

DIRECT BRIGHT METER

HKS MECHANICAL METER

Pursuing the Ultimate in Engine Performance and Efficiency.
HKS Company Limited.

DIRECT BRIGHT METER

INSTRUCTION MANUAL

DIRECT BRIGHT METER

NOTICE

This manual assumes that you have and know how to use the tools and equipment necessary to safely perform service operations on your vehicle. This manual assumes that you are familiar with typical automotive systems and basic service and repair procedures.

Do not attempt to carry out the operations shown in this manual unless these assumptions are correct. Always have access to a factory repair manual. To avoid injury, follow the safety precautions contained in the factory repair manual.



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INTRODUCTION

For your safety and optimal product performance, read all instructions thoroughly before installing and using this product. It is recommended to keep this instruction manual in the vehicle for easy reference. When more than 1 meter is installed, each meter's brightness or tone may be slightly different depending on the LED characteristics.

NAME OF PRODUCT	HKS 60mm DB METER Series •Boost Meter •Temperature Meter •Pressure Meter
PART NUMBER	44004-AK001 (Boost Meter- White Panel/Black Scale) 44004-AK002 (Boost Meter- Black Panel/White Scale) 44004-AK003 (Temp Meter- White Panel/Black Scale) 44004-AK004 (Temp Meter- Black Panel/White Scale) 44004-AK005 (Press Meter- White Panel/Black Scale) 44004-AK006 (Press Meter- Black Panel/White Scale)
USE	Measuring devices for automobile engines as follows: Boost Meter : Measures engine intake air pressure. Temp Meter : Measures engine oil and coolant temperatures. Press Meter : Measures engine oil pressure.
APPLICATION	Any vehicle that operates on a DC12V negative ground.
REMARKS	(1) The face of the panel/scale meters light up as follows: White Panel/Black Scale: The panel lights up blue. (The scale remains black.) Black Panel/White Scale: The scale lights up blue. (The panel remains black.) (2) All measurements utilize international (SI) unit.

- This manual indicates items you need to pay attention in order to install this product safely and lists precautions to avoid any possible damage and/or accidents.
- For any lost, defective and/or damaged parts, contact the dealer to order.
- HKS will not be responsible for any damage caused by incorrect installation and/or use or use after modification and/or dismantling of this product.
- HKS will not be responsible for any damage caused by removing vehicle's in/exterior, electric parts or modification for installation.
- This product was designed based on installing it onto a factory vehicle or a vehicle using other HKS products. The performance and/or safety cannot be guaranteed if this product was installed onto other inapplicable vehicles.
- This product works only with a Japanese vehicle with DC12V negative ground.
- The specifications of this product are subject to be changed without notice.
- This manual is subject to be revised without notice.
- This manual must be kept by the product user.
- This product is designed for use in Japan only. It must not be used in any other country.

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SAFETY INSTRUCTIONS

WARNING

- Make sure to work on the vehicle in a well-ventilated area to prevent possible explosion or a fire.
- Do not mount the unit where it may distract from normal driving and air bag function to avoid possible accidents.
- Do not install this product onto a 24V vehicle. It may cause a fire.
- Make sure to disconnect the cable from the negative terminal of the battery to avoid possible damage to other electronics parts and/or a fire caused by a short circuit. Please note that when disconnecting the cable, the ECU's learning may be initialized, the audio's memory may be deleted, etc.
- If any unusual noises, scents, and/or vibrations are noticed, consult a professional installer immediately.
- Make sure to hold connectors when disconnecting them to avoid possible damage to other electronics parts and/or a fire caused by disconnection or a short circuit.
- The copper pipe of the temperature meter and the pressure meter must be secured with extra slack to absorb engine vibration. Circularizing the copper pipe between the engine and the vehicle can restrain vibration, shock, and/or tension. If the pipe is damaged, liquid may leak from the pipe, and cause a fire.

CAUTION

- Do not install this product by yourself unless you have and know how to use the tools and equipment necessary to safely perform service operations on your vehicle.
- Do not modify, disassemble, and/or remodel the product and/or attached parts to avoid any damage to the unit and/or harness.
- Handle the parts with caution at all times.
- Avoid allowing oil and/or water from entering the unit. It may cause damage to the vehicle.

- To avoid possible malfunction and damage to the engine, install the unit away from excessive heat or water/moisture.
- Make sure all connections and wiring are not disconnected, short circuited, or incorrect to avoid electrical shocks, burns or damage to the vehicle.
- If the product or the vehicle with the product does not perform properly, consult the dealer immediately.
- Do not try to repair the product by yourself.
- If any unusual noises, scents, and/or vibrations are noticed while driving, consult the dealer immediately.
- Glass is used on the front lens of this product. Do not push on it with excessive force or expose it to impacts to prevent breakage.

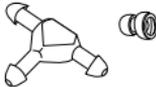
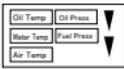
BASIC CHARACTERISTICS

- All measurements utilize international (SI) unit.
- Uses a newly developed translucent lighting type as lighting system.
- 2 types of the panel/scale meters light up: White Panel/Black Scale & Black Panel/White Scale
 - When the meter is on, the panel of White Panel/Black Scale meter lights up blue, and the scale of Black Panel/White Scale lights up blue.
- Marking sticker is included.
- Glass is used on the front lens of this product.

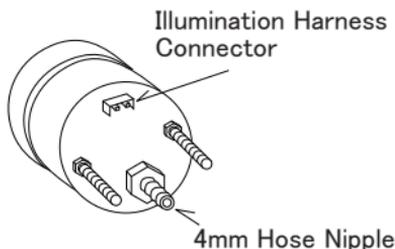
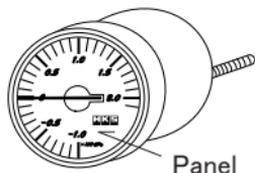
PARTS LIST / INSTALLATION

<BOOST METER>

— PARTS LIST —

	 <p>(installed onto the meter.)</p>	<p>(The panel is preinstalled onto the meter.)</p> 
<p>1 Meter</p>	<p>2 Meter Bracket (1 pc) Lock Washer (2 pcs) Nut (2 pcs)</p>	<p>3 Meter Panel (1 pc) Flat Washer (2 pcs) Tapping Screw (2 pcs)</p>
<p>1 pc</p>	<p>1 set</p>	<p>1 set</p>
		
