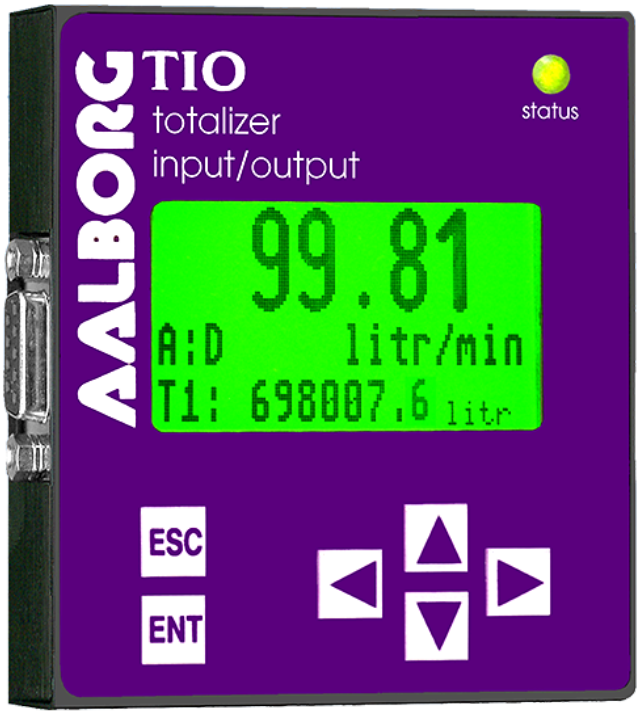


QUICK START GUIDE

Aalborg TIO Totalizer Input/Output

How to mount the TIO Totalizer Input/Output module on a GFM mass flow meter or GFC mass flow controller and set the three parameters it needs before first use.

AMTC-QG-0002

Read this first

The full safety information is in the Safety chapter of the operating manual of the GFM or GFC that carries the TIO (AMTC-MN-0012 for the GFM, AMTC-MN-0011 for the GFC); read that chapter as well as the safety messages in this guide. Read them before you mount, wire or set up the TIO. Not following them can damage the TIO or the device it is mounted on, and can endanger people.

The Aalborg TIO (Totalizer Input/Output) is a small display and interface module that fits onto a GFM flow meter or a GFC mass flow controller. This guide takes you from the unpacked module to a TIO that reads correctly: it shows how to mount the TIO on its host device and how to set the three parameters the TIO needs to match that device.

Read the safety messages below first, then check What you need (p. 5) and follow Mounting the TIO (p. 6) and Setting the parameters (p. 7) in order. The technical data and the mounting kits are in Specifications (p. 9).

This is a quick set-up guide. It does not cover wiring of the analogue, pulse or digital connections or the totaliser, alarm and serial communication menus. If your application needs one of these, contact Analyt-MTC support (see below).

NOTICE

Wiring with the power on can damage the electronics, and some components are sensitive to electrostatic discharge. Switch the power off before you connect or disconnect any cable, and wear a grounded wrist strap when you wire, adjust or service the device. The operating manuals of the GFM and GFC require both; keep to them when you connect the TIO.

Keep this guide for the lifetime of the product. The current revision is on the product page at analyt-mtc.com.

Safety notices in this guide

WARNING

A hazardous situation which, if not avoided, could result in death or serious injury.

NOTICE

Practices not related to personal injury — damage to the product, the process or the sample.

What the TIO does

The TIO is an accessory for GFM flow meters and GFC mass flow controllers; it can also be mated to a device of another make. Mounted on the device, it adds an analogue input/output interface (0–5 V DC, 5–10 V DC, 0–10 V DC or 4–20 mA) for flow indication or control, and it displays the flow rate and the totalized volume on a graphic LCD. It can also raise flow alarms and re-transmit the flow rate or the total through an optically isolated pulse output or a serial interface (RS-232 or RS-485).

Everything is configured from the TIO keypad, through a menu. The menu can be password-protected.

⚠ WARNING

Not for life support. The TIO is not designed for life-support applications. A failure or a wrong reading in such an application could endanger a person's life or health. Do not use the TIO in life-support applications.

Document information

Title	Aalborg TIO Totalizer Input/Output — Quick start guide
Document number	AMTC-QG-0002
Revision	Rev. 2 — October 2026
Applies to	Aalborg TIO Totalizer Input/Output module mounted on a GFM or GFC
Language	English
Manufacturer	Aalborg Instruments & Controls, Inc.
Related documents	GFM Mass Flow Meter — Operating manual (AMTC-MN-0012); GFC Mass Flow Controller — Operating manual (AMTC-MN-0011)

Revision history

Rev.	Date	Change
2	October 2026	Quality programme: new document type, number and identity pages.
1	October 2026	First issue.

