#### Pushbuttons/Selectors/Pilot Lights/Buzzers

#### AH164, AH165 and AH165-2 General information

#### ■ Features Design basis

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

#### Selector switches

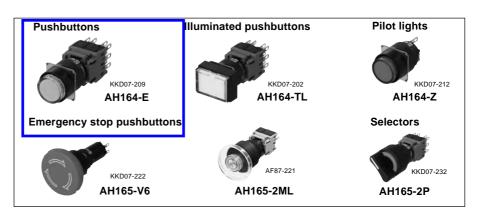
Selector switches can also be supplied in either knob-handle operated or key operated types.

#### **Strong construction**

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

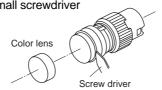
#### **Quality feel tough**

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



#### Easy color change

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



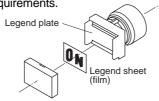
Note: The luminous color of LEDs and neon illumination types varies with the body color of the product.

#### Visible inscription

Button legends are printed on legend sheet, which is stuck to the legend plate on the inner button.

The lettering is back lit by the switch lamp and the inscription is highly visible through the color lens.

Contact FUJI for your lettering requirements.

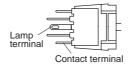


#### **Excellent switch reliability**

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

#### Large terminals

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



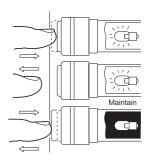
#### Safety

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

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

#### Alternate action

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



#### Pushbutton with finger guards

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

#### **Approvals**



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

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

#### ■ Illuminated pushbutton switches

Operator	Туре	Operator	Туре	Operator	Туре
Extended round head	AH164-L, L5 AH165-L, L5	Flush square head	AH164-SL, SL5 AH165-SL, SL5	Flush rectangular head	AH164-TL, TL5 AH165-TL, TL5
See page 04/195 <b>₹1</b> ° <b>6</b> ° <u>△</u> <b>( € (</b> (()	KKD07-205	See page 04/195 <b>91°                                    </b>	KKD07-204	See page 04/195 <b>R G L L L L L L L</b>	KKD07-202
Flush rectangular head with guard	AH164-TGL, TGL5 AH165-TGL, TGL5	Flush square head with guard	AH164-SGL, SGL5 AH165-SGL, SGL5		
See page 04/196 <b>₹1 ( ( ( ( ( ( ( ( ( (</b>	KKD07-203	See page 04/196 <u>▲</u> ( € (((()))	KKD05-075b		

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

#### ■ Pushbutton switches

Operator	Туре	Operator	Туре	Operator	Туре
Extended round head	AH164-E, E5 AH165-E, E5	Mushroom head	AH164-M, M5 AH165-M, M5	Flush square head	AH164-SF, SF5 AH165-SF, SF5
See page 04/199		See page 04/199		See page 04/199	
<b>71</b> ° <b>6</b> ° & ( <b>6</b> ((())	KKD07-209	<b>71 6 6</b> (6 ((())	KKD07-210	<b>71</b> ° <b>@</b> . 🚣 ( <b>E</b> ((())	KKD07-208
Flush rectangular head	AH164-TF, TF5 AH165-TF, TF5	Flush rectangular head with guard	AH164-TGF, TGF5 AH165-TGF, TGF5	Flush square head with guard	AH164-SGF, SGF5 AH165-SGF, SGF5
	30				200
See page 04/199		See page 04/199		See page 04/199	
<b>71</b> ° <b>6</b> ° 🚣 ( <b>6</b> 📖	KKD07-206	<b>9 6 4</b> (6 <b>6</b>	KKD05-176	<u></u>	KKD05-075b
Convex square head	AH164-SM, SM5 AH165-SM, SM5	Convex rectangular head	AH164-TM, TM5 AH165-TM, TM5	Push-lock, turn-reset (32mm dia.)	AH165-VR
				⊕ (Direct opening action)	
See page 04/199		See page 04/199		See page 04/200	
<b>91 @</b> <u>A</u> ( <b>E</b> ((()	KKD05-081b	<b>9 4 6 6</b>	KKD05-082b	<b>71</b> ° <b>6</b> ° <u>A</u> ( <b>6</b> ((())	AF91-584
Push-lock, turn-reset (40mm dia.)	AH165-V1R				
⊕ (Direct opening action)					
See page 04/200					
<b>71</b> ° <b>(</b> ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	AF91-583				

#### ■ Emergency stop pushbutton switches ⊕ (Direct opening action), conform to EN418

= = mor goney orop p	aciibattoii ciritoiico	C (Birost opening deticity), comonin to Entito			
Operator	Туре	Operator	Туре		
Push-lock, turn-reset (32mm dia.)	AH165-V5R	Push-lock, turn-reset (40mm dia.)	AH165-V6R		
See page 04/200		See page 04/200			
<b>R &amp;</b> ( <b>( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (</b>	KKD07-221	<b>71 6</b> <u>A</u> ( <b>6 (</b>	KKD07-222		

Note: ((C): See page 04/292

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

#### ■ Selector switches

Operator	Туре	Operator	Туре	Operator	Туре
Knob with rectangular bezel	AH164-P AH165-P	Knob with square bezel	AH164-SP AH165-SP	Key with rectangular bezel	AH164-J AH165-J
See page 04/201 <b>91°                                    </b>	KKD07-213	See page 04/201 <b>\$\$\text{\$\ext{\$\text{\$\text{\$\text{\$\exittit{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\exittit{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\exittit{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\exittit{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\exittit{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\exittit{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\ext{\$\exittitt{\$\ext{\$\exittitt{\$\ext{\$\ext{\$\ext{\$\exittit{\$\exittitt{\$\ext{\$\exittit{\$\exittit{\$\exittit{\$\ext{\$\exittit{\$\exittit{\$\exittit{\$\exittit{\$\exittit{\$\exittit{\$\exittit{\$\exittit{\$\exittit{\$\exittit{\$\exittittit{\$\exittit{\$\exittit{\$\exittit{\$\exittittit{\$\exittit{\$\et</b>	KKD07-215	See page 04/201 <b>71°                                    </b>	KKD09-001L
Key with square bezel	AH164-SJ AH165-SJ	Key with rectangular bezel	AH165-JM	Key	AH165-RJM
	A11103-00	⊕ (Direct opening action)		⊕ (Direct opening action)	
See page 04/201, 04/204		See page 04/202		See page 04/202	
<b>91</b> ° <b>6</b> ° <u>A</u> ( <b>6 ((()</b>	KKD09-001R	<b>91 (</b> ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	KKD09-006	<b>71</b> ° <b>(</b> ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	KKD09-007

#### ■ Pilot lights

Lens	Туре	Lens	Туре	Lens	Туре
Extended round	AH164-Z AH165-Z	Flush square	AH164-ZS AH165-ZS	Flush rectangular	AH164-ZT AH165-ZT
See page 04/206		See page 04/206		See page 04/206	
<b>91</b> ° <b>6</b> ° <u>A</u> ( <b>6 (((</b> ))	KKD07-212	<b>71 @</b> <u>A</u> ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	KKD05-094b	<b>71 @</b> <u>A</u> ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	KKD07-211
Dome	AH165-ZM				
See page 04/206					
<b>91</b> ° <b>6</b> ° 🚣 ( (	AF87-45				

#### **■** Buzzers

Sound	Туре	Sound	Туре	Sound	Туре
Standard	AH164-TX	Loud sound	AH164-TX1	Loud sound with volume control	AH164-TX2B
See page 04/208	10. 11. 10. 11.	See page 04/208	4.4.4	See page 04/208	0.10
	AF87-317		AF87-44	<b>71</b> ° <b>6</b> ° 🚣 ( <b>6</b>	KKD07-223
Standard sound with volume control (IP54)	AH165-X				
See page 04/208					
<b>71°                                    </b>	KKD05-096b				

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

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

#### ■ Illuminated pushbutton switches

Operator	Туре	Operator	Туре	Operator	Туре
Flush round head	AH165-2FL, 2FL5	Extended round head	AH165-2EL, 2EL5	Mushroom head	AH165-2ML
See page 04/213		See page 04/213		See page 04/213	
<b>71</b> ° <b>(</b> ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	AF87-211	<b>92 6 6 6</b>	AF87-210	<b>91</b> ° <b>@</b> <u>&amp;</u> ( <b>(</b> ((()	AF87-221
Mushroom head with square bezel	AH165-2YML	Flush square head	AH165-2SFL, 2SFL5	Extended square head	AH165-2SEL, 2SEL5
See page 04/213		See page 04/214		See page 04/214	
<b>71</b> ° <b>(</b> ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	AF87-220	<b>7 3 4 3 4</b>	AF87-201	<b>71 6 4</b> ( <b>6 ( ( ( ( ( ( ( ( ( (</b>	AF87-200
Concave square head	AH165-2SCL, 2SCL5	Push-lock, turn-reset	AH165-2VL	Push-lock, turn-reset with square bezel	AH165-2YVL
See page 04/214		See page 04/215		See page 04/215	
<b>71</b> ° <b>@</b> 🚣 ( <b>(</b> ((()))	AF87-199	<b>71 6</b> <u>A</u> ( € ((())	AF87-219	<b>71</b> ° <b>6</b> ° <u>A</u> ( <b>6</b> ((())	AF87-218

