Data Sheet

PacDrive™
C200 / C200 A2 Controller

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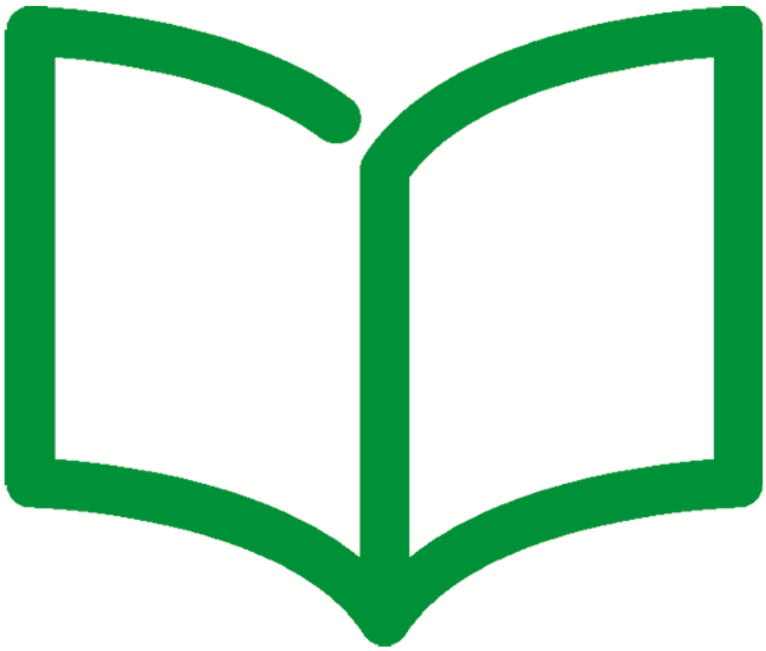

