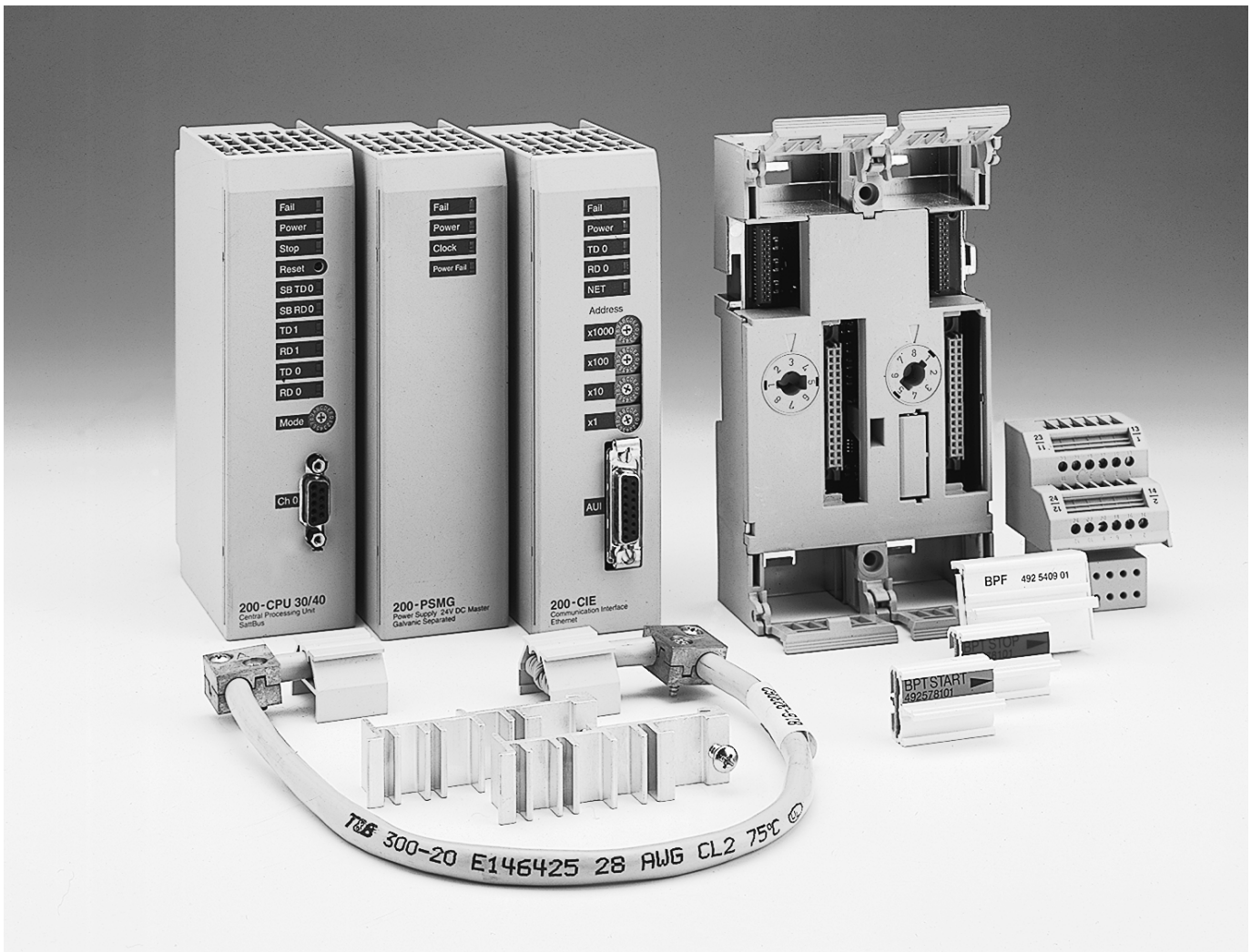
Series 200

Central System Units



The Series 200 platform is compact, modular and built around small backplanes which can be connected to suit the desired system configuration.

The Central System has interface units for communication to other systems and devices via serial channels (COMLI), ControlNet™, SattBus, Ethernet and PROFIBUS-DP.

