tGW-712

tGW-700 Series

tGW-700-T Series

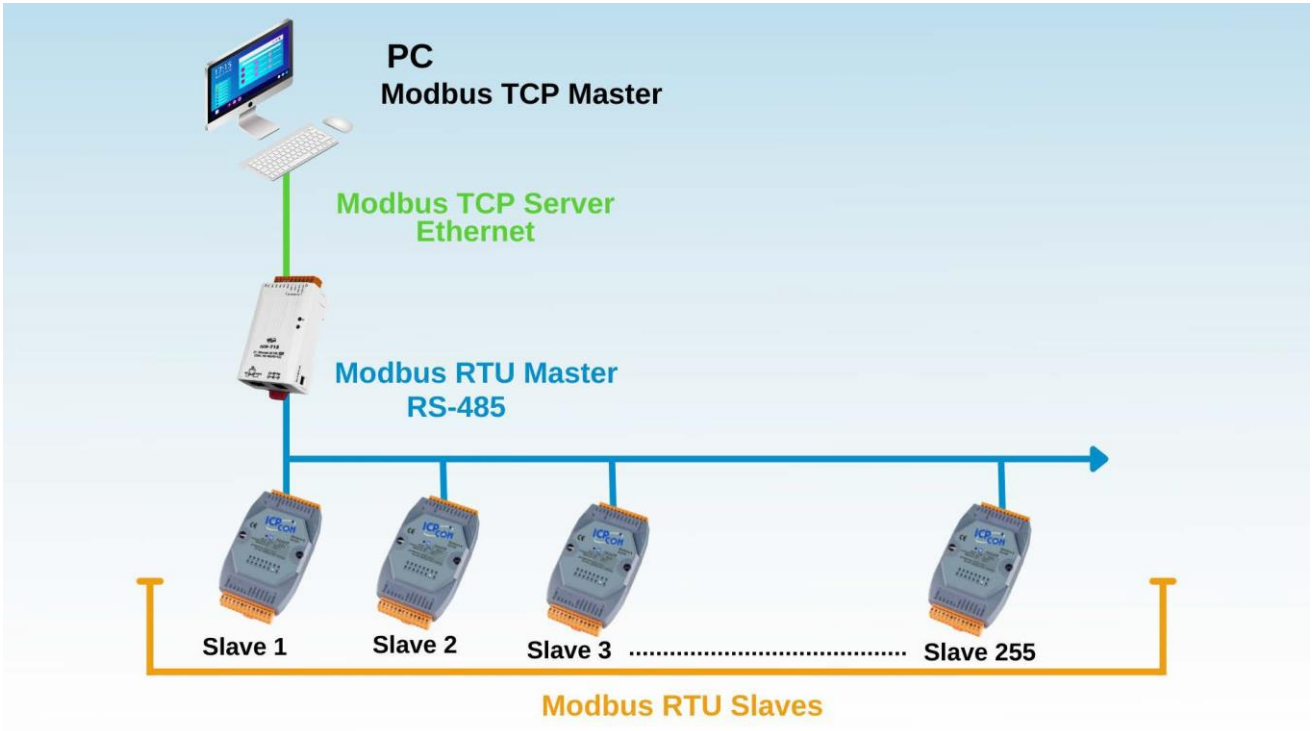
Tiny Modbus/TCP to RTU/ASCII Gateway

Features

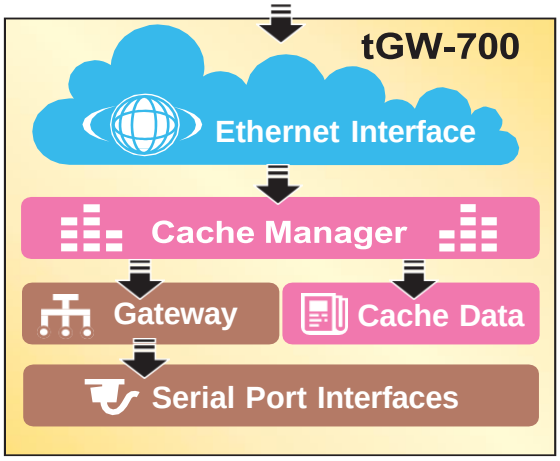
- Modbus TCP/UDP master and slave support
- Modbus RTU/ASCII master and slave support
- 32 Modbus TCP master connections per serial port
- Modbus TCP/UDP responses are faster with read-cache
- Supports device discovery using UDP Search
- Network can be configured as either Static IP or DHCP
- Firmware updates are done via Ethernet (BOOTP, TFTP)
- Serial and network configuration are done using web server
- Efficiently handles network traffic with a 32-bit MCU
- RJ-45 x 1(Auto-negotiating, auto MDI/MDIX, LED Indicators) 10/100 Base-TX Ethernet
- PoE (IEEE 802.3af, Class 1) and a DC connector are included as redundant power inputs
- Automatic RS-485 direction control
- Isolation of 3000 VDC and ESD protection of +/-4 kV for I Version
- Easy wiring a Male DB-9 or terminal block connector
- Low power usage and a small form factor
- RoHS-compliant & halogen-free
- Low cost Modbus/TCP to RTU/ASCII Gateway

Introduction

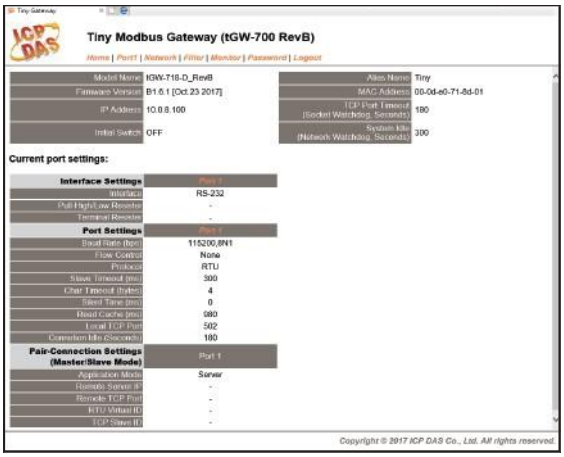
Modbus has become the most widely used method of linking industrial electrical devices, and it has become a standard industrial communication protocol. Modbus enables communication between multiple devices linked to the same RS-485 network, such as a system that monitors temperature and humidity and sends the data to a computer. In supervisory control and data acquisition (SCADA) systems, Modbus is frequently used to connect a supervisory computer to remote terminal units (RTU).