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CHAPTER 1

Supplied items

What you need

- the TIO module;
- the GFM or GFC it is to be mounted on;
- the mounting kit for your device (see Mounting kits (p. 9)): you need its four screws and the mounting bracket;
- a 3/16 in hex nut driver;
- the full scale range of your GFM or GFC (in L/min) and, if you work in mass units, the density of the operating fluid.

CHAPTER 2

First use

What you will do

1. **Mount the TIO** on the GFM or GFC with the bracket (Mounting the TIO (p. 6)).
2. **Set the Device Function** so that the TIO knows whether it is mated to a meter or a controller.
3. **Set the Full Scale Range** to the full scale range of the mated device.
4. **Set the Fluid Std. Density (optional)**, only if the TIO displays mass units (all three in Setting the parameters (p. 7)).

Mounting the TIO

The TIO is mounted against the D-connector side of the GFM or GFC, with the D-connectors of the two devices facing each other. A bracket with an opening for each connector, fastened with four screws, holds the devices together. The procedure is the same for a GFM and a GFC.

You need the 3/16 in hex nut driver and, from the mounting kit, the mounting bracket and the four screws.

Procedure

1. With the hex nut driver, remove the four original screws (**A**) from the D-connectors: two from the TIO, two from the GFM or GFC.
2. Place the TIO against the D-connector side of the GFM or GFC so that the two D-connectors face each other.
3. Fit the mounting bracket (**B**) to both D-connectors.
4. Check that the bracket lines up with both connectors.
5. Fasten it with the four screws (**C**) from the mounting kit.

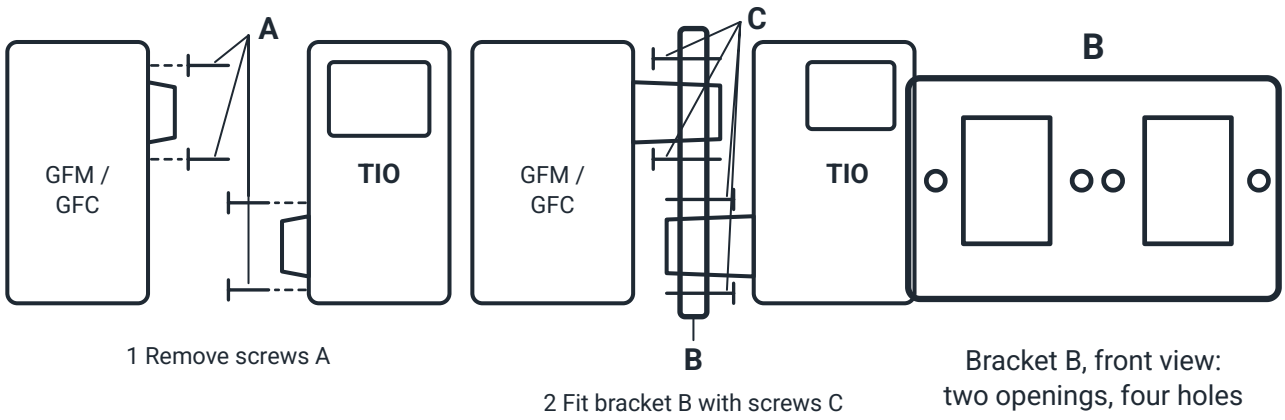


Figure 1. Mounting, seen from above. Left: the four original screws (A) come out of the two D-connectors, which face each other. Centre: the bracket (B) has one opening for each connector and is fastened with the four screws (C). Right: the bracket seen from the front. Schematic, not to scale; the GFM and GFC housings differ in shape.

Setting the parameters

Three parameters tell the TIO what it is mated to. Set them in the order below, after the TIO is mounted.

NOTICE

Wrong values for **`Device Function`**, **`Full Scale Range`** or **`Fluid Std. Density`** make the TIO display incorrect flow and total figures and can make it act in unexpected ways. Enter the correct values for all three.

The keypad

The TIO has six push buttons below the display (Figure 2). Menu names in this guide are written as the display shows them, set apart like this: **`General Settings`**.



