"Sakae"

SAKAE TSUSHIN KOGYO CO., LTD.

JOYSTICK CONTROLLERS & FOOT CONTROLLERS

"Sakae"

For Industrial Use and Precision Multi-Directional Operation

JOYSTICK CONTROLLERS

&

For Precision Industrial Use

FOOT CONTROLLERS

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Technical Development & Designing by 3D CAD/CAM

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Features of Our Joystick Controllers

Recently, civil-engineering and construction machinery, cargo-handling machines and various plant facilities are being designed for and aimed at unmanned operation, where as, to secure the operational certainty, reliability and safety, joystick controllers for multi-directional operations are conveniently and handily used.
Such joystick controllers enable operators of machinery to control directions freely by moving an operational lever forward and backward, right and left, diagonally and rotationally while monitoring the conditions of machinery visually and aurally.
"Sakae" joystick controllers, which employ our precision potentiometers, are particularly designed and developed (pat.) for precision-controlling micro-current applications, and can be used for 3-dimensional coordinate measuring apparatuses, CAD/CAM/CAE display devices, robot operations, electromotive wheel chairs, civil engineering construction machinery, precision machine tools, medical instruments and optical machinery.
A variety of controlling is possible by assembling potentiometers, encoders, rotary switches, micro-switches, etc. in accordance with each different applications. Also, various kind of lever-shapes are available to meet customer's specific applications.
Model 40JE series with digital code switch can give digital output without using A.D. converter.

Features of Our Foot Controllers

"Sakae" foot controllers, which are based on our long experienced technology on precision potentiometers and joystick controllers, have been developed as control units to be operated by the foot motion.
Using our precision potentiometers, these foot controllers are particularly designed for precision-controlling micro-current applications, and can be used as a foot controller for civil engineering construction machinery, special vehicles, precision machine tools, medical instruments and so on.
A variety of controlling is possible by assembling potentiometers, switches, encoders and so on, in accordance with each different application.

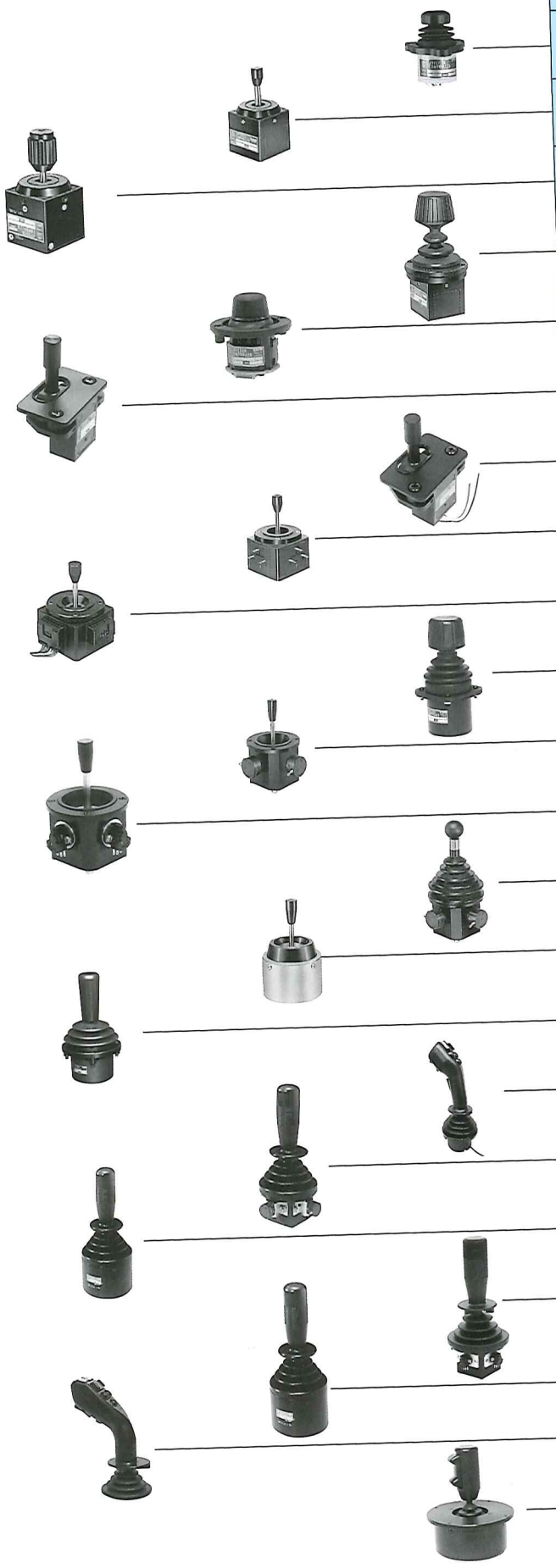
Quality

Our products are being manufactured based on our own quality control system, and after severe outgo in spection procedure of all manufactured items, we are making sure to deliver excellent quality and highly reliable products to our customers in global market.
Furthermore, we are periodically conducting reliability tests by randomly sampling to assure good quality.
Since August, 1994, we have been a certified manufacturer of ISO 9001 approved by Reliability Center for Electronic Components of Japan under their registration number RCJ-94M-28B for precision potentiometers and we are the first certified company in precision potentiometers' field in Japan. This qualified system is naturally applied to our joystick controllers and foot controllers.

Precautions for Use

When selecting or using our joystick controllers and foot controllers for your various applications, please be sure to read the important notice mentioned in pages 9, 55 and 63 in this catalog.

SELECTION GUIDE FOR OUR JOYSTICK CONTROLLERS



Models	Features
H25JB	Very small-sized, joystick controller for industrial use, which accomplished long life-expectancy, high reliability, and robustness. This model can be assembled from both above and under the panel. Possible to be mounted on our cobra shaped knob.
30JB	Most miniaturized series in our joystick controllers. 3-dimensional coordinate type is also available. Spring return device is incorporated inside housing case, and it automatically returns an operating lever to the center position.
30JE	Modified version of type 30JB, and switches are incorporated inside housing case, instead of potentiometers. Spring return device is incorporated inside housing case.
30JH	Low-cost version of 3-dimensional coordinate type joystick controllers and no other dimensional coordinate is available. Spring return device and dust-proof rubber cover are fitted as standard version.
H30JH	Low-cost version of 3-dimensional coordinate type joystick controller incorporated a hall effect IC type resistive element. It offers long life expectancy and high reliability.
30JL	Low-cost version of 1-dimensional coordinate type joystick controller and no other dimensional coordinate is available. Spring return device is fitted as standard version.
H30JL	Low-cost version of 1-dimensional coordinate type joystick controller incorporated a hall effect IC type resistive element.
40JB	Low-cost version with widest operating angle among our miniaturized joystick controllers.
40JE	Almost same outer dimensions as low-cost type 40JB and incorporates code switches of digital output, instead of potentiometers. Spring return device is fitted as standard version.
H40JH	Low-cost version of 3-dimensional coordinate type joystick controller incorporated a hall effect IC type resistive element. It offers high-protection and several special outputs.
50JA	Most standardized joystick controllers. Various special specifications are easily available.
H50JA	H50JA type joystick controller incorporating a hall effect IC type potentiometer, which suits especially for the application with strong vibration.
50JC	Very robust structure featuring dust-proof rubber cover and spring return device, which automatically returns an operating lever to the center position as standard.
60JB	Low-cost type. Spring return device is incorporated inside housing case, and it automatically returns an operating lever to the center position.
H60JH	Low-cost version of 2-dimensional coordinate type joystick controller with hall effect IC incorporated, which features the robust structure, and high load strength to the knob.
HMC60JH	Joystick controller with the mini-cobra shaped knob, which is the down sized version of our cobra shaped knob. The dead-man switch is available on the knob for safety design.
90JA	Robust structure featuring sealed housing case, dust-proof rubber cover, and spring return device as standard. Various special knob shapes are available. Suitable for outdoor applications.
90JB	Almost same specifications as 90JA type, but potentiometers are incorporated inside housing. Suitable for space-saving inside the cabinet.
H90JA	H90JA types joystick controller incorporating a hall effect IC type potentiometer, which offers long life expectancy, high reliability and safety, and are best suitable for special vehicles with strong vibration.
H90JB	H90JB types joystick controller incorporating a hall effect IC type potentiometer, which offers long life expectancy, high reliability and safety, and are best suitable for special vehicles with strong vibration.
C90JAC90JB	90JA or 90JB types joystick controller mounted with cobra shaped knob, which suits for multi-directional operations such as robot operations. It is possible to operate complex functions with push button switches and seesaw motion potentiometer incorporated in the knob.
100JB	This model has a seesaw type potentiometer as Z axis potentiometer and only 3-dimensional coordinate type is available. Suitable for various indoor applications.

Kind of element	Potentiometers' Mounting Method		Switch	Degree of Protection (IP code) (Note 1)		Life Expectancy (Note 2) (Unit:Ten Thousand)	Applications	Page
	Outside	Inside		Standard Version (No Rubber cover)	Special Version with Rubber Cover			
Hall effect IC Type	—	○	—	IP54		Abt. 200	Image processing devices, studio-related apparatuses, medical instruments, etc.	10, 11
Conductive Plastic Type	—	○	—	IP40	IP54 (2 axes type only)	Abt. 500	Various kinds of measuring devices, electromotive wheelchairs, robot operations, precision machine tools, etc.	12,13
—	—	—	○	IP40	IP54 (2 axes type only)	Abt. 100	Medical instruments, studio-related apparatuses, industrial vehicles, etc.	14,15
Conductive Plastic Type	—	○	—	IP65		Abt. 200	Medical instruments, robot operations, 3-dimensional coordinate measuring apparatuses, etc.	16,17
Hall effect IC Type	—	○	—	IP40	IP54	Abt. 100	Medical instruments,security camera operations, etc.	18,19
Conductive Plastic Type	—	○	—	IP65		Abt. 200	Medical instruments,industrial vehicles, robot operations, crane operations, etc.	20,21
Hall effect IC Type	—	○	—	IP65		Abt. 500	Robot operations, crane operations, industrial vehicles, civil engineering and construction machinery, etc.	22,23
Conductive Plastic Type	—	○	—	IP40	IP54	Abt. 500	Image processing devices, electromotive wheelchairs, medical instruments, etc.	24,25
—	—	—	○	IP40	IP54	Abt. 500	Medical instruments,industrial vehicles, robot operations, etc.	26,27
Hall effect IC Type	—	○	—	IP65		X・Y:Abt. 500 Z:Abt. 300	Various kinds of tooling machine, robot operation, security camera operation, 3-dimensional coordinate measuring apparatus, etc.	28,29
Conductive Plastic Type	○	—	—	IP40	IP54 (Consult 3 axes type)	Abt. 500	3-dimensional coordinate measuring apparatuses, CAD/CAM/CAE display devices, robot operations, etc.	30,31
Hall effect IC Type	○	—	—	IP40	IP54 (Consult 3 axes type)	Abt. 1,000	Various kinds of tooling machine, robot operation, conveyer system, etc.	32,33
Conductive Plastic Type	○	—	—	IP54		Abt. 500	Precision equipment for industrial use, construction machinery, crane operations, etc.	34,35
Conductive Plastic Type	—	○	—	IP40	IP54 (2 axes type only)	Abt. 500	3-dimensional coordinate measuring apparatuses,image processing devices,robot operations, etc.	36,37
Hall effect IC Type	—	○	—	IP65		Abt. 500	Robot operations, crane operations, industrial vehicles, civil engineering and construction machinery, etc.	38,39
Hall effect IC Type	—	○	—	IP40		X・Y : Abt.500	Robot operations, crane operations, industrial vehicles, civil engineering and construction machinery, etc.	40, 41
Conductive Plastic Type	○	—	—	IP65		Abt. 500	Robot operations, crane operations, industrial vehicles, civil engineering and construction machinery, etc.	42,43
Conductive Plastic Type	—	○	—	IP65		Abt. 500	Robot operations, crane operations, industrial vehicles, precision machine tools, etc.	42,43
Hall effect IC Type	○	—	—	IP65		Abt. 500	Robot operations, crane operations, industrial vehicles, civil engineering and construction machinery, etc.	44,45
Hall effect IC Type	—	○	—	IP65		Abt. 1,000	Robot operations, crane operations, industrial vehicles, civil engineering and construction machinery, etc.	44,45
Conductive Plastic Type	(C90JA)	(C90JB)	—	IP40		X・Y:Abt. 500	Medical instruments, industrial vehicles, robot operations, etc.	46,47
Conductive Plastic Type	—	○	—	IP40		X・Y:Abt. 500 Z:Abt. 200	3-dimensional coordinate measuring apparatuses, image processing devices, industrial vehicles, robot operations, etc.	48,49

Note 1) IP degree can apply to only the part including the lever above mounting panel and as for the details of IP degree, please see page 63.
Other "IP degrees" are available on request.

Note 2) Life expectancy is approximate number of mechanical operations under the normal operational conditions*, therefore please consider this value as rough indication when designing and selecting. In case of severe environmental conditions such as vibration, shock, high humidity, higher or lower temperature, extreme operations over partial part and etc., please consider these factors when reading these values.
Note *please see page 9

SELECTION GUIDE FOR OUR FOOT CONTROLLERS

Models	Features	Approx. Outer Dimensions Width × Length (mm) (Length of pedal)	Operating Angle (Abt.)	Total Resis Value of Pot meter incorp
H80FCL	Hall effect IC type potentiometer is incorporated. It offers long life expectancy.	100×140 (Abt. 200)	20°	Hall effect IC type potentiom is incorpo Applied vo 5V±10%l
200FCA	Wall-mounted type Suitable for various vehicle applications	100×200 (Abt. 240)	17°	10k
200FCW	Seesaw type	120×220 (Abt. 220)	±11°	10k

ional No. of incorporated (Note 1)	Degree of Protection (Note 2)		Life Expectancy (Note 3) (Unit:Ten Thousand)	Spring return	Digital code switch(standard switch)(Note 4)	Micro switch	Special resistance value	Center Tap (Note 5)	Page
	Standard Version	Optional Version							
p to 2	IP65	—	200	Standard option	—	Special option	—	—	56,57
o to 2	IP54	IP65	200	Standard option	Special option	Special option	Special option	—	58,59
to 2	IP54	IP65	100	Standard option	Special option	Special option	Special option	Special option	60,61

Note 1) : Please specify the operating positions of switches to be incorporated when ordering. Please also see page 62 mentioning the specifications of switch.
Note 2) : Please see page 63 mentioning the details of IP code (Degree of Protection).
Note 3) : Life expectancy is based on our rough mechanical durability test and therefore, please consider this value as rough indication when designing or selecting.
Note 4) :The number of switch availability varies depending on model.
Note 5) :Center tap is current type, short zone is abt.8°.

"Sakae"

JOYSTICK CONTROLLERS

For Industrial Use and Precision Multi-Directional Operation

JOYSTICK CONTROLLERS

■PRECAUSIONS FOR DESIGN

- Potentiometers used on joystick controllers employ precision-class conductive plastic resistive element, and therefore, please make sure that "Sakae" joystick controllers should always be used with voltage method (Voltage shall be applied between terminals ① - ③ and output obtained from terminal ②).
  Please also take care that more than 1 mA shall not flow through terminal ② (movable contact) because overcurrent burns out the resistive element (Appropriate current through terminal ② should be below 10μA).

- Potentiometers used on joystick controllers employ precision inductance type contactless potentiometer and therefore, please don't apply any voltage to other terminals excluding IN (Input) terminal when using or measuring. Otherwise, the potentiometer may be burnt out.

- When operating lever shaft is situated at neutral position, the output of potentiometer is adjusted within 50%±1.5% against applied voltage. In case of 30JB and 40JB, this value is within 50%±2%. In case of 30JH, 30JL, H30JH, H30JL, H40JH and H60JH, this value is whithin 50%±5%. In case of 100JB, this value is within 50%±2% for X and Y axes and within 50%±3% for Z axis. Higher accuracy is available if you request.

- In case potentiometer has a center tap, constant zone of output at center position is adjusted to approx. 3°.

- In case switches are incorporated on each axis, the angle of switching is approx. ±5 ° from the center position. Higher accuracy is available if you request.

- Please take care not to apply excessive side-load over 50N (5.0 kgf), and /or push-pull force over 50N (5.0 kgf) to the stick. Otherwise, it may be bent by such overload. In case of applying over 50N (5 kgf) to the stick, please consult us in advance.

- Please take care not to apply over 10N (1 kgf) force on potentiometer terminals and/or leads.

- In case operating environment abounds with vibration and shock for a long period, please consult us in advance.
  Specifications and values shown in vibration, shock and life expectancy shall be based on the following test conditions.

  ○Vibration 10~55Hz 98m/s2 shall be in accordance with MIL-STD-202-201.

  ○Shock 294m/s2 shall be in accordance with MIL-STD-202-213.

  ○Life expectancy shall be based on test conditions under which lever shall be moved forward and backward per each operation at the speed of 40 r.p.m. in normal room temperature.

- Further technical details of potentiometers to be incorporated, please refer to our General Catalog on precision potentiometers, dials and servo components separately.

■PRECAUSIONS FOR USE

- All values mentioned in this catalog are based under the condition of normal mounting method and application.
  If special mounting method and application are made, the values may be changed.
  In that case, we would kindly request you to comfirm completely on all data in view of operation, performance, reliability, safety and so on at your application after your careful checking and testing.

  Normal mounting method means:

Potentiometers:
Please see page 21, in our General Catalog No. 1510.

Joystick Controllers:
The knob or lever is in the upward position.

- There are 2 different kinds of spring return device for each X and Y axis, there are 2 kinds of spring return force for X and Y axis, respectively, namely, one is stronger return force using 2 springs (we mentioned, "Directive feeling") and the other is spring return force using 1 spring (we mentioned, "omni-directional type"). So, please consider this difference when selecting.
  Repeating spring return action rapidly without holding lever shaft may shorten the life expectancy than specified because such operation will most likely wear out the resistive element of the potentiometer. Especially, around the center position on the resistive element will be worn out. Furthermore, spring return action without gripping specified, because such operation bring over-worn out the resistive element of the potentiometers at the center position and other damages of inner con-struction. Lever operation is preferably made as slow and stable as possible.

- Potentiometer and switch incorporated in the knob are dust-proof construction and, however, are not water-proof construction. When using in rather bad environ-mental conditions such as outdoor, atmosphere of water, gas, etc., please consult us before ordering.

- Dust-and water-proof rubber cover tends to deterio-rate when used outdoors all the time, and therefore we recommend to make replacement with new ones after 1 to 1.5 years use.

- We assume no responsibility on so-called "products liability", unless we are fully noticed of the use or applications and a written confirmation to do so was issued from us.
  This policy shall also be applied for the applications of life support devices and nuclear facilities.

- We will guarantee all of our products for one year after the date of shipment.
  During this period, as for faults and troubles which are attributable to our responsibility, we will repair and adjust them at free of charge. We can not bear any cost for the relative damage based on failures of our products.
  As for faults and troubles which are not attributable to our responsibility or which take place after warranty period, we will require payment for actual costs for repair and adjustment plus all shipping charges includ-ing actual freightage.

"Sakae"

H25JB

● 2-dimensional coordinate ● With a hall effect IC

● Nomenclature

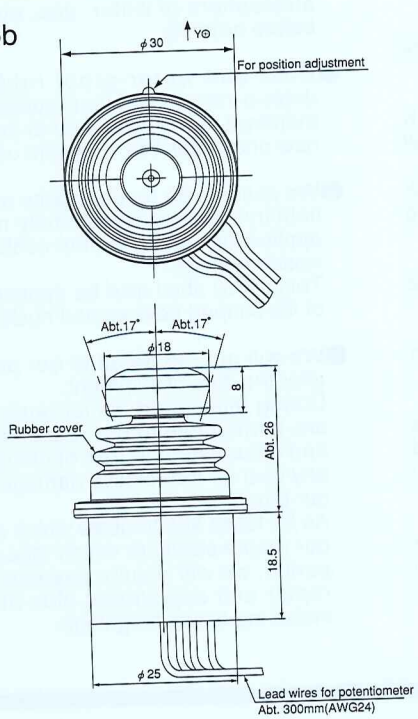
S means special mechanical specifications not applicable to our standards.
H means hall effect IC type resistive element incorporated.
25 means approx. size of base housing in mm.
J means joystick controller.
B means the potentiometer is incorporated inside housing case.
M means round shape.
Mechanism
Y means 2-dimensional coordinate..
Available directions of lever operation
O:Omni-directional 360 ° operating type.

S H 25 J B M - Y O - 2 S 0 R2 G 0 0 - 00000

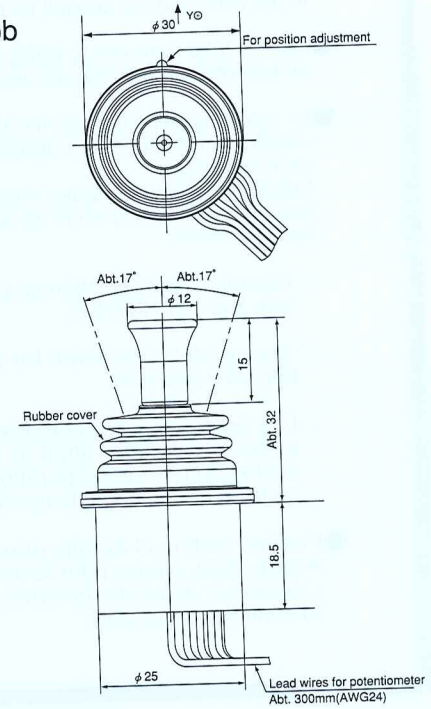
Number of potentiometers to be incorporated
2···2 potentiometers incorporated.
Number of output and kind of output characteristic
S···Single output X···Dual cross output P···Dual parallel output
Number of switches to incorporated
0··· No switch incorporated 1···With 1 push button switch
With spring return device
R2···With spring return device for 2 dimensional coordinate.
Mounting accessories:
G: With dust proof rubber cover.
Shape of knob:
M:M type knob as shown on the below sketch
B:B type knob as shown on the below sketch
S:Special shaped knob
Mounting method
U:Joystick mounted from above panel
D:Joystick mounted from under panel
Special part number
In case we produce customized product, we add 4 or 5 digit branch number.

● Standard Dimensions

With M type knob



With B type knob



H25JBM-YO-2S0R2GMU

H25JBM-YO-2S0R2GBU

STANDARD SPECIFICATIONS

Mechanical Performance

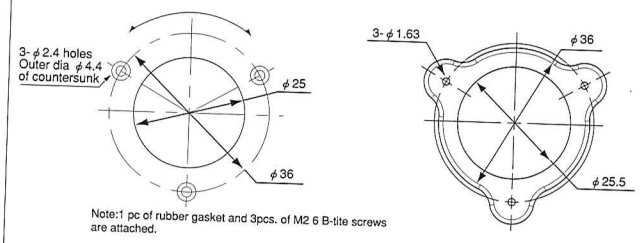
Controlling range of operating lever	Omni-directionally approx. ±17° from center position
Operating force	Spring return device (Automatically return to center) X&Y directions: Approx. 1N～2.5N
Operating temperature range	−20°C～+ 60°C
Vibration	10Hz～55Hz 98m/s²
Shock	294m/s²
Mechanical life expectancy	Approx. 2,000,000 operations
Mass	Single output type: Approx. 22g Dual output type: Approx. 24g

Electrical Performance

Applied voltage	D. C. 5V ±10%
Effective output	0.5V～4.5V
Electrical rotating angle	X&Y directions: Approx. ±17° (Approx.34°)
Independent linearity tolerance	±3%FS
Load resistance	Over 10kΩ
Dielectric strength	1 minute at A. C. 500V
Insulation resistance	Over 1,000MΩ at D. C. 500V
EMS durability	100V/m (80MHz～1GHz 1kHz sine-wave 80%AM modulation)
ESD durability	±8kV contact ±15kV aerial discharge (Based on IEC61000-4-2)

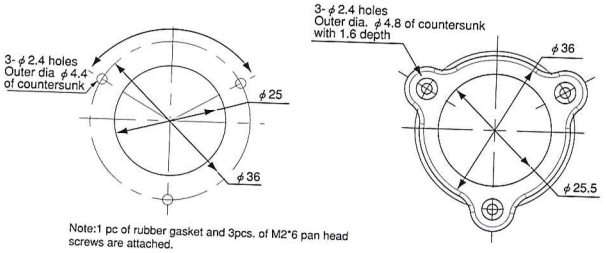
Panel Arrangements

Mounted from under panel



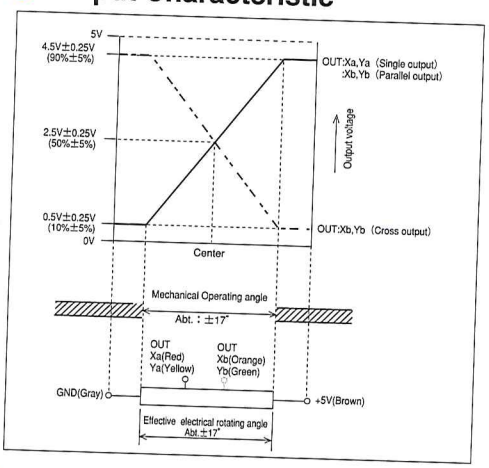
Note:1 pc of rubber gasket and 3pcs. of M2 6 B-tite screws are attached.

Mounted from above panel

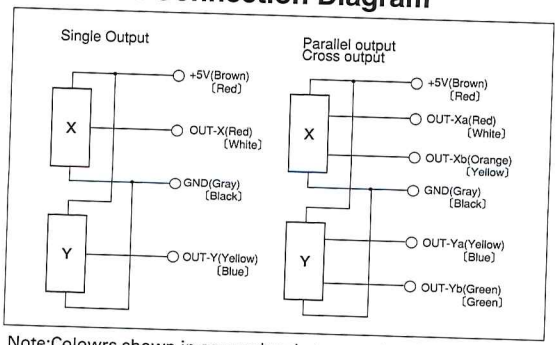


Note:1 pc of rubber gasket and 3pcs. of M2*6 pan head screws are attached.

Output Characteristic



Terminal Connection Diagram



Note:Colowrs shown in square brackets are colors for lead wires when H25JB model is assembled on the mini cobra shaped knob (p.40).

Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

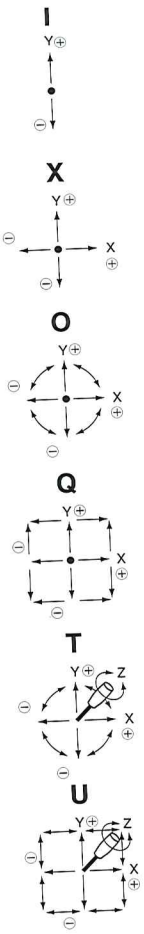
"Sakae"

30JB

● Potentiometer incorporated type ● With conductive plastic element

● Nomenclature

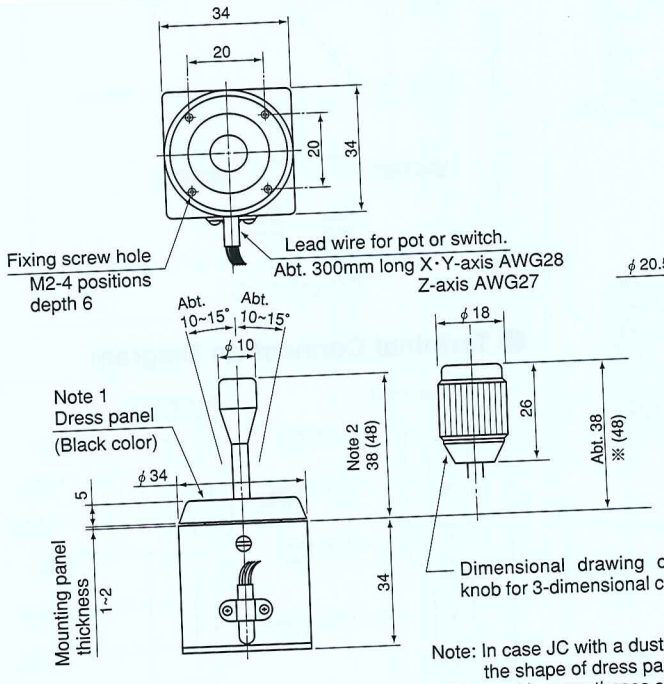
S means special mechanical specifications not applicable to our standard.
30 means approx. size of base housing in mm.
J means joystick controller.
Kind of types
B means type available with 1-, 2- and 3-dimensional coordinates. Potentiometers inside-incorporated type.
K means square shape.
Mechanism
X means 1-dimensional coordinate. **Y** means 2-dimensional coordinate.
Z means 3-dimensional coordinate.
Available directions of lever operation
Standard version:
O: Omni-directional 360°operating type.
Special version:
I: I figure (Y) directional operating type.
X: Cross directional operating type (X and Y)
Q: Square-directional 360°operating type.
T: In addition to omni-directional operation, 3-dimensional coordinate operation is possible by rotating knob in which a potentiometer is incorporated.
U: In addition to square-directional operation, 3-dimensional coordinate operation is possible by rotating knob in which a potentiometer is incorporated.



S 30 J B K - Y O - 2 0 R2 G - 00000

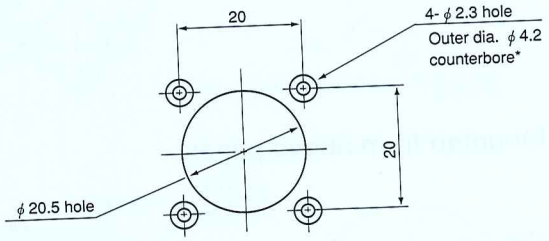
Number of potentiometers to be incorporated only for 30JBK.
0···no potentiometer incorporated. **1**···1 potentiometer incorporated.
2···2 potentiometers incorporated. **3**···3 potentiometers incorporated.
Number of switches to be incorporated.
0···no switch incorporated. **1**···1 switch incorporated.
2···2 switches incorporated.
With spring return device : R1: with spring return device for 1-dimensional coordinate.
R2: with spring return device for 2-dimensional coordinate.
R3: with spring return device for 3-dimensional coordinate.
Mounting accessories : G: with dust proof rubber cover. **P:** with sub-panel for mounting.
Special part number:
In case we produce customized products, we add 4 or 5-digit branch number.

● Standard Dimensions



Note: In case JC with a dust-proof rubber cover, the shape of dress panel shall be changed.
※Numeral in parentheses shows dimensions of Dust-proof rubber cover.

■ Panel Arangements



Note: 1) In case JC with a dust-proof rubber cover, the counterbore-work (*part) is not necessary.
2) 4 pcs. of mounting screw (M2 × 6) are attached.

(Unit : mm)

30JBK-YO-20R2
(Standard
2-dimensional coordinate type)

30JBK-ZT-30R3G
(3-dimensional coordinate type with
dust proof rubber cover)

Special Knobs Available

For detailed dimensions, please refer to page 52.

Knob 104

Knob 304

STANDARD SPECIFICATIONS

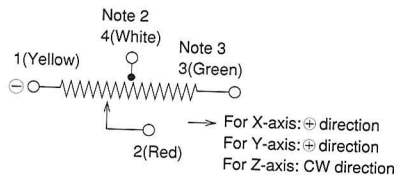
Mechanical Performance

Controlling range of operating lever	X and Y directions : Approx.±10°～±15° from center position.(Omni-directionally) Z direction : Approx.±30°～±35° from center position.
Operating force (Standard spring return device Automatically return to center) (Omni-directionally)	X and Y directions : Approx.0.8～2N (80～200gf) Z direction : Approx.15～60mN・m (150～600gf.cm)
Operating temperature range	−20°C～+65°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 5,000,000 operations
Mass	2-dimensional coordinate type : Approx. 80g 3-dimensional coordinate type : Approx. 100g

Electrical Performance

Potentiometers mounted	Special conductive plastic resistive element is exclusively used for 30JB series. (X and Y axes pots) Resistance value : 10kΩ±15% Rating : 0.1W Electrical rotating angle : Approx.20° Independent linearity tolerance : ±3% (Z axis pot.) Resistance value : 10kΩ±15% Rating : 0.04W Electrical rotating angle : Approx.60° Independent linearity tolerance : ±3%
Output smoothness	Below 0.2% against input voltage
Contact resistance variation	Below 6% C.R.V
Resolution	Essentially infinite
Dielectric strength	1 minute at 500V.A.C.
Insulation resistance	Over 1,000MΩ at 500V.D.C.

Terminal Connection Diagram



Note: 1) Terminals shall be lead-wire terminals with approx. 300mm long. (AWG28)
2) Current center tap shall be applied to all X.Y and Z axes as standard.
3) Markings of X, Y, Z on lead-wire terminals are made on the tag, respectively.

Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

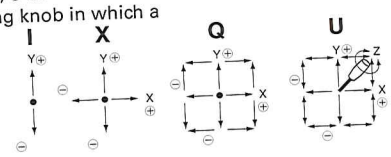
Sakae

30JE

Switch incorporated type

Nomenclature

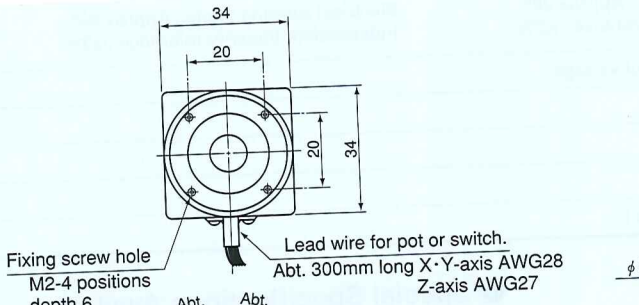
S means special mechanical specifications not applicable to our standard.
30 means approx. size of base housing in mm.
J means joystick controller.
Kind of types
E means type available with 1-, 2- and 3-dimensional coordinates.
Switches inside-incorporated type.
K means square shape.
Mechanism
X means 1-dimensional coordinate. **Y** means 2-dimensional coordinate.
Z means 3-dimensional coordinate.
Available directions of lever operation as below illustration
Standard version:
Q: Square-directional 360°operating angle.
Special version
I : I figure (Y) directional operating type.
X: Cross directional operating type (X and Y)
U: In addition to square-directional operation, 3-dimensional coordinate operation is possible by rotating knob in which a potentiometer is incorporated.

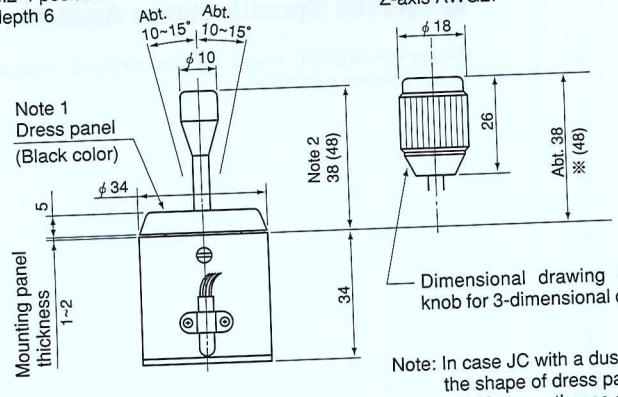


S 30 J E K - Y Q - 0 4 R2 G - 00000

Number of potentiometers to be incorporated.
0···no potentiometer incorporated.
Number of switches to be incorporated.
1···1 switch incorporated. **2**···2 switches incorporated. **3**···3 switches incorporated.
4···4 switches incorporated. **5**···5 switches incorporated. **6**···6 switches incorporated.
With spring return device : R1: with spring return device for 1-dimensional coordinate.
R2: with spring return device for 2-dimensional coordinate.
R3: with spring return device for 3-dimensional coordinate.
Mounting accessories : G: with dust proof rubber cover. **P:** with sub-panel for mounting.
Special part number :
In case we produce customized products, we add 4 or 5-digit branch number.

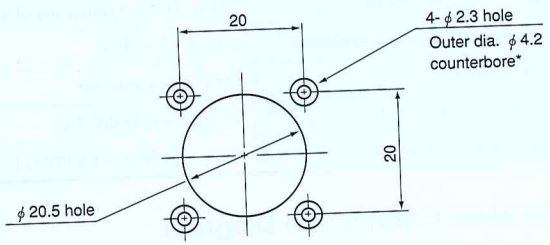
Standard Dimensions





Note: In case JC with a dust-proof rubber cover, the shape of dress panel shall be changed.
※Numeral in parentheses shows dimensions of Dust-proof rubber cover.

Panel Arangements



Note: 1) In case JC with a dust-proof rubber cover, the counterbore-work (*part) is not necessary.
2) 4 pcs. of mounting screw (M2 × 6) are attached.

(Unit : mm)

30JEK-YQ-04R2
(Standard 2-dimensional coordinate type)

30JEK-ZU-06R3G
(3-dimensional coordinate type with dust proof rubber cover)

Special Knobs Available

For detailed dimensions, please refer to page 52.

Knob 104

Knob 304

STANDARD SPECIFICATIONS

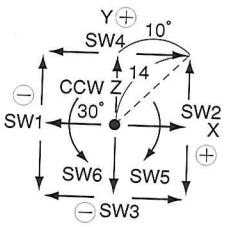
Mechanical Performance

Controlling range of operating lever	X and Y directions : Approx.±10°～±15° from center position. Z direction : Approx.±30°～±35° from center position.
Operating force (Standard spring return device Automatically return to center)	X and Y directions : Approx.0.8～2N (80～200gf) Z direction : Approx.15～60mN・m (150～600gf.cm)
Operating temperature range	–20°C～65°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 1,000,000 operations.
Mass	2-dimensional coordinate type : Approx. 80g 3-dimensional coordinate type : Approx. 100g

Electrical Performance

Switches used (Resistance load)	Rating 24V.D.C., 50mA [In case of 3-dimensional coordinate and Z-axis switch-inside-knob incorporated type U, the ratings are 24V.D.C., 100mA.]
Dielectric strength	1 minute at 500V.A. C.
Insulation resistance	Over 100MΩ at 250V.D.C.

Terminal Connection Diagram



●Switches of each axis will be "on" at both end of each axis.

Note 1) Terminals shall be lead-wire terminals with approx. 300mm long. (AWG28)
2) Colors of micro-switch connection leads are shown in parenthesis.
(For X-axis) SW1 (green 2 leads): ON up to ⊖ directional end from center position
SW2 (white 2 leads): ON up to ⊕ directional end from center position
(For Y-axis) SW3 (yellow 2 leads): ON up to ⊖ directional end from center position
SW4 (red 2 leads): ON up to ⊕ directional end from center position
(For Z-axis) SW5 (orange 2 leads): ON up to CW directional end from center position
SW6 (gray 2 leads): ON up to CCW directional end from center position

Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

"Sakae"

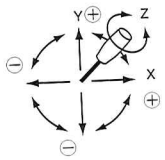
30JH

● Low-cost ● 3-dimensional coordinate ● With conductive plastic element

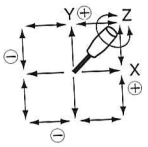
● Nomenclature

S means special mechanical specifications not applicable to our standard.
30 means approx. size of base housing in mm.
J means joystick controller.
Kind of types
H means 3-dimensional coordinate and low-cost type.
K means square shape.
Mechanism
Z means 3-dimensional coordinate.
Available directions of lever operation
T: In addition to omni-directional operation, 3-dimensional coordinate operation is possible by rotating knob in which a potentiometer is incorporated.
U: In addition to square-directional operation, 3-dimensional coordinate operation is possible by rotating knob in which a potentiometer is incorporated.

T



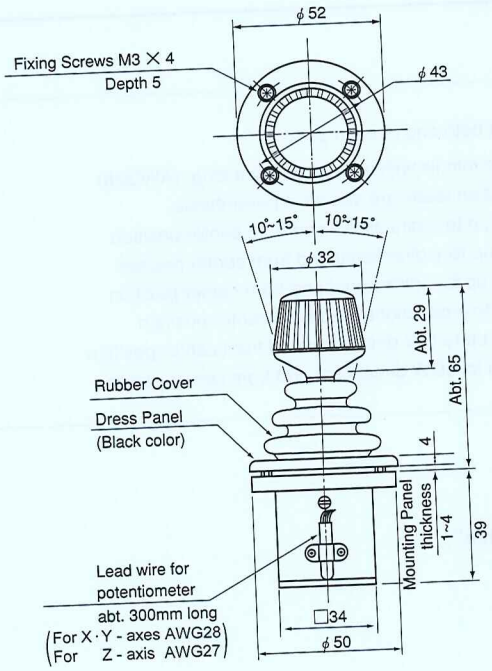
U



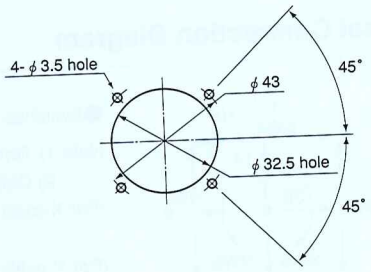
S 30 J H K - Z T - 3 0 R3 G - 00000

Number of potentiometers to be incorporated.
2···2 potentiometers incorporated (in case of the knob with an incorporated switch.)
3···3 potentiometers incorporated.
Number of Switches to be incorporated.
0···no switch incorporated.
2···2 switches incorporated (These switches are active at the both ends of Z axis.These swithces are incorporated inside Z-axis instead of potentiometer. This is special version.)
With spring return device :
R3 : with spring return device for 3-dimensional coordinate type. (30JH standard option)
Mounting accessories : G: with dust proof rubber cover. (30JH standard option)
P: with sub-panel for mounting.
Special part number :
In case we produce customized products, we add 4 or 5-digit branch number.

● Standard Dimensions



■ Panel Arangements



Note: 1) 4 pcs. of mounting screws (M3 × 8) are attached.
2) Fastening torque of fixing screws shall be below 400mN·m(4kgf·cm).

(Unit : mm)

30JHK-ZT-30R3G
(Standard
3-dimensional coordinate type)

STANDARD SPECIFICATIONS

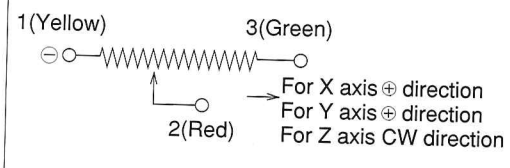
Mechanical Performance

Controlling range of operating lever	3-dimensional coordinate type. X and Y directions : Approx.±10°～±15° from center position.(Omni-directionally) Z direction : Approx.±30°～±35° from center position.
Operating force (Omni-directionally)	X and Y directions : Approx.1～2N (100～200gf) Z direction : Approx.30～70mN・m (300～700gf.cm)
Operating temperature range	−20°C～+60°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 2,000,000 operations.
Mass	Approx. 130g

Electrical Performance

Potentiometer incorporated	Special conductive plastic resistive element is exclusively used for 30JH series. (X and Y axes pots) Resistance value : 10kΩ±20% Rating : 0.1W Electrical rotating angle : Approx.20° Independent linearity tolerance : ±5% (Z axis pot.) Resistance value : 10kΩ±20% Rating : 0.04W Electrical rotating angle : Approx.60° Independent linearity tolerance : ±5%
Output smoothness	Below 0.2% against input voltage.
Contact resistance variation	Below 6% C.R.V.
Resolution	Essentially infinite
Dielectric strength	1 minute at 500V.A.C.
Insulation resistance	Over 1,000MΩ at 500V.D.C.

Terminal Connection Diagram



Note: Terminals shall be lead-wire terminals with approx. 300mm long.

Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

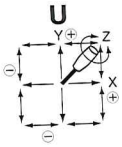
"Sakae"

H30JH

● 3-dimensional coordinate ● With a hall effect IC

● Nomenclature

- **S** means special mechanical specifications not applicable to our standard.
- **H** means hall effect IC type resistive element incorporated.
- **30** means approx. size of base housing in mm.
- **J** means joystick controller.
- **Kind of types**
  H means 3-dimensional coordinate and low-cost type.
- **K** means square shape.
- **Mechanism**
  Z means 3-dimensional coordinate.
- **Available directions of lever operation**
  U: In addition to 360° square-directionally operation, 3-dimensional coordinate operation is possible by the rotating knob in which a potentiometer is incorporated.

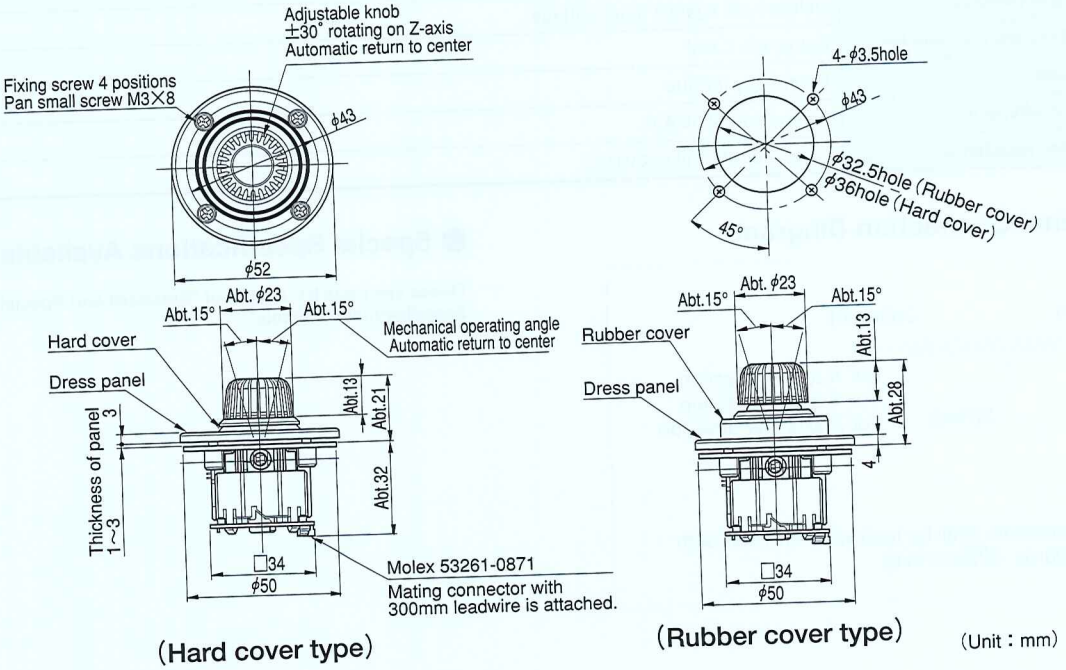


S H 30 J H K - Z U - 3 S R3 G - 00000

Number of potentiometers to be incorporated
0···no potentiometer incorporated. **1**···1 potentiometer incorporated.
2···2 potentiometers incorporated. **3**···3 potentiometers incorporated.
Number of output and kind of output characteristic
S···single output. **X**···dual cross output. **P**···dual parallel output.
With spring return device:
R3 : with spring return device for 3-dimensional coordinate type.
Mounting accessories:
G : with dust proof rubber cover. **P** : with sub-panel for mounting.
Special part number:
In case we produce customized products, we add 4 or 5-digit branch number.

● Standard Dimensions

■ Panel Arangements



30JHK-ZU-3SR3
(Hard cover type)

H30JHK-ZU-3SR3G
(Rubber cover type)

STANDARD SPECIFICATIONS

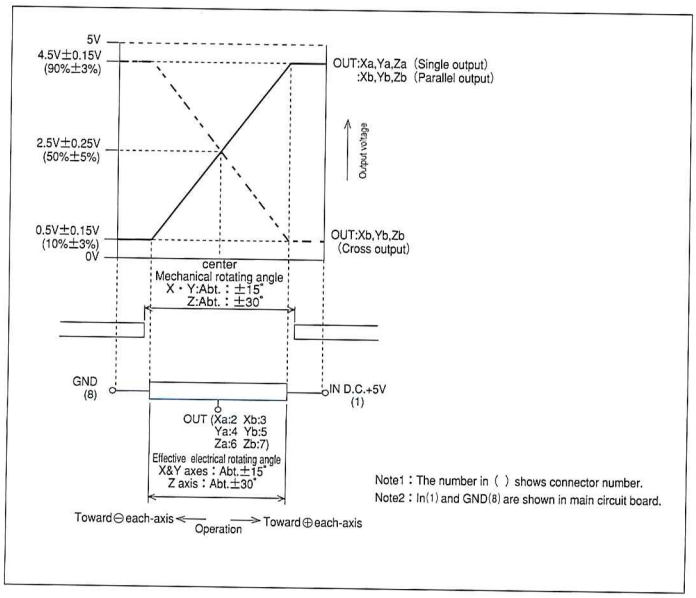
Mechanical Performance

Controlling range of operating lever	3-dimensional coordinate type X and Y directions: Approx. ±15° from center position Z diretions: Approx. ±30° from center position
Operating force (Standard spring return device : Automatically return to center)	X and Y directions: Approx.1.5～3N(150～300gf) (X and Y directions with rubber cover: Approx.1.5～3.5N(150～350gf)) Z direction:Approx.10～30mN～m(100～300gf·cm)
Operating temperature range	–20°C～+60°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx.1,000,000 operations.
Mass	Approx. 50g

Electrical Performance

Hall effect IC type resistive element incorporated	●Applied voltage: 5V±10% D.C. ●Effective output: Approx.0.5V～4.5V ●Electrical rotating angle: X and Y-axis: Approx.±15° Z-axis: Approx.±30° ●Independent linearity tolerance: ±3% ●Load resistance: over 10KΩ
Dielectric strength	1 minute at 250V.A.C.
Insulation resistance	Over 100MΩ at 250V.D.C.
EMC durability	50V/m (80MHz～1GHz 1KHz sine-wave 80%AM modulation)

Terminal Connection Diagram



"Sakae"

30JL

● Low-cost ● 1-dimensional coordinate ● With conductive plastic element

● Nomenclature

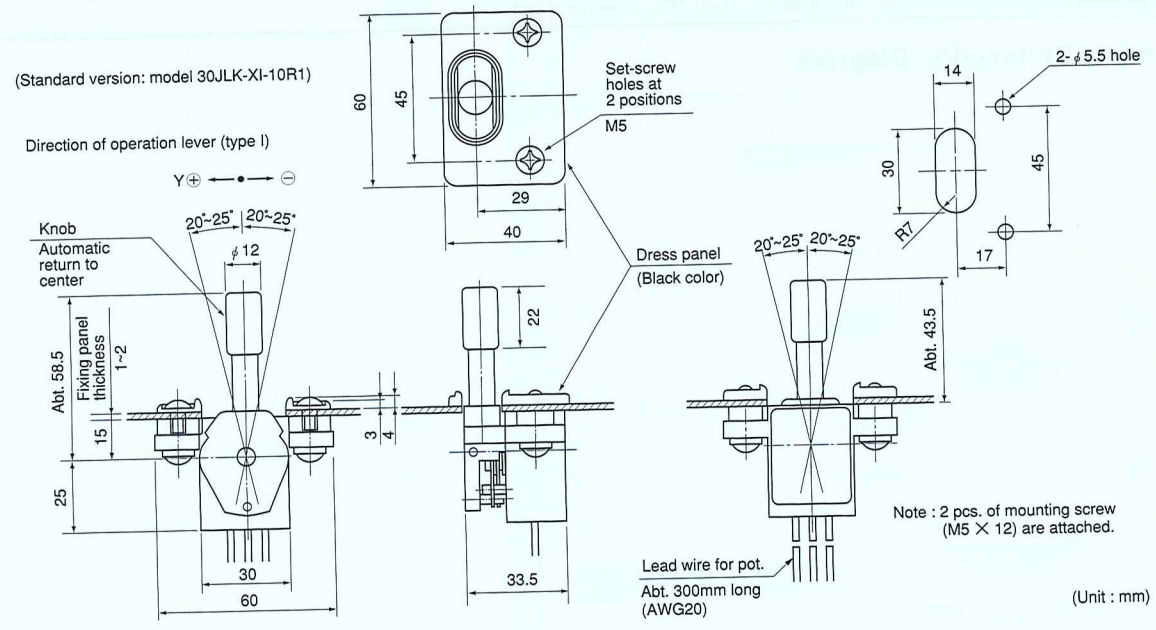
S means special mechanical specifications not applicable to our standard.
30 means approx. size of base housing in mm.
J means joystick controller.
Kind of types
L means 1-dimensional coordinate and low-cost.
K means square shape.
Mechanism
X means 1-dimensional coordinate.
Available directions of lever operation
I: I figure (Y) directional operating type.

S 30 J L K - X I - 1 0 R1 G - 00000

Number of potentiometers to be incorporated.
0···no potentiometer incorporated.
1···1 potentiometer incorporated.
Number of switches to be incorporated.
0···no switch incorporated.
1···1 switch incorporated.
2···2 switches incorporated.
With spring return device
R1 : with spring return device for 1-dimensional coordinate type. (standard option)
Mounting accessories.
G : means with dust proof rubber cover.
R : means with round shaped knob.
H : means with flat shaped knob.
P : means with sub-panel for mounting.
Special part number :
In case we produce customized products, we add 4 or 5-digit branch number.

