



PRODUCT CATALOGUE

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SECTION 1

CLORIUSCONTROLS.COM

COMPANY PROFILE

Clorius
CONTROLS



VISION

We strive to be a world class advisor and
provider of industrial controls

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Who we are

The heritage of Clorius Controls goes back to 1902. Founded by two Danish brothers Odin and Axel Clorius, the company commenced work on developing and producing a range of self-acting temperature controllers, a line that exists more than a century later. Today, we specialize in development and production of controls for temperature and pressure.

For more than a century we have developed our knowledge about monitoring, controlling and regulating heat, cooling and ventilation within offshore, marine, industry, building and utility applications. Understandably, the products and the technology have gone through a dynamic development, and today we offer an up-to-date product range to match our clients' need for reliable, economic and user-friendly solutions.

Clorius Controls continues to maintain the highest standards for materials and workmanship and our work force remains committed to carefully upholding the principles of quality and integrity that define the company. We attribute our success to the unique combination of hard work, industry insights, dedication to quality, and in large part, to our culture and values.

2014

Establishment of our sales office in Singapore and relocation of our HQ near Copenhagen Airport

2012

Establishment of our sales representation in India

2008

Relocation of our production facilities, from Denmark to Poland

2007

Establishment of our sales office in Russia (with our sister company Broen)

2004

Establishment of our sales office in China

2000

The company changes its name from Odin Controls Systems ApS to Clorius Controls A/S

1998

The ownership passes to Aalberts Industries

1994

The company is sold to Raab Karcher Energie Servies GmbH

1983

Introduction of magnetic conductive energy meter

1974

Aquired by ISS Group

1953

Our first exports take place

1902

Foundation of the company as Industri Aktieselskab Clorius, by two Danish brothers, Axel and Odin Clorius. Invention of Clorius' first self-acting controller

Winning takes **TALENT** —
to repeat takes character



What guides us

At Clorius Controls we believe that success comes from teamwork. We apply all our company resources at the service of our customers and partners, from our production facilities, experience and network of experts, to our knowledge, energy and innovative spirit of our people.

MISSION

The Reason For Our Existence

“Our mission is to build a mutually beneficial partnership with our customers by developing, manufacturing, marketing and servicing products for temperature and pressure control, and regulation of heating and cooling circuits with water, steam or oil as the heat-transferring medium”.

VISION

Where We Want To Go

“We strive to be a world class advisor and provider of industrial controls.”

VALUES

What We Believe In

FLEXIBILITY — Global Vision, Local Agility

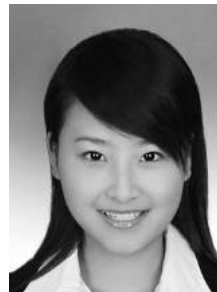
CUSTOMER FOCUS — A fundamental ingredient to our success

RELIABILITY — Keeping our promises

QUALITY — In our products and excellence in our processes



Our people are key to
 our **SUCCESS** -
 Experienced, diverse
 and multi-skilled



Our quality

Since our founding in 1902, quality has been of utmost priority in our production and operations. At Clorius Controls each and every associate knows and lives the purpose of our organization. Providing innovative, industry-leading valves and associated products for controlling the flow and pressure of industrial liquids and steam.

We largely accomplish this through a constant commitment to quality and efficiency.

The key values that differentiate Clorius Controls is our continuous collaboration with customers, vendors and staff to design and produce the best possible products. We eagerly partner with our customers to develop innovative products and new configurations. We appreciate the recommendations of vendors for better components and improved materials. In exchange, you can count on us for responsive engineering and quick, accommodating production.

For our customer this means:

- Unique and robust design
- Precise regulation
- High reliability
- Low maintenance cost
- Longer life-cycle
- Complete documentation

Our dedication to quality
has never been greater.



2
YEAR
WARRANTY

Standards & Certificates

Clorius Controls routinely manufactures and tests its products to the most demanding customer specifications and recognized national and international industry standards. A long-standing tradition of delivering to the shipbuilding industry means that products delivered by Clorius Controls A/S are developed in order to match the high requirements set by the maritime industry.

Since 1993 we have been ISO 9001 certified for development, manufacturing, sales and servicing of controls for buildings, industrial and marine applications.

Control valves from Clorius Controls can be delivered with test certificates from all approved Ship Classification Societies:

- ANSI, DIN, JIS

Likewise, we can also deliver valves with certificates in accordance to:

- EN 10.204 / 2.1
- EN 10.204 / 2.2
- EN 10.204 / 3.1

Furthermore, we conduct:

- Inspection and test plan
- Pressure and leakage test



Segments served

Clorius Controls' products control the flow and pressure of liquids and steam throughout marine and industrial process industries. These include end-users and OEMs in the following segments.

- Marine & Offshore
- Oil & Gas
- Power generation
- Chemical
- Pulp & Paper
- Water treatment
- Food & Beverage
- Renewable energy
- Building & Construction
- District heating
- HVAC
- Food processing
- Refineries
- Boiler and heat exchangers
- Minerals
- Petrochemical
- Agriculture
- Textiles



Our products

Clorius Controls continually aims to develop our product portfolio by identifying the needs of the market and providing products and solutions of uncompromised quality.

Our product range is divided into 5 different sections, offering an extensive range of equipment for monitoring and control of heating, cooling and ventilation systems.


























- Electric Control Valves
- Pneumatic Control Valves
- Self-acting temperature controls
- Self-acting pressure controls
- Controlling & Monitoring

Clorius valves are the preferred choice of the maritime industries, being installed in more than 1500 vessels within the last five years.

Simple, reliable and durable.

For a full list of products, do not hesitate to request a copy of our latest product catalog by contacting us or visiting our website.

Solutions

- | | | | |
|---|---|---|--|
| <p>1. Thermostat
DN 15/4 - 150</p>  <p>2-way valve</p> | <p>5. Electric Actuator
2+3 point, analogue</p>  <p>2-way valve
(DN 15/4 - 800)</p> | <p>Controller ER 2000
(Electric)</p>  | <p>Sensor PT100</p>  |
| <p>2. Thermostat
DN15/4 - 150</p>  <p>3-way valve</p> | <p>6. Electric Actuator
3 point, analogue</p>  <p>3-way valve
(DN 20 - 800)</p> | <p>Controller ER 2000
(Electric)</p>  | <p>Sensor PT100</p>  |
| <p>3. Pressure reducing valve
DN 15- 80</p>  | <p>7. Electric Actuator
3 point, analogue</p>  <p>3-way valve
(DN 20 - 800)</p> | <p>Controller ER 3000
(Electric)</p>  | <p>Sensor PT100</p>  <p>Transmitter 24 mA</p>  |
| <p>4. Differential Pressure Controls
DN 15 - 150</p>  | <p>8. Pneumatic Actuator
spring close/open</p>  <p>Positioner</p> <p>2-way valve
(DN 15/4 - 800)</p> | <p>Controller (Pneumatic)</p>  | <p>Transmitter 24 mA</p>  |
| <p>9. Differential Pressure Controls
DN 20 - 800</p>  | <p>9. Pneumatic Actuator
spring close/open</p>  <p>Positioner</p> <p>3-way valve
DN 20 - 800</p> | <p>Controller (Pneumatic)</p>  | <p>Transmitter 24 mA</p>  |
| <p>10. Differential Pressure Controls
DN 20 - 800</p>  | <p>10. Pneumatic Actuator
spring close/open</p>  <p>Positioner</p> <p>3-way valve
DN 20 - 800</p> | <p>Controller ER 2000
(Electric)</p>  | <p>Sensor PT100</p>  |

Our clients

We have had the good fortune of being involved with a large number of strong global companies. Our clients are our starting point. They drive everything we do and we work collaboratively with them to achieve results they can measure. Our size enables our specialists to work closely together to develop tailor-made solutions, that meet our clients' evolving needs.

Here are some clients we have recently added to our growing list of partnerships.

- Alfa Laval
- Alstom
- BASF
- BWSC
- Doosan
- Flowserve
- Gazprom
- Guangzhou Shipbuilding International Cp., Ltd
- Hi Air Korea
- Hyundai
- Jinling Shipyard
- Johnson Controls
- Maersk
- MAN Diesel & Turbo
- Saacke
- Semco
- Shanghai Shipyard Co., Ltd.
- Shanghai Waigaoqiao Shipbuilding Co., Ltd.
- Thermax
- Yangzijiang Shipbuilding Co., Ltd.
- Zheijing Ouhua Shipbuilding Co., Ltd.

“ Clorius Controls has been a trusted partner for many years, and their equipment has been included in the auxiliary systems for our two-stroke diesel engines during the last 30 years. Furthermore, their service and equipment have been an appreciated part in our systems, at our R&D center”.

“ At the beginning of 2013, a new internal cooling water system for our two-stroke diesel engines was developed and was introduced at the end of 2013. The new developed cooling water system, the LDCL system, required a special valve design with an extremely low leakage rate between two ports (Control Valve Leakage Classification Class IV). Also provided the significant vibration level from having the valve mounted directly on a diesel engine, robustness was a critical design factor. Clorius Controls took on the project and developed a three-way valve according to all requirements, which was tested with great success and to our full satisfaction”.

Ole Skeltved
Head of Marine Installation Department
MAN Diesel & Turbo



Sales channels

Our sales network is there for you in more than 50 countries. Thanks to our sales representation in China, Russia, Singapore and Poland, as well as our broad network of distributors, we are available whenever our products or services are required.

HEADQUARTERS

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Poland

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Clorius
CONTROLS

Reliable Industrial Controls Since 1902

 **AALBERTS
INDUSTRIES**

SECTION 2

2-way Control Valves type L1S

Gun Metal, PN 16, DN 15/6 – 20 mm

2.2.02-L

GB-1

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Single seated and tight closing
- Quadratic characteristic

Applications

Regulating valves type L1S are designed for regulating low, medium and high pressure hot water, steam and lubricating oils.

The valves are installed combined with temperature or pressure differential regulators in control systems for heating of domestic premises, district heating, industrial processes or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of gun metal RG 5. The thread for the actuator connection is G1B ISO 228.

The valves are single seated and designed for tight closure.

The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

To obtain an approximate, linear transfer performance, for use in systems with standard existing heat exchangers and pumps, the valve characteristic is made quadratic.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

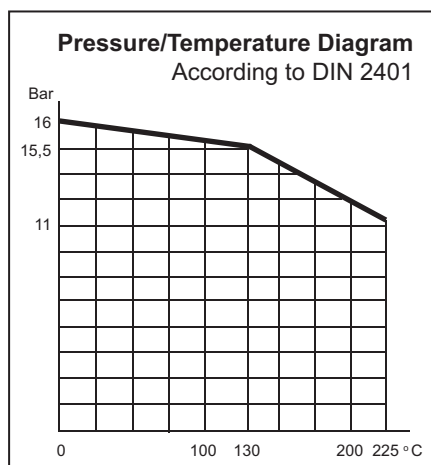
In connection with thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.



Technical Data

Materials:	
- valve body	Gun metal RG 5
- components	Stainless steel
Nominal pressure	PN 16
Seating	Single seated
Valve characteristic	Quadratic
Leakage	≤ 0.05% of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Internal connection threads	ISO 7/1



Specifications

Type	Connection threads	DN mm	Opening mm	k_{vs} -value m^3/h	Lifting height mm	Weight kg
15/6 L1S	Rp ½	15	6	0.45	6	0.7
15/9 L1S	Rp ½	15	9	0.95	6	0.7
15/12 L1S	Rp ½	15	12	1.7	6	0.7
15 L1S	Rp ½	15	15	2.75	6	0.7
20 L1S	Rp ¾	20	20	5.00	7	0.8

Subject to change without notice.

2-way Control Valves type L1S

Gun Metal, PN 16, DN 15/6 – 20 mm

2.2.02-L

GB-2

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

The valves can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170°C, the thermostat/ actuator can be fitted below or above the valve. For valve temperatures above 170°C, a cooling unit of type KS 4 has to be applied with connection downwards.

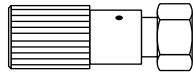
Strainer

It is recommended to use a strainer in front of the regulating valve if the liquid contains suspended particles.

Subject to change without notice.

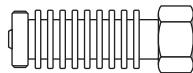
Accessories

Manual Adjusting Device



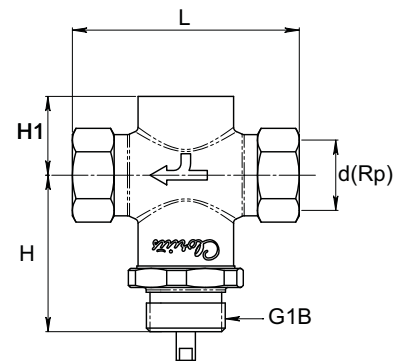
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the motor/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Dimension sketch



Type	L mm	H mm	H1 mm	d
15/6 L1S	85	65	20	Rp 1/2
15/9 L1S	85	65	20	Rp 1/2
15/12 L1S	85	65	20	Rp 1/2
15 L1S	85	65	26	Rp 1/2
20 L1S	95	67	32	Rp 3/4

2-way Control Valves type L1SB

Gun Metal, PN 16, DN 15 – 32 mm

2.2.04-I

GB-1

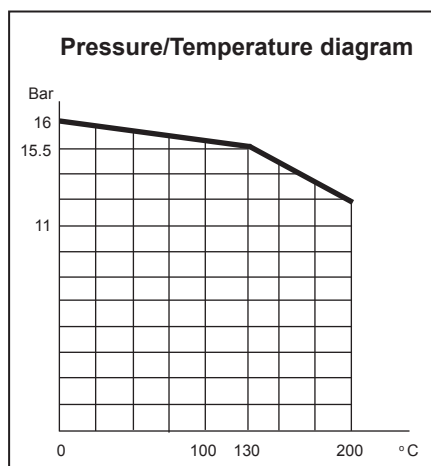
Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Single seated, balanced
- Quadratic characteristic

Applications

Control valves type L1SB are designed for regulation of hot water, steam and lubricating liquids.

The valves are installed combined with our self-acting thermostats, pressure differential regulators or electric valve actuators for regulation in central heating plants, industrial plants, industrial processes or marine installations.



Design

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of gun metal RG 5.

The thread for the actuator connection is G1B ISO 228. The valve is single seated, balanced. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

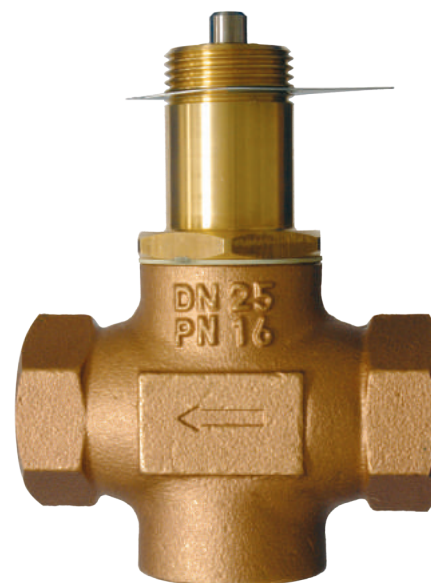
Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

In connection with our thermostats the valves will close at rising temperatures.

In connection with our electric valve actuators the valves will either close or open depending on the application.

The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.



Technical data

Materials:	
- valve body	Gun metal RG 5
- components	Stainless steel
Nominal pressure	PN 16
Seating	Single seated
Valve characteristic	Quadratic
Leakage	≤ 0.05% of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Internal connection threads	ISO 7/1

Specifications						
Type	Connection threads	DN mm	Opening mm	k_{vs} -value m^3/h	Lifting height mm	Weight kg
15 L1SB	Rp 1/2	15	15	2.75	6	1.0
20 L1SB	Rp 3/4	20	20	5	6.5	1.3
25 L1SB	Rp 1	25	25	7.5	7	1.6
32 L1SB	Rp 1 1/4	32	32	12.5	8	2.9

Subject to change without notice.

2-way Control Valves type L1SB Gun Metal, PN 16, DN 15 – 32 mm

2.2.04-I

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

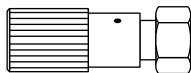
Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS-4 has to be applied. It must then be installed with electric actuator/thermostat downwards.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

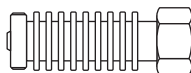
Accessories

Manual Adjusting Device



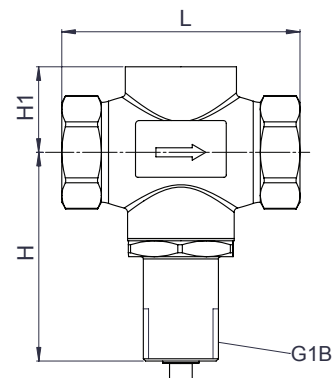
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Dimension sketch



Type	L mm	H mm	H1 mm
15 L1SB	85	86	30
20 L1SB	95	94	35
25 L1SB	105	92	40
32 L1SB	138	94	54

Dimensioning

Type	Water / Steam	Thermostats		Valve actuators VB/VBA	Pressure differential controllers	
		V2	V4		TD66-4	TD66-8
DN 15	Water: Δp_L & max. p_1 bar	9.5	16	16	16	16
	Steam: Δp_L & max. p_1 bar	9				
DN 20	Water: Δp_L & max. p_1 bar	9				
	Steam: Δp_L & max. p_1 bar	8				
DN 25	Water: Δp_L & max. p_1 bar	8				
	Steam: Δp_L & max. p_1 bar	7				
DN 32	Water: Δp_L & max. p_1 bar	7				
	Steam: Δp_L & max. p_1 bar	6				

p_1 = absolute pressure

Subject to change without notice.

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Single seated, balanced
- Quadratic characteristic
- Pressure balanced control valve

Applications

Balanced control valves type L1SBR are designed for regulation of cooling water, hot water, steam and lubricating liquids. Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable.

The valves are installed combined with our self-acting thermostats, pressure differential regulators or electric valve actuators for regulation in central heating plants, industrial plants, industrial processes or marine installations - especially in control systems for cooling.

The reverse acting valves are held in closed position by means of a built-in spring.

Design

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of gun metal RG 5.

The thread for the actuator connection is G1B ISO 228. The valve is single seated, balanced. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

Quality assurance

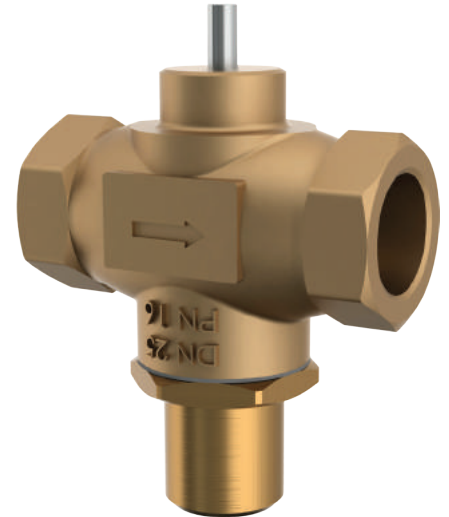
All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

Function

Without the actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens.

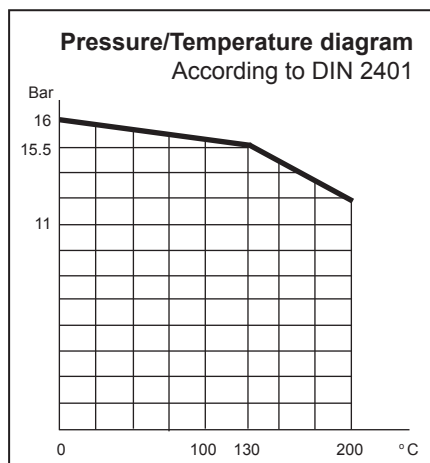
In connection with our thermostats the valves will open at rising temperatures. In connection with our valve motors the valves will either close or open depending on the application.

The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.



Technical data

Materials:	
- valve body	Gun metal RG 5
- components	Stainless steel
Nominal pressure	PN 16
Seating	Single seated
Valve characteristic	Quadratic
Leakage	≤ 0.05% of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Internal connection threads	ISO 7/1



Specifications

Type	Connection threads	DN mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
15 L1SBR	Rp ½	15	15	2,75	6	1.0
20 L1SBR	Rp ¾	20	20	5	6.5	1.3
25 L1SBR	Rp 1	25	25	7.5	7	1.6
32 L1SBR	Rp 1¼	32	32	12.5	8	2.9

Subject to change without notice.

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

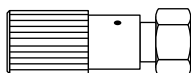
For media temperatures of max. 170°C, the thermostat/actuator can be fitted below or above the valve. For valve temperatures above 170°C, a cooling unit of type KS 4 has to be applied and the thermostat/actuator must be fitted below the valve.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Accessories

Manual Adjusting Device



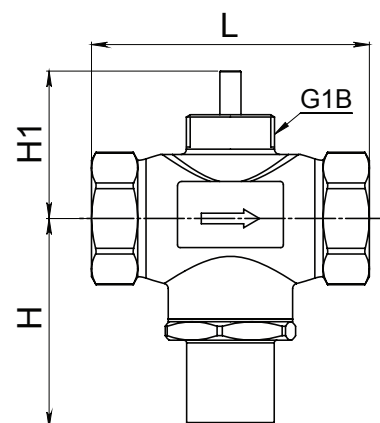
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the motor/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Dimension sketch



Type	L mm	H mm	H1 mm
15 L1SBR	85	71	40
20 L1SBR	95	79	46
25 L1SBR	105	79	50
32 L1SBR	138	81	64

Dimensioning

Type	Water / Steam	Thermostats		Valve motors VB/VBA	Pressure differential controllers	
		V2	V4		TD66-4	TD66-8
DN 15	Water: Δp_L & max. p_1 bar	9	16	16	16	16
	Steam: Δp_L & max. p_1 bar	8				
DN 20	Water: Δp_L & max. p_1 bar	7.5				
	Steam: Δp_L & max. p_1 bar	6.5				
DN 25	Water: Δp_L & max. p_1 bar	6				
	Steam: Δp_L & max. p_1 bar	5				
DN 32	Water: Δp_L & max. p_1 bar	7				
	Steam: Δp_L & max. p_1 bar	6				

Subject to change without notice.

