

ONOSOKKI

2022

General Product Guide

General Product Guide

Vol. 4

2022

Brochures and Website

For detailed product information, brochures and applications, please refer to our website (<https://www.onosokki.co.jp/English/english.htm>).

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Digital Rotation Detector

■MP-9100/911 Electromagnetic Detector



■Specifications

Output voltage	2.0 Vp-p or more (1kHz, 10kΩ load)
	M=1, gap=0.5mm
Detectable rotation speed	200 to 35,000 r/min (60 P/R)
Gear module	1 to 3
Operating temperature range	-10 to +90°C
Detected distance	0.5 to 1 mm
Power supply	Not required
Outer dimensions	MP-9100; φ20×58.5(L)mm
	MP-911 ; φ20×64(L)mm
Weight	MP-9100; Approx. 90g
	MP-911 ; Approx. 300g
	(cable included)
Others	MP-930 Oil proof
	MP-935 Oil proof/ heat resistant
	MP-9120 Low impedance

■Features

- No power supply is required and suitable for the field measurement.
- Non-contact detector
- MP-911: directly attached cable type (5m)
- Various types are available including oil proof, heat resistant and ultra compact.

■MP-981/9820 Magneto-electric Rotation Detector (General, high speed type)



■Specifications

Output waveform	Square wave
	Hi; +5±0.5V
	Lo; +0.5V or less
Measurement range	MP-981 ; 1Hz to 20kHz
	MP-9820; 1Hz to 100kHz
Detection gear	Ferromagnetic, 3mm or more gear width
	Module 0.5 to 3
Output format	Float earth
Output impedance	Approx. 330Ω
Operating temperature range	-10 to +70°C
Power supply	12±2VDC, approx. 40mA (at 12V)
Outer dimensions	φ22×75mm
Weight	Approx. 80g
	(including mounting nut×2)

■Features

- Detection from nearly 0 r/min is available.
- Non-contact detector
- Rigid and durable design, can be used in harsh environment.
- Operation status and attaching position can be checked with signal indicator.

■AP-981 Magneto-electric Rotation Detector (Acid resistant, water proof type)



■Specifications

Output waveform	Square wave
	Hi; +5±0.5V
	Lo; +0.5V or less
Measurement range	1Hz to 20kHz
Detection gear	Ferromagnetic, 3mm or more gear width
	Module 1 to 3
Output impedance	Approx. 330Ω
Outer material	Polycarbonate
Power supply	12±2VDC, Approx. 40mA
Outer dimensions	90mm length
Weight	Approx. 130g
	(including signal cable)

■Features

- Water and acid resistant type which conforms to IPX7 of JIS C 0920.
- Detection from nearly 0 r/min is available.
- Non-contact detector
- Acid resistant cable 1.9m is directly attached.
- Operation status and attaching position can be checked with signal indicator.

■LG-9200 Optical Detector



■Specifications

Detection method	Light reflection using an optical fiber sensor
Detection distance	20 to 40mm
	(using 12mm square reflective mark)
Light source	Light emitting diode (red visible light)
Max. response speed	40 m/s (converted by the circumferential speed of rotating shaft)
Output waveform	Rectangular wave
	Hi; +5V±0.5V
	Lo; +0.5V or less
Output impedance	1kΩ or less
Operating temperature range	-10 to +60°C
Power source	12±2VDC, 60 mA or less (at 12V)
Outer dimensions	21(W)×24(H)×117(D)mm
Weight	Approx. 150g
	(including mounting nut×2)

■Features

- Unified structure of light source, receiver and amplifier
- Compact and lightweight
- Non-contact detection by affixing the reflective mark on the rotating shaft.
- Easy to adjust a position by visible light

■LG-930 Photoelectric Detector



■Specifications

Detection method	Light reflection using an optical fiber sensor
Detection distance	70 to 200mm
	(using 12mm square reflective mark)
Light source	Light emitting diode (red visible light)
Max. response speed	25 m/s (when using 12mm square reflective mark in 48mm interval)
Output waveform	Rectangular wave
	Hi; +5V±0.5V
	Lo; +0.5V or less
	(load resistance 100kΩ or more)
Output impedance	1kΩ or less
Operating temperature range	-10 to +60°C
Cable length	4.9m
Power source	12±2VDC, 85mA or less (at 12V)
Outer dimensions	23(W)×29(H)×76.5(D)mm
Weight	Approx. 200g

■Features

- Maximum detectable distance: 200 mm
- Easy to attach by using L-shaped fixture (accessory)
- Easy to adjust a position by visible light and built-in operation display lamp
- Pulse lighting type

■FS-540/542/5500/FG-1300 Fiber Optic Sensor/Fiber Sensor Amplifier



■Specifications

Detection distance	Max. 69mm
	(using 12mm square reflective mark)
Frequency response range	0 to 10 kHz (when duty is 1:1)
Pulse output	Rectangular wave
	Hi; +5V, Lo; +0.5V or less
Analog output	Voltage output according to the reflection light amount.
Output voltage range	0 to +10V
Power supply	100VAC±10%, approx. 8VA
Outer dimensions	144(W)×72(H)×180(D)mm
	(not including protruded section)
	(Fiber part: FS-540; 1m, FS-542/5500; 2m)
Weight	Approx. 1kg

■Features

- Thin rotating shaft and a target in a limited space can be measured.
- High performance type, even a minute amount light change or light and dark is detected without being affected by disturbance light.
- Analog, pulse output

TM-3100 series Digital Tachometer



Specifications

Input signal	Square wave 0.2 to 45 Vrms Rectangular wave Hi: +4 to +30V Lo: -1 to +1V (at pulse width: 5 μ s or more)
Input frequency range	Square wave; 1Hz to 100 kHz Rectangular wave; 0.1Hz to 100 kHz
Measurement accuracy	Display value $\times (\pm 0.01\%) \pm 1$ count or less
Measurement method	Periodic calculation method
Display device	Fluorescent display tube
External power supply	12VDC $\pm 10\%$ Max. 100mA
Input terminal	M3, free terminal screw
Power supply	100 to 240VAC, 50/60Hz
Outer dimensions	96(W) \times 48(H) \times 148(D)mm
Weight	Approx. 340g

Features

- Able to add more functions by optional cards.
- TM-3110: Display only
- TM-3120: BCD output
- TM-3130: Analog output
- TM-3140: Comparator output
- TM-0301 to 0350: Options

TM-5100 Multifunction Digital Tachometer



Specifications

Number of input ch	2ch
Measurement method	Periodic calculation method, Gate calculation method (switch type)
Input frequency range	Square wave; 1Hz to 100kHz Rectangular wave; 0.0006Hz to 100kHz (Pulse width 4 μ s or more)
2ch calculation function	Difference (B-A), Ratio (B/A \times 100), Fluctuation ratio (B-A/A \times 100)
Main display	7 segment green LED Display range; 0 to $\pm 999,999$
Sub display	LCD module
Comparator function	Output item; UPPER/GOOD/LOWER
Analog output	Voltage range; 0 to ± 10 V/F.S.
BCD output	6-digit parallel, Open collector
RS-232C communication	Baud rate; 2400, 4800, 9600 bps
Operating temperature range	0 to +40°C
Power supply	100 to 240VAC, 50/60Hz, 45VA or less
Outer dimensions	144(W) \times 72(H) \times 180(D)mm (not including protruded section)
Weight	Approx. 1.5kg

Features

- 2ch calculation function (rotation speed difference, rotation speed ratio, rolling reduction, draw, rotation fluctuation ratio, rotation direction)
- Dual display (main and sub)

FT-2500 Advanced Tachometer



Specifications

Input signal voltage	± 12 V, ± 0.5 V (FT-0501, and others) ± 5 V, ± 0.5 V, ± 0.05 V (IP, NP, MI, OM, VP or others)
Input signal frequency	500Hz, 2kHz, 10kHz (3 frequency ranges) 3.75Hz to 10kHz
Input connector	BNC304(BNC), R03-RB6F
Output function	Analog, pulse, comparator output
Interface	RS-232C
Applicable detector	OM-1200/1500, VP-202/1220, IP-292/296/3000A/3100, NP-3000 series, FT-0501/0801, MI series, current probe, etc.
Power supply	100 to 240VAC, 50/60Hz
Operating temperature range	0 to +40°C
Outer dimensions	144(W) \times 72(H) \times 180(D)mm (not including protruded section)
Weight	2kg or less

Features

- Able to use for vibration detector, displacement detector, magnetic flux detector, and current probe.
- Sensor attachment processing and reflective mark are not required.

Handheld Digital Tachometer

FT-7200 Advanced Handheld Tachometer



Specifications

Input signal voltage	± 5 V, ± 0.5 V, ± 0.05 V
Input signal frequency	250Hz, 500Hz, 2kHz(3 frequency ranges) 3.75 Hz to 2 kHz
Input connector	C02 type (BNC)
Output function	Analog, pulse output
Applicable detector	OM-1200/1500, VP-202/1220, IP-292/296/3000A/3100, NP-3000 series, FT-0501+0150/0801, MI series, etc.
Power supply	Size AAA alkaline battery \times 4pcs. or an exclusive AC adapter
Battery life	Approx. 6 hours (when backlight OFF) Approx. 5 hours (when backlight ON)
Operating temperature range	0 to +40°C
Outer dimensions	66.0(W) \times 189.5(H) \times 47.5(D)mm
Weight	Approx. 230g (not including batteries)

Features

- Supports rotation speed changes, acceleration and deceleration speed.
- Enables calculation of rotation speed using sound and vibration, even its rotating shaft is not come out.
- Large size LCD with backlight
- Built-in averaging function

HT-3200 Handheld Digital Tachometer (contact type)



Specifications

Detection method	Contact method
Rotation speed measurement range	0.5 to 10,000 r/min
Circumferential speed measurement range	0.05 to 1,000.0 m/min (when using KS-200) 0.5 to 10,000 mm/s (when using KS-100)
Display method	5-digit LCD 7 segment
Measurement time	1s (2s update in 0.5 to 10 r/min)
Accuracy	Lo; 0.5 to 1249.9 r/min; within ± 0.1 r/min 1250.0 to 2,000.0 r/min; within ± 0.2 r/min Hi; 5 to 10,000 r/min; within ± 1 r/min
Data hold function	Auto power off when 30 seconds have elapsed after the end of measurement.
Power supply	Size AAA alkaline battery cell \times 3pcs.
Battery life	Approx. 20 hours (when alkaline batteries are used, at 20°C)
Outer dimensions	63(W) \times 172(H) \times 38.5(D)mm
Weight	Approx. 160g (not including batteries)

Features

- Built-in memory function
- A large-size display (10.5mm character height)
- Both rotation and circumferential speed is available by changing attachment (contact tip or circumferential ring).
- Storage pocket for a circumferential ring provided
- Battery replacement time indicator is provided.

HT-4200 Handheld Digital Tachometer (non-contact type)



Specifications

Detection method	Red visible ray photoelectric reflection method
Rotation speed measurement range	4 to 50,000 r/min
Measurement accuracy	When 30 to 12,499 r/min; within ± 1 r/min (when using one reflective mark) When 12,500 to 24,999 r/min; within ± 2 r/min When 25,000 to 50,000 r/min; within ± 4 r/min
Display method	5-digit 7 segment LCD
Memory function	Number of memories; 10
Data hold function	Auto power off when 30 seconds have elapsed after the end of the measurement.
Pulse number setting function	Specified values: 1,2,3,4,6,8,P/R (number of reflective mark)
Detection distance	20 to 300mm
Power supply	Size AAA alkaline battery cell \times 3pcs.
Battery life	Approx. 20 hours (when alkaline batteries are used, at 20°C)
Outer dimensions	62(W) \times 129(H) \times 26.4(D)mm
Weight	Approx. 90g (not including batteries)

Features

- Built-in memory function
- A large-size display (10.5mm character height)
- Measurement of wide range from 30 to 50,000 r/min, in 1r/min resolution (when using one reflective mark)
- Applicable to multiple reflective marks
- Battery replacement time indicator is provided.

■HT-5500 Handheld Digital Tachometer (contact/non-contact type) — ■HR-6800 Handheld Digital Tachometer (high-speed type) —



■Features

- Built-in memory function, up to 20 data saving.
- Built-in peak hold function, Max/Min value display while measuring
- Large LCD with backlight
- Continuous measurement available using a tripod

■Specifications

Detection method Red visible ray photoelectric reflection method
 Contact method (contact adapter attached)
 Measurement range r/min (Hi) ; 6 to 99999 (20000)
 (When the contact adapter is used) r/min (Lo); 6.0 to 600.0
 r/s ; 0.10 to 999.99 (400.00)
 m/min ; 0.6 to 9999.9 (400.0)
 Measurement accuracy Displayed value $\times (\pm 0.02\%) \pm 1$ count
 Analog output Output voltage; 0 to 1 V/0 to F.S.
 (Full scale is specified by user.),
 Conversion method; 10-bit D/A
 Pulse output Output voltage
 Hi; +4.5 V or more, Lo; +0.5 V or less
 Power supply Size AAA alkaline battery cell \times 4pcs.
 or an exclusive AC adapter
 Battery life Approx. 32 hours (when backlight is OFF.)
 Approx. 8 hours (when backlight is ON.)
 Outer dimensions 66(W) \times 180.5(H) \times 47.5(D) mm
 Weight Approx. 220g
 (not including battery cell)



■Features

- High rotation speed measurement with the MP-5350 (electromagnetic rotation detector) and high sensitivity amplifier.
- Low to high-speed rotation measurement from 100 to 999,990 r/min.
- Built-in memory function, up to 20 data saving

■Specifications

Measurement object Dental rotating object, texturizing machine, high-speed machine tools (Target measurement objects must be magnetized)
 Measurement unit 10 r/min (Rotation speed)
 Measurement accuracy Displayed value $\times (0.02\%) \pm 1$ count
 Measurement accuracy (Full scale is specified by user.)
 Analog output Output voltage; 0 to 1 V/ 0 to F.S.
 Monitor output Analog output for monitor after the shaping of the sensor signal waveform (prior to pulse waveform conversion).
 Pulse output Output voltage Hi; +4.5V or more, Lo; +0.5V or less
 Power supply Size AAA alkaline battery cell \times 4pcs.
 or an exclusive AC adapter
 Battery life Approx. 13 hours (when backlight is OFF.)
 Approx. 8 hours (when backlight is ON.)
 Outer dimensions 66.0(W) \times 189.5(H) \times 47.5(D) mm
 Weight Approx. 230g
 (Main unit only, not including battery cells)

Elevator Speedometer

■EC-2100 Elevator Speedometer



*with circumferential ring (option)

■Specifications

Measurement range Speed: 0.1 to 2,000.0 m/min
 Rotation speed: 1 to 20,000 r/min
 Distance (option): 0 to ± 999 mm*1
 Measurement accuracy ± 1 count
 Measurement time: 10 ms
 Resolution Speed: 0.1 m/min*2,
 Rotation speed: 1 r/min*2,
 Distance: 1 mm (option)
 Analog output Output signal: Instantaneous value
 Voltage range: 0 to 1V/ 0 to F.S.
 Pulse output Output method: Transistor output (Open collector)
 Number of pulses: 600 P/R/ 1 rotation
 Pulse width: Approx. 0.5 to 1.2 μ s
 Power supply Size AA alkaline battery \times 3pcs.
 Battery life 15 hours or more
 (using at room temperature)
 Outer dimensions 60(W) \times 162(H) \times 38(D) mm
 Weight Approx. 423 g
 (Including batteries/not including a circumferential ring)

■Features

- Built-in analog output function
- Built-in max. value hold function
- Built-in memory function
- Display of remaining battery level
- Built-in auto power off function
- Built-in averaging function

*1: Up to ± 5000 mm is available, more than ± 999 mm is not guaranteed

*2: Averaging times are 10 or more.

Passing Velocity Speedometer

■ST-1210 Linear Motion Speedometer (made to order)



■Specifications

Signal input section
 Hi; +4 to +30V
 Lo; 0 to +1V
 Number of input ch 2ch (Ach & Bch)
 External control signal input
 Hi; +4 to +5.25V
 Lo; 0 to +1V

Sub display LCD module
 Measurement mode Speed / passing time measurement
 Comparator function* Setting range; 0 to 999999
 Number of setting stages; 2
 Output item; UPPER/GOOD/LOWER
 Output type; Semi-conductor relay
 (Each 1 make contact)
 Analog output* Conversion type; 12-bit D/A type
 Voltage range; 0 to 10 V/F.S.
 BCD output* Output type; Open collector
 RS-232C output* Baud rate; 2400, 4800, 9600 bps
 Operating temperature range 0 to +40°C
 Power supply 100 to 240 VAC, 50/60 Hz
 Outer dimensions 144(W) \times 72(H) \times 180(D) mm
 (not including protruded section)
 Weight Approx. 1300 g

*Cannot be used depending on the measurement mode

Converter for Rotation Measurement

■ FV-1500 High-speed F/V Converter



■ Features

- High-speed conversion per signal period
- Using the fluorescent display tube
- Rotation direction can be judged with two-phase input
- Rapid deceleration follow-up function

*Rotation speed is limited by maximum frequency

■ Specifications

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
Input terminal	C02 type (BNC), terminal block
Input format	Single-phase, AC/DC/non-voltage (+12V pull-up for open collector devices), Two-phase signal with 90° phase difference (DC input only)
Filter	OFF/20 kHz/120 kHz low-pass filter
Output voltage	Full scale: 0 to 10V Resolution: 16-bit Deviation: -5 to +5V Temperature coefficient: $\pm 0.02\%/F.S./^{\circ}C$ Linearity: $\pm 0.2\%/F.S.$ (up to 180 kHz) Output update time: 1 cycle + 3.5 μ s or less Output current: 0 to 16 mA or 4 to 20 mA
Display	Fluorescent display tube
Display unit	Selectable from Hz, r/min, m/min or USER
Display range	0.02 to 320,000 Hz, 0.02 to 320,000 r/min*
Operating power	Exclusive adapter (accessory)
Operating temperature range	0 to +40°C
Outer dimensions	210(W)×44(H)×200(D) mm (not including protruded section)
Weight	Approx. 1 kg

■ PA-150 Isolated Signal Amplifier



■ Features

- The amplifier used for transmitting signals from the rotation/speed detector to the measurement/isolation device at distance.
- A measure to external noise such as balanced input, float ground, filter or isolation.

■ Specifications

Input frequency range	1 Hz to 50 kHz
Input signal	Sine wave or square wave (duty approx. 50%)
Input voltage	Sine wave; 0.1 to 30 Vrms Square wave; 0.3 to 30 Vp-p
Input/output terminal	Terminal block
Output waveform	Square wave
Output signal	Collector output Hi; +10V±2V, Lo; +0.5V or less Open collector output Max. applied voltage; +40 V, Max. input voltage; 50 mA
Power supply	12VDC±5%, Max. 100 mA
Power voltage	100VAC±10%, 50/60 Hz
Outer dimensions	146(W)×112(H)×332(D) mm
Weight	Approx. 4 kg

Line Speed/ Length Measurement

■ RP-7400 series Roller Encoder (low and middle speed/ length) —



■ Features

- Selectable pulse number: 120, 200, 1200 P/R
- Totem pole output (standard)
Emitter output (option)
Collector output (option)
Open collector output (option)

■ Specifications

Roller outer circumference	200 mm (Allowance: 0 to -0.2 (at 20°C))
Number of output pulses	Speed; 120 P/R, 1200 P/R Length; 200 P/R
Speed range	0 to 600 m/min
Measurement unit	1200 P/R; 0.01 m/min 120 P/R; 0.1 m/min 200 P/R; 1 mm
Output waveform	2-phase square wave
Output voltage	Hi; +10V or more, Lo; +0.5V or less
Output format	Totem pole output (standard) emitter output, collector output, open collector output (options)
Applicable detector	RV-3150, TM series
Operating temperature range	0 to +50°C
Vibration resistance	19.6 m/s ² (each in three directions)(150 min)
Power supply	12VDC±5% (100 mA or less)
Weight	Approx. 400g

Compact High Rigidity Torque Detector

RH series Compact High Rigidity Torque Detector



Features

- Highly accurate detection of torque fluctuation with high rigidity
- High speed torque measurement
 - Standard : 16,000 r/min
 - Option : 20,000 r/min
- Direct signal output
 - It can be connected with the TQ-5300 Torque Meter
- Highly accurate performance evaluation
 - Non-linearity (including hysteresis) : ± 0.05 %/F.S.
- Weight and volume are reduced
 - Shaft length : approx. 1/2 shorter
 - Weight, volume : approx. 1/3 reduced

Specifications

- Detection method : Strain gauge
- Applicable torque meter : TQ-5300
- Non-linearity (including hysteresis) : ± 0.05 %/F.S. or less (screen display with TQ-5300 connected)
- Applicable detector : MP-981/9820 (sold separately)
- Rotational detection gear : 4 P/R installed as standard, 60 P/R mounted as option

Model	Rated torque (N · m)	Rated rotational speed (r/min)
1105	10	16,000 (20,000)
1205	20	16,000 (20,000)

※ () option

Phase Difference Method Torque Detector Using Electromagnetic Induction Theory

TH series Micro/Small/Medium Capacity type Torque Detector

Features

- High accuracy
 - TH-1000/2000 series: ± 0.1 %/ F.S.
 - TH-3000 series: ± 0.2 %/ F.S.
- Long service life:
 - Non-contact phase difference method is adopted in the rotating section and the signal detecting section
- Enables high rotation speed measurement (TH-2000 series/ TH-3000H series)
- Superior noise withstanding:
 - Line driver output with strong noise immunity
- Switching of the rotation direction (CW/CCW) is no longer required
- High-speed analog output
- No need for matching:
 - The matching is not required even when the cable length between the torque detector and TS-2800 Torque meter is changed. Cable can be extended up to 50m. (Signal cable: option)
- Applicable to CE marking and FCC (All TH series)
CE: EN61010-1, EN61326-1 FCC: Part 15B

