# LG/SP/MP/RP series FV/FT/HT/TM series **Digital Tachometer**







# Diverse lineup that Ono Sokki is proud of. Choose the product that satisfies your need.



## **Rotation Detector**

# Notes on Detection Gears

## •Detection Gear

In general, gear made with soft metals (S45C, SS400, etc.) is used as a detection gear, which has magnetic body and large magnetic permeability. When measuring the rotation speed, if the gate time of the counter is 1 second, it can be read directly by the counter using the gear with 60 P/R. Shape of a Detection Gear Fig.1 shows detector output waveforms from various types of external rotors (detection gears etc.) Involute gear is the most suitable for detection gear. \*Note

1. Distortion might appear in output waveform, such as high frequency distortion when triangular teeth / square teeth / round teeth / partially missing teeth are used.

2. If the gear is magnetized, output voltage decreases or the abnormal waveform is output due to interference with the permanent magnet inside the detector

Abbreviation of gears: M=Module Z=number of teeth D=pitch circle diameter of gear

D N (r/min) × Z (number of teeth) M = Ζ 60 (s)

= C (Hz) When Z=60, N=C

## •Shape of the gear for the MP-981 and the mounting method

#### (1) Output signals according to the shape of the gear

(2) Mounting method



## **Electromagnetic Rotation Detectors and Magneto-electric Rotation Detectors**

Electromagnetic Rotation Detectors (MP-900/MP-9000 series)



Electromagnetic Rotation Detector generates frequency signal of proportional to the rotation speed by bringing it close to the tooth tip of the detection gear attached to the rotating shaft. It consists of a permanent magnet, a detection coil, and a yoke.

When a magnetic material approaches in the vicinity of the yoke, the magnetic flux passing through the detection coil changes, and an induced voltage of frequency proportional to the change is generated in the detection coil

Magnetic flux pulsates "frequency f = rotation speed x gear". Therefore, this will be output as the rotation signal of the detector. Features are as follows.

- Easy structure
- 2. No power supply required
- 3. Compact 4. No need for maintenance
- It provides reliable rotation measurement and is widely used in many ways.

٢ R1≶ √R≸ Waveform Output Output circuit shaping R₂ ≷ DC Amp  $\gamma$ Regulator circuit VIN: DC12 V+2V

Magneto-electric Rotation Detectors (MP-981/9820, AP-981)

Magneto-resistive element

Fig. 1 Various teeth shapes and

output waveforms

Magneto-electric rotation detector is made by applying a magneto-resistive element whose resistance value varies depending on the intensity of the magnetic field.

Normally, a constant magnetic field is applied by a magnet, and the change in the magnetic field when the detection gear approaches the element is detected as a change in the resistance value.

Changes in resistance value (= differential output) is detected and its signal is amplified by a DC amplifier. The output of the DC amplifier goes through a waveform shaping circuit and is made into a rectangular wave.

Magneto-resistive element is arranged at the tip of

the detector. For correct detection, it is necessary that the detection surface and the gear surface face

each other with the proper direction and position. As a guide, the detector is marked with an alignment mark (power supply: DC 12  $\pm$  2 V)



## Electromagnetic Type Rotation Detector MP-900/9000 series

By bringing the MP-900/9000 series close to the tooth tip, it detects the frequency signal proportional to the rotation speed (sine wave output). You can select according to the purpose from wide selection, such as general purpose type, special type including oil proof / heat resistant type. Extension cable, signal cable, connector are sold separately (See P28-31).



## Features

- General-purpose type MP-9100 •Low cost and popular type
- Direct attached cable type

MP-911 •Cable 5m direct attached type of MP-9100 (cable: 3D-2V)

 Low impedance (high-speed rotation type) MP-9120

 Noise-resistant due to low impedance Adapted for detection in high speed range •Same size as MP-9100

## Oil-proof type

MP-930

•Conforms to Japan Electrical Manufacturers Association (JEM) standard (old), JEM-1030-1983\*1 oil proof type •Direct attached cable 0.5 m

### Oil proof and heat-resistant type MP-935

 Conforms to Japan Electrical Manufacturers Association (JEM) standard (old), JEM-1030-1983\*1, oil proof type •Heat resistant cable up to 150 °C

•1 m directly attached type

#### Heat resistant type MP-936

•Heat resistant up to 220 °C •Heat resistant cable 1 m directly attached type

## Long body type

MP-940A

•Long body type of 105 mm mounting section, suitable for the rotation detection of the rotating object deeply installed.

## Long body type

MP-954

•Long body type of 81 mm mounting section, suitable for the rotation detection of the rotating object deeply installed.

- Mounting screw size is same as MP-950
- •Directly attached cable 0.5 m
- \*1 Protective type F: Not affected harmful by oil droplets/oil spill from any direction.

<sup>t</sup> When the electromagnetic type rotation detector MP series is used especially in the place where great importance is placed on reliability, the technical consultation is required.

Please consult your nearest distributor or Ono Sokki sales office nearby.

**Rotation Detectors** 

Notes on

Detection

Gears



- Compact type MP-950 •Compact (M12), directly attached cable 0.5 m
- Compact type MP-962
- •Compact (M8), directly attached cable 0.5 m
- Ultra-compact type MP-992
- •Ultra-compact (M5), directly attached cable 0.5 m
- Compact module type MP-9200 •For module 0.5 to 1
- Medium module type MP-963 •For module 3 to 10

## Standard detection gear

MP-001 (Ø = 62) •Module 1, 60 teeth



## •MP-900/9000 series specifications

Detectors	General-purpose	General-purpose (With cable attached)	Low impedance (High-speed rotation type)	Oil-proof (With cable attached)	Oil-proof/Heat- resistant (150 °C) (With cable attached)	Heat-resistant (220 °C) (With cable attached)
Items	MP-9100	MP-911	MP-9120	MP-930	MP-935	MP-936
DC resistance value ( $\Omega$ ) <sup>*1</sup>	850 t	o 950	85 to 105	850 to 950	600 to 700	800 to 900
Inductance (mH) [1kHz, T.Y.P]	30	00	30	300	270	370
Impedance (Ω) [1kHz, T.Y.P]	2	k	240	2 k	1.8 k	2.5 k
Output voltage (Vp-p) [ 1kHz, T.Y.P]*2	2.0 or more					
Detectable frequency range (Hz) $^{\star3,\ \star4}$	200 to	35,000	200 to 80,000	200 to 35,000	300 to 35,000	
Detecting gear module			1 to	o 3		
Operating temperature range		-10 to	90 °C		-10 to 150 °C	-10 to 220 °C
Vibration resistance $(m/s^2)^{*5}$	196					
Shock resistance $(m/s^2)^{*6}$	1,960					
Weight (g)	Approx. 90         Approx. 300 (Including cable)         Approx. 90         Approx. 100 (Including cable)					
Surrounding magnetic field (T)	0.03 or less 0.02 or less					

Detectors	Long body	Long body (With cable attached)	Compact type (With cable attached)	Compact type (With cable attached)	Ultra-compact type (With cable attached)	For small modules	For medium modules
Items	MP-940A	MP-954	MP-950	MP-962	MP-992	MP-9200	MP-963
DC resistance $(\Omega)^{*1}$	500 to 600	2.1 to	2.3 k	1.25 to 1.45 k	160 to 190	850 to 950	3.7 to 4 k
Inductance (mH) [1kHz, T.Y.P]	270	40	00	210	25 300		1800
Impedance (Ω) [1kHz, T.Y.P]	1.8 k	3.5	5 k	2.1 k	250	2 k	16 k
Output voltage (Vp-p) [1kHz, T.Y.P]*2		2.0 or more		1.5 or more	0.5 or more	0.6 or more (M=0.75)	2.5 or more
Detectable frequency range (Hz)*3, *4	300 to 35,000			400 to 35,000	400 to 100,000	300 to 35,000	45 to 15,000
Detecting gear module			0.5 to 1	3 to 10			
Operating temperature range		-10 to	90 °C		-10 to 120 °C	-10 to	90 °C
Vibration resistance (m/s <sup>2</sup> )* <sup>5</sup>	196						
Shock resistance (m/s <sup>2</sup> )*6	1,960						
Weight (g)	Approx. 150	Approx. 90 (Including cable)	Approx. 70 (Including cable)	Approx. 50 (Including cable)	Approx. 3 (Including cable)	Approx. 90	Approx. 200
Surrounding magnetic field (T)		Up to 0.01		Up to 0.005	Up to 0.001	Up to 0.005	Up to 0.03

\*1: The temperature coefficient for the DC resistance value: 0.4% / °C

\*2: Load resistance: 10 k $\Omega$ , M=1, gap=0.5 mm (As for MP-963; load resistance 10 k $\Omega$ , M=3, gap=1.5 mm)

\*3: When using the 60 P/R detection gear, the value for frequency [Hz] and value for rotation speed [r/min] are the same.

\*4: When using the Ono Sokki standard MP-001 detection gear (when using a gear with M=3 for MP-963, M=0.75 for MP-9200)

\*5: JIS E 4031, five types, 40 Hz, two hours in each of the X and Y directions; four hours in the Z direction

\*6: Three times each in the X, Y and Z directions

## • Notes on the Detection Gear

- a) Gap between the detector and the detection gear The smaller the gap, the lower rotation speed can be detected. The gap should normally be set between 0.5 to 1 mm.
- b) Detection gear tooth shape
- An involute gear is recommended.

## c) Gear size

The module unit (M) is used. This value is used to determine the size of the teeth. Modules with the same number of teeth can be meshed.

## Module = Pitch circle diameter Number of teeth

We recommend a module of greater than 1 and the width of teeth 4 mm.

#### d) Detection gear material

Material with a property of being strongly attracted to a magnet, (ferromagnet) is good to use. If you have a choice, we recommend materials such as S45C, SS400, SUS430, etc.

M4

## Ono Sokki's Standard Detection Gear

MP-001 The detection gear Ono Sokki provides is a module 1 involute gear with 60 teeth. Number of teeth: 60 Module :1 Material

: SS400 (surface treatment: trivalent chromate)

## •The relationship between the gap and detection range

- (1) The relationship between the gap from the detector to the detection gear and the detection range (lowest measurable value) is given in the tables below.
- (2) The rotation speed range where an output voltage of 0.5 Vp-p or more can be maintained. (load resistance =  $10\Omega$ )
- (3) The measureable rotation speed varies according to the type of display unit used.

#### • MP-900/9000 series measureable rotation speed (r/min)

Model	Module	M	=1	M=	1.5	M	=2	Upper limit of rotation speed
	Gap	0.5	1	0.5	1	0.5	1	
MP-910	D	200	500	50	300	30	100	35,000
91	1	200	500	50	300	30	100	35,000
912	D	200	500	50	300	30	100	80,000
93	D	200	500	50	300	30	100	35,000
93	5	300	1200	75	300	40	100	35,000
93	6	300	1000	75	300	40	100	35,000
940/	4	300	1200	80	300	50	130	35,000
95	D	300	1000	100	300	60	150	35,000
954	4	300	1200	100	300	60	150	35,000
96	2	400	1500	140	420	80	200	35,000

Model	Module	M=1		M=1.5		M=2		Upper limit of
	Gap	0.2	0.5	0.2	0.5	0.2	0.5	rotation speed
MP- 992	2	400	1000	230	600	140	330	100,000

Model	Module	M=0.5		M=0.75				Upper limit of	
Woder	Gap			0.2		0.5		rotation speed	
MP- 920	0	2,000		300		1,000		35,000	
								•	
Model	Module	M=3		M=5		M=7.5		Upper limit of	
IVIOUEI	Gap	1	2	1	2	1	2	rotation speed	
MP- 963	3	45	90	25	50	20	45	15,000	

Model	Module	M=0.5		M=0.75				Upper limit of	
Woder	Gap			0.2		0.5		rotation speed	
MP- 920	0	2,000		300		1,000		35,000	
								•	
Model	Module	M=3		M=5		M=7.5		Upper limit of	
IVIOUEI	Gap	1	2	1	2	1	2	rotation speed	
MP- 963	3	45	90	25	50	20	45	15,000	

\*The data is standard value and do not warrant the operation. When using our rotation detectors.



* When	using a	detection	gear with	h 60 teetl





## [Measurement conditions]

Detection gear: M = 1, Z = 120 P/R Load resistance:  $R_L = 10 \text{ k}\Omega$ Gap: G = 0.5 mm

100 KHz



• MP-911









• MP-935







• MP-936













• MP-963







## • MP-9200



## Electromagnetic Type Rotation Detector MP-800 series Low-to-medium speed

There are three models in the series, each with a different outer appearance: MP-810, MP-820 and MP-830.



## MP-810 (Base mount type)



## MP-820 (Dual-shaft type)



## MP-830 (Flange type)



## Features

- There are three models in the series, differentiated by their outer appearances.
  - MP-810: base mount type MP-820: dual-shaft type MP-830: flange type
- Number of output pulses

Model	Number of Pulses (P/R)			
MP-810F, 820F	300			
MP-810G, 820G, 830G	60, 120, 360			
MP-810B, 820B, 830B 600				
* Models other than MP-810B are made-to-order products.				

• Specifications		
Rotating speed range	: 5 to 5,000 r/min	
Output waveform	: approximate sine wave	
Output voltage	: 0.5 Vp-p or more	
DC resistance value	: 770 ±30 Ω	
Inductance	: 2 H typ. (at 1 kHz)	
Starting torque	: 245 mN·m or less	
Moment of inertia	: approx. 1.5 kg·cm <sup>2</sup>	
Allowable shaft load	: radial 147N, thrust 98N	
Vibration resistance	: 98 m/s <sup>2</sup> in each direction of X, Y, Z (fo	or 2 hour)
Shock resistance	: 980 m/s <sup>2</sup> in each direction of X, Y and	d Z (three
	times each)	
Operating temperatur	e : -10 to 80 °C	
Weight	: approx. 2 kg	
Connection method	: M3 crimp terminal (JIS C 2805 1.25-3	3) (When
	using MP-081) See P.36 and P.37	
Cable outlet	: cable clamp (complies with IP-68)	
Surrounding magnetic	c field : up to 0.01 T	
Option	: connector output (MP-081)	Connector



## <Related product: MP-837 (low impedance type)>

- Number of output pulses
- Number of Model Pulses (P/R) MP-837J 180 MP-837K 240 MP-837L 300



Inductance MP-810/820/830.

## Related product: MP-837 (low impedance type)



## Magneto-electric Rotation Detector MP-981/9820 General-purpose/ high speed detection type -

This is a magnetic flux response type detector (the resistance value changes according to the magnetic flux) which internally has magnetic resistance elements, permanent magnets, a direct current amplifier, and a voltage regulator. It can detect over a wide range of rotation speed from ultra low speed to high, and outputs the results as a square waveform. Three models are provided; General-purpose type (MP-981), high speed detection type (MP-9820), and acid-resistance and waterproof type (AP-981).





