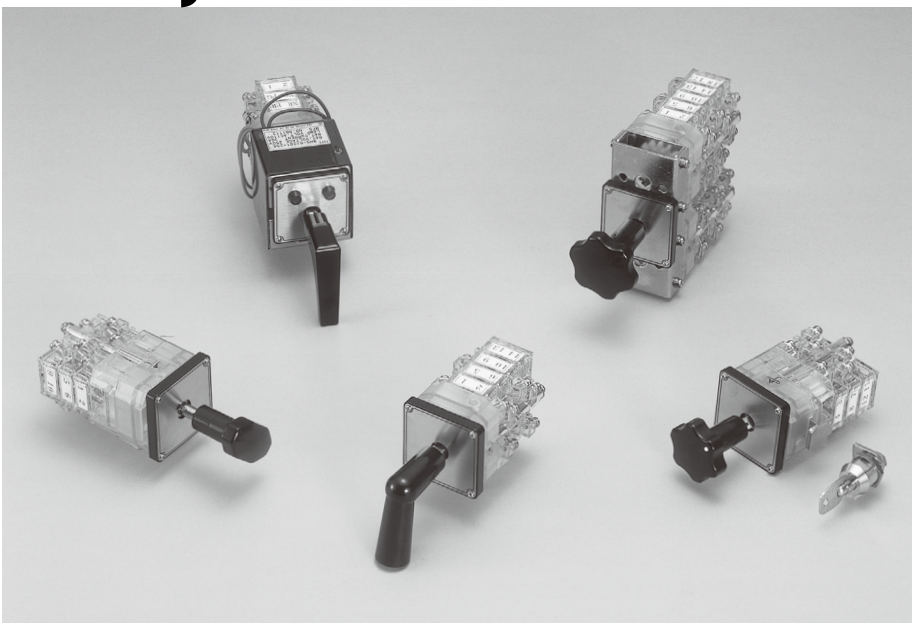
CAM-OPERATED SWITCH

B, BH TYPE

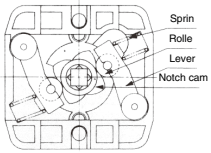
(Some models unconformable)



FEATURES

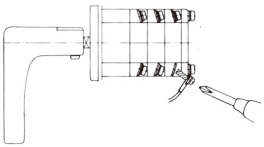
■Heavy-duty mechanical durability against high-frequent switching

The mechanical section features the optimal layout of components and the use of materials with high wear resistance, which provides accurate operation feeling and durability against high-frequent switching up to 5 million times.



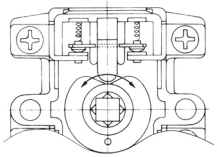
■The terminal arrangement greatly improves wiring efficiency

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

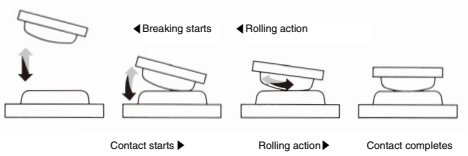


■High-performance engineering plastics ensure high quality and high reliability

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 machinery. The contact and mechanical part are transparent to facilitate checking the contacting part.

■Rolling action of contact mechanism improves contacting 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 contacting stability than the former product.



SPECIFICATIONS (RATINGS, PERFORMANCE)

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

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

AC			DC				
Rated voltage (V)	Rated current (resistance load) (A)	Rated current (inductive load) (A)	Rated voltage (V)	Rated current (resistance load) (A)	Rated current (inductive load) (A)	2 contacts used in series Rated current (resistance load) (A)	2 contacts used in series Rated 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, BH TYPE

HOW TO ORDER

Standard switches should be selected based on the following format.
For custom switches, refer to P. 205 and 206.

PRODUCT CODING

Circuit No. (arrangement)
See P. 221 and subsequent pages for standard development diagram.

BH-T2-2B2A-LD-B

Basic type

B	B type switch
BH	BH type switch

Notch | **No. of units*** | **No. of contacts*** | **Contact** | **Handle**

* A standard unit has 2 contacts, in it but some kind of units have only 1 contant due to the contact configuration.

	Munsell color code	
Code	**Handle**	**Flange**
B (Black)	N1.5	N1.5
BG (Blue Green)	7.5BG3/3.5	7.5BG4/1.5

■Notch

Code	**H**	**HB**	**HA**	**K**	**V**	**TB**	**TA**	**T**	**F**	**E**	**G**	**J**	**O**	**B**
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	(45°–5) 5 notches	(45°–6) 6 notches	(45°–7) 7 notches	(45°–8) 8 notches	(45°–2) 2 notches
	Manual return													Automatic return

Code	**A**	**S**	**TR, TL**	**FR, FL**	**FS**	**303**	**305**	**306**	**307**	**308**	**309**	**310**	**311**	**312**
Notch configuration														
Operation	(45°–2) 2 notches	(45°–3) 3 notches	(45°–3) 3 notches	(45°–4) 4 notches	(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	(30°–12) 12 notches
	Automatic return		Combination of manual and automatic return			Manual return								

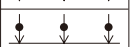
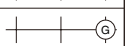
Code	**305S**	**307S**	**454S**		**455S**	**SB**	**SBS**	**SBW**	**SBTR**	**SQ**	**SQA**	**SQR**	**SQL**
Notch configuration													
Operation	(30°–5) 5 notches	(30°–7) 7 notches	(45°–4) 4 notches	(45°–4) 4 notches	(45°–5) 5 notches	Automatic rotating return							
	Automatic return					Automatic axial return							

Code	**SQRL**	**SR**	**SRL**	**SRR**	**SY**	**SN**	**SM**	**SUB□**	**SUY□**	**HC**	**TC**	**FC**	**SC**
Notch configuration										The handle is removable as in H, T, F, and S.			
Operation	Automatic rotating return							Manual rotating return		(90°–2) 2 notches	(45°–3) 3 notches	(45°–4) 4 notches	(45°–3) 3 notches
	Automatic axial return	Manual axial return			Manual axial return	Automatic axial return			Manual axial return	Manual return			Automatic return

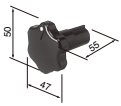
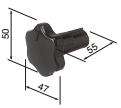
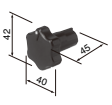
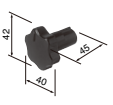
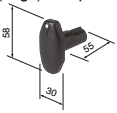
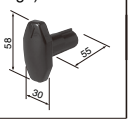
Code	**HW**	**TW**	**FW**	**EW**
Notch configuration	The stage is the dual body type as in H, T, F, and E.			
Operation	(90°–2) 2 notches	(45°–3) 3 notches	(45°–4) 4 notches	(45°–5) 5 notches
	Manual return			

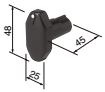
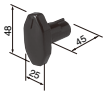
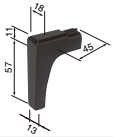
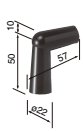
(Note) In the above table, the ● mark indicates the ordinary stop position of the switch and the → mark shows that the switch moves in this direction and then automatically stops in the arrowhead position.
●——● means that the switch is manually moved from ● to ●.

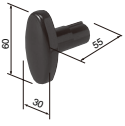
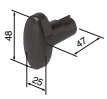
■Contact

Code	Graphic symbol	Designation	Description	Code	Graphic symbol	Designation	Description
U		U (push) / L (pull)-contact	Contacts open after pulling	L		Overlapping contact	Before either contact is opened between notches, the next contact is closed.
L			Contacts close after pulling				
Y		Maintained closing contact	When returned to the right, contacts maintain closing.	B, A		Normal contact	B, A, T···V
Z			When returned to the left, contacts maintain closing.	T···V			Closed in each notch position.
M		Continuous closing contact	Contacts close between left and center.	BX		Gold plating contact	Closed in the B notch position.
N			Contacts close between right and center.	AX			Closed in the A notch position.

■Handle

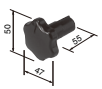
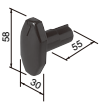
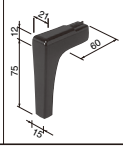
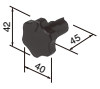
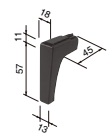
Code	LDP	LD	HDP	HD	LFP	LF
Shape	Rose shape (large) with pointer 	Rose shape (large) 	Rose shape (small) with pointer 	Rose shape (small) 	Octagonal shape (large) with pointer 	Octagonal shape (large) 

Code	HFP	HF	LP	HP	MP	HR
Shape	Octagonal shape (small) with pointer 	Octagonal shape (small) 	Stick shape (large) 	Stick shape (small) 	Pistol shape (large) 	Pistol shape (small) 

Code	LS*	LE	HE
Shape	Knob shape 	Egg shape (large) 	Egg 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)

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

●CONTROL SWITCH

CAM-OPERATED SWITCH

B, BH TYPE

SPECIAL SPECIFICATION SWITCH CODING FOR ORDERING

1 Key-operated switch

The contact can be directly opened / closed with key operation.

B-KMC-H2-2B2A-B key off B K6510

Notch, No. of units, No. of contacts, Contact, Handle and flange color, Lock position, Key No.

Code	Switch
B-KMC	B type
BHO	BH type

●S, H, T, and F notches are available.
●Max. unit No. is 4.
●The keys are Takigen's C-88 and C-110; the standard is No. K6510 of C-88.
●See P. 220 for key system.
●Key off position

2 Switch with key locking mechanism

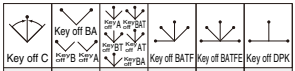
Locked with an insert key.
To open / close the switch, unlock the key and then operate the handle.

B-KM-H2-2B2A-LD-B key off B K6510

Notch, No. of units, No. of contacts, Contact, Handle, Handle and flange color, Lock position, Key No.

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

●S, H, T, F, W, and SB notch types are available.
●Max. unit No. is 10.
●See P. 220 for key system.
●The keys are Takigen's C-88 and C-110; the standard is No. K6510 of C-88.
●Key off position



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 key off B

Notch, No. of units, No. of contacts, Contact, Handle, Handle and flange color, Lock position

Code	Switch	Unlocking lever type
B-KH	B type	Pushing type
B-KHM	B type	Pulling type
B-KHL	B type	Pulling type (manual)
BHP	BH type	Pushing type
BHPS	BH type	Pushing type

●S, H, T, F, and SB notch types are availnle.
●Max. unit No. is 10.
●The padlock is positioned below the switch as standard.
●No padlock is provided.
●Use a padlock with diameter of 6 mm.
●Lockable position

Before indicating your requirements, see the above item 2 for switch with key locking mechanism.

4 High-frequent type switch

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

BM-H2-2B2A-LD-B

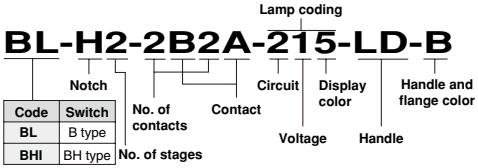
Notch, No. of contacts, Contact, Handle, Handle and flange color, No. of units

Code	Switch
BM	B type
BHM	BH type

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

5 Switch with indicator lamp (separate)

This switch is provided with an indicator lamp on its top.
An indicator mounting hole is additionally required.



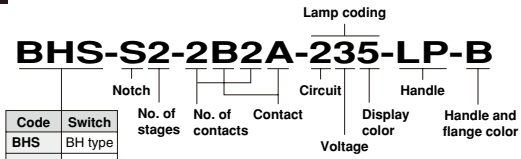
Code	Switch
BL	B type
BHI	BH type

- The notches and specification are the same as those of the standard switches.
- For the circuit, voltage, and display color of the indicator, 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

6 Switch with indicator lamp (built-in)

This switch is provided with a indicator lamp on its top.



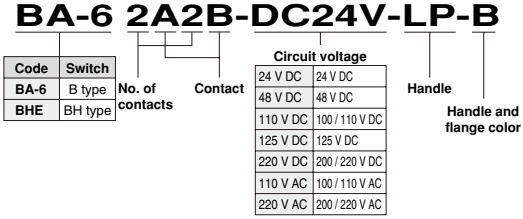
Code	Switch
BHS	BH type
BHS-B	BH type (with rear terminal block)

- S, H, T, and SB notches types are available. The SR and SY types are also available.
- For the circuit, voltage, and display color of the indicator lamp, 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

7 Lockout relay

This is an auxiliary relay used in a circuit breaker or the main part of adjustment.



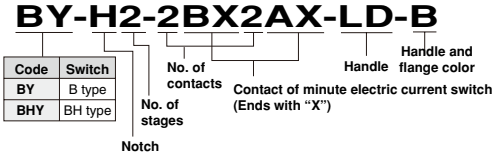
Code	Switch
BA-6	B type
BHE	BH type

Circuit voltage	
24 V DC	24 V DC
48 V DC	48 V DC
110 V DC	100 / 110 V DC
125 V DC	125 V DC
220 V DC	200 / 220 V DC
110 V AC	100 / 110 V AC
220 V AC	200 / 220 V AC

- For the switching speed, see technical data on P. 215.
- Max unit No. is 8.
- Up to 8 stages available.
- The model with a key is BA-6K, BHEK using Takigen's C-88.specify the corresponding numbers.

8 Minute electric current switch (BY)

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



Code	Switch
BY	B type
BHY	BH type

- 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 contacts of the minute electric current switch are in the dedicated stage.

