

# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164, AH165 and AH165-2

### General information

#### ■ Features

##### Design basis

The 16mm dia. series of compact size pushbuttons are 'finger-size', and consequently take up little panel space. AH165-2 series operators are about twice as large as the AH164 and AH165 series operators for easier operation. With many types of operator available, the most suitable switch can be identified by color, shape and legend, and have a smooth, quality "snap-action". In spite of their small size they have a highly reliable mechanism, and are eminently suited for solid state and other electronic circuits. AH164, AH165 and AH165-2 series contact block holders can easily be removed manually. Moreover, the contact block can be easily attached or detached without using any special tools, thus facilitating addition or replacement of contact.

##### Selector switches

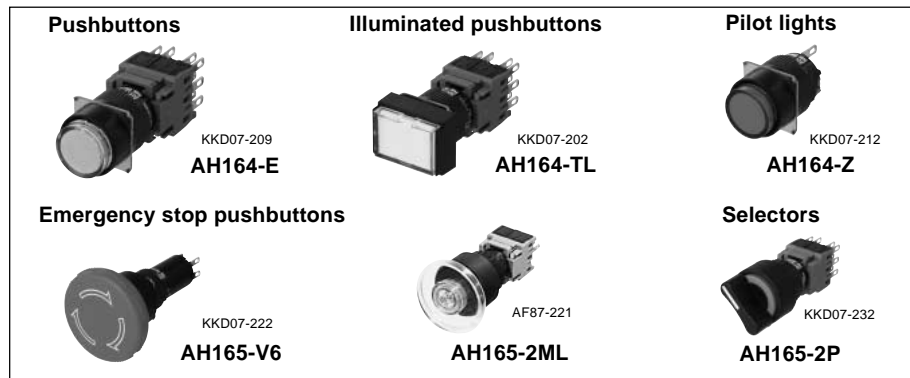
Selector switches can also be supplied in either knob-handle operated or key operated types.

##### Strong construction

The operator and contact blocks are molded from an excellent thermal resistance resin and can withstand the heat at the time of soldering. Since these pushbuttons are manufactured to industrial standards they can withstand vibration or shock thus eliminating lamp failure due to such causes as loose bases. With regard to the degree of protection, standard types which met the requirements of IP40 of IEC 60529, and oil tight types which meet the requirements of IP65 of the said, are available. This permits the application to various fields, from machine tools to OA (Office Automation) facilities.

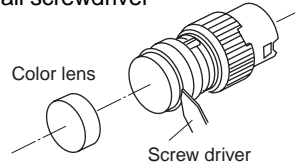
##### Quality feel tough

Both the operator and contact block are precisely engineered. There is no fear of the switch malfunction even after long use and it continues to operate smoothly for its service life of about 1,000,000 operations.



##### Easy color change

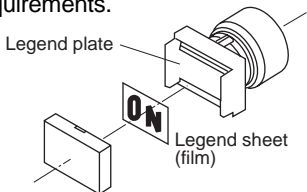
Color lenses fit over the inner button. The lens can easily be removed using a small screwdriver



Note: The luminous color of LEDs and neon illumination types varies with the body color of the product.

##### Visible inscription

Button legends are printed on legend sheet, which is stuck to the legend plate on the inner button. The lettering is back lit by the switch lamp and the inscription is highly visible through the color lens. Contact FUJI for your lettering requirements.

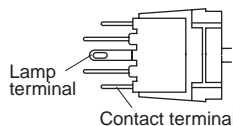


##### Excellent switch reliability

The switch uses a snap-action mechanism. The pushbuttons are available with either momentary or alternative actions. The snap-action switch has a double break movement which operates independently of the speed of switching. The contacts are made from gold-flashed silver. High contact reliability of 1mA at 5V AC/DC is assured. Contact blocks are available in 1NO+1NC to 3NO+3NC arrangement.

##### Large terminals

Solder/tab terminal is provided as standard. Wire-wrap terminal is available on request.



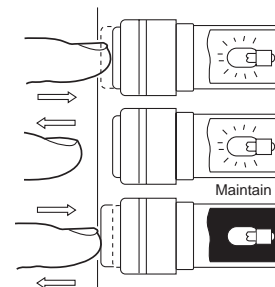
##### Safety

FUJI's original Trigger Action mechanism is used in the emergency stop pushbuttons. They are suitable for emergency stop and safety. This mechanism prevents the contacts from moving until the button is pushed and locked.

- Provided with a trigger action mechanism conforming to EN418.
- Provided with direct opening action (approved by TÜV) conforming to EN60947-5-1 and EN60947-5-5.

##### Alternate action

In the case of alternate action when the button is depressed the contacts are maintained and remain so even if the finger is removed. The button will not return to its free position. In order to remove the lock, the button must be given a second pressure before the button will return to its free position. This makes it most suitable as the switch for a power source.



##### Pushbutton with finger guards

Finger guards are provided for square or rectangular type pushbuttons (SF, TF, SL and TL types) in order to prevent operational error of adjacent buttons.











##### Approvals



For further information related to approved type, see page 04/187 to 04/190.



**AH164 (standard) / AH165 (oil-tight)**

■ **Illuminated pushbutton switches**

Operator	Type	Operator	Type	Operator	Type
Extended round head  <i>See page 04/195</i> 	<b>AH164-L, L5</b> <b>AH165-L, L5</b>  KKD07-205	Flush square head  <i>See page 04/195</i> 	<b>AH164-SL, SL5</b> <b>AH165-SL, SL5</b>  KKD07-204	Flush rectangular head  <i>See page 04/195</i> 	<b>AH164-TL, TL5</b> <b>AH165-TL, TL5</b>  KKD07-202
Flush rectangular head with guard  <i>See page 04/196</i> 	<b>AH164-TGL, TGL5</b> <b>AH165-TGL, TGL5</b>  KKD07-203	Flush square head with guard  <i>See page 04/196</i> 	<b>AH164-SGL, SGL5</b> <b>AH165-SGL, SGL5</b>  KKD05-075b		

Note: Spot LED and red/green LED types: Not approved standard

■ **Pushbutton switches**

Operator	Type	Operator	Type	Operator	Type
Extended round head  <i>See page 04/199</i> 	<b>AH164-E, E5</b> <b>AH165-E, E5</b>  KKD07-209	Mushroom head  <i>See page 04/199</i> 	<b>AH164-M, M5</b> <b>AH165-M, M5</b>  KKD07-210	Flush square head  <i>See page 04/199</i> 	<b>AH164-SF, SF5</b> <b>AH165-SF, SF5</b>  KKD07-208
Flush rectangular head  <i>See page 04/199</i> 	<b>AH164-TF, TF5</b> <b>AH165-TF, TF5</b>  KKD07-206	Flush rectangular head with guard  <i>See page 04/199</i> 	<b>AH164-TGF, TGF5</b> <b>AH165-TGF, TGF5</b>  KKD05-176	Flush square head with guard  <i>See page 04/199</i> 	<b>AH164-SGF, SGF5</b> <b>AH165-SGF, SGF5</b>  KKD05-075b
Convex square head  <i>See page 04/199</i> 	<b>AH164-SM, SM5</b> <b>AH165-SM, SM5</b>  KKD05-081b	Convex rectangular head  <i>See page 04/199</i> 	<b>AH164-TM, TM5</b> <b>AH165-TM, TM5</b>  KKD05-082b	Push-lock, turn-reset (32mm dia.) ⊖ (Direct opening action) <i>See page 04/200</i> 	<b>AH165-VR</b>  AF91-584
Push-lock, turn-reset (40mm dia.) ⊖ (Direct opening action) <i>See page 04/200</i> 	<b>AH165-V1R</b>  AF91-583				

■ **Emergency stop pushbutton switches** ⊖ (Direct opening action), conform to EN418

Operator	Type	Operator	Type
Push-lock, turn-reset (32mm dia.)  <i>See page 04/200</i> 	<b>AH165-V5R</b>  KKD07-221	Push-lock, turn-reset (40mm dia.)  <i>See page 04/200</i> 	<b>AH165-V6R</b>  KKD07-222













Note: (CCC): *See page 04/292*

# Pushbuttons/Selectors/Pilot Lights/Buzzers









## AH164, AH165 and AH165-2

### Quick reference guide







#### ■ Selector switches

Operator	Type	Operator	Type	Operator	Type
Knob with rectangular bezel  <i>See page 04/201</i> 	<b>AH164-P</b> <b>AH165-P</b>  KKD07-213	Knob with square bezel  <i>See page 04/201</i> 	<b>AH164-SP</b> <b>AH165-SP</b>  KKD07-215	Key with rectangular bezel  <i>See page 04/201</i> 	<b>AH164-J</b> <b>AH165-J</b>  KKD09-001L
Key with square bezel  <i>See page 04/201, 04/204</i> 	<b>AH164-SJ</b> <b>AH165-SJ</b>  KKD09-001R	Key with rectangular bezel ⊖ (Direct opening action)  <i>See page 04/202</i> 	<b>AH165-JM</b>  KKD09-006	Key ⊖ (Direct opening action)  <i>See page 04/202</i> 	<b>AH165-RJM</b>  KKD09-007

#### ■ Pilot lights

Lens	Type	Lens	Type	Lens	Type
Extended round  <i>See page 04/206</i> 	<b>AH164-Z</b> <b>AH165-Z</b>  KKD07-212	Flush square  <i>See page 04/206</i> 	<b>AH164-ZS</b> <b>AH165-ZS</b>  KKD05-094b	Flush rectangular  <i>See page 04/206</i> 	<b>AH164-ZT</b> <b>AH165-ZT</b>  KKD07-211
Dome  <i>See page 04/206</i> 	<b>AH165-ZM</b>  AF87-45				

#### ■ Buzzers

Sound	Type	Sound	Type	Sound	Type
Standard  <i>See page 04/208</i>	<b>AH164-TX</b>  AF87-317	Loud sound  <i>See page 04/208</i>	<b>AH164-TX1</b>  AF87-44	Loud sound with volume control  <i>See page 04/208</i> 	<b>AH164-TX2B</b>  KKD07-223
Standard sound with volume control (IP54)  <i>See page 04/208</i> 	<b>AH165-X</b>  KKD05-096b				

Note: (CCC): *See page 04/292*

**AH165-2 (oil-tight)**

■ **Illuminated pushbutton switches**

Operator	Type	Operator	Type	Operator	Type
Flush round head  <i>See page 04/213</i> 	<b>AH165-2FL, 2FL5</b>   AF87-211	Extended round head  <i>See page 04/213</i> 	<b>AH165-2EL, 2EL5</b>   AF87-210	Mushroom head  <i>See page 04/213</i> 	<b>AH165-2ML</b>   AF87-221
Mushroom head with square bezel  <i>See page 04/213</i> 	<b>AH165-2YML</b>   AF87-220	Flush square head  <i>See page 04/214</i> 	<b>AH165-2SFL, 2SFL5</b>   AF87-201	Extended square head  <i>See page 04/214</i> 	<b>AH165-2SEL, 2SEL5</b>   AF87-200
Concave square head  <i>See page 04/214</i> 	<b>AH165-2SCL, 2SCL5</b>   AF87-199	Push-lock, turn-reset  <i>See page 04/215</i> 	<b>AH165-2VL</b>   AF87-219	Push-lock, turn-reset with square bezel  <i>See page 04/215</i> 	<b>AH165-2YVL</b>   AF87-218

Note: : *See page 04/292*

■ **Pushbutton switches**













Operator	Type	Operator	Type	Operator	Type
Flush round head  <i>See page 04/216</i> 	<b>AH165-2F, 2F5</b>   AF87-211	Extended round head  <i>See page 04/216</i> 	<b>AH165-2E, 2E5</b>   AF87-210	Mushroom head  <i>See page 04/216</i> 	<b>AH165-2M</b>   AF87-215
Mushroom head with square bezel  <i>See page 04/216</i> 	<b>AH165-2YM</b>   AF87-214	Flush square head  <i>See page 04/216</i> 	<b>AH165-2SF, 2SF5</b>   AF87-201	Concave square head  <i>See page 04/216</i> 	<b>AH165-2SCE, 2SCE5</b>   AF87-199
Extended square head  <i>See page 04/216</i> 	<b>AH165-2SE, 2SE5</b>   AF87-200	With selector ring  <i>See page 04/217</i> 	<b>AH165-2S2</b>   AF87-207	With selector ring with square bezell  <i>See page 04/217</i> 	<b>AH165-2YS2</b>   AF87-206
Push-lock, turn-reset  <i>See page 04/217</i> 	<b>AH165-2V</b>   AF87-217	Push-lock, turn-reset with square bezel  <i>See page 04/217</i> 	<b>AH165-2YV</b>   AF87-216		

# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164, AH165 and AH165-2

### Quick reference guide









#### ■ Selector switches

Operator	Type	Operator	Type	Operator	Type
Knob	<b>AH165-2P</b>  KKD07-232	Knob with square bezel	<b>AH165-2YP</b>  KKD07-234	Key	<b>AH165-2J</b>  KKD09-003L
<i>See page 04/218</i> 		<i>See page 04/218</i> 		<i>See page 04/218</i> 	
Key with square bezel	<b>AH165-2YJ</b>  KKD09-003R	Lever	<b>AH165-2H</b>  AF87-209	Lever with square bezel	<b>AH165-2SH</b>  AF87-203
<i>See page 04/218</i> 		<i>See page 04/219</i> 		<i>See page 04/219</i> 	

#### ■ Illuminated selector switches

Operator	Type
Knob	<b>AH165-2PL</b>  KKD07-240
<i>See page 04/221</i> 	

#### ■ Pilot lights

Lens	Type	Lens	Type	Lens	Type
Flush round	<b>AH165-2Z</b>  AF87-213	Extended round	<b>AH165-2ZE</b>  AF87-212	Flush square	<b>AH165-2SZ</b>  AF87-205
<i>See page 04/222</i> 		<i>See page 04/222</i> 		<i>See page 04/222</i> 	
Extended square	<b>AH165-2SZE</b>  AF87-204				
<i>See page 04/222</i> 					

Note: : See page 04/292

# Pushbuttons/Selectors/Pilot Lights/Buzzers AH164 and AH165 Type number nomenclature

## ■ Type number nomenclature

### Pushbuttons, illuminated pushbuttons and pilot lights

**AH165 - L R 11 E 3 - W**  
①      ② ③ ④ ⑤ ⑥      ⑦

#### ① Product category

AH164: Standard (IP40)

AH165: Oil-tight (IP65)

#### ② Operator or lens

• Operator for illuminated pushbutton

SL: Flush square head

SL5: Flush square head (Alternate)

TL: Flush rectangular head

TL5: Flush rectangular head (Alternate)

L: Extended round head

L5: Extended round head (Alternate)

TGL: Flush rectangular head with guard

TGL5: Flush rectangular head with guard (Alternate)

SGL: Flush square head with guard

SGL5: Flush square head with guard (Alternate)

• Operator for pushbuttons

SF: Flush square head

SF5: Flush square head (Alternate)

TF: Flush rectangular head

TF5: Flush rectangular head (Alternate)

E: Extended round head

E5: Extended round head (Alternate)

TGF: Flush rectangular head with guard

TGF5: Flush rectangular head with guard (Alternate)

SGF: Flush square head with guard

SGF5: Flush square head with guard (Alternate)

M: Mushroom head

M5: Mushroom head (Alternate)

SM: Convex square head

SM5: Convex square head (Alternate)

TM: Convex rectangular head

TM5: Convex rectangular head (Alternate)

V: Push-lock, turn-reset (32mm dia.)\*1 \*2

V1: Push-lock, turn-reset (40mm dia.)\*1 \*2

• Operator for emergency stop pushbuttons

V5: Push-lock, turn-reset (32mm dia.)\*2

V6: Push-lock, turn-reset (40mm dia.)\*2

• Lens for pilot lights

Z: Extended round

ZS: Flush square

ZT: Flush rectangular

ZM: Dome

Note: \*1 Product with no trigger action mechanism

\*2 AH165 type only, direct opening action

#### ③ Color of button or lens

Code	color	Button	LED	Incandescent	Neon
G	Green	○	○	○	○
R	Red	○	○	○	○ (Orange)
B	Black*	○	—	—	—
Y	Yellow	○	○	○	○ (Orange)
W	White	○	○ (Orange)	○	○ (Orange)
S	Blue	○	○	○	○ (Green)
O	Orange	○	○ (Amber)	○	○
RG	Red/Green	—	○	—	—

