■ 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.

Pushbuttons	Illuminated pushbuttons	Pilot lights
KKD07-209 **AH164-E**	KKD07-202 **AH164-TL**	KKD07-212 **AH164-Z**

Emergency stop pushbuttons		Selectors
KKD07-222 **AH165-V6**	AF87-221 **AH165-2ML**	KKD07-232 **AH165-2P**
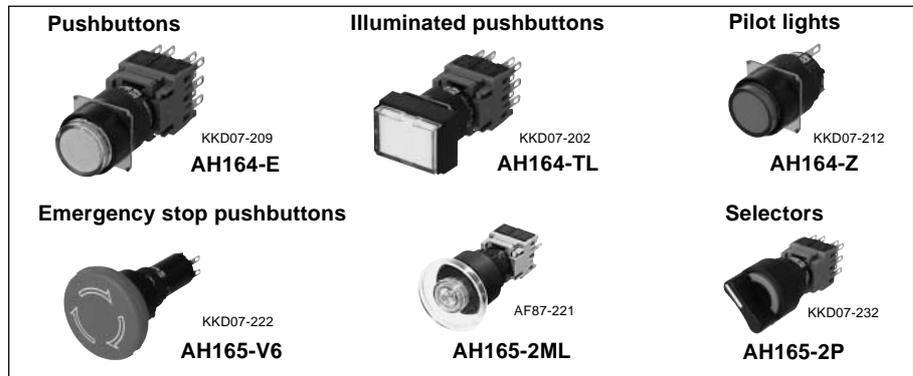
Easy color change
Color lenses fit over the inner button. The lens can easily be removed using a small screwdriver


Color lens

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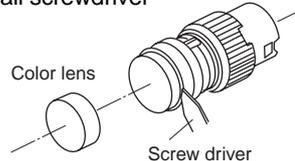
Note: The luminous color of LEDs and neon illumination types varies with the body color of the product.

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.

Legend plate

Legend sheet (film)
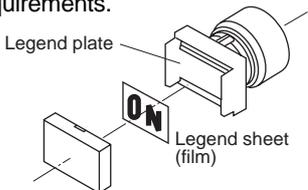
Excellent switch reliability
The switch uses a snap-action mechanism. The pushbuttons are available with either momentary or alternative actions. The snap-action switch has a double break movement which operates independently of the speed of switching. The contacts are made from gold-flashed silver. 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.


Lamp terminal

Contact terminal
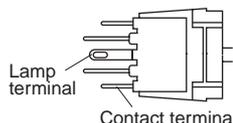
Safety
FUJI's original Trigger Action mechanism is used in the emergency stop pushbuttons. They are suitable for emergency stop and safety. This mechanism prevents the contacts from moving until the button is pushed and locked.
• Provided with a trigger action mechanism conforming to EN418.
• Provided 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.

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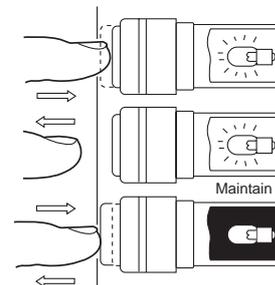
Pushbutton with finger guards
Finger guards are provided for square or rectangular type pushbuttons (SF, TF, SL and TL types) in order to prevent operational error of adjacent buttons.

Approvals

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

AH164 (standard) / AH165 (oil-tight)

■ Illuminated pushbutton switches

Operator	Type	Operator	Type	Operator	Type
Extended round head *See page 04/195* 🇺🇱 🇨🇱 △ C€ ⓒ	**AH164-L, L5 AH165-L, L5** KKD07-205	Flush square head *See page 04/195* 🇺🇱 🇨🇱 △ C€ ⓒ	**AH164-SL, SL5 AH165-SL, SL5** KKD07-204	Flush rectangular head *See page 04/195* 🇺🇱 🇨🇱 △ C€ ⓒ	**AH164-TL, TL5 AH165-TL, TL5** KKD07-202
Flush rectangular head with guard *See page 04/196* 🇺🇱 🇨🇱 △ C€ ⓒ	**AH164-TGL, TGL5 AH165-TGL, TGL5** KKD07-203	Flush square head with guard *See page 04/196* △ C€ ⓒ	**AH164-SGL, SGL5 AH165-SGL, SGL5** KKD05-075b		

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

■ Pushbutton switches

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

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

Operator	Type	Operator	Type
Push-lock, turn-reset (32mm dia.) *See page 04/200* 🇺🇱 🇨🇱 △ C€ ⓒ	**AH165-V5R** KKD07-221	Push-lock, turn-reset (40mm dia.) *See page 04/200* 🇺🇱 🇨🇱 △ C€ ⓒ	**AH165-V6R** KKD07-222

Note: ⓒ: *See page 04/292*

■ Selector switches

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

■ Pilot lights

Lens	Type	Lens	Type	Lens	Type
Extended round *See page 04/206* 🆄 🆆 △ C E ⒸⒸⒸ	**AH164-Z** **AH165-Z** KKD07-212	Flush square *See page 04/206* 🆄 🆆 △ C E ⒸⒸⒸ	**AH164-ZS** **AH165-ZS** KKD05-094b	Flush rectangular *See page 04/206* 🆄 🆆 △ C E ⒸⒸⒸ	**AH164-ZT** **AH165-ZT** KKD07-211
Dome *See page 04/206* 🆄 🆆 △ C E	**AH165-ZM** AF87-45				

■ Buzzers

Sound	Type	Sound	Type	Sound	Type
Standard *See page 04/208*	**AH164-TX** AF87-317	Loud sound *See page 04/208*	**AH164-TX1** AF87-44	Loud sound with volume control *See page 04/208* 🆄 🆆 △ C E	**AH164-TX2B** KKD07-223
Standard sound with volume control (IP54) *See page 04/208* 🆄 🆆 △ C E	**AH165-X** KKD05-096b				

Note: ⒸⒸⒸ: *See page 04/292*

AH165-2 (oil-tight)

■ Illuminated pushbutton switches

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

Note: ⓒ : See page 04/292

■ Pushbutton switches

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

04

■ Selector switches

Operator	Type	Operator	Type	Operator	Type
Knob *See page 04/218* 🆄ᴸ 🆂🅿 ⚠ CE ⒸⒸⒸ	**AH165-2P** KKD07-232	Knob with square bezel *See page 04/218* 🆄ᴸ 🆂🅿 ⚠ CE ⒸⒸⒸ	**AH165-2YP** KKD07-234	Key *See page 04/218* 🆄ᴸ 🆂🅿 ⚠ CE ⒸⒸⒸ	**AH165-2J** KKD09-003L
Key with square bezel *See page 04/218* 🆄ᴸ 🆂🅿 ⚠ CE ⒸⒸⒸ	**AH165-2YJ** KKD09-003R	Lever *See page 04/219* 🆄ᴸ 🆂🅿 ⚠ CE	**AH165-2H** AF87-209	Lever with square bezel *See page 04/219* 🆄ᴸ 🆂🅿 ⚠ CE	**AH165-2SH** AF87-203