Specifications

- TH-1000 series Torque Detector (For general use)
 - Mounting diameter is same as the SS series with same torque.
- TH-2000 series Torque Detector (For general use and high rotation speed)
 - Mounting diameter is same as the SS series with same torque.
- TH-3000 (H) series Torque Detector (For micro torque)
 - (H: for high rotation speed)
 - Mounting diameter is same as the MD series with same torque.
- Applicable Torque Meter: TS-2800 Digital Torque Meter



TH-1000/2000 series

TH-1000 series (For general use)

Model name	Rated torque (N · m)	Rated rotational speed (r/min)
1204	2	6,000
1504	5	6,000
1105	10	8,000
1205	20	8,000
1505	50	6,000
1106	100	6,000
1206	200	6,000
1506	500	6,000

TH-2000 series (For general use and high rotation speed)

Model name	Rated torque (N · m)	Rated rotational speed (r/min)
2204	2	20,000
2504	5	20,000
2105	10	20,000
2205	20	20,000



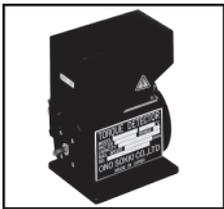
TH-3000(H) series

TH-3000 (H) series (For micro torque (H: for high rotation speed, made to order))

Model name	Rated torque (N · m)	Rated rotational speed (r/min)
3502	0.05	15,000
3502H	0.05	25,000
3103	0.1	15,000
3103H	0.1	25,000
3203	0.2	15,000
3203H	0.2	25,000
3503	0.5	15,000
3503H	0.5	25,000
3104	1	15,000
3104H	1	25,000
3204	2	15,000
3204H	2	25,000

Phase Difference Method Torque Detector Using Electromagnetic Gears

MD series Micro Capacity and High Rotation Speed Type (Made to order)



Specifications

Detection method Phase difference method using electromagnetic gears
 Applicable torque meter TS-2800
 Overall accuracy $\pm 0.2\%$ / F.S.
 Applicable detector MD-0110 series (option)
 Power supply 100 VAC $\pm 10\%$, 50/60 Hz

Model name	Rated torque (mN · m)	Rated rotational speed (r/min)
201C	2	10,000
501C	5	10,000
102C	10	10,000
202C	20	10,000

Features

- Low moment of inertia and small starting torque
- Wide revolution range
- Available up to 20,000 r/min by adjustment (Excluding MD-201C)

SS series Small/ Medium Capacity Type



Specifications

Detection method Phase difference method using electromagnetic gears
 Applicable torque meter TS-2800
 Overall accuracy $\pm 0.2\%$ / F.S.
 Applicable detector MP-981 (option)
 Power supply 100VAC $\pm 10\%$, 50/60 Hz

Model name	Rated torque (N · m)	Rated rotational speed (r/min)
002	0.2	6,000
005	0.5	6,000
010	1	6,000
020	2	6,000
050	5	6,000
100	10	8,000
200	20	8,000
500	50	6,000
101	100	6,000
201	200	6,000
501	500	6,000
102	1000	5,000
202	2000	5,000

Features

- In-stock items, cost effective type
- Wide revolution range
- Excellent at overload resistance

Torque Meter

TQ-5300 High-stiffness Torque Meter



Specifications

Measurement item Torque, revolution
 Applicable detector Torque; 2000 (H) series Revolution; MP-981/9820
 Revolution detection signal 60, 120, 180, 240, 360, 720 (P/R)
 Display method Fluorescent display tube
 Display unit Torque; N·m, kN·m Revolution; r/min
 Analog output 0 to $\pm 10V$ / F.S.
 Pulse output Torque, revolution; Outputs after pulling up the open collector output to +5V with resistance 330 Ω
 Comparator Torque 3ch, non-voltage contact output
 Remote Revolution direction CW/CCW switchable input, auto zero input, measurement ready output
 Power supply 24 VDC, (18 to 30 VDC)
 Outer dimensions 170(W) \times 49(H) \times 150(D) mm (not including protruded section)
 Weight Approx. 700g

Features

- Four kinds of digital interface (option) Ether CAT[®], PROFIBUS[®], CAN, RS-232C
- Supports factor high resolution function (TQ-0521 option)
- Analog output of torque and revolution simultaneously

TS-2800 Torque Meter



Specifications

Measurement item Torque, revolution
 Applicable detector Torque; Phase difference type torque detector by Ono Sokki Revolution; MP-981/9820
 Display method LCD
 Display unit Torque; N · m, Revolution; r/min
 Analog output Torque; $\pm 10V$,
 Time constant SS type; 63/500 ms
 TH type; 1.6/16/63/500 ms
 Revolution; 10V (at 200 to 100,000 r/min),
 Time constant SS type; 63 ms
 TH type; Outputs with one cycle delay
 Digital output BCD, RS-232C
 Power supply 100 to 240 VAC, 28VA or less
 Outer dimensions 76(W) \times 142(D) \times 262(D) mm (not including protruded section)
 Weight Approx. 2 kg

Features

- Can be connected all the phase difference type torque detectors made by Ono Sokki.
- Analog voltage is isolated and easy to connect to control system, data processing devices etc.
- Enables N-0 compensation

Flange Type High-stiffness Torque Detector

TQ-3507 Flange type High-stiffness Torque Detector



Specifications

Detection method Strain gauge
 Applicable torque meter TQ-5300
 Non-linearity (including hysteresis) $\pm 0.05\%$ F.S. (screen display with TQ-5300 connected)
 $\pm 0.02\%$ F.S. (with option)
 Applicable detector MP-981/9820 (sold separately)
 Rotational detection gear option

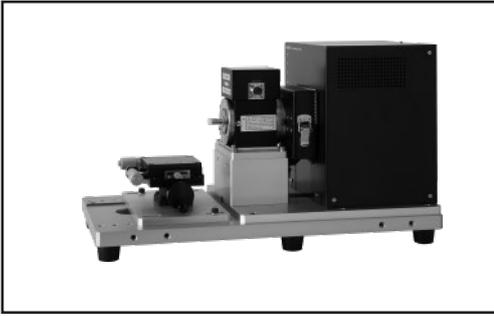
Model	Rated torque (N · m)	Rated rotational speed (r/min)
TQ-3507	5,000	8,000

Features

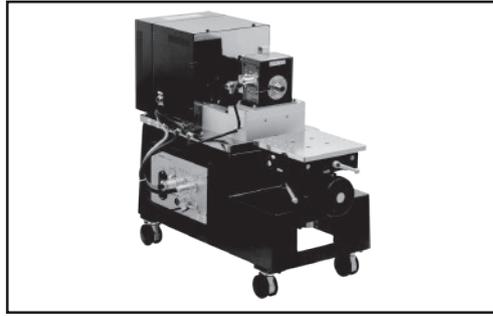
- High stiffness enables to capture even minute torque fluctuations. Ideal for torque measurement on benches in automotive development
- High durability
- Compact & space saving
- Multi-range option

Motor Torque Measurement Detector

■ MT series Torque Detector for TS-8700

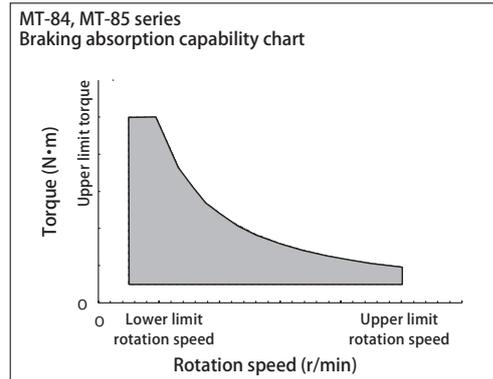
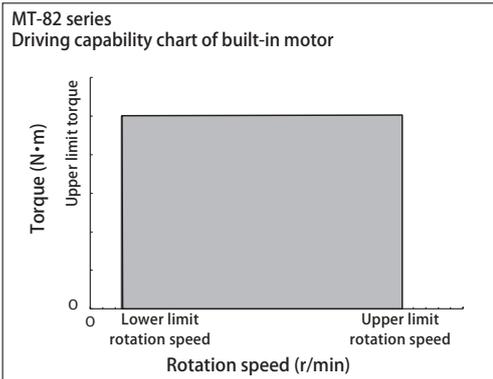


MT-82T52, MT-84M22 for small capacity
(XYZ stage and base:option.)



MT-82R15, MT-82T25 for medium capacity
(Stand with XYZ stage:option.)

Braking capability (It can be used within the shaded range in the chart below.)



* MT-84/85 series can be used within the upper range and the braking capability W. Braking capability $W = \text{Torque N·m} \times \text{Rotation speed r/min} \times 0.10472$

The detector with a new compact high-rigidity torque detector RH series (10 N·m/20 N·m) has been added, and the measurement up to a higher frequency range with high accuracy ($\pm 0.05\%$ F.S.) is available.

Motor Torque Measurement

■ TS-8700 Torque Station Pro



■ Features

TS-8700 Torque Station Pro is torque measurement system for motor basic property. Using with the motor torque detector MT series with the high accuracy and high response, and has achieved up to 5.12 kHz sampling, $\pm 0.1\%$ (TH type) / $\pm 0.05\%$ (RH type) of accuracy. It is ideal for measuring torque fluctuations in a wide range of motors such as EPS motors.

■ Specifications

Measurement target	: DC motor, AC motor (excluding stepping motor)
Measurement item	: Torque, rotation speed, voltage signal input data, temperature*, power meter digital input*
Torque input	: Use signals from Ono Sokki's exclusive detector (MD/SS, TH/RH/TQ*) , external torque analog input*
Rotation input	: Use signals from Ono Sokki's MP-981 or RP series detectors
Analog input	: 0 to ± 10 V DC, 16 channels, 16 bit A/D
Temperature input	: Type T thermocouple*
Measurement accuracy	: Torque** $\pm 0.1\%$ /F.S. (TH-1000/2000) $\pm 0.2\%$ /F.S. (MD/SS, TH-3000H) $\pm 0.05\%$ /F.S. (RH/TQ*)
Revolution speed**	$\pm 0.02\%$ /F.S. ± 1 count
Analog	Linearity : $\pm 0.1\%$ /F.S. or less (1 second average) Temperature drift: $\pm 0.01\%$ /F.S./ $^{\circ}\text{C}$
Temperature	Conversion accuracy : within $\pm 0.5\%$ of span + $0.5\text{ }^{\circ}\text{C}$ [thermosensitive element accuracy] **After N-0 compensation. 1-second averaged value. Excluding the influence of fluctuation component which comes from equipment component and resonance component including the measurement target.
Computing equation	: 4 operations (four arithmetic operations) Can be defined calculation items from input signal, existing computed data
Measurement condition setting	: Setting of torque detector, revolution detector
Control method	: Revolution/torque
Measurement mode	: Automatic/Manual (can be saved with a file name)
Measurement function	: Fixed value, Sweep, Step, Pattern
Monitor display	: Numeric value display: Max. 100 items can be displayed simultaneously
Trend display	: Time axis display

*: option

■ MT series specifications

Type	Series	ID code	Torque (N·m)	Braking capability (W)	Rotation speed range (r/min)	Torque measurement accuracy (%/FS)	
Torque ripple/cogging torque measurement	Standard type with MD/SS (successor of MT-6200B series)	82M21	0.002	-	0.5 to 5	±0.2	
		82M51	0.005	-	0.5 to 5	±0.2	
		82M12	0.01	-	0.5 to 5	±0.2	
		82M22	0.02	-	0.5 to 5	±0.2	
		82M52	0.05	-	0.5 to 5	±0.2	
		82M13	0.1	-	0.5 to 5	±0.2	
		82M23	0.2	-	0.5 to 5	±0.2	
		82M53	0.5	-	0.5 to 5	±0.2	
		82M14	1	-	0.5 to 5	±0.2	
		82M24	2	-	0.5 to 5	±0.2	
		82M54	5	-	0.5 to 5	±0.2	
		82M15	10	-	0.5 to 5	±0.2	
		82M25	20	-	0.5 to 5	±0.2	
	High performance type with TH (successor of MT-6200B series)	82T52	0.05	-	2 to 15	±0.2	
		82T13	0.1	-	2 to 15	±0.2	
		82T23	0.2	-	2 to 15	±0.2	
		82T53	0.5	-	2 to 15	±0.2	
		82T14	1	-	2 to 15	±0.2	
		82T24	2	-	2 to 15	±0.1	
		82T54	5	-	2 to 15	±0.1	
		82T15	10	-	0.5 to 5	±0.1	
	High accuracy type with RH	82R15	10	-	0.5 to 5	±0.05	
		82R25	20	-	0.5 to 5	±0.05	
	TN/TI characteristics measurement with hysteresis brake	Standard type with MD/SS (successor of MT-6400B series)	84M22	0.02	5	100 to 20,000	±0.2
			84M52	0.05	8	100 to 20,000	±0.2
84M13			0.1	12	100 to 20,000	±0.2	
84M23			0.2	23	100 to 15,000	±0.2	
84M53			0.5	75	100 to 12,000	±0.2	
84M14			1	75	100 to 12,000	±0.2	
84M24			2	160	100 to 10,000	±0.2	
84M54			5	200	100 to 10,000	±0.2	
84M15			10	350	100 to 7,000	±0.2	
84M25			20	600	100 to 7,000	±0.2	
High performance type with TH (successor of MT-6400B series)		84T22	0.02	5	100 to 9,000	±0.2	
		84T52	0.05	8	100 to 11,000	±0.2	
		84T13	0.1	12	100 to 20,000	±0.2	
		84T23	0.2	23	100 to 15,000	±0.2	
		84T53	0.5	75	100 to 12,000	±0.2	
		84T14	1	75	100 to 12,000	±0.2	
		84T24	2	160	100 to 10,000	±0.1	
		84T54	5	200	100 to 10,000	±0.1	
High accuracy type with RH		84R15	10	350	100 to 7,000	±0.05	
		84R25	20	600	100 to 7,000	±0.05	
TN/TI characteristics measurement with powder brake		Standard type with MD/SS (successor of MT-6500B series)	85M14	1	20	5 to 1,800	±0.2
			85M24	2	50	5 to 1,800	±0.2
			85M54	5	130	5 to 1,800	±0.2
			85M15	10	320	5 to 1,800	±0.2
			85M25	20	450	5 to 1,800	±0.2
	High performance type with TH (successor of MT-6500B series)	85T14	1	20	5 to 1,800	±0.1	
		85T24	2	50	5 to 1,800	±0.1	
		85T54	5	130	5 to 1,800	±0.1	
		85T15	10	320	5 to 1,800	±0.1	
		85T25	20	450	5 to 1,800	±0.1	
	High accuracy type with RH	85R15	10	320	5 to 1,800	±0.05	
		85R25	20	450	5 to 1,800	±0.05	

Torque measurement

Rotary Encoder

■ RP-1700 series General purpose industrial type (Bottom-mount/Flange-mount type)



Bottom-mount type
RP-1710/20 series

■ Features

- Excellent resistance to shock and load of shaft
- High resolution, wide range of output pulse types (61 types, max. 120000 P/R)
- Line driver output can be selected for long distance transmission
- Worldwide power supply (AC and DC)
- Selectable connection for either terminal board or connector
- IP65 (Applicable by affixing an oil seal to the rotating shaft and selecting terminal board as an option)

■ Specifications

Output waveform 2-phase square waveform
Zero mark is available as an option.
Output voltage Hi; +10V or more, Lo; +0.5V or less
Output method Totem pole: Load resistance 470 Ω or more
*Collector: Load resistance 10k Ω or more
*Open collector: DC 40V, 50 mA or less
*Line driver
*: option
Power supply AC100 to 240 V±10% / DC12 to 24 V±5%
Response frequency 100 kHz (500 kHz for line driver output)
Connection method Terminal board or connector

Max. rotation speed 5000 r/min
Allowable shaft load Radial 80N
Thrust 50N
Starting torque 15 mN·m * When the rotating shaft is affixed with an oil seal.
Moment of inertia 161 g·cm²
Weight 3.7 kg
Operating temperature range -5 to +55°C
Storage temperature range -20 to +70°C
Humidity 95%RH (40°C / 8h, the rotating shaft is affixed an oil seal, with no condensation)
Protection class IP65 (When selected terminal board and oil seal)
Vibration resistance 98 m/s² (Axial direction for 4h, up/down/left/right for 2h each)
Shock resistance 980 m/s² (Three times each in X, Y and Z directions)
Number of output pulses 60,100,120,180,200,240,250,256,300,360,400,480,500,512,600,720,750,800,900,960,1000,1024,1200,1250,1280,1440,1500,1600,1800,2000,2048,2400,2500,2560,2880,3000,3600,3750,4000,4096,4500,4800,5000,5120,6000,7500,9000,12000,15000,18000,22500,24000,30000,36000,45000,48000,60000,72000,90000,96000,120000 P/R

Rotary Encoder

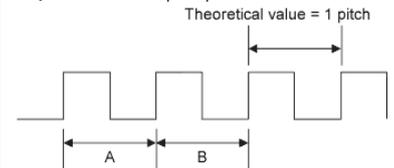


Flange-mount type
RP-1730/40 series

■ Adjacent error

Adjacent error	Number of pulses (P/R)
1/200 P or less	60, 100, 180, 250, 256, 300, 750, 4500, 6000
1/8.3 P or less	120, 200, 240, 360, 400, 500, 512, 600, 720, 900, 1000, 1024, 1200, 1250, 1280, 1500, 3000, 3750, 9000, 12000, 18000, 22500, 24000, 30000
1/4.6 P or less	480, 800, 1440, 1800, 2000, 2048, 2400, 2500, 2560, 7500, 36000, 45000, 48000, 60000
1/3.3 P or less	960, 1600, 2880, 4000, 4096, 4800, 72000, 96000
1/2.5 P or less	3600, 5000, 5120, 15000, 90000, 120000

Adjacent error is an absolute value of pitch variation between any two adjacent pulses.
Adjacent error=|A-B|



*When rotation fluctuation measurement is performed with pulse interval, use the pulse of adjacent error 1/200 P.
Here is a useful link for selecting specifications and model names.
<URL>https://www.onosokki.co.jp/English/rp17_katamei_e.htm

■ SP-405ZA Series Ultra-compact Type (Some output pulses are made to order)



■ Features

- Ultra compact and light weight (φ38 mm, approx. 100g)
- Two-phase square wave and zero mark signal output
- 13 types of output pulses

■ Specifications

Output waveform 2-phase square waveform + zero mark
Output voltage Hi; More than power supply voltage -20%
Lo; +0.5V or less
Output method Collector (load resistance 10 kΩ or more)
Power supply 5 to 12 VDC±10% (50 mA)
Response frequency 100 kHz
Connection method Direct connected cable (1m)
Max. rotation speed 6000 r/min
Allowable shaft load Radial 25N
Thrust 15N
Starting torque 2 mN·m

Moment of inertia 6 g·cm²
Weight Approx. 0.1 kg
Operating temperature range -10 to +70°C
Storage temperature range -20 to +80°C
Humidity 90%RH (no condensation)
Protection class IP40
Vibration resistance 98 m/s² (X,Y,Z direction for 2h)
Shock resistance 980 m/s² (Three times each in X, Y and Z directions)
Number of output pulses Standard 60,100,200,300,360,500,600 P/R

■ RP-432Z Series Compact Multi-use Type



■ Features

- Compact and economical design for general purpose
- 5VDC or 12VDC operation
- Easy-to-use signal output connector
- Two-phase square wave and zero mark square wave outputs

■ Specifications

Output waveform 2-phase square waveform + zero mark
Output voltage 5 V power is used: Hi; +4 V or more, Lo; +0.2 V or less
12 V power is used: Hi; +10 V or more, Lo; +0.3 V or less
Output method Totem-pole: Load resistance 1 kΩ or more
Adjacent error ±1/20 P
Power supply 5 VDC±5% (100 mA) or 12 VDC±5% (100 mA)
Response frequency 50 kHz
Connection method 7-core connector (cable)

Max. rotation speed side:TRC116-12A10-7F) 5000 r/min
Allowable shaft load Radial 20N
Thrust 10N
Starting torque 1.5 mN·m
Moment of inertia 24 g·cm²
Weight Approx. 0.25 kg
Operating temperature range 0 to +50°C
Storage temperature range -20 to +80°C
Humidity 85%RH (40°C / 8h, no condensation)
Vibration resistance 49 m/s² (X,Y,Z direction for 2h)
Shock resistance 490 m/s² (Three times each in X, Y and Z directions)
Number of output pulses 120, 360, 600, 1000, 1024

RV-3150 Reversible Counter



Specifications

Sensor input signal	Single phase or 90° phase difference rectangular wave
	Voltage signal (Hi; +4 to +30V, Lo; 0 to +1V)
	Line receiver (compliant to RS-422A)
Input frequency range	DC to 100 kHz
Power supply for sensor	5 ± 0.25VDC, 12 ± 0.6VDC (selectable)
External control signal	Type of input signal: Reset, gate, offset, key protect
	Format of input signal: Voltage input (Hi; +4 to +5.25V, Lo; 0 to +1 V) non-voltage contact input
Function	Multiple (1/2/4), Ratio (0.000001 to 0.999999), Offset (0 to ± 999999), Comparator (setting range: 0 to ± 999999, 2-step display)
Outer dimensions	144(W) × 72(H) × 180(D) mm (not including protruded section)
Power supply	100 to 240 VAC, 50/60 Hz
Weight	Approx. 1.3 kg

Features

- Multiplication ratio switching, ratio compensation, offset, decimal point selection and counting direction selection
- External output: Comparator (4 kinds of comparator setting values can be stored as conditions), analog, BCD, RS-232C communication

Digital Linear Gauge Sensor

■BS-1210/1310 Baby Gauge Sensor



■Features

- Ultra compact design
- Conforms to protection class IP66 (dust-proof and splash-proof)
- High durability, high vibration resistance, high shock resistance

■Specifications

Model name	BS-1210	BS-1310
Measurement range (mm)	10	
Resolution (μm)	10	1
Accuracy (at +20°C) (μm)	3	
Max. spindle velocity* (m/s)	1(4)	0.3(1.2)
Measurement force (downward) (N)	1.47 or less	
Protection class	IP66	
Stem diameter (mm)	$\Phi 8^{+0}_{-0.003}$	
Operating temperature range (°C)	0 to +50	
Outer dimensions (mm) (Whole length)	94.5	
Weight (g) (including cable, connector)	Approx. 110	

*When used with Ono Sokki's Gauge Counter. The values within parentheses () is the maximum spindle velocity with the DG-4320/4340/5100. (AA-8910 conversion cable is required for connecting with the DG-5100.)

