IDEC

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ø25mm TWS Series Switches & Pilot Lights



IDEC CORPORATION

(14/03/18)

ø25 TWS Series (Selection Guide)

Function	Pushbutton				
Category	Flush	Extended	Extended with Half Shroud	Extended with Full Shroud	Mushroom
	Momentary/Maintained				
Shape					
Model	**ABS1 AOS1**	**ABS2 AOS2**	**ABGS2 AOGS2**	**ABFS2 AOFS2**	**ABS3 AOS3**
Page	9	9	9	C-9	10

Function	Pushbutton			
Category	Mushroom with Full Shroud Momentary/Maintained	Mushroom Pushlock Turn Reset	Mushroom Push Turn Lock	Mushroom Push-Pull
Shape				
Model	**ABGS3 AOGS3**	**AVS3**	**AJS3**	**AYS3**
Page	10	10	10	11

Function	Pushbutton			
Category	Square Flush	Square Extended	Square Twin	Square Twin
	Momentary/Maintained		Momentary	Maintained
Shape				
Model	**UBQS1 UOQS1**	**UBQS2**	**UWQN1**	**UWQN2**
Page	11	11	12	12

Function	Pilot Light				
Category	Dome	Square (Marking) (Plastic Bezel)	Square (Marking) (Metal Bezel)	Rectangular (Marking) (Plastic Bezel)	Dome Push-to-Check
Shape					
Model	**APS1**	**UPQS1B**	**UPQMS1B**	**UPQS4B**	**APS1*PN**
Page	13	13	13	13	13

Function	Illuminated Pushbutton				
Category	Extended (Non-marking)	Extended with Half Shroud (Non-marking)	Extended with Full Shroud (Non-marking)	ø35mm Mushroom (Non-marking)	Mushroom Pushlock Turn Reset
Shape					
Model	**ALS2** **AOLS2**	**ALGS2** **AOLGS2**	**ALFS2** **AOLFS2**	**ALS3** **AOLS3**	**AVLS3**
Page	15	16	17	18	18

Function	Illuminated Pushbutton	Selector Switch			Illuminated Selector Switch
Category	Square Flush (Marking)	Knob	Lever	Key	Knob
Shape					
Model	**ULQS1B** **UOLQS1B**	**ASS**	**ASS□L**	**ASS□K**	**ASLS**
Page	19	21	22	23	24

ø25 TWS Series

Highly reliable heavy-duty switches and pilot lights
Suitable for industrial use

- HW-C contact blocks are used.
- Degree of protection: IP65 (IEC 60529)
- UL and CSA approved, EN and CCC compliant

Applicable Standards	Mark	File No. or Organization
UL508	UL LISTED	UL Listing File No. E68961
CSA C22.2 No.14	SP	CSA File No. LR21451
EN60947-1	TÜV	TÜV Rheinland
	CE	EU Low Voltage Directive
GB14048.5	CCC	CCC No. 2007010305223156 (Pilot light: 2007010304226714)



Specifications and Ratings

Contact Ratings

Contact Block	Rated Insulation Voltage	600V
	Rated Continuous Current	10A
	Contact Ratings by Utilization Category IEC 60947-5-1	AC-15 (A600) DC-13 (P600)

Characteristics

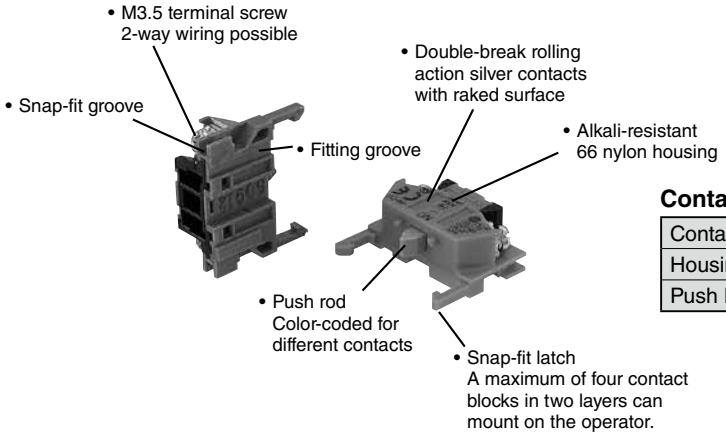
Contact Ratings by Utilization Category

Operational Voltage			24V	48V	50V	110V	220V	440V
Operational Current	AC 50/60 Hz	AC-12 Control of resistive loads and solid state loads	10A	—	10A	10A	6A	2A
		AC-15 Control of electromagnetic loads (> 72 VA)	10A	—	7A	5A	3A	1A
	DC	DC-12 Control of resistive loads and solid state loads	8A	4A	—	2.2A	1.1A	—
		DC-13 Control of electromagnets	4A	2A	—	1.1A	0.6A	—

Minimum applicable load: 3V AC/DC, 5 mA (applicable range may vary with operating conditions and load types)

For the units listed below, the rated current (load switching current) is reduced to a half of the rated operational current of the contact block. The rated insulation voltage (600V) and the rated thermal current (10A) remain unchanged.
- Selector switches and illuminated selector switches with contact code 2R, 3S, 4S, or 4R.

HW-C (Contact Block)



Contact Blocks

Contact	NO	NC	$\overline{NO}$ (early make)	$\overline{NC}$ (late break)
Housing	Blue	Purple red	Blue	Purple red
Push Rod	Green	Red	Black	White

Note: BS contact block is used for square twin pushbuttons UWQN1 and UWQN2.

Specifications

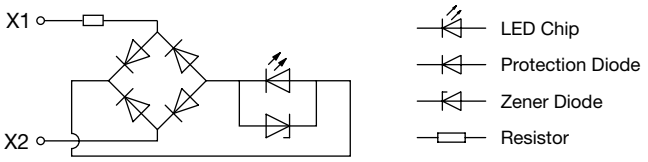
Operating Temperature	–25 to +50°C (no freezing)
Storage Temperature	–40 to +80°C (no freezing)
Operating Humidity	45 to 85% RH (no condensation)
Contact Resistance	50 mΩ maximum (initial value)
Insulation Resistance	100 MΩ minimum (500V DC megger)
Dielectric Strength	Between live and dead metal parts: 2,500V AC, 1 minute (Full voltage illuminated units: 2,000V AC, 1 minute)
Vibration Resistance	Damage Limits: 30 Hz, amplitude 1.5 mm Operating extremes: 5 to 55 Hz, amplitude 0.5 mm
Shock Resistance	Damage limits: 1,000 m/s² Operating extremes: 100 m/s²
Mechanical Life (minimum operations)	Pushbuttons, Illuminated pushbuttons Momentary: 5,000,000 Others: 500,000 Pushlock turn reset: 250,000 Selector switches: 500,000 Key selector switches: 500,000 Illuminated selector switches: 500,000
Electrical Life (minimum operations)	Pushbuttons: 500,000 ∗1 Illuminated pushbuttons: 500,000 ∗1 Pushlock turn reset: 250,000 ∗1 Square twin maintained: 500,000 ∗2 Selector switches: 500,000 ∗3 Key selector switches: 500,000 ∗3 Illuminated selector switches: 250,000 ∗3 Others: 500,000 ∗1 ∗1 Switching frequency 1,800 operations/h, duty ratio 40% ∗2 Switching frequency 900 operations/h, duty ratio 40% ∗3 Switching frequency 1,200 operations/h, duty ratio 40%
Wegiht (approx.)	72g (ABS122N) 36g (APS122DN) 97g (ALS22222DN 76g (ASS222N) 117g (ASS2K22N) 97g (ASLS22222DN)

LED Illuminated Unit Specifications

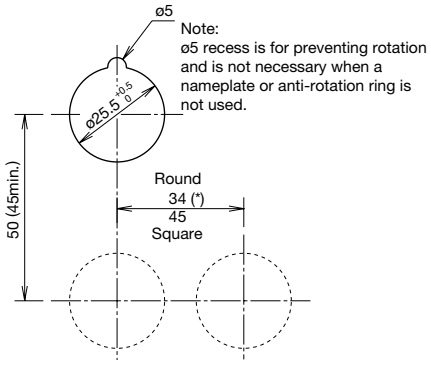
Unit	Color Code ②	Input	Operating Voltage	LED Lamp		
				Lamp Base	Part No.	Voltage
Pilot Light Illuminated Pushbutton Illuminated Selector Switch	A: amber G: green PW: pure white R: red S: blue W: white Y: yellow	Full Voltage	6V AC/DC	BA9S/13	**LSTD-6**②	6V AC/DC ±10%
			12V AC/DC		**LSTD-1**②	12V AC/DC ±10%
			24V AC/DC		**LSTD-2**②	24V AC/DC ±10%
		Transformer	100/110V AC/DC 115/120V AC/DC 200/220V AC/DC 230/240V AC/DC 380V AC/DC 400/440V AC/DC (50/60 Hz)		**LSTD-6**②	6V AC/DC ±10%
		DC-DC Converter	110V DC		**LSTD-6**②	6V AC/DC ±10%

• Use a pure white (PW) LED for yellow illumination.

LED Lamp Ratings (LSTD)

Part No.		LSTD-6②	LSTD-1②	LSTD-2②
Lamp Base		BA9S/13		
Rated Voltage		6V AC/DC	12V AC/DC	24V AC/DC
Voltage Range		6V AC/DC ±10%	12V AC/DC ±10%	24V AC/DC ±10%
Current Draw	AC	8 mA	11 mA	11 mA
	DC	A, R, W: 7 mA, G, PW, S: 5.5 mA	10 mA	10 mA
Color Code ②		A (amber), G (green), PW (pure white), R (red), S (blue), W (white)		
Lamp Base Color		Same as illumination color		
Voltage Marking		Die stamped on the base		
Life (reference value)		Approx. 50,000 hours (The luminance is reduced to 50% the initial intensity when used on complete DC.)		
Internal Circuit				

Mounting Hole Layout



* The minimum mounting centers are applicable to switches with one layer of contact blocks (two contact blocks). When two layers of contact blocks are mounted, determine the minimum mounting centers in consideration of convenience for wiring.
- ø35mm mushroom: 35 mm minimum
- Mushroom with shroud: 42 mm minimum
- 2-position, 3-position lever selector switch: 42 mm minimum
- 4-position, 5-position lever selector switch: 50 mm minimum

Degree of Protection

Part No.	Unit	NEMA ICS 6-110	IEC 60529
A****	Pushbuttons, pilot lights, illuminated pushbutons, and selector switches	Type 1, 2, 3, 3R, 4, 5, 12,13	IP65
	Illuminated selector switches and key selector switches	Type 1, 2, 3R, 5, 12, 13	IP54
U****	Square pushbuttons, square pilot lights, and square illuminated pushbuttons	Type 1, 2	IP40

Ordering Information

Standard Units

- Specify an operator or lens color code in the Part No.
- Full voltage illuminated units are not supplied with a lamp. Order LED lamps separately. Transformer and DC-DC converter illuminated units contain an LED lamp.
- All standard units are UL, CSA, EN, and TÜV approved (except DC-DC converter).
- Terminal covers, nameplates, and accessories are ordered separately.

Terminal Cover

- When a terminal cover is required, order an applicable terminal cover referring to page 29.

The Part No. development charts shown below can be used to specify switches/pilot lights other than those listed on the following pages.

Pushbuttons

ABS1 11 N R

- Button color code
- Contact arrangement code
  - 10: 1NO
  - 01: 1NC
  - 11: 1NO-1NC
  - 20: 2NO
  - 02: 2NC
  - 22: 2NO-2NC
  - 40: 4NO
  - 04: 4NC
  - 13: 1NO-3NC
  - 31: 3NO-1NC
  - 30: 3NO
  - 03: 3NC
  - 12: 1NO-2NC
  - 21: 2NO-1NC

Note:
- Push-pull AYS3 can have a maximum of two contact blocks.

Illuminated Pushbuttons

ALFS2 126 13 D N R

- Lens color code
- Lamp
  - D: LED (Transformer only)
  - (blank): Incandescent
- Contact arrangement code
  - 11: 1NO-1NC
  - 20: 2NO
  - 02: 2NC
  - 31: 3NO-1NC
  - 22: 2NO-2NC
  - 13: 1NO-3NC
  - 40: 4NO
  - 04: 4NC
- Operating voltage code

Pilot Lights

APS1 116 D N R

- Lens color code
- Lamp
  - D: LED (Transformer only)
  - (blank): Incandescent
- Operating voltage code

ø25 TWS Series (Ordering Information)

Selector Switch

ASS 2 L 11 N

- Contact arrangement code
- Operator
  - (blank): Knob
  - L: Lever
- Number of positions

Note:
• See pages C-26 to C-28 for contact arrangement codes.

Illuminated Selector Switch

ASLS 2 16 22 D N R

- Lens color code
- Lamp
  - D: LED (Transformer only)
  - (blank): Incandescent
- Contact arrangement code
- Operating voltage code
- Number of positions

Note:
• See pages C-26 to C-28 for contact arrangement codes.

