



CAN Bus

Modules for the 300/400 series

DP/CAN coupler

Connectors

PN/CAN gateway

CAN bridge

CAN 300 PRO, communication module



CAN 300 PRO, communication module

The CAN 300 PRO module, for use in an S7-300¹ from Siemens, enables connection of CAN participants with the automation device.

The module can be plugged into either the central frame or the expansion frame. It supports CAN 2.0A (11 bit) and CAN 2.0B (29 bit) telegrams with a freely selectable baud rate from 10 kbps to 1 Mbps.

The CAN 300 PRO can send and receive CAN telegrams in Layer 2 mode. In the CANopen[®] master mode, the data of the CANopen[®] slaves can be processed as a process map in the PLC.

Use as a CANopen[®] slave is also possible. For standard applications, such as motor control with CANopen[®], application examples are available. In addition, handling blocks for the SAE J1939 protocol are available.

There are 16 freely settable timers available in the CAN 300 PRO. Each timer can trigger a freely programmable CAN telegram. This means the synchronous protocols widely available in drive and servo control are easy to implement using the CAN 300 PRO.

A DIP switch for setting the baud rate and station address facilitates commissioning. An optional Micro memory card stores the project. In this way, replacement of the parameterization or the module during servicing can be carried out quickly.

6 LEDs indicate the operating status of the module. There is a USB interface for diagnostics and parameterization.

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

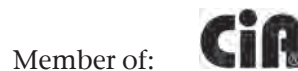
A USB programming cable is included in the delivery.

ORDERING DATA

ORDERING DATA	ORDER NO.
CAN 300 PRO, communication module (incl. USB programming cable)	700-600-CAN12
Micro memory card, 256 Kbyte	700-953-8LH30
CAN 300 PRO Manual, German/English	900-600-CAN12
CAN training (see also page 120)	400-600-CAN01

FEATURES

- Layer 2, 11 bit and 29 bit (CAN 2.0 A/B)
- CANopen[®] master on the module
- DIP switches for address + baud rate
- Memory card for project backup (optional)
- USB interface for parameterization and diagnostics
- Extensive CAN bus diagnostic possibilities
- Can also be used as CANopen[®] slave
- Extended ambient temperature



Member of:

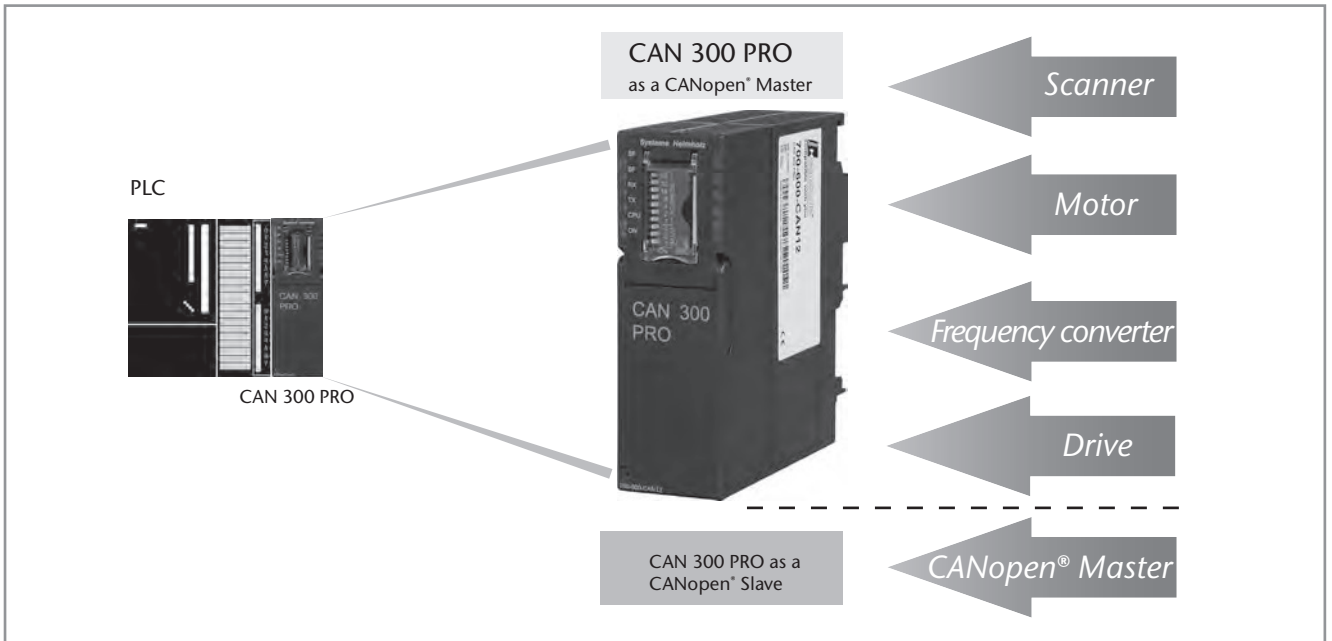
Note

On page 75 you will find information on the parameterization software CANParam and on the handling blocks for the PLC. In the first use, handling blocks for the PLC are needed.

