TWTD Series — Full Size NEMA Pushbuttons

TWTD Series: Heavy duty switches built to last

Key features include:

- *Variety of button sizes up to 2 9/16" (65mm)*
- *Rugged construction includes chrome plated zinc locking ring die cast zinc mounting threads, screw mounted contact blocks*
- *LED or incandescent illumination*
- *Transformer or full voltage*
- *Transparent contact windows*
- *Slow make, double break self cleaning contacts*
- *Modular construction for maximum flexibility*
- *Double nickel plated terminal screws*
- *Available assembled or as sub-components*
- *NEMA 4x and IP65 watertight/oiltight panel*
- *Large M3.5 screw terminals with captive sems plate*

The rugged series of TWTD switches offers both variety and durability in an attractive design.

With button sizes up to 2 9/16" (65mm), chrome plated zinc locking rings, die cast zinc mounting threads, steel anti-rotation rings, and self cleaning contacts, the TWTD's are here to stay.

The TWTD series also offers either LED or incandescent illumination in full voltage and transformer models.

Transparent contact windows allow the viewing of IDEC's self cleaning slow-make/slow-break contacts.

Regardless of your switching needs, the TWTD series provides the kind of long lasting, industrial strength quality you've come to expect from IDEC.

UL Listed
File No. E70646

File No. LR48366

Ref. No. 117617MC

Specifications

Conforming to Standards	EN60947-1, EN60947-5-1, VDE0660-200, UL508, CSA C22-2 No.14
Approvals UL Listed File No. E70646 File No. LR48366 Ref. No. 117617MC	**CSA:** pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) **UL:** pushbuttons and selector switches: A600 pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V) **TÜV:** pushbuttons and selector switches: A600=P600 (NO, NC)/Q600 (NO-EM, NC-LB) pilot lights and illuminated pushbuttons, direct supply pilot lights and illuminated pushbuttons with integral transformer (100/110, 115, 120, 200/220, 230, 240, 380, 400/440, 480V)
Operating Temperature	Operation: –25 to +50°C (without freezing) Storage: –40 to +70°C (without freezing)
Vibration Resistance	10 to 55Hz, 98m/sec^2 (10g) conforming to IEC6068-2-6
Shock Resistance	980m/sec^2 (100g) conforming to IEC6068-2-7
Electric Shock Protection	Class 0 conforming to IEC60536
Degree of Protection	IP65 (from front of the panel) (conforming to IEC60529) NEMA 1, 2, 3, 3R, 3S, 4, 4X, 5, 12, 13 (conforming to NEMA ICS6-110)
Mechanical Life	Momentary pushbuttons: 5,000,000 (900 operations per hour) All other switches: 500,000
Pollution Degree (conforming to IEC60947-1)	3 for switches not using a transformer 2 for switches using a transformer

Mechanical-Electrical Specifications

Rated Operational Characteristics	AC-15: A600 or Ue = 250V, Ie = 3A (NO, NC, NO-EM, NC-LB) DC-13: P600 or Ue = 125V, Ie = 1.1A (NO, NC) DC-13: Q600 or Ue = 125V, Ie = 0.9A (NO-EM, NC-LB)
Rated Insulation Voltage	600V
Rated Switching Over-Voltage	Less than 4kV, conforming to IEC60947-1
Rated Impulse Withstanding Voltage	4kV for contact circuit 2.5kV for lamp circuit
Rated Thermal Current	10 Amp
Minimum Switching Capacity	5 mA at 3V AC/DC
Contact Operation	Slow break NC or NO, self-cleaning
Operating Force	Flush and extended pushbuttons—with 1NO or 1NC contact: 6.2±2N (momentary), 7.0±2N (maintained) Additional contacts—1NO or 1NC: +3.2N (momentary), + 3.3N (maintained)
Terminal Referencing	Conforming to CENELEC EN50005
Recommended Terminal Torque	0.8 N m (7.1 in lb.)
External Short-Circuit Protection	10A 250V fuse conforming to IEC60269-1
Applicable Wire Size	Minimum 1 x 22 AWG, max. 2 x 14 AWG or 1 x 12 AWG
Contact Resistance	Initial contact resistance of 50mΩ or less
Contact Gap	4mm (NO and NC) 2mm (NO-EM and NC-LB)
Lamp Ratings	Incandescent: 1 W LEDs: 6, 12, 24V: 20mA / 120, 240V: 10mA
Maximum Inrush Current	40 A (40 msec)
Contact Material	Silver

Contact Ratings

	Break Values				Make Values			
	AC		DC		AC		DC	
	Inductive	Resistive	Inductive	Resistive	Inductive	Resistive	Inductive	Resistive
Rated Operating Current	120V: 6A 240V: 3A 480V: 1.5A 600V: 1.2 A	120V: 10A 240V: 6A 480V: 2A	120V: 1.1A 240V: 0.6A 12V: 4A 24V: 4A	120V: 2A 240V: 1.1A 480V: 0.4A 12V: 4A, 24V: 4A	120V: 60A 240V: 30A 480V: 15A 600V: 12 A	120V: 100A 240V: 60A 480V: 20A	120V: 11A 240V: 6A 12V: 40A 24V: 40A	120V: 20A 240V: 11A 480V: 4A 12V: 40A, 24V: 40A
Horsepower Rating	1/4 HP @ 120V (single-phase, non-reversing motor); 1 HP @ 240V (3 phase, non-reversing motor)							

Non-Illuminated Pushbuttons (Assembled)

Assembled Pushbuttons

A B ( ) D 1 10 N - B

Function
B: Momentary
O: Maintained
V: Pushlock Turn Reset
Y: Push-Pull

Bezel Shape
Blank: Octagonal
F: Full Shroud
G: Mushroom Shroud
P: Neoprene Boot

Series Designation
D: TWTD Series

Button Color
B: Black G: Green
R: Red S: Blue
W: White Y: Yellow

Contact Arrangement
10: 1NO 01: 1NC
20: 2NO 02: 2NC
11: 1NO-1NC 22: 2NO-2NC

Button Shape
1: Flush
2: Extended
3: Mushroom Ø 40mm
4: Jumbo Mushroom Ø 65mm

1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. Custom contact configurations available, contact IDEC for details.

Non-Illuminated Pushbuttons (Assembled) con't

Part Numbers: Non-Illuminated Pushbuttons

Style	Contacts	Part Number	
		Momentary	Maintained
Flush	1NO 1NC 1NO-1NC 2NO 2NC	ABD110N-① ABD101N-① ABD111N-① ABD120N-① ABD102N-①	AOD110N-① AOD101N-① AOD111N-① AOD120N-① AOD102N-①
Extended	1NO 1NC 1NO-1NC 2NO 2NC	ABD210N-① ABD201N-① ABD211N-① ABD220N-① ABD202N-①	AOD210N-① AOD201N-① AOD211N-① AOD220N-① AOD202N-①
Extended with Neoprene Boot	1NO 1NC 1NO-1NC 2NO 2NC	ABPD210N-① ABPD201N-① ABPD211N-① ABPD220N-① ABPD202N-①	AOPD210N-① AOPD201N-① AOPD211N-① AOPD220N-① AOPD202N-①
Recessed	1NO 1NC 1NO-1NC 2NO 2NC	ABFD110N-① ABFD101N-① ABFD111N-① ABFD120N-① ABFD102N-①	AOFD110N-① AOFD101N-① AOFD111N-① AOFD120N-① AOFD102N-①
Extended with Full Shroud	1NO 1NC 1NO-1NC 2NO 2NC	ABFD210N-① ABFD201N-① ABFD211N-① ABFD220N-① ABFD202N-①	AOFD210N-① AOFD201N-① AOFD211N-① AOFD220N-① AOFD202N-①
Ø 40mm Mushroom Head	1NO 1NC 1NO-1NC 2NO 2NC	ABD310N-① ABD301N-① ABD311N-① ABD320N-① ABD302N-①	AOD310N-① AOD301N-① AOD311N-① AOD320N-① AOD302N-①
Ø 40mm Mushroom Head with Full Shroud	1NO 1NC 1NO-1NC 2NO 2NC	ABGD310N-① ABGD301N-① ABGD311N-① ABGD320N-① ABGD302N-①	AOGD310N-① AOGD301N-① AOGD311N-① AOGD320N-① AOGD302N-①
Ø 65mm Jumbo Mushroom Head	1NO 1NC 1NO-1NC 2NO 2NC	ABD410N-① ABD401N-① ABD411N-① ABD420N-① ABD402N-①	AOD410N-① AOD401N-① AOD411N-① AOD420N-① AOD402N-①
Ø 65mm Jumbo Mushroom Head with Shallow Shroud	1NO 1NC 1NO-1NC 2NO 2NC	ABGD410N-① ABGD401N-① ABGD411N-① ABGD420N-① ABGD402N-①	AOGD410N-① AOGD401N-① AOGD411N-① AOGD420N-① AOGD402N-①
Ø 65mm Jumbo Mushroom Head With Deep Shroud	1NO 1NC 1NO-1NC 2NO 2NC	ABFD410N-① ABFD401N-① ABFD411N-① ABFD420N-① ABFD402N-①	AOFD410N-① AOFD401N-① AOFD411N-① AOFD420N-① AOFD402N-①

1. In place of ①, specify the Button Color Code.
2. For sub-assembly part numbers, see next page.
3. For accessories, see page A-182.
4. † Neoprene boot available only in Black (B), Green (G), Red (R) and Yellow (Y).

① Button Color Code

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

1. 65mm Jumbo mushroom not available in white.
2. Neoprene boot is not available in blue or white.

