

G20 motor control module with an integrated logic function



Function

The motor control module is a field module with two sensor inputs and two electronic outputs for controlling DC roller motors. The module is optimized for use with the Interroll EC310 and Rulmeca BL3. The module can control two consecutive zones of an accumulating conveyor section. A zone consists of a roller motor and a zone sensor, e.g., for a light barrier. Both zone controllers are logically coupled within the module. The second zone controller within the module can be deactivated.

Two interfaces are available for coupling with the neighboring zones of the conveyor belt. The interfaces each provide a signal input and a signal output. The interfaces can be connected directly to 24 V-compatible SPS-IOs.

The compact housing can be installed directly into support profiles or cable ducts. The U_{AUX} power supply is connected using insulation piercing technology via a black AS-Interface flat cable. The swiveling flat cable guide is locked using a snap-fit without the use of tools.

The sensor inputs and motor outputs are connected using cable outputs with M8 round plug connectors. Cable outputs with 4-pin M12 round plug

connectors are provided for zone coupling. Power is supplied to the inputs and motors by the U_{AUX} supply. The IN LEDs display the current switching status of the sensor inputs. The MOT LEDs indicate the operating status of the motors. The ERR LEDs display when the noise is set using a motor and a defective fuse from the motor supply. The XIN and XOUT LEDs indicate the status of the zone coupling signals.

The module is configured using three rotary switches on the back of the module. Ten predefined motor speeds are available. For both zones, the direction of rotation and the direction of transportation can be adjusted. There is a choice of five predefined start/stop ramps. The operating mode of the module can be adjusted. A detailed description of the individual operating modes can be found in the manual for this module.

Dimensions



Technical Data

General specifications

UL File Number

Compatible roller motors

E223772 "For use in NFPA 79 Applications only"

Interroll EC310, Interroll EC5000 (24V: 20W / 35W / 50W), Itoh Denki PM500XK, Rulmeca BL3

Refer to "General Notes Relating to Pepperl+Fuchs Product Information

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Technical Data

Indicators/operating me

indicators/operating means		
Switch		S1: motor speed; rotary switch, 10 positions S2: direction of rotation and start/stop ramp; rotary switch, 10 positions S3: operating mode, rotary switch, 10 positions
LED ERR		Motor fault; 2 yellow LEDs yellow: motor error flashing yellow: motor protection unit defective
LED PWR		Supply voltage U _{PWR} ; green LED
LED IN		switching state (input); 2 LED yellow
LED MOT		Motor active; 2 yellow LEDs
LED XIN		Zone coupling input active; 2 yellow LEDs
LED XOUT		Zone coupling output active; 2 yellow LEDs
Electrical specifications		
Rated operating voltage	U _e	18 V 30 V DC PELV (via U _{PWR})
Rated operating current	le	≤ 30 mA (Closed-circuit current) max. 10 A (<2 s)
Surge protection		U _{PWR} : overvoltage category II, securely isolated power supply (PELV)
Interface 1		
Interface type		Interface for coupling zones with one input and one output for control signals X1
Physical		4-pin M12 socket Electronic output: PNP, overload and short-circuit proof (X1OUT) Input: PNP, galvanically isolated, potential-free (X1IN)
Load current		Input: ≤ 8 mA (internally limited) Output: 10 mA
Voltage		Input: max. 30 V DC Output (via U _{PWR}): ≥ (U _{PWR} - 2 V)
Switching point		in accordance with DIN EN 61131-2 (type 1) 0 (undamped): ≤ 0.5 mA 1 (damped): ≥ 2 mA
Interface 2		
Interface type		Interface for coupling zones with one input and one output for control signals X2
Physical		M12 connector, 4-pin Electronic output: PNP, overload and short-circuit proof (X2OUT) Input: PNP, galvanically isolated, potential-free (X2IN)
Load current		Input: ≤ 8 mA (internally limited) Output: 10 mA
Voltage		Input: max. 30 V DC Output (via U _{PWR}): ≥ (U _{PWR} - 2 V)
Switching point		in accordance with DIN EN 61131-2 (type 1) 0 (undamped): ≤ 0.5 mA 1 (damped): ≥ 2 mA
Input		
Number/Type		2 Inputs for 3-wire sensors (PNP), DC
Supply		via U _{PWR}
Current loading capacity		500 mA , overload and short-circuit protected
Input current		\leq 8 mA (limited internally)
Switching point		according to DIN EN 61131-2 0 (undamped) ≤ 0.5 mA 1 (damped) ≥ 2.0 mA
Input filter		10 ms
Output		
Number/Type		2 outputs for DC roller motors (MOT1, MOT2)
Supply		via U _{PWR}
Current		3.5 A continuous current , 5 A (<2 s) , max. 7.5 A (<0,3 s) per motor
Overload protection		fuse , l ² t = 53.7 A ² s
Velocity signal	Us	1.4 13 V at no-load $R_i = 5.6 k\Omega$, $R_{LOAD} \ge 35 k\Omega$ Control using rotary switch S1
Rotation direction signal	U _D	low: high impedance high; \geq (U _{PWR} - 1.0 V) in no-load operation $R_i = 5.6 k\Omega$, $R_{LOAD} \geq 5 k\Omega$ Control using rotary switch S2

