



Digitized Automation for a Changing World

Delta Multi-Loop Modular Temperature Controller DTN Series



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Delta Multi-Loop Modular Temperature Controller DTN Series

Temperature control is crucial for stabilizing efficiency and product quality. As customer requirements advance due to the rapid development of industry, Delta has applied its extensive experience and solid technological capabilities and introduced the new Multi-Loop Modular Temperature Controller DTN Series with a thin-type design. The DTN Series not only offers multi-point temperature control, but also saves horizontal mounting space to optimize space utilization, overcome cabinet limitations, and reduce production costs. With the employment of the Ethernet module, it builds a network connecting multiple DTN groups to achieve real-time multi-loop parameter management to satisfy the needs of advanced and complex applications.

The DTN series consists of a measurement module, I/O extension modules, and an Ethernet module. A fully extended DTN group consists of one host, 7 measurement modules, 8 I/O extension modules, and an Ethernet module for up to 64-point temperature control and section-compartmentalized heating. The DTN Series is suitable for rubber and plastics, lithium-battery, and other industries.





Thin-type Design & Multi-Point Temperature Control

1. Thin-type design saves horizontal mounting space
2. Supports Ethernet communication for stable and real-time multi-loop parameter control
3. Modular design allows easy replacement and extension up to 64 PID control loops for flexible applications

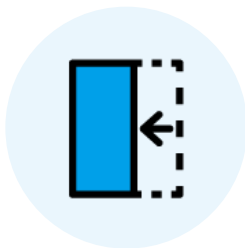
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Overview

Delta's Multi-Loop Modular Temperature Controller DTN Series features a thin-type design and supports Ethernet communication to save horizontal mounting space as well as simplify wiring.

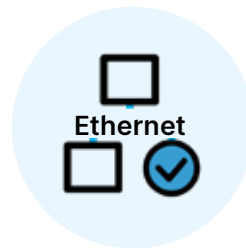
Users can extend modules based on their actual needs and simultaneously control up to 64-point temperature to meet advanced complex requirements.



Thin-Type Design



Modular Design
Easy for Removal



Ethernet
Communication

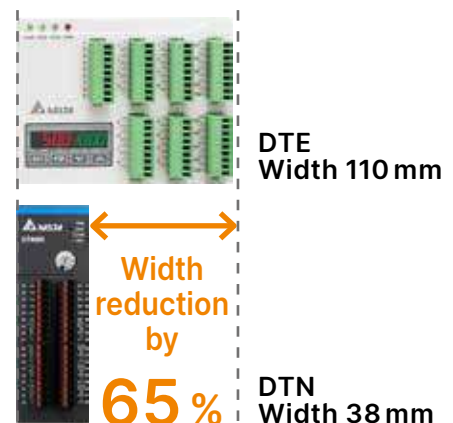


Multiple Input
Channels

Product Features

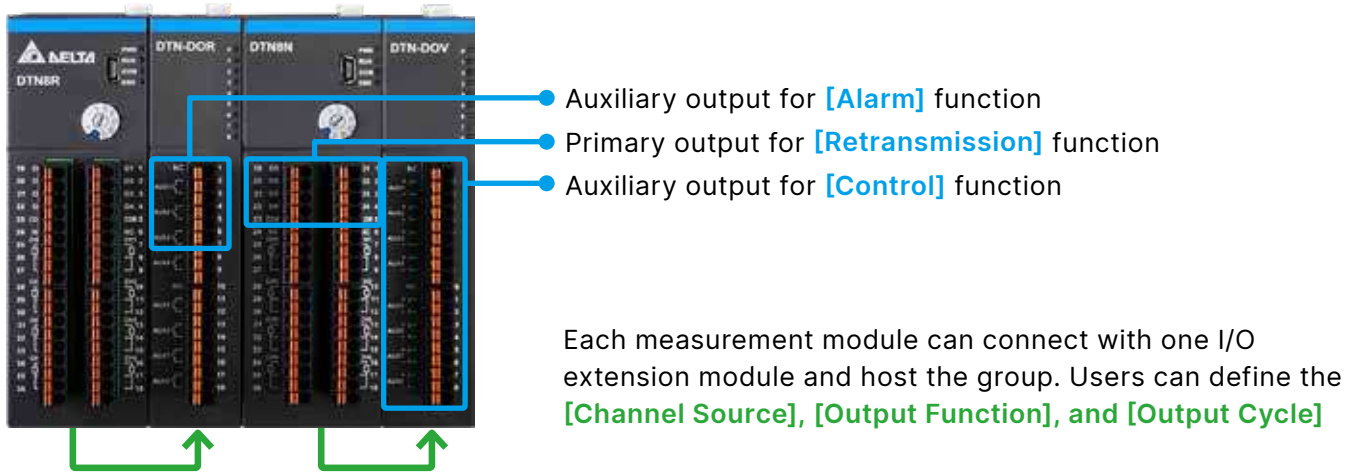
Thin-type design saves horizontal mounting space

- Reduces width by 65 % compared to the DTE Series
- Saves horizontal mounting space
- Overcomes the limitation of cabinet size



