

# Controller Area Networks



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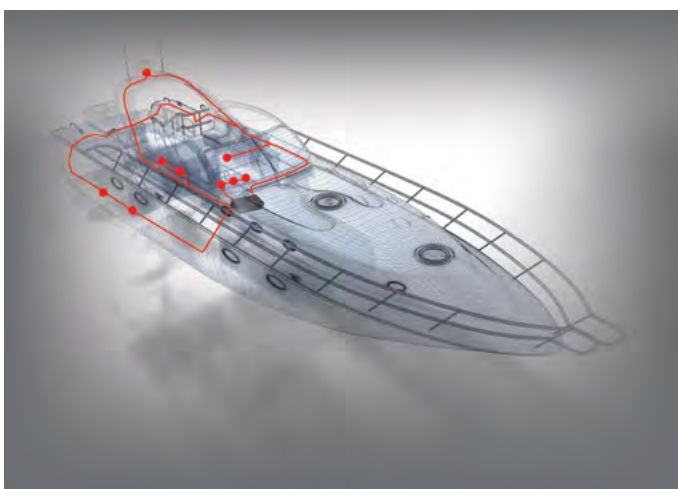
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## CAN Overview

Controller Area Networks, or CAN, are multiplex data systems. Multiplexing allows multiple data signals to travel on the same wires, integrating separate electronic systems and applications to a single point control and monitoring system. Using signals sent over a serial network, CAN systems provide instantaneous monitoring of diagnostic and control systems allowing early detection of potential problems. Early detection of problems leads to lower repair costs and reduced downtime. CAN systems allow an operator to use a single command station to control diagnostic systems and receive such varied information as brake and transmission temperature, tire pressure, fuel efficiency, and emissions levels. Anything that can be measured and controlled electronically can be monitored and directed by a CAN system.

Whether you're building a Controller Area Network for anything from on/off-highway, construction, material handling, agriculture machines, or your OEM fleet of fire engines, there is a DEUTSCH solution for your CAN needs. Options include several configurations: 2-wire, 3-wire, and 4-wire, with in-line and flange mount, along with splitters, heavy duty breakaway connectors, and an off-board 9-pin diagnostic connector.

SAE J1939 is a specific type of CAN that defines the communications pathways for vehicle networks. Improved electrical systems as defined under SAE J1939 allow electrical devices to communicate with each other. Communication occurs using a Controlled Area Network between intelligent sensors over a serial network. Through a series of microprocessors a CAN interconnects every device establishing a common link between each.



There are four main electrical interconnect subsets of J1939 including /11, /12, /13, and /15:

- J1939/11 is a 3-wire system that uses the DEUTSCH DT Series connectors primarily for truck and bus. The DT Series accepts size 16 contacts and 14-20 AWG. Connector options include in-line, bulkhead, "Y" splitter, and terminating resistors.
- J1939/12 is a system that requires the DEUTSCH DT Series, HD30 Series, and ISO Box (HDBox). This group of electrical interfaces terminates a CAN between the tractor and its implement. Its main feature is a breakaway function that prevents damage to the tractor or implement in case of an accidental drive-away disconnect.
- J1939/13 is a system that uses the DEUTSCH HD10 Series connectors for on-board diagnostics. The HD10 Series accepts size 16 contacts and 14-20 AWG.
- J1939/15 is a 2-wire system that uses the DEUTSCH DTM Series connectors. The DTM Series accepts size 20 contacts and 16-22 AWG. Connector options include in-line, "Y" splitter, and terminating resistors.

The continued sophistication in design of equipment is demanding increased response of electrical systems. The application of J1939 has allowed designers to improve both the quantity and the quality of the options offered along with the increased electrical system reliability.