Key Selector Switch

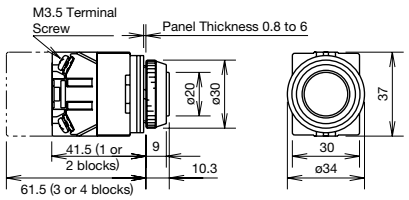
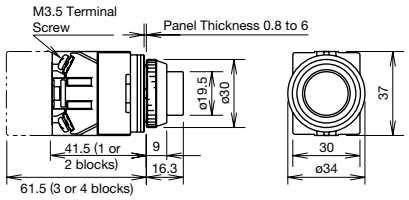
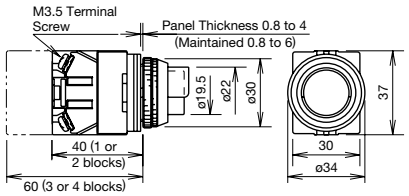
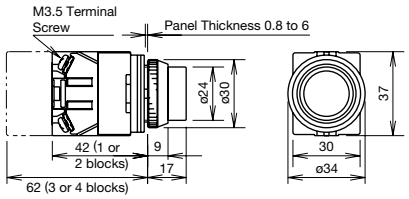
ASS 2 K 20 N B

- Key removable position code
  - 2-position
    - • Maintained
      - (blank): Removable in all positions
      - B: Removable in left only
      - C: Removable in right only
    - • Spring return from right
      - (blank): Removable in left only
    - • Spring return from left
      - (blank): Removable in right only
  - 3-position
    - • Maintained
      - (blank): Removable in all positions
      - B: Removable in left and center
      - C: Removable in right and center
      - D: Removable in center only
      - E: Removable in right and left
      - G: Removable in left only
      - H: Removable in right only
    - • Spring return from right
      - (blank): Removable in left and center
      - D: Removable in center only
      - G: Removable in left only
    - • Spring return from left
      - (blank): Removable in right and center
      - D: Removable in center only
      - H: Removable in right only
    - • Spring return two-way
      - (blank): Removable in center only
- Contact arrangement code
- Number of positions

Note:
• See page 26 to C-28 for contact arrangement codes.
• The key cannot be removed in the return position.

Flush / Extended Pushbuttons

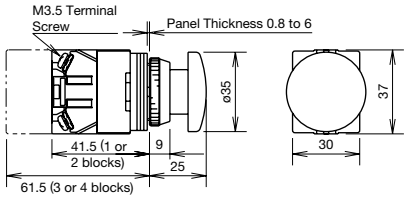
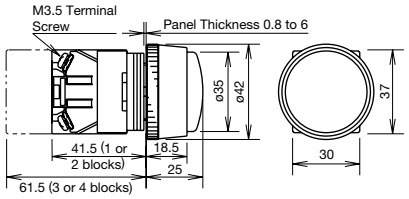
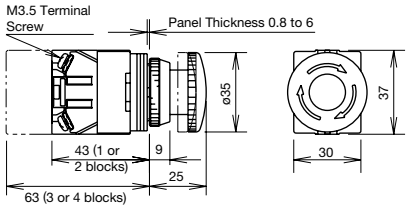
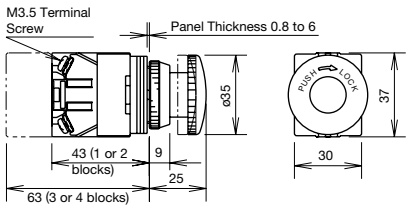
Package Quantity: 1

Shape	Operation	Contact	Part No.	① Button Color Code	Dimensions (mm)
Flush ABS1 AOS1 	Momentary	1NO	**ABS110N①**	Black (B), green (G), and red (R) buttons are supplied with each unit as standard. Specify S, W, or Y when a blue, white, or yellow button is required.	 Note: The depth behind the panel of the maintained unit is 1.5mm longer than the momentary unit.
		1NC	**ABS101N①**		
		1NO-1NC	**ABS111N①**		
		2NO	**ABS120N①**		
		2NC	**ABS102N①**		
		2NO-2NC	**ABS122N①**		
	Maintained	1NO	**AOS110N①**		
		1NC	**AOS101N①**		
		1NO-1NC	**AOS111N①**		
		2NO	**AOS120N①**		
		2NC	**AOS102N①**		
		2NO-2NC	**AOS122N①**		
Extended ABS2 AOS2 	Momentary	1NO	**ABS210N①**		 Note: The depth behind the panel of the maintained unit is 1.5mm longer than the momentary unit.
		1NC	**ABS201N①**		
		1NO-1NC	**ABS211N①**		
		2NO	**ABS220N①**		
		2NC	**ABS202N①**		
		2NO-2NC	**ABS222N①**		
	Maintained	1NO	**AOS210N①**		
		1NC	**AOS201N①**		
		1NO-1NC	**AOS211N①**		
		2NO	**AOS220N①**		
		2NC	**AOS202N①**		
		2NO-2NC	**AOS222N①**		
Extended with Half Shroud ABGS2 AOGS2 	Momentary	1NO	**ABGS210N①**	Specify a button color code in place of ① in the Part No. B: black G: green R: red S: blue W: white Y: yellow	 Note: The depth behind the panel of the maintained unit is 1.5mm longer than the momentary unit.
		1NC	**ABGS201N①**		
		1NO-1NC	**ABGS211N①**		
		2NO	**ABGS220N①**		
		2NC	**ABGS202N①**		
		2NO-2NC	**ABGS222N①**		
	Maintained	1NO	**AOGS210N①**		
		1NC	**AOGS201N①**		
		1NO-1NC	**AOGS211N①**		
		2NO	**AOGS220N①**		
		2NC	**AOGS202N①**		
		2NO-2NC	**AOGS222N①**		
Extended with Full Shroud ABFS2 AOFS2 	Momentary	1NO	**ABFS210N①**		 Note: The depth behind the panel of the maintained unit is 1.5mm longer than the momentary unit.
		1NC	**ABFS201N①**		
		1NO-1NC	**ABFS211N①**		
		2NO	**ABFS220N①**		
		2NC	**ABFS202N①**		
		2NO-2NC	**ABFS222N①**		
	Maintained	1NO	**AOFS210N①**		
		1NC	**AOFS201N①**		
		1NO-1NC	**AOFS211N①**		
		2NO	**AOFS220N①**		
		2NC	**AOFS202N①**		
		2NO-2NC	**AOFS222N①**		

- Specify a button color code in place of ① in the Part No.
- Round bezel and shroud (metal): Chrome-plated
- Pushbuttons with one or three contact blocks contain a dummy block.
- Other contact arrangements are also available. See page 7.

Mushroom / Pushlock Turn Reset / Push Turn Lock Pushbuttons

Package Quantity: 1

Shape	Operation	Contact	Part No.	① Button Color Code	Dimensions (mm)
Mushroom ABS3 AOS3 	Momentary	1NO	**ABS310N**①	Specify a button color code in place of ① in the Part No. B: black G: green R: red S: blue W: white Y: yellow	 Note: The depth behind the panel of the maintained unit is 1.5mm longer than the momentary unit.
		1NC	**ABS301N**①		
		1NO-1NC	**ABS311N**①		
		2NO	**ABS320N**①		
		2NC	**ABS302N**①		
		2NO-2NC	**ABS322N**①		
	Maintained	1NO	**AOS310N**①		
		1NC	**AOS301N**①		
		1NO-1NC	**AOS311N**①		
		2NO	**AOS320N**①		
		2NC	**AOS302N**①		
		2NO-2NC	**AOS322N**①		
Mushroom with Full Shroud ABGS3 AOGS3 	Momentary	1NO	**ABGS310N**①		 Note: The depth behind the panel of the maintained unit is 1.5mm longer than the momentary unit.
		1NC	**ABGS301N**①		
		1NO-1NC	**ABGS311N**①		
		2NO	**ABGS320N**①		
		2NC	**ABGS302N**①		
		2NO-2NC	**ABGS322N**①		
	Maintained	1NO	**AOGS310N**①		
		1NC	**AOGS301N**①		
		1NO-1NC	**AOGS311N**①		
		2NO	**AOGS320N**①		
		2NC	**AOGS302N**①		
		2NO-2NC	**AOGS322N**①		
Pushlock Turn Reset AVS3 		1NO	**AVS310N**①	R: red Y: yellow	
		1NC	**AVS301N**①		
		1NO-1NC	**AVS311N**①		
		2NO	**AVS320N**①		
		2NC	**AVS302N**①		
		2NO-2NC	**AVS322N**①		
Push Turn Lock AJS3 		1NO	**AJS310N**①	B: black G: green R: red Y: yellow	
		1NC	**AJS301N**①		
		1NO-1NC	**AJS311N**①		
		2NO	**AJS320N**①		
		2NC	**AJS302N**①		
		2NO-2NC	**AJS322N**①		

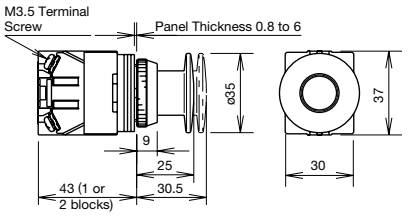
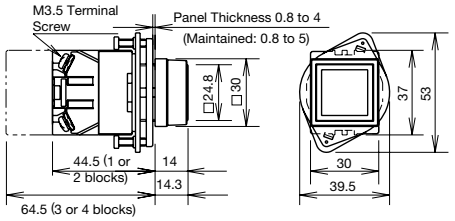
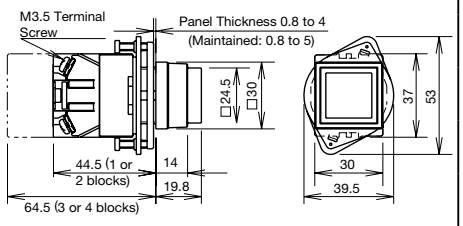
- Specify a button color code in place of ① in the Part No.
- Round bezel (metal): Chrome-plated
- Pushbuttons with one or three contact blocks contain a dummy block.
- Other contact arrangements are also available. See page C-7.
- **Pushlock Turn Reset:** Button is maintained when pressed and is reset when turned clockwise.

Note: AVS3 and AJS3 cannot be used as emergency stop switches. When emergency stop switches are required, use HW series emergency stop switches with HW9Z-A25 ring adapter (ISO 13850 and IEC 60947-5-5 compliant).

- **Push Turn Lock:** Button is locked when turned clockwise in the depressed position and is reset when turned counterclockwise.

Push-Pull / Square Flush / Square Extended Pushbuttons

Package Quantity: 1

Shape	Operation	Contact	Part No.	① Button Color Code	Dimensions (mm)
Mushroom Push-Pull AYS31 	Maintained	1NO	**AYS3110N①**	B: black G: green R: red Y: yellow	
		1NC	**AYS3101N①**		
		1NO-1NC	**AYS3111N①**		
		2NO	**AYS3120N①**		
		2NC	**AYS3102N①**		
Square Flush UBQS1 UOQS1 	Momentary	1NO	**UBQS110N①**	B: black G: green R: red S: blue Y: yellow	
		1NC	**UBQS101N①**		
		1NO-1NC	**UBQS111N①**		
		2NO	**UBQS120N①**		
		2NC	**UBQS102N①**		
		2NO-2NC	**UBQS122N①**		
	Maintained	1NO	**UOQS110N①**		Note: The depth behind the panel of the maintained unit is 1.5mm longer than the momentary unit.
		1NC	**UOQS101N①**		
		1NO-1NC	**UOQS111N①**		
		2NO	**UOQS120N①**		
		2NC	**UOQS102N①**		
		2NO-2NC	**UOQS122N①**		
Square Extended UBQS2 	Momentary	1NO	**UBQS210N①**		
		1NC	**UBQS201N①**		
		1NO-1NC	**UBQS211N①**		
		2NO	**UBQS220N①**		
		2NC	**UBQS202N①**		
		2NO-2NC	**UBQS222N①**		

- Specify a button color code in place of ① in the Part No.
- Round bezel (metal): Chrome-plated
- Square bezel (plastic): Black
- Pushbuttons with one or three contact blocks contain a dummy block.
- Other contact arrangements are also available. See page C-7
- **Push-Pull:** Button is maintained in both depressed and reset positions. Up to 2 contact blocks (1 layer) can be mounted on AYS31 push-pull switches.

Note: AYS31 cannot be used as emergency stop switches. When emergency stop switches are required, use HW series emergency stop switches with HW9Z-A25 ring adapter (ISO 13850 and IEC 60947-5-5 compliant).

Contact Statuses of Push-Pull Switch

Contact	AYS31	
	Push	Pull
1NO		
1NC		
1NO-1NC		
2NO		
2NC		

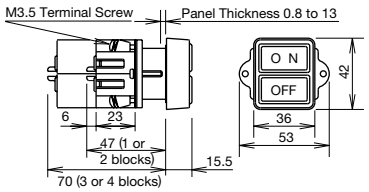
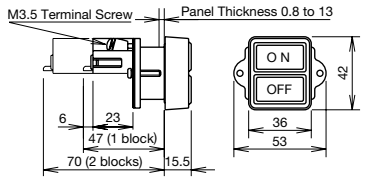
Note: Push-pull switch can have a maximum of two contact blocks.

Panel Mounting of Square Pushbuttons

1. Tighten the square bezel to the operator and position the ring correctly.
2. Lightly tighten the screw to secure the pushbutton onto the panel.

