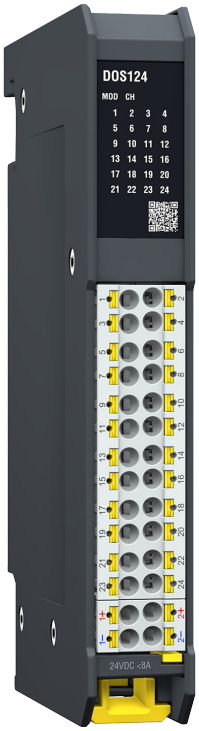

DOS108, DOS112, DOS124
Digital Output Modules

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-/12-/24-channel digital output module
- Interface according to IEC 61131-2 type 0.5
- High overload capability
- 3-/2-/1-wire connection
- Synchronous clocks / timed output
- Energy saving function
- Pulse width modulation
- Direct module-to-module communication

Part type designation	Part number
DOS108	00030587-00
DOS108 EC	00039167-00
DOS112	00030586-00
DOS112 EC	00039168-00
DOS124	00028975-00
DOS124 EC	00038806-00

Common properties	DOS108	DOS112	DOS124
Basic function	8x digital output 24 V DC type 0.5 standard (source)	8x digital output 24 V DC type 0.5 standard (source) 4x digital output 24 V DC type 1 standard (source)	24x digital output 24 V DC type 0.5 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	**DOS108**	**DOS112**	**DOS124**
Number of digital outputs	8	12	24
Signal standard	IEC 61131-2 type 0.5 source (HighSide, sourcing output)	IEC 61131-2 type 0.5 source (HighSide, sourcing output) (8x) IEC 61131-2 type 1 source (HighSide, sourcing output) (4x)	IEC 61131-2 type 0.5 source (HighSide, sourcing output)
Voltage category, nominal	24 V DC		
Output type	Semiconductor		
Signals per supply group	8 (1 group)	12 (1 group)	16 (1 group) 8 (1 group)
Signal supply voltage range	18 V DC to 32 V DC		
Overvoltage protection	-11 V DC [1] to 32 V DC		
Connections per output	3 (DO, +24V, GND)	2 (DO, GND)	1 (DO)
Output current per channel, nominal, continuous	0.5 A	0.5 A (8x) 1 A (4x)	0.5 A
Output current per channel, max.	0.7 A	0.7 A (8x) 1.2 A (4x)	0.7 A
Output current per channel, short-term overload	1.3 A (typical, thermal overload protection)	1.3 A (typical, thermal overload protection) (8x) 2.6 A (typical, thermal overload protection) (4x)	1.3 A (typical, thermal overload protection)
Output current per group, max.	5.6 A	8 A	8 A (group with 16 channels) 5.6 A (group with 8 channels)
Output current per channel, min.	0 mA		
Output current per channel, off-state, max.	5 µA	10 µA	5 µA
Paralleling outputs	With resistive load, all coupled outputs can be switched in parallel		
Coupled outputs	Up to 8 outputs coupled	Up to 8/4 outputs coupled	Up to 8 outputs coupled
Voltage drop, on-state, max.	220 mV @ 0.5 A		
Output impedance, on-state, max.	440 mΩ		
Signal on delay, max.	22 µs (typ.) 50 µs (max.)		
Signal off delay, max.	32 µs (typ.) 80 µs (max.) [2]		
Internal scan rate, max.	30 kHz		

Digital outputs – 24 V	DOS108	DOS112	DOS124
Maximum output frequency [3]	15 kHz @ 0.5 A, T_a = 25 °C (resistive load) 15 kHz @ 0.5 A, T_a = 70 °C (resistive load) 1 Hz @ 0.5 A, T_a = 70 °C (inductive load 1.6 H) 15 kHz @ 14 W, T_a = 70 °C (lamp load)		
Signal inversion	8x	12x	24x
Pulsetrains	Up to 128 values per cycle (4x)		
Time triggered output	Absolute time set value for output (4x)		
Fail safe breaking via common supply	No		
Signal state indication	Yes, green numeric LED per channel		

[1] *Corresponds to module supply voltage minus 43 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.*

Pulse width modulation (PWM)	DOS108	DOS112	DOS124
Number of PWMs	0 to 4 configurable		
Selectable output interfaces	Digital outputs - 24 V		
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.	35 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	DOS108	DOS112	DOS124
Number of supply points 24 V DC	8	0	0
Output current per channel, nominal, continuous	1 A	–	–
Short-circuit protected, supply	No	–	–
Overvoltage protection	-32 V DC to +32 V DC	–	–

Actuator supply GND	DOS108	DOS112	DOS124
Number of supply points GND	8	12	0

Module-to-module communication	DOS108	DOS112	DOS124
Signal propagation to neighbour	No		
Signal receiver from neighbor modules	DO (8x)		

