General Catalog / 2a

Product Data and Specifications

Solenoid Valves
Magnetic Level Switches

Jefferson

3000 MODELS FOR ALL TYPES OF FLUIDS

ENGINEERING FOR INDUSTRIAL AUTOMATION

ISO 9001 Certified

An Enterprising Company at Your Service

JEFFERSON SUDAMERICANA S.A. has been manufacturing solenoid valves, magnetic level switches and other equipment for over 30 years for industrial automation. Since its birth it has dedicated itself to serve and respond to the needs of its customers, continuously incorporating new features.

Constantly perfecting its products, using state of the art machinery, it is now a redesigned organization to comply to the ISO 9001 standards, with a product engineering and market-designed orientation controlled by engineers and technical specialists that check all the manufacturing stages that have made JEFFERSON, not only a pioneer in Latin America, but a leader in the control of fluids.

Currently, its catalog of standard products includes over 3.000 models between solenoid valves and magnetic level switches which satisfy different needs and industrial requirements to control the most diverse liquids and gases such as water, air, steam, oils, refrigerants, oxygen, liquid nitrogen (-200°C), corrosive fluids and many others.

Its principal customers cover a wide spectre of world-wide industry: petroleum; engineering; laboratories; construction; food and beverage; heating; automobiles; metallurgical; textile; chemical & petrochemical; etc.

JEFFERSON's head offices and principal manufacturing plant is situated in Buenos Aires, Argentina only twenty minutes away from Ezeiza International Airport and the banking district in downtown. Equipped with the latest designed CNC machinery all assisted by computers it produces high quality products for its local and export markets.

Its products have international recognition as attested by the approvals of UNDERWRITERS LABORATORIES (UL), CANADIAN STANDARDS ASSOCIATION (CSA) and ISO 9001, amongst other, which has permitted Jefferson to introduce its products range -in direct competition with other market leaders- in more than 24 countries covering the Five Continents in such competitive markets as the USA, Canada, Mexico, Brazil, Autralia, Japan, Taiwan, Greece with standard or special models showing its flexibility to adapt to each and every market's needs.

Jefferson's international insertion is reflected with the establishment in Brazil through JEFFERSON SOLENOIDBRAS LTDA., in Mexico through VALJEFF S.A. de C.V., in the U.S.A. through JEFFERSON SOLENOID VALVES U.S.A. INC. with seat in Miami and sales offices in New York, from which they are taken care of U.S.A. market and Canada. In addition a network of distributors in the rest of the countries of America and the rest of the world, fulfill the objective to cover with sales and services in all the orb.

JEFFERSON is continuously visiting sites, assisting industrial projects to understand the markets' needs and offer solutions -which may require new designs - thinking and planning for the future.

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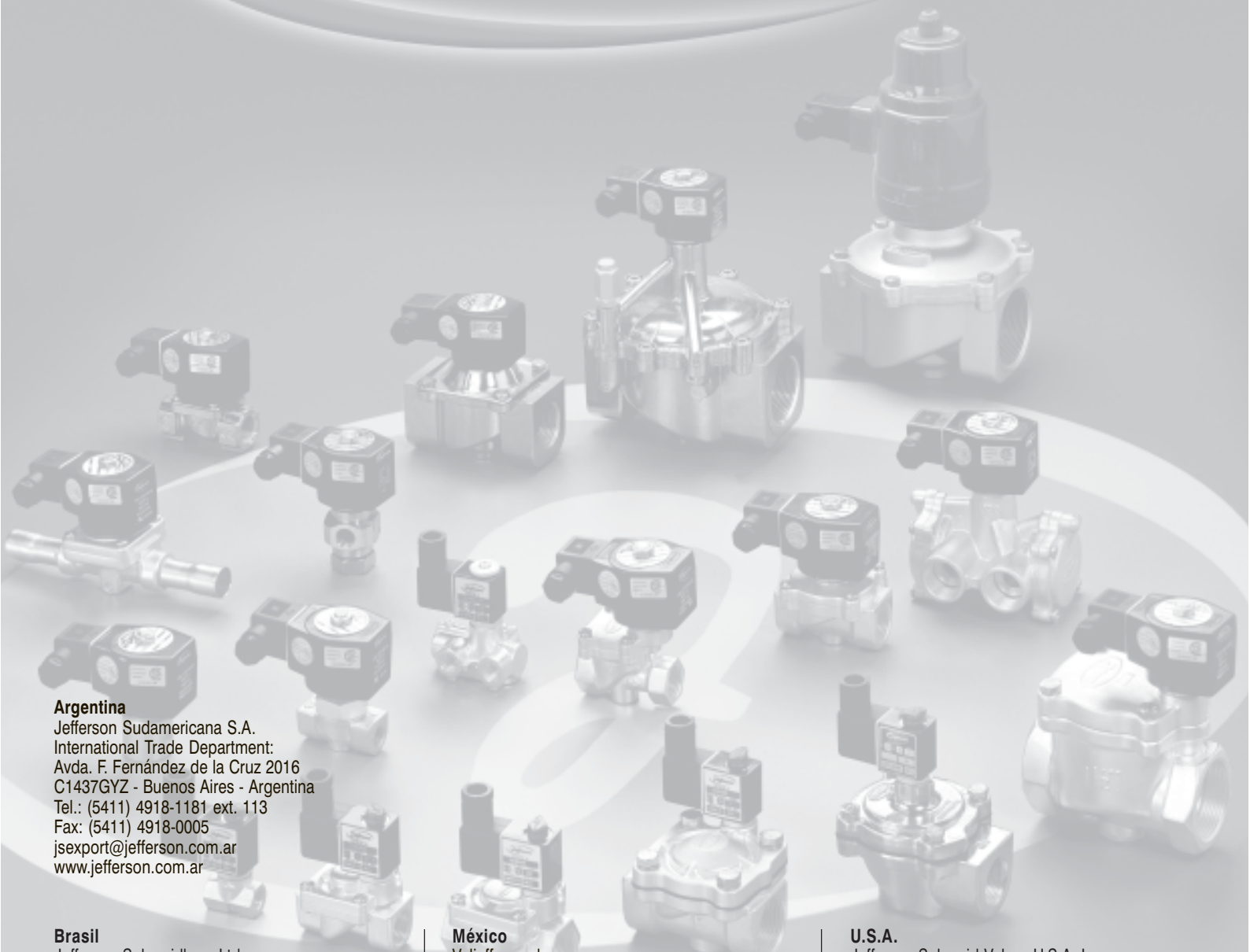

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Solenoid valves
Engineering Information

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Introduction

Solenoid valves are always present in every current industrial process operating with fluids such as liquids, steam or gases, serving as an automation or safety device.

Selecting them properly allows to save money and guarantees the best performance and long useful life for the system.

This manual aims at that objective and it provides the design or maintenance engineer with all the necessary information to choose the best valve for projects or replacements.

Definition and scope

Solenoid valves are a combination of two functional units:

The electromagnetic package, which comprises a solenoid with its plunger, and the **valve body** including the passage/s and port/s.

Needle type metal guillotine plugs, or elastomer or teflon® disks, close the passage orifice/s. Some models have a sliding closure with seal rings.

Having selected the correct model, it can be applied to a great variety of fluids, whether corrosive or not, provided they are free from suspended solids and have a viscosity below 60 cst, unless they belong to some specific models which exceed that value.

Generally, pressure ranges from vacuum to a maximum of 0.1 to 17 bar, except one model that goes up to 100 bar. However, these values are exceeded in some special constructions. Temperature ranges from -200ºC to 180ºC at most.

Solenoid valve types

Ways - Positions - Resting Position

According to the number of ports, solenoid valves are classified as: 2-Way, 3-Way, 4-Way and 5-Way valves.

According to their operation, they may be monostable or bistable. When de-energized, the monostable valve's solenoid reverts to a stable position. On the other hand, bistable ones include one coil at each position and may work with current pulse.

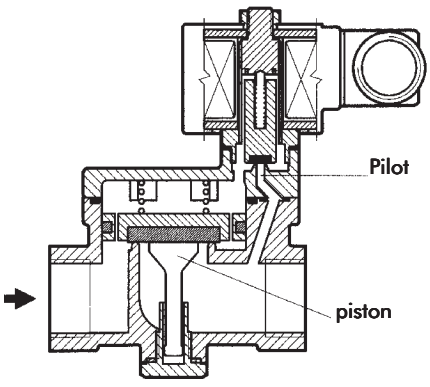
Monostable 2-way valves which close when de-energized are called ***Normally Closed Valves***.

On the contrary, those which remain open are called ***Normally Open Valves***.
Monostable 3-way valves have different denominations depending on how they work, i.e. ***Normally Closed, Normally Open, Convergent, Divergent***. The ones that may be operated in any way are called ***Universal***.

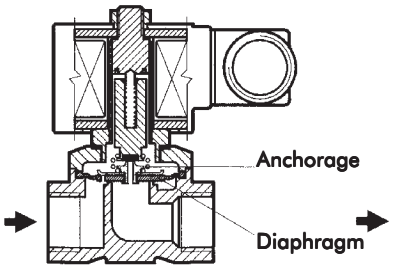
3, 4 or 5-way valves may have 2 or 3 positions; the last having one stable position and two unstable, with one coil each.

Direct Acting - Pilot operated - Combined

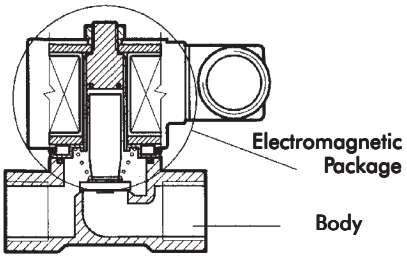
According to their operation mode, valves may be direct acting, pilot operated or a combination of both - hung valves.



Pilot-operated



Hung



Direct Acting

Manual Reset
Many safety systems require manual reset solenoid valves.

Automatic operation (due to the absence or presence of electric signal) takes place only to adopt one position, which may be open or closed, but it does not return to the previous one unless the operator in charge manually activates a lever ad hoc. **1332** and **1369** Series are examples of these devices.

Valves operated with air, water or any other auxiliary fluid.
These are not solenoid valves, though they may be considered as such when a pilot solenoid valve integrated to the equipment carries the auxiliary fluid signal.

Jefferson manufactures two kinds of devices:

•***Pneumatic Operators:*** These substitute the electric operator (solenoid) and are actuated by an auxiliary pneumatic signal to change the valve position. They may be applied to most of the solenoid valve series. For more details, see **1372** Series: Pneumatic Devices.

•***Pneumatic or Hydraulic Cylinders:*** These are applied to globe or diaphragm type valves, and large valves that are operated by means of an auxiliary fluid such as air, water or others. Cylinder sizing is related to the main fluid pressure, the auxiliary fluid pressure and the valve size. The system is completed with a pilot solenoid valve integrated to the equipment.

Application: uses

This manual groups the different valve series into families according to their standard use or by specific industrial area with special requirements and parameters. However, they shall not be restricted only to these applications.

These families are:

General purpose valves
These are used in a great variety of systems and different industrial areas that handle water, air, steam, light oils, neutral gases and cryogenic fluids, from vacuum to high pressure and high temperature.
Some application examples are: automatic petrol and beverage pumps, sector-programmed park irrigation, sown land, dancing water fountains, oxyacetylene welding equipments, electric welding under inert atmosphere, fire-extinguisher systems, liquid or gas dosing, liquid level regulation, packing machines, water treatment systems, pneumatic expellers, car washing machines, building exterior cleaning machines, nickel-plating process, galvanization, coffee machines, car systems against theft or gas selection systems, air heating systems, hot water, steam, hot oils, laboratory or industrial cryogenic systems, low and high vacuum regulation, ink drying systems, etc..

Refrigeration Valves
These are used for refrigerating fluids in their different aggregation degrees. So the connections and construction materials are specific for commercial or industrial refrigeration systems. You shall find information about this kind of valves in the ***Refrigeration Manual.***

Fuel Valves
These are used for automation, for the security of combustion equipments for boilers, furnaces, etc., and for the oil and petrochemical industries.

Directional Valves for Pneumatic and / or Hydraulic Systems
These are 3, 4 and 5-way valves used to direct the flow needed to operate single or double acting cylinders. They are also used when two fluids are to enter the same circuit (convergence), or one fluid into two circuits (divergence).

Valves for corrosive or contaminated products
These valves use plastic materials which are compatible with the fluid, isolating the internal materials that are not compatible, such as the fixed core and the plunger, so as to avoid corrosion or fluid contamination.

Pneumatically and / or Hydraulically Operated Valves
These are used when there are no solenoid valves available due to size, pressure, working temperature, type of fluid or special service conditions (explosive areas, corrosive fluids, etc.).

Dust collector Valves
Due to their special design, response time and flow, these are used for shaking dust collector sleeves by means of periodical pressurized air pulses.

Manual Reset Valves
These are used in shut-off security systems for temperature limit, pressure, lack of flame, level, etc..
They are widely used in the oil industry and combustion.

Necessary data for selecting and / or purchasing solenoid valves.

Solenoid Valves provide an easy, safe and economical solution for a great variety of security and control systems, though they are limited in respect to pressure, temperature, viscosity, flow and fluid corrosion and dirtyness. Choosing the right model demands attention to some data for the specific application:

Fluid characteristics

The liquid or gaseous product to be handled must be clean and free from suspended foreign particles. Therefore, in order to guarantee continuous faultless service it is ***essential*** to place a ***strainer*** before the valve and very close to it, with a particle retention capacity of 100 microns or less.
Generally, viscosity shall not exceed 60 cSt (SAE 10 at 30ºC). However, some direct acting models may work with greater viscosity.
Another important aspect is the fluid compatibility with the valve materials that are in contact with it. For this reason, different materials are used to manufacture the body, seal, seat, diaphragm, piston, etc, for a single valve. Each valve series provides complete information.

Size and Type of connection

Connection size is indicated in inches. Connection type depends on the specific use and application area. For General Use, Combustion or Pneumatics: Threaded BSP or NPT. Flanged upon request. Refrigeration: SAE flare threads, flanged or welding ends.

Installation

The best valve position is over horizontal pipeline with the coil upright. For some models this is the only position acceptable.

Pressure Differential

Pressure differential , or pressure drop or charge loss, is the static pressure difference between the valve's inlet and outlet. Its symbol is Δp.

Maximum Operating Pressure Differential

The maximum operating pressure differential is the maximum difference in pressure between the inlet and outlet against which the solenoid can safely operate the valve.

Minimum Operating Presure Differential

The minimum operating pressure differential is the minimum difference in pressure required to open a pilot operated valve and keep it open (Not required for direct acting or hung type valves).

Maximum Line Pressure

It is usually equal to the maximum operating pressure differential, except in cases of residual pressure or vacuum from the outlet , and is also defined as the line pressure to which the valve may be subjected without being damaged.

Hydraulic Test Pressure

It is the pressure at which the valve's design is tested, and equals 5 times the maximum line pressure.
This safety factor securely prevents strain or breakage of the external components in case of accidental overpressure in the line.

Counterpressure

Two-way solenoid valves do not allow output pressure or counterpressure to be greater than the input pressure. In this case, it is necessary to use retention valves to prevent counterpressure from entering the circuit before the valve.

Operating Temperature

Each model indicates the maximum fluid temperature allowed for that specific valve.

There are two aspects related to this temperature: Construction materials and the coil thermal class. Ambient temperature is also relevant, since the sum of the fluid's heat absorbed by the coil when it exceeds 80°C. and the heat generated by itself when energized, must be dissipated into the environment; so a high temperature can make this process difficult.

In these cases, it is advisable to place the valve in a ventilated area which shall not exceed 40ºC.

If these conditions are not complied with, as a hard and fast rule, the following correction shall be used:
Maximum temperature indicated in the valve + 30ºC =
= fluid temperature + ambient temperature.

Ambient Conditions

Besides temperature, there are other factors to be considered, such as internal or external use, humidity, rain, water showers, corrosive, explosive or prone to flood environments. **M** and **G** size coils are often encapsulated, with DIN connections and IP65 protection (water and weather proof).

For explosive ambients Jefferson manufactures encapsulated explosion and weather proof coils, according to IEC79-18 m., ZC type. Non capsulated coils are used in valves that have a weather proof housing, **Y** type, weather and explosion proof, **Z** type, or internal use, **C** type.

Response Time

It is the period of time from the commutation of the electric signal to the moment the valve has arrived to 90% of its change of position. Solenoid valves are fast operating. Direct acting models open or close with air at 6 bar at a rate that ranges from 8 to 50 milliseconds (ms). Pilot operated valves are slower and range from 50 to 80 ms according to the model and size.

In some models, response time with liquids may double the response time with air, especially when closing. Jefferson can correct them according to service conditions upon request, by slightly modifying the standard valves.

For this reason, when response time is critical for the system where the valve is to be installed,we advise to consult Jefferson 's Technical Department.

Electric Power Supply

Since there is a special coil for each type of current and voltage with the exact power to operate upon a specific service condition, valves shall only be used with their technically appropriate coil.

Jefferson produces coils with a wide range of power, sizes, housings and connections for voltages from 12 to 440 V, alternating current of 50 Hz, 60 Hz and direct current.
See Coils and Housings.

Flow and Flow Factor

There are formulas, diagrams and charts which are based on the valve's flow factor, in order to determine the flow of a fluid that goes through a valve in certain conditions such as pressure differential, fluid temperature, state, density, viscosity, etc.

The value is set experimentally, and it is known as the flow factor **Kv** for the Metric system and **Cv** for the English system: pounds, feet, inches, gallons (USA). Calculations are valid only under fully open valve condition.

The flow factor Kv is the estimated flow of water in m^3/hr that goes through a valve with a pressure drop of 1 Bar, at ambient temperature.
So:
For Δp = 1 bar
Qn = 1 m^3/h Kv = 1
Generally
Qn = n m^3/h Kv = n

The flow factor Cv is the estimated flow of water in GPM that goes through a valve with a pressure drop of 1 psi, at ambient temperature.

So:
For Δp = 1 psi
Qn = 1 Gall/Min Cv = 1
Generally
Qn = n Gall/Min Cv = n

Equivalences	
Cv = 1	***Kv = 0,85***
Kv = 1	***Cv = 1,17***

Kv calculation for two valves or more.
-2 equal valves in series. $\mathbf{Kv_t = Kv_1 \times 0,7}$
- 2 or more, equal or different size valves in series. $\mathbf{1/Kv_t = 1/Kv_t + 1/Kv_2 + . . . + 1/Kv_n}$
- 2 or more, equal or different size valves in parallel. $Kv_t = Kv_1 + Kv_2 + .. . + Kv_n$

$\mathbf{Kv_t}$: **Kv** equivalent to one solenoid valve that replaces them.

Example:

Two Kv = 1 valves **in series,** are equivalent to 1 valve with Kv = 0,7

Two Kv = 1 valves **in parallel,** are equivalent to 1 valve with Kv = 2

$\mathbf{Kv_t}$ simplifies the calculation using the formulas and graphics all at once, with no need to repeat the procedure for each particular valve.

Formulas for flow calculation.
Metric units.

Fluids		Flow Calculation; Q_v = liquids; Q_n = gases; Q_m = steam	Calculation of flow coefficient Kv (m^3/h)	Pressure drop calculation (bar)
Liquids		$Q_v = Kv\sqrt{\frac{\Delta p}{\gamma}}$	$Kv = Q_v\sqrt{\frac{\gamma}{\Delta p}}$	$\Delta p = \gamma\left[\frac{Q_v}{Kv}\right]^2$
Gases	$P_2 > \Delta p$	$Q_n = 500 \cdot Kv\sqrt{\frac{P_2 \cdot \Delta p}{\delta_n (273+t)}}$	$Kv = \frac{Q_n}{500}\sqrt{\frac{\delta_n (273+t)}{P_2 \cdot \Delta p}}$	$\Delta p = \frac{P_1}{2} - \sqrt{\frac{P_1^2}{4} - C}$ $C = \delta_n T\left[\frac{Q_n}{500\ Kv}\right]^2$
	$P_2 \leq \Delta p$	$Q_n = \frac{250 \cdot Kv \cdot P_1}{\sqrt{\delta_n (273 + t)}}$	$Kv = \frac{Q_n\sqrt{\delta_n (273 + t)}}{250 \cdot P_1}$	
Dry saturated steam	$P_2 > \Delta p$	$Q_m = Kv \cdot 31.7\sqrt{\frac{\Delta p}{v_2}}$	$Kv = \frac{Q_m}{31.7}\sqrt{\frac{v_2}{\Delta p}}$	$\Delta p = \left[\frac{Q_m}{Kv\ 31.7}\right]^2 v_2$
	$P_2 \leq \Delta p$	$Q_m = Kv \cdot 22.5\sqrt{\frac{P_1}{v_1}}$	$Kv = \frac{Q_m}{22.5}\sqrt{\frac{v_1}{P_1}}$	

Symbol	Unit	Magnitude
Kv	m^3/h	*Valve flow factor* at full open position
Q_v	m^3/h	*Liquid volumetric flow*
Q_n	Nm^3/h	*Gas volumetric flow under normal conditions (atmospheric pressure = 760 mm Hg. and temperature 20ºC).*
Q_m	kg/h	*Mass flow in dry saturated steam state.*
γ	g/cm^3	*Liquid specific weight at operating temperature.*
δ_n	—	*Air related density under normal pressure and temperature conditions.*
t_1	^oC	*Fluid temperature upstream the valve.*
T_1	^oK	*Absolute fluid temperature upstream the valve (273 + t_1).*
V_2	m^3/kg	*Steam specific volume at the valve outlet and t_1 condition.*
V_1	m^3/kg	*Steam specific volume at $P_1 \div 2$ pressure and t_1 temperature (overheat).*
P_1	bar	*Absolute pressure at the valve inlet = gauge pressure + atmospheric pressure.*
Δp	bar	*Pressure drop across the valve.*
P_2	bar	*Absolute pressure at the valve outlet. $P_2 = P_1 - \Delta p$*
C	—	*Constant.*

Relative density of some gases and liquids

Gases

At 20 ºC and 760 mm Hg	Air related density (δ_n)
Acetone	1.06
Acetylene	0.91
Air	1.00
Ammonia	0.72
Argon	1.38
Butane	2.07
Carbon dioxide	1.53
chlorine	2.49
Ethane	1.05
Ethylene	0.97
Ethylene propane	1.45
Helium	0.14
Hydrochloric acid	1.27
Hydrogen	0.07
Hydrogen sulfide	1.19
LPG grade 1	1.50
LPG grade 2	1.90
Methane	0.55
Natural gas *	0.65 *
Nitric oxide	1.04
Nitrogen	0.97
Nitrous oxide	1.53
Oxygen	1.11
Ozone	1.66
Propane	1.56
Sulphur dioxide	2.26
Sulphur oxide	2.26

Liquids

At operating temperature	Temp. in ºC	S.W. g/cm³ (γ)
Acetone	15	0.79
Ammonia	15	0.65
Benzene	15	0.88
Diesel oil	20	0.90
Acohol, ethyl	20	0.79
Acohol, methyl	20	0.81
Freon 12	20	1.33
Freon 22	20	1.21
Fuel oil Nº 1	20	0.83
Fuel oil Nº 2	20	0.84
Fuel oil Nº 3	20	0.89
Fuel oil Nº 4	20	0.90
Gas oil	20	0.90
Gasoline	20	0.75
Kerosene	20	0.82
Light Crude oil	20	0.91
Liquid carbon dioxide	-160	1.06
Liquid nitrogen	-160	0.80
Liquid oxygen	-160	1.20
LPG grade 1	20	0.51
LPG grade 2	20	0.57
Naphta	20	0.76
Olive oil	20	0.92
Phenol	20	1.02
SAE 10	20	0.88
Turpentine	20	0.87
Water	15	1

Some properties of dry saturated water steam

Gage pressure bar	Temperature ºC	Specific Volume m³/kg
- 0.2	93.5	2.09
0	99.6	1.69
0.1	102.3	1.69
0.2	104.8	1.43
0.3	107.1	1.33
0.5	111.4	1.16
0.7	115.2	1.03
1	120.2	0.89
1.3	124.7	0.78
1.6	128.7	0.69
2	133.5	0.61
2.5	138.9	0.52
3	143.6	0.46
3.5	147.9	0.43
4	151.8	0.38
4.5	156	0.34
5	159	0.32
5.5	161	0.28
6	165	0.27
6.5	168	0.26
7	170	0.24
7.5	173	0.23
8	175	0.22
8.5	177	0.20
9	180	0.19
9.5	182	0.19
10	184	0.18

(*) This is a representative value. According to its composition, it varies from 0.60 to 0.70.

For flow calculation. English units.

Formulas for flow calculation. English units.

Fluids		Flow Calculation; Q_v = liquids; Q_n = gases; Q_m = steam	Calculation of flow coefficient Cv (GPM)	Pressure drop calculation (psi)
Liquids		$Q_v = Cv\sqrt{\frac{\Delta p}{\gamma}}$	$Cv = Q_v\sqrt{\frac{\gamma}{\Delta p}}$	$\Delta p = \gamma\left[\frac{Q_v}{Cv}\right]^2$
Gases	$P_2 > \Delta p$	$Q_n = 1412 \cdot Cv\sqrt{\frac{P_2 \cdot \Delta p}{\delta_n (460+t)}}$	$Cv = \frac{Q_n}{1412}\sqrt{\frac{\delta_n (460+t)}{P_2 \cdot \Delta p}}$	$\Delta p = \frac{P_1}{2} - \sqrt{\frac{P_1^2}{4} - C}$ $C = \delta_n T\left[\frac{Q_n}{1412.Cv}\right]^2$
	$P_2 \leq \Delta p$	$Q_n = \frac{706 \cdot Cv \cdot P_1}{\sqrt{\delta_n (460 + t)}}$	$Cv = \frac{Q_n\sqrt{\delta_n (460 + t)}}{706 \cdot P_1}$	
Dry saturated steam	$P_2 > \Delta p$	$Q_m = Cv \cdot 64.2\sqrt{\frac{\Delta p}{v_2}}$	$Cv = \frac{Q_m}{64.2}\sqrt{\frac{v_2}{\Delta p}}$	$\Delta p = \left[\frac{Q_m}{Cv\ 64.2}\right]^2 v_2$
	$P_2 \leq \Delta p$	$Q_m = Cv \cdot 45.4\sqrt{\frac{P_1}{v_1}}$	$Cv = \frac{Q_m}{45.4}\sqrt{\frac{v_1}{P_1}}$	

Symbol	Unit	Magnitude
Cv	*GPM*	*Valve flow factor* at full open position
Q_v	*GPM*	*Liquid volumetric flow*
Q_n	*SCFH*	*Gas volumetric flow under normal conditions (atmospheric pressure = 760 mm Hg. and temperature 68ºF).*
Q_m	*lb/h*	*Mass flow in dry saturated steam state.*
γ	—	*Specific gravity at operating temperature.*
δ_n	—	*Specific gravity under normal pressure and temperature conditions.*
t_1	*ºF*	*Fluid temperature upstream the valve.*
T_1	*ºR*	*Absolute fluid temperature upstream the valve (460 + t_1).*
V_2	*ft³/lb*	*Steam specific volume at the valve outlet and t_1 condition.*
V_1	*ft³/lb*	*Steam specific volume at $P_1 \div 2$ pressure and t_1 temperature (overheat).*
P_1	*psia*	*Absolute pressure at the valve inlet = gauge pressure + atmospheric pressure.*
Δp	*psi*	*Pressure drop across the valve.*
P_2	*psia*	*Absolute pressure at the valve outlet. $P_2 = P_1 - \Delta p$*
C	—	*Constant.*

Specific gravity of some gases and liquids

Gases	
At 68 ºF and 760 mm Hg	Specific gravity (δ_n)
Acetone	1.06
Acetylene	0.91
Air	1.00
Ammonia	0.72
Argon	1.38
Butane	2.07
Carbon dioxide	1.53
chlorine	2.49
Ethane	1.05
Ethylene	0.97
Ethylene propane	1.45
Helium	0.14
Hydrochloric acid	1.27
Hydrogen	0.07
Hydrogen sulfide	1.19
LPG grade 1	1.50
LPG grade 2	1.90
Methane	0.55
Natural gas *	0.65 *
Nitric oxide	1.04
Nitrogen	0.97
Nitrous oxide	1.53
Oxygen	1.11
Ozone	1.66
Propane	1.56
Sulphur dioxide	2.26
Sulphur oxide	2.26

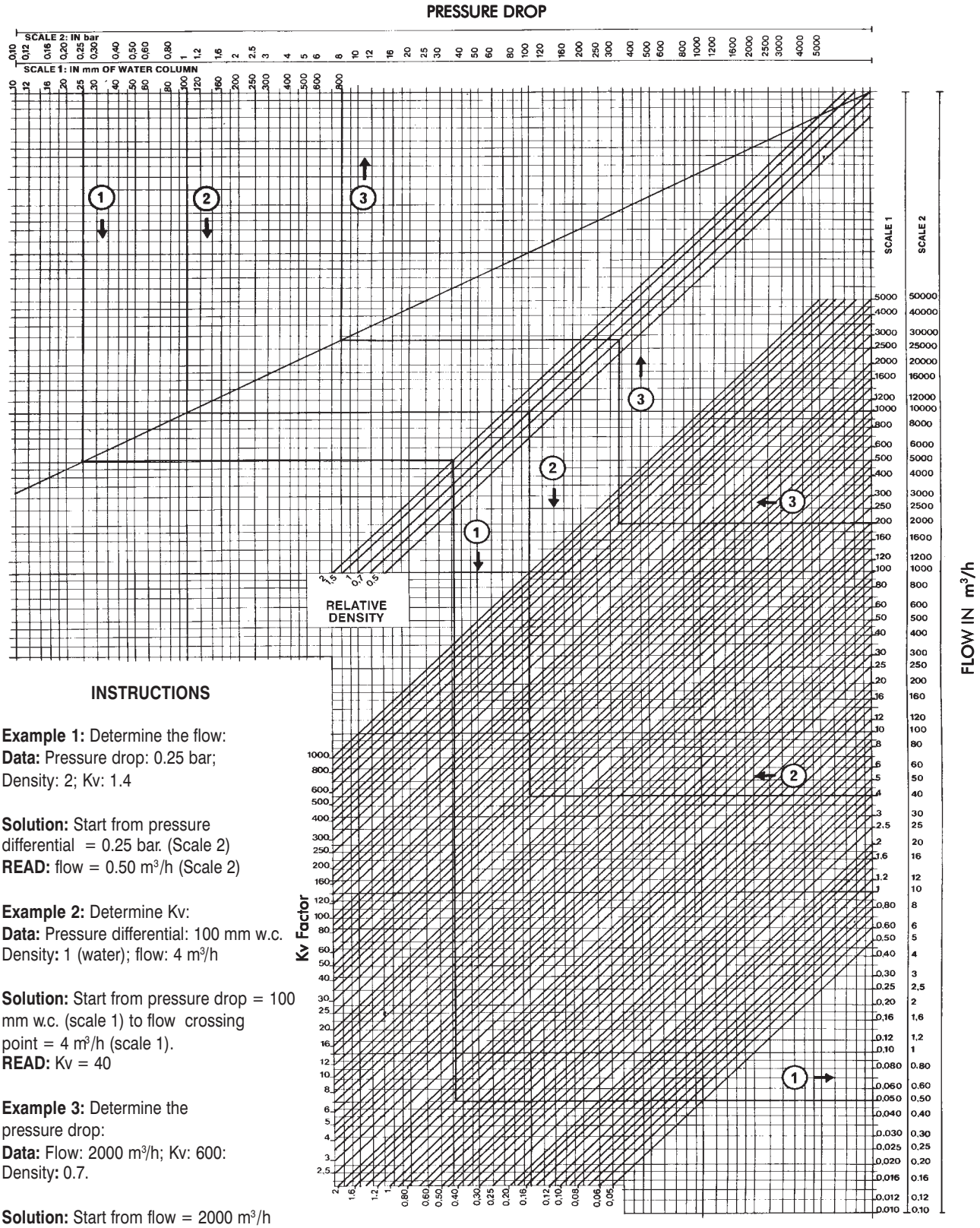
Liquids		
At operating temperature	Temp. in ºF	Specific gravity (γ)
Acetone	60	0.79
Ammonia	60	0.65
Benzene	60	0.88
Diesel oil	68	0.90
Acohol, ethyl	68	0.79
Acohol, methyl	68	0.81
Freon 12	68	1.33
Freon 22	68	1.21
Fuel oil Nº 1	68	0.83
Fuel oil Nº 2	68	0.84
Fuel oil Nº 3	68	0.89
Fuel oil Nº 4	68	0.90
Gas oil	68	0.90
Gasoline	68	0.75
Kerosene	68	0.82
Light Crude oil	68	0.91
Liquid carbon dioxide	-256	1.06
Liquid nitrogen	-256	0.80
Liquid oxygen	-256	1.20
LPG grade 1	68	0.51
LPG grade 2	68	0.57
Naphta	68	0.76
Olive oil	68	0.92
Phenol	68	1.02
SAE 10 (oil)	68	0.88
Turpentine	68	0.87
Water	60	1

Some properties of the dry saturated water steam

Gage pressure psig	Temperature ºF	Specific Volume ft³/lb
-3	200.7	33.2
0	212	26.8
2	218.7	23.6
4	224.4	21.4
6	230	19.4
7	232	18.6
10	240	16.4
15	250	13.9
20	259	12
25	267	10.6
30	274	9.16
35	281	8.57
40	287	7.83
45	292	7.21
50	298	6.68
55	302	6.23
60	307	5.38
65	311	5.49
70	316	5.19
80	324	4.67
90	331	4.24
100	338	3.89
110	344	3.59
120	350	3.34
130	356	3.12
140	361	2.93
145	363	2.84

(*) This is a representative value. According to its composition, it varies from 0.60 to 0.70.

For liquids.



INSTRUCTIONS

Example 1: Determine the flow:
Data: Pressure drop: 0.25 bar;
Density: 2; Kv: 1.4

Solution: Start from pressure differential = 0.25 bar. (Scale 2)
READ: flow = 0.50 m³/h (Scale 2)

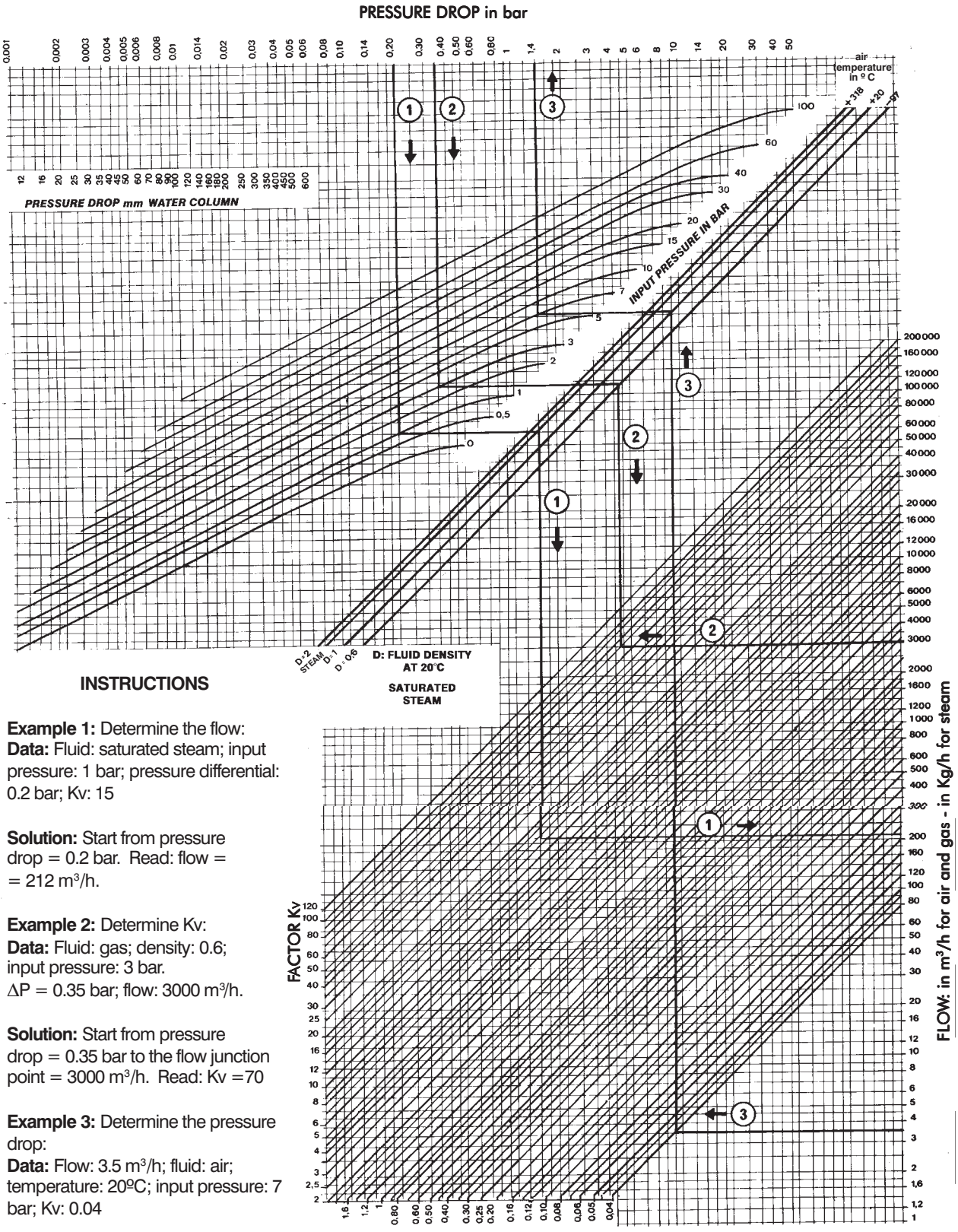
Example 2: Determine Kv:
Data: Pressure differential: 100 mm w.c.
Density**:** 1 (water); flow: 4 m³/h

Solution: Start from pressure drop = 100 mm w.c. (scale 1) to flow crossing point = 4 m³/h (scale 1).
READ: Kv = 40

Example 3: Determine the pressure drop:
Data: Flow: 2000 m³/h; Kv: 600:
Density**:** 0.7.

Solution: Start from flow = 2000 m³/h (scale 2).
READ: pressure drop = 8 bar (scale 2).

For compressible fluids.



INSTRUCTIONS

Example 1: Determine the flow:
Data: Fluid: saturated steam; input pressure: 1 bar; pressure differential: 0.2 bar; Kv: 15

Solution: Start from pressure drop = 0.2 bar. Read: flow = = 212 m^3/h.

Example 2: Determine Kv:
Data: Fluid: gas; density: 0.6; input pressure: 3 bar.
ΔP = 0.35 bar; flow: 3000 m^3/h.

Solution: Start from pressure drop = 0.35 bar to the flow junction point = 3000 m^3/h. Read: Kv =70

Example 3: Determine the pressure drop:
Data: Flow: 3.5 m^3/h; fluid: air; temperature: 20ºC; input pressure: 7 bar; Kv: 0.04

Solution: Start from flow = 3.5 m^3/h. Read: pressure drop = 1.4 bar

Main characteristics.

DIN 43650 shape A

DIN 43650 shape B

NEMA 4x
IEC 79-18 m

Current	DIN 43650 Connection - IP65 Integrated weather and humidity proof coil and housing. Plug-in connection with strain-relief or thread for 1/2''NPT conduit.			NEMA 4x. Integrated weather, water and saline corrosion proof coil and housing.		IEC 79-18 m. Integrated explosion, weather and saline corrosion proof coil and housing. (Prefix ZC)	
	Size G	Size M		Size M		Size M	
	Shape B	Shape A		1/2"NPT Connection		1/2"NPT Connection	
Hz	Class F 155ºC	Class F 155ºC	Class H 180ºC	Class F 155ºC	Class H 180ºC	Class F 155ºC	Class H 180ºC
D/C	GF06C	MF19C	MH19C	MF19Y	MH19Y	MF19Z	MH19Z
A/C 50 Hz	GF06C	MF11C	MH11C	MF11Y	MH11Y	MF11Z	MH11Z
		MF16C	MH16C	MF16Y	MH16Y	MF16Z	MH16Z
		MF20C	MH20C	MF20Y	MH20Y	MF20Z	MH20Z
A/C 60 Hz	GF06C	MF13C	MH13C	MF13Y	MH13Y	MF13Z	MH13Z
		MF16C	MH16C	MF16Y	MH16Y	MF16Z	MH16Z
		MF20C	MH20C	MF20Y	MH20Y	MF20Z	MH20Z

** Shape **B** stands for Shape B DIN 43650 Connections - * Shape **A** stands for Shape A DIN 43650 Connections.*

Available tensions

Volts	12	24	48	110	120	220	240
D / C	Yes	Yes	Yes	Yes	No	Yes	No
50 Hz	Yes	Yes	Yes	Yes	No	Yes	Yes
60 Hz	Yes	Yes	Yes	Yes	Yes	Yes	Yes

DIN Connector types

Strain-relief Pg9			Strain-relief Pg11			1/2"NPT Connection		
Common	Luminous gasket	Luminous connector	Common	Luminous gasket	Luminous connector	Common	Luminous gasket	Luminous connector
1	**4**	**7**	**2**	**5**	**8**	**3**	**6**	**9**

Catalog Number Information

M	F	11	Y	220	50	1
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*

Thermal Class:

Class F up to 155ºC

Class H up to 180ºC

(1, 2, 3, and 4) See the available encapsulated coils chart.
1 - Size; 2 - Thermal Class; 3 - Power in Watts; 4 - Coil Type:
- C DIN Connection
- Y threaded connection with 3 output leads (one for ground).
- ZC explosion proof, threaded connection with 3 output leads (one for ground).

(5 and 6) See Available tension
5 - Tension; 6 - Type of current
(7) Type of connectors (only for DIN connection. See chart).

Coated with glass fibre and insulating impregnation. Terminal cables for splicing.

Current	Size C	Size M		Size S		Size B
	Class F 155ºC	Class F 155ºC	Class H 180ºC	Class F 155ºC	Class H 180ºC	Class H 180ºC
D/C	C08F		M19H		S48H S60H (1)	B113H (1)
A/C 50 Hz	C08F	M11F M16F	M11H M16H	S28F	S28H S46H S46P (3) S60H (2)	B113H (2)
A/C 60 Hz	C08F	M13F M16F	M13H M16H		S30H S46H S46P S60H (2)	B113H (2)

(1) Without rectifier bridge. (2) With rectifier bridge, only 110, 120, 220 and 240 V available. (3) Class H + polyester coating.

Available Tensions - Size C, M and S.

Volts	12	24	48	110	120	220	240	380	440
D / C	Yes	Yes	Yes	Yes	No	Yes	No	No	No
50 Hz	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
60 Hz	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

Catalog number information

S	20	H	220	50
(1)	(2)	(3)	(4)	(5)

Thermal Class:
Class F up to 155ºC
Class H up to 180ºC

(1, 2 and 3) See fibre coated coils chart.
1 - Coil size; 2 - Power in Watts; 3 - Thermal class.
P = class H + polyester coating.
(4 and 5) See available tensions chart.
4 - Tension.
5 - Current.

Non capsulated coil housings.

Classification	Coil size				
	C	M	S	S (for 1388)	B
General internal use (Prefix C)	Chro-mium plated	Plate hole for 19 mm electric connection. Ground terminal	Iron 3/4" NF Connector	Iron 1/2" BSP or NPT Con-nector	Iron 1/2" BSP or NPT Connector
Weather and water proof. NEMA 4x. and IP65 (Prefix Y)	--	Aluminium epoxy paint 1/2" BSP or NPT electric connection	Iron epoxy paint 1/2" BSP or NPT electric connection	Iron epoxy paint 1/2" BSP or NPT electric connection	Iron epoxy paint 1/2" BSP or NPT electric connection
Explosion and weather proof according to IEC 79-1 "d" (Prefix Z)	--	Aluminium epoxy paint 1/2" BSP or NPT electric connection	Iron epoxy paint 1/2" BSP or NPT electric connection	--	--

General Purpose

Series	Page	Connection (ins.)										Maximum Temp. ºC			Δp bar		Δp psi		Fluids or typical applications						
		1/8	1/4	3/8	1/2	3/4	1	1 1/2	2	2 1/2	3	80	150	180	Minimum	Maximum	Minimum	Maximum	Air and inert gases	Water and light liquids	Thermal oils	Steam	Oxygen	Gasoline	Vacuum
1314	B-4					■	■	■	■			○	○	○	0	15	0	225	A	A	T	T	N	V	A-V
1327	B-6		■	■								○	○	○	0	100	0	1500	A	A	T	T	N	V	A-V
1335	B-8			■	■	■						○	○		0	10	0	150	A	A	V	E	N	V	A-V
1342	B-10					■	■	■	■	■	■	○	○	○	0.2	17	3	255	A	A	T	T	N	V	-
1390	B-12		■	■	■							○	○	○	0.1	15	1.5	225	A	A	T	T	N	V	-
1393	B-14		■	■	■									○	0	4	0	60	T	T	T	T	-	-	-
2026	B-16	■	■									○	○		0	50	0	750	A	A	-	E	N	V	A-V
2036	B-18			■	■	■						○			0.2	15	3	225	A	A	-	-	-	-	-
2036	B-18						■					○			0.3	15	4.5	225	A	A	-	-	-	-	-

Note: 1327, 1335, 1342, 1390 NC and NO.

Combustion Use

Series	Page	Connection (ins.)										N. Closed	N. Open	Δp bar		Δp psi		Manual Reset	Slow opening	Position ind.	Fluids				
		1/8	1/4	3/8	1/2	3/4	1	1 1/2	2	2 1/2	3			Minimum	Maximum	Minimum	Maximum				Gasoil	Fueloil	Natural V	LPG	Combustion Air
1312	C-8				■	■	■					○	○	0	21	0	315	-	-	-	S	S	-	A	A
1330	C-10				■	■	■					○	○	0	0.2	0	3	-			-	-	A	A	A
2030	C-10						■	■	■			○	○	0.001	2	0.015	30	-	○	○	-	-	A	A	A
1332	C-12						■	■	■	■	■	○	-	0	3	0	45	○	-	○	-	-	A	A	A
1356	C-14			■	■	■						○	-	0	20	0	300	-	-	-	T	T	T	T	-
1388	C-16					■	■	■	■	■	■	○	-	0	5	0	75	-	○	○	-	-	A	A	A
1327	B-6		■	■								○	○	0	20	0	300	-	-	-	V	T	A	A	A
2026	B-16	■	■									○	-	0	10	0	150	-	-	-	V	-	A	A	A
1335	B-8			■	■	■						○	○	0	10	0	150	-	-	-	V	-	A	A	A
1390	B-12		■	■	■							○	○	0.1	15	0.1	225	-	-	-	V	-	A	A	A
2088	C-20						■	■	■			○	-	0	3	0	45	-	○	○	-	-	A	A	A
V171	C-23					■						○	-	0	1.5	0	22.5	Thermoelectric safety valve			-	-	A	A	-

Nomenclature:
The letters indicated in Typical Applications refer to the seat, seal and diaphragm materials (if any), as follows:
A: Buna N; **N:** Neoprene®; **E**: EPDM; **V**: FKM; **T**: PTFE, **S**: AISI 304.

Pneumatic and hydraulic use

Series	Page	Connection (ins.)					3 Ways							4 & 5 Ways				Positions	Monostable	Bistable	Fluids				
							Minimum		Maximum					Minimum		Maximum									
									NC		NO		U												
		1/8	1/4	3/8	1/2	3/4	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi				Lubricated Air	Dry Air	Gas	Water	Hydraulic Oil
1323	D-2						0	0	12	180	12	180	8	120	-	-	-	-	2	O	-	A	A	A	A	A
1325	D-4						0.5	7.5	10	150	10	150	-	-	-	-	-	-	2	O	-	A	A	A	A	A
1339	D-6						-	-	-	-	-	-	-	-	0.5	10	10	150	3	O	-	A	A	A	A	A
1350	D-8						-	-	-	-	-	-	-	-	0.5	10	10	150	2	O	O	A	A	A	A	A
1351	D-10						0.5	7.5	10	150	10	150	-	-	-	-	-	-	2	O	O	A	A	A	A	A
1365	D-12						0	0	15	225	15.5	232	9	135	-	-	-	-	2	O	-	A	A	A	A	A
1375	D-14	NAMUR					-	-	-	-	-	-	-	-	0.5	10	10	150	2	O	-	A	A	-	-	-
1387	D-15	NAMUR					0	0	10	150	-	-	-	-	-	-	-	-	2	O	-	A	A	-	-	-
1387	D-15	NAMUR					0.5	7.5	10	150	-	-	-	-	-	-	-	-	2	O	-	A	A	-	-	-
2024	D-18						-	-	-	-	-	-	-	-	0.8	12	10	150	2	O	-	A	A	-	-	-
2095	D-16	NAMUR					0.8	12	8	120	-	-	-	-	0.8	12	8	120	2	O	-	A	A	-	-	-

Note: Hot Air or Gas: FKM Seats or Seals - NC: Normally Closed. NO: Normally Open. U. Universal.

