



TRICAN HTD2800P1B11C6 – Digital RH/T/P module



- Combo sensor (Specific Humidity, Temperature and Pressure)
- Optimized design for high RH, high T°C environment
- Digital output as per J1939, CAN2.0B standard or CAN 2.0A
- Rugged, automotive graded sensor
- High resistance to chemicals
- Customizable CAN Frame
- Optional output for NOx humidity correction factor



DESCRIPTION

Based on a rugged and qualified combo sensor, TRICAN HTD2800P1B11C6, digital humidity sensor with temperature and pressure outputs, is a cost effective dedicated humidity, temperature and pressure transducer designed for automotive and truck applications where a reliable and accurate measurement is needed. The information is delivered as a digital output on a CAN bus. The TRICAN HTD2800P1B11C6 design has been optimized to provide accurate information and fast response time for systems where repeated long term immersion in high humidity and high temperature environment is needed as air intake ducts, fuel cell systems.

FEATURES

- Demonstrated reliability and long term stability
- Reliability not affected by repeated condensation
- Fast response time even in saturated humidity environment

APPLICATIONS

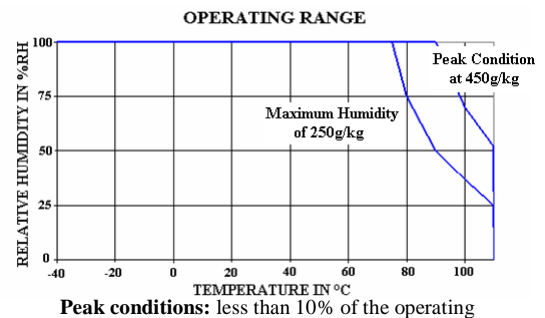
- Trucks (diesel market) + off road
- Industrial (compressor and genset (diesel))
- Fuel Cell Systems
- ...

PERFORMANCE SPECS

MAXIMUM RATINGS

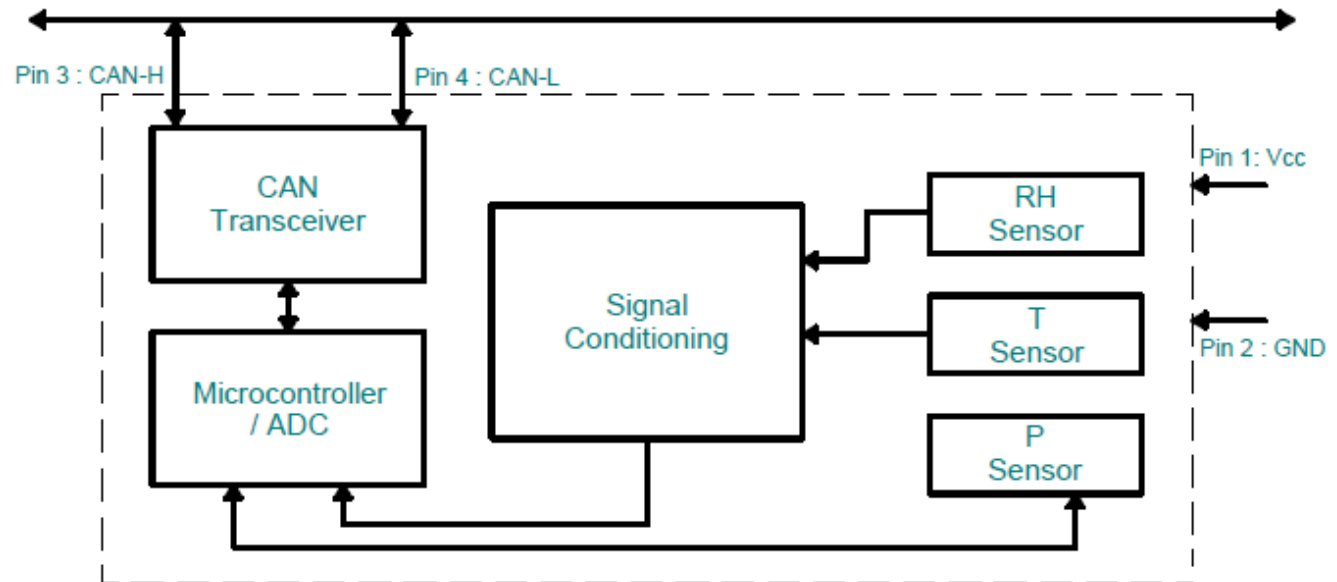
| Ratings | Symbol | Value | Unit |
|------------------------------|------------------|-------------|-----------------|
| Storage Temperature | T _{stg} | -40 to +125 | °C |
| Supply Voltage (Peak) | V _{cc} | 32 | V _{dc} |
| Humidity Operating Range | RH | 0 to 100 | %RH |
| Temperature Operating Range* | T _a | -40 to +105 | °C |
| Max Pressure (Burst) | P _{abs} | 130 | kPa |

