



Pad diameters  $\phi 10$  [0.394],  $\phi 15$  [0.591], and  $\phi 20$  [0.787]

# Vacuum pads

## Bellows type

**NEW** Fluorine vacuum pads have been added to our offering for specific applications that require no suction marks on surfaces.

**New development** **Rubber pad materials**

**Oil-free** fluorine is the solution to suction marks  
 Oil which causes suction marks are eliminated.

\*Each pad can be mounted on conventional brackets.

	Halogen-treated NBR	Electroconductive silicon
		

Heat resistance 200°C [392 °F]



**Incline**



**Step**

Perfect for handling workpieces at variable heights or with incline surfaces.



# Bellows type vacuum pads



## Specifications

### ● Standard type, horizontal piping

Item	Model	Horizontal piping, fixed type	Horizontal piping, integrated spring type
		KPJHF	KPJHS
Pad diameter <sup>Note 1</sup>	mm [in]	10 [0.394], 15 [0.591], 20 [0.787]	10 [0.394], 15 [0.591], 20 [0.787]
Applicable tube size <sup>Note 2</sup>	mm [in]	6 × 4 [0.236 × 0.157]	6 × 4 [0.236 × 0.157]
Spring stroke	mm [in]	—	6 [0.236]
Spring return force (1/2 stroke)	N [lbf]	—	1.0 [0.225]
Materials	Main unit	Brass (nickel plated)	Brass (nickel plated)
	Guide	—	Brass (nickel plated)
	Spring	—	Stainless steel
	Rubber pad (color)	Synthetic rubber: halogen-treated NBR (black), electroconductive silicon (black with a yellow mark), fluorine as a countermeasure for suction marks (blueish grey)	

### ● Standard type, vertical piping

Item	Model	Vertical piping, fixed type	Vertical piping, integrated spring type
		KPJVF	KPJVS
Pad diameter <sup>Note 1</sup>	mm [in]	10 [0.394], 15 [0.591], 20 [0.787]	10 [0.394], 15 [0.591], 20 [0.787]
Sizes for the tubes to be used <sup>Note 2</sup>	mm [in]	6 × 4 [0.236 × 0.157]	6 × 4 [0.236 × 0.157]
Stroke of spring deformation	mm [in]	—	5 [0.197]
Spring return force (1/2 stroke)	N [lbf]	—	1.0 [0.225]
Materials	Main unit	Brass (nickel plated)	Brass (nickel plated)
	Guide	—	Brass (nickel plated)
	Spring	—	Stainless steel
	Rubber pad (color)	Synthetic rubber: halogen-treated NBR (black), electroconductive silicon (black with a yellow mark), fluorine as a countermeasure for suction marks (blueish grey)	

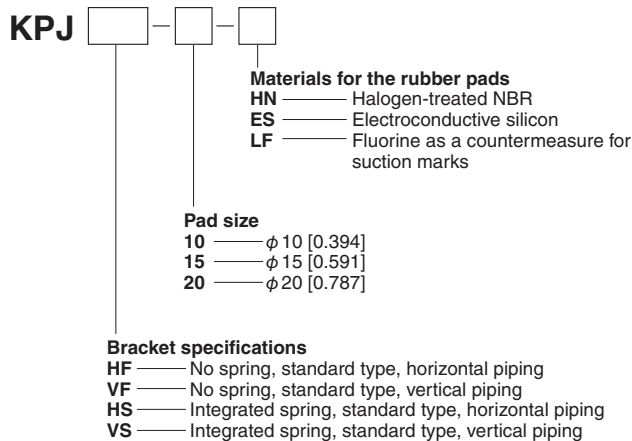
Note 1: The bracket is common to all the pad sizes that appear in the cell for the pad diameter. (Some of the mounting screws for the rubber pads are different.)

Note 2: Choose urethane tubes for the tubes you will be using.

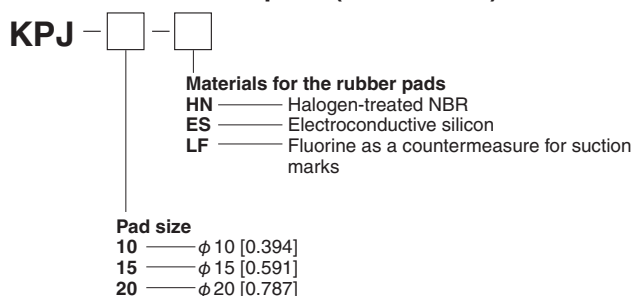
Remark: Each rubber pad can be mounted with conventional brackets (KPHF-□, KPHS-□, KPVF-□, and KPVS-□).

