TM238LDA24DR
compact base M238 - 24 I/O - 100..240 V AC supply - internal RAM 500 kB

Main

Range of product	Modicon M238 logic controller
Product or component type	Compact base
Product specific application	-
Discrete I/O number	24
Discrete input number	8 fast input conforming to EN/IEC 61131-2 type 1 6 input conforming to EN/IEC 61131-2 type 1
Discrete input voltage	24 V
Discrete input voltage type	DC
Discrete output number	6 relay output 4 solid state output
Discrete output voltage	240 V AC relay output 24 V DC solid state output 24 V DC relay output
Number of I/O expansion module	7
[Us] rated supply voltage	100...240 V AC
Memory description	Internal RAM 500 kB
Data backed up	Variables of type retain and retain persistent optional battery lithium thionyl chloride (TSXPLP01) 1 year Variables of type retain and retain persistent internal battery 3 days 22 hrs 10 yr
Mounting support	35 mm symmetrical DIN rail Panel

Complementary

Discrete input logic	Sink or source (positive/negative) input Positive logic (sink) fast input
Number of common point	4 relay output 4 fast input 1 solid state output 1 input
Sensor power supply	19.2...30 V DC
Voltage state1 guaranteed	>= 15 V input/fast input
Current state 1 guaranteed	>= 2 mA input/fast input
Voltage state 0 guaranteed	<= 5 V input/fast input
Current state 0 guaranteed	<= 1.5 mA input/fast input
Discrete input current	8 mA fast input 10.4 mA input
Input impedance	3 kOhm fast input 2.3 kOhm input
Response time	300 ns fast input 3 ms input 0.25 ms solid state output
Configurable filtering time	4 ms fast input 2 ms fast input 1 ms fast input 0.4 ms fast input 0.004 ms fast input
Anti bounce filtering	4 ms configurable input/fast input 12 ms configurable input/fast input 1.5 ms configurable input/fast input 0 ms configurable input/fast input

Input frequency	<= 100 kHz input <= 100 kHz fast input (normal mode) <= 100 kHz fast input (counter mode)
Cable length	<= 30 m solid state output <= 30 m relay output <= 30 m input <= 30 m fast input (normal mode) <= 10 m shielded cable fast input (counter mode)
Isolation between channels and internal logic	500 V DC solid state output 500 V AC relay output
Isolation between channels	None input 500 V solid state output 500 V for group of 2 fast inputs
Discrete output logic	Positive logic (source)
Output voltage limits	30 V relay output 250 V relay output 19.2...30 V solid state output
Discrete output current	5 A relay output Q9 20...500 mA solid state output 2 A relay output Q4...Q8
Output frequency	<= 100 kHz solid state output
Leakage current	< 2 mA solid state output
[Ures] residual voltage	< 2 V solid state output
Tungsten load	< 3 W solid state output
Short-circuit protection	With solid state output
Overvoltage protection	With solid state output
Overload protection	With solid state output
Minimum load	10 mA 5 V DC relay output
Contact resistance	<= 50 µOhm
Load current	5 A 30 V DC inductive <= 1800 cyc/mn relay output Q9 5 A 240 V AC inductive <= 1800 cyc/mn relay output Q9 2 A 30 V DC resistive <= 600 cyc/mn relay output Q4...Q8 2 A 240 V AC resistive <= 600 cyc/mn relay output Q4...Q8
Mechanical durability	>= 20000000 cycles relay output
Electrical durability	>= 500000 cycles relay output Q9 >= 100000 cycles relay output Q4...Q8
Input/Output number	<= 248 HE-10 connector with I/O expansion module <= 192 spring terminal block with I/O expansion module <= 136 removable screw terminal block with I/O expansion module
Supply voltage limits	85...264 V
Inrush current	<= 35 A
Power consumption in W	<= 42 W 264 V <= 25 W 100 V
Insulation resistance	> 10 MOhm at 500 V, between supply and earth terminals > 10 MOhm at 500 V, between I/O and earth terminals
Exact time for 1 Kinstruction	0.3 ms 70 % Boolean + 30 % fixed arithmetic
Execution time per instruction	7.25 µs arithmetic REAL floating by operation 5111 µs arithmetic REAL floating +, -, x operations 0.971 µs Boolean 0.648 µs arithmetic REAL floating LD and ST 0.506 µs arithmetic DINT double-word +, -, x operations 0.459 µs arithmetic DINT double-word LD and ST 0.439 µs arithmetic INT word +, -, x operations 0.42 µs arithmetic INT word LD and ST
Exct time for event task	0.95 ms arithmetic DINT double-word >= 0.75 ms arithmetic INT word <= 1.75 ms arithmetic REAL floating
System overhead	0.9 ms master task (I/O) 0.35 ms master task (advanced counting) 0.2 ms master task (PTO) 0.15 ms master task (simple counting) 0.15 ms master task (PWM, frequency meter)
Input output assignment	Reading/Writing I/O on extension modules Reading/Writing I/O on base
Application structure	1 configurable freewheeling/cyclic master task 2 configurable freewheeling/cyclic/event auxiliary tasks 32 levels of priority between tasks 4 interrupt tasks

