

Product datasheet

Specifications



Base Built-in Display M168 - 23 IO - Solution - BMS connectivity

TM168D23CS

⚠ Discontinued on: 30 Sept 2015

⚠ End-of-service on: 21 Sept 2023

⚠ Discontinued

Main

Range of product	Modicon M168 logic controller
product or component type	Base controller
Product specific application	For solutions
variant	Programmable
Communication port protocol	BACnet MS/TP, optional BACnet IP, optional Modbus
Input/output number	23
Input/output number	7 discrete input 5 configurable analog input 8 discrete output 1 dedicated PWM output 2 configurable analog output

Complementary

Discrete input number	7
Discrete input logic	Sink or source (positive/negative)
Discrete input voltage	24 V
Discrete input voltage type	AC/DC
Sensor power supply	4.4...5 V DC 18...36 V DC
Voltage state 1 guaranteed	> 15 V for discrete input
Voltage state 0 guaranteed	<= 10 V for discrete input
Input impedance	Discrete input: <= 10 kOhm
Network frequency	50...60 Hz +/- 3 Hz discrete input
Discrete output number	5 (8 mA) 3 (5 mA)
Contacts type and composition	7 NO for discrete output 1 C/O for discrete output
Minimum load	10 mA at 12 V
Discrete output current	8 mA for relay output 5 mA for relay output
Load current	8 A at 5...30 V DC 8 A at 24...250 V AC 5 A at 5...30 V DC 5 A at 24...250 V AC
Mechanical durability	10000000 cycles for relay output

Disclaimer: This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications

Electrical durability	120000 cycles DC-12 braking current: 8 A at 30 V, 2 A 6000 cycles DC-13 braking current: 8 A at 24 V, 2 A 300 ms 300000 cycles AC-12 braking current: 8 A at 250 V, 2.5 A 6000 cycles AC-15 braking current: 8 A at 250 V, 3 A, cos phi = 0.3 120000 cycles DC-12 braking current: 5 A at 30 V, 2 A 200000 cycles DC-13 braking current: 5 A at 24 V, 1 A 48 ms 300000 cycles AC-12 braking current: 5 A at 250 V, 2.5 A 50000 cycles AC-15 braking current: 5 A at 250 V, 3 A, cos phi = 0.4
Operating rate in Hz	10 Hz - off load for discrete output 8 mA 0.1 Hz - operating current for discrete output 8 mA 20 Hz - off load for discrete output 5 mA 0.1 Hz - operating current for discrete output 5 mA
Response time	10 ms on closing for discrete output 8 mA 5 ms on opening for discrete output 8 mA 8 ms on closing for discrete output 5 mA 4 ms on opening for discrete output 5 mA
Analogue input number	5
Analogue input type	Voltage at 0...10 V or 0...5 V ratio - resolution: 0.01 V Current at 0...20 mA/4...20 mA - resolution: 0.01 mA Temperature probe at -50...+120 °C - resolution: 0.1 °C temperature probe: NTC Temperature probe at -50...+150 °C - resolution: 0.1 °C temperature probe: PTC Temperature probe at -100...+200 °C - resolution: 0.5 °C temperature probe: Pt 1000
Analogue output number	2
Analogue output type	Voltage 0...10 V - resolution: 0.01 V Current 0-20 mA or 4-20 mA - resolution: 0.05 mA
Load impedance ohmic	>= 1000 Ohm voltage 40...300 Ohm current
Absolute accuracy error	-5 %...+2 % of full scale 1...5 kOhm for analog output voltage +/- 2 % of full scale > 5 kOhm for analog output voltage +/- 3 % of full scale for analog output current +/- 0.5 % of full scale for analog input
LSB value	10 mV for analog output voltage 0.02 mA for analog output current 0.07 °C for analog input NTC 0.5 °C for analog input Pt 1000 5 mV for analog input voltage 0.01 mA for analog input current
communication service	Open collector synchro on AC power supply
Protection type	Reverse polarity protection for analog input voltage Overload protection for analog output voltage Reverse polarity protection for power supply
[Us] rated supply voltage	20...40 V DC 24 V AC
Supply voltage limits	20.4...27.6 V
Network frequency	50/60 Hz
network frequency limits	47...63 Hz
Immunity to microbreaks	10 ms
Maximum power consumption in W	22 W
Power consumption in VA	30 VA at 24 V
Memory capacity	544 kB
Realtime clock	With clock, clock drift <= 30 s/month
Data backed up	Date and hour internal battery, 3 days autonomy
Number of port	1 Modbus RJ45 slave 1.2...57.6 kbit/s 1 Modbus RJ45 master/slave 1.2...57.6 kbit/s 1 expansion bus terminal block master/slave

