

FP-4135/DF-2200

ONOSOKKI

On-Board Volumetric Flow Detector On-Board Flow Meter

More Precise and more flexible.
Achieves measurement of higher level transient
fuel consumption in various test environment.



FP-4135 On-Board Volumetric Flow Detector

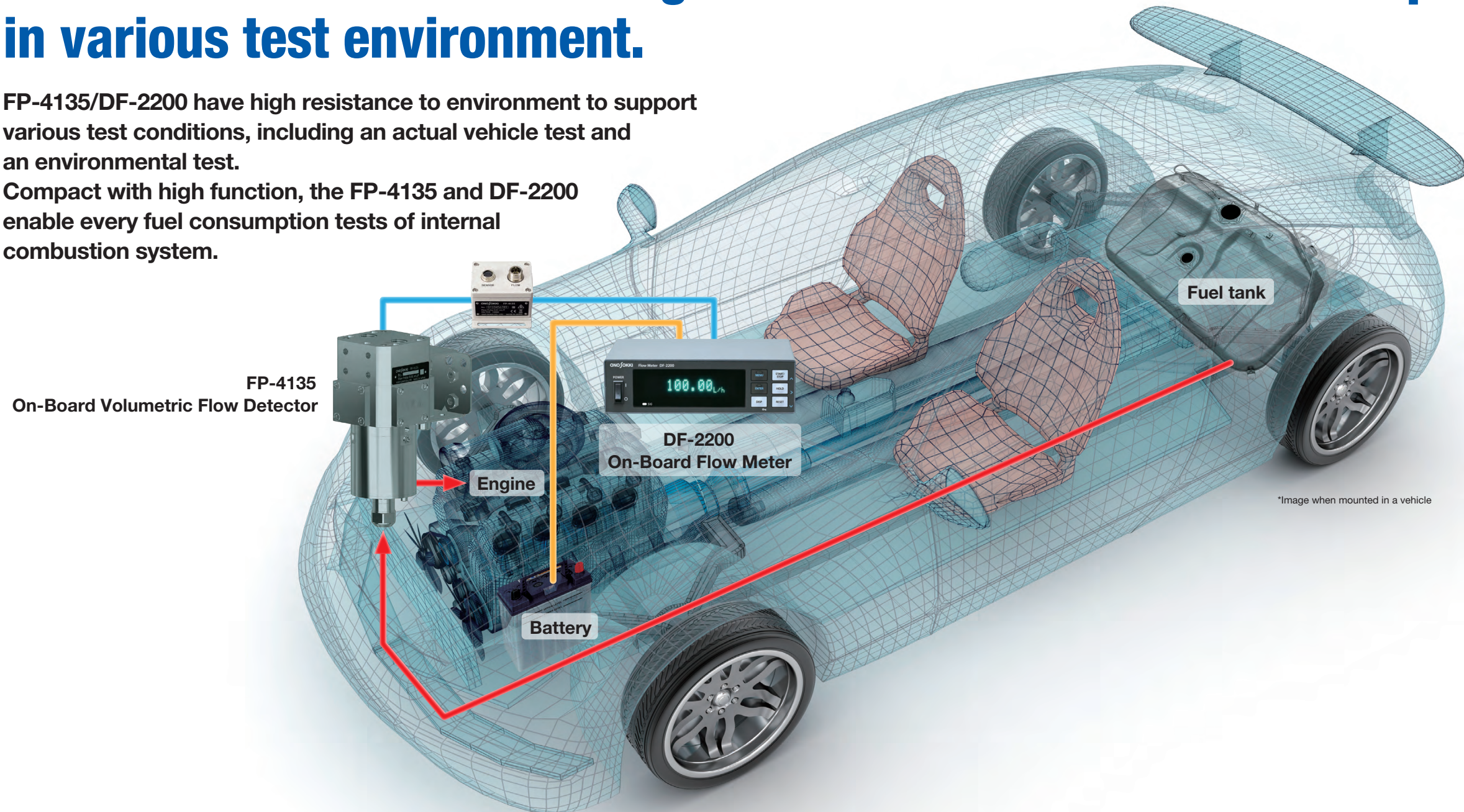


DF-2200 On-Board Flow Meter

More precise and more flexible. Achieves measurement of higher level transient fuel consumption in various test environment.