* At the tip of the sensor



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BLOCK DIAGRAM



CHARACTERISTICS

(@T=23°C)

| Electrical Characteristics | Symbol | Min | Typ | Max | Unit |
|-------------------------------------|--------|-----|----------------------------|------------------------------|------|
| Voltage supply (V _{batt}) | V | 8 | 12 or 24 | 32 | VDC |
| Current consumption | mA | | 15 (At 12V) 20 (At 24V) | 100 (At 12V) 104 (At 24V) | mA |
| Sink current capability | mA | | 150 | | mA |

| CAN Bus Timing | Symbol | Min | Typ | Max | Unit |
|-----------------------|--------|-------|-----|-------|------|
| Bit time | μs | 3.999 | 4 | 4.001 | μs |
| CAN_H CAN_L slew rate | V/μs | | 7 | | V/μs |

| CAN_H & CAN_L limiting values | Symbol | Min | Typ | Max | Unit |
|------------------------------------|--------|------|-----|------|------|
| DC voltage at CAN_L | | -36 | | +36 | V |
| DC voltage at CAN_H | | -36 | | +36 | V |
| Transient voltage on CAN_H & CAN_L | | -200 | | +200 | V |

| DC Bus Receiver* | Symbol | Min | Typ | Max | Unit |
|--|--------|------|-----|------|------|
| Differential input voltage (recessive) | | -1.0 | | +0.5 | V |
| Differential input voltage (dominant) | | 0.9 | | 5.0 | V |
| Differential input hysteresis | | - | 150 | - | mV |
| CAN_H, CAN_L input resistance | | 5 | | 25 | Kohm |
| Differential input resistance | | 20 | | 100 | Kohm |

* (Transceiver V_{cc} 4,5 to 5,5V ; R_L = 60 ohm)

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| Humidity Characteristics | Symbol | Min | Typ | Max | Unit |
|--|--------|-----|--------|-----|---------|
| Humidity Measuring Range | RH | 0 | | 100 | %RH |
| Relative Humidity Accuracy (10% to 95%RH) | | | ±3 | ±5 | %RH |
| Relative humidity Resolution | | | 0.4 | | %RH |
| Time Constant (at 63% of signal) 33%RH to 75%RH ⁽¹⁾ | τ | | 5 | 10 | s |
| Humidity hysteresis | | | +/-1 | | %RH |
| Time Constant (at 63% of signal) 33%RH to 75%RH ⁽¹⁾ | τ | | 5 | 10 | s |
| Long term stability | | | +/-0.5 | | %RH /Yr |

| Pressure | Symbol | Min | Typ | Max | Unit |
|--|--------|-----|--------|--------|---------|
| Absolute pressure measuring range | kPa | 1 | - | 250 | kPa |
| Pressure measuring range with full accuracy guaranteed | kPa | 30 | | 130 | kPa |
| Pressure accuracy | | | +/-1 | +/-1.5 | %FS |
| Pressure resolution | | | +/-0.5 | | kPa |
| Time Constant | τ | | 1 | | s |
| Long term stability | | | +/-0.5 | | kPa /Yr |

| Temperature Characteristics | Symbol | Min | Typ | Max | Unit |
|------------------------------|----------------|-----|--------|--------|-------|
| Temperature measuring range | T _a | -40 | | 105 | °C |
| Temperature accuracy | | | +/-0.5 | +/-1.5 | °C |
| Time Constant ⁽¹⁾ | τ | | 10 | | S |
| Long term stability | | | +/-0.3 | | °C/Yr |