The basic hardware consists of Central Processing Units, power supply units, backplanes and associated cables. The Series 200 units are used by both SattCon 200 and SattLine systems in various combinations.

The Series 200 Central Units deliver these main features:

- Compact and modular design making it simple to expand.
- Optimization for any specific application, through a choice of Central Processing Units delivering a comprehensive range of performance.
- Units connect to screw terminal blocks, reducing wiring, and thus simplifying installation and improving reliability.
- Reduced installation and maintenance costs through DIN rail mounting.
- Mechanical code keys prevent the units from being damaged during replacement.
- Extensive external communication support through serial communication (RS232 and RS485), ControlNet, SattBus, Ethernet and PROFIBUS-DP.

Central Processing Unit

The 200-CPU is a high performance 32 bit single board computer, available in different models. Most have a floating point processor (FPU), to improve calculations, and a SattBus interface.

All models have RAM memory and a real time clock, both with battery back-up. Two RS232 serial channels are also included on all types, except the 200-CPU50s, which have one RS232 channel for maintenance and service but no SattBus channel.

The power fail signal (PF) generated in the 200-PSMG power unit, is necessary for normal operation. A power loss brings the central processing unit to a power fail mode.

On the front of the unit is a start-mode switch to select different program modes, and a reset button to reset the system. The LEDs show status for program, power and communication.

A range of different CPUs are available for both SattCon 200 and SattLine configurations. Their memory size and performance vary. Please refer to the technical data for more information.

Backup Unit

The 200-BUP is a backup unit for the Series 200 system. The front of the unit has a slot for a “SmartMedia” memory card for information storage. This card is available with 4 or 8 Mbytes of memory.

The 200-BUP has Save, Load, Verify and Format functions. An “autoload” function is available for automatic loading of, for example, an application program to the control system after a power failure.

Five LEDs show power status, error detection and Load/Verify/Save activation.

Power Supply Units

The Series 200 system power supply units use an external 24 V DC supply and the generated output voltage (7–9 V DC, galvanically isolated) is used to create a regulated 5 V DC for the Central System and the Central I/O system. The output voltage is distributed to the units via backplanes and cables.

200-PSMG

The 200-PSMG is an internal master power supply unit and only one 200-PSMG can be used in a Central System. For higher capacity or power redundancy one or more 200-PSSG slave power supply units should be added.

The 200-PSMG has power fail circuitry (PF) for detection of power loss which senses a 24 V DC failure. The generated PF output is connected to the screw terminal block. Other units use this PF signal as an input. The PF signal must be connected to the CPU so the PF output status can be read by the application program.

The Central System bus clock-frequency is automatically set by the firmware in the CPU.

The LEDs show status for power, internal logic and clock.

200-PSSG

The 200-PSSG is a complementary power supply to the 200-PSMG for additional power requirements.

It has power fail circuitry (PF) to detect power loss by sensing 24 V DC failure. The PF output status can be read by the application program.

The LEDs show status for power and power fail.

Communication Interface

The communication interfaces are powered from the system bus.

All communication units interface to the Central System via the system bus.

200-CI232

The 200-CI232 has two non-isolated RS232 asynchronous serial channels with overvoltage protection. Connection takes place via two 9-pin female D-type connectors on the front or via the screw terminal blocks.

Six green LEDs show communication status. Another green LED indicates status of the internal power.

200-CI485G

The 200-CI485G has two opto-isolated RS485 asynchronous serial channels, available from the screw terminal blocks.

The unit converts data to/from serial format. The signals are galvanically separated (isolated) by optocouplers and converted to RS485 levels in the RS485 interfaces. All signals have protection against overvoltage.

It can be used for both half duplex 2-wire connection (with a common wire pair for receive and transmit), and full duplex 4-wire connection (with separate wire pairs for receive and transmit).

The 200-CI485G contains pull up/ down resistors for the communication wires on each channel. It also contains termination resistors and logic for selection of two or four wire communication.

It needs an external 24 V DC power supply for the two channels. This is then converted to another voltage and galvanically separated from the two channels.