FP-4135/DF-2200 have high resistance to environment to support various test conditions, including an actual vehicle test and an environmental test.

Compact with high function, the FP-4135 and DF-2200 enable every fuel consumption tests of internal combustion system.



1

Wide temperature range, high resolution, and low pressure loss

By optimizing the detection part with the technological abilities of long time-proven volumetric flow detector and adopting a magnetic type encoder, FP-4135 has achieved temperature resistance, high resolution, and low pressure loss.

2

Compact and space-saving design

75 %* reduction in volume has been achieved by a downsized filter and the built-in temperature sensor which is required for fuel consumption measurement.

* Compared to the main unit of the FP-5131 made by Ono Sokki, excluding signal processing part.

3

Having good visibility and operability

Good visual perceptivity by large display of instantaneous flow rate. One button operation allows easy switching of the display pattern among instantaneous flow rate, total flow rate, and temperature.

4

Wide variety of signal outputs

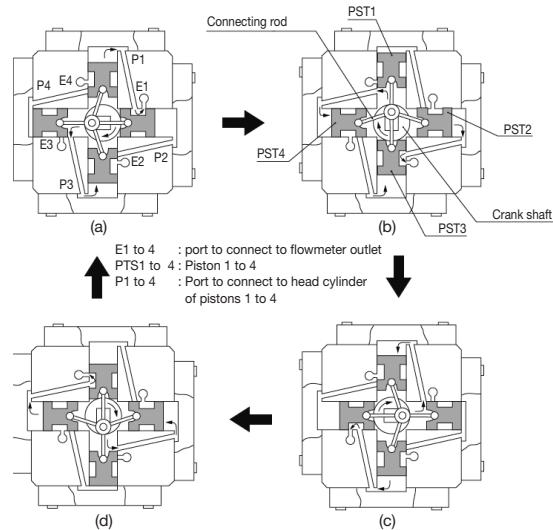
Wide variety of signal outputs including CAN output as well as high speed analog signal and pulse signal support various fuel measurement such as on-board vehicle measurement, measurement on an engine bench etc.

FP-4135 On-Board Volumetric Flow Detector

The FP-4135 supports wide variety of fuel rate measurement. Wide range from 0.1 to 200 L/h has been achieved by the use of magnetic type encoder, which enables fuel measurement with the range from low load such as vehicle idling to high load. Having environmental resistance, measurement in wide temperature range is supported as standard. Also it can measure various fuels including alcohol. From on-board measurement to the test on the chassis dynamometer, wide range and wide variety of fuel rate measurement are supported.

Radial piston method

The range required for fuel measurement (from 0.1 to 200 L/h) and vibration test (up to approx. 3G) have been satisfied by vibration resistant pistonphone method and by new designed internal flow path.



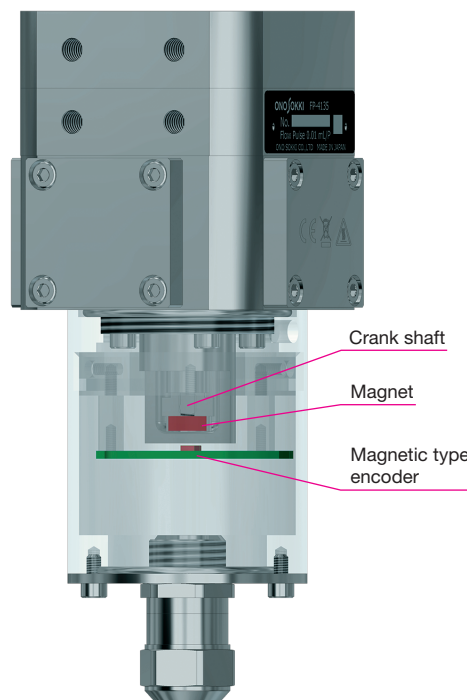
Enhanced measurement functions

By the structure that the fuel detection part is separated from signal processing part for the consideration of temperature change in an engine room, it has high temperature resistance that withstands the temperature change from -30 to 100 °C.



