

■ **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**

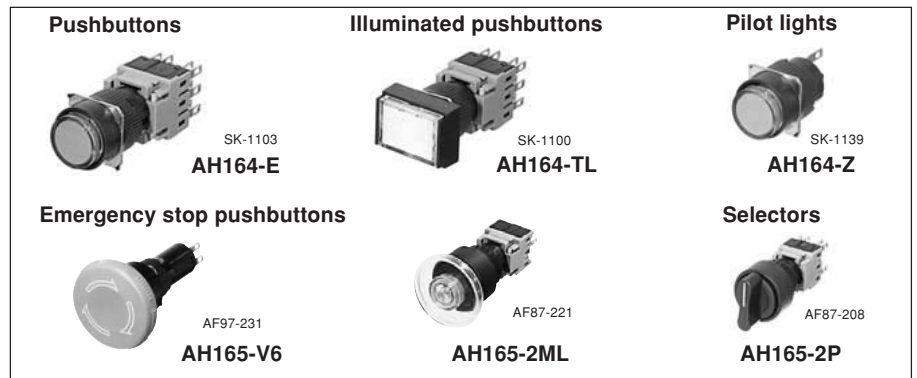
Selector switches can also be supplied in either knob-handle operated or key operated types.

**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 Pub. No. 529, IEC Standards, 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.

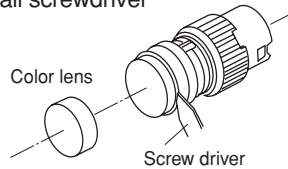
**Quality feel tough**

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**

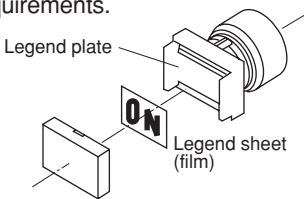
Color lenses fit over the inner button. The lens can easily be removed using a small screwdriver



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.

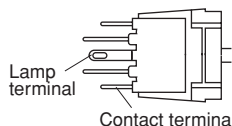


**Excellent switch reliability**

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.



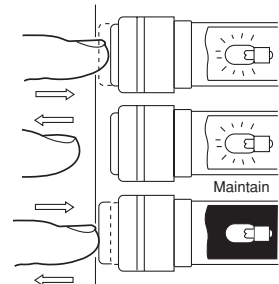
**Safety**

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 04/132 to 04/136.











# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164, AH165 and AH165-2

### Quick reference guide





















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

##### ■ Illuminated pushbutton switches

Operator	Type	Operator	Type	Operator	Type
Extended round head  <i>See page 04/142</i> 	<b>AH164-L, L5</b> <b>AH165-L, L5</b>  SK-1103	Flush square head  <i>See page 04/142</i> 	<b>AH164-SL, SL5</b> <b>AH165-SL, SL5</b>  SK-1102	Flush rectangular head  <i>See page 04/142</i> 	<b>AH164-TL, TL5</b> <b>AH165-TL, TL5</b>  SK-1100
Flush rectangular head with guard  <i>See page 04/143</i> 	<b>AH164-TGL, TGL5</b> <b>AH165-TGL, TGL5</b>  SK-1101	Flush square head with guard  <i>See page 04/143</i> 	<b>AH164-SGL, SGL5</b> <b>AH165-SGL, SGL5</b>  AF90-301		

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 04/147</i> 	<b>AH164-E, E5</b> <b>AH165-E, E5</b>  SK-1103	Mushroom head  <i>See page 04/147</i> 	<b>AH164-M, M5</b> <b>AH165-M, M5</b>  SK-1136	Flush square head  <i>See page 04/147</i> 	<b>AH164-SF, SF5</b> <b>AH165-SF, SF5</b>  SK-1102
Flush rectangular head  <i>See page 04/147</i> 	<b>AH164-TF, TF5</b> <b>AH165-TF, TF5</b>  SK-1100	Flush rectangular head with guard  <i>See page 04/147</i> 	<b>AH164-TGF, TGF5</b> <b>AH165-TGF, TGF5</b>  SK-1101	Flush square head with guard  <i>See page 04/147</i> 	<b>AH164-SGF, SGF5</b> <b>AH165-SGF, SGF5</b>  AF90-301
Convex square head  <i>See page 04/147</i> 	<b>AH164-SM, SM5</b> <b>AH165-SM, SM5</b>  SK-1134	Convex rectangular head  <i>See page 04/147</i> 	<b>AH164-TM, TM5</b> <b>AH165-TM, TM5</b>  SK-1135	Push-lock, turn-reset (32mm dia.) ⊖ (Direct opening action)  <i>See page 04/148</i> 	<b>AH165-VR</b>  AF91-584
Push-lock, turn-reset (40mm dia.) ⊖ (Direct opening action)  <i>See page 04/148</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 04/148</i> 	<b>AH165-V5R</b>  AF97-232	Push-lock, turn-reset (40mm dia.)  <i>See page 04/148</i> 	<b>AH165-V6R</b>  AF97-231













Note: (CCC): *See page 04/245*

# 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 04/149</i> 	<b>AH164-P</b> <b>AH165-P</b>   SK-1099	Knob with square bezel  <i>See page 04/149</i> 	<b>AH164-SP</b> <b>AH165-SP</b>   SK-1133	Key with rectangular bezel  <i>See page 04/149</i> 	<b>AH164-J</b> <b>AH165-J</b>   SK-1098
Key with square bezel  <i>See page 04/149, 04/152</i> 	<b>AH164-SJ</b> <b>AH165-SJ</b>   SK-1132	Key with rectangular bezel ⊖ (Direct opening action)  <i>See page 04/150</i> 	<b>AH165-JM</b>   AF95-57	Key ⊖ (Direct opening action)  <i>See page 04/150</i> 	<b>AH165-RJM</b>   AF99-320

#### ■ Pilot lights

Lens	Type	Lens	Type	Lens	Type
Extended round  <i>See page 04/154</i> 	<b>AH164-Z</b> <b>AH165-Z</b>   SK-1139	Flush square  <i>See page 04/154</i> 	<b>AH164-ZS</b> <b>AH165-ZS</b>   SK-1138	Flush rectangular  <i>See page 04/154</i> 	<b>AH164-ZT</b> <b>AH165-ZT</b>   SK-1137
Dome  <i>See page 04/154</i> 	<b>AH165-ZM</b>   AF87-45				

#### ■ Buzzers

Sound	Type	Sound	Type	Sound	Type
Standard  <i>See page 04/156</i>	<b>AH164-TX</b>   AF87-317	Loud sound  <i>See page 04/156</i>	<b>AH164-TX1</b>   AF87-44	Loud sound with volume control  <i>See page 04/156</i> 	<b>AH164-TX2B</b>   AF93-297
Standard sound with volume control (IP54)  <i>See page 04/156</i> 	<b>AH165-X</b>   AF96-243				





Note:  : *See page 04/245*

# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164, AH165 and AH165-2

### Quick reference guide

#### ■ Numerical indicators

Display	Type	Display	Type	Display	Type
Without decimal decoder  <i>See page 04/157</i>	<b>AH164-TS</b> <b>AH165-TS</b>  SP-165	With decimal decoder (5, 12, 15V)  <i>See page 04/157</i>	<b>AH164-TC</b> <b>AH165-TC</b>  AF87-315	With decimal decoder (24V)  <i>See page 04/157</i>	<b>AH164-TC4□E</b> <b>AH165-TC4□E</b>  AF89-948
With sign decoder (±1 display)  <i>See page 04/157</i>	<b>AH164-TC4□E-1</b> <b>AH165-TC4□E-1</b>  AF88-1093				

#### AH165-2 (oil-tight)























##### ■ Illuminated pushbutton switches

Operator	Type	Operator	Type	Operator	Type
Flush round head  <i>See page 04/164</i>	<b>AH165-2FL, 2FL5</b>  AF87-211	Extended round head  <i>See page 04/164</i>	<b>AH165-2EL, 2EL5</b>  AF87-210	Mushroom head  <i>See page 04/164</i>	<b>AH165-2ML</b>  AF87-221
Mushroom head with square bezel  <i>See page 04/164</i>	<b>AH165-2YML</b>  AF87-220	Flush square head  <i>See page 04/165</i>	<b>AH165-2SFL, 2SFL5</b>  AF87-201	Extended square head  <i>See page 04/165</i>	<b>AH165-2SEL, 2SEL5</b>  AF87-200
Concave square head  <i>See page 04/165</i>	<b>AH165-2SCL, 2SCL5</b>  AF87-199	Push-lock, turn-reset  <i>See page 04/166</i>	<b>AH165-2VL</b>  AF87-219	Push-lock, turn-reset with square bezel  <i>See page 04/166</i>	<b>AH165-2YVL</b>  AF87-218













Note: (CCC) : See page 04/245

# Pushbuttons/Selectors/Pilot Lights/Buzzers AH164, AH165 and AH165-2 Quick reference guide

## ■ Pushbutton switches

Operator	Type	Operator	Type	Operator	Type
Flush round head  <i>See page 04/167</i> 	<b>AH165-2F, 2F5</b>  AF87-211	Extended round head  <i>See page 04/167</i> 	<b>AH165-2E, 2E5</b>  AF87-210	Mushroom head  <i>See page 04/167</i> 	<b>AH165-2M</b>  AF87-215
Mushroom head with square bezel  <i>See page 04/167</i> 	<b>AH165-2YM</b>  AF87-214	Flush square head  <i>See page 04/167</i> 	<b>AH165-2SF, 2SF5</b>  AF87-210	Concave square head  <i>See page 04/167</i> 	<b>AH165-2SCE, 2SCE5</b>  AF87-199
Extended square head  <i>See page 04/167</i> 	<b>AH165-2SE, 2SE5</b>  AF87-200	With selector ring  <i>See page 04/168</i> 	<b>AH165-2S2</b>  AF87-207	With selector ring with square bezel  <i>See page 04/168</i> 	<b>AH165-2YS2</b>  AF87-206
Push-lock, turn-reset  <i>See page 04/168</i> 	<b>AH165-2V</b>  AF87-217	Push-lock, turn-reset with square bezel  <i>See page 04/168</i> 	<b>AH165-2YV</b>  AF87-216		

## ■ Selector switches

Operator	Type	Operator	Type	Operator	Type
Knob  <i>See page 04/169</i> 	<b>AH165-2P</b>  AF87-208	Knob with square bezel  <i>See page 04/169</i> 	<b>AH165-2YP</b>  AF87-202	Key  <i>See page 04/169</i> 	<b>AH165-2J</b>  AF87-223
Key with square bezel  <i>See page 04/169</i> 	<b>AH165-2YJ</b>  AF87-222	Lever  <i>See page 04/170</i> 	<b>AH165-2H</b>  AF87-209	Lever with square bezel  <i>See page 04/170</i> 	<b>AH165-2SH</b>  AF87-203



## ■ Illuminated selector switches

Operator	Type
Knob  <i>See page 04/172</i> 	<b>AH165-2PL</b>  AF87-607

Note:  : See page 04/245

Pushbuttons/Selectors/Pilot Lights/Buzzers  
**AH164, AH165 and AH165-2**  
**Quick reference guide**

■ Pilot lights

Lens	Type	Lens	Type	Lens	Type
Flush round	<b>AH165-2Z</b>	Extended round	<b>AH165-2ZE</b>	Flush square	<b>AH165-2SZ</b>
<i>See page 04/173</i>	 AF87-213	<i>See page 04/173</i>	 AF87-212	<i>See page 04/173</i>	 AF87-205
					
Extended square	<b>AH165-2SZE</b>				
<i>See page 04/173</i>	 AF87-204				
					

Note: (CCC): See page 04/245



# 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



■ Type number nomenclature

Numerical indicators

**AH164 - T C4 R E - 1 N K**  
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

① **Product category**

AH164: Standard (IP40)

AH165: Splash-proof (IP54)

② **Shape of the indicator**

T: Rectangular

③ **Type of decoder**

S: Without decoder

C1: With decoder (74LS47: TTL, positive logic)

C4: With decoder (4511: C-MOS)

④ **Luminous color**

R: Red

G: Green

⑤ **Type of common or operating voltage**

• Type of common (without decoder)

A: Anode

C: Cathode

• Operating voltage (with decoder)

Blank: 5V DC

B: 12V DC \*

C: 15V DC \*

E: 24V DC \*

Note: \* TC4 types only

⑥ **Type of indicator**

Blank: Decimal\*<sup>1</sup>

1: Sign ( $\pm 1$  display)\*<sup>2</sup>

Notes: \*<sup>1</sup> Input voltage: 5, 12, 15V DC

\*<sup>2</sup> Input voltage: 24V DC

⑦ **Input logic**

Blank: Positive logic

N: Negative logic \*

Note: \* Input voltage: 24V DC

⑧ **Card connector (Input voltage: 24V DC)**

K1: Without connector

K: With connector

# 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

## • Numerical indicators

### Without decoder

Item		AH164-TS (LED)	AH165-TS (LED)
Electrical	Forward voltage $V_F$ ( $I_F=10\text{mA}$ )	Red: 2.0V (max. 2.8V), green: 2.1V (max. 2.8V)	
	Reverse current $I_R$ ( $V_R=3\text{V}$ )	100 $\mu\text{A}$	
Max. power dissipation pd/Seg		Red: 40mW, green: 60mW	
Max. forward current $I_F$		Red: 15mA, green: 20mA	
Max. reverse voltage $V_R$		3V	
Ambient temperature	Opening $T_{\text{opr}}$	-20 to +40°C (No condensation or no icing)	
	Storage $T_{\text{stg}}$	-30 to +85°C	
Degree of protection		IP40	IP65

### With decoder

Item		AH164-TC1, TC4	AH165-TC1, TC4	AH164-TC4□E	AH165-TC□E
Power supply $V_{CC}$ , $V_{DD}$ (DC)		5V $\pm$ 5%, 12V $\pm$ 5%, 15V $\pm$ 5%		24V $\pm$ 20%	
Current consumption		5V Red: 120mA (C1), 100mA (C4), green: 170mA (C1), 150mA (C4) 12V Red: 90mA (C4), green: 130mA (C4) 15V Red: 90mA (C4), green: 130mA (C4)		Numerical indicator, decimal: 110mA Unit indicator: 80mA	
Ambient temperature	Opening $T_{\text{opr}}$	-20 to +40°C (No condensation or no icing)		-20 to +40°C (No condensation or no icing)	
	Storage $T_{\text{stg}}$	-30 to +85°C		-30 to +85°C	
Degree of protection		IP40	IP65	IP40	IP65

## ■ Contact ratings

### • UL/CSA standards

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

### • 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	–	–	–	0.7A	1.0A
	100 to 120V	0.3A	1.0A	1.5A	–	–
	100 to 125V	–	–	–	0.15A	0.2A
	200 to 240V	0.3A	0.7A	1.0A	–	–

## ■ Lamp ratings

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

- Notes:
- With transformer (LED): 1.5VA/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 Pushbuttons