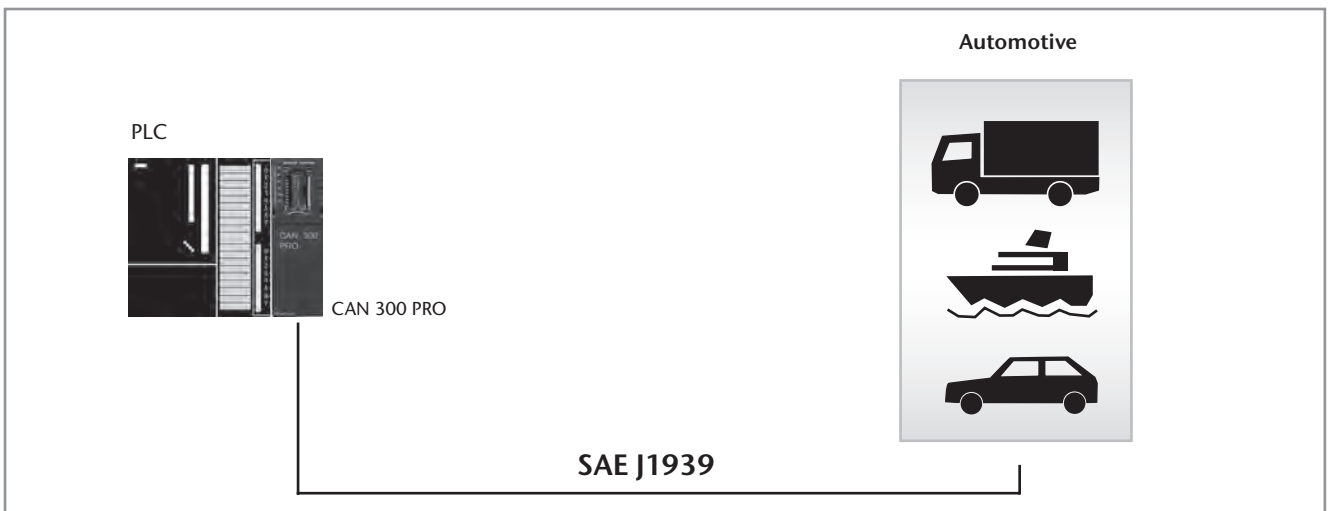
TECHNICAL DATA

Dimensions in mm (D x W x H)	116 x 40 x 125
Weight	Approx. 280 g
Power supply Voltage	DC +5 V via backplane bus
Current draw	typ. 160 mA max. 190 mA
CAN interface 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)
Connector	Connector, SUB-D, 9-pin
Status indicator	6 LEDs
Configuration interface Type	USB 1.1
Connector	USB-B socket
Ambient temperature	-25 °C ... +60 °C
Transport and storage temperature	-25 °C ... +75 °C

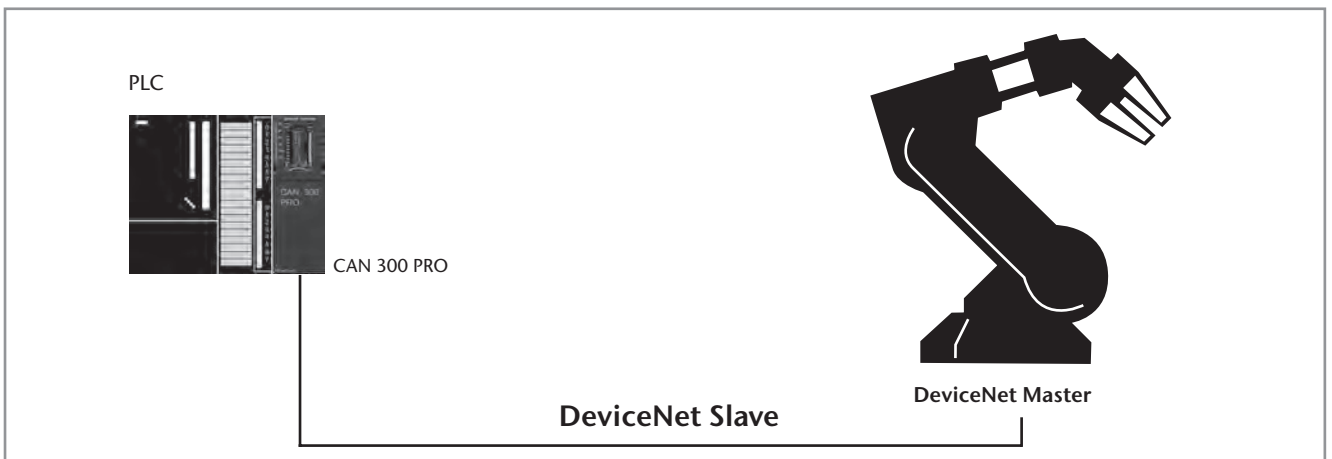
1) S7-300 is a registered trademark of Siemens AG.