## Order codes

### ● Models of bellows type vacuum pads (with brackets)



### ● Models of rubber pads (no brackets)



### ● Halogen-treated NBR

By treating the NBR with halogen, we reduced the friction of the rubber by about 88% <sup>Note</sup> and made it more difficult to leave behind the suction marks that are typical of rubber.

Note: Compared to our products, the material is NBR.

### ● Electroconductive silicon

Because the vacuum pad rubber is electroconductive rubber, it allows static electricity to flow and prevents the formation of a charge.

### ● Fluorine as a countermeasure for suction marks

Starting at the composition stage, this rubber has had much of the oils that cause suction marks removed as possible to ameliorate the suction marks that are typical of rubber.

### Volume resistivity and identification marks

Materials for the rubber pads	Volume resistivity <sup>Note</sup>	Identification marks
Halogen-treated NBR	10 <sup>5</sup> to 10 <sup>12</sup> Ω cm	—
Electroconductive silicon	1 to 10 <sup>2</sup> Ω cm	Yellow dot
Fluorine as a countermeasure for suction marks	10 <sup>15</sup> to 10 <sup>18</sup> Ω cm	—

Note: Standard values of the materials

Halogen-treated NBR



Color: black

Electroconductive silicon



Color: black

Yellow identification mark

Fluorine as a countermeasure for suction marks



Color: blueish grey

## Theoretical lifting power

### Theoretical lifting power N [lbf]

Degree of vacuum kPa [inHg]	Pad diameter mm [in]			
	φ 10 [0.394]	φ 15 [0.591]	φ 20 [0.787]	
	pad area A cm <sup>2</sup> [in <sup>2</sup> ]	0.785 [0.122]	1.766 [0.003]	3.14 [0.005]
-93.3 [-27.561]	7.32 [1.646]	16.48 [3.705]	29.3 [6.587]	
-80 [-23.632]	6.28 [1.412]	14.13 [3.177]	25.1 [5.643]	
-66.7 [-19.703]	5.24 [1.178]	11.78 [2.648]	20.9 [4.699]	
-53.3 [-15.745]	4.18 [0.94]	9.41 [2.115]	16.7 [3.754]	
-40 [-11.816]	3.14 [0.706]	7.06 [1.587]	12.6 [2.833]	
-26.7 [-7.887]	2.10 [0.472]	4.72 [1.061]	8.4 [1.888]	
-13.3 [-3.929]	1.04 [0.234]	2.35 [0.528]	4.2 [0.944]	

Note: Valves in the above table are calculated.

Consider the various multiplying factors below when configuring a safety margin for the lifting power of the bellows type pads.

**Picking up while gripped level with the ground: more than 10x**  
**Picking up while gripped on the side: forbidden**

## Mass

### Mass g [oz]

Model	Pad diameter mm [in]			
	10 [0.394]	15 [0.591]	20 [0.787]	
Fixed type	KPJHF	14 [0.494]	16 [0.564]	16 [0.564]
	KPJVF	13 [0.459]	15 [0.529]	15 [0.529]
Spring Type	KPJHS	35 [1.235]	37 [1.305]	37 [1.305]
	KPJVS	25 [0.882]	27 [0.952]	27 [0.952]