Six green LEDs show communication status. Another green LED indicates status of the internal power.

200-CIE

The 200-CIE has one IEEE 802.3 (Ethernet) channel and performs all the logic operations needed for communication.

It has a panel mounted 15-pin D-type female connector (AUI) with a slide latch used for connection to an external Ethernet transceiver (MAU) via a drop cable. The transceiver is supplied with 12 V DC via the D-type connector. A battery is used for back-up of the buffer memory.

The network address is defined by four rotary switches. Four green LEDs show status for communication and internal power. A red LED is lit during initialisation and error.

The 200-CIE needs an external 24 V DC supply. A DC/DC converter converts the voltage to 12 V DC which is connected to the standard (AUI) front panel connector.

200-CISB

The 200-CISB has two SattBus supervisor channels available on the lower screw terminal block. A separate communication processor for each SattBus channel handles the field bus communication.

The two channels are individually isolated via transformers, and there is no polarity.

Five green LEDs show status for communication and internal power.

200-CICN

The 200-CICN is an interface to the ControlNet industrial network. It is used for the remote connection of Series 200 I/O.

Each 200-CICN acts as an I/O scanner for up to 31 200-ACN Remote I/O-adapters. The number of allowed adapters depends on which CPU is used (SattCon 200 or SattLine). A coaxial cable is used for connection to the Remote I/O.

The 200-CICN is connected to the ControlNet cable system via a tap and a 1 m drop cable.

The unit has drivers and receivers for the ControlNet connection, which is performed via an insulation transformer to a BNC connector.

The network address is defined by two rotary switches. One green LED show status for internal power. Three bicolour (red/green) LEDs show the channel status.

200-CIPB/DP-G

The 200-CIPB/DP-G is an interface to a PROFIBUS-DP network. It is used for remote connection to PROFIBUS-DP slaves.

Each 200-CIPB/DP-G acts as an I/O scanner for the 200-APB12 Remote I/O adapters. The number of allowed 200-APB12 depends on which CPU is used (SattCon 200 or SattLine).

The unit serves as a gateway to transfer registers and I/O bits, via PROFIBUS-DP, between a host system, using the COMLI protocol, and Remote I/O systems. A 9-pin D-type male connector is used for configuration and COMLI data transfer, and a female one for PROFIBUS.

There are LEDs for power supply, communication and field bus device diagnostics.

200-BIAL

The 200-BIAL is an interface to the Alert I/O system, using two flat cable connectors on the front of the unit. It controls two I/O racks in a PRI-cabinet of the Alert system, hence two 200-BIAL units can control all four I/O racks in a PRI-cabinet.

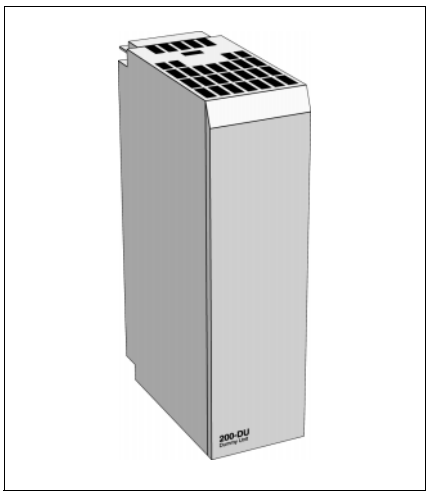
The signals from the Central System bus interface are converted and level adjusted to match the Alert I/O bus signals. The unit takes care of the speed differences between the two systems.

200-BIAL is to be supplied (via the screw terminal block) with 12 V DC from e.g. the power supply earlier used by the Process Control Unit (PRICO) in the Alert system. The power supply input is overvoltage protected.

A green LED shows the internal power status.

Dummy Unit

200-DU



The 200-DU is a dummy unit used to occupy empty slots in the backplane of the Central System. It protects the system bus from external mechanical and electrical damage.

