Air Release Valves

Introduction:

Air release valves objective is to release air from pipelines at irregular ground as it may appear air bag provoking damages to pipes.
They are also used to bring pressure to pipes whose pressure is lower than barometric one.

Advantages:

- They prevent from breakage in pipes because of overpressure.
- Avoid stagnant water.
- Increase the efficiency of water transport
- Reduce the pressure drop in pipes

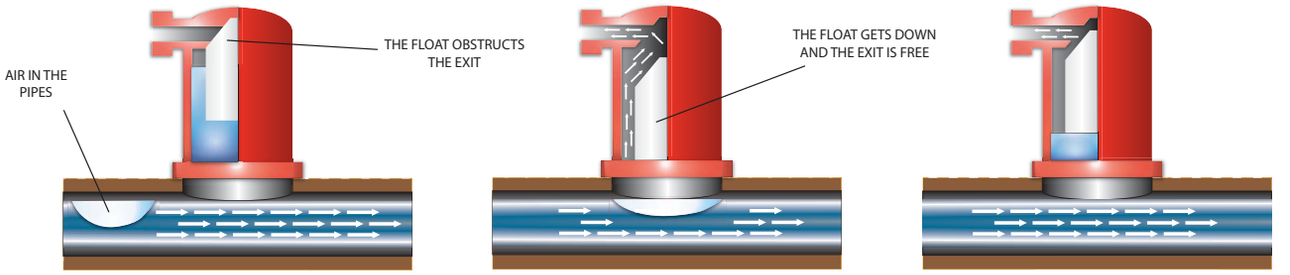
Recommended uses:

Simple acting air release valves for areas where it is needed a better removal of undesired elements, for abrupt slopes and every 500 m pipe.
Double or triple acting air release valves: to help filling the pipes., before and after a regulator system and pumping system and every 1000m .

More information about the air release valves:

They can be simple acting valves protecting from or eliminating excess of air in the water or double acting ones which purge air and eliminate trapped air from a piping system introducing fresh air as soon as they are lack of pressure.
Triple acting air valves, release air from overpressure pipelines and provide air when there is lack of pressure and maintain automatically its mission.

Drop of speed: it is the drop of running speed of water in the pipe, because of friction with the walls of the pipe.
Barometric pressure: Es la presión que ejerce la atmósfera sobre una masa de agua al aire libre.
Overpressure: pressure increase of water in the pipeline system
Lack of pressure: pressure decrease of water in the pipes.

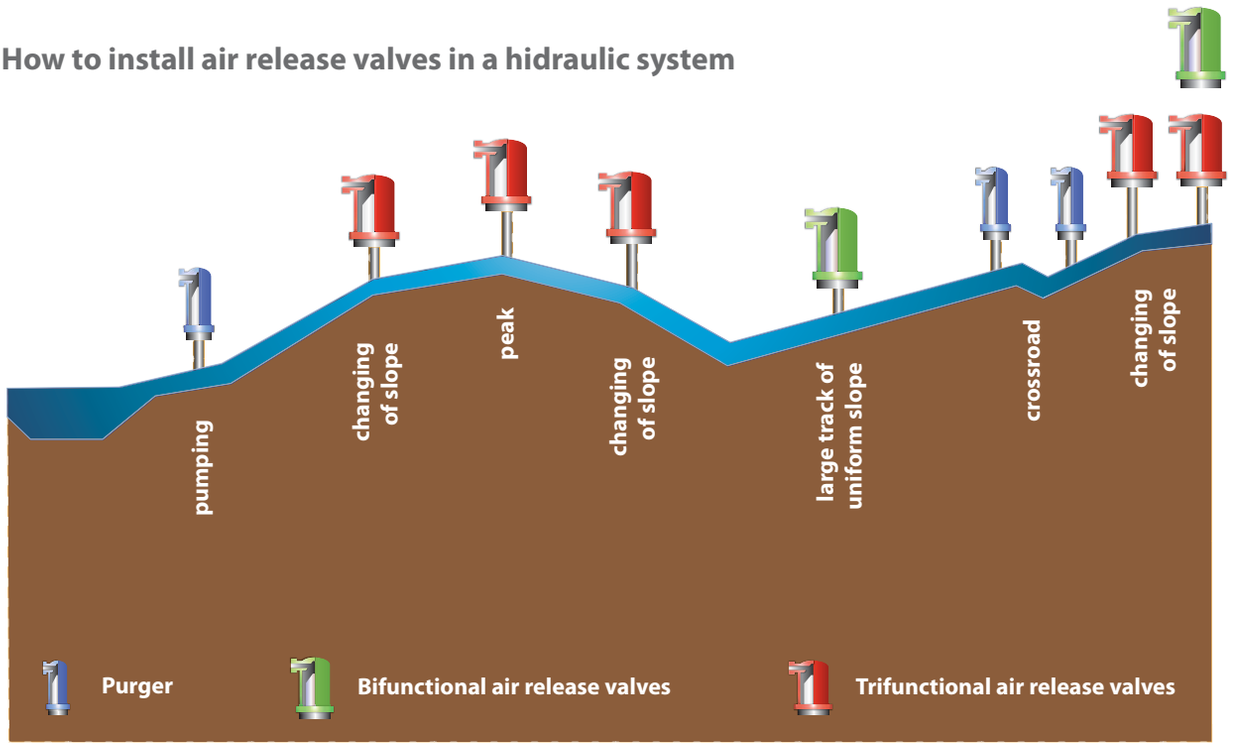


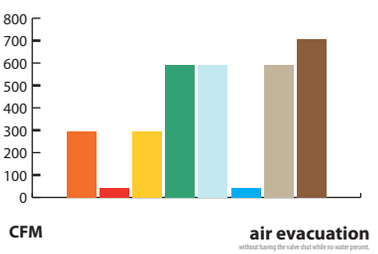
NORMAL POSITION OF A FLOAT

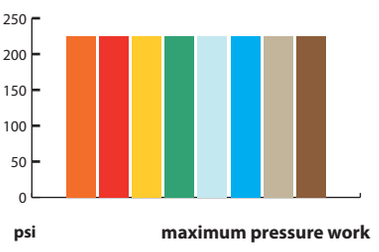
OPENING TRACK FLOAT

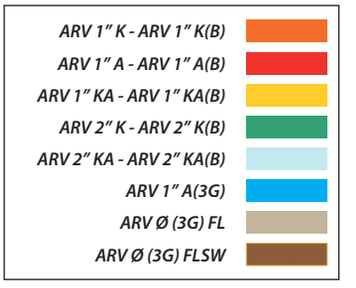
RELEASE AIR FLOAT

How to install air release valves in a hidraulic system









AIMPLAS
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EMPRESA ASOCIADA

afre

UNIRAIN ARV-Mini-In

Vacuum Breaker Air Valve

Application

Vacuum breaker air valve, designed to effectively admit air at high flow rates during drainage and in case of pumping interruption or water column separation
Recommended as safety valve in drip irrigation systems, breaking the system vacuum and preventing dirt suction into the drippers.

For correct operation, the valve should always be in a vertical position.
It is recommended to install a manual ball valve under the ARV, in order to make maintenance and repair operations easier without shutting the whole system*.

Advantages

- The valve has a large hole, with a special seal system, capable of admitting high air flow rates.
- Simple in design, with only 5 parts, it's easy to disassemble for maintenance and cleaning when needed.
- Its body features a built-in filter to prevent objects, such as insects and leaves, from getting into the valve through the outlet.
- Owing to a perfect fit, the valve is totally sealed at low pressures .

Technical specifications

- Performance as vacuum breaker.
- It admits air flows rates up to 185 m^3/h (109 CFM).
- Maximum working pressure 12 bar (174 PSI).
- Body and base made of fiberglass-reinforced polyamide.
- Treated for protection from UV radiation.
- Base available in 3/4" male thread.
- Optional BSP or NPT thread.
- Built-in filter in body hole.

BASE
3/4" Male Thread
Avaiblable
BSP & NPT

ARV-Mini-In

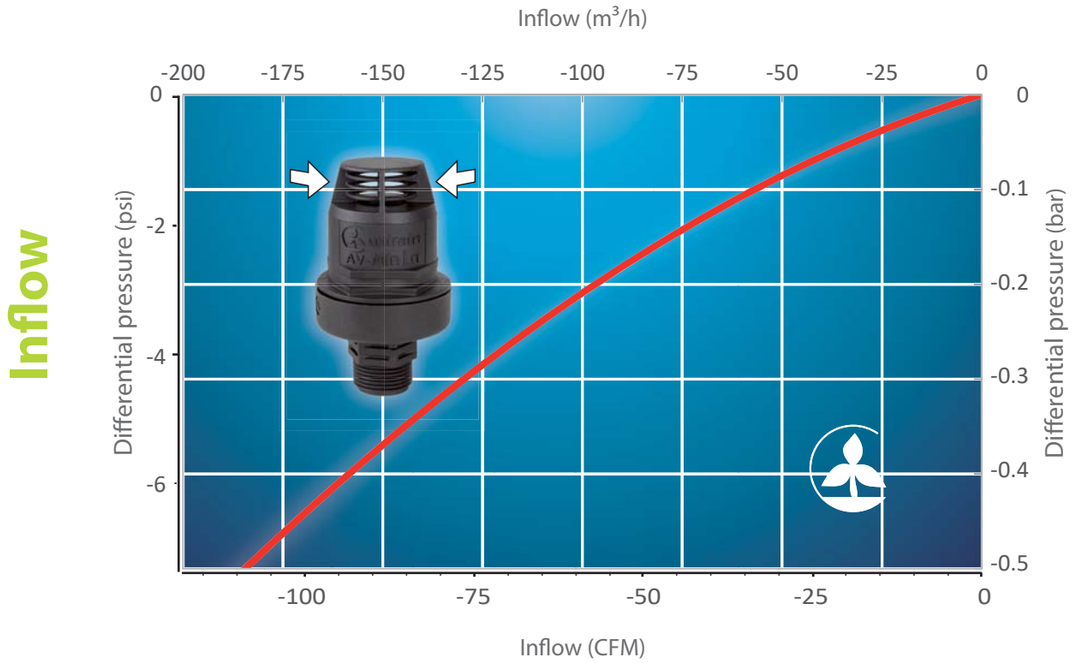
Performance

Prevents pipes from collapsing (**Vacuum**). At the smallest decrease in pressure, the float drops and opens the seal allowing outside air to enter the pipe immediately.

In drip irrigation systems, this performance helps avoiding dirt suction into the drippers.

TECHNICAL SHEET ARV-Mini-In 02 Version
The current final version will always be published on the official Unirain website www.unirain.com

Units Conversion	
FLOW	**PRESSURE**
m^3 / h *(cubic metres per hour)* **l / h** *(litres per hour)* **GPM** *(gallons per minute)* **CFM** *(cubic feet per minute)*	**mWa** *(metres of water column)* **PSI** *(pounds per square inch)*
1 CFM = 1.699 m^3 / h **1 GPM = 227.1192 l / h**	**1 PSI = 0.70307 mWa**



Normal Conditiones Flow
(P= 1 atm, T= 293.15 K)

***Normal conditions of use, service and maintenance.**
This product has been tested at low pressure (0.5 bar) and high pressure (12 bar) with satisfactory results.

For correct operation, valves must undergo regular routine checks. The check should include the cleaning of the internal components and inspection of the seal conditions. For more detailed information about the use and maintenance of valves, please check the document called "Unirain ARV: INSTALLATION AND OPERATION MANUAL".

For specific uses, please consult the technical department.

WARRANTY AND EXCLUSIONS

The manufacturer guarantees its products for direct customers against any defects in materials or manufacture for a period of two years from the original date of purchase, when the products have been used under normal operating and service conditions. The manufacturer assumes no liability for installation, removal or repairs carried out by unauthorised personnel.
This warranty is limited to the replacement or repair of defective parts.
The manufacturer does not accept liability for damage to crops or any other consequences damages deriving from defects in the products covered by this warranty.

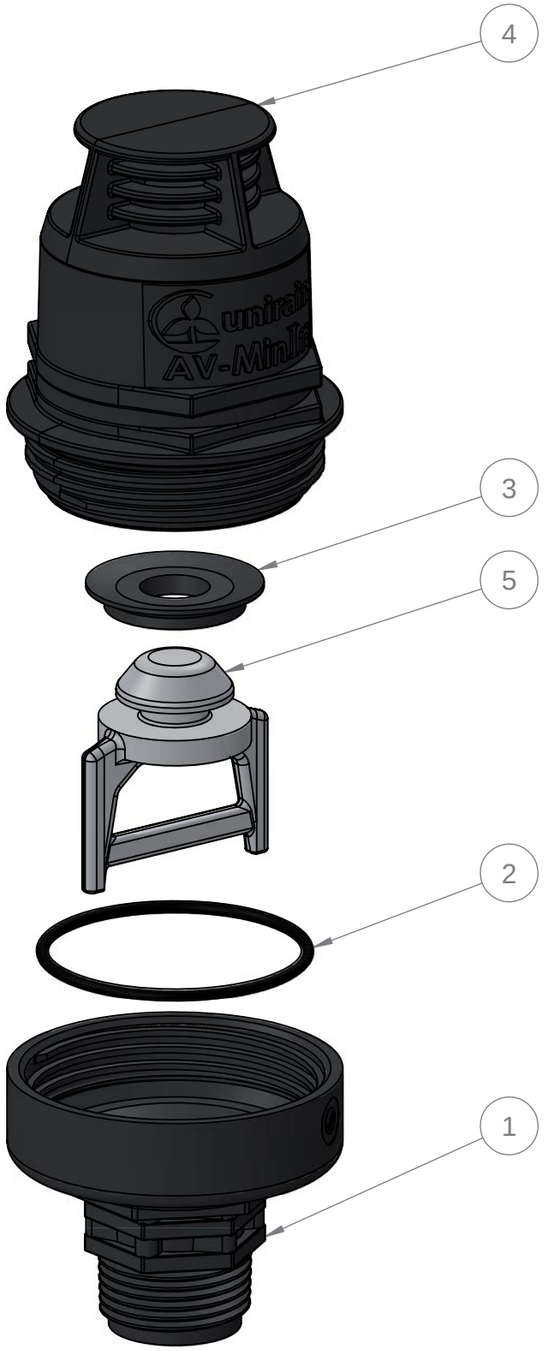
THIS WARRANTY SUPERSEDES AND VOIDS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY OR ANY OTHER ATTRIBUTING LIABILITY TO THE MANUFACTURER.