Button	Use in this guide
ESC	From the main screen, opens the menu.
ENT	Opens the highlighted menu item, or saves the value you have set.
Up / **Dn**	Up and down arrows. Move the highlight up or down the menu; adjust a value.
Left / **Right**	Left and right arrows. Adjust a value.

Figure 2. Front of the TIO. The D-connector is on the left side of the housing.

Open the settings

Switch off the program protection before you change any setting.

1. On the main screen, press **ESC**.
2. Highlight **`Program Protection`** and press **ENT**.
3. Highlight **`Disable`** and press **ENT**.

Device Function

This tells the TIO whether the device it is mounted on measures flow only or also controls it.

1. Press **Dn** to highlight **`General Settings`** and press **ENT**.
2. Select **`Device Function`** and press **ENT**.
3. Select the setting that matches the device (table below) and press **ENT**.

The TIO is mounted on	Select
a GFM flow meter	**`Meter`**
a GFC mass flow controller	**`Controller`**
a device of another make	the setting that matches what that device does

Full Scale Range

The TIO needs the full scale range of the mated device, expressed in litres per minute (L/min), whatever unit the device is specified in.

1. In **General Settings**, scroll down to **Device Calibration** and press **ENT**.
2. Select **Full Scale Range** and press **ENT**.
3. Use **Up**, **Dn**, **Left** and **Right** to set the value to the full scale range of the device, in L/min.
4. Press **ENT** to save.

Fluid Std. Density

Set this parameter only if the TIO displays flow or total in mass units. It is the density of the operating fluid, in grams per litre (g/L); with volume units it is not needed.

1. From **Calibration Menu**, scroll down to **Fluid Std. Density** and press **ENT**.
2. Use **Up**, **Dn**, **Left** and **Right** to set the density of the operating fluid, in g/L.
3. Press **ENT** to save.

Summary

Parameter	Where to find it	Value
Device Function	**General Settings**	**Meter** for a GFM, **Controller** for a GFC
Full Scale Range	**General Settings** › **Device Calibration**	full scale range of the mated device, in L/min
Fluid Std. Density	**Calibration Menu**	density of the operating fluid, in g/L (mass units only)

Unsure of a value, or the TIO does not behave as expected after set-up? Contact Analyt-MTC support with the information listed under Where to find more (p. 11).

CHAPTER 3

Specifications

Technical data

INPUTS AND OUTPUTS	
ADC / DAC resolution	12 bit
Analogue inputs	0–5 V DC, 4–20 mA, 5–10 V DC (selected by jumper); 0–10 V DC: ask Analyt-MTC
Analogue outputs	0–5 V DC, 4–20 mA (selected by jumper)
Pulse output	Programmable, optically isolated; active-low time preset from 10 to 6550 ms
Digital outputs	Two, programmable, optically isolated; UCE 40 V DC, ICE 150 mA; isolation voltage 250 V rms
Serial interface	RS-232 or RS-485 2-wire; up to 64 devices on one line, with up to 255 addresses (RS-485 only); 1200, 2400, 4800, 9600, 19 200, 38 400, 57 600 or 115 200 baud (user selectable); 8 data bits, 1 stop bit, no parity, no flow control
DISPLAY AND KEYPAD	
Display	128 × 64 graphic LCD showing instantaneous flow and total volume; digits 13 mm high for flow, 5.5 mm for the total; adjustable contrast and backlight
Keypad	Six push buttons
POWER, CONNECTORS AND HOUSING	
Supply voltage	12–26 V DC, 60 mA maximum
Connectors	Process signals and serial interface: miniature 9-pin female D-sub. Digital outputs: 4-position 3.5 mm terminal block header
Operating temperature	−10 °C to +70 °C (14 °F to +158 °F)
Dimensions	86.4 × 76.2 × 19.1 mm (3.4 × 3.0 × 0.75 in), W × H × D
Weight	Approx. 125 g (0.3 lb)

Mounting kits

Each kit mounts the TIO on one device type and includes the cable that links the two; the GFC kits also include a power supply. Choose the kit for the device the TIO is mounted on, and for whether you need digital communication with a host PC or PLC.

Kits for a GFM flow meter

Order code	Contents and use
`KIT-TM-DD`	Shielded cable with two 9-pin D-connectors for process signals and the communication branch. Required for digital communication with a host PC or PLC.
`KIT-TM-RD`	4-wire cable between the GFM RJ11 connector and the TIO 9-pin D-connector. 5–10 V DC input, no digital communication.
`KIT-TM-FD`	Flat cable between the 9-pin D-connectors of the GFM and the TIO. 0–5 V DC input, no digital communication.

