



Main

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|------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| 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 discrete input |
| Voltage state 0 guaranteed | <= 10 V 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 discrete output 1 C/O discrete output |
| Minimum load | 10 mA 12 V |
| Discrete output current | 8 mA relay output 5 mA relay output |
| Load current | 8 A 5...30 V DC 8 A 24...250 V AC 5 A 5...30 V DC 5 A 24...250 V AC |
| Mechanical durability | 10000000 cycles relay output |
| Electrical durability | 120000 Cycles DC-12 8 A 30 V, 2 A 6000 Cycles DC-13 8 A 24 V, 2 A 300 ms 300000 Cycles AC-12 8 A 250 V, 2.5 A 6000 Cycles AC-15 8 A 250 V, 3 A, cos phi = 0.3 120000 Cycles DC-12 5 A 30 V, 2 A 200000 Cycles DC-13 5 A 24 V, 1 A 48 ms 300000 Cycles AC-12 5 A 250 V, 2.5 A 50000 cycles AC-15 5 A 250 V, 3 A, cos phi = 0.4 |
| Operating rate in Hz | 10 Hz - off load discrete output 8 mA 0.1 Hz - operating current discrete output 8 mA 20 Hz - off load discrete output 5 mA 0.1 Hz - operating current discrete output 5 mA |
| Response time | 10 ms closing discrete output 8 mA 5 ms opening discrete output 8 mA 8 ms closing discrete output 5 mA 4 ms opening discrete output 5 mA |
| Analogue input number | 5 |

| | |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Analogue input type | Voltage 0...10 V or 0...5 V ratio 0.01 V Current 0...20 mA/4...20 mA 0.01 mA Temperature probe -50...+120 °C 0.1 °CNTC Temperature probe -50...+150 °C 0.1 °CPTC Temperature probe -100...+200 °C 0.5 °CPt 1000 |
| Analogue output number | 2 |
| Analogue output type | Voltage 0...10 V 0.01 V Current 0-20 mA or 4-20 mA 0.05 mA |
| Load impedance ohmic | >= 1000 Ohm voltage 40...300 Ohm current |
| Absolute accuracy error | -5 %...+2 % of full scale 1...5 kOhm analog output voltage +/- 2 % of full scale > 5 kOhm analog output voltage +/- 3 % of full scale analog output current +/- 0.5 % of full scale analog input |
| LSB value | 10 mV analog output voltage 0.02 mA analog output current 0.07 °C analog input NTC 0.5 °C analog input Pt 1000 5 mV analog input voltage 0.01 mA analog input current |
| Communication Service | Open collector synchro on AC power supply |
| Protection type | Reverse polarity protection analog input voltage Overload protection analog output voltage Reverse polarity protection 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 24 V |
| Memory capacity | 544 kB |
| Realtime clock | With <= 30 s/month |
| Data backed up | Date and hour internal battery, 3 days |
| 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 <3280.84 ft (1000 m) expansion bus <98.43 Ft (30 m) power supply <328.08 Ft (100 m) embedded sensor PS <328.08 Ft (100 m) analog input <328.08 Ft (100 m) relay digital output <98.43 Ft (30 m) configurable analog output <3.28 Ft (1 m) PWM analog output <3280.84 Ft (1000 m) SL1 bus <3280.84 Ft (1000 m) SL2 bus <328.08 Ft (100 m) isolated digital input <328.08 Ft (100 m) no isolated digital input USB <9.84 ft (3 m) PC programming tool TTL <9.84 ft (3 m) PC programming tool <98.43 ft (30 m) supply for remote display |
| Display Type | Without Display |
| Local signalling | For PWR 1 LED (green) For RUN 1 LED (green) For alarm status 1 LED (red) For expansion bus 1 LED (red) For user 1 LED (red) |
| Mounting Support | 35 mm symmetrical DIN rail |

| | |
|-------------------|-------------------------------|
| Software Function | Applicatives functions blocks |
| Width | 9.88 in (251 mm) |
| Height | 5.09 in (129.19 mm) |
| Depth | 2.42 in (61.5 mm) |
| Net Weight | 1.59 lb(US) (0.723 kg) |

