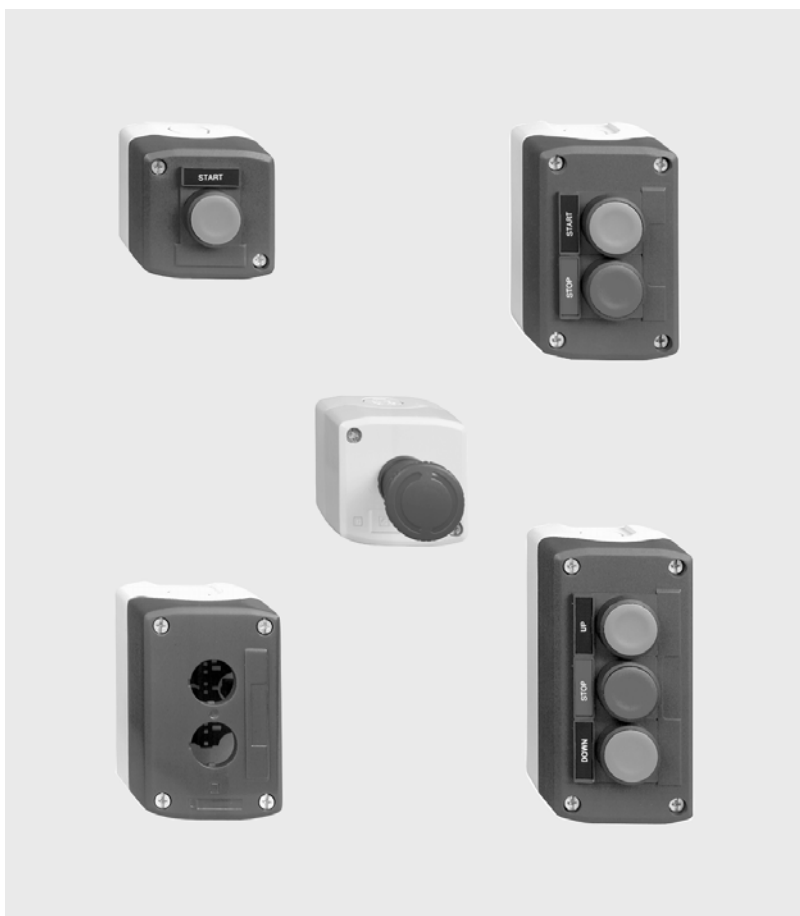


Push Buttons and Operator Interface Specifier's Guide Type XAL Control Stations

Catalog
2005

File 9001



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Push Buttons & Operator Interface - XAL Control Stations

