TCC-80/80I Series

Port-powered RS-232 to RS-422/485 converters with optional 2.5 kV isolation

Features and Benefits

- External power source supported but not required
- Compact size
- Converts RS-422, and both 2-wire and 4-wire RS-485
- RS-485 automatic data direction control
- Automatic baudrate detection
- Built-in 120-ohm termination resistors
- 2.5 kV isolation (for TCC-80I only)
- LED port power indicator

Certifications

Introduction

The TCC-80/80I media converters provide complete signal conversion between RS-232 and RS-422/485, without requiring an external power source. The converters support both half-duplex 2-wire RS-485 and full-duplex 4-wire RS-422/485, either of which can be converted between RS-232's TxD and RxD lines.

Automatic data direction control is provided for RS-485. In this case, the RS-485 driver is enabled automatically when the circuitry senses the TxD output from the RS-232 signal. This means that no programming effort is required to control the transmission direction of the RS-485 signal. Moreover, the TCC-80I's patented LED port power indicator lets you check whether or not the TCC-80I is receiving enough power.

Port Power over RS-232

The RS-232 port of the TCC-80/80I is a DB9 female socket that can connect directly to the host PC, with power drawn from the TxD line. Regardless of whether the signal is high or low, the TCC-80/80I can obtain enough power from the data line. However, external power can be used if the handshake line is not available, if the serial cable is too long, or if the RS-232 device is a low-power device. For external power, a five to twelve VDC power supply can be connected using an adapter or a USB power cord.
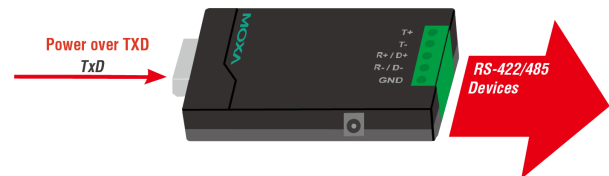
External Power Adapter
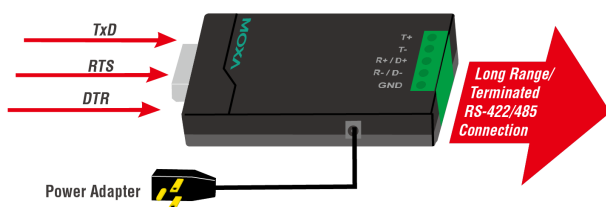
USB Power
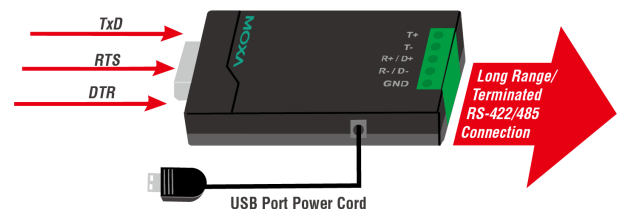
Port Power Dissipation

When installing a TCC-80 or TCC-80I converter, it is important to pay attention to power consumption, RS-232 cable length, and RS-422/485 transmission distance. In general, the TCC-80 and TCC-80I obtain 50 mW of power from the power source. Standard PC COM ports can provide 70 to 90 mW of power if the TxD, RTS, and DTR lines are connected. Moreover, the RS-232 cable should be shorter than 15 m (@ 9600 bps) to ensure that less power is lost from the host/device to the TCC-80. The remainder of the supplied power is used for transmitting the RS-422/485 signal.

Port Power and Optical Isolation

The RS-232 port of the TCC-80/80I is a DB9 female socket that can connect directly to the host PC, with power drawn from the TxD line. Electrical 2.5 kV isolation for the TCC-80I is achieved with a photo coupler that transforms the electrical signal into light, and then re-transforms the light back into an electrical signal on the other side. In this way, the two electrical circuits are completely isolated from each other. This also protects the devices from ground loop currents, reduces damage caused by data loss, and prevents damage to the communication interfaces.

LED Port Power Indicator

It's easy enough to test the serial device with a multimeter to determine that the serial device will provide enough power to the media converter. However, it's even easier to let the TCC-80I test the device for you. Simply connect the TCC-80I to the device's RS-232 port and set the SW4 switch to Test mode. If the patented port power LED indicator lights up, the TCC-80I is receiving enough power. If the LED does not light up, you will need to attach an external power source to the TCC-80I.

Specifications

Serial Interface

Connector	TCC-80-DB9/80I-DB9: DB9 male TCC-80/80I: Terminal block
No. of Ports	2
Serial Standards	RS-232, RS-422, RS-485
Isolation	TCC-80I/80I-DB9: 2 kV
RS-485 Data Direction Control	ADDC® (automatic data direction control)
Terminator for RS-485	N/A, 120 ohms, 120 kilo-ohms
Baudrate	50 bps to 115.2 kbps

Serial Signals

RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422	Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w	Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w	Data+, Data-, GND

Power Parameters

Input Current	TCC-80: 10 mA @ 5 VDC TCC-80-DB9: 10 mA @ 5 VDC TCC-80I: 20 mA @ 5 VDC TCC-80I-DB9: 20 mA @ 5 VDC
Input Voltage	5 to 12 VDC
No. of Power Inputs	1
Overload Current Protection	Supported