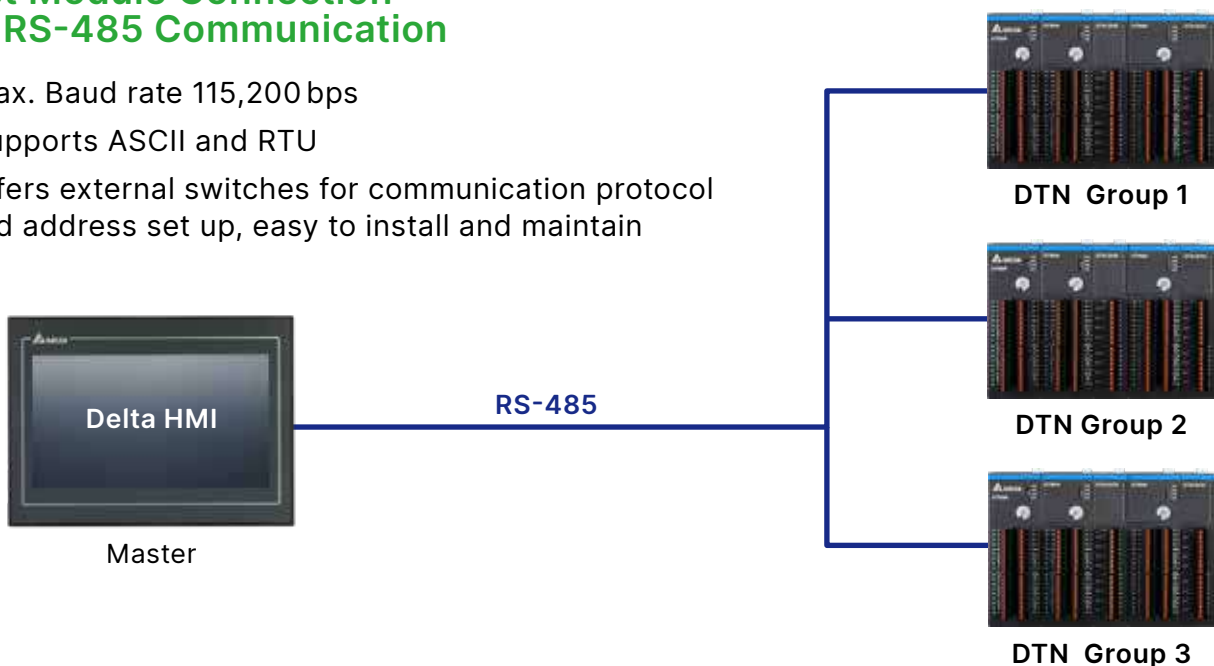
Various Extension Modules for Flexible Applications

- The DTN Series consists of measurement, I/O extension, and Ethernet modules. One measurement module provides up to 8-point control loop, and a host group controls up to 64 points
- The second output and alarm point can be easily set as any address in the I/O extension module for convenient on-site wiring and a wide range of applications



Fast Module Connection via RS-485 Communication

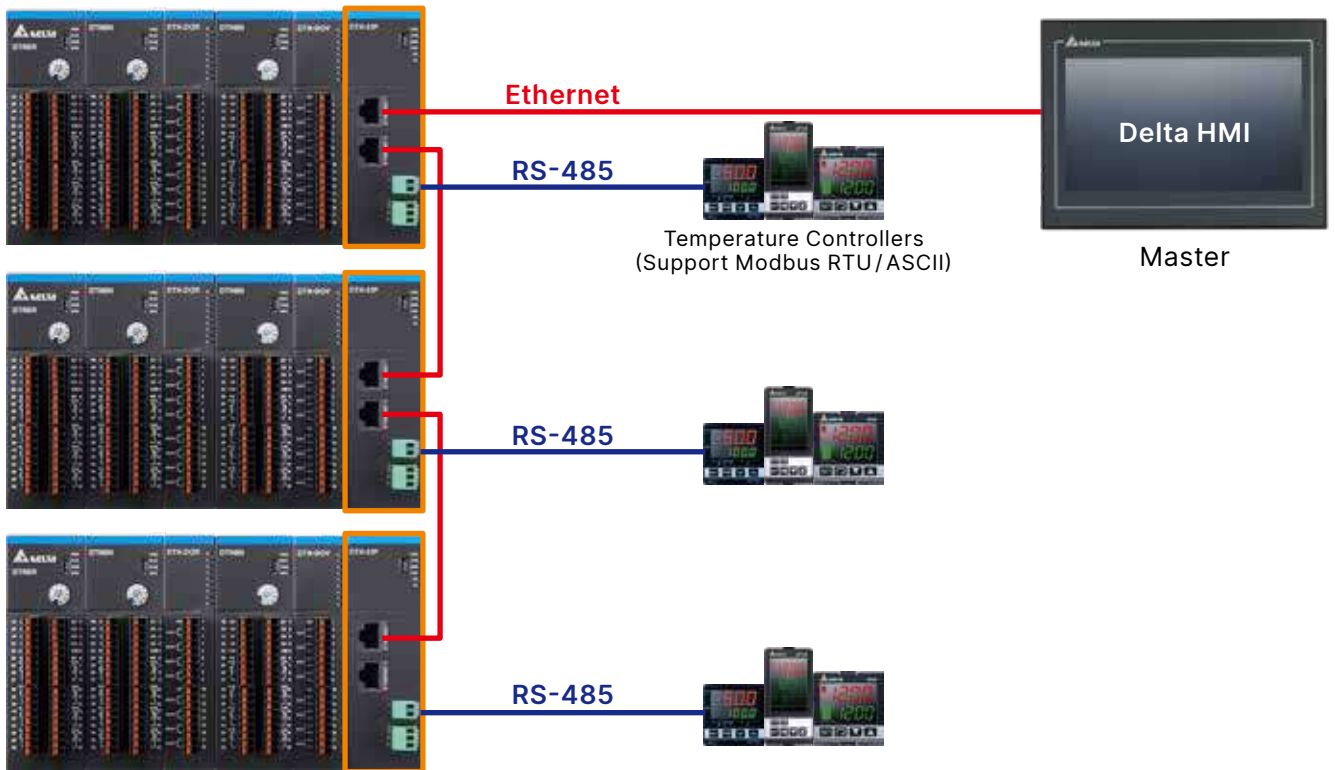
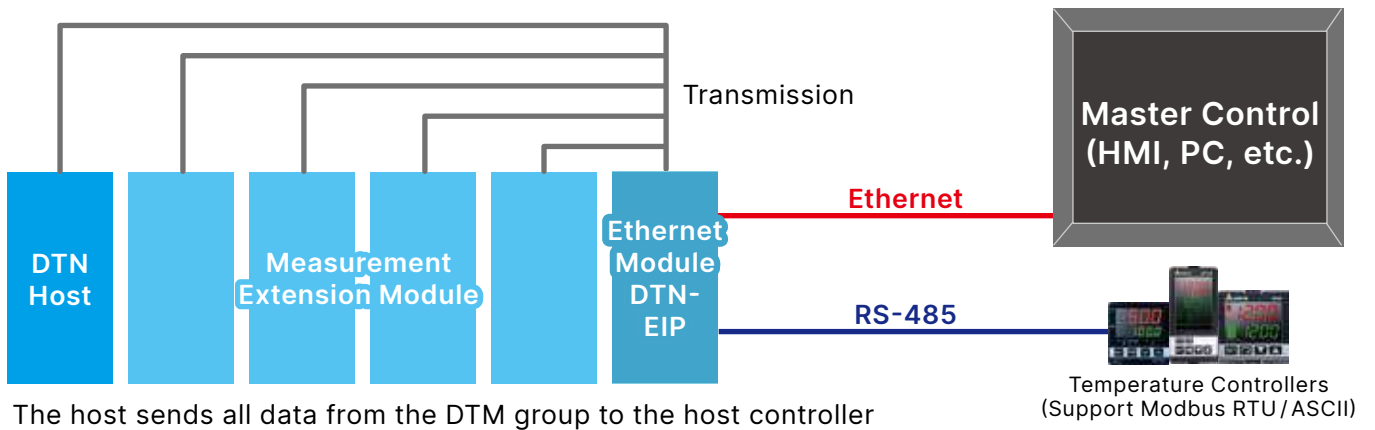
- Max. Baud rate 115,200 bps
- Supports ASCII and RTU
- Offers external switches for communication protocol and address set up, easy to install and maintain