Note: ((C): See page 04/292

#### ■ Pushbutton switches

Operator	Туре	Operator	Туре	Operator	Туре
Flush round head	AH165-2F, 2F5	Extended round head	AH165-2E, 2E5	Mushroom head	AH165-2M
			~		
See page 04/216		See page 04/216		See page 04/216	O Marie
<b>71</b> ° <b>(</b> ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	AF87-211	<b>71</b> ° <b>@</b> <u>&amp;</u> ( <b>(</b> ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	AF87-210	<b>71</b> ° <b>@</b> <u>&amp;</u> ( <b>(</b> ( ( ( ( )	AF87-215
Mushroom head with square bezel	AH165-2YM	Flush square head	AH165-2SF, 2SF5	Concave square head	AH165-2SCE, 2SCE5
oquare pozer					
See page 04/216		See page 04/216		See page 04/216	
<b>71</b> ° <b>6</b> ° 🚣 ( <b>6</b> 📖	AF87-214	<b>71</b> ° <b>6 4</b> ( € <b>((()</b>	AF87-201	<b>71</b> ° <b>6</b> ° <u>4</u> ° ( <b>6</b> ° ( <b>10</b> ° )	AF87-199
Extended square head	AH165-2SE, 2SE5	With selector ring	AH165-2S2	With selector ring with square bezell	AH165-2YS2
See page 04/216		See page 04/217		See page 04/217	O
<b>71 6</b> <u>4</u> ( <b>6 (</b>	AF87-200	<b>71'                                    </b>	AF87-207	<b>7 6 4</b> (6 <b>((()</b>	AF87-206
Push-lock, turn-reset	AH165-2V	Push-lock, turn-reset with square bezel	AH165-2YV		
	70		200		
See page 04/217		See page 04/217			
<b>71</b> ° <b>6</b> ° 🚣 ( ( ( (()	AF87-217	<b>% &amp;</b> ( <b>( ( ( )</b>	AF87-216		

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

#### ■ Selector switches

Operator	Туре	Operator	Туре	Operator	Туре
Knob	AH165-2P	Knob with square bezel	AH165-2YP	Key	AH165-2J
See page 04/218 <b>91°                                    </b>	KKD07-232	See page 04/218 <b>91</b>	KKD07-234	See page 04/218 <b>₹1 6</b> △ <b>( ( ( ( ( ( ( ( ( (</b>	ККD09-003L
Key with square bezel	AH165-2YJ	Lever	AH165-2H	Lever with square bezel	AH165-2SH
See page 04/218 <b>₹1 6</b> △ <b>( € (((())</b>	KKD09-003R	See page 04/219	AF87-209	See page 04/219 <b>N°</b>	AF87-203

#### ■ Illuminated selector switches

Operator	Туре
Knob	AH165-2PL
See page 04/221	
<b>71</b> ° <b>6</b> ° 🔬 ( <b>6 (((()</b>	KKD07-240

#### ■ Pilot lights

Lens	Туре	Lens	Туре	Lens	Туре
Flush round	AH165-2Z	Extended round	AH165-2ZE	Flush square	AH165-2SZ
See page 04/222 <b>**** ** ** * * * * * *</b>	AF87-213	See page 04/222 <b>¬ • • • • • • • • • •</b>	AF87-212	See page 04/222 <b>*** ** * * * * * * * </b>	AF87-205
Extended square	AH165-2SZE				
See page 04/222  \$\mathbb{A}\times \times \times (\begin{center} \tilde{\times} \tilde{\times} \times \tilde{\times} \tilde{\times} \tilde{\times} \tilde{\times} \tilde{\times} \tilde{\times} \times \tilde{\times} \times \time	AF87-204				

Note: ((C): See page 04/292

### ■ Type number nomenclature

#### Pushbuttons, illuminated pushbuttons and pilot lights

 $\frac{\textbf{AH165}}{\textcircled{1}} \cdot \frac{\textbf{L}}{\textcircled{2}} \ \frac{\textbf{R}}{\textcircled{3}} \ \frac{\textbf{11}}{\textcircled{4}} \ \frac{\textbf{E}}{\textcircled{5}} \ \frac{\textbf{3}}{\textcircled{6}} - \frac{\textbf{W}}{\textcircled{7}}$ 

#### 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) TI: Flush rectangular head

Flush rectangular head (Alternate) TL5:

1: 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)

F: Extended round head

Extended round head (Alternate) E5: Flush rectangular head with guard TGF:

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)

Convex rectangular head TM:

Convex rectangular head (Alternate) TM5: V: Push-lock, turn-reset (32mm dia.)\*1 \*2 Push-lock, turn-reset (40mm dia.)\*1 \*2 V1:

#### • Operator for emergency stop pushbuttons

Push-lock, turn-reset (32mm dia.)\*2 V5: 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	0	0	0	0
R	Red	0	0	0	O (Orange)
В	Black*	0	_	_	_
Υ	Yellow	0	0	0	O (Orange)
W	White	0	O (Orange)	0	O (Orange)
S	Blue	0	0	0	○ (Green)
0	Orange	0	O (Amber)	0	0
RG	Red/Green	_	0	_	_

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

#### ⑤ Lamp voltage

Code	LED	Incandescent*2	Neon*2
AA	5V DC*2	_	_
Α	6V DC*2	5V AC/DC	_
В	12V DC	12V AC/DC	_
E	24V DC	24V AC/DC	_
Н	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
Р	_	_	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 W٠ Wire-wrap

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

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

<sup>\*2</sup> Not available for with transformer types

#### Pushbuttons/Selectors/Pilot Lights/Buzzers

#### **AH164 and AH165**

#### Type number nomenclature

#### **■** Type number nomenclature

#### Selector switches

 $\frac{\textbf{AH165}}{\textcircled{1}} - \frac{\textbf{J}}{\textcircled{2}} \ \frac{\textbf{2}}{\textcircled{3}} \ \frac{\textbf{B}}{\textcircled{4}} \ \frac{\textbf{11}}{\textcircled{5}} \ \frac{\textbf{A}}{\textcircled{6}} - \frac{\textbf{W}}{\textcircled{7}}$ 

#### Product category

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

#### ② Operator

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

SP: Knob with square bezelP: Knob with rectangular bezelSJ: Key with square bezelJ: 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-pos (oper	sition ating a	angle 4	l5°)	
	2	0	1	3	6	7	1	3	6	7
Α	ᢐ	0	_	$\Theta$	-	$\Theta$	-	0	_	0
В	⊗	_	_	$\Theta$	-	-	-	⊗	_	_
С	_	_	_	<b>⊕</b>	-	-	-	\\$	_	_
D	Ø	_	_	$\Theta$		-	-	Ø		_
E	_	_	1				1			
F	_	_	_	_	-	-	_	<b>②</b>		_
G	_	_	_	_	ı	-	_	•	_	ூ

#### **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 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\*<sup>2</sup>
ADC: 6V DC\*<sup>2</sup>
A: 6V AC/DC\*<sup>1</sup>
E: 12 to 24V AC/DC
F: 35 to 48V AC/DC

Notes: \*1 Except for TX and TX1 types

 $^{\star_2}\,$  Except for TX2 and X types

#### Pushbuttons/Selectors/Pilot Lights/Buzzers **AH164** and **AH165 Ratings and specifications**

#### ■ Standards approved

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

#### ■ Specifications (Indoor use)

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

· · ·	O			
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 condensation or no i			
Durability (operations) Mechanical Electrical	Pushbutton switch Momentary action: 1 million Alternate action: 250,000 Push-lock, turn-reset: 100,000 Selector switch: 250,000 *3 100,000 (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> * <sup>6</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)			
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
  - $^{\star 5}\,$  Emergency stop type: 10 to 500Hz, double amplitude 0.7mm (acceleration 50m/s²), according to the test condition of EN60947-5-5 (1998)
  - \*6 Emergency stop type:150m/s²

#### Buzzers

- Duzzoio				
Item	AH164-TX	AH164-TX1		
Rated insulation voltage	60V AC/DC			
Operating voltage	6V AC, 6V DC,12 to 35 to 48V AC/DC	24V 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/m	inute		
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	ı		
Insulation resistance	100M $\Omega$ or more (500V DC megger)			
Ambient temperature	-20 to +60°C (no condensation or no icir			
Humidity	45 to 85%RH (at -5	i to +40°C)		
Operator protection	IP00			
Item	AH164-TX2	AH165-X		
Rated insulation voltage	60V AC/DC			
Operating voltage	6V AC/DC, 12 to 24 35 to 48V AC/DC	V 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/m	inute		
Current consumption	30mA (6V DC) 20mA (24, 48V DC) 40mA (6, 24, 48V AC)			
Dielectric strength	1000V AC, 1 minute	ı		
Insulation resistance	100M $\Omega$ or more (50	OV DC megger)		
Ambient temperature	-20 to +60°C (no cor	densation or no icing)		
Humidity	45 to 85%RH (at -5	5 to +40°C)		
Degree of protection	IP00	IP54		
	•			

#### Pushbuttons/Selectors/Pilot Lights/Buzzers

#### **AH164 and AH165 Ratings and specifications**

#### **■** Contact ratings

#### UL/CSA standards

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

#### • EN standards (TÜV approved)

Rated thermal	Rated operational	Rated operational current						
current	voltage	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

Consumption					
LED DC	Incandescent AC/DC	Neon AC			
7mA (Yellow: 28mA)	0.45W (6V)	_			
7mA (Yellow: 28mA)	_	_			
7mA	0.55W (14V)	-			
7mA	0.55W (28V)	-			
_	_ ` ` `	0.19VA			
_	_	0.21VA			
_	_	0.38VA			
_	_	0.42VA			
	LED DC 7mA (Yellow: 28mA) 7mA (Yellow: 28mA) 7mA	LED Incandescent AC/DC  7mA (Yellow: 28mA) 0.45W (6V) - 0.55W (14V)			

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

- With transformer (Incandescent): 2VA/110, 220V
- For the incandescent lamps, the values in parentheses indicate the rated voltage of the lamps.

