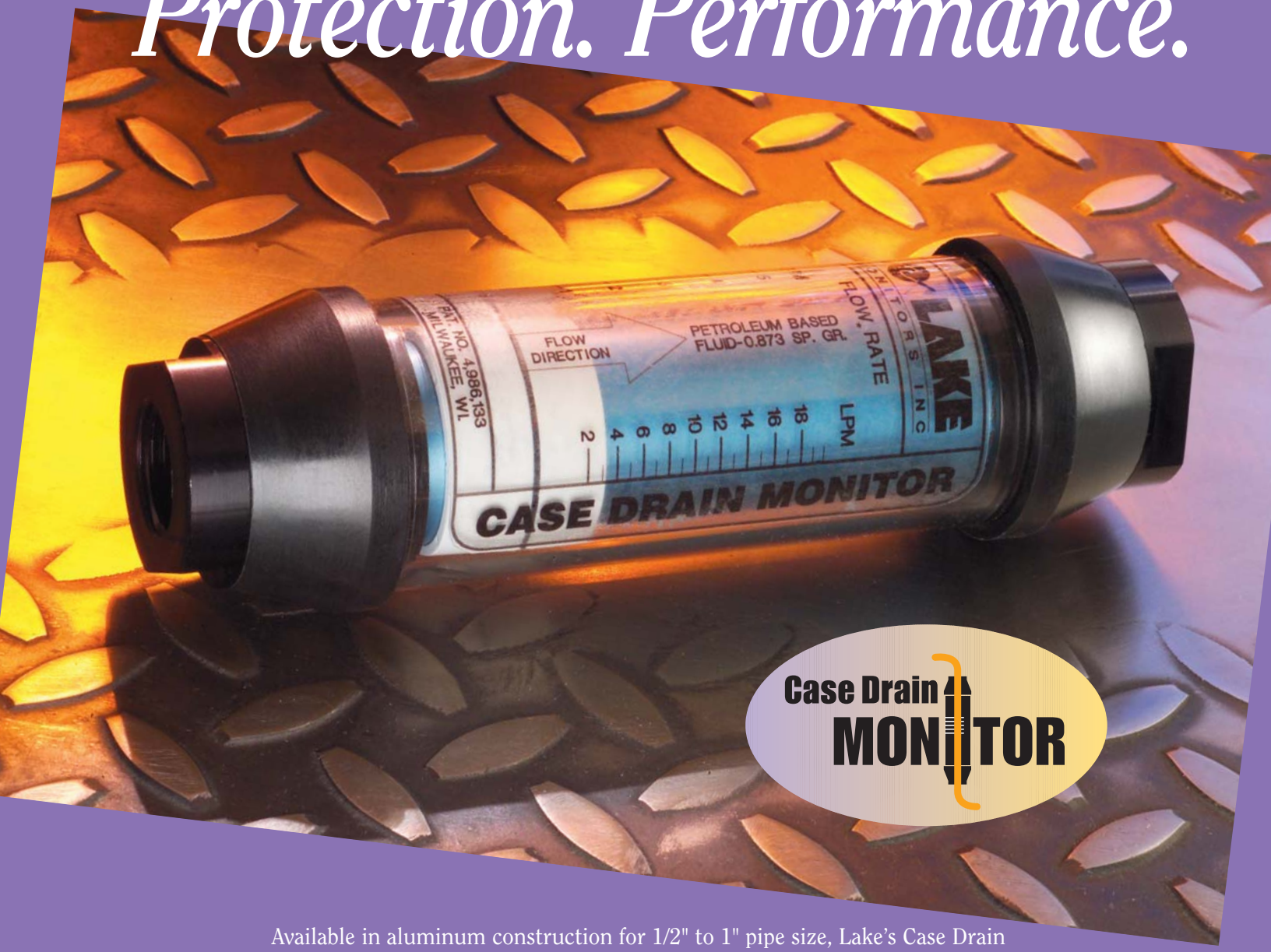
Prevention. Protection. Performance.

LAKE MONITORS INC
Division of Total Automated Solutions, Inc.



Case Drain MONITOR

Available in aluminum construction for 1/2" to 1" pipe size, Lake's Case Drain Monitor is an affordable option to using a standard flow meter for case drain applications. It offers a flow measuring accuracy of ±5% of range that can help confirm pump performance, identify required maintenance and reduce costly MRO down-time associated with unpredictable pump failure.

Designed for convenient vertical, horizontal and inverted installation, the monitor has a sealed window tube that makes it ideal for outdoor/exposed applications and where wash-downs may be required. And Lake backs its Case Drain Monitor with a One-Year Warranty!

www.lakemonitors.com

Case Drain MONITOR

STYLE C

When ordering use Lake Monitors No.
C_ _ – _ _ _ – _ _

MATERIALS OF CONSTRUCTION

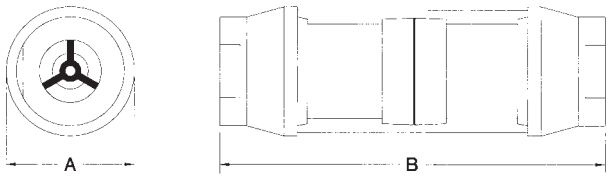
WETTED COMPONENTS

- Pressure casing and end ports: Aluminum
- O-ring Seals: Buna-N
- Transfer magnet: Teflon® coated Alnico
- Floating orifice disk: Stainless Steel
- All other internal parts: Stainless Steel

NON-WETTED COMPONENTS

- Window tube: Polycarbonate (STD)
- Window seals: Buna-N (STD), Teflon®

MECHANICAL SIZE CODE



SERIES 3

Dimension A: 1-7/8" (48mm)
Dimension B: 6-9/16" (167mm)
Port Sizes (NPTF): 1/2"

SERIES 4

Dimension A: 2-3/8" (60mm)
Dimension B: 7-5/32" (182mm)
Port Sizes (NPTF): 3/4" and 1"

SAE and BSP porting also available. Contact Lake for more information

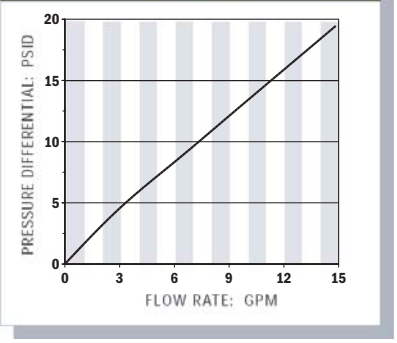
PERFORMANCE

- Measuring accuracy: ±5% of full-scale
- Repeatability: ±1% of full-scale
- Flow measuring range: Up to 30 GPM (10:1 turndown)
- Maximum operating pressure: 1000 PSIG (69 Bar)
- Maximum operating temperature: 240ºF (116ºC)
- Filtration requirements: 74 micron filter or 200 mesh screen minimum

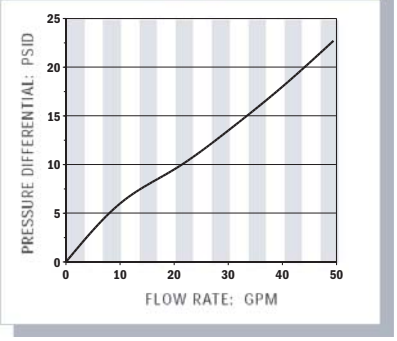
TYPICAL PRESSURE DIFFERENTIALS

For specific differential graphs, refer to Lake data sheet PDDS-404

SERIES 3 MONITORS
1/2"



SERIES 4 MONITORS
3/4" – 1



LAKE MONITORS INC
Division of Total Automated Solutions, Inc.

800.850.6110 or 414.671.3577
www.lakemonitors.com

LAKE MONITORS, INC.
2013 S. 37th St., Milwaukee, WI 53215 USA
414.671.3577 FAX: 414.671.5253

Lake Monitors

ClearView™
VALUE FLOW METER

Economical way to monitor municipal pressure water flows, observe case drain flows and verify pump outputs.

FOR 1/2" – 1" PIPE SIZES

STYLE CV

For media compatibility, select from:

ClearView™ H_2O
VALUE FLOW METER

Polycarbonate body (ClearView H_20) or

ClearView™ +
VALUE FLOW METER

Polysulphone body (ClearView+).

UNRESTRICTED MOUNTING
Allows for horizontal, vertical or inverted installation of the meter.

