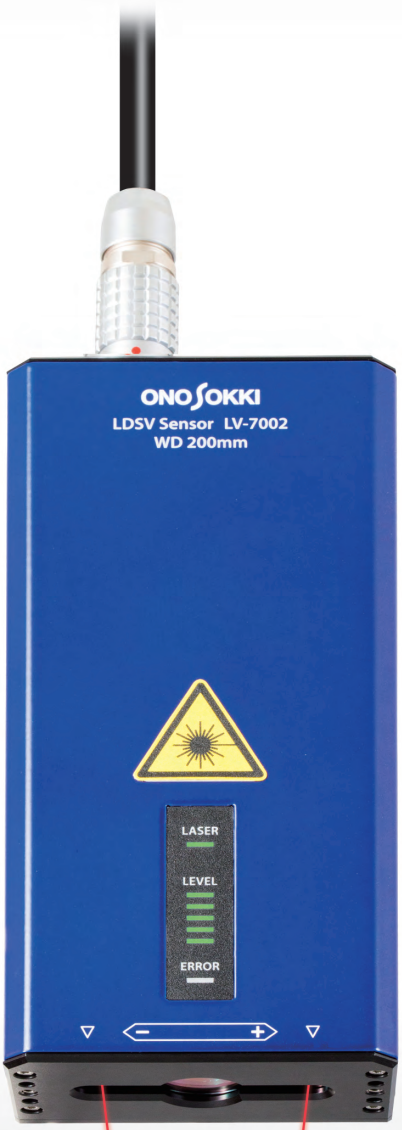
Laser Doppler Surface Velocity Meter

LV-7000 Series



Anytime anywhere, high sensitivity and high response detection

ONO SOKKI

LV-7000 series

Laser Doppler Surface Velocity Meter

Anytime anywhere

Fast and easy non-contact detection

High sensitivity and high-speed response

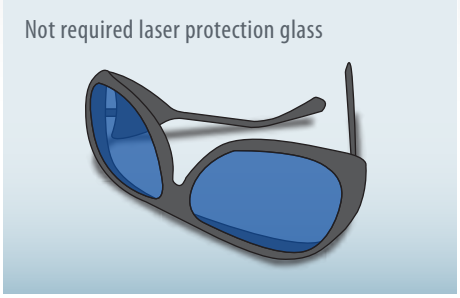
Laser Doppler Surface Velocity Meter

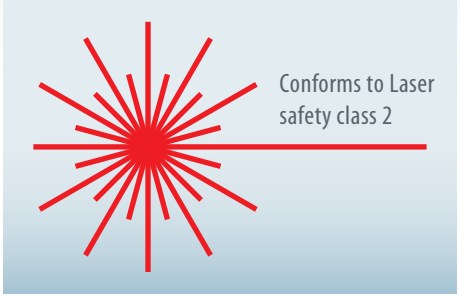
The LV-7000 series
Laser Doppler Surface Velocity Meter
offers non-contact detection of velocity,
velocity irregularity and displacement of rotating
objects and moving objects.

CE

Feature

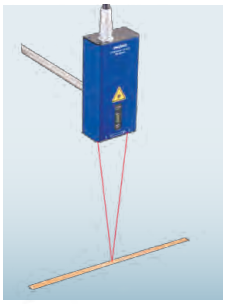
High sensitivity detection class 2 Laser product

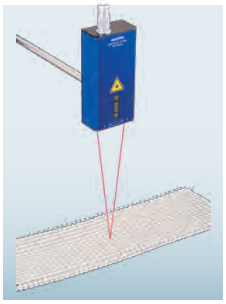


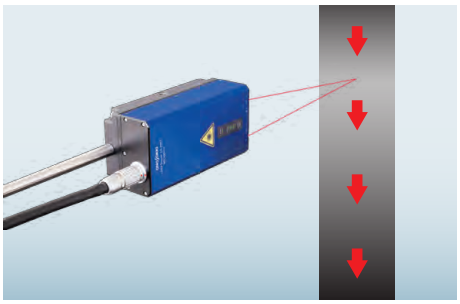


- Laser protection glass, laser controlled area and laser administrator are no longer required.
- Original optical system and demodulating circuit allow high sensitivity detection.
  Available to measure wide variety of targets.
- Red visible light allows easy, quick positioning and checking.

Non-contact detection, No-load measurement







- High spatial resolution with small laser-spot.
  Enables measurement of thin/tiny target including thread and narrow parts.
- Not necessary to worry about defects such as scratch, wrinkle, or transformation by laser detection.
- Hardly affected by flipping, shaking, or eccentricity. Slip or friction is not generated.
- Enables velocity measurement and length measurement in vertical movement, negative gradient movement, which are difficult to detect by contact-type detector.
- Extension speed/direction measurement of extensible materials including rubber, resin, and cloth.

Simple operation and high function

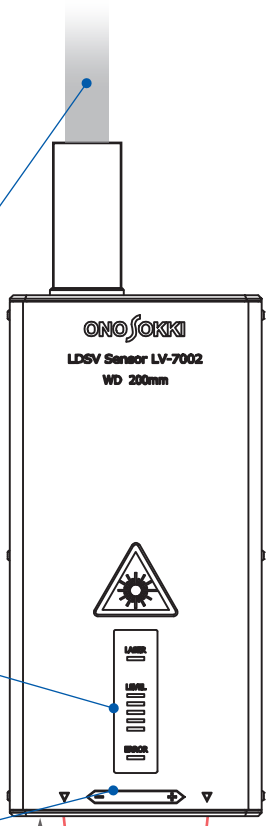
- Indicator on a compact sensor allows you to check the target and operating condition at the same time.
- High speed response of 800 m/s^2.
  Velocity after steep start from zero and before sudden stop are able to be detected.
- Difference measurement between two points by setting two speedometers.
- Easy to see numerical values by large LED display and stand jigs. Current setting conditions are clear at a glance.
- Simple and speedy operation with large function button.
- Selectable output signal format from analog, digital, and phase difference according to the usage.

Function

Detection, measurement and control all in one simple, compact unit

LV-7002

Laser Doppler Surface Velocity Sensor



Sensor cable

•LV-0703(3 m) •LV-0705(5 m)

Scale factor specific to a sensor is automatically calibrated.No worry of setting error anymore.

LASER / LEVEL / ERROR

All the indicators are equipped on a surface of the sensor. Detection conditions and sensor operating conditions are able to be checked at a glance.

"+" when moving from the left to the right of the front of the sensor.

"-" when moving from the right to the left of the front of the sensor.

*The polarity of the output/display can be inversed.

Center of detection:200 mm from the bottom surface of the sensor.

Conforms to Laser Safety class 2

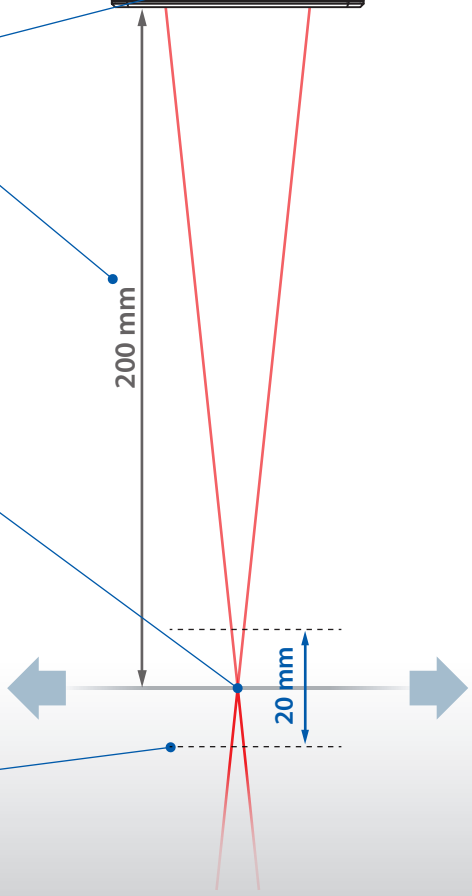
You can confirm the focus of the laser, and a detection position in vision by the naked eye.