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

#### ■ Illuminated pushbutton switches/without transformer

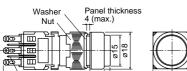
Operator	Lamp	Voltage	Contact	Momentary action		Alternate action	
				AH164 type	AH165 (Oil-tight) type	AH164 type	AH165 (Oil-tight) type
Extended round head	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	AH164-L□11E3 AH164-L□22E3 AH164-L□33E3	AH165-L□11E3 AH165-L□22E3 AH165-L□33E3	AH164-L5□11E3 AH164-L5□22E3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

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

#### **AH164 and AH165**

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

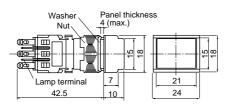
#### **■** Dimensions, mm



L, L5

TL, TL5

Lamp terminal 42.5 10

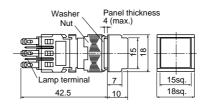


#### Button color

Color	Green	Red	White	Yellow	Blue	Orange
Code	G	R	W	Υ	S	0

- 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.

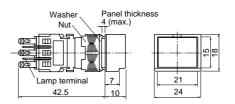
#### SL, SL5



TGL, TGL5 SGL, SGL5

15sq.

18sq.



#### • Lamp voltage

Voltages other than above are available

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

#### ■ Illuminated pushbutton switches/with transformer

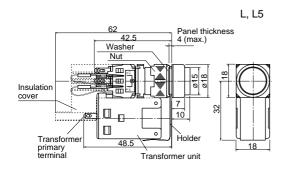
Operator	Lamp	Voltage	Contact	Momentary action		Alternate action	
				AH164 type	AH165 (oil-tight) type	AH164 type	AH165 (oil-tight) type
Extended round head	Flat LED	■ Voltage code	1NO+1NC	AH164-L□11 <b>■</b> 3	AH165-L□11 <b>■</b> 3	AH164-L5□11 <b>■</b> 3	AH165-L5□11 <b>■</b> 3
		H: 100-110V	2NO+2NC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

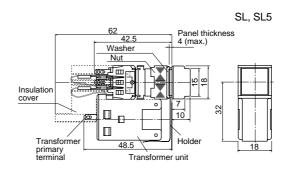
Note: Replace the  $\square$  mark by the button color code, see page 04/198.

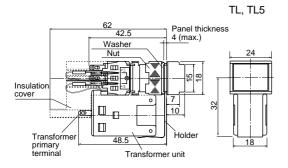
#### Illuminated Pushbuttons

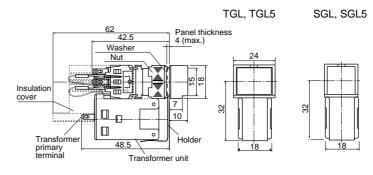
#### **AH164 and AH165**

#### **■** Dimensions, mm









#### Button color

Color	Green	Red	White	Yellow	Blue	Orange
Code	G	R	W	Υ	S	0

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

#### ■ Pushbutton switches

■ Pushbutton switche	es					
Operator	Contact	Momentary action	on	Alternate action		Dimensions, mm
		AH164 type A	AH165 (oil-tight) type	AH164 type Al	H165 (oil-tight) type	
Extended round head	1NO+1NC	AH164-E□11	AH165-E□11	AH164-E5□11	AH165-E5□11	Washer Panel thickness Nut 4 (max.)
	2NO+2NC	AH164-E□22	AH165-E□22	AH164-E5□22	AH165-E5□22	
KKD07-209	3NO+3NC	AH164-E□33	AH165-E□33	AH164-E5□33	AH165-E5□33	7 18sq. 11
Flush square head	1NO+1NC	AH164-SF⊡11	AH165-SF⊡11	AH164-SF5□11	AH165-SF5⊡11	Washer Panel thickness Nut 4 (max.)
	2NO+2NC	AH164-SF□22	AH165-SF□22	AH164-SF5□22	AH165-SF5□22	
KKD07-208	3NO+3NC	AH164-SF□33	AH165-SF□33	AH164-SF5□33	AH165-SF5□33	42.5 10 15sq. 18sq.
Flush rectangular head	1NO+1NC	AH164-TF□11	AH165-TF□11	AH164-TF5□11	AH165-TF5□11	Washer Panel thickness Nut, \ 4 (max.)
	2NO+2NC	AH164-TF□22	AH165-TF□22	AH164-TF5□22	AH165-TF5□22	
KKD07-206	3NO+3NC	AH164-TF□33	AH165-TF□33	AH164-TF5□33	AH165-TF5□33	42.5 10 21 24
Flush rectangular head with guard	1NO+1NC	AH164-TGF⊡11	AH165-TGF□11	AH164-TGF5□11	AH165-TGF5□11	Washer Panel thickness Nut 4 (max.)
	2NO+2NC	AH164-TGF□22	AH165-TGF□22	AH164-TGF5□22	2 AH165-TGF5□22	
KKD05-176	3NO+3NC	AH164-TGF□33	AH165-TGF□33	AH164-TGF5□33	3 AH165-TGF5□33	42.5
Flush square head with guard	1NO+1NC	AH164-SGF⊡11	AH165-SGF□11	AH164-SGF5□11	I AH165-SGF5□11	Washer Panel thickness Nut 4 (max.)
	2NO+2NC	AH164-SGF□22	AH165-SGF□22	AH164-SGF5□22	2 AH165-SGF5□22	
KKD05-075b	3NO+3NC	AH164-SGF⊟33	AH165-SGF□33	AH164-SGF5□33	3 AH165-SGF5□33	42.5 10 15sq. 18sq.
Mushroom head	1NO+1NC	AH164-M□11	AH165-M□11	AH164-M5□11	AH165-M5□11	Washer Panel thickness Nut 4 (max.)
	2NO+2NC	AH164-M□22	AH165-M□22	AH164-M5□22	AH165-M5□22	
KKD07-210	3NO+3NC	AH164-M□33	AH165-M□33	AH164-M5□33	AH165-M5□33	42.5 16.5
Convex square head	1NO+1NC	AH164-SM□11	AH165-SM⊡11	AH164-SM5□11	AH165-SM5□11	Washer Panel thickness Nut 4 (max.)
	2NO+2NC	AH164-SM□22	AH165-SM□22	AH164-SM5□22	AH165-SM5□22	8.49
KKD05-081b	3NO+3NC	AH164-SM□33	AH165-SM□33	AH164-SM5□33	AH165-SM5□33	42.5 16.5
Convex rectangular head	1NO+1NC	AH164-TM□11	AH165-TM□11	AH164-TM5□11	AH165-TM5□11	Washer Panel thickness Nut 4 (max.)
	2NO+2NC	AH164-TM□22	AH165-TM□22	AH164-TM5□22	AH165-TM5□22	
KKD05-082b	3NO+3NC	AH164-TM□33	AH165-TM□33	AH164-TM5□33	AH165-TM5□33	42.5 16.5 23.5

#### Button color

Replace the  $\square$  mark by the following color code

Color	Green	Red	Black	White	Blue	Yellow	Orange
Code	G	R	В	W	S	Υ	0

- 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
- 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.)	Red	1NC	Solder/Tab Solder	AH165-VR01 (AH165-VR01-S)	Panel thickness 4 (max.)
AF91-584		2NC		AH165-VR02 (AH165-VR02-S)	15.5 15 24.5 *(20)
Push-lock, turn-reset (40mm dia.)		1NC		AH165-V1R01 (AH165-V1R01-S)	Panel thickness 4 (max.)
AF91-583		2NC		AH165-V1R02 (AH165-V1R02-S)	15.5 15 24.5 1(20)

- 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.)	Red	1NC	Solder/Tab Solder	AH165-V5R01 (AH165-V5R01-S)	Washer Panel thickness 6 (max.)
KKD07-221		2NC		AH165-V5R02 (AH165-V5R02-S)	33 42 (37.5)
Push-lock, turn-reset (40mm dia.)		1NC		AH165-V6R01 (AH165-V6R01-S)	Washer Panel thickness 6 (max.)
KKD07-222		2NC		AH165-V6R02 (AH165-V6R02-S)	33 42 24.5

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

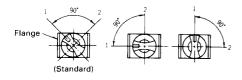
• Contact arrangements indicated in the table can be supplied.

