

AMANO[®]

AGP-0509 TC-CONVERTER

RS-232 to RS-485

INSTALLATION AND OPERATION MANUAL



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We recommend that this document be read in its entirety before any attempt is made to operate the equipment.

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Chapter 1: INTRODUCTION

The TC-Converter is a compact device designed to convert serial communication between RS-232C signals and RS-485 signals. RS-232C is the standard protocol for a serial port on a PC. The RS-485 protocol is used to link multiple (up to 32) remote peripheral devices (Fee Computers, Pay Stations, Validators, Lag Time Readers, Ticket Dispensers, etc.) on a network to a host PC or device. RS-485 has the advantage of allowing long cable runs (up to 4000 feet (1219 meters)).

This manual will detail the installation and configuration of the TC-Converter. For information on the installation and configuration of the Amano equipment being connected to the TC-Converter, refer to the documentation for that equipment.

This manual is organized in the following format:

Introduction: This chapter describes the format of this manual and the purpose of the TC-Converter, its specifications and accessories.

Installation and Configuration: Chapter 2 details the installation of the TC-Converter and the configuration and purpose of the internal switches and jumpers.

Specifications

Physical

Size: 2.95" (7.5 cm) long x 2.07" (6.85 cm) wide x 1" (2.54 cm) high.
Weight: 2.9 oz. (82 g).

Environmental

Temperature: Operating: 32°F - 104°F (0°C - 40°C)
Storage: 14°F - 140° F (-10°C - 60°C)

Humidity: Operating: 20% - 90% relative humidity (non-condensing)
Storage: 20% - 90% relative humidity (non-condensing)

Location: Indoor use only.

Electrical

Converter

Input Voltage: 5 VDC
Input Current: 1 AMP
Power Connector DC connector, positive tip (2.1mm ID, 5.5mm OD)

AC Adapter

Input Voltage: 90 - 264 VAC, 47 - 63 Hz
Output Voltage: 5 VDC
Output Current: 1 AMP

Unpacking

Your TC-Converter comes packed with the following components:

<u>Component</u>	<u>Part Number</u>
AC Adapter	EOE-107200
TC Converter	ATC-100370
This Manual	ATC-100600

Check the box to be sure all these contents are included.

Chapter 2: INSTALLATION AND CONFIGURATION

Configuration

While the TC-Converter comes factory configured for the most common uses, there are three parameters that may need to be changed, depending on your requirements: **DTE/DCE**, **RTS** and **Termination** settings.

The **DTE/DCE** (Date Terminal Equipment/Data Communication Equipment) switch and the **RTS** (Request To Send) jumper are inside the unit. You will have to remove the two case screws to open the case and modify these settings.

The **Termination** settings are used to balance the RS-485 communication line and are controlled by a three position DIP switch accessible from outside the case.

Refer to the following figure for the location of the switches and jumpers.