■ Illuminated selector switches

Operator	Type
Knob *See page 04/221* 🆄ᴸ 🆂🅿 ⚠ CE ⒸⒸⒸ	**AH165-2PL** KKD07-240

■ Pilot lights

Lens	Type	Lens	Type	Lens	Type
Flush round *See page 04/222* 🆄ᴸ 🆂🅿 ⚠ CE ⒸⒸⒸ	**AH165-2Z** AF87-213	Extended round *See page 04/222* 🆄ᴸ 🆂🅿 ⚠ CE ⒸⒸⒸ	**AH165-2ZE** AF87-212	Flush square *See page 04/222* 🆄ᴸ 🆂🅿 ⚠ CE ⒸⒸⒸ	**AH165-2SZ** AF87-205
Extended square *See page 04/222* 🆄ᴸ 🆂🅿 ⚠ CE ⒸⒸⒸ	**AH165-2SZE** AF87-204				

Note: ⒸⒸⒸ: *See page 04/292*

Fuji Electric FA Components & Systems Co., Ltd./D & C Catalog
Information subject to change without notice

■ **Type number nomenclature**

Pushbuttons, illuminated pushbuttons and pilot lights

<u>AH165-2</u> <u>FL</u> <u>R</u> <u>11</u> <u>E</u> <u>3</u> − <u>W</u>
  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

04

■ 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 pushubutton switch
		   Momentary action: 1 million
		   Alternate action: 250,000
		   Push-lock, turn-reset: 100,000
		   With selector ring: 250,000
		Selector and illuminated selector switch: 250,000*2

	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
Pollution degree		3
Vibration		Resonance: 10 to 55Hz, double amplitude 0.1mm Constant: 16.7Hz, double amplitude 3mm
Shock		Malfunction durability: 100m/s^2 Mechanical durability: 500m/s^2
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 04/194

■ **Lamp ratings**

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

Notes: 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**

Operator	Lamp	Voltage	Contact	Momentary action Type	Alternate action Type	Dimensions, mm
Flush round head	Flat LED	24V DC	1NO+1NC	**AH165-2FL□11E3**	**AH165-2FL5□11E3**	
			2NO+2NC	**AH165-2FL□22E3**	**AH165-2FL5□22E3**	
			3NO+3NC	**AH165-2FL□33E3**	**AH165-2FL5□33E3**	
	Incandescent	24V AC/DC	1NO+1NC	**AH165-2FL□11E**	**AH165-2FL5□11E**	
			2NO+2NC	**AH165-2FL□22E**	**AH165-2FL5□22E**	
			3NO+3NC	**AH165-2FL□33E**	**AH165-2FL5□33E**	
	Neon	110V AC	1NO+1NC	**AH165-2FL□11H1**	**AH165-2FL5□11H1**	
			2NO+2NC	**AH165-2FL□22H1**	**AH165-2FL5□22H1**	
			3NO+3NC	**AH165-2FL□33H1**	**AH165-2FL5□33H1**	
AF87-211		220V AC	1NO+1NC	**AH165-2FL□11M1**	**AH165-2FL5□11M1**	
			2NO+2NC	**AH165-2FL□22M1**	**AH165-2FL5□22M1**	
			3NO+3NC	**AH165-2FL□33M1**	**AH165-2FL5□33M1**	
Extended round head	Flat LED	24V DC	1NO+1NC	**AH165-2EL□11E3**	**AH165-2EL5□11E3**	
			2NO+2NC	**AH165-2EL□22E3**	**AH165-2EL5□22E3**	
			3NO+3NC	**AH165-2EL□33E3**	**AH165-2EL5□33E3**	
	Incandescent	24V AC/DC	1NO+1NC	**AH165-2EL□11E**	**AH165-2EL5□11E**	
			2NO+2NC	**AH165-2EL□22E**	**AH165-2EL5□22E**	
			3NO+3NC	**AH165-2EL□33E**	**AH165-2EL5□33E**	
	Neon	110V AC	1NO+1NC	**AH165-2EL□11H1**	**AH165-2EL5□11H1**	
			2NO+2NC	**AH165-2EL□22H1**	**AH165-2EL5□22H1**	
			3NO+3NC	**AH165-2EL□33H1**	**AH165-2EL5□33H1**	
AF87-210		220V AC	1NO+1NC	**AH165-2EL□11M1**	**AH165-2EL5□11M1**	
			2NO+2NC	**AH165-2EL□22M1**	**AH165-2EL5□22M1**	
			3NO+3NC	**AH165-2EL□33M1**	**AH165-2EL5□33M1**	
Mushroom head	Flat LED	24V DC	1NO+1NC	**AH165-2ML□11E3**	–	
			2NO+2NC	**AH165-2ML□22E3**	–	
			3NO+3NC	**AH165-2ML□33E3**	–	
	Incandescent	24V AC/DC	1NO+1NC	**AH165-2ML□11E**	–	
			2NO+2NC	**AH165-2ML□22E**	–	
			3NO+3NC	**AH165-2ML□33E**	–	
	Neon	110V AC	1NO+1NC	**AH165-2ML□11H1**	–	
			2NO+2NC	**AH165-2ML□22H1**	–	
			3NO+3NC	**AH165-2ML□33H1**	–	
AF87-221		220V AC	1NO+1NC	**AH165-2ML□11M1**	–	
			2NO+2NC	**AH165-2ML□22M1**	–	
			3NO+3NC	**AH165-2ML□33M1**	–	
Mushroom head with square bezel	Flat LED	24V DC	1NO+1NC	**AH165-2YML□11E3**	–	
			2NO+2NC	**AH165-2YML□22E3**	–	
			3NO+3NC	**AH165-2YML□33E3**	–	
	Incandescent	24V AC/DC	1NO+1NC	**AH165-2YML□11E**	–	
			2NO+2NC	**AH165-2YML□22E**	–	
			3NO+3NC	**AH165-2YML□33E**	–	
	Neon	110V AC	1NO+1NC	**AH165-2YML□11H1**	–	
			2NO+2NC	**AH165-2YML□22H1**	–	
			3NO+3NC	**AH165-2YML□33H1**	–	
AF87-220		220V AC	1NO+1NC	**AH165-2YML□11M1**	–	
			2NO+2NC	**AH165-2YML□22M1**	–	
			3NO+3NC	**AH165-2YML□33M1**	–	
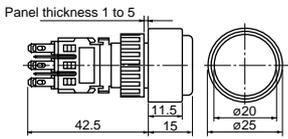
Note: Replace the □ mark by the following color code, *see page 04/215*.