<p>4 Illumination Harness L=1000mm</p>	<p>5 4mm Hose L=2000mm</p>	<p>6 T-fitting (4-4-4mm with Orifice)</p>
<p>1 pc</p>	<p>1 pc</p>	<p>1 set</p>
 <p>(packed with the instruction manual.)</p>	 <p>(packed with the instruction manual.)</p>	 <p>(packed with the instruction manual.)</p>
<p>7 Marking Sticker</p>	<p>8 Splice Connector Red</p>	<p>9 Tie Wrap L=100mm</p>
<p>1 pc</p>	<p>1 pc</p>	<p>3 pcs</p>
		
<p>10 Instruction Manual</p>		
<p>1 set</p>		

METER COMPONENT NAMES



INSTALLATION

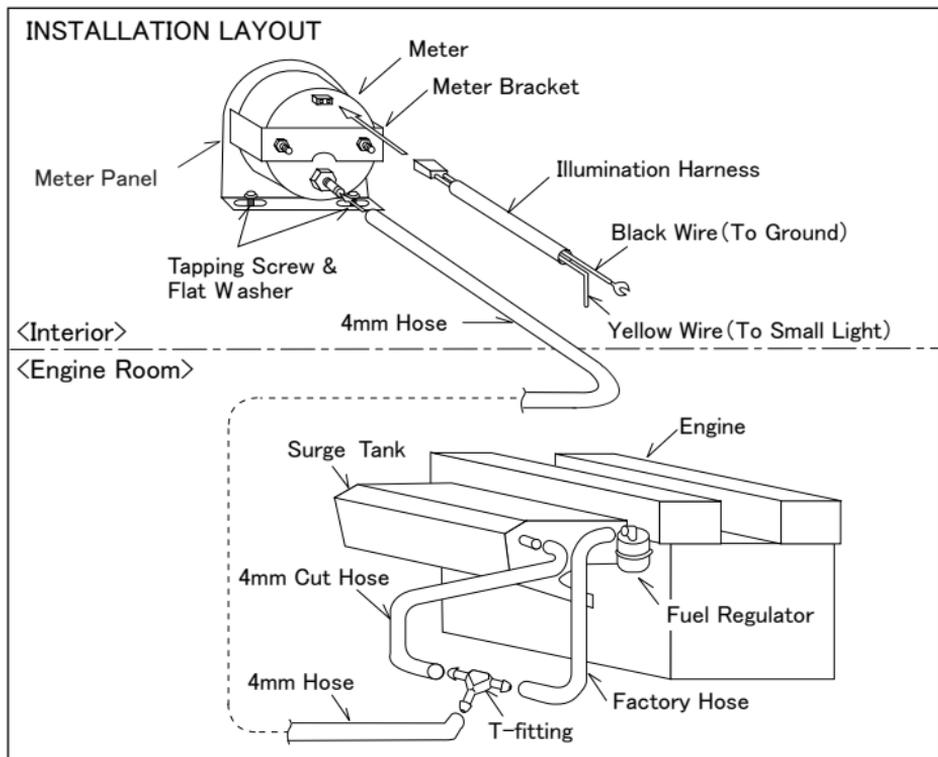
- This manual shows a typical installation. Actual installation may vary depending on the vehicle application.
- Refer to the factory manual when removing factory parts.

WARNING

- To avoid possible accidents, do not mount the unit where the illumination may become a distraction while driving, or if the unit falls from its mounted location. Install the product correctly. Incorrect installation and/or an inappropriate mounting position may cause damage to the vehicle or serious accident.
- Installation must be done in a well-ventilated area and away from inflammables to prevent possible explosion or a fire. Engine oil is highly inflammable; keep it away from the installation area.
- Route the 4mm hose without being twisted, bent, and/or come off to prevent possible damage to the vehicle or accidents.
- Install the hose away from excessive heat.

CAUTION

- Be careful when handling this product; avoid dropping or subjecting it to excessive impacts. It may bend the meter needle.
- Before installation, make sure engine room temperature is lower than 40°C. Failure to do so may result in a fire.
- Make sure all connections and wiring are correct as each part is installed.



1. Installation

- (1) Determine the installation layout considering components size and/or length.

NOTE

- Illumination Harness length: 1000mm, 4mm Hose length: 2000mm
- Leave an extra slack when connecting the 4mm hose and the illumination hose; so they do not pull the meter.

- (2) Disconnect the factory hose connected to the fuel regulator from the surge tank.
- (3) Connect the T-fitting to the end of the factory hose disconnected from the surge tank.
- (4) Cut the 4mm hose to 30 – 50mm.
- (5) Connect the cut 4mm hose between the T-fitting and the surge tank.
- (6) Route the remaining 4mm hose to the vehicle's interior.
- (7) Connect the remaining 4mm hose to the T-fitting.

NOTE

- Make sure the 4mm hose is not twisted and/or bent.

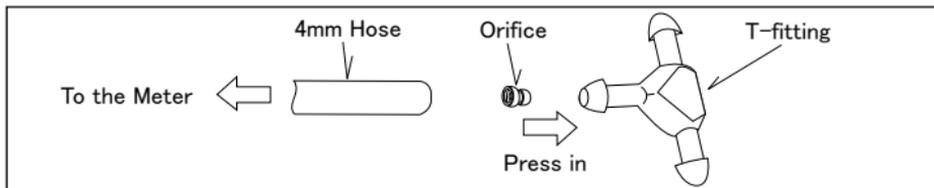
How to use the Orifice

If any of the following symptoms are noticed, use the Orifice to eliminate the symptom.

- The needle on the meter shakes and makes noise.
- While boost is rising, the needle shakes; so the indicated value is not clear.

Installation

1. Disconnect the 4mm hose between the T-fitting and the meter.
2. Press the orifice into the nipple of the T-fitting securely as shown in the illustration below.
3. Reconnect the 4mm hose to the T-fitting and the meter.



NOTE

It is not necessary to use the orifice if any of symptoms are not noticed.