COMPACT AND RUGGED DESIGN
Measures less than 8-1/4" long and 2-7/16" diameter with a rigid tube and union nut design.

VISUAL INSPECTION OF FLUID
The transparent body allows for visual inspection of fluid conditions. Diagnose problems at a glance.

MULTIPLE MATERIALS AND CALIBRATIONS AVAILABLE
With a variety of wetted materials of construction and media calibrations, the ClearView™ will be well suited to your process.

SENSING METHOD ASSURES ACCURACY
The proven variable-area piston metering assembly provides accurate, dependable flow rate indication.

SUPERIOR READABILITY
High contrast scale/indicator provides easy-to-read flow rate measuring resolution along with dual units of GPM and LPM.

MULTIPLE PORTING OPTIONS AVAILABLE
ClearView end ports are available in a variety of materials, sizes, and threading options to simplify installation.

LOW COST PRECISION
Measuring accuracy of ±5% of range and repeatability of ±1%.

ENGINEERING SPECIFICATION

THE CLEARVIEW FLOW METER SHALL:

- Use the variable area piston metering method to measure flow rate.
- Not require inlet or outlet straight plumbing, or require vertical pipe mounting.
- Have a measuring accuracy of ±5% of full scale with ±1% repeatability.
- Be Lake Monitors No. CV - _ _ - _ _

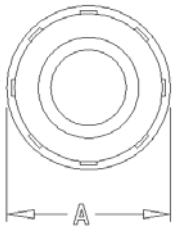
ClearView Flow Meter

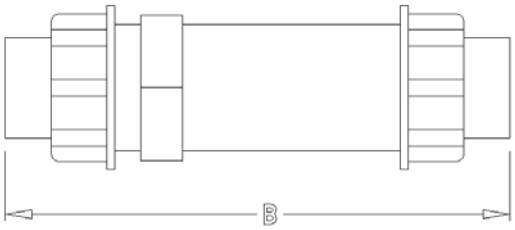
MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

	ClearView H_2O	ClearView +
End Ports	Brass, Polysulphone	Brass, Polysulphone
Seals	Buna-N	Buna-N
Spring	Stainless Steel	Stainless Steel
Body	Polycarbonate	Polysulphone
Indicator	Polysulphone	Polysulphone

PERFORMANCE

Measuring Accuracy:		±5% of full-scale
Repeatability:		±1% of full-scale
Flow Measuring Range:		1–30 GPM (5-110 LPM)
Turn Down Ratio (All Ranges):		10:1
Maximum operating pressure:		325 PSIG (22.4 Bar)
Maximum operating temperature:	ClearView H_2O	200°F (93°C)
	ClearView+	250°F (121°C)
Pressure Differential:		See graph on right
Filtration requirements:		74 Micron (200 U.S. mesh) minimum

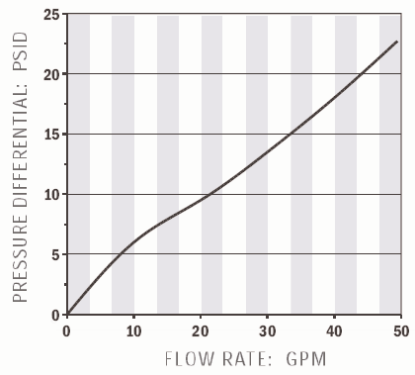




MECHANICAL SIZE CODE

DIM	1/2" Female	3/4" Female	1" Female
A	2-7/16" (62mm)	2-7/16" (62mm)	2-7/16" (62mm)
B	7-5/32" (182mm)	7-9/16" (192mm)	7-9/16" (192mm)
Port Type	NPTF, BSPP	NPTF, BSPP	NPTF, BSPP

TYPICAL PRESSURE DIFFERENTIALS



LAKE MONITORS

www.lakemonitors.com

AW-LAKE COMPANY
A TASI Group Company
8809 Industrial Dr., Franksville, WI 53126
262.884.9800 / Fax: 262.884.9810
800.850.6110

Lake Monitors
Flow Rate Alarms

FOR 1/4" – 2" PIPE SIZES

Utilized in applications such as mobile hydraulic equipment and industrial process control, ensures sufficient flows of coolants and lubricants.

STYLE M & N

FIELD ADJUSTABLE ALARM SETTING

Only an allen wrench is required to change the flow alarm setting.

WEATHER-TIGHT CONSTRUCTION

Rugged cast aluminum NEMA type 4X enclosure allows installation in outdoor applications and in environments where liquid tight seals are required.

SIMPLE ON/OFF LOGIC

Positive alarm points using 10 A., dry-contact, SPDT switches, reduce the complexity found in standard rotameter OFF/ON/OFF circuits.

PRE-WIRED WITH CABLE DISCONNECT

The standard Hirschmann interconnection provides easy installation and maintenance of the FLOW ALARM and the system it is a part of.

UNRESTRICTED MOUNTING

Allows the designer to install the monitor in any orientation – horizontal, vertical or inverted.

ECONOMICAL PROTECTION

This monitor rapidly pays for itself as it “sounds the alarm” on incorrect pneumatic, lubrication or cooling volumes, protecting expensive equipment and reducing downtime.

QUALITY ASSURANCE

Can be an integral part of a quality control system, yielding consistent system operation.

ENGINEERING SPECIFICATION

THE IN-LINE FLOW RATE MONITOR/ALARM SHALL:

- Have field adjustable, dry-contact, alarm setting(s).
- Use the variable annular orifice technique with compression spring recoil.
- Not require inlet or outlet straight plumbing, or require vertical pipe mounting.
- Have a measuring accuracy of ±2.5% of full scale in the center third of the measuring range, and ±4% in upper and lower thirds.
- Have a maximum working pressure rating of 3500 or 6000 PSIG for liquids.
- Have a maximum working pressure rating of 600 or 1000 PSIG for gasses.
- Have a stainless steel sharp-edged orifice.
- Have a weather-tight NEMA type 4X external construction.
- Be Lake Monitors No. M _ _ – _ _ _ – _ _ for single alarm applications, or N _ _ – _ _ _– _ _ for dual alarm applications.

Flow Rate Alarms

MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
High-pressure casing, end ports and tapered shaft	Aluminum	Brass	#303 Stainless Steel
Seals	Buna-N (STD), EPR, Viton® or Kalrez®	Buna-N (STD), EPR, Viton® or Kalrez®	Viton® with Teflon® backup (STD), Buna-N, EPR or Kalrez®
Transfer Magnet	Teflon® coated Alnico	Teflon® coated Alnico	Teflon® coated Alnico
Floating Orifice Disk	Stainless Steel	Stainless Steel	Stainless Steel
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

Teflon is a registered trademark of DuPont de Nemours & Co.
Viton and Kalrez are registered trademarks of Dow DuPont Elastomers

MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
Enclosure & Cover	Aluminum	Aluminum	Aluminum
Seals	Buna-N	Buna-N	Buna-N
Window	Pyrex®	Pyrex®	Pyrex®
Din Connector	Polyamide	Polyamide	Polyamide

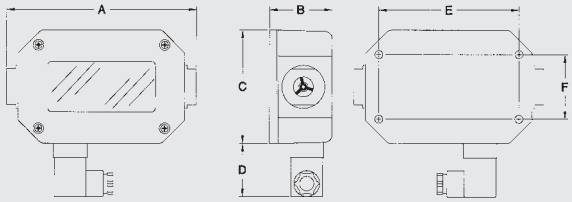
Pyrex is a registered trademark of Corning Inc.

