

ø22 HW Series Switches & Pilot Lights

Complete with finger-safe contact blocks
Ensure safety and save wiring time

- Finger-safe terminal blocks
- Self-cleaning rolling action contacts.
- Degree of protection: IP65 (except dual pushbutton: IP40)
- Dual pushbutton switches available with two pushbuttons and a pilot light integrated into one space-saving unit.
- A wide range of operating voltages for worldwide application.
- UL, CSA rated, and EN compliant.

Standards and Approvals

Applicable Standards	Mark	File No. or Organization
UL508		UL Listing File No. E68961
CSA C22.2 No.14		CSA File No. LR21451
EN60947-5-1		TÜV Rheinland
		EU Low Voltage Directive and RoHS 2 Directive (except for DC-DC converter unit)
GB14048.5		Contact IDEC for details.

- DC-DC converter types are not approved by standards.
- See website for details on approvals and standards.



Application for dual pushbuttons:

Ideal for use as power switches and start/stop switches (available with I/ON and O/OFF markings on the buttons and a pilot light in the center).
 Interlock type prevents two pushbuttons from being pressed at the same time, providing the best solution for up/down switches.

Specifications and Ratings

Contact Ratings

Pushbuttons Illuminated Pushbuttons Dual Pushbuttons Selector Switches Illuminated Selector Switches Selector Pushbuttons	Rated insulation voltage	600V
	Rated continuous current	10A
	Contact ratings by utilization category IEC60947-5-1	AC-15 (A600)
		DC-13

Contact Ratings by Utilization Category

HW-U10 (NO contact), HW-U01 (NC contact)

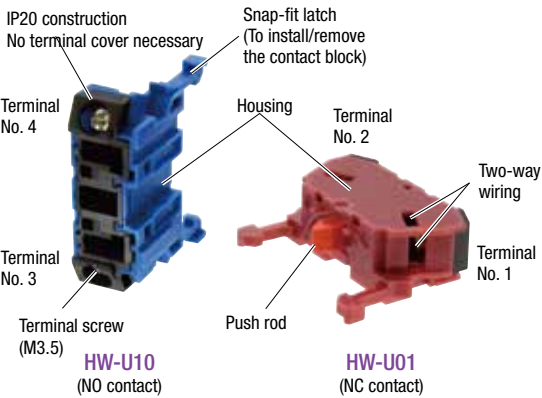
Operating Voltage			24V	48V	50V	110V	220V	440V
Operating Current	AC 50/60 Hz	AC-12 Control of resistive loads and solid state loads	10A	—	10A	10A	6A	2A
		AC-15 Control of electromagnetic loads (> 72 VA)	10A	—	7A	5A	3A	1A
	DC	DC-12 Control of resistive loads and solid state loads	10A	5A	—	2.2A	1.1A	—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

HW-U10R (EM contact/NO contact), HW-U01R (LB contact/NC contact)

Operating Voltage			24V	48V	50V	110V	220V	440V
Operating Current	AC 50/60 Hz	AC-12 Control of resistive loads and solid state loads	5A	—	5A	5A	3A	1A
		AC-15 Control of electromagnetic loads (> 72 VA)	5A	—	3.5A	2.5A	1.5A	0.5A
	DC	DC-12 Control of resistive loads and solid state loads	5A	2.5A	—	1.1A	0.55A	—
		DC-13 Control of electromagnets	2.5A	1A	—	0.55A	0.3A	—

- The operating current represents the classification by making and breaking currents (IEC 60947-5-1).
- Contact materials: Silver contacts
- Minimum applicable load: 3V AC/DC, 5 mA (applicable range may vary with operating conditions and load types)

HW-U Contact Block



Part No.	HW-U10	HW-U01	HW-U10R	HW-U01R
Contact				
Contact No.	1NO	1NC	EM (NO) (early make)	LB (NC) (late break)
Contact No.	3-4	1-2	3-4	1-2
Housing	Blue	Purple red	Blue	Purple red
Push Rod	Green	Red	Black	White
Weight	Approx. 11g			