ICP DAS USA's tGW-700 series are Modbus TCP to RTU/ASCII gateways that solves the cable length barrier of serial communication devices by allowing a Modbus TCP/UDP host to communicate with serial Modbus RTU/ASCII devices over an Ethernet network. They can be used to create a pair-connection application (also known as a serial bridge or serial-tunnel application) that can route data over TCP/IP between two serial Modbus RTU/ASCII devices, which is useful when connecting computers, servers, or other serial devices that do not have Ethernet capability.



For each serial port, the maximum number of TCP connections is 32, allowing several masters to access slave devices on the same serial port. The read-cache function is used to save past requests and responses in the tGW-700 series memory buffer. The cached response is returned promptly when additional HMI/SCADA master controllers issue the same requests to the same RTU slave device. This functionality significantly reduces the serial port communication loading, provides faster TCP responses, and enhances overall system stability.



The tGW-700 series has a powerful 32-bit microcontroller (MCU) for efficient network traffic handling, as well as a built-in web server with an intuitive web management interface that allows users to change the module's format, such as the DHCP/Static IP, gateway/mask settings, and serial port settings.

If the built-in firmware is operating abnormally, the CPU watchdog automatically resets the CPU, while the host watchdog automatically resets the CPU if there is no communication between the module and the host (PC or PLC) for a predetermined amount of time (system timeout). The dual watchdog is a critical component that ensures the module continues to operate even in extreme conditions. This diverts potentially destructive charges away from critical circuits, protecting the module and equipment from abrupt and momentary electric current.