PERFORMANCE

Measuring accuracy:	±2.5% of full-scale in the center third of the measuring range; ±4% in upper and lower thirds
Repeatability:	±1% of full-scale
Flow measuring range:	0.05-150 GPM (0.2-560 LPM); 1.5-1300, SCFM (0.75-610 SLPS)
Maximum operating pressure:	aluminum and brass monitors: 3500 PSIG (240 Bar) stainless steel monitors: 6000 PSIG (410 Bar)
Maximum operating temperature:	media: 240ºF (116ºC), ambient: 180ºF (82ºC)
Pressure differential:	See graphs on the right for typical pressure differentials.
Standard calibration fluids:	Oil monitors: DTE 25® @ 110ºF (43ºC), 0.873 sg Water monitors: tap water @ 70ºF (21ºC), 1.0 sg Air monitors: air @ 70ºF (21ºC), 1.0 sg and 100 PSIG (6.8 Bar)
Enclosure:	NEMA type 4X (UL Approved)
Alarm switch dead-band:	4% of full scale
Alarm switch contacts:	SPDT (dry contact), UL/CSA rating: 10 amps and 1/4 hp, 125 or 250 VAC. 1/2 amp, 125 VDC; 1/4 amp, 250 VDC; 3 amps, 125 VAC "L" (lamp load)
Filtration requirements:	74 micron filter or 200 mesh screen minimum

DTE 25 is a registered trademark of Exxon Mobil

MECHANICAL SIZE CODE



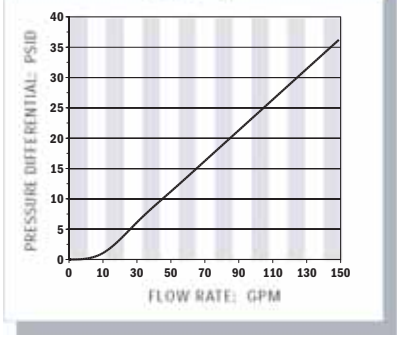
DIM	SERIES 3	SERIES 4	SERIES 5	SERIES 5
A	6-9/16" (167mm)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)
B	2-3/16" (56mm)	2-15/16" (75mm)	3-13/16" (97mm)	3-13/16" (97mm)
C	4" (101mm)	4-1/2" (114mm)	5-5/16" (135 mm)	5-5/16" (135mm)
D	1-7/8" (47mm)	1-7/8" (47mm)	1-7/8" (47mm)	1-7/8" (47mm)
E	4-7/8" (128mm)	5" (127mm)	6-3/4" (172mm)	6-3/4" (172mm)
F	2-1/4" (57mm)	2-7/8" (73mm)	3-3/4" (95mm)	3-3/4" (95mm)
Port Sizes	NPTF: 1/4", 3/8", 1/2" SAE: #6, #8, #10 BSP: 3/8", 1/2"	NPTF: 3/4", 1" SAE: #12, #16 BSP: 3/4", 1"	NPTF: 1-1/4", 1-1/2" SAE: #20, #24 BSP: 1-1/4", 1-1/2"	NPTF: 2" SAE: #32 BSP: 2"

Note: Consult factory for SAE brass monitor requirements.

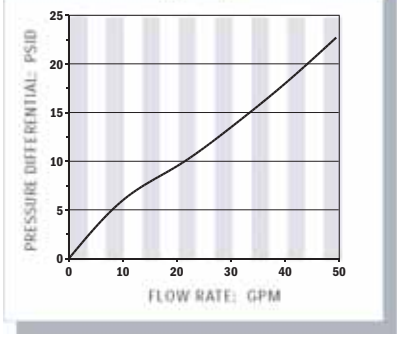
TYPICAL PRESSURE DIFFERENTIALS

For specific differential graphs, refer to Lake data sheet PDDS-404.

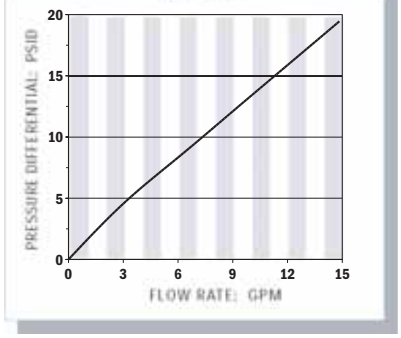
SERIES 5 MONITORS 1-1/4" - 2"



SERIES 4 MONITORS 3/4" - 1"



SERIES 3 MONITORS 1/4" - 1/2"



LAKE MONITORS

www.lakemonitors.com

AW-LAKE COMPANY
A TASI Group Company
8809 Industrial Dr., Franksville, WI 53126
262.884.9800 / Fax: 262.884.9810
800.850.6110

MNDS-1106 7.5M MR / WGD / MAS

Lake Monitors
High Temperature Flow Rate Monitors

FOR 1/8" – 2" PIPE SIZES

STYLE H & J

Enables flow monitoring of barrel heating fluids, thermal transfer fluids such as Syltherm® coolant flows through heat exchangers, as well as flows through hydraulic circuits and sub-circuits with elevated temps.

CHOICE OF THREE MATERIALS OF CONSTRUCTION

Select from aluminum, brass or stainless steel to meet system requirements.

UNRESTRICTED MOUNTING

Allows the designer to install the monitor in any orientation – horizontal, vertical or inverted.

GOOD VISCOSITY STABILITY

A sharp-edged stainless steel orifice provides excellent measurement stability for viscosities ranging from 0-500 SSU.

RUGGED AND RELIABLE

Designed as a hydraulic service tool, this monitor will provide years of maintenance-free performance.

HIGH PRESSURE OPERATION

The magnetically-coupled follower design allows operation to 6000 PSIG and use with opaque liquids.

24 DIFFERENT PORTS AVAILABLE

Standard selection of NPT, SAE and BSP ports reduces the amount of adapters required for installation.

LOW COST ACCURACY

±2.5% of range accuracy in center third of scale; ±4% in upper and lower thirds.

BI-DIRECTIONAL AND REVERSE FLOW OPTION OFFERED

High temperature monitors are also available in bi-directional and reverse flow versions. Contact Lake Monitors for more information.

ENGINEERING SPECIFICATION

THE HIGH TEMPERATURE IN-LINE FLOW RATE MONITOR SHALL:

- Use the variable annular orifice technique with compression spring recoil.
- Not require inlet or outlet straight plumbing, or require vertical pipe mounting.
- Have a measuring accuracy of ±2.5% of full scale in the center third of the measuring range, and ±4% in upper and lower thirds.
- Have a stainless steel sharp-edged orifice.
- Have a maximum temperature rating of: H-series 400ºF (204ºC) or J-series 600ºF (315ºC).
- Have a working pressure rating of 3500 PSIG.
- Be Lake Monitors No. H _ _ – _ _ _ – _ _ for 400ºF (204ºC) applications or J _ _ – _ _ _ – _ _ for 600ºF (315ºC) applications.

High Temperature Flow Rate Monitors

MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
High-pressure casing, end ports and tapered shaft	Aluminum	Brass	#303 Stainless Steel
Seals H-Series (400ºF) J-Series (600ºF)	 Viton® w/Teflon® backup Kalrez® w/Teflon backup	 Viton® w/Teflon® backup Kalrez® w/Teflon backup	 Viton® w/Teflon® backup Kalrez® w/Teflon® backup
Transfer Magnet	Teflon® coated Alnico	Teflon® coated Alnico	Teflon® coated Alnico
Floating Orifice Disk	Stainless Steel	Stainless Steel	Stainless Steel
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

Teflon is a registered trademark of DuPont de Nemours & Co.
Viton and Kalrez are registered trademarks of Dow DuPont Elastomers.

MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
Window Tube	Pyrex	Pyrex	Pyrex
Window Seals	Teflon®	Teflon®	Teflon®

Teflon is a registered trademark of DuPont de Nemours & Co.

PERFORMANCE

Measuring accuracy:	±2.5% of full-scale in the center third of the measuring range; ±4% in upper and lower thirds
Repeatability:	±1% of full-scale
Flow measuring range:	0.05-150 GPM (0.2 - 560 LPM)
Pressure differential:	See graphs on the right for typical pressure differentials. For specific differential information, refer to Lake data sheet PDDS-404.
Maximum operating pressure[1]:	aluminum and brass monitors: 3500 PSIG (240 Bar) stainless steel monitors: 6000 PSIG (410 Bar)
Maximum operating temperature:	H-Series 400ºF (204ºC) J-Series 600ºF (315ºC)
Standard calibration fluids:	Oil monitors: DTE 25® @ 110ºF (43ºC), 0.873 sg Water monitors: tap water @ 70°F (21°C), 1.0 sg Air monitors: air @ 70°F (21°C), 1.0 sg and 100 PSIG (6.8 Bar)
Filtration requirements:	74 micron filter or 200 mesh screen minimum

[1] *Note: Consult factory for Temperature/Pressure De-rating Chart.*
DTE 25 is a registered trademark of Exxon Mobil.