Product Features

Ethernet Communication for Fast and Stable Transition & Simple Wiring

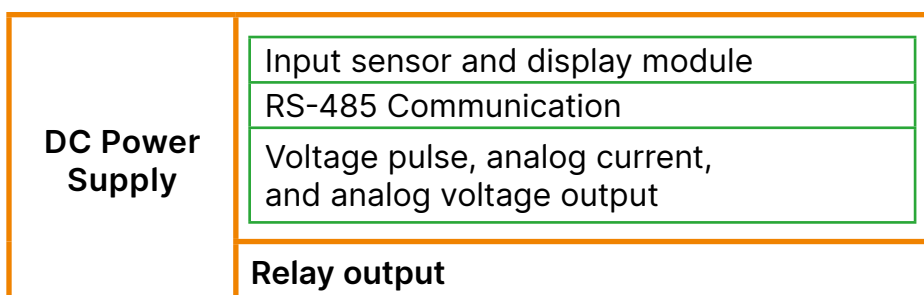
- Internal communication interface, collecting data from all extension modules at any time for high communication efficiency
- Connects multiple Ethernet devices with dual ports to simplify wiring
- Supports Modbus TCP and Ethernet/IP
- Features Gateway function to support the temperature controllers with Modbus interface via RS-485



Product Features

Complete Isolation between Channels

- Complete isolation between channels prevents electricity leakage of the heating device and damage to the electric circuit of the thermocouple input channels
- 8 sets of input channels are completely isolated to ensure a stable measurement signal and avoid interference



— Reinforced Insulation — Functional Insulation



Complete isolation between channels ensures stable temperature measurement and prevents noise jamming during operation

Applications

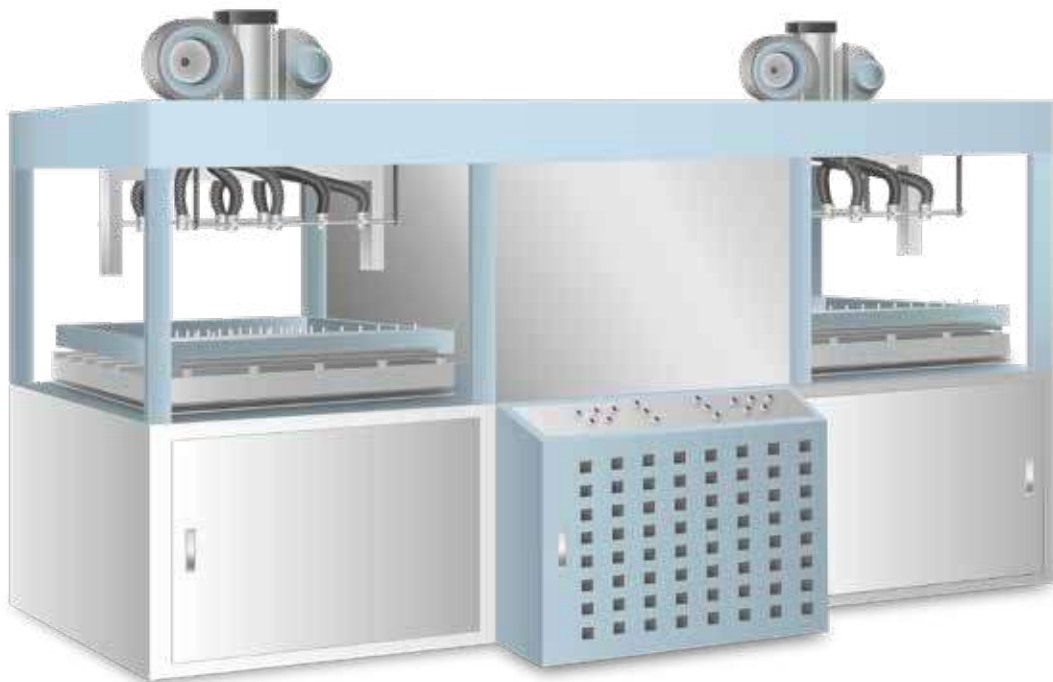
Ceramic Heating Plate of Vacuum Forming Machine