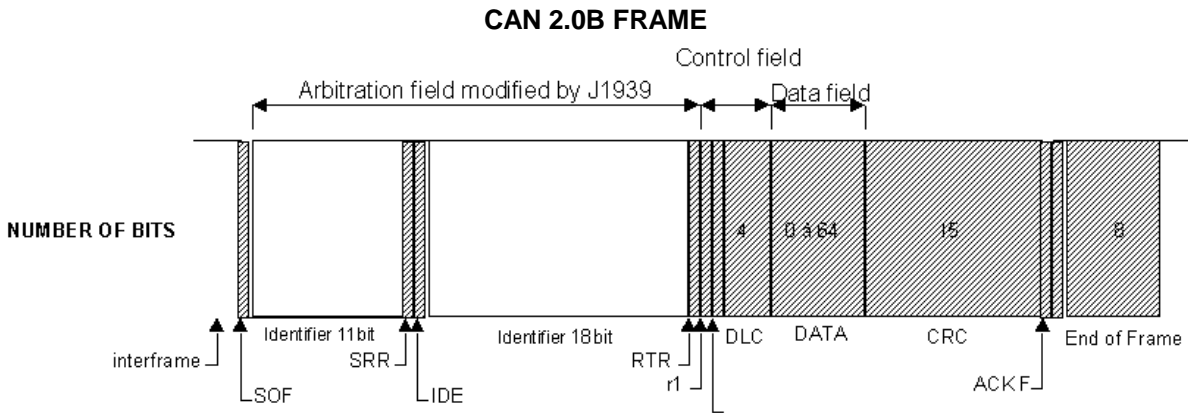
(1) At 2m/s air flow

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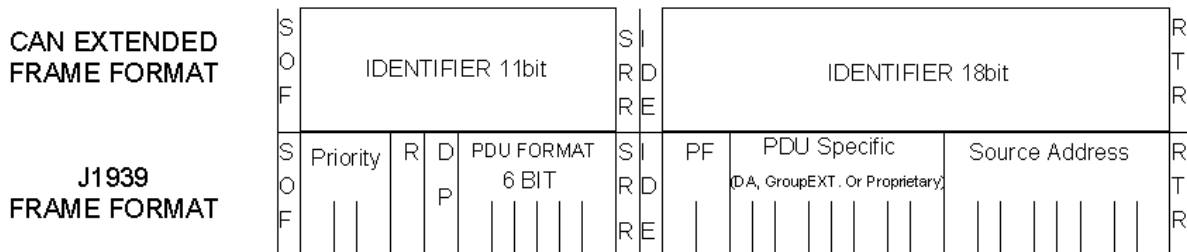
CAN BUS INTERFACE

The system is J1939 Standard compliant. The system delivers temperature (SPN 1172), inlet pressure (SPN 1176) , relative humidity (SPN 354) and Specific Humidity (SPN4490) . Identifier, transmission repetition rate, data length, ranges, and resolutions are defined by J1939 or specified by customer. Optional and customizable output for Dew point through internal calculation in accordance with EPA methodology is also available.

CAN 2.0B/J1939 FRAME DESCRIPTION



ARBITRATION / IDENTIFICATION FIELD



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TRICAN HTD2800P1B11C6 STANDARD SPN

| | | | |
|-----------------------|----------|-------------|-----------------------------------|
| Inlet pressure | SPN 1176 | Data length | 2 byte |
| | | Resolution | 0,1KPa/bit gain, -250 KPa offset |
| | | Data range | -250kPa to 251,99 kPa |
| Relative humidity | SPN 354 | Data length | 1byte |
| | | Resolution | 0.4%RH/bit gain, 0%RH offset |
| | | Data range | 0 to 100%RH |
| Specific humidity | SPN 4490 | Data length | 2 byte |
| | | Resolution | 0.01 g/kg, 0 g/kg offset |
| | | Data range | 0 to 642.55 g/kg |
| Air inlet temperature | SPN 1172 | Data length | 2 byte |
| | | Resolution | 0,03125°C/bit gain, -273°C offset |
| | | Data range | -273 to1735°C |

SELF DIAGNOSTIC CAPBILITES

Optional and customizable diagnostic byte can be implemented

- Pressure failure sensor (no communication or internal CRC issues)
- Pressure failure sensor (out of range issue)
- Temperature sensor circuit - voltage above normal
- Temperature sensor circuit - voltage below normal
- Humidity sensor circuit - voltage above normal
- Humidity sensor circuit - voltage below normal
- Sensor controller over temperature conditions (105°C)
- SH internal computation / calculation out of range or wrong CRC value

SAE J1939-21 REQUEST

Optional and customizable answers to SAE J1939-21 request can be implemented

- Address claim (PGN 60928)
- Software identification (PGN 65242)
- Calibration information DM19 (PGN 54016)
- Status code message (PGN TBD)