MECHANICAL SIZE CODE

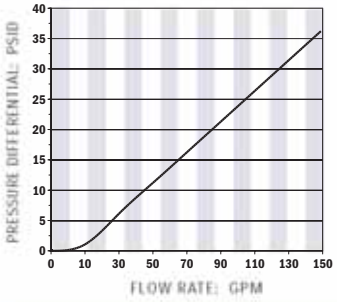
DIM	SERIES 2	SERIES 3	SERIES 4	SERIES 5	SERIES 5
A	1-1/4" (32mm)	1-7/8" (48mm)	2-3/8" (60mm)	3-1/2" (90mm)	3-1/2" (90mm)
B	4-13/16" (122MM)	6-9/16" (167MM)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)
Port Sizes	NPTF: 1/8", 1/4"	NPTF: 1/4", 3/8", 1/2" SAE: #6, #8, #10 BSP: 3/8", 1/2"	NPTF: 3/4", 1" SAE: #12, #16 BSP: 3/4", 1"	NPTF: 1-1/4", 1-1/2" SAE: #20, #24 BSP: 1-1/4", 1-1/2"	NPTF: 2" SAE: #32 BSP: 2"

Note: Consult factory for SAE brass monitor requirements.

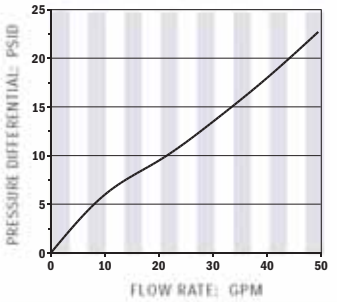
TYPICAL PRESSURE DIFFERENTIALS

For specific differential graphs, refer to Lake data sheet PDDS-404.

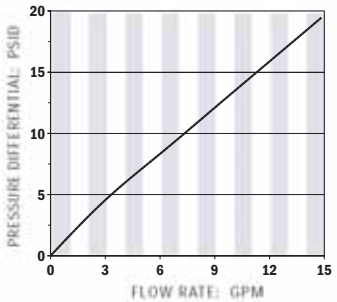
SERIES 5 MONITORS 1-1/4" - 2"



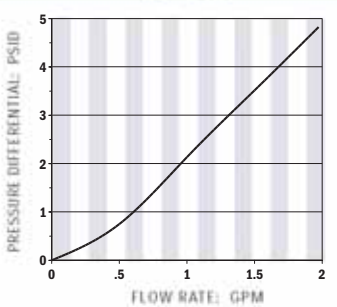
SERIES 4 MONITORS 3/4" - 1"



SERIES 3 MONITORS 1/4" - 1/2"



SERIES 2 MONITORS 1/8" - 1/4"



AW-LAKE COMPANY, *A TASI Group Company*, 8809 Industrial Dr., Franksville, WI 53126
262.884.9800 / Fax: 262.884.9810 / 800.850.6110

LAKE MONITORS

www.lakemonitors.com

Hydraulic System Test Analyzers

FOR 3/8" - 1-1/2" PIPE SIZES

STYLE K - Flow & Pressure
STYLE T - Flow, Pressure & Temperature

Used to diagnose faults in hydraulic circuits, determine hydraulic horsepower and test for component wear such as hydraulic valve and cylinder leakage.

A COMPLETE TROUBLESHOOTING SYSTEM

The analyzer consists of a flow meter, glycerine-filled pressure gauge (Style "K"), bi-metal temperature gauge/dry pressure gauge (Style "T") and a precision needle-type load valve. A comprehensive operator's manual describes testing of various system components.

MATERIALS OF CONSTRUCTION

Kits offer choice of flow meters in aluminum for pressure up to 3000 PSIG or stainless steel for pressures up to 5000 PSIG. **All stainless steel #303/304 kits available for pressure up to 6000 PSIG.** ***Contact Lake for more information.***

PLAN COMPONENT REPAIRS

This system analyzer can be part of a predictive maintenance program, allowing strategized pump, valve, motor and cylinder rebuilding.

COMPACT AND RUGGED

The complete hydraulic system test analyzer is small enough to fit in a tool box and built to withstand rigorous industrial use.

NON-ELECTRICAL

Without batteries to fail or other electrical power connections to make, this system will provide a lifetime of simple and reliable operation.

METRIC AND US/STANDARD MEASURING RANGES

These multi-measurement analyzers simultaneously measure flow in GPM and LPM, pressure in PSIG and Bar, and temperature in degrees F and C.

UNRESTRICTED MOUNTING

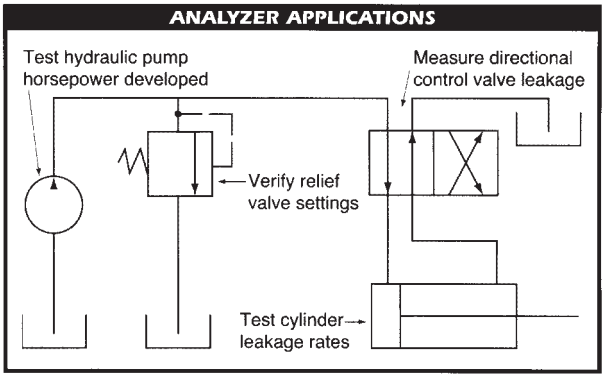
Accurate measurements can be taken in any mounting orientation, without the straight pipe required with other analyzer systems.

PIN-POINT SYSTEM PROBLEMS

The hydraulic system analyzer and comprehensive troubleshooting manual will save time and money by testing discrete components within the system, eliminating trial and error approaches.

REVERSE FLOW OPTION AVAILABLE

Built-in reverse bypass mechanism prevents potential damage from mis-installation or backflow.



www.lakemonitors.com

LAKE MONITORS INC
Division of Total Automated Solutions, Inc.

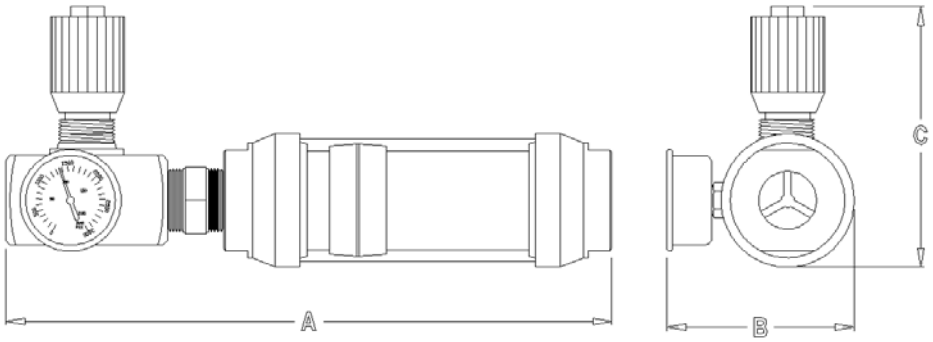
MATERIALS OF CONSTRUCTION

WETTED COMPONENTS		NON-WETTED COMPONENTS	
Component	**Materials**	**Component**	**Materials**
High-pressure casing, end ports and tapered shaft	Aluminum (3000 PSIG version) Stainless Steel (5000 PSIG version)	Window Tube	Polycarbonate
Seals	Buna-N (STD), Viton, EPR, Neoprene optional	Window Tube Seals	Buna-N
Transfer Magnet	Teflon® coated Alnico	Gauge Window	Acrylic
Floating Orifice Disk	Stainless Steel		
All other internal parts	Stainless Steel		
Needle Valve	Carbon Steel (Stainless optional)		
Gauge	Brass and Stainless Steel		

PERFORMANCE

Measuring Accuracy	Flow: ±4% of full-scale (±2.5% in center third of measuring range); Pressure: ±2.5% of full-scale; Temperature: ±2.5% of full-scale
Repeatability:	±1% of full-scale - all measurements
Measuring range:	Flow: 0.05-150 GPM (0.2-560 LPM) See guide to standard meters for specific ranges; Pressure: 0-3000 PSIG (0-200 Bar) / 0-5000 PSIG (0-340 Bar); Temperature: 0-250°F (-20-120°C) - "T" Style only
Maximum Operating Pressure:	Aluminum meters: 3000 PSIG (200 Bar); Stainless Steel Meters: 5000 PSIG (340 Bar); All stainless version: 6000 PSIG (410 Bar)
Maximum operating temperature:	240°F (116°C)
Standard Calibration Fluids:	Oil meters: DTE 25® @ 110°F (43°C), 0.873 sg
Filtration Requirements:	74 micron filter or 200 mesh screen minimum