● Standard Dimensions

■ Panel Arangements



30JLK-XI-10R1
(Standard)

30JLK-XI-10R1R
(With round shaped knob)

30JLK-XI-10R1H
(With flat shaped knob)

30JLK-XI-10R1GR
(With dust proof rubber cover and round shaped knob)

STANDARD SPECIFICATIONS

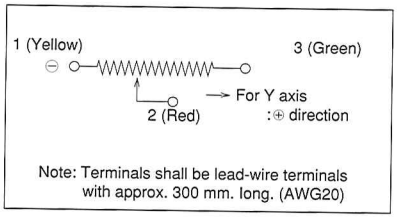
Mechanical Performance

Controlling range of operating lever	±20°～± 25° from center position.
Operating force	Standard spring return device : Automatically return to center. Standard··· Approx. 1N～2.5N (Approx. 100gf～250gf). With rubber cover··· Approx. 1N～5.5N (Approx. 100gf～550gf)
Operating temperature range	–20°C～+60°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Lite expectancy	Approx. 2,000,000 operations.
Mass	Approx. 100g

Electrical Performance

Potentiometer mounted	Special conductive plastic resistive element is exclusively used for 30JL series.
Total resistance value	10kΩ±20%
Independent linearity tolerance	±5%
Electrical rotating angle	Approx. 40°
Rated power	0.1W
Output smoothness	Below 0.2% against input voltage.
Contact resistance variation	Below 6% C.R.V.
Resolution	Essentially infinite
Dielectric strength	1 minute at 500V.A.C.
Insulation resistance	Over 1,000MΩ at 500V.D.C.

Terminal Connection Diagram

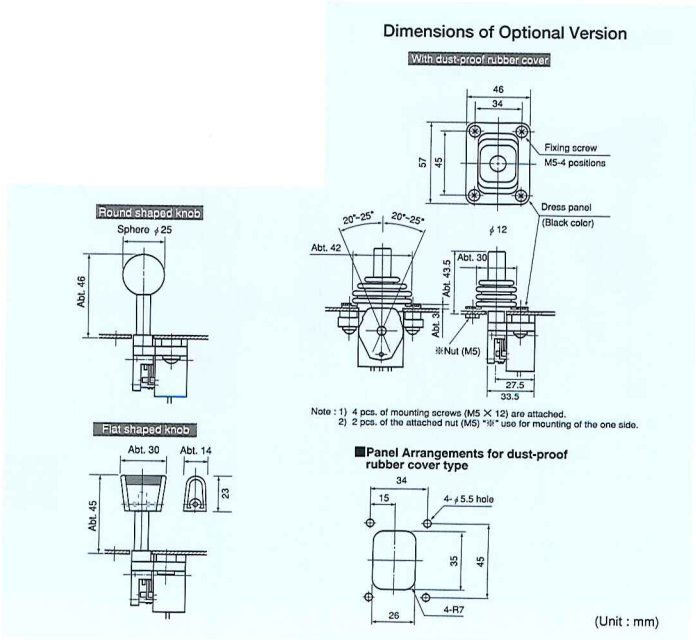


Note: Terminals shall be lead-wire terminals with approx. 300 mm. long. (AWG20)

Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

Dimensions of Optional Version



(Unit : mm)

"Sakae"

H30JL

● Low-cost ● 1-dimensional coordinate ● With a hall effect IC

● Nomenclature

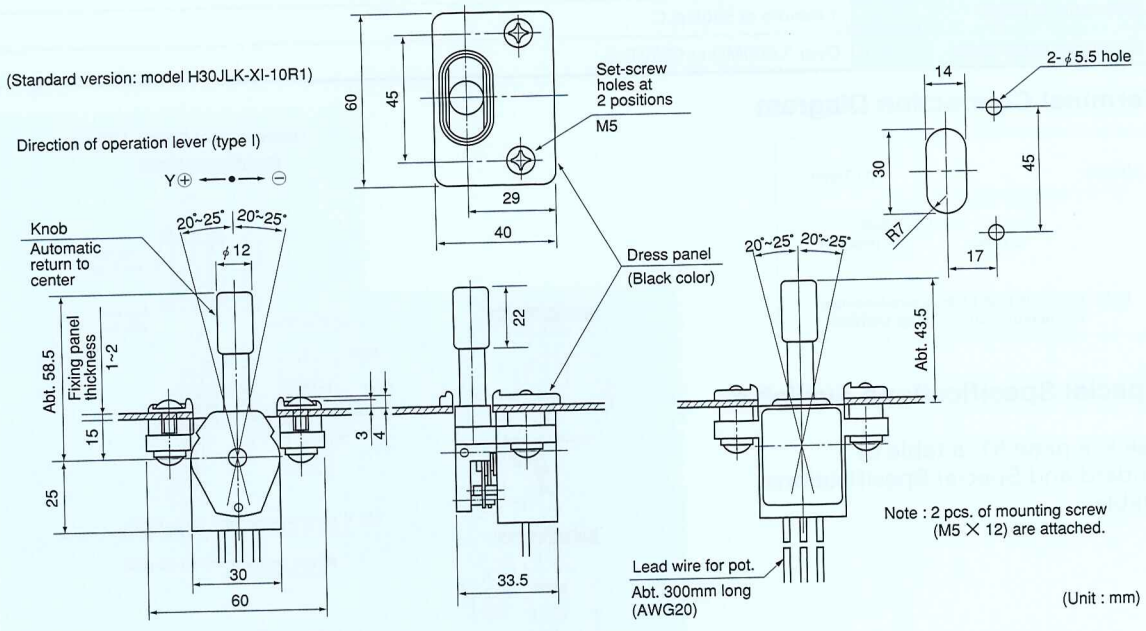
S means special mechanical specifications not applicable to our standard.
H means hall effect IC type resistive element incorporated.
30 means approx. size of base housing in mm.
J means joystick controller.
Kind of types
L means 1-dimensional coordinate potentiometer incorporated and pot low-cost type.
K means square shape.
Mechanism
X means 1-dimensional coordinate.
Available directions of lever operation
I: (H30JL) our standard version.

S H 30 J L K - X I - 1 P 0 R1 GR - 00000

Number of outputs from potentiometer
1··· single output. **2**··· two (dual output).
Output characteristics
S··· single output. **X**··· dual cross output. **P**··· dual parallel output.
Number of switches to be incorporated
0···no switch incorporated. **1**···1 switch incorporated.
With spring return device:
R1 : with spring return device for 1-dimensional coordinate type.
Mounting accessories:
G : with dust proof rubber cover.
R : with round shaped knob
H : with flat shaped knob
P : with sub-panel for mounting
Special part number:
In case we produce customized products, we add 4 or 5-digit branch number.

● Standard Dimensions

■ Panel Arangements



H30JLK-XI-10R1
(Standard)

H30JLK-XI-10R1GR
(With round shaped knob, dust proof roubber cover)

H30JLK-XI-10R1H
(With flat shaped knob)

STANDARD SPECIFICATIONS

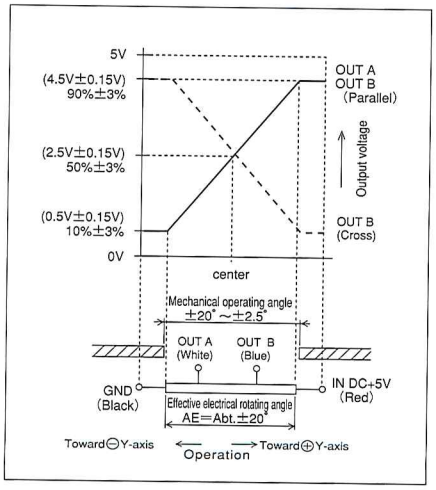
Mechanical Performance

Controlling range of operating lever	1-dimensional coordinate type ±20°～±25° from center position.
Operating force	Standard spring return device : Automatically return to center Approx.1～2.5N(100～250gf) (With rubber cover: Approx.1～5.5N(100～550gf))
Operating temperature range	–20°C～+60°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx.5,000,000 operations.
Mass	Approx.100g

Electrical Performance Hall effect IC type resistive element incorporated

Hall effect IC type resistive element incorporated	●Applied voltage: 5V±10% D.C. ●Effective output: Approx.0.5V～4.5V ●Independent linearity tolerance: ±3% ●Load resistance: over 10KΩ
Dielectric strength	1 minute at 250V.A.C.
Insulation resistance	Over 1000MΩ at 250V.D.C.
EMS durability	50V/m(80MHz～1GHz 1KHz sine-wave 80%AM modulation)

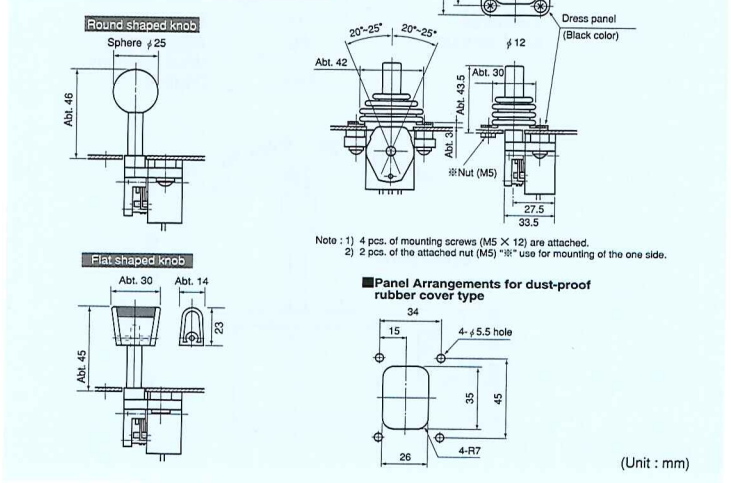
Output Characteristic and Terminal Connection Diagram



Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

Dimensions of Optional Version



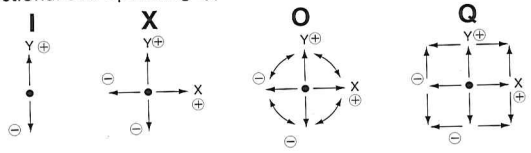
"Sakae"

40JB

● Potentiometer incorporated type ● With conductive plastic element

● Nomenclature

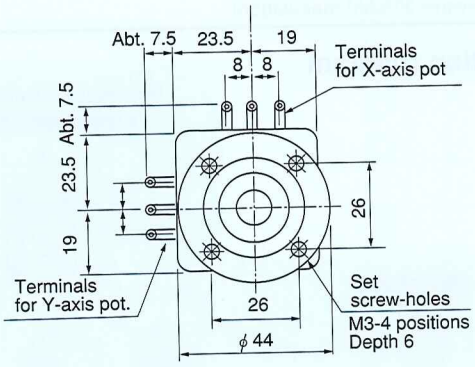
S means special mechanical specifications not applicable to our standard.
40 means approx. size of base housing in mm.
J means joystick controller.
Kind of types
B means 1- or 2-dimensional coordinates is available and also means potentiometer is incorporated inside housing case.
K means square shape.
Mechanism
X means 1-dimensional coordinate.
Y means 2-dimensional coordinate.
Available directions of lever operation Standard version:
O: Omni-directional 360°operating type.
Special version:
I : I figure (Y) directional operating type.
X: Cross direction of X andY operating type.
Q: Square-directional 360°operating type.

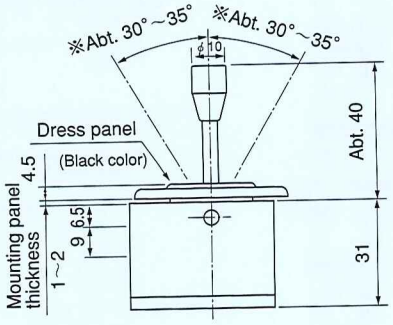


S 40 J B K - Y O - 2 0 R2 G - 00000

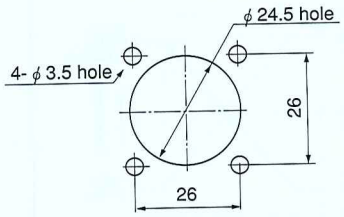
Number of potentiometers to be incorporated.
1···1 potentiometer incorporated.
2···2 potentiometers incorporated.
Number of switches to be incorporated.
0···no switch incorporated. **1**···1 switch incorporated.
With spring return device :
R1 : with spring return device for 1-dimensional coordinate.
R2 : with spring return device for 2-dimensional coordinate.
Mounting accessories :
G : with dust proof rubber cover.
P : with sub-panel for mounting.
Special part number :
In case we produce customized products, we add 4 or 5-digit branch number.

● Standard Dimensions





■ Panel Arangements



Note : 1) In case of type Q, the angle of mark"※" becomes 360° square-directionally and ±20° ~±25° from center position.
2) 4 pcs. of mounting screw (M3 × 8) are attached.

(Unit : mm)

40JBK-YO-20
(Standard
2-dimensional coordinate type)

40JBK-YO-20R2G
(2-dimensional coordinate type with dust proof rubber cover and spring return device)

Special Knobs Available
For detailed dimensions, please refer to page 52.

Knob 101

STANDARD SPECIFICATIONS

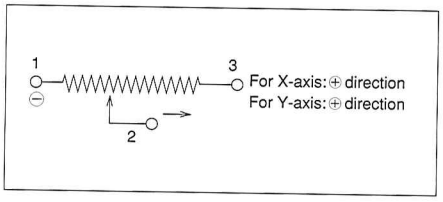
Mechanical Performance

Controlling range of operating lever	2-dimensional coordinate type. Omni-directionally approx. ±30°～±35° from center position.
Operating force	Standard : Approx. 0.2～0.6N (20～60gf.) High torque type : Approx.0.7～1.5N (70～150gf.) With spring return device (omni-directional type) : Approx. 0.6～3N (60～300gf.)
Operating temperature range	–20°C～+65°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 5,000,000 operations.
Mass	Without spring return device : Approx. 160g With spring return device : Approx. 180g

Electrical Performance

Potentiometers incorporated	Special conductive plastic resistive element is exclusively used for 40JB series. Total resistance value : 10kΩ±15% Rating : 0.2W Electrical rotating angle : Approx. 60° Independent linearity tolerance ±3% [All terminals can be fitted with Tyco110 series fasten receptacle (2.8 x 0.5mm) or equivalents]
Output smoothness	Below 0.2% against input voltage.
Contact resistance variation	Below 5% C.R.V.
Resolution	Essentially infinite
Dielectric strength	1 minute at 500V.A.C.
Insulation resistance	Over 1,000MΩ at 500V. D.C.

Terminal Connection Diagram



Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

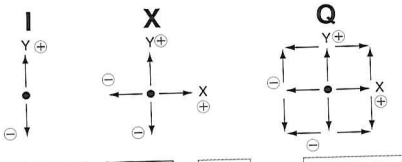
"Sakae"

40JE

● Digital switch incorporated type

● Nomenclature

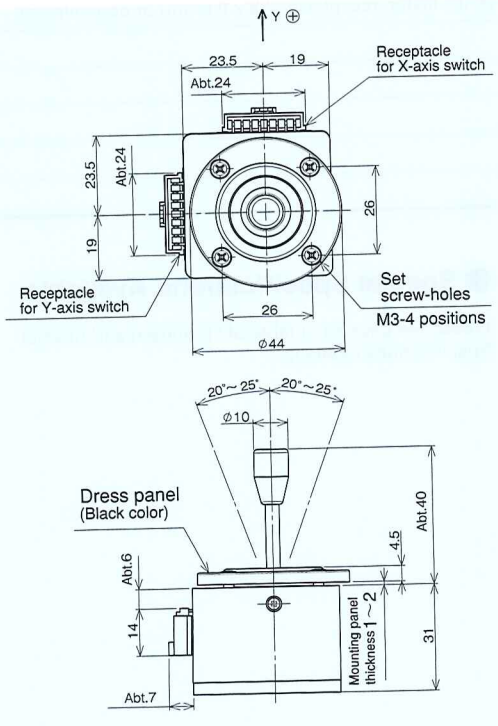
- **S** means special mechanical specifications not applicable to our standard.
- **40** means approx. size of base housing in mm.
- **J** means joystick controller.
- **Kind of types**
  E means 1- or 2- dimensional coordinates is available and also means digital code switch is incorporated.
- **K** means square shape.
- **Mechanism**
  X means 1-dimensional coordinate.
  Y means 2-dimensional coordinate.
- **Available directions of lever operation**
  Standard version:
  Q: Square-directional 360°2-dimensional coordinate type.
  Special version:
  I : I figure (Y) directional operating type.
  X: Cross direction of X andY operating type.



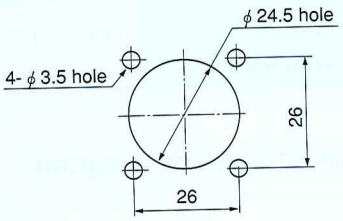
S 40 J E K - Y Q - 0 8 R2 G - 00000

Number of potentiometers to be incorporated.
0···no potentiometer incorporated.(No.potentiometer function available)
Number of switches to be incorporated.
7···4bit Gray Digital code switch incorporated.
8···4bit Binary Digital code switch incorporated.
75···5bit Gray Digital code switch incorporated.
With spring return device :
R1: with spring return device for 1-dimensional coordinate.
R2: with spring return device for 2-dimensional coordinate.
Mounting accessories :
G : with dust proof rubber cover.
P : with sub-panel for mounting.
Special part number :
In case we produce customized products, we add 4 or 5-digit branch number.

● Standard Dimensions



■ Panel Arangements



Note : 4 pcs. of mounting screw (M3 × 8) are attached.

(Unit : mm)

RoHS Compliant

40JEK-YQ-07R2(4 bit gray code)
40JEK-YQ-08R2(4 bit binary code)
40JEK-YQ-075R2(5 bit gray code)
(Standard 2-dimensional coordinate type)

40JEK-YQ-07R2G(4 bit gray code)
40JEK-YQ-08R2G(4 bit binary code)
40JEK-YQ-075R2G(5 bit gray code)
(2-dimensional coordinate type)
with dust-proof rubber cover)

Special Knobs Available

For detailed dimensions, please refer to page 52.

Knob 101

STANDARD SPECIFICATIONS

Mechanical Performance

Controlling range of operating lever	2-dimensional coordinate type : 360° and square-directionally approx. ±20°~±25° operation from center position.
Operating Force	Standard spring return device (Automatically return to center) : Approx. 1.6~3N (160~300gf)
Operating temperature range	−20°C~+65°C
Vibration	10~55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 5,000,000 operations.
Mass	Approx. 180g

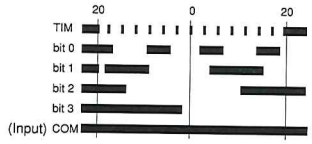
Electrical Performance

Switches used	Rating 12V.D.C. below 1mA
Contact resistance	Below 300mΩ
Dielectric strength	1 minute at 500V.A.C.
Insulation resistance	Over 100MΩ at 250 V.D.C.

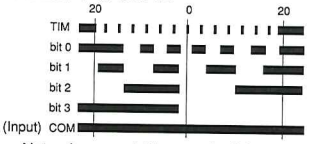
Pattern of Digital Code Switch

When ordering, please specify on which you require gray code or binary code.

4 bit gray code
40JEK-YQ-07R2

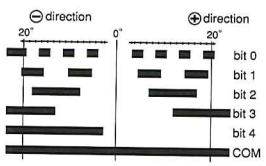


4 bit binary code
40JEK-YQ-08R2



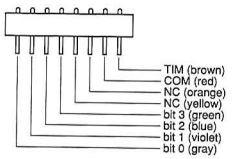
Note : In case of binary code, it is necessary to use the terminal TIM output code as a conversion gate signal.

5 bit gray code
40JEK-YQ-075R2G



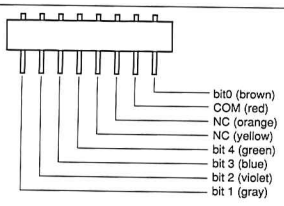
Plug Connection Diagram

For 4 bit



- Gray code and binary code have same plug connection diagram.
- "NC" means no connection and please do not use this terminal.
- Attached plug has a 300mm length lead wire (AWG28) and other length is also available on request.

For 5 bit



- "NC" means no connection and please do not use this terminal.
- Attached plug has a leadwire of about 300 mm long and other length is also available on request.

Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

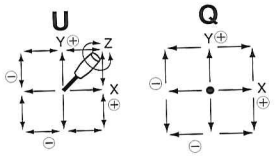
"Sakae"

H40JH

● Low-cost ● 3-dimensional coordinate ● With a hall effect IC

● Nomenclature

S means special mechanical specifications not applicable to our standard.
H means hall effect IC type resistive element incorporated.
40 means approx. size of base housing in mm.
J means joystick controller.
Kind of types
H means 3-dimensional coordinate low-cost type.
K means square shape.
Mechanism
Z means 3-dimensional coordinate. **Y** means 2-dimensional coordinate.
Available directions of lever operation
U: In addition to 360°square-directional operation, 3-dimensional coordinate operation is possible by the rotating knob in which a hall effect type potentiometer is incorporated.
Q: Square-directional 360° 2-dimensional coordinate type.

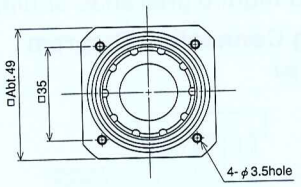


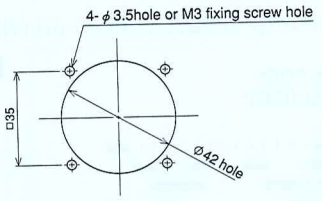
S	H	40	J	H	K	-	Z	U	-	3	S	0	R3	G	-	00000

Number of potentiometers to be incorporated
0···no potentiometer incorporated. **1**···1 potentiometer incorporated.
2···2 potentiometers incorporated. **3**···3 potentiometers incorporated.
Number of output and kind of output characteristic
S···single output. **X**···dual cross output. **P**···dual parallel output.
Number of switches to be incorporated
0··· no switch incorporated. **2**···2 switches incorporated.
3···3 switches incorporated. **4**···4 switches incorporated.
5···5 switches incorporated.
With spring return device:
R3: with spring return device for 3-dimensional coordinate.
R2: with spring return device for 2-dimensional coordinate.
Mounting accessories:
G: with dust proof rubber cover. **P** : with sub-panel for mounting.
Special part number:
In case we produce customized products, we add 4-digit or 5-digit branch number.

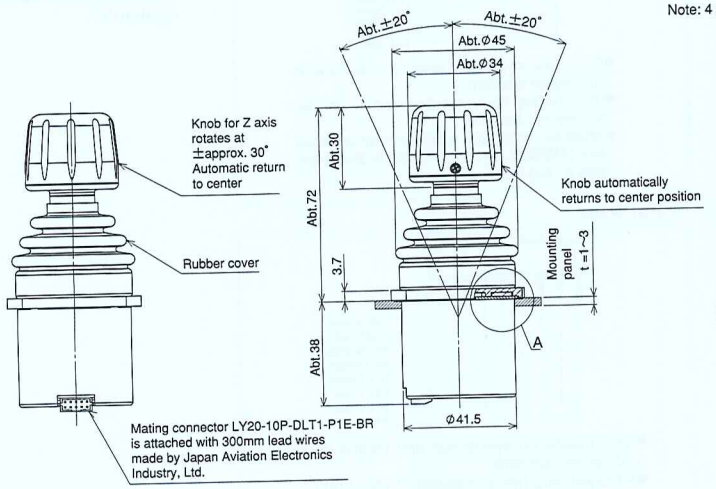
● Standard Dimensions

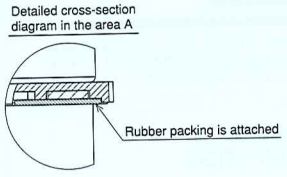
■ Panel Arangements





Note: 4 pcs. of mounting screws(M3X12) are attached.





(Unit : mm)

H40JHK-ZU-3S0R3G
Standard

STANDARD SPECIFICATIONS

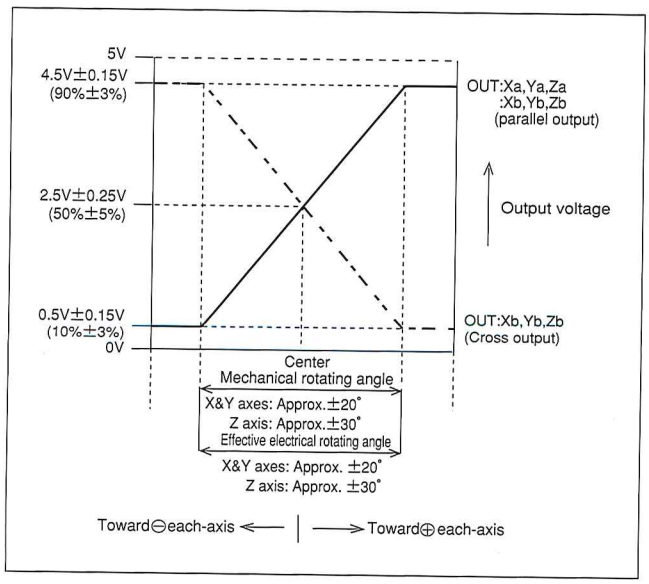
Mechanical Performance

Controlling range of operating lever	3-dimensional coordinate type. X and Y directions: Approx. ±20° from center position. Z direction : Approx.±30° from center position.
Operating force	Standard spring return device (Automatically return to center) X and Y directions: Approx.1～4N(100～400gf) Z direction : Approx.40～80mN·m(400～800gf·cm)
Operating temperature range	−20°C～+60°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 5,000,000 operations for X and Y axes. Approx. 3,000,000 operations for Z axis.
Mass	Approx.110g

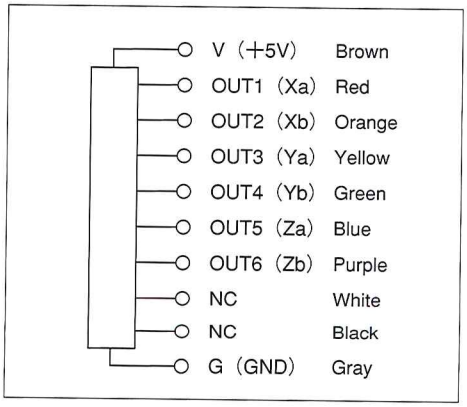
Electrical Performance

Hall effect IC type resistive element incorporated	Applied voltage: 5V±10% D.C. Effective output: Approx.0.5V～4.5V Electrical rotating angle: X and Y-axis: Approx.±20° Z-axis: Approx.±30° Independent linearity tolerance: ±3% Load resistance: over 10KΩ
Dielectric strength	1 minute at 500V.A.C.
Insulation resistance	Over 1,000MΩ at 500V.D.C.
EMS durability	100V/m (80MHz～1GHz 1kHz sine-wave 80%AM modulation)
ESD durability	±8kV contact ±15kV aerial discharge (Based on IEC61000-4-2)

Output Characteristic



Terminal Connection Diagram



Note: The above colors show the colors of lead wires of the mating connector.