04

Illuminated Pushbutton Switches
AH165-2

■ Illuminated pushbutton switches

Operator	Lamp	Voltage	Contact	Momentary action Type	Alternate action Type	Dimensions, mm
Flush square head 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**	Panel thickness 1 to 5 42.5 11.5 25sq. 20sq.
	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	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2SFL□11H1** **AH165-2SFL□22H1** **AH165-2SFL□33H1**	**AH165-2SFL5□11H1** **AH165-2SFL5□22H1** **AH165-2SFL5□33H1**	
		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**	
Extended square head AF87-200	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2SEL□11E3** **AH165-2SEL□22E3** **AH165-2SEL□33E3**	**AH165-2SEL5□11E3** **AH165-2SEL5□22E3** **AH165-2SEL5□33E3**	Panel thickness 1 to 5 42.5 11.5 15 25sq. 20sq.
	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	**AH165-2SEL□11H1** **AH165-2SEL□22H1** **AH165-2SEL□33H1**	**AH165-2SEL5□11H1** **AH165-2SEL5□22H1** **AH165-2SEL5□33H1**	
		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**	
Concave square head AF87-199	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2SCL□11E3** **AH165-2SCL□22E3** **AH165-2SCL□33E3**	**AH165-2SCL5□11E3** **AH165-2SCL5□22E3** **AH165-2SCL5□33E3**	Panel thickness 1 to 5 42.5 11.5 16.5 20sq. 25sq.
	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	**AH165-2SCL□11H1** **AH165-2SCL□22H1** **AH165-2SCL□33H1**	**AH165-2SCL5□11H1** **AH165-2SCL5□22H1** **AH165-2SCL5□33H1**	
		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**	
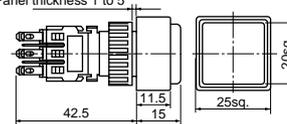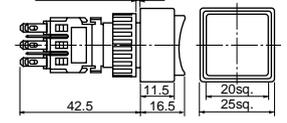
Note: Replace the □ mark by the following color code, *see page 04/215.*

■ **Illuminated pushbutton switches**

Operator	Lamp	Voltage	Contact	Type	Dimensions, mm
Push-lock, turn-reset	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2VL□11E3** **AH165-2VL□22E3** **AH165-2VL□33E3**	Panel thickness 1 to 5 42.5 11.5 22 ø32
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2VL□11E** **AH165-2VL□22E** **AH165-2VL□33E**	
	Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2VL□11H1** **AH165-2VL□22H1** **AH165-2VL□33H1**	
AF87-219		220V AC	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2VL□11M1** **AH165-2VL□22M1** **AH165-2VL□33M1**	
Push-lock, turn-reset with square bezel	Flat LED	24V DC	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2YVL□11E3** **AH165-2YVL□22E3** **AH165-2YVL□33E3**	Panel thickness 1 to 5 42.5 11.5 22 ø32 25sq.
	Incandescent	24V AC/DC	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2YVL□11E** **AH165-2YVL□22E** **AH165-2YVL□33E**	
	Neon	110V AC	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2YVL□11H1** **AH165-2YVL□22H1** **AH165-2YVL□33H1**	
AF87-218		220V AC	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2YVL□11M1** **AH165-2YVL□22M1** **AH165-2YVL□33M1**	
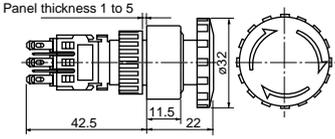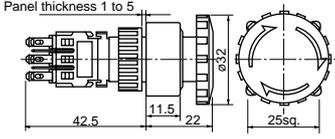
04

• **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 AF87-211	1NO+1NC	**AH165-2F☐11**	**AH165-2F5☐11**	Panel thickness 1 to 5 42.5 11.5 ø20 ø25
	2NO+2NC	**AH165-2F☐22**	**AH165-2F5☐22**	
	3NO+3NC	**AH165-2F☐33**	**AH165-2F5☐33**	
Flush square head AF87-201	1NO+1NC	**AH165-2SF☐11**	**AH165-2SF5☐11**	Panel thickness 1 to 5 42.5 11.5 20sq. 25sq.
	2NO+2NC	**AH165-2SF☐22**	**AH165-2SF5☐22**	
	3NO+3NC	**AH165-2SF☐33**	**AH165-2SF5☐33**	
Extended round head AF87-210	1NO+1NC	**AH165-2E☐11**	**AH165-2E5☐11**	Panel thickness 1 to 5 42.5 11.5 15 ø20 ø25
	2NO+2NC	**AH165-2E☐22**	**AH165-2E5☐22**	
	3NO+3NC	**AH165-2E☐33**	**AH165-2E5☐33**	
Extended square head AF87-200	1NO+1NC	**AH165-2SE☐11**	**AH165-2SE5☐11**	Panel thickness 1 to 5 42.5 11.5 15 20sq. 25sq.
	2NO+2NC	**AH165-2SE☐22**	**AH165-2SE5☐22**	
	3NO+3NC	**AH165-2SE☐33**	**AH165-2SE5☐33**	
Concave square head AF87-199	1NO+1NC	**AH165-2SCE☐11**	**AH165-2SCE5☐11**	Panel thickness 1 to 5 42.5 11.5 16.5 20sq. 25sq.
	2NO+2NC	**AH165-2SCE☐22**	**AH165-2SCE5☐22**	
	3NO+3NC	**AH165-2SCE☐33**	**AH165-2SCE5☐33**	
Mushroom head AF87-215	1NO+1NC	**AH165-2M☐11**	–	Panel thickness 1 to 5 42.5 11.5 22 ø32
	2NO+2NC	**AH165-2M☐22**	–	
	3NO+3NC	**AH165-2M☐33**	–	
Mushroom head with square bezel AF87-214	1NO+1NC	**AH165-2YM☐11**	–	Panel thickness 1 to 5 42.5 11.5 22 ø32 25sq.
	2NO+2NC	**AH165-2YM☐22**	–	
	3NO+3NC	**AH165-2YM☐33**	–	
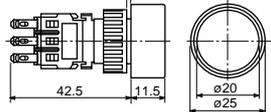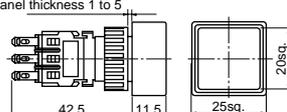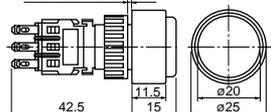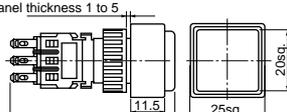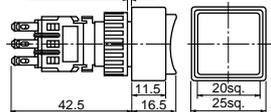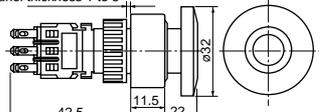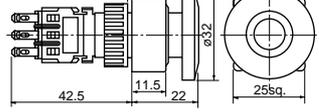
Note: Replace the ☐ mark by the following color code, *see page 04/217*.