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

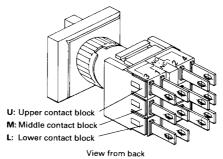
Operator	· ·	<u> </u>	Contact	A11464 + :	ALIAGE	Dimensions mm
Operator	Operation	Key removable position	Contact	AH164 type	AH165 (oil-tight) type	Dimensions, mm
Knob with	Maintained		1NO+1NC	AH164-P2B11	AH165-P2B11	Washer Panel thickness (42)
rectangular bezel		_	2NO+2NC	AH164-P2B22	AH165-P2B22	Washer Panel thickness \$\phi 18\$  Nut \$\frac{4}{4}\$ (max.) \$\phi 18\$
			3NO+3NC	AH164-P2B33	AH165-P2B33	
	Spring		1NO+1NC	AH164-P0B11	AH165-P0B11	
	return 🗑	_	2NO+2NC	AH164-P0B22	AH165-P0B22	8.5
KKD07-213			3NO+3NC	AH164-P0B33	AH165-P0B33	42.5 18.5 24
Knob with square	Maintained		1NO+1NC	AH164-SP2B11	AH165-SP2B11	Panel thickness
bezel		_	2NO+2NC	AH164-SP2B22	AH165-SP2B22	Washer 4 (max.)
			3NO+3NC	AH164-SP2B33	AH165-SP2B33	
	Spring		1NO+1NC	AH164-SP0B11	AH165-SP0B11	
	return 🗑	_	2NO+2NC	AH164-SP0B22	AH165-SP0B22	8.5
KKD07-215			3NO+3NC	AH164-SP0B33	AH165-SP0B33	42.5 18.5 18sq.
Key with	Maintained		1NO+1NC	AH164-J2A11A	AH165-J2A11A	
rectangular bezel		$\bigcirc$	2NO+2NC	AH164-J2A22A	AH165-J2A22A	
		A	3NO+3NC	AH164-J2A33A	AH165-J2A33A	
			1NO+1NC	AH164-J2B11A	AH165-J2B11A	
00.00		$\otimes$	2NO+2NC	AH164-J2B22A	AH165-J2B22A	Washer Panel thickness 4 (max.)
200		В	3NO+3NC	AH164-J2B33A	AH165-J2B33A	
2			1NO+1NC	AH164-J2D11A	AH165-J2D11A	
(3)		$\bigcirc$	2NO+2NC	AH164-J2D22A	AH165-J2D22A	42.5
		D	3NO+3NC	AH164-J2D33A	AH165-J2D33A	10.5
	Spring		1NO+1NC	AH164-J0A11A	AH165-J0A11A	
	return 🗑	$\bigcirc$	2NO+2NC	AH164-J0A22A	AH165-J0A22A	
KKD09-001L		A	3NO+3NC	AH164-J0A33A	AH165-J0A33A	
Key with square	Maintained		1NO+1NC	AH164-SJ2A11A	AH165-SJ2A11A	
bezel		$\bigcirc$	2NO+2NC	AH164-SJ2A22A	AH165-SJ2A22A	
		A	3NO+3NC	AH164-SJ2A33A	AH165-SJ2A33A	
			1NO+1NC	AH164-SJ2B11A	AH165-SJ2B11A	1
-4.0		$\otimes$	2NO+2NC	AH164-SJ2B22A	AH165-SJ2B22A	Washer Panel thickness 4 (max.)
		В	3NO+3NC	AH164-SJ2B33A	AH165-SJ2B33A	
			1NO+1NC	AH164-SJ2D11A	AH165-SJ2D11A	1 <b></b>
		$\oslash$	2NO+2NC	AH164-SJ2D22A	AH165-SJ2D22A	42.5 8.5 18
		D	3NO+3NC	AH164-SJ2D33A	AH165-SJ2D33A	10.5 18sq.
	Spring		1NO+1NC	AH164-SJ0A11A	AH165-SJ0A11A	
	return 🗑	$\bigcirc$	2NO+2NC		AH165-SJ0A22A	
KKD09-001R		A	3NO+3NC	AH164-SJ0A33A	AH165-SJ0A33A	

 The operating angle range can be changed as shown below by setting the attached flange shifted by 45° in combination with the contact block.

In this case, the minimum mounting pitch is 26mm because the contact block is shifted by 45° from the flange.



#### · Contact block position



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

Contact arrange- ment		1NO+1NC	2NO+2NC	3NO+3NC
Operator position Left		M 1 Q L Q 2 3 O O 4	U 1 Q   Q 2 3 O O 4 1 Q   Q 2 3 O O 4	1 Q L Q 2 3 O O 4 U 1 Q L Q 2 3 O O 4 1 Q L Q 2 3 O O 4
	Right 🗷	M 1 O O 2 3 O O 4	U 1 0 0 2 3 0 0 4 1 0 0 2 3 0 0 4	1 0 0 2 U 3 0 0 4 U 1 0 0 2 M 3 0 0 4 1 0 0 2 L 3 0 0 4

3-position sele	ector switch
Contact arrange	- 2NO+2NC

Contact arrange- ment		2NO+2NC	3NO+3NC
Operator position	Left ⊕	U L 101021002 30 0430 04	U M L 1010210021002 300430043004
	Center	1 <u>0   0</u> 2 1 <u>0   0</u> 2 30 04 30 04	1 <u>0 1 02 10 1 02 10 1 02</u> 30 04 30 04 30 04
	Right	10 02 10 102 30 04 30 04	10 02 10 02 1 <u>0 1 02</u> 30 04 30 04 30 04

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

### Selector Switches **AH165**

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

⊕ (Direct opening action)

(Direct opening	action				
Operator	Operation	Key removable position	Contact	AH165 (oil-tight) type	Dimensions, mm
Key with rectangular bezel	Maintained	A 🚫	1NO+1NC	AH165-JM2A11A	Washer Panel thickness 24 (max.)
KKD09-005L		B ⊗ D ⊘		AH165-JM2B11A AH165-JM2D11A	32.5 8.8 41.5 10.8 18
KKD09-005L		A 🕥	2NO+2NC	AH165-JM2A22A	Washer Panel thickness Nut 4 (max.)
		В ⊗		AH165-JM2B22A	37.5 0.5
KKD09-005R		D Ø		AH165-JM2D22A	46.5 10.5 18
Key with round bezel	Maintained	A 🚫	1NO+1NC	AH165-RJM2A11A	Washer Panel thickness Nut 4(max.)
		В ⊗		AH165-RJM2B11A	32.5 9.8
KKD09-005L		D 🗷		AH165-RJM2D11A	41.5 10.8 18
		A 🚫	2NO+2NC	AH165-RJM2A22A	Washer Panel thickness Nut 4(max.)
		В 🕅		AH165-RJM2B22A	37.5 9.8
KKD09-007R		D 🕢		AH165-RJM2D22A	37.5 9.8 46.5 10.8 18

<sup>•</sup> 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	O   O O O O O O O O O O O O O O O O O O	
	Right		
	0	O	

Contact arrangement		2NO+2NC	
Operator position	Left 🛇	U O O O O O O O O O O O O O O O O O O O	L O
	Right	O O O O O O O O O O O O O O O O O O O	O   O 11 12 O   O 21 22

#### • Terminal number

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

Operator	Operation	Key	Contact	AH164 type	AH165	Dimensions, mm
	·	removable position			(oil-tight) type	
Knob with	Maintained	_	2NO+2NC	AH164-P3B22	AH165-P3B22	
rectangular bezel		_	3NO+3NC	AH164-P3B33	AH165-P3B33	Danel thickness
20.00	Spring/ (1)		2NO+2NC	AH164-P6B22	AH165-P6B22	Washer Panel thickness 4 (max.)
120	manual return	_	3NO+3NC	AH164-P6B33	AH165-P6B33	Nut ——
	Spring/ 🕥		2NO+2NC	AH164-P7B22	AH165-P7B22	
	manual return	_	3NO+3NC	AH164-P7B33	AH165-P7B33	
	Spring return	_	2NO+2NC	AH164-P1B22	AH165-P1B22	42.5 18.5
KKD07-214		_	3NO+3NC	AH164-P1B33	AH165-P1B33	
Knob with square	Maintained	_	2NO+2NC	AH164-SP3B22	AH165-SP3B22	
bezel		_	3NO+3NC	AH164-SP3B33	AH165-SP3B33	Panel thickness
	Spring/ (1)		2NO+2NC	AH164-SP6B22	AH165-SP6B22	Washer 4 (max.)
	manual return	_	3NO+3NC	AH164-SP6B33	AH165-SP6B33	
	Spring/ 🕥		2NO+2NC	AH164-SP7B22	AH165-SP7B22	
1480	manual return	_	3NO+3NC	AH164-SP7B33	AH165-SP7B33	
	Spring return		2NO+2NC	AH164-SP1B22	AH165-SP1B22	42.5 18.5 18sq.
KKD07-216		_	3NO+3NC	AH164-SP1B33	AH165-SP1B33	
Key with	Maintained*	_ ·	2NO+2NC	AH164-J3A22A	AH165-J3A22A	
rectangular bezel		⊖A	3NO+3NC	AH164-J3A33A	AH165-J3A33A	
Ū			2NO+2NC	AH164-J3E22A	AH165-J3E22A	
		① E	3NO+3NC	AH164-J3E33A	AH165-J3E33A	
		0.5	2NO+2NC	AH164-J3D22A	AH165-J3D22A	
		⊖D	3NO+3NC	AH164-J3D33A	AH165-J3D33A	Washer Panel thickness
-00-01			2NO+2NC	AH164-J3C22A	AH165-J3C22A	Washer Panel thickness  4 (max.)  Nut \ +
		⊕ C	3NO+3NC	AH164-J3C33A	AH165-J3C33A	
	Spring/		2NO+2NC	AH164-J6E22A	AH165-J6E22A	
(0)	manual return	① E	3NO+3NC	AH164-J6E33A	AH165-J6E33A	42.5
U -	<u> </u>	<u> </u>	2NO+2NC	AH164-J6D22A	AH165-J6D22A	42.5   8.5   18   24
	1	⊝ D	3NO+3NC	AH164-J6D33A	AH165-J6D33A	
	Spring/	_ ·	2NO+2NC	AH164-J7A22A	AH165-J7A22A	
	manual return	⊖A	3NO+3NC	AH164-J7A33A	AH165-J7A33A	
	<b>(</b>		2NO+2NC	AH164-J7E22A	AH165-J7E22A	
		① E	3NO+3NC	AH164-J7E33A	AH165-J7E33A	
	Spring 🚕		2NO+2NC	AH164-J1E22A	AH165-J1E22A	
KKD09-002L	return	① E	3NO+3NC	AH164-J1E33A	AH165-J1E33A	
Key with square	Maintained*		2NO+2NC	AH164-SJ3A22A	AH165-SJ3A22A	
bezel		⊖A	3NO+3NC	AH164-SJ3A33A	AH165-SJ3A33A	
		@ <b>-</b>	2NO+2NC	AH164-SJ3E22A	AH165-SJ3E22A	
		① E	3NO+3NC	AH164-SJ3E33A	AH165-SJ3E33A	
			2NO+2NC	AH164-SJ3D22A	AH165-SJ3D22A	
		⊝ D	3NO+3NC	AH164-SJ3D33A	AH165-SJ3D33A	Washer Panel thickness
-40 a.			2NO+2NC	AH164-SJ3C22A		Washer Panel thickness Nut 4 (max.)
		⊕ C	3NO+3NC	AH164-SJ3C33A	AH165-SJ3C33A	
	Spring/		2NO+2NC	AH164-SJ6E22A		│ <del>───</del> ── <del>──────────────────────────────</del>
	manual return	① E	3NO+3NC	AH164-SJ6E33A		42.5 8.5 18
<b>J</b>		0.5	2NO+2NC		AH165-SJ6D22A	10.5 18sq.
	<b>(</b>	⊖D	3NO+3NC	AH164-SJ6D33A		
	Spring/		2NO+2NC	AH164-SJ7A22A		1
	manual return	⊖A	3NO+3NC	AH164-SJ7A33A		
			2NO+2NC	AH164-SJ7E22A		1
		① E	3NO+3NC	AH164-SJ7E33A		
	Spring 🙈		2NO+2NC	AH164-SJ1E22A		1
KKD09-002R	return	① E	3NO+3NC	AH164-SJ1E33A		
	1.00011	I	311013110	1 7.1110- OU ILOUA	71100 00 1E00A	<u> </u>

