

Tiny Serial-to-Ethernet Modbus Gateway

tGW-700/tGW-2200 Series

Tiny Modbus/TCP to RTU/ASCII Gateway



tGW-712 tGW-700 series tGW-2200 series

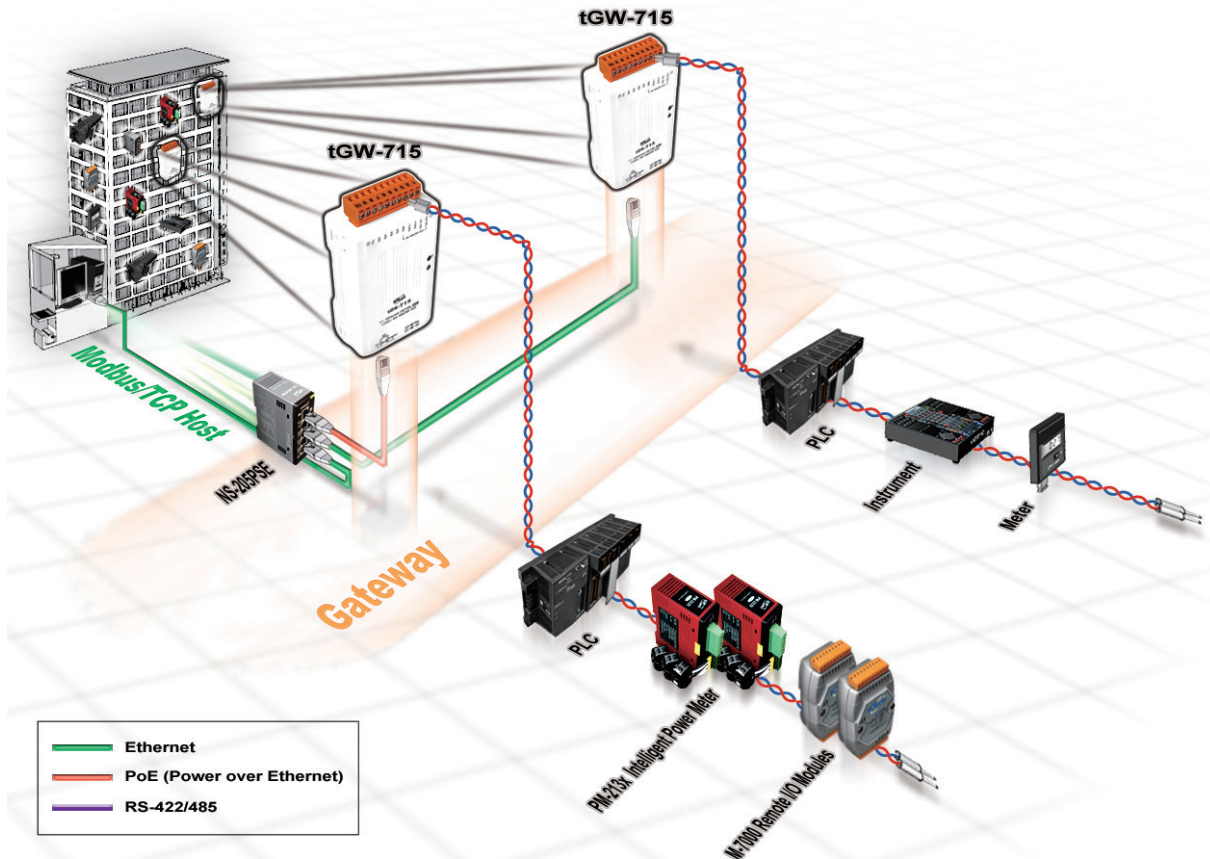


Features ▶▶▶

- Supports Modbus TCP/UDP master and slave
- Supports Modbus RTU/ASCII master and slave
- Max. TCP masters per serial port: 32 (RevB)
- Read-cache ensures faster Modbus TCP/UDP response
- Supports UDP responder for device discovery (UDP Search)
- Static IP or DHCP network configuration
- Easy firmware update via the Ethernet (BOOTP, TFTP)
- Tiny Web server for serial and network configuration (HTTP)
- Redundant power inputs: PoE and DC jack
- tGW-700: 10/100 Base-TX Ethernet, RJ-45 × 1
- tGW-2200: 2-port Ethernet Switch (LAN Bypass for Daisy-Chain Wiring)
- Allows automatic RS-485 direction control
- Power or Signal isolation for i versions
- ±4 kV ESD protection
- Male DB-9 or terminal block connector for easy wiring
- Tiny form-factor and low power consumption
- RoHS compliant & no Halogen

Introduction

Modbus has become a de facto standard industrial communication protocol, and is now the most commonly available means of connecting industrial electronic devices. Modbus allows for communication between many devices connected to the same RS-485 network, for example, a system that measures temperature and humidity and communicates the results to a computer. Modbus is often used to connect a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition (SCADA) systems.