Application example of CAN 300 PRO as CANopen® master/slave



Application example CAN 300 PRO SAE J1939 protocol



Application example CAN 300 PRO as DeviceNet slave

CAN 400, communication module



CAN 400, communication module

The CAN 400 module, for use in an S7-400¹ from Siemens, enables connection of CAN participants with the automation device. The module can be plugged into either the central frame or the expansion frame.

It supports CAN 2.0A (11 bit) and CAN 2.0B (29 bit) telegrams with a freely selectable baud rate from 10 kbps to 1 Mbps.

The CAN 400 can be operated as Layer 2, CANopen[®] master or CANopen[®] slave.

The module contains the scripts for “Power On”, “Stop -> Run”, “Run -> Stop”, “Power Off”. Using a multi-stage acceptance mask, relevant IDs can be pre-filtered for the automation device.

In the CAN 400, there are 16 freely settable timers up to a resolution of 1 ms. Each timer can trigger a freely programmable CAN telegram. This means the synchronous protocols widely available in drive and servo control are easy to implement using the CAN 400.

FEATURES

- Layer 2, 11 bit and 29 bit (CAN 2.0 A/B)
- DIP switches for address + baud rate
- USB interface for parameterization and diagnostics
- Extensive CAN bus diagnostic possibilities
- Can also be used as CANopen[®] master or CANopen[®] slave



Member of:

Note

On page 75 you will find information on the parameterization software CANParam and on the handling blocks for the PLC. In the first use, handling blocks for the PLC are needed.

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
CAN 400 Manual, German/English	900-640-CAN21
CAN training (see also page 120)	400-600-CAN01

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

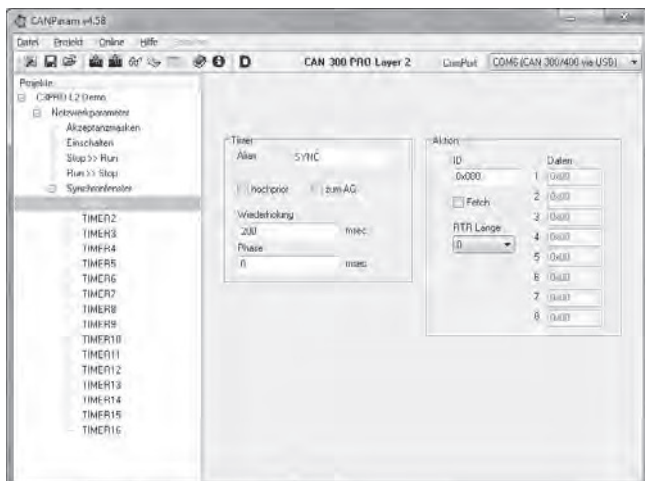
TECHNICAL DATA

	CAN 400-1	CAN 400-2
Dimensions in mm (D x W x H)	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 draw	560 mA	600 mA
CAN interface		
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
Connector	Connector, SUB-D, 9-pin	Connector, SUB-D, 9-pin
Status indicators	6 LEDs	10 LEDs
Configuration interface		
Type	USB 1.1	USB 1.1
Connector	USB-B socket	USB-B socket
Ambient temperature	0 °C ... +60 °C	0 °C ... +60 °C
Transport and storage temperature	-25 °C ... +75 °C	-25 °C ... +75 °C

Parameterization tool CANParam

The CAN modules are configured on the PC with the parameterization tool CANParam (included in the software package 800-600-1AA11). This means the communication parameters can be easily set. The parameters for 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).



