

### Main

Range of product	Modicon M168 logic controller
Product or component type	Base controller
Product specific application	Air cooled chiller
Variant	Ready to use without PC
Communication port protocol	Modbus BACnet MS/TP (optional) BACnet IP (optional)
Input/output number	23
Input/output number	7 discrete input(s) 5 configurable analog input(s) 8 discrete output(s) 1 dedicated PWM output(s) 2 configurable analog output(s)

### 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
Input impedance	<= 10 kOhm discrete input(s)
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(s) 1 C/O discrete output(s)
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
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, L/R = 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, L/R = 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 0...10 V or 0...5 V ratio - resolution: 0.01 V Current 0...20 mA/4...20 mA - resolution: 0.01 mA Temperature probe -100...+200 °C - resolution: 0.5 °C - Pt 1000 probe

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Temperature probe -50...+120 °C - resolution: 0.1 °C - NTC probe  
 Temperature probe -50...+150 °C - resolution: 0.1 °C - PTC probe

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 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	24 V 20...40 V DC
Supply voltage limits	20.4...27.6 V
Network frequency	50/60 Hz
Network frequency limits	47...63 Hz
Immunity to microbreaks	10 ms
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 autonomy: 3 days)
Number of port	1 Modbus RJ45connector slave,transmission rate : 1.2...57.6 kbit/s 1 Modbus RJ45connector master/slave,transmission rate : 1.2...57.6 kbit/s 1 expansion bus terminal blockconnector master/slave
Electrical connection	1 removable screw terminal block (9 terminals) analog input (AI1 to AI5, GND, +5 V, 24 V) 1 removable screw terminal block (8 terminals) discrete input (DI1 to DI7, COM) 1 removable screw terminal block (2 terminals) fan output (FAN+, FAN-) 1 removable screw terminal block (5 terminals) expansion bus (+24 V, GND, CAN-, CAN+) 1 removable screw terminal block (2 terminals) power supply (L/+, N/-) 1 removable screw terminal block (5 terminals) discrete output (NO1 to NO3, COM 1-2, COM 3) 1 removable screw terminal block (6 terminals) discrete output (NO4 to NO7, COM 6-7, COM 4-5) 1 removable screw terminal block (3 terminals) discrete output (NO8, NC8, COM8) 1 removable screw terminal block (3 terminals) analog output (AO1, AO2, GND)
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 PWR 1 LED green RUN 1 LED red alarm status 1 LED red expansion bus 1 LED red user
Mounting support	35 mm symmetrical DIN rail

Width	9.88 in (251 mm)
Height	5.09 in (129.19 mm)
Depth	2.42 in (61.5 mm)
Product weight	1.74 lb(US) (0.79 kg)

## Environment

standards	EN/IEC 61000-6-3 EN/IEC 60730-1 EN/IEC 61000-6-1
product certifications	RoHS REACH UL 60730-1A CSA 60730-1
marking	CE
ambient air temperature for operation	14...140 °F (-10...60 °C) 14...131 °F (-10...55 °C) for UL conformance
ambient air temperature for storage	-22...158 °F (-30...70 °C)
relative humidity	5...95 % without condensation
IP degree of protection	IP20 IP40 on front face
pollution degree	2
overvoltage category	III
operating altitude	0...6561.68 ft (0...2000 m)
storage altitude	0...10000 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

## Offer Sustainability

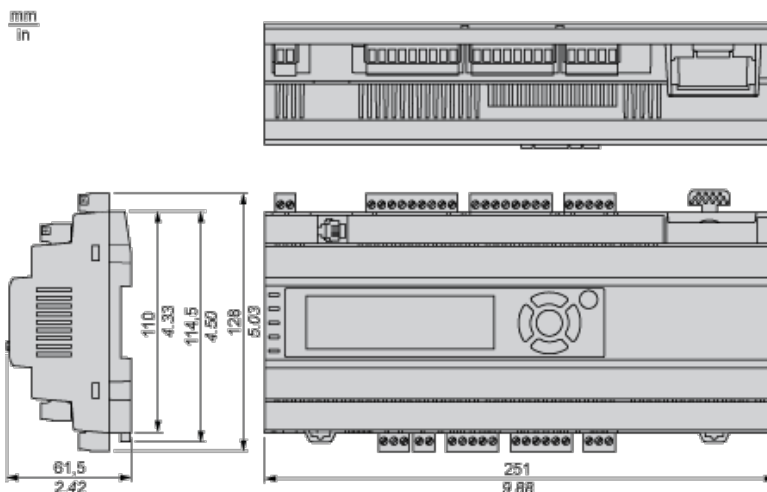
Green Premium product	Green Premium product
Compliant - since 1041 - Schneider Electric declaration of conformity	Compliant - since 1041 - Schneider Electric declaration of conformity
Reference not containing SVHC above the threshold	Reference not containing SVHC above the threshold
Available	Available
Available	Available