Square Twin Pushbuttons

Package Quantity: 1

Shape	Contact		Part No.	Button Color	Dimensions (mm)
Square Twin (Momentary) UWQN1  	**ON**	**OFF**		ON: Black OFF: Red	
	1NO	1NO	**UWQN11010**		
	1NO	1NC	**UWQN11001**		
	2NO	2NC	**UWQN12002**		
Square Twin (Maintained) UWQN2  	1NO		**UWQN21000**	ON: Black OFF: Red	
	1NC		**UWQN20100**		
	1NO-1NC		**UWQN21100**		
	2NO		**UWQN22000**		
	2NC		**UWQN20200**		

- **Square Twin (Momentary):** Two independent momentary switches are contained in one unit, each operated by ON or OFF button. With the ø30 adapter removed from the sleeve, the unit can mount in a ø25.5mm mounting hole for the ø25 series.
- **Square Twin (Maintained):** The contact operates when ON button is pressed and is maintained in the depressed position. The button is reset by pressing the OFF button. With the ø30 adapter removed from the sleeve, the unit can mount in a ø25.5mm mounting hole for the ø25 series.

Dome / Square / Rectangular (Marking) Pilot Lights

Package Quantity: 1

Shape	Lamp	Part No.	②Lens/LED Color Code
Dome APS1 	Without Lamp	**APS199**②	NA: amber, NC: clear, NG: green, NR: red, NS: blue, NW: white, DNY: yellow
	LED	**APS1**③**DN**②	A: amber, G: green, PW: pure white, R: red, S: blue, W: white, Y: yellow
Square (Marking) UPQS1B (Plastic Bezel) 	Without Lamp	**UPQS1B99**②	NA: amber, NG: green, NR: red, NS: blue, NW: white, DNY: yellow
	LED	**UPQS1B**③**DN**②	A: amber, G: green, PW: pure white, R: red, S: blue, W: white, Y: yellow
Square (Marking) UPQMS1B (Metal Bezel) 	Without Lamp	**UPQMS1B99**②	NA: amber, NG: green, NR: red, NS: blue, NW: white, DNY: yellow
	LED	**UPQMS1B**③**DN**②	A: amber, G: green, PW: pure white, R: red, S: blue, W: white, Y: yellow
Rectangular (Marking) UPQS4B (Plastic Bezel) 	Without Lamp	**UPQS4B99N**②	A: amber, G: green, R: red, S: blue, W: white
Push-to-Check APS1∗PN 	Without Lamp	**APS199PN**②	A: amber, C: clear, G: green, R: red, S: blue, W: white

• Incandescent lamp is also available.

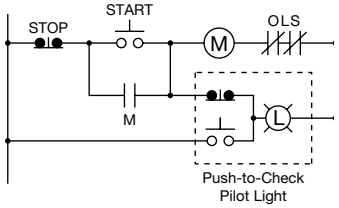
Operating Voltage Code

Specify an operating voltage code in place of ③ in the Part No.

③ Operating Voltage Code LED	Input
66: 6V AC/DC	Full Voltage
11: 12V AC/DC	
22: 24V AC/DC	
16: 100/110V AC	Transformer
126: 115/120V AC	
26: 200/220V AC	
246: 230/240V AC	
386: 380V AC	
46: 400/440V AC	
486: 480V AC	
16D: 110V DC	DC-DC Converter ∗

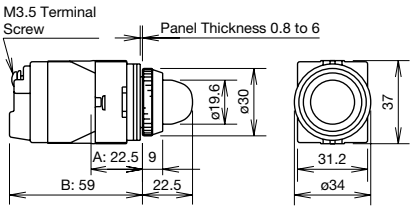
• Specify a color code in place of ② in the Part No.
• Round bezel (metal): Chrome-plated Square bezel (plastic): Black Square bezel (metal): Chrome-plated
∗ DC-DC converter types are not approved by UL, CSA, and TÜV, and not CE compliant (operating voltage 90 to 140V DC).

The lamp of push-to-check pilot light is not connected to the contact terminal. To connect, refer to the circuit diagram example below.



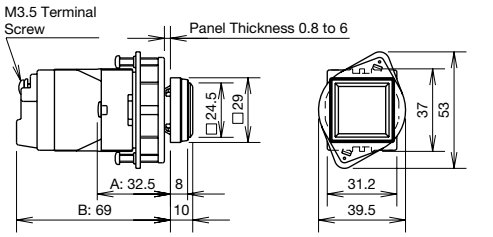
Dimensions

Dome
APS1



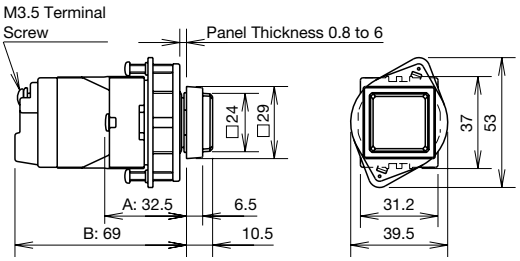
A: Full voltage
B: Transformer

Square (Marking)
UPQS1B (Plastic Bezel)

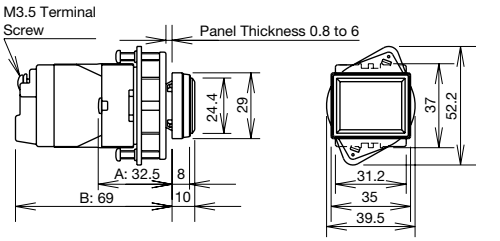


Marking Plate Size: □21.2×1t mm, 2 plates included

Square (Marking)
UPQMS1B (Metal Bezel)

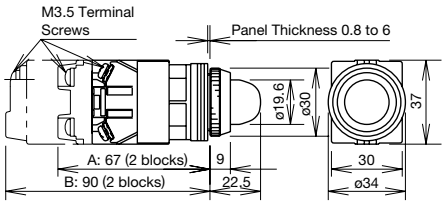


Rectangular (Marking)
UPQS4B



Lens Size: 30.4×24.4×7.6 mm
Marking Plate Size: 27.2×21.2×1t mm, 2 plates included

Push-to-Check
APS1∗PN



A: Full voltage
B: Transformer

All dimensions in mm.

Terminal Wiring (Bottom View)

Arrows indicate access directions for wiring.

Panel Mounting of Square and Rectangular Pilot Lights

1. Tighten the square or rectangular bezel to the operator and position the ring correctly.
2. Lightly tighten the screw to secure the pilot light onto the panel.

Round Extended Illuminated Pushbuttons

Package Quantity: 1

Shape	Operation	Lamp	Contact	Part No.	
Round Extended ALS2 AOLS2 	Momentary	Without Lamp	1NO-1NC	**ALS29911**②	
			2NO	**ALS29920**②	
			2NO-2NC	**ALS29922**②	
		LED	1NO-1NC	**ALS2**③**11DN**②	
			2NO	**ALS2**③**20DN**②	
			2NO-2NC	**ALS2**③**22DN**②	
			1NO-1NC	**ALS21611DDN**②	(Note)
			2NO	**ALS21620DDN**②	(Note)
			2NO-2NC	**ALS21622DDN**②	(Note)
	Maintained	Without Lamp	1NO-1NC	**AOLS29911**②	
			2NO	**AOLS29920**②	
			2NO-2NC	**AOLS29922**②	
		LED	1NO-1NC	**AOLS2**③**11DN**②	
			2NO	**AOLS2**③**20DN**②	
			2NO-2NC	**AOLS2**③**22DN**②	
			1NO-1NC	**AOLS21611DDN**②	(Note)
			2NO	**AOLS21620DDN**②	(Note)
			2NO-2NC	**AOLS21622DDN**②	(Note)

Note: DC-DC converter types.
• Incandescent lamp is also available.

Designation Code

Specify a code in place of ② or ③ in the Part No.

② Lens/LED Color Code		③ Operating Voltage Code	Input
Without Lamp	LED	LED	
Specify a lens color code in place of ②. NA: amber NC: clear NG: green NR: red NS: blue NW: white DNY: yellow	Specify a lens/LED color code in place of ②. A: amber G: green PW: pure white R: red S: blue W: white Y: yellow A pure white LED lamp is used for yellow illumination.	66: 6V AC/DC	Full Voltage
		11: 12V AC/DC	
		22: 24V AC/DC	
		16: 100/110V AC	Transformer
		126: 115/120V AC	
		26: 200/220V AC	
		246: 230/240V AC	
		386: 380V AC	
		46: 400/440V AC	
		486: 480V AC	
		16□□D: 110V DC	DC-DC Converter ∗

• Round bezel (metal): Chrome-plated
• Other contact arrangements are also available. See page 7.
∗ DC-DC converter types are not approved by UL, CSA, and TÜV, and not CE compliant (operating voltage 90 to 140V DC).

Round Extended with Half Shroud Illuminated Pushbuttons

Package Quantity: 1

Shape	Operation	Lamp	Contact	Part No.	
Round Extended with Half Shroud ALGS2 AOLGS2 	Momentary	Without Lamp	1NO-1NC	**ALGS29911**②	
			2NO	**ALGS29920**②	
			2NO-2NC	**ALGS29922**②	
		LED	1NO-1NC	**ALGS2**③**11DN**②	
			2NO	**ALGS2**③**20DN**②	
			2NO-2NC	**ALGS2**③**22DN**②	
			1NO-1NC	**ALGS21611DDN**②	(Note)
			2NO	**ALGS21620DDN**②	(Note)
			2NO-2NC	**ALGS21622DDN**②	(Note)
	Maintained	Without Lamp	1NO-1NC	**AOLGS29911**②	
			2NO	**AOLGS29920**②	
			2NO-2NC	**AOLGS29922**②	
		LED	1NO-1NC	**AOLGS2**③**11DN**②	
			2NO	**AOLGS2**③**20DN**②	
			2NO-2NC	**AOLGS2**③**22DN**②	
			1NO-1NC	**AOLGS21611DDN**②	(Note)
			2NO	**AOLGS21620DDN**②	(Note)
			2NO-2NC	**AOLGS21622DDN**②	(Note)

Note: DC-DC converter types.
• Incandescent lamp is also available.

Designation Code

Specify a code in place of ② or ③ in the Part No.

② Lens/LED Color Code		③ Operating Voltage Code	Input
Without Lamp	LED	LED	
Specify a lens color code in place of ②. NA: amber NC: clear NG: green NR: red NS: blue NW: white DNY: yellow	Specify a lens/LED color code in place of ②. A: amber G: green PW: pure white R: red S: blue W: white Y: yellow A pure white LED lamp is used for yellow illumination.	66: 6V AC/DC	Full Voltage
		11: 12V AC/DC	
		22: 24V AC/DC	
		16: 100/110V AC	Transformer
		126: 115/120V AC	
		26: 200/220V AC	
		246: 230/240V AC	
		386: 380V AC	
		46: 400/440V AC	
		486: 480V AC	
		16□□D: 110V DC	DC-DC Converter ∗

• Round bezel (metal): Chrome-plated
• Other contact arrangements are also available. See page 7.
∗ DC-DC converter types are not approved by UL, CSA, and TÜV, and not CE compliant (operating voltage 90 to 140V DC).

Round Extended with Full Shroud Illuminated Pushbuttons

Package Quantity: 1

Shape	Operation	Lamp	Contact	Part No.	
Round Extended with Full Shroud ALFS2 AOLFS2 	Momentary	Without Lamp	1NO-1NC	**ALFS29911**②	
			2NO	**ALFS29920**②	
			2NO-2NC	**ALFS29922**②	
		LED	1NO-1NC	**ALFS2**③**11DN**②	
			2NO	**ALFS2**③**20DN**②	
			2NO-2NC	**ALFS2**③**22DN**②	
			1NO-1NC	**ALFS21611DDN**②	(Note)
			2NO	**ALFS21620DDN**②	(Note)
			2NO-2NC	**ALFS21622DDN**②	(Note)
	Maintained	Without Lamp	1NO-1NC	**AOLFS29911**②	
			2NO	**AOLFS29920**②	
			2NO-2NC	**AOLFS29922**②	
		LED	1NO-1NC	**AOLFS2**③**11DN**②	
			2NO	**AOLFS2**③**20DN**②	
			2NO-2NC	**AOLFS2**③**22DN**②	
			1NO-1NC	**AOLFS21611DDN**②	(Note)
			2NO	**AOLFS21620DDN**②	(Note)
			2NO-2NC	**AOLFS21622DDN**②	(Note)

Note: DC-DC converter types.
• Incandesent lamp is also available.

Designation Code

Specify a code in place of ② or ③ in the Part No.

② Lens/LED Color Code		③ Operating Voltage Code	Input
Without Lamp	LED	LED	
Specify a lens color code in place of ②. NA: amber NC: clear NG: green NR: red NS: blue NW: white DNY: yellow	Specify a lens/LED color code in place of ②. A: amber G: green PW: pure white R: red S: blue W: white Y: yellow A pure white LED lamp is used for yellow illumination.	66: 6V AC/DC	Full Voltage
		11: 12V AC/DC	
		22: 24V AC/DC	
		16: 100/110V AC	Transformer
		126: 115/120V AC	
		26: 200/220V AC	
		246: 230/240V AC	
		386: 380V AC	
		46: 400/440V AC	
		486: 480V AC	
		16□□D: 110V DC	DC-DC Converter ∗

• Round bezel (metal): Chrome-plated
• Other contact arrangements are also available. See page 7.
∗ DC-DC converter types are not approved by UL, CSA, and TÜV, and not CE compliant (operating voltage 90 to 140V DC).

