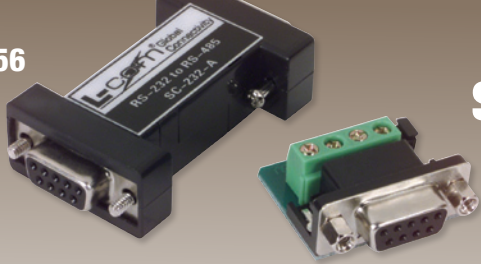# Serial Products Tutorial

What is a Serial Converter?

A Serial Converter, sometimes referred to as an Interface converter, allows you to convert between different serial protocols to allow for the interconnectivity of various serial devices.

How is a Serial Converter used?

Serial Converters typically consist of a minimum of two bi-directional interfaces, one each for the different protocols being converted, for RS232 (Full Duplex / Half Duplex) for RS422 / 423 / 485 (Half Duplex). These interfaces can consist of any combination of Telephony style Modular Jacks, Terminal Blocks or D-Subs (DB9, DB25). In the case of an RS232 to RS485 Converter, one of the interfaces would be used to handle the RS232 signals while the other is used to handle the RS485 signals.

RS232:

First introduced in 1962, it is a series of standards for serial binary single-ended data and control signals for connecting a DTE (Data Terminal Equipment) (PC) and a DCE (Data Communication Equipment) (Modem).

It uses multi-conductor cabling and can function in half duplex as well as full duplex modes of operation. It was designed for point-to-point connections, (1) DTE & (1) DCE.

The accepted max distance for standard cabling is 50 feet (15m) with a maximum baud rate of 20 kbit / s. Theoretically, 1kbit / s can be achieved at 4,000 feet (1,200m). With low-capacitance cabling the 20 kbit / s can be effectively maintained up to a theoretical distance of 1,000 feet (300m).

RS422:

A high-speed protocol similar to RS232 but with differential signaling in a multi-drop configuration.

It was designed for half duplex mode of operation.

It uses Twisted Pair cabling and can support a maximum of 10 Devices (1) DTE & (10) DCE.

With appropriate cabling it can be effectively used up to a theoretical distance of 4,000 feet (1,200m).

With a maximum baud rate of 10 Mbit / s at 40 feet (12m) & 100 kbit / s at 4,000 feet (1,200m).

RS423:

A high-speed protocol similar to RS422 but with unbalanced signaling in a multi-drop configuration.

It uses multi-conductor cabling and was designed for half duplex mode of operation.

It can support a maximum of 10 Devices (1) DTE & (10) DCE.

With a maximum baud rate of 100 kbit / s at 40 feet (12m) 1kbit / s at 4,000 feet (1,200m).

RS485:

A protocol developed from RS422 that can be used as a bus in multi-drop / multipoint configurations.

It was designed for half duplex mode of operation.

It uses Twisted Pair cabling and can support a maximum of 32 Devices.

With appropriate cabling it can be effectively used up to a theoretical distance of 4,000 feet (1,200m).

With a maximum baud rate of 35 Mbit / s at 40 feet (12m) & 100 kbit / s at 4,000 feet (1,200m).

Typical Serial Converter Applications

Point of Sale — RS232, RS485, Barcode Reader, Barcode Scanner

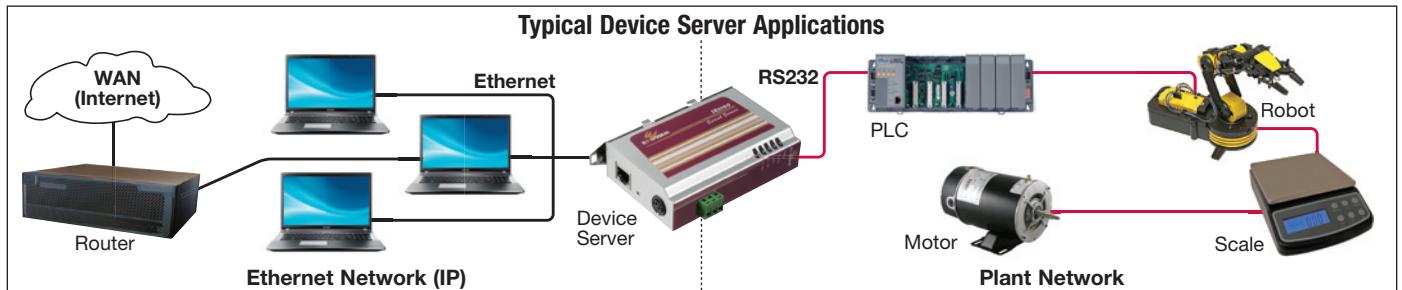**Factory Automation** — RS232, RS485, Flow Meter, Temperature Sensor, PLC, Remote I/O

What is a Device Server?

