chanhvinh.com

Product data sheet
Characteristics

TM221C40R
controller M221 40 IO relay



Main

Range of product	Modicon M221
Product or component type	Logic controller
[Us] rated supply voltage	100...240 V AC
Discrete input number	24, discrete input IEC 61131-2 Type 1
Analogue input number	2 0...10 V
Discrete output type	Relay normally open
Discrete output number	16 relay
Discrete output voltage	5...125 V DC 5...250 V AC
Discrete output current	2 A

Complementary

Discrete I/O number	40
Maximum number of I/O expansion module	7 relay output
Supply voltage limits	85…264 V
Network frequency	50/60 Hz
Inrush current	40 A
Maximum power consumption in VA	67 VA 100...240 V with max number of I/O expansion module 37 VA 100...240 V without I/O expansion module
Power supply output current	0.52 A 5 V expansion bus 0.24 A 24 V expansion bus
Discrete input logic	Sink or source (positive/negative)
Discrete input voltage	24 V
Discrete input voltage type	DC
Analogue input resolution	10 bits
LSB value	10 mV
Conversion time	1 ms per channel + 1 controller cycle time analog input
Permitted overload on inputs	+/- 30 V DC 5 min maximum)analog input +/- 13 V DC permanent)analog input
Voltage state 1 guaranteed	>= 15 V input
Voltage state 0 guaranteed	<= 5 V input
Discrete input current	7 MA discrete input 5 mA fast input
Input impedance	3.4 kOhm discrete input 100 kOhm analog input 4.9 kOhm fast input
Response time	35 µs turn-off, I2...I5 input 10 ms turn-on output 10 ms turn-off output 5 µs turn-on, I0, I1, I6, I7 fast input 35 µs turn-on, other terminals input 5 µs turn-off, I0, I1, I6, I7 fast input 100 µs turn-off, other terminals input
Configurable filtering time	0 ms input 3 ms input 12 ms input
Output voltage limits	125 V DC 277 V AC
Maximum current per output common	7 A
Absolute accuracy error	+/- 1 % of full scale analog input

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein.
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.
It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof.
Neither Schneider Electric Industries SAS nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein.

chanhvinh.com

Electrical durability	100000 Cycles AC-12, 120 V, 240 VA, resistive 100000 Cycles AC-12, 240 V, 480 VA, resistive 300000 Cycles AC-12, 120 V, 80 VA, resistive 300000 Cycles AC-12, 240 V, 160 VA, resistive 100000 Cycles AC-15, cos phi = 0.35, 120 V, 60 VA, inductive 100000 Cycles AC-15, cos phi = 0.35, 240 V, 120 VA, inductive 300000 Cycles AC-15, cos phi = 0.35, 120 V, 18 VA, inductive 300000 Cycles AC-15, cos phi = 0.35, 240 V, 36 VA, inductive 100000 Cycles AC-14, cos phi = 0.7, 120 V, 120 VA, inductive 100000 Cycles AC-14, cos phi = 0.7, 240 V, 240 VA, inductive 300000 Cycles AC-14, cos phi = 0.7, 120 V, 36 VA, inductive 300000 Cycles AC-14, cos phi = 0.7, 240 V, 72 VA, inductive 100000 Cycles DC-12, 24 V, 48 W, resistive 300000 Cycles DC-12, 24 V, 16 W, resistive 100000 Cycles DC-13, 24 V, 24 W, inductive (L/R = 7 ms) 300000 cycles DC-13, 24 V, 7.2 W, inductive (L/R = 7 ms)
Switching frequency	20 switching operations/minute with maximum load
Mechanical durability	20000000 cycles relay output
Minimum load	1 mA 5 V DC relay output
Protection type	Without protection 5 A
Reset time	1 s
Memory capacity	256 kB user application and data RAM 10000 instructions 256 kB internal variables RAM
Data backed up	256 kB built-in flash memory backup of application and data
Data storage equipment	2 GB SD card optional)
Battery type	BR2032 lithium non-rechargeable 4 year(s)
Backup time	1 year 77 °F (25 °C) by interruption of power supply)
Execution time for 1 KInstruction	0.3 ms event and periodic task
Execution time per instruction	0.2 µs Boolean
Exct time for event task	60 µs response time
Maximum size of object areas	512 %M memory bits 512 %KW constant words 8000 %MW memory words 255 %C counters 255 %TM timers
Realtime clock	With
Clock drift	<= 30 s/month 77 °F (25 °C)
Regulation loop	Adjustable PID regulator up to 14 simultaneous loops
Counting input number	4 fast input (HSC mode) 100 kHz 32 bits
Counter function	Single phase Pulse/Direction A/B
Integrated connection type	USB port mini B USB 2.0 Non isolated serial link serial 1 RJ45 RS485 Non isolated serial link serial 2 RJ45 RS232/RS485
Supply	Serial)serial link supply 5 V, <200 mA
Transmission rate	1.2...115.2 kbit/s (115.2 kbit/s by default) 49.21 ft (15 m) RS485 1.2...115.2 kbit/s (115.2 kbit/s by default) 9.84 ft (3 m) RS232 480 Mbit/s USB
Communication port protocol	USB port USB - SoMachine-Network Non isolated serial link Modbus master/slave - RTU/ASCII or SoMachine-Network
Local signalling	1 LED (green) for PWR RUN 1 LED green) Module error (ERR) 1 LED red) SD card access (SD) 1 LED green) BAT 1 LED red) SL1 1 LED green) SL2 1 LED green) 1 LED per channel (green) for I/O state
Electrical connection	Removable screw terminal block for inputs Removable screw terminal block for outputs Terminal block, 3 for connecting the 24 V DC power supply Connector, 4 for analogue inputs Mini B USB 2.0 connector for a programming terminal
Maximum cable distance between devices	Shielded cable <32.81 ft (10 m) fast input Unshielded cable <98.43 ft (30 m) output Unshielded cable <98.43 ft (30 m) digital input Unshielded cable <3.28 ft (1 m) analog input