Mushroom / Mushroom Pushlock Turn Reset Illuminated Pushbuttons

Package Quantity: 1

Shape	Operation	Lamp	Contact	Part No.
ø35mm Mushroom ALS3 AOLS3 	Momentary	Without Lamp	1NO-1NC	**ALS39911N②**
			2NO	**ALS39920N②**
			2NO-2NC	**ALS39922N②**
	Maintained	Without Lamp	1NO-1NC	**AOLS39911N②**
			2NO	**AOLS39920N②**
			2NO-2NC	**AOLS39922N②**
		Incandescent	1NO-1NC	**AOLS3③11N②**
			2NO	**AOLS3③20N②**
			2NO-2NC	**AOLS3③22N②**
Mushroom Pushlock Turn Reset AVLS3 		Without Lamp	1NO-1NC	**AVLS39911NR**
			2NO	**AVLS39920NR**
			2NO-2NC	**AVLS39922NR**
		LED	1NO-1NC	**AVLS3③11DNR**
			2NO	**AVLS3③20DNR**
			2NO-2NC	**AVLS3③22DNR**

• Incandescent lamp is also available.

Designation Code

Specify a code in place of ② or ③ in the Part No.

② Lens Color Code	③ Operating Voltage Code LED	Input
Specify a lens color code in place of ②. A: amber G: green R: red S: blue W: white	66: 6V AC/DC	Full Voltage
	11: 12V AC/DC	
	22: 24V AC/DC	
	16: 100/110V AC	Transformer
	126: 115/120V AC	
	26: 200/220V AC	
	246: 230/240V AC	
	386: 380V AC	
	46: 400/440V AC	
	486: 480V AC	

• Round bezel (metal): Chrome-plated
• Other contact arrangements are also available. See page 7.
• **Pushlock Turn Reset:** Lens is maintained when pressed and is reset when turned clockwise. Red lens only.
• Note: AVLS3 pushlock turn reset switches cannot be used as emergency stop switches. When emergency stop switches are required, use HW series emergency stop switches with HW9Z-A25 ring adapters (ISO 13850 and IEC 60947-5-5 compliant).

Square Flush Illuminated Pushbuttons

Package Quantity: 1

Shape	Operation	Lamp	Contact	Part No.
Square Flush (Marking) ULQS1B UOLQS1B 	Momentary	Without Lamp	1NO-1NC	**ULQS1B9911②**
			2NO	**ULQS1B9920②**
			2NO-2NC	**ULQS1B9922②**
		LED	1NO-1NC	**ULQS1B③11DN②**
			2NO	**ULQS1B③20DN②**
			2NO-2NC	**ULQS1B③22DN②**
	Maintained	Without Lamp	1NO-1NC	**UOLQS1B9911②**
			2NO	**UOLQS1B9920②**
			2NO-2NC	**UOLQS1B9922②**
		LED	1NO-1NC	**UOLQS1B③11DN②**
			2NO	**UOLQS1B③20DN②**
			2NO-2NC	**UOLQS1B③22DN②**

• Incandescent lamp is also available.

Designation Code

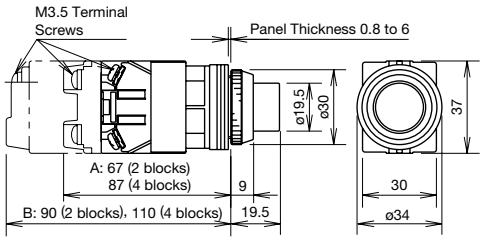
Specify a code in place of ② or ③ in the Part No.

② Lens/LED Color Code		③ Operating Voltage Code	Input
Without Lamp	LED	LED	
Specify a lens color code in place of ②. NA: amber NG: green NR: red NS: blue NW: white DNY: yellow	Specify a lens/LED color code in place of ②. A: amber G: green PW: pure white R: red S: blue W: white Y: yellow A pure white LED lamp is used for yellow illumination.	66: 6V AC/DC	Full Voltage
		11: 12V AC/DC	
		22: 24V AC/DC	
		16: 100/110V AC	Transformer
		126: 115/120V AC	
		26: 200/220V AC	
		246: 230/240V AC	
		386: 380V AC	
		46: 400/440V AC	
		486: 480V AC	

• Square bezel (plastic): Black
• Marking plate size: □21.2 × 1.0 mm (2 pieces supplied)
• Illumination color W (white) and PW (pure white) marking consist of clear lens and white marking plate. See page 38.
• Other contact arrangements are also available. See page 7.

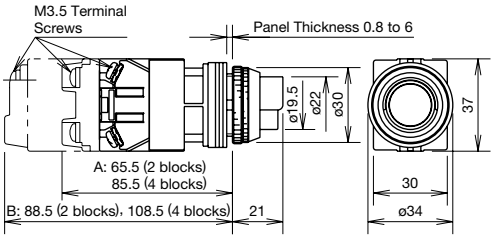
Dimensions

Round Extended
ALS2 / AOLS2



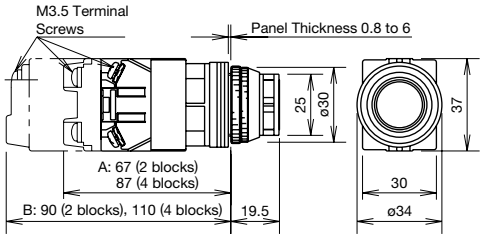
A: Full voltage
B: Transformer

Round Extended with Half Shroud
ALGS2 / AOLGS2



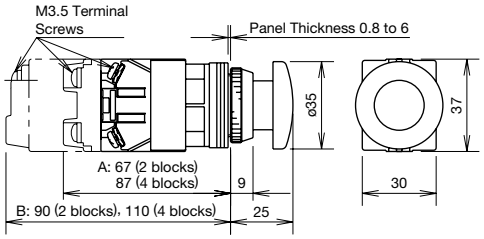
A: Full voltage
B: Transformer

Round Extended with Full Shroud
ALFS2 / AOLFS2



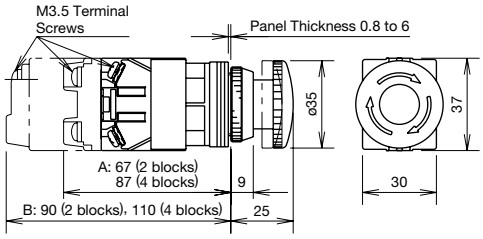
A: Full voltage
B: Transformer

ø35mm Mushroom
ALS3 / AOLS3



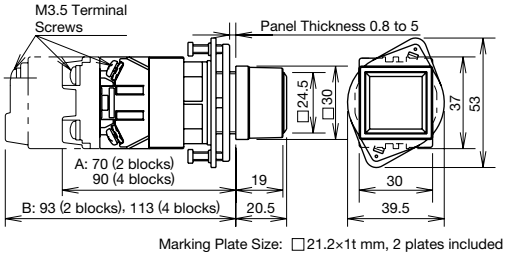
A: Full voltage
B: Transformer

Mushroom Pushlock Turn Reset
AVLS3



A: Full voltage
B: Transformer

Square Flush
ULQS1B / UOLQS1B



Marking Plate Size: □21.2×1t mm, 2 plates included

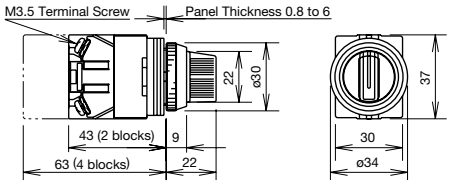
A: Full voltage
B: Transformer

All dimensions in mm.

Selector Switches (Knob Operator)

Package Quantity: 1





90° 2-position

Contact Code	Contact Block: Mounting Position	Contact Block: Contact	Operator Position: L	Operator Position: R	Maintained	Spring Return from Right	Spring Return from Left	—
10 (1NO)	1	NO		●	ASS210N	ASS2110N	ASS2210N ∗	
	2	Dummy						
11 (1NO-1NC)	1	NO		●	ASS211N	ASS2111N	ASS2211N ∗	
	2	NC	●					
20 (2NO)	1	NO		●	ASS220N	ASS2120N	ASS2220N ∗	
	2	NO		●				
22 (2NO-2NC)	1	NO		●	ASS222N	ASS2122N	ASS2222N ∗	—
	2	NC	●					
	3	NO		●				
	4	NC	●					
2R ★ (1NO-1NC)	1	NO		▬	ASS22RN-118 ★	ASS212RN-118 ★	—	
	2	NC	▬					
2R ★ (1NO-1NC)	1	NC		▬	—	—	ASS222RN-169 ★	
	2	NO	▬					

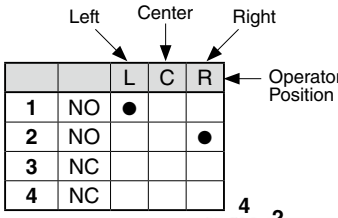
45° 3-position

Contact Code	Contact Block: Mounting Position	Contact Block: Contact	Operator Position: L	Operator Position: C	Operator Position: R	Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-way
20 (2NO)	1	NO	●			ASS320N	ASS3120N	ASS3220N	ASS3320N
	2	NO			●				
02 (2NC)	1	NC		▬		ASS302N	ASS3102N	ASS3202N	ASS3302N
	2	NC	▬						
22 (2NO-2NC)	1	NO	●			ASS322N	ASS3122N	ASS3222N	ASS3322N
	2	NO			●				
	3	NC		▬					
	4	NC	▬						
40 (4NO)	1	NO	●			ASS340N	ASS3140N	ASS3240N	ASS3340N
	2	NO			●				
	3	NO	●						
	4	NO			●				
04 (4NC)	1	NC		▬		ASS304N	ASS3104N	ASS3204N	ASS3304N
	2	NC	▬						
	3	NC		▬					
	4	NC	▬						
3S ★	1	NO	●			ASS33SN-243 ★	—	—	—
	2	NO			●				
	3	NC		●					
	4	Dummy							

30° 5-position / 45° 4-position

Contact Code	Contact Block: Mounting Position	Contact Block: Contact	Operator Position: 1	2	3	4	5	Maintained	Maintained
4S ★	1	NO		▬	▬	▬		ASS44SN-407 ★	—
	2	NC		●					
	3	NC			●				
	4	NO				●			
4S ★	1	NO	●					ASS44SN-411 ★	—
	2	NC		●					
	3	NC			●				
	4	NO				●			
3S ★	1	NO	●					ASS43SN-461 ★	—
	2	NC		●					
	3	NC			●				
	4	Dummy							
4S ★	1	NO	●					—	ASS54SN-501 ★
	2	NC		●					
	3	NC				●			
	4	NO					●		

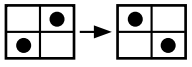
Contact Block Mounting Position and Contact Arrangement Chart





• For more contact arrangement chart, see pages C-26 to C-28.

• On the 2-position selector switches marked with ∗ above, the contact operation is reversed as follows.



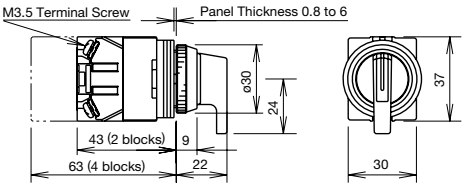
• On the contact arrangement marked with ★ in the table above, the rated current (load switching current) is reduced to a half of the rated current of the contact block. The rated insulation voltage and the rated thermal current remain unchanged.
• Selector switches with one or three contact blocks contain a dummy block.
• Knob operator: White indicator on black knob

Selector Switches (Lever Operator)

Package Quantity: 1

No. of Positions | Shape | ASS□L





Contact Arrangement Chart

90° 2-position

Contact Code	Contact Block: Mounting Position	Contact Block: Contact	Operator Position: L	Operator Position: R	Maintained	Spring Return from Right	Spring Return from Left	—
10 (1NO)	1	NO		●	ASS2L10N	ASS21L10N	ASS22L10N ∗	
	2	Dummy						
11 (1NO-1NC)	1	NO		●	ASS2L11N	ASS21L11N	ASS22L11N ∗	
	2	NC	●					
20 (2NO)	1	NO		●	ASS2L20N	ASS21L20N	ASS22L20N ∗	
	2	NO		●				
22 (2NO-2NC)	1	NO		●	ASS2L22N	ASS21L22N	ASS22L22N ∗	—
	2	NC	●					
	3	NO		●				
	4	NC	●					
2R★ (1NO-1NC)	1	NO	▬		ASS2L2RN-118 ★	ASS21L2RN-118 ★	—	
	2	NC	▬					
2R★ (1NO-1NC)	1	NC	▬		—	—	ASS22L2RN-169★	
	2	NO	▬					

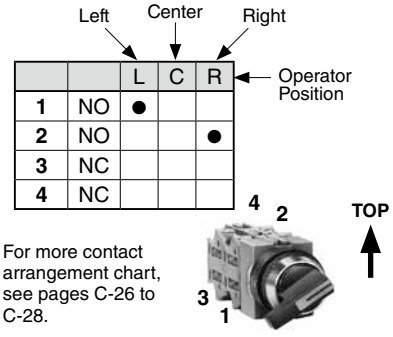
45° 3-position

Contact Code	Contact Block: Mounting Position	Contact Block: Contact	Operator Position: L	Operator Position: C	Operator Position: R	Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-way
20 (2NO)	1	NO	●			ASS3L20N	ASS31L20N	ASS32L20N	ASS33L20N
	2	NO			●				
02 (2NC)	1	NC		▬		ASS3L02N	ASS31L02N	ASS32L02N	ASS33L02N
	2	NC	▬						
22 (2NO-2NC)	1	NO	●			ASS3L22N	ASS31L22N	ASS32L22N	ASS33L22N
	2	NO			●				
	3	NC		▬					
	4	NC	▬						
40 (4NO)	1	NO	●			ASS3L40N	ASS31L40N	ASS32L40N	ASS33L40N
	2	NO			●				
	3	NO	●						
	4	NO			●				
04 (4NC)	1	NC		▬		ASS3L04N	ASS31L04N	ASS32L04N	ASS33L04N
	2	NC	▬						
	3	NC		▬					
	4	NC	▬						
3S ★	1	NO	●			ASS3L3SN-243 ★	—	—	—
	2	NO			●				
	3	NC		●					
	4	Dummy							

30° 5-position / 45° 4-position

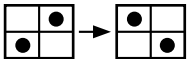
Contact Code	Contact Block: Mounting Position	Contact Block: Contact	Operator Position: 1	2	3	4	5	Maintained	Maintained
4S ★	1	NC		▬	▬	▬		ASS4L4SN-407 ★	—
	2	NC		●					
	3	NC			●				
	4	NO				●			
4S ★	1	NO	●					ASS4L4SN-411 ★	—
	2	NC		●					
	3	NC			●				
	4	NO				●			
3S ★	1	NO	●					ASS4L3SN-461 ★	—
	2	NC		●					
	3	NC			●				
	4	Dummy							
4S ★	1	NO	●					—	ASS5L4SN-501★
	2	NC		●					
	3	NC				●			
	4	NO					●		

Contact Block Mounting Position and Contact Arrangement Chart



• For more contact arrangement chart, see pages C-26 to C-28.