- Up to 2 layers (4 blocks) can be attached.
- Gold contacts available (gold-plated silver)

LED Specifications

Unit					LED lamp		
	Color	Rated Voltage		Operating Voltage		Lamp Base	Part No.
Illuminated pushbutton Illuminated selector switch Pilot light Dual pushbutton (with pilot light)	R (red) G (green) Y (yellow) A (amber) W (white) S (blue) PW (pure white)	6V AC/DC		6V AC/DC	±10%	BA9S/13	LSTD-6*
		12V AC/DC		12V AC/DC			LSTD-1*
		24V AC/DC		24V AC/DC			LSTD-2*
		100/110V AC	50/60 Hz	100/110V AC			LSTD-6*
		115/120V AC		115/120V AC (*1)			
		200/220V AC		200/220V AC			
		230/240V AC		230/240V AC (*1)			
		380V AC		380V AC			
		400/440V AC		400/440V AC			
		480V AC		480V AC			
		110V DC		90 to 140V DC			

- See page 3. for details on LED lamp ratings.
- For the LED lamp used in jumbo dome pilot lights, see page 3.
- Yellow (Y) cannot be used with dual pushbuttons.
- Color codes for units without LED lamps:
R (red), G (green), A (amber), Y (yellow), W (white), S (blue)
When using a commercially available lamp, choose a lamp with rated voltage 5 to 30V AC/DC and 1W maximum, and with the same base and shape. Make sure of correct operation before installation. The operation of HW series cannot be guaranteed when a commercially available lamp is used.

Power Unit Terminal

Power Unit	Illuminated Unit				Pilot Light		
	Full voltage adapter	Transformer		DC-DC converter	Full voltage adapter	Transformer	DC-DC converter
Rated Voltage	6, 12, 24V AC/DC	100 to 240V AC	380V AC min.	110V DC	6, 12, 24V AC/DC	100 to 480V AC	110V DC
Polarity	None	None	None	X1 (+) X2 (-)	None	None	X1 (+) X2 (-)
Shape/Terminal							

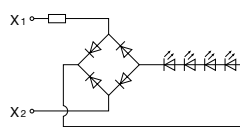
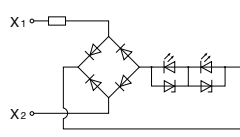
LED Lamp Ratings

LSTD (Except Jumbo Dome Pilot Lights)

Part No.		LSTD-6*		LSTD-1*		LSTD-2*		
Lamp Base		BA9S/13						
Rated Voltage		6V AC/DC			12V AC/DC		24V AC/DC	
Voltage Range		6V AC/DC $\pm 10\%$			12V AC/DC $\pm 10\%$		24V AC/DC $\pm 10\%$	
Current Draw	Color	R, A, W	G, S, PW	R, G, A, W, S, PW		R, G, A, W, S, PW		
	DC	7mA	5.5mA	10mA		10mA		
	AC	8mA	8mA	11mA		11mA		
Lamp Base Color		Same as illumination color (PW: gray)						
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 at 25°C.)						
Internal Circuit		X1      X2      Symbols  LED chip  Rectifier diode  Zener diode  Resistor Example: LSTD-2PW  Base Color						
Weight		Approx. 2g						

- Specify a color code in place of *. R (red), G (green), A (amber), W (white), S (blue), PW (pure white)
- Use a pure white (PW) LED for yellow (Y) illumination.

LSTDB (For Jumbo Dome Pilot Lights HW1P-5Q4 Only)

Part No.	LSTDB-2*	
Lamp Base	BA9S/13	
Voltage Range	24V AC/DC $\pm 10\%$	
Current Draw	15mA	
Rated Voltage	24V AC/DC	
Life (reference value)	Approx. 20,000 hours (The luminance is reduced to 50% the initial intensity when used on complete DC at 25°C.)	
Internal Circuit	R, A, W 	
	G, S, PW 	
	Symbols  LED chip  Rectifier diode  Zener diode  Resistor	

- Specify a color code in place of *. R (red), G (green), A (amber), W (white), S (blue), PW (pure white)
- Use a pure white (PW) LED for yellow (Y) illumination.