A Device Server, sometimes referred to as a Serial Server, is used to connect a serial network or device such as RS232 to an Ethernet Network that uses the IP (Internet Protocol) data transmission.

How is a Device Server used?

A Device Server has one or more serial ports and typically one RJ45 Ethernet port. After connecting the serial devices to the server, then connecting the server to the Ethernet Network, some set up is required to configure the communication between the two networks via a management application built into the Device Server.

Typical Device Server Applications

WAN (Internet), Router, Ethernet, Ethernet Network (IP), Device Server, RS232, PLC, Robot, Motor, Scale, Plant Network

Item #	Description	List Price

L-com's SC-232 Series of RS232 to RS485 & 485 / 422 Interface Converters DB9M / DB9F

L-com's SC-232 series of RS232 to RS485 & RS232 to 485 / 422 converters provide an array of configuration options to meet your specific application requirements. Datasheets with additional specification details can be found on our website.

SC-232-A	L-com SC-232 Series RS232 to RS485 Interface Converter, DB9M/DB9F, Half Duplex, Port Powered	61.14
SC-232-B	L-com SC-232 Series RS232 to RS485 Interface Converter, DB9M/DB9F, Half Duplex, Externally Powered	71.50
SC-232-C	L-com SC-232 Series RS232 to RS485/422 Interface Converter, DB9M/DB9F, Half/Full Duplex, Port Powered	61.14
SC-232-D	L-com SC-232 Series RS232 to RS485/422 Interface Converter, DB9M/DB9F, Half/Full Duplex, Externally Powered, Opto-Isolated	71.50
SC-232-E	L-com SC-232 Series RS232 to RS485/422 Interface Converter, DB9M/DB9F, Half/Full Duplex, Port Powered, Opto-Isolated	70.46

SC-232-A

View of the SC-232-A with terminal block adapter attached
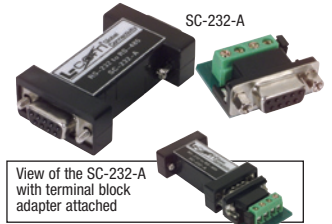
5V DC Power Supply for SC-232 L-com's Series Interface Converters

SC-5VDC-PWR	5VDC Power Supply for SC-232 Series Interface Converter	5.70

SC-5VDC-PWR

Economy RS232 to Current Loop Converter with 4-Pin Terminal Block

The ICC47B-014 RS232 to current loop serial converter provides users with an economical and compact way to extend RS232 signals using standard twisted pair cabling. The ICC47B-014 features a DB25F input connector and a 4-pin terminal block for the current loop side. The ICC47B-014 supports data rates up to 128Kbps and distances up to 1,000 meters. The unit includes a 9VDC external power supply and a one year manufacturer's warranty.

ICC47B-014	Economy RS232 to V.24 Interface Converter with 4-Pin Terminal Block	43.50

ICC47B-014

L-com Industrial RS232 to RS422/485 Converter, Din Rail Mountable

L-com's LC-IND232-422-485 serial converter provides a rugged, industrial solution for optically isolated data transmission. Din rail mountable, and powered via a 10-30VDC terminal block, this device is compact and simple to set up.

LC-IND232-422-485	L-com Din Rail Mountable RS232 to RS422/485 Industrial Converter	134.71

LC-IND232-422-485

L-com Isolated RS232 to RS422/485 Converter

L-com's RS232 to R422/485 converter is a flexible tool for industrial communications. Providing 2000VAC isolation, easily switchable modes, and accepting between 10-48 VDC to power the device, this converter can be easily inserted into most existing setups.

LC-232I-422-485	L-com Isolated RS232 to RS422/485 Converter	112.95

LC-232I-422-485

L-com Port Powered RS232 to RS485/422 Converter

The LC-232SW-422-485 serial converter is a flexible, easy to use device that can be powered directly from the RS232 connector. Four switches on the top of the device allow you to switch between the different modes quickly, and an external 12VDC power supply can be used for high power or long distance applications.