Using a standard category 5 Ethernet connection to receive power from a PoE switch such as the NS-205PSE, the tGW-700 series provides genuine IEEE 802.3af-compliant (classification, Class 1) Power over Ethernet (PoE) capabilities. If a PoE switch is not available, the module will receive power from a DC adapter. The tGW-700 series is designed for ultra-low power usage, which reduces hidden expenses associated with rising fuel and energy prices, particularly when a large number of modules are installed. Choosing energy-efficient equipment to reduce electricity use can help to keep the environment green.

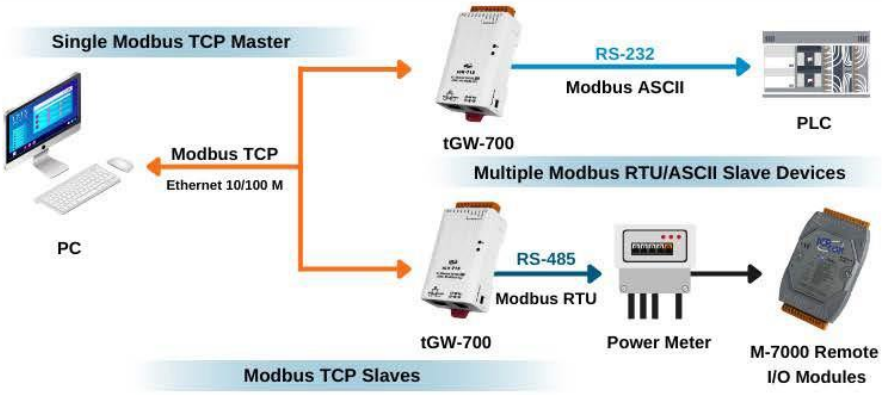
For easy wiring, the tGW-700 comes with a male DB-9 or a removable terminal block connector. The tGW-700 series provides ultimate space savings thanks to its extremely small form-factor, allowing it to be simply put anywhere, even directly embedded inside a machine. When sending and receiving data, it also offers automatic RS-485 direction control, which improves the RS-485 communication's stability.

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
tGW-700-T Series	10/100 M	–	–	–	Yes	Yes	Yes	Yes	Yes
PPDS-700-MTCP Series	10/100 M, PoE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

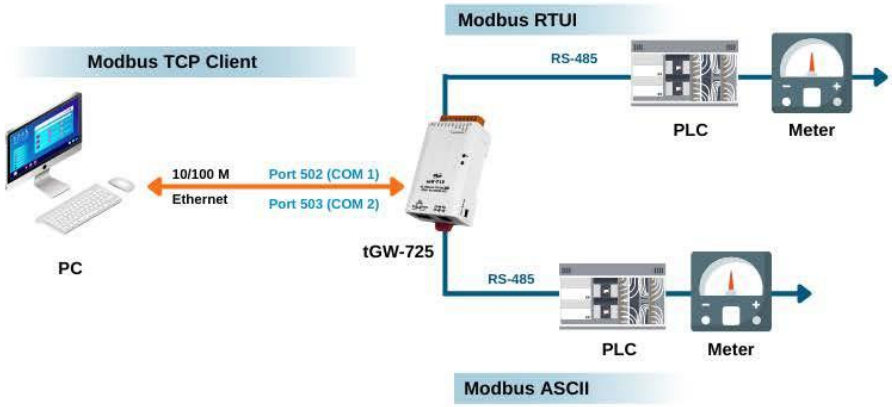
Applications

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

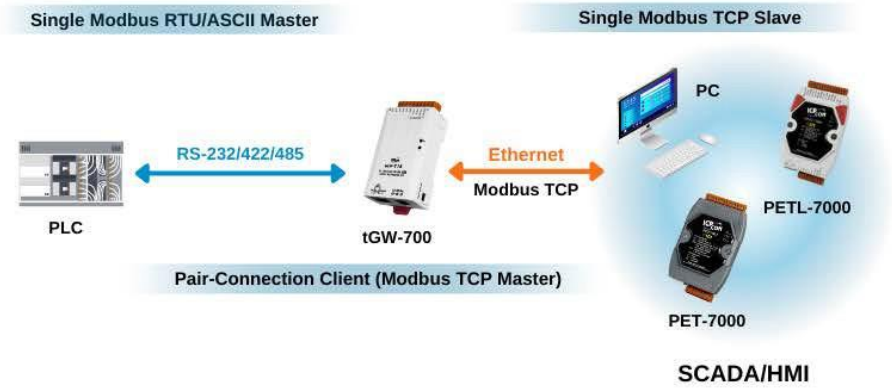
Modbus TCP to RTU/ASCII Gateway Application



