



Safety instructions

The product was developed, manufactured and inspected according to the basic safety requirements of EC Guidelines and state-of-the-art technology.

Intended use

- The sensor may only be installed and operated if the safety instructions have been thoroughly read, understood and followed.
- Sensor only use in earth-bound vehicles and machines as well as in pleasure boats, including non-classified commercial shipping
- Modifications or manipulations of the sensor can affect safety. Consequently, you may not modify or manipulate the sensor! Not install damaged sensors!
- Complete EMPS-Product Family may only be used in medium Oil (Engine & Gear Oil) and dry, clean air! All other media are not allowed.

Disregard of intended use may lead to life-threatening personal injuries as well as damage to property or environment!

Instruction before installation:

- The safety instructions should be thoroughly read and followed!
- Using the vehicle documentation, learn about the vehicle type and possible special features before installation!
- Note possible modifications to the vehicle, which must be considered during installation!
- To prevent personal injury, property damage or environmental damage, basic knowledge of motor vehicle/shipbuilding electronics and mechanics is required. The product should be installed by a specialized professional.
- Use the assembly plan to learn the location of the fuel/hydraulic/compressed air and electrical lines!
- Pay attention to how lines and cable harnesses are laid so that you do not drill or saw through them!
- Do not install the product in the mechanical and electrical airbag area!
- Do not drill holes or ports in load-bearing or stabilizing stays or tie bars!
- Wear work clothes. Do not wear loose clothing, as it may get caught in moving parts. Protect long hair with a hair net.
 - When working on the on-board electronics, do not wear metallic or conductive jewelry such as necklaces, bracelets, rings, etc.
 - Make sure that the engine cannot start unintentionally during installation!
- When removing/installing seats, covers, etc., ensure that lines are not damaged and plug-in connections are not loosened!
- Note all data from other installed instruments with volatile electronic memories.
- Sensor/wiring as well as vehicle functionality has to be undamaged!



No smoking! No open fire or lights!

Instruction during installation:

- When working in the engine compartment of ships with a gasoline engine: Turn on engine compartment fan.
- If work on a running engine is required, exercise extreme caution. Wear only appropriate work clothing as you are at risk of personal injury, resulting from being crushed or burned.
- When working underneath the vehicle, secure it according to the specifications from the vehicle manufacturer.
- Note the necessary clearance at the installation location.
- Drilling small ports, cutting threads, deburring edges. Follow the safety instructions of the tool manufacturer.

Instruction after installation:

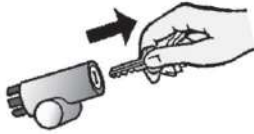
- Connect the ground cable tightly to the negative terminal of the battery.
- Reenter/reprogram the volatile electronic memory values.
- Check all functions.
- Note the Ingress Protection (IP) ratings (IEC 60529).

Instruction for the electrical connection:

- Pay attention for proper ground connections.
- Connect cables according to the electrical wiring diagram.
- Do not operate vehicle/engine with incorrect or damaged connections. Have a specialist fix damages.
- Note cable cross-sectional area! Reducing the cable cross-sectional area leads to higher current density, which can cause the cable cross-sectional area in question to heat up!
- Use only insulated tools, if work is necessary on live parts.
- Use only the multimeter or diode test lamps provided, to measure voltages and currents in the vehicle/machine or boat. Use of conventional test lamps can cause damage to control units or other electronic systems.
- Laying metallic, uninsulated cables and contacts is prohibited.
- When installing electrical cables, use the provided cable ducts and harnesses; however, do not run sensor cables parallel to ignition cables or to cables that lead to large electricity consumers.
- Fasten cables with cable ties or adhesive tape. Do not run cables over moving parts. Do not attach cables to the steering column!
- Ensure that cables are not subject to tensile, compressive or shearing forces.
- If cables are run through drill holes, protect them using rubber sleeves or the like.
- Use only one cable stripper to strip the cable. Adjust the stripper so that stranded wires are not damaged or separated.
- Use only a soft soldering process or commercially available crimp connector at new cable connections!
- Make crimp connections with cable crimping pliers only. Follow the safety instructions of the tool manufacturer.
- If operating the sensor on power supply units, note that the power supply unit must be stabilized and it must comply with the following standard: **DIN EN 61000, Parts 6-1 to 6-4.**

Procedures for installing Sensors 1 to 6

1 Switch the ignition off



⚠ DANGER

Danger of explosion, fire and suffocation!