Power Consumption	TCC-80/80-DB9: 10 mA @ 5 VDC
	TCC-80I/80I-DB9: 20 mA @ 5 VDC
Source of Input Power	Power input jack

Physical Characteristics

Housing	Plastic top cover, metal bottom plate
IP Rating	IP30
Dimensions	TCC-80/80I: 42 x 80 x 22 mm (1.65 x 3.15 x 0.87 in)
	TCC-80-DB9/80I-DB9: 42 x 91 x 23.6 mm (1.65 x 3.58 x 0.93 in)
Weight	50 g (0.11 lb)
Installation	Desktop

Environmental Limits

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature (package included)	-20 to 75°C (-4 to 167°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

Standards and Certifications

EMC	EN 55032/24
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV
	IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m
	IEC 61000-4-4 EFT: Power: 1 kV
	IEC 61000-4-5 Surge: Power: 1 kV
	IEC 61000-4-6 CS: 150 kHz to 80 MHz: 3 V/m; Signal: 3 V/m
	IEC 61000-4-8 PFMF
Environmental Testing	IEC 60068-2-1
	IEC 60068-2-2
	IEC 60068-2-3
Safety	EN 60950-1, IEC 60950-1
Vibration	IEC 60068-2-6

MTBF

Time	2,781,161 hrs
Standards	Telcordia (Bellcore), GB

Warranty

Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

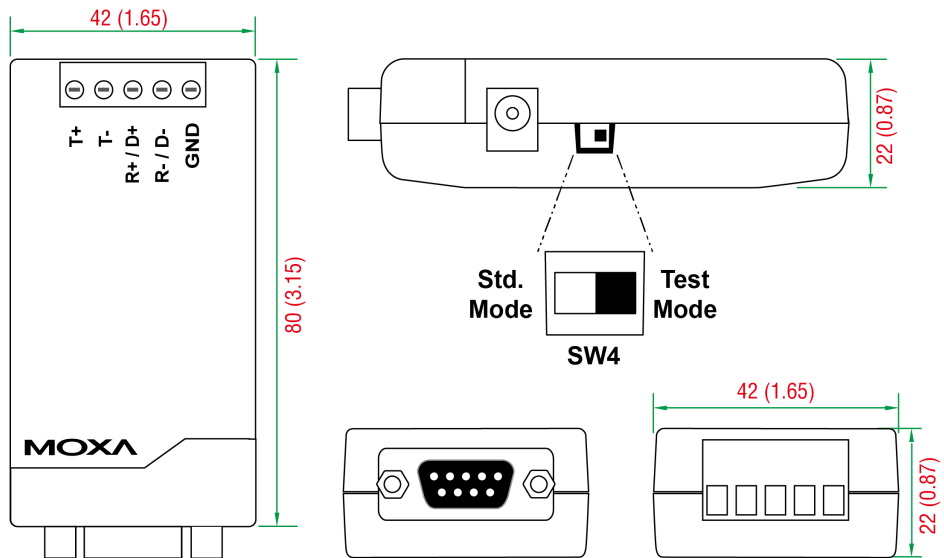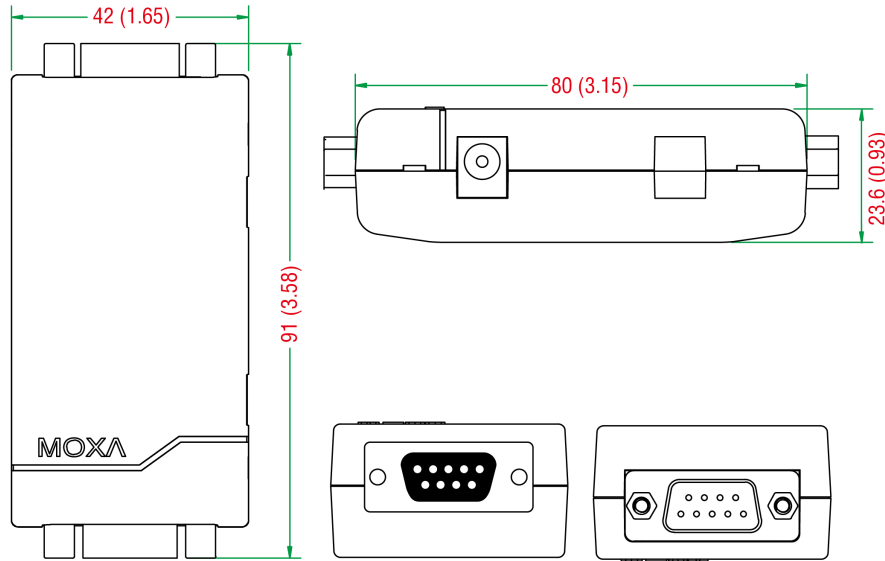|	
Device	1 x TCC-80/80I Series converter
Cable	1 x USB power cord, 50 cm
Documentation	1 x quick installation guide
	1 x warranty card

