



CAN Bus

CAN Bus Modules for S7-300¹⁾, S7-400¹⁾
DP/CAN Coupler
CAN Bus Connector

¹⁾ S7-300 and S7-400 are registered trademarks of Siemens AG.

CAN 300 PRO, Communication Module



CAN 300 PRO, communication module

The CAN 300 PRO module of Systeme Helmholtz GmbH for use in an S7-300¹⁾ from Siemens permits connection of CAN stations with the programmable controller.

The module can be slotted either in the central controller or in the expansion unit.

The CAN 300 PRO module supports CAN 2.0A (11 Bit) and CAN 2.0B (29 Bit) frames with a freely selectable baud rate of 10 kbps to 1 Mbps.

The CAN 300 PRO module can send and receive CAN frames in Layer 2 operating mode. The data of the CANopen[®] slaves can be processed as a process image in CANopen[®] Master operating mode in the PLC. Applications as a CANopen[®] Slave is also possible. Application examples are provided for standard applications including motor control with CANopen[®]. Data handling blocks for the SAE J1939 protocol are also available.

The CAN 300 PRO module contains 16 freely settable timers. Each timer can trigger a freely programmable CAN telegram. That way, it is easy to implement the synchronous protocols in common use in drive and servo systems using the CAN 300 PRO module.

The DIP switch for setting the baud rate and the station address facilitate commissioning. An optional micro memory card stores the project so that the parameterization or the module is quickly replaced during servicing.

6 LEDs indicate the operating status of the module. A USB interface is available for diagnostics and parameterization tasks.

The CAN 300 PRO also works in the extended ambient temperature range of -25 °C to +60 °C.

A USB cable is included.

Ordering Data	
	Order No.
CAN 300 PRO, communication module (incl. USB programming cable)	700-600-CAN12
Micro Memory Card, 256 kByte	700-953-8LH11
Manual CAN 300 PRO, German/English	900-600-CAN12
CAN Training Course (see page 124)	400-600-CAN01

1) S7-300 is a registered trademark of Siemens AG

Features

- Layer 2, 11 Bit and 29 Bit (CAN 2.0 A/B)
- CANopen[®] Master on the module
- DIP switch for address + baud rate
- Micro Memory Card for saving a project (optional)
- USB Interface for parameterization and diagnostics
- Extensive CAN-Bus diagnostics
- Can also be used as a CANopen[®] slave
- Extended ambient temperature range

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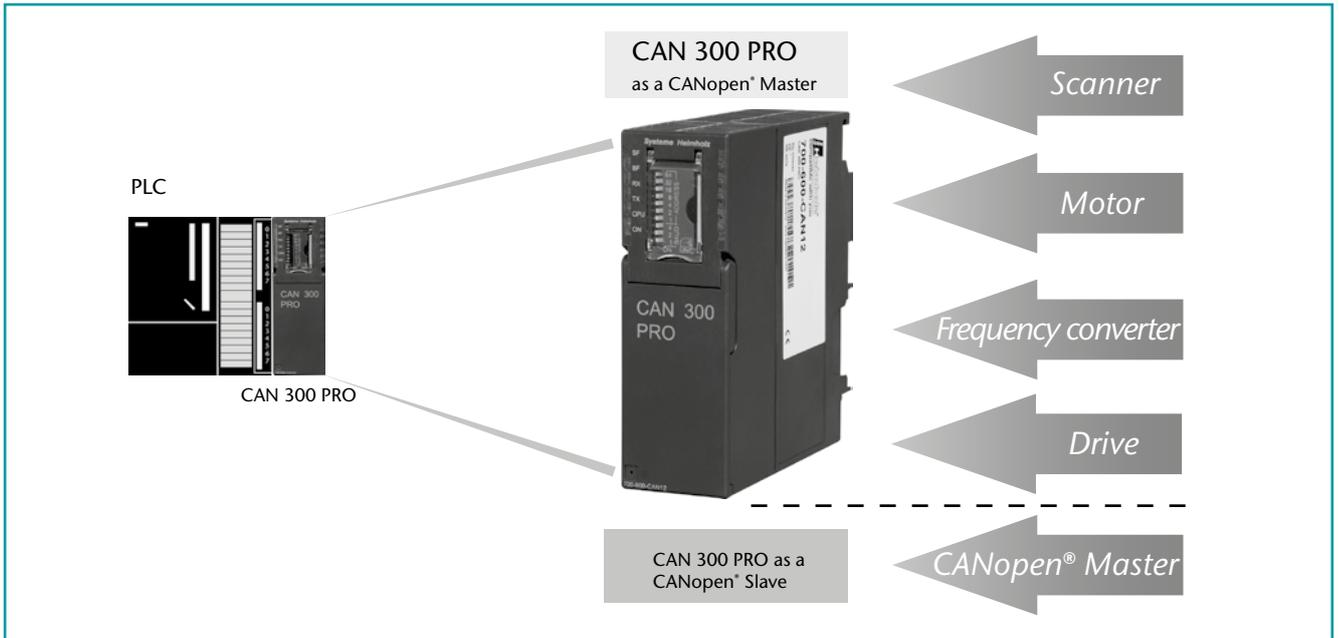
Note