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Realtime clock	With 10 s/month at 25 °C
Integrated connection type	1 isolated serial link female RJ45 Modbus master/slave RTU/ASCII, character mode or SoMachine-Network RS232/RS485 1.2...115.2 kbit/s (115.2 kbit/s by default)
Supply	Serial link supply 5 V 200 mA
Positioning functions	HSC reflex 4 100 Hz
Counting input number	8 100 kHz 32 bits
Complementary function	Event processing PID
Marking	CE
Local signalling	1 LED SL1 1 LED PWR 1 LED per channel I/O state 1 LED module error (ERR) 1 LED Batt 1 LED RUN
Electrical connection	1 removable screw terminal block for connecting the 100-240 V AC power supply 1 removable screw terminal block (7 terminals) for connecting the sensors (inputs) 1 removable screw terminal block (6 terminals) for connecting the 4 preactuators (output) 1 removable screw terminal block (12 terminals) for connecting the sensors (fast inputs) 1 removable screw terminal block (10 terminals) for connecting the 6 preactuators (output) 1 connector mini B USB 2.0 for a programming terminal
Product weight	0.56 kg

Environment
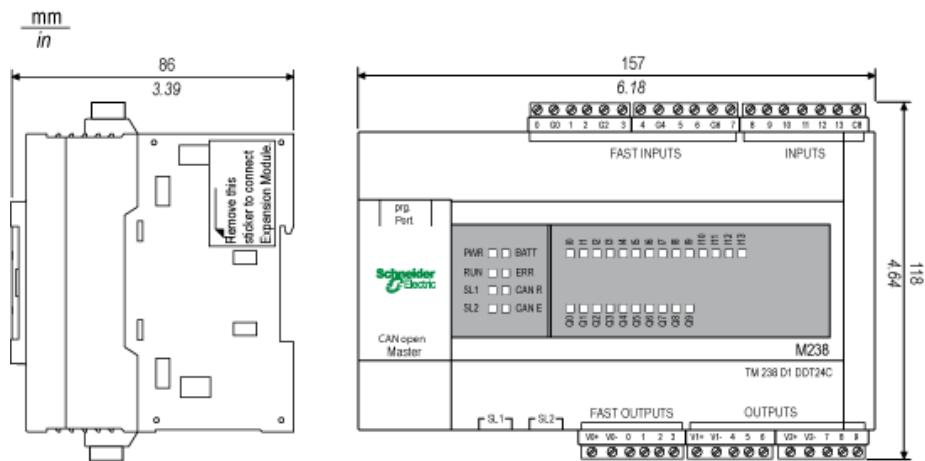
Immunity to microbreaks	10 ms
Dielectric strength	1500 V for 1 minute, between supply and earth terminals 1500 V for 1 minute, between I/O and earth terminals
Product certifications	CSA CTick GOST UL
Ambient air temperature for operation	-10...55 °C
Ambient air temperature for storage	-40...70 °C
Relative humidity	95 % without condensation
IP degree of protection	IP20
Pollution degree	<= 2
Operating altitude	0...2000 m
Storage altitude	0...3000 m
Vibration resistance	1 gn 3.5 mm (f= 5...150 Hz)
Shock resistance	15 gn for 11 ms
Height	118 mm
Depth	86 mm
Width	157 mm

