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**Motor Torque Measurement**

**MT series Torque Detector for TS-8700**

**Specifications**
- **Type**: MH-85F2, MH-87F2, MH-88F2, MH-89F2
- **Braking capability**: Full scale (X2 stage and base pair)
- **Maximum torque**: 10 N-m
- **Resolution**: 0.1 N-m
- **Accuracy**: ±0.1% of full scale
- **Operating temperature range**: -10°C to 50°C
- **Storage temperature range**: -40°C to 80°C
- **Weight**: 7 kg

**Features**
- **High performance**: Long life, high accuracy, and high灵敏度
- **Performance parameters**: High sensitivity and wide range of measurement

**Motor Torque Measurement**

**TS-8700 Torque Station Pro**

**Specifications**
- **Application range**: DC motors, AC motor (including stepping motor)
- **Input**: Torque, rotation speed, voltage, signal input data, temperature, power meter, digital signal
- **Response time**: 0.1 ms
- **Accuracy**: ±0.1% of full scale
- **Operating temperature range**: -10°C to 50°C
- **Storage temperature range**: -40°C to 80°C

**Features**
- **High performance**: Long life, high accuracy, and high sensitivity
- **Performance parameters**: High sensitivity and wide range of measurement

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**Rotary Encoder**

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

**Specifications**
- **Type**: Bottom-mount type
- **Output**: 2-phase square waveform
- **Output voltage**: 5 V peak-to-peak
- **Output current**: 150 mA
- **Accuracy**: ±0.1% of full scale
- **Weight**: 98 g
- **Encoders**: 100, 180, 250, 350, 500, 1000, 2000, 3000, 4000, 5000, 10000

**Features**
- **Excellent resistance to shock and load of shaft**: 1000 g (7-kgf)
- **High reliability**: Wide range of output pulse types
- **Full driver output**: Can be selected for long-distance transmission

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**SP-405S Ultra-compact Type (Some output pulses are made to order)**

**Features**
- **Economy type response to OBM**: 10 μm (7%)
- **Light weight**: 10 μm (7%)
- **Two-phase square wave and zero mark signal output**: 10 types of output pulses

**Specifications**
- **Output**: 2-phase square wave + zero mark
- **Output voltage**: 5 V peak-to-peak
- **Output current**: 150 mA
- **Accuracy**: ±0.1% of full scale

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**RP-432S Series Compact Multi-use Type**

**Features**
- **Compact and economical design for general purpose**
- **Input/Output functions**: 10 kHz input, 10 kHz output, 50 kHz output
- **Specifications**: 10 kHz square wave and zero mark signal

**Features**
- **Compact and economical design for general purpose**
- **Input/Output functions**: 10 kHz input, 10 kHz output, 50 kHz output
- **Specifications**: 10 kHz square wave and zero mark signal
**Rotary Encoder Related Product**

**PA-330Z Isolated Pulse Transmitter**
- Square wave (Duty: approx. 50%) 470Ω
- H1: 0 to +12.5V
- Lo: 0 to +4V
- Approx. 2 µs between input and output

**RV-3150 Reversible Counter**
- Single phase or 90° phase difference rectangular wave
- Voltage signal (H): +1 to +10V, (L): 0 to +1V
- Type of input signal: Rect, gate, offset, key protect
- Input frequency range: 5 to 100kHz
- DC to 100kHz
- 10-25VDC, 12 to 6VDC (selectable)

**Features**
- Receives the square wave signals from the rotary encoder with photo coupler, and converts to low impedance signals suitable for long distance transmission after isolation amplifying, and wave-shaping by the light.
- Provides 12VDC power to the rotary encoder.

**Specifications**
- Input waveform: Square wave (Duty: approx. 50%)
- Input resistance: 470Ω
- Input voltage: H1: 0 to +12.5V, Lo: 0 to +4V
- Response frequency: Approx. 2 µs between input and output
- Output voltage: H1: +10V (50Ω load), Lo: +5V or less (50Ω load)
- Collector resistance: 330Ω
- Power requirement: 100VAC, 12VA
- Operating temperature range: -5 to +40°C
- Weight: Approx. 4 kg
- Option: Open collector output
- Change of power-supply voltage: Change of input/output resistance

**Digital Linear Gauge Sensor**

**BS-1210/1310 Baby Gauge Sensor**
- Ultra compact design
- Conforms to protection class IP66
- High durability, high vibration resistance, high shock resistance

**BS-77110A/7710A Pen-figured Type**
- 8 mm slim body
- Conforms to protection class IP67
- Types provided: standard stem, nut-mounted stem

**Specifications**
- Resolution: 0.1 µm
- Conforms to protection class IP66 (vibration resistance structure, dust-proof, splash-proof and oil-proof)
- Achieve longer bearing life and high environment resistance

**GS-3813/3830B High Resolution Type**
- Resolution: 0.1 µm type
- Conforms to protection class IP66 (vibration resistance structure, dust-proof, splash-proof and oil-proof)
- Achieve longer bearing life and high environment resistance

**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
- Suitable for mounting on automatic machines

**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 IP66)
- *Cut or modified signal cable connector is not applicable to CE marking.

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

**GS-4713A/4730A/4813A/4830A Tough Gauge 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 machines

**Specifications**
- Measurement range: IP64
- Measurement range: 13 to 30 mm
- Non-linear error: ±0.019%
- Non-linear error: ±0.003%
### Digital Linear Gauge Related Product

**DG-0010 2ch Digital Linear Gauge Converter**

- **Specifications**
  - **Amplification format**
  - **Signal waveform**
  - **Input level**
  - **Input impedance**
  - **Input frequency range**
  - **Input connector**
  - **Direct connection to PLC**

- **Features**
  - Compact signal converter
  - Direct output
  - Specifications

- **Dimensions**
  - **Size**
  - **Weight**

**DG-0010 Digital Linear Conversion Box**

- **Specifications**
  - **Input signal**
  - **Output voltage**
  - **Output current**
  - **Operating temperature range**
  - **Power supply**

- **Features**
  - 2 channels select by switcher knob
  - Convension accuracy is 0.5% value
  - Conversion speed is 40 μs

**DA-4130 D/A Converter**

- **Specifications**
  - **Input signal**
  - **Output voltage**
  - **Output current**
  - **Operating temperature range**
  - **Power supply**