2. Wiring

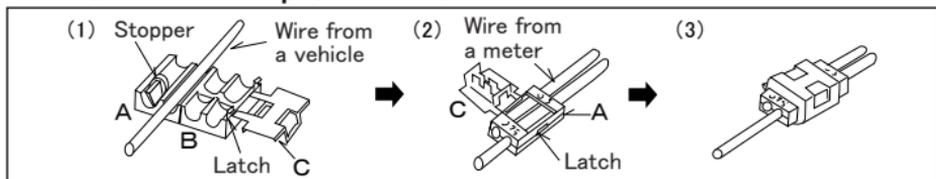
⚠ WARNING

- Make sure to disconnect the cable from the negative terminal of the battery to avoid possible damage to other electronics parts and/or a fire caused by a short circuit. Please note that when disconnecting the cable, the ECU's learning may be initialized, the audio's memory may be deleted, etc.
- Make sure to hold connectors when disconnecting them to avoid possible damage to other electronics parts and/or a fire caused by disconnection or a short circuit.
- Make sure all connections and wiring are not disconnected, short circuited, or incorrect. If so, it may cause an electric shock, burn out, or damage to the vehicle.

⚠ CAUTION

- When using the splice connector, do not strip the wire cover. It may cause bad connection and damage to the vehicle.
- Connect the ground wire to a good chassis ground. Failure to do so may cause bad connection to damage the vehicle.

2.1 How to use the Splice Connector



- (1) Place the vehicle-side wire into side A (without stopper). Fold side B towards side A using pliers to ensure the snap is securely fastened.
- (2) Insert the wire from the meter until it reaches the stopper.
- (3) Fold side C towards side A using pliers to ensure the snap is securely fastened.
- (4) Gently pull on the wire to verify the splice connector is completely tight.

2.2 Wiring the Illumination Harness

※ A tester or electroscope is required.

- (1) Reconnect the negative battery cable to the battery.
- (2) Find a power source wire that receives 12 volts when the parking light switch is in the "ON" position and 0 volts when the switch is in the "OFF" position using a tester or electroscope.
- (3) Disconnect the negative battery cable from the battery.
- (4) Connect the yellow wire of the illumination harness to the wire found in (2) using a splice connector.
- (5) Connect the black wire to a good chassis ground.

NOTE

• Remove paint and/or rust from the metal part of the black wire.

3. Mounting the Meter

3.1 Using the Supplied Meter Panel

- (1) Install the meter panel using tapping screws to the meter mounting position.
- (2) Mount the meter unit to the meter panel using the meter bracket.
- (3) Connect the 4mm hose pulled into the vehicle's interior to the 4mm Hose Nipple.
- (4) Connect the illumination harness to the illumination harness connector on the back of the meter unit.

NOTE

• Do not press the connector too hard; it may cause damage to the meter connector.

- (5) Secure the 4mm hose and the illumination harness using tie wraps.

NOTE

• Leave extra slack to the hose and harness so they can absorb engine vibration.

2.2 Using a custom Meter Panel

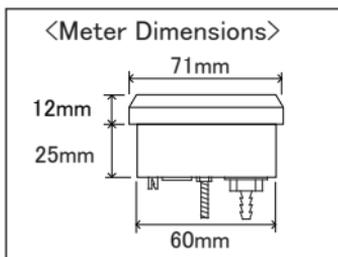
- (1) Prepare a panel to mount the meter.

Drill a 60mm to 61mm hole.

ADVICE

- Make sure the hole is the appropriate size.

- (2) Mount the meter unit to the panel using the meter bracket.
(3) Follow procedures 3.1 (3) to (5).



4. After Installation

- (1) Reconnect the negative battery cable to the battery.
(2) Attach the marking sticker on the lens of the meter. Use the provided index (▼) to mark a division in the scale.

Confirm After Installation

When installation process is completed, check the following:

- (1) Check the following before starting the engine:

Check item	Check
Make sure the 4mm hose is not twisted or bent.	
Make sure the 4mm hose is routed and connected correctly.	
Make sure the 4mm hose has sufficient slack.	
Make sure all installed components do not come in contact with any other parts.	
Make sure the illumination harness and the 4mm hose are properly secured.	
Make sure the negative cable terminal is securely attached to the battery.	

- (2) Start the engine and check the following:

- Do not raise the engine RPM right after the engine is started. (Let it idle.)

Check item	Check
Make sure air is not leaking.	
Make sure air is not leaking after revving the engine 2-3 times while in neutral.	
Make sure the installed parts do not come in contact with any other parts.	
Make sure there is no excessive stress on the illumination harness and the 4mm hose.	
Make sure there are no loose parts after turning off the engine.	

<TEMPERATURE METER>

PARTS LIST

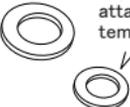
 <p>(The temp sensor is preinstalled.)</p>	
1	Meter
1 pc	

 <p>(installed onto the meter.)</p>	
2	Meter Bracket (1 pc) Spring Washer (2 pcs) Nut (2 pcs)
1 set	

 <p>(The panel is preinstalled onto the meter.)</p>	
3	Meter Panel (1 pc) Flat Washer (2 pcs) Tapping Screw (2 pcs)
1 set	

	
4	Illumination Harness L=1000mm
1 pc	

 <p>(attached to the temp sensor.)</p>	
5	Fitting M12 x P1.25
1 pc	

 <p>(Copper Washer S attached to the temp sensor.)</p>	
6	Copper Washer L (I.D. 12mm) Copper Washer S (I.D. 8mm)
1pc/ea.	

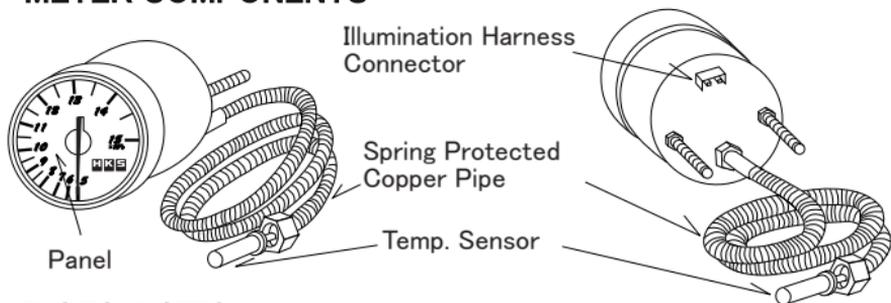
 <p>(packed with the instruction manual.)</p>	
7	Marking Sticker
1 pc	

 <p>(packed with the instruction manual.)</p>	
8	Splice Connector Red
1 pc	

 <p>(packed with the instruction manual.)</p>	
9	Tie Wrap L=100mm
3 pcs	

	
10	Instruction Manual
1 set	

METER COMPONENTS



INSTALLATION

- This manual shows a typical installation. Actual installation may vary depending on the vehicle application.
- Refer to the factory manual when removing factory parts.