<sup>•</sup> There are 6 available key types; A, B, C, D, E and F.

Standard key code is A.

• Contact arrangement and operator position: See page 04/201.

<sup>•</sup> Spring return, spring/manual return (spring return): Operation angle 70-degree

ullet \* Available key removable position: Code B ullet

<sup>•</sup> With wire-wrap pin terminals have a depth of 47mm.

#### Selector Switches **AH164 and AH165**

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

■ Selector switch	es/3-position	(45-degree	<del>'</del> )			
Operator	Operation	Key	Contact	AH164 type	AH165	Dimensions, mm
		removable position			(oil-tight) type	
Knob with	Maintained	position	2010 - 2010	AH164-PK3B22	AU465 DV2D22	
	Maintained	_	2NO+2NC 3NO+3NC		AH165-PK3B22	
rectangular bezel	Spring/ (1)		2NO+2NC	AH164-PK3B33 AH164-PK6B22	AH165-PK3B33 AH165-PK6B22	Washer Panel thickness 4 (max.)
	manual return	_	3NO+3NC	AH164-PK6B33	AH165-PK6B33	Nut 4 (max.)
			2NO+2NC	AH164-PK7B22	AH165-PK7B22	
	Spring/  manual return	_	3NO+3NC	AH164-PK7B33	AH165-PK7B33	
	Spring return		2NO+2NC	AH164-PK1B22	AH165-PK1B22	42.5 18.5 24
KKD07-214	Opining religin	_	3NO+3NC	AH164-PK1B33	AH165-PK1B33	42.5   18.5
Knob with square	Maintained		2NO+2NC	AH164-SPK3B22	AH165-SPK3B22	
bezel	Maintainea	_	3NO+3NC	AH164-SPK3B33	AH165-SPK3B33	Panel thickness
2020	Spring/ 🕥		2NO+2NC	AH164-SPK6B22	AH165-SPK6B22	Washer 4 (max.)
1	manual return	_	3NO+3NC	AH164-SPK6B33	AH165-SPK6B33	
	Spring/ (†)		2NO+2NC	AH164-SPK7B22	AH165-SPK7B22	
	manual return	_	3NO+3NC	AH164-SPK7B33	AH165-SPK7B33	8.5 10.5 10.5
	Spring return		2NO+2NC	AH164-SPK1B22	AH165-SPK1B22	42.5 18.5 18sq.
KKD07-216		_	3NO+3NC	AH164-SPK1B33	AH165-SPK1B33	
Key with	Maintained	0.4	2NO+2NC	AH164-JK3A22A	AH165-JK3A22A	
rectangular bezel		⊗ A	3NO+3NC	AH164-JK3A33A	AH165-JK3A33A	
		① E	2NO+2NC	AH164-JK3E22A	AH165-JK3E22A	
			3NO+3NC	AH164-JK3E33A	AH165-JK3E33A	
		⊘ D	2NO+2NC	AH164-JK3D22A	AH165-JK3D22A	
		<b>⊘ D</b>	3NO+3NC	AH164-JK3D33A	AH165-JK3D33A	- Washer Panel thickness
44		® C	2NO+2NC	AH164-JK3C22A	AH165-JK3C22A	Nut \ 4 (max.)
		<b>0</b>	3NO+3NC	AH164-JK3C33A	AH165-JK3C33A	
	Spring/	ФE	2NO+2NC	AH164-JK6E22A	AH165-JK6E22A	
	manual return		3NO+3NC	AH164-JK6E33A	AH165-JK6E33A	42.5
	1	⊘ D	2NO+2NC	AH164-JK6D22A	AH165-JK6D22A	10.5
		_	3NO+3NC	AH164-JK6D33A	AH165-JK6D33A	-
	Spring/	⊗A	2NO+2NC	AH164-JK7A22A	AH165-JK7A22A	
	manual return		3NO+3NC	AH164-JK7A33A	AH165-JK7A33A	-
		① E	2NO+2NC	AH164-JK7E22A	AH165-JK7E22A	
	Carina		3NO+3NC 2NO+2NC	AH164-JK7E33A AH164-JK1E22A	AH165-JK7E33A AH165-JK1E22A	-
KKD09-002L	Spring return	⊕ E	3NO+3NC	AH164-JK1E33A	AH165-JK1E33A	
Key with square	Maintained		2NO+2NC	AH164-SJK3A22A	AH165-SJK3A22A	
bezel	Mairitairica	⊗A	3NO+3NC	AH164-SJK3A33A		
50201			2NO+2NC	AH164-SJK3E22A	AH165-SJK3E22A	7
		① E	3NO+3NC	AH164-SJK3E33A		
			2NO+2NC			<b>-</b>
		⊘ D	3NO+3NC	AH164-SJK3D33A	AH165-SJK3D33A	Washer Panel thickness
		<b>*</b> •	2NO+2NC			T Wasiei ( // (max )
-40.00		® C	3NO+3NC	AH164-SJK3C33A	AH165-SJK3C33A	
	Spring/	<b>∞</b> Γ	2NO+2NC	AH164-SJK6E22A	AH165-SJK6E22A	
	manual return	① E	3NO+3NC	AH164-SJK6E33A	AH165-SJK6E33A	42.5 8.5 18
	Ó	⊘ D	2NO+2NC	AH164-SJK6D22A	AH165-SJK6D22A	10.5 18sq.
<i>V</i> - 4		, J	3NO+3NC	AH164-SJK6D33A	AH165-SJK6D33A	_
	Spring/	⊗A	2NO+2NC	AH164-SJK7A22A		
	manual return		3NO+3NC	AH164-SJK7A33A		
	( )	① E	2NO+2NC	AH164-SJK7E22A		
			3NO+3NC	AH164-SJK7E33A		7
WWDOO COOD	Spring	① E	2NO+2NC	AH164-SJK1E22A		
KKD09-002R	return		3NO+3NC	AH164-SJK1E33A	AH165-SJK1E33A	4

<sup>•</sup> There are 6 available key types; A, B, C, D, E and F.

Standard key code is A.

• Contact arrangement and operator position: See page 04/205.