CAM-OPERATED SWITCH

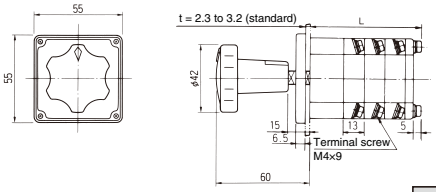
B, BH TYPE

OUTER DIMENSIONS B TYPE

Manual return and automatic return type

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

∗ All the dimensions and outlines of the BY type are identical other than unit color (blue).

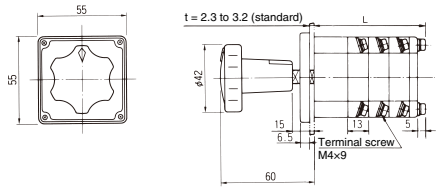


No. of units	1	2	3	4	5	6	7	8	9	10
L (mm)	43	56	69	82	95	108	121	134	147	160

∗ The automatic return type can accept up to 6 units (12 contacts).

Combination of manual and automatic return type

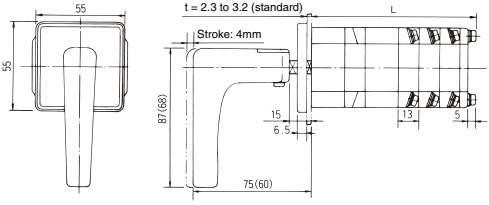
B-TR,TL,FR,FL,FS



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

Automatic return type by pulling

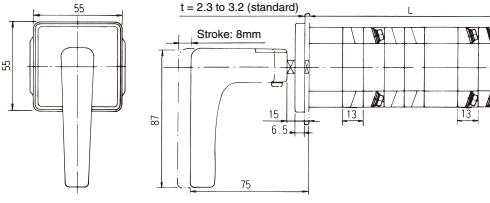
B-SB



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

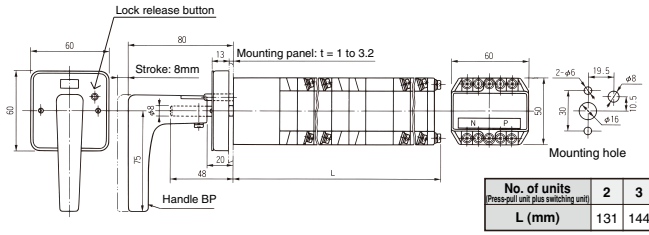


No. of units	2	3	4	5	6	7	8
L (mm)	116	129	142	155	168	181	194

Pulling lock and pushing lock types

B-SN,SM

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

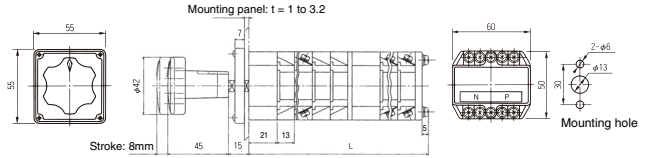


No. of units (Press-pull unit plus switching unit)	2	3	4	5	6	7	8
L (mm)	131	144	157	170	183	196	209

* The shaft shape is different from other shaft shapes. Select a handle shape from the handle codes (for dual body type) on p. 204.

Combination return type

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

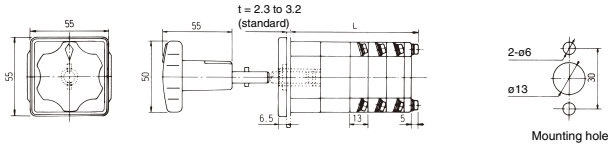


No. of units	2	3	4	5	6	7	8
L (mm)	140	153	166	179	192	205	218

Handle removal type

B-HC,TC,FC,SC

* For HC, TC, and FC, specify the handle removal position. The handle removal position for SC is the center only.

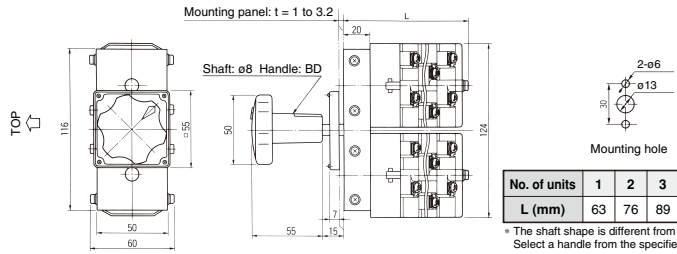


No. of units	1	2	3	4	5	6	7	8	9	10
L (mm)	65	78	91	104	117	130	143	156	169	182

* The automatic return type can accept up to 6 units (12 contacts).

Dual body type

B-HW,TW,FW,EW



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

* The shaft shape is different from that of the other types. Select a handle from the specified range on P. 204.

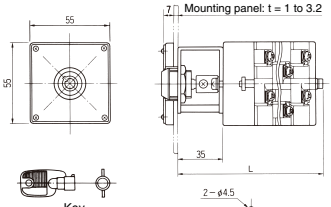
CAM-OPERATED SWITCH

B, BH TYPE

OUTER DIMENSIONS B TYPE

Key-operated type

B-KMC



The standard key is C-88 (Takigen). Master key is also available.
C-110 (Takigen) key is provided for master key type.

Key off position

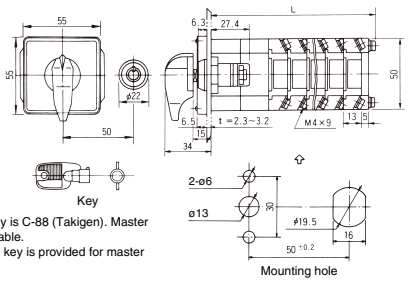
S	H	HB HA	T	F	E

The key is used to directly operate the switch.
For the key, see the specifications of keys.

No. of stages	1	2	3	4
L (mm)	79	92	105	118

With key lock

B-KM



The standard key is C-88 (Takigen). Master key is also available.
C-110 (Takigen) key is provided for master key type.

Key off position

S	H	T	F	E	K

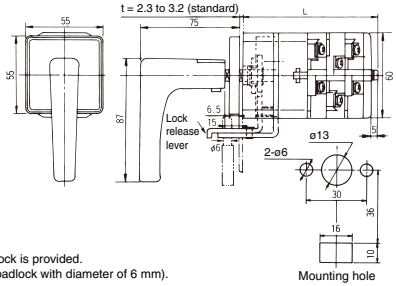
Key lock position

The upper position is standard.

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

With padlock mechanism

B-KH



∗ No padlock is provided.
(Use a padlock with diameter of 6 mm).

Key off position

S	H	T	F	E	K

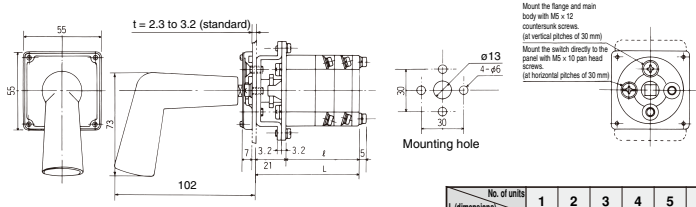
• Remove the padlock and push the lock release lever for handle operation. The switch will be locked automatically after releasing your fingers.

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

High-frequent use

BM

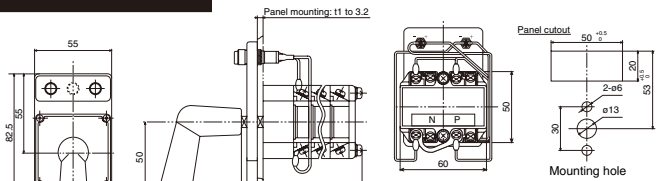
This switch is most suitable for heavy-duty applications, such as in a steel making plant.



No. of units / L (dimensions)	1	2	3	4	5	6	7	8	9
L (mm)	60	73	86	99	112	125	138	151	164

With indicator lamp (separate)

BL



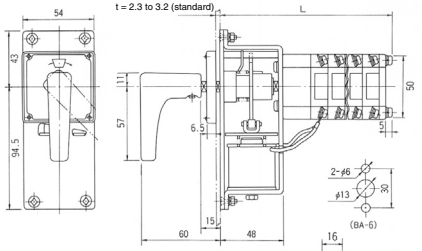
No. of units	1	2	3	4	5	6	7	8	9	10
L (mm)	56	69	82	95	108	121	134	147	160	173

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

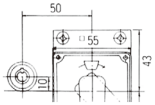
Lockout relay

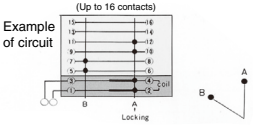
BA-6,6K

BA-6



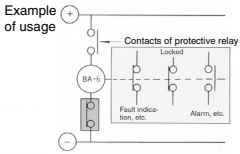
BA-6K (with padlock)





Features and application

The coil is of instantaneous rating, requiring that the self-contact be connected in series to the coil as illustrated.



Contacts specified by a user.

The contacts for the provided coil are not included in the contacts ordered.

Coil specifications

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

■Operation speed at trip voltage

	48 V DC	110 V DC	125 V DC	220 V DC
Coil excitation time	31.5mS	25mS	23mS	30mS
Opening time	27mS	20.5mS	19mS	25mS
Closing time	30mS	25mS	22.5mS	28.5mS

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

CAM-OPERATED SWITCH

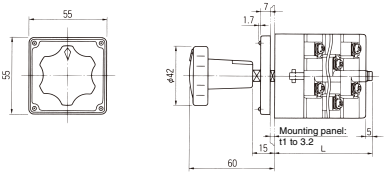
B, BH TYPE

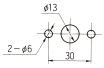
OUTER DIMENSIONS BH TYPE

Manual return and automatic return type

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

∗ All models of the BHY type have the same dimensions and shape. (Unit color: Blue)



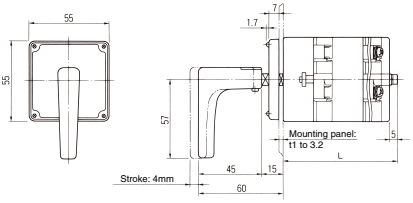


Mounting hole

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

Automatic return type by pulling

BHX-SB

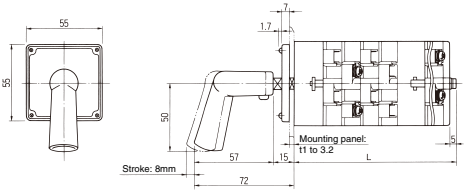


Mounting hole

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

Automatic return type by pulling and pushing

BHW-SQ,SR,BHX-SY

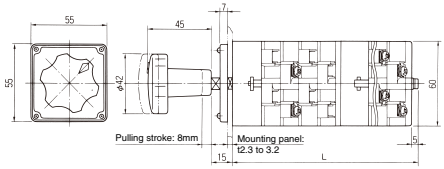


Mounting hole

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

Automatic or manual return type in axial direction

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



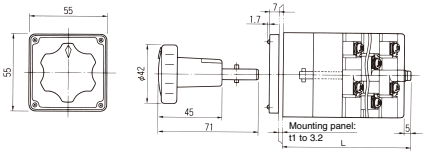
Mounting hole

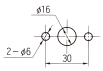
No. of units	2	3	4	5	6	7	8
L (mm)	140	153	166	179	192	205	218

Handle removal type

BHK-HC,TC,FC,SC

∗ For HC, TC, and FC, specify the handle removal position.
The handle removal position for SC is the center only.



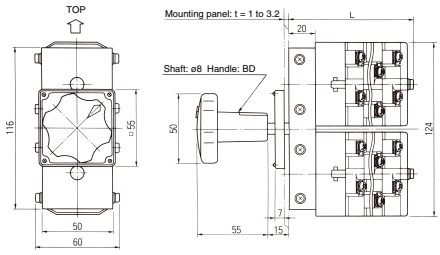


Mounting hole

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

Dual body type

BH-HW,TW,FW,EW



Mounting hole

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

∗ The shaft shape is different from that of the other types.
Select a handle from the specified range on P. 204.

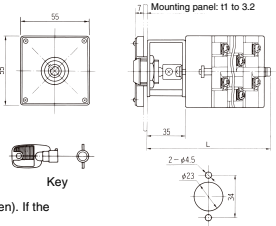
CAM-OPERATED SWITCH

B, BH TYPE

OUTER DIMENSIONS BH TYPE

Key-operated type

BHO



The standard key is C-88 (Takigen). If the master key is also available.
C-110 (Takigen) key is provided for master key type.

Key off position

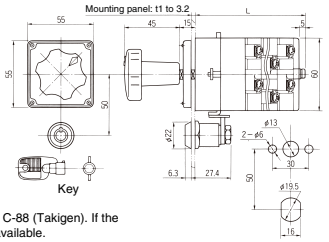
		HB / HA			
S	H	HB HA	T	F	E

The key is used to directly operate the switch.
For the key, see the specifications of keys.

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

With key lock

BHC



The standard key is C-88 (Takigen). If the master key is also available.
C-110 (Takigen) key is provided for master key type.

Key off position

S	H	T	F	E	K

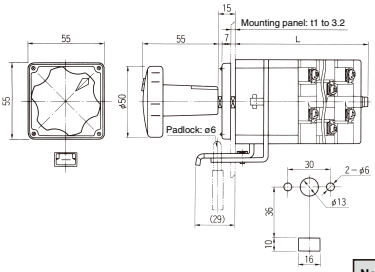
Key lock position

The upper position is standard.