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1 Overview

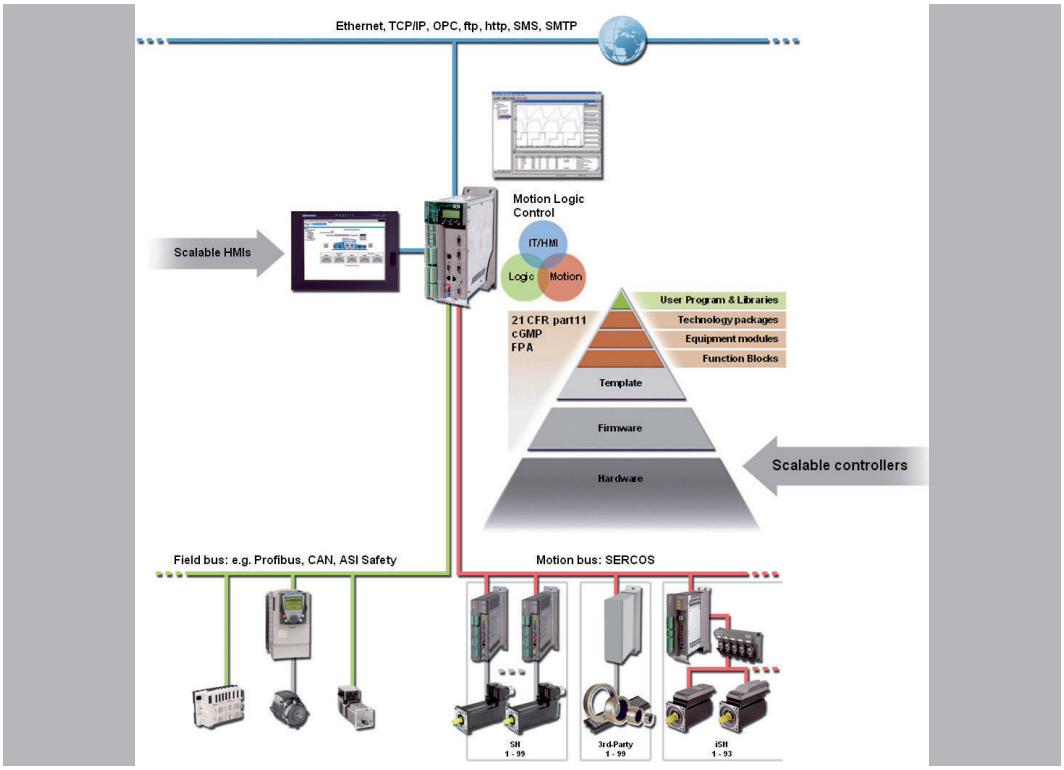


Figure 1-1: PacDrive System Overview

C200 / C200 A2 Controller

Controller based architecture

The PacDrive C200 Controller is the smallest controller solution that uses the real-time operating system VxWorks. VxWorks provides logic and motion functions for a production or packaging machine. A PacDrive Controller synchronizes, coordinates and generates the positioning functions for up to 8 servo drives, which are connected via the SERCOS bus interface.

Several standardized field bus interfaces are available: PROFIBUS DP, CAN, CANopen or DeviceNet. A variety of standard HMI systems, ranging from low-cost text displays to industrial PCs, can be used for the HMI functions.

The highlights:

- CPU: ST-PC VEGA, 128MB RAM
- Real-Time operating system: VxWorks
- IEC 61131-3 programming languages for PLC and Motion Control
- SERCOS interface
- Profibus DP, CAN, CANopen, DeviceNet, or Ethernet/IP
- Fast Touchprobe inputs
- Communication interfaces: RS 232, RS 485, Ethernet (TCP/IP)
- CompactFlash™ card (≥128 MB)
- Includes OPC server for Windows-based HMIs
- Teleservice via web server or modem

2 Technical data

2.1 Ambient conditions

Procedure	Parameters	Value	Basis
Operation	**Class 3K3**		**IEC/EN 60721-3-3**
	Ambient temperature	+5°C...+45°C	
	Condensation	Prohibited	
	Icing	Prohibited	
	Another water	Prohibited	
	Relative humidity	5% ... 85%	
Transport	**Class 2K3**		**IEC/EN 60721-3-2**
	Ambient temperature	-25°C...+70°C	
	Condensation	Prohibited	
	Icing	Prohibited	
	Another water	Prohibited	
	Relative humidity	5% ... 95%	
Long time storage in transport packaging	**Class 1K4**		**IEC/EN 60721-3-1**
	Ambient temperature	-25°C...+55°C	
	Condensation	Prohibited	
	Icing	Prohibited	
	Another water	Prohibited	
	Relative humidity	5% ... 95%	