Backplane Units

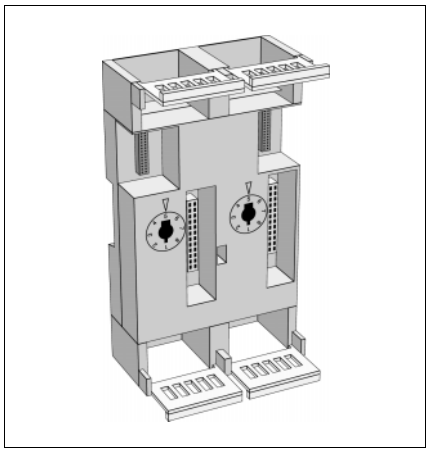
200-BPN

200-BPN is a backplane for Central System units. Each backplane has two slots and the Central System units are held in place with two snap locks.

The backplane is designed to be mounted onto a DIN rail and can be secured by an additional screw if used in environments with severe mechanical stress.

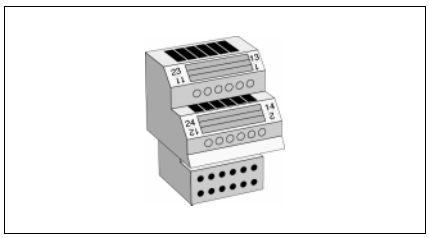
It can be equipped with a maximum four 200-BPP screw terminal blocks, two for each Central System unit.

Two eight-position rotary mechanical code keys prevent the inserted unit from damage if it is inserted into the wrong backplane slot.



A 200-BPF backplane interconnector is delivered with each backplane.

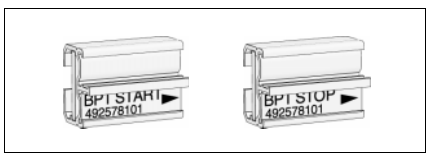
200-BPP



The 200-BPP is a 12-pole screw terminal block for connecting power and communication signals to the Central System.

When positioned above the Central System unit the terminals are numbered 13–24. When positioned below the terminals are numbered 1–12.

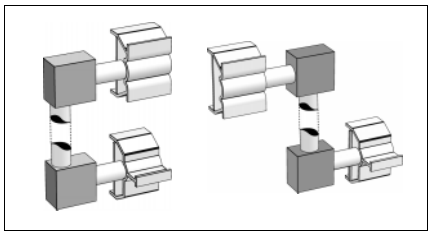
200-BPT



The 200-BPT are a backplane termination pair. There is one “START” plug (green) and one “STOP” plug (red).

Cables

200-CBA/L260, 200-CBA/L260V

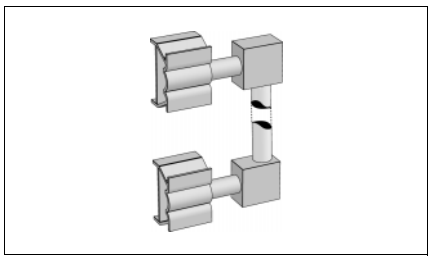


These cables connect the Central System backplane to the first Central I/O adapter placed with a maximum centre-to-centre distance of 255 mm between the DIN rails.

The 200-CBA/L260V is used for vertical Central I/O mounting.

All necessary mounting details are included.

200-CBB/R360



This cable connects two backplanes placed on the far right side of two DIN rails with a centre-to-centre distance of 360 mm.

All necessary mounting details are included.

Miscellaneous

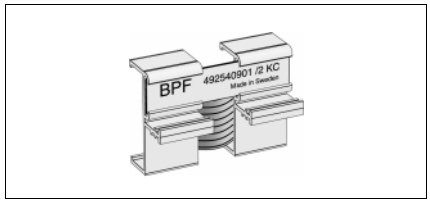
200-MOUNTKIT / BIAL

A kit which enables mounting of the Series 200 Central System in a rack for connection to Alert I/O.

200-MOUNTKIT

A kit which enables mounting of the Series 200 Central System in a rack for connection to rack-based I/O via RANN or RANN/A.

200-BPF



The 200-BPF backplane interconnector connects two Central System backplanes to each other.

One 200-BPF is delivered with each 200-BPN backplane.

