Product data sheet

Characteristics

TM241CEC24T
controller M241 24 IO transistor PNP Ethernet
CAN master

Main

Range of product
Modicon M241

Product or component type
Logic controller

[Us] rated supply voltage
24 V DC

Discrete input number
14, discrete input 8 fast input conforming to IEC 61131-2 Type 1

Discrete output type
Transistor

Discrete output number
10 transistor 4 fast output

Discrete output voltage
24 V DC for transistor output

Discrete output current
0.5 A for transistor output (Q0...Q9)
0.1 A for fast output (PTO mode) (Q0...Q3)

Complementary

Discrete I/O number
24

Maximum number of I/O expansion module
7 (local)
14 (remote)

Supply voltage limits
20.4…28.8 V

Inrush current
50 A

Power consumption in W
32.6…40.4 W (with max number of I/O expansion module)

Discrete input logic
Sink or source

Discrete input voltage
24 V

Discrete input voltage type
DC

Voltage state 1 guaranteed
>= 15 V for input

Voltage state 0 guaranteed
<= 5 V for input

Discrete input current
5 mA for input
10.7 mA for fast input

Input impedance
4.7 kOhm for input
2.81 kOhm for fast input

Response time
50 µs turn-on, I0...I13 terminal(s) for input
50 µs turn-off, I0...I13 terminal(s) for input
<= 2 µs turn-on, I0...I7 terminal(s) for fast input

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.
<table>
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<th>Feature</th>
<th>Details</th>
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</table>
| Configurable filtering time                  | <= 2 µs turn-off, I0...I7 terminal(s) for fast input  
|                                              | <= 34 µs turn-on, Q0...Q9 terminal(s) for output  
|                                              | <= 250 µs turn-off, Q0...Q9 terminal(s) for output  
|                                              | <= 2 µs turn-on, Q0...Q3 terminal(s) for fast output  
|                                              | <= 2 µs turn-off, Q0...Q3 terminal(s) for fast output                                                                                  |
| Discrete output logic                        | Positive logic (source)                                                                                                                                 |
| Output voltage limits                         | 30 V DC                                                                                                                                 |
| Maximum current per output common            | 2 A with Q0...Q3 for fast output  
|                                              | 2 A with Q4...Q7 for output  
|                                              | 1 A with Q8...Q9 for output                                                                                                                                 |
| Maximum output frequency                     | 20 kHz for fast output (PWM mode)  
|                                              | 100 kHz for fast output (PLS mode)  
|                                              | 1 kHz for output                                                                                                                        |
| Accuracy                                     | +/- 0.1 % at 0.02…0.1 kHz for fast output  
|                                              | +/- 1 % at 0.1…1 kHz for fast output                                                                                                                                 |
| Maximum leakage current                      | 5 µA for output                                                                                                                                 |
| Maximum voltage drop                         | <1 V                                                                                                                                 |
| Maximum tungsten load                        | <2.4 W                                                                                                                                 |
| Protection type                              | Short-circuit protection  
|                                              | Short-circuit and overload protection with automatic reset  
|                                              | Reverse polarity protection for fast output                                                                                                                                 |
| Reset time                                   | 10 ms automatic reset output  
|                                              | 12 s automatic reset fast output                                                                                                                                 |
| Memory capacity                              | 8 MB for program  
|                                              | 64 MB for system memory RAM                                                                                                                 |
| Data backed up                               | 128 MB built-in flash memory for backup of user programs                                                                                     |
| Data storage equipment                       | <= 16 GB SD card (optional)                                                                                                                                 |
| Battery type                                 | BR2032 lithium non-rechargeable, battery life: 4 year(s)                                                                                     |
| Backup time                                  | 2 years at 25 °C                                                                                                                                 |
| Execution time for 1 Kinstruction            | 0.3 ms for event and periodic task  
|                                              | 0.7 ms for other instruction                                                                                                                                 |
| Application structure                        | 8 external event tasks  
|                                              | 4 cyclic master tasks  
|                                              | 3 cyclic master tasks + 1 freewheeling task  
|                                              | 8 event tasks                                                                                                                                 |
| Realtime clock                               | With                                                                                                                                 |
| Clock drift                                  | <= 60 s/month at 25 °C                                                                                                                                 |
| Positioning functions                        | PTO function 4 channel(s) (positioning frequency: 100 kHz)                                                                                   |
|                                              | PTO function 4 channel(s) for transistor output (positioning frequency: 1 kHz)                                                               |
| Counting input number                        | 4 fast input (HSC mode) at 200 kHz  
|                                              | 14 standard input at 1 kHz                                                                                                                     |
| Control signal type                          | A/B at 100 kHz for fast input (HSC mode)  
|                                              | Pulse/direction at 200 kHz for fast input (HSC mode)                                                                                       |
|                                              | Single phase at 200 kHz for fast input (HSC mode)                                                                                           |
| Integrated connection type                   | Non isolated serial link serial 1 with RJ45 connector and RS232/RS485 interface  
|                                              | Non isolated serial link serial 2 with removable screw terminal block connector and RS485 interface                                            |
|                                              | USB port with mini B USB 2.0 connector  
|                                              | Ethernet with RJ45 connector  
|                                              | CANopen J1939 with male SUB-D 9 connector                                                                                                    |
| Supply                                       | (serial 1)serial link supply: 5 V, <200 mA                                                                                                   |
| Transmission rate                            | 1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 15 m for RS485  
|                                              | 1.2...115.2 kbit/s (115.2 kbit/s by default) for bus length of 3 m for RS232  
|                                              | 480 Mbit/s for bus length of 3 m for USB  
|                                              | 10/100 Mbit/s for Ethernet  
|                                              | 1000 kbit/s for bus length of 20 m for CANopen  
|                                              | 800 kbit/s for bus length of 40 m for CANopen  
|                                              | 500 kbit/s for bus length of 100 m for CANopen  
|                                              | 250 kbit/s for bus length of 250 m for CANopen  
|                                              | 125 kbit/s for bus length of 500 m for CANopen                                                                                               |
### Communication port protocol
- Non isolated serial link: Modbus master/slave