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

With padlock mechanism

BHP



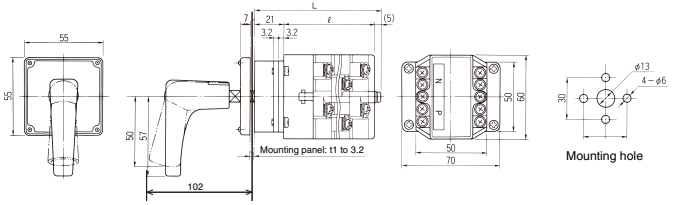
∗ No padlock is provided.
(Use a padlock with diameter of 6 mm).

• Remove the padlock and push the lock release lever for handle operation. The switch will be locked automatically after releasing your fingers.

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

High-frequent use

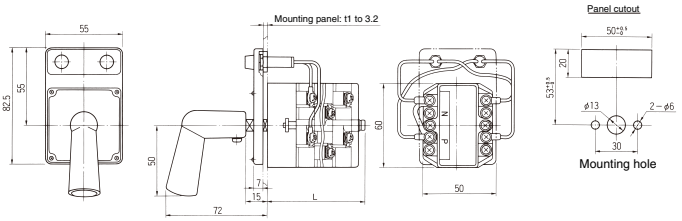
BHM



L (dimensions) \ No. of units	1	2	3	4	5	6	7	8	9
ℓ (mm)	39	52	65	78	91	104	117	130	143
L (mm)	60	73	86	99	112	125	138	151	164

With indicator lamp (separate)

BHI

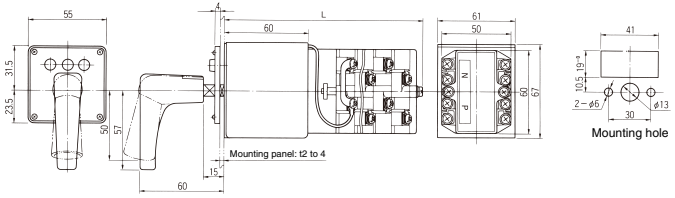


No. of units	1	2	3	4	5	6	7	8	9	10
L (mm)	56	69	82	95	108	121	134	147	160	173

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

With indicator lamp (built-in)

BHS



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

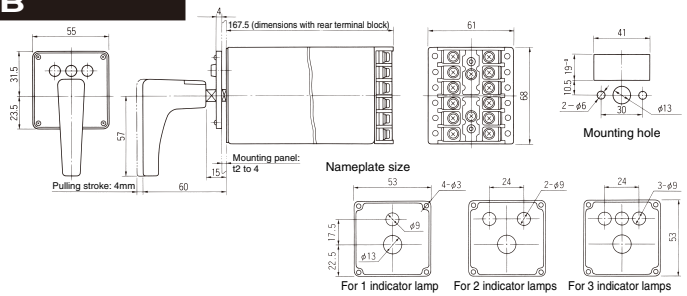
CAM-OPERATED SWITCH

B, BH TYPE

OUTER DIMENSIONS BH TYPE

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

BHS-B

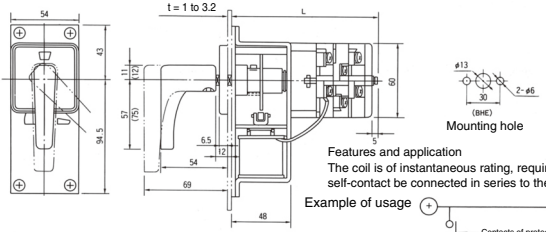


Lockout relay

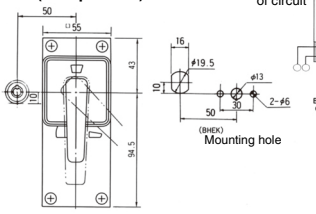
∗ The BHS-B type allows for a maximum of 3 units (6 contacts).

BHE,BHEK

BHE



BHEK (with padlock)



Coil specifications

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

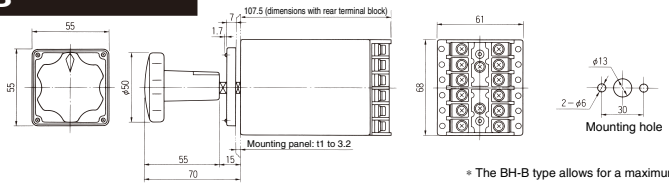
■Operation speed at trip voltage

	48V DC	110V DC	125V DC	220V DC
Coil excitation time	31.5mS	25mS	23mS	30mS
Opening time	27mS	20.5mS	19mS	25mS
Closing time	30mS	25mS	22.5mS	28.5mS

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

Rear terminal type

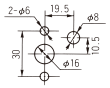
BH-B

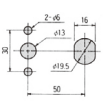
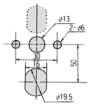
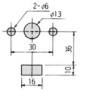
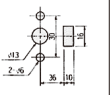
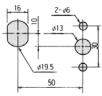


∗ The BH-B type allows for a maximum of 3 units (6 contacts).

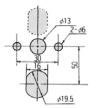
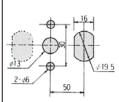
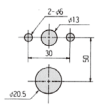
MOUNTING HOLE DIMENSIONS

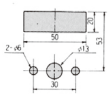
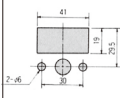
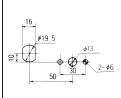
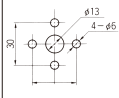
B TYPE

B			B-SN, SM	B-HC, TC	B-KMC	B-KYC	BL
	H.T S SB SQ W BA-6	Manual return Automatic return Pushing and pulling Dual body type Lockout relay					
Mounting screw	M5 × 12 countersunk screws: 2		M5 × 12 countersunk screws: 2	M5 × 12 countersunk screws: 2	M4 × 12 countersunk screws: 2	M30 ring	M5 × 10 countersunk screws: 2

B-KM		B-KH		BA-6K	BM		
Key: right	Key: bottom	Key: bottom	Key: right				
						H.T S SB	Matual return Automatic return Pulling
M5 × 12 countersunk screws: 2	M5 × 10 countersunk screws: 2	M5 × 12 countersunk screws: 2	M5 × 10 countersunk screws: 2	M5 × 10 countersunk screws: 2	M5 × 10 pan head screws: 2 M5 × 12 countersunk screws: 2		

BH TYPE

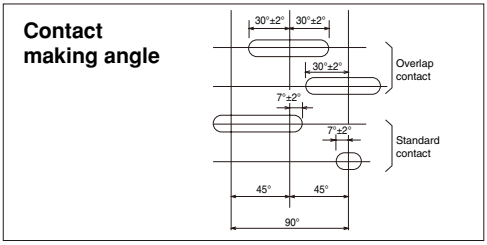
BH			BHK	BHO	BHC		BHPS
	H.T S SB SQ W BA-6	Matual return Automatic return Pushing and pulling Dual body type Lockout relay			Key: bottom 	Key: right 	
Mounting screw	M5 × 10 countersunk screws: 2		M5 × 12 countersunk screws: 2	M4 × 12 countersunk screws: 2	M5 × 10 countersunk screws: 2		M5 × 10 countersunk screws: 2

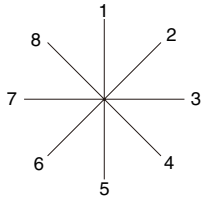
BHP		BHI	BHS, BHSB	BHEK	BHM		
Key: bottom	Key: right						
						H.T S SB	Manual return Automatic return Pulling
M5 × 10 countersunk screws: 2		M5 × 10 countersunk screws: 2	M5 × 12 countersunk screws: 2	M5 × 10 countersunk screws: 2	M5 × 10 pan head screws: 2 M5 × 10 countersunk screws: 2		

CAM-OPERATED SWITCH

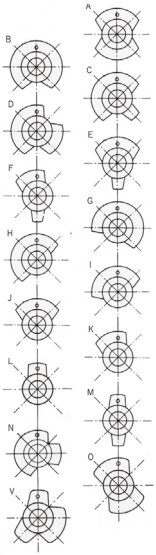
B, BH TYPE

CONTACT ARRANGEMENT DIAGRAM FOR B AND BH TYPE CAM SWITCHES

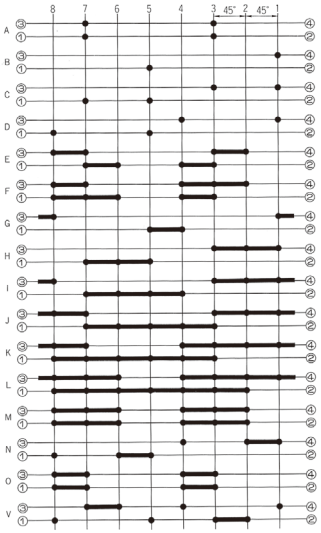




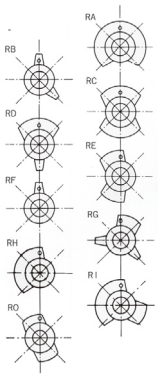
Standard cam (45 degrees)



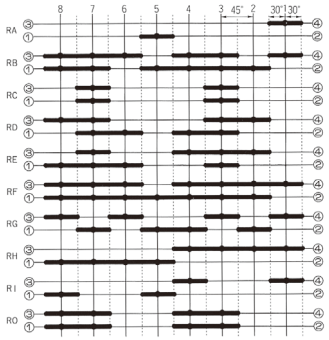
Contact making position

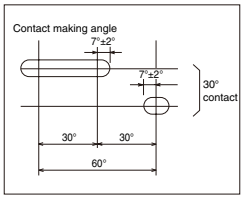


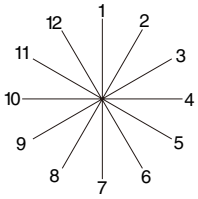
Overlap cam (45 degrees)



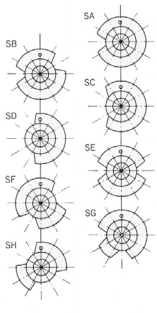
Contact making position



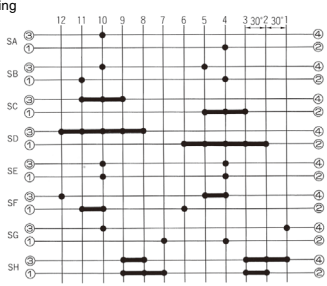




30-degree cam



Contact making position



CAM-OPERATED SWITCH

B, BH TYPE

REPRESENTATION OF CONTACT ARRANGEMENT DIAGRAM

1 Graphic symbol

Contact type	Symbol
Normal making contact	●
Maintained making contact	←◉
Continuous making contact	▬
Overlap making 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.
Use vertical lines for notch positions and horizontal lines for connected circuits when assigning terminal numbers. To enter the contact symbols, follow the order of terminal numbers starting with the front stage.

Fig. 1 T2-1B1AT1BAL1TL

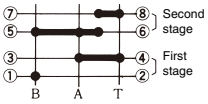


Fig. 1 shows the 45-degree, 3-stage switching type.
- Terminal 1-2 is closed at the B notch.
- Terminal 3-4 is continuously closed at the A and T notches.
- Terminals 5-6 and 7-8 are simultaneously closed (overlapping) in the middle between the A and T notches.

Fig. 2 SBZ3-1Y1Z1M1N1C1A

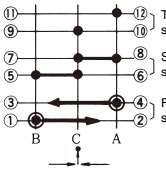


Fig. 2 shows the automatic return type by pulling. The handle can be pulled at the central position, and it returns to the central position after releasing the handle.
- Terminal 1-2 is closed at the B notch. Even if it returns to the central position, it remains closed. It is opened at the A notch.
- 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) = $\frac{\text{(total number of contacts)+1}}{2}$

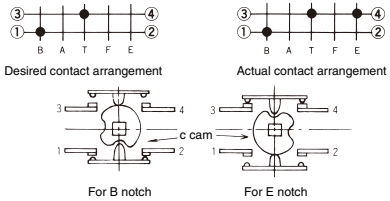
■Number of stages

Each units is provided with 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 provided with 2 contacts.

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

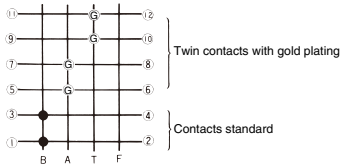
(5 notches at 45 degrees, 3 notches at 90 degrees or more)

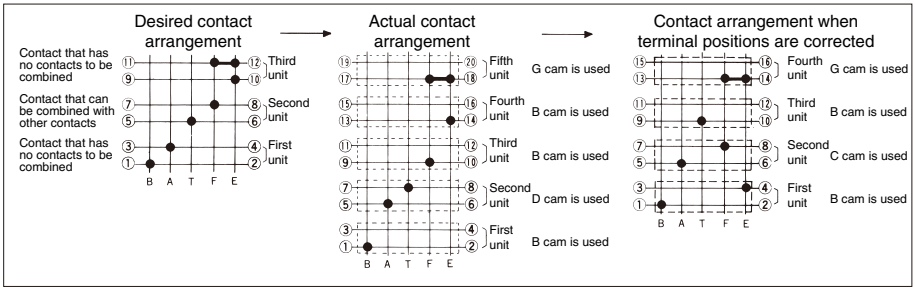
A single cam actuates 2 contacts, upper and lower. Therefore, when the cam is rotated by 180 degrees or more, its concavity to close either contact may also close the other contact. In this case, the upper and lower contacts cannot be combined freely.



