

# HIOKI

## NON-CONTACT CAN SENSOR SP7001, SP7002

NEW

# CAN FD CAN

Controller Area Network



## 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



**50-sec.**  
introductory video



0:00 / 0:52

<https://www.youtube.com/embed/XdHYFXRklQ4?rel=0>



# Capture CAN signals without modifying vehicle cables



**NEW** No-metal-contact sensing



NON-CONTACT CAN SENSOR

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

### New approach means dramatically fewer man-hours

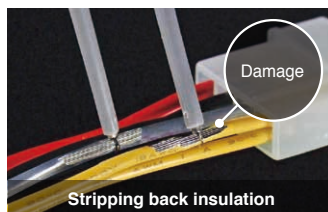
Capture CAN signals without the need to fabricate sub-harnesses or strip back cable insulation so as to significantly reduce the number of man-hours spent on test preparation.



### Conventional CAN signal acquisition method



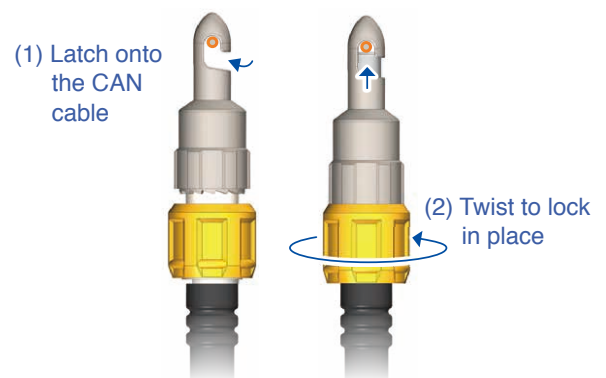
Using a sub-harness



Stripping back insulation

### Easy setup

Hook the probes to insulated CAN cables. Now you're ready to acquire signals.



### Simply connect and you're all set



Connect to an output device



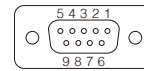
Connect the ground cable



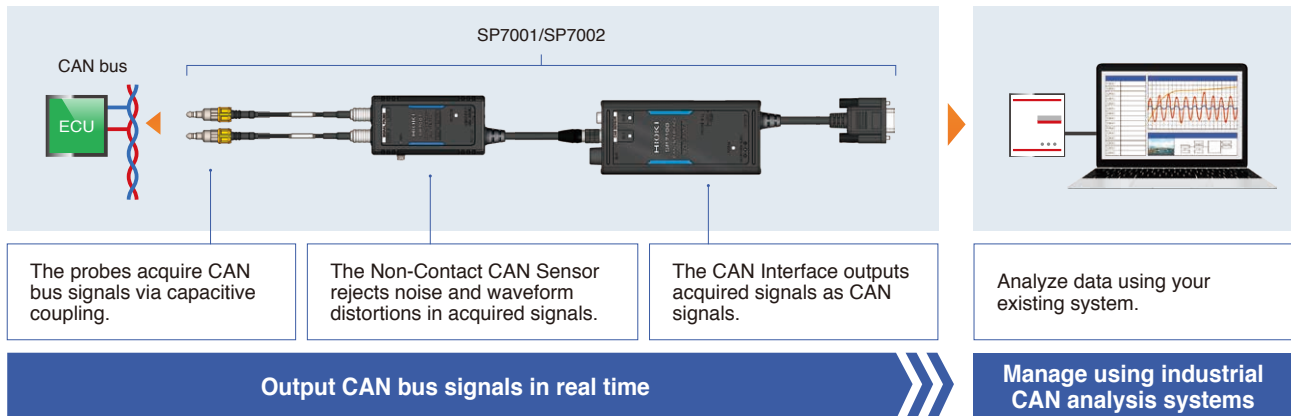
## 2 Continue using your existing CAN analysis system

### 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).



Pin	Assignment
1	CH2 CAN low
2	CH1 CAN low
3	CH1 GND
4	N.C.
5	Shield
6	CH2 GND
7	CH1 CAN High
8	CH2 CAN High
9	N.C.