Notes: • ( ): indicates luminous color

• AH165-V, V1, V5, V6: Red only

\* Not available for illuminated types

#### ④ Contact arrangement

01: 1NC\*1

22: 2NO+2NC

02: 2NC\*1

33: 3NO+3NC\*2

11: 1NO+1NC

Notes: \*1 Available for AH165-V, V1, V5, V6

\*2 Not available for with transformer types

#### ⑤ Lamp voltage

Code	LED	Incandescent**2	Neon*2
AA	5V DC*2	—	—
A	6V DC*2	5V AC/DC	—
B	12V DC	12V AC/DC	—
E	24V DC	24V AC/DC	—
H	100-110V AC*1 *2	100-110V AC*1	110V AC
K	—	—	120V AC
M	200-220V AC*1 *2	200-220V AC*1	220V AC
P	—	—	240V AC

Notes: \*1 With transformer (LED: 24V, Incandescent: 28V)

\*2 Not available AH165-ZM

• ZM type: LED lamp only (12, 24V DC)

#### ⑥ Type of lamp

Blank: Incandescent

1: Neon

2: Spot LED, LED (ZM types)

3: Flat LED

#### ⑦ Terminal

Blank: Solder/tab

W: Wire-wrap

S: Soder (AH165-V, V1, V5, V6 types only)

Note: ZM types: wire-wrap terminal only (Code is blank)

# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164 and AH165

### Type number nomenclature

#### ■ Type number nomenclature

##### Selector switches

**AH165 - J 2 B 11 A - W**  
 ① ② ③ ④ ⑤ ⑥ ⑦

##### ① Product category

AH164: Standard (IP40)  
 AH165: Oil-tight (IP65)

##### ② Operator

• 2-position, 3-position (operating angle 90°)

SP: Knob with square bezel  
 P: Knob with rectangular bezel  
 SJ: Key with square bezel  
 J: Key with rectangular bezel  
 JM: Key with rectangular bezel (Direct opening action) \*  
 RJM: Key (Direct opening action) \*

Note: \* AH165 types (2-position) only

• 3-position (operating angle 45°)

SPK: Knob with square bezel  
 PK: Knob with rectangular bezel  
 SJK: Key with square bezel  
 JK: Key with rectangular bezel

##### ③ Operation

2: 2-position, maintained  
 0: 2-position, spring return\*  
 3: 3-position, maintained  
 6: 3-position, spring/manual return (Left to center)  
 7: 3-position, spring/manual return (Right to center)  
 1: 3-position, spring return

Note: \* Except for JM and RJM types

##### ④ Color of knob or key removable position

• Color of knob  
 B: Black

• Key removable position

Code	2-position		3-position (operating angle 90°)				3-position (operating angle 45°)			
	2	0	1	3	6	7	1	3	6	7
A	⊗	⊗	—	⊖	—	⊖	—	⊗	—	⊗
B	⊗	—	—	⊖	—	—	—	⊗	—	—
C	—	—	—	⊕	—	—	—	⊗	—	—
D	⊗	—	—	⊖	—	—	—	⊗	—	—
E	—	—	Ⓜ	—	—	—	Ⓜ	—	—	—
F	—	—	—	—	—	—	—	⊗	—	—
G	—	—	—	—	—	—	—	⊗	—	⊗

##### ⑤ Contact arrangement

11: 1NO+1NC  
 22: 2NO+2NC  
 33: 3NO+3NC\*

Note: \* Except for JM and RJM types.

##### ⑥ Key type No.

A (standard), B, C, D, E, F

##### ⑦ Terminal

Blank: Solder/tab

W: Wire-warp

Note: JM, RJM types: Solder/tab terminal only

##### Buzzers

**AH164 - T X B E**  
 ① ② ③ ④

##### ① Product category

AH164: Standard (IP00)  
 AH165: Splash-proof (IP54)

##### ② Sound

TX: Standard (AH164)  
 TX1: Loud sound (AH164)  
 TX2: Loud sound with volume control (AH164)  
 X: Standard sound with volume control (AH165)

##### ③ Color of head

B: Black

##### ④ Operating voltage

AAC: 6V AC\*2  
 ADC: 6V DC\*2  
 A: 6V AC/DC\*1  
 E: 12 to 24V AC/DC  
 F: 35 to 48V AC/DC

Notes: \*1 Except for TX and TX1 types

\*2 Except for TX2 and X types

# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164 and AH165

### Ratings and specifications

#### ■ Standards approved

UL508	File No. E44592
CSA C22.2 No.14	File No. LR20479 (except for AH165-ZM) File No. LR84365 (for AH165-ZM)
TÜV: EN60947-5-1	Pushbutton (except for AH165-V, V1), Illuminated pushbutton: R9250087  Pushbutton (for AH165-V, V1): J9551059 Selector (except for AH165-JM, RJM): R9250088 Selector (for AH165-JM, RJM): J9551059 Pilot lights: R9250089 Buzzer: J9950092 (for AH164-TX2, AH165-X)
TÜV: EN60947-5-1 EN60947-5-5	Emergency stop pushbutton: R9950093

#### ■ Specifications (Indoor use)

- Pushbutton switches, illuminated pushbutton switches selector switches, pilot lights

Item	AH164	AH165
Rated insulation voltage	250V AC/DC	
Ambient temperature (no condensation or no icing)	-20 to +70°C *1	-10 to +70°C *2
Humidity	45 to 85%RH (at -5 to +40°C), no condensation or no icing	
Durability (operations)	Mechanical Pushbutton switch Momentary action: 1 million Alternate action: 250,000 Push-lock, turn-reset: 100,000 Selector switch: 250,000 *3	
	Electrical 100,000 (220V AC 0.7A)	
Dielectric strength	2000V AC, 1 minute (Between lamp and contact terminals: 1500V AC, 1 minute)	
Conditional short-circuit current	1000A	
Short-circuit protective device	Fuse 1A *4	
Pollution degree	3	
Vibration	Resonance: 10 to 55Hz, double amplitude 0.1mm *5 Constant: 16.7Hz, double amplitude 3mm	
Shock	Malfunction durability: 100m/s <sup>2</sup> *6 Mechanical durability: 500m/s <sup>2</sup>	
Operating frequency	1200 operation/hour (on-load factor: 40%)	
Insulation resistance	100MΩ or more (500V DC megger)	
Degree of protection	IP40	IP65

Notes: \*1 For illuminated pushbutton switch and pilot light: -20 to +55°C

\*2 For illuminated pushbutton switch and pilot light: -10 to +55°C

\*3 Key insertion/removal durability for selector switch key types: 10,000

\*4 AH165-V, V1, JM, RJM, V5, V6 types: Fuse 5A

\*5 Emergency stop type: 10 to 500Hz, double amplitude 0.7mm (acceleration 50m/s<sup>2</sup>), according to the test condition of EN60947-5-5 (1998)

\*6 Emergency stop type: 150m/s<sup>2</sup>

#### ● Buzzers

Item	AH164-TX	AH164-TX1
Rated insulation voltage	60V AC/DC	
Operating voltage	6V AC, 6V DC, 12 to 24V AC/DC 35 to 48V AC/DC	
Sound level	80dB (0.1m) 60dB(1m)	90dB (0.1m) 70dB(1m)
Durability	1000h	
Frequency	2 ±0.5kHz	2.4 to 3.3kHz
Intermittent cycle	Approx. 170 cycle/minute	
Current consumption	7mA(24, 48V DC) 15mA(6V DC) 20mA (6, 24V AC) 30mA (48V AC)	15mA (24, 48V DC) 25mA (6V DC) 30mA (24V AC) 40mA (48V AC) 50mA (6V AC)
Dielectric strength	1000V AC, 1 minute	
Insulation resistance	100MΩ or more (500V DC megger)	
Ambient temperature	-20 to +60°C (no condensation or no icing)	
Humidity	45 to 85%RH (at -5 to +40°C)	
Operator protection	IP00	

Item	AH164-TX2	AH165-X
Rated insulation voltage	60V AC/DC	
Operating voltage	6V AC/DC, 12 to 24V AC/DC 35 to 48V AC/DC	
Sound level	70dB to 90dB (0.1m) 50dB to 70dB (1m)	60dB to 80dB (0.1m) 40dB to 60dB (1m)
Durability	1000h	
Frequency	2 ±0.5kHz	2.4 to 3.3kHz
Intermittent cycle	Approx. 170 cycle/minute	
Current consumption	30mA (6V DC) 20mA (24, 48V DC) 40mA (6, 24, 48V AC)	
Dielectric strength	1000V AC, 1 minute	
Insulation resistance	100MΩ or more (500V DC megger)	
Ambient temperature	-20 to +60°C (no condensation or no icing)	
Humidity	45 to 85%RH (at -5 to +40°C)	
Degree of protection	IP00	IP54



# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164 and AH165

### Ratings and specifications

#### ■ Contact ratings

##### ● UL/CSA standards

Rated thermal current	Rated operational voltage	Maximum current	
		AC (Res. load)	DC (Res. load)
5A	24V 125V 250V	– – 5.0A	1.0A 0.2A –

##### ● EN standards (TÜV approved)

Rated thermal current	Rated operational voltage	Rated operational current				
		AC 15 (Ind. load)	AC 13 (Ind. load)	AC 12 (Res. load)	DC 13 (Ind. load)	DC 12 (Res. load)
5A	24V 100 to 120V 100 to 125V 200 to 240V	– 0.3A – 0.3A	– 1.0A – 0.7A	– 1.5A – 1.0A	0.7A – 0.15A –	1.0A – 0.2A –

#### ■ Lamp ratings

Rated operational voltage	Consumption		
	LED DC	Incandescent AC/DC	Neon AC
5V	7mA (Yellow: 28mA)	0.45W (6V)	–
6V	7mA (Yellow: 28mA)	–	–
12V	7mA	0.55W (14V)	–
24V	7mA	0.55W (28V)	–
110V	–	–	0.19VA
120V	–	–	0.21VA
220V	–	–	0.38VA
240V	–	–	0.42VA

Notes: • With transformer (LED): 2.6VA/110, 220V

• With transformer (Incandescent): 2VA/110, 220V

• For the incandescent lamps, the values in parentheses indicate the rated voltage of the lamps.

#### ■ Contact reliability

FUJI has confirmed that the unit can be used in 1mA circuit conditions at 5V AC or DC. The operable range may vary depending on the ambient conditions and type of load.

## ■ Illuminated pushbutton switches/without transformer



Operator	Lamp	Voltage	Contact	Momentary action		Alternate action	
				AH164 type	AH165 (Oil-tight) type	AH164 type	AH165 (Oil-tight) type
 KKD07-205	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-L□11E3 AH164-L□22E3 AH164-L□33E3	AH165-L□11E3 AH165-L□22E3 AH165-L□33E3	AH164-L5□11E3 AH164-L5□22E3 AH164-L5□33E3	AH165-L5□11E3 AH165-L5□22E3 AH165-L5□33E3
	Spot LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-L□11E2 AH164-L□22E2 AH164-L□33E2	AH165-L□11E2 AH165-L□22E2 AH165-L□33E2	AH164-L5□11E2 AH164-L5□22E2 AH164-L5□33E2	AH165-L5□11E2 AH165-L5□22E2 AH165-L5□33E2
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-L□11E AH164-L□22E AH164-L□33E	AH165-L□11E AH165-L□22E AH165-L□33E	AH164-L5□11E AH164-L5□22E AH164-L5□33E	AH165-L5□11E AH165-L5□22E AH165-L5□33E
	Neon	110V AC  220V AC	1NO+1NC 2NO+2NC 3NO+3NC  1NO+1NC 2NO+2NC 3NO+3NC	AH164-L□11H1 AH164-L□22H1 AH164-L□33H1  AH164-L□11M1 AH164-L□22M1 AH164-L□33M1	AH165-L□11H1 AH165-L□22H1 AH165-L□33H1  AH165-L□11M1 AH165-L□22M1 AH165-L□33M1	AH164-L5□11H1 AH164-L5□22H1 AH164-L5□33H1  AH164-L5□11M1 AH164-L5□22M1 AH164-L5□33M1	AH165-L5□11H1 AH165-L5□22H1 AH165-L5□33H1  AH165-L5□11M1 AH165-L5□22M1 AH165-L5□33M1
 KKD07-204	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SL□11E3 AH164-SL□22E3 AH164-SL□33E3	AH165-SL□11E3 AH165-SL□22E3 AH165-SL□33E3	AH164-SL5□11E3 AH164-SL5□22E3 AH164-SL5□33E3	AH165-SL5□11E3 AH165-SL5□22E3 AH165-SL5□33E3
	Spot LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SL□11E2 AH164-SL□22E2 AH164-SL□33E2	AH165-SL□11E2 AH165-SL□22E2 AH165-SL□33E2	AH164-SL5□11E2 AH164-SL5□22E2 AH164-SL5□33E2	AH165-SL5□11E2 AH165-SL5□22E2 AH165-SL5□33E2
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SL□11E AH164-SL□22E AH164-SL□33E	AH165-SL□11E AH165-SL□22E AH165-SL□33E	AH164-SL5□11E AH164-SL5□22E AH164-SL5□33E	AH165-SL5□11E AH165-SL5□22E AH165-SL5□33E
	Neon	110V AC  220V AC	1NO+1NC 2NO+2NC 3NO+3NC  1NO+1NC 2NO+2NC 3NO+3NC	AH164-SL□11H1 AH164-SL□22H1 AH164-SL□33H1  AH164-SL□11M1 AH164-SL□22M1 AH164-SL□33M1	AH165-SL□11H1 AH165-SL□22H1 AH165-SL□33H1  AH165-SL□11M1 AH165-SL□22M1 AH165-SL□33M1	AH164-SL5□11H1 AH164-SL5□22H1 AH164-SL5□33H1  AH164-SL5□11M1 AH164-SL5□22M1 AH164-SL5□33M1	AH165-SL5□11H1 AH165-SL5□22H1 AH165-SL5□33H1  AH165-SL5□11M1 AH165-SL5□22M1 AH165-SL5□33M1
 KKD07-202	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TL□11E3 AH164-TL□22E3 AH164-TL□33E3	AH165-TL□11E3 AH165-TL□22E3 AH165-TL□33E3	AH164-TL5□11E3 AH164-TL5□22E3 AH164-TL5□33E3	AH165-TL5□11E3 AH165-TL5□22E3 AH165-TL5□33E3
	Spot LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TL□11E2 AH164-TL□22E2 AH164-TL□33E2	AH165-TL□11E2 AH165-TL□22E2 AH165-TL□33E2	AH164-TL5□11E2 AH164-TL5□22E2 AH164-TL5□33E2	AH165-TL5□11E2 AH165-TL5□22E2 AH165-TL5□33E2
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TL□11E AH164-TL□22E AH164-TL□33E	AH165-TL□11E AH165-TL□22E AH165-TL□33E	AH164-TL5□11E AH164-TL5□22E AH164-TL5□33E	AH165-TL5□11E AH165-TL5□22E AH165-TL5□33E
	Neon	110V AC  220V AC	1NO+1NC 2NO+2NC 3NO+3NC  1NO+1NC 2NO+2NC 3NO+3NC	AH164-TL□11H1 AH164-TL□22H1 AH164-TL□33H1  AH164-TL□11M1 AH164-TL□22M1 AH164-TL□33M1	AH165-TL□11H1 AH165-TL□22H1 AH165-TL□33H1  AH165-TL□11M1 AH165-TL□22M1 AH165-TL□33M1	AH164-TL5□11H1 AH164-TL5□22H1 AH164-TL5□33H1  AH164-TL5□11M1 AH164-TL5□22M1 AH164-TL5□33M1	AH165-TL5□11H1 AH165-TL5□22H1 AH165-TL5□33H1  AH165-TL5□11M1 AH165-TL5□22M1 AH165-TL5□33M1

Note: Replace the □ mark by the button color code, see page 04/196.

