

## Features

- ETX Geode LX800 CPU
- aluminum housing: 110 x 100 x 215mm<sup>3</sup>
- 1x COM (add. 3x COM: internal)
- LCD operating unit with controller
- CompactFlash<sup>®</sup> slot
- extended temperature range -25..+70°C
- power supply 10-36V, electrically isolated
- optional: 4x CAN (max. 1Mbit, Vektor-DBC format)

## Applications

- industrial controls
- supervision unit for AD, DIO
- data logger for motor vehicle applications
- automotive applications



The **ePCII-QUAD** is a compact embedded PC

### ... based on ETX ...,

which was developed especially for the industrial and automotive environment.

For instance a typical application is the control and supervision of automats (e.g. vending machines), machines or vehicles.

In the basic set-up an

### ... ETX-CPU module ...

is used featuring all PC functions and providing RAM and a

### ... CompactFlash<sup>®</sup> slot ... .

The power supply is

### ... 10-36V DC ...

and electrically isolated. For the PC system itself 5V/4A are provided. An external 230V AC power supply is available.

The **ePCII-QUAD** is mounted into an aluminum housing and impresses by its compactness. On the front side an

### ... intelligent LCD display unit ...

is integrated, which can freely be operated. Four keys allow the control of basic PC functions.

Before turning on and during operation the  $\mu$ -controller of the LCD display

### ... checks the temperature ... .

If the values are beyond a valid range the PC will not be booted or will be shut down.

If certain defined values are exceeded during operation a warning is shown and, if necessary, the PC is shut down.

### ... Two digital inputs and two digital outputs ...

are led out for controlling purposes (e.g. connection of fan/heater).

Of course, the connection of a keyboard, mouse or monitor to the **ePCII-QUAD** is possible.

Depending on the application the operating systems MS-DOS, Linux or Windows<sup>®</sup> can be installed.

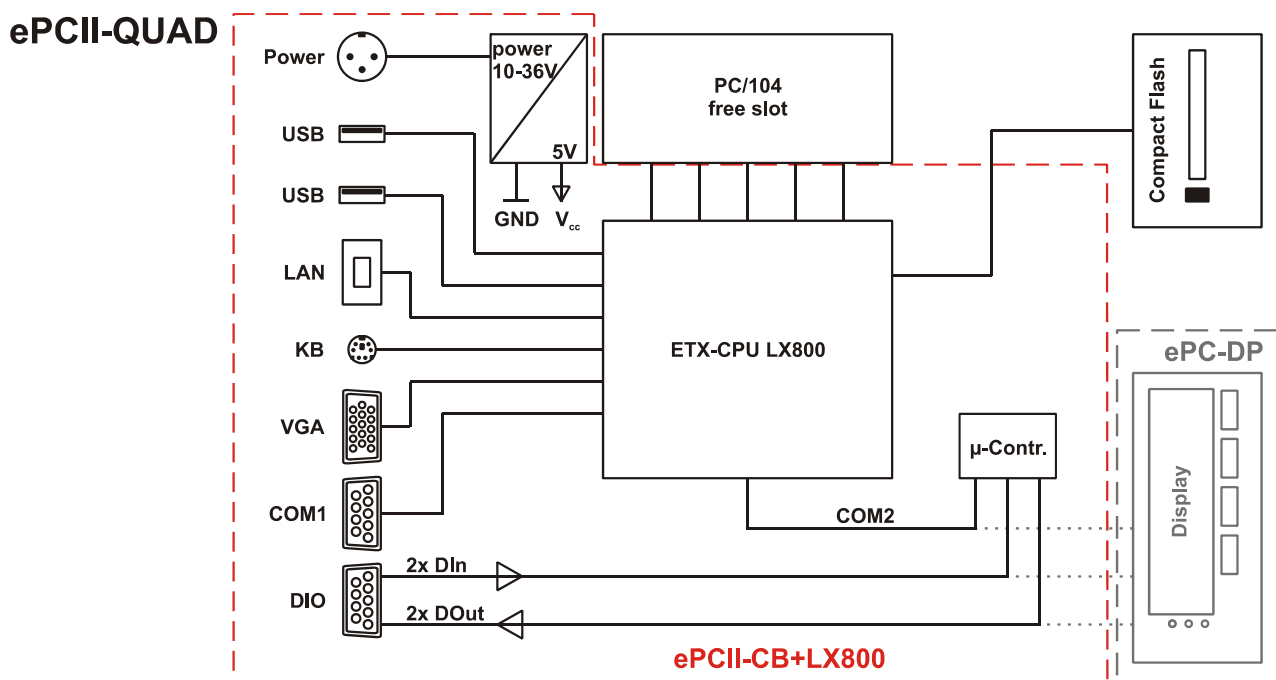
Some components, like the LCD operator unit or the carrier board are available as single products, as well as various PC accessories.

