



Agricultural Solutions

ISO-11783-2 Connectors for Modern Agriculture Technology

Powell

www.powell.com

ISO 11783-2 Components

IBBC (Implement Bus Breakaway Connector)

Powell's IBBC connector is an ISO 11783-2 compatible connector receptacle that incorporates integrated electronics along with a patented breakaway latching system. This breakaway system does not rely on bayonet pins; instead it uses an engineered quick release latching system that provides substantially improved latching, breakaway action and longevity. This product is 100% intermateable and interchangeable with the alternative products on the market.

IBRC (Implement Bus Rear Connector)

Powell's IBRC allows for rapid installation of the ISO connector during final assembly. This four position connector is installed on the cabin harness assembly while the IBBC is installed on the tractor, providing for simple "plug and play" installation. This robust connector features an innovative design that is made for rapid population of the connector without the use of tools.

IBIC (ISO Bus Implement Connector)

Powell's IBIC brings dramatic performance improvements to the implementation side of the ISO 11783-2 interconnect. This connector provides superior corrosion resistance along IP67 environmental protections. This ISO connector maintains complete compatibility with currently available products.



ISO 11783-2 Components

Diagnostic Receptacles ISO / CANBus

Powell provides two different versions of this SAE J1939 diagnostic connector also adopted by ISO 11783-2. The connector is available in a standard flanged variant that is a drop-in replacement for existing connectors, and also a Jam Nut style that provides for far easier installation during manufacturing. These thermoplastic receptacles feature a positive contact retention system, are sealed via redundant grommet wire seals, and use proven Powell AT contact technology.

TBC (Terminating Bias Circuit)

Powell's TBC allows for simple stand-alone termination of CANBus systems. The TBC can be used for active or passive systems and is the ideal cost-effective solution for termination on every location of your BUS.

ISO BUS Jacket Cable

Powell's ISO BUS Jacket Cable is a premium addition for connecting our agricultural components. The layered cable elements consist of stranded plain copper wires, according to IEC 60228 Class 5 specifications. Combined with a TPR and PVC insulation, and a black PUR sheath, this cable allows for accelerated, reliable communication and sustained connection even in harsh temperatures.



IBIC

ISO Bus Implement Connector for CAN Based Implement Systems

The **Powell Electronics ISO BUS Implement Connector (IBIC)** is a new design for the implement connector specified in the ISO 11783 protocol. The IBIC creates the electrical connection of implements to the tractor or other agricultural vehicles in order to transfer power, signals and CAN Bus communication to and from the tractor and implement. This IBIC connector is a new development that provides a cost effective solution for implement manufacturers.

The IBIC combines the use of highly reliable non-corrosive materials with a unique design to guarantee a long life span in highly aggressive environments that demand performance.

The IBIC is designed to mate with the Powell **ISO Bus Breakaway Connector (IBBC)**, but it also backwards compatible with previous designs on the market. Mated with the IBBC, it will last many disconnecting breakaway cycles. In the event a coupling ring should be damaged, these rings are extremely easy to replace and can even be replaced in the field by the tractor operator.

The IBIC features an IP67 environmental rating in a ruggedized construction.

The IBIC breakaway connector is extremely easy to populate and can be assembled with only standard tools.



“This IBIC Connector is a new development that provides a cost effective solution for implement manufacturers.”

Specifications, Features and Benefits

Dimensions and Specifications	
Overall Dimensions	96 x 51mm
Operating Temperature	-30° C to +85° C
Storage Temperature	Room temperature
Mounting Time	2 minutes
Weight	Approximately 100 grams ex contacts
Cable OD	< 18mm / > 14mm
Contacts	2x #8 AWG / 2x #12 AWG / 4x #16 AWG - 1x bridged
Max Power Capacity	2x 60 amp / 2x 25 amp / 4x 13 amp - 1x 13 amp bridged
Construction Material	High grade plastics, non-corrosive
Environmental Protection	IP67 mated and unmated

