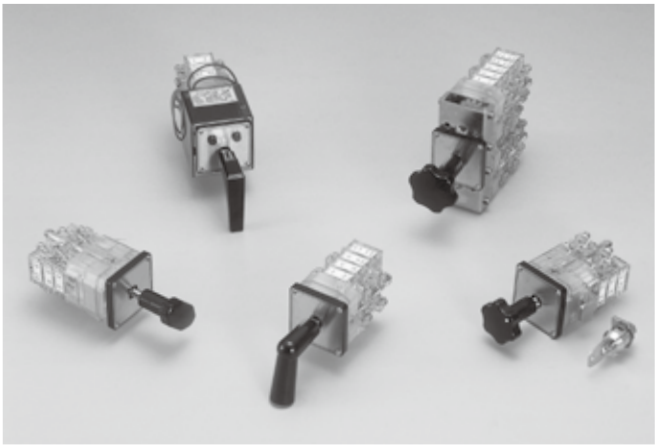


CAM-OPERATED SWITCH

B TYPE, BH TYPE



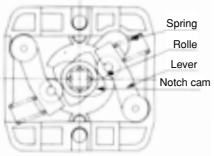
INDEX FOR B / BH TYPE CAM-OPERATED SWITCH

Item	Page	Item	Page	Item	Page
Features	**A1**	Handle code	**A6**	Voltmeter / Ammeter Switches	**A27 to 30**
Specifications / Breaking Capacity	**A2**	Standard Specifications	**A7 to 11**	Contact Arrangement of Standard Switches	**A31 to 48**
How to Order	**A3**	Special Specifications	**A12 to 22**	Accessories	**A49 to 50**
Notch code	**A4 to 5**	Mounting Hole Dimensions	**A23**	Nameplates	**A51 to 54**
Contact code	**A5**	Contact Arrangement Diagram	**A24 to 26**	Technical Information	**A55 to 56**

FEATURES

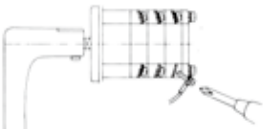
■Heavy-duty mechanical durability against high-frequent switching

Since the optimal layout of components and by using materials with high wear resistance for the mechanical section, it can be provides accurate operation feeling and durability against high-frequent switching up to 5 million times.



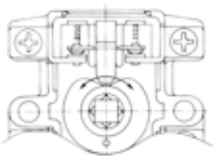
■The terminal arrangement greatly improves wiring efficiency

No up-screw terminal is adopted. It can be quickly wired from the back for the alternate terminal arrangement.



■Campability both compact body and high breaking capacity and yet greatly improved breaking capacity

Larger breaking capacity of the switches generally requires that the main body enlargment. However, Fuji's control switches has achieved downsizing while increasing the breaking capacity. This breakthrough has been made possible by optimally designing the cam shapes and the angle of the movable contact parts for obtaining max. switching speed mechanically.
This allows you to determine the setting values (voltage and current) with allowance.

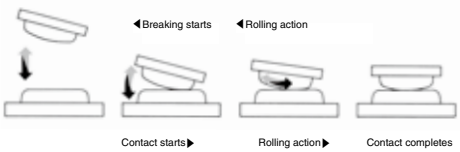


■High-performance engineering plastics ensure high quality and high reliability

For the body, polycarbonate resin is used, which has a high level of performance among engineering plastics. The material greatly improves strength and resistance against environment (temperature, humidity, vibrations, etc.), which are particularly important for the applications related to heavy electric machineries. The contacts and mechanical parts are transparent to facilitate checking the contacting part.

■Rolling action of contact mechanism improves contact stability

In the contact mechanism, the movable contact makes contact with the stationary contact at one point and then gradually increases the contact area while rolling on it. This rolling action minimizes the part exposed to the arc that is generated at the first contact or breaking, thereby maintaining much higher contact stability than the former product.



SPECIFICATIONS (RATINGS, PERFORMANCE)

Specification \ Type	B TYPE	BH TYPE
Rated insulation voltage (Ui)	600V	
Rated current-carrying capacity (Ith)	20A	
Max. wire size	5.5mm²	
Screw size	M4×9	
Withstand voltage	2,500V AC / 1 min.	
Lightning impulse	±7kV (1.2 / 50μs)	
Contact resistance	50mΩ or less	
Mechanical life	5,000,000 operations or more, Class 1	
Electrical life	500,000 operations or more, Class 1	
Shock resistance	500m/s² or more (6 directions)	
Vibration resistance	Range of vibration : 10 to 150Hz, Acceleration : 20m/s², Time : 1 hour (3 directions)	
Min. power requirements	5V AC 500mA, 5V DC 100mA (operating environment must be good)	
Operating temperature	–20 to 60°C	
Storing temperature	–40 to 70°C	
Altitude	2,000 m or less	

■Breaking capacity [electrical life of 500,000 operations (class 1)]

AC			DC				
Rated voltage (V)	Rated operating current (resistance load) (A)	Rated operating current (inductive load) (A)	Rated voltage (V)	Rated operating current (resistance load) (A)	Rated operating current (inductive load) (A)	2 contacts used in series Rated operating current (resistance load) (A)	2 contacts used in series Rated operating current (inductive load) (A)
110	20	15	24	15	10	20	20
220	15	10	48	10	6	18	15
440	4	3	110	3	1.5	4.5	4
——	——	——	220	1.2	0.8	2	1.5

∗ Inductive load: For AC: Power factor 0.6 to 0.7 (Class: AC11)
For DC: Time constant 40±6 ms (Class: DC12)

●CONTROL SWITCH



CAM-OPERATED SWITCH

B TYPE, BH TYPE

HOW TO ORDER

①Type (There's contact arrangement at diagram)

BH-T2002-LD-B54-000

① ② ⑦ ⑧ ⑨

②Type (There's no contact arrangement at diagram)

BH-T2-2B2A-LD-B54-000

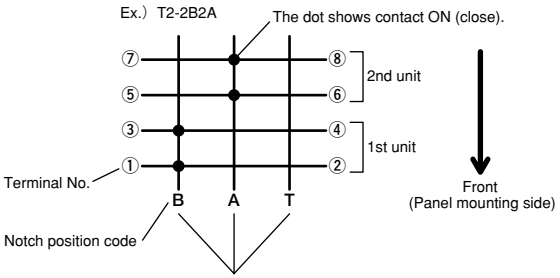
① ③ ④ ⑤ ⑥ ⑤ ⑥ ⑦ ⑧ ⑨

No.	Item	Code	Detail		Note
①	Basic type	B	Screw side is up / down		There are exceptions.
		BH	Screw side is right / left		
②	Contact arrangement	Please see page A31 for contact arrangement diagram.			—
③	Notch code	Please see page A4 to 5 for mechanical operation method.			—
④	No. of units	1 ～	No. of units		Max. unit No. varies from notch and type of switches.
⑤	No. of contacts	1 ～	No. of contacts		1 unit has 2 contacts. (There is only 1 contact in 1 unit in some cases.)
⑥	Contact code	Please see page A5 for Contact code.			About representation of contact code, please refer to the following picture.
⑦	Handle code	Please see page A6 for Handle code.			—
⑧	Color of handle / flange		Munsell color code		—
			Handle	Flange	
		B	N1.5	N1.5	
		BG	7.5BG3/3.5	7.5BG4/1.5	
⑨	Nameplate	Please see page A51 to 54 for Nameplate.			Please select a nameplate No., when the nameplate No. is not specified, plain nameplate is attached.

∗ For the type that corresponding to the all kinds of standard, please contact us separately.

About No. of contacts / Contact code

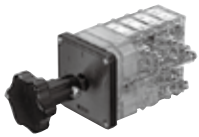
Contact code shows contact ON(close) notch position(s),
And terminal 1-2, 3-4, … from the left of codes.



B type … Screw side is up / down

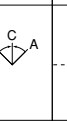


BH type … Screw side is right / left



■Notch code

Code	H	HB	HA	K	V	TB	TA	T	F
Notch configuration									
Operation	(90˚ - 2) 2 notches	(90˚ - 2) 2 notches	(90˚ - 2) 2 notches	(90˚ - 3) 3 notches	(90˚ - 4) 4 notches	(45˚ - 2) 2 notches	(45˚ - 2) 2 notches	(45˚ - 3) 3 notches	(45˚ - 4) 4 notches
	Manual return								

Code	E	G	J	O	B	A	S	TR、TL	FR、FL
Notch configuration									
Operation	(45˚ - 5) 5 notches	(45˚ - 6) 6 notches	(45˚ - 7) 7 notches	(45˚ - 8) 8 notches	(45˚ - 2) 2 notches	(45˚ - 2) 2 notches	(45˚ - 3) 3 notches	(45˚ - 3) 3 notches	(45˚ - 4) 4 notches
	Manual return				Automatic return			Combination of manual and automatic return	

Code	FS	303	305	306	307	308	309	310	311
Notch configuration									
Operation	(45˚ - 4) 4 notches	(30˚ - 3) 3 notches	(30˚ - 5) 5 notches	(30˚ - 6) 6 notches	(30˚ - 7) 7 notches	(30˚ - 8) 8 notches	(30˚ - 9) 9 notches	(30˚ - 10) 10 notches	(30˚ - 11) 11 notches
	Combination of manual and automatic return	Manual return							

Code	312	305S	307S	454S	454SR	455S
Notch configuration						
Operation	(30˚ - 12) 12 notches	(30˚ - 5) 5 notches	(30˚ - 7) 7 notches	(45˚ - 4) 4 notches	(45˚ - 4) 4 notches	(45˚ - 5) 5 notches
	Manual return	Automatic return				

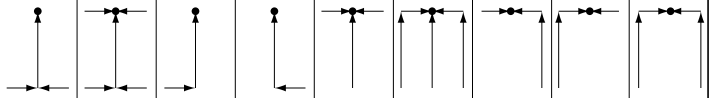
●CONTROL SWITCH

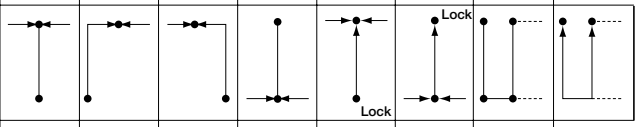


CAM-OPERATED SWITCH

B TYPE, BH TYPE

■Notch code

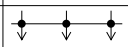
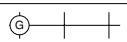
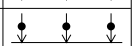
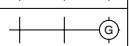
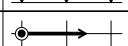
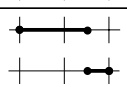
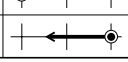
Code	SB	SBW	BB	AB	SQ	SQA	SQR	SQL	SQRL
Notch configuration									
Operation	Automatic rotating return								
	Automatic axial return								

Code	SR	SRL	SRR	SY	SN	SM	SUY□	SUB□
Notch configuration								
Operation	Automatic rotating return						Manual axial return	
	Manual axial return			Manual axial return	Automatic axial return		Manual axial return	Automatic axial return

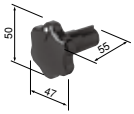
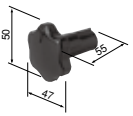
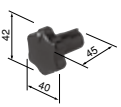
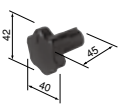
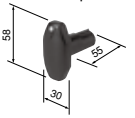
Code	HC	TC	FC	SC	HW	TW	FW	EW
Notch configuration	The handle is removable as in H, T, F, and S.				The stage is the dual body type as in H, T, F, and E.			
Operation	(90˚ – 2) 2 notches	(45˚ – 3) 3 notches	(45˚ – 4) 4 notches	(45˚ – 3) 3 notches	(90˚—2) 2 notches	(45˚ – 3) 3 notches	(45˚ – 4) 4 notches	(45˚ – 5) 5 notches
	Manual return			Automatic return	Manual return			

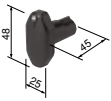
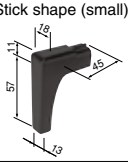
(Note) In the above table, the ● mark indicates the ordinary stop position of the switch and the → mark shows that the switch moves in this direction and then automatically stops in the arrowhead position.
●——● means that the switch is manually moved from ● to ●.

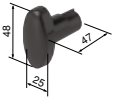
■Contact code

Code	Graphic symbol	Designation	Description	Code	Graphic symbol	Designation	Description
B、A T···V		Normal contact	B, A, T···V Closed in each notch position.	M		Continuous closing contact	Contacts close between left and center.
				N			Contacts close between right and center.
U		U (push) / L (pull)-contact	Contacts open after pulling	BX		Dual contacts (Gold plating)	Closed in the B notch position.
L			Contacts close after pulling	AX			Closed in the A notch position.
Y		Close keep contact	Contact closes after turning to the left and keep closed till turning to the right.	L		Over-lapping contact	Just before one contact closes (ON) the other contact opens during operation.
Z			Contact closes after turning to the right and keep closed till turning to the left.				

■Handle code

Code	LDP	LD	HDP	HD	LFP
Shape	Rose shape (large) with one point 	Rose shape (large) 	Rose shape (small) with one point 	Rose shape (small) 	Octagonal shape (large) with one point 

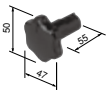
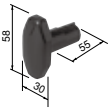
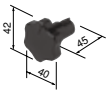
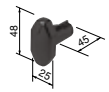
Code	LF	HFP	HF	LP	HP
Shape	Octagonal shape (large) 	Octagonal shape (small) with one point 	Octagonal shape (small) 	Stick shape (large) 	Stick shape (small) 

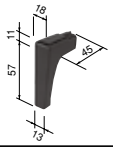
Code	MP	HR	LS*	LE	HE
Shape	Pistol shape (large) 	Pistol shape (small) 	Knob shape 	Egg shape (large) 	Egg shape (small) 

Code	HSP	USP
Shape	Beak shape (large) 	Beak shape (small) 

* The shaft for the LS handle is 13 mm shorter than the standard shaft.
Therefore, other types of handles cannot be replaced with the LS handle (knob shape).

■Handle code (For dual body type / pulling lock and pushing lock type)

Code	BD	BF	BP	MD	MF
Shape	Rose shape (large) 	Octagonal shape (large) 	Stick shape (large) 	Rose shape (small) 	Octagonal shape (small) 

Code	MQ	MR
Shape	Stick shape (small) 	Pistol shape (small) 



CAM-OPERATED SWITCH

B TYPE, BH TYPE

STANDARD SPECIFICATION SWITCHES

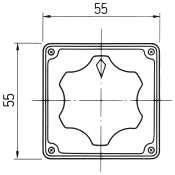
OUTLINES

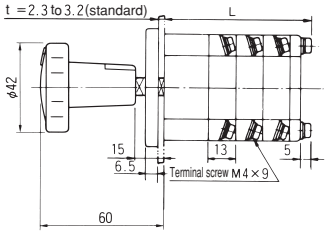
Manual return and automatic return type

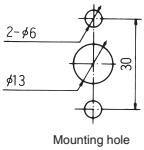
B-S,B,A,□ (H,K,V,T,F,E,G,J,O) (305,306,307,308)

∗ The BY type has the same dimensions and shape. (Unit color: Blue)

(B type)







Mounting hole

No. of units	1	2	3	4	5	6	7	8	9	10
L(mm)	43	56	69	82	95	108	121	134	147	160

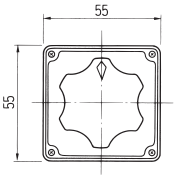
∗ Max unit No. of the Automatic return type is 6 (12 contacts).
∗ Max. 6 contacts for one side.

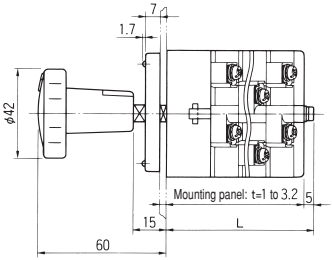
Manual return and automatic return type

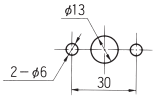
BH-S,B,A,□ (H,K,V,T,F,E,G,J,O) (305,306,307,308)

∗ The BHY type has the same dimensions and shape. (Unit color: Blue)

(BH type)







Mounting hole

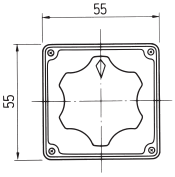
No. of units	1	2	3	4	5	6	7	8	9	10
L(mm)	43	56	69	82	95	108	121	134	147	160

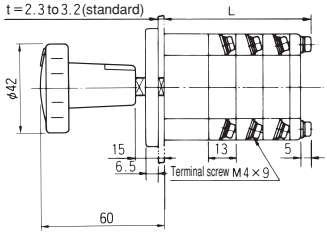
∗ Max unit No. of the Automatic return type is 6 (12 contacts).
∗ Max. 6 contacts for one side.

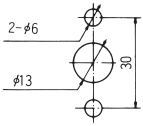
Combination of manual and automatic return type

B-TR,TL,FR,FL,FS

(B type)







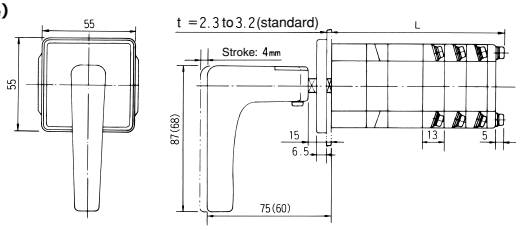
Mounting hole

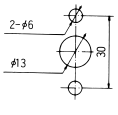
No. of units	1	2	3	4	5	6
L(mm)	43	56	69	82	95	108

Automatic return type by pulling

B-SB

(B type)





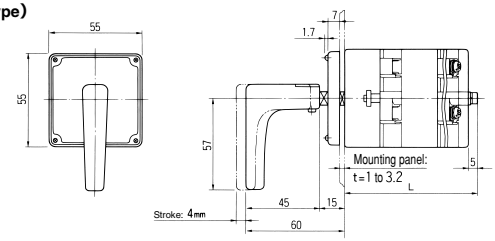
Mounting hole

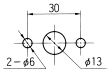
No. of units	1	2	3	4	5	6
L (mm)	77	90	103	116	129	142

Automatic return type by pulling

BHX-SB

(BH type)





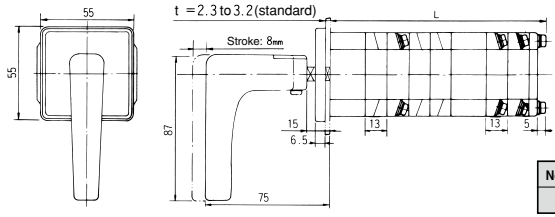
Mounting hole

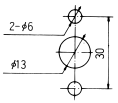
No. of units	1	2	3	4	5	6
L (mm)	77	90	103	116	129	142

Automatic or manual return type in axial direction

B-SQ,SR,SY

(B type)





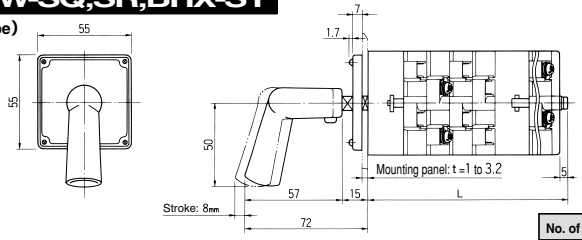
Mounting hole

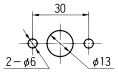
No. of units	2	3	4	5	6	7	8
L (mm)	116	129	142	155	168	181	194

Automatic return type by pulling and pushing

BHW-SQ,SR,BHX-SY

(BH type)





Mounting hole

No. of units	2	3	4	5	6	7	8
L (mm)	116	129	142	155	168	181	194

●CONTROL SWITCH



CAM-OPERATED SWITCH

B TYPE, BH TYPE

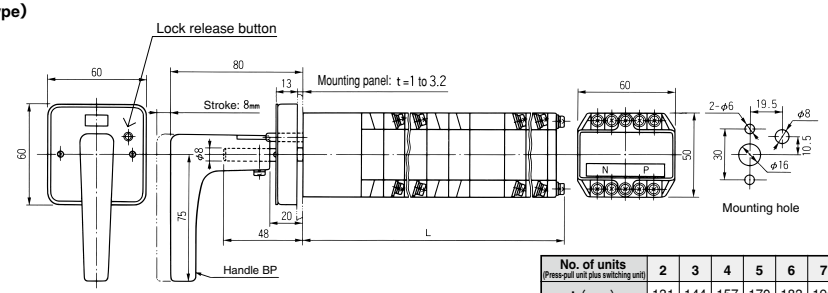
OUTLINES

Pulling lock and pushing lock type

B-SN,SM

∗ The handle returns to orepating position after pushing the lock release button.