A wide range of PC/104 measuring cards allows for the individual equipment of the **ePCII-QUAD**.

For further information please visit our website at:

<http://www.bmcm.de>

## 1 Block diagram



There are several hardware components integrated in the PC, which are available as single products (see chapter 4). For further information please see the relevant data sheet.

- Extended carrier board **ePCII-CB+LX800**: ETX-Geode LX800 CPU, power supply with electrical isolation, PC/104 slot for measuring cards, various interfaces, components for basic PC functions
- Intelligent LCD display **ePC-DP**: backlit display, 4 keys, 3 LEDs, infrared receiver, temperature sensor, command set for programming

The PC/104 slot on the carrier board allows for equipping with additional PC/104 cards (see chapter 4.4):

- PC/104 measuring card **PC104-AD12/16**: 16x Analog IN ( $\pm 10V$ ,  $\pm 5V$ ,  $\pm 2V$ ,  $\pm 1V$ ), 12/16 bit; 2x Analog OUT ( $\pm 10V$ ), 12 bit; 32x Digital I/O (2x 16 bit)
- PC/104 digital I/O card **PC104-PIO48**: 48 (6x 8 bit) Digital I/O
- PC/104 interface card **PC104-CANCOM**: 4x CAN, 2x COM
- PC/104 interface card **PC104-CAN**: 4x CAN
- PC/104 interface card **PC104-COM**: 2x COM
- PC/104 backplane **BP104**: backplane for 8x MAL miniature amplifiers

## 2 Start-up procedure

According to your demands connect the external standard hardware (e.g. monitor, keyboard, mouse) to the appropriate connectors of the **ePCII-QUAD** (see chapter 4.7 - 4.9).

Depending on the interfaces (e.g. CAN, COM, LAN, USB) you use, attach the cables to the respective connectors (e.g. CAN 1..4, COM1, DIO, LAN, USB) of the **ePCII-QUAD**.

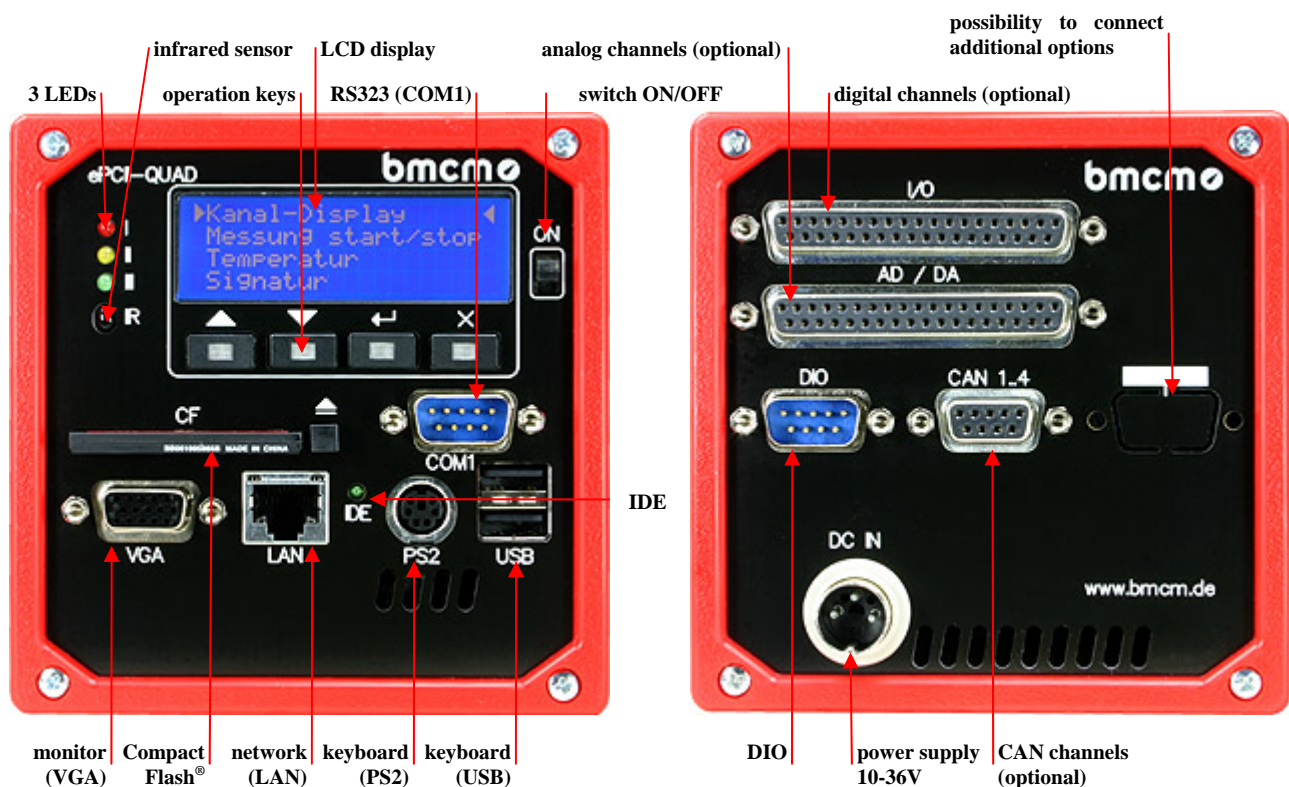
Apply power (10-36V DC) at the 3-pole DIN plug or at the pin plug with the labeling "DC IN". A 70W power supply (*ZU-PW70W*) is available as accessory. After turning on (with "ON"-switch or via  $Z_{on}$  line, see chapter 4.6) the display is lit and the **ePCII-QUAD** boots up.



