

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

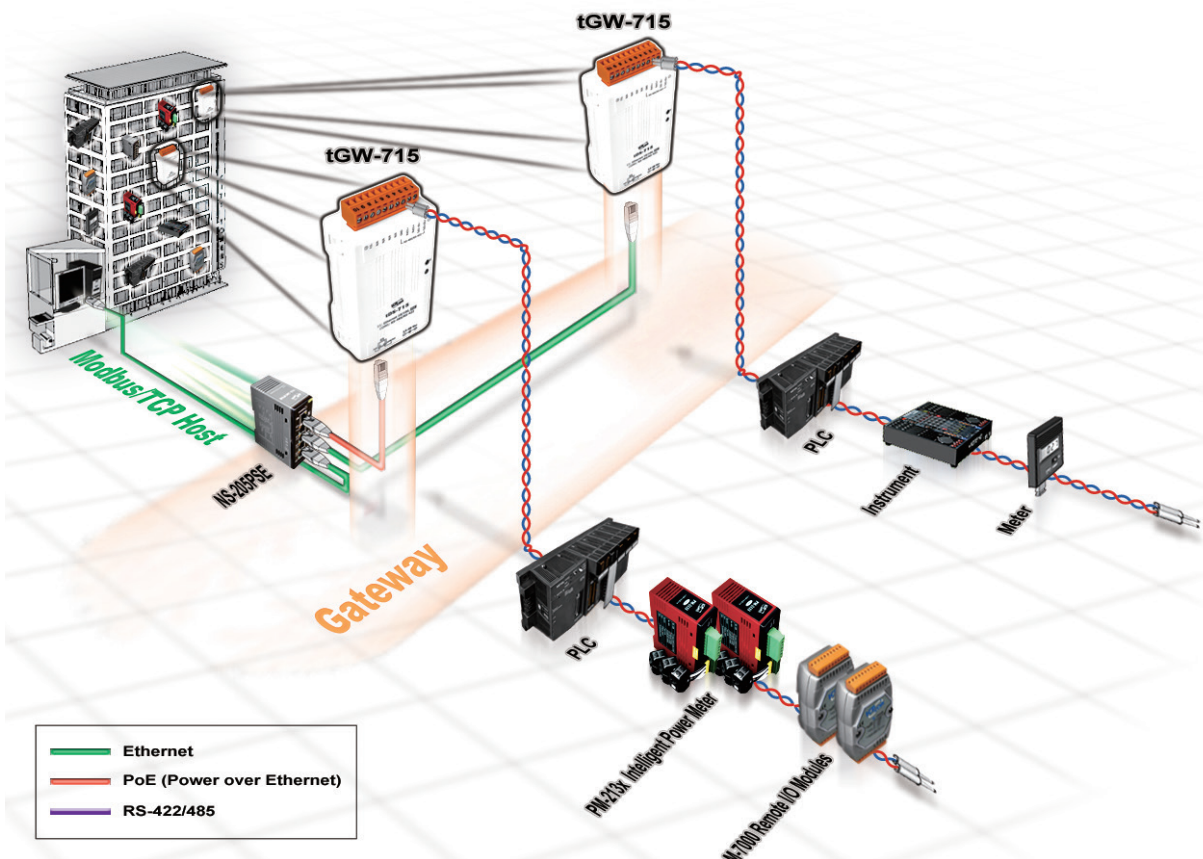


Features ▶▶▶

- 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.

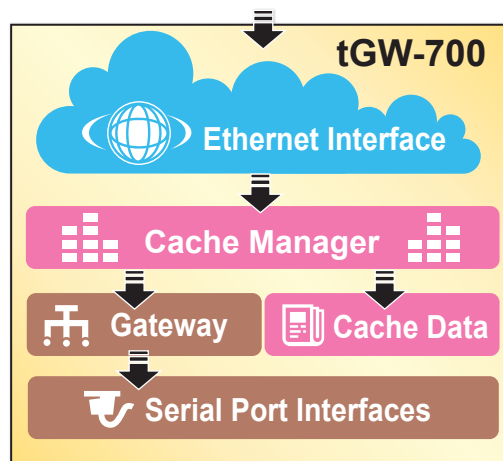
The tGW-700/tGW-2200 module offers true IEEE 802.3af-compliant (classification, Class 1) Power over Ethernet (PoE) functionality using a standard category 5 Ethernet cable to receive power from a PoE switch such as the NS-205PSE. If there