(B type)



No. of units (Press-pull unit plus switching unit)	2	3	4	5	6	7	8
L (mm)	131	144	157	170	183	196	209

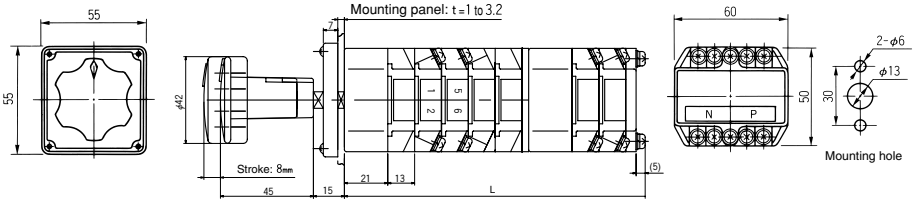
∗ The shaft shape is different from the basic one.
Please select a handle shape from page A6. (for pulling lock and pushing lock type)

Manual / Automatic axial return type

B-SUB□,SUY□ (H,HB,HA,K,V,TB / TA,T,F,E,G,J,O)

∗ A phrase in brackets insert to the blank.

(B type)



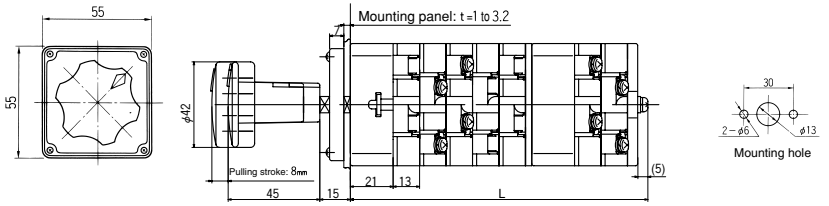
No. of units	2	3	4	5	6	7	8
L (mm)	119	132	145	158	171	184	197

Manual / Automatic axial return type

BHX-SUB□,SUY□ (H,HB,HA,K,V,TB / TA,T,F,E,G,J,O)

∗ A phrase in brackets insert to the blank.

(BH type)

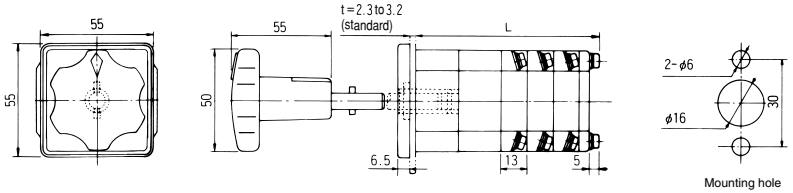


No. of units	2	3	4	5	6	7	8
L (mm)	119	132	145	158	171	184	197

Removable handle type

B-HC,TC,FC,SC

(B type)



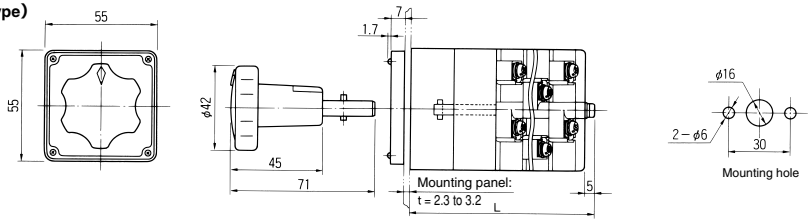
No. of units	1	2	3	4	5	6	7	8	9	10
L (mm)	64	77	90	103	116	129	142	155	168	181

∗ Max. unit No. of the automatic return type is 6 (12 contacts).

Removable handle type

BHK-HC,TC,FC,SC

(BH type)



No. of units	1	2	3	4	5	6	7	8	9	10
L (mm)	64	77	90	103	116	129	142	155	168	181

■Handle removal position

Removal position is selectable.
(More than one positions are available.)

HC	TC	FC	SC
B A	B A T	A T F B	C

■Key coding system (optional extra)

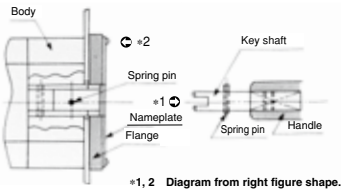
Key coding system is available as an option. Key combination numbers (KB1～4) are selectable, and same number combination of the handle and the body is operational.

Conbination diagram	Key shaft∗1				
	Body∗2				
Key conbination No.		KB1	KB2	KB3	KB4

Concave of key shaft
Convex of spring pin

When the keyshaft and body are muching, it's pasible to remove and insert of the key.

＜Cross-section view＞



∗1, 2 Diagram from right figure shape.



CAM-OPERATED SWITCH

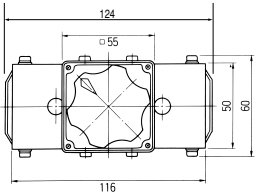
B TYPE, BH TYPE

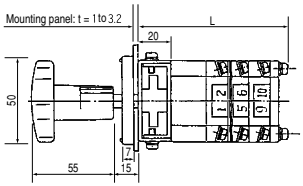
OUTLINES

Dual body type

B-HW,TW,FW,EW

(B type)





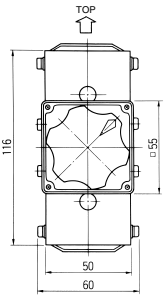


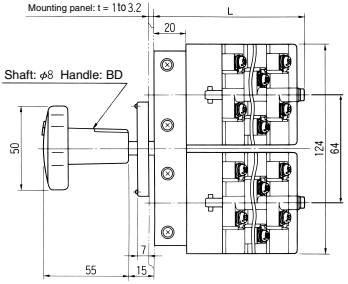
Mounting hole

Dual body type

BH-HW,TW,FW,EW

(BH type)







Mounting hole

No. of stages	1	2	3	4	5	6	7	8	9
L(mm)	63	76	89	102	115	128	141	154	167

∗ Please select a handle shape from page A6. (for dual body type)

SPECIAL SPECIFICATION SWITCH CODING FOR ORDERING

1 Key handle type

A key is used as the handle.

- Available notch : S, H, T, F, E
- Max. unit No. is 4. There are exceptions.
- C-88 and C-110 that made by Takigen is used. No. K6510 of C-88 is a standard key.
- Please see page A14 for information of key system.

1) C-88 key (Not available for master key system)

B-KMC-H2-2B2A-B NUKI B C-88 K6510

Code	Switch
B-KMC	B type
BHO	BH type

Notch code / No. of units / No. of contacts / Contact code / Color of handle / flange / Key lock position / Key type

C-88	Not available for master key system

Key No.

K6510 - K6520	Standard
*	Specified No.

2) C-110 key (Available for master key system)

B-KMC-H2-2B2A-B NUKI B C-110 (AAA111) FUJI13

Code	Switch
B-KMC	B type
BHO	BH type

Notch code / No. of units / No. of contacts / Contact code / Color of handle / flange / lock position / Key type

C-110	Available for master key system

*Master key No.

*	Specified No.

Key No. (change key)

*	Specified No.

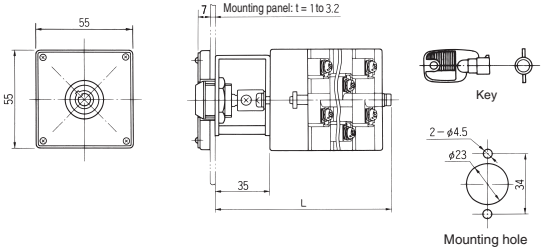
*Available character for master key No. / key No. (change key)

Max. number of character	Master key No.	Within 6 (7 for number only)
	Key No.	Within 7
Available character	Number (0 - 9), Alphabet (A - Z) *Blank is not available.	

OUTLINES

B-KMC

(B type) * The screw side is on the right/left in this type. In case of B type, it's generally on the up/down.



Key lock position

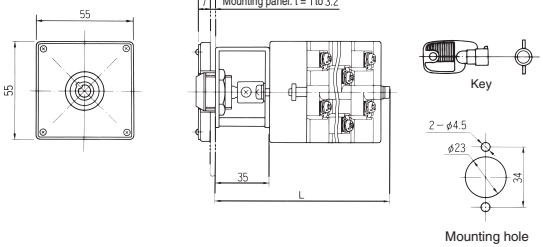
S	H	T	F	E
NUKI C	NUKI B NUKI A NUKI A NUKI B	NUKI B NUKI A NUKI T	NUKI A NUKI T NUKI F	NUKI A NUKI T NUKI F

The key is used to directly operate the switch. For the key, pleas see the specifications of the key. If the another key lock position is needed, please contact us.

* 「NUKI」means key lock position.

BHO

(BH type) * The mounting hole is on the vertical in this type. In case of BH type, it's generally on the horizontal.



No. of units	1	2	3	4
L (mm)	78	91	104	117

*The standard key is C-88 (Takigen). If the master key is needed, please request us. C-110 (Takigen) key is provided as a master key.

*Exclusive cover which a resin molded for the key also available. It cannot be install at a later time.



CAM-OPERATED SWITCH

B TYPE, BH TYPE

SPECIAL SPECIFICATION SWITCH CODING FOR ORDERING

2 Cylinder key type

Locked with an insert key. To open / close the switch, unlock the key and then operate the handle.

●Available notch : S, H, T, F, E, K, W, and SB.
●Max. unit No. is 10. There are exceptions.
●C-88 and C-110 that made by Takigen is used. No. K6510 of C-88 is a standard key.
●Please see page A14 for information of key system.

1) C-88 key (Not available for master key system)

B-KM-H2-2B2A-LD-B NUKI B C-88 K6510

Notch code / No. of units / Contact code / Handle code / Color of handle / flange / Key lock position / Key type / Key No.

Code	Switch	Key position
B-KM	B type	Right
BHC	BH type	Bottom

No. of contacts

Key type	
C-88	Not available for master key system

Key No.	
K6510 - K6520	Standard
*	Specified No.

2) C-110 key (Available for master key system)

B-KM-H2-2B2A-LD-B NUKI B C-110 (AAA111) FUJI13

Notch code / No. of units / Contact code / Handle code / Color of handle / flange / Key lock position / Key type / *Master key No. / Key No. (change key)

Code	Switch	Key position
B-KM	B type	Right
BHC	BH type	Bottom

No. of contacts

Key type	
C-110	Not available for master key system

*Master key No.	
*	Specified No.

Key No. (change key)	
*	Specified No.

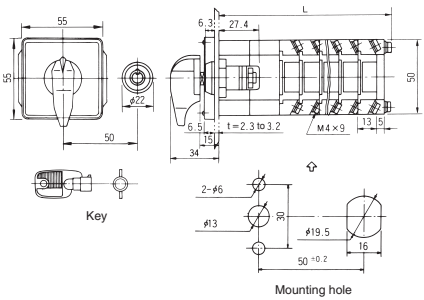
*Available character for master key No. / key No. (change key)

Max. number of character	Master key No.	Within 6 (7 for number only)
	Key No.	Within 7
Available character	Number (0 - 7), Alphabet (A - Z) *Blank is not available.	

OUTLINES

B-KM

(B type)

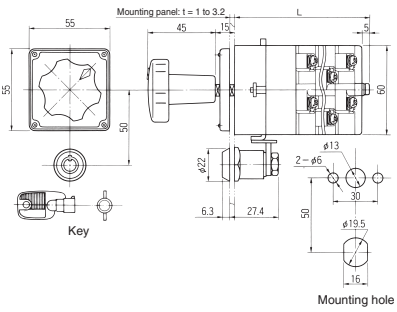


Key lock position

S/SB	H	T	F	E	K
NUKI C	NUKI BA / NUKI B NUKI A	NUKI BA NUKI BT NUKI AT NUKI BAT / NUKI B NUKI A NUKI T	NUKI BATF	NUKI BATFE	NUKI DPK

BHC

(BH type)



Key lock position

Normaly, the key removal position is upside.

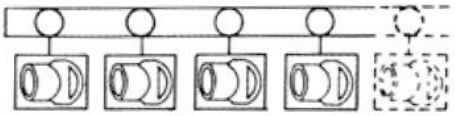
No. of units	1	2	3	4	5	6	7	8
L (mm)	64	77	90	103	116	129	142	155

*The standard key is C-88 (Takigen). If the master key is needed, please request us. C-110 (Takigen) key is provided as a master key.
*Exclusive cover which a resin molded for the key also available. It cannot be install at a later time.

KEY SYSTEM

■C-88 type

〔Master key is disused〕

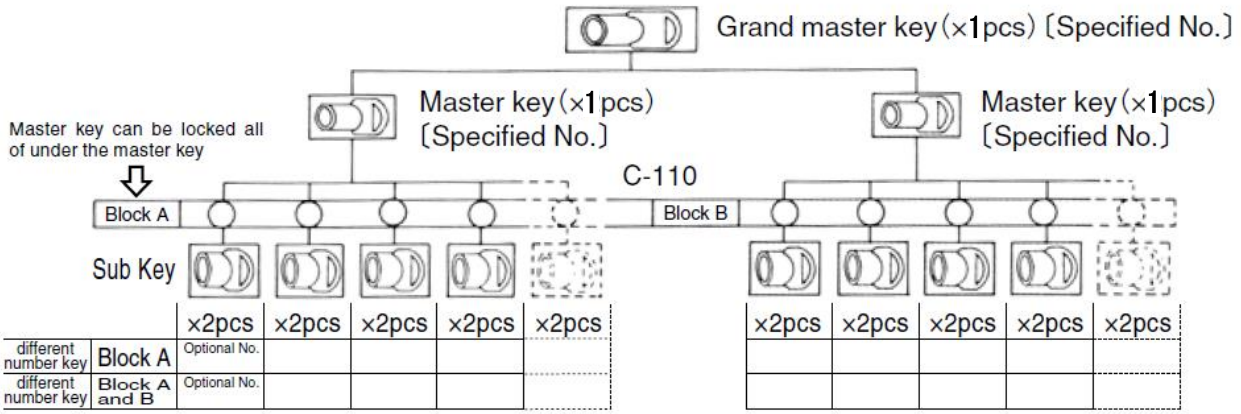


			×2pcs	×2pcs	×2pcs	×2pcs	×2pcs
same number key	K6510 only	10type 1 type	K6510	K6510	K6510	K6510	----------
different number key	K6511 to K6520		K6511	K6512	K6513	K6514	----------

●Special character keys also available. Please see "Available character for key No."

■C-110 type

〔Master key is needed〕



			×2pcs	×2pcs	×2pcs	×2pcs	×2pcs	×2pcs	×2pcs	×2pcs	×2pcs	×2pcs
different number key	Block A	Optional No.										
different number key	Block A and B	Optional No.										

●Key will be decided depends on a decision that a common use with door lock or the master key is needed or not.

●In the case of C-110, if the master key specified No. and sub key specified No. are selected, the master key can be possible to lock the sub key.

●It's not available to make an additional subkey, becase of the relationship between masterkey and subkey are already decided at the stage at manufacture.

●Life time of the key is 10,000 times. (Insertion - Extraction)

■Available character for master key No. / key No. (change key)

Max. number of character	Master key No.	6 (7 for number only)
	Key No.	7
Available character	Number (0 - 9), Alphabet (A - Z) Blank is not available.	

●CONTROL SWITCH



CAM-OPERATED SWITCH

B TYPE, BH TYPE

SPECIAL SPECIFICATION SWITCH CODING FOR ORDERING

3 **Switch with padlock mechanism**

Locked with a padlock. To open / close the switch, unlock the padlock and then open / close the key while pushing or pulling the unlocking lever.

B-KH-H2-2B2A-LD-B NUKI B

Code	Switch	Unlocking lever type
B-KH	B type	Pushing type
BHP	BH type	Pulling type

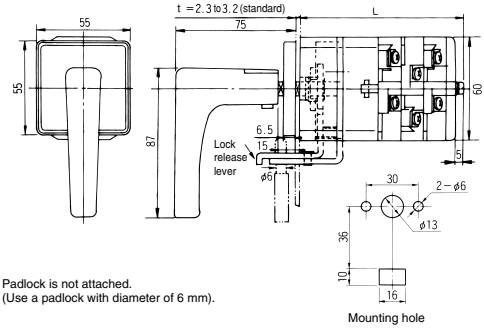
Notch code
No. of units
No. of contacts
Contact code
Handle code
Color of handle / flange
Key lock position

●Available notch : S, H, T, F, and SB.
●Max. unit No. is 10.
●Normaly a padlock is attached to the down side of the switch.
●Padlock is not attached.
●Please use a padlock with diameter of 6 mm.

OUTLINES

B-KH

(B type) ＊ The screw side is on the right/left, and the mounting hole is on the horizontal in this type.
In case of B type, generally the screw side is on the up/down, and the mounting hole is on the vertical.



Mounting hole

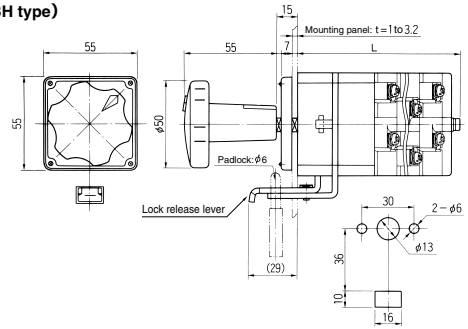
＊ Padlock is not attached.
(Use a padlock with diameter of 6 mm).

Key lock position

S	H	T	F	E	K
NUKI C	NUKI BA NUKI B NUKI A	NUKI BA NUKI BT NUKI AT NUKI BAT NUKI B NUKI A NUKI T	NUKI BATF	NUKI BATFE	NUKI DPK

BHP

(BH type)



Mounting hole

＊ Padlock is not attached.
(Use a padlock with diameter of 6 mm).

