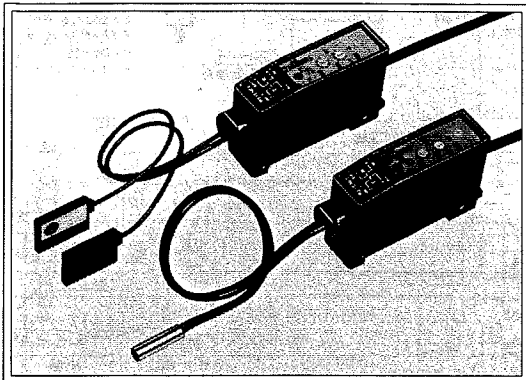
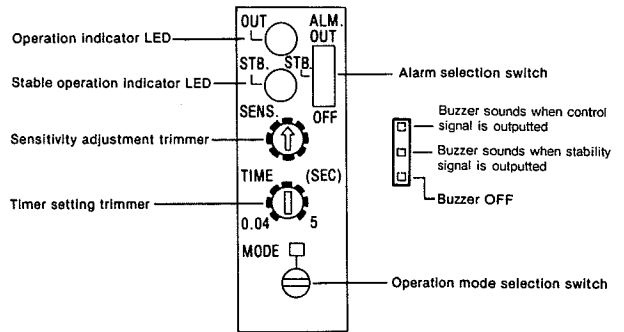


Separate Amplifier Photoelectric Sensor

PS2-61(P) Series



Part names



<Operation Mode Chart>

Mode		No.	1	2	3	4	5	6	7	8	A	B	C	D	E	F	G	H
Out put	Light ON		●	●	●	●					●	●	●	●				
	Dark ON						●	●	●	●					●	●	●	●
Timer	Timer OFF		●								●							
	ON Delay			●				●				●						
	OFF Delay				●					●			●					
	One shot					●								●				●
Normal frequency			●	●	●	●	●	●	●	●								
Different frequency											●	●	●	●	●	●	●	●

Specifications

● Amplifier

Model	PS2-61 (P)
Power supply	12 to 24V DC ± 10% Ripple (P-P) 10% max.
Current consumption	45mA max.
Sensitivity adjustment	3-turn trimmer
Response time	0.5ms (1ms when using different frequency mode)
Operation mode	LIGHT-ON/DARK-ON (Switch selectable)
Control output	NPN(PNP)open collector 100mA max. (40V max.) and residual voltage 1Vmax.
Stability output	NPN(PNP)open collector 50mA max. (40V max.) and residual voltage 1Vmax.
Protection circuit	Inverse-connection protection, short-circuit protection, protection against surge
Indicator	Operation indicator...Red-LED/Stable operation indicator...Green LED
Timer	ON-delay/OFF-delay/One shot/Timer-OFF (selectable) Timer setting range: 40ms to 5s
Buzzer	Buzzer ON when control output turns ON/Buzzer ON when alarm output turns ON/Buzzer OFF (selectable)
Ambient temperature	- 10 to +50°C (14 to 122 °F), No freezing
Relative humidity	35 to 85%, No condensation
Weight (including 2m cable)	Approx. 65g

● Sensor head

Type	Diffuse-reflective General purpose		
	Long-detecting distance	Thin	Cylindrical
Model	PS-45	PS-46	PS-48
Detecting distance (Reference detecting object)	200mm (10×10cm white paper)	100mm (10×10cm white paper)	25mm (10×10cm white paper)
Light source	Infrared LED		
Smallest detectable object	—	—	—
Spot diameter	—	—	—
Hysteresis of detecting distance	15% max.	10% max.	20% max.
Enclosure rating	IP-64	—	IP-67
Ambient light	Incandescent lamp: 4,000 lx max. Sunlight: 12,000 lx max.		
Ambient temperature	- 10 to +60°C (14 to 140 °F), No freezing		
Relative humidity	35 to 85%, No condensation		
Weight (including cable)	Approx. 38g	Approx. 27g	Approx. 37g