3. Contact diagram of BY type arrangement (example)

F3-2B2AX2TX





KEY SYSTEM

■With key lock (B-KH, B-KM, BHP, BHC)

Type \ Notch	S	H	T	F	E	K
Key off position	C	BA, B, A	BA, BT, AT, BAT, A	BATF	BATFE	DPK

The ● mark indicates the key off position of the handle.
The B-KM and BHC types are locked by removing the key.
The B-KH and BHP types are locked with a padlock.

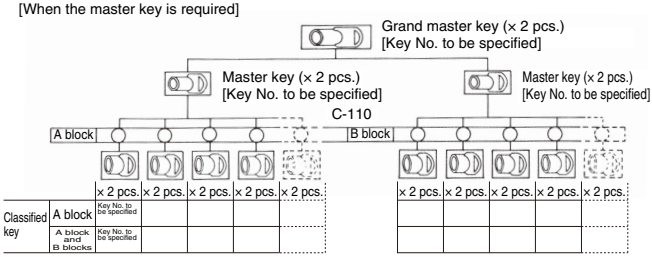
■Key-operated type (B-KMC, BHO, B-KYC)

Type \ Notch	S	H	T	F	E	H (B-KYC)
Key off position	C	B, A, B	A	T, A	T	B

The ● mark indicates the key off position of the handle.

■For C-110 cylinder key

[When the master key is required]

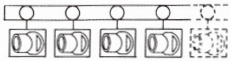


Classified key		× 2 pcs.	× 2 pcs.	× 2 pcs.	× 2 pcs.	× 2 pcs.	× 2 pcs.	× 2 pcs.	× 2 pcs.	× 2 pcs.	× 2 pcs.
	A block	Key No. to be specified									
	A block and B blocks	Key No. to be specified									

●When placing an order for a key system, the key type is determined by whether the use is shared by the door lock and whether the master key is required.
●The insertion / removal count (life) of the key is 10,000 times for both of the cylinder key and the cam rotor key.

■For C-88 cylinder key

[When the mast key is not required]



			× 2 pcs.	× 2 pcs.	× 2 pcs.	× 2 pcs.	× 2 pcs.
Indentical key	K6510 only	1 type	K6510	K6510	K6510	K6510	.....
Classified key	K6511 – K6520	10 types	K6511	K6512	K6513	K6514	.....

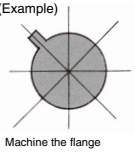
●Key numbers may be engraved on request.

■When the handle is removed (key shaft)

●This information is applicable for the B-HC, TC, FC, SC, and BHK types.

●The standard key shaft allows for a single type of action.

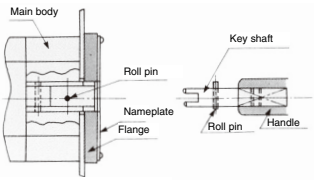
(Example)



Available combination	Key shaft				
	Main body				
Key combination No.		KB1	KB2	KB3	KB4

Note: When ordering, specify the removal position.

< Mechanical part >



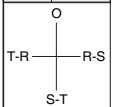
CAM-OPERATED SWITCH

B, BH TYPE

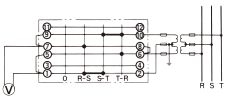
STANDARD ARRANGEMENT DIAGRAM

a) For voltmeter (standard handle: HDP)

Type V3

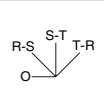


Nameplate No. 54-753

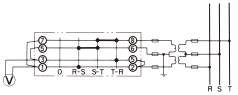


3-phase, 3-wire, 2-PT

Type V2



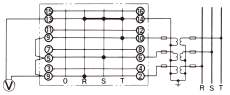
Nameplate No. 54-490



3-phase, 3-wire, 2-PT

Type NV4

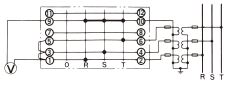
Nameplate No. 54-752



3-phase, 3-wire, 3-PT

Type NV3

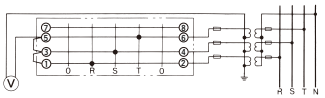
Nameplate No. 54-452



3-phase, 3-wire, 3-PT

Type NV2E

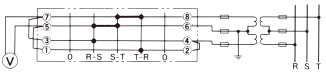
Nameplate No. 54-558



3-phase, 4-wire, 3-PT

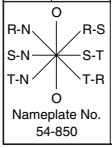
Type V2E

Nameplate No. 54-557

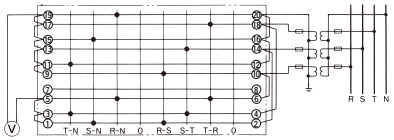


3-phase, 3-wire, 2-PT

Type V5W



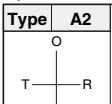
Nameplate No. 54-850



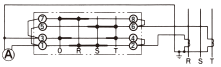
3-phase, 4-wire, 3-PT

b) For ammeter (standard handle: HDP)

Type A2

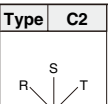


Nameplate No. 54-755

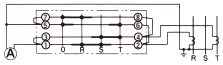


3-phase, 3-wire, 2-CT

Type C2

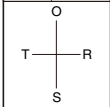


Nameplate No. 54-495

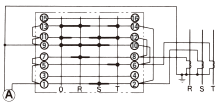


3-phase, 3-wire, 2-CT

Type A4



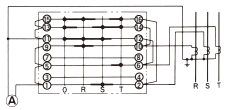
Nameplate No. 54-755



3-phase, 3-wire, 3-CT

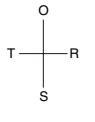
Type C4

Nameplate No. 54-495

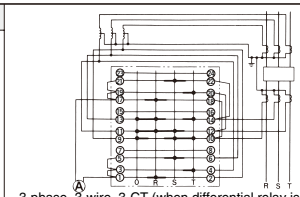


3-phase, 3-wire, 3-CT

Type A6

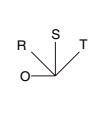


Nameplate No.
54-955

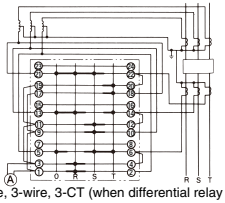


3-phase, 3-wire, 3-CT (when differential relay is used)

Type C6



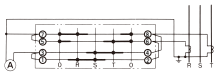
Nameplate No.
54-495



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

Type C2E

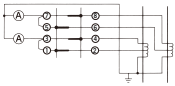
Nameplate No.
54-555



3-phase, 3-wire, 2-CT

Type C2H

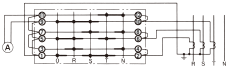
Nameplate No.
*



single-phase, 2-line

Type C3E

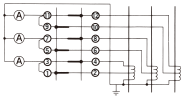
Nameplate No.
54-556



3-phase, 4-wire, 3-CT

Type C3HT

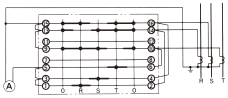
Nameplate No.
*



single-phase, 3-line

Type C4E

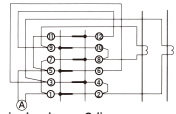
Nameplate No.
54-555



3-phase, 3-wire, 3-CT

Type C3HA

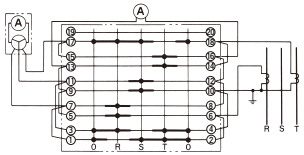
Nameplate No.
*



single-phase, 2-line

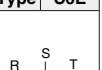
Type C5E

Nameplate No.
54-555

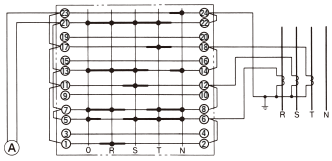


3-phase, 3-wire, 2-CT

Type C6E



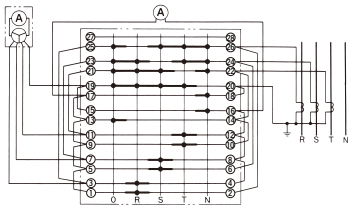
Nameplate No.
54-556



3-phase, 4-wire, 3-CT

Type C7E

Nameplate No.
54-556



3-phase, 4-wire, 3-CT

* For details of nameplates, see p. 241 and subsequent pages.

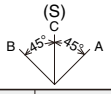
●CONTROL SWITCH

CAM-OPERATED SWITCH

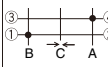
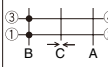
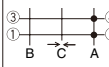
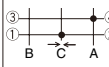
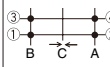
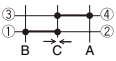
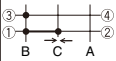
B, BH TYPE

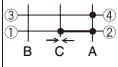
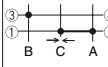
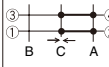
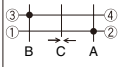
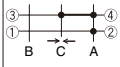
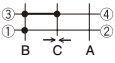
STANDARD ARRANGEMENT DIAGRAM

■Automatic return type (S, SB)

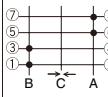
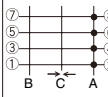
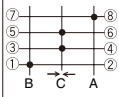
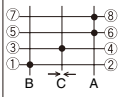
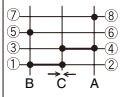
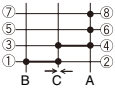
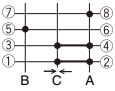


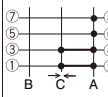
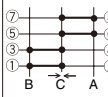
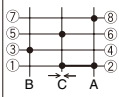
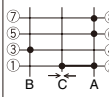
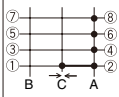
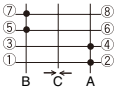
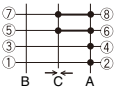
●2 contacts (1 unit)

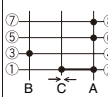
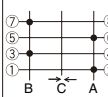
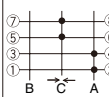
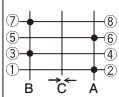
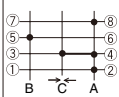
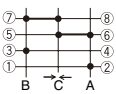
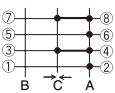
Type (automatic return)	S1001	S1002	S1003	S1004	S1005	S1006	S1007
Detail	S1-1B1A	S1-2B	S1-2A	S1-1C1A	S1-2BA	S1-1M1N	S1-1M1B
Contact arrangement							
Type (pulling)	SB1001	SB1002	SB1003	SB1004	SB1005	SB1006	SB1007

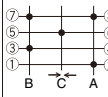
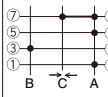
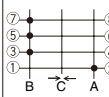
Type (automatic return)	S1008	S1009	S1010	S1101	S1102	S1103
Detail	S1-1N1A	S1-1N1B	S1-2N	S1-1A1B	S1-1A1N	S1-1B1M
Contact arrangement						
Type (pulling)	SB1008	SB1009	SB1010	SB1101	SB1102	SB1103

●4 contacts (2 units)

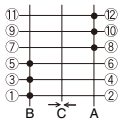
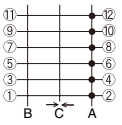
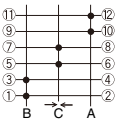
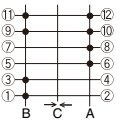
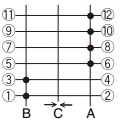
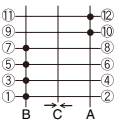
Type (automatic return)	S2001	S2002	S2003	S2004	S2005	S2006	S2007
Detail	S2-2B2A	S2-4A	S2-1B2C1A	S2-1B1C2A	S2-1M1N1B1A	S2-1M1N2A	S2-2N1B1A
Contact arrangement							
Type (pulling)	SB2001	SB2002	SB2003	SB2004	SB2005	SB2006	SB2007

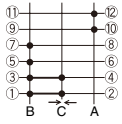
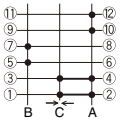
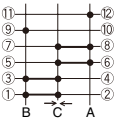
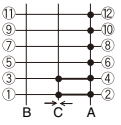
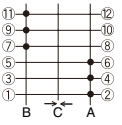
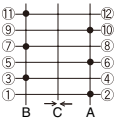
Type (automatic return)	S2008	S2009	S2010	S2011	S2012	S2101	S2102
Detail	S2-2N2A	S2-2M2N	S2-1N1B1C1A	S2-1N1B2A	S2-1N3A	S2-2A2B	S2-2A2N
Contact arrangement							
Type (pulling)	SB2008	SB2009	SB2010	SB2011	SB2012		

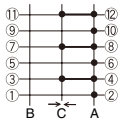
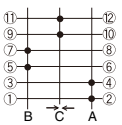
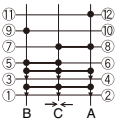
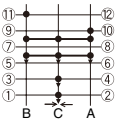
Type (automatic return)			S2103	S2104	S2105	S2106	S2107
Detail	SB2-1N1B2A	SB2-2 (1A1B)	S2-2A2C	S2-2 (1A1B)	S2-1A1N1B1A	S2-1A1B1N1M	S2-2 (1A1N)
Contact arrangement							
Type (pulling)	SB2101	SB2102	SB2103	SB2104	SB2105	SB2106	SB2107

Type (automatic return)	S2108	S2109	S2110		S2120	
Detail	S2-1A1B1C1BA	S2-1A1B1A1N	S2-1A3B	SB2-2 (1B1A)	S2-1B1A1N	SBL2-2L1A1B
Contact arrangement						
Type (pulling)	SB2108	SB2109	SB2110	SB2111		SBL2212

