

AR-7240B

ANALOG ENGINE TACHOMETER

INSTRUCTION MANUAL

Warranty

1. This product is covered by a warranty for a period of one year from the date of purchase.
 2. This warranty covers free-of-charge repair for defects judged to be the responsibility of the manufacturer, i.e., defects occurred while the product is used under normal operating conditions according to descriptions in this manual and notices on the unit label.
 3. For free-of-charge repair, contact either your sales representative or our sales office nearby.
 4. The following failures will be handled on a fee basis even during the warranty period.
 - (a) Failures occurring through misuse, mis-operation, or modification
 - (b) Failures occurring through mishandling (dropping) or transportation
 - (c) Failures occurring through natural calamities (fires, earthquakes, flooding, and lightning), environmental disruption, or abnormal voltage.
- * For repairs after the warranty period expired, contact your sales representative or our sales office nearby.

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2. The contents of this document are subject to change without notice.
3. This document has been produced based on a series of strict verifications and inspections. Should a failure occur nonetheless, please inform our sales representative or sales office.
4. Ono Sokki shall have no liability for any effect resulting from any operation, whether or not the effect is attributable to a defect in the documentation.

FOREWORD

Thanks for using the AR-7240B analog engine tachometer.

This manual describes the functions and specifications of the AR-7240B analog engine tachometer as well as connection procedure and notes on use for the product.

Before starting operation, please read this instruction manual to ensure proper use of the AR-7240B.

In particular, the manual contains some warnings and cautions which may cause property damages if not observed. Be sure to handle the product according to the handling procedures described in the manual.

PRODUCT OVERVIEW

The AR-7240B is an analog engine tachometer with a full scale that can be switched to either low or high speed range manually or automatically.

When revolutions of an engine are to be measured, the full scale of the tachometer can be switched to a range between 0 and 2000 r/min while the engine is at the idling speed, and to a range between 0 and 10000 r/min if engine enters into high speed load domain.

Using the following type of sensors made by our company, the measurements of an engine's revolution can be obtained.

The type that detects the spark signals with the method of clamping the primary side (low voltage) cable of a gasoline engine.

The type that detects the spark signal with the method of clamping the secondary side (high voltage) cable of a gasoline engine.

The type that attaches the magnet to the bolt part of a gasoline engine, or diesel engine to detect the vibration of the engine.

The type that detects the frequency signal in proportion to the revolution of the rotating shaft through a detection gear mounted on the engine's shaft.

The type that detects infrared radiation reflected from a reflection mark attached on the rotating shaft.

FEATURES

A wide variety of engine types can be handled easily; you only need to change a switch to select the most applicable sensor according to the engine under test.

The AR-7240B can be used with sensors to enable engine rpm measurement of 2/4-cycle engines having one to eight cylinders.

The number of input pulses per revolution can be set in a range from 0.5 to 199.5 pulses in 0.5 steps.

The AR-7240B provides analog and pulse output terminals as standard equipment.

The pulse output can be selected as 1 P/R, 60 P/R or as a wave-shaped output of the input signal.

Optional DC power supply, enables use of the AR-7240B on board.

The AR-7240B is equipped with upper and lower limit alarm output, enabling protection of the engine under test.

Notes:

1. Before shipment, the AR-7240B has been tested through severe inspections to verify normal operation.
2. When you unpack the unit, make sure that you have all the parts and that none have been damaged during transportation. Then check whether the AR-7240B operates normally.
3. If any parts is damaged or missing or the AR-7240B does not operate normally, please contact the retail store where you bought the product or your nearest Ono Sokki sales office.

FOR YOUR SAFETY

Please read this document and the product instruction manual to ensure safe and proper use of the AR-7240B. Store these documents in a safe place after reading them.

Ono Sokki Co., Ltd. bears no responsibility for nor makes any warranty regarding damages or injury resulting from failure to follow directions given within this document during operation.

Meaning of Symbols

Warnings and cautions

In this document precautions are classified into two categories: WARNING and CAUTION. This depends on the degree of danger or damage possible if the precaution is ignored and the product is used incorrectly.

 WARNING	This symbol is used to indicate precautions where there is a risk of death or serious personal injury to the operator if the product is handled incorrectly.
 CAUTION	This symbol is used to indicate precautions where there is a risk of some personal injury to the operator or only material damage to the product if the product is handled incorrectly.



WARNING

Before Using

Only use fuses with the specified rating as using incorrect fuses may cause fire. Also, turn the power and unplug the power cord for at least one minute before replacing fuses.

Avoid using the product on locations subject to high temperature as there may be a risk of fire. Avoid using the product on locations with extremely high temperature. Using the product on locations with a temperature exceeding the rated operating temperature range may cause fire.

Do not block the heat radiation system as there is a risk of fire if heat builds up inside the product. Place the product away from the wall on locations with the best ventilation possible.

Do not remove the casing or take apart this product. Using the product without its casing or while taken apart may cause damage to the product or electric shock. When internal adjustment, inspection, or repairs are required, contact the retail store where you bought the product or your nearest Ono Sokki sales office.

Do not splash or spill water on the product, as doing so may cause fire or electric shock due to short or increased heat. If water does happen to get inside the product, unplug the power cord immediately and call the retail store where you bought the product or your nearest Ono Sokki sales office as soon as possible.



WARNING

Precautions Regarding Electric Shock

Never cut the internal or external ground wire of the product or disconnect the wire connected to the protective ground terminal of the product, as doing so may cause electric shock or damage to the product.

Before connecting the product to a device to be measured or external circuit, check that the product is properly grounded and that the power is turned off. Connecting the product to external equipment while not grounded or while power is still on may cause electric shock.

Make sure that the power is turned off before touching the voltage/current output section or circuits connected to the voltage/current output section. Touching such parts while the power is on may cause electric shock. Be sure to sufficiently insulate circuits from output voltage/current.

Make sure that the power always meets specified voltage and frequency requirements. Using the power not meeting the requirements may cause electric shock, fire, or damage to the product.

If you hear thunder, do not touch any metallic parts of the product or the plug as there is a risk of electric shock from conducted lightning. Do not use this product outdoors if you hear thunder.

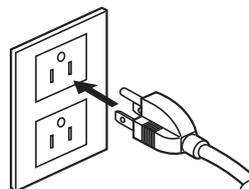


WARNING

About Protective Grounding

Be sure to ground the instrument for safety and noise elimination. The grounding method is shown below.

Grounding with a three-pronged power plug
Plug the supplied three-pronged AC power cord into a three-pronged outlet, securely grounded on the power supply side.





WARNING

About the Power Cord

Only use the power cord or AC adaptor supplied with the product or one specified by Ono Sokki. Use of power cords or AC adaptors other than the one specified may cause electric shock or fire.



WARNING

If a Problem Occurs

Unplug the product immediately if any metal, water, or foreign object should fall inside. Continued operation of the product with metal, water, or foreign object inside may cause fire or electric shock. After unplugging the unit immediately, contact the retail store where you bought the product or your nearest Ono Sokki sales office as soon as possible.