Life Is On Schneider Electric

chanhvinh.com

Insulation	Between input and internal logic at 500 V AC Non-insulated between analogue input and internal logic Non-insulated between analogue inputs Between supply and ground 1500 V AC Between sensor power supply and ground 500 V AC Between input and ground 500 V AC Between output and ground 1500 V AC Between supply and internal logic 2300 V AC Between sensor power supply and internal logic 500 V AC Between output and internal logic 2300 V AC Between Ethernet terminal and internal logic 500 V AC Between supply and sensor power supply 2300 V AC
Marking	CE
Sensor power supply	24 V DC 250 mA supplied by the controller
Mounting support	Top hat type TH35-15 rail IEC 60715 Top hat type TH35-7.5 rail IEC 60715 Plate or panel with fixing kit
Height	3.54 in (90 mm)
Depth	2.76 in (70 mm)
Maximum Width	6.30 in (160 mm)
Net Weight	1.01 lb(US) (0.456 kg)

Environment

Standards	EN/IEC 61131-2 EN/IEC 60664-1 EN/IEC 61010-2-201
Product certifications	RCM IACS E10 LR CSA CULus DNV-GL ABS EAC
Environmental characteristic	Ordinary and hazardous location
Resistance to electrostatic discharge	8 KV in air EN/IEC 61000-4-2 4 kV on contact EN/IEC 61000-4-2
Resistance to electromagnetic fields	9.14 V/M (10 V/m) 80 MHz...1 GHz EN/IEC 61000-4-3 2.74 V/M (3 V/m) 1.4 GHz...2 GHz EN/IEC 61000-4-3 0.91 V/m (1 V/m) 2...2.7 GHz EN/IEC 61000-4-3
Resistance to magnetic fields	30 A/m 50/60 Hz conforming to EN/IEC 61000-4-8
Resistance to fast transients	2 KV EN/IEC 61000-4-4 power lines) 2 KV EN/IEC 61000-4-4 relay output) 1 KV EN/IEC 61000-4-4 I/O) 1 KV EN/IEC 61000-4-4 Ethernet line) 1 kV EN/IEC 61000-4-4 serial link)
Surge withstand	2 KV power lines (AC) common mode EN/IEC 61000-4-5 2 KV relay output common mode EN/IEC 61000-4-5 1 KV I/O common mode EN/IEC 61000-4-5 1 KV shielded cable common mode EN/IEC 61000-4-5 0.5 KV power lines (DC) differential mode EN/IEC 61000-4-5 1 KV power lines (AC) differential mode EN/IEC 61000-4-5 1 KV relay output differential mode EN/IEC 61000-4-5 0.5 kV power lines (DC) common mode EN/IEC 61000-4-5
Resistance to conducted disturbances	10 V 0.15...80 MHz EN/IEC 61000-4-6 3 V 0.1...80 MHz 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) Marine specification (LR, ABS, DNV, GL)