## 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



Use in extreme temperature environments

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

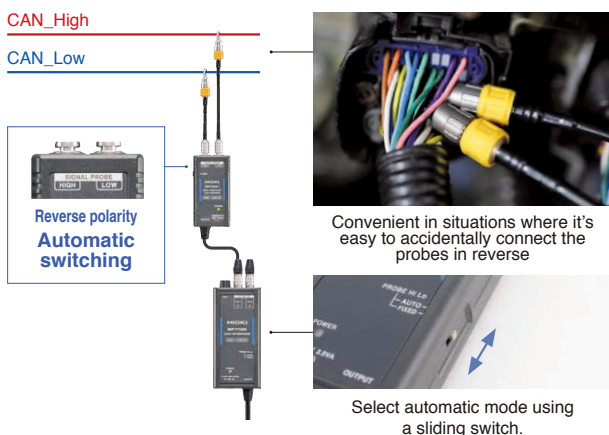
Use a DC power supply with the Power Cable L9500<sup>\*1</sup>, a standard accessory. If using commercial AC power, use the AC Adapter Z1008<sup>\*2</sup>. <sup>\*1</sup> Included with the SP7100. <sup>\*2</sup> Sold separately as an option.



### 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).

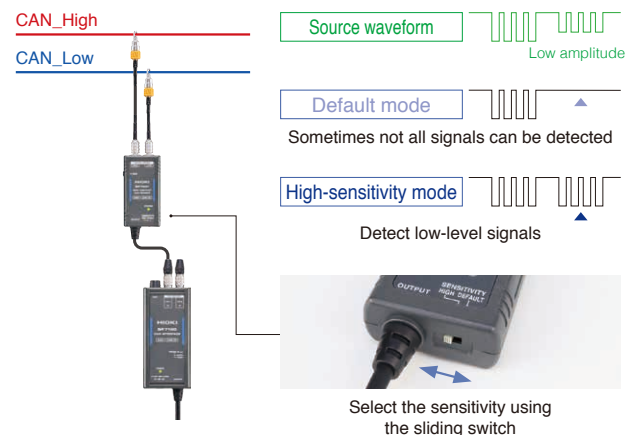
<sup>\*</sup>This function will operate as long as the CAN bus load factor is at least 5%.



### 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.

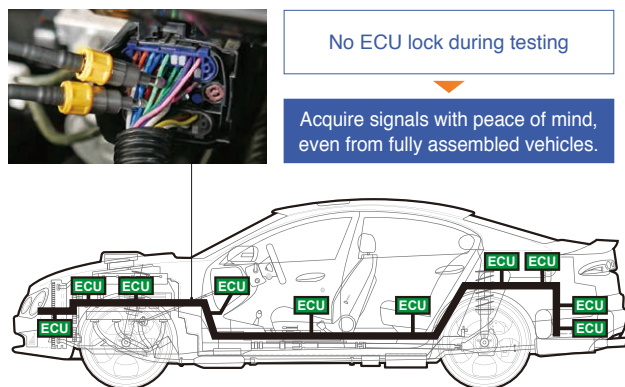
<sup>\*</sup> It is recommended to use default mode under typical situations since it delivers the optimal level of vibration and noise immunity.



# 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.



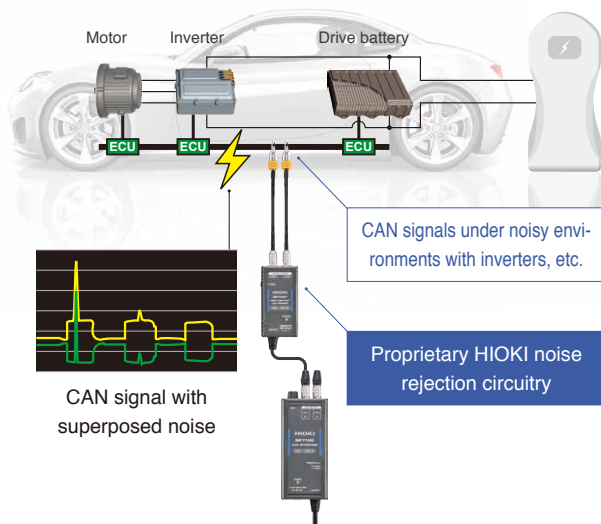
## Vibration resistance designed for on-road testing

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.



