

# S-DIAS Stepper Motor Output Stage

## ST 151



- with 1 stepper motor output stage 50 V/5 A
- 1 brake chopper
- 1 incremental encoder input RS422/TTL
- 2 enable inputs with STO function
- 2 latch/digital inputs

The S-DIAS stepper motor output stage allows the connection of 2-phase stepper motors with a phase current up to 5 A. The incremental encoder input, which supports RS422 as well as TTL encoders, is provided for position feedback. With both enable inputs, the safety function STO is implemented. The 2 latch/digital inputs are provided for the reference motion and monitoring the end positions.

### Stepper Motor Output Specifications

Number of phases	2
Output voltage	dependent on the supply (18-55 V)
Current controller frequency	maximum 32 kHz
Output current	maximum 5 A RMS
Output current over the environmental temperature	maximum 5 A continuous current at 45 °C maximum 3 A continuous current at 55 °C
DC-link capacitance	10 µF
Operating modes	step frequency mode
Step resolution	full step, half step 4-/8-/16-/32-/64x micro step
Voltage measurement	15-70 V with an under voltage < 15 V or over voltage > 70 V, the motor output is shut down through the hardware.
Temperature measurement	0-125 °C with temperature warning at 103 °C with temperature warning at 108 °C

### Brake Chopper Specifications

Number	1
Output	GND switching
Maximum current	6 A
Short-circuit protection	yes
Regen resistor	External power resistor
Regen resistor switching threshold on/off	60 V/55 V

### Incremental Encoder Input Specifications

Number	1
Input signals	Incremental encoder signals RS422 (A, /A, B, /B, R, /R) RS422 signal (150 Ω termination, integrated in the module) Incremental encoder signal TTL (A, B, R) TTL level (1200 Ω Pull-Up, integrated in the module)
Input frequency	maximum 125 kHz
Counter frequency	maximum 500 kHz
Signal analysis	4x
Counter resolution	16-bit
Encoder power supply	+5 V/0.2 A short-circuit proof

### STO Enable Input Specifications

Number	2
Input voltage	+24 V DC
Input voltage range	minimum +18 V      maximum +30 V
Signal level	low: ≤ +5 V      high: ≥ +15 V
Switch hysteresis	typically +11 V
Input current	3 mA at +24 V
Input delay	typically 0.5 ms
Safety Level	complies with the requirements of Category 4, Performance Level "e" according to EN ISO 13849-1 and SIL3 according to 62061
Safety function	STO according to EN61800-5-2, section 4.2.2.2 The motor is not supplied with energy, which can cause a turn. The stepper motor output stage does not supply energy to the motor, which can generate torque.

### Latch/Digital Input Specifications

Number	2	
Input voltage	typically +24 V	maximum +30 V
Signal level	low: < +8 V	high: > +14 V
Switch hysteresis	typically +11 V	
Input current	3.7 mA at +24 V	
Input delay	typically 10 µs	

### Electrical Requirements

Motor supply	+18-55 V DC	
Current consumption of the motor supply	maximum 6 A (load-dependent)	
Current consumption of the +24 V supply on the S-DIAS bus	typically 80 mA (incl. +5 V supply of the incremental encoder)	maximum 120 mA (incl. +5 V supply of the incremental encoder)
Voltage supply from S-DIAS bus	+5 V	
Current consumption on the S-DIAS bus	-	-

### Article Number and Miscellaneous

Article number	20-014-151	
Standard	designed according to UL	
Approvals	CE	

### Environmental Conditions

Storage temperature	-20 ... +85 °C	
Environmental temperature	0 ... +55 °C	
Humidity	0-95 %, non-condensing	
Installation altitude above sea level	0-2000 m without derating > 2000 m with derating of the maximum environmental temperature by 0.5 °C per 100 m	
Operating conditions	pollution degree 2	
EMC resistance	in accordance with 61000-6-7 (Generic standards - Immunity requirements for equipment intended to perform functions in safety-related systems (functional safety) at industrial locations) in accordance with EN 61000-6-2 (industrial area) (increased requirements in accordance with IEC 62061)	
EMC noise generation	in accordance with EN 61000-6-4 (industrial area)	
Vibration resistance	EN 60068-2-6	3.5 mm from 5-8.4 Hz 1g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g
Protection type	EN 60529	IP20

## Notes

