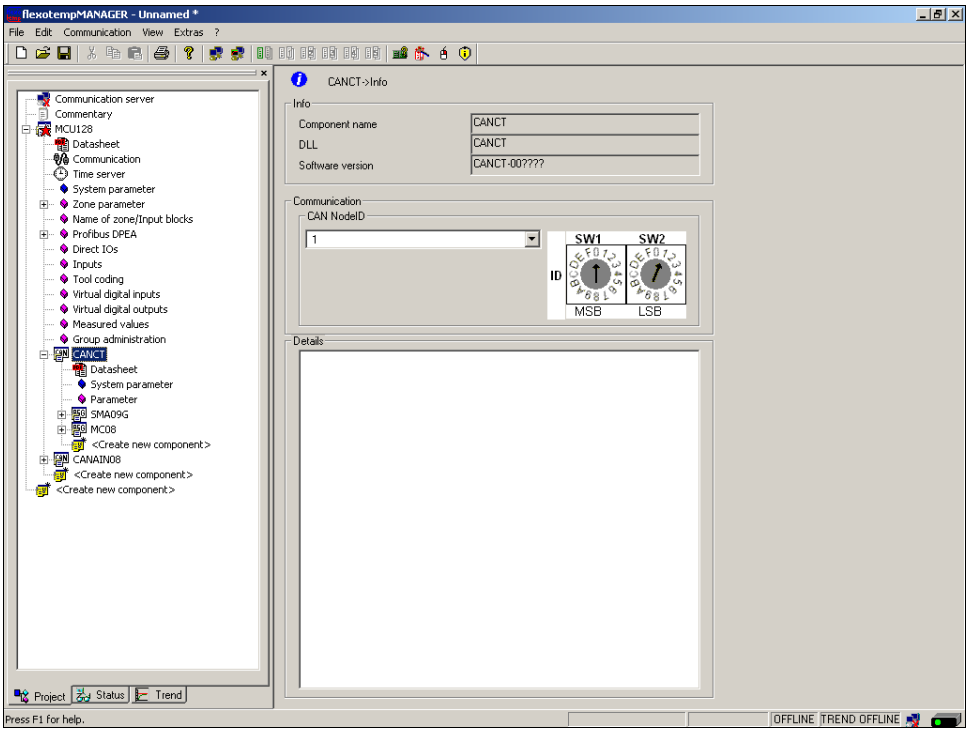
The CAN components are created in the project.



Beneath the CANCT, the RS485 components (SMA09G, MC08 [I/O module PSG bus]) are selected out of a list and created.



The RS485 components are created in the project.

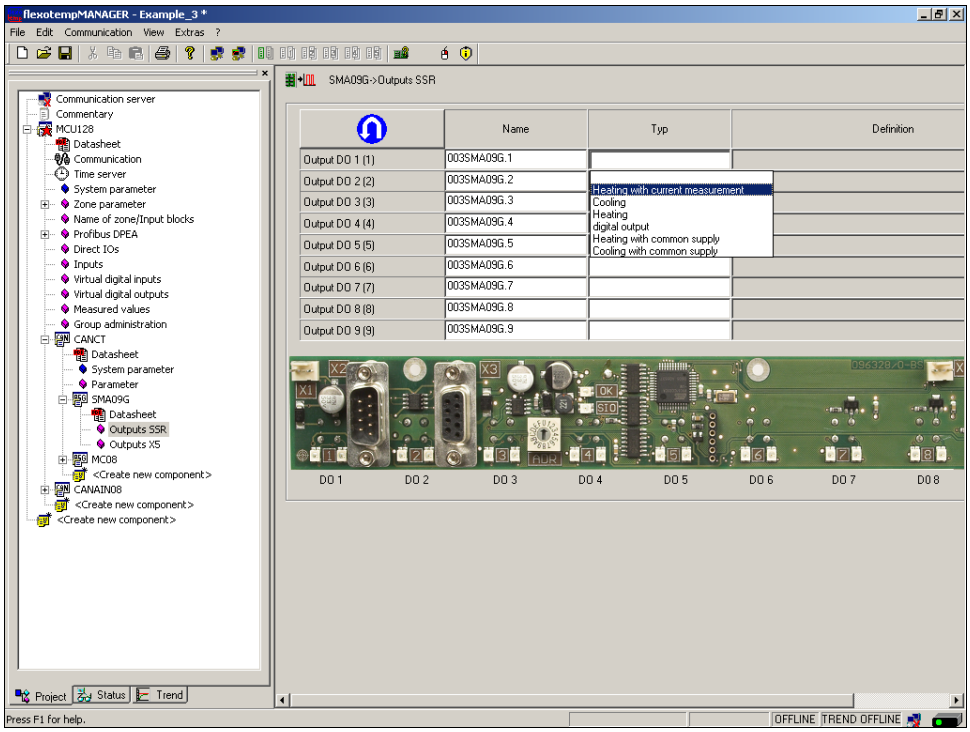


The project is stored with the name Example_3.

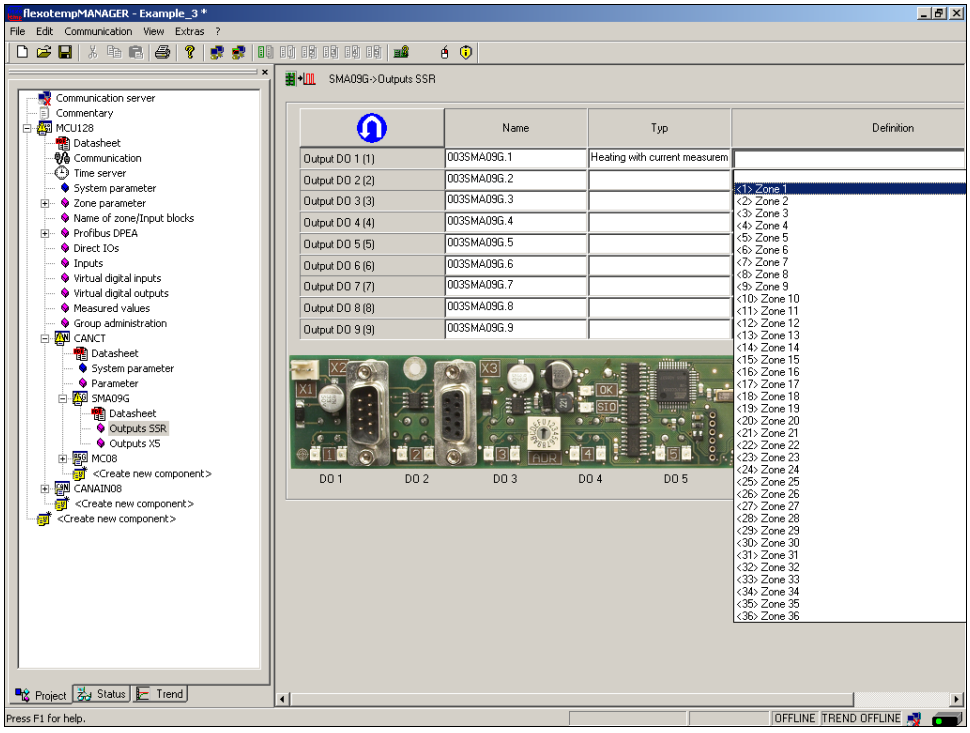
3.3.6.2 Example3-Specify Heating outputs

Specify 8 Heating outputs

At (003)SMA09G on CANCT: for DIO1...DIO8 select and set the type <Heating with current measurement>.*)

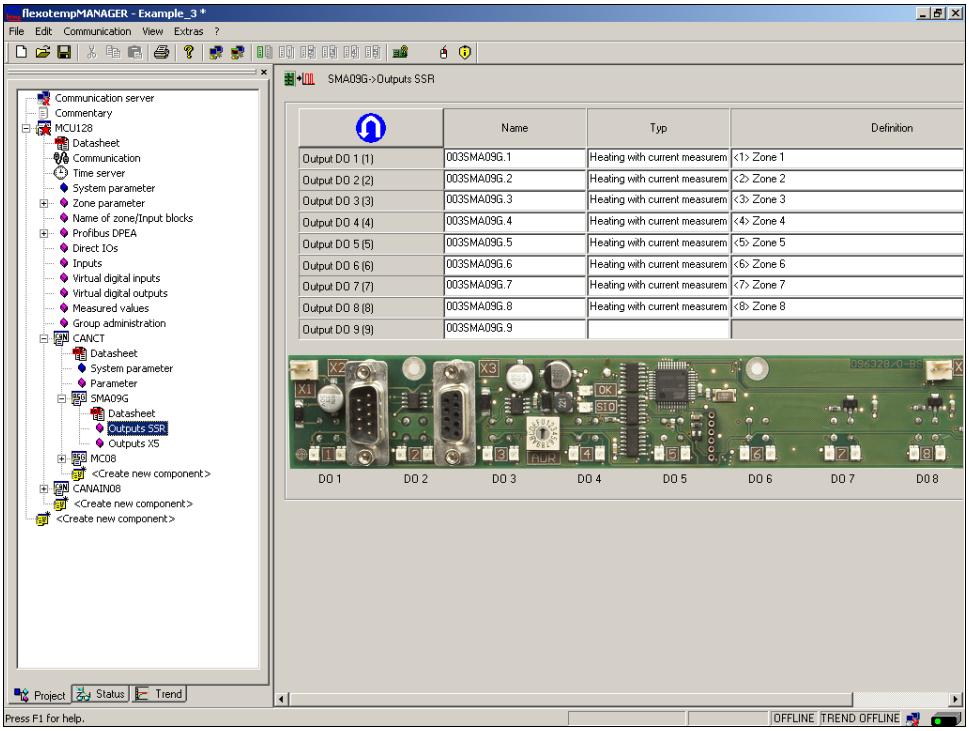


At (003)SMA09G on CANCT: for DO1...DO8 of type <Heating with current measurement>assign zone 1...8.*)



*) By the key the allocation of the logical (DO1-9) to the physical outputs (1-9) can be reversed.

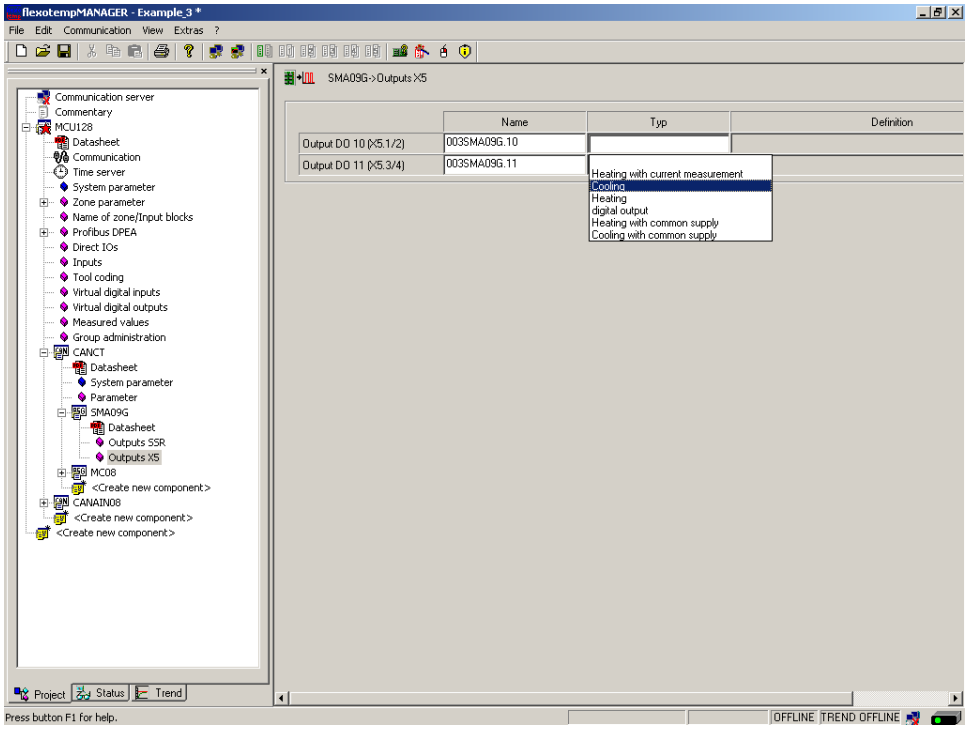
8 Heating outputs are defined for zone 1...8.



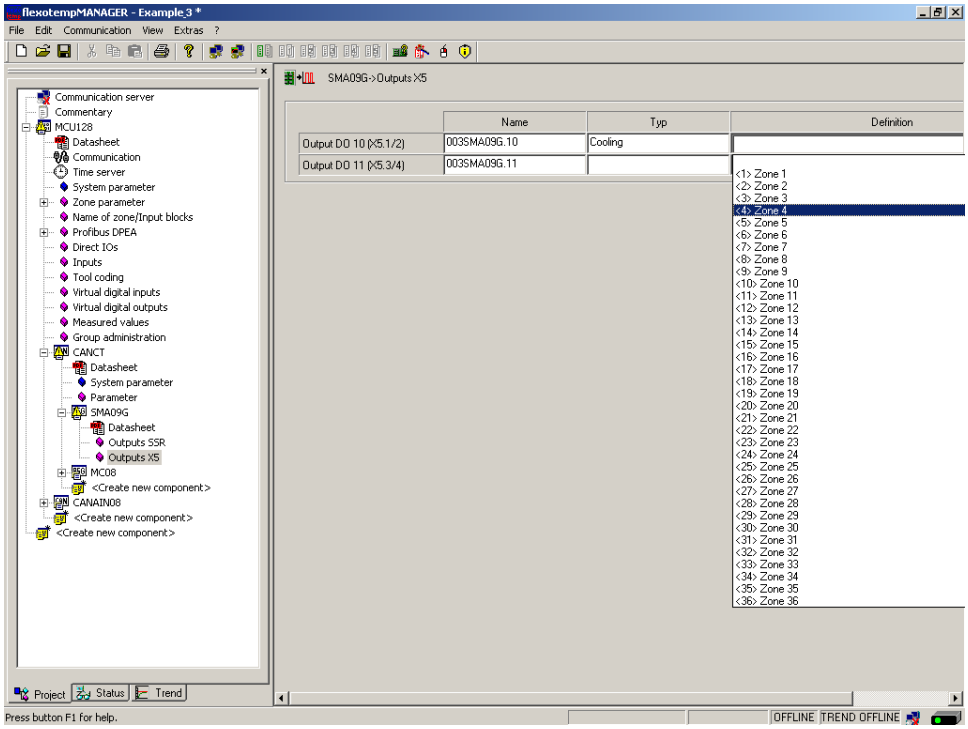
3.3.6.3 Example3-Specify Cooling outputs

Specify 5 Cooling outputs

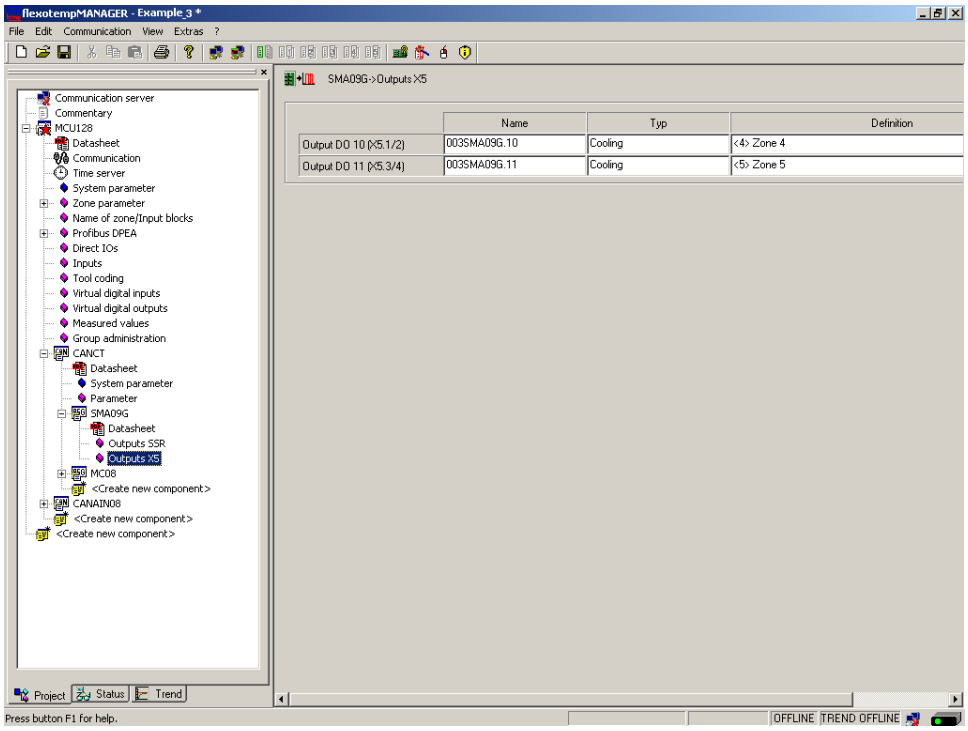
At (003)SMA09G on CANCT: for DIO10...DIO11 select and set the type <Cooling>.