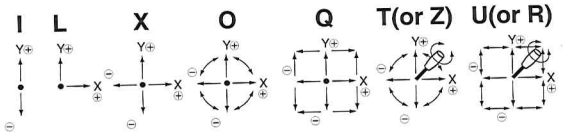
"Sakae"

50JA

● Potentiometer outside-mounted type ● With conductive plastic element

● Nomenclature

- **S** means special mechanical specifications not applicable to our standard.
- **50** means approx. size of base housing in mm.
- **J** means joystick controller.
- **A** means type 1-,2-, or 3-dimensional coordinates is available and also means potentiometers are mounted outside housing case.
- **K** means square shape.
- **Y** means kind of mechanism:
  X means 1-dimensional coordinate. Y means 2-dimensional coordinate.
  Z means 3-dimensional coordinate.
- **Available directions of lever operation**
  Standard version:
  O : Omni-directional 360° operating type.
  Special version:
  I : I figure (Y) directional operating type.
  L : L figure(+Y, +X only) directional operating type.
  X : Cross direction of X and Y operating type.
  Q : Square-directional 360° operating angle.
  Z : In addition to omni-directional 360° operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is mounted on the body side of joystick, and this is standard version, and also can be incorporated inside the rotating knob(T type) on request.
  R : In addition to square-directional 360° operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is mounted on the body side of joystick, and this is standard version, and also can be incorporated inside the rotating knob(U type) on request.
  S : Special operating directions other than the above-mentioned types.



S 50 J A K - Y O - 2 0 R2 G - 00000

Number of potentiometers to be incorporated.
0···no potentiometer incorporated. **1**···1 potentiometer incorporated.
2···2 potentiometers incorporated. **3**···3 potentiometers incorporated.

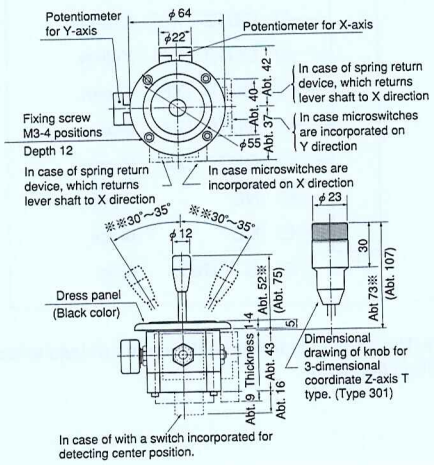
Number of switches to be incorporated.
0···no switch incorporated. **1**···1 switch incorporated. **2**···2 switches incorporated.
3···3 switches incorporated. **4**···4 switches incorporated. **5**···5 switches incorporated.
6···6 and over 6 switches incorporated. **9**···other switches to your special request.

With spring return device :
R1 : with spring return device for 1-dimensional coordinate.
R2 : with spring return device for 2-dimensional coordinate.
R3 : with spring return device for 3-dimensional coordinate.

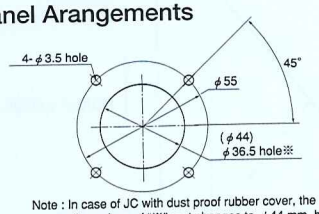
Mounting accessories :
G : with dust proof rubber cover. **P** : with sub-panel for mounting.

Special part number :
In case we produce customized products, we add 4-digit or 5-digit branch number.

● Standard Dimensions



■ Panel Arangements



Note : In case of JC with dust proof rubber cover, the dimensions of "※" part changes to ϕ44 mm. hole.

Note:1) In case of JC with dust-proof rubber cover, the dimensions of dress panel and ※part dimention shall be changed numbers in parentheses.
2) In case of type Q, R and U, the angle of mark "※" becomes 360° square-directional and 20°~25° from center position.
3) 4 pcs. of mounting screw (M3×14) are attached.

(Unit:mm)

RoHS Compliant

50JAK-YO-20
(Standard
2-dimensional coordinate type)

50JAK-ZZ-30
(3-dimensional coordinate type)

Special Knobs Available

For detailed dimensions, please refer to page 52.


Knob 101


Knob 103


Knob 201


Knob 202


Knob 301


Knob 302


Knob 303

STANDARD SPECIFICATIONS

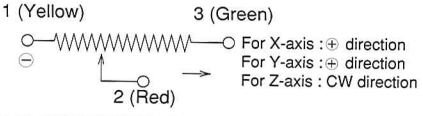
Mechanical Performance

Controlling range of operating lever	2-dimensional coordinate type : Omni-directionally approx.±30°～±35°, operation from center position. 3-dimensional coordinate type : Approx. 320° rotation by knob-operation in addition to the controlling range of 2-dimensional coordinate operation. (in case of center-returning type with spring return device, the operating range is approx. ±45°～±50° from center position.)
Operating force	Without spring return device. Standard : Approx. 0.5～0.8N (50～80gf.) High torque type : Approx. 2～6N (200～600gf.) With spring return device : (subject to directivity) X, Y directions : Approx. 0.8～1.5N (80～150gf) Z direction : Approx. 20～85mN～m (200～850gf・cm.)
Operating temperature range	–20°C～+65°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 5,000,000 operations.
Mass	2-dimensional coordinate type : Approx. 280g 3-dimensional coordinate type : Approx. 230g

Electrical Performance

Potentiometers mounted	SFCP22E 10k Ω±15%, 0.2W (conductive plastic resistive element) Independent linearity tolerance ±3% - For X and Y axes : Electrical rotating angle : Approx. 60° - For Z axis : Electrical rotating angle : Approx. 320° - In case of spring return type for Z axis : Electrical rotating angle approx. 90° All terminals can be fitted with the Tyco 110 series fasten receptacle (2.8 x 0.5mm) or equivalents. - In case of 3-dimensional coordinate Z-axis potentiometer inside-knob incorporated type (T-type), the following potentiometer is used : SFCP12AC 10kΩ ±15%, independent linearity tolerance ±3%, 0.06W (Electrical rotating angle : Approx. 90°)
Output smoothness	Below 0.2% against input voltage.
Contact resistance variation	Below 5% C.R.V.
Resolution	Essentially infinite
Dielectric strength	1 minute at 500V.A.C.
Insulation resistance	Over 1,000MΩ at 500V.D.C.

Terminal Connection Diagram



Note : In case of Z axis potentiometer incorporated type, terminals of potentiometers shall be leadwire type, whose length is approx.300mm. (AWG26)

Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

"Sakae"

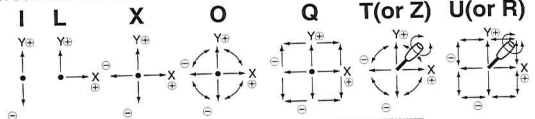
H50JA

● Potentiometer outside-mounted type ● With a hall effect IC

● Nomenclature

● **S** means special mechanical specifications not applicable to our standard.
● **H** means hall effect IC type potentiometer(HSM18E) incorporated type.
● **50** means approx. size of base housing in mm.
● **J** means joystick controller.
● **Kind of types**
A means 1- or 2- dimensional coordinate and also means hall effect IC type. potentiometers are mounted outside housing case.
● **K** means square shape.
● **Mechanism**
X means 1-dimensional coordinate.
Y means 2-dimensional coordinate.
● **Available directions of lever operation as below illustration**
Standard version:
O : Omni-directional 360°operating type.
Special version:
I : I figure (Y) directional operating type.
L : L figure(+Y, +X only) directional operating type.
X : Cross direction(+) of X andY operating type.
Q : Square-directional 360°operating angle.
Z : In addition to omni-directional 360°operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is mounted on the body side of joystick, and this is standard version, and also can be incorporated inside the rotating knob(T type) on request.
R : In addition to square-directional 360°operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is mounted on the body side of joystick, and this is standard version, and also can be incorporated inside the rotating knob(U type) on request.
S : Special operating directions other than the above-mentioned types.

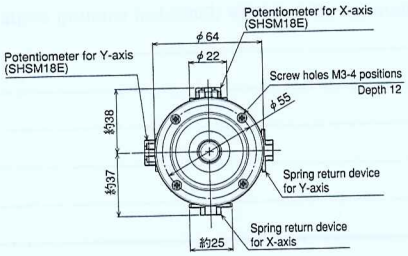
I **L** **X** **O** **Q** **T(or Z)** **U(or R)**

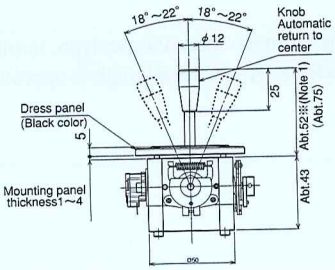


S	H	50	J	A	K	-	Y	O	-	2	0	R2	G	-	00000

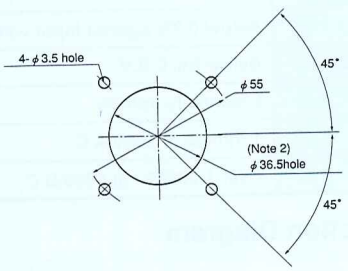
Number of potentiometers to be incorporated ●
0···no potentiometer incorporated. **1**···1 potentiometer incorporated.
2···2 potentiometers incorporated.
Number of switches to be incorporated ●
0···no switch incorporated. **1**···1 switch incorporated. **2**···2 switches incorporated.
3···3 switches incorporated. **4**···4 switches incorporated.
5···5 switches incorporated. **6**···6 and over 6 switches incorporated.
9···9 Other switches to your special request.
With spring return device: ●
R1: with spring return device for 1-dimensional coordinate.
R2: with spring return device for 2-dimensional coordinate.
Mounting accessories: ●
G : with dust proof rubber cover. **P** : with sub-panel for mounting.
Special part number: ●
In case we produce customized product, we add 4-digit or 5-digit branch number.

● Standard Dimensions





■ Panel Arangements



Note 1: In case a dust-proof rubber cover is mounted, the shape of dress panel shall change. ※Numeral in parentheses shows that of with a dust-proof rubber cover.
Note 2: In case of a dust-proof rubber cover is mounted, it is φ44 hole.
Note 3: 4 pcs. of mounting screws(M3X14) are attached.

(Unit : mm)

H50JAK-YO-20R2
(Standard
2-dimensional coordinate type)

STANDARD SPECIFICATIONS

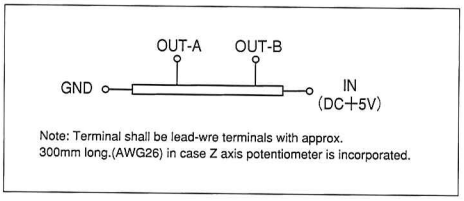
Mechanical Performance

Controlling range of operating lever	2-dimensional coordinate type. Omni-directionally approx.±18°～±22°operation from center position.
Operating force	With spring return device with directive feeling. X and Y directions: Approx.0.8～1.5N(80～150gf)
Operating temperature range	–20°C～+65°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Mechanical life expectancy	Approx.10,000,000 operations.
Mass	2-dimensional coordinate type: Approx.280g

Electrical Performance

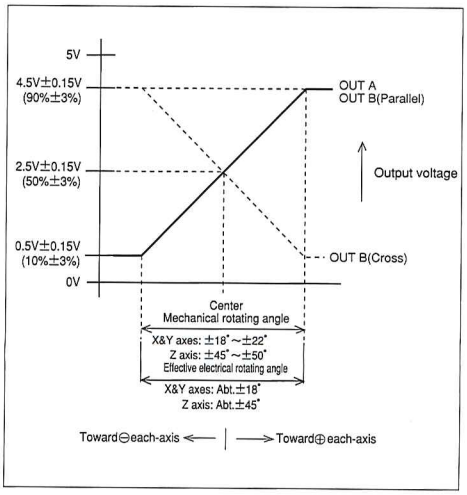
Hall effect IC type potentiometer(SHSM18E) mounted	Applied voltage: 5V±10% D.C. Effective output: Approx.0.5V～4.5V Electrical rotating angle: Approx. ±18° Independent linearity tolerance: ±3% Load resistance: over 10KΩ
Resolution	Infinitesimal
Dielectric strength	1 minute at 250V.A.C.
Insulation resistance	Over 100MΩ at 250V.D.C.
EMS durability	100V/m(80MHz ～ 1GHz 1KHz sine-wave 80%AM modulation)
ESD durability	±8KV contact ±15KV aerial discharge (Based on IEC61000-4-2)

Terminal Connection Diagram



Note: Terminal shall be lead-wre terminals with approx.
300mm long.(AWG26) in case Z axis potentiometer is incorporated.

Output Characteristic



Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".
Regarding kind of output characteristic, dual cross output or dual parallel output instead of single output is also available.

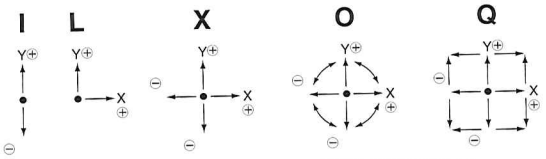
"Sakae"

50JC

● Potentiometer outside-mounted type ● With conductive plastic element

● Nomenclature

- **S** means special mechanical specifications not applicable to our standards.
- **50** means approx. size of base housing in mm.
- **J** means joystick controller.
- **C** means 1 and 2-dimensional coordinates is available and also means potentiometers outside-mounted type. Dust proof rubber cover and spring return device are available as standard version.
- **K** means square shape.
- **Y** means kind of mechanism:
  X :1-dimensional coordinate. Y: 2-dimensional coordinate.
- **Available directions of lever operation**
  Standard version:
  O : Omni-directional 360°operating type.
  Special version:
  I : I figure (Y) directional operating type.
  L : L figure(+Y, +X only) directional operating type.
  X : Cross directional of X and Y operating type.
  Q : Square-directional 360°operating angle.
  S : Special operating directions other than the above-mentioned types.



S 50 J C K - Y O - 2 0 R2 G - 00000

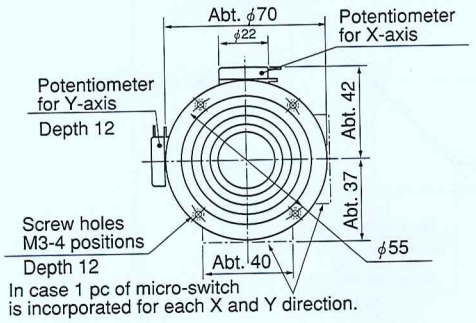
Number of potentiometers to be mounted.
0···no potentiometer mounted. **2**···2 potentiometers mounted.
1···1 potentiometer mounted. **3**···3 potentiometers mounted.

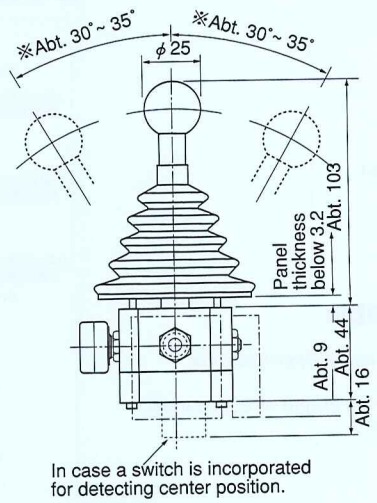
Number of switches to be mounted.
0···no switch mounted. **4**···4 switches mounted.
1···1 switch mounted. **5**···5 switches mounted.
2···2 switches mounted. **6**···6 and over 6 switches mounted.
3···3 switches mounted. **9**···other switches to your special request.

With spring return device : (50JC standard)
R1: with spring return device for 1-dimensional coordinate.
R2: with spring return device for 2-dimensional coordinate.

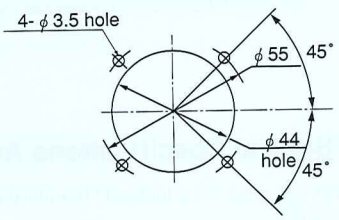
Mounting accessories :
G: with dust proof rubber cover.(50JC standard) **P**: with sub-panel for mounting.
Special part number :
In case we produce customized product, we add 4-digit or 5-digit branch number.

● Standard Dimensions





■ Panel Arangements



(Unit : mm)

RoHS Compliant

50JCK-YO-20R2G
(Standard
2-dimensional coordinate type)

S50JCK-YO-25R2G
(With 5 micro swiches and 1 or them is for detecting the center position)

Special Knobs Available

For detailed dimensions, please refer to page 52.

Knob 102A

Knob 201

Knob 203

STANDARD SPECIFICATIONS

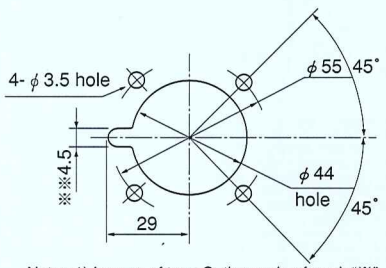
Mechanical Performance

Controlling range of operating lever	2-dimensional coordinate type : Omni-directionally approx. ±30°~±35° operation from center position.
Operating force	Standard spring return device : Automatically return to center (omni-directional type) Approx. 3~15N (300~1,500gf.)
Operating temperature range	–20°C~ +65°C
Vibration	10~55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 5,000,000 operations.
Mass	Approx. 350g

Electrical Performance

Potentiometers mounted	SFCP22E 10kΩ±15%, 0.2W (conductive plastic resistive element) Independent linearity tolerance ±3% Electrical rotating angle: Approx. 60° All terminals can be fitted with the Tyco 110 series fasten receptacle (2.8 x 0.5mm) or equivalents.
Output smoothness	Below 0.2% against input voltage.
Contact resistance variation	Below 5% C.R.V.
Resolution	Essentially infinite
Dielectric strength	1 minute at 500V.A.C.
Insulation resistance	Over 1,000MΩ at 500V.D.C.

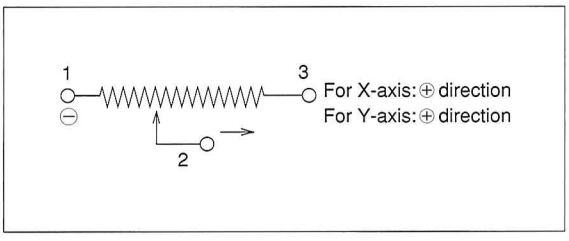
Panel Arangements



Note : 1) In case of type Q, the angle of mark "※" becomes 360° square-direction and ±20° ~±25° from center position.
2) In cace of JC with knob type 102A, if other components, except our standard pot model SFCP22E ,are mounted, the position of mark " ※※ " may be changed to other position.
3) 4 pcs. of mounting screws (M3 × 14) are attached.

(Unit : mm)

Terminal Connection Diagram



Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

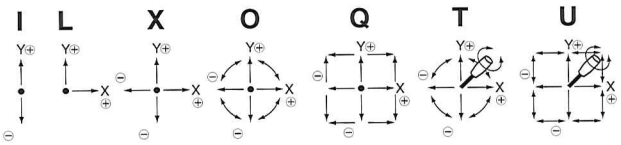
"Sakae"

60JB

● Potentiometer incorporated type ● With conductive plastic element

● Nomenclature

- **S** means special mechanical specifications not applicable to our standards.
- **60** means approx. size of base housing in mm.
- **J** means joystick controller.
- **B** means kind of type:
  B : 1,2 or 3-dimensional coordinates is available and also means Potentiometer is incorporated inside the housing.
- **M**: means round type.
- **Y** means kind of mechanism:
  X : 1-dimensional coordinate. Y: 2-dimensional coordinate.
  Z : 3-dimensional coordinate.
- **Available directions of lever operation as below illustration**
  Standard version:
  O: Omni-directional 360°operating type
  Special version:
  I : I figure (Y) directional operating type
  L : L figure(+Y, +X only) direction operating type
  X : Cross direction of X and Y operating type
  Q: Square-directionally 360°operating angle
  T : In addition to omni-directionally 360°operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is incorporated.
  U :In addition to square-directionally 360°operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is incorporated.
  S : Special operating directions other than the above-mentioned types

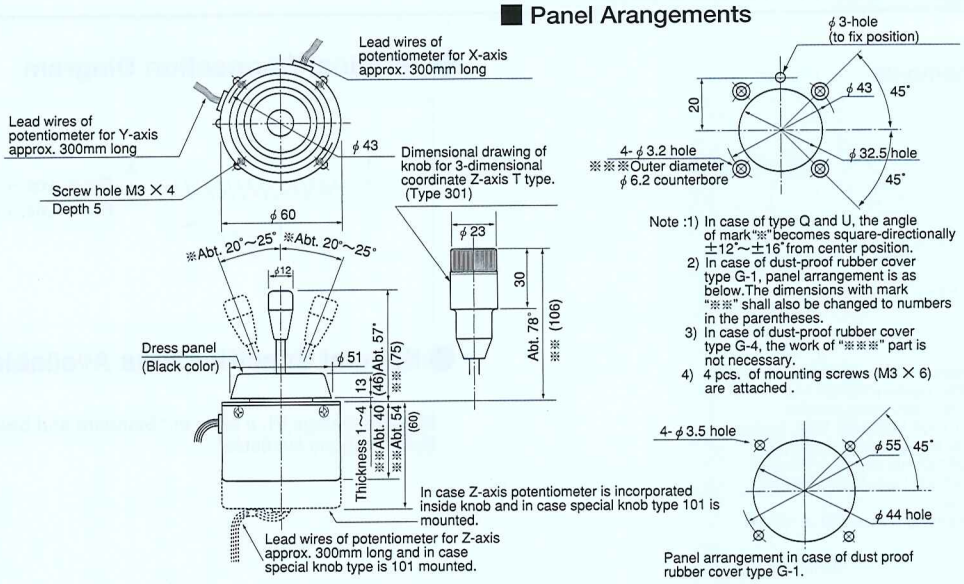


S 60 J B M - Y O - 2 0 R2 G - 00000

Number of potentiometers to be incorporated.
0···no potentiometer incorporated. **2**···2 potentiometers incorporated.
1···1 potentiometer incorporated. **3**···3 potentiometers incorporated.
Number of switches to be incorporated.
0···no switch incorporated. **1**···1 switch incorporated. **2**···2 switches incorporated.
With spring return device.
R1 : with spring return device for 1-dimensional coordinate.
R2 : with spring return device for 2-dimensional coordinate.
R3 : with spring return device for 3-dimensional coordinate.
Mounting accessories : **G** : with dust proof rubber cover. **P** : with sub-panel for mounting.
Special part number :
In case we produce customized product, we add 4-digit or 5-digit branch number.

● Standard Dimensions

■ Panel Arangements



RoHS Compliant

60JBM-YO-20R2
(Standard 2-dimensional coordinate type)

60JBM-YO-20R2G
(With dust-proof rubber type G-1)

60JBM-ZT-30R3G
(3-dimensional coordinate, Z axis potentiometer-inside-knob incorporated type) and flat shaped rubber cover (type G-4)

When the dust-proof rubber cover is required, the type will be G-1 unless particularly specified. The height from the mounting surface is about 75mm.

Special Knobs Available

For detailed dimensions, please refer to page 52.

Knob 101

Knob 202

Knob 301

Knob 302

Knob 305

STANDARD SPECIFICATIONS

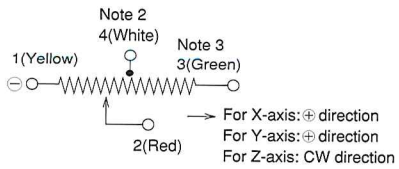
Mechanical Performance

Controlling range of operating lever	Controlling range of operating lever : ● 2-dimensional coordinate type : Omni-directionally approx. ±20°～±25° operation from center position. ● 3-dimensional coordinate type : Approx. ±45°～±50° operation from the center position of knob, in addition to the controlling range of 2-dimensional coordinate type.
Operating force	Standard spring return device (Automatically return to center) - X, Y directions: Approx. 0.8～1.5N (80～150gf.) [with 2 springs (with directive feeling) as standard version] - X, Y directions: Approx. 1～5N (100～500gf.) [with 1 spring (omni-directional type) as optional version] - Z direction: Approx. 20～85mN・m (200～850gf・cm)
Operating temperature range	–20°C～+65°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 5,000,000 operations
Mass	2-dimensional coordinate type : Approx. 240g 3-dimensional coordinate type : Approx. 300g

Electrical Performance

Potentiometers mounted	Special resistive element is exclusively used for 60JB series, 10kΩ±15%, 0.2W (conductive plastic resistive element) Electrical rotating angle approx. 40° Independent linearity tolerance ±3% In case of 3-dimensional coordinate Z-axis potentiometer-inside-knob incorporated type (T-type), the following potentiometer is used: SFCP12AC 10kΩ±15% Independent linearity tolerance±3%, 0.06W Electrical rotating angle : Approx. 90°
Output smoothness	Below 0.2% against input voltage.
Contact resistance variation	Below 6% C.R.V.
Resolution	Essentially infinite
Dielectric strength	1 minute at 500V.A.C.
Insulation resistance	Over 1,000MΩ at 500V.D.C.

Terminal Connection Diagram



Note: 1) Terminals shall be lead-wire terminals with approx. 300mm long. (AWG28)
2) Current center tap shall be applied to all X.Y and Z axes as standard.
3) Markings of X, Y, Z on lead-wire terminals are made on the tag, respectively.

Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".

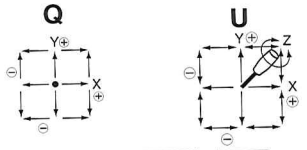
"Sakae"

H60JH

● Potentiometer incorporated type ● With a hall effect IC

● Nomenclature

- **S** means special mechanical specifications.
- **H** means hall effect IC type resistive element incorporated.
- **60** means approx. size of base housing in mm.
- **J** means joystick controller.
- **Kind of types**
  H means 2 dimensional coordinate low-cost type.
- **K** means square shape.
- **Mechanism**
  Y means mechanism of 2-dimensional coordinate type.
- **Available directions of lever operation**
  Standard Q type : 360° square-directional operation, 2-dimensional coordinate type
  Special lever operation U type : In addition to 360° square-directional operation, 3-dimensional coordinate operation is possible.



S	H	60	J	H	K	-	Y	Q	-	2	S	0	R2	G	-	00000

Number of potentiometers to be incorporated
0···No potentiometer incorporated. **1**···1 potentiometer incorporated.
2···2 potentiometers incorporated.

Number of output and kind of output characteristic
S···Single output **X**···Dual cross output **P**···Dual parallel output

Switch function (Using output like switch)
0··· No switch function. **1**···1 switch function. **2**···2 switch function. **3**···3 switch function.
4···4 switch function. **5**···5 switch function. **6**···6 and over 6 switch function.