04

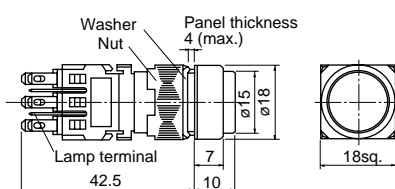
# Illuminated Pushbuttons

## AH164 and AH165

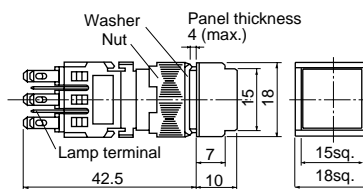
Operator	Lamp	Voltage	Contact	Momentary action		Alternate action	
				AH164 type	AH165 (oil-tight) type	AH164 type	AH165 (oil-tight) type
Flush rectangular head with guard   KKD07-203	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TGL□11E3	AH165-TGL□11E3	AH164-TGL5□11E3	AH165-TGL5□11E3
				AH164-TGL□22E3	AH165-TGL□22E3	AH164-TGL5□22E3	AH165-TGL5□22E3
	AH164-TGL□33E3	AH165-TGL□33E3	AH164-TGL5□33E3	AH165-TGL5□33E3			
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TGL□11E	AH165-TGL□11E	AH164-TGL5□11E	AH165-TGL5□11E
				AH164-TGL□22E	AH165-TGL□22E	AH164-TGL5□22E	AH165-TGL5□22E
	AH164-TGL□33E	AH165-TGL□33E	AH164-TGL5□33E	AH165-TGL5□33E			
Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TGL□11H1	AH165-TGL□11H1	AH164-TGL5□11H1	AH165-TGL5□11H1	
			AH164-TGL□22H1	AH165-TGL□22H1	AH164-TGL5□22H1	AH165-TGL5□22H1	
AH164-TGL□33H1	AH165-TGL□33H1	AH164-TGL5□33H1	AH165-TGL5□33H1				
	220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TGL□11M1	AH165-TGL□11M1	AH164-TGL5□11M1	AH165-TGL5□11M1	
AH164-TGL□22M1	AH165-TGL□22M1	AH164-TGL5□22M1	AH165-TGL5□22M1				
AH164-TGL□33M1	AH165-TGL□33M1	AH164-TGL5□33M1	AH165-TGL5□33M1				
Flush square head with guard   KKD05-075b	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SGL□11E3	AH165-SGL□11E3	AH164-SGL5□11E3	AH165-SGL5□11E3
				AH164-SGL□22E3	AH165-SGL□22E3	AH164-SGL5□22E3	AH165-SGL5□22E3
	AH164-SGL□33E3	AH165-SGL□33E3	AH164-SGL5□33E3	AH165-SGL5□33E3			
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SGL□11E	AH165-SGL□11E	AH164-SGL5□11E	AH165-SGL5□11E
				AH164-SGL□22E	AH165-SGL□22E	AH164-SGL5□22E	AH165-SGL5□22E
	AH164-SGL□33E	AH165-SGL□33E	AH164-SGL5□33E	AH165-SGL5□33E			
Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SGL□11H1	AH165-SGL□11H1	AH164-SGL5□11H1	AH165-SGL5□11H1	
			AH164-SGL□22H1	AH165-SGL□22H1	AH164-SGL5□22H1	AH165-SGL5□22H1	
AH164-SGL□33H1	AH165-SGL□33H1	AH164-SGL5□33H1	AH165-SGL5□33H1				
	220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SGL□11M1	AH165-SGL□11M1	AH164-SGL5□11M1	AH165-SGL5□11M1	
AH164-SGL□22M1	AH165-SGL□22M1	AH164-SGL5□22M1	AH165-SGL5□22M1				
AH164-SGL□33M1	AH165-SGL□33M1	AH164-SGL5□33M1	AH165-SGL5□33M1				

### ■ Dimensions, mm

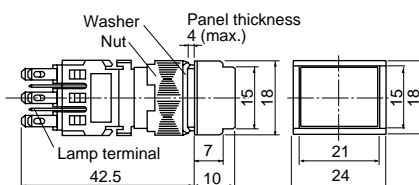
L, L5



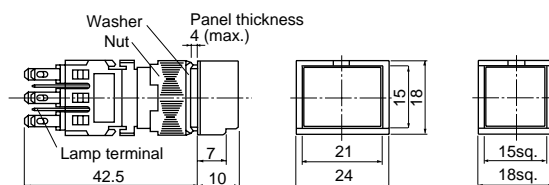
SL, SL5



TL, TL5



TGL, TGL5



SGL, SGL5

### ● Button color

Color	Green	Red	White	Yellow	Blue	Orange
Code	G	R	W	Y	S	O




- The color lens is made of a tinted transparent material.
- A white illuminated pushbutton is fitted with a transparent color lens. (Except the neon lamp)
- With wire-wrap pin terminals have a depth of 47mm.

### ● Lamp voltage

Voltages other than above are available

Code	LED	Incandescent	Neon
AA	5V DC	—	—
A	6V DC	5V AC/DC	—
B	12V DC	12V AC/DC	—
K	—	—	120V AC
P	—	—	240V AC

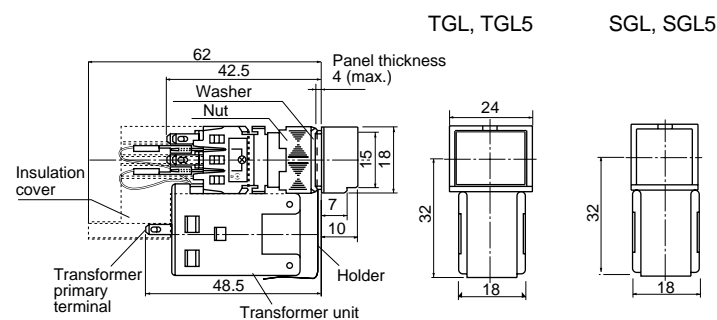
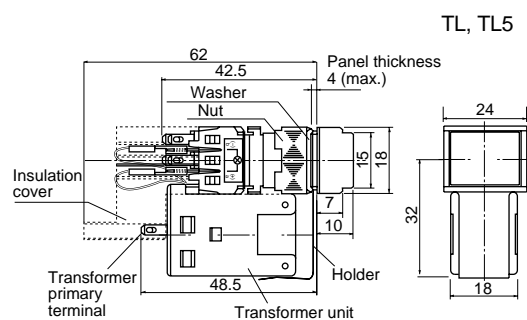
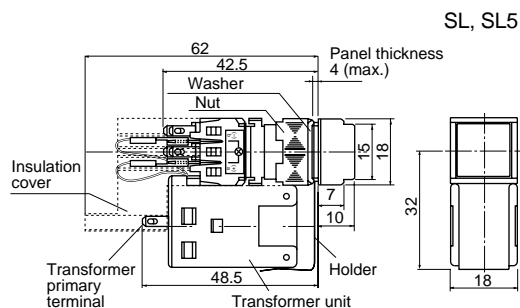
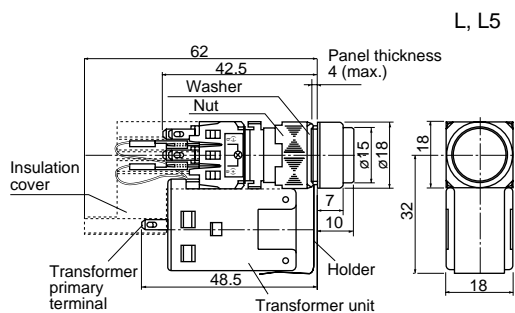
■ Illuminated pushbutton switches/with transformer

Operator	Lamp	Voltage	Contact	Momentary action		Alternate action	
				AH164 type	AH165 (oil-tight) type	AH164 type	AH165 (oil-tight) type
Extended round head  AF90-945	Flat LED	■ Voltage code  H: 100-110V AC M: 200-220V AC	1NO+1NC	AH164-L□11■3	AH165-L□11■3	AH164-L5□11■3	AH165-L5□11■3
			2NO+2NC	AH164-L□22■3	AH165-L□22■3	AH164-L5□22■3	AH165-L5□22■3
	Incandescent		1NO+1NC	AH164-L□11■	AH165-L□11■	AH164-L5□11■	AH165-L5□11■
			2NO+2NC	AH164-L□22■	AH165-L□22■	AH164-L5□22■	AH165-L5□22■
Flush square head  AF90-946	Flat LED	■ Voltage code  H: 100-110V AC M: 200-220V AC	1NO+1NC	AH164-SL□11■3	AH165-SL□11■3	AH164-SL5□11■3	AH165-SL5□11■3
			2NO+2NC	AH164-SL□22■3	AH165-SL□22■3	AH164-SL5□22■3	AH165-SL5□22■3
	Incandescent		1NO+1NC	AH164-SL□11■	AH165-SL□11■	AH164-SL5□11■	AH165-SL5□11■
			2NO+2NC	AH164-SL□22■	AH165-SL□22■	AH164-SL5□22■	AH165-SL5□22■
Flush rectangular head  AF90-947	Flat LED	■ Voltage code  H: 100-110V AC M: 200-220V AC	1NO+1NC	AH164-TL□11■3	AH165-TL□11■3	AH164-TL5□11■3	AH165-TL5□11■3
			2NO+2NC	AH164-TL□22■3	AH165-TL□22■3	AH164-TL5□22■3	AH165-TL5□22■3
	Incandescent		1NO+1NC	AH164-TL□11■	AH165-TL□11■	AH164-TL5□11■	AH165-TL5□11■
			2NO+2NC	AH164-TL□22■	AH165-TL□22■	AH164-TL5□22■	AH165-TL5□22■
Flush rectangular head with guard  AF90-941	Flat LED	■ Voltage code  H: 100-110V AC M: 200-220V AC	1NO+1NC	AH164-TGL□11■3	AH165-TGL□11■3	AH164-TGL5□11■3	AH165-TGL5□11■3
			2NO+2NC	AH164-TGL□22■3	AH165-TGL□22■3	AH164-TGL5□22■3	AH165-TGL5□22■3
	Incandescent		1NO+1NC	AH164-TGL□11■	AH165-TGL□11■	AH164-TGL5□11■	AH165-TGL5□11■
			2NO+2NC	AH164-TGL□22■	AH165-TGL□22■	AH164-TGL5□22■	AH165-TGL5□22■
Flush square head with guard  AF90-948	Flat LED	■ Voltage code  H: 100-110V AC M: 200-220V AC	1NO+1NC	AH164-SGL□11■3	AH165-SGL□11■3	AH164-SGL5□11■3	AH165-SGL5□11■3
			2NO+2NC	AH164-SGL□22■3	AH165-SGL□22■3	AH164-SGL5□22■3	AH165-SGL5□22■3
	Incandescent		1NO+1NC	AH164-SGL□11■	AH165-SGL□11■	AH164-SGL5□11■	AH165-SGL5□11■
			2NO+2NC	AH164-SGL□22■	AH165-SGL□22■	AH164-SGL5□22■	AH165-SGL5□22■

Note: Replace the □ mark by the button color code, see page 04/198.

# Illuminated Pushbuttons AH164 and AH165

## ■ Dimensions, mm


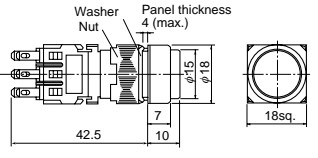

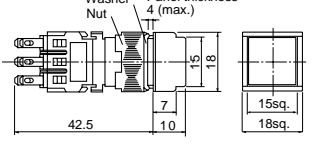

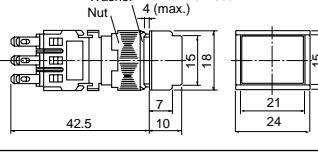

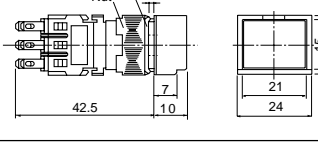

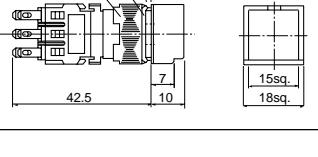

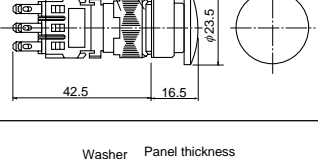

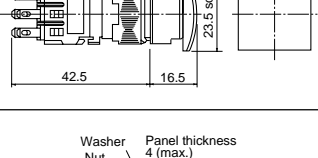

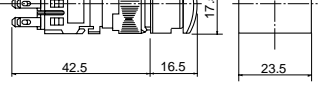


## ● Button color

Color	Green	Red	White	Yellow	Blue	Orange
Code	G	R	W	Y	S	O

- The color lens is made of a tinted transparent material.

## ■ Pushbutton switches

Operator	Contact	Momentary action		Alternate action		Dimensions, mm
		AH164 type	AH165 (oil-tight) type	AH164 type	AH165 (oil-tight) type	
 KKD07-209	1NO+1NC	AH164-E□11	AH165-E□11	AH164-E5□11	AH165-E5□11	
	2NO+2NC	AH164-E□22	AH165-E□22	AH164-E5□22	AH165-E5□22	
	3NO+3NC	AH164-E□33	AH165-E□33	AH164-E5□33	AH165-E5□33	
 KKD07-208	1NO+1NC	AH164-SF□11	AH165-SF□11	AH164-SF5□11	AH165-SF5□11	
	2NO+2NC	AH164-SF□22	AH165-SF□22	AH164-SF5□22	AH165-SF5□22	
	3NO+3NC	AH164-SF□33	AH165-SF□33	AH164-SF5□33	AH165-SF5□33	
 KKD07-206	1NO+1NC	AH164-TF□11	AH165-TF□11	AH164-TF5□11	AH165-TF5□11	
	2NO+2NC	AH164-TF□22	AH165-TF□22	AH164-TF5□22	AH165-TF5□22	
	3NO+3NC	AH164-TF□33	AH165-TF□33	AH164-TF5□33	AH165-TF5□33	
 KKD05-176	1NO+1NC	AH164-TGF□11	AH165-TGF□11	AH164-TGF5□11	AH165-TGF5□11	
	2NO+2NC	AH164-TGF□22	AH165-TGF□22	AH164-TGF5□22	AH165-TGF5□22	
	3NO+3NC	AH164-TGF□33	AH165-TGF□33	AH164-TGF5□33	AH165-TGF5□33	
 KKD05-075b	1NO+1NC	AH164-SGF□11	AH165-SGF□11	AH164-SGF5□11	AH165-SGF5□11	
	2NO+2NC	AH164-SGF□22	AH165-SGF□22	AH164-SGF5□22	AH165-SGF5□22	
	3NO+3NC	AH164-SGF□33	AH165-SGF□33	AH164-SGF5□33	AH165-SGF5□33	
 KKD07-210	1NO+1NC	AH164-M□11	AH165-M□11	AH164-M5□11	AH165-M5□11	
	2NO+2NC	AH164-M□22	AH165-M□22	AH164-M5□22	AH165-M5□22	
	3NO+3NC	AH164-M□33	AH165-M□33	AH164-M5□33	AH165-M5□33	
 KKD05-081b	1NO+1NC	AH164-SM□11	AH165-SM□11	AH164-SM5□11	AH165-SM5□11	
	2NO+2NC	AH164-SM□22	AH165-SM□22	AH164-SM5□22	AH165-SM5□22	
	3NO+3NC	AH164-SM□33	AH165-SM□33	AH164-SM5□33	AH165-SM5□33	
 KKD05-082b	1NO+1NC	AH164-TM□11	AH165-TM□11	AH164-TM5□11	AH165-TM5□11	
	2NO+2NC	AH164-TM□22	AH165-TM□22	AH164-TM5□22	AH165-TM5□22	
	3NO+3NC	AH164-TM□33	AH165-TM□33	AH164-TM5□33	AH165-TM5□33	

### ● Button color

Replace the □ mark by the following color code

Color	Green	Red	Black	White	Blue	Yellow	Orange
Code	G	R	B	W	S	Y	O


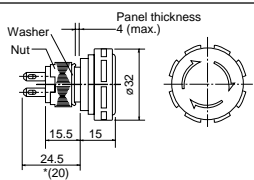

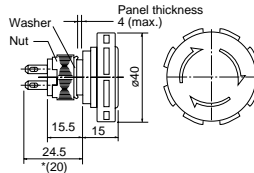
- The color lens is made of a tinted transparent material. (Except the M, SM, TM types)
- A white pushbutton is fitted with a transparent color lens. (Except the M, SM, TM types) A black pushbutton consists of a transparent color lens and an attached black legend plate. (Except M, SM, TM types)
- With wire-wrap pin terminals have a depth of 47mm.

# Pushbuttons

## AH165

### ■ Pushbutton switches

⊖ (Direct opening action)


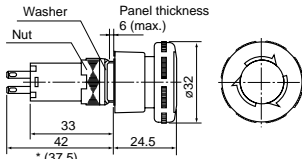

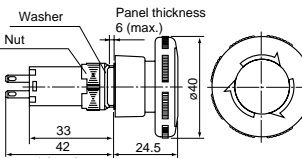
Operator	Button color	Contact	Terminal	AH165 (oil-tight) type	Dimensions, mm
Push-lock, turn-reset (32mm dia.)   <small>AF91-584</small>	Red	1NC	Solder/Tab Solder	<b>AH165-VR01</b> <b>(AH165-VR01-S)</b>	
		2NC		<b>AH165-VR02</b> <b>(AH165-VR02-S)</b>	
Push-lock, turn-reset (40mm dia.)   <small>AF91-583</small>	Red	1NC	Solder/Tab Solder	<b>AH165-V1R01</b> <b>(AH165-V1R01-S)</b>	
		2NC		<b>AH165-V1R02</b> <b>(AH165-V1R02-S)</b>	

Notes: \* ( ) For switch with solder terminal.

- Contact arrangements indicated in the table can be supplied.
- Product with no trigger action mechanism.