**Various connecting cables and PC components are available as accessories.**

### 3 Connections and operating controls

The provided interfaces of the **ePCII-QUAD** can be reached at various male and female connectors on the front and the back side of the PC. Great emphasis was put on using common standard connections and assignments.



If the **ePCII-QUAD** is extended with additional PC/104 interface cards the corresponding Sub-D connectors can be mounted at the back of the device (see chapter 3.11). For pin assignment please see the relevant data sheet.



The functions and operating of the LCD display, the 3 LEDs (I-III) on the left, the 4 keys, the switch and the use of an infrared remote control is described in the data sheet of ePC-DP, as these operating elements are controlled by the intelligent display.

#### 3.1 CompactFlash® unit

The integrated CompactFlash® technology plays an important role to increase the compactness, mobility and flexibility of the **ePCII-QUAD**.

For high amounts of data CompactFlash® cards with a storage capacity of 2GB at the maximum can be used. Those are available as accessory (z. B. *ZU-CF2GB*).



To avoid any loss of data or damage of the memory card insert or remove the CompactFlash® card only at power-off.

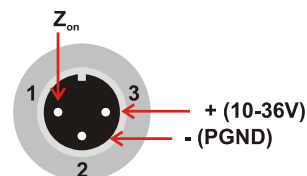
### 3.2 LED "IDE"

The LED labeled "IDE" in the middle of the device front signalizes the access to the CompactFlash<sup>®</sup> card.

### 3.3 Power supply (10-36V) DC IN

The **ePCII-QUAD** requires a power supply within the range of 10-36V. Connect the power (e.g. *ZU-PW70W*) to the phone jack or to the 3-pole DIN plug with the marking "DC IN" at the back of the device.

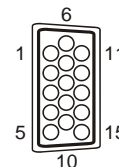
In addition the  $Z_{on}$  line is lead out to pin 1 of the 3-pole DIN plug. Via the  $Z_{on}$  line the PC can be booted up.



For the  $Z_{on}$  line at pin 1 9-36V DC with at least 100mA are needed.

### 3.4 VGA

The monitor is connected at the 15-pole Sub-D socket placed at the device front. It is a VGA connection with standard assignment.



### 3.5 PS2

The connector of the keyboard is designed as a PS2 connection. The PS2 socket with standard assignment is located on the front side of the **ePCII-QUAD**.



### 3.6 USB

Two USB sockets are lead out to the front of the device for keyboard connection. They comply with the USB standard.



### 3.7 LAN

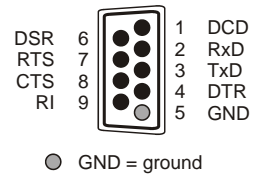
The **ePCII-QUAD** is provided with a network connector (Ethernet 10/100MBit), which is a Twisted Pair connection (RJ45) at a LAN socket with standard assignment.



