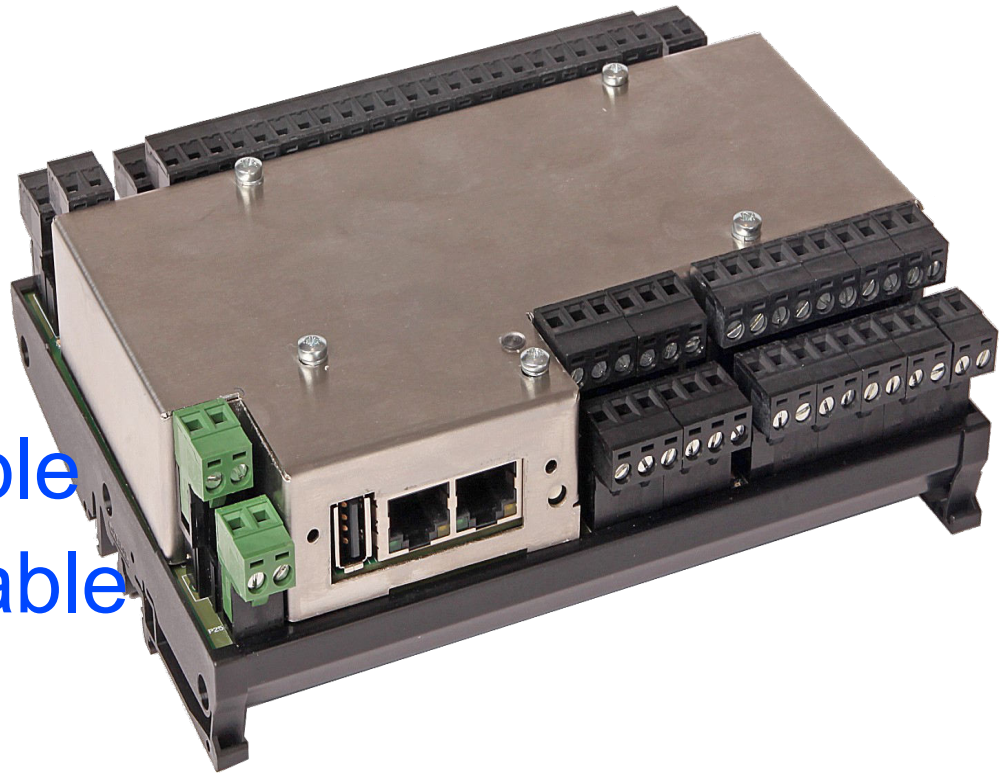


NANO-200 Flow Computer

Robust
Rugged
Reliable
Repeatable
& Predictable



- Significantly reduces the stream, integration and support costs of fiscal measurement
- Rugged and reliable electronics. Power in, power out and every field I/O point individually Galvanically isolated
- Rock Solid measurement and software stability. Unique Software Science employed to ensure predictable operation
- Interfaces with industry standard flow meters and product quality transducers
- Small footprint
- Very simple to set-up but highly configurable and flexible
- Designed to ease the auditing process
- Dual 10/100 MHz Ethernet ports provided as standard for redundant communications
- Integrated web server allows local or remote operation and configuration
- Can be operated as single streams or multi stream clusters
- Designed for a minimum 25 year operational life
- Lower Power product saves over 1 tonne CO₂ over the product life
- RoHS and WEEE Compliant

The evolutionary new component for all fiscal metering, allocation & reporting systems.



So What is New?

The NANO-200 has been designed in a holistic manner to be a well integrated system component, rather than an “island of data” as was the case with previous generation machines.

Communications and connectivity are at the core of the design. Access to data and reports locally and remotely are catered for easily using Internet Protocols (HTTP for browsing and XML for data retrieval). In addition legacy systems are supported with both Modbus serial and Modbus TCP.

The unique configuration method allows System Integrators the freedom to be able to customise the NANO-200 to an unprecedented degree, with the ability to customise existing applications, write new data blocks, and protect any IP added.

For simpler applications, much of the configuration can be done using the embedded web server, giving an optimum balance of simplicity and flexibility.

As a result, the total cost of ownership will be reduced as much as possible to the Oil and Gas companies, operators, integrators and auditors.

Connectivity

Communications

- Two full featured and independent 10/100 MHz Ethernet controllers with dual link status indication
- Three Serial ports supporting data rates up to 115.2K baud using RS232, RS422 and RS485

Analog Field I/O

- Six fully independent isolated high resolution Analog inputs, utilising Voltage or Current mode inputs
- Two Analog inputs can be configured as 4-wire RTDs. These high accuracy temperature measurement inputs are also isolated

Digital Field I/O

- Isolated Dual Pulse meter inputs support true Level A, B or E operation modes up to 15KHz with line integrity checks

- Dual Density meter input circuits measure periods to nanosecond resolution and are also isolated
- Nine individually isolated Digital Inputs can be used as general purpose inputs (with fleeting change detection) or Sphere Switch detectors.
- Eight individually isolated Digital Outputs can drive relays or be used as General Purpose outputs. Two outputs can also be configured as high speed pulse outputs up to 100 Hz

Field Devices

Primary Meters

The NANO-200 is designed to work with almost all primary measurement elements including Turbines, PD meters and a suite of Gas DP meters such as Gas Orifice, Annubar, Venturi and V-Cone.