### ■ Emergency stop pushbutton switches


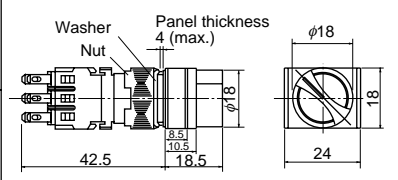
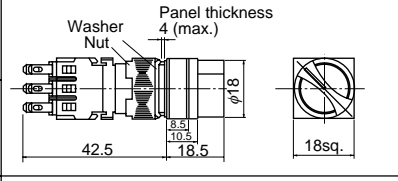



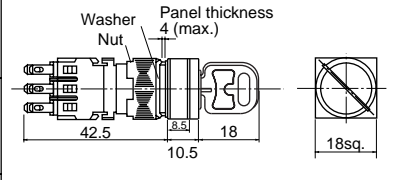
⊖ (Direct opening action), conform to EN418

Operator	Button color	Contact	Terminal	AH165 (oil-tight) type	Dimensions, mm
Push-lock, turn-reset (32mm dia.)   <small>KKD07-221</small>	Red	1NC	Solder/Tab Solder	<b>AH165-V5R01</b> <b>(AH165-V5R01-S)</b>	
		2NC		<b>AH165-V5R02</b> <b>(AH165-V5R02-S)</b>	
Push-lock, turn-reset (40mm dia.)   <small>KKD07-222</small>	Red	1NC	Solder/Tab Solder	<b>AH165-V6R01</b> <b>(AH165-V6R01-S)</b>	
		2NC		<b>AH165-V6R02</b> <b>(AH165-V6R02-S)</b>	

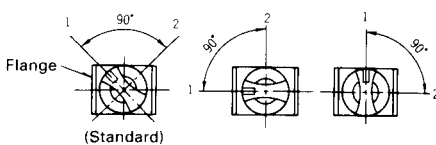
Notes: \* ( ) For switch with solder terminal.

- Contact arrangements indicated in the table can be supplied.

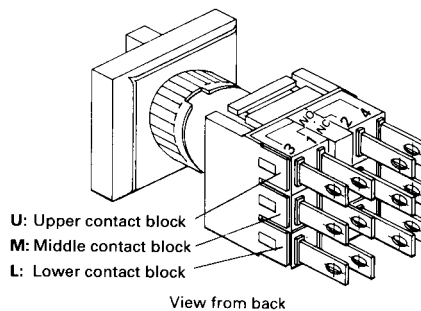
## ■ Selector switches/2-position (90-degree)

Operator	Operation	Key removable position	Contact	AH164 type	AH165 (oil-tight) type	Dimensions, mm	
Knob with rectangular bezel  KKD07-213	Maintained	—	1NO+1NC 2NO+2NC 3NO+3NC	AH164-P2B11 AH164-P2B22 AH164-P2B33	AH165-P2B11 AH165-P2B22 AH165-P2B33		
	Spring return	—	1NO+1NC 2NO+2NC 3NO+3NC	AH164-P0B11 AH164-P0B22 AH164-P0B33	AH165-P0B11 AH165-P0B22 AH165-P0B33		
	Maintained	—	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SP2B11 AH164-SP2B22 AH164-SP2B33	AH165-SP2B11 AH165-SP2B22 AH165-SP2B33		
Knob with square bezel  KKD07-215	Spring return	—	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SP0B11 AH164-SP0B22 AH164-SP0B33	AH165-SP0B11 AH165-SP0B22 AH165-SP0B33		
	Key with rectangular bezel  KKD09-001L	Maintained	⊖ A	1NO+1NC 2NO+2NC 3NO+3NC	AH164-J2A11A AH164-J2A22A AH164-J2A33A	AH165-J2A11A AH165-J2A22A AH165-J2A33A	
		Maintained	⊗ B	1NO+1NC 2NO+2NC 3NO+3NC	AH164-J2B11A AH164-J2B22A AH164-J2B33A	AH165-J2B11A AH165-J2B22A AH165-J2B33A	
Maintained		⊘ D	1NO+1NC 2NO+2NC 3NO+3NC	AH164-J2D11A AH164-J2D22A AH164-J2D33A	AH165-J2D11A AH165-J2D22A AH165-J2D33A		
Key with square bezel  KKD09-001R	Spring return	⊖ A	1NO+1NC 2NO+2NC 3NO+3NC	AH164-J0A11A AH164-J0A22A AH164-J0A33A	AH165-J0A11A AH165-J0A22A AH165-J0A33A		
	Maintained	⊖ A	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SJ2A11A AH164-SJ2A22A AH164-SJ2A33A	AH165-SJ2A11A AH165-SJ2A22A AH165-SJ2A33A		
	Maintained	⊗ B	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SJ2B11A AH164-SJ2B22A AH164-SJ2B33A	AH165-SJ2B11A AH165-SJ2B22A AH165-SJ2B33A		
	Maintained	⊘ D	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SJ2D11A AH164-SJ2D22A AH164-SJ2D33A	AH165-SJ2D11A AH165-SJ2D22A AH165-SJ2D33A		
	Spring return	⊖ A	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SJ0A11A AH164-SJ0A22A AH164-SJ0A33A	AH165-SJ0A11A AH165-SJ0A22A AH165-SJ0A33A		

- The operating angle range can be changed as shown below by setting the attached flange shifted by 45° in combination with the contact block.  
In this case, the minimum mounting pitch is 26mm because the contact block is shifted by 45° from the flange.



### • Contact block position



### • Contact arrangement and operator position: 2-position selector switch

Contact arrangement	1NO+1NC	2NO+2NC	3NO+3NC	
Operator position	Left ⊖	M 1 0 1 0 2 3 0 0 4	U L 1 0 1 0 2 3 0 0 4 L 0 4	U M L 1 0 1 0 2 3 0 0 4 L 0 4
	Right ⊕	M 1 0 1 0 2 3 0 0 4	U L 1 0 1 0 2 3 0 0 4 L 0 4	U M L 1 0 1 0 2 3 0 0 4 L 0 4

### 3-position selector switch

Contact arrangement	2NO+2NC	3NO+3NC	
Operator position	Left ⊖	U L 1 0 1 0 2 1 0 1 0 2 3 0 0 4 3 0 0 4	U M L 1 0 1 0 2 1 0 1 0 2 1 0 1 0 2 3 0 0 4 3 0 0 4 3 0 0 4
	Center ⊕	1 0 1 0 2 1 0 1 0 2 3 0 0 4 3 0 0 4	1 0 1 0 2 1 0 1 0 2 1 0 1 0 2 3 0 0 4 3 0 0 4 3 0 0 4
	Right ⊖	1 0 1 0 2 1 0 1 0 2 3 0 0 4 3 0 0 4	1 0 1 0 2 1 0 1 0 2 1 0 1 0 2 3 0 0 4 3 0 0 4 3 0 0 4




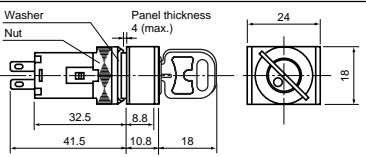



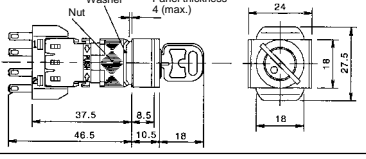





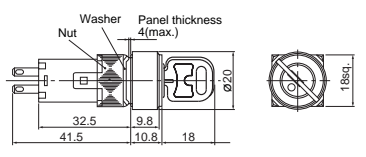



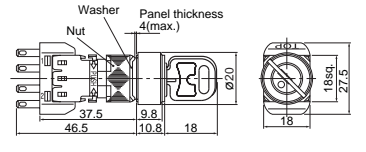


- There are 6 available key types; A, B, C, D, E and F. Standard key code is A.
- With wire-wrap pin terminals have a depth of 47mm.



# Selector Switches AH165

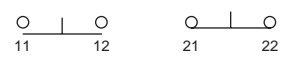

## ■ Selector switches/2-position (90-degree)

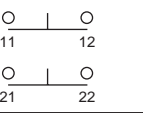
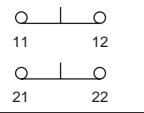
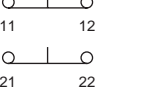
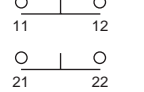
⊕ (Direct opening action)

Operator	Operation	Key removable position	Contact	AH165 (oil-tight) type	Dimensions, mm	
Key with rectangular bezel  KKD09-005L  KKD09-005R	Maintained	A 	1NO+1NC	AH165-JM2A11A		
		B 		AH165-JM2B11A		
		D 		AH165-JM2D11A		
		A 	2NO+2NC	AH165-JM2A22A		
		B 		AH165-JM2B22A		
		D 		AH165-JM2D22A		
Key with round bezel  KKD09-005L  KKD09-007R	Maintained	A 	1NO+1NC	AH165-RJM2A11A		
		B 		AH165-RJM2B11A		
		D 		AH165-RJM2D11A		
		A 	2NO+2NC	AH165-RJM2A22A		
		B 		AH165-RJM2B22A		
		D 		AH165-RJM2D22A		

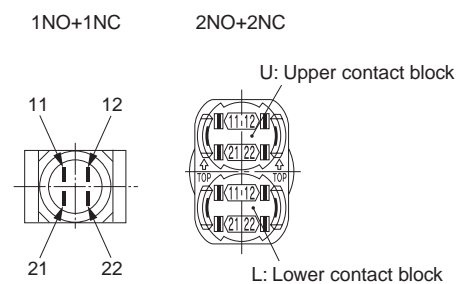
• There are 6 available key types; A, B, C, D, E and F. Standard key code is A.

### • Contact arrangement and operator positions: 2-position selector switch


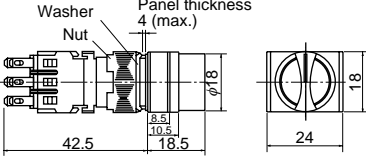

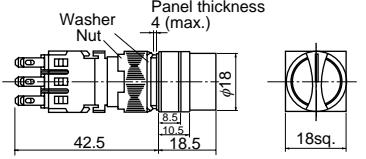

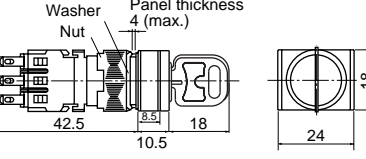

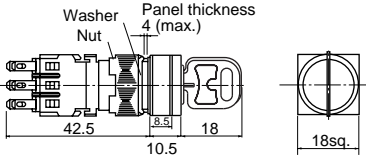
Contact arrangement	1NO+1NC	
Operator position	Left	
	Right	

Contact arrangement	2NO+2NC				
Operator position	Left	U		L	
		Right			

### • Terminal number



## ■ Selector switches/3-position (90-degree)


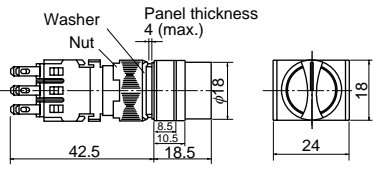

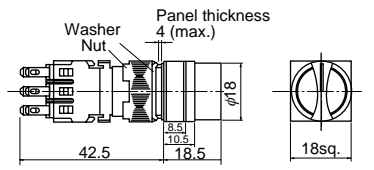

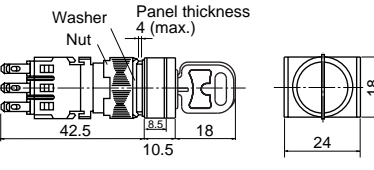

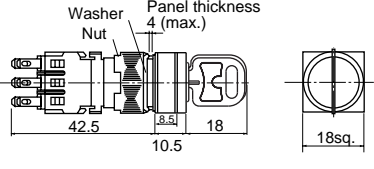
Operator	Operation	Key removable position	Contact	AH164 type	AH165 (oil-tight) type	Dimensions, mm		
Knob with rectangular bezel  KKD07-214	Maintained	—	2NO+2NC 3NO+3NC	AH164-P3B22 AH164-P3B33	AH165-P3B22 AH165-P3B33			
	Spring/ manual return	—	2NO+2NC 3NO+3NC	AH164-P6B22 AH164-P6B33	AH165-P6B22 AH165-P6B33			
	Spring/ manual return	—	2NO+2NC 3NO+3NC	AH164-P7B22 AH164-P7B33	AH165-P7B22 AH165-P7B33			
	Spring return	—	2NO+2NC 3NO+3NC	AH164-P1B22 AH164-P1B33	AH165-P1B22 AH165-P1B33			
Knob with square bezel  KKD07-216	Maintained	—	2NO+2NC 3NO+3NC	AH164-SP3B22 AH164-SP3B33	AH165-SP3B22 AH165-SP3B33			
	Spring/ manual return	—	2NO+2NC 3NO+3NC	AH164-SP6B22 AH164-SP6B33	AH165-SP6B22 AH165-SP6B33			
	Spring/ manual return	—	2NO+2NC 3NO+3NC	AH164-SP7B22 AH164-SP7B33	AH165-SP7B22 AH165-SP7B33			
	Spring return	—	2NO+2NC 3NO+3NC	AH164-SP1B22 AH164-SP1B33	AH165-SP1B22 AH165-SP1B33			
Key with rectangular bezel  KKD09-002L	Maintained*	⊖ A	2NO+2NC 3NO+3NC	AH164-J3A22A AH164-J3A33A	AH165-J3A22A AH165-J3A33A			
		Ⓢ E	2NO+2NC 3NO+3NC	AH164-J3E22A AH164-J3E33A	AH165-J3E22A AH165-J3E33A			
		⊖ D	2NO+2NC 3NO+3NC	AH164-J3D22A AH164-J3D33A	AH165-J3D22A AH165-J3D33A			
		⊕ C	2NO+2NC 3NO+3NC	AH164-J3C22A AH164-J3C33A	AH165-J3C22A AH165-J3C33A			
	Spring/ manual return	Ⓢ E	2NO+2NC 3NO+3NC	AH164-J6E22A AH164-J6E33A	AH165-J6E22A AH165-J6E33A			
		⊖ D	2NO+2NC 3NO+3NC	AH164-J6D22A AH164-J6D33A	AH165-J6D22A AH165-J6D33A			
	Spring/ manual return	⊖ A	2NO+2NC 3NO+3NC	AH164-J7A22A AH164-J7A33A	AH165-J7A22A AH165-J7A33A			
		Ⓢ E	2NO+2NC 3NO+3NC	AH164-J7E22A AH164-J7E33A	AH165-J7E22A AH165-J7E33A			
	Spring return	Ⓢ E	2NO+2NC 3NO+3NC	AH164-J1E22A AH164-J1E33A	AH165-J1E22A AH165-J1E33A			
	Key with square bezel  KKD09-002R	Maintained*	⊖ A	2NO+2NC 3NO+3NC	AH164-SJ3A22A AH164-SJ3A33A		AH165-SJ3A22A AH165-SJ3A33A	
			Ⓢ E	2NO+2NC 3NO+3NC	AH164-SJ3E22A AH164-SJ3E33A		AH165-SJ3E22A AH165-SJ3E33A	
			⊖ D	2NO+2NC 3NO+3NC	AH164-SJ3D22A AH164-SJ3D33A		AH165-SJ3D22A AH165-SJ3D33A	
⊕ C			2NO+2NC 3NO+3NC	AH164-SJ3C22A AH164-SJ3C33A	AH165-SJ3C22A AH165-SJ3C33A			
Spring/ manual return		Ⓢ E	2NO+2NC 3NO+3NC	AH164-SJ6E22A AH164-SJ6E33A	AH165-SJ6E22A AH165-SJ6E33A			
		⊖ D	2NO+2NC 3NO+3NC	AH164-SJ6D22A AH164-SJ6D33A	AH165-SJ6D22A AH165-SJ6D33A			
Spring/ manual return		⊖ A	2NO+2NC 3NO+3NC	AH164-SJ7A22A AH164-SJ7A33A	AH165-SJ7A22A AH165-SJ7A33A			
		Ⓢ E	2NO+2NC 3NO+3NC	AH164-SJ7E22A AH164-SJ7E33A	AH165-SJ7E22A AH165-SJ7E33A			
Spring return		Ⓢ E	2NO+2NC 3NO+3NC	AH164-SJ1E22A AH164-SJ1E33A	AH165-SJ1E22A AH165-SJ1E33A			

- There are 6 available key types; A, B, C, D, E and F. Standard key code is A.
- Contact arrangement and operator position: *See page 04/201.*
- Spring return, spring/manual return (spring return): Operation angle 70-degree

- \* Available key removable position: Code B ⊖
- With wire-wrap pin terminals have a depth of 47mm.