Valves and devices for special service

Series	Page	Connection (ins.)												Maximum Temperature		Maximum pressure		Auxiliary Fluids	Fluids or typical applications						
		1/8	1/4	3/8	1/2	3/4	1	1 1/2	2	2 1/2	3	4	6	8	°C	°F	bar	psi		Acids	Alkalis	Distillate water	Oil Products	Dirty Fluids	Neutral Gases and Air	Thermal Oils
Solenoid Valves for Dust Collector Systems																										
2073	E-10														80	176	10	150	no	-	-	-	-	-	O	-
Solenoid Valves for Corrosives Fluids																										
1360	E-6														60	140	4	60	no	O	O	O	O	-	O	O
Solenoid Valves with Manual Reset Device																										
1369	E-8														80	176	20	300	no	-	-	O	O	-	O	-
Valves with Pneumatic or Hydraulic Operators																										
1372	E-11														80	176	10	150	yes	O	O	O	O	-	O	-
Pneumatically or Hydraulically Operated Valves																										
1310	E-2														300	572	20	300	yes	-	-	O	O	-	O	O
1311	E-4														150	302	7	105	yes	O	O	O	O	O	O	-

Note: 1310, special construction for higher temperature and pressure.

Continues in next page

Valves and devices for special service (continued)

Series	Page	Connection (ins.)										Minimum Temperature		Maximum Temperature		Maximum pressure		Fluid applications									
																		Liquid									
		1/8	1/4	3/8	1/2	3/4	1	1 1/2	2	2 1/2	3	ºC	ºF	ºC	ºF	bar	psi	Oxygen	Argon	Nitrogen	CO_2	CNG (VNG)	Air	Water	Steam	Light oil
Solenoid Valves for CNG (VNG)																											
2094	E-12		■	■	■									80	176	250	3700	-	-	-	-	O	O	-	-	-
Pulse operated solenoid unit																											
1370	E-14	■	■	■	■	■	■	■	■	■	■			80	176	10	150	-	-	-	-	-	O	O	-	O
Digital condensation removal timer																											
1398	E-15		■	■	■	■	■							80	176	15	225	-	-	-	-	-	O	O	-	O
Solenoid valves for cryogenic fluids																											
UC	E-16		■	■	■	■	■	■	■			-200	-328	50	122	15*	225*	O	O	O	O	-	-	-	-	-
Power control **																											
CP	E-18		■	■	■	■	■	■	■	■	■	-200	-328	180	356	250	3700	O	O	O	O	O	O	O	O	O

* CO_2 maximum pressure: 70 bar - 1050 PSI
* * The power control is available for any solenoid valve using a DIN type Size A coil (12 & 24 VDC only).

Recommendations

Establish the necessary data for the correct selection of the solenoid valve or the pneumatically operated valve.

Do neither oversize, nor undersize the valve. Use the formulas and graphics shown in this manual, which will make your calculations easier.

Check that there is a strainer with a mesh size smaller than 100 microns immediately upstream the valve.

Make sure that the installer follows the mounting instructions indicated by Jefferson, specially regarding the coil connector airtightness when exposed to water, condensation or ambient humidity, and to the thorough cleaning of pipelines before operation.

Find out beforehand which are the recommended repair kits for each valve.They are inexpensive and the product design contemplates an easy and quick replacement. If the valves have been correctly selected, there will be no need to shut down the system in order to perform those replacements. At the **Repair Kits** chapter we indicate the component numbers corresponding to the standard models.

Contact Jefferson if you have any trouble reading this catalog or if you need to handle an unusual or special application.

2 Way Solenoid Valves for General Purpose


1314


1327


1335


1342


1390


1393


2026


2036


2036


1359

		Pages
1314 Series	Normally closed Pilot operated.	**B-4 / B-5**
1327 Series	Normally closed and Normally open. Direct acting.	**B-6 / B-7**
1335 Series	Normally closed and Normally open. Direct acting or pilot operated.	**B-8 / B-9**
1342 Series	Normally closed and Normally open. Pilot operated.	**B-10 / B-11**
1390 Series	Normally closed and Normally open. Pilot operated.	**B-12 / B-13**
1393 Series	Normally closed and Normally open Direct acting.	**B-14 / B-15**
2026 Series	Normally closed Microvalve Direct acting.	**B-16 / B-17**
2036 Series	Normally closed. Pilot operated.	**B-18 / B-19**
1359 Series	**"Y"** strainer for general purpose.	**B-20**

1314 Series
2 way solenoid valves. General Purpose. Normally closed.

CERTIFIED QUALITY SYSTEM

Association canadienne de normalisation
Canadian Standards Association
FILE LR87427 2M - LR108921-1

1314 Series

Applications:
- Pumps of re-circulation for cold or hot water.
- Heating with low or high pressure steam.
- Laundry equipments.
- Spraying. Irrigation. Dishwashers.
- Air dryers. water treatment. Vacuum systems

Main characteristics

Normally closed.
Pilot operated.
Bronze, stainless steel body.
BSP or NPT threaded connection.
Brass, stainless steel piston, among others.
Coil: Encapsulated up to 150º C (302º F) or coated with glass fibre and insulating impregnation up to 180º C (356º F).
Interconnection cables. Internal general use housing.
3/4 " NF electric connection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.

Options:
- Explosion and / or weather proof housing.
- Manual operator on the main orifice.
- Flanged connections.

Operating pressure differential

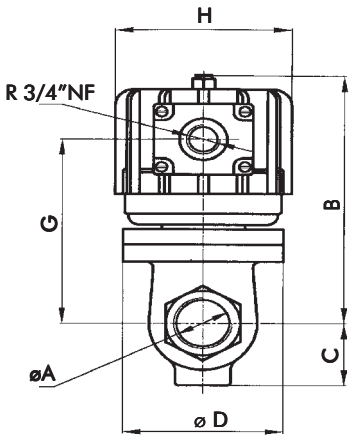
Type	Minimum		Maximum steam				Maximum other fluids			
			PTFE seat		EPDM seat		AC		DC	
	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi
Hung piston	0	0	7	105	3	45	7	105	7	105
Floating piston	0.1	1.5	10	150	3	45	15	225	10	150

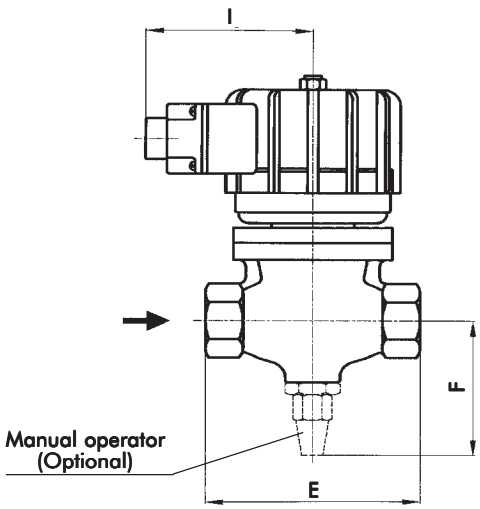
Technical specifications - Bronze body

Pipe size ins.	Orifice size		Flow factor		Weight		Maximum temp. and catalog Nº according to seat material				
							Buna "N"	Neoprene	EPDM	FKM	PTFE
	mm	ins.	Kv	Cv	kg	Lb	80º C / 176º F	80º C / 176º F	150º C / 302º F	150º C / 302º F	180º C / 356º F
Hung piston											
3/4"	19	0.75	6	7	4	8,9	1314BA06A	1314BN06A	1314BE06A	1314BV06A	1314BST06A
1"	26	1.02	10	12	4.9	10.9	1314BA08A	1314BN08A	1314BE08A	1314BV08A	1314BST08A
1,1/2"	32	1.26	15	18	6.5	14.4	1314BA12A	1314BN12A	1314BE12A	1314BV12A	1314BST12A
2"	38	1.50	23	27	7.3	16.2	1314BA16A	1314BN16A	1314BE16A	1314BV16A	1314BST16A
Floating piston											
3/4"	19	0.75	6	7	4	8,9	1314BA06	1314BN06	1314BE06	1314BV06	1314BST06
1"	26	1.02	10	12	4,9	10.9	1314BA08	1314BN08	1314BE08	1314BV08	1314BST08
1,1/2"	32	1.26	15	18	6,5	14.4	1314BA12	1314BN12	1314BE12	1314BV12	1314BST12
2"	38	1.50	23	27	7,3	16.2	1314BA16	1314BN16	1314BE16	1314BV16	1314BST16

Note: *In PTFE seat constructions, the piston is made of stainless steel* ***AISI316***

General dimensions *1314*





øA	B	C	øD	E	F	G	øH	I
R 3/4"	150	32	76	100	80	113	99	95
R 1"	157	41	90	120	89	120		
R 1.1/2"	180	49	100	149	97	143		
R 2"	180	51	100	149	100	147		

Measurements: mm

øA	B	C	øD	E	F	G	øH	I
R 3/4"	5.91	1.26	2.99	3.94	3.15	4.45	3.90	3.74
R 1"	6.18	1.61	3.54	4.72	3.50	4.72		
R 1.1/2"	7.09	1.93	3.94	5.87	3.82	5.63		
R 2"	7.09	2.01	3.94	5.87	3.94	5.79		

Measurements: ins.

Special constructions

Stainless steel body:

- AISI304: change letter **B** or **BS** for **S** in the catalog Nº. Example: 1314SA08, 1314ST08.
- AISI316: change letter **B** or **BS** for **I** in the catalog Nº. Example: 1314IA08, 1314IT08.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	º C	º F	
AC 50 Hz	SH28C	28	241	69	155	311	1
	S28H (*)	28	252	73	180	356	1
AC 60 Hz	SH30C	30	267	80	155	311	2
	S30H (*)	30	237	78	180	356	2
DC	SH48	48	48	48	155	311	3
	S48H (*)	48	48	48	180	356	3

(*) For steam
1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Weather proof housing	**Y**		**Y**1314BST08A
Explosion and weather proof housing	**Z**		**Z**1314BST08A
Manual operator: on the main orifice		**-M**	1314BST08A**-M**
NPT connections		**T**	1314BST08A**T**
Flanged connections		**B**	1314BST08A**B**

Recommendations for installation

Place a strainer with a porosity ≤ 100μ upstream the valve.
Mount the valve **only** over horizontal pipeline with the coil upright.
The valve input pressure must always be equal or greater than the output pressure.

Application according to seat material

Seat material	Buna "N"	Neoprene	EPDM	FKM	PTFE
Maximum temperature	+80º C / 176º F	+80º C / 176º F	+150º C / 302º F	+150º C / 302º F	+180º C / 356º F
Uses	Water, air, light oils, kerosene, low and medium vacuum.	Oxygen, alcohol, argon, other non-corrosive light gases and liquids, Freon 12.	Water steam, hot water, acetone.	Benzene, naphta, aromatics, etc. hot gases, high vacuum, diesel oil.	Steam, hot oils, corrosive fluids.

1327 Series

CERTIFIED QUALITY SYSTEM

Underwriters Laboratories Inc.®
FILE MH16855 Vol. 2 Secc.2

Applications:
- Instrumentation. Laboratory.
- Burner pilot for gas and oil.
- Welding equipment. Humidifiers.
- Dental equipment. Vacuum systems.
- Laundry and dry cleaning machines.
- Heating with low or high pressure steam

Main characteristics

Normally closed and normally open.
Direct acting. No minimum differential pressure to operate.
Brass, iron, stainless steel body.
1/4" BSP or NPT threaded connections.
DIN 43650 connection encapsulated coils, shape A.
IP65 and NEMA4 protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430F s.s.
Shading coil: copper (brass body) silver (s.s. body).
Approximate weight: 0.5 kg. (1.1Lb)

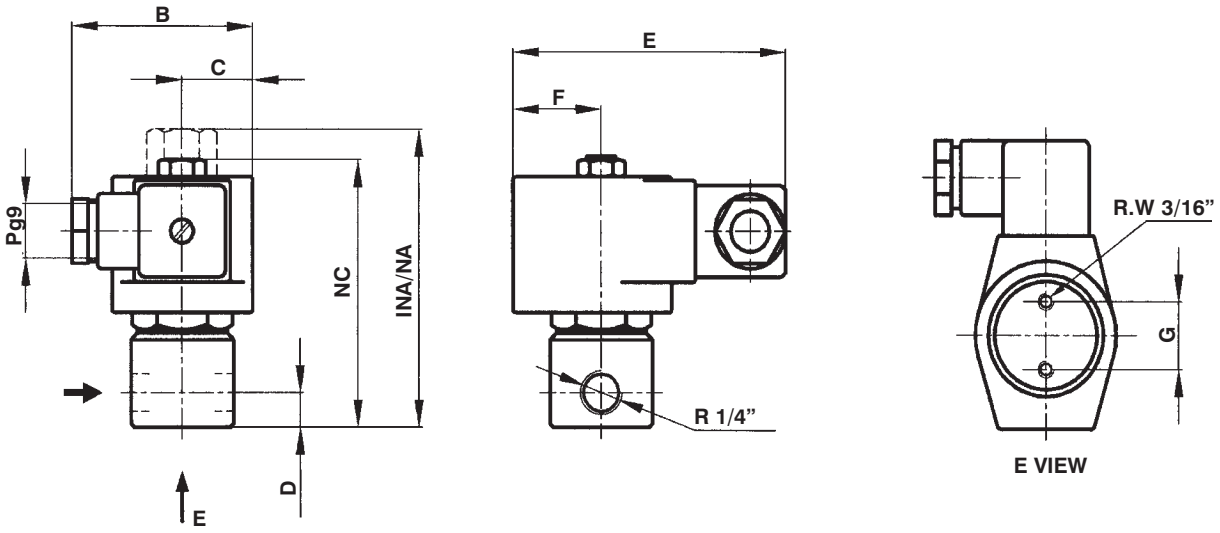
Options:
- Energized coil indicator light.
- Explosion and / or weather proof coils and housings.
- Manual operator.

Technical specifications - Brass body

***Advise:** when using direct current (DC), a 25% reduction on the maximum operating pressure differential is expected

Orifice size		Flow factor		Δp * maximum		Maximum temp. and catalog Nº according to seat material				
						Buna "N"	Neoprene	EPDM	FKM	PTFE
mm	ins.	Kv	Cv	bar	psi	80º C / 176º F	80º C / 176º F	150º C / 302º F	180º C / 302º F	180º C / 356º F
Normally closed										
1.25	.049	0,05	0.06	100	1500	1327BA122	1327BN122	1327BE122	1327BV122	1327BT122
1.75	.068	0,09	0.11	35	525	1327BA172	1327BN172	1327BE172	1327BV172	1327BT172
2.25	.088	0,13	0.15	20	300	1327BA222	1327BN222	1327BE222	1327BV222	1327BT222
3.00	.118	0,26	0.30	10	150	1327BA302	1327BN302	1327BE302	1327BV302	1327BT302
4.00	.157	0,43	0.50	5	75	1327BA402	1327BN402	1327BE402	1327BV402	1327BT402
5.00	.197	0,60	0.70	3	45	1327BA502	1327BN502	1327BE502	1327BV502	-
5.25	.206	0,65	0.76	2,2	33	1327BA522	1327BN522	1327BE522	1327BV522	-
Normally open										
1,25	.049	0,05	0.06	50	750	1327BA122NA	1327BN122NA	1327BE122NA	1327BV122NA	1327BT122INA
1,75	.068	0,09	0.11	20	300	1327BA172NA	1327BN172NA	1327BE172NA	1327BV172NA	1327BT172INA
2,25	.088	0,13	0.15	12	180	1327BA222NA	1327BN222NA	1327BE222NA	1327BV222NA	1327BT222INA
2,50	.098	0,17	0.20	10	150	1327BA252NA	1327BN252NA	1327BE252NA	1327BV252NA	-
3,00	.118	0,26	0.30	10	150	1327BA302INA	1327BN302INA	1327BE302INA	1327BV302INA	1327BT302INA
4,00	.157	0,43	0.50	5	75	1327BA402INA	1327BN402INA	1327BE402INA	1327BV402INA	1327BT402INA

General dimensions *1327*



NC	NA	INA	B	C	D	E	F	G
80	89	102	57	22	10	85	27	20

Measurements: mm

NC	NA	INA	B	C	D	E	F	G
3.15	3.50	4	2.24	0.87	0.39	3.35	1.06	0.79

Measurements: ins.

Special constructions

Stainless steel body.
- AISI 304: change letter **B** for **S** in the catalog Nº. Example: 1327ST302
- AISI 316: change letter **B** for **I** in the catalog Nº. Example: 1327IT302.
- Iron body. change letter **B** for **H** in the catalog Nº. Example: 1327HT302.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	º C	º F	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1327BA302
Explosion and weather proof coils.	**ZC**		**ZC**1327BA302
Weather proof housing.	**Y**		**Y**1327BA302
Explosion and weather proof housing.	**Z**		**Z**1327BA302
Manual operator: on the main orifice **(*)**		**- M**	1327BA302**-M**
NPT connections		**T**	1327BA122**T**
Energized coil indicator light	See coils.		

(*) Up to 20 bar - 300 psi

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100 μ.
The valve allows > output pressure than input pressure, but in these cases watertightness is not guaranteed when it is closed.

Application according to seat material

Seat material	Buna "N"	Neoprene	EPDM	FKM	PTFE
Maximum temperature	+80º C / 176º F	+80º C / 176º F	+150º C / 302º F	+150º C / 302º F	+180º C / 356º F
Uses	Water, air, light oils, kerosene, low and medium vacuum.	Oxygen, alcohol, argon, other non-corrosive light gases and liquids, Freon 12.	Water steam, hot water, acetone.	Benzene, naphta, aromatics, etc. hot gases, high vacuum, diesel oil.	Steam, hot oils, corrosive fluids.

2 way solenoid valves. General purpose.

1335 Series

CERTIFIED QUALITY SYSTEM

Underwriters Laboratories Inc.®
FILE MH16855 Vol. 2 Secc.2

Association canadienne de normalisation
Canadian Standards Association
FILE LR87427 2M - LR108921-1

Applications:
- Washing machines.
- Lubricated air, hot air, dry air, etc.
- Oxygen and acetylene equipments.
- Fuel oil and gas burners.
- Vacuum systems.

Main characteristics

Forged brass, stainless steel body.
BSP or NPT threaded connections.
Encapsulated plug-in coils. Shape A DIN 43650 Connection. IP65 and NEMA4 Protection.
Normally closed and normally open.
Plastic or metal core diaphragm.

Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass body) silver (s.s. body).

Options:
- Energized coil indicator light.
- Explosion and / or weather coils and housings.
- Manual operator.

Operating pressure differential

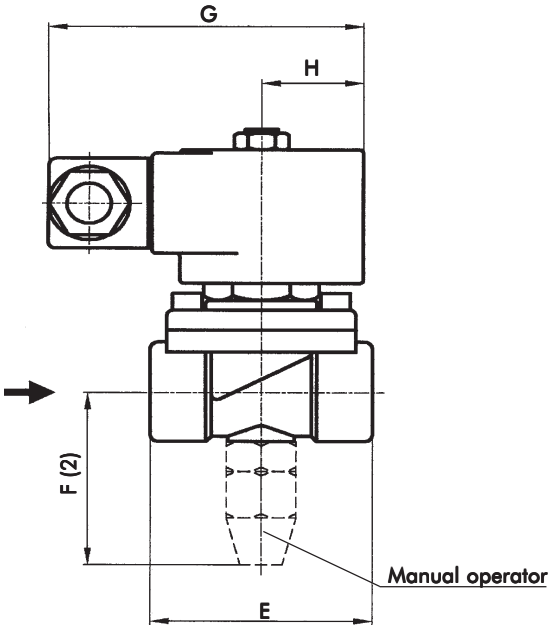
Type	Action	Minimum		Max. steam (EPDM seat)		Maximum other fluids			
						AC		DC	
		bar	psi	bar	psi	bar	psi	bar	psi
NC	Direct acting	0	0	0.2	3	0.2	3	0.1	1.5
NC	Floating diaphragm	0.1	1.5	4	60	10	150	6	90
NC	Hung diaphragm	0	0	4	60	7	105	6	90
NO	Floating diaphragm	0.1	1.5	4	60	10	150	10	150

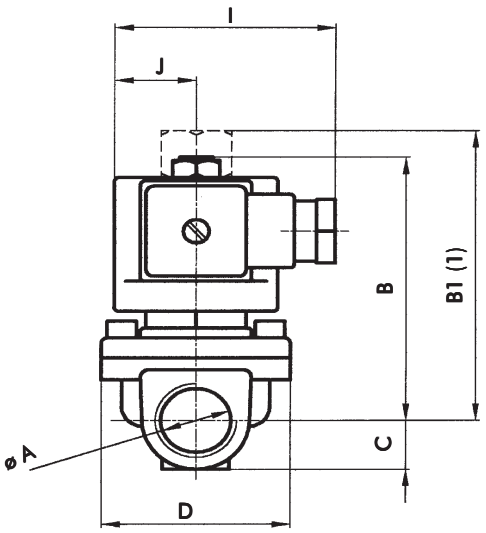
Technical specifications - Brass body

Pipe size ins.	Orifice size		Flow factor		Weight		Maximum temp. and catalog Nº according to seat material			
							Buna "N"	Neoprene	EPDM	FKM
	mm	ins	Kv	Cv	kg	Lb	80º C / 176º F	80º C / 176º F	150º C / 306º F	150º C / 306º F
Direct acting - Normally closed										
3/8"	14	0.55	2,35	2.75	0,8	1.75	1335BA3D	1335BN3D	1335BE3D	1335BV3D
1/2"	14	0.55	2,65	3.1	0,8	1.75	1335BA4D	1335BN4D	1335BE4D	1335BV4D
3/4"	18	0.71	4,30	5.03	0,9	2.0	1335BA6D	1335BN6D	1335BE6D	1335BV6D
Floating diaphragm - Normally closed										
3/8"	14	0.55	2,35	2.75	0,8	1.75	1335BA3	1335BN3	1335BE3	1335BV3
1/2"	14	0.55	2,65	3.1	0,8	1.75	1335BA4	1335BN4	1335BE4	1335BV4
3/4"	18	0.71	4,30	5.03	0,9	2.0	1335BA6	1335BN6	1335BE6	1335BV6
Hung diaphragm - Normally closed										
3/8"	14	0.55	2,35	2.75	0,8	1.75	1335BA3A	1335BN3A	1335BE3A	1335BV3A
1/2"	14	0.55	2,65	3.1	0,8	1.75	1335BA4A	1335BN4A	1335BE4A	1335BV4A
3/4"	18	0.71	4,30	5.03	0,9	2.0	1335BA6A	1335BN6A	1335BE6A	1335BV6A
Floating diaphragm - Normally open										
3/8"	14	0.55	2,35	2.75	0,8	1.75	1335BA3INA	1335BN3INA	1335BE3INA	1335BV3INA
1/2"	14	0.55	2,65	3.1	0,8	1.75	1335BA4INA	1335BN4INA	1335BE4INA	1335BV4INA
3/4"	18	0.71	4,30	5.03	0,9	2.0	1335BA6INA	1335BN6INA	1335BE6INA	1335BV6INA

General dimensions *1335*

(1) Normally open version - (2) Manual operator (optional)





øA	B	B1	C	D	E	F	G	H	I	J
R 3/8"	80	88	15	51	60	53	85	26	57	22
R 1/2"										
R 3/4"	82	90	17	58	72	55				

Measurements: mm

øA	B	B1	C	D	E	F	G	H	I	J
R 3/8"	3.15	3.46	0.59	2.01	2.36	2.09	3.35	1.02	2.24	0.87
R 1/2"										
R 3/4"	3.23	3.54	0.67	2.28	2.83	2.17				

Measurements: ins.

Special constructions

- Investment cast AISI316 Body: change letter **B** for **I** to Catalog Nº. Example: 1335IV4.
- Vacuum systems: consult **Jefferson**.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	º C	º F	
AC 50 Hz	MF11C	11	47	18	155	311	1
	MH11C	11	47	18	180	356	1
AC 60 Hz	MF13C	13	57	23	155	311	2
	MH13C	13	57	23	180	356	2
DC	MH19C	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1335BN4A
Explosion and weather proof coils.	**ZC**		**ZC**1335BA4A
Weather proof housing.	**Y**		**Y**1335BA4A
Explosion and weather proof housing.	**Z**		**Z**1335BA4A
Manual operator: on the main orifice		**- M**	1335BA4A**-M**
NPT connections		**T**	1335BA4A**T**
Energized coil indicator light	See coils.		

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100μ.
Install the valve in any position, preferably over horizontal pipeline with the coil upright.

Application according to seat material

Seat material	Buna "N"	Neoprene	EPDM	FKM
Maximum temperature	+80º C / 176º F	+80º C / 176º F	+150º C / 306º F	+150º C / 306º F
Uses	Water, air, light oils. Neutral gases. Kerosene. Low and medium vacuum	Oxygen, alcohol, argon, other non-corrosive light gases and liquids. Freon 12.	Water steam, hot water, acetone.	Benzene, naphta, aromatics, benzene, etc.. Hot gases. High vacuum. Diesel oil.

1342 Series

CERTIFIED QUALITY SYSTEM

Underwriters Laboratories Inc.®
FILE MH16855 Vol. 2 Secc.2

Association canadienne de normalisation
Canadian Standards Association
FILE LR87427 2M - LR108921-1

Applications:
- Pumps. Spraying. Laundry equipments.
- Irrigation. Compressors. Pollution controls.
- Heating with low or high pressure steam.
- Autoclaves. Laundry equipments.
- Spraying. Irrigation. Dishwashers.
- Air dryers. water treatment.

Main characteristics.

Normally closed or normally open.
Pilot operated.
Body: Forged brass or bronze, stainless steel, etc.
Shape A DIN 43650 Connection encapsulated coils.
IP65 and NEMA4 Protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass body) silver (s.s. body).

Options:
- Energized coil indicator light.
- Explosion and / or weather proof coils and housings.
- Manual operator on main passage.
- Manual operator on pilot orifice.

Operating pressure differential

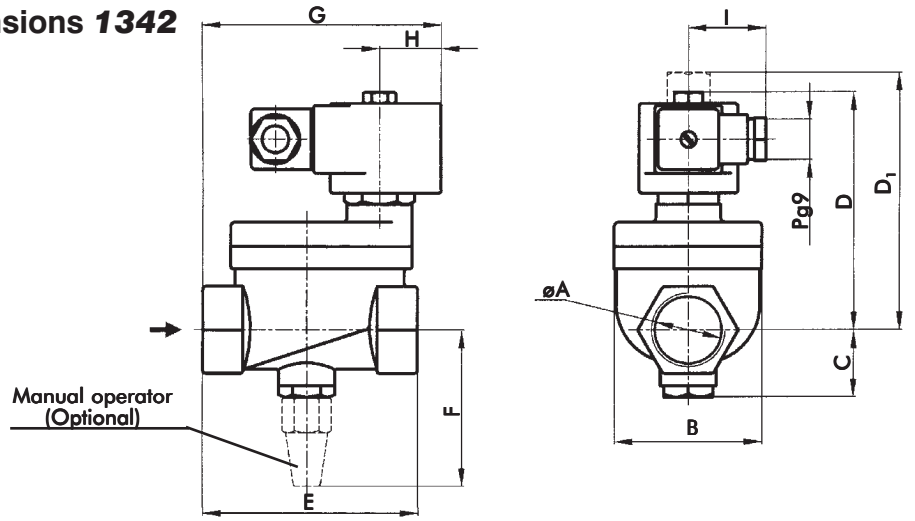
***Advise:** when using direct current (DC), a 25% reduction on the maximum operating pressure differential is expected

Type	Minimum				Maximum steam				Maximum other fluids			
	PTFE		Others		PTFE seat		EPDM seat		PTFE seat		Other seats	
	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi
NC	0.5	7.5	0.2	3	10	150	3	45	17 *	255 *	15 *	225 *
NO	0.5	7.5	0.2	3	10	150	3	45	10	150	10	150

Technical specifications - Brass body

Pipe size ins.	Orifice size		Flow factor		Weight		Maximum temp. and catalog Nº according to seat material				
	mm	ins.	Kv	Cv	kg	Lb	Buna "N"	Neoprene	EPDM	FKM	PTFE
							80º C / 176º F	80º C / 176º F	150º C / 302º F	150º C / 302º F	180º C / 356º F
Normally closed											
3/4"	20	0.79	5	6.9	1.2	2.6	1342BA06	1342BN06	1342BE06	1342BV06	1342BT06
1"	26	1.02	11	13	1.7	3.8	1342BA08	1342BN08	1342BE08	1342BV08	1342BT08
1.1/2"	38	1.50	25	29	3.1	6.8	1342BA12	1342BN12	1342BE12	1342BV12	1342BT12
2"	50	1.97	40	47	4.1	9.0	1342BA16	1342BN16	1342BE16	1342BV16	1342BT16
2.1/2"	76	3.00	66	77	19	4.2	1342BA20	1342BN20	1342BE20	1342BV20	1342BT20
3	76	3.00	85	99	18	4.0	1342BA24	1342BN24	1342BE24	1342BV24	1342BT24
Normally open											
3/4"	20	0.79	5	6.9	1.2	2.6	1342BA06INA	1342BN06INA	1342BE06INA	1342BV06INA	1342BT06INA
1"	26	1.02	11	13	1.7	3.8	1342BA08INA	1342BN08INA	1342BE08INA	1342BV08INA	1342BT08INA
1.1/2"	38	1.50	25	29	3.1	6.8	1342BA12INA	1342BN12INA	1342BE12INA	1342BV12INA	1342BT12INA
2"	50	1.97	40	47	4.1	9.0	1342BA16INA	1342BN16INA	1342BE16INA	1342BV16INA	1342BT16INA
2.1/2"	76	3.00	66	77	19	4.2	1342BA20INA	1342BN20INA	1342BE20INA	1342BV20INA	1342BT20INA
3	76	3.00	85	99	18	4.0	1342BA24INA	1342BN24INA	1342BE24INA	1342BV24INA	1342BT24INA

General dimensions *1342*



øA	B	C	D	D_1	E	F	G	H	I
R 3/4"	52	26	104	114	71	68	84	27	35
R 1"	67	30	108	118	96	72	104		
R 1.1/2"	81	36	119	129	114	79	122		
R 2"	97	44	125	135	128	85	138		
R 2,1/2"-3"	163	89	214	224	224	170	134		

Measurements: mm

øA	B	C	D	D_1	E	F	G	H	I
R 3/4"	2.05	1.02	4.09	4.49	2.80	2.68	3.31	1.06	1.38
R 1"	2.64	1.18	4.25	4.65	3.78	2.83	4.09		
R 1.1/2"	3.19	1.42	4.69	5.08	4.49	3.11	4.80		
R 2"	3.82	1.73	4.92	5.31	5.04	3.35	5.43		
R 2,1/2"-3"	6.42	3.50	8.43	8.82	8.82	6.69	5.28		

Measurements: ins.

Special constructions

Stainless steel body:

- AISI304: change letter **B** for **S** in the catalog Nº. Example: 1342ST08.
- AISI316: change letter **B** for **I** in the catalog Nº. Example: 1342IT08.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	º C	º F	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1342BA08
Explosion and weather proof coils.	**ZC**		**ZC**1342BA08
Weather proof housing.	**Y**		**Y**1342BA08
Explosion and weather proof housing.	**Z**		**Z**1342BA08
Manual operator: on main orifice.		**- M**	1342BA08-**M**
Manual operator on pilot orifice.		**-MP**	1342BA08-**MP**
NPT connections		**T**	1342BA08**T**
Energized coil indicator light	See coils.		

Recommendations for installation.

Place a strainer upstream the valve with a porosity ≤ 100μ. Mount the valve preferably over horizontal pipeline with the coil upright. The valve input pressure must always be > than the output pressure.In order to allow the normally closed or normally open valve to open, the minimum pressure indicated for each model must be respected.

Application according to seat material

Seat material	Buna "N"	Neoprene	EPDM	FKM	PTFE
Maximum temperature	+80º C / 176º F	+80º C / 176º F	+150º C / 302º F	+150º C / 302º F	+180º C / 356º F
Uses	Water, air, light oils, kerosene, low and medium vacuum.	Oxygen, alcohol, argon, other non-corrosive light gases and liquids, Freon 12.	Water steam, hot water, acetone.	Benzene, naphta, aromatics, etc. hot gases, high vacuum, diesel oil.	Steam, hot oils, corrosive fluids.

2 way solenoid valves. General purpose.

1390 Series

CERTIFIED QUALITY SYSTEM

Underwriters Laboratories Inc.®
FILE MH16855 Vol. 2 Secc.2

Association canadienne de normalisation
Canadian Standards Association
FILE LR87427 2M - LR108921-1

Applications:
- Pumps. Spraying. Laundry equipments.
- Irrigation. Compressors. Pollution control.
- Heating with low or high pressure steam.
- Laundry equipments.
- Spraying. Irrigation. Dishwashers
- Air dryers. Water treatment.

Main characteristics

Normally closed and normally open.
Pilot operated.
Brass, stainless steel body.
BSP or NPT threaded connection.
Encapsulated coils. Shape A DIN 43650 Connection.
IP65 and NEMA4 Protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass body) silver (s.s. body).

Options:
- Energized coil indicator light.
- Explosion and / or weather proof coils and housings.
- Manual operator.

Operating pressure differential

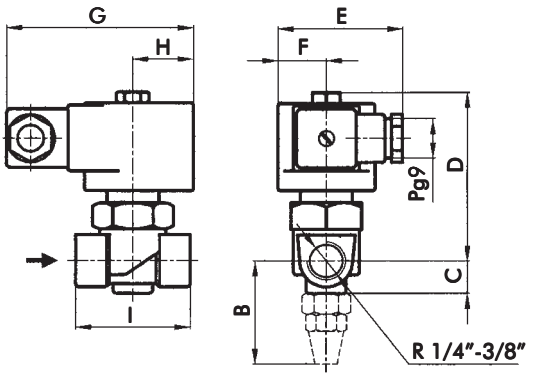
***Advise:** when using direct current (DC), a 25% reduction on the maximum operating pressure differential is expected*

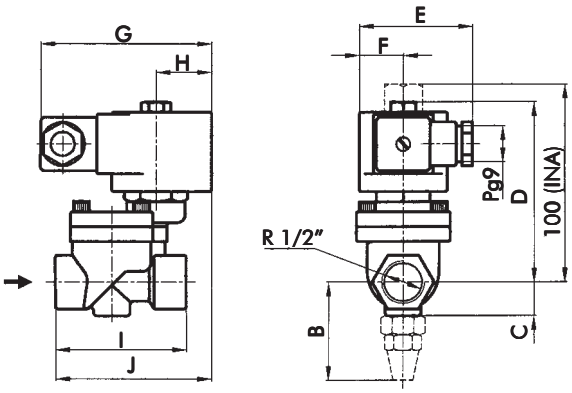
Type	Minimum		Maximum steam				Maximum other fluids	
			PTFE seat		EPDM seat			
	bar	psi	bar	psi	bar	psi	bar	psi
NC	0.1	1.5	10	150	3	45	15 *	225 *
NO	0.1	1.5	10	150	3	45	10	150

Technical specifications - Brass body

Pipe size ins.	Orifice size		Flow factor		Weight		Maximum temp. and catalog Nº according to seat material				
							Buna "N"	Neoprene	EPDM	FKM	PTFE
	mm	ins.	Kv	Cv	kg	Lb	80º C / 176º F	80º C / 176º F	150º C / 302º F	150º C / 302º F	180º C / 356º F
Normally closed											
1/4"	6	0.24	0.80	0.94	0.70	1.6	1390BA2	1390BN2	1390BE2	1390BV2	1390BT2
3/8"	9	0.35	1.60	1.87	0.65	1.4	1390BA3	1390BN3	1390BE3	1390BV3	1390BT3
1/2"	12	.47	2.35	2.75	0.90	2.00	1390BA4	1390BN4	1390BE4	1390BV4	1390BT4
Normally open											
1/4"	6	0.24	0.80	0.94	0.70	1.6	1390BA2INA	1390BN2INA	1390BE2INA	1390BV2INA	1390BT2INA
3/8"	9	0.35	1.60	1.87	0.65	1.4	1390BA3INA	1390BN3INA	1390BE3INA	1390BV3INA	1390BT3INA
1/2"	12	.47	2.35	2.75	0.90	2.00	1390BA4INA	1390BN4INA	1390BE4INA	1390BV4INA	1390BT4INA

General dimensions *1390*





øA	B	C	D	E	F	G	H	I	J
R 1/4"	48	15	77	57	22	85	27	52	-
R 3/8"									
R 1/2"	50	17	91	57	22	85	27	65	78

Measurements: mm

øA	B	C	D	E	F	G	H	I	J
R 1/4"	1.89	0.59	3.03	2.24	0.87	3.35	1.06	2.05	-
R 3/8"									
R 1/2"	1.97	0.67	3.58	2.24	0.87	3.35	1.06	2.56	3.07

Measurements: ins.

Special constructions

Stainless steel body:
- AISI304: change letter **B** for **S** in the catalog Nº. Example: 1390ST4.
- AISI316: change letter **B** for **I** in the catalog Nº. Example: 1390IT4.

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1390BA4
Explosion and weather proof coils.	**ZC**		**ZC**1390BA4
Weather proof housing.	**Y**		**Y**1390BA4
Explosion and weather proof housing.	**Z**		**Z**1390BA4
Manual operator: on the main orifice		**- M**	1390BA4-**M**
NPT connections		**T**	1390BA4**T**
Energized coil indicator light	See coils.		

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	º C	º F	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100m. Mount the valve in any position, preferably over horizontal pipeline with the coil upright. The valve input pressure must always be > than the pressure downstream from the valve. For the normally closed or normally open valve to open, the minimum pressure indicated in each model must be observed.

Application according to seat material

Seat material	Buna "N"	Neoprene	EPDM	FKM	PTFE
Maximum temperature	+80º C / 176º F	+80º C / 176º F	+150º C / 302º F	+150º C / 302º F	+180º C / 356º F
Uses	Water, air, light oils, kerosene, low and medium vacuum.	Oxygen, alcohol, argon, other non-corrosive light gases and liquids, Freon 12.	Water steam, hot water, acetone.	Benzene, naphta, aromatics, etc. hot gases, high vacuum, diesel oil.	Steam, hot oils, corrosive fluids.

1393 Series

CERTIFIED QUALITY SYSTEM

Applications:
- Steam dryers, autoclaves, boiling pans, fryers, condensation drainers, coffee machines.

Main characteristics

Normally closed and normally open.
Direct acting. No minimum differential pressure to operate.
Forged brass, nickel-plated forged brass body.
BSP or NPT threaded connections.
Stainless steel blade type closure PTFE seats.
The straight passage prevents pressure drops and turbulence caused by the fluid's changing direction as it is the case with conventional valves.
Shape A DIN 43650 connection encapsulated coils.

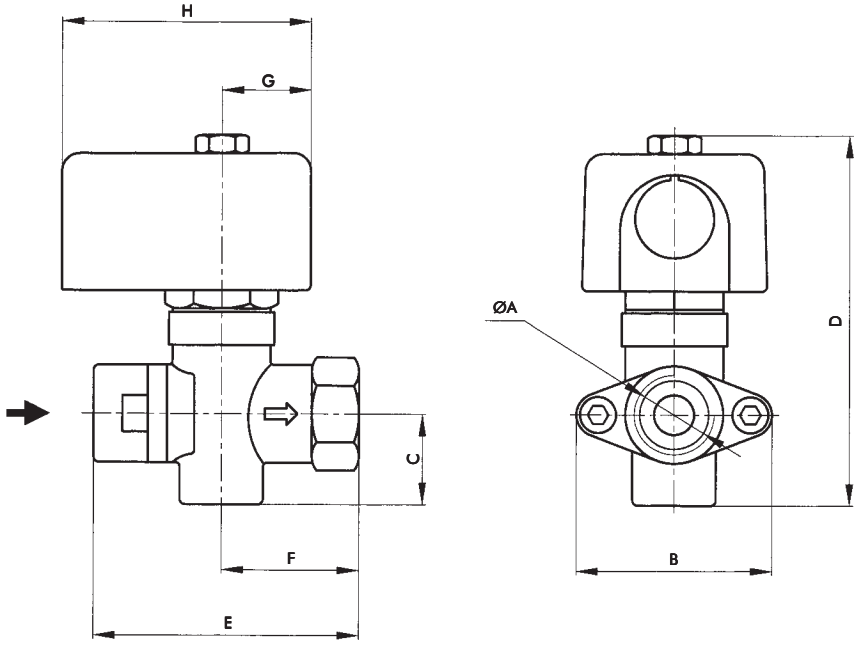
IP65 and NEMA 4 Protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper.

Options:
- Energized coil indicator light.
- Explosion and weather proof coils and housings.

Technical specifications

Pipe size ins.	Orifice size		Flow factor		Δp maximum		Weight		Maximum temperature		Catalog Nº.	
	mm	ins.	Kv	Cv	bar	psi	kg	Lb	ºC	ºF	Brass	Nickel plated
Normally closed												
1/4"	8	0.31	1.80	2.1	4	60	0.83	1.8	180	356	1393BS082	1393NS082
3/8"			2.80	3.28			0.75	1.7			1393BS083	1393NS083
1/2"			2.80	3.28			0.77	1.7			1393BS084	1393NS084
Normally open												
1/4"	8	0.31	1.80	2.1	4	60	0.83	1.8	180	356	1393BS082NA	1393NS082NA
3/8"			2.80	3.28			0.75	1.7			1393BS083NA	1393NS083NA
1/2"			2.80	3.28			0.77	1.7			1393BS084NA	1393NS084NA

General dimensions *1393*



øA	B	C	D	E	F	G	H
R 1/4"	54	25	104	73	38	25	68
R 3/8"							
R 1/2"							

Measurements: mm

øA	B	C	D	E	F	G	H
R 1/4"	2.13	0.98	4.09	2.87	1.50	0.98	2.68
R 3/8"							
R 1/2"							

Measurements: ins.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	^{0}C	^{0}F	
AC 50 Hz	M20H	20	66	33	180	356	1
AC 60 Hz	M20H	20	66	33	180	356	2

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V

Options	Prefix	Suffix	Examples
Weather proof housing	**Y**		**Y**1393BS802
Explosion and weather proof housing	**Z**		**Z**1393BS802
NPT connections		**T**	1393BS802**T**

Recommendations for installation

Place a strainer upstream the valve with a porosity $\leq 100\,\mu$.
Mount **only** over horizontal pipeline with the coil upright.

2 way solenoid microvalves.

2026 Series

CERTIFIED QUALITY SYSTEM

Applications:
- Instrumentation.
- Burner pilot for gas and oil.
- Welding equipment. Humidifiers.
- Dental equipment.
- Dry air-gas. Light liquids.

Main characteristics

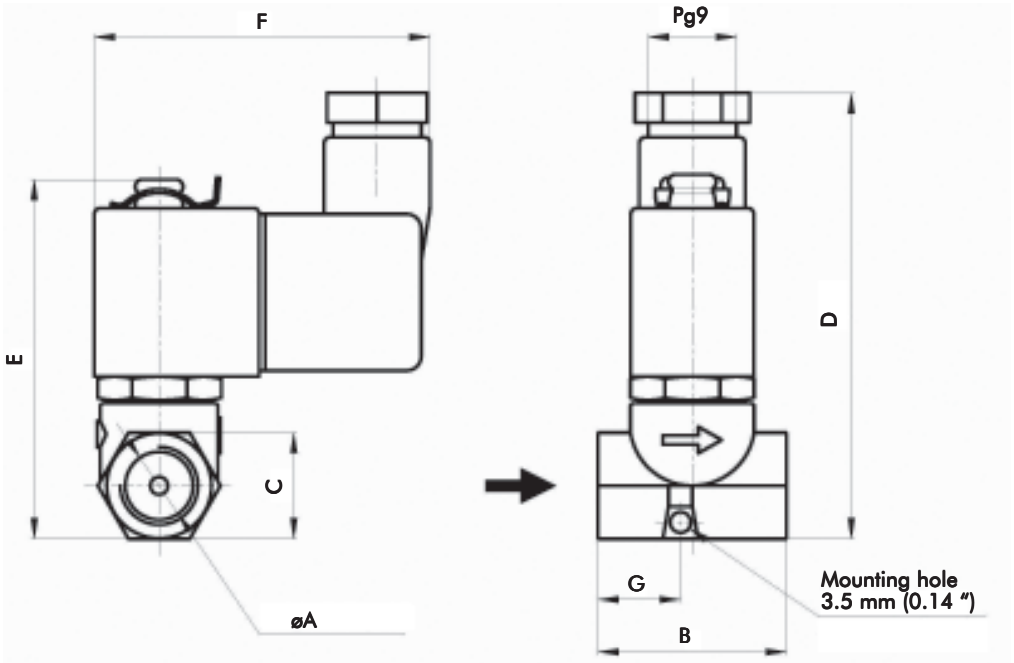
Normally closed.
Direct acting. No minimum differential pressure to operate.
Forged brass compact body.
BSP or NPT threaded connections.
Encapsulated minicoils.

Shape B DIN 43650 connection.
IP65 and NEMA4 Protection.
Response time with air at 6 bar (10 milliseconds)
Approximate weight: 170 g. (0.38 Lb)
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper.

Technical specifications

Pipe size ins.	Orifice size		Flow factor		Maximum Δp				Maximum temp. and catalog Nº according to seat material			
					AC		DC		Buna "N"	Neoprene	EPDM	FKM
	mm	ins.	Kv	Cv	bar	psi	bar	psi	80º C / 176º F	80º C / 176º F	150º C / 302º F	150º C / 302º F
Normally closed - Minimum Δp: 0												
1/8"	1.25	.049	0,05	0.06	50	750	37	550	2026BA121	2026BN121	2026BE121	2026BV121
	1.75	.068	0,09	0.11	20	300	15	225	2026BA171	2026BN171	2026BE171	2026BV171
	2.25	.088	0,13	0.15	10	150	7.5	112	2026BA221	2026BN221	2026BE221	2026BV221
	3.00	.118	0,26	0.30	4	60	3	45	2026BA301	2026BN301	2026BE301	2026BV301
1/4"	1.25	.049	0,05	0.06	50	750	37	550	2026BA122	2026BN122	2026BE122	2026BV122
	1.75	.068	0,09	0.11	20	300	15	225	2026BA172	2026BN172	2026BE172	2026BV172
	2.25	.088	0,13	0.15	10	150	7.5	112	2026BA222	2026BN222	2026BE222	2026BV222
	3.00	.118	0,26	0.36	4	60	3	45	2026BA302	2026BN302	2026BE302	2026BV302

General dimensions *2026*



øA	B	C	D	E	F	G
R 1/8"	32	18	76	61	57	14
R 1/4"						

Measurements: mm

øA	B	C	D	E	F	G
R 1/8"	1.26	0.71	2.99	2.40	2.24	0.55
R 1/4"						

Measurements: ins.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	º C	º F	
AC 50 Hz	GF06C	6	10.8	7.5	155	311	1
AC 60 Hz	GF06C	6	12.9	8.0	155	311	2
DC	GF06C	6	6	6	155	311	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
NPT connections		**T**	2026BA121**T**

Application according to seat material

Seat material	Buna "N"	Neoprene	EPDM	FKM
Maximum temperature	+80º C / 176º F	+80º C / 176º F	+150º C / 302º F	+150º C / 302º F
Uses	Water, air, light oils, kerosene, low and medium vacuum.	Oxygen, alcohol, argon, other non-corrosive light gases and liquids, Freon 12.	Water steam, hot water, acetone.	Benzene, naphta, aromatics, etc. hot gases, high vacuum, diesel oil.

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100μ.
Any position, preferably over horizontal pipeline with the coil upright.

2036 Series ø 3/8" - 1/2" and 3/4"

2036 Series ø 1"

Applications:
- Washing machines.
- Lubricated air, hot air, dry air, etc.
- Oxygen and acetylene equipments.
- Spraying. Irrigation. Dishwashers.

Main characteristics

Normally closed.
Pilot operated.
Forged brass body.
BSP or NPT threaded connections.
Plastic or metal core diaphragm.
Shape B DIN 43650 connection encapsulated minicoils.
IP65 and NEMA4 Protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper.