General Information

GENERAL INFORMATION

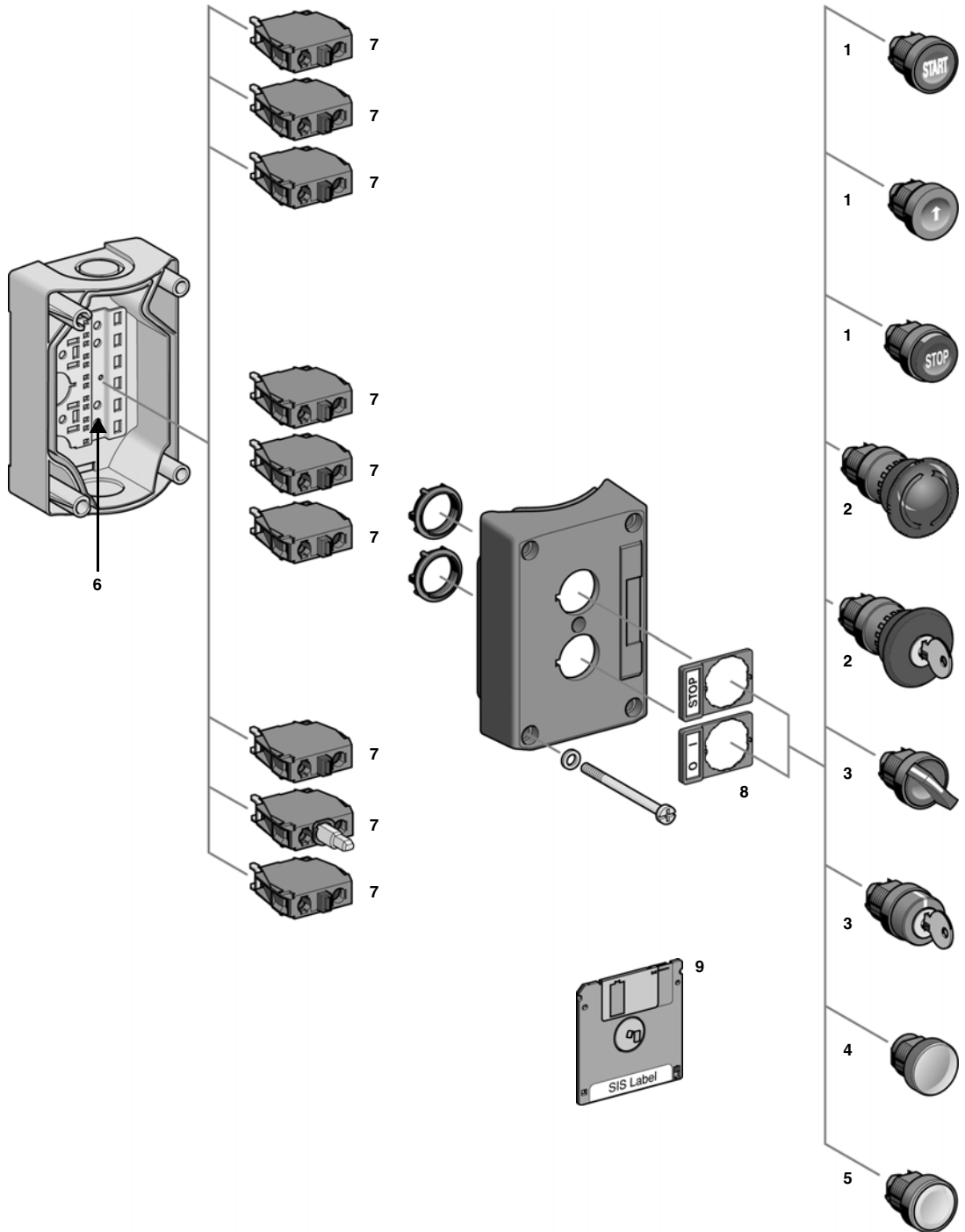
XALD and XALK control stations are available in two forms:

- Pre-assembled
- Custom assembled

These control stations use push buttons and pilot lights from the XB5 plastic operator range.

Control stations are composed of:




- 1 - Non-illuminated operators.
- 2 - Emergency stop operators.
- 3 - Selector switches.
- 4 - Pilot lights.
- 5 - Illuminated operators.
- 6 - Base of enclosure (with mounting plate).
- 7 - Contact block and light module combinations.
- 8 - Legends.
- 9 - SIS label software.



Push Buttons & Operator Interface - XAL Control Stations

General Characteristics

Environment

Protective treatment standard version		"TH"
Ambient air temperature around the device	Storage	-40 to +158 °F (- 40 to +70 °C)
	Operation	-13 to +158 °F (- 25 to +70 °C) unless otherwise stated
Electric shock protection	Conforming to IEC 60536	Class II
Degree of protection	Conforming to IEC 60529	IP 65, unless otherwise stated IP 66, for booted push button heads
	Conforming to UL 50, CSA C22.2 No. 94	Type 1, 4X, 12, and 13, unless otherwise stated
Resistance to high pressure cleaner		1,015 psi (70 x 10 ⁵ Pa-70 bars); distance: 3.94 in (0.1 m) Temperature: 131 °F (55 °C)
Mechanical shock protection	Conforming to EN 50102	Non-illuminated heads: IK 03
		Illuminated heads: IK 05
Conforming to standards	 Marked	IEC 60947-1, IEC/EN 60947-5-1, IEC 60947-5-4, EN 60947-1, JIS C 4520, UL 508, CSA C22.2 No. 14
Product certifications	UL Listed, CSA Certified  File E164353 CCN NKCR  File LR 44087 Class 3211 03	Standard single contacts with screw clamp terminals: A600; R300 Light blocks with screw clamp terminals
Terminal identification	Conforming to EN 50005 and EN 50013	
Material and colors		XALD: polycarbonate, light grey RAL 7035 and dark grey RAL 7016 XALK: polycarbonate, light grey RAL 7035 and yellow RAL 1012
Cable entries		Cable entries: 'knock-outs' for No. 13 (CM 12, PG 13.5) cable glands and tapped ISO 20
Cover Screws		Stainless steel, tightening torque 2 Nm

