

The Thermo Scientific AutoPILOT, our flagship gas flow computer, is a proven workhorse that calculates flow on up to two meter runs. It's accurate, easy to install and use, and solar-powered, providing a highly reliable remote telemetry unit that heightens productivity while lowering your cost of operation.

AutoPILOT®

Two-Run Gas Flow Computer and Remote Telemetry Unit



Applications

- Production
- Transmission
- Processing
- Custody transfer

Versatile & Modular

Whether you have a simple application or a complex installation that involves injection systems, gas samplers and station alarm monitoring, the Thermo Scientific AutoPILOT provides accurate, repeatable measurements on up to two meter runs. Its modularity minimizes additional capital expenditures by enabling input/output expansion as needed to fulfill changing measurement and control requirements, particularly at complex well sites. The system also supports a large variety of input devices, including orifice, turbine and ultrasonic meters.

Reliable & Easy-to-Configure

A 16-bit microprocessor and onboard memory combine in a cost-effective design to reliably perform rigorous AGA Detail calculations. The user-friendly AutoPILOT can be configured on-the-spot using the front keypad or remotely via a personal computer or laptop. Start-up is fast and day-to-day operation requires minimal

user intervention, enabling reliable, ongoing communication of valuable flow data from remote, unmanned locations.

Immediate Alarm Condition Response

The AutoPILOT supports a wide variety of host communication protocols, including the Thermo Scientific in-house standard as well as several popular and specialized protocols. In the event of an alarm condition, a configurable call-out function permits the AutoPILOT to call the host system or a pager to send an immediate notice.

Rugged & Durable Design

Like all Thermo Scientific gas flow computers, the AutoPILOT is built to endure the most extreme environmental conditions. Our board designs are rigorously tested to withstand more than 120 consecutive, indirect lightning strikes, measuring up to 6,000 volts/3,000 amps each. In addition, temperature cycling from -40°C to +85°C (-40°F to +185°F) is conducted. Any board failing these tests will not ship.



AutoPILOT shown with optional plunger lift

System Features

- Per second flow calculation on up to two meter runs simultaneously
- Easy to install, configure and use
- Interfaces with multiple input devices:
 - Differential signal devices: Orifice, stacked orifice, V-cone and Verabar
 - Linear signal devices: Turbine, auto-adjust turbine and ultrasonic
- Modular design enables expansion from a simple flow measurement application to a full measurement and control system
- Supports a wide range of I/O and communication expansion options
- Superior lightning protection built into each board
- Processor operates at the widest temperature range in the industry: -40°C to +85°C (-40°F to +185°F)

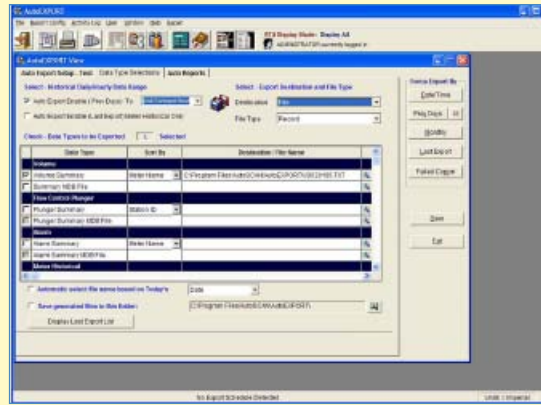
AutoPILOT Input/Output (I/O) Board Options

	Discrete Inputs (DI)	Discrete Outputs (DO)	Pulse Inputs	Analog Output	Communication Ports
DI/DO Board	2 contact inputs, internal +5 Vdc wetting voltage	2 open-drain MOSFETs, externally powered. Rated: +30 Vdc max, 250 mA max			
Pulse Input Board			2 pulse inputs configurable for slot sensor, magnetic pick-up or dry contact inputs, 5 KHz max		
Serial Expansion Board					2 ports (both selectable RS232/RS485, synchronous/asynchronous)
MEB-2-DI/DO Board (up to 4 boards)	2 contact inputs, internal +5 Vdc wetting voltage	2 open-drain MOSFETs, externally powered. Rated: +30 Vdc max, 250 mA max			
MEB-2-Pulse Input Board (up to 2 boards)			2 pulse inputs configurable for slot sensor, magnetic pick-up or dry contact inputs, 5 KHz max		
MEB-2-D/A Board (up to 2 boards)				2 outputs, 1-5 Vdc or 4-20 mA, powered by battery or external +24 Vdc	
MEB-4-DI Board (up to 4 boards)	4 contact inputs, internal +5 Vdc wetting voltage				
MEB-4-DO Board (up to 4 boards)		4 open-drain MOSFETs, externally powered. Rated: +30 Vdc max, 250 mA max			

