



INTERCONNECTIONS FOR  
**CONTROLLER AREA NETWORKS**

# Connecting to Technology

## *OEM's future electrical demands for off-highway equipment driven today by highway systems*

Today's over-the-road electrical systems are driving the demand for improved electrical communication systems. Trucks go down the road today monitoring everything from brake and transmission temperature, fuel usage to light bulb life and this may only be the beginning. Some predictions are that in the future, trucks and buses may have as many as forty functions controlled by computer. Thus, the demand for standardized electrical interfaces is expected to increase. Applications will also expand in the off-highway markets to excavators, implements and trenchers.

The common thread is SAE J1939. Improved electrical systems as defined under SAE J1939 allow electrical devices to communicate with each other. Communication occurs using a Controller Area Network (CAN) between intelligent sensors over a serial network. Through a series of microprocessors a CAN interconnects every device establishing a common link between each. The host CAN protocol has been around about ten years. The heart of these systems is microchip based. These chips are now widely available and able to function in harsh environments making them suitable for off-highway use. Their application began on production factory floors in motion and process controllers, moved into cars and trucks and are now migrating into the off-highway markets.

In a market place fueled by demands to do more, better and faster there is more good news for off-highway OEM's. CAN chips are now evolving into second and third generations. Many of these chips are specialized to perform specific tasks and are now readily available.

Defined in SAE J1939 under slash sheets /11, /12, /13 and /15 are electrical interconnects. Under /11 is a description of the truck and bus physical layer and four connectors. The Deutsch standard "DT" series represents the connector of choice for these general purpose applications. An inline, bulkhead, "T" splitter and terminating connector make up this hardware set. The /12 is actually released internationally as specification ISO/CD 11783-2 and defines an ISO Box and three connector pairs. This group of electrical interfaces terminates a CAN between the Tractor and its implement. Its main feature is a "break-away" function that prevents damage to the tractor or implement in case of an accidental drive-away disconnect. The /13 portion of the document describes the nine pin diagnostic connector set. This includes a standard Deutsch "HD10" mated pair and a plug tool for testing. Like other components in this system these interconnects are rugged off-the-shelf items that have proven themselves over time.





Whether you're building a Controlling Area Network for on- or off-highway, machine manufacture, construction, material handling, forestry machines, aerial work platforms, road building, or your OEM fleet of fire engines, your local Deutschman can supply your needs. We offer several configurations: 2-wire, 3-wire, and 4-wire, in-line and flange mount, along with splitters, heavy-duty breakaway connectors, and off-board 9-pin diagnostic connector.

Without Deutsch's J1939-approved interconnecting devices and ISO/CD 11783-2 approved ISO Box Interface, today's farm implements and construction machinery wouldn't be nearly as smart. This little black box accommodates ISO 11783-2's 4-wire technology with a circuit board inside transmitting signals between farm implements and tractors.



The continued sophistication in design of construction equipment is demanding the same systems responsiveness as the heavy trucking and agricultural industries. The application of J-1939 has allowed designers to improve both the quantity and quality of the options offered along with increased electrical system reliability.



Mounted in the truck cab, bus passenger door, or by the operator's seat or under the dash of construction and agricultural equipment, the 9-pin On-Board Diagnostic Connector accommodates CAN-H and CAN-L (for /12) plus CAN\_SHLD (for /11). Cavity identification is designated in accordance with J1939/13.



## APPLICABLE PART NUMBERS



### UNIVERSAL 9-PIN DIAGNOSTIC

HD10-9-1939P	Receptacle
HD10-9-1939PE	Receptacle, w/Reduced Wire Seal
HD16-9-1939S	Plug, w/Coupling Ring
HD16-9-1939SE	Plug, w/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, Size 16, Gold
0460-247-1631	Pin, Size 16, Extended
0462-201-1631	Socket, Size 16, Gold
0462-221-1631	Socket, Size 16, Extended



### J-1939/15 2-WIRE SYSTEM

DTM04-2P-P007	Receptacle, "Y" Connector
DTM04-2P-E007	Receptacle, Grey, w/Shrink Boot Adapter
DTM04-2P-P006	Receptacle, Grey, w/120 Ohm Resistor
DTM04-2P-EE03	Receptacle, Black, w/ Shrink Adapter
DTM06-3S-P007	Plug, Grey, w/Shrink Boot Adapter
DTM06-3S-P006	Plug, Grey, w/120 Ohm Resistor
DTM06-3S-EE03	Plug, Black, w/Shrink Boot Adapter
DTM06-3S-EP10	Plug, Black, w/120 Ohm Resistor
WM-2P	Wedge Lock, Orange
WM-2PA	Wedge Lock, Grey
WM-2PB	Wedge Lock, Black
WM-2S	Wedge Lock, Orange
WM-2SA	Wedge Lock, Grey
WM-2SB	Wedge Lock, Black
0460-202-2031	Pin, Size 20, Gold
1060-20-0144	Pin, Size 20, Gold, Stamped & Formed
0462-201-2031	Socket, Size 20, Gold
1062-20-0144	Socket, Size 20, Gold, Stamped & Formed