Dimensions

TCC-80

Unit: mm (inch)

TCC-80I

Unit: mm (inch)

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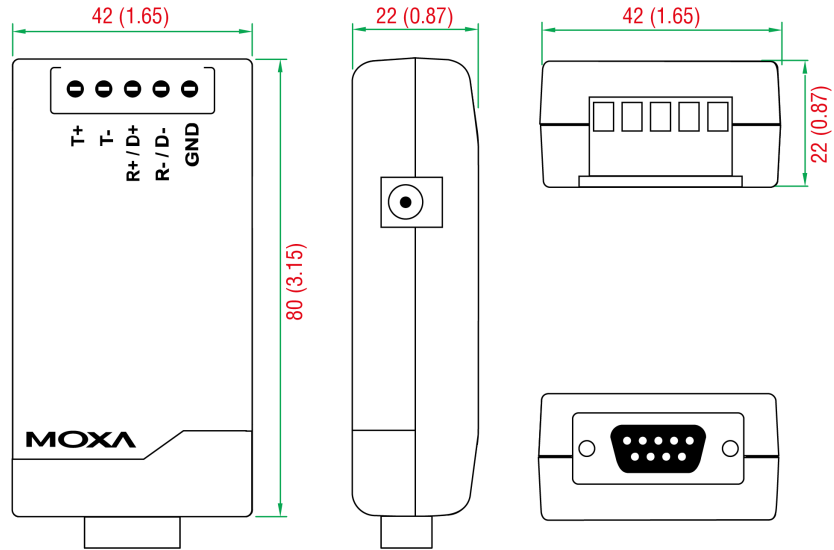
TCC-80-DB9, TCC-80I-DB9

Unit: mm (inch)

42 (1.65) · 91 (3.58) · 80 (3.15) · 23.6 (0.93)

Ordering Information

Model Name	Isolation	Serial Connector
TCC-80	–	Terminal Block
TCC-80I	✓	Terminal Block
TCC-80-DB9	–	DB9
TCC-80I-DB9	✓	DB9

Accessories (sold separately)

Cables

CBL-USBAP-50	USB A male/2.1 mm DC Jack cable, 50 cm

Connectors

ADP-RJ458P-DB9F	DB9 female to RJ45 connector
Mini DB9F-to-TB	DB9 female to terminal block connector

Power Adapters

PWR-12050-WPAU-S2	Non-locking barrel plug, 12 VDC, 0.5 A, 100-240 VAC, Australia (AU) plug, 0 to 40°C operating temperature
PWR-12050-WPCN-S2	Non-locking barrel plug, 12 VDC, 0.5 A, 100-240 VAC, China (CN) plug, 0 to 40°C operating temperature
PWR-12050-WPEU-S2	Non-locking barrel plug, 12 VDC, 0.5 A, 100-240 VAC, Continental Europe (EU) plug, 0 to 40°C operating temperature
PWR-12050-WPUK-S2	Non-locking barrel plug, 12 VDC, 0.5 A, 100-240 VAC, United Kingdom (UK) plug, 0 to 40°C operating temperature
PWR-12050-WPUSJP-S2	Non-locking barrel plug, 12 VDC, 0.5 A, 100-240 VAC, United States/Japan (US/JP) plug, 0 to 40°C operating temperature

TCC-82

## Port-powered RS-232 4-channel isolators

Features and Benefits

- Four channels of 4 kV RMS isolation for 1 minute

- External power source supported but not required

- Automatic baudrate detection

- Compact size

Certifications

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Introduction

The TCC-82 provides full electrical isolation for bidirectional serial communication between two RS-232 devices in a compact, industrial-grade package. Both sides of an RS-232 connection are isolated optically to provide perfect protection against lightning surges, accidental high-voltage shorts, and ground loops. The built-in, wide range isolators are tested to ensure that they can withstand more than 4 kV rms input to output for one minute. This means that the TCC-82 not only meets the requirements of general serial data communications, but also the high standards required by industrial automation and medical applications. The TCC-82 protects the TxD and RxD data lines, and it also protects the RTS and CTS handshake lines for a total of four isolated channels to provide complete protection of your RS-232 applications.
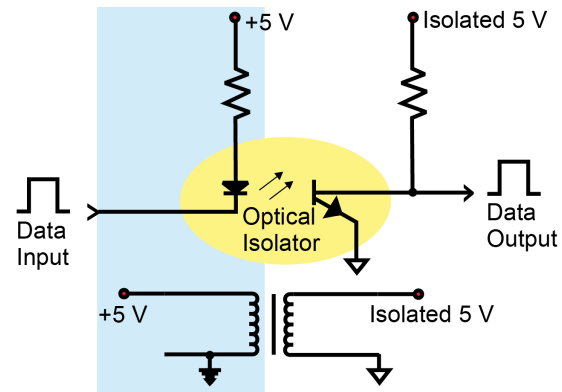
External Power Source Not Required

The TCC-82 supports port-powered operation, which means that it can obtain power directly from the attached serial devices. Power is obtained from the RS-232 TxD, RTS, or DTR lines, regardless of whether the signal is high or low, eliminating the need for an external power supply. However, external power can be used if handshake lines are not available, if the serial cable is too long, or if the serial device is a low-power device. For external power, the TCC-82 can use a 5 to 12 VDC adapter or a USB power cord. Note that both sides of the connection are powered independently, so if necessary, one side can rely on port power and the other on an external power source.