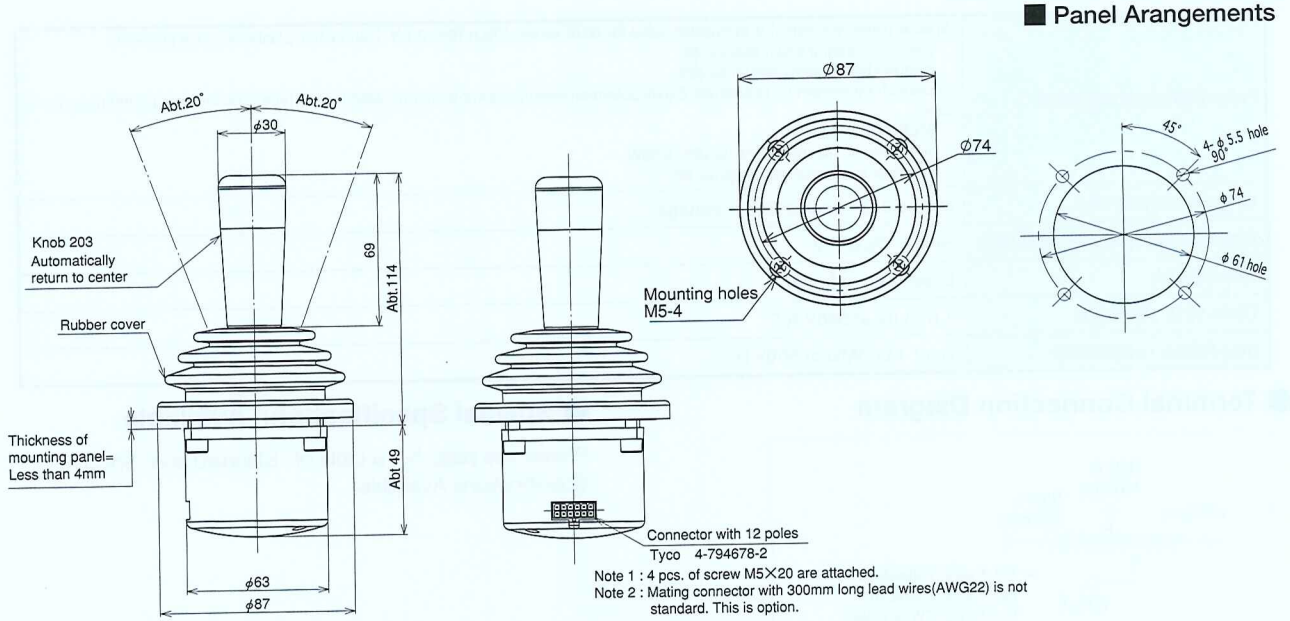
Spring return device:
R2···With spring return device for 2 dimensional coordinate type.

Mounting accessories:
G : With dust proof rubber cover.
P : With sub-panel for mounting.

Special part number:
In case we produce customized product, we add 4 or 5-digit branch number.

● Standard Dimensions

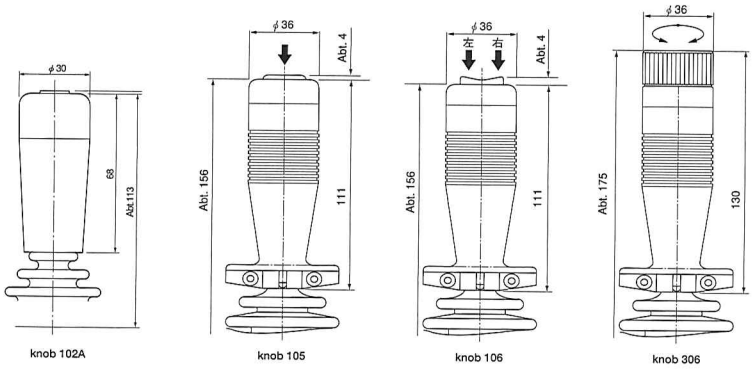
■ Panel Arangements



Note 1 : 4 pcs. of screw M5×20 are attached.
Note 2 : Mating connector with 300mm long lead wires(AWG22) is not standard. This is option.

H60JHK-YQ-2S0R2G
(Standard 2-dimensional coordinate type)

Special Knobs Available



STANDARD SPECIFICATIONS

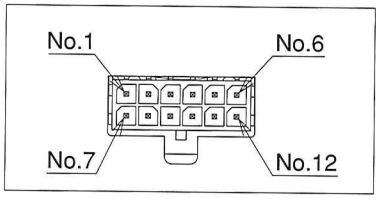
Mechanical Performance

Controlling range of operating lever	2 dimensional coordinate type X and Y directions : Approx.±20° from center position.
Operating force	Spring return device with directive feeling: Automatically return to center X and Y directions : Approx. 3N～4.5N(300～450gf)
Operating temperature range	-20°C～+60°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 5,000,000 operations
Mass	Approx. 300 g

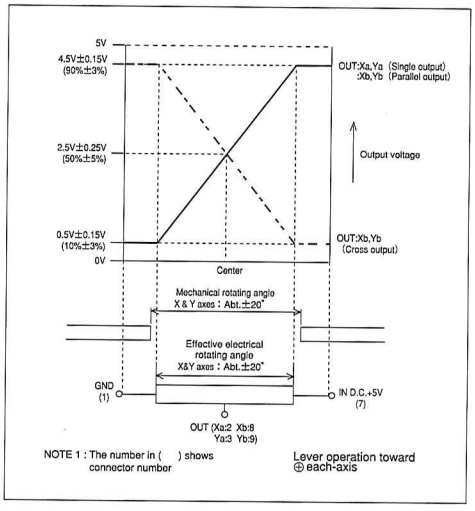
Electrical Performance

Hall effect IC type resistive element incorporated	●Applied voltage : D.C. 5V±10 % ●Effective output : 0.5V～4.5V ●Electrical rotating angle: Approx. ±20° ●Independent linearity tolerance : ±3% ●Load resistance : Over 10KΩ
Dielectric strength	1 minute at 500 V. A.C.
Insulation resistance	Over 1000MΩ at 500 V. D.C.
EMS durability	100V/m (80MHz～1GHz 1kHz sine-wave 80%AM modulation)
ESD durability	±8kV contact ±15kV aerial discharge (Based on IEC61000-4-2)

Terminal Connection Diagram



Output Characteristic



Special Specifications Available

Please refer to page 51.
Dual cross and dual parallel output are available.
Knob for 90J model can be mounted on H60JHK model.

Pin numbers for connector

Pin No.	Standard	Cross or paralled output	102A or 105 knob	106 knob	306 knob
No.1(Blue)	GND	GND	GND	GND	GND
No.2(Green)	X OUT-A	X OUT-A	X OUT-A	X OUT-A	X OUT-A
No.3(Yellow)	Y OUT-A	Y OUT-A	Y OUT-A	Y OUT-A	Y OUT-A
No.4(Orange)	——	——	——	——	Z OUT-A
No.5(Red)	——	——	N.O	N.O (Right)	——
No.6(Brown)	——	——	——	N.O(Left)	——
No.7(Red)	IN D.C +5V	IN D.C +5V	IN D.C +5V	IN D.C +5V	IN D.C +5V
No.8(Brown)	——	X OUT-B	——	——	——
No.9(Black)	——	Y OUT-B	——	——	——
No.10(White)	——	——	——	——	(Z OUT-B)
No.11(Gray)	——	——	——	——	——
No.12(Purple)	——	——	COM	COM	——

Note: When the mating connector is required (option), the colors of lead wires are as shown in this table.

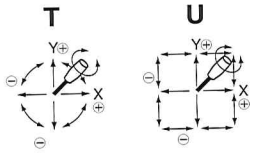
"Sakae"

HMC60JH

● For multi functional control with compact sized cobra shaped knob ● Potentiometer incorporated type

● Nomenclature

- **S** means special mechanical specifications not applicable to our standards.
- **H** means hall effect IC type resistive element incorporated.
- **MC** means with mini cobra shaped knob.
- **60** means approx. size of base housing in mm.
- **J** means joystick controller.
- **H** means kind of type.
- **K** means square shape.
- **4** means kind of mechanism: more than 4-dimensional coordinates.
- **Available directions of lever operation as below illustration**
  - **U** : In addition to square-directional 360°operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is incorporated.
  - **T** : In addition to omni-directional 360°operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is incorporated.



S	H	MC	60	J	H	K	-	4	U	-	4	S	4	R4	G	-	00000

Number of potentiometers to be incorporated.
4···4 potentiometers incorporated. **1**···1 potentiometers incorporated.
2···2 potentiometers incorporated. **3**···3 potentiometers incorporated.

Number of output and kind of output characteristic
S···Single output **X**···Dal cross output **P**···Dual parallel output.

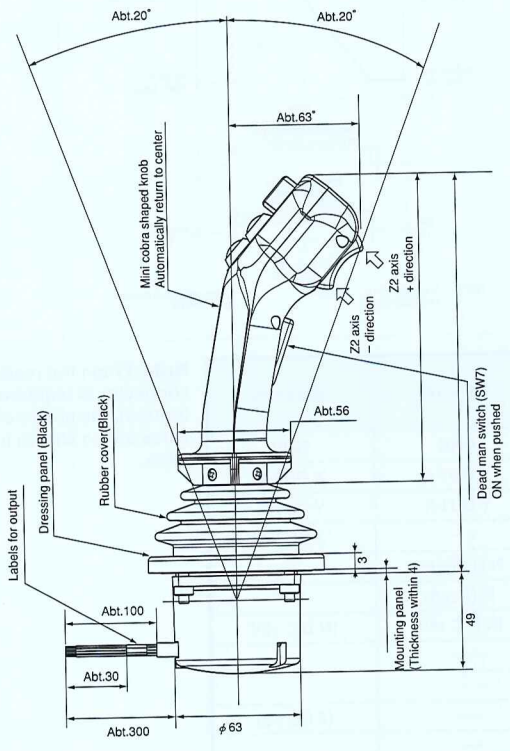
Number of switches to be incorporated.
4···4 switches incorporated. **5**···5 switches incorporated.
6···6 and over 6 switches incorporated.

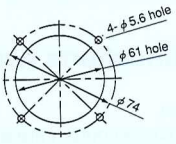
With spring return device
R4 : with spring return device for 2-dimensional coordinate as well as for 2 pcs.of see-saw pots.
R2 : with spring return device for 2-dimensional coordinate.
R3 : with spring return device for 2-dimensional coordinate as well as for 1 pc. of see-saw pot.

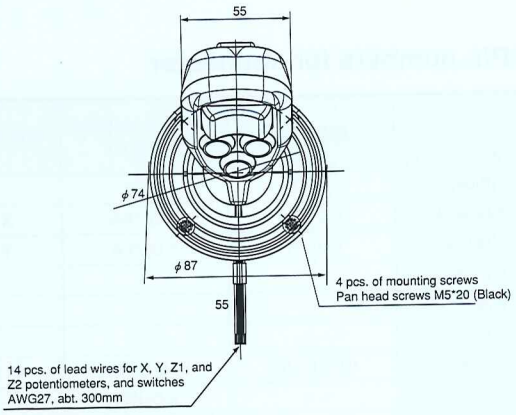
Mounting accessories : **G**: with dust proof rubber cover. **P**: with sub-panel for mounting

Special part number
In case we produce customized product, we add 4-digit or 5-digit branch number.

● Standard Dimensions







RoHS Compliant

HMC60JHK-4U-4S4R4G
(Z1 and Z2 potentiometers, 3 pieces of push button switch, and 1dead man switch on the mini cobra shaped knob)

Examples of Customized Knobs

STANDARD SPECIFICATIONS

Mechanical Specifications

Operating force	Spring return device (Automatically return to center) X &Y directions: Approx. 1.5N～3N Z direction: Approx. 10mN・m～25mN・m

Note 1: The basement is the same as our H60JHK model. For all the specifications excluding the mechanical operating force, please refer to page 38.
Note 2: The standard H60JHK model has a Tyco connector. On the contrary, in case of H60JHK with the mini cobra knob, AWG27 lead wires (approx. 300mm long) are coming out from the joystick base in order to mount optional switches and potentiometers.

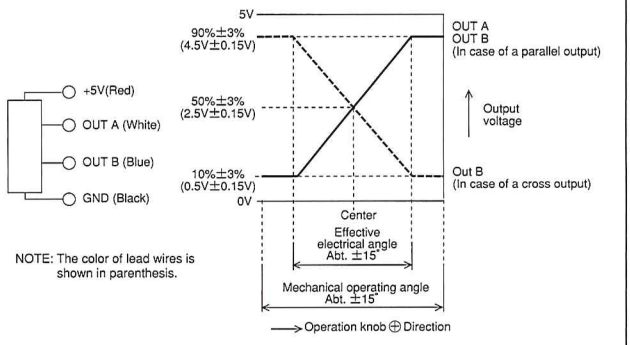
Potentiometers & Switches Available on Mini Cobra Knob

Specs of Z axes potentiometer

Model No.	SRMP12HYS (Single output) SRMP12HYP (Parallel output) SRMP12HYX (Cross output)
Operating temperature range	–20°C～+60°C
Vibration	10Hz～55Hz 98m/s²
Shock	294m/s²
Mechanical life expectancy	Approx. 5,000,000 operations
Mass	Single output type: Approx. 25g Dual output type: Approx. 30g
Applied voltage	D. C. 5V ±10%
Effective output	0.5V～4.5V
Electrical rotating angle	Approx. ±15°(Approx.30°)
Independent linearity tolerance	±3%FS
Load resistance	Over 10kΩ
Dielectric strength	1 minute at A. C. 500V
Insulation resistance	Over 1,000MΩ at D. C. 500V

EMS durability	100V/m (80MHz～1GHz 1kHz sine-wave 80%AM modulation)
ESD durability	±8kV contact ±15kV aerial discharge (Based on IEC61000-4-2)

Terminal connection diagram and output characteristics for Z-axis pot



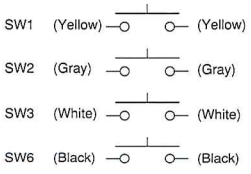
Specs of push button switch

Model No.	59-111 (Black) Manufactured by ITW Switches
Operating characteristics	Momentary type (SW-ON when pushed)
Rating	100mA , 50V D.C
Dielectric strength	1 minute at A. C. 1,000V
Insulation resistance	Over 1,000MΩ at D. C. 500V
Mechanical life expectancy	Max 500,000 operations

Specs of Dead man switch

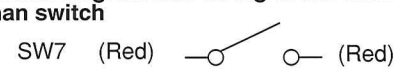
Model No.	SPVQ810100 Manufactured by ALPS
Operating characteristics	Momentary type (SW-ON when pushed)
Rating	100mA , 12V D.C
Dielectric strength	1 minute at A. C. 500V
Insulation resistance	Over 100MΩ at D. C. 500V
Mechanical life expectancy	Max. 300,000 operations

Circuit diagram and wiring connection diagram for push button swith



NOTE: The color of lead wires is shown in parenthesis.

Circuit diagram and wiring connection diagram for dead man switch



NOTE: The color of lead wires is shown in parenthesis.

Other Notes

- The standard basement is our H60JHK model, but the mini cobra shaped knob is also mounted on (H)50JC, (H)90JA, (H)90JB models on your request.
- When the mini cobra is mounted on (H)50JC model, it should have the sub panel for mounting due to its strength.
- As an option, H25JBM model can be assembled on the mini cobra shaped knob.
- Colors of lead wires for X andY axes potentiometers are the same as those of Z axis (shown above).
- Please see page 51, a table of Standard and Specifications Available.

"Sakae"

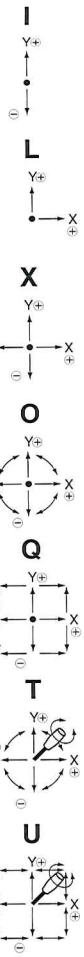
90JA · 90JB

● 90JA: Potentiometer outside-mounted ● 90JB: Potentiometer incorporated ● With conductive plastic element

Nomenclature

S means special mechanical specifications not applicable to our standards.

- **90** means approx. size of base housing in mm.
- **J** means joystick controller.
- **A** means kind of type :
  - **A** : 1,2 or 3-dimensional coordinate is available and also means Potentiometer outside-mounted type.
  - **B** : 1,2 or 3-dimensional coordinate Potentiometer is incorporated inside the housing.
- **M** : means round type
- **Y** means kind of mechanism : X 1-dimensional coordinate.
  Y : 2-dimensional coordinate. Z: 3-dimensional coordinate.
  4 and more numbers : Over 4-dimensional coordinate.
- **Available directions of lever operation**
  Standard version:
  O : Omni-directional 360°operating type.
  Special version:
  I : I figure (Y) directional operating type.
  L : L figure(+Y, +X only) directional operating type.
  X : Cross directional of X and Y operating type.
  Q : Square-directional 360°operating angle.
  T : In addition to omni-directional 360°operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is incorporated.
  U : In addition to square-directional 360°operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is incorporated.
  S : Special operating directions other than the above-mentioned types.

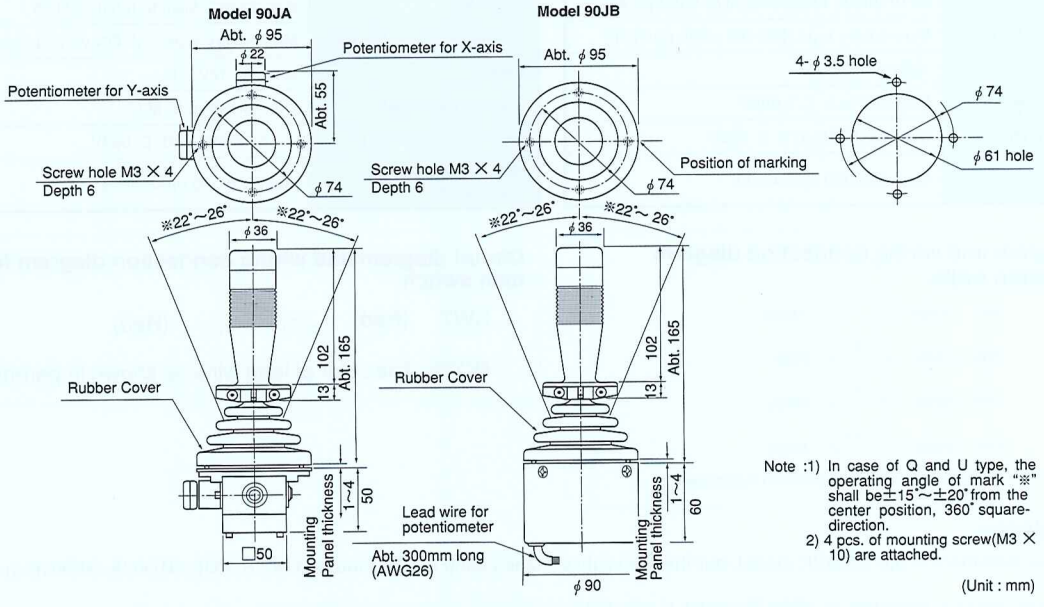


S 90 J A M - Y O - 2 0 R2 G - 00000

Number of potentiometers to be incorporated.
0···no potentiometer incorporated. **2**···2 potentiometers incorporated.
1···1 potentiometer incorporated. **3**···3 potentiometers incorporated.
Number of switches to be incorporated.
0···no switch incorporated. **1**···1 switch incorporated. **2**···2 switches incorporated.
3···3 switches incorporated. **4**···4 switches incorporated. **5**···5 switches incorporated.
6···6 and over 6 switches incorporated. **9**···others.
With spring return device (90JA · JB standard) :
R1 : with spring return device for 1-dimensional coordinate.
R2 : with spring return device for 2-dimensional coordinate.
R3 : with spring return device for 3-dimensional coordinate.
Mounting accessories :
G : with dust proof rubber cover.(90JA · JB standard) **P** : with sub-panel or mounting.
Special part number :
In case we produce customized product, we add 4-digit or 5-digit branch number.

Standard Dimensions

■ Panel Arangements



Note :1) In case of Q and U type, the operating angle of mark "※" shall be±15°~±20°from the center position, 360° square-direction.
2) 4 pcs. of mounting screw(M3 × 10) are attached.

(Unit : mm)

90JAM-YO-20R2G
(Standard
2-dimensional coordinate type)

90JBM-YO-20R2G
(Standard
2-dimensional coordinate type)

STANDARD SPECIFICATIONS

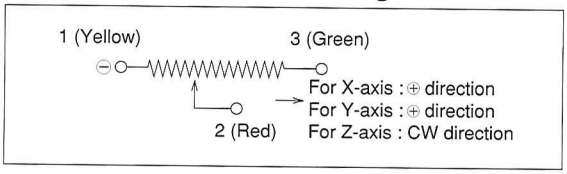
Mechanical Performance

Controlling range of operating lever	●2-dimensional coordinate type : Approx. ±22°～±26° omni-direction from center position. ●3-dimensional coordinate type : Approx. ±45°～±50°operation from center position of knob in addition to the operating range of 2-dimensional coordinate type.
Operating force	Standard spring return device : Automatically return to center. X,Y directions : Approx. 2～12N(200～1,200gf) Z direction : Approx. 20～85mN・m(200～850gf・cm)
Operating temperature range	–20°C～+65°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 5,000,000 opera-tions.
Mass	2-dimensional coordinate type : Approx. 650g 3-dimensional coordinate type : Approx. 750g

Electrical Performance

Potentiometer mounted	90JA type : SFCP22E, 10kΩ±15%, 0.2W, (conductive plastic resistive element) Independent linearity tolerance ±3% Electrical rotating angle for X &Y axis : Approx. 44° 90JB type : Special resistive element is exclusively used for 90JB series : 10kΩ±15%, 0.2W (conductive plastic resistive element) Independent linearity tolerance ±3%, Electrical rotating angle for X &Y axis : Approx. 44° In case of 90JA and 90JB with 3-dimensional coordinate Z-axis potentiometer-inside-knob incorporated type, the following potentiometer is used: SFCP22AC, 10kΩ±15%, 0.3W, Independent linearity tolerance ±3% Electrical rotating angle: Approx. 90°
Output smoothness	Below 0.2% against input voltage.
Contact resistance variation	Below 5% C.R.V.
Resolution	Essentially infinite.
Dielectric strength	1 minute at 500 V.A.C.
Insulation resistance	Over 1,000 MΩ at 500 V.D.C.

Terminal Connection Diagram

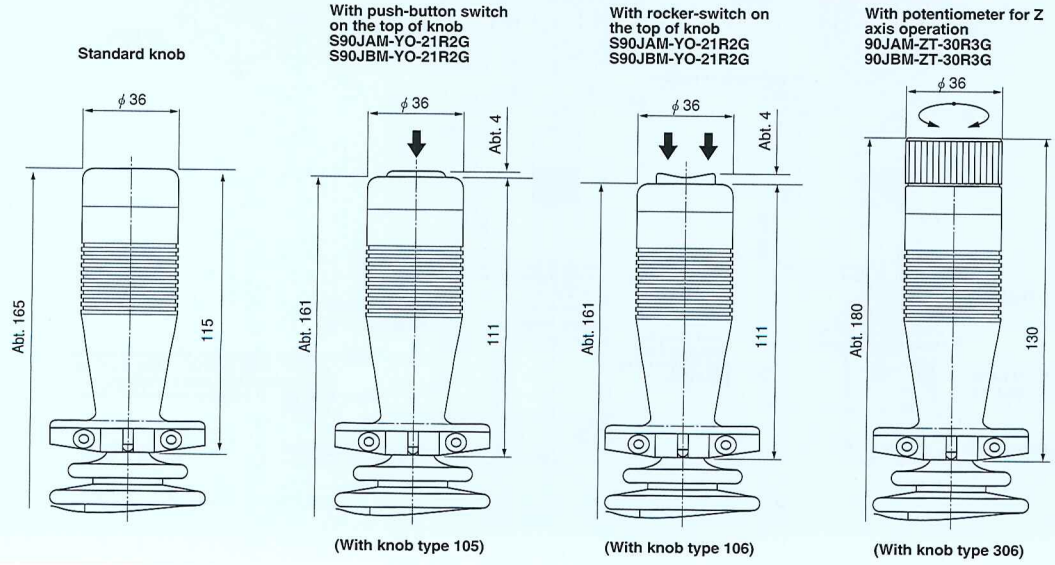


Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".
◎ For outdoor applications, please use model 90JA series.

Special Knobs Available

The following versions are available to knob for both models 90JAM and 90JBM.



(Unit : mm)

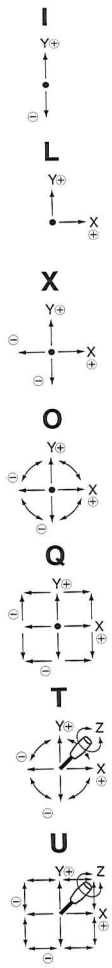
"Sakae"

H90JA · H90JB

● H90JA: Potentiometer outside-mounted ● H90JB: Potentiometer incorporated ● With a hall effect IC

● Nomenclature

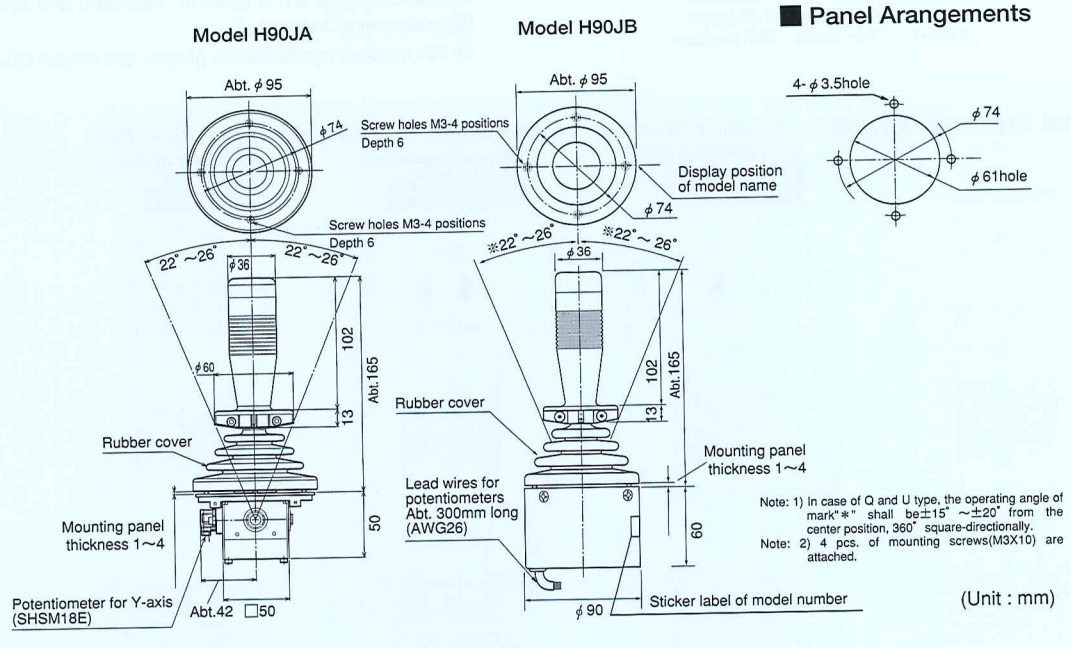
S means special mechanical specifications not applicable to our standard.
H means hall effect IC type potentiometer(HSM18E) is incorporated.
90 means approx. size of base housing in mm.
J means joystick controller.
Kind of types
A : 1,2 or 3-dimensional coordinate is available and also means potentiometer outside-mounted type.
B : 1,2 or 3-dimensional coordinate potentiometer is incorporated inside the housing.
M means round shape.
Kind of Mechanism
X means 1-dimensional coordinate.
Y means 2-dimensional coordinate.
Z means 3-dimensional coordinate.
Available directions of lever operation
Standard version:
O : Omni-directional 360°operating type.
Special version:
I : I figure (Y) directional operating type.
L : L figure(+Y, +X only) directional operating type.
X : Cross direction of X andY operating type.
Q : Square-directional 360°operating angle.
T : In addition to omni-directional operation, 3-dimensional coordinate operation is possible by rotating knob in which a potentiometer is incorporated.
U : In addition to square-directional operation, 3-dimensional coordinate operation is possible by rotating knob in which a potentiometer is incorporated.