Table 2-1: Ambient conditions PacDrive C200 Controller

2.2 Certifications

Certifications	CE, UL , cUL

Table 2-2: Certifications PacDrive C200 Controller

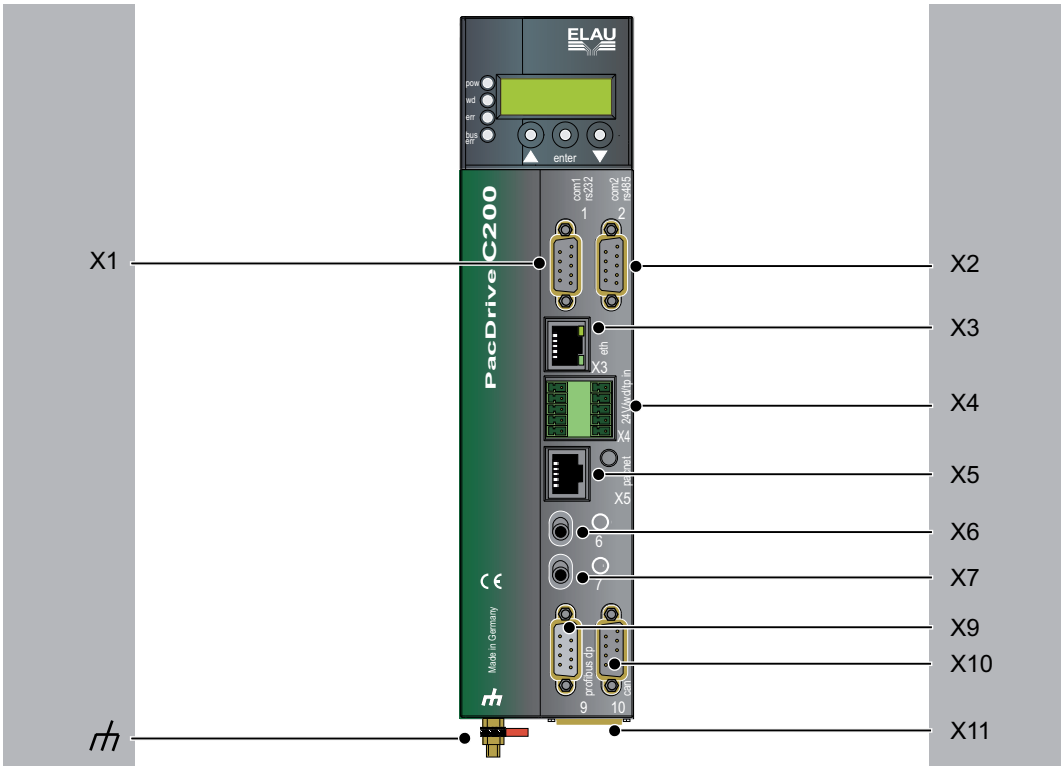
2.3 Mechanical and electrical data

Category	Parameters	Value
Product configuration	Type key C200 up to 8 SERCOS slaves (SERCOS node= MC-4,SCL, iSH)	PacDrive C200 / 10 / 1 / 1 / 1 / 00
	Type key C200 up to 2 SERCOS slaves	PacDrive C200 / A2 / 1 / 1 / 1 / 00
	Order number	C200 up to 8 SERCOS slaves: 13 13 02 60
		C200 up to 2 SERCOS slaves: 13 13 02 60-001
Processor	CPU	ST-PC VEGA
	RAM	128 MB
	L2 Cache	-
	NVRAM	128 kB
	CompactFlash™ card	≥128 MB
	Real time clock (RTC)	Yes (battery maintenance interval: 5 years)
	Watchdog	Yes (max. 60 V < 2 A)
	Diagnosis	Alphanumeric diagnosis display
		Status LEDs
Operating system	Real-time operating system	VxWorks
Programming languages IEC 61131-3		Instruction list (IL)
		Ladder diagram (LD)
		Function block diagram (FBD)
		Sequential function chart (SFC)
		Structured text (ST)
		Continuous function chart (CFC)
Interfaces	Serial interfaces:	COM1: RS232 (**X1**) COM2: RS485 (**X2**)
	Network connection	Ethernet (10/100 Base-T) (**X3**)
	Field bus connection	PROFIBUS DP Master/Slave (12 MBaud) (**X9**) or
		CAN (2.0A) or CANopen (**X10**)
	Real-time bus interface	SERCOS interface (16 MBaud) (**X6**, **X7**)
	PacNet interface	1 PacNet interface (**X5**
	Master encoder interface	1 SinCos master encoder or
		1 incremental master encoder (**X11**)
	HMI interface	RS485 (Modbus or PROFIBUS DP)
		HMI software tools: OPC server (for Windows NT/2000/XP or Windows CE)
	Diagnostic interface for remote maintenance	Modem
	Communications protocols	Http
		Ftp
		SMTP (E-Mail)
	Integrated trace recorder (software oscilloscope)	8 channels, resolution 1 ms
	Integrated data logger for diagnostic messages	27 kB