Offer Sustainability
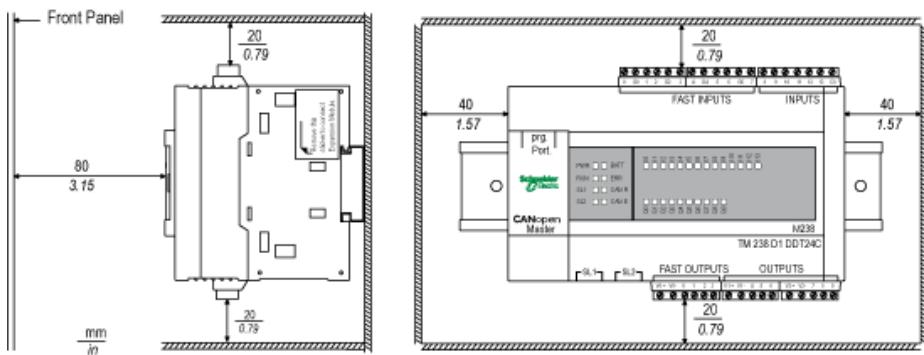
Sustainable offer status	Not Green Premium product

Modicon M238 Logic Controller

Dimensions

$\dfrac{mm}{in}$

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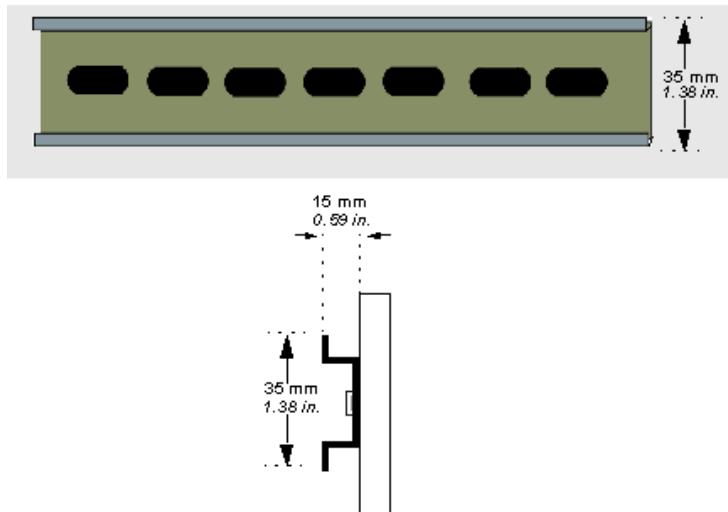
Clearance
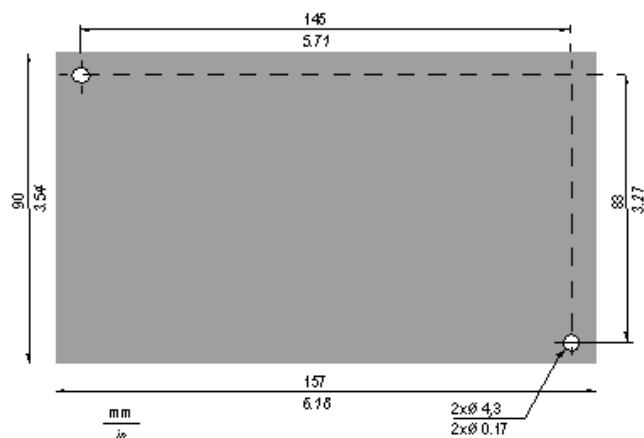
Mounting on a DIN Rail

Dimensions of the DIN Rail

35 mm
1.38 in.

