

TM238LFDC24DTS0

Compact base, Modicon M238 logic controller,
24 I/O, 24 V DC supply, CANOpen, RAM 1000
kB for solutions



Main

Range of Product	Modicon M238 logic controller
Product or Component Type	Compact base
Product Specific Application	For solutions
Software Function	Applicatives functions blocks
Discrete I/O number	24
Discrete input number	6 input EN/IEC 61131-2 type 1 8 fast input EN/IEC 61131-2 type 1
Discrete input voltage	24 V
Discrete input voltage type	DC
Discrete output number	4 fast output 6 output
Discrete output voltage	24 V DC
Maximum Number of I/O Expansion Module	7
[Us] rated supply voltage	24 V DC
Memory description	Internal RAM 1000 kB
Data backed up	Variables of type retain and retain persistent internal battery, 3 days 22 h 10 year(s) Variables of type retain and retain persistent optional battery lithium thionyl chloride (TSXPLP01), 1 year
Mounting Support	35 mm symmetrical DIN rail Panel

Complementary

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

Network frequency	<= 100 kHz fast input (counter mode) <= 100 kHz fast input (normal mode) <= 100 kHz input
Maximum cable distance between devices	Shielded cable <32.81 ft (10 m) fast input (counter mode) <98.43 Ft (30 m) fast input (normal mode) <98.43 Ft (30 m) input Shielded cable <98.43 ft (30 m) fast output (normal mode) <32.81 Ft (10 m) fast output (PWM or PTO mode) <98.43 ft (30 m) output
Isolation between channels and internal logic	500 V DC
Isolation between channels	500 V for group of 2 fast inputs 500 V for output and fast output None input
Discrete output logic	Positive logic (source)/negative logic (sink)
Output voltage limits	19.2...30 V
Discrete output current	<= 100 mA fast output (PTO mode) <= 100 mA fast output (PWM mode) <= 500 mA fast output (normal mode) 20...500 mA output
Maximum output frequency	100 KHz fast output (PTO mode) 100 KHz output 20 kHz fast output (PWM mode)
Absolute accuracy error	1 % of full scale cyclic ratio 20...80% fast output (PWM mode) 1 % of full scale fast output (PTO mode)
Maximum leakage current	2 MA fast output 0.05 mA output
[Ures] residual voltage	2 V output and fast output
Maximum tungsten load	<3 W output and fast output
Short-circuit protection	With output and fast output
Overvoltage protection	With output and fast output
Overload protection	With output and fast output
Maximum input/output number	136 removable screw terminal block with I/O expansion module 192 spring terminal block with I/O expansion module 248 HE-10 connector with I/O expansion module
Supply voltage limits	19.2...28.8 V
Inrush current	35 A
Maximum power consumption in W	17.2 W
Insulation resistance	> 10 MOhm at 500 V, between I/O and earth terminals > 10 MOhm at 500 V, between supply and earth terminals
Exact time for 1 Kinstruction	0.3 ms 70 % Boolean + 30 % fixed arithmetic)
Execution time per instruction	0.42 µs arithmetic INT word LD and ST 0.439 µs arithmetic INT word +, -, x operations 0.459 µs arithmetic DINT double-word LD and ST 0.506 µs arithmetic DINT double-word +, -, x operations 0.648 µs arithmetic REAL floating LD and ST 5111 µs arithmetic REAL floating +, -, x operations 7.25 µs arithmetic REAL floating by operation 0.971 µs Boolean
Exct time for event task	<= 1.75 ms arithmetic REAL floating >= 0.75 ms arithmetic INT word 0.95 ms arithmetic DINT double-word
System overhead	0.15 Ms master task (PWM, frequency meter) 0.15 Ms master task (simple counting) 0.2 Ms master task (PTO) 0.35 Ms master task (advanced counting) 0.9 ms master task (I/O)
Input output assignment	Reading/Writing I/O on base Reading/Writing I/O on CANopen bus Reading/writing I/O on extension modules
Application structure	4 interrupt tasks 1 configurable freewheeling/cyclic master task 32 levels of priority between tasks 2 configurable freewheeling/cyclic/event auxiliary tasks
Realtime clock	With 10 s/month 77 °F (25 °C)