Category	Parameters	Value
Output	Actuator power	C200: 4 servo axes: SERCOS cycle time 2 ms
		C200: 8 servo axes: SERCOS cycle time 4 ms
		C200 / A2: 2 servo axes: SERCOS cycle time 2 ms
		C200 / A2: 2 servo axes: SERCOS cycle time 4 ms
		Max. of 255 parallel motion profiles possible
SPS output	Time for 1000 Bit instructions	90 µs
	Number of PLC processes	Unlimited
	Type of PLC processes	Continuous
		Periodic
		event-controlled
	Cycle time fast task	1 ms
	nominal I/O response time:	2 ms (read in data, process, set output)
Cam Switch Group	Number of cams	Max. 256
	Sequential circuit	Dynamic
	Outputs	Memory or digital outputs
	Inputs	External master encoder
		Virtual master encoder
		Axis position
	Processing time	1 ms
Digital inputs		None
Analog inputs		None
Interrupt inputs		None
Touchprobe inputs (X4)	Number	6 (IEC61131-2)
	Range U_{IN} 0 Voltage	DC 0 ... 6 V
	Range U_{IN} 1 Voltage	DC 20 ... 33 V
	Input data	IIN = 5 mA at UIN = 24 V
	Polarized	Yes
	Input filter TP0 to TP15	100 µs resolution
		10 µs at a cycle time of 1, 2, 4 ms
Digital outputs		None
Analog outputs		None
Additional digital and analog I/Os	Via field bus	Max. 3,584 bytes digital/analog inputs and
		Max. 3,584 bytes digital/analog outputs
		Max. number of stations: 126 (PROFIBUS)
Additional fast digital I/Os	Via PacNet	Max. 64 inputs and 64 outputs
Additional Touchp-robe inputs	Via PacNet	Max. 16 Touchprobe inputs
Power supply	Power supply unit	DC 24 V (-15% / +25%) / max. 0.5 A (without master encoder)
	Power consumption	Max. 12 W
	Uninterruptible Power Supply (UPS)	external
Dimensions	Dimensions packaging	DxWxH (mm): 300x90x400
Weight	Weight (with packaging)	1.7 kg (2.3 kg)
Protection class	Housing	IP 20
Isolation class	Degree of pollution	2

Table 2-3: Technical data PacDrive C200 Controller

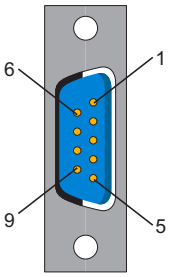
2.4 Electrical connections



Connection	Meaning	max. terminal cross-section [mm²]/ [AWG]	
X1	Com 1 (RS232)	0.25 mm²	-
X2	Com 2 (RS485)	0.25 mm²	-
X3	Ethernet connection	-	-
X4	Power supply, watchdog and Touchprobe inputs	1 mm²	28 - 16
X5	PacNet	-	-
X6	Motion bus SERCOS input *)	-	-
X7	Motion bus SERCOS output *)	-	-
X9	PROFIBUS db	0.25 mm²	-
X10	CAN	0.25 mm²	-
X11	Master encoder	0.25 mm²	-
⏚	Shielded connector		

Table 2-4: Connection overview PacDrive C200 Controller

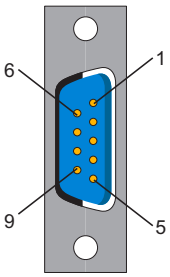
X1 - Com 1 (RS232)



Pin	Designation	Meaning	Range
1	DCD	Data Carrier Detect	
2	RxD	Receive Data	
3	TxD	Transmit Data	
4	DTR	Data Terminal Ready	
5	GND	Signal Ground	
6	DSR	Data Set Ready	
7	RTS	Request To Send	
8	CTS	Clear To Send	
9	RI	Ring Indicator	

Table 2-5: Connection X1

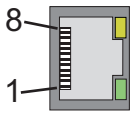
X2 - Com 2 (RS485)



Pin	Designation	Meaning	Range
1	+5 VM	Supply voltage	
2	TxD-	RS485 Transmit -	
3	TxD+	RS485 Transmit+	
4	RxD+	RS485 Receive +	
5	RxD-	RS485 Receive -	
6	GNDR	GND reference RS485	
7	-	Reserved	
8	GNDM	Supply voltage	
9	GNDR	GND reference RS485	

Table 2-6: Connection X2

X3 - Ethernet



Pin	Designation	Meaning	Range
1	Tx+	OutputTransmitData+	
2	Tx-	OutputTransmitData-	
3	Rx+	InputReceiveData+	
4	-	(PE)	
5	-	(PE)	
6	Rx-	InputReceiveData-	
7	-	(PE)	
8	-	(PE)	

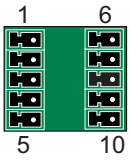
Table 2-7: Connection X3

Depending on the application, you will need different cables to connect the controller via the RJ-45 outlet.