Specifications

Operating Temperature	Non-illuminated: -25 to +60°C (no freezing) Illuminated: -25 to +50°C (no freezing) Jumbo dome pilot lights: -25 to +55°C (no freezing)
Operating Humidity	45 to 85% RH (no condensation)
Storage Temperature	-40 to +80°C (no freezing)
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 and illuminated units: 2,000V AC, 1 minute) (*1)
Vibration Resistance	Damage limits: 30 Hz, amplitude 1.5 mm Operating extremes: 5 to 55 Hz, amplitude 0.5 mm
Shock Resistance	Damage limits: 1,000m/s ² Operating extremes: 100m/s ²
Mechanical Life (minimum operations)	Pushbutton, Illuminated pushbutton Momentary.....500,000 Maintained.....500,000 Dual pushbutton.....500,000 Selector switch.....500,000 Key selector switch (Disc tumbler).....500,000 Key selector switch (Pin tumbler).....100,000 Illuminated selector switch.....500,000 Pushbutton selector.....250,000 Mono-lever switches.....250,000
Electrical Life (*5)	Pushbutton, Illuminated pushbutton Momentary.....500,000 (*2) Maintained.....500,000 (*4) Dual pushbutton.....500,000 (*2) Selector switch.....500,000 (*3) Key selector switch (Disc tumbler).....500,000 (*3) Key selector switch (Pin tumbler).....100,000 (*3) Illuminated selector switch.....500,000 (*3) Pushbutton selector.....250,000 (*3) Mono-lever switches.....250,000 (*4)
Weight (Approx.)	66g (HW1B-M122) 20g (HW1P-1Q4) 84g (HW1L-M122Q4) 66g (HW1S-2T22) 94g (HW1K-2A22) 72g (HW1K-2JPC11) 84g (HW1F-222Q4) 71g (HW1R-2A22) 82g (HW1M-2222-22N9) 72g (HW7D-B111111) 90g (HW7D-L111111Q4)

*1) Dielectric strength for dual pushbuttons are as follows:
Full voltage type: 1,000V AC, 1 minute (between live and dead metal parts)
Transformer and DC-DC converter types: 2,000V AC, 1 minute (between live and dead metal parts)

*2) Switching frequency 1,800 operations/h, duty ratio 40%

*3) Switching frequency 1,200 operations/h, duty ratio 40%

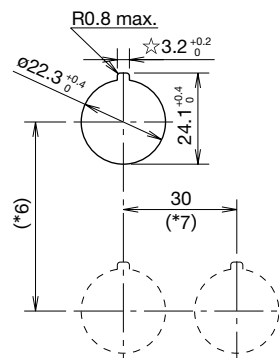
*4) Switching frequency 900 operations/h, duty ratio 40%

*5) Load condition 220V AC, 3A (AC-15)

Mounting Hole Layout

All dimensions in mm.

Panel Cut (IEC60947-5-1)



- The minimum mounting centers are applicable to switches with one layer of contact blocks (one to two contact blocks). When two layers of contact blocks are mounted, determine the minimum mounting centers in consideration of convenience for wiring.
- When high temperature is expected, take necessary measures such as securing sufficient mounting centers or using a cooling fan.

Minimum Mounting Centers

(Dimensions in mm)

Unit	A (*6)	B (*7)
ø40mm mushroom button	50	40
Pushbutton selector	50	50
Mono-lever switch	72	72
Pilot light	30	30
Jumbo dome pilot light	85	85
Dual pushbutton switch	55	30
Illuminated selector switch	50	50

- When using the safety lever lock, determine the vertical spacing (*6) in consideration of convenience for installing and removing the safety lever lock. (Recommended vertical spacing: 100 mm)
The minimum length of vertical spacing (*6) is 45 mm when safety lever lock is not used.
- The 3.2 mm recess is for preventing rotation and is not necessary when the nameplate or anti-rotation ring is not used.