### 3.8 COM1

The COM1 interface can be reached at the 9-pole Sub-D plug on the front side of the **ePCII-QUAD**. The pin assignment corresponds to the standard of serial RS232 interfaces. Other COM interfaces are for internal use only.

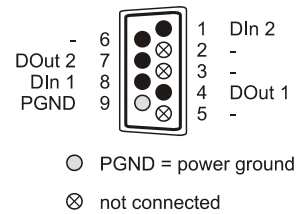
Pin	COM1
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI



### 3.9 DIO

Two digital channels are lead out at the 9-pole Sub-D plug labeled "DIO". Here, for example, a USV or an external device can be connected. In case of extreme temperatures an additional fan or heater can be installed at the outputs.

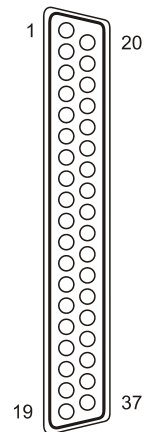
Pin	DIO
1	DIn 2 (digital input 2)
2, 3	-
4	DOut 1 (digital output 1)
5, 6	-
7	DOut 2 (digital output 2)
8	DIn 1 (digital input 1)
9	PGND (GND for DIn / DOut)



### 3.10 Analog and digital channels (optional)

Two 37-pole Sub-D female connectors labeled "I/O" and "AD/DA" are provided on the back side of the ePCII-QUAD. If the PC was equipped with a PC/104 measuring card (e.g. PC104-AD12/16, PC104-PIO48, see chapter 4.4) or an amplifier system (e.g. BP104), the analog and digital inputs and outputs can be reached via these connectors.

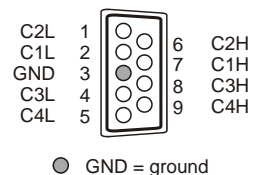
For the pin assignment of the 37-pole Sub-D female connector please see the data sheet of the integrated hardware.



### 3.11 CAN (optional)

If the PC is equipped with an optional CAN interface card (e.g. PC104-CAN, PC104-CANCOM, see chapter 4.4) 4 CAN channels can be connected at the 9-pole Sub-D socket of the ePCII-QUAD labeled "CAN 1..4".

Pin	CAN1..4
1	C2L
2	C1L
3	GND
4	C3L
5	C4L
6	C2H
7	C1H
8	C3H
9	C4H

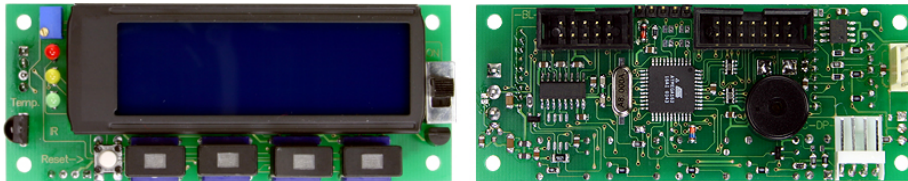


## 4 Components

The **ePCII-QUAD** comprises different functional groups, which are described in the following. In addition various interface cards and measuring cards in PC/104 format are available.

Technical details about the single functional parts are included in the relating data sheets. For information about additional options visit the internet at [www.bmcm.de](http://www.bmcm.de).

### 4.1 Intelligent LCD display ePC-DP



The **ePCII-QUAD** features an LCD display unit **ePC-DP**. The back-lit display edits 4 lines with max. 20 characters per line. Additionally provided are 4 keys to operate and configure the display. 3 LEDs indicate the current state of the device. An infrared receiver allows using a remote control.

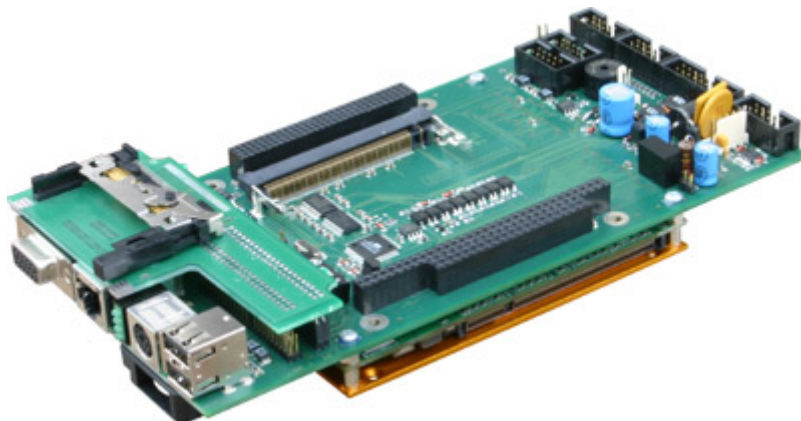
The PC temperature is monitored by an integrated temperature sensor. If the permitted temperature range the PC is shut down or not booted for protection.