# Selector Switches AH164 and AH165

## ■ Selector switches/3-position (45-degree)

Operator	Operation	Key removable position	Contact	AH164 type	AH165 (oil-tight) type	Dimensions, mm		
Knob with rectangular bezel   KKD07-214	Maintained	—	2NO+2NC 3NO+3NC	AH164-PK3B22 AH164-PK3B33	AH165-PK3B22 AH165-PK3B33			
	Spring/ manual return	①	2NO+2NC 3NO+3NC	AH164-PK6B22 AH164-PK6B33	AH165-PK6B22 AH165-PK6B33			
	Spring/ manual return	①	2NO+2NC 3NO+3NC	AH164-PK7B22 AH164-PK7B33	AH165-PK7B22 AH165-PK7B33			
	Spring return	①	2NO+2NC 3NO+3NC	AH164-PK1B22 AH164-PK1B33	AH165-PK1B22 AH165-PK1B33			
Knob with square bezel   KKD07-216	Maintained	—	2NO+2NC 3NO+3NC	AH164-SPK3B22 AH164-SPK3B33	AH165-SPK3B22 AH165-SPK3B33			
	Spring/ manual return	①	2NO+2NC 3NO+3NC	AH164-SPK6B22 AH164-SPK6B33	AH165-SPK6B22 AH165-SPK6B33			
	Spring/ manual return	①	2NO+2NC 3NO+3NC	AH164-SPK7B22 AH164-SPK7B33	AH165-SPK7B22 AH165-SPK7B33			
	Spring return	①	2NO+2NC 3NO+3NC	AH164-SPK1B22 AH164-SPK1B33	AH165-SPK1B22 AH165-SPK1B33			
Key with rectangular bezel   KKD09-002L	Maintained	⊖ A	2NO+2NC 3NO+3NC	AH164-JK3A22A AH164-JK3A33A	AH165-JK3A22A AH165-JK3A33A			
		⓪ E	2NO+2NC 3NO+3NC	AH164-JK3E22A AH164-JK3E33A	AH165-JK3E22A AH165-JK3E33A			
		⊘ D	2NO+2NC 3NO+3NC	AH164-JK3D22A AH164-JK3D33A	AH165-JK3D22A AH165-JK3D33A			
		⊗ C	2NO+2NC 3NO+3NC	AH164-JK3C22A AH164-JK3C33A	AH165-JK3C22A AH165-JK3C33A			
	Spring/ manual return	① E	2NO+2NC 3NO+3NC	AH164-JK6E22A AH164-JK6E33A	AH165-JK6E22A AH165-JK6E33A			
		⊘ D	2NO+2NC 3NO+3NC	AH164-JK6D22A AH164-JK6D33A	AH165-JK6D22A AH165-JK6D33A			
	Spring/ manual return	⊖ A	2NO+2NC 3NO+3NC	AH164-JK7A22A AH164-JK7A33A	AH165-JK7A22A AH165-JK7A33A			
		① E	2NO+2NC 3NO+3NC	AH164-JK7E22A AH164-JK7E33A	AH165-JK7E22A AH165-JK7E33A			
	Spring return	① E	2NO+2NC 3NO+3NC	AH164-JK1E22A AH164-JK1E33A	AH165-JK1E22A AH165-JK1E33A			
	Key with square bezel   KKD09-002R	Maintained	⊖ A	2NO+2NC 3NO+3NC	AH164-SJK3A22A AH164-SJK3A33A		AH165-SJK3A22A AH165-SJK3A33A	
			⓪ E	2NO+2NC 3NO+3NC	AH164-SJK3E22A AH164-SJK3E33A		AH165-SJK3E22A AH165-SJK3E33A	
			⊘ D	2NO+2NC 3NO+3NC	AH164-SJK3D22A AH164-SJK3D33A		AH165-SJK3D22A AH165-SJK3D33A	
⊗ C			2NO+2NC 3NO+3NC	AH164-SJK3C22A AH164-SJK3C33A	AH165-SJK3C22A AH165-SJK3C33A			
Spring/ manual return		① E	2NO+2NC 3NO+3NC	AH164-SJK6E22A AH164-SJK6E33A	AH165-SJK6E22A AH165-SJK6E33A			
		⊘ D	2NO+2NC 3NO+3NC	AH164-SJK6D22A AH164-SJK6D33A	AH165-SJK6D22A AH165-SJK6D33A			
Spring/ manual return		⊖ A	2NO+2NC 3NO+3NC	AH164-SJK7A22A AH164-SJK7A33A	AH165-SJK7A22A AH165-SJK7A33A			
		① E	2NO+2NC 3NO+3NC	AH164-SJK7E22A AH164-SJK7E33A	AH165-SJK7E22A AH165-SJK7E33A			
Spring return		① E	2NO+2NC 3NO+3NC	AH164-SJK1E22A AH164-SJK1E33A	AH165-SJK1E22A AH165-SJK1E33A			

- There are 6 available key types; A, B, C, D, E and F. Standard key code is A.
- Contact arrangement and operator position: See page 04/205.

• Key removable positions (JK, SJK)

Remvable position							
Code	A	B	C	D	E	F	G

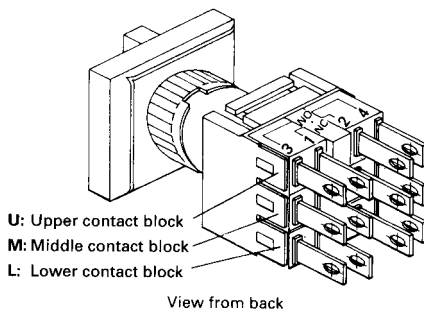
  

Operation code	Key removable position
3	A, B, C, D, E, F, G
6	D, E, F
7	A, E, G
1	E

• Key code No.

There are 6 available key types; A, B, C, D, E and F.  
Standard key code is A.

• Contact block position


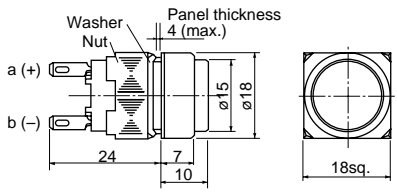

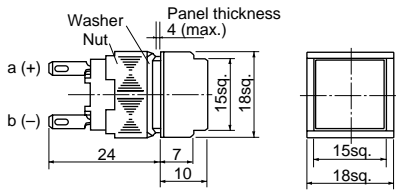

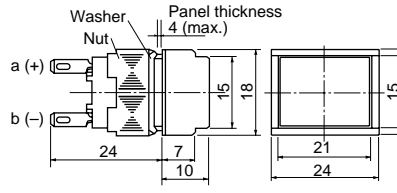

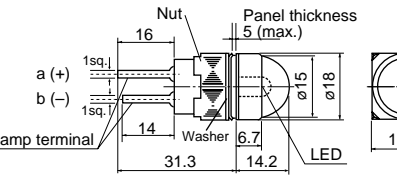


• Contact arrangement and operator position:  
3-position selector switch

Contact arrangement		2NO+2NC	3NO+3NC
Operator position	Left ⊖	U L 1O <sub>1</sub> 1O <sub>2</sub> 1O <sub>1</sub> 1O <sub>2</sub> 3O <sub>1</sub> 04 3O <sub>2</sub> 04	U M L 1O <sub>1</sub> 1O <sub>2</sub> 1O <sub>1</sub> 1O <sub>2</sub> 1O <sub>1</sub> 1O <sub>2</sub> 3O <sub>1</sub> 04 3O <sub>2</sub> 04 3O <sub>3</sub> 04
	Center ⓪	1O <sub>1</sub> 1O <sub>2</sub> 1O <sub>1</sub> 1O <sub>2</sub> 3O <sub>1</sub> 04 3O <sub>2</sub> 04	1O <sub>1</sub> 1O <sub>2</sub> 1O <sub>1</sub> 1O <sub>2</sub> 1O <sub>1</sub> 1O <sub>2</sub> 3O <sub>1</sub> 04 3O <sub>2</sub> 04 3O <sub>3</sub> 04
	Right ⊕	1O <sub>1</sub> 02 1O <sub>1</sub> 1O <sub>2</sub> 3O <sub>1</sub> 04 3O <sub>2</sub> 04	1O <sub>1</sub> 02 1O <sub>1</sub> 1O <sub>2</sub> 1O <sub>1</sub> 1O <sub>2</sub> 3O <sub>1</sub> 04 3O <sub>2</sub> 04 3O <sub>3</sub> 04

# Pilot Lights AH164 and AH165

## ■ Pilot lights/without transformer

Lens	Lamp	Voltage	AH164 type	AH165 (oil-tight) type	Dimensions, mm
 SK-1139	Flat LED	24V DC	AH164-Z□E3	AH165-Z□E3	
	Spot LED	24V DC	AH164-Z□E2	AH165-Z□E2	
	Incandescent	24V AC/DC	AH164-Z□E	AH165-Z□E	
	Neon	110V AC 220V AC	AH164-Z□H1 AH164-Z□M1	AH165-Z□H1 AH165-Z□M1	
 SK-1138	Flat LED	24V DC	AH164-ZS□E3	AH165-ZS□E3	
	Spot LED	24V DC	AH164-ZS□E2	AH165-ZS□E2	
	Incandescent	24V AC/DC	AH164-ZS□E	AH165-ZS□E	
	Neon	110V AC 220V AC	AH164-ZS□H1 AH164-ZS□M1	AH165-ZS□H1 AH165-ZS□M1	
 SK-1137	Flat LED	24V DC	AH164-ZT□E3	AH165-ZT□E3	
	Spot LED	24V DC	AH164-ZT□E2	AH165-ZT□E2	
	Incandescent	24V AC/DC	AH164-ZT□E	AH165-ZT□E	
	Neon	110V AC 220V AC	AH164-ZT□H1 AH164-ZT□M1	AH165-ZT□H1 AH165-ZT□M1	
 AF87-45	LED	12V DC 24V DC	- -	AH165-ZM□B2 AH165-ZM□E2	

### ● Lens color

Replace the □ mark by the following lens color code

Color	Green	Red	White	Yellow	Blue	Orange
Code	G	R	W	Y	S	O

- The color lens is made of a tinted transparent material.
- A white pilot lights is fitted with a transparent color lens. (Except the neon lamp and dome).
- With wire-wrap pin terminals have a depth of 29mm. (Except for ZM type)


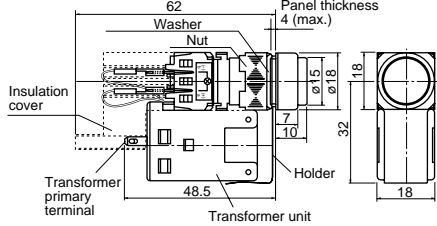

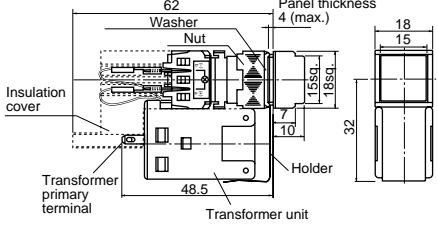

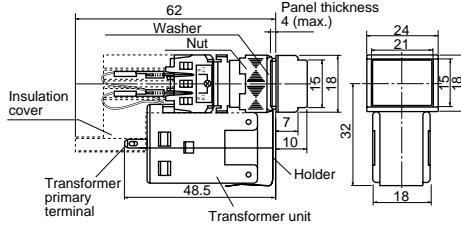
### ● Lamp voltage

Voltages other than above are available

Code	LED	Incandescent	Neon
AA	5V DC	-	-
A	6V DC	5V AC/DC	-
B	12V DC	12V AC/DC	-
K	-	-	120V AC
P	-	-	240V AC

Note: Except for ZM types and red/green LED types

## ■ Pilot lights/with transformer

Lens	Lamp	Voltage	AH164 type	AH165 (oil-tight) type	Dimensions, mm
Extended square   AF90-944	Flat LED	■ Voltage H: 100-110V AC  M: 200-220V AC	<b>AH164-Z□■3</b>	<b>AH165-Z□■3</b>	
	Incandescent		<b>AH164-Z□■</b>	<b>AH165-Z□■</b>	
Flush square   AF90-943	Flat LED	■ Voltage H: 100-110V AC  M: 200-220V AC	<b>AH164-ZS□■3</b>	<b>AH165-ZS□■3</b>	
	Incandescent		<b>AH164-ZS□■</b>	<b>AH165-ZS□■</b>	
Flush rectangular   AF90-942	Flat LED	■ Voltage H: 100-110V AC  M: 200-220V AC	<b>AH164-ZT□■3</b>	<b>AH165-ZT□■3</b>	
	Incandescent		<b>AH164-ZT□■</b>	<b>AH165-ZT□■</b>	

### ● Lens color

Replace the □ mark by the following lens color code

Color	Green	Red	White	Yellow	Blue	Orange
Code	G	R	W	Y	S	O


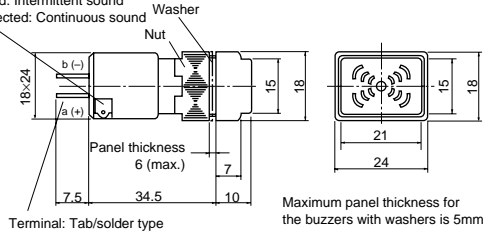

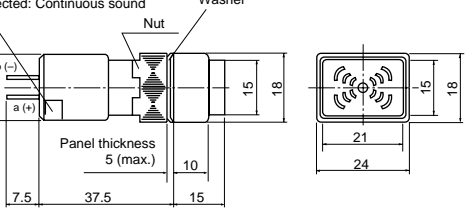

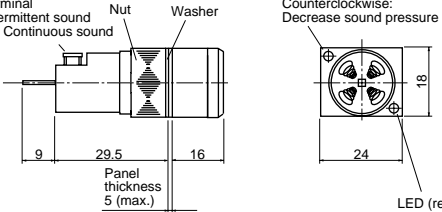

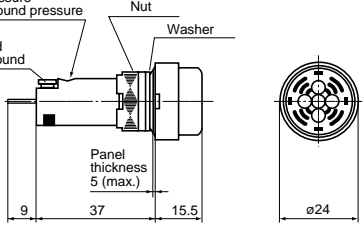
- The color lens is made of a tinted transparent material.
- A white pilot lights is fitted with a transparent color lens.

04

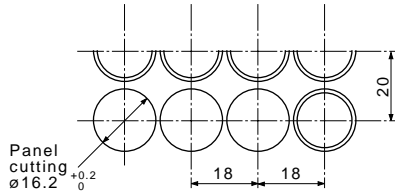
# Buzzers

## AH164 and AH165

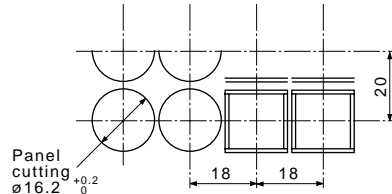
### ■ Buzzers

Sound	Operating voltage	Type	Dimensions, mm
<b>Standard</b>   AF87-317	6V AC  6V DC  12 to 24V AC/DC  35 to 48V AC/DC	<b>AH164-TXBAAC</b>  <b>AH164-TXBADC</b>  <b>AH164-TXBE</b>  <b>AH164-TXBF</b>	<p>Short-circuit terminal            Connected: Intermittent sound            Not connected: Continuous sound</p>  <p>Terminal: Tab/solder type            Maximum panel thickness for the buzzers with washers is 5mm</p>
<b>Loud sound</b>   AF87-44	6V AC  6V DC  12 to 24V AC/DC  35 to 48V AC/DC	<b>AH164-TX1BAAC</b>  <b>AH164-TX1BADC</b>  <b>AH164-TX1BE</b>  <b>AH164-TX1BF</b>	<p>Short-circuit terminal            Connected: Intermittent sound            Not connected: Continuous sound</p> 
<b>Loud sound with volume control</b>   KKD07-223	6V AC/DC  12 to 24V AC/DC  35 to 48V AC/DC	<b>AH164-TX2BA</b>  <b>AH164-TX2BE</b>  <b>AH164-TX2BF</b>	<p>Short-circuit terminal            Connected: Intermittent sound            Not connected: Continuous sound</p>  <p>Volume            Clockwise: Increase sound pressure            Counterclockwise: Decrease sound pressure            LED (red)</p>
<b>Standard sound with volume control (IP54)</b>   KKD05-096b	6V AC/DC  12 to 24V AC/DC  35 to 48V AC/DC	<b>AH165-XBA</b>  <b>AH165-XBE</b>  <b>AH165-XBF</b>	<p>Volume            Clockwise: Increase sound pressure            Counterclockwise: Decrease sound pressure</p> <p>Short-circuit terminal            Connected: Intermittent sound            Not connected: Continuous sound</p> 

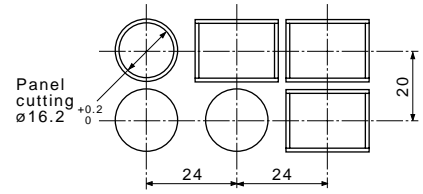
■ **Mounting space, mm**  
 • **Pushbuttons and pilot lights**  
 Extended round head or lens



