Aalborg TIO Totalizer Input/Output

Add-on module for GFM and GFC with LCD, totalisers, alarms, pulse output and RS-232 or RS-485

The Aalborg TIO is a display and I/O module that mounts on a GFM flow meter or a GFC mass flow controller. It shows flow rate and totals, runs two totalisers, a pulse output, flow alarms and two switching outputs, and holds a set point table for controllers. Everything is set on the keypad or over RS-232 or RS-485.



13 mm	2	12 bit	RS-232/485	12–26 V DC
Digit height for flow rate	Independent totalisers	ADC and DAC resolution	Serial interface, up to 64 devices	Supply voltage

Performance

Resolution	12 bit, ADC and DAC

Operating conditions

Operating temperature	−10 to +70 °C (14 to 158 °F)

Mechanical

Mounting	On the GFM or GFC, or as panel, wall or field mount
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)

Electrical and communication

Supply	12–26 V DC, up to 60 mA
Connectors	Process I/O and serial interface: miniature 9-pin female D-sub Digital outputs: 4-position 3.5 mm terminal-block header, male pins, shrouded
Analogue inputs	0–5 V DC, 4–20 mA, 5–10 V DC; jumper-selectable 0–10 V DC: ask Analyt-MTC
Analogue outputs	0–5 V DC, 4–20 mA; jumper-selectable
Type	RS-232 or RS-485 2-wire
Network	Multi-drop, up to 64 devices Up to 255 addresses, RS-485 only
Protocol	Proprietary ASCII command set
Software	Free Aalborg Configuration and Monitoring Utility and Communication Utility
Baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600 or 115200, user-selectable
Frame	8 data bits, 1 stop bit, no parity, no flow control
Digital outputs	Two programmable outputs, optically isolated, for flow alarms or totaliser events UCE 40 V DC, ICE 150 mA; isolation 250 V rms

Compliance

EMC	Emission EN 55011:1991, group 1, class A; immunity EN 55082-1:1992
Installation category	Installation level II, pollution degree II (IEC 664)

Display and keypad

Display	128 × 64 graphic LCD with flow rate and total; adjustable contrast and backlight
Digit height	Flow rate 13 mm (0.51 in), total 5.5 mm (0.21 in)
Readings	Flow rate, totalisers, flow alarms and diagnostic events, in any combination at once
Keypad	6 push buttons; menu can be password-protected
Engineering units	Up to 47 volumetric and mass flow units
Flow linearizer	Built-in, 10-point linearization of the flow curve

Functions

Totalisers	Two independent totalisers, updated every 100 ms Main total saved to EEPROM every second Settings: start flow, event volume, power-on delay, auto reset and delay, reset to zero
Pulse output	Frequency proportional to flow rate, independent of the totalisers Settings: start flow in % FS, unit per pulse, active time 10–6550 ms
Flow alarms	Low and high limits in % FS; action delay; latch mode
Set point control	Controllers: keypad or digital interface; table of up to 16 steps with ramping up and down

Ordering code, for example TIO-LAA2

Position	Code	Meaning
1 Display / keypad	L	LCD and keypad
1 Display / keypad	N	No display, no keypad
2 Input signal	A	0–5 V DC
2 Input signal	B	4–20 mA
2 Input signal	C	0–10 V DC (ask Analyt-MTC)
2 Input signal	D	5–10 V DC
3 Output signal	A	0–5 V DC
3 Output signal	B	4–20 mA
3 Output signal	C	0–10 V DC
4 Digital interface	2	RS-232
4 Digital interface	5	RS-485

Order from Analyt-MTC with the order code. TIO-LAA2: LCD and keypad, 0–5 V DC input, 0–5 V DC output, RS-232.

Mounting kits

GFM kit, shielded cable, digital communication to PC or PLC	KIT-TM-DD
GFM kit, 4-wire cable, 5–10 V DC input, no communication	KIT-TM-RD
GFM kit, flat cable, 0–5 V DC input, no communication	KIT-TM-FD
GFC kit, EU plug to 12 V DC, with communication	KIT-TC-230EU-2C
GFC kit, EU plug to 12 V DC, no communication	KIT-TC-230EU-2N
GFC kit, EU plug to 24 V DC, with communication	KIT-TC-230EU-4C
GFC kit, EU plug to 24 V DC, no communication	KIT-TC-230EU-4N

Notes

1. FS = full scale. The GFC kits above have a 230 V AC EU plug and suit a 0–5 V DC input. Digital communication needs a kit with a communication branch. KIT-TM-RD suits the 12 V DC GFM only.
2. Other GFC kits, 12 V DC (-2) or 24 V DC (-4), with (C) or without (N) communication: North America KIT-TC-110NA-2C, -2N, -4C, -4N; Australia KIT-TC-240AU-2C, -2N, -4C, -4N; UK KIT-TC-240UK-2C, -4C, -4N.
3. GFC kit plugs: North America 110 V AC; Australia and UK 240 V AC.
4. UK kits with a 4–20 mA output branch: KIT-TC-240UK-2AC, -4AC. Kits without cables: KIT-TM (GFM), KIT-TC (GFC). For the UK 12 V DC kit without communication and the 9-conductor cable for the stand-alone TIO, contact Analyt-MTC.

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