S	H	90	J	A	M	-	Y	O	-	2	0	R2	G	-	00000

Number of potentiometers to be incorporated
0···no potentiometer incorporated. 1···1 potentiometer incorporated.
2···2 potentiometers incorporated. 3···3 potentiometers incorporated.
Number of switches to be incorporated
0···no switch incorporated. 1···1 switch incorporated. 2···2 switches incorporated.
3···3 switches incorporated. 4···4 switches incorporated.
5···5 switches incorporated. 6···6 and over 6 switches incorporated.
9···9 Other switches to your special request.
With spring return device:
R1: with spring return device for 1-dimensional coordinate.
R2: with spring return device for 2-dimensional coordinate.
R3: with spring return device for 3-dimensional coordinate.
Mounting accessories:
G : with dust proof rubber cover.
P : with sub-panel for mounting.
Special part number:
In case we produce customized product, we add 4-digit or 5-digit branch number.

● Standard Dimensions



H90JAM-YO-20R2G
(Standard 2-dimensional coordinate type)

H90JBM-YO-20R2G
(Standard 2-dimensional coordinate type)

STANDARD SPECIFICATIONS

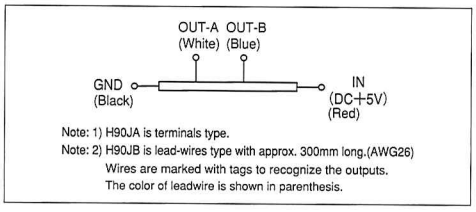
Mechanical Performance

Controlling range of operating lever	●2-dimensional coordinate type: Omni-directionally approx.±22°～±26°operation from center position. ●3-dimensional coordinate type: Approx.±45°～±50°operation from center position of knob in addition to the operating range of 2-dimensional coordinate type.
Operating force	Standard spring return device : Automatically return to center (Omni-directional type) X and Y directions: Approx.2 ～ 12N(200 ～ 1200gf) Z direction: Approx.20 ～ 85mN・m(200 ～ 850gf・cm)
Operating temperature range	–20°C～+65°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Mechanical life expectancy	Approx.10,000,000 operations.
Mass	2-dimensional coordinate type: Approx.650g 3-dimensional coordinate type: Approx.750g

Electrical Performance

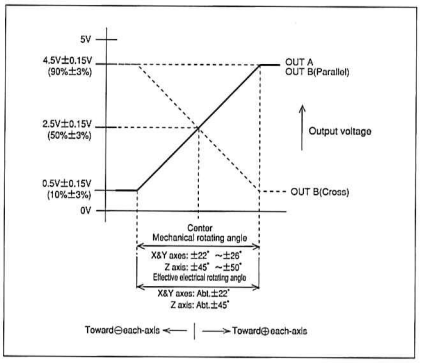
Hall effect IC type potentiometer (SHSM18E) incorporated	●Applied voltage: 5V±10% D.C. ●Effective output: Approx.0.5V～4.5V ●Electrical rotating angle: X and Y-axis: Approx.±22° Z-axis: Approx.±45° ●Independent linearity tolerance: ±3%FS ●Load resistance: over 10KΩ
Resolution	Infinitesimal
Dielectric strength	1 minute at 250V.A.C.
Insulation resistance	Over 100MΩ at 250V.D.C.
EMS durability	100V/m(80MHz～1GHz 1KHz sine-wave 80%AM modulation)
ESD durability	±8KV contact ±15KV aerial discharge (Based on IEC61000-4-2).

Terminal Connection Diagram



Note: 1) H90JA is terminals type.
Note: 2) H90JB is lead-wires type with approx. 300mm long.(AWG26)
Wires are marked with tags to recognize the outputs.
The color of leadwire is shown in parenthesis.

Output Characteristic

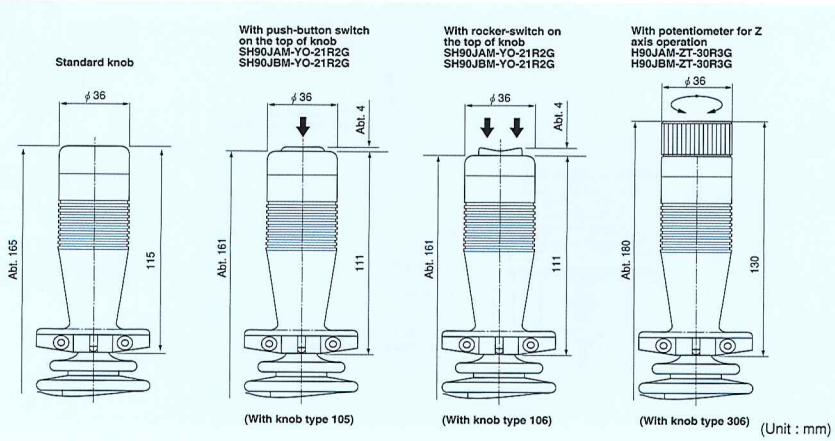


Special Specifications Available

Please see page 51, a table of "Standard and Special Specifications Available".
Regarding kind of output characteristic, dual cross output or dual parallel output instead of single output is also available.

■ Special knobs Available

The following versions are available to knob for both models H90JAM and H90JBM.



(Unit : mm)

"Sakae"

C90JAM • C90JBM

● For multi functional control & with cobra head shaped knob ● C90JA: Potentiometer outside-mounted ● C90JB: Potentiometer incorporated

● Nomenclature

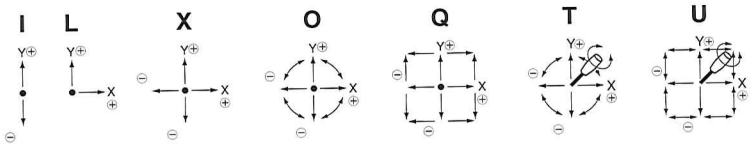
- **S** means special mechanical specifications not applicable to our standards.
- **C** means with cobra shaped knob.
- **90** means approx. size of base housing in mm.
- **J** means joystick controller.
- **A** means type available. **A** : Potentiometers outside-mounted type.
  B : Potentiometers incorporated type.
- **M** means round type.
- **4** means kind of mechanism: more than 4-dimensional coordinates.
- **Available directions of lever operation as below illustration**

Standard version:

O : Omni-directional 360°operating type.

Special version:

I : I figure (Y) directional operating type.
L : L figure(+Y, +X only) directional operating type.
X : Cross direction of X and Y operating type.
Q : Square-directional 360°operating angle.
T : In addition to omni-directional 360°operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is incorporated.
U : In addition to square-directional 360°operation, this type is 3-dimensional coordinate operation by rotating knob in which a potentiometer is incorporated. knob(U type) on request.
S : Special operating directions other than the above-mentioned types.

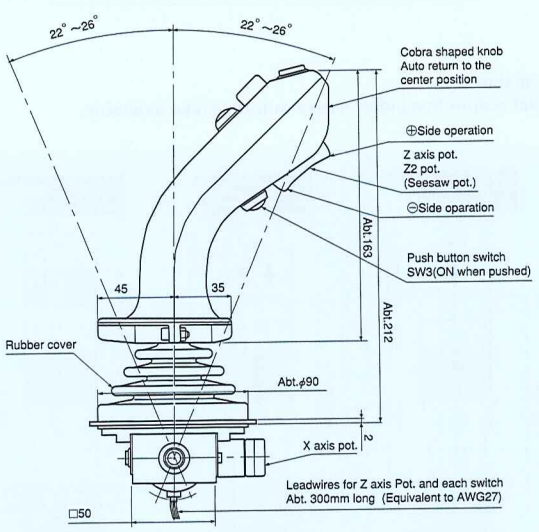


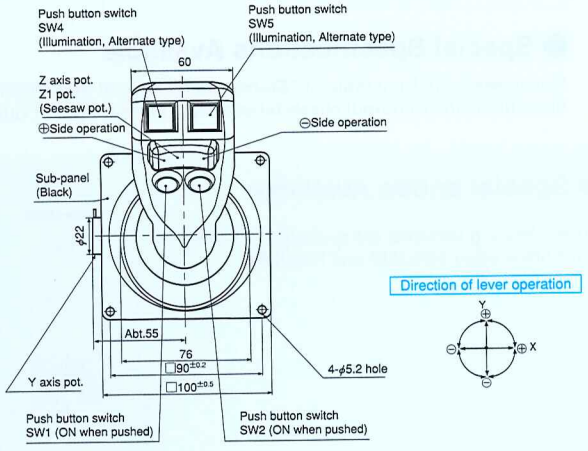
S C 90 J A M - 4 T - 4 5 R4 GP - 00000

Number of potentiometers to be incorporated.
4···4 potentioneters incorporated. **1**···1 potentioneters incorporated.
2···2 potentioneters incorporated. **3**···3 potentioneters incorporated.
Number of switches to be incorporated.
4···4 switches incorporated. **5**···5 switches incorporated.
6···6 and over 6 switches incorporated.
With spring return device :
R4 : with spring return device for 2-dimensional coordinate as well as for see-saw pot.
R1 : with spring return device for 1-dimensional coordinate.
R2 : with spring return device for 2-dimensional coordinate.
R3 : with spring return device for 3-dimensional coordinate.
Mounting accessories : **G**: with dust proof rubber cover. **P**: with sub-panel for mounting
Special part number :
In case we produce customized product, we add 4-digit or 5-digit branch number.

● Standard Dimensions

Standard Dimensions(In case of model C90JAM)
The dimensions on the knob part are the same for model C90JBM in common.





(Unit : mm)

RoHS Compliant

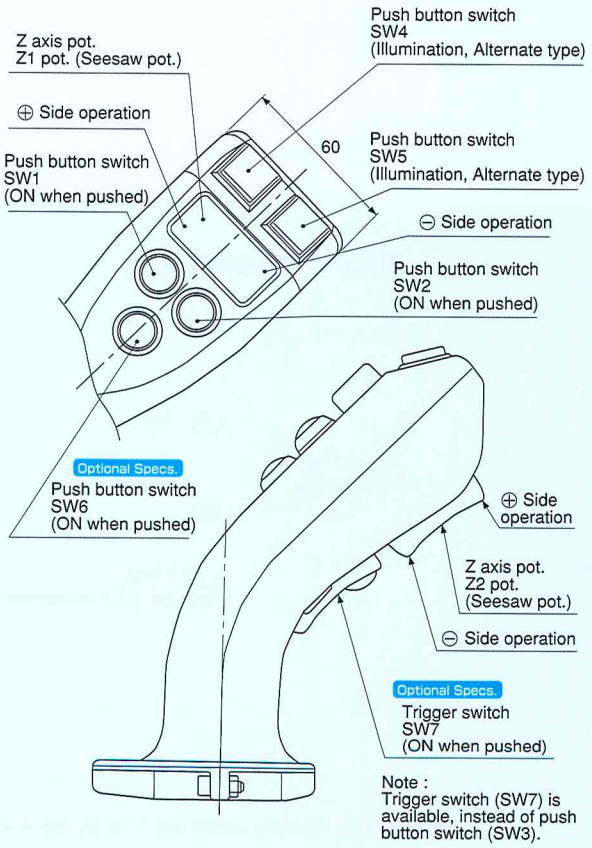
This unique cobra head shaped knob can offer you various and complex controls in wide range. Some push-button switches and seesaw type potentiometer, which enables such multi-functional operations, are available.

C90JBM-4T45R4GP
(Standard)

SC90JAM-4U-46R4GP
(Optional)

【Outer dimensions & Optional specs. on cobra shaped knob】

(Common dimensions for both model C90JAM and C90JBM)

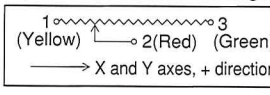


(Unit : mm)

Specification of X and Y axes potentiometers

(C90JA type: SFCP22E outside mounted)
(C90JB type: Special resistance element is exclusively used for C90JB series)

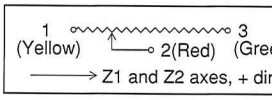
1) Total resistance value : 10kΩ±15%
2) Independent linearity : ±3%
3) Electrical rotating angle : 44° ±5°
4) Center return accuracy : 50%±1.5%
5) Power rating : 0.2W
6) Life expectancy : Approx. 5,000,000 operations
7) Terminal connection diagram



NOTE
1 : Only C90JBM model has leadwire terminal.
2 : The color of leadwire is shown in parenthesis.
3 : AWG26 leadwire is used.

Specs. of Z1 and Z2 axes potentiometers

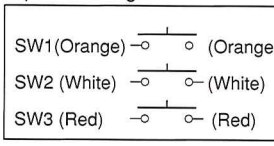
1) Model No. : RMP30AF (Rocker switch unit)
2) Total resistance value : 10kΩ±15%
3) Independent linearity : ±3%
4) Electrical rotating angle : 30° ±5°
5) Center return accuracy : 50%±3%
6) Power rating : 0.1W
7) Life expectancy : Approx. 2,000,000 operations
8) Terminal connection diagram



NOTE
1 : The color of leadwire is shown in parenthesis.
2 : AWG27 leadwire is used.

Specs. of push button switch (SW1, 2, 3 and 6)

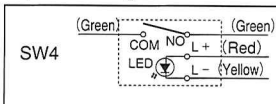
1) Operating characteristics : Momentary type (ON when pushed)
2) Rating : 50VDC, 0.1A
3) Dielectric strength : 1 minute at 1,000V AC
4) Insulation resistance : Over 1,000MΩ at 500V DC
5) Life expectancy : Approx. 500,000 operations
6) Circuit diagram



NOTE
1 : The color of leadwire is shown in parenthesis.
2 : AWG27 leadwire is used.
3 : SW6 is an optional spec.

Specs. of illumination push button switch (SW4 & SW5)

1) Operating characteristics : Alternate type
2) Rating : 30VDC, 5A
3) Rating for illumination LED : 1.85VDC, 20mA
4) Dielectric strength : 1 minute at 1,000V AC
5) Insulation resistance : Over 200MΩ at 500V DC
6) Life expectancy : Approx. 10,000 operations
7) Circuit diagram

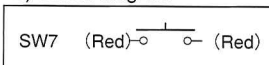


NOTE
1 : The color of leadwire is shown in parenthesis.
2 : AWG27 leadwire is used.

Note: The emission color of LED is red unless otherwise specified.

Specs. of trigger switch (SW7)

1) Operating characteristics : Momentary type
2) Rating : 30VDC, 100mA
3) Dielectric strength : 1 minute at 600V AC
4) Insulation resistance : Over 100MΩ at 500V DC
5) Life expectancy : Approx. 100,000 operations
6) Circuit diagram



NOTE
1 : The color of leadwire is shown in parenthesis.
2 : AWG27 leadwire is used.
3 : SW7 is an optional spec.

Others

The mechanical performances on X and Y axes are the same as those of standard 90JA/90JB models respectively.

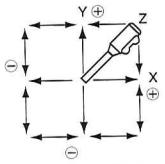
"Sakae"

100JB

● Potentiometer incorporated type ● With conductive plastic element

● Nomenclature

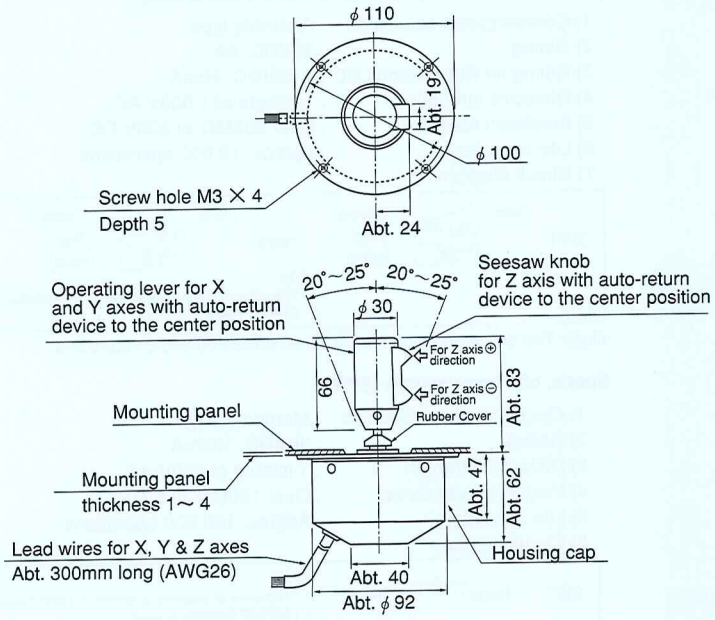
S means special mechanical specifications not applicable to our standards.
100 means approx. size of base housing in mm.
J means joystick controller.
B means 3-dimensional coordinate pot. inside incorporated low cost type.
M means round shape.
Z means mechanisms of 3-dimensional coordinate type.
Available directions of lever operation as below illustration.
U : In addition to 360 square-directional operation, 3-dimensional coordinate operation is possible by the lever in which a seesaw type potentiometer is mounted.



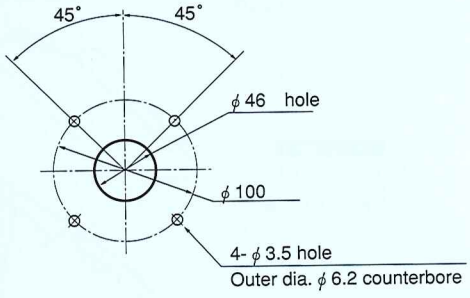
S 100 J B M - Z U - 3 0 R3 G - 00000

Number of potentiometers to be mounted.
3···3 potentiometers are incorporated.
Number of switches to be mounted.
0···no switch is incorporated.
With spring return device
R3 : with spring return device for 3-dimensional coordinate type.
Mounting accessories
G : with dust proof rubber cover.
Special part number
In case we produce customized product, we add 4-digit or 5-digit branch number.

● Standard Dimensions



■ Panel Arangements



Note : 4 pcs. of mounting screws (M3 × 8) are attached.

(Unit : mm)

100JBM-ZU-30R3G
(Standard
dimensional coordinate type)

STANDARD SPECIFICATIONS

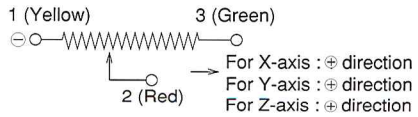
Mechanical Performance

Controlling range of operating lever	● 2-dimensional coordinate type : Omni-directionally approx. ±20° ~ ±25° operation from center position. ● 3-dimensional coordinate type : Approx. ±15°~±19° operation from the center position of the seesaw knob, in addition to the controlling range of 2-dimensional coordinate type.
Operating force	Standard spring return device:Automatically return to center.
X, Y directions	Approx. 0.8~2.3N (80~230gf.) [with 2 springs(with directive feeling)as standard version]
Z direction	Approx. 24~30mN·m (240~300gf·cm)
Operating temperature range	–20°C~+65°C
Vibration	10~55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx. 5,000,000 operations for X and Y axes. Approx. 2,000,000 operations for Z axis.
Mass	3-dimensional coordinate type : Approx. 410g

Electrical Performance

Potentiometers mounted	- For X and Y axes: SFCP22E, 10kΩ±15%, 0.13W (conductive plastic resistive element) Independent linearity tolerance ±3% Electrical rotating angle : Approx. 40° - For Z axis: Special potentiometer RMP30AY is exclusively used for seesaw knob 10kΩ±15% 0.1W Independent linearity tolerance ±3%. Electrical rotating angle: Approx. 30°
Output smoothness	Below 0.2% against input voltage.
Contact resistance variation	Below 5% C.R.V.
Resolution	Essentially infinite
Dielectric strength	1 minute at 500V.A.C.
Insulation resistance	Over 1,000MΩ at 500V.D.C.

Terminal Connection Diagram



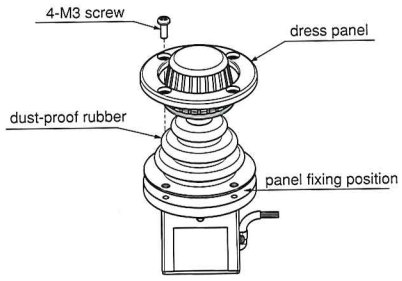
Note:1) Terminals shall be lead-wire terminals with approx. 300mm long.(AWG26)

Special Specifications Available

Please see page 51, table of "Standard and Special Speciffications Available".

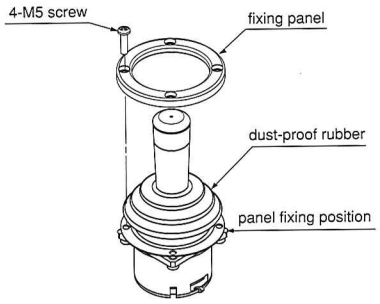
MOUNTING METHOD OF OUR JOYSTICK CONTROLLERS
(How to mount each type of joystick controllers)

●Model 30JH



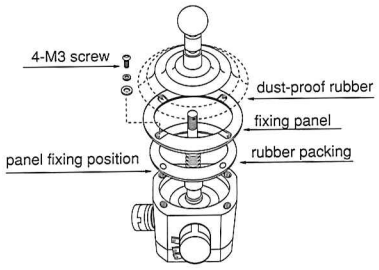
(1) Remove 4 screws from the dress panel.
(2) Put the joystick from the below your panel as shown on the sketch.
(3) Assemble the dust-proof rubber cover and the dress panel, and fix them with 4 screws.

●Model H60JH



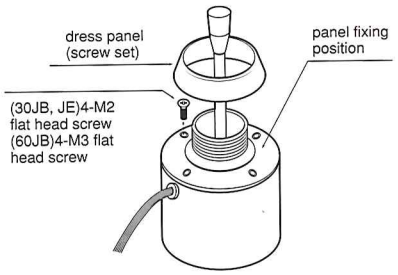
(1) Remove 4 screws from the dress panel.
(2) Put the joystick from the below your panel as shown on the sketch.
(3) Assemble the dust-proof rubber cover and the dress panel, and fix them with 4 screws.

●Model 50JC 90JA 90JB H90JA H90JB



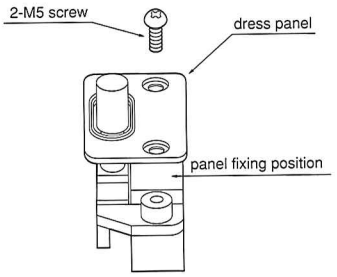
(1) Turn up the dust-proof rubber cover and there appears the fixing panel.
(2) Remove 4 screws from the fixing panel, and then remove the fixing panel and the rubber packing.
(3) Put the joystick from the below your panel as shown on the sketch, and re-assemble the parts by opposite procedure of the above.

●Model 30JB 30JE 60JB



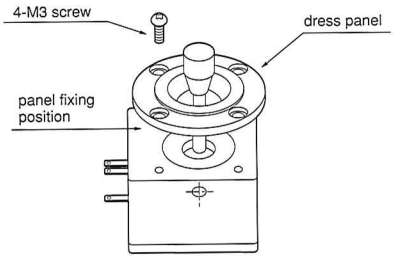
(1) Remove the dress panel (screw set type), and then remove 4 screws from the joystick base.
(2) Put the joystick from the below your panel as shown on the sketch, and fix it with 4 screws.
(3) Assemble the dress panel.

●Model 30JL H30JL



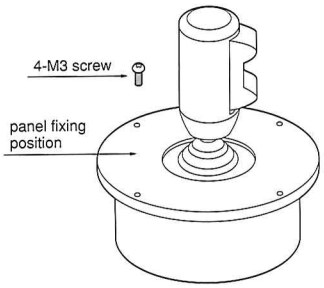
(1) Remove 2 screws from the dress panel.
(2) Put the joystick from the below your panel as shown on the sketch.
(3) Assemble the dress panel, and fix them together with 2 screws.

●Model 40JB 40JE



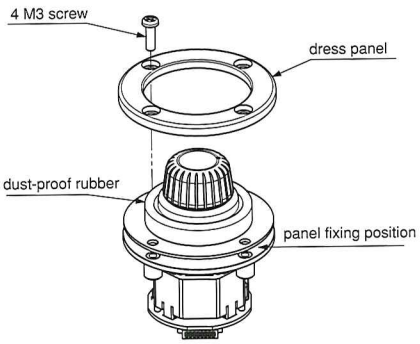
(1) Remove 4 screws from the dress panel.
(2) Put the joystick from the below your panel as shown on the sketch.
(3) Assemble the dress panel, and fix them together with 4 screws.

●Model 100JB



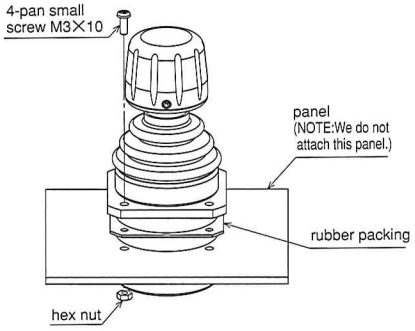
(1) Put the joystick from the below your panel as shown on the sketch.
(2) Fix the joystick with 4 screws.

●Model H30JH



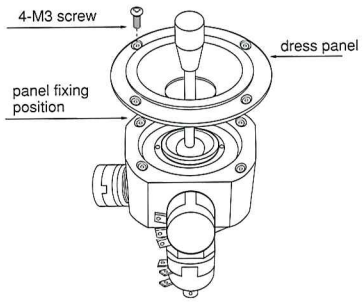
(1) Remove 4 screws from the dress panel.
(2) Put the joystick from the below your panel as shown on the sketch.
(3) Assemble the dust-proof rubber cover and the dress panel, and fix them together with 4 screws.