■ **Pushbutton switches**

Operator	Contact	Type	Dimensions, mm
With selector ring AF87-207	2NO+2NC	**AH165-2S2□22**	Panel thickness 1 to 5 — ø25 — 42.5 — 11.5 — 22 — 90° ø20
With selector ring with square bezel AF87-206	2NO+2NC	**AH165-2YS2□22**	Panel thickness 1 to 5 — ø25 — 42.5 — 11.5 — 22 — 90° ø20 25sq.
Push-lock, turn-reset AF87-210	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2V□11** **AH165-2V□22** **AH165-2V□33**	Panel thickness 1 to 5 — ø32 — 42.5 — 11.5 — 22
Push-lock, turn-reset with square bezel AF87-200	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2YV□11** **AH165-2YV□22** **AH165-2YV□33**	Panel thickness 1 to 5 — ø32 — 42.5 — 11.5 — 22 — 25sq.
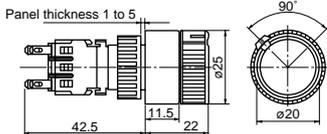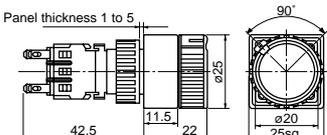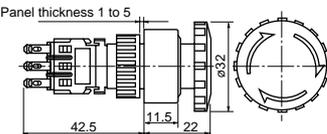
04
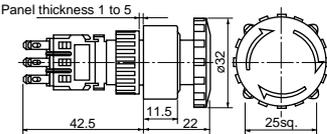
• **Button color**
Replace the □ mark by the following button color code

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

• **Contact arrangement and operator position**
AH165-2S, 2YS

Ring / Button	Left ⊕		Right ⊕	
Free	U 1○ ○2 3○ ○4	L 1○ ○2 3○ ○4	U 1○ ○2 3○ ○4	L 1○ ○2 3○ ○4
Depressed	1○ ○2 3○ ○4	1○ ○2 3○ ○4	1○ ○2 3○ ○4	1○ ○2 3○ ○4

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**

Type number display side

Upper
Lower
③① ②④
└NC┘
└NO┘
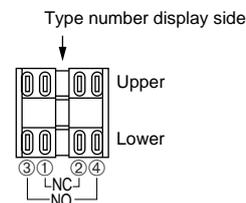
Selector Switches
AH165-2

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

Operator	Operation	Key removable position	Contact	Type	Dimensions, mm
Knob KKD07-232	Maintained	–	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2P2B11** **AH165-2P2B22** **AH165-2P2B33**	Panel thickness 1 to 5 25 / 11.5 / 24 / 42.5 / ø25
	Spring return	– �	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2P0B11** **AH165-2P0B22** **AH165-2P0B33**	
Knob KKD07-234	Maintained	–	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2YP2B11** **AH165-2YP2B22** **AH165-2YP2B33**	Panel thickness 1 to 5 25 / 11.5 / 24 / 42.5 / 25sq.
	Spring return	– ◯	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2YP0B11** **AH165-2YP0B22** **AH165-2YP0B33**	
Key KKD09-003L	Maintained	◯ A	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2J2A11A** **AH165-2J2A22A** **AH165-2J2A33A**	Panel thickness 1 to 5 11.5 / 13.5 / 42.5 / 37 / ø25
		⊗ 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**	
Key with square bezel KKD09-003R	Maintained	◯ A	1NO+1NC 2NO+2NC 3NO+3NC	**AH165-2YJ2A11A** **AH165-2YJ2A22A** **AH165-2YJ2A33A**	Panel thickness 1 to 5 11.5 / 13.5 / 42.5 / 37 / 25sq.
		⊗ 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**	
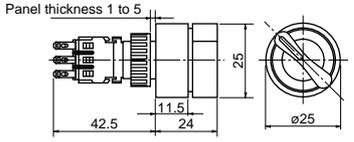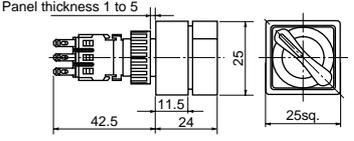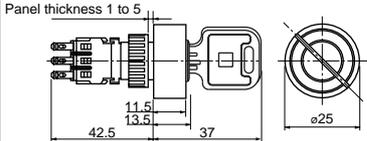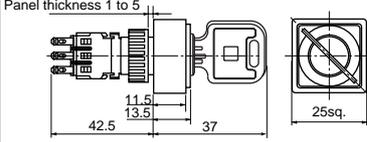
• The key can be removed only at the following positions:

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
↓

Upper
Middle
Lower

③① ②④
└NC┘
└NO┘
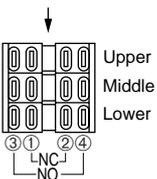
Contact arrangement (terminal No.: common)
1NO+1NC: Middle
2NO+2NC: Upper, lower
3NO+3NC: Upper, middle, lower

• Contact arrangement and operator positions:
2-position

Contact arrangement		1NO+1NC	2NO+2NC	3NO+3NC
Operator position	Left ◯	M 1◯——◯2 3◯ ◯4	U 1◯——◯2 3◯ ◯4 1◯——◯2 3◯ ◯4 L	1◯————◯2 3◯ ◯4 U 1◯——◯2 3◯ ◯4 M 1◯——◯2 3◯ ◯4 L
	Right ⊘	M 1◯——◯2 3◯ ◯4	U 1◯ ◯2 3◯——◯4 1◯ ◯2 3◯——◯4 L	1◯ ◯2 3◯————◯4 U 1◯ ◯2 3◯——◯4 M 1◯ ◯2 3◯——◯4 L

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

Fuji Electric FA Components & Systems Co., Ltd./D & C Catalog
Information subject to change without notice

■ **Selector switches/2-position**

Operator	Lever color	Operation	Contact	Type	Dimensions, mm		
Lever AF87-209	Black	Maintained	1NO+1NC	**AH165-2H2B11**	Panel thickness 1 to 5		
			2NO+2NC	**AH165-2H2B22**		45°	
			3NO+3NC	**AH165-2H2B33**	42.5	11.5 24	ø25
Lever with square bezel AF87-203	Black	Maintained	1NO+1NC	**AH165-2SH2B11**	Panel thickness 1 to 5		
			2NO+2NC	**AH165-2SH2B22**		45°	
			3NO+3NC	**AH165-2SH2B33**	42.5	11.5 24	25sq.
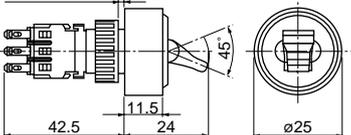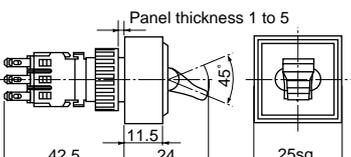
04