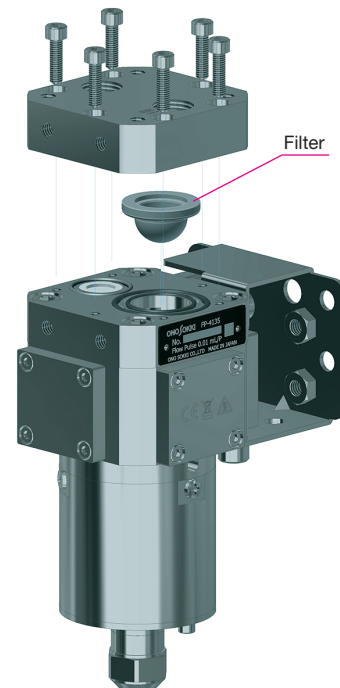
Magnetic type encoder

By conveying the rotation motion of the crank shaft to magnetic type encoder through dividing wall, an extra loss for signal transmission is reduced. The dividing wall is also effective to reduce the risk of fuel leakage.



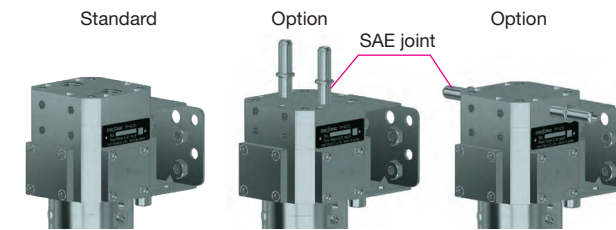
Compact and light weight

Ultra compact filter is installed inside of the detector as a standard specification to protect the detector from impure substances contained in fuel. The filter is removable for easy maintenance by customer.



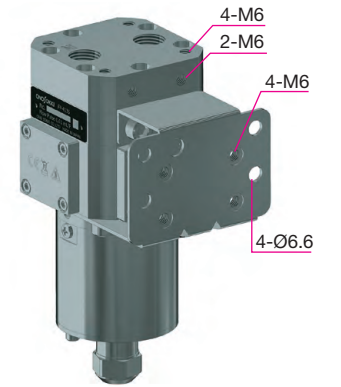
Actual vehicle joint option

The upper part of the detector is able to be replaced according to the type of an actual vehicle as additional processing. It does not need to cut the pipeline of an actual vehicle and reduces the risk of fuel leakage.



Various detector installation options

In addition to metal fittings, various taps are provided on all sides of a detector to fix it in a limited space of engine room.



DF-2200 On-Board Flow Meter

The DF-2200 is designed to have all the required functions for fuel measurement in the compact body by improving an existing fuel flow meter widely. Those functions can sufficiently cope with not only on-board measurement, but also an evaluation on an engine bench. Space-saving design is helpful for measuring fuel flow rate in a limited space.



Compact design suitable for on-board measurement

Compact design (170 (W) x 49 (H) x 120 (D) mm) having the synchronous function of fuel flow rate, temperature and pressure data.