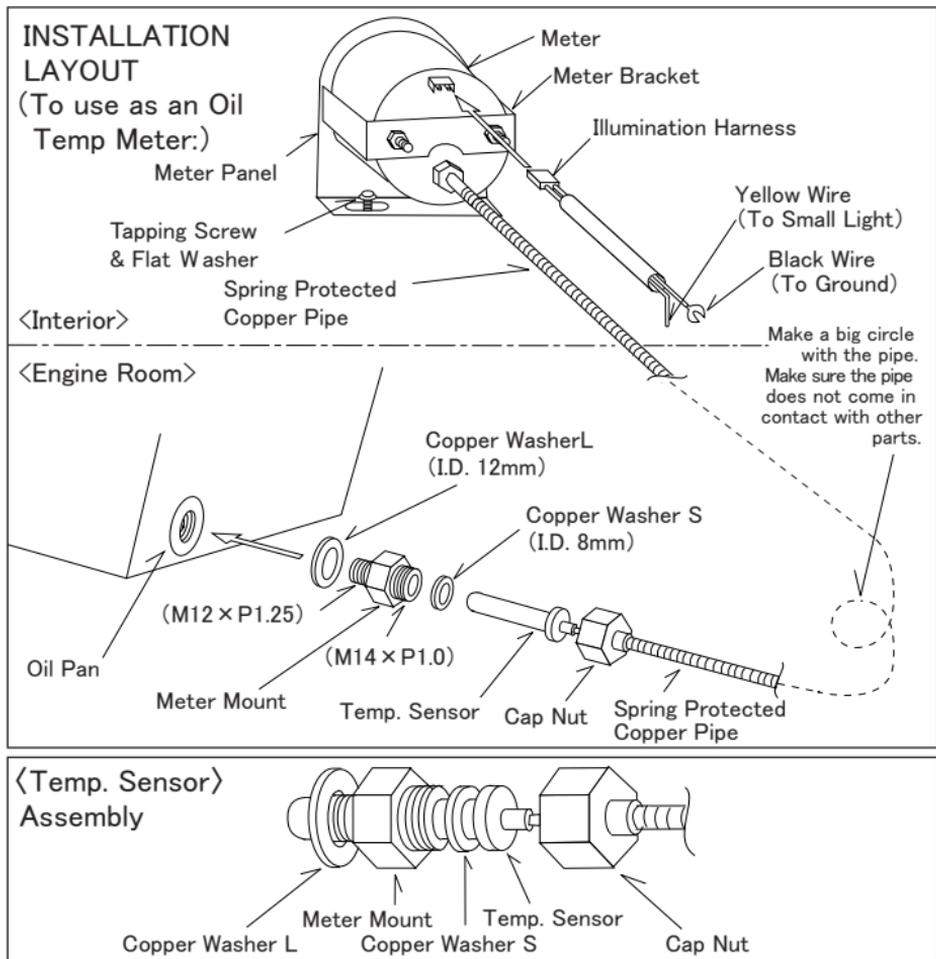
WARNING

- To avoid possible accidents, do not mount the unit where it may distract from normal driving. Install the product correctly. Incorrect installation and/or inappropriate mounting position may cause damage to the vehicle or serious accidents.
- Secure the copper pipe with extra slack to absorb engine vibration. Circularizing the copper pipe between the engine and vehicle can restrain vibration, shock, and/or tension. If the pipe is damaged, liquid may leak from the pipe and cause a fire.
- Clean the meter mount before connecting to ensure a proper connection ; improper connection can lead to oil leaks and/or fires.
- When using this meter as an oil temperature meter, insert the copper washer between the meter mount and the engine to prevent oil leaks that may cause damage to the engine.
- When using this meter as a water temperature meter, apply the liquid gasket to the thread of the meter mount connected to the engine to prevent coolant leaks that may cause damage to the engine.
- Route the copper pipe away from high temperature areas. The liquid inside the pipe may become too hot and cause a fire and/or an explosion.

- After installation, make sure air and/or fuel is not leaking, or the hoses are not degraded to prevent possible fire and/or explosion.
- Installation must be done in a well-ventilated area and away from inflammables to prevent possible explosion or a fire. Engine oil is highly inflammable; keep it away from the installation area.

 **CAUTION**

- The meter is assembled with the temperature sensor and the copper pipe. Do not disassemble them before installation. When installing the meter, route the temperature sensor with the copper pipe from the vehicle's interior to the engine room.
- Handle the temperature sensor and the copper pipe with extra care since they cannot be repaired.
- The liquid inside the temperature sensor is highly evaporative. To prevent inhalation of the evaporated gas:
 - Handle the copper hose with extra care. Before installation, unroll the pipe very carefully to prevent damaging the pipe.
 - When connecting or disconnecting the temperature sensor (for oil changes), Do not connect or disconnect the sensor and the meter mount at the same time to prevent damage to the copper pipe.
- Before installation, make sure engine room temperature has cooled to lower than 40°C. Failure to do so may cause severe burns or a fire.
- Make sure the copper pipe is not twisted or warped when routing it.



1. Installation

1.1 Oil Temperature Meter

- (1) Choose a mounting location where the illumination harness or the copper pipe can reach.

NOTE

- Illumination Harness is 1000mm long, and the Copper Pipe is 2500mm long.

- (2) Route the temperature sensor and the copper pipe through the meter panel. (If a meter stand is used, skip this procedure.)

NOTE

- Unroll the copper pipe with extra care to prevent damage to the pipe.

- (3) Pull the temperature sensor and the copper pipe into the engine room from the interior.

NOTE

- The copper pipe's bending radius must be greater than 30mm when routing the pipe.

- (4) Remove the factory drain bolt and the copper washer from the oil pan.

NOTE

- Place a drainage container underneath to catch engine oil.
- Keep the removed drain bolt and washer.

- (5) Install the provided copper washer L and sensor mount to the oil pan.

- (6) Install the temperature sensor and the copper washer S to the sensor mount; then, install the cap nut to the sensor mount.

NOTE

- To prevent the pipe and/or sensor from being twisted and cut, hold the meter mount with a wrench.

1.2 Water Temperature Meter

For easier installation, use the HKS Water Temp. Sensor Adapter:

(Not available for some vehicles.)