- FDA 21CFR Part 1040.10 (CDRH)
- IEC60825-1:2007:2014
- JIS C 6802:2007:2014

Detectable range ±10 mm*

*Accuracy might be decreased or detection range might be changed according to an object.

Please refer to page 11 for details.



LASER

LASER switch

Allows you to switch the laser emission between ON (start) and OFF (stop). It starts in a switch OFF state at the time of power ON.

* Special mode to start with switch ON state at the time of power ON is available. (Modification for this mode is required before factory shipment.)

+ / –

POLARITY selection switch

Allows you to switch the polarity between negative and positive. You can apply the moving direction and polarity regardless of the suspending sensor direction.

KEY LOCK

Switches the key lock function between ON (enable) and OFF (disable). The function is used to disable all key operations except the KEY LOCK selection switch.

DETECT

OPTICAL SENSITIVITY selection switch to adjust in 4 levels. Wide variety of objects can be detected, such as transparent film, rubber, and building material.

CONNECT IN/OUT

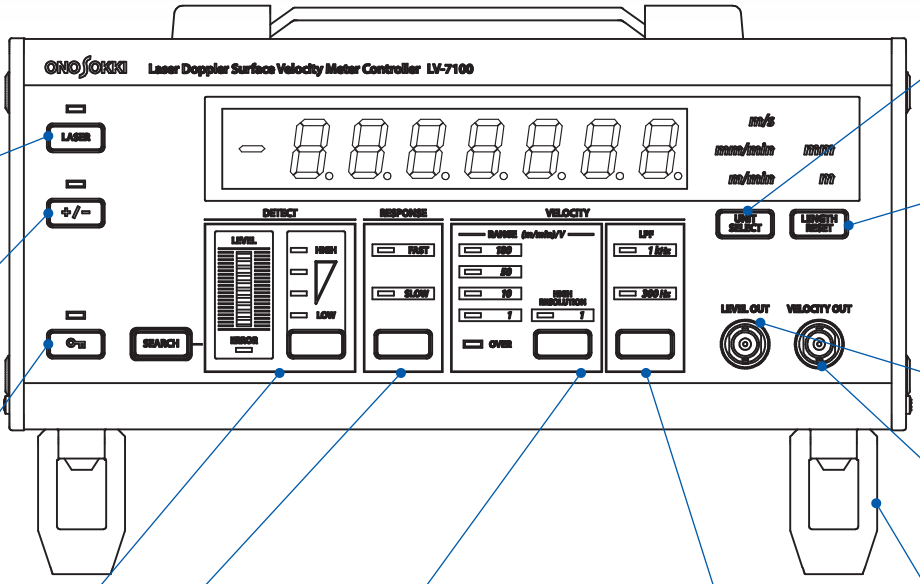
Connects two LV-7100 with each other, which allows simultaneous execution of LENGTH RESET.

SENSOR

Sensor input connector

LV-7100

Laser Doppler Surface Velocity Meter Controller



UNIT SELECT

Switches the indication unit to be displayed on the display panel among velocity, distance, and length.

LENGTH RESET

Resets (zero reset) the measured value currently displayed in the distance measurement.

LEVEL OUT

Outputs the voltage (0 to14 VDC) corresponding to the level of received laser beam displayed in the LEVEL indicator.

VELOCITY OUT

Outputs the voltage corresponding to the velocity (±10 V).

STAND JIG

Unfolding stand jig allows the display panel tilted to make the visual recognition and operation easier.

RESPONSE

You can select FAST or SLOW according to movement of a target.

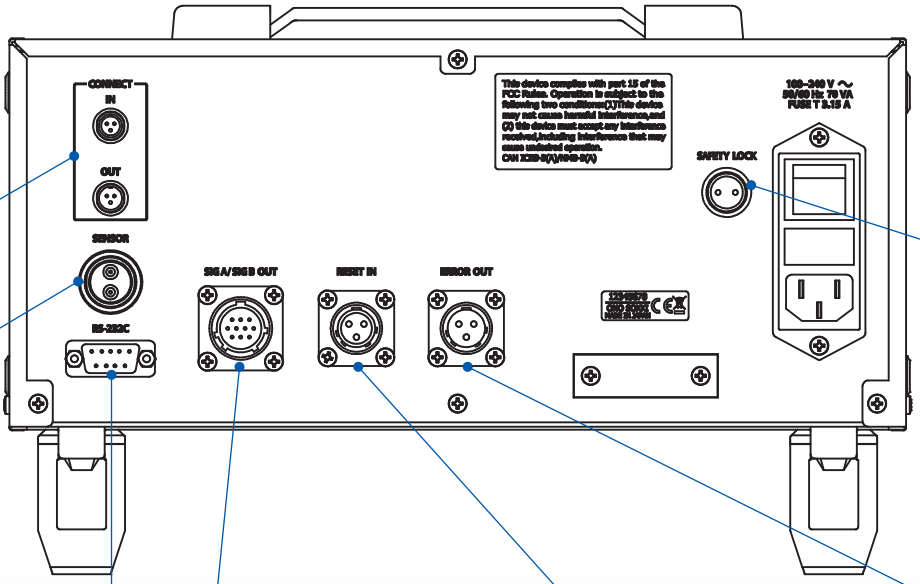
VELOCITY

The detecting velocity range is 0 to ±1800 m/min (MAX). You can select HIGH RESOLUTION range for the target moving with very small velocity.

LPF

Selects the Lowpass filter according to the velocity of the target object to be measured. The band is widen (from DC to 5 kHz)* when it turns OFF.

*Please refer to page 12 for details.



SAFETY LOCK

Normally used by short-circuiting the pins with connecting the supplied safety lock connector. Connect to area sensor or interlock as necessary.

ERROR OUT

Connector for outputting the singnal when the ERROR indicator illuminates in red with the amount of received laser beam being excessive or deficient.

RS-232C

SIG A / SIG B OUT

Connector for outputting phase difference signal corresponding to the distance/length.
You can retrieve the signal to various counters for controlling.

RESET IN

Connector to input a signal for resetting (zero reset) a measured value displayed on the display panel. Can be used for remotely operating the LENGTH RESET switch during measurement of distances.

Application

More correct understanding of phenomena, more precise evaluation, and quality improvement of materials or parts.

- Building materials・Sheet
- Printing machine・Printer・ Office automation equipment
- Carrier machine・Convayor・Belt

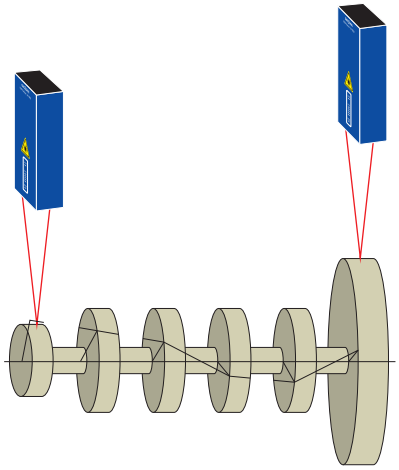
- Converting
- High function film
- Woven fabric・Nonwoven fabric・Textile

- Transmission machine・Pulley・ Transmission belt
- Take-off line・Cutting to standard length
- Tire・Roller

