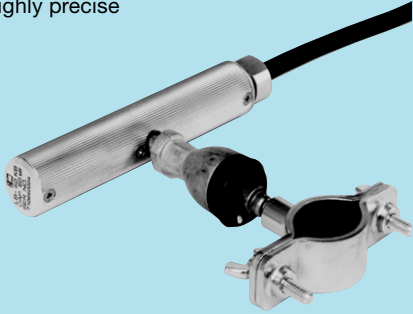

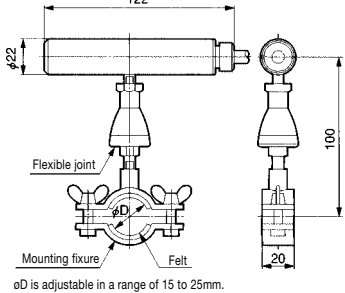
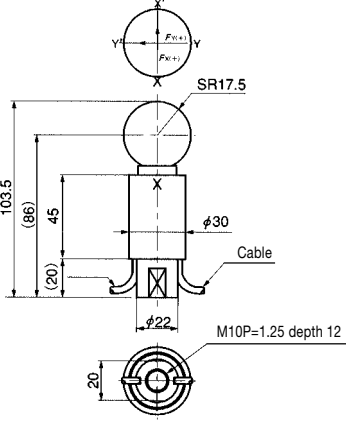
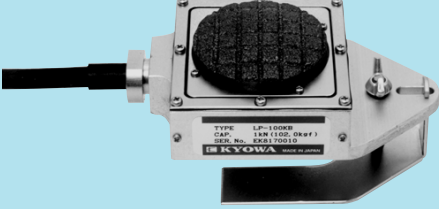
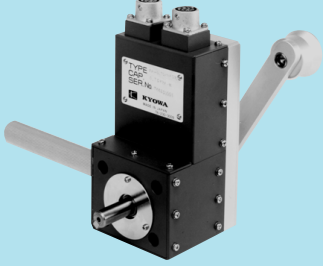
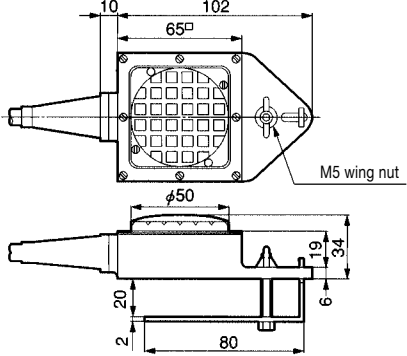
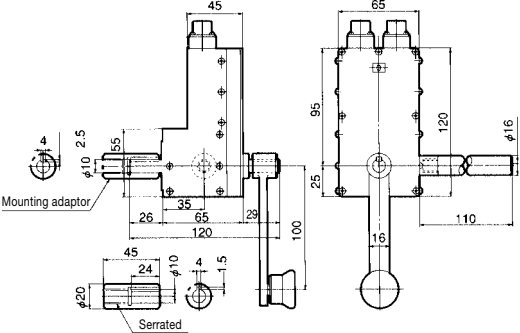
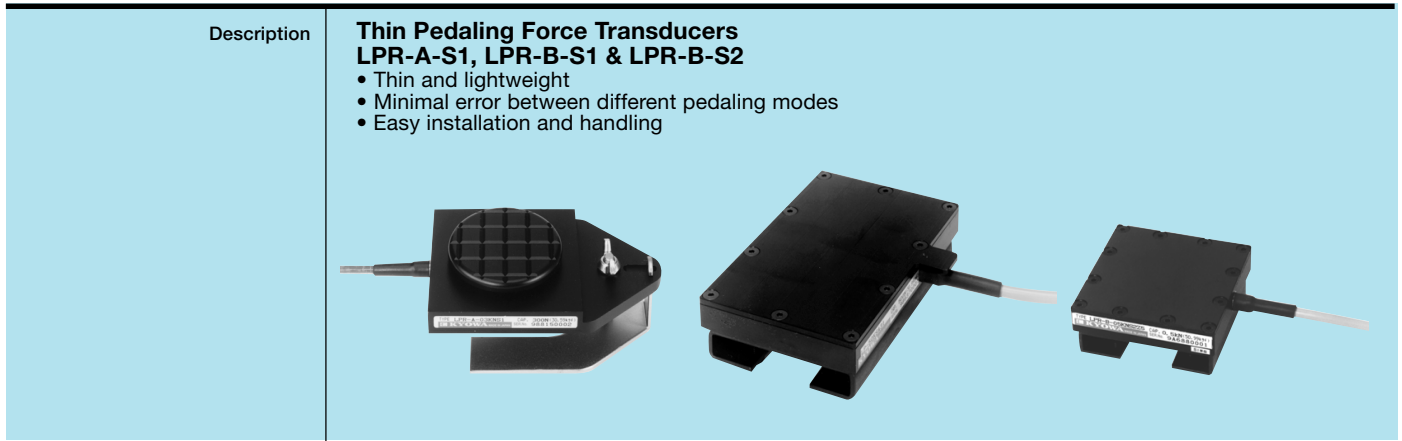