Weight Accessory

## Magneto-electric Rotation Detector

## Acid-resistant, waterproof type

The AP-981 is a waterproof model that complies with the JIS C 0920 Protective Class 7 (marking symbol: IPX7) requirements for the waterproof testing of electrical equipment and wiring materials.



## erromagnetic naterial Ethylene propylene rubber sheatl (approx. 1.9 m) 30±0.5 | | ø44 5±0.1 36±0.2 82±0.6 Mounting \ 2-ø3.5 flange

Weight Accessory

## Caution

MP-981 and AP-981 have been designed for the purpose of detecting rotation speed. Please observe the following points when using these detectors.

(1) A square wave with the same amplitude is output as the result of rotation measurement from low speed to high speed (1 to 20,000 r/min: 60 gear teeth per a gear). However, it does not necessarily mean that the high level is appeared at the peak of the gear, the low level at the valley. The starting points may not be the same when using several detectors for synchronous operation. (2) The output pulse width may be different depending on the rotating direction of a detection gear (CW direction / CCW direction).

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- MP-837M 360 MP-837N 420
- Rotation speed : 50 to 2500 r/min Output voltage : 1.5 Vp-p or more Direct current resistance value  $: 50 \pm 5 \Omega$ : 0.12 H typ. (at 1 kHz) \* The other than the above are same as

#### Features



## Features

· Can be used for measurement in locations where nitric acid mist is in the atmosphere, or in environments where the detector may be submerged. Performs by non-contact detection

• Output as a square wave with the same amplitude from ultra-low to high speed (1 to 20,000 r/min [60-teeth gear])

 Comes with a 1.9 m length acid-resistance directly attached cable Specifications

#### Detection method : detection using magnetic resistance elements and magnetic gears Detection range :1 Hz to 20 kHz Detection gear : ferromagnet (tooth width: at least 3 mm, module: 1 to 3) Detection distance : see the graph at the right Module and detection dis Power requirement :12 ±2 VDC Power consumption : approx. 30 mA (at 12 V, 25 °C) Rotating speed: Output waveform : square wave, Lo; 0.5 V or less, Hi; 5 ±0.5 V 1 to 20 000 r/min (60 P/R) Output impedance : approx. 330 $\Omega$ Temperature: 25°C 13 : power source polarity, output Protective circuit short-circuit protection Detection distance Operating temperature : -10 to 70 °C (mm) 1. -10 to 50 °C (with a nitric acid fume concentration of 10%) Storage temperature : -20 to 80 °C Withstand voltage :250 VDC Vibration resistance (conduction) 1.2 mm compound amplitude, 30 Hz (for 1 hour in each of the X, Y, and Z directions) Module (M) Shock resistance (non-conduction) : 490 m/s<sup>2</sup> (three times each in the X and Y directions) Outer surface material : polycarbonate Connection method : 1.9 m length directly attached cable (other end: open) : approx.130 g (including a signal cable) : instruction manual x1 \*The cable length can be specified as 5, 10, 15 and 20 m. (Example)



## Photoelectric Detector LG-9200 Compact optical detector -

LG-9200 is a reflective type photoelectric rotation detector using an optical fiber at the tip. Designed to be resistant against disturbance light using pulse modulation method for the light source emitting modulation.



**Rotation Detectors** 

Photoelectric Type



## Photoelectric Detector LG-930

Compact, optical model designed for the long-distance detection -

The LG-930 is a compact reflective type photoelectric rotation detector that can detect the target up to 200 mm away.





## Features

- Detection from nearly 0 r/min
- Compact and easy-to-use type optical detector
- A unified structure of light source, receiver and amplifier (weight: approx. 150g)
- Light emitting diode is used for light emitting element
- hting function • Ea

<ul> <li>Easy positioning (vis</li> </ul>	sible light and operation indicator lighting function)
<ul> <li>Specifications</li> </ul>	3
Detection method	: visible light photoelectric reflection method
Detecting distance	: recommended distance 20 to 40 mm
Maximum rosponso sp	(when using a dedicated reliective mark 12 min square)
Maximum response sp	
	: 40 m/s (converted to circumferential speed of rotating shaft)
Response delay time	: 0.6 ms (light receiver conversion time) or less
Light source	: light emitting diode (red visible light)
Light receiving elemen	t: phototransistor
Power requirement	: 12 ±2 VDC
Current consumption	: 60 mA or less (at 12 V)
Output waveform	: rectangular wave; Hi 5 ± 0.5 V, Lo 0.5 V or less
Output impedance	: 1 k $\Omega$ or less
Connection method	: see P. 36, 37
Operating temperature	: -10 to 60 °C
Storage temperature	: -20 to 80 °C
Vibration resistance	: 19.6 m/s <sup>2</sup> in each direction of X, Y, Z
Shock resistance	: 490 m/s <sup>2</sup> in each direction of X, Y and Z (three times each)
Conforming standard	: CE marking
Weight	: approx. 150 g (including 2 nuts for fastening)
Accessory	reflective mark (12 mm square 25 sheets) x 1
, 10000001, j	mounting put $\times 2$ instruction manual $\times 1$

#### Measurement range of the LG-9200



Features

## • Can detect the target up to 200 mm away.

- Compact design, only small installation space required. An L-shaped mounting fixture for installation provided.
- Visible light is used for easy positioning, and the built-in operating indicator light enables easy setup.
- The pulse lighting method ensures that the LG-930 is virtually unaffected by ambient light.

## Specifications

<b>Specifications</b>	
Detection method	: visible light photoelectric reflection method
Detection distance	: 70 to 200 mm (when using dedicated reflective mark of 12mm square)
Object detected	: reflective mark
Maximum response speed	d: 25 m/s (when using the dedicated 12-mm-square reflective mark, affixing interval 48 mm)
Response delay time	: 0.5 ms (light receiver conversion time) or less
Light source	: light emitting diode (red visible light)
Light receiving elemen	t: phototransistor
Power requirement	: 12 ± 2 VDC
Current consumption	: 85 mA or less (at 12 V)
Output waveform	: rectangular wave; Hi: + 5 $\pm$ 0.5 V, Lo: 0.5 V or less (load resistance: 100 k $\Omega$ or more)
Output impedance	: 1 kΩ or less
Operating temperature	e : -10 to + 60 °C
Storage temperature	: -20 to +80 ℃
Input/output connecto	rs : directly attached cable with the other end open
Cable length	: 4.9 m
Weight	: approx. 300 g
Accessory	: reflective mark (12 mm square × 25 sheets)× 1 mounting fixture × 1, screw× 2, instruction manual×

## Photoelectric Rotation Detector FS-540/542/5500, FG-1300 Fiber Optic Sensor/Fiber Optic Sensor Amplifier



• FG-1300



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Panel cut dimension

(Effective screw length 13)

Caulking (ø6, width 3)

SUS flexible tube

L=2000±10

2-M4 (lock nut) (OFø2

(OFø2)

Tip: SUS

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(Note1) L can be changed (custom-made).

## Option

Detection imitting po Fiber leng Mounting Operating Vibration I

## Application

Rear vie

• FS-540/542

• FS-5500

/2- (OFø1.4)



\* For more details of FS-540/542/5500, FG-1300, please refer to the Product Brochure page of our website.

Load res Function

Shock res Reflective mark (12 mm square 25 sheets) 1 sheet included. \* Fiber cable can be extended.

## Features

high-speed rotation. Red visible light adopted, easy to detect an object that is difficult to adjust optical axis position, such as a thin shaft. Enables to detect even minimal variation in light intensity, and measure without reflective marks. Selectable gain/trigger level adjustment in accordance with applications; manual adjustment using volume control button or auto adjustment using auto trigger. Two detection distance adjusting functions are available; normal range and proximity range (from a proximity of 10 mm to the maximum 69 mm)					
can be divided into	Ise which may be generated during measurement 1 pulse without reflective mark.				
• Specification	S Annu l'étan				
Detection method	: detects amount of red visible light reflected				
Detection distance Maximum response fre	light source; red visible light LED, light receiving element; phototransistor : 7 to 69 mm (FS-540/542), 2 to 50 mm (FS-5500) equency : 10 kHz : analog: detects reflected light and outputs signal waveform				
e a par e gina	in proportion to the light amount. output range: 0 to 10 V pulse; outputs pulse signal after the waveform of reflected light is shaped and converted to square				
	output voltage range; Lo level 0.5 V or less				
Load resistance Function	<ul> <li>10 kΩ or more (analog, pulse)</li> <li>gain; can be adjusted by control knob or selection SW.</li> <li>threshold level; can be adjusted manually/automatically by control knob or selection SW.</li> </ul>				
	range; the detection distance can be adjusted by selection SW. frequency dividing; divides the PULSE OUTPUT signal in the range of dividing ratio 1 to 10 by selection SW.				
Display	peak hold time constant; select from 1 s/10 s by selection SW. : for checking sensitivity; LED bar chart type monitor others: LED indicator				
Connecting method Power supply Operating temperature Operating humidity Storage temperature ra Storage humidity range Conforming standard	see P36-37 : 100 to 240 VAC (50 Hz/60 Hz) : 0 to 40 °C : 5 to 80 % RH (with no condensation) ange : -10 to +50 °C : 5 to 80 %RF (without condensation) : CE marking				
Weight	: approx. 1 kg				
Accessory	(4 pieces)×1 set				
Option	: stand (FG-0131), panel mounting fixture (FG-0132)				

## Specifications (FS-540/542/5500)

· ·	,		
	FS-540	FS-542	FS-5500
type	Optical fil		
t diameter at the tip of fiber	ø 4	mm	ø 2 mm
h (L)	1 m	2 r	n
nut	M8 >	M4 x 0.7	
temperature range	-10 to	250 °c	-40 to 250 °c
esistance	-	-	50 m/s <sup>2</sup> (frequency range; 10 to 500 Hz, at tip only)
stance	-	1000 m/s <sup>2</sup>	



## Rotary Encoder SP-405ZA Ultra-compact type







## Features

Weight

- Economic type designed for OEM needs
- ø 38 outer diameter; ultra-compact, light weight model weighing only 100 g
- 2-phase square wave + zero mark signal output
- Choice from 13 pulse output types

## Specifications

Number of output pulse	s: 40, 50, 60, 100, 200, 250, 300, 360, 400, 500, 600, 800, 900 P/R
Output waveform	: 2-phase square waveform+ zero mark (timing is optional)
Output voltage	: HiPower supply voltage -20 % or more Lo0.5 V or less
Output method	: collector load resistance; 10 k Ω or more *Open collector: 30 VDC, 35 mA or less
Adjacent error	: ±1/15 P
Power requirement	: 5 to 12 VDC ± 10 %, 50 mA * 24 VDC is also available only when the open collector is selected (option).
Response frequency	: 100 kHz
Connection method	: directly attached cable (1 m) (other end: open)
Maximum rotation spee	d: 6000 r/min
Allowable shaft load	: radial; 25 N thrust; 15 N
Starting torque	:2mN·m
Moment of inertia	: 6g·cm²
Operating temperature	: -10 to 70 °C
Storage temperature	: -20 to 80 °C
Withstand humidity	: 90 % (with no condensation)
Protection class	: IP 40
Vibration resistance	: 98 m/s <sup>2</sup> in each direction of X, Y, Z (for 2 hour)
Shock resistance	: 980 m/s <sup>2</sup> in each direction of $\pm X$ , Y and Z

(three times each, 18 times), 98 m/s<sup>2</sup> at shaft : approx. 0.1 kg









\* Please visit our website for more details on RP-7400 series.

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(180)

length; 200 P/R : 50 ±25 % Hi; 10 V or more, Lo; 0.5 V or less : Totem pole output (load resistance 470  $\Omega$  or more) Options; RP-0701 Emitter output RP-0702 Collector output RP-0703 Open collector output 0 to +50 °C (with no freezing, no condensation) -10 to +65 °C (with no freezing, no condensation) : approx. 400 g : instruction manual x 1 connector (RM12BPE-5S) x 1; : 0 to 600 m/min \*Speed measurement range depends on condition of measurement object. 1200 P/R 0.01 m/min 200 P/R 1 mm : mandrel; aluminum rubber; polyurethane rubber baked on the roller (rigidity A90) X/Y/Z each direction (150 minutes each) 10 to 150 Hz sweep, 20 cycles  $\pm X/Y/Z$  (3 times for each, total 18 times) ø10 mm x 2, 20 mm of interval : RP-0701 Emitter output RP-0702 Collector output RP-0703 Open collector output RP-0181 cable (5 m) P.36-37 RP-0182 cable (5 m) P.36-37

 Features Number of pulses selectable from 120, 200, or 1200 P/R • Wide variety of output signal Totem pole (standard), Collector (option) Emitter (option), Open collector (option) Specifications **Electrical specification** Number of output: speed; 120, 1200 P/R pulses Output waveform : 2-phase rectangular wave Duty ratio Phase difference : 90 ±45° Output voltage (when 12 VDC is supplied.) : Output method Power supply : 12 VDC±5 % (100 mA or less) **General specification** Operating temperature : Storage temperature : Operating humidity : 35 to 93 % RH or less (with no freezing, no condensation) Protection class : IP 40 (when RP-0181/0182 cable used) Conforming standard : CE marking Accessory HIROSE Electric Co., LTD. Mechanical specification Speed range Measurement unit : 120 P/R 0.1 m/min Roller material Roller outer circumference : 200 mm Maximum allowable load : radial 20 N Starting torgue : 1 mN·m Moment of inertia : 0.6 kg·cm<sup>2</sup> Vibration resistance: 19.6 m/s<sup>2</sup> Shock resistance : 196 m/s<sup>2</sup> Mounting hole (position) : Option

We have extensive variety of rotary encoders. Detailed brochures are prepared separately, so please visit out website.

# **Digital Tachometer**

## Digital Tachometer TM-4000 series Integrating 4 models & New standard for tachometers -

## Features

- Selecting from 4 models: 1-channel input for basic measurement, 2-channel input, reversible counter and passing time/passing speedometer
- Achieves the rotation speed measurement over a wide range with high accuracy, high response
- Clearly visible on the organic EL display
- Ethernet selectable
- Customized according to the connected device

## TM-4100 series \_\_\_\_\_

**Digital Tachometer** 



1-channel input type. Since it follows the input/output specifications and outer dimensions of the existing models, you can use your current detectors, cables, and mounting jigs as they are. (Successor model: TM-3100 series)

## TM-4300 series \_\_\_\_\_

## **Reversible counter**



Multiplication/addition/subtraction counter with 7-digit display. In combination with our rotary encoders and roller encoders, it measures the length and distance of materials and finished products flowing through the production line.