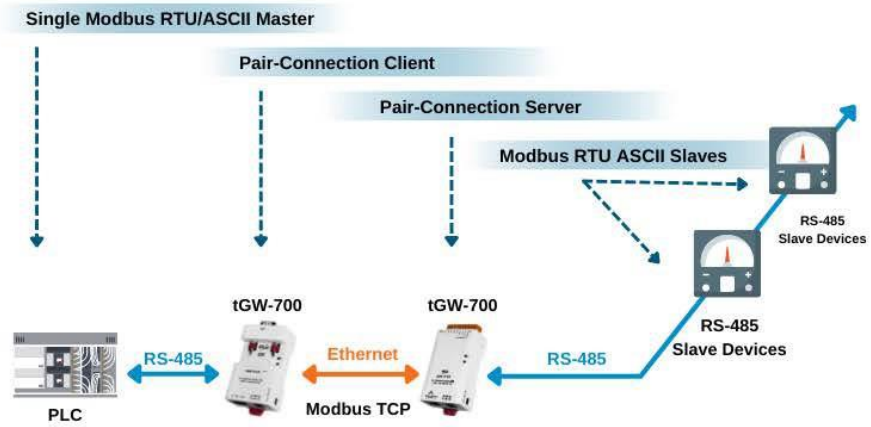
Modbus TCP to RTU/ASCII Gateway Application (Dual-Port)



Modbus RTU/ASCII to TCP Gateway Application (Like Pair-Connection)



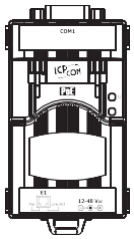
Virtual RS-485 Bus Application Through Pair-Connection



Specifications

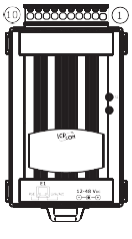
Models		tGW-712 tGW-712i	tGW-722 tGW-722i	tGW-732 tGW732i	tGW-715 tGW-715i tGW-715-T tGW-715i-T	tGW-725 tGW-725i	tGW-735 tGW-735i	tGW-718 tGW-718i tGW-718-T tGW-718i-T	tGW-718i-D	tGW-724 tGW-724i	tGW-734 tGW-734i
System											
CPU		32-bit MCU									
Communication Interface											
Ethernet		10/100 Base-TX, 8-pin RJ-45 x 1, (Auto-negotiating, Auto-MDI/MDIX, LED indicator)									
PoE	700 Series	IEEE 802.3af, Class 1									
	700-T Series	–									
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									
Signal Isolation		3000 VDC for tGW-712i/ 715i/ 725i/ 735i/ 718i/ 724i/ 734i/ 715i-T/ 718i-T									
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		Male DB-9 x 1 for tGW-712(i)/ 718i-D 10-pin Removable Terminal Block x 1 for tGW-722(i)/ 732(i)/ 715(i)/ 725(i)/ 735(i)/ 718(i)/ 724(i)/ 734(i)/ 715(i)-T/ 718(i)-T									
Dimensions (W x H x D)		52 mm x 95 mm x 27 mm (tGW-712: 52 mm x 90 mm x 27 mm)									
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									
Note: COM1 = TCP Port 10001, COM2 = TCP Port 10002, COM3 = TCP Port 10003											

Appearances



tGW-712(i)

COM1 (Male DB-9)	09	N/A
	08	CTS1
	07	RTS1
	06	N/A
	05	GND
	04	N/A
	03	TxD1
	02	RxD1
	01	N/A



tGW-722(i)