●Model H40JH



(1) Assemble the rubber packing, and then assemble the joystick on your panel.
(2) Fix them with 4 pcs. of M3 screws. If your panel has M3 screw threaded holes, the joystick can be fixed with these screws. If your panel has ϕ3.5mm holes instead, use 4 pcs. of hex nuts which are attached together with the joystick.

●Model 50JA H50JA



(1) Remove 4 screws from the dress panel.
(2) Put the joystick from the below your panel as shown on the sketch.
(3) Assemble the dress panel, and fix them together with 4 screws.

Special Specifications Available

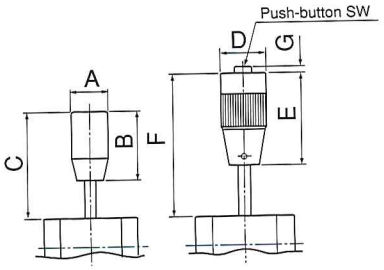
Specifications/Model		H25J	30JB	30JE	30JH	H30JH	30JL	H30JL	40JB	40JE	H40JH	50JA	H50JA	50JC	60JB	H60JH	HMC60JH	90JA	H90JA	90JB	H90JB	C90J	100JB	Remarks
Directions of Lever Operation	1-and 2-dimensional coordinate type O	◎	◎	—	—	—	—	—	◎	—	—	◎	◎	◎	◎	—	—	◎	◎	◎	◎	◎	—	
	1-and 2-dimensional coordinate type X	—	○	○	—	—	—	—	○	○	—	○	○	○	○	—	—	○	○	○	○	○	—	
	1-and 2-dimensional coordinate type I	—	○	○	—	—	◎	◎	○	○	—	○	○	○	○	—	—	○	○	○	○	○	—	
	1-and 2-dimensional coordinate type Q	—	○	◎	—	○	—	—	○	◎	○	○	○	○	○	◎	◎	○	○	○	○	○	◎	
	1-and 2-dimensional coordinate type L	—	—	—	—	—	—	—	—	—	—	○	○	○	○	—	—	○	○	○	○	○	—	
	3-dimensional coordinate type Z	—	—	—	—	—	—	—	—	—	—	○	○	—	—	—	—	—	○	—	—	◎	—	
	3-dimensional coordinate type T	—	○	—	◎	—	—	—	—	—	—	○	—	—	○	—	—	○	○	○	○	◎	—	
	3-dimensional coordinate type R	—	—	—	—	—	—	—	—	—	—	○	○	—	—	—	—	—	○	—	—	—	—	
	3-dimensional coordinate type U	—	○	○	—	◎	—	—	—	—	◎	○	—	—	○	○	○	○	○	○	○	○	◎ note 14	
	Other dimensional coordinate type S	—	—	—	—	—	—	—	—	—	—	○	○	○	—	—	—	○	○	○	○	○	—	
Spring return device		◎	◎※	◎※	◎※	◎※	◎	◎	○	◎	◎※	○	◎	◎	◎	◎※	◎	◎	◎	◎	◎	◎	◎	* "Without spring return" is not available.
Dust-proof rubber		◎	○	○	◎	○	○	○	○	○	◎	○	○	◎	○	◎	◎	◎	◎	◎	◎	◎	◎	note 13
Micro-switch		—	—	◎	○ note 11	—	○ note 1	○ note 1	—	—	○ note 15	○	○ note 2	○	○ note 3	○ note 15	○ note 15	○ note 2	○ note 1	○	○	○	—	Number of switch to be incorporated is depending on models.
Digital code switch		—	—	—	—	—	—	—	—	◎	—	—	—	—	—	—	—	—	—	—	—	—	—	
Alteration of potentiometer's total resistance value		—	○	—	○	—	○	—	○	—	—	○	—	○	○	—	—	○	—	○	—	○	○	Standard is 10kΩ.
Intermediate tap of potentiometer		—	◎	—	○	—	○	—	○	—	—	○	—	○	○	—	—	○	—	○	—	○	○	Standard is current tap.(with blind zone of approx. 3)
Center position detecting switch		—	—	—	○ note 1	—	—	—	○ note 2	—	—	○	○ note 2	○	○ note 5	—	—	○ note 2	○ note 2	○ note 6	○ note 6	○	—	Available for 2-dimensional coordinate type only.
Switch incorporated inside knob		—	○ note 11	○	—	—	○ note 11	—	○ note 7	○	○	○	○ note 7	○	○ note 7	○	○	○ note 10	○	○ note 10	○ note 10	◎	—	Automatically return type.
Rocker swtich incorporated inside knob		—	—	—	—	—	—	—	—	—	—	—	—	—	—	○	—	○ note 10	○	○ note 10	○ note 10	—	—	Automatically return type.
Sub-panel for mounting		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	◎	—	
Potentiometer's "0" position adjusting mechanism		—	—	—	—	—	—	—	—	—	—	○	—	○	—	—	—	○	—	—	—	○	—	
Special knob shapes		○	○	○	○	—	○	○	○	○	—	○	○	○	○	○	—	○	○	○	○	—	—	
Detent mechanism		—	—	—	—	—	○	—	—	—	—	○	○	○	—	—	—	○	○	—	—	○	—	Max.7 positions available in each X and Y axis. Max.5 for H50JA.
Specifications/Model		H25J	30JB	30JE	30JH	H30JH	30JL	H30JL	40JB	40JE	H40JH	50JA	H50JA	50JC	60JB	H60JH	HMC60JH	90JA	H90JA	90JB	H90JB	C90J	100JB	Remarks

◎means standard specifications ○means special specifications and —means "not available". (Depending on specialty you ask, some options on the above cannot be applied.)

(Note) 1. Life expectancy : min. 100,000 operations under the ratings at 30V.D.C./100mA.
2. Life expectancy : min. 200,000 operations under the ratings at 125V.A.C./5A.
3. Life expectancy : min. 100,000 operations under the ratings at 30V.D.C./100mA.

} When the switch is under non-operating condition, the condition between terminals COM and NO is "ON" and when the switch is under operating the condition, between terminal COM and NC is "ON" .

4. No. of contacts : 3 contacts per 1 circuit, Rating 100V. A.C./200mA Life expectancy:min. 50,000 operations.
5. With 1 pc. each micro-switch for X and Y axis under series connections. Rating 30V.D.C./100mA. Life expectancy: min. 100,000 operations.
6. With 1 pc each micro-switch for X and Y axis under series connections. Rating 30V.D C./100mA. Life expectancy: min. 100,000 operations.
7. Rating 125V.A.C./3A. Life expectancy : min. 25,000 operations.
8. Rating 125V.A.C/3A.Life expectancy : min. 25,000 operations.
9. Rating 12V.D.C./1mA Life expectancy : min. 1,000,000 operations.
10. Rating 250V.A.C./10A Life expectancy : min. 300,000 operations.
11. Rating 24 V.D.C./50mA Life expectancy : 1,000,000 operations.
12. We use various kinds of switch, depending on each specification of joystick controller. Thus, if you require specific applied voltage(power rating), please consult us before ordering.
13. We are using a rather stronger rubber material against environmental conditions for our dust-proof rubber cover and however, when you use it in the place where oil is adherent or lower temperature, please consult us before ordering. Please also note that, when changing the dust-proof rubber covers, some types of them can not be changed by yourselves, which means, in that case, we would kindly request you to return it to do so at our side.
14. Seesaw type potentiometer used.
15. Switch function is available. However, please note that switch function is not a real switch. Using analog output in a specific way, swith-like function is possible.
16. Please consult us for other special specifications except the above-mentioned.



Detailed Dimensions of Special Shaped Knob (Unit: mm)

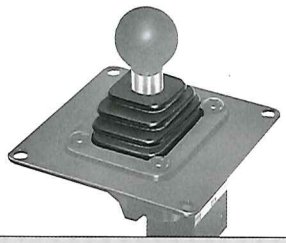
Note1:Our push button switches have 2 kinds of operating characteristic as follows.
- Momentary type:SW-ON when pushed (our standard)
- Alternate type:SW-ON after pushed, and SW-OFF when pushed once again (Available for knob type 101 and knob type 102A)

Note2:Rubber cover G-1, G-2 and G-5 are dust-proof rubbers. Please refer to page 53.
Note3:The height of C and F in the right sketch shows the dimensions when standard type of each model with YO, ZT and ZZ mounts such special knobs.
Note4:"–"in below table stands for "NOT available".

Exterior · Shape	Type	Feature	Dimensions	30JB, JE		40JB, JE		50JA		50JC	60JB		H60JH
				Without rubber cover	With type G5 rubber cover	Without rubber cover	With type G2 rubber cover	With rubber cover	With type G1 rubber cover	With rubber cover	With type G-4 rubber cover & Without rubber cover	With type G1 rubber cover	With rubber cover
	101	Push-button knob ϕ23×50L Switch incorporated inside the knob	D	—	—	ϕ23	ϕ23	ϕ23	ϕ23	—	ϕ23	ϕ23	—
			E	—	—	50	50	50	50	—	50	50	—
			F	—	—	Abt. 74	Abt. 74	Abt. 77	Abt. 102	—	Abt. 82	Abt.101	—
			G	—	—	Abt. 3	Abt. 3	Abt. 3	Abt. 3	—	Abt. 3	Abt. 3	—
	102A	Push-button knob ϕ30×68L Switch incorporated inside the knob with rubber cover	D	—	—	—	—	—	ϕ30	ϕ30	—	—	ϕ30
			E	—	—	—	—	—	68	68	—	—	68
			F	—	—	—	—	—	Abt. 110	Abt. 127	—	—	Abt.113
			G	—	—	—	—	—	Abt. 1	Abt. 1	—	—	Abt.1
	103	Push-button knob ϕ16×30L Switch mounted outside the housing	D	—	—	—	—	ϕ16	ϕ16	—	—	—	—
			E	—	—	—	—	30	30	—	—	—	—
			F	—	—	—	—	Abt. 57	Abt. 81	—	—	—	—
			G	—	—	—	—	Abt. 3	Abt. 3	—	—	—	—
	104	Push-button knob ϕ19×45L Switch incorporated inside the knob	D	ϕ19	ϕ19	—	—	—	—	—	—	—	—
			E	45	45	—	—	—	—	—	—	—	—
			F	Abt.57	Abt.67	—	—	—	—	—	—	—	—
			G	Abt.4	Abt.4	—	—	—	—	—	—	—	—
	201	Grip-knob ϕ32×55L	A	—	—	—	—	ϕ32	ϕ32	ϕ32	—	—	—
			B	—	—	—	—	55	55	55	—	—	—
			C	—	—	—	—	Abt. 82	Abt. 106	Abt. 132	—	—	—
	202	Grip-knob ϕ20×37L	A	—	—	—	—	ϕ20	ϕ20	—	ϕ20	ϕ20	—
			B	—	—	—	—	37	37	—	37	37	—
			C	—	—	—	—	Abt. 58	Abt. 82	—	Abt. 63	Abt. 81	—
	203	Grip-knob ϕ30×69L	A	—	—	—	—	—	—	ϕ30	—	—	ϕ30
			B	—	—	—	—	—	—	69	—	—	69
			C	—	—	—	—	—	—	Abt. 126	—	—	Abt. 114
	301	Rotary-knob ϕ23×55L	A	—	—	—	—	ϕ23	ϕ23	—	ϕ23	ϕ23	—
			B	—	—	—	—	55	55	—	55	55	—
			C	—	—	—	—	Abt. 73	Abt. 107	—	Abt. 78	Abt. 106	—
	302	Rotary-knob ϕ30×55L	A	—	—	—	—	ϕ30	ϕ30	—	ϕ30	ϕ30	—
			B	—	—	—	—	55	55	—	55	55	—
			C	—	—	—	—	Abt. 73	Abt. 107	—	Abt. 78	Abt. 106	—
	303	Rotary-knob ϕ16×30L Fixable to type 50JA-ZZ with spring return device	A	—	—	—	—	ϕ16	ϕ16	—	—	—	—
			B	—	—	—	—	30	30	—	—	—	—
			C	—	—	—	—	Abt. 57	Abt. 83	—	—	—	—
	304	Rotary-knob ϕ18×26L	A	ϕ18	ϕ18	—	—	—	—	—	—	—	—
			B	26	26	—	—	—	—	—	—	—	—
			C	Abt.38	Abt.48	—	—	—	—	—	—	—	—

RoHS Compliant

Dust Proof Rubber (Model 30JH, 50JC, 90JA, 90JB series have a dust proof rubber cover as standard version)

For 50JA, 60JB, 60JE	For 40JB, 40JE	For 50JC	For 60JB
Type G-1	Type G-2	Type G-3	Type G-4(Flat type)
			
For 30JB, 30JE	**For 30JL, H30JL**	**For 30JH**	**For 100JB**
Type G-5	Type G-6	Type G-7	Type G-8
			
For 90JA,90JB,H90JA H90JB	**For H40JH**	**For H60JH**	
Type G-9	Type G-10	Type G-11	
			

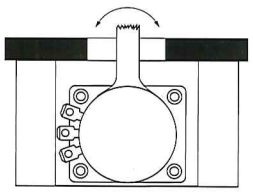
(Note 1)
Dust proof rubbers are mounted on the below models as standard specs.
30JH, H40JH, 50JC, 60JE, H60JH, 90JA, 90JB, H90JA, H90JB, 100JB

(Note 2)
We are using strong rubber materials against severe environmental conditions as our standard dust-proof rubber cover and however, in case of using in the place where oil is adherent or lower temperature, please consult us before ordering. When changing the dust proof rubber cover, it is imposible to change it on some types of joystick controller by yourselves and it requires to return us to do so. Please duly note this fact in your mind.

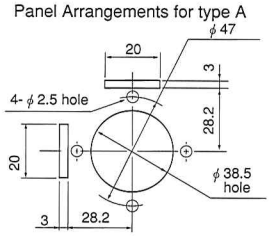
●Potentiometer's "0" Position Adjusting Mechanism

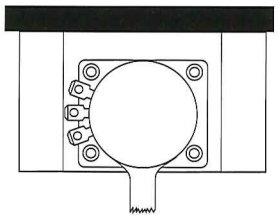
(Note) In case of with dust-proof rubber cover, the dimensions shall change and please ask us the details.

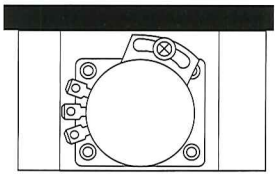
50JA	50JA, 50JC, 90JA	
Type A	Type B	Type C
Operating lever exposed on panel surfaces	Operating lever incorporated inside panel	Operating lever incorporated inside panel and lockable



Panel Arrangements for type A

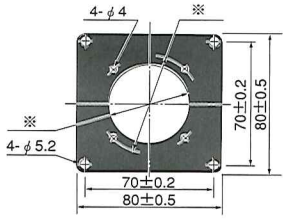






●Sub-panel for mounting

It is possible to supply each type of joystick controller with this sub-panel on request.



Note : 1) Thickness of this sub-panel is 2mm.
Note : 2) The dimensions of mark "※" are determined by the joystick controllers to be mounted.
Note : 3) For mounting use of 90JA, L90JA, and 90JB, the outer dimension is 100×100 and inner dimension between 4-φ5.2 hole pitch is 90×90.

FOOT CONTROLLERS

For Precision Industrial Use

FOOT CONTROLLERS

■PRECAUSIONS FOR DESIGN

●Potentiometers used for foot controllers employ precision-class conductive plastic resistance elements, and therefore, please make sure that Sakae foot controllers should always be used with voltage method (Voltage shall be applied between terminals ①-③ and output obtained from terminal ②). Please also take care that more than 1mA shall not flow through terminal ② (movable contact) because overcurrent burns out the resistance element (Appropriate current through terminal ② should be below 10μA).

●Please take care not to apply over 10N(1kgf) force on output cables.

●In case operating environment with strong vibration and shock for long period, please consult us in advance. Resistant level against vibration, shock and life expectancy shall be based on the following test conditions.

○Vibration 10～55Hz 98m/s2 shall be in accordance with MIL-STD-202-201.

○Shock 294m/s2 shall be in accordance with MIL-STD-202-213.

○Life expectancy shall be based on test conditions under which pedal shall be stepped per each operation at the speed of 60 reciprocating motions per minute in room temperature.

Note: The tests should be made under the condition of normal mounting method and then, vibration and shock testing should be applied in up and down direction, with no voltage loaded.

●In case switches are incorporated, please duly take care of rated values of switches(power, voltage, current, etc.). If you use the switches to be loaded by induced load, please consult us in advance.

●Further technical details of precision Sakae potentiometers to be incorporated, please refer to the proper items in our General Catalog on precision potentiometers, dials and servo components, separately.

■PRECAUTIONS FOR USE

●All numerical values of performances and characteristics mentioned in this catalog are based on those of our standard versions. If you require a special version, we would kindly request you to consult and confirm us on the specifications and performances sufficiently in advance.

●When using our foot controllers, please do not apply an hunting motion or a sudden shock to them in order to avoid any errors during operations.

●The potentiometers or switches to be incorporated inside pedal have a simple water-proof construction and however, if you want to use these foot controllers in severe enviromental conditions such as water or organic gas, we would kindly ask you to consult us in advance.

●We are always doing our efforts to improve quality and reliability of our foot controllers. However, if you want to use these foot controllers as critical applications in a viewpoint of safety (namely, life supporting medical devices, nuclear control facilities, aerospace apparatuses, sea bottom relay apparatuses, limit robots and so on), please duly take care of the following matter. Although we design our foot controller not cause any failure, we can not guarantee 100% safety on actual applications and therefore, we would like you to consider to adopt the safely designing method such as fail-safe and fool-proof, in order to ensure the safety from the failures of disconnection and excess sliding noise.

"Sakae"

H80FCL

● With a hall effect IC

● Nomenclature

S H 80 FCL - S 2 DF K - 00000

● **S**
means special mechanical specifications not applicable to our standard.

● **H**
means hall effect IC type potentiometer is incorporated.

● **80**
means approx. size of base housing in mm.

● **FCL**
means Foot controller.
L means small and compact-sized pedal type.

● **① Number of switches to be incorporated(Option).**
1···1 switch incorporated.
2···2 swithces incorporated.

● **② Rating of switch:**
D·F···micro-switch

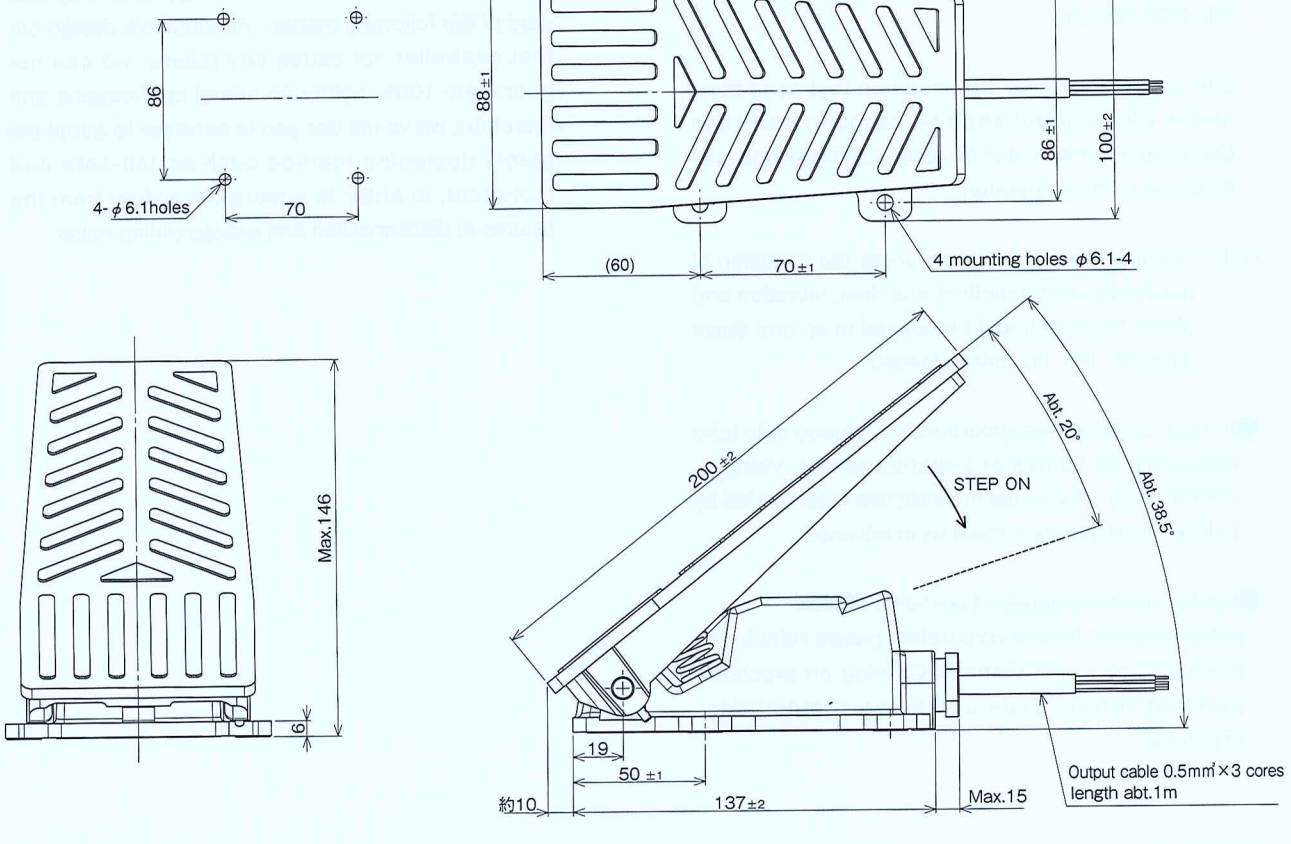
● **Output characteristic**
S···single output **X**···dual cross output **P**···dual parallel output

● **With kick-down device:**
The operating force is increased at about 5°from the end of stepping.

● **00000**
Special part number:
In case we produce customized product,
we add 4-digit or 5-digit branch number.

● Standard Dimensions

■Panel Arrangements



H80FCL-S

STANDARD SPECIFICATIONS

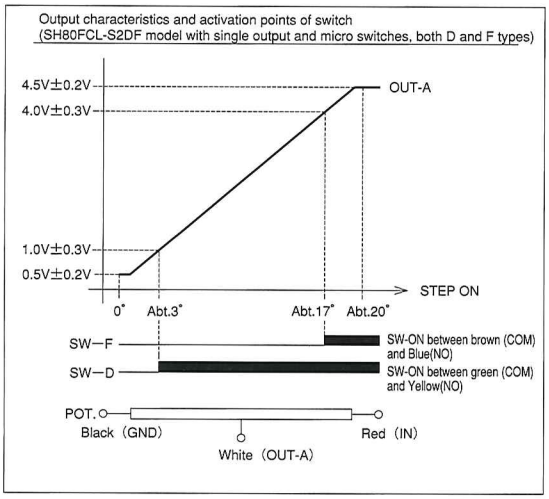
Mechanical Performance

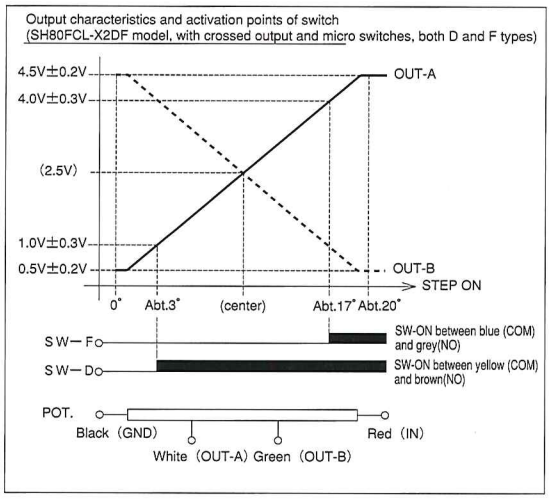
Operating method	Stepping pedal type
Operating angle	Approx.20°C
Operating force	Standard automatic spring return device Abt.10N・60N(Abt.1,000gf.～6,000gf.)
Operating temperature range	–20°C～+65°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²(11ms)
Life expectancy	Approx.2,000,000 operations
Mass	Approx.850g

Electrical Performance

Hall effect IC type potentiometer is incorporated	SHSM18E, hall effect IC type single-turn contactless potentiometer ● Applied voltage: 5V±10% D.C. ● Output range: Apporx.10%～90% Vin ● Independent linearity tolerance: ±3%
Dielectric strength	1 minute at 250V.A.C.
Insulation resistance	Over 100MΩ at 250V.D.C.
EMS durability	100V/m(80MHz～1GHz 1KHz sine-wave 80%AM modulation)
ESD durability	±8KV contact discharge/±15KV aerial discharge (Based on IEC61000-4-2)

Output Characteristics and Terminal Connection Diagram





Special Specifications Available

- **With switch incorporated**
  D version switch: SW "ON" at about 3° from the beginning of stepping under 1V±0.3V.D.C. output.
  F version switch: SW "ON" at about 3° from the end of stepping under 4V±0.3V.D.C. output.
- **With kick-down device**
  Operating force is increased at about 5°from the end of stepping (Max. approx. 250N)
- **With special output**
  Dual parallel output, Dual cross output.
- **Potentiometer with conductive plastic element**
  Type FCP22E is incorporated.

Note : For output characteristics, activation points of switch and terminal connection diagrams, please see above.

"Sakae"

200FCA

● With conductive plastic element

● Nomenclature

S 200 FCA - 1 0 A - 00000

● S
S means special mechanical specifications not applicable to our standard.

● 200
200 means approx. size of base housing in mm.