- Plastic・Rubber・Resin
- Wire・Copper wire・Thread
- Paper・Fiber

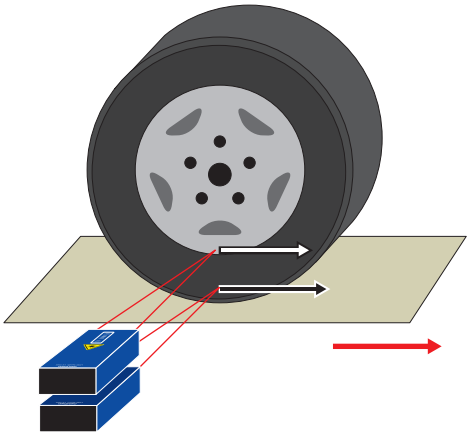
Torsion・ torsional vibration measurement

Transmission machine, Drive-train, Rotating shaft, Turbin, Forged crankshaft



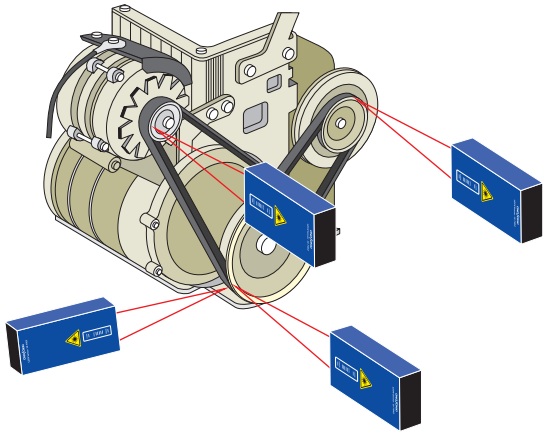
Behavior measurement between a tire and grounding surface

Velocity difference, Peripheral velocity change・difference, Torsion deformation, Slip



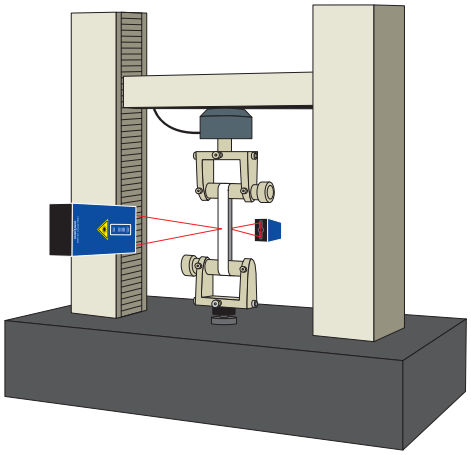
Behavior measurement of pulley/ belt

Velocity, slipping, expand or contract, and differential of a belt, Crank pulley, Alternator, Compressor, Compression machine



Measurement for material evaluation

Stretching position detection, Difference detection of stretching position, and stretching velocity, Behavior of compression/stretching

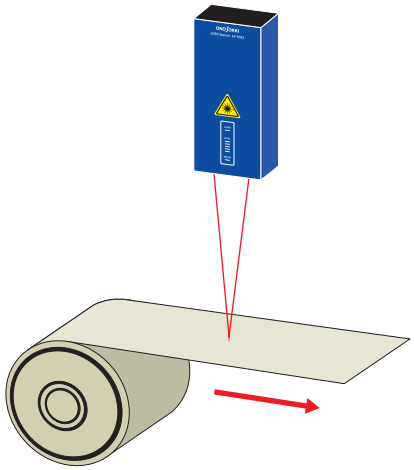


Promises a reduction in wasted material

Paper: Feeding velocity•irregular velocity, meander amount, length	Roller: Irregular velocity, irregular rotation, position
Belt: Irregular velocity, meander amount, length	Hydraulic cylinder, actuator: Extending and retracting velocity
Gear reducer: Irregular rotation velocity, transmission error	Roll, film: Slip, velocity difference
Belt: transmission, slip	Extruder, take-off machine: Velocity, length
Torsion vibration	Wire, pipe: Feeding length, return length

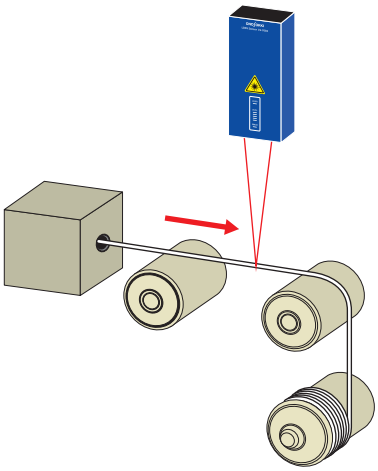
Velocity • Irregular velocity measurement

Paper, film, rubber, woven cloth, nonwoven cloth, textile, plastic



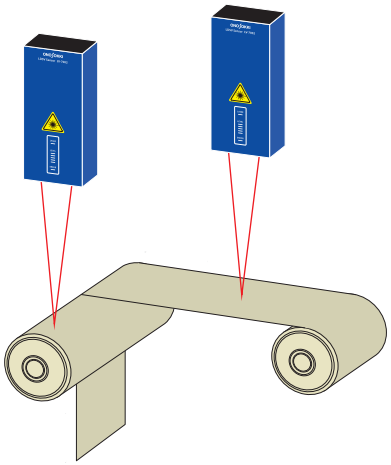
Length measurement when winding

Thread, copper wire for elevator, hose, harness, coated wire material



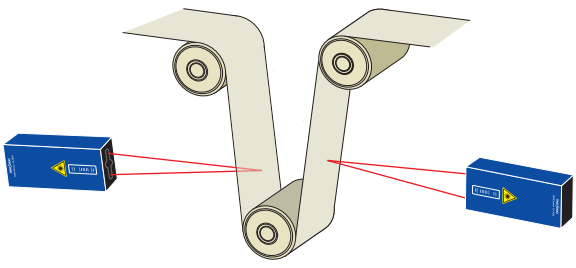
Slipping amount measurement at conveying

Printer, photo copying, scanner, paper, woven cloth, nonwoven cloth, textile, plastic



Vertical • negative gradient of conveyance

Velocity and velocity irregularity at points of 90-degree and even over-90-degree change of transport direction including paper, film, rubber, woven cloth, nonwoven cloth, texile, plastic etc.

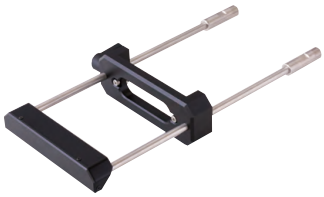


System Configuration

Detection, data processing and analysis・Fully supported by Ono Sokki

Option

90-degree beam bending mirror



This is optic jig to bend the laser light to ±90 degrees. Measurement of the object which is in a narrow place or in a gap between instruments is possible with this option.

※made to order

Sensor suspension adapter

Mounting this sensor adapter offers additional sensor attachment points, enabling the sensor to be held upright or directly downwards. With the adapter, the target can be measured by sensors from four different angles.

※made to order

LV-0030 Large magnet stand

This is an exclusive magnet stand for sensor suspension. Free laser radiation is available with two joints. Assembly with the LV-0015/0016 fine-positioning stage enables the minute position adjustment.

LV-0015 Fine-positioning XY stage

Assembly with the LV-0030 Large magnet stand enables minute position adjustment. Simple position adjustment is possible with individual use.

Stage surface : 60×60 mm
Moving distance : ±5 mm

LV-0016 Fine-positioning Z stage

Precise up and down movement to the Z-axis direction is possible with this stage. Assembly with the LV-0030 Large magnet stand enables focusing of laser light or image, and minute position adjustment of horizontal direction.

Stage surface : 60×60 mm
Moving distance : 0 to 10 mm

LV-0017A Large tripod

The LV-0017A supports the sensor suspension which is in a place without surface plate or high position. Magnetized fixing of sensor or large magnet stand (LV-0030) is available by using a steel plate.