## ■ J1939/13 Universal 9-pin Diagnostic

Part Number	Description
HD10-9-1939P	Receptacle
HD10-9-1939P-B022	Receptacle, Panel Nut Mount
HD10-9-1939PE-B022	Receptacle, Panel Nut Mount, Reduced Wire Seal
HD10-9-1939PE	Receptacle, Reduced Wire Seal
HD16-9-1939S	Plug, Coupling Ring
HD16-9-1939SE	Plug, Coupling Ring, Reduced Wire Seal
HD17-9-1939S	Plug, No Coupling Ring (Slip-on)
HD17-9-1939SE	Plug, No Coupling Ring (Slip-on), Reduced Wire Seal
0460-202-1631	Pin, Solid, Size 16, Gold
0460-247-1631	Pin, Solid, Size 16, Gold, Extended
0462-201-1631	Socket, Solid, Size 16, Gold
0462-221-1631	Socket, Solid, Size 16, Gold, Extended

DEUTSCH J1939/13, HD10 9 pin connector is a standard diagnostic tool interface for on- and off-highway OEMs. The HD10-9-1939P is a data port connector designed to allow an on-board CAN system to mate with a diagnostic computer. The connectors are for use with the 250 kbps network. The DEUTSCH HD10 J1939/13 connectors offer several mounting options for the receptacle, and a mating plug that is available with or without a coupling ring.



## ■ J1939/13 Type II Universal 9-pin Diagnostic

Part Number	Description
HD10-9-1939P-P080	Receptacle, Flange Mount, Type II
HD10-9-1939PE-P080	Receptacle, Flange Mount, Type II, Reduced Wire Seal
HD10-9-1939P-BP03	Receptacle, Panel Nut Mount, Type II
HD10-9-1939PE-BP03	Receptacle, Panel Nut Mount, Type II, Reduced Wire Seal
HD14-9-1939P-P080	Receptacle, Type II
HD14-9-1939PE-P080	Receptacle, Type II, Reduced Wire Seal
HD16-9-1939S-P080	Plug, Coupling Ring, Type II
HD16-9-1939SE-P080	Plug, Coupling Ring, Type II, Reduced Wire Seal
HD17-9-1939S-P080	Plug, No Coupling Ring (Slip-on), Type II
HD17-9-1939SE-P080	Plug, No Coupling Ring (Slip-on), Type II, Reduced Wire Seal
0460-202-1631	Pin, Solid, Size 16, Gold
0460-247-1631	Pin, Solid, Size 16, Gold, Extended
0462-201-1631	Socket, Solid, Size 16, Gold
0462-221-1631	Socket, Solid, Size 16, Gold, Extended

DEUTSCH J1939/13, HD10 9 pin connector is a standard diagnostic tool interface for on- and off-highway OEMs. The HD10-9-1939P\*-P080 is a data port connector designed to allow an on-board CAN system to mate with a diagnostic computer. The green, Type II connectors, HD10-9-1939P-P080, are for use with the 500 kbps network. The DEUTSCH HD10 J1939/13 connectors offer several mounting options for the receptacle, and a mating plug that is available with or without a coupling ring.



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## ■ SAE J1939/11 DEUTSCH Connector Options

Part Number	Description
DT04-3P-P007	Receptacle, "Y" Connector
DT04-3P-E008	Receptacle, Gray, Shrink Boot Adapter
DT04-3P-P006	Receptacle, Gray, 120 Ohm Resistor
DT04-3P-EE01	Receptacle, Black, Shrink Boot Adapter
DT04-3P-EP10	Receptacle, Black, 120 Ohm Resistor
DT06-3S-E008	Plug, Gray, Shrink Boot Adapter
DT06-3S-P006	Plug, Gray, 120 Ohm Resistor
DT06-3S-EP11	Plug, Black, Shrink Boot Adapter
DT06-3S-PP01	Plug, Black, 120 Ohm Resistor
DT06-3S-PE01	Plug, Black, 120 Ohm Resistor, Latch Guard
DT06-3S-P032	Plug, Black, Single Piece Shrink Boot Adapter
W3P-1939	Wedgelock, Blue
W3S	Wedgelock, Orange
W3S-P012	Wedgelock, Green
W3S-1939	Wedgelock, Blue
W3S-1939-P012	Wedgelock, Blue
0460-202-1631	Pin, Solid, Size 16, Gold
1060-16-0144	Pin, Stamped & Formed, Size 16, Gold
0460-247-1631	Pin, Solid, Size 16, Gold, Extended
0462-201-1631	Socket, Solid, Size 16, Gold
1062-16-0144	Socket, Stamped & Formed, Size 16, Gold
0462-221-1631	Socket, Solid, Size 16, Gold, Extended