## AH164 and AH165

### ■ Illuminated pushbutton switches/without transformer

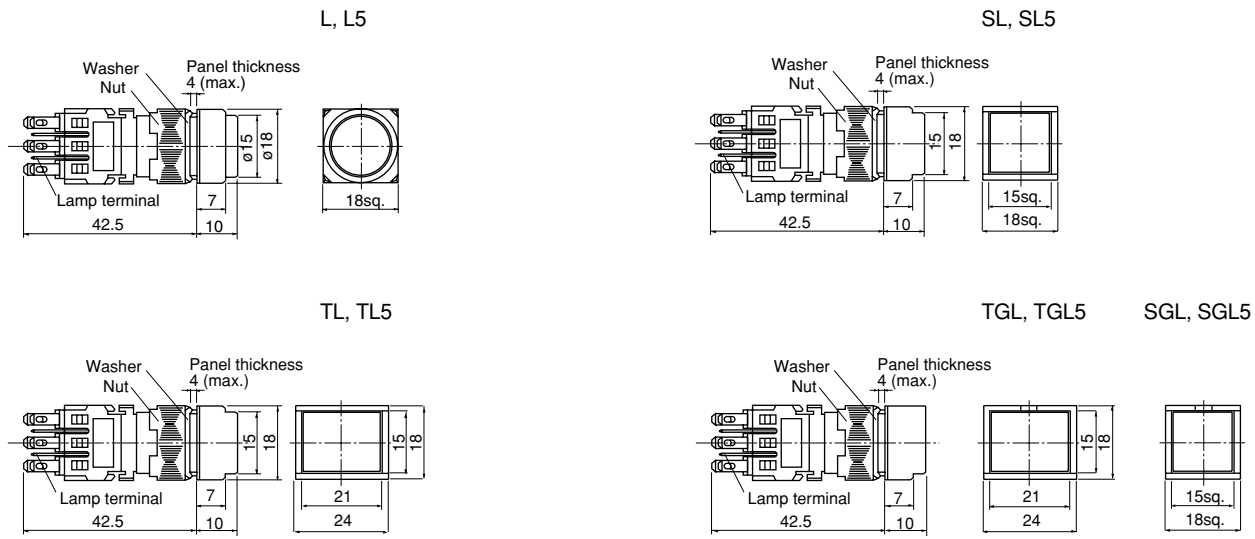
Operator	Lamp	Voltage	Contact	Momentary action		Alternate action	
				AH164 type	AH165 (Oil-tight) type	AH164 type	AH165 (Oil-tight) type
 SK-1103	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-L□11E3	AH165-L□11E3	AH164-L5□11E3	AH165-L5□11E3
				AH164-L□22E3	AH165-L□22E3	AH164-L5□22E3	AH165-L5□22E3
				AH164-L□33E3	AH165-L□33E3	AH164-L5□33E3	AH165-L5□33E3
	Spot LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-L□11E2	AH165-L□11E2	AH164-L5□11E2	AH165-L5□11E2
AH164-L□22E2				AH165-L□22E2	AH164-L5□22E2	AH165-L5□22E2	
AH164-L□33E2				AH165-L□33E2	AH164-L5□33E2	AH165-L5□33E2	
Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-L□11E	AH165-L□11E	AH164-L5□11E	AH165-L5□11E	
			AH164-L□22E	AH165-L□22E	AH164-L5□22E	AH165-L5□22E	
			AH164-L□33E	AH165-L□33E	AH164-L5□33E	AH165-L5□33E	
Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-L□11H1	AH165-L□11H1	AH164-L5□11H1	AH165-L5□11H1	
			AH164-L□22H1	AH165-L□22H1	AH164-L5□22H1	AH165-L5□22H1	
	220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-L□11M1	AH165-L□11M1	AH164-L5□11M1	AH165-L5□11M1	
			AH164-L□22M1	AH165-L□22M1	AH164-L5□22M1	AH165-L5□22M1	
 SK-1102	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SL□11E3	AH165-SL□11E3	AH164-SL5□11E3	AH165-SL5□11E3
				AH164-SL□22E3	AH165-SL□22E3	AH164-SL5□22E3	AH165-SL5□22E3
				AH164-SL□33E3	AH165-SL□33E3	AH164-SL5□33E3	AH165-SL5□33E3
	Spot LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SL□11E2	AH165-SL□11E2	AH164-SL5□11E2	AH165-SL5□11E2
AH164-SL□22E2				AH165-SL□22E2	AH164-SL5□22E2	AH165-SL5□22E2	
AH164-SL□33E2				AH165-SL□33E2	AH164-SL5□33E2	AH165-SL5□33E2	
Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SL□11E	AH165-SL□11E	AH164-SL5□11E	AH165-SL5□11E	
			AH164-SL□22E	AH165-SL□22E	AH164-SL5□22E	AH165-SL5□22E	
			AH164-SL□33E	AH165-SL□33E	AH164-SL5□33E	AH165-SL5□33E	
Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SL□11H1	AH165-SL□11H1	AH164-SL5□11H1	AH165-SL5□11H1	
			AH164-SL□22H1	AH165-SL□22H1	AH164-SL5□22H1	AH165-SL5□22H1	
	220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SL□11M1	AH165-SL□11M1	AH164-SL5□11M1	AH165-SL5□11M1	
			AH164-SL□22M1	AH165-SL□22M1	AH164-SL5□22M1	AH165-SL5□22M1	
 SK-1100	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TL□11E3	AH165-TL□11E3	AH164-TL5□11E3	AH165-TL5□11E3
				AH164-TL□22E3	AH165-TL□22E3	AH164-TL5□22E3	AH165-TL5□22E3
				AH164-TL□33E3	AH165-TL□33E3	AH164-TL5□33E3	AH165-TL5□33E3
	Spot LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TL□11E2	AH165-TL□11E2	AH164-TL5□11E2	AH165-TL5□11E2
AH164-TL□22E2				AH165-TL□22E2	AH164-TL5□22E2	AH165-TL5□22E2	
AH164-TL□33E2				AH165-TL□33E2	AH164-TL5□33E2	AH165-TL5□33E2	
Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TL□11E	AH165-TL□11E	AH164-TL5□11E	AH165-TL5□11E	
			AH164-TL□22E	AH165-TL□22E	AH164-TL5□22E	AH165-TL5□22E	
			AH164-TL□33E	AH165-TL□33E	AH164-TL5□33E	AH165-TL5□33E	
Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TL□11H1	AH165-TL□11H1	AH164-TL5□11H1	AH165-TL5□11H1	
			AH164-TL□22H1	AH165-TL□22H1	AH164-TL5□22H1	AH165-TL5□22H1	
	220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-TL□11M1	AH165-TL□11M1	AH164-TL5□11M1	AH165-TL5□11M1	
			AH164-TL□22M1	AH165-TL□22M1	AH164-TL5□22M1	AH165-TL5□22M1	
				AH164-TL□33M1	AH165-TL□33M1	AH164-TL5□33M1	AH165-TL5□33M1

Note: Replace the □ mark by the button color code, see page 04/143.

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   SK-1101	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	
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	
	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	
Flush square head with guard   AF90-301	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	
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	
	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

04

**■ 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.
- 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 Pushbuttons

## AH164 and AH165

### ■ Illuminated pushbutton switches/without transformer (Red/green LED)

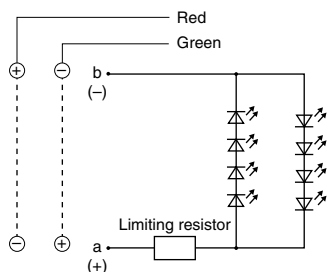
Operator	Lamp	Voltage	Contact	Momentary action		Alternate action	
				AH164 type	AH165 (oil-tight) type	AH164 type	AH165 (oil-tight) type
Extended round head  SK-1103	Red/green LED	24V DC	1NO+1NC	AH164-LRG11E3	AH165-LRG11E3	AH164-L5RG11E3	AH165-L5RG11E3
			2NO+2NC	AH164-LRG22E3	AH165-LRG22E3	AH164-L5RG22E3	AH165-L5RG22E3
			3NO+3NC	AH164-LRG33E3	AH165-LRG33E3	AH164-L5RG33E3	AH165-L5RG33E3
Flush square head  SK-1102	Red/green LED	24V DC	1NO+1NC	AH164-SLRG11E3	AH165-SLRG11E3	AH164-SL5RG11E3	AH165-SL5RG11E3
			2NO+2NC	AH164-SLRG22E3	AH165-SLRG22E3	AH164-SL5RG22E3	AH165-SL5RG22E3
			3NO+3NC	AH164-SLRG33E3	AH165-SLRG33E3	AH164-SL5RG33E3	AH165-SL5RG33E3
Flush rectangular head  SK-1100	Red/green LED	24V DC	1NO+1NC	AH164-TLRG11E3	AH165-TLRG11E3	AH164-TL5RG11E3	AH165-TL5RG11E3
			2NO+2NC	AH164-TLRG22E3	AH165-TLRG22E3	AH164-TL5RG22E3	AH165-TL5RG22E3
			3NO+3NC	AH164-TLRG33E3	AH165-TLRG33E3	AH164-TL5RG33E3	AH165-TL5RG33E3
Flush square head with guard  AF90-301	Red/green LED	24V DC	1NO+1NC	AH164-SGLRG11E3	AH165-SGLRG11E3	AH164-SGL5RG11E3	AH165-SGL5RG11E3
			2NO+2NC	AH164-SGLRG22E3	AH165-SGLRG22E3	AH164-SGL5RG22E3	AH165-SGL5RG22E3
			3NO+3NC	AH164-SGLRG33E3	AH165-SGLRG33E3	AH164-SGL5RG33E3	AH165-SGL5RG33E3
Flush rectangular head with guard  SK-1101	Red/green LED	24V DC	1NO+1NC	AH164-TGLRG11E3	AH165-TGLRG11E3	AH164-TGL5RG11E3	AH165-TGL5RG11E3
			2NO+2NC	AH164-TGLRG22E3	AH165-TGLRG22E3	AH164-TGL5RG22E3	AH165-TGL5RG22E3
			3NO+3NC	AH164-TGLRG33E3	AH165-TGLRG33E3	AH164-TGL5RG33E3	AH165-TGL5RG33E3

Note: • The only color codes used for red/green LEDs are R and G. The color lens is transparent.  
 Red/green LEDs do not have high-brightness specifications.  
 • 24V DC only

### ■ Dimensions, mm




See Page 04/143

Relationship between luminous color and terminal





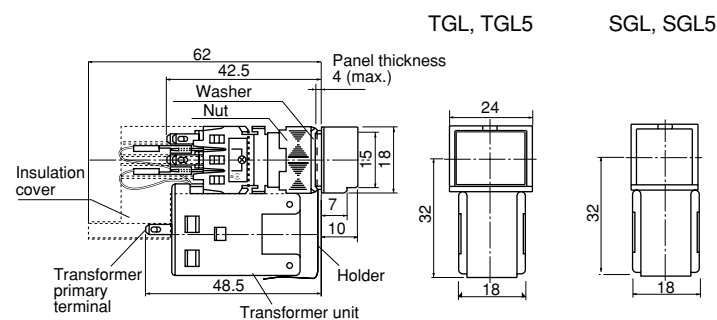
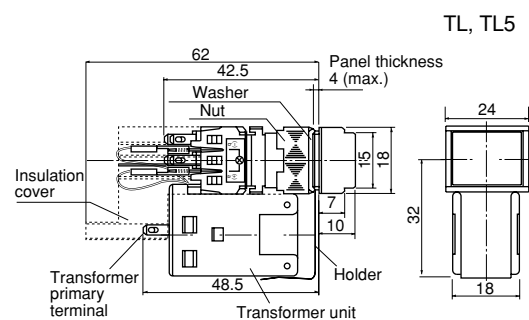
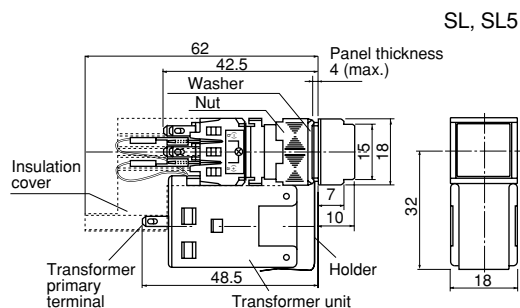
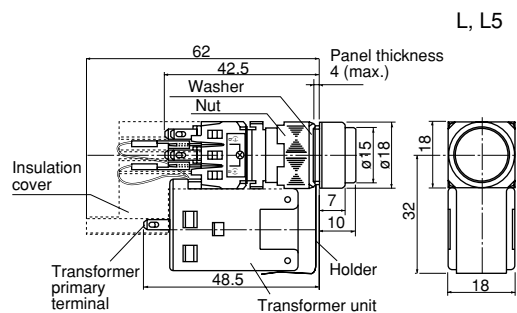
■ Illuminated pushbutton switches/with transformer

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 04/146.

# Illuminated Pushbuttons AH164 and AH165

## ■ Dimensions, mm


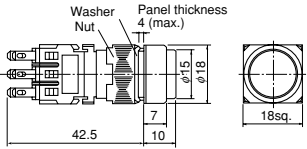

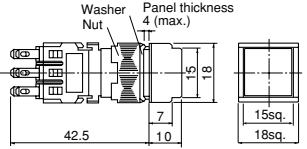

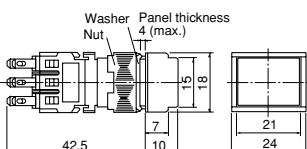

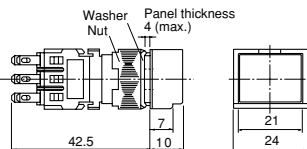

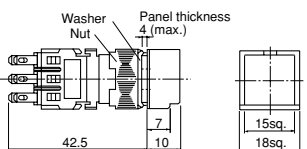

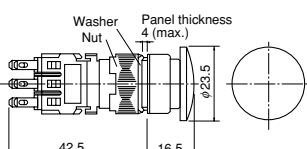

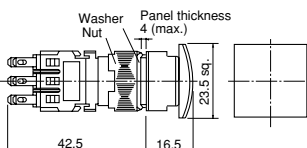

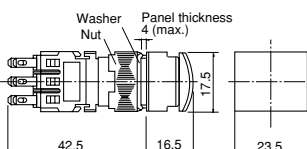


## • Button color

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	
Extended round head  SK-1103	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	
Flush square head  SK-1102	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	
Flush rectangular head  SK-1100	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	
Flush rectangular head with guard  SK-1101	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	
Flush square head with guard  AF90-301	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	
Mushroom head  SK-1136	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	
Convex square head  SK-1134	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	
Convex rectangular head  SK-1135	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


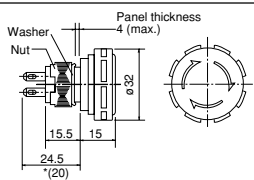

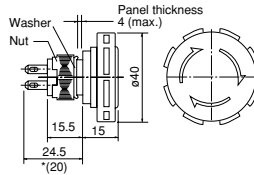
- The color lens is made of a tinted transparent material. (Except the M, SM, TM types)
- A white pushbutton is fitted with a transparent color lens. (Except the M, SM, TM types) A black pushbutton consists of a transparent color lens and an attached black legend plate. (Except M, SM, TM types)
- With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

# Pushbuttons

## AH165

### ■ Pushbutton switches

⊖ (Direct opening action)


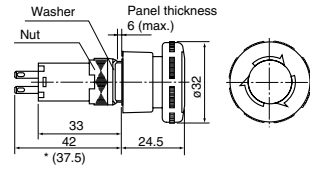

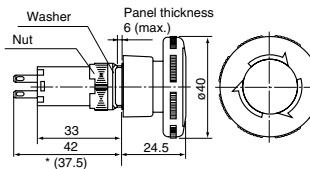
Operator	Button color	Contact	Terminal	AH165 (oil-tight) type	Dimensions, mm
Push-lock, turn-reset (32mm dia.)   <small>AF91-584</small>	Red	1NC	Solder/Tab Solder	<b>AH165-VR01</b> <b>(AH165-VR01-S)</b>	
		2NC		<b>AH165-VR02</b> <b>(AH165-VR02-S)</b>	
Push-lock, turn-reset (40mm dia.)   <small>AF91-583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


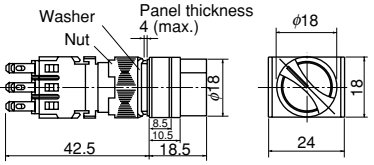

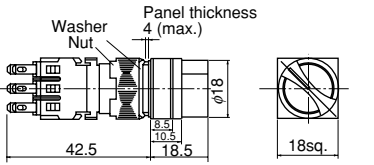

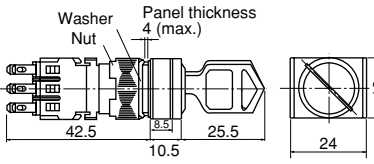

⊖ (Direct opening action), conform to EN418

Operator	Button color	Contact	Terminal	AH165 (oil-tight) type	Dimensions, mm
Push-lock, turn-reset (32mm dia.)   <small>AF97-232</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>AF97-231</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>	

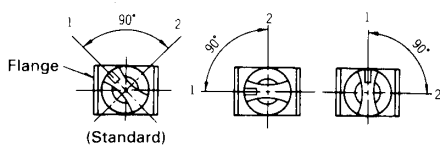
Notes: \* ( ) For switch with solder terminal.

- Contact arrangements indicated in the table can be supplied.