2-way Control Valves type L2S

Gun Metal, PN 16, DN 40 – 50 mm

2.2.05-K

GB-1

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double seated
- Linear characteristic

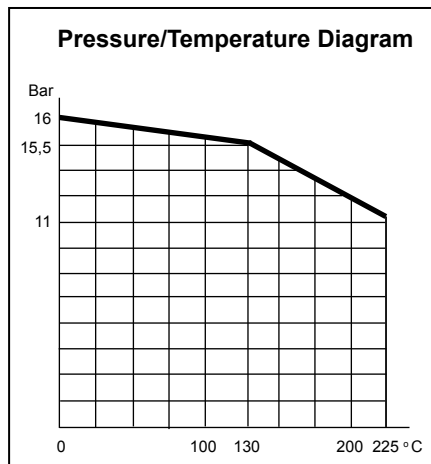
Applications

Control valves type L2S are designed for regulation of hot water and lubricating oils.

The valves are installed combined with one of our self-acting thermostats, pressure differential regulators or electric valve actuators for regulation in central heating plants, industrial plants, industrial processes or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.



Design

The valve body, seats and cone are made of gun metal RG 5. The stem is made of brass.

The thread for the actuator connection is G1B ISO 228.

The valves are double seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

In connection with our thermostats or electric actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.



Technical Data

Materials:	
- valve body	Gun metal RG 5
- components	Gun metal RG 5
- stem	Brass
Nominal pressure	PN 16
Seating	Double seated
Valve characteristic	Linear
Leakage	≤ 0.5% of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Internal connection threads	ISO 7/1

Specifications

Type	Connection threads	DN mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
40 L2S	Rp 1½	40	40	20	8	2.9
50 L2S	Rp 2	50	50	30	9	3.8

Subject to change without notice.

2-way Control Valves type L2S

Gun Metal, PN 16, DN 40 – 50 mm

2.2.05-K

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

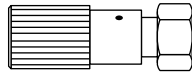
The valves can be installed with vertical as well as horizontal spindles. For valve temperatures of max. 170°C, the thermostat/actuator can be fitted below or above the valve. For valve temperatures above 170°C, a cooling unit of type KS 4 has to be applied with connection downwards.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

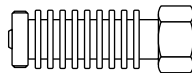
Accessories

Manual Adjusting Device



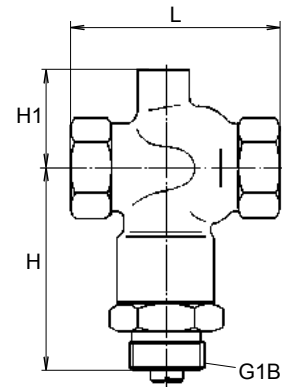
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Dimension Sketch



Type	L mm	H mm	H1 mm
40 L2S	129	118	68
50 L2S	153	122	71

Subject to change without notice.

2-way Control Valves type L2F

Gun metal, PN 10, DN 65 – 150 mm

2.2.05.01-A

GB-1

Characteristics

- Nominal pressure PN 10
- Characteristic almost linear
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Two single seats

Applications

Control valves type L2F are designed for regulating low, medium and high pressure hot water - and cold and hot sea water. The valves are used in connection with one of our temperature regulators in control systems for industrial processes or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - valve body, seats, cone and spindle - are made of sea water resistant materials with connection flanges drilled according to DIN 86021.

The connection thread for the actuator is G1B.

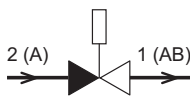
Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Port Numbering

The ports of valves type L2F are marked with the figures 1 and 2.

The letters in parentheses refer to the corresponding internationally adapted designations.



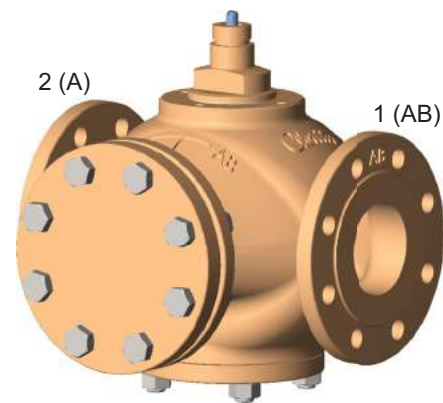
Port 2(A) closes at load on spindle.

Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

In connection with our thermostats or electronic actuators, the valves will close at rising temperatures.

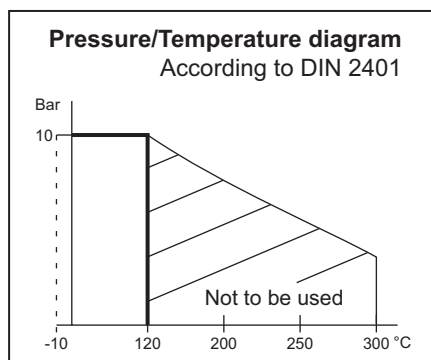
The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.



Technical Data

Materials:

- Valve body,		
seats and cone	CuSn5Zn5Pb5-C	
- Spindle	W.no. 1.4436	
Nominal pressure	PN 10	
Seating	2 balanced seats	
Valve characteristic	Almost linear	
Leakage	$\leq 0.5\%$ of k_{vs}	
Temperature range	See pressure/temperature diagram	
Mounting	With spindle vertical	
Flanges drilled according to	DIN 86021	



Specification					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
65 L2F	65	65	50	10.5	27
80 L2F	80	80	80	11	36
100 L2F	100	100	125	13	62
125 L2F	125	125	215	18	102
150 L2F	150	150	310	21	145

Subject to changes without notice.

2-way Control Valves type L2F

Gun metal, PN 10, DN 65 – 150 mm

2.2.05.01-A

GB-2

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

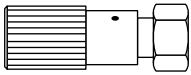
The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Accessories

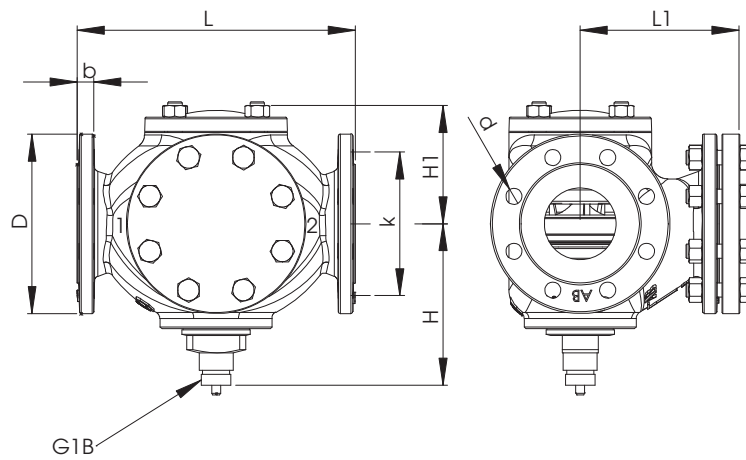
Manual adjusting device



The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Subject to changes without notice.

Dimensions



Type	L mm	L1 mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
65 L2F	240	150	175	120	185	20	145	18x(4)
80 L2F	260	160	185	125	200	22	160	18x(8)
100 L2F	350	205	195	145	220	22	180	18x(8)
125 L2F	400	275	245	180	250	24	210	18x(8)
150 L2F	480	305	280	189	285	24	240	22x(8)

Characteristics

- Nominal pressure
DN 150-300 mm:
PN 10, max. 100°C (option 120°C)
DN 350-600 mm:
PN 6, max. 100°C (option 120°C)
- Slide in Gun metal

Applications

Control valve type L2FM-T is a three-way control valve with blocked port making a two-way control valve. The slide for quarter turn operation designed for regulating of sea water.

The valves are designed for use in conjunction with industrial processes, marine installations with large water quantities.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

Dimensioning

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

Design

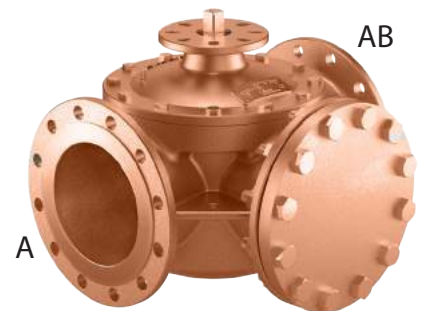
The valve body is made of gun metal and the valve slide is made of alu bronze. The valve flanges are drilled according to EN 1092-2 or ANSI Class 150.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

The slide is firmly connected with the motor spindle. When the slide is in the one extreme position by turning the spindle, connection A-AB is kept fully open. In the other extreme position connection the valve is fully closed. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.



Technical data

Materials:

- Valve body: Gun metal RG5 CuSn5Z5Pb5-C
- Slide: CuAl10Fe5Ni5
- O-ring: NBR 70A

Nominal pressure:

- DN 150-300: PN 10
- DN 350-600: PN 6

- Valve characteristic: Almost linear
- Leakage: Max. 0.5%
- Temperature range: Max. 100°C (option 120°C)

Mounting

- Flanges: EN 1092-2 PN 10/6

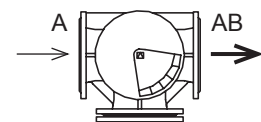
- Counter flanges (suggested): ANSI Class 150 DIN 2632 – PN 10 DIN 2633 – PN 6

Max. pressure Δp_L , against which the control can close:

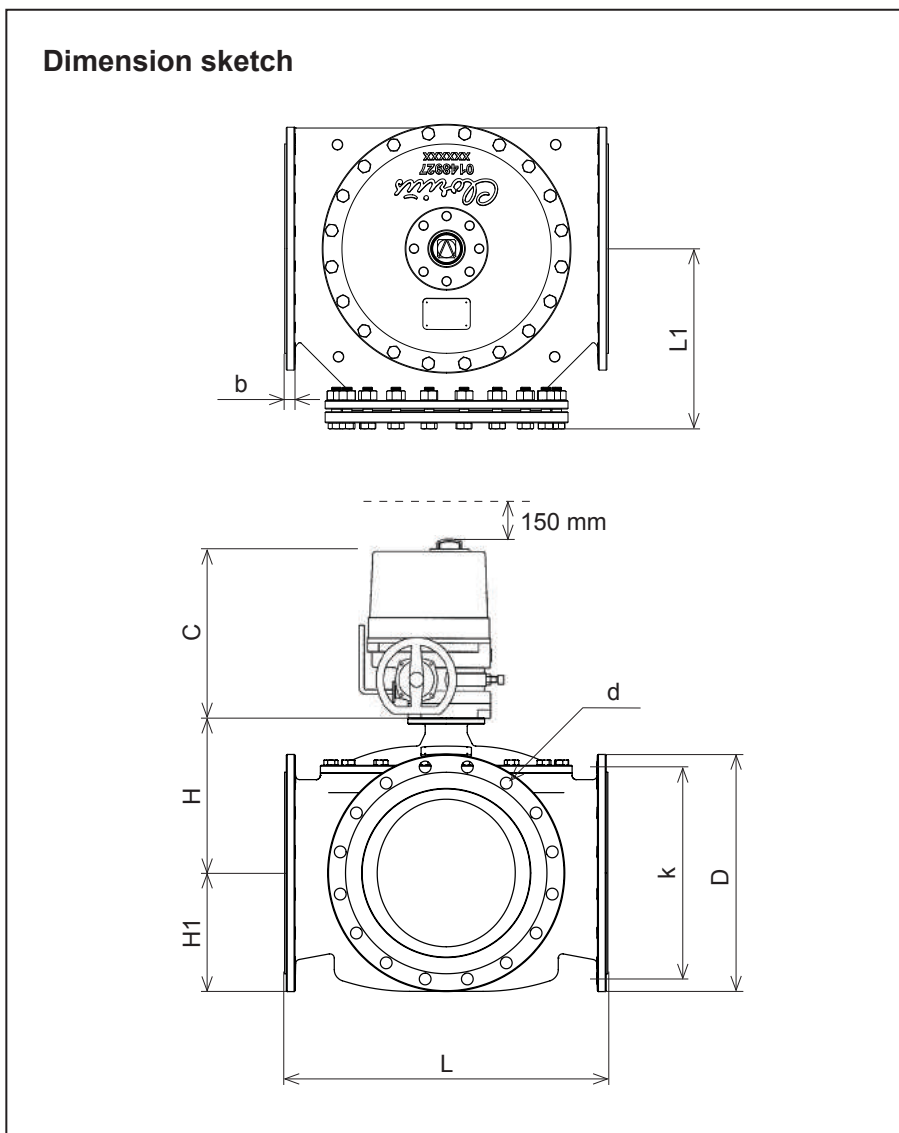
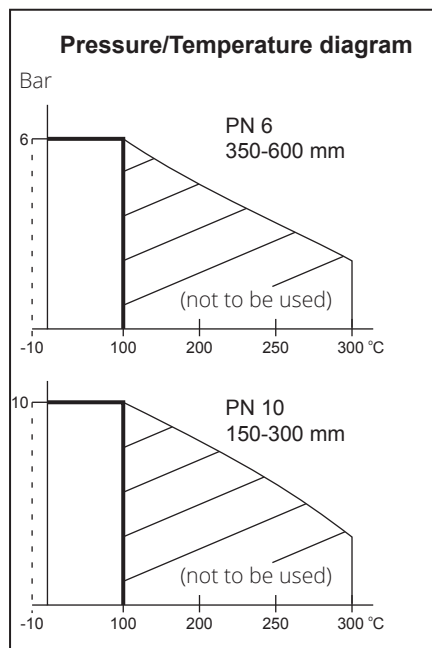
- DN 150-300: 10 bar
- DN 350-600: 6 bar

Specifications				
Type	Flange connection DN in mm	k_{vs} -value m ³ /h	Torque Nm	Weight kg
150 L2FM-T	150	425	135	84
200 L2FM-T	200	1100	330	153
250 L2FM-T	250	1800	450	215
300 L2FM-T	300	2450	700	277
350 L2FM-T	350	3350	780	370
400 L2FM-T	400	3850	880	459
450 L2FM-T	450	4300	1250	579
500 L2FM-T	500	5050	1450	744
600 L2FM-T	600	6020	1750	1090

Port numbering



Subject to change without notice.



Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

The valve connections are marked A and AB. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Type	Dimensions						EN 1092-2			ANSI Class 150		
	L mm	L1 mm	H mm	H1 mm	b mm	C mm	D (dia.) mm	k (dia.) mm	d mm (number)	D (dia.) mm	k (dia.) mm	d mm (number)
150 L2FM-T	438	250	196	139	250	276	290	240	23x(8)	280	241	22x(8)
200 L2FM-T	530	306	236	175	21	361	340	295	23x(12)	343	299	23x(8)
250 L2FM-T	592	340	273	205	23	361	400	355	28x(12)	407	362	26x(12)
300 L2FM-T	649	371	305	230	25.5	361	455	410	28x(12)	483	432	26x(12)
350 L2FM-T	717	403	337	255	25.5	361	505	460	23x(16)	534	477	29x(12)
400 L2FM-T	770	430	375	285	26	361	565	515	28x(16)	597	540	29x(16)
450 L2FM-T	820	457	391	310	26.5	556	615	565	28x(20)	635	578	32x(16)
500 L2FM-T	900	499	425	340	27.5	556	670	620	28x(20)	699	635	32x(20)
600 L2FM-T	1000	553	470	393	31.0	556	780	725	31x(20)	813	750	35x(20)

Subject to change without notice.

2-way Control Valves type L2SR, Gun metal PN 16, DN 40 – 50 mm, 2 seats, Reverse acting

2.2.06-L

GB-1

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Reverse acting (normally closed)
- For cooling water and lubricants
- Linear characteristic

Applications

Valves type L2SR are mainly intended for control of cooling water, sea water and lubricating liquids.

The valves are used in conjunction with temperature- or pressure differential regulators in industrial processes or marine installations - especially in control systems for cooling.

As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure, Δp_L , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force.

Please find the below max. allowable values of Δp_L as well as the max. allowable inlet pressures for opening the valves, p_{1max} , for various actuator forces.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" datasheet no. 9.0.00.

Design

The valve body, seats and cone – are made of gun metal RG 5 and the stem of stainless steel – the valve body with threaded ends according to ISO 7-1. The thread for the actuator connection is G1B.

The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality Assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

Function – Reverse Acting

Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens.

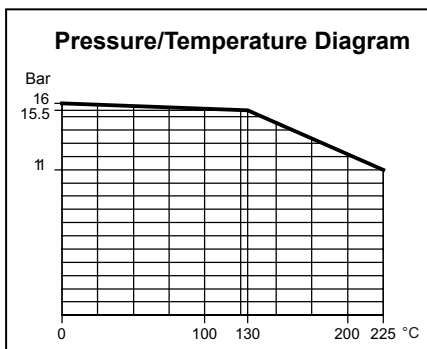
In connection with thermostats or electric valve actuators the valves act as "cooling" valves, i.e. they open at rising temperatures.



Technical Data

Materials:

- Valve, body, seats and cone	Gun metal RG 5 W.No. 2.1086
- Stem	Stainless Steel W.No. 1.4436
Nominal pressure	PN 16
Seating	Double seated
Flow characteristic	Linear
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Leakage rate	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Connection threads	ISO 7-1



Specifications

Type	Connection R_p	Opening dia. mm	k_{vs} -value m^3/h	Rated Travel mm	Max. Δp_L bar	Actuator Force N	Corresp. p_{1max} bar	Weight kg
40 L2SR	1 1/2"	40	20.00	8	2.7	400	16.0	3.0
50 L2SR	2"	50	30.00	9	1.8	400	16.0	4.0

Subject to change without notice.

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

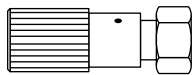
The valves can be installed with vertical as well as horizontal spindles. For valve temperatures of max. $170^\circ C$, the thermostat/actuator can be fitted below or above the valve. For valve temperatures above $170^\circ C$, a cooling unit of type KS4 has to be applied with connection downwards.

Strainer

It is recommended to use a strainer in front of the regulating valve if the liquid contains suspended particles.

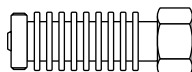
Accessories

Manual Adjusting Device



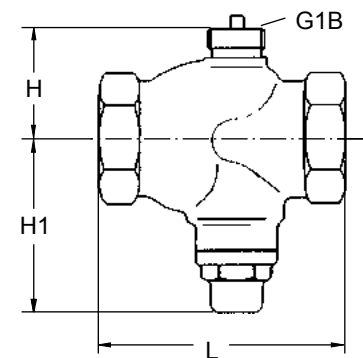
The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. $170^\circ C$).

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between $170^\circ C$ and $250^\circ C$.

Dimension Sketch



Type	L mm	H mm	H1 mm
40 L2SR	129	65	90
50 L2SR	153	70	94

Subject to change without notice.

3-way Control Valves type L3S

Gun metal, PN 10, DN 15 – 50 mm

2.2.07-K

GB-1

Characteristics

- Nominal pressure PN 10
- Characteristic almost linear
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Two single seats

Applications

Control valves type L3S are designed for regulating fresh water, cold and hot sea-water and lubricating liquids.

The valves are used in conjunction with temperature regulators in control systems for heating of domestic premises, district heating, industrial processes or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - valve body, seats and cone - are made of sea-water resistant gun metal RG 5.

The valves are single seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Note: The design of the sizes DN 15 (1/2") and DN 20 (3/4") is different from the bigger ones.

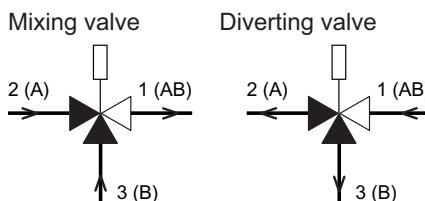
Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

Port numbering

The ports of valves type L3S are marked with the figures 1, 2 and 3.

The letters in parentheses refer to the corresponding internationally adapted designations.



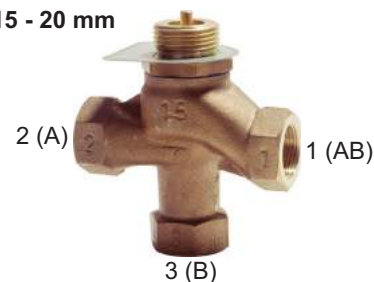
Port 1(AB) common port always open
 Port 2(A) closes at load on spindle
 Port 3(B) opens at load on spindle

Function

Without an actuator being installed, connection 2-1 is fully open and connection 3-1 completely closed by means of a spring.

On increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection 3-1 is fully open and connection 2-1 completely closed.

DN 15 - 20 mm



DN 25 - 50 mm

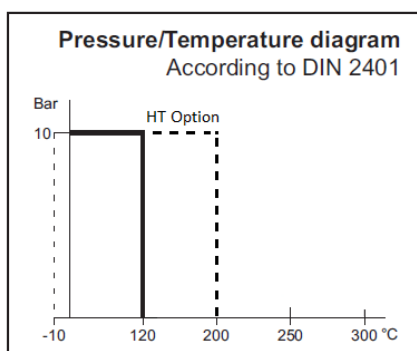


Technical data

Materials:

Valve body, seats and cone: Gun metal RG 5
 Nominal pressure: PN 10 (max. 120°C option 200°C)
 Seating: Two single seats

	15-20 mm unbalanced
	25-50 mm balanced
Valve characteristic	Almost linear
Leakage rate	≤ 0.5% of k_{vs}
Way of operation	When spindle is actuated: Gate 1-2 closes Gate 1-3 opens See page 2
Mounting	
Internal connection threads	ISO 7/1



Specification							
Type	Connection threads	DN	Opening	k_{vs} -value mixing valve	k_{vs} -value diverting valve	Lifting height	Weight
		mm	mm	m ³ /h	m ³ /h	mm	kg
15 L3S	Rp 1/2	15	15	2.75	2.4	3	1
20 L3S	Rp 3/4	20	20	5	4.3	4	1
25 L3S	Rp 1	25	25	7.5	6.4	4	4.4
32 L3S	Rp 1 1/4	32	32	12.5	10.7	6	4.4
40 L3S	Rp 1 1/2	40	40	20	17.2	6	8.3
50 L3S	Rp 2	50	50	30	25.8	8	7.7

Subject to changes without notice.

