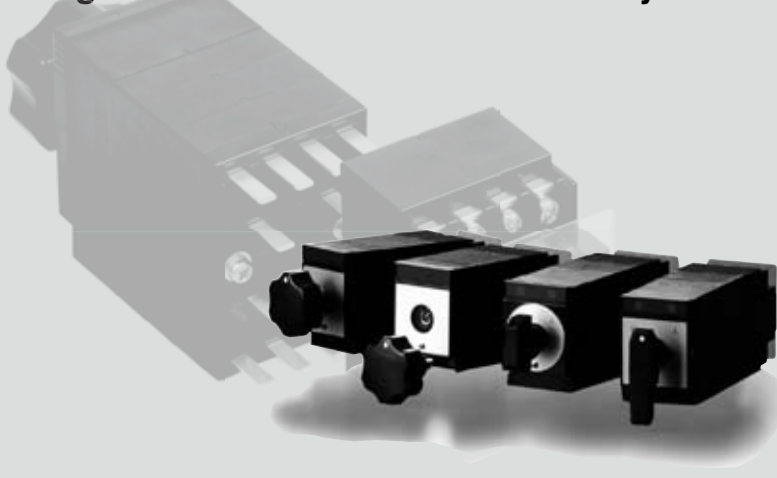




CAM-OPERATED SWITCH

# FH TYPE

Highly reliable cam-operated switch  
pursuing size reduction and work efficiency



## SPECIFICATIONS (RATINGS, PERFORMANCE, STANDARD OPERATING CONDITION)

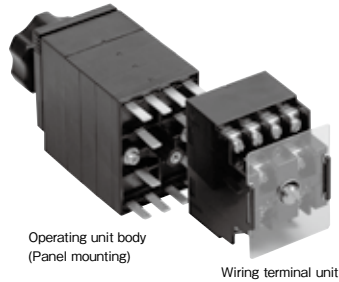
STANDARD: NECA C 4520 (2002)  
NECA C 4522 (2002)

Item	FH
Rated insulation voltage (UI)	250V
Rated current-carrying capacity (Ith)	15A
Rated supply Voltage of LED part	100/110V DC (~20% to 30%)
Circuit current of LED part	Red : 3mA or less    Green : 5mA or less (Both at 110V DC, per lamp)
Max. wire size	2mm <sup>2</sup>
Terminal screw size	M3.5 × 8
Insulation resistance	10MΩ or more (500V DC mega)
Withstand voltage	Between pole and ground : 2,000V AC / 1min.
	Between poles : 2,000V AC / 1min.
	Between terminals : 2,000V AC / 1min.
Rated impulse withstand voltage (Uimp)	Between pole and ground : ±4.5kV (1.2/50μs) 3 times
	Between poles : ±3kV (1.2/50μs) 3 times
	Between terminals : ±3kV (1.2/50μs) 3 times
Contact resistance	50mΩ or less (Initial)
breaking capacity	1A (220V AC, Pf=0.3 ~ 0.4)
	1A (110V DC, L/R=40ms) Contact series specifications : 5A
Making capacity	10A (220V AC, Pf=0.3 ~ 0.4)
	1.4A (110V DC, L/R=40ms) Contact series specifications : 7A
Minimum applicable load	AC5V 500mA, DC5V 100mA
Electrical life	Single contact t: 100,000 operations or more    Double bridge contacts : 50,000 operations or more
Mechanical life	Single contact : 100,000 operations or more    Double bridge contacts : 50,000 operations or more
Shock resistance	500m/s <sup>2</sup> 6 directions / 3 times each
Vibration resistance	Vibration : 16.7Hz    Vibration : 1.5mm    Time : 3 directions / 1 hour
Ambient air temperature	-10~+55°C (No freeze, no dew condensation)
Storing temperature	-20~+60°C (No freeze, no dew condensation)
Rerative humidity	20 to 80%
Altitude	2,000 m or less

## FEATURES

### Improved wiring work efficiency

With the back terminal mechanism, the FH type enables easy mounting and removal of the operating unit body and wiring terminal unit. (Wiring is enabled with the wiring terminal unit only. This structure simplifies wiring work.)