• On the 2-position selector switches marked with ∗ above, the contact operation is reversed as follows.



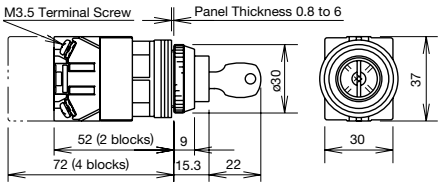
• On the contact arrangement marked with ★ in the table above, the rated current (load switching current) is reduced to a half of the rated current of the contact block. The rated insulation voltage and the rated thermal current remain unchanged.
• Selector switches with one or three contact blocks contain a dummy block.
• Lever operator: White indicator on black lever

Key Selector Switches

Package Quantity: 1

No. of Positions | Shape | Contact Arrangement Chart | ASS□K





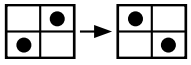
90° 2-position

Contact Code	Contact Block: Mounting Position	Contact Block: Contact	Operator Position: L	R	Maintained	Spring Return from Right	Spring Return from Left	—
10 (1NO)	1	NO		●	**ASS2K10N**	**ASS21K10N**	**ASS22K10N** ∗	
	2	Dummy						
11 (1NO-1NC)	1	NO		●	**ASS2K11N**	**ASS21K11N**	**ASS22K11N** ∗	
	2	NC	●					
20 (2NO)	1	NO		●	**ASS2K20N**	**ASS21K20N**	**ASS22K20N** ∗	
	2	NO		●				
22 (2NO-2NC)	1	NO		●	**ASS2K22N**	**ASS21K22N**	**ASS22K22N** ∗	—
	2	NC	●					
	3	NO		●				
	4	NC	●					
2R ★ (1NO-1NC)	1	NO		▬	**ASS2K2RN-118** ★	**ASS21K2RN-118** ★	—	
	2	NC	▬					
2R ★ (1NO-1NC)	1	NC		▬	—	—	**ASS22K2RN-169** ★	
	2	NO	▬					

45° 3-position

Contact Code	Contact Block: Mounting Position	Contact Block: Contact	Operator Position: L	C	R	Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-way
20 (2NO)	1	NO	●			**ASS3K20N**	**ASS31K20N**	**ASS32K20N**	**ASS33K20N**
	2	NO			●				
02 (2NC)	1	NC		▬		**ASS3K02N**	**ASS31K02N**	**ASS32K02N**	**ASS33K02N**
	2	NC	▬						
22 (2NO-2NC)	1	NO	●			**ASS3K22N**	**ASS31K22N**	**ASS32K22N**	**ASS33K22N**
	2	NO			●				
	3	NC		▬					
	4	NC	▬						
40 (4NO)	1	NO	●			**ASS3K40N**	**ASS31K40N**	**ASS32K40N**	**ASS33K40N**
	2	NO			●				
	3	NO	●						
	4	NO			●				
04 (4NC)	1	NC		▬		**ASS3K04N**	**ASS31K04N**	**ASS32K04N**	**ASS33K04N**
	2	NC	▬						
	3	NC		▬					
	4	NC	▬						
3S ★	1	NO	●			**ASS3K3SN-243** ★	—	—	—
	2	NO			●				
	3	NC		●					
	4	Dummy							

- On the spring-returned, the key can be released only from the maintained position. On the maintained, the key can be released from every position. Key retained positions are also available. See page C-8.
- On the 2-position selector switches marked with ∗ above, the contact operation is reversed as follows.



- On the contact arrangement marked with ★in the table above, the rated current (load switching current) is reduced to a half of the rated current of the contact block. The rated insulation voltage and the rated thermal current remain unchanged.
- Key selector switches with one or three contact blocks contain a dummy block.
- Cylinder cover: Black
  Round bezel (Metal): Chrome-plated

Contact Block Mounting Position and Contact Arrangement Chart



TOP

		Left: L	Center: C	Right: R	Operator Position
1	NO	●			
2	NO			●	
3	NC				
4	NC				

- For more contact arrangement chart, see pages C-26 to C-28.

Illuminated Selector Switches

90° 2-position

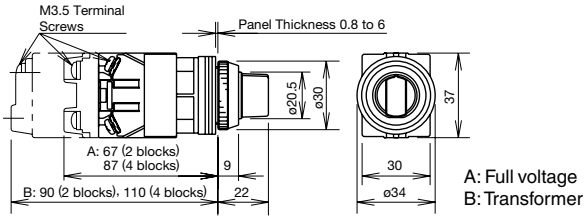
Package Quantity: 1

Shape

Contact Arrangement Chart

ASLS





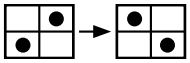
Contact Code	Contact Block		Operator Position		Lamp	Maintained	Spring Return from Right	Spring Return from Left
	Mounting Position	Contact	L	R				
11 (1NO-1NC)	1	NO		●	Without Lamp	**ASLS29911②**	**ASLS219911②**	**ASLS229911② ∗**
	2	NC	●		LED	**ASLS2③11DN②**	**ASLS21③11DN②**	**ASLS22③11DN② ∗**
20 (2NO)	1	NO		●	Without Lamp	**ASLS29920②**	**ASLS219920②**	**ASLS229920② ∗**
	2	NO		●	LED	**ASLS2③20DN②**	**ASLS21③20DN②**	**ASLS22③20DN② ∗**
22 (2NO-2NC)	1	NO		●	Without Lamp	**ASLS29922②**	**ASLS219922②**	**ASLS229922② ∗**
	2	NC	●					
	3	NO		●	LED	**ASLS2③22DN②**	**ASLS21③22DN②**	**ASLS22③22DN② ∗**
	4	NC	●					

Designation Code

Specify a code in place of ② or ③ in the Part No.

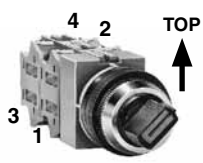
② Lens/LED Color Code		③ Operating Voltage Code	Input
Without Lamp	LED	LED	
Specify a lens color code in place of ②. NA: amber NG: green NR: red NS: blue NW: white DNY: yellow	Specify a lens/LED color code in place of ②. A: amber G: green R: red S: blue W: white Y: yellow A pure white LED lamp is used for yellow illumination.	66: 6V AC/DC	Full Voltage
		11: 12V AC/DC	
		22: 24V AC/DC	
		16: 100/110V AC	Transformer
		136: 115/120V AC	
		26: 200/220V AC	
		256: 230/240V AC	
		386: 380V AC	
		46: 400/440V AC	
		486: 480V AC	

• On the selector switches marked with ∗ above, the contact operation is reversed as follows.



• Round bezel (Metal): Chrome-plated

Contact Block Mounting Position and Contact Arrangement Chart



Left Right

		L	R	Operator Position
1	NO		●	
2	NC	●		
3	NO		●	
4	NC	●		

• For more contact arrangement chart, see pages C-26 to C-28.

Illuminated Selector Switches

45° 3-position

Contact Code	Contact Block		Operator Position			Lamp	Maintained	Spring Return from Right	Spring Return from left	Spring Return Two-way
	Mounting Position	Contact	L	C	R		L C R	L C R	L C R	L C R
20 (2NO)	1	NO	●			Without Lamp	**ASLS39920②**	**ASLS319920②**	**ASLS329920②**	**ASLS339920②**
	2	NO			●	LED	**ASLS3③20DN②**	**ASLS31③20DN②**	**ASLS32③20DN②**	**ASLS33③20DN②**
02 (2NC)	1	NC		▬	▬	Without Lamp	**ASLS39902②**	**ASLS319902②**	**ASLS329902②**	**ASLS339902②**
	2	NC	▬	▬		LED	**ASLS3③02DN②**	**ASLS31③02DN②**	**ASLS32③02DN②**	**ASLS33③02DN②**
22 (2NO-2NC)	1	NO	●			Without Lamp	**ASLS39922②**	**ASLS319922②**	**ASLS329922②**	**ASLS339922②**
	2	NO			●					
	3	NC		▬	▬	LED	**ASLS3③22DN②**	**ASLS31③22DN②**	**ASLS32③22DN②**	**ASLS33③22DN②**
	4	NC	▬	▬						
40 (4NO)	1	NO	●			Without Lamp	**ASLS39940②**	**ASLS319940②**	**ASLS329940②**	**ASLS339940②**
	2	NO			●					
	3	NO	●			LED	**ASLS3③40DN②**	**ASLS31③40DN②**	**ASLS32③40DN②**	**ASLS33③40DN②**
	4	NO			●					
04 (4NC)	1	NC		▬	▬	Without Lamp	**ASLS39904②**	**ASLS319904②**	**ASLS329904②**	**ASLS339904②**
	2	NC	▬	▬						
	3	NC		▬	▬	LED	**ASLS3③04DN②**	**ASLS31③04DN②**	**ASLS32③04DN②**	**ASLS33③04DN②**
	4	NC	▬	▬						

• Incandescent lamp is also available.

Designation Code

Specify a code in place of ② or ③ in the Part No.

② Lens/LED Color Code		③ Operating Voltage Code	Input
Without Lamp	LED	LED	
Specify a lens color code in place of ②. NA: amber NG: green NR: red NS: blue NW: white DNY: yellow	Specify a lens/LED color code in place of ②. A: amber G: green R: red S: blue W: white Y: yellow A pure white LED lamp is used for yellow illumination.	66: 6V AC/DC	Full Voltage
		11: 12V AC/DC	
		22: 24V AC/DC	
		16: 100/110V AC	Transformer
		136: 115/120V AC	
		26: 200/220V AC	
		256: 230/240V AC	
		386: 380V AC	
		46: 400/440V AC	
		486: 480V AC	

• Round bezel (Metal): Chrome-plated

Contact Block Mounting Position and Contact Arrangement Chart



		L	C	R
1	NO	●		
2	NO			●
3	NC			
4	NC			

Left Center Right — Operator Position

• For more contact arrangement chart, see pages C-26 to C-28.

90° 2-position (Maintained / Spring Return)

Positions				Maintained	Spring Return from Right	Spring Return from Left	
				L R	L R	L R	
Operator				Knob, Lever, Key, Illuminated			
				Operator Positions			
Contact Code	Circuit No.	Mounting Position	Contact	L	R	L	R
10 (1NO)	—	1	NO		●	●	
		2	Dummy				
01 (1NC)	—	1	NC	●			●
		2	Dummy				
11 (1NO-1NC)	—	1	NO		●	●	
		2	NC	●			●
	103	1	NC	●			●
		2	NO		●	●	
20 (2NO)	—	1	NO		●	●	
		2	NO		●	●	
02 (2NC)	—	1	NC	●			●
		2	NC	●			●
22 (2NO-2NC)	—	1	NO		●	●	
		2	NC	●			●
		3	NO		●	●	
		4	NC	●			●
	110	1	NC	●			●
		2	NO		●	●	
		3	NC	●			●
		4	NO		●	●	
	111	1	NO		●	●	
		2	NO		●	●	
		3	NC	●			●
		4	NC	●			●
	117	1	NC	●			●
		2	NO		●	●	
		3	NO		●	●	
		4	NC	●			●
31 (3NO-1NC)	107	1	NC	●			●
		2	NO		●	●	
		3	NO		●	●	
		4	NO		●	●	
40 (4NO)	—	1	NO		●	●	
		2	NO		●	●	
		3	NO		●	●	
		4	NO		●	●	
2R ★	118 ★	1	$\overline{NO}$				
		2	$\overline{NC}$				
	168 ★	1	$\overline{NO}$				
		2	$\overline{NC}$				
	119 ★	1	$\overline{NC}$				
		2	$\overline{NO}$				
	169 ★	1	$\overline{NC}$				
		2	$\overline{NO}$				
4R ★	120 ★	1	$\overline{NO}$				
		2	$\overline{NC}$				
		3	$\overline{NO}$				
		4	$\overline{NC}$				
	170 ★	1	$\overline{NO}$				
		2	$\overline{NC}$				
		3	$\overline{NO}$				
		4	$\overline{NC}$				
	121 ★	1	$\overline{NC}$				
		2	$\overline{NO}$				
		3	$\overline{NC}$				
		4	$\overline{NO}$				
	171 ★	1	$\overline{NC}$				
		2	$\overline{NO}$				
		3	$\overline{NC}$				
		4	$\overline{NO}$				

Contact Block Mounting Position and Contact Arrangement Chart



Left Right

		L	R
1	NO		●
2	NC	●	
3	NO		●
4	NC	●	

Operator Position

• On the contact arrangement marked with ★ in the table, the rated current (load switching current) is reduced to a half of the rated current of the contact block. The rated insulation voltage and the rated thermal current remain unchanged.

