OPERATING MANUAL
ACR ACRYLIC FLOW METERS
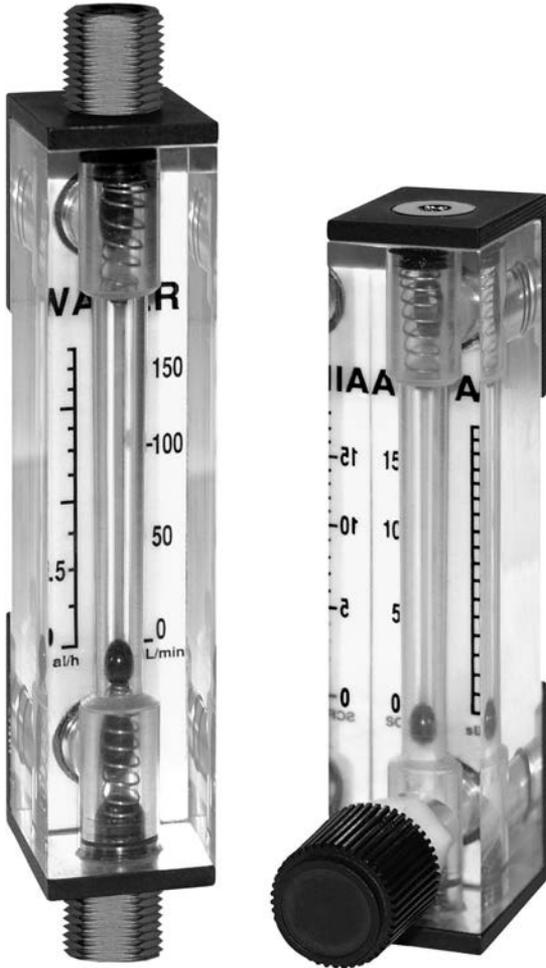
DAKOTA INSTRUMENTS®

INSTALLATION AND OPERATING INSTRUCTIONS FOR ACR ACRYLIC FLOW METERS

Unpacking the ACR Acrylic Flow Meter

Inspect Package for External Damage Your ACR Acrylic Flow Meter was carefully packed in a sturdy cardboard carton, with anti-static cushioning materials to withstand shipping shock. Upon receipt, inspect the package for possible external damage. In case of external damage to the package contact the shipping company immediately.

Unpack the ACR Acrylic Flow Meter Open the carton carefully from the top and inspect for any sign of concealed shipping damage. In addition to contacting the shipping carrier please forward a copy of any damage report to your distributor or Dakota® directly.

When unpacking the instrument please make sure that you have all the items indicated on the Packing List. Please report any shortages promptly.

Specifications

ACCURACY: ± 5% of full scale reading.

FLOAT MATERIALS: Glass (black colored), 316 Stainless Steel (silver colored), Tungsten Carbide (Carboloy- silver colored).

FITTINGS: Brass or 316 Stainless Steel.

O-RINGS: FKM is standard, Buna-N®, EPR are optionally available.

VALVES: Built-in needle valves are available.

MAXIMUM SERVICE TEMPERATURE: 65 °C (150 °F).

MAXIMUM SERVICE PRESSURE: 700 kPA (100 psig).

SCALES: Direct reading dual scales mounted interchangeably at rear of flow meter block. Each scale has both metric and English system units displayed. Scales are mounted by means of locating holes between the rear of the acrylic block and the yellow colored backing plate. Customers can easily exchange scales for different fluids, and flow rates. Extra scales and flow meter kits are available.

FLOAT READINGS: At center of ball shaped floats.

Installation

MOUNTING: Flow meters are shipped ready for panel (rear) mounting, and are easily convertible to partial or full In-line configurations (see diagram). To convert, exchange Plug Seals (3) and Female Adaptors (9) correspondingly using a 5/32" hex wrench and a 1/2" open box wrench. Panel or In-line mounting is through 11/16" diameter holes, using hex nuts supplied.

THE FOLLOWING CONFIGURATIONS ARE POSSIBLE:

1) Panel Mounting, using hex nuts at rear of meter.
2) Full In-line Mounting (not available for meters with valve options.)
3) Partial In-line Mountings, i.e. inlet at bottom, outlet at top rear, or inlet at bottom rear and outlet at top center.

To Exchange Scales: Select Option A, B, or C

A. NO VALVE OPTION (Styles 2, 4, 14)
1) Using a 1/2 open box wrench or 5/32" hex wrench remove rear fittings (Female Adaptor (9) for the panel mounting option or Plug Seal (3) for the In-line mounting option).
2) Remove Back Plate (2) and Scale (7) by sliding both to either side.
3) Holding the desired scale align its holes with those in the Back Plate. Slide both behind the Bracket (5).
4) Insert but do not completely tighten fittings.
5) Recheck Back Plate (2) alignment.
6) Tighten fittings.