Degree of Protection

Unit	IEC 60529
All units except dual pushbutton switches	IP65 (*8)
Dual pushbutton switches	IP40 (*9)

*8) When using a nameplate with the HW series, IP65 protection degree is achieved only when nameplates shown on page 37 are used.
(IP40 when other ø22 nameplates such as NWA are used)

*9) IP65 protection degree when HW9Z-D7D button cover is used.

Ordering Information

Standard models

- Specify Ordering No. when ordering.
- Specify a button or lens color code in place of *.
- Pilot lights, illuminated pushbuttons, and illuminated selector switches have an LED lamp installed unless otherwise specified.
- Nameplates and accessories for mono-lever switch are ordered separately. See page 37 to 39.
- Color codes for units without LED lamps:
R (red), G (green), A (amber), Y (yellow), W (white), S (blue)

When using a commercially available lamp, choose a lamp with rated voltage 5 to 30V AC/DC and 1W maximum, and with the same base and shape.
Make sure of correct operation before installation. The operation of HW series cannot be guaranteed when a commercially available lamp is used.

Ordering Information

Pushbuttons (Page 8 to 10)

When specifying gold-plated silver contact and contact configuration:

HW1B-M1	11	R	-MAU	
				Optional contact
				Contact configuration
				MAU: Gold contact
				10: 1NO
				01: 1NC
				11: 1NO1NC
				20: 2NO
				02: 2NC
				22: 2NO2NC
				40: 4NO
				04: 4NC
				13: 1NO3NC
				31: 3NO1NC
				30: 3NO
				03: 3NC
				12: 1NO2NC
				21: 2NO1NC

Pilot Lights (Page 11)

When specifying LED operating voltage:

HW1P-1	H2	R	
			Operating voltage
			Q0: Without LED lamp
			Q2: 6V AC/DC
			Q3: 12V AC/DC
			Q4: 24V AC/DC
			H2: 100/110V AC
			H22: 115/120V AC
			M2: 200/220V AC
			M42: 230/240V AC
			S2: 380V AC
			T2: 400/440V AC
			T82: 480V AC
			D2: 110V DC

Note: Color codes for units without LED lamps: R (red), G (green), A (amber), Y (yellow), W (white), S (blue)

When using a commercially available lamp, choose a lamp with rated voltage 5 to 30V AC/DC and 1W maximum, and with the same base and shape. Make sure of correct operation before installation. The operation of HW series cannot be guaranteed when a commercially available lamp is used.

Illuminated Pushbuttons (Page 13 to 17)

When specifying gold-plated silver contact, contact configuration, and LED operating voltage:

HW1L-M1	11	H2	R	-MAU	
					Optional contact
					Operating Voltage
					Contact configuration
					MAU Gold contact
					Q0: Without LED lamp
					Q2: 6V AC/DC
					Q3: 12V AC/DC
					Q4: 24V AC/DC
					H2: 100/110V AC
					H22: 115/120V AC
					M2: 200/220V AC
					M42: 230/240V AC
					S2: 380V AC
					T2: 400/440V AC
					T82: 480V AC
					D2: 110V DC
					10: 1NO
					01: 1NC
					11: 1NO1NC
					20: 2NO
					02: 2NC
					22: 2NO2NC
					40: 4NO
					04: 4NC
					13: 1NO3NC
					31: 3NO1NC
					30: 3NO
					03: 3NC
					12: 1NO2NC
					21: 2NO1NC

Note:

• Color codes for units without LED lamps: R (red), G (green), A (amber), Y (yellow), W (white), S (blue)

When using a commercially available lamp, choose a lamp with rated voltage 5 to 30V AC/DC and 1W maximum, and with the same base and shape. Make sure of correct operation before installation. The operation of HW series cannot be guaranteed when a commercially available lamp is used.

• Odd number of contact blocks, such as 1NO, 1NC, 3NO, 2NO-1NC, 1NO-2NC, and 3NC, is not available for transformer type or DC-DC converter type.