When installing the TCC-82, we recommend that you connect all output signals. The TCC-82 obtains power from these signals even if they are not used by your system. Care should be taken when choosing the external power supply if your application requires the full 4 kV of isolation. Most commercial power supplies provide only 1500 VAC isolation between the primary and secondary windings. If you are using external power for both sides of the TCC-82, make sure that separate power sources are used, each with sufficient isolation protection.
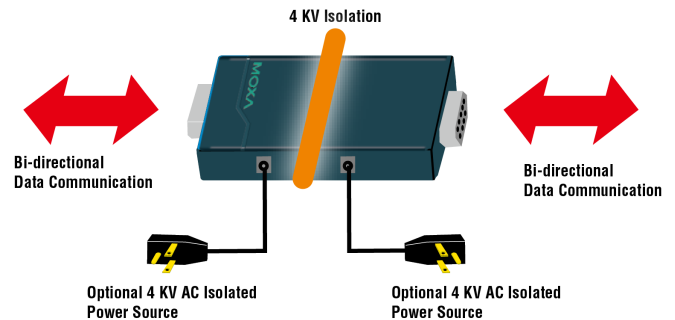
Specifications

Serial Interface

Connector	DB9 male
No. of Ports	2
Serial Standards	RS-232
Baudrate	50 bps to 921.6 kbps (supports non-standard baudrates)

Serial Signals

RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND

Power Parameters

Input Current	20 mA @ 5 VDC
Input Voltage	5 to 12 VDC
No. of Power Inputs	1
Overload Current Protection	Supported
Power Consumption	20 mA @ 5 VDC
Source of Input Power	Power input jack

Physical Characteristics

Housing	Plastic
IP Rating	IP30
Dimensions	42 x 80 x 23.6 mm (1.65 x 3.15 x 0.93 in)
Weight	60 g (0.13 lb)
Installation	Desktop

Environmental Limits

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature (package included)	-20 to 75°C (-4 to 167°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

Standards and Certifications

EMC	EN 55032/24
EMI	CISPR 32, FCC Part 15B Class B
EMS	IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m IEC 61000-4-4 EFT: Power: 0.5 kV IEC 61000-4-5 Surge: Power: 1 kV IEC 61000-4-6 CS: 150 kHz to 80 MHz: 3 V/m; Signal: 3 V/m IEC 61000-4-8 PFMF
Environmental Testing	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-3
Safety	EN 60950-1, IEC 60950-1
Vibration	IEC 60068-2-6

MTBF

Time	959,780 hrs
Standards	MIL-HDBK-217F

Warranty

Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

Device	1 x TCC-82 isolator
Cable	1 x USB power cord, 50 cm
Documentation	1 x quick installation guide 1 x warranty card

Dimensions

Unit: mm (inch)
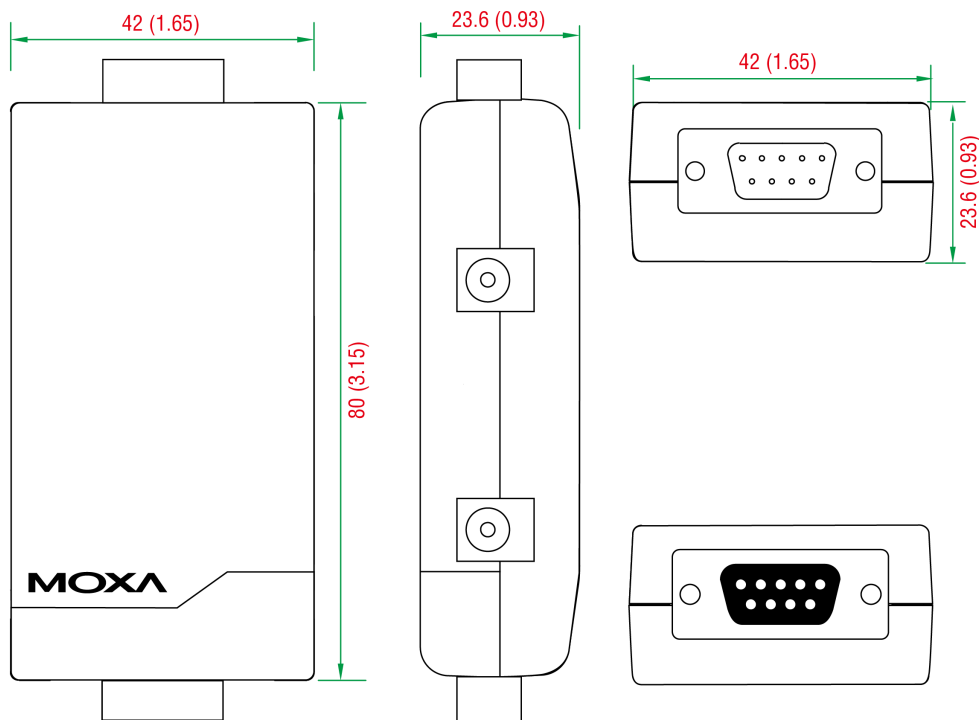
Ordering Information

Model Name	Port Power	Isolation	Serial Connector
TCC-82	✓	4 kV	DB9

Accessories (sold separately)