Module bus interface	DOS108	DOS112	DOS124
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	DOS108	DOS112	DOS124
Distributed clocks	Yes		
Time stamp format	64 bit in ns		

Synchronization/clocks	DOS108	DOS112	DOS124
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	±12 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	DOS108	DOS112	DOS124
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)		
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 Module temperature		
Powerfail, logic supply	No		
Powerfail, signal supply	Powerfail < 16.8 V DC (typical)		
Overload/short-circuit	Yes (totals display 8 channels)	Yes (totals display 8/4 channels)	Yes (totals display 8 channels)
Open circuit	No		
Open circuit detection time	–		
Mismatch output readback	No		

Energy supply	DOS108	DOS112	DOS124
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	0.7 W plus load supply	1.2 W plus load supply	2.2 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.	0.9 W / 1.3 W	1.4 W / 2.1 W	1.8 W / 3.2 W
Reverse polarity protection signal supply	Yes, continuously (up to -32 V)		
Power consumption from backplane	450 mW	640 mW	780 mW
Supply terminal block bridge	Yes, internal connection from 1+ to 2+, and 1- to 2-	Yes, internal connection from 1+ to 2+, and 1- to 2-	No

Product safety	DOS108	DOS112	DOS124
Galvanic isolation	850 V AC		
Galvanic isolation between supply groups	No	No	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		

Product safety	DOS108	DOS112	DOS124
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	DOS108	DOS112	DOS124
Temperature, operating	-30 °C to +70 °C (standard mounting position) [1)]		
Temperature, 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 0.5 °C per 100 m elevation		
Air pressure	106 kPa to 58 kPa (0 m to 4500 m)		
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)] *Specifications apply to maximum continuous current. Higher switching losses occur at fast switching frequencies.*

Approvals/certificates	DOS108	DOS112	DOS124
Product safety	CE, UKCA cULus (NRAQ, NRAQ7)		
Hazard area operation	ATEX in preparation		
Maritime	DNV, LR, ABS, BV, RINA, KR, NK in preparation		
Hazardous substances and waste treatment	RoHS, RoHS China, REACH, WEEE		
IT/cybersecurity	ISO 27001 IEC 62443-4-1		
Quality management	ISO 9001 for development and production		

Engineering	DOS108	DOS112	DOS124
Configuration tool	SolutionCenter (≥ V2.75)		
Firmware package update	Yes (via SolutionCenter or console interface on the head module)		

Mounting/installation	DOS108	DOS112	DOS124
Mounting type	Inserting and screwing onto the backplane with integrated M4 screw		
Ground connection for protection class I	No		

Dimensions	DOS108	DOS112	DOS124
Number of slots	1		
Size unpacked W × H × D	95.7 mm × 152.5 mm × 23.3 mm		
Mass unpacked	263 g		

Order data

Part type designation	Part number	Description
DOS108	00030587-00	Digital output module system M100 8x 24 V DC, type 0.5 source, 3-wire connection (signal, 24 V, GND), 1 group, synchronization, 4x time triggered output, 4x PWM / start-/hold-up pulsing, 4x oversampling, module-to-module communication consumer, isolated from system, without terminal block
DOS108 EC	00039167-00	Like DOS108 with Extended Climate Range
DOS112	00030586-00	Digital output module system M100 8x 24 V DC, type 0.5 source, 4x 24 V DC 1 A source, 2-wire connection (signal, GND), 1 group, synchronization, 4x time triggered output, 4x PWM / start-/hold-up pulsing, 4x oversampling, module-to-module communication consumer, isolated from system, without terminal block
DOS112 EC	00039168-00	Like DOS112 with Extended Climate Range
DOS124	00028975-00	Digital output module system M100 24x 24 V DC, type 0.5 source, 1-wire connection, 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
DOS124 EC	00038806-00	Like DOS124 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 with 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 with Extended Climate Range
TPI100_W24	00039178-00	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 to 2.5 mm² (24 to 13 AWG), solid 0.2 to 1.5 mm² (24 to 16 AWG), with wire end ferrules 0.25 to 1.5 mm² (23 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	00039177-00	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 to 2.5 mm² (24 to 13 AWG), solid 0.2 to 1.5 mm² (24 to 16 AWG), with wire end ferrules 0.25 to 1.5 mm² (23 to 16 AWG), strippinglength: 10 mm, rating: 300 V / 8 A per contact, connector color: gray / push-release: yellow, labeling: 1+/1-/2+/2-
TKP106	00038798-00	Keying element for signal terminal blocks and supply terminal blocks Keying element for signal terminal blocks and supply terminal blocks TPI100 for system M100, plastic ring with 6 keying elements