VDO

SingleViu™

Operating manual

Table of contents

1 General

1.1 Symbols used in this document

Read the relevant chapters of these operating instructions completely before carrying out your work.

Failure to observe safety information may result in injury or damage to property.

Please contact your ►VDO partner if you have any questions or if anything is unclear.

The symbols in this document are used as follows:

- Indicates an instruction for you to take action

► Indicates a keyword that is explained in the glossary

CAUTION

Warns of hazards to your health and indicates possible risks of injury.

WARNING

Indicates possible hazards to the dial gauge or other items.

NOTE

Provides additional information about the product or the installation step.

1.2 Approvals and standards met

1.2.1 Conformity symbol

All dial gauges of the SingleViu family have been developed and manufactured in accordance with EU Regulation 765/2008. In particular, the dial gauges comply with directives 2011/65/EU (ROHS II) and 2014/30/EU (EMC) and accordingly bear the "CE" marking.

Likewise, the SingleViu devices fulfil the SI 2012 No. 3032 “Environmental Protection” and the SI 2016 No. 1091 “Electromagnetic Compatibility” and therefore bear the UKCA marking.

The official ►Declaration of conformity is available.

1.2.2 Type approval in accordance with UN ECE

All dial gauges of the SingleViu family have been tested in accordance with UN ECE R10 ("electromagnetic compatibility") and their design has been approved. They therefore bear the "E" marking. The official ►Type approval is available.

1.2.3 ELV and IMDS

All dial gauges of the *SingleViu* family meet the requirements of Directive 2000/52/EC (ELV). IMDS data can be provided.

2 Safety instructions

2.1 ... concerning users

- These instructions are intended for technicians and users.
- Technicians are appropriately trained or experienced persons with a basic knowledge of automotive/shipbuilding electrics and mechanics. Installation, configuration and removal from service of the product must be carried out by a technician in order to avoid injury to persons, damage to property and environmental damage.
- Users are in particular drivers and other personnel of the target vehicle who operate and clean the dial gauge. Users must be instructed in the function of the dial gauge before use.

2.2 ... concerning intended use

- A dial gauge may only be used in terrestrial vehicles, machinery as well as marine leisure craft, both commercial and private.
- It is designed for nominal voltages of 12 or 24 VDC. Higher voltages can damage the dial gauge.
- The dial gauge may only be used to display specific vehicle or machine parameters.
- Changes or manipulation of the product can have a negative influence on safety. Do not use modified, manipulated or damaged dial gauges.

2.3 ... prior to installation

- Wear working clothes. Do not wear loose clothing that can catch on moving parts. Wear a hair net if you have long hair.
- Make sure ambient conditions are suitable. Secure the vehicle sufficiently before working underneath it.
- Ensure the engine cannot be started unintentionally.
- Take care when removing covers, seats etc. that no cables are damaged or plug connections loosened.
- Note down all data from other installed equipment with volatile electronic memories.

2.4 ... concerning the choice of installation location

- Check that there is adequate installation space.
- When installed, the dial gauge must not obstruct the driver's field of vision.
- Do not choose an installation location in the vicinity of the airbag's mechanical and electrical components.
- Do not drill holes or make installation openings in load-bearing or stabilising struts or spars.
- Keep a sufficient distance from magnets so as not to interfere with them. Recommendation: At least 30 cm.
- When drilling or sawing, be careful not to damage cables, fuel lines, oil lines etc.
- Pre-drill small installation openings, then enlarge with a cone cutter, file, hole saw or jigsaw. Deburr any rough edges.

2.5 ... during electrical work

- Disconnect power sources before carrying out electrical work, disconnect earth cables from starter and auxiliary batteries.
- Ensure correct wiring and connections.
- Only use a fused battery connection, recommendation: 5 A fuse.
- Only use cables with an adequate cross-section and insulation. A smaller cable cross-section will result in a higher current density and the cable section in question will heat up.
- Use existing cable ducts and harnesses when laying cables. Do not run cables for the dial gauge parallel to ignition cables or to cables leading to large power consumers.
- Secure the cable with cable ties or adhesive tape. Do not route the cable over moving parts. Do not attach the cable to the steering column. Cables must not be exposed to tensile forces.
- Use rubber grommets or similar to protect cables when routing them through holes.
- When stripping cable ends, use a wire stripper and adjust it in such a way that no strands are damaged.
- Only solder cable connections using the soft soldering method or use commercially available crimp connectors.
- Only make crimp connections with cable crimping pliers.
- Insulate any exposed cable and connection points.

2.6 ... after installation

- Do not put the vehicle/ machine into operation with faulty connection points or damaged cables.
- Firmly connect the ground cable to the negative terminal of the starter battery.
- Re-enter/program values of any volatile electronic memories.
- Check that the vehicle is functioning properly.

2.7 Residual security risks of SingleViu from VDO to the customer

VDO hereby informs about residual security risks identified for the SingleViu.

After conducting a threat analysis and risk assessment (TARA) on the SingleViu, VDO has identified certain security risks that could be exploited by malicious actors.

While VDO has taken measures to mitigate security risks according to ISO/SAE 21434:2021, we need to inform you about existence of residual security risks as listed below (hereinafter referred to as “Residual Security Risks”) and the potential impact they may have on your business operations. These risks pose a potential threat to the confidentiality, integrity, and/or availability of the SingleViu in operation. Due to (process) technical limitations of the SingleViu, Residual Security Risks cannot be reduced further on the level of VDO’s contractually agreed SingleViu.

The following residual Security Risks are inherent to the SingleViu:

Risk Description	Threats	Risk Level
CAN messages can be manipulated through the gauges.	Denial of Service of CAN port, Spoofing of CAN port	4
The Software update package is vulnerable when in transit and when at rest.	Tampering of Software update package, Spoofing of Software update package	4
Flashing of non-authentic Software.	Tampering of RAM, Spoofing of RT Application, Tampering of RT Bootloader, Denial of Service of RT Bootloader	3
Tampering of the odometer values and configuration parameters stored in the EEPROM.	Information Disclosure of RAM, Denial of Service of NVM, Tampering of NVM, Tampering of (SW) Renesas uC, Spoofing of EEPROM	3
Tampering of the Hardware	Denial of Service of (HW) Renesas Uc, Tampering of Power supply, Denial of Service of Power supply	2

Risk Level Explanation:

Level	Risk	Risk Treatment Options
1	Low	Acceptance, Reduction, Transfer, Avoidance
2	Medium	Reduction to Low, Transfer, Avoidance, Acceptance with Project Management Approval and Close Risk Monitoring
3	Medium-High	Reduction to Low, Transfer, Avoidance, Acceptance with Segment Quality Management, Product Management Approval, Solution/ R&D Management Approval, BA PSO Information/ Consult and Close Risk Monitoring
4	High	Reduction to Low, Transfer, Avoidance, Acceptance with BA Quality Management, Segment Management, R&D Head Approval, BA PSO Consult and Close Risk Monitoring
5	Critical	Reduction, Transfer, Avoidance

Further details can be found in the TARA report.

A detailed report outlining the assessment results can be shown on-site at a VDO location upon request of customer.

VDO regards it is necessary for customer to acknowledge the security risks of the SingleViu in order to ensure that there is a clear understanding of the responsibilities associated with the use of this SingleViu, in particular as component with or within VDO's product.

By reading this Transfer of Risks Agreement, customer agrees to all terms and conditions and acknowledges the residual risk.

Therefore, customer is aware of the Residual Security Risks of the SingleViu and the potential impact these may have on customer's business operations. It is customer's responsibility to ensure ongoing and continuous risk mitigation on system level. More details regarding further mitigations can be found within the TARA report.

customer agrees to defend, indemnify and hold VDO harmless in case of any security breaches or incidents related to the Residual Security Risks of the SingleViu, from and against any and all claims, losses, liabilities, costs, damages and expenses (including reasonable attorneys' fees and expenses) suffered or sustained by, or asserted against VDO.

3 Technical data

3.1 Dimensions

Mounting hole diameter	52 – 53 mm	80 - 81 or 85 – 86 mm	100 – 101 mm
Dial gauge diameter	52 mm	80 mm	100 mm
Dial gauge depth	76 mm	80 mm	80 mm
Mounting depth including connector	110 mm	110 mm	110 mm
Weight	100 g	240 g	290 g

3.2 Environmental and electrical stability

Operating temperature range	-40 °C to +80 °C Display: -20 °C to +80 °C	
Storage temperature range	-40 °C to +85 °C	
Protection class	IP 67 (without connector IP 40)	
Chemical stability	- Ammonia/alcohol-based washing solution, e.g. windscreen cleaner - Methylated spirits - Aqueous surfactant solution, e.g. interior cleaner - Liquids containing caffeine and tea, e.g. coffee, tea, cola	
Mechanical shock	Continuous	25 g; 6 ms
	Single	100 g; 11 ms
	Free fall	1 m
Vibration	Periodic	2 g; 8 – 500 Hz
	Random	4.2 g; 10 – 1000 Hz
Temperature shock	Range	-40 °C to +85 °C
	Duration of transfer	10 s
	Retention time	2 h
Storage climate conditions	Range	+25 °C to +55 °C
	Relative humidity	80% to 100%
Salt spray test	5% NaCl, 672 h	
Electromagnetic compatibility	Radiation	CISPR25 Class 3
	Irradiation resistance	IEC 61000-6-2 Class A
	Current injection (BCI)	ISO11452-4 Class A
Polarity reversal protection	Yes	

3.3 Electrical connection

Nominal voltage	12 VDC or 24 VDC
Operating voltage range	8 VDC to 32.5 VDC
Power consumption during operation	< 200 mA at nominal voltage
Power consumption in standby mode	< 3 mA

3.4 Pin description

3.4.1 8-pin connector

Each *SingleViu* dial gauge has a connection for a MOLEX 334724801 8-pin ►connector.

Pin	Designation	Comment	Cable colour ►Power supply cable
1	Terminal 30	Battery positive (12/24 VDC)	Red
2	Terminal 31	Battery negative (earth)	Black
3	Sensor earth	Reference potential for encoder signal	Blue
4	Terminal 15	Ignition	Brown
5	Sensor input	Connection for analogue encoder signal	Green
6	Terminal 58	Illumination	Blue/red
7	CAN High	Input for CAN bus	White
8	CAN low	Input for CAN bus	Pink

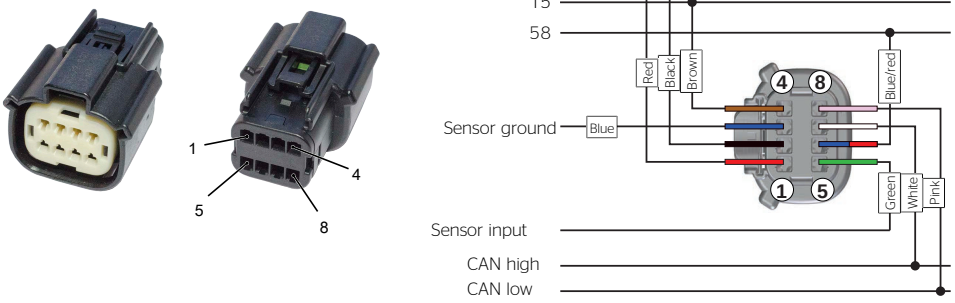


Fig. 1: Molex 8-pin connector with connection diagram

NOTE

Examples of sensor connections can be found in Annex C (Connection diagrams).

Pin 1: Power supply (terminal 30)

VDC = +8 VDC to +32.5 VDC

This pin supplies the dial gauge with DC voltage. Power consumption is less than 200 mA in operation and less than 3 mA in standby. The restart is delayed by 0.5 volts after overvoltage or undervoltage.

Pin 2: Ground (terminal 31)

Power supply earth contact.

Pin 3: Sensor Ground

Ground reference for the analogue sensor signal, see pin 5.

Pin 4: Ignition (terminal 15)

Voltage range: 0 V to UBat. Activation threshold 8 VDC, deactivation threshold 2.5 VDC, debounce time 200 ms. Wake-up via CAN is possible.

Pin 5: Sensor input

The type of sensor input depends on the dial gauge variant.

a) Resistance input

Range: 0 to 500 ohms

The preset ►Sensor characteristic curve depends on the dial gauge variant. The “SingleViu 8Pin 250 Ohm” 2801000020301 adapter cable is available as an ►Accessory for sensor characteristics >500 ohms; it connects a 250 ohm resistor between signal lines 3 and 5 and accordingly in parallel with the sensor. The resulting characteristic curve can be entered using the ►ConfigTool.

b) Power input

Range: 0 to 6 V or -100 to +100 mV

The signal for pyrometers must be connected to the supply voltage (terminal 30); see Annex C (Connection diagrams).

Voltmeters do not require a separate signal input, but use the supply voltage as a signal in analogue mode.

c) Pulses and frequencies

Thresholds: Ulow < 0.2 V, Uhigh frequency-dependent from 1 V. Frequencies up to 400 kHz are possible.

SingleViu is approved for all standard sensors and signal types.

- Inductive sensor
- Magnetic pick-up
- Hall effect sensors
- Alternator
- Ignition
- Generator encoder

d) Power input

SingleViu gauges with voltage input can receive the standard signal 4 -20 mA via the " SingleViu 8Pin 250 Ohm" adapter cable 2801000020301 available as an ►Accessory. This adapter cable connects a 250 ohm resistor between the signal lines 3 and 5 and thus converts the current signal into a voltage signal 1 - 5 V. Using the ►ConfigTool, the SingleViu dial gauge can be configured to match this characteristic curve.

Pin 6: Illumination (terminal 58)

Voltage range: 0 V to UBat. For functionality, see chapter Illumination [→ 17].

Pin 7: CAN High

Connection pin for "CAN high" according to ISO 11898-2 (High-speed CAN) without terminating resistor.

Pin 8: CAN low

Connection pin for "CAN low" according to ISO 11898-2 (High-speed CAN) without terminating resistor.

3.4.2 12-pin connector

SingleViu dial gauges with a diameter of 80 and 100 mm also have a connection for the MOLEX 334721201 ►connector with 12 pins. All connections contained therein are optional.

Pin	Designation	Comment	Cable colour ►Power supply cable
1	CAN High	Opt. input for CAN bus	White
2	CAN low	Opt. input for CAN bus	Pink
3	Terminating resistor	120 ohm CAN terminating resistor	Red
4	Terminating resistor	120 ohm CAN terminating resistor	
5	Digital input 1	Control of indicator light 1	Yellow/white
6	Digital input 2	Control of indicator light 3	Yellow/blue
7	Digital input 3	Control of indicator light 2	Yellow/red
8	Digital input 4	Control of indicator light 4	Yellow/green
9	Digital input 5	Control of indicator light 5	Yellow/black
10	Digital input 6	Connection for external push button	Grey/pink
11	Digital output 1	Connection for external buzzer	Grey
12	Digital output 7	Configuration pin	Orange

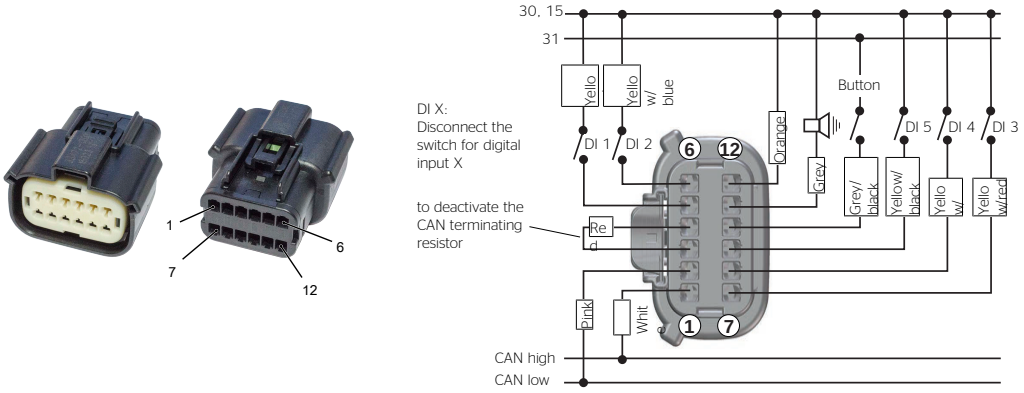


Fig. 2: Molex 12-pin connector with connection diagram

Pin 1: CAN High

Alternative "CAN high" according to ISO 11898 without terminating resistor. This pin can also be used to feed through CAN signals.

Pin 2: CAN low

Alternative connection pin for "CAN low" according to ISO 11898 without terminating resistor. This pin can also be used to feed through CAN signals.

Pin 3 and 4: Terminating resistor

Connection to the 120 ohm CAN terminating resistor according to ISO 11898. The resistor is fitted inside the dial gauge and is activated by connecting pins 3 and 4 outside the gauge.

Pin 5: Digital input 1

Voltage range: 0 V to►UBat. Activation threshold 4 VDC, deactivation threshold 2.5 VDC, debounce time 200 ms.

Switch pin for indicator light 1, the error light. By default, the light is active at high voltage levels.

Pin 6: Digital input 2

Voltage range: 0 V to►UBat. Activation threshold 4 VDC, deactivation threshold 2.5 VDC, debounce time 200 ms.

Switching pin for indicator light 3, the yellow engine warning light. By default, the light is active at high voltage levels.

Pin 7: Digital input 3

Voltage range: 0 V to►UBat. Activation threshold 4 VDC, deactivation threshold 2.5 VDC, debounce time 200 ms.

Switching pin for indicator light 2, the red stop light. By default, the light is active at high voltage levels.

Pin 8: Digital input 4

Voltage range: 0 V to►UBat. Activation threshold 4 VDC, deactivation threshold 2.5 VDC, debounce time 200 ms.

Switching pin for ►indicator light 4. By default, the light is active at high voltage levels.

Pin 9: Digital input 5

Voltage range: 0 V to►UBat. Activation threshold 4 VDC, deactivation threshold 2.5 VDC, debounce time 200 ms.

Switching pin for indicator light 5. By default, the light is active at high voltage levels.

Pin 10: Digital input 6

Connector pin for an optional, external switch. The pin detects a low voltage level, so the external switch must be connected between this pin and the earth contact.

Pin 11: Switch output 1

Connector pin for an optional, external consumer, e.g. a buzzer or a control display unit. It is an open-collector outlet that switches to earth. The external consumer must be connected between battery positive and this pin.

Maximum current: 1000 mA

Pin 12: Digital input 7

Voltage range: 0 V to►UBat. Activation threshold 4 VDC, deactivation threshold 2.5 VDC, debounce time 200 ms.

This configuration connector can be used to enter the advanced ►Configuration menu.

4 Design and functions

The figure Design of a SingleViu dial gauge [→ 13] shows the structure of a dial gauge with a diameter of 80 or 100 mm. Dial gauges with a diameter of 52 mm follow the same design, but do not have a push button or a display.