No agent, employee or representative of the manufacturer is authorised to change, alter or add to the conditions contained in this warranty or to assume liability or make guarantees not specified herein.

UNIRAIN S.A. reserves the right to amend any of the technical features of this product.

ARV - Mini-In

ASSEMBLY



COMPONENT NUMBER	SPARE CODE	DESCRIPTION	MATERIAL	QUANTY
1	----	ARV Mini 3/4" BSP Base	PA6+Fiberglass	1
2	01748	ARV-Mini 43x2 O-Ring	NBR	1
3	01769EPD	ARV 1"-3/4" Main Seal	EPDM	1
4	----	ARV MinIn body	PA6+Fiberglass	1
5	----	Float ARV-MinIn	Expanded PP	1

Notes

Process/Manufacturer: UNIRAIN	Size: A3	Material:	Code: 02334UNI
	Scale: 1:1	Name: ARV-Mini-In	
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UNIRAIN ARV-Kinetic

Kinetic Air Valve

Available with 1" & 3/4" thread

Application

Designed to efficiently extract air trapped in pipes, filters, tanks and other places where unwanted air might cause performance problems.

The release valves are located at the outlet of pipes whose slope varies according to the hydraulic gradient, in areas where pipes are located above ground level, in long pipes with uniform slope, at the input of measuring instruments, the output of reducing valves, in diameter reductions, pumps, filtration systems, and on both sides of a subterranean crossing road.

For correct operation, the valve should always be in a vertical position.
It is recommended to install a manual ball valve under the ARV, in order to make maintenance and repair operations easier without shutting the whole system*.

Advantages

- Owing to a perfect fit, the valve is totally sealed, even at very low pressures.
- With just five parts, it's easy to disassemble for cleaning when needed.
- Its neck features a built-in filter to prevent objects, such as insects and leaves, from getting into the valve through the outlet.
- Due to its exclusive internal design, the float is not dragged up by the air stream, even when air is faster than the speed of sound at the outlet. Only water will shut the valve.

Technical specifications

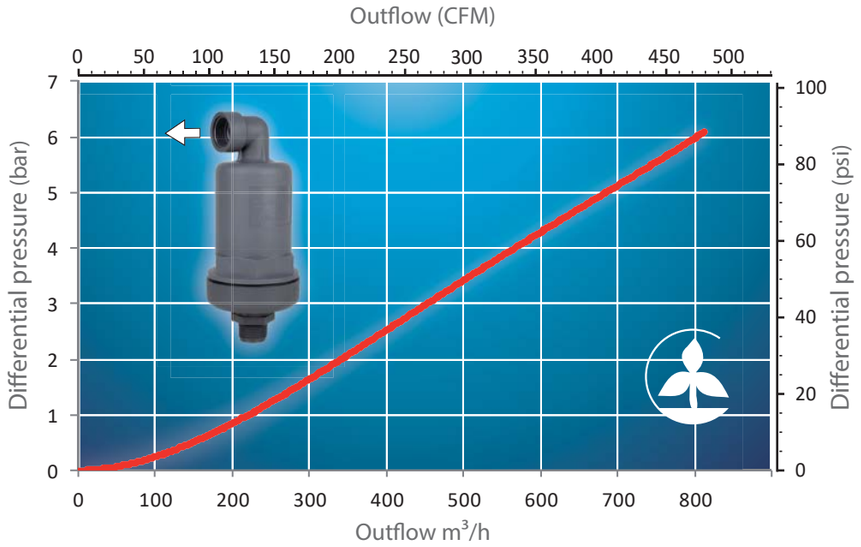
- Kinetic function.
- At least 800 m^3/h (471 CFM) of air released without shutting the valve in the absence of water.
- Released air volume is at least 130 m^3/h (76.5 CFM) at 0.4 bar (5,8 PSI).
- Maximum working pressure 16 bar (232 PSI).
- Body and base made of fibreglass-reinforced polyamide.
- Treated for protection from UV radiation.
- Base available in 1"M and 3/4"M thread.
- Optional BSP or NPT thread.
- 3/4" Female threaded outlet includes filter.

Performance

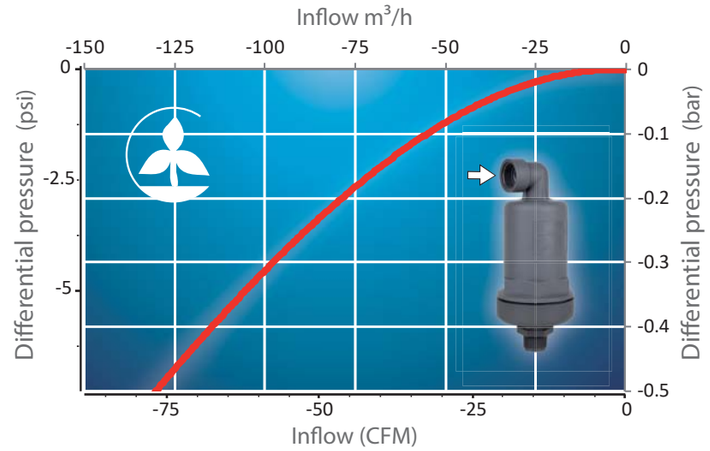
- **Extracts** the air trapped in pipes as they fill. When water reaches the inside of the valve, the float rises, shutting the outlet.
- **Prevents** pipes from collapsing. At the smallest decrease in pressure, the float drops and opens the seal allowing outside air to enter the pipe immediately.

Units Conversion	
FLOW	**PRESSURE**
m^3 / h *(cubic metres per hour)* **l / h** *(litres per hour)* **GPM** *(gallons per minute)* **CFM** *(cubic feet per minute)*	**mWa** *(metres of water column)* **PSI** *(pounds per square inch)*
1 CFM = 1.699 m^3 / h **1 GPM = 227.1192 l / h**	**1 PSI = 0.70307 mWa**

Caudal expulsado



Caudal admitido



Normal Conditiones Flow
(P= 1 atm, T= 293.15 K)

***Normal conditions of use, service and maintenance.**
This product has been tested at low pressure (0.5 bar) and high pressure (16 bar) with satisfactory results.

For correct operation, valves must undergo regular routine checks. The check should include the cleaning of the internal components and inspection of the seal conditions. For more detailed information about the use and maintenance of valves, please check the document called "Unirain ARV: INSTALLATION AND OPERATION MANUAL".

For specific uses, please consult the technical department.

WARRANTY AND EXCLUSIONS

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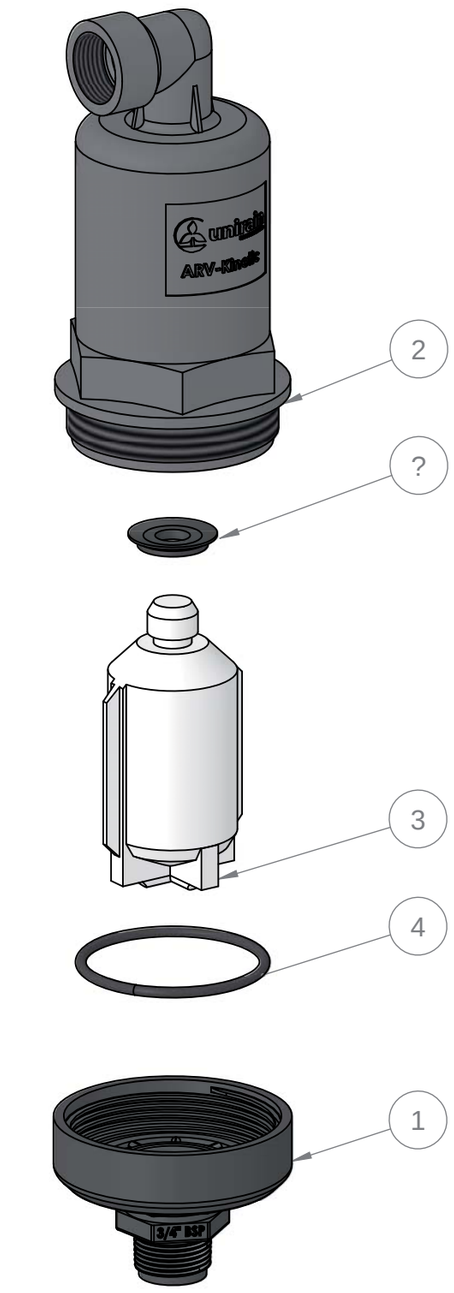
ARV-Kinetic

ASSEMBLY



Plastic base 3/4" BSP / NPT
Plastic base 1" BSP / NPT

COMPONENT NUMBER	SPARE CODE	DESCRIPTION	MATERIAL	QUANTY
1	-----	3/4" BSP Valve Base	PA6 + Fiber Glass	1
2	-----	ARV-Kinetic Valve Body	PA6 + Fiber Glass	1
3	-----	ARV 1"-3/4"K Float	Expanded PP	1
4	01765ANC	NBR	1"-3/4" O-Ring	1
5	01769EPD	ARV 1"-3/4" Main Seal	EPDM	1

Process/Manufacturer UNIRAIN	Size A3	Material	Code ---
	Scale 1:2	Name ARV-Kinectic	
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UNIRAIN ARV-2”-K / K(B)

Kinetic Air Valve

Application

Designed to efficiently extract air trapped in medium-sized pipes, large filters, tanks and other places where the absence of air is required for correct functioning.

The release valves are located at the outlet of pipes whose slope varies according to the hydraulic gradient, in areas where pipes are located above ground level, in long pipes with uniform slope, at the input of measuring instruments, the output of reducing valves, in diameter reductions, pumps, filtration systems, on both sides of a subterranean crossing road.

For correct operation, the valve should always be in a vertical position.
It is recommended to install a manual ball valve under the ARV, in order to make maintenance and repair operations easier without shutting the whole system*.

Advantages

- Owing to a perfect inner finish, the valve is totally sealed even at very low pressures.
- With just five parts, it's very easy to disassemble when it needs to be cleaned.
- Its outlet features a threaded elbow to provide a wider range of connection possibilities, as it's easily detachable, offering a vertical outlet.
- Owing to its exclusive internal design, the air stream will not drag the float up, even when air is faster than the speed of sound at the outlet. Only water will cause the float to rise.

Technical specifications

- Kinetic air valve.
- At least 2000 m^3/h (1177 CFM) of air released without having the valve shut while no water present.
- Released air volume is at least 500 m^3/h (294 CFM) at 0,6 bar (8.7 PSI).
- Maximum working pressure 16 bar (232 PSI).
- Body and base made of fibreglass reinforced polyamide.
- Treated for protection from UV radiation.
- 2"M base thread. Optional base in BSP or NPT & Plastic or Brass ARV-2"-K(B).
- Threaded elbow outlet.

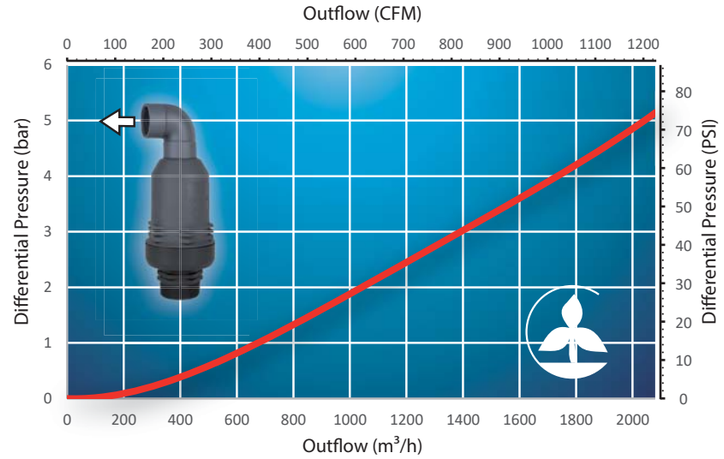
ARV-2”-K **ARV-2”-K(B)**

Performance

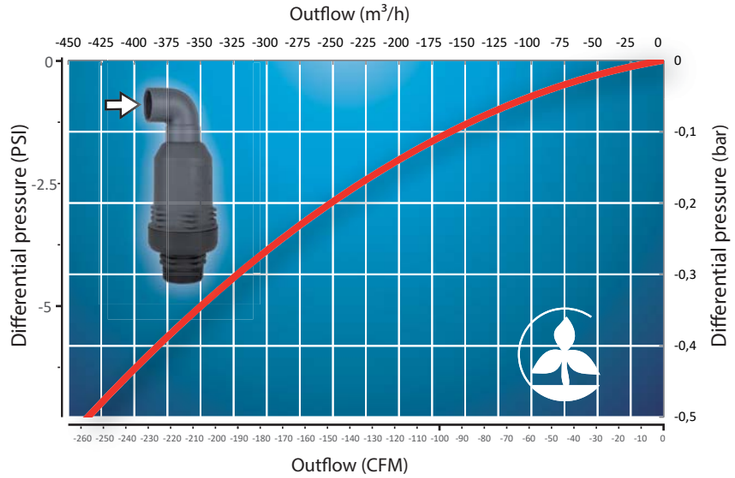
- **Extracts** the air trapped in pipes as they fill. When water reaches the inside of the valve, the float rises, shutting the outlet (KINETIC).
- **Prevents** pipes from collapsing. At the smallest decrease in pressure, the float drops and opens the seal allowing outside air to enter the pipe immediately (AIR VACUUM RELIEF)..

Units Conversion	
FLOW	**PRESSURE**
m^3 / h *(cubic metres per hour)* **l / h** *(litres per hour)* **GPM** *(gallons per minute)* **CFM** *(cubic feet per minute)*	**mWa** *(metres of water column)* **PSI** *(pounds per square inch)*
1 CFM = 1.699 m^3 / h **1 GPM = 227.1192 l / h**	**1 PSI = 0.70307 mWa**

Kinetic Outflow



Kinetic Inflow



***Normal conditions of use, service and maintenance.**
This product has been tested at low pressure (0.5 bar) and high pressure (16 bar) with satisfactory results.