Cables

CBL-USBAP-50	USB A male/2.1 mm DC Jack cable, 50 cm

Connectors

ADP-RJ458P-DB9F	DB9 female to RJ45 connector
Mini DB9F-to-TB	DB9 female to terminal block connector

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Power Adapters

PWR-12050-WPAU-S2	Non-locking barrel plug, 12 VDC, 0.5 A, 100-240 VAC, Australia (AU) plug, 0 to 40°C operating temperature
PWR-12050-WPCN-S2	Non-locking barrel plug, 12 VDC, 0.5 A, 100-240 VAC, China (CN) plug, 0 to 40°C operating temperature
PWR-12050-WPEU-S2	Non-locking barrel plug, 12 VDC, 0.5 A, 100-240 VAC, Continental Europe (EU) plug, 0 to 40°C operating temperature
PWR-12050-WPUK-S2	Non-locking barrel plug, 12 VDC, 0.5 A, 100-240 VAC, United Kingdom (UK) plug, 0 to 40°C operating temperature
PWR-12050-WPUSJP-S2	Non-locking barrel plug, 12 VDC, 0.5 A, 100-240 VAC, United States/Japan (US/JP) plug, 0 to 40°C operating temperature

TCC-100/100I Series

Industrial RS-232 to RS-422/485 converters with optional 2 kV isolation

Features and Benefits

- RS-232 to RS-422 conversion with RTS/CTS support

- RS-232 to 2-wire or 4-wire RS-485 conversion

- 2 kV isolation protection (TCC-100I)

- Wall mounting and DIN-rail mounting

- Plug-in terminal block for easy RS-422/485 wiring

- LED indicators for power, Tx, Rx

- Wide-temperature model available for -40 to 85°C environments

Certifications

Introduction

The TCC-100/100I Series of RS-232 to RS-422/485 converters increases networking capability by extending the RS-232 transmission distance. Both converters have a superior industrial-grade design that includes DIN-rail mounting, terminal block wiring, an external terminal block for power, and optical isolation (TCC-100I and TCC-100I-T only). The TCC-100/100I Series converters are ideal solutions for converting RS-232 signals to RS-422/485 in critical industrial environments.

Specifications

Serial Interface

Baudrate	50 bps to 921.6 kbps (supports non-standard baudrates)
Connector	Terminal block
Isolation	TCC-100I/100I-T: 2 kV (-I model)
No. of Ports	2
Pull High/Low Resistor for RS-485	1 kilo-ohm, 150 kilo-ohms
RS-485 Data Direction Control	ADDC® (automatic data direction control)
Serial Standards	RS-232, RS-422, RS-485
Terminator for RS-485	N/A, 120 ohms, 120 kilo-ohms

Serial Signals

RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422	Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w	Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w	Data+, Data-, GND

Power Parameters

Input Current	TCC-100/100-T: 85 mA @ 12 VDC TCC-100I/100I-T: 150 mA @ 12 VDC
Input Voltage	12 to 48 VDC
No. of Power Inputs	1
Overload Current Protection	Supported
Power Connector	Terminal block (for DC models)
Power Consumption	TCC-100/100-T: 85 mA @ 12 VDC TCC-100I/100I-T: 150 mA @ 12 VDC

Physical Characteristics

Housing	Metal
Dimensions	67 x 100.4 x 22 mm (2.64 x 3.93 x 0.87 in)
IP Rating	IP30
Weight	148 g (0.33 lb)
Installation	DIN-rail mounting (with optional kit), Wall mounting

Environmental Limits

Operating Temperature	Standard Models: -20 to 60°C (-4 to 140°F) Wide Temp. Models: -40 to 85°C (-40 to 185°F)
Storage Temperature (package included)	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

Standards and Certifications

EMC	EN 55032/24
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV IEC 61000-4-5 Surge: Power: 1 kV IEC 61000-4-6 CS: 150 kHz to 80 MHz: 3 V/m; Signal: 3 V/m IEC 61000-4-8 PFMF
Environmental Testing	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-3
Safety	EN 60950-1, IEC 60950-1
Vibration	IEC 60068-2-6

MTBF

Time	3,017,857 hrs
Standards	Telcordia (Bellcore), GB

Warranty

Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

Device	1 x TCC-100/100I Series converter
Installation Kit	1 x DIN-rail kit 1 x rubber stand
Cable	1 x terminal block to power jack converter
Documentation	1 x quick installation guide 1 x warranty card

