

IMPORTANT NOTE: For the most up-to-date version of this manual, please visit www.h2flow.net/product-literature

ACUFLOW™

FLOW METER

Operating Manual

European version (English)



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Above: AF-DN40, AF-DN50/65, AF-DN80, and AF-DN100

DESCRIPTION

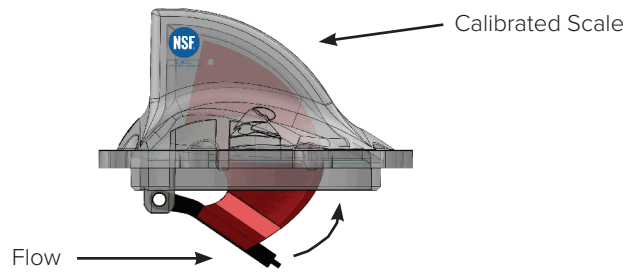
AcuFlow™ is a revolutionary, patented solution for accurate and reliable flow and velocity rate measurement in fresh, gray and potable water applications. A variation of this product, named FlowVis®, is also available for swimming pool, spa, fountain, water feature and flotation tank applications.

Using a design that is based on ‘mass flow’ principles, AcuFlow™ provides many benefits that include:

- Ease of installation with zero to minimal straight pipe
- Installation flexibility that allows orientation in any position, e.g., horizontal, vertical or even upside-down
- Long life without sticking floats or paddle wheels
- Combined Flow Meter and Check Valve for models AF-DN40 and AF-DN50/65
- User upgradeable to include Digital functionality (model AF-D)

CONCEPT

As flow increases, the flapper moves forward toward its fully open position. The flapper’s angular position is directly related to the flow rate through the valve / tee / pipe. A calibrated scale on the valve’s lid provides a highly accurate reading of the flow rate and velocity.



RESOURCES

Thank you for purchasing the AcuFlow flow meter by H2flow Controls. If you would like to find additional product resources, including tech tip sheets, brochures, videos, and materials in other languages, please visit our website at www.h2floweurope.com.

SERVICE REPAIR KIT

Service repair kits are available for all models:

AF-SK for all DN40 and DN50/65 models, comprising:

- 1 x o-ring
- 1 x spring
- 1 x flapper and indicator arm
- 1 x pivot pin

AF-SK-CAR for all DN80, DN100, DN150, and DN200 models, comprising:

- 1 x o-ring
- 1 x spring
- 1 x spring pulley pivot pin
- 1 x spring pulley to flapper pulley wire

For all other parts, please contact H2flow Europe at: (+34) 609 31 52 82.

MODELS & SPECIFICATIONS

AcuFlow™ comprises several models; it is important that you check that the model you are about to install is the correct one for your application.

| Model | Pipe Diameter (DN) | | | | | | | Pipe Schedule | | GPM Scale | Body Type | | | | Independently verified (NSF 50) | Flow Range (m3/h) |
|------------|--------------------|----|----|----|-----|-----|-----|---------------|----|-----------|-----------|-------|-----|--------------|---------------------------------|-------------------|
| | 40 | 50 | 65 | 80 | 100 | 150 | 200 | 40 | 80 | | Union | Valve | Tee | Saddle clamp | | |
| AF-DN40 | • | | | | | | | • | | • | | • | | | • | 2-20 |
| AF-DN50/65 | | • | • | | | | | • | | • | | • | | | • | 2-25 |
| AF-DN80 | | | | • | | | | | • | • | | | • | | • | 16-55 |
| AF-DN100 | | | | | • | | | | • | • | | | • | | • | 28-102 |
| AF-DN150 | | | | | | • | | | • | • | | | | • | • | 89-227 |
| AF-DN200 | | | | | | | • | | • | • | | | | • | • | 113-410 |

VALVE BODY FEATURE

On the side of the valve body that is used for the DN40, DN50, and DN65 models, you will note the following feature:



This feature has no functionality relating to the operation of the AcuFlow™ and is simply provided as an attribute to be able to plumb in a drain down pipe and valve. A typical use for this might be a roof mounted solar system. Under no circumstances should this hole be drilled out when using the valve body with the AcuFlow™.

INSTALLATION

General Installation Guidance

Installation of AcuFlow™ should be in accordance with the following instructions.