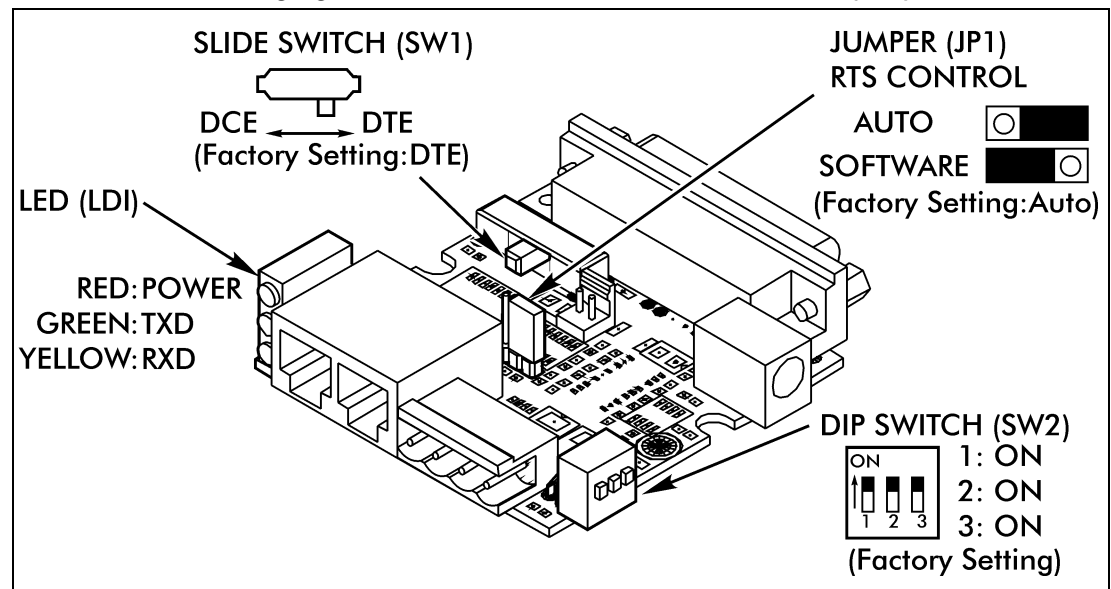


Figure 2-1: Configuration Jumpers and Switches

Internal Settings

Open the case by removing the two screws from the bottom cover and gently remove the top cover.

DTE/DCE Switch (SW1)

The factory default setting for this switch is **DTE**, which ordinarily will not have to be changed. This switch is set according to the type of equipment the RS-232C port of the converter is being connected to and the cable being used. **Data Terminal Equipment** devices are equipment such as computers, terminal, printers, etc. An example of a **Data Communication Equipment** device is a modem.

If the TC-Converter is connected to a modem (in an application where the host PC is dialing in from a remote location), the switch should be set to **DCE**.

The TC-Converter should be connected to a PC with a standard “modem cable” (DB25 M to DB9 F). If a “null modem” cable is used, this switch will have to be set to the **DCE** position.

Configuration - Internal Settings

RTS Jumper (JP1)

The factory default for this jumper is the Auto position. In standby, the TC-Converter is receiving data from the RS-485 ports and sending the data out the RS-232C port to the PC. In automatic mode, the converter is continuously monitoring the RS-232C port; when the computer starts to send, the converter switches direction and sends data from the RS-232 port to the RS-485 devices. In Software Control (**RTS**) mode, the PC must send an **RTS** signal to transmit from RS-232C to RS-485.

External (Termination) Settings

The three position DIP switch sets the internal termination resistors; the setting to use is dependent on the location of the TC-Converter on the RS-485 line (see Figures 2-3 and 2-4). The factory default is all three switches ON. This is the setting that must be used for the first TC-Converter (connected to the host PC) on the RS-485 line. For all other locations except the one furthest from the host (end of the line), all three switches must be set to OFF. A converter located at the end of the line must have switches 1 & 2 set to OFF and switch three set to ON. This applies a termination resistance of 120 ohms.

Switch	Host PC	Middle Positions	End Position
1	ON	OFF	OFF
2	ON	OFF	OFF
3	ON	OFF	ON

Installation

Below is an external view of the TC-Converter showing the locations of the power, RJ11, and four position terminal block connectors as well as the status LEDs.