DTE 25 is a registered trademark of Exxon Mobil



MECHANICAL SIZE CODE

DIM	Series 3	Series 3	Series 4	Series 4	Series 5	Series 5
Port Sizes	3/8" NPTF	1/2" NPTF	3/4" NPTF	1" NPTF	1-1/4" NPTF	1-1/2" NPTF
A	9-1/2" (242mm)	10-1/8" (257mm)	11-1/8" (283mm)	12-1/2" (318mm)	15-5/8" (397mm)	15-25/32"(401mm)
B (K-Style)	3-1/2" (89mm)	3-9/16" (91mm)	4-1/16" (103mm)	4-1/8" (105mm)	4-7/8" (124mm)	5-3/32" (130mm)
B (T-Style)	3-7/32" (82mm)	3-5/16" (85mm)	3-25/32" (96mm)	3-7/8" (99mm)	4-5/8" (118mm)	4-13/16" (123mm)
C	3-5/8" (92mm)	4-3/16" (107mm)	4-31/32" (127mm)	6-1/4" (159mm)	7" (178mm)	7-3/16" (183mm)

DIM	Series 3	Series 3	Series 4	Series 4	Series 5	Series 5
Port Sizes	#6 SAE	#8 SAE	#12 SAE	#16 SAE	#20 SAE	#24 SAE
A	9-7/16" (240mm)	9-9/16" (243mm)	11-3/32" (282mm)	12-9/32" (312mm)	15-3/8" (391mm)	15-3/8" (391mm)
B (K-Style)	3-1/2" (89mm)	3-19/32" (92mm)	4-1/16" (103mm)	4-1/8" (105mm)	4-29/32" (127mm)	5-3/32" (130mm)
B (T-Style)	3-7/32" (82mm)	3-5/16" (85mm)	3-25/32" (96mm)	3-7/8" (99mm)	4-5/8" (118mm)	5-13/16" (148mm)
C	3-5/8" (92mm)	4-3/16" (107mm)	4-31/32" (127mm)	6-1/4" (159mm)	7" (178mm)	7-3/16" (183mm)

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Division of Total Automated Solutions, Inc.

www.lakemonitors.com

Lake Monitors
Basic In-line Liquid Flow Rate Monitors

FOR 1/8" – 2" PIPE SIZES

Ideal for monitoring case drain flows, pump performance and media flows through hydraulic circuits and sub-circuits

STYLE B

CHOICE OF THREE MATERIALS OF CONSTRUCTION

Select from aluminum, brass or stainless steel to meet system and media compatibility requirements.

UNRESTRICTED MOUNTING

Allows the designer to install the monitor in any orientation – horizontal, vertical or inverted.

SUPERIOR EXTERIOR DESIGN

Weather-tight for use outdoors and/or on systems where wash downs are required.

GOOD VISCOSITY STABILITY

A sharp-edged stainless steel orifice provides excellent measurement stability for viscosities from 0-500 SSU.

RUGGED AND RELIABLE

Designed as a hydraulic service tool, this monitor will provide years of maintenance-free performance.

HIGH PRESSURE OPERATION

The magnetically coupled follower and rigid pressure vessel design allows operation to 6000 PSIG and use with opaque liquids.

24 DIFFERENT PORTS AVAILABLE

Standard selection of NPT, SAE and BSP ports reduces the amount of adapters required for installation.

LOW COST ACCURACY

±2.5% of range accuracy in center third of scale; ±4% in upper and lower thirds.

BI-DIRECTIONAL AND REVERSE FLOW OPTION OFFERED

Basic in-line monitors are also available in bi-directional and reverse flow versions. Contact Lake Monitors for more information.

ENGINEERING SPECIFICATION

THE IN-LINE FLOW RATE MONITOR SHALL:

- Use the variable annular orifice technique with compression spring recoil.
- Not require inlet or outlet straight plumbing, or require vertical pipe mounting.
- Have a measuring accuracy of ±2.5% of full scale in the center third of the measuring range, and ±4% in upper and lower third.
- Have a stainless steel sharp-edged orifice.
- Have a weather-tight external construction.
- Be Lake Monitors No. B _ _ – _ _ _ – _ _

Basic In-line Liquid Flow Rate Monitors

MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
High-pressure casing, end ports and tapered shaft	Aluminum	Brass	#303 Stainless Steel
Seals	Buna-N (STD), EPR, Viton® or Kalrez®	Buna-N (STD), EPR, Viton® or Kalrez®	Viton® with Teflon® backup (STD), Buna-N, EPR or Kalrez®
Transfer Magnet	Teflon® coated Alnico	Teflon® coated Alnico	Teflon® coated Alnico
Floating Orifice Disk	Stainless Steel	Stainless Steel	Stainless Steel
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

Teflon is a registered trademark of DuPont de Nemours & Co.
Viton and Kalrez are registered trademarks of Dow DuPont Elastomers

MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

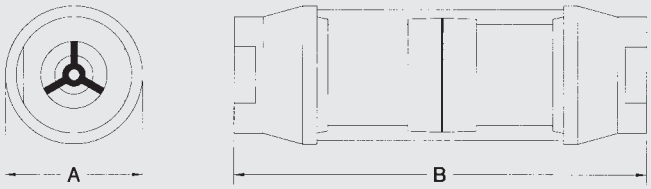
	ALUMINUM	BRASS	STAINLESS STEEL
Window Tube	Polycarbonate (STD)	Polycarbonate (STD)	Polycarbonate (STD)
Window Seals	Buna-N (STD), Teflon®	Buna-N (STD), Teflon®	Buna-N (STD), Teflon®

PERFORMANCE

Measuring accuracy*:	±2.5% of full-scale in the center third of the measuring range; ±4% in upper and lower thirds
Repeatability:	±1% of full-scale
Flow measuring range:	.05-150 GPM (0.2-560 LPM)
Pressure differential:	See graphs on the right for typical pressure differentials. For specific differential information, refer to Lake data sheet PDDS-404.
Maximum operating pressure:	aluminum and brass monitors: 3500 PSIG (240 Bar) stainless steel monitors: 6000 PSIG (410 Bar)
Maximum operating temperature:	240ºF (116ºC) Note: for operation to 600ºF (316ºC), see our High Temperature data sheet.
Standard calibration fluids:	Oil monitors: DTE 25® @ 110ºF (43ºC), 0.873 sg Water monitors: tap water @ 70ºF (21ºC), 1.0 sg
Filtration requirements:	74 micron filter or 200 mesh screen minimum

**Accuracy is ±4% Full-scale across entire range for "BI" option.*
TE 25 is a registered trademark of Exxon Mobil

MECHANICAL SIZE CODE



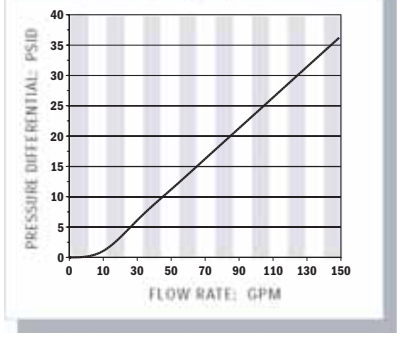
DIM	SERIES 2	SERIES 3	SERIES 4	SERIES 5	SERIES 5
A	1-1/4" (32mm)	1-7/8" (48mm)	2-3/8" (60mm)	3-1/2" (90mm)	3-1/2" (90mm)
B	4-13/16" (122MM)	6-9/16" (167MM)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)
Port Sizes	NPTF: 1/8", 1/4"	NPTF: 1/4", 3/8", 1/2" SAE: #6, #8, #10 BSP: 3/8", 1/2"	NPTF: 3/4", 1" SAE: #12, #16 BSP: 3/4", 1"	NPTF: 1-1/4", 1-1/2" SAE: #20, #24 BSP: 1-1/4", 1-1/2"	NPTF: 2" SAE: #32 BSP: 2"

Note: Consult factory for SAE brass monitor requirements.