Normal plumbing procedures such as cleaning, priming and gluing of fixtures should be followed in order to avoid leaks. If you are not familiar with plumbing procedures, it is recommended that you employ the skills of a qualified plumber.

Unlike other flow meters, the majority of AcuFlow™ models are not affected by flow stream disturbances caused by its proximity to pumps, elbows, tees, valves, etc. AcuFlow™ can be installed either horizontally or vertically. Straight pipe requirements are addressed in the table on page 13.

Pay particular attention to the system's direction of flow and make sure that the arrow on the lid of the AcuFlow™ is pointing in the correct direction. For the AF-DN80, AF-DN100, AF-DN150 and AF-DN200 versions, the Tee / Saddle-clamp will feature an additional arrow label. In the event that the AcuFlow™ is inadvertently installed into the plumbing in the wrong direction, simply remove the (8) screws holding the lid in place and rotate the entire lid assembly by 180°.

NOTE: For models DN40 and DN50/65, always remove the AcuFlow™ lid assembly prior to gluing in the valve body.

NOTE (1): When selecting a physical location to install AcuFlow™, be sure to allow accessibility to read the scale on the lid.

NOTE (2): Due to the possibility of excessive turbulence, models AF-DN80, AF-DN100, AF-DN150, and AF-DN200 should not be installed directly after the pump.

NOTE (3): AcuFlow models are designed for the specific pipe Schedule stated at the bottom of the flow scale label. While it is important to comply with the specific Schedule of pipe, the accuracy stated within this manual can be maintained if a short length (3-6 inches / 75-150mm), of the correct pipe type, is installed either side of the AcuFlow. For example, an AF-DN100 can be installed to a SCH40 plumbing system, provided that a short length of SCH80 pipe is installed into each end of the AcuFlow AF-DN100.

Certified NSF 50 Accuracy and Associated Pipe Configurations

| Model | NSF 50 Level | Pipe Configuration |
|------------|--------------|--------------------|
| AF-DN40 | L1 | A |
| AF-DN50/65 | L1 | A |
| AF-DN80 | L1 | B |
| AF-DN100 | L1 | C |
| AF-DN150 | L1 | D |
| AF-DN200 | L1 | E |

Pipe Configuration Definitions:

- A.** Zero straight pipe before or after AcuFlow. Can be installed in any orientation - horizontal, vertical up or vertical down.
- B.** Straight horizontal pipe of ≥ 279 mm before AcuFlow
- C.** Straight horizontal pipe of ≥ 432 mm before AcuFlow
- D.** Straight horizontal pipe of ≥ 838 mm before AcuFlow
- E.** Straight horizontal pipe of ≥ 1626 mm before AcuFlow

Pipe Configurations other than those used by NSF for Testing

Piping configurations that are more demanding than those used by NSF for testing AcuFlow, e.g., installing an AF-DN80 right next to another fitting such as an elbow, will result in a lower accuracy level than stated above. It is impossible to determine the exact impact that each scenario will have, but like all flow meters installed in larger pipe sizes, turbulence becomes an issue. The longer the run of straight pipe before the AcuFlow, the better.

NSF 50 Accuracy Levels

The NSF 50 Standard for flow meters, has five levels of accuracy (L1-L5) that are expressed as follows:

Level 1 (L1) - Average of absolute values of all single point deviations must be $\leq 2\%$. Single point deviations shall not exceed $\pm 4\%$.

Level 2 (L2) - Average of absolute values of all single point deviations must be $\leq 5\%$. Single point deviations shall not exceed $\pm 7.5\%$.

Level 3 (L3) - Average of absolute values of all single point deviations must be $\leq 10\%$. Single point deviations shall not exceed $\pm 12.5\%$.

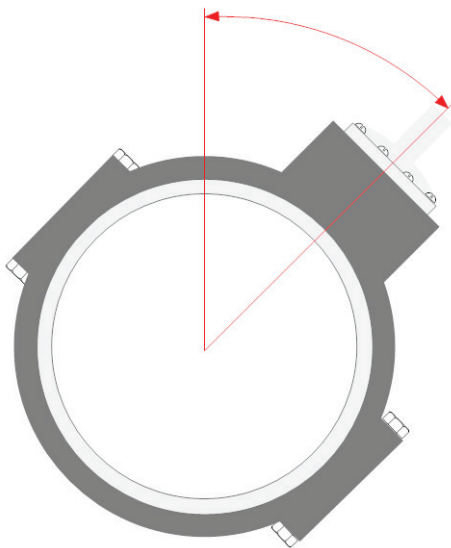
Level 4 (L4) - Average of absolute values of all single point deviations must be $\leq 12.5\%$. Single point deviations shall not exceed $\pm 15\%$.