Description:

A vacuum forming machine usually has hundreds of ceramic heating plates which require temperature control. Insulation deterioration of ceramic heating plates after prolonged use may lead to electrical leakage, thus causing unstable temperature measurement results or even temperature controller damage.

Benefits:

The DTN series is designed with complete isolation between channels to eliminate unstable temperature measurement due to electrical leakage. Data collection by the host, powerful communication as well as accurate multi-point temperature control enhances stable operation and improves product yield of a vacuum forming machine.



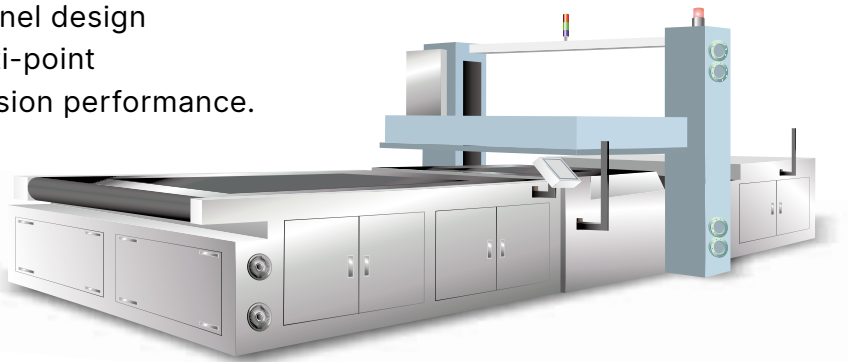
Solar Energy Laminating Machine

Description:

A solar panel is large in size, so it is not easy to achieve uniform temperature distribution with a single-point heating control. To avoid ineffective adhesion of the pressing effect, the solar energy lamination machine usually employs multi-point configuration to meet temperature control requirements.

Benefits:

The DTN Series features multi-channel design and is capable of simultaneous multi-point temperature control to ensure adhesion performance. It also has the advantages of compact size, simple wiring, saving costs, and more.



Woodworking Edge Banding Machine

Description:

The woodworking edge banding machine uses temperature control to heat hot-melt glue and preheat boards and edge banding materials. With precise temperature control, it prevents the hot-melt glue from curing early as well as optimizes adhesion by preheating boards and banding materials in the low-temperature area.

Benefits:

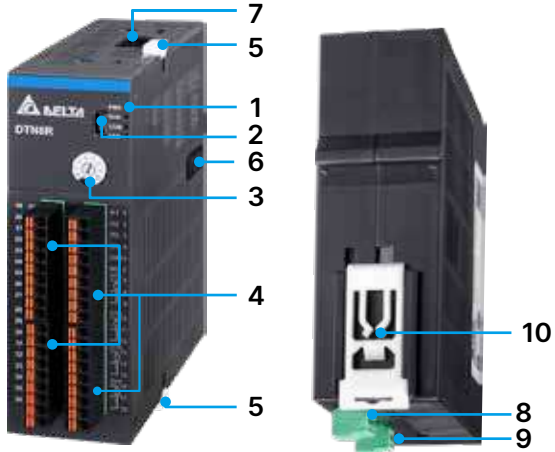
The automatic multi-side edge banding machine requires multi-point temperature control while the DTN Series adopts a multi-channel modular design capable of precise multi-point temperature control to ensure glue curing timing and enhance adhesion.

Moreover, the DTN Series is thin in width to save mounting space; and it supports Ethernet communication to reduce wiring and costs.



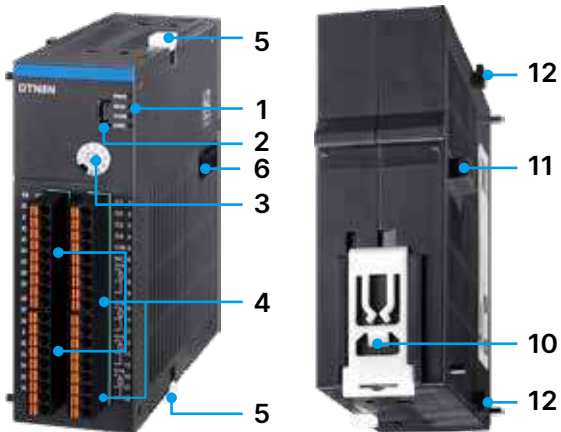
Appearance

Host DTN8R Series



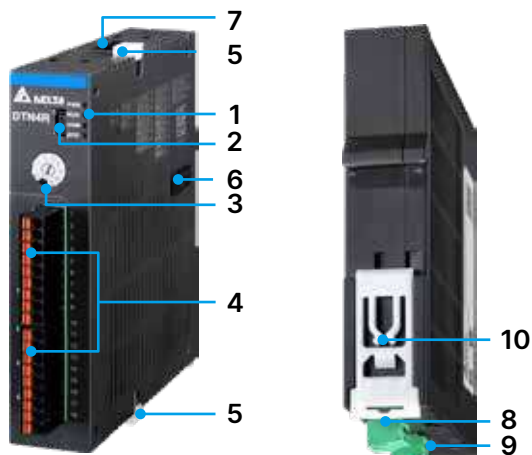
No.	Name	No.	Name
1	LED Indicators	7	Protocol switch
2	Mini USB connector (only for DTN-DU)	8	Power input terminal
3	Modbus station address knob	9	RS-485 terminal
4	I/O terminals	10	DIN RAIL bracket
5	Extension bracket	11	-
6	Connector cover	12	-