Part No. Development

• When circuit number is not required:

ASS 2 11 N
- 11 — Contact Code (1NO-1NC)
- 2 — 2-position

• When circuit number is required:

ASS 2 11 N - 103
- 103 — Circuit No.
- 11 — Contact Code (1NO-1NC)
- 2 — 2-position

45° 3-position (Maintained / Spring Return)

Positions	Maintained	Spring Return from Right	Spring Return from Left	Spring Return Two-way
	L C R	L C R	L C R	L C R
Operatorc	Knob, Lever, Key, Illuminated			

Contact Code	Circuit No.	Mounting Position	Contact	Operator Positions L	C	R
11 (1NO-1NC)	202	1	NO	●		
		2	NC			
	203	1	NC			
		2	NO			●
	302	1	NO	●		●
		2	NC			
	303	1	NC		●	
		2	NO			●
20 (2NC)	—	1	NO	●		
		2	NO			●
	301	1	NO			●
		2	NO			●
02 (2NC)	—	1	NC			
		2	NC			
	304	1	NC		●	
		2	NC			
22 (2NO-2NC)	—	1	NO	●		
		2	NO			●
		3	NC			
		4	NC			
	210	1	NC			
		2	NO			●
		3	NC			
		4	NO			●
	308	1	NO	●		●
		2	NC			
		3	NO	●		●
		4	NC			
	309	1	NO	●		●
		2	NC			
		3	NC		●	
		4	NO			●
	310	1	NC		●	
		2	NO			●
		3	NC		●	
		4	NO			●
31 (3NO-1NC)	206	1	NO	●		
		2	NC			
		3	NO	●		
		4	NO			●
	207	1	NC			
		2	NO			●
		3	NO	●		
		4	NO			●
13 (1NC-3NC)	212	1	NO	●		
		2	NC			
		3	NC			
		4	NC			
	313	1	NC		●	
		2	NO			●
		3	NC		●	
		4	NC			

Contact Code	Circuit No.	Mounting Position	Contact	Operator Positions L	C	R
40 (4NO)	—	1	NO	●		
		2	NO			●
		3	NO	●		
		4	NO			●
	305	1	NO	●		●
		2	NO			●
		3	NO	●		●
		4	NO			●
04 (4NC)	—	1	NC			
		2	NC			
		3	NC			
		4	NC			
	314	1	NC		●	
		2	NC			
		3	NC		●	
		4	NC			

Contact Block Mounting Position and Contact Arrangement Chart



Left Center Right

		L	C	R	Operator Position
1	NO	●			
2	NO			●	
3	NC				
4	NC				

Part No. Development

• When circuit number is not required:

ASS 3 22 N
- 22 — Contact Code (2NO-2NC)
- 3 — 3-position

• When circuit number is required:

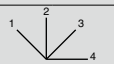
ASS 3 22 N - 210
- 210 — Circuit No.
- 22 — Contact Code (2NO-2NC)
- 3 — 3-position

ø25 TWS Series Selector Switch Contact Arrangement Charts

45° 3-position (Maintained)

Positions				Maintained		
						
Operator				Knob, Lever, Illuminated		
				Operator Positions		
Contact Code	Circuit No.	Mounting Position	Contact	L	C	R
3S★	243 ★	1	NO	●		
		2	NO			●
		3	NC		●	
		4	Dummy			
4S★	233★	1	NO	●		
		2	NC			
		3	NO	●		●
		4	NO			●
	234 ★	1	NO	●		
		2	NC			
		3	NC		●	
		4	NC			
	235 ★	1	NC			
		2	NO			●
		3	NC		●	
		4	NO			●
	237★	1	NO	●		
		2	NO			●
		3	NC		●	
		4	NO			●
	240 ★	1	NC			
		2	NC			
		3	NC		●	
		4	NO			●

45° 4-position (Maintained)

Positions				Maintained			
							
Operator				Knob, Lever			
				Operator Positions			
Contact Code	Circuit No.	Mounting Position	Contact	1	2	3	4
3S ★	461★	1	NO	●			
		2	NC		●		
		3	NC			●	
		4	Dummy				
4S★	405★	1	NC				
		2	NC		●		
		3	NC			●	
		4	NC				
	407 ★	1	NC				
		2	NC		●		
		3	NC			●	
		4	NO				●
	409 ★	1	NO	●			
		2	NC		●		
		3	NC			●	
		4	NC				
	411★	1	NO	●			
		2	NC		●		
		3	NC			●	
		4	NO				●

30° 5-position (Maintained)

Positions				Maintained				
								
Operator				Knob, Lever				
				Operator Positions				
Contact Code	Circuit No.	Mounting Position	Contact	1	2	3	4	5
4S ★	501 ★	1	NO	●				
		2	NC		●			
		3	NC				●	
		4	NO					●

Contact Block Mounting Position and Contact Arrangement Chart

		L	C	R
1	NO	●		
2	NC			
3	NO	●		●
4	NC			●

• On the contact arrangement marked with ★ in the table, the rated current (load switching current) is reduced to a half of the rated current of the contact block. The rated insulation voltage and the rated thermal current remain unchanged.

Part No. Development

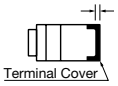
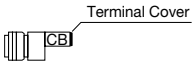
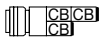
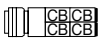
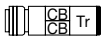
• When circuit number is not required:

ASS 3 4S N
- 4S: Contact Code
- 3: 3-position

• When circuit number is required:

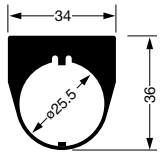
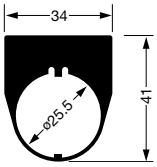
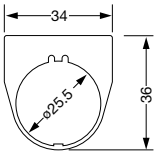
ASS 3 4S N - 233
- 233: Circuit No.
- 4S: Contact Code (2NO-2NC)
- 3: 3-position

Terminal Covers

Switch/Pilot Light	Terminal Cover	HW-VL2  39.8H × 14.1W	**HW-VL3**  37.8H × 26W	**HW-VL5**  39.1H × 15.5W	**APS-PVL**  36H × 29.4W	Use of terminal covers increases the depth by the dimensions below. 
• Pilot light APS UPQS UPQMS	Full Voltage				X	+6 mm
	Transformer DC-DC Converter		X			+3 mm
• Pushbutton ABS AOS ABGS AOGS ABFS AOFS AKS AVS AJS AZS ATS UTS AYS • Selector switch ASS	1 contact block 	X				+3.5 mm
	2 contact blocks 	X 2 pieces				
	3 contact blocks 	X 2 pieces				
	4 contact blocks 	X 2 pieces				
• Illuminated pushbutton ALS AOLFS AOLS ULOS ALGS UOLQS AOLGS AVLS ALFS ATLS • Illuminated selector switch ASLS • Push-to-check pilot light APS	Full Voltage 	X 2 pieces				+3.5 mm
	Full Voltage 			X		+3 mm
	Transformer DC-DC Converter 		X			+3 mm

Ordering Terminal Covers
Terminal covers are ordered separately.
When ordering terminal covers, specify the Part No. and required quantity.

Nameplates

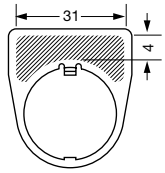
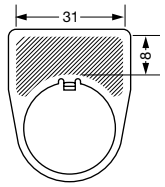
Dimensions (mm)	Legend	Material	Part No.	Ordering No.	Package Quantity	Description
NSA 	Blank	Aluminium 1.2 mm thick	**NSA-0**	**NSA-0**	1	• Black
				NSA-0PN10	10	
	With Legend		**NSA-∗**	**NSA-∗**	1	• White letters on black background
				NSA-∗PN10	10	
NSALO 	Blank	Aluminium 1.2 mm thick	**NSALO**	**NSALO**	1	• Black
				NSALOPN10	10	
NFSO 	Blank	Stainless steel 0.8 mm thick	**NFSO**	**NFSO**	1	• Stainless steel ground color
				NFSOPN10	10	

• Specify a legend code in place of ∗ in the Ordering No.

Legends

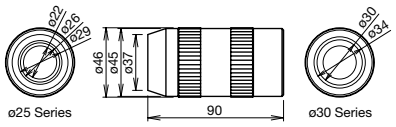
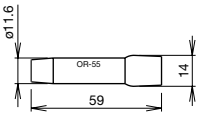
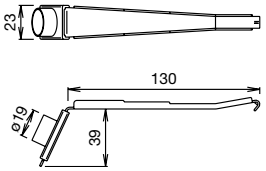
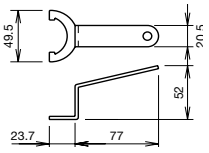
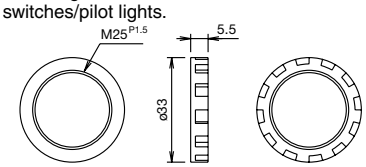
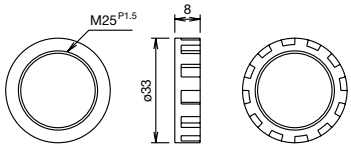
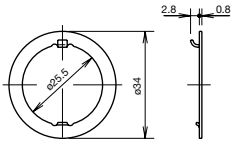
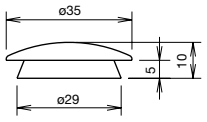
Code	Legend
0	(blank)
1	ON
2	OFF
3	START
4	STOP
31	OFF-ON
35	HAND-AUTO
53	HAND-OFF-AUTO

Example of Shape and Engraving Area

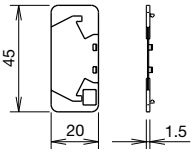
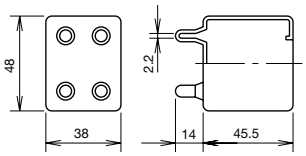
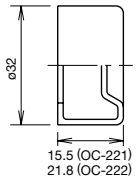
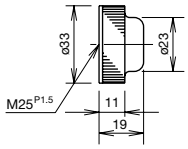
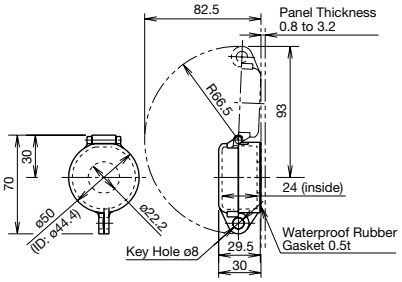
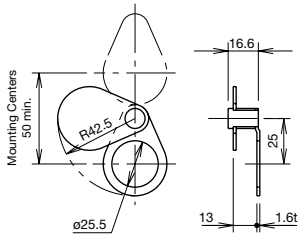
Shape	Engraving Area		Max. No. of Lines	No. of Letters on 1 Line
	Height	Width		
Standard (NSA/NFSO) 	4	31	1	17
Mushroom (NSALO) 	8	31	2	17

• The above example is when the letter is 3 mm tall.
• Engraving must be made within 1.5 mm from the sides.

