LAT-1000A Series

●300 N

6-component Force Measuring System

Configuration

- 6-component force transducer LAT-A
- Signal processor FDP-106A
- PC (Not included)

General Specifications

Rated Capacity	See table below.
Safe Overloads	120%
Nonlinearity	Within ±0.5% RO
Hysteresis	Within ±0.5% RO
Interference	±0.8% RO
Maximum Error	±1.5% RO but ±3% RO for LAT-KA-2
Resolution	0.05% FS
Temperature Effect on Zero	Within ±0.25% RO/°C
Temperature Effect on Output	Within ±0.05%/°C
Compensated Temperature	0 to 50 °C

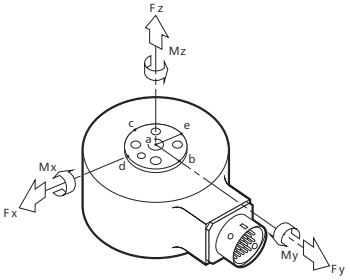
Specifications stated above are values measured with our calibrators under Kyowa's standard conditions.

Models	Rated Capacity					
	Fx (N)	*Fy* (N)	*Fz* (N)	*Mx* (N·m)	*My* (N·m)	*Mz* (N·m)
LAT-1030KA-1	300	300	300	10	10	10
LAT-1030KA-2	300	300	300	20	20	20

Enables Highly Accurate Measurement Possible to compensate interference by Arithmetic Processing.

Each system in the LAT-1000A series consists of the LAT-A 6-component force transducer and the FDP-106A signal processor. The LAT-A simultaneously detects 3-component force in 3 axial directions orthogonal (At the right angle) to the transducer and 3 moments around the 3 axes. The FDP-106A automatically eliminates interference components contained in transducer output by calculation. By minimizing errors due to interference, the system enables highly accurate measurement of both single and multiple component force loads.

- ●5-V output available at the rated load
- ●To guarantee measurement accuracy, performance with multiple component force loaded is indicated as a maximum error (see note on the next page).
- ●Highly accurate measurement possible even under multiple component force loaded
- ●Simultaneous sampling of 6-component force and processing signals up to approximately 300 Hz possible
- ●The compact & lightweight transducer is strain gage based and is cased with a highly rigid special aluminum alloy.
- ●Calibration coefficient is preset in the signal processor, enabling immediate measurement by connecting a monitor indicator.
- ●Force and moment are read directly on a PC if connected.
- ●Direct reading mode is provided to read force and moment at the load point.
- ●High & low limit and hysteresis width of the high & low limit are set to alarm output.



6-component Force Transducer LAT-A Specifications

Rated Capacity	*Fx, Fy, Fz*=300 N
	Mx, My, Mz=10, 20 N·m
	See table above for combinations.
Safe Overloads	120%
Natural Frequencies (With all models)	*Fx, Fy* : Approx. 2.3 kHz, Fz: Approx. 5.5 kHz
	Mx, My : Approx. 8 kHz, Mz: Approx. 4 kHz
Recommended Excitation	2.5 VDC
Safe Excitation	5 VDC
Input Resistance	58.3 Ω±10%
Output Resistance	350 Ω±2%
Compensated Temperature	0 to 60 °C
Safe Temperature	0 to 70 °C
Temperature Effect on Zero	Within 0.05% RO/°C
Temperature Effect on Output	Within 0.05%/°C
Weight	Each model approx. 250 g (Excluding cable)
Degree of Protection	IP30 (IEC 60529)
Cable	14-conductor (0.3 mm^2) PVC shielded cable, 9 mm diameter,
	with connector plugs at both ends. N-78 for connection to
	FDP-106A (Shield wire is not connected to the case.)
	For displacement and angle of inclination, contact us.

Standard Accessories Communications program, torque wrench, hexagon socket wrench, parallel pins ϕ4 and ϕ8, connection cable N-78