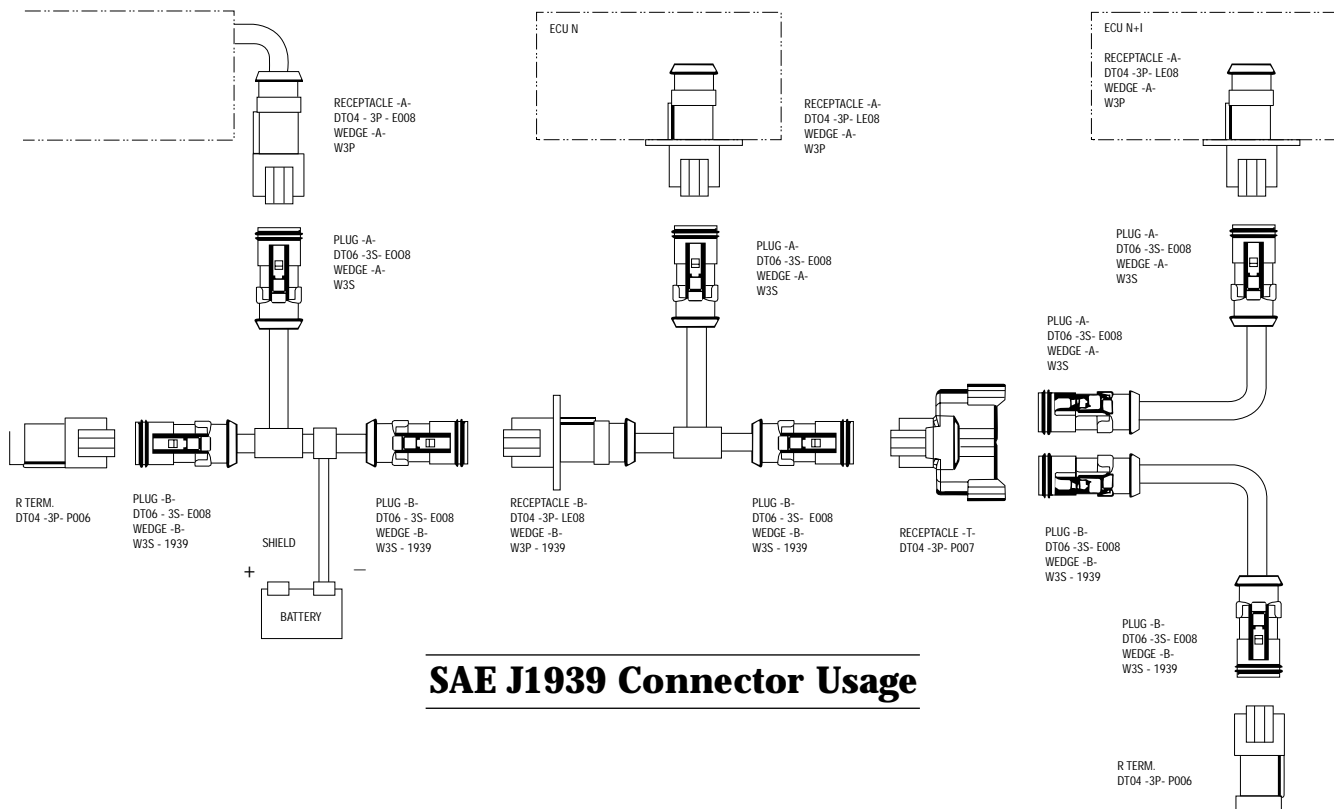


### J-1939/11 3-WIRE SYSTEM

DT04-3P-P007	Receptacle, "Y" Connector
DT04-3P-E008	Receptacle, Grey, w/Shrink Boot Adapter
DT04-3P-P006	Receptacle, Grey, w/120 Ohm Resistor
DT04-3P-EE01	Receptacle, Black, w/Shrink Boot Adapter
DT04-3P-EP10	Receptacle, Black, w/120 Ohm Resistor
DT06-3S-E008	Plug, Grey, w/Shrink Boot Adapter
DT06-3S-P006	Plug, Grey, w/120 Ohm Resistor
DT06-3S-EP11	Plug, Black, w/Shrink Boot Adapter
DT06-3S-PP01	Plug, Black, w/120 Ohm Resistor
DT06-3S-PE01	Plug, Black, w/120 Ohm Resistor & Latch Guard
DT06-3S-EP10	Plug, Black, w/120 Ohm Resistor
DT06-3S-P032	Plug, Black, w/Shrink Tubing Adapter, Single Piece
W3P-1939	Wedge Lock, Blue
W3S	Wedge Lock, Orange
W3S-P012	Wedge Lock, Green
W3S-1939	Wedge Lock, Blue
W3S-1939-P012	Wedge Lock, Blue



0460-202-1631	Pin, Size 16, Gold
1060-16-0144	Pin, Size 16, Gold, Stamped & Formed
0460-247-1631	Pin, Size 16, Extended
0462-201-1631	Socket, Size 16, Gold
1062-16-0144	Socket, Size 16, Gold, Stamped & Formed
0462-221-1631	Socket, Size 16, Extended



## SAE J1939 Connector Usage

## Applicable Part Numbers



### ISO/CD 11783-2 & J-1939/12 ISO BOX AND ASSOCIATED CONNECTORS

HDBOX-24-91PN  
HDBOX-24-91PE  
HD36-24-91SN-059  
HD36-24-91SE-059  
HDB36-24-91SN-059  
HDB36-24-91SE-059

DT06-4S-EP06  
DT06-2S-EP06  
W4S-P012  
W2S-P012

0460-204-08141  
0460-204-12141  
0460-202-1631  
0462-203-08141  
0462-203-12141  
0462-201-1631

ISO Box Assembly  
ISO Box Assembly, w/ Reduced Wire Seal  
Plug, w/Cable Clamp Assembly  
Plug, w/Cable Clamp Assembly & Reduced Wire Seal  
Plug, w/Break-Away Coupling Ring & Cable Clamp Assy  
Plug, w/Break-Away Coupling Ring, Cable Clamp Assy.  
& Reduced Wire Seal  
Plug, Black, w/End Cap  
Plug, Black, w/End Cap  
Wedge Lock  
Wedge Lock

Pin, Size 8  
Pin, Size 12  
Pin, Size 16, Gold  
Socket, Size 8  
Socket, Size 12  
Socket, Size 16, Gold