On page 96 you will find information about the parameterization software CANParam and about the data handling blocks for the PLC.

When first used, data handling blocks are required for the PLC.

Technical Data	
Dimensions (D x W x H mm)	116 x 40 x 125
Weight	Approx. 280 g
Power supply Voltage	+5 V DC via backplane bus
Current consumption	typ. 160 mA max. 190 mA
CAN interfaces Type	ISO/DIN 11898-2 CAN High Speed physical Layer
Transmission rate	10 kbps to 1 Mbps
Protocol	CAN 2.0A (11 Bit) CAN 2.0B (29 Bit) CANopen [®] Master CANopen [®] Slave SAE J1939 DeviceNet Slave (on request)
Connection	Connector, SUB-D, 9-way
Status display	6 LEDs
Configuration interfaces Type	USB 1.1
Connection	USB-B female connector
Ambient temperature	-25 °C ... 60 °C
Transport and storage temperature	-25 °C ... 75 °C

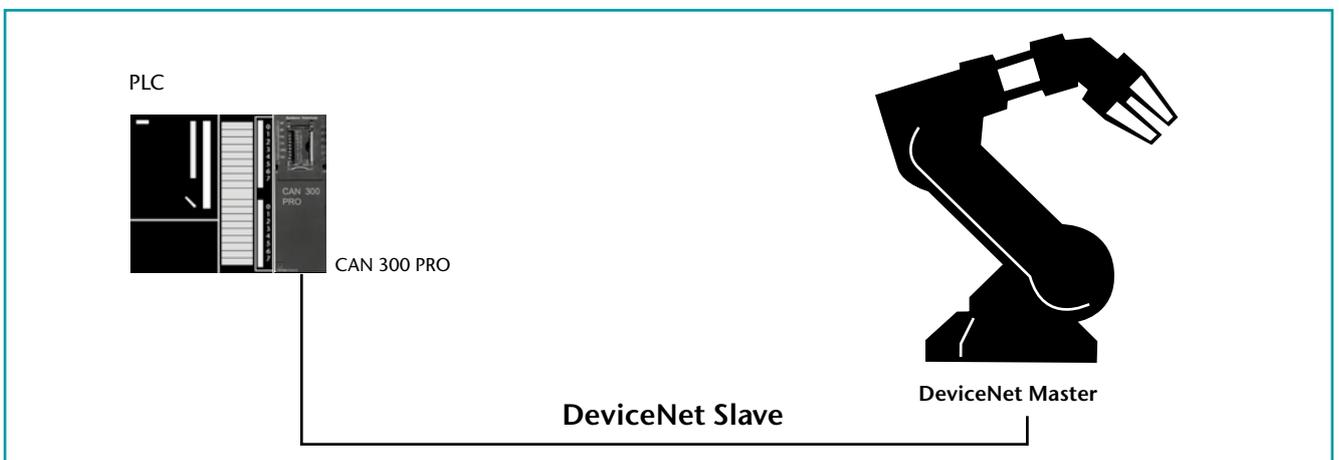
CAN 300 PRO, Communication Module



Application Example CAN 300 PRO as a CANopen[®] Master/Slave



Application Example CAN 300 PRO SAE J1939 Protocol



Application Example CAN 300 PRO as a DeviceNet Slave

CAN 300, Communication Module with DNV certificate



CAN 300, communication module (DNV)



The CAN 300 module from the Systeme Helmholtz GmbH for use in a S7-300¹⁾ from Siemens permits connection of CAN stations with the programmable controller. The module can be slotted either into the central controller or into the expansion unit.

