

ROTARY ENCODER

RP series

A variety of rotary encoders ranging from general purpose industrial types to ultra-compact types can be chosen for your specific application.

ONO SOKKI

CONTENTS

	Page
Selection Guide	4
Common Specifications	5

General-purpose Industrial Type

RP-110 series	General-purpose Bottom-mount Industrial Type	6
RP-120 series	General-purpose Dual-shaft Industrial Type	7
RP-130 series	General-purpose Flange-mount Industrial Type	7
RP-132D	General-purpose High-resolution Type	8
RP-1130D series	General-purpose Compact Bottom-mount Industrial Type.....	9
RP-1330D series	General-purpose Compact Flange-mount Industrial Type	9

Heat Resistant Type

RP-310 series	Air-cooled Type	10
RP-320 series	Water-cooled Type	10
RP-3130D series	General-purpose Heat Resistant Bottom-mount Type	11
RP-3330D series	General-purpose Heat Resistant Flange-mount Type	11

Compact Type

SP-405ZA	Ultra-compact Type	12
RP-410D series	Low-torque High-resolution Type	13
RP-432Z	Compact Multi-use Type	14
RP-442Z	Compact & Flat Type	15

Machine Tool Use Type

RP-510 series	Oil-proof Type	16
RP-5320D series	Rigid Type	17
RP-5610D series	Water-proof Type	18

General-purpose Built-in Type

RP-8524L series	General-purpose Built-in Type	19
------------------------	-------------------------------------	----

Roller Encoder

RP-704ZA	General-purpose Type	20
RP-721	Low & Medium Speed Type	20
RP-732	Reversible Counting Type	20

Peripherals

FV-1300	High-response F/V Converter	21
PA-330Z	Isolation Pulse Transmitter	21
TM-2100 series	Digital Tachometer	22
RV-3150	Reversible Counter	22

Accessories

Cables	23
Couplings	24

P.6



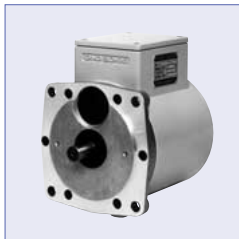
RP-110 series
General-purpose Bottom-mount
Industrial Type
Max 9000P/R

P.7



RP-120 series
General-purpose Dual-shaft
Industrial Type
Max 9000P/R

P.7



RP-130 series
General-purpose Flange-mount
Industrial Type
Max 9000P/R

P.8



RP-132D
General-purpose High-resolution
Type
Max 60000P/R

P.9



RP-1130D series
General-purpose Compact
Bottom-mount Industrial Type
Max 4000P/R

P.9



RP-1330D series
General-purpose Compact
Flange-mount Industrial Type
Max 4000P/R

P.10



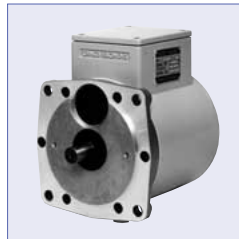
RP-310 series
Air-cooled Type
RP-320 series
Water-cooled Type
Max 3600P/R

P.11



RP-3130D series
General-purpose Heat Resistant
Bottom-mount Type
Max 4000P/R

P.11



RP-3330D series
General-purpose Heat Resistant
Flange-mount Type
Max 4000P/R

P.12



SP-405ZA
Ultra-compact Type
Max 2000P/R

P.13



RP-410D series
Low-torque High-resolution Type
Max 6000P/R

P.14



RP-432Z
Compact Multi-use Type
Max 1024P/R

P.15



RP-442Z
Compact & Flat Type
Max 2500P/R

P.16



RP-510 series
Oil-proof Type
Max 3600P/R

P.17



RP-5320D series
Rigid Type
Max 10000P/R

P.18



RP-5610D series
Water-proof Type
Max 600P/R

P.19



RP-8524L series
General-purpose Built-in Type
Max 5000P/R

P.20



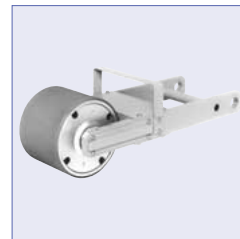
RP-704ZA
Roller Encoder
General-purpose Type

P.20



RP-721
Roller Encoder
Low & Medium Speed Type

P.20



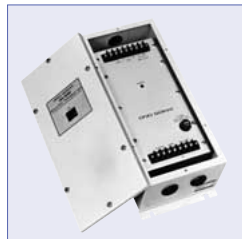
RP-732
Roller Encoder
Reversible Counting Type

P.21



FV-1300
High-response F/V Converter

P.21



PA-330Z
Isolation Pulse Transmitter

P.22



TM-2100 series
Digital Tachometer

P.22



RV-3150
Reversible Counter

Selection Guide

Model number of RP-series Rotary Encoder is expressed in condensation codes representing functions and structures, with a few exceptions in expressions of models.

RP- Model Number - No. of Output Pulses P/R

Item selected Classification		Basic Unit	Power Rating		Zero Mark	Open Collector	Line Driver	Output Connection				Oil seal	
			AC	DC				Terminal Strip	Standerd Connector	Water-proof Connector	Direct Cable	Not Installed	Installed
		Model No.	A	D	Z	O	L	T	C	W	N	0	1
General-Purpose Industrial Type	Bottom-mount Type	RP-110 series	●	○	○	○		●	○	○★		●	○
	Dual-shaft type	RP-120 series	●	○	○	○		○	●	○★		●	○
	Flange-mount Type	RP-130 series	●★	○	○	○		●	○	○★		●	○
	High-resolution Type	RP-132D		●	○	○		●	○	○★		●	○
	Compact Bottom-mount Type	RP-1130D series		●	○	○				●	○		●
	Compact Flange-mount Type	RP-1330D series		●	○	○				●	○		●
Heat-Resistant Type	Air-cooled Type	RP-310 series	●	○		○		●				○	●
	Water-cooled Type	RP-320 series	●	○		○		●				○	●
	General-purpose Bottom-mount Type	RP-3130D series		●	○	○		●				○	●
	General-purpose Flange-mount Type	RP-3330D series		●	○	○		●				○	●
Compact Type	Ultra-compact Type	SP-405ZA		●	●	○	○				●	●	
	Low-torque High-resolution Type	RP-410D series		●		○			●			●	
	Multi-use Type	RP-432Z		●	●				●			●	
	Flat Type	RP-442Z		●	●		●		●				●
Machine-Tool Type	Oil-proof Type	RP-510 series	●	○		○				●	○		●
	Rigid Type	RP-5320D series		●	○	○	○			●	○	○	●
	Water-proof Type	RP-5610D series		●	○	○					●		●
Built-in Type	General-purpose Built-in Type	RP-8524L series		●	●		●				●	●	

Items marked "●" : Standard specification

Items marked "○" : Optional specification, can be manufactured upon request

Items marked "★" : Terminal strip connection is only available when zero mark signal output with water proof connection is requested.

Items marked "☆" : Terminal strip connection is only available when AC power supply type is requested.

Ordering Example

In case of basic unit model with 3-digit

RP- 1 2 3 4 5 6 7 8 9 P/R

- ① Application
 - 1 : General purpose industrial type
 - 3 : Heat-resistant type
 - 4 : Compact type
 - 5 : Machine-tool type
 - 7 : Roller encoder type
- ② Sub classification
 - 1 : Bottom mount type
 - 2 : Bottom mount, dual-shaft type
 - 3 : Flange type (high-resolution type)
- ③ Phase of output
 - 1 : Single phase type
 - 2 : 2-phase type
- ④ Power supply
 - A : AC power supply type
 - D : DC power supply type
- ⑤ "Z" marked when zero mark output provided (water-proof connector is not available)
- ⑥ "O" marked when open collector output provided
- ⑦ Output connection
 - T : Terminal strip type
 - C : Standard connector type
 - W : Water-proof connector type
 - (not available when zero mark output provided)
- ⑧ Oil Seal
 - 0 : Oil seal not provided
 - 1 : Oil seal provided
- ⑨ No. of output pulses

In case of basic unit model with 4-digit

RP- 1 2 3 4 5 6 7 8 9 P/R

- ① Application
 - 1 : General purpose industrial type
 - 3 : Heat-resistant type
 - 5 : Machine-tool type
 - 8 : Built-in type
- ② Sub classification
 - 1 : Bottom mount type
 - 3 : Flange type
 - 6 : Water-proof type
- ③ Version
- ④ Phase of output
 - 1 : Single phase type
 - 2 : 2-phase type
 - 3 : Single phase + zero mark type
 - 4 : 2-phase + zero mark type
- ⑤ Power supply
 - D : DC power supply type
- ⑥ Signal output type
 - O : Open collector type
 - L : Line driver type
- ⑦ Output connection
 - W : Water-proof connector type
 - N : Direct cable type
- ⑧ Oil Seal
 - 0 : Oil seal not provided
 - 1 : Oil seal provided
- ⑨ No. of output pulses

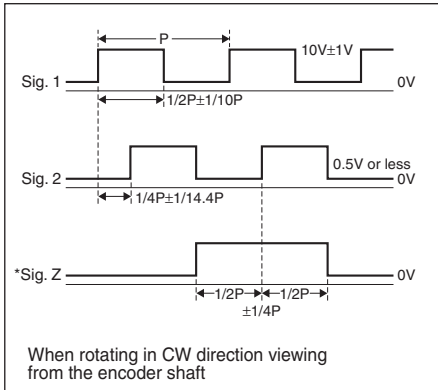
Common Specifications

Output Signals

Output Waveforms

All Ono Sokki rotary encoders feature built-in amplifier and waveshaping circuits to provide stable squarewave output signals with a duty cycle of 1:1 and a constant pulse height (voltage) which is not related to rotational speed.

The output signals which are at a high voltage and low impedance, provide high noise immunity, making these encoders usable in on-site installation and for long distance transmission.



* Option

Number of Output Signal Phases

•2-Phase Output

In this type of encoder, two output signals (Sig. 1 and Sig. 2 in the figure) are output with a phase shift of 90°. By using these signals in combination with a reversible counter having a direction discriminating circuit, it is possible to use these encoders in such applications as high-accuracy determination of angle, detection of amount of movement and automatic positioning control.

•Single-Phase Output

This type of output provides only Sig. 1 shown in the figure.

Thus, for both CW and CCW rotation directions, a single phase signal is output, so that determination of the rotational direction is not possible. This type of output is usable in such applications as speed measurement, length measurement when mounted on a measuring roller and detection of the amount of single-direction feed.