Component A	Component B	required cable
PacDrive Controller	"Firm network" with RJ-45	Commercially available patch cable
PacDrive Controller	Hub	Commercially available patch cable
PacDrive Controller	PC	Crossed RJ-45 network cable

- In case of doubt, ask your network administrator.

X4 - Control voltage, Watchdog and Touchprobe inputs



Pin	Designation	Meaning	Range
1	DC +24 V	Supply voltage	-15% / +25%
2	DC 0 V	Supply voltage	
3	T.00	Touchprobe input 0	DC 20 ... 30 V
4	T.01	Touchprobe input 1	DC 20 ... 30 V
5	T.02	Touchprobe input 2	DC 20 ... 30
6	WD	Watchdog relay	
7	WD	Watchdog relay	
8	T.03	Touchprobe input 3	DC 20 ... 30 V
9	T.04	Touchprobe input 4	DC 20 ... 30 V
10	T.05	Touchprobe input 5	DC 20 ... 30 V
*) From insulating length l=9mm; for core cable ends length of the metal bush l=10mm			

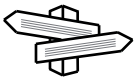
Table 2-8: Connection X4

CAUTION

SWITCHING OFF THE CONTROL VOLTAGE.

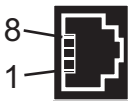
- Use a UPS to avoid loss of data or damage to flash disk.
- Switch off PacDrive Controller control voltage only when all files are closed.

Failure to follow these instructions can result in equipment damage.



Refer also to the EPAS-4 online help function **SysShutdown()**.

X5 - PacNet

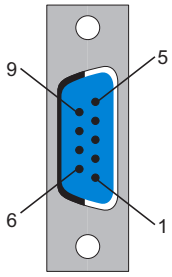


Pin	Designation	Meaning	Range
1	TxD+	OutputTransmit Data+	
2	TxD-	OutputTransmit Data-	
3	RxD+	InputReceive Data+	
4	TxC-	OutputTransmit Clock-	
5	TxC+	OutputTransmit Clock+	
6	RxD-	InputReceive Data-	
7	RxC+	InputReceive Clock+	
8	RxC-	InputReceive Clock-	

Table 2-9: Connection X5

Use only approved PacNet cables at the PacNet connection to avoid malfunction.

X9 - profibus dp



Pin	Designation	Meaning	Range
1	Shield	Shield	
2	-	Reserved	
3	RxD/TxD-P	Data P	
4	CNTR-P	Control signal P	
5	DGND	Signal ground	
6	VP	Supply voltage	
7	-	Reserved	
8	RxD/TxD-N	Data N	
9	-	Reserved	

Table 2-10: Connection X9

Connector

A PROFIBUS connector must be used to connect to the 9 pole PROFIBUS outlet because the bus terminal resistors are in this connector. The possible PROFIBUS connectors with different cable outlets are illustrated below.

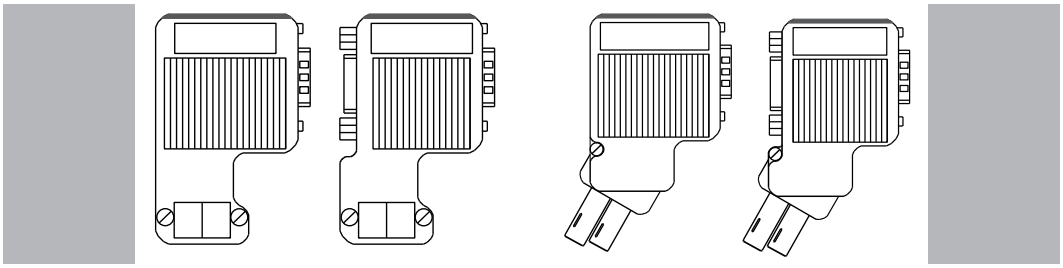


Figure 2-1: PROFIBUS connector

Bus terminal resistors

For the first and last bus nodes, the terminal resistors must be switched on. Otherwise data transmission will not function properly.
The shielding must be applied generously and on both sides.