- **Features**
  - 1 channel
  - Convension accuracy is 0.1% value
  - Conversion speed is 0.2 μs

**RQ-2110 Digital Printer**

- **Specifications**
  - **Input signal**
  - **Output signal**
  - **Operating temperature range**
  - **Power consumption**

- **Features**
  - 3 channels
  - Convension accuracy is 0.1% value
  - Conversion speed is 0.2 μs

### Digital Gauge Counter

**DG-5100 0.1 μm Resolution Type**

- **Specifications**
  - **Display method**
  - **Input signal**
  - **External control input**
  - **Peak hold function**

- **Features**
  - 2-channel analog output
  - Open collector output

**DG-4320 Open Collector BCD Type**

- **Specifications**
  - **Input signal**
  - **External control input**
  - **Peak hold function**

- **Features**
  - 2-channel analog output
  - Open collector output

**DG-4340 Color Comparator Display Type**

- **Specifications**
  - **Display method**
  - **Applicable sensor**
  - **Input signal**

- **Features**
  - 2-channel analog output
  - Open collector output

**DG-2310 2ch with Addition/Subtraction Function**

- **Specifications**
  - **Input signal**
  - **Input control input**

- **Features**
  - 2-channel analog output
  - Open collector output

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**GS-5050A/S100A/S051A/S101A Long Stroke Type**

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

### Digital Measurement Measurement

**Plant Measurement**

**Digital Linear Gauge Related Product**

**Digital Gauge Counter**

**Plant Measurement**

**Digital Measurement Measurement**

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**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 laser Doppler method. Non-contact detection with high sensitivity and high response. This model has been extended to measure far (Laser safety class: Class 2). The LV-7000 series enables evaluation of product users and helps to understand the phenomena more accurately. Non-contact and accurate laser detection is useful for improving parts quality, and useful for reducing loss of material.

  - **Specifications**
    - **LV-7002 Laser Doppler Surface Velocity Sensor**
      - Detection method: Laser Doppler system, back-scattering differential type
      - Laser beam spot size: 2mm x 1mm
      - Center of detection length: 200mm from the bottom surface of the sensor
      - Detection range (depth): 4mm, detection error ±0.2 (of reading) or ±0.3mm
      - Weight: Approx. 710g (not including cable / option)

  - **Features**
    - Non-contact and no-load detection with laser light tightly gives affect on a measurement target, such as slippage, sl kur, deformation, etc.
    - Laser Safety Class 2, no need of safety requirement for detection such as laser projection glasses, laser control/monitor.
    - Indicator on a compact sensor allows you easily to check and make positioning the target and operating condition at the same time.
    - High speed response of 800m/s. Steep start and step down from zero speed are able to be detected.
    - Selectable from speed output, phase output differential and RS-232C.
    - By installing the option, speed and acceleration twist the standard speed can be detected.

**Roller Encoder**

- **RP-7400 series Roller Encoder (low and middle speed) / RV-3150 Reversible Counter**

  - **Specifications**
    - Standard: 200mm (Allow 0.2 to 0.2°C at 20°C)
    - Speed: 120P/R, 1200P/R
    - Measurement: 120P/R, 0.01mm
    - Output waveform: 2-phase square wave
    - Output format: Open collector output (Option)
    - Additional output: 12VDC:±5% (100mA or less)
    - Approx. 400g

  - **Features**
    - Selectable pulse number: 120, 240, 720, 1440, 2880, 5760
    - Tri-color pulse output (standard)
    - Emitter output (option)
    - Open collector output (option)

**Contact Type Length Measuring Device**

- **VC-3150 Reversable Counter**

  - **Specifications**
    - Sensor input signal: Single phase or 90° phase difference rectangular wave
    - Voltage range: +4V to +6V (min. 8.0V to 10V)
    - Line receiver (compliant to RS-422)
    - Input frequency range: DC to 100kHz
    - Power supply voltage: ±5VDC, ±12VDC (selectable)
    - Internal code signal: Type of input signal:
      - Offset: Factory, offset, key protect
    - Format of input signal: Voltage input (V), +4 to +8.15V, DC to 100kHz, ±5VDC, ±12VDC (selectable)
    - External output: Comparator (4 kinds of comparator setting values can be stored as conditions), analog, BCD, RS-232C

  - **Features**
    - Multiplexing ratio: 12:1
    - Decimation: 1:1 (Default: 8:1)
    - Counting direction: 1:1, 2:1, 4:1 (Default: 8:1)
    - Additional output: (Option)
    - Power supply: 20VA Power supply: 12VDC
    - Approx. 1.3 kg

**Electronic Capacitive-type Non-contact Thickness / Displacement Meter**

- **CL-5610**

  - **Features**
    - Minimum display resolution: 0.02 µm (When using VE-2011 / 5011 / 5012 and sensor CL-0202 High-resolution calculation function option)
    - Maximum measurement gap: ±8 mm (When using VE-82010 / 8201 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-5610 series) - (Optional) is used)
    - Thickness of the sensor such as glass or plastic can be measured (CL-0300 Insulator measurement function (Option) used)
    - Stable measurement even in the grounding condition of the measurement target is high (CL-5610S high impedance grounding mode function (option) is used)

  - **Specifications (CL series Non-contact Thickness Meter)**
    - Measuring range: 0 to 8000µm
    - Accuracy: ±0.5% ±0.1µm (or 1µm)
    - Sensor: Built-in 4-digit LED display (up to 3 digits, upper and lower limit value, data hold, max. display)
    - Display: 2 lines, 7 digits (on upper and lower limit value, max. display, data hold, battery level, key lock)
    - Measurement temperature: 0°C to 40°C
    - Dimensions: 131 x 50 x 123 mm
    - Weight: 350g

- **VT-5210/5220/5710/5720**

  - **Specifications**
    - Measuring range: wide range of 20 µm to ±8000µm
    - Measuring points: 10 points
    - Frequency: 10kHz
    - Resolution: 2µm
    - Weight: 240g

**Measurement Target**

- **VE Series Electrostatic capacity type converter**

  - **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 VE series (non-contact displacement meter) or CL series (non-contact thickness meter), it demonstrates its best performance for thickness/shape measurement target of objects, and for vibration measurement of rotating shafts or rotating surface (turbine, electric motors, compressors, machine tools etc.)
    - Cable for VE series (1.5m)
    - Dual connection cable for connector type sensor (VE-1330: straight connection for both sides)
    - VE-1321: L-shape – straight connector

  - **Specifications**
    - Measuring range (unit): 0 - 2000µm
    - Output: 0 to 5VDC

**Non-contact Displacement Meter (made to order)**

- **VT-5210**

  - **Features**
    - Measuring range: 0 - 500µm
    - Resolution: 0.1µm
    - Weight: 120g

  - **Specifications**
    - Measuring range (unit): 0 - 500µm
    - Output: 0 to 5VDC

  - **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 VE series (non-contact displacement meter) or CL series (non-contact thickness meter), it demonstrates its best performance for thickness/shape measurement target of objects, and for vibration measurement of rotating shafts or rotating surface (turbine, electric motors, compressors, machine tools etc.)