Unplug the product if you perceive smoke, strange noise, or strange smell coming from the product or if you accidentally drop it or damage it. Continued operation of the product may cause fire or electric shock. After immediately unplugging the product, contact the retail store where you bought the product or your nearest Ono Sokki sales office as soon as possible.



CAUTION

About Installation and Connections

Do not install the product on unstable locations. If the product should fall, injury or damage to the product may result.

Do not place large or heavy objects on top of the product. If an object on top of the product should fall, injury or damage to the product may result.

Do not install the product on locations where oily smoke, steam, or dust is present or where the humidity is high. Electricity could conduct through oil, water vapor, or dust resulting in fire or electric shock.

Do not install the product on locations subject to extremely high temperature or do not expose it to direct sunlight, as doing so may cause fire.



About the Power Cord

- œ Be sure to hold onto the plug portion when plugging or unplugging the power cord. Pulling on the cord may damage or break the cord possibly resulting in fire or electric shock.
- œ Do not plug or unplug the power cord with your hands wet.
- œ Keep the power cord away from heaters or other heat generating appliances, as the cord casing may melt resulting in fire or electric shock.
- œ To prevent electric shock due to inferior insulation or fire due to leakage current, when the product is not to be used for a long period of time, unplug the power cord or turn off the breaker of the distribution board.



Measurement

- œ Do not change the setting of the sensor switch, input pulse switch, or pulse signal output switch during measurement, as doing so may cause measurement error and abnormal signal to be output to external equipment.
- œ Do not disconnect any input or output connectors during measurement, as doing so may cause measurement error and abnormal signal to be output to external equipment.
- œ Do not turn off the power during measurement, as doing so may cause measurement error and abnormal signal to be output to external equipment.



CAUTION

Checking the Supplies

When you receive the unit, make sure that you have all the parts and that none have been damaged during transportation. If any parts is damaged or missing, contact the retail store where you bought the product or your nearest Ono Sokki sales office.

Name	Qty	Remarks
AC power cable	1	3P-3P 1.9 m
AC power fuse	1	0.5A midzet fuse
Instruction manual	1	(this manual)

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FOR YOUR SAFETY

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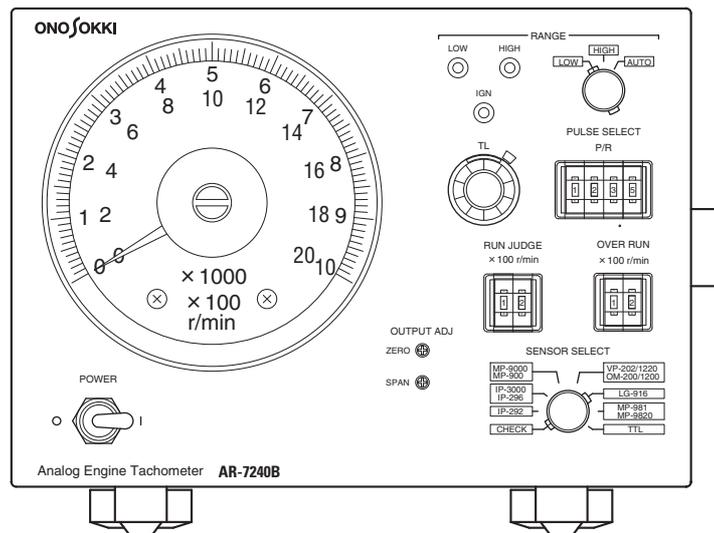
1. System Configuration

Applicable sensor

IP-292/296/3000	MP-900/9000 + MX-005, etc	VP-202/1220
OM-200/1200 + MX-005, etc	LG-916 + MX-805A, etc	MP-981 + MX-805A, etc
MP-9820 + MX-8105, etc	External sensor (TTL level)	



Measurement & Display (AR-7240B)

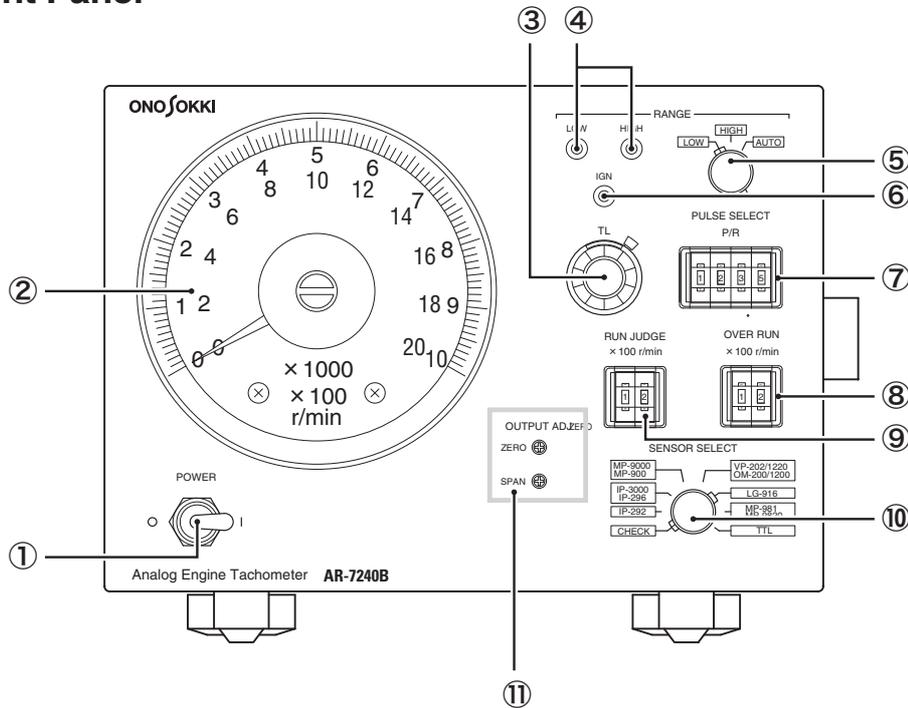


Output Signal

Analog Output (for Recorder)	Pulse output (for Data Recorder)	Alarm Output
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2. Name and Function of Each Section

2.1 Front Panel



POWER switch

This is a common power switch both for 100 to 240VAC and 12VDC (option).

Setting this switch to [I] side turns on the unit, and setting it to [O] side turns the unit off. When the unit is turned on, the indicator LED either HIGH or LOW will light.

The power supply selection switch for 100 to 240VAC or 12VDC is located on the rear panel.

Analog indicator section

This indicator shows the revolution of tested engine.

The indicator has a set of dual scales: the red scale is for the low-speed range and the black one is for the high-speed range.

TL volume(for input sensitivity adjustment)

Used to adjust the input sensitivity when the unit is connected with one of the following sensors, i.e. ignition pulse sensors IP-292/296/3000, engine revolution sensor VP-202/1220 and OM-200/1200 electromagnetic sensor.

The above sensors require different trigger levels to be set according to engine under test.

Having connected one of these sensors to the tachometer, adjust the TL volume, so that the IGN indicator will flash periodically while the engine is idling.

For sensors other than IP-292/296/3000, or VP-202/1220, and OM-200/1200, the trigger level is adjusted internally before shipment.

LOW / HIGH indicators

Indicate the selected full scale of the analog meter.

