

47.4

Pushbuttons and Indicating Lights

22.5 mm Modular Pushbuttons—M22

Technical Data and Specifications

Pushbuttons, Indicating Lights, Selector Switches and Emergency-Stop Operators

Description			Momentary Pushbuttons	Maintained Pushbuttons	Indicating Lights, Buzzers and Potentiometers	Emergency-Stop Operators	Selector Switches	Key-Operated Operators	Double Pushbuttons
General									
Standards			IEC/EN 60947 VDE 0660	IEC/EN 60947 VDE 0660	IEC/EN 60947 VDE 0660	IEC/EN 60947 VDE 0660	IEC/EN 60947 VDE 0660	IEC/EN 60947 VDE 0660	IEC/EN 60947 VDE 0660
Lifespan, mechanical	Operations	x 10 ⁶	>5	>1	—	>0.1	>0.1	>0.1	>0.2
Operating frequency	Operations/h		≥3600	≥1800	—	≥600	≥2000	≥100	≥3600
Actuating force	n		≥5	≥5	—	≥50	—	—	≥5
Operating torque (screw terminals)	Nm		—	—	—	—	≥0.3	≥0.5	—
Protection Type									
IP			IP67, IP69K	IP67, IP69K	Indicating lights: IP67, 69K Buzzers: IP40 Potentiometers: IP66	IP67, IP69K	IP66	IP66	IP66
UL type			4X, 13	4X, 13	Indicating lights: 4X/13 Buzzers: 12 Potentiometers: 4X/13	4X, 13	4X, 13	4X, 13	4X, 13
Climatic proofing			Damp heat, constant, according to IEC 60068-2-78 Damp heat, cyclical to IEC 60068-2-30						
Ambient temperature, operating		°F (°C)	–13 to 158 (–25 to 70)	–13 to 158 (–25 to 70)	–13 to 158 (–25 to 70)	–13 to 158 (–25 to 70)	–13 to 158 (–25 to 70)	–13 to 158 (–25 to 70)	–13 to 158 (–25 to 70)
Mounting position			As required	As required	As required	As required	As required	As required	As required
Mechanical shock resistance to IEC 60068-2-27 shock duration 11 ms, half-sinusoidal		g	>30	>30	>30	>50	>30	>30	>30
Terminal Capacities									
Solid		AWG	—	—	20-16	—	—	—	—
		mm ²	—	—	0.5–1.5	—	—	—	—
Stranded		AWG	—	—	20-16	—	—	—	—
		mm ²	—	—	0.5–1.5	—	—	—	—
Contacts									
Rated impulse withstand voltage		U _{imp}	Vac	—	4000	—	—	—	—
Rated insulation voltage		U _i	V	—	2500	—	—	—	—
Overvoltage category/pollution degree			—	—	III/3	—	—	—	—

Contact Blocks and Light Units

Description			Contact Blocks	LED Light Units
General				
Standards			IEC/EN 60947 VDE 0660	IEC/EN 60947 VDE 0660
Lifespan, mechanical	Operations	$\times 10^6$	>5	—
Operating frequency	Operations/h		≥ 3600	—
Actuating force		n	≥ 5	—
Operating torque (screw terminals)		Nm	≥ 0.8	—
Protection Type				
IP			IP20	IP20
UL type			—	—
Climatic proofing			Damp heat, constant, according to IEC 60068-2-78 Damp heat, cyclical to IEC 60068-2-30	
Ambient temperature, operating		°F (°C)	–13 to 158 (–25 to 70)	–13 to 158 (–25 to 70)
Mounting position			As required	As required
Mechanical shock resistance to IEC 60068-2-27 shock duration 11 ms, half-sinusoidal		g	>30	>30
Terminal Capacities				
Solid		AWG	18–14	18–14
		mm ²	0.75–2.5	0.75–2.5
Stranded		AWG	20–14	20–14
		mm ²	0.5–2.5	0.5–2.5
Contacts				
Rated impulse withstand voltage	U_{imp}	Vac	6000	6000
Rated insulation voltage	U_i	V	500	500
Overvoltage category/ pollution degree			III/3	III/3
NEMA contact ratings			A600, Q300	—
Current draw			—	5–15 mA
Control Circuit Reliability				
at 24 Vdc/5 mA	H_f	Fault probability	$<10^{-7}$, <1 fault in 10^7 operations	—
at 5 Vdc/1 mA	H_f	Fault probability	$<5 \times 10^{-6}$, <1 fault in 5×10^6 operations	—
Max. Short-Circuit Protective Device				
Fuse	gG/gL	A	10	—
Switching Capacity				
Rated Operational Current				
AC-15				
115V	I_e	A	6	—
230V	I_e	A	6	—
400V	I_e	A	4	—
500V	I_e	A	2	—
DC-13				
24V	I_e	A	3	—
42V	I_e	A	1.7	—
60V	I_e	A	1.2	—
110V	I_e	A	0.8	—
220V	I_e	A	0.3	—
Lifespan, Electrical				
AC-15				
230V/0.5A	Operations	$\times 10^6$	1.6	—
230V/1.0A	Operations	$\times 10^6$	1	—
230V/3.0A	Operations	$\times 10^6$	0.7	—
DV-13				
12V/2.8A	Operations	$\times 10^6$	1.2	—