# 6

# TM-4200 series \_\_\_\_\_

2-channel Digital Tachometer



Measures the line speed ratio, speed differences, rolling reduction, etc. from two rotation speeds. Effective for improving the quality of production lines.

## TM-4400 series \_\_\_\_\_

## Passing Time/Passing Speedometer



Measures the passing time and passing speed between two points with high accuracy.

In addition to measuring the passing speed of vehicles and the opening/closing speed of vehicle doors, it is also possible to measure the falling speed and the speed of objects such as pendulums.

## Product Lineup

## Standard models

A new standard digital tachometer with exactly the functions you want. It is also recommended for those want to quickly consider a replacement for an existing model.

Product type	Model name	Output type	Power supply type	Features			
	TM-4110	For display	AC	Standard models for display only			
	TM-4111	I OI UISplay	DC	orandard models for display only			
	TM-4120		AC	6-digit BCD output			
	TM-4121	BCD output	DC	Open collector output that can be directly connected to a PLC. There are 2 types of output mode: normal mode, request mode.			
1-ch input	TM-4130		AC	Selectable voltage output or current output			
		Analog output		1 ms rapid output refresh time			
	TM-4131		DC	Highly accurate linearity of 0.1% FS for voltage output			
				and 0.1% of span for current output			
	TM-4140	Comparator output	AC	Equipped with three contact outputs and evaluation conditions can be set for each.			
	TNA 4141		Comparator output	Comparator output		Comparison cycle every 1 ms	
	1 IVI-4 I 4 I		DC	Equipped with diverse output functions			
		Analog output /		Wide input frequency range: 0.05 Hz to 100 kHz			
2-ch input	TM-4270	Comparator output /	AC	2 ch calculation function			
		2-ch Voltage input		(rotation difference/rotation ratio/rate of change/rotation direction)			
		Analog output /		Reversible counter that measures linear position,			
Deversible counter	TM 4270	Analog output /	10	displacement, dimensions, etc.			
Reversible counter	1101-4370	Comparator output /	AC	Wide input frequency range: DC to 100 kHz			
		2-cri voltage input		Multiplication function (×1/×2/×4) and counting direction switching function are equipped.			
Dessing		Analan autout (		Calculates the passing speed from the distance and the passing time between two points.			
rassing	TM 4470	Analog output /	10	Enables passing time measurement at a minimum resolution of 1 µs.			
une/Passing	1 IVI-4470	2-ch Voltage input	AC	Pulse detection condition setup function			
speedometer				(HIGH/LOW level, rising edge/falling edge)			

## **Customized models**

You can customize the tachometers according to the connected sensors and external devices. These are made to order products by combining 7 types of signal input/output boards and 2 types of power supply boards.

Selec	table me functio	easurem ons	ent	Selectable signal input /output types				Calculation functions (optional software)					in in	97
<ul> <li>1-channel input for measurement of rotation speed</li> <li>2-channel input for measurement of rotation speed differences /rotation speed ratio Reversible Counter for multiplication/addition/subtraction Passing Time/Passing Speedometer</li> <li>Input: Voltage/Line driver</li> <li>Output: Analog/Comparator/BCD</li> <li>Communication: RC-232C/Ethernet</li> <li>Achieved speed/time measurement mode Calculates the time required from the start condition to the stop instruction measurement value. (TM-4100, 4300 only)</li> <li>Table of optional boards/software combination</li> </ul>						L CL								
Slot	PO	WER	A		I	В			C		D		Soft	ware
ifti	Po	wer	Comparator	BCD	D output BS-232C Ethe		Ethernet	et Analog		Voltage input Line driver inputt		Line driver inputt	Calcu	Ilation
pecilications	AC	DC	output	Voltage output	Open collector output	communication	communication	out	tput	1ch	2ch	2ch	func	ction
lodel name	TM-0400	TM-0401	TM-0440	TM-0421	TM-0422	TM-0450	TM-0460	TM-0431	TM-0432	TM-0405	TM-0406	TM-0407	TM-0470	TM-0480
TM-4100	0	0	0	0	0	0	0	0		0			0	
TM-4200	0	0	0			0	0		0		0	0		
M-4300	0	0	0			0	0		0		0	0		0
M-4400	0	0	0			0	0		0		0			

• Only one board can be installed in each slot.

• Be sure to install a board in slot POWER and slot D.

\*Please refer to the details in the product brochure of TM-4000 series on our web site.



POWER AC ▲ 104 100-240 V 204 50/60 Hz 3 ± MAX30 VA □		ETHERNET	RS-232C 1 R0D 2 TXD 3 CTS 4 RTS 5 COM2 6 NC 7 START 8 STOP 9 RESET 10 COM2	ANALOG 1 V/I 2 COM2 3 NC 4 NC 5 NC	INPUT 1 +12V 2 com1 3 sig 4 com1 5 P-OUT 6 com2
CE 🕱	ON	o sokiki c Made in Ja	o., LTD. Npan		

Terminal arrangement diagram (Ex.TM-4100 series)

<ul> <li>Specifications</li> </ul>						Power su
TM-4100 series Number of channels	1ch		TM-4300 series Number of channels	1ch (2-phase)		TM-0400/TM- Please refer to "P
Input amplification format AC amplifier	Selectable from AC o Sine wave input: Square wave input: Input frequency:	or DC 0.2 to 30 Vrms 0.6 to 42 Vp-p 1 Hz to 100 kHz	Input amplification format DC amplifier	DC Input signal:	Square waveform having a pulse width of 4 µs or more (when the low-pass filter is	TM-0405/0406 Voltage input spec Input connector
DC amplifier	Input signal:	Square waveform having a pulse width of 4 µs or more		Input voltage range: Input frequency:	OFF) Hi: 4 to 30 V/ Lo: -1 to 1 V DC to 100 kHz	
	Input voltage range: Input frequency: Time measurement:	Hi: 4 to 30 V/Lo: -1 to 1 V 0.05 Hz to 100 kHz 10 ms to 3600 s	Counting range (internal c Multiplication	ounter) 0 to ±2 000 000 000 × 1/× 2/× 4		TM-0407 Line Signal input spec Input connector
Measurement accuracy	Within displayed valu (count value excludin	ue x (±0.01%) ± 1 count ng decimal point)	Offset function Counting direction switchi	0 to ± 9 999 999 ing function		TM-0421/0422
Measurement time Unit display	Within 1 ms + 1 cycle Rotation Speed: Circumferential Speed:	e time r/s, r/min, r/h mm/s, m/s, mm/min, m/min	Pulse factor Unit display	+/- 0.00001 × 10E-3 to 9 OFF/mm/m/Count/s	).999999 × 10E+3 EU/Pulse	Output form Output format
	Linear Speed: Cycle: Frequency: Count: Flow Bate:	mm/s, m/s, mm/min, m/min, km/min, mm/h, m/h, km/h s, min Hz, kHz 1/s, 1/min, 1/h ml /s ml /min, ml /h	Number of display digits TM-4400 series Number of channels Input amplification format DC amplifier	7 digits + sign 2ch DC Input signal:	Square waveform having a	Sink current Output withstand Output logic Data refresh time Operation modes
	Passing time: User-defined: engineering unit	L/s, L/min, L/h s, min EU/s, EU/min, EU/h		Input voltage range:	pulse width of 4 µs or more (when the low-pass filter is OFF) Hi: 4 to 30 V/ Lo: -1 to 1 V	Request signal ir Operating edge Input voltage
Number of display digits	6 digits		Measurable cycle	Input frequency: 0.1 ms to 3600 s	DC to 100 kHz	TM-0431/0432
TM-4200 series Number of channels Input amplification format	2ch, 1ch (2-phase) Selectable from AC o	or DC	Minimum resolution Measurement range Measurement item	1 μs 10 s/1000 s/3600 s Selectable from pass	ing time/passing speed	Number of outpu Output type Output method Output refresh ti
DC amplifier	Square wave input: Input frequency: Input signal:	0.6 to 42 Vp-p 1 Hz to 100 kHz Square waveform having a pulse width of	Prescale function Unit display Number of display digits	0.00001 × 10E-3 to 9 Passing time (TIME): Passing speed (P.SPE 6 digits	9.99999 × 10E+3 EU/Pulse ms, s EED): m/s, km/h	Voltage output
Measurement accuracy	Input voltage range: Input frequency: Single CH: (CH-A or CH-B)	4 µs or more Hi: 4 to 30 V/Lo: -1 to 1 V 0.05 Hz to 100 kHz Within displayed value × (±0.01%) ± 1 count (count value excluding		-		Current output (TM-0431 only)
	B/A or (B-A)/A:	decimal point) 2 × (Single CH measurement accuracy)				
	Б-А.	± (CH-B measurement accuracy) ± (CH-A measurement				TM-0440 Com Contact output
Unit display	Rotation Speed: Circumferential Speed:	r/s, r/min, r/h mm/s, m/s, mm/min,				Evaluation condi Contact operatio
	Linear Speed:	mm/s, m/s, mm/min, m/min, km/min, mm/h,				Condition setting Maximum contact
	Frequency: User-defined:	m/h, km/h Hz, kHz EU/s, EU/min, EU/h				Output refresh ti
Number of display digits	engineering unit 6 digits + sign					TM-0450 RS-2 Baud rate Data bits Parity
Common specification	าร		Outer dimensions	96 (W) x 48 (H) x 140	(D) mm max.	Stop bits Flow control
Display unit Power supply for detector	OLED Display Output voltage: Maximum output current	12 VDC ± 10% :: [TM-4100] 100 mA	weignt Applicable standards	[TM-4110] Approx. 34 [TM-4270/4370/4470 CE marking	40 g 1] Approx. 400 g	Ierminator
		[TM-4200/4400] Total of 2 channels 180 mA [TM-4300] 180 mA	Accessories	FCC/Canada [TM-4100]	Mounting jig 1 set (2 pcs)	
Power supply	AC power supply model:	$100 \text{ to } 240 \text{ VAC } \pm 10\%,$ 50/60 Hz, 30 VA max.		[TM-4200/4300/4400]	Input connector for D slot made by Phoenix Contact	
Operating temperature an	DC power supply model:	1.25 A max.			Mounting jig 1 set (2 pcs)	

## •Power supply, Signal input/output boards

I-0401 Power Supply Board "Power supply" in [Common specifications].

## 06 Input Voltage Board

becifications Same as Input unit [TM-0405] Terminal block (D slot SIG-COM1 terminal) [TM-0406] FMC 1,5/10-ST-3,5 1952348x1 made by Phoenix contact

## e Driver Signal Input Board

ecifications Equivalent to RS-422A FMC 1,5/10-ST-3,5 1952348x1 made by or Phoenix contact

## 22 BCD Output Board

utput form utput format	6-digit parallel output [TM-0421] 5 V interna [TM-0422] NPN open	l pull-up output collector output
nk current utput withstand voltage utput logic ata refresh time peration modes equest signal input form perating edge put voltage	32 mA max 24 V max Positive logic 100 ms or less Selectable from Norm Request mode Negative logic (pulse Falling edge Hi: 4.2 to 5.25 V/Lo: 0	nal (Continue) mode, width 10 μs or more) ) to 0.9 V
M-0431/0432 Analog	Output Board	
utput type	Solootabla from valta	ao or ourropt
utput type	16-bit D/A conversion	
utput refresh time	Selectable from 1 ms	1 /10 mc/20 mc/50 mc
atput renean time	/100 ms/200 ms/500	ms/1 s
oltage output	Output range:	Selectable from 0 to 10 V/0 to 5V/1 to 5 V
<b>urrent output</b> M-0431 only)	Load resistance: Linearity: Zero temperature drift: Span temperature drift: Output range: Load resistance: Linearity: Zero temperature drift: Span temperature drift:	100 kΩ or more ± 0.1 % FS ± 0.05 % FS/°C ± 0.05 % FS/°C Selectable from 4 to 20 mA or 0 to 16 mA 500 Ω or less ± 0.1 % of span ± 0.05 % of span/°C ± 0.05 % of span/°C

#### omparator Output Board

Contact output	1 make contact output × 3
	(COMP1/COMP2/COMP3)
Evaluation conditions	UPPER, LOWER, OK, ERROR
Contact operation modes	Automatic recover mode, Hold mode (except
	TM-4400), Shot output mode
Condition setting	Output delay function (except TM-4400),
	Reset function (except TM-4400)
Maximum contact capacity	30 VDC/1 A
	250 VAC/1 A
Output refresh time	Approx. 10 ms
TM-0450 RS-232C Boa	ard
Baud rate	9 600/19 200/115 200 bps
Data hite	8 hit

8 bit
None
1-bit
Hardware
CR+LF

0 to 50 °C/30 to 80 %RH (no condensation)

Digital

## TM-0460 Ethernet Board

Electrical specifications IEEE802.3 compliant Transmission method

10BASE-T/100BASE-T automatically selected Communication protocol Socket communication by TCP/IP (IPv4)

## Gate Signal Input

(Valid when any of the BCD output, RS-232C communication, or Ethernet communication board is installed) Gate function

Voltage input	
Non-voltage input	

[TM-4100/4200] START/STOP/RESET [TM-4300] START, STOP/OFFSET/RESET [TM-4400] START/RESET Hi: 4.2 to 5.25 V/Lo: 0 to 0.9 V Open voltage: 5 V ± 0.25 V Short-circuit current: 1 mA max. Contact resistance: 50  $\Omega$  or less

## •Optional software

## TM-0470/0480 Calculation function

Calculation details Calculate the time required from the start condition to the stop instruction measurement value. Calculation item [TM-0470] Selectable from rotation speed/ circumferential speed/moving speed [TM-0480]Pulse accumulated value s (fixed display)

Unit of measurement





# FFT Tachometer FT-2500

Advanced Tachometer

The FT-2500 is a tachometer that performs frequency analysis by FFT calculation processing and measures rotation speed. Even when the rotating shaft is not accessible, it can measure from sound, vibration, etc. and supports various types of rotating objects such as steady rotation of a motor, acceleration / deceleration rotation of an engine.