3-way Control Valves type L3S

Gun metal, PN 10, DN 15 – 50 mm

2.2.07-K

GB-2

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

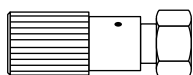
The valves can be installed with vertical as well as horizontal spindles. The thermo-stat/actuator can be fitted below or above the valve.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

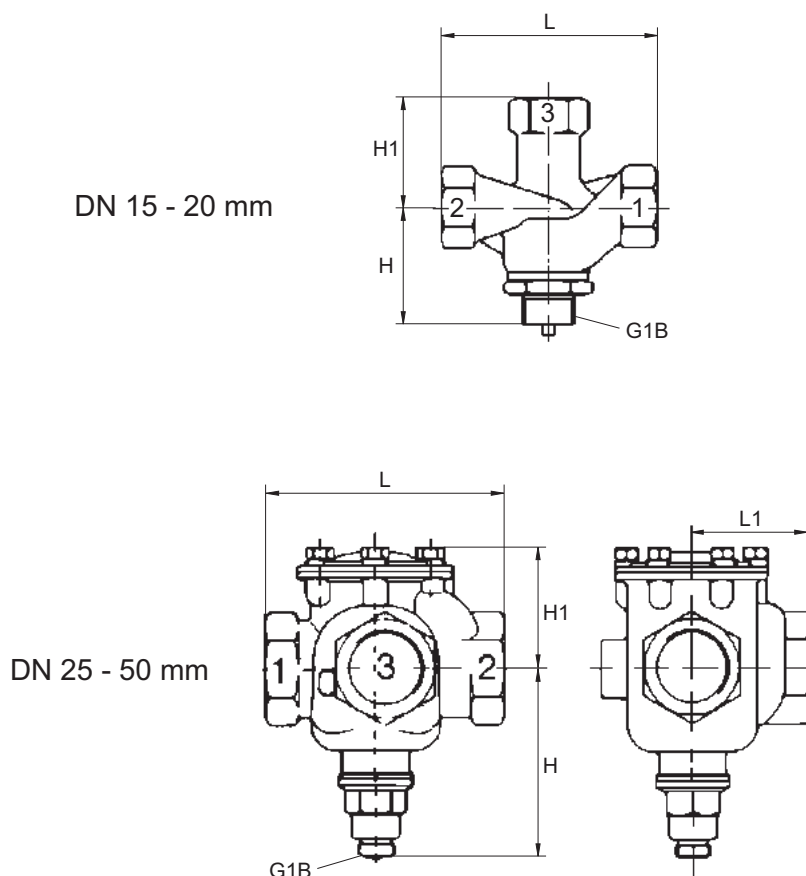
Accessories

Manual Adjusting Device



The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Dimension sketch



Type	L mm	L1 mm	H mm	H1 mm
15 L3S	110	-	60	55
20 L3S	110	-	60	55
25 L3S	140	70	145	80
32 L3S	140	70	145	80
40 L3S	185	95	150	105
50 L3S	185	95	150	105

Subject to changes without notice.

3-way Control Valves type L3F

Gun metal, PN 10, DN 65 – 150 mm

2.2.08-K

GB-1

Characteristics

- Nominal pressure PN 10
- Characteristic almost linear
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Two single seats

Applications

Control valves type L3F are designed for regulating low, medium and high pressure hot water - and cold and hot sea water. The valves are used in connection with one of our temperature regulators in control systems for industrial processes or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - valve body, seats, cone and spindle - are made of sea water resistant materials with connection flanges drilled according to DIN 86021.

The connection thread for the actuator is G1B.

Quality assurance

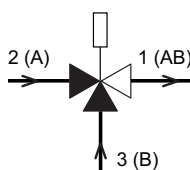
All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Port Numbering

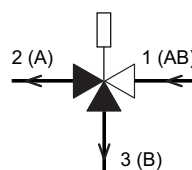
The ports of valves type L3F are marked with the figures 1, 2 and 3.

The letters in parentheses refer to the corresponding internationally adapted designations.

Mixing valve



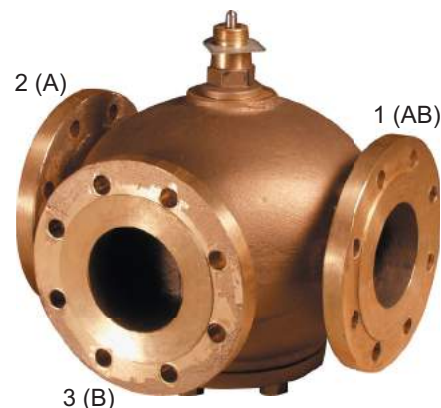
Diverting valve



- Port 1(AB) common port always open
- Port 2(A) closes at load on spindle
- Port 3(B) opens at load on spindle

Function

Without an actuator being installed, connection 2-1 is fully open and connection 3-1 completely closed, by means of a spring. By increasing pressure on the spindle, the opening of the ports changes

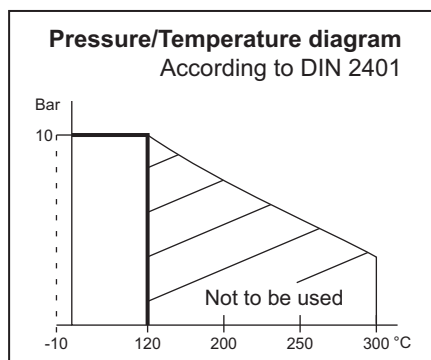


proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection 3-1 is fully open and connection 2-1 completely closed.

Technical Data

Materials:

- Valve body, seats and cone CuSn5Zn5Pb5-C
- Spindle W.no. 1.4436
- Nominal pressure PN 10
- Seating 2 balanced seats
- Valve characteristic Almost linear
- Leakage $\leq 0.5\%$ of k_{vs}
- Temperature range See pressure/temperature diagram
- Mounting With spindle vertical
- Flanges drilled according to DIN 86021



Specification						
Type	Flange connection DN in mm	Opening mm	Mixing valve k_{vs} -value m ³ /h	Diverting valve k_{vs} -value m ³ /h	Lifting height mm	Weight kg
65 L3F	65	65	50	43	10.5	22.5
80 L3F	80	80	80	69	11	40
100 L3F	100	100	125	108	13	55
125 L3F	125	125	215	185	18	91
150 L3F	150	150	310	267	21	131

Subject to changes without notice.

3-way Control Valves type L3F

Gun metal, PN 10, DN 65 – 150 mm

2.2.08-K

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{VS} -value will decrease by 14% as against mixing valves.

Mounting

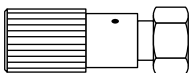
The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 645 mm for mounting and operation of the MT90 Marine motor. See drawing.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Accessories

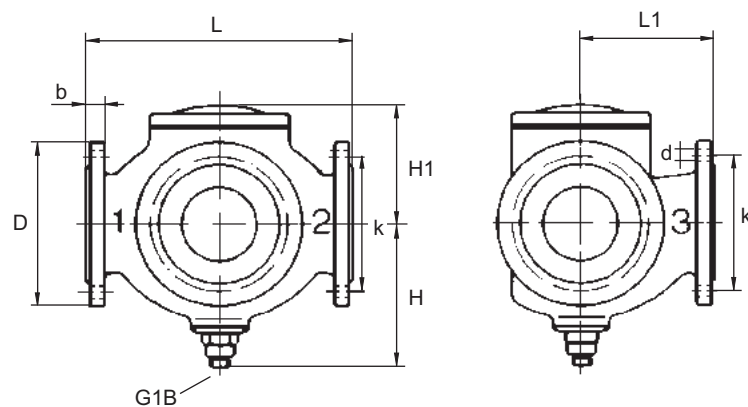
Manual adjusting device



The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Subject to changes without notice.

Dimensions



Type	L mm	L1 mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
65 L3F	240	120	175	120	185	20	145	18x(4)
80 L3F	310	155	180	127	200	22	160	18x(8)
100 L3F	350	175	195	145	220	22	180	18x(8)
125 L3F	400	240	245	180	250	24	210	18x(8)
150 L3F	480	270	280	189	285	24	240	22x(8)

Characteristics

- Nominal pressure
 - 80-200 mm: PN 10 max. 120°C
 - 300/250-300 mm: PN 6 max. 120°C
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Two single seats
- For cooling and heating purposes
- Sea water resistant

Applications

Control valve type L3FA is designed for regulating of sea water. The valves are used in conjunction with marine installations, e.g. cooling of main and auxiliary engines. Designed for use in conjunction with Clorius valve motor type AVM/F 234.

Dimensioning

For sizing of control valves up to DN 150 please see "Quick Choice" leaflet No. 9.0.00. For sizing of control valves bigger than DN 150 mm the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

Design

The valve components (seats and cone) are made of gun metal, the spindle of stainless steel. The valve body is made of gun metal and the valve flanges are drilled according to DIN 86021.

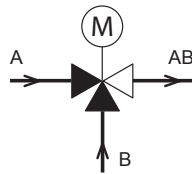
Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

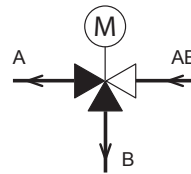
Port numbering

The ports of valves type L3FA are marked with the letters AB, A and B.

Mixing valve



Diverting valve



Port AB	common port always open
Port A	closes at load on spindle
Port B	opens at load on spindle

Function

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one outer position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

Technical data

Materials	
- Valve body	Gun metal RG 5 CuSn5Zn5Pb5-C
- Trim	Gun metal RG 5 CuSn5Zn5Pb5-C
- Valve spindle	Stainless steel (W.no. 1.4436)

Nominal pressure

DN 80-200 mm: PN 10 (max. 120°C)
DN 300/250-300 mm: PN 6 (max. 120°C)

Seats 2 balanced single seats

Valve characteristic Almost linear

Leakage < 0.5%

Temperature range Max. 120°C

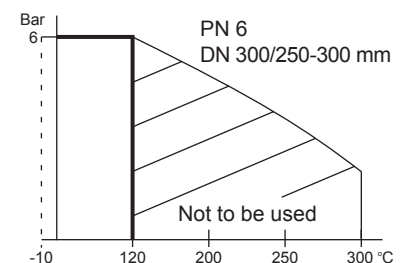
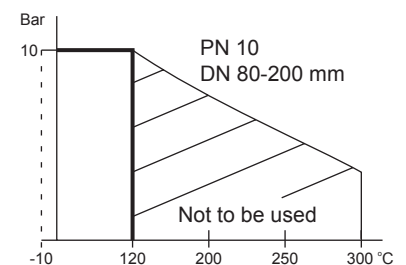
Mounting See page 2

Flanges According to DIN 86021

Note ! Valve type 300/250 L3FA has outer measures and flanges drilled as valve type 300 L3FA



Pressure/Temperature Diagram



Subject to change without notice.

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Important note:

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{VS} -value will decrease by 14% as against mixing valves.

Mounting

The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM234 See drawing.

Strainer

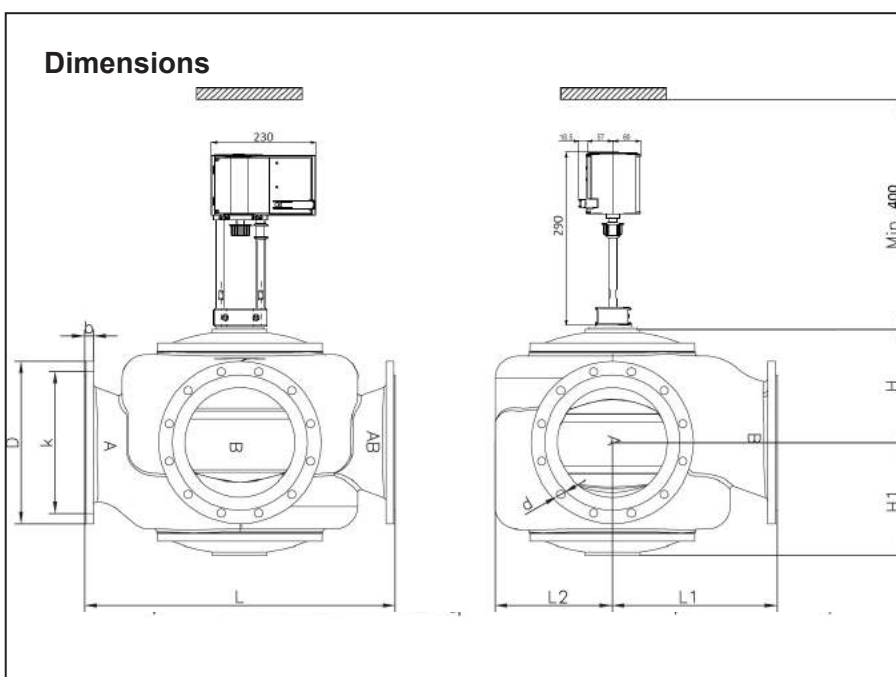
It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Specifications

Type	Flange connection DN in mm	Opening mm	k_{VS} -value ¹⁾ m^3/h	Lifting height mm	Weight kg
80 L3FA	80	80	80	11	40
100 L3FA	100	100	125	13	49
125 L3FA	125	125	215	18	80
150 L3FA	150	150	310	20	126
200/175 L3FA	200	200	425	22	195
200 L3FA	200	200	555	28	190
300/250 L3FA ²⁾	300	300	865	28	365
300 L3FA	300	300	1250	45	355

¹⁾ The stated k_{VS} values apply for mixing valves. Diverting valves: $0.86 \times (k_{VS}$ -values for mixing valves).

²⁾ Valve type 300/250 L3FA has outer measures and flanges drilled as type 300 L3FA.



Type	L mm	L1 mm	H mm	H1 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
80 L3FA	310	155	117	127	19	200	160	18x(8)
100 L3FA	350	175	132	141	19	220	180	18x(8)
125 L3FA	400	240	181	171	19	250	210	18x(8)
150 L3FA	480	270	216	189	19	285	240	22x(8)
200/175 L3FA	600	325	238	238	20	340	295	22x(8)
200 L3FA	600	325	238	238	20	340	295	22x(8)
300/250 L3FA ²⁾	850	450	305	305	25	445	400	22x(12)
300 L3FA	850	450	305	305	25	445	400	22x(12)

Subject to change without notice.

²⁾ Valve type 300/250 L3FA has outer measures and flanges drilled as type 300 L3FA.

3-way Control Valves type L3FM-T

2.2.10-E

Gun metal, PN 10, DN 65 – 300 / PN 6, DN 350 – 600 mm

GB-1

Characteristics

- Nominal pressure
 - 65-300 L3FM-T: PN 10, max. 100°C (option 120°C)
 - 350-600 L3FM-T: PN 6, max. 100°C (option 120°C)
- Slide in CuAl10Fe5Ni5

Applications

Control valve type L3FM-T is a three-way control valve with a slide for quarter turn operation designed for regulating of sea water.

The valves are designed for use in conjunction with valve motor type RCEL with handle for manual operation or for use in conjunction with a pneumatic actuator.

Dimensioning

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

Design

The valve body and the valve slide are made of gun metal. The valve flanges are drilled according to EN 1092-2.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

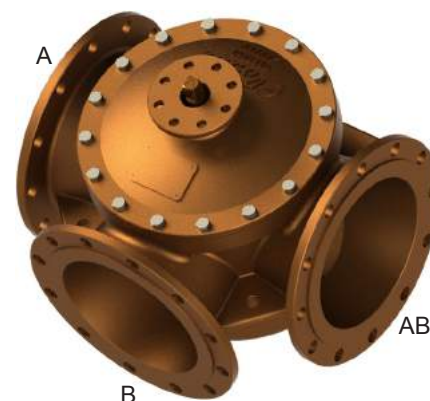
Function

The slide is firmly connected with the motor spindle. When the slide is in the one extreme position by turning the spindle, connection A-AB is kept fully open and connection B-AB is fully closed. In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

Technical data

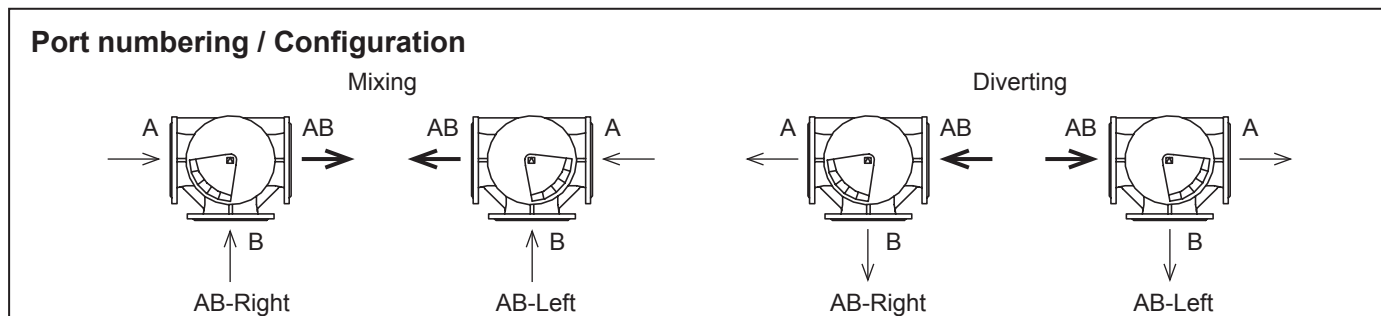
- Materials:
- Valve body: Gun metal RG 5, CuSn5Zn5Pb5-C
 - Slide: CuAl10Fe5Ni5
 - O-ring: NBR 70A
- Nominal pressure:
- 65-300 L3FM-T: PN 10
 - 350-600 L3FM-T: PN 6
- Valve characteristic: Almost linear



- Leakage: Max. 0.5%
- Temperature range: Max. 100°C (option 120°C)
- Mounting: See page 2
- Flanges: EN 1092-2, PN 6/10
- Counter flanges (suggested): DIN 2632 – PN 6, DIN 2633 – PN 10
- Max. pressure Δp_L , against which the control can close:
 - 65-300 L3FM-T: 10 bar
 - 350-600 L3FM-T: 6 bar

Specifications					
Type	Flange connection DN in mm	k_{vs} -value ¹⁾ Mixing valve m ³ /h	k_{vs} -value ¹⁾ Diverting valve m ³ /h	Torque Nm	Weight kg
65 L3FM-TR		Available from December 2016			
80 L3FM-TR		Available from September 2016			
100 L3FM-TR	100	175	220	52	41
125 L3FM-TR	125	245	330	98	58
150 L3FM-TR	150	395	425	135	71
200 L3FM-TR	200	800	1100	330	114
250 L3FM-TR	250	1500	2100	450	159
300 L3FM-TR	300	2000	2650	700	207
350 L3FM-TR	350	2530	3380	780	278
400 L3FM-TR	400	3050	3950	880	346
450 L3FM-TR	450	3680	4480	1250	433
500 L3FM-TR	500	4150	5250	1450	563
600 L3FM-TR	600	4800	6050	1750	816
700 L3FM-TR	700	5500	7000	2150	1150
800 L3FM-TR	800	6200	8000	2550	1400

¹⁾ k_{vs} -value for port A and B 50% open.

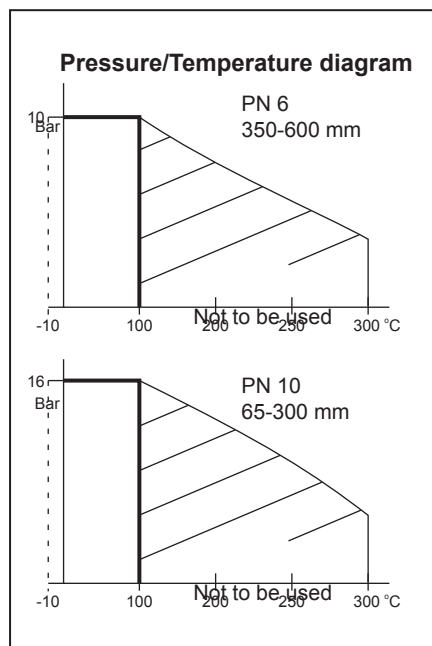


Further specification for ordering (e.g. 400 L3FM-T, AB-Right)

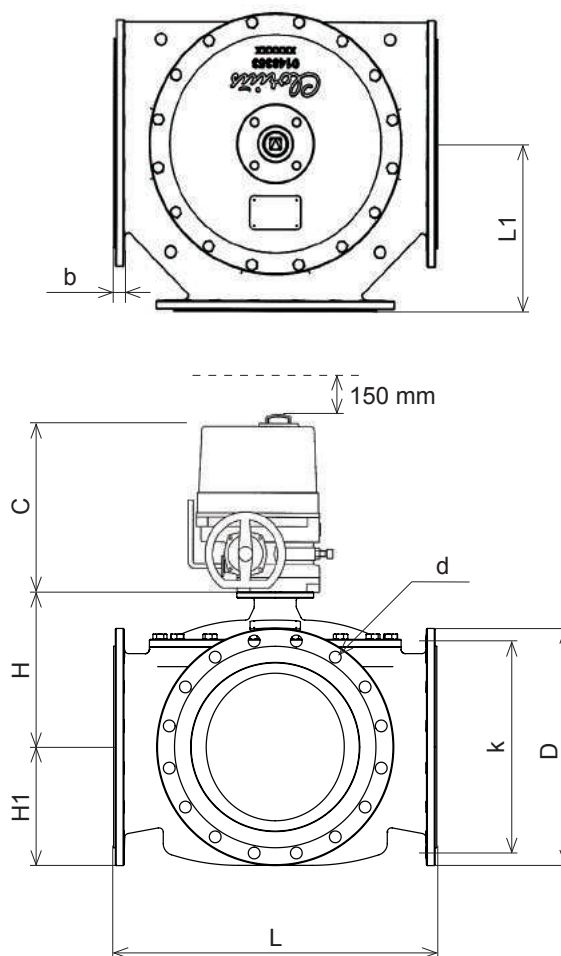
Subject to change without notice.