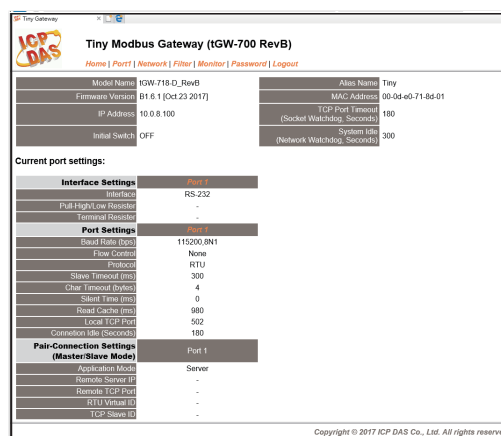
is no PoE switch on site, the module will also accept power input from a DC adapter. The tGW-700/tGW-2200 module is designed for ultra-low power consumption, reducing hidden costs from increasing fuel and electricity prices, especially when you have a large number of modules installed. Reducing the amount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



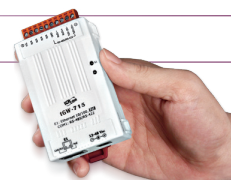
Applications

○ Factory Automation

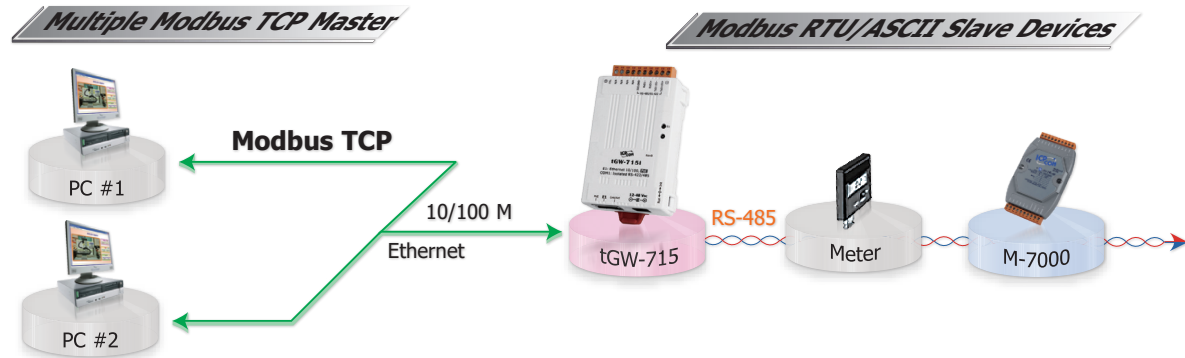
○ Building Automation

○ Home Automation

○ Remote Diagnosis and Management



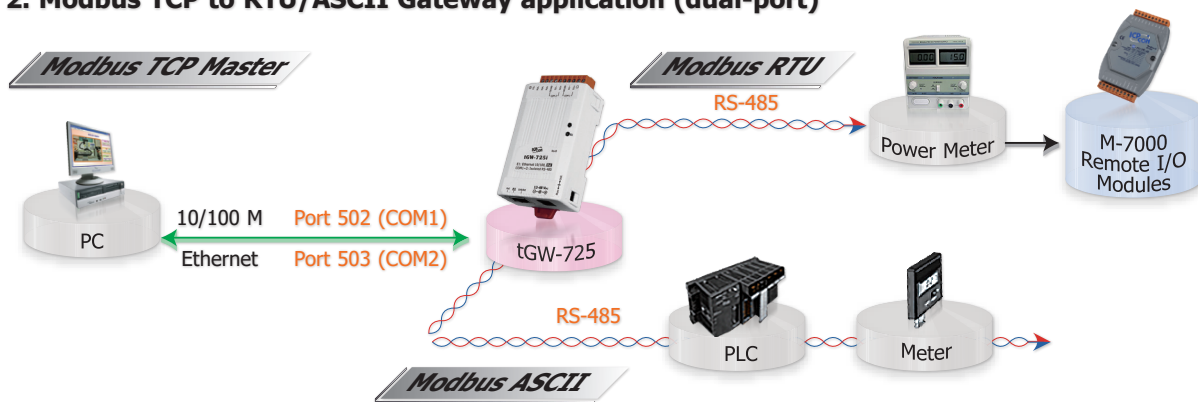
1. Modbus TCP Masters to RTU/ASCII Gateway application