○Remove the padlock and push the lock release lever for handle operation. The switch will be locked automatically after releasing your hand, then please lock with a padlock.

No. of units	1	2	3	4	5	6	7	8
L (mm)	67	80	93	106	119	132	145	158

4 High-frequent type switch

This cam switch is designed for high-frequent heavy-duty uses, in iron manufacture and chemical plants, etc.

BM-H2-2B2A-LD-B

Notch code
No. of contacts
Contact code
Handle
Color of handle / flange
No. of units

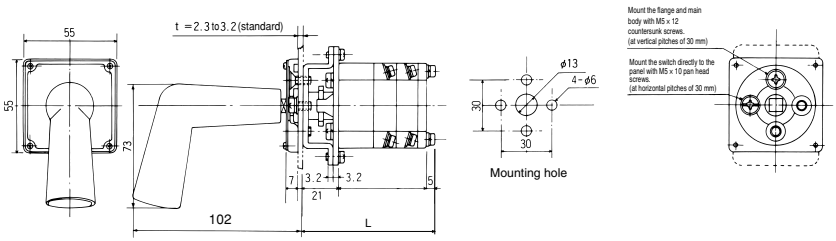
Code	Switch
BM	B type
BHM	BH type

- Available notch : S, H, T, F, and SB. The 30° version is also available.
- High-frequent operation type.
- Please specify if you need the oil-proof type. In the case of oil-proof type, PBT resin is used for the case.

OUTLINES

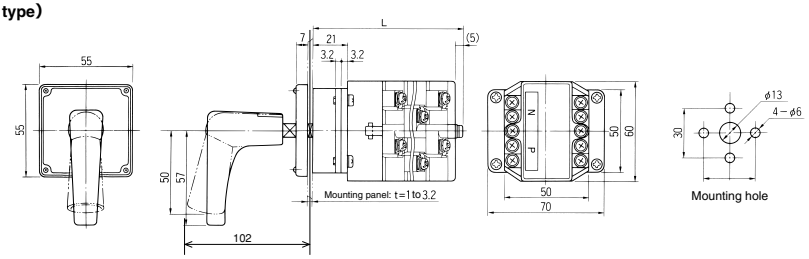
BM

(B type)



BHM

(BH type)



No. of units	1	2	3	4	5	6	7	8	9
L (mm)	65	78	91	104	117	130	143	156	167

●CONTROL SWITCH



CAM-OPERATED SWITCH

B TYPE, BH TYPE

SPECIAL SPECIFICATION SWITCH CODING FOR ORDERING

5 **Switch with indicator lamp (separate)**

This is a switch that an indicator lamp is attached on top.
An indicator mounting hole is additionally required.

Part of lamp display

BL-H2-2B2A-215-LD-B

Notch code

Code	Switch
BL	B type
BHI	BH type

No. of contacts
Contact code
No. of units
Circuit
Voltage
Display color
Handle code
Color of handle / flange

●The notches and specification are the same as those of the standard switches.

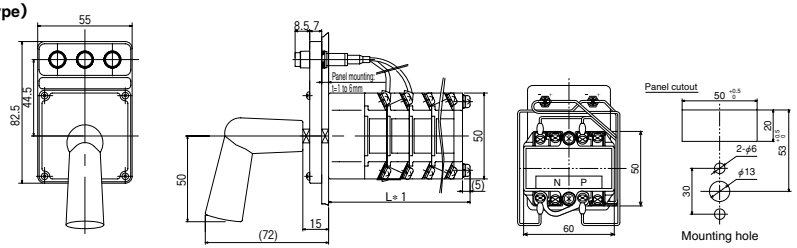
●For the circuit, voltage, and display color of the indicator, please see the following table and specify the corresponding numbers.

Circuit		Voltage		Display color	
1	For 1 indicator lamp	1	24V DC	1	W (Milky white)
2	For 2 indicator lamps	2	48V DC	2	R (Red)
3	For 3 indicator lamps	3	100 / 110V DC	3	G (Green)
		4	125V DC	4	O (Orange)
		5	100 / 110V AC	5	GR
		6	200 / 220V AC	6	GWR
		7	30V DC	7	GOR
9	Special	9	Special	9	Special

OUTLINES

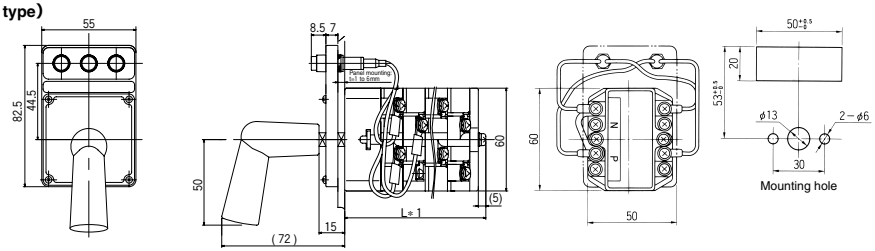
BL

(B type)



BHI

(BH type)



No. of units		1	2	3	4	5	6	7	8	9	10
L(mm)	For 1 indicator	56	69	82	95	108	121	134	147	160	173
L(mm)	For 2 indicators										
L(mm)	For 3 indicators	69	82	95	108	121	134	147	160	173	186

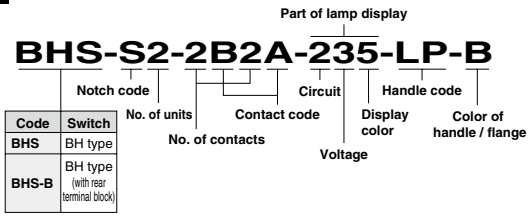
∗ The lamp power supply unit is not included in the above number of units.

●Lamp position

1 lamp ○
2 lamps ○ ○
3 lamps ○ ○ ○

6 Switch with indicator lamp (built-in)

This is a switch that a signal indicator is attached on top.



Code	Switch
BHS	BH type
BHS-B	BH type (with rear terminal block)

●Available notch: S, H, T, F and SB, SR, SY also available.

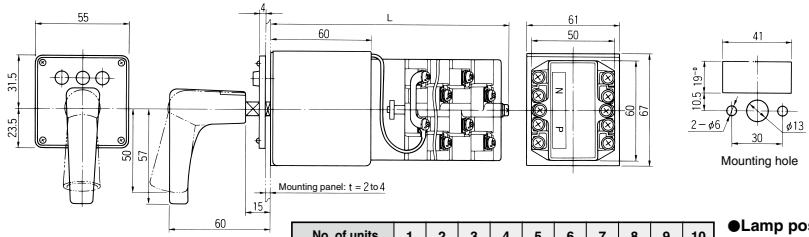
●For the circuit, voltage, and display color of the indicator lamp, please see the following table and specify the corresponding numbers.

Circuit		Voltage		Display color	
1	For 1 indicator lamp	1	24V DC	1	W (Milky white)
2	For 2 indicator lamps	2	48V DC	2	R (Red)
3	For 3 indicator lamps	3	100 / 110V DC	3	G (Green)
		4	125V DC	4	O (Orange)
		5	100 / 110V AC	5	GR
		6	200 / 220V AC	6	GWR
		7	30V DC	7	GOR
9	Special	9	Special	9	Special

OUTLINES

BHS

(BH type)



No. of units		1	2	3	4	5	6	7	8	9	10
L (mm)	For 1 indicator	116	129	142	155	168	181	194	207	220	233
L (mm)	For 2 indicators	129	142	155	168	181	194	207	220	233	246
L (mm)	For 3 indicators	142	155	168	181	194	207	220	233	246	259

●Lamp position

1 lamp 

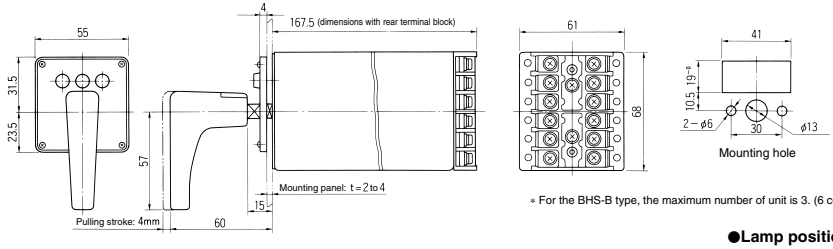
2 lamps 

3 lamps 

With indicator lamp (built-in) and rear terminal block type

BHS-B

(BH type)



∗ For the BHS-B type, the maximum number of unit is 3. (6 contacts)

●Lamp position

1 lamp 

2 lamps 

3 lamps 

●CONTROL SWITCH



CAM-OPERATED SWITCH

B TYPE, BH TYPE

SPECIAL SPECIFICATION SWITCH CODING FOR ORDERING

7 **Lockout relay switch (Coil type)**

●Max. unit No. is 8.

●Please see page A55 for the operation time.

BA-6 2A2B-DC24V-LP-B

Handle code / Color of handle / flange

Code	Switch
BA-6	B type
BHE	BH type

No. of contacts / Contact code

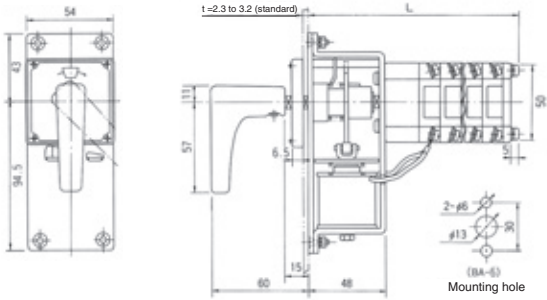
Code	Operation voltage	Code	Operation voltage
DC24V	24V DC	DC220V	200 / 220V DC
DC48V	48V DC	AC110V	100 / 110V AC
DC110V	100 / 110V DC	AC220V	200 / 220V AC
DC125V	125V DC		

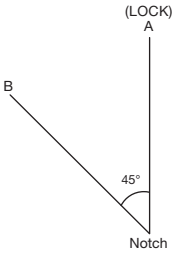
Circuit voltage	24V DC	48V DC	100 / 110V DC	125V DC	200 / 220V DC
Coil resistance	5.3Ω	25Ω	55Ω	80Ω	350Ω

OUTLINES

BA-6

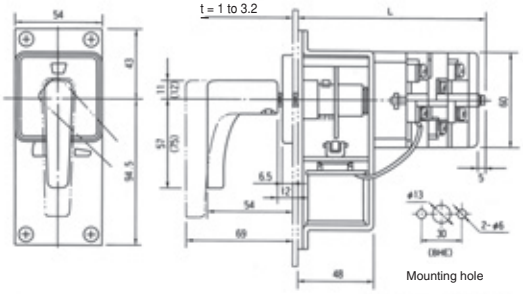
(B type)

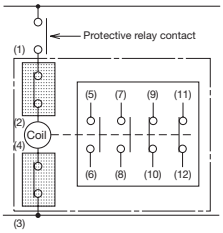




BHE

(BH type)





No. of units	1	2	3	4	5	6	7	8
L (mm)	104	117	130	143	156	169	182	195

⚠ Caution Reset operation on existence of external signal to coil is prohibited. This may cause severe malfunction. (Ex. Coil burnout)

8 Lockout relay switch (Solenoid type)

- Max unit No. is 10.
- High speed operation type.
- 10 types of coils are available.

B-MR-2001-B-LP B

Contact arrangement | Handle code | Color of handle / flange

Code	Operation method
MR	Manual reset

Code	Switch
B	B type
BH	BH type

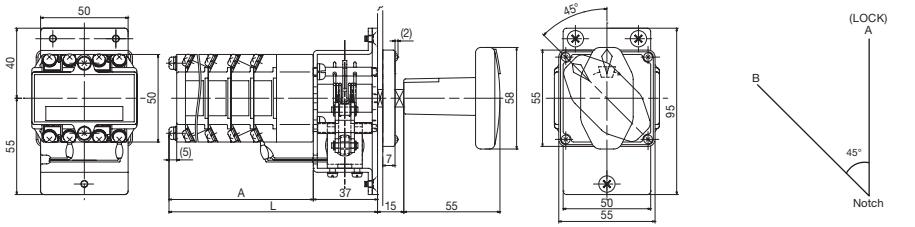
Code	Operation voltage	Code	Operation voltage
A	24V DC	F	200 / 220V AC
B	100 / 110V DC	G	48V DC
C	125V DC	H	125V DC
D	200 / 220V DC	I	100 / 110V AC・DC
E	100 / 110V AC	J	200 / 220V AC・DC

Coil code	A	B	C	D	E	F	G	H	I	J
Coil resistance	3.3Ω	16.5Ω	27Ω	60Ω	16.5Ω	60Ω	13Ω	75Ω	60Ω	240Ω

OUTLINES

B-MR

(B type)

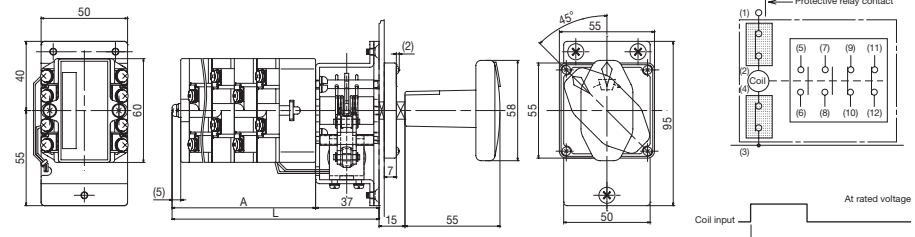


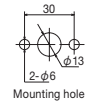


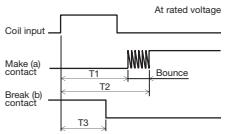
Operating time	Make contact operation time		Break contact operation time
	T1	T2	T3
	8ms or less	16ms or less	8ms or less

BH-MR

(BH type)







No. of units	2	3	4	5	6	7	8	9	10
A (mm)	57	70	83	96	109	122	135	148	161
L (mm)	94	107	120	133	146	159	172	185	198

⚠ Caution Reset operation on existence of external signal to coil is prohibited. This may cause severe malfunction. (Ex. Coil burnout)



CAM-OPERATED SWITCH

B TYPE, BH TYPE

SPECIAL SPECIFICATION SWITCH CODING FOR ORDERING

9 **Minute current switch (BY)**

This switch is used in the applications requiring environmental resistance or using minute electric current.

BY-H2-2BX2AX-LD-B

Code	Switch
BY	B type
BHY	BH type

- Notch code
- No. of units
- No. of contacts
- Contact of minute current switch (Ends with "X")
- Handle code
- Color of handle / flange

∗ Outline is same as standard B / BH type.

●For the specification, please see technical data on A56.
●The notches are the same as those of the standard switches.
●For a contact, X is added to the standard contact symbol like AX.
●This switch can be assembled within a switch with standard contacts. However the units for the contacts of the minute current is exchisive unit.

Ex.) BY-H2-2BX2A
Standard contact
Minute current contact

●In case of lapping contact, L (Minute current lapping contact) is added after X (Minute current contact).

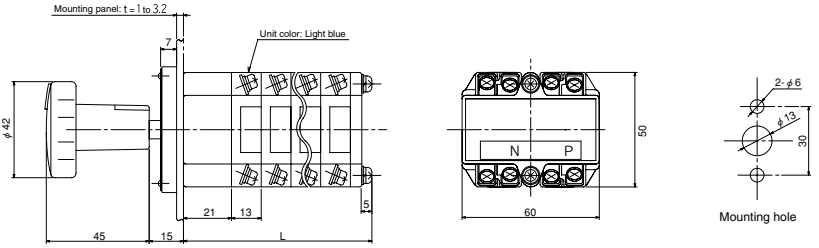
Ex.) BY-H2-2BXL2A
Standard contact
Minute current lapping contact

●Minute current contact is applicable to other standard products.

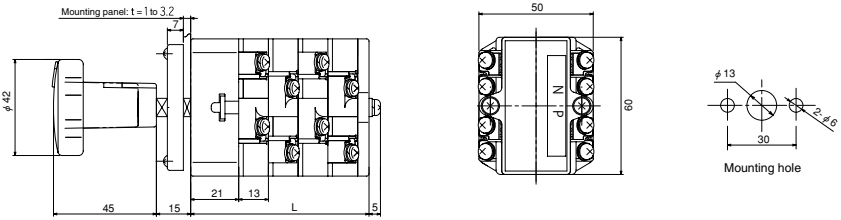
Ex.) BHY-H2-2BX2AX

OUTLINES

BY



BHY



10 Rear terminal type switch

Since the terminal part is arranged to the rear side, it's possible to use the space effectively.

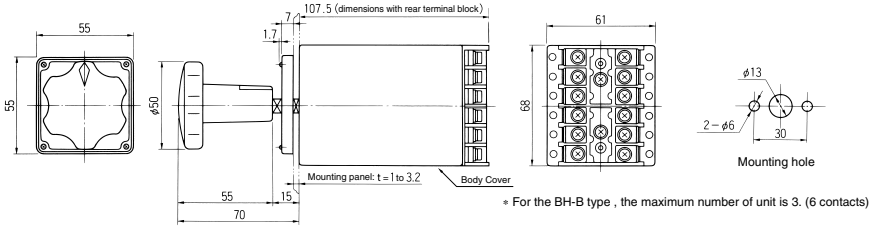
●It's possible to chose any notches except pull (push) type.