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Dimension sketch



Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

The valve connections are marked A, B and AB. The slide is operating between A and B.

Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

Valve can be supplied in two different configurations, AB-Right and AB-Left. Please note that the supplied configuration is according to installation.

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

3-way Control Valves type L3FM-T

2.2.10-E

Gun metal, PN 10, DN 65 – 300 / PN 6, DN 350 – 600 mm

GB-3

Dimensions							EN 1092-2			ANSI Class 150			JIS B 2210 5K			JIS B 2210 10K		
Type	L mm	L1 mm	H mm	H1 mm	b mm	C mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)
65 L3FM-TR	Available from December 2016																	
80 L3FM-TR	Available from September 2016																	
100 L3FM-TR	350	175	158	112	17	273	235	190	23x(8)	230	190,5	19x(8)	200	165	19x(8)	210	175	19x(8)
125 L3FM-TR	400	200	179	123	17	273	270	220	28x(8)	255	216	22x(8)	235	200	19x(8)	250	210	23x(8)
150 L3FM-TR	438	219	196	139	20	276	290	240	23x(8)	280	241	22x(8)	265	230	19x(8)	280	240	23x(8)
200 L3FM-TR	530	270	236	175	21	361	340	295	23x(12)	343	299	23x(8)	320	280	23x(8)	320	290	23x(12)
250 L3FM-TR	592	300	273	205	23	361	400	355	28x(12)	407	362	26x(12)	385	345	23x(12)	400	355	25x(12)
300 L3FM-TR	649	330	305	230	25.5	361	455	410	28x(12)	483	432	26x(12)	430	390	23x(12)	445	400	25x(16)
350 L3FM-TR	717	360	337	255	25.5	361	505	460	23x(16)	534	477	29x(12)	480	435	25x(12)	490	445	25x(16)
400 L3FM-TR	770	385	375	285	26	361	565	515	28x(16)	597	540	29x(16)	540	495	25x(16)	560	510	27x(16)
450 L3FM-TR	820	410	391	310	26.5	556	615	565	28x(20)	635	578	32x(16)	605	555	25x(16)	620	565	27x(20)
500 L3FM-TR	900	455	425	340	27.5	556	670	620	28x(20)	699	635	32x(20)	655	605	25x(20)	675	620	27x(20)
600 L3FM-TR	1000	505	470	393	31.0	556	780	725	31x(20)	813	750	35x(20)	770	715	25x(20)	795	730	33x(24)
700 L3FM-TR	1106	553	519	462	34.0	556	895	840	31x(24)	-	-	-	875	820	27x(24)	905	840	33x(24)
800 L3FM-TR	1200	600	579	507	37	556	1015	950	34x(24)	-	-	-	995	930	33x(24)	1020	950	33x(28)

3-WAY THERMOSTATIC VALVE TYPE L3FSI

2.2.15-B

BRONZE, DN 50 – 150 mm,

GB-1



CHARACTERISTICS

- Nominal pressure
DN 50-150 mm: PN 10,
- Temperature range 7 to 127 °C

APPLICATIONS

Thermostatic control valve type L3FSI is a three-way control valve unique due to its internal sensor technology. The thermostatic valve is ideal for controlling fluid temperature, in cooling and heat recovery systems, and other temperature controlling applications such as: compressors, industrial engines, marine, power generation, renewable energy among others.

TYPICAL APPLICATIONS - MARINE/OFFSHORE/POWER GENERATION Engines - high and low temperature water, sea and fresh water.

Heat Recovery and Fresh Water Generators - water circuits

DIMENSIONING

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{Q \text{ (m}^3 \text{/h)}}{\sqrt{\Delta p \text{ (bar)}}}$$
$$\Delta p \text{ (bar)} = \left(\frac{Q \text{ (m}^3 \text{/h)}}{k_{vs}} \right)^2$$

DEFINITION OF K_{VS}-VALUE

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

DESIGN

The valve body is made of bronze.

Low lead alloy Sizes: DN50, 65, 80 (C89833)

Sizes: DN 100, 125, 150 (C83600)

The valve flanges are drilled according to, EN1092-3 (ANSI flanges available on request).

QUALITY ASSURANCE

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

SPECIFICATIONS

Type	Flange connection DN in mm	kvs-value m^3/h	Weight kg
50 L3FSI	50	53	12
65 L3FSI	65	82	25
80 L3FSI	80	86	31
100 L3FSI	100	173	53
125 L3FSI	125	285	67
150 L3FSI	150	389	89

Subject to changes without notice.

BRONZE, DN 50 – 150 mm,

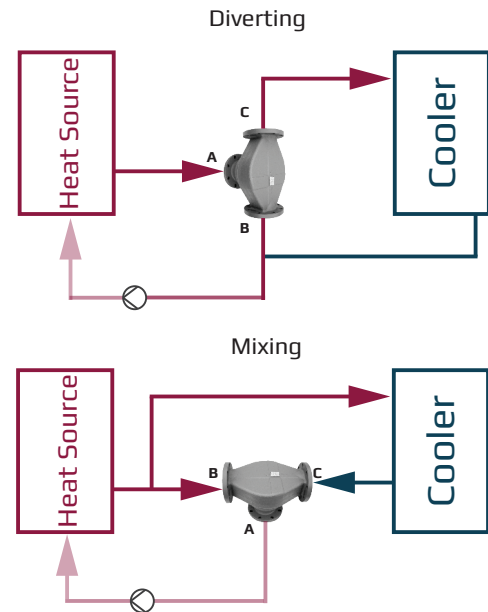
FUNCTION

The thermostatic valve uses the principle of expanding wax, which undergoes large expansion rates within a relatively narrow temperature range. The self-acting element activates a cone, which directs the flow. All Clorius thermostatic valves are factory set at predetermined temperatures: no further adjustments are necessary. A wide range of temperatures are available for water and oil temperature control applications.

When using in a diverting application, on start-up the total fluid flow is routed back to the main system. As fluid temperature rises to the control range, some fluid is diverted to the cooling system. As fluid temperature continues to increase, more flow is diverted. When the thermostat is in a fully stroked condition, all fluid flow is directed to the cooling system. Clorius thermostatic valves may also be used in mixing application.

In a mixing application, port B is the hot by-pass fluid inlet and port C the cold fluid inlet from the cooler. The flows mix and the thermostat adjusts to reach the setpoint temperature of the mixed output flow through port A (common port).

PORT NUMBERING



TECHNICAL DATA

Materials:

- Valve body	Bronze
Low lead alloy	Sizes: DN50, 65, 80 (C89833)
	Sizes: DN 100, 125, 150 (C83600)
Temperature range	7 to 127 °C
Flanges	EN1092-3
	(ANSI flanges available on request)

Recommended pressure drop 0,15 - 0,5 bar

Max. static pressure

DN 50-150 10 bar

Optional Manual override
Nickel plated thermostatic elements
Wheep holes

MOUNTING

The valve can be installed in all positions.
No additional space required.

STRAINER

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Subject to changes without notice.

3-WAY THERMOSTATIC VALVE TYPE L3FSI

2.2.15-B

BRONZE, DN 50 – 150 mm,

GB-3

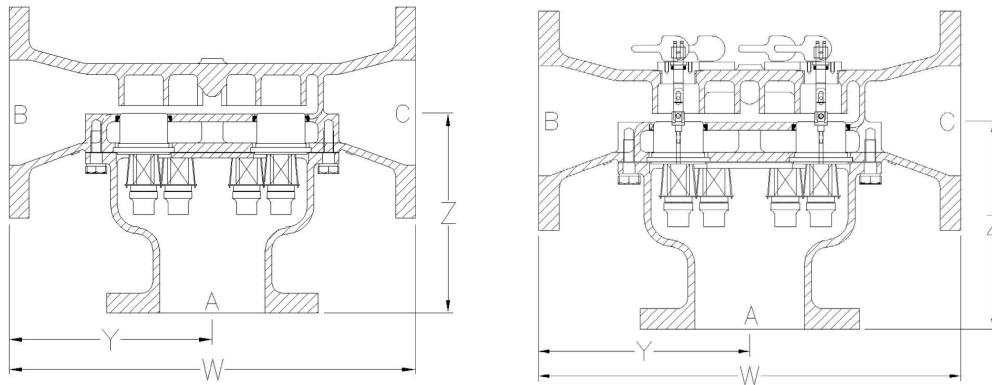
SET POINT TEMPERATURES

DIMENSIONS							
Type	Dimensions			Max. Width in mm	Flange drilling EN 1092-3 in mm		
	Y mm	W mm	Z mm		Outer diameter	Bolt circle	Dia. of holes x no. of holes
50 L3FSI	110	219	149	159	∅159	∅125	∅18 x 4
65 L3FSI	125	251	166	206	∅185	∅145	∅18 x 4
80 L3FSI	132	265	171	203	∅200	∅160	∅18 x 8
100 L3FSI	197	394	213	279	∅220	∅180	∅18 x 8
125 L3FSI	241	482	237	356	∅250	∅210	∅18 x 8
150 L3FSI	241	482	252	406	∅285	∅240	∅22 x 8

Subject to change without notice

Set Point temperature, deg. C.
7
13
18
24
32
35
38
41
43
46
49
54
57
60
66
68
71
74
77
79
82
85
88
91
96
99
104
110
116
121
127

DIMENSION SKETCH



2-way Control Valves type M1F

Cast iron, PN 16, DN 15/4 – 50 mm

2.3.02-L

GB-1

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Single-seated, tightly closing
- Quadratic characteristic

Applications

Control valves type M1F are designed for regulating low, medium and high pressure hot water, steam and lubricating oils.

The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

Dimensioning

For sizing of control valves and selection of actuators, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seat and cone - are made of stainless steel.

The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228. The valves are single-seated and designed for tight closure. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

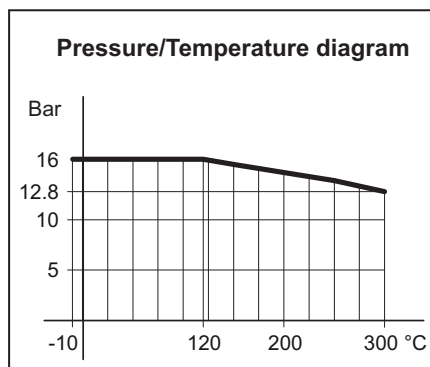
In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.



Technical data

Materials:	Cast iron
- Valve body	EN-GJS-400-15
- Components	Stainless steel
- Bolts, nuts	24 CrMo 4/A4
Nominal pressure	PN 16
Seating	Single-seated
Valve characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Seat leakage	$\leq 0.05\%$ of k_{vs}
Temperature range	See diagram
Mounting	See page 2
Flanged ends	
drilled according to	EN 1092-2 PN 16
Counter flanges	DIN 2633/BS 4504
Colour	Grey



Specifications

Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
15/4 M1F	15	4	0.20	6	3
15/6 M1F	15	6	0.45	6	3
15/9 M1F	15	9	0.95	6	3.1
15/12 M1F	15	12	1.70	6	3.1
15 M1F	15	15	2.75	6	3.1
20 M1F	20	20	5	6.5	4.2
25 M1F	25	25	7.50	7	5.5
32 M1F	32	32	12.50	8	8.1
40 M1F	40	40	20	9	9.7
50 M1F	50	50	30	10	14

Subject to changes without notice.

2-way Control Valves type M1F

Cast iron, PN 16, DN 15/4 – 50 mm

2.3.02-L

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

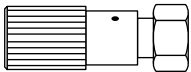
Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	Valve Motors

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

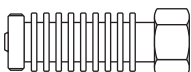
Accessories

Manual Adjusting Device



The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling Unit KS-4



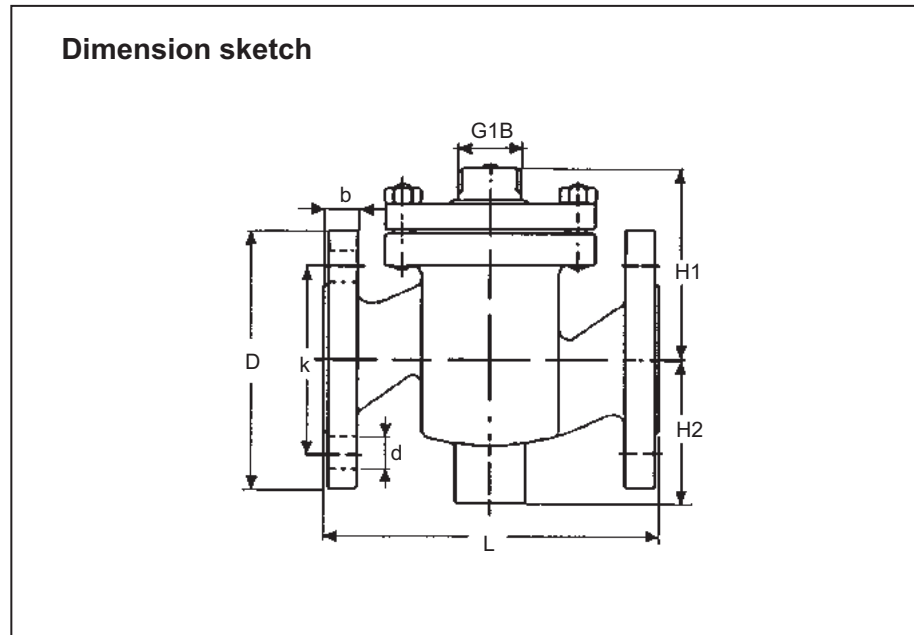
Cooling unit protecting the stuffing box of the motor/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5



Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or valve motor (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Type	L mm	H1 mm	H2 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
15/4 M1F	130	80	60	14	95	65	14 x (4)
15/6 M1F	130	80	60	14	95	65	14 x (4)
15/9 M1F	130	80	60	14	95	65	14 x (4)
15/12 M1F	130	80	60	14	95	65	14 x (4)
15 M1F	130	80	60	14	95	65	14 x (4)
20 M1F	150	85	65	16	105	75	14 x (4)
25 M1F	160	95	70	16	115	85	14 x (4)
32 M1F	180	105	75	18	140	100	18 x (4)
40 M1F	200	110	85	18	150	110	18 x (4)
50 M1F	230	125	95	20	165	125	18 x (4)

Subject to changes without notice.

Balanced 2-way Control Valves type M1FBN

Cast iron, PN 16, DN 15 – 80 mm

2.3.03.01-D

GB-1

Characteristics

- Nominal pressure PN 16
- Pressure balanced valve
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Single-seated, balanced
- Quadratic characteristic

Applications

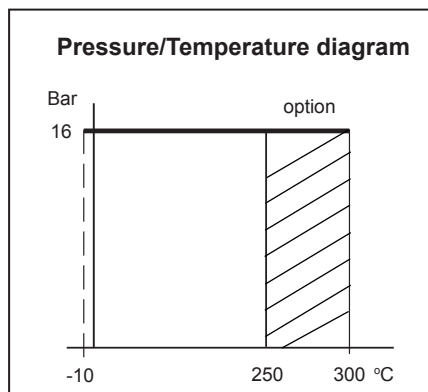
Balanced control valves type M1FBN are designed for regulating hot water, steam and hot oil systems.

Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable.

The valves are used in conjunction with our temperature- or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

Design

The valve components - spindle, seat, cone - are made of stainless steel.



The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The thread for the actuator connection is G1B ISO 228.

The valves are single-seated and designed for tight closure. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

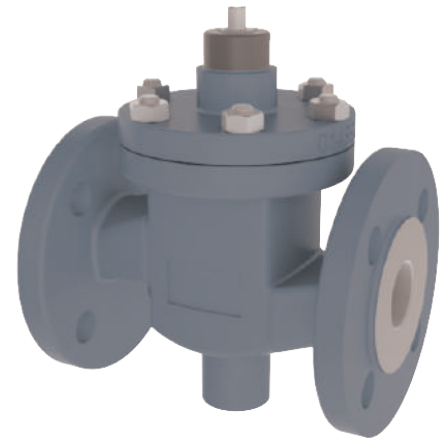
Without an actuator being connected, the valve is held in open position by means of a spring. With force on the spindle the valve will close.

In connection with our thermostats or electric actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting double-seated valve can be used.

The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

Technical data

Materials:	
- Valve body	Cast iron
	EN-GJS-400-15
- Components	Stainless steel
- Nuts, bolts	24 CrMo 5/A4
Nominal pressure	PN 16
Seating	Single-seated
Valve characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$



Leakage	≤ 0.05% of k_{vs}
Temperature range	See pressure/temperature diagram
Flanges drilled according to	EN 1092-2 PN 16 or ANSI B16.5 Class 150
Colour	Grey

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS-4 has to be applied. It must then be installed with electric actuator/ thermostat downwards.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Specifications					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
15 M1FBN	15	15	4	7.5	4
20 M1FBN	20	20	6.3	7.5	5
25 M1FBN	25	25	10	9	6
32 M1FBN	32	32	16	10	9
40 M1FBN	40	40	25	11	13
50 M1FBN	50	50	35	11.5	16
65 M1FBN	65	65	58	14.5	23
80 M1FBN	80	80	80	16	38

Subject to changes without notice.



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Balanced 2-way Control Valves type M1FBN

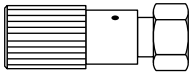
Cast iron, PN 16, DN 15 – 80 mm

2.3.03.01-D

GB-2

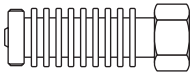
Accessories

Manual adjusting device



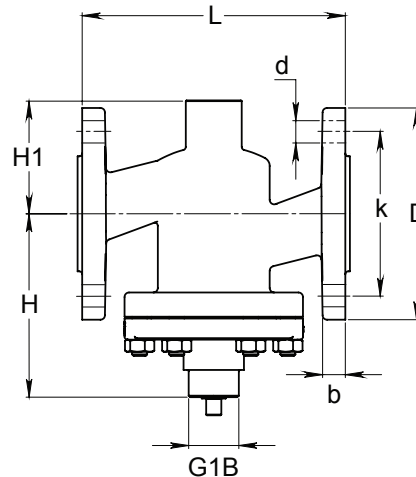
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling unit KS-4



Cooling unit protecting the stuffing box of the electric actuator / thermostat. To be applied at valve temperatures between 170°C and 250°C.

Dimension sketch



Dimensions

Type	L mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
15 M1FBN	130	101	80	95	14	65	14x(4)
20 M1FBN	150	107	85	105	16	75	14x(4)
25 M1FBN	160	112	70	115	16	85	14x(4)
32 M1FBN	180	122	75	140	18	100	18x(4)
40 M1FBN	200	125	85	150	19	110	18x(4)
50 M1FBN	230	140	95	165	19	125	18x(4)
65 M1FBN	290	154	110	185	19	145	18x(4)
80 M1FBN	310	164	115	200	19	160	19x(8)

Dimensioning

Type	Water / Steam	Thermostats			Valve actuators		Pressure differential controllers	
		V2	V4	V8	V / AV	VB / VBA	TD66-4	TD66-8
15 M1FBN	Water: Δp_1 & max. p_1 bar	10	16	16	16	16	16	16
	Steam: Δp_1 & max. p_1 bar	9						
20 M1FBN	Water: Δp_1 & max. p_1 bar	9						
	Steam: Δp_1 & max. p_1 bar	8						
25 M1FBN	Water: Δp_1 & max. p_1 bar	8						
	Steam: Δp_1 & max. p_1 bar	7						
32 M1FBN	Water: Δp_1 & max. p_1 bar	7						
	Steam: Δp_1 & max. p_1 bar	6						
40 M1FBN	Water: Δp_1 & max. p_1 bar	-	10					
	Steam: Δp_1 & max. p_1 bar	-	9					
50 M1FBN	Water: Δp_1 & max. p_1 bar	-	9					
	Steam: Δp_1 & max. p_1 bar	-	8					
65 M1FBN	Water: Δp_1 & max. p_1 bar	-	7					
	Steam: Δp_1 & max. p_1 bar	-	6					
80 M1FBN	Water: Δp_1 & max. p_1 bar	-	5					
	Steam: Δp_1 & max. p_1 bar	-	4					

p_1 = absolute pressure

Subject to changes without notice.

2-way Control Valves type M2F, Cast iron PN 16, DN 20 – 80 mm, 2 seats, Flanged ends

2.3.04-N

GB-1

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double-seated
- Adjustable seat interspace
- Quadratic characteristic

Applications

Control valves type M2F are designed for regulating hot water, steam and lubricating oil systems.

The double-seated valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a single-seated valve.

The valves are used in conjunction with our temperature- or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seats and cone - are made of stainless steel.

The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228.

The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

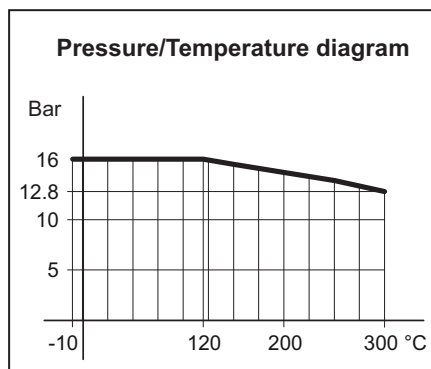
The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.



Technical data

Materials:

- Valve body	Cast iron EN-GJS-400-15
- Components	Stainless steel
- Bolts, nuts	24 CrMo 4/A4
Nominal pressure	PN 16
Seating	Double-seated
Valve characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Leakage rate	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges drilled according to	EN 1092-2 PN 16
Counter flanges	DIN 2633/BS 4504
Colour	Grey



Specification					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
20 M2F	20	20	5	6.5	5
25 M2F	25	25	7.5	7	6.5
32 M2F	32	32	12.5	8	9
40 M2F	40	40	20	9	11
50 M2F	50	50	30	10	16
65 M2F	65	65	50	11	21
80 M2F	80	80	80	13	38

Subject to changes without notice.