The tGW-700/tGW-2200 module is a Modbus gateway that enables a Modbus TCP/UDP host to communicate with serial Modbus RTU/ASCII devices through an Ethernet network, and eliminates the cable length limitation of legacy serial communication devices. The module can be used to create a pair-connection application (as well as serial-bridge or serial-tunnel application), and can then route data over TCP/IP between two serial Modbus RTU/ASCII devices, which is useful when connecting mainframe computers, servers or other serial devices that use Modbus RTU/ASCII protocols and do not themselves have Ethernet capability.

The maximum number of TCP connections for each serial port is up to 32(RevB), this allows multiple masters accessing slave devices on the same serial port. The **read-cache function** is used to store previous requests and responses in the memory buffer of the tGW-700/tGW-2200 module. When other HMI/SCADA master controllers send the same requests to the same RTU slave device, the cached response is returned immediately. **This feature dramatically reduces the loading on the serial port communication, ensures faster TCP responses, and improves the stability of the entire system.**

The tGW-2200 series has a built-in two-port Ethernet switch to implement daisy-chain topology. The cabling is much easier and total costs of cable and switch are significantly reduced. LAN Bypass feature guarantees the Ethernet communication if tGW-2200 loses its power.

The tGW-700/tGW-2200 module features a powerful 32-bit MCU to enable efficient handling of network traffic, and also has a built-in web server that provides an intuitive web management interface that allows users to modify the configuration of the module, including the DHCP/Static IP, the gateway/mask settings and the serial port settings.

The CPU watchdog automatically resets the CPU if the built-in firmware is operating abnormally, while the host watchdog automatically resets the CPU if there is no communication between the module and the host (PC or PLC) for a predefined period of time (system timeout). The dual watchdog is an important feature that ensures the module operates continuously, even in harsh environments.

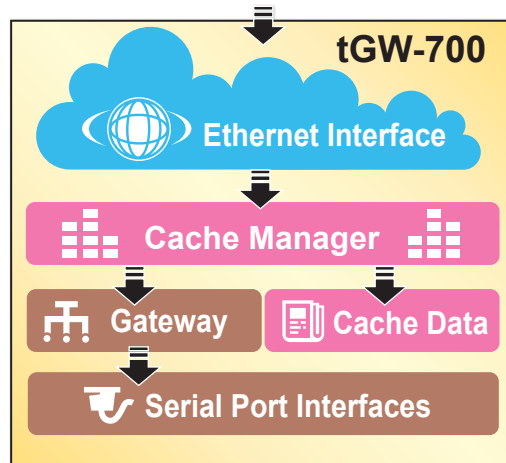
The tGW-700/tGW-2200 module offers true IEEE 802.3af-compliant (classification, Class 1) Power over Ethernet (PoE) functionality using a standard category 5 Ethernet cable to receive power from a PoE switch such as the NS-205PSE. If there



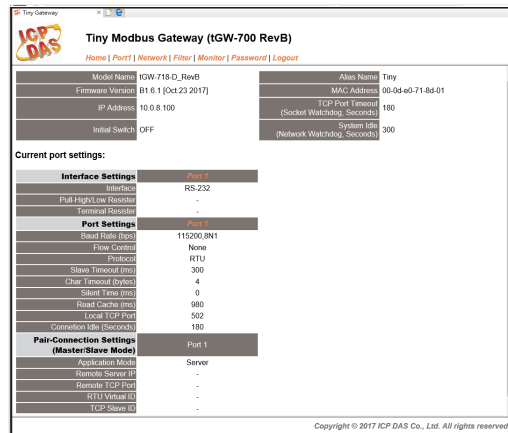
is no PoE switch on site, the module will also accept power input from a DC adapter. The tGW-700/tGW-2200 module is designed for ultra-low power consumption, reducing hidden costs from increasing fuel and electricity prices, especially when you have a large number of modules installed. Reducing the amount of electricity consumed by choosing energy-efficient equipment can have a positive impact on maintaining a green environment.