The CAN 300 modules support both CAN 2.0A (11 Bit) and CAN 2.0B (29 Bit) frames with a free selectable baud rate of 10 kbps to 1 Mbps.

The CAN 300 module can also be run as Layer 2, CANopen[®] Master, and CANopen[®] Slave.

The CAN 300 module contains the power management functions "Power On", "Stop -> Run" and "Run -> Stop". IDs relevant to the programmable controller can be prefiltered using a 5-level acceptance mask.

In CAN 300 modules 11 free settable timers are available. Each timer can trigger a free programmable CAN frame. In that way, it is simple to implement synchronous protocols commonly used in drive and servo control using the CAN 300 module.

Note

Information about software and handling blocks is available on page 96.

When first used, data handling blocks are required for the PLC.

The CAN 300 module is DNV (Det Norske Veritas) "peripheral equipment" approved for increased application conditions.

Ordering Data	
	Order No.
CAN 300, communication module (DNV)	700-600-CAN81
RS232 Parameterization cable, serial PC to CAN 300 communication module	700-610-0VK11
Manual CAN 300, German/English CAN Training Course (see page 124)	900-600-CAN01 400-600-CAN01

1) S7-300 is a registered trademark of Siemens AG

Technical Data	
Dimensions (D x W x H mm)	116 x 40 x 125
Weight	Approx. 280 g
Power supply Voltage	+5 V DC via backplane bus
Current consumption	typ. 160 mA max. 190 mA
CAN interfaces Type	ISO/DIN 11898 -2 CAN High Speed physical Layer
Transmission rate	10 kbps to 1 Mbps
Protocol	CAN 2.0A (11 Bit) CAN 2.0B (29 Bit) CANopen [®] Master CANopen [®] Slave SAE J1939
Connection	Connector, SUB-D, 9-way
Configuration interfaces Type	RS232, serial asynchronous
Transmission rate	9.6 kbps
Format	8/N/1
Connection	Connector, SUB-D, 9-way
Ambient temperature Transport and storage temperature	-25 °C ... 60 °C -25 °C ... 75 °C

CAN 400, Communication Module



CAN 400, communication module

The CAN 400 module from the Systeme Helmholtz GmbH for use in a S7-400¹⁾ from Siemens permits connection of CAN stations with the programmable controller. The module can be slotted either into the central controller or into the expansion unit.

The CAN 400 modules support both CAN 2.0A (11 Bit) and CAN 2.0B (29 Bit) frames with a free selectable baud rate of 10 kbps to 1 Mbps.

The CAN 400 module can also be run as Layer 2, CANopen[®] Master or CANopen[®] Slave.

The CAN 400 module contains the scripts "Power On", "Stop -> Run", "Run -> Stop", "Power Off". IDs relevant to the programmable controller can be prefiltered using a 5-level acceptance mask. In CAN 400 modules, 16 free settable timers up to a resolution of 1ms are available. Each timer can trigger a free programmable CAN frame. In that way, it is simple to implement synchronous protocols commonly used in drive and servo control using the CAN 400 module.

Note

Information about software and handling blocks is available on page 96.

When first used, data handling blocks are required for the PLC.