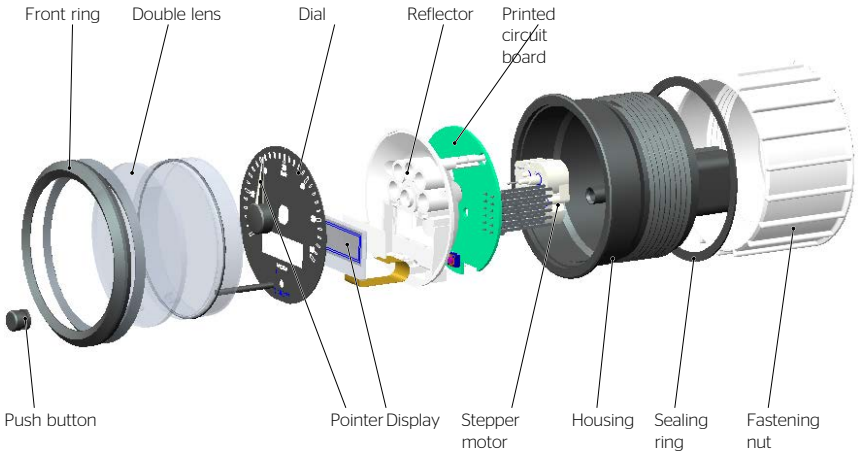


Fig. 3: Design of a SingleViu dial gauge

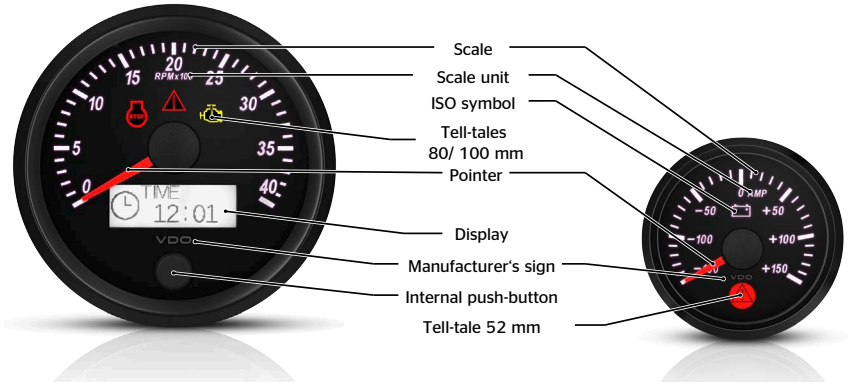


Fig. 4: Dial elements

4.1 Pointer and signal input

The main function of a dial gauge is to display a vehicle parameter read by analogue means or input by a CAN message. By default, dial gauges are supplied in analogue mode and can be operated "plug & play" with many commercially available sensors from the VDO range or reconfigured to other characteristics or pulse values using the ConfigTool. See the description of pin 5 in ►Chapter 3.4.1 and the variant-specific preset sensor curves in Annex B (Sensor lines) for details of possible analogue signals.

As an alternative, each dial gauge can be configured to operate in CAN mode using ConfigTool. SingleViu supports high-speed CAN according to ISO 11898-2 at 125, 250 or 500 kBaud/s and both CAN 2.0A and CAN 2.0B. The dial gauges are preset for messages of the SAE J1939 CAN protocol, for details see Annex A (Overview of variants).

Figures CAN details of a speedometer [→ 14] and CAN details of a water temperature gauge [→ 15] show examples of the CAN settings. The baud rate can be set via the selection menu. Priority, PGN and transmitter address form the CAN ID. According to CAN2.0A, priority = 0 and PGN <=7 must be selected for messages with an 11-digit CAN ID. Only messages matching the setting made are evaluated, not those with e.g. a different transmitter address. The data bytes (low-high) indicate which bytes of the data block contain the desired information. The little-endian byte order must be specified for parameters with a length of 2 bytes, as is usual in J1939.

The four other parameters specify the permissible range of values and thus enable any resolution and offset.

The pointer will return to the zero position and indicator light 1 will be activated in the event of an invalid input value or, in CAN mode, in the event of a missing CAN message (CAN time-out 3 seconds).

Pointer display range	240°
Pointer accuracy	-3° to +3°, speedometer 0° to 6°

4.1.1 Example of a speedometer

In the example of the speedometer, input values ranging from 0 to 30720 (hex: 0x7800) are converted to display values of 0 km/h to 120 km/h and shown on the dial gauge. Input values greater than 30720 are identified as invalid signals.

Remark: The "Max CAN value" can be increased and the "Max physical value [km/h]" can be increased by the same amount to allow for larger input values, so that the ratio remains the same and the resolution does not change.

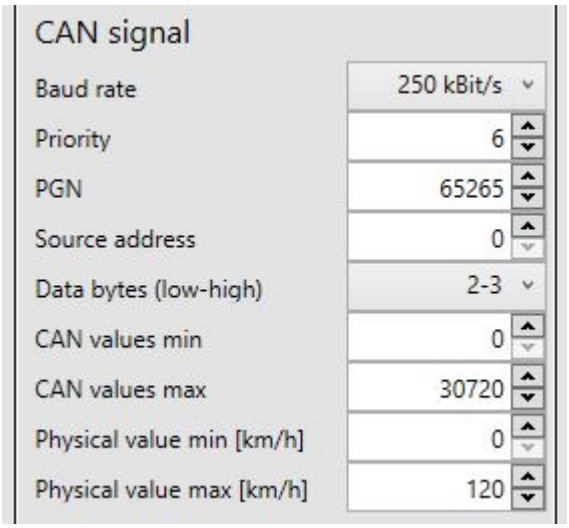


Fig. 5: CAN details of a speedometer

4.1.2 Example of a water temperature gauge

For a water temperature gauge, data in accordance with J1939, SPN 110, are given by default. In the figure Signal input [→ 15], the blue line shows the entire range of possible CAN values in SPN 110, ranging from 0 to 250 (hex: 0xFA), and the corresponding temperature range from -40 °C to +210 °C. This corresponds to an offset of -40 °C and a resolution of 1 bit per degree Celsius. The orange line shows the parameters set in ConfigTool corresponding to the scale range of the SingleViu gauge. This dial gauge also allows a different range of permitted input values to be selected and the associated temperature range to be set.

It is therefore possible to utilise all offsets and resolutions in the case of different messages, including those from other CAN protocols.

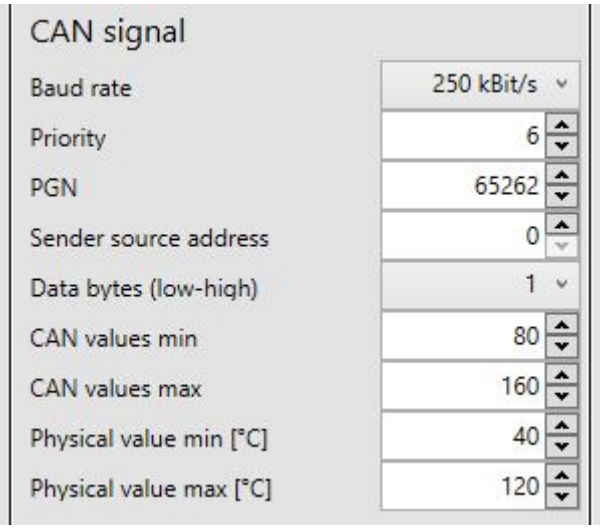


Fig. 6: CAN details of a water temperature gauge

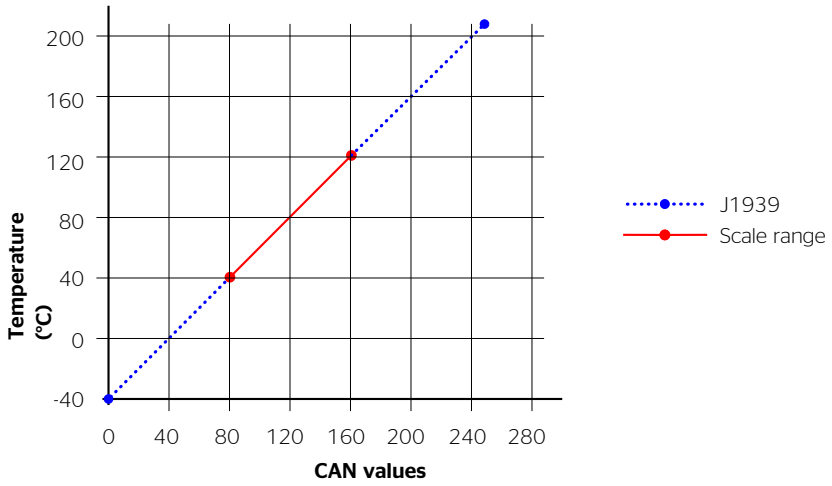


Fig. 7: Signal input

4.2 Indicator lights

4.2.1 Indicator light in dial gauges with a diameter of 52 mm

Dial gauges with a diameter of 52 mm have one indicator light, symbol 0434A according to ISO 7000, which lights up red. The indicator light in fill level indicators is symbol 0245 according to ISO 7000, which lights up yellow.

It is activated when the display value exceeds a warning threshold. For fill level indicators, the lower warning threshold is 10% and, for the A2C38330300 rev counter, it is 400 RPM. The other warning thresholds are set to the ends of the scale by default. It is possible to change the thresholds using ►ConfigTool .

4.2.2 Indicator light in dial gauges with a diameter of 80 or 100 mm

Dial gauges with a diameter of 80 or 100 mm can be equipped with up to five indicator lights. The positions on the dial are shown in the figure opposite.

NOTE

Speedometers are fitted with indicator light 1 only as standard.

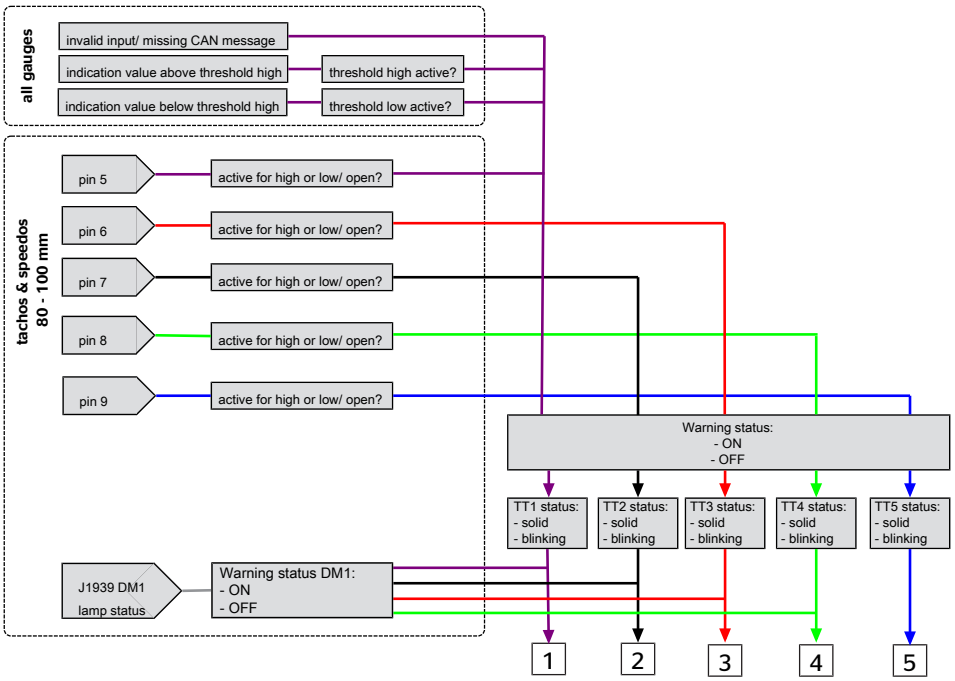


Fig. 8: Arrangement of warning lights in dial gauges with a diameter of 80 or 100 mm

Indicator light 1 shows a warning triangle, symbol 0434A according to ISO 7000, which lights up red. It is activated when the display value exceeds a warning threshold. The lower warning threshold for rev counters is 400 RPM. The other warning thresholds are set to the ends of the scale by default. It is possible to change the warning thresholds using ▶ConfigTool by setting them in the advanced ▶Configuration menu. This indicator light also serves as a hazard lamp according to SAE J1939-73 in rev counters and is activated by switching pin 5 of the 12-pin connector or by error message DM1, SPN 987, PGN 65226 (from SW 01.06.03). Likewise, this warning light is activated in the event of an invalid input signal including a missing CAN message in CAN mode.

Indicator light 2 shows a cylinder symbol with "STOP" written on it, symbol 1388 according to ISO 7000, which lights up red. This indicator light serves as a red stop lamp according to SAE J1939-73. It is activated by switching pin 7 of the 12-pin connector or by error message DM1, SPN 623 or 3039, PGN 65226. Indicator light 2 is fitted on rev counters.

Indicator light 3 shows an engine, symbol 2423 according to ISO 7000, which lights up yellow. This indicator light serves as a malfunction indicator lamp according to SAE J1939-73. It is activated by switching pin 6 of the 12-pin connector or by error message DM1, SPN 1213 or 3038, PGN 65226. Indicator light 3 is fitted on rev counters.

Control light 4 shows a rhombus with call sign, symbol 2813 according to ISO 7000, which lights up yellow-orange. This indicator light serves as an amber warning lamp according to SAE J1939-73. It is activated by switching pin 8 of the 12-pin connector or by error message DM1, SPN 624 or 3040, PGN 65226. Indicator light 4 is being added to rev counters variant by variant.

Indicator light 5 is not used.

4.3 Display and push button

Dial gauges with an 80 or 100 mm diameter have a built-in display that shows a variety of information. This is divided into ►Configuration menu and ►Operating menu.

Dial gauges with an 80 or 100 mm diameter have a built-in push button to control the contents of the display. An external push button, which can be connected to pin 10 of the 12-pin connector, has the same function.

4.3.1 Welcome logo

The welcome logo is a static image that can be shown in the display for a configurable period each time the unit is switched on. By default, no image is displayed. Settings can be made using ►ConfigTool.

4.4 Illumination

All dial gauges in the SingleViu family have internal illumination. The dial and, where applicable, the display are illuminated by RGB LEDs and the pointer by monochrome red LEDs.

Illumination

Pointer	Red
Dial	RGB, default white
Display	RGB, default white

The prerequisite for illumination is that the dial gauge is connected to the supply voltage (pins 1 and 2) and switched on, either by ignition (terminal 15, pin 4) or by CAN wake-up. Illumination is activated via pin 6 (terminal 58).

There are several ways of adjusting the intensity and colour of the backlighting.

4.4.1 Configuration

The settings for illumination intensity and colour can be adjusted using ►ConfigTool or, in the case of dial gauges with a diameter of 80 or 100 mm, by means of a ►Push button as well. When adjusting a setting using the push button, the dial gauge sends a CAN message with PGN 53503 / SPN 1487. Byte 1 contains SPN 1487 and indicates the brightness of the backlighting. If the colour is changed, bytes 4 - 8 are used for private transmission of illumination colour to all other dial gauges of the SingleViu family connected to the CAN bus.

4.4.2 CAN illumination message

Illumination intensity can be adjusted using CAN message J1939, PGN 53503 / SPN 1487. The colours can be changed by setting byte 8 of the message to 0x65 or 0x66:

0x65 > bytes 4, 5 and 6 are interpreted as new RGB values for the dial

0x66 > bytes 4, 5 and 6 are interpreted as new RGB values for the display

4.4.3 Analogue dimming via voltage signal

NOTE

This section describes the functionality in firmware versions 01/07/09 (52 mm units) and 01/06/12 (80/85 mm units and 100 mm units) and higher.

The illumination is activated for voltages >7.5 V at the level of brightness set using ►ConfigTool or the push-button, which is 80% by default. *SingleViu* units can be dimmed in an analogue way, e.g. by potentiometer, by changing the voltage at the unit input in the range between an adjustable threshold value - 0.5 V by default - and 7.5 V. When designing the potentiometer, the supply voltage and the number of SingleViu units must be taken into account because each SingleViu unit has an internal voltage divider.

4.4.4 PWM signal

SingleViu units can also be integrated into architectures with a PWM brightness signal. The PWM signal can be converted into a constant voltage level using an RC low-pass filter. The values of the resistor and the capacitor depend on the on-board voltage and the number of *SingleViu* units.

4.5 Transmit CAN message

All dial gauges of the SingleViu family can send a value measured in analogue mode as a CAN message. For this, they use the parameters that would be taken in CAN mode for the input message; these can be configured using ►ConfigTool. 52 mm dial gauges transmit the message with a cycle time of 1000 ms. 80 and 100 mm dial gauges transmit the vehicle speed or engine speed with an adjustable cycle time of between 100 and 1000 ms; 250 ms is the default. In addition, they transmit the total number of kilometres or the total operating hours in J1939 configuration SPN 245 or SPN 247.

The messages are only sent when terminal 15 is active.

4.6 External buzzer

The digital switched output, pin 11 of the 12-pin connector, is coupled to the►Indicator lights to connect an external buzzer or other electrical load. One of four buzzer states can be set individually for each of the 5 indicator lights:

Status 0: 100 ms AN, 400 ms AUS

Status 1: 1000 ms AN, 500 ms AUS

Status 2: 1000 ms AN (one-time event)

Status 3: permanently OFF

The buzzer output can be switched off (muted) using the push-button.

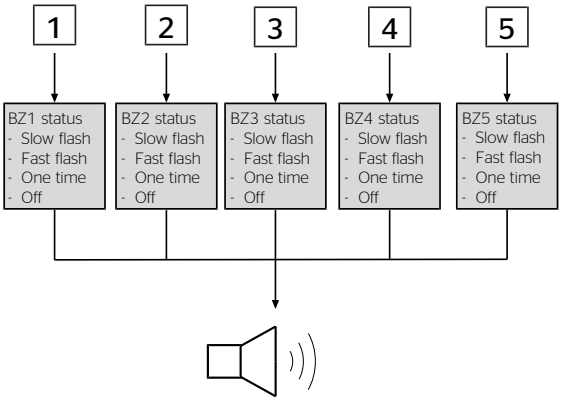


Fig. 9: External buzzer

4.7 CAN wake-up

All dial gauges are activated by a voltage signal at terminal 15 on pin 4 or by a CAN message (CAN wake-up). CAN wake-up can be deactivated from firmware versions 01/07/10 (52mm) and 01/06/20 (80/100mm).

4.8 Request message

Every *SingleViu* device 52mm can send a static message, in particular e.g. as a request. The parameters of this message can be configured using ►ConfigTool. The details of the CAN ID and the first three data bytes can be set. You can choose between data block lengths with 3 bytes and 8 bytes, whereby the last 5 bytes are then set with 0xFF. The cycle time is 1000 ms.

4.9 DM1 messages

Dial gauges with a diameter of 80 or 100 mm receive DM1 messages according to SAE J1939, PGN 65226, including BAM messages with two or more DTCs. The light status is indicated by the ►Indicator lights in the case of rev counters.

