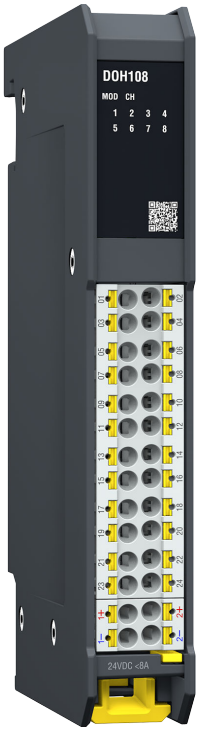

DOH108

Digital Output Module (High Power)

The reliable switching of binary actuators is the basis for any automated plant. Robustness and durability are just as important as precision and power reserves. The DOS/DOH series of digital output modules ideally combines these requirements with integrated special functions and state-of-the-art technology.

Features

- 8-channel digital output module
- Interface according to IEC 61131-2 type 2
- 3-wire connection
- Output read-back
- Synchronous clocks / timed output
- Energy saving function
- Pulse width modulation
- Oversampling
- Direct module-to-module communication

Part type designation	Part number
DOH108	00028976-00
DOH108 EC	00039169-00

Common properties	
Basic function	8x digital output 24 V DC type 2 standard (source) 4x PWM 4x time triggered output 4x oversampling 8x module-to-module communication Paralleling outputs
System	Bachmann system M100
Digital outputs – 24 V	
Number of digital outputs	8
Signal standard	IEC 61131-2 type 2 source (HighSide, P-switching)
Voltage category, nominal	24 V DC
Output type	Semiconductor
Signals per supply group	4 (2 groups)
Signal supply voltage range	18 V DC to 32 V DC
Overvoltage protection	-4 V DC [1] to 32 V DC
Connections per output	3 (DO, +24V, GND)
Output current per channel, nominal, continuous	2 A
Output current per channel, max.	2.8 A
Output current per channel, short-term overload	5.2 A (typical, thermal overload protection)
Output current per group, max.	8 A
Output current per channel, min.	20 µA
Output current per channel, off-state, max.	100 µA
Paralleling outputs	With resistive load, all coupled outputs can be switched in parallel
Coupled outputs	Up to 4 outputs coupled
Voltage drop, on-state, max.	200 mV @ 2 A
Output impedance, on-state, max.	100 mΩ
Signal on delay, max.	45 µs (typ.), 83 µs (max.)
Signal off delay, max.	55 µs (typ.) 106 µs (max.) [2]
Internal scan rate, max.	30 kHz
Maximum output frequency [3]	10 kHz @ 2 A, T_a = 25 °C (resistive load) 5 kHz @ 2 A, T_a = 70 °C (resistive load) 3 kHz @ 2 A, T_a = 70 °C (inductive load 1.6 H) [4] 4 kHz @ 50 W, T_a = 70 °C (lamp load)
Signal inversion	8x
Pulsetrains	Up to 128 values per cycle (4x)
Time triggered output	Absolute time set value for output (4x)
Signal state indication	Yes, green numeric LED per channel

[1] *Corresponds to module supply voltage minus 36 V.*

[2] *Significantly longer delays can be expected with a high-impedance load circuit.*

[3] *The specified maximum values apply to one channel. They do not apply to fast switching on multiple channels.*

[4] *A lower average current occurs at > 1 Hz*

Pulse width modulation (PWM)	
Number of PWMs	0 to 4 configurable
Selectable output interfaces	Digital outputs - 24 V