## Materials and suitability of the rubber pads

### Materials and characteristics of the rubber pads

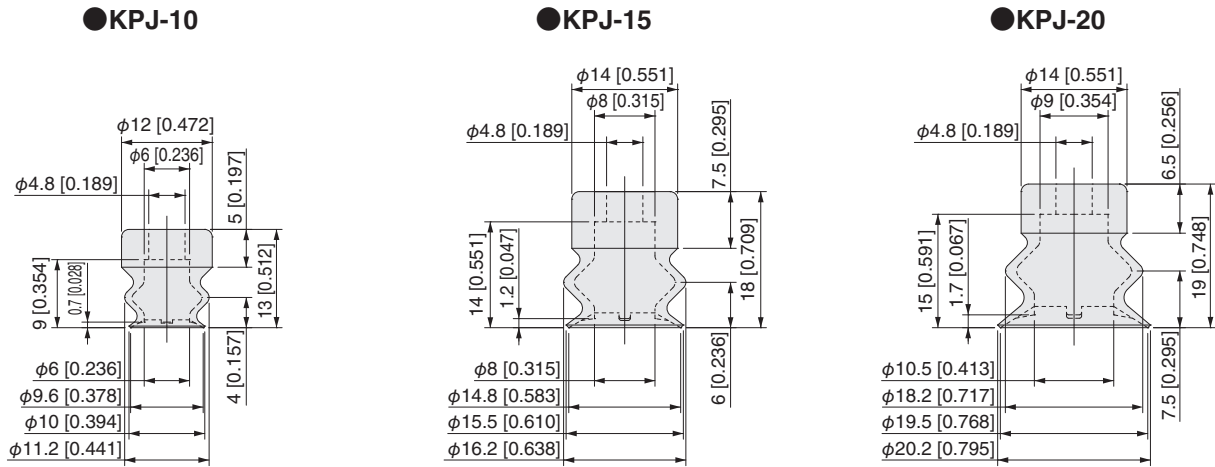
Item	Hardness Hs	Temperature range limits °C [°F]	Pulling strength N/cm <sup>2</sup> [psi]	Stretch %	Oil resistance (Gasoline)	Oil resistance (Benzol)	Weather resistance	Ozone resistance	Alkali resistance	Acid resistance	Water resistance	Wear resistance	Electric insulation	Tear resistance	Durability
Halogen-treated NBR	60 ± 5	0 to 100 [0 to 212]	1250 [181250]	420	○	△	○	×	○	○	○	○	○	○	○
Electroconductive silicon	60 ± 5	30 to 200 [22 to 392]	700 [101500]	290	△	△	○	○	○	△	○	×	×	×	○
Fluorine as a countermeasure for suction marks	60 ± 5	0 to 200 [0 to 392]	1100 [159500]	270	○	○	○	○	×	○	○	○	○	○	○

Remark: ○ Superior (optimal), ○ good (can be used depending on the conditions), △ possible (thorough confirmation is required), × not possible (cannot be used)

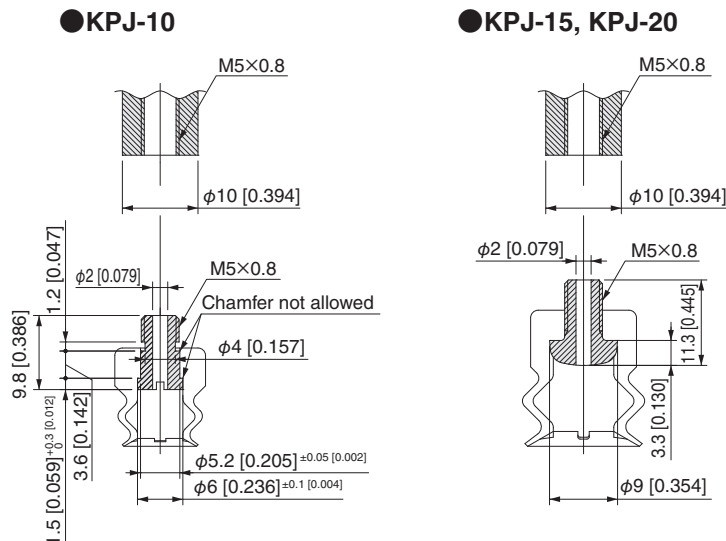
Note: This table indicates the general characteristics of rubber. These characteristics and values are not certified values. Give careful consideration to all types of conditions when using the pads.

**\* Before use, be sure to read the "Safety Precautions" and "General Precautions" in the general catalog and the "Precautions" in the reference material on Koganei's homepage.**