Type	Reflective type		Definite reflective type	
	High durability type		General purpose type	
	Long-distance type	Narrow-visibility type	Small spot type	Long-distance type
Model	PS-205	PS-206	PS-47	PS-49
Detecting distance (Reference detecting object)	200mm (10×10cm white paper)	70mm (10×10cm white paper)	10mm (At center) (1×1cm white paper)	32 to 53mm (2×2cm white paper)
Light source	Infrared LED			
Smallest detectable object	—	—	0.03mm dia. copper wire	0.1mm dia copper wire
Spot diameter	—	6mm ^{※2}	0.8mm dia	1.5mm dia. ^{※3}
Hysteresis of detecting distance	15% max.			
Enclosure rating	IP-67			
Ambient light	Incandescent lamp: 4,000 lx max. Sunlight: 12,000 lx max.		Incandescent lamp: 4,000 lx max. Sunlight: 5,000 lx max.	
Ambient temperature	- 10 to +60°C (14 to 140 °F), No freezing		- 10 to +50°C (14 to 122 °F), No freezing	
Relative humidity	35 to 85%, No condensation			
Weight (including cable)	Approx. 60g		Approx. 41g	Approx. 38g

※2 When detecting distance is 70mm. ※3 When detecting distance is 50mm.

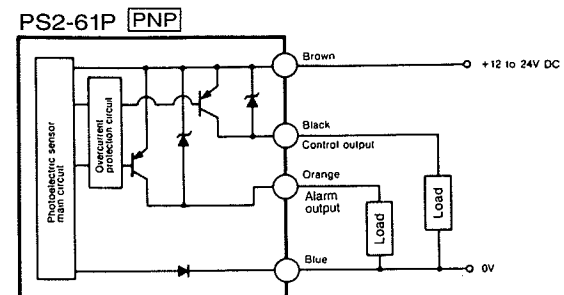
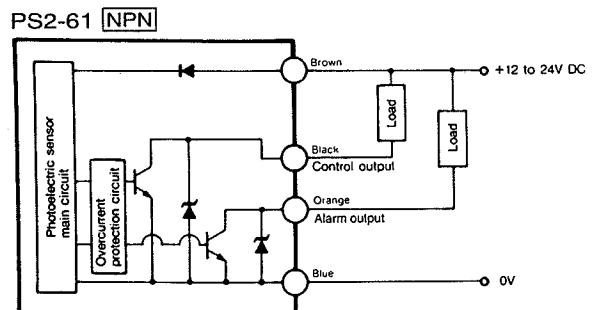
● Sensor head

Type	Through-beam General-purpose		
	Long-detecting distance	Free-positioning	Cylindrical
Model	PS-55	PS-05	P5-58
Detecting distance	2,000mm		700mm
Light source	Infrared LED		
Smallest detectable object ^{※1}	1mm dia. Opaque		0.5mm dia. Opaque
Enclosure rating	IP-64		IP-67
Ambient light	Incandescent lamp: 4,000 lx max. Sunlight: 12,000 lx max.		
Ambient temperature	- 10 to +60°C (14 to 140 °F), No freezing		
Relative humidity	35 to 85%, No condensation		
Weight (including cable)	Approx. 42g	Approx. 48g	Approx. 24g

Type	Through-beam General-purpose			
	Thin type		Long-detecting distance	Aperture-incorporated
Model	PS-52	PS-56	PS-201	PS-202
Detecting distance	300mm		2,000mm	500mm
Light source	Infrared LED			
Smallest detectable object ^{※1}	0.3mm dia. Opaque object		0.8mm dia. Opaque object	0.5mm dia. Opaque object
Enclosure rating	IP-67			
Ambient light	Incandescent lamp: 4,000 lx max. Sunlight: 12,000 lx max.			
Ambient temperature	- 10 to +60°C (14 to 140 °F), No freezing			
Relative humidity	35 to 85%, No condensation			
Weight (including cable)	Approx. 25g	Approx. 27g	Approx. 36g	

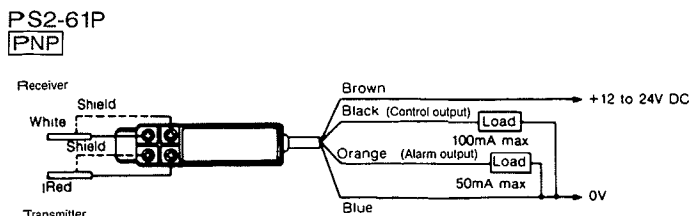
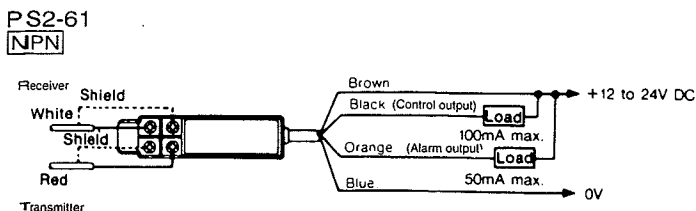
※1 At optimal setting