Measurement Extension Module DTN8N Series



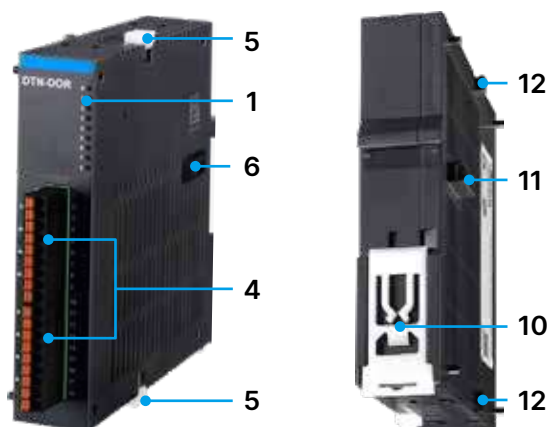
No.	Name	No.	Name
1	LED Indicators	7	-
2	Mini USB connector (only for DTN-DU)	8	-
3	Modbus station address knob	9	-
4	I/O terminals	10	DIN RAIL bracket
5	Extension bracket	11	Extension connector
6	Connector cover	12	Extension guideway

Host DTN4R/DTN2R Series



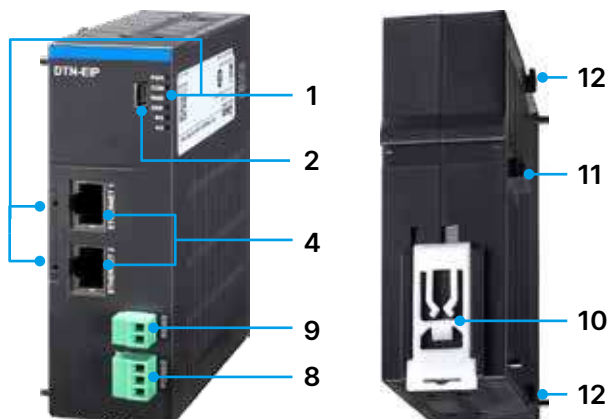
No.	Name	No.	Name
1	LED Indicators	7	Protocol switch
2	Mini USB connector (only for DTN-DU)	8	Power input terminal
3	Modbus station address knob	9	RS-485 terminal
4	I/O terminals	10	DIN RAIL bracket
5	Extension bracket	11	-
6	Connector cover	12	-

I/O Extension Module



No.	Name	No.	Name
1	LED Indicators	7	-
2	-	8	-
3	-	9	-
4	I/O terminals	10	DIN RAIL bracket
5	Extension bracket	11	Extension connector
6	Connector cover	12	Extension guideway

Ethernet Module DTN-EIP Series



Expected to launch in 2023 Q1

No.	Name	No.	Name
1	LED Indicators	7	-
2	Mini USB connector (only for DTN-DU)	8	Power input terminal
3	-	9	RS-485 terminal
4	RJ45	10	DIN RAIL bracket
5	-	11	Extension connector
6	-	12	Extension guideway

Specifications

Electrical Specifications

DTN8RPTx/DTN8RTCx/DTN4RPTx/DTN4RTCx/DTN2RTCx/DTN8NPTx/DTN8NTCx		
Input Power Supply	DC 24 V, isolated switching power	
Operating Voltage Range	90 % - 110 % rated voltage	
Power Consumption (Max.)	8-channel measurement host: 5.5W, 4-channel measurement host and 2-channel measurement host: 3.5W, 8-channel measurement module: 5.5W; I/O extension module DTN-DOV: 4W, DTN-DOR: 3W; Module max.: (Host+ output extension module) × 1 + (8-channel measurement extension module + output extension module) × 7 = (DTN8RTCx+DTN-DOV) × 1+ (DTN8NTCx+DTN-DOV) × 7 = (5.5 W + 4 W) × 1+(5.5 W + 4 W) × 7=76 W	
Weight (Max.)	8-channel host & 8-channel measurement module 270 g; 4-channel host & 2-channel host & I/O extension module 200 g	
Mounting Methods	DIN rail The host is the source of power supply. Measurement extension modules and I/O extension modules cannot be powered up alone. Measurement modules install on the right side of the host or other measurement modules; up to 7 units. Supports continuous installation I/O extension modules install on the right side of the host or other measurement modules; up to 8 units. Does not support continuous installation. Maximum number of modules = (Measurement host + output extension module) × 1 + (Measurement extension module + output extension module) × 7	
Input Sensor Support	Input Type = DTNyyTCx* Thermocouple: K, J, T, E, N, R, S, B, L, U, TXK Input type = DTNyyPTx* Platinum temperature resistance measurement: Pt100, JPt100, Ni120, Cu50	
Sampling Frequency	DTN2RTCx model: 0.1 seconds; Remaining models: 0.4 seconds / All input channels	
Control Methods	PID, ON/OFF	
Output Accessories Types	Host & Measurement Extension Modules	Voltage pulse output: Voltage pulse DC 12 V ± 10 %, max. rated output current 20 mA
		Analog Current Output: 4-20 mA (load impedance ≤ 500 Ω)
		Analog Voltage: 0-10 V (load impedance ≥ 1,000 Ω)
	Output Extension Module	Relay output: Single blade, single gate, maximum load of AC 250V, 2A resistive load Voltage pulse out: Voltage pulse DC 12 V ± 10 %, max. rated output current 20 mA
Outputs (optional)	3 types of outputs: control output, alarm output, and retransmission (needs to be used with optional corresponding models)	
Alarm (optional)	8 alarm modes are available (need to be used with optional corresponding models)	
Communication Functions	RS-485 DIP Switch: supports baud rates of 4,800 - 115,200 bps	
Communication Protocol	Adopts Modbus communication protocol, and supports RTU/ASCII communication format	
Internal Connection	Features internal connection terminals for 24 V power supply and communication signal transmission	
Vibration Resistance	10 ~ 55 Hz, 10 m/s ² for 10 mins in X, Y, Z directions	
Shock Resistance	Max. 300 m/s ² , 3 times in 3 axes and 6 directions	
Operating Ambient Temperature	0 ~ + 50 °C	