- (1) Choose a mounting location where the illumination harness or the copper pipe can reach.

NOTE

Illumination Harness is 1000mm long, and the Copper Pipe is 2500mm long.

- (2) Choose a mounting location for the sensor mount.

- (3) Route the temperature sensor and the copper pipe through the meter panel. (If a meter stand is used, skip this procedure.)

NOTE

- Unroll the copper pipe with extra care to prevent damage to the pipe.

- (4) Pull the temperature sensor and the copper pipe into the engine room from the interior.

NOTE

- The copper pipe's bending radius must be greater than 30mm when routing the pipe.

- (5) Install the provided sensor mount to the location chosen in (2).

NOTE

- When installing the sensor mount, prepare a container to catch coolant.
- Apply the liquid gasket to the sensor mount.

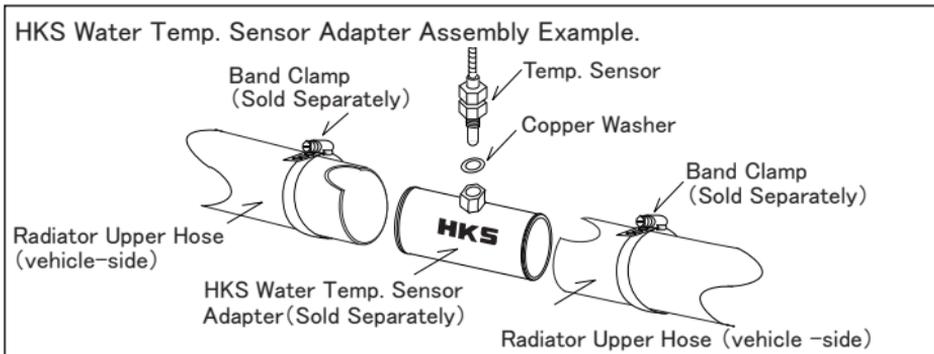
- (6) Install the provided copper washer S and the temperature sensor to the sensor mount; then install the cap nut to the sensor mount.

NOTE

- To prevent the pipe and/or sensor from being twisted and cut, hold the meter mount with a wrench.

- (7) Bleed the air out.

HKS Water Temp. Sensor Adapter



NOTE

- For actual installation, refer to the HKS Water Temp. Sensor Adapter instruction manual.
- Since the adapter is connected to the radiator upper hose, the meter can only indicate the radiator temperature while the thermostat is open and the coolant is circulating through the radiator from the engine.

2. Wiring

See "2. Wiring" on page 8.

3. Mounting Meter

3.1. Using the Supplied Meter Panel

- (1) Install the meter panel using tapping screws to the mounting position.
- (2) Mount the meter unit to the panel using the meter bracket.
- (3) Connect the illumination harness to the illumination harness connector on the back of the meter unit.

NOTE

- Do not press on the connector too hard to prevent damaging it.
- (4) Secure the copper hose and the illumination harness using tie wraps.

NOTE

- Leave extra slack on the hose and harness so they can absorb engine vibration.

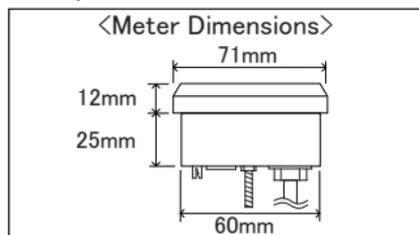
3.2 Using a custom Meter Panel

- (1) Prepare a panel to mount the meter. Drill a 60mm– 61mm hole.

NOTE

- Make sure the hole is the appropriate size.
- (2) Mount the meter unit to the panel using the meter bracket.

- (3) Follow procedures 3.1 (3) to (4).



4. After Installation

- (1) Reconnect the negative battery cable to the battery.
- (2) Make sure the engine oil and coolant are filled to appropriate levels.
 - Do not reuse any old engine oil and coolant.
- (3) Attach the marking sticker on the lens of the meter.
 - Oil Temp. Meter.....Attach "Oil Temp" sticker.
 - Water Temp. Meter.....Attach "Water Temp" sticker.
 - Intake Air Temp.....Attach "Air Temp" sticker.

NOTE

- Use the provided index (▼) to mark a division in the scale.

— Confirm After Installation —

When installation process is completed, check the following:

- (1) Check the following before starting the engine:

Check item	Check
Make sure the copper pipe is not twisted or bent.	
Make sure the sensor mount is not loose.	
Make sure all installed components do not come in contact with any other parts.	
Make sure the illumination harness and the copper pipe are properly secured.	
Make sure the engine oil and coolant are filled to the designated volume.	
Make sure the negative cable terminal is securely attached to the battery.	

- (2) Start the engine and check the following:

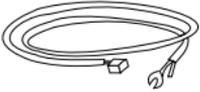
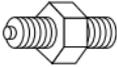
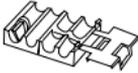
NOTE

- Do not raise the engine RPM right after the engine is started. (Let it idle.)

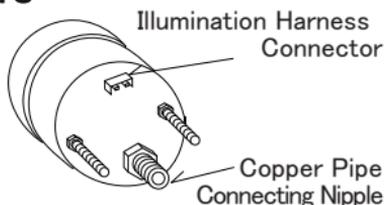
Check item	Check
Make sure oil and/or coolant are not leaking.	
Make sure oil and/or coolant are not leaking after revving the engine 2-3 times while in neutral.	
Make sure the installed parts do not come in contact with any other parts.	
Make sure there are no loose parts after turning off the engine.	

〈PRESSURE METER〉

PARTS LIST

	 <p>(installed onto the meter.)</p>	 <p>(The panel is preinstalled onto the meter.)</p>
<p>1 Meter</p> <p>1 pc</p>	<p>2 Meter Bracket (1 pc) Lock Washer (2 pcs) Nut (1 pcs)</p> <p>1 set</p>	<p>3 Meter Panel (1 pc) Flat Washer (2 pcs) Tapping Screw (2 pcs)</p> <p>1 set</p>
		 <p>(preinstalled onto the copper pipe)</p>
<p>4 Illumination Harness L=1000mm</p> <p>1 pc</p>	<p>5 Copper Pipe L=2500mm</p> <p>1 pc</p>	<p>6 Rubber O-ring</p> <p>1 pc</p>
 <p>(attached to the copper pipe.)</p>	 <p>(attached to the fitting.)</p>	 <p>(packed with the instruction manual.)</p>
<p>7 Fitting PT1/8</p> <p>1 pc</p>	<p>8 T-fitting PT1/8 (Female) × 2 PT1/8 (Male) × 1</p> <p>1 pc</p>	<p>9 Marking Sticker</p> <p>1 pc</p>
 <p>(packed with the instruction manual.)</p>	 <p>(packed with the instruction manual.)</p>	
<p>10 Splice Connector Red</p> <p>1 pc</p>	<p>11 Tie Wrap L=100mm</p> <p>3 pcs</p>	<p>12 Instruction Manual</p> <p>1 set</p>

— NAME OF METER'S COMPONENTS —



— INSTALLATION —

- This manual shows a typical installation. Actual installation may vary depending on the vehicle application.
- Refer to the factory manual when removing factory parts.