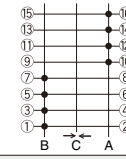
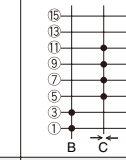
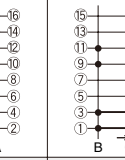
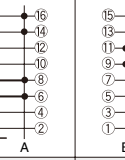
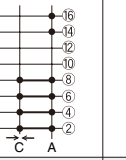
●6 contacts (3 units)

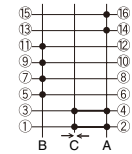
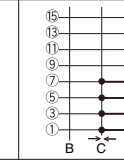
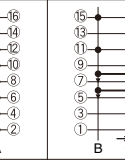
Type (automatic return)	S3001	S3002	S3003	S3004	S3005	S3006
Detail	S3-3B3A	S3-6A	S3-2B2C2A	S3-2B2A2BA	S3-2B4A	S3-4B2A
Contact arrangement						
Type (pulling)	SB3001	SB3002	SB3003	SB3004	SB3005	SB3006

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	SBL3-3U3L1A1B
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

●CONTROL SWITCH

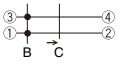
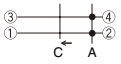
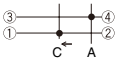
CAM-OPERATED SWITCH

B, BH TYPE

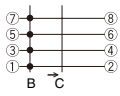
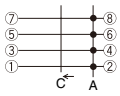
STANDARD ARRANGEMENT DIAGRAM

■Automatic return to the center type (B, A)

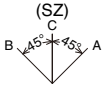
●2 contacts (1 unit)

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

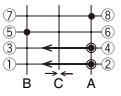
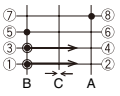
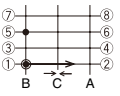
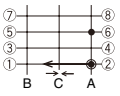
●4 contacts (2 units)

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

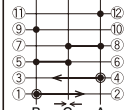
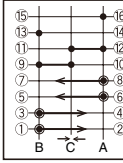
■Automatic return to the center type (with maintained contact) (SZ)



●4 contacts (2 units)

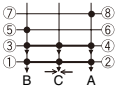
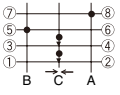
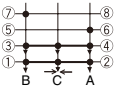
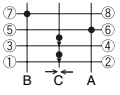
Type	SZ2001	SZ2002	SZ2003	SZ2004
Detail	SZ2-2Z1B1A	SZ2-2Y1B1A	SZ2-1Y1B	SZ2-1Z1A
Contact arrangement				

●6 contacts (3 units) ●8 contacts (4 units)

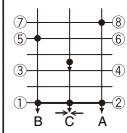
Type	SZ3001	SZ4001
Detail	SZ3-1Y1Z1M1N1B1A	SZ4-2Y2Z1M1N1B1A
Contact arrangement		

■Pulling and pushing type (SQ)

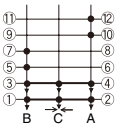
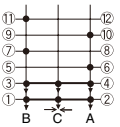
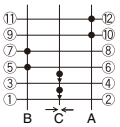
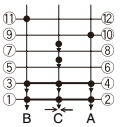
●4 contacts (2 units)

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

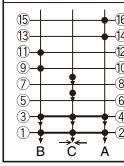
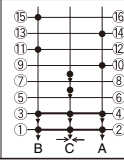
●4 contacts (3 units)

Type	SQ2101
Detail	SQ2-1U1L1B1A
Contact arrangement	

●6contacts (3 units)

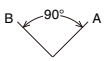
Type	SQ3201	SQ3202	SQ3203	SQ3311
Detail	SQ3-2U2B2A	SQ3-2U2 (1A1B)	SQ3-2L2B2A	SQ3-2U2L1A1B
Contact arrangement				

●8 contacts (4 units)

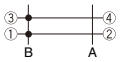
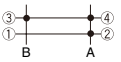
Type	SQ4301	SQ4311
Detail	SQ4-2U2L2B2A	SQ4-2U2L2 (1A1B)
Contact arrangement		

■90° 2-position changeover (H)

(H)

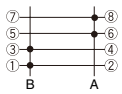
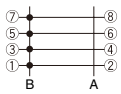
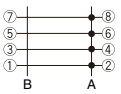
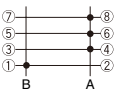
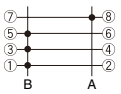
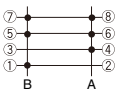


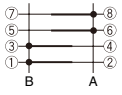
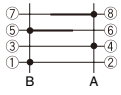
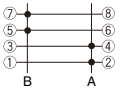
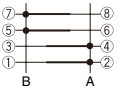
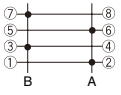
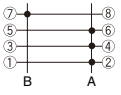
●2 contacts (1 unit)

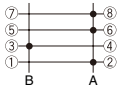
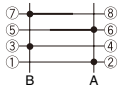
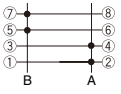
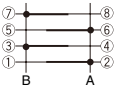
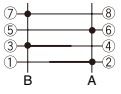
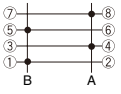
Type	H1001	H1002	H1003	H1004	H1005	H1006
Detail	H1-1B1A	H1-2B	H1-2A	H1-1BL1AL	H1-1B1BA	H1-1A1BA
Contact arrangement						

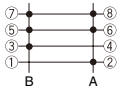
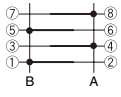
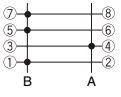
Type	H1101	H1102
Detail	H1-1A1B	H1-1AL1BL
Contact arrangement		

●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	H2107	H2108	H2109	H2110
Detail	H2-1A1B2A	H2-1A1B1AL1BL	H2-1AL1A2B	H2-2 (1AL1BL)	H2-1AL1BL1A1B	H2-2 (1B1A)
Contact arrangement						

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

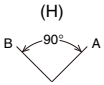
●CONTROL SWITCH

CAM-OPERATED SWITCH

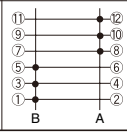
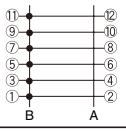
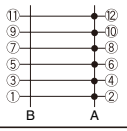
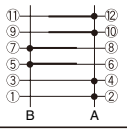
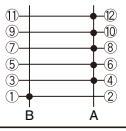
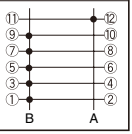
B, BH TYPE

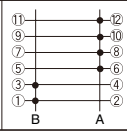
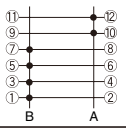
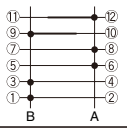
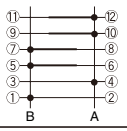
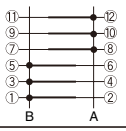
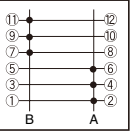
STANDARD ARRANGEMENT DIAGRAM

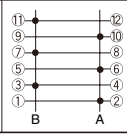
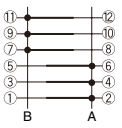
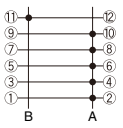
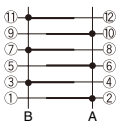
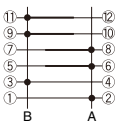
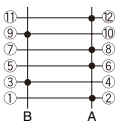
■90° 2-position changeover (H)

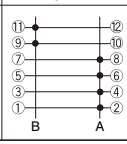
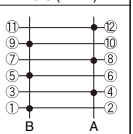


●6 contacts (3 units)

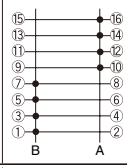
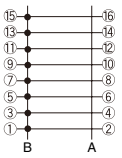
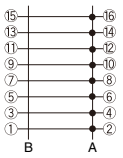
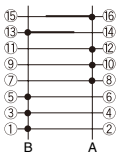
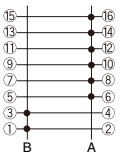
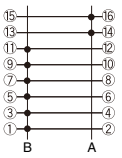
Type	H3001	H3002	H3003	H3004	H3005	H3006
Detail	H3-3B3A	H3-6B	H3-6A	H3-2A2BL2AL	H3-1B5A	H3-5B1A
Contact arrangement						

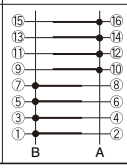
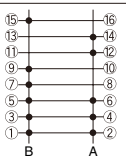
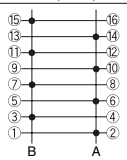
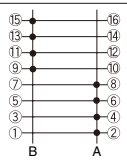
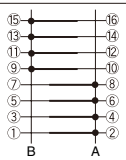
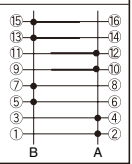
Type	H3007	H3008	H3009	H3010	H3011	H3101
Detail	H3-2B4A	H3-4B2A	H3-2B2A1BL1AL	H3-1B1A2BL2AL	H3-3BL3AL	H3-3A3B
Contact arrangement						

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

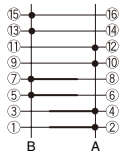
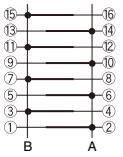
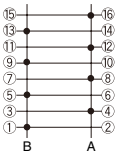
Type	H3108	H3109
Detail	H3-4A2B	H3-3 (1B1A)
Contact arrangement		

●8 contacts (4 units)

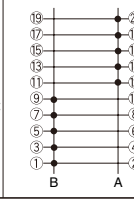
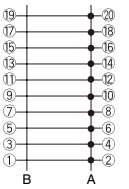
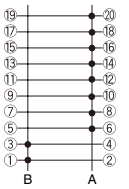
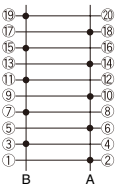
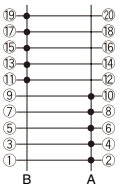
Type	H4001	H4002	H4003	H4004	H4005	H4006
Detail	H4-4B4A	H4-8B	H4-8A	H4-3B3A1BL1AL	H4-2B6A	H4-6B2A
Contact arrangement						

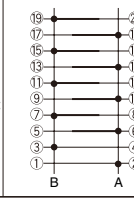
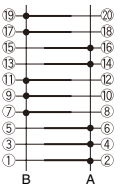
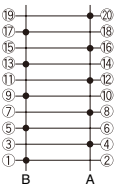
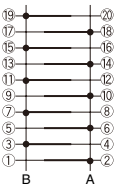
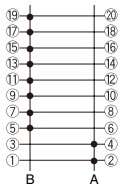
Type	H4007	H4008	H4101	H4102	H4103	H4104
Detail	H4-4BL4AL	H4-3BA2B2A1B	H4-4 (1A1B)	H4-4A4B	H4-4AL4BL	H4-2A2B2AL2BL
Contact arrangement						

●8 contacts (4 units)

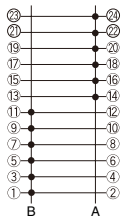
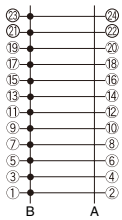
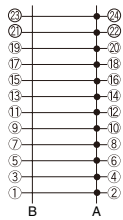
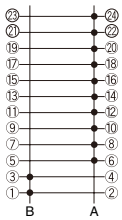
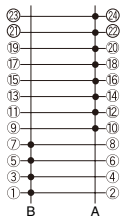
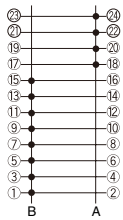
Type	H4105	H4106	H4107
Detail	H4-2AL2BL2A2B	H4-4 (1AL1BL)	H4-4 (1B1A)
Contact arrangement			

●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

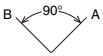
CAM-OPERATED SWITCH

B, BH TYPE

STANDARD ARRANGEMENT DIAGRAM

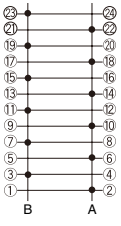
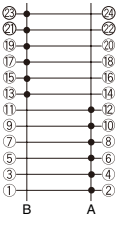
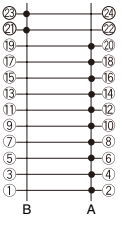
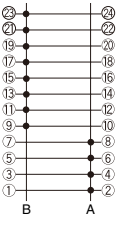
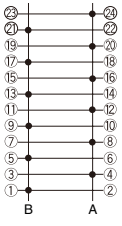
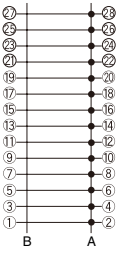
(H)

■90° 2-position changeover (H)

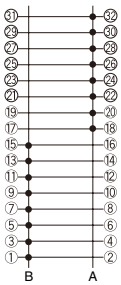
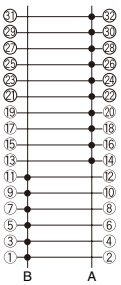
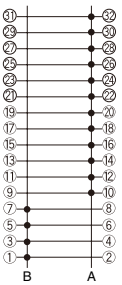
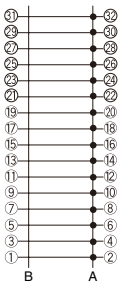
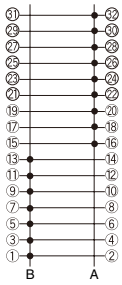
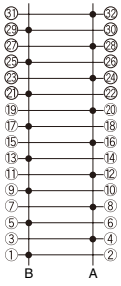