■GS-3813B/3830B High Resolution Type



■Features

- High resolution (0.1 μm) type
- Conforms to protection class IP66G (vibration resistance structure, dust-proof, splash-proof and oil-proof)
- Achieve longer bearing life and high environment resistance

■Specifications

Model name	GS-3813B	GS-3830B
Measurement range (mm)	13	30
Resolution (μm)	0.1	
Accuracy (at +20°C) (μm)	1	
Max. spindle velocity* (m/s)	0.3(1.2)	
Measurement force (downward) (N)	2.3 or less	2.7 or less
Protection class	IP66G	
Stem diameter (mm)	$\Phi 15^{+0}_{-0.009}$	
Operating temperature range (°C)	0 to +40	
Outer dimensions (mm) (Whole length)	146.5	218.5
Weight (g) (including cable, connector)	Approx. 350	Approx. 420

*The values within parentheses () is the electrical response velocity when using the DG-5100.

■GS-1713A/1730A/1813A/1830A Basic Type



■Features

- Compact general purpose
- Conforms to protection class IP64 (dust-proof and splash-proof)
- *Cut or modified signal cable connector is not applicable to CE marking.
- Using ball bearing increases the maximum number of sliding times of the spindle.

■Specifications

Model name	GS-1713A	GS-1730A	GS-1813A	GS-1830A
Measurement range (mm)	13	30	13	30
Resolution (μm)	10		1	
Accuracy (at +20°C) (μm)	3		2	3
Max. spindle velocity* (m/s)	1(4)		0.3(1.2)	
Measurement force (downward) (N)	1.3 or less	1.9 or less	1.3 or less	1.9 or less
Protection class	IP64			
Stem diameter (mm)	$\Phi 15^{+0}_{-0.009}$			
Operating temperature range (°C)	0 to +40			
Outer dimensions (mm) (Whole length)	141.5	205.5	141.5	205.5
Weight (g) (including cable, connector)	Approx. 250	Approx. 310	Approx. 250	Approx. 310

*When used with Ono Sokki's Gauge Counter. The values within parentheses () is the maximum spindle velocity with the DG-4320/4340/5100. (AA-8910 conversion cable is required for connecting with the DG-5100.)

■GS-6713A/6730A/6813A/6830A Vibration Resistant Type



■Features

- Compact general purpose
- Conforms to protection class IP64 (dust-proof and splash-proof)
- Vibration resistant and shock resistant structure
- *Cut or modified signal cable connector is not applicable to CE marking.
- Suitable for mounting on automatic machine

■Specifications

Model name	GS-6713A	GS-6730A	GS-6813A	GS-6830A
Measurement range (mm)	13	30	13	30
Resolution (μm)	10		1	
Accuracy (at +20°C) (μm)	3		2	3
Max. spindle velocity* (m/s)	1(4)		0.3(1.2)	
Measurement force (downward) (N)	1.3 or less	1.9 or less	1.3 or less	1.9 or less
Protection class	IP64			
Stem diameter (mm)	$\Phi 15^{+0}_{-0.009}$			
Operating temperature range (°C)	0 to +40			
Outer dimensions (mm) (Whole length)	141.5	205.5	141.5	205.5
Weight (g) (including cable, connector)	Approx. 250	Approx. 310	Approx. 250	Approx. 310

*When used with Ono Sokki's gauge counter. The values within parentheses () is the maximum spindle velocity with the DG-4320/4340/5100. (AA-8910 conversion cable is required for connecting with the DG-5100.)

■GS-4713A/4730A/4813A/4830A Long life Type



■Features

- Long life and high environment resistance
- Two times longer bearing life than the existing model
- Dust-proof, splash-proof and oil-proof (protection class IP66G)
- *Cut or modified signal cable connector is not applicable to CE marking.

■Specifications

Model name	GS-4713A	GS-4730A	GS-4813A	GS-4830A
Measurement range (mm)	13	30	13	30
Resolution (μm)	10		1	
Accuracy (at +20°C) (μm)	3		2	3
Max. spindle velocity* (m/s)	1(4)		0.3(1.2)	
Measurement force (downward) (N)	1.8 or less	2.4 or less	1.8 or less	2.4 or less
Protection class	IP66G			
Stem diameter (mm)	$\Phi 15^{+0}_{-0.009}$			
Operating temperature range (°C)	0 to +40			
Outer dimensions (mm) (Whole length)	145.5	209.5	145.5	209.5
Weight (g) (including cable, connector)	Approx. 325	Approx. 385	Approx. 325	Approx. 385

*When used with Ono Sokki's gauge counter. The values within parentheses () is the maximum spindle velocity with the DG-4320/4340/5100. (AA-8910 conversion cable is required for connecting with the DG-5100.)

■GS-5050A/5100A/5051A/5101A Long Stroke Type



■Features

- Long stroke type
- Protection class IP5X
- Displacement measurement of large objects such as building materials and large molded products can be measured with high accuracy

■Specifications

Model name	GS-5050A	GS-5100A	GS-5051A	GS-5101A
Measurement range (mm)	50	100	50	100
Resolution (μm)	10		1	
Accuracy (at +20°C) (μm)	10	12	4	5
Max. spindle velocity* (m/s)	1(4)		0.3(1.2)	
Measurement force (downward) (N)	2.9 or less	5.2 or less	2.9 or less	5.2 or less
Protection class	IP5X			
Stem diameter (mm)	$\Phi 15^{+0}_{-0.009}$			
Operating temperature range (°C)	0 to +40			
Outer dimensions (mm) (Whole length)	258.5	355	258.5	355
Weight (g) (including cable, connector)	Approx. 570	Approx. 655	Approx. 570	Approx. 655

*When used with Ono Sokki's Gauge Counter. The values within parentheses () is the maximum spindle velocity with the DG-4320/4340/5100. (AA-8910 conversion cable is required for connecting with the DG-5100.)

Digital Gauge Counter

DG-5100 0.1 μm Resolution Type



Specifications

Applicable gauge sensor	GS-3813B/3830B*
Display method	Fluorescent display tube 7-digit
Input signal	90° phase difference square wave signal Line driver output method or voltage output method
External control input signal	Hold, reset
Peak hold function	MAX, MIN, RANGE (MAX to MIN)
Offset function	0 to ±9999999
Factor function	0.001 to 1000
Operating temperature range	0 to +50°C
Power supply	100 to 240 VAC, 50/ 60 Hz
Outer dimensions	96(W)×48(H)×148(D) mm
Weight	Approx. 370g

*When using other than GS-3800 series sensor, conversion cable AA-8910 is required.

Features

- Function can be added by the optional board DG-0522: BCD output (open collector)
- DG-0530: Analog output (voltage/ current)
- TM-0340: Comparator output card
- TM-0350: RS-232C card
- TM-0301: DC power card

DG-4320 BCD output Type



Specifications

Display method	Liquid crystal display 5.5 digits and polarity (-)
Display range	0.000 to ±199.999 mm or 0.00 to ±1999.99 mm
Applicable sensor	BS/GS series linear gauge sensor (GS-3800 series are incompatible)
Input signal	90° phase difference square wave signal, DC to 300 kHz
External control command (BCD connector)	Reset, hold, start, stop, busy
Digital output	BCD open collector output
Operating temperature	0 to +40°C
Power supply	100 to 240 VAC, 50/60 Hz
Outer dimensions	72(W)×72(H)×114(D) mm
Weight	Approx. 300g

Features

- Multiplication switching/ offset/ Multiplier setting function
- BCD output: Open collector output (positive/ negative logic switchable)
- MAX, MIN, RANGE (MAX to MIN) calculation function
- DG-0430 power supply (12V)

DG-4340 Color Comparator Display Type



Specifications

Display method	Liquid crystal display 5.5 digits and polarity (-)
Display range	0.000 to ±199.999 mm or 0.00 to ±1999.99 mm
Applicable sensor	BS/GS series linear gauge sensor (GS-3800 series is not applicable.)
Input signal	90° phase difference sine wave signal DC to 300 kHz
Comparator I/O	5 digits polarity BCD open collector output
External control command	Reset, hold, comparator, start, stop, busy
Operating temperature range	0 to +40°C
Power supply	100 to 240 VAC, 50/60 Hz
Outer dimensions	72 (W)×72(H)×114(D) mm
Weight	Approx. 300g

Features

- Pass/fail judgment with backlight of the LCD (red: NG/ green: OK) according to the setting value of comparator
- Multiplication switching/ offset/ Multiplier setting function
- BCD output: Open collector output (positive/ negative logic switchable)
- MAX, MIN, RANGE (MAX to MIN) calculation function
- DG-0430 power supply (12V)

DG-2310 2ch with Addition/Subtraction Function



Specifications

Display method	Main display; Polarity (-) & 6 digits of number in red LED Sub display; LCD 16 words×2 lines Comparator output display; UPPER (red), GOOD (green), LOWER (red)
Input signal	90° phase difference sine wave DC to 100 kHz
External control input signal	Input method; Voltage input, Non-voltage contact input Input type ; Reset, Peak hold, Hold, Key protect
BCD input/ output signal	Output signal (BCD, polarity, judgment, error); open collector
Analog output signal	0 to ±10 V/ F.S. (F.S. is optionally setting)
RS-232C communication	Baud rate; 2400/4800/9600 bps
Comparator output signal	Output item ; LOWER/ GOOD/ UPPER
Peak hold function	Output amount; Max. contact amount 30 VDC, 0.1A Maximum value (MAX), Minimum value (MIN), Max. value - Min. value (RANGE)
Offset function	Setting range; 0 to ±999999
Resolution	0.5 μm, 1 μm, 10 μm
switching function	
Operating temperature range	0 to +40°C
Power supply	100 to 240 VAC, 50/60 Hz
Outer dimensions	144(W)×72(H)×180(D) mm (not including protruded section)
Weight	Approx. 1.3 kg

Features

- With addition/ subtraction function: Ach, Bch, (A+B)ch, (A-B)ch
- Various calculation functions: MAX, MIN, RANGE (MAX-MIN)
- 0.5 μm resolution with the combination with the GS-7000 series

Specifications

Applicable sensor: GS/BS series gauge sensor (GS-3800 series are not applicable)
Number of inputs: 2ch

Digital Linear Gauge Related Product

DG-0010/0020 Signal Conversion Box



Specifications

Amplification format	2ch waveform shaped
Signal waveform	90° phase difference signal in square wave
Input level	Hi; +3 to +5.25 V, Lo; 0 to +1.4 V
Input impedance	Approx. 47 kΩ
Frequency range	DC to 300 kHz (When using sensor of Ono Sokki)
Open collector output	Withstand voltage; Max. 30 V (max) Sink current ; 100mA (max) Residual voltage ; 1V or less
Line driver output	Hi; +2.5 V or more Lo; +0.5 V or less
Operating temperature range	0 to +40°C
Power voltage	12 to 24 VDC
	80 mA or less (at 12VDC) (DG-0010) 120 mA or less (at 12VDC) (DG-0020)
Outer dimension	23 (W)×29 (H)×90 (D) mm (not including protruded section)
Weight	Approx. 100 g

Features

- Compact signal converter
- DG-0010: Open collector output
- DG-0020: Line driver output
- Direct connection to a PLC is available

Non-contact Length Meter/ Speedometer

LV-7000 Series Laser Doppler Surface Velocity Meter



Overview

LV-7000 series detects speed, uneven speed, moving distance, length of moving object or rotating object by non-contact with high sensitivity and high response.

Features

- Conforming to "Laser Safety Class 2", no need of safety requirement for detection such as laser protection glasses, laser control regions/controller.
- Original optical system and demodulating circuit allow high sensitivity detection. Available to measure wide variety of targets.
- Easy, quick positioning and checking with red visible light.
- High speed response of 800 m/s², steep start and stop from zero speed are able to be detected.
- Connecting two sensors to one main unit enables to calculate difference in velocity/ length (LV-7220).
- Detecting minute speed changes with up to 20 kHz of the frequency response.
- By installing the option, the detection velocity range and the tracking acceleration can be doubled: 3600 m/min, 1,600 m/s²

Specifications

<LV-7210/LV-7220 Main Unit/ LV-7002 Sensor>

Laser safety class	Class 2
Distance accuracy	Within $\pm 0.2\%$ (Length evaluation by our standard plane at 25 °C)
Laser spot diameter	2 mm x 1 mm, ellipse
Detection distance (center)	200 mm *from the bottom surface of the sensor
Detection range (depth)	± 4 mm distance accuracy: within $\pm 0.2\%$ (of reading) ± 10 mm distance accuracy: within $\pm 5.0\%$ (of reading) (Length evaluation by our standard plane at 25 °C)
Detection velocity range	0 to ± 1800 m/min (standard)
Maximum tracking acceleration	800 m/s ² (standard)
Option	LV-0730 High-Velocity Module for Sensor

Roller Encoder

RP-7400 series Roller Encoder



Specifications

Roller outer circumference	200 mm (Allowance: 0 to -0.2 (at 20°C))
Number of output pulses	Speed; 120 P/R, 1200 P/R Length; 200 P/R
Speed range	0 to 600 m/min
Measurement unit	1200 P/R; 0.01 m/min 120 P/R; 0.1 m/min 200 P/R; 1 mm

Features

- Selectable pulse number: 120, 200, 1200 P/R
- Totem pole output (standard)
Emitter output (option)
Collector output (option)
Open collector output (option)

Output waveform	2-phase square wave
Output voltage	Hi; +10V or more, Lo; +0.5V or less
Output format	Totem pole output (standard) Emitter output, collector output, open collector output (option)
Applicable detector	RV-3150, TM series
Operating temperature range	0 to +50°C
Vibration resistance	19.6 m/s ² (Each in three directions: X, Y, Z) (150 minutes each)
Power source	12VDC $\pm 5\%$ (100 mA or less)
Weight	Approx. 400g

Contact Type Length Measuring Device

RV-3150 Reversible Counter



Specifications

Sensor input signal	Single phase or 90° phase difference rectangular wave Voltage signal (Hi; +4 to +30V, Lo; 0 to +1V) Line receiver (compliant to RS-422A)
Input frequency range	DC to 100 kHz
Power supply for sensor	5 \pm 0.25VDC, 12 \pm 0.6VDC (selectable)
External control signal	Type of input signal: Reset, gate, offset, key protect
Format of input signal:	Voltage input (Hi; +4 to +5.25V, Lo; 0 to +1 V) non-voltage contact input
Function	Multiple (1/2/4), ratio (0.000001 to 0.999999), offset (0 to ± 999999), Comparator (setting range: 0 to ± 999999 , 2-step display)
Outer dimensions	144(W) x 72(H) x 180(D) mm (not including protruded section)
Power supply	100 to 240 VAC, 50/60 Hz
Weight	Approx. 1.3 kg

Features

- Multiplication ratio switching, ratio compensation, offset, decimal point selection and counting direction selection
- External output: Comparator (4 kinds of comparator setting values can be stored as conditions), analog, BCD, RS-232C communication

Electrostatic Capacitance-type Non-contact Thickness/ Displacement Meter

CL-5610/5610S Non-contact Thickness Meter (CL-5610S: made to order)



CL-5610

Features

- Minimum display resolution: 0.02 μm (When using VE-2011/5010/5011 sensor and CL-0200 High-resolution calculation function option)
- Maximum measurement gap is 8 mm (When using VE-8020/8021 sensor)
- Up to 11.5 m separation between the main unit (CL-5610S) and a sensor.
- Easy to view with fluorescent display tube
- Gap and thickness outputs as analog voltage, and judgment output by comparator function. (CL-0110 Output function (option) is used)
- Thickness of the insulator such as glass or plastic can be measured (CL-0300 Insulator measurement function (option) is used)
- Stable measurement even the grounding impedance of the measurement target is high (CL-0210 High impedance grounding mode function (option) is used.)

Specifications (CL series Non-contact Thickness Meter)

Model name	CL-5610	CL-5610S
Measurement item	Thickness, gap (A, B)	
Display mode	Measurement value, deviation value, maximum value, minimum value, max-min value (Range)	
Linearity (10 to 100 % at F.S.)	$\pm 0.15\%$ F.S., when attached high resolution calculation function option (CL-0200): $\pm 0.12\%$ F.S.	
Sensor cable	1.5 m	
Gap converter	Built-in the main unit	CL-0420 (2.5 m length signal cable is supplied as standard, can be optionally extended up to 10 m.)
Measurable objects	Conductors, semiconductors, insulators	
Display	Fluorescent display tube	
Comparator function	Available when CL-0110 output function (option) is attached, [Setting value] upper and lower limit value, [Number of outputs] 3, Open collector output (three window comparator or three conditions (UPPER/OK/LOWER))	
Analog output	Available when CL-0110 output function (option) is attached, [Output voltage] $\pm 5\text{ V}$, [Output signal] [SENS-A/ SENS-B terminal] Gap signal of sensor A, B, [A-OUT terminal] select from THICK/GAP-A/GAP-B/A-B	
Applicable printer	DPU-414	
Power supply	100 to 240 VAC, 50/60 Hz	
Operating temperature range	0 to $+40^\circ\text{C}$ (guaranteed accuracy range $23 \pm 2^\circ\text{C}$)	
Outer dimensions	210(W) x 99(H) x 275 (D) mm (not including protruded section)	210(W) x 99(H) x 275 (D) mm, CL-0420: 56(W) x 42.4(H) x 122(D) mm (not including protruded section)
Weight	Approx. 4.2 kg	Approx. 4.2 kg, CL-0420: Approx. 0.5 kg

VT series Non-contact Displacement Meter (made to order)



VT-5210/5710

Features

- Measurement range: wide range of 20 μm to max. 8 mm
- $\pm 0.2\%$ F.S. of measurement accuracy (combination of converter and sensor) (VT-5210/5710)
- Max. 10 kHz high frequency response: High speed response in dynamic change (VT-5220/5720)
- Since it is non-contact, there is no influence to the measurement object
- All conductors can be measured- Not be affected by color, roughness, reflectivity, and light of measurement object.
- Compact converter ideal for application of embedded system (VT-5710/5720)

Measurement target

Objects made with a conductor material

Specifications (VT series Electrostatic capacitance type converter)

Model name	VT-5210	VT-5220	VT-5710	VT-5720
Detection method	Electrostatic capacitance-type			
Output	0 to 5 V / 0 to 100% F.S			
Linearity (10 to 100 % at F.S.)	$\pm 0.2\%$ F.S.	$\pm 0.25\%$ F.S.	$\pm 0.2\%$ F.S.	$\pm 0.25\%$ F.S.
Temperature characteristics	$\pm 0.05\%$ F.S./ $^\circ\text{C}$ or less			
Response frequency	DC to 4 kHz	DC to 10 kHz	DC to 4 kHz	DC to 10 kHz
Indicated section	0 to 100 % / LED (divided into 20)		0 to 100 % / LED (divided into 10)	
Operating temperature range	0 to $+40^\circ\text{C}$ (guaranteed accuracy range: $23 \pm 2^\circ\text{C}$)			
Power requirement	100 to 240 VAC, 10 VA		$\pm 15\text{VDC}$ ($\pm 0.5\text{ V}$ or less), 100mA	
Outer dimensions	95(W) x 150 (H) x 195 (D) mm (not including protruded section)		56 (W) x 42.4 (H) x 122 (D) mm (not including protruded section)	
Weight	Approx. 2 kg		Approx. 500g	

VE series Electrostatic capacitance-type Gap Detectors (VE-5011: made to order)



Overview

VE series is a displacement sensor with high accuracy which can measure the gap between the sensor and measurement target. Used together with the VT series (non-contact displacement meter) or CL series (non-contact thickness meter), it demonstrates its best performance for thickness/shape measurement of target objects, and for vibration measurement of rotating shafts or rotating surface (turbine, electric motors, compressors, machine tools etc.).

- Cable for VE series (1.5 m)

Exclusive cable for connector connection type sensor

VL-1520: straight connector for both sides

VL-1521: L-shape – straight connector

Specifications

	VE-2011	VE-5011	VE-1021	VE-8021
Measurement range (μm)	20 to 200	50 to 500	100 to 1000	800 to 8000
Diameter of target (mm)	$\phi 3$ (hold part $\phi 10$)	$\phi 6$ (hold part $\phi 10$)	$\phi 8$ (hold part $\phi 10$)	$\phi 40$ (hold part $\phi 10$)
Cable connecting method	Connector (using exclusive cable (1.5 m))			
Operating temperature range	0 to $+80^\circ\text{C}$			

	VE-5010	VE-1020	VE-1520	VE-3020	VE-8020
Measurement range (μm)	50 to 500	100 to 1000	150 to 1500	300 to 3000	800 to 8000
Diameter of target (mm)	$\phi 6$	$\phi 8$	$\phi 10$	$\phi 20$	$\phi 40$ (hold part $\phi 20$)
Cable connecting method	Directly attached cable (1.5 m)		Connector (using exclusive cable (1.5 m))		
Operating temperature range	0 to $+80^\circ\text{C}$				

CF-9200/9400 Portable 2ch/4ch FFT Analyzer



CF-9400

Overview

The CF-9200/9400 is all-in-one portable 2 ch/4 ch FFT Analyzer. Two on-board, large capacity lithium ion secondary batteries enable continuous cordless operation up to 5 hours. The intuitive and light operation is possible by a large hard key and a capacitance type touch panel. New developed 100 kHz analysis front end has a 24-bit A/D converter, dynamic range 120 dB or more. Real-time FFT analysis at 100 kHz is possible.