#### • Key removable positions (JK, SJK)

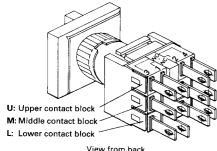
Remvable position	$\Diamond$	$\boxtimes$	<b>X</b>	$\varnothing$	1	<b>Ø</b>	1
Code	Α	В	С	D	Е	F	G

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



View from back

#### • Contact arrangement and operator position:

3-position selector switch

Contact arrange- ment		2NO+2NC	3NO+3NC	
Operator position	Left	U L 1010210 02 30 0430 04	U M L 1010210 0210 02 30 0430 0430 04	
	Center	1 <u>O I O</u> 2 1 <u>O I O</u> 2 3O O4 3O O4	1 <u>O I O2</u> 1 <u>O I O2</u> 1 <u>O I O2</u> 30 04 30 04 30 04	
	Right	10 02 10 102 30 04 30 04	10 02 10 02 10 102 30 04 30 04 30 04	

#### Pilot Lights **AH164 and AH165**

#### ■ Pilot lights/without transformer

_ ·					
Lens	Lamp	Voltage	AH164 type	AH165 (oil-tight) type	Dimensions, mm
Extended round	Flat LED	24V DC	AH164-Z□E3	AH165-Z□E3	Washer Panel thickness
	Spot LED	24V DC	AH164-Z□E2	AH165-Z□E2	a (+)
	Incandescent	24V AC/DC	AH164-Z□E	AH165-Z□E	
	Neon	110V AC	AH164-Z□H1	AH165-Z□H1	b (-) 24 7
SK-1139		220V AC	AH164-Z□M1	AH165-Z□M1	10 18sq.
Flush square	Flat LED	24V DC	AH164-ZS□E3	AH165-ZS□E3	Washer Panel thickness Nut. 4 (max.)
	Spot LED	24V DC	AH164-ZS□E2	AH165-ZS□E2	
	Incandescent	24V AC/DC	AH164-ZS□E	AH165-ZS□E	- 1.52   8.5   - 1.52
	Neon	110V AC	AH164-ZS□H1	AH165-ZS□H1	b (-) (24 7 1 15sq. )
SK-1138		220V AC	AH164-ZS□M1	AH165-ZS□M1	10 18sq.
Flush rectangular	Flat LED	24V DC	AH164-ZT□E3	AH165-ZT□E3	Washer Panel thickness Nut. 4 (max.)
	Spot LED	24V DC	AH164-ZT□E2	AH165-ZT□E2	a (+) (-)
	Incandescent	24V AC/DC	AH164-ZT□E	AH165-ZT□E	
	Neon	110V AC	AH164-ZT□H1	AH165-ZT□H1	b (-) (C) (24 7 ) (21 )
SK-1137		220V AC	AH164-ZT□M1	AH165-ZT□M1	10 24
Dome	LED	12V DC	_	AH165-ZM□B2	Nut Panel thickness
<b>3</b>		24V DC	_	AH165-ZM□E2	a (+) 1sq.
AF87-45					31.3 14.2 LED

#### • Lens color

Replace the  $\hfill\square$  mark by the following lens color code

		•				
Color	Green	Red	White	Yellow	Blue	Orange
Code	G	R	W	Υ	S	0

- 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 Flat	Flat LED	■ Voltage H: 100-110V AC	AH164-Z□ <b>■</b> 3	AH165-Z□ <b>■</b> 3	Panel thickness  Washer  4 (max.)
AF90-944	Incandescent	M: 200-220V AC	AH164-Z□■	AH165-Z□ <b>■</b>	Transformer das.5 Transformer unit
Flush square	Flat LED	■ Voltage H: 100-110V AC	AH164-ZS□■3	AH165-ZS□■3	62 Panel thickness Washer 4 (max.) 18 Nut 15 Insulation
AF90-943	Incandescent	M: 200-220V AC	AH164-ZS□■	AH165-ZS□■	Transformer unit  Transformer unit
Flush rectangular	Flat LED	■ Voltage H: 100-110V AC	AH164-ZT□ <b>■</b> 3	AH165-ZT□■3	62 Panel thickness 4 (max.) 24 Insulation cover
AF90-942	Incandescent	M: 200-220V AC	AH164-ZT□■	AH165-ZT□■	Transformer unit  O 7 10 8 Holder  Transformer unit

#### • Lens color

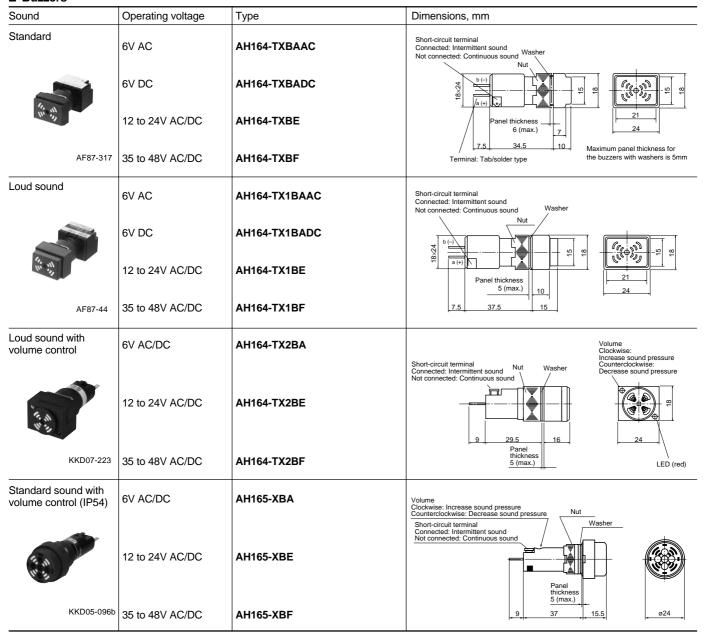
Replace the  $\square$  mark by the following lens color code

Color	Green	Red	White	Yellow	Blue	Orange
Code	G	R	W	Υ	S	0

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

### Buzzers AH164 and AH165

#### **■** Buzzers



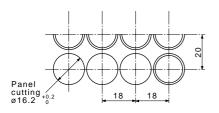
04

#### AH164 and AH165 Mounting space

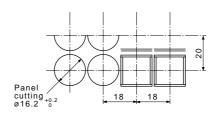
#### ■ Mounting space, mm

#### • Pushbuttons and pilot lights

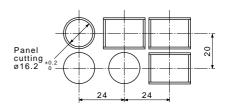
#### Extended round head or lens



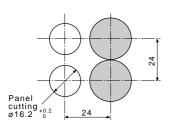
#### Flush square head or lens



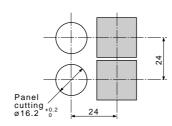
#### Flush rectangular head or lens



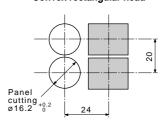
#### Mushroom head



#### Convex square head

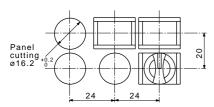


#### Convex rectangular head



#### Selector switches

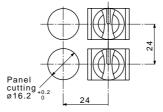
•When mounting the selector switches near the pilot light



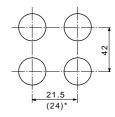
near each other (2NO+2NC only)

• When mounting the JM or RJM selector switches

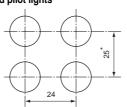
 When mounting the selector switches near each other



· With transformer



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

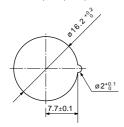


Mushroom, convex square, convex rectangular: 27

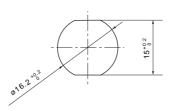
Note: \*( ) For switch with flush rectangular head

1

#### • AH165-V, V1, V5, V6



#### • AH165-JM, RJM



#### ■ Terminal number

#### • AH164, 165

Туре	Wiring		Terminal position
Illuminated pushbuttons	a (+)	b (-)	Type number display side
	$ \hspace{.05cm} -\hspace{05cm} \otimes \hspace{.05cm}  $		
	10	<u> </u> 2	30 b 24
	3°	o <b>4</b>	30 <sup>-</sup> 24
Pushbuttons			]
Selector switches	(1)	<b>_</b> 2	30724
(except for JM, RJM types)	30	o <b>4</b> )	[] [] (+) [] []
Pilot lights	а	b	Type number
(without transformer)	(+) (X	(-) )——•	display side
		,	

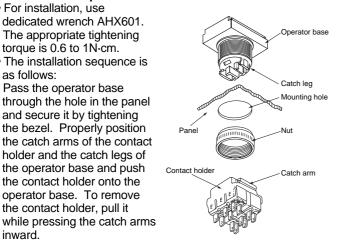
#### AH164. AH165 and AH165-2 Notes on use

#### Notes on use

inward.

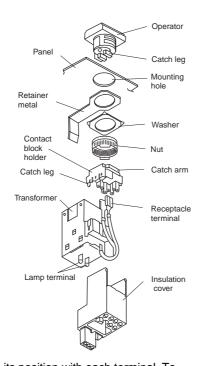
#### ■ Installation on panel

- · 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 of the contact holder and the catch legs of the operator base and push the contact holder onto the operator base. To remove the contact holder, pull it



#### ■ Mounting steps of switch with transformer

①Pass the switch operator through the panel hole and secure with a nut by way of the retainer metal from the front of the panel. ②Align 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. 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: -) ⑤Push 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, guardring

Be careful that the panel thickness does not exceed the following: Panel thickness Protection cover: 2.6mm max.

Guard ring: 2.5mm max.

Dust-tight cover: 2.0mm max.

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

Operating voltage
4 to 5V
10 to 12V
20 to 24V

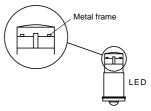
Incandescent lamps should be operated at the operating voltages if a lamp service life of 5,000 to 10,000 hours are needed. The ambient temperature must not exceed 30°C if the lamp is used at the rated voltage continuously.

#### ■ Method of replacing lamp

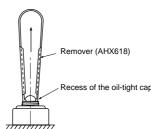
 Incandescent lamps/LED lamps/neon lamps Remove the color lens and inner button with a remover AHX618.

Then draw out the lamp with a lamp changer AHX672. When installing lamps, do it manually and in the reverse order

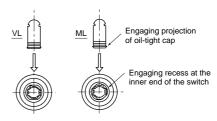
• Products with blue and green LEDs The LED devices on products with high-brightness (blue and green) LEDs are very sensitive to static electricity. When replacing LED lamps do not allow static electricity to come into direct contact with the metal frame on the upper side of the LED lamp. The LED device 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).