- **Cable for VE series (1.5m)**

- **GAP series**

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

  - **Specifications**
    - Measuring range (unit): 0 - 2000µm
    - Output: 0 to 5VDC
**FFT Analyzer**

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

- **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 2A-20A A/D converter, dynamic range 120 dB or more. Real-time FFT analysis at 100 kHz is possible.

- **Features**
  - High dynamic range 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 charged 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 tripper graph
  - PV curve line can be displayed on 1/3 octave tripper graph

- **Option**
  - *CF-0071 USB connection cable is attached.*

- **Specifications**
  - Number of CH: 1CH
  - Input terminal: BNC (C2P), 2A type
  - Time axis (power): 1CH
  - Time axis (power): 2A type
  - Input range: 0.1 mV to more (50 dB range)
  - Frequency range: 0 to 100 kHz
  - Voltage range: 0 to 10 V (7 steps)
  - Power supply: Battery cell (Type AA battery, alkaline or nickel-hydride) x4
  - Battery life: 4A hours or more when nickel-hydride 2000 mAh (used for 1.0 hour)
  - Battery level: DC to 10V
  - Recording file: SD (capacity 256 MB), SDHC (max. 32 GB)

- **Data Recorder**
  - DR-7100 Portable Data Recorder for Acoustics & Vibration

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

- **Features**
  - 4ch, 40kHz range, 24-bit (4294967296), 20 kHz (standard)
  - Dynamic range 90 dB (frequency range 10 kHz to 12V range), 10% (Type A)/12V (Type B)
  - Input range: for recording speed signal
  - Unit synchronization function option (synchronize units to record the data with 6 units or more)
  - 16-bit

- **Specifications**
  - Number of CH: 4CH
  - Input terminal: BNC, Power IN, Data OUT, Trigger OUT
  - Input terminal: BNC, Power IN, Data OUT, Trigger OUT
  - Input terminal: BNC, Power IN, Data OUT, Trigger OUT
  - A/D converter: 16-bit
  - Quantization bit rate: 24-bit
  - Frequency range: DC to 1000 Hz/500 Hz/1 kHz/5 kHz/10 kHz/20 kHz/40 kHz/50 kHz (5 MegBit/sec)
  - Voltage range: 0 to 10 V (7 steps)

- **Acoustic Related Product**

**Mi-1271/1273/1433/1531 Measurement Microphone**

- **Features**
  - S/Cal Electret type microphone
  - Mi-1271: 1/2 inch back electret type high performance microphone (temperature characteristics, wide range, high sensitivity)
  - Mi-1273: 1/2 inch back electret type general usage microphone (preference type)
  - Mi-1433: 1/2 inch back electret type general usage microphone (standard type)
  - Mi-1531: 1/4 inch high performance microphone

- **Specifications**
  - Frequency range: 1 Hz to 20 kHz
  - Frequency range: 1 Hz to 50 kHz
  - Frequency range: 1 Hz to 20 kHz
  - Frequency range: 1 Hz to 20 kHz

- **Mi-1271/1273/1370 Preamplifier**

- **Features**
  - Constant current type preamplifier
  - Mi-1271: 1/2 inch back electret type high performance microphone
  - Mi-1273: 1/2 inch back electret type general usage microphone
  - Mi-1273: 1/2 inch back electret type general usage microphone
  - Mi-1273: 1/2 inch back electret type general usage microphone

- **Specifications**
  - Power supply: 4.5 to 5.5 VDC
  - Power supply: 4.5 to 5.5 VDC
  - Power supply: 4.5 to 5.5 VDC
  - Power supply: 4.5 to 5.5 VDC

- **Mi-3140/3111 Microphone Preamplifier**

- **Features**
  - Microphone and microphone preamplifier integrated type
  - Mi-3140: Preamplifier to 1/4 inch back electret microphone
  - Mi-3111: Preamplifier to 1/2 inch back electret microphone

- **Specifications**
  - Power supply: 4.5 VDC
  - Power supply: 4.5 VDC

- **Mi-1271A12 TEDS Microphone**

- **Features**
  - Microphone and microphone preamplifier integrated type
  - Mi-1271A12: Preamplifier to 1/4 inch back electret microphone
  - Mi-1271A12: Preamplifier to 1/2 inch back electret microphone

- **Specifications**
  - Power supply: 4.5 VDC
  - Power supply: 4.5 VDC

- **SC-3120/2500/2120A Sound Calibrator**

- **Features**
  - SC-3120: Used for calibration of Class 1 and Class 2 sound level meter. Since large sound pressure (114 dB) is generated, it reduces the influence of ambient noise.
  - SC-2500: Used for calibration of Class 1 and Class 2 sound level meter. Since the SC-2500 uses the sound pressure feedback control system to control fluctuations in sound pressure caused by static pressure, it can generate a stable sound pressure even if the operating environment changes.
  - SC-2120A: Dynamic speaker type. Simple type for quick operation check, cost effective model

- **Specifications**
  - Power supply: 4.5 VDC
  - Power supply: 4.5 VDC
  - Power supply: 4.5 VDC

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The value under the standard environment (standard environmental temperature: 23 ± 1°C, state pressure: 1013.25 kPa, relative humidity: 50%RH)
**SR-2210 2ch Sensor Amplifier**

- **Features**
  - 2ch input
  - Connection to CCD type microphone preamplifier or accelerometer
  - Providing frequency weighing filter (A, C, E)