For correct operation, valves must undergo regular routine checks. The check should include the cleaning of the internal components and inspection of the seal conditions. For more detailed information about the use and maintenance of valves, please check the document called “Unirain ARV: INSTALLATION AND OPERATION MANUAL”.

For specific uses, please consult the technical department.

WARRANTY AND EXCLUSIONS

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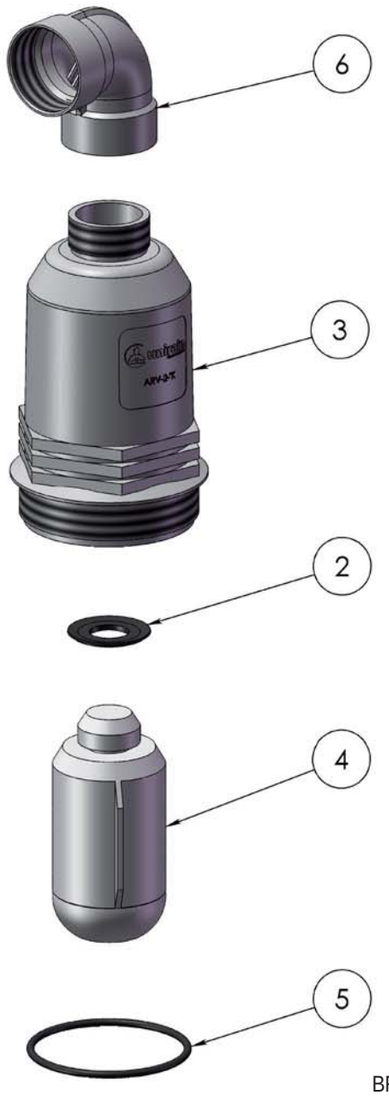
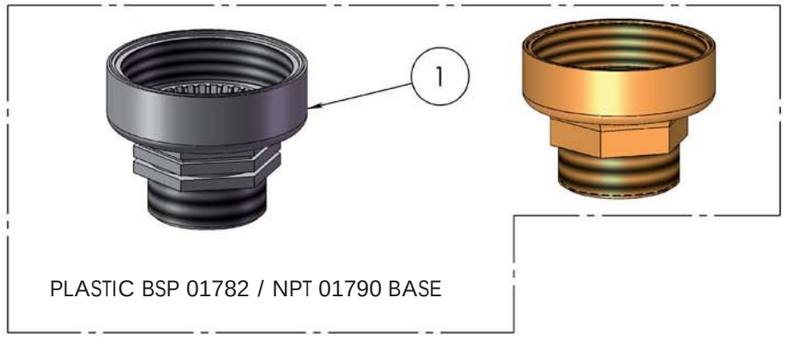
ARV 2” - K

ASSEMBLY



BRASS BSP / NPT BASE 01756



PLASTIC BSP 01782 / NPT 01790 BASE

ELEMENT NO	PART CODE	DESCRIPTION	MATERIAL	QUANTITY
1	01782	2" BSP Valve Base	PA6 + Fiber Glass	1
2	01785	ARV 2" Main Seal	EPDM	1
3	01791	ARV 2"-K Valve Body	PA6 + Fiber Glass	1
4	01793	ARV 2"-K Float	Expanded PP	1
5	01787	2" O-Ring	NBR	1
6	01788	ARV 90 º Elbow	PP + Fiber Glass	1

Notes

Process/Manufacturer	Size	Material	Code
UNIRAIN	A3		02120
	Scale 1:3	Name ARV 2"-K	
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UNIRAIN ARV-2”-K-Compact

Combination Air Valve

Application

Designed to efficiently extract air trapped in medium-sized pipes, large filters, tanks and other places where the absence of air is required for correct functioning.

The release valves are located at the outlet of pipes whose slope varies according to the hydraulic gradient, in areas where pipes are located above ground level, in long pipes with uniform slope, at the input of measuring instruments, the output of reducing valves, in diameter reductions, pumps, filtration systems, on both sides of a subterranean crossing road.

For correct operation, the valve should always be in a vertical position.
It is recommended to install a manual ball valve under the ARV, in order to make maintenance and repair operations easier without shutting the whole system*.

Advantages

- New compact design more sustainable and competitive with similar quality and performance as the rest of our air valves.
- Owing to a perfect inner finish, the valve is totally sealed even at very low pressures.
- With just five parts, it's very easy to disassemble when it needs to be cleaned.
- Its outlet features a threaded elbow to provide a wider range of connection possibilities, as it's easily detachable, offering a vertical outlet.
- Owing to its exclusive internal design, the air stream will not drag the float up, even when air is faster than the speed of sound at the outlet. Only water will cause the float to rise.
- Includes an internal grille in the elbow to prevent foreign bodies from entering the valve.

Technical specifications

- Kinetic air valve.
- At least 1700 m^3/h (1000 CFM) of air released without having the valve shut while no water present.
- Released air volume is at least 260 m^3/h (153 CFM) at 0.4 bar (5.8 PSI).
- Maximum working pressure 16 bar (232 PSI).
- Body and base made of fibreglass reinforced polyamide.
- Treated for protection from UV radiation.
- 2"M base thread. Optional base in BSP or NPT thread.
- 1-1/4" F threaded outlet with grille.

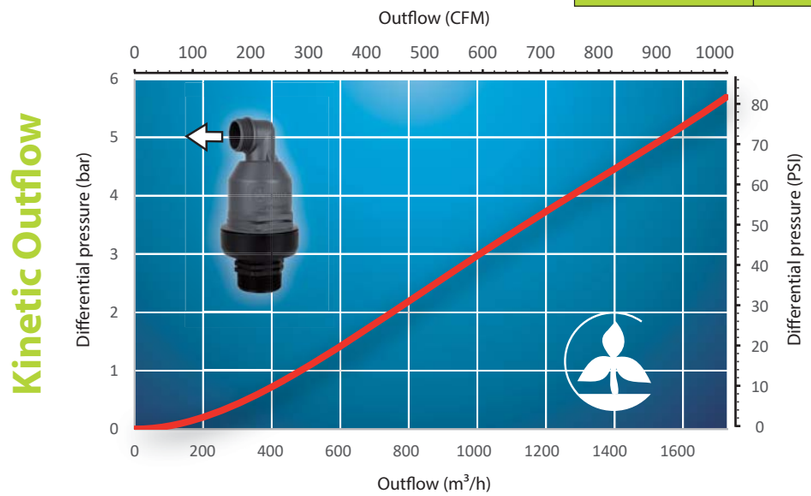
ARV-2”-K-Compact

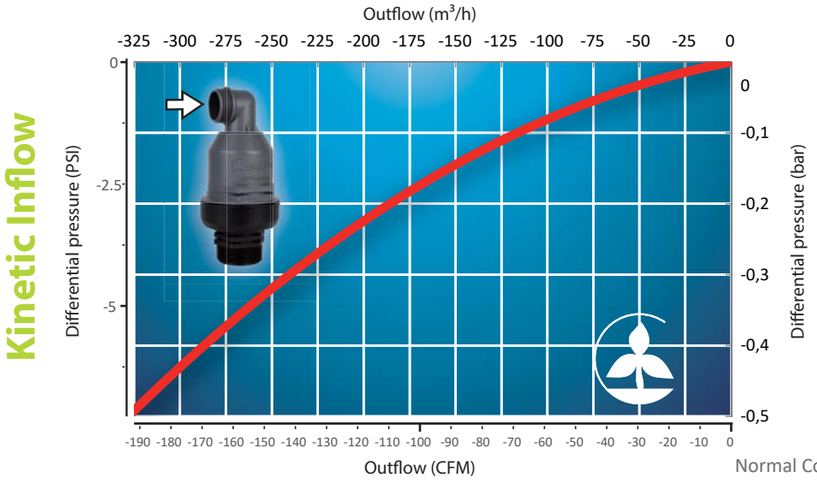
Performance

- **Extracts** the air trapped in pipes as they fill. When water reaches the inside of the valve, the float rises, shutting the outlet (KINETIC).
- **Prevents** pipes from collapsing. At the smallest decrease in pressure, the float drops and opens the seal allowing outside air to enter the pipe immediately (AIR VACUUM RELIEF).

ARV-2”-K DATA SHEET Versión 01
The current final version will always be published on the official Unirain website www.unirain.com

Units Conversion	
FLOW	**PRESSURE**
m^3 / h *(cubic metres per hour)* **l / h** *(litres per hour)* **GPM** *(gallons per minute)* **CFM** *(cubic feet per minute)*	**mWa** *(metres of water column)* **PSI** *(pounds per square inch)*
1 CFM = 1.699 m^3 / h **1 GPM = 227.1192 l / h**	**1 PSI = 0.70307 mWa**





Normal Conditions Flow
(P= 1 atm, T= 293.15 K)

***Normal conditions of use, service and maintenance.**
This product has been tested at low pressure (0.5 bar) and high pressure (16 bar) with satisfactory results.

For correct operation, valves must undergo regular routine checks. The check should include the cleaning of the internal components and inspection of the seal conditions. For more detailed information about the use and maintenance of valves, please check the document called “Unirain ARV: INSTALLATION AND OPERATION MANUAL”.

For specific uses, please consult the technical department.

WARRANTY AND EXCLUSIONS

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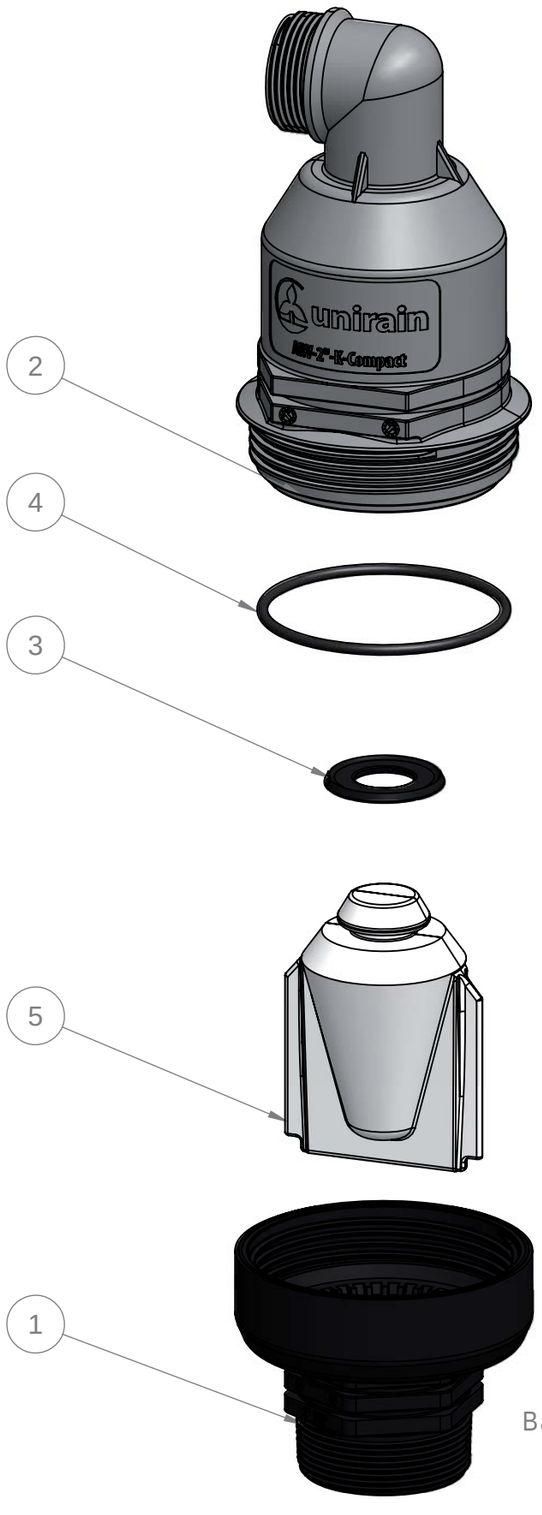
ASSEMBLY



Base ARV 2" DS BSP / NPT

COMPONENT NUMBER	SPARE CODE	DESCRIPTION	MATERIAL	QUANTY
1	01782BDS	ARV-2" (BSP) DS Base	PA6 + Fiber Glass	1
2	01782BDS	ARV 2"-K Compact Gray Valve Body	PA6 + Fiber Glass	1
3	01785SPU	ARV 2" Main Seal SPU	EPDM	1
4	01787DNS	2" DNS O-Ring	NBR	1
5	01793COM	ARV 2"-K-Compact Float	Expanded PP	1

Anotaciones

Process/Manufacturer: UNIRAIN	Size: A3	Material:	Code:
	Scale: 1:2	Name: ARV-2"K-Compact	
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UNIRAIN ARV-Automatic

Automatic Air Valve

Available with in 1" & 3/4" thread

Application

Designed to efficiently extract air trapped in pipes, filters, tanks and other places where unwanted air might cause performance problems.

The air release valves are located at the outlet of pipes whose slope varies according to the hydraulic gradient, in areas where pipes are located above ground level, in long pipes with uniform slope, at the input of measuring instruments, the output of reducing valves, in diameter reductions, pumps, filtration systems, and on both sides of a subterranean crossing road.

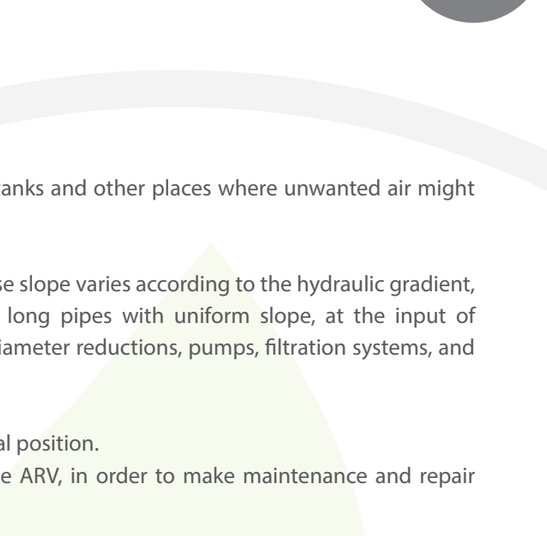
For correct operation, the valve should always be in a vertical position.
It is recommended to install a manual ball valve under the ARV, in order to make maintenance and repair operations easier without shutting the whole system*.