BH-B-H2-2B2A-LD-B

- Basic type
- Notch code
- No. of units
- No. of contacts
- Contact code
- Handle code
- Color of handle / flange

OUTLINES

BH-B



∗ For the BH-B type , the maximum number of unit is 3. (6 contacts)

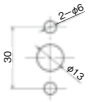
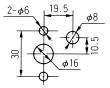
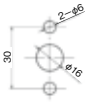
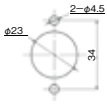
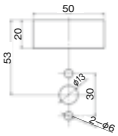


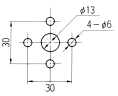
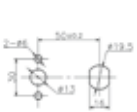
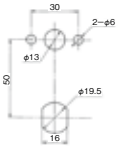
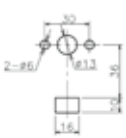
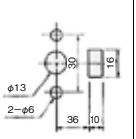
CAM-OPERATED SWITCH

B TYPE, BH TYPE

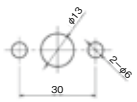
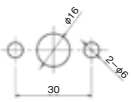
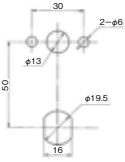
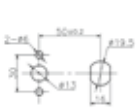
MOUNTING HOLE DIMENSIONS

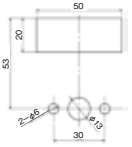
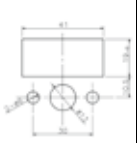
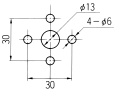
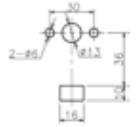
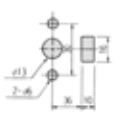
B TYPE

B		B-SN、SM	B-HC、TC、FC、SC	B-KMC	BL
H.T Manual return S Automatic return SB SQ Pushing and pulling W Dual body type BA-6 Lockout relay					
Mounting screw	M5×12 countersunk screws: 2	M5×12 countersunk screws: 2	M5×12 countersunk screws: 2	M4×12 countersunk screws: 2	M5×10 countersunk screws: 2

B-KM		B-KH		BM	
Key: right	Key: bottom	Key: bottom	Key: right	H.T Manual return S Automatic return SB Pushing	
					
M5×12 countersunk screws: 2	M5×10 countersunk screws: 2	M5×12 countersunk screws: 2	M5×10 countersunk screws: 2	M5×10 pan head screws: 2 M5×12 countersunk screws: 2	

BH TYPE

BH		BHK	BHO	BHC	
H.T Manual return S Automatic return SB SQ Pushing and pulling W Dual body type BHE Lockout relay				Key: bottom 	Key: right 
Mounting screw	M5×10 countersunk screws: 2	M5×12 countersunk screws: 2	M4×12 countersunk screws: 2	M5×10 countersunk screws: 2	

BHP		BHI	BHS、BHSB	BHM	
Key: bottom	Key: right			H.T Manual return S Automatic return SB Pushing	
					
M5×10 countersunk screws: 2		M5×10 countersunk screws: 2	M5×12 countersunk screws: 2	M5×10 pan head screws: 2 M5×10 countersunk screws: 2	

INSTRUCTIONS FOR CONTACT ARRANGEMENT DIAGRAM

1 Graphic symbol

Contact type	Symbol
Normal contact	
Close keep contact	
Continuous closing contact	
Over lapping contact	

Operation	Symbol
Manual return (rotating direction)	Not indicated
Manual return (axial direction)	
Auto return (to neutral position)	
Auto return (axial direction)	

2 Development representation method

Contact arrangement diagrams should be viewed from the panel surface with the handle positioned below.
Vertical line shows notch positions, and horizontal line shows conected circuits with terminal numbers. To enter the contact symbols, follow the order of terminal numbers starting with the front stage.

Fig. 1 T2-1B1AT1BAL1TL

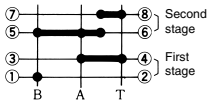


Fig. 1 shows the 45-degree, 3-stage switching type.
- Terminal 1-2 is closed at the B notch.
- Terminal 3-4 is continuously closed at the A and T notches.
- Terminals 5-6 and 7-8 are simultaneously closed (overlapping) in the middle between the A and T notches.

Fig. 2 SBZ3-1Y1Z1M1N1C1A

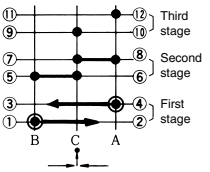


Fig. 2 shows the automatic return type by pulling. The handle can be pulled at the central position, and it returns to the central position after releasing the handle.
- Terminal 1-2 is closed at the B notch. Even if it returns to the central position, it remains closed. It is opened at the A notch.
- Terminal 3-4 is closed at the A notch. Even if it returns to the central position, it remains closed. It is opened at the B notch.
- Terminal 5-6 is opened at the A notch.
- Terminal 7-8 is opened at the B notch.
- Terminal 9-10 is closed at the C notch.
- Terminal 11-12 is closed at the A notch.

3 Notes on diagrammatic representation

1. When the rotational angle of the handle is less than 180 degrees

(When the rotational angle of the notch is 45 degrees)

When the total number of contacts is even (number of units) = $\frac{\text{(total number of contacts)}}{2}$

When the total number of contacts is odd (number of units) = $\frac{\text{(total number of contacts)+1}}{2}$

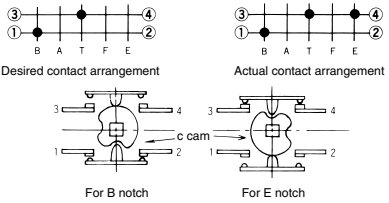
■Number of stages

Each units has 2 contacts. This means that the number of units is half of the total number of contacts.
However, if the handle is turned by 180 degrees or more, each units may not be includes 2 contacts.

2. When the rotational angle of the handle is 180 degrees or more

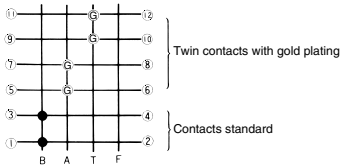
(5 notches at 45 degrees, 3 notches at 90 degrees or more)

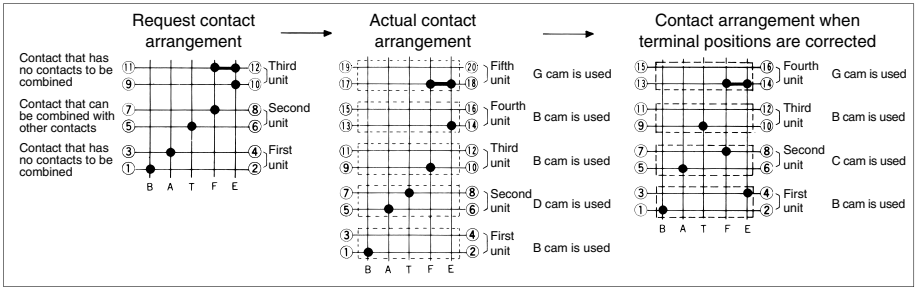
A single cam actuates 2 contacts, upper and lower side. Therefore, when the cam is rotated by 180 degrees or more, its concavity to close either contact may also close the other contact. In this case, the upper and lower contacts cannot be combined freely.



3. Contact diagram of BY type arrangement (example)

F3-2B2AX2TX



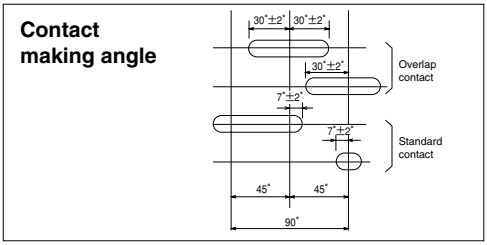


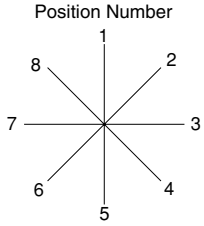


CAM-OPERATED SWITCH

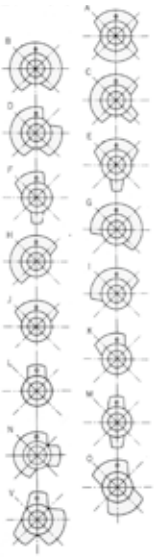
B TYPE, BH TYPE

CONTACT ARRANGEMENT DIAGRAM FOR B AND BH TYPE CAM SWITCHES

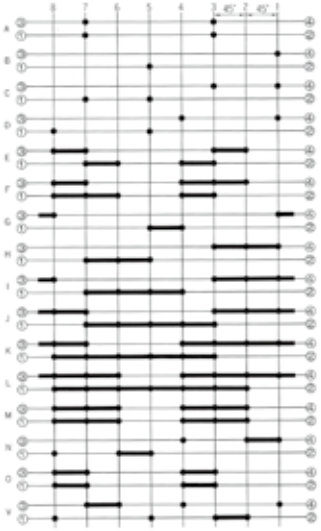




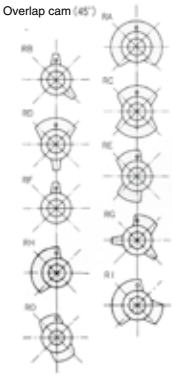
Standard cam (45 degrees)



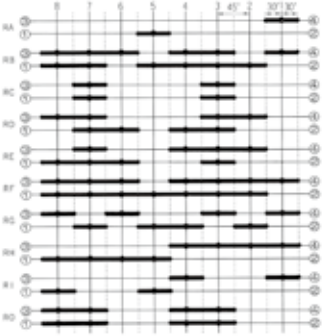
Set Position No.

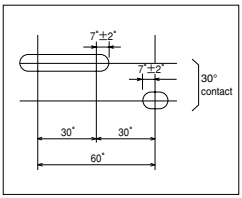


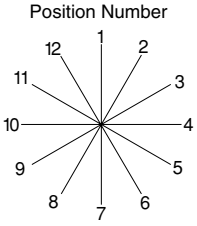
Overlap cam (45 degrees)



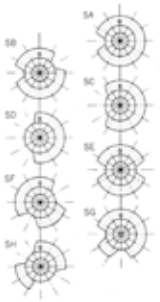
Set Position No.



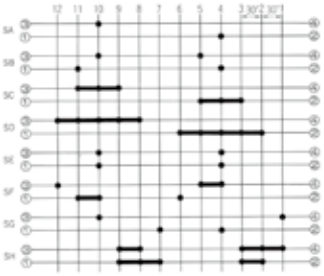




30-degrees cam



Set Position No.



●CONTROL SWITCH



CAM-OPERATED SWITCH

B TYPE, BH TYPE

VOLTMETER • AMMETER SWITCH

HOW TO ORDER

B-V3-HDP-B JUMPER

Code	Switch
B	B type
BH	BH type

Type (page A27 to 30)

Handle code (page A6)

Color of handle / flange

Code	Jumper
(Blank)	No jumper
JUMPER	With jumper

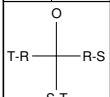
∗ The mark " ⌒ " shows a jumper.

STANDARD ARRANGEMENT DIAGRAM

Notice: Jumpers are not standard accessory.
If it's necessary, please instruct "with jumper".

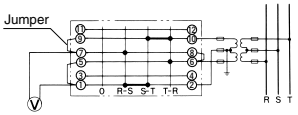
a) For voltmeter (standard handle: HDP)

Type V3



Nameplate No. 54-753 (E)

3-phase, 3-wire, 2-PT

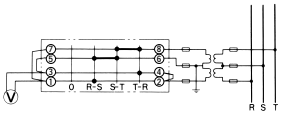


Type V2

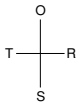


Nameplate No. 54-490 (E)

3-phase, 3-wire, 2-PT

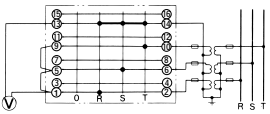


Type NV4



Nameplate No. 54-752

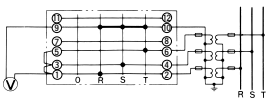
3-phase, 3-wire, 3-PT



Type NV3



3-phase, 3-wire, 3-PT

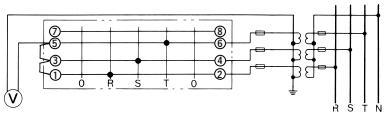


Type NV2E



Nameplate No. 54-558

3-phase, 4-wire, 3-PT



∗ If added "E" to the end of nameplate number, the nameplate in English shall be attached. For futher details, please see page A51 to A52 for nameplate.
Ex) 54-753 : Japanese 54-753E : English

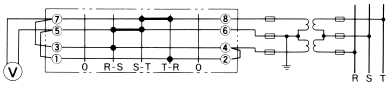
a) For voltmeter (standard handle: HDP)

Type V2E

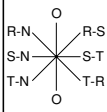


Nameplate No. 54-557 (E)

3-phase, 3-wire, 2-PT

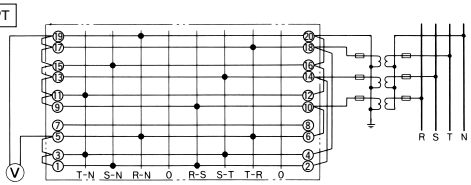


Type V5W

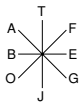


Nameplate No. 54-850 (E)

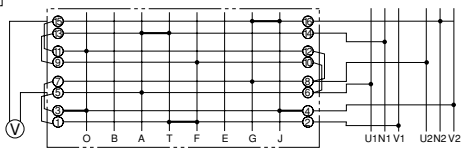
3-phase, 4-wire, 3-PT



Type V4O-2

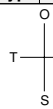


single 3-wire, 2-PT



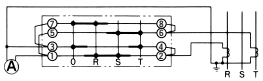
b) For ammeter (standard handle: HDP)

Type A2



Nameplate No. 54-755 (E)

3-phase, 3-wire, 2-CT

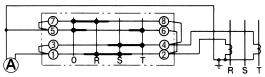


Type C2

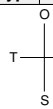


Nameplate No. 54-495 (E)

3-phase, 3-wire, 2-CT

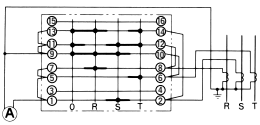


Type A4



Nameplate No. 54-755 (E)

3-phase, 3-wire, 3-CT



∗ For details of nameplates, see A51 to A52 and subsequent pages.



CAM-OPERATED SWITCH

B TYPE, BH TYPE

STANDARD ARRANGEMENT DIAGRAM

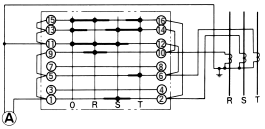
b) For ammeter (standard handle: HDP)

Type C4

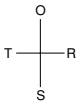


Nameplate No. 54-495 (E)

3-phase, 3-wire, 3-CT

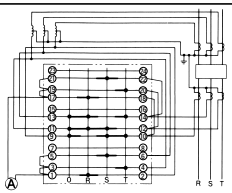


Type A6



Nameplate No. 54-755 (E)

3-phase, 3-wire, 3-CT (when differential relay is used)

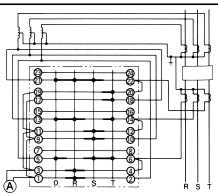


Type C6



Nameplate No. 54-495 (E)

3-phase, 3-wire, 3-CT (when differential relay is used)

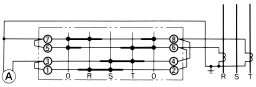


Type C2E



Nameplate No. 54-555 (E)

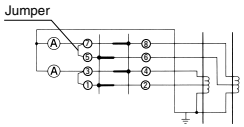
3-phase, 3-wire, 2-CT



Type C2H



for change ratio of current transformation

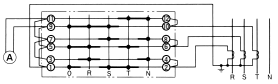


Type C3E



Nameplate No. 54-556 (E)

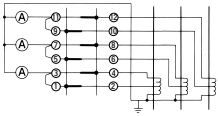
3-phase, 4-wire, 3-CT



Type C3HT



for change ratio of current transformation



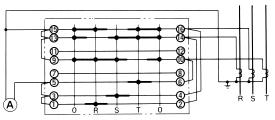
∗ If added "E" to the end of nameplate number, the nameplate in English shall be attached. For futher details, please see page A51 to A52 for nameplate.
Ex) 54-753 : Japanese 54-753E : English

Type C4E



Nameplate No.
54-555 (E)

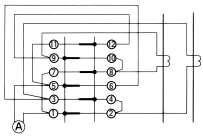
3-phase, 3-wire, 3-CT



Type C3HA



single-phase, 2-line

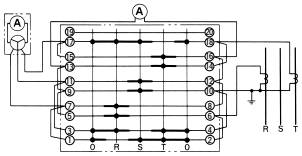


Type C5E



Nameplate No.
54-555 (E)

3-phase, 3-wire, 2-CT

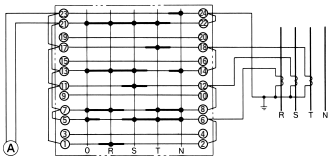


Type C6E



Nameplate No.
54-556 (E)

3-phase, 4-wire, 3-CT

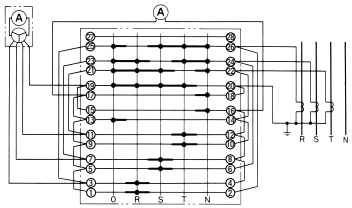


Type C7E

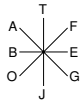


Nameplate No.
54-556 (E)

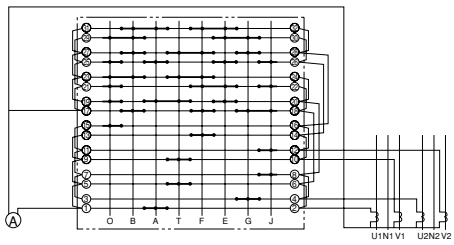
3-phase, 4-wire, 3-CT



Type C8O-2



single 3-wire, 2-CT



∗ For details of nameplates, see A51 to A52 and subsequent pages.

●CONTROL SWITCH



CAM-OPERATED SWITCH

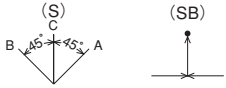
B TYPE, BH TYPE

CONTACT ARRANGEMENT DIAGRAM INDEX

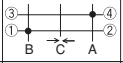
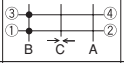
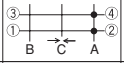
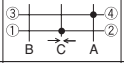
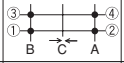
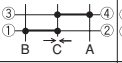
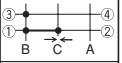
Operation	Notch code	Contact number	Page	Operation	Notch code	Contact number	Page
Automatic return	S,SB	2,4,6,8	A31 to 32	45° 3-position changeover	T	2,4,6,8,10,12,14,16,18,20,24,28	A41 to 45
Automatic return (45 degree operation)	B,A	2,4	A33	45° 4-position changeover	F	4,6,8,10,12	A45 to 46
Automatic return with close keep contact	SZ	4,6,8	A33	45° 5-position changeover	E	4,6,8,10,12,14,16,24,30,32	A46 to 48
Automatic return type by pulling and pushing	SQ	4,6,8	A33	45° 6-position changeover	G	6	A48
90° 2-position changeover	H	2,4,6,8,10,12,14,16,18,20,24,26,28,30,32	A34 to 40				

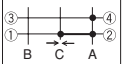
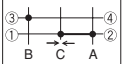
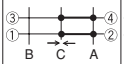
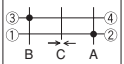
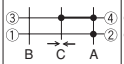
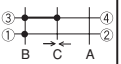
CONTACT ARRANGEMENT DIAGRAM

■Automatic return (S, SB)

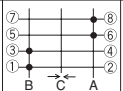
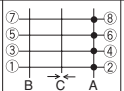
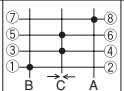
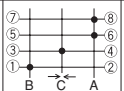
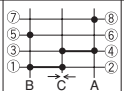
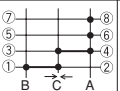
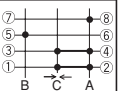


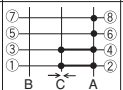
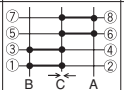
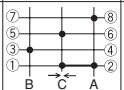
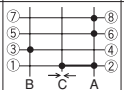
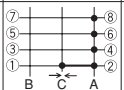
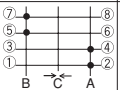
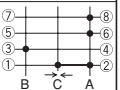
●2 contacts (1 unit)

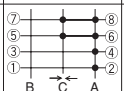
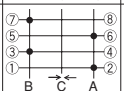
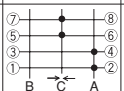
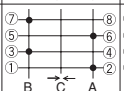
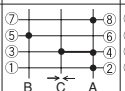
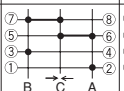
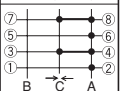
Type (automatic return)	S1001	S1002	S1003	S1004	S1005	S1006	S1007
Detail	S1-1B1A	S1-2B	S1-2A	S1-1C1A	S1-2BA	S1-1M1N	S1-1M1B
Contact arrangement							
Type (pulling)	SB1001	SB1002	SB1003	SB1004	SB1005	SB1006	SB1007