LOW/HIGH/AUTO select switch

This switch is used for the scale selection of the analog meter.

Each set position corresponds to the range of:LOW (0~2000r/min), HIGH (0~10000r/min), or AUTO (range is selected automatically).

IGN indicator

The meaning of this indicator differs according to the sensor used.

For the sensors like IP-292/296/3000, VP-202/1220, and OM-200/1200, it is used for an input level adjustment indicator. Input a signal from one of these sensors and adjust the input signal level by turning the TL volume, so that this indicator will light.

For other sensors, this indicator will flash when a signal is input.

PULSE SELECT switch

Used to set the pulse count for each revolution of the sensor. The correspondence of the sensor to the number of cylinders of the engine is shown in the table.

For pulse gears mounted on the engine shaft (1 to 199 P/R) or pulses coming from other measuring instruments (3 to 33000 P/s), set the PULSE SELECT switch to the pulse count show below.

Sensor	IP-292 / 3000 OM-200 / 1200		IP-296 / 3000		VP-202 / 1220		MP-900 / 9000 series MP-981 / 9820 (TTL)	LG-916
Number of cycles	2	4	2	4	2	4	2 / 4	2 / 4
1 cylinder	1.0	0.5	1.0	0.5	-	0.5	0.5 to 199.5	1.0
2 cylinders	2.0	1.0			-	1.0		
3 cylinders	3.0	1.5			-	1.5		
4 cylinders	4.0	2.0			4.0	2.0		
5 cylinders	-	2.5			-	2.5		
6 cylinders	-	3.0			-	3.0		
8 cylinders	-	4.0			-	4.0		

Note: • For 2-cycle, 5-cylinders and 4-cycle, 10-cylinders engines (pulse selector set to 5.0), measurement cannot be performed using the IP-292 ignition pulse sensor.

- With engines having dummy spark cycles, the relationship between the input pulse count and the number of cylinders will be different.
- The above number of cylinders may differ according to the type of the ignition system used by the engine. For details, contact the retail store where you bought the product or your nearest Ono Sokki sales office.

OVER RUN setter

An engine speed limit can be set in the range between 100 and 9900 r/min in 100 r/min steps. If 50 is being set with the thumb wheel switches, for example, a signal will be output from the ALARM terminal on the rear panel when the engine speed exceeds 5000 r/min.

RUN JUDGE setter

An engine speed limit can be set in the range between 100 and 9900 r/min in 100 r/min steps. If 10 is being set with the thumb wheel switches, for example, a signal will be output from the ALARM terminal on the rear panel when the engine speed exceeds 1000 r/min.

SENSOR SELECT switch

Used to select the type of sensor. Listed below are applicable sensors:

- IP-292 : For primary side ignition on gasoline engines
- IP-296 : For secondary side ignition on gasoline engines
- IP-3000 : Both for primary and secondary side ignition on gasoline engines
- MP-900/9000 series : Gasoline, diesel engines and other general rotating bodies
- VP-202/1220 : 4-cylinder diesel or gasoline engines
- OM-200/1200 : For gasoline engines
- LG-916 : Gasoline, diesel engines and other general rotating bodies
- MP-981/9820 : Gasoline, diesel engines and other general rotating bodies
- TTL : For TTL level signal input from an external sensor
- CHECK : For checking the internal analog and digital circuit. It is also used together with PULSE SELECT switch 7. At that time, the analog indicator and output voltage to the input pulse count are as followings:

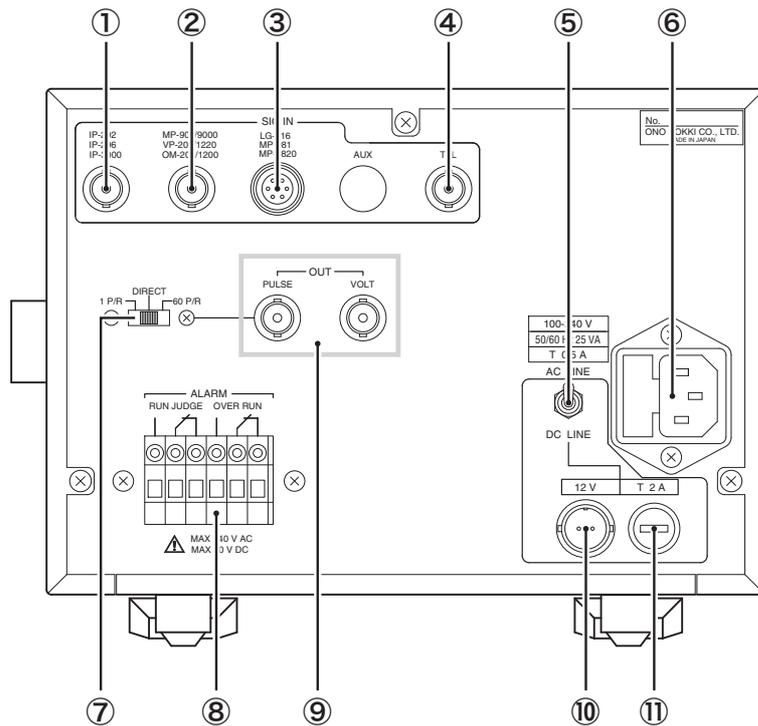
Input pluse count	Analog display	Output voltage (V)
0.5	10000	5.000
1.0	5000	2.500
1.5	3333	1.666
2.0	2500	1.250
2.5	2000	1.000
3.0	1666	0.833
4.0	1250	0.625
8.0	625	0.312

OUTPUT ADJ trimmer

Used to adjust ZERO and SPAN of r/min analog output. Adjustment range for ZERO is within $\pm 5\%$ of the full scale, and for SPAN is within $\pm 10\%$.

For more details, see Chapter 3. Measurement, setting, and adjustment Procedures.

2.2 Rear Panel



IP-292/296/3000 input connector

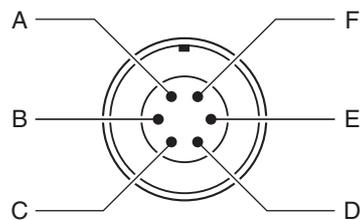
Used to input the signal from IP-292/296/3000 ignition pulse sensor, The applicable connector type is BNC.

MP- 900/9000, VP-202/1220, OM-200/1200 input connector

Used to input the signal from MP-900/9000, OM-200/1200 electromagnetic sensor and the VP-202/1220 galvanic electricity vibration sensor. The applicable connector type is BNC.

LG- 916, MP-981/9820 input connector

Used to input the signal from LG-916 photoelectric sensor and MP-981/9820 electromagnetic sensor. The applicable connector type is R03-PB6M. Refer to the illustration below.



Pin No.	Signal
A	Signal
B	Vacant
C	Power (+12V)
D	Shield
E	Common
F	Common

TTL signal input connector

Used to input TTL level signal. The applicable connector type is BNC.

AC LINE / DC LINE power source select switch (optional)

Used to select the unit power supplied from 100 to 240 VAC or 12 VDC.