DEUTSCH J1939/11 connectors are rugged field proven DT 3 pin connectors designed to meet the SAE requirements for 3-wire CAN applications linking ECUs for serial data communications. The DT 3 way connectors accommodate the CAN\_HI, CAN\_LO and shield wires with a variety of options including "Y" receptacles, connectors with mounting flanges, keyed wedgelocks to prevent mis-mating, and network terminating connectors with molded-in 120Ω resistors.



## SAE J1939/15 DEUTSCH Connector Options

Part Number	Description
DTM04-2P-P007	Receptacle, "Y" Connector
DTM04-2P-E007	Receptacle, Gray, Shrink Boot Adapter
DTM04-2P-P006	Receptacle, Gray, 120 Ohm Resistor
DTM04-2P-EE03	Receptacle, Black, Shrink Boot Adapter
DTM06-2S-E007	Plug, Gray, Shrink Boot Adapter
DTM06-2S-P006	Plug, Gray, 120 Ohm Resistor
DTM06-2S-EE03	Plug, Black, Shrink Boot Adapter
DTM06-2S-EP10	Plug, Black, 120 Ohm Resistor
WM-2P	Wedgelock, Orange
WM-2PA	Wedgelock, Gray
WM-2PB	Wedgelock, Black
WM-2S	Wedgelock, Orange
WM-2SA	Wedgelock, Gray
WM-2SB	Wedgelock, Black
0460-202-2031	Pin, Solid, Size 20, Gold
1060-20-0144	Pin, Stamped & Formed, Size 20, Gold
0462-201-2031	Socket, Solid, Size 20, Gold
1062-20-0144	Socket, Stamped & Formed, Size 20, Gold

SAE J1939/15 defines the requirements for reduced physical layer 2-wire CAN systems consisting of an unshielded twisted pair of wires. DEUTSCH DTM 2 way connectors are offered in several modifications to meet the requirements of this standard. DTM connectors for serial data communications include "Y" receptacles, connectors with end caps and shrink boot adapters, and receptacles with molded-in 120Ω resistors for network terminations.



## ISO/CD 11783-2 & J1939/12 ISO Box and Associated Connectors

Part Number	Description
HDBOX-24-91PN	ISO Box Assembly
HDBOX-24-91PE	ISO Box Assembly, Reduced Wire Seal
HD36-24-91SN-059	Plug, Cable Clamp Assembly
HD36-24-91SE-059	Plug, Cable Clamp Assembly, Reduced Wire Seal
HDB36-24-91SN-059	Plug, Breakaway Coupling, Cable Clamp Assembly
HDB36-24-91SE-059	Plug, Breakaway Coupling, Cable Clamp Assembly, Reduced Wire Seal
DT06-4S-EP06*	Plug, Black, End Cap
DT06-2S-EP06*	Plug, Black, End Cap
W4S-P012	Wedgelock, Green
W2S-P012	Wedgelock, Green
0460-204-08141	Pin, Solid, Size 8
0460-204-12141	Pin, Solid, Size 12
0460-202-1631	Pin, Solid, Size 16, Gold
0462-203-08141	Socket, Solid, Size 8
0462-203-12141	Socket, Solid, Size 12
0462-201-1631	Socket, Solid, Size 16, Gold

Originally designed for agricultural applications, the DEUTSCH J1939/12 ISO Box creates a communication pathway between an on-board CAN system and the electronic components on an attached implement. The HDBox, which holds two DT13 connectors and an HD30 Series receptacle, mounts on the vehicle and mates with an HD30 plug connector that features a breakaway coupling ring. DEUTSCH breakaway couplings are designed to help prevent damage to the vehicle or the attached implement by fragmenting and separating from the vehicle in the event of a drive-away disconnect.



\*DT Series receptacles are molded in the HDBox