Advantages

- The valve has one seal, which expels both kinetic and residual air automatically, and this function is not affected by water pressure.
- Simple in design, with only 5 parts, it's easy to disassemble for maintenance and cleaning when needed.
- Its exclusive Y-shaped discharge outlet design allows a much greater air flow than other valves of this type, in both the discharge and the intake phases.
- Owing to a perfect fit, the valve is totally sealed, even at very low pressures.
- The body is red, making it easily visible.

Technical specifications

- Continuous and automatic operation.
- At least 136 m^3/h (80 CFM) of air released without shutting the valve in the absence of water
- Released air volume is at least 35 m^3/h (20.6 CFM) at 1bar (14.5 PSI).
- Maximum working pressure 16 bar (232 PSI).
- Body and base made of fibreglass-reinforced polyamide.
- Treated for protection from UV radiation.
- Base available in 1"M and 3/4"M thread.
- Optional BSP or NPT thread.
- Filter included in the base.



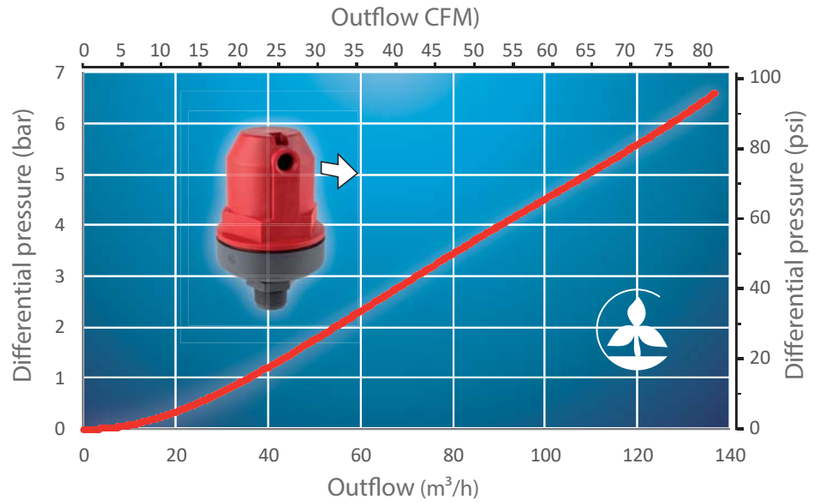
Performance

- **Extracts** air from small pipes as they fill. When water reaches the inside of the valve, the float rises and seals the discharge outlet.
- **Maintains** automatically and continuously its function of eliminating any residual air pockets reaching the valve, as the float immediately drops and the closure outlet is partly or totally opened. Water pressure does not interfere with this function.
- **Prevents** small pipes from collapsing. At the smallest decrease in pressure, the float drops and opens the seal allowing outside air to enter the pipe immediately.

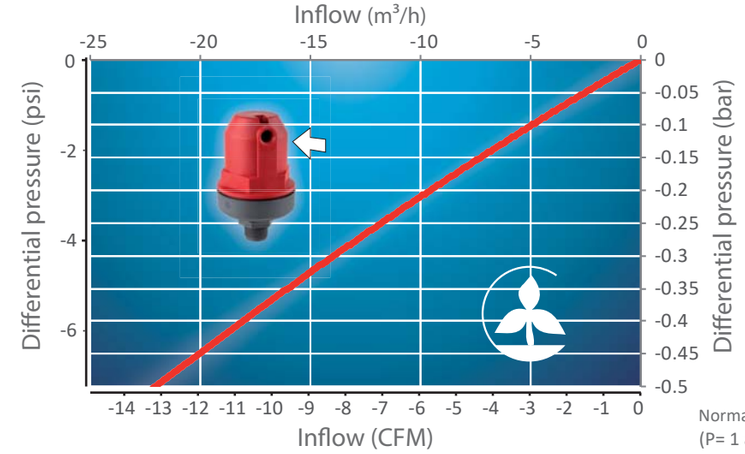
TECHNICAL SHEET 2238

Units Conversion	
FLOW	**PRESSURE**
m^3/h *(cubic metres per hour)* **l / h** *(litres per hour)* **GPM** *(gallons per minute)* **CFM** *(cubic feet per minute)*	**mWa** *(metres of water column)* **PSI** *(pounds per square inch)*
1 CFM = 1.699 m^3/h **1 GPM = 227.1192 l / h**	**1 PSI = 0.70307 mWa**

Outflow



Inflow



Normal Conditiones Flow
(P= 1 atm, T= 293,15 K)

***Normal conditions of use, service and maintenance.**
This product has been tested at low pressure (0.5 bar) and high pressure (16 bar) with satisfactory results.

For correct operation, valves must undergo regular routine checks. The check should include the cleaning of the internal components and inspection of the seal conditions. For more detailed information about the use and maintenance of valves, please check the document called "Unirain ARV: INSTALLATION AND OPERATION MANUAL".

For specific uses, please consult the technical department.

WARRANTY AND EXCLUSIONS

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THIS WARRANTY SUPERSEDES AND VOIDS ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY OR ANY OTHER ATTRIBUTING LIABILITY TO THE MANUFACTURER.

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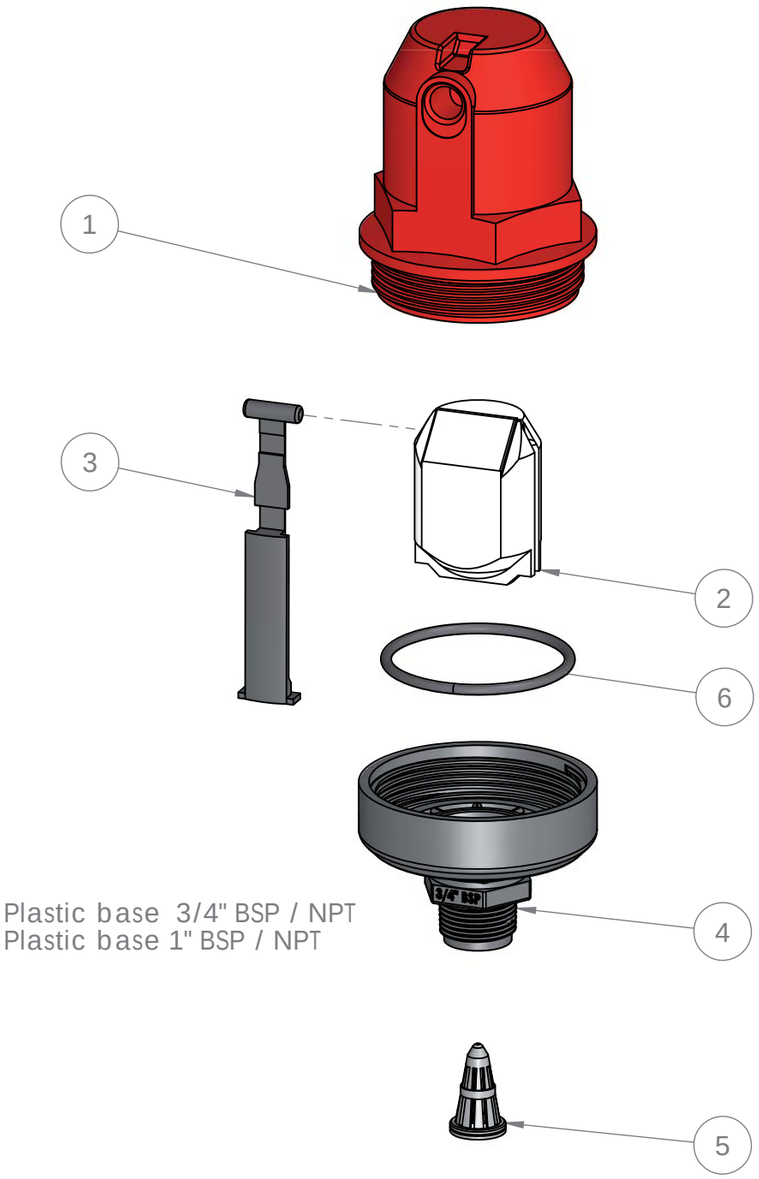
ARV - Automatic

ASSEMBLY



COMPONENT NUMBER	SPARE CODE	DESCRIPTION	MATERIAL	QUANTY
1	----	ARV-Automatic Valve Body	PA6 + Fiber Glass	1
2	----	ARV-Automatic Float	Expanded PP	1
3	01764	ARV-Automatic Seal	EPDM	1
4	----	3/4" BSP Valve Base	PA6 + Fiber Glass	1
5	01752	1"-3/4" Valve base filter	PP	1
6	01765ANC	NBR	1"-3/4" O-Ring	1

Notes

Process/Manufacturer	Size	Material	Code
UNIRAIN	A3		
	Scale 1:2	Name ARV-Automatic	
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UNIRAIN ARV-1”-A(3G)

Automatic Air Release Valve

Application

Designed to efficiently extract air trapped in pipes, filters, tanks and other places where unwanted air might cause performance problems.

The air release valves are located at the outlet of pipes whose slope varies according to the hydraulic gradient, in areas where pipes are located above ground level, in long pipes with uniform slope, at the input of measuring instruments, the output of reducing valves, in diameter reductions, pumps, filtration systems, and on both sides of a subterranean crossing road.

For correct operation, the valve should always be in a vertical position.
It is recommended to install a manual ball valve under the ARV, in order to make maintenance and repair operations easier without shutting the whole system*.

Advantages

- The valve has one seal, which expels both kinetic and residual air automatically, and this function is not affected by water pressure.
- Simple in design, with only 5 parts, it's easy to disassemble for maintenance and cleaning when needed.
- Its exclusive Y-shaped discharge outlet design allows a much greater air flow than other valves of this type, in both the discharge and the intake phases.
- Owing to a perfect fit, the valve is totally sealed, even at very low pressures.
- The base and body are made of nodular cast iron GGG-40 with EPOXY cover, so you get great strength and durability.

Technical specifications

- Continuous and automatic operation.
- At least 70 m3/h (41,2 CFM) of air released without shutting the valve in the absence of water.
- Released air volume is at least 15 m^3/h (8,8 CFM) at 10 mWc (14,2 PSI).
- Maximum working pressure 16 kg/cm^2 (225 PSI).
- Body and base made of ductile iron GGG-40.
- Inner body made of fibreglass-reinforced polyamide.
- Float made of expanded polypropylene and seals made of EPDM.
- Covering of body and base made of baked EPOXY.
- 1"M base thread. Optional base in BSP or NPT thread.
- Fasteners made of stainless steel AISI 304, A2-70 quality.

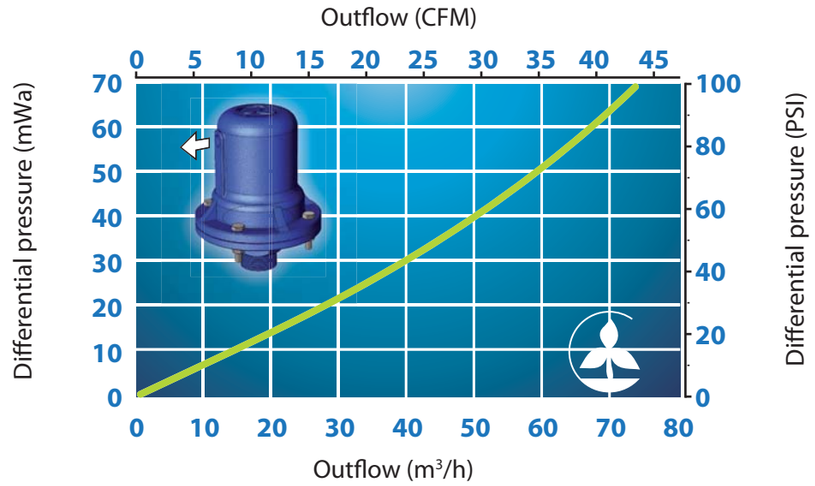
ARV-1”-A (3G)

Performance

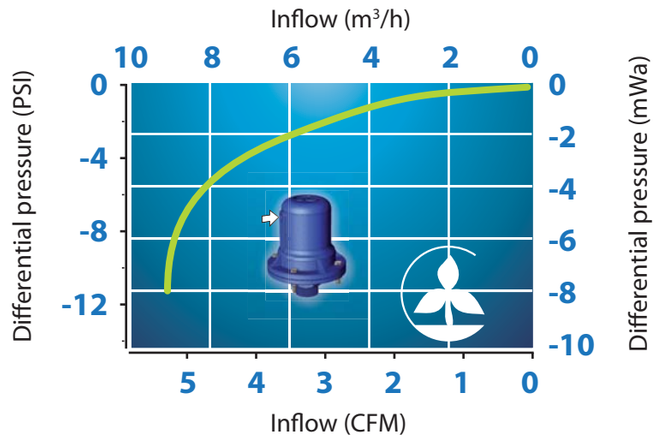
- **Extracts** air from small pipes as they fill. When water reaches the inside of the valve, the float rises and seals the discharge outlet.
- **Maintains** automatically and continuously its function of eliminating any residual air pockets reaching the valve, as the float immediately drops and the closure outlet is partly or totally opened. Water pressure does not interfere with this function.
- **Prevents** pipes from collapsing. At the smallest decrease in pressure, the float drops and opens the seal, allowing outside air to enter the pipe immediately.

Units Conversion	
FLOW	**PRESSURE**
m^3 / h *(cubic metres per hour)* **l / h** *(litres per hour)* **GPM** *(gallons per minute)* **CFM** *(cubic feet per minute)*	**mWa** *(metres of water column)* **PSI** *(pounds per square inch)*
1 CFM = 1.699 m^3/ h **1 GPM = 227.1192 l / h**	**1 PSI = 0.70307 mca**

Outflow



Inflow



***Normal conditions of use, service and maintenance.**
This product has been tested at low pressure (0.5 bar) and high pressure (16 bar) with satisfactory results.

