Monitor CAN FD/CAN signals without a sub-harness

**No modification of vehicle cables**
Acquire CAN data immediately, simply by hooking probes to the cables

**No impact on the CAN bus or ECUs**
Eliminate testing concerns by using non-contact sensing technology

**Accurate, reliable signal capture**
Use in a diverse array of development and evaluation applications that demand reliability
Capture CAN signals without modifying vehicle cables

NEW No-metal-contact sensing

1 No need for a sub-harness--simply hook probes over cable insulation

- New approach means dramatically fewer man-hours
  Capture CAN signals without the need to fabricate sub-harnesses or strip back cable insulation so as to significantly reduce the number of man-hours spent on test preparation.

- Easy setup
  Hook the probes to insulated CAN cables. Now you’re ready to acquire signals.

Conventional CAN signal acquisition method

- Using a sub-harness
- Stripping back insulation

Simply connect and you’re all set

- Connect to an output device
- Connect the ground cable

(1) Latch onto the CAN cable
(2) Twist to lock in place
The probes acquire CAN bus signals via capacitive coupling. The Non-Contact CAN Sensor rejects noise and waveform distortions in acquired signals. The CAN Interface outputs acquired signals as CAN signals. Analyze data using your existing system.

Industry-standard CAN output connector pin layout

Customers who already have a CAN analysis system such as those manufactured by Vector Informatik GmbH need only connect the sensor to that system’s input terminal (via a D-sub 9-pin connector).

2 Continue using your existing CAN analysis system

Output CAN bus signals in real time

Manage using industrial CAN analysis systems

3 A Non-Contact CAN Sensor engineered to fully meet professional requirements

Wide -40°C to 85°C operating temperature

Acquire CAN signals in environments from -40°C to 85°C (-40°F to 185°F), the temperature range required in vehicle testing.

Connect probes without worrying about CAN bus polarity

If you’re using automatic input polarity mode, the SP7001/SP7002 will automatically switch the input polarity to ensure you can capture CAN signals properly, even if the probes are connected in reverse relative to the CAN bus’s polarity (CAN_High/CAN_Low).

*This function will operate as long as the CAN bus load factor is at least 5%.

Power with 12 V and 24 V vehicle batteries and other sources

Use a DC power supply with the Power Cable L9500*, a standard accessory. If using commercial AC power, use the AC Adapter Z1008*. *1 Included with the SP7100. *2 Sold separately as an option.

Powerful 12 V and 24 V vehicle batteries

Adjustable sensitivity accommodates a variety of conditions

Use high-sensitivity mode to broaden the detection level when the CAN signal amplitude is low relative to the CAN standard or when you are unable to detect a signal due to cable conditions.

* It is recommended to use default mode under typical situations since it delivers the optimal level of vibration and noise immunity.

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Pin Assignment

<table>
<thead>
<tr>
<th>Pin</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CH2 CAN low</td>
</tr>
<tr>
<td>2</td>
<td>CH1 CAN low</td>
</tr>
<tr>
<td>3</td>
<td>GND</td>
</tr>
<tr>
<td>4</td>
<td>N.C.</td>
</tr>
<tr>
<td>5</td>
<td>Shield</td>
</tr>
<tr>
<td>6</td>
<td>CH2 GND</td>
</tr>
<tr>
<td>7</td>
<td>CH1 CAN High</td>
</tr>
<tr>
<td>8</td>
<td>CH2 CAN High</td>
</tr>
<tr>
<td>9</td>
<td>N.C.</td>
</tr>
</tbody>
</table>

DC power supply

Vehicle battery

Power socket

Portable power supply

Outlet

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High-sensitivity mode

Detect low-level signals

Select the sensitivity using the sliding switch
Eliminate testing concerns by using non-contact sensing technology

**Designed not to trigger ECU security lock-outs**
The SP7001/SP7002 acquires signals without changing the electrical characteristics of the CAN bus. Even if the vehicle is equipped with an ECU that has a security lock-out function designed to detect changes in the CAN bus’s electrical characteristics, you’ll be able to carry out testing without worrying about getting locked out.