Ordering Data	
	Order No.
CAN 400-1, Communication module with 1 CAN interface	700-640-CAN11
CAN 400-2, Communication module with 2 CAN interfaces	700-640-CAN21
Manual CAN 400, German/English	900-640-CAN21
CAN Training Course (see page 124)	400-600-CAN01

1) S7-400 is a registered trademark of Siemens AG

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Technical Data		
	CAN 400-1	CAN 400-2
Dimensions (D x W x H mm)	290 x 210 x 25	290 x 210 x 25
Weight	Approx. 900 g	Approx. 900 g
Power supply		
Voltage	DC +5 V via backplane bus	DC +5 V via backplane bus
Current consumption	560 mA	600 mA
CAN interfaces		
Number	1	2
Type	ISO/DIN 11898-2 CAN High Speed physical Layer	ISO/DIN 11898-2 CAN High Speed physical Layer
Transmission rate	10 kbps to 1 Mbps	10 kbps to 1 Mbps
Protocol	CAN 2.0A (11 Bit) CAN 2.0B (29 Bit) CANopen [®] Master CANopen [®] Slave SAE J1939	CAN 2.0A (11 Bit) CAN 2.0B (29 Bit) CANopen [®] Master CANopen [®] Slave SAE J1939
Connection	SUB-D connector, 9-way	2 x SUB-D connector, 9-way
Status signal	6 LEDs	10 LEDs
Configuration interfaces		
Type	USB 1.1	USB 1.1
Connection	USB B-female	USB B-female
Ambient temperature	0 °C ... 60 °C	0 °C ... 60 °C
Transport and storage temperature	-25 °C ... 75 °C	-25 °C ... 75 °C

DP/CAN Coupler CANopen®



DP/CAN Coupler CANopen®

The DP/CAN coupler links CANopen® devices into a PROFIBUS-DP network.

The DP/CAN coupler is a full-function CANopen® Master. It supports network management, SYNC telegrams and nodelocking for monitoring the nodes.

On the PROFIBUS-DP, the DP/CAN coupler is a normal node. The IO data of the CANopen® nodes are placed on the PROFIBUS in a transparent and freely configurable way.

The DP/CAN coupler is linked into the hardware configuration software via a GSD file and can be configured completely there. Further tools are not necessary.

On the PROFIBUS all standard baud rates up to 12Mbps are supported; on the CAN bus, up to 1Mbps.

The PROFIBUS address is set via a DIP switch.

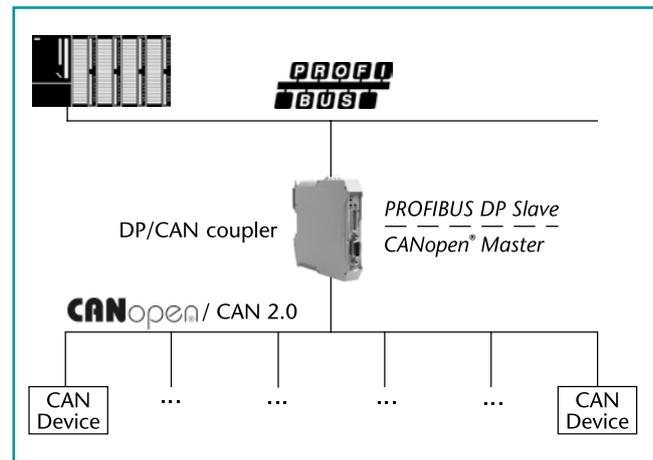
Parameterization of the CANopen® nodes via SDO telegrams and management of emergency messages is also possible.

Alternatively the DP/CAN coupler can also be used as a CAN Layer 2 device on the CAN bus. This enables the connection of customer-specific CAN protocols via the PROFIBUS, too.

The DP/CAN coupler is intended for mounting on the DIN sectional rail and requires a 24V power supply. Because of its small width it fits even into the smallest cabinets.

Features

- Up to 15 CANopen® participants
- Up to 1 Mbps CAN-baud rate
- Up to 12 Mbps PROFIBUS-DP
- Address setting via DP switch
- Simple configuration via GSD file
- CANopen® Master and CAN Layer 2 possible
- Address and function settable via dip switches
- 3 status LEDs
- Extended ambient temperature range