Contact Blocks Characteristics

Mechanical Characteristics			
Contact operation	N/C or N/O	Slow break	
Positive operation	Conforming to IEC/EN 60947-5-1 Appendix K	All functions incorporating a N/C contact are positive opening operation	
Operating travel (to change electrical state)	Push button	Changing N/C state: 0.06 in (1.5 mm) Changing N/O state: 0.11 in (2.6 mm) Total travel: 0.17 in (4.3 mm)	
	Operating force	Push button Changing N/C state: 0.79 lbf (3.5 N) Changing N/O state: 0.85 lbf (3.8 N)	
Operating force	Additional contact only	Single N/C contact: 0.45 lbf (2 N) Single N/O contact: 0.52 lbf (2.3 N)	
	Emergency stop with N/C + N/O	Standard push-pull: 10.12 lbf (45 N) Trigger action push-pull: 11.24 lbf (50 N)	
		Standard turn to release and key release: 8.99 lbf (40 N) Trigger action turn to release and key release: 9.89 lbf (44 N)	
Operating torque (to change electrical state)	Selector switches	N/O contact: 1.24 lb-in (0.14 N•m)	
	Additional contact only	N/O contact: 0.44 lb-in (0.05 N•m)	
Mechanical durability (in operating cycles)	Push button	Momentary	5 million
	Selector switches	Non-illuminated	3 million
		Illuminated	1 million
	Toggle switches		500,000
	Emergency stop push button		100,000
Vibration resistance	Conforming to IEC 60068-2-6	Frequency (2 to 500 Hz): 5 gn	
Shock resistance	Conforming to IEC 60068-2-27	All functions except mushroom head push buttons– Half sine wave acceleration 11 ms: 50 gn Half sine wave acceleration 18 ms: 30 gn	
		Mushroom head push buttons– Half sine wave acceleration 11 ms: 10 gn	

Push Buttons & Operator Interface - XAL Control Stations

General Characteristics

Contact Block Characteristics (continued)

Electrical Characteristics				
Cabling capacity	Conforming to IEC 60947-1	Screw and captive clamp terminals Min: 1 x 24 AWG (0.22 mm ²) without cable end 1 x 22 AWG (0.34 mm ²) for linking Max: 2 x 16 AWG (1.5 mm ²) with cable end Cross headed screw (Pozidrive type 1) slotted for flat 4 and 5.5 mm screwdriver Typical torque: 0.8 N•m (8.55 lb-in) Maximum torque: 1.2 N•m (10.7 lb-in)		
Contact material		Silver alloy (Ag/Ni)		
Short-circuit protection	Conforming to IEC/EN 60947-5-1	Standard blocks with screw clamp terminals: 10 A (gG cartridge fuse conforming to IEC 60269-1)		
Rated insulation voltage	Conforming to IEC 60947-1	Standard blocks with screw clamp terminals: Ui = 600 V, degree of pollution 3		
Rated impulse withstand voltage	Conforming to IEC 60947-1	Standard block with screw clamp terminals: Uimp = 6 kV		
Rated operational characteristics Conforming to IEC/EN 60947-5-1	AC supply: Utilization category AC-15	A600: Ue = 600 Vac and Ie = 1.2 A or Ue = 240 Vac and Ie = 3 A or Ue = 120 Vac and Ie = 6 A		
	DC supply: Utilization category DC-13	R300: Ue = 250 Vdc and Ie = 0.1 A or Ue = 125 Vdc and Ie = 0.22 A		
Electrical durability Conforming to IEC/EN 60947-5-1 Appendix C Operating rate 3600 operating cycles/hour. Load factor: 0.5	AC supply for 1 million operating cycles, utilization category AC-15	24 Vac	120 Vac	230 Vac
		4 A	3 A	2 A
	DC supply for 1 million operating cycles, utilization category DC-13	24 Vdc	110 Vdc	
		0.4 A	0.15 A	
Electrical reliability	Failure rate Conforming to IEC 947-5-4	Standard blocks: - at 17 V and 5 mA, $\lambda < 10^{-8}$ - at 5 V and 1 mA, $\lambda < 10^{-6}$		