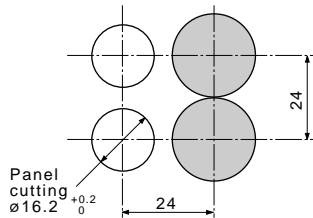
Flush square head or lens



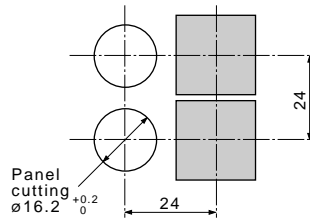
Flush rectangular head or lens



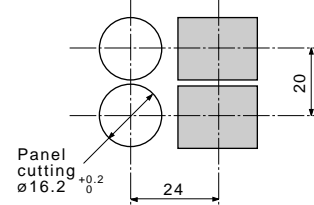
Mushroom head



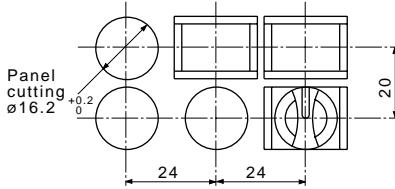
Convex square head



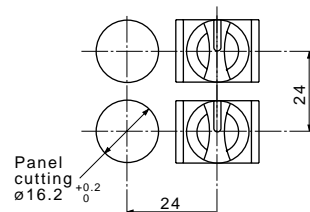
Convex rectangular head



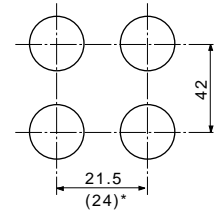
• **Selector switches**  
 • **When mounting the selector switches near the pilot light**



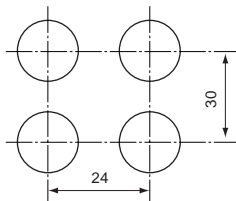
• **When mounting the selector switches near each other**



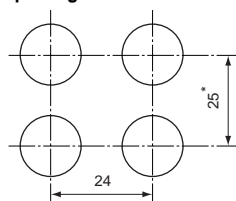
• **With transformer**



• **When mounting the JM or RJM selector switches near each other (2NO+2NC only)**



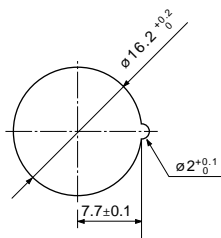
• **When mounting the JM or RJM selector switches near the other selector switch, pushbutton switch and pilot lights**



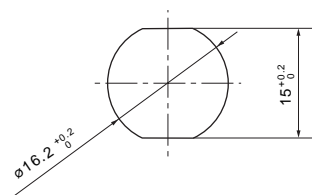
Note: \* Mushroom, convex square, convex rectangular: 27

Note: \* ( ) For switch with flush rectangular head

• **AH165-V, V1, V5, V6**



• **AH165-JM, RJM**



■ **Terminal number**

• **AH164, 165**

Type	Wiring	Terminal position
Illuminated pushbuttons	a (+) b (-) 	Type number display side 
Pushbuttons Selector switches (except for JM, RJM types)		
Pilot lights (without transformer)	a (+) b (-) 	Type number display side 

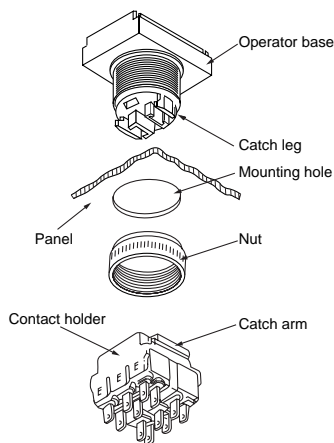


# Pushbuttons/Selectors/Pilot Lights/Buzzers AH164, AH165 and AH165-2 Notes on use

## Notes on use

### ■ Installation on panel

- For installation, use dedicated wrench AHX601. The appropriate tightening torque is 0.6 to 1N·cm.
- The installation sequence is as follows:  
Pass the operator base through the hole in the panel and secure it by tightening the bezel. Properly position the catch arms and the catch legs of the operator base and push the contact holder onto the operator base. To remove the contact holder, pull it while pressing the catch arms inward.



### ■ Mounting steps of switch with transformer

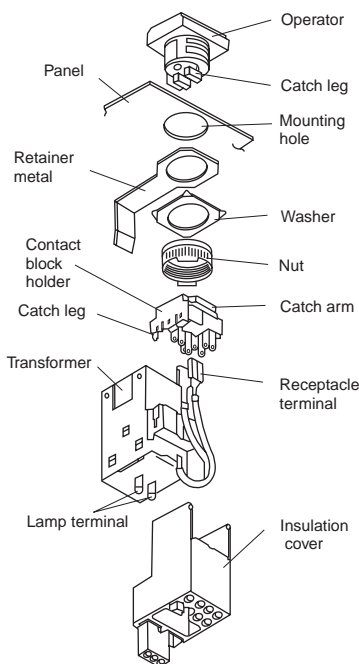
① Pass the switch operator through the panel hole and secure with a nut by way of the retainer metal from the front of the panel.

② Align the position of the catch arm of the contact block holder with that of the catch leg of the switch operator. Engage these two catches by pushing them together.

③ Insert and secure the transformer unit while assembling the contact block holder with the retainer metal.

④ Connect the receptacle terminal with lead wires extending from the transformer to the lamp terminal of the contact block holder. (Be care on the polarity of the LED. Red: +, Black: -)

⑤ Push in and secure the standard accessory insulation cover by aligning its position with each terminal. To replace the transformer, remove the transformer by widening the catch leg of the contact block holder. Pay attention not to excessively widen the catch leg. Mounting steps are the same as the above steps ③, ④, and ⑤.



### ■ Installing the protection cover / dust-tight cover, guard-ring

Be careful that the panel thickness does not exceed the following:

- Panel thickness
- Protection cover: 2.6mm max.
- Dust-tight cover: 2.0mm max.
- Guard ring: 2.5mm max.

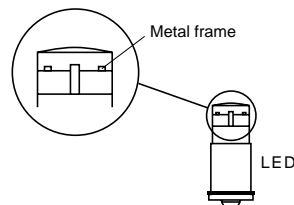
### ■ Operating voltage and rated voltage of incandescent lamps

Rated voltage	Operating voltage
6V	4 to 5V
14V	10 to 12V
28V (Standard)	20 to 24V

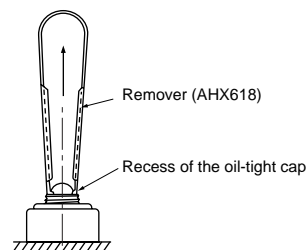
Incandescent lamps should be operated at the operating voltages if a lamp service life of 5,000 to 10,000 hours are needed. The ambient temperature must not exceed 30°C if the lamp is used at the rated voltage continuously.

### ■ Method of replacing lamp

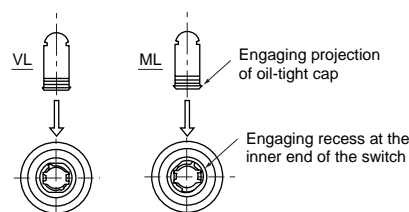
- Incandescent lamps/LED lamps/neon lamps  
Remove the color lens and inner button with a remover AHX618. Then draw out the lamp with a lamp changer AHX672. When installing lamps, do it manually and in the reverse order of removing.
- Products with blue and green LEDs  
The LED devices on products with high-brightness (blue and green) LEDs are very sensitive to static electricity. When replacing LED lamps do not allow static electricity to come into direct contact with the metal frame on the upper side of the LED lamp. The LED device may be damaged if this part is subjected to static electricity. When installing or removing an LED lamp, it is recommended that you use the lamp changer (AHX672).



- To replace the lamp of a AH165-2 illuminated pushbutton switch (ML, VL), remove the button and draw out the oil-tight cap.



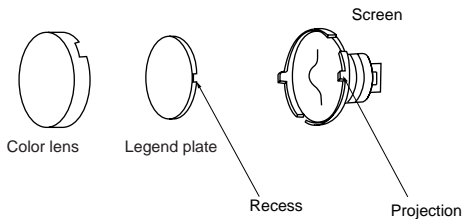
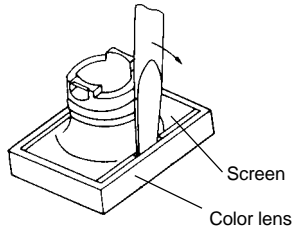
- Then, replace the lamp using a lamp changer (AHX672) and push the oil-tight cap into its original position with its engaging projection properly adjusted (see the figure below).



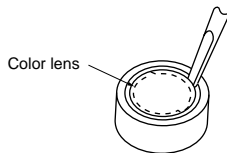
Note: Lamp of AH165-ZM type can not be replaced.

■ **Method of replacing color lens**

- To remove the color lens, insert a small screwdriver into the color lens and twist in direction of the arrow.



- For an AH165-2, use a small standard screwdriver or a similar tool with a flat end. If one side of the color lens is removed from the screen, insert the screwdriver or a similar tool deeper and remove the color lens together with the screen.



■ **Replacing pushbuttons**

In the case of alternative action type pushbutton switches and illuminated pushbutton switches, be sure not to replace the pushbuttons in their locked state. This could result in internal damage to the mechanism.

■ **Description sheet**

The Fuji description sheet is 25μm thick. If preparing custom description sheets, make sure that the thickness is 0.1mm or less.

■ **Contact block**

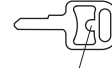
To replace a contact block, use removing tool AGX012. If excessive force is applied when attempting to open the support legs for the contact block holder, deformation or damage may occur.

■ **Handling precautions**

- Do not apply torque in excess of 1.0 N•m to operate the selectors switch (Type "P"). Required operating force of switches is less than 0.1 N•m.
- Do not tap on a pushbutton to turn it ON or OFF, such handling may damage it. Be sure to operate the pushbutton by hand.

■ **Key type selector switch**

- Five key types (Type B to Type F) are available besides Type A, which is the standard key type.



Be sure to use a key with a symbol which is matched with the symbol on the main unit.

- Fully insert the key into the main unit before turning the key.
- The key turning force should not exceed 0.1 N•m.
- Do not pull out or insert the key forcibly.

■ **Wiring connections**

- Use a soldering iron with a wattage of not more than 30W and a tip length of more than 20mm.

Use a rosin-core solder

With a 30W iron complete soldering within 5 seconds, or 10 seconds with a 20W iron. Do not apply external force to the terminals. Do not deform the terminals.

Because lead-free solder's melting point is slightly high, soldering work may be difficult. Use a soldering iron whose tip is rather large or whose calorie is rather high.

- Wires that can be connected
  - Two solid wires with a maximum diameter of 0.8mm (solder)
  - One stranded wire with a maximum area of 0.75mm<sup>2</sup> (solder)
- Flat connection terminal
  - (2.8□-1.25-5) 0.5 to 1.25mm<sup>2</sup>
  - (2.8□-0.5-5) 0.2 to 0.5mm<sup>2</sup>
- Using contact blocks
  - When using NO and NC contacts in the same contact block, avoid connection that involves opposite polarity or wiring from different types of power supply.
- For wiring to adjacent terminals, use insulated tubing to prevent short-circuit and to assure isolation. For solder terminals, be careful when connecting thick wires. Do not use too much solder.
- Wiring to wire-wrap pin terminals
  - Select the appropriate wire sizes and tools from the table below.

Wire size	Bit	Sleeve	Number of effective wraps
0.4mm dia.	3-A	1-B	About 8
0.5mm dia.	1-A	1-B	About 6
(0.65mm dia.)	(2-A)	(2-B)	(About 6)

Use ordinary wrapping for connection.

Wires of 0.65mm dia. must not be used on adjacent terminals. However, 0.65mm dia. wire can be mixed with 0.4 and 0.5mm dia. wires.

- Wiring to tab terminals
  - Use receptacles, No. 110.

■ **Installing lamps in close order**

When continuously lighting pilot lights or pressing illuminated pushbuttons installed in close order, care must be taken that the ambient temperature does not exceed the rated value.

# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164, AH165 and AH165-2

### Notes on use

#### ■ LEDs

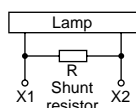
##### • LED Lamp Malfunctioning

The LED lamp is lit by a very small level of current (approximately 0.01mA). Therefore, the it may be erroneously lit by a current leaking from the surge absorption circuit or semiconductor circuit or due to stray capacitance between cables. In that case, provide a countermeasure (e.g., connect a resistor in parallel with the LED lamp).

##### • Countermeasure for Malfunctioning

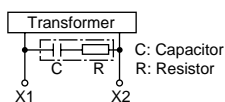
Shunt Resistor R or CR elements connected in parallel Lamp malfunctions can be prevented by connecting a shunt resistor (R) or CR elements (a capacitor and resistor) in parallel with the LED lamp terminal. The resistance and CR values vary depending on the model and the operating conditions.

Example 1



- 24V DC  
R: 10k $\Omega$  (1W)

Example 2



- 110V AC  
C: 0.33 $\mu$ F (250V AC)  
R: 120 $\Omega$  (0.25W)
- 220V AC  
C: 0.33 $\mu$ F (250V AC)  
R: 120 $\Omega$  (0.25W)

##### • Incoming surge

Be careful that since high luminance LED products use an element sensitive to static electricity, they may not be lit by an abnormal voltage like surge.

#### ■ Using a flat LED in 48V DC circuit

When a flat LED lamps having a rated voltage of 24V DC is used with 48V DC circuit, connect an external resistor of 3,500 $\Omega$  (1W).

#### ■ Preventing the neon lamp from incorrectly turning ON

The neon lamp may incorrectly turn ON due to current leakage or voltage induction. In such a case, connect a shunt resistor in parallel with the lamp.

Example) 110V AC: 100k (0.25W)  
220V AC: 50k (2W)

If an external surge of 3kV or more may occur, connect a surge absorption element in parallel with the lamp.

#### ■ Operation

Do not use a hitting or bouncing action to operate the button, or the switch may break. Always operate the switch by hand.

#### ■ Storage and operation site

- Use the unit within the rated operating ambient temperature and humidity ranges.
- Do not use the enclosed type in places where oil or water is sprayed or where dust accumulates. In places such as these, use the oil-tight type or provide a dust cover.
- The oil-tight type is evaluated with standard cutting oil and cooling oil applied. The oil-tight type cannot be used with some special oils.

#### ■ Buzzer

##### • Noise







If the application circuit is likely to generate excessively strong noise, connect a surge absorber (e.g., FUJI'S ENC390D, provided that the switch is a 24V type) in parallel with the buzzer.




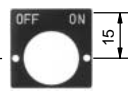
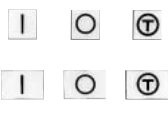
##### • Place of Use

The buzzer does not have a drip-proof construction. Do not use the buzzer in places where oil or water is sprayed or where dust accumulates. If the buzzer is a splash-proof type, it will resist sprays of water.

- Do not use the buzzer in places that are subject to an excessive amount of corrosive gas.
- Be careful that the buzzer is likely to sound erroneously due to leakage current or the like.