Up to 8 DTCs are shown in the display, see chapters 8.2.9 and 8.3.8. [→ 15]

The DM1 information is temporarily stored in the dial gauge for as long as the message is regularly received again. Otherwise, the information is deleted after 3 seconds.

5 Overview of variants

You can find an overview of the available variants in Appendix A.

The associated preset signal inputs are given in Appendix B.

The corresponding connection diagrams are available in Appendix C.

5.1 Package contents

Each package contains one dial gauge with retaining nut and safety instructions.

Bulk packages of 52 mm dial gauges contain 25 sets of parts. Bulk packages of 80 or 100 mm dial gauges contain 10 sets of parts. Additional ►Accessories are available separately.

6 Handling and installation instructions

6.1 Transportation and storage

Dial gauges should only be transported and stored in their packaging. Handle with care. The permitted storage temperature range is -40 °C to +85 °C; storage at room temperature is recommended. Protect from moisture and dirt.

WARNING

Dial gauges are susceptible to dust and liquids without a ►Connector.

- If desired, perform ►Configuration before installation.

6.2 Switch off the power supply

CAUTION

Danger in the event of battery short circuits.

Short circuits may result in cable fires, battery explosions and damage to other electronic systems.

a) Disconnect sources of power before carrying out electrical work.

b) Remove earthing cables from starter and auxiliary batteries.

c) Secure batteries against unintentional reconnection.

NOTE

When you disconnect the battery, all volatile memories will lose any values entered and will have to be reprogrammed subsequently.

- Switch off the ignition and remove the ignition key.
- Where applicable, disconnect the main power switch.
- Disconnect the negative pole of the starter battery and, where applicable, all auxiliary batteries.

6.3 Prepare the installation location

CAUTION

Danger if the installation location is incorrectly chosen.

An incorrectly chosen installation location can affect other vehicle components or the vehicle's stability.

- The installed dial gauge must not obstruct the driver's field of vision.

- Do not choose an installation location in the vicinity of the airbag's mechanical and electrical components.

- Do not drill holes or make installation openings in load-bearing or stabilising struts or spars.

- Keep a sufficient distance from magnets so as not to interfere with them. Recommendation: At least 30 cm.

NOTE

The panel must be sufficiently stable and between 2 and 16 mm thick.

The dial gauge can be mounted in any nominal position, i.e. NP 0° to 90° according to DIN 16257.

- Select a suitable installation location.
- If necessary, create the opening for installation, e.g. in the dashboard.

Hole dimensions must conform to the following values:

	Hole diameter	Installation depth
52 mm	52 + 1 mm	110 mm
80 mm	80 + 1 mm or 85 + 1 mm	110 mm
100 mm	100 + 1 mm	110 mm

Dial gauges with a diameter of 80 mm can be mounted in holes with a diameter of 85 mm.

- In this case, mount the fastening pattern with the centring lip first, see Figure 6.6.

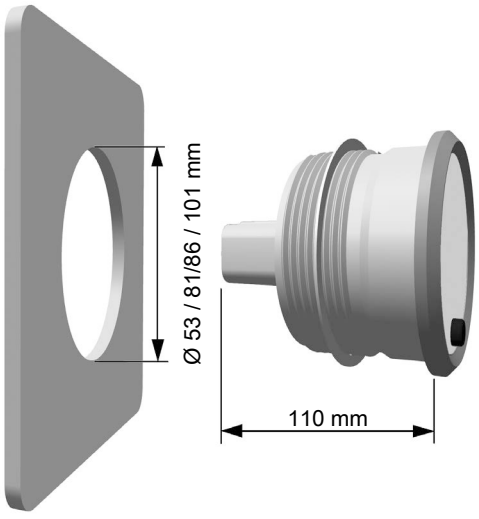


Fig. 10: Hole size

CAUTION

- When drilling or sawing, be careful not to damage cables, fuel lines, oil lines or similar.

- Pre-drill small installation openings, then enlarge with a cone cutter, file, hole saw or jigsaw. Deburr any rough edges.

- Re-route cables, if necessary.

NOTE

Use 1.20 – 2.69 mm cable thickness according to MOLEX specifications in order to be able to ensure tightness.

http://www.molex.com/pdm_docs/ps/PS-33472-000.pdf.

CAUTION

Danger of sudden loss of function of a vehicle system.

Faulty connections or unsuitable cable routing can lead to parts failure or short circuits, sometimes even after the vehicle has been in operation for a long time.

- Only use a fused battery connection, recommendation: 5 A fuse.

- Only use cables with an adequate cross-section and insulation.

- Use existing cable ducts and harnesses when laying cables. Do not run cables for the dial gauge parallel to ignition cables or to cables leading to large power consumers.

- Secure the cable with cable ties or adhesive tape. Do not route the cable over moving parts. Do not attach the cable to the steering column. Cables must not be exposed to tensile forces.

- Use rubber grommets or similar to protect cables when routing them through holes.

- Only make crimp connections with cable crimping pliers.

- Insulate any exposed cable and connection points.

6.4 Fitting connectors

SingleViu uses the MX150 connector system from MOLEX.

NOTE

You can find all information on the MOLEX MX150 connector system, drawings, product specifications, assembly and disassembly instructions and crimping instructions at:

http://www.molex.com/ind/mx150.html

WARNING

When stripping cable ends, use a wire stripper and adjust it in such a way that no strands are damaged.

NOTE

Various crimp contacts from the 33012 series are available in the MOLEX MX150 product family. When selecting, make sure that the surface is tin-plated and that the size class matches the cable cross-section.

http://www.deutsch.molex.com/molex/products/listview.jsp?channel=products&sType=s&query=33012

The MOLEX recommendation for sealed connectors is 33012-2004 or 33012-3004

- Attach crimp contacts to the cable ends.
- Plug the cable into the MOLEX-MX150 connector according to the pin assignment in chapter Pin description [→ 9].

8-pin connector, MOLEX 334724801, for all dial gauges:

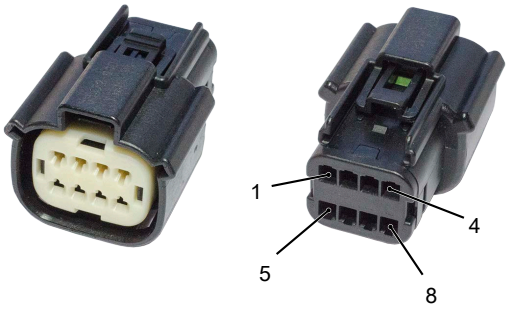


Fig. 11: Molex 8-pin connector

Pin		Comment
1	Terminal 30	Battery positive (12/24 VDC)
2	Terminal 31	Battery negative (earth)
3	Sensor earth	
4	Terminal 15	Ignition (12/24 VDC)
5	Sensor input	See dial gauge data sheet for sensor characteristic curve
6	Terminal 58	Illumination (12/24 VDC)
7	CAN High	Input for CAN bus
8	CAN low	Input for CAN bus

12-pin connector, MOLEX 334721201, for dial gauges with a diameter of 80 or 100 mm:

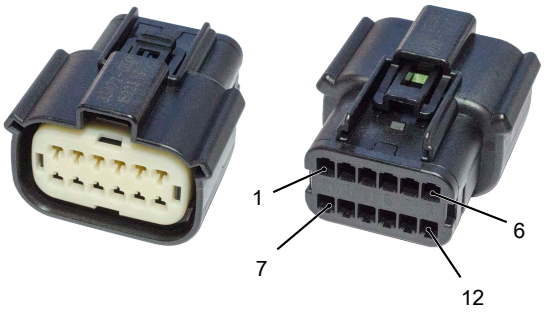


Fig. 12: Molex 12-pin connector

Pin	Designation	Comment
1	CAN High	Opt. input for CAN bus
2	CAN low	Opt. input for CAN bus
3	Terminating resistor	120 ohm CAN terminating resistor
4	Terminating resistor	120 ohm CAN terminating resistor
5	Digital input 1	Control of indicator light 1
6	Digital input 2	Control of indicator light 3
7	Digital input 3	Control of indicator light 2
8	Digital input 4	Control of indicator light 4
9	Digital input 5	Control of indicator light 5
10	Digital input 6	Connection for external push button
11	Digital output 1	Connection for external buzzer
12	Digital input 7	Configuration

- Fill unused positions with blind plugs, part number MOLEX 34345-0001, or use matching MOLEX sealing insert with partially blocked inlets.

WARNING

Protection class IP67 is only achieved if all plug positions are occupied or closed with blind plugs. The dial gauge only achieves IP40 without a connector.

6.5 Fitting the dial gauge

- Insert and align the dial gauge.

NOTE

Make sure that the sealing ring is not twisted and lies flat between the panel and the front ring.

- Align the 80/85 mm retaining nut with the centring lip first.
- Hand-tighten the retaining nut, max. 4 Nm (400 Ncm).
- Plug in the connector until the latching lug clicks audibly into place.

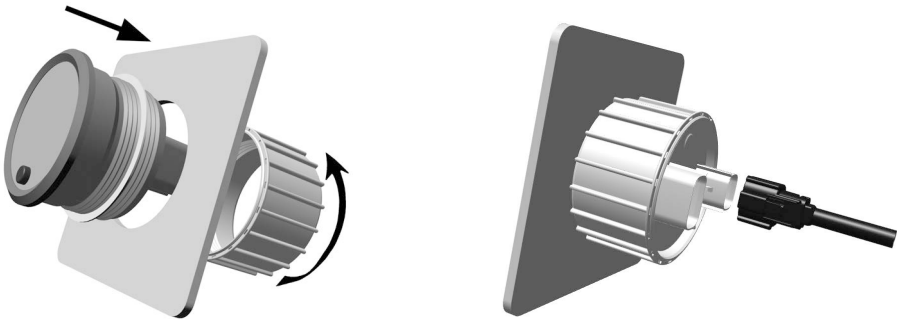


Fig. 13: Inserting the dial gauge, mounting the connector

6.6 Restore power supply

CAUTION

Danger with defective or deactivated components!

Vehicle components may have been damaged or disconnected unintentionally. Faulty functionality of a system endangers the safety of the entire vehicle / machine.

- Check the display values of the dial gauge for plausibility.

- Check that other components of the vehicle are functioning properly.

- Reconnect the starter battery and, if applicable, all auxiliary batteries after checking the connection.

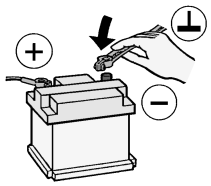


Fig. 14: Connecting the battery

- Where applicable, switch the main power switch back on. Switch on the ignition and carry out a functional check of the dial gauge and the vehicle.

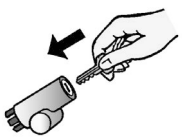


Fig. 15: Switching on the ignition

- Reprogram other dial gauges that have lost the contents of their volatile memory.

7 Configuration and operation

The SingleViu dial gauges are configured for analogue operation and can be used directly in many cases. You can find details, e.g. on preset ►Sensor characteristics, in Annex B. It may still be necessary to perform configuration to adapt dial gauge functionality to vehicle conditions or in accordance with your wishes, e.g. for operation using CAN messages.

7.1 Configuration using SingleViu ConfigTool

SingleViu ►ConfigTool is a software tool to help you configure SingleViu dial gauges. It is available from your ►VDO partner. The figure below shows the function of the ConfigTool version 2.0.

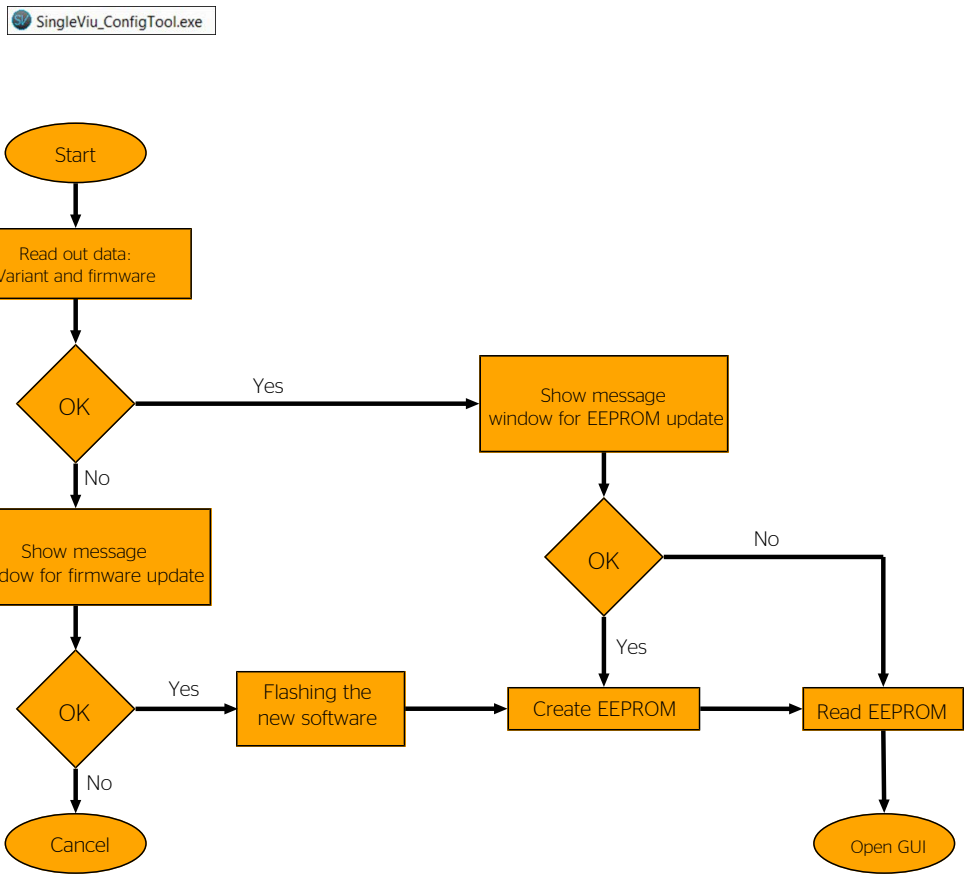


Fig. 16: ConfigTool flow

7.1.1 Prerequisites and preparation

SingleViu ConfigTool requires Windows 7, Windows 8 or Windows 10 with .NET platform version 4.5.2 or higher as the operating system. Administrator rights are required for installation.

- Unzip and execute the file.
- Follow the user menu instructions.

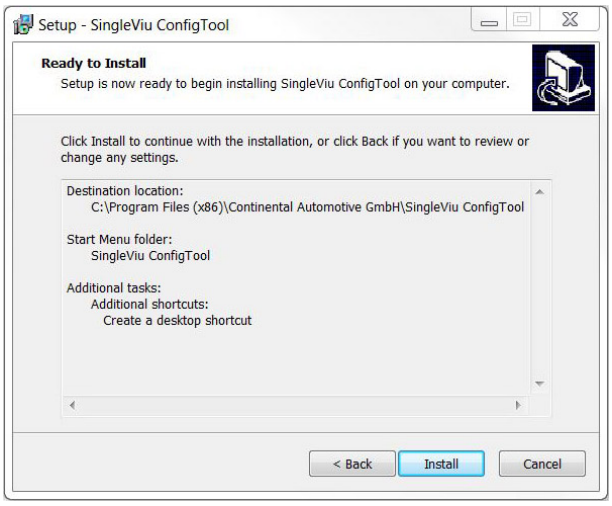


Fig. 17: Setup

The *SingleViu* ConfigTool is installed in the selected directory and can be used immediately. The desktop icon makes it easy to start the *SingleViu* ConfigTool.

The *SingleViu* dial gauges are configured in the CAN bus using Unified Diagnostic Services (UDS on CAN) in accordance with ISO standard 14229. The *SingleViu* ConfigTool set up for CAN boxes from Vector and Peak-System, which must be installed separately.

Fig. 18: PCAN-USB from Peak-System

Configuration files are saved with the ending ".acg". By default, the factory settings of all dial gauges are preset and available under their part number. You can also create and save your own configuration files.

Configuration must be performed prior to installation in the vehicle. During configuration, only one dial gauge may be connected to the CAN bus at a time; configuration must therefore be performed individually for each gauge.

The "*SingleViu* Programming/Test cable" from the ►Accessories can be used for configuration:

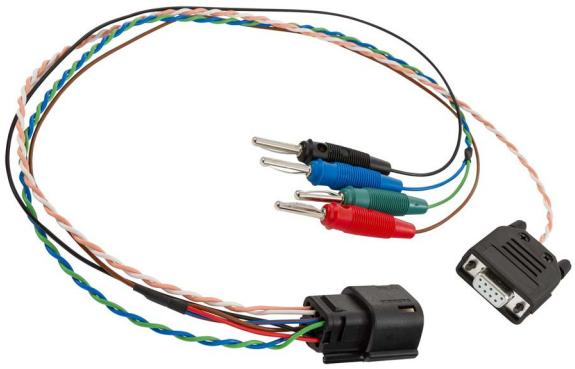


Fig. 19: SingleViu Programming / Test cable

Activating the dial gauge

- Connect the brown lead (terminals 30, 15 and 58; battery positive, ignition and illumination) to positive direct current, nominal voltage 12 or 24 V.
- Connect the black lead (terminal 31, earth) to negative DC.
- Plug the MOLEX connector onto the dial gauge until it clicks audibly into place.

Set up the CAN connection.

- Connect the D-sub connector to the CAN box using a 120-ohm terminating resistor.

Since July 2018, the programming cables have included a built-in CAN terminating resistor of 120 ohms. This can be recognised by the corresponding sticker on the D-sub connector. Older cables must be connected to the CAN box using a separate terminating resistor. For this you can use a prefabricated component, e.g. the "PCAN-Term" from Peak-System, or manually solder a resistor between the white and the pink lead.

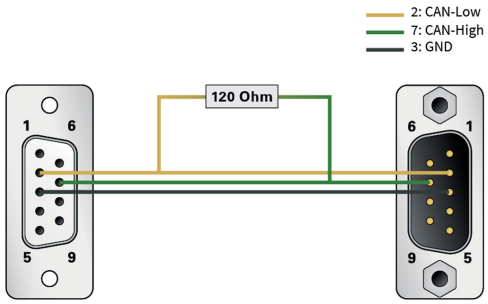


Fig. 20: Schematic structure of the PCAN-Term

- Connect the CAN box to the computer.
- Launch the *SingleViu* ConfigTool by clicking on the programme file on the desktop or in the start menu folder.

7.2 Flashing with ConfigTool

The SingleViu ConfigTool first checks the firmware on the dial gauge and offers an update to a new version if available.