Operating pressure differential

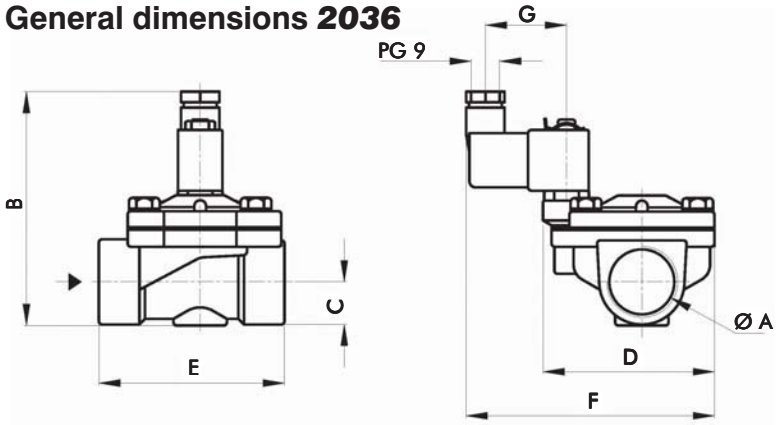
Size	Minimum		Maximum		Maximum steam EPDM	
	bar	psi	bar	psi	bar	psi
3/8"	0.2	3	15	225	3	45
1/2"						
3/4"						
1"	0.3	4.5				

Technical specifications

ø Connect.	Orifice size		Flow factor		Weight		Maximum temp. and catalog Nº according to seat material			
							Buna "N"	Neoprene	EPDM	FKM
	mm	ins.	Kv	Cv	kg	Lb	80º C / 176º F	80º C / 176º F	150º C / 302º F	150º C / 302º F
3/8"	13	0.50	2.60	2.90	0.320	0.7	2036BA03	2036BN03	2036BE03	2036BV03
1/2"	13	0.50	3.60	4.20	0.320	0.7	2036BA04	2036BN04	2036BE04	2036BV04
3/4"	16	0.63	5.50	6.40	0.225	1.4	2036BA06	2036BN06	2036BE06	2036BV06
1"	25	1	9	10.50	0.980	2.2	2036BA08	2036BN08	2036BE08	2036BV08

BVQI ISO 9001
CERTIFIED QUALITY SYSTEM

General dimensions *2036*

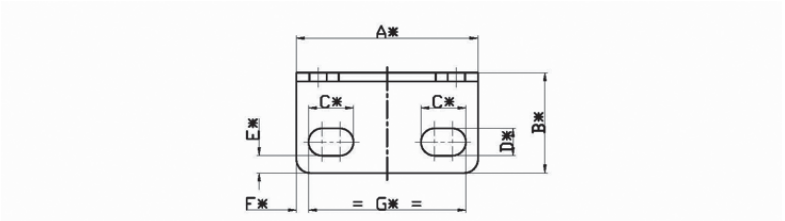


øA	B	C	D	E	F	G
R 1"	111	20	81	87	118	35

Measurements: mm

øA	B	C	D	E	F	G
R 1"	4.37	0.79	3.19	3.43	4.65	1.38

Measurements: ins.

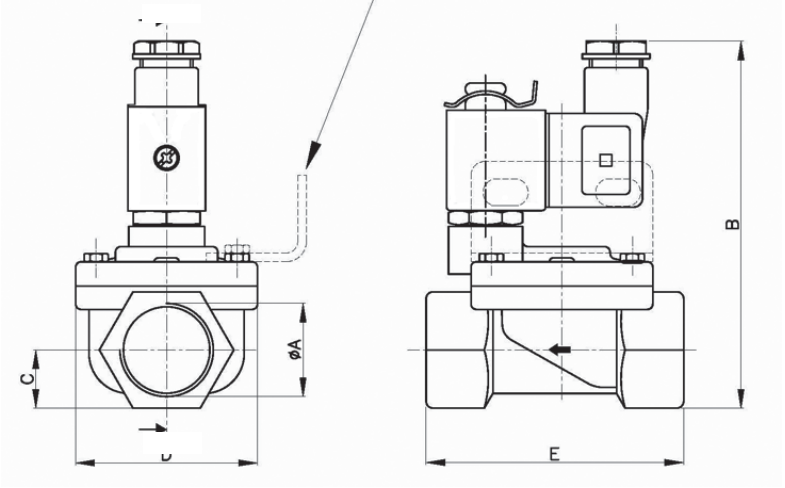


A*	B*	C*	D*	E*	F*	G*
52.5	29	13	7.9	5	3.5	45.5

Measurements: mm

A*	B*	C*	D*	E*	F*	G*
2.07	1.14	0.51	0.31	0.20	0.14	1.79

Measurements: ins.



øA	B	C	D	E
R 3/8"	95	13	45	64
R 1/2"				
R 3/4"	103	17	52	73

Measurements: mm

øA	B	C	D	E
R 3/8"	3.74	0.51	1.77	2.52
R 1/2"				
R 3/4"	4.06	0.67	2.05	2.86

Measurements: ins.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	º C	º F	
AC 50 Hz	GF06C	6	10.8	7.5	155	311	1
AC 60 Hz	GF06C	6	12.9	8.0	155	311	2
DC	GF06C	6	6	6	155	311	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Mounting bracket		**-MB**	2036BA03**-MB**
NPT connections		**T**	2036BA06**T**
Energized coil indicator light	See coils.		

Application according to seat material

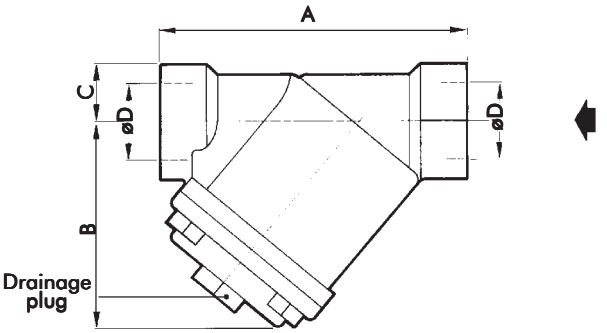
Seat material	Buna "N"	Neoprene	EPDM	FKM
Maximum temperature	+80º C / 176º F	+80º C / 176º F	+150º C / 302º F	+150º C / 302º F
Uses	Water, air, light oils, kerosene, low and medium vacuum.	Oxygen, alcohol, argon, other non-corrosive light gases and liquids, Freon 12.	Water steam, hot water, acetone.	Benzene, naphta, aromatics, etc. hot gases, high vacuum, diesel oil.

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100m.
Preferably over horizontal pipeline with the coil upright.

"Y" strainer for general purpose.

General dimensions *1359*



A	B	C	D(ø)
80	60	16	1/2"
100	78	18	3/4"
120	95	21	1"
150	121	32	1.1/2"
180	165	39	2"

Measurements: mm

A	B	C	D(ø)
3,15	2,36	0,63	1/2"
3,93	3,07	0,70	3/4"
4,72	3,74	0,82	1"
5,90	4,76	1,26	1.1/2"
7,08	6,49	1,53	2"

Measurements: ins.

Applications:

• Strainers must be used wherever it is essential that the fluid flowing through pipe lines be maintained free of foreign solid matter, to assure the correct operation of the solenoid valve.

Options	Suffix	Example
NPT connections	**T**	1359BS4**T**

Main characteristics

Gray cast body.
Basket type filtering element with stainless steel double mesh.
Particle retention capacity from 100 microns.
Its design features guarantee 100% filtration of the product.
Flanged cover with drainage connection.
Special bronze, carbon steel, stainless steel constructions.
Low pressure drop.

Technical specifications

Pipe size ins.	Flow factor		Δp Maximum		Weight		Maximum temp.		Catalog Nº.
	Kv	Cv	bar	psi	kg	Lb	ºC	ºF	
Iron body (1)									
1/2	6	7	10	150	0,5	1.1	180	356	1359FS04
3/4	12	14			1	2.2			1359FS06
1	19	22			1,6	3.5			1359FS08
1.1/2	40	47			3	6.6			1359FS12
2	65	76			5,2	11.5			1359FS16
Bronze body (2)									
1/2	6	7	10	150	0,4	0.9	180	356	1359BS04
3/4	12	14			1,1	2.4			1359BS06
1	19	22			1,7	3.8			1359BS08
1.1/2	40	47			3,2	7.1			1359BS12
2	65	76			5,6	12.4			1359BS16

*(**1** Standard construction (in stock) - **(2)** Special construction (upon request).*

2 Way Solenoid Valves for Combustion Use.


1312 - 2012


1330


2030


1332


1356


1388


2088


V171

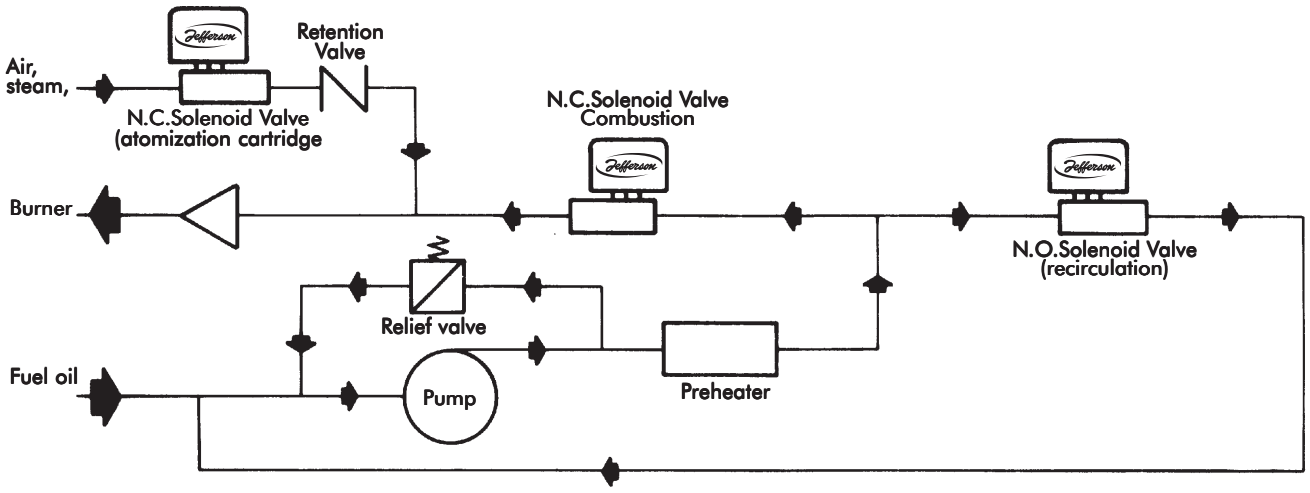
		Pages
Combustion	Solenoid valves. For liquid fuel and combustible gases.	**C-2** / **C-3** **C-4** / **C-5** **C-6** / **C-7**
1312 - 2012 Series	2 way solenoid valves. For fuel oil.	**C-8** / **C-9**
1330 - 2030 Series	2 way valves. For fuel gas and other gases.	**C-10** / **C-11**
1332 Series	Free handle manual reset safety valve.	**C-12** / **C-13**
1356 Series	2 way solenoid valves for fuel oil, gas-oil and mixtures thereof.	**C-14** / **C-15**
1388 Series	Solenoid valves with slow opening and quick shutoff for natural gas and other gases.	**C-16** / **C-17** **C-18** / **C-19**
2088 Series	Solenoid valves with slow opening and quick shutoff for natural gas and other gases.	**C-20** / **C-21** **C-22**
V171 Series	Thermoelectric safety valves.	**C-23** / **C-24**

Jefferson provides solenoid valves specially designed for combustion, for both liquid and gaseous fuels.

Solenoid valves for liquid fuels

1312 - 2012 and 1356 Series are direct acting and are applied particularly for the control of all fuel oil grades, both light and heavy, for temperatures up to 180ºC (356ºF) and pressure up to 21 bar (300 psi). They may also be used for LPG; heavy oil, gas or steam. Series 2026 & 1327 described in General Purpose section, are also applied to light liquid fuel burners, such as gas-oil or LPG.

Typical circuit of a fuel oil burner with mechanical pressure atomizer, preheated up to more than 100ºC, with a recirculation valve and an atomization cartridge cleaning valve.



Flow charts

For Fuel oil (100ºC) in kg/hour
For Gas-oil (20ºC) in liters/hour

Δp	1356 Series				1312 Series							
	Flow factor Kv				Flow factor Kv							
	0.13		0.6		0.39		0.6		1.4		2.5	
	Fuel oil	Gas-oil	Fuel oil	Gas-oil	Fuel oil	Gas-oil	Fuel oil	Gas-oil	Fuel oil	Gas-oil	Fuel oil	Gas-oil
0,1	41	45	189	207	123	135	189	207	440	483	787	863
0,2	58	63	267	293	174	190	267	293	623	683	1112	1220
0,3	71	78	327	359	213	233	327	359	763	837	1362	1494
0,4	82	90	378	414	245	269	378	414	881	966	1573	1725
0,5	91	100	422	463	274	301	422	463	985	1080	1759	1929
0,7	108	119	499	548	325	356	499	548	1165	1278	2081	2282
1	129	142	597	655	388	426	597	655	1393	1528	2487	2728
2	183	201	844	926	549	602	844	926	1970	2160	3518	3858
3	224	246	1034	1134	672	737	1034	1134	2413	2646	4308	4725
5	289	317	1335	1464	868	952	1335	1464	3115	3416	5562	6099
10	409	449	1888	2070	1227	1346	1888	2070	4405	4830	7866	8626

For Fuel oil Nº 6 (212ºF) in Lb/hour
For Fuel oil Nº 2 (68ºC) in gal/min

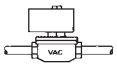
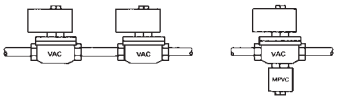
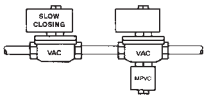
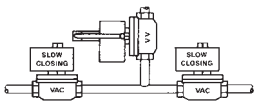
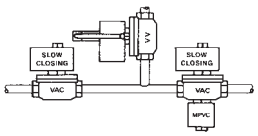
Δp	1356 Series				1312 / 2012 Series							
	Flow factor Cv				Flow factor Cv							
	0.15		0.7		0.46		0.7		1.6		2.9	
	Nº 6	Nº 2	Nº 6	Nº 2	Nº 6	Nº 2	Nº 6	Nº 2	Nº 6	Nº 2	Nº 6	Nº 2
1	77	10	354	46	230	30	354	46	825	107	1474	191
2	108	14	500	65	325	42	500	65	1167	152	2084	271
3	133	17	613	80	398	52	613	80	1429	186	2553	332
4	153	20	707	92	460	60	707	92	1651	214	2948	383
5	171	22	791	103	514	67	791	103	1845	240	3295	428
10	242	31	1119	145	727	94	1119	145	2610	339	4660	606
20	343	45	1582	206	1028	134	1582	206	3691	480	6591	856
25	383	50	1769	230	1150	149	1769	230	4127	536	7369	957
50	542	70	2501	325	1626	211	2501	325	5836	758	10421	1354
100	766	100	3537	460	2299	299	3537	460	8253	1072	14738	1915
150	939	122	4332	563	2816	366	4332	563	10108	1313	18050	2345

Solenoid valves for combustible gases

1330 / **2030**, **1332**, **1388** and **2088** Series valves are especially designed to comply with the Resolutions, Regulations and Recommendations for the use of Natural Gas in Industrial Installations.
They may be used with other gases, such as LPG, propane, manufactured gas, etc., as well as with air or any other noncombustible neutral gas.
1330 / **2030** Series **Normally Closed** diaphragm valves are optionally provided with adjustable slow openings up to 10 sec..
1388 and **2088** series valves include a system that allows them to open in two stages, the first of which is quick and with adjustable opening percentage, and the second is time adjustable up to > 20 seconds.
Both **1330** / **2030** and **1332, 1388** and **2088** Series are optionally provided with microcontacts for proof of closed valve. **1330, 2030** and **2088** Series have a reed switch, and the others have an SPDT microswitch.

2088 Series are provided with a power-rectifier-controller that makes it possible for the valve to open at max. coil power, and after 90 sec. to come down to 16% of nominal value, that is, starting at 50 W and down to 8 W after 90 sec. The benefits over conventional systems are, safe opening, low power consumption, low working temperature and longer coil life.

Automatic shutoff valve train for Natural Gas boiler burners according to current Resolutions for industrial installations.

Diagrams	Requirements	Boiler maximum thermal charge	
		Automatic	Semiautomatic and manual
	One automatic shutoff valve. Tc< 5sec.	CT < 360 kwh = = 309,600 kcal./h = = 1,228,320 btu/h	CT < 600 kwh = = 516.000 kcal./h = = 2,047,200 btu/h
	Two automatic shutoff valves or one automatic shutoff valve with microcontact for closed valve verification (MCVV) Tc: < 1 sec.	CT < 720 kwh = = 619.200 kcal./h = = 2,456,640 btu/h **without pilot** CT < 600 kwh = = 516.000 kcal./h = = 2,047,200 btu/h	CT < 1.200 kwh = = 1.032.000 kcal./h = = 4,094,400 btu/h
	Two automatic shutoff valves, one with MCVV. Valve upstream of the train: Mot = 10 sec. Both Tc: < 1 sec.	CT < 1.800 kwh = = 1.548.000 kcal./h **pilot burners** CT < 60 kwh = = 51.600 kcal./h = = 204,720 btu/h (no need for Mot)	CT < 3.600 kwh = = 3.096.000 kcal./h = = 12,283,200 btu/h **pilot burners** CT < 60 kwh = = 51.600 kcal./h = = 204,720 btu/h (no need for Mot)
	Two automatic shutoff valves with a venting N.O. valve in between. Mot: 10 sec. Tc < 1 seg.	CT < 12.000 kwh = = 10.320.000 kcal./h = = 40,944,000 btu/h	CT < 12.000 kwh = = 10.320.000 kcal./h = = 40,944,000 btu/h
	Two automatic shutoff valves, one with MCVV and one venting N.O. valve in between. Mot: 20 sec. Tc < 1 sec.	CT > 12.000 kwh = =10.320.000 kcal./h = = 40,944,000 btu/h	CT > 12.000 kwh = = 10.320.000 kcal./h = = 40,944,000 btu/h
For equipment wiith a thermal charge greater than 30,000 kwh and multiple burners, an automatic shutoff valve independent from the burner system shall be provided. (See manual reset valves).			

TC: Thermal Charge: 1 kwh = 860 kcal./h = 3,412 btu/h; Ct: Maximum Closing Time in seconds; Mot: Minimum opening time in seconds; MCVV: microcontact for closed valve verification.

Automatic systems: They are similar to those indicated for boilers. If there are no flame control devices available, an automatic shutoff and manual reset valve shall be installed.

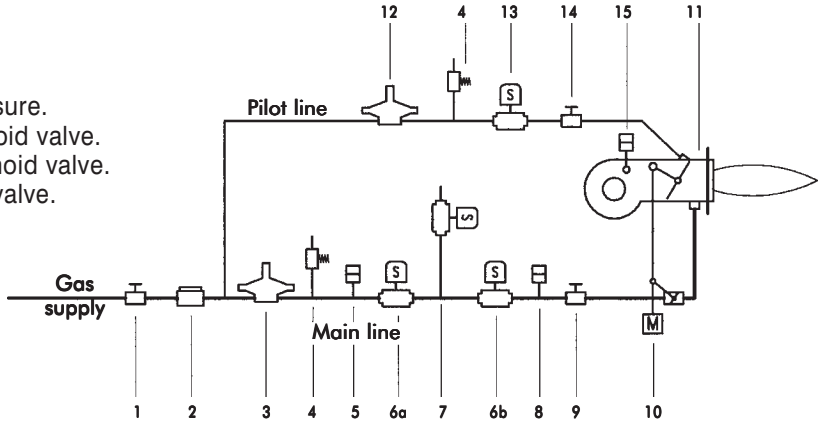
Manual systems: The combustion equipment includes at least two automatic shutoff valves, one of which is a manual reset valve.

Strainers
Appliances which are not for domestic use must have strainers or dust separators immediately after the (manual) blocking valve. Said strainers shall retain 100% of the solid particles from 50μ.

Applications

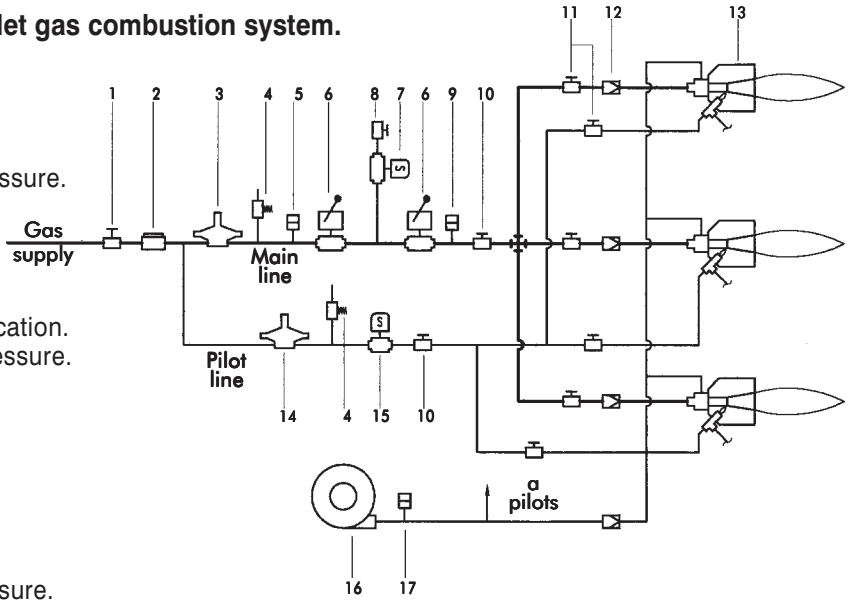
Tandem valves for an automatic gas burner up to 12,000 kw.

1 Main manual shutoff valve.
2 Gas strainer.
3 Main gas pressure regulator.
4 Venting safety valve.
5 Pressure switch for minimum gas pressure.
6a 1st Series standard closed Jefferson solenoid valve.
6b 2nd Series standard closed Jefferson solenoid valve.
7 Venting standard open Jefferson solenoid valve.
8 Pressure switch for maximum gas pressure.
9 Loss testing manual valve.
10 Firepower regulation device.
11 Burner.
12 Pilot gas pressure regulator.
13 Jefferson pilot solenoid valve.
14 Manual valve for leakage.
15 Pressure switch for minimum air pressure.



Tandem valves for a multiple fire-outlet gas combustion system.

1 Main manual shutoff valve.
2 Gas strainer.
3 Main gas pressure regulator.
4 Venting safety valve.
5 Pressure switch for minimum gas pressure.
6 Series standard closed Jefferson manual reset valve.
7 Venting standard open Jefferson solenoid valve.
8 Manual valve with microcontact verification.
9 Pressure switch for maximum gas pressure.
10 Manual shutoff valve for leakage test.
11 Manual shutoff valve.
12 Firepower regulation device.
13 Burner.
14 Pilot gas pressure regulator.
15 Pilot Jefferson solenoid valve.
16 Ventilator.
17 Pressure switch for minimum air pressure.



Kv calculation for two valves or more

-2 equal valves in series $Kv_t = Kv_1 \times 0,7$

- 2 or more, equal valves or with different sizes in series.
$1/Kv_t = 1/Kv_1 + 1/Kv_2 + \ldots + 1/Kv_n$

- 2 or more equal valves or with different sizes in parallel.
$Kv_t = Kv_1 + Kv_2 + \ldots + Kv_n$

Kv_t: ***Kv*** *equivalent to a solenoid valve that replaces them.*

Cv calculation for two valves or more

-2 equal valves in series $Cv_t = Cv_1 \times 0,7$

- 2 or more, equal valves or with different sizes in series.
$1/Cv_t = 1/Cv_1 + 1/Cv_2 + \ldots + 1/Cv_n$

- 2 or more equal valves or with different sizes in parallel.
$Cv_t = Cv_1 + Cv_2 + \ldots + Cv_n$

Cv_t: ***Cv*** *equivalent to a solenoid valve that replaces them.*

Flow chart for Natural Gas or other gases. Nm^3/h

P_1	Pressure drop through the valve in mm w.c.										
	20	40	60	100	150	200	300	500	700	1000	1500
100	1,61	2,27	2,78	3,58							
200	1,62	2,28	2,79	3,60	4,40	5,06					
300	1,62	2,29	2,81	3,62	4,42	5,09	6,20				
500	1,64	2,32	2,83	3,65	4,46	5,14	6,26	8,00			
700	1,65	2,34	2,86	3,69	4,50	5,19	6,32	8,08	9,47		
1000	1,68	2,37	2,90	3,74	4,57	5,26	6,41	8,20	9,61	11,32	
1300	1,70	2,40	2,94	3,79	4,63	5,33	6,50	8,32	9,75	11,49	
1600	1,72	2,43	2,98	3,84	4,69	5,41	6,59	8,43	9,89	11,65	13,93
2000	1,75	2,48	3,03	3,90	4,77	5,50	6,71	8,58	10,07	11,87	14,21
3000	1,82	2,58	3,15	4,07	4,97	5,73	6,99	8,95	10,50	12,40	14,87
4000	1,89	2,67	3,27	4,22	5,16	5,95	7,26	9,30	10,92	12,91	15,50
5000	1,96	2,77	3,39	4,37	5,34	6,16	7,52	9,64	11,33	13,39	16,11
7000	2,09	2,95	3,61	4,65	5,69	6,56	8,01	10,28	12,09	14,32	17,26
10000	2,26	3,20	3,92	5,05	6,18	7,12	8,70	11,18	13,16	15,60	18,86
15000	2,53	3,58	4,38	5,65	6,91	7,97	9,74	12,53	14,76	17,54	21,25
20000	2,77	3,92	4,80	6,19	7,57	8,74	10,69	13,75	16,21	19,28	23,41

P_1 = Gauge pressure at the valve inlet in mm w.c.

Calculation base:
Relative density 0,65
Fluid temperature: 25ºC
Kv = 1

Correction factor for density

Relative density	0,60	0,62	0,65	1,00	1,20	1,50
Correction factor	1,04	1,02	1,00	0,81	0,74	0,66

Application examples

Data
Fluid: Natural Gas density 0.60
Flow: 120 Nm^3/h
Input pressure: 500 mm w.c.
Admissible pressure drop through the valve: 15%
Unknown: Kv.

Procedure
1st) Flow / correction factor = 120 / 1.04 = 115
2nd) Search for value at intersection P_1 = 500 mm w.c. and Δp = 60 mm w.c. in the flow chart: value found: 2.83
3rd) Corrected flow / value found = Kv: 115 / 2.83 = 40.6
For 2030 Series the most approximate value is:
2030LA16 Kv = 43.
For 1388 Series the most approximate value is:
1388LA16D Kv = 45.

Pressure drop for Kv = 45
1) Corrected flow / Kv: 115 / 45 = 2.55
2) Search for the closest value for P_1 = 500 mm w.c. in the table, value found: in Δp 40 value: 2.32
3) Δp calculation: $(2.55 / 2.32)^2 \times 40 = 48$ mm w.c..

Pressure drop for Kv = 43
1) Corrected flow / Kv: 115 / 43 = 2.67
2) Search for the closest value for P_1 = 500 mm w.c. in the table value found: in Δp 60 value: 2.83
3) Δp calculation: $(2.67 / 2.83)^2 \times 60 = 53$ mm w.c.

Calculation for two valves in series with the same data:
1) Corrected flow: 120 / 1.04 = 115
2) Search for a value for Δp 60 or Δp 100.
We chose Δp 100 = 3.65.
3) Kv = 115 / 3.65 = 31.5 (2 valves Kv) Kv for one valve: 31.5 / 0.7 = 45.
4) We must look for a valve with Kv greater than 45 to bring Δp 100 down to < 75 mm w.c.
(according to data shown).

2030 Series has no valve greater than 43, so it can only be possible in the 1388 Series:
we choose catalog number 1388LA20: Kv = 65
Corrected Kv: 65 x 0.707 = 46.

Pressure drop for corrected Kv = 46
1) Corrected flow / Kv: 115 / 46 = 2.5.
2) Search for P_1 = 500 mm w.c. line in the table the Δp with the closest value: 2.83 for Δp = 60.
3) Δp calculation: $(2.5 / 2.83)^2 \times 60 = 47$ mm w.c.

This 47 mm w.c. value belongs to the pressure drop through both valves.

Flow chart for Natural Gas or other gases. SCFH

P_1	Pressure drop through the valve in inches w.c.										
	1	2	3	4	6	8	12	20	30	40	60
2	55,2	78,0									
4	55,3	78,2	95,6	110,3							
5	55,4	78,2	95,7	110,4							
10	55,7	78,7	96,3	111,1	135,7	156,3					
20	56,4	79,7	97,5	112,4	137,3	158,2	192,8	246,5			
30	57,1	80,6	98,6	113,7	139,0	160,1	195,1	249,5	301,9		
40	57,7	81,5	99,7	115,0	140,6	161,9	197,4	252,5	305,6	348,7	416,4
50	58,4	82,4	100,8	116,3	142,1	163,8	199,7	255,5	309,3	352,9	421,7
75	59,9	84,7	103,6	119,5	146,0	168,3	205,2	262,7	318,2	363,3	434,8
100	61,5	86,8	106,3	122,6	149,8	172,6	210,6	269,7	326,9	373,5	447,5
125	63,0	89,0	108,9	125,6	153,5	176,9	215,9	276,5	335,3	383,3	459,8
150	64,4	91,0	111,4	128,5	157,1	181,1	221,0	283,2	343,6	393,0	471,9
200	67,3	95,1	116,3	134,2	164,1	189,2	230,9	296,1	359,5	411,5	495,0
250	70,0	98,9	121,0	139,7	170,8	196,9	240,4	308,4	374,8	429,3	517,2
400	77,6	109,6	134,2	154,9	189,4	218,5	266,9	342,8	417,2	478,6	578,5
600	86,7	122,5	150,0	173,1	211,8	244,3	298,6	383,9	467,8	537,4	651,3

P_1 = Gauge pressure at the valve inlet in inches w.c.

Calculation base:
Relative density 0,65
Fluid temperature: 77º F
Cv = 1

Correction factor for density

Relative density	0.60	0.62	0.65	1.00	1.20	1.50
Correction factor	1.04	1.02	1.00	0.81	0.74	0.66

Application examples

Data
Fluid: Natural Gas density 0.60
Flow: 4,300 SCFH
Input pressure: 20" w.c.
Admissible pressure drop through the valve: 15%
Unknown: Cv.

Procedure
1st) Flow / correction factor = 4,300 / 1.04 = 4,135
2nd) Search for value at intersection P_1 = 20" w.c. and Δp = 3" w.c. in the flow chart: value found: 97.5
3rd) Corrected flow / value found = Cv: 4,135 / 97.5 = 42.4
For 2030 Series the most approximate value is: 2030LA16 Cv = 50.
For 1388 Series the most approximate value is: 1388LA16D Cv = 57.

Pressure drop for Kv = 50
1) Corrected flow / Cv: 4,135 / 50 = 82.7
2) Search for the closest value for P_1 = 20" w.c. in the table value found: in Δp 2" value: 79.7
3) Δp calculation: $(82.7 / 79.7)^2 \times 2 = 2.15$" w.c.

Pressure drop for Cv = 57
1) Corrected flow / Cv: 4,135 / 57 = 72.54
2) Search for the closest value for P_1 = 20" w.c. in the table, value found: in Δp 2" value: 79.7
3) Δp calculation: $(72.54 / 79.7)^2 \times 2 = 1.66$" w.c.

Calculation for two valves in series with the same data:
1) Corrected flow: 4,300 / 1.04 = 4,135
2) Search for a value for Δp 2 or Δp 3.
We chose Δp 3 = 97.5
3) Cv = 4,135 / 97.5 = 42.4 (2 valves Cv) Cv for one valve: 42.4 / 0.707 = 60
4) We must look for a valve with Cv greater than 60 to bring Δp 3 down to < 2" w.c.
(according to data shown).

2030 Series has no valve greater than 50, so it can only be possible in the 1388 Series:
we choose catalog number 1388LA20: Cv = 76
Corrected Cv: 76 x 0.707 = 54

Pressure drop for corrected Cv = 54
1) Corrected flow / Cv: 4,135 / 54 = 76.6
2) Search for P_1 = 20" w.c. line in the table the Δp with the closest value: 79.7 for Δp = 2"
3) Δp calculation: $(79.7 / 76.6)^2 \times 2 = 2.19$" w.c.

This 2.19" w.c. value belongs to the pressure drop through both valves.

CERTIFIED QUALITY SYSTEM

1312 / 2012 Series

Applications:

- Burners for fuel oil (preheated or not) and its mixtures, gas-oil, etc., with mechanical pressure atomizer, rotating cup, compressed air, steam, etc.
- It may be used with heavy fluids, steam and corrosive fluids.

Main characteristics

Normally closed and normally open.
Lever activated direct acting. No minimum differential pressure to operate.
Body: bronze, stainless steel, etc..
Stainless steel needle type seats.
Class **H** coils coated with glass fibre and insulating impregnation.
Output cables for splicing.
Interior use housing with an outlet for electrical connector.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass body) silver (s.s. body).

Options:

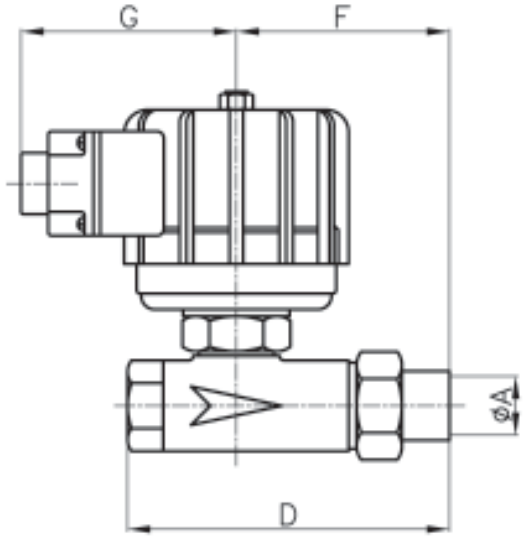
- Explosion and / or weather proof housings.

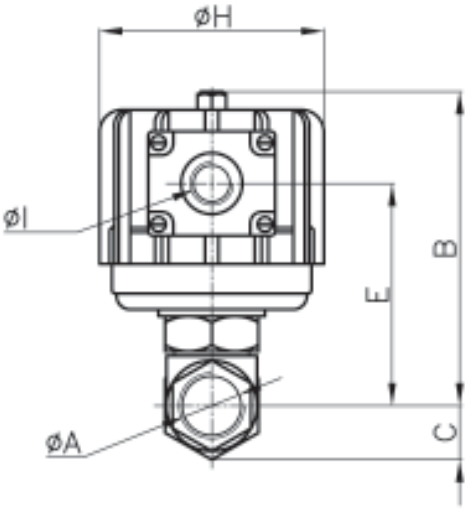
Technical specifications

***Advise:** when using direct current (DC), a 25% reduction on the maximum operating pressure differential is expected*

Piper size ins.	Orifice size		Flow factor		Δp * maximum		Maximum Temp.		Weight		Catalog Nº.	
	mm	ins.	Kv	Cv	bar	psi	ºC	ºF	kg	Lb	Brass	AISI 304
Normally closed												
1/2"	5	0.20	0.60	0.7	21	300	180	356	3.4	7.5	2012BS504	1312SS504
3/4"									3.6	7.9	2012BS506	1312SS506
	8	0.31	1.40	1.6	12	180					2012BS806	1312SS806
1"									3.8	8.4	1312BS808	1312SS808
	11	0.43	2.50	2.9	6	90					1312BSB08	1312SSB08
Normally open												
1/2"	4	0.16	0.39	0.46	15	225	180	356	3.4	7.5	2012BS404NA	1312SS404NA
3/4"									3.6	7.9	2012BS406NA	1312SS406NA
	5	0.20	0.60	0.7	12	180					2012BS506NA	1312SS506NA
1"	4	0.16	0.39	0.46	15	225			3.8	8.4	2012BS408NA	1312SS408NA
	5	0.20	0.60	0.7	12	180					2012BS508NA	1312SS508NA

General dimensions *1312 - 2012*





øA	B	C	D	E	F	G	øH	øI
R 1/2"	139	22	140	98	95	95	99	3/4"NF
R 3/4"								
R 1"	147	30	147	106	96			

Measurements: mm

øA	B	C	D	E	F	G	øH	øI
R 1/2"	5.47	0.87	5.51	3.86	3.74	3.74	3.90	3/4"NF
R 3/4"								
R 1"	5.79	1.18	5.79	4.17	3.78			

Measurements: ins.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	⁰C	⁰F	
AC 50 Hz	SH46C	46	277	104	155	311	1
	S46(*)	46	277	104	180	356	1
AC 60 Hz	SH46C	46	286	103	155	311	2
	S46(*)	46	286	103	180	356	2
D/C	SH48C	48	48	48	155	311	3
	S48(*)	48	48	48	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Weather proof housing	**Y**		**Y**1312BS504
Explosion and weather proof housing	**Z**		**Z**1312BS506
NPT connections		**T**	1312BS504**T**

Recommendations for installation

Mount the valve **only** over horizontal pipeline with the coil upright.

2 way solenoid valves. For fuel gas and other gases.

1330 Series

2030 Series

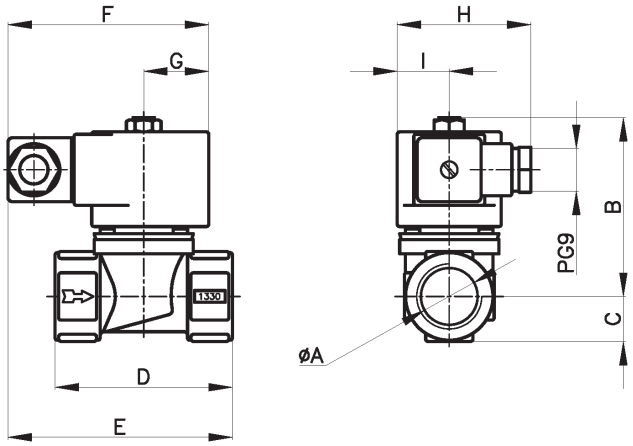
Main characteristics

Normally closed and normally open. Direct acting or pilot operated versions. Injected aluminium body. Stainless steel or aluminium die-cast bonnet. BSP or NPT threaded connections. Buna "N" seats and diaphragm. Encapsulated coil. DIN 43650 Connection. IP65 and NEMA 4 Protection. Quick or slow opening adjustable up to 10 sec. Closure in less than 1 second. Optional microcontact for closed valve verification. Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s. Shading coil: copper.

Technical specifications

Pipe size ins.	Orifice size		Flow factor		Pressure differential				Weight		Catalog N°
					Minimum		Maximum				
	mm	ins.	Kv	Cv	bar	psi	bar	psi	kg	Lb	
Normally closed - Direct acting											
1/2	8	3.18	1.7	2	0	0	1	30	0.5	1.1	1330LA0
1/2	18	0.71	2.7	3.2			0.2	3	0.5	1.1	1330LA04
3/4	18	0.71	4.2	4.9			0.2	3	0.5	1.2	1330LA06
1	32	1.26	10	1.2			0.05	0.75	1	2.2	2030LA08
1 1/4	32	1.26	12	14			0.05	0.75	0.9	1.9	2030LA10
Normally closed - Pilot operated - Quick open											
1	26	1.02	12	14	0.001	0.015	0.2	3	1	2.2	1330LA08
1 1/2	48	1.89	35	41					1.8	4.0	2030LA12
2	51	2.00	43	50					1.6	3.5	2030LA16
Normally closed - Pilot operated - Slow opening											
1	26	1.02	12	14	0.001	0.015	0.2	3	1.09	2.4	1330LA08L
1 1/2	48	1.89	35	41					1.88	4.2	2030LA12L
2	51	2.00	43	50					1.66	3.7	2030LA16L
Normally closed - Pilot operated - Reinforced diaphragm											
1	26	1.02	12	14	0.01	0.15	2	30	1	2.2	1330LAR08
1 1/2	48	1.89	35	41					1.8	4.0	2030LAR12
2	51	2.00	43	50					1.6	3.5	2030LAR16
Normally open - Direct acting											
1/2	8	3.18	1,7	2	0	0	1	15	0.6	1.3	1330LA0INA
1/2	18	0.71	2.7	3.2	0	0	0.2	3	0.6	1.3	1330LA04INA
3/4	18	0.71	4.2	4.9					0.6	1.3	1330LA06INA
Normally open - Pilot operated											
1	26	1.02	12	14	0.001	0.015	0.2	3	1	2.2	1330LA08NA
1 1/2	48	1.89	35	41					1.8	4.0	2030LA12NA
2	51	2.00	43	50					1.6	3.5	2030LA16NA
Normally open - Pilot operated - Reinforced diaphragm											
1	26	1.02	12	14	0.01	0.15	2	30	1	2.2	1330LAR08NA
1 1/2	48	1.89	35	41					1.8	4.0	2030LAR12NA
2	51	2.00	43	50					1.6	3.5	2030LAR16NA

General dimensions *1330 - 2030*



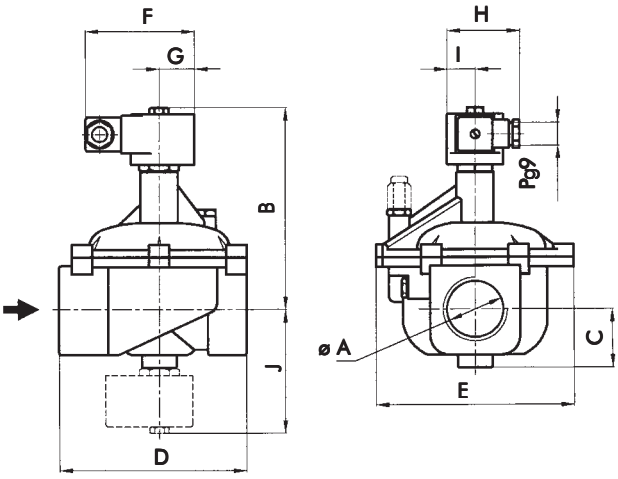
DIRECT ACTING

øA	B	C	D	E	F	G	H	I
1/2"	75	19	75	95	85	27	57	22
3/4"								
1"	90	29	105	111	85	27	57	22
1.1/4"								

Measurements: mm

øA	B	C	D	E	F	G	H	I
1/2"	2.95	0.75	2.95	3.74	3.35	1.06	2.24	0.87
3/4"								
1"	3.54	1.14	4.13	4.37	3.35	1.06	2.24	0.87
1.1/4"								

Measurements: ins.



PILOT OPERATED

øA	B	C	D	E	F	G	H	I	J
1"	131	22	157	124	85	27	57	22	74
1 1/2"	158	46	148	154	85	27	57	22	98
2"									

Measurements: mm

øA	B	C	D	E	F	G	H	I	J
1"	5.16	0.87	6.18	4.88	3.35	1.06	2.24	0.87	2.91
1 1/2"	6.22	1.81	5.83	6.06	3.35	1.06	2.24	0.87	3.86
2"									

Measurements: ins.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	°C	°F	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
D/C	MH19C	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**2030LA12
Explosion and weather proof coils.	**ZC**		**ZC**1330LA08
Explosion and weather proof housing.	**Z**		**Z**1327BA302
NPT connections		**T**	1330LA0**T**
Closed valve verification (*)		**-I2**	2030LA12-**I2**
Energized coil indicator light	See coils.		

(*) Minimum dp 0.005 bar - 0.075 psi

Applications

- Low and medium pressure gas combustion equipment.
- Low and medium pressure air or any other neutral gas.
- They comply with the resolutions, regulations and recommendations for the use of natural gas in industrial installations in Argentina.

Recommendations for installation

Place a strainer upstream the valve with a porosity $\leq 50\mu$.
Any position, preferably over horizontal pipeline with the coil upright.

Free handle manual reset safety valve.

1332 Series

CERTIFIED QUALITY SYSTEM

Applications

- Shutoff security systems that work with temperature limits, pressure, lack of flame, level, etc., in boiler combustion systems.
- Combustion equipment with charges over 30,000 Kw/h and multiple burners.
- Burners for automatic and semiautomatic furnaces.

Main characteristics.

Normally closed.
Direct acting. No minimum differential pressure to operate.
"Free handle" system, i.e., it closes automatically when current is cut off and opens manually when the electric signal is on.
Injected or cast aluminium body.
Buna "N" seat.
DIN 43650 Connection encapsulated coils.
IP65 and NEMA 4 Protection.
Closed or open valve viewer.

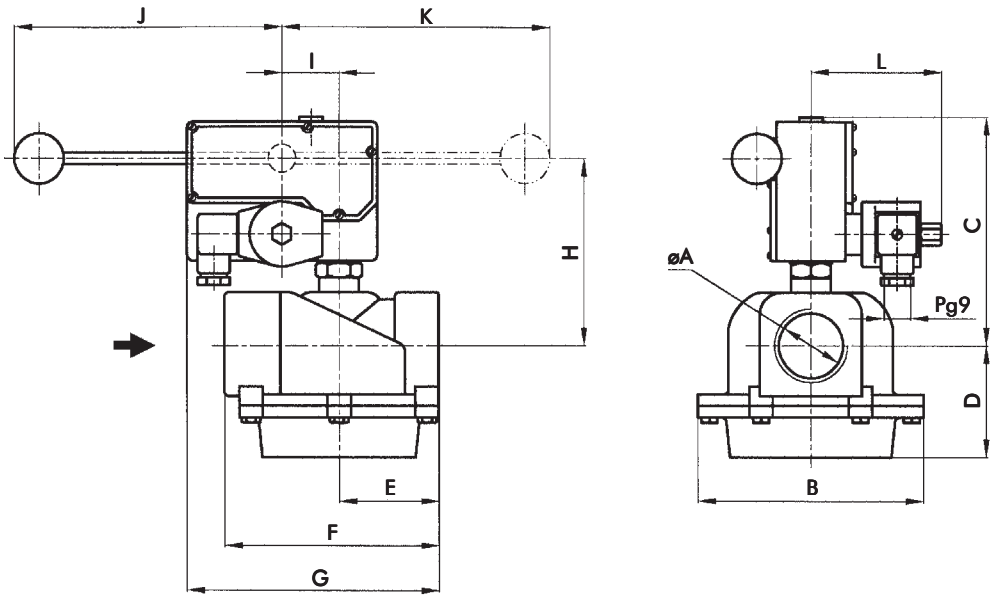
360º Rotating housing.
Response time < 50 milliseconds.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper.

Options:
- Energized coil indicator light.
- Explosion and / or weather proof coils and housings.
- Explosion and / or weather proof coils and housings.

Technical specifications - Brass body

Pipe size ins.	Orifice size		Flow factor		Δp Maximum		Weight kg.		Maximum Temp.		Catalog Nº.
	mm	ins.	Kv	Cv	Bar	Psi	Kg	Lb	ºC	ºF	
1"	26	1.02	13	15	3	45	2.3	5.1	80	176	1332LA08
1.1/4"	32	1.26	22	26							1332LA10
1.1/2"	48	1.89	30	35	2	30	3.3	7.3			1332LA12
2"	51	2.00	55	64			3.1	6.8			1332LA16
2 1/2"	76	3.00	60	70	1	15	6.2	13.7			1332LA20
3"	76	3.00	76	89			6.0	13.2			1332LA24

General dimensions *1332*



øA	B	C	D	E	F	G	H	I	J	K	L
1”	124	133	87	79	157	183	104	39	190	190	90
1.1/2”	154	157	76	68	146	173	128	39	190	190	90
2”											
2.1/2”	163	190	135	112	224	-	162	39	190	190	90
3”											

Measurements: mm.

øA	B	C	D	E	F	G	H	I	J	K	L
1”	4.88	5.24	3.43	3.11	6.18	7.20	4.09	1.54	7.48	7.48	3.54
1.1/2”	6.6	6.18	2.99	2.68	0.23	6.81	5.04	1.54	7.48	7.48	3.54
2”											
2.1/2”	6.42	7.48	5.31	4.41	8.82	-	6.38	1.54	7.48	7.48	3.54
3”											

Measurements: ins.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	ºC	ºF	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
D/C	MH19C	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1332LA12
Explosion and weather proof coils.	**ZC**		**ZC**1332LA08
Explosion and weather proof housing.	**Z**		**Z**1332LA16
NPT connections		**T**	1332LA08**T**
		-I	1332LA12**-I**
closed valve verification	See coils.		

Special constructions

- It closes automatically as soon as it receives the electric signal. It opens manually and it is reset only when the electric signal is off.
- Normally open.

Recommendations for installation

Place a strainer upstream the valve with aporosity ≤ 50 µ. Preferably over horizontal pipeline with the coil upright.

2 way solenoid valves for fuel oil, gas-oil and mixtures thereof.

1356 (t) Series

1356 (s) Series

Applications

•Burners for fuel oil (preheated or not) and its mixtures, gas-oil, etc., with mechanical pressure atomizer, rotating cup, compressed air, steam, etc.

Main characteristics

Normally closed.
Direct acting. No minimum differential pressure to operate.
Body: bronze, stainless steel, etc..
BSP or NPT threaded connections.
Stainless steel type closure (s).
PTFE seat closure (t).

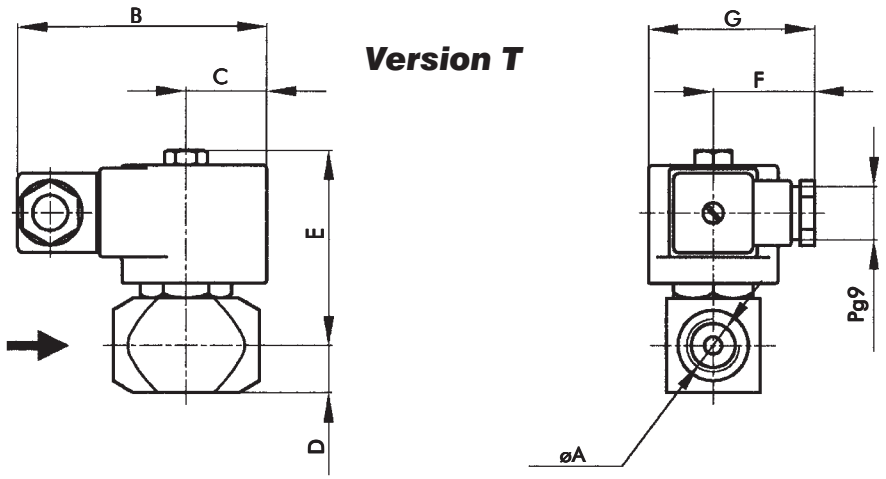
Class **H** coil coated with glass fibre and isolating impregnation. Output cables for splicing (s version).
Internal use housing with an outlet for electric connector (s version).
Encapsulated coil. Shape A DIN 43650 connection (t version).
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass body) silver (s.s body).