Pulse width modulation (PWM)	
Operation modes	Flexible, parameters can optionally be set as process values: Cycle time Mark-to-space ratio Start pulse duration Pulse rate setting
Cycle time	100 µs to 4 s adjustable
Duty cycle	0 % to 100 % of cycle time
Settings resolution	16-bit for setting duty cycle 0 % to 100 % Observe limit values for minimum pulse duration and switching frequency
Impulse duration, min.	50 µs
Energy saving mode	Constant start pulse configurable duration Holdup-pulsing with configurable period and mark-to-space ratio
Coupled PWM	Via coupled digital channel
Actuator supply 24 V DC	
Number of supply points 24 V DC	8
Output current per channel, nominal, continuous	2 A
Short-circuit protected, supply	No
Overvoltage protection	-32 V DC to +32 V DC
Actuator supply GND	
Number of supply points GND	8
Module-to-module communication	
Signal propagation to neighbour	No
Signal receiver from neighbor modules	DO (8x)
Module bus interface	
System	M100
Slot type	IO (1/E, 2, 3, 4, ...31)
Module data rate	Typ.: 0 Mbit/s to 33.6 Mbit/s depending on the configuration
Bus cycle time, min.	4.5 µs [1)]

[1)] *Depending on the fieldbus used and the respective configuration, lower data rates and longer cycle times can be expected.*

Synchronization/clocks	
Distributed clocks	Yes
Time stamp format	64 bit in ns
Time resolution	10 ns
Time precision	25 ns within the station 100 ns via network (typ.) 1 µs via network (max.)
Synchronization functions	DO
Synced output	Yes
Synced output jitter	±1 µs
Field bus cycle time, min.	100 µs [1)]

[1)] *Depending on the fieldbus used and the respective configuration, lower data rates and longer cycle times can be expected.*

Diagnostics	
Electronic type plate	Yes (application interface and in the engineering tool)
Machine readable type plate	Yes (QR code with type and part information and internet link)
Environmental conditions sensor	Integrated (temperature)

Diagnostics	
Operational indications	LED "MOD" (red/green) module status LED "CH" (red/green) channel status summary Numeric LED per channel (green) digital level of the channel
Error indications	Supply voltage too low Overload Cable break / open signal circuit Discrepancy (read-back of output signal) Module temperature
Powerfail, logic supply	No
Powerfail, signal supply	Undervoltage < 16.8 V DC (typical)
Overload/short-circuit	Yes (totals display 4 channels)
Open circuit	Yes, per channel
Open circuit detection time	1.5 ms
Mismatch output readback	Yes, per channel
Energy supply	
Supply voltage, nominal	24 V DC
Supply voltage, range	18 V DC to 32 V DC
Supply voltage, short-term overload	40 V for 100 ms
Power consumption from 24 V signal supply	4.0 W plus load supply
Maximum residual ripple 24 V signal supply	±2.4 V
Overcurrent protection required	No internal protection External protection with circuit breaker characteristic: B, C, D, Z or K Max. nominal current 8 A DC per group
Power dissipation, typ./max.	2.6 W / 4.7 W
Reverse polarity protection signal supply	Yes, continuously (up to -32 V)
Power consumption from backplane	650 mW
Supply terminal block bridge	No
Product safety	
Galvanic isolation	850 V AC
Galvanic isolation between supply groups	60 V
Permitted potential difference between digital channels	40 V
Degree of protection acc. IEC 60529	IP40, terminal block IP30
Protection class acc. IEC 61010-1, IEC 61010-2-201	III
Overvoltage category acc. IEC 61010-1	II
Rated impulse withstand voltage acc. IEC 61000-4-5	Supply DC: • 500 V DM • 1000 V CM
Short-circuit protected, outputs	Thermal overload protection
Keying of terminal block	Yes (6-fold per 4 contacts)
Environmental conditions	
Temperature range, operating	-30 °C to +70 °C [1) 2)]
Temperature range, transport and storage	-40 °C to +85 °C
Installation altitude, max.	Up to 2000 m without temperature derating 2000 m to 4500 m: Reduction of the max. ambient temperature by 0.1 °C per 100 m elevation
Air pressure	106 kPa to 58 kPa (0 m to 4500 m)

Environmental conditions	
Relative humidity, operation	Standard: 0 % to 100 % noncondensing Extended Climate: 0 % to 100 % with temporary condensation
Pollution degree acc. IEC 61010-1	Standard: 2, noncondensing Extended Climate: 2
Vibration	6 g (14.1 Hz to 500 Hz) 7.5 mm amplitude (2 Hz to 14.1 Hz) Test duration: 15 h
Shock	45 g max. (test scope 18 shocks) 20 g permanently (test scope 6000 shocks)