Output circuit

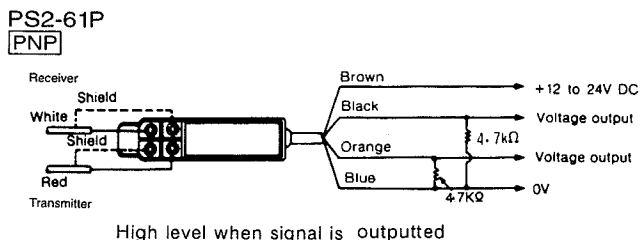
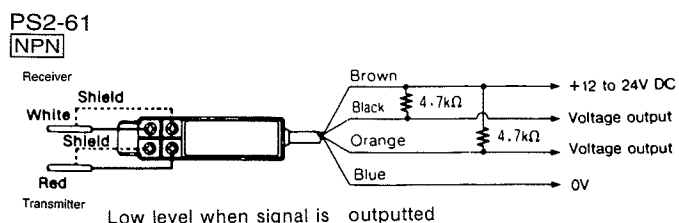


Connections

When directly driving a load



When connected to voltage input equipment



Adjustment

Setting the sensor so that it is turned on when the light is received (LIGHT-ON) (If sensor is to be turned on when the light is interrupted (DARK-ON) follow the procedures inside brackets.)

Setting the sensor so that it is turned on when the light is interrupted (DARK-ON) (If the sensor is to be turned on when the light is received (LIGHT-ON), follow the procedures inside brackets.)

No.	Operating condition	Sensitivity adjustment trimmer	Indicator	Adjustment
Reflective type	1		Green ● < ● Red ⊙ < ⊙	Without placing an object to be detected in front of the sensor, turn sensitivity adjustment trimmer clockwise. Check position at which operation indicator lights [goes off] (Position A). If operation indicator does not light [go off] even at maximum setting, determine maximum setting as Position A. *Turning trimmer three rotations or more specifies maximum setting.
	2		Green ● < ● Red ⊙ < ⊙	Placing an object to be detected in front of the sensor, turn sensitivity adjustment trimmer counterclockwise gradually from Position A. Check position at which stable operation indicator goes off (Position B).
	3		Green ⊙ < ⊙ Red ● < ●	Set adjustment trimmer at midpoint between Position A and Position B. Check operation of sensors.

No.	Operating condition	Sensitivity adjustment trimmer	Indicator	Adjustment
Throughbeam type	1		Green ⊙ < ⊙ Red ● < ●	Set sensitivity adjustment trimmer to maximum (Position A). Secure one sensor. Without placing an object to be detected between the sensors, tilt another sensor up and down as well as right to left, and check range in which stable operation indicator lights. Set and secure the sensor at midpoint in range mentioned above. *Turning trimmer three rotations or more specifies maximum setting.
	2		Green ● < ● Red ⊙ < ⊙	Turn sensitivity adjustment trimmer counterclockwise gradually from maximum setting. Check position at which stable operation indicator goes off (Position B).
	3		Green ⊙ < ⊙ Red ● < ●	Set adjustment trimmer at midpoint between maximum setting A and Position B. Check operation of sensors.

How to use alarm (buzzer)

When the ALM selection switch on the top face of the sensor is set to OUT, the operation indicator and buzzer are synchronized. Using this setting, you can make fine adjustments by noting when the buzzer turns on and off. When the ALM selection switch is set to STB, you can confirm the decrease in light due to adhered dust or a misaligned optical axis, as well as disconnection of the sensor cable, by listening for the buzzer.

*To silence the buzzer (for normal operation), set the ALM selection switch to OFF.

Timer chart

ON operation when receiving light (LIGHT ON)	Timer mode	Mode switch	Operation chart (control output)
	Timer OFF	1 (A)	
	ON delay	2 (B)	
	OFF delay	3 (C)	
	One shot	4 (D)	
ON operation when light is interrupted (DARK ON)	Timer mode	Mode switch	Operation chart (control output)
	Timer OFF	5 (E)	
	ON delay	6 (F)	
	OFF delay	7 (G)	
	One shot	8 (H)	

- Operation modes in parentheses for mode switch show a different frequency mode.
- The letter "T" indicates times which may be adjusted by the trimmer. (Adjustable from 0.04s to 5s)
- If a sensor receives light twice during a one-shot time in the one-shot mode, the one-shot time is determined by the second reception of light.