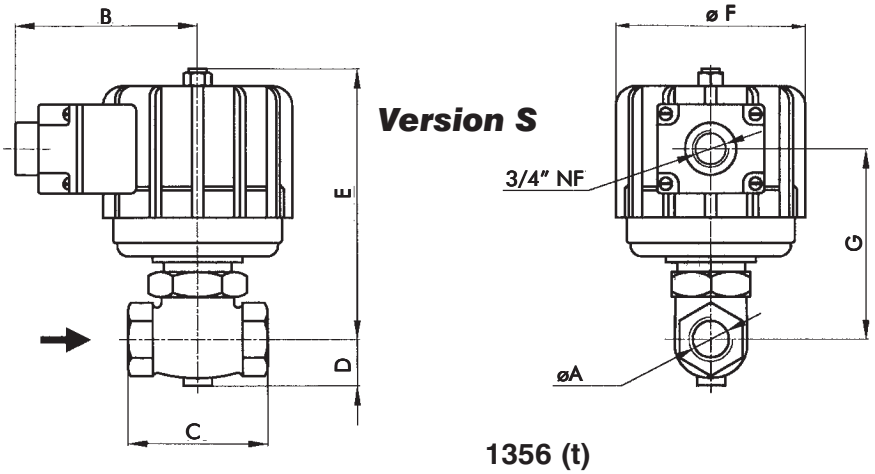
Options:
•Explosion and weather proof coils and housings.
It may be used for heavy fluids such as fuel oil, heavy oils, steam and corrosive fluids.

Technical specifications

Pipe size ins.	Orifice size		Flow factor		Operating pressure differential				Power W		Weight		Version	Catalog Nº
					Minimum		Maximum							
	mm	ins.	Kv	Cv	bar	psi	bar	psi	50 Hz	60 Hz	kg	Lb		
3/8"	2.25	.088	0.13	0.15	0		20	300	18	16	0.72	1.6	T	1356BT3
1/2"	2.25	.088	0.13	0.15			20	300	46		0.68	1.5	T	1356BT4
1/2"	5	.197	0.60	0.70			10	150			3.10	6.8	S	1356BS4-48

General dimensions 1356 (t) - 1356 (s)





1356 (t)

Version	øA	B	C	D	E	F	G
T	R3/8"	85	27	16	67	35	57
T	R1/2"						

Measurements: mm

1356 (s)

Version	øA	B	C	D	E	F	G
S	R1/2"	95	73	24	142	99	98

Measurements: mm

1356 (t)

Version	øA	B	C	D	E	F	G
T	R3/8"	3.35	1.06	0.63	2.64	1.38	2.24
T	R1/2"						

Measurements: ins.

1356 (s)

Version	øA	B	C	D	E	F	G
S	R1/2"	3.74	2.87	0.94	5.59	3.90	3.86

Measurements: ins.

Coil characteristics

Electric power supply	Version	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
				Inrush	Holding	°C	°F	
AC 50 Hz	T	MH18C	18	61	39	155	311	1
		M18H(*)	18	61	39	180	356	1
AC 60 Hz		MH16C	16	48	29	155	311	2
		M16H(*)	16	48	29	180	356	2
AC 50 Hz	S	SH46C	46	277	104	155	311	1
		S46H(*)	46	277	104	180	356	1
AC 60 Hz		SH46C	46	286	103	155	311	2
		S46H(*)	46	286	103	180	356	2

(*) For Steam. **1**-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V

Options	Prefix	Suffix	Examples
Weather proof housing	**Y**		**Y**1356BT34
Explosion and weather proof housing	**Z**		**Z**1356BT36
NPT connections		**T**	1356BT3**T**

Recommendations for installation

- Place a strainer upstream the valve.
- "T" version: Installation: any position.
- Preferably over horizontal pipeline with the coil upright.
- "S" version: Installation: **only** over horizontal pipeline with the coil upright.

2 way solenoid valves with slow opening and quick shutoff for natural gas and other gases.

1388 A Series

1388 D Series

Application

•Low and high pressure gas combustion equipment.
•Low and medium pressure air or other neutral gases.
•They comply with the resolutions, regulations and recommendations for the use of natural gas in industrial installations in Argentina.

Main characteristics

Normally closed.
Direct acting. No minimum differential pressure to operate.
Low and high pressure versions.
Injected or cast aluminium body.
BSP or NPT threaded connections.
Acrylo-nitrile seats.

Class **H** coils with internal use housings.
It includes the terminals for the electrical connection.
Connection for 1/2" BSP pipeline.
For 220V and 110V: current rectifier and transient reactive overvoltage supressor.
Quick or two-stage opening.
Both are adjustable.

1st stage: Quick opening from 0 to 80% of the total adjustable stroke.
2nd stage: Adjustable slow opening up to 20 seconds, from the end of stage 1, up to full stroke.
Shutoff in less than one second.

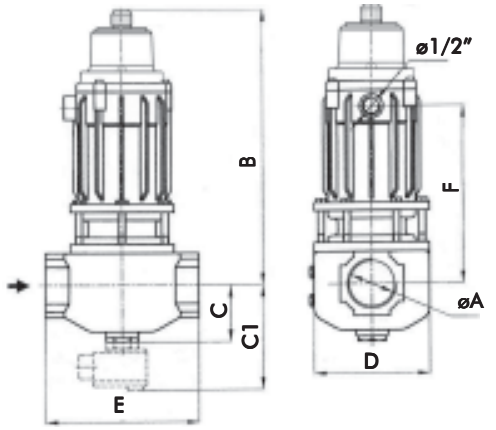
Optional: microcontact for closed valve verification.

Technical specifications

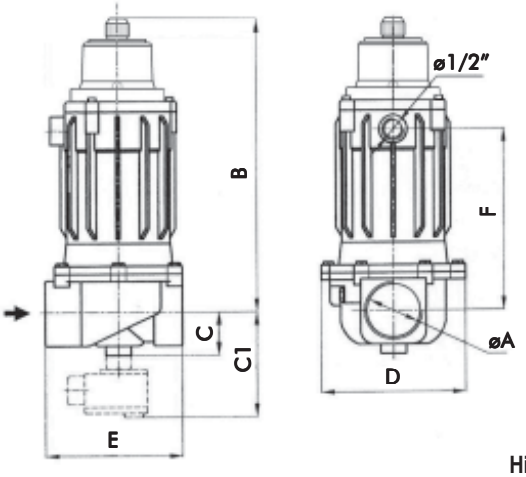
Pipe size ins.	Orifice size		Flow factor		Δp Maximum		Weight		Maximum Temp.		Catalog Nº.	
	mm	ins.	Kv	Cv	Bar	Psi	Kg	Lb	ºC	ºF	Slow opening	Quick opening
Low pressure												
2 1/2"	76	3	65	76	0.1	1.5	13.8	30.5	80	176	1388LA20D	1388LA20DS
3"			80	94			13.5	29.8			1388LA24D	1388LA24DS
High pressure												
3/4"	24	0.95	6	7	5	75	4.5	9.9	80	176	1388LA06A	1388LA06AR
1"	24	0.95	12	14			4.2	9.3			1388LA08A	1388LA08AR
1 1/2"	51	2.00	36	42			12.7	28			1388LA12A	1388LA12AR
2"	51	2.00	49	57			12.3	27			1388LA16A	1388LA16AR
2 1/2"	76	3.00	65	76			16.1	36			1388LA20A	1388LA20AR
3"	76	3.00	80	94			15.8	35			1388LA24A	1388LA24AR

General dimensions *1388*

High pressure



Low pressure



High pressure

øA	B	C	C_1	D	E	F
3/4"	228	44	104	88	117	111
1"						
1.1/2"	323	72	132	147	192	221
2"						
2.1/2"	350	82	142	172	220	248
3"						

Low pressure

øA	B	C	C_1	D	E	F
2.1/2"	302	82	142	172	220	200
3"						

Measurements: mm

High pressure

øA	B	C	C_1	D	E	F
3/4"	8,97	1,73	4,09	3,46	4,60	4,37
1"						
1.1/2"	12,71	2,83	5,19	5,78	7,55	8,70
2"						
2.1/2"	13,78	3,22	5,59	6,77	8,66	9,76
3"						

Low pressure

øA	B	C	C_1	D	E	F
2.1/2"	11,89	3,22	5,59	6,77	8,66	7,87
3"						

Measurements: ins.

Coil Characteristics for 3/4 and 1".

Electric Power Suply	Coil Type	Power W	VA (volt-amper)		Maximum Temperature		Avalaible Tensions
			Inrush	Holding	°C	°F	
AC 50 Hz	S60HR	60	60	60	180	356	1
AC 60 Hz	S60HR						1
D/C	S60H						2

1-(110,120,220 y 240)V **2**-(24,110,120,220)V

Coil Characteristics for 1.1/2" and up.

Electric Power Suply	Coil Type	Power W	VA (volt-amper)		Maximum Temperature		Avalaible Tensions
			Inrush	Holding	°C	°F	
AC 50 Hz	113HR	113	113	113	180	356	1
AC 60 Hz	113HR						1
D/C	113H						2

1-(110,120,220 y 240)V **2**-(24,110,120,220)V

Options	Prefix	Suffix	Examples
NPT connections		**T**	1388LA06DS**T**
Closed valve verification		**-I**	1388LA06D-**I**

Recommendations for installation.

See next page.

General instructions for installation and maintenance.

Technical characteristics

The instructions shown on the valve nameplate must be followed.
They indicate:

Working pressure differential and range.
Maximum working pressure.
Valve identification.
Pipe size.
Power consumption in W.
Voltage and current type.

Electrical installation.

All valves are provided for different tensions and current types as follows. When the valve has a different coil voltage from the one required, a new coil with the right voltage can be placed without replacing the valve.
1388 valves are supplied with the following coils:

Size 3/4" to 1.1/4"		
24V D.C.	60W.	Part Nº S76HZ93
110V 50/60 Hz or D.C.	60W.	Part Nº S35H195
220V 50/60 Hz or D.C.	60W.	Part Nº S25H800
Size 1.1/2" to 3"		
24V D.C.	113W.	Part Nº BB3HZ56
110V 50/60 Hz or D.C.	113W.	Part Nº B55H098
220V 50/60 Hz or D.C.	113W.	Part Nº B40H385

The use of the voltage and current type specified on the nameplate is compulsory. Permitted tolerance: -15% or +10% of the nominal value.
All the coils, except for some special cases, are for continuous use or high operation frequency. When the coil is on for a long time, the housing heats up to the point that contact with hands will only be possible for a short time. Nonetheless, this temperature is normal and safe.

Starting up

2088 slow closing and quick shutoff solenoid valves comprise two regulation elements: quick stoke regulator and opening time regulator.

Quick stoke regulator adjustment (2 and 3, figure 1)
It must be adjusted from 0 to 80% of the total stroke.
Remove the cap from the valve. Percentage decreases when turning the knob clockwise and increases when turning it counterclockwise.

Opening time regulator adjustment (1, figure 1)
It must be adjusted from 0 to 25 seconds. Time increases when turning the knob clockwise and decreases when turning it counterclockwise.

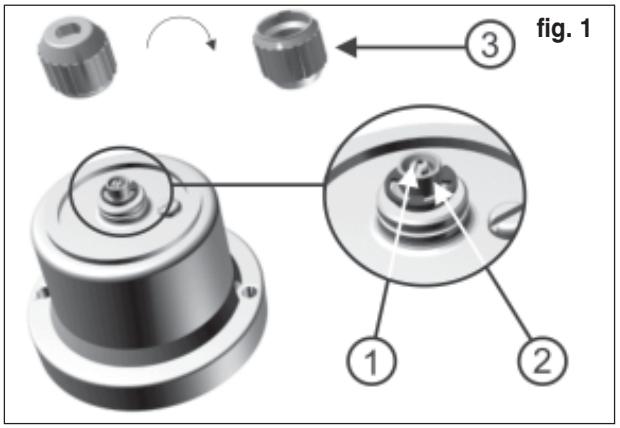


fig. 1

Mechanical installation.

Check that the service conditions are within the range of differential pressure and temperature indicated on the nameplate.
Place a strainer upstream from the valve with an adequate capacity and porosity below 50 microns.
The mounting position is only over horizontal pipeline with the coil upright.
The pipe must be carefully and exhaustively cleaned upstream from the valve and before the strainer by means of compressed air purges or any other system that guarantees the disposal of solid elements such as welding or packaging remains, mud, etc.; this must be done especially in new pipelines.
The flow direction indicated with an arrow on the valve body must be observed. So, the input pressure must always be equal or greater than the output pressure.

Calibration of the position indicator.

When present in the valve, the position indicator is already calibrated. If it is to be installed or recalibrated, proceed as follows:

Installation:
Remove the drainage cap from the valve.
Thread in the position indicator assembly, checking that the corresponding gasket is present.

Calibration:
A continuity tester is necessary.
Connect the tester between the cables (1 and 2 figure 2) and check for continuity. If so, turn the screw (3) clockwise until contact is eliminated. Then, turn the adjusting screw (3) counterclockwise until continuity is set. Energize the coil and check that the circuit opens.

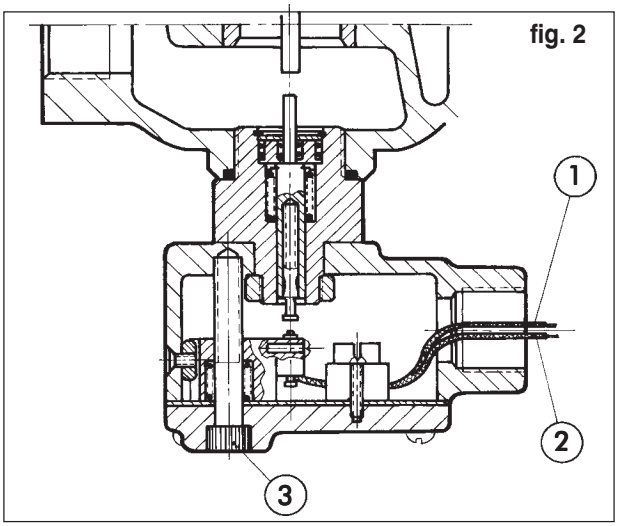


fig. 2

Sequence for 1388 series coil replacement

1388LA12-24 (1 ½" to 3") See figure 1.

1 - Cut off electric supply.

2 - Remove the 3 screws which fasten the bonnet cover (Pos.21).

Remove the bonnet cover.

3 - Disconnect the coil terminal cables.

4 - Unscrew the fixing nut (Pos.22) and remove it together with the bumper (Pos. 9).

5 - Remove the washer (Pos.23).

6 - Remove the coil (Pos. 14).

7 - Place the new coil and assemble the device following the instructions in the opposite direction.

1388LA06-10 (3/4" to 1 ¼") See figure 2.

1 - Cut off electric supply.

2 - Remove both screws (Pos.20) and the connection box cover (Pos.21) and disconnect both coil cable ends from the terminal.

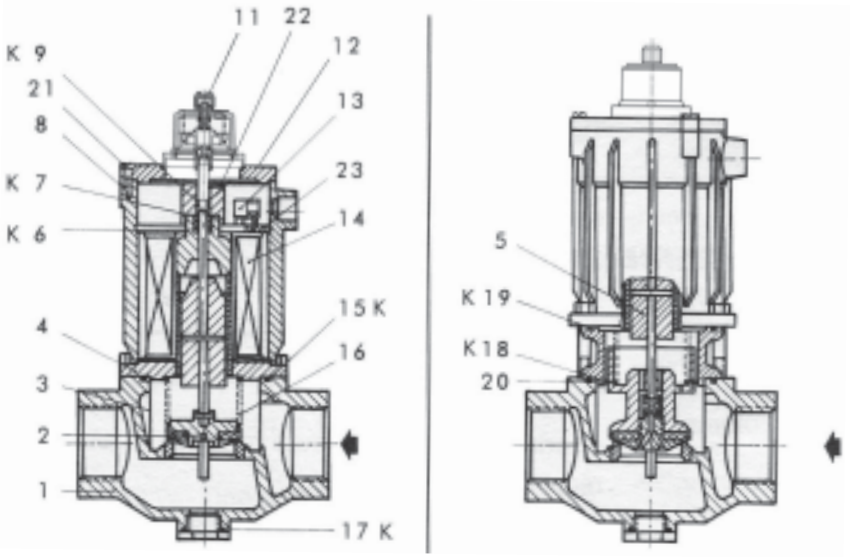
3 - Remove both screws (Pos. 22) from the cap end, which is taken out together with the restraint.

4 - Remove seeger ring (Pos. 23).

5 - Remove retention washer (Pos. 24), then the cap washer (Pos. 25) and finally the coil (Pos. 6).

6 - Place the new coil and assemble the device following the instructions in the opposite direction.

Figure 1.



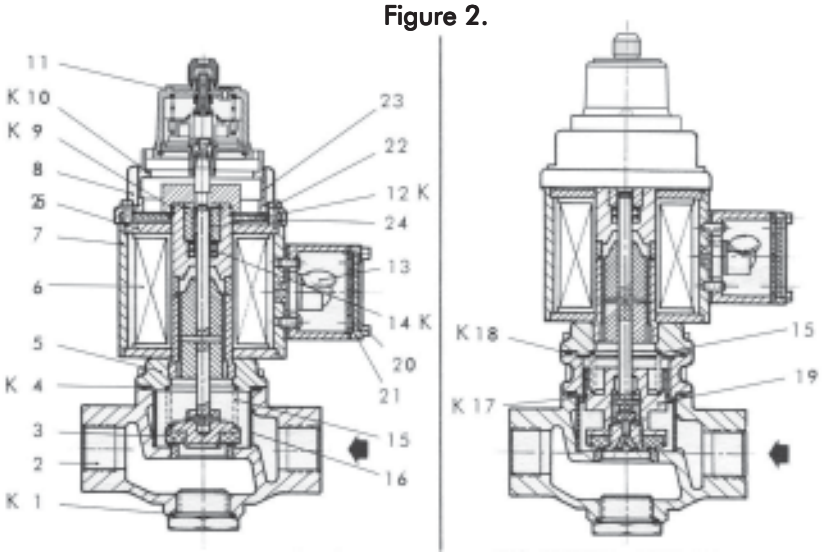
LOW PRESSURE 1388LA12-24D

HIGH PRESSURE 1388LA12-24A

POS	DESCRIPTION	NUMBER	KIT
1	BODY	1	
2	SEAT ASSEMBLY	1	
3	STRAINER	1	
4	BONNET ASSEMBLY	1	
5	PISTON ASSEMBLY - PLUNGER	1	
6	RETAINER	2	K
7	SEEGER RING D.17 DIN 472	1	K
8	HOUSING COVER	1	
9	BUMPER	1	K
10	O-RING	1	K
11	BRAKE ASSEMBLY	2	
12	BONNET COVER	1	
13	RECTIFYING CIRCUIT	1	
14	COIL	1	
15	O-RING	1	K
16	SPRING	1	
17	O-RING	1	K
18	O-RING	1	K
19	O-RING	1	K
20	SPRING	1	
21	CYLINDR. C. SCREW W. 3/16"X 5/8"	3	
22	FLIXING NUT	1	
23	IRON WASHER	1	

POS	DESCRIPTION	NUMBER	KIT
1	O-RING	1	K
2	BODY	1	
3	SEAT ASSEMBLY	1	
4	O-RING	1	K
5	BONNET ASSEMBLY	1	
6	COIL	1	
7	HOUSING ASSEMBLY	1	
8	HOUSING BONNET	1	
9	SEEGER RING D.17 DIN 472	1	K
10	O-RING	1	K
11	BRAKE ASSEMBLY	1	
12	BUMPER	1	K
13	RECTIFYING CIRCUIT	1	
14	RETAINER	2	K
15	PLUG SPRING	1	
16	STRAINER	1	
17	O-RING	1	K
18	O-RING	1	K
19	PISTON ASSEMBLY - PLUNGER	1	
20	ROUND HEAD SCREW W 1/8" x 3/8"	2	
21	CONNECTION BOX BONNET	1	
22	CYL. HEAD SCREW W 5/32"x 3/8"	2	
23	SEEGER RING D. 30 DIN 471	1	
24	RETENTION GASKET	1	
25	HOUSING GASKET	1	

Figure 2.



LOW PRESSURE 1388LA06-10D

HIGH PRESSURE 1388LA06-10A

2088 Series
Solenoid valves. with slow opening and quick shutoff for natural gas and other gases.

2088 Series

CERTIFIED QUALITY SYSTEM

Application:

- Low and high pressure gas combustion equipment.
- Low and medium pressure air or other neutral gases.
- They comply with the resolutions, regulations and recommendations for the use of natural gas in industrial installations in Argentina.

Main characteristics

No minimum differential pressure to operate.
Low and mean pressure versions.
Injected or cast aluminium body.
BSP or NPT threaded connections.
Buna N seats.
Class **H** coils with internal use housings.
Includes terminals for the electrical connection.
Connection for 1/2" NPT pipeline.

For 220 V and 110 V : current rectifier and transient reactive overvoltage supressor is supplied.
Quick or two-stage slow opening.
1º Stage: Quick opening from 0 to 80% of the total adjustable stroke.
2º Stage: Adjustable slow opening up to 25 seconds from the end of stage 1, up to full stroke.
Shutoff in less than one second.

Optional:
Microcontact for closed valve verification.

2088 Series are provided with a power-rectifier-controller that makes it possible for the valve to open at max. coil power, and after 90 sec. to come down to 16% of nominal value.

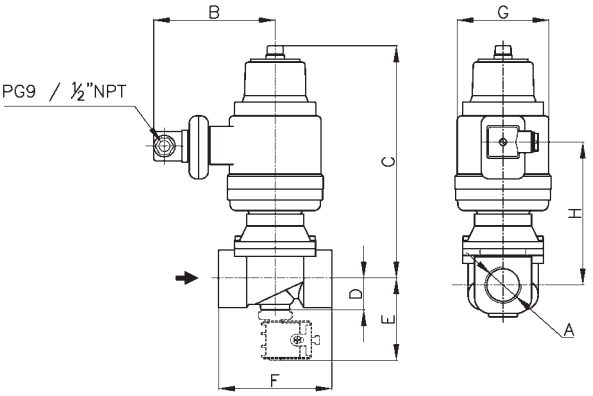
The benefits over conventional systems are, safe opening, low power consumption, low working temperature and longer coil life.

Technical specifications

Pipe size ins.	Orifice size		Flow factor		Δp Maximum		Maximum Temp.		Weight kg.		Catalog Nº.	
	mm	ins.	Kv	Cv	Bar	Psi	ºC	ºF	Kg	Lb	Slow opening	Quick opening
Low pressure												
1"	32	1.26	12	14	0.2	3	80	176	2.8	6.2	RC 2088LA08DL	RC 2088LA08DR
1.1/4"	32	1.26	15	17.5							RC 2088LA10DL	RC 2088LA10DR
1.1/2"	48	1.89	36	42					3.3	7.3	RC 2088LA12DL	RC 2088LA12DR
2"	51	2.00	49	57							RC 2088LA16DL	RC 2088LA16DR
High pressure												
1"	32	1.26	12	14	3	45	80	176	2.8	6.2	RC 2088LA08L	RC 2088LA08R
1.1/4"	32	1.26	15	17.5							RC 2088LA10L	RC 2088LA10R
1.1/2"	48	1.89	36	42					3.3	7.3	RC 2088LA12L	RC 2088LA12R
2"	51	2.00	49	57							RC 2088LA16L	RC 2088LA16R

General dimensions *2088*

2088 1" and 1 1/4"



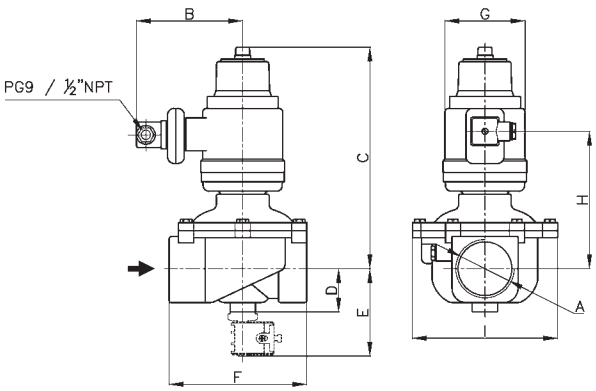
Measurements: mm

øA	B	C	D	E	F	G	H
R 1"	110	217	29	77	105	99	120
R 1 1/4"	110	217	29	77	105	99	120

Measurements: ins.

øA	B	C	D	E	F	G	H
R 1"	4.33	8.54	1.14	3.03	4.13	3.89	4.72
R 1 1/4"	4.33	8.54	1.14	3.03	4.13	3.89	4.72

2088 1 1/2" and 2"



Measurements: mm

øA	B	C	D	E	F	G	H
R 1 1/2"	110	236	46	95	146	99	139
R 2"	110	236	46	95	146	99	139

Measurements: ins.

øA	B	C	D	E	F	G	H
R 1 1/2"	4.33	9.29	1.81	3.74	5.74	3.89	5.47
R 2"	4.33	9.29	1.81	3.74	5.74	3.89	5.47

Coil Charateristics

Electric Power Suply	Version	Coil Type	Power W	VA (volt-amper)		Maximum Temperature		Avalaible Tensions
				Inrush	Holding	°C	°F	
AC 50 Hz	Higth	S50HR	50	50	8(*)	155	311	1
AC 60 Hz		S50HR						1
DC		S50HR						2
AC 50 Hz	Low	S100HR	100	100	16(*)	155	311	1
AC 60 Hz		S100HR						1
DC		S100HR						2

1-(110,120,220, 240)V **2**-(24,110,120,220)V - (*) con RC

Recommendations for installation

- Place a stainer with a porosity below 50 microns upstream the valve.
- Mount the valve only over horizontal pipeline with the coil upright.

Options	Prefix	Suffix	Examples
Weather proof housing	**Y**		**Y**2088LA08L
Explosion and weather proof housing.	**Z**		**Z**2088LA08L
Microcontact for closed valve verification (position indicator)		**-I2**	2088LA08L-**I2**
Microcontact for closed valve verification (position indicator)*		**-I4**	2088LA08L-**I4**
NPT connections		**T**	2088LA08L**T**
Energized coil indicator light	See coils.		

** With Led - Voltage 5-240 V. - Minimum current 5 mA*
Maximum power 50 W. - Voltage drop 3V.

Solenoid valves. with slow opening and quick shutoff for natural gas and other gases.

Technical characteristics:

The instructions shown on the valve nameplate must be followed. They indicate:

- Working pressure differential and range: 0 to 3 bar (45 psi)
- Maximum working temperature: 0 to 80 °C (176 °F)
- Valve identification: RC2088LA (1) (2) (3) - (4)
- (1) Pipe size: 1" (08); 1,1/4" (10); 1. 1/2" (12); 2" (16) BSP connection
- (2) Slow opening: (L); Quick opening: (R)
- **Example:** RC2088LA08L: 1" Slow opening
- (3) NPT connection (T)
- (4) Options: position indicator RC2088LA08L-I4
- Power consumption: Inrush 50 W, Holding 16 W.
- Voltage and current type

Electrical installation

All the coils are for continuous use or high operation frequency. When the coil is on for a long time, the housing heats up to the point that contact with hands will only be possible for a short time. Nonetheless, this temperature is normal and safe.
When the valve has a different coil voltage from the one required, a new coil with the right voltage can be placed without replacing the valve.
The use of the voltage and current type specified on the nameplate is compulsory.
Permitted tolerance: -15% + 10% if the nominal value.
Electrical connection with strain-relief or thread for 1/2" NPT conduit.

Mechanical installation

Check that the service conditions are within the range of pressure differential and temperature indicated on the nameplate. Place a strainer upstream from the valve with an adequate capacity and porosity below 50 microns.
The mounting position must be only over horizontal pipeline with the coil upright. The pipe must be carefully and exhaustively cleaned upstream from the valve and before the strainer by means of compressed air purges or any other system that guarantees the disposal of solid elements such as welding or packaging remains, mud, etc.; this must be done especially in new pipelines.
The flow direction indicated with an arrow on the valve body must be observed. So, the input pressure must always be equal or greater than the output pressure.

Starting up

2088 slow closing and quick shutoff solenoid valves comprise two regulation elements: quick stoke regulator and opening time regulator.

Quick stoke regulator adjustment (2 and 3, figure 1)
It must be adjusted from 0 to 80% of the total stroke.
Remove the cap from the valve. Percentage decreases when turning the knob clockwise and increases when turning it counterclockwise.

Opening time regulator adjustment (1, figure 1)
It must be adjusted from 0 to 25 seconds. Time increases when turning the knob clockwise and decreases when turning it counterclockwise.

fig. 1

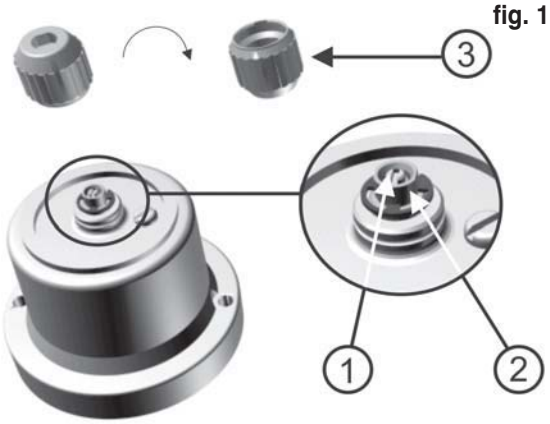
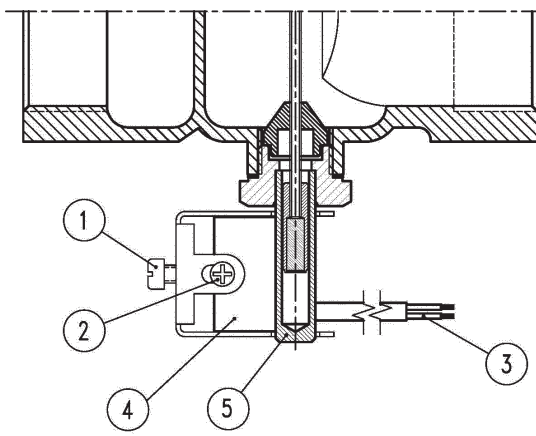


fig. 2



Calibration of the position indicator.

When present in the valve, the position indicator is already calibrated. If it is to be installed or recalibrated, proceed as follows:

- Connect a tester between the cables **(3, figure 2)** and check for continuity.
- Place the indicator **(4)** and slide through the column **(5)** until continuity is set.
- Turn the screw **(1)** and after that turn the second screw **(2)**.
- Energize the valve and verify that there is no continuity.
- If so, de-energize the coil and check for continuity.
- If there is no continuity redo calibration.

Thermoelectric safety valves.

V171 Series

CERTIFIED QUALITY SYSTEM

Applications:
- Secutity systems for natural gas and LPG burners.

Construction characteristics

Injected aluminum body.
Seats: Buna N.
Interior: brass, stainless steel.
BSP or NPT 3/4" connections.
BSP or NPT 1/8" pilot connection.
Maximum torque: 30 Nm (22 lb.ft).
Thermocouple connection: M9 x 1.
Maximum torque: 4 Nm (3 lb.ft)

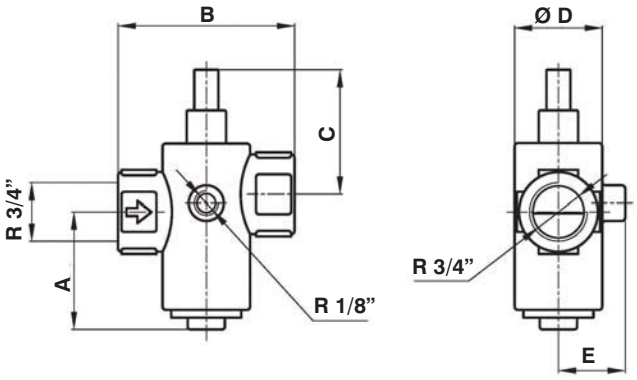
Technical characteristics

No minimum pressure to operate.
Opening time: 5 seconds.
Cutoff time due to lack of flame: 60 seconds max.

Additional features

Standard thermocouples: 16", 24" and 47" (400, 600 and 1200 mm).

V171 General dimensions



A	B	C	Ø D	E
54	81	57	41	31

Measurements: mm

A	B	C	Ø D	E
54	81	57	41	31

Measurements: ins.

Technical specifications

Orifice size		Flow factor		Pilot	Maximum pressure		Minimum temperature		Maximum temperature		Weight		Catalog N⁰
mm	ins.	Kv	Cv		bar	psi	⁰C	⁰F	⁰C	⁰F	Kg	Lb	
19	0.75	4.2	4.9	si	0.2	3	-10	14	80	176	0.44	0.97	V171 P06
19	0.75	4.2	4.9	no	1.5	22					0.43	0.95	V171-2
9	0.35	1.9	2.2	si	1.5	22					0.44	0.97	V171-3

Recommendation for installation

Shutoff time for a thermoelectric valve depends on each single unit and how it is installed. Usually it takes from 45 – 60 seconds to shutdown the gas flow.

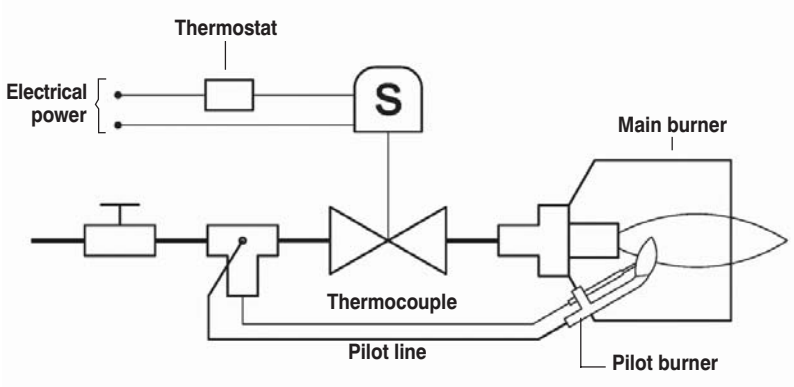
Positioning the thermocouple is very important for a proper shutdown. If it is positioned in the wrong place, radiation from any heat source nearby can be strong enough to restrain it from dropping its temperature, or can significantly extend dropping time.

It is clear that a quick temperature drop of the bulb will occur in case of absence of flame in the burner. Also, in order to extend the thermocouple useful life, we recommend positioning it in such place so it does not get too hot.

The bulb must be placed in such position to produce just enough signal to reliably maintain the burner flow, getting the additional benefit of a quick temperature drop.

The explained above is a good reason to monitor the pilot flame rather than the main burner flame, since the whole system ignition depends on the pilot.

Typical circuit



3, 4 and 5 Way Solenoid Valves for Pneumatic and Hydraulic Use


1323


1325


1339


1350


1351


1365


1375


1387 BA 1-N


1387 BA2-N


2095


2024

		Pages
1323 Series	3/2 ways. N.closed and N.open or universal. Direct acting.	**D-2 / D-3**
1325 Series	3/2 ways. N.closed and N.open. Pilot operated.	**D-4 / D-5**
1339 Series	4/3 ways. Closed center. Pilot operated.	**D-6 / D-7**
1350 Series	5/2 ways. Monostable and bistable. Pilot operated.	**D-8 / D-9**
1351 Series	3/2 ways. N. closed, N. open or bistable. Pilot operated.	**D-10 / D-11**
1365 Series	3/2 ways N. closed, N. open or universal. Direct acting.	**D-12 / D-13**
1375 Series	5/2 ways. Direct NAMUR mount. Pilot operated.	**D-14**
1387 Series	3/2 ways. Direct NAMUR mount. Direct acting or pilot operated.	**D-15**
2095 Series	3/2 - 5/2 ways. Direct NAMUR mount. Pilot operated.	**D-16 / D-17**
2024 Series	5/2 ways. Pilot operated.	**D-18**

3/2 way solenoid valves. for pneumatic and / or hydraulic use.

CERTIFIED QUALITY SYSTEM

1323 Series

Applications

- Single acting pneumatic or hydraulic cylinders.
- Divergence of one fluid into two circuits.
- Alternative convergence of two fluids into one circuit.

Main characteristics

3 Ways, 2 positions, normally closed, normally open or universal.
Direct acting. No minimum differential pressure to operate.
Body: brass, iron, stainless steel, etc.
BSP or NPT 1/4" Connection.
Buna N seats for neutral fluids up to 80ºC.
Seats: neoprene, FKM and EPDM for other uses.
Encapsulated coils.
Shape A DIN 43650 connection.
IP65 and NEMA4 Protection.
Approximate weight: 0.5 kg. / 1.1 Lb
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass body) silver (s.s. body).

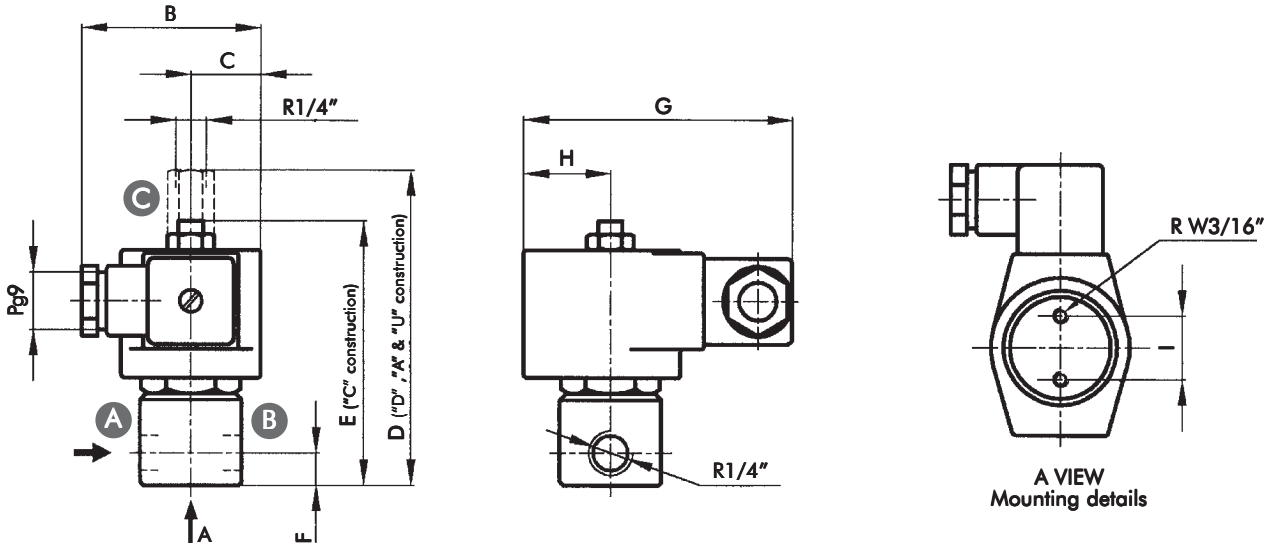
Options:

- Energized coil indicator light.
- Explosion and / or weather proof coils and housings.
- Manual operator.

Technical specifications

Orifice size		Flow factor		Δp maximum								Maximum temp. and catalog Nº according to seat material			
				NC		NO		DIV		CONV		Buna "N"	Neoprene	EPDM	FKM
mm	ins.	Kv	Cv	bar	psi	bar	psi	bar	psi	bar	psi	80º C / 176º F	80º C / 176º F	150º C / 302º F	150º C / 302º F
"C" Construction - no connector at "C" port															
1.75	.069	0.09	0.11	12	180	-	-	-	-	-	-	1323BA17C	1323BN17C	1323BE17C	1323BV17C
2.00	.079	0.10	0.12	8	120	-	-	-	-	-	-	1323BA20C	1323BN20C	1323BE20C	1323BV20C
2.50	.098	0.14	0.16	3	45	-	-	-	-	-	-	1323BA25C	1323BN25C	1323BE25C	1323BV25C
"D" Construction															
1.75	.069	0.09	0.11	12	180	-	-	20	300	-	-	1323BA17D	1323BN17D	1323BE17D	1323BV17D
2.00	.079	0.10	0.12	8	120	-	-	15	225	-	-	1323BA20D	1323BN20D	1323BE20D	1323BV20D
2.50	.098	0.14	0.16	3	45	-	-	10	150	-	-	1323BA25D	1323BN25D	1323BE25D	1323BV25D
"A" Construction															
1.75	.069	0.09	0.11	4	60	12	180	5	75	4	60	1323BA17A	1323BN17A	1323BE17A	1323BV17A
2.00	.079	0.10	0.12	3	45	8	120	3	45	3	45	1323BA20A	1323BN20A	1323BE20A	1323BV20A
2.50	.098	0.14	0.16	-	-	3	45	-	-	-	-	1323BA25A	1323BN25A	1323BE25A	1323BV25A
"U" Construction															
1.75	.069	0.09	0.11	9	135	9	135	20	300	9	135	1323BA17U	1323BN17U	1323BE17U	1323BV17U
2.00	.079	0.10	0.12	7	105	7	105	15	225	7	105	1323BA20U	1323BN20U	1323BE20U	1323BV20U
2.50	.098	0.14	0.16	3	45	3	45	10	150	3	45	1323BA25U	1323BN25U	1323BE25U	1323BV25U

General dimensions 1323



B	C	D	E	F	G	H	I
57	22	100	85	10	85	27	20

Measurements: mm

B	C	D	E	F	G	H	I
2.24	0.87	3.93	3.35	0.39	3.35	1.06	0.79

Measurements: ins.

Special constructions

Stainless steel body.
- AISI 304: change letter **B** for **S** in the catalog Nº.
  Example: 1365SA302C
- AISI 316: change letter **B** for **I** in the catalog Nº.
  Example: 1365IA302C.

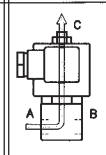
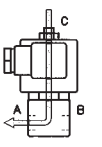
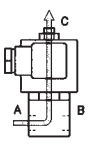
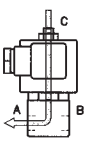
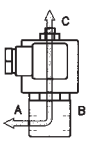
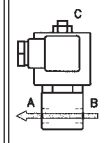
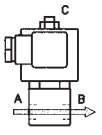
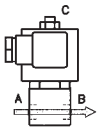
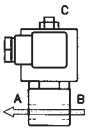
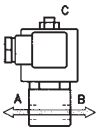
Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1323BA17C
Explosion and weather proof coils.	**ZC**		**ZC**1323BA17C
Weather proof housing. (**C** shape is not provided)	**Y**		**Y**1323BA17D
Explosion and weather proof housing. (**C** shape is not provided)	**Z**		**Z**1323BA17D
Manual operator: on the main orifice		**- M**	1323BA17C**-M**
NPT connections		**T**	1323BA17C**T**
Energized coil indicator light	See coils.		

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	ºC	ºF	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

1-(24,110,220)V **2**-(24,110,120,240)V **3**-(12,24,110,220)V

Flow diagrams

Construc.	C ó D	A	D	U	U
De-Energized					
Energized					
Operation	NC	NO	Divergent	Convergent	Universal

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100μ.
Installation: in any position, preferably over horizontal pipeline with the coil upright.
Except C, all the constructions may be used for any operation manner, but it is advisable to choose the valve according to its use in order to obtain the best performance.

3/2 way solenoid valves. High capacity.

1325 Series

CERTIFIED QUALITY SYSTEM

Underwriters Laboratories Inc.®
FILE MH16855 Vol. 2 Secc.2

Association canadienne de normalisation
Canadian Standards Association
FILE LR87427 2M - LR108921-1

Application

- Large single acting cylinders or actuators, compressors, turbines, etc..
- Ideal for instrument air or dry gas.
- It can also operate with lubricated air, water, light oils, fuel gas, etc..

Main characteristics

3 ways, 2 positions, normally closed, normally open.
Pilot operated.
Seat shutoff. No need for lubrication to operate.
Body: brass, stainless steel, etc.
BSP or NPT threaded connections.
Buna N diaphragm and seats for neutral fluids up to 80ºC.
FKM diaphragm and seats for other uses.
Shape A DIN 43650 connection encapsulated coils.
IP65 and NEMA 4 protection.

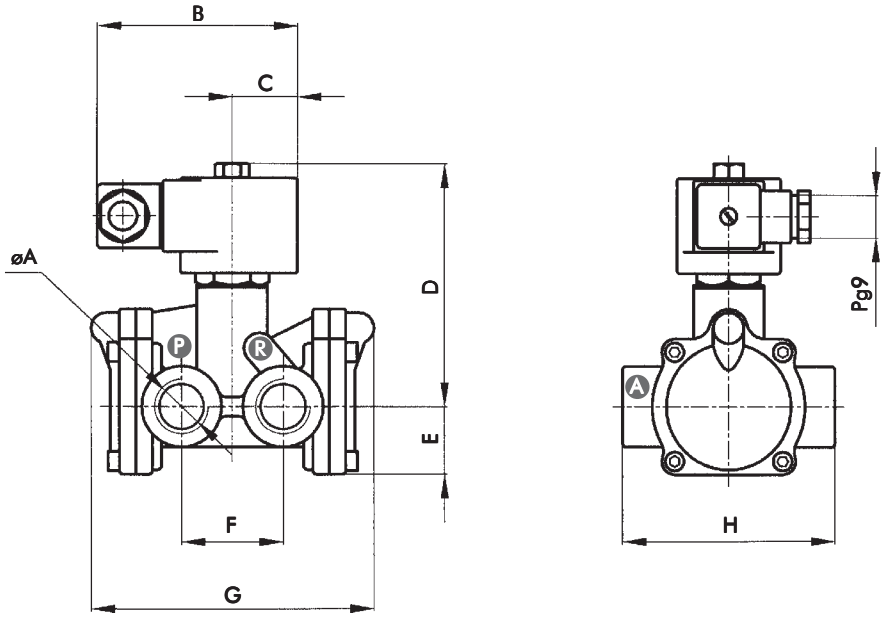
Pilot orifice with internal discharge. It may be used with fluids which cannot be discharged into the atmosphere.
Greater flow capacity and lower response time than any other spool valve of the same size.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass body) silver (s.s. body).

Options:
- Energized coil indicator light.
- Explosion and / or weather proof coils and housings.

Technical specifications

Pipe size ins.	Orifice size		Flow factor		Δp				Maximum temp. and catalog Nº according to seat material	
					Minimum		Maximum		Buna "N"	FKM
	mm	ins.	Kv	Cv	bar	psi	bar	psi	80º C / 176º F	80º C / 176º F
Forged Brass Body - Normally closed										
3/8"	16	0.63	2.7	3.2	0.5	7.5	10	150	1325BA3C	1325BV3C
1/2"			3.4	4.0					1325BA4C	1325BV4C
3/4"			4.7	4.7					1325BA6C	1325BV6C
Forged brass body - Normally open										
3/8"	16	0.63	2.7	3.2	0.5	7.5	10	150	1325BA3A	1325BV3A
1/2"			3.4	4.0					1325BA4A	1325BV4A
3/4"			4.7	5.5					1325BA6A	1325BV6A
Stainless steel body AISI 304 - Normally closed										
3/8"	16	0.63	2.7	3.2	0.5	7.5	10	150	1325SA3C	1325SV3C
1/2"			3.4	4.0					1325SA4C	1325SV4C
3/4"			4.7	5.5					1325SA6C	1325SV6C
Stainless steel body AISI 304 - Normally open										
3/8"	16	0.63	2.7	3.2	0.5	7.5	10	150	1325SA3A	1325SV3A
1/2"			3.4	4.0					1325SA4A	1325SV4A
3/4"			4.7	5.5					1325SA6A	1325SV6A

General dimensions *1325*



øA	B	C	D	E	F	G	H
3/8"	85	27	103	29	43	121	90
1/2"							
3/4"							

Measurements: mm

øA	B	C	D	E	F	G	H
3/8"	3.34	1.06	4.05	1.14	1.69	4.76	3.54
1/2"							
3/4"							

Measurements: ins.

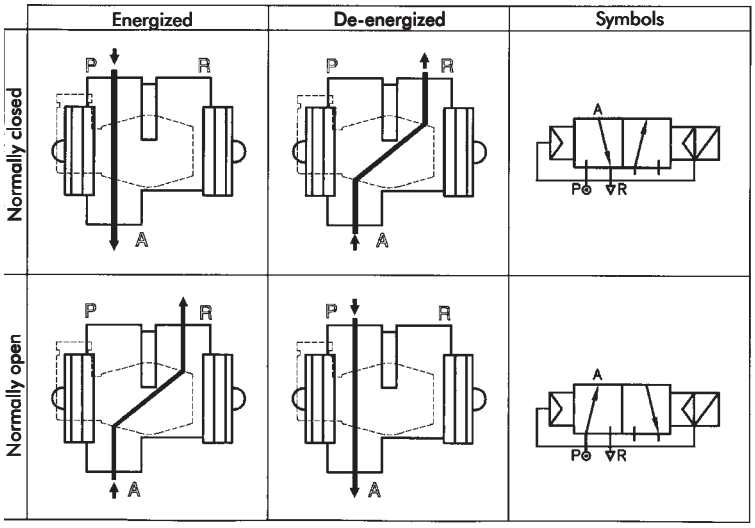
Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	ºC	ºF	
AC 50 Hz	MF11C	11	40	22	155	311	1
AC 60 Hz	MF13C	13	45	17	155	311	2
DC	MH19	19	19	19	180	356	3

1-(24,110,220)V **2**-(24,110,120,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1325BA4C
Explosion and weather proof coils.	**ZC**		**ZC**1325BA4C
Weather proof housing. (**C** shape is not provided)	**Y**		**Y**1325BA4C
Explosion and weather proof housing. (**C** shape is not provided)	**Z**		**Z**1325BA4C
NPT connections		**T**	1325BA4C**T**
Energized coil indicator light	See coils.		