Application example DP/CAN Coupler CANopen®

Technical Data

Dimensions (D x W x H mm)	114 x 18 x 108
Weight	Approx. 110 g
Power supply	
Voltage	24 V
Current consumption	Approx. 180 mA
CAN interfaces	
Type	ISO/DIN 11898-2 CAN High Speed physical Layer
Transmission rate	10 kbps to 1 Mbps
Protocol	CANopen® Master CAN 2.0A (11 Bit)
Connection	Clamp, 3-way
Status display	3 LEDs
Configuration interfaces	
Transmission rate	max. 12 Mbps, autodetection
Protocol	PROFIBUS-DP to EN 50 170
Connection	SUB-D female, 9-way
Ambient temperature	-25 °C ... 70 °C
Transport and storage temperature	-40 °C ... 75 °C
Relative humidity	max 80% at +20 °C, non- condensing
Degree of protection	IP 20

Ordering Data

	Order No.
DP/CAN coupler CANopen® (incl. manual, CD with software)	700-650-CAN01

DP/CAN Coupler Layer 2



DP/CAN Coupler Layer 2

The DP/CAN coupler layer 2 of Systeme Helmholtz GmbH allows you to connect any number of CAN nodes to the PROFIBUS-DP. The DP/CAN coupler layer 2 must be parameterized in the hardware configurator as a PROFIBUS node. The GSD files required for this purpose are supplied with the device.

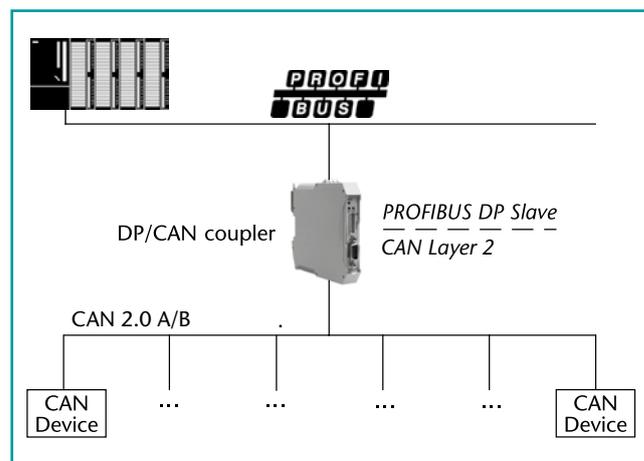
The PROFIBUS side is configured as a DP slave. The interfaces meets EN 50170 and are electrically isolated. Baud rates of 9.6 kbps to 12 Mbps are automatically detected. The size of the input and output information is up to 320 Bytes.

The CAN bus interface meets ISO/DIN 11898-2 and is electrically isolated.

The DP/CAN coupler can send and receive any number of CAN messages. Messages can be defined with a fixed identifier, whose data are always visible in the PROFIBUS as an I/O image. Alternatively the DP/CAN coupler layer 2 can be equipped with a receive buffer for any number of CAN messages.

Features

- Up to 1 Mbps CAN baud rate
- Up to 12 Mbps PROFIBUS-DP
- Address setting via DP switch
- Simple configuration via GSD file
- Any protocols possible via layer 2
- CAN 2.0 A (11Bit)
- CAN 2.0 B (29 Bit)
- Timer for cyclic telegrams
- 3 Status LEDs
- Extended ambient temperature range



Application example DP/CAN Coupler Layer 2

Technical Data

Dimensions (D x W x H mm)	114 x 18 x 108
Weight	Approx. 110 g
Power supply	
Voltage	24 V
Current consumption	Approx. 180 mA
CAN interfaces	
Type	ISO/DIN 11898 -2 CAN High Speed physical Layer
Transmission rate	10 kbps to 1 Mbps
Protocol	CAN 2.0A (11 Bit) / CAN 2.0B (29 Bit)
Connection	Clamp, 3-way
Status display	3 LEDs
Configuration interfaces	
Transmission rate	max. 12 Mbps, autodetection
Protocol	PROFIBUS-DP to EN 50 170
Connection	SUB-D female, 9-way
Ambient temperature	-25 °C ... 70 °C
Transport and storage temperature	-40 °C ... 75 °C
Relative humidity	max 80% at +20 °C, non- condensing
Degree of protection	IP 20