Features

- 2ch/4ch 24-bit A/D isolation input
- High dynamic range of 120 dB or more
- Real-time 2ch/4ch 100 kHz FFT analysis
- Simultaneous recording and analysis
- Cordless driving with on-board secondary batteries
- Batteries can be changed while the power is ON
- Noise and vibration-free operation in a fan-less, spindle-less design
- Large hard key and touch panel allow quick operation
- Three amplitude values can be read out in real-time tripartite graph
- VC curve line can be displayed on 1/3 octave tripartite graph

- Cordless screen printing with the connection of Bluetooth®*1
- Waveform observation and main body operation with a tablet terminal by wireless LAN connection*1
- Applicable to RTA/ tracking analysis/ Log sweep analysis, excitation control*1
- External control with LAN and automatic analysis with auto sequence function*1

Specifications

A/D converter	24-bit $\Delta\Sigma$ Type
Frequency range	100 mHz to 100 kHz
Analysis points	Max. 6400 points
Voltage range	1 Vrms/ 31.62 Vrms (2 ranges)
Data record	2ch/ 4ch 100 kHz range (MAX)

Option

Model name	Product name
CF-0922	Tracking Analysis Function (software)
CF-0923	RTA Analysis Function (software)
CF-0942	Log sweep/ Excitation control function (software)*2
CF-0947	LAN External Control Function (software)
CF-0971	1ch Signal Output Module (hardware)

*1 Option

*2 CF-0971 is required

CF-4700 FFT Comparator



Features

- 1ch portable FFT analyzer
- Dynamic range 110 dB or more
- Directly touching the 8.4-inch color crystal liquid screen to input setting
- Simultaneous storing of binary, text and BMP files to the main unit
- Backup of memory data, condition memory to the PC or USB memory by using the USB interface
- TEDS (Ver. 0.9, 1.0) applicable accelerometer and microphone can be used.*

*TEDS information may not be read depending on the type of a TEDS tip included in a sensor.

Option

Model name	Product name
CF-0471	Tracking Analysis Function
CF-0472	Shape Comparator Function
CF-0473	Amplitude Modulation Component Extraction Function (band-pass envelope monitor function)
CF-0477*	USB Mass Storage Function
CF-0478	Power Source Backup Function

* CF-0703 USB connection cable is attached.

Specifications

Number of CH	1ch
Input terminal	BNC (C02 type)
Processing function	Time-axis waveform, power/ Fourier spectrum, octave (1/1 bundled, 1/3 bundled), amplitude probability density function, amplitude probability distribution function
Frequency range	1 Hz to 40 kHz
Voltage range	1 Vrms, 31.62 Vrms (2 ranges)
Dynamic range	110 dB or more
Analysis point	Max. 16384 points/ 6400 lines
Preprocessing function	High pass filter (HPF) 1, 3, 10 Hz Low pass filter (LPF) 1 k, 10 kHz HPF: 10 Hz, LPF: 1 kHz conforms to vibration severity standards
AC adapter	100 to 240 VAC, 50/60 Hz
Outer dimensions	220 (W) x 185 (H) x 220 (D) mm (not including protruded section)
Weight	Approx. 3.3 kg (when full option is equipped)

FFT Analyzer & Data Recorder

Data Recorder

DR-7100 Portable Data Recorder for Acoustics & Vibration



Features

- 4ch, 40 kHz range, 24-bit (*40 kHz: option, 20 kHz: standard)
- Dynamic range: 90 dB (Frequency range 20 kHz, 1 V range, TYP)
- Input exclusive for rotation speed signal
- Unit synchronicity function option (Synchronize units to make the unit 8 channels)
- A5-size

Specifications

Number of CH	Input x4, rotation speed/ external trigger input x1, output x4, monitor PHONE output x1
Input terminal	BNC (Voltage input/ Switch to CCLD)
TEDS	Conforms to IEEE1451.4 (TEDS) (Ver. 1.0 or later)*
A/D converter	Quantization bit rate: 24-bit
Frequency range	DC to 100 Hz/ 500 Hz/ 1 kHz/ 5 kHz/ 10 kHz/ 20 kHz/ 40 kHz, 7 steps (*40 kHz: option)
Input voltage range	0.01 to 10 V (7 steps)

Rotation input	AC: sine wave or square wave DC: rectangular wave with pulse width 5 μ s or more (Duty ratio: 20 % or more)
Dynamic range	90 dB or more (frequency range 20 kHz, 1 V range)
File format	ORF format (Ono Sokki Record Format)
Recording media	SD (capacity 256 MB), SDHC (Max. 32 GB) (Only the memory that operation has been checked can be used.)
Recording time	Up to 2 GB can be recorded continuously
Power supply	Battery cell (Type AA battery, alkaline or nickel hydride) x4 External DC: +10 to +18 VDC
Battery life	4.0 hours or more when nickel hydride 1900 mAh is used (frequency range: 20 kHz, 4ch, CCLD ON) 5.0 hours or more when nickel hydride 2400 mAh is used (frequency range: 20 kHz, 4ch, CCLD ON) Approx. 43 minutes (when 4ch recording), Approx. 174 minutes (when 1ch recording), 20 kHz range (sampling frequency 51.2 kHz, 24-bit, 2GB recording)

* TEDS information may not be read depending on the type of a TEDS tip included in a sensor.

Overview

The DR-7100 is a portable data recorder for acoustic and vibration with easy operation and high accuracy.

With dedicated input terminal for rotation speed signal, data recording without sacrificing any input channel is enabled. 4 channels 40 kHz range, 24-bit high speed recording with a compact body of portable A5-size, suitable for field use. By using the analysis software (O-Solution / OS-2000 series) sold separately, you can easily compare recorded data, perform FFT analysis and tracking analysis.

Acoustic Related Product

MI-1271/1235/1433/1531 Measurement Microphone



Features

- Back electret type microphone
- MI-1271: 1/2-inch Back electret-type high performance microphone (Temperature characteristics, wide range, high sensitivity)
- MI-1235: 1/2-inch Back electret-type general-usage microphone (precision type)
- MI-1433: 1/2-inch Back electret-type general-usage microphone (standard type)
- MI-1531: 1/4-inch high performance microphone

Specifications

	MI-1271	MI-1235	MI-1433	MI-1531
Frequency range	1 Hz to 20 kHz	10 Hz to 20 kHz	20 Hz to 8 kHz	10 Hz to 100 kHz (without protection grid) 10 Hz to 20 kHz (with protection grid)
Response type	Free sound field type			
Bias voltage	0 V			
Sensitivity (re.1 V/Pa)	-26±1.5 dB 50 mV/Pa (1 kHz)	-29±3 dB 36 mV/Pa (1 kHz)		-48±3 dB 4 mV/Pa (250 Hz)
Max. sound pressure level	135 dB (when using MI-3170)	135 dB (when using MI-3111)		157 dB (when using MI-3140)
Self noise level (A-weighting)	14 dB(typ) (when using MI-3170)	19 dB(typ) (when using MI-3111)		30 dB(typ) (when using MI-3140)
Operating temperature range	-30 to +80°C	-10 to +50°C		-30 to +60°C
Outer dimensions	φ 13.2x16.9 mm	φ 13.2x13.7 mm	φ 13.2x13.5 mm	φ 6.9x10.5 mm
Weight	Approx. 6 g			Approx. 1.5 g

MI-3170/3111/3140 Microphone Preamplifier



Features

- Constant current type preamplifier
- MI-3170: Preamplifier for 1/2-inch Back electret-type high performance microphone
- MI-3111: Preamplifier for 1/2-inch Back electret-type microphone
- MI-3140: Preamplifier for 1/4-inch Back electret-type microphone

Specifications

	MI-3170	MI-3111	MI-3140
Applicable microphone	MI-1271/1235/1234/1233 /1433/1432/1431	MI-1235/1234/1233/1433 /1432/1431	MI-1531
Frequency range	1 Hz to 40 kHz	10 Hz to 20 kHz	10 Hz to 100 kHz
Self loss (Typical value)	0.15 dB	1.0 dB	0.25 dB
Max. output voltage	±8 V (peak) (sound pressure conversion 135 dB)	±5.6 V (peak) (sound pressure conversion 135 dB)	±8 V (peak) (sound pressure conversion 157 dB)
Self noise level (effective value)	3.3 μV or less (A)	5.0 μV or less (A)	2.5 μV or less (A)
Total harmonic distortion (at 1 kHz)	0.0316 % or less (Input effective voltage: 1V)	1 % or less (Input effective voltage: 3.15V)	3 % or less (Input effective voltage: 8V)
Operating temperature range	-30 to +80°C	-10 to +50 °C	-30 to +60 °C
Power voltage current	2 to 4.5 mA (18 to 26 VDC)	0.5 to 5 mA (15 to 25 VDC)	2 to 20 mA (15 to 25 VDC)
Outer dimensions	φ 12.7x80.5 mm	φ 12.7x63.5 mm	φ 6.35x44 mm
Weight	Approx. 35 g	Approx. 25 g	Approx. 5.5 g
Recommended signal cable	MX-1000 series	MX-2000 series	NP-0130 series + NP-0021 conversion connector

MI-1271M12 TEDS Microphone



Features

- Microphone and preamplifier integrated type,
- Applicable to TEDS: IEEE 1451.4.2004

Specifications

MI-1271M12			
Response type	Free sound field	Input driving power	CCLD
Microphone sensitivity	-26.0±1.5dB re.1 V/Pa (50 mV/Pa)	Driving current	2 to 4.5 mA (rated value 4 mA)
Frequency range	1 Hz to 20 kHz (±2 dB)	Driving power voltage	18 to 26 VDC (rated value 24 V)
Electrostatic capacity	12 pF (typical value)	Output connector	C02 (BNC)
Max. sound pressure level (total harmonic distortion 3%)	135 dB or more	Outer dimensions	φ 13.2 x 91.9 mm
Self noise level (A-weighting)	14.0 dB (typical value)	Weight	Approx. 41 g
Operating temperature range	-30 to +80 °C	Accessory	Instruction manual x1, calibration chart x1, preamplifier holder (MI-0301)
Operating relative humidity range	0 to 90%RH (with no condensation)		

SC-2500/2120A Sound Calibrator



Features

- SC-2500
Used for calibration of Class 1 and Class 2 Sound level meter
Since the SC-2500 uses the sound pressure feedback control method to control fluctuations in sound pressure caused by static pressure, it can generate a stable sound pressure even if the operating environment changes.
Cost-effective model.
- SC-2120A
Dynamic speaker type
Simple type for quick operation check,
cost-effective model

Specifications

	SC-2500	SC-2120A
Applicable standard	IEC 60942:2017 Class 1 ANSI S1.40-2006 (R2011) JIS C 1515:2004 Class 1	IEC 60942:2003 Class 2 JIS C 1515:2004 Class 2
Method	Dynamic speaker	
Applicable microphone	1/2-inch microphone: MI-1211/1233/1234/1235/1271/1431/1432/1433 1/4-inch microphone: MI-1531 (SC-0313 adapter which is attached to MI-3140 1/4-inch preamplifier is required.)	1/2-inch microphone: MI-1431/1432/1433
Sound pressure level	Nominal sound pressure level: 114 dB Sound pressure deviation: ±0.25 dB or less*	Nominal sound pressure level: 94 dB Sound pressure deviation: ±0.5 dB or less*
Distortion rate	0.5% or less	
Frequency	Nominal frequency: 1000 Hz Frequency deviation: ±0.5% or less*	Nominal frequency: 1000 Hz Frequency deviation: ±1% or less*
Operating environment	Air temperature: -10 to +50°C (with no condensation), Static pressure: 65 to 108 kPa, Relative humidity: 25 to 90% (Excluding a combination of air temperature and humidity that exceeds dew-point temperature of 39°C or higher.)	
Power requirement	Size AA battery (LR6 or HR6) × 2	9 V flat battery (6F22 or 6LR61) × 1
Battery life	4 hours continuous operation (when using LR6)	20 hours continuous operation (when using 6F22)
Outer dimensions (not including protruded section)	84(W)x53(H)x76(D) mm	52(W)x45(H)x130(D) mm
Weight (not including battery cells)	Approx. 200 g	Approx. 300 g

*The value under the standard environment (standard environmental condition: air temperature: 23 °C, static pressure: 101.325 kPa, relative humidity: 50 %)

Ultraminiature Microphone

SR-2210 2ch Sensor Amplifier



Specifications

Operating frequency range	1 Hz to 20 kHz (± 0.5 dB) (Output load impedance 100 k Ω or more)
Gain	-10, 0, 10, 20, 30, 40, 50, 60 dB
Frequency weighting characteristics	A/C/FLAT (Z) (Applicable standard: IEC 61672-1, JIS C 1509-1)
Output cutoff frequency	Approx. 0.2 Hz (load impedance 100 k Ω or more) Approx. 0.4 Hz (load impedance 50 k Ω or more)
Input/output connector	BNC (C02)
Power supply	Size AA battery x4 or exclusive AC adapter
Battery life	20 hours or more (with alkaline battery cell (LR6)x4)
Outer dimensions	140(W)x40(H)x125(D) mm (not including protruded section)
Weight	Approx. 500 g (with batteries)

Features

- 2ch input
- Connection to CCLD type microphone preamplifier or accelerometer
- Providing frequency weighting filter (A, C)

MB-2200M10 Ultraminiature Microphone



Specifications

Sensitivity (1 kHz)	-37.0 \pm 3 dB re.1 V/Pa (14 mV/Pa)
Frequency (1 kHz reference)	200 Hz to 16 kHz (\pm 2.5 dB)
Max. sound pressure level	114 dB or more (1 kHz, total harmonic distortion : 3 %)
Inherent noise level	36 dB or less (A-weighting)
Operating temperature range	-30 to +80 $^{\circ}$ C (within 2500 mm from tip of the sensor part), 0 to +50 $^{\circ}$ C (until the connector part of a preamplifier)
Operating humidity range	0 to 90 % RH (with no condensation)
Storage temperature range	-10 to +60 $^{\circ}$ C (sensor section, preamplifier section)
Storage humidity range	0 to 90 % RH (with no condensation)
Power requirement	CCLD (Constant current drive)/ 2.2 mA to 4.9 mA (Rated 4.0 mA)/ 18 V to 26 V DC (Rated 24 V)
Outer dimensions	Sensor: 4.7 (W) x 7.1 (D) x 3.3 (H) mm Preamplifier: ϕ 13.6 x 46.8 mm (including BNC connector) Cable : 2850 mm (including bush)
Weight	Approx. 48 g (sensor section only: approx. 0.3 g)

Features

- Ultra compact. Easy sound pressure measurement even in limited spaces.
- Super lightweight. Can be fixed with double-sided tape
- Stable measurement at multiple-point
- TEDS supported, conforms to CE marking

Accelerometer

NP-3000 series (single-axis) Accelerometer with Built-in Preamplifier



Features

- Built-in preamplifier reduces cable noise influence.
- Direct input to FFT Analyzer CF-9200/9400/7200A*, DS series, Vibration comparator VC-2200/3200, and Portable data recorder for acoustics & vibration DR-7100.

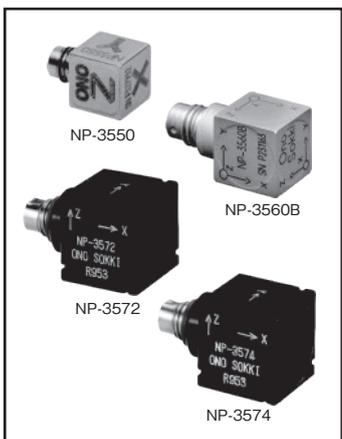
*Discontinued product

Specifications

Model name	NP-3211	NP-3412	NP-3414	NP-3418	NP-3110	NP-3120
Features	Ultra compact, lightweight	Compact, lightweight	Compact, lightweight	Compact, lightweight	Compact, general-purpose usage	General-purpose usage
Sensitivity	1.02 mV/(m/s ²) \pm 15%	1 mV/(m/s ²) \pm 1 dB	1 mV/(m/s ²) \pm 1 dB	1 mV/(m/s ²) \pm 10%	0.5 mV/(m/s ²) \pm 1 dB	1 mV/(m/s ²) \pm 1 dB
Weight	0.5 g	5.5 g	3.5 g	1.9 g	5.4 g	20 g
Frequency range	0.3 Hz to 20 kHz \pm 3 dB	0.8 Hz to 16 kHz \pm 3 dB	0.8 Hz to 16 kHz \pm 3 dB	0.8 Hz to 16 kHz \pm 3 dB	5 Hz to 15 kHz \pm 3 dB	5 Hz to 12 kHz \pm 3 dB

Model name	NP-3121	NP-3130	NP-3131	NP-3310	NP-3331B	NP-3331N30
Features	General-purpose usage, floating	High sensitivity	High sensitivity, floating	Waterproof, directly attached cable	Waterproof, CE, floating	Waterproof, CE, floating
Sensitivity	1 mV/(m/s ²) \pm 1 dB	10 mV/(m/s ²) \pm 1 dB	10 mV/(m/s ²) \pm 1 dB	1 mV/(m/s ²) \pm 1 dB	5 mV/(m/s ²) \pm 10%	5.0 mV/(m/s ²) \pm 10%
Weight	34 g	46 g	69 g	59 g (not including cable)	50 g	50 g
Frequency range	5 Hz to 10 kHz \pm 3 dB	5 Hz to 10 kHz \pm 3 dB	5 Hz to 8 kHz \pm 3 dB	5 Hz to 10 kHz \pm 3 dB	2 Hz to 10 kHz \pm 3 dB	2 Hz to 10 kHz \pm 3 dB

NP-3000 series (tri-axial) Accelerometer with Built-in Preamplifier



Features

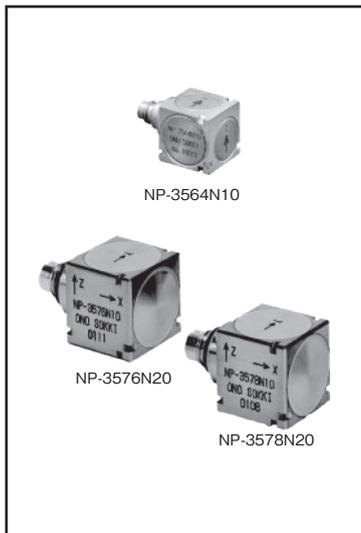
- CCLD built-in preamplifier reduces cable noise influence
- Direct input to FFT Analyzer CF-9200/9400/7200A*, DS series, Vibration comparator VC-2200/3200, and Portable data recorder for acoustics & vibration DR-7100

*Discontinued product

Specifications

Model name	NP-3550	NP-3560B	NP-3572	NP-3574
Features	Ultra compact, tri-axial, 6.35mm Cube	Compact, tri-axial, 10 mm Cube	General-purpose, tri-axial, 14 mm Cube	General-purpose, tri-axial, 14 mm Cube
Sensitivity	1.02 mV/(m/s ²) \pm 20 %	1.02 mV/(m/s ²) \pm 10%	1 mV/(m/s ²) \pm 10%	10 mV/(m/s ²) \pm 10%
Weight	1.0 g	5.3 g	8.1 g	8.1 g
Frequency range	2 Hz to 5 kHz \pm 5 % (X-axis) 2 Hz to 8 kHz \pm 5 % (Y, Z-axis)	2 Hz to 5 kHz \pm 5% (X-axis) 2 Hz to 10 kHz \pm 5% (Y, Z-axis)	1 Hz to 5 kHz \pm 10% (X, Y-axis) 1 Hz to 8 kHz \pm 10% (Z-axis)	1 Hz to 5 kHz \pm 10% (X, Y-axis) 1 Hz to 8 kHz \pm 10% (Z-axis)

NP-3000 series TEDS* Compatible Accelerometer with Built-in Pre-amplifier



Features

- Accepts TEDS* (IEEE1451.4 Ver.1.0)
When connecting TEDS* accepted unit, unique information (sensitivity, serial number, etc.) of the sensor can be read.
- Tri-axial cube type (NP-3564N10, NP-3576N20, 3578N20), adhesive attachment on any surface except for connector surface

*TEDS: Transducer Electronic Data Sheet

Specifications

Model name	NP-3564N10	NP-3576N20	NP-3578N20
Features	TEDS compatible, compact, tri-axial	TEDS compatible, compact, tri-axial	TEDS compatible, compact, tri-axial
Sensitivity	10 mV/(m/s ²) ± 10 %	1 mV/(m/s ²) ± 10%	10 mV/(m/s ²) ± 10%
Weight	4.4 g	11.1 g	11.1 g
Frequency range	2 Hz to 7 kHz ± 5 % (X, Y-axis) 2 Hz to 10 kHz ± 5 % (Z-axis) 0.5 Hz to 10 kHz ± 3 db (X,Y) 0.5 Hz to 18 kHz ± 3 db (Z)	1 Hz to 5 kHz ± 1 dB (X-axis) 1 Hz to 8 kHz ± 1 dB (Y, Z-axis)	1 Hz to 5 kHz ± 1 dB (X-axis) 1 Hz to 8 kHz ± 1 dB (Y, Z-axis)

NP-2000 series Charge Output Type Accelerometer



Features

- Due to charge output type, it can be used under high temperature (160°C), NP-2710 : 260°C
 - Low-frequency (5 Hz or less) vibration measurement is available
 - Applicable charge amplifier: CH-1200A, 6130, 6140*
- *Charge converter for direct input to FFT Analyzer CF-9200/9400/7200A**/DS series, Vibration comparator VC-2200/3200 and Portable data recorder for acoustics & vibration DR-7100. **Discontinued product

Specifications

Model name	NP-2106	NP-2110	NP-2910	NP-2810
Features	Ultra compact, lightweight, directly attached cable	Compact, lightweight, directly attached cable	Compact, general-purpose	Compact
Sensitivity	0.035 pC/(m/s ²) ± 20%	0.16 pC/(m/s ²) ± 2 dB	0.3 pC/(m/s ²) ± 20%	1.2 pC/(m/s ²) ± 2 dB
Weight	0.2 g (not including cable)	0.6 g (not including cable)	2 g	12 g
Frequency range	fc to 20 kHz ± 3 dB	fc to 20 kHz ± 3 dB	fc to 20 kHz ± 3 dB	fc to 15 kHz ± 3 dB

Model name	NP-2120	NP-2506	NP-2710
Features	General-purpose usage	Ultra compact, tri-axial, directly attached cable	Compact, high-temperature
Sensitivity	5 pC/(m/s ²) ± 2 dB	0.04 pC/(m/s ²) ± 20%	0.306 pC/(m/s ²) ± 10%
Weight	25 g	1.2 g (not including cable)	2 g
Frequency range	fc to 12 kHz ± 3 dB	fc to 20 kHz ± 3 dB	Applicable to 260°C, fc to 20 kHz ± 3 dB

fc: Lower limit frequency which is decided by the number of time constant of charge amplifier.