Flow diagrams



Recommendations for installation

Place a strainer upstream of the valve with a porosity ≤ 100μ.
Installation: in any position. Preferably on a horizontal pipeline with the coil upright.

4/3 way solenoid valves. Closed center.

CERTIFIED QUALITY SYSTEM

1339 Series

Applications

• Ideal for application where graduated or full stroke of piston is required.
•High flow; exceptionally long life; heavy-duty operation.
•Dry air, gas, water, light oil and others gases and liquids.

Main characteristics

4 ways, 3 positions, closed center.
It allows to operate double acting cylinders or actuators.
Aluminium, brass and stainless steel body.
BSP or NPT 1/4", 3/8", 1/2" threaded connections.
Seat shutoff, 4 diaphragms which plug up the respective ways.
High capacity and operation speed.
No need for lubrication to operate, ideal for instrument air.

Pilot orifices with internal discharge, it may operate dangerous fluids or those which do not allow spills, such as gas, fuel, water, light oils and other similar fluids.
Shape A DIN 43650 connection encapsulated coils.
IP65 and NEMA 4 protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass or aluminium body) silver (s.s. body).

Options:
•Energized coil indicator light.
•Explosion and / or weather proof coils and housings.

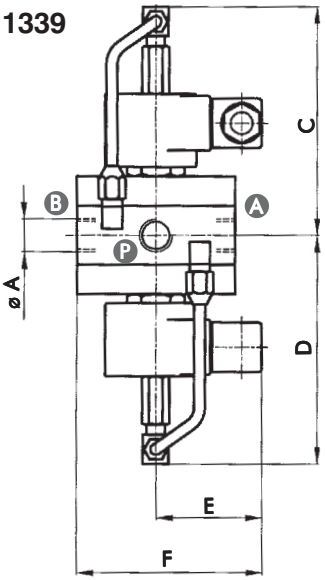
Technical specifications

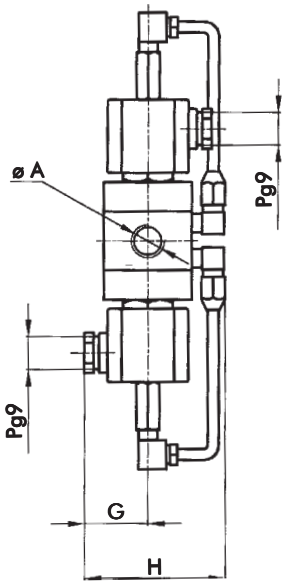
Pipe size ins.	Orifice size		Flow factor		Pressure differential				Weight (*)				Maximum temp. and catalog Nº according to seat material		
					Δp minimum		Δp maximum		kg		Lb				
	mm	ins.	Kv	Cv	bar	psi	bar	psi	Alum	Br/ss	Alum	Br/ss	Aluminium	Brass	Stainless steel AISI.304
Buna "N" diaphragm															
1/4"	6	0.23	0.34	0.4	0.5	10	7.5	150	1.3	2.2	2.9	4.9	1339LA1	1339BA1	1339SA1
3/8"	8	0.31	0.68	0.8									1339LA2	1339BA2	1339SA2
1/2"	10	0.39	1.27	1.5									1339LA3	1339BA3	1339SA3
FKM diaphragm															
1/4"	6	0.23	0.34	0.4	0.5	10	7.5	150	1.3	2.2	2.9	4.9	1339LV1	1339BV1	1339SV1
3/8"	8	0.31	0.68	0.8									1339LV2	1339BV2	1339SV2
1/2"	10	0.39	1.27	1.5									1339LV3	1339BV3	1339SV3

(*) Between brackets, weight with aluminium body.

4/3 way solenoid valves. Closed center.

General dimensions 1339





øA	C	D	E	F	G	H
R 1/4"	125	125	58	102	35	76
R 3/8"						
R 1/2"						

Measurements: mm

øA	C	D	E	F	G	H
R 1/4"	81.7	81.7	2.3	4.0	1.4	3.0
R 3/8"						
R 1/2"						

Measurements: ins.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	ºC	ºF	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

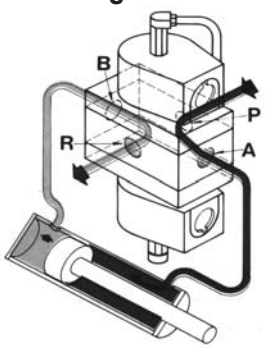
1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Recomemendations for installation

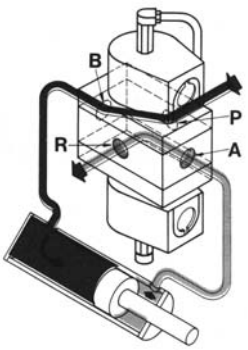
Place a strainer upstream the valve with a porosity ≤ 100μ.
Installation: in any position.

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1339BA2
Explosion and weather proof coils.	**ZC**		**ZC**1339BA2
Weather proof housing.	**Y**		**Y**1339BA2
Explosion and weather proof housing.	**Z**		**Z**1339BA2
Manual operator: on the main orifice		**- M**	1339BA2-**M**
NPT connections		**T**	1339LA1**T**
Energized coil indicator light	See coils.		

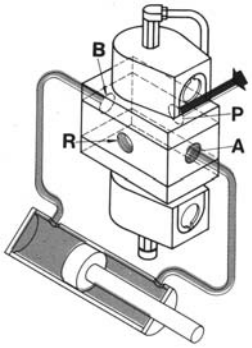
Flow diagrams



POSITION 1
Nº 1 Solenoid energized. Pressure through A and exhaust through B.



POSITION 2
Nº 2 Solenoid energized. Pressure through B and exhaust through A.



POSITION 3
Both solenoids de-energized. 4 ways closed, the cylinder stops in a balanced position with pressure at both sides.

Note: *The solenoids cannot be energized both at the same time because all 4 ways would open and pressure would be in direct contact with the exhaust.*

1350 Series — 5/2 way solenoid valves for double acting cylinder.

1350 Series

CERTIFIED QUALITY SYSTEM
ISO 9001

Underwriters Laboratories Inc.®
FILE MH16855 Vol. 2 Secc.2

Association canadienne de normalisation
Canadian Standards Association
FILE LR87427 2M - LR108921-1

Applications

- Double acting cylinders or diaphragms valves.
- Lubricated or dry air-gas, water, light oil.
- Heavy-duty operation.

Main characteristics

5 ways, 2 positions, monostable or bistable.
Aluminium, brass, stainless steel body.
BSP or NPT threaded connections.
Buna "N" seals for neutral fluids up to 80º C.
FKM seals for other uses.
PTFE sleeve for instrument air and dry gases.
Shape A DIN 43650 connection encapsulated coils.
IP65 and NEMA 4 protection.
Internal or external pilot: electropneumatic or pneumatic.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass or aluminium body) silver (s.s. body).

Options:
- Energized coil indicator light.
- Explosion and / or weather proof coils and housings.
- Manual operator.

Suffix	Main line supply press. Min bar	Min psi	Max bar	Max psi	Operation manner
Electric operator with internal pilot					
A	1	15	10	150	Spring return
B	0.5	7.5			Pneumatic return
C	0.5	7.5			Bistable
Electric operator with independent pilot					
G	0	0	10	150	Spring return
I					Bistable
Pneumatic operator					
D	0	0	10	150	Spring return.
F					Bistable

Note: *The pilot signal with independent pilots or pneumatic operators must be 1 bar and equal or greater than the valve working pressure.*

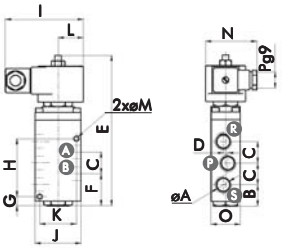
Technical specifications

Pipe size ins.	Orifice size mm	Orifice size ins.	Flow factor Kv	Flow factor Cv	Buna "N" seals No sleeve	Buna "N" seals with sleeve	FKM seals No sleeve	FKM seals with sleeve
Aluminium body								
1/4"	7	0,27	0.80	0.94	1350LA1*	1350LTA1*	1350LV1*	1350LTV1*
3/8"	7	0,27	0.96	1.12	1350LA2*	1350LTA2*	1350LV2*	1350LTV2*
1/2"	10	0,39	1.90	2.22	1350LA3*	1350LTA3*	1350LV3*	1350LTV3*
Brass body								
1/4"	7	0,27	0.80	0.94	1350BA1*	1350BTA1*	1350BV1*	1350BTV1*
3/8"	7	0,27	0.96	1.12	1350BA2*	1350BTA2*	1350BV2*	1350BTV2*
1/2"	10	0,39	1.90	2.22	1350BA3*	1350BTA3*	1350BV3*	1350BTV3*
Stainless steel body AISI 304								
1/4"	7	0,27	0.80	0.94	NO	1350STA1*	NO	1350SV1*
3/8"	7	0,27	0.96	1.12		1350STA2*		1350SV2*
1/2"	10	0,39	1.90	2.22		1350STA3*		1350SV3*

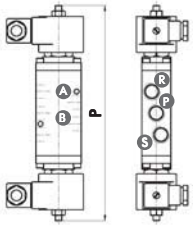
(*) The suffix corresponding to the operation manner must be added to the catalog number according to the table Example: 1350LA1A.

General dimensions 1350

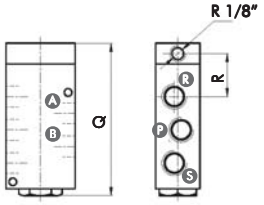
A, B, G and H Constructions



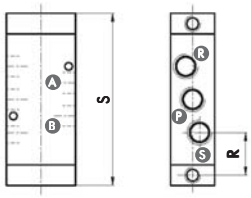
C and I Constructions



D Construction



F Construction



ø A	Unit	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
R1/4" R3/8"	mm	24	24	5	168	36	10	64.5	85	50	40	27	5.5	57	32	240	110	31	126
R1/2"		23	33		192	39	39	56								259	134	39	144
R1/4" R3/8"	ins.	0.944	0.944	1.196	6.614	1.417	0.393	2.539	3.346	1.968	1.574	1.062	0.216	2.244	1.259	9.448	4.330	1.220	4.960
R1/2"		0.905	1.299		7.559	1.535	1.535	2.204								10.196	5.275	1.535	5.669

Weight									
ø A	Units	Figure 1		Figure 2		Figure 3		Figure 4	
		Aluminium	Brass	Aluminium	Brass	Aluminium	Brass	Aluminium	Brass
R1/4" R3/8"	Kg	0.820	1.650	1.300	2.700	0.400	1.250	0.460	1.470
R1/2"		0.900	1.820	1.380	2.400	0.480	1.400	0.540	1.570
R1/4" R3/8"	Lb	1.610	3.642	2.869	4.856	0.883	2.759	1.015	3.134
R1/2"		1.986	4.017	3.046	5.298	1.059	3.090	1.192	3.465

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	°C	°F	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

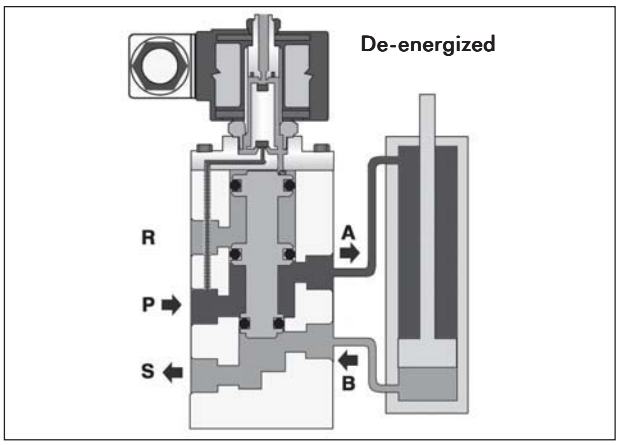
1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

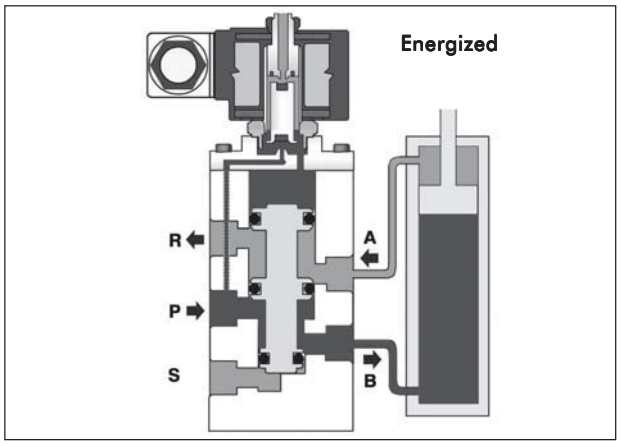
Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1350BA2B
Explosion and weather proof coils.	**ZC**		**ZC**1350BA2B
Weather proof housing.	**Y**		**Y**1350BA2B
Explosion and weather proof housing.	**Z**		**Z**1350BA2B
Manual operator: on the main orifice		**- M**	1350BA2B**-M**
NPT connections		**T**	1350BA2B**T**
Energized coil indicator light	See coils.		

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100μ.Installation: in any position. Preferably over horizontal pipeline with the coil upright. It is advisable to use lubrication with valves which do not have a PTFE sleeve.

Flow diagrams





3/2 way solenoid valves for single acting cylinders.

1351 Series

CERTIFIED QUALITY SYSTEM
ISO 9001

Underwriters Laboratories Inc.®
FILE MH16855 Vol. 2 Secc.2

Association canadienne de normalisation
Canadian Standards Association
FILE LR87427 2M - LR108921-1

Applications

- Single acting cylinders or diaphragms valves.
- Lubricated or dry air-gas, water, light oil
- Heavy-duty operation.

Main characteristics

3 ways, 2 positions, normally open or normally closed.
Aluminium, brass, stainless steel body.
BSP or NPT threaded connections.
Buna "N" seals for neutral fluids up to 80ºC.
FKM seals for other uses.
PTFE sleeve for instrument air and dry gases.
Shape A DIN 43650 connection encapsulated coils.
IP65 and NEM4 protection.
Internal or external pilot: electropneumatuic or pneumatic.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass or aluminium body), silver (s.s. body).

Options:

- Energized coil indicator light.
- Explosion and / or weather proof coils and housings.
- Manual operator.

Suffix	Main line supply press. Min bar	Min psi	Max bar	Max psi	Operation manner
Electric operator with internal pilot.					
A	1	15	10	150	N. closed. Spring return
B	0.5	7.5			N. closed. Pneumatic return
C	0.5	7.5			Bistable
G	1	15			N. open. Spring return.
H	0.5	7.5			N. open. Pneumatic return
Electric operator with independent pilot					
K	0	0	10	150	N. closed. Spring return
N					N. open. Spring return
M					Bistable
Pneumatic operator					
D	0	0	10	150	N. closed. Spring return
J					N. open. Spring return
F					Bistable

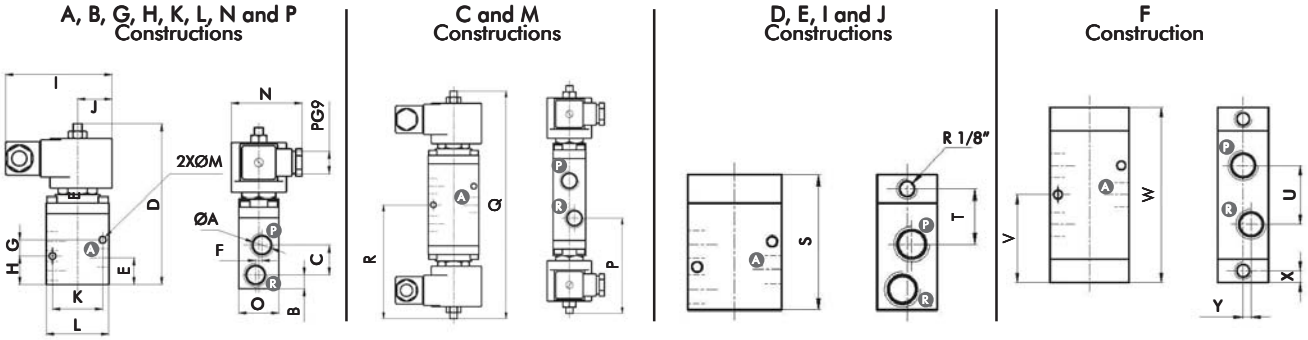
Note: *The pressure at the pilot signal with and independent pilot or a pneumatic operator must be 1 bar and equal or greater than the valve's working pressure.*

Technical specifications

Pipe size ins.	Orifice size mm	Orifice size ins.	Flow factor Kv	Flow factor Cv	Buna "N" seals No sleeve	Buna "N" seals with sleeve	FKM seals No sleeve	FKM seals with sleeve
Aluminium body								
1/4"	7	0.27	0.80	0.94	1351LTA1*	1351LA1*	1351LTV1*	1351LV1*
3/8"	7	0.27	0.96	1.12	1351LTA2*	1351LA2*	1351LTV2*	1351LV2*
1/2"	10	0.39	1.90	2.22	1351LTA3*	1351LA3*	1351LTV3*	1351LV3*
Brass body								
1/4"	7	0.27	0.80	0.94	1351BTA1*	1351BA1*	1351BTV1*	1351BV1*
3/8"	7	0.27	0.96	1.12	1351BTA2*	1351BA2*	1351BTV2*	1351BV2*
1/2"	10	0.39	1.90	2.22	1351BTA3*	1351BA3*	1351BTV3*	1351BV3*
Stainless steel body AISI 304								
1/4"	7	0.27	0.80	0.94	1351STA1*	NO	1351SV1*	NO
3/8"	7	0.27	0.96	1.12	1351STA2*		1351SV2*	
1/2"	10	0.39	1.90	2.22	1351STA3*		1351SV3*	

(*) The suffix corresponding to the operation must be added to the catalog number according to the table Example: 1351LA1A.

General dimensions 1351



ø A	Unit	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
R1/4" R3/8"	mm	11	24	130	22	5	13	23	85	27	40	50	5.5	57	32	95	226	113	72	30	37	56	112	7.5	5
R1/2"		15	31	149	31	-	21.5	31								102	252	126	91	38	47	68	137	-	3
R1/4" R3/8"	ins.	0.433	0.944	5.118	0.866	0.196	0.511	0.905	3.346	1.062	1.574	1.968	0.216	2.244	1.259	3.740	8.897	4.448	2.834	1.181	1.456	2.204	4049	0.295	0.196
R1/2"		0.590	1.220	5.866	1.220	-	0.846	1.220								4.015	9.921	4.960	3.582	1.496	1.850	2.677	5.393	-	0.118

Weight									
ø A	Units	Figure 1		Figure 2		Figure 3		Figure 4	
		Aluminium	Brass	Aluminium	Brass	Aluminium	Brass	Aluminium	Brass
R1/4" R3/8"	Kg	0.680	1.250	0.680	1.800	0.280	0.800	0.350	0.970
R1/2"		-	-	1.20	1.950	0.300	0.920	0.370	1.100
R1/4" R3/8"	Lb	1.501	2.759	1.501	3.973	0.618	1.766	0.772	2.141
R1/2"		-	-	2.649	4.304	0.662	2.030	0.816	2.428

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	ºC	ºF	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

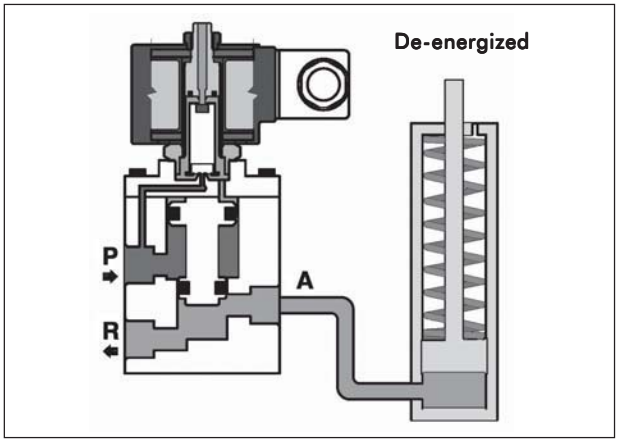
1-(12, 24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

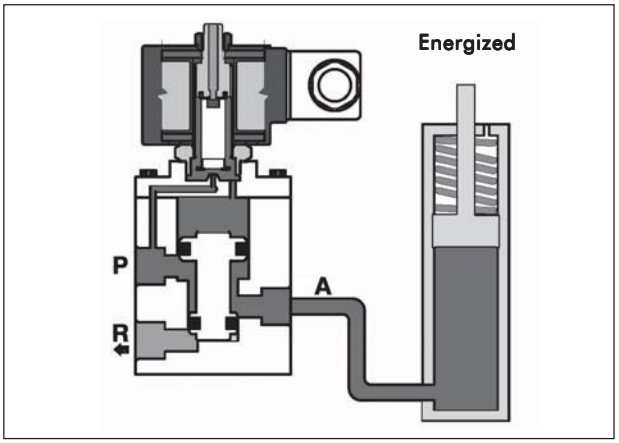
Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1351BA2B
Explosion and weather proof coils.	**ZC**		**ZC**1351BA2B
Weather proof housing.	**Y**		**Y**1351BA2B
Explosion and weather proof housing.	**Z**		**Z**1351BA2B
Manual operator: on the main orifice		**- M**	1351BA2B-**M**
NPT connections		**T**	1351BA2B**T**
Energized coil indicator light	See coils.		

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100μ. Installation: in any position. Preferably over horizontal pipeline with the coil upright. It is advisable to use lubricated air when valves have no PTFE sleeve.

Flow diagrams for normally closed operation





3/2 way solenoid valves for pneumatic and / or hydraulic use.

1365 Series

CERTIFIED QUALITY SYSTEM
ISO 9001

Underwriters Laboratories Inc.®
FILE MH16855 Vol. 2 Secc.2

Association canadienne de normalisation
Canadian Standards Association
FILE LR87427 2M - LR108921-1

Applications

- For the control of single acting cylinders and diaphragms. Normally closed and normally open.
- Also suitable for selection or diversion of pressure.
- Dry air, gas, water, light oil and others gases and liquids
- Instrumentation, lubrication devices, robots, pilot operators.

Main characteristics

3 Ways, 2 positions, normally closed, normally open or universal.
Direct acting. No minimum differential pressure to operate.
Body: brass, iron, stainless steel, etc.
BSP or NPT 1/4" Connection.
Buna N seats for neutral fluids up to 80ºC.
Seats: neoprene, FKM and EPDM for other uses.

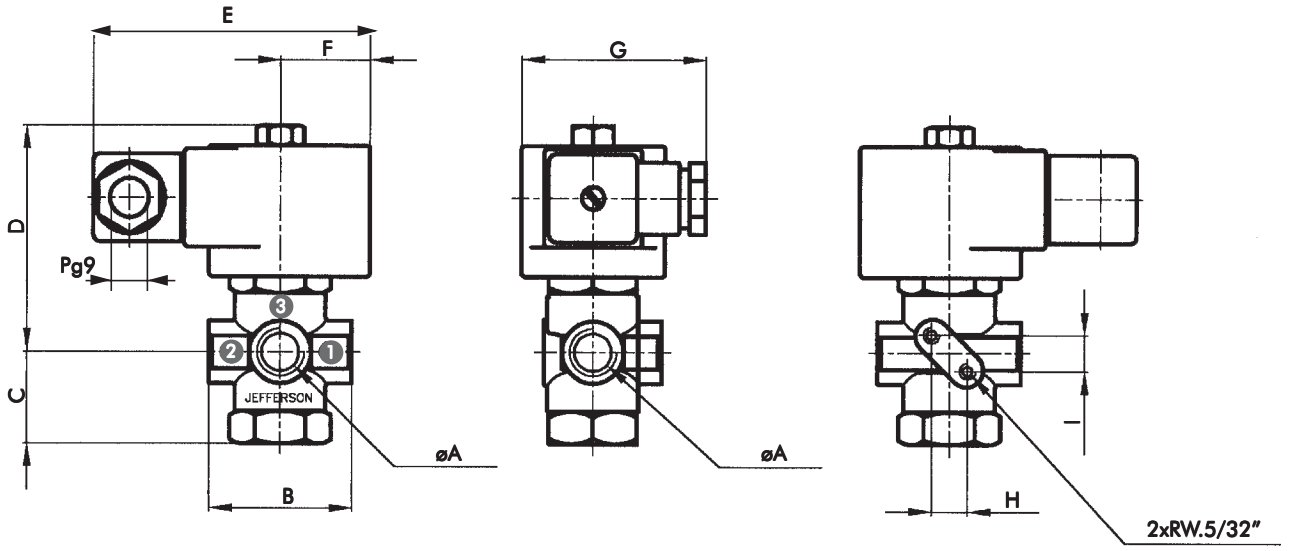
Encapsulated coils. Shape A DIN 43650 connection.
IP65 and NEMA4 Protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass body) silver (s.s. body).
Approximate weight: 0.6 kg / 1.3 Lb.

Options:
- Energized coil indicator light.
- Explosion and / or weather proof coils and housings.
- Manual operator.

Technical specifications

Orifice size		Flow factor		Δp maximum								Maximum temp. and catalog Nº according to seat material			
				NC		NA		DIV		CONV		Buna "N"	Neoprene	EPDM	FKM
mm	ins.	Kv	Cv	bar	psi	bar	psi	bar	psi	bar	psi	80º C / 176º F	80º C / 176º F	150º C / 302º F	150º C / 302º F
"C" Construction															
1.75	0.07	0.08	0.09	15	225	3	45	20	300	3	45	1365BA17C	1365BN17C	1365BE17C	1365BV17C
2.25	0.09	0.12	0.14	11	165	1.5	22	15	225	1.5	22	1365BA22C	1365BN22C	1365BE22C	1365BV22C
3.00	0.12	0.21	0.25	6	90	0.5	7.5	10	150	0.5	7.5	1365BA30C	1365BN30C	1365BE30C	1365BV30C
4.00	0.16	0.30	0.35	3	45	-	-	5	75	-	-	1365BA40C	1365BN40C	1365BE40C	1365BV40C
"A" Construction															
1.75	0.07	0.08	0.09	1.5	22	14	210	10	150	1.5	22	1365BA17A	1365BN17A	1365BE17A	1365BV17A
2.25	0.09	0.12	0.14	1.2	18	10.5	157	5	75	1.2	18	1365BA22A	1365BN22A	1365BE22A	1365BV22A
3.00	0.12	0.21	0.25	1	15	5	75	3	45	1	15	1365BA30A	1365BN30A	1365BE30A	1365BV30A
4.00	0.16	0.30	0.35	-	-	3	45	1	15	-	-	1365BA40A	1365BN40A	1365BE40A	1365BV40A
"U" Construction															
1.75	0.07	0.08	0.09	9	135	8	120	15	225	8	120	1365BA17U	1365BN17U	1365BE17U	1365BV17U
2.25	0.09	0.12	0.14	7	105	7	105	8	120	7	105	1365BA22U	1365BN22U	1365BE22U	1365BV22U
3.00	0.12	0.21	0.25	4	60	3.5	52	6	90	3.5	52	1365BA30U	1365BN30U	1365BE30U	1365BV30U
4.00	0.16	0.30	0.35	1.5	22	1.5	22	4	60	1.5	22	1365BA40U	1365BN40U	1365BE40U	1365BV40U

General dimensions 1365



øA	B	C	D	E	F	G	H	I
R1/4"	44	29	70	85	27	57	11	10

Measurements: mm

øA	B	C	D	E	F	G	H	I
R1/4"	0.94	1.14	1.76	3.35	1.06	2.24	0.43	0.39

Measurements: ins.

Special constructions

Stainless steel body.

- AISI 304: change letter **B** for **S** in the catalog Nº.
  Example: 1365SA302C
- AISI 316: change letter **B** for **I** in the catalog Nº.
  Example: 1365IA302C.

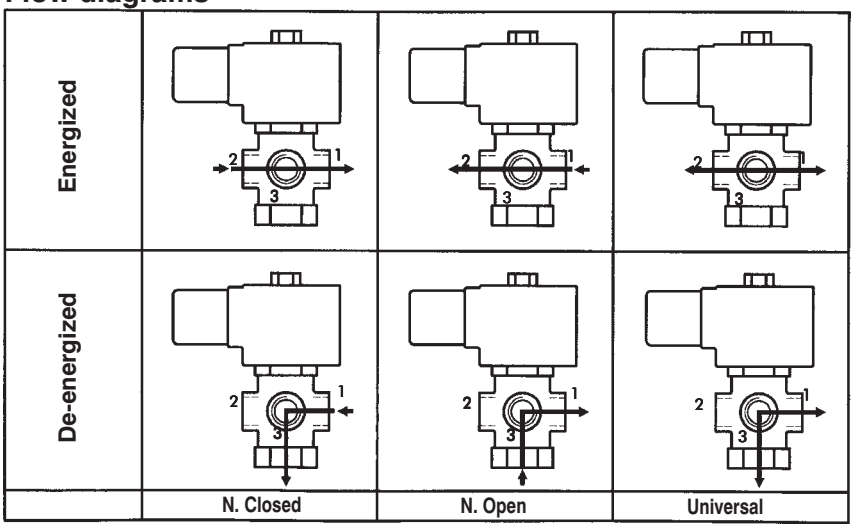
Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	ºC	ºF	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

1-(24,110,220)V **2**-(24,110,120,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1365BA17C
Explosion and weather proof coils.	**ZC**		**ZC**1365BA17C
Weather proof housing.	**Y**		**Y**1365BA17C
Explosion and weather proof housing.	**Z**		**Z**1365BA17C
Manual operator: on the main orifice		**- M**	1365BA17C-**M**
NPT connections		**T**	1365BA17C**T**
Energized coil indicator light	See coils.		

Flow diagrams



Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100μ.
Installation: in any position, preferably over horizontal pipeline with the coil upright.
Except for C, all constructions may be used for any operation, but it is advisable to choose the valve according to its use in order to obtain the best performance.

1375 Series

CERTIFIED QUALITY SYSTEM

Main characteristics

5 ways, 2 positions, monostable.
Pilot operated.
Forged brass body.
Buna "N" seals.
NAMUR mount.
Shape A DIN 43650 connection encapsulated coils.

Applications

•Ideally suited as pilot valves for double acting cylinders and actuators with NAMUR mount.

IP65 and NEMA 4 protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper.

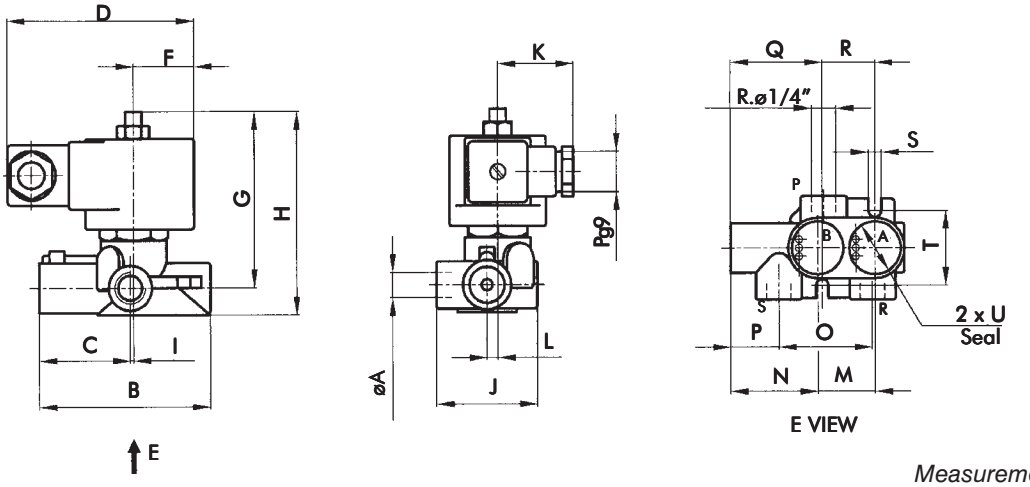
Options:

•Energized coil indicator light.
•Explosion and weather proof coils and housings.

Technical specifications

Orifice size		Flow factor		Δp Minimum		Δp Maximum		Weight		Catalog Nº
mm	ins.	Kv	Cv	bar	psi	bar	psi	kg	Lb	
5.5	0.21	0.59	0.69	0.5	7.5	10	150	0.8	1.76	1375BA2N

General dimensions 1375



Measurements: mm

øA	B	C	D	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
R1/4	78	42	85	27	78	90	1.5	46	35	5	25	38	42,5	21	41	24	6	32	23,5

Measurements: ins.

øA	B	C	D	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
R1/4	3.07	1.65	3.35	1.06	3.07	3.54	0.06	1.81	1.38	0.2	0.98	1.5	1.67	0.83	1.61	0.94	0.24	1.26	0.93

1387BA1N

1387BA2N

Main characteristics

3 ways, 2 positions.
Normally closed.
Direct acting or pilot operated.
Brass body.
Buna N seals.
NAMUR Mount.

Shape A DIN 43650 connection encapsulated coils.
IP65 and NEMA 4 protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper.

Options:

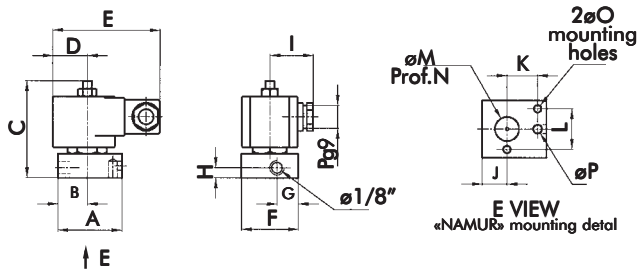
- Energized coil indicator light.
- Explosion and weather proof coils and housings.

Technical specifications

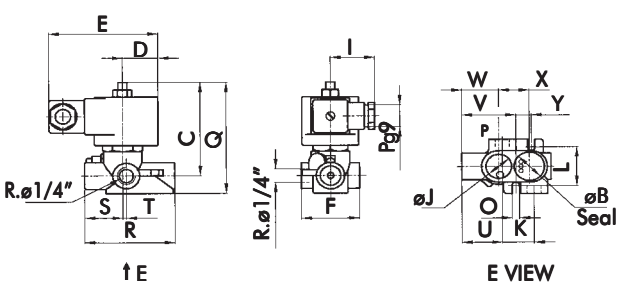
Orifice size		Flow factor		Δp				Weight		Catalog Nº
				Minimum		Maximum				
mm	ins.	Kv	Cv	bar	psi	bar	psi	kg	Lb	
1.75	0.06	0.09	0.11	0	0	10	150	0.71	1.56	1387BA1N
5.50	0.21	0.59	0.69	0.5	7.5			0.8	1.76	1387BA2N

General dimensions

1387BA1N



1387BA2N



Measurements: mm

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
51	23.5	77	27	85	45	17	8	35	20	24	32	19	1.2	6	7	92	70	30	3	31	42	29	23	12

Measurements: ins.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
2	0.93	3.03	1.06	3.35	1.77	0.67	0.31	1.38	0.79	0.94	1.26	0.75	0.05	0.24	0.28	3.62	2.76	1.18	0.12	1.22	1.65	1.14	0.91	0.47

3/2 or 5/2 way solenoid valves. Direct NAMUR mount.

2095 Series

Applications

Ideally suited as pilot valves for single or double acting cylinders and actuators with NAMUR mount.

Main characteristics

Compact valve convertible from 5/2 to 3/2 NC.
NAMUR mount construction.
Pilot operated.
BSP or NPT input and exhaust threaded connections.
Buna “N” seals.
Forged brass compact body.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430F s.s.
Shading coil: copper.
Shape B DIN 43650 connection encapsulated minicoils.
IP65 and NEMA 4 protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper.

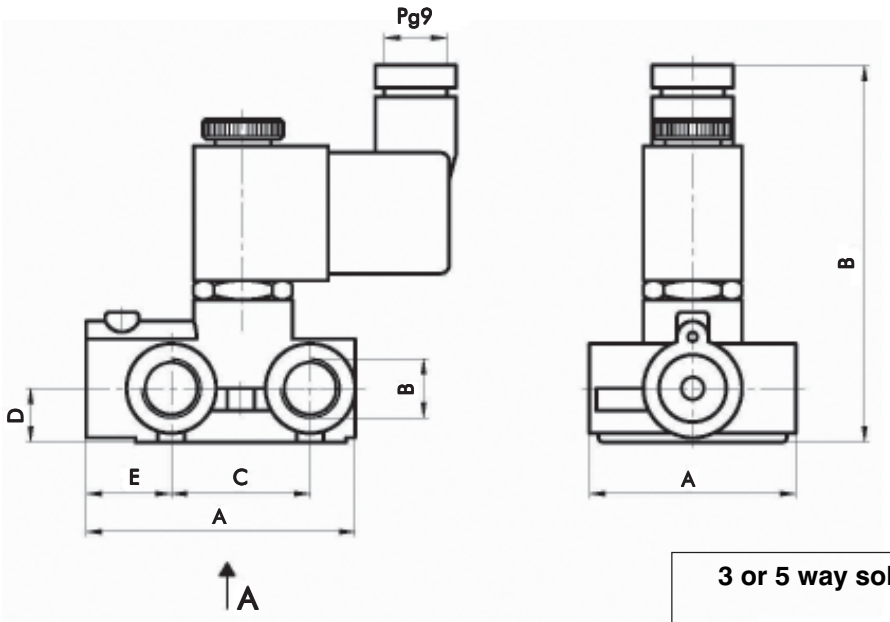
Special constructions:

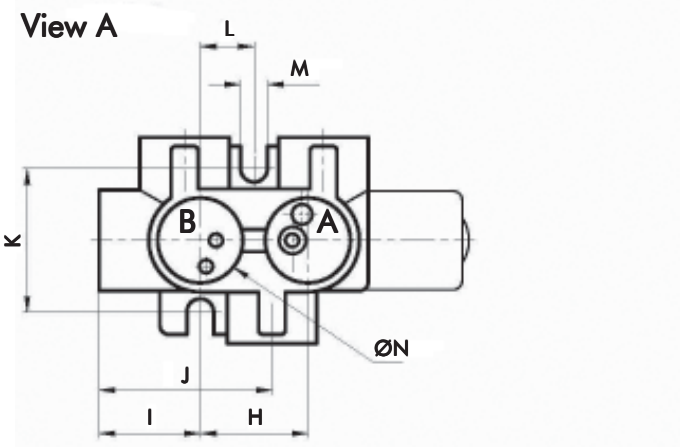
Intrinsically safe solenoid operator

Technical specifications

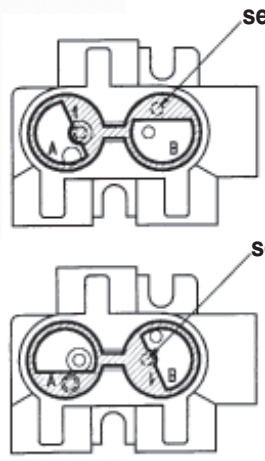
Pipe Size ins.	Orifice size		Flow factor		Δp				Maximum temperature		Weight		Catalog N°
					Minimum		Maximum						
	mm	ins.	Kv	Cv	bar	psi	bar	psi	°C	°F	kg	Lb	
1/4”	3	0.12	0.18	0.21	0.8	12	8	120	80	176	0.4	0.9	2095BA2N

General dimensions *2095*





3 or 5 way solenoid valves Joint position



UNIT	A	B	C	D	E	F	G	H	I	J	K	L	M	N
mm	60.5	R Ø 1/4"	31	13.5	19.5	46	85	24	23	39	32	12	6	19
ins.	2.381	BSP / NTP	1.220	0.531	0.767	1.812	3.347	0.945	0.905	1.535	1.259	0.473	0.237	0.748

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	⁰C	⁰F	
AC 50 Hz	GF06C	6	10.8	7.5	155	311	1
AC 60 Hz	GF06C	6	12.9	8.0	155	311	2
DC	GF06C	6	6	6	155	311	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Suffix	Examples
NPT connections	**T**	2095BA2N**T**

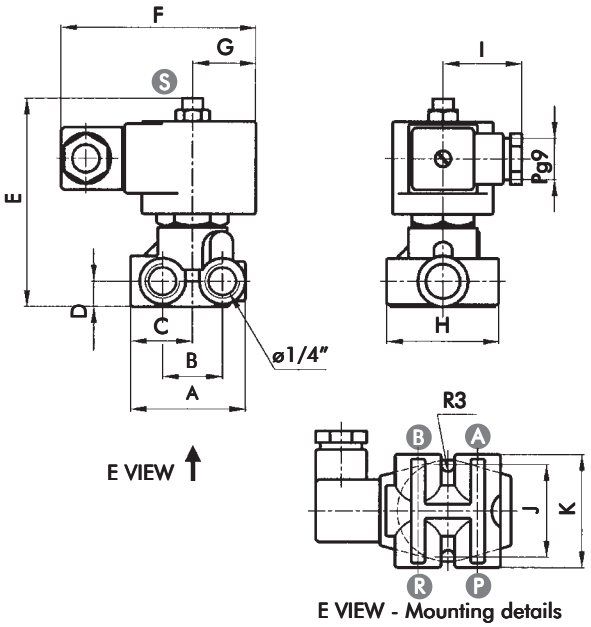
Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100μ. It is advisable to use lubrication with compressed air.
Installation: in any position. Preferably over horizontal pipeline with the coil upright.

5/2 way solenoid valves for small double acting cylinder.

2024 Series

General dimensions 2024



E VIEW - Mounting details

øA	A	B	C	D	E	F	G	H	I	J	K
R 1/4"	49	26	27	11	91	85	27	49	35	40	49

Measurements: mm

øA	A	B	C	D	E	F	G	H	I	J	K
R 1/4"	1.92	1.02	1.06	0.43	3.58	3.34	1.06	1.92	1.37	1.57	1.92

Measurements: ins.

Applications

•These 5 way valves control small double acting cylinder not larger than 4" in diameter.

Main characteristics

For compressed air and other neutral gases.
Forged brass body. Buna "N" seals and seats.
BSP or NPT 1/4" threaded connections.
Servo operated action. Shape A DIN 43650 connection encapsulated coil. IP65 NEMA 4 protection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper.

Options:

•Energized coil indicator light.
•Explosion and weather proof coils and housings.

Technical specifications

Pipe size ins.	Orifice size		Flow factor		Δp Minimum		Δp Maximum		Manual Operator	Weight		Catalog Nº	
	mm	ins.	Kv	Cv	bar	psi	bar	psi		kg	Lb	BSP	NPT
1/4"	1.75	0.07	0.08	0.09	0.8	12	10	150	No	0.7	1.55	2024BA2	2024BA2T
									Yes			2024BA2-M	2024BA2T-M

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**2024BA2
Explosion and weather proof coils.	**ZC**		**ZC**2024BA2
Explosion and weather proof housing.	**Z**		**Z**2024BA2
NPT connections		**T**	2024BA2**T**
Energized coil indicator light	See coils.		

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper) Inrush	VA (volt-amper) Holding	Maximum temperature °C	Maximum temperature °F	Available tensions
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

1-(24,110,220)V **2**-(24,110,120,240)V **3**-(12,24,110,220)V

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100μ. It is advisable to use lubrication with compressed air. Installation: in any position. Preferably over horizontal pipeline with the coil upright.

Valves and Devices for Special Service


1310


1311


1360


1369


2073


1372


2094


1398


"UC"

		Pages
1310 Series	Pneumatically operated globe valves.	**E-2 / E-3**
1311 Series	Pneumatically operated diaphragm valves.	**E-4 / E-5**
1360 Series	Solenoid valves for corrosive fluids.	**E-6 / E-7**
1369 Series	Manual reset device for solenoid valves	**E-8 / E-9**
2073 Series	Solenoid valves for dust collector systems.	**E-10**
1372 Series	Pneumatic operator.	**E-11**
2094 Series	Solenoid valves for CNG (VNG).	**E-12 / E-13**
1370 Series	Pulse operated solenoid unit.	**E-14**
1398 Series	Digital condensation removal timer.	**E-15**
"UC" Series	Solenoid valves for cryogenic fluids.	**E-16 / E-17**
"CP" Series	Power control.	**E-18**

1310 Series — Globe valves operated by double acting pneumatic or hydraulic cylinder with solenoid pilot.

CERTIFIED QUALITY SYSTEM

Applications:

These are used when there are no solenoid valves available due to size, pressure, working temperature, type of fluid or special service conditions (explosive areas, corrosive fluids, etc.)

Main characteristics

Normally closed or normally open.
Direct acting. Operated by double acting pneumatic or hydraulic cylinder (air, water, light oils).
Body: bronze, carbon steel, stainless steel, etc..
BSP or NPT threaded or flanged connections.

Buna "N", PTFE, stainless steel seats.
Minimum auxiliary pressure: 1.5 bar.
5-Way, 2 or 3 position pilot valve.
DIN 43650 connection encapsulated coil.
IP65 and NEMA 4 protection.
Standard constructions to be used with water, air, light oils, other neutral liquids or steam up to 200ºC.

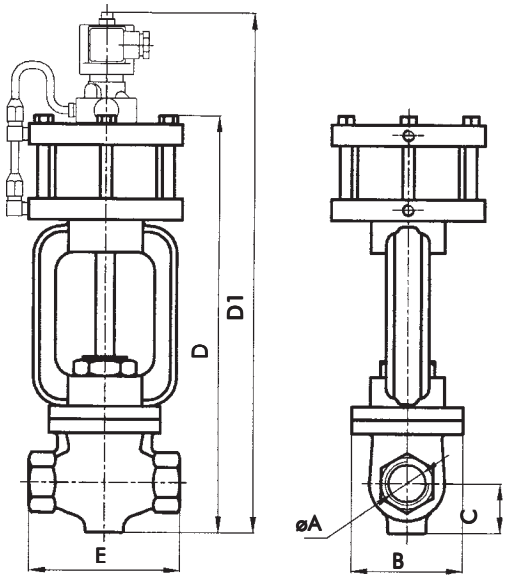
Technical specifications

Pipe size ins.	Orifice size		Flow Factor		Δp maximum		ø Cylinder		Catalog Nº according to body and seat material		
									Body material		
									Bronze	Steel	AISI304
									Seat material		
	mm	ins.	Kv	Cv	bar	psi	mm	ins.	Buna N (*)	S.S.	AISI304
3/4"	19	0.75	6	7	20	300	76.2	3"	1310BA06D3	1310AS06D3	1310SS06D3
1"	26	1.02	11	13	20	300			1310BA08D3	1310AS08D3	1310SS08D3
1.1/2"	32	1.26	15	18	10	150			1310BA12D3	1310AS12D3	1310SS12D3
2"	38	1.5	23	27	10	150	101.6	4"	1310BA16D4	1310AS16D4	1310SS16D4
2.1/2"	76	2.99	66	77	2	30			1310BA20D4	1310AS20D4	1310SS20D4
3"	76	2.99	85	99	10	150	152.4	6"	1310BA24D6	1310AS24D6	1310SS24D6
4"	100	3.94	150	176	2	30			--	1310AS32BD6	1310SS32BD6
6"	150	5.91	320	374	4	60	203.2	8"	--	1310AS48BD8	1310SS48BD8
8"	200	7.87	600	702	3,5	53	254	10"	--	1310AS64BD10	1310SS64BD10

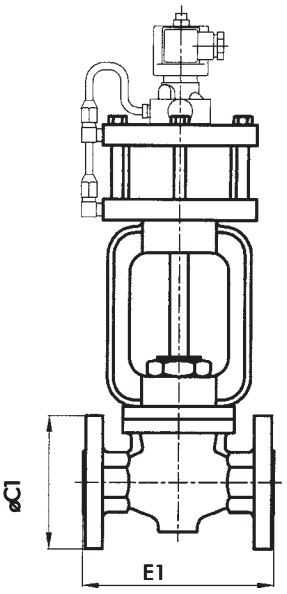
(*) *For PTFE seats change **A** for **T**. Example: 1310BT06D3*
Note: *Maximum temp.: with PTFE or stainless steel seat 200ºC - with Buna N seat 80 ºC.*
Maximum pressure: Maximum pressures are determined considering an auxiliary pressure of 5 bar.

Globe valves operated by double acting pneumatic or hydraulic cylinder with solenoid pilot.