Acceptance masks are available in the CAN modules. Using these masks, it is possible to activate or block various telegram IDs for reception. Express masks filter high-priority CAN telegrams to pass them directly to the PLC.

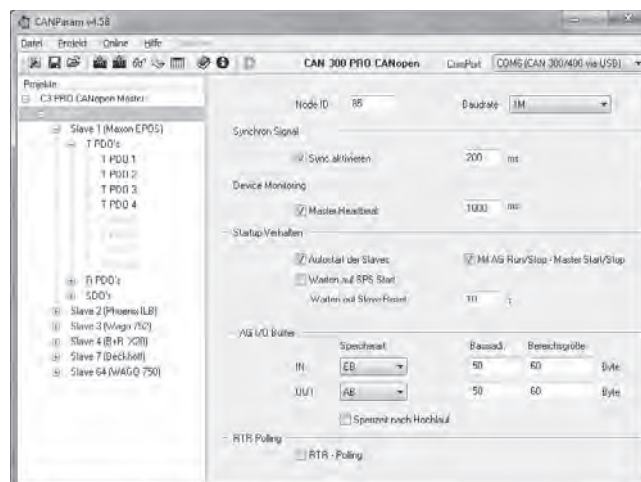
For time-dependent events, such as the SYNC frame in CANopen®, up to 16 timers with a resolution of up to 1 ms are available in the CAN modules. Each timer can transmit any CAN telegram. The timers can be started, stopped, and changed from the PLC. In addition, synchronized transmission of CAN messages can be enabled. With this, a time window in which all data will be transmitted synchronously is specified.

Using freely programmable scripts, upon certain events, such as “Power ON” or “PLC Stop -> Run”, CAN messages can be sent or timers started.

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

For the CANopen® master function of the CAN 300 PRO, the behavior of the master can be defined and the slaves that exist in the CAN bus can be parameterized.

To simplify configuration, the CANParam software can read in the EDS files from CANopen® slaves.



Handling blocks

The CAN modules are entered in the hardware configurator of the programming software as CP module (CAN 300, CAN 300 PRO) or as FM module (CAN 400) and addressed in the STEP 1 7 program / TIA Portal¹ using handling blocks.

For the CAN modules, handling blocks are available for Layer 2 communication and for the CANopen® master (DS301 V4). For use of the CAN modules as CANopen® slaves, handling for the profiles DS401 (IO modules) and DS420 (Corrugator) is available. Additional profiles can be prepared on request.

Functionality of the Layer 2 handling:

- Send CAN telegram
- Receive CAN telegram
- Start/stop timer
- Module reset
- CAN controller reset

With the handling blocks for Layer 2, any number of CAN protocols can be implemented in 11-bit and 29-bit mode.

Functionality of the CANopen® master handling:

- Read/send SDO
- SDO segmented download/upload
- Receive emergency
- Send/request PDO
- Node guarding / heartbeat monitoring
- Network management functions
- Error control

Application examples for control of drives according to profile DS402 are also available.

Furthermore, handling blocks for the application of the CAN 300 PRO as a DeviceNet slave are available.

ORDERING DATA

Handling blocks for CAN
CD with parameterization software
“CANParam”, handling blocks “Layer 2”,
“CANopen®”, and “SAE J1939”

ORDER NO.

800-600-1AA11

CANopen® slave handling

Upon request

Devicenet slave handling

Upon request

CAN training (see also page 120)

400-600-CAN01

1) STEP and TIA Portal are registered trademarks of Siemens AG.

DP/CAN coupler CANopen® Layer 2



DP/CAN coupler CANopen® Layer 2

The DP/CAN coupler integrates CANopen® devices into a PROFIBUS DP network. It is a full-fledged CANopen® master and supports network management, SYNC telegrams, and node guarding to monitor the participants.

On the PROFIBUS-DP, the DP/CAN coupler is a normal participant. The IO data of the CANopen® participants is shown in the PROFIBUS in a transparent and freely configurable manner.

The DP/CAN coupler is integrated in the hardware configurator with a GSD file and can be completely configured there. Additional tools are not necessary.