Accessories

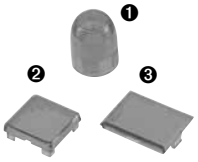
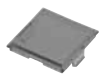
Shape	Material	Part No.	Ordering No.	Package Quantity	Dimensions (mm)
Locking Ring Wrench 	Rubber (nitryl)	**OR-12**	**OR-12**	1	• Used to tighten the round bezel when installing the TWS switch/pilot light onto a panel. 
Lamp Holder Tool 	Rubber (nitryl)	**OR-55**	**OR-55**	1	• Used to install and remove LED/incandescent lamps. 
Contact Block Removal Tool 	Metal (steel: zinc-plated) / Rubber (nitryl)	**TW-KC1**	**TW-KC1**	1	• Used to remove contact blocks, transformers, lenses and adapters. 
Nut Locking Wrench 	Metal (steel: zinc-plated)	**TWST-T1**	**TWST-T1**	1	• Used to tighten the locking ring on the square switches/pilot lights. 
Locking Ring (For Square Units) 	Pushbutton Illuminated Pushbutton	Polyamide	**OG-RT1**	**OG-RT1PN02**	2	• Used to attach square pushbuttons and illuminated pushbuttons on to the panel. • Mounting centers are the same as round switches/pilot lights. 
	Pilot Light	Polyamide	**OG-RT2**	**OG-RT2PN02**	2	• Used to attach pilot lights on to the panel. • Mounting centers are the same as round switches/pilot lights. 
Anti-rotation Ring 	Metal (steel: zinc-plated)	**OGL-21**	**OGL-21PN10**	10	• Used to prevent the operator from rotating. Generally used when using no nameplates on selector switches. 
Rubber Mounting Hole Plug 	Rubber (nitryl /black)	**OBS-13B**	**OBS-13BPN05**	5	• Used to plug unused ø25.5mm mounting holes. Gray also available (ordering no. OBS-13PN05) 

Accessories

Shape		Material	Part No.	Ordering No.	Package Quantity	Dimensions (mm)
Barrier 		Polyamide	**HW-VL1**	**HW-VL1PN10**	10	• Used to prevent contact between adjacent lead wires when units are mounted closely. Barriers should be always used in close mounting. 
Contact Rubber Boot 	For 1 layer of contact blocks (2 contact blocks)	Rubber (nitryl) Black	**OCS-99**	**OCS-99**	1	• Dust cover boot used for pushbuttons and selector switches. • Temperature range: -5 to +60°C • Black 
Button Clear Boot 	For flush pushbuttons	Rubber (EPDM)	**OC-221**	**OC-221**	1	• Used to cover and protect pushbuttons where units are subject to water splash. Not suitable for outdoor use or where the units are subject to oil splash. 
	For extended pushbuttons		**OC-222**	**OC-222**	1	
Button Cover 		Rubber (nitryl)	**OCS-11①**	**OCS-11①**	1	B (black), G (green), R (red), Y (yellow) • Metallic bezels covered with rubber boot to enhance waterproof and oiltight characteristics. • Button is installed in the cover. Remove the button from the pushbutton before using the button cover. • Temperature range: –5 to +60°C 
Padlock Cover 		Polyarylate (gasket: nitryl rubber)	**OLS-KL1**	**OLS-KL1**	1	• Used to protect momentary and maintained pushbuttons, illuminated pushbuttons, knob selector switches, and key selector switches. 
Metal Protector 		Metal (steel: zinc-plated)	**OLS-C**	**OLS-C**	1	• Used to protect flush buttons from inadvertent operation. • Can be easily attached under the round bezel. 

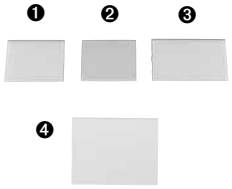
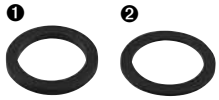
Note: Specify a button cover color code in place of ① in the Ordering No.

Maintenance Parts

Shape		Material	Part No.	Ordering No.	Package Quantity	Color Code
Bezel 	❶Pushbutton Pilot Light	Polycarbonate	**OGP-22①**	**OGP-22①PN02**	2	B (black), G (green), R (red), Y (yellow), W (white) • Cannot be used for switches/ pilot lights with half shroud or full shroud.
	❷Selector Switch		**OGP-33①**	**OGP-33①PN02**		
	❸Pushbutton Pilot Light Key Selector Illuminated Selector	Metal (chrome-plated) ZDC	**OG-22**	**OG-22PN02**		• Cannot be used for switches/ pilot lights with half shroud or full shroud.
	❹Selector Switch (except key selector)		**OG-33**	**OG-33PN02**		
	❺Pushbutton with Full Shroud		**ABS2FN**	**ABS2FN**	1	
	❻Mushroom with Full Shroud		**ABS3GN**	**ABS3GN**		
	❼Pushbutton, Illuminated Pushbutton with Half Shroud	Shroud: brass Others: ZDC	**ALS1G**	**ALS1G**		
	❽Illuminated Pushbutton with Full Shroud	Metal (chrome-plated) ZDC	**ALS1F**	**ALS1F**		
Button 	❶Flush	Polyacetal	**ABS1BN-①**	**ABS1BN-①PN05**	5	B (black), G (green), R (red), S (blue), Y (yellow), W (white) • Light color
	❷Extended		**ABS2BN-①**	**ABS2BN-①PN05**		
	❸ø35mm Mushroom		**ABS3BN-①**	**ABS3BN-①PN02**	2	
	❹Square Flush		**UBQS1BN-①**	**UBQS1BN-①PN02**	2	B (black), G (green), R (red), S (blue), Y (yellow) • Light color
	❺Square Extended		**UBQS2BN-①**	**UBQS2BN-①PN02**		
	❻Pushlock Turn Reset		**AVS3BN-①**	**AVS3BN-①PN02**		R (red), Y (yellow)
	❼Push-Pull		**AYS3BN-①**	**AYS3BN-①PN02**		B (black), G (green), R (red), Y (yellow)
Lens (for illuminated pushbuttons) 	❶Dome	AS resin	**APS106L-②**	**APS106L-②PN05**	5	C (clear), G (green), R (red), S (blue)
			APS106LD-②	**APS106LD-②PN05**		A (amber), W (white), Y (yellow)
	❷For Square Metal Bezel Unit		**UPQS306L-②**	**UPQS306L-②PN05**		C (clear), G (green), R (red), S (blue)
			UPQS306LD-②	**UPQS306LD-②PN05**		A (amber), Y (yellow)
	❸Rectangular		**UPQS406L-②**	**UPQS406L-②PN05**		A (amber), C (clear), G (green), R (red), S (blue)
Lens (for pilot lights and illuminated pushbuttons) 	For Square with Plastic Bezel	AS resin	**UPQS106L-②**	**UPQS106L-②PN05**	5	C (clear), G (green), R (red), S (blue)
			UPQS106LD-②	**UPQS106LD-②PN05**	5	A (amber), Y (yellow)
Lens 	❶Extended	AS resin	**ALS06L-②**	**ALS06L-②PN05**	5	C (clear), G (green), R (red), S (blue)
			ALS06LD-②	**ALS06LD-②PN05**		A (amber), Y (yellow), W (white)
	❷Mushroom		**ALS3L-②**	**ALS3L-②PN02**	2	G (green), R (red), S (blue)
			ALS3LD-②	**ALS3LD-②PN02**		A (amber), W (white)
	❸Pushlock Turn Reset		**AVLS3L-R**	**AVLS3L-RPN02**		

Note: Specify a button color code or lens color code in place of ① or ② in the Ordering No.
Use a clear lens for white or pure white illumination.

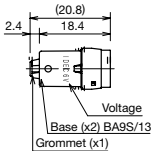
Maintenance Parts

Shape		Material	Part No.	Ordering No.	Package Quantity	Remarks
Selector Operator 	❶Knob	Plastic	**ASSHHY-①**	**ASSHHY-①PN02**	2	B (black), G (green), R (red)
	❷Lever		**ASSHHL-①**	**ASSHHL-①PN02**		
	❸Color Insert		**TWS-HC1①**	**TWS-HC1①PN05**	5	B (black), G (green), R (red), S (blue), Y (yellow), W (white)
	❹Illuminated Selector	Plastic	**ASLSLDY-②**	**ASLSLDY-②**	1	G (green), R (red), S (blue)
			ASLSDDY-②	**ASLSDDY-②**		A (amber), W (white), Y (yellow),
Cap for Key Selector 		Plastic	**AKS2B-①**	**AKS2B-①PN05**	5	B (black), R (red)
Clear Button Cover 		Plastic	**ABS1B-C**	**ASB1B-CPN05**	5	B (black), G (green), R (red), W (white) Y (yellow) • Used on flush pushbuttons to indicate a mark or a symbol engraved on the marking plate. The clear button cover holds the marking plate.
Marking Plate for Clear Button Cover 		Plastic	**TWS-0①**	**TWS-0①PN10**	10	
Marking Plate 	❶For Square Pilot Lights and Illuminated Pushbuttons	Plastic	**UPQS106P-W**	**UPQS106P-WPN02**	2	• □21.2 × 1t mm
			UPQS106P-C	**UPQS106P-CPN02**		
	❷For Square Pilot Lights with Metal Bezel		**UPQS306N-W**	**UPQS306N-WPN02**		• □20 × 2t mm
	❸❹For Rectangular Pilot Lights		**UPQS406P-W**	**UPQS406P-WPN02**		27.2 × 21.2 × 1t mm
			UPQS406P-C	**UPQS406P-CPN02**		
Contact Block 	1NO		**HW-C10**	**HW-C10**	1	Housing: Blue Push rod: Green
	1NC		**HW-C01**	**HW-C01**		Housing: Purple red Push rod: Red
	Early Make		**HW-C10R**	**HW-C10R**		Housing: Blue Push rod: Black
	Late Break		**HW-C01R**	**HW-C01R**		Housing: Purple red Push rod: White
Dummy Block 			**TW-DB**	**TW-DBPN10**	10	• Used for non-illuminated units with 1NO or 1NC contact blocks.
Full Voltage Adapter 			**TW-DA1B**	**TW-DA1BPN02**	2	• Adapter with M3.5 screws used for illuminated pushbutton or illuminated selector switch. Snaps on to the back of the contact block.
Spare Key 	For Key Selector Switch	Metal	**TW-SK-0**	**TW-SK-0PN02**	2	
Rubber Washer 	❶3.0-mm thick	Rubber	**OW-22**	**OW-22PN10**	10	• Outside diameter: ø33.8 • Inside diameter: ø25.5
	❷1.5-mm thick		**OW-21**	**OW-21PN10**		

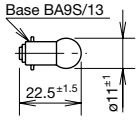
Note: Specify a color code in place of ① or ② in the Ordering No.

Maintenance Parts

LED Lamps (LSTD)

Dimensions	Operating Voltage	Current Draw AC	Current Draw DC	Part No.	Ordering No.	Illumination Color Code	Package Quantity	Base
 	6V AC/DC ±5%	8 mA	7 mA (A, R, W) 5.5 mA (G, PW, S)	**LSTD-6②**	**LSTD-6②**	Specify a color code in place of ② in the Ordering No. A: amber G: green PW: pure white R: red S: blue W: white Use a pure white (PW) LED lamp with yellow (Y) lens.	1	BA9S/13
					LSTD-6②PN10		10	
	12V AC/DC ±10%	11 mA	10 mA	**LSTD-1②**	**LSTD-1②**		1	
					LSTD-1②PN10		10	
	24V AC/DC ±10%	11 mA	10 mA	**LSTD-2②**	**LSTD-2②**		1	
					LSTD-2②PN10		10	

Incandescent Lamps (LS)

Dimensions	Rated Operating Voltage	Lamp Ratings	Part No.	Package Quantity
 	6V AC/DC	1W (6.3V)	**LS-6**	1
	12V AC/DC	1W (18V)	**LS-8**	
	18V AC/DC	1W (24V)	**LS-2**	
	24V AC/DC	1W (30V)	**LS-3**	

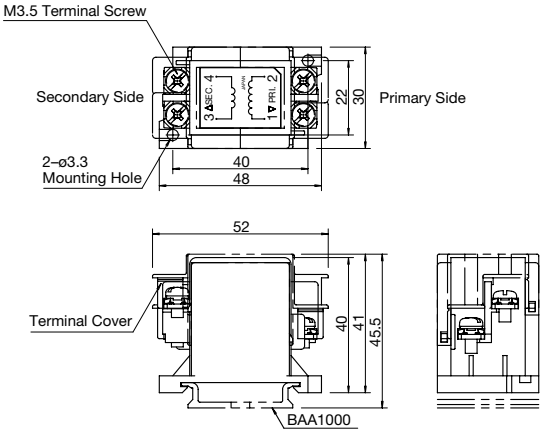
Transformer

Shape	Primary Voltage	Secondary Voltage	Part No.	Applicable Load
For 6V 	100/110V AC	5.5V AC, 1W	**TWR516**	LSTD-6 LED lamp (6V AC/DC) or LS-6 incandescent lamp (6V AC/DC, 1W)
	115/120V AC		**TWR5126**	
	200/220V AC		**TWR526**	
	230/240V AC		**TWR5246**	
	380V AC		**TWR5386**	
	400/440V AC		**TWR546**	
	480V AC		**TWR5486**	

Specifications

Operating Voltage	100/110V AC, 115/120V AC, 200/220V AC, 230/240V AC, 380V AC, 400/440V AC, 480V AC (50/60Hz)
Current Draw	2.4 VA
Rated Insulation Voltage	600V
Insulation Resistance	100 MΩ minimum (500V DC megger)
Operating Temperature	–30 to +60°C (no freezing)
Storage Temperature	–40 to +80°C (no freezing)
Operating Humidity	35 to 85% RH (no condensation)
Vibration Resistance	Damage Limits: 30 Hz, amplitude 1.5 mm Operating extremes: 5 to 55 Hz, amplitude 0.5 mm
Shock Resistance	Damage limits : 1,000 m/s^2
Dielectric Strength	2,500V AC, 1 minute
Terminal Screw	M3.5
Applicable Wire	2 mm^2 maximum, 2 wires maximum
Weight (approx.)	87g

Dimensions

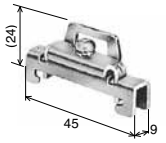


Accessories

DIN Rail

Part No.	Ordering No.	Length	Weight (approx.)	Material	Package Quantity
BAA1000	**BAA1000PN10**	1000 mm	200g	Aluminum	10
BAP1000	**BAP1000PN10**	1000 mm	320g	Steel	10

End Clip

Part No.	Ordering No.	Applicable DIN Rail	Weight (approx.)	Material	Package Quantity	Dimensions
BNL6	**BNL6PN10**	**BAA1000** **BAP1000**	15g	Steel (Zinc-plated)	10	

• Use plastic end clip BC9Z-E/NS35N when using 400/440V AC primary voltage transformers.