Technical Data

General specifications

Power supply	24 V DC (19.2–30 V DC) incl. 5% ripple according to IEC 1132-1 standard i.e. +20%, –15% and max. 5% ripple.
Temperature	
Operating	+5°C to +55°C
Non-operating	–25°C to +70°C
Humidity	Max 90%, non-condensing
Protection rating	IP20
Approvals (when product or packaging is marked)	CE marked and meets EMC directive 89/336/EEC according to the following standards: EN 50081-2 and EN 50082-2. Low Voltage Directive 73/23/EEC with supplement 93/68/EEC according to the following standard: EN 61131-2 (only applicable for units connected to 50–1000 V AC and/or 75–1500 V DC). UL listed for US and Canada according to UL 508, with the exception for 200-CIPB/DP-G. Class 1 div 2 hazardous locations.
Package volume for the central system units	
1–2 units	H279 x W360 x D90 mm (9 dm^3)
3–8 units	H265 x W265 x D175 mm (12 dm^3)

200-CPU

Processor type	
200-CPU20/30/40	Motorola MC68020
200-CPU50	Motorola MC68060
Clock frequency	
200-CPU20/30	16.7 MHz
200-CPU40	28.8 MHz
200-CPU50	50 MHz
Maths co-processor	Yes (not on CPU 20/10)
Memory for system and application program	
200-CPU20/10	1 Mbyte RAM
200-CPU30/10	2 Mbyte RAM
200-CPU30/20	2 Mbyte RAM
200-CPU30/30	4 Mbyte RAM
200-CPU30/40	4 Mbyte RAM
200-CPU30/40-SL	4 Mbyte RAM
200-CPU40/40	4 Mbyte RAM
200-CPU40/40-SL	4 Mbyte RAM
200-CPU40/80-SL	8 Mbyte RAM
200-CPU40/120-SL	12 Mbyte RAM
200-CPU50/40	4 Mbyte RAM
200-CPU50/80	8 Mbyte RAM
200-CPU50/160-SL	16 Mbyte RAM
200-CPU50/200-SL	20 Mbyte RAM
	All with battery back-up
Status indicators	
200-CPU20/30/40	Green LEDs for Power, SattBus signals (SB TD 0, SB RD 0), serial channel signals (TD 0, TD 1, RD 0 and RD 1). Red LEDs for Fail and Stop.
200-CPU50	Green LEDs for Power, serial channel signals TD 0 and RD 0. Red LEDs for Fail and Stop. Red/green LED for battery status.

Communication channels	
Serial channels	Maximum cable length: 15 metres.
Baudrate	75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600 (default) and 19200 baud.
200-CPU20/30/40	2 RS232 channels. Channel 0 connects TD, RD, RTS, CTS, DCD and DTR. Channel 1 connects RD and TD. Data bits 7 or 8 (default). Parity odd, even or none (default). Stop bits 1 (default) or 2.
200-CPU50	1 RS232 channel. Channel 0 has connections for TD, RD, RTS and CTS
SattBus	1 channel, supervisor (not available on CPU 20/10 or CPU50)
Real-time clock	Yes
Accuracy, normal mode	
200-CPU20/30/40	10 ppm (approx. 6 min/year)
200-CPU50	100 ppm (approx. 60 min/year)
Accuracy, battery back-up mode	50 ppm (approx. 0.2 s/hour)
Backup battery	
200-CPU20/30/40	A lithium battery for the memory and real time clock (3.6 V, 1.75 Ah, size AA/R6/UM-3) incl. connection cable. Batteries are to be replaced every 3rd year, with exceptions for all CPU40/XX and CPU40/XX-SL, where the battery lifetime is max. 3000 h when the system is not powered.
200-CPU50	A NiMH rechargeable battery for the memory and real time clock (4.8 V, 200 mAh, size 4 x V200H). Recharging time about 1 hour.
Connectors	One 200-BPP screw terminal block. One 9-pin female D-type connector at the front.
Earthing	Directly connected via the 200-BPN backplane.
Power supply	From 200-PSMG/PSSG Power supply unit.
Internal current consumption (from PSMG/PSSG)	
CPU 20/10	Max. 0.45 A
Other CPUs	Max. 0.6 A
Backplane key code	5.
Weight	0.43 kg excl. packaging 0.50 kg incl. packaging
Dimensions	H 163 x W 45 x D 91 mm (excl. connectors and snap locks)
Order codes	200-CPU20/10 200-CPU30/10 200-CPU30/20 200-CPU30/30 200-CPU30/40 200-CPU40/40 200-CPU30/40-SL 200-CPU40/40-SL 200-CPU40/80-SL 200-CPU40/120-SL 200-CPU50/40 200-CPU50/80 200-CPU50/160-SL 200-CPU50/200-SL