Features and Benefits
High-grade, non-corrosive materials used
Rapid population and simple assembly
Ergonomic design, with no sharp edges or parts
No special tooling required
Mates with all existing ISO 11783-2 Tractor connectors
Strong high-grade plastic construction that will not deform if dropped
Bayonet rings are easily field replaceable in case of damage to keep equipment working in the field
Environmentally sealed; IP67 rated against moisture and dust in both mated and unmated states



IBBC

Implement Bus Breakaway Connector for CAN Based Implement Systems

Powell's Implement Bus Breakaway Connector is a cost effective connector solution for CAN based implement systems. The IBBC connector maintains full compatibility with ISO 11783-2 standards, insuring reliable communications between the implement and tractor or construction equipment.

Why is ISO 11783 so important?

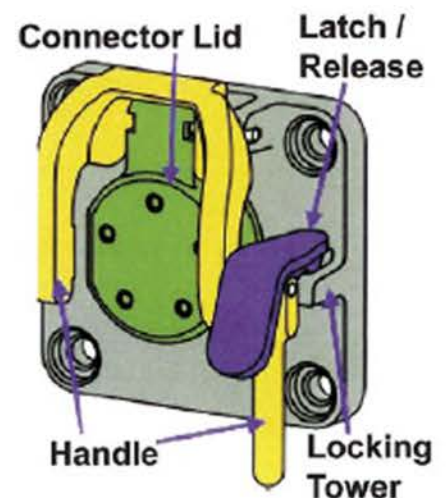
Electronics have become a major aspect of construction and agricultural equipment. In an effort to create standards for communications and electronics in mechanized equipment, the ISO 11783 (ISO BUS) specifications were developed. The ISO 11783 protocol describes a control area network or CAN protocol, a proven technology that has been used for the control of components in agricultural equipment for many years. ISO 11783 defines a standard format for communications traveling between electronic devices. Through compliance with ISO 11783, you are insuring that connectors and wire harnesses are compatible and that the systems will communicate with each other.

“ISO 11783 defines a standard format for communications traveling between electronic devices.”

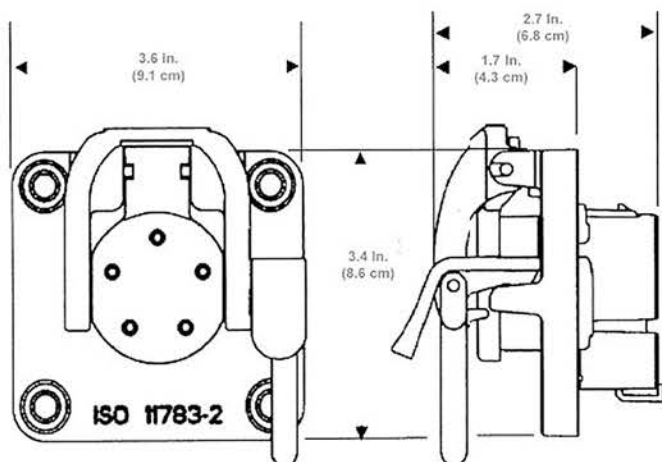
Why Powell's IBBC is a Better Choice

The IBBC uses an improved design, which consists of a die cast aluminum handle and locking latch/release mechanism that holds the mating connector securely in place. This design offers many benefits over the typical bayonet locking pin and ring design:

- Simple to line up and push the implement harness connector into place, ensuring ease of use in the field.
- Power-coated aluminum handle will not corrode due to exposure to farm chemicals and the environment.
- The handle holds the mated connectors firmly in place during operation while the latch/release will allow the connectors to breakaway in the event of a mishap.