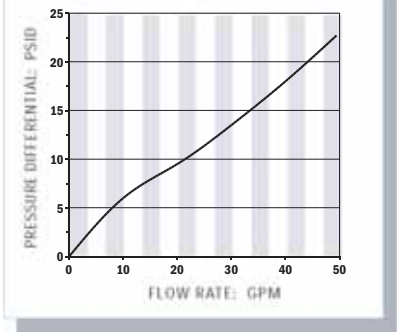
TYPICAL PRESSURE DIFFERENTIALS

For specific differential graphs, refer to Lake data sheet PDDS-404.

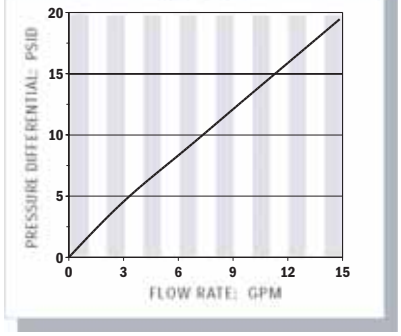
SERIES 5 MONITORS 1-1/4" - 2"



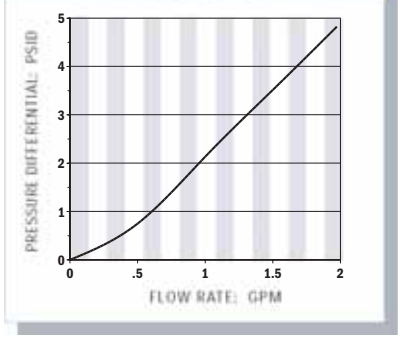
SERIES 4 MONITORS 3/4" - 1"



SERIES 3 MONITORS 1/4" - 1/2"



SERIES 2 MONITORS 1/8" - 1/4"



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LAKE MONITORS

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Lake Monitors
Phosphate Ester Flow Rate Monitors

FOR 1/8" – 2" PIPE SIZES

Compatible with aviation lubricants such as Skydrol®, as well as fire-retardant fluids such as Pydraul®, Fyrquil® and Houghton 900 series.

STYLE P

CHOICE OF THREE MATERIALS OF CONSTRUCTION

Select from aluminum, brass or stainless steel to meet system requirements.

UNRESTRICTED MOUNTING

Allows the designer to install the monitor in any orientation — horizontal, vertical or inverted.

MULTI-USE

Factory calibrated for phosphate esters, these versatile monitors can be used to verify hydraulic power unit outputs, as well as test machinery and tools for proper fluid flow rates.

RUGGED AND RELIABLE

These monitors are constructed with all metal pressure vessels that allow safe, permanent installation in industrial systems.

HIGH PRESSURE OPERATION

The magnetically coupled follower design allows operation to 6000 PSIG.

24 DIFFERENT PORTS AVAILABLE

Standard selection of NPT, SAE and BSP ports reduces the amount of adapters required for installation.

LOW COST ACCURACY

±2.5% of range accuracy in center third of scale; ±4% in upper and lower thirds.

BI-DIRECTIONAL AND REVERSE FLOW OPTION OFFERED

Phosphate ester monitors are also available in bi-directional and reverse flow versions. Contact Lake Monitors for more information.

ENGINEERING SPECIFICATION

THE PHOSPHATE ESTER IN-LINE FLOW RATE MONITOR SHALL:

- Include a direct-reading scale corrected for phosphate ester media.
- Use the variable annular orifice technique with compression spring recoil.
- Not require inlet or outlet straight plumbing, or require vertical pipe mounting.
- Have a measuring accuracy of ±2.5% of full scale in the center third of the measuring range, and ±4% in upper and lower thirds.
- Have a stainless steel sharp-edged orifice.
- Be Lake Monitors No. P _ _ – _ _ _ – _ _

Phosphate Ester Flow Rate Monitors

MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
High-pressure casing, end ports and tapered shaft	Aluminum	Brass	#303 Stainless Steel
Seals	EPR, w/Teflon® backup Virton® or Kalrez®	Teflon® coated Alnico	EPR, w/Teflon® backup Virton® or Kalrez®
Transfer Magnet	Teflon® coated Alnico	Teflon® coated Alnico	Teflon® coated Alnico
Floating Orifice Disk	Stainless Steel	Stainless Steel	Stainless Steel
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

Teflon is a registered trademark of DuPont de Nemours & Co.
Viton and Kalrez are registered trademarks of Dow DuPont Elastomers.

MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
Window Tube	Pyrex	Pyrex	Pyrex
Window Seals	Teflon®	Teflon®	Teflon®

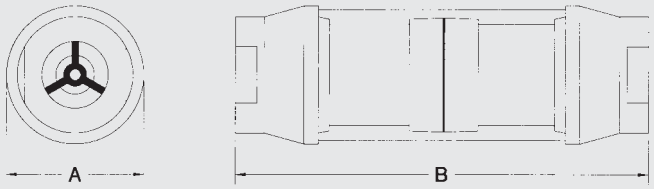
PERFORMANCE

Measuring accuracy:	±2.5% of full-scale in the center third of the measuring range; ±4% in upper and lower thirds
Repeatability:	±1% of full-scale
Flow measuring range [1]:	0.1-130 GPM (0.4 – 490 LPM)
Pressure differential:	See graphs on the right for typical pressure differentials. For specific differential information, refer to Lake data sheet PDDS-404.
Maximum operating pressure:	aluminum and brass monitors: 3500 PSIG (240 Bar) stainless steel monitors: 6000 PSIG (410 Bar)
Maximum operating temperature:	240ºF (116ºC) Note: For operation to 600ºF (316ºC), Note: For operation to 600°F (316°C) alternate o-ring material will be required.
Standard calibration fluids:	DTE 25® @ 110ºF (43ºC), 0.873 sg Monitors are density corrected to 1.15 sg
Filtration requirements:	74 micron filter or 200 mesh screen minimum

*[1] To determine approximate measuring ranges multiply the range listed in the Liquid Flow Rate section of Lake's Guide to standard monitor numbers by 0.93. For example, a P3A6WB10 would have a scale range to 10 GPM *0.93 = 9.3 GPM at full scale.*

DTE 25 is a registered trademark of Exxon Mobil.

MECHANICAL SIZE CODE



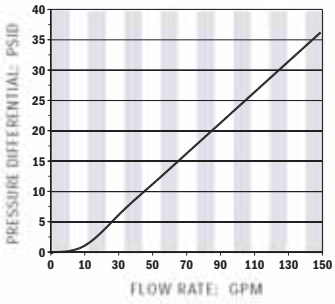
DIM	SERIES 2	SERIES 3	SERIES 4	SERIES 5	SERIES 5
A	1-1/4" (32mm)	1-7/8" (48mm)	2-3/8" (60mm)	3-1/2" (90mm)	3-1/2" (90mm)
B	4-13/16" (122mm)	6-9/16" (167mm)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)
Port Sizes	NPTF: 1/8", 1/4"	NPTF: 1/4", 3/8", 1/2" SAE: #6, #8, #10 BSP: 3/8", 1/2"	NPTF: 3/4", 1" SAE: #12, #16 BSP: 3/4", 1"	NPTF: 1-1/4", 1-1/2" SAE: #20, #24 BSP: 1-1/4", 1-1/2"	NPTF: 2" SAE: #32 BSP: 2"

Note: Consult factory for SAE brass monitor requirements.

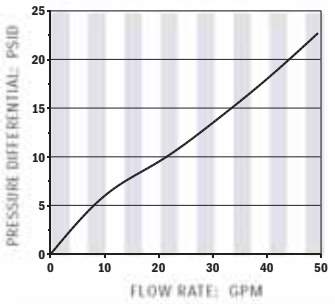
TYPICAL PRESSURE DIFFERENTIALS

For specific differential graphs, refer to Lake data sheet PDDS-404.

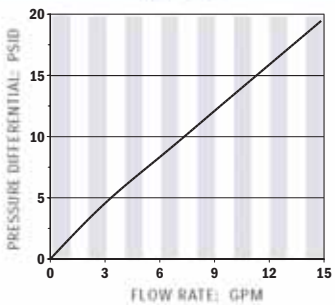
SERIES 5 MONITORS 1-1/4" - 2"



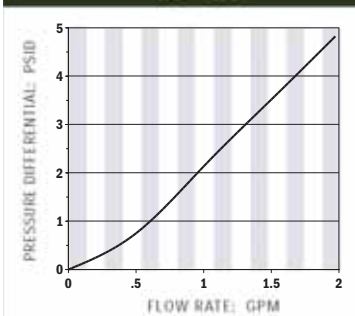
SERIES 4 MONITORS 3/4" - 1"



SERIES 3 MONITORS 1/4" - 1/2"



SERIES 2 MONITORS 1/8" - 1/4"



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LAKE MONITORS

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Lake Monitors
Pneumatic Flow Rate Monitors

FOR 1/8" – 2" PIPE SIZES

STYLE G

Ideal for monitoring air compressor outputs, pneumatic tool air consumption and industrial gas flows.