Electromagnetic emission	Conducted emissions 79 dBµV/m QP/66 dBµV/m AV power lines (AC))0.15…0.5 MHz EN/IEC 55011 Conducted emissions 73 dBµV/m QP/60 dBµV/m AV power lines (AC))0.5…300 MHz EN/IEC 55011 Conducted emissions 120...69 dBµV/m QP power lines)10…150 kHz EN/IEC 55011 Conducted emissions 63 dBµV/m QP power lines)1.5…30 MHz EN/IEC 55011 Radiated emissions 40 dBµV/m QP class A 10 m)30…230 MHz EN/IEC 55011 Conducted emissions 79...63 dBµV/m QP power lines)150…1500 kHz EN/IEC 55011 Radiated emissions 47 dBµV/m QP class A 10 m)200…1000 MHz EN/IEC 55011
Immunity to microbreaks	10 ms

Ambient air temperature for operation	14…131 °F (-10…55 °C) horizontal installation) 14…95 °F (-10…35 °C) vertical installation)
Ambient air temperature for storage	-13…158 °F (-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...6561.68 ft (0...2000 m)
Storage altitude	0.00…9842.52 ft (0…3000 m)
Vibration resistance	3.5 mm 5…8.4 Hz symmetrical rail 3.5 mm 5…8.4 Hz panel mounting 1 gn 8.4…150 Hz symmetrical rail 1 gn 8.4…150 Hz panel mounting
Shock resistance	98 m/s² 11 ms

Ordering and shipping details

Category	22533 - M2XX PLC & ACCESSORIES
Discount Schedule	MSX
GTIN	00785901126348
Nbr. of units in pkg.	1
Package weight(Lbs)	1.88 lb(US) (0.85 kg)
Returnability	Yes
Country of origin	TW

Packing Units

Package 1 Height	4.17 in (106.000 mm)
Package 1 width	5.47 in (139.000 mm)
Package 1 Length	8.19 in (208.000 mm)

Offer Sustainability

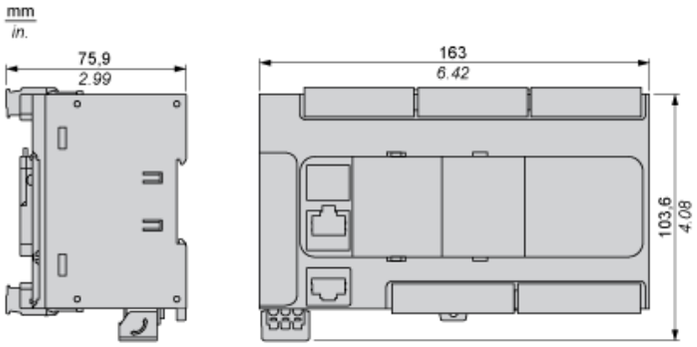
Sustainable offer status	Green Premium product
California proposition 65	WARNING: This product can expose you to chemicals including: Lead and lead compounds, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov
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
WEEE	The product must be disposed on European Union markets following specific waste collection and never end up in rubbish bins.
PVC free	Yes

chanhvinh.com

Product data sheet TM221C40R

Dimensions Drawings

Dimensions

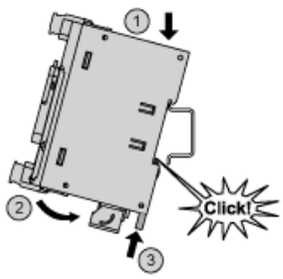


chanhvinh.com

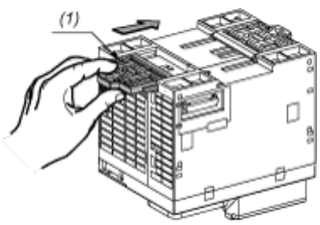
Product data sheet
Mounting and Clearance