WARNING

Once started, a flash process must not be interrupted or disturbed, as it would leave the *SingleViu* dial gauge defective and unusable

- Only connect the SingleViu dial gauge and the CAN box directly to each other; do not insert any other devices into the CAN bus

- Do not transmit any other CAN messages

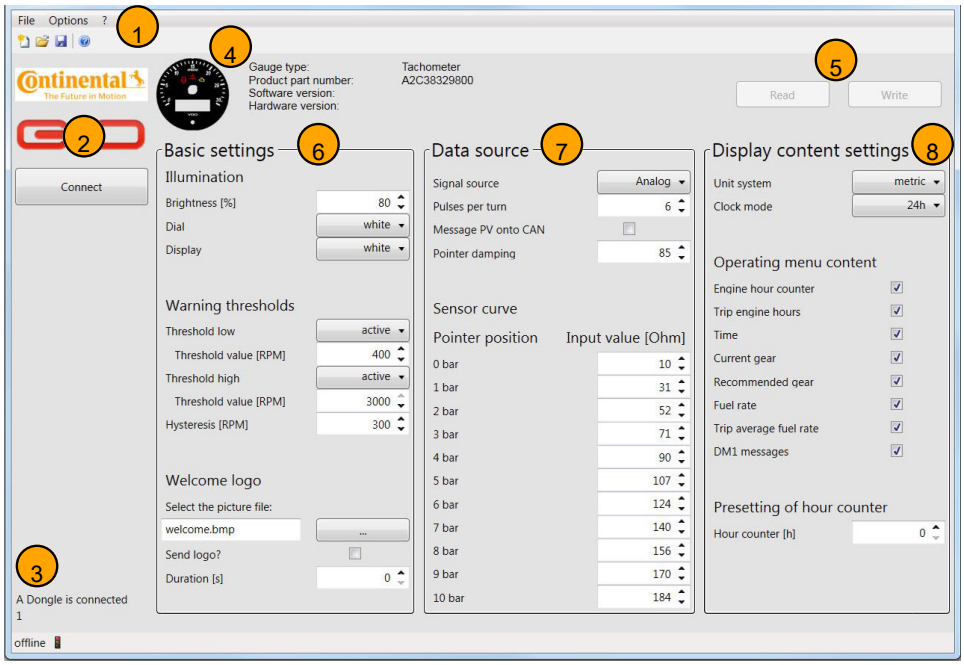
If the update fails, the SingleViu ConfigTool cannot be connected to the dial gauge.

In the second step, the SingleViu ConfigTool provides the option of resetting the configuration to factory settings.

The operating window is opened in the third step.

7.3 Operating window

The operating window consists of the following section:



1 Basic functions [→ 31]
2 CAN connection [→ 31]
3 Dongle [→ 32]
4 Basic data [→ 32]
5 Read / write [→ 32]
6 Basic settings [→ 32]
7 Data source [→ 33]
8 Display contents [→ 34]

7.3.1 Basic functions

The "File" menu item offers the following activities:

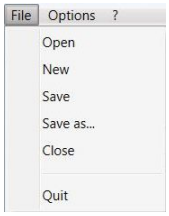


Fig. 21: ConfigTool_File

- Open: Load an existing configuration. In a connected state, it is only possible to load configurations that are compatible with the current dial gauge.
- New: Only in offline mode: Load and edit a standard configuration.
- Save: Save the current configuration under its current name.
- Save as...: Save the current configuration under a new name.
- Close: Only in offline mode: Close the current configuration.
- End: Close the ConfigTool.

The "Options" menu item offers the following activities:

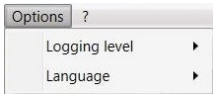


Fig. 22: ConfigTool_Options

- Logging-level: Additional information on the use of ConfigTool can be displayed for advanced users.
- Language: ConfigTool language selection. Any change of language will take effect after ConfigTool has been restarted.

English (default setting), German and French are available.

The "?" menu item offers the following activities:

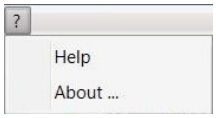


Fig. 23: ConfigTool_Help

- Help: This chapter of the operating instructions will open.
- Info: Information about ConfigTool.

7.3.2 CAN connection

The status display "Connected" / "Disconnected" shows the current CAN connection status.

You can establish / disconnect the connection with the CAN bus with the Connect / Disconnect button.

7.3.3 Dongle

The dongle status shows whether ConfigTool has detected a ►Dongle and, if so, the workshop number of the dongle.

7.3.4 Basic data

The basic data of the currently connected SingleViu dial gauge is displayed in the general dial gauge information field. This consists of an image of the dial, the gauge type, the article number of the boxed gauge and the software and hardware version numbers.

7.3.5 Read / write

The "Read" button loads the configuration currently stored in the dial gauge and displays it in the configuration area. The "Write" button can be used to save the configuration currently set in the configuration area to the dial gauge. These buttons will be disabled (greyed out) if the CAN bus is not connected.

7.3.6 Basic settings

Brightness

The intensity of the background illumination of the dial and, where applicable, the display can be set in the range from 0% for no backlighting to 100% for full intensity. The default setting is 80%.

Dial

The colour of the dial backlighting can be set. White (default setting), amber, red, yellow, blue and green are available in the drop-down menu.

Display

The colour of the display backlighting can be set for dial gauges with a display. White (default setting), amber, red, yellow, blue and green are available in the drop-down menu.

Warning lights

It is possible to select a warning light mode of "OFF", "flashing" or "permanent", see Fig. 10. If "OFF" is selected, the warning lights will remain off, except for DM1 messages.

A lower and an upper warning threshold can be set. If the display values are outside this range, ► indicator light 1 will be activated. The deactivation of the indicator light will be delayed by the adjustable hysteresis value.

Welcome logo

The path to an image to be displayed as a welcome logo can be selected for dial gauges with a display. This image must be a monochrome bitmap image with a resolution of 132 x 43 pixels. The "Write logo?" checkbox must be selected in order to load the image into the dial gauge in the next write operation. The display duration of the welcome logo after ignition (terminal 15 "on") can be defined in seconds. A maximum value of 255 means that the welcome logo will be displayed permanently.

7.3.7 Data source

Signal source

In the selection menu, you can choose whether the data is to be provided by ► CAN bus or whether an analogue value is to be read in.

Pulses per revolution (rev counter) or kilometres (speedometer)

This function is only activated in analogue mode for speedometer and rev counter with a diameter of 80 or 100 mm. The number of pulses or frequency per revolution or kilometre delivered by the sensor must be specified. Possible values are 0.5 to 999.9 pulses per engine revolution and 20 to 400,000 pulses per kilometre.

CAUTION

There is a danger of an incorrect speedometer!

Incorrect information will result in an incorrect engine speed or vehicle speed reading for the driver. This can lead to dangerous driving situations. The operating licence may be invalidated.

- Input only the correct pulse number for the vehicle in question.
- If necessary, first determine the pulse rate or refer to the sensor's documentation.
- Only use dial gauges in analogue mode if the correct pulse rate is known.

Transmit CAN message

The dial gauge will send a CAN message with the value read in if this function is activated. This function is not available for rev counters.

Pointer damping

This value sets the parameters of the PT1 filter for damping the speed of the pointer.

Sensor characteristic curve

This function is enabled in analogue mode for dial gauges connected to a sensor with possibly non-linear ►Sensor characteristic curve. The corresponding input value can be specified for the dial markings.

CAN signal

The details of the CAN input signal can be modified, see Pointer and signal input [→ 13]

CAN request

52 mm dial gauges can send a static request message with a 29-bit identifier and a cycle time of 1000 ms. Data for the CAN identifier and the three data bytes can be entered.

7.3.8 Display contents

This section is only shown on dial gauges with a display.

System of units

You can select whether the values shown on the display are in metric units (default setting) or in US units.

Clock mode

You can select whether times are to be shown on the display in 24-hour mode (default setting) or in the 12-hour mode.

Operating menu contents

You can select or deselect the information individually by setting or removing the check mark in the selection field.

NOTE

The predefined contents of the operating menus differ for rev counters and speedometers.

NOTE

Certain information can be calculated by the dial gauge and is also available in analogue mode. Other information can only be obtained from the vehicle bus. For details, see Operating instructions during operation [→ 37]

Default setting of operating hours (rev counters) or total distance travelled (speedometers).

In analogue mode, rev counters calculate the total operating hours, while speedometers calculate the total distance travelled. The internal value can be updated in this field. This function is only available to authorised workshops that have a ►dongle. The total distance travelled must be entered in kilometres or miles, depending on the system of units set.

7.4 Configuration via push button

(Only for dial gauges with a diameter of 80 or 100 mm)

Certain dial gauge settings can be made using the ▶ Push button.

The dial gauge has a reduced configuration menu that allows the driver to make convenience selections.

For the initial configuration, there is an extension of the configuration menu with additional items that must not be changed during regular driving operation.

For this, connect pin 12 of the 12-pin connector to the power supply battery+

CAUTION

There is a danger of an incorrect speedometer!

Incorrect information will result in an incorrect engine speed or vehicle speed reading for the driver. This can lead to dangerous driving situations. The operating licence may be invalidated.

- Input only the correct pulse number for the vehicle in question.

- If necessary, first determine the number of pulses, refer to the documentation of the sensor or use the auto-calibration function.

- Remove the contact from this pin after initial configuration. Do not keep the pin connected during regular operation.

Steps for accessing the configuration menu:

- Establish power supply, i.e. connect terminal 30/31 to a DC supply of nominally 12 or 24 VDC
- Where applicable, deactivate terminal 15
- Only for initial configuration: connect pin 12 to the DC power supply where necessary
- Press and hold down the button
- Connect terminal 15 to the DC power supply
- Release the button

Pressing the button briefly ("SP", less than 2 seconds) switches to the next menu item or increments the currently displayed value when in change mode. Pressing the button longer ("LP", longer than 2 seconds) switches to change mode, to the next value or back to the configuration menu. If no button is pressed for 30 seconds, the display returns to normal operating mode.

Units

The metric unit system with kilometres and litres is preset by default.
By pressing and holding the button, you can switch to and from the Anglo-American unit system with miles and gallons.

Clock

By default, the time is set in the 24-hour system.
Change to the 12-hour system possible.

Brightness

The default setting is 80% brightness.
Various brightness levels can be set.

Colour of the dial backlighting

The dial is illuminated in white as standard.
Different illumination colours can be set.

Colour of the display backlighting

The display is illuminated in white as standard.
Different illumination colours can be set.

Only for initial configuration

Selecting the signal source

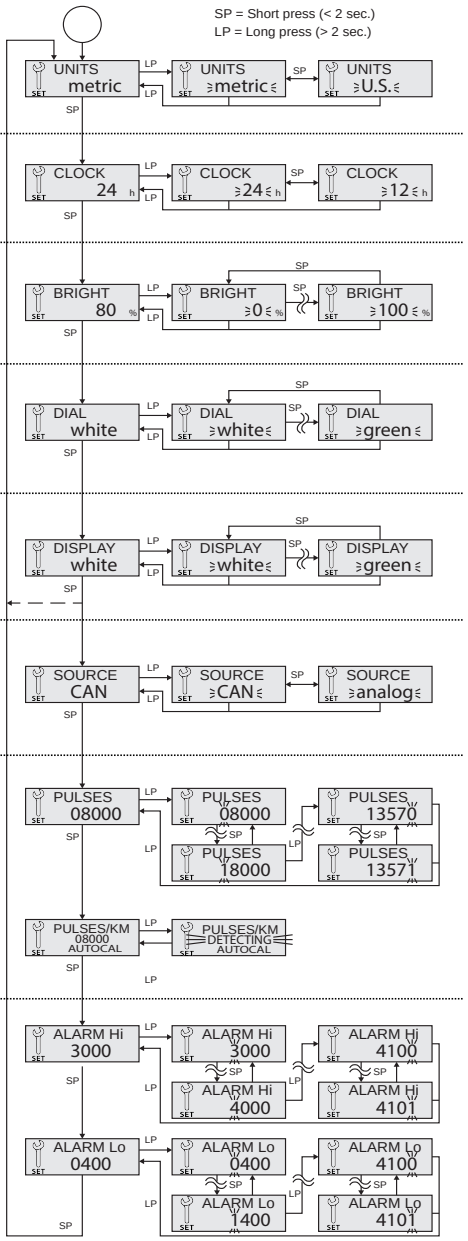
The analogue signal input is activated by default.
It can be switched to CAN input.

Setting the pulse rate

In the case of an analogue signal source, the correct pulse number must be set in order to obtain a correct display of driving speed or motor speed. The default setting is 8000 pulses per kilometre and 6 pulses per revolution. Possible values are 0.5 to 999.9 pulses per engine revolution and 20 to 99,999 pulses per kilometre.
For speedometers with unit selection "metric" and for rev counters, this pulse number can be specified directly. Speedometers have an auto-calibration of the pulse number, see chapter Automatic pulse calibration.

Setting the warning thresholds

Upper and lower warning threshold for activating the red warning light in the dial gauge. In the case of engine rev counters, the warning light is activated by default at below 400 rpm and otherwise the upper and lower ends of the dial scale are selected.



7.4.1 Automatic pulse calibration

For speedometers, there is the option of auto-calibration, where the dial gauge determines the pulse rate itself.

The auto-calibration function is started in the extended configuration menu by holding the button pressed and is indicated by a flashing "DETECTING". The vehicle now travels exactly one kilometre or one mile (road or test bench), depending on the unit system set. At the same time, the dial gauge counts the pulses independently. Pressing the button ends the measurement, and the determined pulse rate is accepted and displayed.

The function will terminate if the result is invalid (number of pulses lower than 20 or higher than 400,000) or after 30 seconds without pulse detection (time-out).

8 Operating instructions during operation

8.1 Operating instructions for dial gauges with a diameter of 52 mm

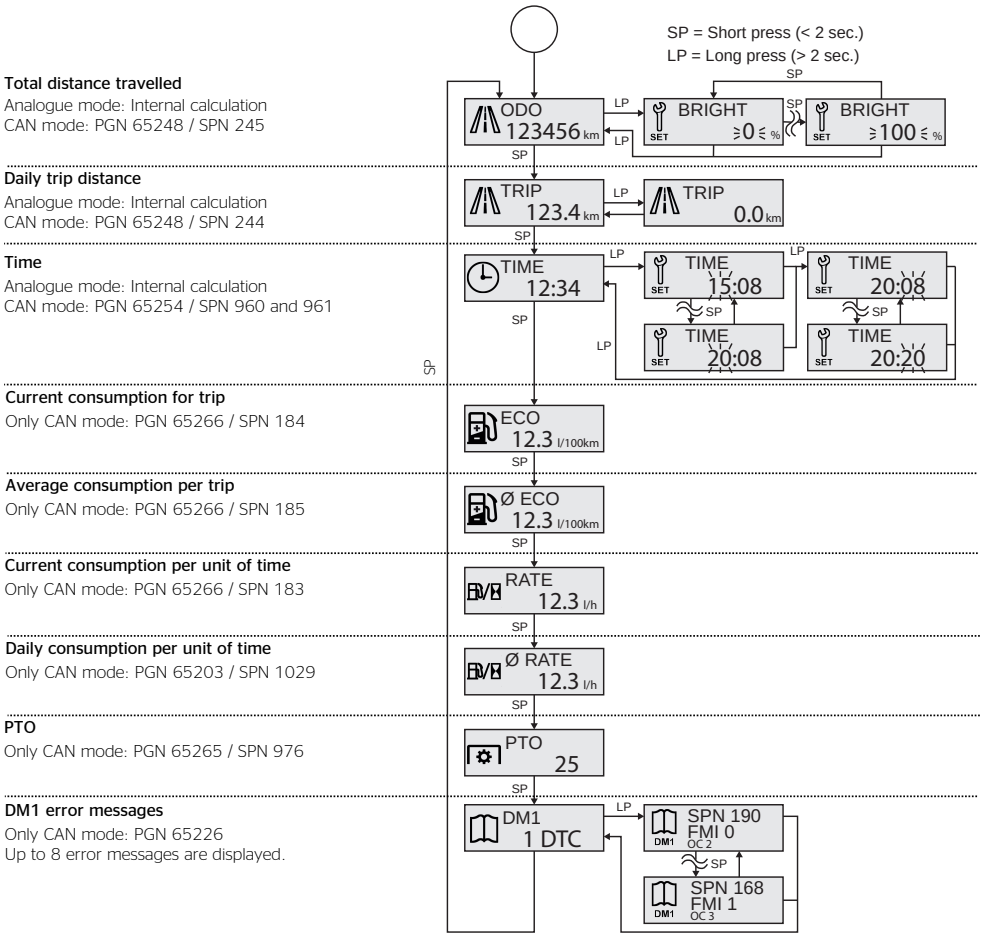
Dial gauges with a diameter of 52 mm display the relevant vehicle parameter and, where applicable, a warning during operation and do not allow any further operation by the user.

8.2 Operating instructions for speedometers (with a diameter of 80 and 100 mm)

Pressing the button briefly ("SP", shorter than 2 seconds) switches to the next menu item or increments the currently displayed value when in change mode.

Pressing the button for longer than 2 seconds ("LP") switches to change mode, to the next value or back to the display menu. Change mode is terminated if no button is pressed for 30 seconds.

The ►Configuration menu can be accessed each time the vehicle is started by pressing the button when the vehicle is being switched on.

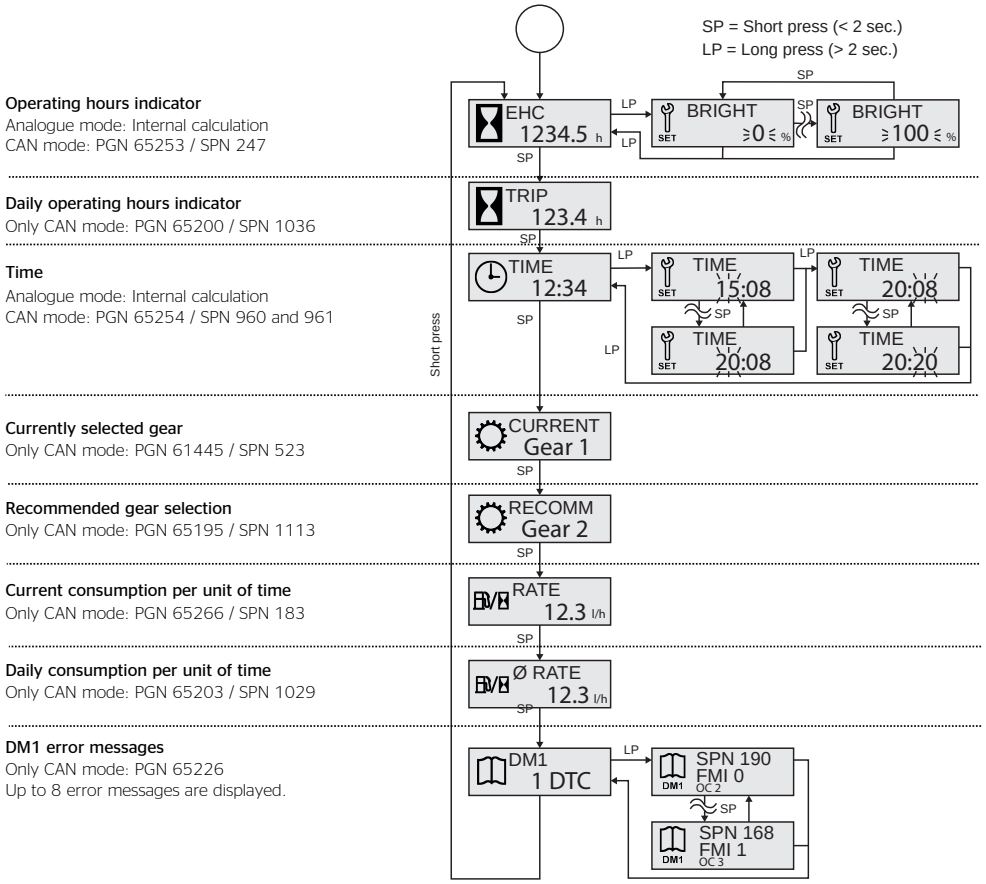


8.3 Operating instructions for rev counters (with a diameter of 80 and 100 mm)

The ►Configuration menu can be accessed each time the vehicle is started by pressing the button when the vehicle is being switched on.