Environment

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|---------------------------------------|--------------------------------------------------------------------------------|
| Standards | EN/IEC 61000-6-3 EN/IEC 60730-1 EN/IEC 61000-6-1 |
| Product Certifications | UL 60730-1A CSA 60730-1 |
| Marking | CE |
| Ambient air temperature for operation | -4...131 °F (-20...55 °C) UL -4...149 °F (-20...65 °C) |
| Ambient Air Temperature for Storage | -22...158 °F (-30...70 °C) |
| Relative humidity | 5...95 % without condensation |
| IP degree of protection | IP20 Front face IP40 |
| Pollution degree | 2 |
| Overvoltage category | III |
| Operating altitude | 0...6561.68 ft (0...2000 m) |
| Storage altitude | 0.00...10000.00 ft (0...3048 m) |
| Vibration resistance | 3.5 mm constant amplitude 5...8.4 Hz) 1 gn constant amplitude 8.4...150 Hz) |
| Shock resistance | 15 gn 11 ms |

Ordering and shipping details

| | |
|-----------------------|------------------------------|
| Category | 22535 - M168 HVAC CONTROLLER |
| Discount Schedule | PC12 |
| GTIN | 3595864108995 |
| Nbr. of units in pkg. | 1 |
| Package weight(Lbs) | 25.08 oz (711 g) |
| Returnability | No |
| Country of origin | IT |

Packing Units

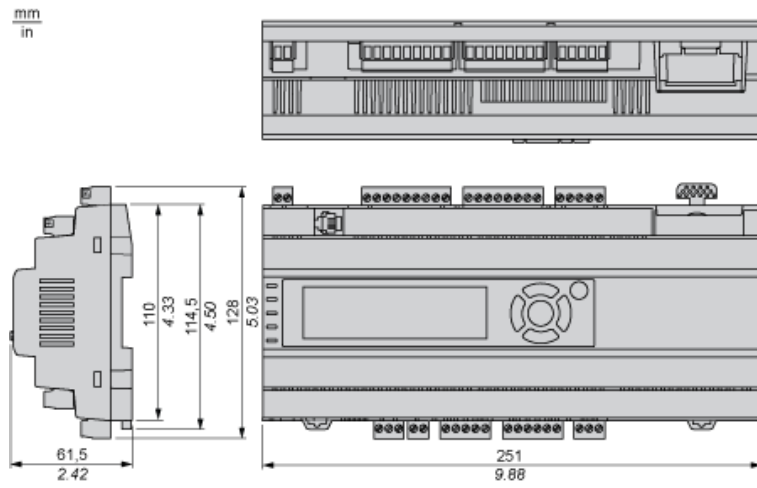
| | |
|------------------------|-------------------|
| Unit Type of Package 1 | PCE |
| Package 1 Height | 4.33 in (11 cm) |
| Package 1 width | 6.10 in (15.5 cm) |
| Package 1 Length | 10.24 in (26 cm) |

Contractual warranty

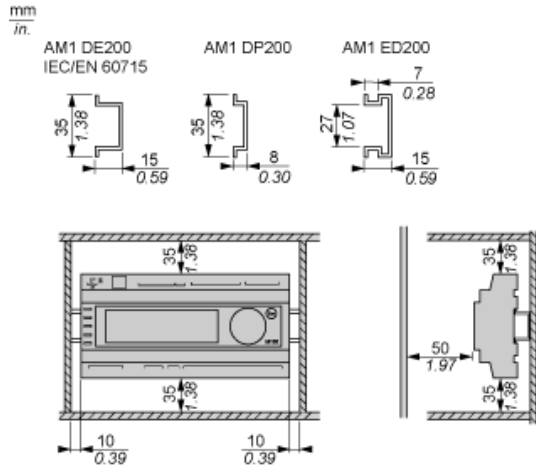
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|----------|-----------|
| Warranty | 18 months |
|----------|-----------|

