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Operating instructions

Bus module BCM 400..B2/B3 PROFINET/EtherNet/IP for BCU 4xx



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Safety

Please read and keep in a safe place



Please read through these instructions carefully before installing or operating. Following the installation, pass the instructions on to the operator. This unit must be installed and commissioned in accordance with the regulations and standards in force. These instructions can also be found at www.docuthek.com.

Explanation of symbols

■, **1**, **2**, **3**... = Action
 ▷ = Instruction

Liability

We will not be held liable for damage resulting from non-observance of the instructions and non-compliant use.

Safety instructions

Information that is relevant for safety is indicated in the instructions as follows:

DANGER

Indicates potentially fatal situations.

WARNING

Indicates possible danger to life and limb.

! CAUTION

Indicates possible material damage.

All interventions may only be carried out by qualified gas technicians. Electrical interventions may only be carried out by qualified electricians.

Conversion, spare parts

All technical changes are prohibited. Only use OEM spare parts.

Changes to edition 04.19

The following chapters have been changed:

- Commissioning
- Assistance in the event of malfunction
- Certification

Checking the usage

The bus module BCM 400 is used as a communication interface for burner control units BCU 4xx for connection to a fieldbus interface via PROFINET or EtherNet/IP.

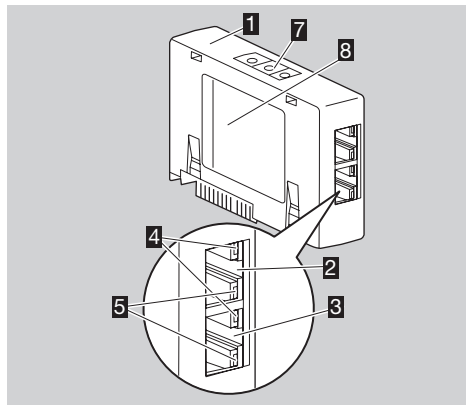
Networking via the fieldbus enables BCU 4xx units to be controlled and monitored by an automation system (e.g. PLC). The communications network must be protected against unauthorized access.

This function is only guaranteed when used within the specified limits – see page 5 (Technical data). Any other use is considered as non-compliant.

Type code

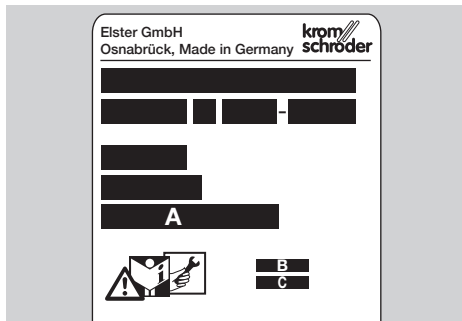
Code	Description
BCM	Bus module
400	Series 400
S0	Standard communication
S1	SafetyLink
B1	PROFIBUS DP
B2	PROFINET
B3	EtherNet/IP
B4	Modbus TCP
/1	9-pin D-Sub
/3	Two RJ45 sockets
-0	–
-3	Three-point step control via bus

Part designations



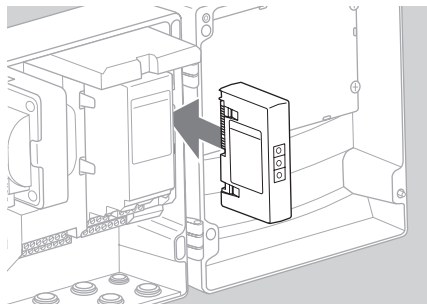
- 1** BCM../3 with RJ45 sockets
- 2** RJ45 socket (port P1) for connecting to the bus communications system
- 3** RJ45 socket (port P2) for connecting to the bus communications system
- 4** Green LED
(to indicate a connection: off = no connection, on = connection, flashing = data transfer)
- 5** Yellow LED
(to indicate the transfer rate: on = 100 Mbit, off = 10 Mbit)
- 7** Code switches
- 8** Type label

MAC address (**A**) and ambient temperature (**B + C**) – see type label.