AutoCONFIG™ Software Facilitates Setup

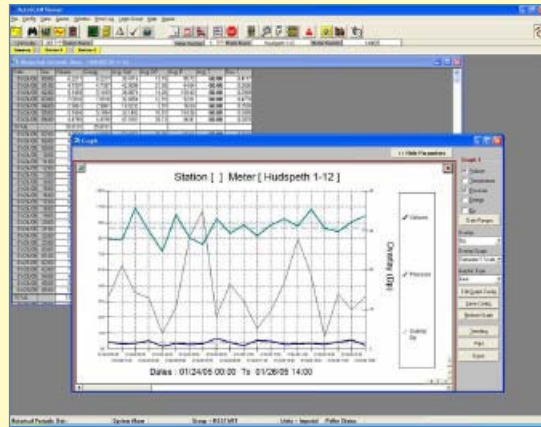
AutoCONFIG software for Microsoft® Windows® provides ease-of-use for the integrator or operator. A graphical user interface and built-in wizards enable inexperienced technicians to setup Thermo Scientific flow computers in minutes. Additional benefits include:

- Complete integrated support for all Thermo Scientific flow computers
- Multiple, simultaneous views
- User-configurable Microsoft® Outlook™-like tree view
- Remote communications via serial, TCP, radio, satellite, etc.
- High-contrast monochrome mode for use in direct sunlight.



Expedite Data Downloads with AutoSCAN®

Move data rapidly from the most remote field location to your local network with the Thermo Scientific AutoSCAN host system. It enables the AutoPILOT to communicate directly with any SCADA system that uses MODBUS or native protocol to facilitate data downloads. Consisting of Poller, Viewer, Vox and Export, the system consolidates data to simplify management of measurement applications and can easily be configured to automatically save, print and/or email reports in a variety of formats. With the ability to optimize displays, reports, exports and scan parameters, the system enables users to efficiently manage electronic flow measurement.



AutoMITTER® — Smart Multi-Variable Transmitter

Achieve effective, cost-efficient data transmission to your AutoPILOT by integrating an AutoMITTER Smart Multi-Variable Transmitter on each meter run. This compact, lightweight transmitter mounts remotely and uses an RS-485 signal to rapidly communicate static pressure, differential pressure and temperature inputs at up to 2,250 feet in a Class I, Division 1 area and up to 4,000 feet in a Class I, Division 2 area. Using the RS-485 interface, the AutoMITTER can be connected directly to the AutoPILOT without using any valuable analog inputs. This user-friendly device enables capital expenditure reduction, provides highly accurate, repeatable measurements to increase process efficiency, and has very low power requirements to keep operating costs down.

AutoGAGE® — Tank Level for Reliable Custody Transfer

Accurate tracking of custody transfer at remote well sites ensures accountability. The Thermo Scientific AutoGAGE is a highly reliable digital level sensor that relays data to our flow computers, enabling staff to efficiently monitor tank levels on a daily basis. The electronics measure in precise increments with minimal calibration required. A dual float option enables liquids with varying densities to be measured separately to ensure salt water or other liquids are not factored into your final oil numbers to accurately account for product and revenues.

Plunger Lift — Well Optimization Software

Maximizing well production is the key to maximizing profits. AutoPILOT users can now automatically increase well production by as much as 20 percent by integrating Thermo Scientific plunger lift software into this powerful flow computer. Once the software's plunger lift algorithm learns the flow characteristics of the well, advanced self-optimizing methods take effect to ensure maximum results are achieved over time. The system provides real-time production data via remote monitoring and features full reporting and troubleshooting capabilities, minimizing system downtime and maximizing staff efficiency and productivity. It also reduces capital expenditures by eliminating a costly secondary control system as well as lowers well maintenance costs and ensures fewer remedial treatments, providing long term cost benefits in addition to increased well potential.