For correct operation, valves must undergo regular routine checks. The check should include the cleaning of the internal components and inspection of the seal conditions. For more detailed information about the use and maintenance of valves, please check the document called “Unirain ARV: INSTALLATION AND OPERATION MANUAL”.

For specific uses, please consult the technical department.

WARRANTY AND EXCLUSIONS

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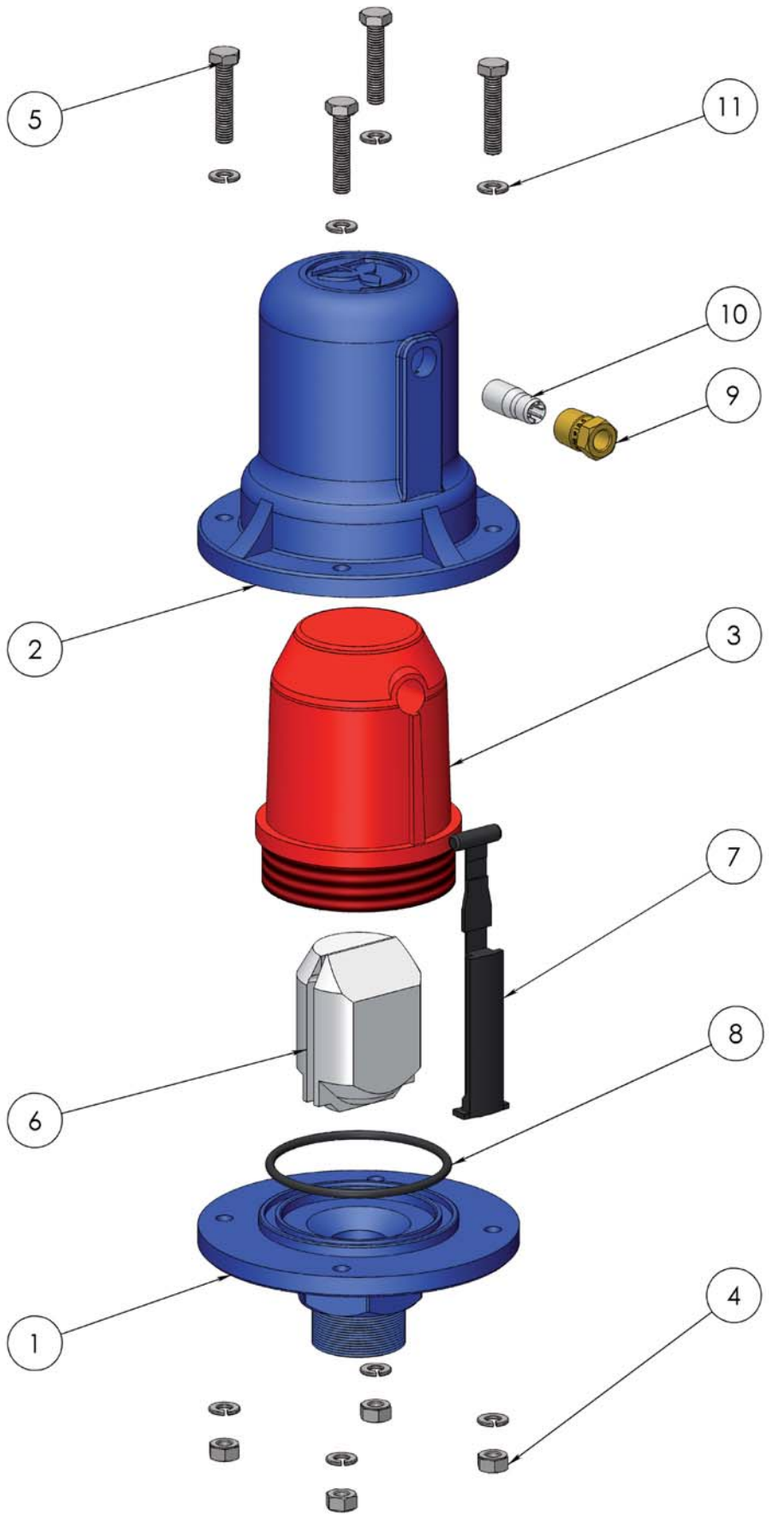
ARV 1” - A (3G)

ASSEMBLY



ELEMENT NO.	PART CODE	MATERIAL	DESCRIPTION	QUANTITY
1	01757BSP / 01757NPT	Nodular Cast Iron GGG-40	ARV 1”-A (3G) BSP/NPT Valve Base	1
2	01754UNI	Nodular Cast Iron GGG-40	ARV 1”-A (3G) Valve Body	1
3	01761MEC	PA6 + Fiber Glass	ARV 1”-A Valve Body	1
4	01776	Stainless Steel	DIN 934-M6 Hex Nut A2-70 Quality	4
5	01775	Stainless Steel	DIN 933-M6 Screw A2-70 Quality	4
6	01763	Expanded PP	ARV 1”-A Float	1
7	01764	EPDM	ARV 1”-A Seal	1
8	01765	NBR	1”O-Ring	1
9	---	Brass	Optional Nozzle	1
10	---	Polyoxymethylene (POM)	Optianal Vane	1
11	01777	Stainless Steel	DIN-125 M6 Washer	8

Notes

Process/Manufacturer	Size	Material	Code
UNIRAIN	A3		06010
	Scale 1:2	Name ARV 1"-A (3G)	
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UNIRAIN ARV-Kinetic Automatic

Combinatiom Air Valve

Available with 1" & 3/4" thread

Application

Valve designed to extract air from pipes, large filters, tanks or any other similar equipment which must work without the presence of air.

The air release valves are located at the outlet of pipes whose slope varies according to the hydraulic gradient, in areas where pipes are located above ground level, in long pipes with uniform slope, at the input of measuring instruments, the output of reducing valves, in diameter reductions, pumps, filtration systems, on both sides of a subterranean crossing road.

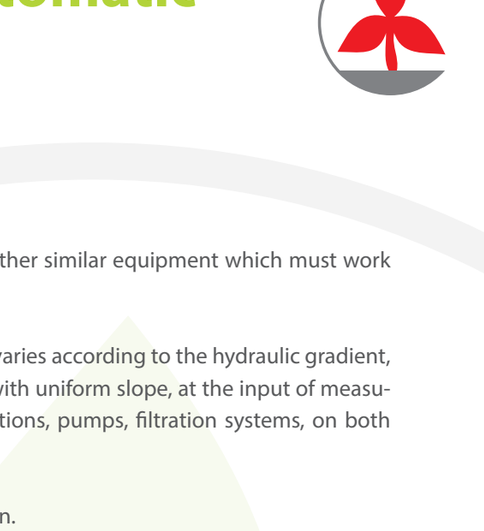
For correct operation, the valve should always be in a vertical position.
It is recommended to install a manual ball valve under the ARV, in order to make maintenance and repair operations easier without shutting the whole system*.

Advantages

- An exclusive double seal system, together with a low density float for kinetic function and automatic control, make the valve completely watertight when the pipe is being pressurized or emptied, no matter how slowly these operations are carried out.
- Its new inner design gets the float to resist the air stream even when the flow velocity is faster than the speed of sound at the outlet. The valve will only shut by the action of water.
- Its outlet elbow features an internal filter to prevent debris from entering inside the valve.

Technical specifications

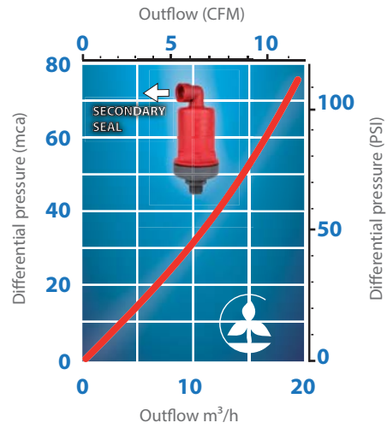
- Combination air valve.
- At least 800 m^3/h (471 CFM) of air released without having the valve shut while no water present.
- Released air volume is at least 130 m^3/h (76.5 CFM) at 0.4 bar (5.8 PSI).
- Maximum working pressure 16 bar (232 PSI).
- Body and base made of fibreglass reinforced polyamide.
- Treated for protection from UV radiation.
- Base available in 1"M and 3/4"M thread.
- Optional BSP or NPT thread.
- 3/4" Female threaded outlet includes filter.



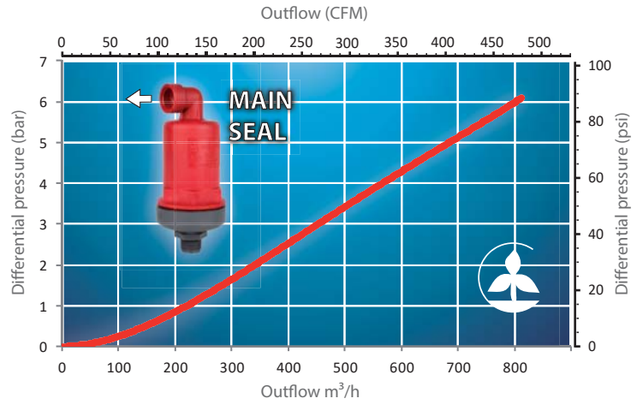
Performance

- **Extracts** air from pipes as they fill. When water reaches the inside of the valve, the float rises and seals the discharge outlet (KINETIC).
- **Maintains** automatically and continuously its function of eliminating any residual air pockets reaching the valve, as the float immediately drops and the closure outlet is partly or totally opened. Water pressure does not interfere with this function (AUTOMATIC).
- **Prevents** pipes from collapsing. At the smallest decrease in pressure, the float drops and opens the seal allowing outside air to enter the pipe immediately (AIR VACUUM RELIEF).

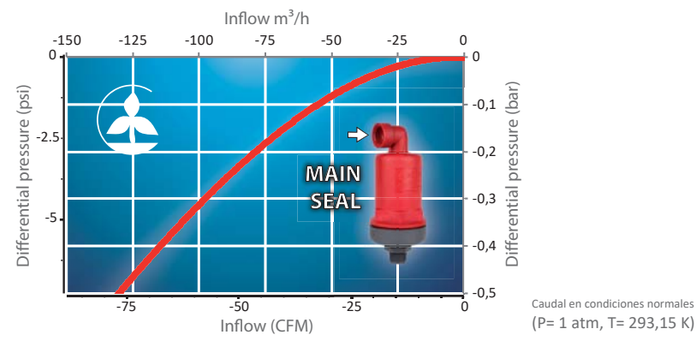
Auomatic Outflow



Outflow



Inflow



Units Conversion	
FLOW	**PRESSURE**
m^3 / h *(cubic metres per hour)* **l / h** *(litres per hour)* **GPM** *(gallons per minute)* **CFM** *(cubic feet per minute)*	**mWc** *(metres of water column)* **PSI** *(pounds per square inch)*
1 CFM = 1.699 m^3 / h **1 GPM = 227.1192 l / h**	**1 PSI = 0.70307 mWc**

***Normal conditions of use, service and maintenance.**
This product has been tested at low pressure (0.5 bar) and high pressure (16 bar) with satisfactory results.

For correct operation, valves must undergo regular routine checks. The check should include the cleaning of the internal components and inspection of the seal conditions. For more detailed information about the use and maintenance of valves, please check the document called "Unirain ARV: INSTALLATION AND OPERATION MANUAL".

For specific uses, please consult the technical department.

WARRANTY AND EXCLUSIONS

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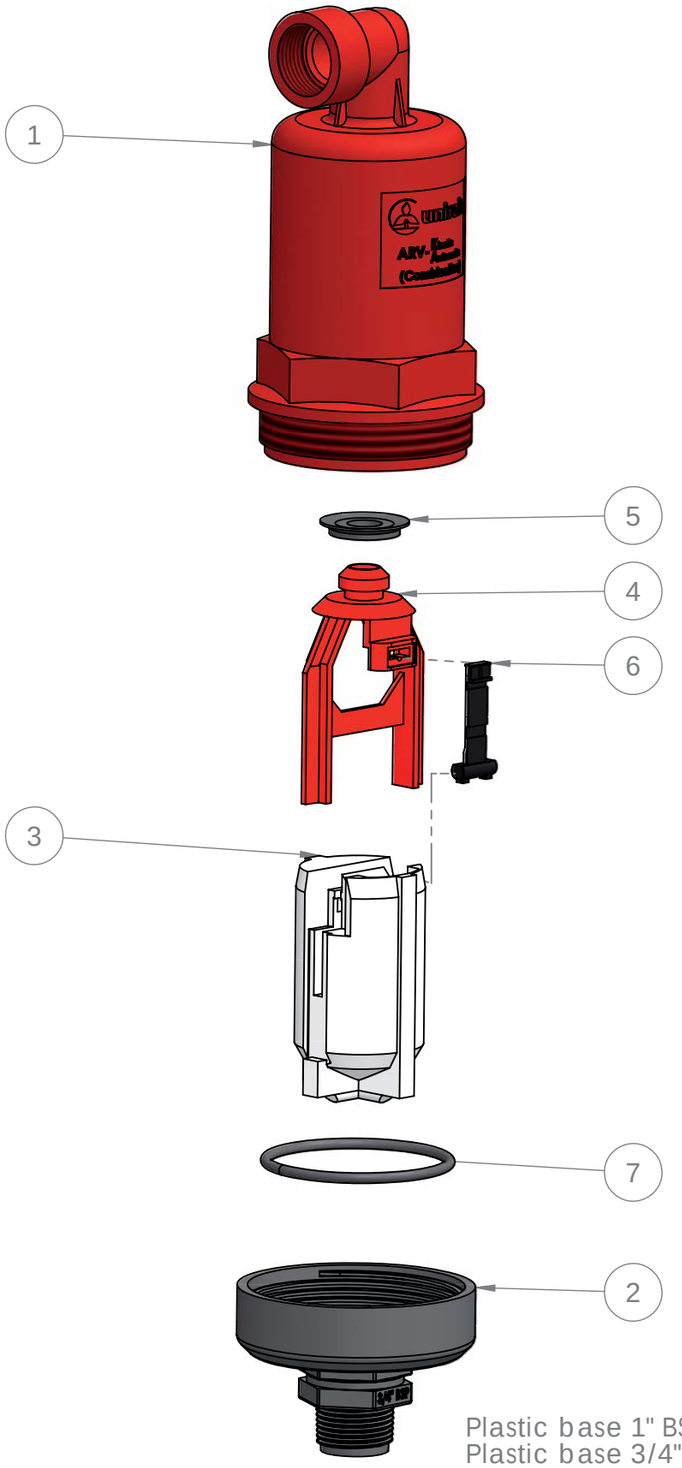
ARV
Kinetic Automatic

ASSEMBLY



COMPONENT NUMBER	SPARE CODE	DESCRIPTION	MATERIAL	QUANTY
1	---	ARV- Kinetic Automatic Body	PA6+Fiber Glass	1
2	---	3/4" BSP Valve Base	PA6 + Fiber Glass	1
3	---	ARV 1"-3/4" KA Float	Expanded PP	1
4	---	ARV 1"-3/4" KA Yoke	PA6+Fiber Glass	1
5	01769EPD	ARV 1"-3/4" Main Seal	EPDM	1
6	01786	ARV KA Secondary Seal	EPDM	1
7	01765ANC	NBR	1"-3/4" O-Ring	1

Process/Manufacturer UNIRIAN	Size A3	Material	Code ---
	Scale 1:2	Name ARV-Kinetic Automatic (Combination)	
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UNIRAIN ARV-2”-KA / KA(B)

Combination Air Valve

Application

Valve designed to extract air from pipes, large filters, tanks or any other similar equipment which must work without the presence of air.