AC power supply input connector / fuse(0.5A)

Used to supply 100 to 240 VAC (50/60 Hz) through the AC power cable. The midget fuse (0.5A) is in the AC power connector to protect the internal circuits. To prevent any electric shock, fire or the damage of the instrument, be sure to use the suitable fuse recommended by specification.

1P/R / DIRECT / 60P/R output select switch

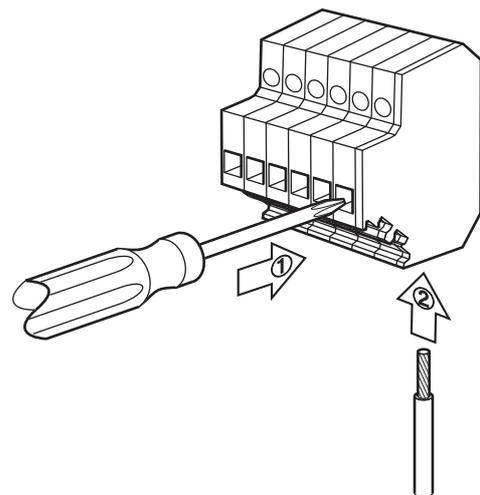
Used to switch the pulse type according to the usage and purpose. There are three types of pulse can be selected (1P/R, DIRECT, 60P/R). The pulse signal selected by this switch will be output from the pulse output connector p.

- 1P/R : Output a pulse signal whose frequency is multiplied by input signal first, then divided as one pulse per round. So, output signal is not synchronized with input signal. It will output 100P/s pulses per second, when the meter shows 6000 r/min.
- DIRECT : Output the shaped waveform of the input signal.
- 60P/R : Output a pulse signal whose frequency is multiplied by input signal. Thus the output signal is not synchronized with input signal. It will output 6000 pulses per second, for example, when the meter indicates 6000 r/min.

Contact signal output terminal

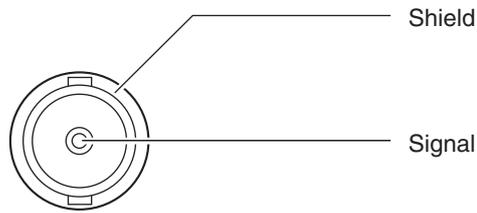
Used to output the contact signal for engine start and over run. Each has a transfer contact with resistance loads (240VAC/2A, 30VDC/2A). Refer to the following figure for connection.

Insert a screwdriver into the rectangular hole and loosen the screw in it. Put a lead wire from the bottom of the terminal block and then tighten the screw in the hole to fix the wire.

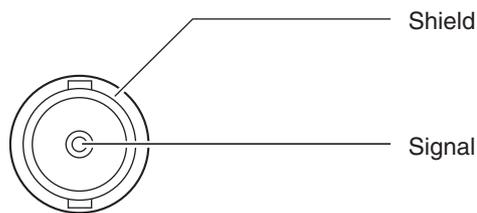


PULSE OUT/ANALOG OUT connectors

The pulse signal output connector (PULSE OUT) outputs the signal selected by the output select switch i, with TTL level (with fan out of 2). The applicable connector type is BNC. (See the pin assignment below.)



The analog signal connector (VOLT OUT) outputs voltage from 0 to 5 V corresponding 0 to 10000 r/min. The applicable connector type is BNC. (See the pin assignment below.) voltage output.



Note: • If modification is made, the VOLT OUT connector can output current from 0 to 10 mA (corresponding to 0 to 10000 r/min). In this case, however, note that it cannot be used for voltage output.

Exclusive Connector for 12 VDC power Supply (Optional)

12 VDC power can be supplied by a DC power cable, the applicable connector type is RM12BPG-2S.

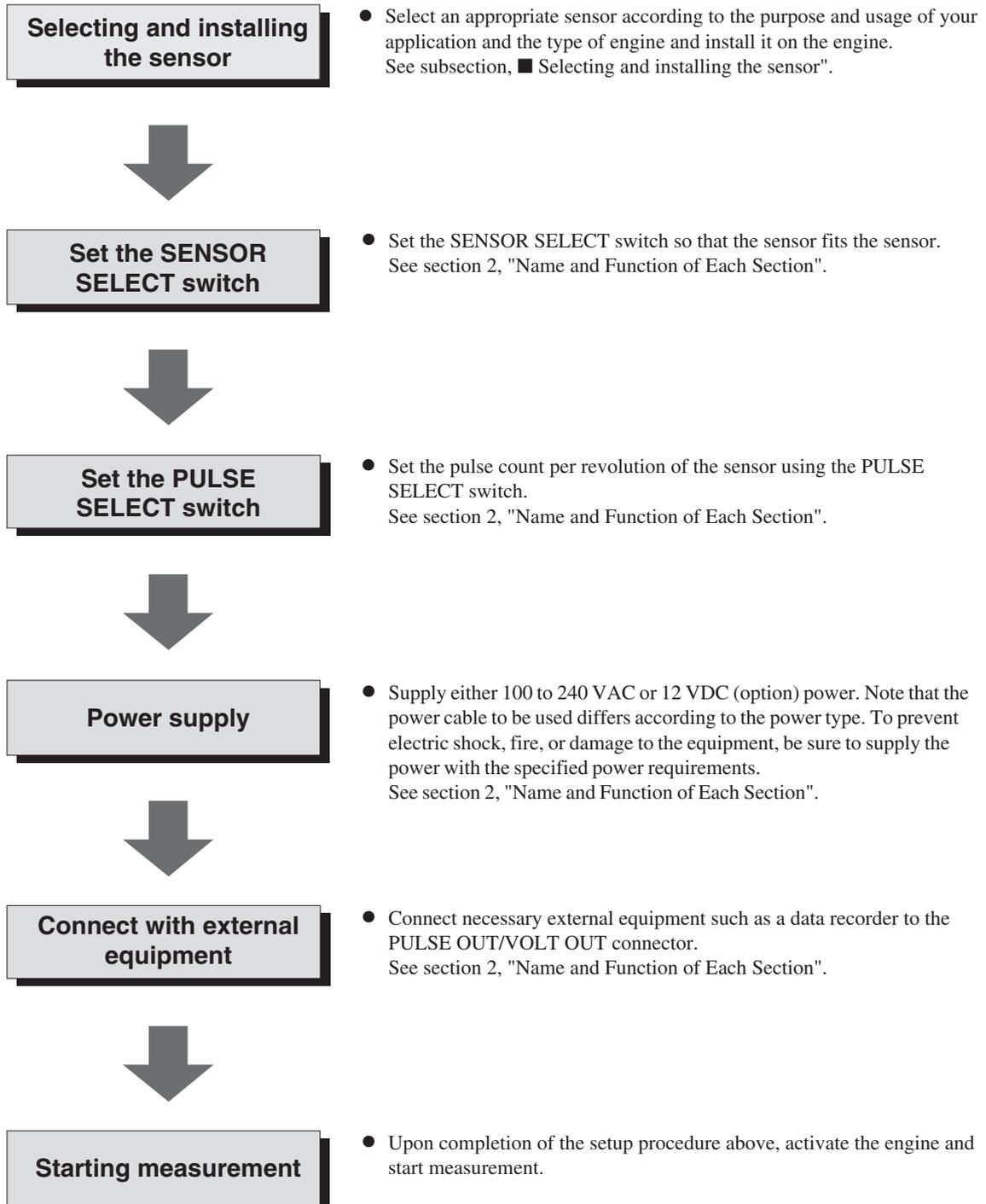
Note: • The supplied DC power cable is provided with red and black clips at one end. To prevent electrical shock, fire, or damages to the unit, be sure to connect the red clip to positive pole (+) and the black one to the negative pole (-).