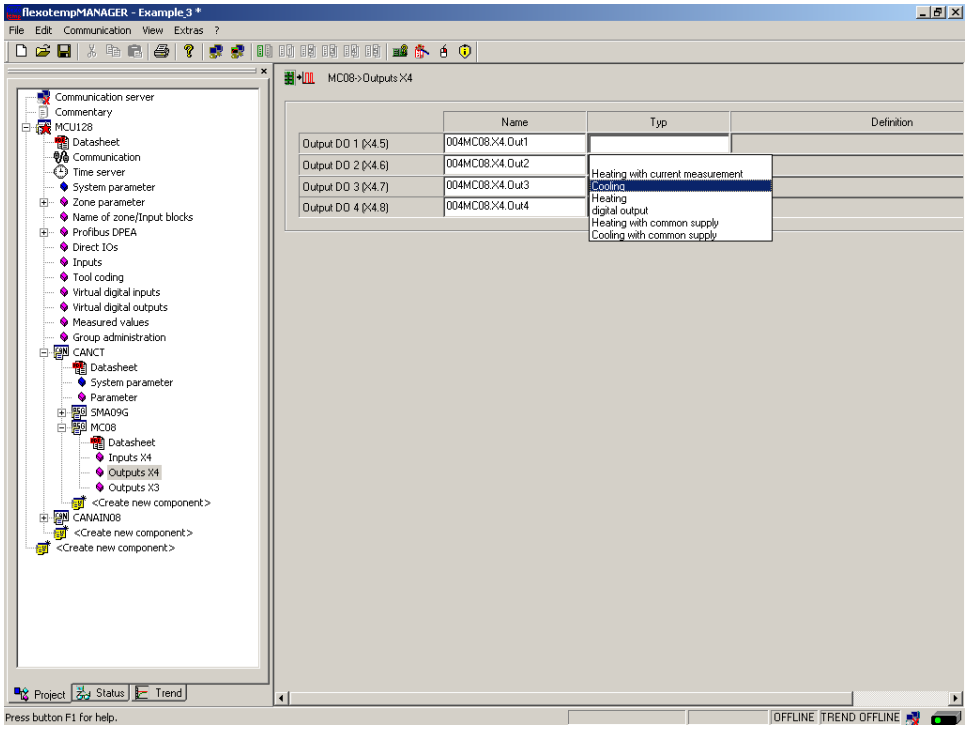
At (003)SMA09G on CANCT: for DO10...DO11 of type <Cooling> assign zone 4...5.



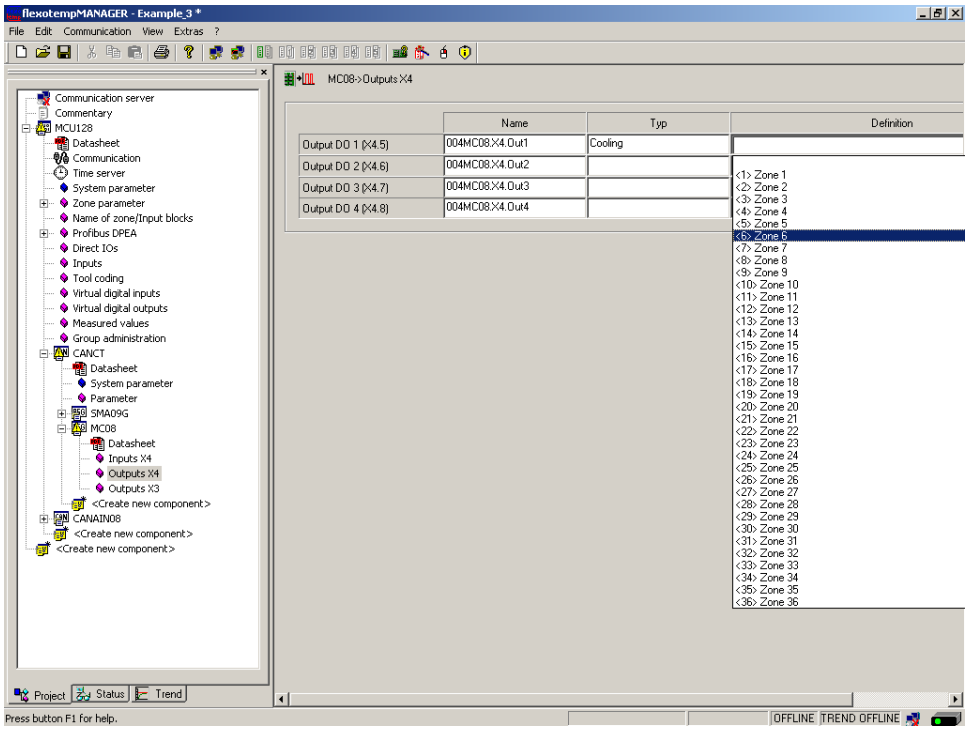
2 Cooling outputs are defined for zone 4...5.



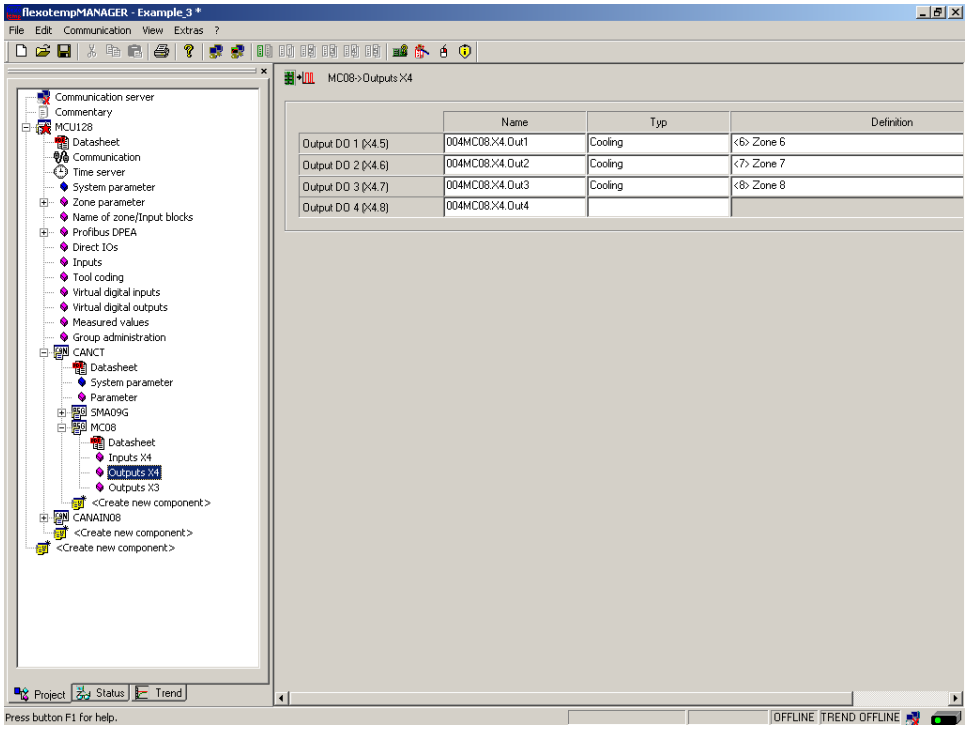
At (004)MC08.X4 on CANCT: for DO1...DO3 select and set the type <Cooling>.



At (004)MC08.X4 on CANCT: for DO1...DO3 of type <Cooling> assign zone 6...8.



3 Cooling outputs are defined for zone 6...8.



3.3.6.4 Example3-Parameterize Heating/Cooling outputs

Output type switching SSR (zero-crossing switching)

For zone 1...8 the parameters must be specified as follows:
[P026 RELH] = <Off>
[P027 RELC] = <Off>

Zone only Heating

For zone 1...3 the parameters must be specified as follows:
[P023 OUTH] = 100
[P024 OUTC] = 0

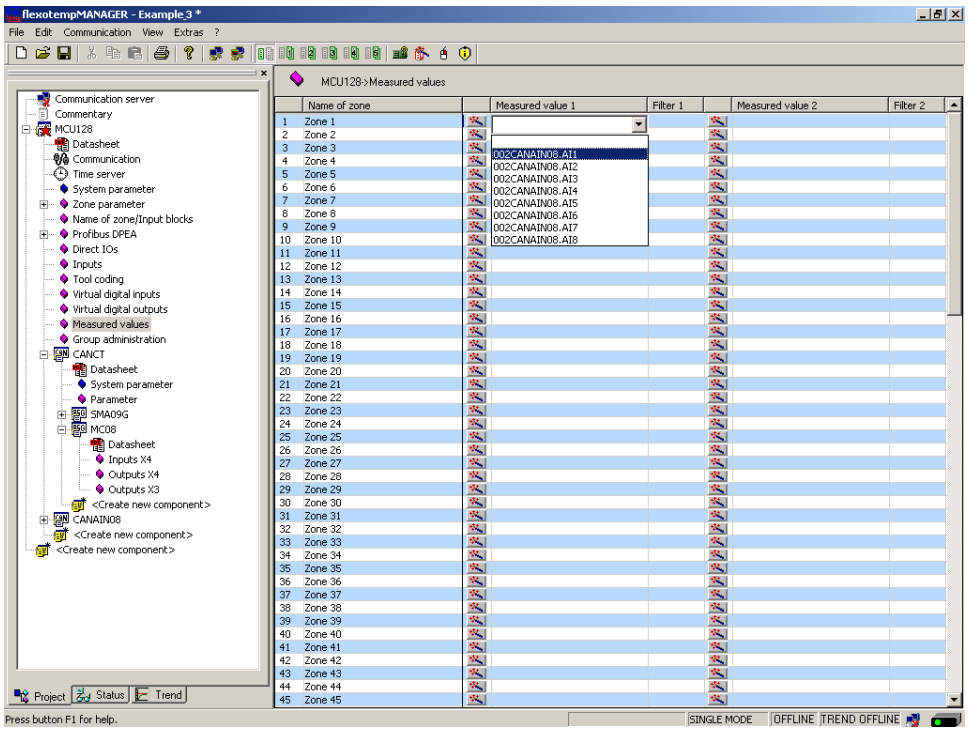
Zone Heating/Cooling

For zone 4...8 the parameters must be specified as follows:
[P023 OUTH] = 100
[P024 OUTC] = -100

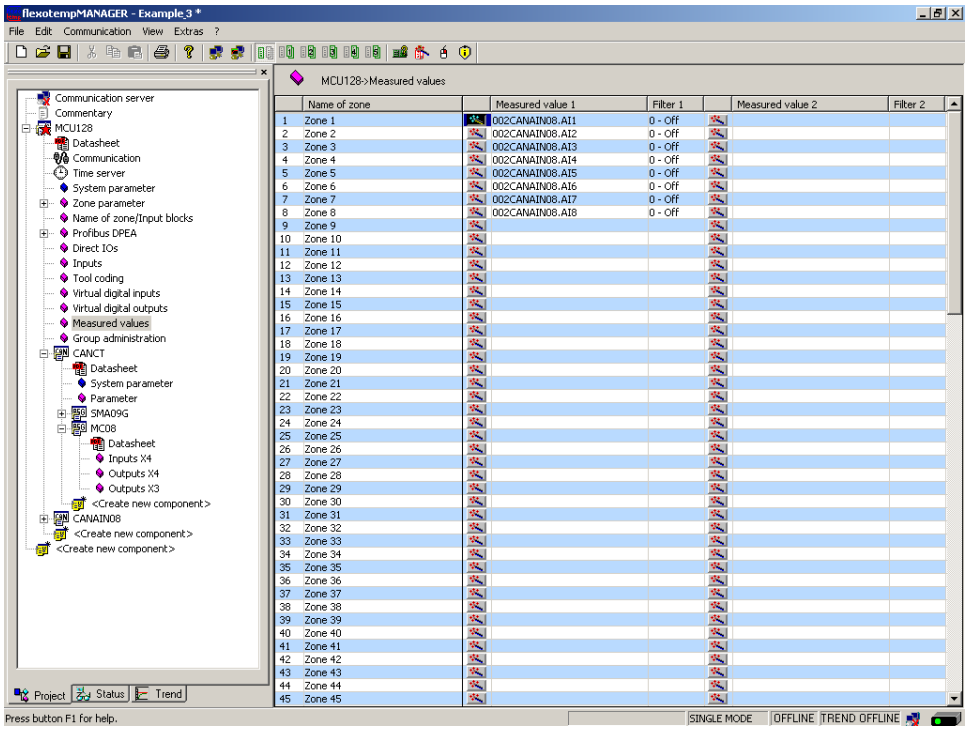
3.3.6.5 Example3-Assign analog inputs of type TC to measurement inputs

8 Analog inputs of type TC are assigned to measurement inputs

At the controller, under <Measured values> zone 1 is assigned to analog input 002CANAIN08.AI1



The zones 1...8 are 8 analog inputs TC assigned as measured value inputs.



3.4 Example_4 - MCU system expanded by a peripheral I/O node

3.4.1 Example4-Target

The described and configured control system under Example_3, should be expanded by 9 further zones in a new project part.

This is in detail:

- 9 zones (3 Heating, 6 Heating/Cooling)
- Zones with measurement inputs thermocouple TC
- Outputs Heating, SSR, zero-crossing switching
- Outputs Cooling, SSR, zero-crossing switching activation for fan, drive
- Heating Current Monitoring

For the distribution on two plant components, a peripheral I/O node is necessary. From the control system of Example_3, a connection is established between CANAIN08.X4 and the peripheral I/O node of the flexotemp® component CANBC. The CANBC ensures, as a base module, the communication with the controller as well, as the across communication and the power supply for further connected flexotemp® components.

The planned I/O node should be represented in a table, e.g. in the way shown, to deduce the number of components and the project setup.