WARNING

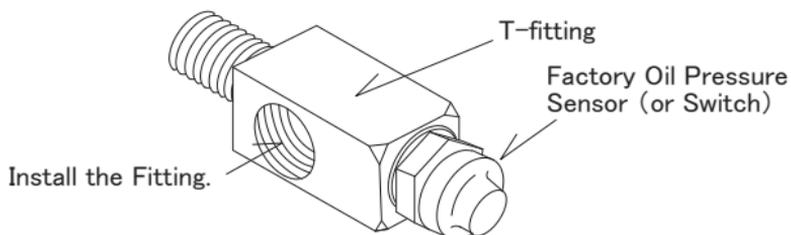
- To avoid possible accidents, do not mount the unit where it may distract from normal driving. Install the product correctly. Incorrect installation and/or inappropriate mounting position may cause damage to the vehicle or serious accidents.
- Secure the copper pipe with extra slack to absorb engine vibration. Circularizing the copper pipe between the engine and vehicle can restrain vibration, shock, and/or tension. If the pipe is damaged, liquid may leak from the pipe and cause a fire.
- Clean the meter mount before connecting to ensure a proper connection; improper connection can lead to oil leaks and/or fires.
- Do not apply sealant to the copper pipe connecting nipple. Doing so will cause a weak seal which can cause an oil leak leading to possible explosion and/or a fire.
- Hose bands must be tightened with the appropriate amount of tightening torque to prevent oil leaks that may cause a fire and/or explosion.
- If the copper pipe is damaged, the oil inside the pipe may leak and cause a fire and/or explosion. Therefore, when handling the pipe:

- Handle the copper hose with extra care. Before installation, unroll the pipe very carefully to prevent damaging the pipe.
- When connecting or disconnecting the pipe, make sure the pipe is not twisted or warped.
- Route the copper pipe away from high temperature areas. The liquid inside the pipe may become heated and cause a fire and/or explosion.
- Installation must be done in a well-ventilated area and away from flammables to prevent possible explosion or a fire. Oils are highly flammable ; keep away from the installation area.
- Do not install this meter onto a diesel engine vehicle or a vehicle with a direct ignition system where fuel pressure is high ($6 \times 100\text{kPa}$ or more). Fuel may leak and cause a fire or explosion.
- When the meter is used as an oil pressure meter, oil must travel close to the meter unit for measurement. Make certain oil is not leaking. If any unusual scents are noticed, stop using the meter and consult a professional installer immediately.
- Installation must be done in a well-ventilated area and away from flammables to prevent possible explosion or a fire. Engine oil is highly flammable; keep away from the installation area.

CAUTION

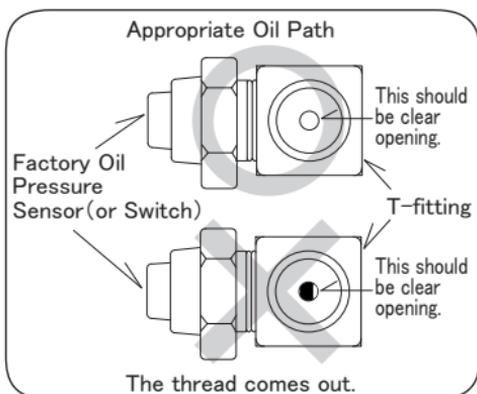
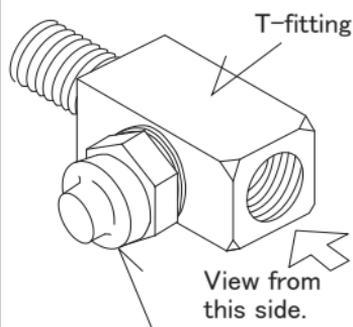
- Before installation, make sure engine room temperature has cooled to lower than 40°C . Failure to do so may cause severe burns or a fire.
- When installing the factory oil pressure sensor (or switch) using the provided T-fitting, refer to "Recommended Installation" on the next page to keep the proper oil path.
If "Alternative Installation" is chosen, make sure the path for oil is properly kept. Also, do not over-tighten the fitting and the factory oil pressure sensor (or switch) to the T-fitting.
- If the proper path for oil is not kept, the oil pressure may be measured accurately, the engine may not start, or the meter may become damaged, etc.

<Recommended Installation>



For accurate oil pressure sensor measurements, installation should be done correctly as shown above.

<Alternative Installation>



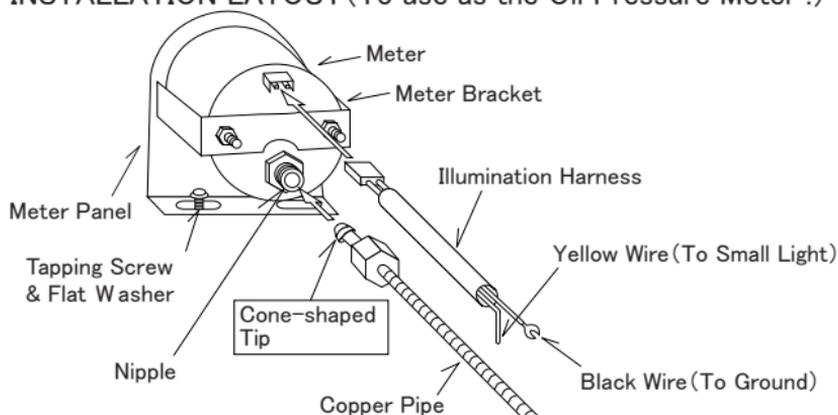
Factory Oil Pressure Sensor (or Switch)

If the "Recommended Installation" method is not possible, install the T-fitting as shown in "Alternative Installation." Make sure the path for oil is kept properly.

