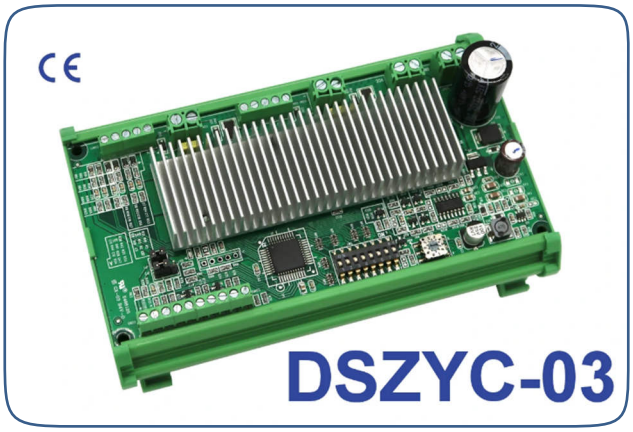
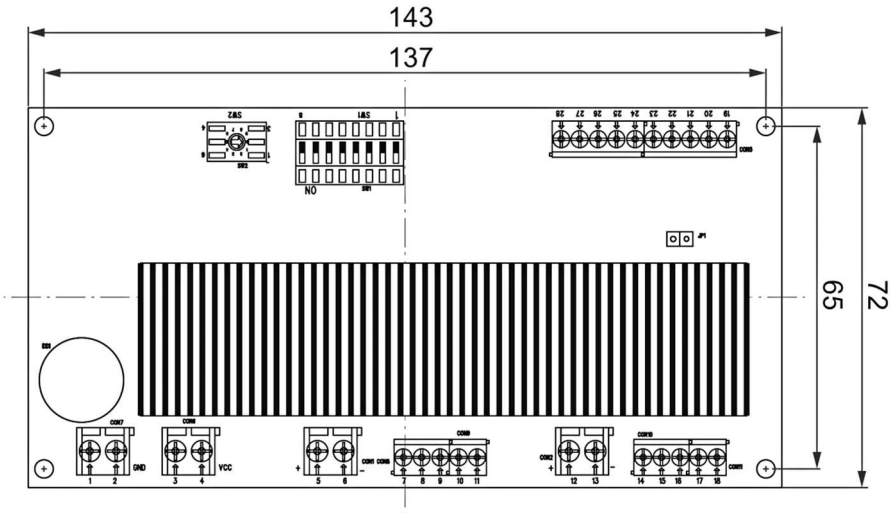
Control unit DSZYC-03

The DSZYC-03 is a multifunctional, versatile industrial controller that supports 2 linear actuators for synchronous applications.

- Input voltage: 12 / 24 Vdc
- Max. current limit: 25 A per linear actuator
- Controls 1 or 2 linear actuators
- Supports potentiometers (POT) or Hall sensors (HS) (only NPN) for synchronisation purposes
- 4-stage adjustable start/stop ramp
- Overcurrent protection adjustable from 2.0 A - 25.0 A
- Duty cycle 2 x 20 A: 15% DC
  2 x 10 A: 40% DC
- Ambient operating temperature: -20°C to +55°C
- Includes mounting kit (for NS 35/7.5 or NS 32 DIN rails)