The air release valves are located at the outlet of pipes whose slope varies according to the hydraulic gradient, in areas where pipes are located above ground level, in long pipes with uniform slope, at the input of measuring instruments, the output of reducing valves, in diameter reductions, pumps, filtration systems, and on both sides of a subterranean crossing road.

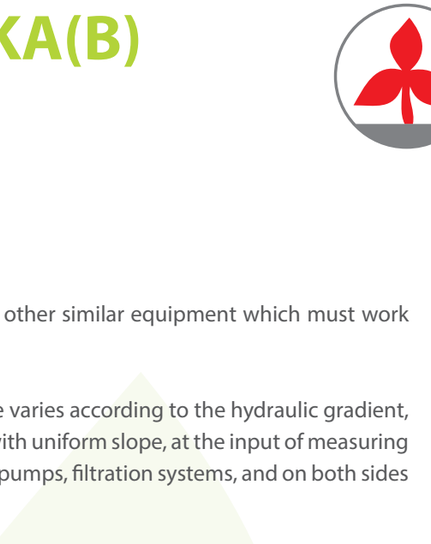
For correct operation, the valve should always be in a vertical position.
It is recommended to install a manual ball valve under the ARV, in order to make maintenance and repair operations easier without shutting the whole system*.

Advantages

- Its exclusive independent double seal system, one for kinetic function and the other for automatic function, as well as the low density of its float, make the valve completely watertight when the pipe is being pressurized or emptied, no matter how slowly these operations are carried out.
- Its new inner design allows the float to resist the air stream even when the flow velocity is faster than the speed of sound at the outlet. The valve will only shut by the action of water.
- Includes an internal grille in the elbow to prevent foreign bodies from entering the valve.

Technical specifications

- Combintaion air valve.
- At least 2000 m^3/h (1177 CFM) of air released without having the valve shut while no water present.
- Released air volume is at least 450m^3/h (265 CFM) at 0,6 bar (8,7 PSI).
- Maximum working pressure 16 bar (232 PSI).
- Body and base made of fibreglass reinforced polyamide.
- Treated for protection from UV radiation.
- 2"M base thread. Optional base in BSP or NPT & Plastic or Brass ARV-2"-KA(B).
- 1-1/4" F threaded outlet with grille.

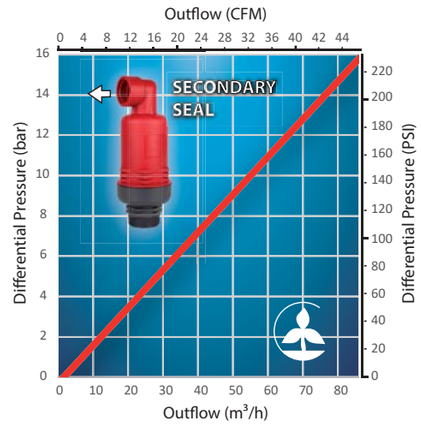


ARV-2”-KA **ARV-2”-KA(B)**

Performance

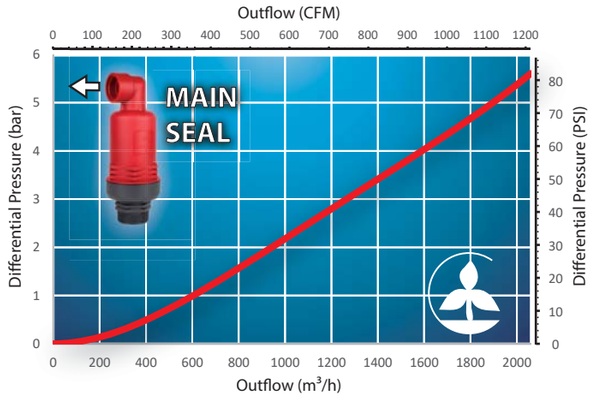
- **Extracts** air from pipes as they fill. When water reaches the inside of the valve, the float rises and seals the discharge outlet (KINETIC).
- **Maintains** automatically and continuously its function ofeliminating any residual air pockets reaching the valve, as the float immediately drops and the closure outlet is partly or totally opened. Water pressure does not interfere with this function (AUTOMATIC).
- **Prevents** pipes from collapsing. At the smallest decrease in pressure, the float drops and opens the seal allowing outside air to enter the pipe immediately (AIR VACUUM RELIEF).

Outflow



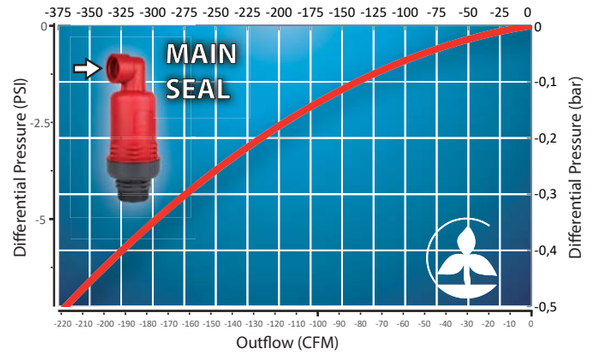
Units Conversion	
FLOW	**PRESSURE**
m^3 / h *(cubic metres per hour)* **l / h** *(litres per hour)* **GPM** *(gallons per minute)* **CFM** *(cubic feet per minute)*	**mWa** *(metres of water column)* **PSI** *(pounds per square inch)*
1 CFM = 1.699 m^3 / h **1 GPM = 227.1192 l / h**	**1 PSI = 0.70307 mWa**

Outflow



Outflow (m^3/h)

Inflow



***Normal conditions of use, service and maintenance.**
This product has been tested at low pressure (0.5 bar) and high pressure (16 bar) with satisfactory results.

For correct operation, valves must undergo regular routine checks. The check should include the cleaning of the internal components and inspection of the seal conditions. For more detailed information about the use and maintenance of valves, please check the document called “Unirain ARV: INSTALLATION AND OPERATION MANUAL”.

For specific uses, please consult the technical department.

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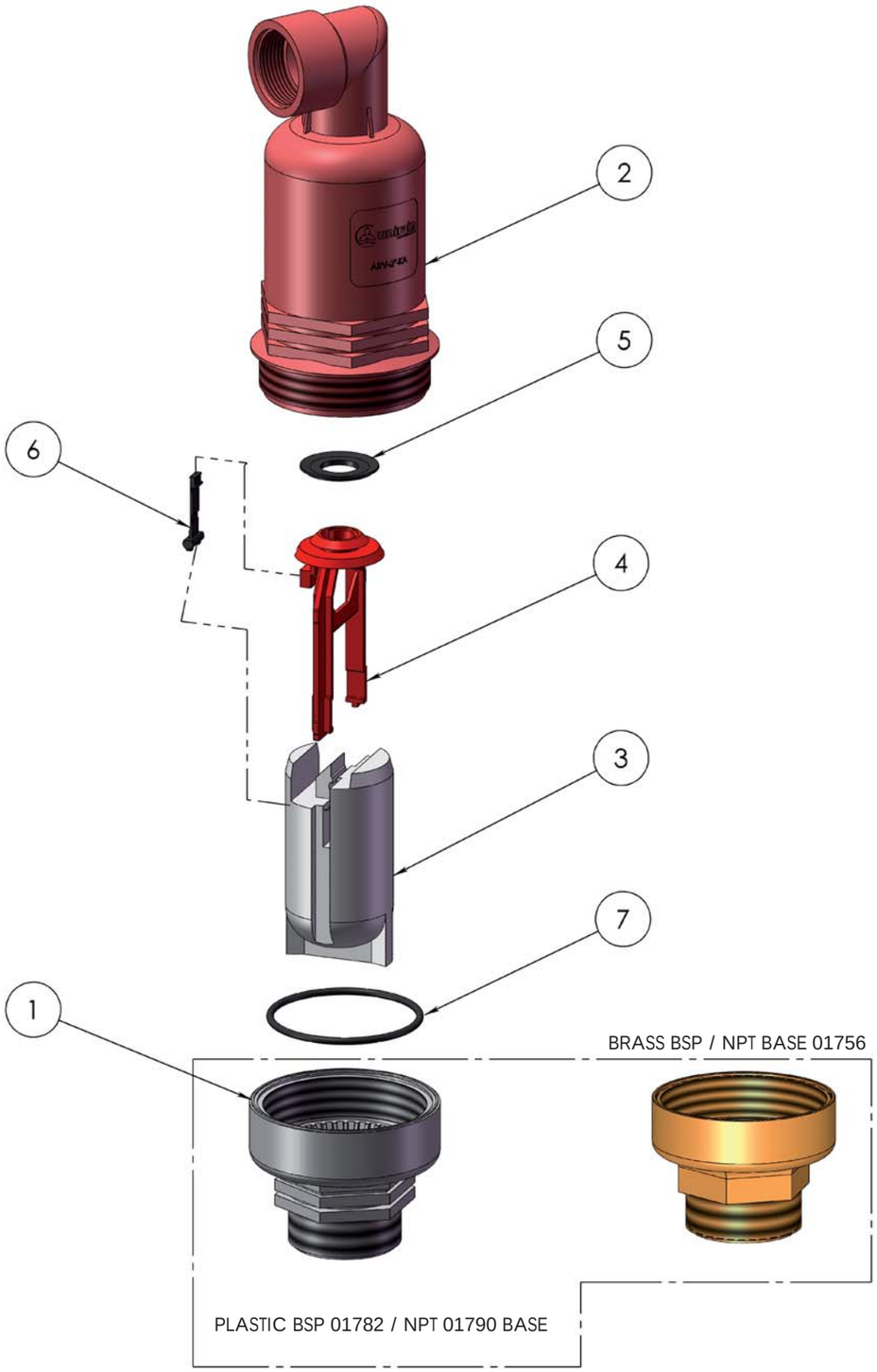
ARV 2” - KA

ASSEMBLY



ELEMENT NO	PART CODE	DESCRIPTION	MATERIAL	QUANTITY
1	01782	2" BSP Valve Base	PA6 + Fiber Glass	1
2	01781	2"-KA Valve Body	PA6 + Fiber Glass	1
3	01783	2"-KA Float	Expanded PP	1
4	01784	ARV 2"-KA Yoke	PA6 + Fiber Glass	1
5	01785	ARV 2" Main Seal	EPDM	1
6	01786	ARV KA Secondary Seal	EPDM	1
7	01787	2" O-Ring	NBR	1

Notes

Process/Manufacturer	Size	Material	Code
UNIRAIN	A3		02020
	Scale 1:3	Name ARV 2"-KA	
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	J.N.E.		

UNIRAIN ARV-2”-KA-Compact

Combination Air Valve

Application

Valve designed to extract air from pipes, large filters, tanks or any other similar equipment which must work without the presence of air.

The air release valves are located at the outlet of pipes whose slope varies according to the hydraulic gradient, in areas where pipes are located above ground level, in long pipes with uniform slope, at the input of measuring instruments, the output of reducing valves, in diameter reductions, pumps, filtration systems, and on both sides of a subterranean crossing road.

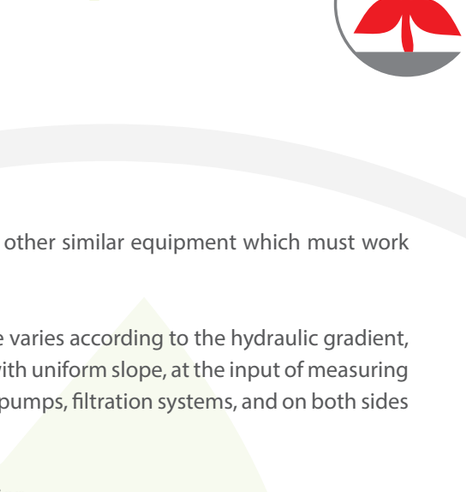
For correct operation, the valve should always be in a vertical position.
It is recommended to install a manual ball valve under the ARV, in order to make maintenance and repair operations easier without shutting the whole system*.

Advantages

- New compact design more sustainable and competitive with similar quality and performance as the rest of our air valves.
- Its exclusive independent double seal system, one for kinetic function and the other for automatic function, as well as the low density of its float, make the valve completely watertight when the pipe is being pressurized or emptied, no matter how slowly these operations are carried out.
- Its new inner design allows the float to resist the air stream even when the flow velocity is faster than the speed of sound at the outlet. The valve will only shut by the action of water.
- Includes an internal grille in the elbow to prevent foreign bodies from entering the valve.