■ Accessories for AH164 and AH165


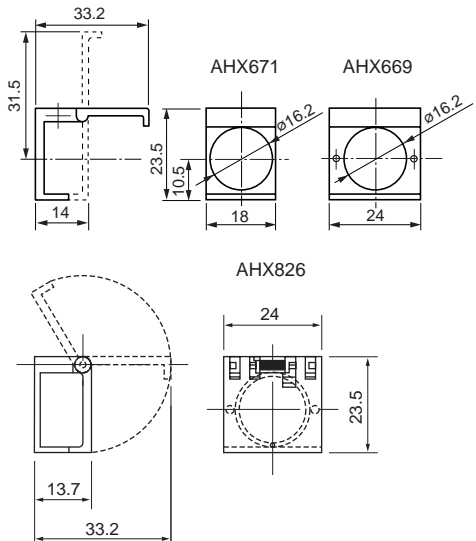



Description	Type	
Color chips (Round)	Color	Type
 <p>L, L5, E E5, Z</p>	Green	<b>AHX631-G</b>
	Red	<b>AHX631-R</b>
	White (For Neon)	<b>AHX631-W</b>
	Blue	<b>AHX631-S</b>
	Yellow	<b>AHX631-Y</b>
	Orange	<b>AHX631-O</b>
	Clear	<b>AHX631-C</b>
SF-682 For LED, Neon	Green	<b>AHX653-G</b>
Color chips (Square)	Color	Type
 <p>SL, SL5, SGL, SGL5, SF, SF5, SGF, SGF5, ZS</p>	Green	<b>AHX632-G</b>
	Red	<b>AHX632-R</b>
	White (For Neon)	<b>AHX632-W</b>
	Blue	<b>AHX632-S</b>
	Yellow	<b>AHX632-Y</b>
	Orange	<b>AHX632-O</b>
	Clear	<b>AHX632-C</b>
SF-681 For LED, Neon	Green	<b>AHX653-SG</b>
Color chips (Rectangular)	Color	Type
 <p>TL, TL5, TGL TGL5, TF, TF5 TGF, TGF5, ZT</p>	Green	<b>AHX633-G</b>
	Red	<b>AHX633-R</b>
	White (For Neon)	<b>AHX633-W</b>
	Blue	<b>AHX633-S</b>
	Yellow	<b>AHX633-Y</b>
	Orange	<b>AHX633-O</b>
	Clear	<b>AHX633-C</b>
SF-680 For LED, Neon	Green	<b>AHX653-TG</b>
Mushroom head button	Color	Type
 <p>M, M5</p>	Green	<b>AHX682-G</b>
	Red	<b>AHX682-R</b>
	White	<b>AHX682-W</b>
	Blue	<b>AHX682-S</b>
	Yellow	<b>AHX682-Y</b>
	Orange	<b>AHX682-O</b>
	Black	<b>AHX682-B</b>
SI-40		
Convex square head button	Color	Type
 <p>SM, SM5</p>	Green	<b>AHX683-G</b>
	Red	<b>AHX683-R</b>
	White	<b>AHX683-W</b>
	Blue	<b>AHX683-S</b>
	Yellow	<b>AHX683-Y</b>
	Orange	<b>AHX683-O</b>
	Black	<b>AHX683-B</b>
SI-43		
Convex rectangular head button	Color	Type
 <p>TM, TM5</p>	Green	<b>AHX684-G</b>
	Red	<b>AHX684-R</b>
	White	<b>AHX684-W</b>
	Blue	<b>AHX684-S</b>
	Yellow	<b>AHX684-Y</b>
	Orange	<b>AHX684-O</b>
	Black	<b>AHX684-B</b>
SI-44		

Description	Type			
Legend sheet	Round	Type: <b>AHX615-□</b> Legend: ON, OFF, UP, DOWN		
	Square	Type: <b>AHX616-□</b> Legend: ON, OFF, UP, DOWN START, STOP, OPEN CLOSE, AUTO, MAN, RESET, POWER, REV, FWD, HIGH, LOW		
	Rectangular	Type: <b>AHX617-□</b> Legend: ON, OFF, UP, DOWN START, STOP, AUTO, MAN, FOWARD, REVERSE		
	When ordering, specify desired legend in the □ at the end of ordering code, Transparent blank sheets are also available.			
	Use black oil ink.			
	SH-165			
	Legend plate (Acrylic resin)	Type	Color Dimensions, mm	
		Round	<b>AHX665</b> White <b>AHX665-C</b> Transparent <b>AHX665-B</b> Black	ø12.2 x 0.9
		Square	<b>AHX666</b> White <b>AHX666-C</b> Transparent <b>AHX666-B</b> Black	12.2sq. x 0.9
		Rectangular	<b>AHX667</b> White <b>AHX667-C</b> Transparent <b>AHX667-B</b> Black	12.2 x 18.2 x 0.9
	SH-164			
Legend plate for spot LED (Acrylic resin)	Type	Dimensions, mm		
	Round	<b>AHX650</b> ø12.2 x 0.9		
	Square	<b>AHX651</b> 12.2sq. x 0.9		
	Rectangular	<b>AHX652</b> 12.2 x 18.2 x 0.9		
SP-113				
Legend plate for selector switch (2-position)	Type: <b>AHX664</b> Legend: ON-OFF Legend: Blank	Dimensions, mm: 24sq. x 0.5		
				
	SH-226A			
Legend plate for symbol mark	Mark	Type		
	Square	○ <b>AHX666-E</b>		
	Rectangular	□ <b>AHX667-E</b>		
	Square	I <b>AHX666-H</b>		
	Rectangular	□ <b>AHX667-H</b>		
	Square	⊕ <b>AHX666-T</b>		
	Rectangular	□ <b>AHX667-T</b>		
AF87-74				

# Pushbuttons/Selectors/Pilot Lights/Buzzers


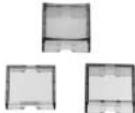
## AH164 and AH165

### Accessories

Description	Type																	
<p>Protection cover</p>  <p>KKD07-246</p> <p>KKD07-248</p> <p>KKD07-247</p>	<p>For round and square head button Type: <b>AHX671</b></p> <p>For rectangular head button Type: <b>AHX669</b> <b>AHX826</b></p> <p>This cover protect against accidental operation. Note: Not used for illuminated pushbuttons with guard. Applicable panel thickness is 2.6mm max.</p> <p>Dimensions, mm</p> 																	
<p>Dust-tight cover</p>  <p>AF91-123, SI-41</p>	<p>For round and square head button Type: <b>AHX822</b> Dimensions, mm: 24sq. x 14.2</p> <p>For rectangular head button Type: <b>AHX668</b> Dimensions, mm: 24 x 30 x 14.2</p> <p>For mushroom head button Type: <b>AHX649</b> Dimensions, mm: <math>\varnothing 30</math> x 18</p> <p>These covers protect against dust. Note: Applicable panel thickness is 2.0mm max.</p>																	
<p>Guard ring</p>  <p>SI-42</p>	<table border="1"> <thead> <tr> <th>Type</th> <th>Color</th> <th>Dimensions, mm</th> </tr> </thead> <tbody> <tr> <td><b>AHX676-B</b></td> <td>Black</td> <td><math>\varnothing 21</math> x 12</td> </tr> <tr> <td><b>AHX676-GY</b></td> <td>Gray</td> <td></td> </tr> </tbody> </table> <p>This guard ring is used in combination with an extended round head pushbutton (L or E). Note: Applicable panel thickness is 2.5mm max. Please place an order for a packing (AHX685) separately when you intend to use for AH165 series.</p>			Type	Color	Dimensions, mm	<b>AHX676-B</b>	Black	$\varnothing 21$ x 12	<b>AHX676-GY</b>	Gray							
Type	Color	Dimensions, mm																
<b>AHX676-B</b>	Black	$\varnothing 21$ x 12																
<b>AHX676-GY</b>	Gray																	
<p>Transformer</p>  <p>AF90-949</p>	<table border="1"> <thead> <tr> <th>Voltage</th> <th>Type</th> <th>Lamp</th> </tr> </thead> <tbody> <tr> <td>100 to 110V AC</td> <td><b>AHX805-H</b></td> <td>LED</td> </tr> <tr> <td>200 to 220V AC</td> <td><b>AHX805-M</b></td> <td></td> </tr> <tr> <td>100 to 110V AC</td> <td><b>AHX806-H</b></td> <td>Incandescent</td> </tr> <tr> <td>200 to 220V AC</td> <td><b>AHX806-M</b></td> <td></td> </tr> </tbody> </table>			Voltage	Type	Lamp	100 to 110V AC	<b>AHX805-H</b>	LED	200 to 220V AC	<b>AHX805-M</b>		100 to 110V AC	<b>AHX806-H</b>	Incandescent	200 to 220V AC	<b>AHX806-M</b>	
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100 to 110V AC	<b>AHX806-H</b>	Incandescent																
200 to 220V AC	<b>AHX806-M</b>																	



# Pushbuttons/Selectors/Pilot Lights/Buzzers AH165-2 Accessories

## ■ Accessories for AH165-2

Description	Type														
Color lens (Round)  	For flush head (Used with 2F, 2F5, 2FL, 2FL5, 2Z)														
	<table border="0"> <tr><td>Color</td><td>Type</td></tr> <tr><td>Green</td><td><b>AHX2604-G</b></td></tr> <tr><td>Red</td><td><b>AHX2604-R</b></td></tr> <tr><td>Yellow</td><td><b>AHX2604-Y</b></td></tr> <tr><td>Blue</td><td><b>AHX2604-S</b></td></tr> <tr><td>Orange</td><td><b>AHX2604-O</b></td></tr> <tr><td>Clear</td><td><b>AHX2604-C</b></td></tr> </table>	Color	Type	Green	<b>AHX2604-G</b>	Red	<b>AHX2604-R</b>	Yellow	<b>AHX2604-Y</b>	Blue	<b>AHX2604-S</b>	Orange	<b>AHX2604-O</b>	Clear	<b>AHX2604-C</b>
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Blue	<b>AHX2604-S</b>														
Orange	<b>AHX2604-O</b>														
Clear	<b>AHX2604-C</b>														
Color lens (Square)  	For flush head (Used with 2SF, 2SF5, 2SFL, 2SFL5, 2SZ)														
	<table border="0"> <tr><td>Color</td><td>Type</td></tr> <tr><td>Green</td><td><b>AHX2606-G</b></td></tr> <tr><td>Red</td><td><b>AHX2606-R</b></td></tr> <tr><td>Yellow</td><td><b>AHX2606-Y</b></td></tr> <tr><td>Blue</td><td><b>AHX2606-S</b></td></tr> <tr><td>Orange</td><td><b>AHX2606-O</b></td></tr> <tr><td>Clear</td><td><b>AHX2606-C</b></td></tr> </table>	Color	Type	Green	<b>AHX2606-G</b>	Red	<b>AHX2606-R</b>	Yellow	<b>AHX2606-Y</b>	Blue	<b>AHX2606-S</b>	Orange	<b>AHX2606-O</b>	Clear	<b>AHX2606-C</b>
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Blue	<b>AHX2606-S</b>														
Orange	<b>AHX2606-O</b>														
Clear	<b>AHX2606-C</b>														
	For extended head (Used with 2E, 2E5, 2EL, 2EL5, 2ZE)														
	<table border="0"> <tr><td>Color</td><td>Type</td></tr> <tr><td>Green</td><td><b>AHX2605-G</b></td></tr> <tr><td>Red</td><td><b>AHX2605-R</b></td></tr> <tr><td>Yellow</td><td><b>AHX2605-Y</b></td></tr> <tr><td>Blue</td><td><b>AHX2605-S</b></td></tr> <tr><td>Orange</td><td><b>AHX2605-O</b></td></tr> <tr><td>Clear</td><td><b>AHX2605-C</b></td></tr> </table>	Color	Type	Green	<b>AHX2605-G</b>	Red	<b>AHX2605-R</b>	Yellow	<b>AHX2605-Y</b>	Blue	<b>AHX2605-S</b>	Orange	<b>AHX2605-O</b>	Clear	<b>AHX2605-C</b>
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Red	<b>AHX2605-R</b>														
Yellow	<b>AHX2605-Y</b>														
Blue	<b>AHX2605-S</b>														
Orange	<b>AHX2605-O</b>														
Clear	<b>AHX2605-C</b>														
	For extended head (Used with 2SE, 2SE5, 2SEL, 2SEL5, 2SZE)														
	<table border="0"> <tr><td>Color</td><td>Type</td></tr> <tr><td>Green</td><td><b>AHX2607-G</b></td></tr> <tr><td>Red</td><td><b>AHX2607-R</b></td></tr> <tr><td>Yellow</td><td><b>AHX2607-Y</b></td></tr> <tr><td>Blue</td><td><b>AHX2607-S</b></td></tr> <tr><td>Orange</td><td><b>AHX2607-O</b></td></tr> <tr><td>Clear</td><td><b>AHX2607-C</b></td></tr> </table>	Color	Type	Green	<b>AHX2607-G</b>	Red	<b>AHX2607-R</b>	Yellow	<b>AHX2607-Y</b>	Blue	<b>AHX2607-S</b>	Orange	<b>AHX2607-O</b>	Clear	<b>AHX2607-C</b>
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Blue	<b>AHX2607-S</b>														
Orange	<b>AHX2607-O</b>														
Clear	<b>AHX2607-C</b>														
	For concave head (Used with 2SCE, 2SCE5, 2SCL, 2SCL5)														
	<table border="0"> <tr><td>Color</td><td>Type</td></tr> <tr><td>Green</td><td><b>AHX2608-G</b></td></tr> <tr><td>Red</td><td><b>AHX2608-R</b></td></tr> <tr><td>Yellow</td><td><b>AHX2608-Y</b></td></tr> <tr><td>Blue</td><td><b>AHX2608-S</b></td></tr> <tr><td>Orange</td><td><b>AHX2608-O</b></td></tr> <tr><td>Clear</td><td><b>AHX2608-C</b></td></tr> </table>	Color	Type	Green	<b>AHX2608-G</b>	Red	<b>AHX2608-R</b>	Yellow	<b>AHX2608-Y</b>	Blue	<b>AHX2608-S</b>	Orange	<b>AHX2608-O</b>	Clear	<b>AHX2608-C</b>
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Green	<b>AHX2608-G</b>														
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Blue	<b>AHX2608-S</b>														
Orange	<b>AHX2608-O</b>														
Clear	<b>AHX2608-C</b>														

AF87-631

AF87-632

Description	Type																
Legend plate  	For flush head																
	<table border="0"> <tr><td>Color</td><td>Type</td><td>Used with</td></tr> <tr><td>White</td><td><b>AHX2609-W</b></td><td>Incandescent lamp, LED lamp, Pushbutton *1</td></tr> <tr><td>Clear</td><td><b>AHX2609-C</b></td><td>Neon lamp *2</td></tr> <tr><td>Black</td><td><b>AHX2609-B</b></td><td>Pushbutton *3</td></tr> </table> <p>Dimensions, mm: <math>\phi 18 \times 0.9</math></p>	Color	Type	Used with	White	<b>AHX2609-W</b>	Incandescent lamp, LED lamp, Pushbutton *1	Clear	<b>AHX2609-C</b>	Neon lamp *2	Black	<b>AHX2609-B</b>	Pushbutton *3				
Color	Type	Used with															
White	<b>AHX2609-W</b>	Incandescent lamp, LED lamp, Pushbutton *1															
Clear	<b>AHX2609-C</b>	Neon lamp *2															
Black	<b>AHX2609-B</b>	Pushbutton *3															
	For extended head																
	<table border="0"> <tr><td>Color</td><td>Type</td><td>Used with</td></tr> <tr><td>White</td><td><b>AHX2610-W</b></td><td>Incandescent lamp, LED lamp, Pushbutton *1</td></tr> <tr><td>Clear</td><td><b>AHX2610-C</b></td><td>Neon lamp *2</td></tr> <tr><td>Black</td><td><b>AHX2610-B</b></td><td>Pushbutton *3</td></tr> </table> <p>Dimensions, mm: <math>\phi 18 \times 4.4</math></p>	Color	Type	Used with	White	<b>AHX2610-W</b>	Incandescent lamp, LED lamp, Pushbutton *1	Clear	<b>AHX2610-C</b>	Neon lamp *2	Black	<b>AHX2610-B</b>	Pushbutton *3				
Color	Type	Used with															
White	<b>AHX2610-W</b>	Incandescent lamp, LED lamp, Pushbutton *1															
Clear	<b>AHX2610-C</b>	Neon lamp *2															
Black	<b>AHX2610-B</b>	Pushbutton *3															
	For flush square																
	<table border="0"> <tr><td>Color</td><td>Type</td><td>Used with</td></tr> <tr><td>White</td><td><b>AHX2611-W</b></td><td>Incandescent lamp, LED lamp, Pushbutton *1</td></tr> <tr><td>Clear</td><td><b>AHX2611-C</b></td><td>Neon lamp *2</td></tr> <tr><td>Black</td><td><b>AHX2611-B</b></td><td>Pushbutton *3</td></tr> </table> <p>Dimensions, mm: 17sq. x 0.9</p>	Color	Type	Used with	White	<b>AHX2611-W</b>	Incandescent lamp, LED lamp, Pushbutton *1	Clear	<b>AHX2611-C</b>	Neon lamp *2	Black	<b>AHX2611-B</b>	Pushbutton *3				
Color	Type	Used with															
White	<b>AHX2611-W</b>	Incandescent lamp, LED lamp, Pushbutton *1															
Clear	<b>AHX2611-C</b>	Neon lamp *2															
Black	<b>AHX2611-B</b>	Pushbutton *3															
	For extended square, concave square																
	<table border="0"> <tr><td>Color</td><td>Type</td><td>Used with</td></tr> <tr><td>White</td><td><b>AHX2612-W</b></td><td>Incandescent lamp, LED lamp, Pushbutton *1</td></tr> <tr><td>Clear</td><td><b>AHX2612-C</b></td><td>Neon lamp *2</td></tr> <tr><td>Black</td><td><b>AHX2612-B</b></td><td>Pushbutton *3</td></tr> </table> <p>Dimensions, mm: 17sq. x 4.4</p>	Color	Type	Used with	White	<b>AHX2612-W</b>	Incandescent lamp, LED lamp, Pushbutton *1	Clear	<b>AHX2612-C</b>	Neon lamp *2	Black	<b>AHX2612-B</b>	Pushbutton *3				
Color	Type	Used with															
White	<b>AHX2612-W</b>	Incandescent lamp, LED lamp, Pushbutton *1															
Clear	<b>AHX2612-C</b>	Neon lamp *2															
Black	<b>AHX2612-B</b>	Pushbutton *3															
	*1 Illuminated pushbutton switches and pilot lights with incandescent lamps or LED lamps, Pushbutton switches (excluding).																
	*2 Illuminated pushbutton switches and pilot lights with neon lamps.																
	*3 Pushbutton switches (black)																
	*4 Engraved range: 17mm dia.																
Mushroom head button  	For illuminated pushbuttons (Used with 2ML, 2YML)																
	<table border="0"> <tr><td>Color</td><td>Type</td></tr> <tr><td>Green</td><td><b>AHX2614-G</b></td></tr> <tr><td>Red</td><td><b>AHX2614-R</b></td></tr> <tr><td>White</td><td><b>AHX2614-W</b></td></tr> <tr><td>Yellow</td><td><b>AHX2614-Y</b></td></tr> <tr><td>Blue</td><td><b>AHX2614-S</b></td></tr> <tr><td>Orange</td><td><b>AHX2614-O</b></td></tr> </table>	Color	Type	Green	<b>AHX2614-G</b>	Red	<b>AHX2614-R</b>	White	<b>AHX2614-W</b>	Yellow	<b>AHX2614-Y</b>	Blue	<b>AHX2614-S</b>	Orange	<b>AHX2614-O</b>		
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Blue	<b>AHX2614-S</b>																
Orange	<b>AHX2614-O</b>																
	For non-illuminated pushbuttons (Used with 2M, 2YM)																
	<table border="0"> <tr><td>Color</td><td>Type</td></tr> <tr><td>Green</td><td><b>AHX2613-G</b></td></tr> <tr><td>Red</td><td><b>AHX2613-R</b></td></tr> <tr><td>White</td><td><b>AHX2613-W</b></td></tr> <tr><td>Yellow</td><td><b>AHX2613-Y</b></td></tr> <tr><td>Blue</td><td><b>AHX2613-S</b></td></tr> <tr><td>Orange</td><td><b>AHX2613-O</b></td></tr> <tr><td>Black</td><td><b>AHX2613-B</b></td></tr> </table>	Color	Type	Green	<b>AHX2613-G</b>	Red	<b>AHX2613-R</b>	White	<b>AHX2613-W</b>	Yellow	<b>AHX2613-Y</b>	Blue	<b>AHX2613-S</b>	Orange	<b>AHX2613-O</b>	Black	<b>AHX2613-B</b>
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Black	<b>AHX2613-B</b>																