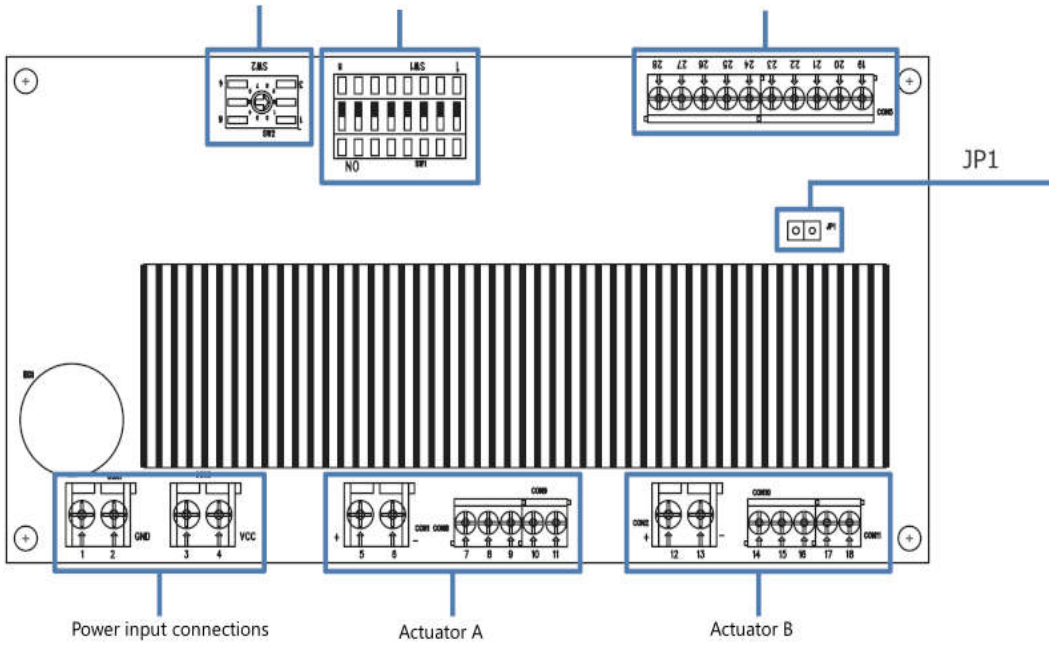


PCBA board dimensions

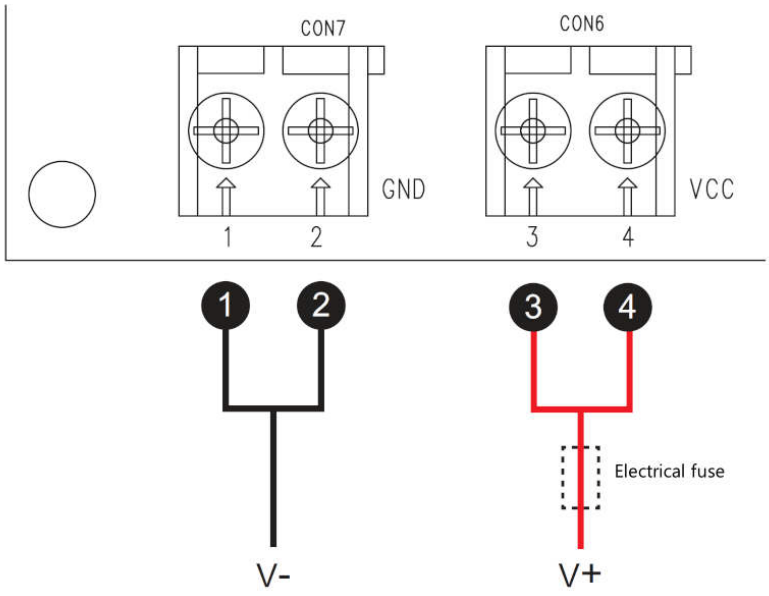


unit: mm

DIP switch and connections



Power input connections



Connection	Definition	Description
1	V-	• GND (earth) • Copper wire – max. permissible cross-section of copper braid wire 3.3 mm² (12 AWG)
2		
3	V+	• Input voltage 12 / 24 Vdc (accepted voltage range 9 - 32 Vdc) • Per terminal – max. permissible cross-section of copper braid wire 3.3 mm² (12 AWG)
4		

Note:

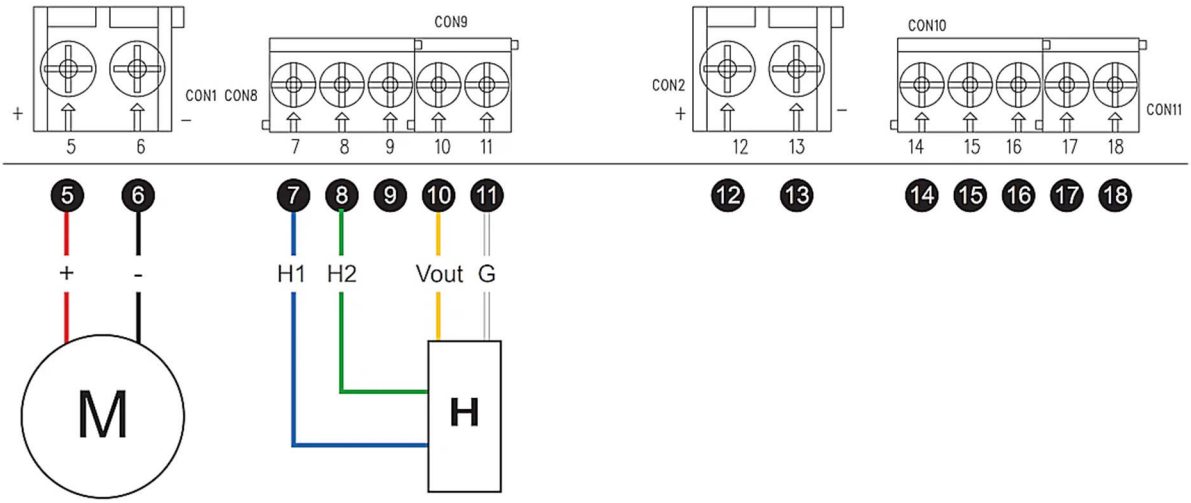
1. Install a slow-blow fuse between the control unit and the power supply for protection purposes.
   The fuse is connected on site and should be rated (A) to match the required current.

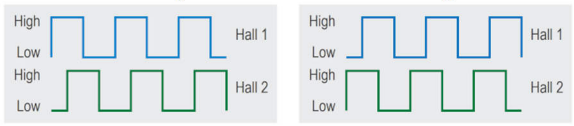
2. The cross-section of the mains cable must be large enough to prevent malfunctions caused by voltage drop.
   The lengths of cable between the power supply and control unit and between the control unit and actuator motor should be as short as possible. It is advisable for these cables to be shorter than 1 metre.
   If the maximum load current is less than 30 A, a single wire with a cross-section of 3.3 mm² (12 AWG) can be used.
   If the maximum load current is 30 A to 50 A, it is advisable to use two cables with a wire cross-section of 2.0 mm² (14 AWG) or more connected in parallel.

Attention:

	• A higher inrush current is required for approx. 0.2 seconds when starting the actuator. The inrush current of the actuator can be up to three times the typical nominal current of the corresponding load. • If a power supply unit is used, it must be designed to withstand the on-site inrush current at maximum load. If batteries are used as a power source, this peak current is not a problem. All other connectors, switches and relays used must also be able to withstand the inrush current. • It is forbidden to control the speed of the connected actuators by using the PWM power input or by adjusting the input voltage.