Accepts wide range of input power supply voltage

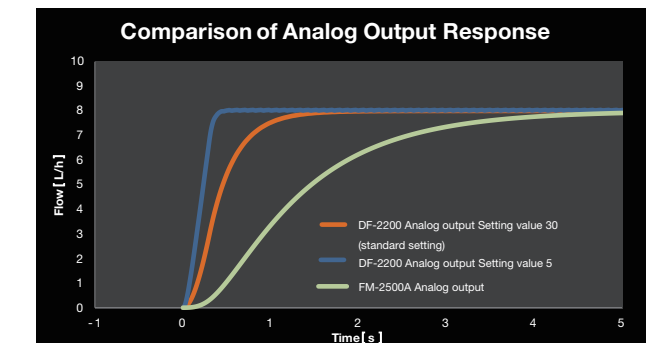
To support various actual cars including a passenger vehicle and a large commercial vehicle, the DF-2200 accepts wide range of input supply voltage from 12 to 24 VDC as a standard specification, and accepts 100 to 240 VAC by an optional AC adapter.

CAN output as a standard

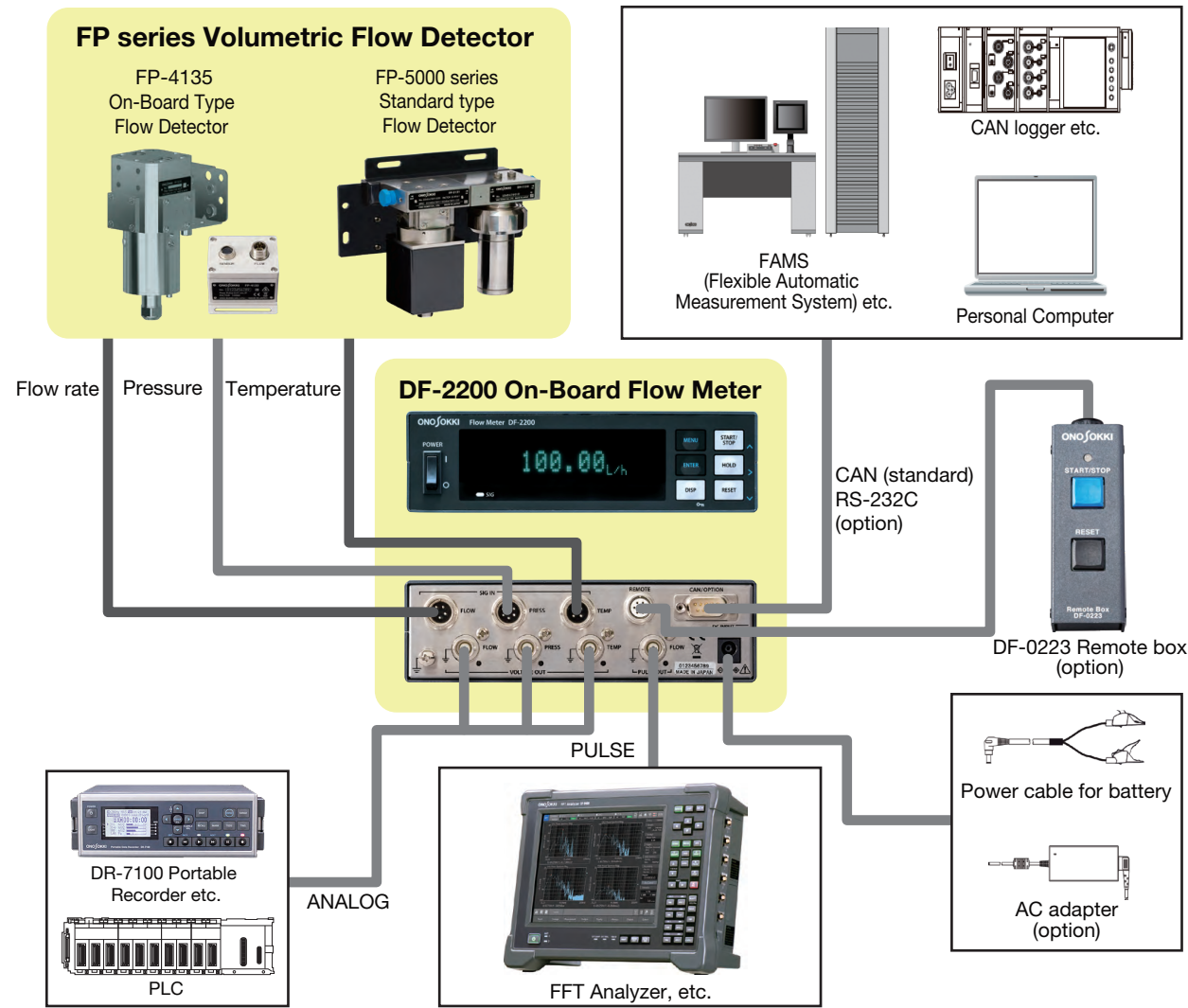
The DF-2200 provides CAN output required for actual vehicle measurement as a standard, and enables real time output of instantaneous flow rate, temperature and pressure. Optional RS-232C communication allows automatic measurement on an engine bench.