Non-Illuminated Pushbuttons (Sub-Assembled)

Contact Block	+	Operator	+	Button	+	=	Complete Part

Part Numbers: Operators

Style	Part Number	
	Momentary	Maintained
Flush/Extended	ABD-100	AOD-100
Extended with Full Shroud	ABFD-200	AOFD-200
Ø 40mm Mushroom/ Ø 65mm Jumbo Mushroom	ABD-300	AOD-300
Ø 40mm Mushroom with Full Shroud	ABGD-300	AOGD-300
Ø 65mm Jumbo Mushroom with Shallow Shroud	ABGD-400	AOGD-400
Ø 65mm Jumbo Mushroom with Deep Shroud	ABFD-400	AOFD-400

Part Numbers: Buttons and Lenses

Style	Part Number
Flush	ABD1BN-①
Extended	ABD2BN-①
Ø 40mm Mushroom	ABD3BN-①
Ø 65mm Jumbo Mushroom	ABD4BN-①

In place of ①, specify the Button Color Code. (See table previous page)

Part Numbers: Contact Blocks

Description	Part Number	
	1NO	1NC
	BST-010 BST-010S (early make)	BST-001 BST-001S (late break)
Dummy Block	BST-D	

1. *Dummy blocks (no contacts) are used with an odd number of contact blocks.*
2. *Combining BST-010S and BST-001S result in overlapping contacts.*

Assembled E-Stops

A V (L) D 4 (99) 11 (D) N - R - (24V)

Function
V: Pushlock Turn Reset
Y: Push-Pull

Illumination
Blank: None
L: Illuminated

Series Designation
D: TWTD Series

Button/Lens Size
4: 40mm Mushroom

Illuminated Circuit (illuminated unit only)
99: Full Voltage (lamp determines voltage)
126:120V AC Step Down Transformer
246: 240V AC Step Down Transformer
486: 480V AC Step Down Transformer

Lamp Voltage
(full voltage illuminated units only)
6V: 6V AC/DC
12V: 12V AC/DC
24V: 24V AC/DC
120V: 120V AC/DC
240V: 240V AC/DC

Button/Lens Color

A: Amber	R: Red	W: White
G: Green	S: Blue	Y: Yellow

Lamp Type (illuminated units only)
Blank: Incandescent
D: LED

Contact Arrangement

10: 1NO	01: 1NC
20: 2NO	02: 2NC
11: 1NO/1NC	22: 2NO/2NC

1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. Custom contact configurations available, contact IDEC for details.

E-Stops (Assembled)

Part Numbers: E-Stop Switches

Style		Contacts	Part Number
Ø 40mm Pushlock Turn Reset	Non-Illuminated	1NO 1NC 1NO-1NC 2NO 2NC	AVD310N-R* AVD301N-R* AVD311N-R* AVD320N-R* AVD302N-R*
Ø 40mm Illuminated Pushlock Turn Reset	Full Voltage	1NO-1NC 2NO 2NC	AVLD39911⑤N-R-③* AVLD39920⑤N-R-③* AVLD39902⑤N-R-③*
	Transformer	1NO-1NC 2NO 2NC	AVLD3 ④ 11⑤N-R* AVLD3 ④ 20⑤N-R* AVLD3 ④ 02⑤N-R*
Ø 40mm Push-Pull	Non-Illuminated	1NO 1NC 1NO-1NC 2NO 2NC	AYD310N-① AYD301N-① AYD311N-① AYD320N-① AYD302N-①
Ø 40mm Push-Pull	Full Voltage	1NO-1NC 2NO 2NC	AYLD39911⑤N-②-③ AYLD39920⑤N-②-③ AYLD39902⑤N-②-③
	Transformer	1NO-1NC 2NO 2NC	AYLD3 ④ 11⑤N-② AYLD3 ④ 20⑤N-② AYLD3 ④ 02⑤N-②
Ø 40mm Momentary Push-Pull (3-position)	Full Voltage	1NO-1NC 1NC-1LB†	AYLD229911⑤N-②-TK962-③ AYLD229902S⑤N-②-TK962-③
	Transformer	1NO-1NC 1NC-1LB†	AYLD22 ④ 611⑤N-②-TK962 AYLD22 ④ 602S⑤N-②-TK962

Part Numbers: Unibody E-Stops

Style		Contacts	Part Number
Ø 40mm Pushlock Turn Reset (available in Red only)		1NO-1NC 2NC	HN1E-BV4F11-R* HN1E-BV4F02-R*
Illuminated Ø 40mm Pushlock Turn Reset (available in Red only)		1NO-1NC 2NC	HN1E-LV4F11Q⑤-R-③ HN1E-LV4F02Q⑤-R-③

1. * Available in Red only.
2. In place of ③, specify Full Voltage Code.
3. With single unit construction, the positive action contacts are integrated in the body of the switch. This provides an extra degree of safety and reliability for critical emergency stop functions.
5. For nameplates and accessories, see page A-113.
6. For dimensions, see page A-116.
7. For sub-assembly part numbers, see next page.
8. HN1E series E-stops comply with EN418, the IEC "E-Stop Addendum to the Low Voltage Directive," this includes "tamper proof" operation whereby a change of contact state is not possible by "teasing" or "floating" the operator.

3 Position Push-Pull

Contact	Push	Center	Pull
NC (BST-001)	0	0	X
NC-LB (BST-001S)	0	X	X
NO (BST-010)	X	0	0
NC (BST-001)	0	0	x

1. In place of ①, specify the button color code
2. In place of ②, specify the lens color code.
3. In place of ③, specify the Full Voltage (lamp voltage) Code.
4. In place of ④, specify the transformer voltage code.
5. In place of ⑤, specify the Lamp Type code.
6. *Available in red only.
7. 3 position push-pull available in spring return to center only.
8. † The most common configuration for motor starting applications. (See page A-179 for details).
9. For accessories, see page A-182.
10. For dimensions, see page A-186.

① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y

② LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

③ Full Voltage Code

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC	240V (LED only)

④ Transformer Voltage Codes

Voltage	Code
120VAC	126
240VAC	246
480VAC	486

Transformers step down to 6V.

⑤ Lamp Type Code

Lamp	Code
Incandescent	Blank
LED	D

E-Stops (Sub-Assembled)

Transformer*	+	Operator	+	Lamp	+	Button/Lens	=	Complete Part

*Not required for full voltage units (full voltage clips used instead).

Part Numbers: Operators

	Style		Part Number
Ø 40mm Pushlock Turn Reset			AVD-300
Illuminated Ø 40mm Pushlock Turn Reset			AVLD3-0600N
Ø 40mm Push-Pull			AYD-3100
Illuminated Ø 40mm Push-Pull		2 pos	AYLD-0600
		3 pos	AYLD22TK962-0B01*

1.*Includes red lens (40mm mushroom with red insert).

Part Numbers: Buttons and Lenses

	Style		Part No.
Ø 40mm Pushlock Turn Reset Button (available in red only)			AVN3B-R
Ø 40mm Pushlock Turn Reset Lens (available in red only)			AVLN3LU-R
Ø 40mm Push-Pull button			AYD3BN-①
Ø 40mm Push-Pull Lens (Incandescent or LED)		2 pos*	AYLD3L-②
		3 pos	AYLD2L-②

1. In place of ①, specify the Button Color Code. (See table below)
2. In place of ②, specify the LED Color Code.
3. *Not available in blue.

Part Numbers: Lamps

Type	Voltage	Part Number
LED	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②
Incandescent	6V AC/DC	IS-6
	12V AC/DC	IS-12
	24V AC/DC	IS-24
	120VAC	L-120L

1. In place of ②, specify the LED color code.
2. The LED contains a current-limiting resistor and a protection diode.

① Button Color Code

Color	Code
Black	B
Green	G
Red	R
Blue	S
Yellow	Y

② LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W

Part Numbers: Contact Blocks

Description	Part Number	
	1NO	1NC
All Control Units	BST-010 BST-010S (early make)	BST-001 BST-001S (late break)
Dummy Blocks	BST-D	

1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Combining BST-010S and BST-001S result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

Part Numbers: Full Voltage Clips

Primary Voltage (50/60Hz)	Part Number
Full Voltage Clips (2 req'd for each unit)	APD-F

Part Numbers: Transformers

Description	Primary Voltage (50/60Hz)	Part Number
	120V AC	TWD-0126
	240V AC	TWD-0246
	480V AC	TWD-0486

6V secondary voltage (uses 6V lamp).

Pilot Lights (Assembled)

Assembled Pilot Lights

A P D 1 126 D N - R - ( )

Function
P: Pilot Light

Series Designation
D: TWTD Series

Lens Shape
1: Dome

Rated Operational Voltage (Primary)

Transformer Type
126:120V AC
246:240V AC
486:480V AC

Full Voltage Type
99:Full Voltage

Lamp Voltage (Full Voltage Only)
6V: 6V AC/DC
12V:12V AC/DC
24V:24V AC/DC
120V:120V AC
240V: 240V AC (LED only)

Lens Color Code
A: Amber
G: Green
R: Red
S: Blue
W: White
Y: Yellow

Lamp Type
Blank: Incandescent Lamp
D: LED Lamp

Use only when interpreting part numbers. Do not use for developing part numbers.

Part Numbers: LED and Incandescent Pilot Lights

Style	Operating Voltage	Part Number	
		LED	Incandescent
Transformer Dome	120V AC 240V AC 480V AC	APD1126DN-② APD1246DN-② APD1486DN-②	APD1126N-② APD1246N-② APD1486N-②
Full Voltage Dome	—	APD199DN-②-③	APD199N-②-③

1. In place of ②, specify the Lens/LED Color Code.
2. In place of ③, specify the Full Voltage Code (lamp voltage).

② Lens Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Code

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC (LED only)	240V

Pilot Lights (Sub-Assembled)

Transformer*	+	Operator	+	Lamp	+	Lens	=	Complete Part

*Not required for full voltage units (full voltage clips used instead).

Part Numbers: Operators

Style	Part Number
Full Voltage	APD-199
AC Adaptor/Transformer	APD-006

The lens, lamp, and transformer/adaptor or the full voltage clips must be ordered separately.

Part Numbers: Lenses

Style	Part Number
Dome Lens	APD106LN-②

1. *In place of ②, specify the Lens Color Code.*
2. *LED and incandescent lenses differ in shade only. Some colors have only one shade.*

Part Numbers: Lamps

Type	Voltage	Part Number
LED	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②
Incandescent	6.3V AC/DC	IS-6
	12V AC/DC	IS-12
	24V AC/DC	IS-24
	120VAC, 1W	L-120L

1. *In place of ②, specify the LED color code.*
2. *The LED contains a current-limiting resistor and a protection diode.*

Part Numbers: Full Voltage Clips

Primary Voltage (50/60Hz)	Part Number
	APD-F

Required for all full voltage models. Two pieces each.

Part Numbers: Transformers

Description	Primary Voltage (50/60Hz)	Part Number
Transformers	120V AC	TWD-0126
	240V AC	TWD-0246
	480V AC	TWD-0486

6V secondary voltage (use 6V lamp).

