



Design Features

- Displays instantaneous, total and accumulated flow rates.
- Built-in Flow Linearizer (10 point linearization of the flow curve).
- Up to 47 different volumetric and mass flow engineering units.
- Large 13mm (0.51") digits for flow rate and 5.5mm (0.21") for Total.
- Digital RS-232 or RS-485 interface (multi-drop capability of up to 64 devices.)
- Compact design for unit mount, panel mount, wall mount or field mount applications.
- User-programmable, optically-isolated pulse output.
- Two programmable, optically-isolated, digital outputs.
- Flow controllers, set point command control via local LCD or digital interface.
- Programmable set point table with ramping up/down capability up to 16 steps.
- Free Configuration and Monitoring Utility software.



Applications

For flow meters and controllers with analog 0-5 (5-10) (0-10)Vdc, 4-20mA input output interface, where flow indications / control and totalizers or alarm functions are required. Also when re-transmission of the flow rate and/or totalizer functions via optically-isolated pulse output or serial communication is desired. Local or programmable set point control for flow controllers (no host PC presence required). Activation of user-supplied equipment via programmable optically-isolated digital outputs when flow alarms or totalizers events are active.

Display

The graphical LCD display has large 13mm (0.51") digits for flow rate and 5.5mm (0.21") for total and can be set by user to simultaneously show different combination of the flow parameters: flow rate, totalizers, flow alarms, and diagnostic events . All configuration parameter settings are easily accessed via a simple user-interface menu driven by a 6 button key-pad which can be password-protected.

Signal Input and Signal Output

- 0-5 Vdc (Input/Output)
 - 5-10 Vdc (Output only)
 - 0-10 Vdc (Input/Output)
 - 4-20 mA (Input/Output)
- For flow meters and / or flow controllers, TIO provides jumpers selectable for 0-5 Vdc or 4-20 mA analog set point control signals. The flow rate set point can be adjusted locally via key-pad, remotely via host PC using digital communication interface, or programmed in advance using built-in 16 steps batch table with ramping up/down support.

Programmable Pulse Output

The programmable flow pulse output is operating independently from totalizers and based on configuration settings can provide pulse frequency proportional to instantaneous fluid flow rate.

The LCD/keypad and digital communication interface commands are provided to:

- Enable/Disable Pulse Output.
- Configure Pulse Output start flow rate (in % of full scale).
- Configure the Unit/Pulse value (in current volumetric or mass flow units).
- Configure Pulse Active On Time (10 - 6550 ms).

Programmable Totalizers

TIO provides two independent programmable flow totalizers. Both totalizers are updated every 100 ms and can be set to activate different events. Main totalizer accumulated total is backed-up in EEPROM memory every second.

The LCD/keypad and digital communication interface commands are provided to:

- Enable/Disable totalizing the flow.
- Start the totalizer at a preset flow rate (in % of full scale).
- Assign action at a preset total volume (Event Volume).
- Configure power on delay (in seconds).
- Configure Auto Reset at preset volume.
- Configure Auto Reset delay (in seconds).
- Reset the totalizer to ZERO.



Programmable Alarms

TIO provides the user with a flexible alarm/warning system that monitors the fluid flow for conditions that fall outside configurable limits as well as visual feedback for the user via the LCD or via an optically-isolated output. The flow alarm has several attributes which can be configured by the user via LCD/Keypad or digital communication interface:

- Enable/Disable flow alarm.
- Low flow alarm settings (in % of full scale).
- High flow alarm settings (in % of full scale).
- Flow alarm action delay.
- Flow alarm action latch mode.

Digital Communication

All process data and settings can be read and modified manually via local LCD Key-pad or through the digital RS-232 or RS-485 communication interface. Proprietary ASCII software interface command set and free Communication Utility software are provided.