Enhanced measurement functions

- High speed internal sampling and exponential average function of analog output allow the averaged data output of transient measurement data.
- Conversion to mass flow rate is performed in real time by density input.
- HOLD function, and Auto stop function (option) are provided.
- Greatly improved various functions including average processing of display data.



Example of System



The high resolution type (FP-5132/34, 5142/44) and FP-5150 series cannot be connected to the DF-2200.

List of option

Model name	Product name	Remarks
FP-0015/16/17	Flow signal cable 5/10/20 m	FP-4135 ⇄ FM-0311(FM-3100) / FP-4135 ⇄ DF-2200
FP-0025/26/27	Temperature signal cable 5/10/20 m	
FP-0411	For FP-4135: Inlet/Outlet filter set	Inlet/Outlet filter and O-ring set
FP-0412	For FP-4135: O-ring set for filter maintenance	O-ring set for filter maintenance
FP-0413	For FP-4135: O-ring set for filter maintenance	O-ring set for filter maintenance (perfluoro type)
FP-0414	For FP-4135: Temperature sensor	Standard, class A
FP-0415	For FP-4135: Additional pressure sensor set	Pressure measurement: 0 to 980 kPa, F.S.±0.5 %
FP-0416	For FP-4135: Pressure sensor	Pressure measurement: 0 to 980 kPa, F.S.±0.5 %
FP-0417	For FP-4135: Top cover block (side port)	Inlet/outlet Rc1/4 port (side)
FP-0418	For FP-4135: Front mounting fixture 1	Front mounting fixture
FP-0419	For FP-4135: Rear mounting fixture 2	Rear mounting fixture 2 (not suitable for on-board)
FP-0420	For FP-4135: Mounting fixture for signal processing part	For M6 screw hole
FP-0421	For FP-4135: Ø6 mmSAE (side) block	Ø6.3 Max. operating pressure 500 kPa
FP-0422	For FP-4135: Ø8 mmSAE (side) block	Ø8 Max. operating pressure 500 kPa
FP-0423	For FP-4135: Ø6 mmSAE (top) block	Ø6.3 Max. operating pressure 500 kPa
FP-0424	For FP-4135: Ø8 mmSAE (top) block	Ø8 Max. operating pressure 500 kPa

Model name	Product name	Remarks
DF-0221	Auto stop function	Integrated auto stop
DF-0222	RS-232C communication function	* When selecting DF-0222, CAN communication cannot be used. DF-0225 cannot be used at the same time.
DF-0225	CAN integrated value output function	*As above
DF-0223	Remote box	
DF-0224	High-speed output function	10 ms (standard) --> 1 ms (high speed)
LC-0860	CAN interface cable	Cable for CAN communication, connector: D-Sub /9pin/male
PS-P20023E	AC adapter	Power cable is required.
VM1391-VM1700	Power cable for AC adapter	2m (for Japan)
CT-0673	Panel mount fitting	Common for CT-6700
CT-0675	Protection handles	
CT-0676	Light shield	