## Features

**Digital Tachometer** 

Advanced Type

- No need for reflective mark and special machining to install a detector
- Enables rotation measurement using sound and vibration easily. Machining of the rotating shaft is not required.
- Supports rotation speed change and acceleration/deceleration. (when selecting rotation acceleration/deceleration measurement mode)
- Rotation direction judgment function (FT-0501)
- · Easy-to-read indication by fluorescent display tube
- With analog output, pulse output

## Specifications

Input section	
Applicable sensor	: FT-0501, IP-292/296/3000A/3100, VP-202/1220, OM-1500/1200, Constant Current Line Drive sensors (microphones, accelerometers) and so on
Measurement section	(microphones, accelerometers) and so on.
•Measurement mode: Stea	dy rotation measurement mode
Arithmetic operation	· 1024 points EET processing
Frequency range	: 500 Hz 2 kHz 10 kHz
Rotation speed searching	: Measurement frequency range (Hz) x 60/ range (Pulse count [P/R])
	Measurement frequency range
	When 500 Hz range selected; 3.75 Hz to 500 Hz
	<ul> <li>When 2 kHz range selected; 15 Hz to 2 kHz</li> </ul>
	<ul> <li>When 10 kHz range selected; 75 Hz to 10 kHz</li> </ul>
Update time	: within 500 ms
Measurement accuracy	: ±2 x rotating speed resolution[r/min] ±1 count
	*Measurement accuracy depends on frequency range.
Rotation speed resolution	: Frequency range [Hz] ÷ 12800 × 60 ÷set pulse count [P/R] *12800 = 400 line x 32
<ul> <li>Measurement mode: Rota</li> </ul>	tion acceleration/deceleration measurement mode
Arithmetic operation	: 512 & 256 points, FFT processing
Frequency range	: 250 Hz, 500 Hz, 2 kHz
Rotation speed measuremen	t: Measurement frequency range (Hz) x 60/ (Pulse count [P/R])
range	Measurement frequency range
	• When 250 Hz range selected; 3.75 Hz to 250 Hz
	• When 0 kHz range celected, 7.5 Hz to 500 Hz
Lindate time	within 250 ms
Measurement accuracy	: +2 x rotating speed resolution[r/min] +1 count
moded of them accountery	*Measurement accuracy depends on frequency range
Rotation speed resolution	: Frequency range $[Hz] \div 6400 \times 60 \div$ set pulse count $[P/R]$
	*If the rotation speed is changing, the resolution is worsen.
	*6400 = 200 line x 32
Display section	
<ul> <li>Main display unit</li> </ul>	
Display unit	: fluorescent display tube (Blue - Green)
Display update time	: 0.5 ±0.2 second
Display resolution	: 1 r/min, 1 Hz
Measurement display range	; : 0 to 999,999 r/min(0 to 10,000 Hz)
Level monitor LED	- 0. select LED
Display method	. 2-COIOF LED
	Unin , Sensor signal amplitude is small and stable
	Red Sensor signal amplitude exceeds the set voltage range
	Green : Sensor signal amplitude is appropriate
<ul> <li>Comparator monitor LED</li> </ul>	(common to Upper Lower Rotation)
Display method	: 2-color LED
,	Unlit : Comparator is disabled.
	Red Comparator is active and measurement values do
	not meet operating conditions.
	Green ; Comparator is active and measurement values
	meet operating conditions.
Rotation pulse count sett	ing
Set range	: 0.5 to 199.5
Minimum number of steps	: 0.5 [P/R]
Averaging processing	Martin and a second
Averaging type	: Moving average
Allowable count	: UFF, 2, 4, 8, 16
Processing type	· Specifying the desired measurement retating aread
FIDLESSING Lype	(frequency) range within the selected frequency range

Rotating direction judgme Applicable sensor Judgment Judgment output	<b>nt</b> : FT-0501 : CW/CCW : semiconductor relay, status display
Key protection function Setting/Cancelling	: It can be switched by pressing and holding SET/NEXT
Protection range	key approximately 2 seconds in measurement mode. : All keys except < (SAMPLE) key when returning to measurement ready state in rotation acceleration/
Analog voltage output	deceleration mode.
REVO output     Output contents	: displayed value
Voltage range	: 0 to F.S./ 0 to 10 V
Linearity	: ±0.3 % of F.S.
Output update time	: steady rotation measurement mode (CONSTANT); 500 ms or less
	rotation acceleration/deceleration mode (ACTIVE);
Temperature stability Set error Load resistance	250 ms or less $\pm 0.05 \%$ F.S./°C (common to ZERO and SPAN) $\pm 0.5 \%$ of F.S. (default error, common to ZERO and SPAN) $\pm 100 \text{ k}\Omega \text{ or more}$
Output connector Calibration function	: R03RB3F : Outputting ZERO/FULL calibration signal
<ul> <li>SIG output Output contents</li> </ul>	: analog output for monitoring obtained by wave-shaping
Load resistance	of sensor signal 100 kO or more
Output connector	: switching to/from REVO output connector
Items	: LOWER, UPPER, ROTATOIN, OK
LOWER UPPER ROTATION	: closed when LOWER threshold value >displayed value : closed when UPPER threshold value ≤displayed value : closed when comparator ROTATION operating direction setting
OK	= measurement value (CW/CCW) : closed when three comparators above are all open
Output type Output connector	: semiconductor relay (Photo-MOS) : D-SUB (15-pin connector)
Maximum contact capacity Contact ON resistance	: 30 VDC, 0.1A
Pulse output	
Signal contents	operation
Output voltage Output update time	: LO; 1 V or less, HI; 4.5 V or more (no load) : steady rotation measurement mode (CONSTANT);
	500 ms or less rotation acceleration/deceleration mode (ACTIVE):
Load resistance	250 ms or less
Output type	: D-SUB (15-pin connector)
Remote input signal	: Terminal open; measurement start, displayed value
	Terminal close; measurement stop, display value hold, comparator output hold, analog/pulse
Input logic switching	: enabled by RS-232C communications in setup mode
Input connector Input signal type	: D-SUB (15-pin connector) : no voltage contact input, open voltage; +5 V ±0.25V,
	short-circuit current; 1 mA or less, contact resistance; 50 Q or less
Condition memory functio	n n
Number of conditions	: 3 kinds (selectable in setup mode)
larget item Communications function	: set parameters
•RS-232C I/F	: reading function measurement data. setting parameters.
Connector	reading parameters
Character code	: ASCII
Data length	: 2400/4800/9600/19200 bps : 8 bit
Stop bit Parity check	: 1bit : none
X parameter control	: none
Terminator	: CR + LF
Power requirement	: 100 to 240 VAC±10% (50/60 Hz)
Conforming standard Outer dimensions	: CE marking : 144(W) × 72(H) × 180(D) mm
Weight Power consumption	: 2 kg or less
Operating temperature range	: 0 to +40 °C
Operating (storage) humidity	2 10 to 405 °C : 20 to 80 %RF (without condensation)
Withstand voltage Insulation resistance	: 1500 VAC (between power supply and FG, 1min) : 5 MΩ or more (between power supply and FG, 500 VDC)
Accessories	: power cable, panel mounting bracket, stand foot, rubber foot, connector, instruction manual
Options	: analog output cable 1.5m (FT-0100)
	pulse output cable 1.5 (FT-0110)
	RS-232C cable 2m (AX-5022B)
They may be some cases	that FT-2500 cannot measure depending on the type

pe of engines and motors, or the measurement range may change. Please confirm with the demonstration machine before order. Please contact the nearest distributors or our sales office for demonstration machines.

## Application

 Example of engine rotation speed measurement using cigar lighter socket sensor

Connect to power outlet installed in an automobile or a construction machine. The ignition noise of the voltage output from the power outlet is detected and the rotation speed of engine can be measured by the FT-2500. Compatible with battery 12 and 24 VDC.



### FT-2500 advanced tachometer



## • FT-0501 Rotation detector for DC motor



Sensor specification	FT-0501	FT-0801
Measurement target	DC motor etc. (commutator type)	Automobile, construction machine
Detection method	Leakage magnetic flux detection	Voltage noise
Major specifications	Direct attached signal cable 3m	Plug in cigarette lighter socket.
	With tip connector (R03-PB6M)	Cable length 2m
	*It is necessary to set the number of poles of the motor.	With tip connector (C02) (BNC)
Operating temperature range	-10 to 60 °C	0 to 40 °C

Settina

: Specifying upper and lower rotation speeds (frequencies)





## FT-0801 Cigar lighter socket sensor



## F/V Converter FV-1500 Frequency-to-Voltage/Frequency-to-Current Converter -

Filter

## High response type



## Features

**Digital Tachometer** 

**F-V** Converter

- Wide frequency range: 0.2 Hz to 320 kHz
- High-speed response of every signal period Rotation direction judgment using two-phase signal
- input Rapid deceleration follow-up function
- Automatic center frequency follow-up function can analyze transient fluctuation component (option)

## Specifications

Response	: within 1 period time of input
	frequency + 3.5 µs
Input voltage	: AC input signal voltage range;
	0.3 to 30 Vp-p
	DC input signal voltage range;
	Hi +4 to +30 V, Lo 1 V or less
Input frequency range	: 0.2 Hz to 320 kHz
	For full scale mode output:
	Can be set between 1 and 320000 Hz every 1 Hz
	Can be set between 1 and 320000 r/min every 1 r/min
	Can be set between 1 and 320000 m/min every 1 m/min
	For deviation mode:
	Selectable from the measurement
	frequency range up to 320 kHz
	+1 % +5 % +10 % +20 % +50 %
	$\pm 100\%$ or $\pm 1$ to 180 000 (can be set
	eveny 1Hz 1r/min or 1m/min )
Input torminal	· RNC (CO2) or terminal block
input terminai	selectable
Input format	: single-phase, AC/DC/non-voltage
	selectable (+12 V pull-up for open
	collector devices)

Two-phase signal with 90° phase difference (DC input only)

Analog output terminal	l signal :	·
	voltage output;	0 to 10 V (Full scale mode signal output, direction recognition function OFF) $\pm$ 5 V (Full scale output mode, direction recognition function ON, deviation mode, automatic center frequency follow-up mode)
	current output;	Load resistance 100 k $\Omega$ or more to 16 mA (at the time of shipment)/4 to 20 mA
Linearity	: voltage output	Load resistance 500 Ω or less ; DC: ±0.1 % ( to 180 kHz), ±0.2 % ( to 320 kHz)
	current output;	AC: ±0.2 % ( to 180 kHz), ±0.4 % ( to 320 kHz) ; DC: ±0.7 % ( to 180 kHz),
		±1.4 % ( to 320 kHz) AC: ±1.4 % ( to 180 kHz), ±2.8 % ( to 320 kHz)
Analog output low pas	s filter : OFF/ 3 H	Iz/ 10 Hz/ 1 kHz selectable
Analog output terminal	I:BNC/C02 type	(voltage output) or terminal
	block (phoenix	contact: MC1,5/6-STF-3,81)
_ /	(voltage output	t) selectable
D/A resolution	:16-bit	
Display	: fluorescent dis	play tube
	(display range	69.85 mm × 11.45 mm)
Display unit	: Hz, r/min, m/m	iin, USER
Power requirement for	sensor:	
	12 VDC ±10 %,	, 150 mA / 5 VDC ±10 % 150 mA
Operating power valte	Selectable by s	switch on the real panel.
Operating power volta	ge range : 16 VDC dodioo	tod AC adapter (100 to $240 \text{ VAC})$
	novided as st	andard
Operating temperature		anuaru
Storage temperature	:_10 to 50 ℃	
Operating humidity	:5 to 80 % BH (	(with no condensation)
Storage humidity	: 5 to 85 % BH	(with no condensation)
Weight	approx. 1 kg	
Accessorv	: dedicated AC a	adapter (AC adapter: PS-P20023D
	cable: VM1391	-VM1700 2m) x 1. instruction
	manual x 1, co	nnector (MC1.5/6-STF-3.81)× 1
	(equipped with	the main body)
CE marking	: Low Voltage Dire	ective; 2006/95/EC EN61010-1:2010
	EMC Directive;	; 2004/108/EC EN61326-1:2006
	Class A Table 2	2
Option	: FV-0151 (Autor	matic center frequency follow-up function)
	FV-0152 (Com	parator output function)
	FV-0153 (Devia	ation scale change function)
	FV-0154 (Oper	collector output function)
	rv-0014 (Pane	er mounting fixture)

: OFF / 20 kHz / 120 kHz low-pass filter



# Signal Amplifier -Uppe

Isolated Signal Amplifier PA-150

# Features

## Specifications

Input am Input im

Open col

## **Coupling Selection Guide**

(332

cover

112)

Gromme with sea

Case

When connecting an electromagnetic rotation detector to a device, a rigid coupling will give accurate transmission of rotation and angle. However, if there is misalignment of the centering or allowance in the thrust direction, the bearing will be elastically deformed, which will impair accuracy or damage the detector.

For stable and long use with rigid coupling, the shaft misalignment should be within 6/1000 m. When you cannot make shaft centering with that accuracy, it is necessary to use flexible coupling which can accept the differences in shaft center and the allowance in thrust direction.

There are various kinds of flexible couplings, such as one with high torsional rigidity, one suitable for general rotation speed measurement. It must be selected according to the application. Please perform the centering work as carefully as possible to prevent dynamic and static loads on the shaft beyond allowance.

Coupling name	Application	Features	Allowable eccentricity, deflection angle [Note 1]	Detaching method	Remarks	Manufacturer
Rub flex coupling RF-100 etc. Fig.1	MP-810B MP-200	<ul> <li>Relaxation of rubber impact elasticity</li> <li>Vibration damping</li> </ul>	Rotation speed: 2000 r/min Deviation: 1.5 mm Deflection angle: 6 °	Attach the flange to the detector and the machine side. After setting to the dimensions specified in the centering rules, attach the rubber tire. Removable without moving system.	At high speed, expansion of the rubber due to centrifugal power causes a thrust power and it damages the detector. Drive side shaft diameter ø 10 to ø 22 [Note 2]	Nitta Chemical Industrial Products Co., Ltd.
Center flex coupling CF-A-002-02 Fig.2		<ul> <li>Absorbs vibrations and shocks</li> <li>Does not occupy wide space in the axial direction</li> </ul>	Rotation speed: 5000 r/min Deviation: 0.5 mm Deflection angle: 1 °	Attach the flange hub and hub to the detector and the machine side, and attach the rubber body after centering.	Drive side shaft diameter ø 10 to ø 25	Miki Puli Co., Ltd.

[Note 1] Allowable eccentricity and deflection angle are the ranges that guarantee the performance as a coupling. However, please avoid installing in the way that the detector shaft exceeds the specified load even if it is within the allowable range. [Note 2] Customers should prepare hole machining on the drive shaft side.

## Recommended coupling shape/weight





\* Please visit our website for more details on FV-1500.

• Used as an amplifier for electromagnetic detectors under electrically bad environment. Converts the input signal into a high-voltage low-impedance signal to transmit the signal to remote locations accurately.

• 12 VDC power terminal for use with various sensors.