Control Performance Test Sensors

In addition to engine performance test sensors, KYOWA offers a variety of sensors for testing the performance of control units including hand-brake, gear-change lever, pedal and steering. These sensors enable performance testing, as well as safety verification and research into riding comfort. All of them are remote-controllable for operator safety.

Description	Hand Brake Operating Force Transducer LB-B <ul style="list-style-type: none"> • Can be easily installed on any automobile on the market • Highly precise 	Gear-change Lever Operating Force Transducer LSA-A-S1 <ul style="list-style-type: none"> • Small, lightweight and easy to install and handle • Minimal interference between axes to ensure precise measurement • Minimal error between different grip modes 
Rated Capacity (Reference Value)	LB-50KB: 500N (50.99kgf) LB-100KB: 1kN (102.0kgf)	LSA-A-200NS1: 200N (20.39kgf) (with both Fx and Fy) LSA-A-300NS1: 300N (30.59kgf)
Safe Overload Rating	120%	120% (with both Fx and Fy)
Rated Output, Approx.	1mV/V (2000 x10 ⁻⁶ strain) min.	0.5mV/V (1000 x10 ⁻⁶ strain) with both Fx and Fy
Non-linearity	±1%RO	±0.5%RO
Hysteresis	±1%RO	±0.5%RO
Repeatability	±1%RO	Interference between Fx and Fy: ±5%RO
Recommended Excitation Voltage	—	1 to 8V ac or dc
Safe Excitation Voltage	—	10V ac or dc
Input Resistance	350Ω ±1%	175Ω ±2%
Output Resistance	350Ω ±1%	175Ω ±2%
Compensated Temperature Range	—	0 to 40°C
Safe Temperature Range	—	-10 to 60°C
Temperature Effect on Zero Balance	—	±0.1%RO/°C
Temperature Effect on Zero	—	±0.1%/°C
Mass, Approx.	800g	100g
Cables	4-conductor (0.3mm ²) chloroprene shielded cable, 7.6mm dia. x 5m long: terminated with NDIS connector plug	4-conductor (0.05mm ²) chloroprene shielded cables, 3mm dia. x length as specified by the customer; terminated with connector plug
Dimensions	 <p>oD is adjustable in a range of 15 to 25mm.</p>	

