

Technical Specifications

► GENERAL

Characteristics	Data	Standards
► Storage temperature	- 40 °C to + 70 °C	
► Operating temperature	- 25 °C to + 70 °C	
► Climatic resistance	Constant humid heat Cyclic damp heat Resistance to sea air	IEC 60068-2-3 IEC 60068-2-30 IEC 60068-2-52
► Degree of protection	IP 66 for standard heads IP 67 for shrouded heads IP 66 for equipped control stations IP 20 at the rear of the panel for contact blocks and one piece pilot lights Type 1, 2, 3, 3R, 3S, 4, 4X, 12, and 13 for heads and control stations	IEC 60529 NEMA standard
► Protection against mechanical impacts	IK 05 illuminated and non-illuminated heads IK 07 empty control station	IEC 62262
► Electrical insulation	Class II - heads and control station	IEC 60947-5-1
► Terminal marking		IEC 60947-1
► Tightening torques	Locking ring: recommended 3 N.m terminals: max. 1.2 N.m	
► Approvals	UL United states and Canada BV Bureau Véritas Certification OC/CB	UL 508, CSA 22.2 Marine rules IEC 60947-5-1 IEC 60947-5-5 IEC 60947-5-4
► Vibrations	withstand vibration Fc test: 2 to 25 Hz, 1.6 mm; 25-100 Hz, 4 g	IEC 60068-2-6

Technical Specifications

▶ HEADS

Characteristics	Data	Standards
▶ Mechanical endurance	Spring return: 5,000,000 Push-push: 500,000 Selector switches: 300,000 Mushroom head maintained function EN 418: 10,000 Mushroom head maintained function: 150,000	
▶ Activation force in N	Spring return + NO: 6.5 Spring return + NC: 4.5 Additional NO contact: 4.5 Additional NC contact: 3.0 Push-pull mushroom head + NO + NC: 27 Push-turn mushroom head + NO + NC: 22 Push-pull mushroom head EN 418 + NO + NC: 37 Push-turn mushroom head EN 418 + NO + NC: 60	
▶ Activation force in Nm	Selector switch + NO: 0.04 Additional NO contact: 0.03	

▶ EMERGENCY STOP ACTUATORS - EN 418/ISO 13850:

According to IEC/EN60947-5-5, the emergency stop function can be provided by an EN418/ISO13850 mushroom head combined with a "positive opening" NC contact block.

The mechanism of our EN418/ISO13850 mushroom heads is so designed that a "push" action of sufficient force to open the contact systematically triggers an irreversible locking of this opening. This generates an "emergency stop" signal which can be cancelled only by deliberate manual resetting of the mushroom head (pull and turn or unlocking by key).

This function allows to generate an "emergency stop" signal for any equipment subject to directive 98/37CE (machinery safety) completed by the IEC 60204-1 standard.

The EN418/ISO13850 mushroom heads also comply with the safety requirements detailed in standards EN418 and ISO13850.