Based on an amazing tiny form-factor, the tGW-700/tGW-2200 achieves maximum space savings that allows it to be easily installed anywhere, even directly embedded into a machine. It also supports automatic RS-485 direction control when sending and receiving data, thereby improving the stability of the RS-485 communication.

Comparison Table	Ethernet	Programmable	Virtual COM	Virtual I/O	DHCP	Web Configuration	UDP Search	Modbus Gateway	Multi-client
tGW-700 Series	10/100 M, PoE	-	-	-	Yes	Yes	Yes	Yes	Yes
PPDS-700-MTCP Series	10/100 M, PoE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

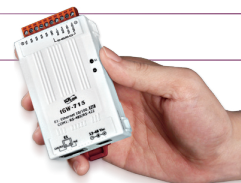


Daisy-Chain Ethernet Cabling

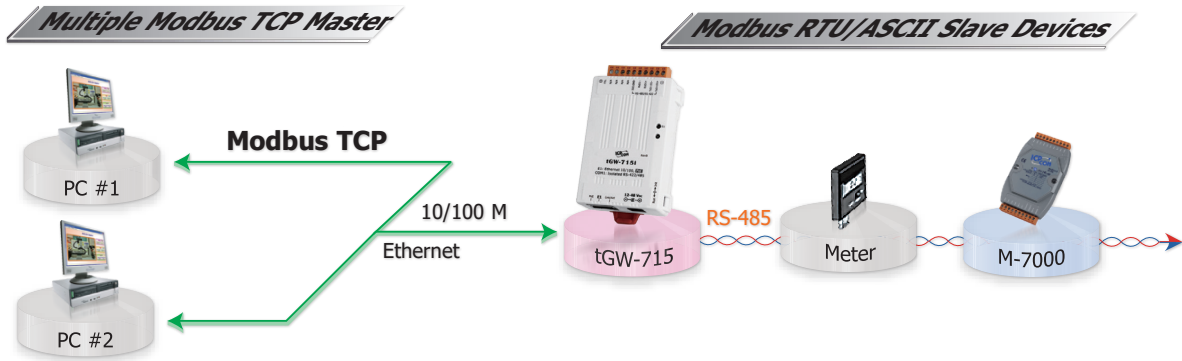


Applications

- Factory Automation
- Building Automation
- Home Automation
- Remote Diagnosis and Management



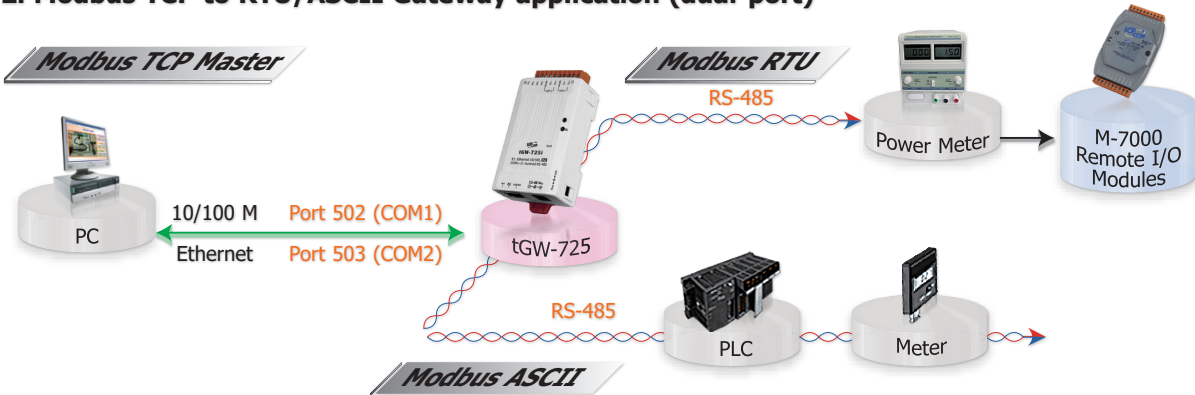
1. Modbus TCP Masters to RTU/ASCII Gateway application