Technical specifications

- Combination air valve.
- At least 1800 m^3/h (1060 CFM) of air released without having the valve shut while no water present.
- Released air volume is at least 400 m^3/h (235 CFM) at 0.6 bar (8 PSI).
- Maximum working pressure 16 bar (232 PSI).
- Body and base made of fibreglass reinforced polyamide.
- Treated for protection from UV radiation.
- 2"M base thread. Optional base in BSP or NPT thread.
- 1-1/4" F threaded outlet with grille.

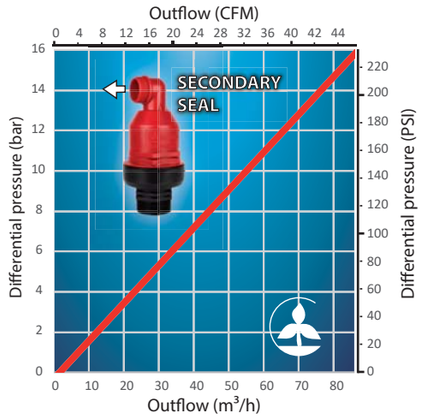


ARV-2”-KA-Compact

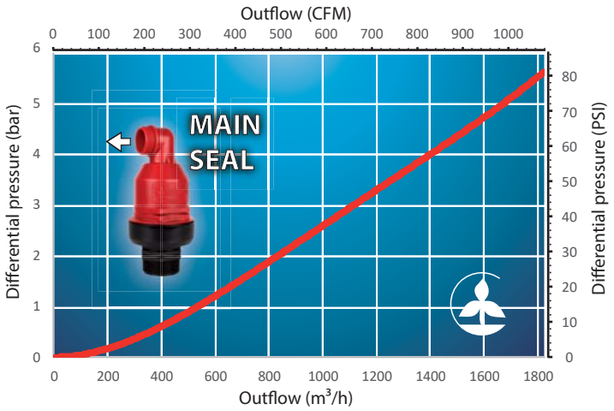
Performance

- **Extracts** air from pipes as they fill. When water reaches the inside of the valve, the float rises and seals the discharge outlet (KINETIC).
- **Maintains** automatically and continuously its function of eliminating any residual air pockets reaching the valve, as the float immediately drops and the closure outlet is partly or totally opened. Water pressure does not interfere with this function (AUTOMATIC).
- **Introduces** air into the pipes to prevent collapse. At the smallest decrease in pressure, the float drops and opens the seal allowing outside air to enter the pipe immediately (AIR VACCUM RELIEF).

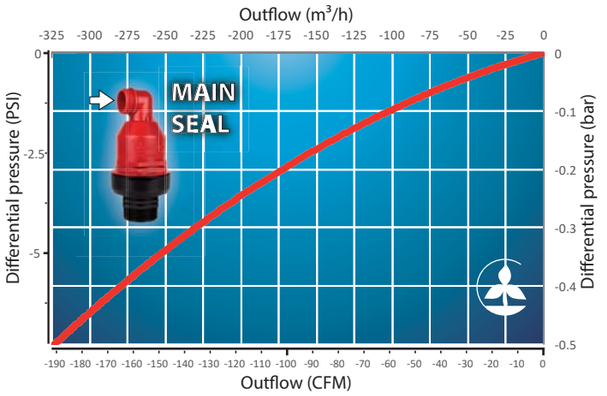
Automatic Outflow



Kinetic Outflow



Kinetic Inflow



Units Conversion	
FLOW	**PRESSURE**
m^3 / h *(cubic metres per hour)* **l / h** *(litres per hour)* **GPM** *(gallons per minute)* **CFM** *(cubic feet per minute)*	**mWa** *(metres of water column)* **PSI** *(pounds per square inch)*
1 CFM = 1.699 m^3 / h **1 GPM = 227.1192 l / h**	**1 PSI = 0.70307 mWa**

Normal Conditions Flow
(P= 1 atm, T= 293.15 K)

***Normal conditions of use, service and maintenance.**
This product has been tested at low pressure (0.5 bar) and high pressure (16 bar) with satisfactory results.

For correct operation, valves must undergo regular routine checks. The check should include the cleaning of the internal components and inspection of the seal conditions. For more detailed information about the use and maintenance of valves, please check the document called “Unirain ARV: INSTALLATION AND OPERATION MANUAL”.

For specific uses, please consult the technical department.

WARRANTY AND EXCLUSIONS

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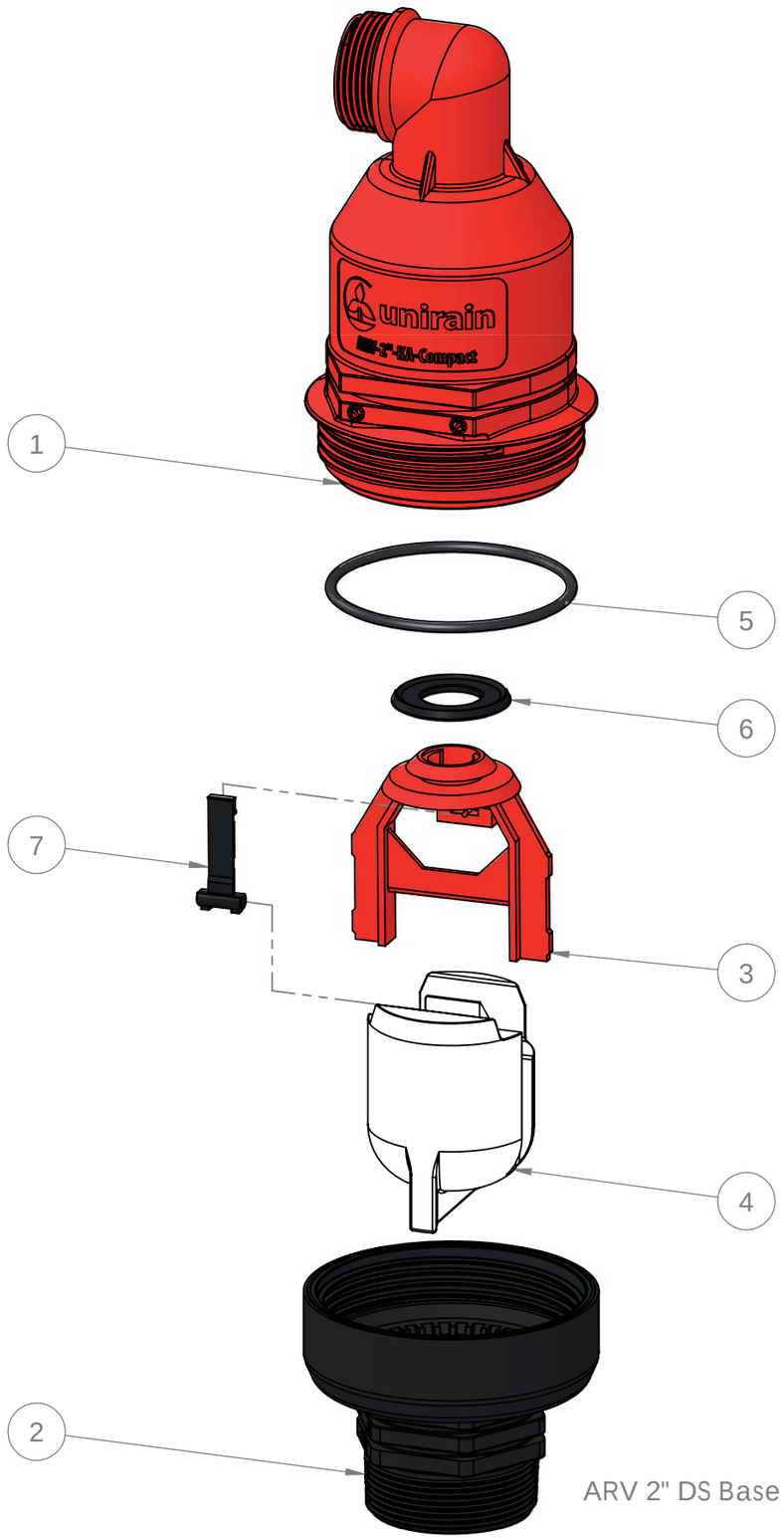
UNIRAIN S.A. reserves the right to amend any of the technical features of this product.

ASSEMBLY



ARV 2" DS Base BSP / NPT

COMPONENT NUMBER	SPARE CODE	DESCRIPTION	MATERIAL	QUANTY
1	----	ARV-2"-KA Compact Valve Body	PA6 + Fiber Glass	1
2	----	ARV-2" (BSP) DS Base	PA6 + Fiber Glass	1
3	----	ARV-2"-KA-Compact Yoke	PA6 + Fiber Glass	1
4	----	ARV 2"-KA-Compact Float	PA6 + Fiber Glass	1
5	01787DNS	2" DNS O-Ring	NBR	1
6	01785SPU	ARV 2" Main Seal SPU	EPDM	1
7	01786	ARV KA Secondary Seal	EPDM	1

Process/Manufacturer	Size	Material	Code
UNIRAIN	A3		
	Scale 1:2	Name ARV-2"-KA-Compact	
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UNIRAIN ARV-Ø-(3G)-FL

Metal flanged Air Release Valve with double or triple acting

Application

The Air Release Valves (ARV) are used for extraction and intake of air in pipes, avoiding breakages due to the overpressure and depression. The ARV-Ø-(3G)-FL is designed only for clean water in systems with flanged assemblies. Suitable for a wide range of pipe depending on diameter 200-800 mm (see table).

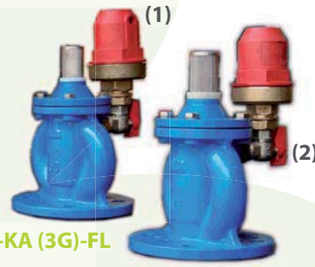
Advantages

- Virtually maintenance free, works automatically.
- The air filter (4) prevents the penetration of foreign bodies and small animals that can nest in the closing hole.
- Easy to clean. The triple acting valve incorporates a small purge valve. In case of obstruction by dirt in the 1 " purge valve (1), the procedure is simple: close the stopcock (2), remove small valve, clean and assemble it again. Turn the stopcock (2) to the vertical position. Clean the big valve while the purge valve is disassembled and the stopcock is closed.
- There are no variations in performance thanks to the interaction between the ball of polypropylene (hard material) and the dome of vulcanized neoprene (soft material) at closing. Perfect closed position due to the contact between spherical-conical surfaces.

Technical specificacions

- Kinetic and automatic (optional) operation.
- Minimum evacuation (according to model): **Ø50=** 441 CFM, **Ø65 =** 441 CFM, **Ø80 =** 500 CFM, **Ø100 =** 588 CFM liters of air without causing the closure of the valve (while no water present).
- Maximum working pressure for TRIPLE ACTING Valve: 225 PSI.
- Maximum working pressure for DOUBLE ACTING Valve: 355 PSI.
- Body and dome made of nodular cast iron GGG-40 with EPOXY cover.
- Flange for assembly and installation.
- Output with filter and screws made of stainless steel AISI 304.
- Purge valve with a body made of polyamide reinforced with fiberglass and brass base.
- Stopcock made of chrome plated brass with sphere closure.

(1)



(2)

ARV-Ø50-KA (3G)-FL

ARV-Ø65-KA (3G)-FL

(4)

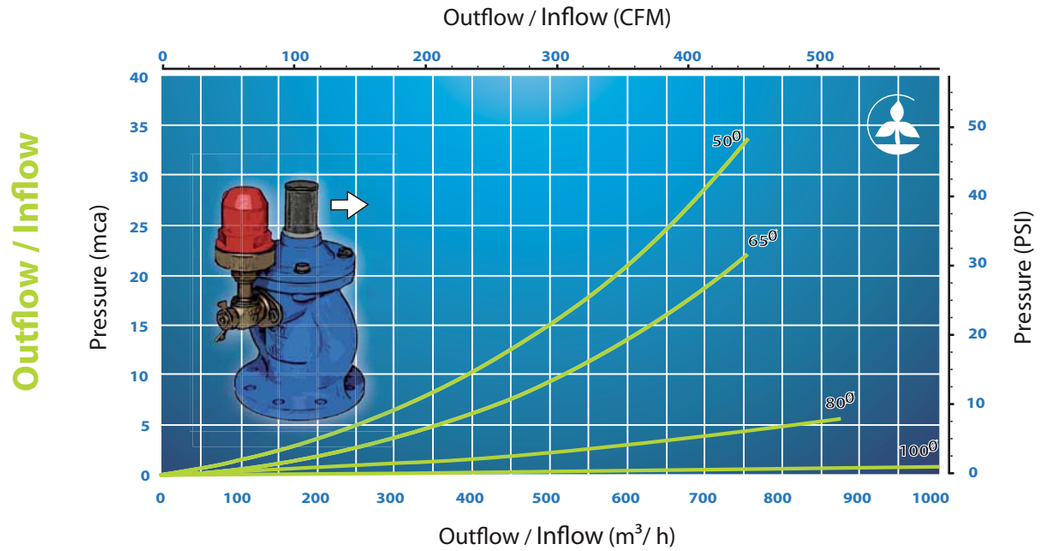
ARV-Ø80-KA (3G)-FL

ARV-Ø100-KA (3G)-FL

Performance

- It **extracts** the air from pipes as they fill. This stage ends when water reaches the inside of the valve, raising the float and closing the main discharge outlet.
- Using the purge valve, the ARV exerts continuous **automatic control**, eliminating any residual pocket of air that might reach the valve, as when it happens, the float drops partially or totally and opens the discharge outlet. Water pressure will not prevent this function from being carried out.
- It **prevents** pipe collapse. At the least decrease in pressure, the float drops and opens the main seal, allowing outside air to enter in the pipe.

Units Conversion	
FLOW	**PRESSURE**
m³ / h *(metro cúbico por hora)* **l / h** *(litro por hora)* **GPM** *(Gallons per Minute)* **CFM** *(Cubic Feet per Minute)*	**mca** *(metro de columna de agua)* **PSI** *(Pounds per Square Inch)*
1 CFM = 1.699 m³ / h **1 GPM = 227.1192 l / h**	**1 PSI = 0.70307 mca**



Vertical axis: differential pressure (psi).
Horizontal axis: Air flow evicted.
Absolute values of pressure and flow.