Ordering Data

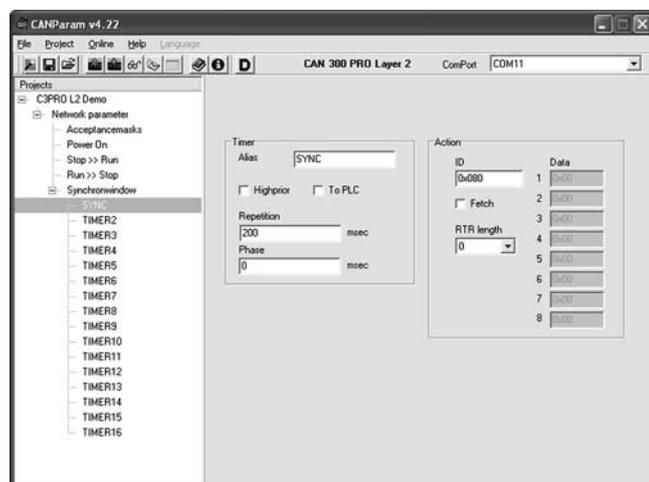
	Order No.
DP/CAN Coupler Layer 2 (incl. manual, CD with software)	700-651-CAN01

CAN Software

Parameterization Tool CANParam

The CAN modules are parameterized on the PC using the CAN-Param parameterization tool (contained in the 800-600-1AA11 software package). That makes setting the communication parameters easy. The parameterization of a module can be stored in a project on the PC.

The CAN modules support both the protocol format CAN 2.0A (11 Bit) and CAN 2.0B (29 Bit).



The CAN modules contain acceptance masks. These masks can be used to enable or disable various telegram IDs for reception. Express masks filter high-priority CAN telegrams so that they can be forwarded directly to the PLC.

For time-dependent events, such as the SYNC telegram in the case of CANopen®, up to 11 timers (CAN 300) or 16 timers (CAN 400) are available in the CAN modules up to a resolution of 1ms. Each timer can transmit any CAN telegram. The timers can be started, stopped, and changed from the PLC.

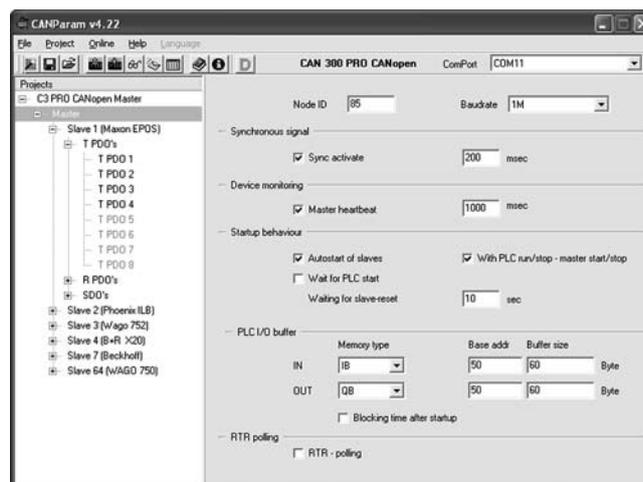
The timer 0 can also be used for synchronized transmission of CAN telegrams. It defines the time window in which all data will be transmitted synchronously.

CAN telegrams can be transmitted or timers started via freely programmable scripts on certain events such as “Power ON” or “PLC Stop -> Run”.

An integrated diagnostic function facilitates troubleshooting on commissioning of the module.

For CAN 300 PRO's CANopen® Master Function it's both possible to define the masters properties as to parameterize the slaves existing on the CAN bus.

In order to facilitate projection EDS-files can be read from CANopen® Slaves by CANParam Software.



Handling blocks

The CAN module is entered in the hardware configuration of the programming software as a CP- module (CAN 300, CAN 300 PRO) or an FM-module (CAN 400) and addressed in the STEP¹⁾7 program via handling blocks.

For the CAN modules, handling blocks are available for layer 2 communication and for CANopen® Master (DS301 V4). If CAN modules are to be used as a CANopen® Slave, data handling functions are available for the profiles DS401 (IO modules) and DS420 (Corrugator). Further profiles can be set up on request.

Function scope of layer 2 data handling function:

- Transmit CAN telegram
- Read CAN telegram from the module
- Transmit CAN telegram to a timer
- Timer start/stop
- module reset

Various CAN protocols in 11 Bit or 29 Bit mode can be implemented with the handling blocks for layer 2.