② Lens/LED Color Code

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

Illuminated Pushbuttons (Assembled)

Assembled Illuminated Pushbuttons

A L ( ) D 2 126 11 (D) N - R - ( )

Function
L: Momentary Action
OL: Alternate Action

Bezel Shape
Blank: Octagonal
F: Full Shroud

Series Designation
D: TWTD Series

Lens Shape
2: Extended
3: Mushroom Ø 40mm

Rated Operational Voltage (Primary)

Transformer
126:120V AC
246:240V AC
486:480V AC

Full Voltage Type
99:Full Voltage

Lamp Voltage (Full Voltage Only)
6V: 6V AC/DC
12V: 12V AC/DC
24V: 24V AC/DC
120V:120V AC
240V: 240V AC (LED only)

Lens Color Code
A: Amber
G: Green
R: Red
S: Blue
W: White
Y: Yellow

Lamp Type
Blank: Incandescent Lamp
D: LED

Contact Arrangement
20: 2NO 02: 2NC
11: 1NO-1NC

1. Use only when interpreting part numbers. Do not use for developing part numbers.
2. All transformers and AC Adaptors step down to 6V.

Illuminated Pushbuttons (Assembled) con't

Part numbers: Illuminated Pushbuttons

Style		Contacts	Part Number	
			Momentary	Maintained
Extended Lens	Full Voltage	1NO-1NC 2NO 2NC	ALD29911⑤N-②-③ ALD29920⑤N-②-③ ALD29902⑤N-②-③	AOLD29911⑤N-②-③ AOLD29920⑤N-②-③ AOLD29902⑤N-②-③
	Transformer	1NO-1NC 2NO 2NC	ALD2 ④ 11⑤N-② ALD2 ④ 20⑤N-② ALD2 ④ 02⑤N-②	AOLD2 ④ 11⑤N-② AOLD2 ④ 20⑤N-② AOLD2 ④ 02⑤N-②
Extended Lens with Full Shroud	Full Voltage	1NO-1NC 2NO 2NC	ALFD29911⑤N-②-③ ALFD29920⑤N-②-③ ALFD29902⑤N-②-③	AOLFD29911⑤N-②-③ AOLFD29920⑤N-② ③ AOLFD29902⑤N-②-③
	Transformer	1NO-1NC 2NO 2NC	ALFD2 ④ 11⑤N-② ALFD2 ④ 20⑤N-② ALFD2 ④ 02⑤N-②	AOLFD2 ④ 11⑤N-② AOLFD2 ④ 20⑤N-② AOLFD2 ④ 02⑤N-②
Ø 40mm Mushroom Lens	Full Voltage	1NO-1NC 2NO 2NC	ALD39911⑤N-②-③ ALD39920⑤N-②-③ ALD39902⑤N-②-③	AOLD39911⑤N-②-③ AOLD39920⑤N-②-③ AOLD39902⑤N-②-③
	Transformer	1NO-1NC 2NO 2NC	ALD3 ④ 11⑤N-② ALD3 ④ 20⑤N-② ALD3 ④ 02⑤N-②	AOLD3 ④ 11⑤N-② AOLD3 ④ 20⑤N-② AOLD3 ④ 02⑤N-②

1. In place of ②, specify the Lens Color Code.
2. In place of ③, specify the Full Voltage Code (lamp voltage).
3. In place of ④, specify the Transformer Voltage Code.
4. In place of ⑤, specify the Lamp Type Code.

② Lens Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC (LED only)	240 V

④ Transformer Voltage Codes

Voltage	Code
120VAC	126
240VAC	246
480VAC	486

6V secondary voltage (uses 6V lamp).

⑤ Lamp Type Code

Lamp	Code
Incandescent	Blank
LED	D

Illuminated Pushbuttons (Sub-Assembled)

Transformer*	+	Contact Block	+	Operator	+	Lamp	+	Lens	=	Complete Part

** Not required for full voltage types (full voltage types use APD-F full voltage clips).*

Part Numbers: Operators

Style	Part Number	
	Momentary	Maintained
Extended	ALD-0600	AOLD-0600
Extended with Full Shroud	ALFD-0600	AOLFD-0600
40mm Mushroom	ALD-0600	AOLD-0600

Part Numbers: Lenses

Style	Part No.
Extended	ALN06LU-②
Ø 40mm Mushroom	ALN3LU-②

1. In place of ②, specify the Lens Color Code.
2. LED and incandescent lenses differ in shade only. Some colors have only one shade.

Part Numbers: Full Voltage Clips

Primary Voltage (50/60Hz)	Part Number
Full Voltage Clips (2 req'd for each unit)	APD-F

Required for all full voltage models. Two pieces each.

Part Numbers: Lamps

Type	Voltage	Part Number
LED	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②
Incandescent	6V AC/DC	IS-6
	12V AC/DC	IS-12
	24V AC/DC	IS-24
	120VAC	L-120L

1. In place of ②, specify the LED Color code.
2. The LED contains a current-limiting resistor and a protection diode.

② Lens/LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

Mushroom lens not available in yellow.

Part Numbers: Contact Blocks

Description	Part Number	
	1NO	1NC
All Control Units	BST-010 BST-010S (early make)	BST-001 BST-001S (late break)
Dummy Blocks	BST-D	

1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Combining BST-010S and BST-001S result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

Part Numbers: Transformers

Description	Primary Voltage (50/60Hz)	Part Number
Transformers	120V AC	TWD-0126
	240V AC	TWD-0246
	480V AC	TWD-0486

6V secondary voltage (uses 6V lamp).

Non-Illuminated Selector Switches (Assembled)

Knob Selector (Non-illuminated)

Key Selector (Non-illuminated)

Lever Selector (Non-illuminated)

Assembled Selector Switches

A S D 2 ( ) ( ) 11 N - ( )

Function
S: Selector Switch

Series Designation
D: TWTD Series

Number of Positions
2: 2-Position
3: 3-Position

Spring Return Action
Blank: Maintained
1: Spring return from Right
2: Spring return from Left
3: 2-Way spring return from Left and Right

Circuit Number
(See Circuit # column of Selector Switch Contact Arrangement Chart on beginning on A-179.)

Contact Arrangement Code

10: 1NO	01: 1NC
20: 2NO	02: 2NC
40: 4NO	04: 4NC
11: 1NO-1NC	22: 2NO-2NC

Operator Style Code
Blank: Knob Operator
L: Lever Operator
K: Key Operator

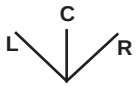
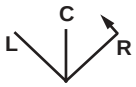
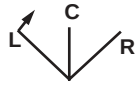
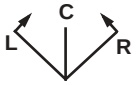
Use only when interpreting part numbers. Do not use for developing part numbers.

Non-Illuminated Selector Switches (Assembled) con't

Part numbers: Non-Illuminated 2–Position Selector Switches

Style					Part Number	Part Number	Part Number
Contact	Mounting	Operator Position L	Operator Position R		Maintained	Spring Return from Right	Spring Return from Left
1NO	1 2	O O	X O	Knob Lever Key	ASD210N ASD2**L**10N ASD2**K**10N	ASD2110N ASD21**L**10N ASD21**K**10N	ASD2210N ASD22**L**10N ASD22**K**10N
1NC	1 2	X O	O O	Knob Lever Key	ASD201N-116 ASD2**L**01N-116 ASD2**K**01N-116	ASD2101N-116 ASD21**L**01N-116 ASD21**K**01N-116	ASD2201N-116 ASD22**L**01N-116 ASD22**K**01N-116
1NO 1NC	1 2	X O	O X	Knob Lever Key	ASD211N ASD2**L**11N ASD2**K**11N	ASD2111N ASD21**L**11N ASD21**K**11N	ASD2211N ASD22**L**11N ASD22**K**11N
2NO	1 2	O O	X X	Knob Lever Key	ASD220N ASD2**L**20N ASD2**K**20N	ASD2120N ASD21**L**20N ASD21**K**20N	ASD2220N ASD22**L**20N ASD22**K**20N
2NC	1 2	X X	O O	Knob Lever Key	ASD202N-104 ASD2**L**02N-104 ASD2**K**02N-104	ASD2102N-104 ASD21**L**02N-104 ASD21**K**02N-104	ASD2202N-104 ASD22**L**02N-104 ASD22**K**02N-104
2NO 2NC	1 2 3 4	O X O X	X O X O	Knob Lever Key	ASD222N ASD2**L**22N ASD2**K**22N	ASD2122N ASD21**L**22N ASD21**K**22N	ASD2222N ASD22**L**22N ASD22**K**22N
2NO 2NC	1 2 3 4	O O X X	X X O O	Knob Lever Key	ASD222N-111 ASD2**L**22N-111 ASD2**K**22N-111	ASD2122N-111 ASD21**L**22N-111 ASD21**K**22N-111	ASD2222N-111 ASD22**L**22N-111 ASD22**K**22N-111

Part Numbers: Non-Illuminated 3–Position Selector Switches

Style						Part Number	Part Number	Part Number	Part Number
Contact	Mounting	Operator Position L	Operator Position C	Operator Position R		Maintained 	Spring Return from Right 	Spring Return From Left 	Spring Return Two-Way 
2NO	1 2	X O	O O	O X	Knob Lever Key	ASD320N ASD3**L**20N ASD3**K**20N	ASD3120N ASD31**L**20N ASD31**K**20N	ASD3220N ASD32**L**20N ASD32**K**20N	ASD3320N ASD33**L**20N ASD33**K**20N
2NC	1 2	O ~~X~~	~~X~~ ~~X~~	~~X~~ O	Knob Lever Key	ASD302N ASD3**L**02N ASD3**K**02N	ASD3102N ASD31**L**02N ASD31**K**02N	ASD3202N ASD32**L**02N ASD32**K**02N	ASD3302N ASD33**L**02N ASD33**K**02N
2NO 2NC	1 2 3 4	X O O ~~X~~	O O ~~X~~ ~~X~~	O X ~~X~~ O	Knob Lever Key	ASD322N ASD3**L**22N ASD3**K**22N	ASD3122N ASD31**L**22N ASD31**K**22N	ASD3222N ASD32**L**22N ASD32**K**22N	ASD3322N ASD33**L**22N ASD33**K**22N
2NO 2NC	1 2 3 4	X ~~X~~ O O	O ~~X~~ X O	X O O X	Knob Lever Key	ASD322N-309 ASD3**L**22N-309 ASD3**K**22N-309	ASD3122N-309 ASD31**L**22N-309 ASD31**K**22N-309	ASD3222N-309 ASD32**L**22N-309 ASD32**K**22N-309	ASD3322N-309 ASD33**L**22N-309 ASD33**K**22N-309
2NO 2NC	1 2 3 4	O O O O	X O X O	O X O X	Knob Lever Key	ASD322N-310 ASD3**L**22N-310 ASD3**K**22N-310	ASD3122N-310 ASD31**L**22N-310 ASD31**K**22N-310	ASD3222N-310 ASD32**L**22N-310 ASD32**K**22N-310	ASD3322N-310 ASD33**L**22N-310 ASD33**K**22N-310
4NO	1 2 3 4	X O X O	O O O O	O X O X	Knob Lever Key	ASD340N ASD3**L**40N ASD3**K**40N	ASD3140N ASD31**L**40N ASD31**K**40N	ASD3240N ASD32**L**40N ASD32**K**40N	ASD3340N ASD33**L**40N ASD33**K**40N
4NC	1 2 3 4	O ~~X~~ O ~~X~~	~~X~~ ~~X~~ ~~X~~ ~~X~~	~~X~~ O ~~X~~ O	Knob Lever Key	ASD304N ASD3**L**04N ASD3**K**04N	ASD3104N ASD31**L**04N ASD31**K**04N	ASD3204N ASD32**L**04N ASD32**K**04N	ASD3304N ASD33**L**04N ASD33**K**04N