Inflammatory and harmful vapors / liquids may be present at the installation site (especially the engine compartment).

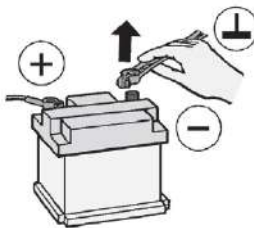
- » Do not smoke. No open fire or light
- » Ventilate workplace / installation site of the sensor well



Before beginning work

- » Turn off ignition and remove ignition key.
- » If necessary, remove the main power switch.

2 Disconnect the battery



⚠ WARNING

Danger from short circuit!

Short circuits in the electrical system can cause cable fires, battery explosions and damage to other electronic systems. All connections to the voltage supply must be provided with weldable butt connectors and be adequately insulated.

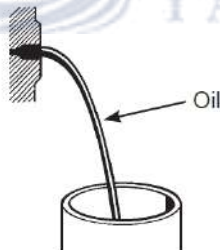
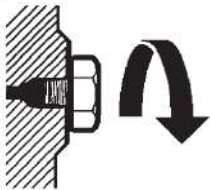
- » Pay attention to proper ground connections.
- » Insulate exposed wires.
- » Connect cable only in accordance with the electrical connection plan.

- » Disconnect the negative pole of the starter battery.

Information: If the vehicle has additional batteries, the negative poles on these batteries may also need to be disconnected! All volatile electronic memories lose their input values and must be reprogrammed when the battery is disconnected.

- » Secure battery against accidental reconnection.

3 Discharge oil



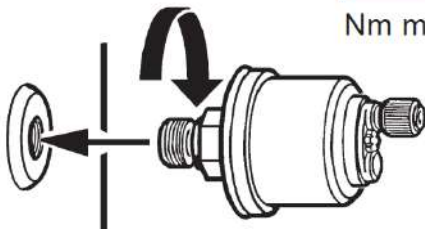
⚠ DANGER

Complete EMPS-Product Family may only be used in medium Oil (Engine & Gear Oil) and dry, clean air! All other media are not allowed.

4 Screw in sensor

NOTICE

- » When screwing in the sensor, observe the tightening torque (Nm max).



Nm max.

M 10x1	max. 30 Nm	1/4 in. BSPF	max. 60 Nm
1/8 in. BSPF	max. 30 Nm	1/4 - 18 NPTF	max. 60 Nm
1/8 - 27 NPTF	max. 30 Nm	3/8 - 18 NPTF	max. 60 Nm
R 1/8 DIN 2999	max. 30 Nm	M 16x1,5	max. 80 Nm
M 12x1,5	max. 40 Nm	3/8 - 18 Dryseal NPTF	max. 80 Nm
M 12x1	max. 50 Nm	M 18x1,5	max. 100 Nm
M 14x1,5	max. 60 Nm		