Ordering Information

Dual Pushbutton Switches [without pilot light] (Page 20)

When specifying gold-plated silver contact and contact configuration:

HW7D-B 1 1 10 02 GR 1-MAU	
Optional contact	MAU: Gold-plated silver
Button legends	Blank: Without legend
Button color code	1: I/ON + O/OFF
Contact Arrangement (bottom button)	GR: Green (top) Red (bottom)
Lamp code (top button)	WB: White (top) Black (bottom)
Button style	10: 1NO
Operation	01: 1NC
	11: 1NO1NC
	20: 2NO
	02: 2NC
	10: 1NO
	01: 1NC
	11: 1NO1NC
	20: 2NO
	02: 2NC
	1: Flush + Flush
	2: Flush + Extended
	1: Momentary
	2: Interlock

Dual Pushbutton Switches [with pilot light] (Page 21)

When specifying gold-plated silver contact, contact configuration, and LED operating voltage:

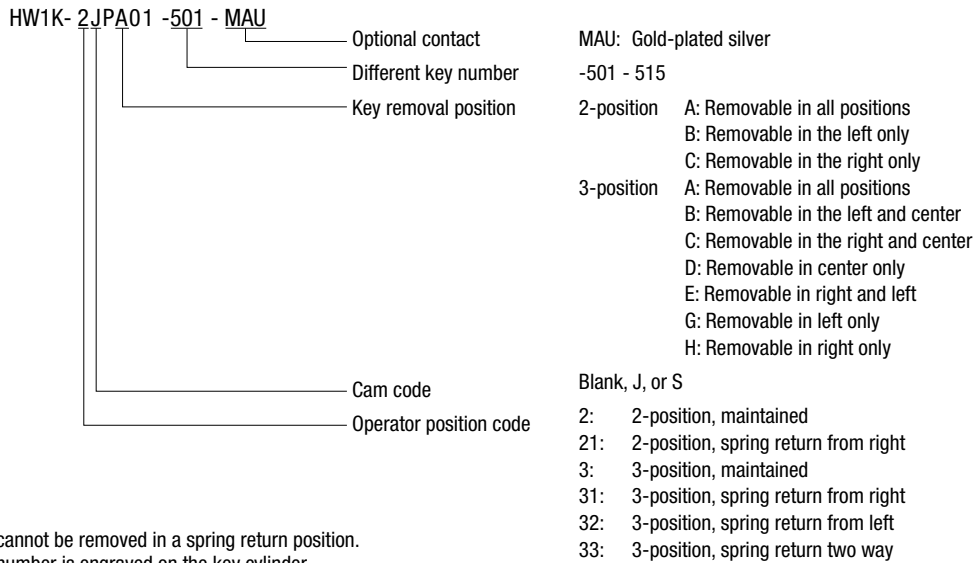
HW7D-L 1 1 1 1 20 H2 R GR 1-MAU	
Optional contact	MAU: Gold-plated silver
Button legends	Blank: Without legend
Button color code	1: I/ON + O/OFF
Lamp color code	GR: Green (top), Red (bottom)
Lamp code	WB: White (top), Black (bottom)
Contact arrangement code (bottom button)	R: Red
Contact arrangement code (top button)	G: Green
Button style	A: Amber
Operation	W: White
	S: Blue
	PW: Pure White
	Q2: 6V AC/DC
	Q3: 12V AC/DC
	Q4: 24V AC/DC
	H2: 100/110V AC
	H22: 115/120V AC
	M2: 200/220V AC
	M42: 230/240V AC
	S2: 380V AC
	T2: 400/440V AC
	T82: 480V AC
	10: 1NO
	01: 1NC
	11: 1NO1NC
	20: 2NO
	02: 2NC
	10: 1NO
	01: 1NC
	11: 1NO1NC
	20: 2NO
	02: 2NC
	1: Flush + Flush
	2: Flush + Extended
	1: Momentary
	2: Interlock

Note: Transformer type cannot have a contact arrangement of 3 contact blocks for the total of top and bottom.