* x=Output type; yy=Type. Please refer to the model name description.

Specifications

Electrical Specifications

DTN8RPTx/DTN8RTCx/DTN4RPTx/DTN4RTCx/DTN2RTCx/DTN8NPTx/DTN8NTCx	
Storage Temperature	- 20 ~ + 65 °C
Operating Altitude	< 2,000 m
Operating Ambient Humidity	35 ~ 85 % RH (non-condensing)
Pollution Degree	2

DTN-EIP	
Input Power Supply	DC 24 volts, isolated switching power supply
Operating Voltage Range	90 % - 110 % rated voltage
Power Consumption (Max.)	5 W
Installation Method	DIN RAIL. Ethernet modules install on the rightmost side of the DTN module
Weight (Max.)	200 g
Internal Connection	Features internal connection terminals for communication signal transmission
Vibration Resistance	10 ~ 55 Hz, 10 m/s ² for 10 mins in X, Y, Z directions
Shock Resistance	Max. 300 m/s ² , 3 times in 3 axes and 6 directions
Ambient Operating Temperature	0 ~ +50 °C
Storage Temperature	-20 ~ +65 °C
Operating Altitude	< 2,000m
Operating Ambient Humidity	35 to 85 % RH (non-condensing)
Pollution Degree	2

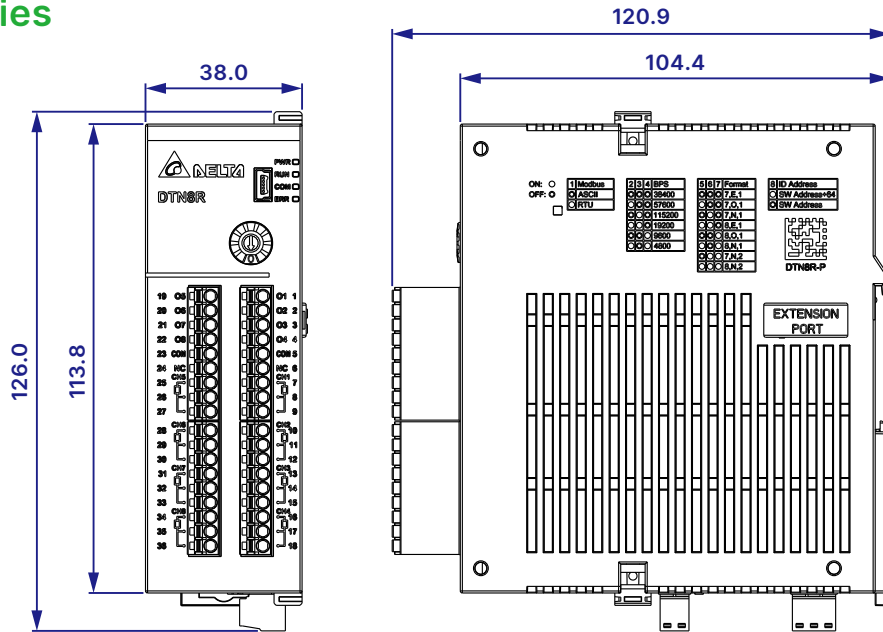
Specifications

DTN-EIP		
LAN	Communication Protocol	ICMP, IP, DHCP, BOOTP, EtherNet/IP Adapter, Modbus TCP
	Communication Speed	10/100 Mbps Auto-Detection
	Communication Mode	IEEE 802.3, IEEE 802.3u
	Communication Cable	Category 5e shielding 100M
	Communication Interface	RJ-45 with Auto MDI/MDIX
	Number of Ethernet Ports	2
Modbus TCP	Device Type	Server
	Supported Topology	Star, linear
	Supported Function Codes	03H, 06H, 10H
	Max. Connection	16 (calculated separately from EtherNet/IP)
	Max. Data Length for a Single Connection	100 Words
EtherNet/IP	Device Type	Adapter
	Max. Connections	8 (Separate from Modbus TCP, all EIP types combined)
	Supported Topology	Star, linear, ring (DLR Ring Node)
EtherNet/IP Implicit Message (I/O Connection)	Packet Transmission Interval (Requested packet interval, RPI)	5 ~ 1,000 ms
	Max. Communication Capability (Packets per second)	400 pps
EtherNet/IP Explicit Message	Type	Class 3 (Connected Type) UCMM (Unconnected Type)
	Supported Object	Please refer to the DTN-EIP online manual for details
RS-485	Device Type	Host
	Supported Topology	Bus (Multi-drop)
	Communication Method	Half-duplex
	Communication Protocol	Modbus ASCII Master, Modbus RTU Master
	Transmission Speed (bps)	4,800/9,600/19,200/38,400/57,600/115,200
	Data Bit	7 or 8
	Parity Bit	None, Even, Odd
	Stop Bit	1 or 2
RS-485 Parameter Timing Collection	Max. Parameter Number	100
	Collection interval	0.1 ~ 10 sec