Technical Specifications

▶ CONTACT BLOCKS

Screw and plug-in connection characteristics	Data	Standards																																						
▶ Rated insulation voltage	690 V AC 600 V AC	IEC/EN 60947-1 UL 508																																						
▶ NC contacts	Positive opening	IEC/EN 60947-5-1																																						
▶ Rated impulse voltage U _{imp} Pollution degree	6kV 3																																							
▶ Conventional thermal current in free air conditions	AC15: 10 A DC13: 2.5 A	IEC 60947-5-1																																						
▶ Electrical ratings	<p>Alternating current AC15 - A 600 U_e = 120 V, I_e = 6 A U_e = 240 V, I_e = 3 A U_e = 380 V, I_e = 1.9 A U_e = 480 V, I_e = 1.5 A U_e = 500 V, I_e = 1.4 A U_e = 600 V, I_e = 1.2 A</p> <p>Minimum operating current - standard blocks U_e = 24 V DC and I_e = 5 mA Failure rate < 10⁻⁸</p> <p>UL508 Alternating Current 50/60Hz - A600 Continuous Current - 10 amps Rated Voltage - 600Vac</p> <table border="1"> <thead> <tr> <th rowspan="2">Voltage</th> <th colspan="2">Max. Amps</th> </tr> <tr> <th>Make</th> <th>Break</th> </tr> </thead> <tbody> <tr> <td>72</td> <td>60</td> <td>10</td> </tr> <tr> <td>120</td> <td>60</td> <td>6.0</td> </tr> <tr> <td>240</td> <td>30</td> <td>3.0</td> </tr> <tr> <td>480</td> <td>15</td> <td>1.5</td> </tr> <tr> <td>600</td> <td>12</td> <td>1.2</td> </tr> </tbody> </table>	Voltage	Max. Amps		Make	Break	72	60	10	120	60	6.0	240	30	3.0	480	15	1.5	600	12	1.2	<p>Direct current DC13 - Q 600 U_e = 125 V, I_e = 0.55 A U_e = 250 V, I_e = 0.27 A U_e = 400 V, I_e = 0.15 A U_e = 500 V, I_e = 0.13 A U_e = 600 V, I_e = 0.1 A</p> <p>- gold plated contacts U_e = 5 V DC and I_e = 1 mA Failure rate < 10⁻⁸</p> <p>Direct Current - Q600 Continuous Current - 2.5 amps Rated Voltage - 600Vdc</p> <table border="1"> <thead> <tr> <th rowspan="2">Voltage</th> <th colspan="2">Max. Amps</th> </tr> <tr> <th>Make</th> <th>Max. Amps Break</th> </tr> </thead> <tbody> <tr> <td>24</td> <td>2.5</td> <td>2.5</td> </tr> <tr> <td>125</td> <td>0.55</td> <td>0.55</td> </tr> <tr> <td>250</td> <td>0.27</td> <td>0.27</td> </tr> <tr> <td>301-600</td> <td>0.10</td> <td>0.10</td> </tr> </tbody> </table>	Voltage	Max. Amps		Make	Max. Amps Break	24	2.5	2.5	125	0.55	0.55	250	0.27	0.27	301-600	0.10	0.10	IEC 60947-5-1
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▶ Electrical operating life	<p>1 million cycles for: - AC15 - B 300 U_e = 120 V, I_e = 3 A U_e = 240 V, I_e = 1.5 A</p> <p>- DC13 - R 300 U_e = 125 V, I_e = 0.22 A U_e = 250 V, I_e = 0.1 A</p>																																							
▶ Applicable wire sizes	Rigid or flexible wire without ferrule: 0.5 mm ² to 2 x 2.5 mm ² Rigid or flexible wire with ferrule: 0.5 mm ² to 2 x 1.5 mm ²																																							

Technical Specifications

▶ CONTACT BLOCKS

Faston connection	Data	Standards																																																
▶ Rated insulation voltage	320 V AC 300 V AC	IEC/EN60947-1 UL 508																																																
▶ NC contacts	Positive opening	IEC/EN 60947-5-1																																																
▶ Rated impulse withstanding voltage Uimp Pollution degree	6 kV 3																																																	
▶ Conventional thermal current in free air conditions	AC 15: 10 A DC 13: 2.5 A	IEC 60947-5-1																																																
▶ Electrical ratings	<p>Alternating current AC15 - A 300 Ue = 120 V, Ie = 6 A Ue = 240 V, Ie = 3 A</p> <p>Minimum current of use Ue = 24 V DC and Ie = 5 mA Failure rate < 10⁻⁸</p> <p>UL508</p> <table border="0"> <tr> <td colspan="3">Alternating Current 50/60Hz - A300</td> <td colspan="3">Direct Current - Q300</td> </tr> <tr> <td colspan="3">Continuous Current - 10 amps</td> <td colspan="3">Continuous Current - 2.5 amps</td> </tr> <tr> <td colspan="3">Rated Voltage - 300Vac</td> <td colspan="3">Rated Voltage - 300Vdc</td> </tr> <tr> <td></td> <td>Max. Amps</td> <td>Max. Amps</td> <td></td> <td>Max. Amps</td> <td>Max. Amps</td> </tr> <tr> <td>Voltage</td> <td>Make</td> <td>Break</td> <td>Voltage</td> <td>Make</td> <td>Break</td> </tr> <tr> <td>72</td> <td>60</td> <td>10</td> <td>24</td> <td>2.5</td> <td>2.5</td> </tr> <tr> <td>120</td> <td>60</td> <td>6.0</td> <td>125</td> <td>0.55</td> <td>0.55</td> </tr> <tr> <td>240</td> <td>30</td> <td>3.0</td> <td>250</td> <td>0.27</td> <td>0.27</td> </tr> </table>	Alternating Current 50/60Hz - A300			Direct Current - Q300			Continuous Current - 10 amps			Continuous Current - 2.5 amps			Rated Voltage - 300Vac			Rated Voltage - 300Vdc				Max. Amps	Max. Amps		Max. Amps	Max. Amps	Voltage	Make	Break	Voltage	Make	Break	72	60	10	24	2.5	2.5	120	60	6.0	125	0.55	0.55	240	30	3.0	250	0.27	0.27	IEC 60947-5-1
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▶ Faston size	6.35 mm (0.25") or 2 x 2.8 mm (0.110")																																																	