### Port Ethernet
- **10BASE-T/100BASE-TX** - 1 port(s) copper cable

### Ethernet services
- SNMP client/server
- Modbus TCP slave device
- Modbus TCP server
- Modbus TCP client
- IEC VAR ACCESS
- FTP client/server
- SQL client
- DHCP client
- Ethernet/IP adapter
- Send and receive email from the controller based on TCP/UDP library
- Web server (WebVisu & XWeb system)
- OPC UA server
- DNS client

### Local signalling
- 1 LED (green) **PWR**:
- 1 LED (green) **RUN**:
- 1 LED (red) **module error (ERR)**:
- 1 LED (red) **I/O error (I/O)**:
- 1 LED (green) **SD card access (SD)**:
- 1 LED (red) **BAT**:
- 1 LED (green) **SL1**:
- 1 LED (green) **SL2**:
- 1 LED (red) **bus fault on TM4 (TM4)**:
- 1 LED per channel (green) **I/O state**:
- 1 LED (green) **Ethernet port activity**:
- 1 LED (green) **CANopen run**:
- 1 LED (green) **CANopen error**:

### Electrical connection
- removable screw terminal block for inputs and outputs (pitch 5.08 mm)
- removable screw terminal block for connecting the 24 V DC power supply (pitch 5.08 mm)

### Maximum cable distance between devices
- Unshielded cable: <50 m for input
- Shielded cable: <10 m for fast input
- Unshielded cable: <50 m for output
- Shielded cable: <3 m for fast output

### Insulation
- Between supply and internal logic at 500 V AC
- Non-insulated between supply and ground
- Between input and internal logic at 500 V AC
- Non-insulated between inputs
- Between fast input and internal logic at 500 V AC
- Between output and internal logic at 500 V AC
- Non-insulated between outputs
- Between fast output and internal logic at 500 V AC

### Marking
- CE

### Surge withstand
- 1 kV power lines (DC) common mode conforming to EN/IEC 61000-4-5
- 1 kV shielded cable common mode conforming to EN/IEC 61000-4-5
- 0.5 kV power lines (DC) differential mode conforming to EN/IEC 61000-4-5
- 1 kV relay output differential mode conforming to EN/IEC 61000-4-5
- 1 kV input common mode conforming to EN/IEC 61000-4-5
- 1 kV transistor output common mode conforming to EN/IEC 61000-4-5

### Web services
- Web server
- Maximum number of connections
  - 16 Ethernet/IP device
  - 8 Modbus server

### CANopen feature profile
- DS 301 V4.02
- DR 303-1

### Number of slave
- 63 CANopen:

### Mounting support
- Top hat type TH35-15 rail conforming to IEC 60715
- Top hat type TH35-7.5 rail conforming to IEC 60715 plate or panel with fixing kit

### Height
- 90 mm

### Depth
- 95 mm

### Width
- 150 mm

### Net weight
- 0.53 kg
### Environment

**Standards**
- ANSI/ISA 12-12-01
- CSA C22.2 No 142
- CSA C22.2 No 213
- Marine specification (LR, ABS, DNV, GL)
- UL 1604
- UL 508

**Product certifications**
- IACS E10
- RCM
- CULus
- CSA

**Resistance to electrostatic discharge**
- 8 kV in air conforming to EN/IEC 61000-4-2
- 4 kV on contact conforming to EN/IEC 61000-4-2

**Resistance to electromagnetic fields**
- 10 V/m 80 MHz...1 GHz conforming to EN/IEC 61000-4-3
- 3 V/m 1.4 GHz...2 GHz conforming to EN/IEC 61000-4-3
- 1 V/m 2 GHz...3 GHz conforming to EN/IEC 61000-4-3