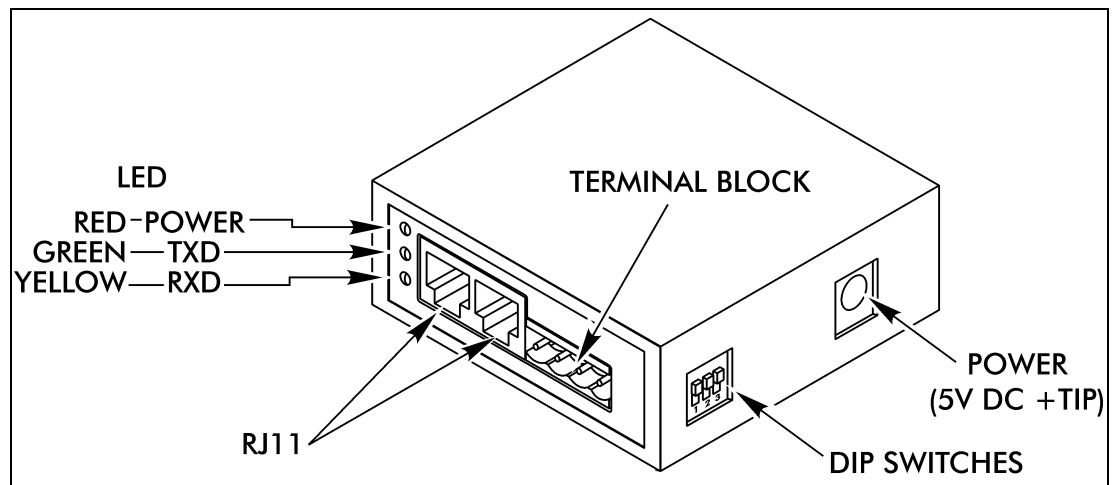


Figure 2-2: TC-Converter Exterior

The RS-232C side of the TC-Converter is usually connected to a host PC running system application software. The RS-232C cable should be no longer than 50 feet. Up to 32 RS-485 devices can be connected to the RS-485 line at distances of up to 4000 feet from the host.

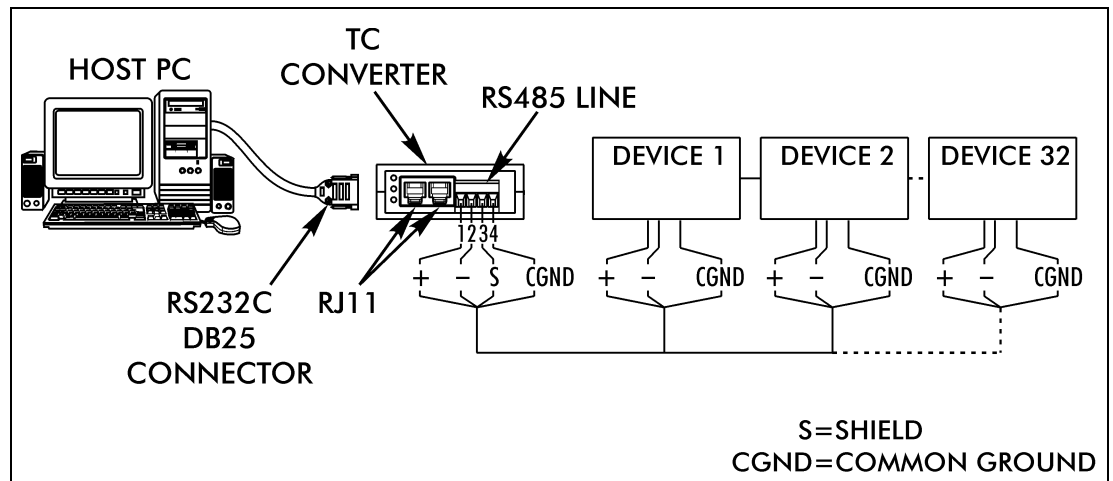


Figure 2-3: System Diagram

Connection to PC (RS-232C)

The RS-232C port on the TC-Converter accepts a standard DB25 male connector. The other end of your cable should be a DB9 female connector to match your computers serial port.

Note: Do not use a 25 pin to 25 pin cable as the configuration of the converter's DB-25 port is customized for use with specific Amano devices and could cause equipment damage.

The cable should be a standard RS-232C 9 to 25 pin serial cable (modem cable).

Connection to RS-485 Devices

There are two methods of connecting to the RS-485 line: via either of the two RJ11 modular jacks or the four position terminal block. Only one RS-485 connection should be used: either RJ11 jack or the terminal block. The RJ11 jacks should only be used for short runs to Amano equipment (such as the AGP-5600 Validator or the AGP-5900 Fee Display) designed to accept an RJ11 connector. For runs up to 4000 feet, use shielded twisted pair cable (Belden 9842 or equivalent).

The following figure illustrates the appropriate cable configuration for the shielded cable connected to the terminal block. If using RJ11 connectors, only pin 3 (com+) and pin 4 (com-) of the connectors are used.