# DEUTSCH CONNECTOR FAMILY

## A COMMON SYSTEM OF CONTACTS KNOWN WORLDWIDE



### DEUTSCH COMMON CONTACT SYSTEM

Fundamental to the Deutsch connector series is the principle that all wires are terminated by a single contact system. The only variation in contacts is that dictated by wire gauge. The word "common" describes the Deutsch contact system well. For one contact, whether it be of solid or stamped and formed, can be assembled with the complete Deutsch connector family and applies to a common system of contacts, tooling processes, and terminations. Let's look at each of these subjects in detail:

### COMMON CONTACTS

The basic system uses five contact sizes: 4, 8, 12, 16, & 20. These are the only contacts that an O.E.M. or their supplier need stock no matter what connector is being terminated. Two styles of Deutsch contacts are available - solid crimp types, manufactured by a cold heading process and solid copper alloys. Stamped and formed contacts are manufactured with a series of progressive dies. Both contacts are interchangeable within the connector and are selected based upon the user's application. Stocking costs, engineering costs, and termination costs are all slashed, because the number of evaluations, test procedures, test reports, process standards, drawing notes, etc., are reduced, if not eliminated.

### COMMON TOOLING

Two hand crimp tools are used to crimp the five different sizes of contacts to the wire end. For semi-automation to full automation, one universal crimp tool will crimp the volume required for wire termination.

### COMMON PROCESSING

Using Deutsch contacts means that the way an O.E.M. supplier attaches a wire to its terminus never varies. This procedural standard allows electrical workers to become highly proficient in terminating Deutsch connectors.

### COMMON TERMINATIONS

The selection of Deutsch connectors means that all contact terminations will be the same, thus reducing the chance of errors in the harness system. Performance, reliability, and maintainability are critical to any electrical system. The use of a common contact system eliminates many of the failures reported in harnesses where hundreds of different types of terminations are used. The end result of selecting Deutsch is increased profits and long term performance.



For Regional Information Contact ...

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