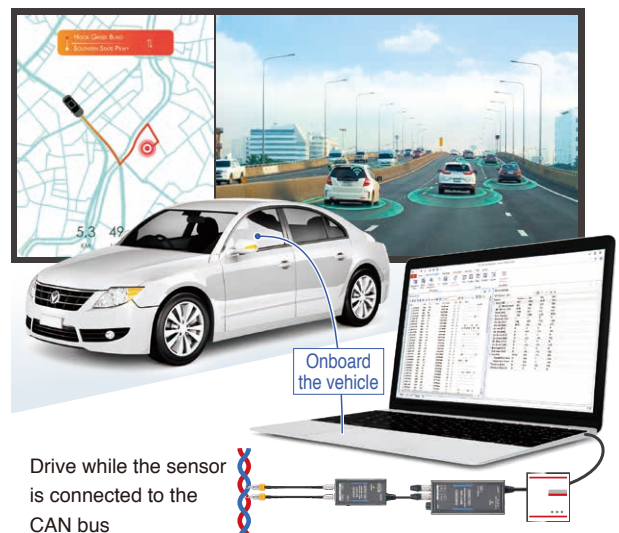
## Noise immunity robust enough for use with EVs and HVs

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

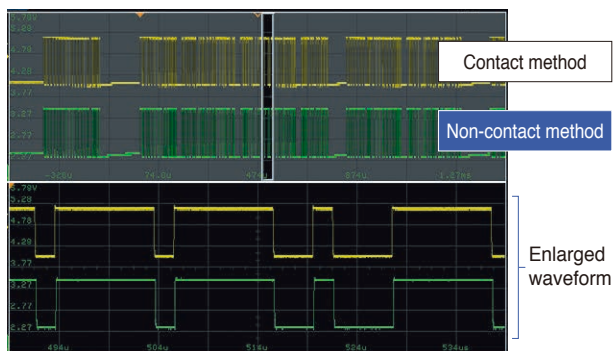
Because it acquires signals without making electrical contact, the SP7001/SP7002 is ideal for use in tests where CAN bus insulation cannot be modified. Also apply in the development of advanced driver assistance systems (ADAS) and self-driving technology.



# 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.

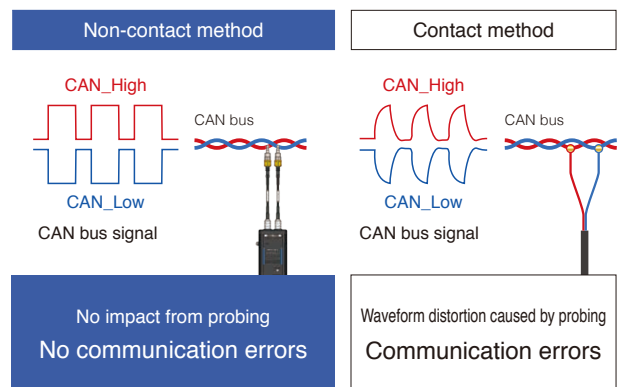


CAN waveform that's identical to one captured using the contact method

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

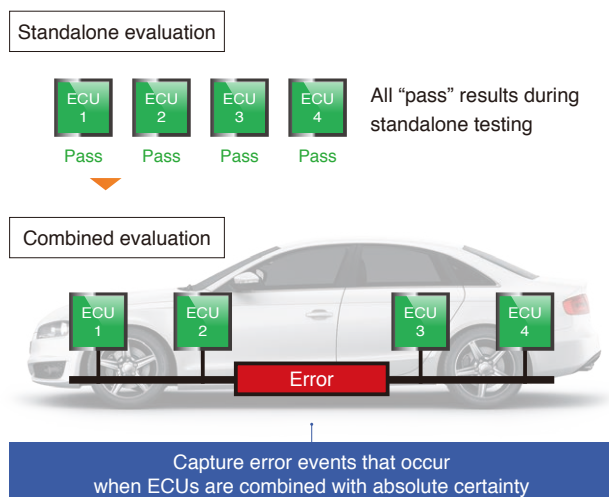
Unlike the contact method, the non-contact method does not distort the original signal when probing the CAN bus. This approach avoids communication errors caused by degraded communications quality.