Function scope of the CANopen® Master data handling function:

- Read SDO
- Transmit SDO
- SDO segmented download
- SDO segmented upload
- Spontaneous receive (NMT,PDO, Emergency)
- Transmit PDO
- Request PDO
- Nodeguarding/Heartbeat
- Network management

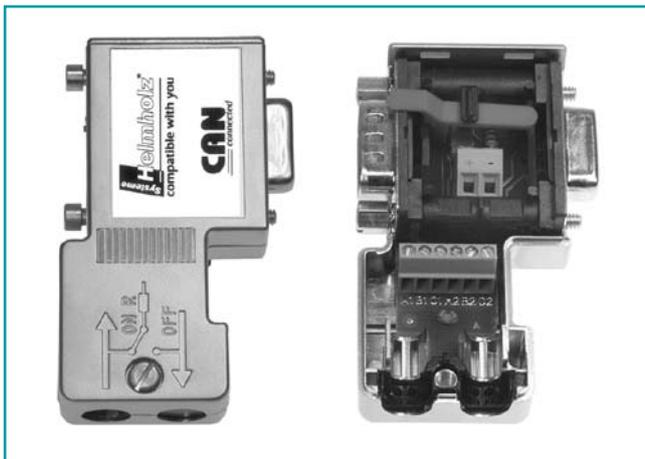
Application examples for controlling drives according to the DS402 profile are also supplied.

Furthermore handling blocks are available to utilize CAN 300 PRO as DeviceNet Slave.

Ordering Data	
	Order No.
Handling blocks for CAN CD with parameterization software “CANParam”, handling blocks “Layer 2”, “CANopen®” and “SAE J1939”	800-600-1AA11
CANopen® Slave handling blocks Devicenet Slave handling blocks	on request on request
CAN Trainig Course (see page 124)	400-600-CAN01

1) STEP is a registered trademark of Siemens AG

CAN Bus Connector



CAN bus connector, 90° cable outlet



CAN bus connector, axial

The bus connectors for CAN bus are used to connect a CAN bus station to the CAN bus cable. The connector is quickly mounted and has integrated, connectable terminating resistors.

The Systeme Helmholtz GmbH offers the bus connector with a vertical outgoing cable and for transmission rates up to 1 Mbps. The bus connector is plugged directly onto the CAN bus interface (SUB-D-connector, 9-way) of the CAN bus stations. The CAN bus cables are connected using 6-way screw terminals.

Using a slide switch, you can set whether the connector is to be used as a node or segment end. The switch can also be operated when the connector is installed. The setting can be clearly seen. The connector must be operated in node setting ("OFF") when the incoming bus and the outgoing bus are to be interconnected. The terminating resistors are then bypassed.

The connector must be set as a segment end ("ON"), on the first and last (extreme) stations of the segment. In that case the terminating resistors are connected on the incoming bus, the outgoing bus is disconnected.

The bus connectors for CAN are also available with axial cable outlet and 24 V for user supply.

Features

- 24 V for user supply (only for 90°)
- Metalized housing
- No loosable parts
- 90° and axial cable outlet available
- Small housing

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Ordering Data

	Order No.
CAN Bus Connector 90° without additional connection jack	700-690-1BA12
CAN Bus Connector 90° with additional connection jack	700-690-1BB12
CAN Bus Connector axial	700-690-0CA12

Technical Data

Connection jack Order No. 700-690-1BB12 Order No. 700-690-1BA12 Order No. 700-690-0CA12	Yes No No
Dimensions (D x W x H mm) 700-690-1BB12/690-1BA12 700-690-0CA12	65 x 48 x 16 67.5 x 35 x 17
Weight	Approx. 40 g
Terminating resistor	Resistance 120 Ω; integrated and connectable with slide switch
Transmission rate max.	1 Mbps
Interfaces CAN bus station	SUB-D connector, 9-way
CAN bus cable	6 terminals for wires up to 0.5 mm ²
Max. outside diameter	8.0 mm
Ambient temperature Transport and storage temperature	0 °C ... +60 °C -25 °C ... +75 °C
Relative humidity max.	75% at +25 °C
Degree of protection	IP 20

CAN Bridge, connecting CAN networks



CAN Bridge

CAN bus systems have become widely distributed in automation technology and are also being used more and more frequently in complex applications.