Signal Processor FDP-106A Specifications

Input	Channels: Max. 6 (6-component force)
	Zero balance adjustment: Automatic
	(True electron method)
	Bridge excitation voltage: 2.5 VDC
Analog Output	Channels: 6
	Output: ±5 V (150% the rated output of 6-component
	force transducer may be made ±5 V)
	Resolution: 0.05% FS
	Frequency response: DC to approx. 300 Hz
	Initial setting: ±5V analog output for the rated capacity
	of 6-component force transducer,
	0 mm for coordinates X, Y and Z at the load point
Serial Interface	RS-232C
	Transmission mode: Start-stop synchronized mode
	Baud rate: 9600 bps fixed
	Data: 8 bits, Parity: None, Stop bit: 1
	Transmission contents: Data, setting conditions
	Data format: Binary or ASCII
	Connector: D-Sub 25 pin, female
	PC connection: Optional interface cable for RS-232C
Sampling Frequency	When not using digital output
	0.72 ms/6-channel (Cutoff frequency 366 Hz)
	When using digital output
	22.9 ms/6-channel in binary format (Cutoff frequency 11 Hz)
	45.7 ms/6-channel in ASCII format (Cutoff frequency 6 Hz)
Nonlinearity	Within ±0.05% FS
Calculation Error of compensating Interference	Within ±0.1% FS
Stability	Zero ±0.25 µV/V per °C
	Sensitivity ±0.01%/°C
Functions	Over input checking, automatic zero balance,
	load point correction, alarm
Monitor Indicator	LED
Alarm Output	Open collector
Operating Temperature	0 to 50°C
Operating Humidity	95% RH or less (Non-condensing)
Power Supply	100 VAC
Dimensions	255 W x 88 H x 180 D mm (Excluding protrusions)
Weight	Approx. 2.5 kg

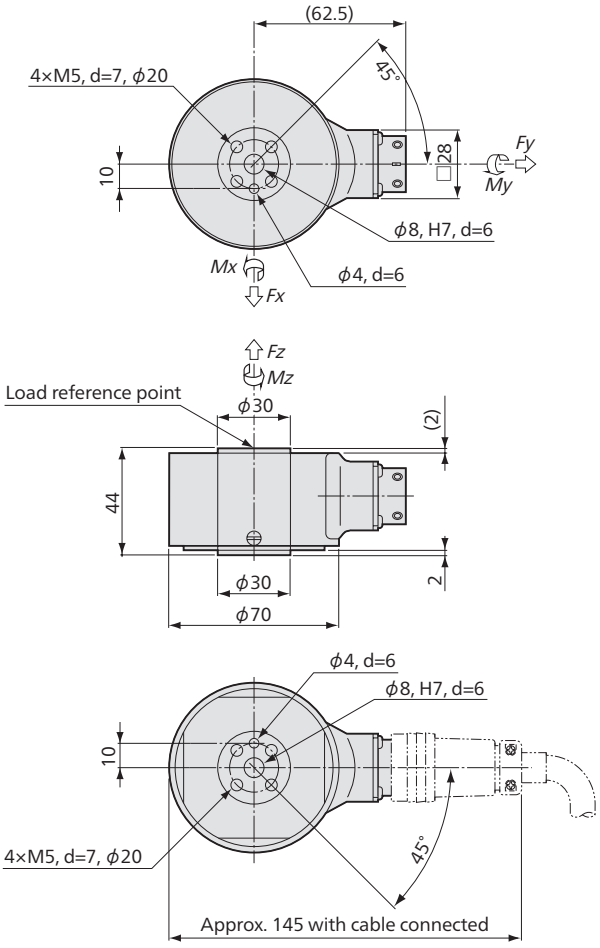
Standard Accessories Output cable U-58 (6 PC.)
AC power cable P-18 with conversion adapter CM-39

Options RS cross cable N-23, Mounting fixture FL-1A

Communication Program (Attached to LAT-A)

Operating Environment	
OS	Window® 7
Memory	64 MB or more
Display	800×600 pixels or more

■Dimensions



Note on Maximum Error

■Definition
A maximum error denotes a maximum deviation in plus and minus directions from the characteristic curve observed when testing devices or equipment according to specified procedures under standard operating conditions.

■Description
Performance specifications of a load cell include nonlinearity hysteresis and repeatability. In the case of a 6-component force transducer, interference is added to these performance specifications. All these specifications apply to a single component force, that is, force or moment in a single direction. However, the 6-component force transducer rarely receives a single component force and detects 2 or more component force. Accordingly, characteristic values for multiple component force should be considered. To solve the problem, a maximum error is newly included in performance specifications of the LAT-A series. The maximum error is obtained as follows: Apply external force F_M of known value to the 6-component force transducer and read resultant output values of *Fx*, *Fy*, *Fz*, *Mx*, *My* and *Mz*. Referring to the magnitude and direction of the external force F_M, calculate 6-component force F_{xM}, F_{yM}, F_{zM}, M_{xM}, M_{yM} and M_{zM}.

A maximum error of *Fx* is calculated using the following equation:
Maximum error of $F_x = (F_x - F_{xM})/F_{xO} \times 100$ (% RO)
for the force in X direction.

Maximum errors of other components are calculated in the same way.
Practically, we tested through simultaneous application of 3-component force in 3 directions and 6-component force/moment in 3 directions and confirmed that the calculated maximum errors satisfy the stated specification.
Thus, the LAT-A series 6-component force transducers are assured of the accuracy in measurement of multiple component force loads, enabling safe operation under any loading conditions.

●Static measurement

LAT-1000A
Recommended products for combination


Signal processor FDP-106A
→ 2-63