Alarm output

The stable operation indicator will be turned off if the amount of received light decreases below the 150% of operation level due to causes such as a stained lens surface or deviation of the optical axis. The alarm output and control output turn ON simultaneously.

Amount of received light ↔ Stable operation indication/output correlation diagram (LIGHT ON mode)

Amount of received light (Ratio to minimum operation level)	150%		100% (Operation level)
Red LED	Lit	Lit	Unlit
Green LED	Lit	Unlit	Unlit
Control output	ON	ON	OFF
Alarm output	OFF	ON* Until being reset	

*The alarm output remains ON until reset. Clean the lens surface, or adjust the optical axis when the alarm output is operating, so that the stable operation indicator of the controller lights. The alarm output is reset by allowing the sensor to operate when the green LED is lit.

*In the DARK ON mode, the operation of the red LED and control output is reversed.

When the stability output is not used, cut the orange cable at the root, or connect this cable to the 0V (Positive with PNP model) terminal of the power supply.

*When cutting the cables at the root, be sure not to contact other cables.

Hints on correct use



Do not use this product for the purpose of protecting the human body.

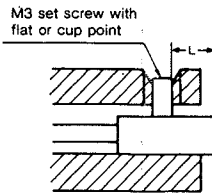
Wiring

- When using a commercially available switching regulator, ground both a frame ground terminal and ground terminal.
- Separate the conduit for the amplifier wiring, power lines, and high-voltage lines. Otherwise the sensor may malfunction due to the noise.
- Use a wire having a conductor cross-section area of more than 0.3mm². Do not exceed 100mm in length when extending the wire.
- The stripped portion of the sensor wire should be less than 20mm for both light-receiving and light-emitting units. It is recommended that the wire length should be as short as possible. Therefore, never use a relay terminal.
- Sensor cord can be extended up to 10m in total length.

Installation

- When mounting PS-48, as illustrated in the figure shown below, set the sensor head so that the front face of the sensor head comes in front of the mounting face.
- Use the mounting bracket provided when mounting the PS-58 and the PS-48. Do not exceed the screw tightening torque shown below.

Model	L	Tightening torque
PS-58	7mm minimum	0.15Nm max.
PS-48	5mm minimum	0.15Nm max.



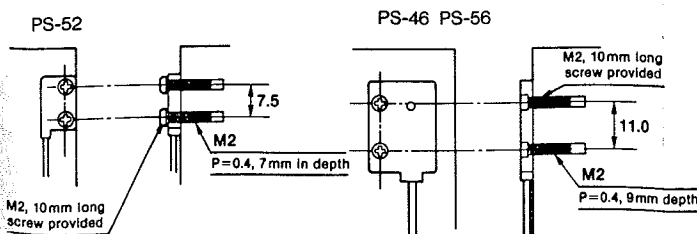
Tightening torque

Tightening torque for the sensor head with mounting hole should be less than the specified below.

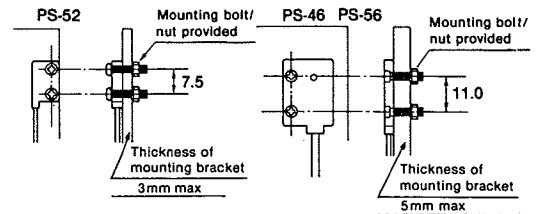
Model	Tightening torque	Screw
PS-45	0.6Nm max.	M3
PS-46	0.3Nm max.	M2
PS-47	0.6Nm max.	M3
PS-49	0.6Nm max.	M3
PS-52	0.15Nm max.	M2
PS-55	0.6Nm max.	M3
PS-56	0.3Nm max.	M2
PS-205	0.5Nm max.	M4
PS-206	0.5Nm max.	M4

Using bolt/nut provided

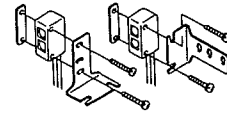
1. When mounting on the surface with threaded holes by using bolts provided.



2. When mounting on bracket by using bolt/nut provided.

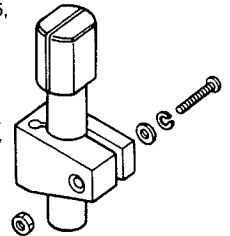


- A special mounting bracket is provided for PS-45 (Reflective type). It can be mounted in two ways according to the mounting space as shown below.