Integrated in the intelligent display **ePC-DP** is a  $\mu$ -controller, sending data via the RS232 interface (COM2) for controlling and configuration purposes between **ePCII-QUAD** and the display.

The command set used in the terminal program to communicate with the **ePC-DP** consists of standard VT100 commands as well as terminology specially developed for the **ePCII-QUAD** to incorporate both commonly accepted industrial standards and the individual characteristics of the device.

For detailed information about how to operate and program the **ePC-DP** please see the relating data sheet.

### 4.2 ETX carrier board ePCII-CB+LX800 with power supply



The integrated carrier board **ePCII-CB+LX800** is the central element of the **ePCII-QUAD**. Via various internal and external connections it is attached to the different components (CPU, display, keyboard, I/O cards), routes incoming signals and realizes basic PC functions (e.g. reset, basic supply by battery). A system connector in standard PC/104 technology allows for the connection of additional PC/104 cards (see chapter 4.4).

The carrier board provides a CompactFlash<sup>®</sup> slot. As a storage medium CompactFlash<sup>®</sup> cards with max. 2GB storage capacity can be used. These are available as accessory (e.g. *ZU-CF2GB*).

A power supply unit (10-36V DC) with galvanic isolation is integrated. Internally 5V/4A are provided to supply the CPU, the display **ePC-DP** and additional measuring cards (if connected).

For acoustic signals a beeper is available on the carrier board. A 3V Lithium battery supplies clock and RAM during off-state. A fan is included by default.

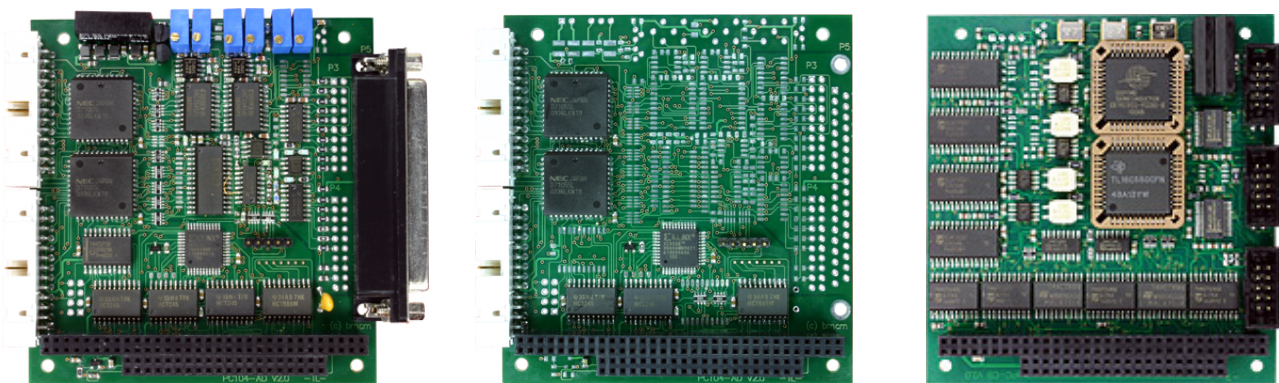
Two digital inputs and outputs (e.g. for fan/heater connection) can be reached externally at the 9-pole Sub-D plug. A keyboard is attached via a PS2 connection.

For detailed information about the connector functions and their pin assignment please see the data sheet of the same title.

### 4.3 ETX CPU

In the basic set-up an ETX Geode LX800 CPU by Congatec is used. For further information please see the relevant documentation of Congatec at [www.congatec.com](http://www.congatec.com).

### 4.4 PC/104 cards (optional)



To record analog or digital signals a measuring card (e.g. PC104-AD12/16, PC104-PIO48) can be integrated in the **ePCII-QUAD** on request. To provide the **ePCII-QUAD** with additional CAN and COM interfaces, various interface cards are available. All extension cards are implemented in PC/104 standard.