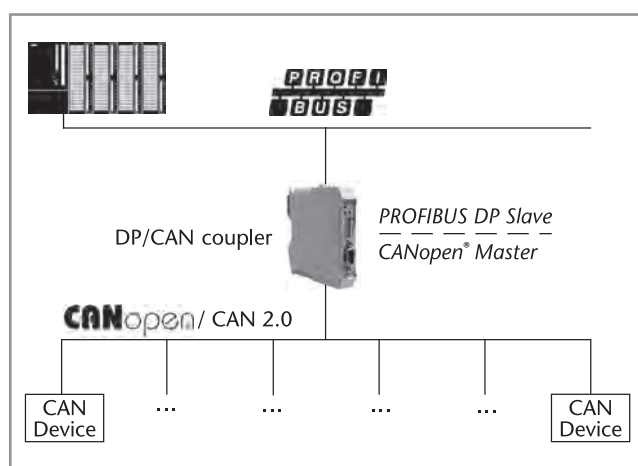
On PROFIBUS all standard transfer rates up to 12 Mbps are supported, on the CAN bus up to 1 Mbps.

The PROFIBUS address is set using a DIP switch.

Parameterization of the CANopen® participants using 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 makes it possible to also integrate customer-specific CAN protocols via PROFIBUS.

FEATURES

- Up to 15 CANopen® participants
- Up to 1 Mbps CAN baud rate
- Up to 12 Mbps PROFIBUS-DP
- Address setting using DIP switches
- Easy configuration via GSD file
- No handling blocks or parameterization software necessary
- CANopen® master and CAN Layer 2 possible
- Address and operating mode can be set via DIP switch
- 3 status LEDs
- Extended ambient temperature
- USB interface for firmware updates



Application example DP/CAN coupler CANopen®

TECHNICAL DATA

Dimensions in mm (D x W x H)	114 x 18 x 108
Weight	Approx. 110 g
Power supply	
Voltage	24 V
Current draw	Approx. 180 mA
CAN interface	
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)
Connector	Terminal, 3-pin
Status indicator	3 LEDs
PROFIBUS-DP interface	
Transfer rate	max. 12 Mbps, autom. detection
Protocol	PROFIBUS-DP as per EN 50 170
Connector	SUB-D socket, 9-pin
Ambient temperature	-25 °C ... +70 °C
Transport and storage temperature	-40 °C ... +75 °C
Relative humidity	max. 80 % at +20 °C, non-condensing
Protection rating	IP 20

ORDERING DATA

DP/CAN coupler CANopen® Layer 2
(incl. manual, CD with software)

ORDER NO.

700-650-CAN01

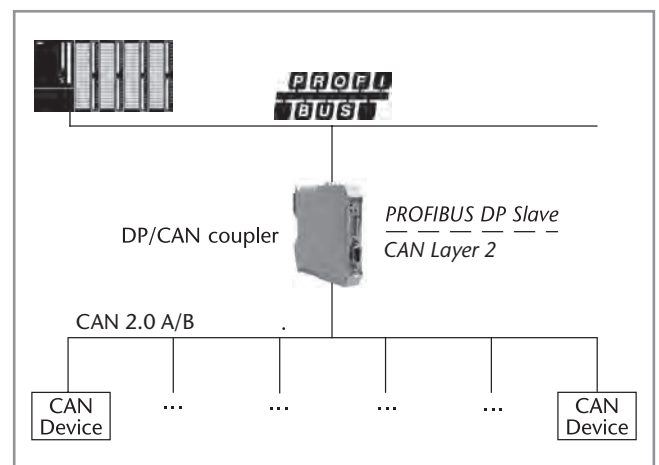


DP/CAN coupler Layer 2

The DP/CAN coupler Layer 2 allows you to connect any number of CAN participants to the PROFIBUS-DP. The DP/CAN coupler Layer 2 must be parameterized in the hardware configurator as a PROFIBUS participant. Corresponding GSD files are included with the device. The PROFIBUS side is configured as a DP slave; the interfaces correspond to EN 50170 and are electrically isolated. The baud rate from 9.6 kbps to 12 Mbps is automatically detected, and the size of the input and output information is up to 312 bytes. The CAN bus interface complies with ISO/DIN 11898-2 and is electrically isolated. The DP/CAN coupler can send and receive any CAN messages. Messages can be defined with a fixed identifier, whose data is always visible as a peripheral image in PROFIBUS. Alternatively, the DP/CAN coupler Layer 2 has a transmit and receive buffer for any CAN messages.