General dimensions 1310



THREADED



FLANGED

ø A	B	C	ø C1	D	D1	E	E1
3/4"	150	32	99	317	408	100	117
1"	157	41	108	335	426	122	127
1.1/2"	173	49	127	358	449	139	165
2"	180	51	152	394	485	149	203
2.1/2"	163	89	178	466	557	224	216
3"	163	89	191	466	557	224	241
4"	--	--	229	570	661	--	292
6"	--	--	279	673	764	--	406
8"	--	--	343	770	861	--	495

Measurements: mm

ø A	B	C	ø C1	D	D1	E	E1
3/4"	5.90	1.26	3.89	12.48	16.06	3.93	4.60
1"	6.18	1.61	4.25	13.18	16.77	4.80	5.00
1.1/2"	6.81	1.92	5.00	14.04	17.67	5.47	6.49
2"	7.08	2.00	5.98	15.51	19.09	5.86	7.99
2.1/2"	6.41	3.50	7.00	18.34	21.92	8.81	8.50
3"	6.41	3.50	7.52	18.34	21.92	8.81	9.48
4"	--	--	9.01	22.44	26.02	--	11.49
6"	--	--	10.98	26.49	30.07	--	15.98
8"	--	--	13.50	30.31	33.89	--	19.48

Measurements: ins.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	ºC	ºF	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1310BT12D3
Explosion and weather proof coils.	**ZC**		**ZC**1310BT12D3
Explosion and weather proof housing.	**Z**		**Z**1310BT12D3
NPT connections		**T**	1310BT12**T**D3
Flanged connections		**B**	1310BT12**B**D3
Energized coil indicator light	See coils		

Special constructions

Consult **Jefferson**.

Pilot solenoid valves (supplied)

For 3, 4 & 6" cylinders: 2024BA2 (2 positions)
1339BA2 (3 positions)
For 6, 8, & 10" cylinders: 1350BA2 (2 positions)
1339BA2 (3 positions)

Recommendations for installation

Place a strainer upstream the pilot valve with a porosity ≤ 50μ if the fluid is gas, or not greater than 100μ if the fluid is water. It is advisable that the air or other gas employed is lubricated.
It is also recommended to place an adequate strainer on the main line to prevent suspended solid elements from settling on the valve seats, thus hindering a complete shutoff.
Mounting: Preferably over horizontal pipeline with the operator upright.

1311 Series — Diaphragm valves operated by double acting pneumatic or hydraulic cylinder with solenoid pilot.

CERTIFIED QUALITY SYSTEM

1311 Series

Applications

Fluids with suspended solids, corrosive chemical products, vacuum systems, food products, large flows of liquids and gases, etc.

Main characteristics

Normally closed or normally open.
Direct acting. Operated by double acting pneumatic or hydraulic cylinder (air, water, light oils).
Body: cast iron, carbon steel, stainless steel, plastic coated, etc.
BSP or NPT threaded or flanged connections.
Diaphragm: rubber, FKM, neoprene, PTFE, etc.
5-way, 2 or 3 position pilot valve.

DIN 43650 connection encapsulated coil. IP65 and NEMA 4 protection.
Minimum auxiliary pressure: 1.5 bar.
No pressure differential required to operate.
Standard constructions to handle water, air, light and heavy oils and other liquids or steam.
Fluids: corrosive, viscose with suspended solids, etc.

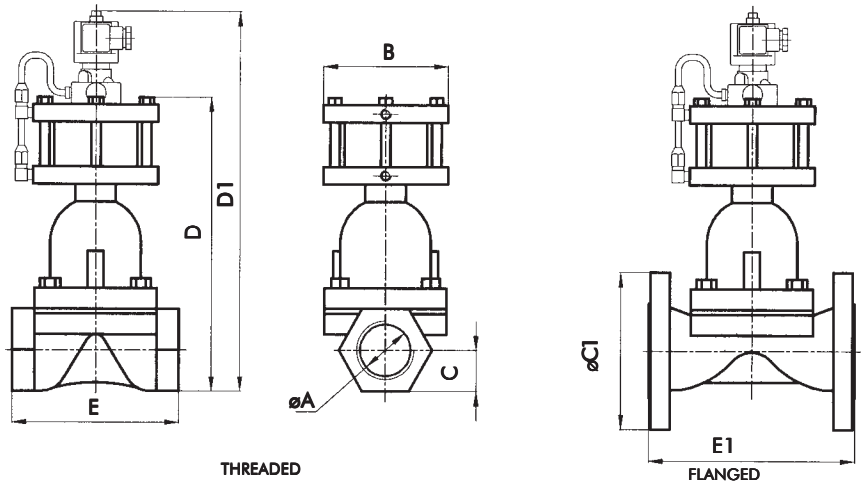
Technical specifications

Pipe size ins.	Factor flow		Δp maximum		ø Cylinder		Catalog Nº according to body material		
	Kv	Cv	bar	psi	mm	ins.	Iron	AISI 316	Ebonite coated
3/4"	8	9.4	7	105	76.2	3"	1311FA06D3	1311IT06D3	1311EV06D3
1"	12	14	5	75			1311FA08D3	1311IT08D3	1311EV08D3
1.1/2"	31	36	5	75	101.6	4"	1311FA12D4	1311IT12D4	1311EV12D4
2"	60	70	3	45			1311FA16D4	1311IT16D4	1311EV16D4
2.1/2"	89	104	5	75	152.4	6"	1311FA20D6	1311IT20D6	1311EV20D6
3"	127	149	2	30			1311FA24D6	1311IT24D6	1311EV24D6
4"	226	264	3	45	203.2	8"	1311FA32D8	1311IT32D8	1311EV32D8
5"	299	350	2	30			1311FA40D8	1311IT40D8	1311EV40D8
6"	425	497	2	30	254	10"	1311FA48D10	1311IT48D10	1311ET48D10

Note: *Diaphragms are made of natural rubber, PTFE or FKM for iron, stainless steel and ebonite coated bodies respectively.*
Valves can be provided with other types of diaphragms or body materials upon request.
Maximum pressures are established with an auxiliary pressure of 5 bar.

Diaphragm valves operated by double acting pneumatic or hydraulic cylinder with solenoid pilot.

General dimensions 1311



ø A	B	C	ø C1	D	D1	E	E1
3/4"	125	19	99	195	275	100	117
1"	125	21	108	215	295	122	127
1.1/2"	125	29	127	265	345	139	160
2"	145	37	152	315	395	149	190
2.1/2"	145	43	178	340	420	224	216
3"	200	48	191	390	470	224	254
4"	200	--	229	500	580	--	305
6"	270	--	279	660	740	--	406
8"	330	--	343	880	960	--	521
10"	330	--	406	1000	1080	--	635

Measurements: mm

ø A	B	C	ø C1	D	D1	E	E1
3/4"	4.92	0.74	3.89	7.67	10.82	3.93	4.60
1"	4.92	0.82	4.25	8.46	11.61	4.80	5
1.1/2"	4.92	1.14	5	10.43	13.58	5.47	6.29
2"	5.70	1.45	5.98	12.40	15.55	5.86	7.48
2.1/2"	5.70	1.69	7.00	13.38	16.53	8.81	8.50
3"	7.87	1.89	7.52	15.35	18.50	8.81	10
4"	7.87	--	9.01	19.68	22.83	--	12.00
6"	7.87	--	10.98	25.98	29.13	--	15.98
8"	12.99	--	13.50	34.64	37.79	--	20.51
10"	12.99	--	15.98	39.37	42.52	--	25

Measurements: ins.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	⁰C	⁰F	
AC 50 Hz	MF11C	11	40	22	155	311	1
	MH11C	11	40	22	180	356	1
AC 60 Hz	MF13C	13	45	27	155	311	2
	MH13C	13	45	27	180	356	2
DC	MH19C	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1311FA12D3
Explosion and weather proof coils.	**ZC**		**ZC**1311FA12D3
Explosion and weather proof housing.	**Z**		**Z**1311FA12D3
NPT connections		**T**	1311FA12D3**T**
Flanged connections		**B**	1311FA12D3**T**
Energized coil indicator light	See coils		

Pilot solenoid valves

With 3, 4, 6" cylinders: 2024BA2 (2 positions)
1339BA2 (3 positions)
With 6, 8, 10" cylinders: 1350BA2 (2 positions)
1339BA2 (3 positions)

Recommendations for installation

Place a strainer upstream the pilot valve with a porosity ≤ 50μ if the fluid is gas and not greater than 100μ if the fluid is water.
It is advisable that air or other gas employed is lubricated.
It is advisable to place the valve over horizontal pipeline with the operator upright.

1360 TV2

1360 TV4

Main characteristics

Acrylic, PVC, PTFE bodies.
FKM seals and diaphragms.
Shielded core. Solenoid parts totally isolated from the fluid.
Shape A DIN 43650 connection encapsulated coil.
IP65 and NEMA 4 protection.
Absence of galvanic electrolysis.
No contamination of the fluid handled.

Options

- Energized coil indicator light.
- Explosion and weather proof coils and housings.

Technical specifications

Pipe size ins.	Orifice size		Flow factor		Max. pressure				Maximum temperature		Figure Nº	Weight		Catalog Nº
					Imput		Output							
	mm	ins.	Kv	Cv	bar	psi	bar	psi	ºC	ºF		kg	Lb	
Acrylic body														
1/4”	2.25	0.09	0.13	0.15	1	15	0.5	7.5	60	140	1	0.4	0.88	1360AV2
PVC body														
3/8”	7	0.28	1	1.17	4	60	2	30	60	140	2	0.8	1.75	1360PV3
1/2”														1360PV4
PTFE body														
1/4”	2.25	0.09	0.13	0.15	1	15	0.5	7.5	60	140	1	0.4	0.88	1360TV2
3/8”	7	0.28	1	1.17	4	60	2	30	150	302	2	0.8	1.75	1360TV3
1/2”														1360TV4

Note: *For Buna N diaphragms and seals, change letter **V** for **A** in the valve catalog number.*
Example: 1360TV4 turns into 1360TA4.

General dimensions

Fig.1

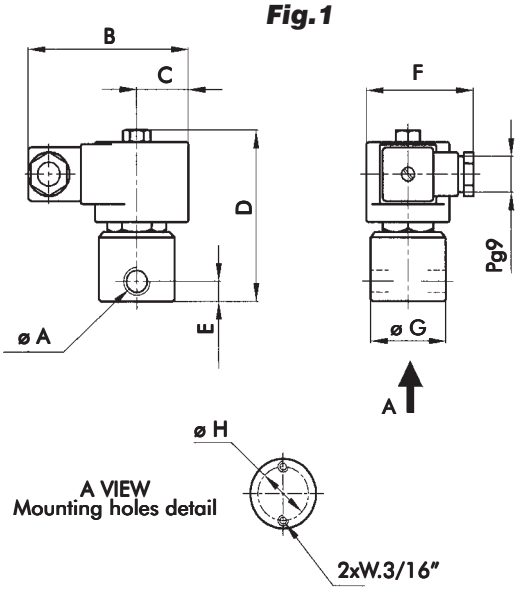
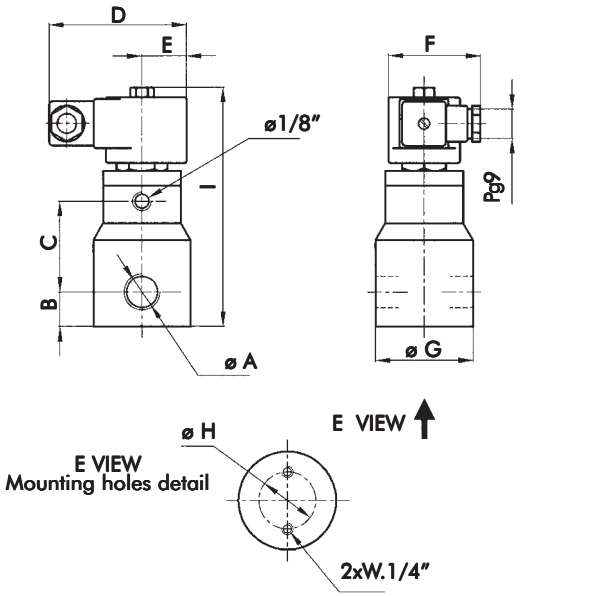


Fig. 2



Dimensions Fig. 1

ø A	B	C	D	E	F	ø G	ø H
1/4	85	27	86	10	57	40	27

Measurements: mm

ø A	B	C	D	E	F	ø G	ø H
1/4	3.35	1.06	3.39	0.39	2.24	1.57	1.06

Measurements: ins.

Dimensions Fig. 2

ø A	B	C	D	E	F	ø G	ø H
1/2" 3/8"	21	56	85	27	57	60	35

Measurements: mm

ø A	B	C	D	E	F	ø G	ø H
1/2" 3/8"	0.83	2.20	3.35	1.06	2.24	2.36	1.38

Measurements: ins.

Coil characteristics

Electric power supply	Pipe size ins.	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
				Inrush	Holding	⁰C	⁰F	
AC 50 Hz	1/4"	MF11C	11	40	22	155	311	1
	3/8"-1/2"	MH18C	18	61	39	180	356	1
AC 60 Hz	1/4"	MF13C	13	45	27	155	311	2
	3/8"-1/2"	MH16C	16	48	29	180	356	2

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1360PV4
Explosion and weather proof coils.	**ZC**		**ZC**1360PV4
Explosion and weather proof housing.	**Z**		**Z**1360PV4
NPT connections		**T**	1360PV4**T**
Energized coil indicator light	See coils.		

Special constructions

Diaphragms and seals: neoprene, EPDM, etc.
Vacuum Service.

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100μ.
Installation: in any position. Preferably over horizontal pipeline with the coil upright. Do not restrict the flow downstream with fittings or other devices since this may end up increasing the output pressure, thus hindering a proper closure. If a flow control valve has to be installed, it must be located upstream the solenoid valve. In case of using spray nozzles, make sure that the valve's output pressure does not exceed the value shown in the table. Due to the mechanical properties and limitations of every material, the installation of a plastic body valve must be done very carefully in order to avoid distortion or breakage, especially while threading.

Resistance of materials in contact with the fluid.

Bodies			Diaphragms, seals and seats
PTFE	PVC	Acrylic	FKM
It is practically inert to all corrosive products. Atmospheric conditions do not affect it. It is neither hydroscopic nor flammable and has an exceptional low friction coefficient.	At low temperatures it is excellent for the most severe alkaline products, mineral acids, salts and many other chemical products that corrode conventional materials.	It is a hard and rigid resin. Weather, oxidation and light radiation proof. Common acids and solvents resistant. It is corroded by strong acids: highly concentrated oxidant acids (nitric, sulphuric, hydrochloric).	It is resistant to petroleum and its distillations, most mineral acids and aliphatic and aromatic hydrocarbons which act as solvents to other elastomers. Not advisable for acetone or halogenated hydrocarbons.

"Free-handle" manual reset safety device for solenoid valves.

1335-69 Series

1365-69 Series

Main characteristics

Manual reset and automatic release.
Reset with energized coil or without electric signal.
The free-handle system sets the lever out of operation when the coil is de-energized (1369 version) or energized (1369B version).
It is adaptable to most of our valve series.

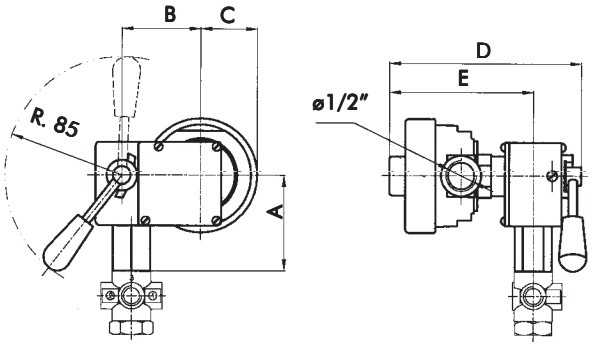
Technical specifications

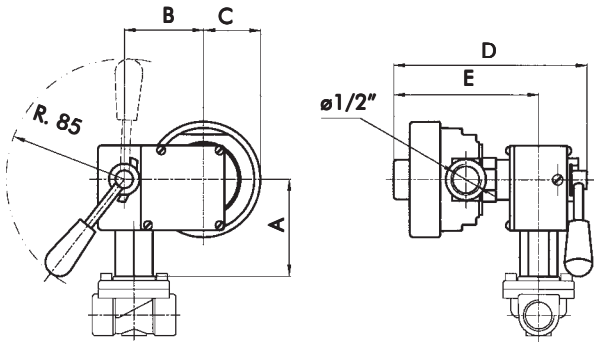
Pipe size ins.	1327	1335	1390 1342	1351	1365 1325	1350
1369 version - Reset **with** electrical signal						
1/4"	1327BA402-69	--	--	1351LA1A-69	1365BA402-69	1350LA1A-69
3/8"	--	1335BA3-69	--	1351LA2A-69	1325BA3-69	1350LA2A-69
1/2"	--	1335BA4-69	1390BA4-69	1351LA3A-69	1325BA4-69	1350LA3A-69
3/4"	--	1335BA6-69	1342BA06-69	--	1325BA6-69	--
1"	--	--	1342BA08-69	--	--	--
1.1/2"	--	--	1342BA12-69	--	--	--
2"	--	--	1342BA16-69	--	--	--
1369B version - Reset **without** electrical signal						
1/4"	1327BA402-69B	--	--	1351LA1A-69B	1365BA402-69B	1350LA1A-69B
3/8"	--	1335BA3-69B	--	1351LA2A-69B	1325BA3-69B	1350LA2A-69B
1/2"	--	1335BA4-69B	1390BA4-69B	1351LA3A-69B	1325BA4-69B	1350LA3A-69B
3/4"	--	1335BA6-69B	1342BA06-69B	--	1325BA6-69B	--
1"	--	--	1342BA08-69B	--	--	--
1.1/2"	--	--	1342BA12-69B	--	--	--
2"	--	--	1342BA16-69B	--	--	--

Note: *1365 is also provided for normally open operation.*

"Free-handle" manual reset safety device for solenoid valves.

General dimensions 1369





A	B	C	D	E
70	57	41	140	104

Measurements: mm

A	B	C	D	E
2.76	2.24	1.61	5.51	4.09

Measurements: ins.

Coil characteristics

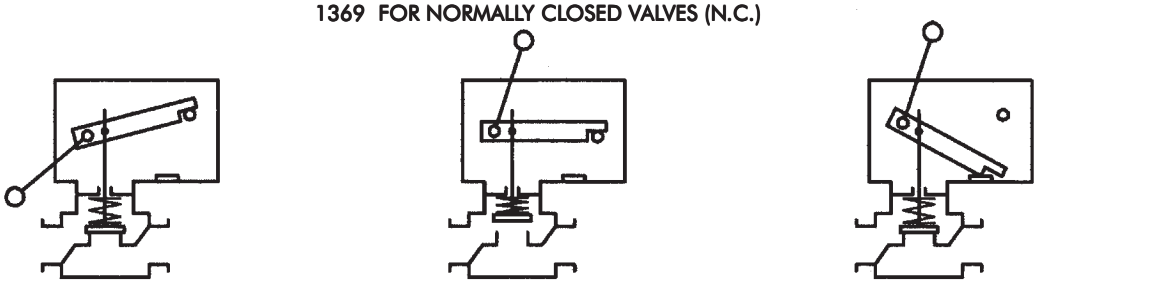
Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	⁰C	⁰F	
AC 50 Hz	MF11C	11	47	18	155	311	1
	MH11C	11	47	18	180	356	1
AC 60 Hz	MF13C	13	57	23	155	311	2
	MH13C	13	57	23	180	356	2
DC	MH19C	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Options	Prefix	Suffix	Examples
Water, weather and saline corrosion proof coils.	**YC**		**YC**1335BA3-69
Explosion and weather proof coils.	**ZC**		**ZC**1335BA3-69
Weather proof housing.	**Y**		**Y**1335BA3-69
Explosion and weather proof housing.	**Z**		**Z**1335BA3-69
NPT connections		**T**	1335BA3**T**-69
Energized coil indicator light	See coils.		

Operation

1369 FOR NORMALLY CLOSED VALVES (N.C.)

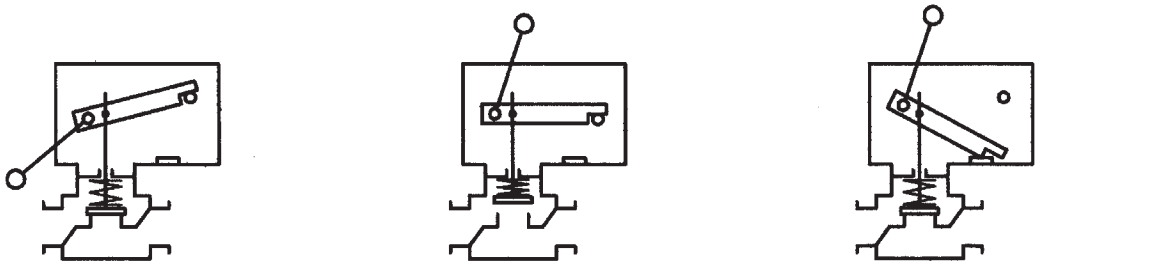


1- Energized, unlatched. (Valve is closed)

2- Energized and latched manually, (Valve opens)

3- Tripped due to lack of electric signal, valve closes and remains so, even after the signal is restored.

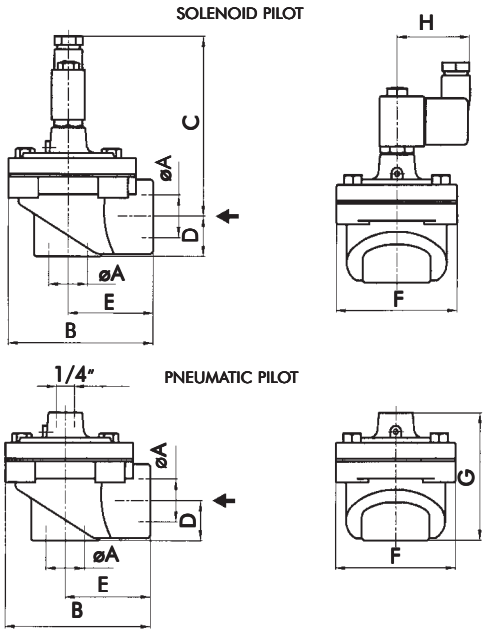
1369B FOR NORMALLY CLOSED VALVES (N.C.)



1- De-energized, unlatched. (Valve is closed)

2- De-energized and latched manually, (Valve opens)

3- Tripped due to signal in the coil, valve closes and remains so even after coil is de-energized.



Main characteristics

High flow and quick response.
Injected or cast aluminum body.
BSP or NPT threaded angle connections.
Buna N or Hytrel diaphragms.
Electric or pneumatic operated versions.
A and B shape encapsulated coils.
DIN 43650 connection. IP65 and NEMA4 protection.

ø A	B	C	D	E	F	G	H
3/4" - 1"	92	104	23	54	76	73	45
1.1/2"	135	119	31	80	126	97	58

Measurements: mm

ø A	B	C	D	E	F	G	H
3/4" - 1"	3.62	4.1	0.91	1.13	2.99	2.87	1.77
1.1/2"	5.31	4.69	1.22	3.15	4.96	3.82	2.28

Measurements: ins.

Coil characteristics

Electric power supply	Pipe size	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
				Inrush	Holding	º C	º F	
AC 50 Hz	ø 3/4" ø 1"	GF06C	6	10.8	7.5	155	311	1
AC 60 Hz		GF06C	6	12.9	8.0	155	311	2
DC		GF06C	6	6	6	155	311	3
AC 50 Hz	ø 1 1/2"	MF11C	11	40	22	155	311	1
AC 60 Hz		MF13C	13	45	17	155	311	2
DC		MH19	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 100μ.
Installation: in any position, preferably over horizontal pipeline with the coil upright.

Options	Prefix	Suffix	Example
NPT connections		**T**	2073LH06S**T**

Technical specifications

Pipe size ins.	Orifice size		Flow factor		Δp				Power W	Max temp.		Weight		Maximum temp. and catalog Nº according to seat material	
	mm	ins.	Kv	Cv	Minimum		Maximum			ºC	ºF	kg	Lb	Buna "N"	Hytrel
					bar	psi	bar	psi						80º C / 176º F	60º C / 140º F
Integrated solenoid pilot															
3/4"	29	1.14	8.7	10.2	0.5	7.5	10	150	6	60	140	0.55	1.21	-	2073LH06S
1"	29	1.14	16	18.7										-	2073LH08S
1,1/2"	40	1.57	29	34					11	80	176	1.3	2.87	2073LA12S	-
External pneumatic pilot (*)															
3/4"	29	1.14	8.7	10.2	0.5	7.5	10	150	-	60	140	0.45	1	-	2073LH06
1"	29	1.14	16	18.7										-	2073LH08
1,1/2"	40	1.57	29	34						80	176	0.9	1.97	2073LA12	-

(*) In this case the auxiliary pneumatic signal must be equal or greater than the main input pressure.

1342-72 Series

1335-72 Series

Main characteristics

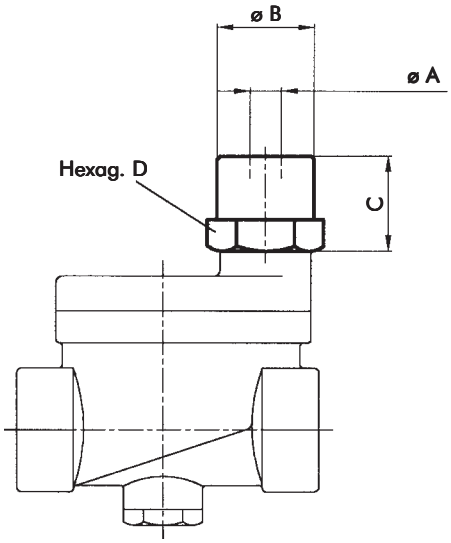
Operates with pneumatic signal.
Replaces the solenoid operator and can be adapted to some of the size M solenoid valve models.
Normally closed and normally open.
Seats: Buna N, FKM, etc.
Minimum operating pressure: 1 bar.
Maximum operating pressure: 10 bar.

Series that match with this device

Direct acting: **1327 Series**
Pilot operated: **1335 - 1342 - 1390 Series**.

For N.C. models, the minimum pressure is 1 bar.
For N.O. models, the minimum pressure equals the maximum pressure of the fluid to be controlled plus 1 bar.

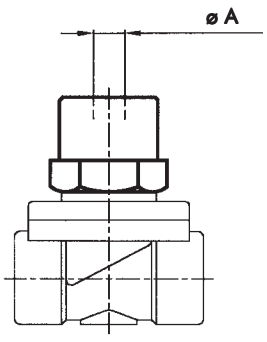
General dimensions



1342-72

ø A	ø B	C	Hexag. D
R 1/8"	31	30	32

Measurements: mm



1335-72

ø A	ø B	C	Hexag. D
R 1/8"	1.22	1.18	1.26

Measurements: ins.

2 way solenoid valves for CNG (VNG).

CERTIFIED QUALITY SYSTEM

Applications

Automatic safety shutoff for Compressed Natural Gas Systems, like CNG Dispensers, etc.

General description

2094 series valves have been designed to handle high pressure fluids such as gaseous fuels and offer the customer the ultimate in performance, resistance and efficiency under hard working conditions.
In addition, the piston system allows perfect opening and shutoff through an 8 mm passage, by means of a pilot orifice suited for high pressure.

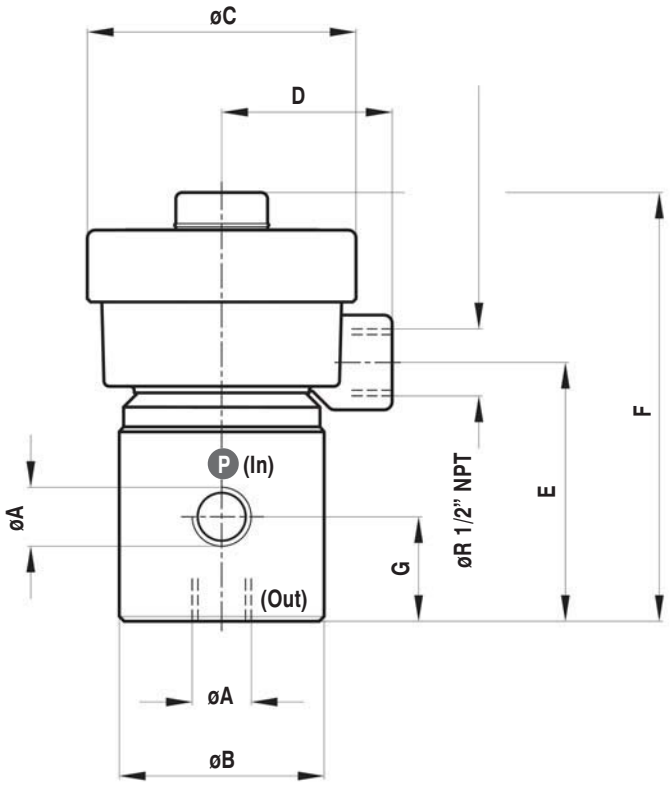
Main characteristics

Normally closed.
Pilot operated.
Brass, stainless steel bodies.
Piston and Seats: Delrin.
NPT threaded connection.
Core tube: 304 s.s. Core spring: 302 s.s. Core: 430 F s.s.
Shading coil: copper (brass body) silver (s.s. body).
Housing: Integrated explosion and weather proof according to IEC 79-1 “d”.

Technical specifications

Pipe size ins.	Orifice size		Flow factor		Operating pressure differential				Power W		Maximum temperature		Weight		Catalog N°
					Minimum		Maximum								
	mm	ins.	Kv	Cv	bar	psi	bar	psi	50 Hz	60 Hz	°C	°F	kg	Lb	
1/4”	8	0.31	1.1	1.29	1	15	250	3750	11	13	80	176	2.3	5	Z2094RBD2
3/8”			1.5	1.76											Z2094RBD3
1/2”			1.5	1.76											Z2094RBD4

General dimensions *2094*



øA	øB	øC	D	E	F	G
R 1/4" NPT	62.5	82	52	80	133	32
R 3/8" NPT						
R 1/2" NPT	75	82	52	80	133	32

Measurements: mm

øA	øB	øC	D	E	F	G
R 1/4" NPT	2.46	3.23	2.05	3.15	5.24	1.26
R 3/8" NPT						
R 1/2" NPT	2.95	3.23	2.05	3.15	5.24	1.26

Measurements: ins.

Special constructions

- AISI304 Body: change letter **B** for **S** to Catalog Nº. Example: Z2094RSD2.
- AISI316 Body: change letter **B** for **I** to Catalog Nº. Example: Z2094RID2.

Recommendations for installation

Place a strainer upstream the valve with a porosity ≤ 50μ.
Mounting: In any position, preferably over horizontal pipeline with the coil upright.

Coil characteristics

Electric power supply	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
			Inrush	Holding	º C	º F	
AC 50 Hz	M11F	11	40	22	155	311	1
	M11H	11	40	22	180	356	1
AC 60 Hz	M13F	13	45	27	155	311	2
	M13H	13	45	27	180	356	2
DC	M19H	19	19	19	180	356	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Pulse operated solenoid unit with magnetic latch.


1327-70


1330-70


1335-70


1390-70


1342-70


2026-70


2036-70

CERTIFIED QUALITY SYSTEM

Description

This device is designed to turn monostable 2-position solenoid valves into bistable 2-position solenoid valves.

Although it uses the same coil as a standard valve, its solenoid assembly has certain specific characteristics.

When the coil is energized with a direct current pulse polarized as shown in the picture, the core goes up to contact the plugnut and stays in that position (P1) by the influence of a magnet placed on top of the core-tube.

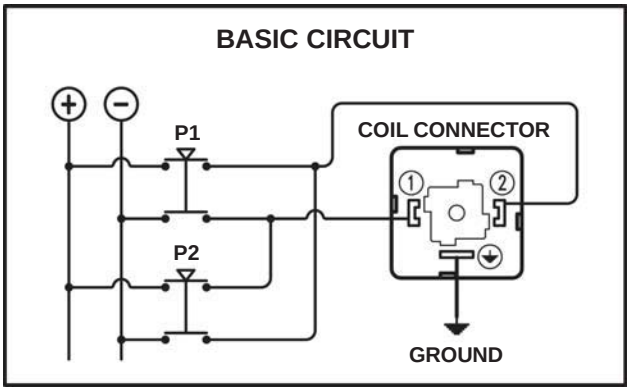
To return to the initial position (P2), a new electric pulse with reversed polarity must be applied.

This device can be adapted to direct acting / internal pilot valves using M or G size coils.

Suitable for neutral liquids or gaseous fluids.

Technical specifications

Pressures up to 10 bar - (150 psi). For higher pressures, please contact Jefferson.
Available tensions: 12, 24, 110 and 220 V DC.
Length of pulse: 0.1 - 1 sec.
Power consumption during electric pulse:
Size M coil: 19 VA.
Size G coil: 6 VA.



P1: To open
P2: To close
Do not pulsate at the same time.

Compatible series

Pipe size ins.	1327	1330	1335	1390 1342	2026	2036
1/8”	-	-	-	-	2026BA..1-70	-
1/4”	1327BA..2-70	--	--	--	2026BA..2-70	-
3/8”	--	-	1335BA3-70	--	-	2036BA03-70
1/2”	--	1330LA04-70	1335BA4-70	1390BA4-70	-	2036BA04-70
3/4”	--	1330LA06-70	1335BA6-70	1342BA06-70	-	2036BA06-70
1”	--	--	--	1342BA08-70	-	2036BA08-70
1.1/2”	--	--	--	1342BA12-70	-	--
2”	--	--	--	1342BA16-70	-	--
21/2”	-	-	-	1342BA20-70	-	-
3”	-	-	-	1342BA24-70	-	-

1398 Series Digital condensation removal timer.

1398 Series

CERTIFIED QUALITY SYSTEM

Applications:

Automatic draining of filters, liquid separators, dryers, receivers, drip legs and other compressed air system components where condensate and contaminants collect.

General description

- The Digital Condensation Removal Timer is a compact electronic device specially designed for pipe air condensation removal when matched with a solenoid valve.
- This digital timer is adaptable to any valve using a DIN type, 43650 – shape A coil, to obtain an optimal system.
- This device can by easy programmed by two press-keys and an LCD display.

Ambient temperature:
-10ºC to +50 ºC; (+14 ºF to +122 ºF).

Weight: 64 g; (2.3 oz.).

Protection:
IP65 when plugged to a coil with a connector.

Insulation group: VDE 0110 1/89 - Class C.

Technical Specifications

Supply voltage: 12 - 115 VDC.
24 - 240 VAC.

Maximum current: 1 A.

Poles: 2 + Ground.

Time ranges:
Off 0-99.59 min.
On 0-59 sec

Time adjustment

1 - Press SET for 2 seconds.
2 - Press ADJ to adjust ON time (sec.)
3 - Press SET
4 - Press ADJ to adjust OFF time (min.)
5 - Press SET

Reset press protected switch located above SET & ADJ keys.

Series that may be adapted to this device

Direct acting: **1327**
Servo operated action: **1335 - 1342 - 1390**.

Cryogenic service and liquid CO_2 solenoid valves.


1327-UC


1390-UC


1314-UC

CERTIFIED QUALITY SYSTEM

Main characteristics

1314, 1327 and 1390 Series solenoid valves are specially designed to control cryogenic flow. Cryogenic fluids include liquid oxygen, liquid argon, liquid nitrogen and liquid CO_2.

Temperature ranges:
Cryogenic fluids -200º C to 50º C (-328º F to 122º F).
Liquid CO_2 **:** -60º C to 50º C (-76º F to 122º F).

Construction Materials

Body: Brass.
Seals and seats: PTFE.
Piston: 304 stainless steel (1390 and 1314 series).
Core assembly and magnetic stop: AISI 430.
Springs: 302 stainless steel.
Shading coil: copper.

Technical specifications

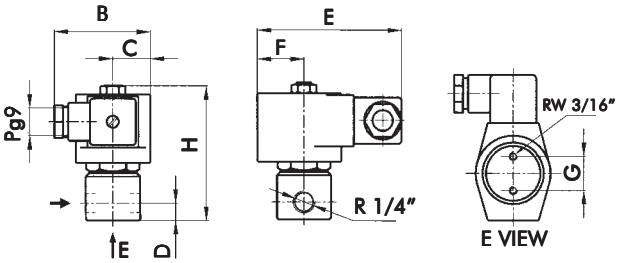
***Advise:** when using direct current (DC), a 25% reduction on the maximum operating pressure differential is expected

Piper size ins.	Orifice size		Flow factor		Δp minimum		Δp * maximum		Minimum Temp.		Maximum Temp.		Weight		Catalog Nº.
	mm	ins.	Kv	Cv	bar	psi	bar	psi	ºC	ºF	ºC	ºF	kg	Lb	
1/4"	3	0.12	0.26	0.30	0	0	10	150	-200	-328	50	122	0.5	1.1	1327BT302UC
	4	0.16	0.43	0.50			5	75					0.5	1.1	1327BT402UC
	6	0.24	0.8	0.94	0.1	1.5	15	225					0.75	1.7	1390BT2UC
3/8"	9	0.35	1.6	1.87									0.70	1.5	1390BT3UC
1/2"	12	0.47	2.35	2.75									0.96	2.1	1390BT4UC
	19	0.75	4.5	5.27	0	0	7	105					4	8.9	1314BST04UC
3/4"	19	0.75	6	7.02									4	8.9	1314BST06UC
1"	26	1.02	10	11.7									4.9	10.9	1314BST08UC
11/2"	32	1.26	15	17.6									6.5	14.4	1314BST12UC
2"	38	1.5	23	26.9									7.3	16.2	1314BST16UC
Liquid CO_2 service (1)															
1/8"	1.25	0.05	0.05	0.06	0	0	70	1.050	-60	-76	50	122	0.5	1.1	1327BT121UC
	1.75	0.07	0.09	0.11			30	450					0.5	1.1	1327BT171UC
	2.25	0.09	0.13	0.15			20	300					0.5	1.1	1327BT221UC
	3.00	0.12	0.26	0.30			10	150					0.5	1.1	1327BT301UC

(1) Connection pipe: Inside diam. cannot be larger than valve´s passage. The expansion will occur downstream. It prevents CO_2 from freezing.

General dimensions

1327 UC



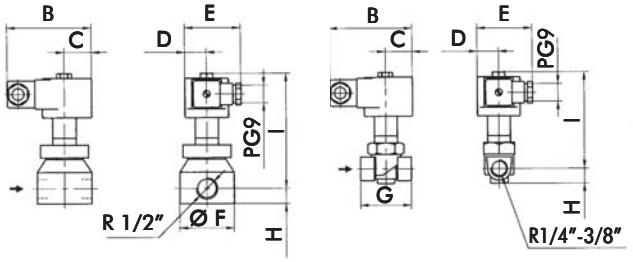
B	C	D	E	F	G	H
57	22	10	85	27	20	80

Measurements: mm

B	C	D	E	F	G	H
2.24	0.87	0.39	3.35	1.06	0.79	3.15

Measurements: ins.

1390 UC



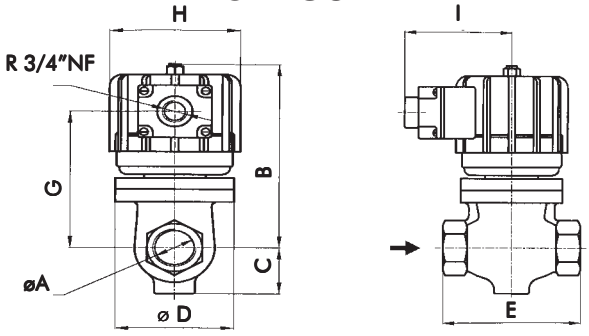
Ø A	B	C	D	E	Ø F	G	H	I
1/4" - 3/8"	85	27	22	57	-	52	15	97
1/2"	85	27	22	57	55	-	15.5	118

Measurements: mm

Ø A	B	C	D	E	Ø F	G	H	I
1/4" - 3/8"	3.35	1.06	0.87	2.24	-	2.05	0.59	3.82
1/2"	3.35	1.06	0.87	2.24	2.17	-	0.61	4.65

Measurements: ins.

1314 UC



øA	B	C	øD	E	F	G	øH	I
R 3/4"	150	32	76	100	80	113	99	95
R 1"	157	41	90	120	89	120		
R 1.1/2"	180	49	100	149	97	143		
R 2"	180	51	100	149	100	147		

Measurements: mm

øA	B	C	øD	E	F	G	øH	I
R 3/4"	5.91	1.26	2.99	3.94	3.15	4.45	3.90	3.74
R 1"	6.18	1.61	3.54	4.72	3.50	4.72		
R 1.1/2"	7.09	1.93	3.94	5.87	3.82	5.63		
R 2"	7.09	2.01	3.94	5.87	3.94	5.79		

Measurements: ins.

Coil characteristics

Electric power supply	Version	Coil type	Power W	VA (volt-amper)		Maximum temperature		Available tensions
				Inrush	Holding	°C	°F	
AC 50 Hz	1327UC 1390UC	MF11C	11	40	22	155	311	1
AC 60 Hz		MF13C	13	45	27	155	311	2
DC		MH19C	19	19	19	155	311	3
AC 50 Hz	1327UC (CO_2)	MH18C	18	61	39	180	356	1
AC 60 Hz		MH16C	16	48	29	180	356	2
DC		MH19C	19	19	19	180	356	3
AC 50 Hz	1314UC	SH28C	28	241	69	155	311	1
AC 60 Hz		SH30C	30	267	80	155	311	2
DC		SH48C	48	48	48	155	311	3

1-(12,24,110,220,240)V **2**-(12,24,110,120,220,240)V **3**-(12,24,110,220)V

Recommendations for installation

Place a strainer with a porosity ≤ 100μ upstream the valve. The valve input pressure must always be equal or greater than the output pressure.

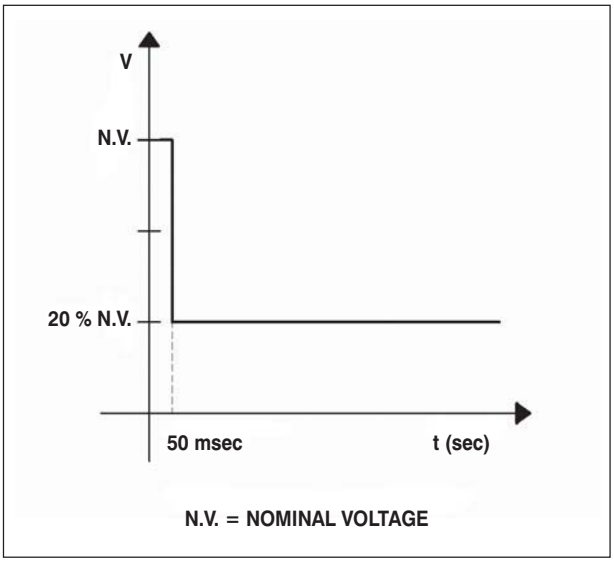
1327UC - 1390UC
Mount the valve in any position, preferably over horizontal pipeline with the coil upright.

1314UC
Mount the valve **only** over horizontal pipeline with the coil upright.

CERTIFIED QUALITY SYSTEM

General Description

The CP is a solid state device used to enhance operational Power control of Solenoid Valve Operators.
The CP has two main functions: one is to induce a stronger than usual response at solenoid pull-in. The second is to reduce the solenoid power consumption during hold-in.
The CP allows the input voltage directly to the coil for a fixed single shot of 50 milliseconds. After that period the CP automatically decreases the output voltage to 20 % of the input nominal voltage, and the power is decreased to 4 %.



N.V. = NOMINAL VOLTAGE

- The CP is available in DIN 43650 / ISO 4400 shape "A " enclosures.
- Speed operator cycle rates with greater consistency.
- Enables coils to be energized for extended periods without burnout.
- Saves energy by reducing overall consumption.
- Reduces hold-in voltage in order to decrease coil heat related losses.
- Increases coil life.
- It is provided with a LED indicator light.
- 3 m (9 ft) standard cable length.

Electrical Data

- Input Voltage: 12 to 24 VDC
- Maximum input voltage tolerance 10 %
- Ambient temperature range: -20º to 50 ºC (4º to 122 ºF)
- Maximum output current:
  - Inrush for 50 milliseconds: 8A
  - Holding: 1 A

Technical information

	Pages
Corrosive fluids table.	F-2 / E-3
Recommendations for installation.	F-4
Problems and solutions.	F-5
Repair Kits.	F-6 / F-7 / F-8

	ACRYLO- NITRILE	ETHMIL-PROPYLENE	NEOPRENE	VITON	DELRIN	NYLON	PVC	TEFLON	CARBON STEEL	AISI 430	AISI 304	AISI 316	SILVER	GRAY CAST	COPPER	BRONZE	BRASS	ALUMINIUM
Acetaldehyde	C	B	C	C		A	C	A	A	B	B	B	A	A	C	C	C	A
Acetic acid		B		C	C	C	C	A	C	B	B	B	A	C	C	C	C	A
Acetone	C	A	C	C	B	A	C	A	A	B	B	B	A	A	A	A	A	B
Acetylene	A	A	B	A	A	A	A	A	A	A	A	A	C	A	C	C		A
Air	A	A	A	A	A	A	A	A	A	A	A	A	A			A	A	A
Ammonium bicarbonate	A	B	A	A		A	A	A	B	B	B			B	C	C	C	B
Ammonium carbonate	C		A				A	A	B	B	B		A	B	C	C	C	B
Ammonium hydroxide		A	A	B	C	A	A	A		A	A	A	C		C	C	C	B
Ammonium nitrate	A	A	A	B	A	A	A	A		B	A	A	A		C	C	C	
Aniline	B	A	B	C		A	C	A		B	B		A	A				C
Animal oil	B	A	A	A	A	A	B	B	B	A	A	C	A	B	C	C	A	C
Antioxidants	A		A				A											
Aqueous acetic acid		A	A			A			C	B	A	A	B	C	C	C	C	B
Argon	B		A						B	A	A	A	A					
Beer					A	A	A	A	A	B	A	A			A	B	B	A
Benzene	C	C	C		A	C	A	A	A	A	A	A	A	A	A	A	A	A
Blood							C	A	C	A	A	A						
Boric acid	A	A		A		A	A	A	C	B			A	C				
Brake oil	A	B	B			A		A	A	A	A	A	B		A	A	A	A
Brine							C	A	C	A	A	A						
Butane	B	C	B	A	A	A		A	A	A	A	A		A	A	A	A	A
Butane	A	B	B			A		A	A	A	A	A	B		A	A	A	A
Butyric acid	A	B	C	C				A		C	C	C	A	C			C	
Carbon bisulfite	C	C	C	A	A	A	C	A	A	A	A	A	B		B	B	B	A
Carbon dioxide						C	A	A	A	A	A	A	A	A	A	A	A	A
Carbonated water	A		A	A		A		A		A	A				B	B	B	
Carbonic acid	C	A	A					A		B	B	B	B	C			B	B
Caustic soda	A	B	B			A		A	A	A	A	A	B		A	A	A	A
Chinese wood oil	A	C	B	A	B	A	A	A	A		A	A		A	B		B	A
Chlorinated hydrocarbonated		C	C	B		C	C	A		B	B		B		A	A	A	A
Chlorinated solvents		C	C	B		B		A	B		B					A		C
Chlorinated water	B	B		B		B		A		C	C							
Chloroform	C	C	C		B	A	C	A		B	A	A	A			B		C
Citric acid	A	A	A	A		A	A	A	C				B	C	C	B	C	
Coke gas		C		B	A		A	A	A	A	A	A	A	A	A		C	A
Corn oil	A	C	B	A	B	A	A	A	A		A	A	A	A	A	A	B	A
Demineralized water		A		A	A	A	A	A	C	A	A	A	A	C				A
Distilled/Deionizated water	B	A	A	A	A	A	B	B	B	A	A	C	A	B	C	C	A	C
Drinking water	A	A			A	A	A	A		A	A	A	A	C	A	A	B	B
Dry chloride	C	C	C	B	C	C	C	B		C	C		B				C	
Edible glucose	A	A	A	A	A	A	A	A	A	A	A	A		A	A	A	B	A
Engine oil (SAE)	A	C		A			A		A	A	A	A	A		A	A	A	A
Ethane	A	C	A		A	A	C	A	A	A	A	A	A	A	A	A	A	
Ethanol	B	A	B	B	A	A	A	A	A	B	B		A	B	B	B	B	
Flax oil (pure)	C		A				A	A	B	B	B		A	B	C	C	C	B
Formic acid	A	B	A	C	C	C		A	C	C				C				C
Freon 12			A	C		A		A	C	A	A	A	A	C	A	A	A	A
Freon 22	C			C		A	C	A	C	A	A	A	A	C	A	A	A	A
Fuel oil		C	B	A	A	A	A	A		A	A	A	A			A	A	A
Gas oil	B	C	B	A	A	A		A	A	A	A	A	A	A	A	A	A	A
Gelatin	A	A	A	A	A	A	A	A	C	A	C			C	A	A	B	A
Glycerin	A	A	A		A	A	A	A	A	A	A	A	A	B	B	A	A	A
Glycol	A	A	A							A	A	A	A		A	A	A	

***A**: Good to excellent - **B**: Acceptable life - Moderate attack - **C**: Unsatisfactory **Blank**: No information.*

	ACRYLO- NITRILE	ETHMI-PROPYLENE	NEOPRENE	VITON	DELRIN	NYLON	PVC	TEFLON	CARBON STEEL	AISI 430	AISI 304	AISI 316	SILVER	GRAY CAST	COPPER	BRONZE	BRASS	ALUMINIUM
Hexane	B	C	B	A	A			A	A	A	A	A	A	B	B	B	A	B
Hot air				A				A	A	A	A	A	A			A	A	A
Hot water	B	A						A		A	A	A	A		B	B	B	
Hydraulic oil	A	C		A	A			A	A	A	A	A	A	A	A	A	A	A
Hydrocloric acid		B				C	C	A	B	C	C	C	C		C	C	C	C
Hydrofluoric acid			C	A	C	C		A		C	C		B	C		C	C	C
Hydrogen	B	C	B	A	A			A	A	A	A	A	A	B	B	B	A	B
Kerosene	A	C	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Lactic acid				B				A	C				B	C		C	C	C
Liquid heptane	A	C	A	A		A		A	A	A	A	A	A		A	A	A	A
Liquid nitrogen (-200ºC)								A			A	A	A			A		
Methane	A	C	B	A			A	A	A	A	A	A	A	A	A	A	A	A
Methanol	A	A	A	C	A	A	A	A	A	B	A	A	A	A	A	A	A	
Milk	A	A	A	A	B	A	A	A	A	A	A	A		A	A	A	A	A
Mineral oil	A	C	B	A		A	A	A	A	A	A	A	A	A	A			A
Naphta	B	C	C	A		A	B	A	A	A	A	A	A		B	B	B	A
Naphta with aromatics		C		A		A	C	A	A	A	A	A	A	A	A	A	A	
Natural gas	A	C	A	A		A	A	A	A	A	A	A	A	A	B	A	A	A
Nitric acid	C		C	C	C	C		A	C		A	A	C	C	C	C	C	
Nitrogen	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Oleic acid	B			B		A	A	A	B	B	A	A	A	B				
Olive oil	A		A	A				A		A	A	A		A			A	A
Oxalic acid	A	A	B	C		A		A	C				B	C		B		
Oxygen	C		A	A						A	A	A	B	A	A	A	A	A
Ozone	C	A		A		A		A	C	B	B							B
Packed gas (LPG)	B	C	B	A						A	A	A	A		A	A	A	A
Perchloridethylene				A				A	A	A	A		A			A	A	
Petroleum oil	A	C		A					A	A			A	A	A	A	A	A
Phosphoric acid		B		A	C	C	A	A	C	C			B	C				A
Pine oil	A	C	C	A		A		A			A	A		A			A	A
Potassium acetate	A	A	B					B	A	B	B	B	A	A	B	B	B	C
Potassium sulfate	A	A	A	A	B	A	A	A	A	A	A	A	B	C	B	B	C	A
Salicylic acid	A		A	A		A	A	A	C	B	B	B	A	C	B	B	B	
Sea water	A	A	A	A	A	A	A	A	C	C			A	C	B	A	C	C
Silicone	A	A	A	A	A		A			A	A	A	A		A	A	A	
Silicone oil	A	A	A	A	A					A	A	A	A		A	A	A	
Sodium bicarbonate	A	A	A		C	A	A	A		B	B				B	B	B	C
Sodium bisulfite	A		A			A	A	A	C				A	C	B	B	C	
Stearic acid	A	B	A			A	A	A					A	C	C	C	C	B
Sulfuric acid (10%)	C		C	A	C	C		A					C	C	C	C	C	B
Sulfuric acid (20%)	B				C	C	A	A	C	C	C	C	B	C	C		C	
Tannic acid		A				A	A	A		B	B		A	B				
Tartaric acid		B				A	A	A	C				A	C			C	
Thinner	C	C	C	C				A	A	A	A	A	A	B	B	B	A	B
Toluene	C	C	C	A	B	A	C	A	A	A	A	A	A	A	A	A	A	A
Trichloroethylene	C	C	C	B	B	A	C	A		B	B							B
Urea	A		A			A	A	A		B	B		A	B		A		B
Vinegar	A		A	B	C		A		B	B		A		B	B	C		
Water steam	C	A	C				C	A	B	A	A		B	B	B	A	B	
Wine	A	A	A	A	C	A	A	A					B					
Xylene	C	C	C	B	A	A		A	B	A	A	A	A		A	A	A	A

***A**: Good to excellent - **B**: Acceptable life - Moderate attack - **C**: Unsatisfactory **Blank**: No information.*

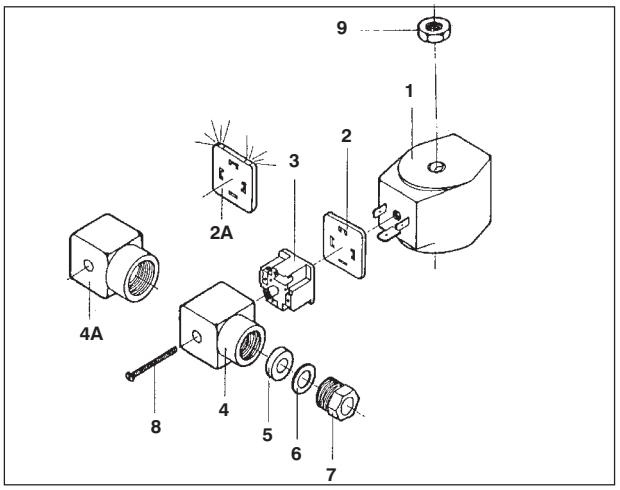
Electrical installation

All the coils are for continuous use - permanent or high frequency operation.
Check that the coil supplied with the valve has the correct tension and current required.
If not, replace it with the adequate coil without changing the valve.
The allowed tension variation that does not affect the performance of the valve is -15% to +10% of the nominal tension for AC and -10% to +10% for DC.
Except for valve series 1312, 1314, 1344, 1356S, 1388 which are provided with "S" coils, and 1326 series with "C" coils, the other Jefferson models are generally supplied with Shape A or B DIN 43650 Connection (ISO 4400) encapsulated coils.