5 Connect the sensor

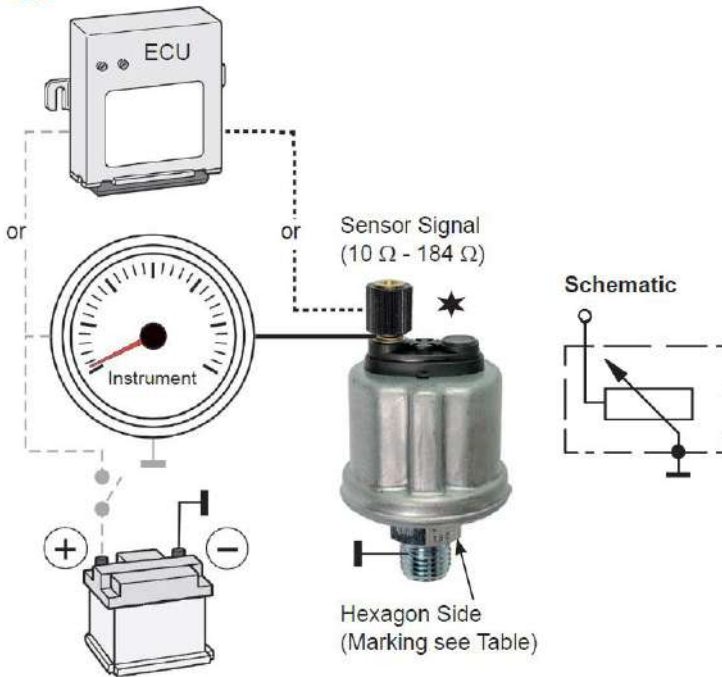
commercially available
Dia. 4.1...4.3



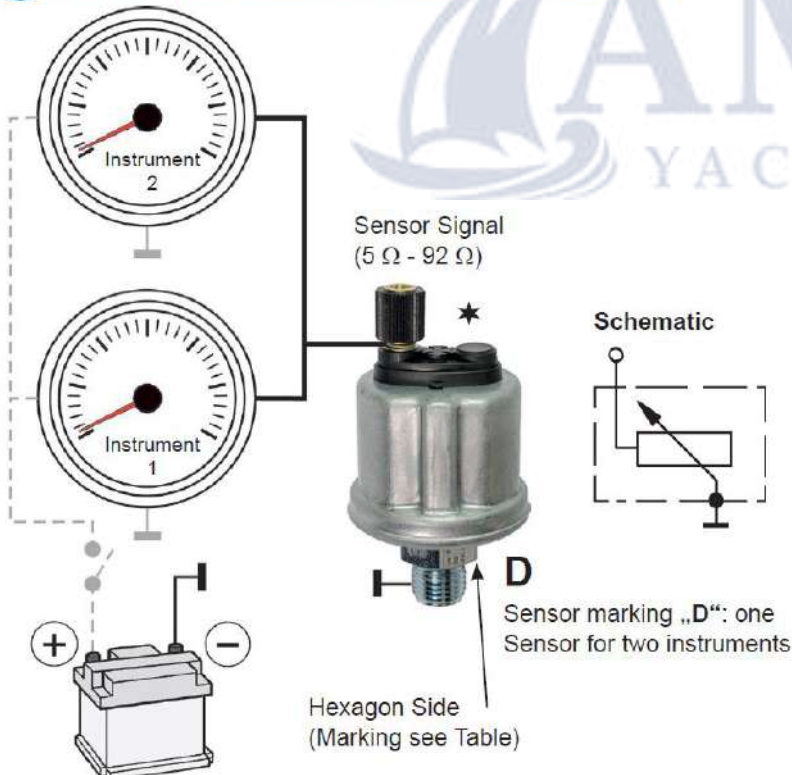
6 Fill in oil



A1 Sensor 1-pole common ground



A2 Sensor 1-pole common ground (for double scale)



Part No.	Marking Hexagon Side
360-081-029-001	29/1
360-081-029-004	29/4
360-081-029-010	29/10
360-081-029-012	29/12
360-081-029-013	29/13
360-081-029-020	29/20
360-081-029-025	29/25
360-081-029-026	29/26
360-081-029-033	29/33
360-081-029-038	29/38
360-081-029-041	29/41
360-081-029-042	29/42
360-081-029-059	29/59
360-081-029-062	29/62
360-081-029-065	29/65
360-081-029-085	29/85
360-081-029-087	29/87
360-081-037-006	37/6
360-081-037-008	37/8
360-081-037-010	37/10
360-081-037-011	37/11
360-081-037-013	37/13
360-081-037-017	37/17
360-081-037-018	37/18
360-081-037-019	37/19
360-081-052-003	52/3