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Technical Data

Motor fault	NPN digital input, U₀ = 14 V, Rᵢ = 34 kΩ 0 (no error) ≥ 125 μA 1 (error) ≤ 25 μA
Directive conformity	
Electromagnetic compatibility	
Directive 2014/30/EU	EN 61326-1:2006
Standard conformity	
Degree of protection	EN 60529:2000
Input	EN 61131-2:2007
Emitted interference	EN 61000-6-4:2007
Noise immunity	EN 61000-6-2:2005, EN 61326-1:2006
Ambient conditions	
Ambient temperature	-30 60 °C (-22 140 °F)
Storage temperature	-30 85 °C (-22 185 °F)
Relative humidity	85 % non-condensing
Climatic conditions	For indoor use only
Altitude	\leq 2000 m above MSL
Shock and impact resistance	30 g, 11 ms in 6 spatial directions, 3 shocks 10 g, 16 ms in 6 spatial directions, 1000 shocks
Vibration resistance	0.75 mm 10 57 Hz , 5 g 57 150 Hz, 20 cycles
Pollution degree	2
Mechanical specifications	
Degree of protection	IP65 in accordance with EN 60529 (not certified by UL)
Connection	PWR: insulation piercing technology Black flat cable Inputs/outputs: M8 round plug connector in accordance with EN 61076-2-104 Inputs: LF004-GS1-A (4-pin, bushing contacts, screw lock, A-coded) Matching connector: LM004-Gx1-A or similar Outputs: NF005-SS1-B (5-pin, bushing contacts, snap lock, B-coded) Matching connector: NM005-Sx1-B or similar Zone coupling: M12 round plug connector in accordance with EN 61076-2-101 X1: M12, 4-pin, bushing contacts, screw-locking, A-coded Female connector: M12, 4-pin, connector contacts, screw-locking, A-coded Female connector: M12, 4-pin, bushing contacts, screw-locking, A-coded
Mass	310 g
Mounting	2 clips with Ø 8 mm drill hole
Cable length	1 m (inputs/outputs) , 1.5 m (zone coupling), max. 30 m
Note	The flat cable routing is designed for 100 actuation cycles

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Connection



Assembly



Accessories

VAZ-ZPA-ANALYZER

Diagnostic adapter for G20 ZPA motor control module

Refer to "General Notes Relating to Pepperl+Fuchs Product Information"

Configuration

Configuration Information

The device can be configured using the S1, S2, and S3 rotary switches.

S1 rotary switch: motor speed

8 configurable speeds. +/- 1 % accuracy Motor stops at U_S < 1.5 V

Motor speed

Switch setting	Speed signal U _S
0	3.96 V
1	4.78 V
2	5.61 V
3	6.44 V
4	8.50 V
5	9.63 V
6	10.00 V
7	7.26 V
8	Reserved
9	Reserved

S2 rotary switch: start/stop ramp and direction of rotation

5 configurable ramps.

Incline: constant, independent of terminal velocity.

Duration: The ramp duration defines the time from stationary to max. speed (U_S = 10 V) or from max. speed to stationary. When the terminal velocity is lower, the ramp duration is shorter.

Direction of rotation/direction of transportation			
Switch setting	Direction of rotation U_D	Direction of transportation	
04	high, right	Zone 1 -> Zone 2	
59	low, left	Zone 2 -> Zone 1	

Start/stop ramp

Switch setting	Ramp duration (stationary -> V _{max} or V _{max} -> stationary)
0, 5	Ramp 1: no ramp (default setting)
1,6	Ramp 2: 500 ms
2,7	Ramp 3: 1000 ms
3, 8	Ramp 4: 1500 ms
4, 9	Ramp 5: 3000 ms

S3 rotary switch: operating mode

Note: The inactive zone synchronizes its motor output with the active zone.

Operating mode		
Switch setting	Mode	Upstream zone
0	Standard ZPA	Active
1	Enhanced ZPA	Active
2	Standard ZPA	Inactive
3	Enhanced ZPA	Inactive
4	Transportation	Active
5	Long Zone	Inactive
6	Direct Control	Active
7	Direction Control	Inactive
8	Slave	Inactive
9	Reserved	-

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