Accessory
LV-0018A : Steel plate

LV-7100
Laser Doppler Surface Velocity Meter Controller

Velocity output ±10 V

LV-0772
Connection kit
(connection cable/ metal fittings for connection)

Distance・length, phase difference output

RS-232C

LV-7000 series
Laser Doppler Surface Velocity Meter

RV-3150
Reversible counter

Displacement・dimension

PLC

Production line control

Waveform analysis device

Up to 40 kHz(102 kS/s)
Up to 100 kHz(256 kS/s)

Data Station
DS-3000 series

ORF
wav
txt

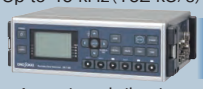
Up to 100 kHz(256 kS/s)

ORF

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

Waveform recording device

Up to 40 kHz(102 kS/s)



ORF

Acoustic and vibration portable recorder
DR-7100

Voltage waveform observation instrument

Time-series data analysis software OS-2000 series

Waveform analysis
- Standard frequency analysis
- Cross frequency analysis
- 1/N octave analysis
- Constant width tracking analysis
- Sound quality evaluation
- Fluctuation sound analysis
- Basic statics analysis
- 2 variable analysis
- 3 variable analysis

Signal processing
- Moving average
- Simple calculation
- Search value extraction processing
- Time-axis differential and integral calculus
- Hilbert transform
- Taper processing
- Level adjustment
- Re-sampling
- Digital filter (FIR, IIR)
- Inter-channel calculation
- F/V convertor

※Please refer to exclusive brochures for more details of DS-3000 series, CF-9000 series, DR-7100, and OS-2000 series.

LV-0772 Connection kit

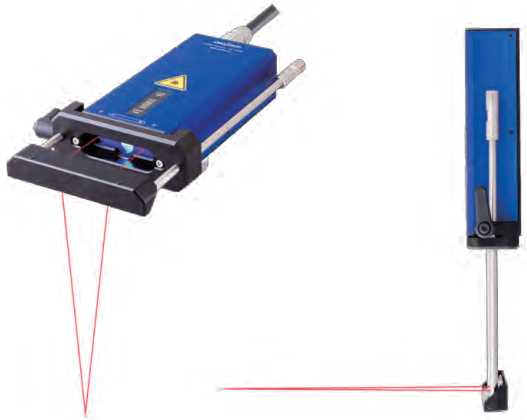
The LV-0772 connects two LV-7100 Laser Doppler Surface Velocity Meter Controllers to make the detection of 2 channels easy. Simultaneous distance/ length reset of two units are available by connecting them.

LV-0791 Storage trunk

In addition to the LV-7000 system set, optional equipment including a large magnet stand, sensor suspension adapter etc. can be stored in this dedicated storage trunk.

Included equipment
- LV-7002 × 1
- LV-7100 × 1
- LV-0703 or LV-0705 × 1
- LV-0030 × 1
- LV-0015 × 1
- LV-0016 × 1
- 90-degree beam bending mirror
- Sensor suspension adapter
- Instruction manual
- AC cable

90-degree beam bending mirror <Example of usage>



Sensor suspension adapter <Example of usage>

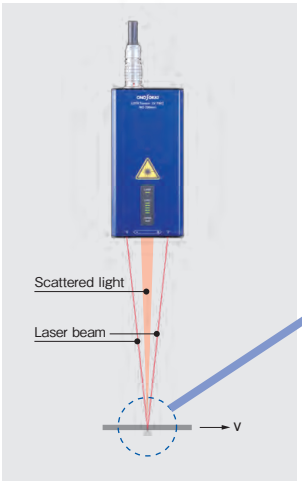
Measurement Principle

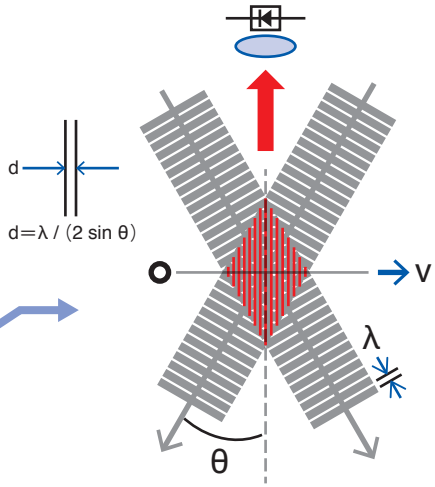
Measurement principle 1
～Detection of moving object velocity～

1) Interference fringe is generated in the intersection of 2 laser beams in angle at 2θ.
2) Particle passes through in the range of interference fringe. (Particle=target object)
3) When the particle passes through the interference fringe, the laser beam is lighted in alternate shifts as light > dark > light > dark….

The frequency of the scattering bright and dark fringes caused by the particle can be expressed using the equation f = v/d where v is the velocity of the particle and d is an interval of the fringes.

4) Based on the scattered light (back scattering) received by the light detecting part of the sensor, the frequency f is calculated.
5) The interval d of interference fringe is fixed, so the velocity v is able to be obtained.



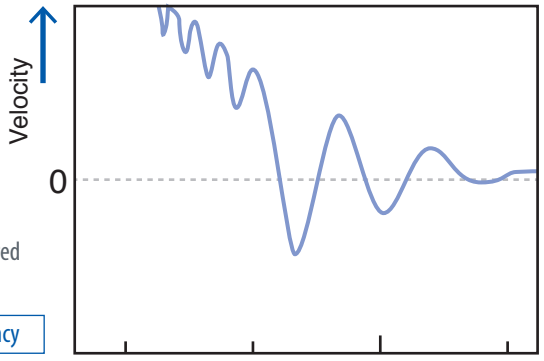


Measurement principle 2
～Detection of variation direction, polarity～

Unless the direction and polarity of the moving target are known, its velocity fluctuation and other irregularities cannot be detected. To solve this issue, the frequency of one of two laser beams is shifted using acousto-optic modulators (AOMs) so that the interference fringes move at a velocity corresponding to the frequency shift ⊿f to make it possible to detect the direction and polarity of velocity v.

The direction and polarity are determined by whether the frequency strength f ' of the scattered light which has been detected at receiver is higher or lower compared to the shift frequency.

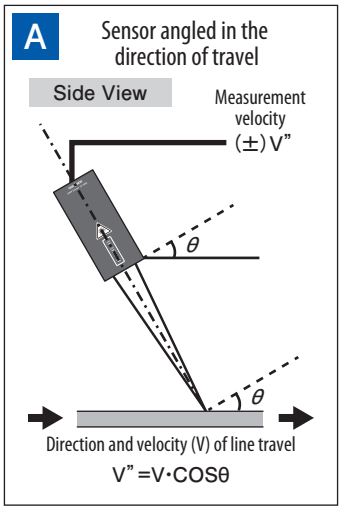
f ' < ⊿f:Frequency lower than shift frequency f ' > ⊿f:Frequency higher than shift frequency

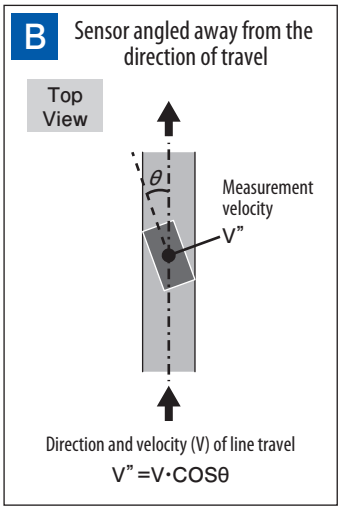


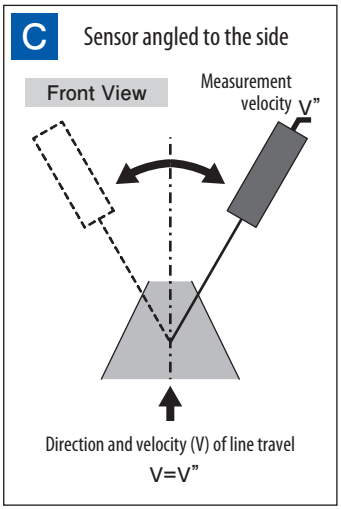
Sensor location relative to the target and associated error

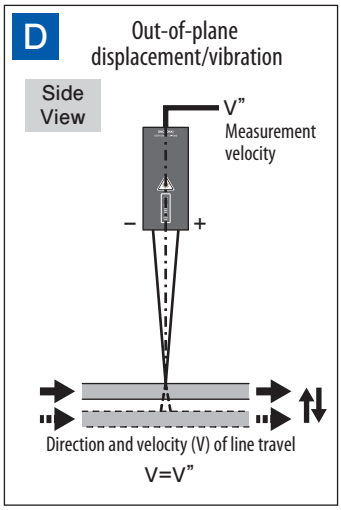
Measurements can have errors depending on the location of the sensor relative to the target. By knowing the relationships between the relative locations and measurements, even better results can be obtained.