**Vibration resistance designed for on-road testing**
The sensor delivers noise immunity designed for in-vehicle testing in a variety of road environments. Acquire CAN signals in a stable manner in evaluation testing not only on test courses, but also in vehicles undergoing test-drives on public roads.

**Noise immunity robust enough for use with EVs and HVs**
The sensor delivers enough noise immunity to acquire CAN signals in a variety of noise environments. Acquire CAN signals in a stable manner, even with vehicles such as EVs and HVs that rely increasingly on electric equipment.

**Carry out testing on public roads with peace of mind since no vehicle modifications are needed**
Because it acquires signals without making electrical contact, the SP7001/SP7002 is ideal for use in tests where CAN bus insulation cannot be modified. Also apply in the development of advanced driver assistance systems (ADAS) and self-driving technology.
Accurate, thorough signal capture

**Acquire CAN signals with the same accuracy as the contact method**

The non-contact method captures CAN signals reliably and accurately, just like the contact method. In addition, with a CAN signal detection delay of just 130 ns, the sensor delivers real-time performance.

**Non-contact method also excels with CAN FD high-speed signals**

Unlike the contact method, the non-contact method does not distort the original signal when probing the CAN bus. This approach avoids communication errors caused by degraded communications quality.

*Model with CAN FD support: SP7001

**Reliably capture even infrequent events**

The Non-Contact CAN Sensor does not affect the electrical characteristics of the CAN bus, allowing you to reliably catch the occasional CAN error events.

**Acquire signals without needing to go through a central gateway**

Only a tiny percentage of all CAN signals can be acquired from the OBD-II connector that is used in vehicle diagnostics. By using the product with the vehicle's internal CAN bus, you can acquire all CAN signals.

**Access all CAN buses**

Only a limited range of CAN signals can be acquired from the OBD-II connector.
Example applications

Analysis of vehicles that have more electrical equipment and data

More extensive safety equipment such as ADAS and increasing adoption of self-driving technology are leading to dramatic growth in the number of ECUs in vehicles and in the complexity of CAN buses. Hikoki’s Non-contact CAN Sensor can be used to easily capture the information you need from complex buses.

Calibration task in unit and vehicle testing (example for a power control unit)

With complex systems such as power control units, in order for manufacturers to perform ECU calibration tasks, they have to monitor CAN bus data exchanged between ECUs, then assess the state of the vehicle. By using the SP7001/SP7002 with an ECU measurement and calibration tool like INCA* from ETAS in such applications, you can easily monitor CAN bus data. As a result, ECU calibration tasks can be performed more efficiently.

*INCA (from ETAS) is an ECU measurement and calibration tool that’s capable of simultaneously reading and writing multiple ECU RAM values. Inquiries concerning ETAS tools should be directed to www.etas.com.
Acquire CAN signals used in a broad range of industries

Basic configuration
SP7001-90 / SP7002-90
Figures in parentheses indicate cable length

Add a sensor to acquire data from 2 channels

Capture 2 channels
Ch1, Ch2 output

Specifications

| Detection method                  | Capacitive-coupled signal detection
| Detectable cables                | AVS/AVSS-compliant cables
| Number of channels               | 2 (SP7100)
| Compatible communications speeds | SP7001, SP7002: CAN 125 kbit/s to 1 Mbit/s
|                                 | SP7001: CAN FD 125 kbit/s to 3 Mbit/s
| Total delay time                 | 130 ns (typical)
| CAN terminal resistance         | 60 Ω (typical), built-in
| Signal output connector         | D-sub 9-pin female (CH1, CH2)
| Operating temperature and humidity range |
|                                 | Temperature: -40°C to 85°C (-40°F to 185°F)
|                                 | Humidity: -40°C to 60°C (-40°F to 140°F), 80% RH or less (non-condensing)
|                                 | 60°C to 85°C (140°F to 185°F), 60% RH or less (non-condensing)
| Storage temperature and humidity range |
|                                 | -40°C to 85°C (-40°F to 185°F), 80% RH or less (non-condensing)
| Compliant standards             | Safety: EN 61010
|                                 | EMC: EN 61326
| Vibration resistance            | JIS D 1601-1996 5.3 (1)
|                                 | Class 1: passenger cars; conditions: Class A equivalent 4h along X-axis and 2h along Y- and Z-axis at a vibration acceleration of 45 m/s² (4.6G)