200-BUP

Status indicators	Green LEDs for Power, Load, Save and Verify Red LED for Backup error
Push buttons	Load, Save, Verify and Format
SmartMedia slot	Slot for SmartMedia memory cards
SmartMedia card	4 or 8 Mbyte, 3.3 V DC
Power supply	From 200-PSMG/PSSG Power supply unit
Internal current consumption (from PSMG-PSSG)	
	Max. 0.3 A
Backplane key code	8
Weight	0.18 kg excl. packaging 0.25 kg incl. packaging
Dimensions	H163 x W45 x D91 mm (excl. connectors and snap locks)
Order codes	200-BUP 200-MEM4 200-MEM8

200-PSMG

Input	24 V DC (19.2–30 V incl. max. 5% ripple) max. 1.3 A
Input fuse	2 A slow 250 V. IEC-127-3 micro fuse, TR5
Inrush current	Max. 4 A for 10 ms
Power drop (hold up)	Max. 0.3 ms
Output	7–9 V DC, max. 2.2 A (1.8 A when one or more PSSG are used)
Clock frequency	4, 6, 8 and 12 MHz, automatically selected by the CPU firmware
Status indicators	Green LEDs for Power (output voltage) and Clock output. Red LEDs for Fail (initialization) and Power Fail
Galvanic isolation	500 V AC rms between input and output
Connectors	A 200-BPP screw terminal block
Earthing	Directly connected via the 200-BPN backplane
Backplane key code	7
Weight	0.17 kg excl. packaging 0.24 kg incl. packaging
Dimensions	H163 x W45 x D91 mm (excl. connectors and snap locks)
Order code	200-PSMG

200-PSSG

Input	24 V DC (19.2–30 V incl. max. 5% ripple) max. 1.3 A
Input fuse	2 A slow 250 V. IEC-127-3 micro fuse, TR5
Inrush current	Max. 4 A for 10 ms
Output	7–9 V DC, max. 1.8 A
Status indicators	Green LEDs for Power (output voltage) and a red LED for Power Fail
Galvanic isolation	500 V AC rms between input and output
Connectors	A 200-BPP screw terminal block
Earthing	Directly connected via the 200-BPN backplane
Backplane key code	7
Weight	0.17 kg excl. packaging 0.24 kg incl. packaging
Dimensions	H163 x W45 x D91 mm (excl. connectors and snap locks)
Order code	200-PSSG

200-CI232

Number of channels	2
Communication interface	RS232C asynchronous serial communication
Status indicators	Green LEDs for Power and serial channel signals RD0, RD1, TD0, TD1, RTS0 and RTS1.
Galvanic isolation	None
Speed of transfer	75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600 (default) and 19200 baud. Max. cable length: 15 metres.
Data bits	7 or 8 (default)
Parity	Odd, even or none (default)
Stop bits	1 (default) or 2
Max load on DTR	5 mA
Power supply	From 200-PSMG/PSSG Power supply unit
Internal current consumption (from PSMG/PSSG)	
	Max. 0.2 A
Connectors	Two 200-BPP screw terminal blocks. Two 9-pin D-type female connectors located at the front.
Backplane key code	8
Weight	0.20 kg excl. packaging 0.27 kg incl. packaging
Dimensions	H163 x W45 x D91 mm (excl. connectors and snap locks)
Order code	200-CI232