Part No.	Marking Hexagon Side	Marking Hexagon Side
362-081-003-001	3/1	D
362-081-003-002	3/2	D
362-081-004-001	4/1	D



The possible connection types:

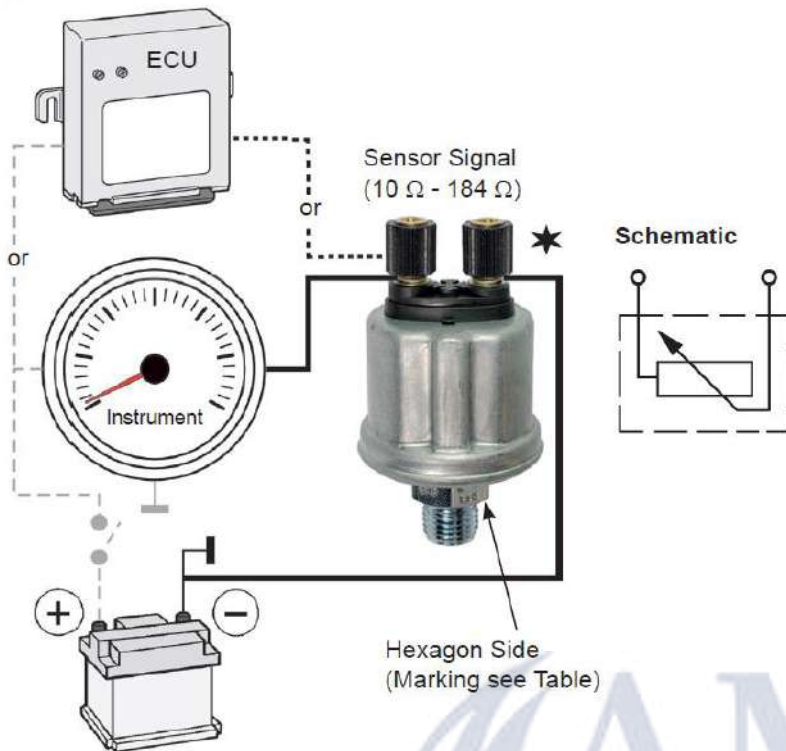
<p>Knurled nut M4</p>	<p>6.3x0.8mm</p> <p>90°</p>	<p>Hex nut M4</p>
<p>Connector pin Dia. 4mm M4</p>	<p>6.3x0.8mm</p> <p>50°</p>	<p>Connector pin Dia. 4mm</p>

⚠ DANGER

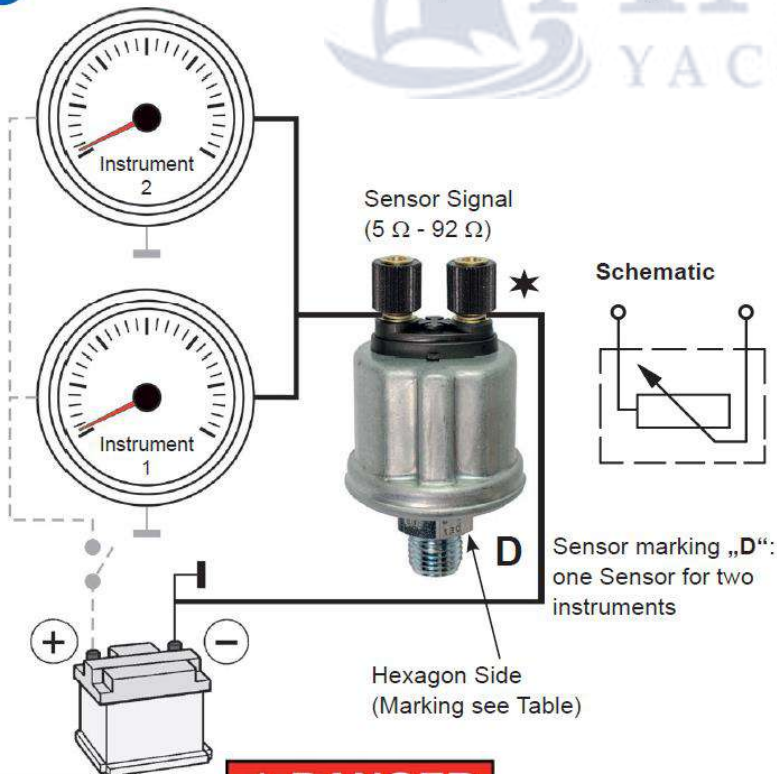
Danger due to incorrect connection of the sensor!
 Disregard of the "Safety instructions" on pages 1 to 2 may lead to life-threatening personal injuries as well as damage to property or environment!