•Output with Zero Mark

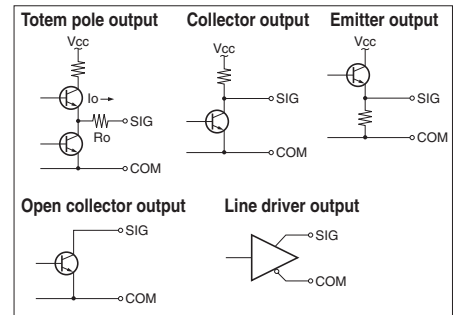
This type of output provides a zero signal (Sig.Z) per rotation indicating the zero position in addition to the 2-phase or single-phase output described above. *

* Timing of sig.Z to sig.1 or sig.2 is random.

Output Circuits

Output Circuits	Series	Ro(Ω)	Io(mA)
Totem pole output	RP-100 1130, 1330 300, 3130 3330, 410 510, 5320 5610	22*	20
Open collector	Option	*40 VDC, 50 mA max.	

* RP-410 is supplied with 15 VDC, 40 mA max.



* The 22Ω Ro output resistors are thermistors with positive PHT thermal coefficient. They are overcurrent protection elements in the output circuits and have a resistance value of 22Ω at 25°C. (When the output is short-circuited, Io decreases and the normal output cannot be gained. The output is recovered by connecting a proper load.)

Power Requirements

AC Power Types

These types of rotary encoders feature an internal power transformer as part of a secondary power supply circuit.

Powered from 100 VAC or other specified line voltage (120/220/240 VAC), they are ideal for on-site use.

(There are some types which cannot be fitted with this power circuit.)

DC Power Types

Types designed to be compact and light-weight, cannot be fitted with the power circuit because of space limitations. These types are powered from an external DC source of either 12VDC or 5VDC. When used in combination with the Ono Sokki PA-330Z pulse transmitter or a reversible counter, these devices can provide the 12VDC required by the encoder.

Output Connection

Connector Types

Connectors (Cable Side)

	Standard type	Water-proof type
Single/2-phase output	RM12BPG-5S	RM12WBP-5S
Output with zero mark provided	TRC116-12A10-7F	—

Pin No.	Single/2-phase output	Pin No.	Output with zero mark provided
1	Sig. 1 (blue)	A	Sig. 1 (blue)
2	Sig. 2 (white)	B	Sig. 2 (white)
3	AC type : N.C. DC type : +12V (red)	C	Sig. Z (orange)
4	Case (shield)	D	Common (green/gray, green/brown, black)
5	AC type : Common (green/gray, green/brown, black) DC type : Common / 0V (green/gray, green/brown, black)	E	AC type : N.C. DC type : +12V (or +5V) (red)
		F	AC type : N.C. DC type : 0V (black)
		G	Case (shield)

A 7-pin connector is used with types having Sig. Z. All cables need to be provided separately (3C2V, R6, R8). The connector is provided as an accessory.

* Output terminals which are not indicated in a model are open.

* Colors in parentheses indicate color division when R6 or R8 is used.

* Terminal strip connection is only available when zero mark signal output with water proof connection is requested.

Terminal Strip Type

Applicable crimp-on terminal

RP-100 : JIS C2805 1.25-3

RP-300 : JIS C2805 2-4

Pin No.	RP-100/300 Series
1	Sig. 1 (blue)
2	Common (gray/green, green)
3	Sig. 2 (white)
4	Common (green/brown)
5	Sig. Z (orange)
6	Case (shield)
7	AC type : AC DC type : +12V (red)
8	AC type : AC DC type : 0V (black)

* Cables need to be provided separately and are not part of the encoder specifications.

* Output terminals which are not indicated in a model are open.

* Colors in parentheses indicate color division when R6 or R8 is used.

RP-110 series

General-purpose Bottom-mount Industrial Type

■ Standard number of output pulse (P/R)

60	100	120	200	300	360	500	600
750	1000	1200	1500	1800	2000		
2500	3000	3600	5000	6000	9000		



- Upon request, an oil seal can be fitted to the rotating shaft, making this encoder waterproof (IP-65 applicable). (Waterproof connector or terminal strip, but waterproof type with a zero mark is terminal strip only.)
- Selectable for either AC or DC operation.
- Excellent resistance to shock and shaft loading.
- Built-in amplifier circuit, making this encoder ideal for on-site installation and long distance transmission.
- "Noise immunity" circuit prevents power noise and erroneous signal generation caused by small vibrations.

■ Electric Specifications

Output Waveform	: 2-phase square wave +*zero mark
Output Voltage	: 1 : 10V min., 0 : 0.5V max.
Output Type	: Totem pole output, load resistance 470Ω min. * Open collector output 40VDC, 50mA max.
Signal Accuracy	: Adjacent ±1/200P Accumulated ±1/5P max.
Power Supply	: 100VAC ±10%, 50mA or 12VDC ±5%, 150mA * 110VAC, 200VAC, 220VAC, 5VDC, 15VDC, 24VDC
Response Frequency	: 100kHz
Light Source	: LED
Light Receiver	: Phototransistor
Connection Method	: Connector (normal type or waterproof type) * Units with a zero mark are supplied with a normal type 7-pin connector or terminal strip.

■ Mechanical Specifications

Maximum Speed	: 5000 r/min *9000 r/min (reinforced type)
Max. Allowable Load	: Radial 80N (*150N), Thrust 50N (*100N) (Items marked * are reinforced type.)
Starting Torque	: 4mN·m (*5), 8mN·m (*10) at 9000P/R, 10mN·m (*15) when fitted with an oil seal, 14mN·m (*19) at 9000P/R with an oil seal. (Items marked * are RP-120 series)
Moment of Inertia	: 693g·cm ² (*836 : acryl), 969g·cm ² (*1112 : glass) (Items marked * are RP-120 series)
Weight	: 3.3kg (RP-110 series) 5.6kg (RP-120 series) 3.3kg (RP-130 series)

■ General Specifications

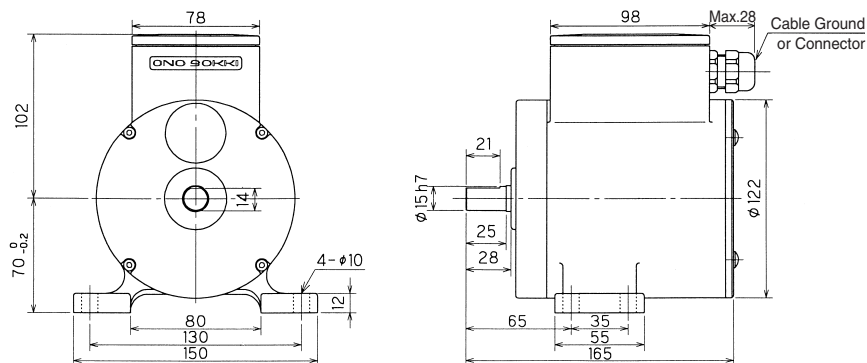
Operating Temperature	: AC type -5°C to +50°C DC type -5°C to +55°C
Storage Temperature	: -20°C to +70°C
Humidity	: 95% (40°C/8h, the rotating shaft is sealed with no condensation)
Standard	: Suitable for use with IP-65 (water-proof connector or terminal strip type only)
Vibration	: 98m/s ² (Axial direction for 4h, up/down/left/light for 2h each.)
Shock	: 980m/s ² (3 times each in X, Y and Z direction, 98m/s ² in the axial direction)

■ Optional number of output pulse (P/R)

314 900 4000

* Items marked * are optional

■ Outer Dimensions



RP-120 series

General-purpose Dual-shaft Industrial Type

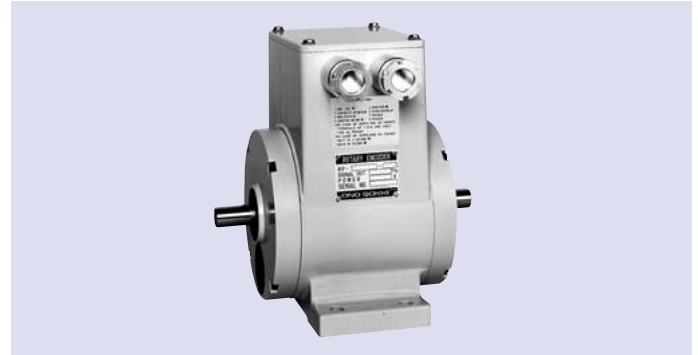
■ Standard number of output pulse (P/R)

60	100	120	200	300	360	500	600
750	1000	1200	1500	1800	2000		
2500	3000	3600	5000	6000	9000		

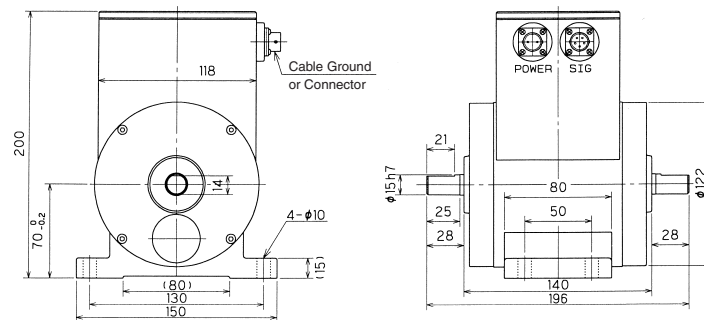
- Allowable shaft transmission torque of the standard piercing shaft is 4N·m, and shaft torsion is 1/100°/2N·m.
- Selectable for either AC or DC operation.
- To increase the allowable shaft load, reinforced type is available as an option.
- Connector and terminal strip are selectable for connection method.
- "Noise Immunity" circuit prevents power noise and erroneous signal generation caused by small vibrations.
- Weight 5.6kg.

■ Specifications

See the RP-110 series specifications.



