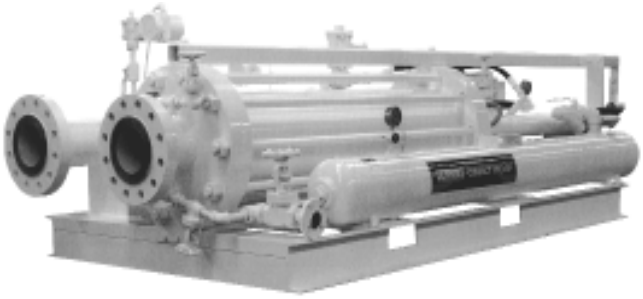
The Compact Prover 8"- 40"

Portable, Economical Flowmeter Proving



DESCRIPTION

The Compact Prover provides high accuracy, rapid operation and constant flow for performance testing or proving a flowmeter in an operational line. This is accomplished without interrupting normal flow and without the use of manually operated bypass valving.

The prover's patented, engineered design features a piston assembly with internal poppet valve in conjunction with optical position sensing, hydraulic piston return, pneumatic piston actuation and advanced electronic data processing techniques. The result is a complete packaged proving system significantly reduced in size, weight and cost while equaling or exceeding the performance of conventional provers.

Because of its relatively small size, the compact prover is totally portable and can be easily mounted on a truck or trailer for field calibration of flowmeters or can be permanently installed in a testing facility either vertically or horizontally.

Pulse Interpolation electronics permit exact time determination and pulse counting which provides high accuracy proving with a smaller volume and fewer flowmeter pulses than any previous prover technology. The use of a small displacement volume is made possible by the high resolution of the compact prover which is attributed to three major factors: precision optical switches, data acquisition using double chronometry, and adjustable multi-pass runs.

Optical switches are used for defining prover volume by detecting the piston position. These switches are reliable, precise and have a fast response time (5×10^{-6} seconds). Data acquisition, using double chronometry, allows a much higher degree of meter pulse resolution than the ±1 pulse common to conventional pipe provers. Multi-pass runs are adjustable which allows for an increased number of meter passes representing an increased measured volume.

Control and operation of the Compact Prover is accomplished by a microprocessor based device providing the advanced electronic capabilities necessary for control in proving volumetric or coriolis mass meters.

! WARNING

Do not operate this instrument in excess of the specifications listed. Failure to heed this warning could result in serious injury and/or damage to the equipment.

The Compact Prover conforms to design guidelines prescribed in API Chapter 4.3 and Pulse Interpolation techniques in API Chapter 4.6. All proving report formats have been designed in accordance with API standard, Chapter 12 - Calculation of Petroleum Quantities of the "Manual of Petroleum Measurement."

DESIGN FEATURES

- Compact and portable - a single prover may be used in multiple locations for proving various sizes of meters.
- 1000:1 flow rangeability
- Skid or Trailer mounted
- Vertical mounting available for applications having restricted space constraints.
- Rapid proving operation offers single or multi-pass operation with immediate K-factor calcula tion.
- Versatility - operates with virtually any pulse output flowmeter.
- Positive leak checking
- Automatic mechanical operation assures undisturbed product flow.
- Corrosion resistant flowtube
- Meets National Electric Code for hazardous locations.

EMERSON.
Process Management

Performance
Repeatability: 0.02% or better (water draw)

Pressure Drop
Piston only: Approx.1" of water during proving pass
Maximum flow: Approx. 10 psi across inlet/outlet flanges on water

Weights & Measures Approvals
- National Conference of Weights & Measures (NCWM)
- National Type Evaluation Program (NTEP)
- Consumer and Corporate Affairs (CCA)-Canada
- Nederlands Meetinstituut (NMI)
- Physikalisch-Technische Budesanstalt (PTB)
- Det Norsk Justenvesen (DNJ)
- Standards & Industrial Research Institute of Malaysia (SIRIM)
- National Association of Testing Authorities (NATA)
- Gos standard (GOST)

Electrical Systems
Standard Electrical System conforms to National Electric Code Class I, Division 1, Group D using UL /CSA approved components.

An Electrical System using CENELEC approved components is also available upon request.