Fuse (2.0A / optional)

A midget fuse, used to protect the internal circuitry of the DC power supply. To prevent any electrical shock, fire, or damages of the unit, be sure to use a fuse with the specified rating.

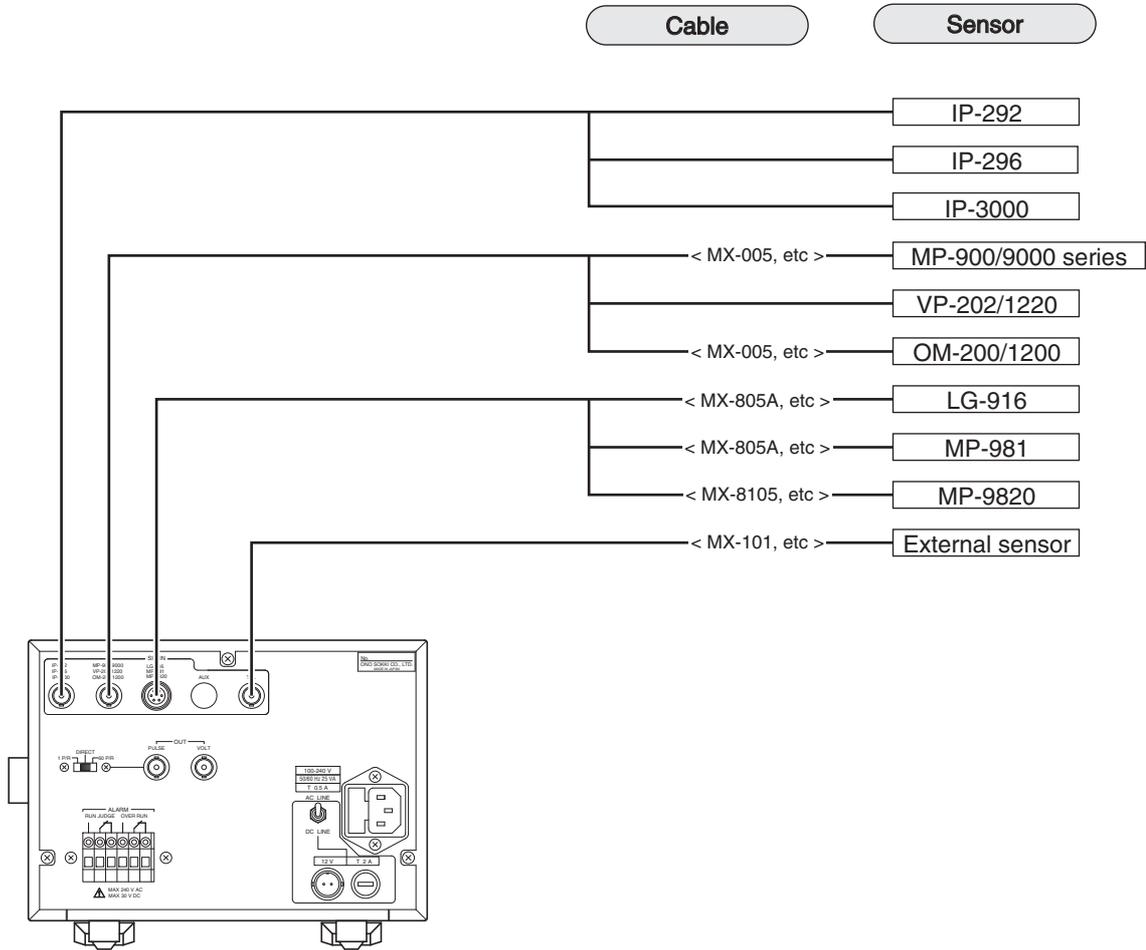
3. Measurement, Setting, and Adjustment Procedures

3.1 Measurement Procedure

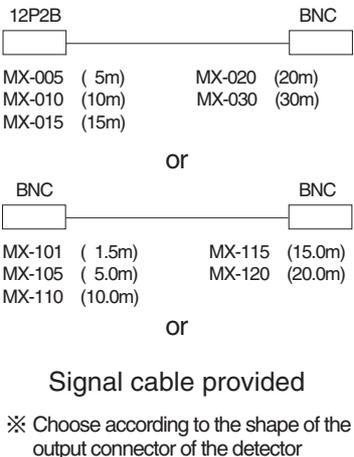
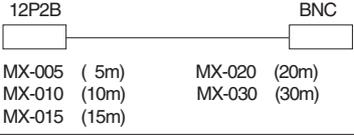
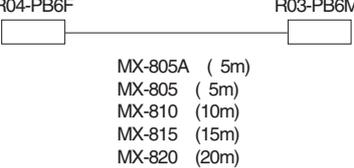
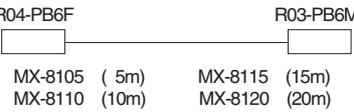


Selecting and Installing the Sensor

Referencing the figure and table below, install the selected sensor on the engine.



Sensor installation list

Sensor	Connection	Installation procedure
IP-292 / 296 / 3000 Ignition pulse sensor	Signal cable provided	Clip the cable of the ignition coil low-voltage primary side (IP-292) or the cable of the high-voltage secondary side (IP-296).
MP-900 / 9000 series Electromagnetic sensor	 <p>12P2B</p> <p>BNC</p> <p>MX-005 (5m) MX-020 (20m) MX-010 (10m) MX-030 (30m) MX-015 (15m)</p> <p>or</p> <p>BNC</p> <p>BNC</p> <p>MX-101 (1.5m) MX-115 (15.0m) MX-105 (5.0m) MX-120 (20.0m) MX-110 (10.0m)</p> <p>or</p> <p>Signal cable provided</p> <p>※ Choose according to the shape of the output connector of the detector</p>	Attach a gear to the crankshaft (recommended type is MP-001). Secure the sensor with mount fittings.
VP-202 / 1220 Engine sensor	Signal cable provided	Attach the magnet of the sensor to the cylinder head bolt or engine mounting bolt.
OM-200 / 1200 Electromagnet sensor	 <p>12P2B</p> <p>BNC</p> <p>MX-005 (5m) MX-020 (20m) MX-010 (10m) MX-030 (30m) MX-015 (15m)</p>	Install the sensor in parallel with the ignition coil. Secure the sensor with mount fittings.
LG-916 Opto-fiber sensor	 <p>R04-PB6F</p> <p>R03-PB6M</p> <p>MX-805A (5m) MX-805 (5m) MX-810 (10m) MX-815 (15m) MX-820 (20m)</p>	Attach the reflection mark onto the crankshaft. Secure the sensor with mount fittings.
MP-981 Electromagnetic sensor		Attach a gear to the crankshaft (recommended type is MP-001). Secure the sensor with mount fittings.
MP-9820 Electromagnetic sensor	 <p>R04-PB6F</p> <p>R03-PB6M</p> <p>MX-8105 (5m) MX-8115 (15m) MX-8110 (10m) MX-8120 (20m)</p>	Attach a gear to the crankshaft (recommended type is MP-001).
External sensor (TTL output)	 <p>BNC</p> <p>BNC</p> <p>MX-101 (1.5m) MX-115 (15.0m) MX-105 (5.0m) MX-120 (20.0m) MX-110 (10.0m)</p>	Depends on the sensor.