Technical Specifications

▶ CONTACT BLOCKS

Pin-style connection (for PCB)	Data	Standards																																																
▶ Rated insulation voltage	250 V AC 250 V AC	IEC/EN60947-1 UL 508																																																
▶ NC contacts	Positive opening	IEC/EN 60947-5-1																																																
▶ Rated impulse withstanding voltage Uimp Pollution degree	4 kV 3																																																	
▶ Conventional thermal current in free air conditions	AC 15: 5 A DC 13: 1 A	IEC 60947-5-1																																																
▶ Electrical ratings	<p>Alternating current AC 15 - B 300 Ue = 120 V, Ie = 3 A Ue = 240 V, Ie = 1.5 A</p> <p>Direct current DC13 - R 300 Ue = 125 V, Ie = 0.22 A Ue = 250 V, Ie = 0.1 A</p> <p>Minimum current of use - standard blocks Ue = 24 V DC and Ie = 5 mA Failure rate < 10⁻⁸</p> <p>- golden contacts Ue = 5 V DC and Ie = 1 mA Failure rate < 10⁻⁸</p> <p>UL508</p> <table border="0"> <tr> <td colspan="3">Alternating Current 50/60Hz - B300</td> <td colspan="3">Direct Current - R300</td> </tr> <tr> <td colspan="3">Continuous Current - 5 amps</td> <td colspan="3">Continuous Current - 1 amp</td> </tr> <tr> <td colspan="3">Rated Voltage - 300Vac</td> <td colspan="3">Rated Voltage - 300Vdc</td> </tr> <tr> <td></td> <td>Max. Amps</td> <td>Max. Amps</td> <td></td> <td>Max. Amps</td> <td>Max. Amps</td> </tr> <tr> <td>Voltage</td> <td>Make</td> <td>Break</td> <td>Voltage</td> <td>Make</td> <td>Break</td> </tr> <tr> <td>72</td> <td>30</td> <td>5.0</td> <td>24</td> <td>1.0</td> <td>1.0</td> </tr> <tr> <td>120</td> <td>30</td> <td>3.0</td> <td>125</td> <td>0.22</td> <td>0.22</td> </tr> <tr> <td>240</td> <td>15</td> <td>1.5</td> <td>250</td> <td>0.11</td> <td>0.11</td> </tr> </table>	Alternating Current 50/60Hz - B300			Direct Current - R300			Continuous Current - 5 amps			Continuous Current - 1 amp			Rated Voltage - 300Vac			Rated Voltage - 300Vdc				Max. Amps	Max. Amps		Max. Amps	Max. Amps	Voltage	Make	Break	Voltage	Make	Break	72	30	5.0	24	1.0	1.0	120	30	3.0	125	0.22	0.22	240	15	1.5	250	0.11	0.11	IEC 60947-5-1 IEC 60947-5-4
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▶ Pin diameter	∅ 1 mm																																																	

Technical Specifications

▶ LED BLOCKS FOR ILLUMINATED HEADS

Characteristics	Data	Standards
▶ Rated insulation voltage	300 V	IEC/EN 60947-5-1
▶ Rated impulse voltage Uimp Pollution degree	4 kV (with filter block see p. 70) 3	IEC/EN 60947-1
▶ Operating voltage	12 to 24 V AC/DC 48 V AC/DC (for LED block) 130 V AC 230 V AC	
▶ Frequency	50 or 60 Hz	
▶ Lifetime at rated supply voltage	Red and yellow: 100 000 hours at 25 °C Other colors: 50 000 hours at 25 °C	
▶ Consumption of LED blocks	Voltage: - 24 V: 25 mA ± 20% - 48 V: 15 mA ± 5% - 130 V: 20 mA ± 10% - 230 V: 16 mA ± 30%	