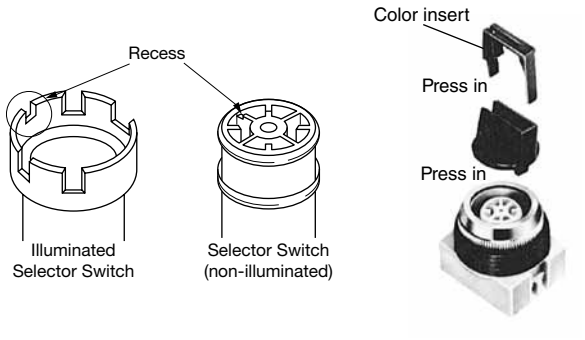
Safety Precautions

- Turn off the power to the TWS series before starting installation, removal, wiring, maintenance, and inspection of the products. Failure to turn power off may cause electrical shocks or fire hazard.
- To avoid a burn on your hand, use the lamp holder tool when replacing lamps.
- For wiring, use wires of a proper size to meet the voltage and current requirements. Tighten the M3.5 terminal screws to a tightening torque of 1.0 to 1.3 N·m. Failure to tighten terminal screws may cause overheat and fire.
- Use HW-C contact blocks for the TWS series. Do not replace with or add conventional TW series contact blocks. Using a different type of contact block may lead to malfunction.

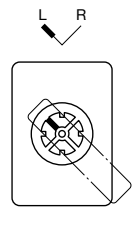
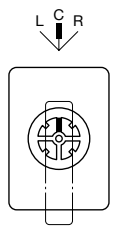
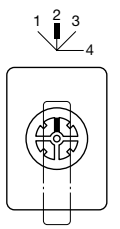
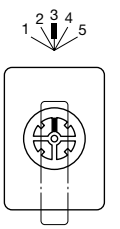
Instructions

Installation of Selector Operators

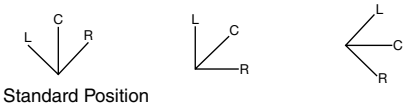
1. The shaft of each selector or illuminated selector switch has a recess to identify in which direction to install the operator. Align the operator with the recess and press in the operator.
2. Press color insert (non-illuminated) into the operator. The color insert retains the operator.



Standard Position

2-Position, 90°	3-Position, 45°	4-Position, 45°	5-Position, 30°
			

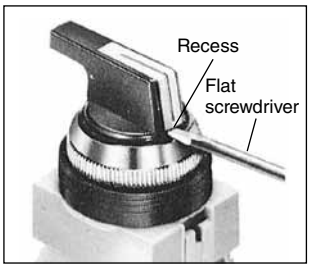
[Example]



Standard Position

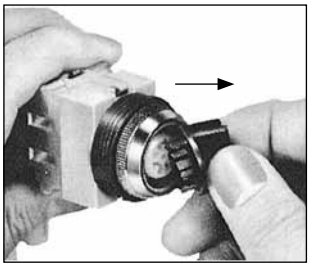
The non-illuminated operators can be installed in positions other than the standard position as shown above.

Removing the Operator



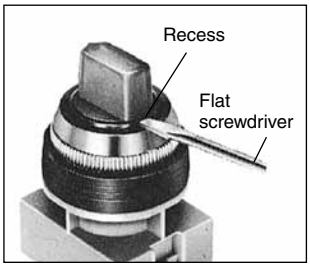
1. Removing the Color Insert

Insert a flat screwdriver (4.5mm wide at maximum) into the recess of the color insert. Turn the screwdriver to push out the insert from the operator.



2. Removing the Operator (Non-illuminated)

Push the operator sideways as shown in the left photo to remove the operator.

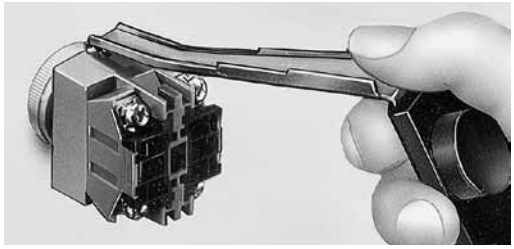


3. Removing the Operator (Illuminated)

Insert a flat screwdriver into the recess of the operator and turn the screwdriver to remove the operator.

Removing Contact Blocks, Transformers, and Full Voltage Adapters

Insert the end of the contact block removal tool into the snap-fit latch of the contact block (or transformer, full voltage adapter) and pull the tool as shown on the right.



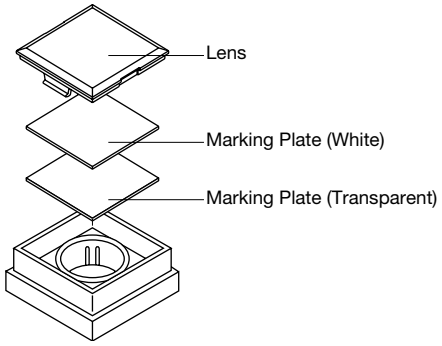
Instructions

Installing Lenses

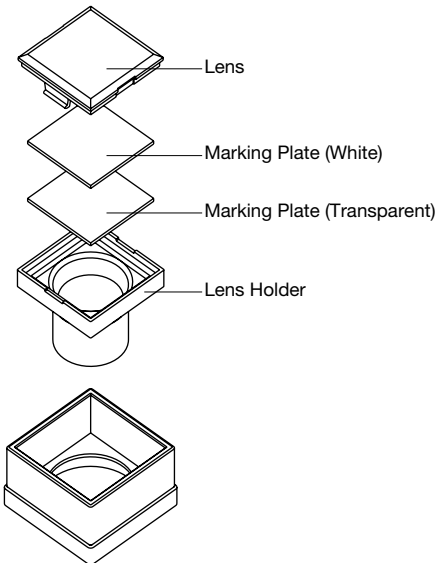
Lens Structure and Marking Plate

All square lens units are marking types. To engrave on the marking plate, remove the marking plate from the lens.

Square Pilot Lens



Square Illuminated Pushbutton



Replacement of Lamps

Lamps can be replaced by using the lamp holder tool (OR-55) from the front of the panel.

How to remove

To remove, slip the lamp holder tool onto the lamp head lightly. Then push slightly, and turn the lamp holder tool counterclockwise.

How to install

To install, insert the lamp head into the lamp holder tool. Place the pins on the lamp base to the grooves in the lamp socket. Insert the lamp and turn it clockwise.

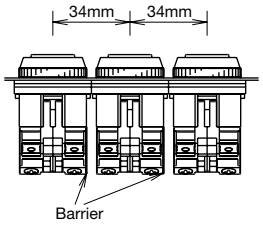


OR-55



Collective Mounting

When mounting the units closely in a horizontal row on 34mm centers, use optional barriers to prevent interconnection between adjoining terminals. The barriers can be attached simply by pressing them onto the sides of contact blocks.





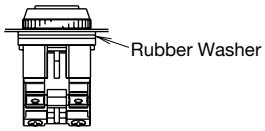
Tightening Torque

Tighten the M3.5 terminal screws to a torque of 1.0 to 1.3 N·m.

Instructions

Panel Thickness and Rubber Washer

Adjust the thickness of the rubber washers according to the panel thickness. Also, make sure to include the nameplate thickness when using a nameplate.



Applicable Models

- Momentary Pushbutton (Excluding Extended with Half Shroud, Extended with Full Shroud, and Square)
- Round Pilot Light (APS1)

Panel Thickness (mm)	Rubber Washer	
	1.5 mm	3.0 mm
Supplied	2 pieces	1 piece
0.8 to 2.5	2 pieces	1 piece
2.5 to 4.0	1 piece	1 piece
4.0 to 5.5	—	1 piece
5.5 to 6.0	1 piece	—

Applicable Models

- Momentary Pushbutton with Half Shroud (ABGS2)

Panel Thickness (mm)	Rubber Washer	
	1.5 mm	3.0 mm
Supplied	1 piece	1 piece
0.8	1 piece	1 piece
0.8 to 2.3	—	1 piece
2.3 to 3.8	1 piece	—

Applicable Models

- Maintained Extended Pushbutton with Half Shroud (AOGS2)
- Momentary Illuminated Pushbutton with Half Shroud (ALGS2)
- Maintained Illuminated Pushbutton with Half Shroud (AOLGS2)

Panel Thickness (mm)	Rubber Washer	
	1.5 mm	3.0 mm
Supplied	2 pieces	1 piece
0.8	2 pieces	1 piece
0.8 to 2.3	1 piece	1 piece
2.3 to 3.8	—	1 piece
3.8 to 5.3	1 piece	—

Applicable Models

- Momentary Extended Pushbutton with Full Shroud (ABFS2)

Panel Thickness (mm)	Rubber Washer	
	1.5 mm	3.0 mm
Supplied	3 pieces	1 piece
0.8 to 1.5	3 pieces	1 piece
1.5 to 3	2 pieces	1 piece
3.0 to 4.5	1 piece	1 piece
4.5 to 6	—	1 piece

Applicable Models

- Maintained Extended Pushbutton with Full Shroud (AOFS2)

Panel Thickness (mm)	Rubber Washer	
	1.5 mm	3.0 mm
Supplied	4 pieces	1 piece
0.8 to 1.5	4 pieces	1 piece
1.5 to 3.0	3 pieces	1 piece
3.0 to 4.5	2 pieces	1 piece
4.5 to 6.0	1 piece	1 piece

Applicable Models

- Other Models (Excluding Square)

Panel Thickness (mm)	Rubber Washer	
	1.5 mm	3.0 mm
Supplied	3 pieces	1 piece
0.8 to 2.5	3 pieces	1 piece
2.5 to 4.0	2 pieces	1 piece
4.0 to 5.5	1 piece	1 piece
5.5 to 6.0	—	1 piece

Installation of LED Illuminated Units

1. Note the polarity for wiring when connecting to DC-DC converter unit.

Terminal No.	Polarity
X1	Positive
X2	Negative

2. Transformer units are recommended for use in areas subjected to noise.

3. Notes for Pure White LED Lamps

- Do not use the pure white LED outdoors, otherwise it will lead to the degradation of brightness and color. Do not remove or apply shock to the cap on the pure white LED lamp, otherwise it may break or damage the cap.
- For the pure white LED, use a white lens. The illumination color will be dull if a different color is used.

Notes on LED Illuminated Units

LED lamps consist of semiconductors. If the applied voltage exceeds the rated voltage, LED elements may deteriorate due to overheat, resulting in significant decrease in luminance, hue change, or failure of lighting. Also, if an extraneous noise, transient voltage, or transient current is applied to the circuit, similar effects may occur. When using LED lamps, observe the following instructions.

Rated Voltage

The LED lamps are rated at 6V, 12V, or 24V AC/DC, and can be used within ±10% the rated voltage of either AC or DC.

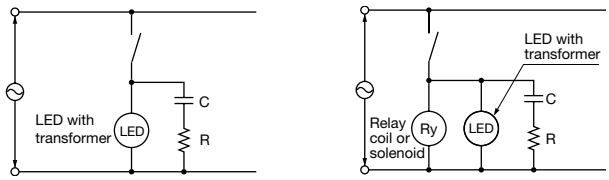
DC Power

1. Switching power supply
   Regulated voltage from switching power supply is best suited. Make sure to use within the rated voltage of the LED lamp.
2. Rechargeable battery
   Note that the battery voltage may exceed the rated voltage of the LED lamp while the battery is being charged and immediately after the charging is complete. Be sure to use the LED lamp on a voltage of ±10% the rated voltage.
3. Full-wave rectification
   Since the LED lamp is AC/DC compatible, a diode bridge for rectification is not necessary. If the LED lamp is used on a full-wave rectification current through a diode bridge, the rectifier diodes will reduce the voltage, resulting in lower luminance.
4. Single-phase half-wave rectification
   This is not suitable for the power source of LED lamps. Use constant-voltage DC power.

Noise

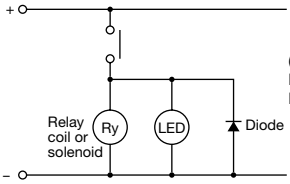
LED elements deteriorate due to extraneous noise, resulting in significant decrease in luminance, hue change, or failure of lighting. When such effects are anticipated, take a protection measure shown below, such as RC elements or a surge absorber.

[Protection Example 1] For AC circuit



(Reference values) R: 120W
C: 0.1 mF

[Protection Example 2] For DC circuit



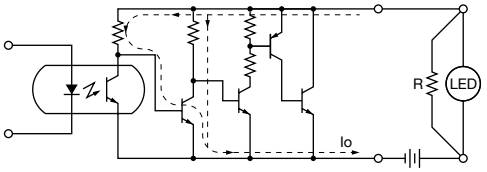
(Reference values of the diode)
Forward current: More than the Ry coil current
Reverse withstand voltage: Ry coil current ¥ 10

Countermeasures against Dim Lighting

1. Leakage currents through the transistors or a contact protection circuit may cause the LED lamp to illuminate dimly even when the output is off.
2. When the LED lamp is illuminated by a transistor output, take the following measure.

[Circuit Example]

Connect shunt resistor R in parallel with the LED lamp.



Io: Leakage current when the output is off
R: Shunt resistor

Specifications and other descriptions in this brochure are subject to change without notice.

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