



Multistream
8+4 in 1 Flow Computer
Cost effective EcoFlow
Different fluids

ECOFLOW - measurement without compromise

Overview

- Measures 8 fluid flows in closed conduits simultaneously according to international standards and recommendations
- Provides 4 additional station totalizations
- Calculates the physical properties of more than 30 fluids (gases, liquids and steam) including the properties required for energy flow calculations
- Can be used with a very wide range of flow meters
- Calculates the CO2 emission
- Cost effective process applications, ideal solution for custody transfers and fiscal measurements
- Redundant metering systems can be implemented at a moderate cost
- Hourly metering data archives for 400 days
- New methods and fluids implementation on request in short term
- EcoConfig software for configuration support and remote archive uploading

Supported fluids

Hydrocarbons

natural gas, coke oven gas, blast furnace gas, NGL & LPG, crude oil, refined products, lubricating oil

Industrial gases

air, nitrogen, oxygen, argon, hydrogen, carbon-dioxide, carbon-monoxide, propane, ethylene, ammonium

Liquids other than water

ethanol, MTBE, ETBE, general liquid

Water, water steam, water-glycol mixture - energy flow (heat transfer) calculation

Supported flowmeter

- Orifice
- Compact orifice
- Venturi tube
- Nozzle
- V-Cone
- Annubar
- Vortex
- Turbine
- Positive displacement
- Ultrasonic
- Coriolis
- Electromagnetic
- Rotameter



PIPELINE EQUIPMENT

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Flow calculation standards

The **EcoFlow** software includes most of the standards widely used in the flow measurements in different countries.

For **differential pressure devices**, the operator can select:

- ISO 5167 (edition 1991, 1998 and 2003),
- GOST 8.563-97, GOST 8.586-2005,
- AGA 3-1990, AGA3-2012 or
- V-Cone meter, Annubar meter according to the manufacturer's method

Natural gas properties calculation includes:

- compression factor calculation according to AGA8 (edition 1985 and 1992) detailed and gross methods, AGA NX19, GOST 30319 (GERG91mod, NX19mod, VNIC SMV),
- heating value, relative density and base density calculation according to ISO 6976 (edition 1995 and 2015), AGA 5, GPA 2172, GOST 30319,
- dynamic viscosity, isentropic exponent and speed of sound calculation according to GOST 30319, ISO 20765-1, ISO TR 9464

The **gas composition** for the natural gas properties calculation can be

- read on-line from a gas chromatograph,
- downloaded from a supervisory system, or
- set as fixed value

Interfaces

The **EcoFlow** can accommodate up to 5 I/O boards. Different combinations of analog, RTD, pulse and digital inputs, analog, pulse and digital outputs make the **EcoFlow** suitable to solve any flow measurement problem.

Digital outputs can be configured as:

- pulse output representing flow totals,
- alarm output signaling high or low limit of any input channel or flow rate,
- control output to open or close valves for example,
- repeat the change of state of any digital input, or
- time base.

The NO or NC state of the digital output is selectable.

I/O boards

I/O board name	Number of channels	Signal	Remark
ANI8	8	4-20 (0-20) mA current input	selectable
	1	24 VDC/200 mA transmitter power	
ANI4PT2	4	4-20 (0-20) mA current input	selectable 4-wire connection
	2	PRT/RTD input	
	1	24 VDC/200 mA transmitter power	
PT4	4	PRT/RTD input	4-wire connection
PDIO484	4	pulse/frequency input	high level (active or passive) active or passive, stat. or pulse static or pulse
	8	digital (contact) input	
	4	digital (open collector) output	
AODIO484	4	4-20 (0-20) mA current output	selectable active or passive, stat. or pulse static or pulse
	8	digital (contact) input	
	4	digital (open collector) output	
DE4	4	DE protocol input for single function (SF) or multi function (MF) transmitter with 24 VDC transmitter power supply	2 off MF and 1 off SF or 4 off SF transmitter
HTI4x15	60	HART communication input in multidrop or broadcast mode 4 independent loops, 15 PV per loops	The loops are isolated if external power supply is used



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Communication

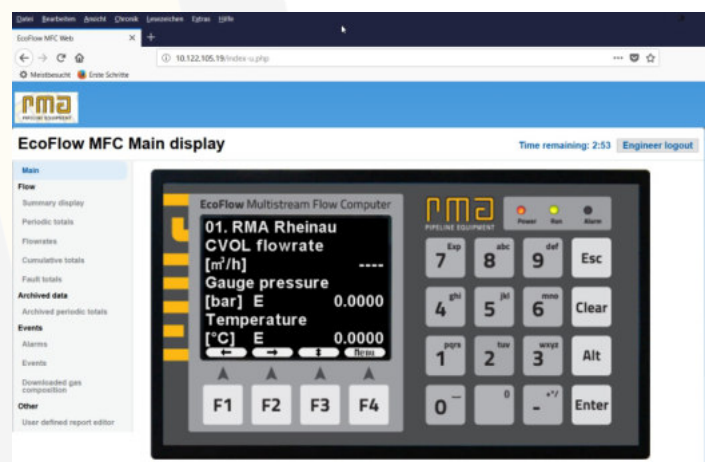
Excellent communications

- multiple RS232/RS485/RS422 serial ports up to 38 400 bit/sec
- 10/100 Ethernet port
- USB port

The **EcoFlow** offers three serial ports. Each of them can be independently configured for point to point or for multi-drop communication (RS232 or RS422 or Rs485). The selectable protocols include standard Modbus and Daniel/Enron/Omni Modbus versions as well. Serial ports are galvanically isolated and protected against overvoltage and miswiring.