- **Specifications**
  - Input: 20 kHz ±0.5 dB (Input load – 50 Ω)
  - Frequency range: 10 Hz to 20 kHz
  - Sensitivity: 50 mV/Hz
  - Noise: 10 μV (1 kHz, 0 dBm)

**MB-2200M10 Ultraminiature Microphone**

**Features**

- High sensitivity
- Wide frequency response
- Small size

**Specifications**

- Sensitivity: 50 mV/Hz
- Frequency range: 20 Hz to 20 kHz
- Output: 50 Ω (balanced)

**Accelerometer**

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

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

- **Specifications**
  - Frequency range: 20 Hz to 20 kHz
  - Sensitivity: 100 mV/Hz
  - Noise: 10 μV (1 kHz, 0 dBm)

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

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

**NP-3000 series Accepts TEDS® Accelerometer with Built-in Preampifier**

- **Features**
  - Boost up the TEDS® accepted type, unique information (sensitivity, serial number, etc.) of the sensor can be read
  - For axial cable type (NP-3579/20, 3579/20Q, 14 mm Cube shape, adhesive attachment on any surface except for connector surface
  - Marking and marking (NP-3531/30)

**Calibrator for Accelerometer**

**NP-3081N20 TEDS Adapter**

- **Features**
  - Brings the accelerometer with built-in preampifier applicable to TEDS
  - Adds the TEDS function to the sensor without changing the sensor features

**NP-0081N20 TEDS Adapter**

- **Features**
  - Suitable for all unit and detector is one to one combination (cannot be combined with multiple detectors)
  - When changing the combination detector or recollecting, rewriting the TEDS information is required before use

**NP-0081N20 TEDS Adapter**

- **Features**
  - Standard unit having three functions of an exciter, sensor, amplifier, and display
  - Change new tri-axis accelerometer and accelerometer with built-in preampifier can be calibrated

**VX-110A Accelerometer Calibrator**

- **Features**
  - Movable frequency (100 Hz ±0.01 Hz)
  - Excitation pressure: 10 mbar or more
  - Equipped with 10 mbar or more
  - Various data rate: 3% or less
  - Movable measurement: 0.1:1 digit (less accuracy)
  - Movable accelerometer

- **Specifications**
  - Output: 10 mbar ±0.01 mbar
  - Power requirement: Approx. 8 battery pack
  - Battery life: Approx. 8 hours
  - Weight: Approx. 1 kg

*Note: The VX-110A cannot be used for NP-2106, 2506*
Sound and Vibration Measurement System

**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.
  - Rapid real-time rate and high performance of throughput function.
  - High dynamic range of 110 dB and max. 16384 points of FFT calculation processing.
  - 85 size, compact, approx. 2.2 kg lightweight unit (20/48/50 kHz).
  - Integrated several analysis functions into one software such as FFT analysis, tracking analysis, and octave analysis to provide commodization 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 LINK” 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 64 ch.)
  - Operating window: Windows® 7 / 12/64-bit and Windows® 10 / 64-bit.

- **Hardware specifications**
  - Max. number of channels: 32 ch (1 unit), 128 ch (4 units).
  - 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 source: 100 to 240 VAC, 15 VDC/25 to 95 VAC (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.

- **Software specifications**

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<td>Recording range/ channel 40 kHz range/ 16ch, 20 kHz range/ 32ch</td>
</tr>
<tr>
<td>FTT analysis function</td>
<td></td>
<td>Analysis frequency range 4 kHz to 40 kHz</td>
</tr>
<tr>
<td>Real-time rate</td>
<td></td>
<td>40 kHz range/ 8ch, 20 kHz range/ 16ch/0 kHz range/ 32ch</td>
</tr>
<tr>
<td>Analysis function/time-axis</td>
<td></td>
<td>Time waveform, impulse response, Cepstrum</td>
</tr>
<tr>
<td>Analysis function/frequency-axis</td>
<td></td>
<td>Power spectrum, cross-spectrum, frequency response function, coherence function, etc.</td>
</tr>
<tr>
<td>Tracking analysis function</td>
<td></td>
<td>Constant ratio tracking, constant width tracking</td>
</tr>
<tr>
<td>Schedule method</td>
<td></td>
<td>Rotation schedule, time schedule</td>
</tr>
<tr>
<td>Octave analysis function</td>
<td></td>
<td>1/1 OCT, 1/3 OCT (option: 1/6, 1/12, 1/24 OCT)</td>
</tr>
</tbody>
</table>

- **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, and environmental facilities. The hardware (DS-3000 series Data Station) at overwhelming processing speed and easy handling software exactly satisfy the needs.

- **DS-3000 series Software**
  - DS-3032A FTT Analysis Software
  - DS-3032L FTT Analysis Software (off-line license)
  - DS-3022 Tracking Analysis Software
  - DS-3022L 1/1 and 1/3 Real-time Octave Analysis Software
  - DS-3022L 1/1 and 1/3 Real-time Octave Analysis Software (off-line license)
  - DS-3024 1/1 Real-time Octave Analysis Software
  - DS-3025A Tripartite Graph Function
  - DS-3030 Recording Function Software
  - DS-3032 Servo Analysis Software

- **Software for special analysis**
  - DS-3022A 3D Sound Intensity Analysis Software
  - DS-3022A Field Balancing Software