200-CI485G

Number of channels	2
Number of nodes	32 per channel
Communication interface	RS485 asynchronous serial communication
Status indicators	Green LEDs for Power and serial channel signals RD0, RD1, TD0, TD1, RTS0 and RTS1.
Galvanic isolation	500 V AC rms. The channels are individually isolated from the main logic and 24 V DC.
Speed of transfer	75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 4800, 9600 (default) and 19200 baud. Max. cable length: 1200 metres.
Data bits	7 or 8 (default)
Parity	Odd, even or none (default)
Stop bits	1 (default) or 2
Power supply	From 200-PSMG/PSSG Power supply units and external power supply (24 V DC).
Internal current consumption (from PSMG/PSSG)	
	Max. 0.2 A
External current consumption	Max. 0.1 A (taken from external 24 V DC)
Connectors	Two 200-BPP screw terminal blocks
Backplane key code	8
Weight	0.22 kg excl. packaging 0.29 kg incl. packaging
Dimensions	H163 x W45 x D91 mm (excl. connectors and snap locks)
Order code	200-CI485G

200-CIE

Number of channels	1
Communication standard	IEEE 802.3 (Ethernet)
Status indicators	Green LEDs for Power, Transmit data TD 0, Received data RD 0 and Ethernet traffic NET. Red LED for Fail (software controlled)
Galvanic isolation	500 V DC from 24 V DC supply. According to the IEEE 802.3 standard, the transceiver (MAU) must provide isolation between the AUI cable and the broadband coaxial medium. When taking current from the AUI, it must not exceed 0.5 A as provided by the AUI source. For further details see ANSI/IEEE Std. 802.3 and the SS-ISO 8802-3.
Speed of transfer	10 Mbits/s
Access method	CSMA/CD (Carrier Sense, Multiple Access with Collision Detect)
Input fuse	Fuse 1.25 A slow. Microfuse TR5 IEC-127-3
Backup battery	Lithium (3.67 V, 0.8 Ah, 1/2 AA / 1/2 RG /1/2 UM-3) with connection cable
Power supply	From 200-PSMG/PSSG Power supply unit and external power supply (24 V DC)
Internal current consumption (from PSMG/PSSG)	
	Max. 0.25 A
External current consumption	Max. 0.5 A at 19.2V DC (typically 0.2A) taken from external 24 V DC supply (depending on transceiver type).
Connector	One 200-BPP screw terminal block. One 15-pin D-type female connector with slide latch located at the front.
Backplane key code	8
Weight	0.34 kg excl. packaging 0.41 kg incl. packaging
Dimensions	H163 x W45 x D91 mm (excl. connectors and snap locks)
Order code	200-CIE

200-CISB

Number of channels	2
Number of nodes	120
Communication protocol	SattBus
Speed of transfer	62.5 kbits/s
Access method	Token bus
Status indicators	Green LEDs for Power, Transmit Data (TD 0, TD1), and Receive Data (RD 0, RD1).
Galvanic isolation	500 V AC rms. The channels are individually isolated via signal transformers.
Connector	One 200-BPP screw terminal block
Power supply	From 200-PSMG/PSSG Power supply unit
Internal current consumption (from 200-PSMG/PSSG)	
	Max. 0.3 A
Backplane key code	8
Weight	0.25 kg excl. packaging 0.32 kg incl. packaging
Dimensions	H163 x W45 x D91 mm (excl. connectors and snap locks)
Order code	200-CISB

200-CICN

Number of channels	1
Communication protocol	ControlNet
Access method	CTDMA (Concurrent Time Division Multiple Access)
Galvanic isolation	Isolation via a signal transformer
Speed of transfer	5 Mbit/s
Status indicators	Green/Red LEDs for OK (unit status) and for COM A and B (communication information). Green LED for Power.
Power supply	From 200-PSMG/PSSG Power supply unit
Internal current consumption (from PSMG/PSSG)	
	Max. 0.5 A
Connector	BNC 75 Ω at the front
Backplane key code	8
Weight	0.25 kg excl. packaging 0.33 kg incl. packaging
Dimensions	H163 x W45 x D91 mm (excl. connectors and snap locks)
Order code	200-CICN