COM2	10	F.G.
	09	CTS2
	08	RTS2
	07	RxD2
	06	TxD2
COM1	05	GND
	04	CTS1
	03	RTS1
	02	RxD1
	01	TxD1

tGW-732(i)

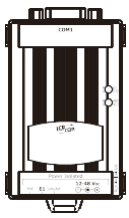
COM3	10	F.G.
	09	GND
	08	RxD3
	07	TxD3
	06	GND
COM2	05	RxD2
	04	TxD2
	03	GND
COM1	02	RxD1
	01	TxD1

tGW-735(i)

COM3	10	F.G.
	09	GND
	08	D3-
	07	D3+
	06	GND
COM2	05	D2-
	04	D2+
	03	GND
COM1	02	D1-
	01	D1+

tGW-718(i)
tGW-718(i)-T

RS-232	10	F.G.
	09	N/A
	08	GND
	07	RxD1
	06	TxD1
RS-485/ RS-422	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-

COM1 (Male DB-9)

tGW-700-T Series

tGW-715(i)
tGW-715(i)-T

RS-485/ RS-422	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(i)

COM2	10	F.G.
	09	N/A
	08	N/A
	07	N/A
	06	GND
	05	D2-
	04	D2+
	03	GND
COM1	02	D1-
	01	D1+

tGW-724(i)

COM2	10	F.G.
	09	N/A
	08	CTS2
	07	RTS2
	06	GND
	05	RxD2
	04	TxD2
	03	GND
COM1	02	D1-
	01	D1+

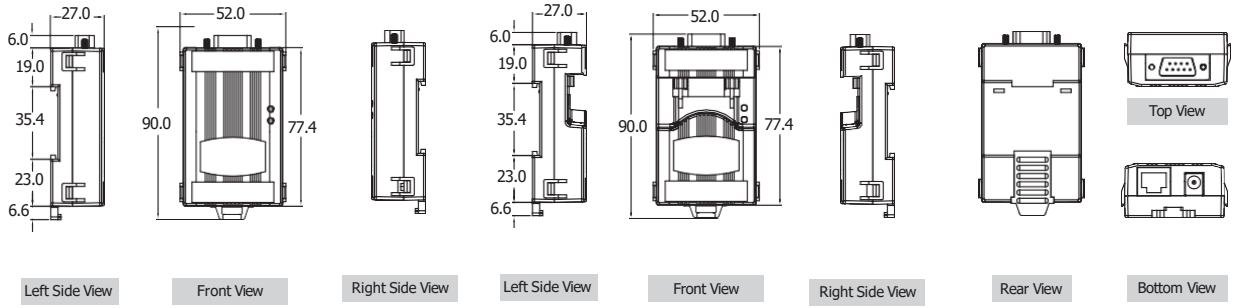
tGW-734(i)

COM3	10	F.G.
	09	GND
	08	RxD3
	07	TxD3
	06	GND
COM2	05	RxD2
	04	TxD2
	03	GND
COM1	02	D1-
	01	D1+

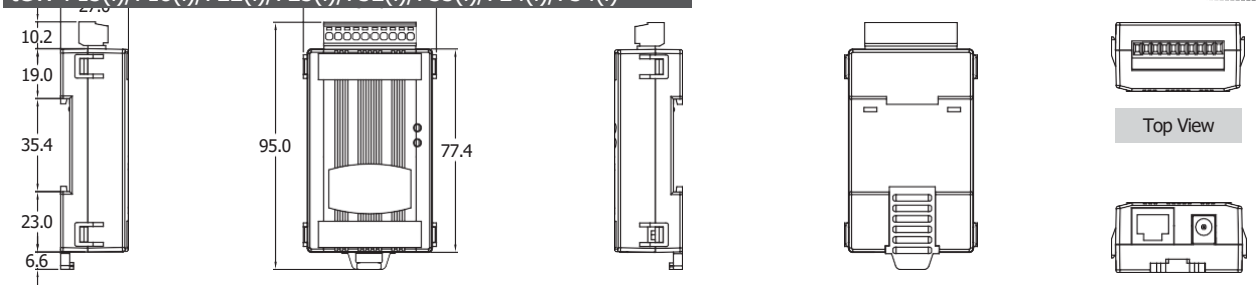
Dimensions (Units: mm)