Dimensions

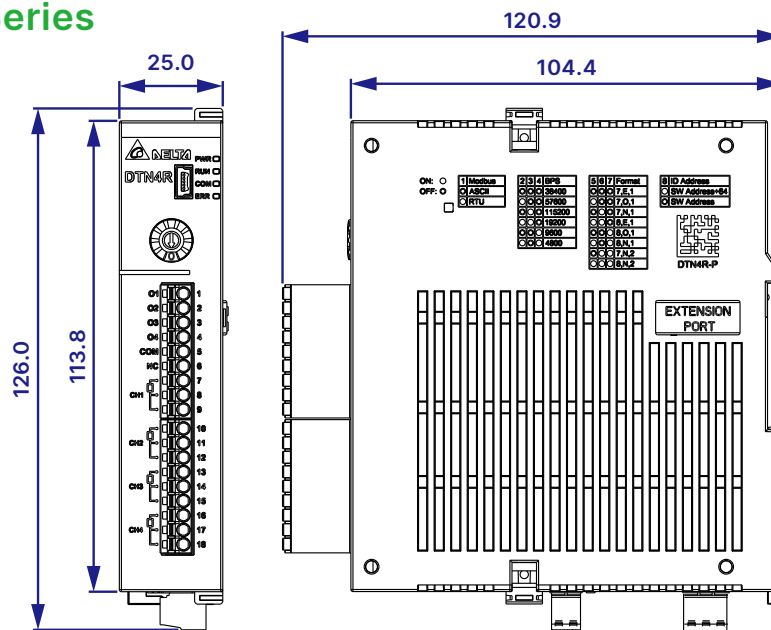
Host DTN8R Series

Unit (mm)



Host DTN4R/DTN2R Series

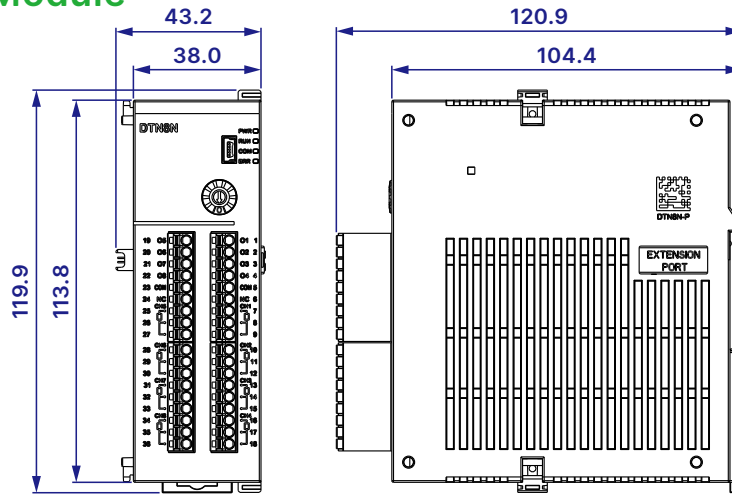
Unit (mm)



Dimensions

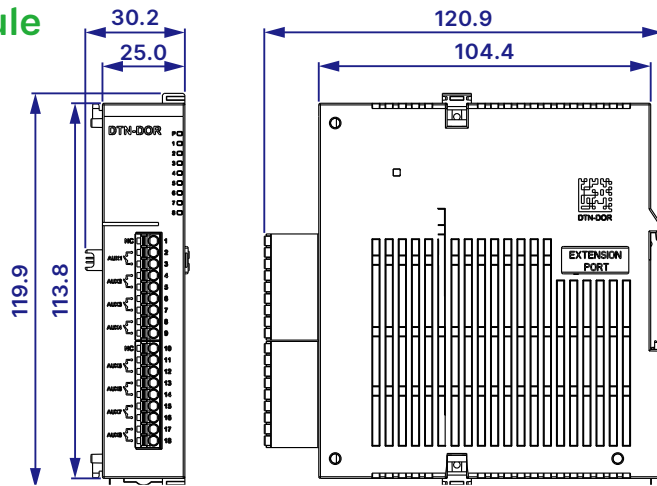
Measurement Module DTN8N Series

Unit (mm)



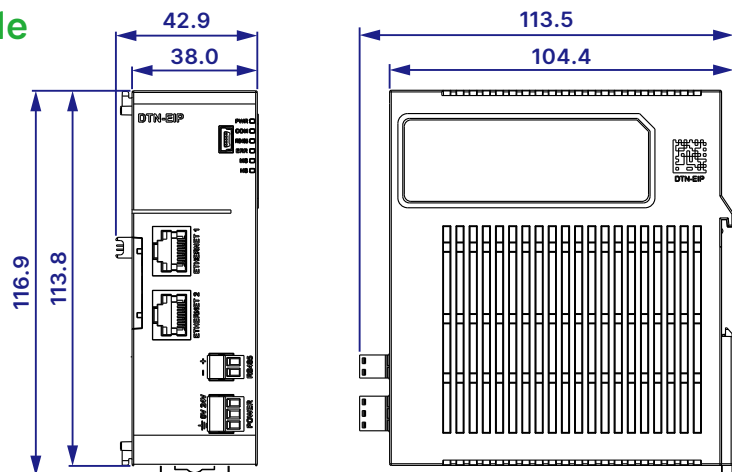
I/O Extension Module

Unit (mm)