NOTE

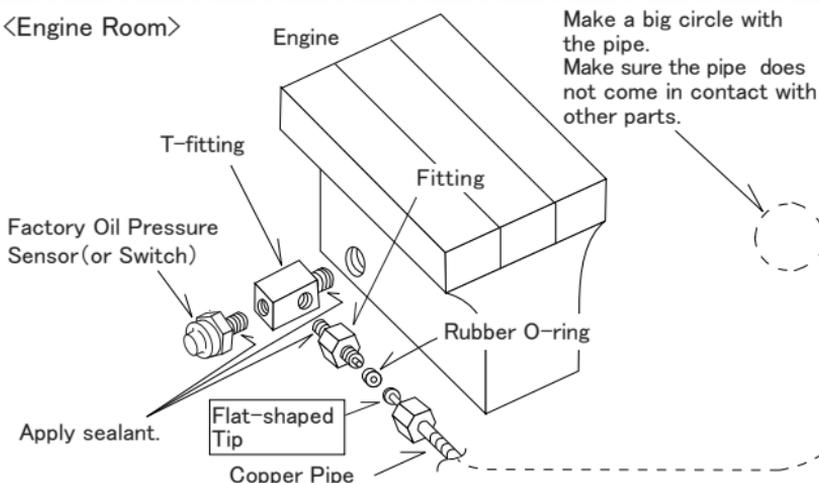
- Do not over-tighten the fitting and the factory oil pressure sensor (or switch).
- Choose "Alternative installation" when the oil path cannot be kept properly after installing the factory oil pressure sensor (or switch).

INSTALLATION LAYOUT (To use as the Oil Pressure Meter :)

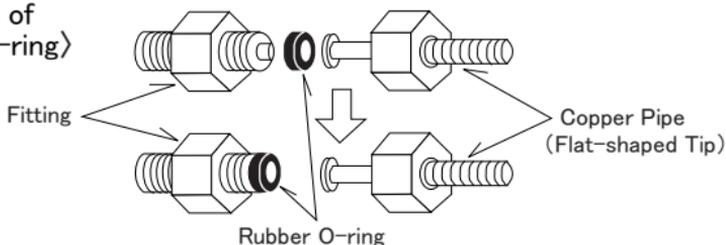


<Interior>

<Engine Room>



<Installation of Rubber O-ring>



Make sure the rubber o-ring surface is pressed equally.

1. Installation

Oil Pressure Meter

- (1) Choose a mounting location where the illumination harness or the copper pipe can reach.

NOTE

- Illumination Harness is 1000mm long, and the Copper Pipe is 2500mm long.

- (2) Remove the factory oil pressure sensor (or switch).

NOTE

- Oil may leak when removing the sensor; prepare a container to catch oil.

- (3) Install the T-fitting where the factory oil pressure sensor was removed.

NOTE

- Apply oil resistant sealant to threads as shown in the installation layout.

- (4) Reconnect the removed factory oil pressure sensor (or switch) to the T-fitting. Make sure to reconnect the sensor (or switch) to the location indicated in the installation layout.

NOTE

- When reconnecting the sensor (or switch), hold the T-fitting with a wrench.
- Apply the oil resistant sealant to the connecting threads.

- (5) Install the fitting to the T-fitting.

NOTE

- When reconnecting the sensor (or switch), hold the T-fitting with a wrench.
- Apply the oil resistant sealant to the connecting threads.

- (6) Route the copper pipe through the engine to the interior.

NOTE

- Unroll the copper pipe with extra care to prevent damage to the pipe.
- The copper pipe's bending radius must be more than 30mm when routing the pipe.

- (7) Install the rubber O-ring to the fitting installed in (5).

NOTE

- Refer to "Installation of Rubber O-ring" for installation.

- (8) Connect the flat-shaped tip of the copper pipe to the Fitting.

NOTE

- When connecting the tip to the Fitting, hold the Fitting with a wrench.
- Make sure the rubber o-ring surface is pressed equally.
- Make sure the copper pipe is not twisted or warped.

2. Wiring

See "2. Wiring" on page 8.

3. Mounting Meter

3.1. Using the Supplied Meter Panel

- (1) Install the meter panel using tapping screws to the meter mounting position.
- (2) Mount the meter unit to the panel using the meter bracket.
- (3) Connect the cone-shaped tip of the copper pipe in the vehicle interior to the nipple on the back of the meter unit while holding the nipple with a wrench.

NOTE

- Clean the nipple and tip before connecting. Failure to do so may lead to a weak connection.

- (4) Connect the illumination harness to the illumination harness connector on the back of the meter unit.

NOTE

- Do not press on the connector too hard; it may cause damage to the meter connector.

- (5) Secure the copper hose and the illumination harness using tie wraps.

NOTE

- Leave extra slack to the hose and harness so they can absorb the engine vibration.

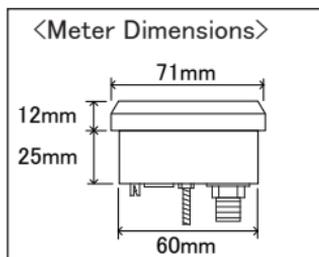
3.2 Using a custom Meter Panel

- (1) Prepare a panel to mount the meter.
Drill a 60mm– 61mm hole.

NOTE

- Make sure the hole is the appropriate size.

- (2) Mount the meter unit to the panel using the meter bracket.
- (3) Follow the procedure 3.1 (3) to (5).



4. After Installation

- (1) Reconnect the negative battery cable to the battery.
- (2) Make sure the engine oil is filled to the appropriate level.
Refill oil if necessary.
 - Do not reuse any old engine oil and coolant.
- (3) Attach the marking sticker on the lens of the meter.
Oil Press. Meter Attach "Oil Press" sticker.

NOTE

- Use the provided index(▼) to mark a division in the scale.

— Confirm After Installation —

When installation process is completed, check the following:

(1) Check the following before starting the engine:

Check item	Check
Make sure the copper pipe is not twisted or bent.	
Make sure the copper pipe is routed correctly.	
Make sure the copper pipe and the fitting are not loose.	
Make sure all installed components do not come in contact with any other parts.	
Make sure the illumination harness and the copper pipe are properly secured.	
Make sure the engine oil and coolant are filled to the designated volume.	
Make sure the negative cable terminal is securely attached to the battery.	