■ Outer Dimensions



RP-130 series

General-purpose Flange-mount Industrial Type

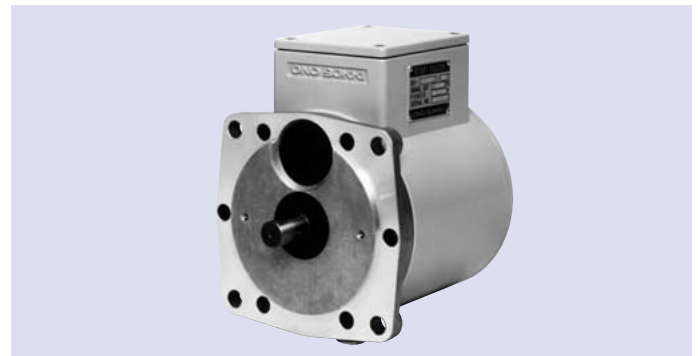
■ Standard number of output pulse (P/R)

60	100	120	200	300	360	500	600
750	1000	1200	1500	1800	2000		
2500	3000	3600	5000	6000	9000		

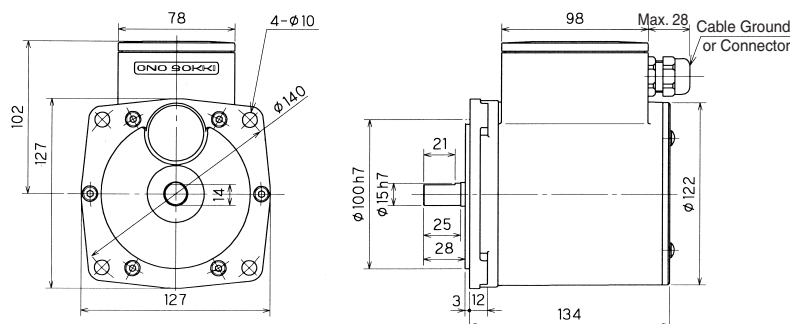
- Flange type has excellent coupling accuracy.
- Selectable for either AC or DC operation.
- To increase the allowable shaft load, reinforced type is available as an option.
- Connector and terminal strip are selectable for connection method.
- "Noise Immunity" circuit prevents power noise and erroneous signal generation caused by small vibrations.
- Weight 3.3kg.

■ Specifications

See the RP-110 series specifications.



■ Outer Dimensions



RP-132D

General-purpose High-resolution Type

■ Standard number of output pulse (P/R)

15000 (Direct output)

30000 45000 60000 (Multiplied output)



- High-resolution type of the traditional RP-130 series. Excellent performance in highly accurate measurement and control.
- "Noise Immunity" circuit prevents power noise and erroneous signal generation caused by small vibrations.
- A built-in multiplier circuit is optionally available to provide high-resolution output with multiplication of x2 to x4.

■ Electric Specifications

Output Waveform	: 2-phase square wave +*zero mark
Output Voltage	: 1 : 10V min., 0 : 0.5V max.
Output Type	: Totem pole output, load resistance 470Ω min. * Open collector 40VDC, 50mA max.
Signal Accuracy	: Adjacent $\pm 1/50$ * Direct output type only Accumulated $\pm 1/4P$ max.
Power Supply	: 12VDC $\pm 5\%$, 150mA (200mA with multiplier) * 5VDC, 15VDC, 24VDC
Response Frequency	: 300kHz
Light Source	: LED
Light Receiver	: Photodiode
Connection Method	: Connector (normal type or water-proof type) or terminal strip * Units with a zero mark are supplied with a normal type 7-pin connector or terminal strip.

■ Mechanical Specifications

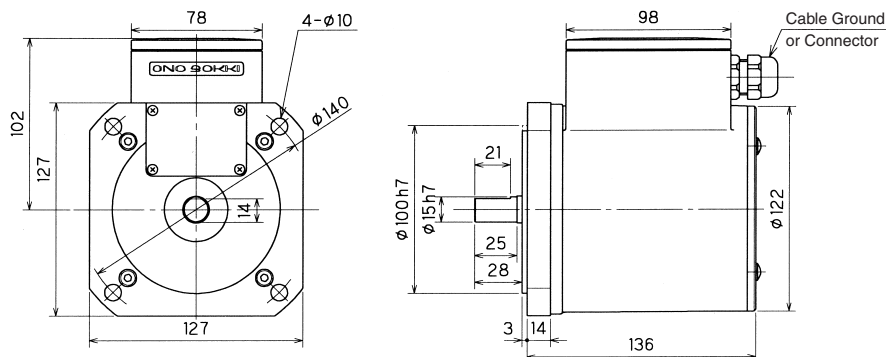
Maximum Speed	: 2000 r/min
Max. Allowable Load	: Radial 30N, Thrust 20N
Starting Torque	: 10mN·m (*12mN·m when fitted with an oil seal)
Moment of Inertia	: 950g·cm ²
Weight	: 4.7kg

■ General Specifications

Operating Temperature	: 0°C to +45°C
Storage Temperature	: -20°C to +60°C
Humidity	: 95% (40°C/8h, the rotating shaft is sealed) with no condensation
Standard	: IP-65 (dustproof and jetproof) for water-proof connector or terminal strip type only
Vibration	: 49m/s ² (Axial direction for 4h, up/down/left/right for 2h each)
Shock	: 490m/s ² (3 times each in X, Y and Z direction, 98m/s ² in the axial direction)

* Items marked * are optional

■ Outer Dimensions



RP-310/320 series

RP-310 series Air-cooled Type
RP-320 series Water-cooled Type

■ Standard number of output pulse (P/R)
60 100 120 200 300 360 500
600 1000 1500 1800 2000 2500
3000 3600



- Designed for use as a detector on high-temperature steel production lines and capable of withstanding both high temperature and vibration.
- Usable in a wide variety of applications including lance position indication, slab width measurement and continuous forging length detection.
- Available as an air-cooled or water-cooled type, depending upon operating environment.
- Selectable for either AC or DC operation.
- To enable long distance transmission, all types feature a built-in amplifier and a low-impedance square wave signal output.

■ Electric Specifications

Output Waveform	: 2-phase square wave +*zero mark
Output Voltage	: 1 : 10V min., 0 : 0.5V max.
Output Type	: Totem pole output, load resistance 470Ω min. * Open collector output 40VDC, 50mA max.
Signal Accuracy	: Adjacent ±1/200P Accumulated ±1/5P max.
Power Supply	: 100VAC ±10%, 80mA or 12VDC ±5%, 200mA * 110VAC, 200VAC, 220VAC, 5VDC, 15VDC, 24VDC
Response Frequency	: 100kHz
Light Source	: LED
Light Receiver	: Phototransistor
Connection Method	: Terminal strip, M4 crimp-on terminals (JIS C2805 2 to 4)

■ Mechanical Specifications

Maximum Speed	: 4000 r/min
Max. Allowable Load	: Radial 150N, Thrust 100N
Starting Torque	: 100mN·m (oil seal is provided)
Moment of Inertia	: 1550g·cm ²
Weight	: 14gk
Cooling Air	: 100kPa, 200 ℓ /min. (RP-310 series)
Cooling Water	: 100kPa, 2 ℓ /min. (RP-320 series)

■ General Specifications

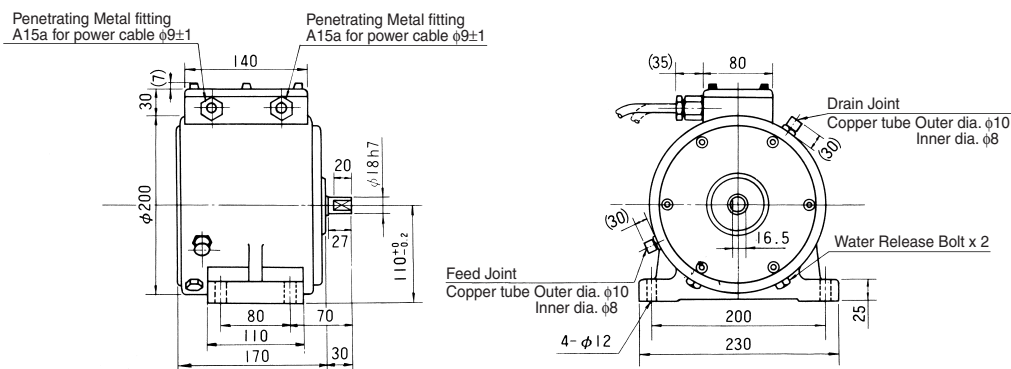
Operating Temperature	: -5°C to +80°C (RP-310 series) -5°C to +120°C (RP-320 series)
Storage Temperature	: -20°C to +70°C
Humidity	: 95% (40°C/8h, the rotating shaft is sealed) with no condensation
Standard	: IP-X5 (Jet proof type)
Vibration	: 98m/s ² (Axial direction for 4h, up/down/left/light for 2h each.)
Shock	: 980m/s ² (3 times each in X, Y and Z direction, 98m/s ² in the axial direction)

■ Optional number of output pulse (P/R)

150 400 720

* Items marked * are optional

■ Outer Dimensions



RP-3130D/3330D series

RP-3130D series General-purpose Heat Resistant Bottom-mount Type
RP-3330D series General-purpose Heat Resistant Flange-mount Type

■ Standard number of output pulse (P/R)
200 600 1000 1200 2000



RP-3130D series



RP-3330D series

- Designed for use in high-temperature environments without applying air- or water-cooling.
- The outer dimensions and output signal of these encoders are common to the RP-100 series.
- "Noise Immunity" circuit prevents power noise and erroneous signal generation caused by small vibrations.
- To increase the allowable shaft load, reinforced type is available as an option.

■ Electric Specifications

Output Waveform	: 2-phase square wave +*zero mark
Output Voltage	: 1 : 10V min., 0 : 0.5V max.
Output Type	: Totem pole output, load resistance 470Ω min. * Open collector output 40VDC, 50 mA max.
Signal Accuracy	: Adjacent $\pm 1/200P$ Accumulated $\pm 1/4P$ max.
Power Supply	: 12VDC $\pm 10\%$, 150 mA * 5VDC, 15VDC, 24VDC
Response Frequency	: 100kHz
Light Source	: LED
Light Receiver	: Photodiode
Connection Method	: Terminal strip, M3 crimp-on terminals (JIS C2805 1.25 to 3)

■ Mechanical Specifications

Maximum Speed	: 3000 r/min
Max. Allowable Load	: Radial 80N, Thrust 50N * Reinforced Type: Radial 150N, Thrust 100N
Starting Torque	: 5 mN·m (oil-seal is provided-11 mN·m)
Moment of Inertia	: 92.5g·cm ²
Weight	: 3kg

■ General Specifications

Operating Temperature	: 0°C to +80°C
Storage Temperature	: -20°C to +85°C
Humidity	: 95% (40°C/8h, the rotating shaft is sealed) with no condensation
Standard	: IP-X5 (Jet proof type)
Vibration	: 49m/s ² (X, Y and Z direction for each 2h)
Shock	: 980m/s ² (3 times each in X, Y and Z direction, 98m/s ² in the axial direction)

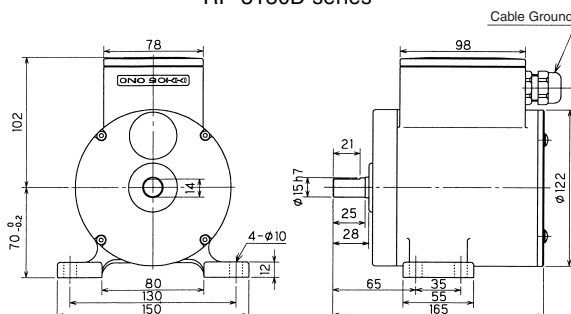
■ Optional number of output pulse (P/R)

100 300 360 500 512 1024 2048 2500 3000 4000

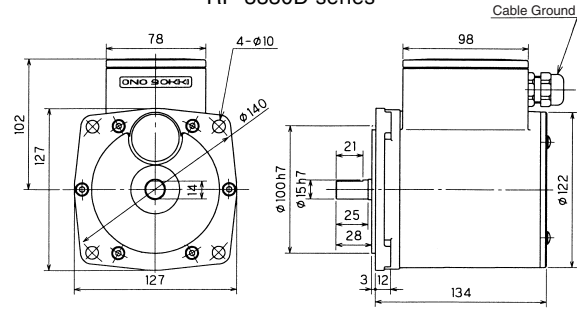
* Items marked * are optional

■ Outer Dimensions

RP-3130D series



RP-3330D series



SP-405ZA

Ultra-compact Type

■ Standard number of output pulse (P/R)

60 100 200 300 360 500 600



- Designed as economy encoders for OEM requirements.
- Ultra-compact and lightweight with an OD of 38 mm and weight of only 100 grams.
- 2-phase and zero mark square wave outputs.
- High-resolution (up-to 2000 P/R)
- Sixteen output pulse types to select from.