15 mm
0.59 in.

35 mm
1.38 in.
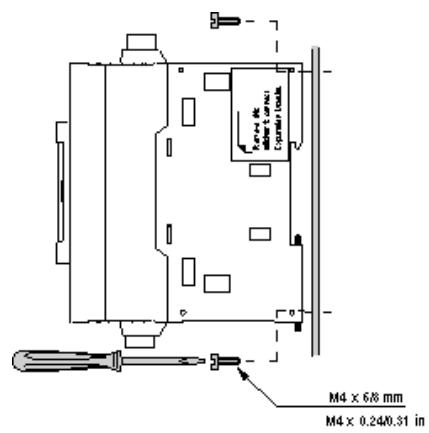
Mounting on a Metallic Panel

Mounting Holes

145
5.71

90
3.54

88
3.27

157
6.18

2x∅ 4,3
2x∅ 0.17

mm
in
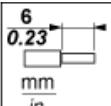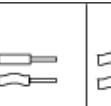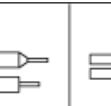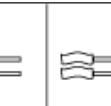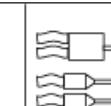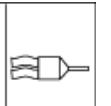
Mounting the Modicon M238 Logic Controller on a Metallic Panel

M4 x 6/8 mm
M4 x 0.24/0.31 in

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Electric

Wiring Requirements
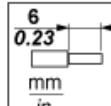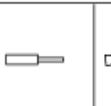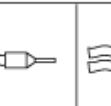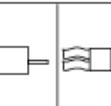
Rules for Removable Screw Terminal Block

mm / in						
mm²	0,2…1,5	0,25…1,5	0,2…1	0,2…1,5	0,25…1	0,5…1,5
AWG	24…14	24…14	26…16	24…14	24…16	20…14

Ø 3,5 mm (0.1 in)	C	N.m	0,6
		lb-in	5.3

Use copper conductors only.
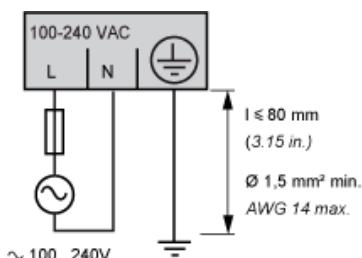
Rules for Removable Spring Terminal Block

mm / in.				
mm²	0,2…1,5	0,25…1,5	0,25…1	0,5…1,5
AWG	24…14	24…14	24…16	20…14

Use copper conductors only.

AC Power Supply

Wiring Diagram

100-240 VAC
L N

I ≤ 80 mm (3.15 in.)
Ø 1,5 mm² min.
AWG 14 max.

~ 100…240V
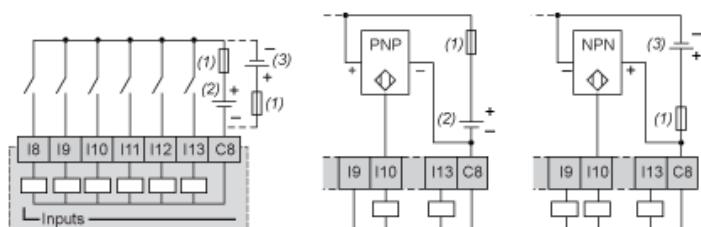
Use an external fuse 2 A type T (UL recognized and CSA approved).