- » Connect sensor in compliance with all safety instructions.
- » Connect cable in accordance with the electrical connection plan.

B1 Sensor 2-pole, insulated return



B2 Sensor 2-pole, insulated return (for double scale)



⚠ DANGER

Danger due to incorrect connection of the sensor!

Disregard of the "Safety instructions" on pages 1 to 2 may lead to life-threatening personal injuries as well as damage to property or environment!

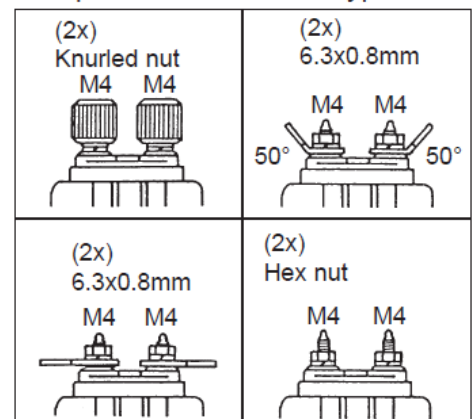
- » Connect sensor in compliance with all safety instructions.
- » Connect cable in accordance with the electrical connection plan.

Part No.	Marking Hexagon Side
360-081-032-011	32/11
360-081-032-013	32/13
360-081-032-014	32/14
360-081-032-016	32/16
360-081-032-025	32/25
360-081-032-052	32/52
360-081-032-053	32/53
360-081-032-054	32/52
360-081-032-057	32/57
360-081-032-058	32/58
360-081-032-059	32/59
360-081-032-060	32/60
360-081-032-061	32/61
360-081-038-001	38/1
360-081-038-002	38/2
360-081-038-003	38/3
360-081-038-005	38/5
360-081-038-008	38/8
360-081-038-014	38/14
360-081-051-012	51/12
360-081-051-013	51/13
360-081-054-002	54/2

