

Flow Management Devices, LLC

"In pursuit of improving liquid and gas measurement technology"



Unidirectional Captive Displacement Provers

Prover Features Include

- Industry standard double chronometry per API 4.6
- Conforms to API 4.2 "Displacement Provers"
- Equal upstream and downstream displaced volumes
- Stainless Steel and PTFE material used on all liquid contacting surfaces
- Galvanized frame per ASTM B633 SC4
- Shock mounted isolation pads provides independent drive end support
- Three point installation for secure mounting on uneven surfaces
- 2" flanges allow rapid draining
- 2" vents with check thermo well and pressure verification ports
- Ability to point drain valves in multiple clocked directions
- Tool-less access to most common serviceable components
- Prover Interface Module with advanced features

Prover Optional Features Include

- 316 stainless steel structural components
- Trailer and Truck mount
- Many options available for portable units
- Service drip pans for all environmentally critical areas
- Nitrogen purged for Cryogenic applications
- Drain Valves
- Selection of Pressure Sensors
- Selection of Temperature Sensors
- Gas Detection Sensors
- Vertically mounted units

Advantages

- ✓ Simple to Operate
- ✓ No Hydraulics
- ✓ No Complicated Release Mechanism
- ✓ 6 Patents including Prover Validation and Self- Diagnostics
- ✓ Includes Data Acquisition Software
- ✓ Four year warranty

Applications

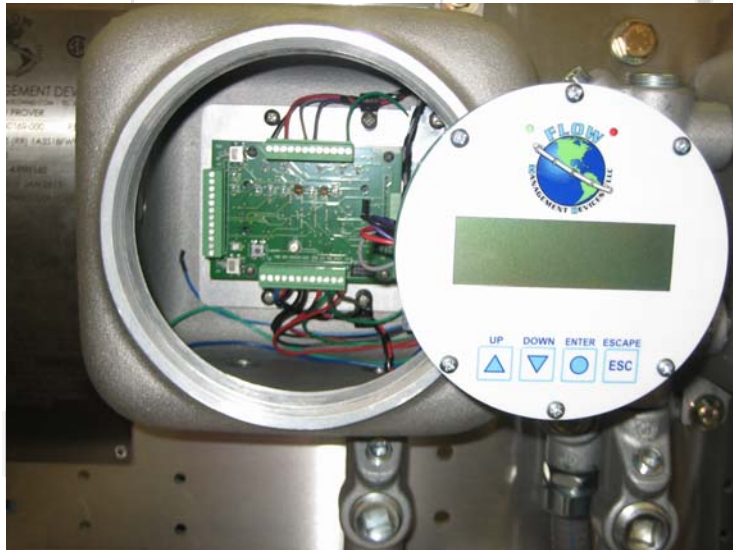
Portable
Stationary
Truck / Train Load Rack
Offshore
Cryogenic
Test Laboratories

Industries

Pipelines
Refineries
Load Racks
Calibration Laboratories
Chemical Processing
Pharmaceuticals



Technological Leader in Unidirectional Captive Displacement Provers



Superior design
Functionality
Flexibility
Ease of installation
Ease of operation
Excellent Customer Service

Prover Features Include

- Self-Diagnostics
- Low power (3 Watts nominal)
- Input power from 11 to 26 Volt Power Supply
- Status code display with red and green LED's
- Fully configurable variable, including time factors using PC via serial port or local keyboard
- Direct reading for configured volume(s) with timing displayed in seconds or microseconds
- Four status / diagnostic outputs to host flow computer
- Prover cycle counter with programmable limits provides preventive maintenance planning
- Timer provides accurate elapsed time between optical switches
- Intrinsic safe design
- 25 MHz processor with:
 - 2 serial ports
 - Counters
 - 64KB flash memory
 - 32KB external memory with 10 year expected life battery back-up
- Communication Ports: RS-232 and RS-485
 - Local and or remote display with keyboard entry via RS-232 or RS-485
 - Built-in Water Draw mode
 - Adjustable motor power-off delay
 - Adjustable pulse input and output signal level for flow computer adaptability
 - Compatible with other Provers



ISO 9001/2008

CRN
Approved





Prover Validation and Self-Test Function

Patented

Prover Control Software (PCS)

The screenshot displays the 'Prover View' window in the 'ScrewDRIVER9 Beta 1' software. It is divided into two main data tables. The left table lists physical measurement data, and the right table lists calculated data. Red callout boxes highlight specific data points.