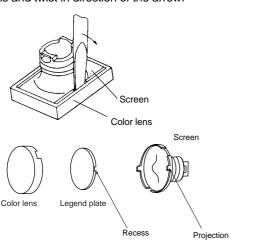


Note: Lamp of AH165-ZM type can not be replaced.

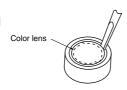
#### AH164, AH165 and AH165-2 Notes on use

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

#### **■** Contact block

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

#### ■ Handling precautions

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

#### ■ Key type selector switch

• Five key types (Type B to Type F) are available besides Type A, which is the standard key type. Be sure to use a key with





Symbol on the key

Symbol on the main unit

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 1.25 mm<sup>2</sup> (2.8 -0.5-5) 0.2 to 0.5 mm<sup>2</sup>

Using contact blocks

When using NO and NC contacts in the same contact block, avoid connection that involves opposite polarity or wiring from different types of power supply.

- For wiring to adjacent terminals, use insulated tubing to prevent short-circuit and to assure isolation. For solder terminals, be careful when connecting thick wires. Do not use too much solder.
- Wiring to wire-wrap pin terminals
   Select the appropriate wire sizes and tools from the table below.

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

Use ordinary wrapping for connection.

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

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

#### ■ Installing lamps in close order

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

#### Pushbuttons/Selectors/Pilot Lights/Buzzers

#### AH164, AH165 and AH165-2 Notes on use

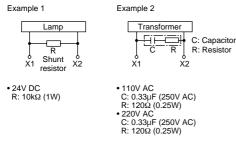
#### **■ LEDs**

#### • LED Lamp Malfunctioning

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

#### Countermeasure for Malfunctioning

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



#### Incoming surge

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

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

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

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

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

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

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

#### ■ Operation

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

#### ■ Storage and operation site

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

#### **■** Buzzer

#### Noise

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

Place of Use

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

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

#### ■ Accessories for AH164 and AH165

Description		Туре	
Color chips (F	Round)	Color	Туре
	L, L5, E	Green	AHX631-G
	E5, Z	Red	AHX631-R
	-,	White (For Neon)	AHX631-W
		Blue	AHX631-S
		Yellow	AHX631-Y
0		Orange	AHX631-O
		Clear	AHX631-C
SF-682	For LED, Neon	Green	AHX653-G
Color chips (	Square)	Color	Туре
	SL, SL5, SGL,	Green	AHX632-G
	SGL5, SF, SF5,	Red	AHX632-R
	SGF, SGF5, ZS	White (For Neon)	AHX632-W
	, ,	Blue	AHX632-S
		Yellow	AHX632-Y
1		Orange	AHX632-O
-		Clear	AHX632-C
SF-681	For LED, Neon	Green	AHX653-SG
Color chips (F	Rectangular)	Color	Туре
	TL, TL5, TGL	Green	AHX633-G
	TGL5, TF, TF5	Red	AHX633-R
	TGF, TGF5, ZT	White (For Neon)	AHX633-W
	101, 1013, 21	Blue	AHX633-W
		Yellow	AHX633-Y
			AHX633-0
1		Orange Clear	AHX633-C
SF-680	For LED, Neon	Green	AHX653-TG
Mushroom he	ead button	Color	Туре
	N N 5	0	ALIV000 O
	M, M5	Green	AHX682-G
		Red	AHX682-R
		White	AHX682-W
		Blue	AHX682-S
		Yellow	AHX682-Y
SI-40		Orange Black	AHX682-O AHX682-B
	re head button	Color	Type
- 1			•
	SM, SM5	Green	AHX683-G
		Red	AHX683-R
		White	AHX683-W
		Blue	AHX683-S
	ľ	Yellow	AHX683-Y
01.40		Orange Black	AHX683-O AHX683-B
Convex recta	ngular head	Color	Туре
button			. , , ~
	TM, TM5	Green	AHX684-G
		Red	AHX684-R
00	NL	White	AHX684-W
	-	Blue	AHX684-S
		Yellow	AHX684-Y
	-	Orange	AHX684-O
		Orange	AIIX004-O

Descrip	otion		Туре			
Legend sheet			Round Type: <b>AHX</b> Legend: Ol		, DOWN	
DFF  OFF	ON 31 ON 31 ON 31	029	S' C R	A616-□ N, OFF, UP TART, STO LOSE, AUT ESET, POW WD, HIGH,	P, OPEN O, MAN, VER, REV,	
OFF OFF OFF	ON 51 ON 51 ON 51 ON 51 ON 57 ON 57	09 09	Rectangular Type: AHX617- Legend: ON, OFF, UP, DOWN START, STOP, AUTO, MAN, FOWARD, REVERS When ordering, specify desired legen in the at the end of ordering code, Transparent blank sheets are also			
SH-165			available. Use black o	oil ink.		
Legend (Acrylic	•	Round	Type  AHX665  AHX665-C  AHX665-B		Dimensions, mm ø12.2 x 0.9	
		Square	AHX666 AHX666-C AHX666-B		12.2sq. x 0.9	
SH-164		Rectangular	AHX667 AHX667-C AHX667-B		12.2 x 18.2 x 0.9	
•	l plate for s	spot LED	Туре	Dimension	s, mm	
(Acrylic	resinj	Round Square Rectangular	AHX650 AHX651 AHX652	ø12.2 x 0.9 12.2sq. x 0 12.2 x 18.2	.9	
switch (	I plate for s (2-position)		Type: AHX Legend: Ol Legend: Bl	N-OFF	. x 0.5	
Legend	I plate for s	symbol mark	Mark	Туре		
1	O 🗇	Square Rectangular	0	AHX666-E AHX667-E		
1	0	Square Rectangular	1	AHX666-H AHX667-H		
		Square Rectangular	$\bigcirc$	AHX666-T AHX667-T		

### Pushbuttons/Selectors/Pilot Lights/Buzzers

## AH164 and AH165 Accessories

Description	Туре
Protection cover	For round and square head button Type: AHX671
	For rectangular head button Type: AHX669 AHX826
	This cover protect against accidental operation.  Note: Not used for illuminated pushbuttons with guard.  Applicable panel thickness is 2.6mm max.  Dimensions, mm
KKD07-246  KKD07-248	33.2 AHX671 AHX669
KKD07-247	AHX826
Dust-tight cover	For round and square head button Type: AHX822 Dimensions, mm: 24sq. x 14.2
	For rectangular head button Type: AHX668 Dimensions, mm: 24 x 30 x 14.2 For mushroom head button Type: AHX649 Dimensions, mm: ø30 x 18
AF91-123, SI-41	These covers protect against dust. Note: Applicable panel thickness is 2.0mm max.
Guard ring	Type Color Dimensions, mm
4	<b>AHX676-B</b> Black Ø21 x 12 <b>AHX676-GY</b> Gray
GG	This guard ring is used in combination with an extended round head pushbutton (L or E).
SI-42	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.
Transformer	Voltage Type Lamp
	100 to 110V AC AHX805-H LED 200 to 220V AC AHX805-M
	100 to 110V AC AHX806-H Incandescent 200 to 220V AC AHX806-M
AF90-949	

#### AH165-2 Accessories

#### ■ Accessories for AH165-2

Description	Туре		Description	Туре	
Color lens (Round)	For flush head (Used with 2) Color Green Red Yellow Blue Orange Clear	Type AHX2604-G AHX2604-R AHX2604-Y AHX2604-S AHX2604-O AHX2604-C	Legend plate	For extended Color Typ White AH	e Used with X2609-W Incandescent lamp, LED lamp, Pushbutton *1 Neon lamp *2 Pushbutton *3 mm: Ø18 * 0.9  head e Used with X2610-W Incandescent lamp, LED lamp, Pushbutton *1
00	For extende	d head		Clear AH	_
		E, 2E5, 2EL, 2EL5, 2ZE)		1	mm: ø18 x 4.4
	Color	Туре			
	Green	AHX2605-G		For flush squ Color Typ	
	Red	AHX2605-R		White AH	
	Yellow	AHX2605-Y			LED lamp, Pushbutton *1
	Blue	AHX2605-S		Clear AH	
	Orange	AHX2605-O			mm: 17sq. x 0.9
	Clear	AHX2605-C		Difficitions,	11111. 1734. X 0.3
AF87-631					square, concave square
				Color Typ White AH	
Color lens (Square)	For flush hea	ad !SF, 2SF5, 2SFL, 2SFL5, 2SZ)			LED lamp, Pushbutton *1
	Color			Clear AH	' '
	Green	Туре <b>АНХ2606-G</b>			mm: 17sq. x 4.4
	Red	AHX2606-R			•
	Yellow	AHX2606-Y			oushbutton switches and pilot lights escent lamps or LED lamps,
	Blue	AHX2606-S			switches (excluding).
	Orange	AHX2606-O		*2 Illuminated	pushbutton switches and pilot lights
	Clear	AHX2606-C	AF87-631	with neon la	imps. switches (black)
	Olcai	AllAzooo o	AF87-630	*4 Engraved ra	inge: 17mm dia.
	For extended (Used with 2	d head SE, 2SE5, 2SEL, 2SEL5, 2SZE)	Mushroom head button	For illuminate (Used with 2	ed pushbuttons ML, 2YML)
	Color	Type		Color	Туре
-	Green	AHX2607-G		Green	AHX2614-G
	Red	AHX2607-R		Red	AHX2614-R
	Yellow	AHX2607-Y		White	AHX2614-W
	Blue	AHX2607-S		Yellow	AHX2614-Y
	Orange	AHX2607-O		Blue	AHX2614-S
	Clear	AHX2607-C		Orange	AHX2614-O
	For concave (Used with 2	head SCE, 2SCE5, 2SCL, 2SCL5)	9	For non-illum (Used with 2	inated pushbuttons M, 2YM)
	Color	Туре		Color	Туре
	Green	AHX2608-G		Green	AHX2613-G
	Red	AHX2608-R		Red	AHX2613-R
	Yellow	AHX2608-Y		White	AHX2613-W
	Blue	AHX2608-S		Yellow	AHX2613-Y
	Orange	AHX2608-O		Blue	AHX2613-S
	1			1 -	
	Clear	AHX2608-C		Orange	AHX2613-O