Integrated connection type	1 isolated serial link female RJ45 Modbus master/slave RTU/ASCII or SoMachine-Network RS485 1.2...115.2 kbit/s (115.2 kbit/s by default) 1 isolated serial link female RJ45 Modbus master/slave RTU/ASCII, character mode or SoMachine-Network RS232/RS485 1.2...38.4 kbit/s (19.2 kbit/s by default) CANopen removable screw terminal block CANopen
Supply	Serial link supply 5 V, <200 mA
CANopen feature profile	DS 301 V4.02 DR 303-1
Transmission rate	1000 kbit/s 65.62 ft (20 m) CANopen 125 kbit/s 1640.42 ft (500 m) CANopen 250 kbit/s 820.21 ft (250 m) CANopen 425 kbit/s 410.10 ft (125 m) CANopen 50 kbit/s 3280.84 ft (1000 m) CANopen 500 kbit/s 328.08 ft (100 m) CANopen 800 kbit/s 164.04 ft (50 m) CANopen
Positioning functions	PWM/PTO 2 100 kHz
Counting input number	8 100 kHz 32 bits
Complementary function	PID Event processing
Marking	CE
Local signalling	For RUN 1 LED For Batt 1 LED For module error (ERR) 1 LED For I/O state 1 LED per channel For PWR 1 LED For SL1 1 LED For CAN ERR 1 LED For CAN RUN 1 LED For SL2 1 LED
Electrical connection	1 connector mini B USB 2.0 for a programming terminal 1 removable screw terminal block (12 terminals) for connecting the sensors (fast inputs) 1 removable screw terminal block (7 terminals) for connecting the sensors (inputs) 1 removable screw terminal block (10 terminals) for connecting the 4 preactuators (fast output) 1 removable screw terminal block (6 terminals) for connecting the 6 preactuators (output) 1 removable screw terminal block for connecting the 24 V DC power supply 1 removable screw terminal block (5 terminals) for connection to the CANopen bus
Net Weight	1.31 lb(US) (0.595 kg)

Environment

Immunity to microbreaks	10 ms
Dielectric strength	500 V for 1 minute, between I/O and earth terminals 500 V for 1 minute, between supply and earth terminals
Level or class	Class M20 - 16 CANopen
Product Certifications	CSA CTick GOST UL
Ambient air temperature for operation	14...131 °F (-10...55 °C)
Ambient Air Temperature for Storage	-40...158 °F (-40...70 °C)
Relative humidity	95 % without condensation
IP Degree of Protection	IP20
Pollution degree	<= 2
Operating altitude	0...6561.68 ft (0...2000 m)
Storage altitude	0.00...9842.52 ft (0...3000 m)
Vibration resistance	1 gn 3.5 mm 5...150 Hz)
Shock resistance	15 gn 11 ms
Height	4.65 in (118 mm)
Depth	3.39 in (86 mm)
Width	6.18 in (157 mm)

Ordering and shipping details

Category	22530 - M238 PLC & SOMACHINE SOFTWARE
Discount Schedule	PC12
GTIN	00785901646969
Nbr. of units in pkg.	1
Package weight(Lbs)	1.57 lb(US) (0.71 kg)
Returnability	No
Country of origin	ID

Packing Units

Package 1 Height	4.06 in (103.000 mm)
Package 1 width	5.20 in (132.000 mm)
Package 1 Length	8.66 in (220.000 mm)