• **Contact arrangement and operator position**

AH165-2H, 2SH

Lever / Contact block	Up	Down
1NO+1NC	M 1○ ○2 3○ ○4	M 1○ ○2 3○ ○4
2NO+2NC	U L 1○ ○2 1○ ○2 3○ ○4 3○ ○4	U L 1○ ○2 1○ ○2 3○ ○4 3○ ○4
3NO+3NC	U M L 1○ ○2 1○ ○2 1○ ○2 3○ ○4 3○ ○4 3○ ○4	U M L 1○ ○2 1○ ○2 1○ ○2 3○ ○4 3○ ○4 3○ ○4

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

⬇

Upper
Middle
Lower

③① ②④
└NC┘
└─NO─┘

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

Selector Switches
AH165-2

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

Operator	Operation	Key removable position	Contact	Type	Dimensions, mm
Knob KKD07-233	Mainteined	–	2NO+2NC 3NO+3NC	**AH165-2P3B22** **AH165-2P3B33**	Panel thickness 1 to 5 25, 11.5, 24, 42.5, ø25
	Spring/ manual return ↻	–	2NO+2NC 3NO+3NC	**AH165-2P6B22** **AH165-2P6B33**	
	Spring/ manual return ↻	–	2NO+2NC 3NO+3NC	**AH165-2P7B22** **AH165-2P7B33**	
	Spring return ↻	–	2NO+2NC 3NO+3NC	**AH165-2P1B22** **AH165-2P1B33**	
Knob with square bezel KKD07-235	Mainteined	–	2NO+2NC 3NO+3NC	**AH165-2YP3B22** **AH165-2YP3B33**	Panel thickness 1 to 5 25, 11.5, 24, 42.5, 25sq.
	Spring/ manual return ↻	–	2NO+2NC 3NO+3NC	**AH165-2YP6B22** **AH165-2YP6B33**	
	Spring/ manual return ↻	–	2NO+2NC 3NO+3NC	**AH165-2YP7B22** **AH165-2YP7B33**	
	Spring return ↻	–	2NO+2NC 3NO+3NC	**AH165-2YP1B22** **AH165-2YP1B33**	
Key KKD09-003R	Mainteined	⦸ A	2NO+2NC 3NO+3NC	**AH165-2J3A22A** **AH165-2J3A33A**	Panel thickness 1 to 5 11.5, 13.5, 42.5, 37, ø25
		① 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	① 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**	
	↻	① E	2NO+2NC 3NO+3NC	**AH165-2J7E22A** **AH165-2J7E33A**	
	Spring return ↻	① E	2NO+2NC 3NO+3NC	**AH165-2J1E22A** **AH165-2J1E33A**	
Key with square bezel KKD09-003L	Mainteined	⦸ A	2NO+2NC 3NO+3NC	**AH165-2YJ3A22A** **AH165-2YJ3A33A**	Panel thickness 1 to 5 11.5, 13.5, 42.5, 37, 25sq.
		① 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	① 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**	
	↻	① E	2NO+2NC 3NO+3NC	**AH165-2YJ7E22A** **AH165-2YJ7E33A**	
	Spring return ↻	① E	2NO+2NC 3NO+3NC	**AH165-2YJ1E22A** **AH165-2YJ1E33A**	
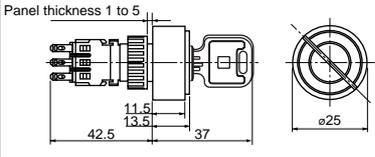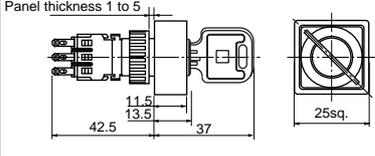
• The Key can be removed at the following positions:

A: ⦸   B: ⊗   C: ⊛   D: ⊘   E: ①   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○ᵁ○2 1○ᴸ○2 3○ ○4 3○—○4		1○ᵁ○2 1○ᴹ○2 1○ᴸ○2 3○ ○4 3○—○4 3○—○4		
	Center ①	1○—○2 1○—○2 3○ ○4 3○ ○4		1○—○2 1○—○2 1○—○2 3○ ○4 3○ ○4 3○ ○4		
	Right ⊘	1○ ○2 1○—○2 3○—○4 3○ ○4		1○ ○2 1○ ○2 1○—○2 3○—○4 3○—○4 3○ ○4		
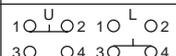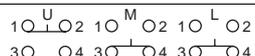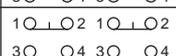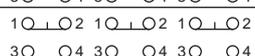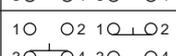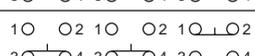
U: Upper contact block   M: Middle contact block   L: Lower contact block
• Contact block positions: *See page 04/219*

Fuji Electric FA Components & Systems Co., Ltd./D & C Catalog

Information subject to change without notice

■ **Illuminated selector switches**

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

KKD07-240

04

• **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
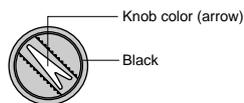
Knob color (arrow)
Black

• **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

Upper
Middle
Lower
③① ②④
NC
NO
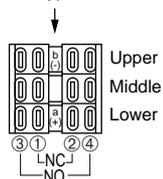
Contact arrangement (terminal No.: common)
1NO+1NC: Middle
2NO+2NC: Upper, lower

• **Contact arrangement and operator positions:**

2-position

Contact arrangement		1NO+1NC	2NO+2NC
Operator position	Left	M	U / L
	Right	M	U / L