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

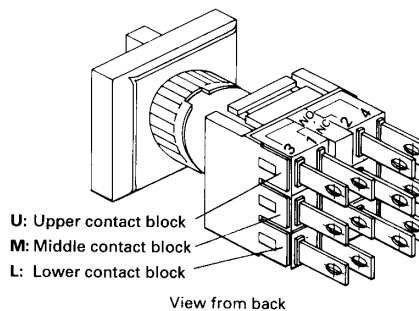
Operator	Operation	Key removable position	Contact	AH164 type	AH165 (oil-tight) type	Dimensions, mm		
Knob with rectangular bezel  AF89-564	Maintained	—	1NO+1NC 2NO+2NC 3NO+3NC	AH164-P2B11 AH164-P2B22 AH164-P2B33	AH165-P2B11 AH165-P2B22 AH165-P2B33			
	Spring return	☉	1NO+1NC 2NO+2NC 3NO+3NC	AH164-P0B11 AH164-P0B22 AH164-P0B33	AH165-P0B11 AH165-P0B22 AH165-P0B33			
	Knob with square bezel  AF89-563	Maintained	—	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SP2B11 AH164-SP2B22 AH164-SP2B33		AH165-SP2B11 AH165-SP2B22 AH165-SP2B33	
Spring return		☉	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SP0B11 AH164-SP0B22 AH164-SP0B33	AH165-SP0B11 AH165-SP0B22 AH165-SP0B33			
Key with rectangular bezel  AF89-561		Maintained	☉	1NO+1NC 2NO+2NC 3NO+3NC	AH164-J2A11A AH164-J2A22A AH164-J2A33A	AH165-J2A11A AH165-J2A22A AH165-J2A33A		
	⊗		1NO+1NC 2NO+2NC 3NO+3NC	AH164-J2B11A AH164-J2B22A AH164-J2B33A	AH165-J2B11A AH165-J2B22A AH165-J2B33A			
	☉		1NO+1NC 2NO+2NC 3NO+3NC	AH164-J2D11A AH164-J2D22A AH164-J2D33A	AH165-J2D11A AH165-J2D22A AH165-J2D33A			
	Spring return	☉	1NO+1NC 2NO+2NC 3NO+3NC	AH164-J0A11A AH164-J0A22A AH164-J0A33A	AH165-J0A11A AH165-J0A22A AH165-J0A33A			
		Key with square bezel  AF89-562	Maintained	☉	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SJ2A11A AH164-SJ2A22A AH164-SJ2A33A		AH165-SJ2A11A AH165-SJ2A22A AH165-SJ2A33A
				⊗	1NO+1NC 2NO+2NC 3NO+3NC	AH164-SJ2B11A AH164-SJ2B22A AH164-SJ2B33A		AH165-SJ2B11A AH165-SJ2B22A AH165-SJ2B33A
☉	1NO+1NC 2NO+2NC 3NO+3NC			AH164-SJ2D11A AH164-SJ2D22A AH164-SJ2D33A	AH165-SJ2D11A AH165-SJ2D22A AH165-SJ2D33A			
Spring return	☉		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.



- 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.

### • 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 1 0 1 0 2 3 0 0 4 L 1 0 1 0 2 3 0 0 4
	Right	M 1 0 1 0 2 3 0 0 4	U 1 0 1 0 2 3 0 0 4 M 1 0 1 0 2 3 0 0 4 L 1 0 1 0 2 3 0 0 4


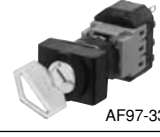
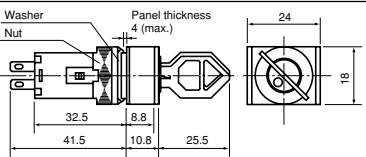
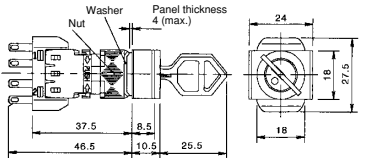


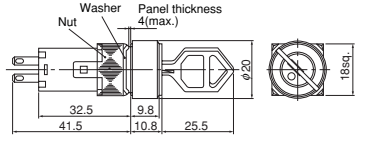
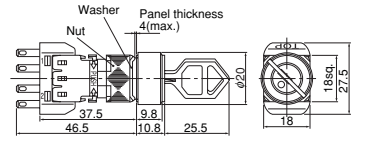
### 3-position selector switch

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
	Center	U M L 1 0 1 0 2 1 0 1 0 2 3 0 0 4 3 0 0 4
	Right	U L 1 0 1 0 2 1 0 1 0 2 3 0 0 4 3 0 0 4

# Selector Switches AH165

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

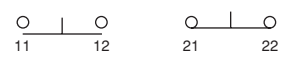

⊖ (Direct opening action)

Operator	Operation	Key removable position	Contact	AH165 (oil-tight) type	Dimensions, mm
Key with rectangular bezel  AF95-57  AF97-334	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  AF99-320  AF99-320	Maintained	A ⊖	1NO+1NC	AH165-RJM2A11A	
		B ⊗		AH165-RJM2B11A	
		D ⊖		AH165-RJM2D11A	
		A ⊖	2NO+2NC	AH165-RJM2A22A	
		B ⊗		AH165-RJM2B22A	
		D ⊖		AH165-RJM2D22A	

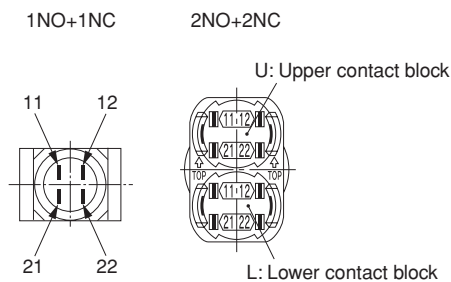
• There are 6 available key types; A, B, C, D, E and F. Standard key code is A.

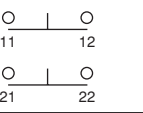
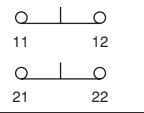
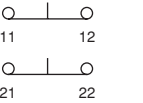
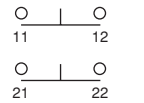
### • Contact arrangement and operator positions:

2-position selector switch

Contact arrangement	1NO+1NC	
Operator position	Left	
	Right	


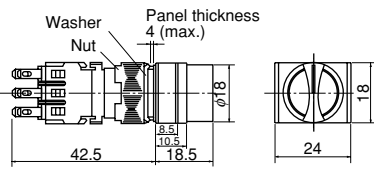

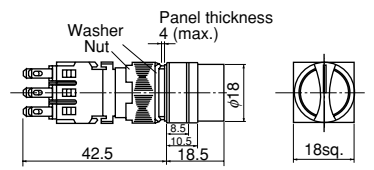

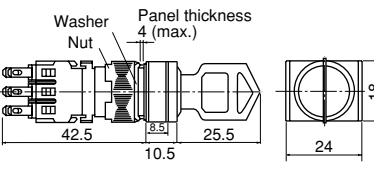

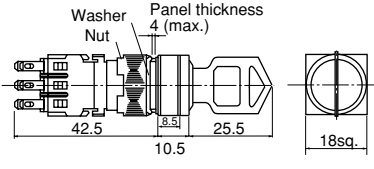
### • Terminal number



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



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


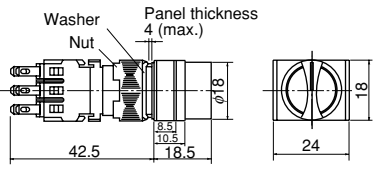

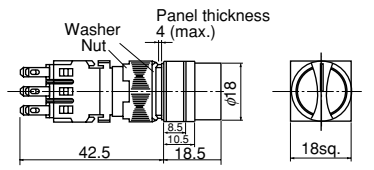

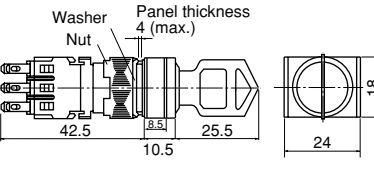

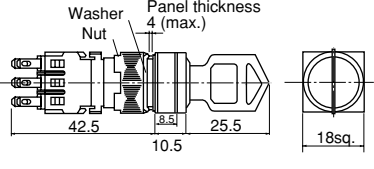
Operator	Operation	Key removable position	Contact	AH164 type	AH165 (oil-tight) type	Dimensions, mm		
Knob with rectangular bezel   SK-1099	Maintained	—	2NO+2NC 3NO+3NC	AH164-P3B22 AH164-P3B33	AH165-P3B22 AH165-P3B33			
	Spring/ manual return	⌚	2NO+2NC 3NO+3NC	AH164-P6B22 AH164-P6B33	AH165-P6B22 AH165-P6B33			
	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   SK-1133	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   SK-1098	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   SK-1132	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 04/149.
- 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  SK-1099	Maintained	—	2NO+2NC 3NO+3NC	AH164-PK3B22 AH164-PK3B33	AH165-PK3B22 AH165-PK3B33			
	Spring/ manual return	—	2NO+2NC 3NO+3NC	AH164-PK6B22 AH164-PK6B33	AH165-PK6B22 AH165-PK6B33			
	Spring/ manual return	—	2NO+2NC 3NO+3NC	AH164-PK7B22 AH164-PK7B33	AH165-PK7B22 AH165-PK7B33			
	Spring return	—	2NO+2NC 3NO+3NC	AH164-PK1B22 AH164-PK1B33	AH165-PK1B22 AH165-PK1B33			
Knob with square bezel  SK-1133	Maintained	—	2NO+2NC 3NO+3NC	AH164-SPK3B22 AH164-SPK3B33	AH165-SPK3B22 AH165-SPK3B33			
	Spring/ manual return	—	2NO+2NC 3NO+3NC	AH164-SPK6B22 AH164-SPK6B33	AH165-SPK6B22 AH165-SPK6B33			
	Spring/ manual return	—	2NO+2NC 3NO+3NC	AH164-SPK7B22 AH164-SPK7B33	AH165-SPK7B22 AH165-SPK7B33			
	Spring return	—	2NO+2NC 3NO+3NC	AH164-SPK1B22 AH164-SPK1B33	AH165-SPK1B22 AH165-SPK1B33			
Key with rectangular bezel  SK-1098	Maintained	⊖ A	2NO+2NC 3NO+3NC	AH164-JK3A22A AH164-JK3A33A	AH165-JK3A22A AH165-JK3A33A			
		⊕ 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	⊕ 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			
		⊕ E	2NO+2NC 3NO+3NC	AH164-JK7E22A AH164-JK7E33A	AH165-JK7E22A AH165-JK7E33A			
	Spring return	⊕ E	2NO+2NC 3NO+3NC	AH164-JK1E22A AH164-JK1E33A	AH165-JK1E22A AH165-JK1E33A			
		⊕ E	2NO+2NC 3NO+3NC	AH164-JK1E22A AH164-JK1E33A	AH165-JK1E22A AH165-JK1E33A			
	Key with square bezel  SK-1132	Maintained	⊖ A	2NO+2NC 3NO+3NC	AH164-SJK3A22A AH164-SJK3A33A		AH165-SJK3A22A AH165-SJK3A33A	
			⊕ 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		⊕ 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			
		⊕ E	2NO+2NC 3NO+3NC	AH164-SJK7E22A AH164-SJK7E33A	AH165-SJK7E22A AH165-SJK7E33A			
Spring return		⊕ E	2NO+2NC 3NO+3NC	AH164-SJK1E22A AH164-SJK1E33A	AH165-SJK1E22A AH165-SJK1E33A			
		⊕ 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 04/153.

• Key removable positions (JK, SJK)

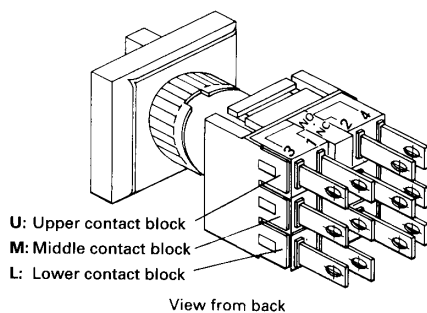
Removable position							
Code	A	B	C	D	E	F	G

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




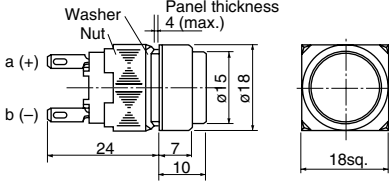

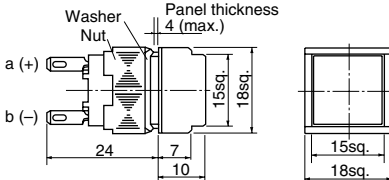

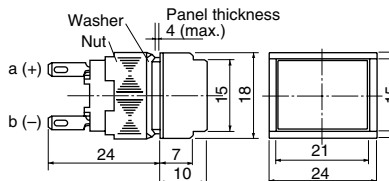

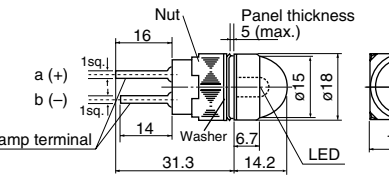
• Contact arrangement and operator position:

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>1</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>1</sub> 04 3O <sub>1</sub> 04
	Center 	1O <sub>1</sub> 1O <sub>2</sub> 1O <sub>1</sub> 1O <sub>2</sub> 3O <sub>1</sub> 04 3O <sub>1</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>1</sub> 04 3O <sub>1</sub> 04
	Right 	1O <sub>1</sub> 02 1O <sub>1</sub> 1O <sub>2</sub> 3O <sub>1</sub> 04 3O <sub>1</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>1</sub> 04 3O <sub>1</sub> 04

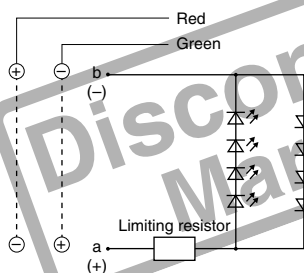
# Pilot Lights AH164 and AH165

## ■ 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	
	Red/green LED	24V DC	AH164-ZRGE3	AH165-ZRGE3	
	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	
	Red/green LED	24V DC	AH164-ZSRGE3	AH165-ZSRGE3	
	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	
	Red/green LED	24V DC	AH164-ZTRGE3	AH165-ZTRGE3	
	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	

Note: • The only color codes used for red/green LEDs are R and G. The color lens is transparent.  
Red/green LEDs do not have high-brightness specifications.

Relationship between luminous color and terminal



### • 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)


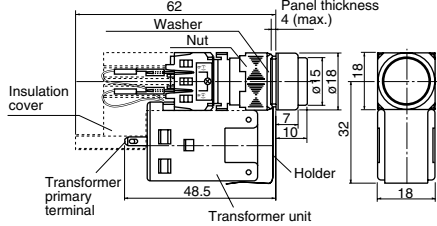

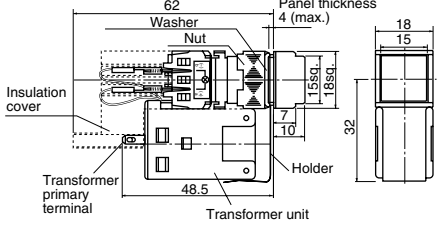

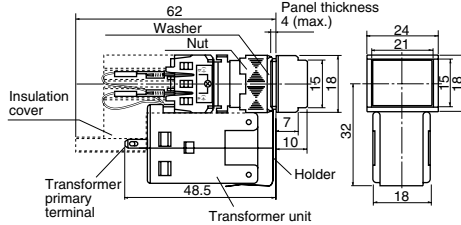
### • Lamp voltage

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	AH164-Z□■3	AH165-Z□■3	
	Incandescent		AH164-Z□■	AH165-Z□■	
Flush square  AF90-943	Flat LED	■ Voltage H: 100-110V AC M: 200-220V AC	AH164-ZS□■3	AH165-ZS□■3	
	Incandescent		AH164-ZS□■	AH165-ZS□■	
Flush rectangular  AF90-942	Flat LED	■ Voltage H: 100-110V AC M: 200-220V AC	AH164-ZT□■3	AH165-ZT□■3	
	Incandescent		AH164-ZT□■	AH165-ZT□■	

### • 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


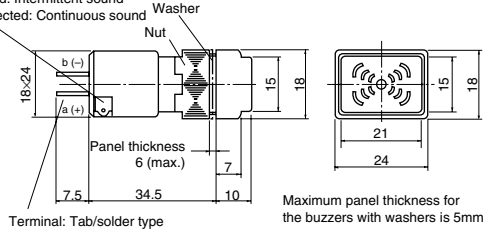

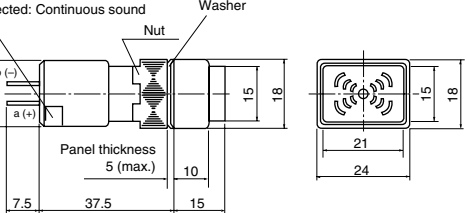

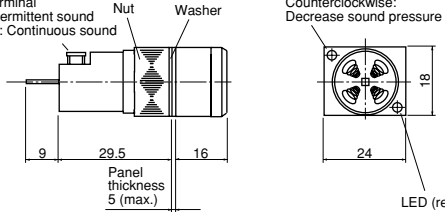

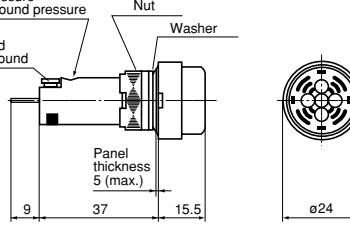
- The color lens is made of a tinted transparent material.
- A white pilot lights is fitted with a transparent color lens.