LC-232SW-422-485	L-com RS232 to RS422/485 Converter, Port Powered, or Externally Powered via 12VDC Jack	74.61

LC-232SW-422-485

L-com RS422/485 Isolated Line Repeater, Din Rail Mountable

L-com's LC-IND422-485-IRPT RS422/485 repeater is a rugged, compact extender that can easily be mounted on a standard DIN rail. This extender is optically isolated up to 2000V with 600W surge suppression, and can extend an existing RS422 or 485 network up to 4000 additional feet.

LC-IND422-485-IRPT	L-com Din Rail Mountable RS422/485 Isolated Line Repeater	217.60

LC-IND422-485-IRPT
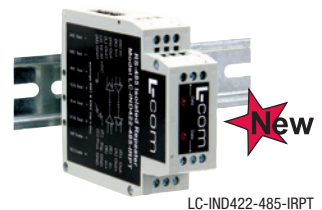
L-com Isolated RS232 Repeater, Din Rail Mountable

L-com's LC-IND232-IRPT isolated repeater is a simple, drop in way to extend RS232 signals as well as protecting attached equipment. This device provides 2000V of optical isolation, mounts easily to a standard DIN rail, and accepts 10-30VDC of external power.

LC-IND232-IRPT	L-com Din Rail Mountable RS232 Isolated Repeater	170.97

LC-IND232-IRPT

L-com Isolated RS485/422 Repeater

L-com's LC-IND422-485-IRPT RS422/485 repeater is a rugged, compact extender, and comes with an external 12VDC power supply. This extender is optically isolated up to 2000V with 600W surge suppression, and can extend an existing RS422 or 485 network up to 4000 additional feet.

LC-IND485-IRPT	L-com RS422/485 Isolated Line Repeater	217.60

LC-IND485-IRPT

Tip | *What are ground loops?*

Ground currents or loops are caused when two or more electrical devices are tied together via copper cabling and the equipment has different ground potentials.This combination can cause difficulty in data transmission,can damage equipment and in extreme cases cause bodily harm in medical applications.

The simplest way to protect ground currents is to tie all the equipment in question to a common ground (preferably earth ground). In many applications this is not physically possible due to the distance between equipment.The next simplest way to solve this problem is by installing an optical link in between the copper cabling connecting the equipment. This can be done with an Opto-Isolation Module which converts the electrical data signals to light then back to electrical signals. The last way to solve the problem is to not use copper cabling at all, but to use fiber optic connections between equipment. The biggest advantage here is that the ground current problem is solved and operating distance can be greatly increased.

L-com® Global Connectivity

Item #	Description	List Price

Telebyte RS232 to RS422 Serial Converter - Self-powered DB9 Connector

Adding an RS422 interface to a PC is now a snap. The TB253P serial converter does this for full duplex signals at data rates up to 19.2 KBPS, without AC or DC power. The unit features a DB9F connector, (allowing it to be plugged directly into any one of the PCs com ports) and an RJ11 (6x4) jack.

TB253P	Telebyte RS232 to RS422 Serial Converter, DB9F, Self-powered	72.48

Telebyte RS232 to Current Loop Converter

The TB65A is a small, versatile, RS232 to current loop converter for use with teletypes or computers providing local terminal input via a 20mA (or 60mA) current loop. The TB65A includes a wall-mounted transformer and internal power supply circuitry. Additionally the TB65A provides switch selection of all RS232 operating modes including: Half Duplex - Passive Loop, Half Duplex - Active Loop, Full Duplex - Passive Loop, and Full Duplex - Active Loop. This product will drive 20mA and accept 20mA or 60mA loop currents and operates from DC to 9.6 KBPS.

TB65A	Telebyte RS232 to Current Loop Converter (Includes Power Supply)	119.16

Telebyte RS232 Fiber Optic Line Drivers

The TB271 series of RS232 fiber optic line drivers provides maximum protection from ground currents and noise interference between equipment as well as increases operating distances to up to 2km. Three versions are available, supporting RS232 serial interfaces. The TB271 series achieves power from the transmit data line, whereas, the TB271A series has an external power supply (included). DB25M and DB25F versions available. Fiber optic connection utilizes dual ST connectors and duplex 62.5/125 multimode cabling.