Mechanical installation

- Verify that the working conditions are within the range of differential pressure and temperature indicated on the nameplate of the valve.
- Place a strainer immediately upstream from the valve with the adequate capacity and a mesh smaller than 100 µ.
- The most favorable mounting position is on a horizontal pipeline with the coil upright.
- Pipelines upstream from the valve must be carefully and exhaustively cleaned even before the strainer, by means of purges with compressed air or any other system that guarantees the disposal of solid elements as well as welding bits, mud, dirt, etc.., especially with new pipelines.
- Follow the arrow that indicates the flow direction in the valve's body. The input pressure must always be equal or greater than the output pressure.

Plug-in coils - DIN 43650 Connection (ISO 4400). IP65 Protection.



1 Coil
2 Gasket
2a -Gasket with energized coil indicator light. (Upon request).
3 Electric terminals block. Maximum wiring section AWG14 (1.6 mm.)
4 Cover with opening for armored cable. Strain relief "PG9", cableexternal f from 6 to 8 mm.. Cover with indicator light upon request.
4a Cover with opening for conduit. ½ NPT Connection. (Part No 3189-2). Cover with indicator light upon request.
5 Strain relief gasket.
6 Washer.
7 Strain relief.
8 Fixing screw.
9 Coil fixing nut.

Instructions for the electrical connection with strain relief.

1. Unscrew the screw (8) to reach the block (3), where the terminals are. The system is designed to use armored cables with 3 "PG9" conductors. Carry out Neutral - Live - Ground connections.
2. Insert the terminal block into the cover (4) according to the desired entrance angle, in any of the four possible positions: Left, Right, Above, Below.
3. Insert the coil blades into the connector. Fasten it with the screw (8).
4. Finally but very important, tighten the strain relief (7) to make sure that it is hermetic. Otherwise, moisture may enter and cause a short-circuit between the terminals.

Instructions for the cover with an opening for ½ NPT conduit.

1. Follow instructions 1, 2 and 3 for strain relief connector.
2. It is important to be sure that the interconnection is hermetic, so we recommend the use of a sealant or gasketing tape over the threads.

Coil fixing

The nut (9) that fixes the coil to the core-tube must be 5 Nm / 0,5 kpm / 3.75 lbf, to prevent the coil from turning round. Avoid unnecessary tension that may damage the core-tube due to excess of torsion.

Note: All this is valid both for shape "A" and shape "B" connectors (2026, 2036 and 2073 series).

Failure analysis

Many times solenoid valves fail due to an inadequate selection for certain applications.
In other cases the failures are caused by a defective installation, not having followed the manufacturer's recommendations. In many other cases, because of lack of maintenance, which should be adequate for the kind of job or the efforts the valve is subjected to.
Most of the failures that occur when starting a new installation are the result of lack of cleanness in the pipelines between the filter and the valve, due to left-owers of packaging, teflon, welding residue, dirt, etc..
However, in spite of having made a good choice, a good installa-tion and the adequate maintenance, some contingent factors may occur after the installation and disturb a suitable peration.
Jefferson offers its complete sales service by phone or fax to assist the end user in studying and finding a solution to the failure.
The following page shows the most common failures with their possible causes and solution.

PROBLEM	POSSIBLE CAUSES	SOLUTIONS
Make sure in every case that the voltage energy effectively reaches the coil terminals and check that the filtering mesh of the strainer before the valve is in good condition.		
1.Valves do not open when energized (NC) or when de-energized (NO).	**For direct acting valves** 1. Tension less than 15% of the nominal voltage. 2. Too high a differential pressure for that model. 3. Burnt coil (with the circuit open). 4. Plunger jammed with solids. 5. Damaged plunger. **For servo operated action valves** **The same as above plus:** 6. Differential pressure too low. 7. Jammed servo piston. 8. Damaged servo piston, servo piston rings or diaphragm. 9. Pilot orifice blocked. 10. Pilot gasket damaged or mis-aligned. 11. Excessive viscosity.	1. Check the coil voltage, which must not be less than 85% of the indicated nomi nal tension. If this is the case, adjust the source to the adequate value. 2. Reduce pressure to the maximum shown on the valve nameplate or change it for a more adequate one. 3. See Burnt Coils. 4. Clean the plunger's core tube and the valve. If the system lacks an adequate strainer before the valve, the problem will substist and service will shut down. 5. Replace the damaged part. Damage may be caused by fluid abrasive elements or high operation frequency over a long period of time and exceeding the element's life. 6. This factor should be considered when choosing a valve. It may occur due to over-sizing or reduction of differential pressure. If differential pressure cannot be increased by increasing the flow, the valve must be changed for an adequate one. 7. Check that solids have not affected the piston's movement. After cleaning, check that it is not damaged. A strainer must be placed upstream from the valve to eliminate the problem. 8. Change damaged parts. Check that the cause is not dirt. Point 1.4.1. is applicable in this case. 9. Clean the orifice. See 1.4.1., if the orifice is damaged consult Jefferson. 10. This is caused by poor assembly. Change the damaged part and assemble the valve correctly. The O-ring must be correctly fitted. 11. Fluids with vicosities exceeding 60 CST cannot be used with servo operated valves. If not, change the valve model.
2.The valve remains open	**For direct acting valves** 1. The coil was not de-energized (NC valve) or energized (NO valve). 2. Plunger jammed with solids. **For servo assisted valves** The same as above plus: 3. The pilot orifice does not close. 4. Compensation orifice blocked. 5. Jammed servo piston. 6. Servo piston, servo piston rings or diaphragm damaged. 7. Excessive viscosity.	1. Check the control circuits. 2. Clean the plunger's core tube and the valve. If the system lacks an adequate strainer before the valve, the problem will substist and service will shut down. 3. Check that the plunger is not jammed or the seats damaged. In the first case, clean it, in the second case, change it. If the orifice seat is damaged, consult Jefferson. 4. Clean the orifice. See 1.4.1., if the orifice is damaged consult Jefferson. 5. Check that solids have not affected the piston's movement. After cleaning, check that it is not damaged. A strainer must be placed upstream from the valve to eliminate the problem. 6. Change the damaged parts. Check that the cause is not dirt. Point 1.4.1. is applicable in this case. 7. Fluids with vicosities exceeding 60 cSt cannot be used with servo operated valves. If not, change the valve model.
3.The coil gives off a burning smell after working for a short period or it burns up frequently.	1. Excessive voltage. 2. Only for AC: Too high a pressure that does not allow the pilot to open, therefore, only inrush current is present, which doubles the holding current. 3. The coil's nominal tension is less than the source's or does not correspond to its cycling. 4. Excessive fluid or ambient temperature. 5. Moisture entering the interior of the coil. 6. Lack of part of the electromagnetic package when it is not integrated to the coil. 7. It is energized outside the valve (AC only).	1. The voltage must not exceed 10% of the nominal tension, and only for brief periods. Correct the voltage. 2. Adjust the maximum working pressure to the maximum shown on the nameplate. If pressure is within the parameters, check that voltage is not less than 85% of the nominal tension. 3. Check that the tension and current type is as indicated on the coil. 4. The fluid, atmosphere and power of the coil determine the internal temperature. As a general rule, the fluid temperature + ambient temperature must not exceed 210ºC. The fluid temperature cannot be above 180ºC. When handling hot fluids and the ambient exceeds 30ºC, it is advisable to fit the valve in the most ventilated area. 5. Check that DIN coils' strain relief is tight and the armored cable corresponds to the connector Pg. For S coils, check that the housing and connection are closed. See mounting recommendations. 6. Replace the missing parts because they are part of the magnetic circuits and their absence results in an increase of the intensity which reduces the force of the magnetic attraction. 7. Do not energize the coil if it is not fitted to the valve.
4.The coil vibrates when energized.	1. Insufficient voltage. 2. Dirty fixed core and plunger surfaces, they have scales.	1. Adjust the tension within the permitted parameters. 2. Clean the surfaces. If scales remain there, change the components.
5-Fluid leakage when closed.	1. Main or pilot seat damaged or dirty.	1. Clean or change seats. If the orifice seats are damaged, consult Jefferson.
6-It operates slowly or fails.	1. Compensation or pilot orifice partially blocked. 2. Excessive fluid viscosity. 3. Temporary excess or lack of differential pressure.	1. In case of dirt, clean the orifices. In case of damage, consult Jefferson. 2. The fluid's viscosity must not exceed 60 cSt. See 1.11. 3. Check that both differential and opening pressure differential are within the limits indicated in the valve nameplate.

General Purpose

Catalog №	Kit part №
1314	
1314BA06	K14A1
1314BA08	K14A2
1314BA12	K14A3
1314BA16	
1314BE06	K14T1
1314BE08	K14T2
1314BE12	K14T3
1314BE16	
1314BN06	K14N1
1314BN08	K14N2
1314BN12	K14N3
1314BN16	
1314BST06	K14T1
1314BST08	K14T2
1314BST12	K14T3
1314BST16	
1314BV06	K14V1
1314BV08	K14V2
1314BV12	K14V3
1314BV16	
1314BA06A	K14A1
1314BA08A	K14A2
1314BA12A	K14A3
1314BA16A	
1314BE06A	K14T1
1314BE08A	K14T2
1314BE12A	K14T3
1314BE16A	
1314BN06A	K14N1
1314BN08A	K14N2
1314BN12A	K14N3
1314BN16A	
1314BST06A	K14T1
1314BST08A	K14T2
1314BST12A	K14T3
1314BST16A	
1314BV06A	K14V1
1314BV08A	K14V2
1314BV12A	K14V3
1314BV16A	
1327	
1327BA122	K27A
1327BA172	
1327BA222	
1327BA302	
1327BA402	
1327BA502	
1327BA522	
1327BE122	K27E
1327BE172	
1327BE222	
1327BE302	
1327BE402	
1327BE502	
1327BE522	
1327BN122	K27N
1327BN172	
1327BN222	
1327BN302	
1327BN402	
1327BN502	
1327BN522	

Catalog №	Kit part №
1327	
1327BT122	K27T
1327BT172	
1327BT222	
1327BT302	
1327BT402	
1327BV122	K27V
1327BV172	
1327BV222	
1327BV302	
1327BV402	
1327BV502	
1327BV522	
1327BA122NA	K27AA
1327BA172NA	
1327BA222NA	
1327BA252NA	
1327BA302INA	K27AINA
1327BA402INA	
1327BA502INA	
1327BE122NA	K27EA
1327BE172NA	
1327BE222NA	
1327BE252NA	
1327BE302INA	K27EINA
1327BE402INA	
1327BE502INA	
1327BN122NA	K27NA
1327BN172NA	
1327BN222NA	
1327BN252NA	
1327BN302INA	K27NINA
1327BN402INA	
1327BN502INA	
1327BT122INA	K27TINA
1327BT172INA	
1327BT222INA	
1327BT302INA	
1327BT402INA	
1327BV122NA	K27VA
1327BV172NA	
1327BV222NA	
1327BV252NA	
1327BV302INA	K27VINA
1327BV402INA	
1335	
1335BA3D	K35A1D
1335BA4D	
1335BA6D	K35A2D
1335BE3D	K35E1D
1335BE4D	
1335BE6D	K35E2D
1335BN3D	K35N1D
1335BN4D	
1335BN6D	K35N2D
1335BV3D	K35V1D
1335BV4D	
1335BV6D	K35V2D
1335BA3	K35A1
1335BA4	
1335BA6	K35A2
1335BE3	K35E1
1335BE4	

Catalog №	Kit part №
1335	
1335BE6	K35E2
1335BN3	K35N1
1335BN4	
1335BN6	K35N2
1335BV3	K35V1
1335BV4	
1335BV6	K35V2
1335BA3A	K35A1A
1335BA4A	
1335BA6A	K35A2A
1335BE3A	K35E1A
1335BE4A	
1335BE6A	K35E2A
1335BN3A	K35N1A
1335BN4A	
1335BN6A	K35N2A
1335BV3A	K35V1A
1335BV4A	
1335BV6A	K35V2A
1335BA3INA	K35A1INA
1335BA4INA	
1335BA6INA	K35A2INA
1335BE3INA	K35E1INA
1335BE4INA	
1335BE6INA	K35E2INA
1335BN3INA	K35N1INA
1335BN4INA	
1335BN6INA	K35N2INA
1335BV3INA	K35V1INA
1335BV4INA	
1335BV6INA	K35V2INA
1342	
1342BA06	K42A1
1342BA08	K42A2
1342BA12	K42A3
1342BA16	K42A4
1342BA20	K42A5
1342BA24	
1342BE06	K42E1
1342BE08	K42E2
1342BE12	K42E3
1342BE16	K42E4
1342BE20	K42E5
1342BE24	
1342BN06	K42N1
1342BN08	K42N2
1342BN12	K42N3
1342BN16	K42N4
1342BN20	K42N5
1342BN24	
1342BT06	K42T1
1342BT08	K42T2
1342BT12	K42T3
1342BT16	K42T4
1342BT20	K42T5
1342BT24	
1342BV06	K42V1
1342BV08	K42V2
1342BV12	K42V3
1342BV16	K42V4
1342BV20	K42V5
1342BV24	

Catalog №	Kit part №
1342	
1342BA06INA	K42A1INA
1342BA08INA	K42A2INA
1342BA12INA	K42A3INA
1342BA16INA	K42A4INA
1342BA20INA	K42A5INA
1342BA24INA	
1342BE06INA	K42E1INA
1342BE08INA	K42E2INA
1342BE12INA	K42E3INA
1342BE16INA	K42E4INA
1342BE20INA	K42E5INA
1342BE24INA	
1342BN06INA	K42N1INA
1342BN08INA	K42N2INA
1342BN12INA	K42N3INA
1342BN16INA	K42N4INA
1342BN20INA	K42N5INA
1342BN24INA	
1342BT06INA	K42T1INA
1342BT08INA	K42T2INA
1342BT12INA	K42T3INA
1342BT16INA	K42T4INA
1342BT20INA	K42T5INA
1342BT24INA	K42T5INA
1342BV06INA	K42V1INA
1342BV08INA	K42V2INA
1342BV12INA	K42V3INA
1342BV16INA	K42V4INA
1342BV20INA	K42V5INA
1342BV24INA	K42V5INA
1390	
1390BA2	K90BA1
1390BA3	
1390BA4	K90BA2
1390BE2	K90BE1
1390BE3	
1390BE4	K90BE2
1390BN2	K90BN1
1390BN3	
1390BN4	K90BN2
1390BT2	K90BT1
1390BT3	
1390BT4	K90BT2
1390BV2	K90BV1
1390BV3	
1390BV4	K90BV2
1390BA2INA	K90BA1INA
1390BA3INA	
1390BA4INA	K90BA2INA
1390BE2INA	K90BE1INA
1390BE3INA	
1390BE4INA	K90BE2INA
1390BN2INA	K90BN1INA
1390BN3INA	
1390BN4INA	K90BN2INA
1390BT2INA	K90BT1INA
1390BT3INA	
1390BT4INA	K90BT2INA
1390BV2INA	K90BV1INA
1390BV3INA	
1390BV4INA	K90BV2INA

General Purpose

Catalog №	Kit part №
1393	
1393BS082	K93T1
1393BS083	
1393BS084	
1393NS082	
1393NS083	
1393NS084	
1393BS082NA	
1393BS083NA	
1393BS084NA	
1393NS082NA	
1393NS083NA	
1393NS084NA	
2026	
2026BA121	K026A
2026BA171	
2026BA221	
2026BA301	
2026BA122	
2026BA172	
2026BA222	
2026BA302	
2026BE121	K026E
2026BE171	
2026BE221	
2026BE301	
2026BE122	
2026BE172	
2026BE222	
2026BE302	
2026BN121	K026E
2026BN171	K026N
2026BN221	
2026BN301	
2026BN122	
2026BN172	
2026BN222	
2026BN302	
2026BV121	K026V
2026BV171	
2026BV221	
2026BV301	
2026BV122	
2026BV172	
2026BV222	
2026BV302	
2036	
2036BA03/4	K036A01
2036BA08	K036A02
1359	
1359BS04	K59S1
1359BS06	K59S2
1359BS08	K59S3
1359BS12	K59S4
1359BS16	K59S5
1359FS04	K59S1
1359FS06	K59S2
1359FS08	K59S3
1359FS12	K59S4
1359FS16	K59S5

Combustion Use

Catalog №	Kit part №
1312 - 2012	
1312BS504	K12B1
1312BS506	K12B2
1312BS806	
1312BS808	
1312BSB08	
1312SS504	K12S1
1312SS506	K12S2
1312SS806	
1312SS808	
1312SSB08	
1312BS404NA	K12B1
1312BS406NA	K12B2
1312BS606NA	
1312BS408NA	
1312BS608NA	
1312SS404NA	K12S1
1312SS406NA	K12S2
1312SS606NA	
1312SS408NA	
1312SS608NA	
1330 - 2030	
1330LA0	K30A0
1330LA04	K30A1
1330LA06	
2030LA08	K030A1
2030LA10	
1330LA08	K30A2
2030LA12	K030A2
2030LA16	
1330LA08L	K30A2L
2030LA12L	K030A2L
2030LA16L	
1330LAR08	K30AR2
2030LAR12	K030AR2
2030LAR16	
1330LA04NA	K30A1A
1330LA06NA	
1330LA08NA	K30A2
2030LA12NA	K030A2
2030LA16NA	
1330LAR08NA	K30AR2
2030LAR12NA	K030AR2
2030LAR16NA	
1332	
1332LA08	K32A1
1332LA10	K32A2
1332LA12	K32A3
1332LA16	
1332LA20	K32A4
1332LA24	
1356	
1356BT3	K56B1
1356BT4	
1356BS4-48	K56B2
1388	
1388LA06D	K88A2D
1388LA08D	K88A3D
1388LA10D	
1388LA12D	K88A5D
1388LA16D	
1388LA20D	K88A6D
1388LA24D	

Catalog №	Kit part №
1388	
11388LA06DS	K88A2D
1388LA08DS	K88A3D
1388LA10DS	
1388LA12DS	K88A5D
1388LA16DS	
1388LA20DS	K88A6D
1388LA24DS	
1388LA06A	K88A2A
1388LA08A	
1388LA12A	K88A4A
1388LA16A	
1388LA20A	K88A6A
1388LA24A	
1388LA06AR	K88A2A
1388LA08AR	
1388LA12AR	K88A4A
1388LA16AR	
1388LA20AR	K88A6A
1388LA24AR	
2088	
RC2088LA08DL	K088D1L
RC2088LA10DL	
RC2088LA12DL	K088D2L
RC2088LA16DL	K088D3L
RC2088LA08DR	K088D1R
RC2088LA10DR	
RC2088LA12DR	K088D2R
RC2088LA16DR	K088D3R
RC2088LA08L	K0881L
RC2088LA10L	
RC2088LA12L	K0882L
RC2088LA16L	K0883L
RC2088LA08R	K0881R
RC2088LA10R	
RC2088LA12R	K0882R
RC2088LA16R	K0883R

Pneumatic Use

1323	
1323BA17C	K23AC
1323BA20C	
1323BA25C	
1323BE17C	K23EC
1323BE20C	
1323BE25C	
1323BN17C	K23NC
1323BN20C	
1323BN25C	
1323BV17C	K23VC
1323BV20C	
1323BV25C	
1323BA17D	K23AD
1323BA20D	
1323BA25D	
1323BE17D	K23ED
1323BE20D	
1323BE25D	
1323BN17D	K23ND
1323BN20D	
1323BN25D	
1323BV17D	K23VD
1323BV20D	

Catalog №	Kit part №
1323	
1323BV25D	K23VD
1323BA17A	K23AA
1323BA20A	
1323BA25A	
1323BE17A	K23EA
1323BE20A	
1323BE25A	
1323BN17A	K23NA
1323BN20A	
1323BN25A	
1323BV17A	K23VA
1323BV20A	
1323BV25A	
1323BA17U	K23AU
1323BA20U	
1323BA25U	
1323BE17U	K23EU
1323BE20U	
1323BE25U	
1323BN17U	K23NU
1323BN20U	
1323BN25U	
1323BV17U	K23VU
1323BV20U	
1323BV25U	
1325	
1325BA3C	K25AC
1325BA4C	
1325BA6C	
1325BV3C	K25VC
1325BV4C	
1325BV6C	
1325BA3A	K25AA
1325BA4A	
1325BA6A	
1325BV3A	K25VA
1325BV4A	
1325BV6A	
1325SA3C	K25SA1C
1325SA4C	
1325SA6C	K25SA2C
1325SV3C	K25SV1C
1325SV4C	
1325SV6C	K25SV2C
1325SA3A	K25SA1A
1325SA4A	
1325SA6A	K25SA2A
1325SV3A	K25SV1A
1325SV4A	
1325SV6A	K25SV2A
1339	
1339LA1	K39A
1339LA2	
1339LA3	
1339LV1	K39AV
1339LV2	
1339LV3	
1339BA1	K39B
1339BA2	
1339BA3	
1339BV1	K39BV
1339BV2	

Pneumatic Use

Catalog Nº		Kit part Nº
1339		
1339BV3		K39BV
1339SA1		K39A
1339SA2		
1339SA3		
1339SV1		K39AV
1339SV2		
1339SV3		
1350		
1350LA1	A	K50LA1A
1350LA2	B	K50LAB
1350LTA1	C	K50LAC
1350LTA2	G	K50LA1A
1350SA1	I	K50LAC
1350SA2	D	K50A1D
	F	K50A1F
1350LA3	A	K50LA2A
1350LTA3	B	K50LAB
1350SA3	C	K50LAC
	G	K50LA2A
	I	K50LAC
	D	K50A2D
	F	K50A1F
1350LV1	A	K50LV1A
1350LV2	B	K50LVB
1350LTV1	C	K50LVC
1350LTV2	G	K50LV1A
1350SV1	I	K50LVC
1350SV2	D	K50V1D
	F	K50V1F
1350LV3	A	K50LV2A
1350LTV3	B	K50LVB
1350SV3	C	K50LVC
	G	K50LV2A
	I	K50LVC
	D	K50V1D
	F	K50V1F
1350BA1	A	K50BA1A
1350BA2	B	K50BAB
1350BTA1	C	K50BAC
1350BTA2	G	K50BA1A
	I	K50BAC
	D	K50A1D
	F	K50A1F
1350BA3	A	K50BA2A
1350BTA3	B	K50BAB
	C	K50BAC
	G	K50BA2A
	I	K50BAC
	D	K50A2D
	F	K50A1F
1350BV1	A	K50BV1A
1350BV2	B	K50BVB
1350BTV1	C	K50BVC
1350BTV2	G	K50BV1A
	I	K50BVC
	D	K50V1D
	F	K50V1F
1350BV3	A	K50BV2A
1350BTV3	B	K50BVB
1350BV3	C	K50BVC
	G	K50BV2A
	I	K50BVC

Catalog Nº		Kit part Nº
1350		
1350BV3	D	K50V2D
1350BTV3	F	K50V1F
1351		
1351LA1	A	K51LA1A
1351LA2	B	K51LA1B
1351LTA1	C	K51LAC
1351LTA2	G	K51LA1A
1351SA1	H	K51LA1B
1351SA2	K	K51LA1A
	N	
	M	K51LAC
	D	K51A1D
	I	
	F	K51A1F
1351LA3	A	K51LA2A
1351LTA3	B	K51LA1B
1351SA3	C	K51LAC
	G	K51LA2A
	H	K51LA1B
	K	K51LA2A
	N	
	M	K51LAC
	D	K51A2D
	I	
	F	K51A1F
1351LV1	A	K51LV1A
1351LV2	B	K51LV1B
351LTV1	C	K51LVC
1351LTV2	G	K51LV1A
1351SV1	H	K51LV1B
1351SV2	K	K51LV1A
	N	
	M	K51LVC
	D	K51V1D
	I	
	F	K51V1F
1351LV3	A	K51LV2A
1351LTV3	B	K51LV1B
1351SV3	C	K51LVC
	G	K51LV2A
	H	K51LV1B
	K	K51LV2A
	N	
	M	K51LVC
	D	K51V2D
	I	
	F	K51V1F
1351BA1	A	K51BA1A
1351BA2	B	K51BA1B
1351BTA1	C	K51BAC
1351BTA2	G	K51BA1A
	H	K51BA1B
	K	K51BA1A
	N	
	M	K51BAC
	D	K51A1D
	I	
	F	K51A1F
1351BA3	A	K51BA2A
1351BTA3	B	K51BA1B
	C	K51BAC
	G	K51BA2A

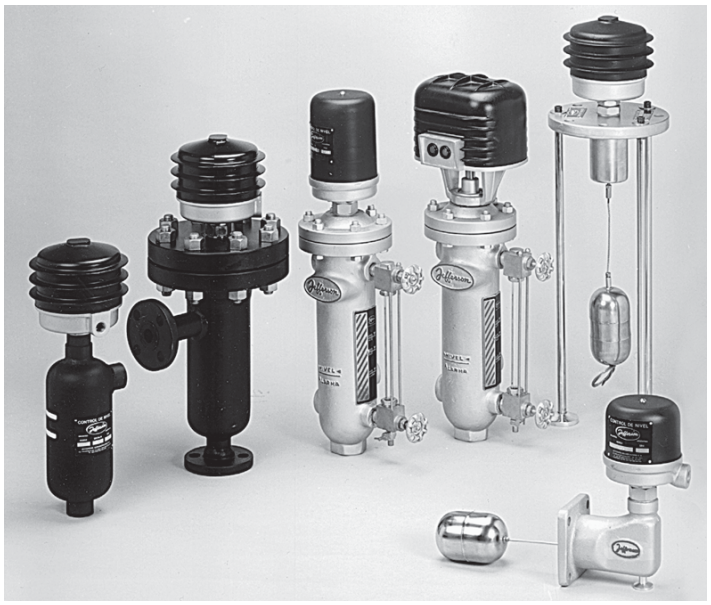
Catalog Nº		Kit part Nº
1351		
1351BA3	H	K51BA1B
1351BTA3	K	K51BA2A
	N	
	M	K51BAC
	D	K51A2D
	I	
	F	K51A1F
	A	K51BV1A
1351BV1	B	K51BV1B
1351BV2	C	K51BVC
1351BTV1	G	K51BV1A
1351BTV2	H	K51BV1B
	K	K51BV1A
	N	
	M	K51BVC
	D	K51V1D
	I	
	F	K51V1F
	A	K51BV2A
1351BV3	B	K51BV1B
1351BTV3	C	K51BVC
	G	K51BV2A
	H	K51BV1A
	K	K51BV2A
	N	
	M	K51BVC
	D	K51V2D
	I	
	F	K51V1F
1365		
1365BA17C		K65BAC
1365BA20C		
1365BA25C		
1365BE17C		K65BEC
1365BE20C		
1365BE25C		
1365BN17C		K65BNC
1365BN20C		
1365BN25C		
1365BV17C		K65BVC
1365BV20C		
1365BV25C		
1365BA17A		K65BAA
1365BA20A		
1365BA25A		
1365BE17A		K65BEA
1365BE20A		
1365BE25A		
1365BN17A		K65BNA
1365BN20A		
1365BN25A		
1365BV17A		K65BVA
1365BV20A		
1365BV25A		
1365BA17U		K65BAU
1365BA20U		
1365BA25U		
1365BE17U		K65BEU
1365BE20U		
1365BE25U		
1365BN17U		K65BNU
1365BN20U		

Catalog Nº	Kit part Nº
1365	
1365BN25U	K65BNU
1365BV17U	K65BVU
1365BV20U	
1365BV25U	
1375	
1375BA2	K75A2
1387	
1387BA1	K87A1
1387BA2	K87A2
2024	
224BA2	K024A
2024BA2-M	K024A-M
2095	
2095BA2	K095BA2

Special Aplications

1360	
360AV2	K60AV1
1360PV3	K60PV2
160TV2	K60AV1
1360TV3	K60PV2
160TV4	
2073	
2073LA08S	K073LA1S
2073LA12S	K73A2S
2073LH06	
2073LH08	K073LH1
2073LH12	K73H2
2073LH06S	
2073LH08S	K073LH1S
2073LH12S	K73H2S
2094	
2094RPD2T	K094RBDZ
Z2094RPD3T	
Z2094RPD4T	
UC	
1327BT302UC	27T
1327BT402UC	
1390BT2UC	K90BT1
1390BT3UC	
1390BT4UC	K90BT2
1314BST04UC	K14T1
1314BST06UC	
1314BST08UC	K14T2
1314BST12UC	K14T3
1314BST16UC	K14T4
1327BT121UC	K27T
1327BT171UC	
1327BT221UC	
1327BT301UC	

Magnetic Level Switches

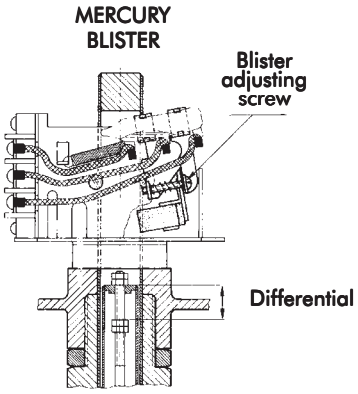


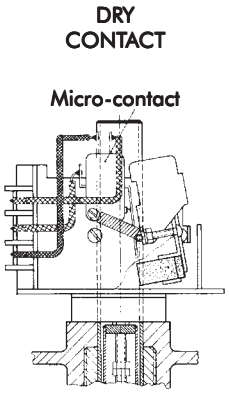
		Pages
	Introduction	**G-2** / **G-3** / **G-4** / **G-5**
1317 Series	Magnetic level switches for water boilers	**G-6** / **G-7**
2017 - 2049 Series	External float magnetic level switches for general use	**G-8** / **G-9** / **G-10**
1340 Series	Magnetic level switches for internal float tank Top mounting	**G-11**
1340A Series	Internal float magnetic level switches Side mounting	**G-12** / **G-13**
1376 - 1380 Series	Internal displacer magnetic level switches External displacer magnetic level switches	**G-14** / **G-15** **G-16** / **G-17**

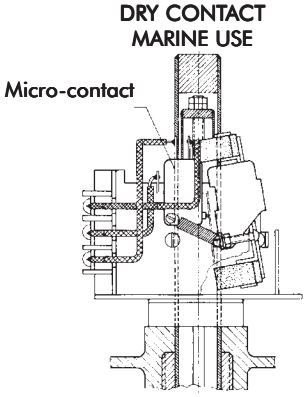
JEFFERSON SUDAMERICANA S.A. has developed a wide range of float and displacer magnetic level switches, to be installed either inside or outside the container to be controlled.
The magnetic system eliminates technical problems of other devices, such as blocked stuffing boxes, worn-out diaphragms, corroded electrodes, and besides, it offers the advantage of containing all the mechanical and electrical elements on the same hydrometric column. This arrangement saves time and cost of installation. Its high-quality mercury switches made of special "Pyrex" glass, allow to protect its operation from any factor affecting the electric contacts, such as suspended dust, humidity, etc., as well as preventing any possible "contact sticking" due to excess of current or short-circuits.

Electromagnetic mechanisms

One, two or three mechanisms arranged inside the switch housing with SPDT, DPDT or SPST mercury contacts, allow a wide range of functional combinations. SPDT dry contacts, normal or hermetically sealed, are provided as an option. Another type of construction is that for Marine Use,vibration or rolling proof, with SPDT dry contacts.







Magnetic float level switches

There are two basic types: Internal float such as **1340** series, or External float (with pressure chamber) such as **1317**, **2017** and **2049** series.

Operation Principle

The following diagrams show the simple and safe way in which level switch mechanisms work.
As the float-stem assembly is raised by the liquid, a magnetic attraction sleeve attached to it goes into a non-magnetic barrier tube, approaching the field of the switch magnet, thus causing the switch mechanism to move and commute the switch contacts which are attached to a high-precision pivot system.
A secondary adjusting screw provides the optimum slope to ensure absolute reliability on the mercury contact.
For dry contacts, the mechanism is similar except for a small lever required for its rotation.
In such locations where the system may experience vibration or rolling movements, just as in Marine Use, the mechanism requires two magnets instead of one, as it is shown in Figure 2.

Figure 1: Mercury Contact

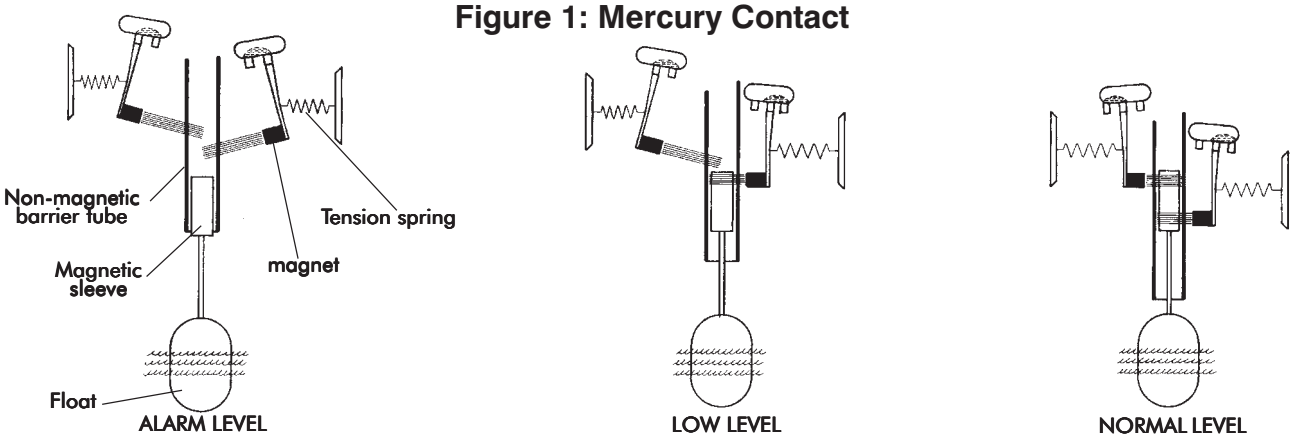
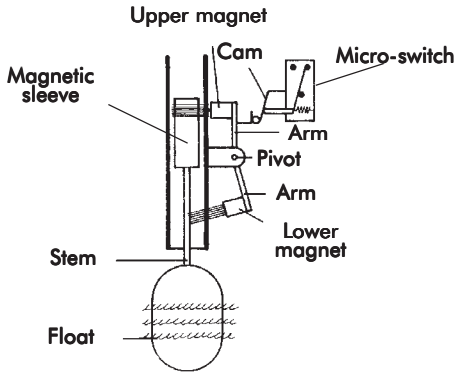
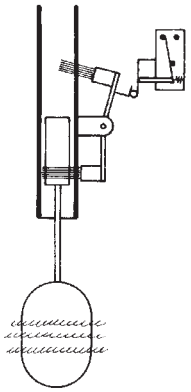


Figure 2: Dry contact - Marine use



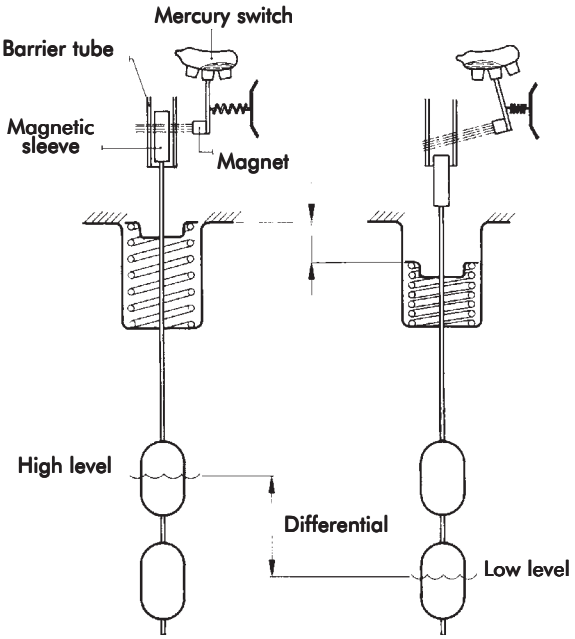


Magnetic displacer level switches

There are two types:
Internal displacer **1376** series and External displacer **1380** series.

Operation Principle

Magnetic displacer level switches follow the Archimedean principle to operate:
The decrease in the relative weight of the displacers when immersed in the fluid, transform a large differential level into a small displacement of the magnetic sleeve. The displacers, which are held by a cable, add their weights to press the spring downwards reaching a balance position. The upper side of the spring is attached to a stem which runs inside and outside the barrier tube causing variations to the spring arrow (see diagram).
The different magnetic sleeves are disposed along the stem, attracting the magnets when they reach up their respective attraction fields and releasing them (plus its hysteresis) when going down, in a similar way to that described for the float systems.The displacer does not float, but it loses weight as it sinks in the fluid, modifying the spring arrow and consequently the position of the magnetic sleeves, thus causing the effect previously described.

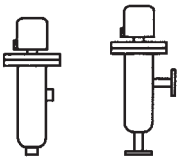


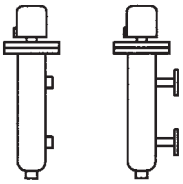
OPERATION DIAGRAM

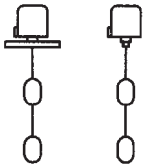
General characteristics and options Mounting and type of connections

External float or displacer level switches are installed aside the container to be controlled either through threaded or flanged connections. According to how connections are arranged in the float chamber, they are called side/side or side/bottom. Side/side connection chambers are also provided with a threaded or flanged outlet at the bottom of the chamber for purging.
Internal float or displacer level switches are top mounting in **1376** and **1340J** series and side mounting in **1340A** series, both with threaded or flanged connections as described in each series technical information catalog.


SIDE MOUNTING


SIDE/BOTTOM MOUNTING


SIDE /SIDE MOUNTING


TOP MOUNTING

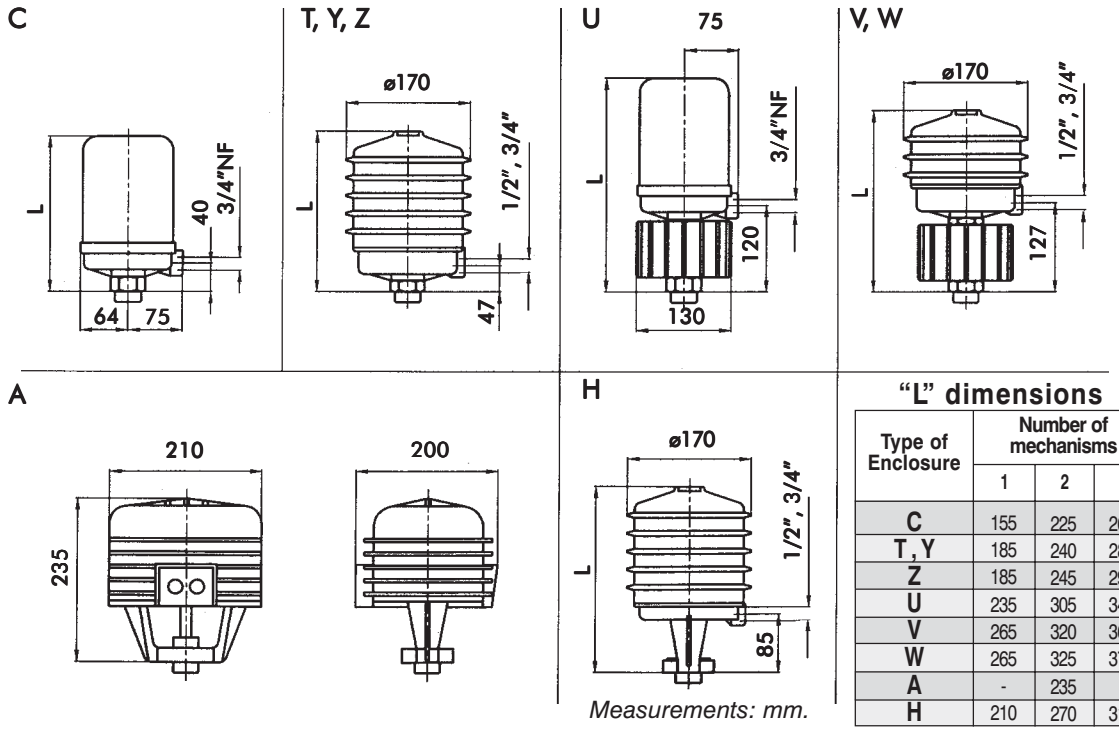
Level limits and differentials

Differential: It is the distance between the different level limits involved. These limits are not externally adjustable inthe case of float level switches. For displacer level switches, differential regulation is performed with the displacers set along the holding cable. There is a small differential called hysteresis in each mechanism between the magnet attraction level limit during rise and the detachment level limit during descent.
In float level switches the normal differential is approximately 25 mm, but it can be internally adjusted from 15 to 80 mm in some models. In two float tandem models, differential can be much greater, although it is not advisable to exceed 500 mm, since above this limit a displacer system would be more suitable. In standard constructions, the minimum hysteresis for a displacer is 40 mm. This differential may be extended up to several meters in those models with two displacers.
The differential between the operation of 2 mechanisms in float level switches is 40 mm, and in special constructions it can be reduced to 10 mm or extended up to 500 mm by using two floats.
In displacer models the minimum differential between two mechanisms is 200 mm. The maximum differential is limited by the cable's length.

Level limits: These are referred to the center of the upper connection for external float models or to the lower edge of the mounting flange in **1376** and **1340J** series. For **1340A** series, it is established from the center of the connection, setting the upper limit half the differential above this point and the lower limit half the differential below (approximately).

Switch Housings and Enclosures

There are 9 different types as shown in the dimensional diagrams below.
C – Standard flat sheet metal cover Housing. (Not indicated in the Catalog No).
A – Finned cover Housing with heat dissipation yoke and signal lights.
H – Weather proof finned cover Housing with heat dissipation yoke.
Y - Weather proof hermetically sealed Enclosure. IP65 protection.
T - Weather and saline corrosion proof Enclosure.
Z - Weather and explosion proof hermetically sealed Enclosure. IRAM-IAP-IEC 79-0 and 79-1 Approval.
U – Standard flat sheet metal cover Housing with heat dissipation collar.
V - Weather proof Enclosure with heat dissipation collar. IP65 protection.
W –Weather and Explosion proof Enclosure with heat dissipation collar, similar to Z type.
The way in which the different options can be added to the Catalog No. are indicated in each series technical information catalog.



Measurements: mm.

"L" dimensions

Type of Enclosure	Number of mechanisms		
	1	2	3
C	155	225	265
T, Y	185	240	285
Z	185	245	290
U	235	305	345
V	265	320	365
W	265	325	370
A	-	235	-
H	210	270	315

Additional security for low level

There is an additional security device for type **A** housing level switches when installed in boilers: a sparkplug, which directly contacts the water mirror.

This effective system consists of a small panel located in the connection box which contains an electric circuit, a transformer and the connection terminals.
The electrode is installed on top of the boiler dome.

Visual level

The level cocks are manufactured in brass. The sight tube is made of ø 5/8" temperate Pyrex glass. A purging cock is also provided for the sight tube. Maximum pressure is 18 bar and the maximum temperature is 220ºC.
Frequent purges guarantee a correct reading, since it may be distorted due to obstructions through the communicating vessels.

Manual reset

By means of this device and in case of level failure (high level alarm or low level alarm) the signal remains on even when the liquid level has returned to its normal limit, so the existence of the failure is established. Reset must be carried out manually once the cause of the anomaly has been revised and corrected.

Try cocks

These are useful when sight glasses are not available or out of service (usually due to breakage) or in frequent cases, to verify their correct reading.

Access flanges

These are available for **1317**, **2017** and **1380** series level switches.
They allow an internal inspection of the body and the floats or displacers for cleaning and maintenance. They are essential when the fluid contains foreign matter, crust or corrosive elements, as in a boiler application.

Purging

It is essential particularly in level switches for boilers, to have a purging device for the pressure chamber.
In side/side connection chambers there is an additional tapping that allows the installation of a manual or automatic purging device. It is advisable to perform this operation at least twice a day.