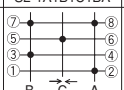
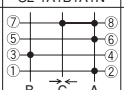
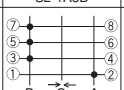
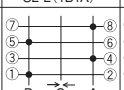
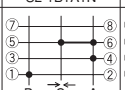
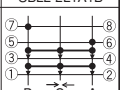
Type (automatic return)	S1008	S1009	S1010	S1101	S1102	S1103
Detail	S1-1N1A	S1-1N1B	S1-2N	S1-1A1B	S1-1A1N	S1-1B1M
Contact arrangement						
Type (pulling)	SB1008	SB1009	SB1010	SB1101	SB1102	SB1103

●4 contacts (2 units)

Type (automatic return)	S2001	S2002	S2003	S2004	S2005	S2006	S2007
Detail	S2-2B2A	S2-4A	S2-1B2C1A	S2-1B1C2A	S2-1M1N1B1A	S2-1M1N2A	S2-2N1B1A
Contact arrangement							
Type (pulling)	SB2001	SB2002	SB2003	SB2004	SB2005	SB2006	SB2007

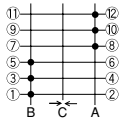
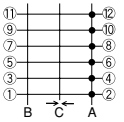
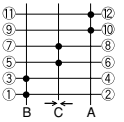
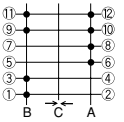
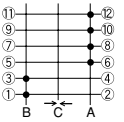
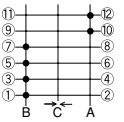
Type (automatic return)	S2008	S2009	S2010	S2011	S2012	S2101	—
Detail	S2-2N2A	S2-2M2N	S2-1N1B1C1A	S2-1N1B2A	S2-1N3A	S2-2A2B	SB2-1N1B2A
Contact arrangement							
Type (pulling)	SB2008	SB2009	SB2010	SB2011	SB2012	—	SB2101

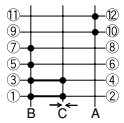
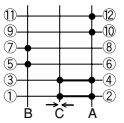
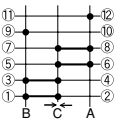
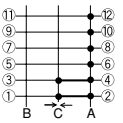
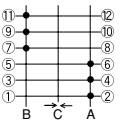
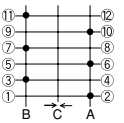
Type (automatic return)	S2102	—	S2103	S2104	S2105	S2106	S2107
Detail	S2-2A2N	SB2-2(1A1B)	S2-2A2C	S2-2(1A1B)	S2-1A1N1B1A	S2-1A1B1N1M	S2-2(1A1N)
Contact arrangement							
Type (pulling)	—	SB2102	SB2103	SB2104	SB2105	SB2106	SB2107

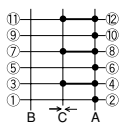
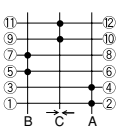
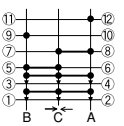
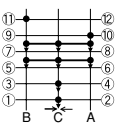
Type (automatic return)	S2108	S2109	S2110	S2111	S2120	—
Detail	S2-1A1B1C1BA	S2-1A1B1A1N	S2-1A3B	S2-2(1B1A)	S2-1B1A1N	SBL2-2L1A1B
Contact arrangement						
Type (pulling)	SB2108	SB2109	SB2110	SB2111	SB2120	SBL2212

CONTACT ARRANGEMENT DIAGRAM

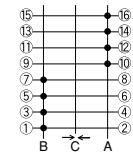
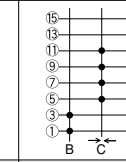
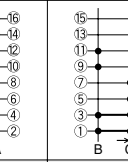
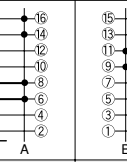
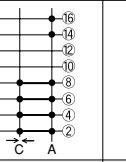
●6 contacts (3 units)

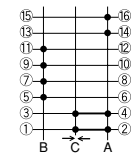
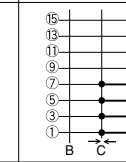
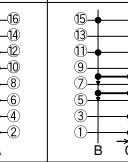
Type (automatic return)	S3001	S3002	S3003	S3004	S3005	S3006
Detail	S3-3B3A	S3-6A	S3-2B2C2A	S3-2B2A2BA	S3-2B4A	S3-4B2A
Contact arrangement						
Type (pulling)	SB3001	SB3002	SB3003	SB3004	SB3005	SB3006

Type (automatic return)	S3007	S3008	S3009	S3010	S3101	—
Detail	S3-2M2B2A	S3-2N2B2A	S3-2M2N1B1A	S3-2N4A	S3-3A3B	SB3-3 (1A1B)
Contact arrangement						
Type (pulling)	SB3007	SB3008	SB3009	SB3010	—	SB3101

Type (automatic return)		S3104		
Detail	SB3-3 (1A1N)	S3-2A2B2C	SBL3-2L1M1N1B1A	SBL3-202L1A1B
Contact arrangement				
Type (pulling)	SB3102	—	SBL3202	SBL3311

●8 contacts (4 units)

Type (automatic return)	S4001	S4002	S4003	S4004	S4005
Detail	S4-4B4A	S4-2B4C2A	S4-2M2N2B2A	S4-4N2B2A	S4-2N2B4A
Contact arrangement					
Type (pulling)	SB4001	SB4002	SB4003	SB4004	SB4005

Type (automatic return)	S4006	S4007	—
Detail	S4-2N4B2A	S4-4N4A	SBL4-2U2L2 (1A1B)
Contact arrangement			
Type (pulling)	SB4006	SB4007	SBL4311



CAM-OPERATED SWITCH

B TYPE, BH TYPE

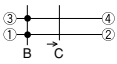
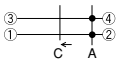
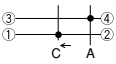
CONTACT ARRANGEMENT DIAGRAM

■Automatic return type (45 degree operation) (B, A)

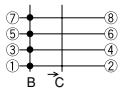
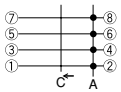




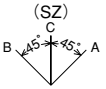
●2 contacts (1 unit)

Type	B1001	A1001	A1002
Detail	B1-2B	A1-2A	A1-1C1A
Contact arrangement			

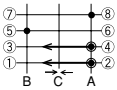
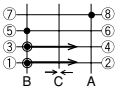
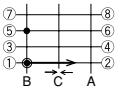
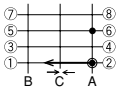
●4 contacts (2 units)

Type	B2001	A2001
Detail	B2-4B	A2-4A
Contact arrangement		

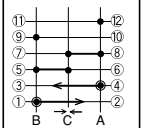
■Automatic return type with close keep contact (SZ)



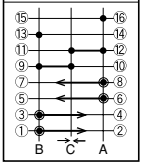
●4 contacts (2 units)

Type	SZ2001	SZ2002	SZ2003	SZ2004
Detail	SZ2-2Z1B1A	SZ2-2Y1B1A	SZ2-1Y1B	SZ2-1Z1A
Contact arrangement				

●6 contacts (3 units)

Type	SZ3001
Detail	SZ3-1Y1Z1M1N1B1A
Contact arrangement	

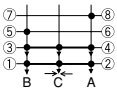
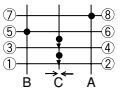
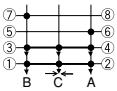
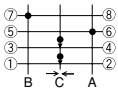
●8 contacts (4 units)

Type	SZ4001
Detail	SZ4-2Y2Z1M1N1B1A
Contact arrangement	

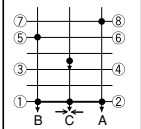
■Automatic return type and manual return type in axial direction (SQ)



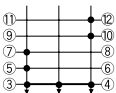
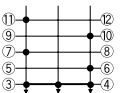
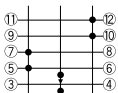
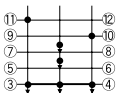
●4 contacts (2 units)

Type	SQ2001	SQ2002	SQ2211	SQ2212
Detail	SQ2-2U1B1A	SQ2-2L1B1A	SQ2-2U1A1B	SQ2-2L1A1B
Contact arrangement				

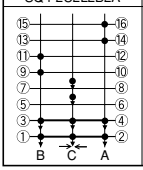
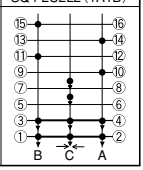
●4 contacts (3 units)

Type	SQ2101
Detail	SQ2-1U1L1B1A
Contact arrangement	

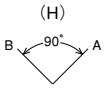
●6contacts (3 units)

Type	SQ3201	SQ3202	SQ3203	SQ3311
Detail	SQ3-2U2B2A	SQ3-2U2 (1A1B)	SQ3-2L2B2A	SQ3-2U2L1A1B
Contact arrangement				

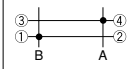
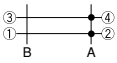
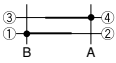
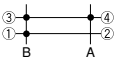
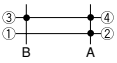
●8 contacts (4 units)

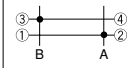
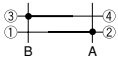
Type	SQ4301	SQ4311
Detail	SQ4-2U2L2B2A	SQ4-2U2L2 (1A1B)
Contact arrangement		

■90° 2-position changeover (H)

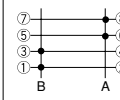
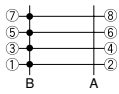
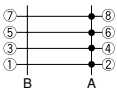
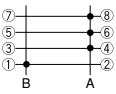
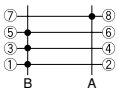
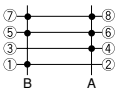


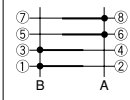
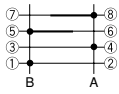
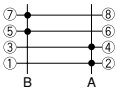
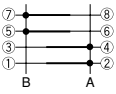
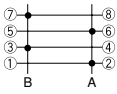
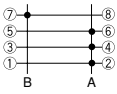
●2 contacts (1 unit)

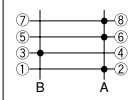
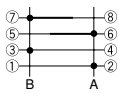
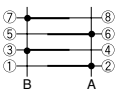
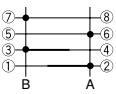
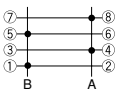
Type	H1001	H1002	H1003	H1004	H1005	H1006
Detail	H1-1B1A	H1-2B	H1-2A	H1-1BL1AL	H1-1B1BA	H1-1A1BA
Contact arrangement						

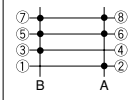
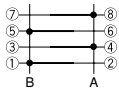
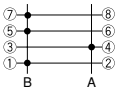
Type	H1101	H1102
Detail	H1-1A1B	H1-1AL1BL
Contact arrangement		

●4 contacts (2 units)

Type	H2001	H2002	H2003	H2004	H2005	H2006
Detail	H2-2B2A	H2-4B	H2-4A	H2-1B3A	H2-3B1A	H2-1B1A2BA
Contact arrangement						

Type	H2008	H2009	H2101	H2102	H2103	H2104
Detail	H2-2BL2AL	H2-1B1A1BL1AL	H2-2A2B	H2-2AL2BL	H2-2 (1A1B)	H2-3A1B
Contact arrangement						

Type	H2105	H2106	H2108	H2109	H2110
Detail	H2-1A1B2A	H2-1A1B1AL1BL	H2-2 (1AL1BL)	H2-1AL1BL1A1B	H2-2 (1B1A)
Contact arrangement					

Type	H2111	H2112	H2113
Detail	H2-1A1B2BA	H2-2 (1BL1AL)	H2-1B1A2B
Contact arrangement			

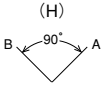


CAM-OPERATED SWITCH

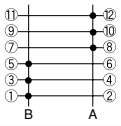
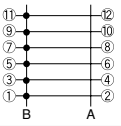
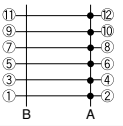
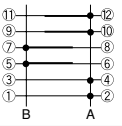
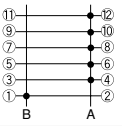
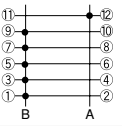
B TYPE, BH TYPE

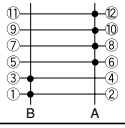
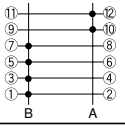
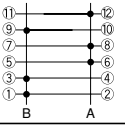
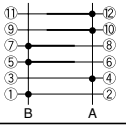
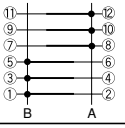
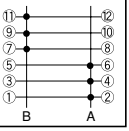
CONTACT ARRANGEMENT DIAGRAM

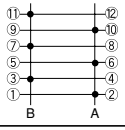
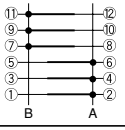
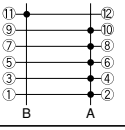
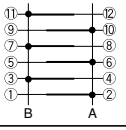
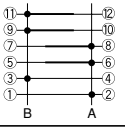
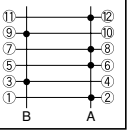
■90° 2-position changeover (H)

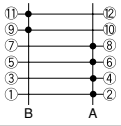
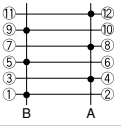


●6 contacts (3 units)

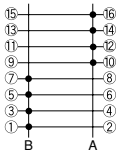
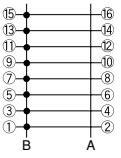
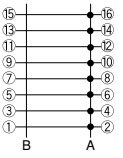
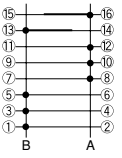
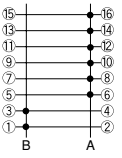
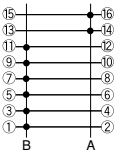
Type	H3001	H3002	H3003	H3004	H3005	H3006
Detail	H3-3B3A	H3-6B	H3-6A	H3-2A2BL2AL	H3-1B5A	H3-5B1A
Contact arrangement						

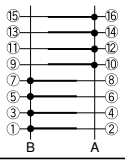
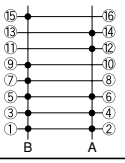
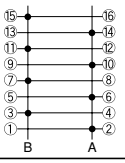
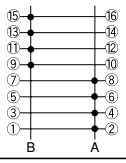
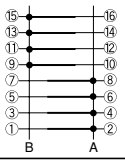
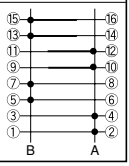
Type	H3007	H3008	H3009	H3010	H3011	H3101
Detail	H3-2B4A	H3-4B2A	H3-2B2A1BL1AL	H3-1B1A2BL2AL	H3-3BL3AL	H3-3A3B
Contact arrangement						

Type	H3102	H3103	H3104	H3105	H3106	H3107
Detail	H3-3(1A1B)	H3-3AL3BL	H3-5A1B	H3-3（1AL1BL）	H3-1A1B2AL2BL	H3-1A1B2A1B1A
Contact arrangement						

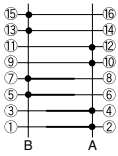
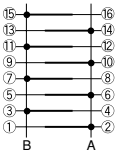
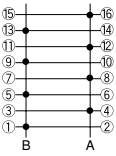
Type	H3108	H3109
Detail	H3-4A2B	H3-3（1B1A）
Contact arrangement		

●8 contacts (4 units)

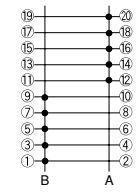
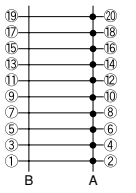
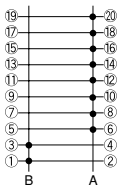
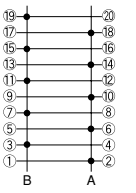
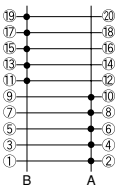
Type	H4001	H4002	H4003	H4004	H4005	H4006
Detail	H4-4B4A	H4-8B	H4-8A	H4-3B3A1BL1AL	H4-2B6A	H4-6B2A
Contact arrangement						

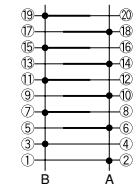
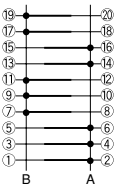
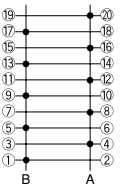
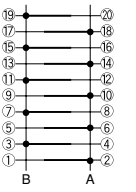
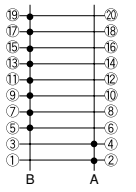
Type	H4007	H4008	H4101	H4102	H4103	H4104
Detail	H4-4BL4AL	H4-3BA2B2A1B	H4-4（1A1B）	H4-4A4B	H4-4AL4BL	H4-2A2B2AL2BL
Contact arrangement						

●8 contacts (4 units)

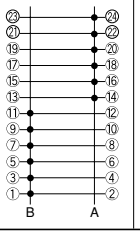
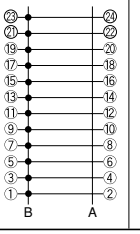
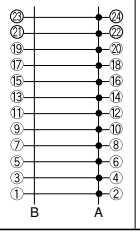
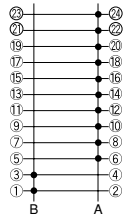
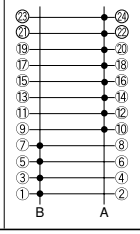
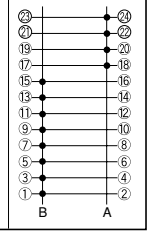
Type	H4105	H4106	H4107
Detail	H4-2AL2BL2A2B	H4-4(1AL1BL)	H4-4(1B1A)
Contact arrangement			

●10 contacts (5 units)

Type	H5001	H5003	H5005	H5101	H5102
Detail	H5-5B5A	H5-10A	H5-2B8A	H5-5(1A1B)	H5-5A5B
Contact arrangement					

Type	H5103	H5104	H5105	H5106	H5107
Detail	H5-1A1B4(1AL1BL)	H5-3AL3BL2AL2BL	H5-5(1B1A)	H5-5(1AL1BL)	H5-2A8B
Contact arrangement					

●12 contacts (6 units)

Type	H6001	H6002	H6003	H6004	H6005	H6006
Detail	H6-6B6A	H6-12B	H6-12A	H6-2B10A	H6-4B8A	H6-8B4A
Contact arrangement						

●CONTROL SWITCH

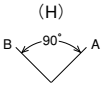


CAM-OPERATED SWITCH

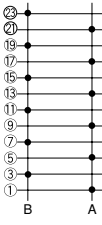
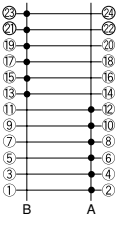
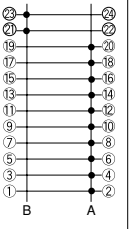
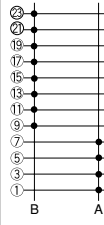
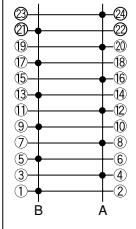
B TYPE, BH TYPE

CONTACT ARRANGEMENT DIAGRAM

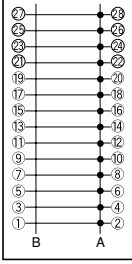
■90° 2-position changeover (H)