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

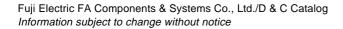
## **Accessories**

Description	Туре
Push-lock, turn-reset button	For illuminated pushbuttons (Used with 2VL, 2YVL)  Color Type
	Green AHX2616-G Red AHX2616-R
	White AHX2616-W Yellow AHX2616-Y
	For pushbuttons (Used with 2V, 2YV)
	Color Type Green AHX2615-G
	Red AHX2615-R Yellow AHX2615-Y
	Black AHX2615-B
AF87-634	
Dust-tight cover	For flush round (Used with 2F, 2FL, 2F5, 2FL5) Type: AHX2603-2
	For flush square (Used with 2SF, 2SFL, 2SF5, 2SFL5) Type: AHX2603-2S
AF87-636	These covers protect against dust.
Key washer	Type: <b>AHX2601</b>
0	Mounting hole, mm
	17.9%
AF87-635	ø16.2 <sup></sup> 8 <sup>2</sup>

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

■ Accessories fo	or AH164, A	AH165 a	nd .	AH165-2	
Description		Туре			
Incandescent lamp		Voltage		Туре	
KKD06-333		6V, 0.6V 14V, 0.7 28V, 0.7	W	AHX641 AHX642 AHX643	
		Voltago		Typo	
LED lamp		5V DC 6V DC 12V DC 24V DC		Type  AHX69  AHX69  AHX69  AHX69	5-6 □ 5-12 □
KKD06-206		color co Red (R)	de , Gre	□ mark by th een (G), Oran ′ellow (Y), Bl	ige (O),
Neon lamp		Voltage		Туре	Luminous
		110V A	0	AHX655-H AHX654-H	color Green Orange
		120V A	0	AHX655-K AHX654-K	Green Orange
<i>5</i>		220V A	С	AHX655-M AHX654-M	Green Orange
KKD06-306		240V A	2	AHX655-P AHX654-P	Green Orange
Panel plug		Color	Тур	e	
KKD07-262	Round	Black Gray			P40 P40
KKD07-261	Square	Black Gray		-	P40 P40
KKD07-260	Rectangular	Black Gray Black	AH.	X645-GY	P40 P40 P65
Lamp changer		Type: A	НХб	572	
KKD07-259		this tool	to re	is fitted with a move the lar ary when inst	•
Remover	40	Type: A	нхе	618	
KKD07-258		This too			cing the color
Contact holder reme	over	Type: A	нхе		
SP-522		This too	l is u /hen	sed to remov switches are	

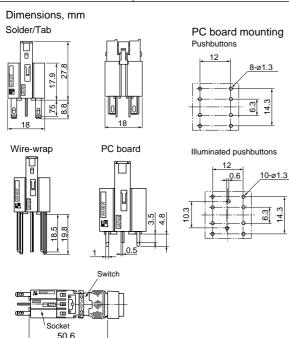
Description	Type
	7.
Wrench  KKD07-257	Type: AHX601  When installing a command switch on a panel, this tool is useful for tightening the switch firmly and efficiently.
Terminal cover	Type: <b>AHX2602</b>
AF87-637	This cover is used with AH164 and AH165 and AH165-2 (except pilot lights). Pass the wires through the cover, then mount the cover in position.
Contact block	Terminal Type
Par Propo	Solder/Tab AGX001 Wire-wrap AGX001–W
KKD06-305, KKD06-304	
Dummy unit	Type: AGX002
SK-1141	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.
Removei	Type: AGX012
SM-334	This tool is used for replacing the contact blocks or dummy units.



### Pushbuttons/Selectors/Pilot Lights/Buzzers

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

Description	Туре		
Sockets	Terminal	Туре	Used with
	Solder/Tab Wire-wrap PC board	AHX697-S AHX697-W AHX697-P	Pushbuttons
3	Solder/Tab Wire-wrap PC board	AHX697-SL AHX697-WL AHX697-PL	Illuminated pushbuttons
SM-1097		ngement is 2N H165-2PL type	•
Sockets for	Terminal	Туре	
	Solder/Tab Wire-wrap	AHX697-SH	-
SM-1098	These socket lamps rated for 110V AC/DC.  Except for Al- pilot lights or and the wide-by continuous lights.	gement is 2NOs are used only or 24V DC are used 1164, 165 and 1 AH165-2PL type side mounting thing, note that ature over the a	when LED sed under 65-2 series and a socket has



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		About 6
(0.65mm dia.)	(2-A)		(About 6)

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

#### ■ Mass, gram AH164 series

#### Type 1NO 2NO 3NO 1NC 2NC 3NC AH164-L,L5 (Without transformer) 12.5 13.5 14.5 L,L5 (With transformer) 53.5 54.5 SL,SL5 (Without transformer) 14.1 13.1 15.1 SL,SL5 (With transformer) TL,TL5 (Without transformer) 54.1 55.1 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 14.4 13.4 15.4 TM,TM5 13.1 14.1 15.1 AH164-P2,P0 16.1 17.1 18.1 P3,P6,P7,P1 17.1 18.1 PK3,PK6,PK7,PK1 17.1 18.1 SP2,SP0 15.8 16.8 17.8 SP3,SP6,SP7,SP1 16.8 17.8 SPK3,SPK6,SPK7,SPK1 16.8 17.8 J2,J0 30.6 31.6 32.6 J3,J6,J7,J1 31.6 32.6 JK3,JK6,JK7,JK1 31.9 32.9 SJ2,SJ0 30.3 31.3 32.3 SJ3,SJ6,SJ7,SJ1 31.3 32.3 SJK3,SJK6,SJK7,SJK1 31.6 32.6 AH164-Z (Without transformer) 6.9 Z (With transformer) 50.9 ZS (Without transformer) 7.5 ZS (With transformer) 51.5 ZT (Without transformer) 8.2 ZT (With transformer) 52.2 AH164-TX 16 TX1 17.5 TX2B 13

#### AH165 series

AH165 series			
Туре	1NO	2NO	3NO
	+ 1NC	+ 2NC	+ 3NC
AH165-L,L5 (Without transformer)	12.5	13.5	14.5
L,L5 (With transformer)	53.5	54.5	-
SL,SL5 (Without transformer)	13.1	14.1	15.1
SL,SL5 (With transformer)	54.1	55.1	-
TL,TL5 (Without transformer)	13.9	14.9	15.9
TL,TL5 (With transformer)	54.9	55.9	-
TGL,TGL5 (Without transformer)	13.9	14.9	15.9
TGL,TGL5 (With transformer)	54.9	55.9	-
SGL,SGL5 (Without transformer)	13.1	14.1	15.1
SGL,SGL5 (With transformer)	54.1	55.1	-
AH165-E,E5	10.5	11.5	12.5
M,M5	12.5	13.5	14.5
SF,SF5	11.1	12.1	13.1
TF,TF5	11.9	12.9	13.9
TGF,TGF5	11.9	12.9	13.9
SGF,SGF5	11.1	12.1	13.1
SM,SM5	13.4	14.4	15.4
TM,TM5	13.1	14.1	15.1
VR	13.4 *1	14 *²	-
V1R	14.4 *1	15 * <sup>2</sup>	-
AH165-V5R	18.1 *1	18.7 * <sup>2</sup>	-
V6R	18.9 *1	19.5 *2	-
AH165-P2,P0	16.7	17.7	18.7
P3,P6,P7,P1	-	17.7	18.7
PK3,PK6,PK7,PK1	_	17.7	18.7
SP2,SP0	16.1	17.1	18.1
SP3,SP6,SP7,SP1	-	17.1	18.1
SPK3,SPK6,SPK7,SPK1	-	17.1	18.1
J2,J0	31.2	32.2	33.2
J3,J6,J7,J1	-	32.2	33.2
JK3,JK6,JK7,JK1	-	32.5	33.5
SJ2,SJ0	30.6	31.6	32.6
SJ3,SJ6,SJ7,SJ1	-	31.6	32.6
SJK3,SJK6,SJK7,SJK1	-	31.9	32.9
AH165-JM2	30	33.9	-
RJM2	29.6	34	-
AH165-Z (Without transformer)	6.9		
Z (With transformer)	50.9		
ZS (Without transformer)	7.5		
ZS (With transformer)	51.5		
ZT (With transformer)	8.2		
ZT (With transformer)	52.2 5.4		
	5 /1		
ZM (Without transformer)	J. <del>4</del>		

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

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

#### ■ Mass, gram AH165-2 series

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