Kits for a GFC mass flow controller

Order code	Contents and use
KIT-TC-230EU-2C	Shielded cable with European plug, 230 V AC to 12 V DC power supply, communication branch.
KIT-TC-230EU-2N	Shielded cable with European plug, 230 V AC to 12 V DC power supply. No digital communication.
KIT-TC-230EU-4C	Shielded cable with European plug, 230 V AC to 24 V DC power supply, communication branch.
KIT-TC-230EU-4N	Shielded cable with European plug, 230 V AC to 24 V DC power supply. No digital communication.
KIT-TC-110NA-2C	Shielded cable with North America plug, 110 V AC to 12 V DC power supply, communication branch.
KIT-TC-110NA-2N	Shielded cable with North America plug, 110 V AC to 12 V DC power supply. No digital communication.
KIT-TC-110NA-4C	Shielded cable with North America plug, 110 V AC to 24 V DC power supply, communication branch.
KIT-TC-110NA-4N	Shielded cable with North America plug, 110 V AC to 24 V DC power supply. No digital communication.
KIT-TC-240AU-2C	Shielded cable with Australia plug, 240 V AC to 12 V DC power supply, communication branch.
KIT-TC-240AU-2N	Shielded cable with Australia plug, 240 V AC to 12 V DC power supply. No digital communication.
KIT-TC-240AU-4C	Shielded cable with Australia plug, 240 V AC to 24 V DC power supply, communication branch.
KIT-TC-240AU-4N	Shielded cable with Australia plug, 240 V AC to 24 V DC power supply. No digital communication.
KIT-TC-240UK-2C	Shielded cable with UK plug, 240 V AC to 12 V DC power supply, communication branch.
KIT-TC-240UK-4C	Shielded cable with UK plug, 240 V AC to 24 V DC power supply, communication branch.
KIT-TC-240UK-4N	Shielded cable with UK plug, 240 V AC to 24 V DC power supply. No digital communication.
KIT-TC-240UK-2AC	Shielded cable with UK plug, 240 V AC to 12 V DC power supply, communication branch and analogue 4–20 mA output branch from the GFC.
KIT-TC-240UK-4AC	Shielded cable with UK plug, 240 V AC to 24 V DC power supply, communication branch and analogue 4–20 mA output branch from the GFC.
KIT-TM	GFM kit without cables, for your own cables.
KIT-TC	GFC kit without cables, for your own cables.

For the UK kit with a 12 V DC power supply and no digital communication, and for the 9-conductor cable for the TIO on its own with a power supply of your choice, contact Analyt-MTC.

CHAPTER 4

Where to find more

This guide covers the mounting and the first settings of the TIO. The documents below go further; ask Analyt-MTC if you do not have one of them.

Related documents

Document	Number	What it covers
GFM Mass Flow Meter — Operating manual	AMTC-MN-0012	The full safety information, installation, electrical connections, commissioning and operation of the GFM.
GFC Mass Flow Controller — Operating manual	AMTC-MN-0011	The full safety information, installation, electrical connections, commissioning and operation of the GFC.
Aalborg TIO Totalizer Input/Output — Technical data sheet	AMTC-SS-0027	Specifications, functions, ordering code and mounting kits of the TIO.

Contact and support

ANALYT-MTC Messtechnik GmbH

German Headquarters

Klosterrunsstraße 18, 79379 Müllheim
Germany

+49 7631 5545

info@analyt-mtc.de

French Subsidiary

175 Avenue d'Alsace, 68000 Colmar
France

+33 3 89 41 47 78

info@analyt-mtc.fr

www.analyt-mtc.com

Before you call

Have the following at hand so that Analyt-MTC can help you quickly:

- the model and serial number of the TIO and of the GFM or GFC it is mounted on;
- the full scale range and operating fluid of that device;
- the values currently entered for the three parameters in Setting the parameters (p. 7).

ANALYT-MTC Messtechnik GmbH

Sales, service and calibration

German Headquarters
Klosterrunsstraße 18, 79379 Müllheim
Germany
+49 7631 5545
info@analyt-mtc.de

French Subsidiary
175 Avenue d'Alsace, 68000 Colmar
France
+33 3 89 41 47 78
info@analyt-mtc.fr

www.analyt-mtc.com

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