In addition, smart meters using Ultrasonic and Coriolis principles are catered for with pulse or serial interfaces.

Product Quality Inputs

The NANO-200 allows direct connection to a number of fiscal standard Gas Chromatographs over serial or Ethernet.

Transmitters

Pressure, Temperature and Differential Pressure devices can be utilised via 4-20 mA or 1-5 Volt signals, and 4-wire Temperature elements are supported.

Density inputs can be presented in both the Analog or the frequency domain.

Meter Provers

The NANO-200 can interface with conventional 2 or 4 switch bi-directional Provers as well as uni-directional variants.

In addition, Brooks, Calibron and Flow Management Devices small volume Provers can be used with dual chronometry to increase resolution. Alternatively, the increasing use of Master Meters is readily supported.

Configuration using NANOConf

The NANOConf tool allows a user to:-

- select an appropriate application from the library
- transfer the application
- configure network settings

In-use field parameters and other system settings (time, date, printer) can then be configured using the built-in web server.

The use of Zero Configuration Networking allows NANO-200 units to be discovered and configured without manual operator intervention.

Customization using VC/Cure™

System Integrators have full access to the VC/Cure™ environment. This flexible tool set is unique in that it allows the System Integrator to modify existing applications, or build new ones with unprecedented ease using both code and visual programming techniques.

VC/Cure Library Functions:

Gas Calculations

ISO 5167 – 1991, 1998, 2004

AGA3 – 2003

ISO 6976 – 1995

GPA 2172 - 2009

AGA5 – appended 2009

AGA8 – 1992, Detailed or Gross 1 & 2

AGA7 – 2006 Gas Turbines

AGA10 – 2003 SoS

Liquid Calculations

API T5, 6, 23, 24, 53, 54 – 1952, 1980

API 11.2.1, 11.2.1M, 11.2.2, 11.2.2M

API 11.1 2007

LNG and LPG

API Table 53E and 54E

API 11.2.2 and 11.2.2M

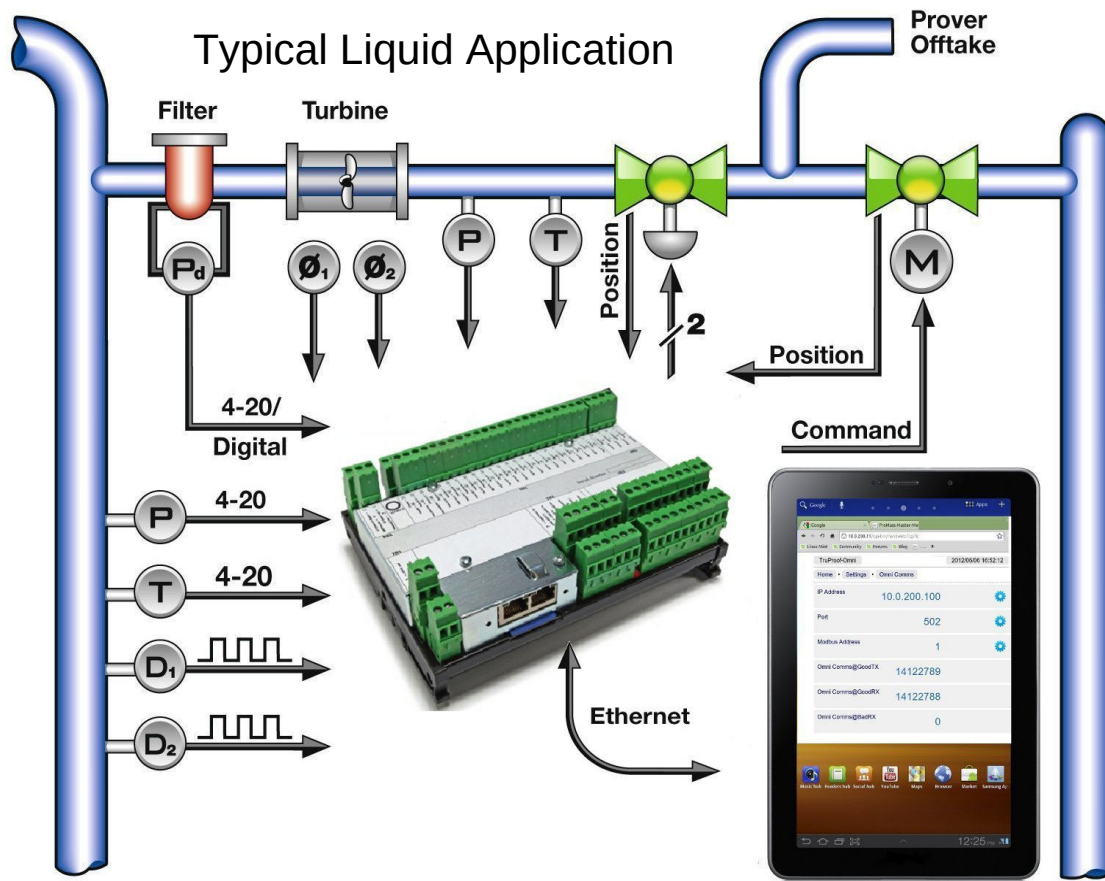
GPA TP15 & TP27

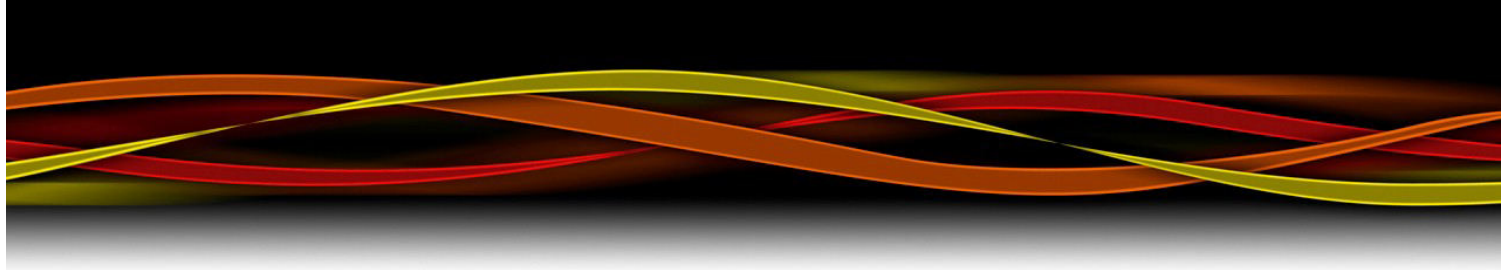
Proving Methods

Bi-Directional & Uni-Directional

Compact (Brooks, Calibron, FMD)

Master Meter





Hardware Specifications

Physical

Mass	485 Grams excluding mating connectors
Size	170mm by 130mm by 70mm high
Mounting	Needs 170mm length of top-hat DIN Rail to EN50022

Environmental

Operating Temperature	-40°C to +85°C, Non-Condensing
Storage Temperature	-50°C to +90°C

Power

Supply Voltage	12 to 28 VDC, 5 Watt Typical
Redundancy / Isolation	Two independent power connectors to allow dual redundant supplies, Supply is Galvanically isolated from computer ground
Backup Supply	Use of FRAM allows 30 year archive storage without batteries

Transaction Capacity

CPU arrangement	Two CPUs are used, an 80 MIPS I/O processor and the System CPU
System CPU Type	Advanced RISC Processor, 720MHz ARM Cortex-A8
Volatile Memory	256MBytes DDR3
NV Memory	1 or 4 Mbit Ferroelectric RAM (FRAM)
Archive Store	64MBytes NOR Flash with SD/SDHC slot for 32GByte removable storage

Field I/O Specifications

Analog Inputs

Number and Type	Up to 6 off, high accuracy differential 0-5V or 4-20mA, Fully Isolated from ground
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PRT/RTD Input

Number and Type	Up to 2 off, 4-wire temperature measurement, IEC751 & DIN curves Note : Each PRT/RTD input requires one Analog input
Temperature Range	-125°C to +400°C

Analog Outputs

Number and Type	2 off Fully floating 14 bit, Source or Sink 4-20mA DAC
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Digital Inputs

Digital Inputs	9 off Opto-Isolated inputs, with filtering and fast sampling Digital Input 9 can be used as Sphere Detectors, with Dual Chronometry
Prover Pulse Bus	Raw pulse bus connecting multiple meter runs to a single Prover
Dual Pulse Inputs	1 pair of inputs, supporting a single meter run or master meter Supports level A IP252/76, IEC 6551 & API Ch5.5
Frequency Inputs	2 off high resolution period measurements for Density Meter interfaces 100 Hz to 5KHz, 2.5ppm accuracy with nanosecond resolution

Digital Outputs

Digital Outputs	8 off Opto-Isolated Open Collector outputs 50V, 100mA
Pulse Outputs	2 of the Digital Outputs can be configured as pulse outputs to 100Hz

Communications

Field Serial Port	1 off opto-isolated, 2-wire RS485 Multi-drop port for Intelligent Meters
Ethernet	2 off 10/100 MHz Ethernet ports supporting IP protocols
Serial Ports.	2 off serial ports provide RS232 and 2 or 4 wire RS422/485. These ports operate at up to 115k Baud and can be used for printing and remote data gathering by a DCS or SCADA system

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