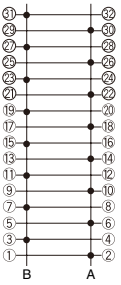
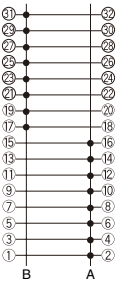
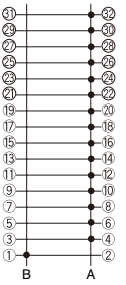
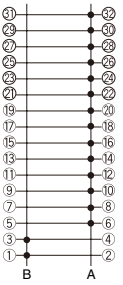
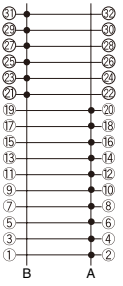
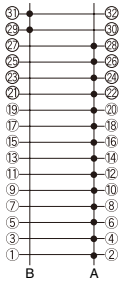
●12 contacts (6 units)

●14 contacts (7 units)

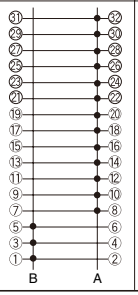
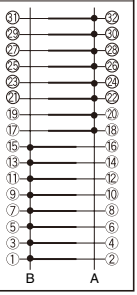
Type	H6101	H6102	H6103	H6105	H6106	H7003
Detail	H6-6 (1A1B)	H6-6A6B	H6-10A2B	H6-4A8B	H6-6 (1B1A)	H7-14A
Contact arrangement						

●16 contacts (8 units)

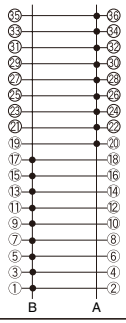
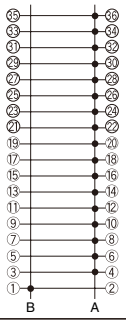
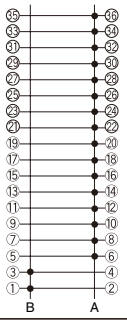
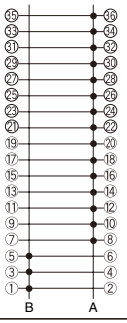
Type	H8001	H8002	H8003	H8005	H8006	H8007
Detail	H8-8B8A	H8-6B10A	H8-4B12A	H8-16A	H8-7B9A	H8-8 (1B1A)
Contact arrangement						

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

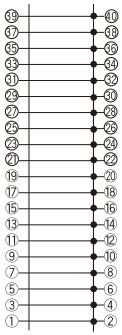
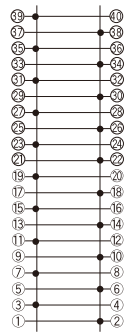
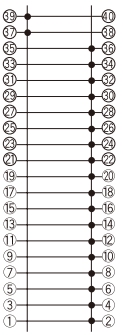
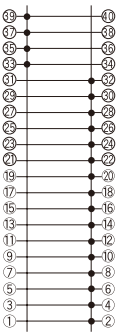
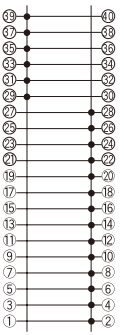
●16 contacts (8 units)

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					

●CONTROL SWITCH

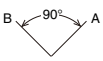
CAM-OPERATED SWITCH

B, BH TYPE

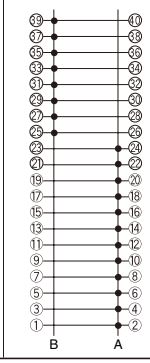
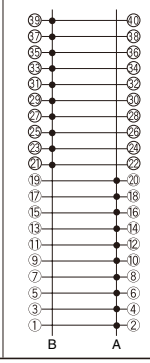
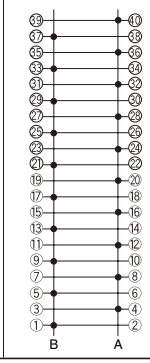
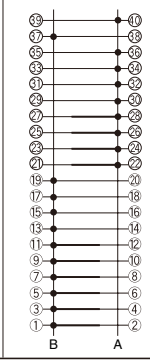
STANDARD ARRANGEMENT DIAGRAM

■90° 2-position changeover (H)

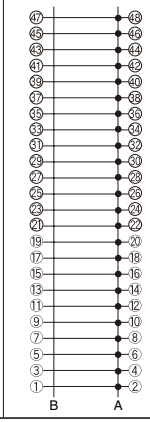
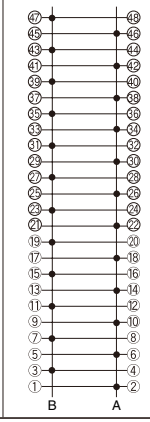
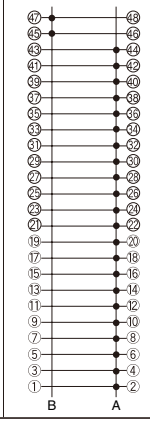
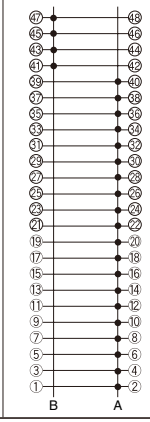
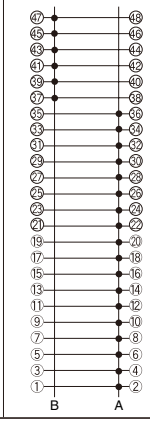
(H)



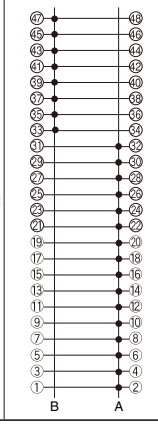
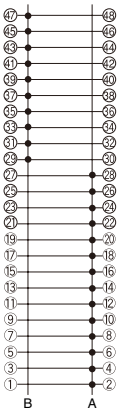
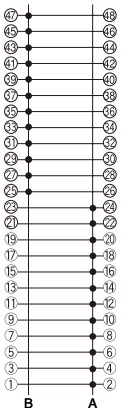
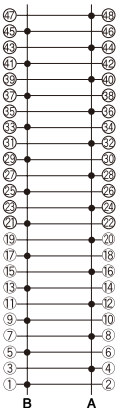
●20 contacts (10 units)

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

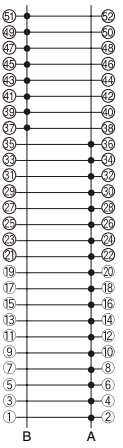
●24 contacts (12 units)

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

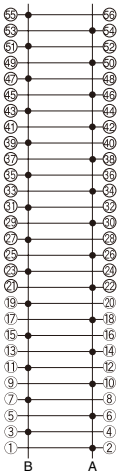
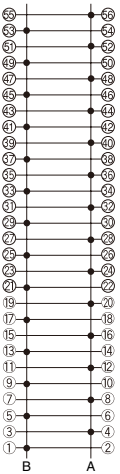
●24 contacts (12 units)

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

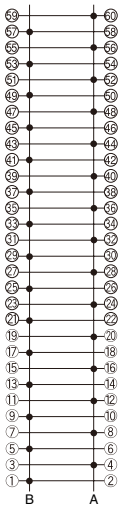
●26 contacts (13 units)

H13001
H13-18A8B


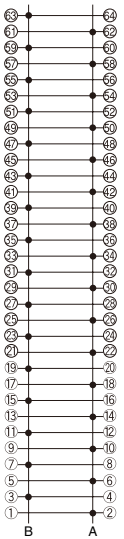
●28 contacts (14 units)

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)


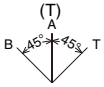
●CONTROL SWITCH

CAM-OPERATED SWITCH

B, BH TYPE

STANDARD 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			

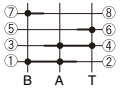
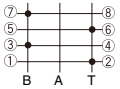
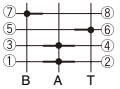
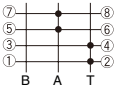
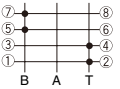
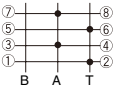
●4 contacts (2 units)

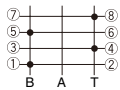
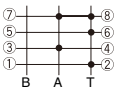
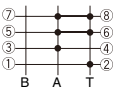
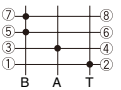
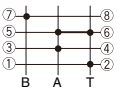
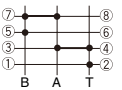
Type	T2001	T2002	T2003	T2004	T2005	T2006
Detail	T2-2B2T	T2-2B2A	T2-2A2T	T2-1B2A1T	T2-2B1A1T	T2-1B1A2T
Contact arrangement						

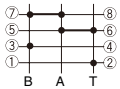
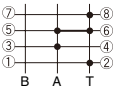
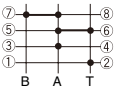
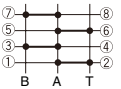
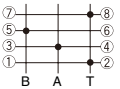
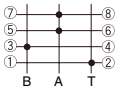
Type	T2007	T2008	T2009	T2010	T2011	T2012
Detail	T2-2B2AT	T2-2T2AT	T2-1B1A1T1BA	T2-1B1A1T1AT	T2-1B1T1BA1AT	T2-2T1BA1AT
Contact arrangement						

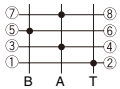
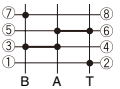
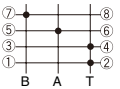
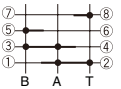
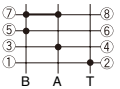
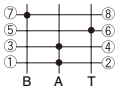
Type	T2013	T2014	T2015	T2016	T2017	T2018
Detail	T2-1B2T1AT	T2-1B1A1T1BT	T2-1B1T2BT	T2-2BA2AT	T2-2AL1BL1TL	
Contact arrangement						

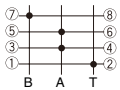
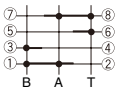
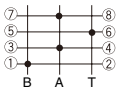
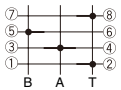
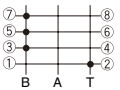
●4 contacts (2 units)

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

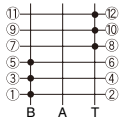
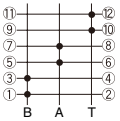
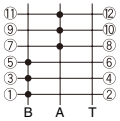
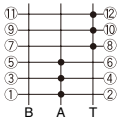
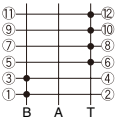
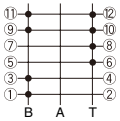
Type	T2106	T2107	T2108	T2109	T2110	T2111
Detail	T2-2 (1B1T)	T2-1T1A1T1AT	T2-1T1A2AT	T2-1T1A2B	T2-1T1A1AT1B	T2-1T1AT1B1BA
Contact arrangement						

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		T2-1T1A1B1BA	T2-2A1T1B
Contact arrangement						

Type	T2125	T2126	T2127	T2128	T2129
Detail	T2-1T2A1B		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						

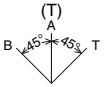
●CONTROL SWITCH

CAM-OPERATED SWITCH

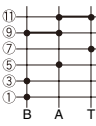
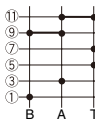
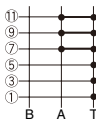
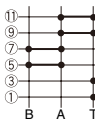
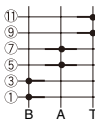
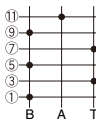
B, BH TYPE

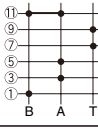
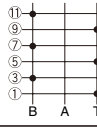
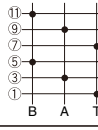
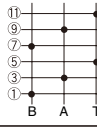
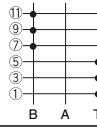
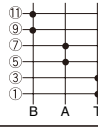
STANDARD ARRANGEMENT DIAGRAM

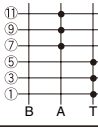
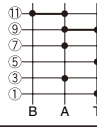
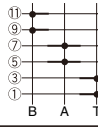
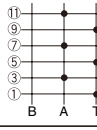
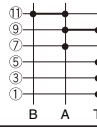
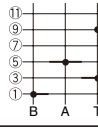
■45° 3-position changeover (T)

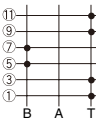
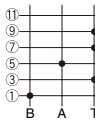
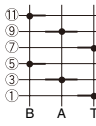


●6 contacts (3 units)

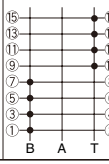
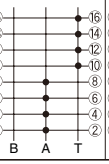
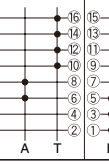
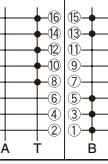
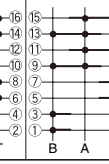
Type	T3007	T3008	T3009	T3010	T3011	T3012
Detail	T3-2B1A1T1BA1AT	T3-1B1A2T1BA1AT	T3-3T3AT	T3-2T2BA2AT	T3-2BL2AL2TL	T3-2 (1B1T) 1B1A
Contact arrangement						

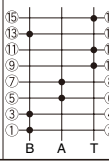
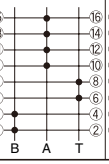
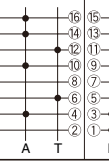
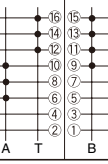
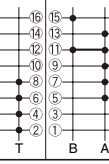
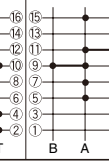
Type	T3013	T3101	T3102	T3103	T3104	T3105
Detail	T3-1B2A2T1BA	T3-3 (1T1B)	T3-2 (1T1A1B)	T3-2 (1B1A1T)	T3-3T3B	T3-2T2A2B
Contact arrangement						