B. VALVE OPTION (Styles 2,4)
1) Using a 1/2 open box wrench remove top Female Adaptor (9).
2) Loosen Valve Cartridge (11) allowing the lower Female Adaptor (12) to be unscrewed.
   Do not remove Cartridge from the meter.
3) Remove Back Plate (2) and Scale (7) by sliding both to either side.
4) Holding the desired scale align its holes with those in the Back Plate. Slide both behind the Bracket (5).
5) Insert but do not completely tighten top Female Adaptor (9).
6) Insert but do not completely tighten lower Female Adaptor (12) (it has an extra orifice and O-ring on it), while keeping Valve Cartridge (11) in place.
7) Screw Valve Cartridge (11) into lower Female Adaptor (12).
8) Recheck Back Plate (2) alignment.
9) Tighten both Female Adaptors (9), (12).
10) Tighten Valve Cartridge (11). **Do not over tighten it.**

C. VALVE OPTION (Style 14)
1) Use a 1/16" hex wrench to loosen 2 set screws on Knob (15).
2) Using a 1/2" open box wrench, remove Valve Cartridge (13) and top Female Adaptor (9).
3) Remove Back Plate (2) and Scale (7) by sliding them to either side.
4) Holding the desired scale align its holes with those in the Back Plate slide them behind Brackets (5).
5) Insert but do not completely tighten top Female Adaptor (9).
6) Insert but do not completely tighten Valve Cartridge (13).
7) Recheck Back Plate (2) alignment.
8) Tighten Female Adaptor (9) and Valve cartridge (13).
9) Secure Knob, tighten its set screws.

Cleaning: Disassembly, Re-assembly

From time to time you may need to clean the meter. Clean with mild soap solution. Dry out with air or inert gas. Disassembly and reassembly must be done in a clean environment.

Disassembly

First, follow the common steps, then select Option A, B, or C, based on the block style.

1) Unscrew top Plug Seal (3) using a 5/32" hex wrench and remove Bumping Spring (8).

2) Flip the meter over and let the spherical float fall out on to a clean surface. The float should be handled with appropriate tweezers. **Do not touch it with fingers**. Store the float in a clean bag or box, free of grease.

A. NO VALVE OPTION (Styles 2, 4, 14)
   Unscrew top Plug Seal (3) using a 5/32" hex wrench and remove Bumping Spring (8).

B. VALVE OPTION (Styles 2,4)
   Unscrew Valve Cartridge (11) using a 1/2" open box wrench. Unscrew
   bottom Plug Seal (3) using a 5/32" hex wrench and remove Bumping Spring (8).

C. VALVE OPTION (Style 14)
   Use a 1/16" hex wrench to loosen 2 set screws on Knob (15). Remove Valve
   Cartridge (13) using a 1/2" open box wrench. Unscrew bottom Plug Seal (3); push
   out the plastic Y-Shape Float Stop toward the wide bore using an appropriate
   non-metal stick.

Re-Assembly: Select Option A, B, or C

A. NO VALVE OPTION (Styles 2, 4, 14)
Install Bumping Spring (8) in the bottom cavity; secure it by screwing in Plug Seal (3) until it is flush with Bracket (5). **Proceed to steps 1-3.**

B. VALVE OPTION (Styles 2,4)
Install Bumping Spring (8) in the bottom cavity; while squeezing the spring with appropriate flat stick insert Valve Cartridge (11), tighten it. Screw in bottom Plug Seal (3) until it is flush with Bracket (5). **Proceed to steps 1-3.**

C. VALVE OPTION (Style 14)
Insert the plastic Y-Shape Float Stop (14) from the wide bore using an appropriate non-metal stick; push the Stop all the way down the bore. Screw in Valve Cartridge (13), and reinstall Knob (15). Screw in bottom Plug Seal (3) until it is flush with Bracket (5). **Proceed to steps 1-3.**

STEPS:
1. Insert Float (6),
2. Insert Bumping Spring (8) into the top cavity; secure it by screwing in Plug Seal (3) until it is flush with Bracket (5).
3. Shake the meter making sure the ball is floating free without restrictions.