<p>Description</p>	<p>Pedaling Force Transducer LP-B</p> <ul style="list-style-type: none"> • Easy installation and handling • Minimal error between different pedaling modes 	<p>Door Window Torque Transducer TPW-S-8NMS1</p> <ul style="list-style-type: none"> • Small, lightweight and easy to install and handle • Precisely measures operating force (torque) and angle 
<p>Rated Capacity (Reference Value)</p>	<p>LP-50KB: 500N (50.99kgf) LP-100KB: 1kN (102.0kgf) LP-200KB: 2kN (203.9kgf)</p>	<p>Torque: $\pm 8\text{N}\cdot\text{m}$ ($\pm 0.816\text{kgf}\cdot\text{m}$) Turning angle: ± 10 turns</p>
<p>Safe Overload Rating</p>	<p>120%</p>	<p>120% (turning angle: mechanically endless)</p>
<p>Rated Output, Approx.</p>	<p>1 to 2mV/V (2000 to 4000 $\times 10^{-6}$ strain)</p>	<p>1mV/V (2000 $\times 10^{-6}$ strain)</p>
<p>Non-linearity</p>	<p>$\pm 0.5\%$RO</p>	<p>$\pm 0.5\%$RO</p>
<p>Hysteresis</p>	<p>$\pm 0.5\%$RO</p>	<p>$\pm 0.5\%$RO</p>
<p>Repeatability</p>	<p>0.5%RO max.</p>	<p>—</p>
<p>Recommended Excitation Voltage</p>	<p>1 to 5V ac or dc</p>	<p>1 to 6V ac or dc</p>
<p>Safe Excitation Voltage</p>	<p>15V ac or dc</p>	<p>10V ac or dc</p>
<p>Input Resistance</p>	<p>$350\Omega \pm 5\%$</p>	<p>$350\Omega \pm 2\%$ (turning angle 340 to 360Ω)</p>
<p>Output Resistance</p>	<p>$350\Omega \pm 5\%$</p>	<p>$350\Omega \pm 2\%$ (turning angle 340 to 360Ω)</p>
<p>Compensated Temperature Range</p>	<p>10 to 40°C</p>	<p>0 to 50°C</p>
<p>Safe Temperature Range</p>	<p>0 to 50°C</p>	<p>0 to 60°C</p>
<p>Temperature Effect on Zero Balance</p>	<p>$\pm 0.4\%$RO/°C</p>	<p>$\pm 0.05\%$RO/°C</p>
<p>Temperature Effect on Zero</p>	<p>$\pm 0.1\%$/°C</p>	<p>$\pm 0.05\%$/°C</p>
<p>Mass, Approx.</p>	<p>1kg</p>	<p>—</p>
<p>Cables</p>	<p>4-conductor (0.3mm²) chloroprene shielded cable, 7.6mm dia. x 5m long; terminated with NDIS connector plug</p>	<p>Two 4-conductor (0.3mm²) chloroprene shielded cables, 7.6mm dia. x 5m long; terminated with NDIS connector plug at both ends</p>
<p>Dimensions</p>		



	LPR-A-S1	LPR-B-S1	LPR-B-S2
Rated Capacity (Reference Value)	LPR-A-03KNS1 300N (30.59kgf) LPR-A-05KNS1 500N (50.99kgf) LPR-A-1KNS1 1kN (102.0kgf) LPR-A-2KNS1 2kN (203.9kgf)	LPR-B-05KNS1 500N (50.99kgf) LPR-B-2KNS1 2kN (203.9kgf)	LPR-B-05KNS2 500N (50.99kgf) LPR-B-1KNS2 1kN (102.0kgf) LPR-B-2KNS2 2kN (203.9kgf)
Safe Overload Rating	150%	150%	150%
Rated Output, Approx.	1mV/V (2000 x10 ⁻⁶ strain) max.	0.5mV/V (1000 x10 ⁻⁶ strain) max.	0.5mV/V (1000 x10 ⁻⁶ strain) max.
Non-linearity	±0.5%RO	±1%RO	±1%RO
Hysteresis	±0.5%RO	±1%RO	±1%RO
Recommended Excitation Voltage	1 to 5V ac or dc	1 to 5V ac or dc	1 to 5V ac or dc
Safe Excitation Voltage	10V ac or dc	8V ac or dc	8V ac or dc
Input Resistance	350Ω ±2%	240Ω ±3%	240Ω ±3%
Output Resistance	350Ω ±2%	240Ω ±3%	240Ω ±3%
Compensated Temperature Range	0 to 50°C (no dew condensing)	0 to 50°C (no dew condensing)	0 to 50°C (no dew condensing)
Safe Temperature Range	-10 to 65°C (no dew condensing)	-10 to 70°C (no dew condensing)	-10 to 70°C (no dew condensing)
Temperature Effect on Zero Balance	±0.1%RO/°C	±0.05%RO/°C	±0.05%RO/°C
Temperature Effect on Output	±0.1%/°C	±0.05%/°C	±0.05%/°C
Mass, Approx.	250g	280g	200g
Cable	4-conductor (0.05mm ²) chloroprene shielded cables, 3mm dia. x 3m long; terminated with NDIS connector plug		