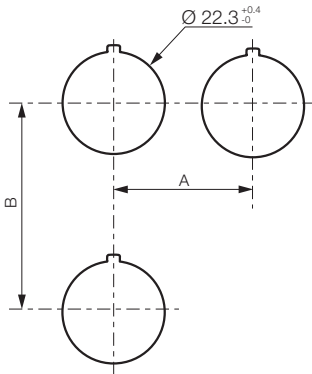
▶ ONE PIECE PILOT LIGHT BA9S

Characteristics	Data	
▶ Rated insulation voltage	400 V	IEC 60947-5-1
▶ Rated impulse withstand voltage Uimp	4 kV	IEC/EN 60947-1
▶ Bulb rating	400 V max. - 2.6 W max. 240 V max. - 2.6 W max.	IEC 60947-5-1 UL 508

Technical Specifications

▶ PANEL CUT-OUT

DRILLING

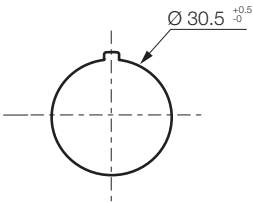


For heads equipped with electrical blocks with screw or plug-in terminals

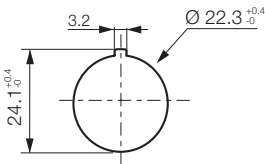
Minimum interval (mm)

	= 30	With or without legend (usual case)
	= 33	IP 67 (silicon shroud)
	= 40	With large legend plate
A	> 40	For mushroom head $\varnothing 40$
	> 45	For selector switch with long handle
	= 38	For super-flush button
	= 50	With 5 position clip
	= 45	With or without legend plate (usual case)
B	= 54	With double touch
	= 77	With double touch + legend plate
	= 50	Joystick

DRILLING FOR SUPER-FLUSH BUTTON

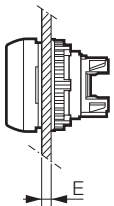


DRILLING WHEN USING THE ANTI-ROTATION RING (OPTIONAL)



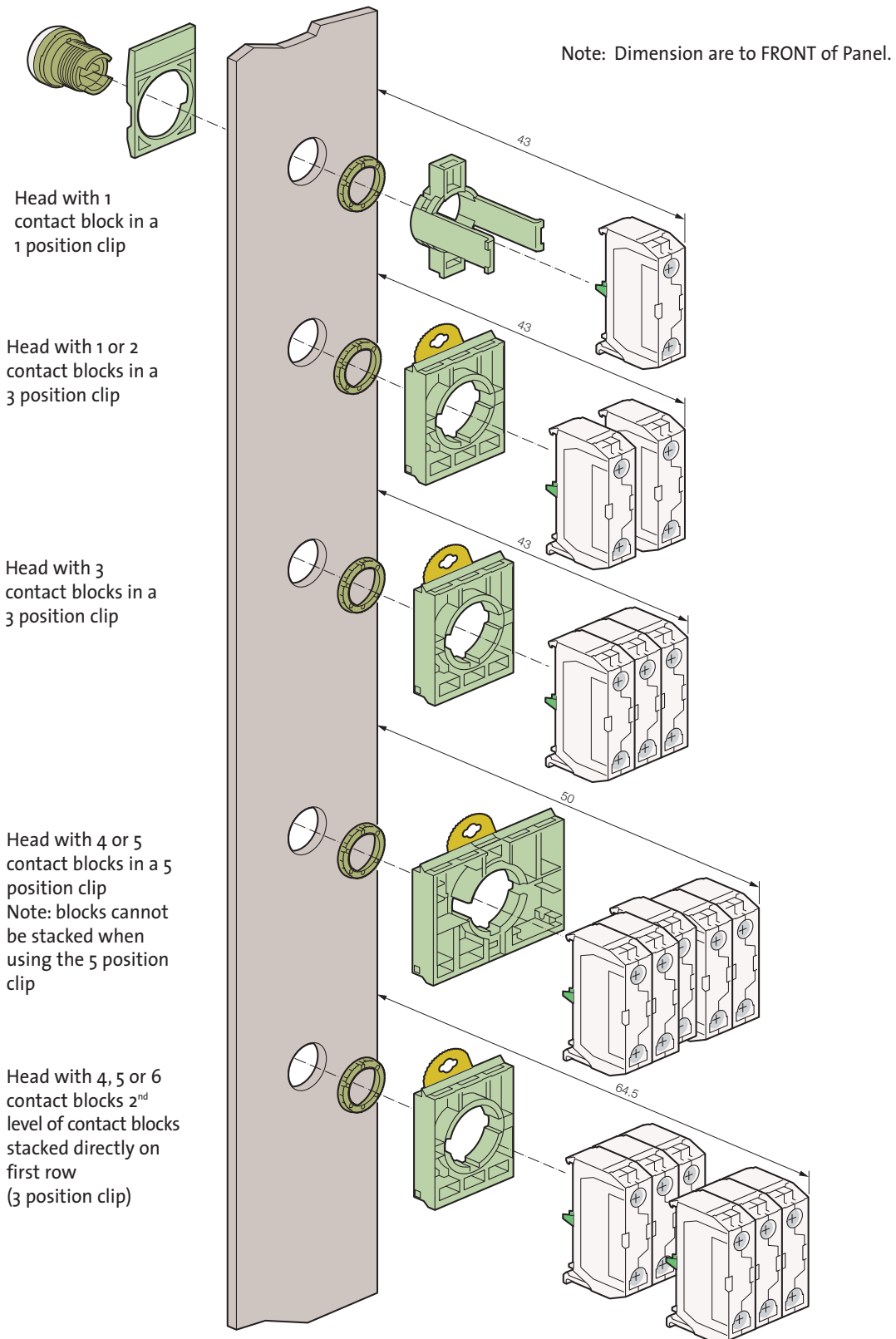
THICKNESS OF PANEL (E)