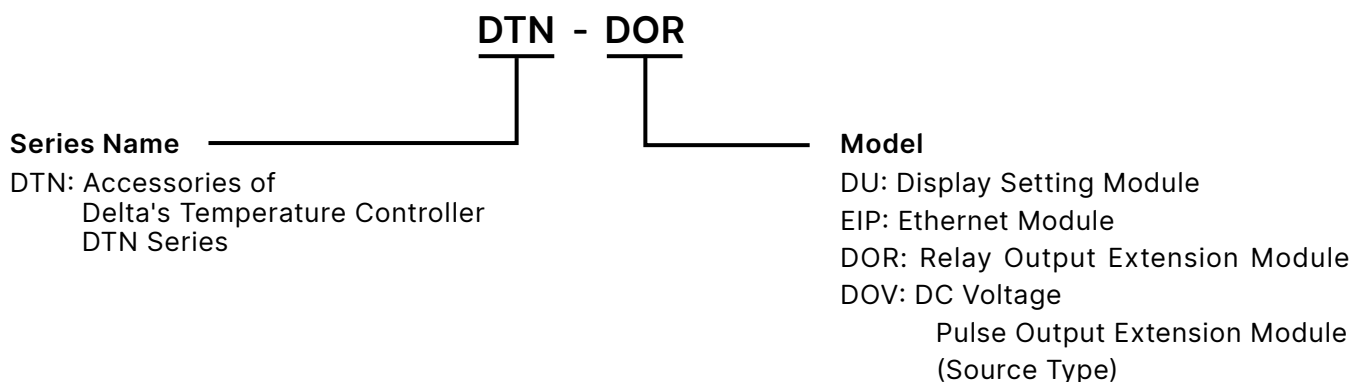
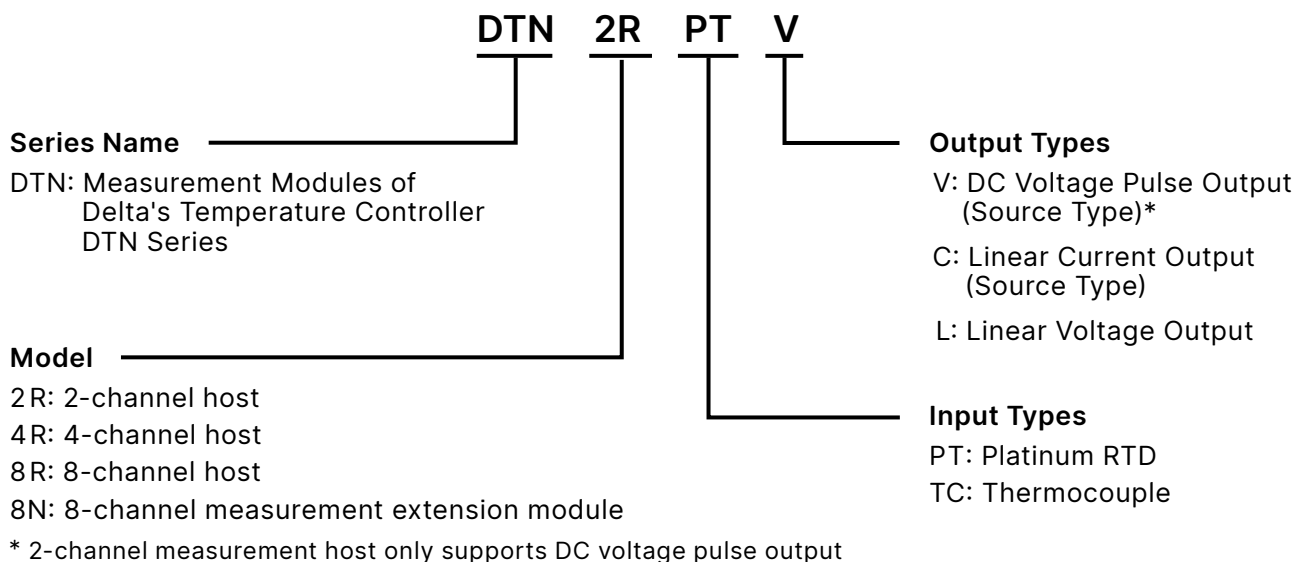


Ethernet Module

Unit (mm)






Model Name Description




Ordering Information


Hosts

Appearance	Channel Number	Input Type	Model	Specifications
	8	Platinum RTD	DTN8RPTV	0/12 V Pulse Voltage
			DTN8RPTC	4~20 mA Output
			DTN8RPTL	0~10 V Output
		Thermocouple	DTN8RTCV	0/12 V Pulse Voltage
			DTN8RTCC	4~20 mA Output
			DTN8RTCL	0~10 V Output
	4	Platinum RTD	DTN4RPTV	0/12 V Pulse Voltage
			DTN4RPTC	4~20 mA Output
			DTN4RPTL	0~10 V Output
		Thermocouple	DTN4RTCV	0/12 V Pulse Voltage
			DTN4RTCC	4~20 mA Output
			DTN4RTCL	0~10 V Output
	2	Thermocouple	DTN2RTCV	0/12 V Pulse Voltage

Measurement Modules

Appearance	Channel Number	Input Type	Model	Specifications
	8	Platinum RTD	DTN8NPTV	0/12 V Pulse Voltage
			DTN8NPTC	4~20 mA Output
			DTN8NPTL	0~10 V Output
		Thermocouple	DTN8NTCV	0/12 V Pulse Voltage
			DTN8NTCC	4~20 mA Output
			DTN8NTCL	0~10 V Output

Accessories

Appearance	Modular Type	Model	Specifications
	I/O Extension Module	DTN-DOR	8-channel, Relay Contact
		DTN-DOV	8-channel, 0/12 V Pulse Voltage
	Ethernet Module	DTN-EIP	EtherNet/IP Adapter, Modbus TCP



Smarter. Greener. Together.

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