1. *The truth table indicates the operating position of contact block when the operator is switched to that position.*
   X = On (closed contacts) O = Off (open contacts)
   ~~X X~~ = Overlapping Contacts: Remain on (closed contacts) when switch is moved between these two positions.
2. *All knob and lever selector switches come in black. Other colors are available by ordering the knob or lever separately.*
3. *Custom contact arrangements available, see page A-179 or call IDEC for details.*

Non-Illuminated Selector Switches (Sub-Assembled)

Contact Blocks	+	Operator	+	Knob or Lever*	+	Color Insert*	=	Complete Part †

1. * Not needed with key type switches.
2. † Knob type shown.

Part Numbers: Operators

Appearance/ Position		Description	Part Number
Knob & Lever	2	Maintained	ASD200
	2	Spring-Ret. from Right	ASD2100
		Spring-Ret. from Left	ASD2200
	3	Maintained, Cam 1 Maintained, Cam 2	ASD300-1 ASD300-2
	3	Spring-Ret. from Right, Cam1 Spring-Ret. from Right, Cam 2	ASD3100-1 ASD3100-2
		Spring-Ret. from Left, Cam 1 Spring-Ret. from Left, Cam 2	ASD3200-1 ASD3200-2
		Spring-Ret. from L/R, Cam 1 Spring-Ret. from L/R, Cam 2	ASD3300-1 ASD3300-2
Key	2	Maintained	ASD2K00-RA
	2	Spring-Ret. from Right	ASD21K00-RL
		Spring-Ret. from Left	ASD22K00
	3	Maintained, Cam 1 Maintained, Cam 2	ASD3K00-1-RA ASD3K00-2-RA
	3	Spring-Ret. from Right, Cam1 Spring-Ret. from Right, Cam 2	ASD31K00-1-RLC ASD31K00-2-RLC
		Spring-Ret. from Left, Cam 1 Spring-Ret. from Left, Cam 2	ASD32K00-1-RRC ASD32K00-2-RRC
		Spring-Ret. from L/R, Cam 1 Spring-Ret. from L/R, Cam 2	ASD33K00-1-RC ASD33K00-2-RC

1. Order knobs, levers, color inserts separately (see below).
2. For key switches, keys are removable in all maintained positions. Other options available, contact IDEC for details.
3. See page A-181 "Operator Truth Tables" for details of difference between cams.

① Color Codes

Knob/Lever Color	Code
Black	B
Blue	S
Green	G
Red	R
Yellow	Y
White	W

1. Knob/Lever not available in white.
2. Color inserts not available in Black.

Part Numbers: Handles and Inserts

Style	Part Number
Knob	ASDHHY - ①
Lever	ASDHHL -①
Color Insert	TW-HC1 - ①

In place of ①, specify the Color Code.

Part Numbers: Contact Blocks

Style	Part Number	
	1NO	1NC
	BST-010 BST-010S (early make)	BST-001 BST-001S (late break)
Dummy Blocks	BST-D	

1. Dummy blocks (no contacts) are used with an odd number of contact blocks.
2. Combining BST-010S and BST-001S result in overlapping contacts (remain on, or closed, when switch is moved between two positions).

Illuminated Selector Switches (Assembled)

Assembled Illuminated Selector Switches

A SL D 2 (2) 126 11 D N - 111 - R - 24

Function
SL: Illuminated Selector Switch

Series Designation
D: TWTD Series

Number of Positions
2: 2-Position
3: 3-Position

Spring Return Action
Blank: Maintained
1: Spring return from Right
2: Spring return from Left
3: 2-Way spring return from Left and Right

Rated Operational Voltage (Primary)

Transformer	Full Voltage Type
126:120V AC	99: Full Voltage
246:240V AC	
486:480V AC	

Contact Arrangement

20: 2NO	02: 2NC
40: 4NO	04: 4NC
11: 1NO-1NC	22: 2NO-2NC

Lamp Voltage (Full Voltage Only)
6V: 6V AC/DC
12V: 12V AC/DC
24V: 24V AC/DC
120V: 120V AC
240V: 240V AC (LED only)

Lens Color Code
A: Amber
G: Green
R: Red
S: Blue
W: White
Y: Yellow

Circuit Code Number
See Circuit # column of Selector Switch Contact Arrangement Charts on page A-179.

Lamp Type
Blank: Incandescent
D: LED

Use only when interpreting part numbers. Do not use for developing part numbers.

Illuminated Selector Switches (Assembled) con't

Part Numbers: Illuminated 2–Position Selector Switches

Style					Maintained	Spring Return From Right	Spring Return From Left
Contact	Mounting	Operator Position L	Operator Position R				
1NO 1NC	1 2	0 X	X 0	transformer full voltage	ASLD2 ④11⑤N-② ASLD29911⑤N-②-③	ASLD21 ④11⑤N-② ASLD219911⑤N-②-③	ASLD22 ④11⑤N-② ASLD229911⑤N-②-③
2NO	1 2	0 0	X X	transformer full voltage	ASLD2 ④20⑤N-② ASLD29920⑤N-②-③	ASLD21 ④20⑤N-② ASLD219920⑤N-②-③	ASLD22 ④20⑤N-② ASLD229920⑤N-②-③
2NC	1 2	X X	0 0	transformer full voltage	ASLD2 ④02⑤N-104-② ASLD29902⑤N-104-②-③	ASLD21 ④02⑤N-104-② ASLD219902⑤N-104-②-③	ASLD22 ④02⑤N-104-② ASLD229902⑤N-104-②-③
2NO 2NC	1 2 3 4	0 X 0 X	X 0 X 0	transformer full voltage	ASLD2 ④22⑤N-② ASLD29922⑤N-②- ③	ASLD21 ④22⑤N-② ASLD219922⑤N-②-③	ASLD22 ④22⑤N-② ASLD229922⑤N-②-③
2NO 2NC	1 2 3 4	0 0 X X	X X 0 0	transformer full voltage	ASLD2 ④22⑤N-11-② ASLD29922⑤N-111-②-③	ASLD21 ④22⑤N-111-② ASLD219922⑤N-111-②-③	ASLD22 ④22⑤N-111-② ASLD229922⑤N-111-②-③

② Lens/LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

③ Full Voltage Codes

Voltage	Code
6V AC/DC	6V
12V AC/DC	12V
24V AC/DC	24V
120V AC	120V
240V AC (LED only)	240V

④Transformer Voltage Codes

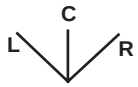
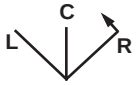
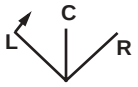
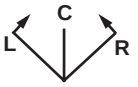
Voltage	Code
120VAC	126
240VAC	246
480VAC	486

6V secondary voltage (uses 6V lamps).

⑤ Lamp Type Code

Lamp	Code
Incandescent	Blank
LED	D

Part Numbers: Illuminated 3–Position Selector Switches

Style								
Contact	Mounting	Operator Position L	Operator Position C	Operator Position R		Maintained 	Spring Return From Right 	Spring Return From Left 	Spring Return Two-Way 
2NO	1 2	X 0	0 0	0 X	transformer full voltage	ASLD3 ④ 20⑤N-② ASLD39920⑤N-②-③	ASLD31 ④ 20⑤N-② ASLD319920⑤N-②- ③	ASLD32 ④ 20D⑤N-② ASLD329920D⑤N-②-③	ASLD33 ④ 20D⑤N-② ASLD339920D⑤N-②-③
2NC	1 2	0 ~~X~~	~~X~~ ~~X~~	~~X~~ 0	transformer full voltage	ASLD3 ④ 02⑤N-② ASLD39902⑤N-②-③	ASLD31 ④ 02⑤N-② ASLD319902⑤N-②-③	ASLD32 ④ 02D⑤N-② ASLD329902D⑤N-②-③	ASLD33 ④ 02D⑤N-② ASLD339902D⑤N-②-③
2NO 2NC	1 2 3 4	X 0 0 ~~X~~	0 0 ~~X~~ ~~X~~	0 X ~~X~~ 0	transformer full voltage	ASLD3 ④ 22⑤N-② ASLD39922⑤N-②-③	ASLD31 ④ 22⑤N-② ASLD319922⑤N-②-③	ASLD32 ④ 22D⑤N-② ASLD329922D⑤N-②-③	ASLD33 ④ 22D⑤N-② ASLD339922D⑤N-②-③
2NO 2NC	1 2 3 4	X ~~X~~ 0 0	0 ~~X~~ X 0	X 0 0 X	transformer full voltage	ASLD3 ④ 22⑤N-309-② ASLD39922⑤N-309-②-③	ASLD31 ④ 22⑤N-309-② ASLD319922⑤N-309-②-③	ASLD32 ④ 22D⑤N-309-② ASLD329922D⑤N-309-②-③	ASLD33 ④ 22D⑤N-309-② ASLD339922D⑤N-309-②-③
2NO 2NC	1 2 3 4	0 0 0 0	X 0 X 0	0 X 0 X	transformer full voltage	ASLD3 ④ 22⑤N-310-② ASLD39922⑤N-310-②-③	ASLD31 ④ 22⑤N-310-② ASLD319922⑤N-310-②-③	ASLD32 ④ 22D⑤N-310-② ASLD329922D⑤N-310-②-③	ASLD33 ④ 22D⑤N-310-② ASLD339922D⑤N-310-②-③
4NO	1 2 3 4	X 0 X 0	0 0 0 0	0 X 0 X	transformer full voltage	ASLD3 ④ 40⑤N-② ASLD39940⑤N-②-③	ASLD31 ④ 40⑤N-② ASLD319940⑤N-②-③	ASLD32 ④ 40⑤N-② ASLD329940⑤N-②-③	ASLD33 ④ 40⑤N-② ASLD339940⑤N-②-③
4NC	1 2 3 4	0 ~~X~~ 0 ~~X~~	~~X~~ ~~X~~ ~~X~~ ~~X~~	~~X~~ 0 ~~X~~ 0	transformer full voltage	ASLD3 ④ 04⑤N-② ASLD39904⑤N-②-③	ASLD31 ④ 04⑤N-② ASLD319904⑤N-②-③	ASLD32 ④ 04⑤N-② ASLD329904⑤N-②-③	ASLD33 ④ 04⑤N-② ASLD339904⑤N-②-③

1. In place of ②, specify the Lens/LED Color Code, in place of ③, specify the Full Voltage (lamp voltage) Code, in place of ④, specify the Transformer Voltage Code and in place of ⑤ specify the Lamp Type Code.