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						

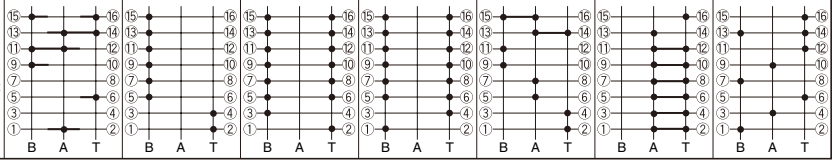
Type	T3112	T3113	T3114
Detail	T3-2T2B2T	T3-1B1T1A2T	T3-2 (1TL1AL1BL)
Contact arrangement			

●8 contacts (4 units)

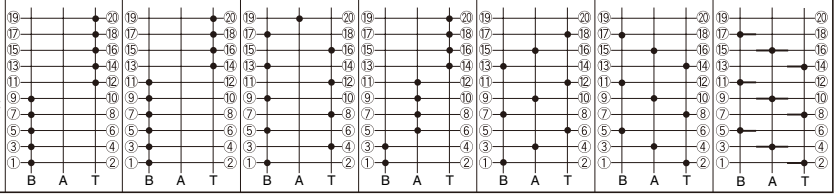
Type	T4001	T4002	T4003	T4004	T4005	T4006	T4007
Detail	T4-4B4T	T4-4A4T	T4-2B2A4T	T4-3B5T	T4-3B3T2BT	T4-2B2T2BA2AT	
Contact arrangement							

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							

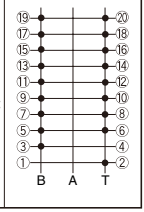
●8 contacts (4 units)

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							

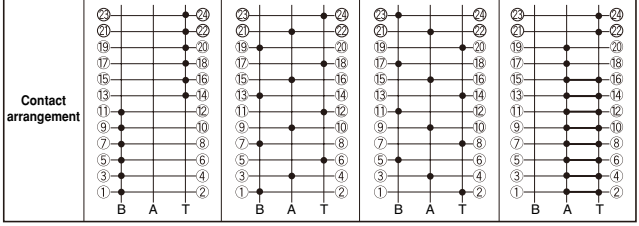
●10 contacts (5 units)

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							

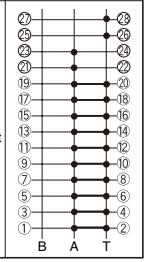
●10 contacts (5 units)

Type	T5104
Detail	T5-1T1B8BT
Contact arrangement	

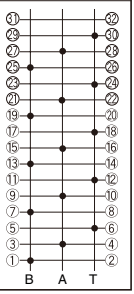
●12 contacts (6 units)

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

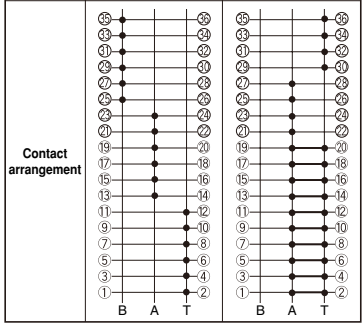
●14 contacts (7 units)

Type	T7122
Detail	T7-10AT2A2T
Contact arrangement	

●16 contacts (8 units)

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

●18 contacts (9 units)

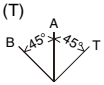
Type	T9102	T9103
Detail	T9-6T6A6B	T9-10AT4A4T
Contact arrangement		

CAM-OPERATED SWITCH

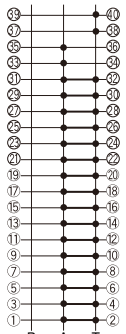
B, BH TYPE

STANDARD ARRANGEMENT DIAGRAM

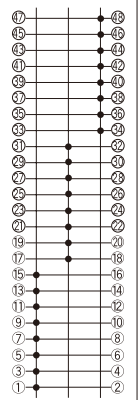
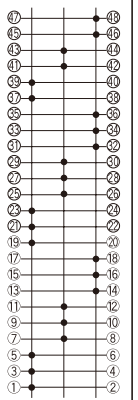
■45° 3-position changeover (T)



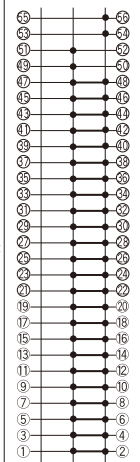
●20 contacts (10 units)

Type	T10101
Detail	T10-16AT2A2T
Contact arrangement	

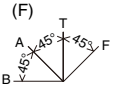
●24 contacts (12 units)

Type	T12001	T12101
Detail	T12-8B8A8T	T12-2 (3B3A3T) 2B2A2T
Contact arrangement		

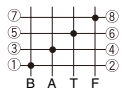
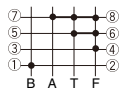
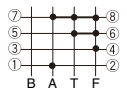
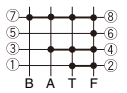
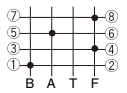
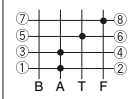
●28 contacts (14 units)

Type	T14102
Detail	T14-24AT2A2T
Contact arrangement	

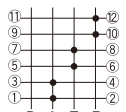
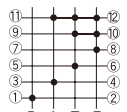
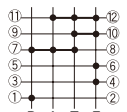
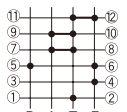
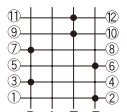
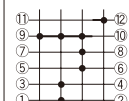
■45° 4-position changeover (F)

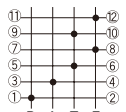
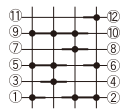
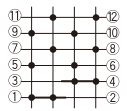


●4 contacts (2 units)

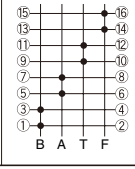
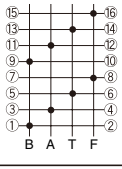
Type	F2001	F2002	F2003	F2004	F2101	F2102
Detail	F2-1B1A1T1F	F2-1B1F1TF1ATF	F2-1A1F1TF1ATF	F2-1TF1ATF1F1BATF	F2-1B1F1A1F	F2-2A1T1F
Contact arrangement						

●6 contacts (3 units)

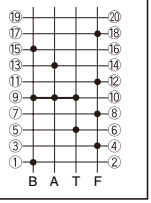
Type	F3001	F3002	F3003	F3004	F3101	F3102
Detail	F3-2A2T2F	F3-1B1A1T1F1TF1ATF	F3-1B2F1BAT1TF1ATF	F3-1T1F1BF2AT1TF	F3-2 (1F1B) 2T	
Contact arrangement						

Type	F3103	F3104	F3110
Detail	F3-1B1A1T1F1T1F		
Contact arrangement			

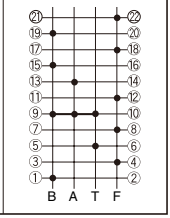
●8 contacts (4 units)

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

●10 contacts (5 units)

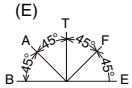
Type	F5101
Detail	F5-1B1F1T1F1BAT1F1A1B1F
Contact arrangement	

●12 contacts (6 units)

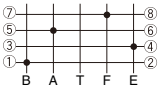
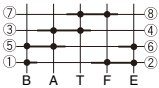
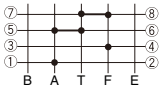
Type	F6101
Detail	F6-1B1F1T1F1BAT1F1A2 (1B1F)
Contact arrangement	

■45° 5-position changeover (E)

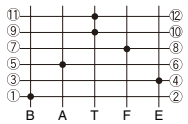
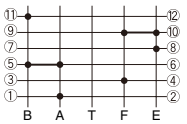
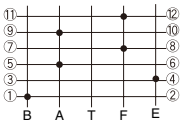
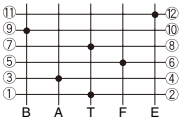
(E)

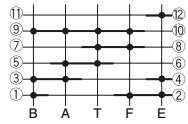
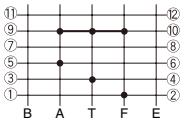
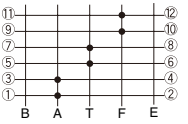


●4 contacts (2 units)

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

●6 contacts (3 units)

Type	E3001	E3002	E3003	E3004
Detail	E3-1B1E1A1F2T	E3-1A1F1BA1E1TE1B	E3-1B1E2 (1A1F)	E3-1T1A1F1T1B1E
Contact arrangement				

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

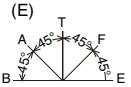
●CONTROL SWITCH

CAM-OPERATED SWITCH

B, BH TYPE

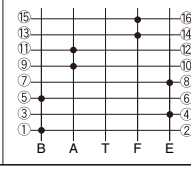
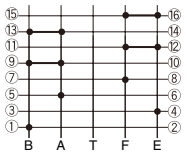
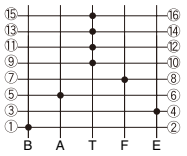
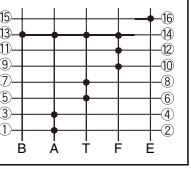
STANDARD ARRANGEMENT DIAGRAM

(E)

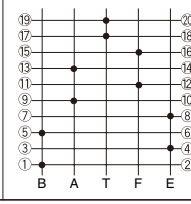
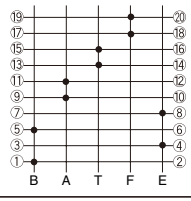


■45° 5-position changeover (E)

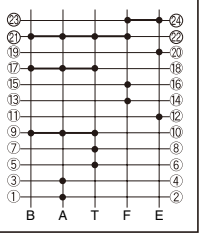
●8 contacts (4 units)

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

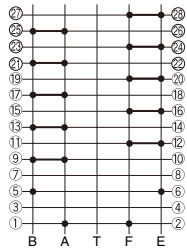
●10 contacts (5 units)

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

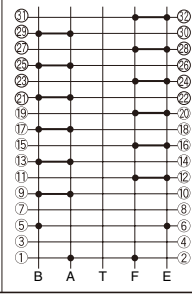
●12 contacts (6 units)

Type	E6101
Detail	E6-2A2T1BAT1E2F1BAT1E1BATF1FE
Contact arrangement	

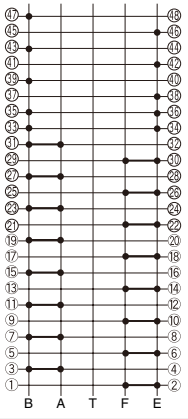
●14 contacts (7 units)

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

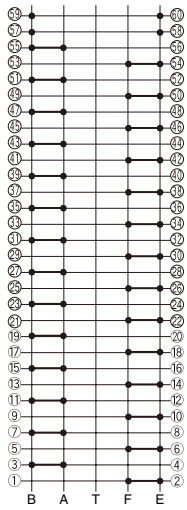
●16 contacts (8 units)

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

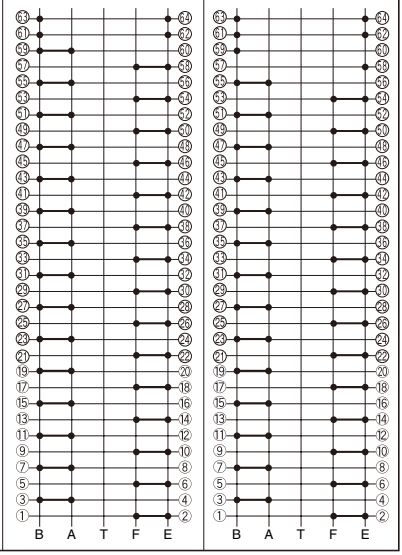
●24 contacts (12 units)

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

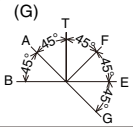
●30 contacts (15 units)

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

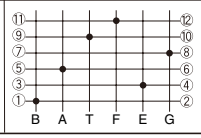
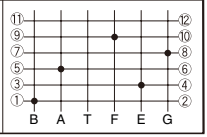
●32 contacts (16 units)

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, BH TYPE

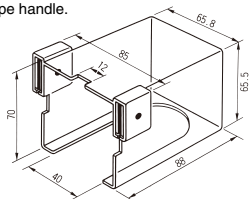
ACCESSORIES

Handle cover

●B-H HCV

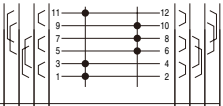
This cover is used to prevent mis-operation. It is a magnet type that can be mounted on or removed from a panel easily.
(Material: Polycarbonate resin)

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 short bar	1-3	1-5	5-9
BH type	1-5	5-9	1-3	Example of usage of short bar	1-3	5-9	1-5

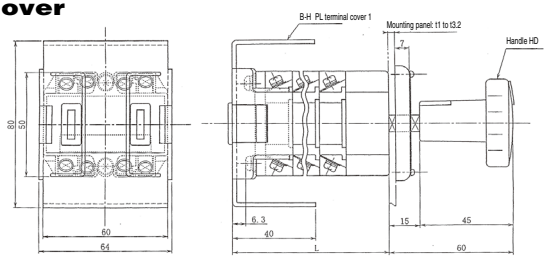
B jumper 1-3

B jumper 1-5

B jumper 5-9

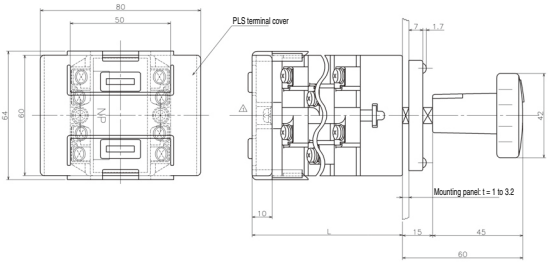
Terminal protection cover

●B-H PL terminal cover 1



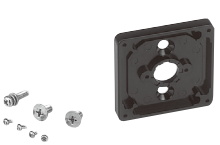
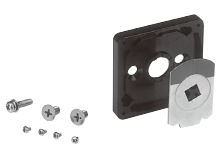
Note: This cover cannot be used for a rear terminal type and a dual-body type.