Electrical connection	Analog input (AI1 to AI5, GND, +5 V, 24 V) : 9 1 removable screw terminal block Discrete input (DI1 to DI7, COM) : 8 1 removable screw terminal block Fan output (FAN+, FAN-) : 2 1 removable screw terminal block Expansion bus (+24 V, GND, CAN-, CAN+) : 5 1 removable screw terminal block Power supply (L/+, N/-) : 2 1 removable screw terminal block Discrete output (NO1 to NO3, COM 1-2, COM 3) : 5 1 removable screw terminal block Discrete output (NO4 to NO7, COM 6-7, COM 4-5) : 6 1 removable screw terminal block Discrete output (NO8, NC8, COM8) : 3 1 removable screw terminal block Analog output (AO1, AO2, GND) : 3 1 removable screw terminal block
Maximum cable distance between devices	2 twisted pair cables: <1000 m for expansion bus <30 m for power supply <100 m for embedded sensor PS <100 m for analog input <100 m for relay digital output <30 m for configurable analog output <1 m for PWM analog output <1000 m for SL1 bus <1000 m for SL2 bus <100 m for isolated digital input <100 m for no isolated digital input USB: <3 m for PC programming tool TTL: <3 m for PC programming tool <30 m for supply for remote display
Display type	Integrated LCD display
Local signalling	1 LED (green) for PWR 1 LED (green) for RUN 1 LED (red) for alarm status 1 LED (red) for expansion bus 1 LED (red) for user
mounting support	35 mm symmetrical DIN rail
Software function	Applicatives functions blocks
Width	251 mm
Height	129.19 mm
Depth	61.5 mm
net weight	0.79 kg

Environment

Standards	EN/IEC 60730-1 EN/IEC 61000-6-3 EN/IEC 61000-6-1
Product certifications	CSA 60730-1 UL 60730-1A
marking	CE
Ambient air temperature for operation	-10...55 °C conforming to UL -10...60 °C
Ambient air temperature for storage	-30...70 °C
Relative humidity	5...95 % without condensation
IP degree of protection	IP20 IP40 front face:
Pollution degree	2
Overvoltage category	III
Operating altitude	0...2000 m
Storage altitude	0...3048 m
Vibration resistance	3.5 mm constant amplitude (f = 5...8.4 Hz) 1 gn constant amplitude (f = 8.4...150 Hz)

Shock resistance	15 gn for 11 ms
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Packing Units

Unit Type of Package 1	PCE
Number of Units in Package 1	1
Package 1 Height	11.0 cm
Package 1 Width	15.5 cm
Package 1 Length	26.0 cm
Package 1 Weight	790.0 g