Ordering Information

Key Selector Switches (Pin Tumbler Key) (Pages 25 to 26)

When specifying gold-plated silver contact, key removal position, and key number:

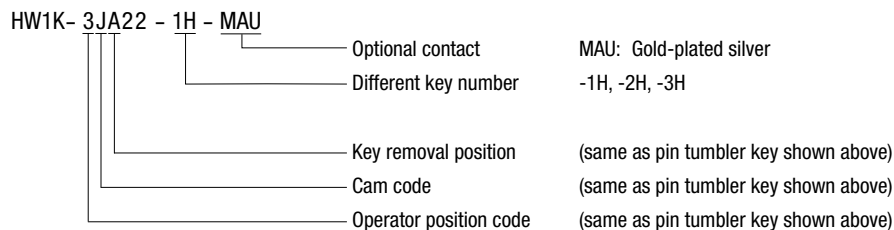


Note:

- The key cannot be removed in a spring return position.
- The key number is engraved on the key cylinder.
(default key is not engraved with a number)

Key Selector Switches (Disc Tumbler Key) (Pages 27 to 28)

When specifying gold-plated silver contact, key removal position, and key number:

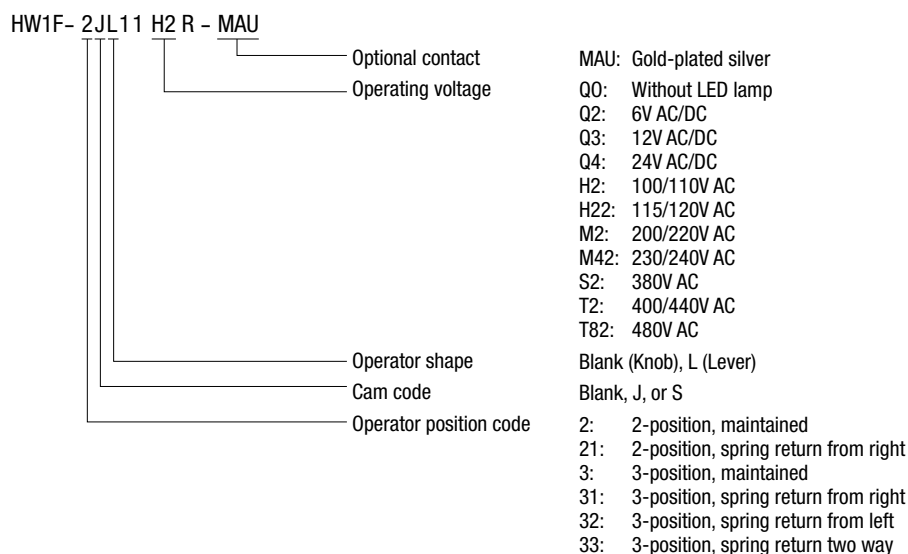


Note:

- The key cannot be removed in a spring return position.
- The key number is engraved on the key cylinder.
(default key is not engraved with a number)

Illuminated Selector Switches (Pages 29 to 30)

When specifying gold-plated silver contact and LED operating voltage:

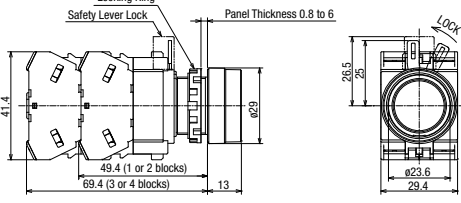
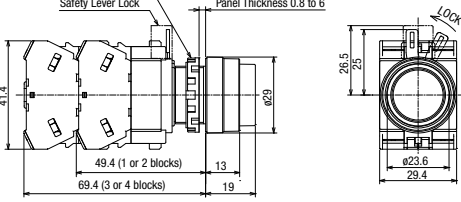
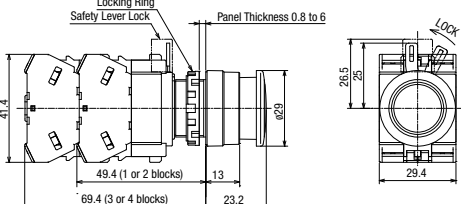
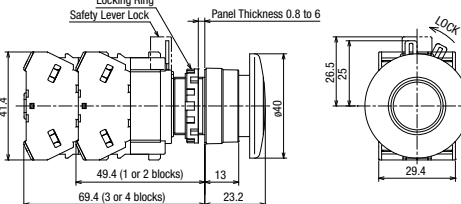
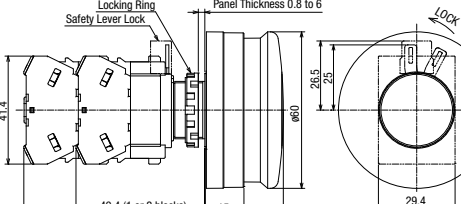