Offer Sustainability

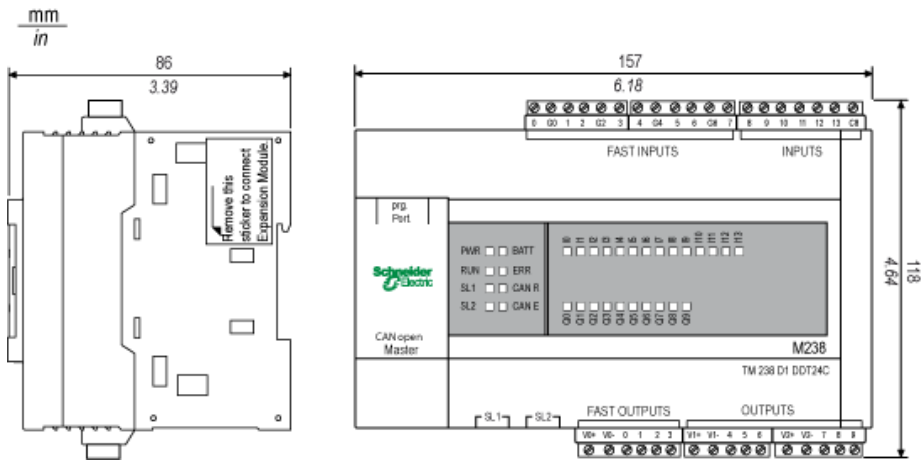
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds which is known to the State of California to cause Carcinogen & Reproductive harm. For more information go to www.p65warnings.ca.gov
EU RoHS Directive	Pro-active compliance (Product out of EU RoHS legal scope) EU RoHS Declaration
China RoHS Regulation	China RoHS Declaration
Environmental Disclosure	Product Environmental Profile
Circularity Profile	End Of Life Information
WEEE	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.
PVC free	Yes

Contractual warranty

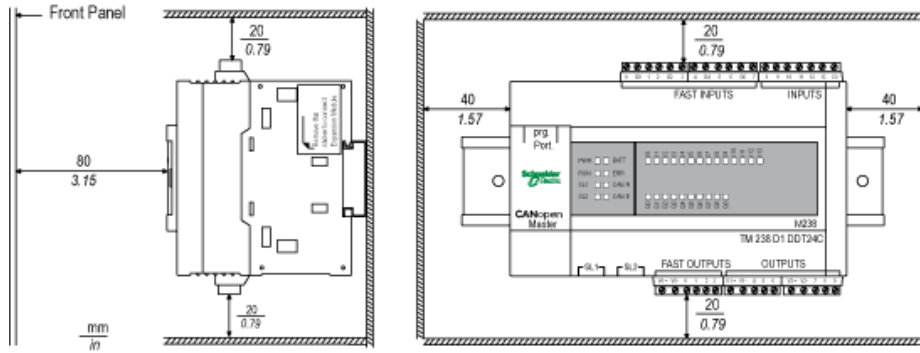
Warranty	18 months
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Modicon M238 Logic Controller