Explanation of the table contents

	Prerequisite	The standard names of flexotempMANAGER are used.
	Z	Number of zone
	M/C	Measurement/Control
	SSR	Solid State Relay
	e.g. 006DIO16_CI.DIO7	flexotemp® component DIO16_CI, 7th DIO (006 is an internal consecutive number, which is assigned by the program, to identify the flexotemp® component)
	S-Type	Sensor Type

Z	M/C	Output type Switching SSR **Heating *)**	Output type Switching SSR **Cooling**	Output type Analog signal	Measurement input Analog signal	S-Type	Measurement input Sensor Type
10	C	007SMA09G.1				TC	005TC12.AI1
11	C	007SMA09G.2				TC	005TC12.AI2
12	C	007SMA09G.3				TC	005TC12.AI3
13	C	007SMA09G.4	006DIO16_CI.DIO1			TC	005TC12.AI4
14	C	007SMA09G.5	006DIO16_CI.DIO2			TC	005TC12.AI5
15	C	007SMA09G.6	006DIO16_CI.DIO3			TC	005TC12.AI6
16	C	007SMA09G.7	006DIO16_CI.DIO4			TC	005TC12.AI7
17	C	007SMA09G.8	006DIO16_CI.DIO5			TC	005TC12.AI8
18	C	007SMA09G.9	006DIO16_CI.DIO6			TC	005TC12.AI9

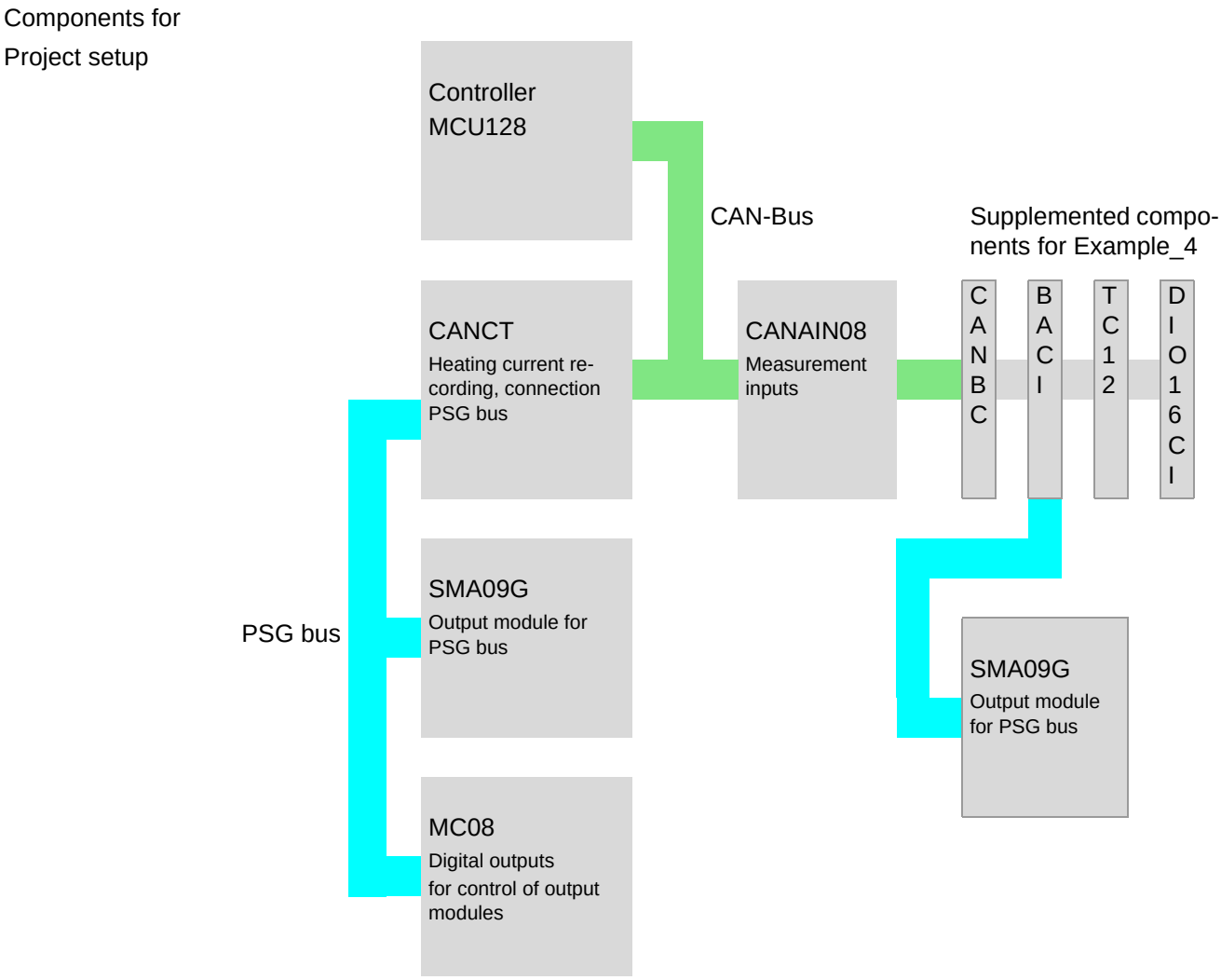
*) In the current example, the heating current monitoring is done for all Heating outputs, which are distributed to the module SMA09G, so the flexotemp® component BACI is connected with external current transformers. The PSG current transformer module ESW75 is used. The control outputs Heating are of type <Heating with current

measurement>. Further details on heating current monitoring see operating instructions **Temperature Control System flexotemp® Parameter**.

3.4.2 Example4-Necessary components

The following flexotemp® components are required in addition to the components of Example_3:

- 1 Bus Coupler flexotemp® CANBC
- 1 Bus Actuator Interface, Current Input flexotemp® BACI
- 1 Thermocouple Interface flexotemp® TC12
- 1 Digital In-/Output Interface, Current Input flexotemp® DIO16CI
- 1 Digital Output Module flexotemp® SMA09G



3.4.3 Example4-Installation

A connection is established between CANAIN08.X4 (CAN-OUT) of Example_3 and the peripheral I/O node. For the peripheral I/O node, the flexotemp® components are added from the right side, starting from the CANBC, as shown. The cross connections click into place for automatic parallel bus contact in the housing, that builds a block of flexotemp® components.

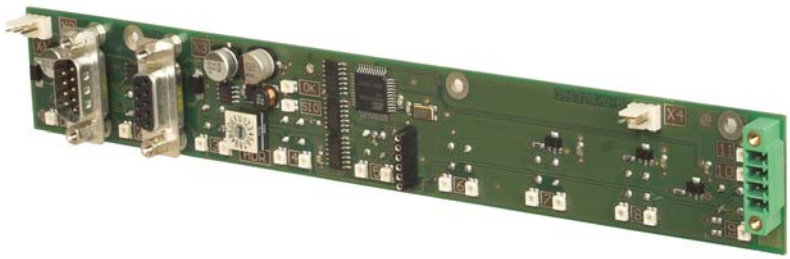
Control system
OFF
Example_3

CAN-OUT
of
CANAIN08.X4

Power unit

Output voltage
24 VDC

	CANBC	ÙBACI ←click into place	←TC12	←DIO16CI
Rated voltage	18...30 VDC	18...30 VDC	18...30 VDC	18...30 VDC
Power consumption	2 W (Electronics)	2 W (Electronics)	2 W (Electronics)	2 W (Electronics)



SMA09G

Rated voltage	18...30 VDC
Power consumption	1 W

See current data sheets

Starting with CANBC, the flexotemp® components must be connected with the 24 VDC power supply.

Component		CANBC	BACI	TC12	DIO16CI
Terminal		X1	X1	<n.a.>	X1
	See current data sheets				

The in-/outputs of the flexotemp® components must be wired accordingly.

Component		CANBC	BACI	TC12	DIO16CI
Terminal		<n.a.>	X2	X2, X3	X2, X3
	See current data sheets				

The interfaces of the CAN filed bus on one hand and the PSG bus on the other hand have to be connected with each other.

Component	CANAIN08 (Example_3)	CANBC	BACI	TC12	DIO16CI
CAN field bus	X4 (out)	X3	<n.a.>	<n.a.>	<n.a.>
PSG bus	<n.a.>	<n.a.>	X3 (out) with SMA09G.X2	<n.a.>	<n.a.>
	See current data sheets				

The three current transformers ESW75 have to be connected to the flexotemp® component BACI, for heating current monitoring.

Component		BACI
Terminal		X2
Current transformer		3 x ESW75
	See current data sheets	

The outgoing control lines for the Heating actuators on SMA09G, have to be led through the connected current transformer.

3.4.4 Example4-Project setup and configuration

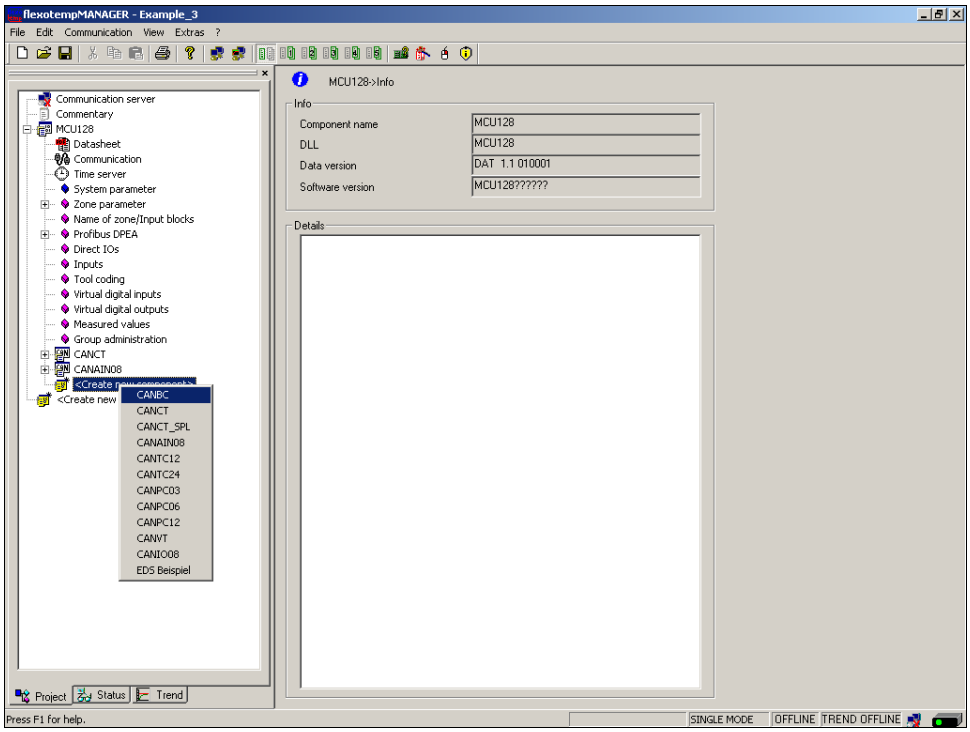
Further details, how the project setup and configuration tool flexotempMANAGER should be used and operated, as well as further explanations of the parameters, please see the operating instructions (see chapter ↗Additional and continuative documents).

3.4.4.1 Example4-Create components for peripheral I/O node

	Prerequisite	flexotempMANAGER is installed on PC.
	Prerequisite	flexotempMANAGER and the communication server (PSGCommServer) are running on the same computer hardware.
		The flexotemp® components are configured in the order shown in ↗Example1-Installation (from the left, starting with CANBC, to the right).
		A connection is established between CANAIN08.X4 (CAN-OUT) of Example_3 and the peripheral I/O node.
	PC side	
	flexotempMANAGER start	Symbol bar: <View> Symbol bar, Status bar, Project are active. Menu bar: <File> <Open> Project <Example_1>. The project <Example_1> is displayed.

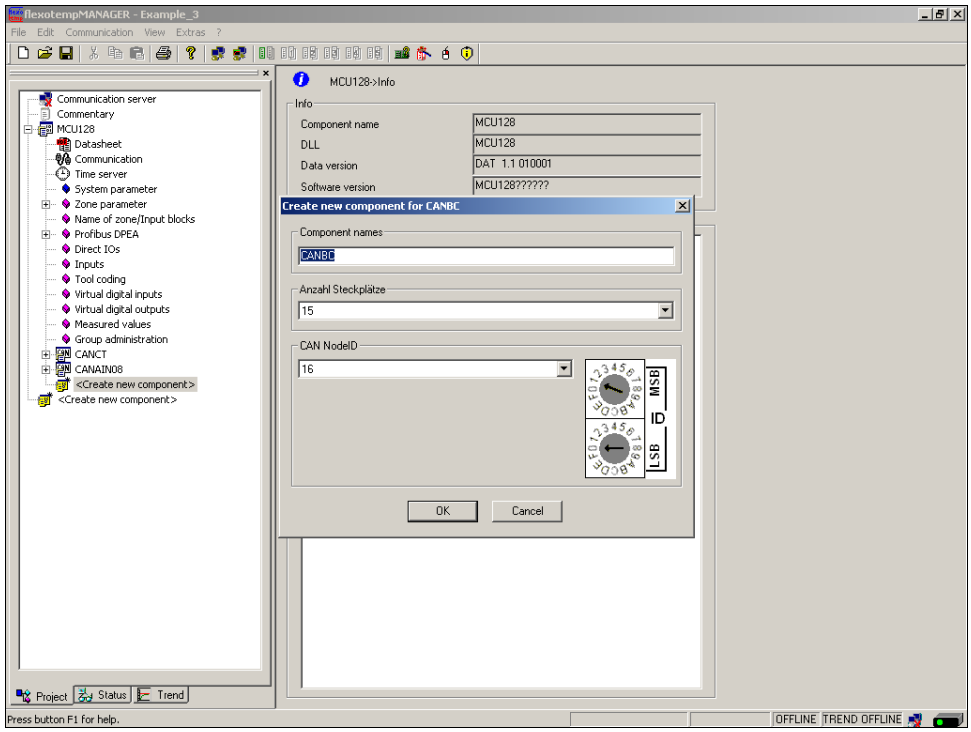
Create peripheral I/O node

The flexotemp® component CANBC is added to the existing project Example_3 as peripheral I/O node.



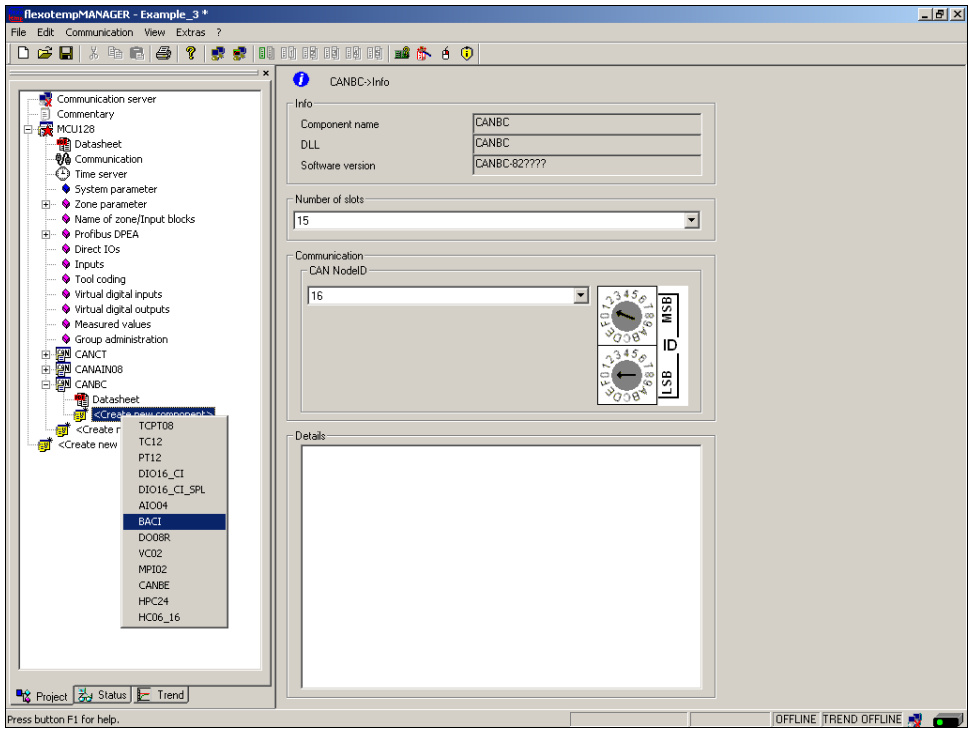
Address setting

The setting of the device ID on the coding switch here and on the rotary switch on the CANBC must fit.
The CANBC gets CAN NodeID 16, because the controller reserves 15 slots.

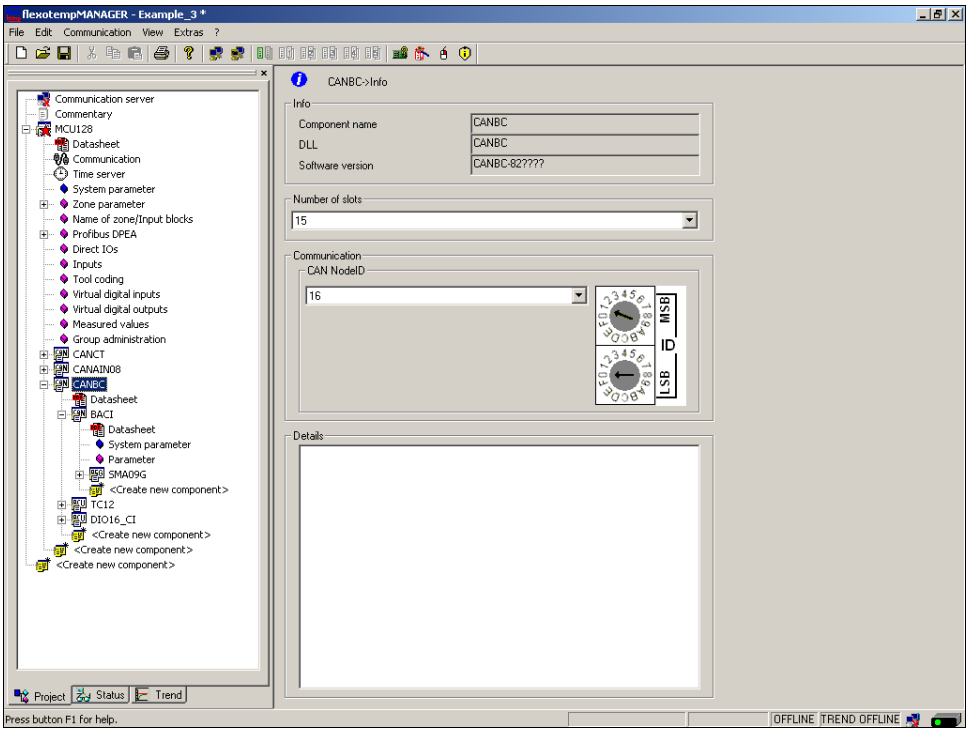


Create further components

Beneath the CANBC, the further components (BACI (SMA09G below), TC12, DIO16_CI) are selected out of a list and created.