TABLE 17 - SPECIFICATIONS	
ADC/DAC RESOLUTION:	12 bit
ANALOG INPUTS	0-5 Vdc, 4-20 mA, 5-10 Vdc (jumper-selectable), 0-10 Vdc (special order)
ANALOG OUTPUTS:	0-5 Vdc, 4-20 mA (jumper-selectable)
LCD:	128x64 graphic LCD with instantaneous Flow reading and Total volume indication. Adjustable LCD contrast and back light.
KEY-PAD:	Local 6 tactical push buttons.
PULSE OUTPUT:	User-programmable, optically-isolated, with preset active low time interval (10 – 6550 ms).
DIGITAL OUTPUT:	Two programmable, optically-isolated, UCE @ 40Vdc, ICE @ 150 mA (Voltage Isolation: 250 Vrms).
DIGITAL INTERFACE:	RS-232 or RS-485 (multidrop capability up to 64 devices)
 PROTOCOL:	Proprietary ASCII software interface command set.
 SPEED:	1200 - 2400 - 4800 - 9600 -19200 – 38400 – 57600 – 115200 baud (user selectable).
 CONFIGURATION:	Stop bit: 1 Data bits: 8 Parity: None Flow Control: None
 ADDRESSING:	Maximum 255 addresses (for RS-485 option only).
 TYPE:	RS232 or RS485 2-wire.
POWER REQUIREMENTS:	12 – 26 Vdc (up to 60 mA maximum).
INTERFACE CONNECTORS:	Process I/O signals and Digital RS-232/RS-485 interface – miniature 9 pin female D-SUB connector. Digital optically-isolated outputs: TERM BLOCK HEADER 4POS 3.5MM Male Pins, Shrouded.
ENVIRONMENT:	Installation Level II, Pollution Degree II, (Per IEC 664).
ELECTROMAGNETIC COMPATIBILITY:	Compliant ref. 89/336/EEC as amended. Emission Standard: EN 55011:1991, Group 1, Class A Immunity Standard: EN 55082- 1:1992
OPERATING TEMPERATURE:	-10 °C to +70 °C (14°F to +158 °F).
DIMENSIONS:	86.4 x 76.2 x 19.1 mm (3.4" x 3.0" x 0.75") - W x H x D.
WEIGHT:	Appr. 125g / 0.3 lbs