TM221C40R

Mounting on a Rail

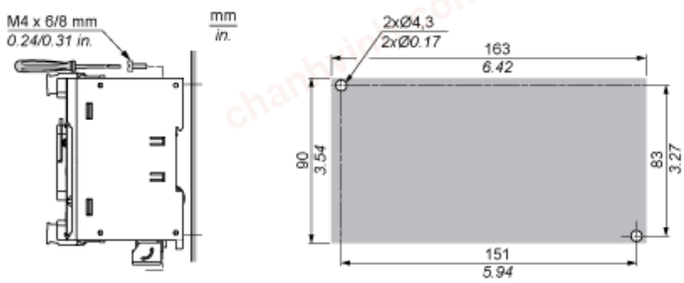


Direct Mounting on a Panel Surface



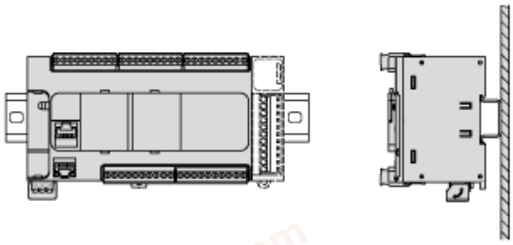
(1) Install a mounting strip

Mounting Hole Layout



Mounting

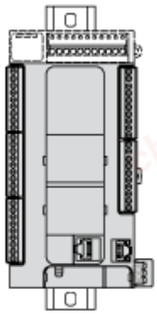
Correct Mounting Position



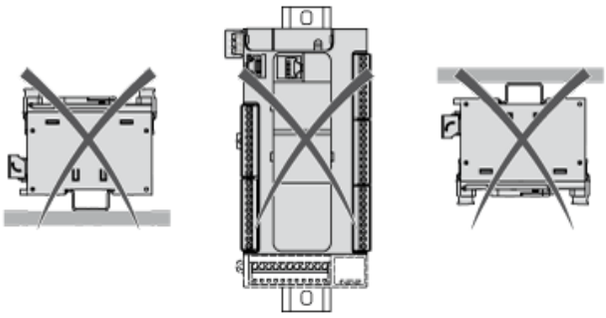
Life Is On Schneider Electric

chanhvinh.com

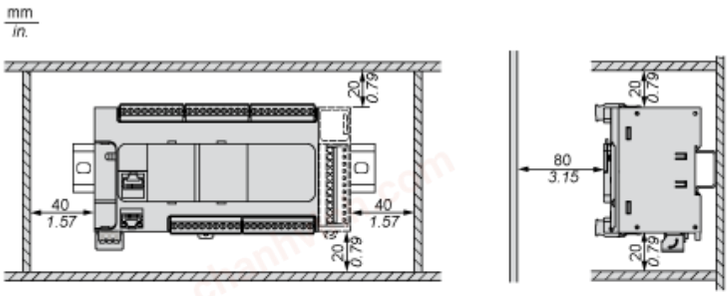
Acceptable Mounting Position



Incorrect Mounting Position



Clearance



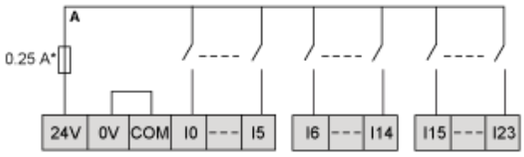
chanhvinh.com

Product data sheet
Connections and Schema

TM221C40R

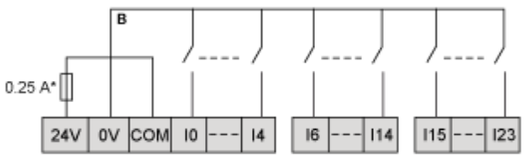
Digital Inputs

Wiring Diagram (Positive Logic)



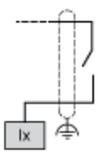
(*) Type T fuse

Wiring Diagram (Negative Logic)