Note: Color codes for units without LED lamps: R (red), G (green), A (amber), Y (yellow), W (white), S (blue)

When using a commercially available lamp, choose a lamp with rated voltage 5 to 30V AC/DC and 1W maximum, and with the same base and shape. Make sure of correct operation before installation. The operation of HW series cannot be guaranteed when a commercially available lamp is used.

Flush / Extended / Mushroom Pushbuttons

Package Quantity: 1

Shape	Operation	Contact	Part No.	Color Code	Dimensions (mm)
Flush HW1B-M1 HW1B-A1 	Momentary	1NO	HW1B-M110*	B G R Y S W	
		1NC	HW1B-M101*		
		1NO-1NC	HW1B-M111*		
		2NO	HW1B-M120*		
		2NC	HW1B-M102*		
		2NO-2NC	HW1B-M122*		
	Maintained	1NO	HW1B-A110*		
		1NC	HW1B-A101*		
		1NO-1NC	HW1B-A111*		
		2NO	HW1B-A120*		
		2NC	HW1B-A102*		
		2NO-2NC	HW1B-A122*		
Extended HW1B-M2 HW1B-A2 	Momentary	1NO	HW1B-M210*	B G R Y S W	
		1NC	HW1B-M201*		
		1NO-1NC	HW1B-M211*		
		2NO	HW1B-M220*		
		2NC	HW1B-M202*		
		2NO-2NC	HW1B-M222*		
	Maintained	1NO	HW1B-A210*		
		1NC	HW1B-A201*		
		1NO-1NC	HW1B-A211*		
		2NO	HW1B-A220*		
		2NC	HW1B-A202*		
		2NO-2NC	HW1B-A222*		
ø29mm Mushroom HW1B-M3 HW1B-A3 	Momentary	1NO	HW1B-M310*	B G R Y S W	
		1NC	HW1B-M301*		
		1NO-1NC	HW1B-M311*		
		2NO	HW1B-M320*		
		2NC	HW1B-M302*		
		2NO-2NC	HW1B-M322*		
	Maintained	1NO	HW1B-A310*		
		1NC	HW1B-A301*		
		1NO-1NC	HW1B-A311*		
		2NO	HW1B-A320*		
		2NC	HW1B-A302*		
		2NO-2NC	HW1B-A322*		
ø40mm Mushroom HW1B-M4 HW1B-A4 	Momentary	1NO	HW1B-M410*	B G R Y S W	
		1NC	HW1B-M401*		
		1NO-1NC	HW1B-M411*		
		2NO	HW1B-M420*		
		2NC	HW1B-M402*		
		2NO-2NC	HW1B-M422*		
	Maintained	1NO	HW1B-A410*		
		1NC	HW1B-A401*		
		1NO-1NC	HW1B-A411*		
		2NO	HW1B-A420*		
		2NC	HW1B-A402*		
		2NO-2NC	HW1B-A422*		
ø60mm Mushroom HW1B-M5 	Momentary	1NO	HW1B-M510*	B G R	
		1NC	HW1B-M501*		
		1NO-1NC	HW1B-M511*		
		2NO	HW1B-M520*		
		2NC	HW1B-M502*		
		2NO-2NC	HW1B-M522*		

- Specify a color code in place of * in Part No. B (black), G (green), R (red), Y (yellow), S (blue), W (white)
- Pushbuttons with 1 or 3 contact blocks have a dummy block.
- See page 5 for other contact configurations and gold-plated silver contacts.
- Pushbuttons: M3.5 Terminal screws integrated terminal cover