AF87-631  
AF87-630


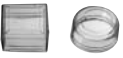

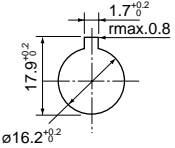
AF87-633

04








# Pushbuttons/Selectors/Pilot Lights/Buzzers


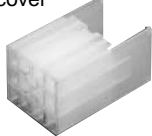



## AH165-2

### Accessories

Description	Type																				
<p>Push-lock, turn-reset button</p>  <p>AF87-634</p>	<p>For illuminated pushbuttons (Used with 2VL, 2YVL)</p> <table border="0"> <tr> <td>Color</td> <td>Type</td> </tr> <tr> <td>Green</td> <td><b>AHX2616-G</b></td> </tr> <tr> <td>Red</td> <td><b>AHX2616-R</b></td> </tr> <tr> <td>White</td> <td><b>AHX2616-W</b></td> </tr> <tr> <td>Yellow</td> <td><b>AHX2616-Y</b></td> </tr> </table> <p>For pushbuttons (Used with 2V, 2YV)</p> <table border="0"> <tr> <td>Color</td> <td>Type</td> </tr> <tr> <td>Green</td> <td><b>AHX2615-G</b></td> </tr> <tr> <td>Red</td> <td><b>AHX2615-R</b></td> </tr> <tr> <td>Yellow</td> <td><b>AHX2615-Y</b></td> </tr> <tr> <td>Black</td> <td><b>AHX2615-B</b></td> </tr> </table>	Color	Type	Green	<b>AHX2616-G</b>	Red	<b>AHX2616-R</b>	White	<b>AHX2616-W</b>	Yellow	<b>AHX2616-Y</b>	Color	Type	Green	<b>AHX2615-G</b>	Red	<b>AHX2615-R</b>	Yellow	<b>AHX2615-Y</b>	Black	<b>AHX2615-B</b>
Color	Type																				
Green	<b>AHX2616-G</b>																				
Red	<b>AHX2616-R</b>																				
White	<b>AHX2616-W</b>																				
Yellow	<b>AHX2616-Y</b>																				
Color	Type																				
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Red	<b>AHX2615-R</b>																				
Yellow	<b>AHX2615-Y</b>																				
Black	<b>AHX2615-B</b>																				
<p>Dust-tight cover</p>  <p>AF87-636</p>	<p>For flush round (Used with 2F, 2FL, 2F5, 2FL5) Type: <b>AHX2603-2</b></p> <p>For flush square (Used with 2SF, 2SFL, 2SF5, 2SFL5) Type: <b>AHX2603-2S</b></p> <p>These covers protect against dust.</p>																				
<p>Key washer</p>  <p>AF87-635</p>	<p>Type: <b>AHX2601</b></p> <p>Mounting hole, mm</p> 																				

■ Accessories for AH164, AH165 and AH165-2

Description	Type		
<p>Incandescent lamp</p>  <p>KKD06-333</p>	Voltage	Type	
	6V, 0.6W	<b>AHX641</b>	
	14V, 0.7W	<b>AHX642</b>	
	28V, 0.7W	<b>AHX643</b>	
<p>LED lamp</p>  <p>KKD06-206</p>	Voltage	Type	
	5V DC	<b>AHX695-5</b> □	
	6V DC	<b>AHX695-6</b> □	
	12V DC	<b>AHX695-12</b> □	
	24V DC	<b>AHX695-24</b> □	
	Replace the □ mark by the luminous color code Red (R), Green (G), Orange (O), Amber (A), Yellow (Y), Blue (S)		
<p>Neon lamp</p>  <p>KKD06-306</p>	Voltage	Type	Luminous color
	110V AC	<b>AHX655-H</b> <b>AHX654-H</b>	Green Orange
	120V AC	<b>AHX655-K</b> <b>AHX654-K</b>	Green Orange
	220V AC	<b>AHX655-M</b> <b>AHX654-M</b>	Green Orange
	240V AC	<b>AHX655-P</b> <b>AHX654-P</b>	Green Orange
<p>Panel plug</p>  <p>KKD07-262                      KKD07-261                      KKD07-260</p>	Color	Type	
Round	Black	<b>AHX622-B</b>	IP40
	Gray	<b>AHX622-GY</b>	IP40
Square	Black	<b>AHX644-B</b>	IP40
	Gray	<b>AHX644-GY</b>	IP40
Rectangular	Black	<b>AHX645-B</b>	IP40
	Gray	<b>AHX645-GY</b>	IP40
	Black	<b>AHX850-B</b>	IP65
<p>Lamp changer</p>  <p>KKD07-259</p>	Type: <b>AHX672</b>		
	If the switch is fitted with a lamp, use this tool to remove the lamp. The tool is unnecessary when installing a lamp.		
<p>Remover</p>  <p>KKD07-258</p>	Type: <b>AHX618</b>		
	This tool is used for replacing the color chips or screens.		
<p>Contact holder remover</p>  <p>SP-522</p>	Type: <b>AHX699</b>		
	This tool is used to remove a contact holder when switches are densely installed.		

Description	Type
<p>Wrench</p>  <p>KKD07-257</p>	Type: <b>AHX601</b>
	When installing a command switch on a panel, this tool is useful for tightening the switch firmly and efficiently.
<p>Terminal cover</p>  <p>AF87-637</p>	Type: <b>AHX2602</b>
	This cover is used with AH164 and AH165 and AH165-2 (except pilot lights). Pass the wires through the cover, then mount the cover in position.
<p>Contact block</p>  <p>KKD06-305, KKD06-304</p>	Terminal Type
	Solder/Tab <b>AGX001</b>
	Wire-wrap <b>AGX001-W</b>
<p>Dummy unit</p>  <p>SK-1141</p>	Type: <b>AGX002</b>
	A dummy unit is used to fill the space where no contact blocks are installed. For example, two dummy units are used if 1NO+1NC contact block is installed, and one dummy unit is used if 2NO+2NC contact blocks are installed.
<p>Remover</p>  <p>SM-334</p>	Type: <b>AGX012</b>
	This tool is used for replacing the contact blocks or dummy units.



# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164, AH165 and AH165-2

### Accessories

Description	Type		
Sockets	Terminal	Type	Used with
	Solder/Tab Wire-wrap PC board	<b>AHX697-S</b> <b>AHX697-W</b> <b>AHX697-P</b>	Pushbuttons
Sockets for LED	Terminal	Type	
	Solder/Tab Wire-wrap	<b>AHX697-SH3</b> <b>AHX697-WH3</b>	

SM-1097

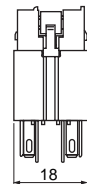
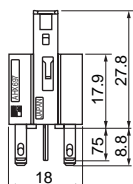
Contact arrangement is 2NO+2NC only.  
Except for AH165-2PL types

SM-1098

- Contact arrangement is 2NO+2NC only.
- These sockets are used only when LED lamps rated for 24V DC are used under 110V AC/DC.
- Except for AH164, 165 and 165-2 series pilot lights or AH165-2PL type.
- When side-by-side mounting and continuous lighting, note that a socket has higher temperature over the ambient temperature.

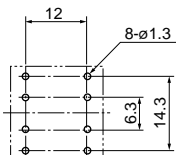
#### Dimensions, mm

##### Solder/Tab

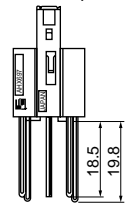


##### PC board mounting

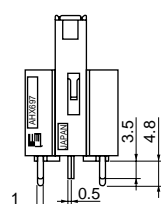
###### Pushbuttons



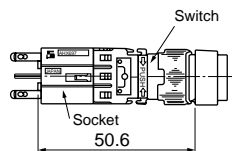
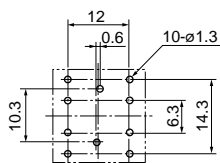
##### Wire-wrap



##### PC board



##### Illuminated pushbuttons



For wiring to wire-wrap pin terminals, select appropriate wire sizes and tool from the table below.

Wire size	Bit	Sleeve	Number of effective wraps
0.4mm dia.	3-A	1-B	About 8
0.5mm dia. (0.65mm dia.)	1-A (2-A)	1-B (2-B)	About 6 (About 6)

Use ordinary wrapping for connection. Wires of 0.65mm dia. must not be used on adjacent terminals. However, 0.65mm dia. wire can be mixed with 0.4mm and 0.5mm dia. wires.

■ Mass, gram  
**AH164 series**

Type	1NO + 1NC	2NO + 2NC	3NO + 3NC
AH164-L,L5 (Without transformer)	12.5	13.5	14.5
L,L5 (With transformer)	53.5	54.5	-
SL,SL5 (Without transformer)	13.1	14.1	15.1
SL,SL5 (With transformer)	54.1	55.1	-
TL,TL5 (Without transformer)	13.9	14.9	15.9
TL,TL5 (With transformer)	54.9	55.9	-
TGL,TGL5 (Without transformer)	13.9	14.9	15.9
TGL,TGL5 (With transformer)	54.9	55.9	-
SGL,SGL5 (Without transformer)	13.1	14.1	15.1
SGL,SGL5 (With transformer)	54.1	55.1	-
AH164-E,E5	10.5	11.5	12.5
M,M5	12.5	13.5	14.5
SF,SF5	11.1	12.1	13.1
TF,TF5	11.9	12.9	13.9
TGF,TGF5	11.9	12.9	13.9
SGF,SGF5	11.1	12.1	13.1
SM,SM5	13.4	14.4	15.4
TM,TM5	13.1	14.1	15.1
AH164-P2,P0	16.1	17.1	18.1
P3,P6,P7,P1	-	17.1	18.1
PK3,PK6,PK7,PK1	-	17.1	18.1
SP2,SP0	15.8	16.8	17.8
SP3,SP6,SP7,SP1	-	16.8	17.8
SPK3,SPK6,SPK7,SPK1	-	16.8	17.8
J2,J0	30.6	31.6	32.6
J3,J6,J7,J1	-	31.6	32.6
JK3,JK6,JK7,JK1	-	31.9	32.9
SJ2,SJ0	30.3	31.3	32.3
SJ3,SJ6,SJ7,SJ1	-	31.3	32.3
SJK3,SJK6,SJK7,SJK1	-	31.6	32.6
AH164-Z (Without transformer)	6.9		
Z (With transformer)	50.9		
ZS (Without transformer)	7.5		
ZS (With transformer)	51.5		
ZT (Without transformer)	8.2		
ZT (With transformer)	52.2		
AH164-TX	16		
TX1	17.5		
TX2B	13		

**AH165 series**

Type	1NO + 1NC	2NO + 2NC	3NO + 3NC
AH165-L,L5 (Without transformer)	12.5	13.5	14.5
L,L5 (With transformer)	53.5	54.5	-
SL,SL5 (Without transformer)	13.1	14.1	15.1
SL,SL5 (With transformer)	54.1	55.1	-
TL,TL5 (Without transformer)	13.9	14.9	15.9
TL,TL5 (With transformer)	54.9	55.9	-
TGL,TGL5 (Without transformer)	13.9	14.9	15.9
TGL,TGL5 (With transformer)	54.9	55.9	-
SGL,SGL5 (Without transformer)	13.1	14.1	15.1
SGL,SGL5 (With transformer)	54.1	55.1	-
AH165-E,E5	10.5	11.5	12.5
M,M5	12.5	13.5	14.5
SF,SF5	11.1	12.1	13.1
TF,TF5	11.9	12.9	13.9
TGF,TGF5	11.9	12.9	13.9
SGF,SGF5	11.1	12.1	13.1
SM,SM5	13.4	14.4	15.4
TM,TM5	13.1	14.1	15.1
VR	13.4 *1	14 *2	-
V1R	14.4 *1	15 *2	-
AH165-V5R	18.1 *1	18.7 *2	-
V6R	18.9 *1	19.5 *2	-
AH165-P2,P0	16.7	17.7	18.7
P3,P6,P7,P1	-	17.7	18.7
PK3,PK6,PK7,PK1	-	17.7	18.7
SP2,SP0	16.1	17.1	18.1
SP3,SP6,SP7,SP1	-	17.1	18.1
SPK3,SPK6,SPK7,SPK1	-	17.1	18.1
J2,J0	31.2	32.2	33.2
J3,J6,J7,J1	-	32.2	33.2
JK3,JK6,JK7,JK1	-	32.5	33.5
SJ2,SJ0	30.6	31.6	32.6
SJ3,SJ6,SJ7,SJ1	-	31.6	32.6
SJK3,SJK6,SJK7,SJK1	-	31.9	32.9
AH165-JM2	30	33.9	-
RJM2	29.6	34	-
AH165-Z (Without transformer)	6.9		
Z (With transformer)	50.9		
ZS (Without transformer)	7.5		
ZS (With transformer)	51.5		
ZT (Without transformer)	8.2		
ZT (With transformer)	52.2		
ZM (Without transformer)	5.4		
AH165-X	13.7		

Note: \*1 For 1NC  
\*2 For 2NC

Pushbuttons/Selectors/Pilot Lights/Buzzers  
**AH164, AH165 and AH165-2**  
**Mass**

■ Mass, gram  
**AH165-2 series**

Type	1NO + 1NC	2NO + 2NC	3NO + 3NC
AH165-2FL,FL5	15.3	16.3	17.3
2EL,EL5	15.8	16.8	17.8
2ML	18.7	19.7	20.7
2YML	20.2	21.2	22.2
2SFL,SFL5	16.6	17.6	18.6
2SEL,SEL5	17.4	18.4	19.4
2SCL,SCL5	17.6	18.6	19.6
2VL	20.7	21.7	22.7
2YVL	21.4	22.4	23.4
AH165-2F,F5	13.4	14.4	15.4
2E,E5	13.9	14.9	15.9
2M	17.8	18.8	19.8
2YM	18.2	19.2	20.2
2SF,SF5	14.6	15.6	16.6
2SE,SE5	15.4	16.4	17.4
2SCE,SCE5	15.6	16.6	17.6
2S2	-	19	-
2YS2	-	20.6	-
2V	18	19	20
2YV	19.4	20.4	21.4
AH165-2P2,P0	16.6	17.6	18.6
2P3,P6,P7,P1	-	17.6	18.6
2YP2,YP0	18.3	19.3	20.3
2YP3,YP6,YP7,YP1	-	19.3	20.3
2J2,J0	40.9	41.9	42.9
2J3,J6,J7,J1	-	41.9	42.9
2YJ2	42.6	43.6	44.6
2YJ3,YJ6,YJ7,YJ1	-	43.6	44.6
2H	14.3	15.3	16.3
2SH	16.1	17.1	18.1
AH165-2PL2	17.4	18.4	-
2PL3	-	18.4	-
AH165-2Z	9.7		
2ZE	10.2		
2SZ	11		
2SZE	11.6		