Note: • For details on each sensor including handling precautions, specifications, and other notes, see each individual manuals.

3.2 Adjustment of the Input Trigger Level

If the input LED indicator on the front panel does not flash periodically, turn the input sensitivity adjustment knob to adjust the input trigger level. This section describes the adjustment procedure for the input signal for each sensor.

When the IP-292/296/3000 is connected

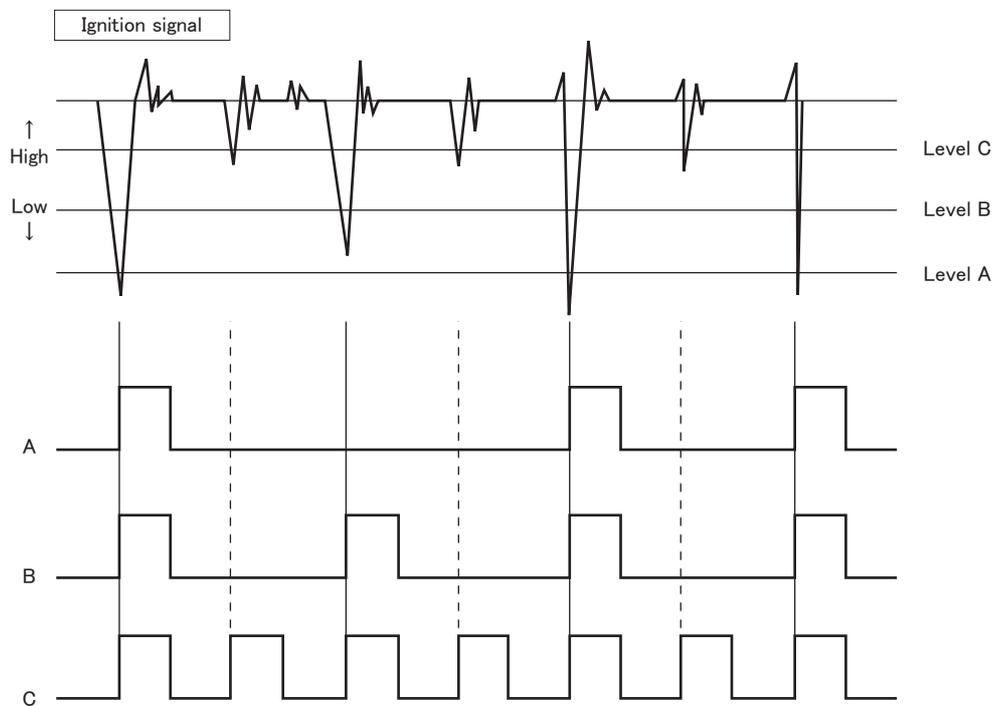
When the IP-292/296/3000 sensor is connected, follow the steps below to adjust the input trigger level.

Initially, make sure that there is no clearance at the clamp surface of the sensor. If any gap is present, eliminate it.

Then perform the following steps 1 to 3 to adjust the trigger level.

The waveform of the ignition signal to be detected is as follows:

If the trigger level setting is not appropriate, e.g., if it is too low (as level A shown), some pulses cannot be detected; if it is too high (as level C shown), unnecessary noise is also detected.



During idling of the engine, increase the input sensitivity gradually from "5".

Using the input sensitivity adjustment knob, set the input sensitivity to level B which is between level A (at which the input LED indicator starts flashing) and level C (at which the indicator goes on).

Increase the idling r/min of the engine to near the maximum value. In this case, make sure that a stable r/min display is obtained.

If the r/min display fluctuates at level A, increase the input sensitivity gradually to level B.

If the r/min display fluctuates even at level C, change the connecting position of the sensor.

If the r/min display fluctuates upon completion of the above adjustment procedure, it is assumed that the r/min value of the engine cannot be measured with the IP-292/296/3000. Use other type of sensors.

When the VP-202/1220, OM-200/1200 is connected

The input signal is affected by the VP-202/1220, OM-200/1200 depending on the mounting position.

If the input signal fluctuates after the trigger level adjustment procedure, change the mounting position of the sensor and then perform the procedure again.

If the input signal fluctuates after the trigger level adjustment procedure with various mount positions, it is assumed that the r/min value of the engine cannot be measured with the VP-202/1220, OM-200/1200. Use other type of sensors.

When the LG-916, MP-981/9820 is connected

As the input trigger level for the LG-916, MP-981/9820 is semifixed internally (i.e., level adjustment was made at the factory), it is not necessary to adjust the input trigger level.

There are cases when the input signal cannot be detected depending on the gap between the rotating body and the sensor. In such cases, see the instruction manual of the the LG-916, MP-981/9820 and then install it again.

3.3 Checking the Display and Output Voltage

This subsection explains the check procedure for the digital display circuit and adjustment procedure for the analog output voltage.

Set the SENSOR SELECT switch to "CHECK".