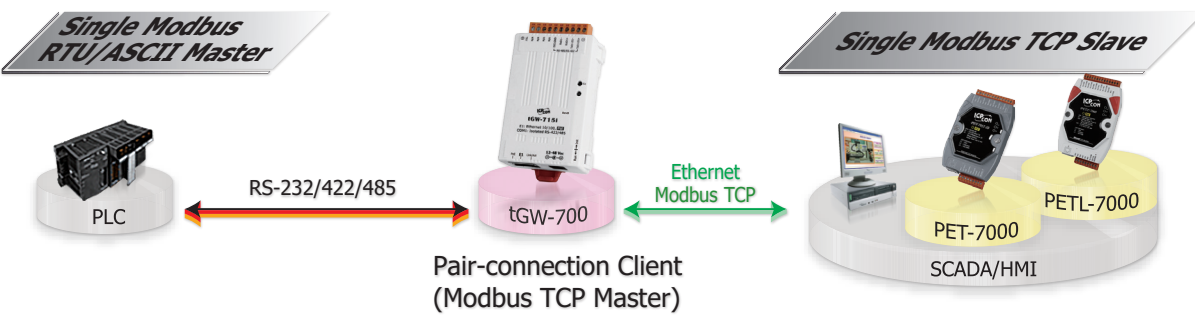
Max. TCP connections (Masters) per serial port: 32 (RevB)

Max. Device (Slave) per serial port: 247

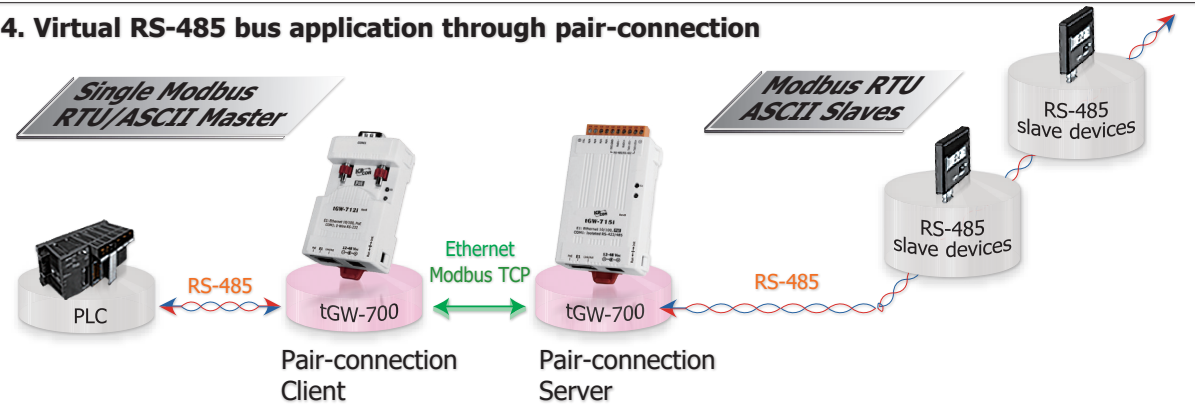
2. Modbus TCP to RTU/ASCII Gateway application (dual-port)



3. Modbus RTU/ASCII to TCP Gateway application (like pair-connection)



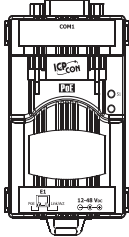
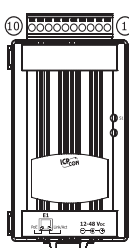
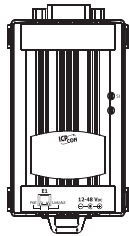
4. Virtual RS-485 bus application through pair-connection