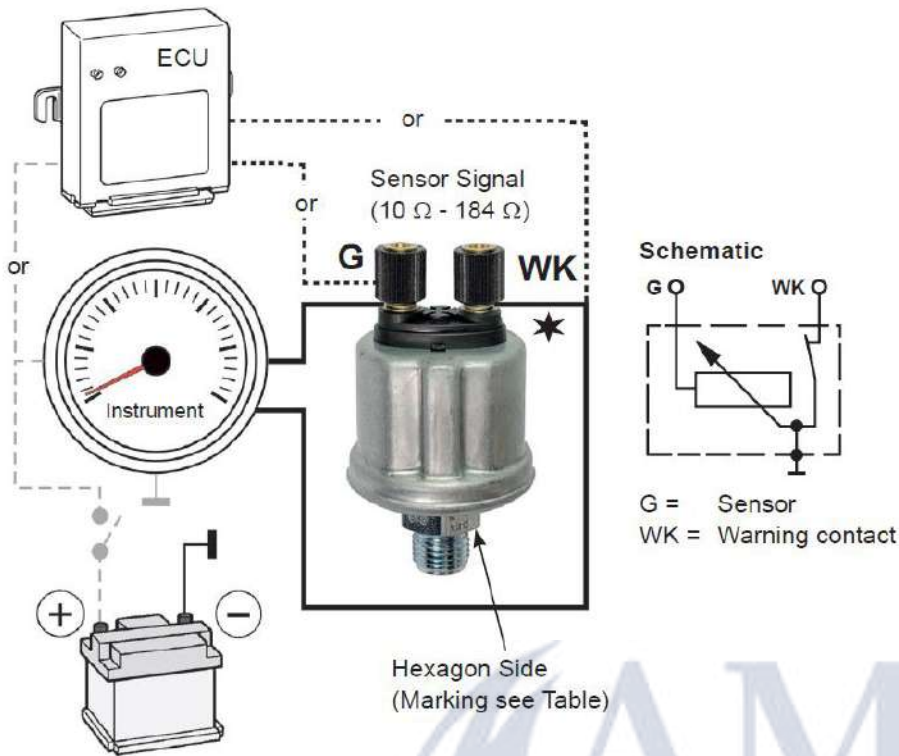
Part No.	Marking Hexagon Side	Marking Hexagon Side
362-081-001-001	1/1	D
362-081-001-002	1/2	D
362-081-002-001	2/1	D
362-081-002-003	2/3	D
362-081-002-004	2/4	D



The possible connection types:



C Sensor 2-pole, with Warning Contact



Part No.	Marking Hexagon Side
360-081-030-107	30/107
360-081-030-112	30/112
360-081-030-119	30/119
360-081-030-120	30/120
360-081-030-122	30/122
360-081-030-138	30/138
360-081-030-144	30/144
360-081-030-152	30/152
360-081-030-157	30/157
360-081-034-002	34/2
360-081-034-004	34/4
360-081-053-001	53/4
360-081-053-003	53/3
360-081-053-004	53/4
360-081-061-002	61/2
360-081-061-003	61/3
360-081-061-006	61/6
360-081-062-002	62/2
360-081-062-003	62/3
360-081-062-004	62/4
360-081-062-005	62/5

★
The possible connection types:

(2x) Knurled nut M4 WK G M4	(2x) 6.3x0.8mm (50°) WK G M4	(2x) 6.3x0.8mm WK G M4	WK 4.8x0.8mm (90°) G 6.3x0.8mm (90°) WK G M4
WK 6.3x0.8mm (50°) G 4.8x0.8mm (50°) WK G M4	WK 4.8x0.8mm (50°) G 6.3x0.8mm (50°) WK G M4	WK 6.3x0.8mm (90°) G 4.8x0.8mm (90°) WK G M4	Hex nut WK G M5
(2x) Hex nut, M4 WK G M4	WK 6.3x0.8mm (90°) G M4 WK G M4	Special push-on connector WK G	Special push-on connector G WK