CHOICE OF THREE MATERIALS OF CONSTRUCTION

Select from aluminum, brass or stainless steel to meet system and media compatibility requirements.

UNRESTRICTED MOUNTING

Allows the designer to install the monitor in any orientation — horizontal, vertical or inverted.

SUPERIOR EXTERIOR DESIGN

Weather-tight for use outdoors and/or on systems where wash downs are required.

RUGGED AND RELIABLE

These monitors are constructed with all metal pressure vessels, allowing safe, permanent installation in industrial systems.

HIGH PRESSURE OPERATION

The magnetically coupled follower and rigid pressure vessel design allows operation to 1000 PSIG.

24 DIFFERENT PORTS AVAILABLE

Standard selection of NPT, SAE and BSP ports reduces the amount of adapters required for installation.

LOW COST ACCURACY

±2.5% of range accuracy in center third of scale; ±4% in upper and lower thirds

BI-DIRECTIONAL AND REVERSE FLOW OPTION OFFERED

Pneumatic monitors are also available in bi-directional and reverse flow versions. Contact Lake Monitors for more information.

ENGINEERING SPECIFICATION

THE PNEUMATIC IN-LINE FLOW RATE MONITOR SHALL:

- Use the variable annular orifice technique with compression spring recoil.
- Not require inlet or outlet straight plumbing, or require vertical pipe mounting.
- Have a measuring accuracy of ±2.5% of full scale in the center third of the measuring range, and ±4% in upper and lower thirds.
- Have a stainless steel sharp-edged orifice.
- Have a weather-tight external construction.
- Be Lake Monitors No. G _ _ – _ _ _ – _ _

Pneumatic Flow Rate Monitors

MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
High-pressure casing, end ports and tapered shaft	Aluminum	Brass	#303 Stainless Steel
Seals	Buna-N (STD), EPR, Viton® or Kalrez®	Buna-N (STD), EPR, Viton® or Kalrez®	Viton® with Teflon® backup (STD), Buna-N, EPR or Kalrez®
Transfer Magnet	Teflon® coated Alnico	Teflon® coated Alnico	Teflon® coated Alnico
Floating Orifice Disk	Stainless Steel	Stainless Steel	Stainless Steel
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

Teflon is a registered trademark of DuPont de Nemours & Co.
Viton and Kalrez are registered trademarks of Dow DuPont Elastomers.

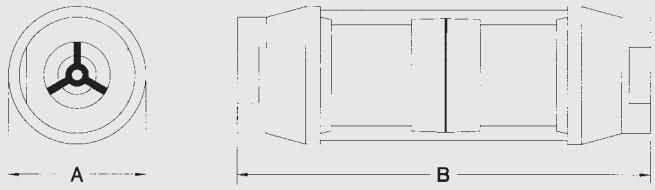
MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
Window Tube	Polycarbonate (STD) Pyrex	Polycarbonate (STD) Pyrex	Polycarbonate (STD) Pyrex
Window Seals	Buna-N (STD), Teflon®	Buna-N (STD), Teflon®	Buna-N (STD), Teflon®

PERFORMANCE

Measuring accuracy:	±2.5% of full-scale in the center third of the measuring range; ±4% in upper and lower thirds
Repeatability:	±1% of full-scale
Flow measuring range:	1.5-1300 SCFM @ 100 PSIG (1-610 LPS)
Pressure differential:	See graphs on the right for typical pressure differentials. For specific differential information, refer to Lake data sheet PDDS-404.
Maximum operating pressure:	aluminum and brass monitors: 600 PSIG (40 Bar) stainless steel monitors: 1000 PSIG (70 Bar)
Maximum operating temperature:	240ºF (116ºC) Note: For operation to 600ºF (316ºC), see our High Temperature data sheet.
Standard calibration fluids:	Air @ 70°F (21°C), 1.0 sg and 100 PSIG (6.8 Bar)
Filtration requirements:	74 micron filter or 200 mesh screen minimum

MECHANICAL SIZE CODE



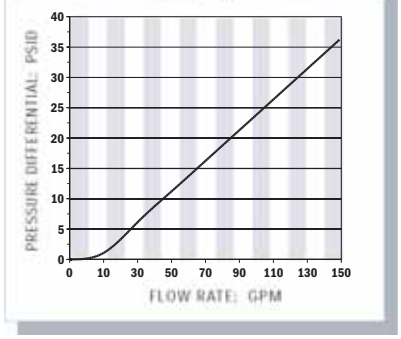
DIM	SERIES 2	SERIES 3	SERIES 4	SERIES 5	SERIES 5
A	1-1/4" (32mm)	1-7/8" (48mm)	2-3/8" (60mm)	3-1/2" (90mm)	3-1/2" (90mm)
B	4-13/16" (122mm)	6-9/16" (167mm)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)
Port Sizes	NPTF: 1/8", 1/4"	NPTF: 1/4", 3/8", 1/2" SAE: #6, #8, #10 BSP: 3/8", 1/2"	NPTF: 3/4", 1" SAE: #12, #16 BSP: 3/4", 1"	NPTF: 1-1/4", 1-1/2" SAE: #20, #24 BSP: 1-1/4", 1-1/2"	NPTF: 2" SAE: #32 BSP: 2"

Note: Consult factory for SAE brass monitor requirements.

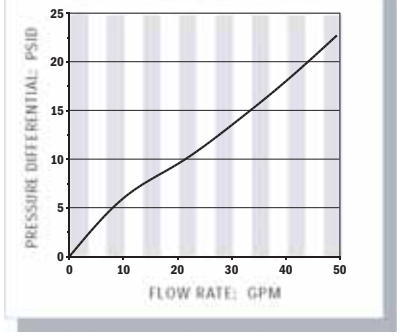
TYPICAL PRESSURE DIFFERENTIALS

For specific differential graphs, refer to Lake data sheet PDDS-404.

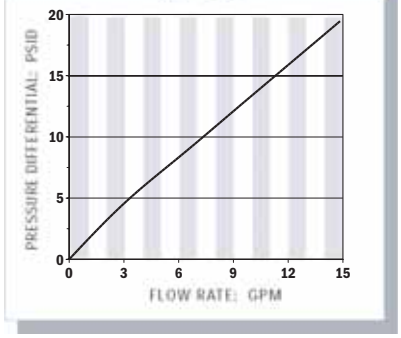
SERIES 5 MONITORS 1-1/4" - 2"



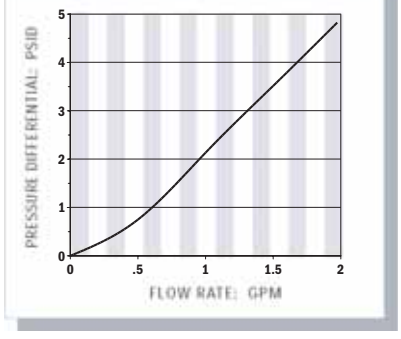
SERIES 4 MONITORS 3/4" - 1"



SERIES 3 MONITORS 1/4" - 1/2"



SERIES 2 MONITORS 1/8" - 1/4"



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LAKE MONITORS

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Lake Monitors
Flow Rate Transmitters

FOR 1/4" – 2" PIPE SIZES

Ideal for batching, industrial process control, mobile hydraulic equipment and computer/PLC-controlled hydraulic system monitoring applications.

STYLE R

SIMPLE TO INSTALL

All transmitters are factory calibrated and ship fully assembled. Simply install the transmitter into your system and apply power.

INDUSTRY STANDARD OUTPUTS

Transmitters provide proportional analog outputs of 4-20mA, 0-5 Vdc and 1-5 Vdc[1], 20-2000 Hz square-wave pulse. These outputs will drive popular data acquisition devices, meters and analog input cards.

DIRECT READING

All transmitters provide a visual indication of flow rate integral to the transmitted output.