FEATURES

- Up to 1 Mbps CAN baud rate
- Up to 12 Mbps PROFIBUS-DP
- Address setting using DIP switches
- Easy configuration via GSD file
- No handling blocks or parameterization software necessary
- Any protocols via Layer 2 possible
- CAN 2.0 A (11 bit)
- CAN 2.0 B (29 bit)
- Timer for cyclical telegrams
- 3 status LEDs
- Extended ambient temperature
- USB interface for firmware updates



Application example DP/CAN coupler Layer 2

TECHNICAL DATA

Dimensions in mm (D x W x H)	114 x 18 x 108
Weight	Approx. 110 g
Power supply	
Voltage	24 V
Current draw	Approx. 180 mA
CAN interface	
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)
Connector	Terminal, 3-pin
Status indicator	3 LEDs
PROFIBUS-DP interface	
Transfer rate	max. 12 Mbps, autom. detection
Protocol	PROFIBUS-DP as per EN 50 170
Connector	SUB-D socket, 9-pin
Ambient temperature	-25 °C ... +70 °C
Transport and storage temperature	-40 °C ... +75 °C
Relative humidity	max. 80 % at +20 °C, non-condensing
Protection rating	IP 20

ORDERING DATA

DP/CAN coupler Layer 2
(incl. manual, CD with software)

ORDER NO.

700-651-CAN01

Bus connector for CAN Bus



CAN Bus connector, 90° cable outlet

The bus connectors for the CAN bus are used to connect a CAN bus participant to the CAN bus line. The connector is quickly mounted and has an integrated, connectable terminating resistor.

Helmholz offers you the bus connector with vertical cable outlet and for transmission rates up to 1 Mbps.

The bus connector is plugged directly onto the CAN bus interface (SUB-D socket, 9-pin) of the CAN bus participants. The CAN bus cables are connected using 6-pin screw terminals.

A slide switch is used to set whether the connector is to be used as a node or at the segment end. The switch can also be operated in the installed condition. The setting is clearly visible.

In node setting ("OFF"), the connector must be operated when the incoming and outgoing bus are connected to each other. The terminating resistor is then ineffective.

As segment end ("ON"), the connector must be set on the first and last (outermost) participants of the segment. In this case the terminating resistor is connected on the incoming bus, and the outgoing bus is disconnected.

The bus connectors for CAN bus are also available in axial design and with 24 V supply for participant supply.

The CAN connectors also work in the extended ambient temperature range of -25 °C to +85 °C¹.

ORDERING DATA

	ORDER NO.
CAN Bus connector 90°, without additional device connection	700-690-1BA12
CAN Bus connector 90°, with additional device connection	700-690-1BB12
CAN Bus connector, axial	700-690-0CA12



CAN Bus connector, axial

FEATURES

- 24 V supply for participant supply (only at 90°)
- Metalized housing
- No parts that can be lost
- 90° and axial cable outlet available
- Small size



Member of:



TECHNICAL DATA

Socket	
Order No. 700-690-1BB12	Yes
Order No. 700-690-1BA12	No
Order No. 700-690-0CA12	No
Dimensions in mm (D x W x H)	
700-690-1BB12/690-1BA12	64 x 40 x 17
700-690-0CA12	68 x 35 x 17
Weight	Approx. 40 g
Terminating resistor	Resistor 120 Ω, integrated and can be switched with slide switch
Transfer rate	max. 1 Mbps
Interfaces	
CAN bus participants	SUB-D socket, 9-pin
CAN bus cable	6 serial terminals for wires up to 0.5 mm ²
Maximum outside diameter	8.0 mm
Ambient temperature	-25 °C ... +85 °C ¹
Transport and storage temperature	-25 °C ... +85 °C
Relative humidity	max. 75% at +25 °C
Protection rating	IP 20

1) The maximum ambient temperature for UL is 60 °C.