[1] *At 70 °C ambient temperature, the supply voltage must be limited to 24 V DC.*

[2] *Specifications apply to maximum continuous current. Higher switching losses occur at fast switching frequencies.*

Approvals/certificates	
Product safety	CE, UKCA cULus (NRAQ, NRAQ7)
Hazard area operation	ATEX: Ex II 3G Ex ec IIC Gc
Maritime	ABS, BV, DNV, KR, LR, NK, RINA: in preparation
Hazardous substances and waste treatment	RoHS, RoHS China, REACH, WEEE
Quality management	ISO 9001 for development and production
Engineering	
Configuration tool	SolutionCenter (≥ V2.75)
Firmware package update	Yes (via SolutionCenter or console interface on the head module)
Mounting/installation	
Mounting type	Inserting and screwing onto the backplane with integrated M4 screw
Ground connection for protection class I	No
Dimensions	
Number of slots	1
Size unpacked W × H × D	23.3 mm × 152.5 mm × 95.7 mm
Mass unpacked	273 g

Order data

Part type designation	Part number	Description
DOH108	00028976-00	Digital output module system M100 8x 24 V DC, type 2 source, 3-wire technology (signal, 24 V, GND), 2 groups, synchronization, 4x time triggered output, 4x PWM / start-/ hold-up pulsing, 4x oversampling, module-to-module communication consumer, isolated from system, without terminal block
DOH108 EC	00039169-00	Like DOH108 with Extended Climate Range

Accessories

Part type designation	Part number	Description
BPR1nn	00039235-nn	Backplane for DIN-rail mounting Active backplane system M100: BPR1nn with nn = 04 to 16 slots in increments of 1, as well as 20, 24, 28, 32 slots, for DIN-rail mounting; delivery without backplane slot covers and without mounting rail
BPR1nn EC	00039236-nn	Like BPR1nn; Extended Climate Range
BPS1nn	00039237-nn	Backplane for direct screw mounting Active backplane system M100: BPS1nn with nn = 04 to 16 slots in increments of 1, as well as 20, 24, 28, 32 slots, for direct screw mounting; delivery without backplane slot covers and without screws
BPS1nn EC	00039238-nn	Like BPS1nn; Extended Climate Range
TPI100_W24_P5.0_Cgy_L1to24		Signal terminal block Completely removable terminal block, push-in spring connector for system M100, 24-way/contacts, pitch 5.0 mm, female, conductors flexible 0.2 mm² to 2.5 mm² (24 to 14 AWG), solid 0.2 mm² to 1.5 mm² (24 to 16 AWG), with wire end ferrules 0.25 mm² to 1.5 mm² (24 to 16 AWG), stripping length: 10 mm, rating: 300 V / 8 A per contact, connector color: gray, push-release: yellow, labeling: 1 to 24
TPI100_W4_P5.0_Cgy_Lsup		Supply terminal block Completely removable terminal block, push-in spring connector for system M100, 4-way/contacts, pitch 5.0 mm, female, conductors flexible 0.2 mm² to 2.5 mm² (24 to 14 AWG), solid 0.2 mm² to 1.5 mm² (24 to 16 AWG), with wire end ferrules 0.25 mm² to 1.5 mm² (24 to 16 AWG), stripping length: 10 mm, rating: 300 V / 8 A per contact, connector color: gray, push-release: yellow, labeling: 1+/1-/2+/2-
TKP106		Keying element Keying element for signal terminal blocks and supply terminal blocks TPI100 for system M100, plastic ring with 6 keying elements
TPI100_W24_W4_Set [1)]	00042412-00	Terminal block set for M100 standard modules: • 1x TPI100_W24_P5.0_Cgy_L1to24 • 1x TPI100_W4_P5.0_Cgy_Lsup • 2x TKP106

[1)] *All components of the set are also available in bulk packages.*