NP-0081N20 TEDS Adapter



Features

- Makes the accelerometer with built-in preamplifier being applicable to TEDS.
- Adds the TEDS function to the sensor without changing the sensor features.

Configuration

- The main unit and detector is one to one combination (cannot be combined with multiple detectors)
- When changing the combination detector or recalibrating it, rewriting the TEDS information is required before use.

Specifications

TEDS standard Connector	IEEE1451.4-2004 Template Ver.1.0 Sensor side; 10-32 Coaxial (miniature) Measurement side; C02 (BNC)
Applicable sensor	NP-3000 series
Operating temperature range	-40 to +85°C
Outer dimensions	φ 15 x 40 mm
Weight	Approx. 20 g

Calibrator for Accelerometer

VX-1100A Accelerometer Calibrator



Features

- Standalone unit having three functions of an exciter, sensor amplifier, and display
- Charge output type accelerometer and accelerometer with built-in preamplifier can be calibrated.
- With carrying case

Specifications

Exciter frequency	159.2 Hz ± 1%
Exciter acceleration	10 m/s ² (rms) ± 3%
Excitation speed	10 mm/s (rms) ± 4%
Excitation displacement	10 μm (rms) ± 5%
Harmonic distortion rate	3% or less
Sensitivity measurement accuracy	± 3% ± 1 digit or less
Applicable accelerometer weight	110 g or less
Sensor power	Constant current: 2.0 mA/4.0mA (switchable) Voltage 24V
Power requirement	Size AA battery x 4
Battery life	Approx. 8 hours (Detector weight: Approx. 25 g, with the use of alkaline dry cell battery)
Outer dimensions	120 (W) x 140 (H) x 50 (D) mm (not including protruded section)
Weight	Approx. 1 kg

*BNC/miniature conversion adapter (NP-0021) is required depending on the model of the sensor.

Note: The VX-1100A cannot be used for NP-2106, 2506.

Vibration Related Amplifier

■CH-1200A Charge Amplifier



■Specifications

Max. input charge	±100,000 pC
Frequency response function	Acceleration; 1.0 Hz to 15 kHz ±0.5 dB, 0.2 Hz to 50 kHz ±3 dB Velocity ; 3.0 Hz to 3 kHz ±0.5 dB Displacement; 3.0 Hz to 500 Hz ±1 dB (*160 Hz: 0 dB)
Rated output voltage	±10 V
Filter	HPF; Through, 3 Hz, 10 Hz (-18 dB/oct) LPF; Through, 1 kHz, 10 kHz (-18 dB/oct)
CAL signal	160 Hz ±5%, 1 Vo-p±2% sine wave (at 25°C±3°C)
Sensitivity	0.01 to 999 pC/ EU*1
Input connector	Miniature connector(Model C25 by Tajimi Electronics Co., LTD, or equivalent)
Output connector	C02 type (BNC)
Operating temperature (humidity) range	-10 to +50°C (90% RH or less)
Power requirements	10 to 15 VDC, 120 mA at 12 V (When using exclusive AC adapter; 100 VAC)
Outer dimensions	28 (W) x 121 (H) x 194 (D) mm (not including protruded section)
Weight	Approx. 510 g *1 EU: Engineering unit

■Features

- Oscillator for calibration built-in

■PS-1300 3ch Sensor Amplifier



■Specifications

Frequency response function	Acceleration; 1.0 Hz to 30 kHz±0.5 dB Velocity ; 3.0 Hz to 3 kHz±0.5 dB/-1.0 dB Displacement; 3.0 Hz to 500 Hz±1 dB (*160 Hz: 0 dB)
CCLD power	Constant current; 2.4 mA±20%, voltage; +24 VDC
Number of channels	3ch
Rated output voltage	AC OUT ±5 Vmax
Input connector	Miniature connector(Model C25 by Tajimi Electronics Co., LTD, or equivalent)
Output connector	C02 type (BNC)
Filter	3rd Butterworth type, -18 dB/oct HPF; Thru, 3 Hz, 10 Hz LPF; Thru, 1 kHz, 10 kHz
Power supply	10 to 15 VDC, 300 mA or less at 12 VDC IN (When using the exclusive AC adapter; 100 VAC)
Operating temperature (humidity) range	-10 to +50°C (90% RH or less)
Outer dimensions	92(W) x 121 (H) x 194 (D) mm (not including protruded section)
Weight	Approx. 1 kg

■Features

- Used in combination with a tri-axial accelerometer
- Fine adjustment of output gain is available
- High pass filter and low pass filter are installed for each channel

■VC-2200 Vibration Comparator (2-band)



■Specifications

Input section	Number of input channels; 1ch
Analysis section	Band filter; (Number of setting bands; 2) HPF, LPF; THR, 100, 300, 500, 1 k, 3 k, 5 k, 10 k (Hz)
Calculation section	Measurement mode; rms value, peak value, max hold, peak hold switching selection, calculation display of each measurement value
Comparator output	Judgment factor is selectable for each band from rms value, peak value

*Sensor, cable and magnetic base : option.

■Features

- Digital display function
- With analog output
- Comparator gate input is available
- Headphone connection is available

●General specifications

Power supply	24 VDC±10%
Operating temperature range	0 to +50°C
Operating humidity range	85% RH or less (with no condensation)
Outer dimensions	DIN 96 x 96 x 112 mm
Weight	Approx. 500 g

■VC-3200 Vibration Comparator (3-band)



■Specifications

Input section	Number of input channels; 1ch
Analysis section	Band filter; (Number of setting bands; 3) HPF, LPF; THR, 50, 100, 200, 300, 500, 1 k, 2 k, 3 k, 5 k, 10 k (Hz)
Calculation section	Measurement mode; rms value, peak value, peak/ maximum rms factor (peak/rms) value, max hold, peak hold, peak/ max rms factor (peak/rms) hold switching selection, calculation display of each measurement band
Comparator output	Judgment is made independently for each band. Judgment factor is selectable for each band from rms value, peak value, peak/ max rms factor value

*Sensor, cable and magnetic base : option.

■Features

- Digital display function
- With analog output
- Comparator gate input is available
- Headphone connection is available
- Condition/ data memory function are provided

●General specifications

Power supply	24 VDC±10%
Operating temperature range	0 to +50°C
Operating humidity range	85% RH or less (with no condensation)
Outer dimensions	DIN 96 x 96 x 112 mm
Weight	Approx. 500 g

■CH-6130/6140 Charge Converter



■Specifications

Gain	1 mV/pC ¹ (CH-6130), 10mV/pC ¹ (CH-6140)
Frequency range	5 Hz to 15 kHz (±0.5 dB) ² , 2 Hz to 45 kHz (±3 dB) ²
Max. output voltage	10 Vp-p or more
Output bias	10 VDC ±2 VDC
Driving power supply	Constant current; 2 to 20 mA, Voltage; 18 to 36 V
Input connector	Miniature connector (Screw No. 10 to 32 UNF)
Output connector	C02 (BNC plug)
Operating temperature range	0 to +50°C
Operating humidity range	85% RH or less
Outer dimensions	φ15 x 40 mm
Weight	Approx. 20 g

■Features

- Separate charge amplifier is not required.
- Direct connection to BNC connector which has CCLD* function

*CCLD:
Constant Current Line Drive

*1: at 160 Hz
*2: The gain at 160 Hz to be 0 dB.
Note: The output polarity is reversed.

Impulse Hammer

■GK-2110/3100/4110G20 Impulse Hammer



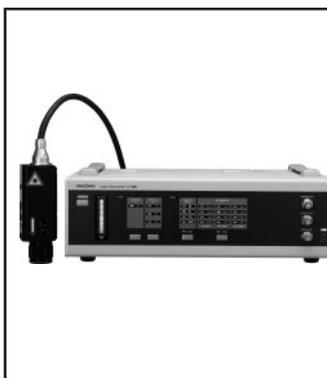
■Features

- Checking of excitation, excitation force, and excitation band easily
- Selectable from three types of impulse hammers according to the measurement target
- Excitation force and excitation frequency band changeable by replacing the impact tip
- Built-in force sensor with built-in preamplifier enables direct connection to power supply unit or CCLD compatible analyzer

Model name	GK-2110	GK-3100	GK-4110G20
Measurement range	220 N	2,200 N	22,000 N
Detection element	Crystal piezoelectric element		
Sensitivity	22.5 mV/N	2.3 mV/N	0.23 mV/N
Resonance frequency	100 kHz or more	31 kHz or more	12 kHz or more
Excitation frequency range (when hard tip is used)	Up to 20 kHz	Up to 8 kHz	Up to 1 kHz
Hammer weight	Approx. 4.8 g (when attached with a plastic hammer handle)	Approx. 140 g	Approx. 1100 g
Head diameter	6.3 mm	15 mm	51 mm
Tip diameter	2.5 mm	6.3 mm	51 mm
Hammer length	107 mm	203 mm	370 mm
Output connector	Aluminum hammer handle: 5-44 coaxial connector Plastic hammer handle: directly attached cable, miniature connector (10-32)	BNC (C02)	BNC (C02)
Output signal	Voltage output with CCLD compatible	Voltage output with CCLD compatible	Voltage output with CCLD compatible, Applicable to TEDS
Output impedance	100 Ω or less		
CCLD power supply	2 to 20 mA, +18 to +30 VDC		

Laser Doppler Vibrometer

■LV-1800 Laser Doppler Vibrometer



■Features

- Compact, high-sensitivity, and high resolution non-contact vibration sensor with built-in interacting system to the sensor head.
- Laser radiation part can be checked on the PC screen with the LV-0181 built-in positioning camera on the sensor head.
- Excellent for measuring amplitude of piezoelectric element, micro-amplitude of MEMS or thin film, non-contact vibration detection of large structure, measurement of ultrasonic tool

■Specifications

Frequency measurement range 0.3 Hz to 3 MHz^{*1}
 Velocity measurement range 0.3 μm/s to 10 m/s
 Measurement distance More than 100 mm
 Laser spot 20 μm (at minimum measurement distance)
 Light source He-Ne Laser (632.8 nm 1mW or less)
 Laser safety standard Class 2

■Options

- LV-0181 Built-in positioning camera
- LV-0800 Small velocity range board
- LV-0111/0112 Acceleration/displacement output board
- LV-0121A Digital displacement meter^{*1}
- LV-3800 3D optical unit^{*2}
- LV-0383 3D microscope unit^{*2}
- LV-0381 Microscope unit

*1: LV-0041 (connection set) is necessary for connecting with the LV-1800.

*2: Signal operation system (option) is required.

Sound Source Visualization System

■Sound Source Visualization System 4ch Beam Forming



■System Configuration

- Sound Source Visualization Probe Microphone : MI-5420A
- BF Monitor : BF-3200
- BF Offline Analysis : BF-0310
- Time-series data analysis tool : OS-2720/0281
- Data Station : DS-3204/0371

* Windows®C is required.

■Features

- The improved Beam Forming method enables to specify the sound source and share information, which helps reducing the time for problem solving and man-hours.
- Real-time monitoring of sound source (20 times/sec.)
You can monitor the occurring sound in real-time. Having good performance of follow-up, you can visualize various sounds including transient sound as well as stationary sound.
- With only four microphones, you can visualize wideband sound source of 500 Hz to 8 kHz.

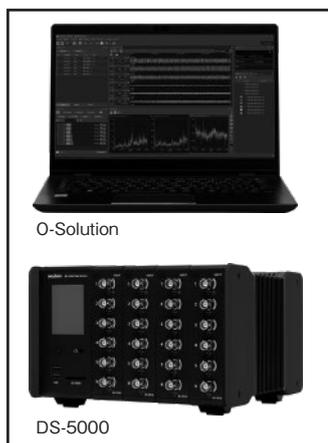
■MI-5420A Sound Source Visualization Probe microphone



- Short-distance object measurement by a camera with wider viewing angle
The measurement from close to a target produces less reflection waves and less environmental influences including noise, making it easier to detect the sound and vibration signals.

■Specifications

Sound pressure sensitivity -38 dB ± 3 dB (0 dB = 1 V/Pa, 1 kHz)
 Max. sound pressure level 110 dB (1 kHz, THD= 3%)
 Self-noise level 39 dB (A weighting)
 Operating temperature range 0 °C to 50 °C
 Operating humidity range 80 % RH or less (with no condensation)
 Storage temperature range -10 °C to 60 °C
 Storage humidity range 90 % RH or less (with no condensation)
 Weight 120 mm probe head
 Approx. 785 g
 60 mm probe head
 Approx. 655 g
 Power source DC24V, 4 mA/ch, CCLD
 Camera CMOS USB camera



O-Solution

DS-5000

■ Overview

The O-solution and the DS-5000 measure the sound and vibration phenomena at various site with high accuracy, and performs detailed analysis at once. Quickly and smoothly, this new system helps to uncover the various problems for sound and vibration.

- O-Solution (Software)- "Measurement" and "Analysis" mode in one application with one click (for Windows®)

■ Check the results instantly

You can perform all the process of setting, measurement, and analysis smoothly in one application. The result is quickly checked in the flow of process, and it can eliminate loss of time due to the rework.

■ Perfect monitoring

Equipped with monitor functions that you can quickly respond to unexpected phenomena at site. Easy to notice errors such as overrange voltage and external noise

■ Share the data

You can share the measured data and the analysis result with engineers far from the site, by using the free viewer (O-Solution Lite).

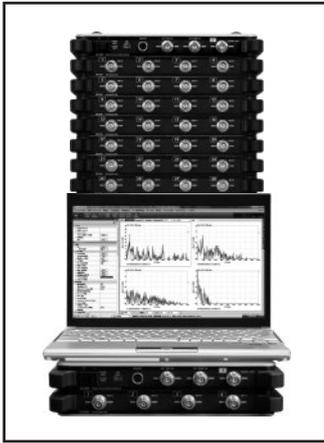
- DS-5000 (Hardware) - Multi-channel measurement from 3 up to 240 ch in the stack structure

- The input unit with 6 ch is provided.
- The maximum input channels is 48 ch, the maximum hardware to hardware connection is 5 units (up to 240 channels).
- There are two types of input units with a frequency range of 40kHz and 100kHz.
- The hardware to hardware connection builds a multi-channel measurement system according to your application.
- The DS-5000 is a battery-driven system and can be used outdoors, in factories and other places even where a power source is not easy to secure.
- Each channel has isolation structure so that electrical noise is less affected.
- Achieved the dynamic range that can measure from small to large amplitude.

■ Hardware specifications

Maximum number of input channels	: 48 ch 240 ch (when the hardware to hardware connection function used)
Input voltage range	: -30/ 0/ 30 dBVrms
Max. input voltage	: 30 Vrms (42.4 Vpk)
Recording performance	: 10 kHz range 240ch
Dynamic range	: 130 dB or more
Channel to channel phase accuracy	: $\pm 0.6^\circ$ (less than 20 kHz)
Channel to channel isolation	: available
Operating temperature range	: -10 to 50 °C (humidity 20 to 80 %RH, no dew condensation)
Power supply	: AC adapter, external DC (battery unit required)

■ DS-3000 series Sound and Vibration Real-time Analysis System



■ Features

- USB 3.0 interface enables easy connection and fast data transmission to a PC.
- Up to 4 units (128 ch) can be connected.
- Available 2 types of units, 40 kHz unit and 100 kHz unit
- Fast real-time rate and high performance of throughput function
- High dynamic range of 110 dB and max. 16384 points of FFT calculation processing
- B5 size, compact, approx. 2.2 kg lightweight unit (2ch/ 4ch)
- Integrated several analysis functions into one software such as FFT analysis, tracking analysis, and octave analysis to provide commonization of procedure.
- Real-time analysis and recording system: enables automatic recording of backup data and real-time analysis at the same time.
- Unit connecting function "FRAME LINK2" : Provides flexible building of multi-channel measurement system only by connecting two units of the DS-3000 via a cable and an interface. (Can be increased up to 64ch.)
- Operating software: Windows® 7 (32/64-bit) and Windows® 10 (64-bit).

■ Hardware specifications

Max. number of channels	32 ch (1unit), 128 ch (4 units)
PC interface	USB 3.0 interface (Supports USB 2.0 and 3.0. Data transmission using USB 2.0 is slower than USB 3.0.)
Power voltage/ power consumption	100 to 240 VAC, 15 VDC/ 25 to 95 VA (at 15 VDC)
Outer dimensions	269(W) x 71 to 267 (H) x 217 (D) mm (including protector)
Weight	Approx. 2.2 kg (4ch system) to approx. 8.2 kg (32ch system)
Cooling fan	Required for a system of 5 units or more (Provided as standard with the system of 5 units or more.)
CE marking	Applicable
Accessory	Instruction manual, AC adapter, Power cable for AC adapter

■ Overview

The DS-3000 series can perform real-time analysis of noise and vibration generated from products in various industries such as vehicles, railways, home appliances, wind power generation or environmental facilities. The hardware (DS-3000 series Data Station) at overwhelming processing speed and easy handling software exactly satisfy the needs.

■ Software specifications

Function	Item	Specification
Recording function (Throughput, recording function)	Recording range/ channel	40 kHz range/ 16ch, 20 kHz range/ 32ch
	Analysis frequency range	4 mHz to 40 kHz
FFT analysis function	FFT real-time rate	40 kHz range/ 8ch, 20 kHz range/ 16ch, 10 kHz range/ 32ch
	Number of FFT samplings	Max. 16384 points (6400 lines)
	Analysis function(time-axis)	Time waveform, Impulse response, Cepstrum
	Analysis function(frequency-axis)	Power spectrum, cross-spectrum, frequency response function, coherence function, etc.
Tracking analysis function	Tracking method	Constant ratio tracking, constant width tracking
	Schedule method	Rotation schedule, time schedule
Real-time octave analysis function	Octave type	1/ 1 OCT, 1/3 OCT (option: 1/6, 1/12, 1/24 OCT)

Sound Level Meter

LA-7000 series High Performance Sound Level Meter



Overview

LA-7000 series allows "measuring while listening to sound" in addition to the original features of a sound level meter such as measurement and calculation. By listening to the sound instantly at the measuring place, you can confirm condition of a target, perform sound source probing, and check that the sound is unfailingly being recorded. The LA-7000 series sound level meter is a great help for reliable measurement at measurement place where any mistakes cannot be allowed. By adding various options, the LA-7000 series is able to be upgraded to a sound analyzer, frequency analyzer, and a sound recorder (options), performing more than just a sound level meter. The measurement performance is substantially improved only using LA-7000 series which does multiple duties, such as sound measurement, sound recording, frequency analysis, and sound probing of abnormal sound.

Features

- 4.3 inch color LCD
- Intuitive operation by a touch panel
- Capturing function
- Language selection from English and Japanese
- USB power supply allows long time measurement
- Windscreen correction function
- Start recording with one-touch operation
- Achieves 35% of size reduction in volume of conventional model.
- Home key leads you to return to the first page
- External power supply ON/OFF function
- Listening function
- Strap provided as an accessory

Option

LA-0702	1/3 Real-time Octave Analysis function
LA-0703	FFT Analysis function
LA-0704	Sound Recording function
LA-0705	Level Judgment function
LA-0707	Level Simulator function
LA-0708A	Sound Quality Evaluation function
LA-0709	Ultra low frequency sound measurement function

LA-1441/1441A/4441A Integrating Sound Level Meter



Overview

LA-1441/1441A/4441A sound level meter are applicable to IEC 61672-1: 2013, JIS C 1509-1:2017. Adopted curved surface body with less reflection of sound. Cost effective sound level meter with the following features.

Features

- All models have the functions indispensable for on-site measurement.
- The time averaging sound level (Leq) measurement function which is necessary for noise measurement.
- Abundant simultaneous measurement items.
- 100 dB wide linearity range unnecessary for level range switching.
- Easy menu format enables simple operation.
- Measurement condition resume function enables to start measurement with the same condition as the previous measurement.
- BNC connector and CCLD type preamplifier are adopted. Easy to extend the cable.
- Equipped with USB and RS-232C interfaces. (LA-1441A/4441A)

LA-1411

Class 2 sound level meter for product testing and measuring the sound level generated from machines etc. High-performance and cost-effective model

LA-1441A

Class 2 sound level meter for measuring the working environment and environmental noise. Auto measurement function by timer and trigger. Level trend can be recorded at the interval from 1 ms.