3-position

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

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

Pilot Lights
AH165-2

■ Pilot lights

Lens	Lamp	Voltage	Type	Dimensions, mm
Flush round AF87-213	Flat LED	24V DC	**AH165-2Z□E3**	Panel thickness 1 to 5 a (+) b (-) 24 11.5 ø20 ø25
	Incandescent	24V AC/DC	**AH165-2Z□E**	
	Neon	110V AC	**AH165-2Z□H1**	
		220V AC	**AH165-2Z□M1**	
Flush square AF87-205	Flat LED	24V DC	**AH165-2SZ□E3**	Panel thickness 1 to 5 a (+) b (-) 24 11.5 20sq. 25sq.
	Incandescent	24V AC/DC	**AH165-2SZ□E**	
	Neon	110V AC	**AH165-2SZ□H1**	
		220V AC	**AH165-2SZ□M1**	
Extended round AF87-212	Flat LED	24V DC	**AH165-2ZE□E3**	Panel thickness 1 to 5 a (+) b (-) 24 11.5 15 ø20 ø25
	Incandescent	24V AC/DC	**AH165-2ZE□E**	
	Neon	110V AC	**AH165-2ZE□H1**	
		220V AC	**AH165-2ZE□M1**	
Extended square AF87-204	Flat LED	24V DC	**AH165-2SZE□E3**	Panel thickness 1 to 5 a (+) b (-) 24 11.5 15 20sq. 25sq.
	Incandescent	24V AC/DC	**AH165-2SZE□E**	
	Neon	110V AC	**AH165-2SZE□H1**	
		220V AC	**AH165-2SZE□M1**	
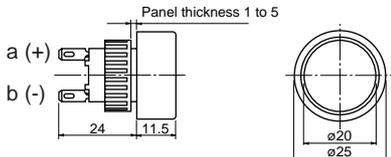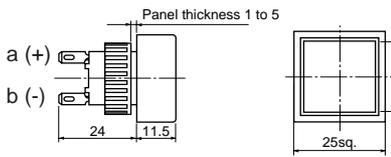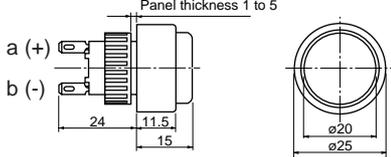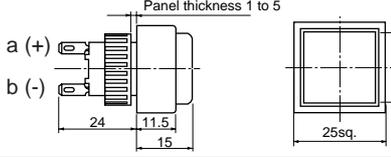
• Lens color
Replace the □ mark by the following lens color code

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.

■ **Mounting space, mm**

• **Illuminated pushbuttons, pushbuttons, selector switches, illuminated selector switches and pilot lights**

Round head
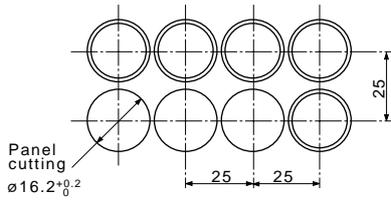
Square head
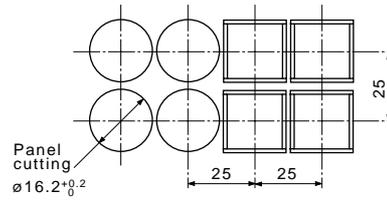
**Mushroom head
Push-lock, turn-reset**

Panel cutting ø16.2$^{+0.2}_{0}$ 25   25

Panel cutting ø16.2$^{+0.2}_{0}$ 25   25

Panel cutting ø16.2$^{+0.2}_{0}$ 33

25

25

33

04
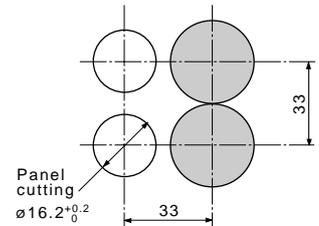
■ **Terminal number**

| Type	Wiring	Terminal position
Illuminated pushbuttons, Illuminated selector switches	a (+) b (-) ① ┃ ② ③ ④	Type number display side ③① b(-) ②④ ③① ②④ ③① a(+) ②④
Pushbuttons Selector switches	① ┃ ② ③ ④	
Pilot lights (without transformer)	a (+) b (-)	Type number display side ⊕ a ① b

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 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 while pressing the catch arms inward.

Operator base

Catch leg

Mounting hole

Panel

Nut

Contact holder
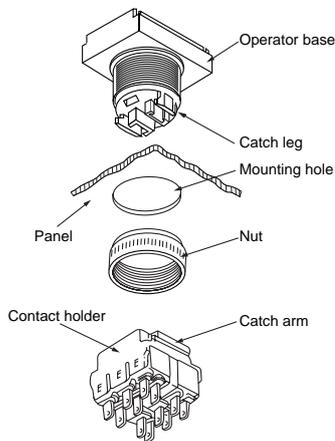
Catch arm

■ 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.
③Insert and secure the transformer unit while assembling the contact block holder with the retainer metal.
④Connect 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: –)
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.

Operator

Panel

Catch leg

Mounting hole

Retainer metal

Washer

Contact block holder

Nut

Catch leg

Catch arm

Transformer

Receptacle terminal

Lamp terminal

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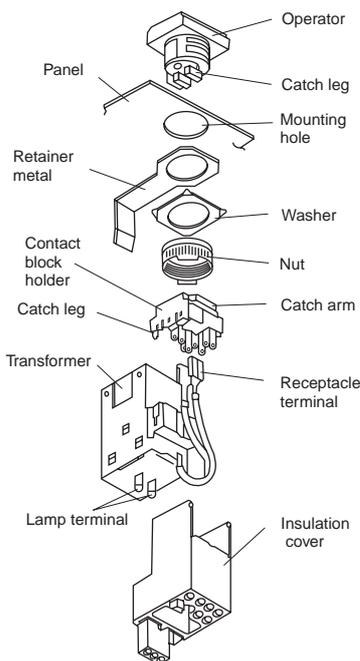
■ Installing the protection cover / dust-tight cover, guard-ring

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).

Metal frame

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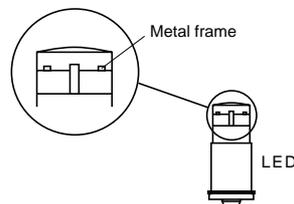
- To replace the lamp of a AH165-2 illuminated pushbutton switch (ML,VL), remove the button and draw out the oil-tight cap.

Remover (AHX618)

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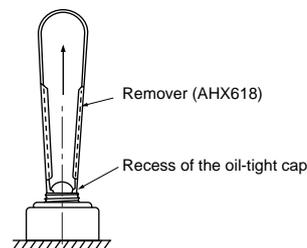
- Then, replace the lamp using a lamp changer (AHX672) and push the oil-tight cap into its original position with its engaging projection properly adjusted (see the figure below).

VL

ML

Engaging projection of oil-tight cap

Engaging recess at the inner end of the switch
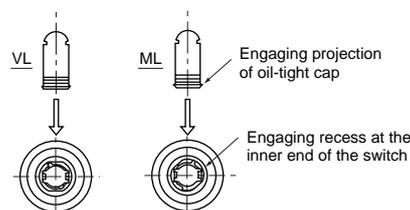
Note: Lamp of AH165-ZM type can not be replaced.

■ Method of replacing color lens
• To remove the color lens , insert a small screwdriver into the color lens and twist in direction of the arrow.