The Ethernet 10BaseT interface makes use of the Modbus/TCP protocol for flexibility and network connectivity. The built-in web server makes the remote access to the flow computer data very convenient from any point of the LAN or WAN.

The USB port allows the operator to transfer the archive data file into a pen drive within seconds and to analyze the data using the office PC



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Specifications

Analog inputs

Symmetrical inputs with galvanic isolation

Input range	0/4-20 mA *
Accuracy	+/- 0,02 %
Input voltage drop	5,4 V max.
Potential diff. among inputs	50 V max.

4-wire RTD inputs

Sensor type	Pt100 ** standard or individually calibrated
Accuracy	+/- 0,03 °C
Wiring resist.incl.safety barriers	3 k Ω max.

Pulse-frequency input (including NAMUR)

Signal processing	without loss of pulses
Frequency range	0 ... 10 000 Hz
Input signal level	2 V ... 15 V
Signal form	square, unipolar
Inaccuracy of freq. meas.	0,001 % max.

Digital inputs

Potential-free contacts, open collector (transistor) and 24 VDC inputs can be accepted and used as static inputs, or pulse inputs (frequency: 100 Hz max.) without any further activity required from the user
Potential-free inputs are supplied with power from the circuit board
(12 VDC, 6,8 kohm)

Analog outputs

Output channels with individual galvanic isolation

Output range	0/4-20 mA *
Resolution	12 bits
Load	500 ohm max.

Digital outputs

Galvanically isolated open collector (transistor), overvoltage- and overcurrent-protected outputs
Load 100 mA, 40 Vdc max.

Field bus inputs

HART point to point or multidrop connections using HART protocol
complete with 24 Vdc power supply

Digital communication

RS232/RS422/RS485*
Baud rate 1200 ... 38400 bit/sec*
Protocol Modbus (RTU, ASCII)
Length of cable RS232 15 m max.
Length of cable RS485/422 1200 m max.

10/100 Ethernet (RJ45)
Protocol Modbus TCP

USB USB 1.1 for data saving to pendrive

Operator Panel

3,5" QVGA (320 x 240) backlit TFT color LCD display
Foil protected membrane keyboard

Uncertainty, MPE

Maximum permissible error (MPE) of the separate calculator on the calculation of quantities of gas, applicable to electronic calculators without uncertainty of the input channels (OIML R 140:2007) +/-0.05 %

Maximum permissible error (MPE) of the separate calculator of gas volume conversion device including the uncertainty of the input channels (EN 12405-1:2005) +/-0.2 %

Maximum permissible error (MPE) of the separate calculator on the calculation of quantities of liquid (OIML R 117-1:2007) +/-0.03 %



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Specifications

Environment

Operating temperature	-10 ... +60°C
Operating humidity	10 ... 90%. non-condensing
Storage temperature	-25 ... +70°C

Power Requirements

Dual power input	automatic switch over
Power inputs	230 Vac +10%, -15%, 50-60 Hz 24 Vdc (20 ... 35 V)
Power consumption	25W max.
Transmitter power	1 x 24 Vdc, 200 mA max.

Dimensions

Panel cut-out	186 mm W x 91 mm H
Case/min.cabinet depth	260/320 mm
Front panel	195 mm W x 110 mm H
Weight	4,3 kg

Compliances and certificates

EN 12405, OIML R117, OIML R22, OIML R140, EC-type (MID) certificate, Available with European CE Mark. Registered in the state register of metering equipment of Russian Federation. Registration number 58182-14.

Standards used in the calculations

Flow meters	ISO 5167 (1991, 1998, 2003), EN 12405 (2005), AGA 3 (1990, 2012), AGA 7 (1996), AGA 9 (1998), GOST 8.563 (1997), GOST 8.586 (2005)
Gas	ISO 6976 (1995, 2015), ISO 20765-1 (2005), ISO TR 9464 (2008), AGA 5 (2009), AGA 8 (1985, 1992), AGA 10 (2003), GPA 2172 (2009), GOST 30319 (1996, 2015)
Oil	ASTM D 1250/API 2540/IP 200 (1980), MPMS Chapter 11.1 (2004), GPA TP-27 (2007), STO Gazprom 5.9 B1, B2, B3 (2007)
Water, steam	IAPWS-IF97
Ethanol	OIML R22 (revised formula by Bettin H.)

I/O moduls ***

ANI8	8 ch 4-20 mA
PT4	4 ch Pt100 **
ANI4PT2	4 ch 4-20 mA, 2 ch Pt100 **
PDIO484	4 ch pulse input, 8 ch digital input, 4 ch digital output
AODIO484	4 ch 4-20 mA output, 8 ch digital input, 4 ch digital output
HTI4x15	4 loops to scan 15 HART PV/loop (multidrop) or 4 pcs HART transmitters (point to point), using HART protocol
DE4	2 pcs multivariable, or 4 pcs single transmitters using DE protocol

Supported flow meters

orifice, compact orifice, Venturi tube, nozzle, V-Cone, Annubar, Vortex, turbine, positive displacement, ultrasonic, Coriolis. electromagnetic, rotameter

Supported fluids

hydrocarbons:

natural gas, coke oven gas, blast furnace gas, NGL&LPG, crude oils, refined products, lubricating oil, UGC, SLH, WFLH

Industrial gases:

air, nitrogen, oxygen, hydrogen, argon, carbon-dioxide, carbon-monoxide, ethylene, ammonium, propane, general gases

Liquids other than water - ethanol, MTBE, ETBE, general liquid, liquid mixture

Water, water steam, water-glycol mixture - energy flow (heat transfer) calculation

* software selectable

** optionally Pt50, Pt500 or Pt1000 is also possible

*** one EcoFlow can accommodate up to 5 I/O boards in any combination

Subject to technical changes.



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