LA-4441A

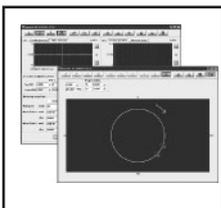
Class 1 sound level meter for sound analysis and product testing. Time weighting (10 ms, Impulse) corresponding to the fast sound fluctuation. Level trend can be recorded at the interval from 1 ms.

Option

LA-0141 Comparator function

Analysis Software for Sound and Vibration

DS-0227A Field Balancing Software



Overview

DS-0227A is the software to measure the unbalance of the rotation axis which is the main cause of the abnormality of rotary machine. It automatically performs various troublesome calculations required for balancing correction, and supports the balance correction work in the field.

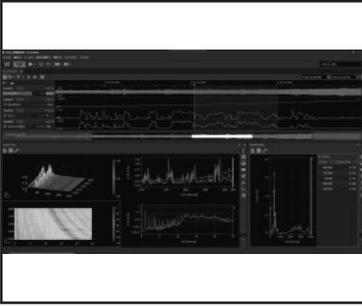
Features

- Procedure for balance correction, operation instruction, result display, etc. are graphically displayed on screen, understandable and easy operation
- Reliable operation by adopting the large button applicable to touch panel.
- Expandable measuring system with the combination of the DS-2000/3000 series.
- Field balancing of 1-plane 1-condition/ 1-plane 2-condition/ 2-plane 2-condition

Specifications

Balancing mode	1-plane 1-condition/ 1-plane 2-condition/ 2-plane 2-condition
	Rotation 1-speed/ Rotation 2-speed
Applicable rotation speed	100 to 48,000 r/min
Corrected position	Position of correction weight is displayed at divided angle format.
Applicable measurement unit	DS-2000/3000 series (4ch or more), CF-3650/3850 series

■ O-Solution Sound and Vibration Analysis System Software



■ Features

- Compare/ analyze the data with wide sampling frequency from 10 μ Hz to 100 GHz
- Flexibly layout to compare the data in different formats or sampling frequency
- Further analysis on specified area with the marker function
- Automation of analysis with the external control function

■ Specifications

Applicable sampling frequency	: 10 μ Hz to 100 GHz
Number of analysis data	: Max 1,000 per one time
Number of output files	: Max. 1,000 per one time
Data size	: Large volume up to 1 TB
Multi-thread processing	: Other processing can be performed while analyzing or importing data.

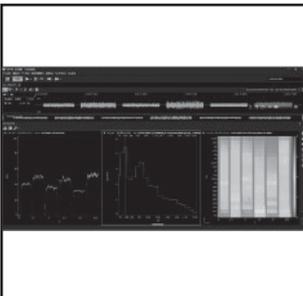
■ Option

Model Name	Product name	Overview
O-Solution Lite	Viewer function (free)	It is a license free viewer function that anyone can use anywhere.
OS-5100	Platform	A variety of editing functions such as waveform cutting, correction, and search is available.
OS-0521	Digital filter	Applying an IIR or FIR filter to the recorded data
OS-0522	FFT analysis function	It enables to calculate the power spectrum, frequency response function, etc.
OS-0523	Tracking analysis function	Tracking analysis with constant ratio and constant width are available.
OS-0524	Octave analysis function	Analysis from 1/1 to 1/24 octave
OS-0510	External control function	It communicates with user's application via TCP / IP and controls O-Solution.

■ Operation environment

Interface	: LAN terminal 1000base-T
OS	: Microsoft® Windows® 10 version 21H1 SAC Pro(64-bit)
CPU	: For the measurement/recording with 96 channels or less Intel® Core™ processor (Intel® Core™ i7 or higher grade, and 8th Generation or later generation), 4 cores and 8 threads or more, and 1.8 GHz or more base clock For the measurement/ recording with 96 channels or more Intel® Core™ processor (Intel® Core™ i7 or higher grade, and 8th Generation or later generation), 6 cores and 12 threads or more, and 2.5 GHz or more base clock frequency
Memory	: Minimum 16 GB
Storage	: Minimum free space 32 GB When storing data to the external HDD or SSD, the port for USB3. 2 (Gen1) / USB3. 1 (Gen1) / USB3. 0 is required.
Display	: Minimum 1920 x 1080

■ OS-0525 O-Solution Sound Quality Evaluation Function



■ Overview

It is difficult to quantify subjective feelings such as pleasant sounds and unpleasant sounds. The Sound Quality Evaluation Function enables to quantify a human sense of sound using the sound quality evaluation parameters such as loudness, sharpness, roughness, tonality. When taking measures to reduce unpleasant sounds, these parameters enable quantitative determination that helps investigation of causes, fundamental countermeasures and sound improvement.

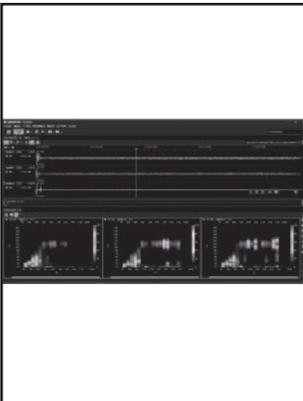
■ Applicable standards

- Loudness of stationary sounds (ISO532-1)
- Loudness of non-stationary sounds (ISO532-2)
- TNR/PR(ISO7779 Annex D)

■ Parameters for sound quality evaluation

- Loudness (Loudness of sound)
- Sharpness (High-pitched sound)
- Tonality (Feeling of pure tones)
- Roughness (Roughness, rasping)
- Fluctuation strength (Fluctuating feeling)
- TNR/PR (Discrete tone)

■ OS-0526 O-Solution Fluctuation Sound Analysis Function



■ Overview

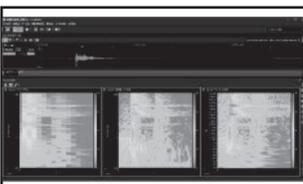
Although the loudness of sound is not so large, there are many "unpleasant sounds" in the world. Sounds with significant temporal fluctuations often feel unpleasant even if the magnitude (level) is not so large.

The Fluctuation Sound Analysis Function enables to extract only the components with large temporal fluctuations that are not affected by the level. As a result, it can quantify the characteristics of various temporal fluctuations that were difficult to detect with roughness or fluctuation strength. In addition, it is equipped with a function that can evaluate the audibility when only the variable components are emphasized or removed without changing the frequency characteristics. (Fluctuation sound simulator)

■ Features

- Various speed fluctuation sounds can be evaluated intuitively to display in the color-map at once.
- Effective when extracting only variable components from high-level background noise.
- It supports a wide range of fluctuation frequencies from slow to fast fluctuations (0.5 to 200 Hz).
- It enables to evaluate how the audible impression of the target sound changes by emphasizing or removing specific variable components.
- It can generate a time waveform that extracts only specific variable components.

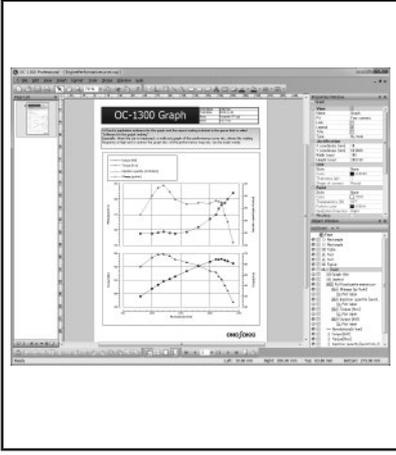
■ OS-0527 O-Solution Time Frequency Analysis Function



■ Overview

This function can evaluate transient phenomena that were difficult to capture by FFT analysis and display clearly time change of the frequency components while maintaining the frequency resolution. It is equipped with STFT (Short Time Fourier Transform) and Wavelet transform.

OC-1300 Multi-functioned Graph Creating Tool



Overview

The OC-1300 series makes it possible to create reports smoothly and easily from huge amount of data. You can arrange them freely by dragging the axes, and easily create complex multi-axis graphs with Excel®.

Features

- Easy creation of multiple-axis graph and 3D graph which cannot be created by Excel®
- Flexible graph creation by moving graph axis anywhere with a mouse.
- 3D and 4D graphs can be moved easily with a mouse.
- Improved operability with the Excel® add-in function
- You can draw a digital map.

Specifications

- Type of graph (OC-1330)

Scatter plot, line plot, curve chart (cubic spline, B spline, Hermitian, regression curve and moving average), bar chart, grouping graph, counter map (clipping map), color scatter plot, lattice graph, 3D scatter plot, 3D bar chart, 3D contour map, waterfall, 4D scatter plot, 4D bar chart, 4D contour map, vector diagram (plane, solid)

- Import format

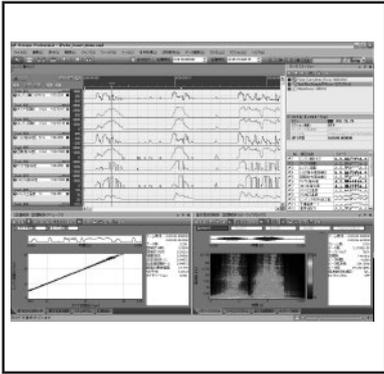
XLS^{*1}, XLSX^{*2}, XLSM^{*2}, CSV, text, DS/CF (with restriction), FAMS/KY, combustion analysis^{*3}, Meidensha MEIDACS^{*4}

*1: Installation of Excel®2002 or later is required.

*2: Installation of Excel®2007 or later is required.

*3: Installation of DS-0228A ver. 7.03 or later is required.

*4: Please contact us for the applicable models (data).



■ Features

- Division, move, overlapping of waveform available with the mouse operation
- Data of various devices can be displayed simultaneously
- Realize the AND/OR search function in the combination of time-series data items (max. 10 conditions)
- Various analysis functions of statistical processing, scatter plot/ regression analysis, FFT analysis, sound quality evaluation
- Playback of video while sound and vibration analysis by loading the video file.
- The horizontal axis of the graph can be displayed as axes other than time, such as distance and angle.
- Software for editing or analyzing the long time-series data, can display data without being restricted by data format and sampling frequency.

■ Specifications

- Common specifications
 - Number of data: Max. 500 million points (Number of files x Number of channels x Number of records)
 - Number of display tracks: 1,000
 - Number of waveforms in 1 track: 64
 - Sampling frequency: 0.01 Hz to 20 MHz
 - Data import format: ASCII (*.txt, *.csv), EXCEL® (*.xls, *.xlsx), WAVE (*.wav), sound file (*.s01, *.s02), TEAC TAFFmat file, AQ-VU file, HIOKI memory HiCorder file, YOKOGAWA WVF/WDF file, IPG Automotive ERG file, GRAPHTEC GBD file, Ono Sokki original file (ORF, DS/CF, FAMS, KY, VARTS), video file (*.avi, *.wmv)
 - Data export format: CSV (*.csv), WAVE (*.wav), ORF (*.orf), AVI (*.avi), OC-1300 output
- Function
 - Common function: Waveform editing function, marker function, sound playback function, search function, merging/ combining sections, simple calculation, moving average, event counter, statistical processing (interval), OC-1300 controller, signal calibration
 - OS-2000 Standard/ professional: Search value extraction, time-axis calculus, F/V converter, inter-channel calculation, resampling
 - OS-2000 Professional: Waveform generation tool, file merge, Hilbert transform, taper processing, recording
- Option
 - OS-0251 Statistics analysis, OS-0252 FFT analysis, OS-0253 FIR filter, OS-0254 Continuous automatic analysis, OS-0255 Combustion analysis monitor, OS-0261 IIR filter, OS-0263 Time frequency analysis, OS-0264 1/N octave analysis, OS-0265 Tracking analysis, OS-0271 Sound quality evaluation, OS-0272 Sound fluctuation analysis, OS-0273 Fluctuation sound simulator, OS-0281 Video playback, OS-0291 Non-time series graph, OS-0292 Tracking map

■ Applicable OS

Microsoft® Windows® 7, 10

*Installation of NET Framework 3.5 Service pack 1 is required.

■ Product lineup

Model name	Product name	Overview
OS-2500	Basic	This is the basic version equipped with the Event counter, search function and other essential capabilities.
OS-2600	Standard	This is the standard version includes enhanced features such as Inter-channel calculation, search value extraction, and F/V functions in addition to the basic version.
OS-2700	Professional	This is the professional version includes numerous advanced functions in addition to the functions in the standard version such as file merge, waveform generation tool, Hilbert transform, and recording functions.

Engine Rotation Detector

■IP-292/296 Ignition Pulse Detector



■Specifications

Applicable engine 2/4-cycle gasoline engine
 Detection section Primary cord of an ignition coil (IP-292)
 Secondary cord of an ignition coil (IP-296)
 Applicable cord diameter Max. ϕ 10 mm
 Output cord length 4.9 m (directly attached/ with BNC)
 Applicable display unit CT-6700: Digital engine tachometer
 FT-2500: Advanced tachometer
 FT-7200: Advanced handheld tachometer
 HT-6200: External sensor input type handheld tachometer
 GE-2500: Diesel engine tachometer
 Operating temperature range -40 to +120°C
 Outer dimensions 102 (W) x 48(H) x 30(D) mm
 Weight Approx. 280g

■Features

- CE modification applicable
- Rotation detector exclusive for gasoline engine
- Convenient one-touch mounting
- Max. ϕ 10 mm conductive wire can be installed
- Heat resistance structure

■IP-3000A Ignition Pulse Detector



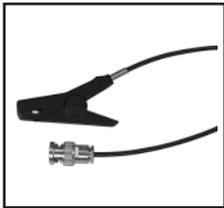
■Specifications

Applicable engine 2/4-cycle gasoline engine
 Detection section Primary cord of an ignition coil
 Current cord of an electronic distributor
 Applicable cord diameter Max. ϕ 5 mm
 Output cord length 4.9 m (directly attached/ with BNC)
 Applicable display unit CT-6700: Digital engine tachometer
 FT-2500: Advanced tachometer
 FT-7200: Advanced handheld tachometer
 HT-6200: External sensor input type handheld tachometer
 GE-2500: Diesel engine tachometer
 Operating temperature range -40 to +120°C
 Outer dimensions 8(W)x 14.3(H)x 30(D) mm
 Weight Approx. 80 g (including cable)

■Features

- CE modification applicable
- Rotation detector exclusive for gasoline engine
- Convenient one-touch mounting
- Compact and lightweight detector enables installation on engines in narrow space

■IP-3100 Ignition Pulse Detector



■Specifications

Applicable engine 2/4-cycle gasoline engine
 Detection section Primary cord of an ignition coil
 Secondary cord of an ignition coil
 Current cord of an electronic distributor
 Applicable cord diameter Max. ϕ 10 mm
 Output cord length 4.9 m (directly attached/ with BNC)
 Applicable display unit CT-6700: Digital engine tachometer
 FT-2500: Advanced tachometer
 FT-7200: Advanced handheld tachometer
 HT-6200: External sensor input type handheld tachometer
 GE-2500: Diesel engine tachometer
 Operating temperature range -40 to +120°C
 Outer dimensions 13(W)x 33(H)x 60(D) mm
 Weight Approx. 130 g (including cable)

■Features

- CE modification applicable
- Rotation detector exclusive for gasoline engine
- Convenient one-touch mounting
- Compact and lightweight detector enables installation on engines in narrow space

■OM-1200 Motor/Engine RPM Detector



■Specifications

Applicable engine 2/4-cycle gasoline engine, EV/HEV, motor
 Detection method Electromagnetic induction
 Applicable display unit CT-6700: Digital engine tachometer
 FT-2500: Advanced tachometer
 FT-7200: Advanced handheld tachometer
 HT-6200: External sensor input type handheld tachometer
 GE-2500: Diesel engine tachometer
 MX-005/010/015/020 (option)
 Operating temperature range 0 to +80°C
 Outer dimensions ϕ 16 x 54 mm (only sensor)
 ϕ 16 x 80 mm (when connecting cable)
 Weight Approx. 65 g

■Features

- Excellent in durability, environmental resistance and rigidity
- Gasoline engine rotation measurement and motor rotation measurement

■OM-1500 Motor/Engine RPM Detector



■Specifications

Applicable engine 2/4-cycle gasoline engine, EV/HEV, motor
 Detection method Electromagnetic induction
 Output cord length 4.9 m (directly attached/ with BNC)
 Applicable display unit CT-6700: Digital engine tachometer
 FT-2500: Advanced tachometer
 FT-7200: Advanced handheld tachometer
 HT-6200: External sensor input type handheld tachometer
 GE-2500: Diesel engine tachometer
 Operating temperature range -10 to +100°C
 Outer dimensions ϕ 16 x 30mm
 Weight Approx. 130 g (including cable)

■Features

- One-touch attachment in parallel with the ignition coil (Attach OM-1500 perpendicular to the rotating shaft of the motor in measuring motor rotation)
- Excellent in durability, environmental resistance, and rigidity
- Easy to use

■CP-044 Diesel Engine Rotation Sensor



■Specifications

Applicable engine Diesel engine
 Detection method A piezoelectric element is used to detect pulsation at the time of fuel injection
 Applicable pipe diameter ϕ 4 to 8 mm
 Output cord length 4.9 m (directly attached/ with 6-core connector)
 Piezoelectric element withstand compressive pressure 1960 bar
 Applicable display unit GE-1400
 Operating temperature range 0 to +80°C
 Outer dimensions ϕ 32x79 mm
 Weight Approx. 120 g

■Features

- CE modification applicable
- One touch attachment to fuel injection pipe
- Attachment to the injection pipe of ϕ 4 to 8 mm are available
- Detection is available regardless of the

VP-201/1210 Engine Vibration Detector



Specifications

Applicable engine	4-cylinder diesel/ gasoline engines
Detection part	Engine, cylinder head part bolt or engine fixing bolt
Detection method	Electro-dynamic vibration detection
Output cord length	2.9 m (directly attached/ with mini plug)
Applicable display unit	SE-2500A
Operating temperature range	0 to +100°C
Outer dimensions	φ25 x 50 mm
Weight	VP-201 ; Approx. 110 g VP-1210; Approx. 130 g

Features

- Easy mounting to a cylinder head by a magnet built-in detector
- Lightweight and heat resistant structure
- VP-1210: high sensitive type

VP-202/1220 Engine Vibration Detector



Specifications

Applicable engine	4-cylinder diesel/ gasoline engines
Detection part	Engine, cylinder head part bolt or engine fixing bolt
Detection method	Electro-dynamic vibration detection
Output cord length	2.9 m (directly attached/ with BNC)
Applicable display unit	CT-6700: Multi-function, digital display FT-2500: Advanced tachometer FT-7200: Advanced handheld tachometer HT-6200: External sensor input type handheld tachometer GE-2500: Diesel engine tachometer
Operating temperature range	0 to +100°C
Outer dimensions	φ25 x 50 mm
Weight	VP-202 ; Approx. 110 g VP-1220; Approx. 130 g

Features

- CE modification applicable
- Easy mounting to a cylinder head by a magnet built-in detector
- Lightweight and heat resistant structure
- VP-1220: high sensitive type

* Depending on the specifications, some engine cannot be measured with our engine tachometer. Please contact your nearest distributor or send us an email (overseas@onosokki.co.jp).