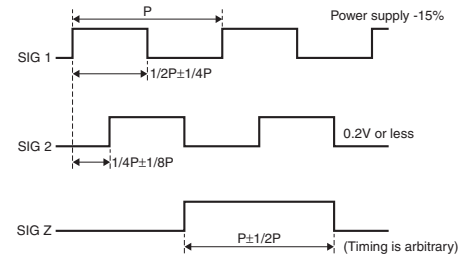
■ Electric Specifications

Output Waveform	: 2-phase square wave +zero mark
Output Voltage	: 1 : Power supply voltage-20% min. 0 : 0.5V max.
Output Type	: Collector output, load resistance 10kΩ min. * Open collector output 30VDC, 35mA max. * Line driver output equivalent to 26C31
Signal Accuracy	: Adjacent $\pm 1/15P$ max. Accumulated $\pm 1/4P$ max.
Power Supply	: 5 to 12VDC $\pm 10\%$ 50mA * 24VDC available in open collector output only * In case of line driver output, 5VDC $\pm 10\%$ is only available.
Response Frequency	: 100kHz
Light Source	: LED
Light Receiver	: Phototransistor
Connection Method	: Directly connected 5-conductor shielded cable, 1m long (far end not terminated)

Signal Wire Assignment

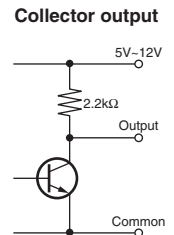
Green	White	Yellow	Red	Black	Shield
SIG 1	SIG 2	SIG Z	+5 to 12V	0V	Case

Output Waveforms



Viewing from the encoder shaft when rotating in CW direction.
(Viewing in CCW direction abbr.)

Output Circuits



■ Mechanical Specifications

Maximum Speed	: 6000 r/min
Max.Allowable Load	: Radial 25N, Thrust 15N
Starting Torque	: 2 mN·m
Moment of Inertia	: 6 gcm ²
Weight	: 0.1kg

■ General Specifications

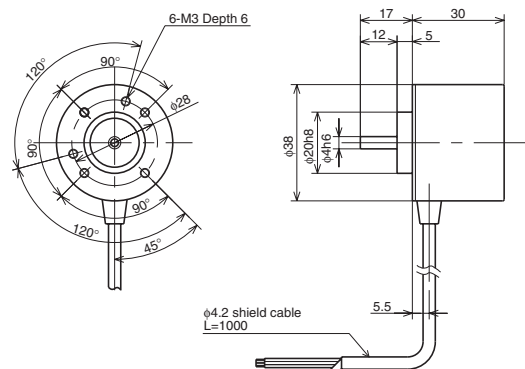
Operating Temperature	: -10°C to +70°C
Storage Temperature	: -20°C to +80°C
Humidity	: 90% (40°C/8h) with no condensation
Vibration	: 98m/s ² (2h each in X, Y and Z direction)
Shock	: 980m/s ² (3 times each in X, Y and Z direction, 98m/s ² in the axial direction)

■ Optional number of output pulse (P/R)

250 400 800 1000 1024 1200 1500 1800 2000

* Items marked * are optional

■ Outer Dimensions



RP-410D series

Low-torque High-resolution Type

■ Standard number of output pulse (P/R)
60 120 200 300 600 1000 1200
1500 1800 2000 2500 3000
3600 5000 6000



- Compact, lightweight design featuring an ultra-low starting torque.
- High reliability has made this model extremely popular.
- 12VDC power supply.
- Model with high number of output pulses available.

■ Electric Specifications

Output Waveform : 2-phase square wave
Output Voltage : 1 : 10V min., 0 : 0.5V max.
Output Type : Totem pole output, load resistance 470Ω min.
* Open collector output 15VDC 40mA max.
Signal Accuracy : Adjacent $\pm 1/200P$
Power Supply : Accumulated $\pm 1/5P$ max.
: 12VDC $\pm 5\%$, 100mA
* 5VDC, 15VDC, 24VDC
Response Frequency : 100kHz
Light Source : LED
Light Receiver : Phototransistor
Connection Method : 5-pin connector (Cable side:RM12BPG-5S)

■ Mechanical Specifications

Maximum Speed : 5000 r/min
Max. Allowable Load : Radial 10N, Thrust 5N
Starting Torque : 1 mN·m
Moment of Inertia : 32.5g·cm²
Weight : 0.9kg (1.3kg for 5000, 6000P/R)

■ General Specifications

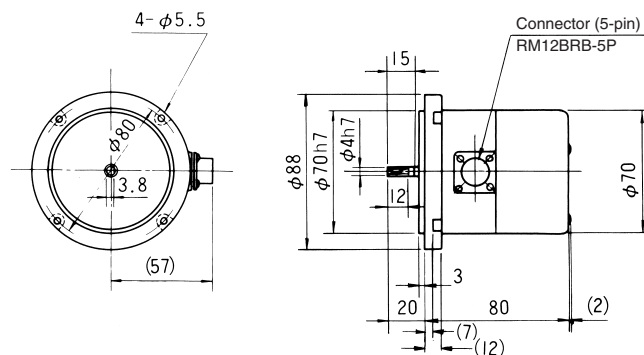
Operating Temperature : -5°C to +50°C
Storage Temperature : -20°C to +70°C
Humidity : 85% (40°C/8h) with no condensation
Vibration : 49m/s² (Axial direction for 4h,
up/down/left/right for 2h each)
Shock : 490m/s² (3 times each in X, Y and Z direction,
98m/s² in the axial direction)

■ Optional number of output pulse (P/R)

900

* Items marked * are optional

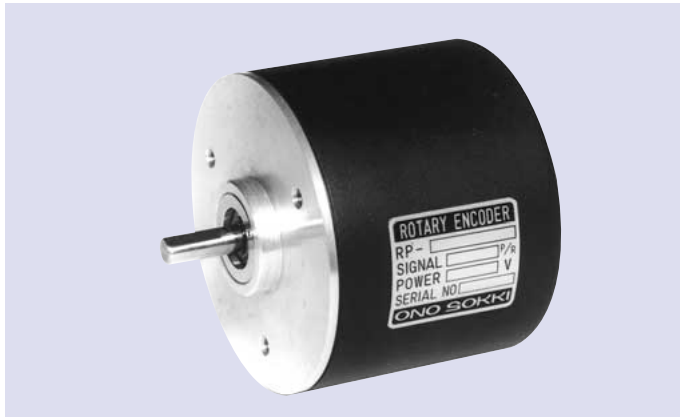
■ Outer Dimensions



RP-432Z

Compact Multi-use Type

■ Standard number of output pulse (P/R)
60 120 300 360 500 600 1000
1024



- Standard compact and economical design; ideal for OEM applications.
- 5VDC or 12VDC operation.
- Easy-to-use output signal connector.
- 2-phase and zero mark square wave outputs.
- Nine output pulse types to select from.

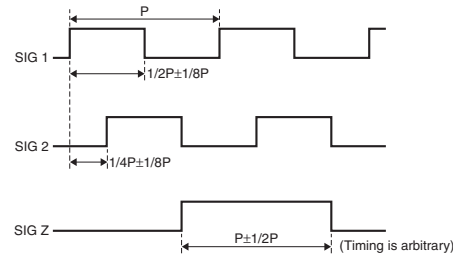
■ Electric Specifications

Output Waveform	: 2-phase square wave + zero mark
Output Voltage	: 1 : 4V min., 0 : 0.2V max. (when using 5VDC) 1 : 10V min., 0 : 0.3V max. (when using 12VDC)
Output Type	: Totem pole output, load resistance 1kΩ min.
Signal Accuracy	: Adjacent $\pm 1/20P$
Power Supply	: Accumulated $\pm 1/5P$ max. 5VDC $\pm 5\%$ 100mA or 12VDC $\pm 5\%$ 100mA
Response Frequency	: 50kHz
Light Source	: LED
Light Receiver	: Phototransistor
Connection Method	: 7-pin connector (Cable side: TRC116-12A10-7F)

Signal Wire Assignment

A	B	C	D	E	F	G
SIG 1	SIG 2	SIG Z	Common	+5 or 12V	0V	Case

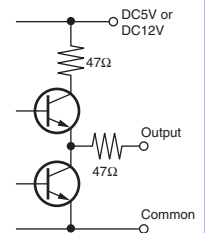
Output Waveforms



Viewing from the encoder shaft when rotating in CW direction.
(Viewing in CCW direction abbr.)