• Terminal block allowing easy wiring, sealed structure, a take-off vent for various plumbing and cabling methods. Isolated shielded type to allow installation on site. Noise-resistant.

Input amplification	: AC amplification		
Input impedance	: differential input: approx. 70 kΩ (50 kHz)		
	single-ended input: approx. 45 k $\Omega$ (50 kHz)		
Input waveform	: sine wave or rectangular wave (with a duty of approx 1:1)		
Input sensitivity	: sine wave input ; 0.1 Vrms,		
	rectangular wave input ; 0.3 Vp-p		
-	(max. allowable bias voltage: ± 1 VDC)		
Frequency range	: 1 Hz to 50 kHz		
Operating voltage range	: sine wave input ; 0.1 to 30 Vrms		
	rectangular wave input ; 0.3 to 30 Vp-p		
Max. input apply voltage	: sine wave; 100 Vrms, rectangular wave; 100 VDC		
Output waveform	: rectangular waveform		
Voltage output	: max. peak voltage (Vp-p) ; 12 ±1 V		
	max. bias voltage (VBIAS) ; 0.5 V or less		
	"When OUT2 and OUT1 is short-circuited and no load between		
	output impedance: approx 330.0		
Open collector output	· collector maximum applied voltage: 40 VDC		
open concerter cutput	collector maximum input current: 50 mA		
	*Between OUT2 and OUT1: open		
	Between OUT1 and COM2; collector maximum applied voltage, and		
	collector maximum input current		
Power source	: 12 VDC ± 5 %, 100 mA max.		
Operating temperature	: -10 to 40 °C		
Storage temperature	: -20 to 70 °C		
Power requirement	: 100 VAC ±10 %, 50/60 Hz		
Power consumption	: approx. 8 VA		
Weight	: approx. 4 kg		
Accessory	: crimp terminal x 11, fuse for 200/220V x 1,		
	Instruction manual x 1		
Ierminal block	: applicable to JIS C 2805 2-4 crimp terminal		

\* For details of coupling, please contact each manufacturer.

# **Handheld Tachometer**

## Handheld Tachometer FT-7200

## Advanced Handheld Tachometer-

## FT-7200 FFT calculation method

The FT-7200 is a handy type tachometer that performs frequency analysis by FFT calculation processing and measures rotation speed. Can measure a wide range from steady motor rotation to acceleration/deceleration of engine rotation.



## Features

- Enables rotation measurement easily using sound and
- vibration. Machining of the rotating shaft is not required.
- Supports rotation speed change and acceleration/deceleration. • Efficient for measuring engine rotation speed of completed vehicles etc.
- Various sensors can be used.
- Both analog and pulse outputs provided as standard. Used for recording rotation speed and as rotation synchronization signals.
- Large LCD with backlight. • With averaging processing function.

## Specifications

Measurement section	
Measurement object	: DC motor, compressor, engine or
,	general rotating body
Calculation method	: FFT calculation method
Measurement time	: within 250 ms
Input frequency range	: 3 75 Hz to 2 kHz (3 ranges switching)
Measurement unit	r/min (rotation speed)
Measurement accuracy (r/min)	$+ 2 \times rotation speed resolution (r/min) + 1 count$
	*Measurement accuracy depends on the frequency range.
Rotation speed resolution (r/min)	): frequency range (Hz) ÷ 6400 × 60 ÷
	number of set pulses
	frequency range; 250, 500, 2000 (Hz)
	number of set pulses; 0.5, 1, 1.5, etc. (P/R)
	6400 = 200 lines x 32
	*It becomes coarse when the rotation speed is
	accelerating or decelerating.
Filter function	: Specifies the frequency range (rotation
	speed range) to be measured within the
	selected frequency range.
Averaging processing	: moving average processing
	number of averaging processing
o	OFF, 2, 4, 8, 16
Sensor amplifier sensitivity	adjustment volume :
	Sensor amplifier sensitivity can be
	adjusted with the rotary type volume
Balandar and the	knob on the right side of the main unit.
Detection section	deally a load for an also and all for an and a lot
Compatible sensors	: dedicated for engine rotation measurement
	OM-1200/1500, VP-1220/202,
	IP-292/296, IP-3000A/3100, F1-0801
	F I-050 I +F I-0 150, NP-3000 series (with
	built-in preamplifier), ivil series (microphone
In much constants and accent	+ preamplimer)
input voltage level	: 3-range available; 5 v (max $\pm$ 5 v),
Less Less of Read	0.5 V (max±0.5 V), 0.05 V (max±0.05 V)
Input coupling	
Power supply for INP series	accelerometer:
	constant current power supply
	$(2.4 \pm 0.5 \text{ mA})$
	and measuring object, it may not detect properly
	and model ing object, it may not detect property.

Display section	
LCD display	: 5 digits, LCD 7 segments, with backlight
Display update time	(Character height 10.2 mm)
Display resolution	: 1 r/min
Measurement mode	
CNS (Constant)	: Used when the fluctuation of the
	rotation speed of the object to be
	the rated rotation speed etc.)
ACT (Active)	: Used when the rotation speed of the
	object to be measured accelerates or
	decelerates. (However, when it changes
Output section	suddenly, it may not measure correctly.)
[ANALOG] analog output (	switch to analog output for monitor)
Output content	: Output for the display value of rotation speed.
Voltage range	: 0 to 1 V / 0 to F.S. (F.S. is arbitrarily set.)
Conversion method	: 10 bit D/A conversion method
Linearity Output update time	: ± 1% 01 F.S. ; within 250 ms
Temperature stability	: ± 0.05% of F.S. / °C (ZERO & SPAN)
Setting error	$\pm 0.5\%$ of F.S. (factory setting
	adjustment error, ZERO & SPAN)
Load resistance	: 100 k $\Omega$ or more
IANALOGI analog output t	: MINI JACK (Ø 2.5) for monitor (switch to analog output)
Output content	: analog output for monitoring after
	waveform shaping of sensor pulse
Load resistance	: 100 kΩ or more
Output connector	: mini jack (Ø 2.5/commonly used with
[PUI SE] output	ANALOG Odipul)
Signal content	: Outputs frequency pulse of the power
	spectrum extracted by FFT processing.
Output voltage	: Lo. 0.5 V or less, Hi. 4.5 V or more (no load)
Output frequency range	: 3.75 HZ to 2 KHZ, equivalent to display
	per rotation (P/R)
Output update time	: steady rotation mode (Constant); within
	500 ms
	rotation acceleration/deceleration
Load resistance	100 kO or more
Output connector	: mini jack (ø 2.5/commonly used with
	ANALOG output)
General specification	
Power supply	(DP 7000, and apparently)
Battery life	approx 6 hours (When the backlight is off)
Buttery me	approx. 5 hours (When the backlight is on.)
	(When alkaline battery is used, at 20 °C,
	excluding when using the NP-3000 series
	accelerometer <sup>1</sup> ) *1: When using NP-3000 series accelerometer
	consumption current increases due to driving
	constant current power. We recommend using
Low battery display	: The LOW mark is displayed, when the
	battery voltage drops 4.2 V or less.
Operating temperature	: 0 to 40 °C
Storage temperature	:-10 to 50 °C v: 35 to 85% PH (with no condensation)
Outer dimensions	: 66.0 (W)×189.5 (H)×47.5 (D) mm
Conforming standard	: CE marking
Weight	: approx. 230g (not including battery)
Accessory	: AAA battery ×4, instruction manual
	(Dasic operation, function guide, measurement procedure) v1 each
	carrying case ×1
Option	: relay cable for FT-0501, 0.5 m (FT-0150)
	output signal cable, 2m (AX-501)
	dedicated AC adapter (PB-7090)
	stand iig (HT-0521A)
	measurement tripod (LA-0203 D)

(Airy L 100 manufactured by SLIK)

## Handheld Tachometer HT-5500 Handheld Digital Tachometer -

## HT-5500 Contact/non-contact type · multifunction type\_

Extensive measurement from 6.0 r/min (low speed rotation) to 99999 r/min (high



## Features

- Memory function: up to 20 data of memory can be recorded.
- · Both contact and non-contact measurement, line speed
- measurement is available with non-contact method.
- Both analog and pulse outputs provided as standard. Used for recording rotation speed and as rotation synchronization signals.
- · Peak hold function installed: maximum value and minimum value during measurement can be displayed.
- Large LCD with backlight.
- Tripod, stand jig (option) mounting: can be fixed to a tripod etc. for continuous measurement.

### Specifications

Detection method	: red visible light photoelectric reflection method, contact method (attaching contact adapter)
Detection distance	: 20 to 300 mm
Display section	: LCD, 5 digits, with backlight
	(character height: 10.2 mm)
Measurement time	: Within 1 s + time for one cycle
	(however, when the rotation is less than
	60 r/min, twice the time for one cycle).
Display update time	: approx. 1 s
Measurement unit	: r/min, r/s (rotation speed), m/min (circumferential speed), ms (period), COUNT (integration count)

Measurement range

Measurem

0				
	Non-contact type	Contact type		
r/min (Hi level)	6 to 99999	6 to 20000		
r/min (Lo level)	6.0 to 600.0	6.0 to 600.0		
r/s	0.10 to 999.99	0.10 to 400.00		
m/min	0.6 to 9999.9	0.6 to 400.0		
COUNT	0 to 99999	0 to 99999		
ms	0.6 to 9999.9	2.5 to 9999.9		
nt accuracy : display value* × (± 0.02%) ± 1 count *Display value is the count value excluding the decimal point				

(Note)

- The measurement accuracy of circumferential speed depends on the
- rotation speed of the rotating body.
- The above measurement accuracy is for non-contact measurement. It does not include errors due to camera shake. Contact slippage and accuracy are added at the time of contact measurement.

**Measurement function** Peak hold function

maximum value (MAX), minimum value (MIN)

Memory function Over range function

up to 20 data : over range (ERROR mark) is displayed when the measured value exceeds the measurement range.

Please visit our website for more detail brochure of the FT-7200.

Handheld Tachometer

Advanced Handheld Tachometer

gh speed rotation).			
Rotation upper limit warning function : When the rotation speed exceeds a			
	preset upper limit value, upper limit warning ( ↑ mark) is displayed.		
Circumferential speed calcul	lation function : [non-contact type] circumferential speed		
	(mm) and the measured rotation speed. [contact type] circumferential ring		
Integration count function	KS-100/200 is used. Performs integration pulse counting of input signal "Note: The display is undated every display undate time		
Period measurement function	n : Measures the period of input pulse		
Rotation speed	(however, average value of input pulse if it is 1 second or more) non-contact type (with reflective mark),		
Output section lanalog out	contact type (using KS-300)		
Output voltage	: 0 to 1 V / 0 to F.S. (Full scale is arbitrarily set.)		
Conversion method Linearity	: 10 bit D/A conversion method : ± 1% F.S.		
Output update time Temperature stability	: 50 ms + input pulse within 1 period time : ± 0.05 %/ F.S. /°C (span & zero)		
Full scale setting error Load resistance	: ± 0.5 % /F.S. : 100 kΩ or more		
Output section [pulse outp	ut]		
Output voltage	: Hi level… 4.5 V or more (when detecting with reflective mark)		
Output logic	Lo level··· 0.5 V or less		
Load resistance	: 100 k $\Omega$ or more		
General specifications			
Power	: AAA battery x4 or dedicated AC adapter (PB-7090: sold separately)		
Battery life	approx. 32 hours (when the backlight is OFF)		
	approx. 8 hours (when the backlight is ON)		
Low battery display	: The LOW mark is displayed, when the		
Operating temperature	: 0 to 40 °C		
Storage temperature	: -10 to 50 °C		
Operating (storage) humidity	r : 35  to  85%  RH (with no condensation)		
	66 (W) ×237.2 (H) ×57.5 (D) mm (contact		
Conforming standard	: CE marking		
Weight (excluding batteries)	approx.220g (only main unit)		
Accessory	contact)		
recours	rotation contact tip (KS-300)×1,		
	circumferential ring (KS-200 for m/min)×1, reflective mark (12mm square, 25 sheets) ×1.		
	AAA battery ×4, carrying casex1		
	instruction guide:		
	Japanese/English, basic operation: Japanese/English)×1		
Option	: pulse output cable; 2 m (AX-501)		
	reflective mark; 12 mm square 25 sheet,		
	circumferential ring for mm/s (KS-100)		
	circumferential ring for m/min (KS-200) rotation contact tip (KS-300)		
	contact adapter (HT-0502)		
	extension relay shaft for KS-300 (KS-700) stand iig (HT-0521B)		
	magnet stand (HT-0522)		
	measurement tripod (LA-0203D) (Airy L 100 manufactured by SLIK)		

## HT-3200 Contact type / general purpose liquid crystal display\_

With a low range setting that can measure from 0.5 r/min. A circumferential ring/rotation contact can be stored in a pocket of the main body.



#### Features

- Measurable from a low speed of 0.5 r/min to 10,000 r/min (circumferential speed: 0.05 to 1,000.0 m/min).
- · Large liquid crystal display on a compact, lightweight body (character height 10.5 mm).
- With memory function useful for checking
- By replacing the contact tip with the attached circumferential ring, it can also measure circumferential speed.
- With a pocket to store the circumferential ring.
- Continuesly displays the latest measurement value for approx. 30 seconds after power-off.
- Displays the timing of battery replacement.

• Specifications Method : contact method Display section : liquid crystal display, 5 digits (character height 10. 5 mm)	Over range display : "ERROR" is displayed. Power requirement : AAA battery×3 Battery life : approx. 20 hours (using alkaline dry batteries, at 20 °C)
Measurement unit : Lo range… 0.1 r/min, Hi range… 1 r/min Display update time : 1 second automatic repeat For Lo range (0.5 to 1.0 r/min); every 2 seconds For Hi range (5 to 10 r/min); every 2 seconds Measurement range and accuracy of rotation speed : Lo range… 0.5 to 1249.9 r/min; within ±0.1 r/min 1250.0 to 2000.0 r/min; within ±0.2 r/min Hi range…5 to 10.000 r/min;	Operating temperature : 0 to 40 °C Storage temperature : -10 to 55 °C Operating (storage) humidity range : 35 to 85% RH (with no condensation) Outer dimensions : 63 (W) x 172 (H) x 38.5 (D) mm Conforming standard : CE marking Weight : approx. 160 g (without batteries) Accessory : contact tip for rotation measurement (KS-300) x2 (One of them is stored in the
within ±1 r/min Circumferential speed measurement range: Lo range 0.05 to 2000 (provided) KS-100 (option) Lo range 0.05 to 2000.0 m/min 5 to 10,000 mm/s Hi range 0.5 to 1000.0 m/min 5 to 10,000 mm/s • The accuracy is calibrated with the rotation speed. • The unit of measurement can not be changed. When using KS-200, setting the measurement value to 1/10 will result in the value in m/min. Memory function : number of memories; 10 Data hold function : automatic power off 30 seconds after the end of measurement Low battery display : "LOW" mark is displayed when the battery voltage drops 3.3 V or less.	Option : circumferential ring (KS-200 for m/min)×1 (stored in the main body) AAA batteryx3, instruction manual (English, Japanese) x1 each : circumferential ring for mm/s (KS-100), circumferential ring for m/min (KS-200), rotation contact tip (KS-300), extension shaft for KS-300 (KS-700), a carrying case (HT-0300)

## HT-4200 Non-contact type/general-purpose liquid crystal display\_

•

Affix a reflective mark to the rotating body of the measurement target object, and then aim the red visible light at the mark. By attaching multiple reflective marks, it is possible to measure from a lower speed.