WEATHER-TIGHT CONSTRUCTION

The rugged cast aluminum NEMA type 4X enclosure allows installation in outdoor applications and in environments where liquid tight seals are required.

RUGGED AND RELIABLE

Without delicate internal components to break, abrade or corrode, the Lake flow transmitter will provide many years of low-maintenance service.

COMPATIBLE WITH LAKE MONITORS' R/T100 AND R100 FLOW ANALYZERS

The Lake flow rate transmitter combines with these Lake analyzers to make a powerful flow instrument capable of remote monitoring of rate and total flows.

[1]The 1-5Vdc output requires an external 249 ohm resistor (not included with transmitter) to be wired at the receiving device.

ENGINEERING SPECIFICATION

THE IN-LINE FLOW RATE MONITOR/ TRANSMITTER SHALL:

- Be factory calibrated for 4-20mA, 0-5Vdc, 1-5Vdc, and square wave pulse outputs.
- Use the variable annular orifice technique with compression spring recoil.
- Not require inlet or outlet straight plumbing, or require vertical orientation.
- Have a measuring accuracy of ±2.5% of full scale in the center third of the measuring range, and ±4% in upper and lower thirds.
- Have a stainless steel sharp-edged orifice
- Have a maximum working pressure rating of 3500 or 6000 PSIG for liquids.
- Have a maximum working pressure rating of 600 or 1000 PSIG for gasses.
- Have a weather-tight external construction.
- Be Lake Monitors No. R _ _ – _ _ _ – _ _.

Flow Rate Transmitters

MATERIALS OF CONSTRUCTION (WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
High-pressure casing, end ports and tapered shaft	Aluminum	Brass	#303 Stainless Steel
Seals	Buna-N (STD), EPR, Viton® or Kalrez®	Buna-N (STD), EPR, Viton® or Kalrez®	Viton® with Teflon® backup (STD), Buna-N, EPR or Kalrez®
Transfer Magnet	Teflon® coated Alnico	Teflon® coated Alnico	Teflon® coated Alnico
Floating Orifice Disk	Stainless Steel	Stainless Steel	Stainless Steel
All other internal parts	Stainless Steel	Stainless Steel	Stainless Steel

Teflon is a registered trademark of DuPont de Nemours & Co.
Viton and Kalrez are registered trademarks of Dow DuPont Elastomers.

MATERIALS OF CONSTRUCTION (NON-WETTED COMPONENTS)

	ALUMINUM	BRASS	STAINLESS STEEL
Enclosure & Cover	Aluminum	Aluminum	Aluminum
Seals	Buna-N	Buna-N	Buna-N
Window	Pyrex®	Pyrex®	Pyrex®
Din Connector	Polyamide	Polyamide	Polyamide

Pyrex is a registered trademark of Corning Inc.

MONITOR PERFORMANCE

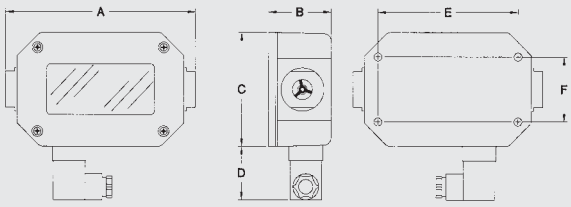
Measuring accuracy:	±2.5% of full-scale in the center third of the measuring range; ±4% in upper and lower thirds
Repeatability:	±1% of full-scale
Flow measuring range:	0.05-150 GPM (0.2-560 LPM); 1.5-1300 SCFM (0.75-610 SLPS)
Maximum operating pressure:	aluminum and brass monitors: 3500 PSIG (240 Bar) Stainless steel monitors: 6000 PSIG (410 Bar)
Maximum operating temperature:	media: 240ºF (116ºC), ambient: 180ºF (82ºC)
Pressure differential:	Liquid: see graphs. Gases: see Pneumatic data sheet
Standard calibration media:	Oil monitors: DTE 25® @ 110ºF (43ºC), 0.873 sg Water monitors: tap water @ 70ºF (21ºC), 1.0 sg Air monitors: air @ 70ºF (21ºC), 1.0 sg and 100 PSIG (6.8 Bar)
Filtration requirements:	74 micron filter or 200 mesh screen minimum

DTE 25 is a registered trademark of Exxon Mobil.

ELECTRONIC TRANSMITTER PERFORMANCE

Power requirements:	12-35 Vdc
Load driving capacity:	4-20mA: Load resistance is dependent on power supply voltage. Use the following equation to calculate maximum load resistance: Max Loop Load (Ω) = 50(Power supply volts – 12). 0-5 VDC: Minimum load resistance 1000Ω. 1-5 VDC: Minimum load resistance 25 K Ω Square Wave Pulse: Minimum load resistance 1000 Ω
Transmission distance:	4-20mA and 1-5 VDC are limited only by wire resistance and power supply voltage. <200 feet recommended for 0-5 VDC and square wave pulse.
Over-current protection:	self limiting at 35mA
Resolution:	10 bit (0.1%)
Isolation:	Inherently isolated from the process
Response time:	<100 milliseconds

MECHANICAL SIZE CODE



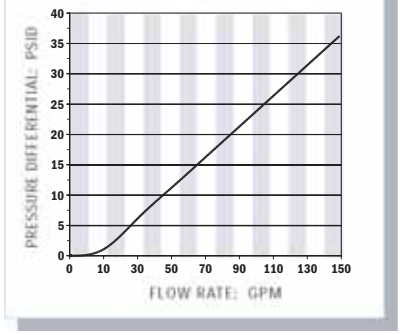
DIM	SERIES 3	SERIES 4	SERIES 5	SERIES 5
A	6-9/16" (167mm)	7-5/32" (182mm)	10-1/8" (258mm)	12-5/8" (322mm)
B	2-3/16" (56mm)	2-15/16" (75mm)	3-13/16" (97mm)	3-13/16" (97mm)
C	4" (101mm)	4-1/2" (114mm)	5-5/16" (135 mm)	5-5/16" (135mm)
D	1-7/8" (47mm)	1-7/8" (47mm)	1-7/8" (47mm)	1-7/8" (47mm)
E	4-7/8" (128mm)	5" (127mm)	6-3/4" (172mm)	6-3/4" (172mm)
F	2-1/4" (57mm)	2-7/8" (73mm)	3-3/4" (95mm)	3-3/4" (95mm)
Port Sizes	NPTF: 1/4", 3/8", 1/2" SAE: #6, #8, #10 BSP: 3/8", 1/2"	NPTF: 3/4", 1" SAE: #12, #16 BSP: 3/4", 1"	NPTF: 1-1/4", 1-1/2" SAE: #20, #24 BSP: 1-1/4", 1-1/2"	NPTF: 2" SAE: #32 BSP: 2"

Note: Consult factory for SAE brass monitor requirements.

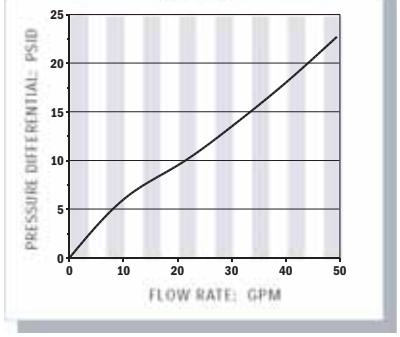
TYPICAL PRESSURE DIFFERENTIALS

For specific differential graphs, refer to Lake data sheet PDDS-404.

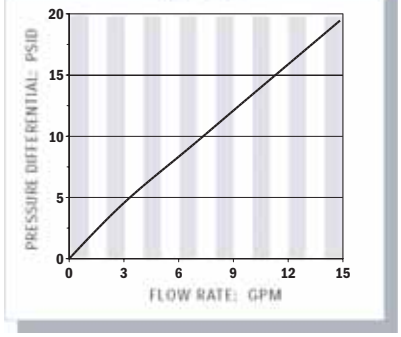
SERIES 5 MONITORS 1-1/4" - 2"



SERIES 4 MONITORS 3/4" - 1"



SERIES 3 MONITORS 1/4" - 1/2"



LAKE MONITORS

www.lakemonitors.com

AW-LAKE COMPANY
A TASI Group Company
8809 Industrial Dr., Franksville, WI 53126
262.884.9800 / Fax: 262.884.9810
800.850.6110

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