Output Circuits

Totem pole output



■ Mechanical Specifications

Maximum Speed	: 5000 r/min
Max. Allowable Load	: Radial 20N, Thrust 10N
Starting Torque	: 1.5mN·m
Moment of Inertia	: 24g·cm ²
Weight	: 0.25kg

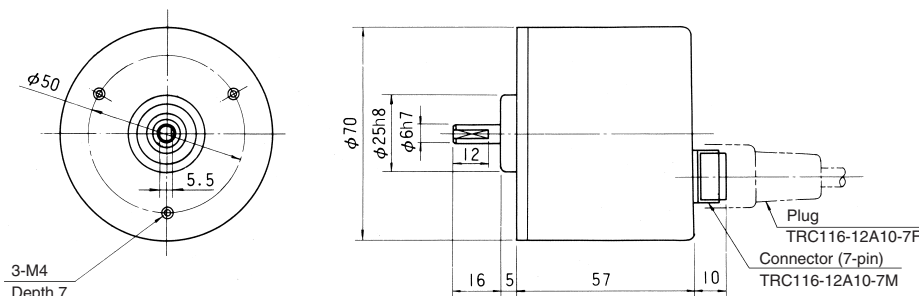
■ General Specifications

Operating Temperature	: 0°C to +50°C
Storage Temperature	: -20°C to +80°C
Humidity	: 85% (40°C/8h) with no condensation
Vibration	: 49m/s ² (2h each in X, Y and Z direction)
Shock	: 490m/s ² (3 times each in X, Y and Z direction, 98m/s ² in the axial direction)

■ Optional number of output pulse (P/R)

512

■ Outer Dimensions



RP-442Z

Compact & Flat Type

■ Standard number of output pulse (P/R)

1000 1200 2000 2500



- Compact, flat design and low cost.
- Bearings fitted with oil seals.
- 2-phase and zero mark square wave outputs.
- Line driver outputs with balanced outputs for each phase.
- Connections by means of a large MS connector (Canon plug).
- "Noise Immunity" circuit prevents power noise and erroneous signal generation caused by small vibrations.

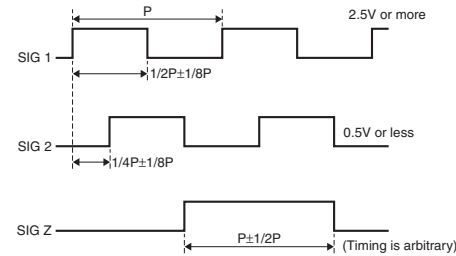
■ Electric Specifications

Output Waveform	: 2-phase square wave + zero mark (total of 6 phases with balanced outputs for each phase)
Output Voltage	: 1 : 2.5V min., 0 : 0.5V max.
Output Type	: Line driver (equivalent to 26LS31P)
Signal Accuracy	: Adjacent $\pm 1/20P$ Accumulated $\pm 1/5P$ max.
Power Supply	: 5VDC $\pm 5\%$ 200mA
Response Frequency	: 100kHz
Light Source	: LED
Light Receiver	: Phototransistor
Connection Method	: 10-pin connector (Cable side: MS3106A18-1S) (Clamp: MS3057-10A)

Signal Wire Assignment

A	B	C	D	E	F	G	H	I	J
SIG 1	SIG 2	SIG Z	Common	Case	+5V	0V	SIG $\bar{1}$	SIG $\bar{2}$	SIG \bar{Z}

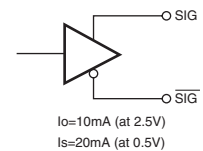
Output Waveforms



Viewing from the encoder shaft when rotating in CW direction.
(Viewing in CCW direction abbr.)

Output Circuits

Line driver output



■ Mechanical Specifications

Maximum Speed	: 5000 r/min
Max.Allowable Load	: Radial 20N, Thrust 10N
Starting Torque	: 3mN·m
Moment of Inertia	: 24g·cm ²
Weight	: 0.25kg

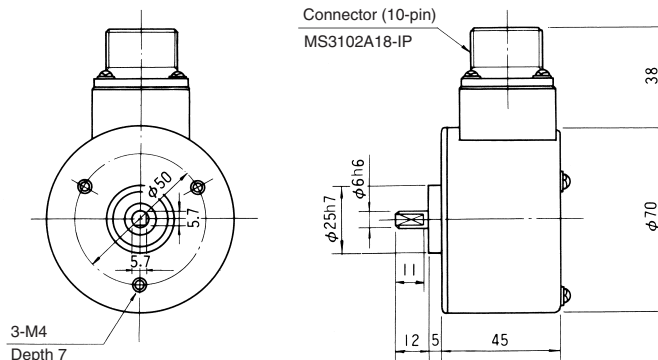
■ General Specifications

Operating Temperature	: -5°C to +60°C
Storage Temperature	: -20°C to +80°C
Humidity	: 90% (40°C/8h) with no condensation
Vibration	: 49m/s ² (2h each in X, Y and Z direction)
Shock	: 490m/s ² (3 times each in X, Y and Z direction, 98m/s ² in the axial direction)

■ Optional number of output pulse (P/R)

100 200 360 500 600

■ Outer Dimensions



RP-510 series

Oil-proof Type

■ Standard number of output pulse (P/R)
60 120 200 300 600 1000 1200
1500 1800 2000 2500 3000
3600



- Designed for use on machine tools or in environments in which the encoder is subjected to oil and/or water splash.
- Bearings fitted with oil seals.
- Powered from an AC line (DC power also available upon request).
- A variety of output pulse types to select from.

■ Electric Specifications

Output Waveform : 2-phase square wave
Output Voltage : 1 : 10V min., 0 : 0.5V max.
Output Type : Totem pole output, load resistance 470Ω min.
* Open collector output 40VDC 50mA max.
Signal Accuracy : Adjacent $\pm 1/200P$
Accumulated $\pm 1/5P$ max.
Power Supply : 100VAC $\pm 10\%$ 50mA max. or 12VDC $\pm 5\%$
150mA
Response Frequency : *110VAC
Light Source : 100kHz
Light Receiver : LED
Connection Method : Phototransistor
: 5-pin waterproof connector (Cable side:
RM12WBP-5S)
* 2m lead wires (far end unterminated)

■ Mechanical Specifications

Maximum Speed : 5000 r/min
Max. Allowable Load : Radial 40N, Thrust 20N
Starting Torque : 30mN·m
Moment of Inertia : 42.5g·cm²
Weight : 1.2kg

■ General Specifications

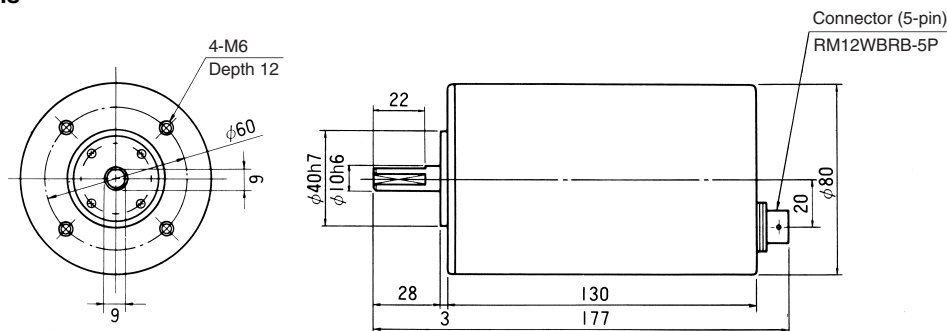
Operating Temperature : -5°C to +50°C,
Storage Temperature : -20°C to +70°C
Humidity : 95% (40°C/8h) with no condensation
Standard : IP-X5 (Jet proof type)
Vibration : 49m/s² (2h each in X, Y and Z direction)
Shock : 490m/s² (3 times each in X, Y and Z direction,
98m/s² in the axial direction)

■ Optional number of output pulse (P/R)

900

* Items marked * are optional

■ Outer Dimensions



RP-5320D series

Rigid Type



- Compact, rigid with thick diameter ($\phi 15$) and designed for machine tool.
- By increasing the distance between bearings, equivalent load was lightened, thus enabling long service life.
- Excellent resistance to particle intrusion provided by the shaft seal and the waterproof connector as standard.
- Designed to operate with various output pulse types, power supplies and voltages.
- "Noise Immunity" circuit prevents power noise and erroneous signal generation caused by small vibrations.

Electric Specifications

Output Waveform	: 2-phase square wave + *zero mark
Output Voltage	: 1 : 10V min., 0 : 0.5V min. (at 12VDC)
Output Type	: Totem pole output, load resistance 470 Ω min. * Line driver output equivalent to 26LS31 * Open collector output 40VDC 55mA max.
Signal Accuracy	: Adjacent $\pm 1/200P$ Accumulated $\pm 1/4P$ max.
Power Supply	: 12VDC $\pm 10\%$, 150mA * 5VDC $\pm 5\%$ 180mA * 15VDC $\pm 10\%$ 150mA * 24VDC $\pm 10\%$ 150mA
Response Frequency	: 100kHz
Connection Method	: 10-pin waterproof connector (Cable side: SNW-2010-PCF) * 2m lead wires (far end unterminated)

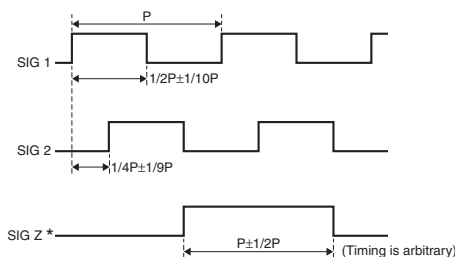
Standard number of output pulse (P/R)

100	200	300	360	500	600	1000	1200	1500
1800	2000	2500	3000	4096	5000	(Direct output)		
6000	8192	10000	(Multiplied output)					

Signal Wire Assignment

1	2	3	4	5	6	7	8	9	10
SIG 1	SIG 2	SIG Z	-	-	-	Common	Shield	Power supply	0V

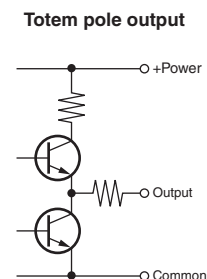
Output Waveforms



Viewing from the encoder shaft when rotating in CW direction.
(Viewing in CCW direction abbr.)