## Features

- The 5-digit display enables wide-range measurement from 4 to 50,000 r/min (when several reflective marks are used).
- A large-size display (character height 10.5 mm) is adopted to the compact, lightweight body.
- Memory function for easy confirmation of the measurement results
- Even it is shiny shaft its rotation can be measured by using the reflective marks provided as standard.
- Measurement can be performed over a wide range from 30 to 50,000 r/min, in 1 r/min unit (When one reflective mark is used.).
- Safe measurement available for being detectable from a position away from the measurement target (20 to 300 mm).
- Continuously displays the latest measurement value for approx. 30 seconds after power off.
  Displays the timing of battery replacement.

• Specifications	Memory functio Data hold functi	
ph ph	otoelectric reflection	Low batton dia
Detection distance : 20 Display : LC	to 300 mm D, 5 digits (character	Low ballery dis
hei me Display update time : 1 s	ght ; 10.5 mm), fixed easurement unit (r/min) second automatic repeat	Over range disp Power source
(hc the	wever, 2 seconds when e circumferential speed	Battery life
is I ma Measurement range: me Aff	ower than 60/reflective arks r/min) assurement unit ;1r/min ixing of multiple reflective	Operating temp Storage temper Operating (stora
of	lower rotation speeds.	Outer dimension
Measurement range	Number of reflective marks	Conforming stan
30 to 50,000 r/min	1	Weight
15 to 25,000 r/min	2	
10 to 16,667 r/min	3	Accesson
8 to 12,500 r/min	4	Accessory
5 to 8,333 r/min	6	
4 to 6,250 r/min	8	
Measurement accuracy (whe	en one reflective	
ma	rk is used) :	Option
30	to 12,499 r/min;	
wit	hin ±1 r/min	
12	,500 to 24,999 r/min;	
wit	hin ±2 r/min	
25		
wit		
Pulse number setting fur		
Th	e number of reflective	
ma		
sp	ecified in order to	
pe	rform measurement	
fro	m lower rotation speeds.	
set	tting values; 1, 2, 3, 4,	
6,	8 P/R	

ory function hold function	: 10 data can be memorized. : The power automatically turns off 30 seconds after
attery display	: "LOW" mark is displayed when the battery voltage drops 3.3 V or less
range display r source y life	: "ERROR" mark is displayed. : AAA battery×3 : approx. 20 hours (when using alkaline batteries at 20 °C)
iting temperati	ure : 0 to 40 °C
ne temperature	e : -10 to + 55 ℃
iting (storage)	humidity ·
ung (otorago)	35 to 85 % PH (with no
	condenaction)
aimensions	: 62 (VV)×129(H)×26.4 (D) mm
rming standard	: CE marking
ıt	: approx. 90 g (not including batteries)
sorv	: reflective marks 1 sheet
	(12 mm square×25 marks),
	instruction manual (English
	lananese) v1 each
<b>^</b>	reflective mark 12mm
1	aguaray 25: 10 chaota 1 cot
	carrying case (H1-0400),
	soft case (HT-0003)