The I/O node and the components are created in the project.

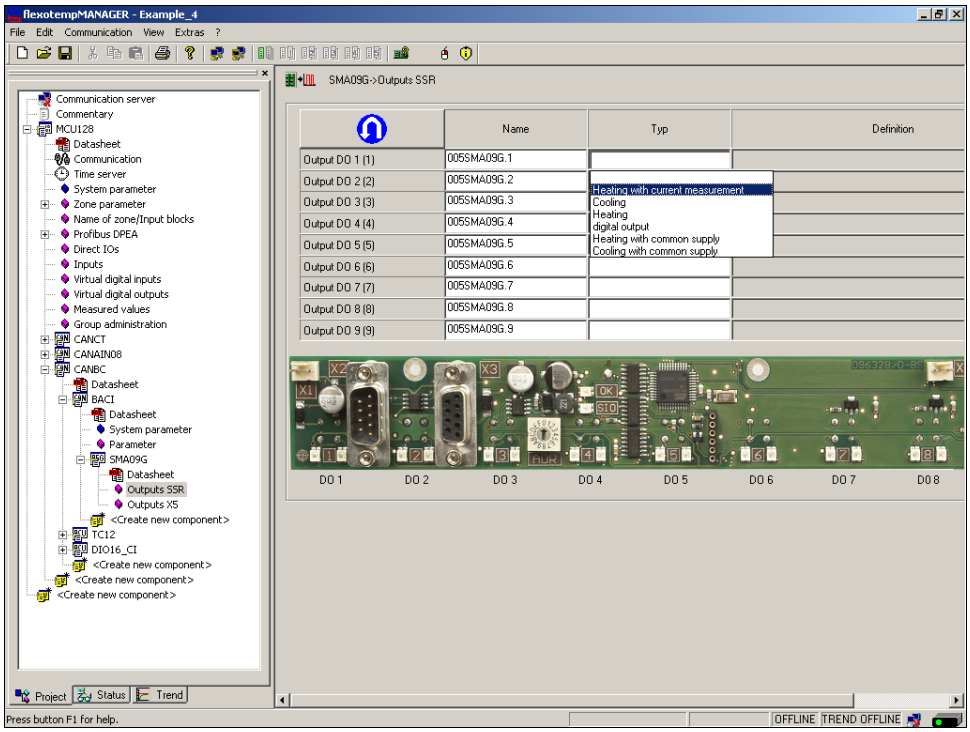


The project is stored with the name Example_4.

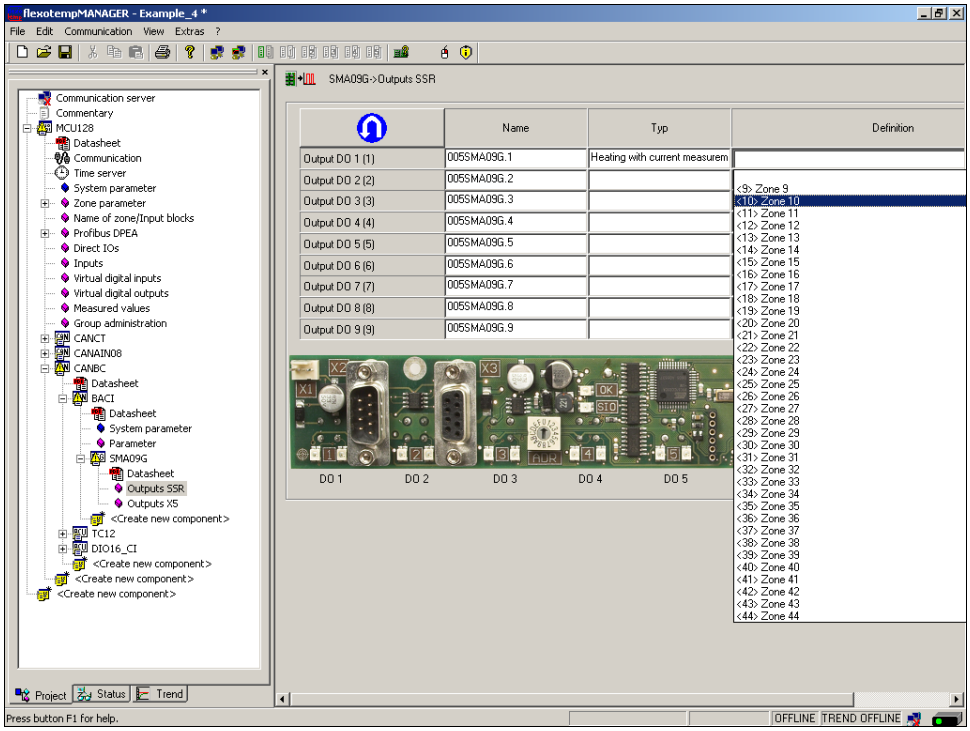
3.4.4.2 Example4-Specify Heating outputs

Specify 9 Heating outputs

At (007)SMA09G on BACI: for DO1...DO9 select and set the type <Heating with current measurement>.*)

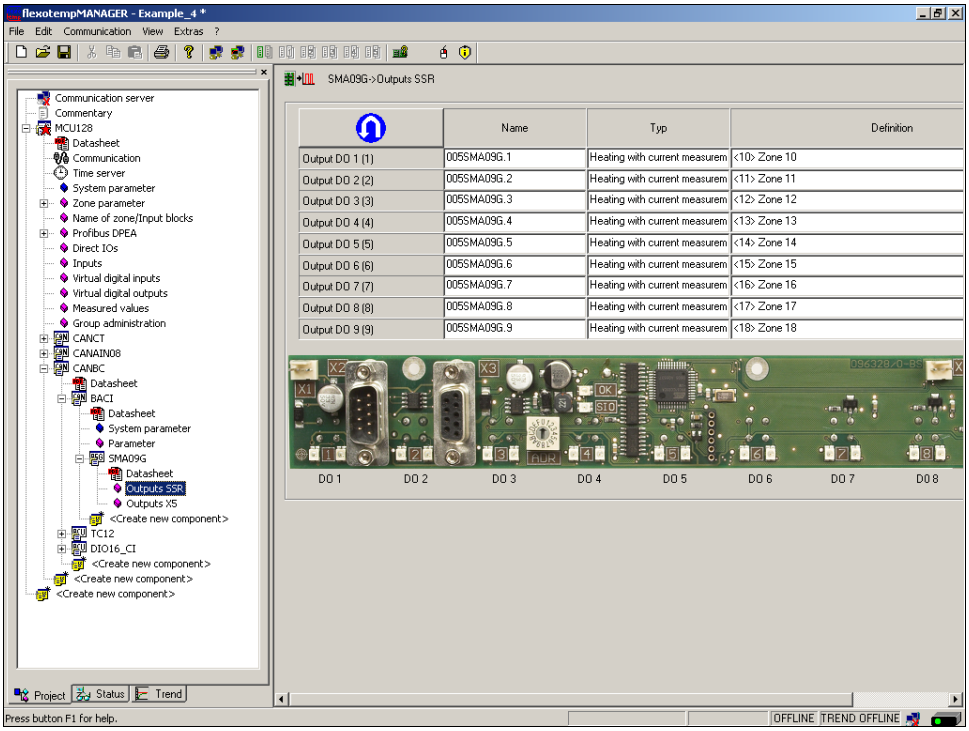


At (007)SMA09G on BACI: for DO1...DO9 of type <Heating with current measurement> assign zone 10...18.*)



*) By the key the allocation of the logical (DO1-9) to the physical outputs (1-9) can be reversed.

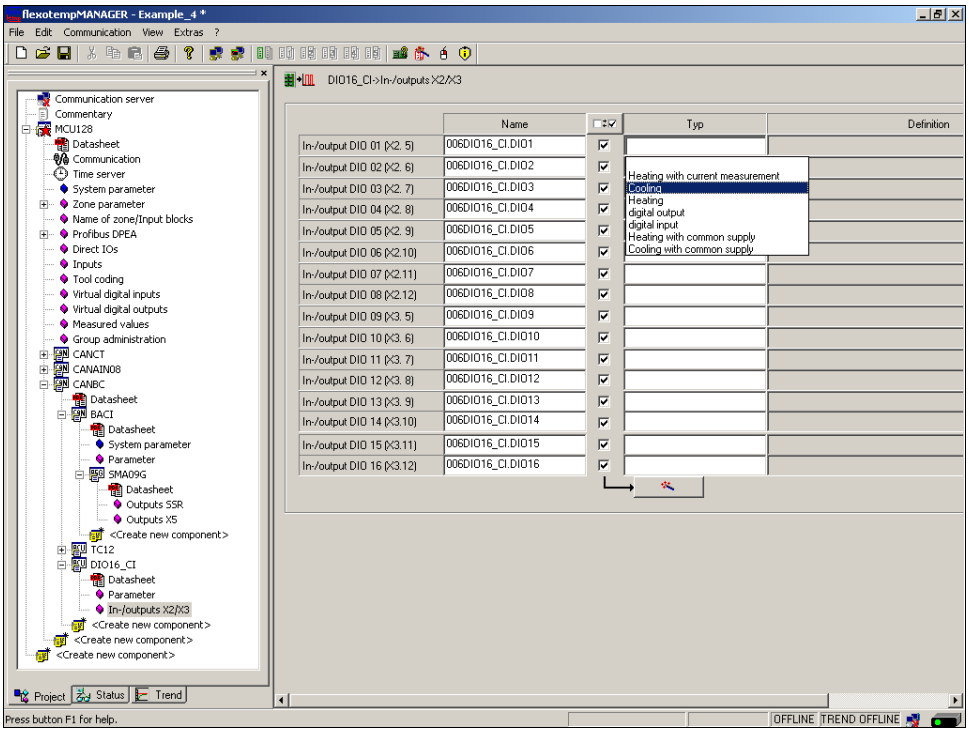
9 Heating outputs are defined for zone 10...18.



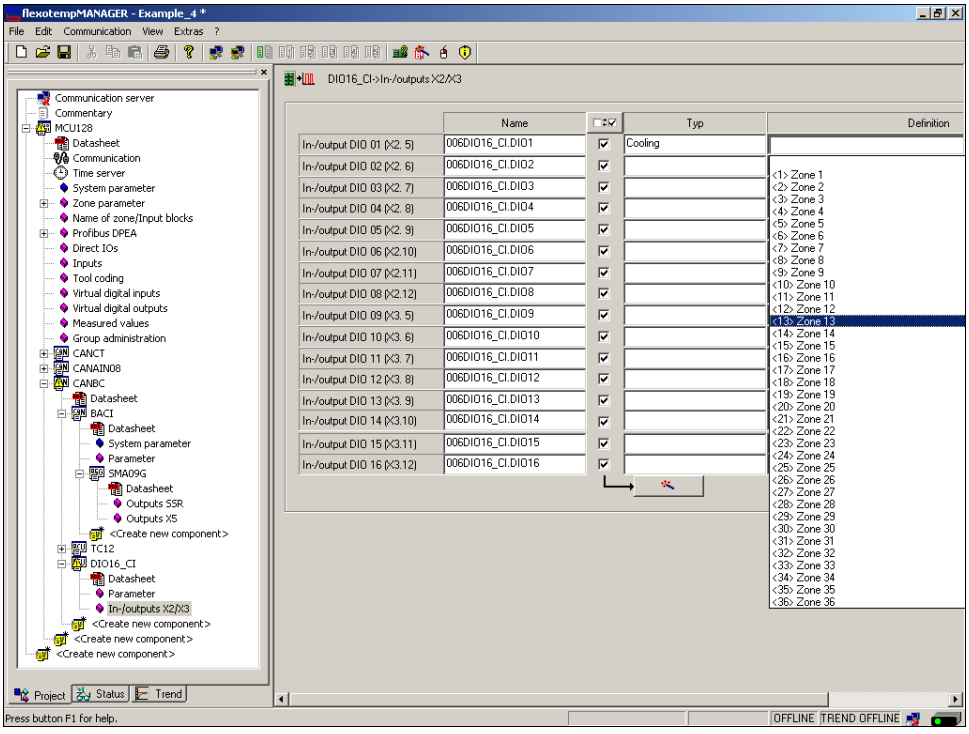
3.4.4.3 Example4-Specify Cooling outputs

Specify 6 Cooling outputs

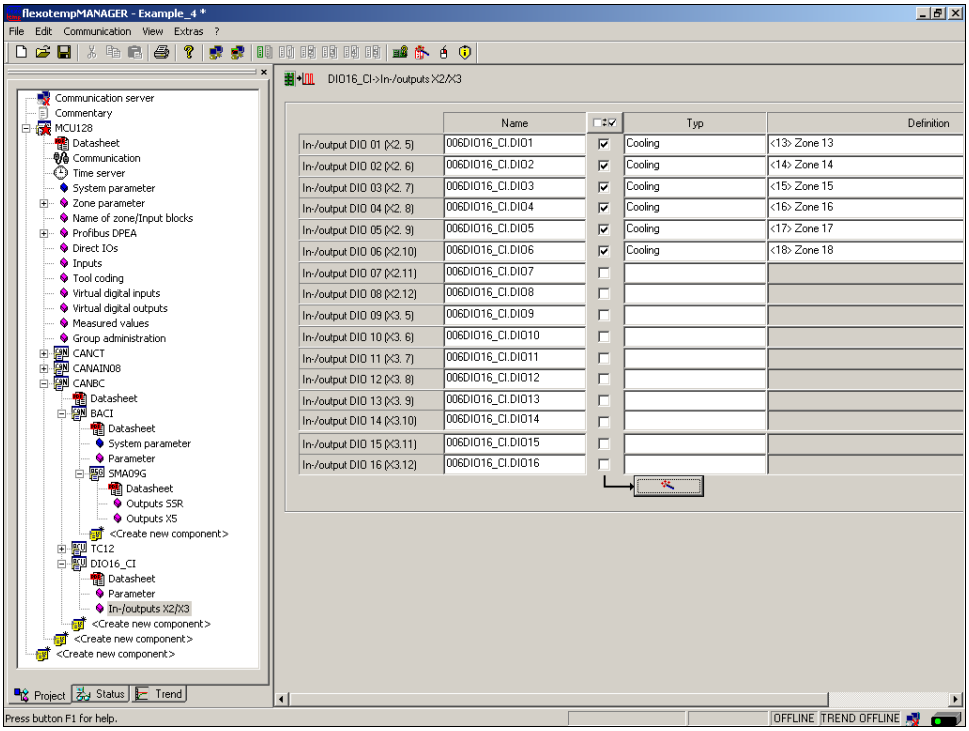
At (006)DIO16_CI on CANBC: for DIO1...DIO6 select and set the type <Cooling>.



At (006)DIO16_CI on CANBC: for DIO1...DIO6 of type <Cooling> assign zone 13...18.