The Welcome logo [→ 17] may be displayed initially after the start.

The operating menu is then launched. The menu items can be edited using ►ConfigTool. The preset menu is explained below.



9 Replacing dial gauges of an earlier series

From a technical perspective, SingleViu dial gauges can replace most of the gauges of earlier product families Viewline, World Wide Gauges and CANcockpit.

- Use the appropriate adapter cable to connect a SingleViu dial gauge to your existing vehicle wiring harness.

WARNING

Protection class IP67 is only ensured if all plug positions are occupied or closed with blanking plugs, part number MOLEX 34345-0001.

NOTE

Dummy connector MOLEX 33472-1258 can also be used if the 12-pin connector is completely disconnected.

9.1 Replace Viewline gauges

- Connect the adapter cable "*SingleViu* adapter cable Viewline 8pin", part number 2910000301300, to the SingleViu dial gauge and the 8-pin connector to the vehicle.
- Plug the MOLEX connector onto the *SingleViu* dial gauge until it clicks audibly into place.

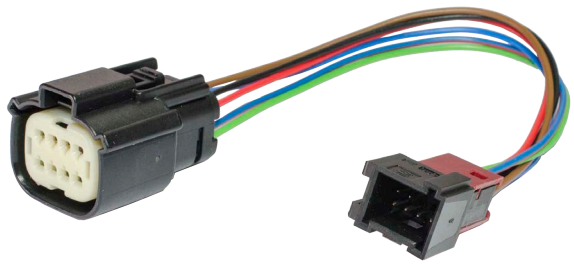


Fig. 24: Adapter cable_2910000301300_ SingleViu adapter cable Viewline 8pin

In the case of *SingleViu* dial gauges with a diameter of 80 or 100 mm, it is possible to connect an external push button and an alarm output, just as in the Viewline dial gauges being replaced.

- For this, connect the adapter cable "*SingleViu* adapter cable Viewline 14pin", part number 2910000301400, to the *SingleViu* dial gauge and the 14-pin connector to the vehicle.
- Plug the MOLEX connector onto the SingleViu dial gauge until it clicks audibly into place. Unlike Viewline, the external push button must be connected to terminal 31.
- Connect the external push button accordingly.

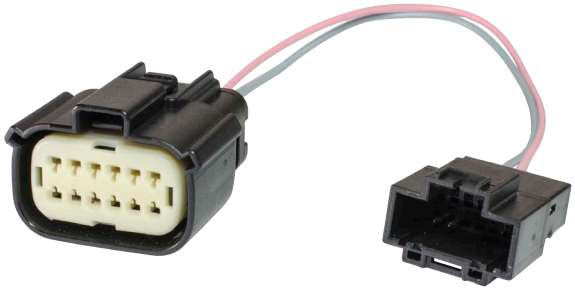


Fig. 25: SingleViu adapter cable Viewline 14pin_adapter_cable_2910000301400

9.2 Replacing World Wide Gauges (WWG; Cockpit international, Cockpit Vision)

SingleViu dial gauges can replace the electric dial gauges of the WWG family.

- For the electrical connection, use the adapter cable "*SingleViu* Adapter cable WWG", part number 2910000301500.

The individual leads are colour-coded as follows:

- Red: Battery positive (terminal 30)
- Black: Earth (terminal 31)
- Brown: Ignition (terminal 15)
- Blue: Sensor earth
- Green: Sensor signal
- Red-blue: Illumination (terminal 58)

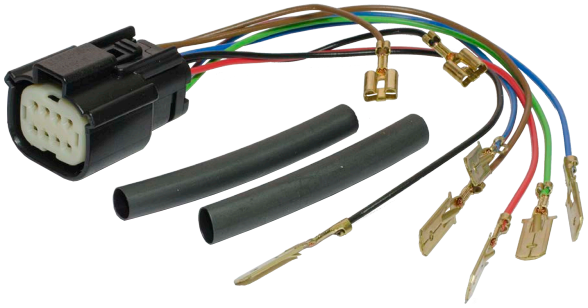


Fig. 26: Adapter_cable_2910000301500_ *SingleViu* adapter cable WWG

WARNING

Insulate all open cable connections with the heat-shrink tubing provided or with insulating tape.

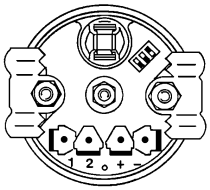
9.2.1 Replacing a speedometer or rev counter (80 or 100 mm)

The speedometer and rev counter with a diameter of 80 or 100 mm were connected to a vehicle connector, order number 999-115-016. There are up to two bulbs for illumination, each connected to the power supply (terminal 58) and earth contact.

Steps for connecting the adapter cable:

- Connect the brown lead of the adapter cable to pin 1 or 2 of the WWG vehicle connector, depending on which pin is connected there.
- Connect the black lead of the adapter cable to pin 3 of the WWG vehicle connector.
- Connect the green lead of the adapter cable to the signal input pin of the WWG vehicle connector, either pin 4 or pin 8.
- Connect the red-blue lead of the adapter cable to a cable lug of the power supply to the illumination.
- Connect the red lead of the adapter cable to the brown lead.
- Connect the blue lead of the adapter cable to the black lead.
- Plug the MOLEX connector onto the *SingleViu* dial gauge until it clicks audibly into place.
- Use a dummy MOLEX 33472-1258 plug for the 12-pin connector of the *SingleViu* dial gauge.

9.2.2 Replacing a rev counter (52 mm)

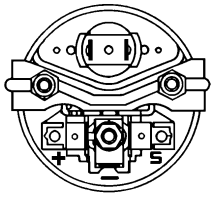


The 52 mm diameter rev counter was connected to individual cables, each ending on a cable lug.

Steps for connecting the adapter cable:

- Connect the brown lead of the adapter cable to the cable lug of the positive pin.
- Connect the black lead of the adapter cable to the cable lug of the negative pin.
- Connect the green lead of the adapter cable to cable lug of pin 2.
- Connect the red-blue lead of the adapter cable to the cable lug of the illumination.
- Connect the red lead of the adapter cable to the brown lead.
- Connect the blue lead of the adapter cable to the black lead.
- Plug the MOLEX connector onto the *SingleViu* dial gauge until it clicks audibly into place.

9.2.3 Replacing a pressure, temperature or fill-level indicator (52 mm)

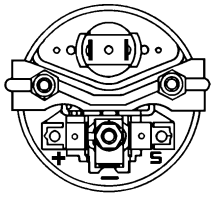


The 52 mm diameter pressure, temperature and fill level indicators were connected to individual cables, each ending on a cable lug.

Steps for connecting the adapter cable:

- Connect the brown lead of the adapter cable to the cable lug of the positive pin.
- Connect the black lead of the adapter cable to the cable lug of the negative pin.
- Connect the green lead of the adapter cable to the cable lug of pin S. Connect the red-blue lead of the adapter cable to the cable lug of the illumination.
- Connect the red lead of the adapter cable to the brown lead.
- Connect the blue lead of the adapter cable to the black lead.
- Plug the MOLEX connector onto the *SingleViu* dial gauge until it clicks audibly into place.

9.2.4 Replacing a voltmeter (52 mm)

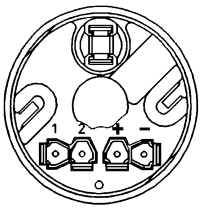


The 52 mm diameter voltmeter was connected to individual leads, each ending on a cable lug.

Steps for connecting the adapter cable:

- Connect the brown lead of the adapter cable to the cable lug of the positive pin.
- Connect the black lead of the adapter cable to the cable lug of the negative pin.
- The green lead of the adapter cable remains unused.
- Connect the red-blue lead of the adapter cable to the cable lug of the illumination.
- Connect the red lead of the adapter cable to the brown lead.
- The blue lead of the adapter cable remains unused.
- Plug the MOLEX connector onto the *SingleViu* dial gauge until it clicks audibly into place.

9.2.5 Replacing an ammeter (52 mm)

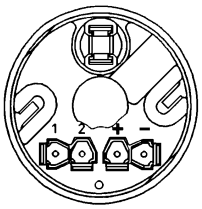


SingleViu dial gauges can replace WWG type B ammeters. The 52 mm diameter ammeter was connected to individual leads, each ending on a cable lug.

Steps for connecting the adapter cable:

- Connect the brown lead of the adapter cable to the cable lug of the positive pin.
- Connect the black lead of the adapter cable to the cable lug of the negative pin.
- Connect the green lead of the adapter cable to the cable lug of pin 1.
- Connect the red-blue lead of the adapter cable to the cable lug of the illumination.
- Connect the red lead of the adapter cable to the brown lead.
- Connect the blue lead of the adapter cable to the cable lug of pin 2.
- Plug the MOLEX connector onto the *SingleViu* dial gauge until it clicks audibly into place.

9.2.6 Replacing a pyrometer (52 mm)



The 52 mm diameter pyrometer was connected to individual leads, each ending on a cable lug.

Steps for connecting the adapter cable:

- Connect the brown lead of the adapter cable to the cable lug of the positive pin.
- Connect the black lead of the adapter cable to the cable lug of the negative pin.
- Connect the green lead of the adapter cable to the cable lug of pin 1.
- Connect the red-blue lead of the adapter cable to the cable lug of the illumination.
- Connect the red lead of the adapter cable to the brown lead.
- Connect the blue lead of the adapter cable to the cable lug of pin 2.
- Plug the MOLEX connector onto the *SingleViu* dial gauge until it clicks audibly into place.

9.3 Replace CANcockpit

In CANcockpit, all data are read in by the master, which supplies the downstream satellite dial gauges. In contrast, each *SingleViu* dial gauge functions independently and must be connected individually. A "*SingleViu* adapter cable CANcockpit", part number 2910000301600, is required for each CANcockpit dial gauge being replaced. This cable picks up all signals for the *SingleViu* dial gauge to be connected to it on the one hand and forwards them to the gauge to be connected subsequently on the other. All *SingleViu* dial gauges can be connected successively in this way.

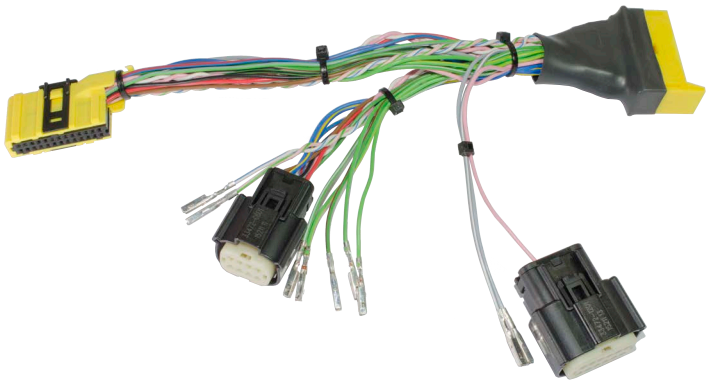


Fig. 27: Adapter_cable_2910000301600_"*SingleViu* adapter cable CANcockpit"

Steps for connecting the adapter cable:

- For an analogue input signal, select the appropriate green lead and connect it to pin 5 of the MOLEX 8-pin connector.
- In the case of a signal input via CAN, select the corresponding CAN bus (1 or 2) and connect the two leads as follows: Connect the white lead (CAN High) to Pin 7 of the MOLEX 8-pin connector and connect the pink lead (CAN Low) to Pin 8 of the MOLEX 8-pin connector.
- In the case of a SingleViu dial gauge with a diameter of 80 or 100 mm, the alarm output can also be connected. For this, select the corresponding grey lead and connect it to pin 11 of the MOLEX 12-pin connector.
- Disconnect the pink lead if an external switch is not to operate for this dial gauge.
- Connect the adapter cable to the connector on the vehicle side.
- Plug the MOLEX connector onto the SingleViu dial gauge until it clicks audibly into place.

10 Maintenance

Dial gauges of the *SingleViu* family are maintenance free.

WARNING

Defective gauges must not be used any further and must be replaced.

- If necessary, clean the glass with a commercially available window cleaner or interior cleaner and a soft cloth.

11 Decommissioning and disposal

11.1 Switch off the power supply

CAUTION

Danger in the event of battery short circuits.

Short circuits may result in cable fires, battery explosions and damage to other electronic systems.

a) Disconnect sources of power before carrying out electrical work.

b) Remove earthing cables from starter and auxiliary batteries.

c) Secure batteries against unintentional reconnection.

NOTE

When you disconnect the battery, all volatile memories will lose any values entered and will have to be reprogrammed subsequently.

- Switch off the ignition and remove the ignition key.
- Where applicable, disconnect the main power switch.
- Disconnect the negative pole of the starter battery and, where applicable, all auxiliary batteries.

11.2 Removal

- Detach the connector
- Loosen the retaining nut
- Remove the dial gauge

11.3 Restore power supply

- Reconnect the starter battery and, if applicable, all auxiliary batteries after checking the connection.
- Where applicable, switch the main power switch back on.
- Switch on the ignition and carry out a functional check of the vehicle.
- Reprogram other devices that have lost the contents of their volatile memory.

11.4 Disposal

A dial gauge of the SingleViu family is an electronic component part and must be disposed of as such. For this purpose, refer to the entry in the automotive industry's international material database (►IMDS) for the exact material composition.

12 Accessories and spare parts

12.1 Spare parts

Spare retaining nuts can be ordered:

- Retaining nut for 52-mm dial gauges: Part number A2C10434200
- Retaining nut for 80/85-mm dial gauges: Part number A2C39712100
- Retaining nut for 100-mm dial gauges: Part number A2C10434100

Please contact your ►VDO partner if you wish to replace the front ring or the front glass of existing dial gauges.

12.2 Cable accessories, connectors and crimp contacts

To make the electrical connection to the SingleViu dial gauges, you will need connectors and crimp contacts from MOLEX, which are available in various assemblies in the VDO portfolio, from your electronics dealer or at www.molex.com. Diagrams of the accessory cables are available from your ►VDO partner.

Pre-assembled cables:

- "SingleViu 8 pin cable" power supply cable: Part number 2910000484200
- "SingleViu 12 pin cable" power supply cable: Part number 2910000484300
- "SingleViu 8Pin 250 Ohm" adapter cable: Part number 2801000020301

Sets of connectors and corresponding crimp contacts:

- 52mm-devices: "SingleViu 8Pin connector": Part number 2910000954200
- 80 or 100mm devices: "SingleViu 8Pin_12Pin connector": Part number 2910000954300

Programming cable for configuration using ConfigTool:

- "SingleViu Programming/Test cable" programming cable: Part number 2910000401700

Adapter cable for electrical contacting when replacing dial gauges of earlier models:

- "SingleViu Adapter cable Viewline 8pin" adapter cable: Part number 2910000301300
- "SingleViu Adapter cable Viewline 14pin" adapter cable: Part number 2910000301400
- "SingleViu Adapter cable Viewline WWG" adapter cable: Part number 2910000301500
- "SingleViu Adapter cable Viewline CANcockpit" adapter cable: Part number 2910000301600

Article numbers of the individual parts, not in the VDO portfolio:

- 8-pin connector, MOLEX 334724801, for all dial gauges. Further variants, also with sealed pins, are available
- 12-pin connector, MOLEX 334721201, for dial gauges with a diameter of 80 or 100 mm. Further variants, also with sealed pins, are available
- Blind plug: MOLEX 34345-0001 to seal individual, unoccupied pins
- Blind plug: MOLEX 33472-1258, with all 12 positions locked
- Crimp contact: There is a choice of different contacts from the MOLEX 33012 family that are selected depending on the coating, cable thickness and unwinding direction

12.3 SingleViu ConfigTool, programming dongle and CAN boxes

The SingleViu ConfigTool is available from your VDO partner. Product training by AUMOVIO can be arranged on request.

A dongle A2C59515259 is required to preset two secured parameters, the odometer in speedometers and the number of operating hours in rev counters. A user licence must be concluded before purchase; please contact your > VDO partner for this.

For CAN boxes from Vector or Peak-System and CAN terminating resistors, please contact the particular manufacturer or its sales partner, see websites www.vector.com and www.peak-system.com respectively.

The programming cable can be used for configuration using ConfigTool.

– “SingleViu Programming/Test cable” programming cable: Part number 2910000401700

Glossary

Accessory

Articles that can be used in addition to the dial gauges and fixing nuts.

CAN bus

Vehicle bus system, e.g., with SAE J1939 network protocol

ConfigTool

The SingleViu ConfigTool is available from your VDO partner.

Configuration, configuration menu

The dial gauges can be configured using the ConfigTool or by pressing a button in the configuration menu.

Connection cable

Pre-assembled cable for connecting a device.

Connector

Connector on the vehicle wiring harness to which the SingleViu dial gauges are connected.

Declaration of conformity

Manufacturer's declaration of conformity with EU regulations. You can obtain the document from your VDO partner.

Dongle

USB flash drive with licence for saving parameters.

IMDS

International material database of the automotive industry, in which all materials used in SingleViu dial gauges are listed. The extract is available from your VDO partner.

Indicator lights

Indicator lights integrated in the dial gauge.

Operating menu

Menu containing various information during vehicle operation.

Overview of variants

List of all SingleViu variants.

Push button

Internal or external push button.

RGB

Colour space with the three primary colours red, green and blue.

Sensor characteristics

Preset and changeable characteristic curve for analogue sensor data.

Type approval

Certificate of type approval in accordance with UN ECE R10. You can obtain the document from your VDO partner.

UBat

Battery voltage, actual VDC supply voltage.

VDC

DC voltage (voltage direct current).

VDO partner

AUMOVIO's regional sales partner for SingleViu. You can find a list of VDO partners at www.vdo-partner.com.

Warning thresholds

Activation thresholds for indicator 1.