E = 1 to 6 mm



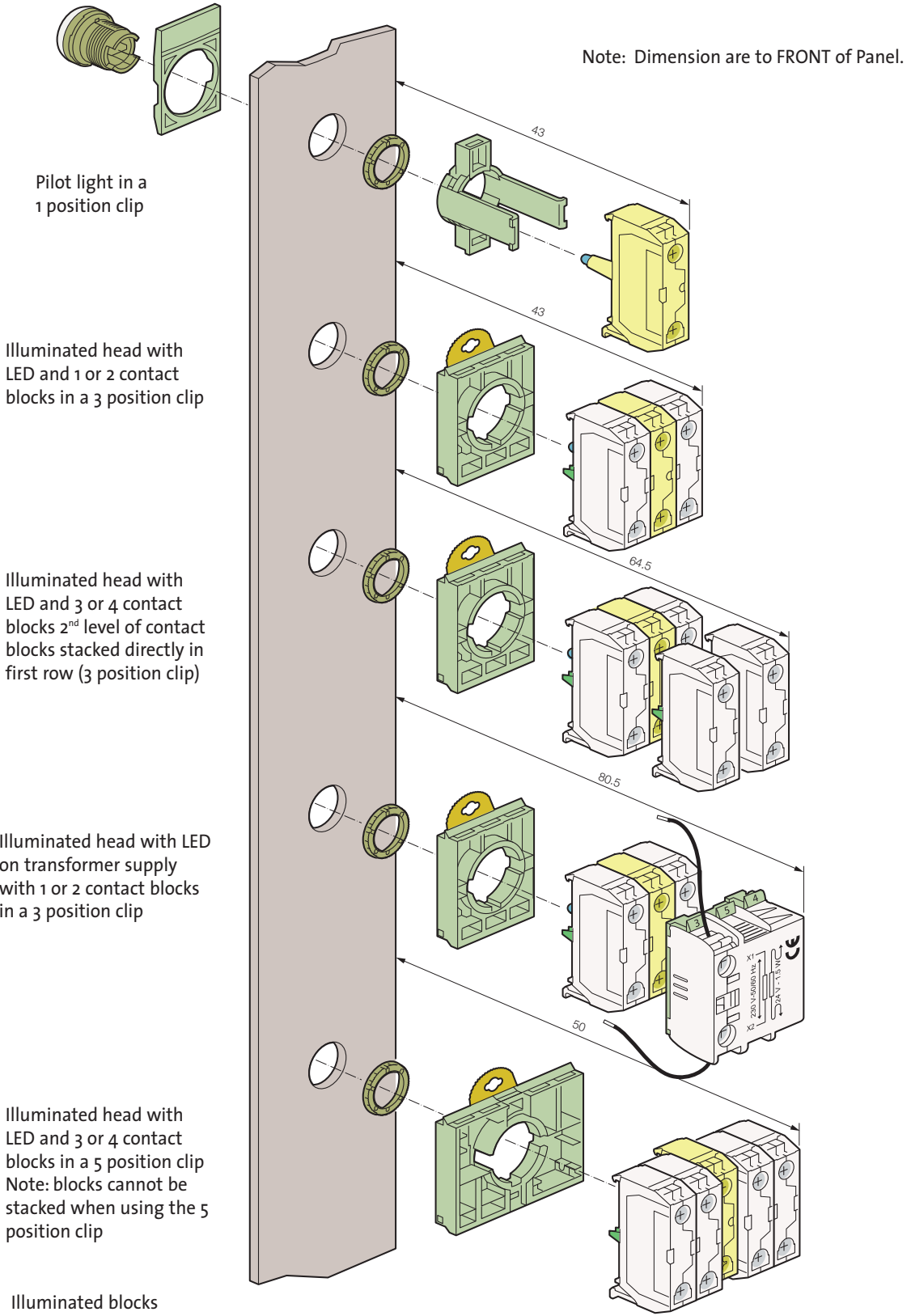
Technical Specifications

NON-ILLUMINATED



Technical Specifications

ILLUMINATED

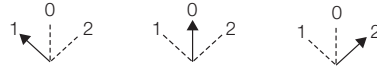


Technical Specifications

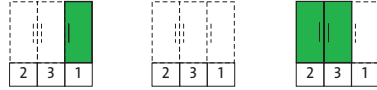
MECHANICAL OPERATION

For 3 position selector switches

Handle position
(view from front of panel)



Contacts block actuation
(clip position)



Non operated block



Operated block



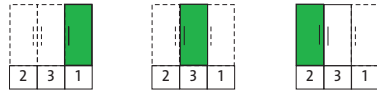
MECHANICAL OPERATION

For twin/triple touch switches

Operator View
(highlighted button is depressed)



Contacts block actuation
(clip position)



Non operated block



Operated block



MECHANICAL OPERATION

For Joysticks

2 position

TWO BLOCK CLIP (LME3 - STANDARD WITH JOYSTICK HEAD)				