Contact Element Note: >200 Vac/60 Hz: –25/55°C

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Palm Switches

Description		Momentary	Maintained	FAK-R-V-KC11-I
General				
Standards		IEC/EN 60947 VDE 0660	IEC/EN 60947 VDE 0660	IEC/EN 60947 VDE 0660
Lifespan, mechanical	Operations x 10 ⁶	>1	>0.1	>0.1
Operating frequency	Operations/h	≥3600	≥600	≥600
Actuating force	n	20–40	40–60	15–25
Operating torque	Nm	—	—	—
Degree of protection, IEC/EN 60529	IP	IP67, IP69K	IP67, IP69K	IP65
	UL Type	4X, 13	4X, 13	4X, 13
Climatic proofing		Damp heat, constant, to IEC 60068-2-78 Damp heat, cyclic, to IEC 60068-2-30		
Ambient temperature, operating	°F (°C)	–73 to 104 (–25 to 40)	–73 to 104 (–25 to 40)	–73 to 104 (–25 to 40)
Mounting position		As required		
Mechanical shock resistance to IEC 60068-2-27 shock duration 11 ms, half-sinusoidal	g	>15	>15	>15

ASi Adapter Modules

Description		M22-ASI	M22-ASI-C
General			
Standards		IEC/EN 60947, DIN EN 50295	IEC/EN 60947, DIN EN 50295
Radio interference suppression		EN 55011, EN 55022	EN 55011, EN 55022
Limit value class		—	—
Protection type		IP20	IP00
Climatic proofing		Damp heat, constant, to IEC 60068-2-78, cyclical, to IEC 60068-2-30	
Ambient temperature, operating	°F (°C)	–13 to 131 (–25 to 55)	–13 to 131 (–25 to 55)
Shock resistance shock duration 11 ms	g	>30	>30
Vibration to IEC 60068-2-27 (amplitude 1 mm)	Hz	—	—
Dimensions	mm	—	—
Weight	kg	—	—
Mounting		Front mounting	Front mounting
Mounting position		As required	As required
Power supply			
Rated voltage to AS-interface specification	Vdc	26.5–31.6	26.5–31.6
Connection technique		Yellow plug-in terminal as insulation piercing terminal	Two cables onboard
Power supply		Completely from the AS-interface cable	
Addressing		Via connection to AS-interface cable	
Total power consumption of the AS-interface	mA	≥40	≥40
AS-interface		—	—
Rated operational current at full load	mA	—	—
Rated operational current when idle (no I, O set)	mA	—	—
Status LEDs		POWER AS-interface cable: green LED on the rear side of the element ERROR AS-interface, AS-interface master failure: red LED on the rear side of the element	POWER AS-interface cable: green LED on the board ERROR AS-interface, AS-interface master failure: red LED on the board

ASi-S Adapter Modules

Description		M22-ASI-S	M22-ASI-CS
Inputs			
Inputs, protected against short-circuit	Number	Two (normally 22V/5 mA)	Two (normally 22V/5 mA)
Voltage range	Vdc	—	—
Rated current per input	mA	—	—
High signal level	V	—	—
Low signal	mA	—	—
Length of connecting cables	cm	—	—
Outputs			
Outputs, protected against short-circuit	Number	One (normally 19V/8 mA)	One (normally 19V/8 mA)
Voltage range	Vdc	—	—
Max. Current Carrying Capacity			
All outputs		—	—
Σ three external outputs		—	—
Length of connecting cables	cm	—	—
Profile		S-3.A.E	S-3.A.E
Specification		2.1	2.1
Addresses	Number	62	62
Emergency-Stop Circuits			
Connection of the AS-interface line		Yellow plug terminal with insulation piercing	Two cables on the circuit board
Power supply		Complete from AS-interface, cable 26.5–31.6 Vdc	Complete from AS-interface, cable 26.5–31.6 Vdc
Fixing		Front mounted	Base mounted
Addressing		Via AS-interface cable	Via AS-interface cable
Max. total current	A	45 mA	45 mA
Ambient temperature, operating	°F (°C)	–13 to 131 (–25 to 55)	–13 to 131 (–25 to 55)
Shock resistance		30g/11 ms as per IEC 60068-2-27	30g/11 ms as per IEC 60068-2-27
Protection type		IP20	IP00
Climatic proofing		Damp heat, constant, to IEC 60068-2-78, cyclical, to IEC 60068-2-30	Damp heat, constant, to IEC 60068-2-78, cyclical, to IEC 60068-2-30
Mounting position		As required	As required
Standards		EN 50178 EN 50 295	EN 50178 EN 50 295
Inputs		Two-channel input (22V/5 mA) (moduled by code sequence) (two break contact sets M22-K01)	Two-channel input (22V/5 mA) (moduled by code sequence) (two break contact sets M22-K01)
Outputs		One output, typically 19V/8 mA, short-circuit proof	One output, typically 19V/8 mA, short-circuit proof
Status Displays			
Power, AS-interface cable		Green LED on the back	Green LED on the back
AS-interface error, AS-interface master failure		Red LED on the back	Red LED on the back
Profile		S-7.B.E	S-7.B.E