### Four models of switches are available in product lineup.

- ① Manual switching type (2 or 3 notches)    ② Handle removable type (2 or 3 notches)
- ③ Automatic return push type    ④ Automatic return pull type



Manual switching type  
(2 or 3 notches)  
-Non-illuminated type



Handle removable type  
(2 or 3 notches)  
-Non-illuminated type



Automatic return push type  
Automatic return pull type  
-LED illuminated type



### Compact body for saving mounting space

Minimum mounting pitches are 42 mm (horizontal) and 65 mm (vertical). The FH type can be mounted in a miniaturized control panel.

### Terminal cover as standard accessory.

The terminal cover is provided as standard, preventing the user from accidentally touching live parts. (The handle cover is optionally available.)

### Maximum applicable cable size: 2mm<sup>2</sup>

Cable of up to 2 mm<sup>2</sup> can be connected.  
(Screw size: M3.5)

### Two types of contact mechanisms

Two types of contact mechanisms are available: Single (standard) contact and double-bridge (highly reliable) contact. A desired type can be selected according to the purpose of use.

### Circuit indication can be checked at a glance.

Circular and square metal identification plates and bases (flanges) are available. Circuit condition can be directly indicated.

FH-B-SP type



Square type (Y)



Circular type (Z)



CAM-OPERATED SWITCH

# FH TYPE

## HOW TO ORDER

**FH - SP 1001 - 0 0 S B Z 000 - WS**

①      ②      ③      ④ ⑤ ⑥ ⑦ ⑧      ⑨      ⑫

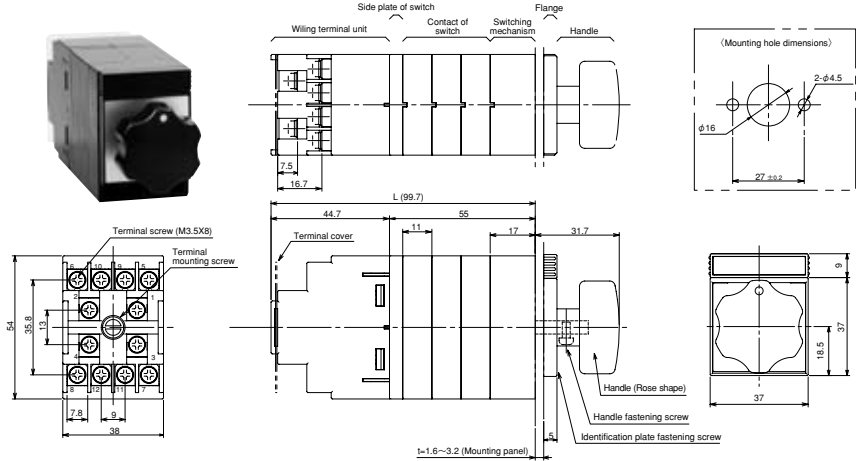
No.	Item	Code
①	Basic type	FH
②	Operation method (Notch configuration)	Manual switching type (Non-illuminated type)
		Handle removable type (Non-illuminated type)
		Automatic return push type (LED illuminated type)                      Push at center → Manual turn by 45° (CW/CCW) → Automatic return to center → Automatic return to non-push status
		Automatic return pull type (LED illuminated type)                      Pull at center → Manual turn by 45° (CW/CCW) → Automatic return to center → Automatic return to non-pull status
③	Contact arrangement	Circuit No. (Combination format) Please see page A76 to 78 for contact arrangement diagram.
④	LED circuit	0: Without LED indication 1: Standard (Independent circuit) 2: N-common 3: P-common * For LED circuit diagram, see p. A78.
⑤	Supply voltage of LED display part	0: Without LED indication 3: 100/110V DC 4: 125V DC
⑥	Handle code	S: Knob shape P: Stick shape D: Rose shape (See the accessories on p.A79.)
⑦	Color of handle	B: Black
⑧	Flange	Y: Square type Z: Round type
⑨	Nameplate	Nameplate No. * For text on each plate, see p. A79.
⑩	Handle removal position	1: Position B 2: Position A 3: Position T 4: Positions B and A 5: Positions B and T 6: Positions A and T 7: Positions B, A and T * For symbol of each position, see the above notch diagram. (② Operating method: Handle removal type)
⑪	Type of handle key	Handle key No. (See the combination diagram on p. A74.)
⑫	Contact spec	No code: Single contact WS: Double - bridge - Silver contact WG: Double - bridge - Gold contact

For Nos. ④ and ⑤, only the LED illuminated type can be specified.