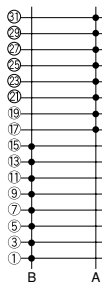
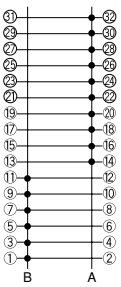
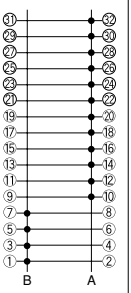
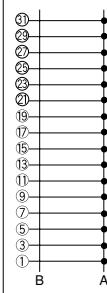
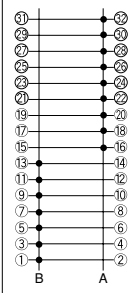
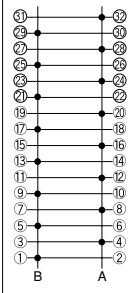
●12 contacts (6 units)

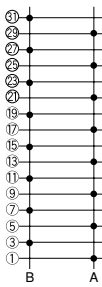
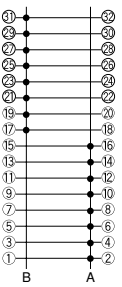
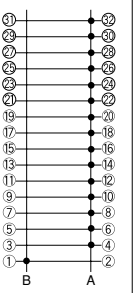
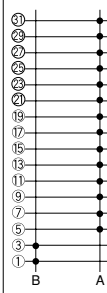
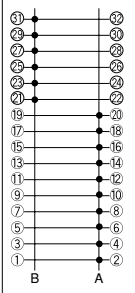
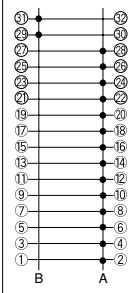
Type	H6101	H6102	H6103	H6105	H6106
Detail	H6-6 (1A1B)	H6-6A6B	H6-10A2B	H6-4A8B	H6-6 (1B1A)
Contact arrangement					

●14 contacts (7 units)

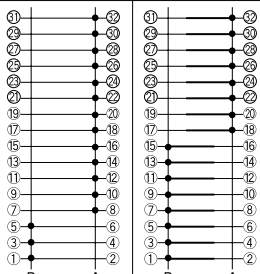
Type	H7003
Detail	H7-14A
Contact arrangement	

●16 contacts (8 units)

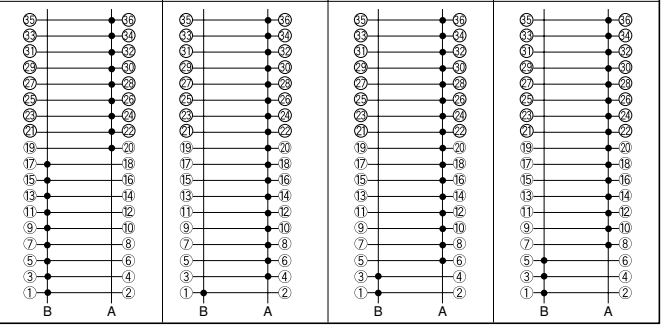
Type	H8001	H8002	H8003	H8005	H8006	H8007
Detail	H8-8B8A	H8-6B10A	H8-4B12A	H8-16A	H8-7B9A	H8-8 (1B1A)
Contact arrangement						

Type	H8101	H8102	H8103	H8104	H8105	H8106
Detail	H8-8 (1A1B)	H8-8A8B	H8-1B15A	H8-2B14A	H8-10A6B	H8-14A2B
Contact arrangement						

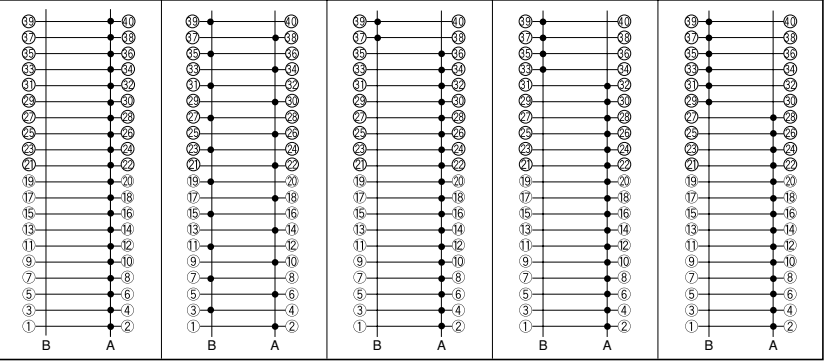
●16 contacts (8 units)

Type	H8107	H8108
Detail	H8-3B13A	H8-8BL8AL
Contact arrangement		

●18 contacts (9 units)

Type	H9001	H9101	H9102	H9103
Detail	H9-9B9A	H9-1B17A	H9-2B16A	H9-3B15A
Contact arrangement				

●20 contacts (10 units)

Type	H10003	H10101	H10102	H10103	H10104
Detail	H10-20A	H10-10 (1A1B)	H10-18A2B	H10-16A4B	H10-14A6B
Contact arrangement					



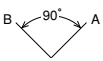
CAM-OPERATED SWITCH

B TYPE, BH TYPE

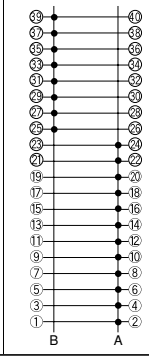
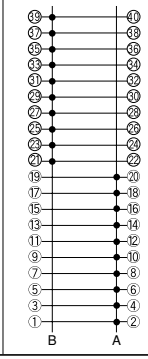
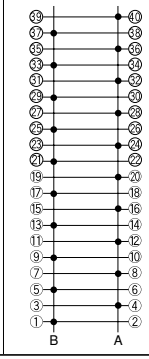
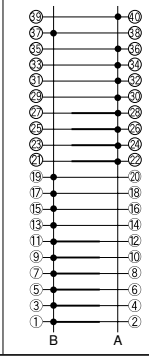
CONTACT ARRANGEMENT DIAGRAM

■90° 2-position changeover (H)

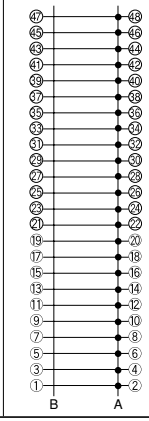
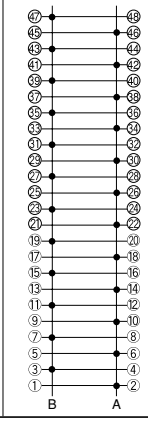
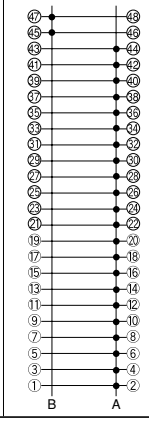
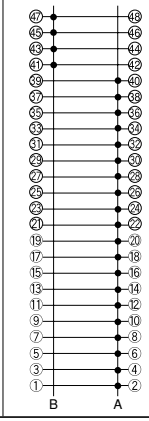
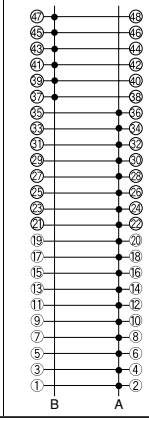
(H)



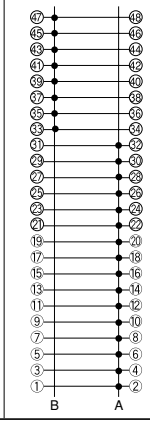
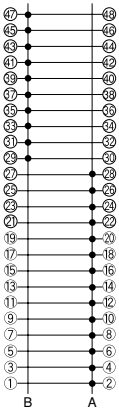
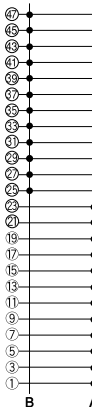
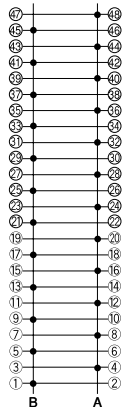
●20 contacts (10 units)

Type	H10105	H10106	H10110	H10120
Detail	H10-12A8B	H10-10A10B	H10-10（1B1A）	H10-6BL4B4AL4A1B1A
Contact arrangement				

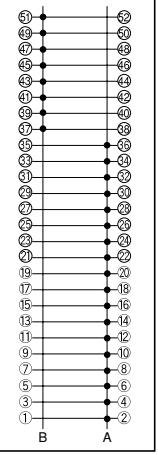
●24 contacts (12 units)

Type	H12003	H12102	H12103	H12104	H12105
Detail	H12-24A	H12-12（1A1B）	H12-22A2B	H12-20A4B	H12-18A6B
Contact arrangement					

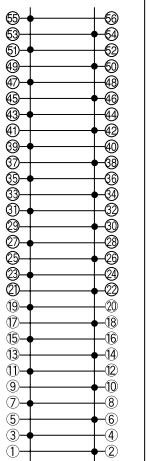
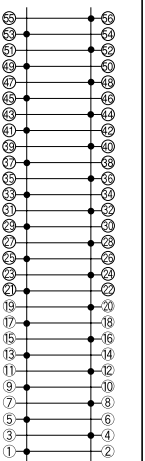
●24 contacts (12 units)

Type	H12106	H12107	H12108	H12110
Detail	H12-16A8B	H12-14A10B	H12-12A12B	H12-12 (1B1A)
Contact arrangement				

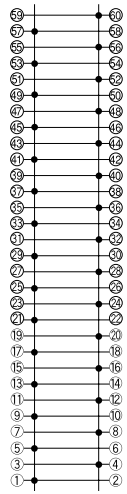
●26 contacts (13 units)

Type	H13001
Detail	H13-18A8B
Contact arrangement	

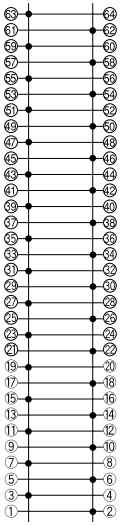
●28 contacts (14 units)

Type	H14101	H14102
Detail	H14-14 (1A1B)	H14-14 (1B1A)
Contact arrangement		

●30 contacts (15 units)

H15110
H15-15 (1B1A)


●32 contacts (16 units)

H16101
H16-16 (1A1B)


●CONTROL SWITCH

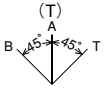


CAM-OPERATED SWITCH

B TYPE, BH TYPE

CONTACT ARRANGEMENT DIAGRAM

■45° 3-position changeover (T)



●2 contacts (1 unit)

Type	T1001	T1002	T1003	T1004	T1005	T1006	T1007
Detail	T1-1B1T	T1-1B1A	T1-1A1T	T1-1T1AT	T1-1BA1AT	T1-1T1BT	T1-2BT
Contact arrangement							

Type	T1101	T1102	T1103
Detail	T1-1T1B	T1-1A1B	T1-1T1A
Contact arrangement			

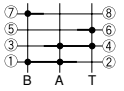
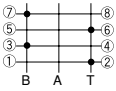
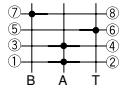
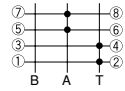
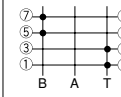
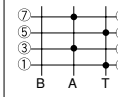
●4 contacts (2 units)

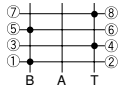
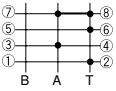
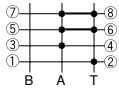
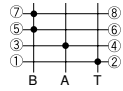
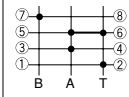
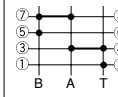
Type	T2001	T2002	T2003	T2004	T2005	T2006
Detail	T2-2B2T	T2-2B2A	T2-2A2T	T2-1B2A1T	T2-2B1A1T	T2-1B1A2T
Contact arrangement						

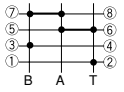
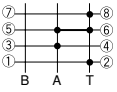
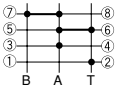
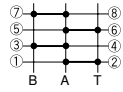
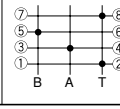
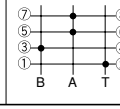
Type	T2007	T2008	T2009	T2010	T2011	T2012
Detail	T2-2B2AT	T2-2T2AT	T2-1B1A1T1BA	T2-1B1A1T1AT	T2-1B1T1BA1AT	T2-2T1BA1AT
Contact arrangement						

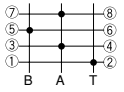
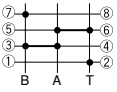
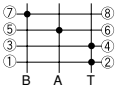
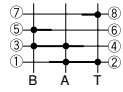
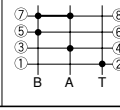
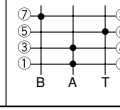
Type	T2013	T2014	T2015	T2016	T2017	T2018
Detail	T2-1B2T1AT	T2-1B1A1T1BT	T2-1B1T2BT	T2-2BA2AT	T2-2AL1BL1TL	T2-1BL1BAL1ATL1TL
Contact arrangement						

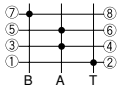
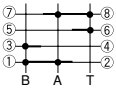
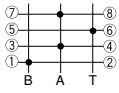
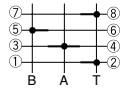
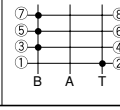
●4 contacts (2 units)

Type	T2019	T2101	T2102	T2103	T2104	T2105
Detail	T2-1BAL1ATL1TL1BL	T2-2(1T1B)	T2-2AL1TL1BL	T2-2T2A	T2-2T2B	T2-2(1T1A)
Contact arrangement						

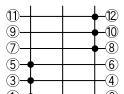
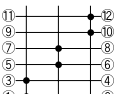
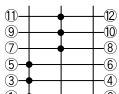
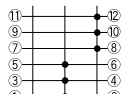
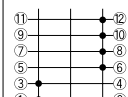
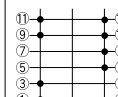
Type	T2106	T2107	T2108	T2109	T2110	T2111
Detail	T2-2(1B1T)	T2-1T1A1T1AT	T2-1T1A2AT	T2-1T1A2B	T2-1T1A1AT1B	T2-1T1AT1B1BA
Contact arrangement						

Type	T2112	T2114	T2115	T2116	T2117	T2118
Detail	T2-1T1B1AT1BA	T2-1T1A1AT1T	T2-1T1A1AT1BA	T2-2(1AT1BA)	T2-1T1A1B1T	T2-1T1B2A
Contact arrangement						

Type	T2119	T2120	T2121	T2122	T2123	T2124
Detail	T2-1T1A1B1A	T2-1T1BA1AT1B	T2-2T1A1B	T2-1ATL1BAL1BL1TL	T2-1T1A1B1BA	T2-2A1T1B
Contact arrangement						

Type	T2125	T2126	T2127	T2128	T2129
Detail	T2-1T2A1B	T2-1BAL1BL1TL1ATL	T2-1B1A1T1A	T2-1TL1AL1BL1TL	T2-1T3B
Contact arrangement					

●6 contacts (3 units)

Type	T3001	T3002	T3003	T3004	T3005	T3006
Detail	T3-3B3T	T3-2B2A2T	T3-3B3A	T3-3A3T	T3-2B4T	T3-2B2T2BT
Contact arrangement						

●CONTROL SWITCH

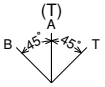


CAM-OPERATED SWITCH

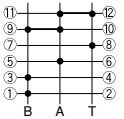
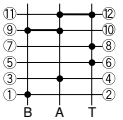
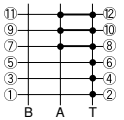
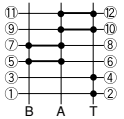
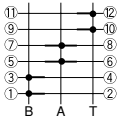
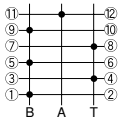
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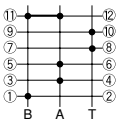
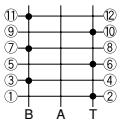
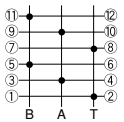
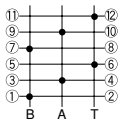
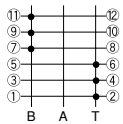
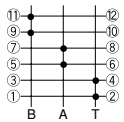
CONTACT ARRANGEMENT DIAGRAM

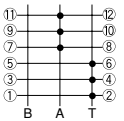
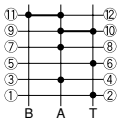
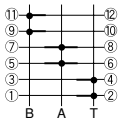
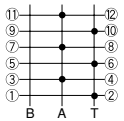
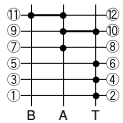
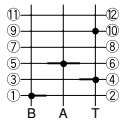
■45° 3-position changeover (T)

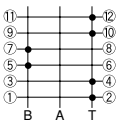
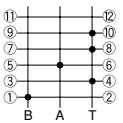
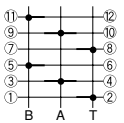


●6 contacts (3 units)

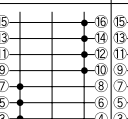
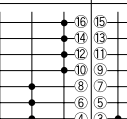
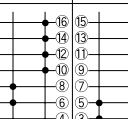
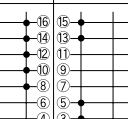
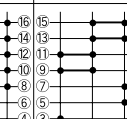
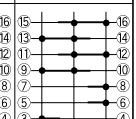
Type	T3007	T3008	T3009	T3010	T3011	T3012
Detail	T3-2B1A1T1BA1AT	T3-1B1A2T1BA1AT	T3-3T3AT	T3-2T2BA2AT	T3-2BL2AL2TL	T3-2(1B1T)1B1A
Contact arrangement						

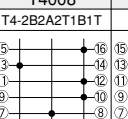
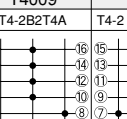
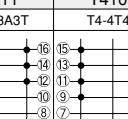
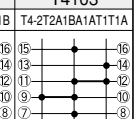
Type	T3013	T3101	T3102	T3103	T3104	T3105
Detail	T3-1B2A2T1BA	T3-3(1T1B)	T3-2(1T1A1B)	T3-2(1B1A1T)	T3-3T3B	T3-2T2A2B
Contact arrangement						

Type	T3106	T3107	T3108	T3109	T3110	T3111
Detail	T3-3T3A	T3-2(1T1A)1AT1BA	T3-2TL2AL2BL	T3-3(1T1A)	T3-3T1A1AT1BA	T3-1BL1TL1AL1T
Contact arrangement						

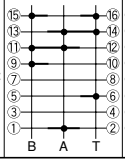
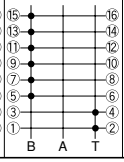
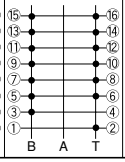
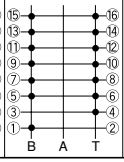
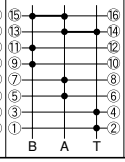
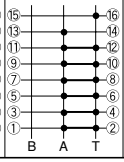
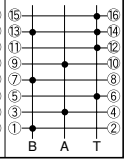
Type	T3112	T3113	T3114
Detail	T3-2T2B2T	T3-1B1T1A2T	T3-2(1TL1AL1BL)
Contact arrangement			

●8 contacts (4 units)