Engine Tachometer

GE-1400 Diesel Engine Tachometer



Specifications

Applicable engines	4-cycle diesel engines
Detection method	Detection of the pulsation of the injection pipe generated at the time of fuel injection
Display update time	1 ± 0.2 s
Applicable detector	CP-044
Measurement range	400 to 8000 r/min
Analog output	Output voltage; 0 to 1 V/ 0 to F.S. (F.S. is arbitrary setting) Conversion method: 10 bit D/A
Monitor output	Analog output for monitoring purposes after waveform reshaping of the sensor signal
Pulse output	Output voltage Hi; +4.5 V or more, Lo; +0.5 V or less
Power source	Size AAA battery x4 or exclusive AC adapter
Battery life	Approx. 16 hours (when the backlight is OFF.) Approx. 8 hours (when the backlight is ON.)
Outer dimensions	66 (W)x 186.5 (H)x 47.5 (D) mm
Weight	Approx. 230 g (not including batteries)

Features

- Built-in memory function
- Built-in trigger adjustment function

HT-6200 Handheld Digital Tachometer



Specifications

Applicable engine	Diesel engine, gasoline engine, motor, general rotating object
Display update time	1 ± 0.2 s
Applicable detector	IP-292/296/3000A/3100, OM-1200/1500, VP-202/1220
Measurement target	Ignition coil, primary/secondary ignition cables, ECU rotation pulses (5 to 12 V)
Max. measurement value	20,000 r/min
Measurement accuracy	Display value x (±0.02%) ± 1 count
Analog output	Output voltage; 0 to 1 V/ 0 to F.S. (F.S. is arbitrary setting) Conversion method; 10 bit D/A
Monitor output	Sensor detection signal (using analog output by switching)
Pulse output	Output voltage Hi; +4.5 V or more, Lo; +0.5 V or less
Power source	Size AAA battery x4 or exclusive AC adapter
Battery life	Approx. 16 hours (when backlight is OFF.) Approx. 8 hours (when backlight is ON.)
Outer dimensions	66 (W)x 189.5 (H)x 47.5 (D) mm
Weight	Approx. 230 g (not including batteries)

Features

- The maximum and minimum values can be displayed during measurement (peak-hold function)
- Built-in memory function

SE-2500A Digital Engine Tachometer



Specifications

Applicable engine	Gasoline engines, 2-cycle (1 to 4 cylinders), 4-cycle (1 to 6, 8, 10, 12 cylinders)
Detection method	Electromagnetic induction
Display update time	1 ± 0.2s
Measurement target	Ignition coil
Applicable detector	VP-201/1210
Measurement range	120 to 20,000 r/min
Analog output	Output voltage; 0 to 1 V/ 0 to F.S. (F.S. is arbitrary setting) Conversion method; 10 bit D/A
Monitor output	Analog output for monitoring purposes after waveform reshaping of the sensor signal
Pulse output	Output voltage Hi; +4.5 V or more, Lo; +0.5 V or less
Power source	Size AAA battery x4 or exclusive AC adapter
Battery life	Approx. 32 hours (when backlight is OFF.) Approx. 8 hours (when backlight is ON.)
Outer dimensions	66 (W)x 198.5 (H)x 47.5 (D) mm
Weight	Approx. 250 g (not including batteries)

Features

- Built-in sensor type
- Built-in memory function
- Capable of measurement from a position 1 m apart by using the external sensor.
- Measurement can be performed in 1 r/min or 0.01 r/s unit

■CT-6700 Digital Engine Tachometer



■Specifications

Applicable engine	Gasoline engine, diesel engine, EV, HEV, general rotating object
Measurement range	0 to 99,999 r/min (depending on sensor and input pulse)
Applicable detector	IP-292/296/3000A/3100, LG-9200, MP-9100/911/981/9820, OM-1200/1500, VP-202/1220
Display method	Fluorescent display tube (52.5x11.5 mm)
Analog output	0 to 10 V/ 0 to 99,999 r/min
Pulse output	0.5 P/R, 1 P/R, 60 P/R and waveform shaping output (switchable)
Contact output	Over run: 1 to 99,999 r/min Engine run: 1 to 99,999 r/min Output with engine run, over run setting
Digital interface	RS-232C/ CAN (option)
Power supply	9 to 28 VDC, 12 VA or less (AC adapter); 100 to 240 VAC 36 VA or less)
Outer dimensions	170(W) × 49(H) × 120(D) mm
Weight	Approx. 700 g

■Features

- High response measurement
- Supports various sensors with different purposes
- Automatic setting of trigger level with the Trigger Assist Function
- Measurement by ECU crank signal of unequal interval pulses
- High speed digital data output by CAN interface (option)
- Space saving design

■GE-2500 Diesel Engine Tachometer



■Specifications

Applicable engine	Diesel engine, gasoline engine (Engine without alternator cannot be measured.)
Calculation method	FFT calculation
Input frequency range	1 kHz, 2 kHz, 5 kHz (Measurement mode MAIN)/ 500 Hz (Calibration mode REF)
Measurement range	20,000 r/min
Applicable detector	OM-1200/1500, VP-202/1220, IP-292/296/3000A/3100, NP-3000 series, FT-0501/0801, MI series, Current probe, etc.
Constant drive power supply	2.2 to 3.2 mA (REF only)
[REVO] output	Outputs for rotation speed calculation values 0 to F.S./ 0 to 10 V (Value of F.S. can be specified.)
[SIG] output	Outputs signal of the sensor input to MAIN (can be used by switching from analog output)
Pulse output	Pulse output of the frequency of rotation speed calculation value Hi; +4.5 V or more/ Lo; +0.5 V or less (at no load) Update time; 200 ms or less, load resistance; 100kΩ or more
Power supply (power consumption)	12 to 24 VDC (8 VA or less)
Outer dimensions	Approx. 144 (W) × 72 (H) × 180 (D) mm (not including protruded section)
Weight	2 kg or less

■Features

- By using rotation speed of an alternator, measurement is possible regardless of the engine type and number of cylinders
- Easy setting, sensor can be set any place of an alternator
- Enables small signal detection by FFT calculation. High noise tolerance and stable measurement.

■LC-8120 GPS Speedometer



■Features

- Using GPS enables stable measurement which is not affected by weather or road surface conditions.
- Highly accurate and fast response measurement by original algorithm using GPS / GLONASS+ IMU.
- Various vehicle measurements by adding optional software.
- With excellent performance of a delay time within 5 ms, useful for acceleration tests or brake tests.

■Specifications

Horizontal speed	Measurement range: 0.1 to 500.0 km/h Accuracy : ±0.1 km/h
Horizontal distance	Accuracy : ±0.05%
Analog (speed) output	Voltage range : 0 to 10 V/ 0 to 500 km/h Output delay : 5 ms or less
Pulse (distance) output	Resolution : 1, 5, 10 mm/P switchable Output delay : 5 ms or less
External trigger input	Non-voltage contact, voltage contact
External trigger output	Gate output : 1ch
General specification	Operating power : 10 to 28 VDC/ 100 to 240 VAC (using AC adapter: option) Power consumption: Max. 30 VA Operating temperature range: 0 to +50°C Storage temperature range: -10 to +60°C
Accessory	Antenna (LC-0721), Remote box (LC-0083), IMU (LC-0087) and each cable, DC power cable, USB cable, PC standard software, IMU mounting jig Approx. 269 (W)x180 (D) x 43 (H) mm (not including protruded section) (Approx. 1.4 kg)
Outer dimensions (weight)	

■Option

LC-0080	: Small display unit
LC-0084	: Large display unit
LC-0730B	: Power cable for cigarette light socket
LC-0811A	: CAN output function
LC-0813A	: Carrying case
LC-0815	: INPUT CONNECTOR BOX
LC-0819	: OUTPUT CONNECTOR BOX
LC-0820	: km/ mile switching function
LC-0821	: IMU data output function
LC-0822	: Vertical direction measurement function
LC-0823	: Vector measurement function
LC-0831	: Acceleration/ deceleration test software(ver.3)
LC-0832	: Fuel consumption test software(ver.3)
LC-0833	: Track display software(ver.3)
LC-0850	: External input output unit
LC-0851	: CAN input function
LC-0855	: High precision IMU
LC-0856	: White line detection sensor
LC-0871	: Jerk measurement function
DPU-414	: Digital printer
PW-C 0725	: AC adapter, AC 100 to 240 V
TP-0411	: Thermal paper for printer

■LC-8220 GPS Vector Speedometer



■Features

- High end model of GPS speedometer of Ono Sokki.
- Various vehicle measurements by adding optional software.
- Measurement of over 30 items including forward speed, lateral speed and sideslip angle are allowed in a single unit.
- Analog output up to 16ch selected from acquired data.
- 8ch of analog input, 5ch of pulse input.

■Specifications

Horizontal speed	Measurement range: 0.1 to 500.0 km/h
Horizontal speed	Accuracy: ±0.1 km/h
Horizontal distance	Accuracy: ±0.05%
Forward speed	Measurement range: -500.0 to 500.0 km/h

Lateral speed	Measurement range: -20.0 to 20.0 m/s
Sideslip angle	Measurement range: -25.0 to +25.0°
Yaw angle	Measurement range: -180.0 to 180.0°
XYZ acceleration	Measurement range: -98.0 to 98.0 m/s ²
XYZ angular speed	Measurement range: -150.0 to 150.0°/s
Analog (speed) output	Voltage range : 0 to 10 V/ 0 to 500 km/h Output delay : 5 ms or less
Pulse (speed) output	Resolution : 1, 5, 10 mm/P selectable Output delay : 5 ms or less
Arbitrary analog output	16ch selectable
Analog input	8ch
Pulse input	4ch: TTL pulse 1ch: SIN input
Power supply output	12 ±2VDC (Approx. 4VA or less) x 1ch
External trigger input	Non-voltage contact, voltage contact
External trigger output	Gate output 1ch
General specification	Power supply : 10 to 28 VDC/ 100 to 240 VAC (when AC adapter used: option) Power consumption : Max. 30 VA Operating temperature range: 0 to +50°C Storage temperature range: -10 to +60°C
Accessory	Antenna (LC-0721) x2, Display unit (LC-0084), Remote box (LC-0083), IMU (LC-0087) and each cable, DC power cable, USB cable, PC standard software, Mounting jig for antenna and IMU
Outer dimensions (Weight)	Approx. 269 (W) x 180 (D) x 71 (H) mm (not including protruded section), (Approx. 2.2 kg)

■Option

LC-0730B	: Power cable for cigarette light socket
LC-0811A	: CAN output function
LC-0813A	: Carrying case
LC-0815	: INPUT CONNECTOR BOX
LC-0819	: OUTPUT CONNECTOR BOX
LC-0820	: km/mile switching function
LC-0831	: Acceleration/ deceleration test software (ver.3)
LC-0832	: Fuel consumption test software (ver.3)
LC-0833	: Track display software (ver.3)
LC-0851	: CAN input function
LC-0855	: High precision IMU
LC-0856	: White line detection sensor
LC-0871	: Jerk measurement function
DPU-414	: Digital printer
PW-C 0725	: AC adapter, AC 100 to 240 V
TP-0411	: Thermal paper for printer

■LC-8310 High-Sensitive GPS Speedometer



■Features

- Compact & supporting various kinds of vehicle tests without PC.
- Using GPS enables stable measurement which is not affected by road surface conditions.
- Measurement by original algorithm using GPS, GLONASS and IMU.
- Easily installed even in a limited space such as two-wheel vehicles.
- Data can be stored in an attached USB memory or internal storage memory without connecting with PC.
- Easy to operate with a touch panel.
- Analog 4ch, pulse 1ch, CAN 64ch input as standard.
- Various vehicle measurements can be conducted by adding optional software.
- CAN-OBD II data acquisition function is available. (It conforms to SAEJ1979, but the data can't be acquired when the communication protocol is different,

depending on the model (vehicle model) or engine model.

■Specifications

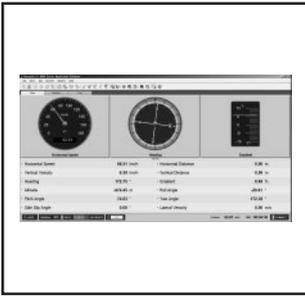
Horizontal speed	Measurement range: 0.1 to 500.0 km/h Accuracy: ±0.2 km/h
Horizontal distance	Accuracy: ±0.20 %
XYZ acceleration	Measurement range: -98.0 to 98.0 m/s ²
XYZ angular speed	Measurement range: -150.0 to 150.0°/s
Output	Selectable from analog or pulse output
Analog	Voltage range: 0 to 10 V/ 0 to 500 km/h Output delay: 10 ms or less
Pulse	Resolution: 1, 5 or 10 mm/P Selectable Output delay: 10 ms or less Level: TTL
Input	Analog 4 channels ± 20 V/16 bit Pulse 1 channel TTL pulse, SIN input
Power supply output	12 ± 2 VDC (approx. 200 mA or less) x 1 ch
External trigger input	Start, stop signals (non-voltage/voltage contacts)
External trigger output	Gate signal or speed judgment output signal
Main unit function	Normal measurement, interval measurement, starting acceleration, passing acceleration, MFDD, ABS, fade recovery, coasting test
Others	Speed interpolation function (pulse, CAN), CAN communication function Printing function by optional printer
General specification	Power supply: 9 to 28 VDC/100 to 240 VAC (AC adapter use: option) Power consumption: up to 12 VA Operating temperature range: 0 to 50 °C Storage temperature range: -10 to 60 °C
Accessory	Antenna, Remote box, Touch panel display unit, Cable for cigarette lighter socket, USB memory, PC software, Mount adapter for display unit, Carrying

Outer dimensions	case Approx. 170 (W) x 120 (D) x 40 (H) mm (not including protruded section)
Weight	Approx. 0.75 kg

■Option

LC-0864	: Tape switch
LC-0866	: General-purpose input output cable
LC-0082	: Power cable
LC-0824	: Unit selection function
LC-0825	: IMU data output
LC-0826	: Vertical direction measurement function
LC-0827	: Hardware acceleration test function
LC-0828	: Hardware brake test function
LC-0829	: Hardware coasting test function
LC-0831	: Acceleration / deceleration test
LC-0832	: Fuel consumption test
LC-0833	: Track display
LC-0854	: CAN output
LC-0860	: CAN cable (2m)
LC-0863	: CAN-OBD2 cable
DPU-414	: Compact thermal printer
PW-C0725-W2-U	: AC adapter for printer *for Japan use
TP-0411	: Thermal paper for printer (28 m per roll, 10 rolls in a pack)

■ Software for GPS Speedometer



■ Operating environment

OS	Microsoft® Windows® 7 [32bit/64bit]/10 [32bit/64bit]
CPU	Intel® Core™ 2 Duo/ 2GHz or more
Memory	512 MB or more
HDD	80 GB or more
Display	Able to display XGA (1024x768) or more
USB	USB 2.0 (High Speed) 1 port or more

■ Features

- Accessory software of the LC-8000 series
- Logging of all data which can be measured with the speedometer such as speed, distance, latitude, longitude, altitude, number of satellites captured are available.
- Data can be transferred to the OS-2000 series Time-series data analysis software made by Ono Sokki by one button operation.
- Display language is selectable from Japanese and English.

■ LC-0831 Acceleration/Deceleration Test Software



■ Overview

This is the software for acceleration/ deceleration tests on a straight line such as starting-acceleration test, passing-acceleration test, brake test, coasting test. Creates a report on the basis of speed, time and distance.

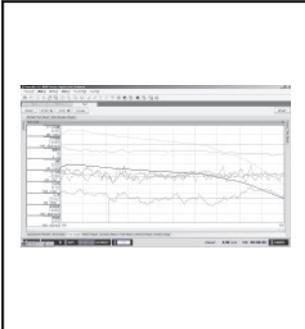
■ Features

- Creates a report based on a speed. Speed step: 5, 10, 20 km/h
- Creates a report based on a distance. Distance step: 5, 10, 20, 25, 50, 100 m
- Creates a report based on a time. Time step: 1, 10, 60 s
- Simultaneous recording at 100 Hz as an original data available
- Display of distance, time, starting speed, maximum speed and minimum speed in the measurement result list
- All functions for the software for GPS speedometer are covered.
- Up to 8 data can be displayed as graphs.
- Start trigger: external input signal or speed change. Measurement is started when the condition is cleared in Ready state.
- Stop trigger: external input signal, speed change, or reaching distance. Measurement is stopped when the condition is cleared in the measurement state.
- Brake test can be selected from MFDD mode or ABS mode
- Stopping speed of the MFDD test can be selected arbitrary.
- Correction calculation of the correction speed in the ABS test can be selected from TRIAS and NCAP.
- Passing time of coasting test can be measured.
- Selected data can be displayed as a list when recording multiple data
- Displays the recorded multiple data as a list, and deletes the failure data in it.
- When recording multiple data, data of forward and backward can be distinguished.
- When recording is made with a distinction between forward and backward in case of performing coasting test by dividing the speed, divided data can be observed as a one coasting data.

■ Operating environment

Same as the software for GPS speedometer

■ LC-0832 Fuel Consumption Test Software



■ Overview

This is the software for level ground fuel consumption test, and pattern fuel consumption test. Input the pulse of DF-210B/DF-2200 On-board Digital Flow Meter to the pulse input unit, and calculate, display, and record the fuel consumption from the obtained data and driving data.

■ Features

- Mode selection is available from level ground fuel consumption test and pattern fuel consumption test
- Creates a report based on a distance in the level ground fuel consumption test mode. Distance step: 5, 10, 20, 25, 50, 100 m
- Creates a report based on a time in the level ground fuel consumption test mode. Time step: 1, 10, 60 s
- Simultaneous recording at 100 Hz as an original data available
- Display of distance, time, starting speed, average speed, fuel flow, fuel consumption in the level ground fuel consumption test mode.
- All functions for the software for GPS speedometer are covered.
- Up to 8 data can be displayed as graphs.
- Start trigger: external input signal or speed change. Measurement is started when the condition is cleared in Ready state.
- Stop trigger: external input signal, speed change, or reaching distance. Measurement is stopped when the condition is cleared in the measurement state.
- Multiple tests can be observed and managed in the level ground fuel consumption test mode.
- Selected data can be displayed as a list when recording multiple data
- Displays the recorded multiple data as a list, and deletes the failure data in it.
- When recording multiple data, data of forward and backward can be distinguished.

■ Operating environment

Same as the software for GPS speedometer

■ LC-0833 Track display software



■ Overview

This is the software for measuring driving path of the vehicle such as minimum turning radius measurement, and drift amount measurement while testing brake. A symbol imitated the vehicle draws a driving path on a screen. You can check the speed and distance with the driving path line.

■ Features

- Minimum turning radius can be measured.
- Brake test and the measurement of drift amount in brake testing can be performed simultaneously when the LC-0831 Acceleration/deceleration test software is installed.
- Drawing of vehicle to be measured is possible on the driving path.
- All functions for the software for GPS speedometer are covered.
- Up to 8 data can be displayed as graphs. (Driving path screen is displayed separately.)
- Start trigger: external input signal or speed change. Measurement is started when the condition is cleared and in Ready state.
- Stop trigger: external input signal, speed change, or reaching distance. Measurement is stopped when the condition is cleared in the measurement state.
- Drawing on a map is optionally available with the OS-0292 Tracking map.
- Checking of speed and distance on the cursor position
- 10 points can be selected on the line of the driving path
- Checking of north direction distance difference between starting point and each marker point is available
- Checking of east direction distance difference between starting point and each marker point is available
- Checking of north direction distance difference between starting point and cursor point is available.
- Checking of east direction distance difference between starting point and cursor point is available.
- Checking of north direction distance difference between each marker point and cursor point is available.
- Checking of east direction distance difference between each marker point and cursor point is available.
- Checking of direct distance between each marker point and cursor point is available.

■ Operating environment

Same as the software for GPS speedometer

Volumetric Type Flow Detector

FP series Flow Detector (FP-5000 series made to order)



Standard type



Low pressure loss type



Compact/Environment resistant type

Features

Standard type

- Achieves pulse resolution up to 20 times that of the existing models
- Various detector lineup supports wide flow range from motorcycles to large vehicles such as buses, trucks and ships
- A filter, a flow detector, and a temperature/pressure sensor unit, fuel density meter can be connected together, and achieved space saving.
- Applicable to alcohol mixed fuel as standard

Low pressure loss type

- It is driven by a motor so that the free piston inserted into the detector's bypass tube is located at the neutral position.
- High accuracy within $\pm 0.2\%$ of reading over the entire flow measurement range optimized by PID and feedforward control

Compact/Environment resistant type

- Small and light weight, ideal for on-board measurement
- Super wide range ability: 1:2000

Specifications

Standard type

		Small flow rate type FP-5130 series	Medium flow rate type FP-5140 series	Large flow rate type FP-5150 series
Usable liquid		Gasoline, light oil, kerosene, alcohol biofuel and general	petroleum-based hydraulic oi (*1)	
Measurement range	Flow rate	FP-5131/5132: 0.05 to 60 L/h FP-5133/5134: 0.05 to 108 L/h (*2)	FP-5141/5142: 0.3 to 300 L/h FP-5143/5144: 0.3 to 600 L/h	FP-5151/5152: 1 to 1440 L/h
	Accuracy	Flow rate Within ± 0.0009 L/h (0.05 to 0.18 L/h) Within $\pm 0.5\%$ of reading (0.18 to 108 L/h)	Within $\pm 0.2\%$ of reading	Within $\pm 0.5\%$ of reading
Pressure loss		8 kPa or less (at 40 L/h <gasoline>)	2 kPa or less (at 60 L/h <gasoline>)	7.5 kPa or less (at 500 L/h <light oil>)
Operating temperature	Liquid	0 to +65 °C	0 to +65 °C	0 to +65 °C
	Ambient	0 to +65 °C	0 to +65 °C	0 to +65 °C
Resolution		FP-5131/5133: 0.001 mL/Pulse FP-5132/5134: 0.0005 mL/Pulse	FP-5141/5143: 0.01 mL/Pulse FP-5142/5144: 0.005 mL/Pulse	FP-5151: 0.1 mL/Pulse FP-5152: 0.05 mL/Pulse
Port	Size	IN: Rc3/8 (*3) OUT: Rc3/8 (*3)	IN: Rc3/8 (*3) OUT: Rc3/8 (*3)	IN: Rc1/2 OUT: Rc1/2
	Maximum operating pressure	1 MPa	1 MPa	3.4 MPa
Weight		Approx. 3.5 kg	Approx. 5.0 kg	Approx. 13.5 kg
● Temperature/ pressure sensor unit		EH-0830		EH-0850
Measurement range	Temperature	0 to +100 °C		
	Pressure	0 to 1 Mpa		
Accuracy	Temperature	PT100 Ω class A		
	Pressure	$\pm 0.25\%$ F.S		
● Filter/ Element				
Alcohol applicable	Filter	EH-1130		EH-1150
	Element	EH-0031A		EH-0051A

*1 Please contact to your nearest distributor.

*2 Made-to order for the measurement range from 0.02 L/h. Please contact to your nearest distributor.

*3 Option joint (SAE joint) is available. Please contact to your nearest distributor.

Low pressure loss type

		FP-213S	FP-2140S
Usable liquid		Gasoline, light oil, kerosene and general petroleum-based hydraulic oi (option: alcohol biofuel) (*1)	
Measurement range		0.06 to 60 L/h	0.05 to 200 L/h
Accuracy		Within $\pm 0.5\%$ of reading (over the entire 0.06 to 60 L/h range)	Within $\pm 0.2\%$ of reading
Pressure loss		0.01 kPa or less (excluding filter pressure loss)	0.01 kPa or less (excluding filter pressure loss)
Operating temperature	Liquid	0 to +60 °C	0 to +60 °C
	Ambient	0 to +60 °C	0 to +60 °C
Port	Size	IN: Rc1/4 OUT: Rc1/8	IN: Rc3/8 OUT: Rc3/8

*1 Please contact to your nearest distributor.

Compact/Environment resistant type

		FP-413S
Usable liquid		Gasoline, light oil, kerosene, alcohol biofuel and general petroleum-based hydraulic oi (*1)
Measurement range	Flow rate	0.1 to 200 L/h
	Temperature	-30 ~ +100 °C
Accuracy	Flow rate	Within $\pm 0.2\%$ of reading
	Temperature	PT100 Ω class A
Pressure loss		4 kPa or less (at 60 L/h <gasoline>)
Operating temperature	Liquid	-30 to +100 °C
	Ambient	-30 to +100 °C (*2)
Resolution		0.01 mL/Pulse
Port	Size	IN: Rc1/4 (*3) OUT: Rc1/4 (*3)

*1 Please contact to your nearest distributor.