For Nos. ⑩ and ⑪, only the handle removable type can be specified.

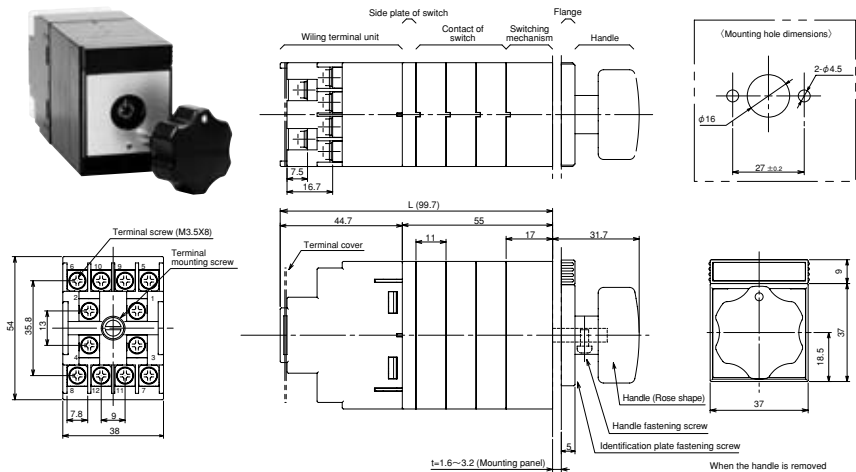
## OUTLINE AND DIMENSIONS

### FH-□ type (Manual switching type, Non-illuminated type)



No. of units	1	2	3
L (mm)	77.7	88.7	99.7

### FH-□ type (Handle removable type, Non-illuminated type)



#### ● Combination of handle key (Key shaft)

When viewed from front of switch

Handle key No.	1	2	3	4
Handle key shaft shape				
Keyhole of switch				

\* The key shaft (keyhole) has a roll pin (pinhole) for handle removal position.