AutoPILOT

General Specifications

Processor	16-bit Intel® 80C188EB
Program Memory	EPROM 512 KB
Data Storage Memory	RAM 512 KB
CPU Board Communication Port	2 x RS232
COM Board Communication Port	2 x RS232 or RS485
Input Power	5.5 VDC to 16 VDC
Output Power	12 VDC Transducer Power
Historical Data Storage	65 days of daily, 35 days of hourly
Audit Trails	200 audit events, 60 different types of audits
Alarm Log Storage	200 alarm events, 15 different types of alarms

Environmental Specifications

Operating Temperature	-40°C to +85°C (-40°F to +185°F)
Operating Humidity	0-95% RH, non-condensing
Approvals	UL and c-UL Class I Division 2 (Groups C&D); UL and c-UL Class I Division 1 (Group D)
Enclosure Rating	NEMA 4X industrial control enclosure

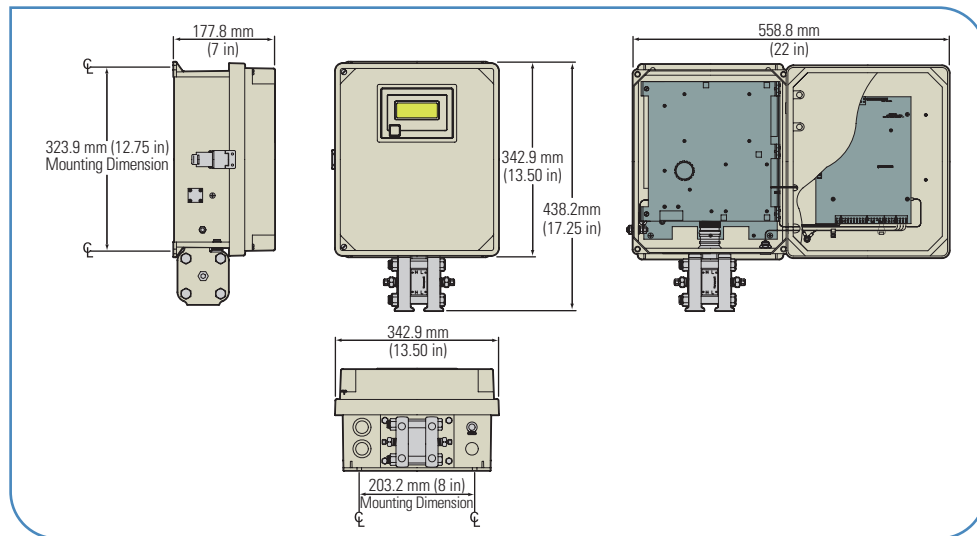
Physical Specifications

Cover Rack/Panel Mount Dimensions	AutoPILOT:	287.3 mm (11.31 in) W x 342.9 mm (13.5 in) H x 177.8 mm (7.0 in) D
	AutoPILOT LCS:	374.65 mm (14.75 in) W x 450.85 mm (17.75 in) H x 209.55 mm (8.25 in) D
Overall Rack/Panel Mount Dimensions	AutoPILOT:	287.3 mm (11.31 in) W x 438.2 mm (17.25 in) H x 177.8 mm (7.0 in) D
	AutoPILOT LCS:	374.65 mm (14.75 in) W x 546.10 mm (21.5 in) H x 209.55 mm (8.25 in) D
Keypad	4 x 5 (20-key) input	
Display	4 x 16 character LCD	

Natural Gas Calculations

Supercompressibility (Fpv)	AGA 8 Gross-1992; AGA 8 Detail-1992; AGA 8 Short-1988; NX-19; NX-19 Analysis
Differential Meters (DP, Orifice)	AGA 3/ANSI/API 2530-1992 Method 2 or ANSI/API 2530-1985
Linear Meters (Turbine)	AGA 7
Energy	AGA 5
Diagnostic	AGA 10 SoS
Additional Factors/Equations	Fww (manual, partial or full); Fws
Turbine Meter Linearization	10 Point Frequency/K-factor Table

AutoPILOT Technical Diagram



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Room 1010 - 1019	+86 (10) 5850-3588
Ping'an Mansion No. 23 Jinrong Street	+86 (10) 6621-0847 fax
Xicheng Dist, Beijing 100032 CHINA	
A-101, ICC Trade Tower, Senapati Bapat Road	+91 (20) 6626 7000
Pune 411016 Maharashtra, INDIA	+91 (20) 6626 7001 fax
Ion Path, Road Three, Winsford	+44 (0) 1606 548700
Cheshire CW7 3GA UNITED KINGDOM	+44 (0) 1606 548711 fax
1410 Gillingham Lane	+1 (800) 437-7979
Sugar Land, TX 77478 USA	+1 (713) 272-0404
	+1 (713) 272-4573 fax