2. The truth table indicates the operating position of contact block when the operator is switched to that position.
X = On (Closed Contacts) O = Off (Open Contacts)
~~X X~~ = Overlapping Contacts: Remain on (closed contacts) when switch is moved between these positions

A

Switches & Pilot Devices

Illuminated Selector Switches (Sub-Assembled)

Transformer*	+	Contact Block	+	Operator	+	Lamp	Lense	=	Complete Part

**Not required for full voltage units (use APD-F full voltage clips instead).*

Part Numbers: Operators

Appearance/ Positions		Description	Part Number
Operator	2	Maintained	ASLD200
	3	Maintained, Cam 1 Maintained, Cam 2	ASLD300-1 ASLD300-2
	2	Spring-Ret. from Right	ASLD2100
		Spring-Ret. from Left	ASLD2200
	3	Spring-Ret. from Right, Cam 1 Spring-Ret. from Right, Cam 2	ASLD3100-1 ASLD3100-2
		Spring-Ret. from Left, Cam 1 Spring-Ret. from Left, Cam 2	ASLD3200-1 ASLD3200-2
		Spring-Ret. from L/R, Cam 1 Spring-Ret. from L/R, Cam 2	ASLD3300-1 ASLD3300-2

Part Numbers: Lenses

Style	Part Number
Knob	ASLNLHU - ①

Incandescent and LED lenses differ only in shade. Some colors are only available in one shade.

Part Numbers: Lamps

Type	Voltage	Part Number
LED	6V AC/DC	LSTD-6②
	12V AC/DC	LSTD-1②
	24V AC/DC	LSTD-2②
	120V AC	LSTD-H2②
	240V AC	LSTD-M4②
Incandescent	6.3V AC/DC	IS-6
	12V AC/DC	IS-12
	24V AC/DC	IS-24
	120VAC	L-120L

1. *In place of ②, specify the LED color code.*
2. *The LED contains a current-limiting resistor and a protection diode.*

Contact Blocks

Description	Part Number	
	1NO	1NC
	BST-010 BST-010S (early make)	BST-001 BST-001S (late break)
Dummy Blocks	BST-D	

1. *Dummy blocks (no contacts) are used with an odd number of contact blocks.*
2. *Combining BST-010S and BST-001S result in overlapping contacts (make before break).*

Part Numbers: Full Voltage Clips

Primary Voltage (50/60Hz)	Part Number
Full Voltage Clips (2 req'd for each unit)	APD-F

Part Numbers: Transformers

Description	Primary Voltage (50/60Hz)	Part Number
Transformers	120V AC	TWD-0126
	240V AC	TWD-0246
	480V AC	TWD-0486

6V secondary voltage

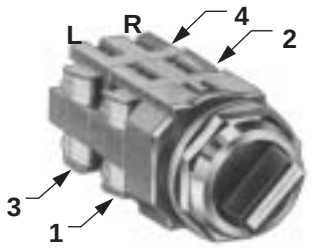
② Lens/LED Color Codes

Color	Code
Amber	A
Green	G
Red	R
Blue	S
White	W
Yellow	Y

Contact Arrangement Charts

How to Read Contact Arrangement Charts

To determine contact block mounting position, first make sure the selector switch is oriented as shown on the right



Contact Arrangement
Type and quantity of switch contacts

Circuit Number
* N/D = No designation

Contact Block Mounting
Position or mounting contact blocks on operator

Operator Position
Truth table indicates the operating position of contact block when operator is switched to that position.

X = On (Closed Contacts)
O = Off (Open Contacts)
X X = Overlapping Contacts: Remain on (closed) when switch is moved between these two positions

Contact Block Part Number
Part number to use when ordering sub-assembly contact blocks, as required for use with corresponding mounting position

Contact Arrangement Chart: 2-position Selector Switches

Style		Mounting Position	Operator Position		Contact Block Part Number	Description	Operator Part Number		
Contact	Circuit Number		L	R			Maintained	Spring Ret. from Rt.	Spring Ret. from Lt.
			↖	↗			L R	L R	L R
1NO	N/D	1	O	X	BST-010	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	O	BST-D				
1NC	116	1	X	O	BST-001	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	O	BST-D				
1NO 1NC	N/D	1	O	X	BST-010	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	X	O	BST-001				
	103	1	X	O	BST-001	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010				
1NO-EM 1NC-LB	600	1	O	X	BST-010S	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	X	O	BST-001S				
	601	1	X	O	BST-001S	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010S				
2NO	N/D	1	O	X	BST-010	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010				
2NC	104	1	X	O	BST-001	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	X	O	BST-001				
2NO 2NC	N/D	1	O	X	BST-010	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	X	O	BST-001				
		3	O	X	BST-010				
		4	X	O	BST-001				
	110	1	X	O	BST-001	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010				
		3	X	O	BST-001				
		4	O	X	BST-010				
	111	1	O	X	BST-010	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010				
		3	X	O	BST-001				
		4	X	O	BST-001				
4NO	N/D	1	O	X	BST-010	Knob/Lever Key Illuminated Knob	ASD200 ASD2K00 ASLD200	ASD2100 ASD21K00 ASLD2100	ASD2200 ASD22K00 ASLD2200
		2	O	X	BST-010				
		3	O	X	BST-010				
		4	O	X	BST-010				

Contact Arrangement Chart: 3-Position Selector Switches

Style		Mounting Position	Operator Position			Contact Block Part Number	Description	Operator Part Number			
Contact	Circuit Number		L	C	R			Maintained	Spring Ret. from Rt.	Spring Ret. from Lt.	Two-Way
1NO 1NC	202	1	X	0	0	BST-010	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	~~X~~	~~X~~	0	BST-001					
	203	1	0	~~X~~	~~X~~	BST-001	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	0	0	X	BST-010					
	302	1	X	0	X	BST-010	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	~~X~~	~~X~~	0	BST-001					
	303	1	0	X	0	BST-001	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	0	0	X	BST-010					
2NO	N/D	1	X	0	0	BST-010	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	0	0	X	BST-010					
	301	1	X	0	X	BST-010	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	0	0	X	BST-010					
2NC	304	1	0	X	0	BST-001	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	~~X~~	~~X~~	0	BST-001					
	N/D	1	0	~~X~~	~~X~~	BST-001	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	~~X~~	~~X~~	0	BST-001					
2NO 2NC	N/D	1	X	0	0	BST-010	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	0	0	X	BST-010					
		3	0	~~X~~	~~X~~	BST-001					
		4	~~X~~	~~X~~	0	BST-001					
	210	1	0	~~X~~	~~X~~	BST-001	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	0	0	X	BST-010					
		3	0	~~X~~	~~X~~	BST-001					
		4	0	0	X	BST-010					
	308	1	X	0	X	BST-010	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	~~X~~	~~X~~	0	BST-001					
		3	X	0	X	BST-010					
		4	~~X~~	~~X~~	0	BST-001					
	309	1	X	0	X	BST-010	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	~~X~~	~~X~~	0	BST-001					
		3	0	X	0	BST-001					
		4	0	0	X	BST-010					
	310	1	0	X	0	BST-001	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	0	0	X	BST-010					
		3	0	X	0	BST-001					
		4	0	0	X	BST-010					
4NO	N/D	1	X	0	0	BST-010	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	0	0	X	BST-010					
		3	X	0	0	BST-010					
		4	0	0	X	BST-010					
	305	1	X	0	X	BST-010	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	0	0	X	BST-010					
		3	X	0	X	BST-010					
		4	0	0	X	BST-010					
4NC	N/D	1	0	~~X~~	~~X~~	BST-001	Knob/Lever Key Illuminated Knob	ASD300-1 ASD3K00-1 ASLD300-1	ASD3100-1 ASD31K00-1 ASLD3100-1	ASD3200-1 ASD32K00-1 ASLD3200-1	ASD3300-1 ASD33K00-1 ASLD3300-1
		2	~~X~~	~~X~~	0	BST-001					
		3	0	~~X~~	~~X~~	BST-001					
		4	~~X~~	~~X~~	0	BST-001					
	314	1	0	X	0	BST-001	Knob/Lever Key Illuminated Knob	ASD300-2 ASD3K00-2 ASLD300-2	ASD3100-2 ASD31K00-2 ASLD3100-2	ASD3200-2 ASD32K00-2 ASLD3200-2	ASD3300-2 ASD33K00-2 ASLD3300-2
		2	~~X~~	~~X~~	0	BST-001					
		3	0	X	0	BST-001					
		4	~~X~~	~~X~~	0	BST-001					

1. Each operator sub-assembly is available as a "-1" and a "-2" for 3-position selector switches. The internal cam of a "-1" is different from that of a "-2". This results in designated combinations of open and closed contacts in the various operator positions.

2. N/D = No circuit number designation required in assembled part number.

3. X = On (closed contacts) O = Off (open contacts). ~~X X~~ Overlapping contacts remain on (closed) when switch is moved between these two positions.

Operator Truth Tables

Use the following tables to build custom selector switches.