## Dimensions diagram for the rubber pads mm [in]

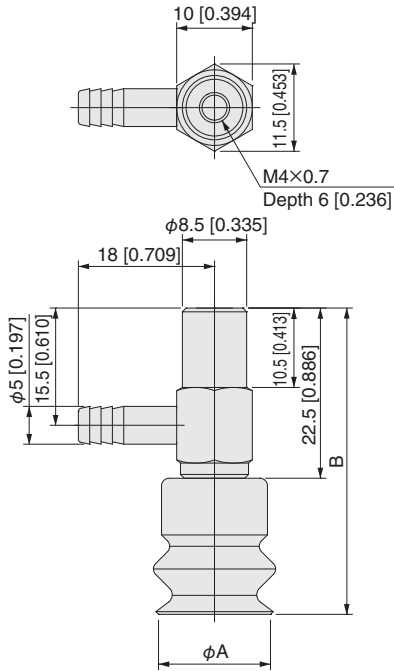


## Dimension diagram for fitting the rubber pads mm [in]



**KPJHF**

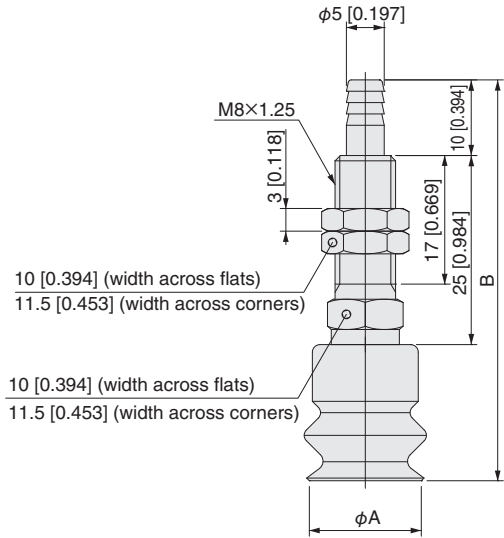
●10 [0.394], 15 [0.591], 20 [0.787]



Model of pad	Item	Pad diameter A	Total length B	Applicable Tube Size
KPJHF-10		10 [0.394]	35.5 [1.398]	Urethane tube 6×4 [0.236×0.157]
KPJHF-15		15 [0.591]	40.5 [1.594]	
KPJHF-20		20 [0.787]	41.5 [1.634]	

**KPJVF**

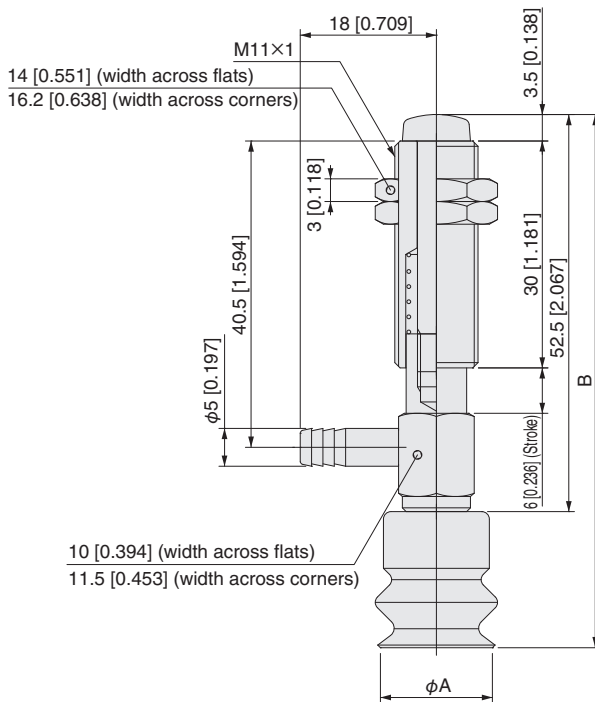
●10 [0.394], 15 [0.591], 20 [0.787]



Model of pad	Item	Pad diameter A	Total length B	Applicable Tube Size
KPJVF-10		10 [0.394]	48 [1.890]	Urethane tube 6×4 [0.236×0.157]
KPJVF-15		15 [0.591]	53 [2.087]	
KPJVF-20		20 [0.787]	54 [2.126]	

**KPJHS**

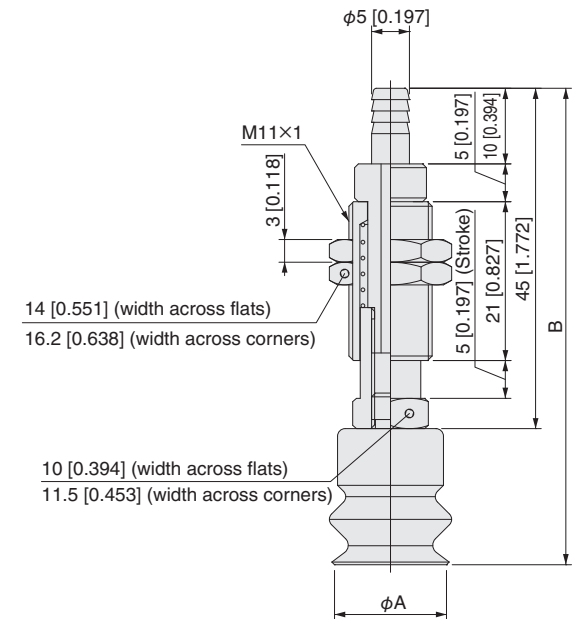
●10 [0.394], 15 [0.591], 20 [0.787]