No. of units	1	2	3
L (mm)	77.7	88.7	99.7

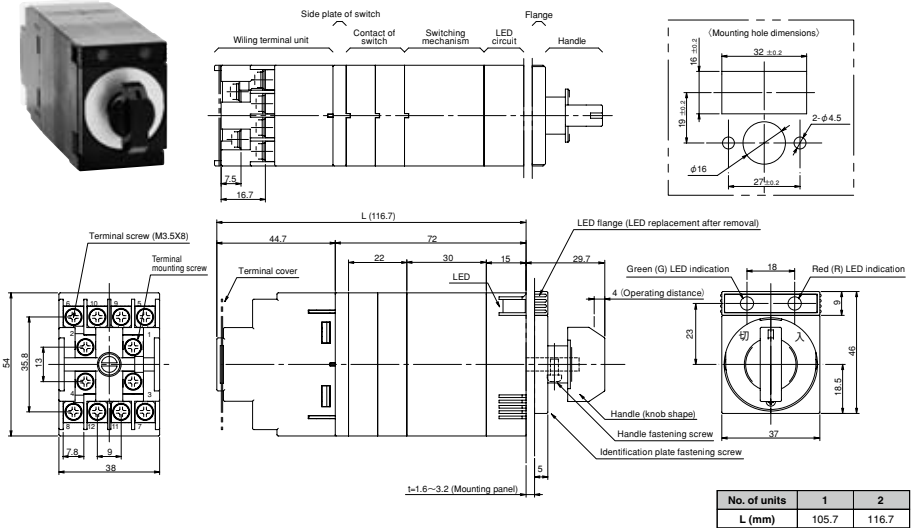


CAM-OPERATED SWITCH

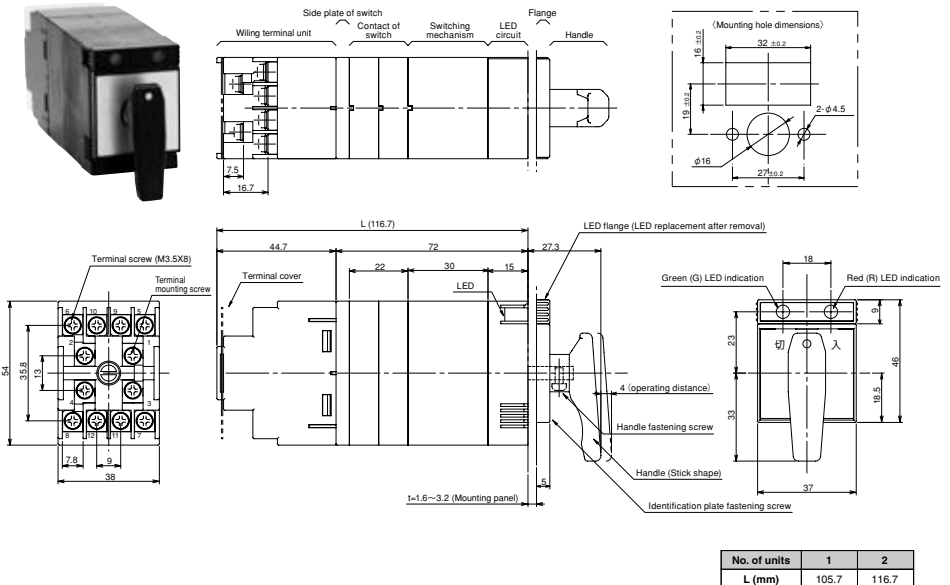
# FH TYPE

## OUTLINE AND DIMENSIONS

### FH-SP type (Automatic return push type, LED illuminated type)



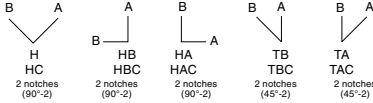
### FH-SB type (Automatic return pull type, LED illuminated type)



## CONTACT ARRANGEMENT DIAGRAM

(CAUTION) For non-illuminated type, 6 contacts (12 terminals) are provided. For LED illuminated type, 4 contacts (8 terminals) are provided. For other contact specifications, please contact us.

### 2-position changeover



### 2 contacts (1 unit)

Type	1001	1002	1003
Detail	2A	2B	1B1A
Contact arrangement			

### 4 contacts (2 unit)

Type	2001	2002	2003	2004	2005	2006
Detail	4A	4B	1B3A	3B1A	2B2A	1B1A1B1A1L
Contact arrangement						

Type	2007	2008	2101
Detail	2B1L2AL	1B1L3AL	2AL2B
Contact arrangement			

### 6 contacts (3 unit)

Type	3001	3002	3003	3004	3005
Detail	6A	6B	3B3A	1B5A	2B4A
Contact arrangement					

Type	3006	3007	3008	3009
Detail	4B2A	5B1A	2B1L4AL	3B1L3AL
Contact arrangement				

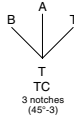


CAM-OPERATED SWITCH

# FH TYPE

## OUTLINE AND DIMENSIONS

### ■ 3-position changeover



#### ● 2 contacts (1 unit)

Type	1001	1002	1003	1004	1101
Detail	1A1T	1B1A	1B1T	1BA1AT	1AT1T
Contact arrangement					

#### ● 4 contacts (2 unit)

Type	2001	2002	2003	2004	2005
Detail	2A2T	2B2A	1B1A2T	1B2A1T	2B2T
Contact arrangement					

Type	2006	2007	2008	2009	2010
Detail	2B1A1T	3B1T	1B1A1T1BA	1A1T2AT	1BL1AL2TL
Contact arrangement					

Type	2101	2102	2103
Detail	2 (1T1B)	1B1T1BA1AT	2BA2AT
Contact arrangement			

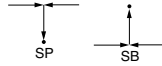
#### ● 6 contacts (3 unit)

Type	3001	3002	3003	3004	3005
Detail	2A4T	1B1A4T	1B3A2T	1B4A1T	2B2A2T
Contact arrangement					

Type	3006	3007	3008	3009	3010
Detail	2B4T	2B4A	2B1A3T	3B3A	3B3T
Contact arrangement					

Type	3011	3012	3101	3102
Detail	2A2T2AT	2BL2AL2TL	2 (1T1A1B)	2B1A1T1BA1AT
Contact arrangement				