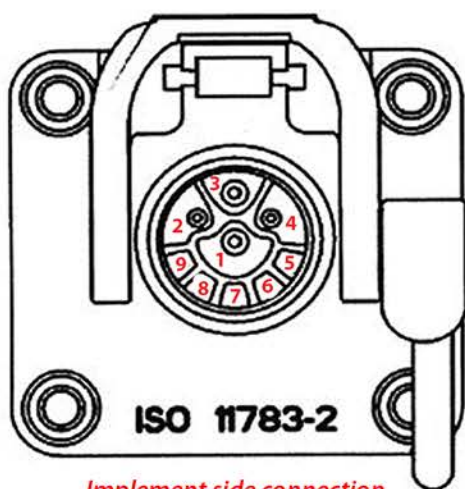


Overall Dimensions, Specifications and Pin Connections

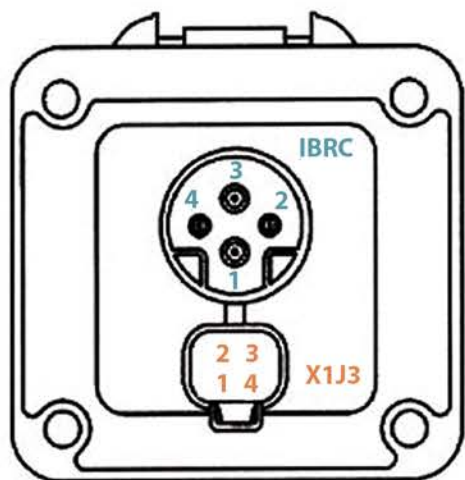


Specifications

Enclosure	Over molded polypropylene
Handle	Die cast aluminum
Connectors	One 9 pin (implement side) Two 4 pins (tractor side)
Latch / Release	Spring loaded, holds securely onto locking tower.
Connector Lid	Spring loaded to remain closed when mating connector is not in use, and automatically closes when connector breaks away.



Implement side connection for IBIC



Tractor side connection for IBRC Connector and X1J3

Connector IBIC For Implement Side Connections

1	Pass through ground
2	Electronic control unit (ECU) ground
3	Pass through power
4	ECU power (6-16 Vdc)
5	Terminating bias circuit (TBC) disconnect (6-16 Vdc input)
6	TBC power (6-16 Vdc)
7	TBC return
8	CAN high (2500V, 75 ohm, +/- 5 ohm termination resistance)
9	CAN low (2500V, 75 ohm, +/- 5 ohm termination resistance)

Connector IBRC For Tractor Side Connections

1	Pass through ground
2	Electronic control unit (ECU) ground
3	Pass through power
4	ECU power (6-16 Vdc)

Connector X1J3 For Tractor Side Connections

1	TBC power (6-16 Vdc)
2	CAN high (2500V, 75 ohm, +/- 5 ohm termination resistance)
3	TBC return
4	CAN low (2500V, 75 ohm, +/- 5 ohm termination resistance)

Mating Connectors for Powell IBBC

Implement Side Mating Connector		
IBIC (9 Pin)		
Description	Quantity	Part Number
Mating Plug	1	Powell IBIC (Recommended)*
Socket contacts #8 AWG	2	I-11783-08
Socket contacts #12 AWG	2	I-11783-12
Socket contacts #16-18 AWG	5	CIO-1616-089-1
Sealing plug #8	2 max	114018
Sealing plug #12-18	7 max	114017

**HDB36-24-915N-059 functions well as an alternative*

Tractor Side Mating Connector		
Powell IBRC Connector Kit		
Description	Quantity	Part Number
Plug Housing	1	
Hold down clip	1	
Connector wire seal	1	
Connector interface seal	1	
Socket contact #12 AWG	2	I-11783-12
Socket contact #8-10 AWG	2	I-11783-08

Tractor Side Mating Connector		
J3 (Rectangular 4 Pin Connector)		
Description	Quantity	Part Number
Plug Housing	1	DT06-4S
Socket contact #16-18 AWG	4	CIO-1616-089-1
Wedge lock	1	W4S

Mechanical Features and Benefits	
Feature	Benefit
Compact smaller and lighter design	Ease of mounting in places where space is at a premium
Simple to install	"Plug and Play" installation due to rear mating IBRC connector
Increased breakaways	Connector still functions even after many breakaways
Operates with corroded mating connector	Offers good functional operation despite a corroded connector
Ease of use via latching handle	Allows ease of use during mating and release of connectors in the field