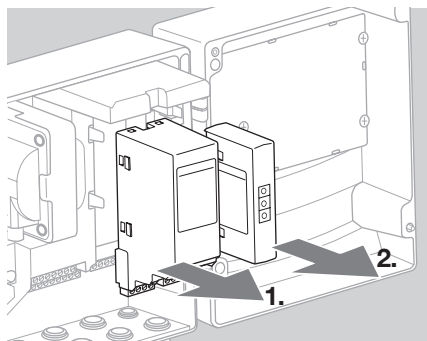
Installation

- 1** Disconnect the BCU from the electrical power supply.
- 2** Open the cover of the BCU.
- 3** Insert the bus module in the slot provided.



Replacement

- 1** Disconnect the BCU from the electrical power supply.
- 2** Open the cover of the BCU.
- 3** Remove the connection plug from the power and bus module.
- 4** Remove the modules in the following order to facilitate handling:
 - 1.** Power module,
 - 2.** Bus module.



▷ Installation of the modules in reverse order.

Wiring

- 1** Disconnect the system from the electrical power supply.
- Use only cable and plug components which comply with the appropriate fieldbus specifications.
- Use shielded RJ45 plugs.
- Cable length: max. 100 m between 2 subscribers.
- PROFINET installation guidelines, see www.profinet.com.
- Ethernet installation guidelines, see www.odva.org.
- Installation of the communications network pursuant to IEC 61918.
- 2** Connect the BCM 400 to the fieldbus on an automation system.
- Protect the communications network against unauthorized access.

Commissioning

WARNING

Risk of explosion! Do not enable the BCM and control unit (BCU) for operation until the parameter settings and wiring are correct and the faultless processing of all input and output signals has been ensured.

In the event that the bus communication is faulty or interrupted, or the communications data is invalid, or during initialization, the signals received by the controller are interpreted as "0". If the control unit is activated using the inputs at the terminals during this time, the normal program runs. Be sure to take the settings of parameters A085 to A089 into account.

WARNING




Danger through uncontrolled burner start.

The control signals for start and external air valve have an OR link between the bus and input terminals. The BCU may start the burner if there is an active signal on the bus or terminal.

Depending on the bus module version (BCM..B2 or BCM..B3), fieldbus communication can be configured using the engineering tool of the automation system or using BCSOft.

BCM..S1 can only be commissioned using BCSOft. Further information can be found in TI BCU 46x or BCU 480.

- The BCSOft operating instructions and software can be downloaded from www.docuthek.com.
- 1** Check the code switch settings (001 to FEF) on the BCM for communication between BCSOft and the control unit via Ethernet.
- Each code switch setting combination may only exist once within the fieldbus system.

- Each device name/network name and each IP address may only be allocated once within the fieldbus system.
- **PROFINET:** a device within the fieldbus system can be identified using the subscriber flash test (display shows  with alternately highlighted segments).
- For instructions on commissioning the control unit, see operating instructions "Burner control unit BCU 46x, 480".
- If the fault message  to  flashes in the control unit's display, fieldbus communication cannot be commissioned, see also page 4 (Assistance in the event of malfunction). The control unit can continue to be operated via its digital inputs. Be sure to take the settings of parameters A085 to A089 into account.

BCM..B2 (PROFINET)

- All the device-specific parameters for the control unit (BCU) are saved in the device master data file (GSD): download the device master data file (GSD) from www.docuthek.com.
- Read the GSD file into the engineering tool of the automation system and complete the network configuration.
- The steps required for this are described in the instructions for the engineering tool.
- 2** Connect voltage to the BCU.
- 3** Configure the bus communication.
- **Using the engineering tool of the automation system:** enter the device name for the control unit.
- **Using BCSOft:** enter the network name, IP address, subnet mask and standard gateway for the control unit.
- Only when the device name/network name has been entered, does the control unit receive unique identification in the PROFINET IO system.
- On the control unit, parameter A080 must be set to 1 or 2 so that a device name/network name can be entered for the BCM, see also page 4 (Fieldbus configuration (parameter A080)).