FP-4135 Specification

Measurable liquid	Gasoline, light oil, kerosene, class-A heavy oil, engine oil, petroleum-based general hydraulic oil, methanol, ethanol, mixture of alcohol and gasoline, and brake oil *Please note that the detector might not be used in the depositing condition. *Alcohol is measurable as standard.	
Measurement range	Flow rate	0.1 to 200 L/h
	Temperature	-30 to 100 °C
Accuracy	Flow rate	Within ± 0.2 % of reading (measurement condition: 20 °C, 50% RH, Cleansol HS)
	Temperature	Class A
Pressure loss	4 kPa or less at 60 L/h (gasoline)	
Applicable detector/flow meter	DF-2200 On-Board Flow Meter FM-3100 Digital Flow Meter + FP-0311 measurement module for FP series FM-2500A Digital Flow Meter + DF-0400A measurement module for FP series FM-1500 Digital Flow Meter + DF-0400A measurement module for FP series	
Inlet/Outlet port	Rc1/4	
Operating maximum pressure	8 Mpa	
Operating temperature range	Flow detecting part:	-30 to 100 °C (environment temperature, liquid temperature, with no condensation)
	Signal processing part:	-30 to 70 °C (environment temperature)
Vibration resistance (conducted)	Acceleration rms value:	27.3 m/s ²
	10 to 1000 Hz random vibration, 1 hour for each direction of each 3 axis	
Weight	Flow detecting part:	approx.2.0 kg
	Signal processing part:	approx.0.4 kg
Power source	Power is supplied from the DF-2200 On-Board Flow Meter or the FM Series Digital Flow Meter	
Accessory	Instruction manual	
Applicable cable	Option: FP-0015(5m), FP-0016(10m), FP-0017(20m)	

DF-2200 Specification

Applicable detectors	FP series (excluding FP-5000 series high resolution type and FP-5150), MF-3200	
Display items	Accumulated flow rate, accumulated time, instantaneous flow rate, pressure, temperature	
Voltage output	Instantaneous flow rate, pressure, temperature	
Pulse output	Instantaneous flow rate	
Digital communication	CAN, RS-232C	
Power source	Battery connecting:	10 to 28 VDC
	When using AC adapter (option):	100 to 240 VAC 50/60 Hz
Power consumption	28 VA or less (when 12 VDC)	
Operating temperature range	0 to 50 °C * When using AC adapter: 0 to +40 °C	
Storage temperature range	-10 to 60 °C	
Operating humidity range	5 to 80 %	
Storage humidity range	5 to 85 %	
Outer dimensions	170 (W) x 49(H) x 120(D) mm	
Weight	Approx. 800 g	
Safety	IEC61010-1: Over-voltage category II Protection Class II Pollution level II when using an optional AC adapter	
Conforming standard	Low Voltage Directive 2014/35/EU Standard EN61010-1 (with AC adapter) EMC Directive 2014/30/EU Standard EN61326-1 RoHS Directive 2011/65/EU Standard EN IEC 63000	
FCC	CFR47 part15 Subpart B Class A	
Operating environment	Indoor, in a vehicle	
Altitude	Elevation 2000 m or less	
Accessory	Power cable for battery (equivalent to LC-0082), rubber foot, instruction manual	

Reliable and high level calibration JCSS Accredited Calibration Laboratory

Ono Sokki provides reliable and high level calibration as "Accredited Calibration Laboratory" (fluid flow scope), which is certificated by JCSS*1 calibration laboratory accreditation system, base on the skills and know-how of quality assurance system which has been acquired through many years of practice.

Under the JCSS of calibration laboratory accreditation system, Ono Sokki is assessed and accredited as Accredited Calibration Laboratories to meet the requirements of the Measurement Law, relevant regulations and ISO/IEC 17025.