2-way Control Valves type M2F, Cast iron PN 16, DN 20 – 80 mm, 2 seats, Flanged ends

2.3.04-N

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

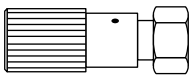
Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	Valve Motors

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

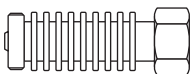
Accessories

Manual Adjusting Device



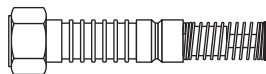
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Cooling Unit KS-4



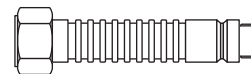
Cooling unit protecting the stuffing box of the motor/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5

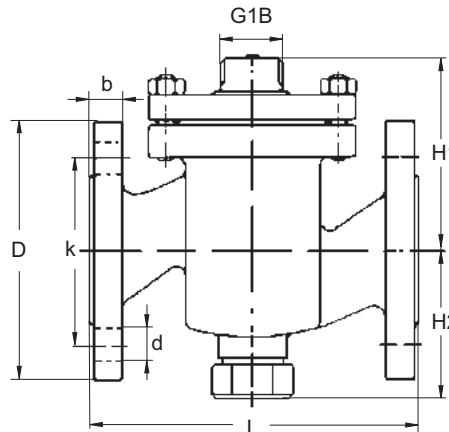


Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or valve motor (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Dimension sketch



Type	L mm	H1 mm	H2 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
20 M2F	150	85	70	16	105	75	14x(4)
25 M2F	160	95	77	16	115	85	14x(4)
32 M2F	180	105	82	18	140	100	19x(4)
40 M2F	200	110	92	19	150	110	19x(4)
50 M2F	230	125	102	19	165	125	19x(4)
65 M2F	290	135	120	19	185	145	19x(4)
80 M2F	310	145	130	19	200	160	19x(8)

Subject to changes without notice.

2-way Control Valves type M2F

Cast iron, PN 16, DN 100 – 150 mm

2.3.05-H

GB-1

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double-seated

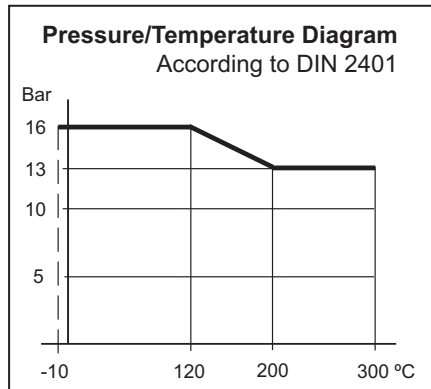
Applications

Control valves type M2F are designed for regulating hot water, steam and hot oil systems.

The valves are installed combined with temperature- or pressure-differential regulators in control systems for heating to domestic premises, district- and group heating schemes, industrial processes or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.



Design

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of cast iron GG 25 with flanges drilled according to EN 1092-2. The connection thread for the actuator connection is G1B ISO 228.

The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.



Technical Data

Materials:

- Valve body Cast iron GG 25
- Components Stainless steel
- Bolts, nuts 24 CrMo 4/A4

Nominal pressure PN 16

Seating Double-seated

Valve characteristic Almost quadratic

Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$

Function Closing with pressure on spindle

Leakage rate $\leq 0.5\%$ of k_{vs}

Temperature range See pressure/temperature diagram

Mounting See page 2

Flanges drilled according to EN 1092-2

Counter flanges DIN 2633

Colour Grey

Specification

Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
100 M2F	100	100	125	20	32
125 M2F	125	125	215	20	50
150 M2F	150	150	310	20	70

Subject to changes without notice.

2-way Control Valves type M2F

Cast iron, PN 16, DN 100 – 150 mm

2.3.05-H

GB-2

Definition of k_{VS} -value

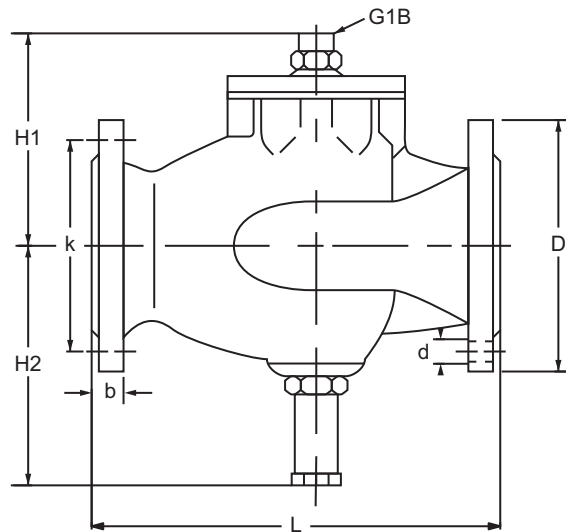
The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with electric actuator/thermostat downwards, and according to the following instructions:

Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	El. actuators

Dimension sketch

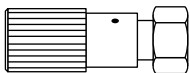


Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

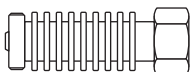
Accessories

Manual Adjusting Device



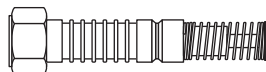
The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Cooling Unit KS-4



Cooling Unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5



Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Dimensions							
Type	L mm	H1 mm	H2 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
100 M2F	350	185	209	24	220	180	18x(8)
125 M2F	400	205	224	26	250	210	18x(8)
150 M2F	400	240	244	26	285	240	22x(8)

Subject to changes without notice.

Characteristics

- Nominal pressure
200 M2FA: PN 10 max. 120°C
250-300 M2FA: PN 6 max. 120°C
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double seated

Applications

Regulating valve type M2FA is designed for regulating of hot water, steam and hot oil systems.

The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary engines. Is designed for use in conjunction with Clorius valve motor type AVM/AVF 234.

Dimensioning

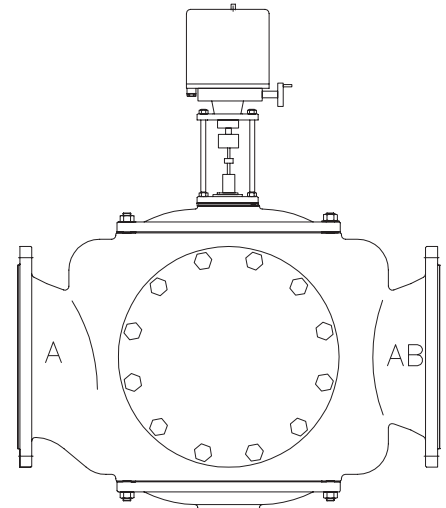
For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

Design

The valve components (seats and cone) are made of gun metal, the spindle of stainless steel. The valve body is made of cast iron and the valve flanges are drilled according to EN 1092-2.



Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

The valve cone is firmly connected with the motor spindle. The valve will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.

Technical Data

Materials

- Valve body Cast iron EN-GJS-400-15
- Trim Gun metal RG 5
CuSn5Zn5Pb5-C
- Valve spindle Stainless steel
(W.no. 1.4436)

Nominal pressure	200 M2FA: PN 10 (max. 120°C)
	250-300 M2FA: PN 6 (max. 120°C)

Seating double seated

Valve characteristic Almost linear

Leakage ≤ 0.5%

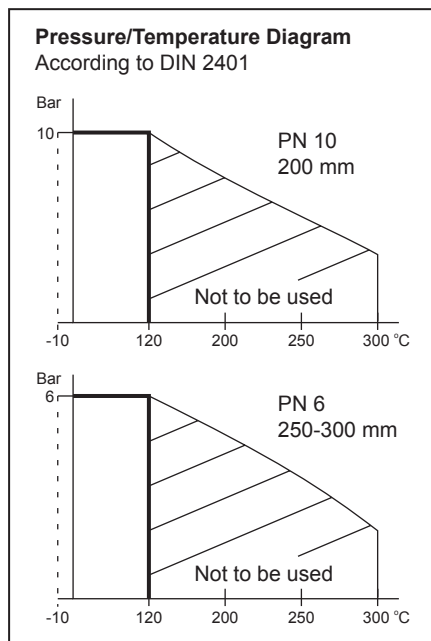
Temperature range See pressure/temperature diagram

Mounting See page 2

Flanges EN 1092-2 PN 10

Note ! Type 250 M2FA has outer measures and flanges drilled as type 300 M2FA

Counter flanges (suggested)	200 M2FA: DIN 2633 – PN 10/16
	250-300 M2FA: DIN 2632 – PN 10



Specifications					
Type	Flange connection mm	Opening DN in mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
200 M2FA	200	200	555	28	160
250 M2FA ¹⁾	300	300	865	28	306
300 M2FA	300	300	1250	45	290

¹⁾ Valve type 250 M2FA has outer measures and flanges drilled as type 300 M2FA.

Subject to change without notice.

Definition of kvs-value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

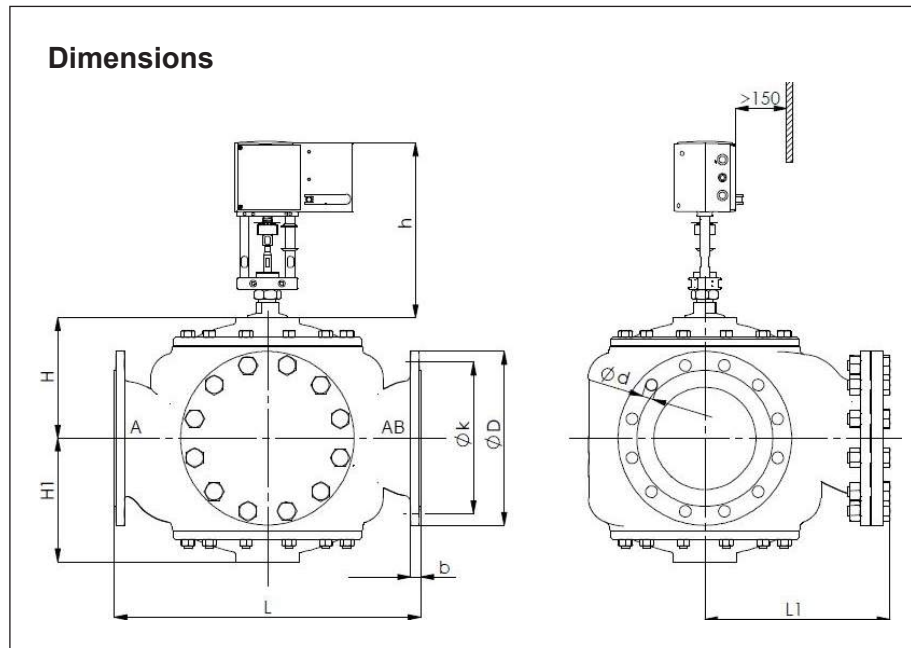
The valves must always be mounted with vertical spindle, preferable with the motor connection over the valve. Besides, the valve should be mounted so that the valve motor is exposed to a minimum of moisture and unnecessary vibrations.

Free height above/below the valve must be minimum 400 mm for mounting and operating of the AVM/AVF 234 motor, see drawing.

Strainer

It is recommended to use a strainer in front of the regulating valve if the liquid contains suspended particles.

Subject to change without notice.



Type	L mm	L1 mm	H mm	H1 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
200 M2FA	600	380	238	238	26	340	295	22 x (8)
250 M2FA ¹⁾	850	510	305	305	28	445	400	23 x (12)
300 M2FA	850	510	305	305	28	445	400	23 x (12)

¹⁾ Valve type 250 M2FA has outer measures and flanges drilled as type 300 M2FA.

2-way Control Valves type M2FR, Cast iron PN 16, DN 20 – 80 mm, 2 seats, Reverse acting

2.3.06-M

GB-1

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Reverse acting (normally closed)
- For cooling systems or similar
- Adjustable seats

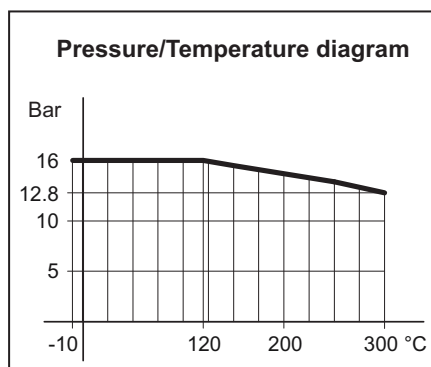
Applications

Valves type M2FR are mainly intended for control of cooling systems.

The valves are used in conjunction with temperature or pressure differential regulators for controlling industrial processes or cooling systems.

As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure, Δp_L , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force.

The table below shows the max. allowable values of Δp_L as well as the max. allowable inlet pressures for opening the valves, p_{1max} for various actuator forces.



Dimensioning

For sizing of control valves, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seats and cone - are made of stainless steel.

The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228.

The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

Function

Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens.

In connection with our thermostats, the valves act as "cooling" valves, i.e. they open at rising temperatures.

The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.



Technical Data

Materials:	
- Valve body	Cast iron EN-GJS-400-15
- Trim	Stainless steel
- Bolts, nuts	24 CrMo 4/A4
Nominal pressure	PN 16
Seating	Double seated
Flow characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Function	Opening with pressure on spindle
Leakage rate	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges drilled according to	EN 1092-2
Counter flanges	DIN 2633/BS 4504
Colour	Grey

Subject to changes without notice.

Specifications								
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Max. Δp_L bar	Actuat. force N	Corresp. p_{1max} bar	Weight kg
20 M2FR	20	20	5	6.5	8.3	200 400	9.4 16	5
25 M2FR	25	25	7.5	7	8	200 400	8.8 16	6.5
32 M2FR	32	32	12.5	8	7	400	16	9
40 M2FR	40	40	20	9	6.6	400	16	11
50 M2FR	50	50	30	10	5.8	400	15	16
65 M2FR	65	65	50	11	10	400 800	10 16	21
80 M2FR	80	80	80	13	6.7	400 800	10 16	38

2-way Control Valves type M2FR, Cast iron PN 16, DN 20 – 80 mm, 2 seats, Reverse acting

2.3.06-M

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

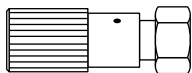
Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	Valve Motors

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

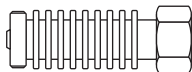
Accessories

Manual Adjusting Device



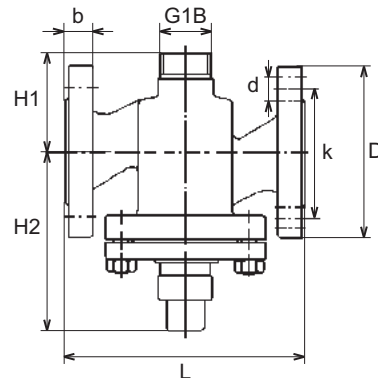
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the motor/thermostat. To be applied at valve temperatures between 170°C and 250°C.

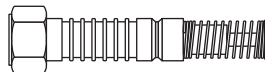
Dimension sketch



Dimensions

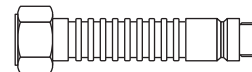
Type	L mm	H1 mm	H2 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
20 M2FR	150	63	112	105	16	75	14x(4)
25 M2FR	160	70	117	115	16	85	14x(4)
32 M2FR	180	75	151	140	18	100	19x(4)
40 M2FR	200	85	155	150	19	110	19x(4)
50 M2FR	230	95	169	165	19	125	19x(4)
65 M2FR	290	110	180	185	19	145	19x(4)
80 M2FR	310	120	180	200	19	160	19x(8)

Cooling Unit KS-5



Cooling units with built-in bellows glands, replacing stuffing box of thermostat (KS-5) or valve motor (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Subject to changes without notice.

2-way Control Valves type M2FR

Cast iron, PN 16, DN 100 – 150 mm, Reverse acting

2.3.07-I

GB-1

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double seated
- Reverse acting (normally closed)
- For cooling water and lubrications

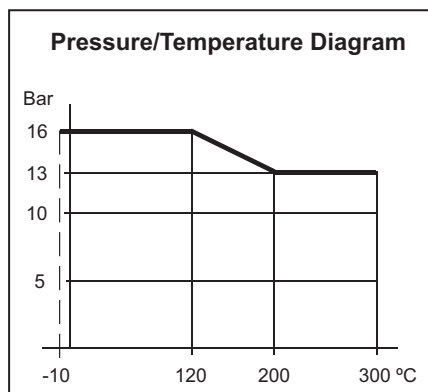
Applications

Valves type M2FR are mainly intended for control of cooling systems.

The valves are used in conjunction with temperature or pressure differential regulators.

As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure, Δp_L , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force.

Please find below the max. allowable values of Δp_L as well as the max. allowable inlet pressures for opening the valves, p_{1max} for various actuator forces.



Dimensioning

For sizing of control valves, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seats and cone - are made of stainless steel.

The valve body is made of cast iron EN-GJL-250 with flanges drilled according to EN 1092-2. The connection thread for the actuator is G1B ISO 228.

The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

Function

Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens.

In connection with our thermostats, the valves act as "cooling" valves, i.e. they open at rising temperatures.

The linear characteristic will not cease until the flow has dropped below 4% of the full flow.



Technical Data

Materials:

- Valve body	Cast iron EN-GJL-250
- Trim	Stainless steel
- Nuts, bolts	24 CrMo 4/A4
Nominal pressure	PN 16
Seating	Double seated
Flow characteristic	Almost quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Function	Opening with pressure on spindle
Leakage rate	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges	EN 1092-2 PN 16
Counter flanges	DIN 2633 / DS623
Colour	Grey

Specifications							
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Max. Δp_L bar	Actuat. force N	Weight kg
100 M2FR	100	100	125	20	12.1	800	39
125 M2FR	125	125	215	20	9	800	53
150 M2FR	150	150	310	20	7.5	800	73

Subject to changes without notice.

2-way Control Valves type M2FR

Cast iron, PN 16, DN 100 – 150 mm, Reverse acting

2.3.07-I

GB-2

Definition of k_{VS} -value

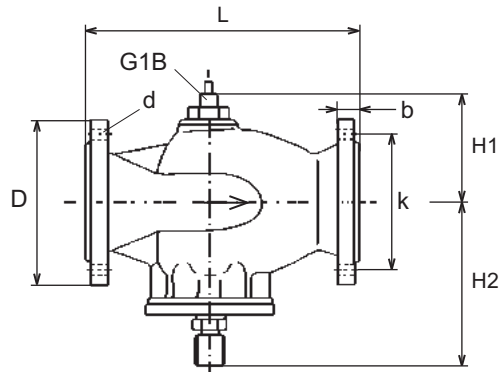
The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with electric actuator/ thermostat downwards, and according to the following instructions:

Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	El. actuators

Dimension sketch

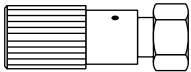


Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

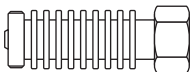
Accessories

Manual Adjusting Device



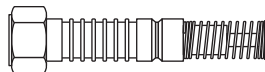
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the electric actuator / thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5



Cooling units with built-in bellows glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Cooling units with built-in bellows glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Dimensions							
Type	L mm	H1 mm	H2 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
100 M2FR	350	145	240	220	24	180	18x(8)
125 M2FR	400	160	260	250	26	210	18x(8)
150 M2FR	400	180	293	285	26	240	22x(8)

Subject to changes without notice.

3-way control valves type M3F

Cast iron, PN 16, DN 20 – 65 mm, Flanged ends

2.3.08-J

GB-1

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Same k_{vs} -value as mixing and diverting valve
- Quadratic/linear characteristic
- Ideal for controlling process and central heating plants.

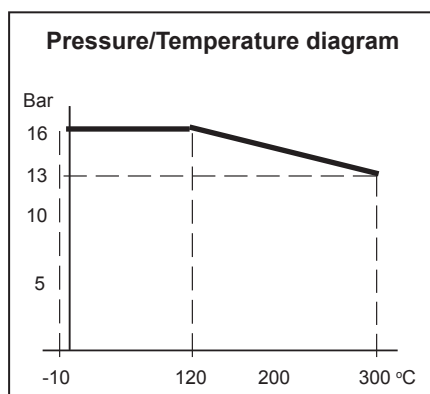
Applications

Control valves type M3F are designed for lubricants, hot water and other liquids and can be installed in pipe systems as mixing or diverting valves.

The valves are used in conjunction with our temperature regulators for controlling industrial processes, district or central heating plants or marine installations.

Dimensioning

For sizing of control valves and selection of actuators, please see "Quick Choice" leaflet No. 9.0.00.



Design

The valve components - seats and cone - are made of gun metal, the stem - of stainless steel.

The valve body is made of cast iron EN-GJL-250 with flanges drilled according to EN 1092-2 PN 16.

The thread for the actuator connection is G1B ISO 228.

The valves have two balanced single seats and are designed for tight closure. The leakage rate is less than 0.5 % of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without an actuator being installed, connection A-AB is fully open and connection B-AB completely closed by means of a spring.

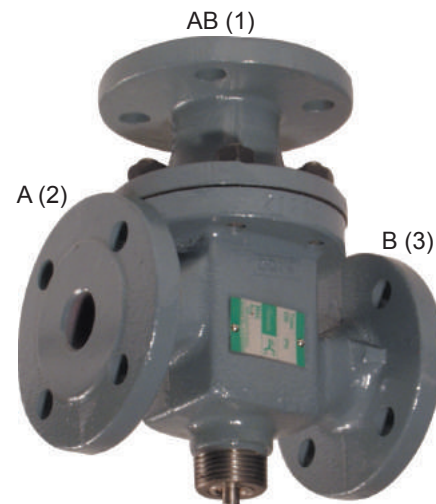
By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection B-AB is fully open and connection A-AB completely closed.

The valve characteristics are as follows:

Port A-AB and AB-A: quadratic

Port B-AB and AB-B: almost linear

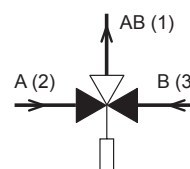
These characteristics ensure constant total flow under almost all pressure conditions and optimum circulation in the individual circuits.



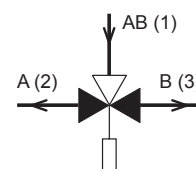
Port Numbering

Valves type M3F are marked with the internationally recognized port designations: A, B, AB.