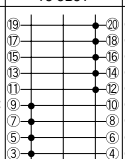
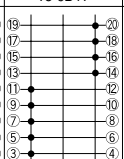
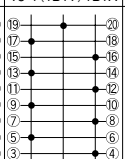
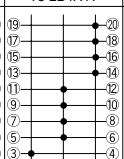
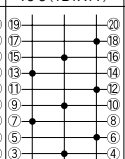
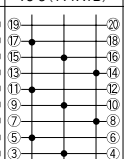
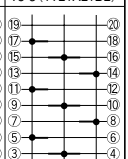
Type	T4001	T4002	T4003	T4004	T4005	T4006	T4007
Detail	T4-4B4T	T4-4A4T	T4-2B2A4T	T4-3B5T	T4-3B3T2BT	T4-2B2T2BA2AT	
Contact arrangement							

Type	T4008	T4009	T4010	T4011	T4101	T4102	T4103
Detail	T4-2B2A2T1B1T	T4-2B2T4A	T4-2(1B1A1T)2A	T4-2B3A3T	T4-4T4B	T4-2T2A1AT1BA1A1B	T4-2T2A1BA1AT1T1A
Contact arrangement							

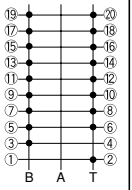
●8 contacts (4 units)

Type	T4104	T4105	T4106	T4107	T4108	T4109	T4110
Detail		T4-2T6B	T4-1T1B6BT	T4-1B1T6BT	T4-2T2A2B1AT1BA	T4-6AT1A1T	T4-2(1B1A1T)1BT1T
Contact arrangement							

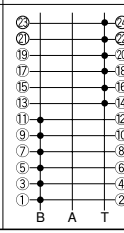
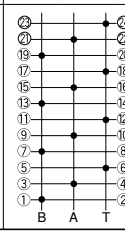
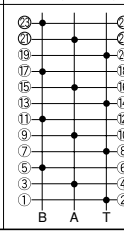
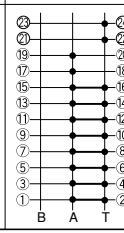
●10 contacts (5 units)

Type	T5001	T5004	T5005	T5006	T5101	T5102	T5103
Detail	T5-5B5T	T5-6B4T	T5-4(1B1T)1B1A	T5-2B4A4T	T5-3(1B1A1T)	T5-3(1T1A1B)	T5-3(1TL1AL1BL)
Contact arrangement							

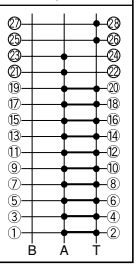
●10 contacts (5 units)

Type	T5104
Detail	T5-1T1B8BT
Contact arrangement	

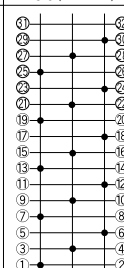
●12 contacts (6 units)

Type	T6001	T6101	T6102	T6103
Detail	T6-6B6T	T6-4(1B1A1T)	T6-4(1T1A1B)	T6-8AT2A2T
Contact arrangement				

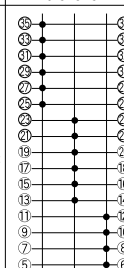
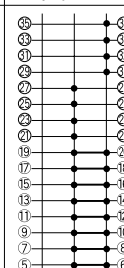
●14 contacts (7 units)

Type	T7122
Detail	T7-10AT2A2T
Contact arrangement	

●16 contacts (8 units)

Type	T8101
Detail	T8-5(1B1A1T)
Contact arrangement	

●18 contacts (9 units)

Type	T9102	T9103
Detail	T9-6T6A6B	T9-10AT4A4T
Contact arrangement		

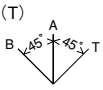


CAM-OPERATED SWITCH

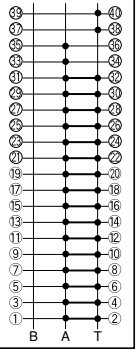
B TYPE, BH TYPE

CONTACT ARRANGEMENT DIAGRAM

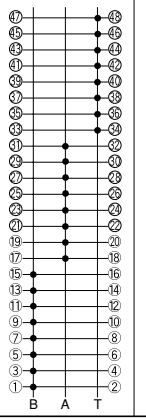
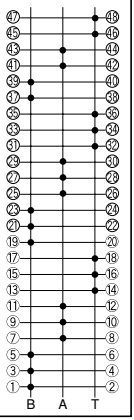
■45° 3-position changeover (T)



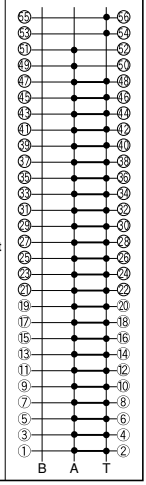
●20 contacts (10 units)

Type	T10101
Detail	T10-16AT2A2T
Contact arrangement	

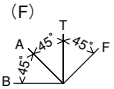
●24 contacts (12 units)

Type	T12001	T12101
Detail	T12-8B8A8T	T12-2(3B3A3T)2B2AT
Contact arrangement		

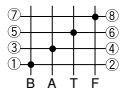
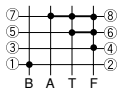
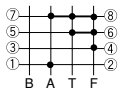
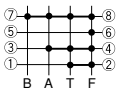
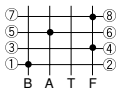
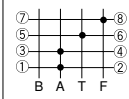
●28 contacts (14 units)

Type	T14102
Detail	T14-24AT2A2T
Contact arrangement	

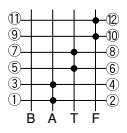
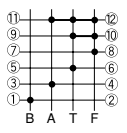
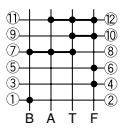
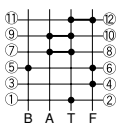
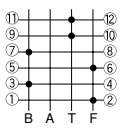
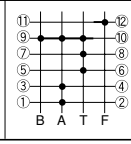
■45° 4-position changeover (F)

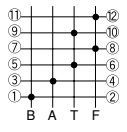
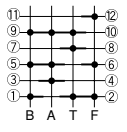
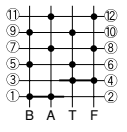


●4 contacts (2 units)

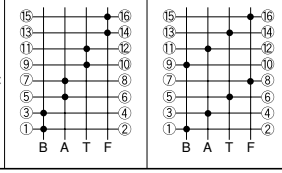
Type	F2001	F2002	F2003	F2004	F2101	F2102
Detail	F2-1B1A1T1F	F2-1B1F1TF1ATF	F2-1A1F1TF1ATF	F2-1TF1ATF1F1BATF	F2-1B1F1A1F	F2-2A1T1F
Contact arrangement						

●6 contacts (3 units)

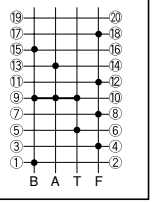
Type	F3001	F3002	F3003	F3004	F3101	F3102
Detail	F3-2A2T2F	F3-1B1A1T1F1TF1ATF	F3-1B2F1BAT1TF1ATF	F3-1T1F1BF2AT1TF	F3-2(1F1B)2T	F3-2A2T1BATL1FL
Contact arrangement						

Type	F3103	F3104	F3110
Detail	F3-1B1A1T1F1T1F		
Contact arrangement			

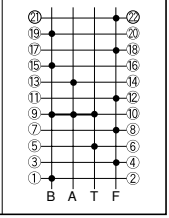
●8 contacts (4 units)

Type	F4001	F4101
Detail	F4-2B2A2T2F	F4-2 (1B1A1T1F)
Contact arrangement		

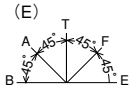
●10 contacts (5 units)

Type	F5101
Detail	F5-1B1F1T1F1BAT1F1A1B1F
Contact arrangement	

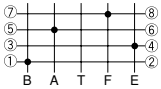
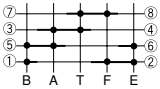
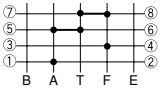
●12 contacts (6 units)

Type	F6101
Detail	F6-1B1F1T1F1BAT1F1A2 (1B1F)
Contact arrangement	

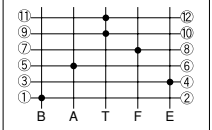
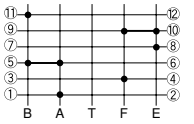
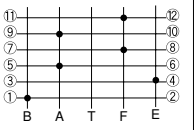
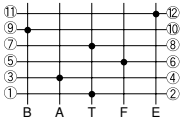
■45° 5-position changeover (E)

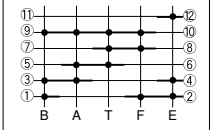
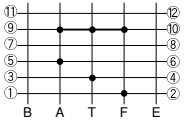
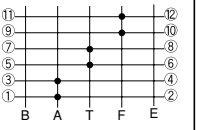


●4 contacts (2 units)

Type	E2001	E2101	E2102
Detail	E2-1B1E1A1F		E2-1A1F1AT1TF
Contact arrangement			

●6 contacts (3 units)

Type	E3001	E3002	E3003	E3004
Detail	E3-1B1E1A1F2T	E3-1A1F1BA1E1FE1B	E3-1B1E2 (1A1F)	E3-1T1A1F1T1B1E
Contact arrangement				

Type	E3101	E3102	E3103
Detail		E3-1F1T1A1ATF	E3-2A2T2F
Contact arrangement			

●CONTROL SWITCH

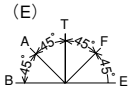


CAM-OPERATED SWITCH

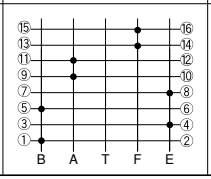
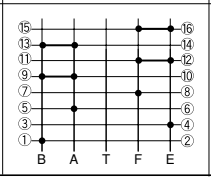
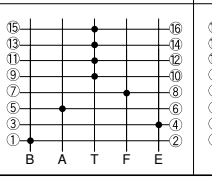
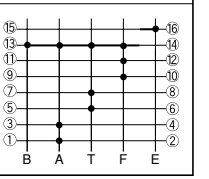
B TYPE, BH TYPE

CONTACT ARRANGEMENT DIAGRAM

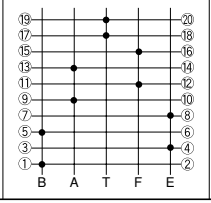
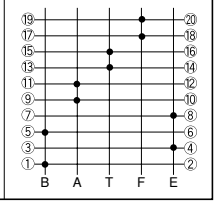
■45° 5-position changeover (E)



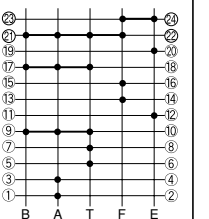
●8 contacts (4 units)

Type	E4001	E4002	E4003	E4101
Detail	E4-2 (1B1E) 2A2F	E4-1B1E1A1F2 (1BA1FE)	E4-1B1E1A1F4T	
Contact arrangement				

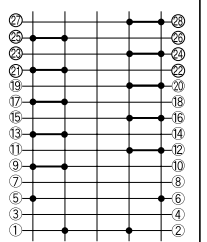
●10 contacts (5 units)

Type	E5001	E5101
Detail	E5-2 (1B1E) 2 (1A1F) 2T	E5-2 (1B1E) 2A2T2F
Contact arrangement		

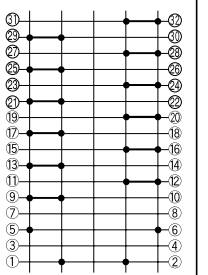
●12 contacts (6 units)

Type	E6101
Detail	E6-2A2T1BAT1E2F1BAT1E1BATF1FE
Contact arrangement	

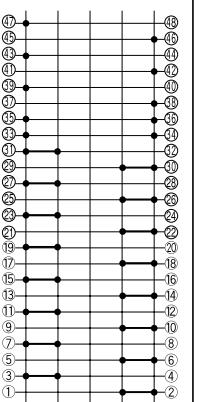
●14 contacts (7 units)

Type	E7101
Detail	E7-1AF1BE5 (1BA1FE)
Contact arrangement	

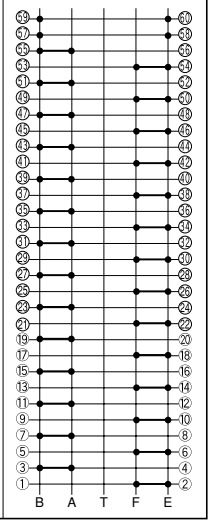
●16 contacts (8 units)

Type	E8101
Detail	E8-1AF1BE6 (1BA1FE)
Contact arrangement	

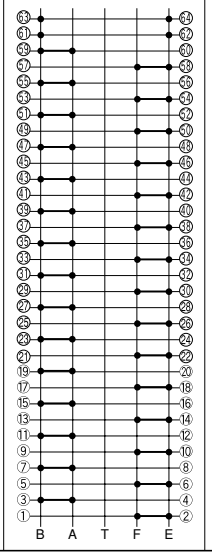
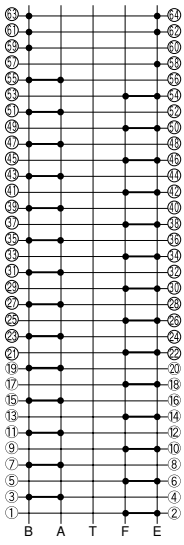
●24 contacts (12 units)

Type	E12102
Detail	E12-8 (1FE1BA) 2BE3 (1E1B)
Contact arrangement	

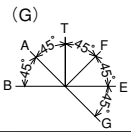
●30 contacts (15 units)

Type	E15101
Detail	E15-14 (1FE1BA) 2BE
Contact arrangement	

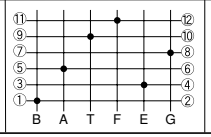
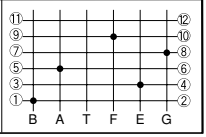
●32 contacts (16 units)

Type	E16101	E16102
Detail	E16-15 (1FE1BA) 2BE	E16-14 (1FE1BA) 1E1B2BE
Contact arrangement		

■45° 6-position changeover (G)



●6 contacts (3 units)

Type	G3101	G3102
Detail	G3-1B1E1A1G1T1F	G3-1B1E1A1G1F
Contact arrangement		



CAM-OPERATED SWITCH

B TYPE, BH TYPE

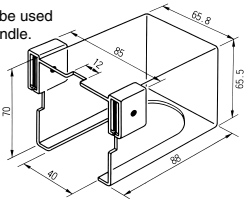
ACCESSORIES (selling separately)

Handle cover

●B-H HCV

This cover is used to prevent mis-operation. It is a magnet type that can be mounted on or removed from a panel easily.
(Material: Polycarbonate resin)

Note: This cover cannot be used for the MP type handle.



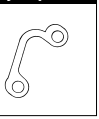
Jumper

For B and BH type

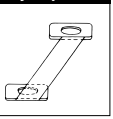


B type	5-9	1-5	1-3	Example of usage of jumper	1-3	5-9	1-5
BH type	1-5	5-9	1-3	Example of usage of jumper	1-3	1-5	5-9

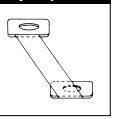
BS jumper 1-3



BS jumper 1-5



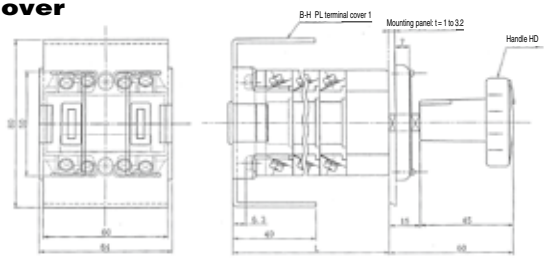
BS jumper 5-9



Terminal protection cover

●B-H PL terminal cover 1

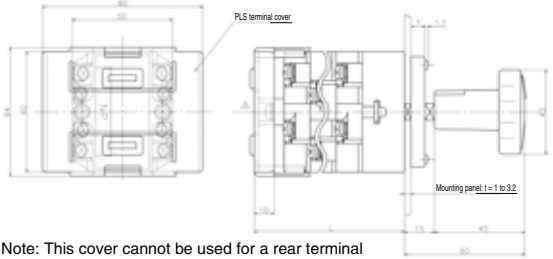




Note: This cover cannot be used for a rear terminal type.

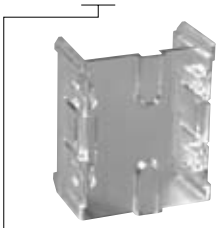
●B-H PLS terminal cover





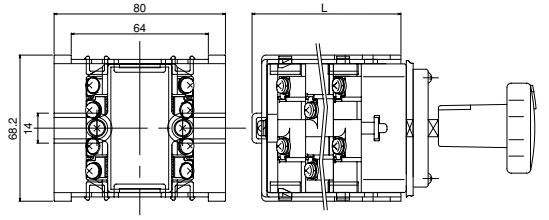
Note: This cover cannot be used for a rear terminal type.

●BH-CVN-□



	Applicable unit number	L (mm)		Applicable unit number	L (mm)
AB	1 to 3 units	44	DB	10 to 12 units	160
BB	4 to 6 units	83	EB	13 to 15 units	199
CB	7 to 9 units	121.5			

∗ The above shows standard type switches. Please ask for special types.



Note: This cover cannot be used for a rear terminal type and a dual-body type.

Flange (Nameplate) set □ : B(N1.5), BG(7.5BG4/1.5)

●B flange set□	●F panel set□	●Indicator flange set□	●BA-6 indicator flange set□
			
Supplied screws: ① M5×10 countersunk 2 pcs. ② M4×15 SUS 3-piece 1 pc. ③ M2.6×4 tapping 4 pcs.	Supplied screws: ① M5×10 countersunk 2 pcs. ② M4×15 SUS 3-piece 1 pc.	Supplied screws: ① M5×10 countersunk 2 pcs. ② M4×15 SUS 3-piece 1 pc. ③ M2.6×4 tapping 4 pcs.	Supplied screws: ① M5×10 countersunk 2 pcs. ② M4×15 SUS 3-piece 1 pc. ③ M2.6×4 tapping 4 pcs.

Handle

LD-B

Handle code — Color

Code	Color
B	N1.5
BG	7.5BG3/3.5

Code	Shape		Code	Shape
LD	Rose shape (large)		LP	Stick shape (large)
HD	Rose shape (small)		HP	Stick shape (small)
LDP	Rose shape (large)	with dot	MP	Pistol shape (large)
HDP	Rose shape (small)	with dot	HR	Pistol shape (small)
LF	Octagonal shape (large)		LS	Knob shape
HF	Octagonal shape (small)		LE	Egg shape (large)
LFP	Octagonal shape (large)	with dot	HE	Egg shape (small)
HFP	Octagonal shape (small)	with dot	HSP	Beak shape (large)
			USP	Beak shape (small)

Please check a dimensions from page A6 “Handle”.

Quick nameplate attachment flange

New Product



■HOW TO ORDER

B J Flange set B

① ② ③ ④

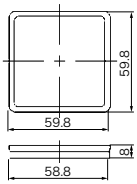
No.	Item	Code	Detail
①	Basic type	B	B/BH type cam operated switch
②	Specification	J	Quick nameplate attachment flange
③	Set items	Flange set	Flange + Cover + Screw set
④	Color	B	Flamge color : Black (N1.5)

∗Supplied items···SS Countersunk screw M5x10, 4 screws.
∗Material···Modified PPE (UL94V-0) adapted to the fire laws.
* About how to order when attach this item to the main body of the cam operated switch, please contact us separately.