04

# Buzzers


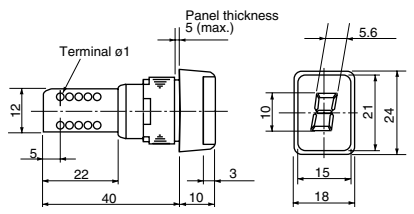

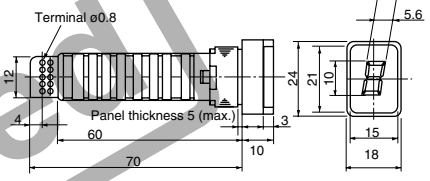
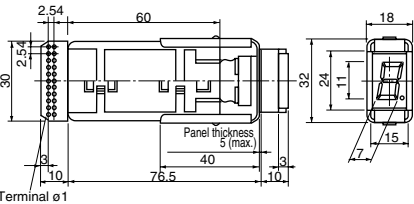
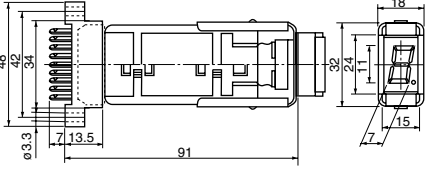
## AH164 and AH165

### ■ Buzzers

Sound	Operating voltage	Type	Dimensions, mm
Standard   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>	Short-circuit terminal Connected: Intermittent sound Not connected: Continuous sound  Terminal: Tab/solder type Maximum panel thickness for the buzzers with washers is 5mm
Loud sound   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>	Short-circuit terminal Connected: Intermittent sound Not connected: Continuous sound 
Loud sound with volume control   AF93-297	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>	Short-circuit terminal Connected: Intermittent sound Not connected: Continuous sound  Volume Clockwise: Increase sound pressure Counterclockwise: Decrease sound pressure LED (red)
Standard sound with volume control (IP54)   AF96-243	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>	Volume Clockwise: Increase sound pressure Counterclockwise: Decrease sound pressure Short-circuit terminal Connected: Intermittent sound Not connected: Continuous sound 



## ■ Numerical indicators

Display	Input logic	Operating voltage	Description	AH164 type	AH165(oil-tight) type	Dimensions, mm
Without decimal decoder   SP-165	-	-	Anode	<b>AH164-TS□A</b>	<b>AH165-TS□A</b>	
			Cathode	<b>AH164-TS□C</b>	<b>AH165-TS□C</b>	
With decimal decoder (5, 12, 15V)   AF87-315	Positive (Low active)	5V DC	Decoder type: 74LS47	<b>AH164-TC1□</b>	<b>AH165-TC1□</b>	
		5V DC	Decoder type: 4511	<b>AH164-TC4□</b>	<b>AH165-TC4□</b>	
		12V DC		<b>AH164-TC4□B</b>	<b>AH165-TC4□B</b>	
		15V DC		<b>AH164-TC4□C</b>	<b>AH165-TC4□C</b>	
With decimal decoder (24V)	Positive	24V DC	Decoder type: 4511	<b>AH164-TC4□E-K■</b>	<b>AH165-TC4□E-K■</b>	Without connector  
	Negative			<b>AH164-TC4□E-NK■</b>	<b>AH165-TC4□E-NK■</b>	
With sign decoder (±1 display)	Positive	24V DC	Decoder type: 4511	<b>AH164-TC4□E-1K■</b>	<b>AH165-TC4□E-1K■</b>	With connector  
	Negative			<b>AH164-TC4□E-1NK■</b>	<b>AH165-TC4□E-1NK■</b>	

### • Luminous color

Replace the □ mark by the luminous color code

R: Red

G: Green

### • Connector

Replace the ■ mark by the connector code

Blank: Without connector

1: With connector

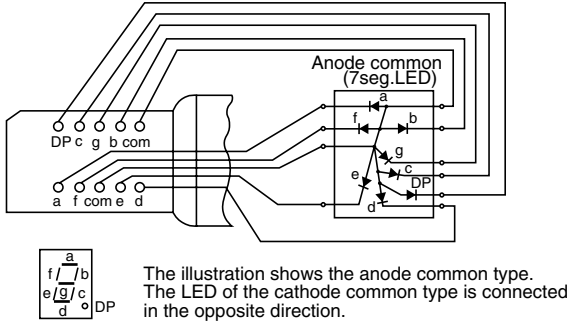
# Numerical Indicators

## AH164 and AH165

### ■ Without decoder, with decoder (5, 12 15V)

#### • Wiring diagrams

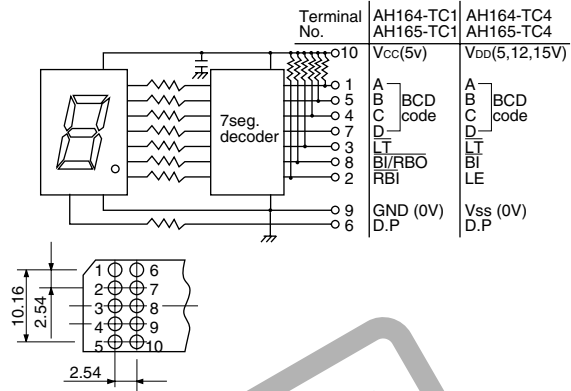
Without decoder/AH164-TS, AH165-TS



Note: As shown in the illustration, the structure of the TS type consists of a 7-segment LED provided with a casing only. Similar to a standard single 7-segment LED, use the TS type with a current limiting resistor connected.

With decoder (5, 12, 15V) /

AH164-TC1, AH165-TC1, AH164-TC4, AH165-TC4



#### • Truth value chart

AH164-TC1, AH165-TC1

BCD input (positive)				Input			Display
D	C	B	A	RBI	BI/RBO	LT	
L	L	L	L	H	H	H	0
L	L	L	L	L	H	H	1
L	L	L	H	L	H	H	2
L	L	L	H	L	H	H	3
L	L	H	L	L	H	H	4
L	L	H	L	L	H	H	5
L	L	H	H	L	H	H	6
L	L	H	H	L	H	H	7
L	H	L	L	L	H	H	8
L	H	L	L	L	H	H	9
L	H	L	H	L	H	H	A
L	H	L	H	L	H	H	B
L	H	H	L	L	H	H	C
L	H	H	L	L	H	H	D
L	H	H	H	L	H	H	E
L	H	H	H	L	H	H	F
L	H	H	H	L	H	H	G
L	H	H	H	L	H	H	H
L	H	H	H	L	H	H	I
L	H	H	H	L	H	H	J
L	H	H	H	L	H	H	K
L	H	H	H	L	H	H	L
L	H	H	H	L	H	H	M
L	H	H	H	L	H	H	N
L	H	H	H	L	H	H	O
L	H	H	H	L	H	H	P
L	H	H	H	L	H	H	Q
L	H	H	H	L	H	H	R
L	H	H	H	L	H	H	S
L	H	H	H	L	H	H	T
L	H	H	H	L	H	H	U
L	H	H	H	L	H	H	V
L	H	H	H	L	H	H	W
L	H	H	H	L	H	H	X
L	H	H	H	L	H	H	Y
L	H	H	H	L	H	H	Z
L	H	H	H	L	H	H	0
L	H	H	H	L	H	H	1
L	H	H	H	L	H	H	2
L	H	H	H	L	H	H	3
L	H	H	H	L	H	H	4
L	H	H	H	L	H	H	5
L	H	H	H	L	H	H	6
L	H	H	H	L	H	H	7
L	H	H	H	L	H	H	8
L	H	H	H	L	H	H	9
L	H	H	H	L	H	H	A
L	H	H	H	L	H	H	B
L	H	H	H	L	H	H	C
L	H	H	H	L	H	H	D
L	H	H	H	L	H	H	E
L	H	H	H	L	H	H	F
L	H	H	H	L	H	H	G
L	H	H	H	L	H	H	H
L	H	H	H	L	H	H	I
L	H	H	H	L	H	H	J
L	H	H	H	L	H	H	K
L	H	H	H	L	H	H	L
L	H	H	H	L	H	H	M
L	H	H	H	L	H	H	N
L	H	H	H	L	H	H	O
L	H	H	H	L	H	H	P
L	H	H	H	L	H	H	Q
L	H	H	H	L	H	H	R
L	H	H	H	L	H	H	S
L	H	H	H	L	H	H	T
L	H	H	H	L	H	H	U
L	H	H	H	L	H	H	V
L	H	H	H	L	H	H	W
L	H	H	H	L	H	H	X
L	H	H	H	L	H	H	Y
L	H	H	H	L	H	H	Z
L	H	H	H	L	H	H	0
L	H	H	H	L	H	H	1
L	H	H	H	L	H	H	2
L	H	H	H	L	H	H	3
L	H	H	H	L	H	H	4
L	H	H	H	L	H	H	5
L	H	H	H	L	H	H	6
L	H	H	H	L	H	H	7
L	H	H	H	L	H	H	8
L	H	H	H	L	H	H	9
L	H	H	H	L	H	H	A
L	H	H	H	L	H	H	B
L	H	H	H	L	H	H	C
L	H	H	H	L	H	H	D
L	H	H	H	L	H	H	E
L	H	H	H	L	H	H	F
L	H	H	H	L	H	H	G
L	H	H	H	L	H	H	H
L	H	H	H	L	H	H	I
L	H	H	H	L	H	H	J
L	H	H	H	L	H	H	K
L	H	H	H	L	H	H	L
L	H	H	H	L	H	H	M
L	H	H	H	L	H	H	N
L	H	H	H	L	H	H	O
L	H	H	H	L	H	H	P
L	H	H	H	L	H	H	Q
L	H	H	H	L	H	H	R
L	H	H	H	L	H	H	S
L	H	H	H	L	H	H	T
L	H	H	H	L	H	H	U
L	H	H	H	L	H	H	V
L	H	H	H	L	H	H	W
L	H	H	H	L	H	H	X
L	H	H	H	L	H	H	Y
L	H	H	H	L	H	H	Z
L	H	H	H	L	H	H	0
L	H	H	H	L	H	H	1
L	H	H	H	L	H	H	2
L	H	H	H	L	H	H	3
L	H	H	H	L	H	H	4
L	H	H	H	L	H	H	5
L	H	H	H	L	H	H	6
L	H	H	H	L	H	H	7
L	H	H	H	L	H	H	8
L	H	H	H	L	H	H	9
L	H	H	H	L	H	H	A
L	H	H	H	L	H	H	B
L	H	H	H	L	H	H	C
L	H	H	H	L	H	H	D
L	H	H	H	L	H	H	E
L	H	H	H	L	H	H	F
L	H	H	H	L	H	H	G
L	H	H	H	L	H	H	H
L	H	H	H	L	H	H	I
L	H	H	H	L	H	H	J
L	H	H	H	L	H	H	K
L	H	H	H	L	H	H	L
L	H	H	H	L	H	H	M
L	H	H	H	L	H	H	N
L	H	H	H	L	H	H	O
L	H	H	H	L	H	H	P
L	H	H	H	L	H	H	Q
L	H	H	H	L	H	H	R
L	H	H	H	L	H	H	S
L	H	H	H	L	H	H	T
L	H	H	H	L	H	H	U
L	H	H	H	L	H	H	V
L	H	H	H	L	H	H	W
L	H	H	H	L	H	H	X
L	H	H	H	L	H	H	Y
L	H	H	H	L	H	H	Z
L	H	H	H	L	H	H	0
L	H	H	H	L	H	H	1
L	H	H	H	L	H	H	2
L	H	H	H	L	H	H	3
L	H	H	H	L	H	H	4
L	H	H	H	L	H	H	5
L	H	H	H	L	H	H	6
L	H	H	H	L	H	H	7
L	H	H	H	L	H	H	8
L	H	H	H	L	H	H	9
L	H	H	H	L	H	H	A
L	H	H	H	L	H	H	B
L	H	H	H	L	H	H	C
L	H	H	H	L	H	H	D
L	H	H	H	L	H	H	E
L	H	H	H	L	H	H	F
L	H	H	H	L	H	H	G
L	H	H	H	L	H	H	H
L	H	H	H	L	H	H	I
L	H	H	H	L	H	H	J
L	H	H	H	L	H	H	K
L	H	H	H	L	H	H	L
L	H	H	H	L	H	H	M
L	H	H	H	L	H	H	N
L	H	H	H	L	H	H	O
L	H	H	H	L	H	H	P
L	H	H	H	L	H	H	Q
L	H	H	H	L	H	H	R
L	H	H	H	L	H	H	S
L	H	H	H	L	H	H	T
L	H	H	H	L	H	H	U
L	H	H	H	L	H	H	V
L	H	H	H	L	H	H	W
L	H	H	H	L	H	H	X
L	H	H	H	L	H	H	Y
L	H	H	H	L	H	H	Z
L	H	H	H	L	H	H	0
L	H	H	H	L	H	H	1
L	H	H	H	L	H	H	2
L	H	H	H	L	H	H	3
L	H	H	H	L	H	H	4
L	H	H	H	L	H	H	5
L	H	H	H	L	H	H	6
L	H	H	H	L	H	H	7
L	H	H	H	L	H	H	8
L	H	H	H	L	H	H	9
L	H	H	H	L	H	H	A
L	H	H	H	L	H	H	B
L	H	H	H	L	H	H	C
L	H	H	H	L	H	H	D
L	H	H	H	L	H	H	E
L	H	H	H	L	H	H	F
L	H	H	H	L	H	H	G
L	H	H	H	L	H	H	H
L	H	H	H	L	H	H	I
L	H	H	H	L	H	H	J
L	H	H	H	L	H	H	K
L	H	H	H	L	H	H	L
L	H	H	H	L	H	H	M
L	H	H	H	L	H	H	N
L	H	H	H	L	H	H	O
L	H	H	H	L	H	H	P
L	H	H	H	L	H	H	Q
L	H	H	H	L	H	H	R
L	H	H	H	L	H	H	S
L	H	H	H	L	H	H	T
L	H	H	H	L	H	H	U
L	H	H	H	L	H	H	V
L	H	H	H	L	H	H	W
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L	H	H	H	L	H	H	Z
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L	H	H	H	L	H	H	1
L	H	H	H	L	H	H	2
L	H	H	H	L	H	H	3
L	H	H	H	L	H	H	4
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L	H	H	H	L	H	H	6
L	H	H	H	L	H	H	7
L	H	H	H	L	H	H	8
L	H	H	H	L	H	H	9
L	H	H	H	L	H	H	A
L	H	H	H	L	H	H	B
L	H	H	H	L	H	H	C
L	H	H	H	L	H	H	D
L	H	H	H	L	H	H	E
L	H	H	H	L	H	H	F
L	H	H	H	L	H	H	G
L	H	H	H	L	H	H	H
L	H	H	H	L	H	H	I
L	H	H	H	L	H	H	J
L	H	H	H	L	H	H	K
L	H	H	H	L	H	H	L
L	H	H	H	L	H	H	M
L	H	H	H	L	H	H	N
L	H	H	H	L	H	H	O
L	H	H	H	L	H	H	P
L	H	H	H	L	H	H	Q
L	H	H	H	L	H	H	R
L	H	H	H	L	H	H	S
L	H	H	H	L	H	H	T
L	H	H	H	L	H	H	U
L	H	H	H	L	H	H	V
L	H	H	H	L	H	H	W
L	H	H	H	L	H	H	X
L	H	H	H	L	H		