The CAN Bridge from Systeme Helmholtz GmbH enables the coupling of two CAN networks of the same or different types.

Thereby, the CAN Bridge can operate both as message repeater for increasing the network expansion as well as connecting different CAN networks with each other. It is not significant thereby whether the CAN networks have different baud rates or operate with different protocols, e.g. CANopen® and a proprietary protocol.

A flexible, configurable filtering logic can adopt freely selectable identifiers and implement on the other network. The CAN messages are forwarded to the respective other network according to the Store-Forward principle and sent out again.

Using the CAN Bridge, the CAN networks are both physically decoupled (electrical isolation) as well as reducing the bus load on both CAN networks. The CAN Bridge enables a flexible design of the network topology; star and tree structures can also be implemented as expanded line structures.

The CAN Bridge can be configured for simple applications using the two rotary encoding switches. In the case of more complex applications, the filtering and forwarding of the CAN telegrams can be flexibly adjusted using the supplied CAN Bridge configuration software. Up to 256 range filters and up to 4 bit filters for address filtering are available. The configuration is read in using a USB port and can also be read out again.

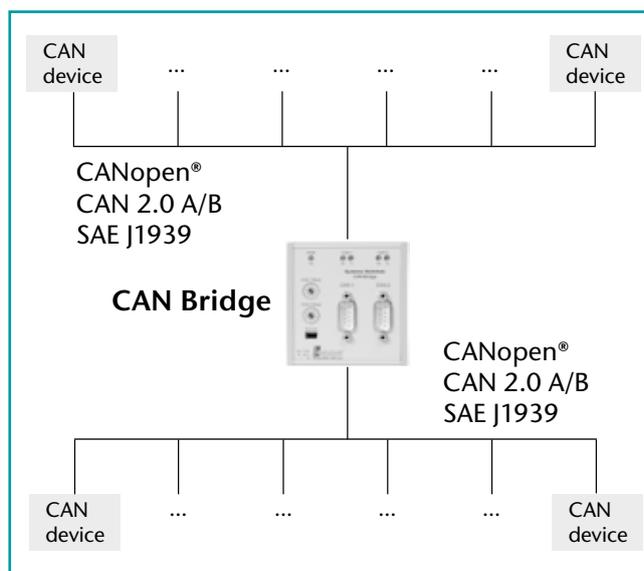
The CAN Bridge operates both in 11-bit as well as 29-bit mode and can communicate with baud rates of 10 Kbaud up to 1 Mbaud. It has a powerful micro controller which can also operate at the highest data rates and bus loads without loss of the messages. 5 LEDs signal the status of the device and the connected CAN networks.

Ordering Data

	Order No.
CAN Bridge 2 x CAN bus interfaces (incl. software and USB programming cable)	700-660-2AA01

Features

- 11 bit/29 bit
- Bit filter/range filter
- Autobaud detection
- 10 Kbaud ... 1 Mbaud
- Easy configuration mode
- Electrical isolation of the CAN networks
- Can be used with CAN 2.0A & 2.0B, CANopen®, DeviceNet, SAE J1939
- CAN bus according to ISO 11898-2
- DIN rail mounting



Technical Data

Dimensions in mm (D x W x H)	31 x 74 x 75
Weight	Approx. 130 g
Power supply	
Voltage	18 - 30 V DC
Current consumption	typ. 35 mA max. 60 mA
CAN interfaces	
Type	2 x ISO/DIN 11898-2 CAN High Speed physical Layer
Transmission rate	10 kbps up to 1 Mbps
Protocol	CAN 2.0A (11 Bit) CAN 2.0B (29 Bit) CANopen® SAE J1939 DeviceNet
Connection	2 x Connector, SUB-D, 9-way
Status display	5 LEDs
Configuration interfaces	
Type	USB 1.1
Connection	Mini USB socket
Ambient temperature	-25 °C ... 60 °C
Transport and storage temperature	-25 °C ... 75 °C