Name	Value	Unit
Measurement Tube Data - referred to 20 °C		
Prover tube material	304L	
Prover Volume	75.502	gal
Prover Internal Diameter	673.00	mm
Prover Wall Thickness	66.89	mm
Prover Shaft Diameter	25.40	mm
Length of switch bar (V1 to V3)	804.6	mm
Switch Bar Data - referred to 20 °C		
Switch Bar material	304	
Calibrated Encoder C1 (V1-V3)	5002.426	
Calibrated Encoder C2 (V1-V2)	3000	
Calibrated Encoder C3 (V2-V3)	2000	
Input Pressure and Temperature - Internal		
Prover internal pressure	0.000	psi
Prover internal temperature	68.000	°F

Name	Value	Unit
Measurement Run Data		
Prover Cycle Count	746	
Remote Volume Selector	CFG#1: Up=V1 Down=V3	
Date	10-17-2010	
Time	06:02:56	
Prover volume corrected	75.502	gal
Corrected test volume	75.502	gal
Primary Proving	0.000	ms
Secondary Proving	0.000	ms
Temperature of the switch bar	-101.0	°C
Prover Flow Rate 1	2619.61	gpm
Prover Flow Rate 2	3330.92	gpm
Flow Rate variance	78.645	%
Encoder Integer Pulses	3556	Count
Encoder Dual Chronometry Pulses	3556	Count
Test Volume Reference Encoder Count	3565.736	Count
Variance from Factory Water Draw		
Encoder derived volume error (%)	0	
Primary encoder error (counts)	-1437	

Virtual display for remote access

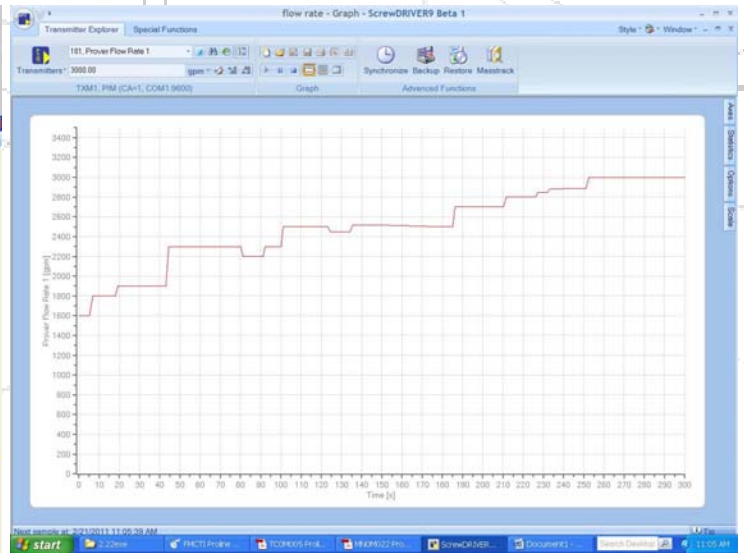
The virtual display shows a 'Virtual Display' window with a yellow background. It displays status information for a transmitter:

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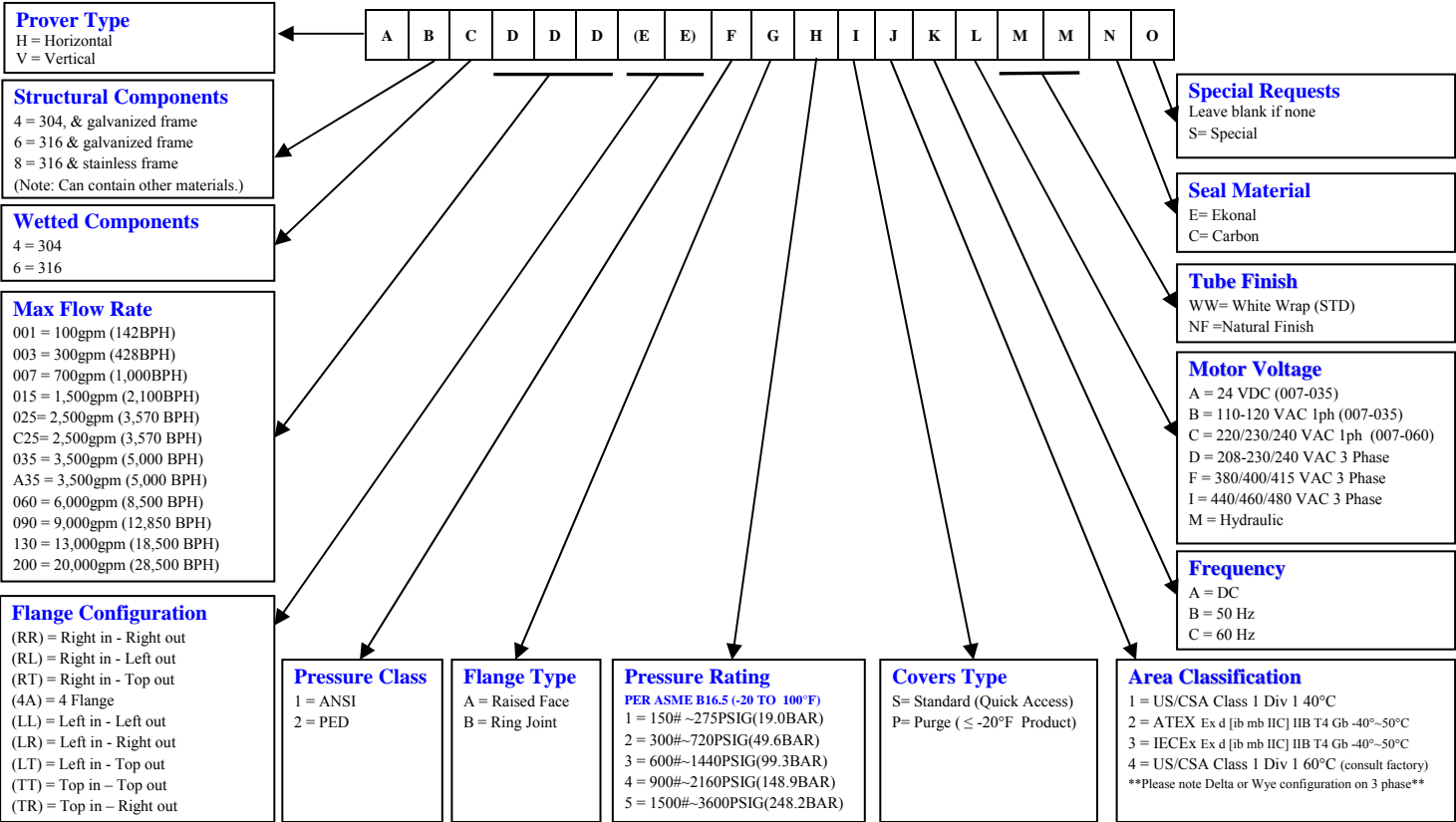
P1 0.000 in/s
P2 0.000 in/s
Ls OK
ST Launch
  
```

Below the text are several control buttons represented by colored triangles and circles.

Flow rate graphs



P R O V E R C O N F I G U R A T I O N



FMD Prover Model Numbers

MODEL NUMBER	MAX FLOW RATE GALLONS/MIN	MAX FLOW RATE BARRELS/HR	MAX FLOW RATE METERS ³ /HR	DISPLACED VOLUME GALLONS	FLANGE SIZE (STANDARD)**
FMD-001	100	142	23	1	1"
FMD-003	300	428	68	2	2"
FMD-007	700	1000	150	5	3"
FMD-015	1,500	2,100	330	10	4"
FMD-025	2,500	3,570	560	20	6"
FMD C25*	2,500	3,570	560	20	6"
FMD-035	3,500	5,000	790	25	6"
FMD-A35	3,500	5,000	790	25	8"
FMD-060	6,000	8,500	1,350	40	10"
FMD-090	9,000	12,850	2,000	75	12"
FMD-130	13,000	18,500	2,900	90	16"
FMD-200	20,000	28,500	4,500	140	20"

*Compact unit **Flange sizes can be customized for other than standard (consult factory for model number)