Connecting linear actuators with Hall sensors

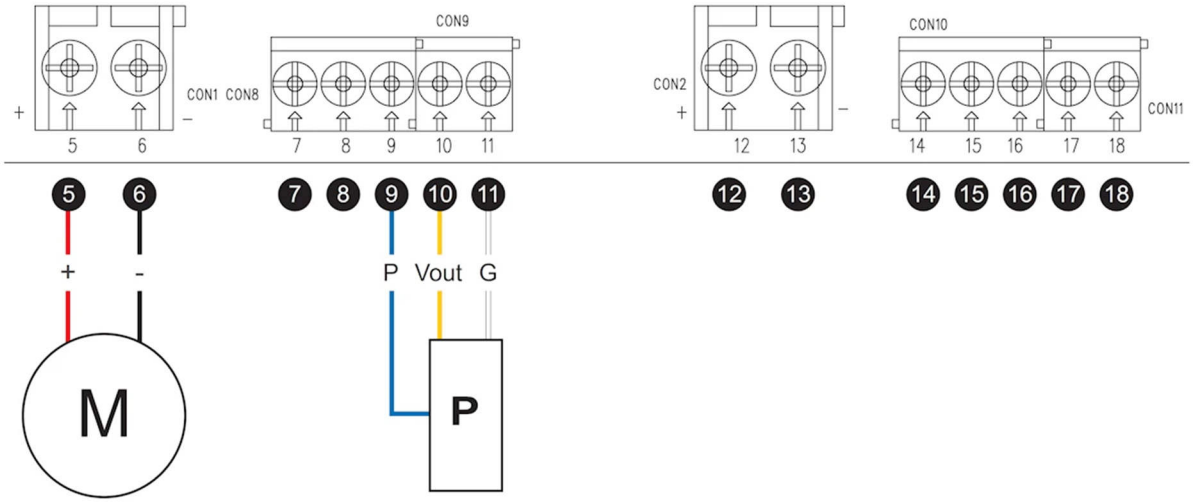


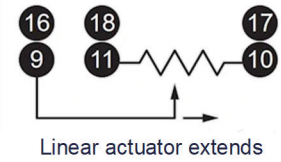
Connection		Definition	Description	
5	12	M+	Motor connection	
6	13	M-		
7	14	H1	Channel 1 Hall sensor	Hall signals when drive is extending:  Both type variants are possible
8	15	H2	Channel 2 Hall sensor	
10	17	Vout	5 Vdc power supply for Hall sensors	
11	18	G	GND (earth)	

Note:

1. The recommended conductor cross-section of each copper wire for connections 5 6 12 13 is 0.5 mm² – 3.3 mm² (20 AWG - 12 AWG).
2. The recommended conductor cross-section of each copper wire for connections 7 to 11 and 14 to 18 is 0.2 mm² – 0.83 mm² (20 AWG - 18 AWG).
3. If only using 1 actuator (page 6 point 2), use connections 5 to 11.
4. If using Hall sensors with only one channel, use connections 7 and 14 (H1).

Connecting linear actuators with potentiometers

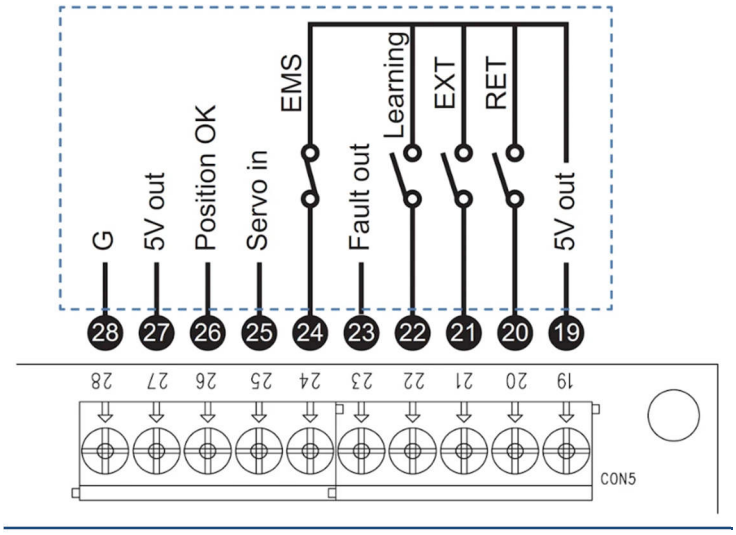


Connection		Definition	Description	
5	12	M+	Motor connection	
6	13	M-		
9	16	P	POT signal output	 Linear actuator extends
10	17	Vout	5 Vdc power supply for Hall sensors	
11	18	G	GND (earth)	

Note:

1. The recommended conductor cross-section of each copper wire for connections 5 6 12 13 is 0.5 mm² - 3.3 mm² (20 AWG - 12 AWG).
2. The recommended conductor cross-section of each copper wire for connections 7 to 11 and 14 to 18 is 0.2 mm² - 0.83 mm² (20 AWG - 18 AWG).
3. If using 1 actuator (page 6 point 2), use connections 5 to 11.