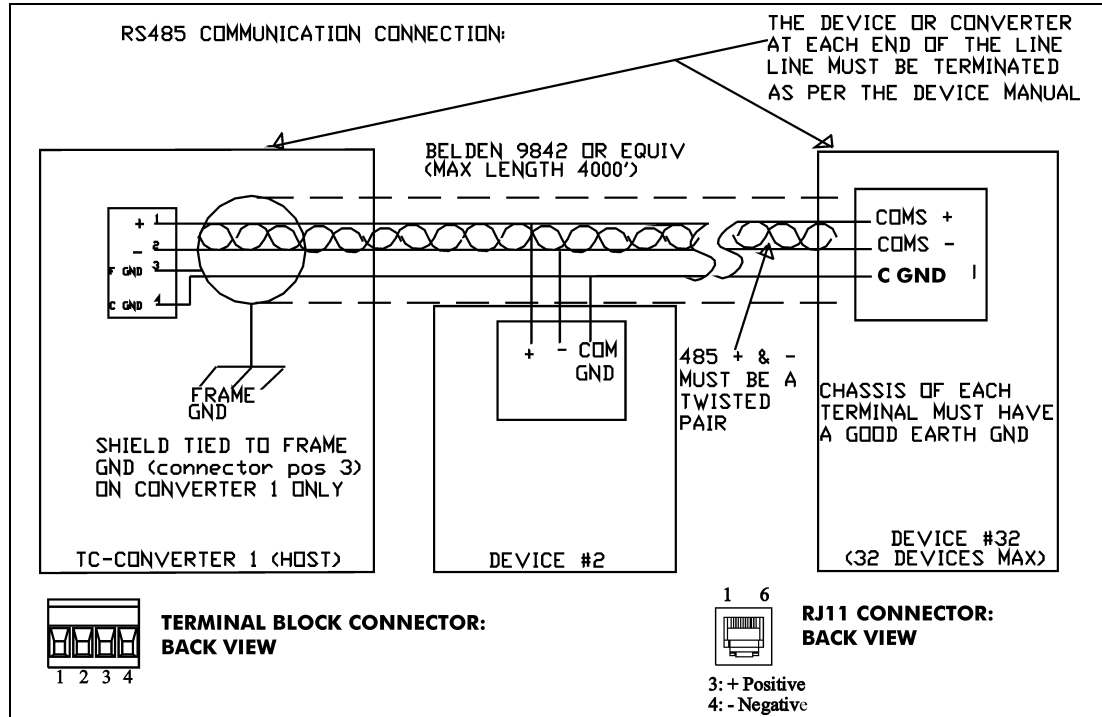


Figure 2-4: RS-485 Network Wiring

Note that the cable shield is connected to the Frame Ground terminal (terminal block position 3) at the beginning of the run only. On the remainder of the devices or other converters, the cable shield must be spliced between cable segments to remain continuous, but must not be connected to the devices.

The recommended Belden cable contains two twisted pairs. Either wire of the second pair can be used for the common ground (C GND) connection.

Cables terminated with RJ11 connectors (telephone cable) does not contain a shield, which limits the usable length of the cable. Only use these jacks to connect to Amano devices equipped with an RJ11 receptacle. In most cases, only one of the jacks should be used (it doesn't matter which one).

The device at the end of the line should be terminated (approximately 120 ohms) to insure error free communication. See the specific device manual for instructions on this procedure. If the last device is a TC-Converter, see Configuration/External Settings in this chapter.

Installation - Connect Power

Connect Power

Connect the output connector of the AC adapter to the Power port of the TC Converter. Plug the adapter into a live 100-240 VAC outlet.

Operation

Once the TC-Converter is configured and installed, operation is fully automatic and requires no user intervention. The status of the device can be monitored by observing the three LED indicators adjacent to the RJ11 jacks (see Figure 2-2).

- **Red LED - Power:** This will light continuously as long as power is applied.
- **Green LED - TXD:** This will light when the unit is transmitting to the RS-485 port (sending from the PC).
- **Yellow LED - RXD:** This will light when the unit is receiving from the RS-485 network (the PC is receiving).

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