Mixing valve



Diverting valve



Port AB common port always open
 Port A closes by activating the spindle
 Port B opens by activating the spindle

Technical data

Materials:

- Valve body: Cast iron EN-GJL-250
- seats and cone: Gun metal RG 5 DIN/EN 1982 CC491K
- spindle: Stainless steel (W. No. 1.4305)
- bolts, nuts: 24 CrMo 4/A4
- Nominal pressure: PN 16
- Seating: 2 balanced single seats
- Valve characteristic: Quadratic/linear
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Leakage: $\leq 0.5\%$ of k_{vs}
- Temperature range: See pressure/temperature diagram
- Mounting: See page 2
- Flanges - drilled according to: EN 1092-2 PN 16
- Counter flanges: DIN 2633
- Colour: Grey
- Subject to changes without notice.

Specification						
Type	Flange connection DN in mm	Opening mm	k_{vs} -value* m ³ /h	Lifting height mm	Weight kg	
20 M3F	20	20	6.3	7.5	6	
25 M3F	25	25	10	9	7	
32 M3F	32	32	16	10	10	
40 M3F	40	40	25	11	14	
50 M3F	50	50	38	11.5	18	
65 M3F	65	65	63	14.5	26	

* Same k_{vs} -values for mixing and diverting valves

3-way control valves type M3F

Cast iron, PN 16, DN 20 – 65 mm, Flanged ends

2.3.08-J

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

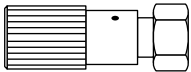
The valves can be installed with vertical as well as horizontal spindles.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Accessories

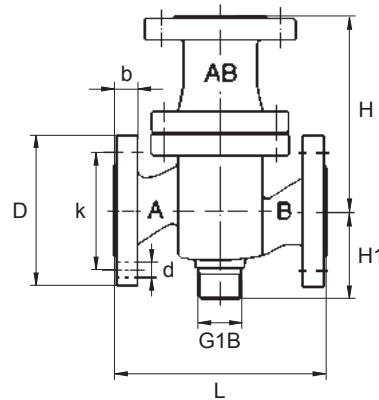
Manual adjusting device



The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Subject to changes without notice.

Dimension sketch



Dimensions

Type	L mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
20 M3F	150	115	63	105	16	75	14x(4)
25 M3F	160	130	70	115	16	85	14x(4)
32 M3F	180	150	75	140	18	100	18x(4)
40 M3F	200	160	85	150	18	110	18x(4)
50 M3F	230	190	95	165	20	125	18x(4)
65 M3F	290	220	110	185	20	145	18x(4)

3-way Control Valves type M3F

Cast iron, PN 10, DN 80 – 150 mm

2.3.09-J

GB-1

Characteristics

- Nominal pressure PN 10 (10 bar/max 120°C, option 9 bar/max 160°C)
- Characteristic - almost linear
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- For regulating of process- and central heating plants

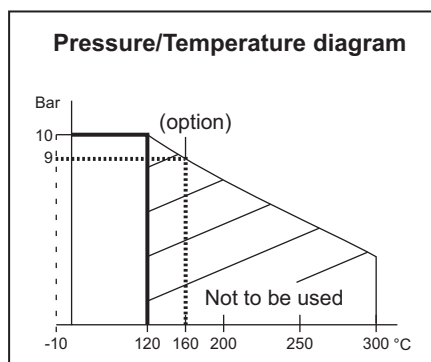
Applications

Control valves type M3F are designed for regulating of water, lubricating oil and other liquid media and can be mounted in the pipe system as either mixing or diverting valves. However when mounting as a diverting valve the pressure drop is increased, compared with mounting as a mixing valve. See "Important note" on page 2.

The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.



Design

The valve components - seats and cone are made of gun metal, the spindle is made of stainless steel.

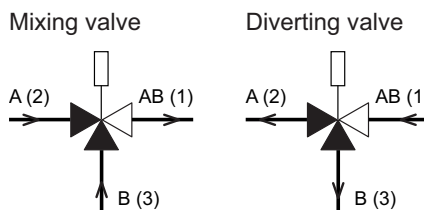
The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The connection thread for the actuator is G1B ISO 228. The valves have two balanced single seats and are designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

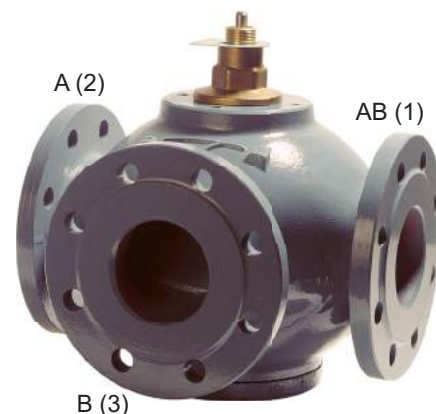
All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Port numbering

The ports of valves type M3F are marked with the letters AB, A and B.



Port AB(1) common port always open
 Port A(2) closes at load on spindle
 Port B(3) opens at load on spindle



Function

Without an actuator being installed, connection A-AB is fully open and connection B-AB completely closed, by means of a spring.

By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection B-AB is fully open and connection A-AB completely closed.

Technical data

Materials:	
- Valve body	Cast iron
- Seats and cone	EN-GJS-400-15 Gun metal RG 5
- Spindle	CuSn5Zn5Pb5-C stainless steel (W.no. 1.4436)
Nominal pressure	PN 10
Seating	Two balanced single seats
Valve characteristic	Almost linear
Temperature range	Max. 120°C/160°C
Mounting	See page 2
Flanges drilled according to	EN 1092-2 PN 10
Counter flanges	DIN 2632
Colour	Grey

Specification						
Type	Flange connection DN in mm	Opening mm	Mixing valve k_{vs} -value m ³ /h	Diverting valve k_{vs} -value m ³ /h	Lifting height mm	Weight kg
80 M3F	80	80	80	69	11	35
100 M3F	100	100	125	108	13	44
125 M3F	125	125	215	185	18	72
150 M3F	150	150	310	267	20	111

Subject to changes without notice.

3-way Control Valves type M3F

Cast iron, PN 10, DN 80 – 150 mm

2.3.09-J

GB-2

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{vs} -value will decrease by 14% as against mixing valves.

Mounting

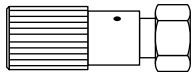
The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Accessories

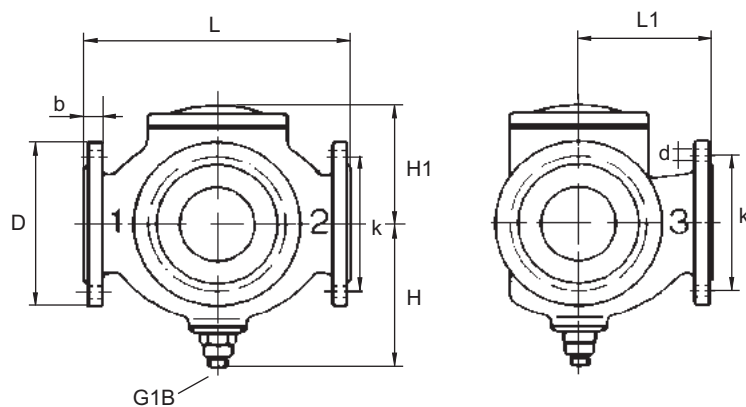
Manual adjusting device



The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Subject to changes without notice.

Dimension sketch



Type	L mm	L1 mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
80 M3F	310	155	180	127	200	20	160	18x(8)
100 M3F	350	175	195	141	220	22	180	18x(8)
125 M3F	400	240	245	171	250	24	210	18x(8)
150 M3F	480	270	280	189	285	24	240	22x(8)

Characteristics

- Nominal pressure
 - 80-150 mm: PN 10 max. 120°C
 - 200/175-200 mm: PN 16 max. 120°C
 - 300/250-300 mm: PN 10 max. 120°C
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Two single seats
- For cooling and heating purposes

Applications

Control valves type M3FA are designed for regulating of fresh water, lubricating oil and other liquid media.

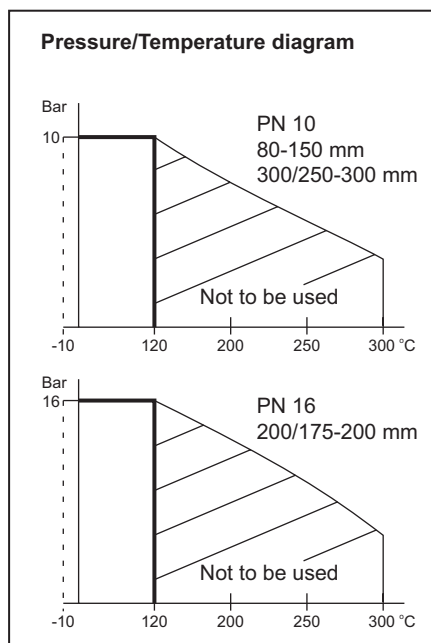
The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary engines. Is designed for use in conjunction with Clorius valve motor type AVM234 or AVF234.

Dimensioning

For sizing of control valves up to DN 150 please see "Quick Choice" leaflet no. 9.0.00. For sizing of control valves bigger than 150 mm following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$



Design

The valve components (seats and cone) are made of gun metal, the spindle of stainless steel. The valve body is made of cast iron and the valve flanges are drilled according to EN 1092-2.

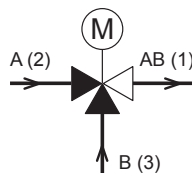
Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

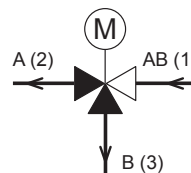
Port numbering

The ports of valves type M3FA are marked with the letters AB, B and A.

Mixing valve



Diverting valve

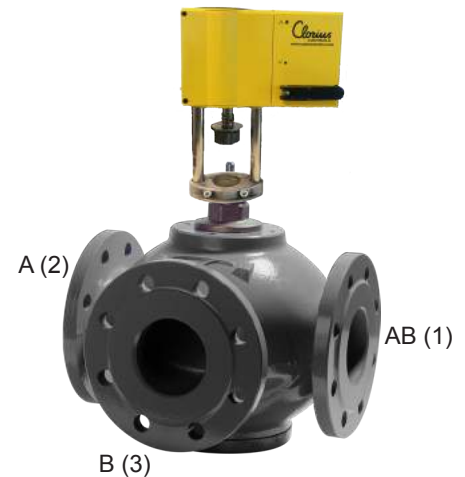


Port AB	common port always open
Port A	closes at load on spindle
Port B	opens at load on spindle

Function

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed.

In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.



Technical data

Materials

- Valve body: 80 – 300 M3FA Nodular cast iron EN-GJS-400-15
- Trim Gun metal RG 5, CuSn5Zn5Pb5-C
- Valve spindle Stainless steel (W.no. 1.4436)

Nominal pressure

- 80 – 300 M3FA : PN 10 (max. 120°C)
- 200/175 – 200 M3FA : PN 16 (max. 120°C)

Seats

2 balanced single seats

Valve characteristic

Almost linear

Leakage

0.5%

Temperature range

Max. 120°C

Mounting

See page 2

Flanges

EN 1092-2 PN 10/16

Note !

- Valve type 200/175 M3FA has outer measures and flanges drilled as valve type 200 M3FA.
- Valve type 300/250 M3FA has outer measures and flanges drilled as valve type 300 M3FA.

Counter flanges (suggested)

- 80 – 150 M3FA: DIN 2632 – PN 10
- 200/175 – 200 M3FA: DIN 2633 – PN 16
- 300/250 – 300 M3FA: DIN 2632 – PN 10

Subject to change without notice.

Specifications						
Type	Flange connection DN in mm	Opening mm	k_{vs} -value ¹⁾ m ³ /h	Lifting height mm	Weight kg	
80 M3FA	80	80	80	11	35	
100 M3FA	100	100	125	13	44	
125 M3FA	125	125	215	18	72	
150 M3FA	150	150	310	20	111	
200/175 M3FA	200	200	425	22	165	
200 M3FA	200	200	555	28	160	
300/250 M3FA	300	300	865	28	306	
300 M3FA	300	300	1250	45	290	

¹⁾ The stated k_{vs} values apply for mixing valves. Diverting valves: 0.86 x (k_{vs} -values for mixing valves).

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Important note:

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{VS} -value will decrease by 14% as against mixing valves.

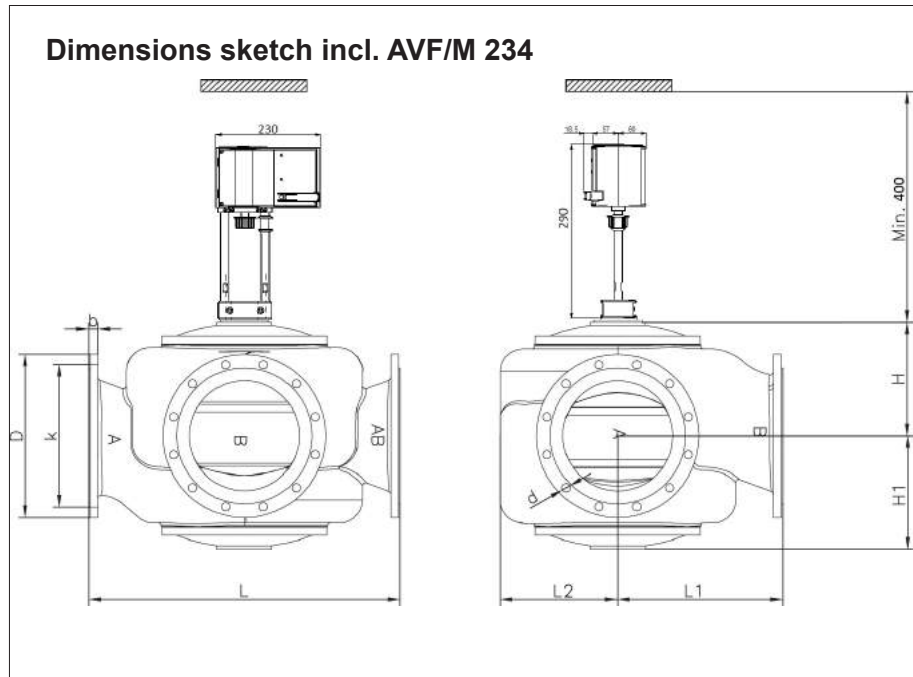
Mounting

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AFM/F 234 Marine motor. See drawing.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Subject to change without notice.



Type	L mm	L1 mm	H mm	H1 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
80 M3FA	310	155	117	127	20	200	160	18 x (8)
100 M3FA	350	175	132	141	22	220	180	18 x (8)
125 M3FA	400	240	181	171	24	250	210	18 x (8)
150 M3FA	480	270	216	189	24	285	240	23 x (8)
200/175 M3FA	600	325	238	238	20	340	295	23 x (12)
200 M3FA	600	325	238	238	20	340	295	23 x (12)
300/250 M3FA	850	450	305	305	25	445	400	23 x (12)
300 M3FA	850	450	305	305	25	445	400	23 x (12)

3-way Control Valves type M3F-I

Cast iron, PN 10, DN 150 mm

2.3.12-B

GB-1

Characteristics

- Nominal pressure PN 10 (10 bar/max 120°C)
- Characteristic - almost linear
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- For regulating of process- and central heating plants

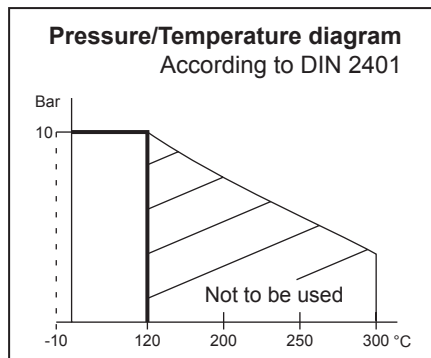
Applications

Control valves type M3F-I are designed for regulating of water, lubricating oil and other liquid media and can be mounted in the pipe system as either mixing or diverting valves. However when mounting as a diverting valve the pressure drop is increased, compared with mounting as a mixing valve. See "Important note" on page 2.

The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.



Design

The valve components - seats and cone are made of gun metal, the spindle is made of stainless steel.

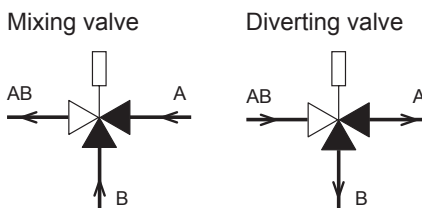
The valve body is made of cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The connection thread for the actuator is G1B ISO 228. The valves have two balanced single seats and are designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

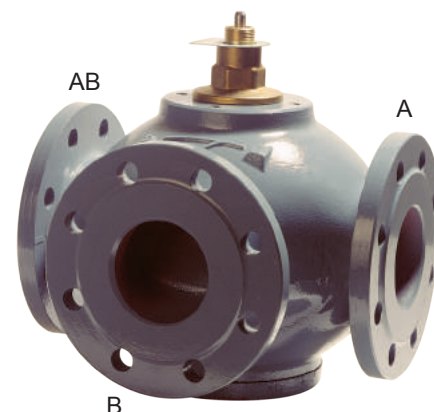
All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Port numbering

The ports of valves type M3F-I are marked with the letters AB, A and B.



Port AB common port always open
 Port A closes at load on spindle
 Port B opens at load on spindle



Function

Without an actuator being installed, connection B-AB is fully open and connection A-AB completely closed, by means of a spring.

By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection A-AB is fully open and connection B-AB completely closed.

Technical data

Materials:	
- Valve body	Cast iron
- Seats and cone	EN-GJS-400-15 Gun metal RG 5
- Spindle	CuSn5Zn5Pb5-C stainless steel (W.no. 1.4436)
Nominal pressure	PN 10
Seating	Two balanced single seats
Valve characteristic	Almost linear
Temperature range	Max. 120°C
Mounting	See page 2
Flanges drilled	
according to	EN 1092-2 PN 10
Counter flanges	DIN 2632
Colour	Grey

Specification						
Type	Flange connection DN in mm	Opening mm	Mixing valve k _{vs} -value m ³ /h	Diverting valve k _{vs} -value m ³ /h	Lifting height mm	Weight kg
150 M3F-I	150	150	310	267	20	111

Subject to changes without notice.

3-way Control Valves type M3F-I

Cast iron, PN 10, DN 150 mm

2.3.12-B

GB-2

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{vs} -value will decrease by 14% as against mixing valves.

Mounting

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations.

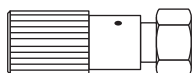
Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVF/M 234.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Accessories

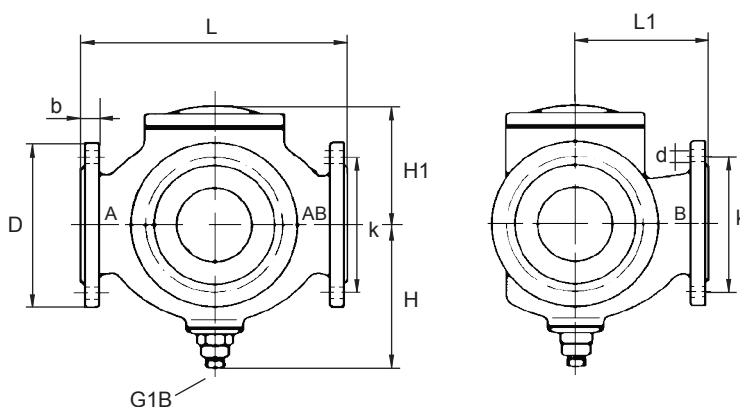
Manual adjusting device



The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Subject to changes without notice.

Dimension sketch



Type	L mm	L1 mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
150 M3F-I	480	270	280	189	285	24	240	22x(8)

3-way Control Valves type M3FA-I (Ports A-AB interchanged) 2.3.12.02-B

Cast iron, PN 16, DN 200/175-200 mm / PN 10, DN 300/250-300 mm

GB-1

Characteristics

- Nominal pressure
200/175-200 M3FA-I: PN 16 max. 120°C
300/250-300 M3FA-I: PN 10 max. 120°C
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Two single seats
- For cooling and heating purposes

Applications

Control valves type M3FA-I are designed for regulating of fresh water, lubricating oil and other liquid media.

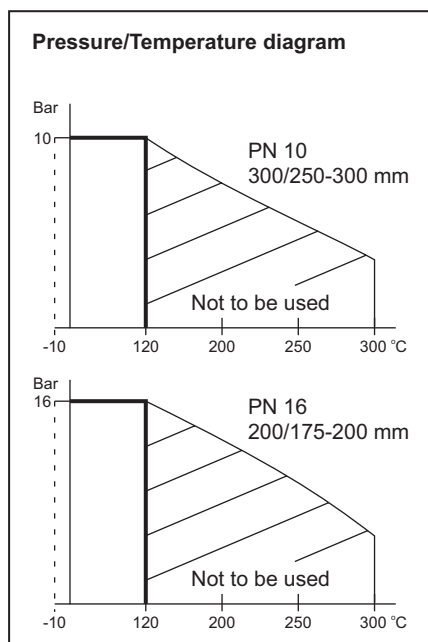
The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary engines.

Dimensioning

For sizing of control valves following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$



Design

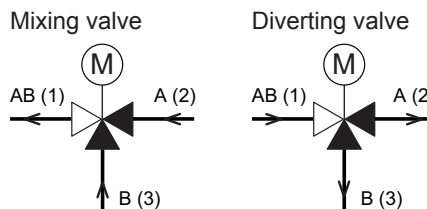
The valve components (seats and cone) are made of gun metal, the spindle of stainless steel. The valve body is made of cast iron and the valve flanges are drilled according to EN 1092-2.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Port numbering

The ports of valves type M3FA-I are marked with the letters AB, B and A.

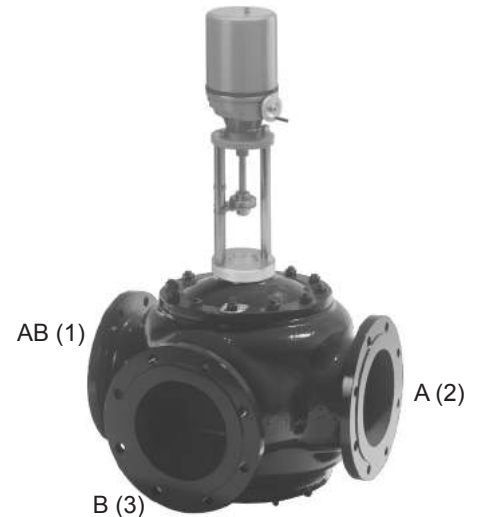


Port AB	common port always open
Port A	opens at load on spindle
Port B	closes at load on spindle

Function

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection B-AB is kept fully open and connection A-AB is fully closed.