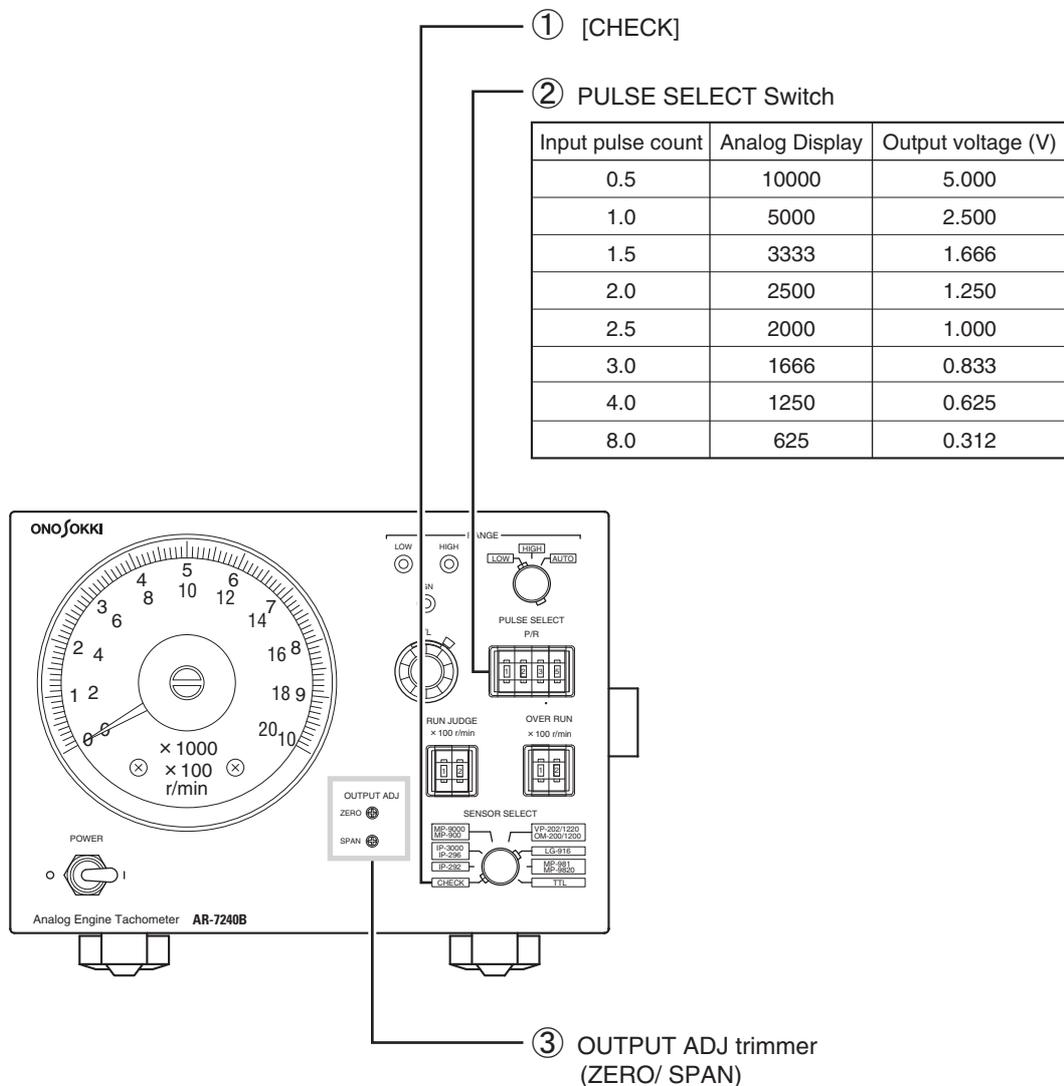
Set the PULSE SELECT switch to a range from 0.5 to 8.0 and then check the digital display and the output voltage.

Make adjustment using the table below.

If the output voltage is not correct, adjust it using the OUTPUT ADJ trimmer.

ZERO : $\pm 4\%$ of the full scale

SPAN : $\pm 4\%$ of the full scale



4. Maintenance (Replacement of Power Fuse)

CAUTION !

* If the power fuse is blown, it seems that an abnormality has occurred on the AR-7240B analog engine tachometer.

Immediately unplug the AC power cable of the AR-7240B analog engine tachometer from the 100-240 VAC power input connector and contact the ONO SOKKI agency where you bought the instrument or a nearest ONO SOKKI sales office to ask for repair.

It is very dangerous to continue using the instrument in this condition, and not only a damage to the instrument but also an electric shock or fire may be resulted.

* To prevent a fire, be sure to use a power fuse of the same rating and type.

It is very dangerous to use a fuse of different rating or type, and not only a damage to the instrument but also an electric shock or fire may be resulted.

The power fuse is stored in the fuse holder on the rear panel of the AR-7240B analog engine tachometer. A spare AC power fuse is stored in the AC fuse folder.

A spare DC power fuse is separately attached. (Option)

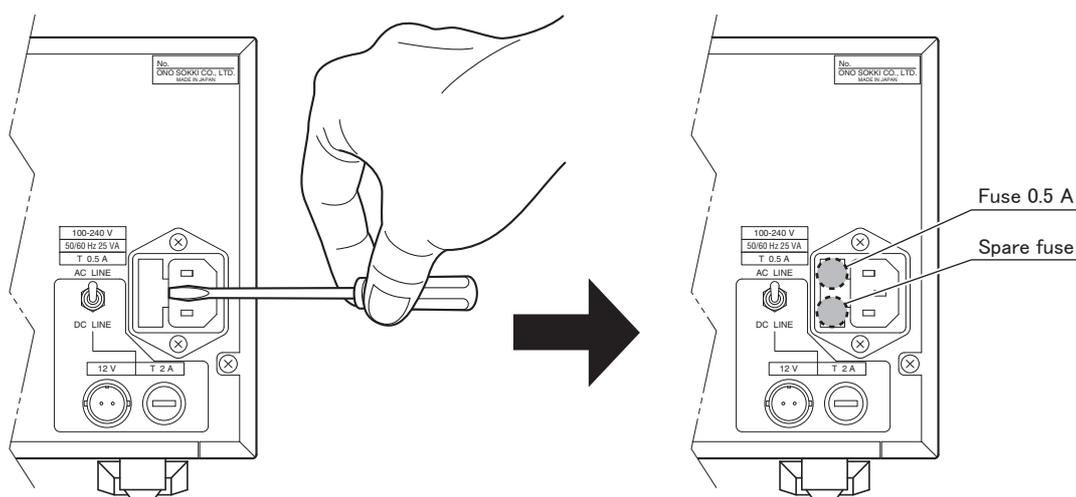
Procedures for Checking and Replacing the AC Fuse

First, after changing the power switch on the rear panel of the AR-7240B analog engine tachometer over to OFF, unplug the AC power cable from the 100-240 VAC power input connector.

Then, according to the figure below, pull out toward you the fuse holder on the rear panel of the AR-7240B analog engine tachometer with a flat-blade screwdriver, etc.

After that, check or replace the fuse.

Finally, restore the fuse holder as before. This completes the fuse checking or replacement work.



Procedures for Checking and Replacing the DC Fuse (Option)

First, after changing the power switch on the rear panel of the AR-7240B analog engine tachometer over to OFF, unplug the DC power cable from the 12 VDC power input connector.

Then, according to the figure below, pull out toward you the fuse holder on the rear panel of the AR-7240B analog engine tachometer with a flat-blade screwdriver, etc.

After that, check or replace the fuse.

Finally, restore the fuse holder as before. This completes the fuse checking or replacement work.

5. Specifications

Input section

Applicable sensor (option)	IP-292/296/3000, OM-200/1200, VP-202/1220, MP-900/9000 series MP-981/9820, LG-916, TTL level, Fiber Sensor (Option)
Measurement range	400 to 10000 r/min * The upper limit r/min depends on the sensor type and the setting of the PULSE SELECT switch.
Input pulse count	0.5 to 199.5 P/R (in 0.5 P/R steps) * The input pulse count depends on the sensor to be connected.
Trigger level	IP-292/296/3000, VP-202/1220 and OM-200/1200 : Adjusted by the adjustment knob Others: Semifixed internally

Digital display section

Indicator	110 mm square wide angle meter, 1.5 grade
Indicator scale	0 to 2000 r/min (red), 20 r/min per 1 scale
	0 to 10000 r/min (black), 100 r/min per 1 scale

Analog output section

Output voltage	0 to 5 V/0 to 10000 r/min *2	
	Load resistance	1k or more
	Linearity	±0.5% of the full scale
	Output adjustment range	±4% of the full scale (ZERO) ±4% of the full scale (SPAN)
	Response	Approx. 80 ms or less/10 to 90% *3
Output current (Option) *1	0 to 10 mA/0 to 10000 r/min	
	Load resistance	100 ohms or less
	Output adjustment range	±5% of the full scale (ZERO) ±10% of the full scale (SPAN)
	Response	Approx. 80 ms or less/10 to 90% *3

*1 When modified to current output type, voltage output is disabled.