Pneumatic Spring Plenum
Dry Nitrogen required for charging

RATINGS

Maximum Working Pressure
Standard
300 lb. ANSI: 740 psig (5,103 kPa)@100^{0}F
- 34"and 40"
600 lb. ANSI: 1,480 psig (10,207 kPa) @100^{0}F
- 8" thru 24"
Optional
900 lb. ANSI: 2,220 psig (15,310 kPa) @ 100^{0}F
- 8" thru 18"

Maximum Working Temperature
Sizes 8" - 34": -20 to 200°F (-29 to 93°C)
Size 40": 20 to 120°F (7 to 49°C)

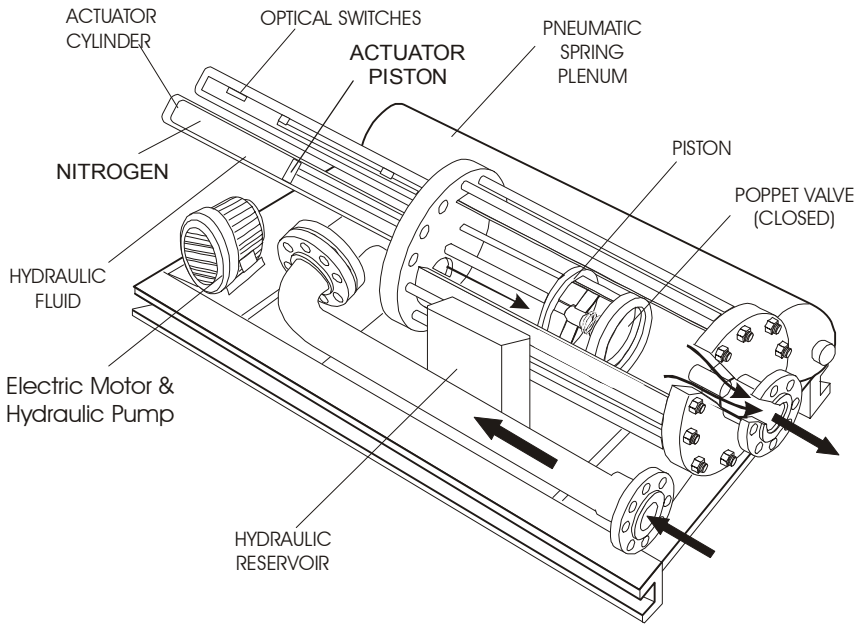
Consult factory for low and high temperature options.

APPLICATIONS

Typical applications include proving of custody transfer flowmeters such as:

- Positive Displacement
- Turbine
- Coriolis
- Vortex Shedding
- Helical
- Magnetic
- and other meters

Types of liquids include crude and refined petroleum products, chemicals and industrial liquids.



MATERIALS OF CONSTRUCTION

Flowtube Material (Chrome Plated)	Piping / Flange Material
Standard	
17-4 PH Stn.Stl.	Carbon Steel
Optional	
17-4 PH Stn.Stl./304 Stn.Stl.	304 Stn.Stl.
304 Stn. Stl.	Low Carbon Steel

Configuration/Mounting Options

Standard
- Horizontal

Optional
- Horizontal with trailer
- Vertical stationary
- Vertical hydraulic positioner
- Vertical hydraulic positioner & trailer
- Mirror image horizontal
- Mirror image horizontal with trailer
- Mirror image vertical hydraulic positioner
- Mirror image vertical hydraulic positioner and trailer

POWER REQUIREMENTS (Specify Vac and Hz required)

8" and 12" Mini Compact Prover
- 115 Vac, 50 Hz, 24 Amp, single phase
- 115 Vac, 60 Hz, 24 Amp, single phase
- 220 Vac, 50 Hz, 12 Amp, single phase
- 220 Vac, 60 Hz, 12 Amp, single phase

12" Standard Compact Prover
- 115 Vac, 50 Hz, 26 Amp, single phase
- 115 Vac, 60 Hz, 26 Amp, single phase
- 220 Vac, 50 Hz, 13 Amp, single phase
- 220 Vac, 60 Hz, 13 Amp, single phase

18" Compact Prover
- 115 Vac, 50 Hz, 52 Amp, single phase (two 26 Amp circuits)
- 115 Vac, 60 Hz, 52 Amp, single phase (two 26 Amp circuits)
- 220 Vac, 50 Hz, 21 Amp, single phase (one 21 Amp circuit)
- 220 Vac, 60 Hz, 21 Amp, single phase (one 21 Amp circuit)

24" Compact Prover
- 220 Vac, 50 Hz, 24 Amp, three phase
- 220 Vac, 60 Hz, 24 Amp, three phase
- 460 Vac, 60 Hz, 12 Amp, three phase
- 380/415 Vac, 50 Hz,15 Amp, three phase

34" and 40" Compact Prover
- 460 Vac, 60 Hz, 26 Amp, three phase
- 380/415 Vac, 50 Hz, 30 Amp, three phase