Electrical Features and Benefits	
Feature	Benefit
Higher breakaway cycle count	Very little electrical de-rating and fretting after many breakaway cycles
Simple and safe to replace	Power is easily disconnected due to rear mating IBRC connector
Replaceable electronics and mechanics	Only PCB or housing needs replacement in case of default
Environmentally sealed against moisture	Superior sealing prevents failure due to water penetration
High quality electronic components	Built with the finest components after ISO 11783-2 standards

Commercial Features and Benefits	
Feature	Benefit
Cost effective	Cost effective premium solution for ISO 11783-2 applications
Readily available	Powell Electronics can provide program supply worldwide

TBC

Terminating Bias Circuit - ISO Compatibility for CAN Based Vehicle Networks

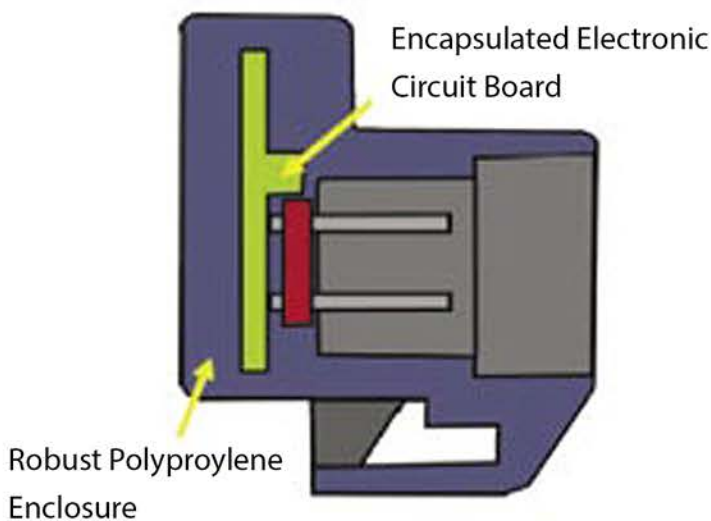
Powell's Terminating Bias Circuit (TBC) is a cost effective solution for providing active termination for CAN Bus vehicle networks. The TBC Terminator maintains a full compatibility with ISO 11783-2 and SAE J1939 specifications.

In some of today's systems, termination of the CAN Bus is made inside the controller. The Powell TBC is an inexpensive alternative that provides the correct electrical bias and termination at each end of a CAN Bus segment and suppresses reflections on the CAN Bus system. The Powell TBC is fully compatible with ISO 11783-2 and SAE J1939 specifications.

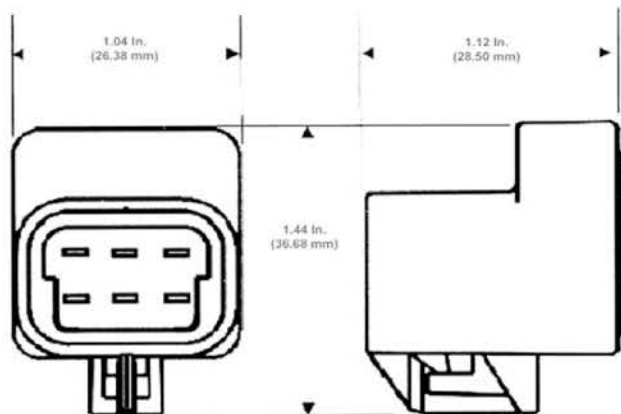
Why Powell's TBC Is A Better Choice

The TBC offers robust construction in a very compact size. It is constructed of an electronic PCB over-molded in a tough polypropylene that protects the electronics from the environment, and provides for a strong housing. Powell's TBC also plugs directly into the harness on a vehicle; no additional mounting hardware is required.

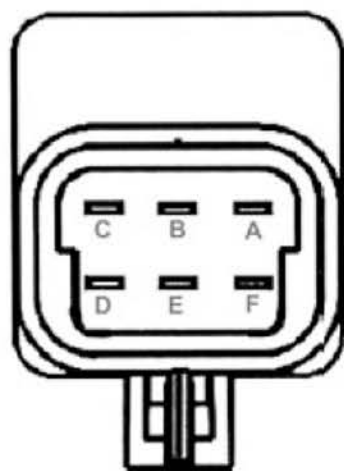
“The TBC offers robust construction in a very compact size...”