2 Position Selector Switches

ASD200

Contact	Mounting Position	Operator Position	
		Left	Right
BST-010 (NO)	L	0	X
	R	0	X
BST-001 (NC)	L	X	0
	R	X	0
BST-010S (NO-EM)	L	0	~~X~~
	R	0	~~X~~
BST-001S (NC-LB)	L	~~X~~	0
	R	~~X~~	0

3 Position Selector Switches

ASD300-1
ASLD300-1
ASD3K00-1

Contact	Mounting Position	Operator Position		
		Left	Center	Right
BST-010 (NO)	L	X	0	0
	R	0	0	X
BST-001 (NC)	L	0	X	~~X~~
	R	~~X~~	~~X~~	0
BST-010S (NO-EM)	L	X	0	0
	R	0	0	X
BST-001S (NC-LB)	L	0	~~X~~	~~X~~
	R	X	~~X~~	0

ASD300-2
ASLD300-2
ASD3K00-2

Contact	Mounting Position	Operator Position		
		Left	Center	Right
BST-010 (NO)	L	X	0	X
	R	0	0	X
BST-001 (NC)	L	0	X	0
	R	~~X~~	~~X~~	0
BST-010S (NO-EM)	L	X	0	~~X~~
	R	0	0	X
BST-001S (NC-LB)	L	0	~~X~~	0
	R	~~X~~	~~X~~	0

3 Position Push/Pull Switches

AYLD22

Contact	Operator Position		
	Pull	Normal	Push
BST-010 (NO)	0	0	X
BST-001 (NC)	X	0	0
BST-010S (NO-EM)	0	X	X
BST-001S (NC-LB)	X	X	0

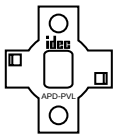
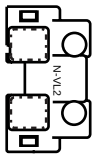
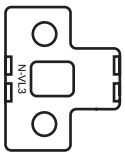
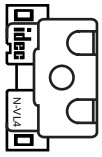
1. For Operator Truth Tables, see next page.
2. For examples of how to assemble selector switches, see A-105.

Accessories — TWTD Series

Lamp Removal Tool		Tool used to install LED's and incandescent lamps.	OR-55
Metal Bezel		Replacement locking ring/bezel — Standard octagonal units (chrome-pl.).	OG-81
		Extended, non-illuminated (chrome-pl.).	OG-82
		Extended, illuminated (chrome-pl.).	OG-83L
		Jumbo Mushroom Shallow Shroud	ABN4G
		Jumbo Mushroom Deep Shroud	ABN4F
Plastic Bezel		Black plastic locking ring/bezel	OGP11B
Boot/Cover		Used to cover and protect push-buttons. — In place of ①, specify neoprene **Rubber Boot** color: **B** (black), **G** (green), **R** (red), **Y** (yellow)	OC-11 ①
		Flush units (clear plastic -40˚ to +60˚C).	OC-121
		Extended units (clear plastic -40˚ to +60˚C).	OC-122
Anti-Rotation Ring		Plastic washer For nameplates or panels that should not be scratched.	OGL-D1T
		Thrust washer/Anti-rotation ring for use with notched panel cutout.	OGL-D1S
Mounting Hole Plug		Plugs used to fill unused 30mm panel cutouts. — Plastic with locking nut attached.	OBP-11
		Metal with locking nut attached	OB-11
		Grey rubber (-5˚ to +60˚C)	OB-13
Terminal Tab Adaptor		Tab #250 17/64" x 3/64" (6.35mm x 0.8mm): Single tab	TW-FA1
Full Voltage Adaptor		Used on all full voltage illuminated units. Two required per unit. (M3.5 screw and saddle)	APD-F
Lock Out Adaptor		Used to provide lockout protection for TWTD pushbuttons and knob selectors. Ø 1-13/64" (30mm)	OL-KL1
Replacement Keys		Pair of Keys (#0)	TW-SK-0PN02

Accessories con't

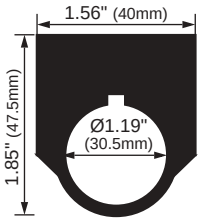
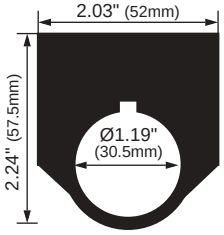
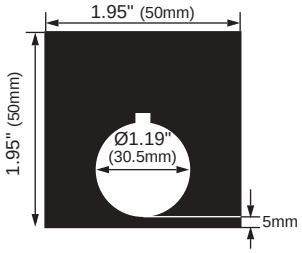
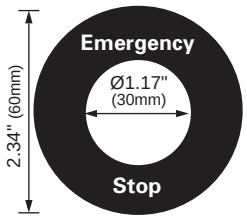
Part Numbers: Fingersafe Covers for TWTD Series

Appearance	Description	Used with	Part Number
	Fingersafe terminal cover, for full voltage pilot lights, adds 3mm to overall depth	APO, APD199... full voltage pilot lights	APD-PVL
	Fingersafe terminal cover, for contact blocks, adds 3mm to overall depth	Non-Illuminated pushbuttons ABD..., AND AOD...	N-VL2
	Fingersafe terminal cover, adds 1.5mm to overall depth	Transformer pilot lights and illuminated units	N-VL3
	Fingersafe terminal cover, adds 4 mm to depth	Full voltage illuminated pushbuttons	N-VL4

Dimensions on page A-186.

Nameplates — TWTD Series

Part Numbers: Nameplates

	NALD	NAKD	NAQD	HNAV
Dimensions				

Description		Part Number	Part Number	Part Number	Part Number
Nameplate (blank)	Black	NALD-B	NAKD-B	NAQD-B	HNAV-0
	Red	NALD-R	NAKD-R	NAQD-R	
Nameplate (engraved)		NALD-①	NAKD-①	NAQD-①	HNAV-27 "Emergency Stop"

1. Nameplates are made of 0.031" aluminum. Lettering is white letters engraved on black background.
2. In place of ①, insert either the standard legend code from table below or custom engraving delimited by " ".
3. HNAV available in yellow only.

*** Standard Legend Codes**

Pushbuttons				Pushbuttons/Selector Switches				Selector Switches	
Legend	**Code**	**Legend**	**Code**	**Legend**	**Code**	**Legend**	**Code**	**Legend**	**Code**
AUTO	101	OPEN	116	AUTO-MAN	201	REV-FOR	216	AUTO-MAN-OFF	301
CLOSE	102	OUT	117	CLOSE-OPEN	202	RUN-JOG	217	AUTO-OFF-MAN	302
DOWN	103	RAISE	118	DOWN-UP	203	RUN-SAFE	218	CLOSE-OFF-OPEN	303
*EMERG.STOP	104	RESET	119	FAST-SLOW	204	SAFE-RUN	219	DOWN-OFF-SLOW	304
FAST	105	REVERSE	120	FOR-REV	205	SLOW-FAST	220	FAST-OFF-SLOW	305
FORWARD	106	RUN	121	HAND-AUTO	206	START-STOP	221	FOR-OFF-REV	306
HAND	107	SLOW	122	HIGH-LOW	207	STOP-START	222	LEFT-OFF-RIGHT	307
HIGH	108	START	123	JOG-RUN	208	UP-DOWN	223	LOWER-OFF-RAISE	308
IN	109	*STOP	124	LEFT-RIGHT	209			OFF-MAN-AUTO	309
INCH	110	STOP	125	LOWER-RAISE	210			OFF-SLOW-FAST	310
JOG	111	TEST	126	MAN-AUTO	211			OFF-1-2	311
LOW	112	UP	127	OFF-ON	212			OPEN-OFF-CLOSE	312
LOWER	113	I (Int'l On)	150	ON-OFF	213			SLOW-OFF-FAST	313
OFF	114	O (Int'l Off)	151	OPEN-CLOSE	214			SUMMER-OFF-WINTER	314
ON	115	EMO	152	RAISE-LOWER	215			UP-OFF-DOWN	315
								1-OFF-2	316
								HAND-OFF-AUTO	317

*1. *Available in Red as standard legend code 104 and 124. To order engraved nameplate and codes, add legend code to nameplate part number. Character height based on the number of characters, space and size of nameplate. Standard character size is 3/16".*
2. Nameplates with standard legends are the same list price as blank nameplates. Special engravings, additional cost.

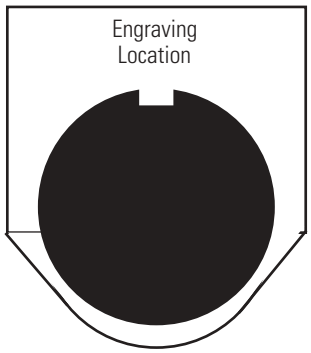
To specify engraving instructions, use the Nameplate order form on next page.

Nameplates Order Form — TWTD Series

Copy this order form and use it to specify Letter Height, Custom Engravings, Location of Engraving on Nameplate, and Quantity Desired.
To insure engraving accuracy, fax it to your IDEC representative or Distributor.

Your Company:		IDEC Rep/Distributor Contact:	
Name:		PO number (if known):	
Telephone:		IDEC Rep/Distributor Phone:	
Fax & Email		IDEC Rep/Distributor Fax & Email	

NALD Nameplate



Step 1.
Choose Letter Size - 7/64" or 1/8".
Check the box for the letter size you want. Then write your lettering in box below checkboxes. Note: 1/8" size letters cannot exceed 13 characters.

Step 2.
Specify Quantity.
Enter the number of nameplates desired in the box on the right.

Qty

Sample Letter Sizes
7/64" Letters:
A B C D

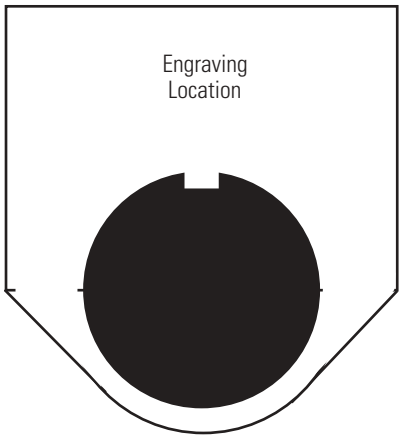
1/8" Letters:
A B C D

7/64" Letter Size ☐ 16 characters max (for 7/64" size letters)

1/8" Letter Size ☐ 13 characters max (for 1/8" size letters)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

NAKD Nameplate



Step 1. 1/8" Letter Size Only
Specify Lettering
Write your lettering in box to the right. Maximum 17 characters per line, maximum 4 lines.