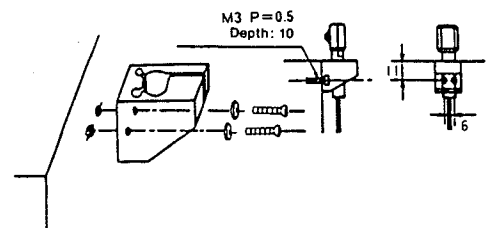


- Do not bend the cord at the portion within 20mm from the neck of the sensor head for PS-201, PS-202, PS-205, and PS-206. The bending radius should be 25mm or more, when bending the other portion than specified above.

- To mount a fixture for PS-05, use the screws and spring washer provided as shown below. The tightening torque should be less than 0.5Nm if you use the screws other than provided/ use M3 pan-head screw.

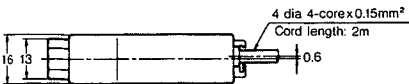


- To mount the sensor head to the fixture, use the screw (longer one, with washer) and nut provided as shown below. The tightening torque should be less than 0.5Nm. Loosen the screw before adjusting the optical axis.

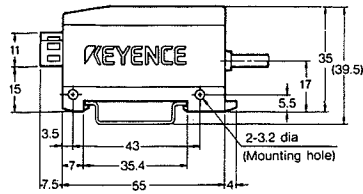


Dimensions

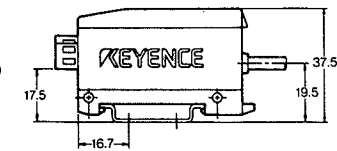
● Amplifier PS2-61(P)



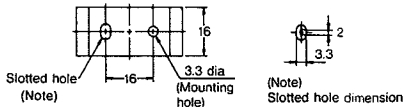
When mounting on DIN rail



When mounting bracket is attached



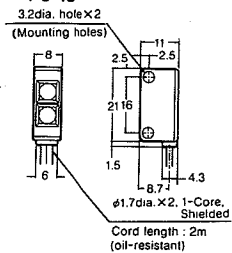
Rear view of a mounting bracket



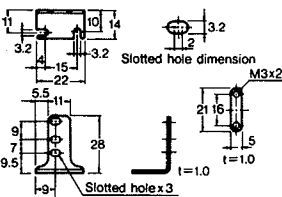
A value in parentheses indicates a dimension when mounting on DIN rail.

● Sensor head (Reflective type)

PS-45

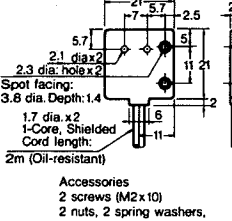


Mounting bracket (provided for PS-45)



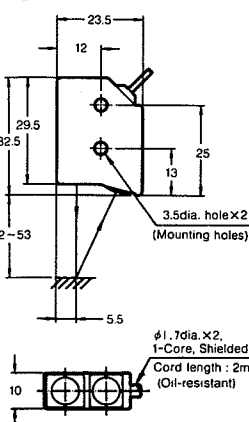
Accessories
2 screws (M3x12)
(with washers)

PS-46

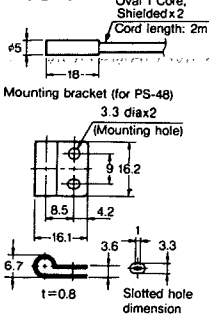


Accessories
2 screws (M2x10)
2 nuts, 2 spring washers,

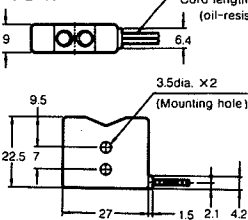
PS-49



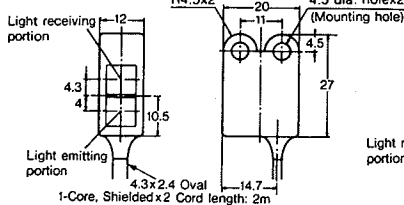
PS-48



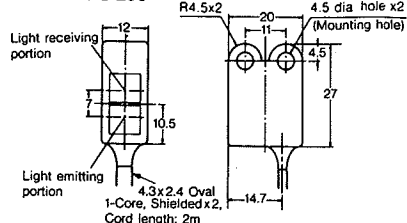
PS-47



PS-205

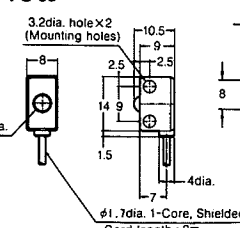


PS-206

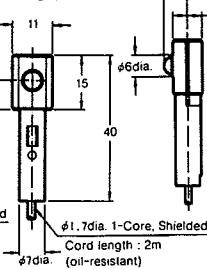


● Sensor head (Through beam type)