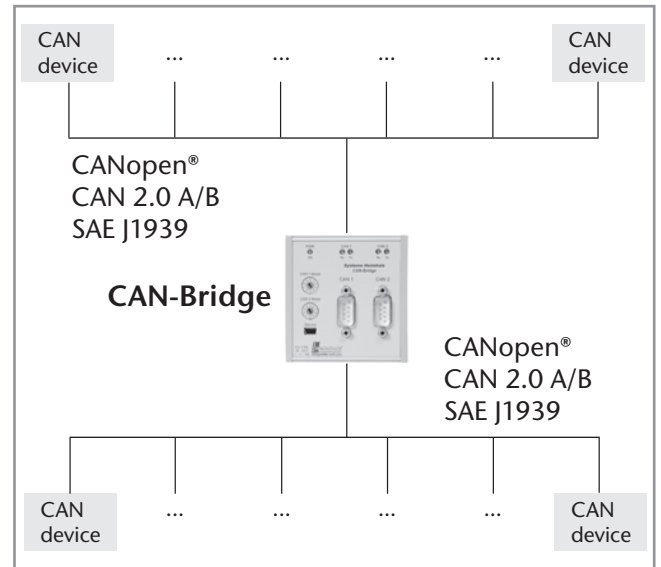


CAN Bridge, connecting CAN networks

The CAN bridge makes it possible to connect two CAN networks of the same type or of different types. It can be used as a message repeater to expand network distances, as well as to connect different CAN networks together. It is immaterial whether the CAN networks have different baud rates or work with different protocols, such as CANopen® and a proprietary protocol. A flexibly adjustable filtering logic can accept freely selectable identifiers and transfer them to the other network. The CAN messages are forwarded to the respective other CAN network according to the store-forward principle and sent out again. With the CAN bridge, the CAN networks are physically decoupled (electrical isolation) and the bus load is reduced on both CAN networks. The CAN bridge allows a flexible design of the network topology; star and tree structures as well as extensive line structures can be implemented. The CAN bridge can be configured for simple applications using the two rotary coding switches. For more complex applications, the supplied CAN bridge parameterization software can be used to flexibly adjust the filtering and forwarding of CAN telegrams. Up to 256 range filters are available, along with up to 4 bit filters for address filtering. The configuration is imported through a USB interface and can also be read out again. The CAN bridge works both in 11-bit and 29-bit mode, and can communicate with baud rates from 10 Kbaud to 1 Mbaud. It has a powerful microcontroller that can operate even with extremely high data rates and bus loads without loss of messages. 5 LEDs indicate the status of the device and the connected CAN networks.

FEATURES

- Enlargement of the network scope
- Connect different CAN networks (different baud rates / different protocols)
- Physical disconnection (electrical isolation)
- Reduced bus load on both CAN networks
- Autobaud detection
- Easy configuration mode
- For use with CAN 2.0A & 2.0B, CANopen®, DeviceNet, SAE J1939
- 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 draw	typ. 35 mA max. 60 mA
CAN interfaces	
Type	2 x 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® SAE J1939 DeviceNet
Connector	2 x connector, SUB-D, 9-pin
Status indicator	5 LEDs
Configuration interface	
Type	USB 1.1
Connector	Mini USB socket
Ambient temperature	-25 °C ... +60 °C
Transport and storage temperature	-25 °C ... +75 °C

ORDERING DATA

CAN Bridge, connecting CAN networks
2 x CAN bus connections (incl. manual,
software and USB programming cable)

ORDER NO.

700-660-2AA01

PN/CAN Gateway, PROFINET/CANopen®



PN/CAN Gateway

The PN/CAN gateway connects CANopen® devices in a PROFINET network. At the same time, it is a full-fledged CANopen® master. As the master, it supports gateway network management, SYNC telegrams, and node guarding / heartbeat for monitoring the participants.

On the PROFINET network, the PN/CAN gateway is a PROFINET IO device that supports transfer rates up to 100 Mbps full duplex, and on the CAN bus up to 1 Mbps is supported.

The IO data (PDOs) of the CANopen® participants is transparently displayed in a freely configurable manner in the PROFINET network and can be processed directly in the PLC.

The PN/CAN gateway is integrated with a GSDML file in the hardware configurator and can be completely configured there.

Other software tools for parameterization or handling blocks for programming are not required.

Parameterization of the CANopen® participants using SDO telegrams and management of emergency messages is also possible.

Device variants with CAN Layer 2 and CANopen® Slave are in development.

FEATURES

- PROFINET IO device as per IEC 61158-6-10
- Integrated 2-port switch
- Full duplex 100 Mbps transmission rate
- Conformance class B
- Media Redundancy Protocol (MRP)
- Up to 127 CANopen® participants
- Up to 1 Mbps CAN baud rate
- Easy configuration via GSDML file, no handling blocks or parameterization software necessary
- CANopen® master and CAN layer 2 possible
- Up to 16 PDOs per CANopen® slave
- SDO communication, emergency messages, participant monitoring with heartbeat and node guarding
- Extensive diagnostic functions
- 3 two-color status LEDs
- USB interface for online diagnostics and firmware update
- DIN rail mounting