Ono Sokki can issue the calibration certificates with the JCSS accreditation symbol, which assures the traceability to National Measurement Standards as well as a laboratory's technical and operational competence, and is acceptable in the world through the ilac*2-MRA*3.

*1 JCSS (Japan Calibration Service System)

*2 ilac: International Laboratory Accreditation Cooperation

*3 MRA: Mutual Recognition Arrangements



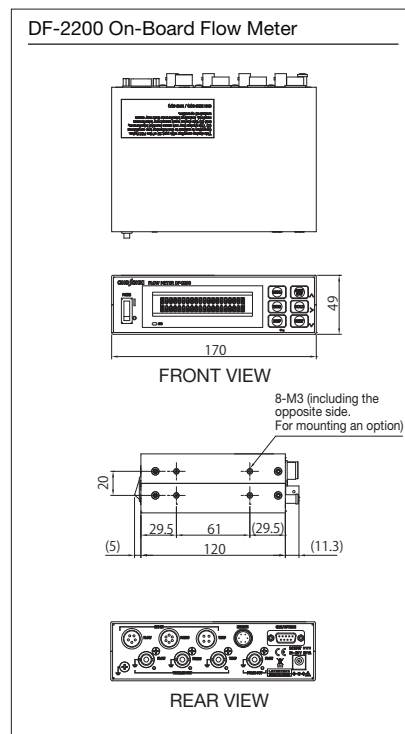
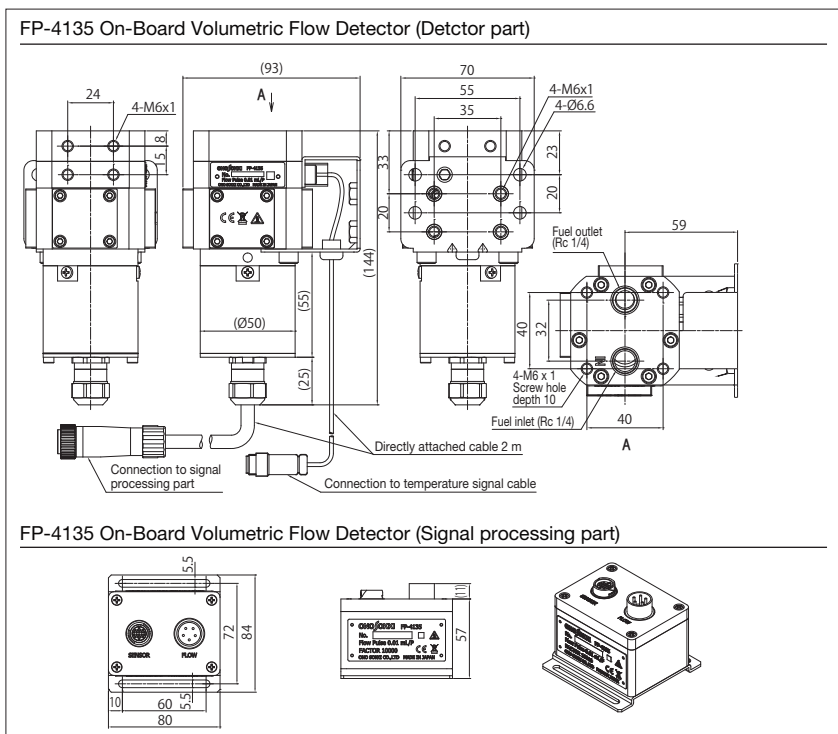
Target flow meter

FP-2000/200 series : FP-213, FP-213S, FP-2140H, FP-2240H, FP-2240HA
 FP-3000 series : FP-3130, FP-3132, FP-3130S, FP-3132S, FP-3140, FP-3142
 FP-4000 series : FP-4135
 FP-5000 series : FP-5131, FP-5133, FP-5141, FP-5143, FP-5151
 FZ-2000 series : FZ-2100, FZ-2200, FZ-2200A



Outer Dimensions

(Unit:mm)



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