(*) Type T fuse

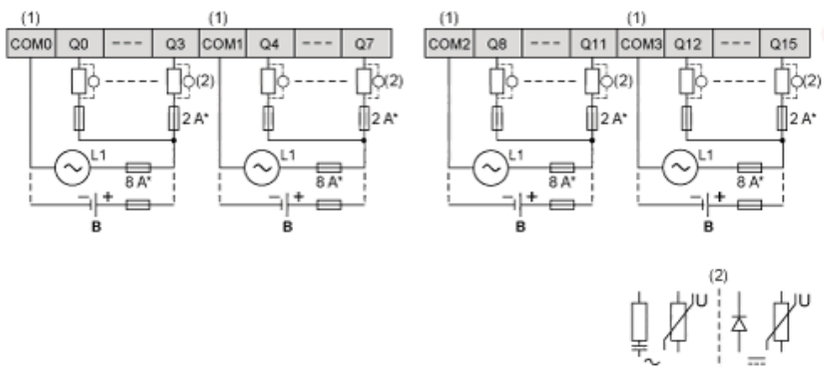
Connection of the Fast Inputs



I0, I1, I6, I7

Relay Outputs

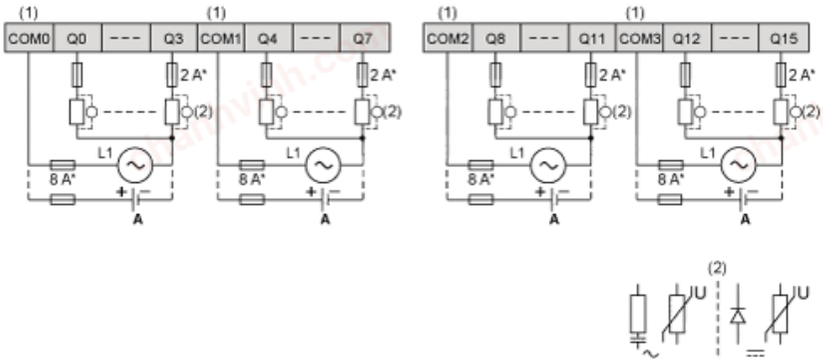
Negative Logic (Sink)



(*) Type T fuse
(1) The COM0, COM1, COM2 and COM3 terminals are not connected internally.
(2) To improve the life time of the contacts, and to protect from potential inductive load damage, you must connect a free wheeling diode in parallel to each inductive DC load or an RC snubber in parallel of each inductive AC load
B Sink wiring (negative logic)

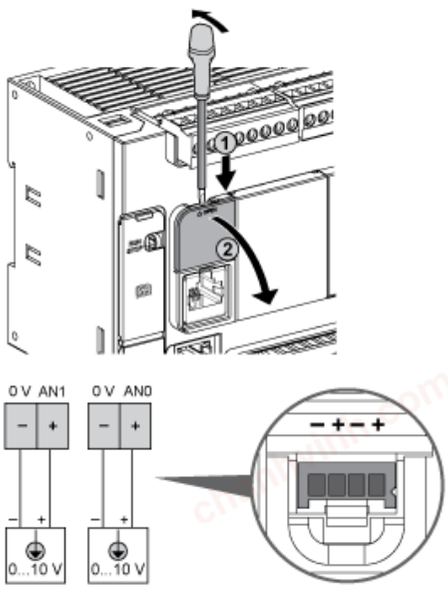
Life Is On Schneider Electric

Positive Logic (Source)



(*) Type T fuse
(1) The COM0, COM1, COM2 and COM3 terminals are not connected internally.
(2) To improve the life time of the contacts, and to protect from potential inductive load damage, you must connect a free wheeling diode in parallel to each inductive DC load or an RC snubber in parallel of each inductive AC load
A Source wiring (positive logic)

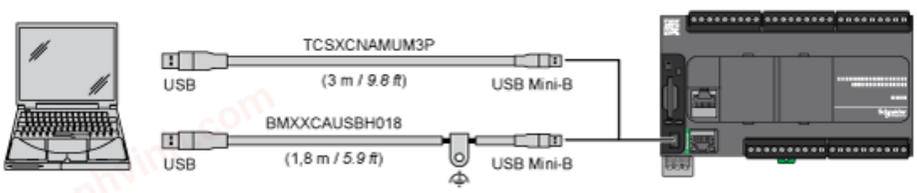
Analog Inputs



The (-) poles are connected internally.