TYPICAL SCALES

| AIR	AIR		WATER	
30	15		6	400
20	10		5 4	300
10	5		3 2	200
0	0		1	100
SCFH	sL/min		Gal/h	mL/min
1/4	ST		1/4	ST
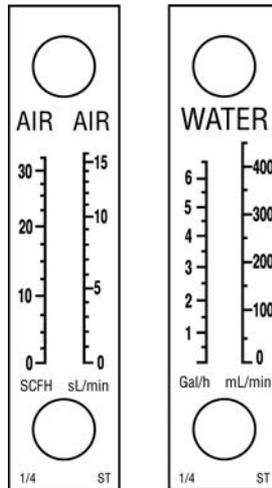
In-Line Version (Styles 2, 4, 14)
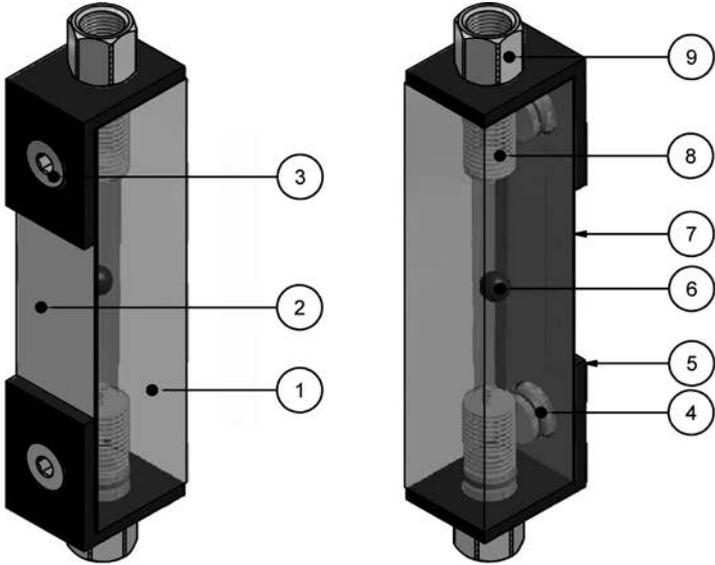
Valve Option Version (Styles 2, 4)
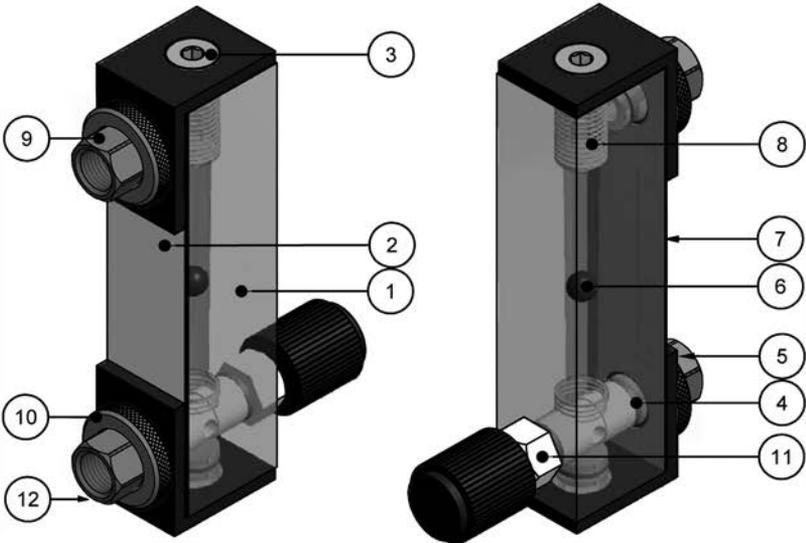
Panel Mount Version (Styles 2, 4, 14)
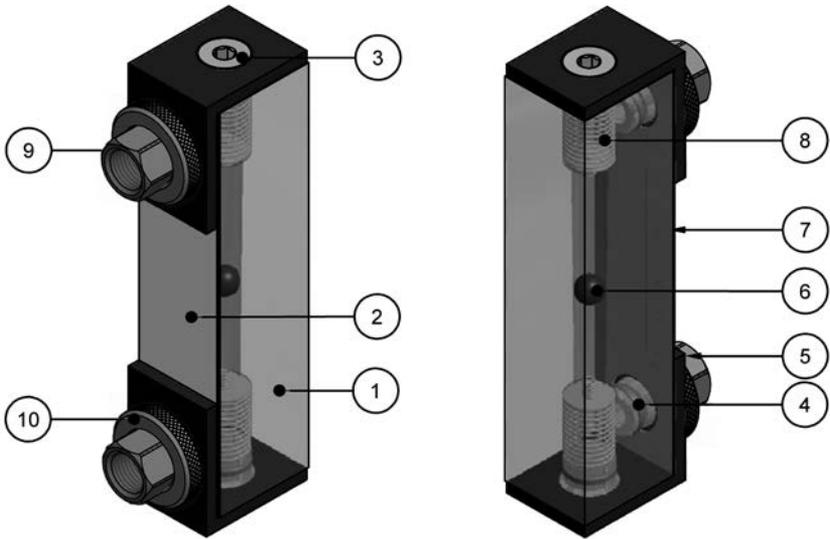
| PARTS LIST			
ITEM	**QTY**	**DESCRIPTION**	**MATERIAL**
1	1	Block	Acrylic
2	1	Back Plate, yellow	Polyethylene
3	2	Seal Plug	Brass or 316 Stainless Steel
4	4	O-ring	FKM
5	2	Bracket	Structural aluminum
6	1	Float	Glass or 316 Stainless Steel or Carboloy
7	1	Scale	Film
8	2	Bumping Spring	316 Stainless Steel
9	1 or 2	Female Adaptor	Brass or 316 Stainless Steel
10	2	Pal Nut	Plastic
11	1	Valve Cartridge	Wetted Parts: PVDF for brass, Stainless Steel, FKM O-Rings
12	1	Female Adaptor for Valve Cartridge	Brass or 316 Stainless Steel