* Option

Output Circuits



Mechanical Specifications

Maximum Speed	: 5000 r/min
Max. Allowable Load	: Radial 50N, Thrust 50N
Starting Torque	: 20mN·m
Moment of Inertia	: 165g·cm ²
Weight	: 0.8kg

General Specifications

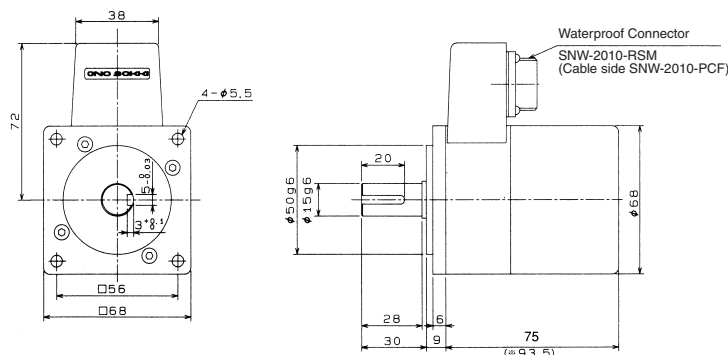
Operating Temperature	: -10°C to +60°C
Storage Temperature	: -20°C to +70°C
Humidity	: 95% (40°C/8h) with no condensation
Standard	: IP-X5 (Jet proof type)
Vibration	: 98m/s ² (2h each in X, Y and Z direction)
Shock	: 980m/s ² (3 times each in X, Y and Z direction, 98m/s ² in the axial direction)

Optional number of output pulse (P/R)

314 512 1024 2048 4000

* Items marked * are optional

Outer Dimensions



* Multiplied output

RP-5610D series

Water-proof Type

■ Standard number of output pulse (P/R)
60 100 200 300 360 500 600



- The water-proof design is provided with a magnetic coupling and partition wall.
- With using a stainless steel case and bearing, the rust-proof and corrosion-proof construction is achieved.
- "Noise Immunity" circuit prevents power noise and erroneous signal generation caused by small vibrations.

■ Electric Specifications

Output Waveform	: 2-phase square wave +*zero mark
Output Voltage	: 1 : 10V min., 0 : 0.5V max.
Output Type	: Totem pole output, load resistance 470Ω min. * Open collector output 40VDC 50mA max.
Signal Accuracy	: Adjacent ±1/15P Accumulated ±1/4P max.
Power Supply	: 12VDC ±10%, 150mA * 5VDC, 15VDC, 24VDC
Response Frequency	: 50kHz
Light Source	: LED
Light Receiver	: Phototransistor
Connection Method	: 5m lead wires (far end unterminated)
Signal Wire Assignment :	

Blue	Green	White	Brown	Yellow	Red	Black
SIG 1	Case	SIG 2	Common	SIG Z	+12V	0V

■ Mechanical Specifications

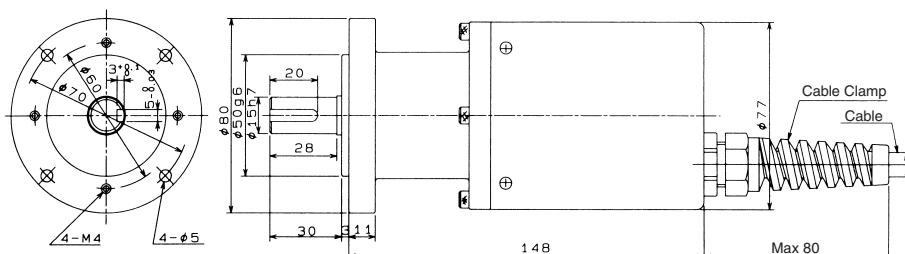
Maximum Speed	: 3000 r/min
Max. Allowable Angular Acceleration	: 400rad/s ² (output signal delay ±0.5°max.)
Max.Speed Delay	: ±0.5° max. (with no resonance)
Max.Allowable Load	: Radial 80N, Thrust 50N
Starting Torque	: 60mN·m
Moment of Inertia	: 255g·cm ²
Weight	: 3kg

■ General Specifications

Operating Temperature	: 0°C to +50°C
Storage Temperature	: -20°C to +70°C
Humidity	: 100%
Standard	: IP-X7 (Immersion proof)
Vibration	: 49m/s ² (2h each in X, Y and Z direction)
Shock	: 490m/s ² (3 times each in X, Y and Z direction, 98m/s ² in the axial direction)

* Items marked * are optional

■ Outer Dimensions



RP-8524L series

General-purpose Built-in Type

■ Standard number of output pulse (P/R)

200 600 1000 1200 2000

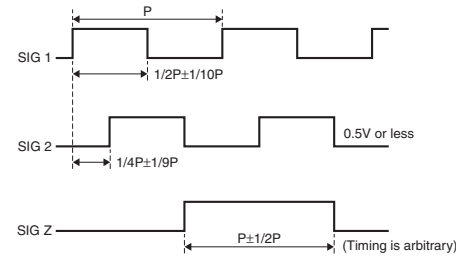


- No coupling is required, 32mm thin body size making it suitable for mounting in restricted spaces.
- Easy installation contributes to labor saving in production.
- Wide operating temperature range from -5°C to +85°C.
- 2-phase square wave output and zero-mark output.

Signal Wire Assignment

Blue	Purple	White	Green	Orange	Brown	Red	Black	Gray
SIG 1	SIG $\bar{1}$	SIG 2	SIG $\bar{2}$	SIG Z	SIG \bar{Z}	+5V	0V	Case

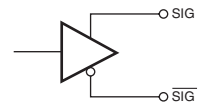
Output Waveforms



Viewing from the encoder shaft when rotating in CW direction.
(Viewing in CCW direction abbr.)

Output Circuits

Line driver output
(equiv. 26LS31)



$I_o=10\text{mA}$ (at 2.5V)
 $I_s=20\text{mA}$ (at 0.5V)
 $SIN=1, 2, Z$
 $SIN=\bar{1}, \bar{2}, \bar{Z}$

Electric Specifications

Output Waveform	: 2-phase square wave +zero mark
Output Voltage	: 1 : 2.5V min., 0 : 0.5V max.
Output Type	: Line driver output equivalent to 26LS31
Signal Accuracy	: Adjacent $\pm 1/20P$ Accumulated $\pm 1/5P$ max.
Power Supply	: 5VDC $\pm 5\%$, 180mA
Response Frequency	: 200kHz
Light Source	: LED
Light Receiver	: Phototransistor
Connection Method	: 200mm lead wires (far end unterminated)

Mechanical Specifications

Maximum Speed	: 6000 r/min
Max.Allowable Load	: Radial 30N, Thrust 15N
Starting Torque	: 2mN·m
Moment of Inertia	: 32.5g·cm ²
Weight	: 0.16kg

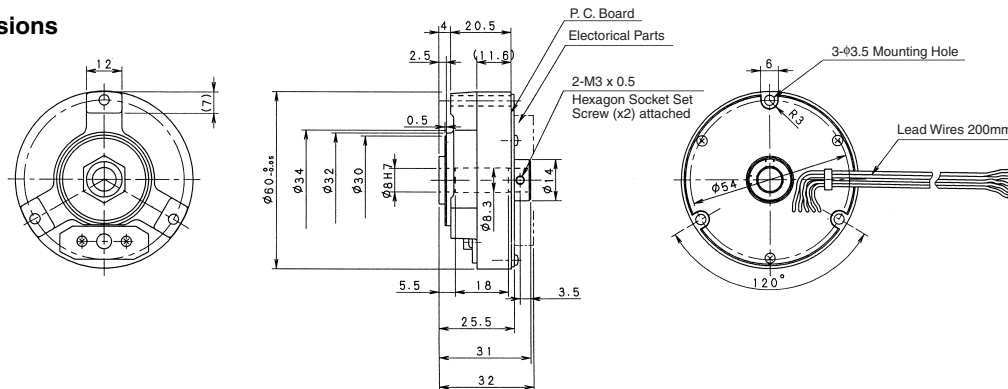
General Specifications

Operating Temperature	: -5°C to +85°C
Storage Temperature	: -20°C to +90°C
Humidity	: 85% (40°C/4h) with no condensation
Vibration	: 196m/s ² (2h each in X, Y and Z direction)
Shock	: 1960m/s ² (3 times each in X, Y and Z direction, 98m/s ² in the axial direction)

■ Optional number of output pulse (P/R)

100 300 360 500 512 1024 2048 2500 3000 4000 5000

Outer Dimensions



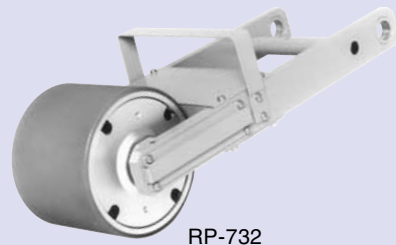
Roller encoders enable line speed and distance measurements.



RP-704ZA



RP-721



RP-732

For line speed measurement

- Direct readout of line speed in combination with the TM-2100 series digital tachometers.
- Available to detect speed nearby 0 r/min.

For distance measurement

- Backlash can be adjusted automatically when stopped, with reversible counting function (available in combination of RP-732 with a reversible counter).

RP-704ZA

General-purpose Type

■ Electric Specifications

Output Waveform	: 2-phase square wave +zero mark
Output Voltage	: 1 : 9 to 12.6V, 0 : 0.5V max. (at no load) Duty 1/2P \pm 1/4P, phase 1/4 \pm 1/8P, Z-width P \pm 1/2P
No. of Output Pulse	: 100P/R (for line speed measurement)
Output Type	: Collector output, load resistance 10k Ω min.
Speed Range	: 0 to 400m/min
Measuring Resolution	: 0.1m/min (at the gate time of 1s)
Roller Circumference	: 166.7mm (ϕ 53.05mm) Polyurethane rubber baked on the roller surface
Power Supply	: 12VDC \pm 5% 50mA

■ Mechanical Specifications

Max. Allowable Load	: 5N (radial)
Starting Torque	: 2mN·m
Moment of Inertia	: 0.6kg·cm ²
Weight	: 0.5kg

■ General Specifications

Operating Temperature	: 0°C to +60°C
Humidity	: 85% (40°C/8h) with no condensation
Vibration	: 19.6m/s ² (2h each in X, Y and Z direction)

RP-721

Low & Midium Speed Type

■ Electric Specifications

Output Waveform	: Single-phase square wave
Output Voltage	: 1 : 10 \pm 1V, 0 : 0.5V max. Duty 1/2P \pm 1/8P
No. of Output Pulse	: 120P/R, 1200P/R (for line speed measurement) 200P/R (for distance measurement)
Output Type	: Emitter output, load resistance 1k Ω min.
Speed Range	: 0 to 200m/min (1200P/R) 0 to 400m/min (120P/R, 200P/R)
Measuring Resolution	: 0.01m/min (1200P/R, at the gate time of 1s) 0.1m/min (120P/R, at the gate time of 1s) 1mm (200P/R, for distance)
Roller Circumference	: 200mm (ϕ 63.66mm) Polyurethane rubber baked on the roller surface
Power Supply	: 12VDC \pm 5% 100mA

■ Mechanical Specifications

Max. Allowable Load	: 10N (radial)
Starting Torque	: 1mN·m
Moment of Inertia	: 0.63kg·cm ²
Weight	: 0.5kg

■ General Specifications

Operating Temperature	: 0°C to +50°C
Humidity	: 85% (40°C/8h) with no condensation
Vibration	: 19.6m/s ² (2h each in X, Y and Z direction)

RP-732

Reversible Counting Type

■ Electric Specifications

Output Waveform	: 2-phase square wave
Output Voltage	: 1 : 10 \pm 1V, 0 : 0.5V max. Duty 1/2P \pm 1/8P, phase 1/4 \pm 1/8P
No. of Output Pulse	: 300, 750P/R (for line distance measurement)
Output Type	: Totem pole output, load resistance 1k Ω min.
Speed Range	: 0 to 200m/min
Measuring Resolution	: 1mm (300P/R) 0.4mm (750P/R)
Roller Circumference	: 300mm (ϕ 95.49mm) Polyurethane rubber baked on the roller surface
Power Supply	: 12VDC \pm 5% 100mA

■ Mechanical Specifications

Max. Allowable Load	: 30N (radial)
Starting Torque	: 5mN·m
Moment of Inertia	: 7.5kg·cm ²
Weight	: 2.2kg

■ General Specifications

Operating Temperature	: 0°C to +50°C
Humidity	: 85% (40°C/8h) with no condensation
Vibration	: 19.6m/s ² (2h each in X, Y and Z direction)

* **Remarks** Cables and connectors at a cable side are sold separately.
Unit P described in output signal represents cycle of pulse per a pitch.