- **DS-3000 series Servo System Analysis**

<table>
<thead>
<tr>
<th>Features</th>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td></td>
<td>The mechanical characteristic measurement (servo analysis mode) and noise vibration measurement (FTT analysis mode) are selectable only by switching the mode on the DS-3000 series.</td>
</tr>
<tr>
<td>FTT mode</td>
<td></td>
<td>The frequency response function can be displayed in graph simultaneously, such as bode diagram, Nyquist diagram.</td>
</tr>
<tr>
<td>Isolation</td>
<td></td>
<td>Time waveform and frequency waveform of measurement signal can be monitored simultaneously.</td>
</tr>
<tr>
<td>Phase accuracy</td>
<td></td>
<td>Two types of measurement mode (FIA mode, FTT mode)</td>
</tr>
<tr>
<td>Accuracy of amplitude and phase differences between input channels has been improved compared to the previous mode (100 kHz input/output unit).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auto resolution function</td>
<td></td>
<td>The function to improve the resolution near the resonance frequency automatically.</td>
</tr>
<tr>
<td>Addition function</td>
<td></td>
<td>The analysis function (DS-3034) is provided as an option. Additional input terminal which adds external noise while measuring control characteristics can be built in the unit (available only with 100 kHz unit).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of channels</td>
<td></td>
<td>2ch or 4th (input/1ch output)</td>
</tr>
<tr>
<td>Frequency range</td>
<td></td>
<td>40 kHz to 100 kHz (FMA mode) 140 dB (FMA mode), 90 dB (FTT mode, 100 kHz unit), 110 dB (FTT mode, 40 kHz unit)</td>
</tr>
<tr>
<td>Isolation</td>
<td></td>
<td>Between inputs or between input and output</td>
</tr>
<tr>
<td>Amplitude accuracy</td>
<td></td>
<td>±0.3 dB or less (0 Hz) to 20 kHz, ±1.0 dB or less (20 kHz to 10 kHz)</td>
</tr>
<tr>
<td>Phase accuracy</td>
<td></td>
<td>±0.3 dB or less (0 Hz) to 20 kHz, ±1.0 dB or less (20 kHz to 10 kHz)</td>
</tr>
<tr>
<td>Measurement display graph</td>
<td></td>
<td>Bode graph, Nyquist graph, Co-quad graph, Nichols graph, Cole-Cole plot, Time-axis waveform</td>
</tr>
<tr>
<td>Amplitude control function</td>
<td></td>
<td>The amplitude can be controlled to be constant at acceleration, speed and displacement level for an arbitrary channel</td>
</tr>
</tbody>
</table>

- **Example of 100 kHz Servo Analysis System**

- **Hardware**
  - DS-3200 Main Unit (40 kHz, 100 kHz)
  - DS-3201 40 kHz range 2ch input main unit
  - DS-3204 40 kHz range 4ch input main unit
  - DS-3262 40 kHz range 2ch input unit
  - DS-3264 40 kHz range 4ch input unit
  - DS-3266 100 kHz range 2ch input unit
  - DS-3371 100 kHz range 1ch output unit
  - DS-3373 100 kHz range 1ch output unit
  - DS-3374 100 kHz range addition function
  - DS-392A Unit connection interface
  - DS-393 Unit connection USB Hub
  - DS-394 Unit connection Box
  - DS-395 Remote Controller

- **Analysis Software for Sound and Vibration**

- **DS-0237A Field Balancing Software**

<table>
<thead>
<tr>
<th>Features</th>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure</td>
<td></td>
<td>Procedure for balance correction, operation instruction, result display, etc. are graphically displayed on screen, understandable and easy operation</td>
</tr>
<tr>
<td>Operation</td>
<td></td>
<td>Reliable operation by adopting the large button applicable to touch panel</td>
</tr>
<tr>
<td>System</td>
<td></td>
<td>Responsible measurable system with the combination of the DS-2000/3000 series</td>
</tr>
<tr>
<td>Display</td>
<td></td>
<td>Display of 1-plane 1-condition / 1-plane 2-condition / 2-plane 2-condition</td>
</tr>
</tbody>
</table>

- **Specifications**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balancing mode</td>
<td></td>
<td>1-plane 1-condition / 1-plane 2-condition / 2-plane 2-condition</td>
</tr>
<tr>
<td>Applicable rotation speed</td>
<td></td>
<td>Rotation 1-speed / Rotation 2-speed 100 to 48,000 rpm</td>
</tr>
<tr>
<td>Applicable position</td>
<td></td>
<td>Position of correction weight is displayed at divided angle format.</td>
</tr>
<tr>
<td>Analysis Software for Sound and Vibration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sound Level Meter

**LA-7200/7500 High Performance Sound Level Meter**

**Overview**
LA-7200 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 sufficiently being recorded. The LA-7200 series sound level meter is a great help for reliable measurement at measurement place where any restrictive conditions are allowed. by adding supplied options, the LA-7200 series is able to be upgraded to a sound analyzer, frequency analyzer, and a sound recorder (option), performing more than just a sound level meter. The measurement performance is substantially improved using LA-7000 series which does multiple duties, such as sound measurement, sound recording, frequency analysis, and sound probing of abnormal sound.

**Features**
- 3.5 inch color LCD
- Menu operation by touch panel
- Capturing function
- Language selection from English and Japanese
- USB power supply allows long time measurement
- Windscreen correction function

**Applicable standard**
IEC 61672-1 / IEC 61672-3

**Measurement frequency range**
50 Hz to 20 kHz

**Measurement level range (A, C, Z)**
- A: 24 Hz to 106 dB(A) / 10 Hz to 108 dB(A) / 1 Hz to 108 dB(A)
- C: 24 Hz to 138 dB(C) / 20 Hz to 138 dB(C) / 10 Hz to 138 dB(C)
- Z: 24 Hz to 120 dB(Z) / 20 Hz to 120 dB(Z) / 10 Hz to 120 dB(Z)

**Microphone/Probes**
- Wide range: 1/2" dia., 150 (± 5) dB
- Microphone: 1/2" dia., 150 (± 5) dB

**Gain range**
35 to 190 dB

**Function selection**
- Off / ON / Hold / Memory

**Data recording**
- 5 sec. to 1 min. resolution: 1 sec.
- 1 sec. to 24 hours: resolution: 1 min.
- 1 sec. to 99 hours: resolution: 1 sec.

**Start mode**
- Manual start, timer start, count down start, level start

**Display device**
- 4.3 inch LCD with color backlit

**Digital display**
- 4.6 digit resolution: 0.1 dB
- 4 digit refresh cycle: 1 sec

**Battery indicator**
- Low: 10% of display range / normal: 75% of display range

**Reference level**
- 40 dB SPL / 70 dB SPL / 100 dB SPL

**Sound level measuring mode**
- Normal mode: Input signal range: ±100 dB
- Full scale: Input signal range: ±140 dB

**Sound level memory**
- Built-in memory: 50 hours / 100 hours
- Built-in battery: 10 hours, 24 hours, 48 hours, 72 hours (continuous)

**Function**
- Built-in/external calibration
- Built-in calibration: 1 kHz reference signal
- External calibration: Output signal from external device

**Recommended calibration**
- 1 kHz, 325 Hz, 1000 Hz, 2000 Hz, 4000 Hz

**External memory**
- 1000 points
- CSV file

**Power supply**
- 4xAA batteries

**Weight**
- Approx. 540 g (including batteries)

Please use a recommended 50 cm cable when you use the 100 memory function.
*1: The described value is extendable length when the exclusive cable is used.
*2: It depends on the usage status such as operation mode, memory mode, and backlight.