Dimensions

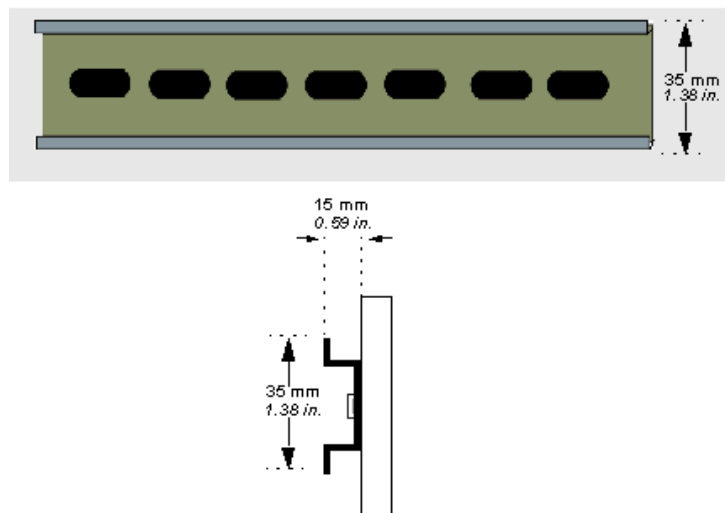


Clearance



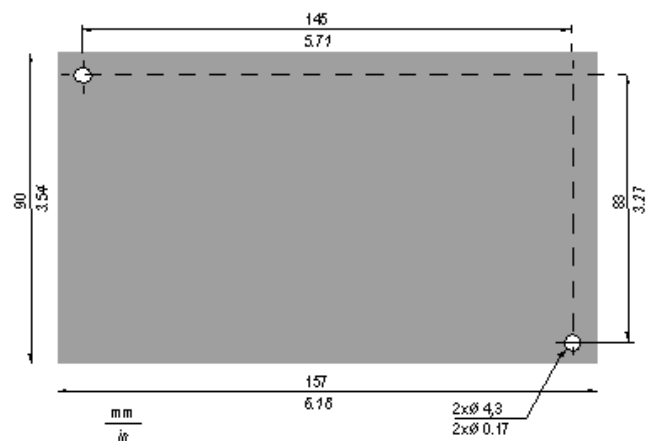
Mounting on a DIN Rail

Dimensions of the DIN Rail

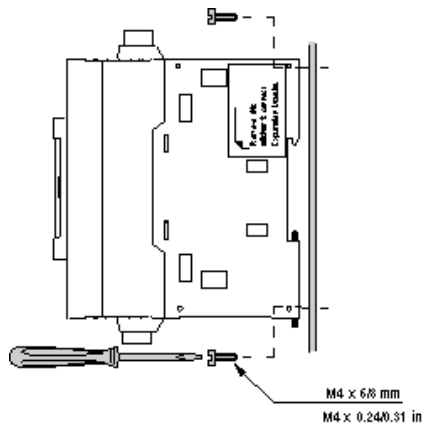


Mounting on a Metallic Panel

Mounting Holes

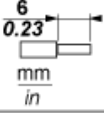

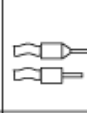



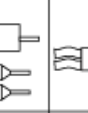


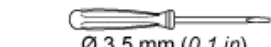

Mounting the Modicon M238 Logic Controller on a Metallic Panel



Wiring Requirements

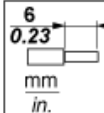
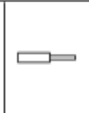
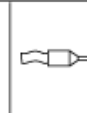

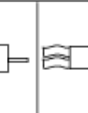
Rules for Removable Screw Terminal Block

 6 0.23 mm in.						
	mm ²	0,2...1,5	0,25...1,5	0,2...1	0,2...1,5	0,25...1
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.

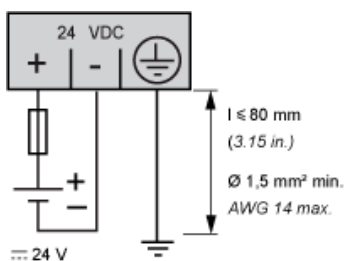
Rules for Removable Spring Terminal Block

 6 0.23 mm in.				
	mm ²	0,2...1,5	0,25...1,5	0,25...1
AWG	24...14	24...14	24...16	20...14

Use copper conductors only.

DC Power Supply

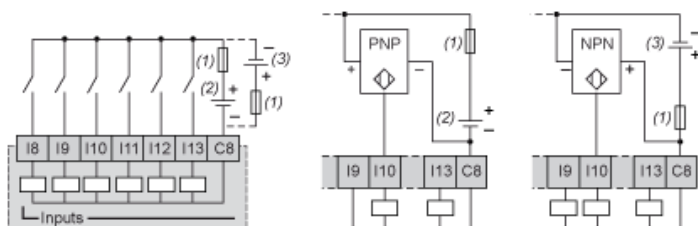
Wiring Diagram



Use an external fast-blow fuse 2 A type F (UL recognized and CSA approved).