Connecting a control unit or handset



Connection	Definition	Description
19	5 Vdc out	• Motor connection
20	RET	• Signal input „Retract“. • Can use the 5 Vdc terminal 19 or an external 5 Vdc power source. • The actuator is retracted when operated.
21	EXT	• Signal input “Extend”. • Can use the 5 Vdc terminal 19 or an external 5 Vdc power source. • The actuator is extended when operated.
22	Lerning	• Signal input “Learn”. • Can use the 5 Vdc terminal 19 or an external 5 Vdc power source. • If this input is triggered >2.0 seconds after switching on, the system automatically learns the stroke of the actuators (see Calibration and Test run part 2)
23	Fault out	• Signal output “Error” • Issues a 5 Vdc signal if overcurrent is present if or the actuator position feedback signal is lost.
24	EMS	• Signal input “EMERGENCY OFF” (switch is normally closed) • An external EMERGENCY OFF switch can be installed between terminal 19 and terminal 24. • Jumper JP1 must be removed to allow this function to be used.
25	Servo in	• Control signal 0 - 5 Vdc • The cylinder can be moved to the desired position using this input. (The 0 - 5 Vdc are evenly distributed over the full stroke as defined by the software limit switches). • The control signal can be generated by an external power source or a potentiometer on the 5 Vdc terminal 27.
26	Position OK	• Signal output “Position reached” • When using Servo control mode, the actuator issues a signal (5 Vdc) after reaching the specified • position (according to terminal 25).
27	5V out	• 5 Vdc voltage output – can be used for POT on terminal 25 GND (earth).
28	G	• GND (earth) • When using Servo control mode, the GND of the power source (e.g. POT) must be connected here.

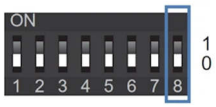
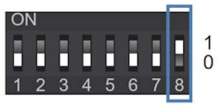
Note:

The recommended conductor cross-section of each copper wire for connections 19 - 28 is 0.2 mm² – 0.83 mm² (20 AWG - 12 AWG).

Setting the parameters

	• To ensure that the parameters are set correctly and for reasons of safety, please make sure that every actuator and all required control input and control output terminals are properly connected before switching on the input voltage. • Check the actuator's technical data once more before setting the parameters. • For safety reasons, the unit must be recalibrated every time its parameters are adjusted (if it is not fitted with a positioning sensor, recalibration is unnecessary). • The factory-set default positions of the DIP switch are all "0".

1. Control mode

Parameter	Value	DIP-Switch
Default without positioning	0	
Servo control (0 Vdc – 5 Vdc) with positioning	1	

2. Number of linear actuators

Parameter	Value	DIP-Switch
If controlling 2 actuators	0	
If controlling 1 actuator	1	

3. Positioning system

Parameter	Value	DIP-Switch
Positioning with 2 Hall sensors	00	
Positioning with 1 Hall sensor	01	
Positioning with potentiometer	10	
No position feedback	11	

Note:

- If you have selected Servo control mode (see section 1.1), the actuator must be equipped with a position feedback device (Hall sensors or potentiometer).
- If the linear actuators do not have a positioning sensor, they must be fitted with limit switches that can interrupt the power supply and stop autonomously, otherwise there is a high risk of the DSZYC-03 being damaged.
- Theoretically, two linear actuators can be controlled in parallel without a position sensor (HS or POT). However, they will then not be synchronised.