Valve Option (Styles 14)
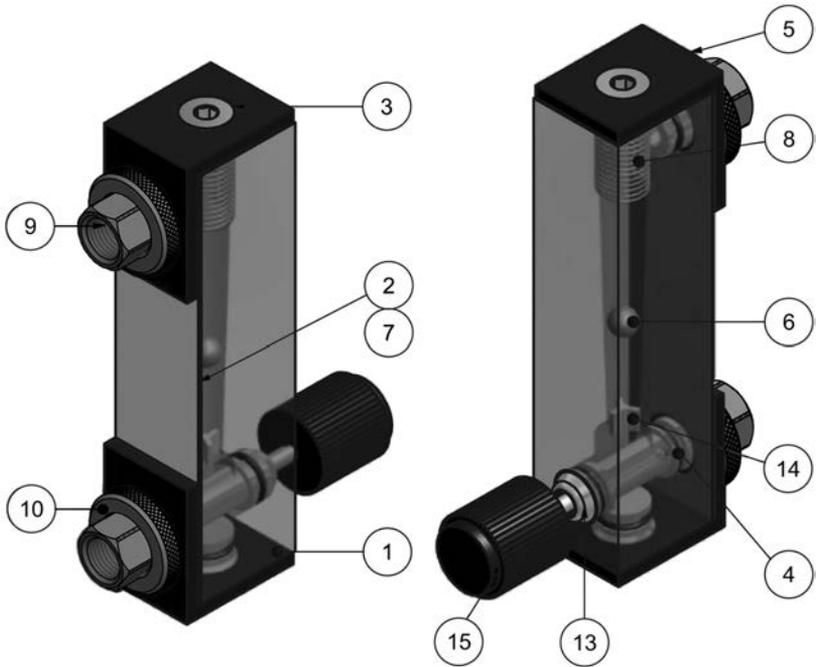
PARTS LIST (For valve option/style 14 only)			
ITEM	QTY	DESCRIPTION	MATERIAL
1	1	Block, style 14	Acrylic
2	1	Back Plate, yellow	Polyethelene
3	2	Seal Plug	Brass or 316 stainless steel
4	3	O-ring	FKM
5	2	Bracket	Structural aluminum
6	1	Float	316 Stainless Steel
7	1	Scale	Film
8	1	Bumping Spring	316 Stainless Steel
9	1	Female Adaptor	Brass or 316 Stainless Steel
10	2	Pal Nut	Plastic
13	1	Valve Cartridge	Wetted Parts: PVDF for brass, Stainless Steel, FKM O-Rings
14	1	O-ring	TFE
15	1	Knob	Plastic, Steel