• Application to PLC

Used with	Input logic	Output from PLC	
		Transistor output (source) PNP	Transistor output (sink) NPN
AH164-TC1□, AH165-TC1□ AH164-TC1□B, AH165-TC4□B AH164-TC1□C, AH165-TC4□C	Positive (low active)	—	○

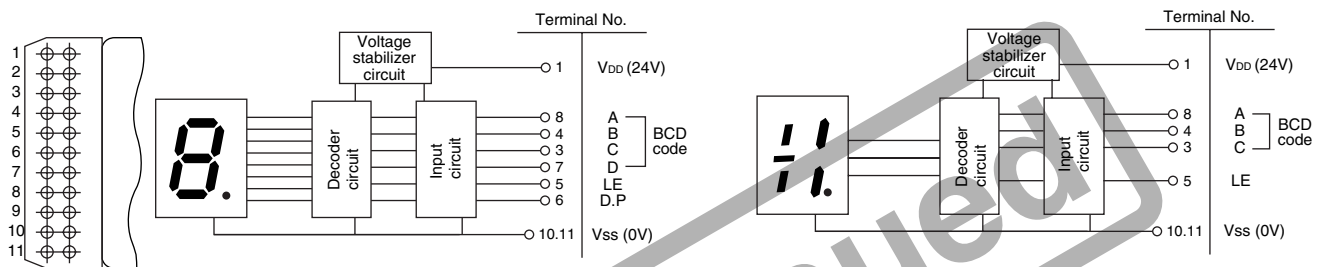
Note: ○ Available, — not available  
 • As AH16□-TC1□, -TC4□B, and -TC4□C (5V, 12V, and 15V models) do not have an inverter circuit inside, use a programmable logic controller, inserting an inverter (reverse) instruction on your program. (Low Active)

■ With decoder (24V)

• Wiring diagrams

With decoder/AH164-TC4□E, AH165-TC4□E

With decoder/AH164-TC4□E-1, AH165-TC4□E-1



• Truth value chart

Decimal display

Positive					Negative					Display
D	C	B	A	LE	D	C	B	A	LE	
L	L	L	L	L	H	H	H	H	H	0
L	L	L	H	L	H	H	H	L	H	1
L	L	H	L	L	H	H	L	H	H	2
L	L	H	H	L	H	H	L	H	H	3
L	H	L	L	L	H	L	H	H	H	4
L	H	L	H	L	H	L	L	H	H	5
L	H	H	L	L	H	L	L	L	H	6
L	H	H	H	L	H	L	L	L	H	7
H	L	L	L	L	L	H	H	H	H	8
H	L	L	H	L	L	H	H	L	H	9
H	L	H	L	L	L	H	L	L	H	Extinguish
H	L	H	H	L	L	H	L	L	H	Extinguish
H	H	L	L	L	L	L	L	H	H	Extinguish
H	H	L	H	L	L	L	L	H	H	Extinguish
H	H	H	L	L	L	L	L	L	H	Extinguish
H	H	H	H	L	L	L	L	L	H	Extinguish
○	○	○	○	H	○	○	○	○	L	Latch

Note: ○ Operates independently from L and H signals.

• Terminal symbol

L.E (Latch Enable):

Holds the last entry when the positive logic type goes to (H) and the negative logic type goes to (L).

D.P (Decimal Point):

Displays a decimal point when the positive logic type goes to (H) and the negative logic goes to (L).

±1 display

Positive				Negative				Display
C	B	A	LE	C	B	A	LE	
L	L	L	L	H	H	H	H	#
L	L	H	L	H	H	L	H	Extinguish
L	H	L	L	H	L	H	H	#
L	H	H	L	H	L	L	H	-
H	L	L	L	L	H	H	H	!
H	L	H	L	L	H	L	H	-!
H	H	L	L	L	L	H	H	#
H	H	H	L	L	L	L	H	Extinguish
○	○	○	H	○	○	○	L	Latch

Note: ○ Operates independently from L and H signals.

• BCD input voltage

L	0 to 2V
H	12 to 30V

• Input current (L)

Positive logic	H	2mA max.
Negative logic	L	4mA max.

• Application to PLC

Used with	Input logic	Output from PLC	
		Transistor output (source) PNP	Transistor output (sink) NPN
AH164-TC4□E AH165-TC4□E	Positive	○	—
AH164-TC4□E-N AH165-TC4□E-N	Negative	—	○

Note: ○ Available, — not available

# Pushbuttons/Selectors/Pilot Lights/Buzzers

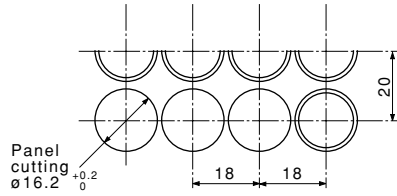
## AH164 and AH165

### Mounting space

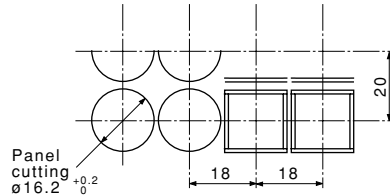
#### ■ Mounting space, mm

- Pushbuttons and pilot lights

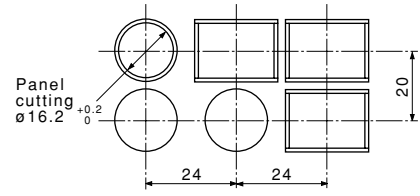
##### Extended round head or lens



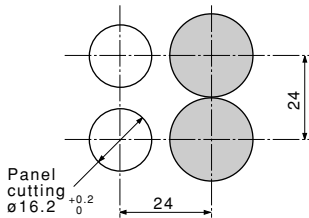
##### Flush square head or lens



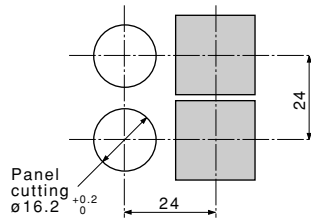
##### Flush rectangular head or lens



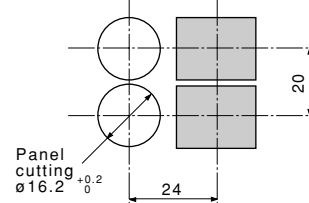
##### Mushroom head



##### Convex square head

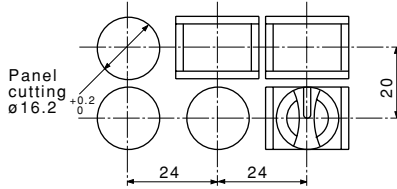


##### Convex rectangular head

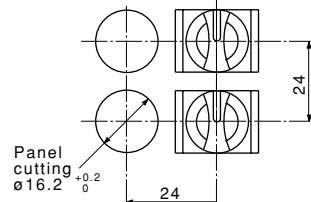


#### • Selector switches

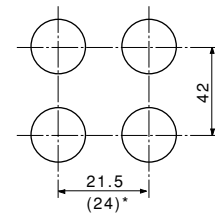
##### • When mounting the selector switches near the pilot light



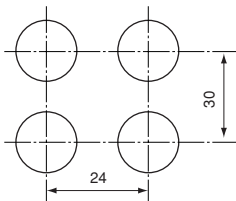
##### • When mounting the selector switches near each other



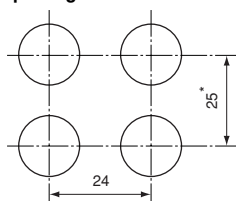
##### • With transformer



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



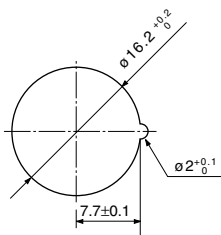
##### • When mounting the JM or RJM selector switches near the other selector switch, pushbutton switch and pilot lights



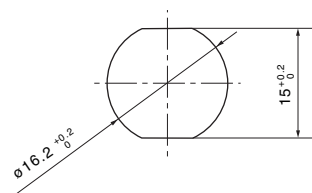
Note: \* Mushroom, convex square, convex rectangular: 27

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		Type number display side 
Pushbuttons Selector switches (except for JM, RJM types)		
Pilot lights (without transformer)		Type number display side 

■ **Type number nomenclature**

**Pushbuttons, illuminated pushbuttons and pilot lights**

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

① **Product category**

AH165-2: Oil-tight (Large operator)

② **Operator or lens**

- Operator for illuminated pushbutton
- FL: Flush round head
- FL5: Flush round head (Alternate)
- SFL: Flush square head
- SFL5: Flush square head (Alternate)
- EL: Extended round head
- EL5: Extended round head (Alternate)
- SEL: Extended square head
- SEL5: Extended square head (Alternate)
- SCL: Concave square head
- SCL5: Concave square head (Alternate)
- ML: Mushroom head
- YML: Mushroom head with square bezel
- VL: Push-lock, turn-reset
- YVL: Push-lock, turn-reset with square bezel

• Operator for pushbuttons

- F: Flush round head
- F5: Flush round head (Alternate)
- SF: Flush square head
- SF5: Flush square head (Alternate)
- E: Extended round head
- E5: Extended round head (Alternate)
- SE: Extended square head
- SE5: Extended square head (Alternate)
- SCE: Concave square head
- SCE5: Concave square head (Alternate)
- M: Mushroom head
- YM: Mushroom head with square bezel
- V: Push-lock, turn-reset
- YV: Push-lock, turn-reset with square bezel
- S2: With selector ring
- YS2: With selector ring with square bezel

• Lens for pilot lights

- Z: Flush round
- SZ: Flush square
- ZE: Extended round
- SEZ: Extended square

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)	○	○

Notes: • ( ) : indicates luminous color  
 \* Not available for illuminated types

④ **Contact arrangement (except pilot lights)**

- 11: 1NO+1NC
- 22: 2NO+2NC
- 33: 3NO+3NC

⑤ **Lamp voltage**

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

⑥ **Type of lamp**

- Blank: Incandescent
- 1: Neon
- 3: Flat LED

⑦ **Terminal**

- Blank: Solder/tab
- W: Wire-wrap

# Pushbuttons/Selectors/Pilot Lights

## AH165-2

### Type number nomenclature

#### ■ Type number nomenclature

##### Selector switches

**AH165-2** J 2 B 11 A - W

① ② ③ ④ ⑤ ⑥ ⑦

##### ① Product category

AH165-2: Oil-tight (Large operator)

##### ② Operator

• Knob and key type

2-position (operating angle 90°)

P: Knob

YP: Knob with square bezel

J: Key

YJ: Key with square bezel

3-position (operating angle 45°)

P: Knob

YP: Knob with square bezel

J: Key

YJ: Key with square bezel

• Lever type

2-position (operating angle 45°)

H: Lever

SH: Lever with square bezel

Note: The operation angle is 45° on the upper and lower side.

##### 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 H and SH types

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

• Color of knob or lever

B: Black

• Key removable position

Code	2-position		3-position			
	2	0	1	3	6	7
A	⊙	⊙	—	⊙	—	⊙
B	⊗	—	—	⊗	—	—
C	—	—	—	⊗	—	—
D	⊙	—	—	⊙	—	—
E	—	—	①	—	—	—
F	—	—	—	⊙	—	—
G	—	—	—	⊙	—	⊙

##### ⑤ Contact arrangement

11: 1NO+1NC\*

22: 2NO+2NC

33: 3NO+3NC

Note: \* Except for 3-position

##### ⑥ Key type No.

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

##### ⑦ Terminal

Blank: Solder/tab

W: Wire-wrap

##### Illuminated selector switches

**AH165-2** PL 2 G 11 E 3

① ② ③ ④ ⑤ ⑥ ⑦

##### ① Product category

AH165-2: Oil-tight (Large operator)

##### ② Operator

• 2-position (operating angle 90°)

PL: Knob

• 3-position (operating angle 45°)

PL: Knob

##### ③ Operation

2: 2-position, maintained

3: 3-position, maintained

##### ④ Color of knob

Code	Color	LED	Incandescent	Neon
G	Green	○	○	○
R	Red	○	○	○ (Orange)
Y	Yellow	○	○	○ (Orange)
W	White	○ (Orange)	○	○ (Orange)
S	Blue	○	○	○ (Green)
O	Orange	○ (Amber)	○	○

Notes: • ( ) : indicates luminous color

• The part other than the arrow of the knob is black.

##### ⑤ Contact arrangement

11: 1NO+1NC\*

22: 2NO+2NC

Note: \* Except for 3-position

##### ⑥ Lamp voltage

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

##### ⑦ Type of lamp

Blank: Incandescent

1: Neon

3: Flat LED

Note: Terminal with solder/tab only

■ **Standards approved**

UL508	File No. E44592
CSA C22.2 No.14	File No. LR20479 (except for AH165-2Z, 2ZE, 2SZ, 2SZE) File No. LR84365 (for AH165-2Z, 2ZE, 2SZ, 2SZE)
TÜV: EN60947-5-1	Pushbutton, illuminated pushbutton: R9250087 Selector (except for AH165-2H, SH), illuminated selector: R9250088 Selector (for AH165-2H, SH): R9250087 Pilot lights: R9250089

■ **Specifications (Indoor use)**

Item	AH165-2	
Rated insulation voltage	250V AC/DC	
Ambient temperature (no condensation or no icing)	-10 to +70°C *1	
Humidity	45 to 85%RH (at -5 to +40°C), no condensation or no icing	
Durability (operations)	Mechanical	Pushbutton and illuminated pushbutton switch Momentary action: 1 million Alternate action: 250,000 Push-lock, turn-reset: 100,000 With selector ring: 250,000
	Electrical	Selector and illuminated selector switch: 250,000*2 100,000 (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	
Pollution degree	3	
Vibration	Resonance: 10 to 55Hz, double amplitude 0.1mm Constant: 16.7Hz, double amplitude 3mm	
Shock	Malfunction durability: 100m/s <sup>2</sup> Mechanical durability: 500m/s <sup>2</sup>	
Operating frequency	1200 operation/hour (on-load factor: 40%)	
Insulation resistance	100MΩ or more (500V DC megger)	
Operator protection	IP65	

Notes: \*1 For illuminated pushbutton, illuminated selector switch and pilot light: -10 to +55°C

\*2 Key insertion/removal durability for selector switch key types: 10,000

■ **Contact ratings**

See page 04/141

■ **Lamp ratings**

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

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


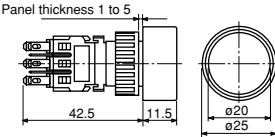
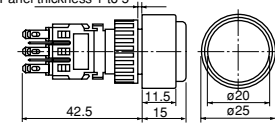

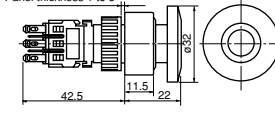


■ **Contact reliability**

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

## AH165-2


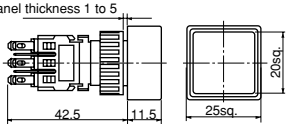


### ■ Illuminated pushbutton switches

Operator	Lamp	Voltage	Contact	Momentary action	Alternate action	Dimensions, mm			
				Type	Type				
 <p>AF87-211</p>	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2FL□11E3 AH165-2FL□22E3 AH165-2FL□33E3	AH165-2FL5□11E3 AH165-2FL5□22E3 AH165-2FL5□33E3				
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2FL□11E AH165-2FL□22E AH165-2FL□33E	AH165-2FL5□11E AH165-2FL5□22E AH165-2FL5□33E				
	Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2FL□11H1 AH165-2FL□22H1 AH165-2FL□33H1	AH165-2FL5□11H1 AH165-2FL5□22H1 AH165-2FL5□33H1				
			220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2FL□11M1 AH165-2FL□22M1 AH165-2FL□33M1		AH165-2FL5□11M1 AH165-2FL5□22M1 AH165-2FL5□33M1		
		Flat LED		24V DC	1NO+1NC 2NO+2NC 3NO+3NC		AH165-2EL□11E3 AH165-2EL□22E3 AH165-2EL□33E3	AH165-2EL5□11E3 AH165-2EL5□22E3 AH165-2EL5□33E3	
			Incandescent				24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	
Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2EL□11H1 AH165-2EL□22H1 AH165-2EL□33H1	AH165-2EL5□11H1 AH165-2EL5□22H1 AH165-2EL5□33H1					
		220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2EL□11M1 AH165-2EL□22M1 AH165-2EL□33M1	AH165-2EL5□11M1 AH165-2EL5□22M1 AH165-2EL5□33M1				
	 <p>AF87-210</p>		Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2ML□11E3 AH165-2ML□22E3 AH165-2ML□33E3	— — —		
		Incandescent				24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC		
Neon		110V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2ML□11H1 AH165-2ML□22H1 AH165-2ML□33H1	— — —				
			220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2ML□11M1 AH165-2ML□22M1 AH165-2ML□33M1	— — —			
		 <p>AF87-221</p>		Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YML□11E3 AH165-2YML□22E3 AH165-2YML□33E3		— — —
			Incandescent				24V AC/DC		1NO+1NC 2NO+2NC 3NO+3NC
Neon	110V AC		1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YML□11H1 AH165-2YML□22H1 AH165-2YML□33H1	— — —				
			220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YML□11M1 AH165-2YML□22M1 AH165-2YML□33M1	— — —			
	Flat LED			24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YML□11E3 AH165-2YML□22E3 AH165-2YML□33E3	— — —	 <p>AF87-220</p>	
			Incandescent			24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC		AH165-2YML□11E AH165-2YML□22E AH165-2YML□33E
Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YML□11H1 AH165-2YML□22H1 AH165-2YML□33H1	— — —					
		220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YML□11M1 AH165-2YML□22M1 AH165-2YML□33M1	— — —				

Note: Replace the □ mark by the following color code, see page 04/166.