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CONNECTING AND MECHANICAL CHARACTERISTICS

NOMENCLATURE

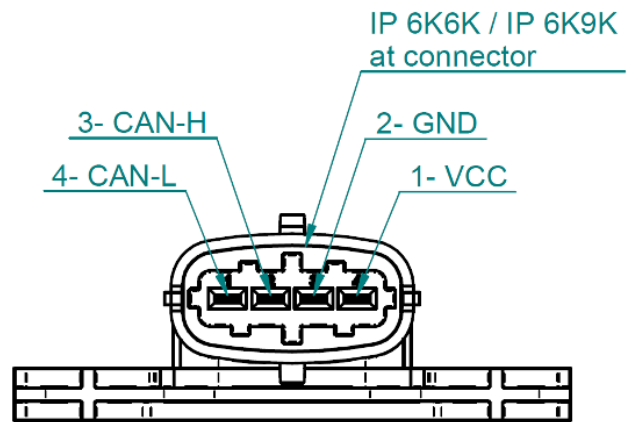
HTD2800P1B11C6

Connector Type: Customizable upon request

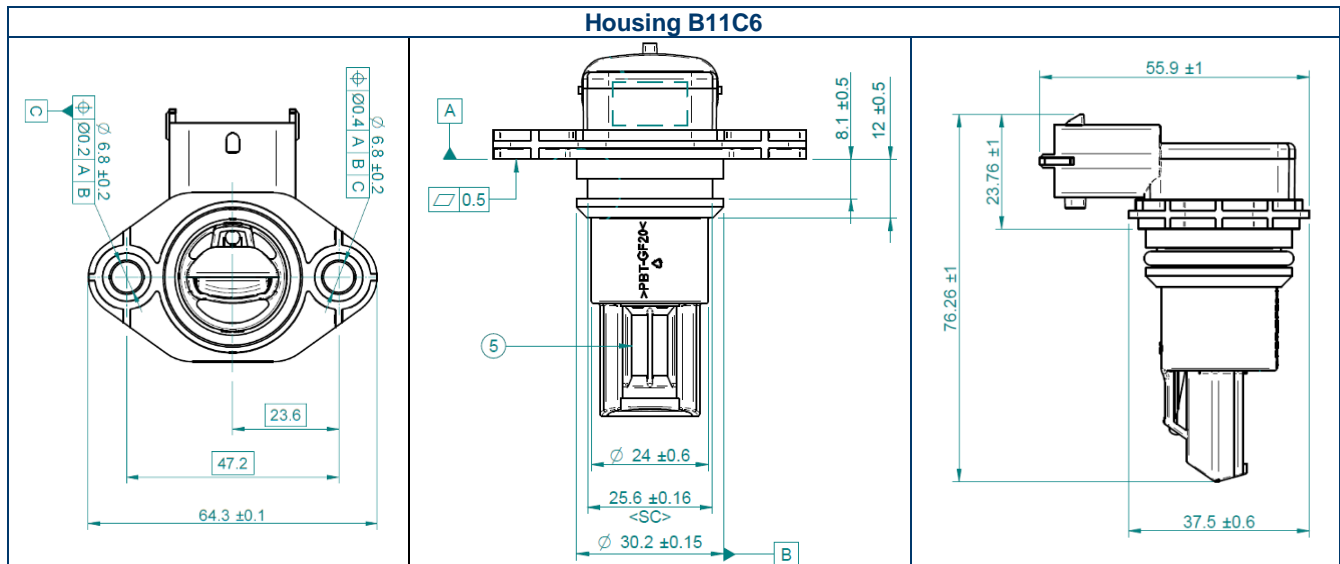
CONNECTING CHARACTERISTICS

Bosch mating connector: 1 928 403 736
Recommended contacts: 1 928 498 054

| Signal | Pin |
|--------|-----|
| VCC | 1 |
| GND | 2 |
| CANH | 3 |
| CANL | 4 |



MECHANICAL CHARACTERISTICS:



Recommended Screw Mounting: M6 ; Typical tightening torque: 12 N.m ; Maximum tightening torque: 17 N.m

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RESISTANCE TO PHYSICAL AND CHEMICAL STRESSES

- TRICAN HTD2800P1B11C6 meets qualification requirements of MEAS FRANCE including vibration, mechanical and thermal shock, storage, high and low temperature, humidity and pressure, ESD and EMC
- Additional tests under harsh chemical conditions demonstrate good operation in presence of salt atmosphere, SO₂ (0.5%), H₂S (0.5%), O₃, NO_x, NO, CO, CO₂, Softener, Soap, Toluene, acids (H₂SO₄, HNO₃, HCl), HMDS, Insecticide, Cigarette smoke
- TRICAN HTD2800P1B11C6 is not light sensitive

ORDERING INFORMATION

HPP816E031 : HTD2800P1B11C6

| Revision | Comments | Who | Date |
|----------|---|----------|-------------|
| 0 | Document Creation | P.METRAL | February 14 |
| 1 | Mechanical Characteristics view updated | P.METRAL | February 14 |
| | | | |

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