*2 Output of 0 to 1 V/0 to 10000 r/min is optional.

*3 When the input signal is absent, response is delayed by 3 to 4 seconds.

Digital output/pulse output/contact output section

Output pulse count	1P/R 60 P/R (asynchronous to the input signal) / wave-shaped output of the input signal TTL level, fan out of 2
Contact output	RUN JUDGE : 1to 99 × 100 r/min OVER RUN : 1to 99 × 100 r/min Comparison interval : 100 ms Transfer contact Contact capacity : 240 VAC/2A, 30 VDC/2A

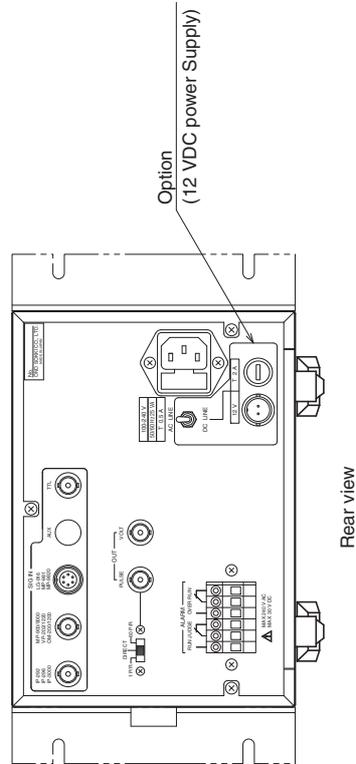
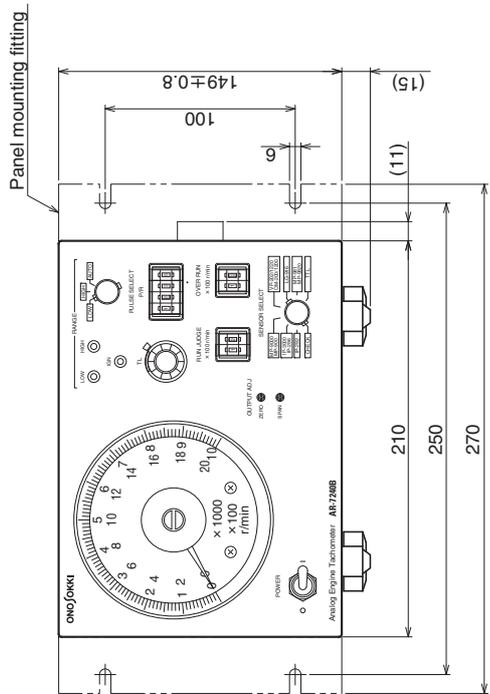
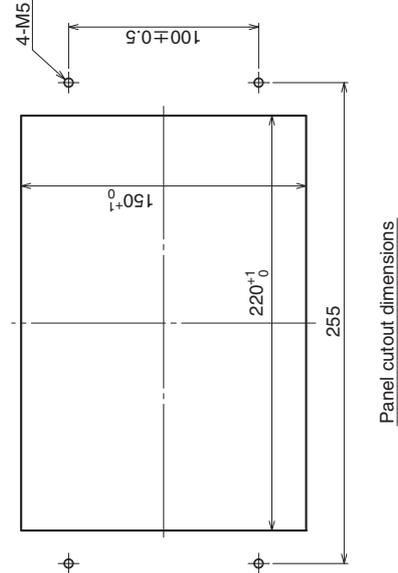
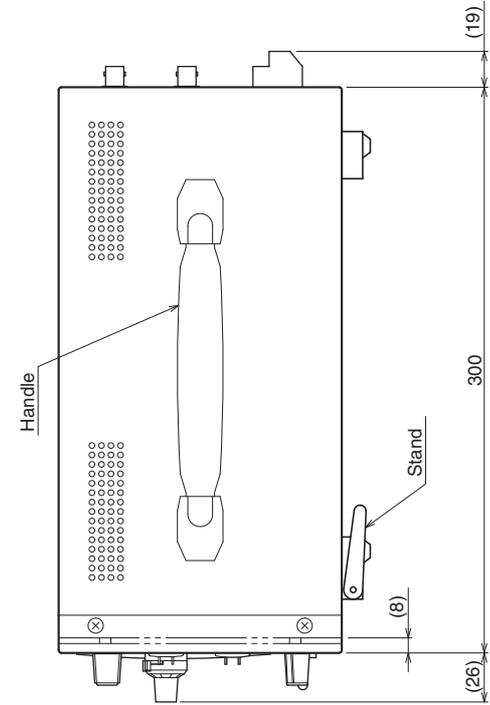
General data

Power supply	AC power	100 to 240 VAC ±10%, Approx. 25 VA
	DC power	11 to 15 V, Approx. 13 V
Operating temperature range	0 to +40 °C	
Dimension	210 (W) × 149 (H) × 300 (D) mm	
Mass	Approx. 4 kg	
Accessory	AC power cable	× 1 (1.9 m)
	AC power fuse	× 1 (0.5A midget fuse)
	Instruction manual	× 1

6. Applicable Sensors List

For gasoline engines	IP-292/296 /3000	Detects spark signal from the ignition system via the ignition coil cable. Used at the ignition coil low-voltage primary side (IP-292) or the cable of the high-voltage secondary side (IP-296).
	OM-200/1200	Detects leakage magnetic flux from the magnet engine shaft with the magnet ignition system. Installed in parallel with and approx. 30 mm apart from the ignition coil. Set the input pulse count according to the number of magnets.
For gasoline and diesel engines	VP-202/1220	Detects vibration due to vertical motion of the piston, based on the galvanic electricity vibration detection method. With the magnet on the bottom, attached to the cylinder head bolt or engine mounting bolt. (Cannot be used for engines with 6 or more cylinders.)
For gasoline and diesel engines and other rotating bodies	MP-900/9000 series	Electromagnetic induction sensor incorporating permanent magnet and sensor coil Located in proximity of the tip of the detection gear mounted on the shaft. Picks out frequency signal which is proportional to the r/min value.
	MP-981/9820	Incorporates a magnetic resistor, a permanent magnet, a dc amplifier, and a voltage regulator, realizing the magnetic flux response type. Detects a wide range of rpm in the form of square wave with the same amplitude. Located in proximity of the tip of the detection gear mounted on the shaft. Picks out frequency signal which is proportional to the r/min value.
	LG-916	Reflective type sensor using an opto-fiber at the top With the unit incorporating a photo emitter, photo receptor, and amplifier, detects the r/min value by means of photo emission and reception. Allows non-contact detection with the reflection mark attached on the shaft.

7. Outside Dimensions



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*Outer appearance and specifications are subject to change without prior notice.

HOME PAGE: <http://www.onosokki.co.jp/English/english.htm>

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