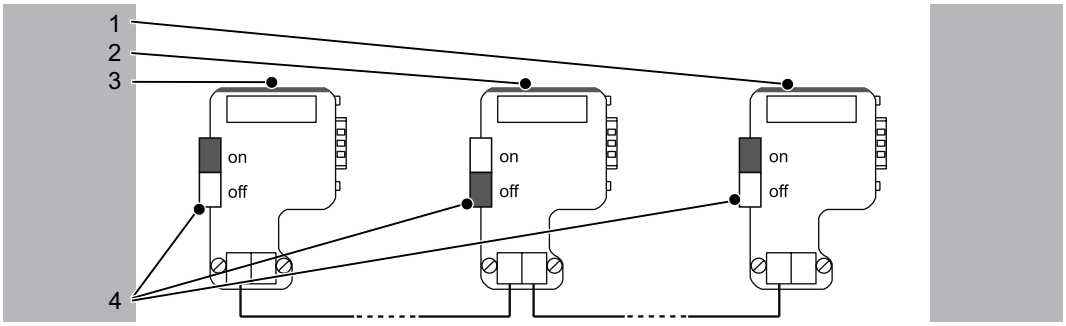
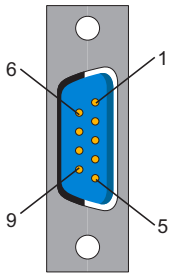


Figure 2-2: Position of the bus terminal resistors

1	Last bus slave
2	nth bus slave
3	First bus slave
4	Bus terminator

X10 - CAN



Pin	Designation	Meaning	Range
1	-	Reserved	
2	CAN_L	CAN bus line (low)	
3	GND	Ground	
4	-	Reserved	
5	-	reserved	
6	GND	Ground	
7	CAN_H	CAN bus line (high)	
8	-	Reserved	
9	-	Reserved	

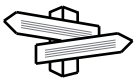
Table 2-11: Connection X10

CAUTION

MALFUNCTION AND DAMAGE TO FIELD BUS COMPONENTS ON SYNCHRONOUS OPERATION OF MULTIPLE FIELD BUSES

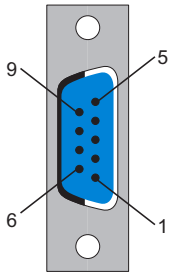
- Use only X9 **or** X10. The field bus connections X9/X10 are not electrically separated!
- **Do not** operate more than **one** field bus at a time.

Failure to follow these instructions can result in equipment damage.



An adapter is available for the connection to DeviceNet.

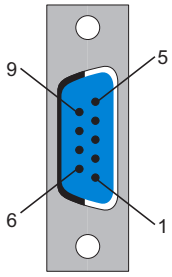
X11 - Master encoder (SinCos)



Pin	Designation	Meaning	Range
1	REFSIN	Sinus reference signal	
2	SIN	Sinus trace	
3	REFCOS	Cosine reference signal	
4	COS	Cosine trace	
5	+9 V	Supply voltage	
6	RS485-	Parameter channel	
7	RS485+	Parameter channel +	
8	SC_SEL	Encoder connected (bridge to GND)	
9	GND	Supply voltage	

Table 2-12: Connection X11 - Master encoder (SinCos)

X11 - Master encoder (incremental)



Pin	Designation	Meaning	Range
1	_UA	Track A	
2	UA	Track A	
3	_UB	Track B	
4	UB	Track B	
5	5 V	Supply voltage	
6	_UO	Track O	
7	UO	Track O	
8		reserved	
9	GND	Ground	

Table 2-13: Connection X11 - Master encoder (incremental)

CAUTION

PLUGGING IN/UNPLUGGING THE MASTER ENCODER PLUG WHEN SWITCHED ON

- Only unplug or plug in master encoder plug when off-circuit.
- Disconnect controller from the 24 V supply voltage.

Failure to follow these instructions can result in equipment damage.