4. Stroke limitation by software

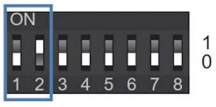
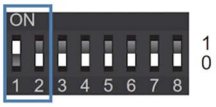
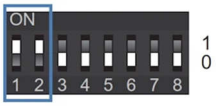
With Hall sensor	With potentiometer	Value	DIP-Switch
Sets the stop position to 40 pulses before reaching either mechanical limit.	Sets the end position to 2% of the full stroke before reaching either mechanical limit.	00	
Sets the stop position to 20 pulses before reaching either mechanical limit.	Sets the end position to 1% of the full stroke before reaching either mechanical limit.	01	
Sets the stop position to 10 pulses before reaching either mechanical limit.	Sets the end position to 0.5% of the full stroke before reaching either mechanical limit.	10	
No software limitation (can only be selected if the drive has integrated limit switches).	No software limitation (can only be selected if the drive has integrated limit switches).	11	

Note:

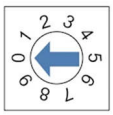
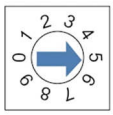
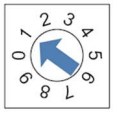
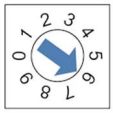
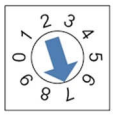
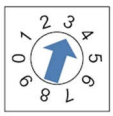
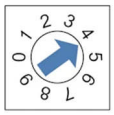
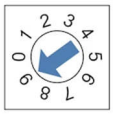
The correlation between the number of Hall sensor pulses and the stroke can be found in the actuator data sheet.

5. Setting the start/ stop ramps

- This parameter is used to set the soft start and stop times.
- If the value is set to 00, a soft start is performed when starting from any position within the entire stroke range.
- If Servo control mode is selected, a soft stop is performed at any position within the entire stroke range. However, if Switch control mode is selected, the soft stop function is only applicable before either end of the stroke and no soft stop function is available in the middle of the stroke.

With Hall sensor	Value	DIP-Switch
0 seconds (no start/stop ramps)	00	
0.5 seconds	01	
1.0 seconds	10	
1.5 seconds	11	

6. Setting overcurrent protection and overcurrent limitation

Parameter	Value	Rotary control switch		Parameter	Value	Rotary control switch
2.0 A	0			10.0 A	5	
3.0 A	1			12.5 A	6	
4.0 A	2			15.0 A	7	
6.0 A	3			20.0 A	8	
8.0 A	4			25.0 A	9	

Note:

The following is recommended: When setting this value, we recommend using the typical rated current specified in the actuator's data sheet plus 20%. The factory setting is 0.

Optional HM6 handset

Handset	Button	Function
		Extend
		Retract
		Calibrate

Pin assignment	
DSZYC-03 Port	Wire colour
19	Red
20	Purple
21	White
22	Blue

Calibration (Learn mode for calibrating the effective stroke)

- Learn mode must be activated with the actuator idle (linear actuator not under load).
- If the actuator does not have a position sensor (Hall sensor or potentiometer), calibration is unnecessary.
- We recommend setting the software-controlled stroke limit (page 7 point 4) and the soft start/stop ramps (page 7 point 5) to 00 before starting Learn mode for the first time.

Carry out the following steps to calibrate the stroke:

1. Start Learn mode by connecting terminal 22 to the 5 Vdc power supply for more than 2 seconds.
   The cylinder retracts automatically to the mechanical limit. Next, it extends automatically to the mechanical limit. It then automatically returns to the start position (start position of Learn mode).
2. After calibration, check the start and end positions of the linear actuator. If necessary, adjust the software-controlled stroke limitation as required (see page 7 point 4). If adjustment is necessary, please repeat point 1.

Note:

1. In the event of a power outage, the stroke calibrated using Learn mode will be stored in the control unit for approx. 24 - 48 hours.
2. If using Hall sensors as position feedback elements, see page 3:
   Linear actuators lose their position in the event of an unforeseen power outage (or after the machine is switched off).
   In this case, start Learn mode when restarting the machine. Thereafter, the linear actuators will once again be in a defined state.

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