**Resistance to fast transients**
- 2 kV (power lines) conforming to EN/IEC 61000-4-4
- 1 kV (Ethernet line) conforming to EN/IEC 61000-4-4
- 1 kV (serial link) conforming to EN/IEC 61000-4-4
- 1 kV (input) conforming to EN/IEC 61000-4-4
- 1 kV (transistor output) conforming to EN/IEC 61000-4-4

**Resistance to conducted disturbances**
- 10 V 0.15...80 MHz conforming to EN/IEC 61000-4-6
- 3 V 0.1...80 MHz conforming to Marine specification (LR, ABS, DNV, GL)
- 10 V spot frequency (2, 3, 4, 6.2, 8.2, 12.6, 16.5, 18.8, 22, 25 MHz) conforming to Marine specification (LR, ABS, DNV, GL)

**Electromagnetic emission**
- Conducted emissions - test level: 120...69 dBμV/m QP (power lines) at 10...150 kHz conforming to EN/IEC 55011
- Conducted emissions - test level: 63 dBμV/m QP (power lines) at 1.5...30 MHz conforming to EN/IEC 55011
- Radiated emissions - test level: 40 dBμV/m QP class A at 30...230 MHz conforming to EN/IEC 55011
- Conducted emissions - test level: 79...63 dBμV/m QP (power lines) at 150...1500 kHz conforming to EN/IEC 55011
- Radiated emissions - test level: 47 dBμV/m QP class A at 230...1000 MHz conforming to EN/IEC 55011

**Immunity to microbreaks**
- 10 ms

**Ambient air temperature for operation**
- -10...50 °C (vertical installation)
- -10...55 °C (horizontal installation)

**Ambient air temperature for storage**
- -25...70 °C

**Relative humidity**
- 10...95 %, without condensation (in operation)
- 10...95 %, without condensation (in storage)

**IP degree of protection**
- IP20 with protective cover in place

**Pollution degree**
- 2

**Operating altitude**
- 0...2000 m

**Storage altitude**
- 0...3000 m

**Vibration resistance**
- 3.5 mm at 5...8.4 Hz on symmetrical rail
- 3 gn at 8.4...150 Hz on symmetrical rail
- 3.5 mm at 5...8.4 Hz on panel mounting
- 3 gn at 8.4...150 Hz on panel mounting

**Shock resistance**
- 15 gn for 11 ms

### Offer Sustainability

**Sustainable offer status**
- Green Premium product

**REACH Regulation**
- REACH Declaration

**EU RoHS Directive**
- Pro-active compliance (Product out of EU RoHS legal scope)
- EU RoHS Declaration

**Mercury free**
- Yes

**RoHS exemption information**
- Yes

**China RoHS Regulation**
- China RoHS declaration

**Environmental Disclosure**
- Product Environmental Profile

**Circularity Profile**
- End of Life Information
<table>
<thead>
<tr>
<th>WEEE</th>
<th>The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins</th>
</tr>
</thead>
<tbody>
<tr>
<td>PVC free</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Dimensions
Mounting Position

Acceptable Mounting

NOTE: Expansion modules must be mounted above the logic controller.

Incorrect Mounting
Direct Mounting On a Panel Surface

Mounting Hole Layout

M4 x 0.5 mm  
0.24 x 0.31 in
Digital Inputs

Wiring Diagram

(*) : Type T fuse
(1) : The COM0, COM1 and COM2 terminals are not connected internally
(A) : Sink wiring (positive logic)
(B) : Source wiring (negative logic)

Fast Input Wiring (I0...I7)
Fast Transistor Outputs

Wiring Diagram

(*) : 2 A fast-blow fuse
Transistor Outputs

Wiring Diagram

(*) : Type T fuse
(1) : The V1+ and V2+ terminals are not connected internally.
(2) : The V1– and V2– terminals are not connected internally.
USB Mini-B Connection
Ethernet Connection to a PC
## CANopen Connection

### Wiring Diagram

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Description</th>
<th>Marking</th>
<th>Color of Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not used</td>
<td>Reserved</td>
<td>NC</td>
<td>red</td>
</tr>
<tr>
<td>2</td>
<td>CAN_H</td>
<td>CAN_H bus line (dominant high)</td>
<td>CAN_H</td>
<td>white</td>
</tr>
<tr>
<td>3</td>
<td>CAN_SHLD</td>
<td>Optional CAN shield</td>
<td>Shield</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>CAN_L</td>
<td>CAN_L bus line (dominant low)</td>
<td>CAN_L</td>
<td>blue</td>
</tr>
<tr>
<td>5</td>
<td>CAN_GND</td>
<td>CAN Ground</td>
<td>GND</td>
<td>black</td>
</tr>
</tbody>
</table>