## Automatic return type



### 2 contacts (1 unit)

Type	1001	1002	1003	1004	1005	1101
Detail	1C1A	1B1A	1M1N	1N1B	1N1A	1A1B
Contact arrangement						

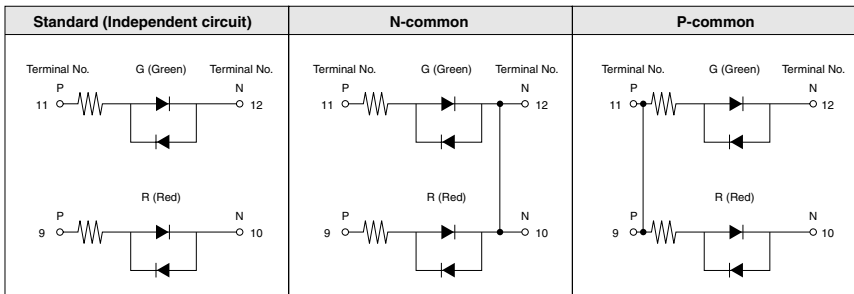
### 4 contacts (2 unit)

Type	2001	2002	2003	2004	2005	2006
Detail	1C1B2A	2C1B1A	2B2A	1N1B2A	1N1C1B1A	1M1N1B1A
Contact arrangement						

Type	2007	2008	2009	2010	2011	2101
Detail	1M1N2A	2N1B1A	2N2B	2N2A	2M2N	2 (1A1B)
Contact arrangement						

※ 2 接点並列仕様

## LED CIRCUIT DIAGRAM







CAM-OPERATED SWITCH

# FH TYPE

## ACCESSORIES

### Handle



FH-HD-S-B  
(Knob shape)



FH-HD-P-B  
(Stick shape)



FH-HD-D-B  
(Rose shape)

### Handle cover (selling separately)

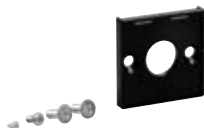


FH-HCV-A

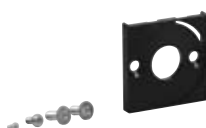


FH-HCV-B

### Flange



FH-FL-Y-B-SET  
(Square type)



FH-FL-Z-B-SET  
(Round type)

### LED Flange set



FH-FL-LED-B-SET

### LED lamp



FH-LED-R



FH-LED-G

### LED removal tool



FH-LED-Q

### Handle removal tool



FH-HD-Q

### Nameplate



Y: Square type Z: Round type

FH-NP- $\frac{Y}{Z}$   $\frac{\square\square}{\square\square}$   
Nameplate No.

Nameplate No.	Text
000	Plain

(For 2 notches)

204E	OPEN	CLOSE
------	------	-------

\* For consideration of other text, please contact us.

## INSTRUCTIONS

### (1) Panel mounting procedure

To mount the switch to a panel, follow the procedure below.  
(To remove the switch, follow the mounting procedure in reverse.)



① Fasten the switch body from the back, and the switch body flange from the front via the mounting panel, and fasten them with the countersunk screws (M4 × 10) included in the product.



② Mount the flange by sliding it diagonally from the front top of the panel. (For LED indication)



③ After hooking the aluminum identification plate in the inner groove of the switch body flange, fasten the panel with the self-tapping screws (M2 × 4) included in the product.



④ After passing the handle through the shaft, fasten it from the bottom with the pan head screws (M3 × 6) included in the product.

### (2) Mounting and removal of the terminal

The terminal can be removed from the switch. Follow the procedure below.



① Loosen the screw at the back center of the switch with a flat head screwdriver.



② Pull the terminal lightly backward to remove it. (To mount the terminal, appropriate tightening torque for the fastening screw is 0.5 N·m.)

### (3) LED element replacement

For replacement of the LED element, follow the procedure below. For replacement, use the dedicated tool.



① While sliding the LED flange diagonally to the front top of the panel, raise the panel by pinching it.



② Pinch the existing LED lightly with the dedicated tool, and pull it out to the front.



③ Pinch a new LED lightly with the dedicated tool, and insert it into the socket of the switch.



④ Mount the LED flange by sliding it diagonally from the front top of the panel.

**CAUTION:** During mounting and removal of the switch and terminal, and replacement of the LED element, make sure that the product is not alive.