Level 5 (L5) - Average of absolute values of all single point deviations must be $\leq 15\%$. Single point deviations shall not exceed $\pm 20\%$.

Installation of Saddle-clamp style models (AF-DN150 and AF-DN200)

AcuFlow models AF-DN150 and AF-DN200, use Schedule 80 Saddle Clamps. Dimensional details are as follows:

| AcuFlow Model | Saddle Size | Hole to be Drilled in Pipe | Angle for Hole / Saddle Clamp |
|---------------|-------------|----------------------------|-------------------------------|
| AF-DN150 | 6" x 3" | Φ 76.2 | 45° |
| AF-DN200 | 8" x 4" | Φ 101.6 | 45° |



When drilling the hole, the following precautions should be taken:

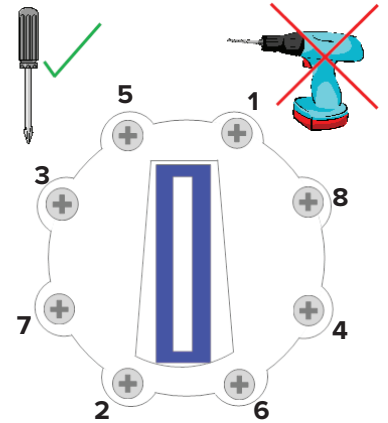
1. Prior to drilling, make sure that the intended hole will be at 45 degrees from the perpendicular.
2. Ensure that the intended position will allow the user to read the AcuFlow scale on the lid. If this is not possible, then we recommend adding an AcuFlow Digital upgrade to enable the flow reading to be read remotely.
NOTE: Model AF-DN200 includes AcuFlow Digital as standard.
3. Do not damage the external pipe area around the drilled hole. Surface damage will result in the Saddle's o-ring being unable to provide a watertight seal.
4. If using a hole saw, it is advisable to run the drill in reverse, and although this will take longer to cut through the pipe, it will be less aggressive and will cut a cleaner hole.
5. Be sure to obtain the correct sized hole saw.

Before securing the Saddle Clamp to the pipe, apply a good quality o-ring lubricant to the o-ring. Install the o-ring into the socket on the underside of the upper-half of the Saddle Clamp. Position the Clamp to the pipe so that the o-ring is centered around the drilled hole. Evenly tighten the nuts and bolts until both halves of the Saddle Clamp are mated together.

Tightening Lid Screws

When removing and re-installing the AcuFlow™ lid assembly, it is important to adhere to the following procedure:

1. Make sure that the o-ring on the underside of the lid is undamaged, lubricated with silicone (such as Boss 820) and is in-place without twists.
2. Ensure flapper hinge pin is centered.
3. Carefully lower the lid onto its valve body, Tee, or Saddle-Clamp, making sure that the o-ring stays in place.
4. Insert by hand the (8) stainless steel screws but do not tighten at this stage.
5. Using a hand Phillips-head screwdriver, slowly tighten the screws in a diagonal pattern, per the sequence to the right. Do not fully tighten one screw before proceeding to the next, i.e., pull them down slowly multiple times to avoid stressing and cracking the lid. Screws should be tightened to a final torque of 25 inch / pounds or 2.8 Nm.

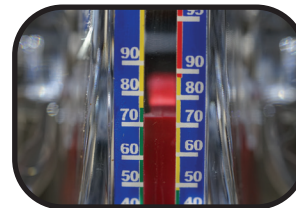


OPERATION

Reading the Flow Rate

AcuFlow is factory-calibrated to be extremely accurate across its full operating range. Any perceived 'inaccuracy' is related to the viewing angle at which the scale is being read. To avoid so-called 'parallax error', it is important to position your eye so that you are looking squarely at the tip of the indicator arm. To achieve this, simply move your head so that you just lose sight of the vertical leading edge of the red arm.