6 Cooling outputs are defined for zone 13...18.



3.4.4.4 Example4-Parameterize Heating/Cooling outputs

Output type switching SSR (zero-crossing switching)

For zone 10...18 the parameters must be specified as follows:
[P026 RELH] = <Off>
[P027 RELC] = <Off>

Zone only Heating

For zone 10...12 the parameters must be specified as follows:
[P023 OUTH] = 100
[P024 OUTC] = 0

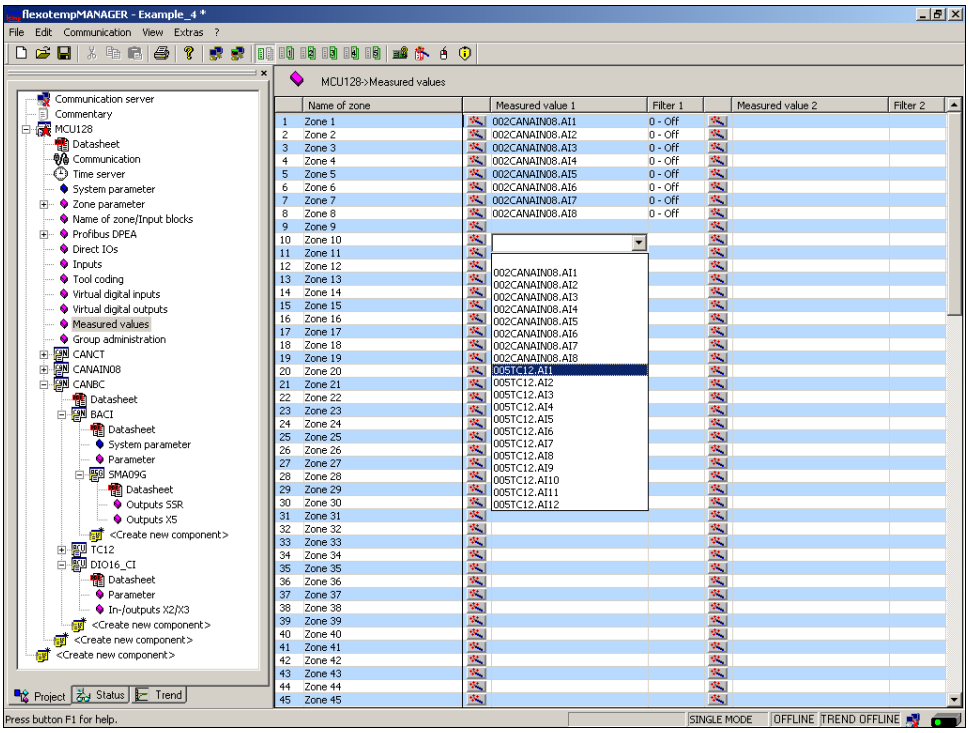
Zone Heating/Cooling

For zone 13...18 the parameters must be specified as follows:
[P023 OUTH] = 100
[P024 OUTC] = -100

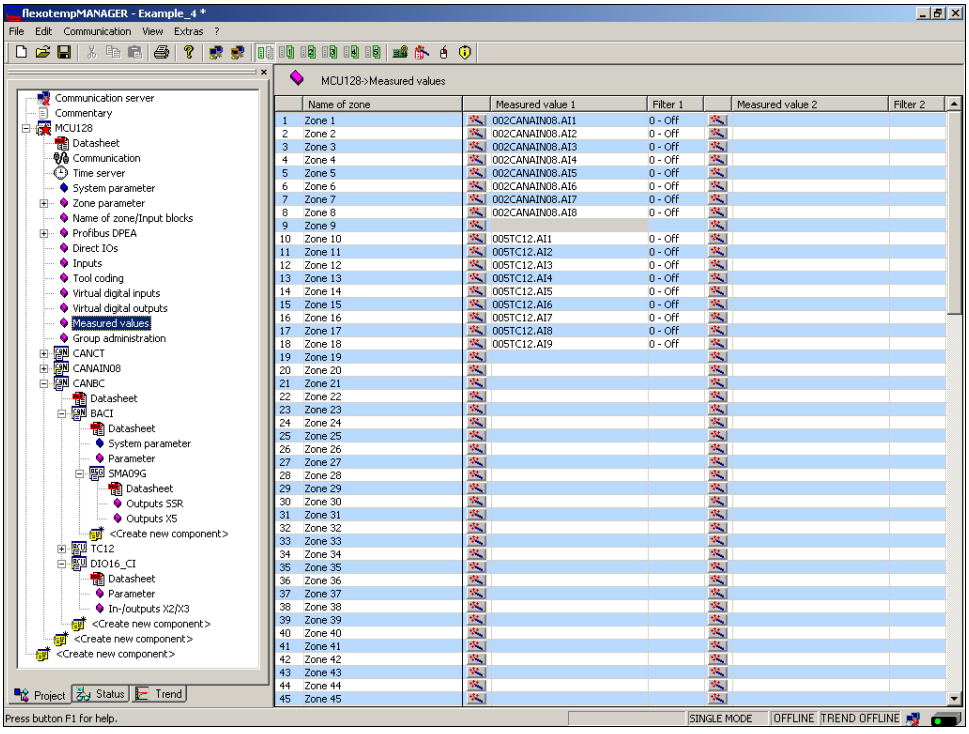
3.4.4.5 Example4-Assign analog inputs of type TC to measurement inputs

9 Analog inputs of type TC are assigned to measurement inputs

At the controller, under <Measured values> zone 10 is assigned to analog input 005TC12.AI1.



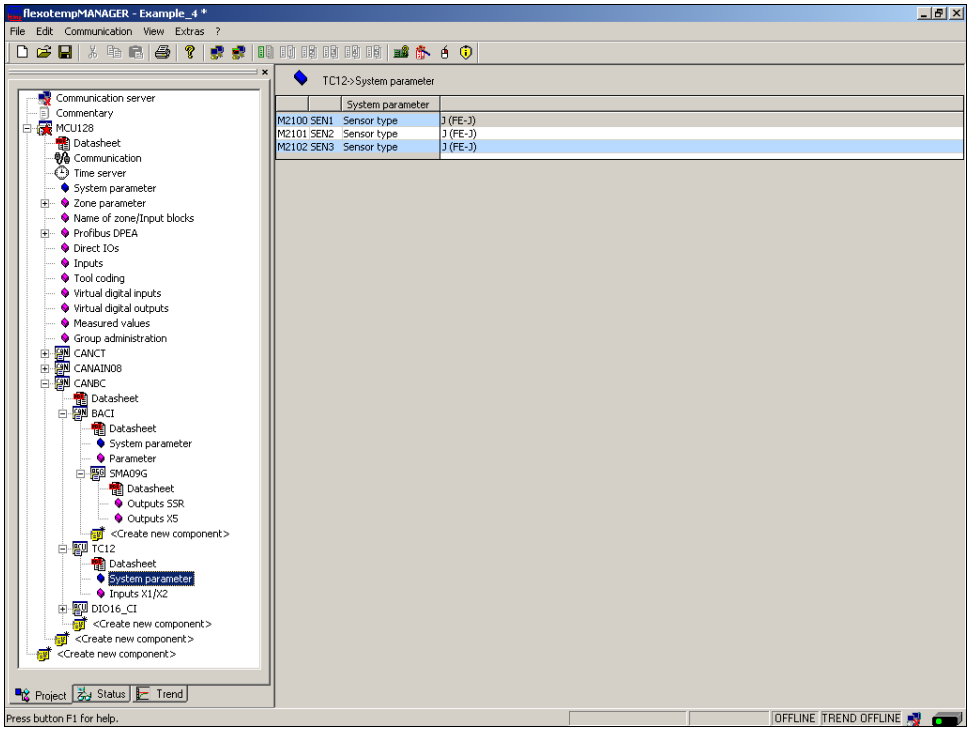
The zones 10...18 are 9 analog inputs TC assigned as measured value inputs.



3.4.4.6 Example4-Analog inputs - specify sensor types

The sensor types are specified in groups on the input card TC12 on CANBC.

On TC12 the sensor type <SEN1>...<SEN3> is set for four analog inputs. Standard setting for the sensor type is <J(Fe-J)>.



The sensor types for the input card TC12 are defined.

4 Project setup and configuration of alarms

Based on example_4, the configuration and the project setup of a system alarm and a zone specific alarm is described.

For further information on alarms see operating instructions on

- **Temperature Control System flexotemp® Parameter** - Chapter Alarm Management
- **Project setup and Configuration Tool flexotempMANAGER Operation** - Chapter IN-/Outputs

(see ↗Additional and continuative documents).

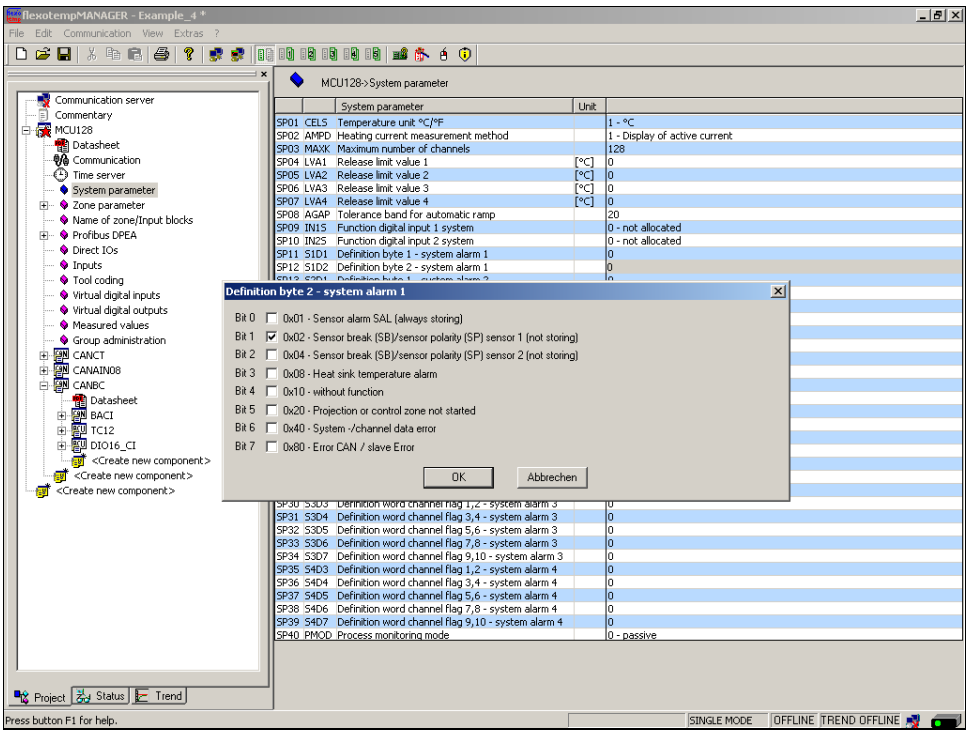
4.1 System alarm

In flexotempMANAGER are system alarms available. Which event/status triggers the alarm, is specified by so called alarm definition bytes. The system alarm can be output on a terminal by allocation of a digital output on a I/O component.

In the example, the connected thermo couples TC are monitored on sensor break. An occurrence of a sensor break should be signalized by system alarm 1. The system alarm 1 is put on a digital output.

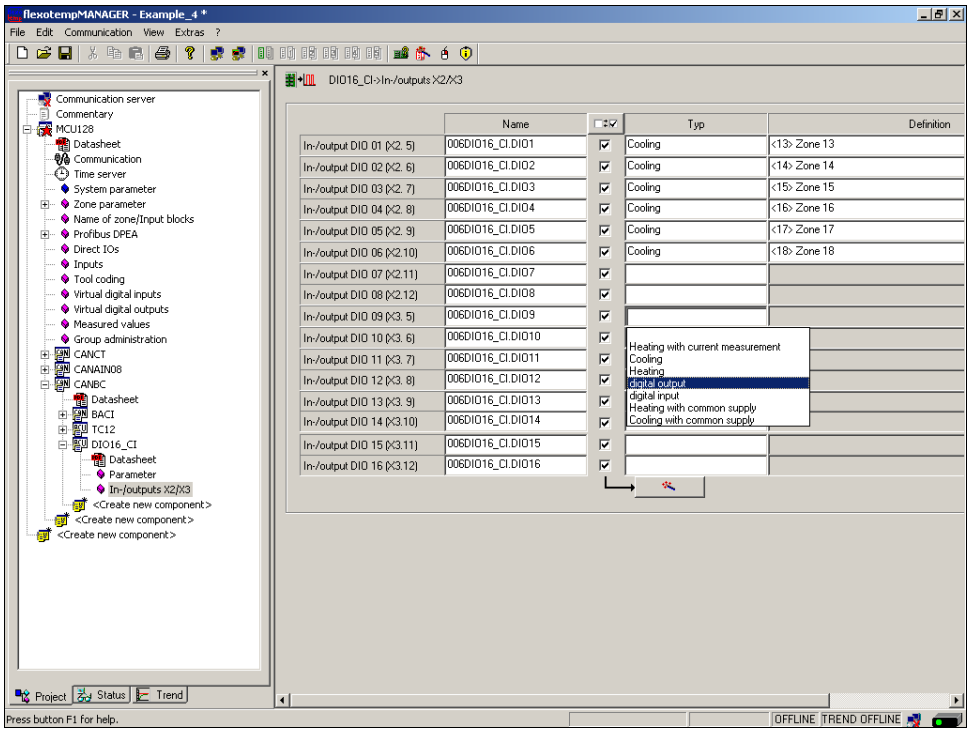
Configure system alarm 1

Set [SP12] S1D2 - Definition Byte 2 - System Alarm 1 = 2_{dec}
(matches with: sensor break (SB)/sensor incorrect polarity (SP) sensor 1 (not storing))

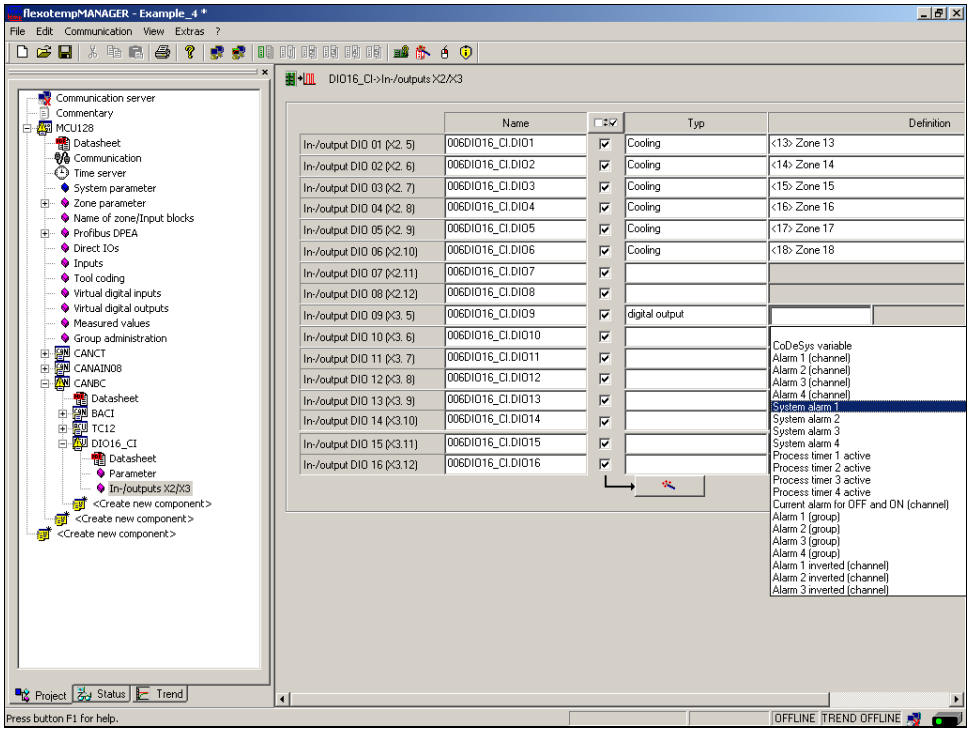


Project setup of the digital output for system alarm 1

(006)DIO16_CI on CANBC for DIO9 select and set the type <Digital output>.



(006)DIO16_CI on CANBC for DIO9 of type <Digital output> assign <System alarm 1>.