BCM..B3 (EtherNet/IP)

- All the device-specific parameters for the control unit (BCU) are saved in the electronic data sheet file (EDS): download the EDS file from www.docuthek.com.
- 2** Read the EDS file into the engineering tool of the automation system and complete the network configuration.
- The steps required on the controller are described in the instructions for the engineering tool.
- 3** Connect voltage to the BCU.
- 4** Configure the bus communication.
- Enter the following data via the engineering tool of the automation system or BCSOft: network name, IP address, subnet mask and standard gateway for the control unit.

Fieldbus configuration (parameter A080)

- ▷ Depending on the setting of parameter A080, fieldbus communication may take place with or without an address check.
- ▷ Check the value of parameter A080 using BCSoft and adjust it if necessary.

Parameter	
No.	Name
	Possible values for bus communication
	Fieldbus communication
00	0 = Off
	1 = With address check
	2 = No address check

- ▷ For further instructions on setting the parameters, see BCU 46x, 480 operating instructions, section entitled "Adjustment".

Parameter A080 = 0:

Fieldbus communication Off

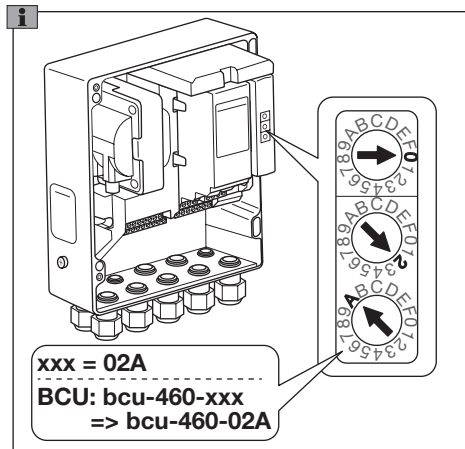
- ▷ Fieldbus communication is switched off. Access to the unit via Ethernet is still possible using BCSoft.

Parameter A080 = 1:

Fieldbus communication with address check

▷ EtherNet/IP

- A fixed valid IP address is allocated using the DHCP server, the engineering tool or BCSoft.
 - ▷ The device name/network name on delivery is: e.g. for BCU 460: "bcu-460-xxx" ("not-assigned-bcu-460-xxx" if configured using the engineering tool).
- The sequence xxx stands for the address set on the code switches of the BCM 400 (xxx = address in the range 001 to FEF).



- ▷ The expression "not-assigned-" must be deleted.
- ▷ An individual name (e.g. "Zone1-bcu-460-xxx") may precede the device name/network name (e.g. bcu-460-xxx).
- ▷ The device name must at least consist of the expression:
e.g. for BCU 465: "bcu-465-xxx".

- ▷ The address on the BCM set on the code switches must be identical to the address (xxx) entered in the automation system's network configuration.
- ▷ After the code switch settings have been changed, the control unit must be switched off and on again to enable the new address setting.

5 Start the network communication.

- ▷ The BCU powers up. If the IP address is valid, the program can be started.

Parameter A080 = 2:

Fieldbus communication without address check

- ▷ The device name/network name can be selected as required.
 - ▷ **EtherNet/IP:** if the IP address is invalid, the BCU automatically starts in DHCP mode so as to avoid network conflicts. The IP address can be allocated by the DHCP server or engineering tool.
- 5 Start the fieldbus communication.

Assistance in the event of malfunction

⚠ DANGER

Electric shocks can be fatal! Before working on possible live components, ensure the unit is disconnected from the power supply.
Fault-clearance must only be undertaken by authorized trained personnel.

- ▷ Faults may be cleared only using the measures described below.
- ▷ If the control unit (BCU) does not respond even though all faults have been remedied: remove the unit and return it to the manufacturer for inspection.
- ▷ If a fault message (n0, n1, n2, n3 or n4) is active, the control unit can continue to be operated via its digital inputs.

? Faults

! Cause

• Remedy



? The display on the control unit blinks and indicates n0.

- ! BCU waits for connection with the automation system controller.
- Check whether the controller is switched on.
- Check the network wiring.
- Check the controller's network configuration.
- Check whether the device name/network name in the network configuration is the same as the BCM address setting.

- Check whether the device name/network name in the network configuration is the same as the device name saved in the control unit.



? The display on the control unit blinks and indicates n1.