- PC104-AD12: 16 Analog In ( $\pm 10V$ ,  $\pm 5V$ ,  $\pm 2V$ ,  $\pm 1V$ ), 12 bit; 2 Analog Out ( $\pm 10V$ ) 12 bit; 32 Digital I/O (2x 16 bit)
- PC104-AD16: 16 Analog In ( $\pm 10V$ ,  $\pm 5V$ ,  $\pm 2V$ ,  $\pm 1V$ ), 16 bit; 2 Analog Out ( $\pm 10V$ ) 12 bit; 32 Digital I/O (2x 16 bit)
- PC104-PIO48: 48 Digital I/O (3x 16 bit, switchable in groups of 8)
- PC104-COM: 2x COM interfaces
- PC104-CAN: 4x CAN channels
- PC104-CANCOM: 4x CAN channels, 2x COM interfaces
- BP104: backplane for 8 MAL miniature amplifiers

For further information please see the relating data sheet.

## 5 Important notes for using the ePCII-QUAD

- The **ePCII-QUAD** is only suitable for extra-low voltages – please observe the relevant regulations! Only use an electrically isolated power supply unit (with CE).
- ESD voltages at open lines / connections may cause malfunction during operation.
- For reasons relating to EMC, the **ePCII-QUAD** must only be operated with housing closed.
- The device produces much heat. Therefore provide for a good dissipation at the outside!
- For cleaning use water and mild detergent only. The device is designed to be maintenance-free.
- The device must not be used for safety-relevant tasks. With the use of the product the customer becomes manufacturer by law and is therefore fully responsible for the proper installation and use of the product. In the case of improper use and/or unauthorized interference our warranty ceases and any warranty claim is excluded.



Do not dispose of the product in the domestic waste or at any waste collection places. It has to be either duly disposed according to the WEEE directive or can be returned to bmcm at your own expense.

## 6 Technical data ePCII-QUAD (typical at 25°C)

### • PC data

CPU (installed ex works):

PC interfaces:

Memory:

PC/104 slots:

PC module based on ETX standard: ETX Geode LX800 (Congatec), wattage app. 5W
VGA, PS2, 2x USB, LAN, 2x RS232 (COM2 internal only), 1x IDE internal to CF, PC/104 (internal)
RAM 256MB, CompactFlash® card (2GB) for CF slot
2 available slots for extension cards

### • Carrier board data (ePCII-CB+LX800)

External connectors:

Internal connectors:

Digital outputs:

Digital inputs:

power connection, LAN (Twisted Pair), 2x USB, 1x RS232, VGA, PS2, DIO
beeper, battery, fan, display (COM2)
2x DOut: optocouplers with semiconductor switch, 10-36V DC max. 0.5A DC
2x DIn: optocouplers, 0-5V = low, 10-36V DC = high

### • Display data (ePC-DP)

LCD:

Operating keys:

Remote control:

LEDs:

Power supply control:

LCD display for 4x20 characters with lighting
4 keys with lighting
with IR transmitter/receiver
3 LEDs to signalize diverse states
temperature control displayed when turning on the PC, ON/OFF control, integrated fan/heater control

### • General data

Power supply:

Protection:

Housing :

Protection type:

Dimensions:

CE standards:

ElektroG // ear registration:

Max. perm. potentials:

Temperature ranges (supervised):

Relative humidity:

Delivery:

for internal use optionally available:

for external use optionally available:

Guarantee:

10-36V DC, typ. 10W without additional load, max. 25W, electrically isolated by DC/DC converter
with 2A multi-fuse
aluminum housing with plastic frame
IP30
W x H x D: 110 x 110 x 215mm <sup>3</sup>
EN61000-6-1, EN61000-6-3, EN61010-1; for decl. of conformity (PDF) visit <a href="http://www.bmcm.de">www.bmcm.de</a>
RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
60V DC acc. to VDE, max. 1kV ESD on open lines
operating temp. -25°C..70°C, storage temp. -25..85°C
0-90% (not condensing)
product with case, description
PC/104 cards e.g. PC104AD12/16, PC104-PIO48, PC104-COM, PC104-CAN, PC104-CANCOM, MAL amplifier backplane BP104
AC power supply ZU-PW70W, CompactFlash® card ZU-CF2GB, CF card reader ZU-CFR, USB keyboard ZU-KBS, IR remote controls ZU-IRS/ZU-IRX, DIN rail set ZU-SCHI, several connecting cables, plugs and sockets
2 years with effect from sales date, damages at product resulting from improper use excluded