LM11 in Clip Location	Terminal Numbers	Position		
		A	O	B
1	3-4	X	O	O
	1-2	O	O	X
2	3-4	O	O	X
	1-2	X	O	O

4 position

TWO BLOCK CLIP (LME3 - STANDARD WITH JOYSTICK HEAD)						
LM11 in Clip Location	Terminal Numbers	Position				
		A	B	O	C	D
1	3-4	O	O	O	O	X
	1-2	O	O	O	X	O
2	3-4	O	X	O	O	O
	1-2	X	O	O	O	O

FOUR BLOCK CLIP (LME5)				
LM11 in Clip Location	Terminal Numbers	Position		
		A	O	B
1	3-4	X	O	O
	1-2	O	O	X
2	3-4	O	O	X
	1-2	X	O	O
3	3-4	X	O	O
	1-2	O	O	X
4	3-4	O	O	X
	1-2	X	O	O

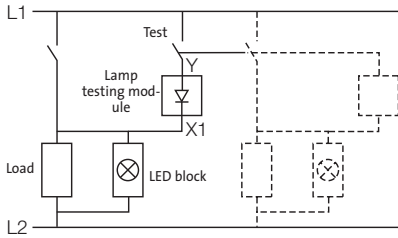
FOUR BLOCK CLIP (LME5)						
LM11 in Clip Location	Terminal Numbers	Position				
		A	B	O	C	D
1	3-4	O	O	O	O	X
	1-2	O	O	O	X	O
2	3-4	O	X	O	O	O
	1-2	X	O	O	O	O
3	3-4	O	O	O	O	X
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	1-2	X	O	O	O	O

