



TM600

Real-time
flow totalizer and
transmitter

Installation and
user guide Rev 1

Auper Electronic Controls Inc
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TM600

Real-time flow totalizer/transmitter



PACKAGE

- TM600 control unit
- Two i-button manager keys
- 12 Volts DC transformer
- Flow meter junction box
- 25 ft (7.62 m) flow meter collector cable

OPTIONAL

- RS-232 serial cable (serial printer, POS or computer)
- Serial printer
- Draft Manager Live software

POSITIONING YOUR SYSTEM

The TM600 being a control system, it should be installed in such a way as to be tamper proof that you choose to install it at the bar or in your office. Cables and connections should be protected and secured out of reach. The **power source should not be installed where it can easily be disconnected**. Do not connect the TM600 power source to an electrical outlet that can be turned off at night.

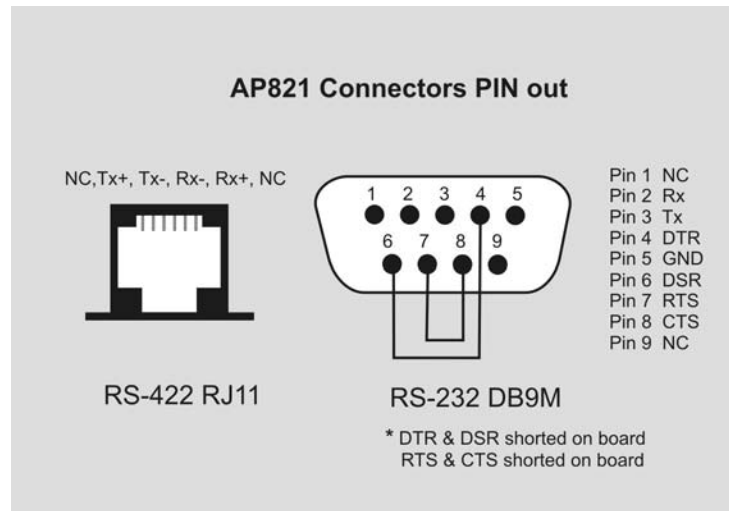


SERIAL COMMUNICATION

The TM600 is equipped with two programmable serial ports:

The RS-422 port serial port connector is a RJ11 jack (phone jack).

The RS-232 port connector is a Dsub 9 pin connector (male)



SPECIFICATIONS

Standard EIA RS-422 Physical Media Twisted Pair Network Topology
Point-to-point

Maximum Distance RS-422 1500 metres (4,900 ft)

Mode of Operation Differential

Maximum Baud Rate RS-422 100 kbit/s – 10 Mbit/s

Voltage Levels -6V to +6V (maximum differential Voltage)

Mark(1) Negative Voltages

Space(0) Positive voltages

Available Signals Tx+, Tx-, Rx-, Rx+ (Full Duplex)

RS-422 connector type RJ11

The RS-232 port can be used with one system connected directly to a serial port of a computer running with the Draft manager software.

Maximum distance RS-232 15.25 metres (50 ft) with straight cable or 44 metres (147 ft) using UTP Cat 5 cable

RS-232 connector type DB9 male

Maximum Baud Rate RS-232 115kbit/s

Using RS-422 and the Auper AP821 RS-422 eight port hub, you can link several Auper metering systems to the same serial port on a computer or printer. This feature is useful to build large metering systems that require more than one control system.

The system is also equipped with a real-time interface. When turned on, the TM600 will send the amount served through the serial port two seconds after the flow meter has stopped recording following a special communication protocol. To use this feature, you must use the Draft Manager Live software with the real-time interface.

RED LED POWER FAIL INDICATOR

The red LED on the TM600 will flash to signal that there was a power failure. To stop the LED from flashing apply a manager i-button key.

CONNECTING THE FLOW METERS



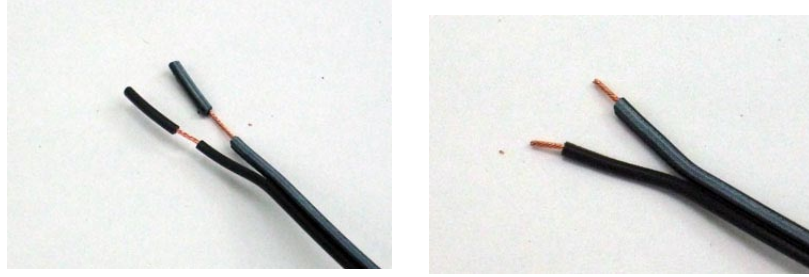
Figure 1 TM600 junction box

Follow the instruction sheet supplied with the flow meters for complete step by step instructions. Since the flow meters are supplied with a 25 ft (7.6 M) cable, you should try to position your junction box to reach as many flow meters as possible. Flow meter cables can be extended 300 feet should you need to.