AUMOVIO Aftermarket GmbH
Guerickestraße 7
60488 Frankfurt am Main
Germany
Tel.+49 (0) 69 7603-0

aftermarket.vdo.com

VDO

SingleViu™

Operating manual

Annex A; Overview of variants

1 Appendix A

1.1 52 mm variants

Article number ending:

- xx = Logistics no.
- 01 = Single packaging (1 pc.)
- 02 = Single packaging (1 pc.) CAN input
- 25 = bulk packaging (25 pcs.)
- 30 = Blister pack (1 pc.)
- 32 = Blister pack (1 pc.) red illumination

Ammeter

Article number	Dial		Analogue signal	Characteristic curve Annex B	CAN input
A2C38330900xx	ISO 0247 	-30 - +30 AMP	Voltage -60 – +60 mV	1.4	PGN 65271 SPN 114
A2C38330800xx	ISO 0247 	-60 - +60 AMP	Voltage -60 – +60 mV	1.3	PGN 65271 SPN 114
A2C38330700xx	ISO 0247 	-100 - +100 AMP	Voltage -60 – +60 mV	1.2	PGN 65271 SPN 114
A2C38330600xx	ISO 0247 	-150 - +150 AMP	Voltage -60 – +60 mV	1.1	PGN 65271 SPN 114

Concentration

Article number	Dial		Analogue signal	Characteristic curve Annex B	CAN input
A2C38327600xx	DEF/AdBlue® ISO 2946 + "DEF“ 	0 – 100 %			PGN 64923 SPN 3516

Tank level

Article number	Dial		Analogue signal	Characteristic curve Annex B	CAN input
A2C38335500xx	DEF/AdBlue® ISO 2946 + "DEF“	0 – 1	Resistance 3 – 180 Ω	2.1	PGN 65276 SPN 1761
A2C38327500xx	DEF/AdBlue® ISO 0245 + "DEF“	E - F	Resistance 240 – 33.5 Ω	2.2	PGN 65276 SPN 1761
A2C38331000xx	DEF/AdBlue® ISO 0245 + "DEF“	0 - 1	Resistance 3 – 180 Ω	2.1	PGN 65276 SPN 96
A2C38331100xx	Fuel ISO 0245	0 - 1	Resistance 75 – 3 Ω	2.3	PGN 65276 SPN 96
A2C38331200xx	Fuel ISO 0245	E - F	Resistance 3 – 180 Ω	2.1	PGN 65276 SPN 96
A2C38331300xx	Fuel ISO 0245	E - F	Resistance 240 – 33.5 Ω	2.2	PGN 65276 SPN 96
A2C38331400xx	Fuel ISO 0245	E - F	Resistance 0 – 90 Ω	2.4	PGN 65276 SPN 96
A2C38331500xx	Fuel ISO 0245	E - F	Resistance 75 – 3 Ω	2.4	PGN 65276 SPN 96
A2C39163000xx	Fuel ISO 0245	E - F	Voltage 0 – 5 V	2.5	PGN 65276 SPN 96

Pressure

Article number	Dial		Analogue signal	Characteristic curve Annex B	CAN input
A2C38334400xx	Air "AIR"	0 – 150 psi	Resistance 10 – 184 Ω	3.1	
A2C38334500xx	Brake ISO 1402	0 – 10 bar	Resistance 10 – 184 Ω	3.2	PGN 65274 SPN 117
A2C38327100xx	Brake ISO 1402	0 – 16 bar	Voltage 0.5 – 4.5 V	3.3	PGN 65274 SPN 117
A2C38334800xx	Brake ISO 1402	0 – 150 psi	Resistance 10 – 184 Ω	3.1	PGN 65274 SPN 117
A2C38327300xx	Brake ISO 1402	0 – 250 psi	Voltage 0.5 – 4.5 V	3.4	PGN 65274 SPN 117
A2C18003100xx	Brake ISO 1405	0 – 10 bar	Voltage 0 – 5 V	3.16	PGN 65274 SPN 117

Article number	Dial		Analogue signal	Characteristic curve Annex B	CAN input
A2C18003300xx	Brake ISO 1406 	0 – 10 bar	Voltage 0 – 5 V	3.16	PGN 65274 SPN 117
A2C1800340001	Brake ISO 0238 	0 – 10 bar	Voltage 0 - 5 V	3.16	PGN 65274 SPN 117
A2C38334600xx	Gear oil ISO 1167 	0 – 25 bar	Resistance 10 – 184 Ω	3.5	PGN 65272 SPN 127
A2C38327200xx	Gear oil ISO 1167 	0 – 30 bar	Voltage 0.5 - 4.5 V	3.6	PGN 65272 SPN 127
A2C38335000xx	Gear oil ISO 1167 	0 – 400 psi	Resistance 10 – 184 Ω	3.7	PGN 65272 SPN 127
A2C38327400xx	Gear oil ISO 1167 	0 – 500 psi	Voltage 0.5 - 4.5 V	3.8	PGN 65272 SPN 127
A2C38331600xx	Engine oil ISO 0248 	0 – 5 bar	Resistance 10 – 184 Ω	3.11	PGN 65263 SPN 100
A2C38331700xx	Engine oil ISO 0248 	0 – 10 bar	Resistance 10 – 184 Ω	3.2	PGN 65263 SPN 100
A2C38332300xx	Engine oil ISO 0248 	0 – 80 psi	Resistance 240 – 33.5 Ω	3.12	PGN 65263 SPN 100
A2C38331900xx	Engine oil ISO 0248 	0 – 80 psi	Resistance 10 – 184 Ω	3.13	PGN 65263 SPN 100
A2C3832690001	Engine oil ISO 0248 	0 – 10 bar	Voltage 0.5 - 4.5 V	3.9	PGN 65263 SPN 100
A2C38332400xx	Engine oil "OIL"	0 – 150 psi	Resistance 10 – 184 Ω	3.1	PGN 65263 SPN 100
A2C38333000xx	Engine oil ISO 0248 	0 – 150 psi	Resistance 10 – 184 Ω	3.1	PGN 65263 SPN 100
A2C38327000xx	Engine oil ISO 0248 	0 – 150 psi	Voltage 0.5 - 4.5 V	3.10	PGN 65263 SPN 100
A2C38334900xx	Turbo ISO 2107 	0 – 2 bar	Resistance 10 – 184 Ω	3.14	PGN 65270 SPN 102
A2C38334700xx	Turbo ISO 2107 	0 – 60 psi	Resistance 10 - 184 Ω	3.15	PGN 65274 SPN 102

Pyrometer

Article number	Dial		Analogue signal	Characteristic curve Annex B	CAN input
A2C38330500xx	ISO 1383 + "PYRO"	0 – 1000 °C	Voltage 4.1 – 37.7 mV	4.1	PGN 65270 SPN 173
A2C38330400xx	ISO 1383 + "PYRO"	0 – 2000 °F	Voltage 4.1 – 37.7 mV	4.2	PGN 65270 SPN 173

Tachometer

Article number	Dial		Analogue signal	Characteristic curve Annex B	CAN input
A2C38330300xx		0 – 40 RPM x 100			PGN 61444 SPN 190

Temperature

Article number	Dial		Analogue signal	Characteristic curve Annex B	CAN input
A2C38335200xx	Cylinder	60 – 200 °C	Resistance 482.5 – 14.3 Ω	5.1	
A2C38335300xx	Cylinder	150 – 400 °F	Resistance 482.5 – 14.3 Ω	5.2	
A2C38335100xx	Hydraulic oil ISO 1414	40 – 120 °C	Resistance 287.4 – 22.7 Ω	5.3	PGN 65128 SPN 1638
A2C39163100xx	Hydraulic oil ISO 1414	0 – 250 °F	Resistance 287.4 – 22.7 Ω	5.4	PGN 65128 SPN 1638
A2C38333800xx	Engine oil ISO 2426	50 – 150 °C	Resistance 322.8 – 18.6 Ω	5.5	PGN 65262 SPN 175
A2C38333900xx	Engine oil ISO 1375	50 – 150 °C	Resistance 322.8 – 18.6 Ω	5.5	PGN 65262 SPN 175
A2C38334100xx	Engine oil ISO 2426	100 – 300 °F	Resistance 322.8 – 18.6 Ω	5.6	PGN 65262 SPN 175
A2C38333200xx	Cooling water ISO 0246	40 – 120 °C	Resistance 287.4 – 22.7 Ω	5.3	PGN 65262 SPN 110
A2C38333300xx	Cooling water ISO 1380	40 – 120 °C	Resistance 287.4 – 22.7 Ω	5.3	PGN 65262 SPN 110
A2C38333400xx	Cooling water ISO 0246	100 – 250 °F	Resistance 450 - 30 Ω	5.7	PGN 65262 SPN 110
A2C38333500xx	Cooling water ISO 0246	100 – 250 °F	Resistance 287.4 – 22.7 Ω	5.8	PGN 65262 SPN 110

Voltmeter

Article number	Dial		Analogue signal	Characteristic curve Annex B	CAN input
A2C38327700xx	ISO 0247 	0 – 16 VOLT	Terminals 30 - 31		PGN 65271 SPN 168
A2C38327800xx	ISO 0247 	16 – 32 VOLT	Terminals 30 - 31		PGN 65271 SPN 168

1.2 80 mm variants

Article number ending:

- xx = Logistics no.
- 01 = Single packaging (1 pc.)
- 10 = bulk packaging (10 pcs.)
- 30 = Blister pack (1 pc.)

Speedometer

Article number	Dial	Analogue signal	CAN input
A2C38329100xx	0 – 120 km/h	Pulse	PGN 65265 SPN 84
A2C38329200xx	0 – 140 mph	Pulse	PGN 65265 SPN 84
A2C38329300xx	0 – 160 mph	Pulse	PGN 65265 SPN 84
A2C38329400xx	0 – 200 km/h	Pulse	PGN 65265 SPN 84
A2C38329500xx	0 – 300 km/h	Pulse	PGN 65265 SPN 84
A2C38328800xx	0 – 30 mph	Pulse	PGN 65265 SPN 84
A2C38328900xx	0 – 60 km/h	Pulse	PGN 65265 SPN 84
A2C38329000xx	0 – 90 mph	Pulse	PGN 65265 SPN 84

Tachometer

Article number	Dial	Analogue signal	CAN input
A2C38329600xx	0 – 20 RPM x 100	Pulse	PGN 61444 SPN 190
A2C38329700xx	0 – 25 RPM x 100	Pulse	PGN 61444 SPN 190
A2C38329800xx	0 – 30 RPM x 100	Pulse	PGN 61444 SPN 190
A2C38329900xx	0 – 40 RPM x 100	Pulse	PGN 61444 SPN 190

Article number	Dial	Analogue signal	CAN input
A2C38330000xx	0 – 50 RPM x 100	Pulse	PGN 61444 SPN 190
A2C38330100xx	0 – 60 RPM x 100	Pulse	PGN 61444 SPN 190
A2C38330200xx	0 - 80 RPM x 100	Pulse	PGN 61444 SPN 190

The display value is linear to the pulse count or frequency of the input signal. For rev counters, a proportionality factor between 0.1 and 999.9 pulses or oscillations per revolution can be selected. The default setting is 6.

For speedometers, a proportionality factor between 1 and 65535 pulses or oscillations per kilometre can be selected. The default setting is 8,000.

1.3 100 mm variants

Article number ending:

- xx = Logistics no.
- 01 = Single packaging (1 pc.)
- 10 = bulk packaging (10 pcs.)
- 30 = Blister pack (1 pc.)

Speedometer

Article number	Dial	Analogue signal	CAN input
A2C38328600xx	0 – 120 km/h	Pulse	PGN 65265 SPN 84
A2C38328500xx	0 – 140 mph	Pulse	PGN 65265 SPN 84
A2C38328400xx	0 – 200 km/h	Pulse	PGN 65265 SPN 84
A2C38328300xx	0 – 300 km/h	Pulse	PGN 65265 SPN 84
A2C38328700xx	0 – 90 mph	Pulse	PGN 65265 SPN 84

Tachometer

Article number	Dial	Analogue signal	CAN input
A2C38328200xx	0 – 25 RPM x 100	Pulse	PGN 61444 SPN 190
A2C38328100xx	0 – 30 RPM x 100	Pulse	PGN 61444 SPN 190
A2C38328000xx	0 – 40 RPM x 100	Pulse	PGN 61444 SPN 190
A2C38327900xx	0 – 50 RPM x 100	Pulse	PGN 61444 SPN 190

The display value is linear to the pulse count or frequency of the input signal. For rev counters, a proportionality factor between 0.1 and 999.9 pulses or oscillations per revolution can be selected. The default setting is 6.

For speedometers, a proportionality factor between 20 and 400000 pulses or oscillations per kilometre can be selected. The default setting is 8,000.

AUMOVIO Aftermarket GmbH
Guerickestraße 7
60488 Frankfurt am Main
Germany
Tel.+49 (0) 69 7603-0

aftermarket.vdo.com

28-0190-0113.1 • 4.2 • 20/02/2026

SingleViu™

Operating manual

Annex B; Characteristic curves

Table of contents

1 Ammeter sensor characteristics

1.1 Ammeter A2C38330600

Display value [A]	-150	-100	-50	0	50	100
Input value [mV]	-60	-40	-20	0	+20	+40

Characteristic curve predefined for shunt resistor A2C59514047 from the VDO portfolio.

1.2 Ammeter A2C38330700

Display value [A]	-100	-50	0	50	100
Input value [mV]	-60	-30	0	+30	+60

Characteristic curve predefined for shunt resistor A2C59514045 from the VDO portfolio.

1.3 Ammeter A2C38330800

Display value [A]	-60	-40	-20	0	+20	+40	+60
Input value [mV]	-60	-40	-20	0	+20	+40	+60

Characteristic curve predefined for shunt resistor A2C59514043 from the VDO portfolio.

1.4 Ammeter A2C38330900

Display value [A]	-30	-20	-10	0	+10	+20	+30
Input value [mV]	-60	-40	-20	0	+20	+40	+60

Characteristic curve predefined for shunt resistor A2C59514041 from the VDO portfolio.

2 Fill level indicator sensor characteristic curve

2.1 Fill level indicators A2C38335500, A2C38331000, A2C38331200

Display value	0 & E	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1/1 & F
Input value [ohm]	3	21	45	65	85	112	138	159	180

Characteristics predefined for fuel lever sensor from the VDO portfolio.

2.2 Fill level indicators A2C38327500, A2C38331300

Display value	E	1/8	1/4	3/8	1/2	5/8	3/4	7/8	F
Input value [ohm]	240	197	153	128	103	85	68	51	34

2.3 Fill level indicators A2C38331100, A2C38331500

Display value	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1/1
Input value [ohm]	75	66	57	48	39	30	21	12	3

Characteristic curve predefined for tubular sensor with input value 75 Ohm at indication value zero.

2.4 Fill level indicator A2C38331400

Display value	E	1/8	1/4	3/8	1/2	5/8	3/4	7/8	F
Input value [ohm]	0	11	23	34	45	56	68	79	90

Characteristic predefined for tubular sensor with input value zero ohm at display value E.

2.5 Fill level indicator A2C39163000

Display value	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8	1/1
Input value [Volt]	0.00	0.63	1.25	1.88	2.50	3.13	3.75	4.38	5.00

3 Pressure gauge sensor characteristic curve

3.1 Pressure gauges A2C38334400, A2C38334800, A2C38332400, A2C38333000

Display value [psi]	0	20	30	50	70	80	100	120	130	150
Input value [ohm]	10	39	53	79	104	116	139	160	170	188

Characteristics predefined for 10 bar pressure sensors from the VDO portfolio.

3.2 Pressure gauges A2C38334500, A2C38331700

Display value [bar]	0	1	2	3	4	5	6	7	8	9	10
Input value [ohm]	10	31	52	71	90	107	124	140	156	170	184

Characteristics predefined for 10 bar pressure sensors from the VDO portfolio.

3.3 Pressure gauge A2C38327100

Display value [bar]	0	2	4	6	8	10	12	14	16
Input value [Volt]	0.5	1	1.5	2	2.5	3	3.5	4	4.5

Characteristics predefined for 10 bar pressure sensors from the VDO portfolio.

3.4 Pressure gauge A2C38327300

Display value [psi]	0	25	50	75	100	125	150	175	200	225	250
Input value [Volt]	0.5	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.7	4.1	4.5

3.5 Pressure gauge A2C38334600

Display value [bar]	0	2.5	5	7.5	10	12.5	15	17.5	20	22.5	25
Input value [ohm]	10	32	53	73	91	109	125	141	156	170	184

Characteristic curve predefined for 25 bar pressure sensors from the VDO portfolio.

3.6 Pressure gauge A2C38327200

Display value [bar]	0	5	10	15	20	25	30
Input value [Volt]	0.5	1.15	1.8	2.5	3.1	3.75	4.5

3.7 Pressure gauge A2C38335000

Display value [psi]	0	50	100	140	160	200	240	260	300	350	400
Input value [ohm]	10	41	68	89	99	117	135	143	160	179	198

Characteristic curve predefined for 28 bar pressure sensors from the VDO portfolio.

3.8 Pressure gauge A2C38327400

Display value [psi]	0	50	100	150	200	250	300	350	400	450	500
Input value [Volt]	0.5	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.7	4.1	4.5

3.9 Pressure gauge A2C38326900

Display value [psi]	0	1	2	3	4	5	6	7	8	9	10
Input value [Volt]	0.5	0.9	1.3	1.7	2.1	2.5	2.9	3.3	3.7	4.1	4.5

3.10 Pressure gauge A2C38327000

Display value [psi]	0	25	50	75	100	125	150
Input value [Volt]	0.5	1.15	1.8	2.5	3.1	3.75	4.5

3.11 Pressure gauge A2C38331600

Display value [bar]	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5
Input value [ohm]	11	29	47	65	82	100	117	134	151	167	184

Characteristic curve predefined for 5 bar pressure sensors from the VDO portfolio.

3.12 Pressure gauge A2C38332300

Display value [psi]	0	10	20	25	30	35	40	60	80
Input value [ohm]	240	198	177	148	120	104	82	63	34

3.13 Pressure gauge A2C38331900

Display value [psi]	0	10	20	30	40	50	60	70	80
Input value [ohm]	11	36	60	84	108	132	155	178	201

3.14 Pressure gauge A2C38334900

Display value [bar]	0	0.25	0.5	0.75	1	1.25	1.5	1.75	2
Input value [ohm]	10	33	56	78	100	122	143	164	184

Characteristic curve predefined for 2 bar pressure sensors from the VDO portfolio.

3.15 Pressure gauge A2C38334700

Display value [psi]	0	10	15	20	25	30	35	40	45	50	60
Input value [ohm]	11	36	48	60	72	84	96	108	120	132	155

Characteristic curve predefined for 5 bar pressure sensors from the VDO portfolio.

3.16 Pressure gauges A2C18003100, A2C18003300, A2C18003400

Display value [bar]	0	1	2	3	4	5	6	7	8	9	10
Input value [Volt]	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5

4 Pyrometer sensor characteristic curve

4.1 Pyrometer A2C38330500

Display value [C°]	0	125	250	375	500	625	750	875	1000
Input value [mV]	0	5	10	15	21	26	31	36	41

Characteristic curve predefined for pyrometer N03 320 264 from the VDO portfolio.