Sensor location relative to the target	Impact on measurement accuracy	Note
A Sensor angled in the direction of travel	Smaller-than-actual velocity	Velocity smaller by the magnitude of the angle (cosθ)
B Sensor angled away from the direction of travel	Smaller-than-actual velocity	Velocity smaller by the magnitude of the angle (cosθ)
C Sensor angled to the side	None	Signal-to-noise ratio needs to be monitored for a possible drop.
D Out-of-plane displacement / vibration	The greater the vertical displacement, the lower the accuracy.	Please refer to the specification for the LV-7002.









Specification

LV-7002 Laser Doppler Surface Velocity Sensor

Detection method	Laser Doppler system, back-scattering differential type		
Detection polarity	"+" when moving from the left to the right of the front of the sensor		
Distance accuracy	±0.2 % or less	At 25 ℃ by distance evaluation on the standard surface by Ono Sokki.	
Laser beam	Laser safety class	Class 2	IEC60825-1:2007:2014（JIS6802:2014）
	Measuring laser light	λ=1550 nm	
		less than 10 mW	CW oscillation
	Aiming laser light	λ= 635 nm	
		less than 1 mW	CW oscillation
	Laser beam spot size	2 mm × 1 mm oval	Long span in a direction parallel with a moving object
	LD light source life	Aiming light source:10000 hours or more (25℃) * Theoretical calculated value	When the output light is less than specified range, the LASER LED at controller side is flashed and the measurement light is turned off.
		Measurement light source：10000 hours or more *Theoretical calculated value	
Detection length	Center of detection length	200 mm *from the bottom surface of the sensor	
	Detection range (depth)	±4 mm detection accuracy:±0.2 (of reading) % or less	*Length evaluation by our standard plane at 25℃.
		±10 mm detection accuracy:±5 (of reading) % or less	
Detection velocity	Scale factor	Automatically read out to the controller from the sensor.	
	Detection velocity range	0 to ±1800 m/min	
	Maximum tracking acceleration	800 m/s² or more	
Sensor suspending	Screw hole for LV-0030 Large magnet stand	Thread nominal diameter: M8	Appropriate tightening torque requirement (6 N･m: corresponds to 0.5T type)
		Number of holes: 1	
		Position： Sensor reference surface part, detection center axis	
		Depth： 8 mm or more	
	Screw hole for sensor suspension	Thread nominal diameter:M4	Appropriate tightening torque requirement (1.5 N･m) Increased strength by helical insert processing
		Number of holes: 4	
		Position： Sensor reference surface part, four corners	
		Depth： 4 mm or more	
Option	Screw hole for 90-degree beam bending mirror	Thread nominal diameter： M3	Appropriate tightening torque requirement (0.6 N･m) Increased strength by helical insert processing
		Number of holes: 2	
		Position: Sensor front surface part	
		Depth: 3 mm or more	
Light receive sensitivity monitor	Light receive signal level(SIG LEVEL)	Displays the light reception level in 5-segment LED (green)	
	Light receive signal error(ERROR)	LED (red) lights up when demodulation error is occured.	
Laser radiation monitor(LASER)	LED (green) lights up when laser for measurement is radiated.		
Outer dimensions	W 75 mm x H 40 mm x D 155 mm		
Weight of the main unit	Approx. 750 g	Not including option/ cable	
Conforming standard	Laser safety	FDA 21CFR Part 1040.10（CDRH）	
		IEC60825-1:2007:2014	
		JIS C 6802:2007:2014	
	EMC standard	FCC（Part15B）:2015	
		CANADA EMI standard (ICES-003):2016	
		EN61326-1:2013 class A Table2	
	Safety	EN61010-1:2013	
Operating environment	Temperature range	0 to 40 ℃	
	Humidity range	20 to 80 % (with no condensation)	
Storage environment	Temperature range	-10 ℃ to 50 ℃	
	Humidity range	20 to 80 % (with no condensation)	