Model of pad	Item	Pad diameter A	Total length B	Applicable Tube Size
KPJHS-10		10 [0.394]	65.5 [2.579]	Urethane tube 6×4 [0.236×0.157]
KPJHS-15		15 [0.591]	70.5 [2.776]	
KPJHS-20		20 [0.787]	71.5 [2.815]	

**KPJVS**

●10 [0.394], 15 [0.591], 20 [0.787]



Model of pad	Item	Pad diameter A	Total length B	Applicable Tube Size
KPJVS-10		10 [0.394]	58 [2.283]	Urethane tube 6×4 [0.236×0.157]
KPJVS-15		15 [0.591]	63 [2.480]	
KPJVS-20		20 [0.787]	64 [2.520]	

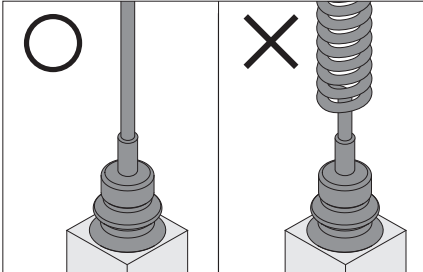
# Handling instructions and precautions



## Vacuum pads

### Piping

To reduce piping resistance, make them straight and the length of the piping as short as possible, and avoid spiral piping.



### Storage

1. Vacuum pads and the rubber of the pads use a variety of rubber. Rubber degrades when exposed to direct sunlight, oil, water, ozone, etc. Store the pads indoor, enclosed in a polyethylene bag, until immediately before use.
2. The storage temperature should be at room temperature.
3. Consider two years from the date of manufacture as a guideline for the storage period.

### Product

Depending on the type of rubber, there are cases when a few uneven spots appear on the outside of the rubber pad; however, these have no effect on performance.

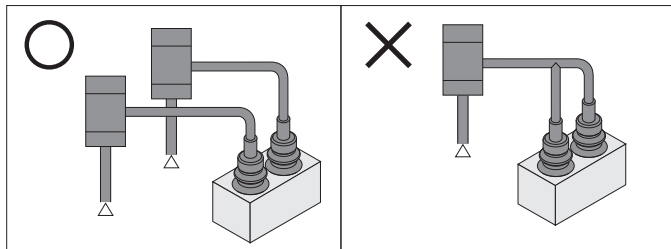
When the material for the rubber pad is halogen-treated NBR or fluorine as a countermeasure for suction marks, wipe off the suction surface with a rag that has been saturated with IPA (isopropyl alcohol) before use and during periodic maintenance.

### Replacing the rubber pad

When replacing the rubber pad, refer to the dimension diagrams for fitting the rubber pad and remove the rubber pad, screws, and brackets. Then replace the rubber pad. When attaching rubber pads KPJ-15 and KPJ-20 to brackets, gradually screw in the mounting screws. After the brackets, rubber pad, and mounting screw have been fit, retighten the mounting screw half a turn (180°). When attaching rubber pad KPJ-10 to a bracket, tighten it with a tightening torque of 1.47N·m [13.011 in·lbf]. (Contact your nearest Koganei sales office for more details.)

### General precautions

1. Use one vacuum pad per micro ejector. Using two or more makes it easier for suction failures to occur and extends the time required to reach the set degree of vacuum.



2. There is a risk of wear to one side of the moving parts or defective spring movements if excessive force is applied when piping spring type vacuum pads with brackets.
3. We recommend use with level workpieces when using the integrated spring type. If the workpiece that is being suctioned is angled, you must thoroughly confirm the operating conditions because the stroke reaches the end of the spring before the bellows deform.
4. Do not use excessive force to press the pad onto the workpiece. As wear, cracks, and pad deformations occur more quickly, position the pad so it is within its range of deformation.
5. Design with sufficient leeway as the mounting screw for the brackets or the mounting screw for the rubber pad may loosen and fall out when using the pad to move workpieces in circular motions. Also, attention is especially required for suction when the workpiece's center of mass is shifted, so check this thoroughly.

### Tightening torque

Control the tightening torque of the nut in the ranges listed in the table on the right when mounting the vacuum pad.