Specific Characteristics of Light Modules with Protected LED

Mechanical Characteristics			
Vibration resistance	Conforming to IEC 60068-2-6	Frequency (2 to 500 Hz): 15 gn	
Shock resistance	Conforming to IEC 60068-2-27	Half sine wave acceleration 11 ms: 50 gn Half sine wave acceleration 18 ms: 30 gn	
Electrical Characteristics			
Cabling capacity	Conforming to IEC 60947-1	Screw and captive clamp terminals Min: 1 x 24 AWG (0.22 mm ²) without cable end 1 x 22 AWG (0.34 mm ²) for linking Max: 2 x 16 AWG (1.5 mm ²) with cable end	
Rated insulation voltage	Conforming to IEC 60947-1	Pilot light blocks with protected LED: Ui = 250 V, degree of pollution 3	
Rated impulse withstand voltage	Conforming to IEC 60947-1	Pilot light blocks with protected LED: Uimp = 4 kV	
Voltage limits	Nominal voltage	24 V: 19.2 to 30 Vdc; 21.6 to 24.6 Vac 120V: 102 to 132 Vac 240V: 195 to 264 Vac	
Current consumption	Applicable to all colors	24 Vac/Vdc supply blocks: 18 mA 120 Vac supply blocks: 14 mA 240 Vac supply blocks: 14 mA	
Service life	At nominal voltage and at an ambient temperature of 77 °F (25 °C)	100,000 hours	
Surge withstand	Conforming to IEC 61000-4-5	2/1 kV	
Resistance to fast transients	Conforming to IEC 61000-4-4	2 kV	
Resistance to electromagnetic fields	Conforming to IEC 61000-4-3	10 V/m	
Resistance to electrostatic discharges	Conforming to IEC 61000-4-2	8/6 kV	
Electromagnetic emission	Conforming to EN 55011	Class B	

Push Buttons & Operator Interface - XAL Control Stations Complete and Emergency Stop Stations

Start or Stop Function (light grey base, RAL 7035; dark grey lid, RAL 7016)



XALD101



XALD111



XALD164

Description	Type of Push	Type of Contact		Legend Marking	Catalog Number
		N/O	N/C		
Marking on Legend Holder					
1 momentary push button	Flush black	1	–	Start	XALD101
	Flush red	–	1	Stop	XALD111
Marking on Legend Holder					
1 mushroom head push button Ø40 mm, momentary	Red	–	1	Emergency stop (red legend)	XALD164

Emergency Stop Function (light grey base, RAL 7035; yellow lid, RAL 1012)



XALK174



XALK184



XALK194

Description	Type	Type of Contact		Catalog Number
		N/O	N/C	
1 Mushroom head push button Ø 40mm, red Turn to release	Standard	–	1	XALK174
	Trigger action	–	1	XALK178
1 Mushroom head push button Ø 40mm, red Key release (Key No. 455)	Standard	–	1	XALK184
	Trigger action	–	1	XALK188
1 Mushroom head push button Ø 40mm, red Push-pull	Standard	–	1	XALK194

Push Buttons & Operator Interface - XAL Control Stations

Empty Enclosures

Start-Stop Function (light grey base, RAL 7035; dark grey lid, RAL 7016)



XALD211H29

Description	Type of Push	Type of Contact		Legend Text	Catalog Number
		N/O	N/C		
Text on legend plate					
2 Momentary push buttons	1 flush black	1	–	Start	XALD211
	1 flush red	–	1	Stop	
	1 flush black	1	–	Forward	XALD221
	1 flush black	1	–	Reverse	

Three Function (light grey base, RAL 7035; dark grey lid, RAL 7016)



XALD321

Description	Type of Push	Type of Contact		Legend Text	Catalog Number
		N/O	N/C		
Text on legend plates					
3 momentary push buttons	1 flush black 1 flush red 1 flush black	1	–	Open	XALD341
		–	1	Stop	
		1	–	Close	
		1	–	Forward	XALD311
		–	1	Stop	
		1	–	Reverse	
		1	–	Up	XALD321
		–	1	Stop	
		1	–	Down	
		–	1	–	

Empty Enclosures ■



XALD02

Description	Number of Holes	Catalog Number
For normal environments, CSA+ UL approvals (with stainless steel lid mounting screws)		
Light grey base "RAL 7035"	1	XALD01
Dark grey lid "RAL 7016"	2	XALD02
	3	XALD03
	4	XALD04
	5	XALD05
	Light grey base "RAL 7035"	1
Yellow lid "RAL 1012"		

■ For customer assembly using XB5 operators, see Push Buttons - XB5 22 mm starting on page 73.