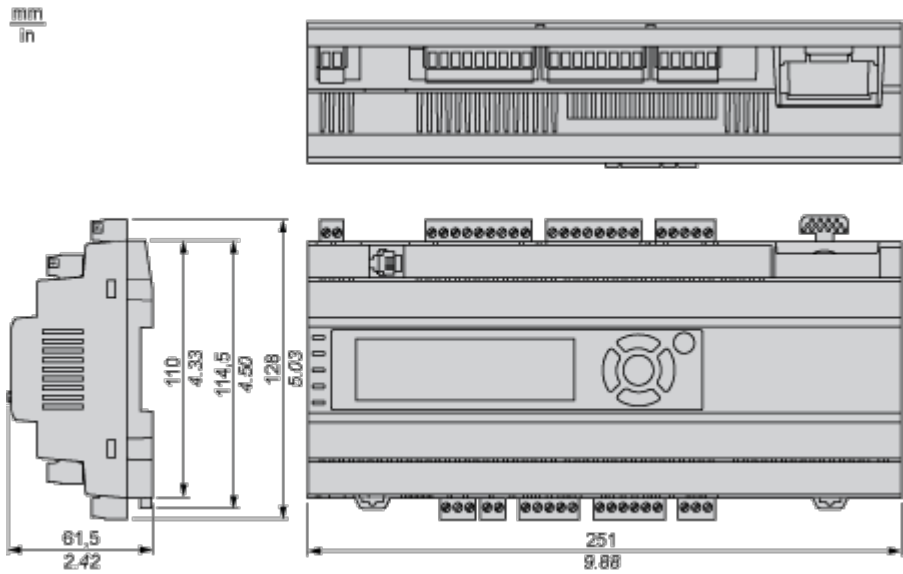
Contractual warranty

Warranty	18 months
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Dimensions Drawings

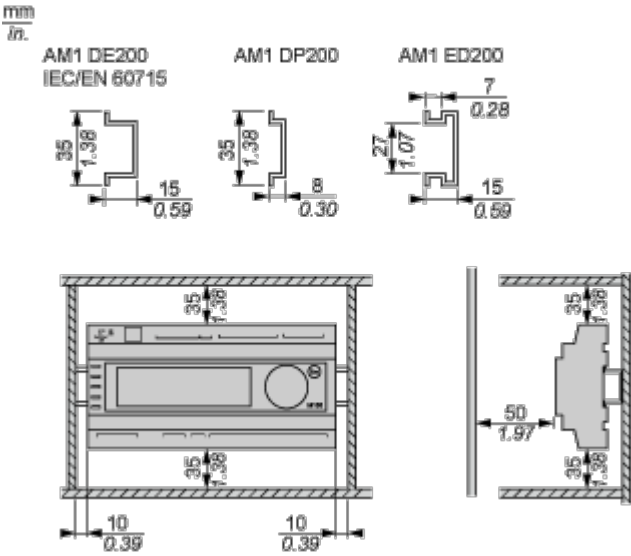
Controller with Communication Slot

Dimensions



Mounting and Clearance

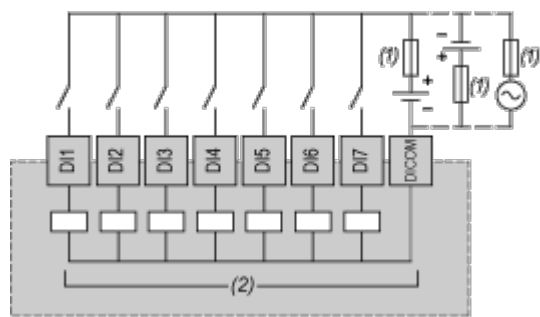
Mounting and Clearance



Connections and Schema

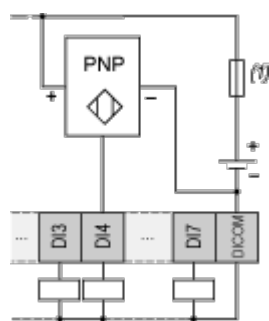
Digital Inputs

Sink/Source Inputs, External Power



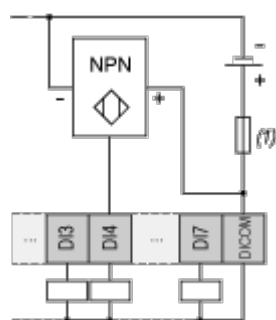
- (1) 0.5 A fast-blow fuse
- (2) Digital inputs

Connection Example for 3-wire PNP Active Switch



- (1) 0.5 A fast-blow fuse

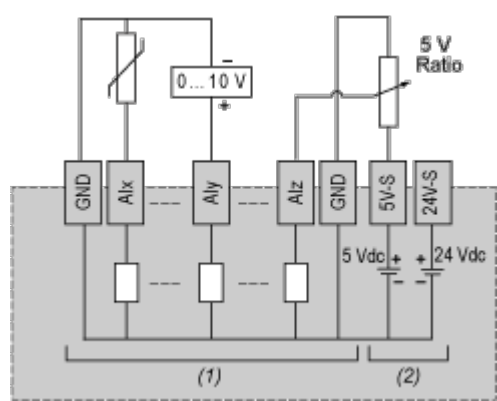
Connection Example for 3-wire NPN Active Switch