Peripherals

FV-1300

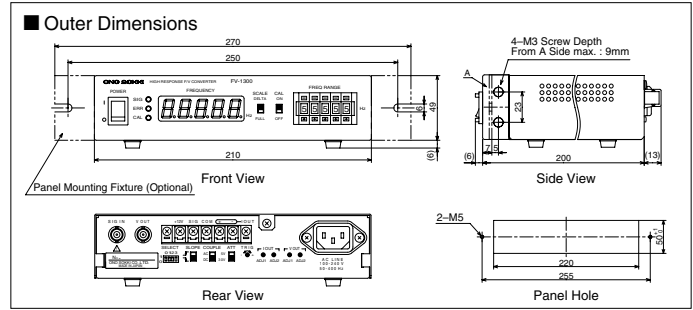
High-response Frequency-to-Voltage (F/V) Converter



- Enabling excellent response rate, converting each period of frequency signals proportional to revolution or velocity, into voltage or current signals at a very high speed.
- Can be measuring transient phenomenon occurs in rotational startup characteristics of engines and motors, furthermore minute rotational variations during stable rotation.
- Achieving high precision and multifunctional capabilities by adopting a digital signal processor (DSP) in the computation section.

Electric Specifications

Conversion Method	: Period computation
Response	: 1 period of input frequency + 7.6μs (calculation time of DSP)
Input Configuration	: Isolated single ended input (The potential difference between common and ground on the housing, should be 42VDC max.)
Input Frequency Range	: 1 Hz to 20kHz (*50kHz or 100kHz, as optional)
Input Voltage Range	: 0.3 to 30Vp-p (AC) ±0.3 to ±30V (DC), trigger level adjustment range : -30 to +30V
Input Terminal	: Type CO2 (BNC) and terminal block (M3)
Frequency Range	
· Full-scale Output Mode	: Max. frequency can be set between 1Hz to 20kHz in a 1Hz basis
· Deviation Output Mode	: Center frequency can be set between 2 to 19,801Hz in a 1Hz basis



Frequency Display	: 5-digit green 7-segment, 1s of display interval
Output Signal (Voltage)	: 0 to 10V (in full-scale output) 0±5V (in deviation output)
Output Signal (Current)	: 0 to 16mA (in full-scale output, at delivery) or 4 to 20mA 8±8mA/12±8mA (in deviation output)
Output Terminal	: Type CO2 (BNC, for voltage output) Terminal block (M3, for current output)
D/A Resolution	: 16-bit (counter frequency : 20MHz)
Output Error (excluding offset)	
· Full-scale Output Mode	: ±0.1% of FS (voltage), ±0.7% of FS (current)
· Deviation Output Mode	: ±0.5 to ±5% of FS (voltage), ±3 to ±10% of FS (current). Differs depending on the center frequency and deviation range settings.

General Specifications

Detector Power Supply	: 12VDC (±10%) 100mA max. (ripple : 200mVp-p max.)
Power Supply	: 100 to 240VAC, 50 to 400 Hz
Power Consumption	: 13VA max.
Operating Temperature Range	: 0 to +40°C
Humidity	: 80% R.H (with no condensation)
Outer Dimension	: 210(W) x 49(H) x 200(D)mm
Weight	: Approx. 1.1kg

PA-330Z

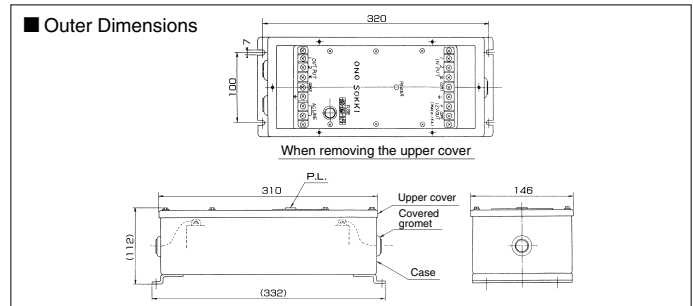
Isolation Pulse Transmitter



- The PA-330Z receives the square wave signals from the rotary encoder, and converts it to low impedance signals suitable for long distance transmission after waveshapening and amplifying via photocouplers which provide isolation between input and output.
- A 12VDC external power supply is provided for use with the DC powered RPseries encoder.
- The case is sealed construction which allows closely mounting to the encoder.

Electric Specifications

Input Waveform	: 2-phase square wave (duty cycle: approx. 50%) +zero mark
Input Resistance	: 470Ω
Input Voltage	: 1 : 8 to 12.5V, 0 : 0 to 4V
Response Frequency	: 50kHz



Response Delay	: Approx. 2μs between input and output
Output Voltage	: 1 : 10V min, 0 : 0.5V max. (with 5kΩ load)
Output Type	: Collector output, load resistance 330Ω * Open collector output 40VDC, 50mA max. (PA-330ZC)
External Power Supply	: 12VDC, 150mA

General Specifications

Power supply	: 100VDC ±10% *100VAC, 200VAC, 220VAC
Operating Temperature	: -5°C to +40°C
Options	: Multiply-by-2 output (PA-332Z Note 1, 2) Multiply-by-4 output (PA-334Z Note 2) Input resistance 1.5kΩ or 47kΩ Output resistance 220Ω (only for 2-phase)

Note 1: When inputting single-phase signals, the output pulse signals of approx. 10μs is provided at the OUT1 terminal with no rotational direction discrimination.
Note 2: When inputting 2-phase signals, the output pulse signals of approx. 10μs is provided at the OUT1 terminal in clockwise direction and at the OUT2 terminal in counter clockwise direction.

* Items marked * are optional

TM-2100 series

Digital Tachometer



- Compact and light-weight, conforming to DIN standards (96 x 48mm)
- Equipped with a large sized green LED
- A suitable type can be found and selectable among following models according to requirements;
 - TM-2110 Basic type
 - TM-2120 featuring BCD output
 - TM-2130 featuring Analog output
 - TM-2140 featuring Comparator

Electric Specifications (common specifications)

Input Section

Input Connection : M3 free terminal screws
 Input Impedance : 30k Ω min (at 20kHz)
 Input Amplification Format: AC or DC (switchable)

AC Amplifier

Signal Waveform : Sine or square wave
 Signal Voltage Range : Sine wave : 0.2 to 45 Vrms
 Square wave : 0.6 to 63 Vp-p
 Signal Frequency Range : 1 Hz to 20 kHz

DC Amplifier

Signal Waveform : Rectangular wave with pulse width of 20 μ s min.
 Signal Voltage Range : Hi : +4 to +30V
 Low : -1 to +1V
 * By changing a bit switch, open collector or dry contact input is available.
 Signal Frequency Range : 0.1 Hz to 20 kHz
 Low Pass Filter : Cut off frequency ; approx. 100Hz
 Attenuation ; approx. -40dB at 20kHz (switchable on/off by a bit switch)

Display Section

Display : 7-segment green LED (5-digit)
 Character Height : 14.2mm
 Display Update : Approx. every one second
 SIG Indicator : Flashes synchronized with input signals
 Error Display : Each digit displays flashing "1" for excessive frequency input.
 Each digit displays flashing "2" for display overflow.
 Each digit displays flashing "3" for setting errors.

General Specifications (common specifications)

Detector Power Supply : 12VDC (\pm 0.6V) 100mA (ripple : 100mVp-p max.)
 Power Supply : 100 to 240VAC, 50/60 Hz
 Withstand Voltage : 1500VAC for 1 min.
 Insulation Resistance : 5M Ω min.
 Power Consumption : 20VA max. (TM-2130 : 23VA max.)
 Operating Temperature Range : 0 to +40°C
 Storage Temperature Range : -10°C to +55°C
 Outer Dimensions : 96(W) x 48(H) x 140(D)mm
 Weight : Approx. 630g

RV-3150

Reversible Counter



- Easily viewable display with large sized LED (14mm of character height)
- A variety of calculation functions can expand applications. Featuring, multiplication selection, ratio compensation, off-set, and decimal point selection functions
- Securing a plenty of external output functions; comparator, analog, BCD, and RS-232C

Electric Specifications

Input Signal : Single phase or 2-phase square waveform signal with voltage range; Hi : +4 to +30V
 Low : -1 to +1V
 Line receiver signal (equivalent to RS-422A)
 Input Frequency : DC to 100 kHz
 Detector Power Supply : 5VDC \pm 0.25V or 12VDC (\pm 0.6V), selectable
 External Control Signal
 • Input Signal : Voltage input ; Hi : +4 to +5.25V Low : 0 to +1V, dry contact input
 • Input Signal Type : Reset, gate, off-set, key protection
 Mode / Functions : Multiplication selection (4/2/1)
 Ratio compensation (0.000001 to 0.999999)
 Off-set (0 to \pm 999999)
 Comparator (0 to \pm 999999, 2-step)

General Specifications

Power Supply : 100 to 240VAC, 50/60 Hz
 Power Consumption : 30VA max.
 Operating Temperature Range : 0 to +40°C
 Outer Dimensions : 144(W) x 72(H) x 210(D)mm
 Weight : Approx. 1.3kg