| External dimensions             | SP7001, SP7002: 44 mm (1.73 in) W × 85 mm (3.35 in) H × 20 mm (0.79 in) D
|                                 | SP7100: 55 mm (2.17 in) W × 120 mm (4.72 in) H × 25 mm (0.98 in) D
|                                 | SP9200: Probe: φ 11.6 mm (0.46 in) × 33.7 mm (1.33 in) H
|                                 | Guard hook: Approx. φ 5 mm (0.20 in) × 11.8 mm (0.46 in) H
| Mass                            | SP7001, SP7002: 180 g
|                                 | SP7100: 130 g
|                                 | SP9200: 26 g
| *Including cables               |
| Cable length                    | SP7001, SP7002: 2.5 m (8.20 ft)
|                                 | SP7100: 0.3 m (0.98 ft)
|                                 | SP9200: 0.5 m (1.64 ft)
| GND terminal                    | Banana input terminal
| Power supply                    | Z1008 AC Adapter
|                                 | Rated supply voltage: 100 to 240 V AC
|                                 | Assuming voltage fluctuations of ±10% of the rated supply voltage
|                                 | Anticipated transient overvoltage: 2500 V
|                                 | Maximum rated power: 8 VA (including AC adapter), 3 VA (product only)
| External power supply           | Rated supply voltage: 10 to 30 V DC
|                                 | Maximum rated power: 3 VA
| Product warranty                | SP7001, SP7002, SP7100: 3 years

The product can also be powered from a wall outlet using the AC Adapter Z1008.
Example bundles

<table>
<thead>
<tr>
<th>Number of channels</th>
<th>Capture 1 channel</th>
<th>Capture 2 channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAN standard</td>
<td>CAN FD/CAN</td>
<td>CAN FD/CAN</td>
</tr>
<tr>
<td></td>
<td>CAN</td>
<td>CAN FD/CAN</td>
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Model number (order code)

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Value</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>SP7001-90 CAN</td>
<td>SP7002-90 CAN FD/CAN</td>
<td>SP7002-90 CAN FD/CAN</td>
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</tr>
<tr>
<td>SP7002-90 CAN</td>
<td>SP7002-90 CAN FD/CAN</td>
<td>SP7000 CAN</td>
<td></td>
</tr>
</tbody>
</table>

Set model

NON-CONTACT CAN SENSOR
SP7001-90 CAN FD / CAN
SIGNAL PROBE SP9200
NON-CONTACT CAN SENSOR SP7001
CAN INTERFACE SP7100 (Includes L9500 and GND cable.)

NON-CONTACT CAN SENSOR
SP7002-90 CAN
SIGNAL PROBE SP9200
NON-CONTACT CAN SENSOR SP7002
CAN INTERFACE SP7100 (Includes L9500 and GND cable.)

System components and options

- CAN FD / CAN
  - SIGNAL PROBE SP9200
  - NON-CONTACT CAN SENSOR SP7000 CAN FD/CAN support
  - NON-CONTACT CAN SENSOR SP7002 CAN support

- CAN
  - CAN INTERFACE SP7100
  - Includes L9500 and GND cable.

POWER CABLE L9500
AC Adapter Z1008
SPLIT CABLE SP9900
SPLIT CABLE CARRYING CASE C1013

About the Split Cable SP9900

If the input interface provided by the device you plan to use does not support 2-channel input, use the SP9900 Branch Cable.

Supports branched output for acquiring 2 channels with the Split Cable SP9900

Output Branch

CH1 output >>
CH2 output >>

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