Dimensions

Unit: mm (inch)
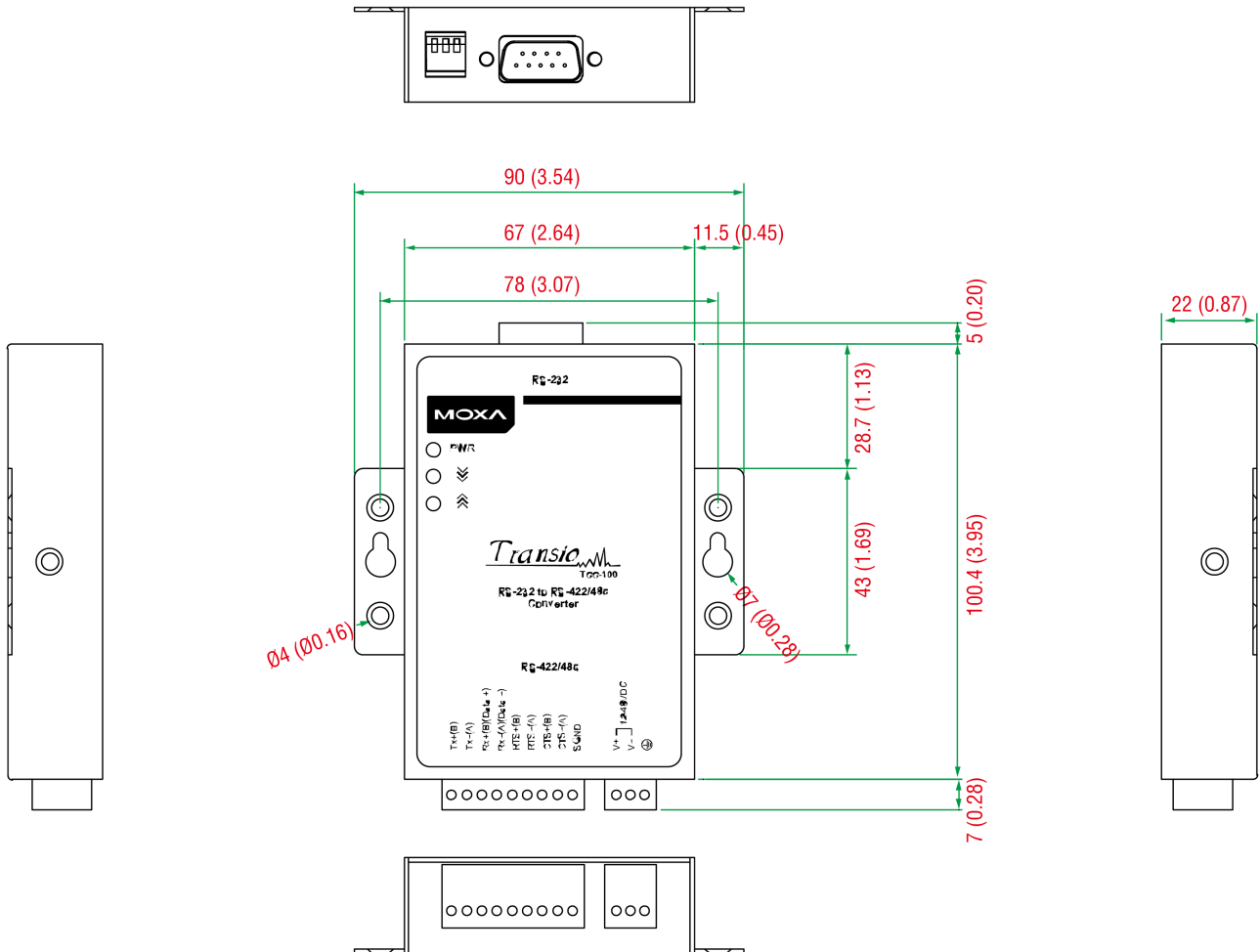
Ordering Information

Model Name	Isolation	Operating Temp.
TCC-100	–	-20 to 60°C
TCC-100-T	–	-40 to 85°C
TCC-100I	✓	-20 to 60°C
TCC-100I-T	✓	-40 to 85°C

Accessories (sold separately)

DIN-Rail Mounting Kits

DK35A	DIN-rail mounting kit, 35 mm

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Power Cords

CBL-PJTB-10	Non-locking barrel plug to bare-wire cable

TCC-120/120I Series

Industrial RS-422/485 converters/repeaters with optional 2 kV isolation

Features and Benefits

- Boosts serial signal to extend transmission distance
- Wall mounting or DIN-rail mounting
- Terminal block for easy wiring
- Power input from terminal block
- DIP switch setting for built-in terminator (120 ohm)
- Boosts RS-422 or RS-485 signal, or converts RS-422 to RS-485
- 2 kV isolation protection (TCC-120I)

Certifications

Introduction

The TCC-120 and TCC-120I are RS-422/485 converters/repeaters designed to extend RS-422/485 transmission distance. Both products have a superior industrial-grade design that includes DIN-rail mounting, terminal block wiring, and an external terminal block for power. In addition, the TCC-120I supports optical isolation for system protection. The TCC-120 and TCC-120I are ideal RS-422/485 converters/repeaters for critical industrial environments.