■ Illuminated pushbutton switches

Operator	Lamp	Voltage	Contact	Momentary action	Alternate action	Dimensions, mm		
				Type	Type			
 AF87-201	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2SFL□11E3 AH165-2SFL□22E3 AH165-2SFL□33E3	AH165-2SFL5□11E3 AH165-2SFL5□22E3 AH165-2SFL5□33E3			
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2SFL□11E AH165-2SFL□22E AH165-2SFL□33E	AH165-2SFL5□11E AH165-2SFL5□22E AH165-2SFL5□33E			
							Neon	110V AC
	220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2SFL□11M1 AH165-2SFL□22M1 AH165-2SFL□33M1	AH165-2SFL5□11M1 AH165-2SFL5□22M1 AH165-2SFL5□33M1				
					 AF87-200		Flat LED	24V DC
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2SEL□11E AH165-2SEL□22E AH165-2SEL□33E			AH165-2SEL5□11E AH165-2SEL5□22E AH165-2SEL5□33E	
Neon						110V AC		1NO+1NC 2NO+2NC 3NO+3NC
	220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2SEL□11M1 AH165-2SEL□22M1 AH165-2SEL□33M1	AH165-2SEL5□11M1 AH165-2SEL5□22M1 AH165-2SEL5□33M1				
 AF87-199						Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2SCL□11E AH165-2SCL□22E AH165-2SCL□33E		AH165-2SCL5□11E AH165-2SCL5□22E AH165-2SCL5□33E		
					Neon		110V AC	1NO+1NC 2NO+2NC 3NO+3NC
	220V AC	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2SCL□11M1 AH165-2SCL□22M1 AH165-2SCL□33M1	AH165-2SCL5□11M1 AH165-2SCL5□22M1 AH165-2SCL5□33M1				


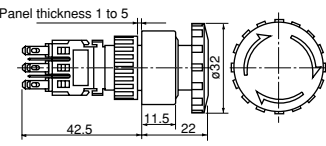

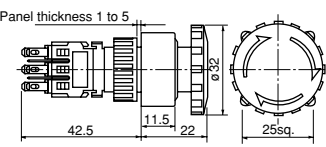
Note: Replace the □ mark by the following color code, see page 04/166.

04

# Illuminated Pushbutton Switches

## AH165-2

### ■ Illuminated pushbutton switches

Operator	Lamp	Voltage	Contact	Type	Dimensions, mm		
 <p>AF87-219</p>	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	<b>AH165-2VL□11E3</b> <b>AH165-2VL□22E3</b> <b>AH165-2VL□33E3</b>			
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	<b>AH165-2VL□11E</b> <b>AH165-2VL□22E</b> <b>AH165-2VL□33E</b>			
	Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	<b>AH165-2VL□11H1</b> <b>AH165-2VL□22H1</b> <b>AH165-2VL□33H1</b>			
		220V AC	1NO+1NC 2NO+2NC 3NO+3NC	<b>AH165-2VL□11M1</b> <b>AH165-2VL□22M1</b> <b>AH165-2VL□33M1</b>			
	 <p>AF87-218</p>	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC		<b>AH165-2YVL□11E3</b> <b>AH165-2YVL□22E3</b> <b>AH165-2YVL□33E3</b>	
		Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC		<b>AH165-2YVL□11E</b> <b>AH165-2YVL□22E</b> <b>AH165-2YVL□33E</b>	
Neon		110V AC	1NO+1NC 2NO+2NC 3NO+3NC	<b>AH165-2YVL□11H1</b> <b>AH165-2YVL□22H1</b> <b>AH165-2YVL□33H1</b>			
		220V AC	1NO+1NC 2NO+2NC 3NO+3NC	<b>AH165-2YVL□11M1</b> <b>AH165-2YVL□22M1</b> <b>AH165-2YVL□33M1</b>			

#### • Button color

Replace the □ mark by the following button color code

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

- With wire-wrap pin terminals have a depth of 47mm.


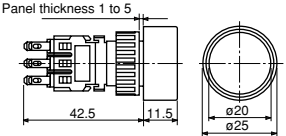

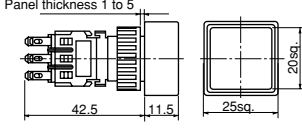

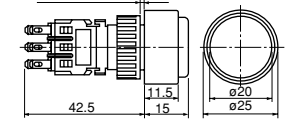

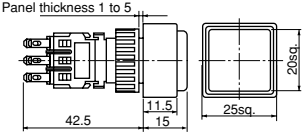

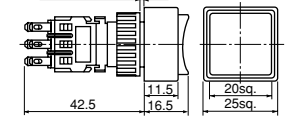

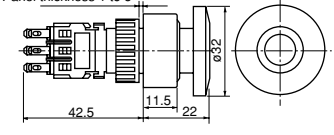

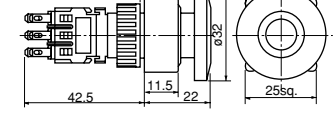
- A white illuminated pushbutton is fitted with a transparent color lens.
- The color lens is made of a tinted transparent material.

#### • 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

■ Pushbutton switches

Operator	Contact	Momentary action	Alternate action	Dimensions, mm
		Type	Type	
Flush round head 	1NO+1NC	AH165-2F□11	AH165-2F5□11	Panel thickness 1 to 5 
	2NO+2NC	AH165-2F□22	AH165-2F5□22	
	3NO+3NC	AH165-2F□33	AH165-2F5□33	
Flush square head 	1NO+1NC	AH165-2SF□11	AH165-2SF5□11	Panel thickness 1 to 5 
	2NO+2NC	AH165-2SF□22	AH165-2SF5□22	
	3NO+3NC	AH165-2SF□33	AH165-2SF5□33	
Extended round head 	1NO+1NC	AH165-2E□11	AH165-2E5□11	Panel thickness 1 to 5 
	2NO+2NC	AH165-2E□22	AH165-2E5□22	
	3NO+3NC	AH165-2E□33	AH165-2E5□33	
Extended square head 	1NO+1NC	AH165-2SE□11	AH165-2SE5□11	Panel thickness 1 to 5 
	2NO+2NC	AH165-2SE□22	AH165-2SE5□22	
	3NO+3NC	AH165-2SE□33	AH165-2SE5□33	
Concave square head 	1NO+1NC	AH165-2SCE□11	AH165-2SCE5□11	Panel thickness 1 to 5 
	2NO+2NC	AH165-2SCE□22	AH165-2SCE5□22	
	3NO+3NC	AH165-2SCE□33	AH165-2SCE5□33	
Mushroom head 	1NO+1NC	AH165-2M□11	—	Panel thickness 1 to 5 
	2NO+2NC	AH165-2M□22	—	
	3NO+3NC	AH165-2M□33	—	
Mushroom head with square bezel 	1NO+1NC	AH165-2YM□11	—	Panel thickness 1 to 5 
	2NO+2NC	AH165-2YM□22	—	
	3NO+3NC	AH165-2YM□33	—	


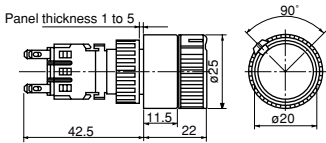

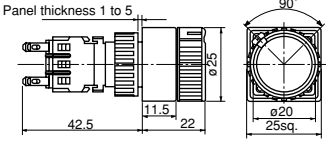

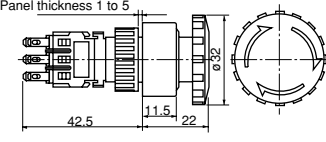

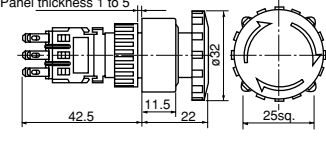
Note: Replace the □ mark by the following color code, see page 04/168.

04

# Pushbutton Switches

## AH165-2

### ■ Pushbutton switches

Operator	Contact	Type	Dimensions, mm
 <p>AF87-207</p>	2NO+2NC	<b>AH165-2S2□22</b>	
 <p>AF87-206</p>	2NO+2NC	<b>AH165-2YS2□22</b>	
 <p>AF87-210</p>	1NO+1NC 2NO+2NC 3NO+3NC	<b>AH165-2V□11</b> <b>AH165-2V□22</b> <b>AH165-2V□33</b>	
 <p>AF87-200</p>	1NO+1NC 2NO+2NC 3NO+3NC	<b>AH165-2YV□11</b> <b>AH165-2YV□22</b> <b>AH165-2YV□33</b>	





#### • Button color

Replace the □ mark by the following button color code

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

#### • Contact arrangement and operator position

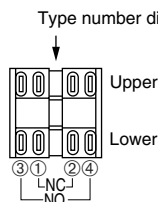
AH165-2S, 2YS

Button	Ring	
	Left	Right
Free	 U                      L 1O ——— 02 1O ——— 02 3O    04 3O    04	 U                      L 1O ——— 02 1O ——— 02 3O    04 3O    04
Depressed	 1O ——— 02 1O ——— 02 3O    04 3O    04	 1O ——— 02 1O ——— 02 3O    04 3O    04


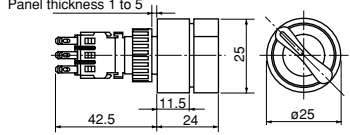

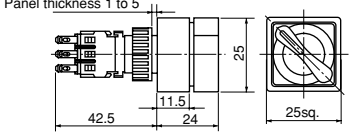

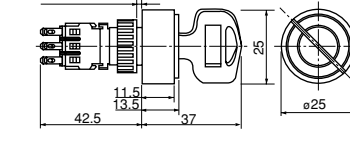

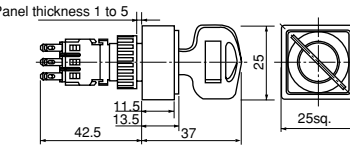
U: Upper contact block  
L: Lower contact block

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

#### • Terminal number and contact block position



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

Operator	Operation	Key removable position	Contact	Type	Dimensions, mm
 AF02-111	Maintained	—	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2P2B11 AH165-2P2B22 AH165-2P2B33	
	Spring return	—	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2P0B11 AH165-2P0B22 AH165-2P0B33	
 AF02-112	Maintained	—	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YP2B11 AH165-2YP2B22 AH165-2YP2B33	
	Spring return	—	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YP0B11 AH165-2YP0B22 AH165-2YP0B33	
 AF02-113	Maintained	⊖ A	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2J2A11A AH165-2J2A22A AH165-2J2A33A	
		⊗ B	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2J2B11A AH165-2J2B22A AH165-2J2B33A	
		⊘ D	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2J2D11A AH165-2J2D22A AH165-2J2D33A	
	Spring return	⊖ A	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2J0A11A AH165-2J0A22A AH165-2J0A33A	
		⊗ B	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YJ2B11A AH165-2YJ2B22A AH165-2YJ2B33A	
		⊘ D	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YJ2D11A AH165-2YJ2D22A AH165-2YJ2D33A	
 AF02-114	Maintained	⊖ A	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YJ2A11A AH165-2YJ2A22A AH165-2YJ2A33A	
		⊗ B	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YJ2B11A AH165-2YJ2B22A AH165-2YJ2B33A	
		⊘ D	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YJ2D11A AH165-2YJ2D22A AH165-2YJ2D33A	
	Spring return	⊖ A	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YJ0A11A AH165-2YJ0A22A AH165-2YJ0A33A	
		⊗ B	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YJ0B11A AH165-2YJ0B22A AH165-2YJ0B33A	
		⊘ D	1NO+1NC 2NO+2NC 3NO+3NC	AH165-2YJ0D11A AH165-2YJ0D22A AH165-2YJ0D33A	

04

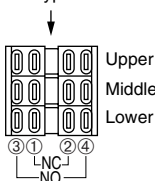
• The key can be removed only at the following positions:

A: ⊖      B: ⊗      D: ⊘

- For spring-return selector switches, the key can be removed at position A.
- 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.

• Terminal number and contact block position

Type number display side



Contact arrangement (terminal No.: common)  
 1NO+1NC: Middle  
 2NO+2NC: Upper, lower  
 3NO+3NC: Upper, middle, lower

• Contact arrangement and operator positions:

2-position


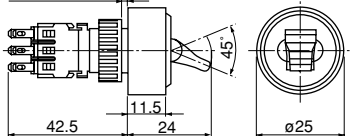

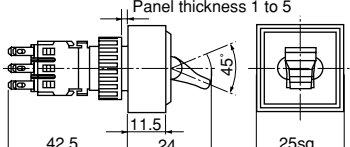
Contact arrangement	1NO+1NC	2NO+2NC	3NO+3NC	
Operator position	Left	1O — M — 02 3O — — 04	1O — U — 02 3O — — 04 1O — — 02 3O — L — 04	1O — — 02 3O — — 04 1O — — 02 3O — — 04 1O — — 02 3O — — 04
	Right	1O — M — 02 3O — — 04	1O — U — 02 3O — — 04 1O — — 02 3O — L — 04	1O — — 02 3O — — 04 1O — — 02 3O — — 04 1O — — 02 3O — — 04

U: Upper contact block  
 M: Middle contact block  
 L: Lower contact block

# Selector Switches



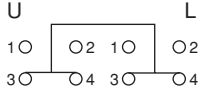
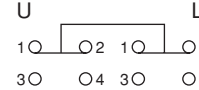
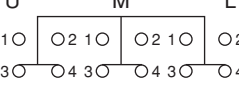
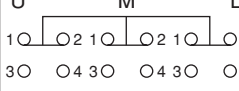
## AH165-2

### ■ Selector switches/2-position

Operator	Lever color	Operation	Contact	Type	Dimensions, mm
 AF87-209	Black	Maintained	1NO+1NC 2NO+2NC 3NO+3NC	<b>AH165-2H2B11</b> <b>AH165-2H2B22</b> <b>AH165-2H2B33</b>	Panel thickness 1 to 5 
 AF87-203	Black	Maintained	1NO+1NC 2NO+2NC 3NO+3NC	<b>AH165-2SH2B11</b> <b>AH165-2SH2B22</b> <b>AH165-2SH2B33</b>	Panel thickness 1 to 5 

#### • Contact arrangement and operator position

AH165-2H, 2SH

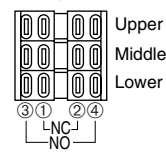
Contact block	Lever	
	Up	Down
1NO+1NC		
2NO+2NC		
3NO+3NC		

U: Upper contact block  
M: Middle contact block  
L: Lower contact block

• With wire-wrap pin terminals have a depth of 47mm.