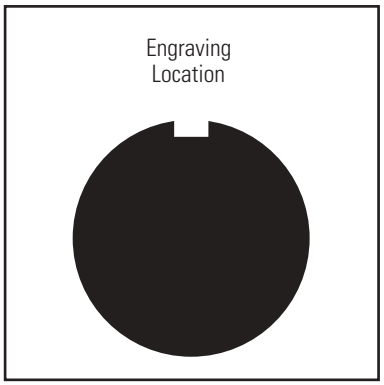
Step 2.
Specify Quantity.
Enter the number of nameplates desired in the box on the right.

Qty

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

Sample Letter Size
1/8" Letters: A B C D

NAQD Nameplate



Step 1.
Choose Letter Size - 7/64" or 1/8".
Check the box for the letter size you want. Then write your lettering in box below checkboxes. Note: 1/8" size letters cannot exceed 16 characters.

7/64" Letter Size ☐ 20 characters max (for 7/64" size letters)

1/8" Letter Size ☐ 16 characters max (for 1/8" size letters)

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Step 2.
Specify Quantity.
Enter the number of nameplates desired in the box on the right.

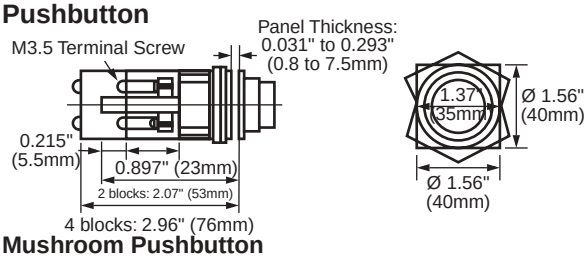
Qty

Sample Letter Sizes
7/64" Letters: A B C D

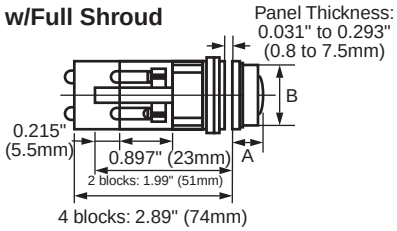
1/8" Letters: A B C D

Dimensions — TWTD Series

Pushbutton



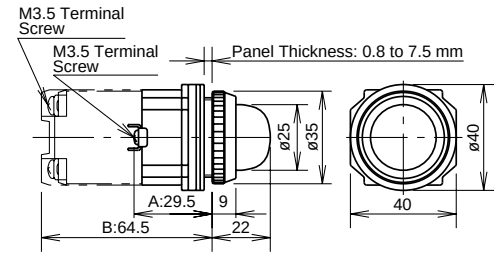
Mushroom Pushbutton w/Full Shroud



Pushbuttons	Dimension A	Dimension B
Flush Extended Extended w/Full Shroud	0.351" (9mm) 0.566" (14.5mm) 0.663" (17mm)	Ø 0.975" (25mm) Ø 0.975"(25mm) Ø 1.11" (28.5mm)
Mushroom Mushroom w/Full Shroud Jumbo Mushroom Ø 1.56" (40mm)	0.858" (22mm) 0.936" (24mm) 1.13" (29mm)	Ø 1.56" (40mm) Ø 1.87" (48mm) Ø 2.54" (65mm)
Mushroom, Pushlock Turn Reset and Push-Pull Ø 1.56" (40mm)	*0.975" (25mm) **0.975" (25mm)	Ø 1.56" (40mm) Ø 1.56" (40mm)

Note: *Dimension when operator is in reset position.
**Dimension when operator is in pull position.

Pilot Lights

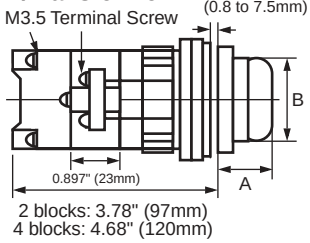


Illuminated Pushbuttons	Dimension A	Dimension B
Flush w/Full Shroud	0.975" (25mm) 0.995" (25.5mm)	Ø 0.936" (24mm) Ø 0.936" (24mm)
Extended w/Full Shroud	0.741" (19mm) 0.761" (19.5mm)	Ø 0.936" (24mm) Ø 0.936" (24mm)
Ø 1.56" (40mm) Mushroom Pushlock Turn Reset, Push-Pull	*0.975" (25mm) **0.975" (25mm)	Ø 1.56" (40mm) Ø 1.56" (40mm)

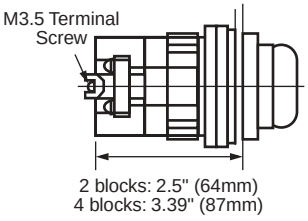
Note: *Dimension when operator is in reset position.
**Dimension when operator is in pull position.

Illuminated Pushbuttons

w/AC Adapter w/Transformer

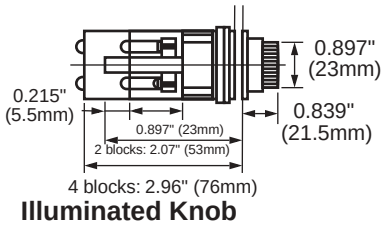


Full Voltage

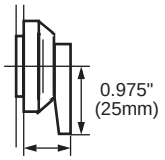


Selector Switches

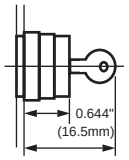
Knob



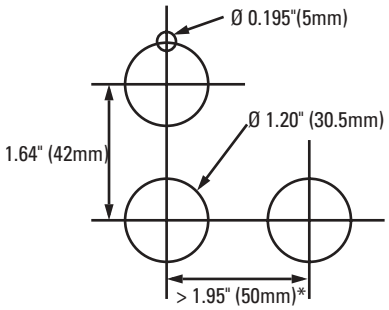
Lever



Key

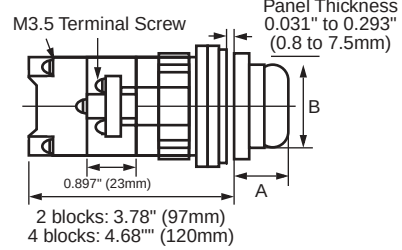


Panel Cut-Out

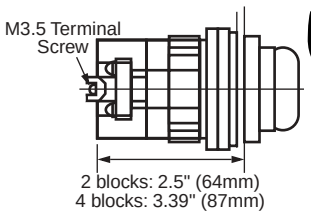


Illuminated Knob

w/AC Adapter w/Transformer



Full Voltage

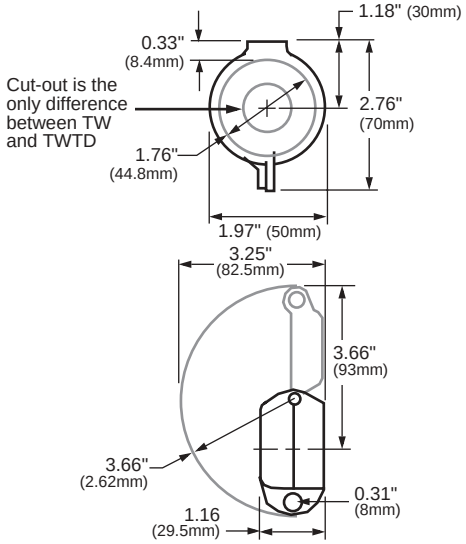


1. **Jumbo Mushroom < 2.61" (66mm)*
2. *Minimum mounting centers are applicable to switches with one stack of contact blocks. When mounting two stacks of contact blocks, minimum centers should allow for access to wiring.*
3. *The Ø 0.195" (Ø 5mm) recess is necessary when either the nameplate or anti-rotation ring is used.*

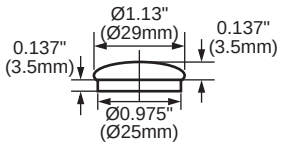
Dimensions — TWTD Series con't

Accessory Dimensions

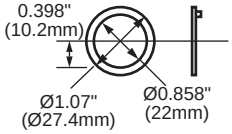
OL-KL1
Lock-Out Adaptor



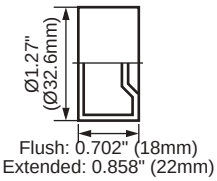
OB-31
Mounting Hole Rubber Plug



OGL-31
Anti-Rotation Ring

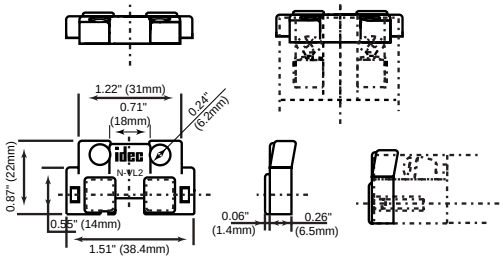


OC-31
Pushbutton Clear Boot

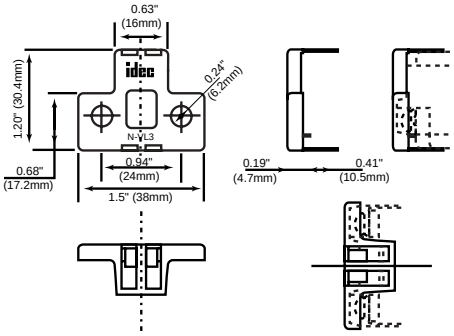


Finger-Safe Cover

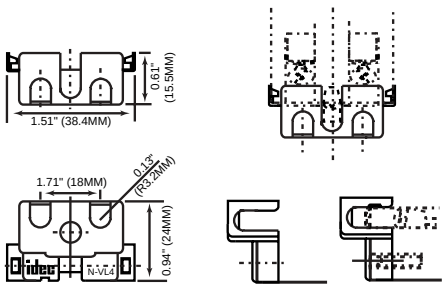
N-VL2



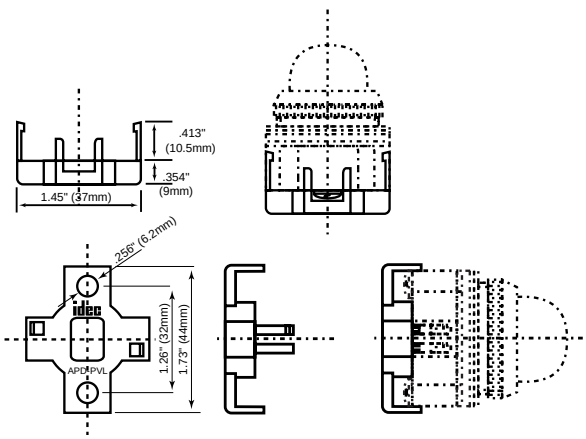
N-VL3



N-VL4



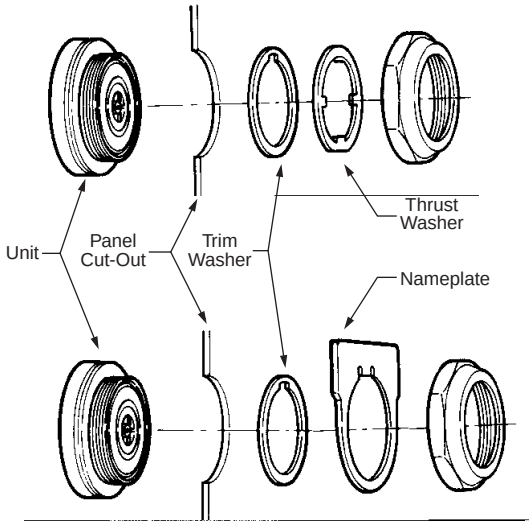
APD-PVL



Adjustment for Panel Thickness

Each unit is shipped with several waterproof gaskets which are 0.06" (1.5mm) and 0.12" (3mm) thick. Combine the gaskets for a dimension approximately equal to panel thickness and install between the bezel and the body of the unit.