EXTERIOR FINISH OPTIONS

Paint System Options

Standard
- 2 Coats = epoxy primer/urethane

Optional
- 3 Coats = organic zinc/epoxy/urethane
- 4 Coats = inorganic zinc/epoxy (2 coats)/urethane

Insulation Options
- Permanent fiberglass jacket
- Detachable foam jacket

Sensor/Gauge Options
- 4-20 mA pressure
- Smart pressure
- 4-20 mA temperature
- Smart temperature
- RTD Probe
- Pressure & Temperature Gauges

Units of Calibration

Standard
- Single volume
- Gallons or litres

Optional
- Dual volume
- Gallons or litres

Accessory Options
- Pressure relief valve
- Thermowell

Vents & Drains

Standard
- NPT Connections

Optional
- Welded Flanges
- Manifolds

Seal Materials

Poppet Seal O-Ring	Flowtube & Seal Support O-Rings
Standard	
Viton	Viton
Optional	
Nitrile (BUNA-N)	Nitrile
Kalrez	Kalrez
Kalrez	Low Swell Nitrile
Neoprene	Neoprene

Compact Prover Selection Guide/Capacities/Approximate Dimensions and Shipping Weight

Tube Dia.	Prover Capacity	Prover Tube Volume	Inlet/ Outlet Flange	Prover Flow Rate Ranges		Dimensions Prover Only Length x Width x Height	Approx. Shipping Weight
				Minimum	Maximum		
8"	250 gpm	5 Gal (20 liters)	2", 600 lb. ANSI	0.25 gpm 0.946 lpm 0.357 bph 0.057 m3/h	250 gpm 946 lpm 357 bph 57 m^3/h	100-3/4" x 38" x 30-5/8" 2,559mm x 965mm x 778mm	2,000 lbs. 907 kgs.
12", Mini	1,000 gpm	10 Gal. (40 liters)	4", 600 lb. ANSI	1.0 gpm 3.785 lpm 1.43 bph 0.227 m^3/h	1,000 gpm 3,785 lpm 1,428 bph 227 m^3/h	91-1/4" x 47" x 33" 2,318mm x 1,194mm x 838mm	4,100 lbs. 1,860 kgs.
12", Std.	2,500 bph	15 Gal. (60 liters)	6", 600 lb. ANSI	1.75 gpm 6.623 lpm 2.5 bph 0.397 $m^{3/}$h	1,750 gpm 6,623 lpm 2,500 bph 397 m^3/h	143-1/4" x 57-1/2" x 32-1/2" 3,639mm x 1,461mm x 826mm	4,350 lbs. 1,975 kgs.
18"	5,000 bph	30 Gal. (120 liters)	8", 600 lb. ANSI	3.5 gpm 13.247 lpm 5.0 bph 0.794 m^3/h	3,500 gpm 13,247 lpm 5,000 bph 794 m^3/h	151-7/8" x 69-3/8" x 49-1/2" 3,858mm x 1,762mm x 1,257mm	6,900 lbs. 3,629 kgs.
24"	10,000 bph	65 Gal. (250 liters)	12", 600 lb. ANSI	7.0 gpm 26.495 lpm 10.0 bph 1.589 m^3/h	7,000 gpm 26,495 lpm 10,000 bph 1,589 m^3/h	178-7/8" x 78-3/8" x 49-1/2" 4,543mm x 1,991mm x 1,257mm	13,380 lbs. 6,082 kgs.
34"	18,000 bph	100 Gal. (400 liters)	16", 300 lb. ANSI	12.6 gpm 47.69 lpm 18.0 bph 2.86 m3/h	12,600 gpm 47,690 lpm 18,000 bph 2,862 m3/h	225-13/16" x 96" x 61-5/8" 5,736mm x 2,438mm x 1,565mm	18,000 lbs. 8,165 kgs.
40"	25,000 bph	170 Gal. (650 liters)	20", 300 lb. ANSI	17.5 gpm 66.237 lpm 25.0 bph 3.972 m3/h	17,500 gpm 66,237 lpm 25,000 bph 3,972 m3/h	221-1/2" x 119-1/2" x 60" 5,626mm x 3,035mm x 1,524mm	32,300 lbs. 14,648 kgs.

NOTES: 1. Temperature and Pressure taps on the outlet flange (1" diameter) can be supplied upon request at extra cost. 2. Considerations for meter type and pulse output quality should be made for all Compact Prover applications. 3. Compact Prover performance depends upon the quality of the pulse signal from the meter being proved. For more information on pulse quality and Compact Provers reference API Chapter 4.3. 4. For certified dimensions consult factory.

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