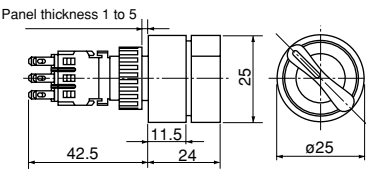

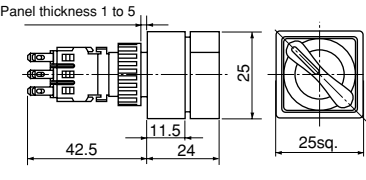

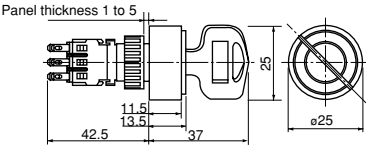

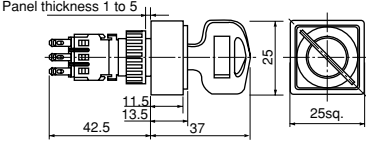
#### • Terminal number and contact block position

Type number display side



Contact arrangement (terminal No.: common)  
1NO+1NC: Middle  
2NO+2NC: Upper, lower  
3NO+3NC: Upper, middle, lower

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

Operator	Operation	Key removable position	Contact	Type	Dimensions, mm		
 <p>AF87-208</p>	Maintained	—	2NO+2NC 3NO+3NC	AH165-2P3B22 AH165-2P3B33			
	Spring/ manual return	①	2NO+2NC 3NO+3NC	AH165-2P6B22 AH165-2P6B33			
	Spring/ manual return	①	2NO+2NC 3NO+3NC	AH165-2P7B22 AH165-2P7B33			
	Spring return	①	2NO+2NC 3NO+3NC	AH165-2P1B22 AH165-2P1B33			
 <p>AF87-202</p>	Maintained	—	2NO+2NC 3NO+3NC	AH165-2YP3B22 AH165-2YP3B33			
	Spring/ manual return	①	2NO+2NC 3NO+3NC	AH165-2YP6B22 AH165-2YP6B33			
	Spring/ manual return	①	2NO+2NC 3NO+3NC	AH165-2YP7B22 AH165-2YP7B33			
	Spring return	①	2NO+2NC 3NO+3NC	AH165-2YP1B22 AH165-2YP1B33			
 <p>AF87-223</p>	Maintained	⊖ A	2NO+2NC 3NO+3NC	AH165-2J3A22A AH165-2J3A33A			
		⊕ E	2NO+2NC 3NO+3NC	AH165-2J3E22A AH165-2J3E33A			
		⊘ D	2NO+2NC 3NO+3NC	AH165-2J3D22A AH165-2J3D33A			
		⊗ C	2NO+2NC 3NO+3NC	AH165-2J3C22A AH165-2J3C33A			
	Spring/ manual return	⊕ E	2NO+2NC 3NO+3NC	AH165-2J6E22A AH165-2J6E33A			
		⊘ D	2NO+2NC 3NO+3NC	AH165-2J6D22A AH165-2J6D33A			
	Spring/ manual return	⊖ A	2NO+2NC 3NO+3NC	AH165-2J7A22A AH165-2J7A33A			
		⊕ E	2NO+2NC 3NO+3NC	AH165-2J7E22A AH165-2J7E33A			
	Spring return	⊕ E	2NO+2NC 3NO+3NC	AH165-2J1E22A AH165-2J1E33A			
		⊕ E	2NO+2NC 3NO+3NC	AH165-2YJ3A22A AH165-2YJ3A33A			
	 <p>AF87-222</p>	Maintained	⊖ A	2NO+2NC 3NO+3NC		AH165-2YJ3A22A AH165-2YJ3A33A	
			⊕ E	2NO+2NC 3NO+3NC		AH165-2YJ3E22A AH165-2YJ3E33A	
⊘ D			2NO+2NC 3NO+3NC	AH165-2YJ3D22A AH165-2YJ3D33A			
⊗ C			2NO+2NC 3NO+3NC	AH165-2YJ3C22A AH165-2YJ3C33A			
Spring/ manual return		⊕ E	2NO+2NC 3NO+3NC	AH165-2YJ6E22A AH165-2YJ6E33A			
		⊘ D	2NO+2NC 3NO+3NC	AH165-2YJ6D22A AH165-2YJ6D33A			
Spring/ manual return		⊖ A	2NO+2NC 3NO+3NC	AH165-2YJ7A22A AH165-2YJ7A33A			
		⊕ E	2NO+2NC 3NO+3NC	AH165-2YJ7E22A AH165-2YJ7E33A			
Spring return		⊕ E	2NO+2NC 3NO+3NC	AH165-2YJ1E22A AH165-2YJ1E33A			
		⊕ E	2NO+2NC 3NO+3NC	AH165-2YJ1E22A AH165-2YJ1E33A			

- The Key can be removed at the following positions:  
A: ⊖ B: ⊗ C: ⊗ D: ⊘ E: ⊕ F: ⊕ G: ⊕

For spring-return selector switches, the key can be removed only at position E. For manual/spring-return selector switches, the key can be removed at positions D, E and F for type J6, and position A, E and G for type J7.

- 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.

• Contact arrangement and operator positions:

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


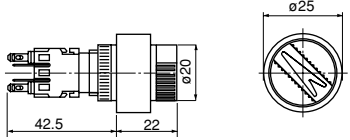
U: Upper contact block M: Middle contact block L: Lower contact block  
• Contact block positions: See page 04/170



# Selector Switches

## AH165-2

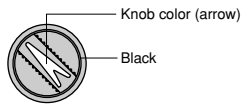
### ■ Illuminated selector switches

Operator	Operation	Lamp voltage	No. of positions	Contact	Type	Dimensions, mm
 <p>AF90-607</p>	Maintained	Flat LED 24V DC	2	1NO+1NC 2NO+2NC	<b>AH165-2PL2□11E3</b> <b>AH165-2PL2□22E3</b>	
			3	2NO+2NC	<b>AH165-2PL3□22E3</b>	
			2	1NO+1NC 2NO+2NC	<b>AH165-2PL2□11E</b> <b>AH165-2PL2□22E</b>	
		Incandescent 24V AC/DC	3	2NO+2NC	<b>AH165-2PL3□22E</b>	
			2	1NO+1NC 2NO+2NC	<b>AH165-2PL2□11H1</b> <b>AH165-2PL2□22H1</b>	
					<b>AH165-2PL3□22H1</b>	
		Neon 110V AC	2	1NO+2NC 2NO+2NC	<b>AH165-2PL2□11M1</b> <b>AH165-2PL2□22M1</b>	
			3	2NO+2NC	<b>AH165-2PL3□22M1</b>	
			Neon 220V AC	2	1NO+2NC 2NO+2NC	
		3		2NO+2NC	<b>AH165-2PL3□22M1</b>	

#### • Knob color (arrow)

Replace the □ mark by the following color code

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



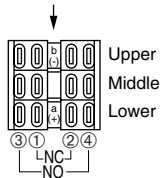
#### • Lamp voltage

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

#### • Terminal number and contact block position

Type number display side



Contact arrangement (terminal No.: common)

1NO+1NC: Middle  
2NO+2NC: Upper, lower

#### • Contact arrangement and operator positions:

##### 2-position

Contact arrangement	1NO+1NC	2NO+2NC	
Operator position	Left (⊖)	M $\begin{matrix} 1 \text{---}   \text{---}   2 \\ 3 \text{---} \text{---} \text{---}   4 \end{matrix}$	U $\begin{matrix} 1 \text{---}   \text{---}   2 \\ 3 \text{---} \text{---} \text{---}   4 \end{matrix}$ L $\begin{matrix} 1 \text{---}   \text{---}   2 \\ 3 \text{---} \text{---} \text{---}   4 \end{matrix}$
	Right (⊕)	M $\begin{matrix} 1 \text{---} \text{---} \text{---}   2 \\ 3 \text{---}   \text{---} \text{---}   4 \end{matrix}$	U $\begin{matrix} 1 \text{---} \text{---} \text{---}   2 \\ 3 \text{---}   \text{---} \text{---}   4 \end{matrix}$ L $\begin{matrix} 1 \text{---} \text{---} \text{---}   2 \\ 3 \text{---}   \text{---} \text{---}   4 \end{matrix}$


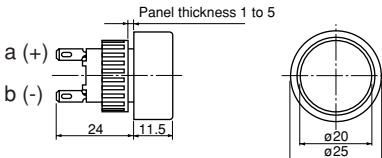

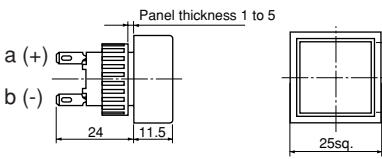

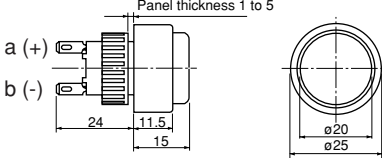

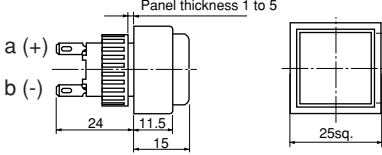
##### 3-position

Contact arrangement	2NO+2NC	
Operator position	Left (⊖)	U $\begin{matrix} 1 \text{---}   \text{---}   2 \\ 3 \text{---} \text{---} \text{---}   4 \end{matrix}$ L $\begin{matrix} 1 \text{---} \text{---} \text{---}   2 \\ 3 \text{---}   \text{---} \text{---}   4 \end{matrix}$
	Center (⊙)	U $\begin{matrix} 1 \text{---}   \text{---}   2 \\ 3 \text{---} \text{---} \text{---}   4 \end{matrix}$ L $\begin{matrix} 1 \text{---}   \text{---}   2 \\ 3 \text{---} \text{---} \text{---}   4 \end{matrix}$
Right (⊕)	U $\begin{matrix} 1 \text{---} \text{---} \text{---}   2 \\ 3 \text{---}   \text{---} \text{---}   4 \end{matrix}$ L $\begin{matrix} 1 \text{---} \text{---} \text{---}   2 \\ 3 \text{---}   \text{---} \text{---}   4 \end{matrix}$	

U: Upper contact block  
M: Middle contact block  
L: Lower contact block



■ Pilot lights

Lens	Lamp	Voltage	Type	Dimensions, mm
 <p>AF87-213</p>	Flat LED	24V DC	<b>AH165-2Z□E3</b>	
	Incandescent	24V AC/DC	<b>AH165-2Z□E</b>	
	Neon	110V AC	<b>AH165-2Z□H1</b>	
		220V AC	<b>AH165-2Z□M1</b>	
 <p>AF87-205</p>	Flat LED	24V DC	<b>AH165-2SZ□E3</b>	
	Incandescent	24V AC/DC	<b>AH165-2SZ□E</b>	
	Neon	110V AC	<b>AH165-2SZ□H1</b>	
		220V AC	<b>AH165-2SZ□M1</b>	
 <p>AF87-212</p>	Flat LED	24V DC	<b>AH165-2ZE□E3</b>	
	Incandescent	24V AC/DC	<b>AH165-2ZE□E</b>	
	Neon	110V AC	<b>AH165-2ZE□H1</b>	
		220V AC	<b>AH165-2ZE□M1</b>	
 <p>AF87-204</p>	Flat LED	24V DC	<b>AH165-2SZE□E3</b>	
	Incandescent	24V AC/DC	<b>AH165-2SZE□E</b>	
	Neon	110V AC	<b>AH165-2SZE□H1</b>	
		220V AC	<b>AH165-2SZE□M1</b>	

04

• 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

• Lamp voltage

Voltage other than above is 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

- The color lens is made of a tinted transparent material.
- A white lens is fitted with a transparent color lens.
- With wire-wrap pin terminals have a depth of 29mm.

# Pushbuttons/Selectors/Pilot Lights

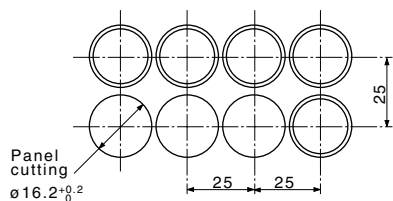
## AH165-2

### Mounting space

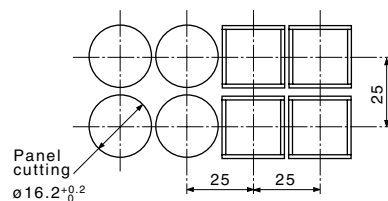
#### ■ Mounting space, mm

- Illuminated pushbuttons, pushbuttons, selector switches, illuminated selector switches and pilot lights

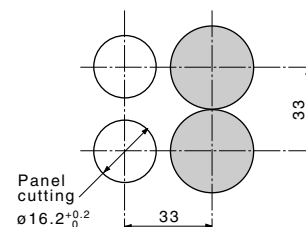
##### Round head



##### Square head



##### Mushroom head Push-lock, turn-reset



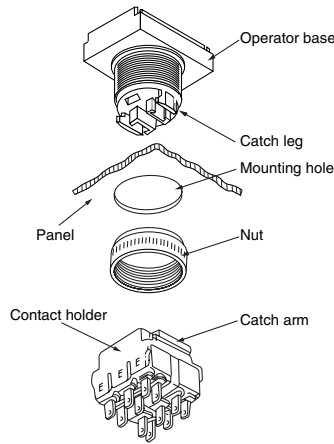
#### ■ Terminal number

Type	Wiring	Terminal position
Illuminated pushbuttons, Illuminated selector switches		
Pushbuttons Selector switches		
Pilot lights (without transformer)		

**Notes on use**

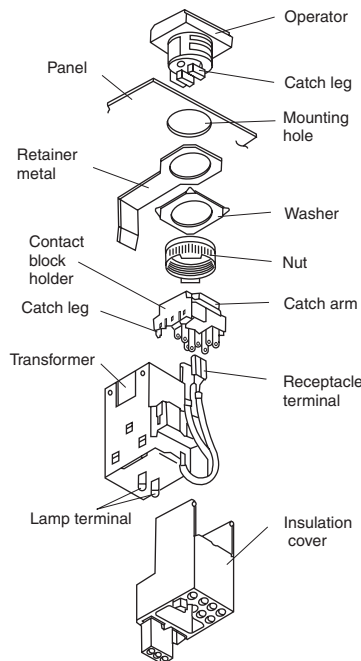
**■ Installation on panel**

- 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.

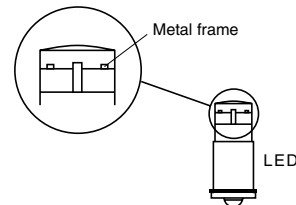
**■ Operating voltage and rated voltage of incandescent lamps**

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

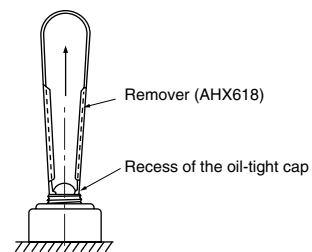
Incandescent lamps should be operated at the operating voltages if a lamp service life of 5,000 to 10,000 hours are needed. The ambient temperature must not exceed 30°C if the lamp is used at the rated voltage continuously.

**■ Method of replacing lamp**

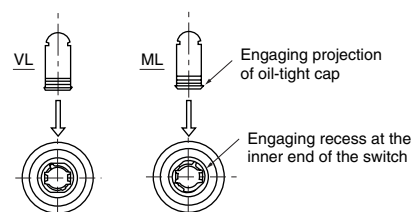
- Incandescent lamps/LED lamps/neon lamps  
 Remove the color lens and inner button with a remover AHX618. Then draw out the lamp with a lamp changer AHX672. When installing lamps, do it manually and in the reverse order of removing.
- Products with blue and green LEDs  
 The LED devices on products 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.

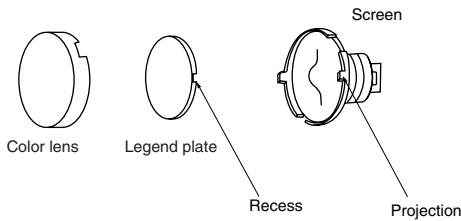
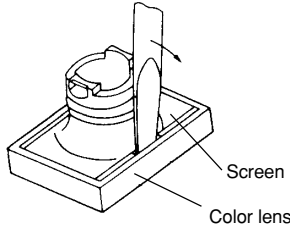
# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164, AH165 and AH165-2

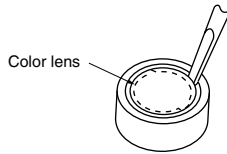
### Notes on use

#### ■ 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 25 $\mu$ m thick. If preparing custom description sheets, make sure that the thickness is 0.1mm or less.