\*Model with CAN FD support: SP7001



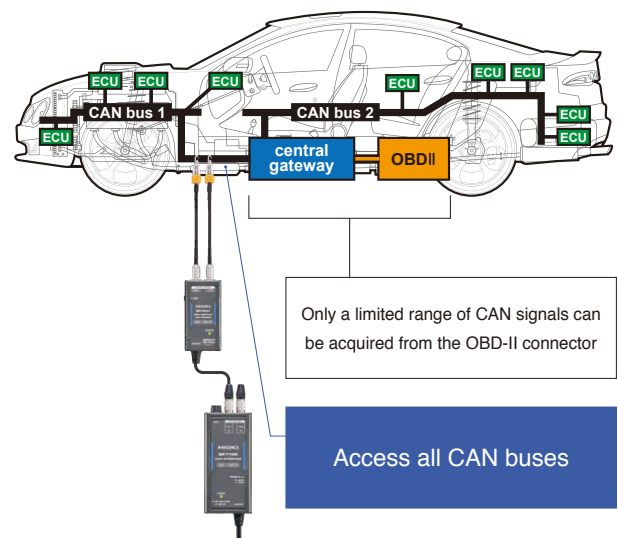
## Reliably capture even infrequent events

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.

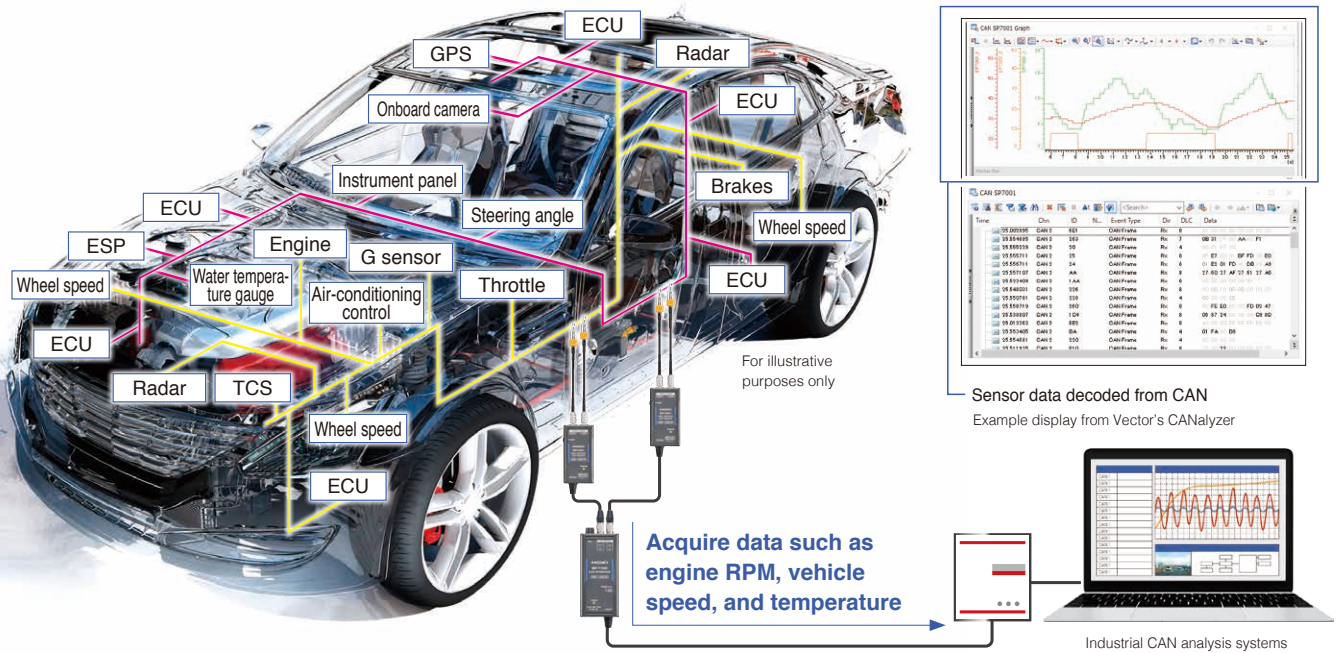