●B-H PLS terminal cover (small)



Flange (nameplate) set

□: (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

Shape Color

Code	Color
B	N1.5
BG	7.5BG3/3.5

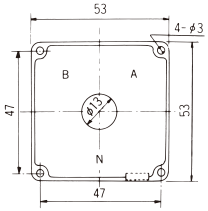
Code	Shape		Code	Shape
LD	Rose shape (large)		LP	Stick shape (large)
HD	Rose shape (small)		HP	Stick shape (small)
LDP	Rose shape (large)	with dot	MP	Pistol shape (large)
HDP	Rose shape (small)	with dot	HR	Pistol shape (small)
LF	Octagonal shape (large)		LS	Knob shape
HF	Octagonal shape (small)		LE	Egg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

For dimensions, see page 204 “Handle”.

Nameplate

Japanese

Nameplate No.	B	A	N
54-000	無地（輪郭のみ）		
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	
54-205	減速	増速	
54-206	平常	試験	
54-207	降	昇	
54-208	停止	起動	
54-209	停止	運転	
54-210	寸動	常時	
54-230	所内	社宅	警報
54-231	平常	活線	活線切換
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
54-254	近接	遠方	切換スイッチ
54-255	停止	起動	操作スイッチ
54-256	停止	運転	操作スイッチ
54-257	切	入	制御電源
54-258	均等	普通	充電切換器
54-259	休止	使用	切換スイッチ
54-260	不使用	使用	不足周波数引外し
54-261	降圧	昇圧	昇降圧操作開閉器
54-262	手動	自動	自動手動切換開閉器
54-263	直送	インバータ	切換器
54-264	直接	インバータ試験	切換器
54-265	不使用	使用	再閉路継電器
54-268	切	入	油入開閉器
54-269	切	入	断路器
54-270	不使用	使用	PC切換
54-272	停止	始動	
54-273	手動	プログラム	制御切換
54-274	手動	自動	エンジン
54-275	停止	始動	エンジン
54-276	不使用	使用	プロコン切換
54-277	閉	開	
54-278	現場	中央	
54-279	No.1	No.2	
54-280	No.2	No.1	
54-281	切	入	シャ断器
54-282	切	入	遮断器
54-286	直接	遠方	切換スイッチ
54-287	使用	ロック	切換スイッチ
54-288	切	入	引きにて操作



Material ····· Aluminum (A1050P-H24)

Letter ····· Sunk type round Gothic

Treatment ····· Surface anodized aluminum film

English

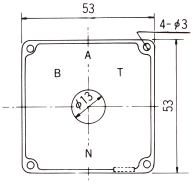
Nameplate No.	B	A	N
54-200E	OFF	ON	
54-231E	LEFT	RIGHT	
54-232E	LOADING	TEST	
54-233E	REV.	FOR.	
54-234E	LOCAL	REMOTE	
54-250E	OFF	ON	CONTROL SWITCH
54-251E	OFF	ON	CHANGE OVER SWITCH
54-252E	OFF	ON	CIRCUIT BREAKER
54-267E	OFF	ON	POWER GENERATION
54-282E	LOCAL	REMOTE	CONTROL
54-283E	OFF	ON	ANNUNCIATOR
54-284E	OFF	ON	SYNCHRONIZING
54-285E	MANUAL	AUTO	CONTROL
54-288E	TEST	NORMAL	CONTROL
54-289E	OFF	ON	AUTO RECLOSING
54-290E	MANU.	AUTO.	TAP CHANGER
54-291E	OFF	ON	RCC
54-292E	TRIP	CLOSE	CIRCUIT BREAKER

●CONTROL SWITCH

CAM-OPERATED SWITCH

B, BH TYPE

Nameplate

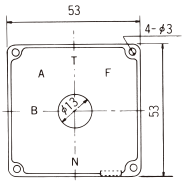


Japanese

Nameplate No.	B	A	T	N
54-300	閉	停　止	開	
54-301	手　動	断	自　動	
54-302	平　常	断	試　験	
54-303	No.1蓄電池	充 電 器	No.2蓄電池	
54-304	低　速	切	高　速	
54-350	手　動	切	自　動	切換スイッチ
54-351	手　動	遠　方	自　動	切換スイッチ
54-352	所　内	社 宅 1	社 宅 2	警報
54-353	整 流 器	蓄 電 池	補償負荷	電圧計切換器
54-354	整 流 器	開	蓄 電 池	電圧計切換器
54-359	手　動	開	自　動	操作スイッチ
54-370	1	自動交互	2	
54-371	中　央	引操作ニテ手動	ローカル	制御切換
54-372	1　号	2　号	3　号	95電圧切換
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

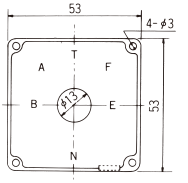
English

Nameplate No.	B	A	T	N
54-332E	STOP	N	START	
54-333E	STOP	IND	NOR	
54-334E	STOP		START	
54-359E	MANUAL	OFF	AUTO	CONTROL SWITCH
54-362E	OFF	RED BLUF	ON	CONTROL SWITCH
54-376E	TEST	LOCAL	REMOTE	CONTROL
54-378E	OFF	1st	2nd	SYNCHRONIZING
54-379E	OFF	1st	2nd	UNDER FREQUENCY
54-380E	MANU	OFF	AUTO	SYNCHRONIZING
54-381E	FOLLOWER	INDIVIDUAL	MASTER	TAP CHANGER
54-382E	AUTO	OFF	ON	FAN



Japanese / English

Nameplate No.	B	A	T	F	N
54-490	O	R-S	S-T	T-R	電圧計
54-492	O	R	S	T	電圧計
54-495	O	R	S	T	電流計
54-490E	O	R-S	S-T	T-R	VOLTMETER
54-495E	O	R	S	T	AMMETER
54-491E	OFF	R-Y	Y-B	B-R	VOLTMETER
54-497E	OFF	R	Y	B	AMMETER

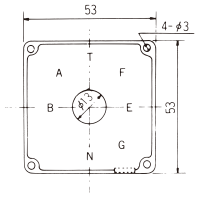


Japanese

Nameplate No.	B	A	T	F	E	N
54-500	自動2	自動1	自動交互	自動1	自動2	
54-501	手動1	手動2	自動交互	手動1	手動2	
54-550	OFF	R-S	S-T	S-T	BUS	電圧計
54-551	OFF	R-S	S-T	S-T	S.C	電圧計
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
54-559	OFF	R	S	T	OFF	電流計
54-560	OFF	R-S	S-T	T-R	OFF	電圧計
54-564	O	1	2	3	O	電流計
54-565	O	1-2	2-3	3-1	O	電圧計

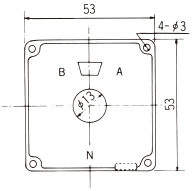
English

Nameplate No.	B	A	T	F	E	N
54-562E	OFF	A	B	C	OFF	AMMETER
54-563E	OFF	A-B	B-C	C-A	OFF	VOLTMETER
54-566E	OFF	R	Y	B	OFF	AMMETER
54-567E	OFF	R-Y	Y-B	B-R	OFF	VOLTMETER
54-570E	REMOTE	LOCAL	TEST / POLE1	TEST / POLE2	TEST / POLE3	SELECTOR SWITCH



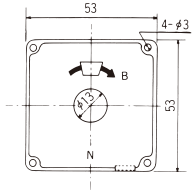
Japanese

Nameplate No.	B	A	T	F	E	G	N
54-651	17Ω	20Ω	25Ω	33Ω	50Ω	100Ω	並列抵抗器



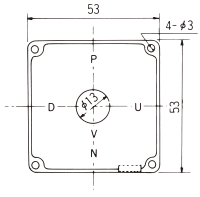
English

Nameplate No.	B	A	N
I54-252E	OFF	ON	SIRCUIT BREAKER
I54-235E	TRIP (PULL to LOCK)	CLOSE	



English

Nameplate No.	B	N
I54-101E	RESET	
I54-102E	RESET	LOCK-OUT RELAY



Japanese / English

Nameplate No.	P	U	V	D	N
54-750	O	1	2	3	電圧計
54-751	O	1-2	2-3	3-1	電圧計
54-752	O	R	S	T	電圧計
54-753	O	R-S	S-T	T-R	電圧計
54-754	O	1	2	3	電流計
54-755	O	R	S	T	電流計
54-756	負荷	無線用 蓄電池	断	電灯用 蓄電池	直流電流計
54-758	開	U	V	W	電流計切換器
54-759	開	U-V	V-W	W-U	電圧計切換器
54-760	O	R	N	T	電流計
54-761	O	R-N	N-T	T-R	電圧計
54-762	OFF	R	S	T	電流計
54-763	OFF	1	0	2	電流計
54-764	OFF	R-S	S-T	T-R	電流計
54-765	OFF	1-0	0-2	2-1	電圧計
54-766	OFF	R	S	T	電圧計
54-753E	OFF	R-S	S-T	T-R	VOLTMETER
54-755E	OFF	R	S	T	AMMETER

CAM-OPERATED SWITCH

B, 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

Remarks: 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

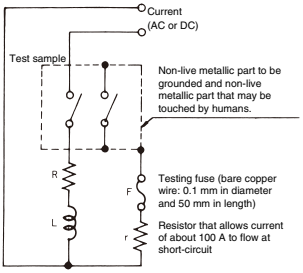
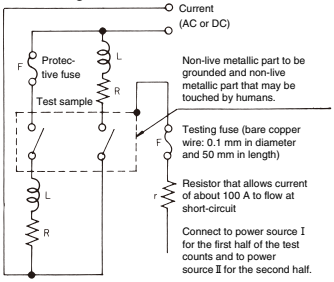


Fig. 2



Remarks: 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.

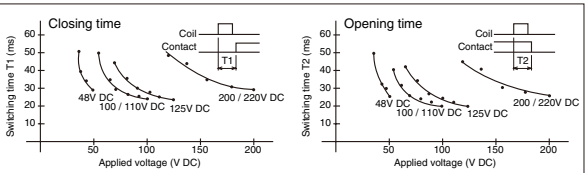
Remarks: *Ie* stands for rated operating current and *Ue* rated operating voltage.

Switching speed of lockout relay

(Example: BA-6 8A8B)

Resistance of coil

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



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

BY type minute electric current switch

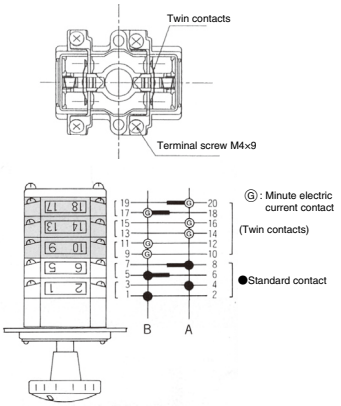
■The BY type switch is used to make / break a sequence control current or any other similar low-voltage, minute electric current circuit. It consists of a contact unit that uses twin contacts.
The contact performance of this switch is independent from the external atmosphere.

■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 translucent in blue, so that it can be discriminated from the standard type.

■BY type contact stage



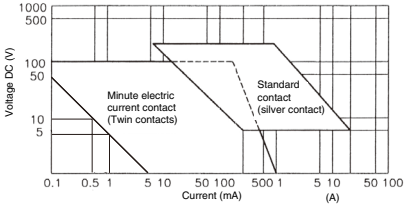
Display example of the above switch:
BY-H5-1B1A1BL1AL2BX2AX1BLX1ALX

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

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

＊Resistance load

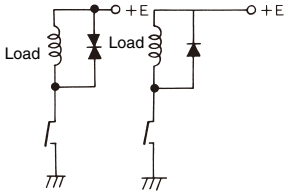
■The operating load range is as shown in the following graph. Select a contact type according to your application.



■Contact protective circuit

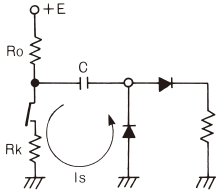
If inductive load or load that causes surge current (rush current) to flow (load-carrying capacity, lamp, long cable, or the like) is used as the load for the twin contacts, a contact protective circuit is required and shown below:

●Inductive load



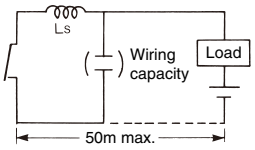
If any electromagnetic relay, solenoid, or counter having an inductance component is used as load, the energy stored in the inductance causes reverse voltage to be generated when the contacts are separated from each other. This reverse voltage reaches even several hundred volt, which can cause remarkable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