## HR-6800 High speed rotation type \_



## E Ha

		50		
	Measurement time	: 50 ms + input signal within 10 periods	Low battery dis	splay : "LOW" mark is displayed when the battery voltage
dan la	Display update time	e: approx. 1 s/approx. 0.5 s	Operating tomp	drops 4.5 V or less.
	Measurement unit	: 10 r/min (rotation speed)	Storage temper	rature : -10 to 50 °C
	Rotation speed me	asurement range :	Operating (stora	age) humidity : 35 to 85% BH (with no
H. C.		(range selectable)		condensation)
S AN	Measurement accu	racy : display value x + (0.02 %)	Outer dimensio	ns : 66 (W) × 189.5 (H) × 47.5 (D) mm
	B	$\pm 1$ count	Conforming stan	idard : CE marking
	Peak hold function	: maximum value (MAX), minimum value (MIN)	Weight	: approx. 230 g (main unit only, not including
	Memory function	: up to 20 data	A	batteries)
	Over range display	exceeds the measurement	Accessory	for tripod mounting
		range, over range (ERROR		(MI-0301)×1, carrying
•Features	Rotation upper limit	t warning function :		(basic operation, function
<ul> <li>High-speed rotation measurement from 100 to</li> </ul>		When the rotation speed	Option	explanation) × 1 each
999,990 r/min Built-in memory function, up to a maximum of 20		limit value, upper limit	option	(AX-501)
data can be saved to memory.		warning ( 1 mark) is displayed.		dedicated AC adapter (PB-7090)
Both analog and pulse outputs provided as	Analog output section	: output voltage; 0 to 1 V/0		Stand jig (HT-0521B)
standard. Used for recording rotation speeds,		output update time; 50 ms		Magnet stand (H1-0522) Measurement tripod
synchronization signals		+ input pulse within 10		(LA-0203D)
Built-in peak hold function: The maximum and	Monitor output	: for monitor analog output		Tripod mounting adapter
minimum values can be displayed during measurement		after waveform shaping of	Dotoction sout	(MI-0301)
Large LCD with backlight		waveform conversion)	Dedicated dete	ctor : MP-5350
•Specifications	Pulse output	: 1 pulse output per pulse detection	Detection meth	od : electromagnetic induction method
Measurement section		output voltage;	DC resistance	value : 25 to 40 Ω (20 °C)
Measurement target : rotating objects used in		Hi level····4.5 V or more, Lo level····0.5 V or less	Connection cat (included)	connector included)
dentistry, texturizing machine, high-speed	Power supply	: AAA battery ×4 or a	Operating temp	perature : 0 to 40 °C
		(PB-7090, sold separately)	Vibration and sl	hock resistance :
machine tools				$10.6 \text{ m/c}^2 \cdot 400 \text{ m/c}^2$
machine tools Note: target measurement objects must be magnetized.	Battery life	: approx. 13 hours (when	Outor dimonsio	19.011/5-149011/5-
Display section Display section Displa	Battery life	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when	Outer dimensio Conforming stan	ns : 107 x ø 14 mm Indard : CE marking
Display section Display sectio	Battery life	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries at 20 °C)	Outer dimensio Conforming stan Weight	idard : CE marking : approx. 50 g (detection section only)
Display section Display sectio	Battery life	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C)	Outer dimensio Conforming stan Weight *Please refer to H	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of
Display section       machine tools         Mote: target measurement objects must be magnetized.         LCD with backlight, 5-digit (character height: 10.2 mm)	Battery life 2100	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C)	Outer dimensio Conforming stan Weight *Please refer to H analog output.	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of
Display section       machine tools         Note: target measurement objects must be magnetized.         . LCD with backlight, 5-digit (character height: 10.2 mm)         Elevator Speedometer         Handheld Type Speedometer	Battery life	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C)	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output.	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of
Display section       machine tools         Note: target measurement objects must be magnetized.         LCD with backlight, 5-digit (character height: 10.2 mm)         Elevator Speedometer Handheld Type Speedometer	Battery life 2100 ter	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C)	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output.	ns : 107 x ø 14 mm Idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of
Display section       machine tools         Note: target measurement objects must be magnetized.         LCD with backlight, 5-digit (character height: 10.2 mm)         Elevator Speedometer Handheld Type Speedometer	Battery life 2100 ter Measurement unit :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option)	Outer dimensio Conforming stan Weight *Please refer to H analog output.	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of perature : 0 to 45 °C
Display section       machine tools         Note: target measurement objects must be magnetized.         LCD with backlight, 5-digit (character height: 10.2 mm)         Elevator Speedometer Handheld Type Speedometer         Option	Battery life 2100 ter Measurement unit : Auto power off func	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns	Outer dimensio Conforming stan Weight *Please refer to H analog output. Operating temp Storage temper Operating (stora	ns : 107 x Ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of perature : 0 to 45 °C rature : -10 to 60 °C age) humidity :
Display section       machine tools         Note: target measurement objects must be magnetized.         1: LCD with backlight, 5-digit (character height: 10.2 mm)         Elevator Speedometer Handheld Type Speedometer         Option         Option	Battery life 2100 ter Measurement unit : Auto power off func	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) :tion : The power automatically turns off 180 seconds after the last	Outer dimensio Conforming stan Weight *Please refer to H analog output. Operating temp Storage temper Operating (stora	<ul> <li>10.7 x Ø 14 mm</li> &lt;</ul>
Display section       machine tools         Display section       Note: target measurement objects must be magnetized.         Elevator Speedometer       EC-2         Handheld Type Speedometer       EC-2         Handheld Type Speedometer       Option         Option       Option	Battery life 2100 ter Measurement unit : Auto power off func Data hold function :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel	Outer dimensio Conforming stan Weight *Please refer to H analog output. Operating temper Storage temper Operating (stora	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of perature : 0 to 45 °C rature : -10 to 60 °C age) humidity : 35 to 85 % (RH) (with no condensation) ns: 60 (W) × 162 (L) ×38 (D) mm
machine tools         Note: target measurement         objects must be magnetized.         1: LCD with backlight, 5-digit         (character height: 10.2 mm)    Elevator Speedometer EC-2 Handheld Type Speedometer	Battery life 2100 ter Measurement unit : Auto power off func Data hold function :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent)	Outer dimensio Conforming stan Weight *Please refer to H analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight	<ul> <li>13.0 Try 6 14 mm</li> <li>107 x 6 14 mm</li> <li>approx. 50 g (detection section only)</li> <li>T-5500 for electrical specification of</li> <li>berature : 0 to 45 °C</li> <li>rature : -10 to 60 °C</li> <li>age) humidity :</li> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) × 38 (D) mm</li> <li>ndard : CE marking</li> <li>approx. 423 a (including</li> </ul>
machine tools         Note: target measurement         objects must be magnetized.         1: LCD with backlight, 5-digit         (character height: 10.2 mm)    Elevator Speedometer EC-2 Handheld Type Speedometer	Battery life 2100 ter Measurement unit : Auto power off func Data hold function : Averaging function :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup)	Outer dimensio Conforming stan Weight *Please refer to H analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of perature : -10 to 60 °C age) humidity : 35 to 85 % (RH) (with no condensation) ns: 60 (W) × 162 (L) ×38 (D) mm indard : CE marking : approx. 423 g (including batteries, not including the
machine tools         Note: target measurement         objects must be magnetized.         1: LCD with backlight, 5-digit         (character height: 10.2 mm)    Elevator Speedometer EC-2 Handheld Type Speedometer	Battery life 2100 ter Measurement unit : Auto power off func Data hold function : Averaging function : Memory function :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit	Outer dimensio Conforming stan Weight *Please refer to H analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of perature : -10 to 60 °C age) humidity : 35 to 85 % (RH) (with no condensation) ns: 60 (W) × 162 (L) ×38 (D) mm ndard : CE marking : approx. 423 g (including batteries, not including the circumferential ring) : EC-022, external bold circual
Display section       Note: target measurement objects must be magnetized.         Display section       : LCD with backlight, 5-digit (character height: 10.2 mm)         Elevator Speedometer EC-2       EC-2         Handheld Type Speedometer       EC-2         Use of the second	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Averaging function : Memory function : Output section	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit.	Outer dimensio Conforming stan Weight *Please refer to H analog output. Operating temper Operating (stora Outer dimension Conforming sta Weight Accessory	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of perature : -10 to 60 °C age) humidity : 35 to 85 % (RH) (with no condensation) ns: 60 (W) × 162 (L) ×38 (D) mm ndard : CE marking : approx. 423 g (including batteries, not including the circumferential ring) : EC-0922 external hold signal cable (1.4m) x 1 set
Display section       Note: target measurement objects must be magnetized.         Display section       : LCD with backlight, 5-digit (character height: 10.2 mm)         Elevator Speedometer EC-:       EC-:         Handheld Type Speedometer       EC-:         Use of the second	Battery life 2100 ter Measurement unit : Auto power off funct Data hold function : Averaging function : Memory function : Memory function : Output section Analog output	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) ction : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output	Outer dimensio Conforming stan Weight *Please refer to H analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of perature : -10 to 60 °C age) humidity : 35 to 85 % (RH) (with no condensation) ns: 60 (W) × 162 (L) ×38 (D) mm ndard : CE marking : approx. 423 g (including batteries, not including the circumferential ring) : EC-0922 external hold signal cable (1.4m) x 1 set (2 pieces) EC-0925 carrying case x 1 piece
machine tools Note: target measurement objects must be magnetized. LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-2 Handheld Type Speedometer Handheld Type Speedometer Coption Figger unit EC-0201 When the circumferential ring KS-400 (option) is attached.	Battery life 2100 ter Measurement unit : Auto power off funct Data hold function : Averaging function : Memory function : Memory function : Output section Analog output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing)	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of perature : -10 to 60 °C age) humidity : 35 to 85 % (RH) (with no condensation) ns: 60 (W) × 162 (L) ×38 (D) mm ndard : CE marking : approx. 423 g (including batteries, not including the circumferential ring) : EC-0922 external hold signal cable (1.4m) x 1 set (2 pieces) EC-0925 carrying case x 1 piece hexagonal wrench
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machine tools Note: target measurement objects must be magnetized. LicD with backlight, 5-digit (character height: 10.2 mm) CELEVATOR SpeedOmeter EC-2 CHARDEN CONSTRUCTION CO	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Averaging function : Memory function : Memory function : Output section Analog output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory	<ul> <li>13.0 Tive 14 mm</li> <li>107 x ø 14 mm</li> <li>107 x ø 14 mm</li> <li>108 and 100 cm</li> <li>107 x ø 14 mm</li> <li>108 and 100 cm</li> <li>108 and 100 cm</li> <li>109 and 100 cm</li> <li>100 and 100 cm</li> <li< td=""></li<></ul>
machine tools Note: target measurement objects must be magnetized. LOD with backlight, 5-digit (character height: 10.2 mm) Clevator Speedometer EC-f Control	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Averaging function : Memory function : Output section Analog output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>13.0 Tive 14 mm</li> <li>107 x ø 14 mm</li> <li>idard : CE marking</li> <li>: approx. 50 g (detection section only)</li> <li>T-5500 for electrical specification of</li> </ul> Derature : -10 to 60 °C age) humidity : <ul> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) ×38 (D) mm</li> <li>ndard : CE marking</li> <li>: approx. 423 g (including the circumferential ring)</li> <li>: EC-0922 external hold signal cable (1.4m) x 1 set (2 pieces)</li> <li>EC-0925 carrying case x 1 piece hexagonal wrench (opposite side:1.5mm) x 1 piece AA battery x 3 pieces Instruction manual x 1 piece</li> <li>: EC-0202 Distance measurement function</li> </ul>
machine tools Note: target measurement objects must be magnetized. LiCD with backlight, 5-digit (character height: 10.2 mm) <b>Elevator Speedometer</b> EC-5 Handheld Type Speedometer (character height: 10.2 mm) <b>Elevator Speedometer</b> (character height: 10.2 mm) <b>Elevator Speedometer</b> (character height: 10.2 mm) <b>Elevator Speedometer</b> (character height: 10.2 mm) <b>Cotor</b> (character height: 10.2 mm) <b>Elevator Speedometer</b> (character height: 10.2 mm) <b>Dotion</b> (character height: 10.2 mm) <b>Cotor</b> (character height: 10.2 mm) <b>Cotor</b> (character height: 10.2 mm) <b>Dotion</b> (character height: 10.2 mm) <b>Cotor</b> (character height: 10.2 mm) (character height: 10.2 mm) (cha	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Averaging function : Memory function : Output section Analog output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm output connector; ø 2.5 mm	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	ns : 107 x ø 14 mm idard : CE marking : approx. 50 g (detection section only) T-5500 for electrical specification of perature : -10 to 60 °C age) humidity : 35 to 85 % (RH) (with no condensation) ns: 60 (W) × 162 (L) ×38 (D) mm indard : CE marking : approx. 423 g (including batteries, not including the circumferential ring) : EC-0922 external hold signal cable (1.4m) x 1 set (2 pieces) EC-0925 carrying case x 1 piece hexagonal wrench (opposite side:1.5mm) x 1 piece AA battery x 3 pieces Instruction manual x 1 piece : EC-0202 Distance measurement function "If ordering after delivering the main unit installation fee is required
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machine tools Note: target measurement objects must be magnetized. LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-2 Handheld Type Speedometer For the speedometer and the speedometer option Option Option Triger unit EC-0201 Wen the circumferential ring KS-400 (option) is attached. Elevator Speedometer Memory function Memory function Memory function Substantial speedometer Auto power off function Substantial speedometer Substantial speedometer Memory function Substantial speedometer Substantial speedometer Subs	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Averaging function : Memory function : Output section Analog output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) stion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack output method; transistor output (open collector) withstand voltage: 14 V	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>13.0 Tive 14 mm</li> <li>13.0 Tive 14 mm</li> <li>idard : CE marking <ul> <li>approx. 50 g (detection section only)</li> </ul> </li> <li>17-5500 for electrical specification of</li> </ul> <li>berature : -10 to 60 °C <ul> <li>age) humidity :</li> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) ×38 (D) mm</li> <li>ndard : CE marking <ul> <li>approx. 423 g (including the circumferential ring)</li> <li>EC-0922 external hold signal cable (1.4m) × 1 set (2 pieces)</li> <li>EC-0925 carrying case x 1 piece hexagonal wrench <ul> <li>(opposite side:1.5mm) × 1 piece</li> <li>Abattery x 3 pieces</li> <li>Instruction manual x 1 piece</li> <li>EC-0202 Distance measurement function <ul> <li>"If ordering after delivering the main unit, installation fee is required separately.</li> <li>KS-400 (circumferential ring (wide type) :15 mm</li> </ul> </li> </ul></li></ul></li></ul></li>
machine tools Note: target measurement objects must be magnetized. LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-5 Handheld Type Speedometer For Handheld Type Speedometer Coption Option Figer unit EC-0201 Wen the circumferential ring KS-400 (option) is attached. Elevator Speedometer Memory function Memory function Memory function Successful function Memory function	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Averaging function : Memory function : Memory function : Output section Analog output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack output method; transistor output (open collector) withstand voltage; 14 V current; 20 mA or less	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (store Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>13.0 Tive 14 mm</li> <li>13.0 Tive 14 mm</li> <li>14ard : CE marking <ul> <li>approx. 50 g (detection section only)</li> </ul> </li> <li>17-5500 for electrical specification of</li> </ul> <li>berature : -10 to 60 °C <ul> <li>age) humidity :</li> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) ×38 (D) mm</li> <li>ndard : CE marking <ul> <li>approx. 423 g (including the circumferential ring)</li> <li>EC-0922 external hold signal cable (1.4m) x 1 set (2 pieces)</li> <li>EC-0925 carrying case x 1 piece hexagonal wrench <ul> <li>(opposite side:1.5mm) x 1 piece</li> <li>A battery x 3 pieces</li> <li>Instruction manual x 1 piece</li> <li>EC-0202 Distance measurement function <ul> <li>"If ordering after delivering the main unit, installation fee is required separately.</li> <li>KS-400 circumferential ring <ul> <li>(wide type) :15 mm</li> <li>KS-500 circumferential ring</li> </ul> </li> </ul></li></ul></li></ul></li></ul></li>
machine tools Note: target measurement objects must be magnetized. LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-2 Handheld Type Speedometer EC-2 Handheld Type Speedometer Control (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Potion (character height: 10.2 mm) Potion (character height: 10.2 mm) (character height: 10.2 mm)	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Averaging function : Memory function : Output section Analog output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage rage; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack output method; transistor output (open collector) withstand voltage; 14 V current; 20 mA or less number of pulses; 600 pulses	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>13.0 Tive 1490 minster 1900 minster 19000 minster 1900 minster 1900 minster 1900 minster 1900 minste</li></ul>
machine tools Note: target measurement objects must be magnetized. : LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-2 Handheld Type Speedometer Control (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Control (character height: 10.2 mm) Note: target unit EC-0201 (character height: 10.2 mm) (character	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Memory function : Memory function : Output section Analog output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack output method; transistor output (open collector) withstand voltage; 14 V current; 20 mA or less number of pulses; 600 pulses / rotation logic; negative logic	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>13.0 Tive 149 mm</li> <li>13.0 Tive 149 mm</li> <li>idard : CE marking <ul> <li>approx. 50 g (detection section only)</li> </ul> </li> <li>17-5500 for electrical specification of</li> </ul> <li>berature : -10 to 60 °C <ul> <li>age) humidity : <ul> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) ×38 (D) mm</li> <li>ndard : CE marking <ul> <li>approx. 423 g (including the circumferential ring)</li> <li>EC-0922 external hold signal cable (1.4m) × 1 set (2 pieces)</li> <li>EC-0925 carrying case x 1 piece hexagonal wrench <ul> <li>(opposite side: 1.5mm) x 1 piece AA battery x 3 pieces Instruction manual x 1 piece</li> <li>EC-0202 Distance measurement function <ul> <li>"If ordering after delivering the main unit, installation fee is required separately.</li> <li>KS-400 circumferential ring (wide type); 15 mm</li> <li>KS-0800 circumferential ring (rubber coating wide type) 15 mm</li> </ul> </li> </ul></li></ul></li></ul></li></ul></li>
machine tools Note: target measurement objects must be magnetized. : LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-2 Handheld Type Speedometer EC-2 Handheld Type Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Coption (character height: 10.2 mm) (character height: 10.2 mm) (chara	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Memory function : Memory function : Output section Analog output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack output method; transistor output (open collector) withstand voltage; 14 V current; 20 mA or less number of pulses; 600 pulses / rotation logic; negative logic pulse width; approx. 0.5 to 1.2 µs output connector; ø 2.5 mm	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>13.0 Tive 1490 minstering</li> <li>1407 x ø 14 mm</li> <li>14dard : CE marking</li> <li>approx. 50 g (detection section only)</li> <li>T-5500 for electrical specification of</li> </ul> Derature : -10 to 60 °C <ul> <li>age) humidity :</li> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) ×38 (D) mm</li> <li>ndard : CE marking</li> <li>approx. 423 g (including the circumferential ring)</li> <li>EC-0922 external hold signal cable (1.4m) × 1 set (2 pieces)</li> <li>EC-0925 carrying case x 1 piece hexagonal wrench</li> <li>(opposite side: 1.5mm) x 1 piece</li> <li>A battery x 3 pieces Instruction manual x 1 piece</li> <li>EC-0202 Distance measurement function</li> <li>"If ordering after delivering the main unit, installation fee is required separately.</li> <li>KS-400 circumferential ring (wide type) ;15 mm</li> <li>KS-0800 circumferential ring (rubber coating wide type);15 mm</li> <li>KS-300 rotating contact tip</li> </ul>
machine tools Note: target measurement objects must be magnetized. : LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-2 Handheld Type Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm)	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Averaging function : Memory function : Output section Analog output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack number of pulses; 600 pulses / rotation logic; negative logic pulse width; approx. 0.5 to 1.2 µs output connector; ø 2.5 mm pin-jack	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>13.0 Tive 14 mm</li> <li>13.0 Tive 14 mm</li> <li>idard : CE marking</li> <li>i approx. 50 g (detection section only)</li> <li>T-5500 for electrical specification of</li> </ul> Derature : -10 to 60 °C <ul> <li>age) humidity :</li> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) ×38 (D) mm</li> <li>ndard : CE marking</li> <li>approx. 423 g (including the circumferential ring)</li> <li>i EC-0922 external hold signal cable (1.4m) × 1 set (2 pieces)</li> <li>EC-0925 carrying case x 1 piece hexagonal wrench</li> <li>(opposite side: 1.5mm) x 1 piece</li> <li>A battery x 3 pieces Instruction manual x 1 piece</li> <li>i EC-0202 Distance measurement function</li> <li>"If ordering after delivering the main unit, installation fee is required separately.</li> <li>KS-400 circumferential ring (wide type) ;15 mm</li> <li>KS-000 circumferential ring (rubber coating wide type);15 mm</li> <li>KS-300 rotating contact tip EC-0924 relay shaft for rotating contact tip</li> </ul>
<complex-block>machine tools Note: target measurement objects must be magnetized. : LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-2 Aandoheld Type Speedometer EC-2 Display section Control Control Control Control (character height: 10.2 mm) Elevator Speedometer EC-2 Data (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Control Control Control Control (character height: 10.2 mm)</complex-block>	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Memory function : Memory function : Output section Analog output : Pulse output :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack number of pulses; 600 pulses / rotation logic; negative logic pulse width; approx. 0.5 to 1.2 µs output connector; ø 2.5 mm pin-jack ad pulses :	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>13.0 Tive 14 mm</li> <li>13.0 Tive 14 mm</li> <li>idard : CE marking</li> <li>i approx. 50 g (detection section only)</li> <li>T-5500 for electrical specification of</li> </ul> Derature : -10 to 60 °C <ul> <li>age) humidity :</li> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) ×38 (D) mm</li> <li>ndard : CE marking</li> <li>approx. 423 g (including the circumferential ring)</li> <li>EC-0922 external hold signal cable (1.4m) × 1 set (2 pieces)</li> <li>EC-0925 carrying case x 1 piece hexagonal wrench</li> <li>(opposite side:1.5mm) x 1 piece</li> <li>AA battery x 3 pieces Instruction manual x 1 piece</li> <li>EC-0202 Distance measurement function</li> <li>"If ordering after delivering the main unit, installation fee is required separately.</li> <li>KS-400 circumferential ring (wide type);15 mm</li> <li>KS-0800 circumferential ring (rubber coating wide type);15 mm</li> <li>KS-300 rotating contact tip EC-0924 relay shaft for rotating contact tip EC-091A external hold detection</li> </ul>
machine tools Note: target measurement objects must be magnetized. : LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-2 Handheld Type Speedometer EC-2 Handheld Type Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Definition (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) (character height: 10.2 m	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Memory function : Memory function : Output section Analog output : Pulse output : Detection section Number of generate	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack number of pulses; 600 pulses / rotation logic; negative logic pulse width; approx. 0.5 to 1.2 µs output connector; ø 2.5 mm pin-jack ed pulses : 150 pulses/ rotation, slit reflection method	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>13.0 Tive 14 mm</li> <li>13.0 Tive 14 mm</li> <li>idard : CE marking <ul> <li>approx. 50 g (detection section only)</li> </ul> </li> <li>1-5500 for electrical specification of</li> </ul> <li>berature : -10 to 60 °C <ul> <li>age) humidity :</li> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) ×38 (D) mm</li> <li>ndard : CE marking <ul> <li>approx. 423 g (including the circumferential ring)</li> <li>EC-0922 external hold signal cable (1.4m) × 1 set (2 pieces)</li> <li>EC-0925 carrying case x 1 piece hexagonal wrench <ul> <li>(opposite side:1.5mm) x 1 piece</li> <li>AA battery x 3 pieces</li> <li>Instruction manual x 1 piece</li> <li>EC-0202 Distance measurement function <ul> <li>"If ordering after delivering the main unit, installation fee is required separately.</li> <li>KS-400 circumferential ring <ul> <li>(marrow type); 15 mm</li> <li>KS-300 rotating contact tip EC-0924 relay shaft for rotating contact tip EC-0924 signal cable (5 m)</li> </ul> </li> </ul></li></ul></li></ul></li></ul></li>
<complex-block>machine tools Note: target measurement objects must be magnetized. : LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-4 Handbheld Type Speedometer EC-4 Handbheld Type Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) (character height:</complex-block>	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Memory function : Memory function : Output section Analog output : Pulse output : Detection section Number of generate Light source :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack output connector; ø 2.5 mm pulse width; approx. 0.5 to 1.2 µs output connector; ø 2.5 mm pin-jack ed pulses : 150 pulses/ rotation, slit reflection method infrared-emitting diode	Outer dimensio Conforming stan Weight *Please refer to H <sup>*</sup> analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>19.0 Try 6 14 mm</li> <li>19.0 Try 6 14 mm</li> <li>Iddard : CE marking <ul> <li>approx. 50 g (detection section only)</li> </ul> </li> <li>T-5500 for electrical specification of</li> </ul> <li>berature : -10 to 60 °C <ul> <li>age) humidity : <ul> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) ×38 (D) mm</li> <li>ndard : CE marking <ul> <li>approx. 423 g (including the circumferential ring)</li> <li>EC-0922 external hold signal cable (1.4m) × 1 set (2 pieces)</li> <li>EC-0925 carrying case x 1 piece hexagonal wrench</li> <li>(opposite side:1.5mm) x 1 piece AA battery x 3 pieces Instruction manual x 1 piece</li> <li>EC-0202 Distance measurement function <ul> <li>"f ordering after delivering the main unit, installation fee is required separately.</li> <li>KS-400 circumferential ring (narrow type); 15 mm</li> <li>KS-300 rotating contact tip EC-0924 relay shaft for rotating contact tip EC-0924 spushaft for rotating contact tip EC-0924 spushaft for rotating contact tip EC-0924 pieces in the contact tip EC-0924 piece in the contact piece in the piece in the</li></ul></li></ul></li></ul></li></ul></li>
machine tools Note: target measurement objects must be magnetized. : LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-4 Andcheld Type Speedometer EC-4 Display section Coption (ption (ption (ption (ption) (ption (ption) (ption (ption) (pti	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Memory function : Memory function : Output section Analog output : Pulse output : Detection section Number of generate Light source : Light source : Light source :	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack output method; transistor output (open collector) withstand voltage; 14 V current; 20 mA or less number of pulses; 600 pulses / rotation logic; negative logic pulse width; approx. 0.5 to 1.2 µs output connector; ø 2.5 mm pin-jack ed pulses : 150 pulses/rotation, slit reflection method infrared-emitting diode tent : photodiode	Outer dimensio Conforming stan Weight *Please refer to HT analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>19.0 Try Ø 14 mm</li> <li>19.0 Try Ø 14 mm</li> <li>Iddard : CE marking</li> <li>approx. 50 g (detection section only)</li> <li>T-5500 for electrical specification of</li> </ul> Perature : 0 to 45 °C <ul> <li>rature : -10 to 60 °C</li> <li>age) humidity :</li> <li>35 to 85 % (RH) (with no condensation)</li> <li>ns: 60 (W) × 162 (L) ×38 (D) mm</li> <li>ndard : CE marking</li> <li>approx. 423 g (including the circumferential ring)</li> <li>EC-0922 external hold signal cable (1.4m) × 1 set (2 pieces)</li> <li>EC-0925 carrying case x 1 piece hexagonal wrench</li> <li>(opposite side:1.5mm) x 1 piece</li> <li>A battery x 3 pieces</li> <li>Instruction manual x 1 piece</li> <li>EC-0202 Distance measurement function</li> <li>"If ordering after delivering the main unit, installation fee is required separately.</li> <li>KS-400 circumferential ring (marow type); 15 mm</li> <li>KS-300 rotating contact tip EC-0924 relay shaft for rotating contact tip</li> <li>EC-0921 signal cable (5 m)</li> <li>EC-0926 trigoer unit cable</li> </ul>
<complex-block>machine tools Note: target measurement objects must be magnetized. : LCD with backlight, 5-digit (character height: 10.2 mm) Elevator Speedometer EC-4 Andoheld Type Speedometer EC-4 Andoheld Type Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Elevator Speedometer (character height: 10.2 mm) Composition</complex-block>	Battery life 2100 ter Measurement unit : Auto power off function : Data hold function : Memory function : Memory function : Output section Analog output : Pulse output : Detection section Number of generate Light source : Light source : Li	: approx. 13 hours (when the backlight is OFF), approx. 8 hours (when the backlight is ON) (using alkaline batteries, at 20 °C) m/min, r/min, mm (option) tion : The power automatically turns off 180 seconds after the last operation. data hold of each channel (CH 1, CH 2, Max value, each independent) 1 to 200 times (optionally setup) Up to 10 measurement results can be stored in the main unit. output content; instantaneous value (output after averaging processing) voltage range; 0 to 1 V/0 to F.S. conversion method; 10-bit D/A conversion linearity; ±1% F.S. output update time; 10 ms output connector; ø 2.5 mm pin-jack output method; transistor output (open collector) withstand voltage; 14 V current; 20 mA or less number of pulses; 600 pulses / rotation logic; negative logic pulse width; approx. 0.5 to 1.2 µs output connector; ø 2.5 mm pin-jack ad pulses : 150 pulses/ rotation, slit reflection method infrared-emitting diode rent : photodiode : radial; 5 kg, thrust; 5 kg 2×10 <sup>7</sup> r/min-h (maximum load	Outer dimensio Conforming stan Weight *Please refer to HT analog output. Operating temper Operating (stora Outer dimensio Conforming sta Weight Accessory Option	<ul> <li>19.0 Try 6 14 mm</li> <li>107 x 6 14 mm</li> <li>108.0 mg</li> <li>107 x 6 14 mm</li> <li>108.0 mg</li> <li>107 x 6 14 mm</li> <li>108.0 mg</li> <li>109.0 mg</li> <li>109.0 mg</li> <li>109.0 mg</li> <li>109.0 mg</li> <li>100.0 mg</li> <li>1</li></ul>