4.2 Zone specific alarm

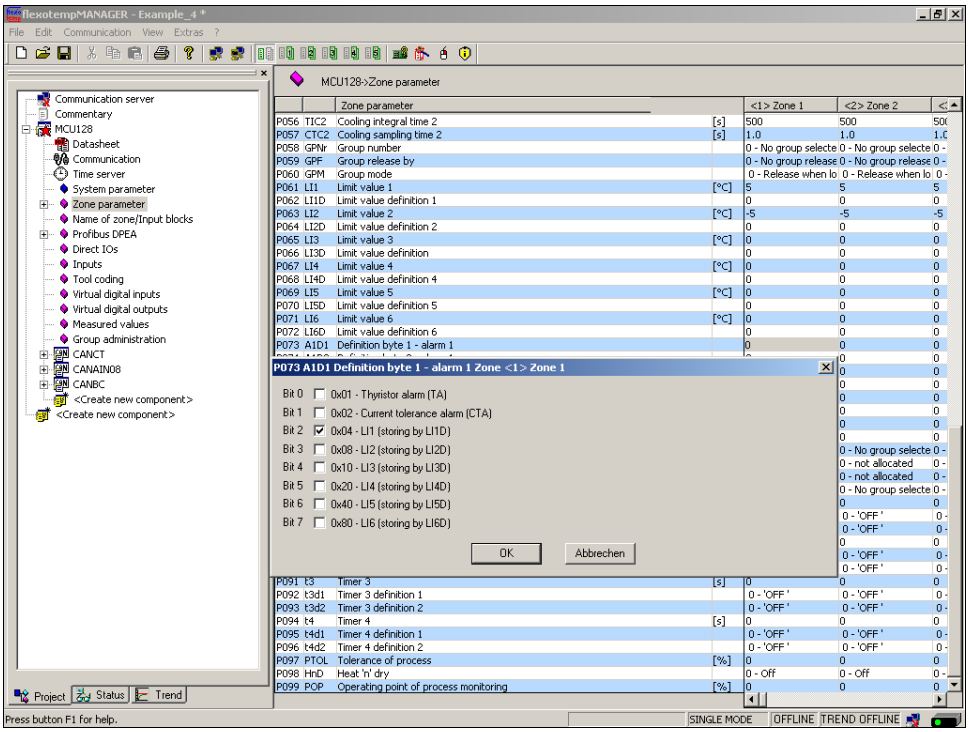
In flexotempMANAGER are zone alarms available. Which event/status triggers the alarm, is specified by so called alarm definition bytes. The zone alarm can be output on a terminal by allocation of a digital output on a I/O component.

In the example for zone 1, a temperature alarm should be output, when the actual value of the zone is 5 C° less than the setpoint value. The zone alarm is put on a digital output.

Configure zone alarm 1

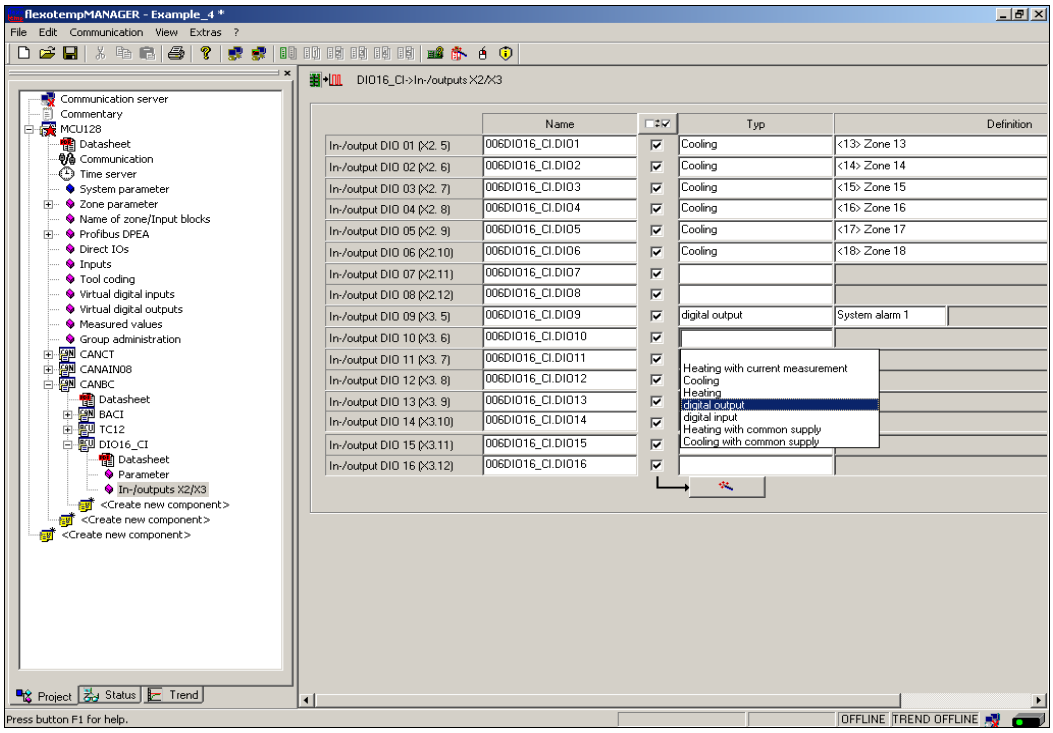
Set [P073] A1D2 - Definition Byte 2 - Alarm 1 = 4dec

(matches with: LI1 (storing by LI1D))

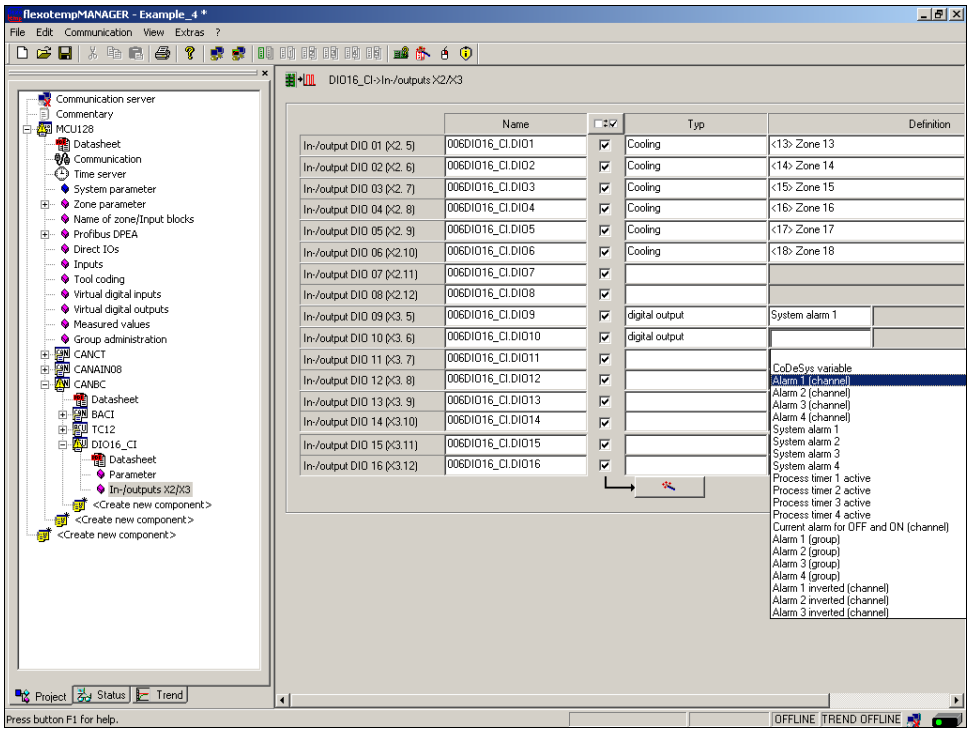


Project setup of the digital output for zone alarm 1

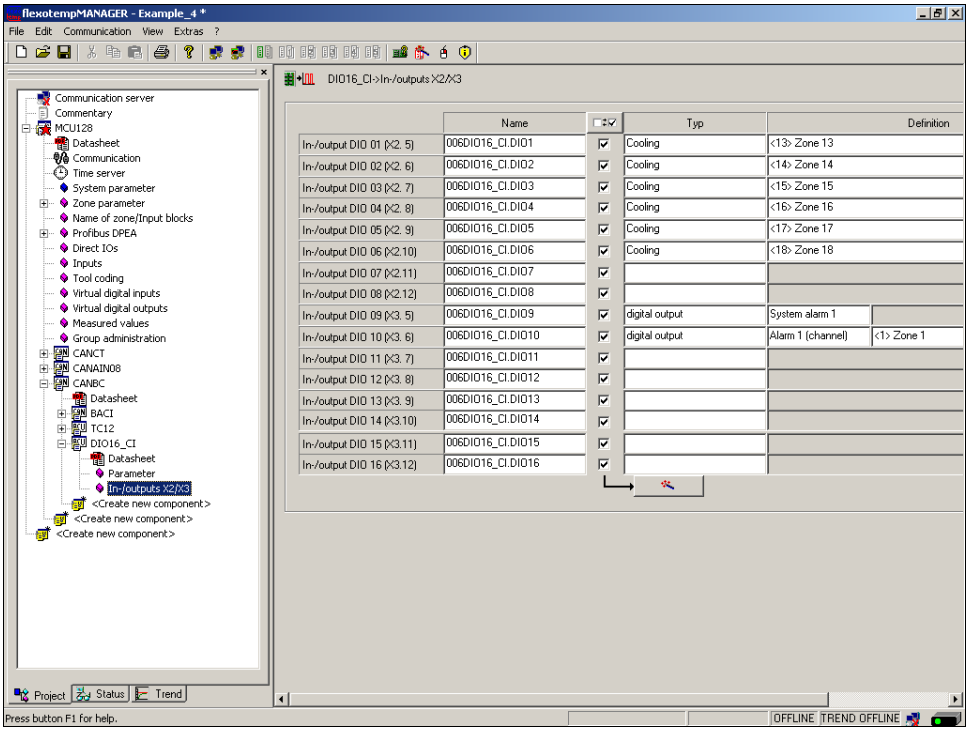
(006)DIO16_CI on CANBC for DIO10 select and set the type <Digital output>.



(006)DIO16_CI on CANBC for DIO10 of type <Digital output> assign <Alarm 1 (channel)>.



(006)DIO16_CI on CANBC for DIO10 assign zone 1.



5 Project setup and configuration of an input function

For further information on alarms see operating instructions on

- **Temperature Control System flexotemp® Parameter** - Chapter System Parameters
- **Project setup and Configuration Tool flexotempMANAGER Operation** - Chapter IN-/Outputs

(see ↗Additional and continuative documents).

5.1 Input function - Disconnect all actuators

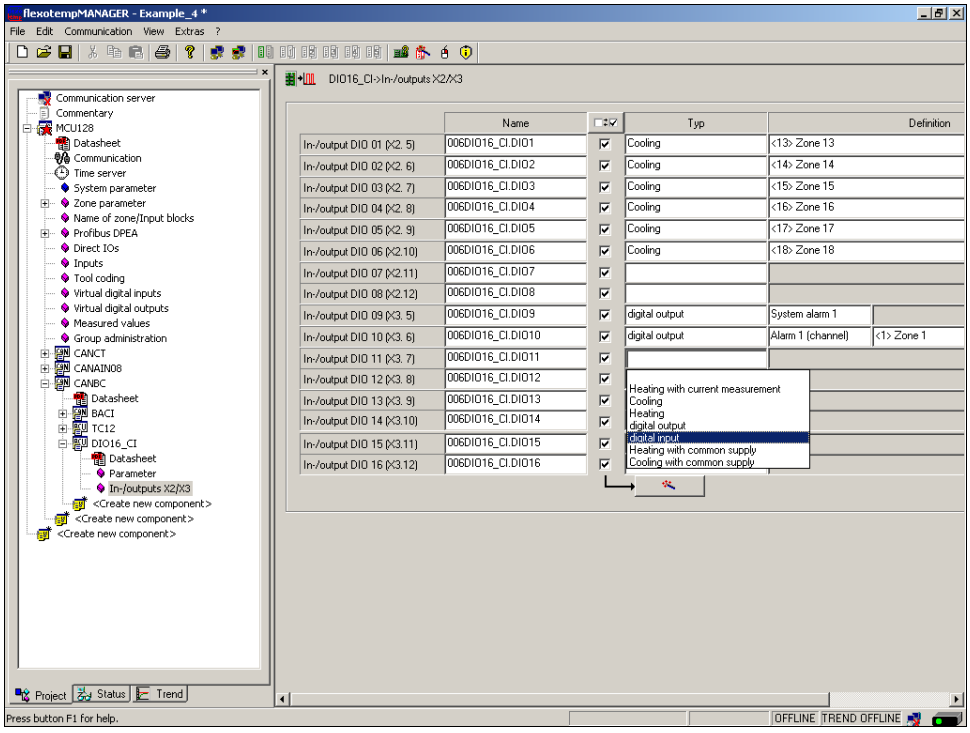
All actuators should be disconnected controlled by an input signal (on example_4 based configuration and the project setup of the input function).

In flexotempMANAGER are system inputs available. By configuration of the system input is specified, which function the system executes for all zones, when the digital input is activated. By allocation of a digital input on an I/O component, the system input is triggered.

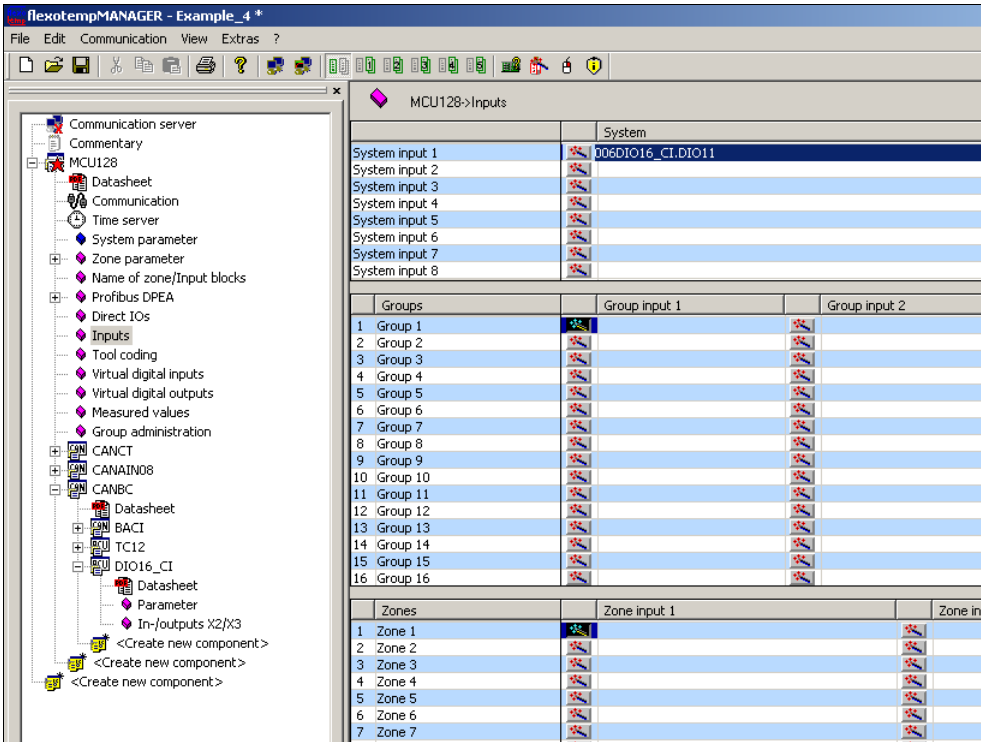
In the example, the controller should disconnect all actuators, when the digital input is set.

Project setup of the digital input

(006)DIO16_CI on CANBC for DIO11 select and set the type <Digital input>.

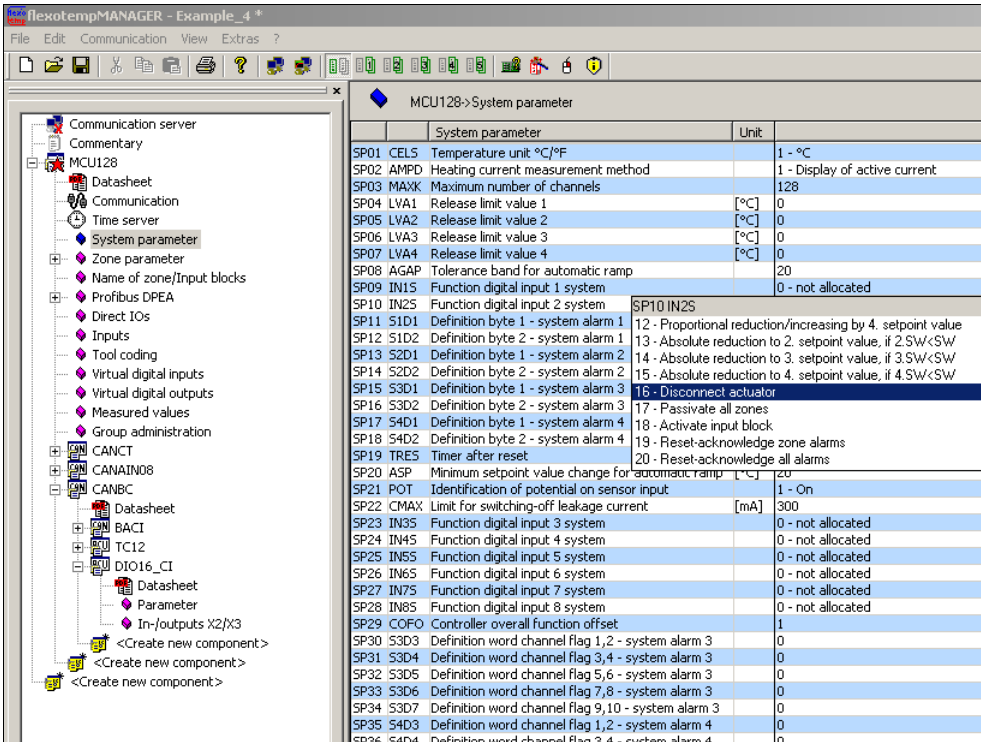


On the controller under <Inputs> the digital input (006)DIO16_CI.DIO11 is assigned to <System Input 1>.