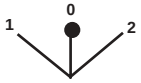
A trim washer must be used with a thrust washer or a nameplate to prevent the control unit from rotating in the mounting hole. When using anti-rotation rings (trim washer with thrust washer or nameplate), install as shown below.



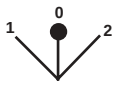
Selector Switches

The operator shaft of each unit has a recess to identify in which direction to install the handle. Align the handle with the recess. Press color insert (TW-HC1) into the Standard Operating Positions.

Standard operation positions

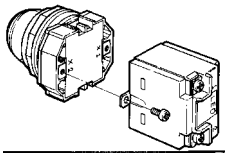
2-Position, 90°	3-Position, 45°
	

Non-Illuminated 3-Position Operators

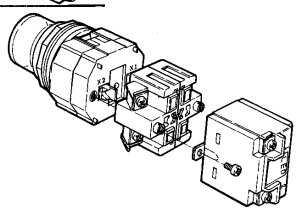


Installation of TWTD Series Units

TWTD Pilot Lights



TWTD Illuminated Pushbuttons, TWTD Selector Switches (Transformer or Full Voltage)



Terminal X1 = Positive

Terminal X2 = Negative

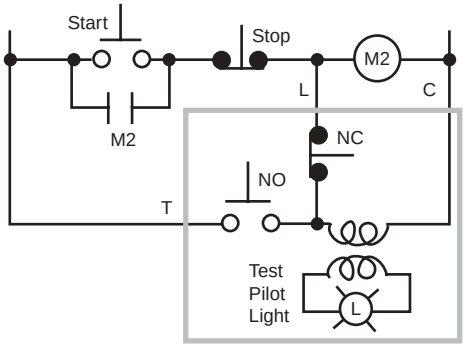
Installation of LED Illuminated Units—Transformer units are recommended for use in areas subjected to inductive noise. When using full voltage types, install a protection diode as shown below. Use diode with AC power supply to protect against reverse polarity. Use with DC power supply to protect against surges and noise.

Make sure that LED illuminated units are installed with correct polarity, as indicated at the terminals.

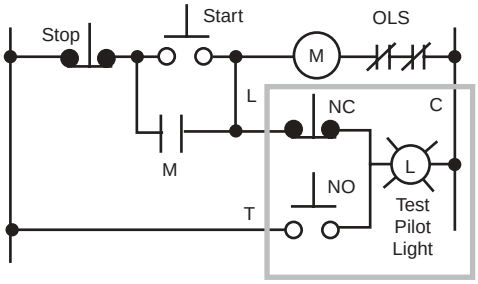
Application Example For Push-To-Test Pilot Light

A typical application of illuminated pushbuttons is a push-to-test pilot light which can be used to check the lamp/LED circuit.

Transformer/AC-Adapter Circuit



Full Voltage Circuit



General Information

Information About LED Lamps

Light-emitting diodes (LEDs) are P–N junction semiconductors with mechanisms called "junction electro-luminescence." Application of direct current results in radiation or emission of a monochromatic light.

Different semiconductor materials produce different wavelengths of light as shown below:

Specifications			
	Green	Gallium Phosphide (GaP)	5600 Å
	Yellow	Gallium Arsenide Phosphide (GaAsP)	5800 Å
	Amber	Gallium Arsenide Phosphide (GaAsP)	6300 Å
	Red	Gallium Arsenide Phosphide (GaAsP)	6600Å
	Infrared	Gallium Arsenide (GaAs)	9000 Å

Advantages of Using LEDs

- **LEDs are used when heat generated by incandescent lamps would damage nearby equipment or interfere with a precision process. This is particularly advantageous when multiple lights are grouped.**
- **LEDs can operate at low temperatures which would cause incandescent lamps to fail, since glass cracks during rapid cooling.**
- **LEDs consume 50 times less power than incandescent lamps, thereby reducing energy consumption.**
- **LEDs last 500 times longer than incandescent lamps. LEDs average a million hours (114 years) while incandescent lamps average 2000 hours.**
- **LEDs do not generally "blow out" unless subjected to a severe overvoltage. They exhibit a half-life type dimishment in brightness over time. After 50,000 hours (6 years) of use, IDEC LEDs will retain approximately half of their original intensity.**
- **IDEC's SUPERBRIGHT LEDs have high visibility.**
- **LEDs require little or no maintenance because of long life and high reliability.**

IDEC Recommendations

For optimum results, especially when using switches and pilot lights in operating environments which are conducive to overheating, use IDEC LED illuminated units. Transformers are available for use with incandescent illuminated units, which operate at lower voltages to avoid overheating.

When IDEC's L-120L lamp is used, make sure ambient temperatures do not exceed 30˚C (86˚F). If a lamp from another supplier is used, it should be rated for less than 1.8 watts (15mA at 120V AC), with ambient temperatures as stated above.

Information About Incandescent Lamps

Filament-type incandescent lamps operate within the following parameters.

Light output and life expectancy depend on operating voltage. Light output varies to the 3rd or 4th power of the voltage. Life expectancy varies inversely to the 12th power of voltage. In other words, over-voltage of 5% reduces life expectancy by 50%. Under-voltage of 5% doubles life expectancy at the price of light output efficiency.

Inrush current (initial current through the filament) has an adverse effect on life expectancy. Cold resistance (room temperature) will have a more detrimental effect than hot resistance to inrush current. Life expectancy of incandescent lamps can be maximized by reducing occurrences of cold resistance to inrush current.

Continued intermittent flashing will significantly reduce life expectancy. When using an incandescent lamp with a tungsten filament, flashing will not reduce life expectancy as long as light output does not exceed that of steady burning.

When an incandescent lamp must withstand shock and vibration, use low voltage/high amperage (5–6V/60–120mA) lamps. These lamps have a short, thick filament with a high resonant frequency.

Provide cooling by using a heat sink, particularly when multiple incandescent lamps are grouped or when air circulation is limited. Make sure ambient temperatures do not exceed 100˚C (212˚F) for maximum life of incandescent lamps.

Comparison: LED vs. Incandescent Lamps

		Superbright LEDs	Incandescent
Characteristics	**Heat Dissipation**	Very Low	High
	Life Expectancy	Very Long	Short
	Reliability	Very High	Low
	Mechanical Strength	Not Susceptible	Susceptible to Shock/Vibration
	Maintenance Required	Negligible	Frequent
	Operation at Low Temps.	Possible	Not Possible
	Inrush Current	Negligible	Very Large
	Voltage Effects on Life	Insignificant	Significant
	Brightness	Slightly Less	Slightly More

Ordering Information

1. IDEC offers assembled and sub-assembled switches and pilot lights for your convenience. In some cases there is a cost difference, with sub-assembled units costing slightly less. Since assembled units are custom made to your order, a couple of days for assembly is added to delivery. To minimize delivery or inventory requirements, it is recommended that switches and pilot lights be ordered as sub-components.
2. When ordering pilot lights or illuminated pushbuttons, make sure to specify the color code in place of the asterisk in the part number, (LED or incandescent lamp included). Spare lamps can be ordered and are listed with sub-assembly components.
3. Accessories, such as locking ring wrench, lens removal tool, and lamp holder, are available to make installation and assembly easier. IDEC recommends using these accessories and is not responsible for damage as a result of using the wrong tool.
4. Marking plates are available for switches and pilot lights which feature a flat lens. Printed mylar (not included) can also be inserted under lens for labeling purposes.
5. Nameplates are available for TW, 7/8" (22mm), HW 7/8" (22mm),and TWTD series, Ø1–13/64" (30mm). For prompt delivery, order standard legends. Custom engraving is also offered for an additional charge.

Installation and Operation

1. Use the appropriate lamp holder to remove or install LED or incandescent lamps. Using pliers will damage the lamp.
2. When mounting switches and pilot lights into a panel, use locking ring wrench.Using pliers or tightening excessively will damage the locking ring.
3. A series, 21/64" (8mm), can be mounted on a panel 0.019" (0.5mm) to 0.236" (6mm) thick.
4. LW 7/8" (22mm), TW, 7/8" (22mm), and TWTD series, Ø1–13/64" (30mm), feature an adjustment ring for mounting on a panel 0.038" (1mm) to 0.236" (6mm) thick. Using a nameplate or an anti-rotation ring adds 0.031" (0.8mm) to the panel thickness.
5. When applicable, solder terminals within 20W/5sec or 260˚/3sec without exerting external force to the terminals. Use a non-corrosive resin liquid flux.
6. The operating voltage for LED units represents a complete DC value. When using a pulsing voltage, such a full-wave rectification, keeppeak currents within the forward current I_f. Peak currents exceeding I_f may shorten the life of the LED lamp.
7. To avoid a short circuit, never connect NO and NC contacts to different voltages or power sources.
8. Optimum performance of TW and TWTD illuminated pushbuttons, selector switches, and pilot lights is obtained with IDEC LED and incandescent lamps.
9. For maximum life of incandescent lamps (approximately 2000 hours), use within the rated operating voltage. If it is necessary to use a higher voltage, keeping ambient temperature below 30˚C (86˚F)will help prolong the life of an incandescent lamp.

If excessive voltage is applied (over 50V), the lamp may blow and the lens holder may pop out.