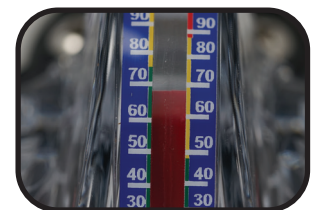
NOTE: Slowly move your head in this direction to the point where the leading edge of the indicating arm is not visible.



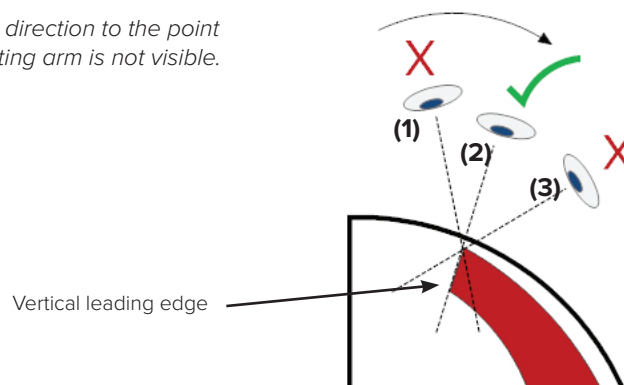
(1) Indicator arm is being viewed too far forward / near the rear of the lid.



(2) Indicator arm is being viewed correctly.

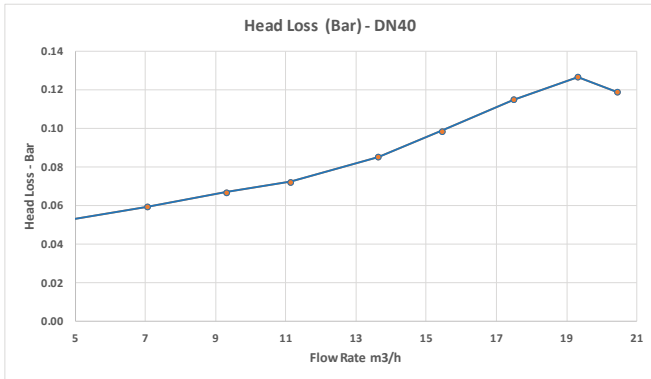


(3) Indicator arm is being viewed too far back / front of the lid.

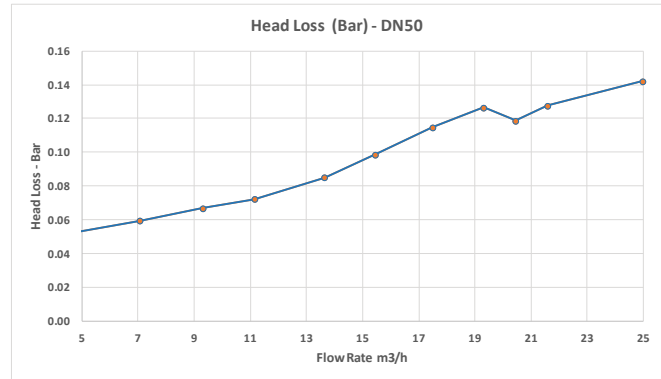


HEAD LOSS DATA

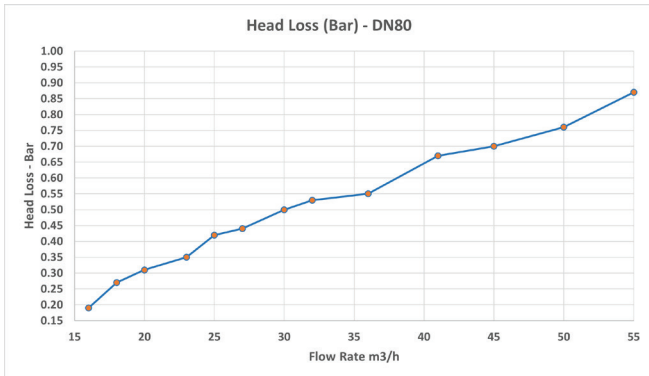
Head Loss (DN40):