(2) Start the engine and check the following:

NOTE

- Do not raise the engine RPM right after the engine is started.
(Let it idle.)

Check item	Check
Make sure oil is not leaking.	
Make sure oil is not leaking after revving the engine 2-3 times while in neutral.	
Make sure the installed parts do not come in contact with any other parts.	
Make sure there are no loose parts after turning off the engine.	

OPTION PARTS LIST

The following optional parts are available separately. Contact your dealer for purchasing.

<For All Meters>

No.	Part Number	Description	Remarks
1	44999-AK012	Illumination Harness for Mechanical Meters	2 pcs / L=1000mm
2	5404-SA006	52mm Meter Stand	Double-sided Tape
3	5404-SA004	60mm Meter Stand	Double-sided Tape

<Temperature Meter>

Water Temp Sensor Mounting Pipe

No.	Part Number	Description	Remarks
1	4499-SA035	For 32mm Hose	Straight Type
2	4499-SA032	For 34mm Hose	Straight Type
3	4499-SA040	For 34mm Hose Bent type	Bent Type
4	4499-SA033	For 38mm Hose	Straight Type

Mechanical Temp Meter Fitting

No.	Part Number	Description	Dia. × Pitch	Length	Remarks
1	4499-SA041	UMFT-1	M12 × P1.25	10	Copper Washer included
2	4499-SA042	UMFT-2	M14 × P1.50	12	Copper Washer included
3	4499-SA043	UMFT-3	M18 × P1.50	12	Copper Washer included
4	4499-SA044	UMFT-4	M16 × P1.50	12	Copper Washer included
5	4499-SA045	UMFT-5	M20 × P1.50	14	Copper Washer included

<Pressure Meter>

No.	Part Number	Description	Remarks
1	4499-SA022	Copper Pipe for Mechanical Meter (2.5m)	Copper Pipe, T-fitting, Fitting, Rubber O-ring, 1 pc/ea.

MAINTENANCE

CAUTION

- Daily maintenance of the vehicle is the responsibility of the owner/user.
- Consult an expert to carry out the operations not shown in this manual.
- Clean your hands and remove dirt and oil before handling this product. It may cause discoloration to the case.

• When cleaning this product, do not use solvents such as: alcohol, thinner, benzene, glass cleaner, and oil. Wipe off dirt with a dry soft cloth.

1. When changing the engine oil of the vehicle with Oil Temp. Meter:

(1) Remove the cap nut; then, remove the temperature sensor with the copper washer S from the fitting.

NOTE

- Hold the fitting with a wrench when removing the cap nut, the sensor, and the copper washer S.
- When removing the fitting, place a container to catch oil.

(2) Remove the fitting with the copper washer L from the oil pan.

(3) Empty the engine oil tank; then, install the new copper washer L and the fitting to the oil pan.

- (4) Install the temperature sensor and the copper washer S; then, install the cap nut and the fitting.

NOTE

- Hold the fitting with a wrench when installing the cap nut, the sensor, and the copper washer S.

- (5) Pour new engine oil in to the tank.

TROUBLESHOOTING

If this product is not performing properly; check all wiring and connections, referring to the following before contacting your dealer.

〈Boost Meter〉

Symptom	Cause	Countermeasure
The indicated value is too low when boost is rising.	Air is leaking. The sensor cannot measure the pressure.	Press the hose in properly. Make sure the hose is not torn. Make sure the hose is not twisted or warped.
The meter needle shakes and makes noise at idle. The needle shakes when boost is rising.	The pressure pulsation is too large.	Insert an Orifice. Refer to "How to use the Orifice" on page 8.
Meter does not illuminate.	The illumination harness is not connected properly. The connector is not connected properly.	Tighten the splice connector properly. Connect the connectors properly. Remove any paint and/or rust from the chassis ground.

〈Temperature Meter〉

Symptom	Cause	Countermeasure
The indicated value is too low.	The sensor cannot measure the temperature.	Make sure the copper pipe is not twisted and/or warped. Make sure the hose is not damaged. Make sure the installed location is appropriate.
Meter does not illuminate.	The illumination harness is not connected properly. The connector is not connected properly.	Tighten the splice connector properly. Connect the connectors properly. Remove any paint and/or rust from the chassis ground.

<Pressure Meter>

Symptom	Cause	Countermeasure
The indicated value is too low.	Air is leaking The sensor can not measure the pressure.	Make sure the copper pipe is not twisted and/or warped. Make sure the hose is not damaged. Make sure the installed location is appropriate.
Meter does not illuminate.	The illumination harness is not connected properly. The connector is not connected properly.	Tighten the splice connector properly. Connect the connectors properly. Remove any paint and/or rust from the chassis ground.

WHEN UNUSUAL CONDITIONS ARE NOTICED

WARNING

- Do not use this product if unusual occurrences occur. Consult with your dealer immediately.
Failure to do so may cause fire and/or an electric shock.

CAUTION

- Do not try to repair the product yourself. Consult with your Authorized HKS Dealer.
- If any unusual noises, scents, and/or vibrations are noticed while driving, please refer to a factory repair manual.

REPAIR SERVICE

- For questions about this product, any optional, lost, defective and/or damaged parts, please contact your dealer.

FOR SUBSEQUENT OWNERS

If this product is passed on to a new owner, make sure this instruction manual is included along with the product. Do not uninstall this product by yourself.

CAUTION

- If this product is removed, make sure all wires from the vehicle are insulated with electrical tape to prevent a possible short.

PRODUCT SPECIFICATIONS

- Operating Voltage ····DC11~16V
- Maximum Electrical Power Consumption ····2.0W
- Measuring Range ····Boost Meter: $-1.0 \sim 2.1 \times 100\text{kPa}$
($-750\text{mmHg} \sim 2.1\text{kgf/cm}^2$)
Temperature Meter: $50 \sim 150^\circ\text{C}$
Pressure Meter: $0 \sim 10 \times 100\text{kPa}$ ($0 \sim 10\text{kgf/cm}^2$)

REVISION OF INSTRUCTION MANUAL

Ver.	Date	Details
3-1.01	Jan., 2002	1st Edition
3-1.02	May, 2002	Illumination harness's length changed.
3-1.03	Jan., 2009	52mm Meter discontinued.

Note.



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