4.2 Pyrometer A2C38330400

Display value [°F]	0	250	500	750	1000	1250	1500	1750	2000
Input value [mV]	0	5	11	16	22	28	34	40	45

Characteristic curve predefined for pyrometer N03 320 264 from the VDO portfolio.

5 Temperature gauge sensor characteristic curve

5.1 Temperature gauge A2C38335200

Display value [°C]	60	80	100	120	140	160	180	200
Input value [ohm]	483	265	151	85	53	32	21	14

5.2 Temperature gauge A2C38335300

Display value [°F]	150	175	200	225	250	275	300	325	350	375	400
Input value [ohm]	422	271	189	127	83	61	44	30	23	17	12

5.3 Temperature gauges A2C38335100, A2C38333200, A2C38333300

Display value [°C]	40	50	60	70	80	90	100	110	120
Input value [ohm]	291	197	134	97	70	51	38	29	22

Characteristic curve predefined for thermistor 92-027-004 from the VDO portfolio.

5.4 Temperature gauge A2C39163100

Display value [°F]	0	50	80	100	110	125	125	150	175	200	225
Input value [ohm]	500	500	500	320	257	257	185	112	71	47	31

Characteristic curve predefined for thermistor 92-027-004 from the VDO portfolio.

5.5 Temperature gauges A2C38333800, A2C38333900

Display value [°C]	50	60	75	90	100	110	125	140	150
Input value [ohm]	322	221	131	83	62	47	32	23	19

Characteristic curve predefined for thermistor 92-027-006 from the VDO portfolio.

5.6 Temperature gauge A2C38334100

Display value [°F]	100	125	150	175	200	225	250	275	300
Input value [ohm]	532	300	181	113	75	53	36	26	19

Characteristic curve predefined for thermistor 92-027-006 from the VDO portfolio.

5.7 Temperature gauge A2C38333400

Display value [°F]	100	125	150	175	200	225	250
Input value [ohm]	450	205	140	99	62	41	30

5.8 Temperature gauge A2C38333500

Display value [°F]	100	125	150	175	200	225	250
Input value [ohm]	320	185	112	71	47	31	22

Characteristic curve predefined for thermistor 92-027-004 from the VDO portfolio.

AUMOVIO Aftermarket GmbH
Guerickestraße 7
60488 Frankfurt am Main
Germany
Tel.+49 (0) 69 7603-0

aftermarket.vdo.com

28-0190-0113.1 • 4.2 • 20/02/2026

VDO

SingleViu™

Operating manual

Appendix C; Wiring diagram

Table of contents

1 Wiring diagram for shunt resistors

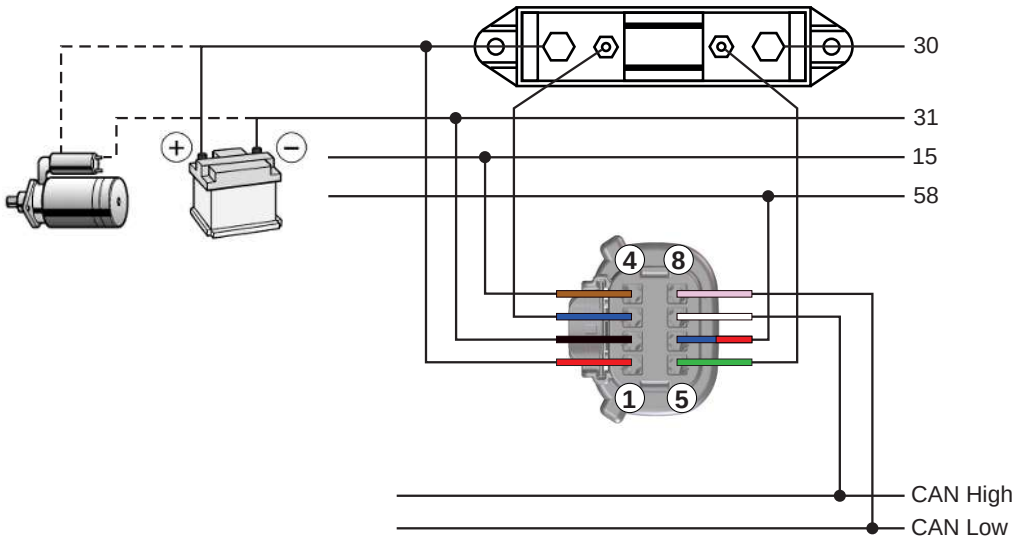


Fig. 1: Wiring diagram for shunt resistors

The alternator and the starter generate or consume more current than may be conducted via the shunt resistors and therefore need to be connected directly to the battery.

2 Wiring diagram for fuel level sensor

2.1 tubular sensor

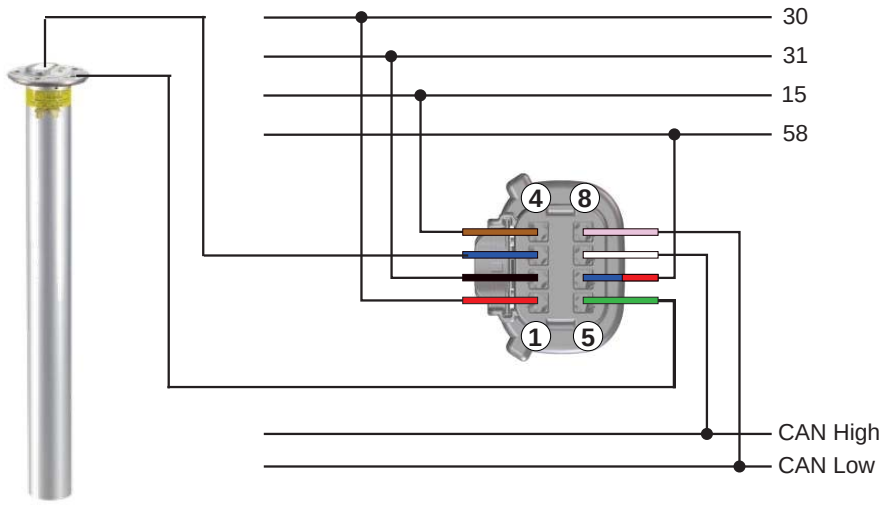


Fig. 2: Wiring diagram for a tubular sensor

2.2 Lever arm sensors

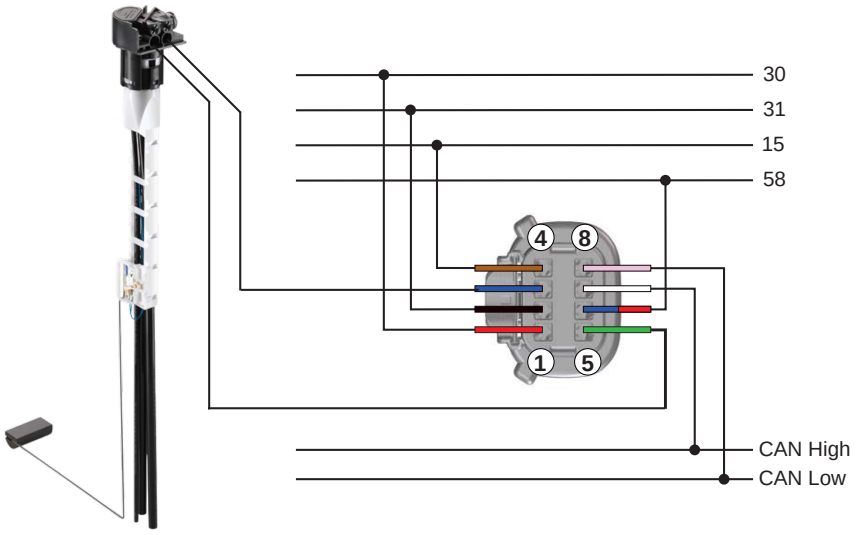


Fig. 3: Wiring diagram for a lever arm sensor

3 Wiring diagram for pressure sensors

3.1 Single-pole pressure sensor

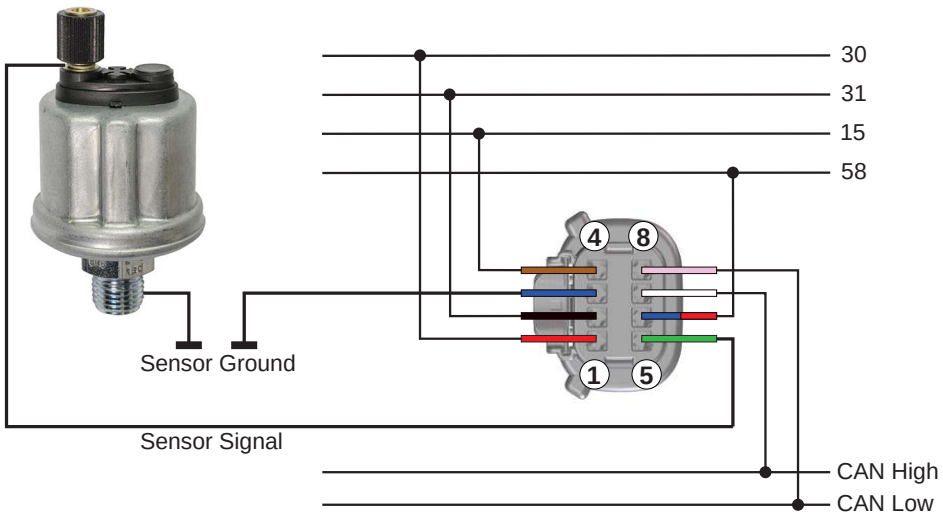


Fig. 4: Wiring diagram for a single-pole pressure sensor (common ground reference)

3.2 Single-pole pressure sensor for a dual station reading

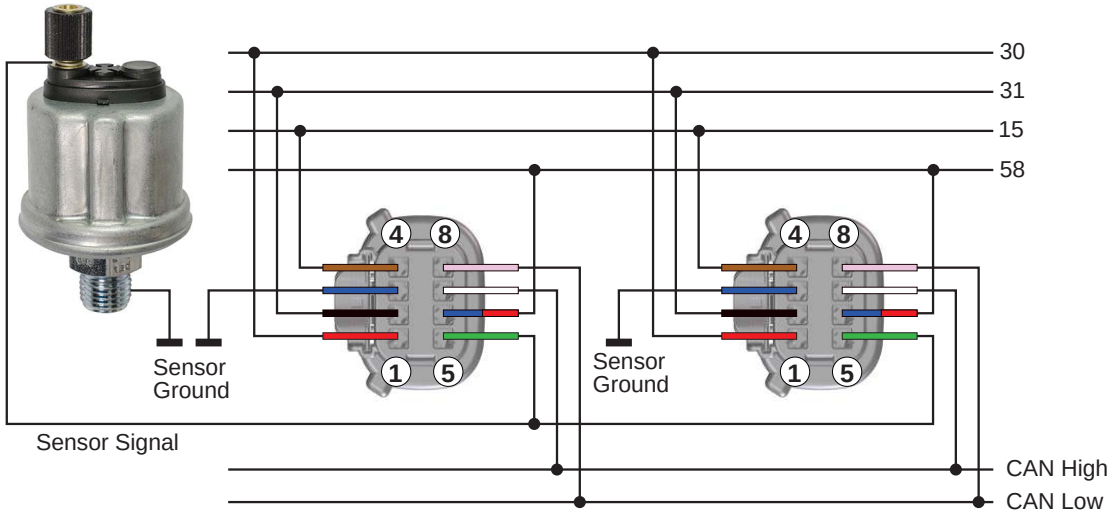


Fig. 5: Wiring diagram for a single-pole pressure sensor for a dual station reading

3.3 Single-pole pressure sensor with ground reference and warning contact

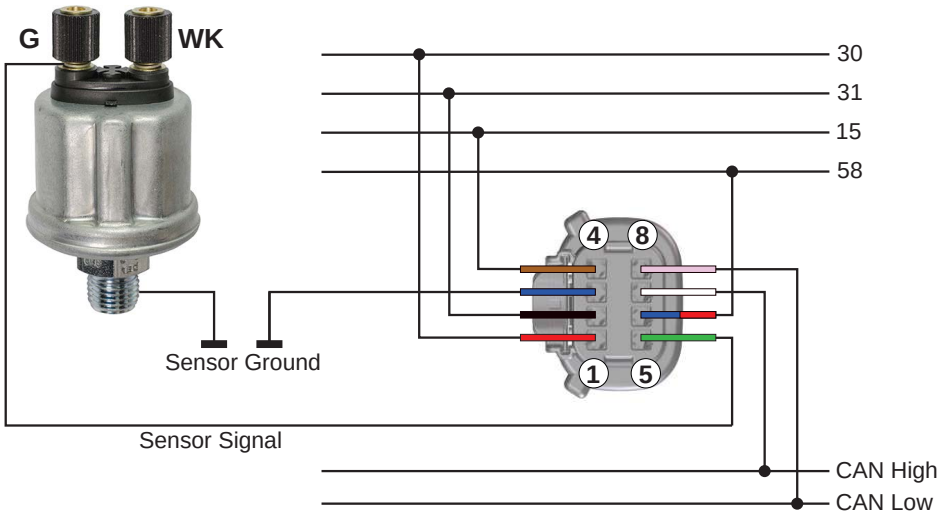


Fig. 6: Wiring diagram for a single-pole pressure sensor with common earth reference and warning contact. This remains unused.

3.4 Two-pole pressure sensor

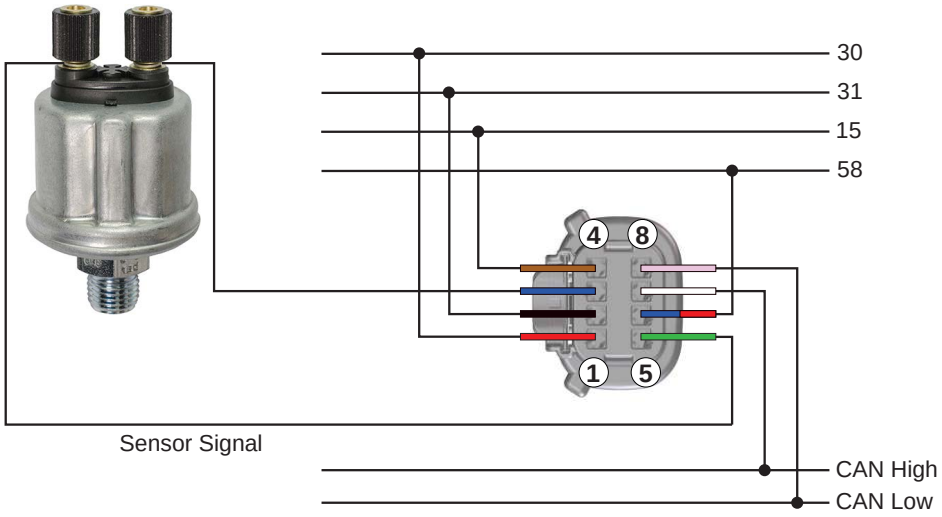


Fig. 7: Wiring diagram for a two-pole pressure sensor

3.5 Two-pole pressure sensor for dual station reading

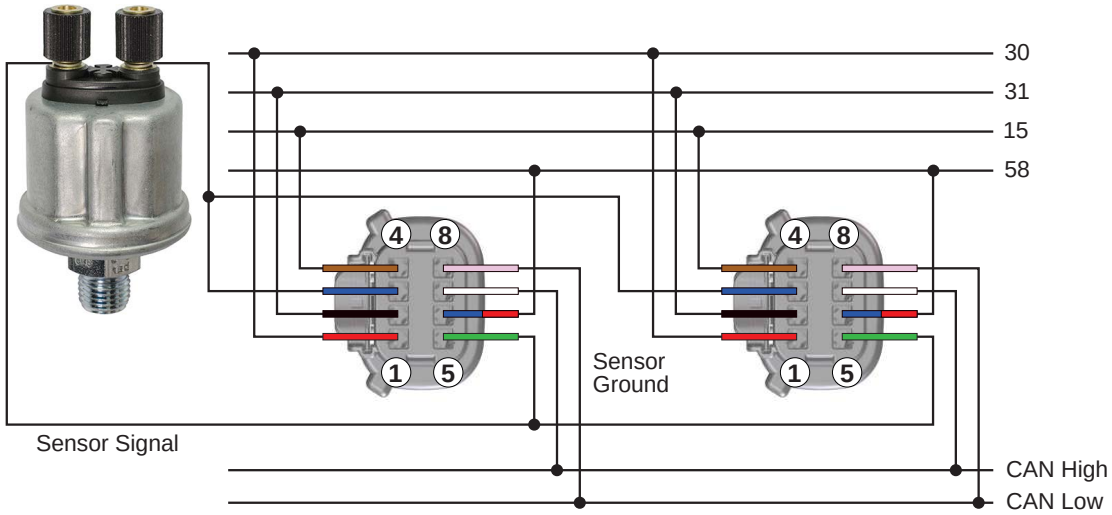


Fig. 8: Wiring diagram for a two-pole pressure sensor for dual station reading

3.6 Three-pole pressure sensor

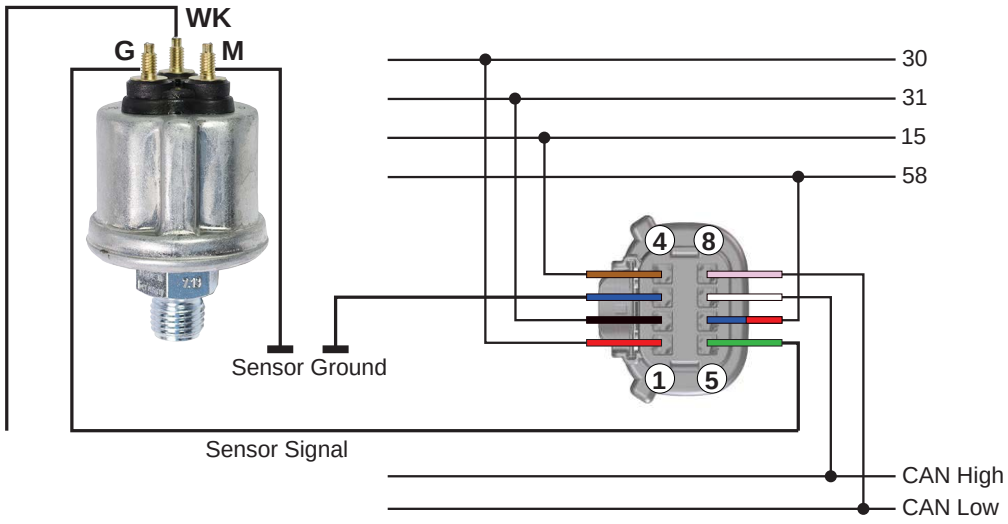


Fig. 9: Wiring diagram for a 3-pole pressure sensor

3.7 Three-pole pressure sensor with common ground reference and anti-torque guard

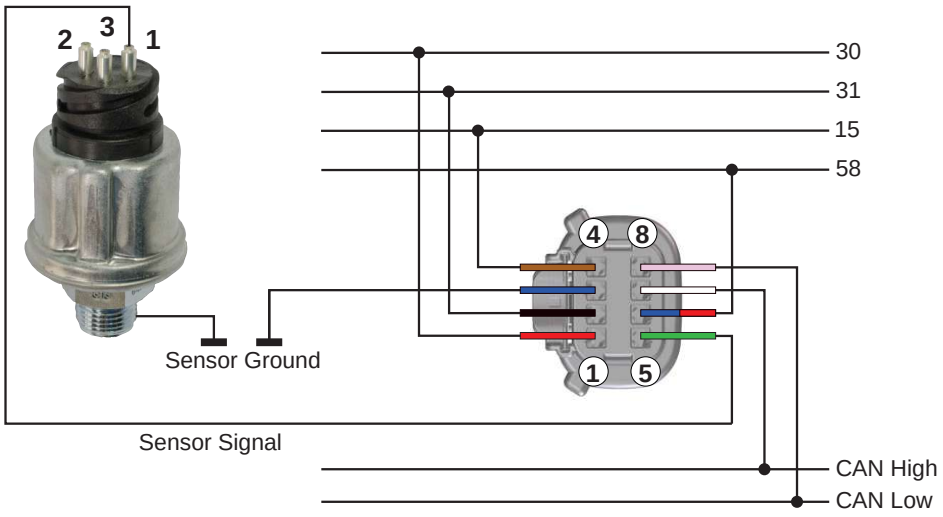


Fig. 10: Wiring diagram for a 3-pole pressure sensor with common ground reference and anti-torque guard