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TABLE 18 - TIO ACCESSORY'S

PART NUMBER	DESCRIPTION	WHEN REQUIRED
KIT-TM-DD	GFM flow meter mounting kit, shielded cable with two 9 pins D-connectors for process signals and communication branch.	GFM + digital communication with Host PC or PLC.
KIT-TM-RD	GFM flow meter mounting kit, 4 wire cable between GFM RJ11 and TIO 9 pin D-connector.	GFM (12 Vdc power option only), 5-10 Vdc input, no digital communication.
KIT-TM-FD	GFM flow meter mounting kit, flat wire cable between GFM and TIO 9 pin D-connectors.	GFM, 0-5Vdc input no digital communication.
KIT-TC-110NA-2C	GFC flow controller mounting kit, shielded cable with North America plug 110 Vac to 12 Vdc power supply, communication branch.	GFC, 0-5 Vdc input, North America 12 Vdc power supply, digital communication.
KIT-TC-110NA-2N	GFC flow controller mounting kit, shielded cable with North America plug 110 Vac to 12 Vdc power supply.	GFC, 0-5 Vdc input, North America 12 Vdc power supply.
KIT-TC-110NA-4C	GFC flow controller mounting kit, shielded cable with North America plug 110 Vac to 24 Vdc power supply, communication branch.	GFC, 0-5 Vdc input, North America 12 Vdc power supply.
KIT-TC-110NA-4N	GFC flow controller mounting kit, shielded cable with North America plug 110 Vac to 24 Vdc power supply.	GFC, 0-5 Vdc input, North America 24 Vdc power supply.
KIT-TC-230EU-2C	GFC flow controller mounting kit, shielded cable with EUROPE plug 230 Vac to 12 Vdc power supply, communication branch.	GFC, 0-5 Vdc input, Europe 12 Vdc power supply, digital communication.
KIT-TC-230EU -2N	GFC flow controller mounting kit, shielded cable with EUROPE plug 230 Vac to 12 Vdc power supply.	GFC, 0-5 Vdc input, Europe 12 Vdc power supply.
KIT-TC-230EU -4C	GFC flow controller mounting kit, shielded cable with EUROPE plug 230 Vac to 24 Vdc power supply, communication branch.	GFC, 0-5 Vdc input, Europe 24 Vdc power supply, digital communication.
KIT-TC-230EU -4N	GFC flow controller mounting kit, shielded cable with EUROPE plug 230 Vac to 24 Vdc power supply.	GFC, 0-5 Vdc input, Europe 24 Vdc power supply.
KIT-TC-240AU-2C	GFC flow controller mounting kit, shielded cable with AUSTRALIA plug 240 Vac to 12 Vdc power supply, communication branch.	GFC, 0-5 Vdc input, Australia 12 Vdc power supply, digital communication.
KIT-TC-240AU-2N	GFC flow controller mounting kit, shielded cable with AUSTRALIA plug 240 Vac to 12 Vdc power supply.	GFC, 0-5 Vdc input, Australia 12 Vdc power supply.
KIT-TC-240AU-4C	GFC flow controller mounting kit, shielded cable with AUSTRALIA plug 240 Vac to 24 Vdc power supply, communication branch.	GFC, 0-5 Vdc input, Australia 24 Vdc power supply, digital communication.
KIT-TC-240AU-4N	GFC flow controller mounting kit, shielded cable with AUSTRALIA plug 240 Vac to 12 Vdc power supply.	GFC, 0-5 Vdc input, Australia 24 Vdc power supply.
KIT-TC-240UK-2C	GFC flow controller mounting kit, shielded cable with UK plug 240 Vac to 12 Vdc power supply, communication branch.	GFC, 0-5 Vdc input, UK 12 Vdc power supply, digital communication.
KIT-TC-240UK -2N	GFC flow controller mounting kit, shielded cable with UK plug 240 Vac to 12 Vdc power supply.	GFC, 0-5 Vdc input, UK 12 Vdc power supply.
KIT-TC-240UK -4C	GFC flow controller mounting kit, shielded cable with UK plug 240 Vac to 24 Vdc power supply, communication branch.	GFC, 0-5 Vdc input, UK 24 Vdc power supply, digital communication.
KIT-TC-240UK-4N	GFC flow controller mounting kit, shielded cable with UK plug 240 Vac to 24 Vdc power supply.	GFC, 0-5 Vdc input, UK 24 Vdc power supply.
KIT-TC-240UK-2AC	GFC flow controller mounting kit, shielded cable with UK plug 240 Vac to 12 Vdc power supply, communication branch, analog 4-20 mA output branch from GFC.	GFC, 0-5 Vdc input, UK 12 Vdc power supply, digital communication, analog 4-20 mA output branch from GFC.
KIT-TC-240UK-4AC	GFC flow controller mounting kit, shielded cable with UK plug 240 Vac to 24 Vdc power supply, communication branch, analog 4-20 mA output branch from GFC.	GFC, 0-5 Vdc input, UK 24 Vdc power supply, digital communication, analog 4-20 mA output branch from GFC.
KIT-TM	GFM flow meter mounting kit, no cables.	GFM, user-supplied custom cables.
KIT-TC	GFC flow controller mounting kit, no cables.	GFC, user-supplied custom cables.
CBL-DA9-X	9 conductor round shielded cable consisting of a 9 pin Female "D" Sub-Connector (plug) on one end, and loose wires on the other end.	For TIO stand alone option, user-supplied power supply.

Note: X – represent the length of the cable in feet



TIO	MODEL										
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EXAMPLE: TIO-LAA2

Totalizer I/O Flow Monitor / Controller with LCD Key Pad, 0-5 VDC Input, 0-5 VDC Output and RS-232 Digital Interface.