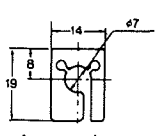
PS-55



PS-05

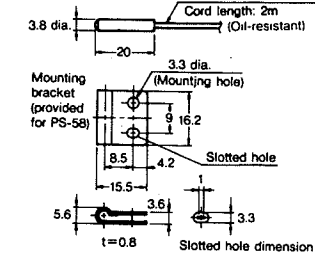


PS-05 holder (Accessory)

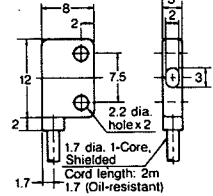


Accessories
1 screw (M3x14)
1 plain washer
1 spring washer
1 nut
2 screws (M3x10)
2 spring washers

PS-58

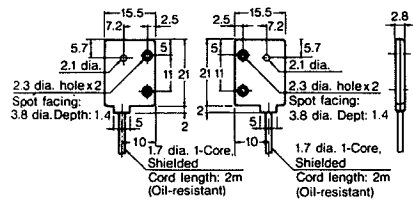


PS-52



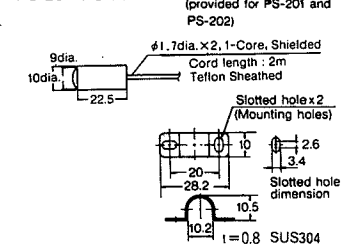
Accessories
4 screws (M2 x 10)
4 nuts, 4 spring washers
4 plain washers

PS-56



Accessories
4 screws (M2 x 10)
4 nuts, 4 spring washers

PS-201 PS-202



WARRANTIES (MUST ACCOMPANY THE PRODUCTS): KEYENCE, at its sole option, will refund, repair or replace at no charge any defective Products within 1 year from the date of shipment. Unless stated otherwise herein, the Products should not be used internally in humans, for human transportation, as safety devices or fail-safe systems. EXCEPT FOR THE FOREGOING, ALL EXPRESS, IMPLIED AND STATUTORY WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT OF PROPRIETARY RIGHTS, ARE EXPRESSLY DISCLAIMED. KEYENCE SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL OR OTHER DAMAGES, EVEN IF DAMAGES RESULT FROM THE USE OF THE PRODUCTS IN ACCORDANCE WITH ANY SUGGESTIONS OR INFORMATION PROVIDED BY KEYENCE. In some jurisdictions, some of the foregoing warranty disclaimers or damage limitations may not apply.

KEYENCE

KEYENCE CORPORATION
1-3-14, Higashi-Nakajima, Higashi-Yodogawa-ku,
Osaka, 533-8555, Japan
PHONE: 81-6-6379-2211 FAX: 81-6-6379-2131

AFFILIATED COMPANIES

KEYENCE CORPORATION OF AMERICA
PHONE: 201-930-0100 FAX: 201-930-0099
KEYENCE DEUTSCHLAND GmbH
PHONE: 06102-3689-0 FAX: 06102-3689-100
KEYENCE (UK) LIMITED
PHONE: 01908-696900 FAX: 01908-696777
KEYENCE FRANCE S.A.
PHONE: 01 47 92 76 76 FAX: 01 47 92 76 77
KEYENCE SINGAPORE PTE LTD.
PHONE: 392-1011 FAX: 392-6055

KEYENCE (MALAYSIA) SDN BHD
PHONE: 03-252-2211 FAX: 03-252-2131
KEYENCE (THAILAND) CO., LTD.
PHONE: 02-369-2777 FAX: 02-369-2775
KEYENCE TAIWAN CO., LTD.
PHONE: 02-2627-3100 FAX: 02-2798-8925
KEYENCE KOREA CORPORATION
PHONE: 02-563-1270 FAX: 02-563-1271

© KEYENCE CORPORATION, 1992
Printed in Japan 0110-24 96M0196
Specifications are subject to change without notice.