**Multi-calibration function (DUAL, QUAD):**
Simultaneous display of four calculation types such as LAeq. Lpeak is available.

**Listening function (Phone output):**
You can measure while checking the sound of microphone.
- Effective for measurement in anechoic rooms and environmental noise measurement in remote locations.
- Extension cable, headphone, small separately

**Silenced sound source probing function (Filter band to only the interested sound and point microphone):**
Listening function and Band filter function (FILTER display)
- Effective for finding the place from which the sound is occurring used with the octave band filter. It allows listening only the specified frequency.
- Sound distinctive in 33 steps with the 1/3 octave band function (with LA-7000S/option)
- FFT function (Narrowband constant width analysis, 400, 800, and 1600 Hz) (with LA-7000A/option)

**Level simulator function**
- Increase or decrease of the sound frequency in every 11 bands can be performed.
- You can make the sound pressure level increase or decrease for each frequency band and listen its sound.
- 11 bands (octave frequency), increase and decrease amount: ±20 dB to ±60 dB

**Easy recording function**
- with LA-7007 (option)
- Hold function when you do not have time on the site.
- You can listen and analyze the filed later.

**Sampling frequency (64kHz)**
- File format: raw (audio data) and CSV (trend data for playbacks 1A to 1 second intervals)
- Recording time: 16 h (approx. 8 hours for 4 GB, approx. 4.5 hours for 2 GB, 4.5 hours for 4 GB, approx. 3 hours for 2GB)

- * When recording LA data by OS 2000: up to 2 GB

- * Useful recalibration and initializations functions

**Sound quality evaluation**
- Effective for evaluation of various sound materials.
- Effective when comparing sounds that is difficult to know the difference, as much as between Leq (Equivalent sound level) and Leq (Peak sound level).
- Not only loudness (steadily sound) but also sharpness
- New evaluation parameter as distortion sound. Cl value (Comfort Index) can be displayed.

**Option**
- LA-7052: 1/3 Band Octave Analysis Function
- LA-7003: FFT Analysis Function
- LA-7004: Sound Recording Function
- LA-7056: Level judgment function
- LA-7077: Level Simulator function
- LA-7078A: Sound Quality Evaluation Function

**Sound Measurement & Analysis**

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Sound Level Meter

LA-141/141A/441A Integrating Sound Level Meter

Overview
LA-141/141A/441A sound level meter are applicable to IEC 61672-1: 2013, JIS C 1909-1:2017. 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.
- Suitable 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.
- BMC connector and CCLD type preamplifier are adopted. Easy to extend the cable.
- Equipped with USB and RS-232C interfaces. (LA-141A/441A)

Specifications

<table>
<thead>
<tr>
<th>LA-141A</th>
<th>LA-141A</th>
<th>LA-441A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview</td>
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</tr>
<tr>
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</tr>
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</tr>
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</tr>
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</tr>
</tbody>
</table>

Clock Function
- Current calendar (year/month/day/hour/minute) with leap year adjustment
- USB
  - Control of main unit and data output
  - Baud rate 38400 bps
- RS-232C
  - Control of main unit and data output
  - Baud rate 9600 bps
- Power requirement
  - Type AA battery x 2 pcs.
  - USB: 2.0 FULL SPEED (connecting virtual COM port)
- Weight
  - Approx. 360 g (including batteries)

* The described value is extendable length when the exclusive cable is used.
**Application Software**

**OC-1300 Multi-functional Graph Creating Tool**

- **Specifications**
  - **Type of graph** (OC-1330): Scatter plot, line plot, curve chart (cubic spline, B spline, Hermitean, regression curve and moving average), bar chart, grouping graph, counter plot (scraping 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 capacity**
    - Max: 30 files, max. 1024 columns, max. 1 million rows, max. 100 million points (number of files x number of data columns x number of data rows)
  - **Import format**
    - XLS, XLSX, XLSM, CSV, text, DS/CF (with restrictions), FAMS/KM, combination analysis, Medibene MEDAC
  - 1): Installation of Excel 2002 or later is required.
  - 2): Installation of Excel 2007 or later is required.
  - 3): Installation of DS-2388 or DS-710I or later is required.
  - 4): Contact us for the applicable models (data).

- **Option**
  - Improved operability with the Excel add-in function

**Features**
- Easy creation of multiple-axis graph and 3D graph which cannot be created by Excel®.
- Mobile graph creation by moving graph axis anywhere with a mouse.
- 2D and 3D graphs can be moved easily with a mouse.
- Improved operability with the Excel add-in function.

**Applicable OS**
- Microsoft® Windows® 7, 10
- *Installation of NET Framework 3.5 Service pack 1 is necessary to use Digital map/cube controller.

**Product Lineup**

<table>
<thead>
<tr>
<th>Model name</th>
<th>Product name</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC-1310</td>
<td>Control API</td>
<td>Control the function of the DC-1300 as file operation, graph operation, from the application software on the Windows® other than OC-1300.</td>
</tr>
<tr>
<td>OC-1360</td>
<td>Digital map</td>
<td>Export and output of the graph data in various formats from the data.</td>
</tr>
<tr>
<td>OC-1300</td>
<td>Cube controller</td>
<td>Visualizes the multiple maps in a multidirectional manner in a 4D graph.</td>
</tr>
<tr>
<td>OC-1340</td>
<td>DAT browser</td>
<td>Displays the data file which is performed testing analysis by the OC-20 series.</td>
</tr>
<tr>
<td>OC-1341</td>
<td>TRC browser</td>
<td>Displays the 3D data file which is performed testing analysis by the OC-20 series.</td>
</tr>
</tbody>
</table>