TB271M	Telebyte RS232 Fiber Line Driver, DB25M, Self Powered	144.03
TB271F	Telebyte RS232 Fiber Line Driver, DB25F, Self Powered	137.76
TB271AF	Telebyte RS232 Fiber Line Driver, DB25F, Externally Powered	144.03

Telebyte RS422 and RS485 Fiber Optic Line Drivers

Similar to the TB271 series except designed for RS422 and RS485. Both units utilize DB25F and dual fiber ST ports. For use with duplex Multimode Fiber Optic cabling.

TB272F	Telebyte RS422 Fiber Line Driver, DB25F, Externally Powered	154.39
TB276F	Telebyte RS485 Fiber Line Driver, DB25F, Externally Powered	154.39

Telebyte RS232 Fiber Optic Line Driver - Auto Powered

The TB9271 RS232 fiber optic auto powered line driver features a standard DB9 female interface and Dual ST style fiber connectors. It can be installed in applications requiring very high data transmission rates, offers resistance to Electromagnetic Interference (EMI) and isolation from lightning-induced current surges and ground loops. The unit employs an RS232 data interface, can achieve 56Kbps asynchronously and operates in either half or full duplex modes over dual fibers up to 2km in length.

TB9271	Telebyte RS232 Fiber Optic Auto Powered Line Driver	144.03

Telebyte RS232, RS422 or RS485 Fiber Optic Modem - DIN Rail Mountable

The model TB8277 is a unique asynchronous fiber optic modem whose optical interface can operate in either point to point or ring (daisy chain) configurations and whose electrical interface can also operate in point to point or multi-drop configurations depending on the user selected interface. The electrical interface is switch selectable between RS232, RS422 and RS485. The TB8277 is supplied with a power cord for the DC input. An optional AC power adapter is available for installations where 12 VDC is not accessible.

TB8277	Telebyte DIN Rail Fiber Optic Media	237.29
TB8277-110PSU	Telebyte Optional 110 VAC Power Supply	14.45

Telebyte Single mode to Multimode Fiber Converter

The TB279 provides transparent conversion between fiber optic devices utilizing multimode fiber and those with single mode fiber. Features of the TB279 include the ability to operate from DC to 2.5 Mbps. This allows a variety of applications to take advantage of the transmission capability of the device and fiber cable. The TB279 is powered by a wall-mounted 12 VDC adapter.

TB279	Telebyte Single mode to Multimode Converter	724.30

ICP DAS USB to RS232/422/485 Converter

The CVTR-I-7561 is a rugged yet cost-effective module that is used for transferring serial data over USB. This converter allows you to connect your serial devices to systems using a USB interface such as a PC. The CVTR-I-7561 contains a self tuner chip, which auto-tunes the baud rate and data format to the RS485 network. CVTR-I-7561 module derives its power from the USB port and does not require an external power supply. This versatile converter also features a high-speed 115.2 Kb/s transmission rate, and supports a multitude of O.S. independent RS232/422/485 Ports. **As an authorized ICP DAS reseller, we can bid on RFQs for any ICP DAS part numbers. Contact us to request a non-obligatory quote.**

CVTR-I-7561	ICP DAS USB to RS232/422/485 Converter	129.53

ICP DAS RS232 to RS485 Protocol Converter

The CVTR-I-7520 seamlessly converts the RS232 protocol to RS485 all in one rugged, economical package. Features include auto switching baud rate of 300~115,200 BPS and a self tuner chip, which auto-tunes the baud rate and data format to the RS485 network. This converter also supports 256 modules max. in one RS485 network without repeater and 2,048 modules max. in one RS485 network with a repeater. Power supply sold separately. **As an authorized ICP DAS reseller, we can bid on RFQs for any ICP DAS part numbers. Contact us to request a non-obligatory quote.**

CVTR-I-7520	ICP DAS RS232 to RS485 Protocol Converter	88.08

ICP DAS RS232 to CAN Protocol Converter

The CVTR-I-7530 offers an economical yet rugged solution for converting RS232 to CAN protocol. Features include maximum transmission speeds up to 1Mbps for CAN and 115.2Kbps for RS232 as well as support for both CAN 2.0A and CAN 2.0B standards. This converter can be easily mounted on a DIN rail and features DB9 connectors. Power supply sold separately. **As an authorized ICP DAS reseller, we can bid on RFQs for any ICP DAS part numbers. Contact us to request a non-obligatory quote.**