Screen

Color lens

Screen

Color lens   Legend plate

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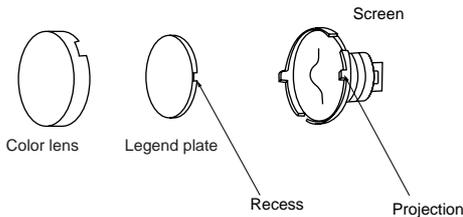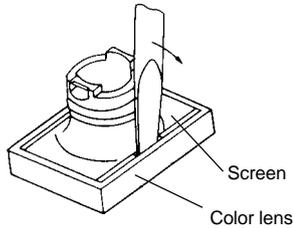
• For an AH165-2, use a small standard screwdriver or a similar tool with a flat end. If one side of the color lens is removed from the screen, insert the screwdriver or a similar tool deeper and remove the color lens together with the screen.

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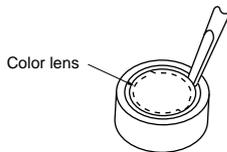
■ Replacing pushbuttons
In the case of alternative action type pushbutton switches and illuminated pushbutton switches, be sure not to replace the pushbuttons in their locked state. This could result in internal damage to the mechanism.

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

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

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

■ Key type selector switch
• Five key types (Type B to Type F) are available besides Type A, which is the standard key type. Be sure to use a key with a symbol which is matched with the symbol on the main unit.
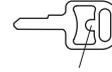
Symbol on the key   Symbol on the main unit

• 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^2 (solder)
  Flat connection terminal
  (2.8□-1.25-5) 0.5 to 1.25mm^2
  (2.8□-0.5-5) 0.2 to 0.5mm^2
• 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.

04

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

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

Example 1
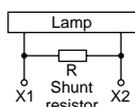
Example 2

Lamp
R
Shunt resistor
X1   X2

Transformer
C   R   C: Capacitor
X1   X2   R: Resistor

• 24V DC
R: 10kΩ (1W)
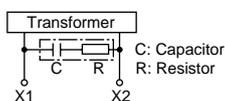
• 110V AC
C: 0.33μF (250V AC)
R: 120Ω (0.25W)
• 220V AC
C: 0.33μF (250V AC)
R: 120Ω (0.25W)

• 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 3,500Ω (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.

04

■ Accessories for AH164 and AH165

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

Description	Type		
Legend sheet	Round Type: **AHX615-□** Legend: ON, OFF, UP, DOWN		
	Square Type: **AHX616-□** Legend: ON, OFF, UP, DOWN START, STOP, OPEN CLOSE, AUTO, MAN, RESET, POWER, REV, FWD, HIGH, LOW		
	Rectangular Type: **AHX617-□** Legend: ON, OFF, UP, DOWN START, STOP, AUTO, MAN, FOWARD, REVERSE		
SH-165	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	**AHX665**	White	ø12.2 x 0.9
	AHX665-C	Transparent	
	AHX665-B	Black	
Square	**AHX666**	White	12.2sq. x 0.9
	AHX666-C	Transparent	
	AHX666-B	Black	
Rectangular	**AHX667**	White	12.2 x 18.2 x 0.9
	AHX667-C	Transparent	
SH-164	**AHX667-B**	Black	
Legend plate for spot LED (Acrylic resin)	Type	Dimensions, mm	
Round	**AHX650**	ø12.2 x 0.9	
Square	**AHX651**	12.2sq. x 0.9	
Rectangular	**AHX652**	12.2 x 18.2 x 0.9	
SP-113			
Legend plate for selector switch (2-position)	Type: **AHX664** Legend: ON-OFF Legend: Blank Dimensions, mm: 24sq. x 0.5		
SH-226A			
Legend plate for symbol mark	Mark	Type	
Square	○	**AHX666-E**	
Rectangular		**AHX667-E**	
Square	I	**AHX666-H**	
Rectangular		**AHX667-H**	
Square	Ⓣ	**AHX666-T**	
AF87-74 Rectangular		**AHX667-T**	
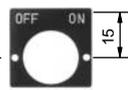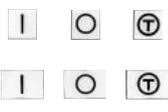
Description	Type

Protection cover
 	
KKD07-246
 	
KKD07-248
 	
KKD07-247
	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
	
	AHX671 AHX669
	33.2 31.5 23.5 10.5 14 ø16.2 18 ø16.2 24
	
	AHX826
	24 23.5 13.7 33.2
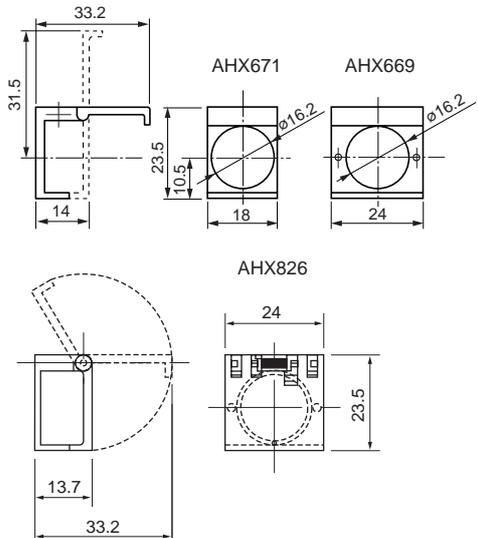
Dust-tight cover AF91-123, SI-41	For round and square head button Type: **AHX822** Dimensions, mm: 24sq. x 14.2 For rectangular head button Type: **AHX668** Dimensions, mm: 24 x 30 x 14.2 For mushroom head button Type: **AHX649** Dimensions, mm: ø30 x 18 These covers protect against dust. Note: Applicable panel thickness is 2.0mm max.
Guard ring SI-42	Type Color Dimensions, mm **AHX676-B** Black ø21 x 12 **AHX676-GY** Gray 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.
Transformer AF90-949	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**

■ Accessories for AH165-2

Description	Type
Color lens (Round)	**For flush head** (Used with 2F, 2F5, 2FL, 2FL5, 2Z) Color / Type Green — **AHX2604-G** Red — **AHX2604-R** Yellow — **AHX2604-Y** Blue — **AHX2604-S** Orange — **AHX2604-O** Clear — **AHX2604-C** **For extended head** (Used with 2E, 2E5, 2EL, 2EL5, 2ZE) Color / Type Green — **AHX2605-G** Red — **AHX2605-R** Yellow — **AHX2605-Y** Blue — **AHX2605-S** Orange — **AHX2605-O** Clear — **AHX2605-C** AF87-631
Color lens (Square)	**For flush head** (Used with 2SF, 2SF5, 2SFL, 2SFL5, 2SZ) Color / Type Green — **AHX2606-G** Red — **AHX2606-R** Yellow — **AHX2606-Y** Blue — **AHX2606-S** Orange — **AHX2606-O** Clear — **AHX2606-C** **For extended head** (Used with 2SE, 2SE5, 2SEL, 2SEL5, 2SZE) Color / Type Green — **AHX2607-G** Red — **AHX2607-R** Yellow — **AHX2607-Y** Blue — **AHX2607-S** Orange — **AHX2607-O** Clear — **AHX2607-C** **For concave head** (Used with 2SCE, 2SCE5, 2SCL, 2SCL5) Color / Type Green — **AHX2608-G** Red — **AHX2608-R** Yellow — **AHX2608-Y** Blue — **AHX2608-S** Orange — **AHX2608-O** Clear — **AHX2608-C** AF87-632