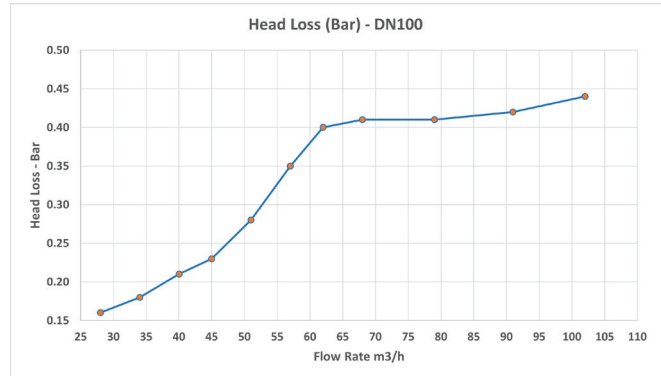
Head Loss (DN50 / DN65):



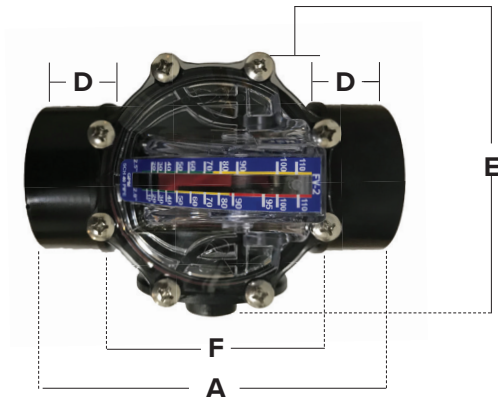
Head Loss (DN80):



Head Loss (DN100):



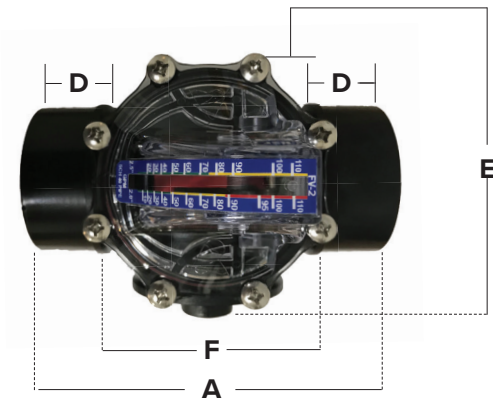
DIMENSIONS



Models: AF-DN40

| Reference | Dimension |
|-----------|--------------------|
| A | 165.1 mm |
| B | 149.23 mm |
| C | Schedule 40 - DN40 |
| D | 34.93 mm |
| E | 117.6 mm |
| F | 92.25 mm |
| WEIGHT | 0.544 kg |

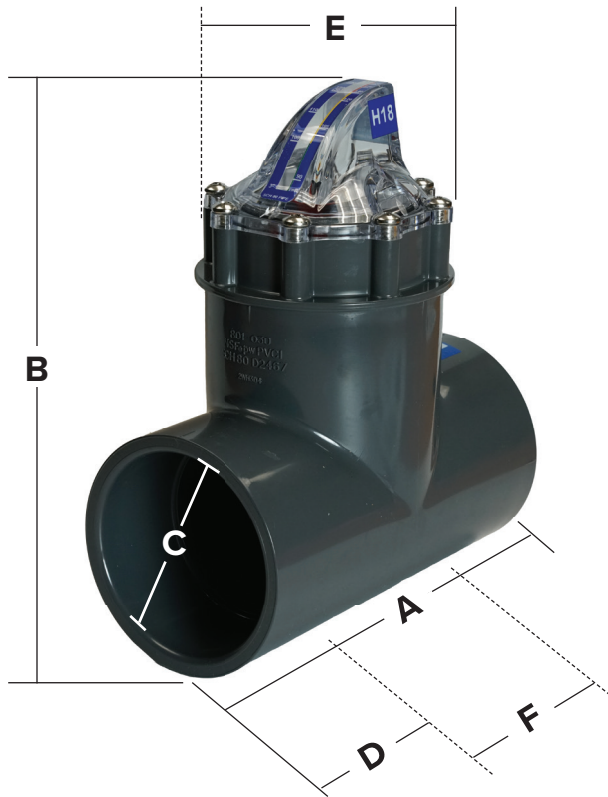
METRIC



Models: AF-DN50/65

| Reference | Dimension |
|-----------|--|
| A | 165.1 mm |
| B | 149.23 mm |
| C | Schedule 40 - DN50 (Slip) / DN65 (with coupling) |
| D | 34.93 mm |
| E | 117.6 mm |
| F | 92.25 mm |
| WEIGHT | 0.544 kg |