CVTR-I-7530	ICP DAS RS232 to CAN Protocol Converter	305.68

ICP DAS USA RS232/RS485 Wireless Modem

The ICP DAS USA SST-2450 is a spread spectrum radio modem with an RS232/RS485 interface port. It is designed for data acquisition and control applications between host and remote sensors. The SST-2450 is also useful for those applications where hard wiring equipment is hard or impossible. The SST-2450 can be used not only in peer to peer mode but also in a multi-point architecture. Based on direct sequence spread spectrum and RF technology operating in ISM bands, frequency range is 2410.496MHz~2471.936MHz and the channel spacing is 4.096MHz. The SST-2450 is configured via a software utility included with the product. Antenna options are available for extended range applications. **As an authorized ICP DAS reseller, we can bid on RFQs for any ICP DAS part numbers. Contact us to request a non-obligatory quote.**

SST-2450	ICP DAS USA RS232/RS485 Wireless Modem	589.60

TB253P

TB65A

TB271M

TB276F

TB9271

TB8277-110PSU

TB8277

TB279

CVTR-I-7561

CVTR-I-7530

SST-2450

Item #	Description	List Price

RS232 / 422 / 485 Fiber Modem

The FRM220-Serial/485 provides a fiber converter solution to extend asynchronous RS485 or RS232 transmission distance up to 2km over multimode fiber or up to 120km over single mode fiber. The converter is equipped with multiple interface circuits for connection to RS232 or RS485/422 (2 or 4 wire, full or half duplex). The FRM220-Serial secures data transmission over EMI resistant fiber at speeds up to 460kbps for RS232 or up to 1024kbps for RS485/422. When the FRM220-Serial/485 card is placed in the FRM220 rack with SNMP management, in-band management allows viewing the card and remote converter's status, type, version, fiber link status, data link status and alarms. Both card and remote can be configured to enable or disable the port, reset the port and set the interface type.

FRM220-SERIAL-ST002	RS232/423/422/485 Fiber Modem	259.03

FRM220-SERIAL-ST002

EtherWAN Single Port Device Servers

EtherWAN offers both Industrial and Hardened versions of its popular single port RS232/422/485 to Ethernet device servers for converting legacy RS232/422/485 to Ethernet. The SE5101-00B equipped with 2KV optical isolation protection and 15KV ESD surge protection of serial interfaces and can be used in temperatures ranges from -10°C to 60°C (14°F to 140°F). The SE6101-00B is designed for harsh environments and operates within temperature ranges of -34°C to 75°C (-29.2°F to 167°F). **As an authorized EtherWan reseller, we can bid on RFQs for any EtherWan part numbers. Contact us to request a non-obligatory quote.**

SE5101-00B	EtherWAN Device Server 1 -10/100TX to 1 -RS232/422/485 (-10 to +60C)	164.76
SE6101-00B	EtherWAN Device Server 1 -10/100TX to 1 -RS232/422/485 (-34 to +75C)	340.91

SE5101-00B
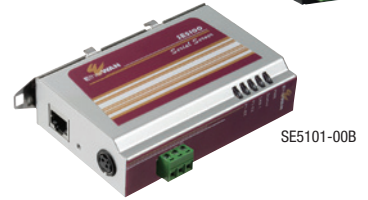
Passport Networks ESport RS232/422/485 to Ethernet Device Servers

The ESport-10x Ethernet device servers connect RS232/422/485 serial devices to a 10/100 Ethernet LAN/WAN providing a reliable communications connection. The ESport-10x Windows driver installs virtual COM ports in the device manager of the operating system. The ESP101 features one RS232/422/485 DB9M port and one RJ45 10/100Ethernet port. The ESP102 features a single RJ45 10/100 Ethernet port and two DB9M ports, one port supports RS232/422/485 and the other only supports RS232. The ESP104 ships with its own external power supply (do not use the ESP-PWR power supply with the ESP104). These products can be powered by an external DC power supply or by an optional 9 VDC power adapter. An optional DIN Rail mounting kit is sold separately. Includes a 1-year manufacturer's warranty. **As an authorized Passport Networks reseller, we can bid on RFQs for any Passport Networks part numbers. Contact us to request a non-obligatory quote.**