Specification

LV-7100 Laser Doppler Surface Velocity Meter Controller

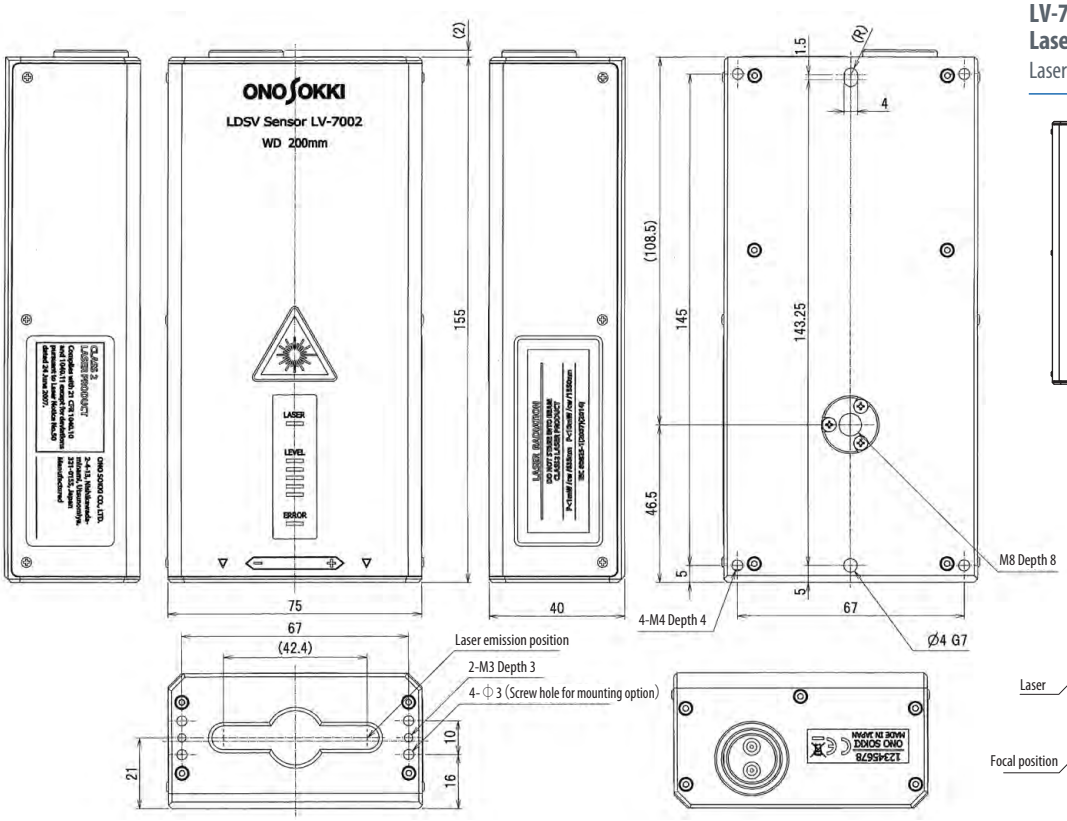
Sesnor input	1	Rear panel side			
Detection velocity	Detection velocity range	0 to ±1800 m/min			
	Tracking acceleration	800 m/s²(MAX)	When【FAST】is selected at RESPONSE.		
		400 m/s²(MAX)	When【SLOW】is selected at RESPONSE.		
Velocity output (VELOCITY OUT)	Output voltage	±10 V(20 V p-p)	When input side impedance is 100 k Ω or more. *Short circuit protection		
		Polarity	"+ voltage" when moving from the left to the right of the front of the sensor "- voltage" when moving from the right to the left of the front of the sensor *Reversible		
	Output impedance	50 Ω or less	Should be received at 100 kΩ or more of impedance (input side).		
	Output terminal format	BNC (receptacle)	Front panel side		
	Cutoff frequency	5 kHz	LPF GAIN fc=-3 dB		
	Velocity range (VELOCITY-RANGE)	Select with the button in the [RANGE] on the front panel			
		180(m/min)/V	Measurement lower limit: 0.54 m/min or less in rms value*1		
		50(m/min)/V	Measurement lower limit: 0.50 m/min or less in rms value*1		
		10(m/min)/V	Measurement lower limit: 0.03 m/min or less in rms value*1		
		1(m/min)/V	Measurement lower limit: 0.003 m/min or less in rms value*1		
		1(m/min)/V (HIGH-RESOLUTION) fc=10 Hz	Resolution: 0.01 m/min or less in rms value*1 *GAIN fc=-3 dB		
		Velocity range over	LED (red) lights up when upper limit of each range is 1 % over.		
	Linearity ※ Excluding DC offset	180(m/min)/V	±1 % (F.S) or less		
		50(m/min)/V	±1 % (F.S) or less		
		10(m/min)/V	±2 % (F.S) or less		
		1(m/min)/V	±5 % (F.S) or less		
		1(m/min)/V (HIGH-RESOLUTION) fc=10 Hz	±5 % (F.S) or less		
	DC offset	180(m/min)/V	±90 m/min or less	※With in the operating temperature range	
		50(m/min)/V	±25 m/min or less		
		10(m/min)/V	±5 m/min or less		
		1(m/min)/V	±0.5 m/min or less		
		1(m/min)/V (HIGH-RESOLUTION) fc=10 Hz	±0.05 m/min or less		
	Low-pass filter (VELOCITY-LPF)	Select with the button in the [LPF] on the front panel			
		1 kHz	GAIN fc=-3 dB (allowance ±2.0 dB)		
		300 Hz			
		OFF	GAIN fc=5 kHz(-3 dB)		
Phase difference output (SIG A / SIG B)	Output waveform	2-phase square wave output			
	Output format	Line driver output	Hi:2.5 V or more		
			Lo:0.5 V or less		
			Response time: up to 1 MHz		
		Totem-pole output	Hi:10.5 V or more		
			Lo:0.5 V or less		
			Response time: up to 100 kHz		
	Phase difference	90 °±60 °	T:cycle T/4±T/6		
	Duty ratio	50 %±20 %	T:cycle T/2±T/5		
	Shape of output terminal	NJC-2010-RF (receptacle)	Rear panel side	made by NANABOSHI ELECTRIC MFG CO.,LTD.	
	Pulse width (A,B Phase)	Dividing ratio 1	The phase difference and the duty ratio above		
		Dividing ratio 2			
		Dividing ratio 4			
		Dividing ratio 8			
		Dividing ratio 16			
		Dividing ratio 32			
		Dividing ratio 64			
		Dividing ratio 128			
		Dividing ratio 256			
	Pulse width selection	Dip-switch setting	Rear panel side		
Display section	Display unit	7-segment LED (green)			
		7-digit + polarity (1-digit)			
		Decimal point	Fixed in the unit or velocity range		
		Display update interval	0.1 s		
		Max. display length	9999.999 m		
		Distance reset	0 reset the distance in the front panel side【LENGTH RESET】 0 reset the distance in the rear panel side【RESET IN】		
	Unit selection	Selectable with【UNIT SELECT】button on the front panel			
		Speed	m/s, mm/min, m/min		
		Distance	m, mm		
	Display of signal level reception error	Flashing display			
	Display while searching	[-] display			
	Display of scale factor error	Displayed "8.8.8.8.8.8.8.8." by 7-segment LED			
	Display of Max. distance	Flashing display			

Light receive monitor	Light receive signal level display (DETECT-LEVEL)	10-segment LED (green) array display		
	Light receive signal level output (LEVEL OUT)	Output terminal format	BNC (receptacle)	Front panel side
		Output signal	0 to 14V	
			Proportional to light receive signal level	
		Frequency response	GAIN fc=5 kHz (-3 dB)	
	Light receive signal level error display (DETECT-ERROR)	LED (red) lights up when the light receive level is decreased.		
	Light receive signal level error output (ERROR OUT)	Output terminal format	NJC-163-RF (Receptacle)	
		Output method	Open collector (negative logic)	
		Output withstand voltage	30 V or less	
		Sync current	50 mA or less	
	Search(DETECT-SEARCH)	Search operation with [SEARCH] button on the front panel		
Serial interface (RS-232C)	Standard	RS-232C		
	Connector	D-sub 9-pin	Rear panel side	
	Communication specification	Communication method	Asynchronous full-duplex	
		Data signal speed (bit/ second)	19200	
		Character length	8 bits	
		Parity bit	None	
		Start bit	1 bit	
		Stop bit	1 bit	
		Terminator	CR+LF	
		Flow resistance	None	
Polarity switch (+ / -)	Polarity inversion with the [+/-] button on the front panel	Polarity inversion of digital display		
		Polarity inversion of velocity output voltage		
	LED (red) lights up while polarity inversion period			
Distance reset input (RESET IN)	Terminal format	NJC-163-RM (Receptacle)	Rear panel side	
	Input method	Non-voltage a contact		
Safety lock connection (SAFETY LOCK)	Input terminal format	RM12BRD-2S (Receptacle)	*Short-circuit processing part is supplied as standard.	
	Input method	Non-voltage a contact input		
		Laser is radiated when device is short circuited.		
Laser radiation ON/OFF (LASER)	ON/OFF with the [LASER] button on the front panel	LED (green) lights on when it is ON		
	Warning display	Aiming laser's lifetime warning	Flashing approx. 1s interval	
		Laser light failure	Flashing approx. 0.1s interval	
	Fail safe function	Always start with LASER OFF when the power is ON. *Can be modified to the operation board type which starts laser emission when the power is turned ON.		
Laser receiving level setting (DETECT-LOW to HIGH)	Laser receiving level setting	4 ranges	*LOW is selected at the time of shipment.	
	Select with the button in the [LOW to HIGH] of the front panel.			
Key lock ( )	Select with the button in the [KEY LOCK] selection switch of the front panel.			
	Select	Press and hold the button for approx. 2 seconds.	* LED (white) flashes while selecting.	
	Cancel	Press and hold the button for approx. 2 seconds.		
	Key locked range	Lock all key operation except [LASER] ON/OFF		
Controller connection (CONNECT IN / OUT)	Signal connection	Number of connection units	Max. 2 with electrical connection	
		Function when connected with a cable	Resets the distance of LV-7100 (2 units) at the same time.	
	Case connection	Connecting two LV-7100 on top and bottom positions (stacking) are available.	*LV-0772 Connection kit is required.	
Operating environment	Temperature range	0 to 40 ℃		
	Humidity range	20 to 80 %	With no condensation	
Storage environment	Temperature range	-10 ℃ to 50 ℃		
	Humidity range	20 to 80 %	With no condensation	
Power requirement	Input voltage	100 to 240 VAC		
		50/60 Hz		
	Power consumption	Less than 70 VA		
Power switch	ON/OFF by locker switch	Rear panel side		
Cooling of main unit	Forced-air cooling			
Outer dimensions	W 310 X H 135 X D 176	Excluding handle/ protruded section		
Weight	Approx. 3 kg	Controller only		
Accessory	AC power cable ×1	YC-1 2M GY	For Japan use (for AC100 V)	
	SAFETY LOCK connector ×1	RM12BPE-2PH (processed short circuit)	HIROSE ELECTRIC CO., LTD.	
	RESET IN connector ×1	NJC-163-PF	Nanaboshi Electric Mfg.Co,Ltd.	
	ERROR OUT connector ×1	NJC-163-PM	Nanaboshi Electric Mfg.Co,Ltd.	
	SIG A/SIG B OUT ×1	NJC-2010-PM	Nanaboshi Electric Mfg.Co,Ltd.	
	Signal cable (1.5m) ×2	MX-101		
	Backup fuse ×1	T3.15A AC250 V	Stored in a fuse holder of main unit.	
	Instruction manual ×1			