METRIC



Models: AF-DN80

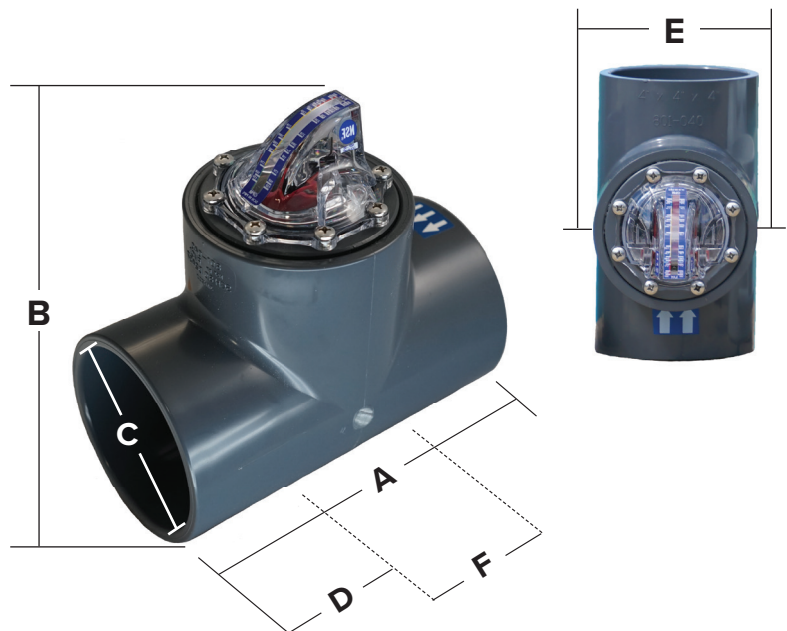
METRIC

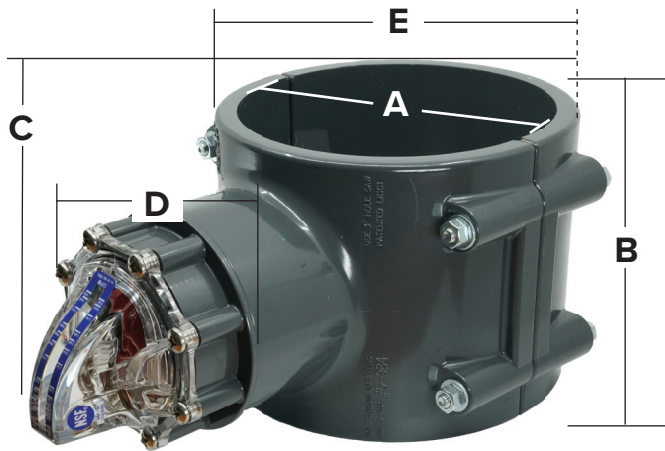
| Reference | Dimension |
|-----------|--------------------|
| A | 203.2 mm |
| B | 241.3 mm |
| C | Schedule 80 - DN80 |
| D | 47.63 mm |
| E | 114.3 mm |
| F | 107.96 mm |
| WEIGHT | 1.36 kg |

Models: AF-DN100

METRIC

| Reference | Dimension |
|-----------|---------------------|
| A | 241.3 mm |
| B | 247.65 mm |
| C | Schedule 80 - DN100 |
| D | 57.15 mm |
| E | 133.26 mm |
| F | 127.0 mm |
| WEIGHT | 2.27 kg |





Models: AF-DN150

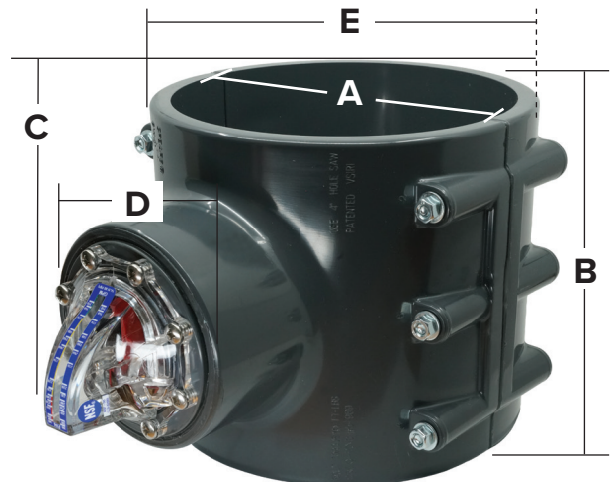
| Reference | Dimension |
|-----------|---------------------------------|
| A | Schedule 80 - 168.86 mm (DN150) |
| B | 152.65 mm |
| C | 318.45 mm |
| D | 107.51 mm |
| E | 191.32 mm |
| WEIGHT | 2.27 kg |