Accessories

Cables

■ Signal Cables

	Power Supply	Part No.	Cable End Termination	Examples of Connection
Single Phase Output	AC	RM5-3T3	RM12BPG-5S (R6) M3 x 3	RP-111A-C0 → TM-2100 series
	AC	3T3-3T3	M3 x 3 (R6) M3 x 3	RP-111A-T0 → TM-2100 series
	DC	RP-004 (RM5-3T5-D)	RM12BPG-5S (R6) M3 x 5	RP-111D-C0 → TM-2100 series, RP-721 → TM-2100 series
	DC	3T5-3T5-D	M3 x 5 (R6) M3 x 5	RP-111D-T0 → TM-2100 series
2-phase Output	AC, DC	RM5-3T7	RM12BPG-5S (R6) M3 x 7	RP-112D-C0 → PA-330Z
	AC, DC	RP-006 (RM5-0P)	RM12BPG-5S (R6) not terminated	RP-112A-C0 sold solely, RP-732 sold solely
	AC	3T5-0P-A	M3 x 5 (R6) not terminated	RP-112A-T0 sold solely
	DC	3T7-0P	M3 x 7 (R6) not terminated	RP-112D-T0 sold solely
	AC	3T5-3T5-A	M3 x 5 (R6) M3 x 5	RP-112A-T0 → PA-330Z
	DC	3T7-3T7	M3 x 7 (R6) M3 x 7	RP-112D-T0 → PA-330Z
	AC, DC	RM5W-0P	RM12WBP-5S (R6) not terminated	RP-112A-W1 sold solely
	AC, DC	RM5W-3T7	RM12WBP-5S (R6) M3 x 7	RP-112A-W1 → PA-330Z
	DC	SNW-3T7	SNW2010-PCF (R6) M3 x 7	RP-1132D, 1332D, 5322D → PA-330
	DC	SNW-R60P	SNW2010-PCF (R6) not terminated	RP-1132D, 1332D, 5322D → PA-330 sold solely
2-phase + Zero Mark Output	DC Line Driver	SNW-R60P-L	SNW2010-PCF (R6) not terminated	RP-5322D-L sold solely
	AC, DC	RP-008 (TRC7F-0P)	TRC116-12A10-7F (R8) not terminated	RP-432Z-C0 sold solely, RP-112AZ-C0 sold solely
	AC	3T7-0P-AZ	M3 x 7 (R8) not terminated	RP-112AZ-T0 sold solely
	DC	3T9-0P	M3 x 9 (R8) not terminated	RP-112DZ-T0 sold solely
	AC	3T7-3T7-Z	M3 x 7 (R8) M3 x 7	RP-112AZ-T0 → PA-330Z
	DC	3T9-3T9	M3 x 9 (R8) M3 x 9	RP-112DZ-T0 → PA-330Z
	DC	SNW-3T9	SNW2010-PCF (R8) M3 x 9	RP-1134D, 1334D, 5324D → PA-330
	DC	SNW-R80P	SNW2010-PCF (R8) not terminated	RP-1134D, 1334D, 5324D sold solely
	DC Line Driver	SNW-R80P-L	SNW2010-PCF (R8) not terminated	RP-5324D-L sold solely

■ Power Cables

	Power Supply	Part No.	Cable End Termination	Examples of Connection
Power Supply	AC	AC-RM2	AC plug (0.75 x 2) RM12BPG-2S	for RP-111A-C0, RP-112A-C0
	AC	AC-3T2	AC plug (0.75 x 2) M3 x 2	for RP-111A-T0, RP-112A-T0
	AC	AC-RM2W	AC plug (0.75 x 2) RM12WBP-2S	for RP-111A-W1, RP-112A-W1
	AC	RM2-0P	RM12BPG-2S (0.75 x 2) not terminated	for RP-111A-C0, RP-112A-C0
	AC	RM2W-0P	RM12WBP-2S (0.75 x 2) not terminated	for RP-111A-W1, RP-112A-W1
	AC	3T2-0P	M3 x 2 (0.75 x 2) not terminated	for RP-111A-T0, RP-112A-T0

■ Cable Materials

	Power Supply	Specifications
Cable Specifications	AC	VCTF 0.75 x 2 2-pin cabtire cable for AC power supply 0.75mm ²
	AC, DC	3-pair twisted, 2-pair shielded cable (R6) for single or 2-phase signal output
	AC, DC	4-pair twisted, 3-pair shielded cable (R8) for 2-phase + zero mark output
	AC, DC	PVC 0.3 x 7-pin (RT7) for RP-5610D series
	* Cable Length : 5 m for signal output, 2.4 m for power supply as standard accessory spec.	

Couplings

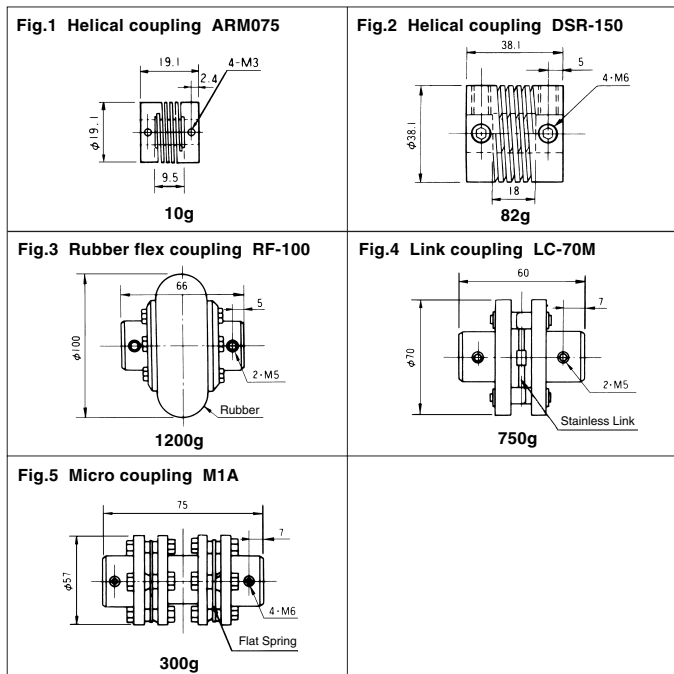
Coupling selection

While a rigid coupling can ensure accurate revolution and angle measurements using a rotary encoder, mounting errors such as misalignment of shaft and play in the thrust direction can result in elastic deformation of bearings and can cause loss of encoder accuracy and even damage to the encoder.

To ensure stable operation using a rigid coupling over a long period of time, mounting of compact encoders should have no more than 7/1000mm shaft misalignment and conventional or large encoders should be mounted with no more than 3/1000mm shaft misalignment. In addition, the thrust direction play should be kept zero.

If such conditions are a practical impossibility, a flexible coupling must be used which can take up such center misalignment and thrust direction play. Flexible couplings with good torsional rigidity that are suitable for angle measurements and those suitable for general-purpose rotational measurements are available, these being selected to suit the individual application. Even with the use of a flexible coupling, however, there is always the possibility that the method of mounting will subject the encoder shaft to more than the allowable mode either statically or dynamically and because of this, centering of shafts should be performed with extreme care.

Recommended Coupling Configurations and Weights



Recommended Coupling Comparison Table

Coupling	Applicable encoders	Application	Features	Recommended specifications	Installation/removal method	Remarks
Helical coupling ACRM050/ARM075/ DSR100 by Miki Pulley, Fig.1	RP-432Z SP-405ZA RP-442Z RP-410D series RP-510 series	Angle measurement Revolution measurement	<ul style="list-style-type: none"> • Uses metallic elasticity • Good torsional rigidity and no backlash 	Revolution 5000 r/min Displacement 0.05mm Deviation 0.03mm Angle deviation 0.2°	Mounted as a unit to an encoder or a machine and inserted into a mating piece.	In case of RP-510 series Revolution 5000 r/min Displacement 0.12mm Deviation 0.1mm Angle deviation 0.5°
Helical coupling DSR150/DSCR150 by Miki Pulley, Fig.2	RP-100 series RP-310 series RP-5320D series			Revolution 5000 r/min Displacement 0.07mm Deviation 0.05mm Angle deviation 0.5°		
Rubber flex coupling RF-100 or others by Toyo Rubber, Fig.3		Revolution measurement	<ul style="list-style-type: none"> • Uses rubber elasticity to absorb shock • Provides attenuation of vibration • Electrically isolated 	Revolution 500 r/min Displacement 0.15mm Deviation 0.3mm Angle deviation 0.3°	A flange is mounted to an encoder and a machine side and, after establishing the centering dimensions, a rubber tire is mounted. May be removed and mounted without moving a machine.	At high speeds, thrust force, caused by expansion of the rubber owing to centrifugal force, can damage an encoder. Drive side shaft diameter: $\phi 10$ to 22mm (see Note)
Link coupling LC-70M or others by Daiyu, Fig.4			<ul style="list-style-type: none"> • Uses elasticity of stainless link • Available in higher revolution than RF 	Revolution 5000 r/min Displacement 0.02mm Deviation 0.1mm Angle deviation 0.3°	Consists of a coupling with stainless link replacing the RF rubber tire.	Drive side shaft diameter: $\phi 10$ to 20mm (see Note)
Micro coupling M1A or others by Daido Precision, Fig.5		Angle and revolution measurement in high accuracy	<ul style="list-style-type: none"> • Uses elasticity of metallic plate • Good torsional rigidity; suitable to angle measurements 	Revolution 5000 r/min Displacement 0.3mm Deviation 0.2mm Angle deviation 0.3°	After centering an encoder shaft and a machine shaft, a flange, a flat spring and a spacer are used for mounting.	Drive side shaft diameter: $\phi 10$ to 20mm (see Note)

Other couplings • Lateral coupling (Mighty)....Good torsional rigidity, compact and lightweight.
• Tribal joint (NTN)....Equispeed

Note : Hole machining on the drive shaft side is the responsibility of the user.

ONO SOKKI

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

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

U.S.A. & CANADA

Ono Sokki Technology Inc.
2171 Executive Drive, Suite 400
Addison, IL. 60101 U.S.A.
Phone : 630-627-9700
Fax : 630-627-0004
URL : <http://www.onosokki.net>
E-mail : info@onosokki.net

P.R.CHINA

Ono Sokki Beijing Office
Beijing Jing Guang Center 3510
Hu Jia Lou, Chao Yang Qu
Beijing P.R.C. 100020
Phone: 010-6597-3113
Fax : 010-6597-3114
E-mail : onosokki@public.bta.net.cn

WORLDWIDE

Ono Sokki Co., Ltd.
1-16-1 Hakusan, Midori-ku,
Yokohama 226-8507, Japan
Phone: 045-935-3976
Fax : 045-930-1906
E-mail: overseas@onosokki.co.jp



Recycled Paper

Printed in Japan 049 (SK) 3K