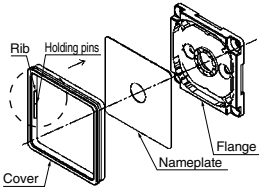
■FEATURES

- **Screw for the nameplate attachment is unnecessary.**
- **It’s possible to quick attachment of the flange without attachment screws.**
- **Decreasing of work time for nameplate attachment is possible.**

■OUTLINES



■ASSEMBLY DRAWING



Rib within the cover can be attach any directions (up or down, left or right) to the flange.



CAM-OPERATED SWITCH

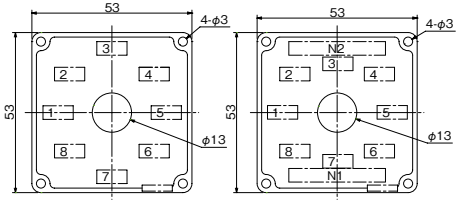
B TYPE, BH TYPE

ACCESSORIES

Nameplate

＊Only by a nameplate, the form of arrangements Bムジ NP AL

〈When there is a character in N1 and N2.〉



For 2 notches

Japanese

Nameplate No.	2	4	N1	N2
54-000	Plain (Outline only)*			
54-200	切	入		
54-201	手動	自動		
54-202	単独	連動		
54-203	直接	遠方		
54-204	減	増		
54-208	停止	起動		
54-209	停止	運転		
54-210	寸動	常時		
54-212	直接	遠方	遠方直接切換開閉器	
54-214	切	入	電源開閉器	
54-221	運転	絶縁試験		切換スイッチ
54-222	常用	非常用	切換SW	
54-223	平常	雨天	雨天モードスイッチ	
54-224	平常	回復	運転速度切換スイッチ	
54-227	切	入		操作スイッチ
54-240	切	入		制御電源
54-250	切	入	切換スイッチ	
54-251	切	入	操作スイッチ	
54-252	切	入	しゃ断器	
54-253	手動	自動	切換スイッチ	
54-257	切	入	制御電源	
54-265	不使用	使用	再閉路継電器	
54-267	切	入	引操作	
54-269	切	入	断路器	
54-271	1	2		
54-277	閉	開		
54-278	現場	中央		
54-279	No.1	No.2		
54-282	切	入	遮断器	
54-286	直接	遠方	切換スイッチ	
54-288	切	入	引きにて操作	
54-290	維護	運転	43R	
54-2101	1	0		
54-2139	切	入	ATOスイッチ	
54-2142	定位	分割	分割運転スイッチ	
54-2147	自動解除	自動		
54-2148	切	入		引きにて操作
54-2149	切	入		引いて手動戻して自動
54-2150	切	入		引いて手元戻して遠方
54-2152	ロック	解除		
54-2154	救援	平常		救援切換スイッチ
54-2155	通常	絶縁		絶縁切換スイッチ

English

Nameplate No.	2	4	N1	N2
54-200E	OFF	ON		
54-201E	MANU	AUTO		
54-211E	LOCAL	REMOTE	CHANGE OVER SWITCH	
54-217E	IN	OUT	PROTECTION	
54-219E	IN	BUPASS	GUARD BYPASS	
54-220E	AUTO	MANUAL	TAP CHANGER CONTROL	
54-226E	OFF	ON		CONTROL
54-233E	REV.	FOR.		
54-234E	LOCAL	REMOTE		
54-236E	OPEN	CLOSE		
54-239E	LOCAL	MCC		
54-252E	OFF	ON	CIRCUIT BREAKER	
54-253E	OFF	ON		PULL TURN
54-282E	LOCAL	REMOTE	CONTROL	
54-285E	MANUAL	AUTO	CONTROL	
54-289E	OFF	ON	AUTO RECLOSING	
54-298E	CC	NCC		
54-2100E	IN	OUT		
54-2102E	OFF	ON	SYNCH OFF/ON	
54-2103E	OFF	ON	OUT/IN SEL.	
54-2104E	LOCK	IN-USE		
54-2122E	OPEN	CLOSE	DISCONNECTOR	
54-2124E	IN	OUT		PROTECTION
54-2127E	OFF	ON	SLEEP MODE	
54-2128E	OFF	ON	±BF SUPPLY	
54-2131E	OUT	IN	OUT/IN SEL.	
54-2132E	RUN	TEST		
54-2134E	OFF	ON	SCADA SEL.	
54-2135E	ON	OFF		
54-2136E	TEST	RUN		
54-2137E	TR	N		
54-2138E	OFF	ON	OFF/ON Switch	
54-2140E	LOCAL	REMOTE		COOLER FAN
54-2141E	IN	OUT	PROTECTION IN/OUT	

Nameplate No.	1	2	3	N1
54-225	絶縁試験		通常	絶縁試験スイッチ
54-228	入		切	ブレーキ軸割合
54-2110	開放		平常	開放スイッチ
54-2111		入換	S	ATS切換
54-2151	解放		定位	開放スイッチ

Nameplate No.	3	5	N1	N2
54-299E	C.R	E.C.C	C.R/ECC SEL	
54-2106E	IN	OUT		BUSBAR PROTECTION
54-2107E	IN	OUT		BREAKER FAILURE PROTECTION
54-2108E	IN	OUT		BUSBAR PROTECTION ZONE
54-2109E	IN	OUT		MECHANICAL PROTECTION
54-2120E	AUTO	MANUAL		BUSBAR PROTECTION ZONE
54-2121E	MASTER	FOLLOWER		MECHANICAL PROTECTION
54-2123E	PAR.	INDEP.		PARALLEL/INDEPENDENT
54-2126E	REMOTE	SUP.		
54-2130E	IN	OUT		BB PROTECTION IN/OUT

For 3 notches

Japanese

Nameplate No.	2	3	4	N1
54-300	閉	停　止	開	
54-305	切	自　動	手　動	
54-350	手　動	切	自　動	切換スイッチ
54-360	整 流 器	蓄 電 池	保証負荷	直流電圧計切換機
54-373	減	↙電圧↘	増	電圧設定
54-374	R	S	T	電流計
54-375	R-S	S-T	T-R	電圧計
54-378	直　送	出　力	インバータ	交流電圧計切換機

English

Nameplate No.	2	3	4	N1
54-339E	OPEN	NEUTRAL	CLOSE	
54-340E	FWD	STOP	REV	
54-342E	DOWN	STOP	UP	
54-343E	LOCAL	OFF	REMOTE	
54-389E	MASTER	SOLO	FOLLOWER	TAP CHANGER CONTROL
54-391E	RAISE	OFF	LOWER	TAP CHANGER CONTROL
54-396E	TRIP	NEUTRAL	CLOSE	
54-398E	OPEN	OFF	CLOSE	
54-3105E	REMOTE	OFF	LOCAL	

For 4 notches

Japanese

Nameplate No.	1	2	3	4	N1
54-490	O	R-S	S-T	T-R	電圧計
54-492	O	R-N	N-T	T-R	電圧計
54-495	O	R	S	T	電流計
54-496	O	R	N	T	電流計

Nameplate No.	1	3	5	7	N1
54-752	T	O	R	S	電圧計
54-753	T-R	O	R-S	S-T	電圧計
54-755	T	O	R	S	電流計
54-760	T	O	R	N	電流計

English

Nameplate No.	1	2	3	4	N1
54-490E	O	R-S	S-T	T-R	VOLTMETER
54-495E	O	R	S	T	AMMETER
54-498E	OPEN		NEUTRAL	CLOSE	BREAKER CONTROL
54-499E	LOCAL	OFF	OSAS	SCADA	

Nameplate No.	1	3	5	7	N1
54-753E	T-R	O	R-S	S-T	VOLTMETER
54-755E	T	OFF	R	S	AMMETER
54-767E	B	OFF	R	Y	AMMETER SELECTOR

For 5 notches

Japanese

Nameplate No.	1	2	3	4	5	N1
54-555	O	R	S	T	O	電流計
54-556	O	R	S	T	N	電流計
54-557	O	R-S	S-T	T-R	O	電圧計
54-558	O	R	S	T	O	電圧計
54-560	OFF	R-S	S-T	T-R	OFF	電圧計
54-564	0	1	2	3	0	電流計
54-565	0	1-2	2-3	3-1	0	電圧計
54-575	OFF	R-N	N-T	T-R	OFF	電圧計

English

Nameplate No.	1	2	3	4	5	N1
54-555E	OFF	R	S	T	OFF	AMMETER
54-556E	O	R	S	T	N	AMMETER
54-557E	OFF	R-S	S-T	T-R	OFF	VOLTMETER
54-572E			UNLOCK		LOCK	

For 8 notches

Japanese

Nameplate No.	1	2	3	4	5	6	7	8	N1
54-800	S	T	切	R	S	T	切	R	
54-801	ST	TR	切	RS	ST	TR	切	RS	
54-850	S-N	R-N	O	R-S	S-T	T-R	O	T-N	電圧計
54-856	切	N	切	R	切	S	切	T	

English

Nameplate No.	1	2	3	4	5	6	7	8	N1
54-850E	S-N	R-N	OFF	R-S	S-T	T-R	OFF	T-N	VOLTMETER
54-855E	Y-N	R-N	OFF	R-Y	Y-B	R-B		B-N	VOLTMETER SELECTOR
54-860E	ESL2		REMOTE	CB1	89DS1	89DS2	REMOTE	ESL1	



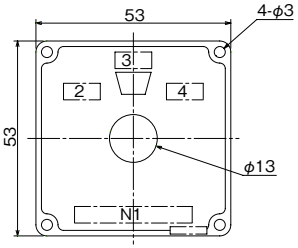
CAM-OPERATED SWITCH

B TYPE, BH TYPE

ACCESSORIES

Nameplate

For indicator window type



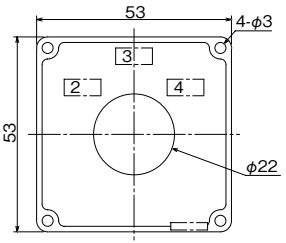
Japanese

Nameplate No.	2	3	4	N1
I54-000	Plain (Outline only)			

English

Nameplate No.	2	3	4	N1
I54-102E			RESET	LOCK-OUT RELAY
I54-235E	TRIP PULL ON LOCK		CLOSE	
I54-236E	OPEN		CLOSE	
I54-252E	OFF		ON	CIRCUIT BREAKER

For key operated type



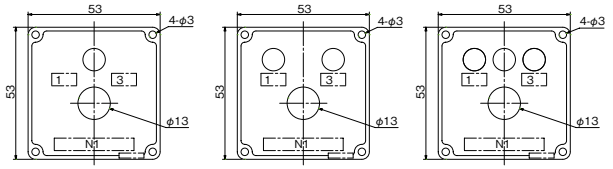
Japanese

Nameplate No.	2	3	4
K54-000			
K54-402	REMOTE		LOCAL
K54-403	JOG	REMOTE	LOCAL
K54-404	TST	N	HS

English

Nameplate No.	2	3	4
K54-229E		NOMAL	BYPASS
K54-236E	OPEN		CLOSE
K54-401E			De-interlock

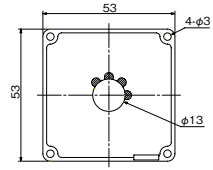
For BHS type



Japanese

Nameplate No.	1		3	N	Remark
P54-000	Plain (Outline only)				1 lamp
					2 lamps
					3 lamps
P54-201	切		入	しゃ断器	2 lamps
P54-202	切		入	断路器	2 lamps
P54-203	切		入	遮断器	2 lamps

For handle removal type



* For handle removal type, please check the removal positions below.

Removal position	B	A	T	F
				
Removal position	**B, A**	**A, T**	**B, T**	**B, A, T**
				



CAM-OPERATED SWITCH

B TYPE, BH TYPE

TECHNICAL DATA

Breaking and making current capacity

Type	AC			DC		
	Test voltage (V)	Test current (A)	Load condition	Test voltage (V)	Test current (A)	Load condition
B, BH, BHL	121	165	Power factor: Pf = 0.6 to 0.7	26.4	11	Time constant: L / R = 40±6ms
	242	110		52.8	6.6	
	484	33		121	1.65	
	—	—		242	0.88	

Breaking / making circuit current capacity test

To conduct the opened / closed circuit current capacity test, connect the reactor or inductance, which is connected in series to a resistor, to the switch as illustrated in Fig. 1 or 2. Using the test current specified in Table 1, perform CO 50 times for AC and 20 times for DC at intervals of 10 seconds when the voltage is 1.1 times the rated operating voltage of the switch. At this test, check for:

(1) Short-circuit between poles or earth fault due to generated arc, or broken or burnt switch.

(2) Any other harmful fault in use

Note: CO means performing the closing action (C) and then the opening action (O) about 50 ms later. For a switch that has some identical structures used for the same electric potential, select an adjacent contact or a contact that is most likely to lead the arc to the frame and then carry out the test using the circuit shown in Fig. 1.

Fig.1

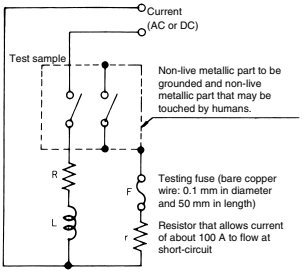
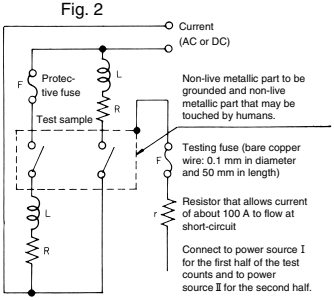


Fig. 2



Note: For DC, connect a parallel resistor so that 1% of the test current value flows in parallel with the loads (R·L).

Table 1

AC or DC	Class	Test voltage	Test current		Power factor (AC) or time constant (DC L / R: ms)
			Making	Breaking	
AC	AC11	1.1*Ue*	11.0 *Ie*	11.0 *Ie*	0.6 to 0.7
	AC12	1.1*Ue*	2.2 *Ie*	2.2 *Ie*	0.6 to 0.7
	AC13	1.1*Ue*	1.1 *Ie*	1.1 *Ie*	0.9 to 1.0
DC	DC11	1.1*Ue*	1.1 *Ie*	1.1 *Ie*	100±15
	DC12	1.1*Ue*	1.1 *Ie*	1.1 *Ie*	40±6
	DC13	1.1*Ue*	1.1 *Ie*	1.1 *Ie*	7±1
	DC14	1.1*Ue*	1.1 *Ie*	1.1 *Ie*	1 max.

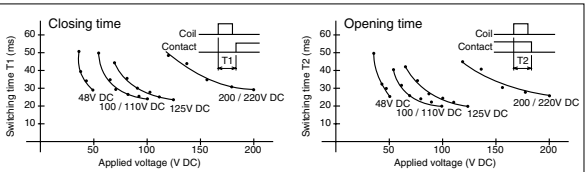
Note: *Ie* shows for the rated operating current and *Ue* shows the rated operating voltage.

Switching speed of lockout relay

(Example: BA-6 8A8B)

Resistance of coil

Voltage	48V DC	100 / 110V DC	125V DC	200 / 220V DC
Resistance	25 Ω	55 Ω	80 Ω	350 Ω



Note: The above voltage values shows the rated values of the coils.

BY type minute electric current switch

■The BY type switch is used to make / break a sequence control current or any other similar low-voltage, minute electric current circuit. It consists of a contact unit that uses twin contacts.

■The BY type switch allows for manufacturing an operation switch that only uses the BY type contact unit. It also allows for manufacturing a switch that incorporates both the BY type contact unit and the standard contact (silver contact) unit (see the right figure).

∗ A silver contact and gold contact cannot be combined in a single unit.

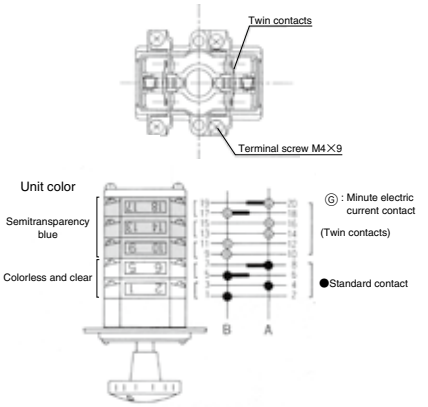
■The contact unit of the BY type switch has its housing designed as semitransparency blue, so that it can be discriminated from the standard type.

●The specification and performance are shown in the following table.

	Contact spec	Twin contacts
Electrical characteristics	Contact resistance (mΩ)	50 max.
	Withstand voltage between contacts (V AC)	2,500
	Insulation resistance (Ω)	1,000M
	Max. current carrying capacity (A)	2.0
	Max. breaking voltage (V)∗	110 DC / 110 AC
	Max. breaking current (A)∗	0.5 DC
	Min. applicable load	5V DC, 1mA
Environmental characteristics	Shock resistance (m/s²)	50
	Vibration resistance (m/s²)	2
	Operating temperature (°C)	–20 to 60

∗ Resistance load

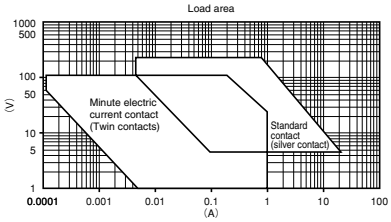
■BY type contact unit



Display example of the above switch:

BY-H5-1B1A1BL1AL2BX2AX1BLX1ALX

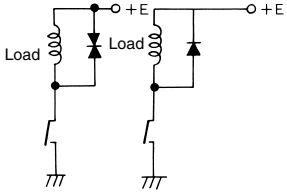
■The operating load range is as shown in the following graph. Select a contact type according to your application.



■Contact protective circuit

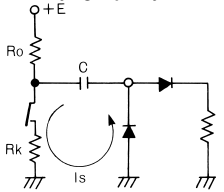
If inductive load or load that causes surge current (rush current) to flow (load-carrying capacity, lamp, long cable, or the like) is used as the load for the twin contacts, a contact protective circuit is required and shown below:

●Inductive load



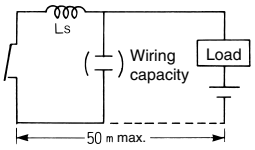
If any electromagnetic relay, solenoid, or counter having an inductance component is used as load, the energy stored in the inductance causes reverse voltage to be generated when the contacts are separated from each other. This reverse voltage reaches even several hundred volt, which can cause remarkable deterioration of the contacts. As a protective circuit, the above method is available.

●Load-carrying capacity



In this case, a capacitor is connected in parallel or in series in a closed circuit including twin contacts. The rush current that flows when the capacitance is charged or discharged can cause remarkable deterioration of the contacts. To prevent this rush current, the above method is generally known and should be used for your reference.

●Wiring capacity



If wiring is carried out at a long distance between the load and twin contacts, the contacts are affected by the capacitance resulting from the cable. Ls differs depending on the load current, but approximately 0.5 to 5 mH is assumed for the circuit.