Configure system input 1

Set [SP09] IN1S - Function System Input 1 = 16dec
(matches with: disconnect actuator)



5.2 Input function - reduce zone X to 2. setpoint value

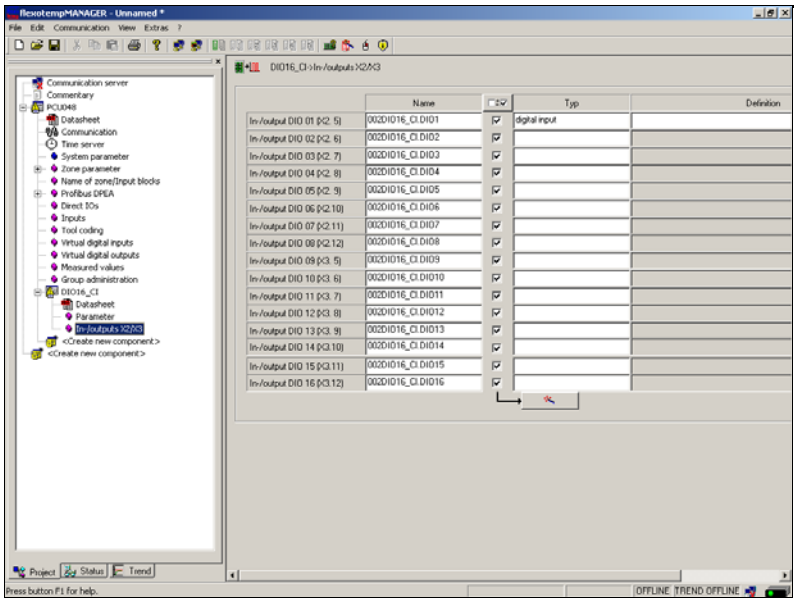
The zone X (here zone 7) is reduced to the 2. setpoint value, controlled by the input signal.

In flexotempMANAGER are zone inputs available. By configuration of a zone input is specified, which function the zone executes, when the digital input is activated. By allocation of a digital input on an I/O component, the zone input is triggered.

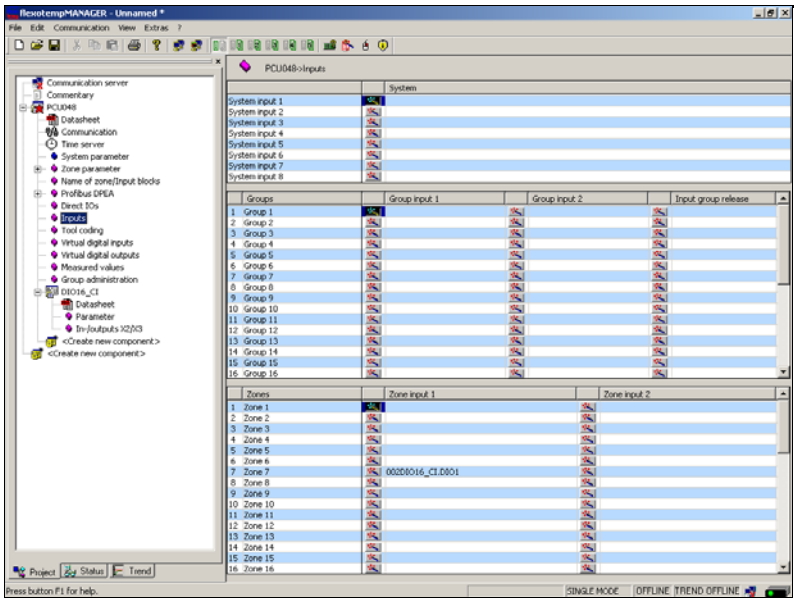
In the example, the controller should reduce the zone 7 to 2. setpoint value, when the digital input is set.

Project setup of the digital input

(003)DIO16_CI for DIO01 select and set the type <Digital input>.

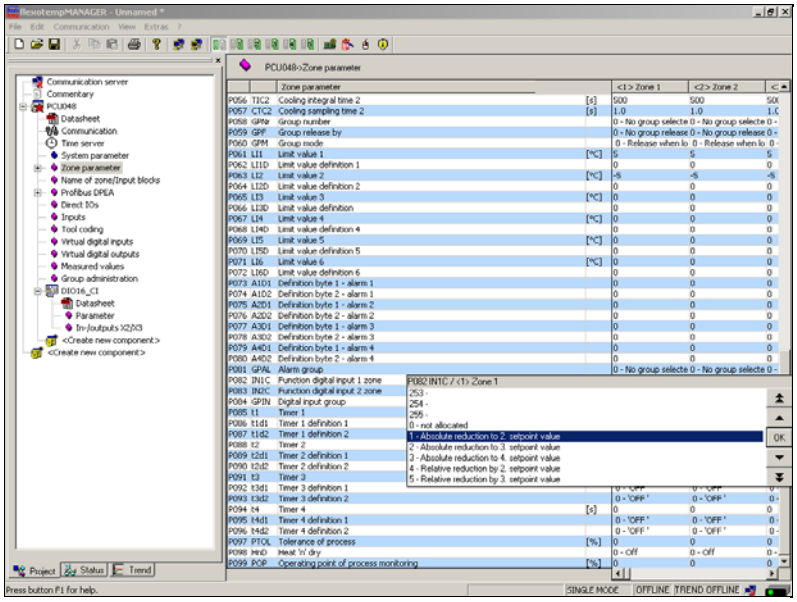


On the controller under <Inputs> the digital input (003)DIO16_CI.DIO01 is assigned to <Zone Input 1> of zone 7.

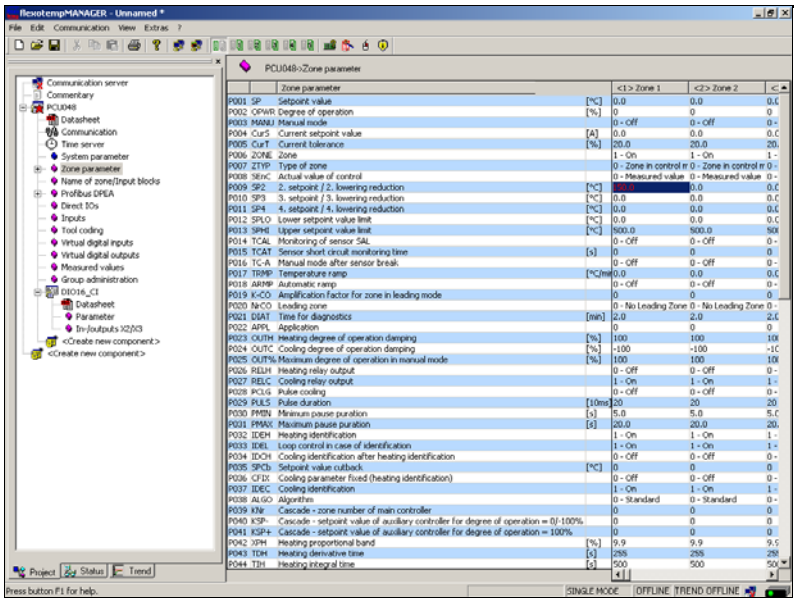


Configure function zone input 1

Set zone 7 [P082] IN1C - Function Zone Input 1 = 1dec
(matches with: absolute reduction to 2. setpoint value)



Set 2. setpoint value [P009] SP2 – 2. Setpoint / 2. Lowering/Reduction Value to 150 [°C]
(it is reduced to this value)



6 Memory Cards

The controllers of the design series flexotemp® are equipped with a slot for a

- SD card/MMC card for MCU
- Micro SD card for PCU

With the memory card, the following functions are usable:

- Firmware updates (duration approx. 2 minutes)
- Direct loading and storage of 10 controller settings (duration approx. 40 seconds each)
- Direct loading and storage of 10 rotary switch dependent controller settings (duration approx. 40 seconds each)
- Transfer of project setup software projects from memory card into the controller
- Project-oriented input of controller configurations from memory card in a project setup software readable and writeable format
- Representation of HTML pages stored on the memory card, with which a direct access to process and configuration data of the controller is possible

Prerequisites for the use of the memory card are:

- Card type SD-/MMC card for MCU, Micro SD card for PCU
- Formatting of the memory card with FAT16 file system
  - Larger cards can also be formatted by FAT16. The controller can then only access a storage range of 1 GB
- Only file names of format 8.3 are supported.

The following are not supported:

- Long file names

6.1 Handling

The memory card is to be inserted into the slot so that the arrow on the memory card points downwards and/or the trimmed corner points upwards. After inserting, the memory card LED lights up shortly.

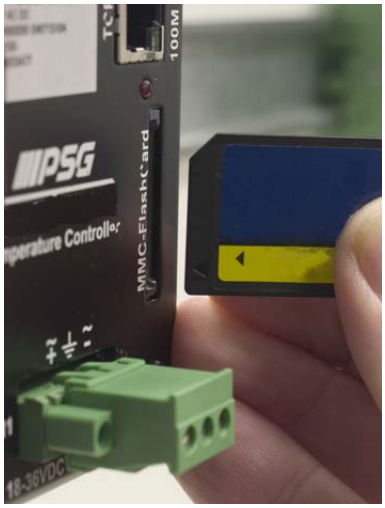


Figure 6-1 Insert memory card into slot on the controller

Some of the functions are started immediately after inserting the card. Therefore it is absolutely necessary to consider the following references first.

6.2 Formatting

The memory card must be formatted with the FAT file system. With another system formatted memory cards are not identified by the controller. The formatting can for example be done with the aid of a card reader on a PC with MSWindows.

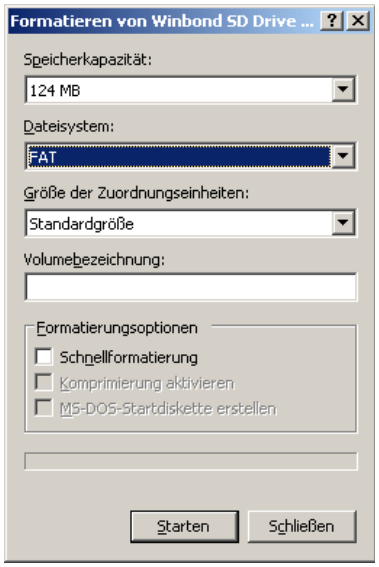


Figure 6-2 Formatting of the memory card with file system FAT

The formatting of the memory card can directly be executed by the entry of code number 90 and 93 on the controller alternatively. Code numbers can directly be entered by the connected operating and display unit BA, by project setup software or interface. However, the command for the input of a code number is also available in every interface protocol. In case of formatting over Code Number 93, the default file structure is additionally attached on the memory card.

6.3 Default file structure and default file names

The following minimum file structure must be attached on the memory card.

Figure 6-3 File structure

Folder		File	Description
		SYSTEM.CFG	Specifications of the file structure (optional)
		Various files with extension ALD	Autoload files (optional). With the aid of the files it is controlled whether and how firmware updates are implemented after the switching on (see chap. 6.4 “Autoload files”).
HEX		MCU12800.H86 MCU12801.H86 PCU02400.H86 PCU02401.H86 PCU04800.H86 PCU04801.H86 PCU12800.H86 PCU12801.H86 PCU12810.H86 PCU12811.H86	Firmware for controller MCU/PCU. The last numeral identifies, whether the software is running in the standard controller OEM (0) or in the hot runner controller (1). The last but one numeral identifies, whether it is a controller with PROFINET IO (1) or not (0).

Folder		File	Description
RECIPE		RCP_0.EXP … RCP_9.EXP	10 controller settings, which can be secured by the controller on the memory card over the code number commands 60...69. The file format is stored in a project setup software readable and writeable format
CFG		CFG_0.EXP … CFG_9.EXP	10 controller settings, which can be secured by the controller on the memory card over the code number command 80 dependent on the rotary switch position. The file format is stored in a project setup software readable and writeable format

The configuration of the default file structure and the default file names is done in the file SYSTEM.CFG This is a text file with the following syntax:

```
#PATH_RCP="Path/Folder for the storage and/or loading of the recipes"
#PATH CFG="Path/Folder for the storage and/or loading of the configurations"
#FILE_MCU12800="Path to firmware for die MCU128"
#FILE_MCU12801="Path to firmware for die MCU128"
#FILE_PCU02400="Path to firmware for die PCU024"
#FILE_PCU02401="Path to firmware for die PCU024"
#FILE_PCU04800="Path to firmware for die PCU048"
#FILE_PCU04801="Path to firmware for die PCU048"
#FILE_PCU12800="Path to firmware for die PCU128"
#FILE_PCU12801="Path to firmware for die PCU128"
#FILE_PCU12810="Path to firmware for die PCU128 PNIO"
#FILE_PCU12811="Path to firmware for die PCU128 PNIO"
```

The last numeral identifies, whether the software is running in the standard controller OEM (0) or in the hot runner controller (1). The last but one numeral identifies, whether it is a controller with PROFINET IO (1) or not (0).

If the file SYSTEMP.CFG is not existing on the memory card or if entries are missing in this or if it contains faulty entries, the default settings are then employed.

(Corresponds to the default settings)

```
#PATH_RCP="RCP"
#PATH_CFG="CFG"
#FILE_MCU12800="HEX\MCU12800.H86"
#FILE_MCU12801="HEX\MCU12801.H86"
#FILE_PCU02400="HEX\PCU02400.H86"
#FILE_PCU02401="HEX\PCU02401.H86"
#FILE_PCU04800="HEX\PCU04800.H86"
#FILE_PCU04801="HEX\PCU04801.H86"
#FILE_PCU12800="HEX\PCU12800.H86"
#FILE_PCU12801="HEX\PCU12801.H86"
#FILE_PCU12810="HEX\PCU12810.H86"
#FILE_PCU12811="HEX\PCU12811.H86"
```

6.4 Autoload files

The autoload files which are filed in the root directory (.ALD) are used for the automatic control of the firmware updates of the controllers of memory card. ALD files can (among other things) be generated manually with a text

editor or attached on the memory card through input of a pre-determined code number (↗Code numbers for the control of the memory card functions). The content of the autoload files is without importance in this case.

File name	Function / Action after reset of the controller	File is deleted automatically
HEX.ALD	The controller type is determined. If a valid controller type is identified, the relevant firmware is loaded into the flash and started. If no controller type is identified (controller does not have any firmware), the firmware is not updated.	Yes (One-time loading process of the H86)
ALL_DIP.ALD	After a restart/reset of the controller is checked, whether the file ALL_DIP.ALD is available on the memory card and the rotary switches are set to FF. Next the recipe file RCP_0.EXP is loaded into the controller. The file ALL_DIP.ALD remains on the memory card, to enable to repeat this action again and again.	No (is always reloaded, when rotary switch is set to FF)

6.4.1 Firmware update over autoload files

Sequence of a firmware update over autoload files

- Copy required autoload file into root directory from memory card.
- Controller is switched off. Insert memory card into card slot. Switch on controller.
- Controller checks whether a firmware file is existing on the memory card under the indicated name and folder.
- Firmware file is transferred from the memory card into the RAM of the controller.
- Controller type is checked: if the controller types of the firmware contained in the flash of the controller and the firmware loaded into the RAM are different, then no firmware is programmed into the flash. Exception: No software is located in the flash.
- Comparison of the firmware versions in the flash and RAM. If these are identical, the firmware is not programmed into the flash. Otherwise, software is programmed from the RAM into the flash.

Controller software is newly started, controller implements reset.