Push Buttons & Operator Interface - XAL Control Stations Assembly Components



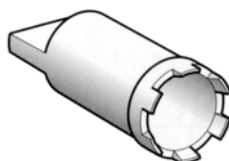
ZENL1111



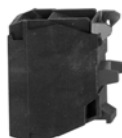
ZALV**



ZB5SZ3



ZB5AZ905



ZBE101



ZBVB*



ZB5AZ009

Electrical Blocks and Accessories (for mounting on metal plate at back of enclosure) ■

Description	Type	Color	Catalog Number
Electrical blocks with screw clamp terminal connections			
Standard contact blocks ■	N/O contact	–	ZENL1111
	N/C contact	–	ZENL1121
Light blocks with protected LED Protected LED	24 Vac or Vdc	White	ZALVB1
		Green	ZALVB3
		Red	ZALVB4
		Yellow	ZALVB5
		Blue	ZALVB6
		120 Vac	White
		Green	ZALVG3
		Red	ZALVG4
		Yellow	ZALVG5
		Blue	ZALVG6
	230 Vac	White	ZALVM1
		Green	ZALVM3
		Red	ZALVM4
		Yellow	ZALVM5
		Blue	ZALVM6

Description	Application	Catalog Number
Accessories for electrical blocks		
Blanking plug	Ø 22 mm units	ZB5SZ3
Nut	Head mounting	ZB5AZ901
Grounding terminal	Grounding	XALZ09
Key	For tightening nut ZB5AZ901	ZB5AZ905

Electrical Blocks (for mounting directly beneath the heads)

Description	Type	Color	Catalog Number
Electrical blocks with screw clamp terminal connections (for mounting on base ZB5AZ009)			
Standard contact blocks ▲	N/O contact	–	ZBE101
	N/O contact	–	ZBE102
Light blocks with protected LED Protected LED	24 Vac or Vdc	White	ZBVB1
		Green	ZBVB3
		Red	ZBVB4
		Yellow	ZBVB5
		Blue	ZBVB6
		110-120 Vac	White
		Green	ZBVG3
		Red	ZBVG4
		Yellow	ZBVG5
		Blue	ZBVG6
	230-240 Vac	White	ZBVM1
		Green	ZBVM3
		Red	ZBVM4
		Yellow	ZBVM5
		Blue	ZBVM6

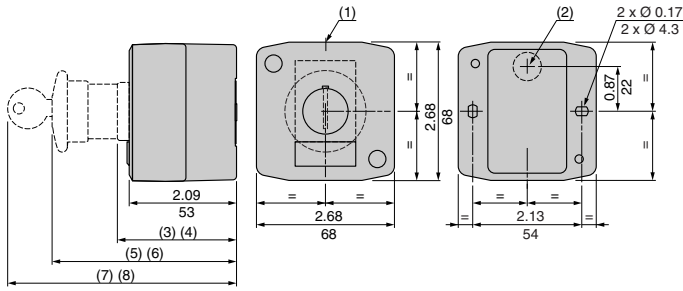
Description	Application	Catalog Number
Accessories for electrical blocks		
Mounting base	Electrical blocks (contact or light module)	ZB5AZ009

- For customer assembly using XB5 operators, see Push Buttons - XB5 22 mm starting on page 73.
- ▲ A maximum of 3 electrical blocks may be fitted per associated head.

Push Buttons & Operator Interface - XAL Control Stations

Dimensions

Single-way control stations XALD1**, K1**, D01

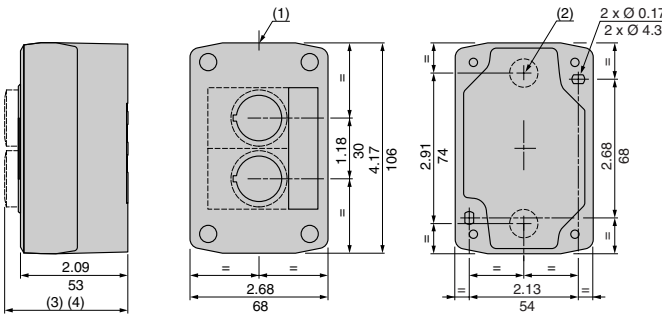


- (1) 2 knock-outs for PG 13.5 cable glands, maximum capacity 0.47 in (12 mm).
- (2) Knock-out for cable entry, maximum capacity 0.55 in (14 mm).