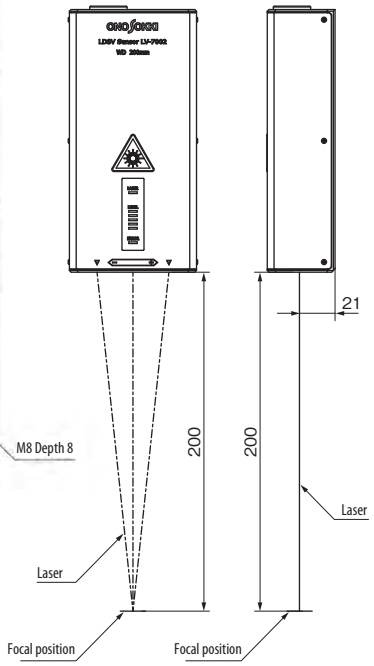
*1：Condition (FFT Power Spectrum, 5 kHz range measurement by using reference measurement target, PEAK value.)

Outer Dimensions (Unit : mm)

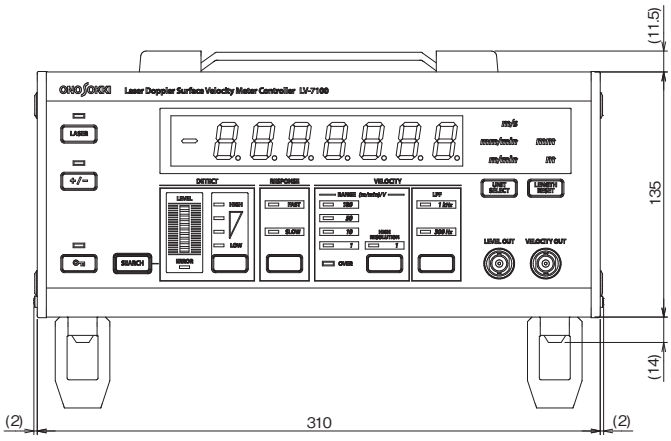
LV-7002 Laser Doppler Surface Velocity Sensor

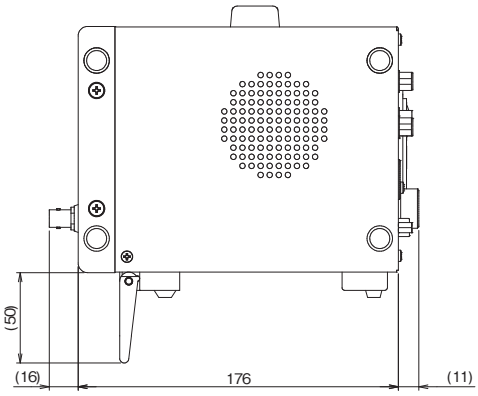


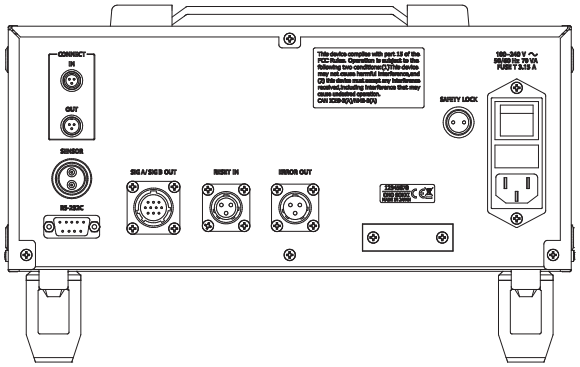
LV-7002
Laser Doppler Surface Velocity Sensor
Laser optical path, focal point position