The junction box will connect to the TM600 using a regular Cat 5 network cable terminated with RJ45 connectors. Cables are available for up to 150 ft (46M). Longer cables can be made on demand and can reach 300 ft (100 M). This is the same kind of cables used for computer networks, so you can always find them in computer stores or have them installed by local computer network contractors.



Figure 2 RJ45 cable end



The ends of flow meter cables have been stripped at the factory. Pull the insulation off the wire and cut the copper wire to get $\frac{1}{4}$ in (6mm) exposed only.

Inspect each wire after to verify that you have not cut the copper wire and that all the strands are intact.

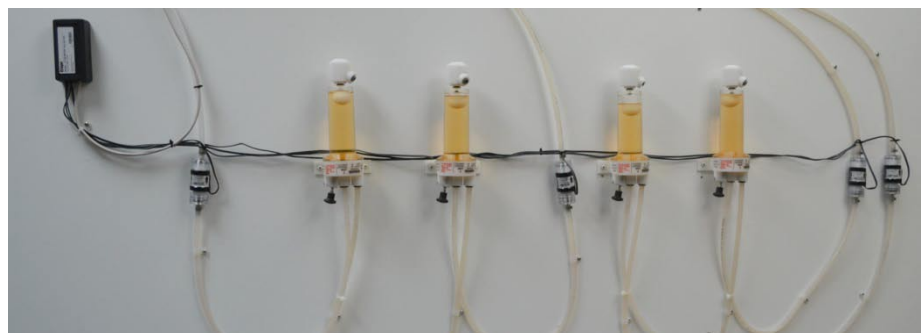
Auper flow meters do not use an external power source. There is no voltage going to the flow meters so you cannot damage them even if you touch the wires. There is no positive or ground either. You do not have to worry about polarities.

Connect the flow meters to terminals 1 to 6 and tighten the screw to secure the connection. **DO NOT OVER TIGHTEN SCREWS AS YOU MAY CUT THE WIRE.**

Inspect your connections before closing the cover to make sure that no wires are touching each other.

If two wires are touching, the flow meter signal will be shorted and the flow meter will not send any signal to the TM600.

Connect the network cable to the junction box. Secure all your cables using cable ties. Loose wires should be avoided at all times.



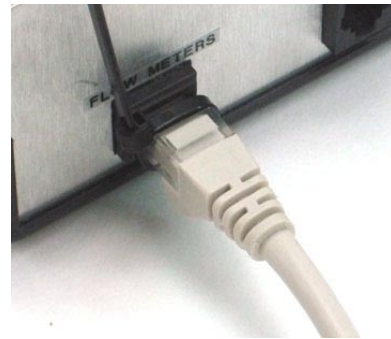
CONNECTING THE TM600

Warning: Although this cable is the same as computer network cables, it is used to bring the flow meter signals to the TM600. This is not a computer network device. **DO NOT CONNECT THIS CABLE IN ANY HUB, ROUTER OR OTHER ETHERNET DEVICE OR JACK.**

Run the UTP Cat 5 network cable between the junction box and the TM600 system.

Securing the connector

Use one of the small cable ties provided with the junction box to secure the connector in place. Slip the cable tie between the connector's body and the tab. The cable tie will prevent the tab from being pushed thus preventing anyone from disconnecting the cable.



REMINDER:

Securing the flow meter cables and junction box cables will effectively prevent people from tampering with the flow meter system. You should visually inspect the cables regularly.

POWER SUPPLY

Use a 12 Volts DC transformer at 0.5 amp to power the TM600.

It's a good idea to plug the power supply into a surge protector or UPS (Uninterrupted Power Supply) to insure stable power to the unit.

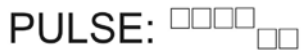
Connect the transformer to a power outlet. Avoid using inexpensive power bars as the transformer may fall and disconnect. Make sure the power source cannot be disconnected by the staff. A UPS (battery backup) is an added security since it will supply power to a TM600 for a long time in case of power failures insuring continuous power to the unit.

POWER UP AND SET UP

PRESS AND HOLD ▲ AS YOU APPLY A MANAGER I BUTTON KEY to enter the programming mode.

Mode 1: IMPULSE MODE

From left to right, 6 dots representing flow meters 1 to 6.



PULSE:

- When a flow meter is connected to a line, the corresponding dot is up.
- If no flow meter is connected to a line, the corresponding dot is down.
- When a flow meter detects liquid flowing through it, the corresponding dot will alternate up and down.
- If a flow meter is installed backward, the corresponding dot will be up but will not alternate when product is flowing.