System Specifications

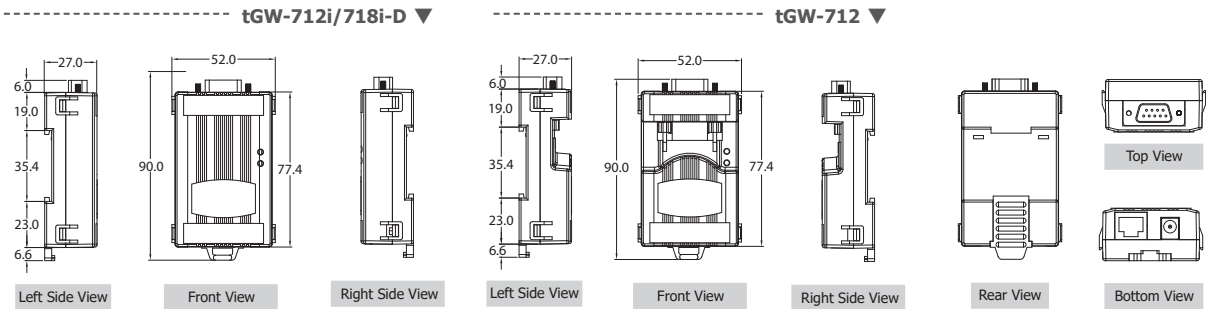
Models	tGW-712 tGW-712i tGW-2212	tGW-722 tGW-722i	tGW-732 tGW-732i	tGW-715 tGW-715i tGW-2215	tGW-725 tGW-725i tGW-2225	tGW-735 tGW-735i tGW-2235	tGW-718 tGW-718i tGW-2218	tGW-718i-D	tGW-724 tGW-724i	tGW-734 tGW-734i	
System											
CPU	32-bit MCU										
Communication Interface											
Ethernet	700 Series	10/100 Base-TX, 8-pin RJ-45 x 1, (Auto-negotiating, Auto-MDI/MDIX, LED indicator)									
	2200 Series	2-Port 10/100 Base-TX Ethernet Switch with LAN Bypass, RJ-45 x 2 (Auto-negotiating, Auto-MDI/MDIX, LED indicator)									
PoE	IEEE 802.3af, Class 1										
COM Port	1 x RS-232	2 x RS-232	3 x RS-232	1 x RS-422/ RS-485	2 x RS-485	3 x RS-485	1 x RS-232 or RS-422/485		1 x RS-485 1 x RS-232	1 x RS-485 2 x RS-232	
Self-Tuner	-			Yes, automatic RS-485 direction control							
Power Isolation	1000 Vdc for tGW-722i/ 732i /718i-D only										
Signal Isolation	3000 Vdc for tGW-712i/ 715i/ 725i/ 735i/ 718i /724i /734i only										
ESD Protection	+/-4 kV										
COM Port Capability (16C550 or compatible UART)											
Baud Rate	115200 bps Max.										
Data Bit	5, 6, 7, 8										
Parity	None, Odd, Even, Mark, Space										
Stop Bit	1, 2										
Power											
Power Input	IEEE 802.3af, Class 1 for PoE +12 ~ 48 Vdc for DC Jack										
Power Consumption	0.07 A @ 24 Vdc										
Mechanical											
Connector	700 Series	Male DB-9 x 1	10-pin Removable Terminal Block x 1				Male DB-9 x 1	10-pin Removable Terminal Block x 1			
	2200 Series	5-pin Removable Terminal Block x 3									
Dimensions (W x H x D)	700 Series	52 mm x 95 mm x 27 mm (tGW-712: 52 mm x 90 mm x 27 mm)									
	2200 Series	90mm x 110mm x 33mm (without connectors)									
Installation	DIN-Rail mounting										
Case	Plastic										
Environment											
Operating Temperature	-25 °C ~ +75 °C										
Storage Temperature	-30 °C ~ +80 °C										
Humidity	10 ~ 90% RH, non-condensing										

Pin Assignments

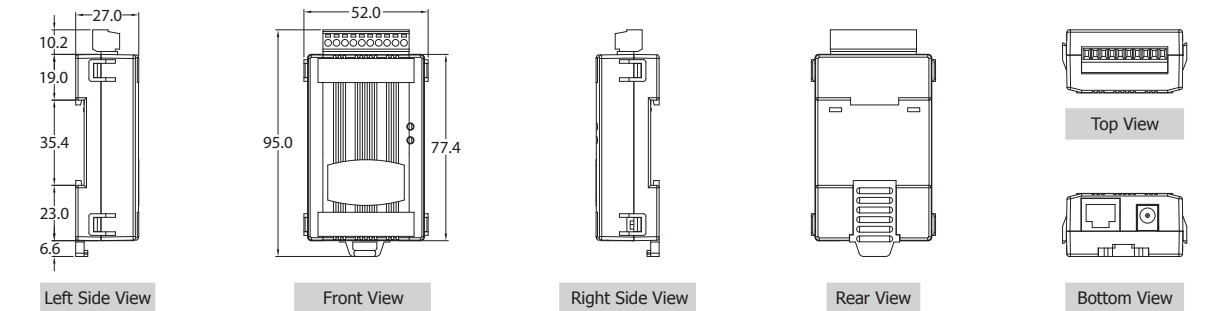
	tGW-712/tGW-712i				tGW-722/tGW-722i		tGW-732/tGW-732i		tGW-735/tGW-735i		tGW-718/tGW-718i			
	09	N/A			10	F.G.	10	F.G.	10	F.G.	10	F.G.	09	N/A
	08	CTS1			09	CTS2	09	GND	09	GND	09	GND	08	GND
	07	RTS1			08	RTS2	08	RxD3	08	D3-	08	D3-	07	RxD1
	06	N/A			07	RxD2	07	TxD3	07	D3+	07	D3+	06	TxD1
	05	GND			06	TxD2	06	GND	06	GND	06	GND	05	GND
	04	N/A			05	GND	05	RxD2	05	D2-	05	D2-	04	RxD1-
	03	TxD1			04	CTS1	04	TxD2	04	D2+	04	D2+	03	RxD1+
	02	RxD1			03	RTS1	03	GND	03	GND	03	GND	02	TxD1-/D1-
	01	N/A			02	RxD1	02	RxD1	02	D1-	02	D1-	01	TxD1+/D1+
			01	TxD1	01	TxD1	01	D1+	01	D1+				
	tGW-718i-D			tGW-715/tGW-715i		tGW-725/tGW-725i		tGW-724/tGW-724i		tGW-734/tGW-734i				
	Terminal No.	RS-232	RS-422	RS-485	10	F.G.	10	F.G.	10	F.G.	10	F.G.		
	09	N/A	N/A	N/A	09	N/A	09	N/A	09	N/A	09	GND		
	08	CTS	N/A	N/A	08	N/A	08	N/A	08	CTS2	08	RxD3		
	07	RTS	N/A	N/A	07	N/A	07	N/A	07	RTS2	07	TxD3		
	06	N/A	N/A	N/A	06	N/A	06	GND	06	GND	06	GND		
	05	GND	GND	GND	05	GND	05	D2-	05	RxD2	05	RxD2		
	04	N/A	RxD-	N/A	04	RxD1-	04	D2+	04	TxD2	04	TxD2		
	03	TxD	RxD+	N/A	03	RxD1+	03	GND	03	GND	03	GND		
	02	RxD	TxD+	Data+	02	TxD1-/D1-	02	D1-	02	D1-	02	D1-		
01	N/A	TxD-	Data-	01	TxD1+/D1+	01	D1+	01	D1+	01	D1+			