200-CIPB/DP-G

Number of channels	1
Communication protocol	PROFIBUS-DP
Channel COMLI / Configuration	RS232 asynchronous serial communication at 9600 baud, even parity and 1 stop bit. Cable length max. 15 m.
Channel CH 0 PROFIBUS-DP	9.6, 19.2, 45.45, 93.75, 187.5, 500, 1500, 3000, 6000 or 12000 kbit/s
Galvanic isolation	None
Status indicators	Green LEDs for Power, Ready and Run. Red LED for Error (LED Fail is for future use).
Power supply	From 200-PSMG/PSSG Power supply unit
Internal current consumption (from PSMG/PSSG)	
	Max. 0.65 A
Connectors	One male and one female 9-pin D-type connector
Backplane key code	8
Weight	270 g excl. packaging 330 g incl. packaging
Dimensions	H163 x W45 x D91 mm (excl. connectors and snap locks)
Order code	200-CIPB/DP-G

200-BIAL

I/O capacity	2 Alert I/O racks, corresponding to 128 digital I/O or 128 analogue inputs or 32 analogue outputs or a mix of these.
Status indicator	Green LED for Power
Power supply	From 200-PSMG/PSSG Power supply unit
External power	12 V DC
Internal current consumption (from PSMG/PSSG)	Max. 0.12 A
External current consumption	Max. 0.15 A (taken from Alert +12 V DC)
Connectors	One 200-BPP screw terminal block. Two ribbon cable connectors at the front
Backplane key code	8
Weight	0.26 kg excl. packaging 0.34 kg incl. packaging
Dimensions	H163 x W45 x D91 mm (excl. connectors and snap locks)
Order code	200-BIAL

200-DU

Backplane key code	None
Weight	0.11 kg excl. packaging 0.18 kg incl. packaging
Dimensions	H163 x W45 x D91 mm
Order code	200-DU

200-BPN

Number of slots	2
Internal current consumption (from 200-PSMG/PSSG)	Max. 0.04 A Note that the current consumption is included in the current consumption data given for the Central System units, i.e. do not add this current when calculating the total system current.
Connectors	The number of 200-BPP screw terminal blocks depends of the type of Central System unit used. 2x32-pole Euro connector for electrical connections between the backplane and the Central System units.
Mounting	On DIN rail 35 x 7.5 mm according to the EN 50022 standard.
Weight	0.17 kg excl. packaging 0.24 kg incl. packaging
Dimensions	
Height	239 mm incl. one screw terminal block; 163 mm excl. terminal block.
Width	91 mm excl. a 5 mm bridge to the next backplane.
Depth	43 mm (127 mm including unit with front connectors and DIN rail).
Order code	200-BPN

200-BPP

Number of terminals	12
Wire size	Solid and stranded 0.5–2.5 mm^2 or AWG 20–AWG 12
Weight	0.070 kg
Dimensions	H60 (only 37 mm once inserted) x W45 x D43 mm
Order code	200-BPP

200-BPT

Number of plugs	One start-plug (green) and one stop-plug (red)
Internal current consumption (from200-PSMG/PSSG)	0.2 A
Weight	0.010 kg
Dimensions	H32 x W23 x D17 mm
Order code	200-BPT

200-CBA/L260, 200-CBA/L260V

DIN-rail distance C-C	255 mm max
Weight	0.092 kg
Order code	200-CBA/L260

200-CBB/R360

DIN-rail distance C-C	360 mm
Weight	0.097 kg
Order code	200-CBB/R360

Regional Center Sweden
Västerås, Sweden
Phone: +46 (0) 21 34 20 00
Fax: +46 (0) 21 13 78 45

Regional Center Americas
Wickliffe, OH, USA
Phone: +1 (440) 585 8500
Fax: +1 (440) 585 8756

Regional Center Germany
Mannheim, Germany
Phone: +49 (0) 1805 266776
Fax: +49 (0) 1805 776329
Email: Marketing.Control-Products@de.abb.com

Internet:
www.abb.com

00000. AE Andersson Grafiska AB. Printed in Sweden 2000.