Verify that your flow meters are connected and registering by serving a little bit at each faucet.

If you had not yet removed the air pocket from your beer lines, now is the time to do it.

PRESS THE M BUTTON ONCE

CAL. WITH 20 OZ:

CAL. WITH 1 UNIT

Mode 2 : UNIT SELECTION MODE

The TM600 can be set to measure ounces or units of 1 (litres, gallons glasses etc...). To calibrate, you will serve a measured amount of liquid into a graduated cylinder during which time the system will read the number pulses sent by the flow meter.

At this stage, you choose how you want the system to count and the amount you will serve into the graduated cylinder to calibrate.

Press the ▼ button to toggle between ounces and units.

To calibrate to count ounces, select Cal with 20 oz.

To count units of 1, select Cal with 1 unit.

PRESS THE M BUTTON ONCE

Mode 3: CALIBRATION MODE

C1 0289 → 00.0000

As soon as you enter this mode, all six channels (lines) are ready to be calibrated. DO NOT LET ANYONE DISPENSE ANY LIQUID WHILE THE SYSTEM IS IN THIS MODE.

Use the ▼▲ button to change the line number displayed on screen.

TIP: For draft beer, you can kill the foam by spraying WD40 into the graduated cylinder before serving. You can stop to let the foam go down when you are in calibration mode.

We recommend you watch the video on Youtube. Access is available from the Auper web site. You can search AUPERCONTROLS on Youtube to find the channel..

Serve 20 oz in a graduated cylinder as accurately as possible. If you selected "Cal. with 20 oz".

Serve 1 litre in a graduated cylinder as accurately as possible if you selected "Cal with 1 unit" and wish to count litres.

Serve 1 glass if you selected “Cal with 1 unit” and wish to count glasses.

If you serve too much on one line, stop and proceed with serving the selected amount at the other beer taps.

Press the S/R button to calibrate after you have poured the amount at each tap. The value on the right will change to the new calibration value. You can view the calibration values of each line by pressing the ▲▼ button.

If you need to recalibrate one of the lines, remain in that mode and serve the selected amount on this line only. As long as you do not touch the other taps, the registered pulses will remain “0000” and the system will not recalibrate.

PRESS THE M BUTTON ONCE

Mode 4: CLEAR MASTER COUNTER MODE

CLR 1? 123456.78

This is the counter showing the amount of liquid dispensed since you started the system.

You can clear a specific line counter in this mode.

Select the line number with the ▼▲ button.

Press S/R to clear the counter.

PRESS THE M BUTTON ONCE

Mode 5: CLEAR POWER FAIL COUNTER MODE

CLR PWF?: 10

The PWF (Power Fail) counter counts the number of times the TM600 was disconnected. As a precautionary measure, you should read this counter every time you read the line counters. The red LED on the TM600 will flash to signal that there was a power failure. To stop the LED from flashing apply a manager i-button key.

Press the S/R button to clear the counter.

PRESS THE M BUTTON ONCE

MANAGER KEY 1:
000014F8E34D

Mode 6: MANAGER KEY

Use this mode to program up to four manager keys in the system. Each key has a unique serial number and must be programmed into the TM600 to get access to the program modes.

If you have lost a key, you can program a new one by applying it to the FOB. If you apply an already programmed key, you will exit the programming mode.

Press ▼▲ to move between manager keys 1 to 4

Apply the new key

Press S/R to accept it

To delete a manager key

Select the key number using the ▲▼ buttons

Press and hold the S/R button and then press ▲

MANAGER KEY 3:
NEW- 000013G8E74Y

PRESS THE M BUTTON ONCE

USER KEY 1:
000035T8E71U

Mode 7: USER KEY

User keys can be used to clear the daily counters only. They do not provide access to the programming modes. Up to 4 user keys can be programmed in the system.

Press ▼▲ to move between user keys 1 to 4

Apply the new key

Press S/R to accept it

To delete a user key

Select the key number using the ▲▼ buttons

Press and hold the S/R button and then press ▲

MANAGER KEY 3:
NEW- 000013G8E74Y

PRESS THE M BUTTON ONCE

Mode 8: BAUD RATE

BAUD RATE: 9600

The baud rate is used only when connecting the TM600 to a computer or a serial printer. The default baud rate of most computers and printers is 9600 bps.

PRESS THE M BUTTON ONCE

Press the ▼▲ button to toggle between 9600, 19.2 K and 2400.

SYS. No.00

Mode 9: SYSTEM NUMBER

The system number is used to identify the TM600 on a printed report or by the computer if you use the Draft Manager software.

You can set the number between 00 and 99. No more than one system can have the same system number if you connect several systems to the same computer or printer using an AP821 hub.