**OS-2500/2600/2700 Time-series Data Analysis Tool**

- **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), *.csv, *.txt, WAVE (wav), sound file (*.au), *.wav, TPF/TPF file, AO-XU file, HIOKI memory Card file, YOKOGAWA WAVE file, PIC Automotive EBG file, GRAPHTEC GBD file, Ono Sokki original file (*.ERF), TAF/CF, KAY (VART), video file (*.av, *.viv).
    - **Data export format**: CSV (*.csv), WAVE (*wav), WDP (*wdf), AVI (*wav), AVS (*wav), OC-1300 output.
  - **Function**
    - **Common function**: Waveform editing function, marker function, sound playback function, search function, merging/combining sections, simple calculation, moving window, event counter, statistical processing (interval), OC-1300 controller, signal calibration
    - **OC-2000 Standard/professional**: Search value extraction, time axis calculation, FFT converter, inter-channel calculation, resampling
  - **Model name**: OC-2000 Professional
    - **Waveform generation tool file, merge, Hilbert transform, taper processing, recording**

- **Option**
  - OC-2031 Statistics analysis, OC-2031 FFT analysis, OC-2031 HR filter, OC-2034 Continuous automatic analysis, OC-2035 Combination analysis monitor, OC-2051 IR filter, OC-2061 Time frequency analysis, OC-2064 1/6 octave analysis, OC-2061 Tracking analysis, OC-2031 Sound quality analysis, OC-2032 Sound fluctuation analysis, OC-2031 Flicker fluctuation simulation, OC-2031 Video playback, OC-2030 Non-time series graph, OC-2032 Tracking map.

**Applicable OS**
- Microsoft® Windows® 7, 10
- *Installation of NET Framework 3.5 Service pack 1 is necessary.

**Product Lineup**

<table>
<thead>
<tr>
<th>Model name</th>
<th>Product name</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>OC-2000</td>
<td>Basic</td>
<td>This is the basic version equipped with the Event counter, search function and other essential capabilities.</td>
</tr>
<tr>
<td>OC-2060</td>
<td>Standard</td>
<td>This is the standard version includes enhanced features such as inter-channel calculation, search value extraction, and FFT functions in addition to the basic version.</td>
</tr>
<tr>
<td>OC-2070</td>
<td>Professional</td>
<td>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.</td>
</tr>
</tbody>
</table>

**Sound Quality Evaluation**

**OS-2740 Sound Quality Evaluation Pack**

- **Overview**
  - **The OS-2740 is the package software consists of the sound quality parameter calculation function, recording function, frequency calculation function based on the time-series data analysis software OS-2000 system. It allows calculation of sound quality parameter such as loudness and sharpness, FFT analysis, octave analysis, sound reproducing and editing, and filter operation.**

- **Features**
  - **Large capacity of data maximum 512 channels and 100 million points can be handled** (30 conditions)
  - The sound evaluation parameter calculation of loudness, sharpness, roughness, fluctuation strength and tonality are available
  - Signal processing, calculation, editing, detection functions can be used
  - Filter is equipped as a standard
  - Real-time listening of the sound which has passed through the frequency filter [order designed arbitrary].

- **Supported various evaluation**
  - WAV, CDA, CDI, DAT, RCD, DDF, AU-1100A (INF), WAV/TS (DAT), FAMS/HK HD, AI-1000 (TR, FA2, AVE, LOG/FAT), HIOKI memory Card file (mem), TEAC (1000-rate (1nd)), YOKOGAWA binary data file (wav, wdf).
  - The function can be added according to the application.

**Operating environment**
- **OS**
  - Microsoft® Windows® 7, 10
  - NET Framework 3.5 Service Pack 1 or later must be installed.

- **CPU**
  - CPU which has an performance of Intel® Pentium 4, 2 GHz or more

- **Memory**
  - 2 GB or more

- **Hard disk**
  - 1 GB or more available capacity

- **Display**
  - Can be displayed 1024 x 768 or more

*Two methods are available to manage the license: [standalone type] by using protect key [per type] by using the PIC which connects to the network.

**OS-2760 Fluctuation Sound Analysis Pack**

- **Overview**
  - The OS-2760 is the package software that fluctuation sound analysis and fluctuation sound simulator are added to the OS-2740 Sound Quality Evaluation package.

  - Fluctuation sound analysis: Effective for sound evaluation which the time fluctuation is a key point. It can capture fluctuation sound often concerned even in small volume, with three factors of frequency (sound pitch), fluctuating frequency (fluctuation speed), and fluctuation magnitude.

  - Fluctuation sound simulator: Emphasizes or reduces only the fluctuating component without changing the frequency characteristics. It increases or decreases only the fluctuation sound, so hearing impression can be simulated when the fluctuating component is changed.

- **Features**
  - Color mapping of various speed fluctuating sound and intuitive evaluation
  - Useful when extracting only fluctuation component from the background noise with the high noise level
  - Applicable to wide fluctuation frequency range (0.5 to 200 Hz), from the slow fluctuation such as beding sound to the fast fluctuation.

**Operating environment**
- **OS**
  - Microsoft® Windows® 7, 10
  - NET Framework 3.5 Service Pack 1 or later must be installed.

- **CPU**
  - CPU which has an performance of Intel® Pentium 4, 2 GHz or more

- **Memory**
  - 2 GB or more

- **Hard disk**
  - 1 GB or more available capacity

- **Display**
  - Can be displayed 1024 x 768 or more

*Two methods are available to manage the license: [standalone type] by using protect key [per type] by using the PIC which connects to the network.
**Volumetric Type Flow Detector/ Flow Meter**

**Features**
- FP-213S/1 Small flow rate type
  - Range width: 1 to 1000 L/h
  - Adsorbable of compensating for errors caused by pulsating or backflow by means of the rotating direction judgment function
- FP-2140H/2240H Standard flow rate type
  - High accuracy within ±0.2% of reading, high pressure resistant design
  - Range width: 1 to 400 L/h
  - Adsorbable of compensating for errors caused by pulsating or backflow by means of the rotating direction judgment function
- FP-2140S Pressure loss compensation function type
  - Measurement range: 0.5 to 200 L/h, resolution of 0.1 mL/P, various measurements are available with one unit including micro fuel flow of HEV engine, high load range of alcohol fuel engine etc. The flow rate detector is driven by a motor to move the free piston instead of a bypass of the measurement device to the neutral position.
  - Reading accuracy: ±0.2% is achieved in all measurement range by optimizing the control with PID and feed forward.

**Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>FP-213S</th>
<th>FP-213S</th>
<th>FP-2140H/2240H</th>
<th>FP-2140H/2240H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow rate</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Temperature</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pressure</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Applicable fluids</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Standard pressure oil</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Measurements range</td>
<td>Pressure: 0 to 50 mH2O</td>
<td>Pressure: 0 to 50 mH2O</td>
<td>Pressure: 0 to 50 mH2O</td>
<td>Pressure: 0 to 50 mH2O</td>
</tr>
<tr>
<td>Flow rate</td>
<td>0.01 to 500 mL/min (at 20°C, for gasoline)</td>
<td>0.01 to 500 mL/min (at 20°C, for gasoline)</td>
<td>0.01 to 500 mL/min (at 20°C, for gasoline)</td>
<td>0.01 to 500 mL/min (at 20°C, for gasoline)</td>
</tr>
<tr>
<td>Maximum flow rate pressure</td>
<td>500 mPa</td>
<td>500 mPa</td>
<td>7.5 mPa</td>
<td>7.5 mPa</td>
</tr>
<tr>
<td>Temperature range</td>
<td>0 to 50 °C</td>
<td>0 to 50 °C</td>
<td>0 to 50 °C</td>
<td>0 to 50 °C</td>
</tr>
</tbody>
</table>

**FP series Flow Detector**

**Operating environment**
- Same as the software for GPS speedometer

**Features**
- 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 calories captured are available.
- Data can be transferred to the OS-2000 Series Time-series data analysis software made by Ono Sokki Co., Ltd. by one button operation.
- Display language is selectable from Japanese and English.

**Overview**
- This is the software for acceleration/ deceleration tests on a straight line such as starting-acceleration test, passing-acceleration test, brake testing, coasting test. Creates a report on the basis of speed, time and distance.
- Brake test can be selected from MFSD mode or ABS mode depending on speed.
- Braking speed of the MFSD test can be selected arbitrarily.
- Confirmation calculation of the correctness of the ABS test can be selected from TRAS and NACP.
- Displaying of the 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.
- All functions for the software for GPS speedometer are covered.
- Up to 8 data can be displayed as graphs.

**Applicable fluids**
- Same as the software for GPS speedometer

**Operating environment**
- Same as the software for GPS speedometer

**Features**
- Mode selection is available from level ground fuel consumption test mode and pattern fuel consumption test mode.
- Input pressure of the OS-2000 Series Flow Meter to the pulse input unit, and calculate, display, and record the fuel consumption from the obtained data and driving data.

**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 indicates the vehicle draws a driving path on a screen. You can check the speed and distance with the driving path line.
- Checking of speed and distance on the cursor position
- Checking of north direction distance difference between starting point and another marker point is available.
- Checking of north direction distance difference between starting point and another marker point is available.
- Checking of north direction distance difference between starting point and another marker point is available.
- Checking of north 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 drift distance between each marker point and cursor point is available.

**Operating environment**
- Same as the software for GPS speedometer

**Overview**
- This is the software for acceleration/ deceleration tests on a straight line such as starting-acceleration test, passing-acceleration test, brake testing, coasting test. Creates a report on the basis of speed, time and distance.
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- All functions for the software for GPS speedometer are covered.
- Up to 8 data can be displayed as graphs.
**Crank Angle Measurement Equipment**

**CP-5700 Crank Angle Detector**
- **Specifications**
  - Applicable amplifier: CA-5700 A/B
  - Output signal: 0 to 20 mA
  - Number of output pulses: 1 (P/Z)
  - Numbers of rotations range: 0 to 50 mm/
  - Vibration resistance: 20 g
  - Operating temperature range: 0 to +60 °C
  - Weight: Approx. 1 kg
  - Features: Suitable for various engine performance tests such as combustion analysis

**CA-6000B Crank Angle Amplifier**
- **Specifications**
  - Applicable amplifier: CA-5700 A/B
  - Output signal: 0 to 20 mA
  - Numbers of rotations range: 0 to 50 mm/
  - Vibration resistance: 20 g
  - Operating temperature range: 0 to +60 °C
  - Weight: Approx. 1 kg
  - Features: Suitable for various engine performance tests such as combustion analysis

**CP-3110B Fiber Optic Crank Angle Detector**
- **Specifications**
  - Applicable amplifier: CA-5700 A/B
  - Number of output pulses: 1 (P/Z)
  - Numbers of rotations range: 0 to 50 mm/
  - Vibration resistance: 20 g
  - Operating temperature range: 0 to +60 °C
  - Weight: Approx. 1 kg
  - Features: Suitable for various engine performance tests such as combustion analysis

**PP-932/PA-500A U-shaped Crank Angle Detection System (For 360° P/R)**
- **System configuration**
  - Photo emitter and connector: PP-932
  - Amplifier: PA-500A
  - Site disk: PA-010A
  - **Features**
  - Suitable for various engine performance tests such as combustion analysis

**PP-933/PA-500A U-shaped Crank Angle Detection System (For 720° P/R)**
- **System configuration**
  - Photo emitter and connector: PP-933
  - Amplifier: PA-500A
  - Site disk: PA-011B
  - **Features**
  - Suitable for various engine performance tests such as combustion analysis

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**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 6 categories 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
- JIL: International Laboratory Accreditation Cooperation

**JCSS system applicable products**

- **Acoustics/Ultrasound**
  - LA series: Sound level meter
  - M1 series: Measurement microphone
  - SC series: Sound calibrator

- **Acceleration**
  - NP series: Accelerometer detector
  - Torque detector

- **Flow fluid**
  - LC-8000 series: Fluid meter (diesel, industrial gases)

- **Electricity**
  - direct current (Low frequency)

- **CF/DS series: FFT Analyzer

**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 certificated 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 MMJ, NPL and NIST. To maintain the traceability system, we are regularly doing calibration in accordance with the regulations for the measurement instruments based on ISO 9001.

**Marking**

CE marking is a safety mark that must be attached to designated products sold in the European Union. This mark can only be attached to products that comply with the safety regulations set forth by the EC Directive (Director of the Council of the European Communities), and if the product does not have CE marking, it cannot be exported to the EU.

**CE modification**

We may be forced to modify product to conform to CE marking. Please contact us if you’d like to have a quotation and delivery date for modification.
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