ESP101	Passport Networks Single Port DB9 RS232/422/485 to RJ45 10/100 Device Server	129.53
ESP102	Passport Networks Dual Port DB9 RS232/422/485 to RJ45 10/100 Device Server	175.12
ESP104	Passport Networks Four Port DB9 RS232/422/485 to RJ45 10/100 Device Server	430.02
ESP-PWR	Passport Networks 9 VDC 500mA Power Adapter	10.36
DK-35A	Passport Networks DIN Rail Mounting Kit (35 mm)	5.18

ESP102

ESP-PWR

LAVA Ethernet-to-Serial 4 Port Device Server

The ES4-232 is ideal for POS systems, security systems, industrial automation, building automation, or any application using RS232 devices. The Lava ES4-232, four-port RS232 device server, provides four serial ports that are network-enabled, simple to install, configure and control. Any serial device can send its information to the ES4-232, which then places that information on the Ethernet network. The serial ports support 115.2 kbps throughput rates each. Additionally, each ES4-232 Includes Lava Ether Link Manager software that makes this the easiest device in its category to install and use. By utilizing the ES4-232 one PC is capable of managing hundreds of serial ports, even remotely. **As an authorized LAVA reseller, we can bid on RFQs for any LAVA part numbers. Contact us to request a non-obligatory quote.**

ES4-232	LAVA Ethernet-to-Serial 4 Port Device Server	278.74

ES4-232

ICP DAS Remote Ethernet I/O Modules

The ICP DAS ET-7000 are remote web-based Ethernet I/O modules that feature a built-in web server. It allows configuration, I/O monitoring and I/O control through a regular web browser. Remote control is as easy as surfing the Internet. No more programming or HTML skills are needed; users can create dynamic and attractive web pages for I/O monitoring and I/O control. They support Modbus/TCP protocol for seamless integration to SCADA software. The ET-7000 series offers easy and safe access for users anytime and anywhere. **As an authorized ICP DAS reseller, we can bid on RFQs for any ICP DAS part numbers. Contact us to request a non-obligatory quote.**

ICP-ET-7017	ICP DAS 8-Channel Analog Input with High Voltage Protection and 4-Channel Isolated Output Module	326.40
ICP-ET-7026	ICP DAS 6-Channel Analog Input, 2 Ch Analog Output, 2 Ch Digital Input and 2 Ch Digital Output Ethernet I/O Module	471.47
ICP-ET-7067	ICP DAS 8-Channel Power Relay Output Module	267.34

ICP-ET-7026

ICP DAS Power over Ethernet I/O Modules

The PET-7000 series is a family of Internet/Ethernet data acquisition and control modules that support Modbus TCP protocols. They are Ethernet remote I/O with a built-in web server for configuration, I/O data monitoring and control via a regular web browser. **As an authorized ICP DAS reseller, we can bid on RFQs for any ICP DAS part numbers. Contact us to request a non-obligatory quote.**

ICP-PET-7005	ICP DAS 8-Channel Thermistor Input and 4-Channel Isolated Digital Output PoE Module	487.01
ICP-PET-7017-10	ICP DAS 10/20-Channel Analog Input Module with High Voltage Protection PoE Module	440.38
ICP-PET-7018Z	ICP DAS 10-Channel Thermocouple Input With High Voltage Protection and 6-Channel Isolated Digital Output PoE Module	557.48

ICP-PET-7018Z

ICP DAS TouchPad Controller

TouchPAD is a tiny touch screen controller HMI which is designed for building and home automation. TPD-28X-W is equipped with a high resolution TFT color touch screen and fits in regular electrical wall-mount outlets. It can be easily integrated with I/O modules and has a beautiful, flexible and user-defined picture display. It is the best choice for upgrading mechanical switches to intelligent control pads. TouchPad comes with Ladder Designer Software For PLC users and a C/C++ language development environment for C/C++ Programmers. You can quickly and easily develop your programs with the development tools provided. **As an authorized ICP DAS reseller, we can bid on RFQs for any ICP DAS part numbers. Contact us to request a non-obligatory quote.**

ICP-TPD-280	ICP DAS Compact 2.8" Touch Screen PLC Controller with High Resolution TFT Color Touch Screen (RS485)	191.70
ICP-TPD-283	ICP DAS Compact 2.8" Touch Screen PLC Controller with High Resolution TFT Color Touch Screen (PoE)	191.70
ICP-TPD-430	ICP DAS 4.3" Touch Screen PLC Controller with High Resolution TFT Color Touch Screen (RS485)	422.77

ICP-TPD-280

ICP-TPD-430

L-com® Global Connectivity