2.5 Dimensions

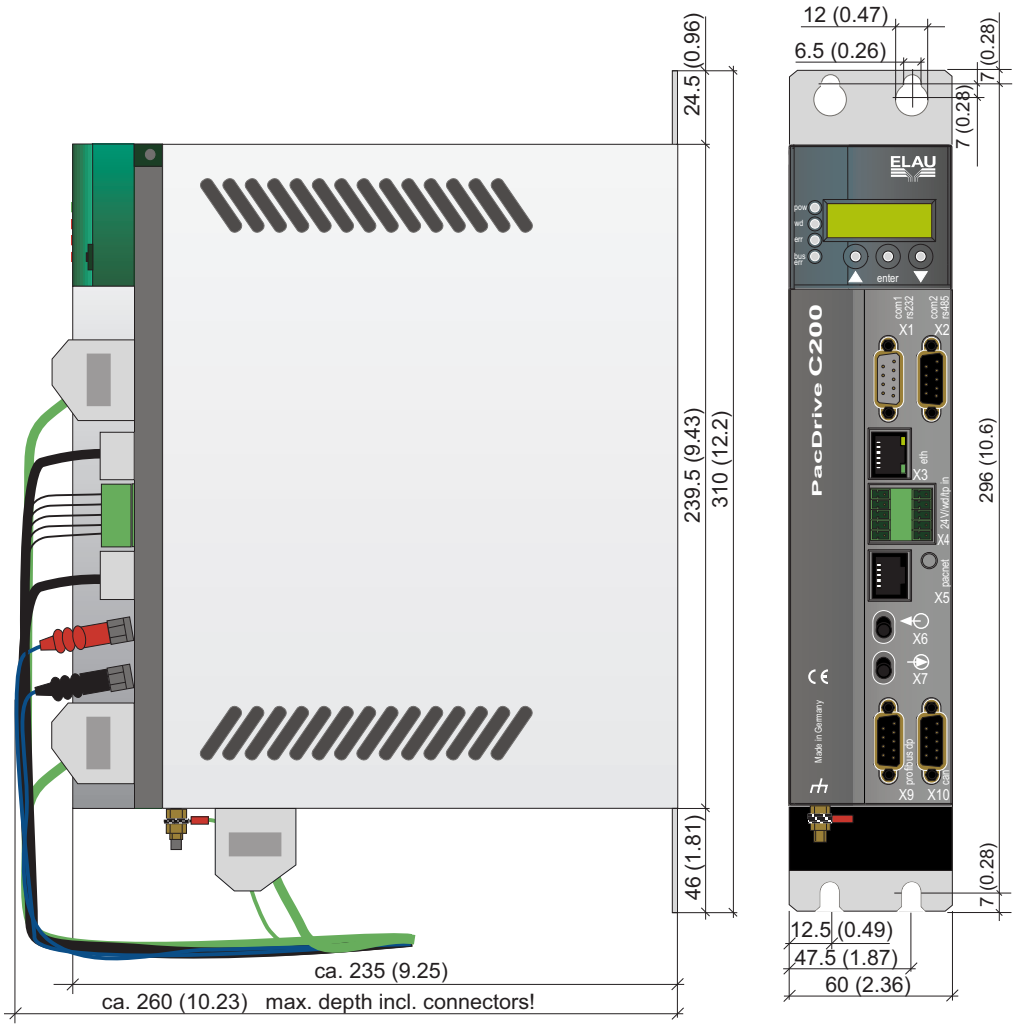
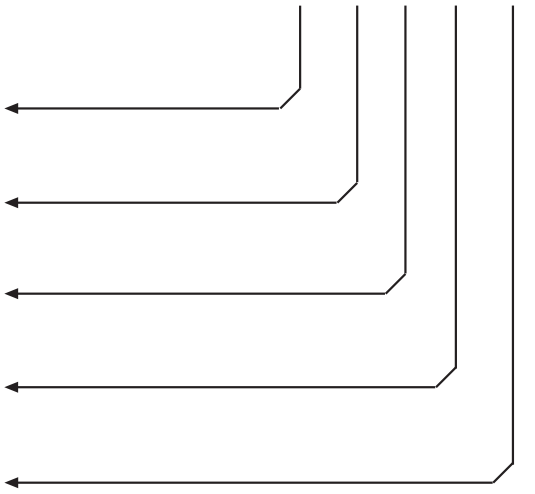


Figure 2-3: Dimensions PacDrive C200 Controller

3 Type code

Product ID code **C200 / 10 / 1 / 1 / 1 / 00**



HW-Variant

Processor
1 = ST-PC VEGA

RAM
1 = 128 MB

Flash memory
1 = 32 MB

Optional functions