Regular Inputs

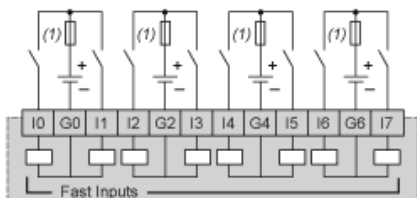
Wiring Diagram



- (1) Fast-blow fuse 0.5 A
- (2) Sink input (positive logic)
- (3) Source input (negative logic)

Fast Inputs

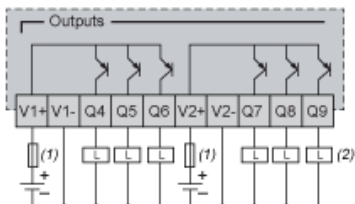
Wiring Diagram



- (1) Fast-blow fuse 0.5 A

Regular Outputs

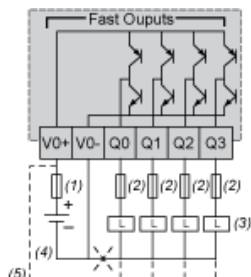
Wiring Diagram



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

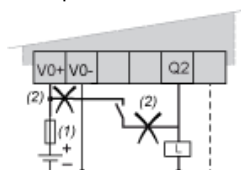
Fast Outputs

Wiring Diagram



- (1) 2 A fast-blow fuse
- (2) Fast-blow fuse: 0.5 A in standard use / 0.1 A in PTO use
- (3) Protection for inductive load
- (4) Positive logic output wiring
- (5) Negative logic output wiring

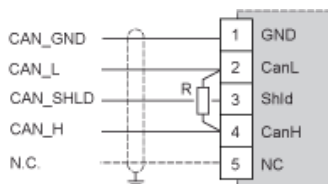
Example of an incorrect wiring on Q2:



- (1) 2 A fast-blow fuse
- (2) Incorrect wiring

CANopen Connection

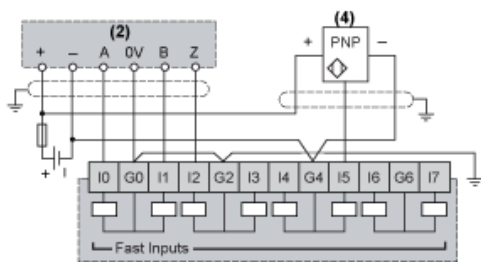
Wiring Diagram



R Line termination resistor (120 Ω)

Wiring Diagram Examples for 1 Encoder on Fast Inputs

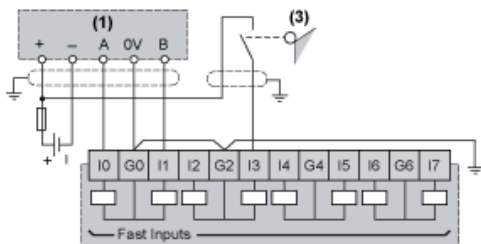
Incremental Encoder with Phase-Shifted Signals with TDC and 3-Wire PNP Detector



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

Use a 0.5 A fast-blow fuse.

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

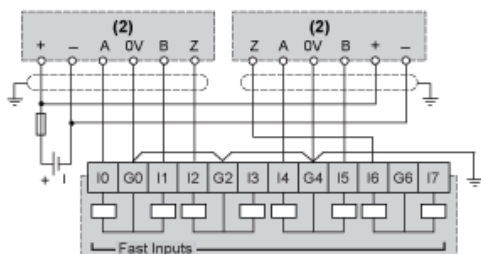


- (1) Dual-phase encoder without index
- (3) Limit switch

Use a 0.5 A fast-blow fuse.

Wiring Diagram Examples for 2 Encoders on Fast Inputs

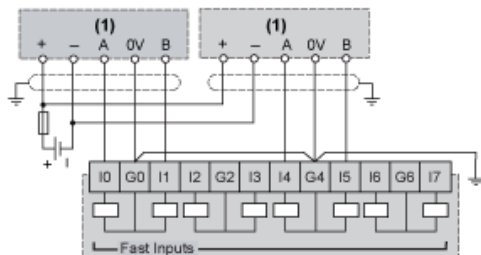
Incremental Encoders with Phase-Shifted Signals with TDC



- (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.

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