Pressure chamber

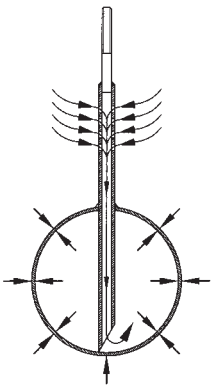
This chamber is supplied for **1317**, **2017**, **2049** and **1380** series level switches. It may be manufactured with different materials and thickness, according to the fluid composition, density, pressure and working temperature. In boiler applications up to 18 bar, it is made of grey cast iron. In other cases and for higher pressures it is made of welded carbon steel or AISI 304 or 316 stainless steel. Hydraulic test: All different chambers are subjected to a hydraulic test 1.5 times the maximum working pressure. In some cases and in those chambers provided with access flanges, this test may be performed after installing the float, specially when testing pressure exceeds the float limit so as to prevent it from collapsing.

Floats

Most models are provided with a single float. However, for systems requiring great differentials, a two float tandem system can be supplied. All floats and stems are made of AISI 304 or AISI 316 stainless steel.

Compensated floats

This type of float allows to operate at very high pressures without collapsing, since the pressure inside the float is compensated with the pressure around it. This system is used either for high level switches or high and low level switches. It is not suitable in switches for low level only, since the equipment cannot be completely flooded.



COMPENSATED FLOAT

Low density and high pressure floats

These are special floats larger than the standard ones, with a balanced weight/volume relation and collapse resistance, making it possible to operate with fluids of 0.5 density and pressure up to 60 bar.

Interphase level switches

These special level switches can be either float type (in most cases) or displacer type. This system makes it possible to sense the lower fluid when dealing with two liquids of different specific weight.
These are special constructions according to both fluids density. Should there be density variations in both fluids, the lowest possible density of the lower fluid and the highest possible density that the upper one (least dense) can get to, shall be indicated when ordering.

Displacers

These are made of AISI 304 or AISI 316 stainless steel, as well as the suspension cable. Size and weight varies according to the different type of switches available, either under standard or special construction.
Fixing nuts are included to secure displacers along the suspension cable.

Data needed for ordering or consulting

Maximum working pressure - Maximum working temperature - Lower and higher fluid composition and density - Control functions - Device to be controlled - Mounting style - Distance between each level limit - Ambient conditions.

Magnetic level switches for boilers.

1317 Series

1317A Series

Main characteristics

Pressure range: 0 to 18 bar.
Maximum temperature: 280ºC.
Relative density: 0.8 to 1.5.
1" BSP or NPT threaded connections.
Access flanges to the chamber allow easy inspection and cleaning.
AISI 304 or 316 stainless steel float.
High-quality mercury contacts which eliminates problems of humidity, dust or stuck contacts.

One, two or three stages (mechanisms).
Additional:
- Manual reset.
- Try cocks.

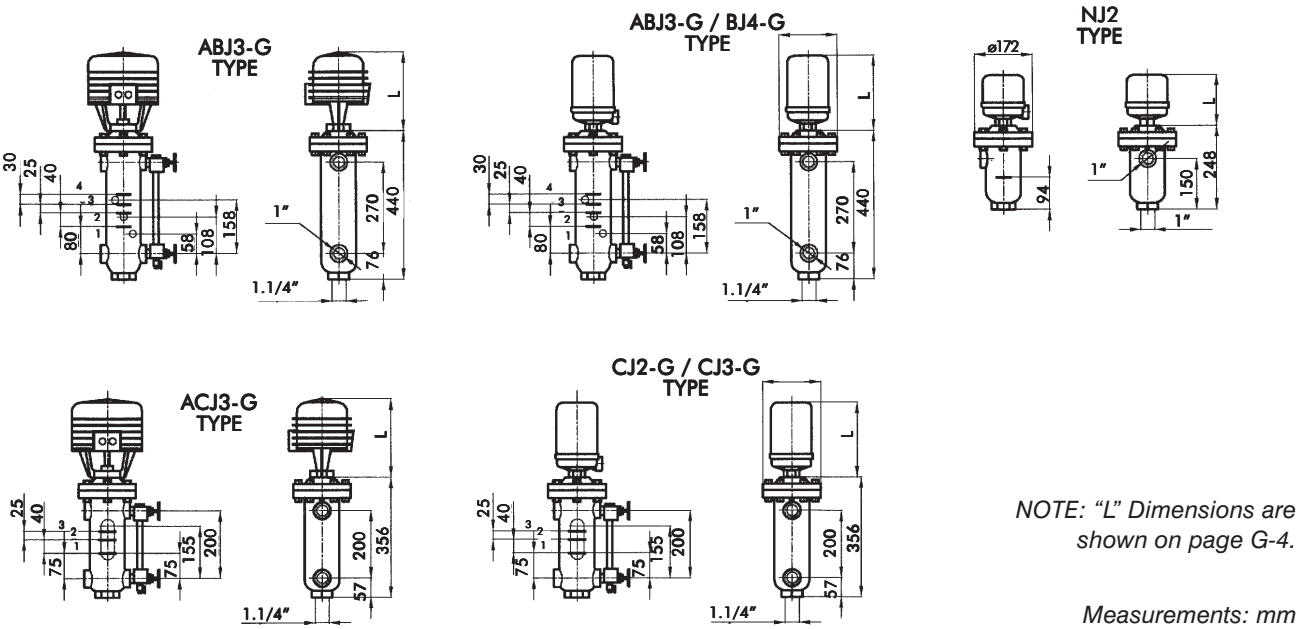
Options:

- Dry contact mechanisms.
- Marine use mechanisms.
- Explosion and / or weather proof enclosures.
- Heat dissipation collar.

Technical specifications

Stages or mechanisms	Function	Connection		Housing	Catalog Nº	
		Distance	Type		W/O visual level	With visual level
1	Low level alarm	150	SIDE/BOTTOM	Standard	1317NJ2	NO
		200	SIDE/SIDE		1317CJ2	1317CJ2-G
2	Pump start-up and stop + low level	200	SIDE/SIDE		1317CJ3	1317CJ3-G
		270	SIDE/SIDE		1317BJ3	1317BJ3-G
		200	SIDE/SIDE	Heat dissipation yoke and signal lights	1317ACJ3	1317ACJ3-G
		270	SIDE/SIDE		1317ABJ3	1317ABJ3-G
2	Idem +safety sparkplug	200	SIDE/SIDE		1317ACJ3B	1317ACJ3B-G
		270			1317ABJ3B	1317ABJ3B-G
3	Pump + high level alarm + low level alarm	270	SIDE/SIDE	Standard	1317BJ4	1317BJ4-G

General dimensions *1317*



NOTE: "L" Dimensions are shown on page G-4.

Measurements: mm

Special constructions

For pressures ranging from 40 to 60 bar.
(See 2017 Series).
Flanged connections (See 2017 Series).
AISI 304 or 316 stainless steel body (See 2017 Series).
Vibration proof or Marine Use mechanisms.

Options

Try cocks.
Add prefix V to the switch catalog number.
(Except for 1317NJ2).
Manual reset.
Add prefix R to the switch catalog number.

Enclosures and electric connections

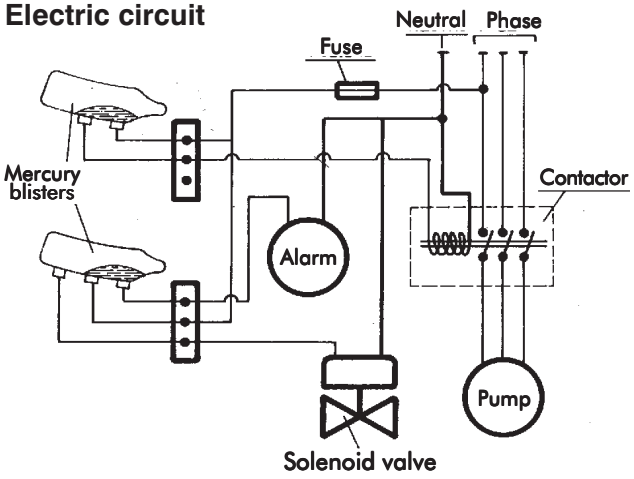
Electric connection	Type of Enclosure (see page G4)							
	A	H	Y	Z	U	V	W	T
1/2"BSP	AR	HR	YR	ZR	UR	VR	WR	TR
1/2"NPT	AS	HS	YS	ZS	US	VS	WS	TS
3/4"BSP	AP	HP	YP	ZP	UP	VP	WP	TP
3/4"NPT	AT	HT	YT	ZT	UT	VT	WT	TT

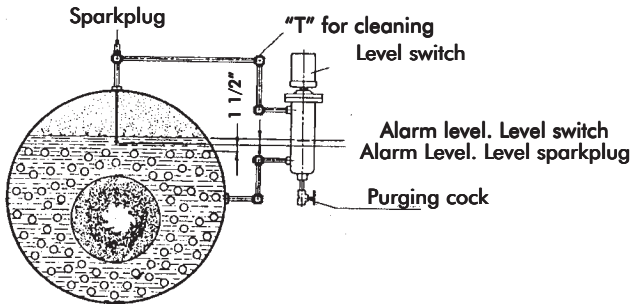
Example: 1317BJ3**ZT**-G

Mounting

Steam vessels must be piped from the highest point of the boiler dome down to the switch chamber, avoiding turns as much as possible to prevent crust accumulation.
"T" indicates fittings used to clean up all the steam and liquid vessel sections.
It is not allowed to connect devices that may consume steam or water from the though pressure gauges or other instruments can be safely installed.

Electric circuit





External float level switches for general use.

2017 Series

2049 Series

Main characteristics

Wide range of models.
Low density and high pressure models.
Liquid temperature up to 400ºC.
AISI 304 or 316 stainless steel float.
High-quality mercury blisters which eliminate problems of humidity, dust or stuck contacts.
One, two or three stages (mechanisms).

Options:

- Dry contact mechanisms.
- Marine use mechanisms.
- Explosion and/or weather proof enclosures.
- Heat dissipation collar.

Special constructions
AISI 304 and 316 stainless steel.

2017 Series

Access flanges to the switch chamber for inspection and cleaning.
Industrial applications: petroleum refineries, petrochemical industries, high pressure boilers.

2049 Series

No access flanges.
Industrial applications: petroleum refineries, petrochemical industries, high pressure boilers.

Technical specifications

Float				Catalog Nº			
Type	Min. Density	Maximum pressure bar		2017 Series (with access flanges)		2049 Series (no access flanges)	
		Working	Test	1 mechanism	2 mechanisms	1 mechanism	2 mechanisms
Single float - Short Differential							
J	0,5	18	27	2017J2(*)-[ ]	2017J3(*)-[ ]	2049J2(*)-[ ]	2049J3(*)-[ ]
P	0,7	40	60	2017P2(*)-[ ]	2017P3(*)-[ ]	2049P2(*)-[ ]	2049P3(*)-[ ]
B	0,5	60	90	2017B2(*)-[ ]	2017B3(*)-[ ]	2049B2(*)-[ ]	2049B3(*)-[ ]
C (1)	0,5	100	150	2017C2(*)-[ ]	2017C3(*)-[ ]	2049C2(*)-[ ]	2049C3(*)-[ ]
F	(2)	60	90	2017F2(*)-[ ]	2017F2(*)-[ ]	2049F2(*)-[ ]	2049F2(*)-[ ]
Double Float - Large Differential							
J	0,6	18	27	2017JD2(*)-[ ]	2017JCD3(*)-[ ]	2049JD2(*)-[ ]	2049JCD3(*)-[ ]
P	0,8	40	60	2017PD2(*)-[ ]	2017PCD3(*)-[ ]	2049PD2(*)-[ ]	2049PCD3(*)-[ ]
B	0,6	60	90	2017BD2(*)-[ ]	2017BCD3(*)-[ ]	2049BD2(*)-[ ]	2049BCD3(*)-[ ]
F	(2)	60	90	2017FD2(*)-[ ]	2017FCD3(*)-[ ]	2049FD2(*)-[ ]	2049FCD3(*)-[ ]

Notes:

(1) *Compensated float.*
(2) *Interphase.*
(*) *All models in this series have standard housing, mercury contacts and 3/4" NF electric connection. If some other enclosure or switch function is required, follow the instructions below for options.*
[ ] *In order to complete the catalog number, the body characteristics, size and type of connection must be indicated according to the following keys:*

A	L	20	B	108
(1)	**(2)**	**(3)**	**(4)**	**(5)**

(1) *Body material:*
- ***A-*** *Carbon steel.*
- ***S-*** *AISI 304 stainless steel.*
- ***I-*** *AISI 316 stainless steel.*

(2) *Mounting type:*
- ***F-*** *Side/bottom*
- ***L-*** *Side-side with tapping purge.*
- ***C-*** *Side-Bottom in "L"*

(3) *Distance between connections:*
- ***20-*** *200mm (side/side mounting only).*
- ***25-*** *250mm*
- ***30-*** *300mm*
- ***35-*** *350mm*
- ***40-*** *400mm*

(4) *Type of connection:*
- ***P-*** *BSP*
- ***T-****NPT*
- ***B-*** *Flange*

(5) *Connection size and series:*

Size	Threaded		Flanged (ANSI)		
	#2000	#3000	#150	#300	#600
3/4"	206	306	106	206	406
1"	208	308	108	208	408
1.1/2"	212	312	112	212	412
2"	216	316	116	216	416

Example: Type B float; 1 mechanism; carbon steel body; no access flanges; side-side mounting; 300 mm distance; 1" NPT threaded connection; 0.5 density; 40 bar pressure.
Catalog number:
2049B2- A L 30 T 308

Options
Mechanism and contact types

Add the suffix according to the following table:
- SPDT or SPST mercury contacts (not indicated).
D- DPDT mercury contacts.
S- SPDT dry contacts (microswitch).
H- hermetically sealed dry contacts.
M- Marine use. Dry contacts.
Example:
2017B2**S**- A L 30 T 308
(1)(2)(3)(4)(5)

Enclosures and electric connections

Electric connection	Type of Enclosure (see page 90)							
	A	H	Y	Z	U	V	W	T
1/2"BSP	AR	HR	YR	ZR	UR	VR	WR	TR
1/2"NPT	AS	HS	YS	ZS	US	VS	WS	TS
3/4"BSP	AP	HP	YP	ZP	UP	VP	WP	TP
3/4"NPT	AT	HT	YT	ZT	UT	VT	WT	TT

Example: 2017B2S**ZT**-AL30T308

Functions

1-Single switch - 1 mechanism (13 mm differential).
2-Single switch or pump start-up and stop - 1switch - 25 mm differential.
3-Pump start-up and stop + low level switch - 2 mechanisms.
3b-Pump start-up and stop + low level switch + safety sparkplug (with A housing 2017 Series only) - 2 mechanisms.
4-Pump start-up and stop + low level switch + high level switch - 3 mechanisms.
5-High level switch + low level switch - 2 mechanisms.
6-High level switch + very high level switch - 2 mechanisms.
7-Low level signal + high level signal + very high level signal - 3 mechanisms.
8-Low level switch + very low level switch - 2 mechanisms.

D2- Large differential. Pump start-up and stop. 1 mechanism.
D3- Large differential. Pump start-up and stop + low level switch. 2 mechanisms.
D4- Large differential. Pump start-up and stop + low level switch + high level switch.
D5- Large differential. High level switch + low level switch.
Example:
Catalog No: **2017P5SZT-AL30B208**

Function 5 - dry contacts - explosion and weather proof housing - 3/4" NPT electric connection.
Type P float - carbon steel body - access flanges - side-side mounting - 300 mm distance - ANSI 300 f1 flanged connection.

Functions and Differentials

Differentials depend on the distance between mounting connections. Large differentials can be accomplished upon request.

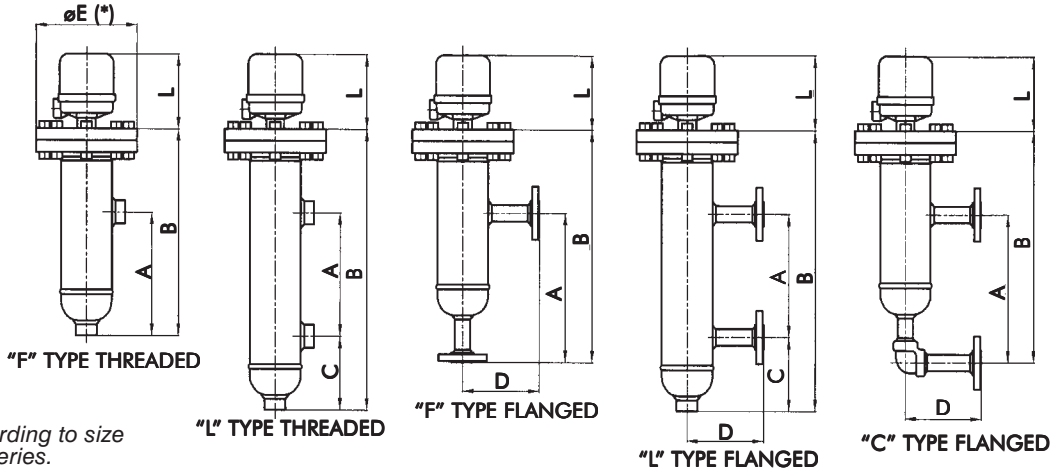
Limits	1	2	3	4	5	6	7	8
1-2	13	25	25	30	65	10	30	10
2-3	--	--	40	25	--	--	60	--
3-4	--	--	--	40	--	--	--	--

Measurements: mm

Special constructions

The established distances and limits are for standard constructions. There are special constructions with distances and limits in accordance with the customer's needs.

General dimensions



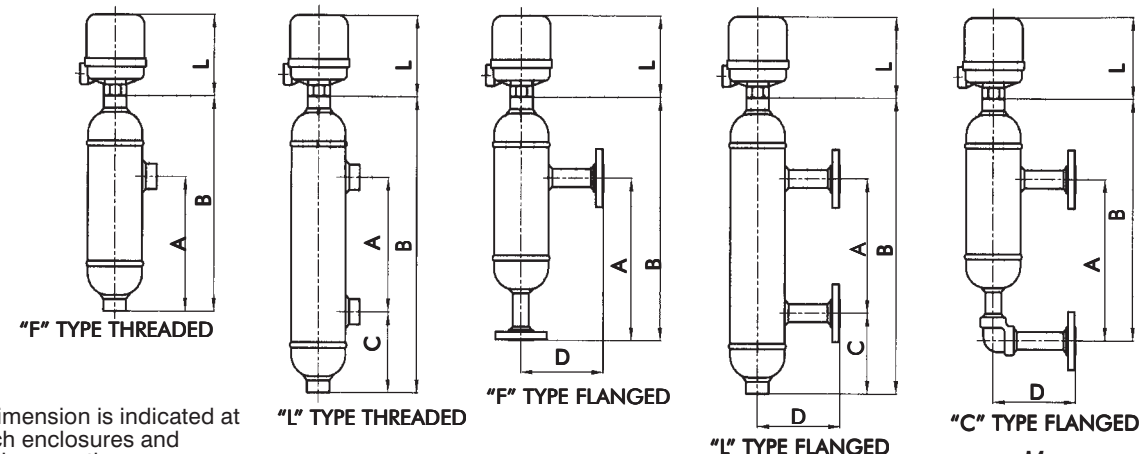
(*) øE: according to size and flange series.

MODEL	F TYPE THREADED		L TYPE THREADED			F TYPE FLANGED			L TYPE FLANGED				C TYPE FLANGED		
	A	B	A	B	C	A	B	D	A	B	C	D	A	B	D
2049J	-	-	200	500		-	-	-	200	500			-	-	-
2049P	250	400	250	550		-	-	-	250	550			-	-	-
2049C	300	450	300	600	150	300	450		300	600	150	170	300	450	
2049F	350	500	350	650		350	500	170	350	650			350	500	170
	400	550	400	700		400	550		400	700			400	550	

MODEL	F TYPE THREADED		L TYPE THREADED			F TYPE FLANGED			L TYPE FLANGED				C TYPE FLANGED		
	A	B	A	B	C	A	B	D	A	B	C	D	A	B	D
2017J	-	-	200	520		-	-	-	200	520			-	-	-
2017P	250	420	250	570		-	-	-	250	570			-	-	-
2017C	300	470	300	620	150	300	470		300	620	150	170	300	470	
2017F	350	520	350	670		350	520	170	350	670			350	520	170
	400	570	400	720		400	570		400	720			400	570	

MODEL	F TYPE THREADED		L TYPE THREADED			F TYPE FLANGED			L TYPE FLANGED				C TYPE FLANGED		
	A	B	A	B	C	A	B	D	A	B	C	D	A	B	D
2049B	-	-	200	530		-	-	-	200	530			-	-	-
	250	400	250	580		-	-	-	250	580			-	-	-
	300	450	300	630	180	300	450		300	630	180	170	300	450	
	350	500	350	680		350	500	170	350	680			350	500	170
	400	550	400	730		400	550		400	730			400	550	

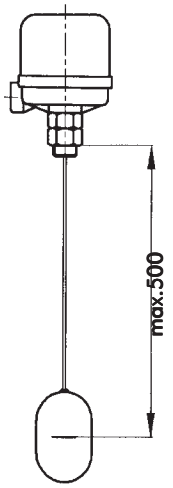
MODEL	F TYPE THREADED		L TYPE THREADED			F TYPE FLANGED			L TYPE FLANGED				C TYPE FLANGED		
	A	B	A	B	C	A	B	D	A	B	C	D	A	B	D
2017B	-	-	200	550		-	-	-	200	550			-	-	-
	250	420	250	600		-	-	-	250	600			-	-	-
	300	470	300	650	180	300	470		300	620	180	170	300	470	
	350	520	350	700		350	520	170	350	700			350	520	170
	400	570	400	750		400	570		400	750			400	570	



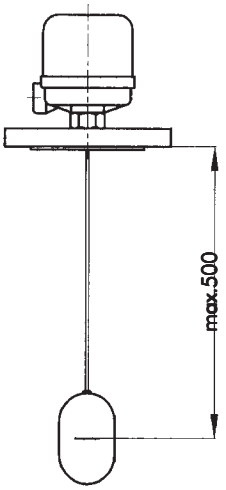
"L" dimension is indicated at switch enclosures and housings section.

Measurements: mm

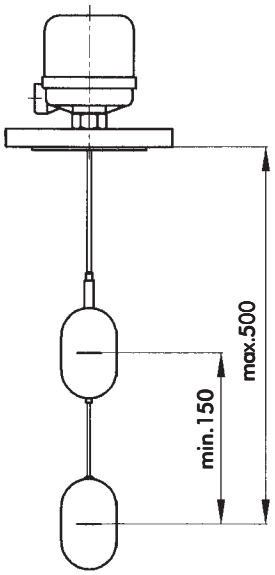
Magnetic level switches for internal float tank.



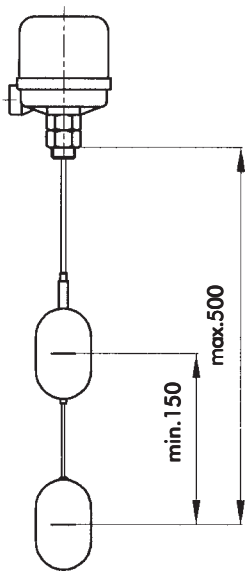
1340J2-R



1340J2-B



1340JD2-B



1340JD2-R

Measurements: mm

Main Characteristics

Low level switch or short differential control.
Top mounting.
Threaded or flanged connections.
Stainless steel float and stems.
One, two or three stages.
High-quality SPDT mercury contacts.
Level limits up to 500 mm.

Options:

- Dry contact mechanisms.
- Marine use mechanisms.
- Explosion and / or weather proof housings.
- Heat dissipation collar.

Technical specifications

Float				Catalog Nº			
Type	Min. Density	Maximum pressure bar		Threaded connection (3)		Flanged connection (4)	
		Working	Test	1 mechanism	2 mechanisms	1 mechanism	2 mechanisms
Single Float - Short differential							
J	0,5	18	27	1340J2-R	1340J3-R	1340J2-B	1340J3-B
P	0,7	60	90	1340P2-R	1340P3-R	1340P2-B	1340P3-B
B	0,5	60	90	1340B2-R	1340B3-R	1340B2-B	1340B3-B
C (1)	0,5	100	150	1340C2-R	1340C3-R	1340C2-B	1340C3-B
F	(2)	60	90	1340F2-R	1340F3-R	1340F2-B	1340F3-B
Double Float - Large Differential							
J	0,6	18	27	1340JD2-R	1340JD3-R	1340JD2-B	1340JD3-B
P	0,8	60	90	1340PD2-R	1340PD3-R	1340PD2-B	1340PD3-B
B	0,6	60	90	1340BD2-R	1340BD3-R	1340BD2-B	1340BD3-B
F	(2)	60	90	1340FD2-R	1340FD3-R	1340FD2-B	1340FD3-B

***Note**: (1) Compensated float for high level only.*
(2) Interphase - Indicate density for each fluid.
*(3) NPT connection - Change R for T. Example: **1340J2-T.***
(4) ø4" Flanges and series according to the maximum working pressure.
*Options: Mechanisms - enclosures - flanges: see **2017** Series.*

CERTIFIED QUALITY SYSTEM

1340 A Series

Main characteristics

Gray cast, carbon steel body.
Stainless steel AISI 304 or 316 stem and float.
Side mounting threaded or flanged connections.
Differential according to stem length upon request.
Large differentials by combining 2 switches in tandem.
High-quality SPDT mercury contacts.

Options:

- Dry contact mechanisms.
- DPDT mercury contact mechanisms.
- Marine use mechanisms.
- Explosion and / or weather proof enclosures.
- Heat dissipation collar.
- AISI 304 and 316 special constructions.

Technical specifications

Body		Diagram	Maximum pressure	Catalog Nº according to stem length in mm.			
Material	Connection(*)			170	200	300	400
Gray cast	2.1/2" BSP	1	10	1340A-R	1340A-20R	1340A-30R	1340A-40R
	2.1/2" NPT	1	10	1340A-T	1340A-20T	1340A-30T	1340A-40T
	Sq. Flange	2	10	1340A-B	1340A-20B	1340A-30B	1340A-40B
	3" Thd. Flange	3	10	1340A-RB310	1340A-20RB310	1340A-30RB310	1340A-40RB310
Welded carbon steel	3" BSP	4	20	1340A-AR3	1340A-20AR3	1340A-30AR3	1340A-40AR3
	3" NPT	4	20	1340A-AT3	1340A-20AT3	1340A-30AT3	1340A-40AT3
	4" BSP	4	20	1340A-AR4	1340A-20AR4	1340A-30AR4	1340A-40AR4
	4" NPT	4	20	1340A-AT4	1340A-20AT4	1340A-30AT4	1340A-40AT4
	3" #150 Fl.	5	20	1340A-AB310	1340A-20AB310	1340A-30AB310	1340A-40AB310
	4" #150 Fl.	5	20	1340A-AB410	1340A-20AB410	1340A-30AB410	1340A-40AB410
	3" #300 Fl.	5	40	1340A-AB320	1340A-20AB320	1340A-30AB320	1340A-40AB320
	4" #300 Fl.	5	40	1340A-AB420	1340A-20AB420	1340A-30AB420	1340A-40AB420

Note: *(*) Flanges - see dimensions in diagram 2 - 125 Series flanges threaded to the cast body*
F #150 and F #300 according to ANSI B16.5

General dimensions *1340*

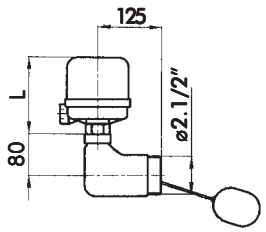
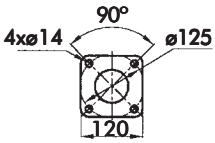


Diagram 1



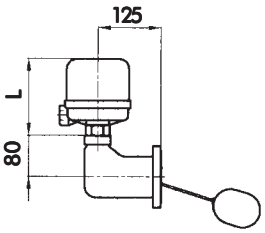


Diagram 2

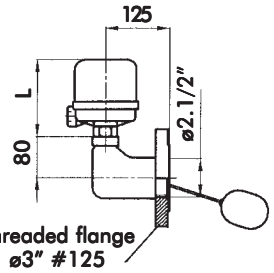


Diagram 3

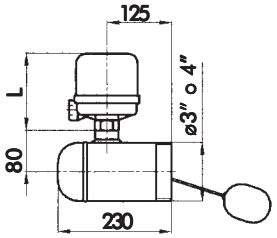


Diagram 4

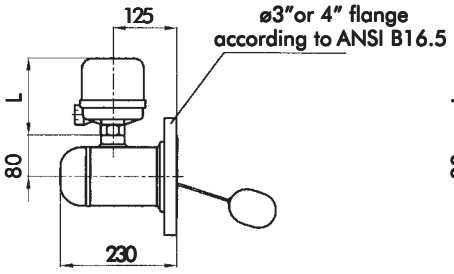


Diagram 5

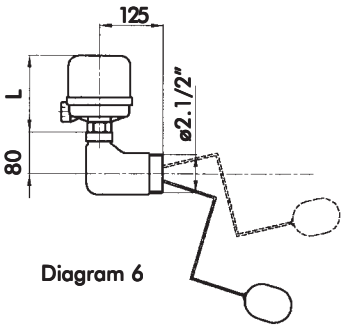


Diagram 6

Measurements: mm.

Differentials according to stem length

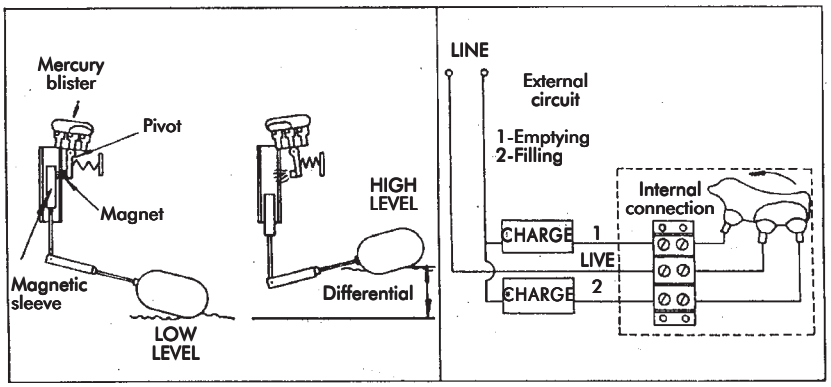
Length mm.	Differential in mm.	
	Minimum	Maximum
170	25	115
200	30	140
300	40	190
400	50	240

Cast stainless steel body:
AISI 304: change letter S to the cast model catalog Nr.
Examples: 1340A-**S**R; 1340A-S30T; 1340A-S40B

Welded stainless steel body:
AISI 304: change letter A at the second module of the welded model catalog number for letter S.
Example: 1340A-30**S**B310

*Z rod: Add suffix Z to the catalog Nr.
Examples: 1340A-30B**Z**: 1340A-30AB310Z
(See diagram 6).

Operation and connection diagram



Options:
Mechanism and contact types

Add the suffix according to the following table.
- SPDT or SPST mercury contacts (not indicated).
D- DPDT mercury contacts.
S- SPDT dry contacts (microswitch).
H- Hermetically sealed dry contacts.
M- Marine use - Dry contacts.
Example: 1340AS-30B.

Enclosures and electrical connection

Add the suffix according to the following table

Electrical connection(R)	Type of enclosure (see page G-4)					
	Y	Z	U	V	W	T
1/2"BSP	YR	ZR	UR	VR	WR	TR
1/2"NPT	YS	ZS	US	VS	WS	TS
3/4"BSP	YP	ZP	UP	VP	WP	TP
3/4"NPT	YT	ZT	UT	VT	WT	TT

Example: 1340AYR-30B; 1340ASYR-30B

Internal and external displacer magnetic level switches.

1376 Series

1380 Series

Main characteristics

Versatility. Control of all types of fluids in their multiple intrinsic and external conditions: viscous, corrosive, foamy, dirty, subjected to ripple or shaking.
Multiple functions. One, two or three mechanisms.
Adjustable differentials or levels by changing the displacer's position, independently, along the suspension cable.
Stainless steel displacers, cable and spring holder.
High-quality SPDT mercury contacts.

Options:

- Dry contact mechanisms.
- Marine use mechanisms.
- Explosion and / or weather proof heads.
- Heat dissipation collar.

1376 Series. Internal float

Stainless or cabon steel mounting flanges.
Easy to transport. No need for stems since displacers are attached to a winding cable.
Easy to install. Standard supply: cable length: 3000 mm.

1380 Series. External float

Welded carbon or stainless steel pressure body.
Access flanges for inspection and cleaning.
Threaded and flanged mounting connections.

Technical specifications

Mechanism	Displacers	Function	Catalog Nº	
			1376 Series	1380 Series
1	1	Low level or high level	1376P-[ ]	1380P-[ ]
1	2	Start-up and stop (1)	1376AP-[ ]	1380AP-[ ]
2	2	Low level + high level	1376LH-[ ]	1380LH-[ ]
2	3	Start-up - stop + low level Start-up	1376APL-[ ]	1380APL-[ ]
2	3	- stop + high level Start-up - stop + low	1376APH-[ ]	1380APH-[ ]
3	4	level + high level	1376APLH-[ ]	1380APLH-[ ]
2	3	Start-up - stop 1st + Start-up - stop 2nd (2)	1376APM-[ ]	1380APM-[ ]
2	4	Start-up - stop 1st + Start-up - stop 2nd (2)	1376APD-[ ]	1380APD-[ ]
3	3	Low level - medium level - high level	1376LMH-[ ]	1380LMH-[ ]

Note:

(1) ***Start-up - stop:*** *pump, valve, other devices.*
(2) ***Start-up - stop 1st and 2nd:*** *two pumps or two valves, etc.*
Contacts are ***SPDT****, therefore, the* ***start-up - stop Function*** *works with both emptying and filling.*

[] ***1376 series*** *In order to complete the catalog number, the body characteristics, size and type of connection shall be indicated as follows:*

Mounting flanges

ø	Carbon steel			AISI 304			AISI 316		
	#150	#300	#600	#150	#300	#600	#150	#300	#600
4	A410	A420	A440	S410	S420	S440	I410	I420	I440
5	A510	A520	A540	S510	S520	S540	I510	I520	I540
6	A610	A620	A640	S610	S620	S640	I610	I620	I640

Notes: *150, 300, 600: Flanges according to ANSI B16.5*
Example: 1376P-A410 4" Mounting flange ANSI 150 (standard supply).

1380 Series

[ ] *In order to complete the catalog number, the body characteristics, size and type of connection shall be indicated as follows:*

A	L	20	B	108
(1)	(2)	(3)	(4)	(5)

(1) *Body material:*

- ***A-****Carbon steel*
- ***S-*** *Stainless steel AISI 304*
- ***I-*** *Stainless steel AISI 316*

(2) *Mounting type:*

- ***F-*** *Side/bottom*
- ***L-*** *Side/side with tapping for purge.*
- ***C-*** *Side/bottom in "L"*

(3) *Distance between connections:*

- ***20-*** *200mm (side/side mounting only)*
- ***25-*** *250mm*
- ***30-*** *300mm*
- ***35-*** *350mm*
- ***40-*** *400mm*

(4) *Type of connection:*

- ***P-*** *BSP*
- ***T-*** *NPT*
- ***B-*** *Flange*
- ***W-*** *Socket Weld*

(5) *Series and connection size*

Size	Threaded		Flanged (ANSI)		
	#2000	#3000	#150	#300	#600
3/4"	206	306	106	206	406
1"	208	308	108	208	408
1.1/2"	212	312	112	212	412
2"	216	316	116	216	416

Example: 1380P-AL30B208

Options
Type of mechanisms and contacts

Add the suffix according to the following table:
- SPDT or SPST mercury contacts (not indicated).
D- DPDT mercury contacts.
S- SPDT dry contacts (microswitch).
H- Hermetically sealed dry contacts.
M- Marine use. Dry contacts.

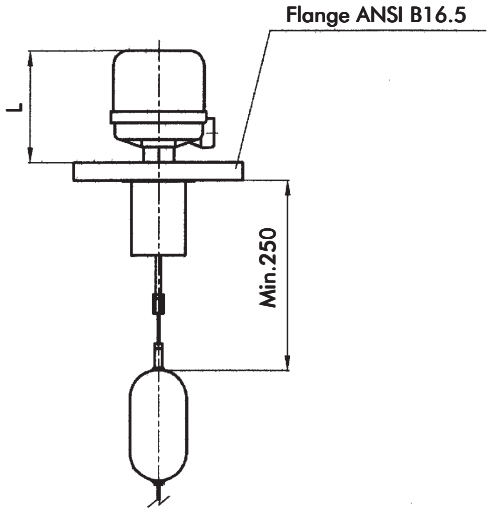
Example:
1380 PS- A L 30 T 308
(1)(2)(3)(4)(5)

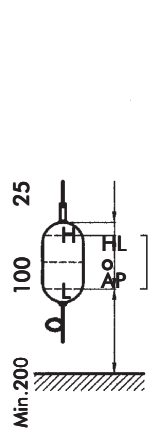
Enclosures and electrical connection

Electrical connection	Type of enclosure (see page G-4)						
	H	Y	Z	U	V	W	T
1/2"BSP	HR	YR	ZR	UR	VR	WR	TR
1/2"NPT	HS	YS	ZS	US	VS	WS	TS
3/4"BSP	HP	YP	ZP	UP	VP	WP	TP
3/4"NP	HT	YT	ZT	UT	VT	WT	TT

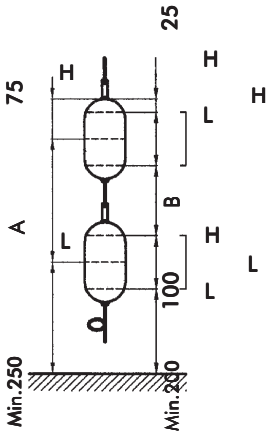
Example:
1376APZR-A410
Suspension cable: Standard supply: 3000 mm.
Other lengths upon request.

General dimensions *1376*

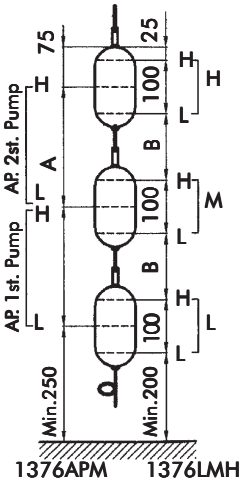




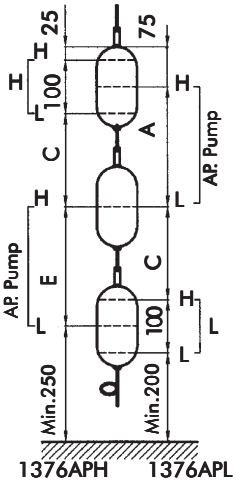
1376P



1376AP 1376LH



1376APM 1376LMH



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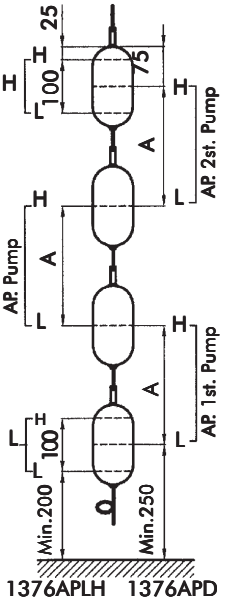
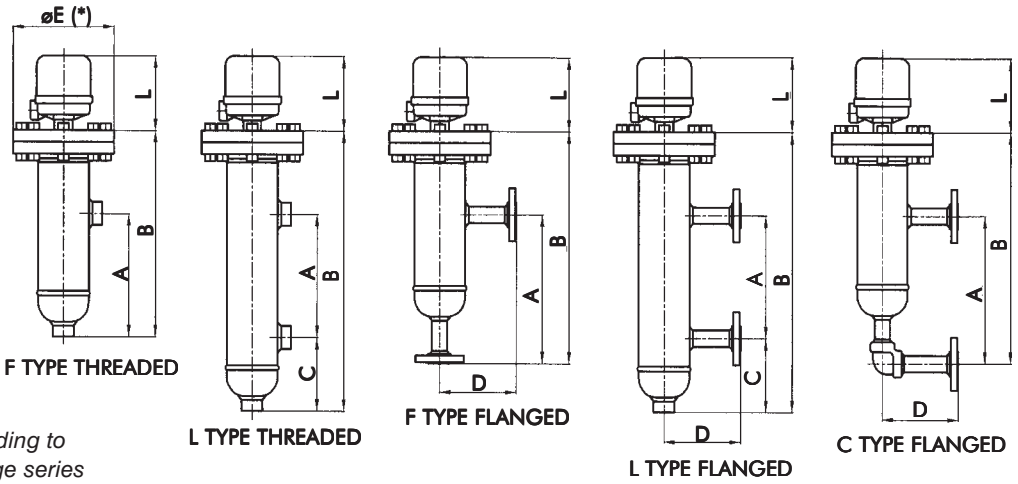


1376APLH 1376APD

Reference	Variable Distances	
	Min.	Max.(*)
A	200	2470
B	100	2370
C	150	2420

Measurements: mm

General dimensions *1380*

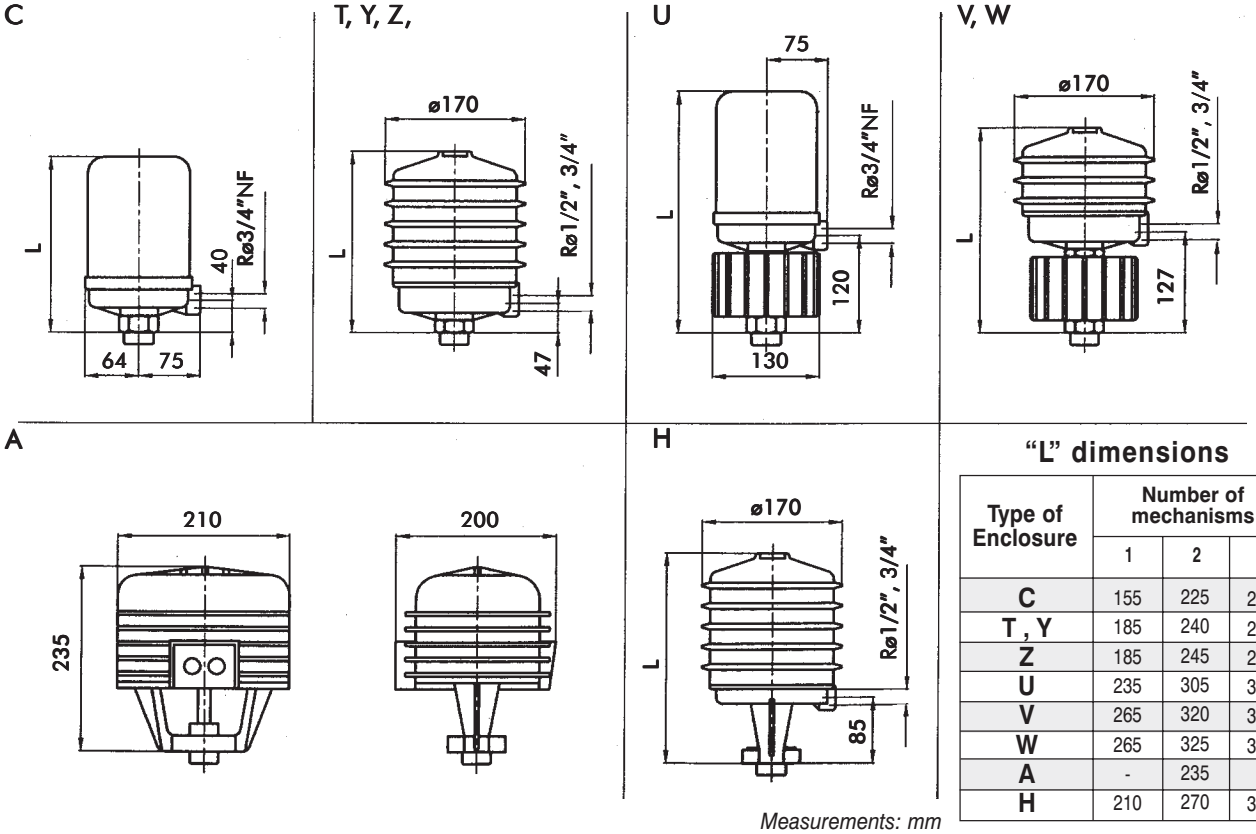


(*) øE: according to size and flange series

Model	"F" Type Threaded		"L" Type Threaded			"F" Type Flanged			"C" Type Flanged				"C" Type Flanged		
	A	B	A	B	C	A	B	D	A	B	C	D	A	B	C
1380J 1380P 1380C 1380F	-	-	200	520	150	-	-	-	200	520	150	170	200	520	150
	250	420	250	570					250	570			250	570	
	300	470	300	620		300	470	170	300	620			300	620	
	350	520	350	670		350	520		350	670			350	670	
	400	570	400	720		400	570		400	720			400	720	

Measurements: mm

Housings and Enclosures general dimensions



Measurements: mm

"L" dimensions

Type of Enclosure	Number of mechanisms		
	1	2	3
C	155	225	265
T , Y	185	240	285
Z	185	245	290
U	235	305	345
V	265	320	365
W	265	325	370
A	-	235	-
H	210	270	315

Unit ConversionTable

Density

	Kg./m³	Lb./ft³
Kg./m³	1	0.0624
Lb./Ft³	16.018	1

Temperature

	ºF	ºC	ºK	ºR
ºF	1	(ºF - 32) / 1.8	(ºF + 459.69) / 1.8	ºF + 459.69
ºC	ºC x 1.8 +32	1	ºC + 273.16	ºC x 1.8 + 491.69
ºK	ºK x 1.8 - 459.69	ºK - 273.16	1	ºK x 1.8
ºR	ºR - 459.69	(ºR - 491.69) / 1.8	ºR / 1.8	1

Power

	Kw.	Kcal./H	BTU/H	Refrig. Ton.
Kw	1	860	3412	0.284
Kcal./H	0.00116	1	3.968	0.0003306
BTU/H	0.000293	0.252	1	0.0000833
Refrig.Ton.	3.5168	3024	12000	1

Volume

	Liters	m³	Gall.USA	ft³
Liters	1	0.001	0.264	0.0353
m³	1000	1	264	35.31
Gall.USA	3.785	0.00378	1	7.481
Ft³	28.32	0.02832	0.1337	1

Pressure

	Kg./cm²	KPa.	bar.	Psi.	mm.c.hg.	Inch.c.hg.
Kg./cm²	1	98.1	0.981	14.22	736	28.97
KPa.	0.0102	1	0.01	0.145	0.75	0.295
bar.	1.02	100	1	14.5	750	29.53
Psi.	0.0703	6.897	0.069	1	51.76	2.036
mm.c.hg.	0.00136	0.133	0.00133	0.0193	1	25.4
Inch.c.hg.	0.0345	3.39	0.0339	0.491	0.0394	1

Weight

	kg.	Pounds
kg.	1	2,207
Pounds	0,453	1

Kinematic Viscosity (approximate)

	m²/s	ft²/s	cSt	SSU	ºE
m²/s	1	10,76	10^6	$4,6 \times 10^6$	$7,5 \times 10^6$
ft²/s	0,093	1	93000	$4,28 \times 10^5$	7×10^5
cSt.	10^{-6}	$10,76 \times 10^{-6}$	1	4,6	0,133
SSU	$2,2 \times 10^{-7}$	$22,8 \times 10^{-6}$	0,217	1	0,029
ºE	$7,5 \times 10^{-6}$	$1,43 \times 10^{-6}$	7,5	34,5	1

Note:
Column units: Origin Units.
Line units: Resultant Units.
In order to obtain the resultants, both unit intersection coefficients must be multiplied by the known value of the origin unit.
Formulas are applied in the case of temperature.

Certification

Awarded to

JEFFERSON SUDAMERICANA S.A.

AV. F.F. DE LA CRUZ 2016, BUENOS AIRES, ARGENTINA.

BVQI certify that the Management System of the above organisation has been audited and found to be in accordance with the requirements of the management system standards detailed below

Standards

ISO 9001:2000

Scope of supply

DISEÑO, DESARROLLO, FABRICACIÓN, COMERCIALIZACIÓN Y SERVICIO DE VÁLVULAS A SOLENOIDE, REGULADORAS DE PRESIÓN Y CONTROLES DE NIVEL.

DESIGN, DEVELOPMENT, MANUFACTURING, COMMERCIALIZATION AND SERVICE OF SOLENOID VALVES, PRESSURE REGULATOR VALVES AND MAGNETIC LEVEL SWITCHES.

Original Approval Date: **21 de Noviembre de 1996**

Subject to the continued satisfactory operation of the organisation's Management System

This certificate is valid until: **23 de Enero de 2007**

To check this certificate validity please call (00 54 11 4000 8100)

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organisation

Arq. Cecilia Altamirano

UKAS QUALITY MANAGEMENT

BVQI (Holding) S.A. using the accreditation certificate number 008

Date: **23 de Enero de 2004**

Certificate Number: **143331**

008

MANAGING OFFICE: Praça Pio X, 17, 8º andar, Centro-20040-020 - Rio de Janeiro/RJ - Brasil
ISSUING OFFICE: Av. Alem 1134, Piso 8º- Capital Federal, Argentina

APPROVALS

Underwriters Laboratories Inc.

FILE MH 16855

Association canadienne de normalisation

Canadian Standards Association

FILE LR 87427 2M - FILE LR 108921-1

JEFFERSON SUDAMERICANA S.A.

ENGINEERING FOR INDUSTRIAL AUTOMATION
SOLENOID VALVES AND MAGNETIC LEVEL SWITCHES

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