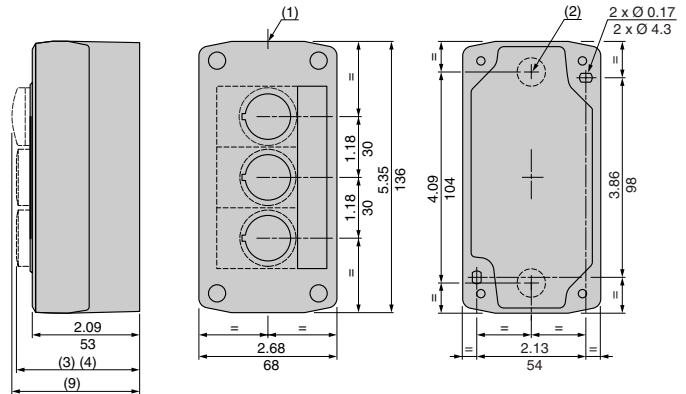
Examples:

- (3) 2.44 in (62 mm) for flush push buttons.
- (4) 2.59 in (66 mm) for projecting push buttons.
- (5) 3.58 in (91 mm) for latching mushroom head push buttons.
- (6) 2.91 in (74 mm) for key switches.
- (7) 4.45 in (113 mm) for latching mushroom head push buttons with key release.
- (8) 3.78 in (96 mm) for key switches with key.
- (9) 2.52 in (64 mm) for pilot lights.

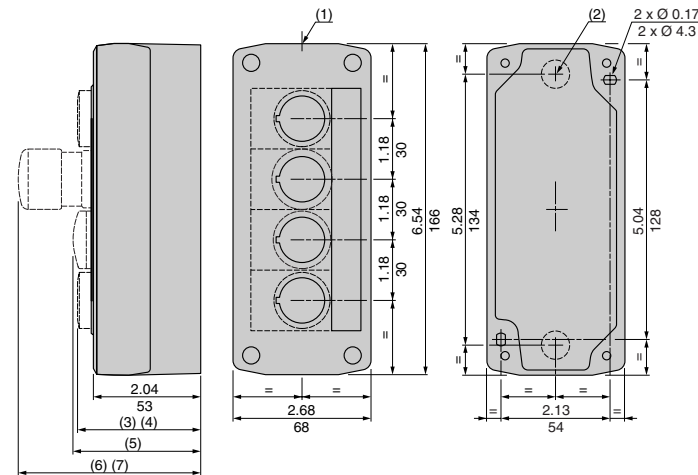
Two-way control stations XALD2**, K2**, D02



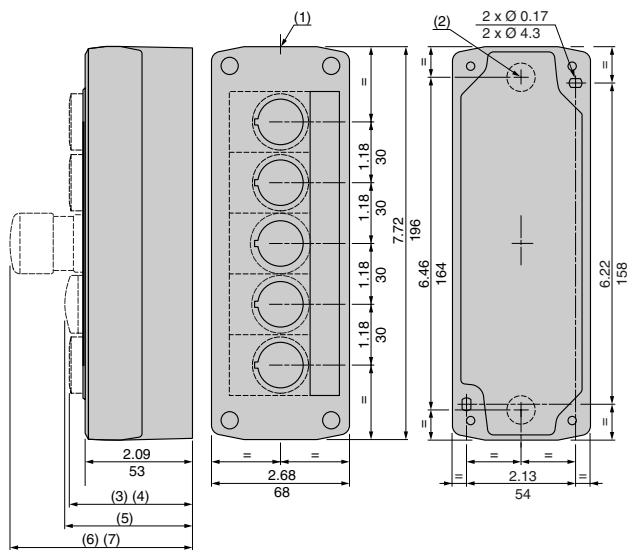
Three-way control stations XALD3**, K3**, D03



Four-way control stations XALD4**, K4**, D04



Five-way control stations XALD5**, K5**, D05



- (1) 2 knock-outs for PG 13.5 cable glands, maximum capacity 0.47 in (12 mm).
- (2) Knock-out for cable entry, maximum capacity 0.55 in (14 mm).

Examples:

- (3) 2.44 in (62 mm) for flush push buttons.
- (4) 2.59 in (66 mm) for projecting push buttons.
- (5) 2.52 in (64 mm) for pilot lights.
- (6) 3.43 in (87 mm) for mushroom head push buttons.
- (7) 3.07 in (78 mm) for selector switches.

Dual Dimensions $\frac{\text{inches}}{\text{mm}}$