- ! An invalid address has been set on the BCM.
- ! The address check has been activated on the control unit by setting parameter A080 = 1.
- Check whether the BCM address is in the permitted address range (001 to FEF).
- Check the value of parameter A080 and adjust it if necessary.
- Adjust the code switch settings on the BCM to the device name assigned in the network configuration.



? The display on the control unit blinks and indicates n2.

- ! The BCM has received an incorrect configuration from the controller.
- Check whether the appropriate GSD/EDS file has been read into the automation system's engineering tool.
- Check the device configuration.



? The display on the control unit blinks and indicates n3.

- ! The device name for the control unit (BCU) in the engineering tool is invalid or has not been entered.
- ! The address check has been activated on the control unit by setting parameter A080 = 1.
- ▷ Device name on delivery:
e.g. for BCU 460 = **not-assigned-bcu-460-xxx** (**xxx** = address in the range **001 to FEF**).
- ▷ The device name must at least consist of the expression:
e.g. for BCU 460 = **bcu-460-xxx**.
Depending on the control unit (BCU) in use, the default value of the address will change, see also page 4 (Parameter A080 = 2: Fieldbus communication without address check).
- Delete the expression "**not-assigned-**" in the engineering tool or replace it with an individual name (e.g. **Furnacezone1-**).
- Check whether the device name in the network configuration is the same as the device name saved in the control unit.

- Check the value of parameter A080 and adjust it if necessary.



? The display on the control unit blinks and indicates n4.

- ! The controller is set to Stop.
- Start the controller.



? The display on the control unit blinks and indicates E b E.

- ! Internal communication with bus module has suffered a fault.
- Connected control elements must be equipped with protective circuits in accordance with the manufacturer's instructions.
- ▷ This prevents high voltage peaks which can cause malfunctioning of the BCU.
- Use interference-suppressed terminal boots (1 kΩ).
- If the fault cannot be remedied by doing this, remove the unit and return it to the manufacturer for inspection.
- ! Bus module is defective.
- Replace the bus module.

For other control unit fault messages, see BCU 46x, 480 operating instructions, section entitled "Assistance in the event of malfunction".

Technical data

Ambient conditions

Avoid direct sunlight or radiation from red-hot surfaces on the unit.

Avoid corrosive influences, e.g. salty ambient air or SO₂.

The unit may only be stored/installed in enclosed rooms/buildings.

This unit is not suitable for cleaning with a high-pressure cleaner and/or cleaning products.

Ambient temperature:

-20 to +70°C (-4 to +158°F),

no condensation permitted.

Transport temperature = ambient temperature.

Storage temperature: -20 to +70°C (-4 to +158°F).

Enclosure: IP 20 pursuant to IEC 529.

Installation location: min. IP 65 (for installation in BCU 4xx).

Permitted operating altitude: < 2000 m AMSL.

Mechanical data

Dimensions (W × H × D):

96 × 63 × 23 mm (3.78 × 2.48 × 0.91 inch).

Weight: 0.3 kg.

Electrical data

Power consumption: 1.2 VA.

Power loss: 0.7 W.

Designed lifetime

Max. service life under operating conditions:

20 years after date of production.

Logistics

Transport

Protect the unit from external forces (blows, shocks, vibration).

Transport temperature: see page 5 (Technical data).

Transport is subject to the ambient conditions described.

Report any transport damage on the unit or packaging without delay.

Check that the delivery is complete, see page 2 (Part designations).

Storage

Storage temperature: see page 5 (Technical data).

Storage is subject to the ambient conditions described.

Storage time: 6 months before using for the first time. If stored for longer than this, the overall service life will be reduced by the corresponding amount of extra storage time.

Packaging

The packaging material is to be disposed of in accordance with local regulations.

Disposal

Components are to be disposed of separately in accordance with local regulations.

Certification

ODVA compliant

EtherNet/IP[®]
ODVA

Scan of the Declaration of conformity (GB) – see www.docuthek.com

PROFIBUS User Organization

The PROFINET IO device BCU 4xx with BCM 400 has successfully passed the certification tests, according to certificate No. Z12594.

Contact

If you have any technical questions, please contact your local branch office/agent. The addresses are available on the Internet or from Elster GmbH.

We reserve the right to make technical modifications in the interests of progress.

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