In the other extreme position connection B-AB is fully closed and connection A-AB is fully open. In the intermediate positions the opening degrees change proportionally.



Technical data

Materials	
- Valve body	Nodular cast iron EN-GJS-400-15
- Trim	Gun metal RG 5 CuSn5Zn5Pb5-C
- Valve spindle	Stainless steel (W.no. 1.4436)

Nominal pressure	
300/250-300 M3FA-I:	PN 10 (max. 120°C)
200/175-200 M3FA-I:	PN 16 (max. 120°C)

Seats	2 balanced single seats
Valve characteristic	Almost linear
Leakage	0.5%
Temperature range	Max. 120°C
Mounting	See page 2
Flanges	EN 1092-2 PN 10/16

Note ! Valve type 200/175 M3FA-I has outer measures and flanges drilled as valve type 200 M3FA-I
Valve type 300/250 M3FA-I has outer measures and flanges drilled as valve type 300 M3FA-I

Counter flanges (suggested)	
200/175-200 M3FA-I:	DIN 2633 – PN 16
300/250-300 M3FA-I:	DIN 2632 – PN 10

Subject to change without notice.

Specifications						
Type	Flange connection DN in mm	Opening mm	k_{vs} -value ¹⁾ m ³ /h	Lifting height mm	Weight kg	
200/175 M3FA-I	200	200	425	22	165	
200 M3FA-I	200	200	555	28	160	
300/250 M3FA-I	300	300	865	28	306	
300 M3FA-I	300	300	1250	45	290	

¹⁾ The stated k_{vs} values apply for mixing valves. Diverting valves: $0.86 \times (k_{vs}$ -values for mixing valves).

3-way Control Valves type M3FA-I (Ports A-AB interchanged) 2.3.12.02-B

Cast iron, PN 16, DN 200/175-200 mm / PN 10, DN 300/250-300 mm

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Important note:

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{VS} -value will decrease by 14% as against mixing valves.

Mounting

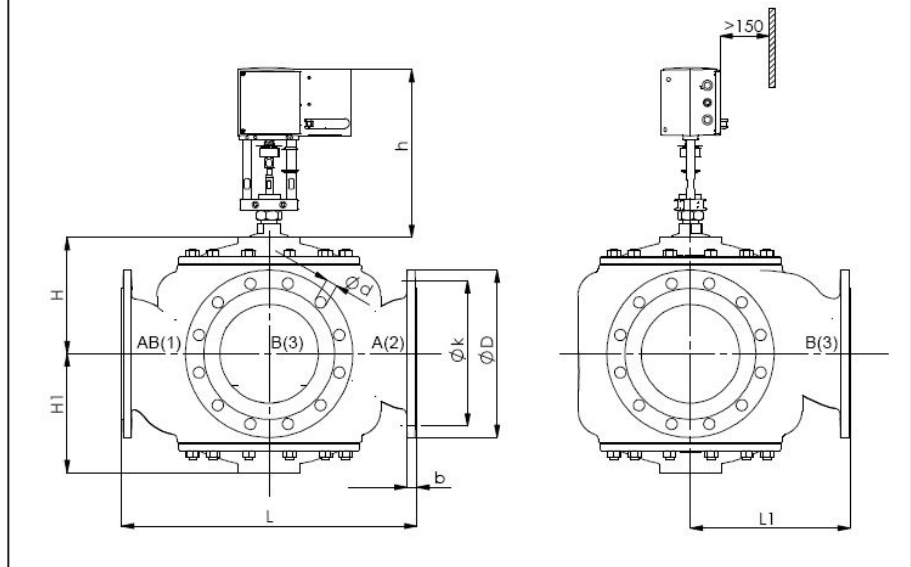
The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor. See drawing.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Subject to change without notice.

Dimensions



Type	L mm	L1 mm	H mm	H1 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
200/175 M3FA-I	600	325	238	238	20	340	295	23 x (12)
200 M3FA-I	600	325	238	238	20	340	295	23 x (12)
300/250 M3FA-I	850	450	305	305	25	445	400	23 x (12)
300 M3FA-I	850	450	305	305	25	445	400	23 x (12)

3-WAY THERMOSTATIC VALVE TYPE M3FSI

2.3.15-B

CAST IRON, DN 50 – 150 mm,

GB-1



CHARACTERISTICS

- Nominal pressure
DN 50-150 mm: PN 10,
- Temperature range 7 to 127 °C

APPLICATIONS

Thermostatic control valve type M3FSI is a three-way control valve unique due to its internal sensor technology. The thermostatic valve is ideal for controlling fluid temperature, in cooling and heat recovery systems, and other temperature controlling applications such as: compressors, industrial engines, marine, power generation, renewable energy among others.

TYPICAL APPLICATIONS - MARINE/OFFSHORE/POWER GENERATION

Engines - lube oil, high and low temperature water, fresh water.

Compressors and Gearboxes - lube oil

Heat Recovery and Fresh Water Generators - water circuits

DIMENSIONING

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{Q \text{ (m}^3 \text{/h)}}{\sqrt{\Delta p \text{ (bar)}}}$$
$$\Delta p \text{ (bar)} = \left(\frac{Q \text{ (m}^3 \text{/h)}}{k_{vs}} \right)^2$$

DEFINITION OF K_{VS}-VALUE

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

DESIGN

The valve body is made of cast iron, Class 30, ASTM A126-04 (EN-GJL-200).

The valve flanges are drilled according to, EN1092-2 (ANSI flanges available on request).

QUALITY ASSURANCE

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

SPECIFICATIONS

Type	Flange connection DN in mm	kvs-value m^3/h	Weight kg
50 M3FSI	50	53	11
65 M3FSI	65	82	22
80 M3FSI	80	86	26
100 M3FSI	100	173	44
125 M3FSI	125	285	55
150 M3FSI	150	389	74

Subject to changes without notice.

CAST IRON, DN 50 – 150 mm,

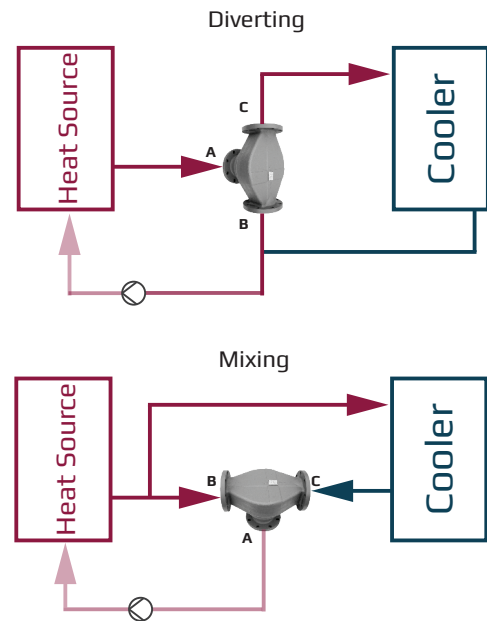
FUNCTION

The thermostatic valve uses the principle of expanding wax, which undergoes large expansion rates within a relatively narrow temperature range. The self-acting element activates a cone, which directs the flow. All Clorius thermostatic valves are factory set at predetermined temperatures: no further adjustments are necessary. A wide range of temperatures are available for water and oil temperature control applications.

When using in a diverting application, on start-up the total fluid flow is routed back to the main system. As fluid temperature rises to the control range, some fluid is diverted to the cooling system. As fluid temperature continues to increase, more flow is diverted. When the thermostat is in a fully stroked condition, all fluid flow is directed to the cooling system. Clorius thermostatic valves may also be used in mixing application.

In a mixing application, port B is the hot by-pass fluid inlet and port C the cold fluid inlet from the cooler. The flows mix and the thermostat adjusts to reach the setpoint temperature of the mixed output flow through port A (common port).

PORT NUMBERING



TECHNICAL DATA

Materials:

- Valve body	Cast iron ASTM A126-04 (EN-GJL-200)
Temperature range	7 to 127 °C
Flanges	EN1092-2 (ANSI flanges available on request)

Recommended pressure drop 0,15 - 0,5 bar

Max. static pressure	
DN 50-150	10 bar
Optional	Manual override Nickel plated thermostatic elements Wheep holes

MOUNTING

The valve can be installed in all positions.
No additional space required.

STRAINER

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Subject to changes without notice.

3-WAY THERMOSTATIC VALVE TYPE M3FSI

2.3.15-B

CAST IRON, DN 50 – 150 mm,

GB-3

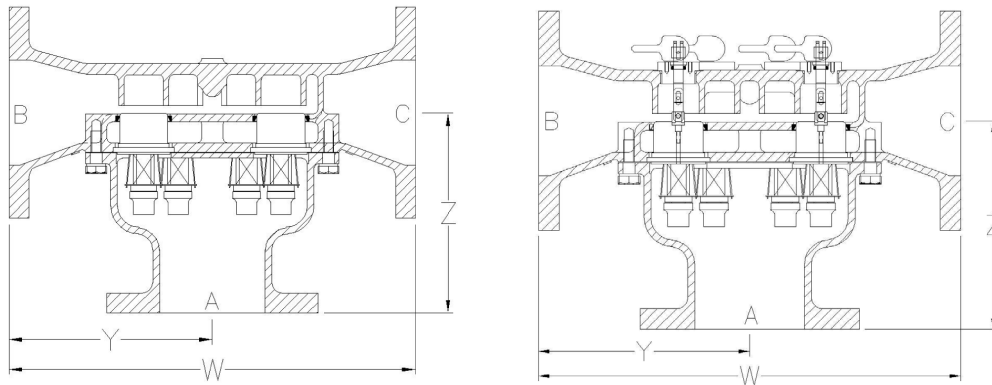
SET POINT TEMPERATURES

DIMENSIONS							
Type	Dimensions			Max. Width in mm	Flange drilling EN 1092-2 in mm		
	Y mm	W mm	Z mm		Outer diameter	Bolt circle	Dia. of holes x no. of holes
50 M3FSI	114	228	153	159	∅159	∅125	∅19 x 4
65 M3FSI	129	259	170	206	∅185	∅145	∅19 x 4
80 M3FSI	136	273	175	203	∅200	∅160	∅19 x 8
100 M3FSI	201	402	217	279	∅220	∅180	∅19 x 8
125 M3FSI	247	494	243	356	∅250	∅210	∅19 x 8
150 M3FSI	245	490	256	406	∅285	∅240	∅23 x 8

Subject to change without notice

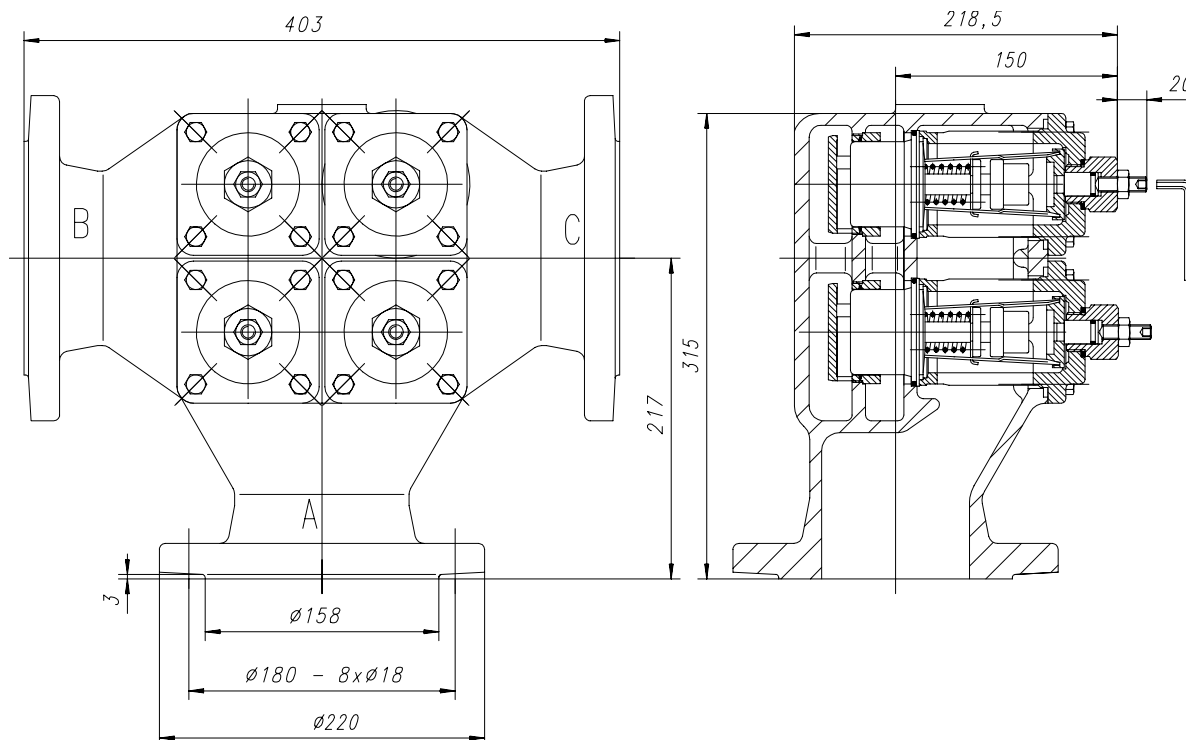
Set Point temperature, deg. C.
7
13
18
24
32
35
38
41
43
46
49
54
57
60
66
68
71
74
77
79
82
85
88
91
96
99
104
110
116
121
127

DIMENSION SKETCH





Clorius Controls Three-Way Temperature Regulator with manual override Type Series 226.0121, Nominal Size DN 100



Technical Data

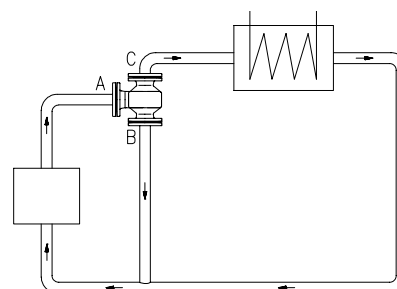
Material	
- Body	EN GJL-250
- Inner Parts	SS/Ms
Thermostat	237.0120-xxx
Sealing Kit	NBR
Operation Temperature	up to 120 °C
Operation Pressure	up to 16 bar
adm. Differential Pressure	up to 16 bar
Nominal Pressure	PN 16

Manual override for the mechanical opening of the cooling path in case of any failure of the thermostat.
This emergency manual adjustment is not to be used for adjustment during automatic operation.

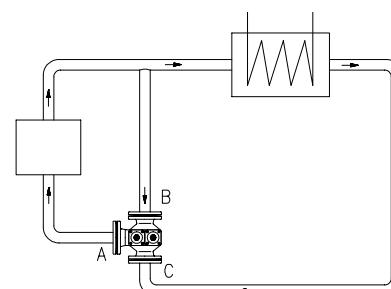
Deliverable temperature ranges part-no. 237.0120-xxx			
05 - 15 °C	37 - 47 °C	66 - 74 °C	82 - 93 °C
14 - 26 °C	39 - 50 °C	68 - 78 °C	85 - 96 °C
20 - 30 °C	43 - 54 °C	71 - 79 °C	88 - 99 °C
27 - 37 °C	51 - 60 °C	74 - 82 °C	93 - 103 °C
32 - 41 °C	57 - 66 °C	77 - 85 °C	102 - 113 °C
35 - 43 °C	62 - 71 °C	79 - 88 °C	

Installation:

The installation can be done selectively as follows:
as divider
path A: from motor
path B: to bypass
path C: to cooler
as mixing valve
path C: from bypass
path B: from bypass
path A: to motor
 The paths have been marked on the connections.
 The temperature regulator may be installed in all.



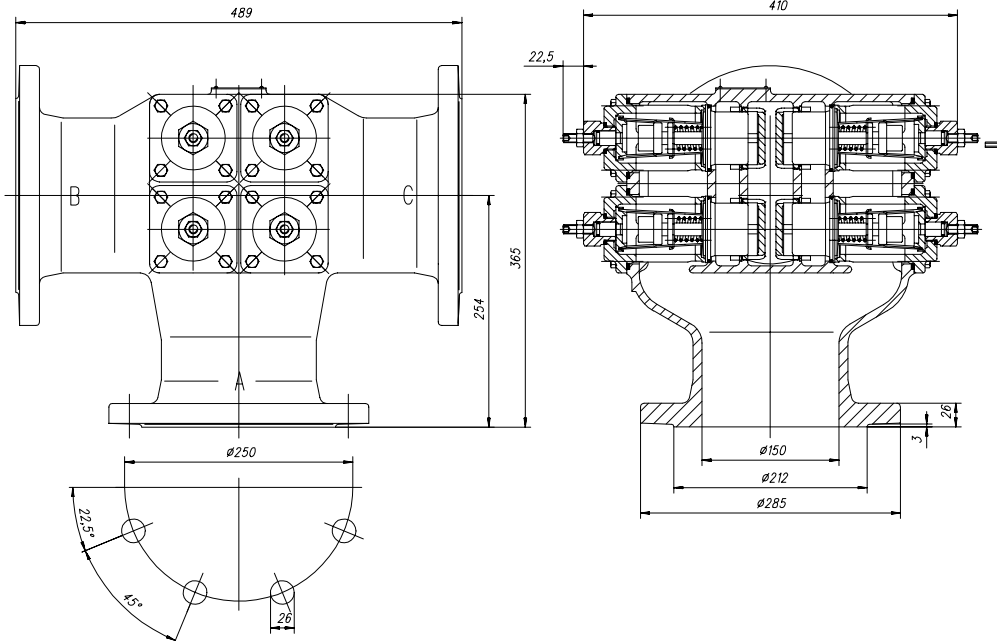
use as divider



use as mixing valve



Clorius Controls Three-Way Temperature Regulator with manual override Type Series 226.0121, Nominal Size DN 150



Technical Data

Material

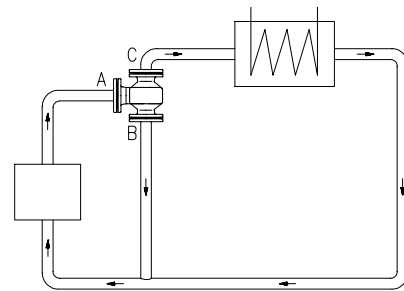
- Body EN GJL-250
- Inner Parts SS/Ms
- Thermostat 237.0120-xxx
- Sealing Kit NBR
- Operation Temperature up to 120 °C
- Operation Pressure up to 16 bar
- adm. Differential Pressure up to 16 bar
- Nominal Pressure PN 16
- Connection flange EN 1092-2 form B

Manual override for the mechanical opening of the cooling path in case of any failure of the thermostat.
This emergency manual adjustment is not to be used for adjustment during automatic operation.

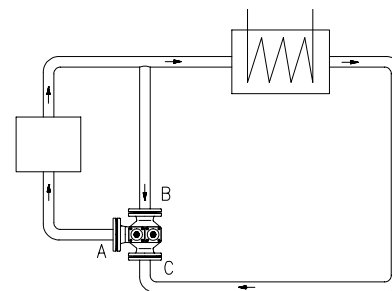
Deliverable temperature ranges part-no. 237.0120-xxx			
05 - 15 °C	37 - 47 °C	66 - 74 °C	82 - 93 °C
14 - 26 °C	39 - 50 °C	68 - 78 °C	85 - 96 °C
20 - 30 °C	43 - 54 °C	71 - 79 °C	88 - 99 °C
27 - 37 °C	51 - 60 °C	74 - 82 °C	93 - 103 °C
32 - 41 °C	57 - 66 °C	77 - 85 °C	102 - 113 °C
35 - 43 °C	62 - 71 °C	79 - 88 °C	

Installation:

The installation can be done selectively as follows:
as divider
path A: from motor
path B: to bypass
path C: to cooler
as mixing valve
path C: from bypass
path B: from bypass
path A: to motor
 The paths have been marked on the connections.
 The temperature regulator may be installed in all.



use as divider



use as mixing valve

2-way Control Valves type H1F, Cast steel PN 40, DN 15/4 – 50 mm

2.4.02-K

GB-1

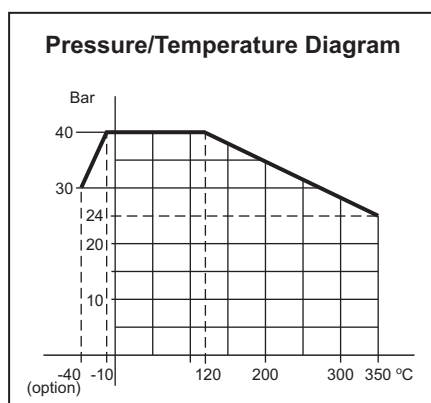
Characteristics

- Nominal pressure PN 40
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Single-seated, tight closing
- Quadratic characteristic

Applications

Control valves type H1F are designed for regulating hot water, steam and hot oil systems.

The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.



Dimensioning

For sizing of control valves and selection of actuators, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seat and cone - are made of stainless steel.

The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1 or ANSI B16.5 Class 150. The thread for the actuator connection is G1B ISO 228.

The valves are single-seated and designed for tight closure. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.



Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

Technical Data

Materials:	
Valve body	Cast steel GP240GH (GS-C25)
- trim	Stainless steel
- bolts, nuts	24 CrMo 4/A4
Nominal pressure	PN 40
Seating	Single seated
Flow characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Seat leakage	$\leq 0.05\%$ of k_{vs}
Temperature range	See diagram
Mounting	See page 2
Flanges drilled according to	EN 1092-1 PN 40 or ANSI B16.5 Class 150
Counter flanges	DIN 2635
Colour	Green

Subject to changes without notice.