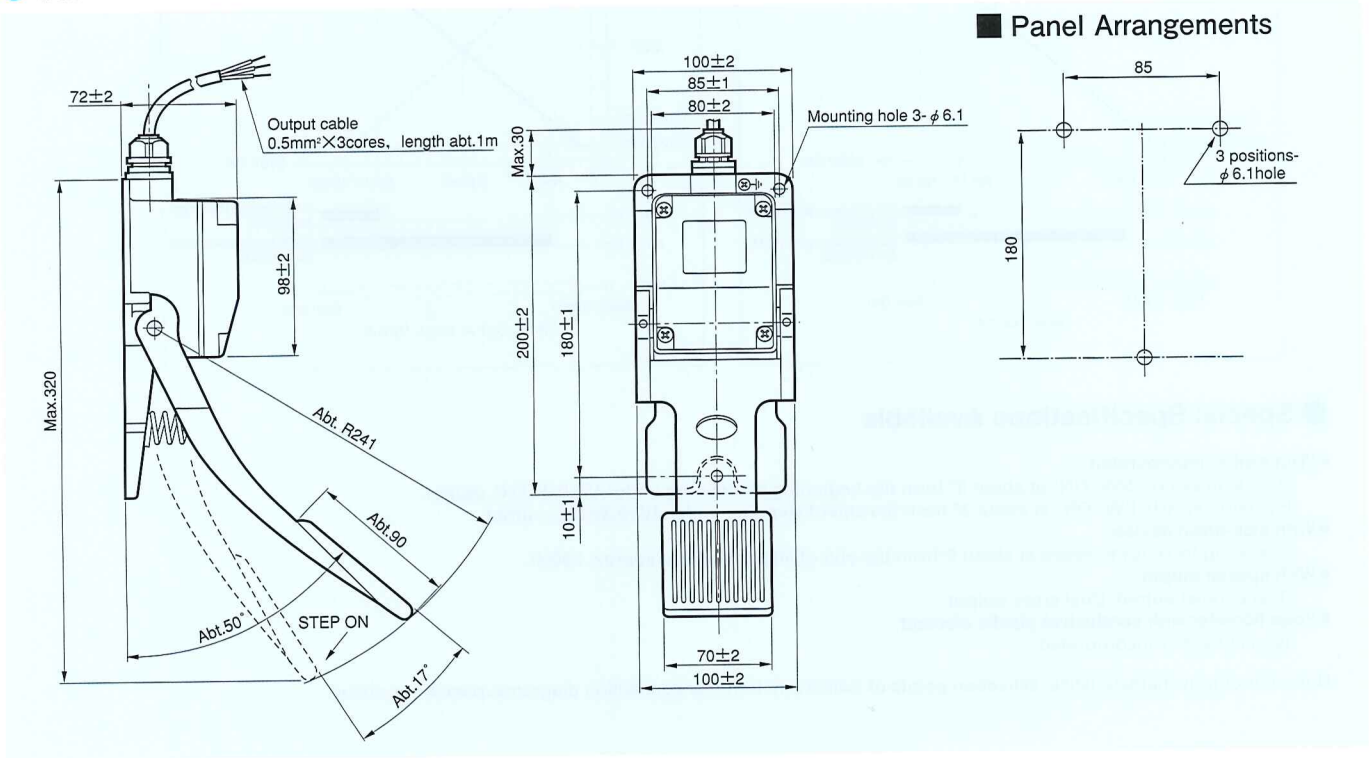
● FCA
FC means Foot Controller, A means long pedal type.

● 0 ① Number of switches to be incorporated (Option).
0···No switch incorporated.
1···1 switch incorporated.
2···2 switches incorporated.
● A ② Rating of switch : A. B. C. ···Code-switch
D. E. F. ···Micro-switch
(For details, please refer to page 62)
G···other switch

● 1 Number of potentiometers to be incorporated
0···No potentiometer incorporated.
1···1 potentiometer incorporated.
2···2 potentiometers incorporated (Option).

● Special part number :
In case we produce customized product, we add 4-digit or 5-digit branch number.

● Standard Dimensions



200FCA-10
(standard)

STANDARD SPECIFICATIONS

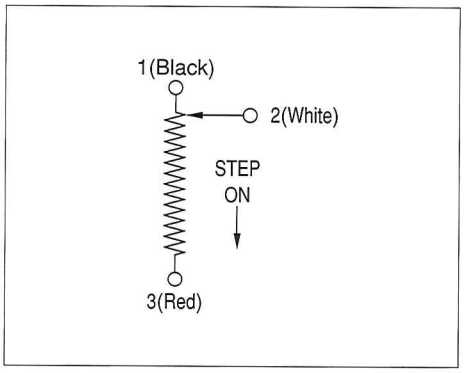
Mechanical Performance

Operating method	Stepping pedal type.
Operating angle	Approx.17°.
Operating force	Standard spring return device : Automatically return to center. Abt. 10N ~ 22N(Abt. 1,000gf. ~ 2,200gf)
Operating temperature range	–20°C~+65°C
Vibration	10~55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx.2,000,000 operations.
Mass	Approx.1.2kg

Electrical Performance

Potentionmeter incorporated	SFCP22E,10kΩ ±20%,0.3W, independent linearity tolerance±3%(conductive plastic resistance element)
Electrical rotating angle	Approx. 70°
Output smoothness	Below 0.2% against input voltage
Contact resistance variation	Below 5% C.R.V.
Resolution	Essentially infinite
Dielectric strength	1 minute at 500VA.C.
Insulation resistance	Over 1,000MΩ at 500V D.C.

Terminal Connection Diagram



Special Specifications Available

- **With swich incorporated**
  Regarding rating of switch, please see page 62.
  If you requite pedal with one switch, unless speciffed, we supply the pedal with A version swich (code-swich with "ON" operation at about 3° flom the beginning of stepping).
- **With hall IC type potentiometer incorporated**

"Sakae"

200FCW

● With conductive plastic element

● Nomenclature

S 200 FCW - 1 0 A - 00000

● **S**
S means special mechanical specifications not applicable to our standard.

● **200**
200 means approx. size of base housing in mm.

● **FCW**
FC means Foot Controller, W means see-saw pedal type.

● **0 ① Number of switches to be incorporated (Option).**
0···No switch incorporated.
1···1 switch incorporated.
2···2 switches incorporated.

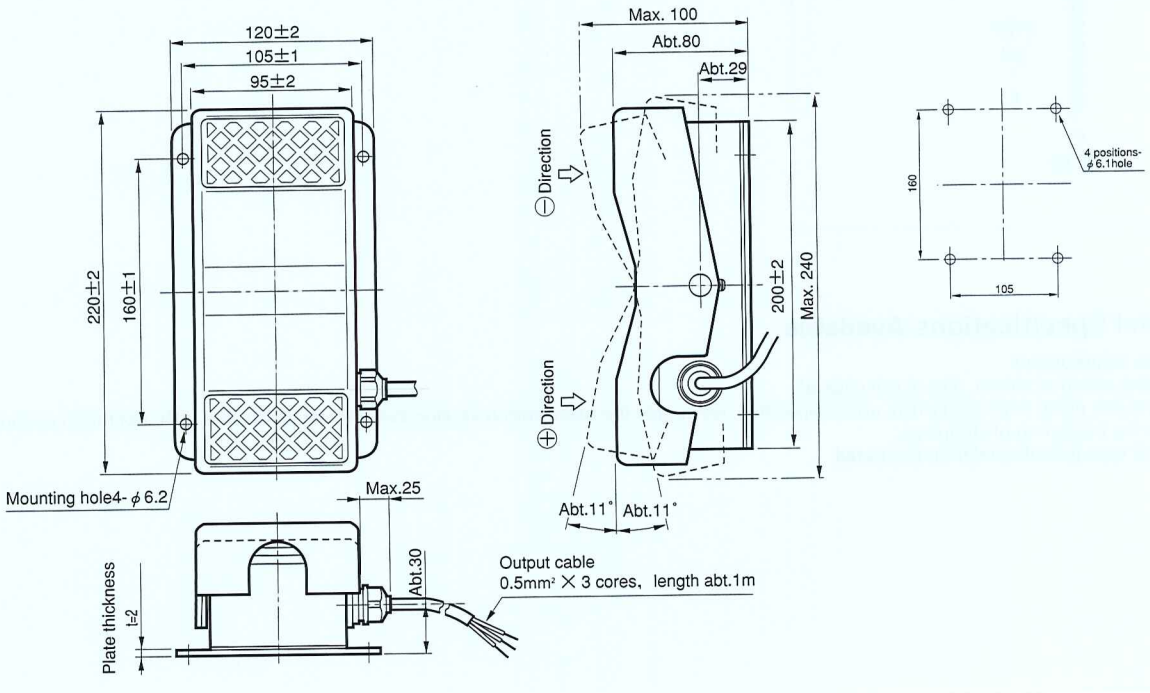
● **A ② Rating of switch** : A. B. C. ···Code-switch
D. E. F. ···Micro-switch
(For details, please refer to page 62)
G···Other switch

● **1 Number of potentiometers to be incorporated (model SFCP22E)**
0···No potentiometer incorporated.
1···1 potentiometer incorporated.
2···2 potentiometers incorporated (Option).

● **Special part number :**
In case we produce customized product, we add 4-digit or 5-digit branch number.

● Standard Dimensions

■ Panel Arrangements



200FCW-10
(Standard)

STANDARD SPECIFICATIONS

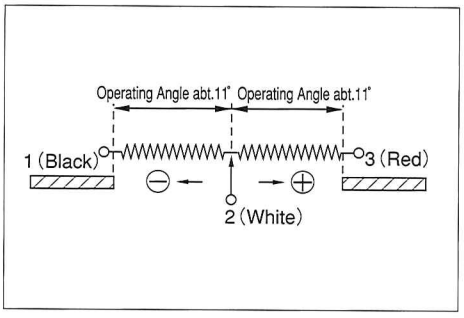
Mechanical Performance

Operating method	Stepping see-saw pedal type.
Operating angle	Approx. ±11°
Operating force	Standard spring return device : Automatically return to center. Abt. 20N(Abt. 2,000gf.)
Operating temperature range	–20°C～+65°C
Vibration	10～55Hz 98m/s²
Shock	294m/s²
Life expectancy	Approx.1,000,000 operations.
Mass	Approx.1.5kg

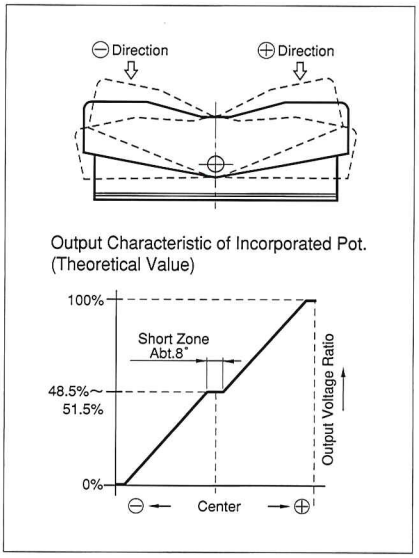
Electrical Performance

Potentionmeter incorporated	SFCP22E,10kΩ ±20%,0.35W, independent linearity tolerance±3%(conductive plastic resistive element)
Electrical rotating angle	Approx. 75° Center shortened zone:With a shortened zone with abt.8° in the center position
Center returning accuracy	50% ±1.5%
Output smoothness	Below 0.2% against input voltage
Contact resistance variation	Below 5% C.R.V.
Resolution	Essentially infinite
Dielectric strength	1 minute at 500V A.C.
Insulation resistance	Over 1,000MΩ at 500V D.C.

Terminal Connection Diagram



Output Characteristics



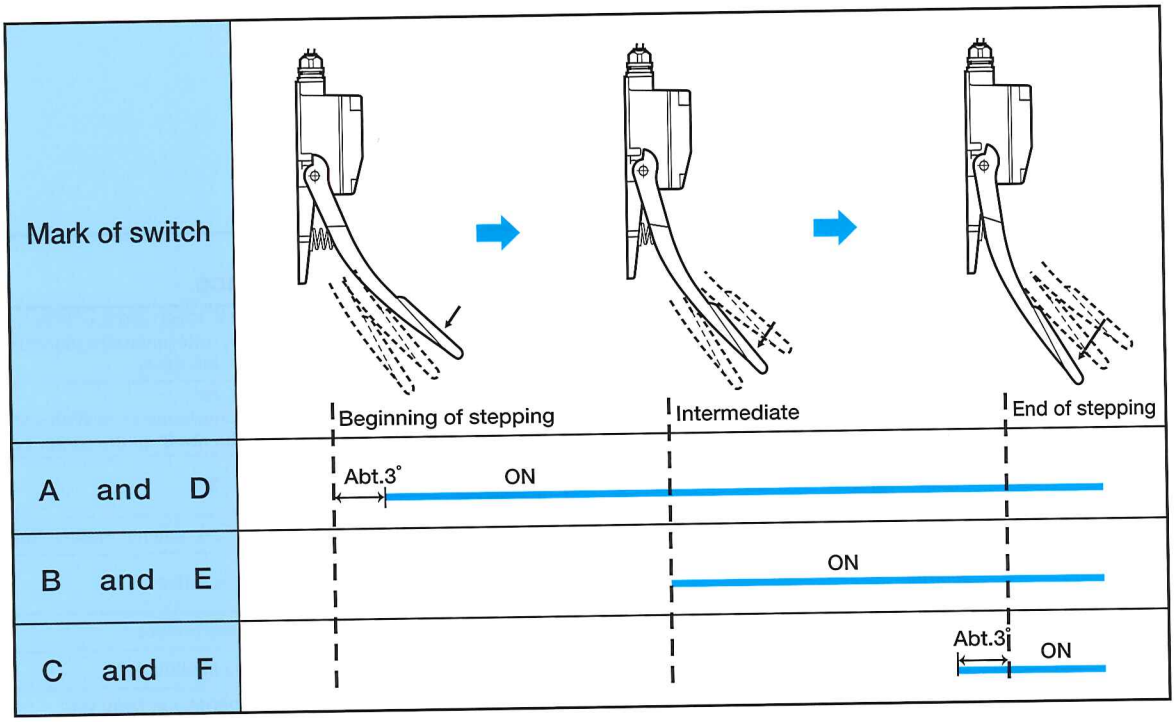
Special Specifications Available

- **With swith incorporated:**
  Regarding rating of switch, please see page 62.
  If you requite the pedal with one switch, unless speciffed, we supply the pedal with A version swich (code-swich with "ON" operation at about 3° flom the beginning of stepping).
- **Automatically one-sided return type**
- **With a center tap on the incorporated pot.**
- **With hall IC type potentiometer incorporated**
  Please note that if the hall IC potentiometer is used, there's no center short zone.

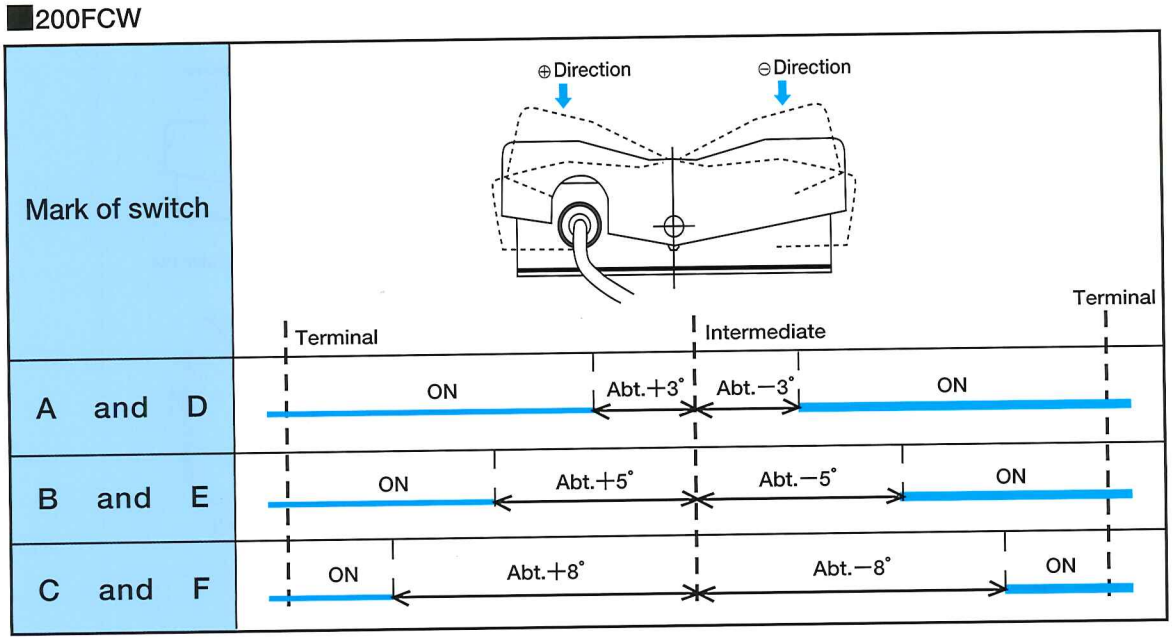
Standard and Special Specifications Available

■Rating of Switch

■200FCA



■200FCW



N.B. : Other ratings of switch are also available, which shows the character of "G" and please ask us for details.

Mark of switch and specifications

★A. B. C. : 12V D. C./1mA (Code-switch)
Life expectancy : Abt. 2,000,000 operations

★D. E. F. : 125V A. C./5A (Micro-switch)
Life expectancy : Abt. 200,000 operations

Note 1) : We will supply pedal with A version switch, unless specified.
2) : It is not available to combine more than 3 patterns from A,B,C or D,E,F.

■DEGREES OF PROTECTION

Example : I P 5 4 — The 2nd characteristic numeral: Degrees of protection against ingress of water

The 1st characteristic numeral: Degrees of protection against solid foreign objects

• The 1st numeral

IP	Degrees of Protection
0	Non-protected
1	Protected aginst solid foreign objects of 50mm. dia. and greater.
2	Protected aginst solid foreign objects of 12.5mm. dia. and greater.
3	Protected aginst solid foreign objects of 2.5mm. dia. and greater.
4	Protected aginst solid foreign objects of 1.0mm. dia. and greater.
5	Dust-protected
6	Dust-tight

• The 2nd numeral

IP	Degrees of Protection
0	Non-protected
1	Protected against vertically falling water drops.
2	protected aginst vertically falling water drops when enclosure titled up 15° .
3	Protected aginst spraying water. when enclosure titled up to 60°.
4	Protected against splashing water.
5	Protected aginst water jets.
6	Preotected aginst powerful water jets.
7	Protected aginst the effects of temporary immersion in water.
8	Protected aginst the effects of continuous immersion in water.

Note: The above table is defined in conformity to the standards of IEC60 529 (1989) and JIS C 0920 (1993).

■WARRANTY

●When using our joystick controllers and foot controllers under the conditions of over-loaded or deviating from the specified contents of this catalog and our specification sheets, there may be a certain accidents such as broken parts of the unit, generation of excess heat on the apparatuses which may produce fire, disconnection of the circuit and so on.
So, please do not use such applications in order to avoid any accidents.

●We will guarantee all of our joystick controllers and foot controllers for one year after the date of shipment in principle. During this period, as for failures and faults which are attributable to our responsibility, we will repair and adjust them at free of charge. As for failures and faults which are not attributable to our responsibility or which take place after warranty period, we will require payment for actual costs for repair and adjustment plus all shipping charges including actual freightage. Unfortunately, we can not bear any cost for the relative damage caused by the failures of our joystick controllers and foot controllers.

■GENERAL NOTES

1. This catalog shows all of "Sakae" present standard joystick controllers and foot controllers as of March, 2016. In case you are considering very special Joystic controller or foot controller not listed in this catalog, please consult us and confirm your requested special specifications are possible, enough reliable, safe, and so on, in advance.

2. All dimensions used in this catalog are in metric system.

3. The figures or values of torque and friction are mentioned under S.I. units (International Systems of Units) and if necessary to use the gravimetric units, please see the figures or values mentioned in the parentheses.

4. Please do not scale all drawings given in this catalog because all drawings are arranged for easy to read and layout.

5. All numerical values on the table mentioned in this catalog are approximate numerical values.

6. All details of this catalog may be subject to change without notice for timely improvements of quality or design.

7. Please confirm all specifications and drawings mentioned in this catalog with our authorized selling agents or with our head office directly prior to ordering, if necessary.

8. For further information, please contact our head office
directly in the following address :

SAKAE TSUSHIN KOGYO CO., LTD.,
322 Ichinotsubo, Nakahara-ku, Kawasaki, Kanagawa,
211-0016 JAPAN
Phone : 044-411-5580
Fax : 044-434-2520
http://sakae-tsushin.co.jp/

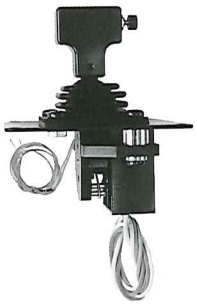
"Sakae"

Specially Ordered Joysticks

"Sakae" Joystick controllers can be supplied with various special specifications according to customers' request and the followings are a part of such special models. Multi-dimensional coordinate operating types other than 3-dimensional coordinate are available on request.

S50JAK-ZT-31R3P

Knob part for operating Z axis with a built-in linear-motion potentiometer and with a push-button switch.



S30JLK-XI-11R1GP

With special "T" shape knob with a push-button switch.

S50JAK-ZR-06R3GP

Special knob for operating Z axis with 2 micro-switches and a push-button switch.

S65JHM-ZS-30R3P

Round shape knob can only operate on Z axis.

S90JAM-YO-24R2GP

Round shape knob with 2 push-button switches.

S50JAK-YO-09R2G

With push-button switch, encoders and gray colored rubber cover.

S90JAM-ZZ-36R3G

With a linear-motion potentiometer for Z axis and special knob with 7 push-button switches.

S50JAK-ZZ-30GP

Seesaw knob used for operating Z axis. The knob is processed with a solid plastic material.

S50JCK-XI-09G

With an encoder as well as over-drive gears.

S90JAM-YX-24R2G

With over-drive gears together with potentiometers.

S90JBM-YO-24R2GP

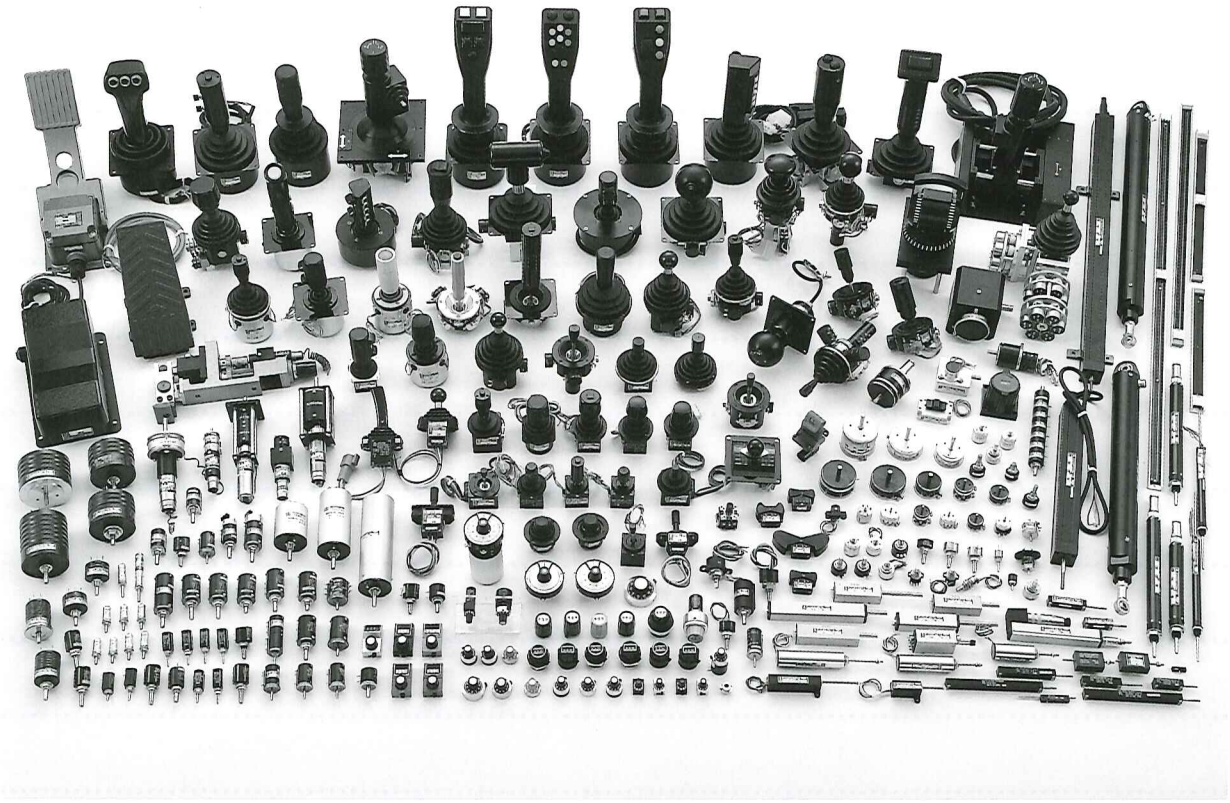
2 axes control. With 4 push-button switches in the hand grip.

S150 JNK-YS-40

Special operations by special shaped lever.

Precision Potentiometers, Dials, Joystick Controllers, Foot Controllers & Servo Components

A part of our products



We are a professional manufacturer of precision potentiometers, turns-counting dials, joystick controllers, foot controllers and servo components since 1950.
(ISO9001 certified in August, 1994 : No. RCJ-94M-28)

- Inauguration August, 1946
- Foundation March 30,1950
- Capital Stock paid up Yen 96,000,000.
- Number of Employee Approx. 270

- Places of Establishments :

Head Office : 322 Ichinotsubo, Nakahara-ku, Kawasaki-city, Kanagawa-prefecture, 211-0016 Japan.
Phone : +81(0)44-411-5580 Fax : +81(0)44-434-2520
URL : http://sakae-tsushin.co.jp/
Mitsuke Factory : 2-8, Honjo 2-chome, Mitsuke-city, Niigata-prefecture, 954-0051 Japan.
Phone : 0258-62-2228 Fax : 0258-62-4514
Agano Factory : Kou 140-1, Jisha, Agano-city, Niigata-prefecture, 959-2205 Japan.
Phone : 0250-68-2084 Fax : 0250-68-2144

Precision Potentiometers & Turns-Counting Dials

- Helicalohm Multi-turn Potentiometer (Models HP, HPC, HD, HDS and HHP Series)
- Turns-Counting Dial (Models MA, MB, MF, MG, DA, DB and DC Series)
- 1-turn Potentiometer (Models CP and FCP-A Series)
- Low Torque Potentiometer (Model LNB Series)
- Non-Linear Potentiometer (Models SCB and FSCB Series)
- Linear-Motion Potentiometer (Models LP, FLP and CFL Series)
- Oil-Filled Potentiometer (Models OF, OFCP, OF-MCA, OFHD, OFHHP and OFLP Series)
- Contactless Potentiometer (Models KSM ,LSM, HSM and LHK Series)

Joystick Controllers

(Models H25JB, 30JB, 30JE, 30JH, H30JH, 30JL, H30JL, 40JB, 40JE, H40JH, 50JA, H50JA, 50JC, 60JB, H60JH, HMC60JH, 90JA, H90JA, H90JB, C90JAM, 90JB,C90JBM and 100JB Series)

Foot Controllers

(Models 200FCA, 200FCW and H80FCL Series)

Servo Components

- Precision Motor-Potentiometer (Model MPH Series)
- Optional Parts

General catalog mentioning precision potentiometers, turns-counting dials and servo components is available, separately, to your request.

MEMO