PRESS THE M BUTTON ONCE

Press ▼▲ to change the system number.

INTERFACE OFF

Mode 10: INTERFACE MODE

The TM600 is equipped with a real time interface mode. This mode can be used with the Draft Manager Live software. The TM600 will send the new counters for the line(s) used, 2 seconds after the tap was closed. The data will be sent through the serial port following a special communication protocol. **TURN THE INTERFACE TO OFF IF YOU DO NOT USE DRAFT MANAGER LIVE.**

Press the S/R button to turn the interface ON/OFF

PRESS THE M BUTTON ONCE

PC --> RS232

Mode 11: PC → COM RS232

If you connect the TM600 to a computer using the RS-232 port set this mode to RS-232. If you connect the TM600 to a PC using the RS-422 port, set this mode to RS-422.

Press ▲ to alternate between RS232 and RS422

PRESS THE M BUTTON ONCE

PRINTER --> RS232

Mode 12: PRINTER → COM RS232

If you connect the TM600 to a serial printer using the RS-232 port set this mode to RS-232. If you connect the TM600 to a serial printer using the RS-422 port, set this mode to RS-422.

Press ▲ to alternate between RS232 and RS422

PRESS THE M BUTTON ONCE

FIRMWARE: 1.1a
MCU: AT89LP51RD2

Mode 13: VERSION MODE

This mode identifies the firmware version and the MCU used to build your TM600.

PRESS THE M BUTTON ONCE to go to mode 1.

APPLY A MANAGER KEY TO EXIT.

OPERATION

SERVING	.00
TOT 1	235231.32

RUN MODE

Use ▼▲ to change the line on display

The top line on display will show the amount currently being dispensed. The bottom number is the total dispensed for the shift.

PRESS THE M BUTTON ONCE

MCTR 1	4331.33
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MCTR (MASTER COUNTERS)

Use ▼▲ to change the line on display

This is the amount measured since the day the system was started. Only managers can clear these counters from the programming modes. If you use the software, you should not clear these counters.

PRESS THE M BUTTON ONCE

NUMBER OF PWF= 10

POWER FAILURE COUNTER

Shows the number of times the power was lost.

PRESS THE M BUTTON ONCE

PRINT REPORT?
YES = (S/R)

PRINT REPORT

Press S/R to start printing to the serial printer

Press M to skip

CLR DAILY CTERS?
CLEAR = (S/R) + iKEY

CLEAR DAILY COUNTERS

Press S/R and hold as you apply a user/manager key

The message counters cleared will appear and the system will revert to the normal run mode screen.

ANNEXE



PRINTER SETTINGS

- Baud rate: 9600
- Parity: none
- Stop bit: 1
- Handshaking: Xon/Xoff
- Print columns: 40



You can connect your TM600 to your computer (PC) to use the Draft Manager software and the Draft Manager LIVE software (cable and software purchased separately).

USE RS-232 NULL MODEM CABLE PART 70-010

USB TO SERIAL CONVERTER

Newer computers may not be equipped with 9-pin serial ports. A USB to serial adapter can be used. Drivers are provided with the converter and must be installed on the computer. Windows will assign the serial port automatically. You can find to which port your converter has been assigned at:

Control panel/system/device manager/ports (Com & LPT)

Use default Windows serial port settings:

- 9600 bps
- 8 bits
- no parity,
- 2 stop bits
- Flux control to none.



USB to serial converter

RS-422 SERIAL PORT CONNECTIONS



You will use the RS-422 port for the following reasons:

- You wish to connect your TM600 to a computer more than 150 ft (50M) away.
- You have more than one metering system that you want to connect to the same computer or printer.

SHORT DISTANCE RS-422 CABLE

Short distance RS-422 connections (no more than 50 ft/ 15M) can be achieved using modular cables. The cables will connect directly from the system(s) into the AP821 hub. (Order the cables separately P/N 70-040-X). Modular cables are not twisted and offer no protection against ambient noise.



RS422 modular cable

LONG DISTANCE RS-422 CABLE INSTALLATION

Option 1: Using UTP **Cat5e 2 pair cable** if you want to connect the devices directly to the RJ11 jacks of each RS-422 device. You can order those from the factory. The cables must be inverted if you make your own.



RJ45 jack

Option 2: Using **Cat5e 4 pair cable** terminated with RJ45 jacks. And modular cables at each end. The RS-422 modular cables fit directly in the middle of the RJ-45 wall plate or coupler. You will need two modular cables for each Cat5e cable to reach the devices (one at each end). One modular cable must be straight (70-041) and one must be inverted (70-040) to end up with an inverted connection.



RJ45 female coupler

Flow meter NO.	Brand	Dispense point	Calibration value
1			
2			
3			
4			
5			
6			