Technical Specifications

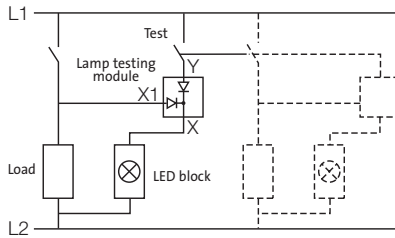
▶ DIAGRAMS

PUSH-TO-TEST LED PILOT LIGHT DIAGRAMS

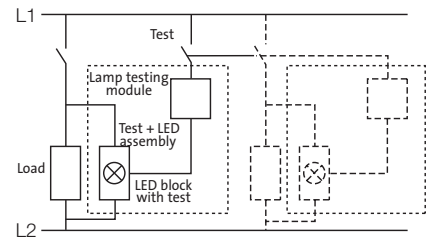
Lamp-testing module with 1 diode (33ET) for direct supply 24 V and 48 V



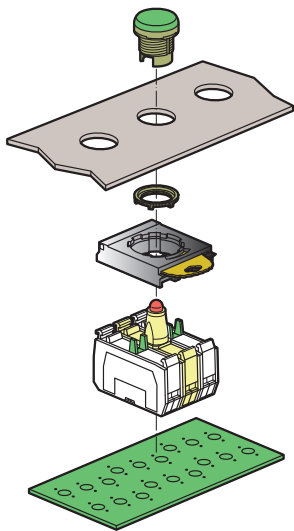
Lamp-testing module with 2 diodes (33ETT) for direct supply 24 V and 48 V



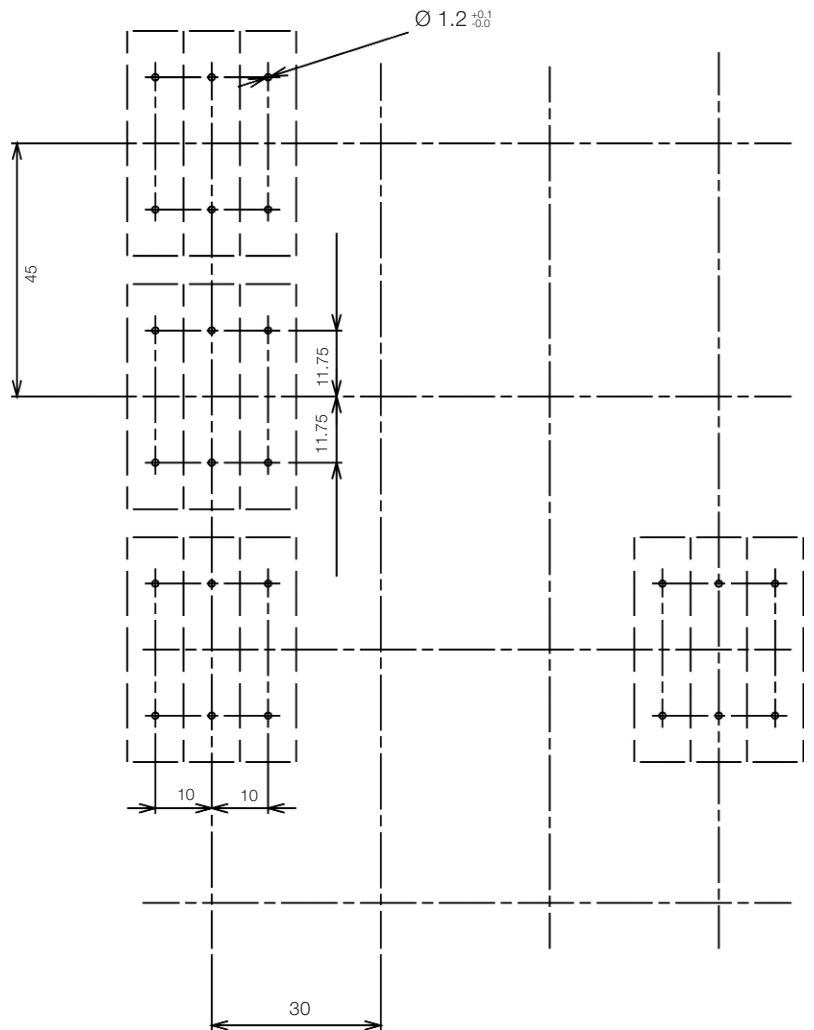
Lamp-testing assembly for direct supply 130 V and 240 V



PRINTED CIRCUIT BOARD MOUNTING



PCB BOARD DRILL PLAN



PCB TERMINAL - SINGLE CLIP

PCB TERMINAL - 3 POSITION CLIP