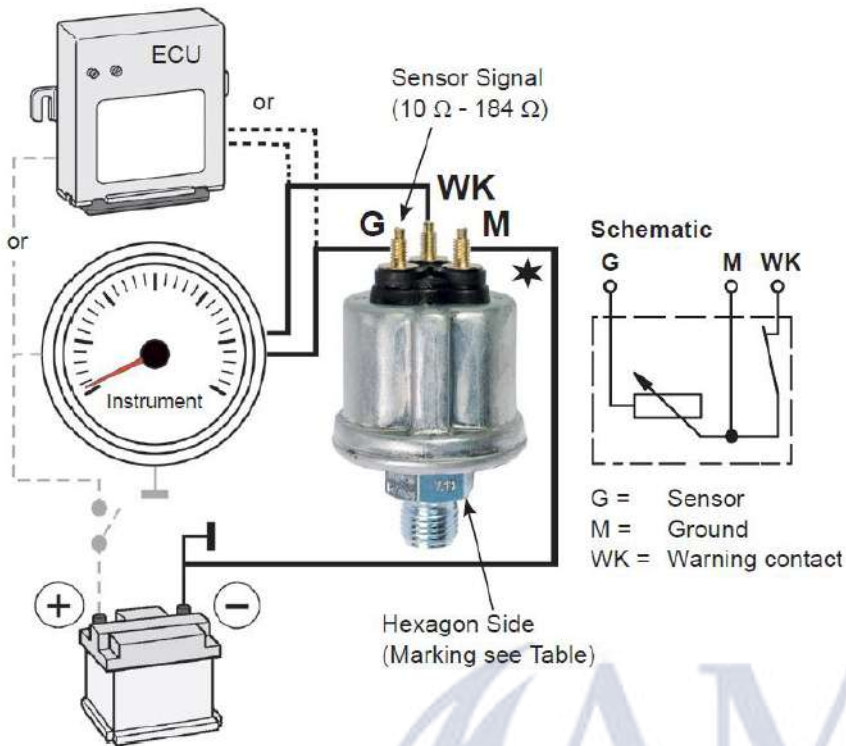
⚠ DANGER

Danger due to incorrect connection of the sensor!

Disregard of the "Safety instructions" on pages 1 to 2 may lead to life-threatening personal injuries as well as damage to property or environment!

- » Connect sensor in compliance with all safety instructions.
- » Connect cable in accordance with the electrical connection plan.

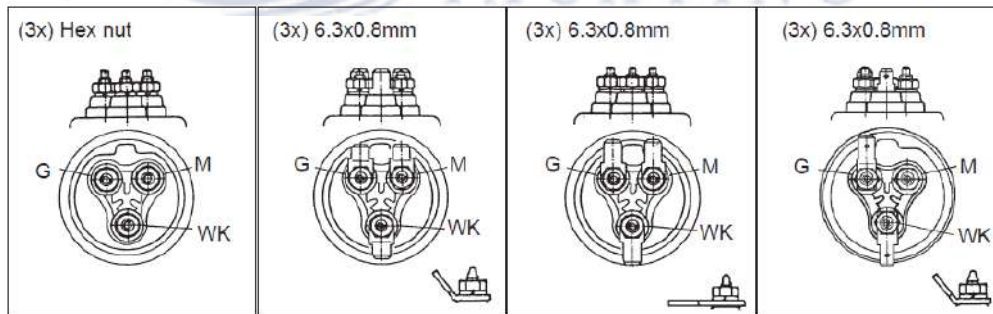
D Sensor 3-pole, with Warning Contact



Part No.	Marking Hexagon Side
360-081-039-002	39/2
360-081-039-003	39/3
360-081-039-004	39/4
360-081-039-007	39/7
360-081-039-015	39/15
360-081-063-001	63/1
360-081-063-003	63/3



The possible connection types:



⚠ DANGER

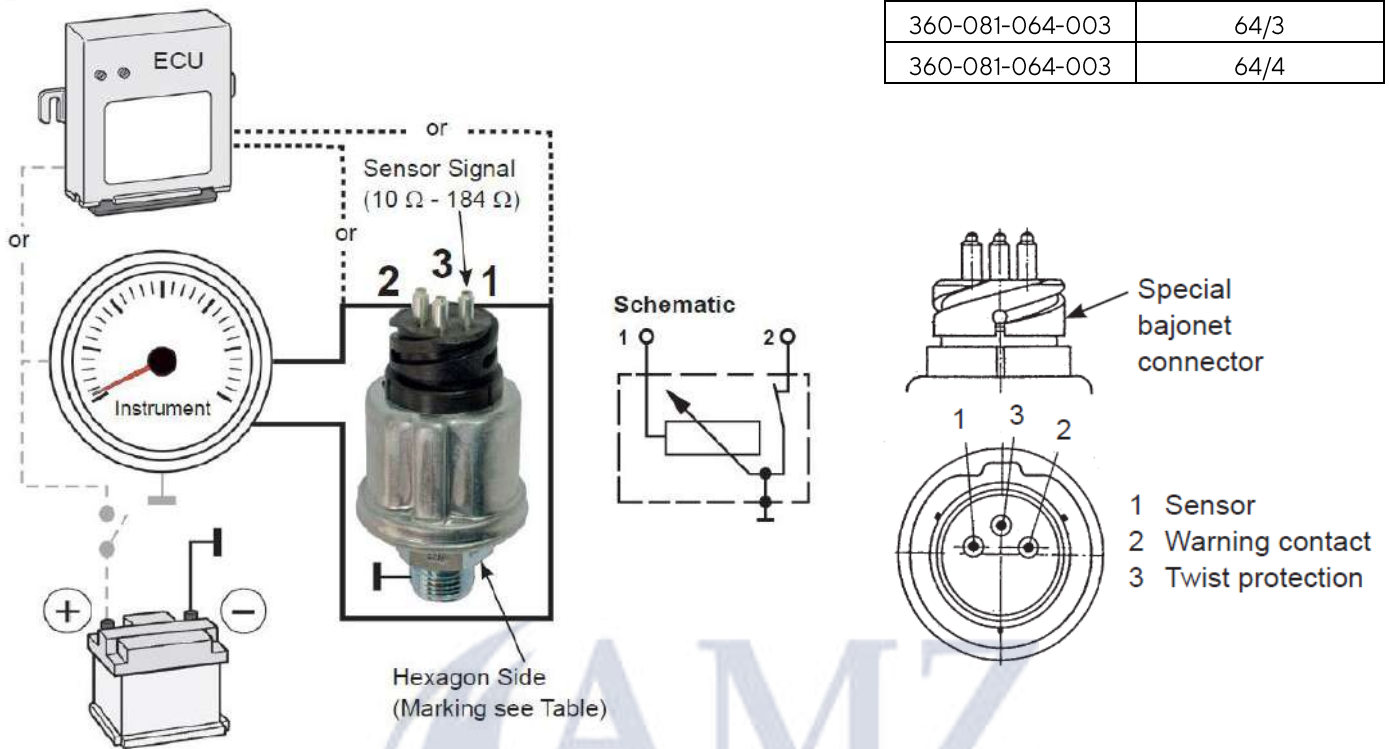
Danger due to incorrect connection of the sensor!

Disregard of the "Safety instructions" on pages 1 to 2 may lead to life-threatening personal injuries as well as damage to property or environment!

- » Connect sensor in compliance with all safety instructions.
- » Connect cable in accordance with the electrical connection plan.

Part No.	Marking Hexagon Side
360-081-064-001	64/1
360-081-064-003	64/3
360-081-064-003	64/4

E Sensor 3-pole, with Warning Contact and Twist Protection



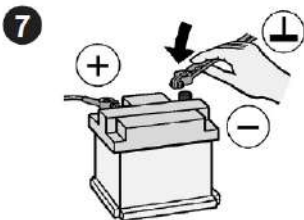
⚠ DANGER

Danger due to incorrect connection of the sensor!

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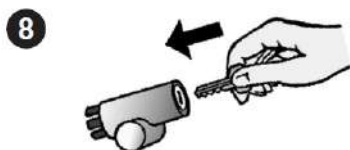
- » Connect sensor in compliance with all safety instructions.
- » Connect cable in accordance with the electrical connection plan.

After Installation 7 to 8



- » Connect battery again after checking the connection.

Note: All volatile electronic memories lose their input values and must be reprogrammed when the battery is disconnected.



- » If necessary, insert the main power switch again.
- » Turn on the ignition and perform a function test.
- » If necessary, reprogram devices that have lost their stored settings.