## Contractual warranty

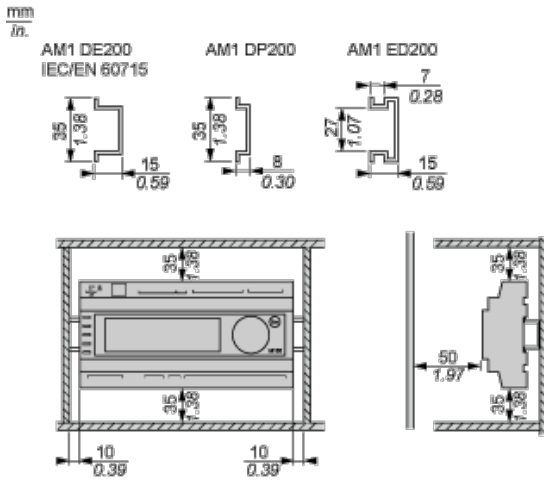
Warranty period	18 months
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## Controller with Communication Slot

### Dimensions

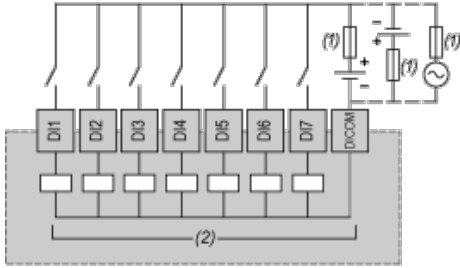


## Mounting and Clearance

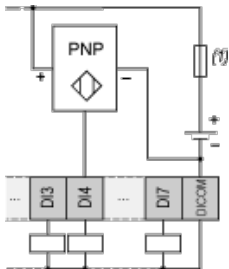


## Digital Inputs

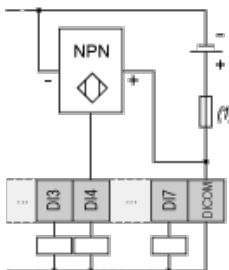
### Sink/Source Inputs, External Power



### Connection Example for 3-wire PNP Active Switch

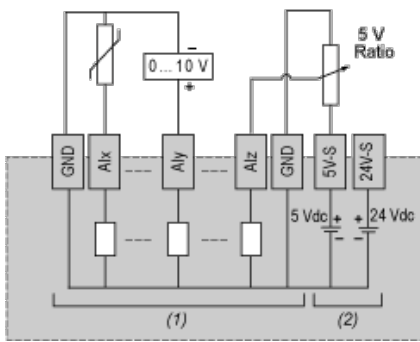


### Connection Example for 3-wire NPN Active Switch



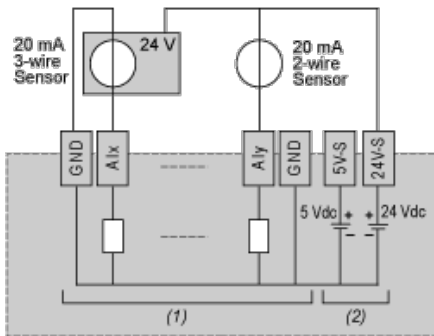
## Analog Inputs

### Voltage Mode



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

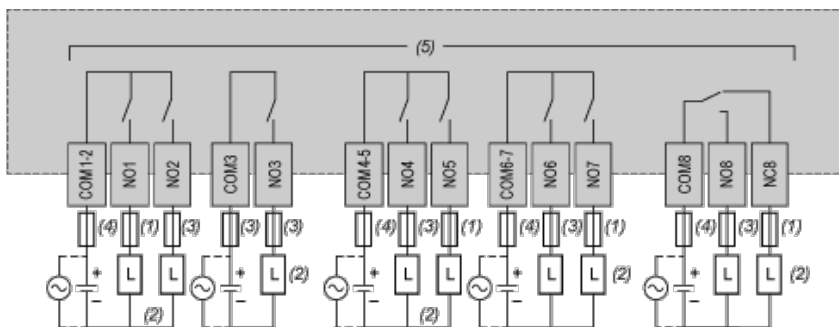
### Current Mode



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

## Digital Outputs

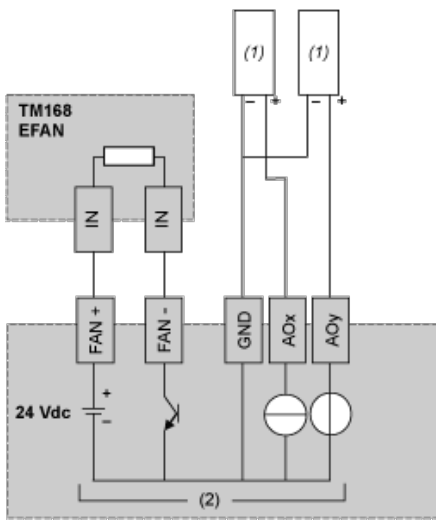
### Wiring Diagram



- (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 Ø				
mm <sup>2</sup>	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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- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
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## JONHON

«JONHON» (основан в 1970 г.)

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«FORSTAR» (основан в 1998 г.)

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