METRIC

Models: AF-DN200

| Reference | Dimension |
|-----------|------------------------------|
| A | Schedule 80 - 220 mm (DN200) |
| B | 216 mm |
| C | 368 mm |
| D | 133.11 mm |
| E | 245 mm |
| WEIGHT | 4.08 kg |

METRIC



TECHNICAL DATA

Material Data Sheet (MSDS)

| Component | AF-DN40 | AF-DN50/65 | AF-DN80 | AF-DN100 | AF-DN150 | AF-DN200 | Material |
|---------------------------------------|---------|------------|---------|----------|----------|----------|---------------------|
| Lid | • | • | • | • | • | • | Clear Polycarbonate |
| Spring | • | • | • | • | • | • | Hasteloy c-276 |
| o-ring | • | • | • | • | • | • | Viton |
| Lid Screws | • | • | • | • | • | • | 316 Stainless Steel |
| Indicator Pivot Pin | • | • | • | • | • | • | Hasteloy c-276 |
| Scale Label | • | • | • | • | • | • | Armalex |
| Product Label | • | • | • | • | • | • | Armalex |
| NSF Label | • | • | • | • | • | • | Armalex |
| Valve Body | • | • | | | | | CPVC |
| Union Valve Body | | | | | | | CPVC |
| Check Valve Flapper | • | • | | | | | PPEPS |
| Flapper Seal | • | • | | | | | Viton |
| Non Check Valve Flapper | | | | | | | ABS |
| Indicator (AF-DN40 and AF-DN50/65) | • | • | | | | | ABS |
| Indicator (AF-DN80 to AF-DN200) | | | • | • | • | • | ABS |
| Magnet | • | • | • | • | • | • | N52 Neodymium |
| Carriage | | | • | • | • | • | ABS |
| Flapper Pulley | | | • | • | • | • | ABS |
| Spring Pulley | | | • | • | • | • | ABS |
| Flapper to Indicator Link | | | • | • | • | • | ABS |
| Connecting Wire | | | • | • | • | • | 316 Stainless Steel |
| Dowel Pin - Link to Indicator | | | • | • | • | • | 316 Stainless Steel |
| Dowel Pin - Flapper to Carriage | | | • | • | • | • | 316 Stainless Steel |
| Barrel Bolt - Link to Flapper Binding | | | • | • | • | • | 316 Stainless Steel |
| Tee, Schedule 80, DN80 | | | • | | | | CPVC |
| Tee, Schedule 80, DN100 | | | | • | | | CPVC |
| Reducing Bushing 3" | | | • | | • | | PVC |
| Reducing Bushing 4" | | | | • | | • | PVC |
| Saddle Clamp 6" x 3" | | | | | • | | CPVC |
| Saddle Clamp 8" x 4" | | | | | | • | CPVC |
| Saddle Clamp Nut & Bolt Set | | | | | • | • | 316 Stainless Steel |

Operational Data

| Model | Accuracy | Pressure Rating | Calibration Required? | Min/Max Operating Ambient Temp | Design Life |
|------------|----------------|-----------------|-----------------------|--------------------------------|----------------------|
| AF-DN40 | Average: 98.7% | 8.62 bar | No | 32°F (0°C) / 140°F (60°C) | Greater than 5 years |
| AF-DN50/65 | Average: 99.2% | | | | |
| AF-DN80 | Average: 98.9% | | | | |
| AF-DN100 | Average: 99.6% | | | | |
| AF-DN150 | Average: 98.1% | | | | |
| AF-DN200 | Average: 98.9% | | | | |

Straight Pipe Requirements

| Model | Straight Pipe Before (x Pipe Diameters) | Straight Pipe After (x Pipe Diameters) |
|---------------------|---|--|
| AF-DN40, AF-DN50/65 | 0mm (x0) | 0" (x0) |
| AF-DN80 | 381mm (x5) | 0" (x0) |
| AF-DN100 | 508mm (x5) | 0" (x0) |
| AF-DN150 | 914mm (x6) | 0" (x0) |
| AF-DN200 | 1625mm (x8) | 0" (x0) |