TECHNICAL DATA

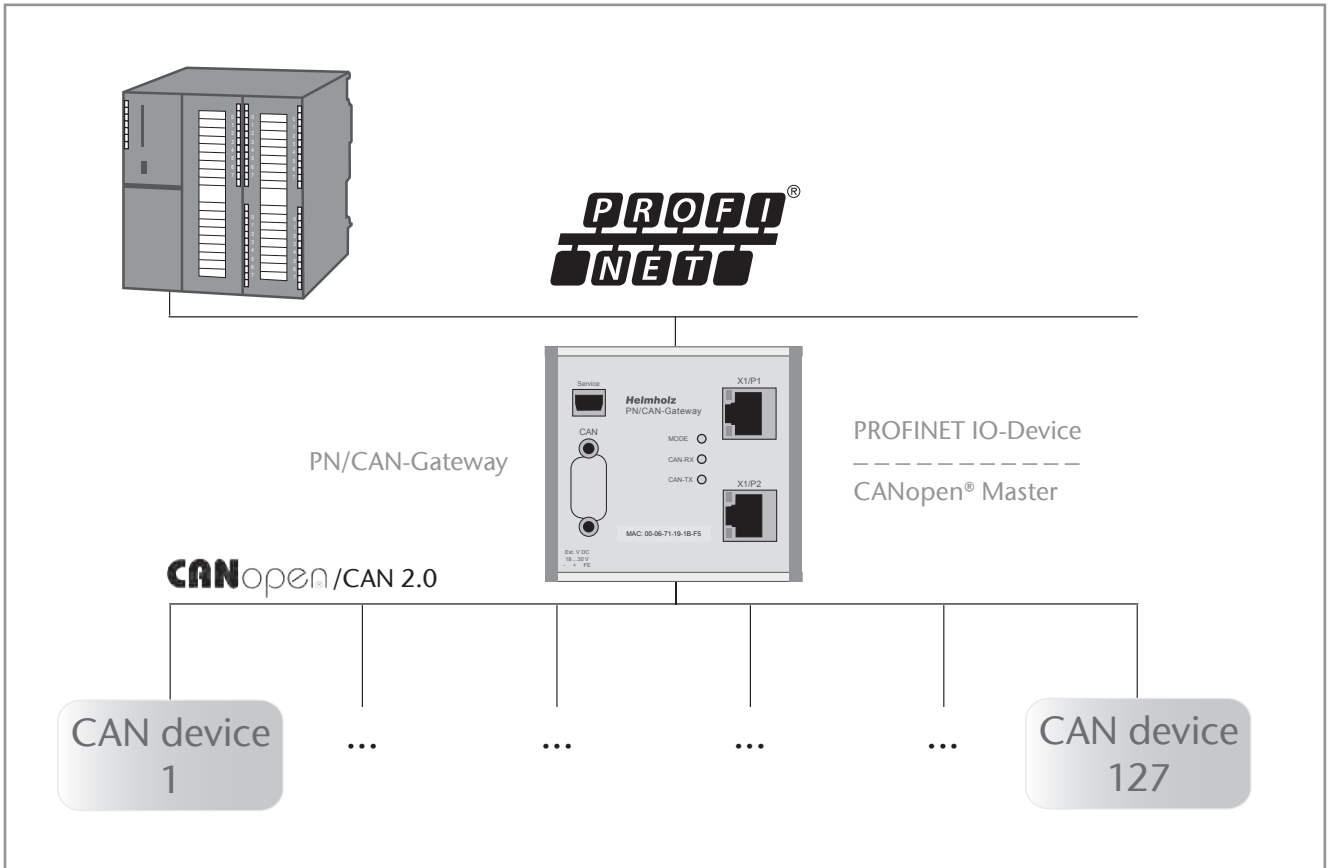
Dimensions in mm (D x W x H)	35 x 83 x 72
Weight	Approx. 160 g
Power supply	
Voltage	24 V
Current draw	max. 250 mA
CAN interface	
Type	ISO/DIN 11898-2 CAN high-speed physical layer
Transmission rate	10 kbps to 1 Mbps
Protocol	CANopen® master
Connector	Connector, SUB-D, 9-pin
PROFINET interfaces	
Protocol	PROFINET IO as per IEC 61158-6-10
Physical layer	Ethernet
Transmission rate	100 Mbps, full-duplex
I/O image size	Up to 1440 bytes
Connector	2 x RJ45, integrated switch
Features	Conformance class B, Media Redundancy Protocol (MRP), automatic addressing / topology detection (LLDP, DCP)
Status indicator	3 two-color LEDs
Ambient temperature	0 °C ... +60 °C
Transport and storage temperature	-25 °C ... +75 °C
Protection rating	IP 20

ORDERING DATA

PN/CAN gateway, PROFINET/CANopen®
(incl. Quick Start Guide, CD with GSDML file
and manual)

ORDER NO.

700-670-PNC01



Application example for PN/CAN gateway