DIMENSIONAL DRAWINGS

1.15"
29 mm

3.00"
28 mm

0.62"
16 mm

1.00"
25 mm

1.62"
41 mm

10
8
6
4
2
0

4.24"
102 mm

1.00"
25 mm

10
8
6
4
2
0

FEMALE ADAPTER
1/8-27 NPT

3.00"
28 mm

1.00"
25 mm

FULLY OPENED MODE 3.05" 77 mm
CLOSED MODE 2.75" 70 mm
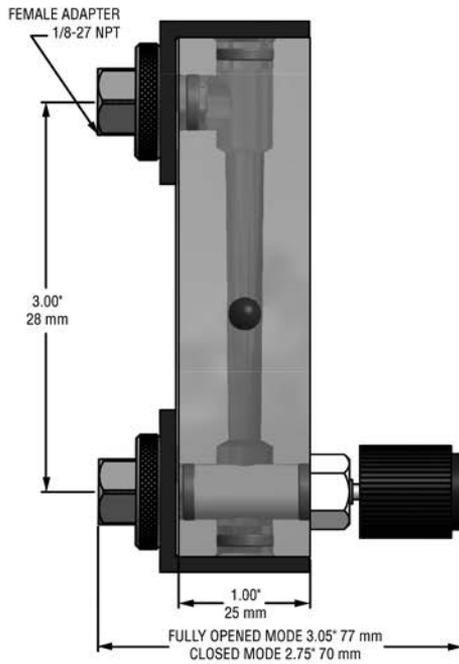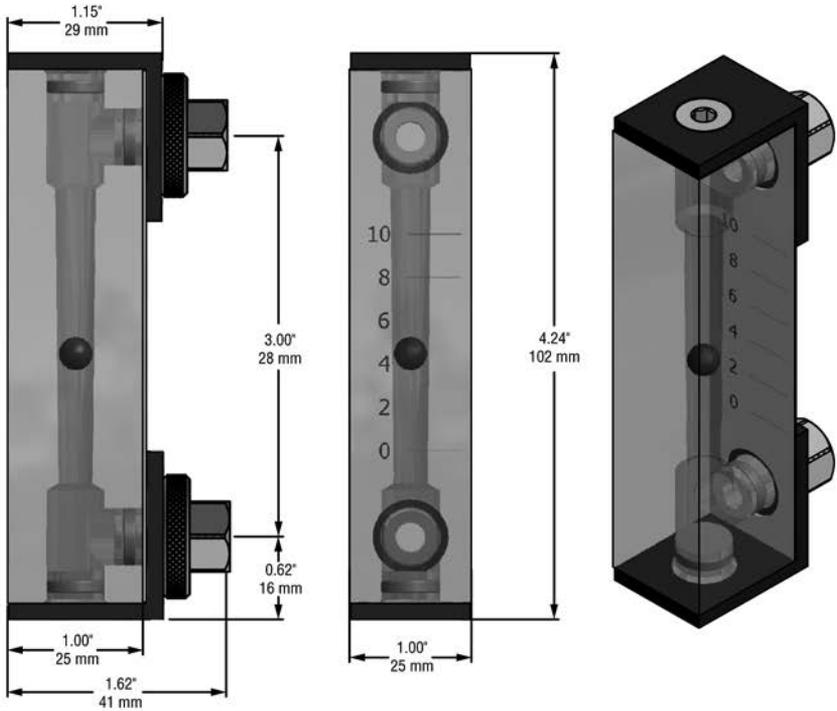
RETURNING MERCHANDISE FOR REPAIR

Please contact the customer service representative of your distributor or Dakota® if you purchased your Flow Meter directly, and request a **Return Authorization Number (RAN). Equipment returned without an RAN will not be accepted.** Dakota® reserves the right to charge a fee to the customer for equipment returned under warranty claims if the instruments are tested to be free from warrantied defects.

Shipping charges are borne by the customer. Items returned "collect" will not be accepted!

It is mandatory that any equipment returned for servicing be purged and neutralized of any dangerous contents including but not limited to toxic, bacterially infectious, corrosive or radioactive substances. No work shall be performed on a returned product unless the customer submits a fully executed, signed SAFETY CERTIFICATE. Please request form from the Service Manager.

LIMITED WARRANTY

No warranty or claims are made by DAKOTA® relating to the fitness of this product to any specific application.

Meters are warranted against defects in materials and workmanship to the original user for a period of one year from the date of shipment. The company shall at its discretion, repair or replace flow meters covered by valid warranty claims. Warranty is non-transferable and applies only to the original end-user. The liability of the company arising out of its supply of the product, or their use, shall not in any case exceed the cost of correcting defects in the products as set forth herewith.

The Warranty will not apply if failure is due to or contributed by any of the following: improper handling, improper storage, improper installation, abuse, unsuitable application of the product, lack of reasonable and necessary maintenance, use exceeding suggested pressure and temperature limitations, improper packaging for return, or repairs made or attempted to be made by anyone other than DAKOTA® or company authorized technicians.

In no event shall DAKOTA® or its distributors be liable for loss of profits, indirect, consequential or incidental damages.

⚠ CAUTION:
This product is not intended to be used in life support applications!

The selection of materials of construction, is the responsibility of the customer.
The company accepts no liability.

TRADEMARKS
Buna-N® -is a registered trademark of DuPont Dow Elastometers.   *Delrin®* -is a registered trademark of DuPont.
Dakota® -is a registered trademark of Dakota Instruments & Controls.