tGW-712/712i/718i-D

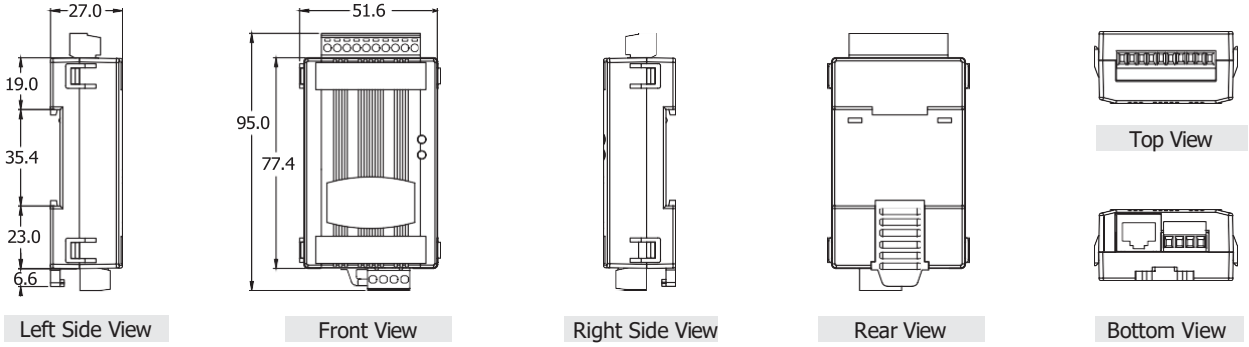
tGW-718i-D ▼ tGW-712/712i ▼



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



tGW-715(i)-T/718(i)-T



Ordering Information

Non-Isolated	Isolated	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and DC jack: Includes DC connector to 2-wire power cable
tGW-712 CR	tGW-712i CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1-port RS-232 (RoHS)
tGW-722 CR	tGW-722i CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 2-port RS-232 (RoHS)
tGW-732 CR	tGW-732i CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 3-port RS-232(RoHS)
tGW-715 CR	tGW-715i CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1-port RS-422/485 (RoHS)
tGW-725 CR	tGW-725i CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 2-port RS-485 (RoHS)
tGW-735 CR	tGW-735i CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 3-port RS-485 (RoHS)
tGW-718 CR	tGW-718i CR tGW-718i-D CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1-port RS-232/422/485 (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-port RS-232 and 1-port RS-485 (RoHS)
tGW-734 CR	tGW-734i CR	Tiny Modbus/TCP to RTU/ASCII Gateway with PoE, 2-port RS-232 and 1-port RS-485 (RoHS)

Non-Isolated	**Isolated**	Tiny Modbus/TCP to RTU/ASCII Gateway with DC Terminal Block
tGW-715-T CR	tGW-715i-T CR	Tiny Modbus/TCP to RTU/ASCII Gateway with 1-port RS-422/485 (RoHS)

tGW-718-T CR	tGW-718i-T CR	Tiny Modbus/TCP to RTU/ASCII Gateway with 1-port RS-232/422/485 (RoHS)

Accessories

CA-002	CA-0915	CA-0910F	CA-0910N
DC connector to 2-wire power cable, 0.3 M	Male DB-9 to Female DB-9 Cable, 1.5 m	Female DB-9 to Female DB-9 Cable, 1.0 m	DB-9 Female-Female 3-wire Null Modem Cable, 1M

CA-PC09F	UP0061D-12PA58G_CR	NS-205PSE CR	NS-205PSE-24V CR
DB-9 Female Connector with Plastic Cover	Wall mount power supply; Input range 90-240VAC; Output 12VDC/0.5A, 6 W; two pins USA plug	Unmanaged Ethernet Switch with 4 PoE Ports and 1 RJ-45 Uplink (RoHS)	Unmanaged 5-port 10/100 Mbps PoE (PSE) Ethernet Switch; 24 VDC Input (RoHS)