	due to camera shake and
	slippage of contact part.)
Measurement time:	10 ms
Display :	5-digit, 7 segment, red LED in
	two-step display
Display update time :	100 ms
Resolution :	0.1 (m/min/average number 10 or
	more), 1 (r/min, average number
	10 or more), 1 (mm)

Handheld Tachometer

within the specification)

: AA battery x 3 pieces : 15 hours or more (continuous using at room

**General specification** 

Power supply

Battery life

temperature) Current consumption : 100 mA max.

(power voltage 4.5 V)

EC-922 external hold signal cable (1.4 m) × 1 set EC-0925 carrying case × 1 piece

(2 m)

(2 pieces)

# Signal Cable

## Table of Signal Cable -

Iten	n Compatible Products	Cable	Model Name	Specifications	Compatible Products	Non-compatible
Sig	gnal cable (Sensors ⇔ Coun	ter)			1	
1	MP-9100/9120/9200/940A/963 MP-810/820/830 (MP-081+MX-005 series)	3C-2 V (High-frequency coaxial cable)	MX-005 5 m 010 10 m 015 *15 m 020 *20 m	HS12PA-2 CO2 type (BNC) plug	CT-6710 FV-1500	TM-4100/4200/4300/4400 set Counter without a BNC input * However, if the input connector is connected to the terminal block's display unit, connection is enabled by using a cable combination (MX-000 series+ MX-603 or MX-6031.)
2	MP-930/935/936/950/954/962 FG-1300	3C-2 V (High-frequency coaxial cable)	MX-101 1.5 m 105 5 m 110 *10 m 115 *15 m 120 *20 m	C02 type (BNC) plug C02 type (BNC) plug C02 type (BNC) plug	CT-6710 FV-1500	TM-4100/4200/4300/4400 set Counter without a BNC input * However, if the input connector is connected to the terminal block's display unit, connection is enabled by using a cable combination (MX-000 series+ MX-603 or MX-6031.)
3	MP-9100/9120/9200/940A/963 MP-810/820/830/837 (MP-081+MX-500 series)	P-2 (2-core outer shield cable)	MX-505 5 m 510 10 m 520 20 m	HS12PA-2 TM1.25-3.5S	FV-1500 PA-150 TM-4100 series	TM-4200/4300/4400 series
4	MP-9100/9120/9200/940A/963 MP-810/820/830/837 (MP-081+MX-5205)	P-2 (2-core outer shield cable)	MX- 5205 5 m	HS12PA-2 Ferruel terminal	TM-4200/4300/4400 series	FV-1500 PA-150 TM-4100 series
5	MP-981/9820 LG-9200	D5-UL (Composite 5-core vinyl sheath cable)	MX-7105 5 m 7110 10 m 7115 15 m 7120 20 m	R04-PB6F TM1.25-3.58	FV-1500 PA-150 TM-4100 series	TM-4200/4300/4400 series
6	MP-981/9820 LG-9200	D5-UL (Composite 5-core vinyl sheath cable)	MX-7305 5 m 7310 10 m 7320 20 m	R04-PB6F Ferruel terminal	TM-4200/4300/4400 series	FV-1500 PA-150 TM-4100 series
7	MP-981/9820 LG-9200	D5-UL (Composite 5-core vinyl sheath cable)	MX-8105 5 m 8110 10 m 8115 15 m 8120 20 m	R04-PB6F R03-PB6M	CT-6710 TS-2800 (LG-9200 cannot be used.)	Counters other than those list left
8	RP-432Z	R8 (4 twisted pairs twist with 3 sheild cables)	RP-0169 5 m	TRC116-12A10-7F One-end open	TM-4100 series	TM-4200/4300 series
9	RP-7400 series	D5-UL (Composite 5-core vinyl sheath cable)	RP-0181 5 m *10 m	RM12BPE-5S TM1.25-3.5S	PA-150 TM-4100 series	TM-4200/4300 series
10	RP-7400 series	D5-UL (Composite 5-core vinyl sheath cable)	RP-0184 5 m	RM12BPE-5S Ferruel terminal	TM-4200/4300 series	PA-150 TM-4100 series
11	RP-1700 series (AC power supply)	20276-VSV-4P	PE3534952 (PS-D11144) 5 m	NJC-2010-PF (for AC power supply)	TM-4200/4300 series	TM-4100 series

\* Made to order

Signal Cables

Products	Remarks					
es	Co	nnector			Signal	
connector		1			SIG	
g.) MX-000 series		2			COM	
MX-603						
且						
MP-940A						
es	Co	nnector			Signal	
connector	Cent	er contact			SIG	
a.) MX-100 series	The fellowin	Shell			attached cable.	
MX-603		g model	IS nave a		allaci	neu cable.
Ę	IVIP-930: 0.5	1 m	IVIP-9		1	
MP-950	935. 1	1 m	0	62·05 m	ו ר	
	930. 1	1 111	5	02. 0.3 11	1	
	Connecto	or	Color of	f Code		Signal
	Contact	1	Whi	ite		SIG
	Contact	2	Gre	en	Cas	COM
	l	9	0110		Uda	
	-					
	Connect	or	Color of	f Code		Signal
	Contact	1	Whi	ite		SIG
	Contact	2	Gre	en		COM
	Shell		Shie	eid	Cas	e Ground
	C	or	Color	Code		Signal
	Connecto	Uľ	Color of Blu	le		SIG
	B		Whi	ite	ι	Jnused
	C		Re	d	_	+12 V
	D F		Shie	en	Cas	COM
	F		Bla	ck		0 V
			<u> </u>			0.
	Connecto	or	Color of	f Code		Signal SIG
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## Table of Signal Cable -

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Sig		tor	Model Name	Specifications	Compatible Products	Non-compauble Products	Remarks
12	RP-1700 series (DC power supply)	20276-VSV-4P	PE3534953 (PS-D11145) 5 m	NJC-2010-PF	TM-4200/4300 series	TM-4100 series	Encoder         Color of Code         Encoder output Signal           1         Blue         SIGA         SIGA           2         White         SIGB         SIGB           3         Orange         SIGZ         SIGB           5         Green         COM         -SIGB           6         Unused         COM         -SIGB           7         Yellow         COM         -SIGZ           8         Red         DC+         DC+           9         Brown         DC-         DC-           10         Unused         COM         COM           Shell         Shell         Folding shield         Folding shield
13	RP-1700 series (AC power supply)	20276-VSV-4P	PE3534954 (PS-D11146) 5 m	M3x7 (for AC power supply) (for AC power supply)	TM-4200/4300 series	TM-4100 series	Encoder terminal block         Color of Code         Encoder output Signal           1         Blue         SIGA         Line driver           2         Green         SIGA         SIGA           3         White         SIGB         SIGB           4         Gray         COM         -SIGB           5         Brown         COM         COM           6         Orange         SIGZ         SIGZ           8         Unused         COM         -SIGZ           9         Unused*         AC         AC           10         Unused*         AC         AC           *Encoder terminal block-Power cable (RP-0151/0152/0153) is required separately for 9-pin, 10-pin.         Pin.
14	RP-1700 series (DC power supply)	20276-VSV-4P	PE3534955 (PS-D11147) 5 m	M3×8 (for DC power supply) (for DC power supply)	TM-4200/4300 series	TM-4100 series	Encoder terminal block         Color of Code         Encoder output Signal           1         Blue         SIGA         Line driver           2         Green         COM         -SIGA           3         White         SIGB         SIGB           4         Gray         COM         -SIGB           5         Unused         COM         -SIGB           6         Orange         SIGZ         SIGZ           8         Unused         COM         -SIGZ           9         Red         DC+         DC+           10         Brown         DC-         DC-
Co	njunction cable (Cables $\Leftrightarrow$ (	Counter)					
1	MX-000 series cable 100 <i>"</i>	3D-2V (2-core outer sheild cable)	MX- 603 0.3 m	C02 type (BNC) (jack) TM1.25-3.55	FV-1500 (e.g.) MX-100 series PA-150 MX-603 MX-603 TM-4100 MP-950	TM-4200/4300/4400 series	Connector         Color of Code         Signal           Center contact         White         SIG           Shell         Green         COM           Shell         Shell         Case Ground
2	MX-000 series cable 100 <i>"</i>	3D-2V (2-core outer sheild cable)	MX- 6031 0.3 m	C02 type (BNC) (jack) Ferruel terminal	TM-4200/4300/4400 series (e.g.) MX-100 series MX-6031 MP-950	FV-1500 PA-150 TM-4100 series	Connector         Color of Code         Signal           Center contact         White         SIG           Shell         Green         COM           Shell         Shield         Case Ground
BC	D cable					·	
	TM-4100 series	30AWG×18P BIOS-E-3018-E	AA-8207 3 m	One-end open	When several counters are connected     Example of using C02 type (BNC)	d to one detector, it is convenient to use BNC-JP	J connector.
Po	wer cable				MX-005 MX-105		
	TM-4100/4200/4300/ 4400 series	Universal power cable	AX-2050N 3 m AC100 V	Crimped terminal AC plug 3P	Counter Detector	Counter BNCTAJPJ Coaxial connector (PE15070	10) BNCTAJJJ Coaxial connector (PE1507025)
Eth	ernet cable		·				
	TM-4100/4200/4300/ 4400 series	R-OKTP-E5-P-SASB	AX- 6103 3 m AX- 6105 5 m	IX30G-A-10S-CV (7.0) RJ45			
RS	-232C cable						
	TM-4100/4200/4300/ 4400 series	R6 (3 twisted pairs with 2 sheild cables)	PE3532908 (PS-D10502) 2m	MC1,5/10-ST3.5 D-sub9PIN			





\* Outer appearance and specifications are subject to change without prior notice. URL: https://www.onosokki.co.jp/English/english.htm



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\*From 15 April 2024, we will move to the following location. 1-16-1 Hakusan, Midori-ku, Yokohama 226-8507, Japan

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