*2 For FP-413S, signal processing part: 0 to 70 °C

*3 Option joint (SAE joint) is available. Please contact to your nearest distributor.

Digital Flow Meter

FM-3100/ DF-2200 Digital Flow Meter/ On-Board Digital Flow Meter



FM-3100



DF-2200

Features

Digital Flow Meter FM-3100

- High-speed response at 1 ms (analog/CAN)
- Applicable to FP series Volumetric Flow Detectors, FX series Mass-Burette Flow Detector and FZ series Coriolis type Mass flow Meter.
- Equipped with the density correction function, various calculation functions

On-Board Digital Flow Meter DF-2200

- Compact body optimum for on-board testing
- Wide power input range from 12 to 24 VDC corresponding to various test vehicles
- Various options such as AC adapter, RS-232C, remote box

Specifications

	Digital Flow Meter FM-3100	On-Board Digital Flow Meter DF-2200
Applicable detector	FP series/ FD-5110/ FX series/ FZ series * Please select the compatible module (sold separately) with each detectors.	FP-4135/MF-3200/FP-2135/2140S/FP-5131, 5133/FP-5141, 5143
Power source	AC100 V to 240 V \pm 10% 80 VA or less (when connected to the FP-2140S and the FM-3100)	DC10 to 28 V, 28 VA or less
Operating temperature range	0 to +50 °C	0 to +50 °C *Operating temperature range of AC adapter is 0 to +40°C.
Operating humidity range	10 to 85 % (without condensation)	5 to 80 %
Storage temperature range	-10 to +60 °C	-10 to +60 °C
Storage humidity range	10 to 85 % (without condensation)	5 to 85 %
Outer dimension	240(W) \times 99(H) \times 297(D) mm *The projection is not included.	170(W) \times 49(H) \times 120(D) mm *The projection is not included.
Weight	Approx. 3 kg	Approx. 800g
Conforming standard	CE marking (FM-0311) LVD Directive 2014/35/EU Standard EN61010-1 EMC Directive 2014/30/EU Standard EN61326-1 Class A Group1 RoHS Directive 2011/65/EU Standard EN50581	LVD Directive 2014/35/EU Standard EN61010-1 (with AC adapter) EMC Directive 2014/30/EU Standard EN61326-1 RoHS Directive 2011/65/EU Standard EN50581
Measurement items	Time/ temperature/ pressure Module for FP/FD: instantaneous flow rate, instantaneous density Module for FZ: instantaneous flow rate, instantaneous density Module for FX: instantaneous flow rate	Instantaneous flow rate/time / temperature/ pressure/ integrating flow rate
Accessory	AC power cable, FM-0012 analog output conversion adapter (D-Sub to BNC 0.5m), instruction manual	DC power cable with clamp

Coriolis type Flow Meter

FZ-2200A Massflow Meter (Made to order)



Specifications

Measurement item	Flow rate, temperature, density
Measureable liquid	Gasoline, light oil, kerosene, water, general kerosene type hydraulic fluid (alcohol: option)*
Measurement range	1 to 1090 kg/h
Flow measurement accuracy	\pm 0.1% of reading value at 27 to 1090 kg/h \pm (0.027 kg/h/ flow rate) \times 100% Within reading value at 1 to 27 kg/h
Density measurement accuracy	Within \pm 0.1% of reading value/at 0.76g/cm ³
Pressure loss	Approx. 100 kPa/F.S. flow rate (when using gasoline)
Withstand pressure	10 MPa
Operating temperature range	0 to +40°C
Applicable display unit	FM-3100(FM-0321 FZ module)
Weight	Approx. 9 kg

* Gaseous fuels such as CNG, LPG are also usable (option). Please contact to your nearest distributor.

Features

- Capable of continuous measurement without influence of temperature, pressure or density.
- High measurement accuracy, up to 40:1 at \pm 0.1 % of reading
- Available to measure density

Fuel Density Meter

FD-5110 Fuel Density Meter



Specifications

Measurement items	Density, temperature
Usable liquid	Gasoline/ kerosene/ A-type heavy oil/ engine oil/ common petroleum hydraulic oil/ methanol/ ethanol/ mixture of alcohol and gasoline/ brake oil, etc.
Measurement range	0.5000 to 2.0000 g/cm ³
Minimum resolution	0.0001 g/cm ³
Accuracy Density	\pm 0.0010 g/cm ³ (Light oil, Cleansol HS at 20 °C)
Temperature	\pm 0.1 °C
Operating temperature range	+10 to +65 °C (liquid temperature) -10 to +50 °C (ambient temperature)
Dimension	60 \times 60 \times 176 mm
Weight	Approx. 1.5 kg
Power	DC5 V 60 mA (supplied by FM-3100)
Conforming standard	EMC Directive 2014/30/EU Standard EN61326-1 Class A Group1 RoHS Directive 2011/65/EU Standard EN50581
Inlet/outlet port	Rc 3/8
Applicable flow meter	FM-3100 (FM-0311 FP module)

Features

- Achieves low pressure loss and high accuracy in small flow rate
- Compact and space-saving design.
- Combining with the the FP series flow detectors, the FM-3100 enables the accurate mass flow measurement

On-Board Flow Detector

MF-3200 On-Board Flow Detector (Made to order)



Specifications

Measurement item	Flow rate, temperature, pressure
Detection method	Flow rate : Volumetric (piston method) Pressure : Semiconductor strain gauge method Temperature: Sheath type resistance temperature detector (PT100)
Measureable liquid	Light oil
Measurement range	Flow rate : 0.3 to 120 L/h Pressure : 0 to 980 kPa Temperature: 0 to +99.9 °C
Measurement accuracy	Flow rate : \pm 0.2% reading value or less Pressure : \pm 0.5% F.S. Temperature: Pt 100Ω Class B
Operating temperature range	0 to +65°C
Weight	Approx. 15 kg
Applicable display unit	FM-3100 (FM-0331 Module for FP/FD) DF-2200

*MF-3200 cannot be used with in-tank fuel pump vehicle.

Features

- Compact and light weight
- A fuel cooling function is provided as standard
- Temperature, pressure sensor is provided as standard
- Capable of compensation for errors due to pulsating flow or backflow by means of rotating direction judging function.

Injection Amount/ Injection Ratio Meter

■FJ-8000 Series Multi-stage Injection Analyzer (made to order)



■Overview

The multi-stage injection system is brought to attention as an effective method for exhaust gas regulation of diesel engines. FJ-8000 series measures injection amount and injection rate with high accuracy even if it is very small amount of injection.

■Features

- Injection measurement in an environment near to an actual vehicle measurement
- 5 types of real-time data display
- Various methods to analyze the sampling data.
- Injection timing analysis by high accuracy and high speed sampling (200 kHz)
- Wide variety of options to meet the customer needs
- Applicable to mass injection measurement

■Applications

- Measurement of fuel injection amount and injection rate of multi-stage fuel injection system for diesel engine.
- Measurement of fuel injection amount and injection rate of direct fuel injection system for gasoline engine.
- Measurement of multi-stage fuel injection (multiple times injection)

■Measurement items

Fuel injection amount (amount of each stage, total injection amount), fuel injection rate, number of injections, pump rotation, temperature, and back pressure

Combustion Analysis System

■DS-3000 series Combustion Analysis Software



■Features

- Supports multiple types of fuels (liquid fuel, gas fuel)
- Real-time measurement & calculation
- Trend display in real-time
- Supports start/ stop combustion testing
- Enable measurement without an encoder

■Operating environment

- CPU Intel® Core™ i5 or more
 Memory 4 GB or more
 Interface USB 3.0 interface
 (USB 2.0 can also be used, however the speed of USB 3.0 is faster than USB 2.0.)
 OS Microsoft® Windows® 7
 Microsoft® Windows® 10 Pro
 Ultimate/Professional
 Microsoft® Windows® XP
 Professional (SP2 or later)

■Specifications

- Number of input pulses 180/360/720/1800/3600 P/R
 Angle sampling resolution 0.05/0.1/0.25/0.5/1.0°
 Number of rotations range 0.05° :10 to 8,000 r/min/ 0.1° :10 to 16,000 r/min/ 0.25/0.5/1.0° :10 to 25,000 r/min
 Specification setting Environmental specification, engine specification, fuel specification (composition weight ratio, element ratio)
 All cylinder TDC auto correction function
 Test mode Manual, auto storage, starting test

Angle resolution	Number of max. cycle	Recording time (1,800 r/min average)
0.05°	2,000	Approx. 2 min
0.1°	4,000	Approx. 5 min
0.25°	10,000	Approx. 10 min
0.5°	20,000	Approx. 20 min
1.0°	20,000	Approx. 20 min

*The above is the value of 4ch measurement. The value will be changed depending on the content of calculation processing or the number of channels.

Automotive Test System

■FAMS*-R5 Engine Testing System (made to order)



*FAMS: Flexible Automatic Measuring System

■Features

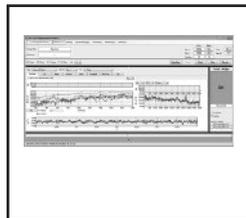
- From dynamometer to data processing, our project team gives consistent support.
- Selectable from various types of actuator developed by Ono Sokki, according to the purpose of the test.
- Since each function is unitized, wide range system from simple system to advanced automatic drive system is easily constructed.
- Wide variety of related equipment or options are available including high performance detector and computer system.

■Overview

The basic system consists of dynamometer which is necessary for giving load condition to the engine, throttle controller and minimum required measuring instrument. By adding a variety of related equipment such as automatic drive setting device, various component controllers, measurement system and data processing system, it is possible to build a test system according to your purpose.

Sound and Vibration Measurement for Automotive

■GN-1100 series Noise Testing Software



■Overview

GN-1100 was developed for tracking analysis of sound & vibration of a rotating object. It can perform pass-fail judgment and tracking analysis of the each three input signal at the same time (Rev.1, Rev.2, and calculation revolution signal based on Rev.1 and Rev.2). This software is ideal to use in total inspections including vibration analysis of CVT, and turbines operated in parallel.

■Features

- Tracking analysis and pass-fail judgment of the each three input at the same time (Rev.1, Rev.2, and calculation revolution).
- Capable of dent judgment during tracking measurement of acceleration/deceleration
- Up to 20 steps of measurement pattern setting
- External control by LAN, DIO, RS-232C

■Specifications

- Number of max. ch 32ch
 Analysis frequency range 2 to 8ch: 40 kHz/ 10 to 16ch: 20 kHz/ 18 to 32ch: 10 kHz
 Number of analysis tracks 16 tracks + OA
 Frequency analysis FFT 12,800 lines/ bundled of octave
 Max. analysis order 1600th order
 Rev. reference Revolution1 / Revolution2 / calculation revolution of Rev.1 and Rev.2
 Average Exponential average/moving average
 Composite calculation Sound: max.1ch Vibration: max.10ch

■System configuration

- DS-3200 series
- PC (Microsoft® Windows® 7 (64bit)/ 10 Pro (64 bit)
- MI series microphone/ NP series accelerometer

Crank Angle Measurement Equipment

■CP-5730 Crank Angle Detector



■Specifications

Applicable amplifier	CA-6000/ A/ B
Output signal	Z, A
Number of output pulses	1 P/R (Z), 720 P/R (A)
Number of rotations range	0 to 15,000 r/min
Vibration resistance	Radial direction; 500 m/s ² Thrust direction: 500 m/s ²
Operating temperature range	0 to +120 °C
Cable	Optical fiber cable 5 m (directly attached)
Rotation stop	CP-0610/ 0600A
Outer dimensions	Outside diameter: 57 mm Thickness : 38 mm
Weight	Approx. 750 g (including optical fiber cable)

■Features

- High accuracy crank angle measurement by using with the CA-6000 crank angle amplifier. (Note: adjustment in our factory is required for CA-6000/A)
- Suitable for each engine performance test such as combustion analysis
- Optical fiber offering high resistance to noise

■CA-6000B Crank Angle Amplifier



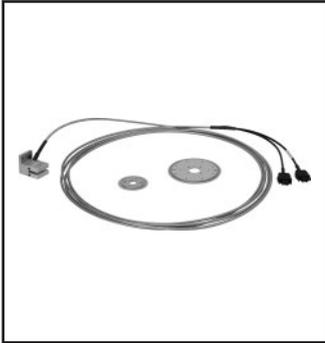
■Specifications

Applicable detector	CP-5730/5720A/5110/5110A/5110B
Response frequency	Max. 300 kHz
Output signal voltage	Hi; +4.5 V or more Lo; +0.2 V or less
Power supply	12 to 24 VDC (8VA)
Operating temperature range	0 to + 40°C
Outer dimensions	162 (W) x 56 (H) x 121 (D) mm (not including protruded section)
Weight	Approx. 1 kg
AC power adapter	STD-1533PA (option)

■Features

- Suitable for each engine performance test such as combustion analysis
- Input the signal from crank angle detector and output the angle signal (A-phase) and 1 P/R signal (Z-phase)
- Detection sensitivity can be adjusted with the external volume.

■CP-5110B Fiber Optic Crank Angle Detector



■System configuration

Photo emitter and receptor	CP-5110B
Slit disk	CP-5120 (1 P/R, 360 P/R) CP-5130 (1 P/R, 720 P/R)

■Features

- High accuracy crank angle measurement by using with the CA-6000 crank angle amplifier
- No bearings, therefore low rotation load
- Small protrusion at shaft end, space saving installation
- Optical fiber offering high resistance to noise
- Optional fiber cable enables extension up to 5m (IX-041) or 10m (IX-042)

■Specifications

Applicable amplifier	CA-6000/A/B
Number of output pulses	1 P/R (Z), 360/ 180 P/R (A) (when using CP-5120) 1 P/R (Z), 720/ 360 P/R (A) (when using CP-5130)
Rotation speed range	0 to 20,000 r/min
Resistance acceleration	490 m/s ²
Operating temperature range	0 to +100°C
Cable	Optical fiber cable 5 m directly attached (with stainless flexible tube)
Outer dimensions/ Weight	CP-5110B: 30(W)x 42.5(H)x 35(D) mm/ approx. 270g CP-5120: φ 52, t2.2 mm/ approx. 20g CP-5130: φ 94, t2.2 mm/ approx. 80g

■PP-932/PA-500A U-shaped Crank Angle Detection System (for 360 P/R)



■System configuration

Photo emitter and receptor	PP-932
Amplifier	PA-500A
Slit disk	PP-010A

■Features

- Suitable for various engine performance tests such as combustion analysis
- Use as a timing signal for collecting combustion pressure data of cylinder at the combustion analysis, and an angle signal for ignition timing measurement or controlling.
- Photo emitter and photo receptor combined type
- Easy installation just to attach to the engine crank shaft end.
- Exclusive Amplifier for PP-932/933 (PA-500A)
- Worldwide power supply (PA-500A)
- Including monitor output of sensor signal

■Specifications

Number of output pulses	360 P/R (A) & 1 P/R (Z)
Response frequency	DC to 80 kHz
Rotation speed range	0 to 6,000 r/min
Output signal voltage	Hi; +4.5 V or more, Lo; +0.2 V or less
Operating temperature range	Sensor part; 0 to +65°C, Amplifier part; 0 to +40°C
Power supply	100 to 240 VAC, 50/60 Hz
PP-010A specifications	
Material	Stainless
Diameter	φ 200 mm
Resistant acceleration	Approx. 200 m/s ²
Outer dimensions / Weight	PP-932 ; 30(W) x 55(H) x 47(D) mm/ Approx. 250 g PA-500A; 200 (W) x 100 (H) x 135 (D) mm (not including protruded section)/ Approx. 1.2 kg

■PP-933/PA-500A U-shaped Crank Angle Detection System (for 720 P/R)



■System configuration

Photo emitter and receptor	PP-933
Amplifier	PA-500A
Slit disk	PP-011B

■Features

- Suitable for various engine performance tests such as combustion analysis
- Use as a timing signal for collecting combustion pressure data of cylinder at the combustion analysis, and an angle signal for ignition timing measurement or controlling.
- Easy installation just to attach to the engine crank shaft end.
- Photo emitter and photo receptor combined type
- Exclusive Amplifier for PP-932/933 (PA-500A)
- Worldwide power supply (PA-500A)
- Including monitor output of sensor signal

■Specifications

Number of output pulses	720 P/R (A), 1 P/R (Z)
Response frequency	DC to 80 kHz
Rotation speed range	0 to 6,000 r/min
Output signal voltage	Hi; +4.5 V or more, Lo; +0.2 V or less
Operating temperature range	Sensor part ; 0 to +65°C, Amplifier part; 0 to +40°C
Power supply	100 to 240 VAC, 50/60 Hz
PP-011B specifications	
Material	Stainless
Diameter	φ 200 mm
Resistant acceleration	Approx. 200 m/s ²
Outer dimensions / Weight	PP-933 ; 30(W) x 55(H) x 47(D) mm/ Approx. 250 g PA-500A; 200 (W) x 100 (H) x 135 (D) mm (not including protruded section)/ Approx. 1.2 kg

JCSS (Japan Calibration Service System)

Ono Sokki provides reliable and high level calibration as a measuring instrument manufacturer based on the skills and know-how which has been acquired through many years of practice to meet ISO 9001 Quality System and the general requirements for the competence of calibration. ISO/IEC 17025. Ono Sokki is registered, accredited by NITE (National Institute of Technology and Evaluation) under 7 scopes based on the JCSS of calibration laboratory accreditation system enforced by Measurement Law, article 143.

*Please refer to our HP about the detail of JCSS system
https://www.onosokki.co.jp/HP-WK/c_support/calibration.htm
*ilac: International Laboratory Accreditation Cooperation



Ono Sokki Quality Assurance group is accredited as Accredited Calibration Laboratories to meet MRA. JCSS 0170 is the accreditation number.

JCSS system applicable products

Acoustics/Ultrasound (Dec 2005)

- LA series Sound level meter
- MI series Measurement microphone
- SC series Sound calibrator

Acceleration (Dec 2012)

- NP series Accelerometer detector

Torque (range: 1 to 5,000 N·m, Oct 2018)

- Torque detector

Fluid flow (Nov 2014)

- Fuel flow meter (diesel, industrial gasoline)

Electricity (Direct current·Low frequency) (Jun 2015)

- CF/DS series FFT Analyzer

Speed (Mar 2019)

- LC-8000 series Speedometer

Time & Frequency & Rotational speed

(calibration range: 0.5 to 100,000 r/min, Dec 2020)

- HT series
- EC series
- Detectors LG, FS+FG series
- Display unit TM, CT, FV series

* in combination with detectors and display units

Ono Sokki can issue the calibration certificates with ilac, MRA marc.

*Please note that some products are not applicable.



Quality Assurance

Establishment of Quality Assurance

In line with our policy on quality, which aims to "Continue to provide satisfaction and security from the customer's perspective", Ono Sokki has been establishing quality control activities on a corporate-wide scale. As a result of these activities, Technical Center/head office have been certified as conforming to the ISO 9001 Quality System.

Ono Sokki not only aims to maintain this certification, but will also strive to improve and enhance its quality assurance system, based on ISO 9001 Quality System in order to continually deliver better quality products to customers. As a result of our achievements, Ono Sokki has been named Japan's first official supplier of sound level meter as Accredited Calibration Laboratory since September 1997.

Traceability

Ono Sokki has established a unique in-house traceability system with the verification instruments and calibration instruments/devices that have been approved and calibrated by the national metrology standards institutions such as NMIJ, NPL and NIST. To maintain the traceability system, we're regularly doing calibration in accordance with the regulations for the measurement instruments based on ISO 9001.

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

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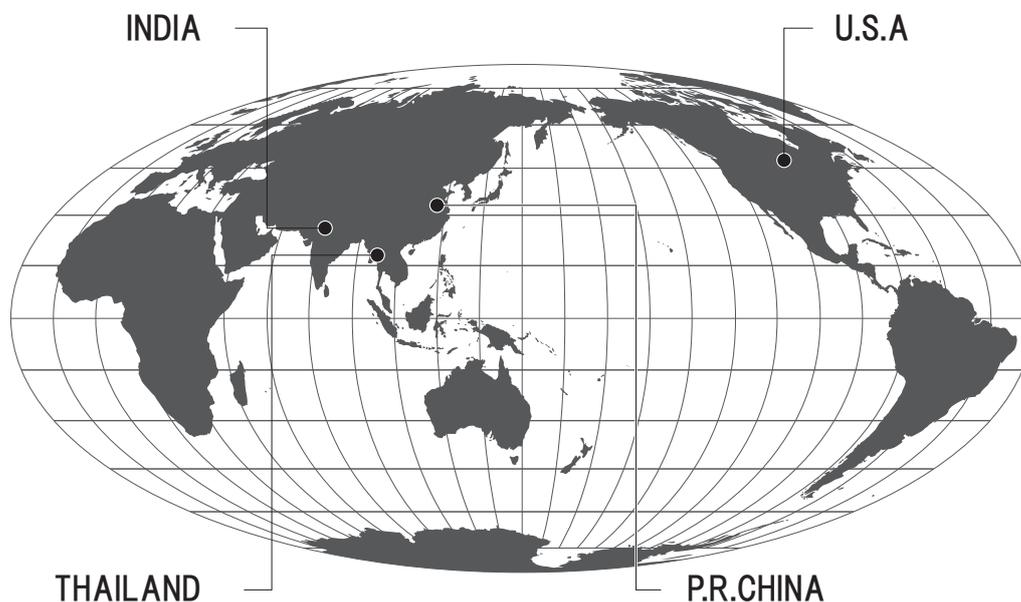
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