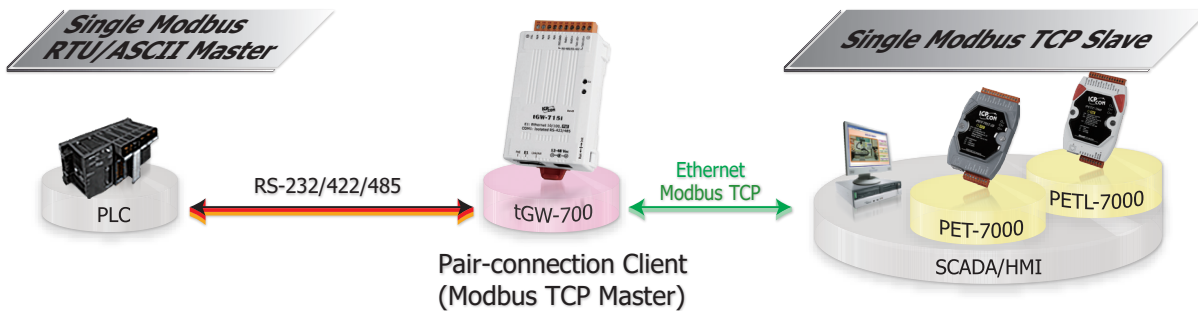
Max. TCP connections (Masters) per serial port: 32 (RevB)

Max. Device (Slave) per serial port: 247

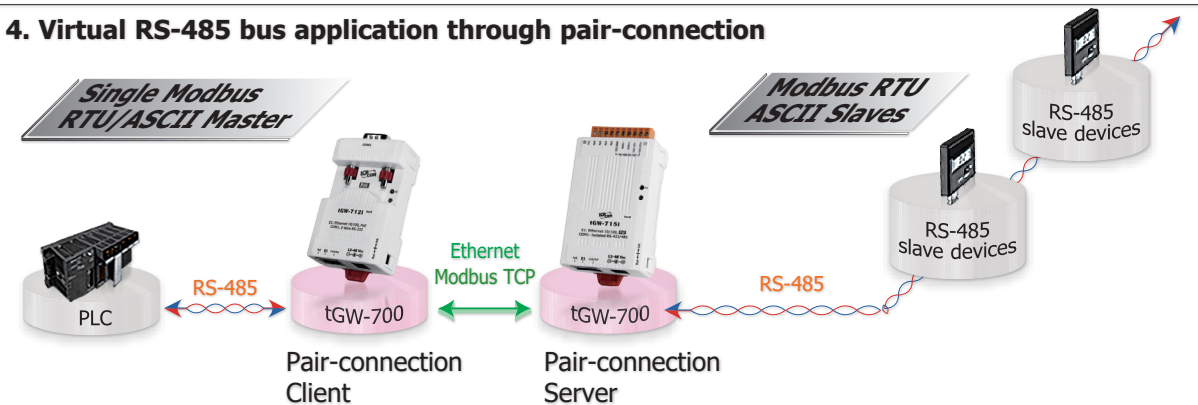
2. Modbus TCP to RTU/ASCII Gateway application (dual-port)



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



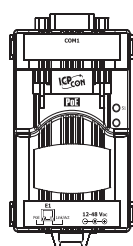
4. Virtual RS-485 bus application through pair-connection



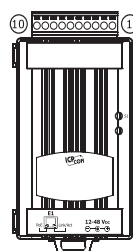
System Specifications

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 × RS-232	2 × RS-232	3 × RS-232	1 × RS-422/ RS-485	2 × RS-485	3 × RS-485	1 × RS-232 or RS-422/485	1 × RS-485 1 × RS-232	1 × RS-485 2 × RS-232	
Self-Tuner		–			Yes, automatic RS-485 direction control						
Power Isolation		1000 V _{DC} for tGW-722i/ 732i /718i-D only									
Signal Isolation		3000 V _{DC} 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 V _{DC} for DC Jack									
Power Consumption		0.07 A @ 24 V _{DC}									
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			
09	N/A		
08	CTS1		
07	RTS1		
06	N/A		
05	GND		
04	N/A		
03	TxD1		
02	RxD1		
01	N/A		