04

Description	Type		
Legend plate	**For flush head**		
	Color	Type	Used with
	White	**AHX2609-W**	Incandescent lamp, LED lamp, Pushbutton [1]
	Clear	**AHX2609-C**	Neon lamp [2]
	Black	**AHX2609-B**	Pushbutton [3]
	Dimensions, mm: ø18 x 0.9 [4]		
	For extended head		
	Color	Type	Used with
	White	**AHX2610-W**	Incandescent lamp, LED lamp, Pushbutton [1]
	Clear	**AHX2610-C**	Neon lamp [2]
	Black	**AHX2610-B**	Pushbutton [3]
	Dimensions, mm: ø18 x 4.4 [4]		
	For flush square		
	Color	Type	Used with
	White	**AHX2611-W**	Incandescent lamp, LED lamp, Pushbutton [1]
	Clear	**AHX2611-C**	Neon lamp [2]
	Black	**AHX2611-B**	Pushbutton [3]
	Dimensions, mm: 17sq. x 0.9		
	For extended square, concave square		
	Color	Type	Used with
	White	**AHX2612-W**	Incandescent lamp, LED lamp, Pushbutton [1]
	Clear	**AHX2612-C**	Neon lamp [2]
	Black	**AHX2612-B**	Pushbutton [3]
	Dimensions, mm: 17sq. x 4.4		
	[1] Illuminated pushbutton switches and pilot lights with incandescent lamps or LED lamps, Pushbutton switches (excluding). [2] Illuminated pushbutton switches and pilot lights with neon lamps. [3] Pushbutton switches (black) [4] Engraved range: 17mm dia.		
	AF87-631 AF87-630		
Mushroom head button	**For illuminated pushbuttons** (Used with 2ML, 2YML) Color — Type Green — **AHX2614-G** Red — **AHX2614-R** White — **AHX2614-W** Yellow — **AHX2614-Y** Blue — **AHX2614-S** Orange — **AHX2614-O** **For non-illuminated pushbuttons** (Used with 2M, 2YM) Color — Type Green — **AHX2613-G** Red — **AHX2613-R** White — **AHX2613-W** Yellow — **AHX2613-Y** Blue — **AHX2613-S** Orange — **AHX2613-O** Black — **AHX2613-B** AF87-633		

Description	Type
Push-lock, turn-reset button AF87-634	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**
Dust-tight cover AF87-636	For flush round (Used with 2F, 2FL, 2F5, 2FL5) Type: **AHX2603-2** For flush square (Used with 2SF, 2SFL, 2SF5, 2SFL5) Type: **AHX2603-2S** These covers protect against dust.
Key washer AF87-635	Type: **AHX2601** Mounting hole, mm

For the key washer mounting hole:

$1.7^{+0.2}_{0}$

rmax.0.8

$17.9^{+0.2}_{0}$

$\varnothing 16.2^{+0.2}_{0}$

04

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

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

Description	Type	
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 AF87-637	Type: **AHX2602** 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 KKD06-305, KKD06-304	Terminal	Type
	Solder/Tab	**AGX001**
	Wire-wrap	**AGX001–W**
Dummy unit SK-1141	Type: **AGX002** 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 SM-334	Type: **AGX012** This tool is used for replacing the contact blocks or dummy units.	
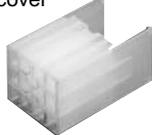
Description	Type		
Sockets	Terminal	Type	Used with
	Solder/Tab	**AHX697-S**	Pushbuttons
	Wire-wrap	**AHX697-W**	
	PC board	**AHX697-P**	
	Solder/Tab	**AHX697-SL**	Illuminated
	Wire-wrap	**AHX697-WL**	pushbuttons
	PC board	**AHX697-PL**	
	Contact arrangement is 2NO+2NC only. Except for AH165-2PL types		
SM-1097			
Sockets for LED	Terminal	Type	
	Solder/Tab	**AHX697-SH3**	
	Wire-wrap	**AHX697-WH3**	
	• Contact arrangement is 2NO+2NC only. • These sockets are used only when LED lamps rated for 24V DC are used under 110V AC/DC. • Except for AH164, 165 and 165-2 series pilot lights or AH165-2PL type. • When side-by-side mounting and continuous lighting, note that a socket has higher temperature over the ambient temperature.		
SM-1098			

Dimensions, mm

Solder/Tab
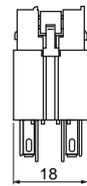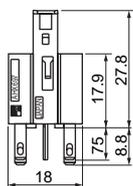
PC board mounting
Pushbuttons

27.8 17.9 .75 8.8 18 18

12 8-ø1.3 6.3 14.3

Wire-wrap   PC board

18.5 19.8   3.5 4.8   1 0.5

Illuminated pushbuttons

12 0.6 10-ø1.3 10.3 6.3 14.3

Switch

Socket
50.6
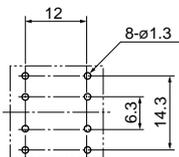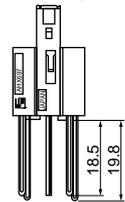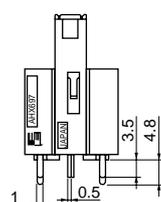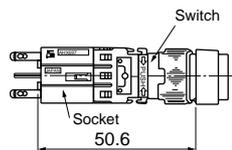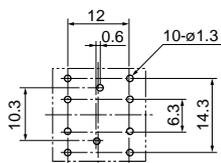
For wiring to wire-wrap pin terminals, select appropriate wire sizes and tool from the table below.

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.

■ **Mass, gram**

AH164 series

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

Type			
AH164-Z (Without transformer)	6.9		
Z (With transformer)	50.9		
ZS (Without transformer)	7.5		
ZS (With transformer)	51.5		
ZT (Without transformer)	8.2		
ZT (With transformer)	52.2		
AH164-TX	16		
TX1	17.5		
TX2B	13		

AH165 series

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

Type			
AH165-Z (Without transformer)	6.9		
Z (With transformer)	50.9		
ZS (Without transformer)	7.5		
ZS (With transformer)	51.5		
ZT (Without transformer)	8.2		
ZT (With transformer)	52.2		
ZM (Without transformer)	5.4		
AH165-X	13.7		

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

04

■ Mass, gram
AH165-2 series

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