Overall Dimensions, Specifications and Pin Connections



Specifications	
Enclosure	Over molded polypropylene
Rated Voltage	13.5 Vdc
Operating Voltage Range	6 to 16 Vdc
Max Current	0.1 Amp
Operating Temperature	-40° C to +75° C
Storage Temperature	-55° C to +105° C



Pin Connections	
A	Electronic control unit power
B	Terminator power line (6 to 16 Vdc)
C	Electronic control unit ground
D	Terminator return line
E	CAN high (2500V +/- 0 / 75 ohm +/- 5 ohm termination)
F	CAN low (2500V +/- 0 / 75 ohm +/- 5 ohm termination)

The number of terminals, wire seals and cavity plugs necessary will depend on whether the TBC is to be wired in a master (ECU provides termination power) or in a slave (TBC power provides termination power) configuration.

Mating Connector - Delphi Part Numbers	
Connector Shell	12052848
Terminal	12048074
Wire Seal	12048086
Cavity Plug	12059168

J1939

Powell J1939 Circular Diagnostic Connectors

Powell's J1939 Circular Diagnostic Connectors are available in two different versions. The first is a flange mounting version that is a drop-in replacement for products currently on the market. The second is a jam nut version that dramatically simplifies installation of the connector during assembly.

These 9 pin connectors are designed to perform in the demanding environments found on construction equipment, agricultural equipment and heavy trucks.

These circular connectors feature robust thermoplastic construction with a positive contact retention system and are sealed via redundant grommet wire seals.

Powell's AT contact system used in these connectors is a proven system that has been used successfully at major OEM's, and feature both machined, stamped, and formed versions.



Connectors & Accessories	
Part Number	Description
24EJ10-9-1939PN	Flange mount receptacle
24EJ17-9-1939PN	Jam nut mount receptacle
24EJ17-9-1939PN-1	Jam nut mount receptacle with thermoplastic jam nut
24EJ17-9-1939PN-2	Jam nut mount receptacle with anodized aluminum jam nut
ALHN-19	Thermoplastic hex nut for jam nut receptacles
ALHN-192	Anodized aluminum hex nut for jam nut receptacles
ATC10-RC9	Protective Cover

“These 9 pin connectors are designed to perform in the demanding environments found on construction equipment, agricultural equipment and heavy trucks.”

Material, Electrical and Mechanical Specifications

Material Specifications	
Connector Shell	Thermoplastic
Grommet Seal	Silicone
Contacts	Copper Alloy (nickel and gold plating available)

Electrical Specifications	
Dielectric withstanding (test) voltage	Current leakage less than 2 milliamperes at 1500 Vac
Current rating @ 125°C	13 amp
Insulation resistance	1000 mega ohms. min @ 25°C

Mechanical Specifications	
Durability (mating cycles)	No electrical or mechanical defects after 100 cycles of engagement and disengagement
Corrosion resistance	No evidence of corrosion after exposure to 48 hours of salt spray per Mil Std 1344 method 1001
Moisture resistance	Water does not penetrate seals when submerged in 3 feet of water
Fluid resistance	No signs of damage when exposed to most fluids in industrial applications
Vibration	Maintains continuity and exhibits no physical or mechanical damage during or while subjected to sinusoidal vibration, having an amplitude of .060 inches double amplitude and the frequency varied linearly between limits of 10 to 2000Hz with a maximum force of 20g's
Operating temperature range	-40° to +125°C
Thermal shock	-40° to +125°C, 100 cycles, 1 hour per cycle
Physical shock	No unlocking, unmating or other unsatisfactory result during or after 50g's in each of three mutually perpendicular planes; no electrical discontinues longer than 1 microsecond, per Mil Std 202, Method 213, Condition C
Recommended hex nut torque for jam nut	Maximum of 10 Ft-Lbs.
Crimp tensile strength	25 lbs.