UTILIZATION CRITERIA

Pipe diameter	Valve type
200-250	Ø50
250-300	Ø65
300-450	Ø80
450-800	Ø100

Diameter of pipes and valves in mm.

***Normal use, service and maintenance conditions.**
This product has been tested at low pressure (8 psi) and high pressure (225 psi) with satisfactory results.

For the correct running of valves they must be regularly checked. The checking should include the cleaning of the internal components and a control of the seal conditions. For more detailed information about use and maintenance of valves, please check the document called “Unirain ARV: INSTALLATION AND OPERATION”.

For specific uses, please check the technical department.

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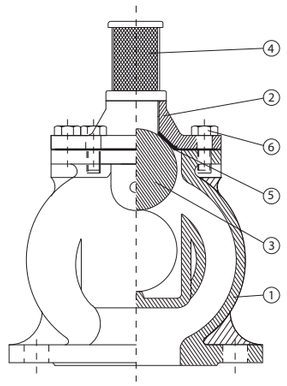
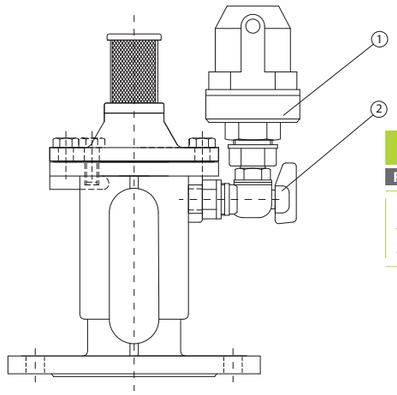
ARV-Ø-KA (3G)-FL

ASSEMBLY

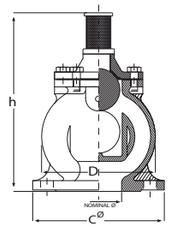
AIR RELEASE VALVES DN 50-65

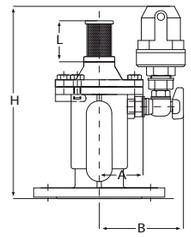


DOBLE ACTING		
Ref	Description	Material
1	BODY	Nod Cast Iron GGG-40
2	DOME	Nod Cast Iron GGG-40
3	CLOSURE BALL	Polypropylene d=0.9
4	AIR FILTER	Stainless steel mesh
5	VULCANIZED	Neoprene 65º Shore
6	SCREWS	Stainless steel



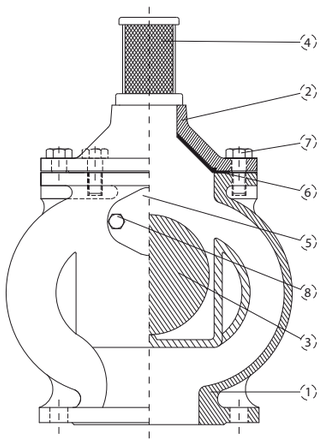
TRIPLE ACTING		
Ref	Description	Material
1	PURGE VALVE 1"	Polyamide+Fibrer Glass METALIC BASE (brass)
2	STOPCOCK	Chrome-plated brass



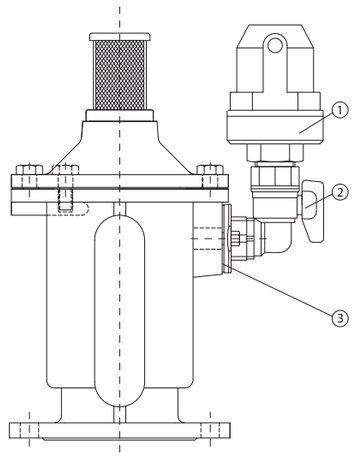


General Dimensions				DOBLE ACTING			TRIPLE ACTING		
Ø NOMINAL	C Ø	D	L	h	A	WEIGHT (Kg)	H	B	WEIGHT (Kg)
40	150	125	40	200	51	4	---	---	-
50	165	160	50	235	54	6	285	123	7
65	185	170	60	260	56	8	295	130	9
80	200	214	72	325	81	13	340	155	15
100	220	291	72	395	108	23	395	180	25

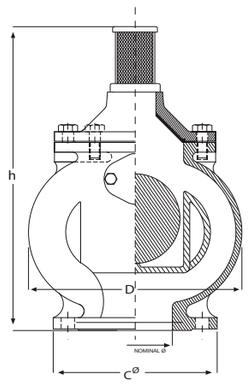
AIR RELEASE VALVES DN 80-100

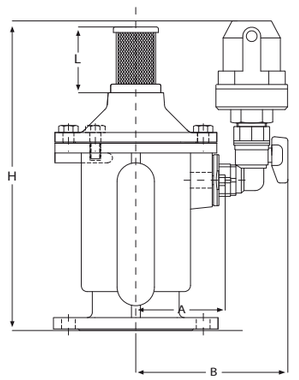


DOBLE ACTING		
Ref	Description	Material
1	BODY	Nod Cast Iron GGG-40
2	DOME	Nod Cast Iron GGG-40
3	CLOSURE BALL	Polypropylene d=0.9
4	AIR FILTER	Stainless steel mesh
5	COVER (Double acting)	Cadmium-plated steel
6	VULCANIZED	Neoprene 65º Shore
7	SCREWS	Stainless steel
8	COVER SCREWS	Stainless steel



TRIPLE ACTING		
Ref	Description	Material
1	PURGE VALVE 1"	Polyamide+Fibrer Glass METALIC BASE (brass)
2	STOPCOCK	Chrome-plated brass
3	SEAL	Pressed Leather





Process/Manufacturer: UNIRAIN	Size: A3	Material	Code
	Escala	Name: ARV-Ø-KA (3G)-FL	
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UNIRAIN ARV-Ø-(3G)-FLFP

Metal flanged Air Release Valve with double or triple acting

Technical features

The water supply through closed pipes involves several inconvenients for ensure an eficient and safely work. One of these problems is the air presence in the pipes, either included in the water or introduced during the filling and emptying.

Air valve

During this processes it's necessary to place devices capables to allow the air inlet and outlet in a safely form.

The air valves are the indicated device to kill the air in the pipes thanks to their operation based in the float closing.

In the moments of filling and emptying of the pipe, the water column pushes out or takes in big air quantities that have to go across the air valve, the filling is the more critical process as is necessary evacuate a large air quantity at high speed.

The traditional air valve designs have outlet diameters lower than the inlet, this feature causes an excessively increasing of the air speed that can generate an early closing of the valve due to the drag over the floating ball.

The FLFP air valves design are based in keep a constant flow section from the imput to the exit. This property provides the valve of an high-coefficient of flow output and provides the plant with the necessary safety level, preventing air overloads wich can colapse the pipes or bubble accumulation wich could damage the pumping equipment.

ADVENTADGES

- *Large air evacuation*
- *Internal design optimized for avoid early closing.*
- *Seal ring designed for low load closing*
- *Floating ball with density 0,9 for progressive closing*
- *Air filter*
- *Suitable for SEWAGE*
- *EPOXY/CERAMIC coating*

Settings

Double effect: FLFP air valve of nodular cast iron for inlet and outlet of larger air quantitites in the filling and emptying of the pipes.

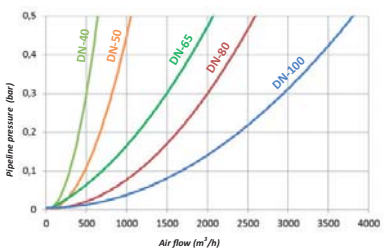
Triple effect: FLFP air valve of nodular cast iron for inlet and outlet of larger air quantities. Automatic 1" air valve for air expulsion with the pipes loaded, avoiding performance losses and wrong measures in measuring equipment.

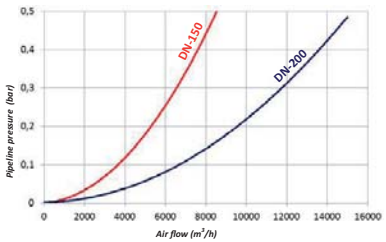
Triple effect with bleeder valve: FLFP air valve of nodular cast iron. Equipped with a bleeder valve to ease the maintenance tasks. Available for diameter 65, 80, 100, 150 and 200mm.

PN-25: under request, any model is supplied suitable for nominal pressure PN-25.

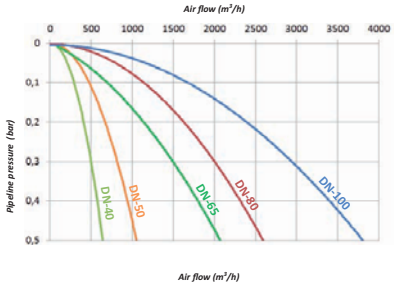
Air flow performance charts

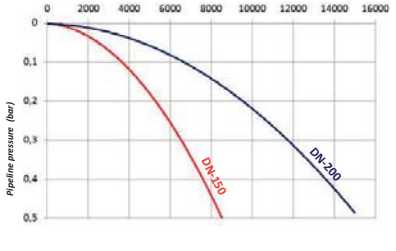
AIR RELIEF





AIR INTAKE





Selection criteria

When the air flow or pipeline pressure are not available, UNIRAIN recommends using the following selection chart. The valve size is related to the pipe diameter in a simple way. In a doubt situation, always take the higher size for security. The air flow performance of the UNIRAIN FLFP air valve is so high, don't use this criteria with other air valve models.

Pipe diameter (mm)	Air Valve diameter (mm)
0-200	40
200-300	50
300-400	65
400-500	80
500-800	100
800-1200	150
1200-1600	200

***Normal use, service and maintenance conditions.**
This product has been tested at low pressure (8 psi) and high pressure (225 psi) with satisfactory results.

For the correct running of valves they must be regularly checked. The checking should include the cleaning of the internal components and a control of the seal conditions. For more detailed information about use and maintenance of valves, please check the document called "Unirain ARV: INSTALLATION AND OPERATION".

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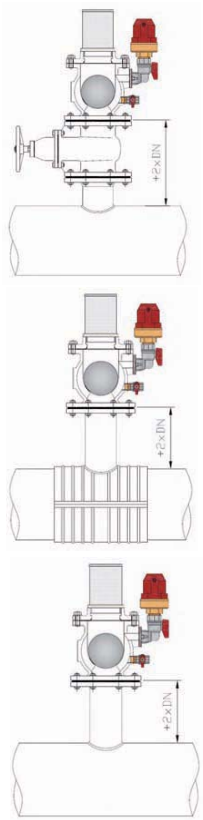
ARV-Ø-(3G)-FLFP

Assembly recommendations



For to get a good working of the air valve, an uniform flow water is needed. We recomend a minimal straight pipe piece (length=2xNominal Diameter) from the flange of the valve to the general pipe.

In the pattern are shown different ways to install the valve:

A) On a gate valve.

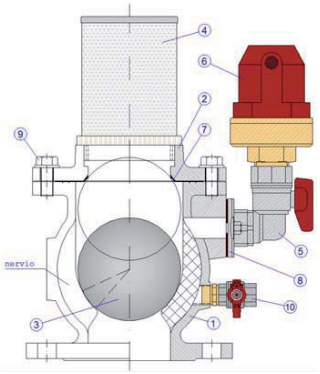
B) On an intake ring.

C) On a welded flange.

In any case, the specified distance must be used, getting the stability of the flow water.

During the air output process and until the closing time, a little water quantity is ejected trough the upper exit of the valve. In plants where exist electric devices or similar near the valve, it's recommended to protect them properly.

Components



FREE-PASS air valve (TRIPLE EFFECT)

Ref.	Description	Materials
1	BODY	Nodular cast iron GGG-40
2	BONNET	Nodular cast iron GGG-40
3	BALL	Polypropylene d=0,9
4	AIR FILTER	Stainless steel grid
5	SHUT OFF VALVE	Chromed brass
6	1" AIR VALVE	Poliamide (metalic base)
7	SEALING	Neoprene 65° Shore
8	JOINT	Pressed leather
9	BOLTING	Stainless steel
10	BLEEDER optional 65 to 200	Chromed brass

FLFP air valve

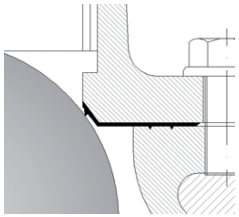
- Large air evacuation
- Internal design optimized for avoid early closing.
- Seal ring designed for low load closing
- Floating ball with density 0,9 for progressive closing
- Air filter
- Suitable for SEWAGE
- EPOXY/CERAMIC coating

Special closing system

The special closing system is designed for provide a perfect sealing in each situation.

Its profile with sensible-contact area gets a ideal sealing line at the lowers pressures.

The polypropylen closing ball doesn't allow deformations and its density similar to the water produces a slow elevation of the ball during the closing, avoiding the generation of a water hammer inside the own valve.



*Ceramic enamel coating

FEATURES

ACID RESISTANT
Hold on with several acids and chemical agents.

RUST RESISTANT
The ceramic enamel doesn't get oxidation.

ABRASION RESISTANT
Its hard finish resists cutting, scratching and cleaning products.

FIRE RESISTANT
Doesn't flare up or get burned.

HIGYENIC FINISH
Free of germs. Sterile, odorless and easy cleaning.

LONG LIFE COLOUR
Keeps the original color and shine, without pale or discoloration.

PAINTING RESISTANCE
Non-porous easy cleaning surfaces.

Ceramic enamel coating*

Under request, the FLFP air valve is supplied with special ceramic enamel coating, both internal and external. The ceramic enamel is a long-life inorganic coating in boron-aluminium silicates which are obteined by high temperature melting with the steel, in one or several layers, from a mixture of basic and acid oxides. The result is a high protection quality, keeping a perfect preserving of the valve.

General dimenssions

** length in millimeters*
Weight in kilograms

dimension	signal	DN 40	50	65	80	100	150	200
flange bore	C	150	165	185	200	220	285	340
output bore	-	40	50	65	80	100	150	200
to axis width	A	135	145	165	180	195	236	300
max. Width	-	210	228	258	280	305	390	480
max. Height	H	230	250	285	335	390	455	670
filter height	L	71	88	110	125	135	100	155
weight	-	4	7	9	15	20	46	72