Regulations and notes for the firmware update of the controller

- During the programming procedure, the supply voltage of the controller must not be switched off! (Software in the flash deleted)
- During loading of the firmware very fast flashing of memory card LED
- After successful loading process, this LED goes out and the software starts.

6.4.2 Error reports during the firmware update over autoload files

If a fault occurs during the firmware update over memory card the fault is signaled for approx.15 seconds at the end of the loading process with the assistance of the LED's.

Error report	OK-LED	SIO-LED	Memory card LED
Checksum error in the firmware file	flashes cyclical (period 0.5 sec) synchronous with SIO LED	flashes cyclical (period 0.5 sec) synchronous with OK LED	flashes cyclical quickly (period approx. 0.25 sec)
Fault during the opening of the firmware file/fault during the programming of the FLASH	flashes cyclical (period 0.5 sec) synchronous with SIO LED	flashes cyclical (period 0.5 sec) synchronous with OK LED	flashes cyclical slowly (period approx. 1.0 sec)

6.5 Code numbers for the control of the memory card functions

Code number	Function
60	Store current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from controller onto the memory card in the recipe file RCP_0.EXP.
61	Store current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from controller onto the memory card in the recipe file RCP_1.EXP.
62	Store current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from controller onto the memory card in the recipe file RCP_2.EXP.
63	Store current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from controller onto the memory card in the recipe file RCP_3.EXP.
64	Store current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from controller onto the memory card in the recipe file RCP_4.EXP.
65	Store current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from controller onto the memory card in the recipe file RCP_5.EXP.
66	Store current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from controller onto the memory card in the recipe file RCP_6.EXP.
67	Store current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from controller onto the memory card in the recipe file RCP_7.EXP.
68	Store current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from controller onto the memory card in the recipe file RCP_8.EXP.
69	Store current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from controller onto the memory card in the recipe file RCP_9.EXP.
70	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from the recipe file RCP_0.EXP on the memory card into the controller.
71	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from the recipe file RCP_1.EXP on the memory card into the controller.
72	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from the recipe file RCP_2.EXP on the memory card into the controller.
73	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from the recipe file RCP_3.EXP on the memory card into the controller.
74	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from the recipe file RCP_4.EXP on the memory card into the controller.
75	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from the recipe file RCP_5.EXP on the memory card into the controller.
76	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from the recipe file RCP_6.EXP on the memory card into the controller.
77	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from the recipe file RCP_7.EXP on the memory card into the controller.
78	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from the recipe file RCP_8.EXP on the memory card into the controller.
79	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) from the recipe file RCP_9.EXP on the memory card into the controller.
80	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) dependent on rotary switch from controller and store in the configuration file on memory card CFG_x.EXP (x= Addresses of rotary switch position).
81	Load controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) dependent on rotary switch from the configuration file on memory card CFG_x.EXP (x= Addresses of rotary switch position) into the controller. An existing file is overwritten directly.

Code number	Function
90	Functional release memory card Before loading the firmware over code number or before formatting the memory card, a functional release must be implemented. If no further code number is entered after that within 20 seconds, then the functional release is canceled automatically again. With active functional release the message text "LdF" is output in the operating and display units BA and in the project setup and configuration tool. In addition, the mode is signaled over a cyclical flashing of the memory card LED (frequency 1 Hz).
91	Update of the firmware is started. Prerequisite: Functional release activated. The hex file assigned to the controller type is loaded into the controller (see also chap.6.3 “Default file structure and default file names”)
93	Formatting of memory card. Prerequisite: Functional release activated. With formatting, the default file names and the default file structure are attached.
94	Formatting of memory card. Prerequisite: Functional release activated. After formatting of the memory card the current controller configuration (zone parameters, system parameters, attributes, Profibus, project setup) is stored into the recipe file RCP_0.EXP on the memory card. In addition the file ALL_DIP.ALD is created.
99	Functional release cancellation memory card.

6.6 Generate memory card project from project setup software project

Projects generated in the project setup software can be converted directly into memory card compatible projects with the aid of the export function. The exported project can be copied directly onto the memory card. Based on an exemplary project with a PCU048 and a PCU128, the procedure is explained below step by step.

With the project setup software attach and edit a project

A project is attached in the project setup software consisting of the two controllers and stored in the directory C:\Programs\PSG\flexotempMANAGER\PROJEKTE under the project name TEST_2.

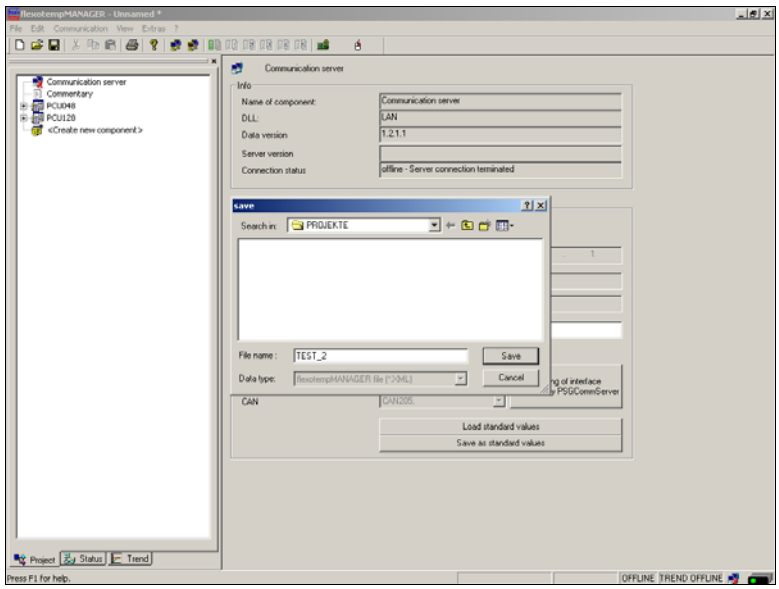


Figure 6-4 With the project setup software attach a project

Compiling information for memory card project

Call up the menu item <Export on memory card> in the menu bar <File>. The following dialog window is opened.

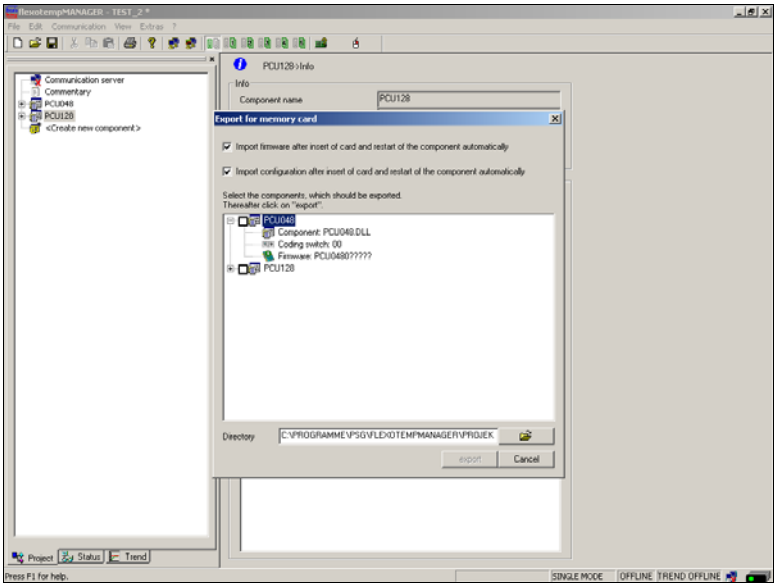
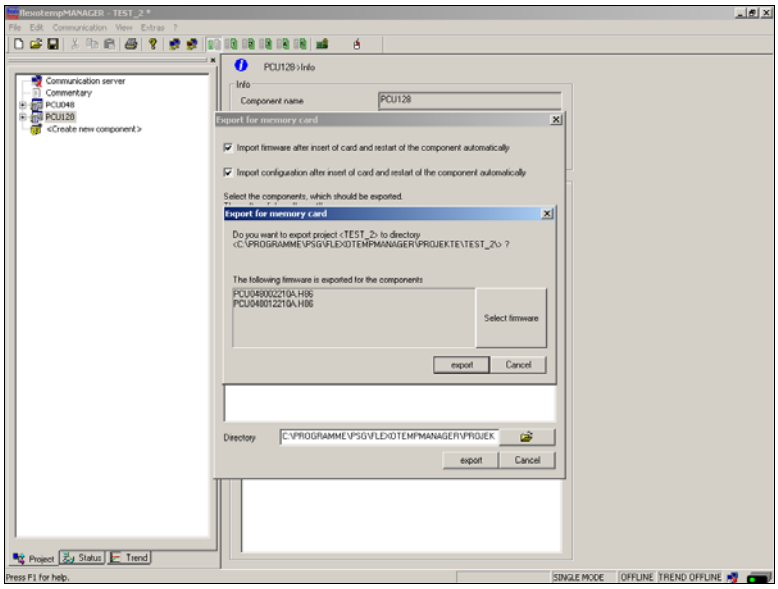


Figure 6-5 Dialogue window: Export memory card project before processing

In the dialog window the following stipulations are set for the memory card project:

- Is firmware file loaded automatically with insertion of the memory card into the controller and/or after new start of the controller?
- Is the configuration data loaded automatically with insertion of the memory card into the controller and/or after new start of the controller?
- The controllers of the project are listed in the component area and can be selected by ticking for export. The firmware files, which are associated with the controllers in the project, are listed by the +-sign left beside the controller. When they are identical with the firmware files of the controller, they are stored into the memory card project.
- The standard storage path (consisting of the standard directory C:\Programs\PSG\flexotempMANAGER\PRO-JEKTE\ & project name as storage path TEST_2\) of the memory card project can be taken or edited.

Before export of the project is checked, that the components, selected for the export, have a unique code switch setting. Is this not the case, the code switch setting can be corrected, and/or the components can be exported individually.



The export is done onto the stated storage place, after a security query, where a selection of the firmware can be done.

Store memory card project and copy onto memory card

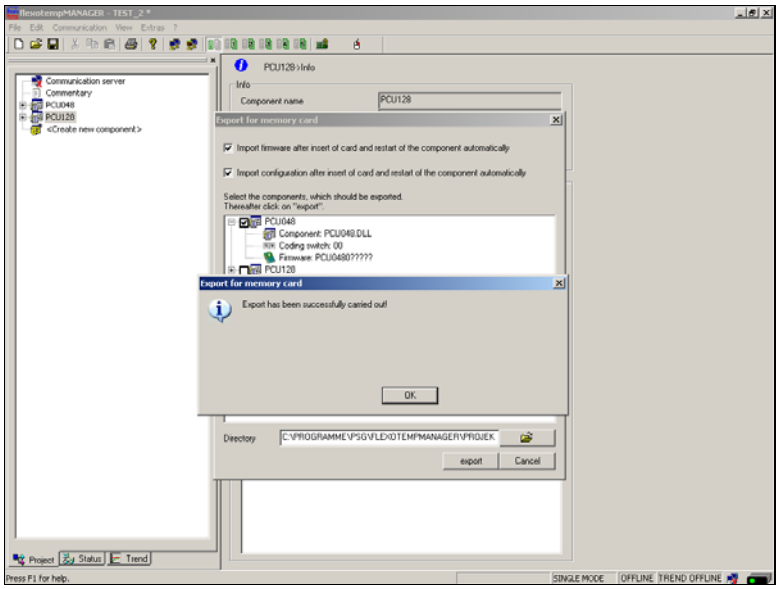


Figure 6-6 Dialogue window: Export memory card project after processing

The memory card project is stored on e.g. directory C:\Programs\PSG\flexotempMANAGER\PROJEK-TE\TEST_2, after specification of all data.

- In the main directory are the sub directories CFG and HEX
- In the directory CFG is located one file per controller with the configuration data
- The firmware files are located in the HEX directory

The files of the memory card project are complete and can be copied directly onto the memory card.

7 Appendix

7.1 Ordering designations

Order number	Article description
025 000	Multi Loop Control Unit flexotemp® MCU 128
025 010	Multi Loop Control Unit flexotemp® MCU 128 / SoftPLC
025 070	Peripheral Control Unit flexotemp® PCU 128
025 080	Peripheral Control Unit flexotemp® PCU 128 / SoftPLC
025 077	Peripheral Control Unit flexotemp® PCU 128 PNIO
025 020	Peripheral Control Unit flexotemp® PCU 48
025 030	Peripheral Control Unit flexotemp® PCU 48 / SoftPLC
025 027	Peripheral Control Unit flexotemp® PCU 48 PNIO
025 015	Peripheral Control Unit flexotemp® PCU 24
025 016	Peripheral Control Unit flexotemp® PCU 24 / SoftPLC
025 017	Peripheral Control Unit flexotemp® PCU 24 PNIO
025 040	Bus Coupler flexotemp® CANBC
025 041-1	Bus Extension Interface flexotemp® BE
025 041-2	Bus Extension Interface flexotemp® BEF
025 042	Bus Actuator Interface, Current Input flexotemp® BACI
025 043	Bus Extension Interface flexotemp® CANBE
025 050-1	Thermocouple Interface flexotemp® TCPT08
025 053-1	Thermocouple Interface flexotemp® TC12
025 054-0	Thermocouple Interface flexotemp® PT 08-3
025 054-1	Thermocouple Interface flexotemp® PT 12-2
025 054-2	Thermocouple Interface flexotemp® PT 16-3
025 051-1	Analog In-/Output Interface flexotemp® AIO04
025 057	Melt Pressure Input flexotemp® MPI 02
025 052-2	Digital In-/Output Interface, Current Input flexotemp® DIO16CI
025 052-3	Digital In-/Output Interface, Current Input flexotemp® DIO16CI SPL
025 055	Digital Output Interface Relay flexotemp® DO 08 R
025 055-1	Digital Output Interface flexotemp® DO 16
025 056	Valve Control Module flexotemp® VC 02
025 056-1	Valve Control Module flexotemp® VC 04
025 100	Current Transducer Interface flexotemp® CANCT
025 100-1	Current Transducer Interface flexotemp® CANCT 400 A
	Current Transducer Interface flexotemp® CANCT SPL
025 101	Voltage Transducer Interface flexotemp® CANVT
025 103	Digital In-/Output Interface flexotemp® CANIO 08
025 102	Analog Input Interface flexotemp® CANAIN 08 TCPT/TCPT/24VDC
025 106	Zero Crossing Detection flexotemp® ZCD
025 201	Digital In-/Output Interface flexotemp® MC 08
025 200	Digital Output Module flexotemp® SMA 09
025 202	Digital Output Module flexotemp® SMA 06G

Order number	Article description
025 203	Digital Output Module flexotemp® SMA 09G
020 322-03	sysTemp® Servo Valve Module SMV 04
020 323	sysTemp® Output Module SMAO 04

7.2 Version History

Version	Date	Changes
1.01.05	2/11/2013	In detail the following amendments were made: ▪ New modules DO16, VC04, PT08-3, PT16-3 ▪ Chapter address scan activated manually added
1.01.04	10/29/2010	First release English version based on German version 1.01.03)
1.01.03	08/13/2010	Amendments of operating instructions for flexotempMANAGER software version 1.02.02 In detail the following amendments were made: ▪ Amendments concerning translation ▪ Convert allocation for SMA09G ▪ "Text corrections SP09/10/23-28, P082/83/84, Input->Eingang
1.01.02	01/25/2010	Amendments of operating instructions for flexotempMANAGER software version 1.02.00 In detail the following amendments were made: ▪ Additional and continuative documents updated ▪ List of ordering designations updated ▪ PCU PNIO implemented ▪ For chapter memory cards default file names amended ▪ For chapter input functions - reduce zone X to 2. setpoint value amended
1.01.01	10/30/2009	Amendments of operating instructions for flexotempMANAGER software version 1.01.00 In detail the following amendments were made: ▪ List of ordering designations updated ▪ CAN connection BE plug
1.01.00	12/05/2008	Amendments of operating instructions for flexotempMANAGER software version 1.00.00 In detail the following amendments were made: ▪ Show component DIO16CI in-/outputs as X2/X3 ▪ Export for memory card revised ▪ Termination of CAN-Bus amended
1.00.00	09/29/2008	First publication. Valid for flexotempMANAGER software version 0.9.13. Meusburger Deutschland GmbH Voltastraße 2 68519 Viernheim Germany Tel. +49 6204 6069 0 www.meusburger.com office-de@meusburger.com