Specifications

Serial Interface

Connector	Terminal block
No. of Ports	2
Serial Standards	RS-422, RS-485
Baudrate	50 bps to 921.6 kbps (supports non-standard baudrates)
Isolation	TCC-120I: 2 kV
Pull High/Low Resistor for RS-485	1 kilo-ohm, 150 kilo-ohms
RS-485 Data Direction Control	ADDC® (automatic data direction control)
Terminator for RS-485	N/A, 120 ohms, 120 kilo-ohms

Serial Signals

RS-422	Tx+, Tx-, Rx+, Rx-, GND
RS-485-4w	Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w	Data+, Data-, GND

Power Parameters

Input Current	TCC-120: 65 mA @ 12 VDC TCC-120I: 180 mA @ 12 VDC
Input Voltage	12 to 48 VDC

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No. of Power Inputs	1
Overload Current Protection	Supported
Power Connector	Terminal block (for DC models)
Power Consumption	TCC-120: 65 mA @ 12 VDC TCC-120I: 180 mA @ 12 VDC

Physical Characteristics

Housing	Metal
IP Rating	IP30
Dimensions	67 x 100.4 x 22 mm (2.64 x 3.93 x 0.87 in)
Weight	148 g (0.33 lb)
Installation	DIN-rail mounting (with optional kit), Wall mounting

Environmental Limits

Operating Temperature	Standard Models: -20 to 60°C (-4 to 140°F)
Storage Temperature (package included)	-40 to 85°C (-40 to 185°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

Standards and Certifications

EMC	EN 55032/24
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV IEC 61000-4-5 Surge: Power: 1 kV IEC 61000-4-6 CS: 150 kHz to 80 MHz: 3 V/m; Signal: 3 V/m IEC 61000-4-8 PFMF
Environmental Testing	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-3
Safety	EN 60950-1, IEC 60950-1
Vibration	IEC 60068-2-6

MTBF

Time	1,949,025 hrs
Standards	Telcordia (Bellcore), GB

Warranty

Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

Device	1 x TCC-120/120I Series isolator
Cable	1 x terminal block to power jack converter

Installation Kit	1 x DIN-rail kit 1 x rubber stand
Documentation	1 x quick installation guide 1 x warranty card