Dimensions (Unit: mm)

tGW-712/712i/718i-D



tGW-715(i)/718(i)/722(i)/725(i)/732(i)/735(i)/724(i)/734(i)



Ordering Information

Note: ▶ Available soon

Non-Isolated	Isolated	2-port Ethernet Switch	Modbus/TCP to RTU/ASCII Gateway: Includes one CA-002 cable.
tGW-712 CR	tGW-712i CR	▶tGW-2212	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1 RS-232 Port (RoHS)
tGW-722 CR	tGW-722i CR	-	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 2 RS-232 Ports (RoHS)
tGW-732 CR	tGW-732i CR	-	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 3 RS-232 Ports (RoHS)
tGW-715 CR	tGW-715i CR	▶tGW-2215	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1 RS-422/485 (RoHS)
tGW-725 CR	tGW-725i CR	▶tGW-2225	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 2 RS-485 Ports (RoHS)
tGW-735 CR	tGW-735i CR	▶tGW-2235	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 3 RS-485 Ports (RoHS)
tGW-718 CR	tGW-718i CR tGW-718i-D CR	▶tGW-2218	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1 RS-232/422/485 Port (RoHS) (10-pin Terminal Block Connector for tGW-718/718i, Male DB-9 Connector for tGW-718i-D)
tGW-724 CR	tGW-724i CR	-	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE, 1 RS-485 and 1 RS-232 Ports (RoHS)
tGW-734 CR	tGW-734i CR	-	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE, 1 RS-485 and 2 RS-232 Ports (RoHS)

Accessories

CA-002	DC connector to 2-wire power cable, 0.3 M
CA-0915	Male DB-9 to Female DB-9 Cable, 1.5 m
CA-0910F	Female DB-9 to Female DB-9 Cable, 1.0 m
CA-0910N	DB-9 Female-Female 3-wire Null Modem Cable, 1M
CA-PC09F	DB-9 Female Connector with Plastic Cover
FRA05-S12-SU CR	12V/0.58A (max.) Power Supply (RoHS, for tDS/tGW-700)
DIN-KA52F CR	24V/1.04A, 25 W Power Supply with DIN-Rail Mounting (RoHS, for NS-205 and NS-205PSE-24V)
DIN-KA52F-48 CR	48V/0.52A, 25 W Power Supply with DIN-Rail Mounting (RoHS, for NS-205PSE)
NS-205PSE CR	Unmanaged Ethernet Switch with 4 PoE Ports and 1 RJ-45 Uplink (RoHS)
NS-205PSE-24V CR	Unmanaged 5-port 10/100 Mbps PoE (PSE) Ethernet Switch; 24 VDC Input (RoHS)