Controller with Communication Slot

Dimensions

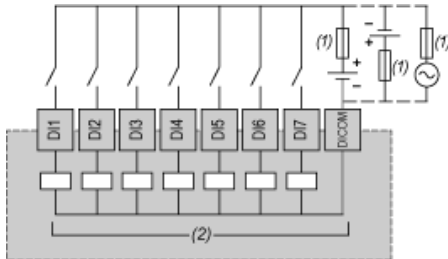


Mounting and Clearance



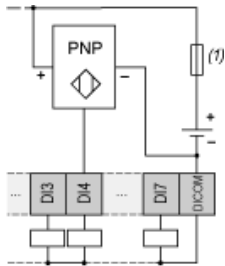
Digital Inputs

Sink/Source Inputs, External Power



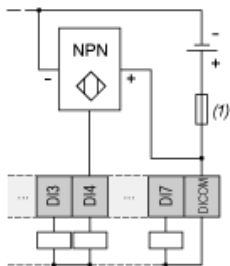
- (1) 0.5 A fast-blow fuse
- (2) Digital inputs

Connection Example for 3-wire PNP Active Switch



- (1) 0.5 A fast-blow fuse

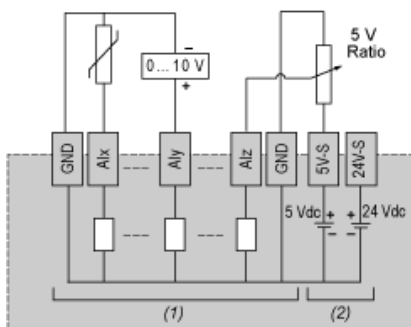
Connection Example for 3-wire NPN Active Switch



- (1) 0.5 A fast-blow fuse

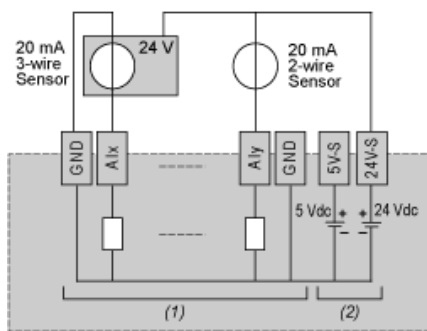
Analog Inputs

Voltage Mode



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

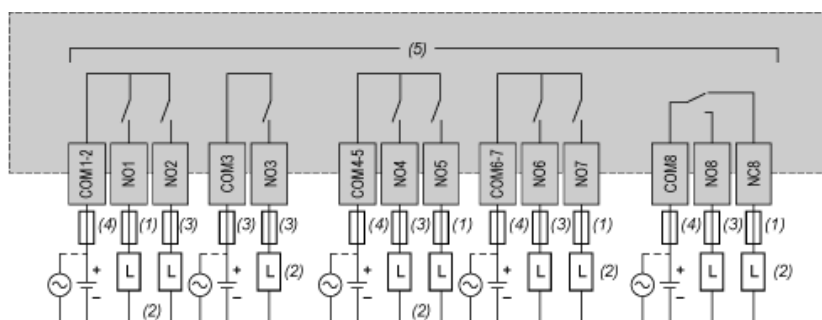
Current Mode



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

Digital Outputs

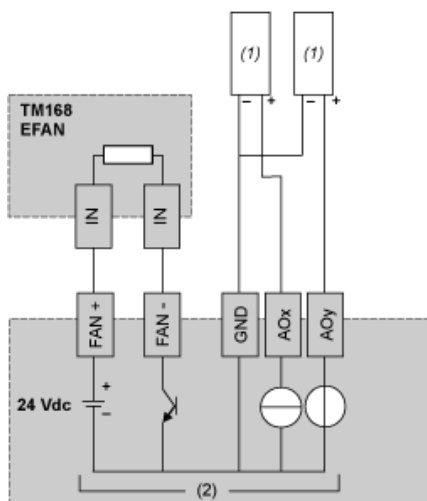
Wiring Diagram



- (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 in. |  |  |  |  |
|-----------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| 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.

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