LV-7100 Laser Doppler Surface Velocity Meter Controller

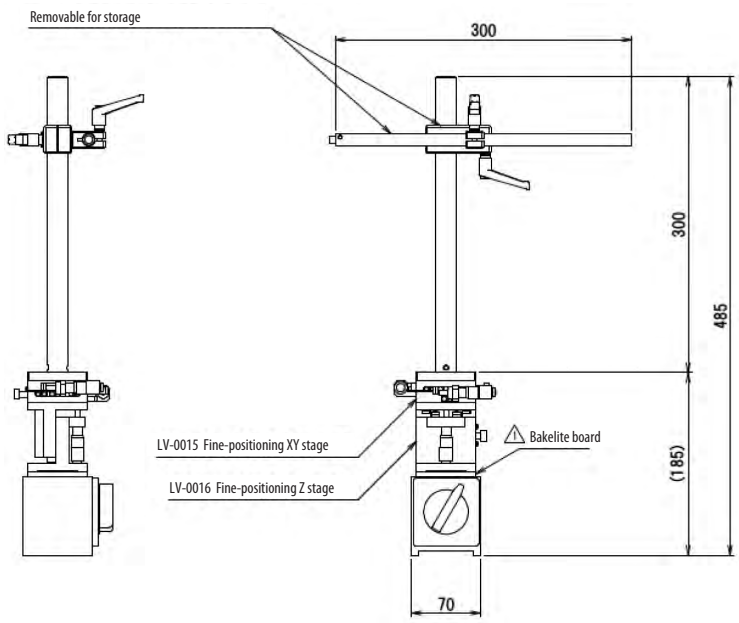




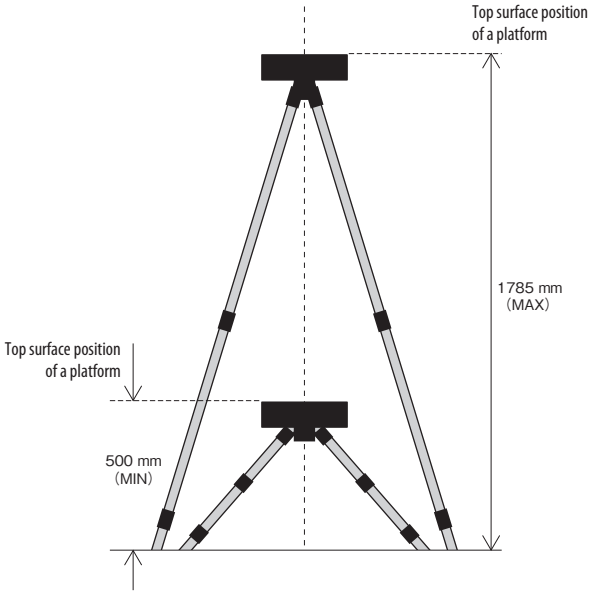


LV-0030 Large Magnet Stand

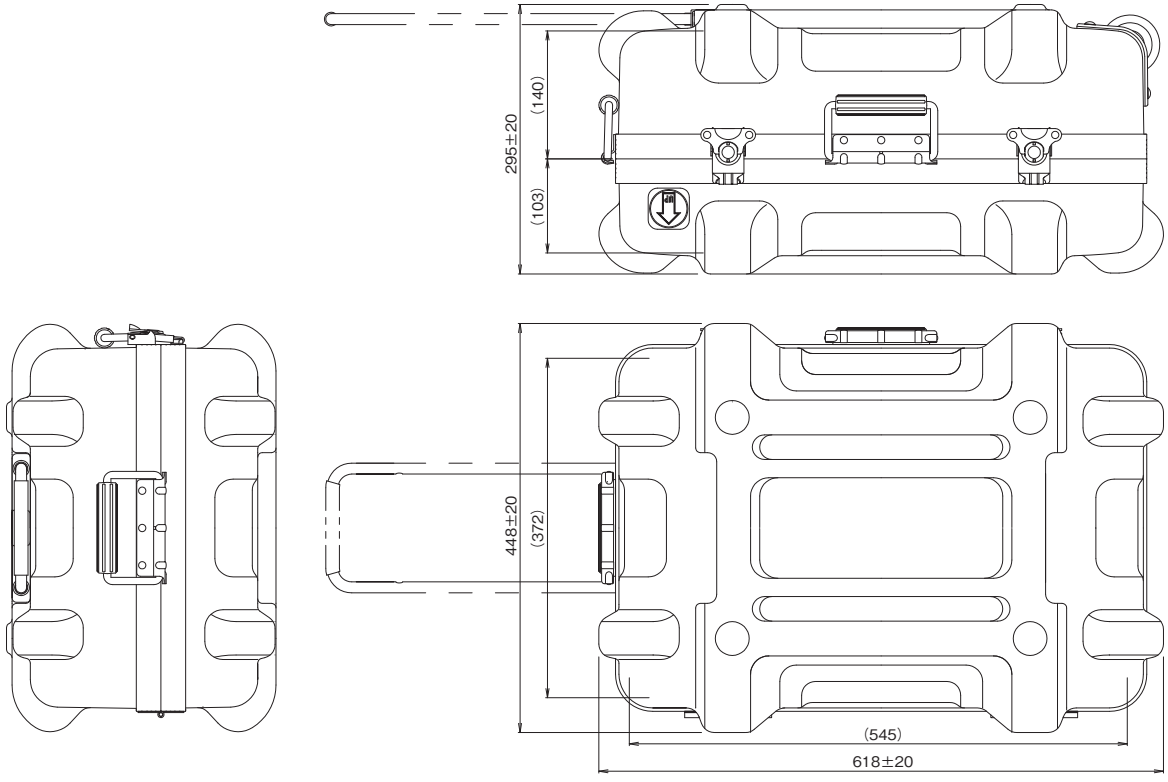
LV-0015 Fine-positioning XY stage
LV-0016 Fine-positioning Z stage



LV-0017A Large Tripod



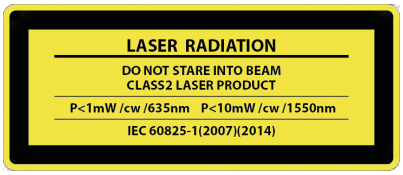
LV-0791 Storage Trunk

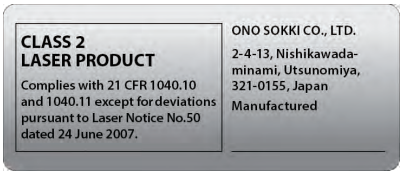


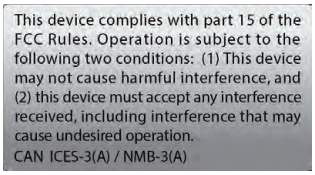
LV-7000 series Laser Doppler Surface Velocity Meter

Model name	Product name	Description
LV-7002	Laser Doppler Surface Velocity Sensor	WD=200 mm
LV-7100	Laser Doppler Surface Velocity Meter Controller	———
LV-0703	Sensor cable	3 m
LV-0705	Sensor cable	5 m
LV-0772	Connection kit	2 sets, for LV-7100
LV-0791	Storage trunk	Storage for 1 set

Label







Peripherals

RP-7400 series Roller Encoder

120·200 P/R
1200 P/R

■Feature

- Number of pulses:
  Selectable from
  120, 200 or 1200 P/R
- Output method (4 types)
  - Totem-pole output (standard)
  - Emitter output (option)
  - Collector output (option)
  - Open collector output (option)

■Specification

Roller circumference	: 200 mm (tolerance :0 to -0.2 at 20°C)
Output pulse	: for velocity : 120 P/R,1200 P/R for length : 200 P/R
Velocity 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; 10 V or more, Lo; 0.5 V or less
Output method	: Totem-pole output (standard) Emitter output (option) Collector output (option) Open collector output (option)
Applicable detector	: RV-3150, TM series
Operating temperature range	: 0 to 50°C
Vibration resisntance	: 19.6 m/s² (2 hours for each 3 directions) 10 to 150 Hz sweep, 20 cycles
Power requirement	: 12 VDC±5 % (100 mA or less)
Weight	: Approx. 400 g

RV-3150 Reversible Counter

■Feature

- Multiple ratio selection,
  ratio compensation, offset,
  decimal point selection,
  counting direction selection
- External output: comparator
  (Setting for comparator: 4 types
  are able to be saved as conditions.),
  Analog, BCD, RS-232C

■Specification

Sensor input signal	: Single phase or 90-degree phase difference square waveform Voltage signal (Hi; 4 to 30 V, Lo; 0 to 1 V) line receiver (conforms to RS-422A)
Input frequency range	: DC to 100 kHz
Power supply for sensor	: 5±0.25 VDC,12 ±0.6 VDC (select either of them)
External control signal	
Input signal type	: Reset, gate, offset, key protect
Input signal format	: Voltage input (Hi; 4 to 5.25 V, Lo; 0 to 1 V) Non-voltage contact input
Function	: Number of multiplyings (1/2/4) Ratio (0.000001 to 0.999999), offset (0 to ±999999), comparator (setting range:0 to ±999999, 2-stage)
Outer dimensions	: 144 (W) x 72 (H) x 180 (D) mm (not including protruded section)
Power requirement	: 100 to 240 VAC, 50/60 Hz
Weight	: Approx.1.3 kg

ONO SOKKI

WORLDWIDE ONO SOKKI CO., LTD.
1-16-1 Hakusan, Midori-ku, Yokohama, 226-8507, Japan
Phone : +81-45-935-3918 Fax : +81-45-930-1808
E-mail : overseas@onosokki.co.jp

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

U.S.A.
Ono Sokki Technology Inc.
2171 Executive Drive, Suite 400,
Addison, IL. 60101, U.S.A.
Phone : +1-630-627-9700
Fax : +1-630-627-0004
E-mail : info@onosokki.net
http://www.onosokki.net

THAILAND
Ono Sokki (Thailand) Co., Ltd.
1/293-4 Moo.9 T.Bangphud
A.Pakkred,
Nonthaburi 11120, Thailand
Phone : +66-2-584-6735
Fax : +66-2-584-6740
E-mail : sales@onosokki.co.th

INDIA
Ono Sokki India Private Ltd.
Plot No.20, Ground Floor, Sector-3,
IMT Manesar Gurgaon-122050,
Haryana, INDIA
Phone : +91-124-421-1807
Fax : +91-124-421-1809
E-mail : osid@onosokki.co.in

P.R.CHINA
Ono Sokki Shanghai Technology Co., Ltd.
Room 506, No.47 Zhengyi Road, Yangpu
District, Shanghai, 200433, P.R.C.
Phone : +86-21-6503-2656
Fax : +86-21-6506-0327
E-mail : admin@shonosokki.com

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