- (1) 0.5 A fast-blow fuse

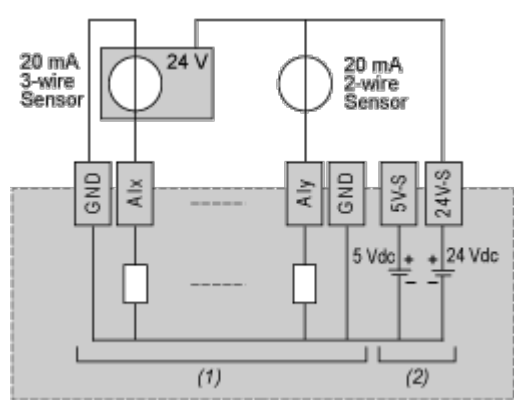
Analog Inputs

Voltage Mode



- (1) Analog inputs
- (2) To sensor

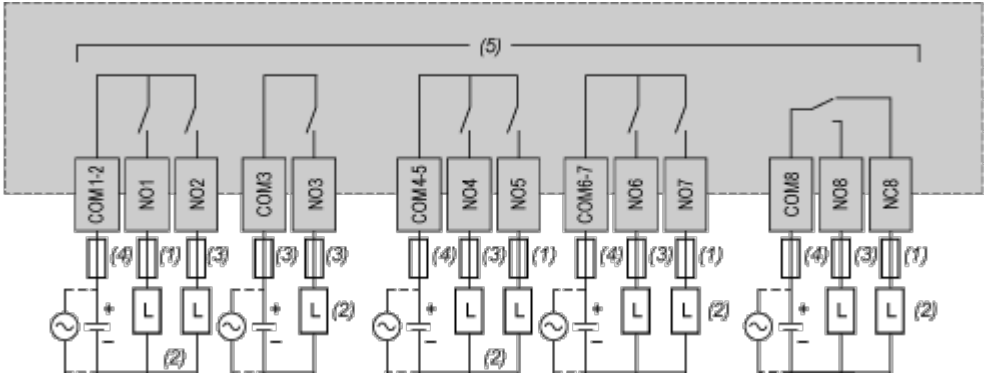
Current Mode



- (1) Analog inputs
- (2) To sensor

Digital Outputs

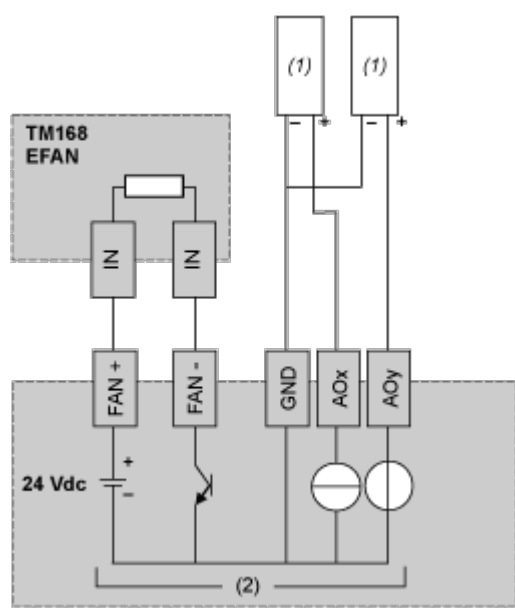
Wiring Diagram



- (1) 5 A Max fuse
- (2) Protection for inductive load
- (3) 8 A Max fuse
- (4) 10 A Max fuse
- (5) Relay outputs

Analog Outputs

Wiring Diagram



- (1) Voltage/current actuator
- (2) Controller or expansion module analog outputs

Wiring Requirements

Cable Types and Wire Sizes

				
mm ²	0,08...2,5	0,25...2,5	0,25...1,5	2 x 0,25...2 x 0,75
AWG	28...14	24...14	24...16	2 x 24...2 x 18

Use copper conductors only. Use shielded cables for Modbus.