3.8 Pressure sensors with own 5V power supply

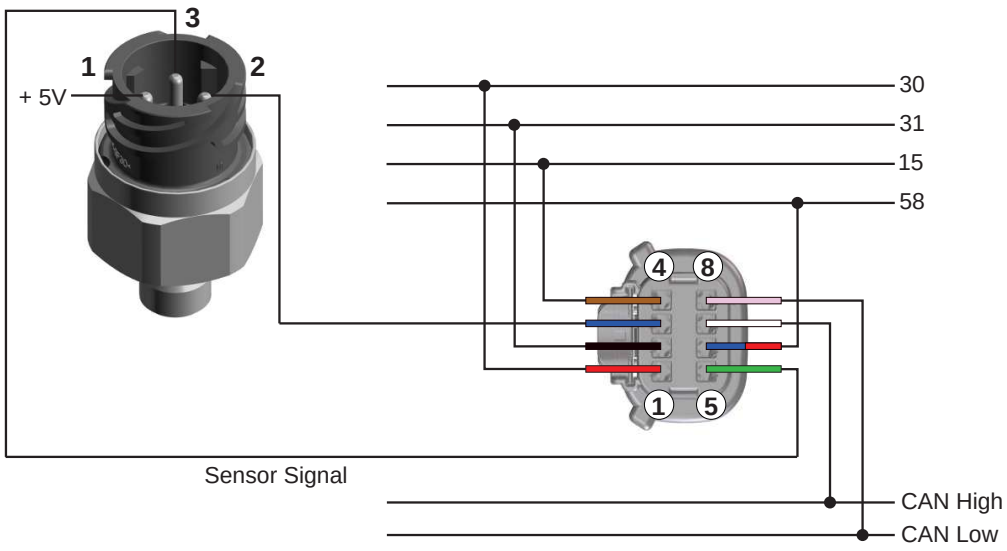


Fig. 11: Wiring diagram for a pressure sensor with own 5V power supply

3.9 Pressure sensors with own 8 – 32 Volt power supply

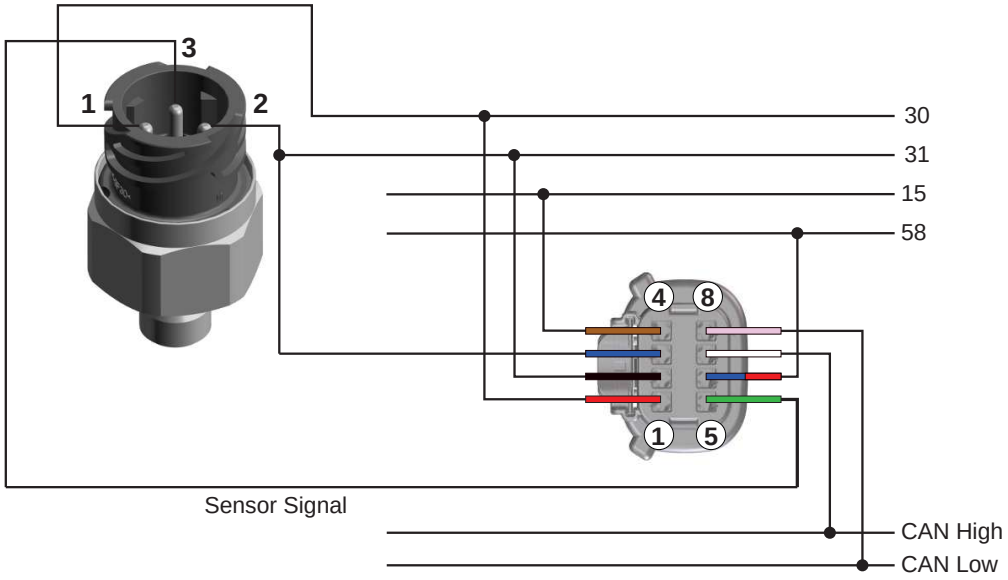


Fig. 12: Wiring diagram for a pressure sensor with own 8 – 32 volt power supply

4 Wiring diagram for pyrometric sensor

NOTE! Note connection between pins 1 and 5.

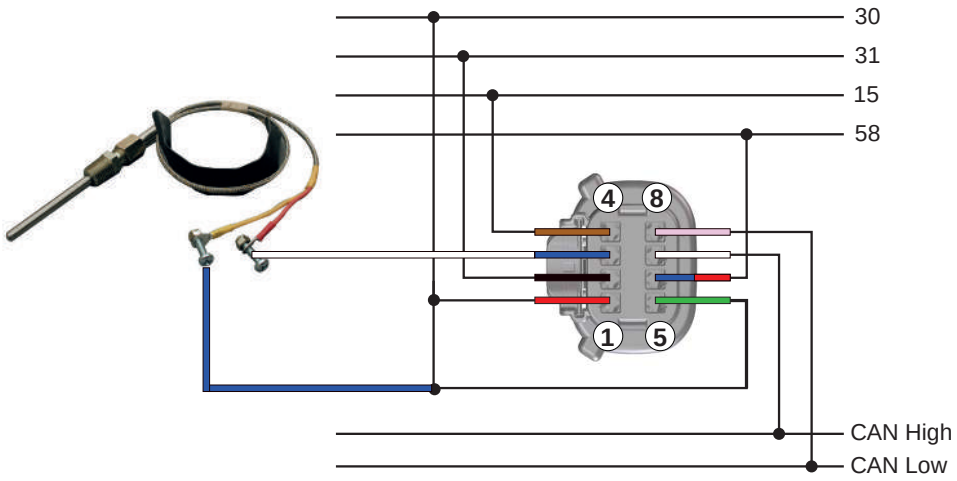


Fig. 13: Wiring diagram for pyrometric sensor N03-320-264

5 Wiring diagram for temperature sensors

5.1 Single-pole temperature sensor with common ground reference

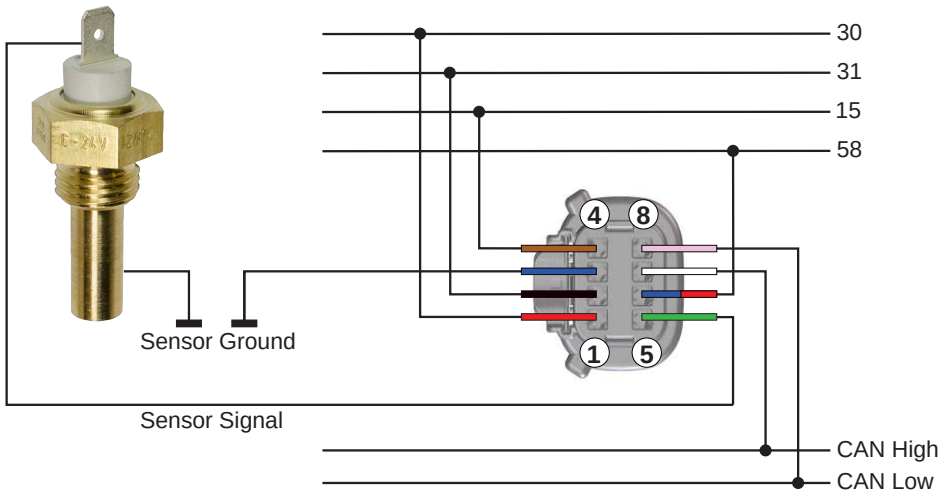


Fig. 14: Wiring diagram for a single-pole temperature sensor with common ground reference

5.2 Single-pole temperature sensor with warning contact

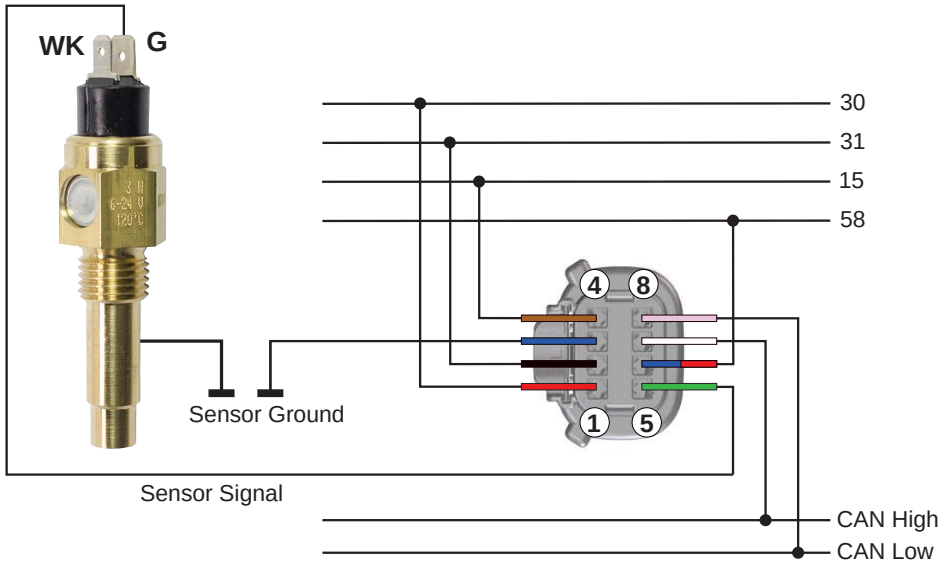


Fig. 15: Wiring diagram for a single-pole temperature sensor with warning contact. This remains unused.

5.3 Two-pole temperature sensor

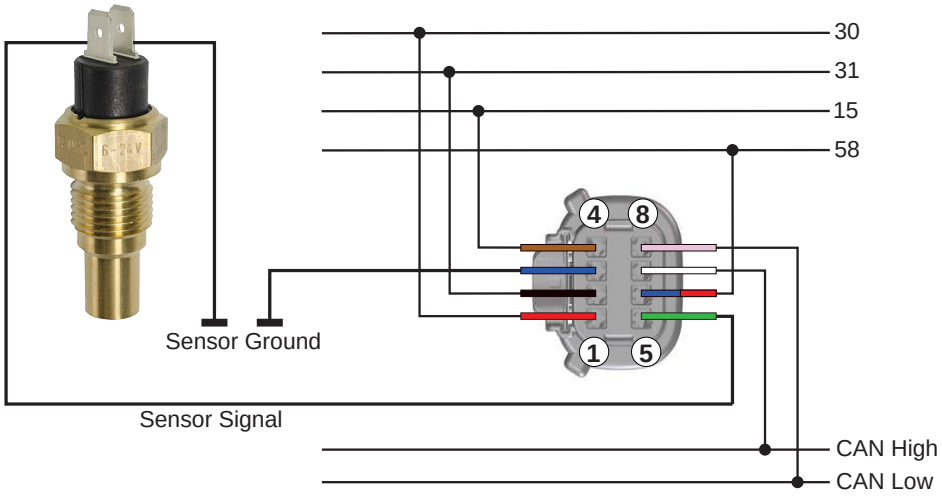


Fig. 16: Wiring diagram for a two-pole temperature sensor

5.4 Two-pole temperature sensor for a dual station reading

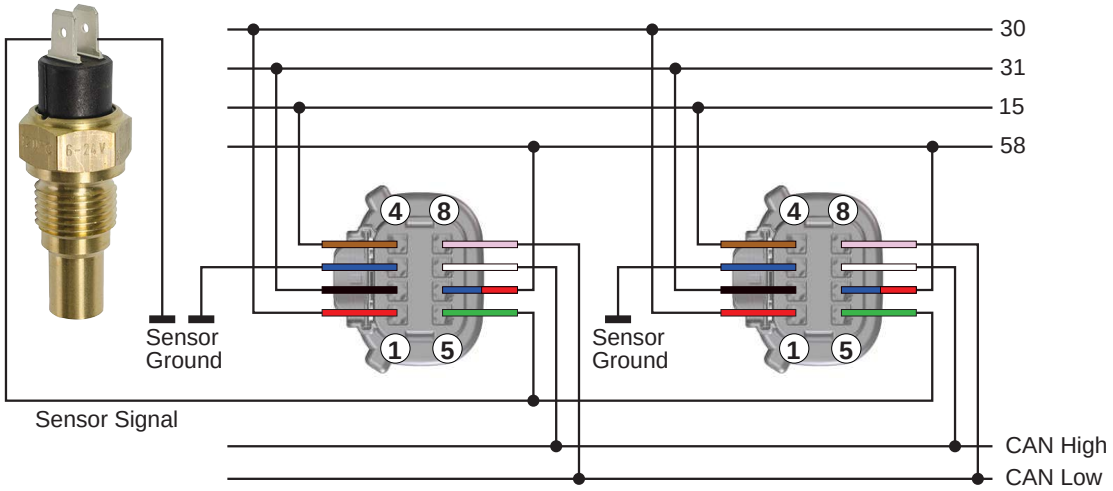


Fig. 17: Wiring diagram for a two-pole temperature for a dual station reading

6 Wiring diagram for speed sensor, pulse sensor

6.1 Two-pole speed sensor

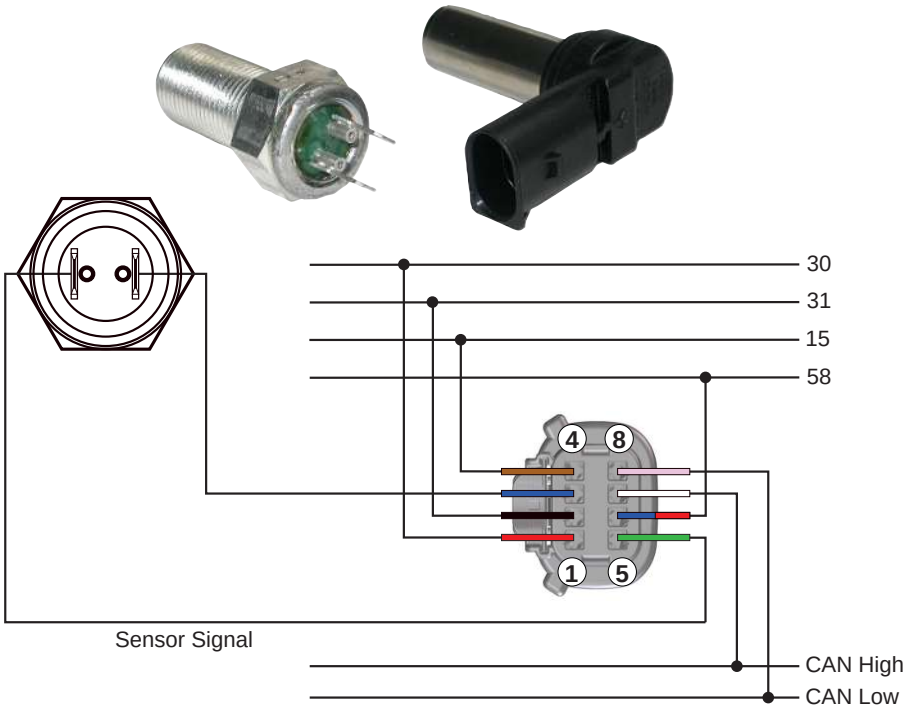


Fig. 18: Wiring diagram for various types of two-pole speed sensors

6.2 Multi-pole speed sensors with separate power supply

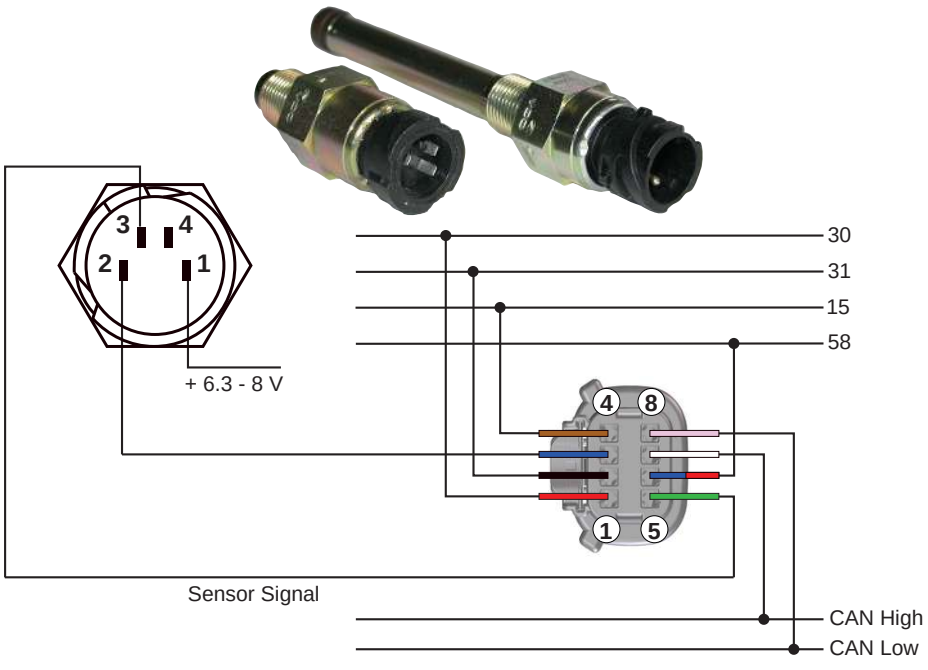


Fig. 19: Wiring diagram for various multi-pole speed sensors with separate power supply

AUMOVIO Aftermarket GmbH
Guerickestraße 7
60488 Frankfurt am Main
Germany
Tel.+49 (0) 69 7603-0

aftermarket.vdo.com

28-0190-0113.1 • 4.2 • 20/02/2026