Dimensions

Unit: mm (inch)
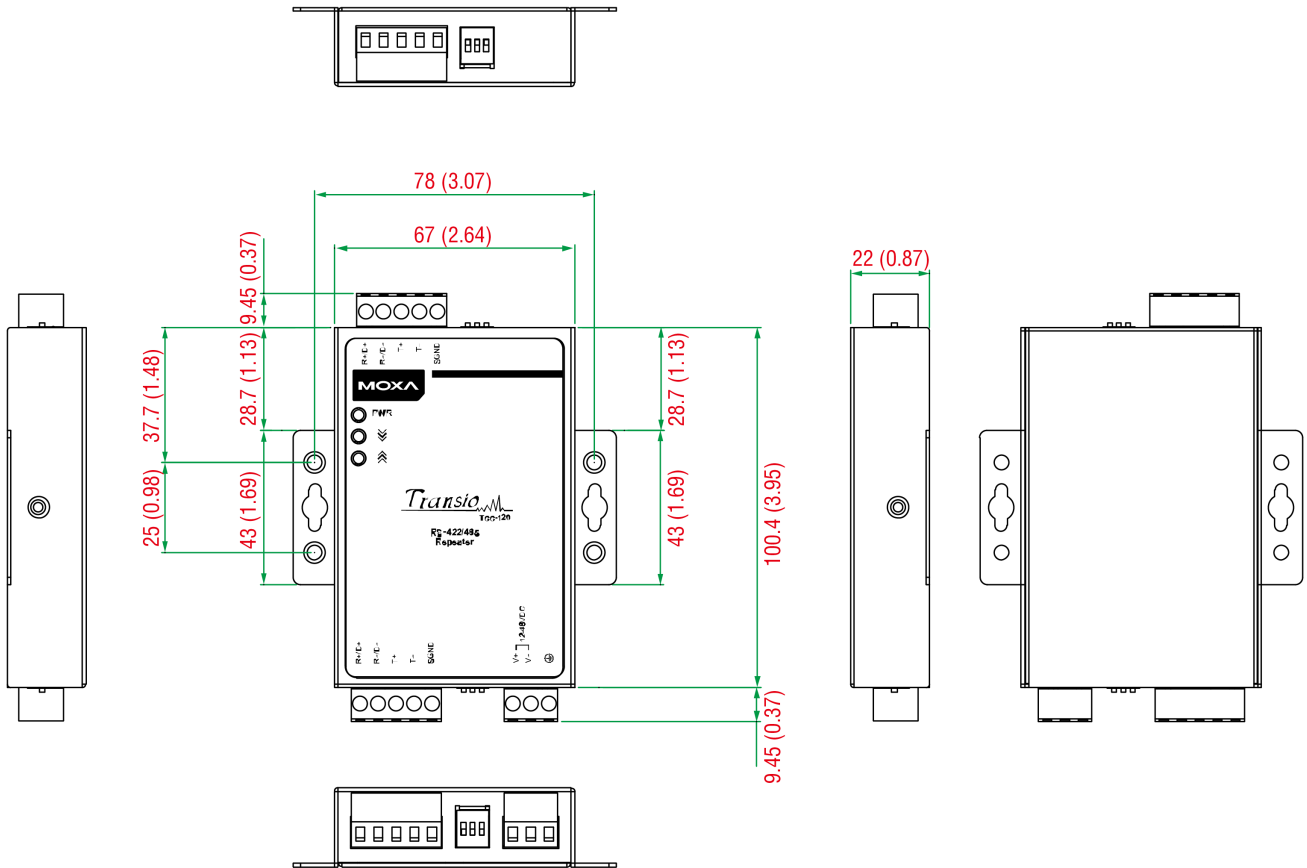
Ordering Information

Model Name	Isolation	Operating Temp.
TCC-120	–	-20 to 60°C
TCC-120I	✓	-20 to 60°C

Accessories (sold separately)

DIN-Rail Mounting Kits

DK35A	DIN-rail mounting kit, 35 mm

Power Cords

CBL-PJTB-10	Non-locking barrel plug to bare-wire cable

Transio A52/A53 Series

Entry-level RS-232 to RS-422/485 converters

Features and Benefits

- ADDC™ (Automatic Data Direction Control) RS-485 data control
- Automatic baudrate detection
- RS-422 hardware flow control: CTS, RTS signals
- LED indicators for power and signal status
- RS-485 multidrop operation, up to 32 nodes
- 2 kV isolation protection (A53)
- Built-in 120-ohm termination resistors

Certifications

Introduction

The A52 and A53 are general RS-232 to RS-422/485 converters designed for users who need to extend RS-232 transmission distance and increase networking capability.

Specifications

Serial Interface

Connector	10-pin RJ45
Flow Control	RTS/CTS
Isolation	A53 Series: 2 kV
No. of Ports	2
RS-485 Data Direction Control	ADDC® (automatic data direction control)
Serial Standards	RS-232, RS-422, RS-485

Serial Signals

RS-232	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
RS-422	Tx+, Tx-, Rx+, Rx-, RTS+, RTS-, CTS+, CTS-, GND
RS-485-4w	Tx+, Tx-, Rx+, Rx-, GND
RS-485-2w	Data+, Data-, GND

Power Parameters

Input Current	A52 Series: 170 mA @ 9 VDC A53 Series: 195 mA @ 9 VDC
Input Voltage	9 to 30 VDC
No. of Power Inputs	1
Overload Current Protection	Supported

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Power Consumption	A52 Series: 170 mA @ 9 VDC A53 Series: 195 mA @ 9 VDC
Source of Input Power	Power input jack

Physical Characteristics

Housing	Plastic
IP Rating	IP30
Dimensions	90 x 60 x 21 mm (3.54 x 2.36 x 0.83 in)
Weight	85 g (0.19 lb)
Installation	Desktop

Environmental Limits

Operating Temperature	0 to 55°C (32 to 131°F)
Storage Temperature (package included)	-20 to 75°C (-4 to 167°F)
Ambient Relative Humidity	5 to 95% (non-condensing)

Standards and Certifications

EMC	EN 55032/24
EMI	CISPR 32, FCC Part 15B Class A
EMS	IEC 61000-4-2 ESD: Contact: 4 kV; Air: 8 kV IEC 61000-4-3 RS: 80 MHz to 1 GHz: 3 V/m IEC 61000-4-4 EFT: Power: 1 kV; Signal: 0.5 kV IEC 61000-4-5 Surge: Power: 1 kV IEC 61000-4-6 CS: 150 kHz to 80 MHz: 3 V/m; Signal: 3 V/m IEC 61000-4-8 PFMF
Environmental Testing	IEC 60068-2-1 IEC 60068-2-14 IEC 60068-2-2 IEC 60068-2-3
Safety	EN 60950-1, IEC 60950-1
Vibration	IEC 60068-2-6

MTBF

Time	1,870,854 hrs
Standards	Telcordia (Bellcore), GB

Warranty

Warranty Period	5 years
Details	See www.moxa.com/warranty

Package Contents

Device	1 x Transio A52/A53 Series converter
Cable	1 x 10-pin RJ45 to DB9F (-DB9F models) 1 x 10-pin RJ45 to DB25F (-DB25F models)
Documentation	1 x quick installation guide 1 x warranty card

Ordering Information

Model Name	Serial Isolation	Power Adapter Included	Serial Cable
A52-DB9F w/o Adapter	–	–	DB9F
A52-DB25F w/o Adapter	–	–	DB25F
A52-DB9F w/ Adapter	–	✓	DB9F
A52-DB25F w/ Adapter	–	✓	DB25F
A53-DB9F w/o Adapter	✓	–	DB9F
A53-DB25F w/o Adapter	✓	–	DB25F
A53-DB9F w/ Adapter	✓	✓	DB9F
A53-DB25F w/ Adapter	✓	✓	DB25F

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