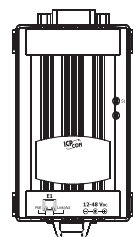


tGW-722/tGW-722i	
10	F.G.
09	CTS2
08	RTS2
07	RxD2
06	TxD2
05	GND
04	CTS1
03	RTS1
02	RxD1
01	TxD1

tGW-732/tGW-732i	
10	F.G.
09	GND
08	RxD3
07	TxD3
06	GND
05	RxD2
04	TxD2
03	GND
02	RxD1
01	TxD1

tGW-735/tGW-735i	
10	F.G.
09	GND
08	D3-
07	D3+
06	GND
05	D2-
04	D2+
03	GND
02	D1-
01	D1+

tGW-718/tGW-718i	
10	F.G.
09	N/A
08	GND
07	RxD1
06	TxD1
05	GND
04	RxD1-
03	RxD1+
02	TxD1-/D1-
01	TxD1+/D1+



tGW-718i-D			
Terminal No.	RS-232	RS-422	RS-485
09	N/A	N/A	N/A
08	CTS	N/A	N/A
07	RTS	N/A	N/A
06	N/A	N/A	N/A
05	GND	GND	GND
04	N/A	RxD-	N/A
03	TxD	RxD+	N/A
02	RxD	TxD+	Data+
01	N/A	TxD-	Data-

tGW-715/tGW-715i	
10	F.G.
09	N/A
08	N/A
07	N/A
06	N/A
05	GND
04	RxD1-
03	RxD1+
02	TxD1-/D1-
01	TxD1+/D1+

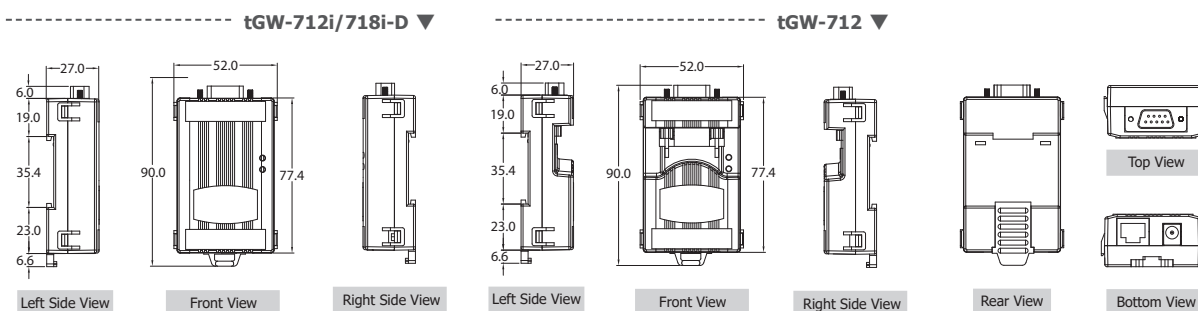
tGW-725/tGW-725i	
10	F.G.
09	N/A
08	N/A
07	N/A
06	GND
05	D2-
04	D2+
03	GND
02	D1-
01	D1+

tGW-724/tGW-724i	
10	F.G.
09	N/A
08	CTS2
07	RTS2
06	GND
05	RxD2
04	TxD2
03	GND
02	D1-
01	D1+

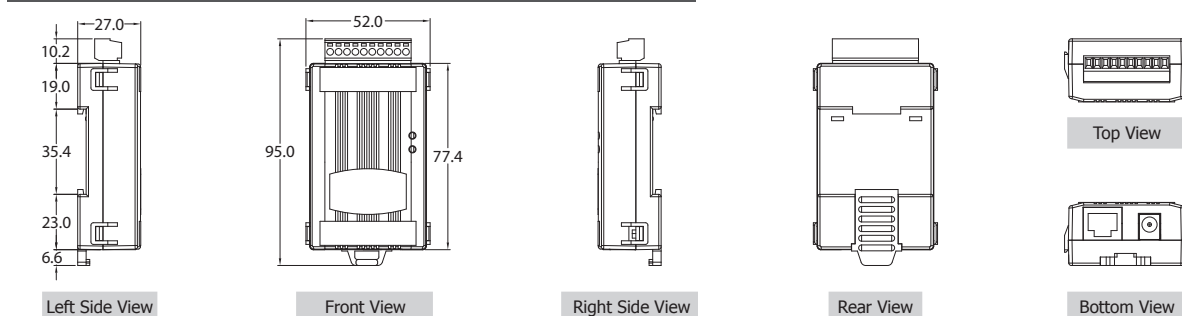
tGW-734/tGW-734i	
10	F.G.
09	GND
08	RxD3
07	TxD3
06	GND
05	RxD2
04	TxD2
03	GND
02	D1-
01	D1+

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)