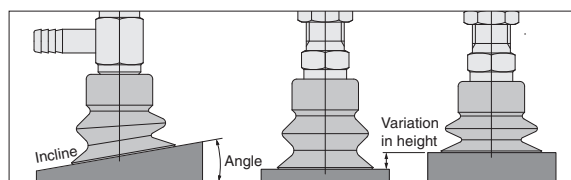
Model	Thread size	Tightening torque N·m [in·lbf]
KPJHF-10 to 20	M4×0.7	0.69 [6.107]
KPJVF-10 to 20	M8×1.25	6.86 [60.718]
KPJHS-10 to 20	M11×1	8.83 [78.154]
KPJVS-10 to 20	M11×1	8.83 [78.154]

### Reference material

These are guidelines for the maximum angle and variation in height that can be suctioned when the suction surface of the workpiece is at an incline or is at variable heights.

Models of rubber pads	Maximum angle <sup>Note</sup>	Maximum variation in height <sup>Note</sup>
KPJ-10	15°	3 [0.118]
KPJ-15	15°	5 [0.197]
KPJ-20	15°	6 [0.236]

Note: Use these as reference values as actual values differ depending on usage conditions.



# Limited Warranty

KOGANEI CORP. warrants its products to be free from defects in material and workmanship subject to the following provisions.

**Warranty Period** The warranty period is 180 days from the date of delivery.

**Koganei Responsibility** If a defect in material or workmanship is found during the warranty period, KOGANEI CORP. will replace any part proved defective under normal use free of charge and will provide the service necessary to replace such a part.

**Limitations**

- This warranty is in lieu of all other warranties, expressed or implied, and is limited to the original cost of the product and shall not include any transportation fee, the cost of installation or any liability for direct, indirect or consequential damage or delay resulting from the defects.

- KOGANEI CORP. shall in no way be liable or responsible for injuries or damage to persons or property arising out of the use or operation of the manufacturer's product.

- This warranty shall be void if the engineered safety devices are removed, made inoperative or not periodically checked for proper functioning.

- Any operation beyond the rated capacity, any improper use or application, or any improper installation of the product, or any substitution upon it with parts not furnished or approved by KOGANEI CORP., shall void this warranty.

- This warranty covers only such items supplied by KOGANEI CORP. The products of other manufacturers are covered only by such warranties made by those original manufacturers, even though such items may have been included as the components.

The specifications are subject to change without notice.

URL <http://www.koganei.co.jp>

E-mail: [overseas@koganei.co.jp](mailto:overseas@koganei.co.jp)



## KOGANEI CORPORATION

### OVERSEAS DEPARTMENT

3-11-28, Midori-cho, Koganei City, Tokyo 184-8533, Japan  
Tel: 81-42-383-7271 Fax: 81-42-383-7276

### KOGANEI INTERNATIONAL AMERICA, INC.

39300 Civic Center Dr., Suite 280, Fremont, CA 94538, U.S.A.  
Tel: 1-510-744-1626 Fax: 1-510-744-1676

### SHANGHAI KOGANEI INTERNATIONAL TRADING CORPORATION

Room 2606-2607, Tongda Venture Building No.1, Lane 600, Tianshan Road,  
Shanghai, 200051, China  
Tel: 86-21-6145-7313 Fax: 86-21-6145-7323

### TAIWAN KOGANEI TRADING CO., LTD.

Rm. 2, 13F., No88, Sec. 2, Zhongxiao E. Rd., Zhongzheng Dist., Taipei City 100,  
Taiwan (ROC)  
Tel: 886-2-2393-2717 Fax: 886-2-2393-2719

### KOGANEI KOREA CO., LTD.

6F-601, Tower Bldg., 1005, Yeongdeu-dong, Giheung-gu, Yongin-si, Gyeonggi-do,  
446-908, Korea  
Tel: 82-31-246-0414 Fax: 82-31-246-0415

### KOGANEI (THAILAND) CO., LTD.

3300/90, Tower B, Elephant Tower, 16th Fl., Phaholyothin Road, Chomphon,  
Chatuchak, Bangkok 10900, Thailand  
Tel: 66-2-937-4250 Fax: 66-2-937-4254

### KOGANEI ASIA PTE. LTD.

69 Ubi Road 1, #05-18 Oxley Bizhub, Singapore 408731  
Tel: 65-6293-4512 Fax: 65-6293-4513