#### ■ Contact block

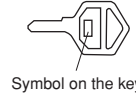
To replace a contact block, use removing tool AGX012. If excessive force is applied when attempting to open the support legs for the contact block holder, deformation or damage may occur.

#### ■ 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.

■ **LEDs**

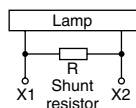
• **LED Lamp Malfunctioning**

The LED lamp is lit by a very small level of current (approximately 0.01mA). Therefore, 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**

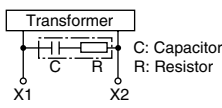
Shunt Resistor R or CR elements connected in parallel Lamp malfunctions can be prevented by connecting a shunt resistor (R) or CR elements (a capacitor and resistor) in parallel with the LED lamp terminal. The resistance and CR values vary depending on the model and the operating conditions.

Example 1



- 24V DC  
R: 10kΩ (1W)

Example 2



- 110V AC  
C: 0.33μF (250V AC)  
R: 120Ω (0.25W)
- 220V AC  
C: 0.33μF (250V AC)  
R: 120Ω (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 1,800Ω (2W).

■ **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.

■ **Numerical indicators**

To ensure high reliability and long life for the LED, design the circuit not to exceed the maximum ratings under any operating conditions.

- Keep in mind that the display may malfunction or be damaged due to noise in input signals. (TC type)
- Wire the TC type as shown on the nameplate. The IC may break if the supply voltage is connected in reverse.
- Keep in mind that the correct display will not appear with negative logic input because the TC type accepts positive logic input.

■ **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.

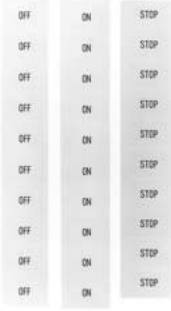











# Pushbuttons/Selectors/Pilot Lights/Buzzers


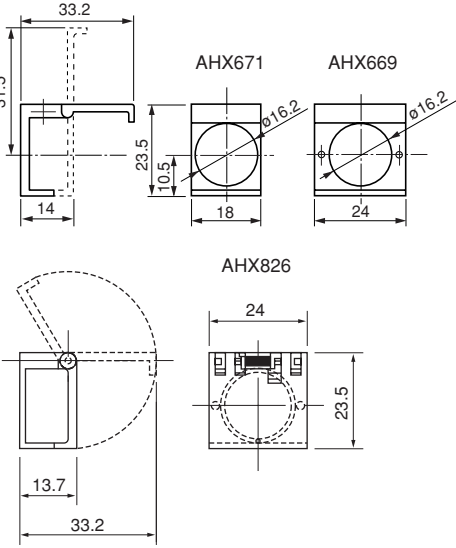



## AH164 and AH165

### Accessories

#### ■ Accessories for AH164 and AH165

Description	Type	
Color chips (Round)	Color	Type
 L, L5, E E5, Z	Green Red White (For Neon) Blue Yellow Orange Clear	<b>AHX631-G</b> <b>AHX631-R</b> <b>AHX631-W</b> <b>AHX631-S</b> <b>AHX631-Y</b> <b>AHX631-O</b> <b>AHX631-C</b>
SF-682 For LED, Neon	Green	<b>AHX653-G</b>
Color chips (Square)	Color	Type
 SL, SL5, SGL, SGL5, SF, SF5, SGF, SGF5, ZS	Green Red White (For Neon) Blue Yellow Orange Clear	<b>AHX632-G</b> <b>AHX632-R</b> <b>AHX632-W</b> <b>AHX632-S</b> <b>AHX632-Y</b> <b>AHX632-O</b> <b>AHX632-C</b>
SF-681 For LED, Neon	Green	<b>AHX653-SG</b>
Color chips (Rectangular)	Color	Type
 TL, TL5, TGL, TGL5, TF, TF5 TGF, TGF5, ZT	Green Red White (For Neon) Blue Yellow Orange Clear	<b>AHX633-G</b> <b>AHX633-R</b> <b>AHX633-W</b> <b>AHX633-S</b> <b>AHX633-Y</b> <b>AHX633-O</b> <b>AHX633-C</b>
SF-680 For LED, Neon	Green	<b>AHX653-TG</b>
Mushroom head button	Color	Type
 M, M5	Green Red White Blue Yellow Orange Black	<b>AHX682-G</b> <b>AHX682-R</b> <b>AHX682-W</b> <b>AHX682-S</b> <b>AHX682-Y</b> <b>AHX682-O</b> <b>AHX682-B</b>
SI-40		
Convex square head button	Color	Type
 SM, SM5	Green Red White Blue Yellow Orange Black	<b>AHX683-G</b> <b>AHX683-R</b> <b>AHX683-W</b> <b>AHX683-S</b> <b>AHX683-Y</b> <b>AHX683-O</b> <b>AHX683-B</b>
SI-43		
Convex rectangular head button	Color	Type
 TM, TM5	Green Red White Blue Yellow Orange Black	<b>AHX684-G</b> <b>AHX684-R</b> <b>AHX684-W</b> <b>AHX684-S</b> <b>AHX684-Y</b> <b>AHX684-O</b> <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	
SH-165	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.			
Legend plate (Acrylic resin)	Type	Color Dimensions, mm	
 Round	<b>AHX665</b> <b>AHX665-C</b> <b>AHX665-B</b>	White Transparent Black	ø12.2 x 0.9
 Square	<b>AHX666</b> <b>AHX666-C</b> <b>AHX666-B</b>	White Transparent Black	12.2sq. x 0.9
 Rectangular	<b>AHX667</b> <b>AHX667-C</b> <b>AHX667-B</b>	White Transparent 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> <b>AHX667-E</b>	
 Rectangular		<b>AHX666-H</b> <b>AHX667-H</b>	
 Square	⓪	<b>AHX666-T</b> <b>AHX667-T</b>	
 Rectangular			
AF87-74			


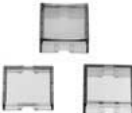



Description	Type															
<p>Protection cover</p>  <p>SM-378</p>	<p>For round and square head button            Type: <b>AHX671</b></p> <p>For rectangular head button            Type: <b>AHX669</b>  <b>AHX826</b></p> <p>This cover protect against accidental operation.            Note: Not used 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>\phi 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>\phi 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	$\phi 21$ x 12	<b>AHX676-GY</b>	Gray							
Type	Color	Dimensions, mm														
<b>AHX676-B</b>	Black	$\phi 21$ 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>	
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>															

# 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
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>													
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
Color	Type													
Green	<b>AHX2606-G</b>													
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Blue	<b>AHX2606-S</b>													
Orange	<b>AHX2606-O</b>													
Clear	<b>AHX2606-C</b>													
Mushroom head button 	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
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Blue	<b>AHX2605-S</b>													
Orange	<b>AHX2605-O</b>													
Clear	<b>AHX2605-C</b>													
Mushroom head button 	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
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Blue	<b>AHX2607-S</b>													
Orange	<b>AHX2607-O</b>													
Clear	<b>AHX2607-C</b>													
Mushroom head button 	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
Color	Type													
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


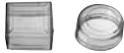

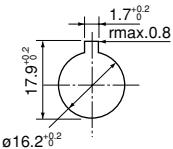
Description	Type															
Legend plate 	For flush head															
	<table border="0"> <tr> <td>Color</td> <td>Type</td> <td>Used with</td> </tr> <tr> <td>White</td> <td><b>AHX2609-W</b></td> <td>Incandescent lamp, LED lamp, Pushbutton *<sup>1</sup></td> </tr> <tr> <td>Clear</td> <td><b>AHX2609-C</b></td> <td>Neon lamp *<sup>2</sup></td> </tr> <tr> <td>Black</td> <td><b>AHX2609-B</b></td> <td>Pushbutton *<sup>3</sup></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 * <sup>1</sup>	Clear	<b>AHX2609-C</b>	Neon lamp * <sup>2</sup>	Black	<b>AHX2609-B</b>	Pushbutton * <sup>3</sup>			
Color	Type	Used with														
White	<b>AHX2609-W</b>	Incandescent lamp, LED lamp, Pushbutton * <sup>1</sup>														
Clear	<b>AHX2609-C</b>	Neon lamp * <sup>2</sup>														
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Mushroom head button 	For extended head															
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Black	<b>AHX2610-B</b>	Pushbutton * <sup>3</sup>														
Mushroom head button 	For flush square															
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Black	<b>AHX2611-B</b>	Pushbutton * <sup>3</sup>														
Mushroom head button 	For extended square, concave square															
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Mushroom head button 	For illuminated pushbuttons (Used with 2ML, 2YML)															
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Blue	<b>AHX2614-S</b>															
Orange	<b>AHX2614-O</b>															
Mushroom head button 	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
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Black	<b>AHX2613-B</b>															

AF87-631

AF87-630








AF87-633


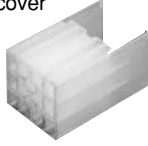






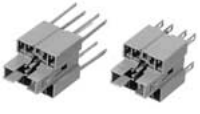
Description	Type																				
<p>Push-lock, turn-reset button</p>  <p>AF87-634</p>	<p>For illuminated pushbuttons (Used with 2VL, 2YVL)</p> <table border="0"> <tr> <td>Color</td> <td>Type</td> </tr> <tr> <td>Green</td> <td><b>AHX2616-G</b></td> </tr> <tr> <td>Red</td> <td><b>AHX2616-R</b></td> </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>
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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> 																				

# Pushbuttons/Selectors/Pilot Lights/buzzers AH164, AH165 and AH165-2 Accessories

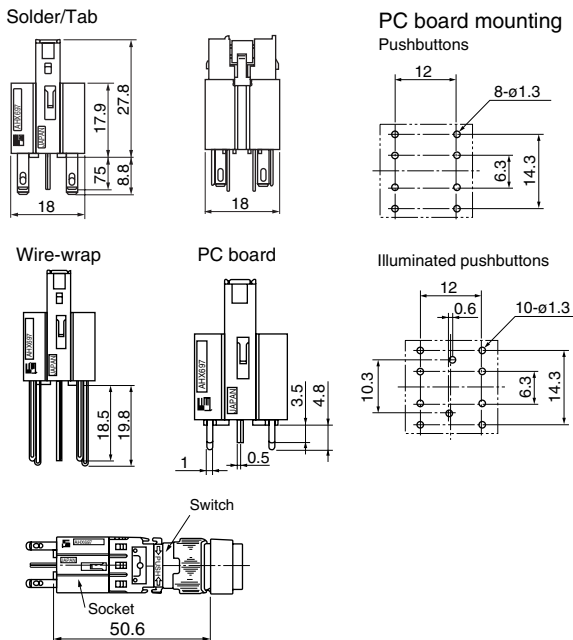
## ■ Accessories for AH164, AH165 and AH165-2

Description	Type		
Incandescent lamp  <small>SD-924</small>	Voltage	Type	
	6V, 0.6W	<b>AHX641</b>	
	14V, 0.7W	<b>AHX642</b>	
	28V, 0.7W	<b>AHX643</b>	
LED lamp  <small>AF02-116</small>	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)		
Neon lamp  <small>SP-119</small>	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
Panel plug  <small>SI-186</small>	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
Lamp changer  <small>AF02-117</small>	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.		
Remover  <small>SE-34</small>	Type: <b>AHX618</b>		
	This tool is used for replacing the color chips or screens.		
Contact holder remover  <small>SP-522</small>	Type: <b>AHX699</b>		
	This tool is used to remove a contact holder when switches are densely installed.		

Description	Type	
Wrench  <small>SE-741</small>	Type: <b>AHX601</b>	
	When installing a command switch on a panel, this tool is useful for tightening the switch firmly and efficiently.	
Terminal cover  <small>AF87-637</small>	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.	
Contact block  <small>SK-1140</small>	Terminal	Type
	Solder/Tab	<b>AGX001</b>
	Wire-wrap	<b>AGX001-W</b>
Dummy unit  <small>SK-1141</small>	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.	
Remover  <small>SM-334</small>	Type: <b>AGX012</b>	
	This tool is used for replacing the contact blocks or dummy units.	

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	<ul style="list-style-type: none"> <li>• Contact arrangement is 2NO+2NC only.</li> <li>• These sockets are used only when LED lamps rated for 24V DC are used under 110V AC/DC.</li> <li>• Except for AH164, 165 and 165-2 series pilot lights or AH165-2PL type.</li> <li>• When side-by-side mounting and continuous lighting, note that a socket has higher temperature over the ambient temperature.</li> </ul>		

Dimensions, mm



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.	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 0.4mm and 0.5mm dia. wires.

# Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164, AH165 and AH165-2

### Mass

#### ■ 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	16.4	17.4	18.4
P3,P6,P7,P1	-	17.4	18.4
PK3,PK6,PK7,PK1	-	17.4	18.4
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	30.4	31.4	32.4
J3,J6,J7,J1	-	31.6	32.6
JK3,JK6,JK7,JK1	-	31.6	32.6
SJ2,SJ0	29.8	30.8	31.8
SJ3,SJ6,SJ7,SJ1	-	30.8	31.8
SJK3,SJK6,SJK7,SJK1	-	30.8	31.8
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	13.2		
AH164-TS	9.7		
TC	15.6		
TC4□E-□K1	46.4		
TC4□E-□K	52.8		

##### 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 <sup>*1</sup>	14 <sup>*2</sup>	-
V1R	14.3 <sup>*1</sup>	14.9 <sup>*2</sup>	-
AH165-V5R	18 <sup>*1</sup>	18.6 <sup>*2</sup>	-
V6R	18.9 <sup>*1</sup>	19.5 <sup>*2</sup>	-
AH165-P2,P0	16.7	17.7	18.7
P3,P6,P7,P1	-	17.7	18.7
PK3,PK6,PK7,PK1	-	18	19
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	31.1	32.1	33.1
J3,J6,J7,J1	-	32.1	33.1
JK3,JK6,JK7,JK1	-	32.1	33.1
SJ2,SJ0	30.5	31.5	32.5
SJ3,SJ6,SJ7,SJ1	-	31.5	32.5
SJK3,SJK6,SJK7,SJK1	-	31.5	32.5
AH165-JM2	30	34.4	-
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	13.6		
AH165-TS	9.7		
TC	15.6		
TC4□E-□K1	46.4		
TC4□E-□K	52.8		

Note: <sup>\*1</sup> For 1NC  
<sup>\*2</sup> For 2NC

■ Mass, gram  
**AH165-2 series**

Type	1NO + 1NC	2NO + 2NC	3NO + 3NC
AH165-2FL,FL5	15.2	16.2	17.2
2EL,EL5	15.6	16.6	17.6
2ML	18.7	19.7	20.7
2YML	20.2	21.2	22.2
2SFL,SFL5	16.5	17.5	18.5
2SEL,SEL5	17.4	18.4	19.4
2SCL,SCL5	17.6	18.6	19.6
2VL	19.9	20.9	21.9
2YVL	21.4	22.4	23.4
AH165-2F,F5	14.4	15.4	16.4
2E,E5	14.8	15.8	16.8
2M	16.7	17.7	18.7
2YM	18.2	19.2	20.2
2SF,SF5	14.5	15.5	16.5
2SE,SE5	15.4	16.4	17.4
2SCE,SCE5	15.6	16.6	17.6
2S2	-	19	-
2YS2	-	20.6	-
2V	17.9	18.9	19.9
2YV	19.4	20.4	21.4
AH165-2P2,P0	17.1	18.1	19.1
2P3,P6,P7,P1	-	18.1	19.1
2YP2,YP0	18.7	19.7	20.7
2YP3,YP6,YP7,YP1	-	19.7	20.7
2J2,J0	40	41	42
2J3,J6,J7,J1	-	41	42
2YJ2	41.6	42.6	43.6
2YJ3,YJ6,YJ7,YJ1	-	42.6	43.6
2H	14.3	15.3	16.3
2SH	16.1	17.1	18.1
AH165-2PL2	17.3	18.3	-
2PL3	-	18.3	-
AH165-2Z	9.7		
2ZE	10.1		
2SZ	10.9		
2SZE	11.4		