# Example applications

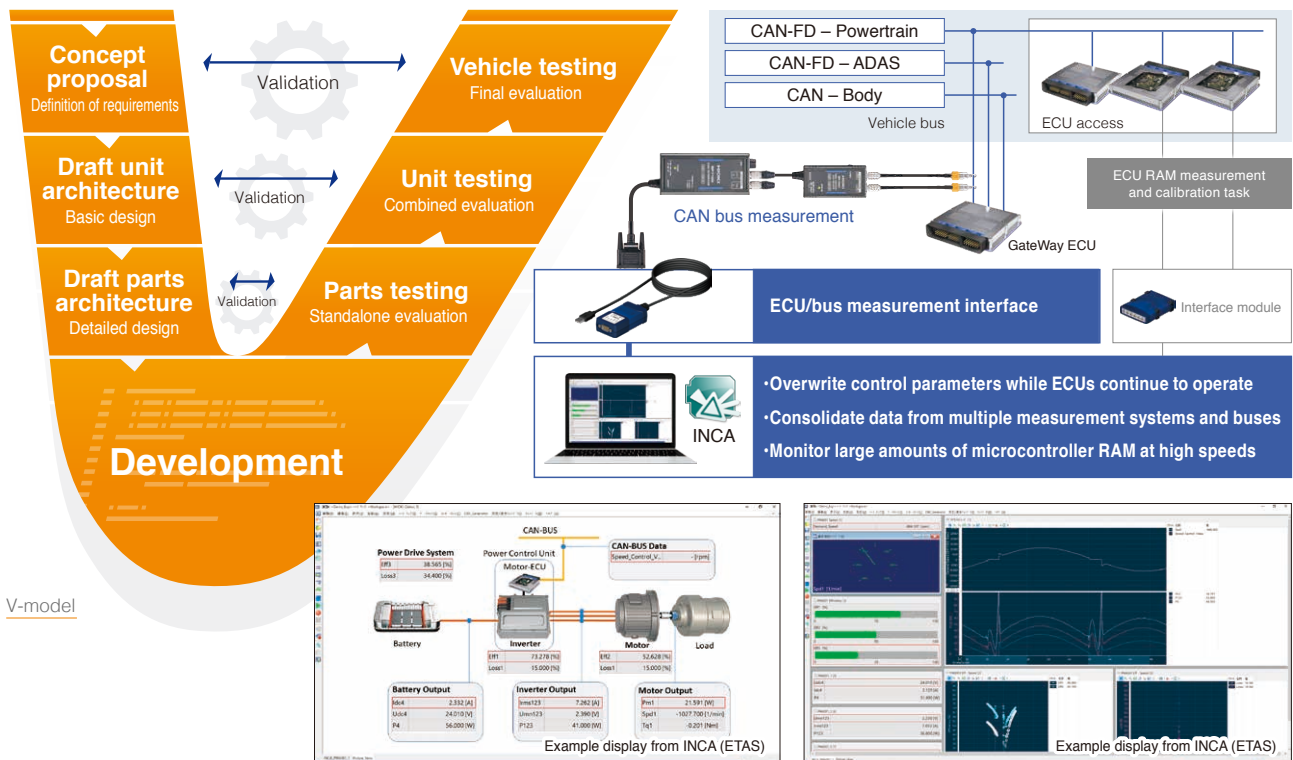
## Analysis of vehicles that have more electrical equipment and data

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. Hioki'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.