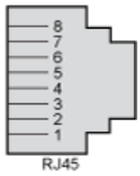
Pin	Wire Color
0 V	Black
AN1	Red
0 V	Black
AN0	Red

USB Mini-B Connection



SL1 Connection

chanhvinh.com

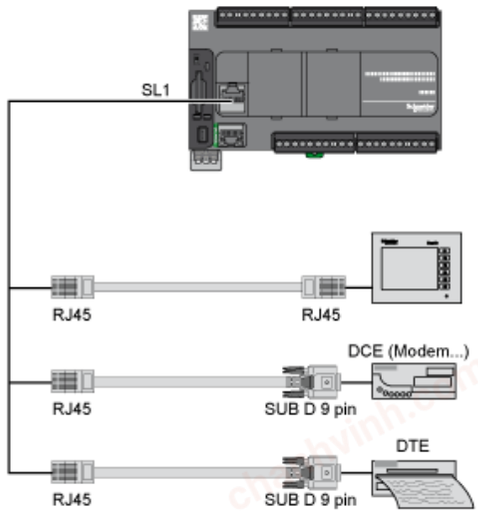


SL1

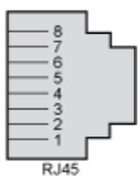
N °	RS 232	RS 485
1	RxD	N.C.
2	TxD	N.C.
3	RTS	N.C.
4	N.C.	D1
5	N.C.	D0
6	CTS	N.C.
7	N.C*.	5 Vdc
8	Common	Common

N.C.: not connected

* : 5 Vdc delivered by the controller. Do not connect.



SL2 Connection



N °	RS 485
1	N.C.
2	N.C.
3	N.C.
4	D1
5	D0
6	N.C.
7	N.C.
8	Common

N.C.: not connected

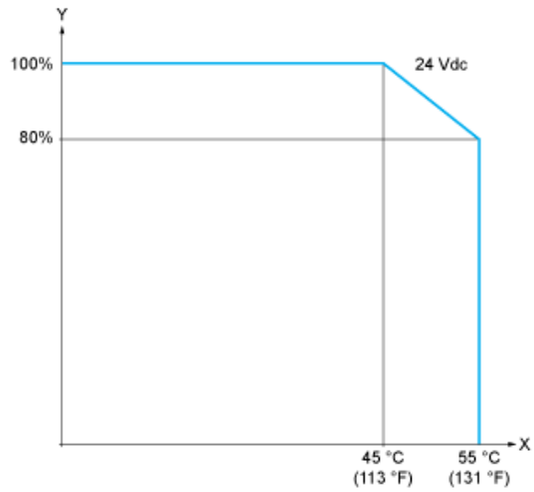
chanhvinh.com

Product data sheet TM221C40R

Performance Curves

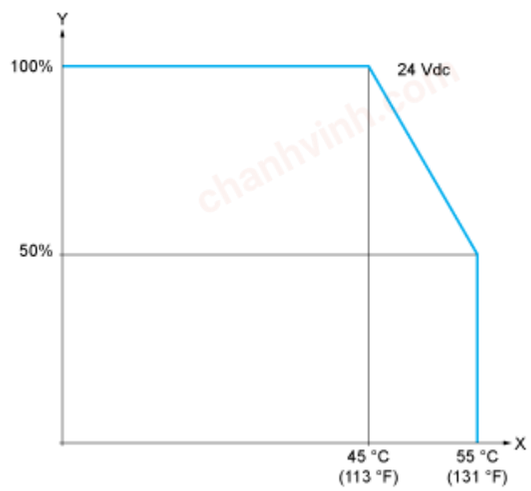
Derating Curves

Embedded Digital Inputs (No Cartridge)



X : Ambient temperature
Y : Input simultaneous ON ratio

Embedded Digital Inputs (with Cartridge)



X : Ambient temperature
Y : Input simultaneous ON ratio