Regular Inputs

Wiring Diagram

I8 I9 I10 I11 I12 I13 C8
Inputs

PNP   (1)
(2)
I9 I10   I13 C8

NPN   (3)
(1)
I9 I10   I13 C8
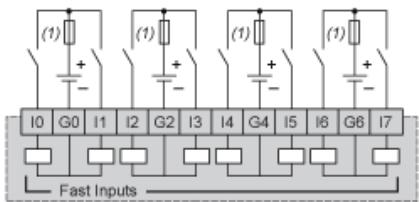
(1)   Fast-blow fuse 0.5 A
(2)   Sink input (positive logic)
(3)   Source input (negative logic)

Fast Inputs
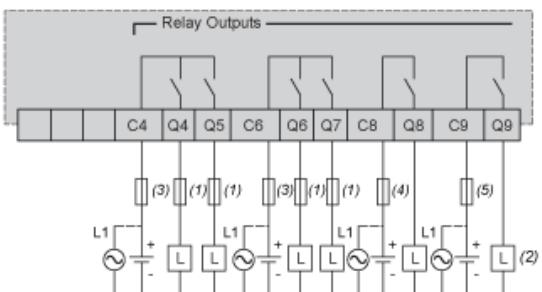
Wiring Diagram

(1)   Fast-blow fuse 0.5 A

Relay Outputs

### Wiring Diagram
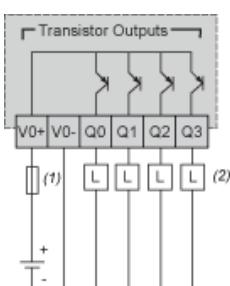
(1)   2 A fast-blow fuse
(2)   Load protected against inductive charge
(3)   4 A slow-blow fuse
(4)   2 A slow-blow fuse
(5)   5 A slow-blow fuse
L1   All relays use the same phase across relay groups for alternate current connections

Transistor Outputs
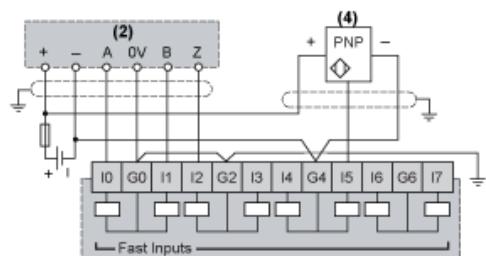
Wiring Diagram

(1)   2 A fast-blow fuse
(2)   Protection for inductive load

Wiring Diagram Examples for 1 Encoder on Fast Inputs
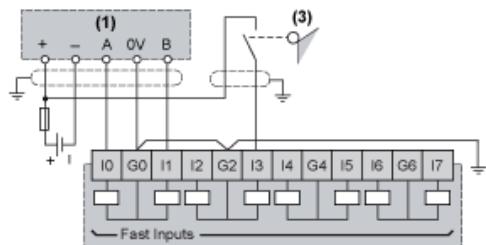
### Incremental Encoder with Phase-Shifted Signals with TDC and 3-Wire PNP Detector

(2)   Dual-phase encoder with index
(4)   PNP sensor

Use a 0.5 A fast-blow fuse.

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Incremental Encoder with Phase-Shifted Signals without TDC and Electromechanical Sensor
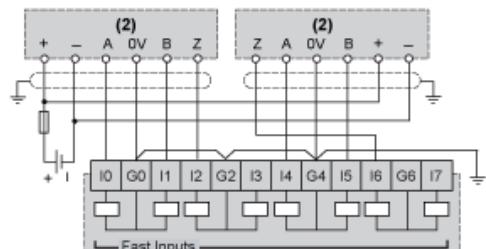

(1)   Dual-phase encoder without index
(3)   Limit switch

Use a 0.5 A fast-blow fuse.

## Wiring Diagram Examples for 2 Encoders on Fast Inputs
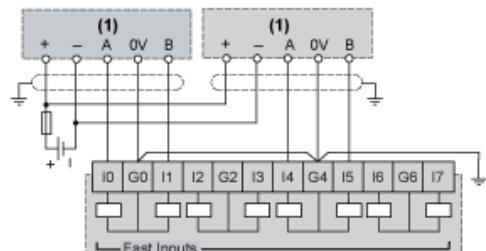
Incremental Encoders with Phase-Shifted Signals with TDC

(2)   Dual-phase encoder with index

Use a 0.5 A fast-blow fuse.

Incremental Encoders with Phase-Shifted Signals without TDC

(1)   Dual-phase encoder without index

Use a 0.5 A fast-blow fuse.