MAINTENANCE

Although AcuFlow™ is designed to be maintenance-free, periodic checks should be made to the following:

| Condition | Check for | Remedy |
|--|--------------------------------------|-----------------------------|
| Leak around lid seal | O-Ring Failure | Replace O-Ring |
| Leak from lid | Cracks in lid | Order new lid from supplier |
| Higher flow reading than normal | Broken or weak spring | Replace spring |
| Lower flow reading than normal | Indicator arm stuck due to debris | Remove lid and clear debris |
| Flow indicator stuck at one position | Debris between indicator arm and lid | Remove lid and clear debris |
| Indicator always at max flow when pump running | Broken spring | Replace spring |

WARRANTY

IMPORTANT, please read and keep this document on record.

1. Definition

H2flow Controls, Inc., warrants the AcuFlow™ product for 3-years from its date of supply from H2flow Controls, Inc. or its stocking Distributor. In the event that the product experiences a premature failure due to defective workmanship or materials, H2flow will, at its discretion, replace either the failed component(s) or the complete AcuFlow unit. H2flow shall not be responsible for third-party labor or any consequential losses. Damage caused by improper installation, misuse or exposure to excessive chemicals such as acids or chlorine, will not be covered by this warranty.

2. Eligibility

This warranty extends to the original purchaser only or to the end-user client of an H2flow Controls Inc authorized affiliate.

3. How to obtain service

To obtain service under the terms of this warranty, the customer is required to notify H2flow Controls Inc. before the expiration of the warranty period and to return the item in accordance with H2flow Controls Inc's product return policy. Any product returned for warranty repair must be accompanied by a full fault report specifying the symptoms and the conditions under which the fault occurs. Should H2flow Controls Inc incur additional cost as a result of a failure to complete the appropriate paperwork, an administrative charge may be levied.

4. Exclusions

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate care. H2flow Controls Inc. shall not be obligated to provide service under this warranty if:

- a) damage has been caused by a failure to make a full and proper inspection of the product (as described by the documentation enclosed with the product at the time of shipment) on initial receipt of the product following shipment;
- b) damage has been caused by the attempts of individuals, other than H2flow Controls Inc staff to repair or service the product;
- c) damage has been caused by the improper use of the product, including but not limited to, the installation of a AcuFlow unit using a chlorination system as described in this manual.

5. Charges

Under cover of this warranty, H2flow Controls Inc will pay the carriage and insurance charges for the shipment of defective product back to H2flow Controls Inc and for its return to the client's original site of dispatch except when:

- a) H2flow Controls Inc's product return policy has not been followed.
- b) product failure is caused by any of the exclusions described at paragraph 4 above, when the customer will be liable for the full cost of the repair (parts and labor) plus all carriage and insurance costs to and from H2flow Controls Inc's premises.
- c) the product is damaged in transit and a contributory cause is inadequate packaging. It is the customer's responsibility to ensure that the packaging used to return equipment to H2flow Controls Inc is the same, or has equivalent protective qualities, to that used to ship the product to the customer in the first instance. Any damage resulting from the use of inadequate packaging will nullify H2flow Controls Inc's obligations under this warranty.

Should the customer's product be damaged in transit following a repair at H2flow Controls Inc's site, a full photographic record of the damage must be obtained (packaging and the product) to support any claim for recompense. Failure to present this evidence may limit H2flow Controls Inc's obligations under this warranty.

THIS WARRANTY IS GIVEN BY H2FLOW CONTROLS INC IN LIEU OF ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY, NON INFRINGEMENT OR FITNESS FOR A PARTICULAR PURPOSE. H2FLOW CONTROLS INC SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES. WE SPECIFICALLY DISCLAIM ANY AND ALL WARRANTIES TO CUSTOMERS OF THE CUSTOMER. THE CUSTOMER'S SOLE REMEDY FOR ANY BREACH OF WARRANTY IS THE REPAIR OR REPLACEMENT, AT H2FLOW CONTROLS INC'S DISCRETION, OF THE FAILED PRODUCT.



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