## Acquire CAN signals used in a broad range of industries



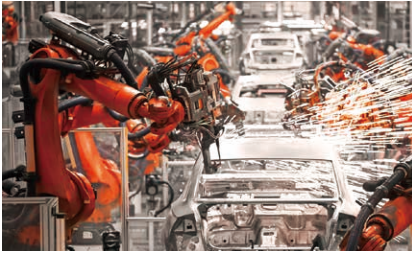
Aircraft



Construction and farming machinery



Motorcycles



Industrial robots



Medical devices

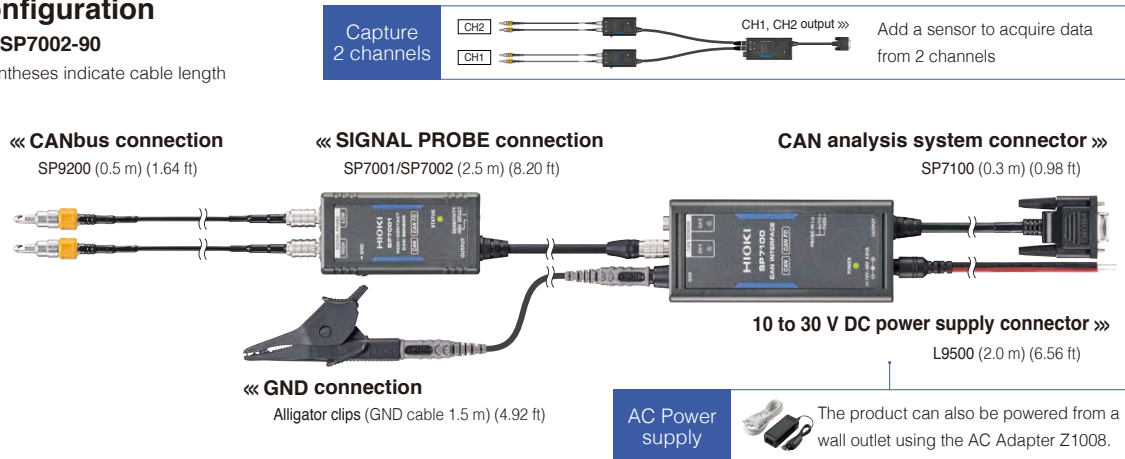


IoT systems

## Basic configuration

### SP7001-90 / SP7002-90

Figures in parentheses indicate cable length














## Specifications

Detection method	Capacitive-coupled signal detection *No bare-wire connections
Detectable cables	AVS/AVSS-compliant cables External diameter: 1.2 to 2.0 mm (0.05 to 0.08 in)
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 1601:1995 5.3 (1) Class 1: passenger cars; conditions: Class A equivalent 4h along X-axis and 2h along Y- and Z-axes at a vibration acceleration of 45 m/s <sup>2</sup> (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	<b>Z1008 AC Adapter</b> 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) <b>External power supply</b> Rated supply voltage: 10 to 30 V DC Maximum rated power: 3 VA
Product warranty	SP7001, SP7002, SP7100: 3 years

## Example bundles

Number of channels	Capture 1 channel		Capture 2 channels		
CAN standard	CAN FD/CAN	CAN	CAN FD/CAN	CAN FD/CAN	CAN
	CAN FD/CAN	CAN	CAN FD/CAN	CAN	CAN
Model number (order code)	 CAN FD / CAN SP7001-90	 CAN Value SP7002-90	 CAN FD / CAN SP7001-90	 CAN Value SP7002-90	 CAN Value SP7002-90
	—	—	 SP9200	 SP9200	 SP9200
	—	—	 CAN FD / CAN SP7001	 CAN FD / CAN SP7001	 CAN SP7002

## Set model

### NON-CONTACT CAN SENSOR SP7001-90

CAN FD / CAN

set content

SIGNAL PROBE SP9200

NON-CONTACT CAN SENSOR SP7001

CAN INTERFACE SP7100 (Includes L9500 and GND cable.)



### NON-CONTACT CAN SENSOR SP7002-90

CAN

set content

SIGNAL PROBE SP9200

NON-CONTACT CAN SENSOR SP7002

CAN INTERFACE SP7100 (Includes L9500 and GND cable.)



**Value**  
Take advantage of bundled pricing rather than purchasing individual products separately.

## System components and options



**SIGNAL PROBE  
SP9200**  
Set of 2



**NON-CONTACT  
CAN SENSOR  
SP7001**  
CAN FD/CAN support



**NON-CONTACT  
CAN SENSOR  
SP7002**  
CAN support



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



**POWER CABLE  
L9500**  
For supplying  
10 to 30 V DC



**AC Adapter  
Z1008**  
For supplying  
100 to 240 V AC



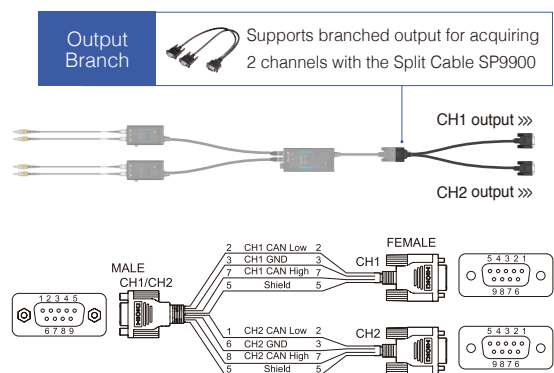
**SPLIT CABLE  
SP9900**  
For branched  
CH1/CH2 output



**CARRYING CASE  
C1013**  
Hard case  
with space for 2 channels

### 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.



**HIOKI**  
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