Specifications					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
15 / 4 H1F	15	4	0.20	6	3.3
15 / 6 H1F	15	6	0.45	6	3.3
15 / 9 H1F	15	9	0.95	6	3.4
15 / 12 H1F	15	12	1.7	6	3.4
15 H1F	15	15	2.75	6	3.4
20 / 4 H1F	20	4	0.2	6.5	4.7
20 / 6 H1F	20	6	0.45	6.5	4.7
20 / 9 H1F	20	9	0.95	6.5	4.7
20 H1F	20	20	5	6.5	4.9
25 H1F	25	25	7.5	7	6.1
32 H1F	32	32	12.5	8	9.0
40 H1F	40	40	20	9	10.8
50 H1F	50	50	30	10	15.5

2-way Control Valves type H1F, Cast steel

PN 40, DN 15/4 – 50 mm

2.4.02-K

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

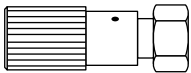
Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 350°C	KS-5	Thermostats
250°C - 350°C	KS-6	El. actuators

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

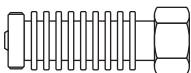
Accessories

Manual Adjusting Device



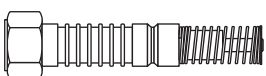
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5

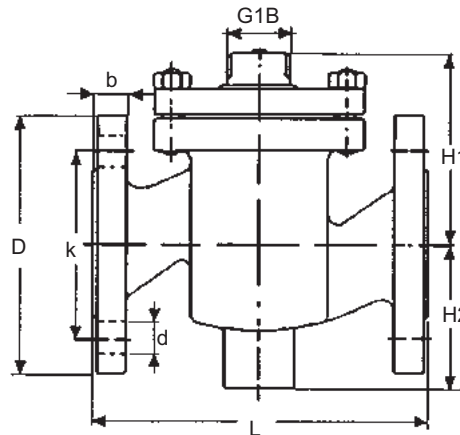


Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Dimension sketch



Dimensions

Type	L mm	H1 mm	H2 mm	b mm	EN 1092-1			ANSI B16.5 Class 150		
					D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)
15 / 4 H1F	130	80	60	16	95	65	14x(4)	89	61	16x(4)
15 / 6 H1F	130	80	60	16	95	65	14x(4)	89	61	16x(4)
15 / 9 H1F	130	80	60	16	95	65	14x(4)	89	61	16x(4)
15 / 12 H1F	130	80	60	16	95	65	14x(4)	89	61	16x(4)
15 H1F	130	80	60	16	95	65	14x(4)	89	61	16x(4)
20 / 4 H1F	150	85	65	18	105	75	14x(4)	98	70	16x(4)
20 / 6 H1F	150	85	65	18	105	75	14x(4)	98	70	16x(4)
20 / 9 H1F	150	85	65	18	105	75	14x(4)	98	70	16x(4)
20 H1F	150	85	65	18	105	75	14x(4)	98	70	16x(4)
25 H1F	160	95	70	18	115	85	14x(4)	108	79	16x(4)
32 H1F	180	105	75	18	140	100	18x(4)	118	89	16x(4)
40 H1F	200	110	85	18	150	110	18x(4)	127	98	16x(4)
50 H1F	230	125	95	20	165	125	18x(4)	153	121	19x(4)

Balanced 2-way Control Valves type H1FB

Cast steel, PN 40, DN 25 – 80 mm

2.4.03-

GB-1

Characteristics

- Pressure balanced
- Single seated, tight closing
- Quadratic valve characteristic
- Regulating capability better than 25:1

Applications

The pressure balanced control valves type H1FB are designed for regulating hot water, steam, hot oil etc. and can be used if a single-seated valve is required, but where the system pressure and valve size, out of regard for the pressure force of the actuator, necessitate a pressure balanced valve.

The valves are installed combined with one of our temperature regulators in control systems in domestic premises, district heating systems, industrial processes or marine installations.

Dimensioning

For sizing of control valves and selection of actuators, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seat, cone and bellows - are made of stainless steel.

The bellows for balancing the pressure is fitted on the valve spindle and it reduces

the power necessary for closing the valve, as the upstream pressure of the medium through the hollow valve spindle acts outside and the pressure after the valve acts inside the bellows system.

The valve body is made of cast steel GP240GH (GS-C25) with connection flanges drilled according to EN 1092-1. The connection thread for the actuator is G1B ISO 228.

The valves are single seated and tight closing. The leakage is less than 0.05% of full flow (see VDI/VDE 2174).

Function

Without an actuator being connected, the valve is held in open position by means of a spring and the bellows system. With pressure on the spindle the valve will close.

In connection with our thermostats, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

Quality assurance

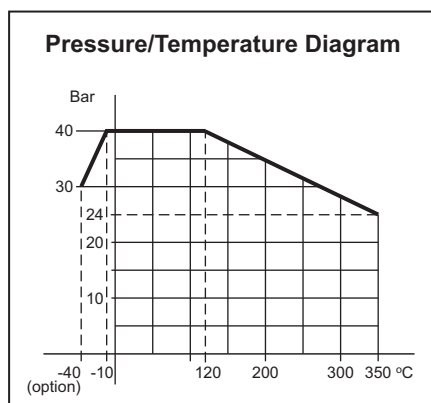
All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.



Technical Data

Materials:	
- Valve body	Cast steel GP240GH (GS-C25)
- Components	Stainless steel
- Bolts, nuts	24 CrMo 4/A4
Nominal pressure	PN 40
Seating	Single seated
Valve characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Leakage	$\leq 0.05\%$ of k_{vs}
Temperature range	See pressure/ temperature diagram
Mounting	See page 2
Flanges	EN 1092-1 PN 40
Colour	Green



Specifications					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
25 H1FB	25	25	7.5	7	6
32 H1FB	32	32	12.5	8	9
40 H1FB	40	40	20	9	13
50 H1FB	50	50	30	10	16
65 H1FB	65	65	50	13	23
80 H1FB	80	80	80	16	38

Subject to changes without notice.

Balanced 2-way Control Valves type H1FB

Cast steel, PN 40, DN 25 – 80 mm

2.4.03-I

GB-2

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

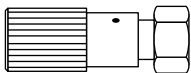
Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 350°C	KS-5	Thermostats
250°C - 350°C	KS-6	El. actuators

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

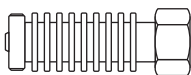
Accessories

Manual Adjusting Device

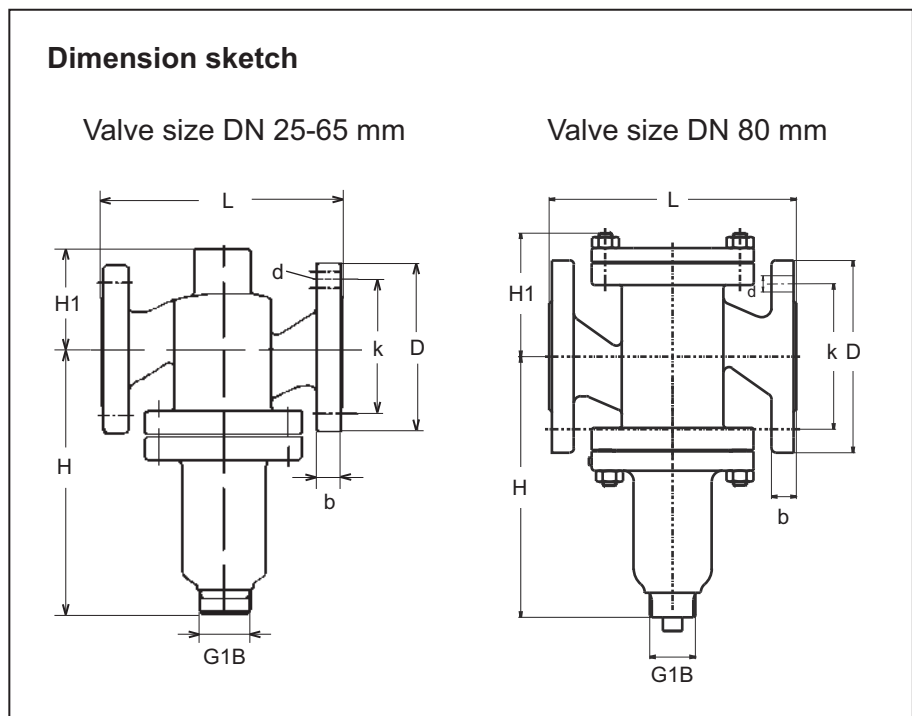


The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling Unit KS-4

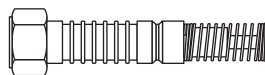


Cooling Unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between 170°C and 250°C.



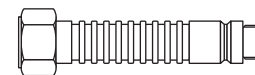
Dimensions							
Type	L mm	H mm	H1 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
25 H1FB	160	180	70	18	115	85	14x(4)
32 H1FB	180	195	75	18	140	100	18x(4)
40 H1FB	200	205	85	18	150	110	18x(4)
50 H1FB	230	225	95	20	165	125	18x(4)
65 H1FB	290	260	110	22	185	145	18x(8)
80 H1FB	310	275	115	24	200	160	18x(8)

Cooling Unit KS-5



Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Subject to changes without notice.

Balanced 2-way Control Valves type H1FBN

Cast steel, PN 40, DN 15 – 80 mm

2.4.03.01-E

GB-1

Characteristics

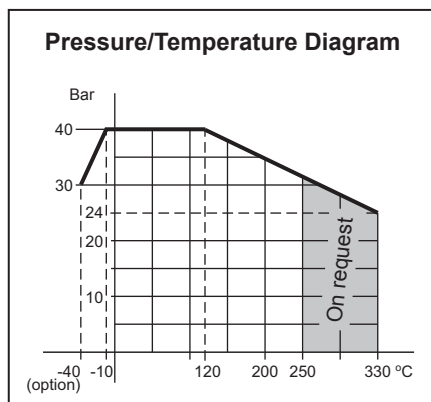
- Nominal pressure PN 40
- Pressure balanced valve
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Single-seated, balanced
- Quadratic characteristic

Applications

Balanced control valves type H1FBN are designed for regulating hot water, steam and hot oil systems.

Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable.

The valves are used in conjunction with our temperature- or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.



Design

The valve components - spindle, seat, cone - are made of stainless steel.

The valve body is made of cast steel GP240GH (GS-C25). The thread for the actuator connection is G1B ISO 228.

The valves are single-seated and designed for tight closure. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without an actuator being connected, the valve is held in open position by means of a spring. With force on the spindle the valve will close.

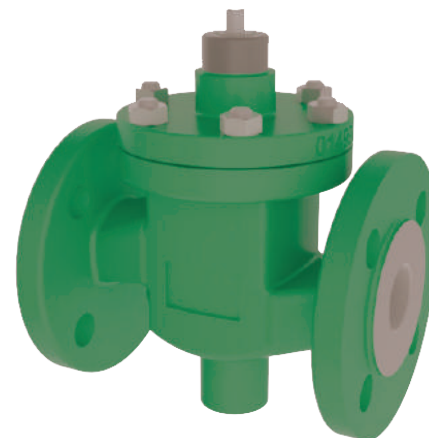
In connection with our thermostats or electric actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting double-seated valve can be used.

The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

Technical data

Materials:

- Valve body Cast steel GP240GH (GS-C25)
- Components Stainless steel
- Nuts, bolts 24 CrMo 5/A4



Nominal pressure	PN 40
Seating	Single-seated
Valve characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Leakage	$\leq 0.05\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Flanges drilled according to	EN 1092-1 PN 40
Colour	Green

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with electric actuator/ thermostat downwards, and according to the following instructions:

Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	El. actuators

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Subject to changes without notice.

Specifications					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m^3/h	Lifting height mm	Weight kg
15 H1FBN	15	15	4	7.5	4
20 H1FBN	20	20	6.3	7.5	5
25 H1FBN	25	25	10	9	6
32 H1FBN	32	32	16	10	9
40 H1FBN	40	40	25	11	13
50 H1FBN	50	50	35	11.5	16
65 H1FBN	65	65	58	14.5	23
80 H1FBN	80	80	80	16	38



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Balanced 2-way Control Valves type H1FBN

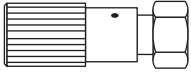
Cast steel, PN 40, DN 15 – 80 mm

2.4.03.01-E

GB-2

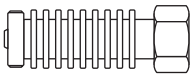
Accessories

Manual adjusting device



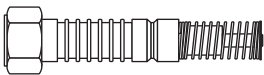
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling unit KS-4

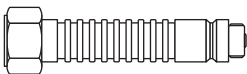


Cooling unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5

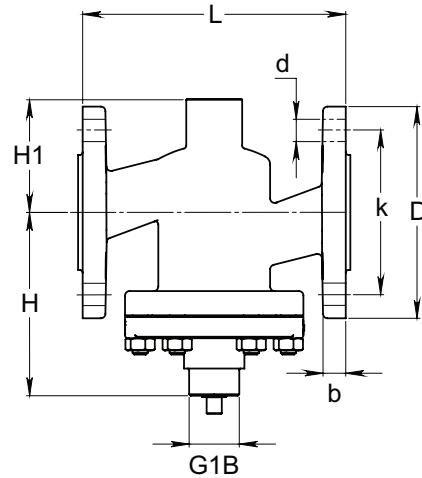


Cooling Unit KS-6



Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Dimension sketch



Dimensions

Type	L mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
15 H1FBN	130	101	80	95	14	65	14x(4)
20 H1FBN	150	107	85	105	16	75	14x(4)
25 H1FBN	160	112	70	115	16	85	14x(4)
32 H1FBN	180	122	75	140	18	100	18x(4)
40 H1FBN	200	125	85	150	19	110	18x(4)
50 H1FBN	230	140	95	165	19	125	18x(4)
65 H1FBN	290	154	110	185	19	145	18x(8)
80 H1FBN	310	164	115	200	19	160	19x(8)

Dimensioning

Type	Water / Steam	Thermostats			Valve actuators		Pressure differential controllers	
		V2	V4	V8	V / AV	VB / VBA	TD66-4	TD66-8
15 H1FBN	Water: Δp_1 & max. p_1 bar	16	16	16	16	16	16	16
	Steam: Δp_1 & max. p_1 bar							
20 H1FBN	Water: Δp_1 & max. p_1 bar							
	Steam: Δp_1 & max. p_1 bar							
25 H1FBN	Water: Δp_1 & max. p_1 bar							
	Steam: Δp_1 & max. p_1 bar							
32 H1FBN	Water: Δp_1 & max. p_1 bar							
	Steam: Δp_1 & max. p_1 bar							
40 H1FBN	Water: Δp_1 & max. p_1 bar	-	10	16	16	16	10	16
	Steam: Δp_1 & max. p_1 bar	-	9				9	
50 H1FBN	Water: Δp_1 & max. p_1 bar	-	9	16	16	16	9	16
	Steam: Δp_1 & max. p_1 bar	-	8				8	
65 H1FBN	Water: Δp_1 & max. p_1 bar	-	7	16	16	16	8	16
	Steam: Δp_1 & max. p_1 bar	-	6				-	
80 H1FBN	Water: Δp_1 & max. p_1 bar	-	5	16	16	16	5	16
	Steam: Δp_1 & max. p_1 bar	-	4				-	

p_1 = absolute pressure

Subject to changes without notice.



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2-way Control Valves type H2F

Cast Steel, PN 40, DN 20 – 80 mm

2.4.05-K

GB-1

Characteristics

- Nominal pressure PN 40
- Regulating capability $\frac{K_{vs}}{K_{vr}} > 25$
- Double-seated
- Adjustable seat interspace
- Quadratic characteristic

Applications

Control valves type H2F are designed for regulating hot water, steam and hot oil systems.

The double-seated valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a single-seated valve.

The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seats and cone - are made of stainless steel.

The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1. The connection thread for the actuator is G1B ISO 228.

The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

In connection with thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.



Technical Data

Materials:

- Valve body Cast steel GP240GH (GS-C25)
- Spring 1.4568
- Cone 1.4408, 1.4305
- Upperseat AISI 303
- Lowerseat 1.4301, 1.4305, 1.4307

- Components Stainless steel
- Bolts, nuts 24 CrMo 4/A4
- Nominal pressure PN 40
- Seating Double-seated
- Valve characteristic Quadratic

Regulating capability $\frac{K_{vs}}{K_{vr}} > 25$

Function Closing with pressure on spindle

Leakage rate $\leq 0.5\%$ of k_{vs}

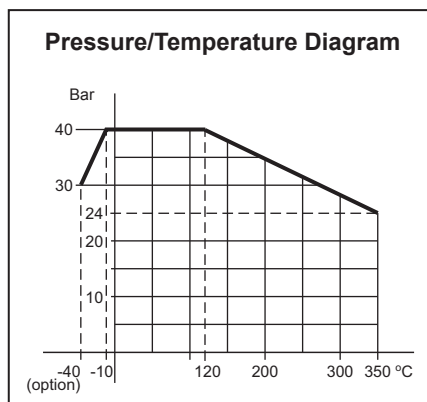
Temperature range See pressure/temperature diagram

Mounting See page 2

Flanges drilled according to EN 1092-1 PN 40

Counter flanges DIN 2635

Colour Green



Specifications					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m^3/h	Lifting height mm	Weight kg
20 H2F	20	20	5	6.5	5
25 H2F	25	25	7.5	7	6.5
32 H2F	32	32	12.5	8	9
40 H2F	40	40	20	9	11
50 H2F	50	50	30	10	16
65 H2F	65	65	50	11	21
80 H2F	80	80	80	13	38

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2-way Control Valves type H2F

Cast Steel, PN 40, DN 20 – 80 mm

2.4.05-K

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

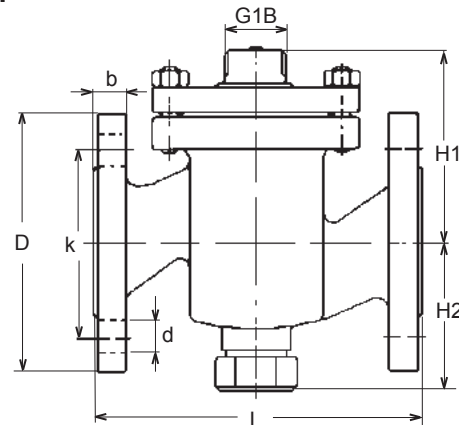
Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 350°C	KS-5	Thermostats
250°C - 350°C	KS-6	El. actuators

Strainer

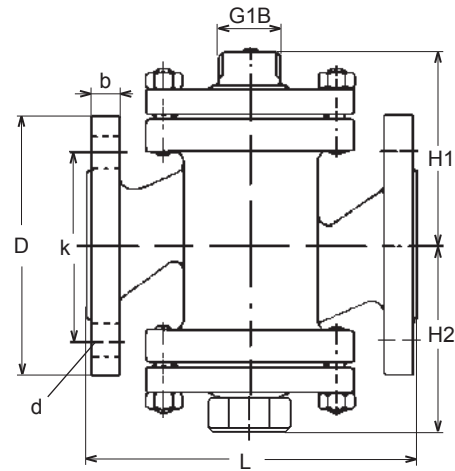
It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Dimension sketch

DN 20-65

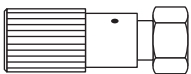


DN 80



Accessories

Manual Adjusting Device

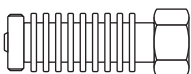


The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Dimensions

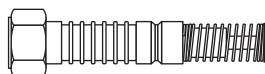
Type	L mm	H1 mm	H2 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
20 H2F	150	85	70	18	105	75	14x(4)
25 H2F	160	95	77	18	115	85	14x(4)
32 H2F	180	105	82	18	140	100	18x(4)
40 H2F	200	110	92	18	150	110	18x(4)
50 H2F	230	125	102	20	165	125	18x(4)
65 H2F	290	135	120	22	185	145	18x(8)
80 H2F	310	145	165	24	200	160	18x(8)

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5



Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Subject to changes without notice.

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Characteristics

- Nominal pressure PN 25
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double seated
- Characteristic - almost linear

Applications

Control valves type H2F are designed for use in regulating high pressure hot water, steam and heat transfer oil, ammonia, freon, etc.

The double-seated valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a single-seated valve.

The valves are used in conjunction with temperature or pressure differential regulators for controlling district or central heating plants, industrial processes or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" datasheet no. 9.0.00.

Design

The valve components – spindle, seats and cone – are made of stainless steel. The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1. The connection thread for the actuator is G1B ISO 228. The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.



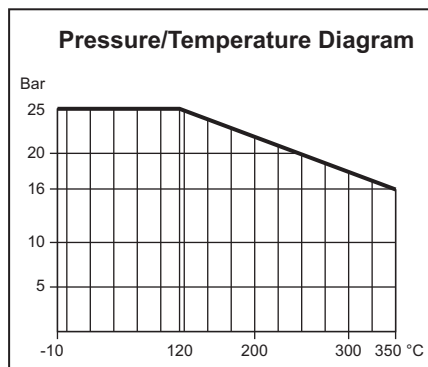
Technical Data

Materials

- Valve body	Cast steel GP240GH (GS-C25)
- Components	Stainless steel
-Bolts, nuts	24 CrMo 4/A4
Nominal pressure	PN 25
Seating	Double seated
Valve characteristic	Almost quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Function	Closing with pressure on spindle
Leakage rate	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/ temperature diagram
Mounting	See page 2
Flanges drilled according to	EN 1092-1 PN 25
Counter flanges	DIN 2635
Colour	Green

Note: All Clorius valves are approved in accordance to the Pressure Equipment Directive (PED). Valve type 150 H2F in only approved for nominal pressure PN 16, but for applications not effected by the PED, valve type 150 H2F can be delivered for nominal pressure PN 25.

Subject to change without notice.



Specification					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m^3/h	Lifting height mm	Weight kg
100 H2F	100	100	125	20	38
125 H2F	125	125	215	20	73
150 H2F	150	150	310	20	76

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with electric actuator/ thermostat downwards, and according to the following instructions:

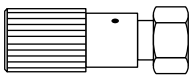
Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 350°C	KS-5	Thermostats
250°C - 350°C	KS-6	El. actuators

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

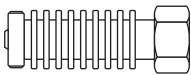
Accessories

Manual Adjusting Device

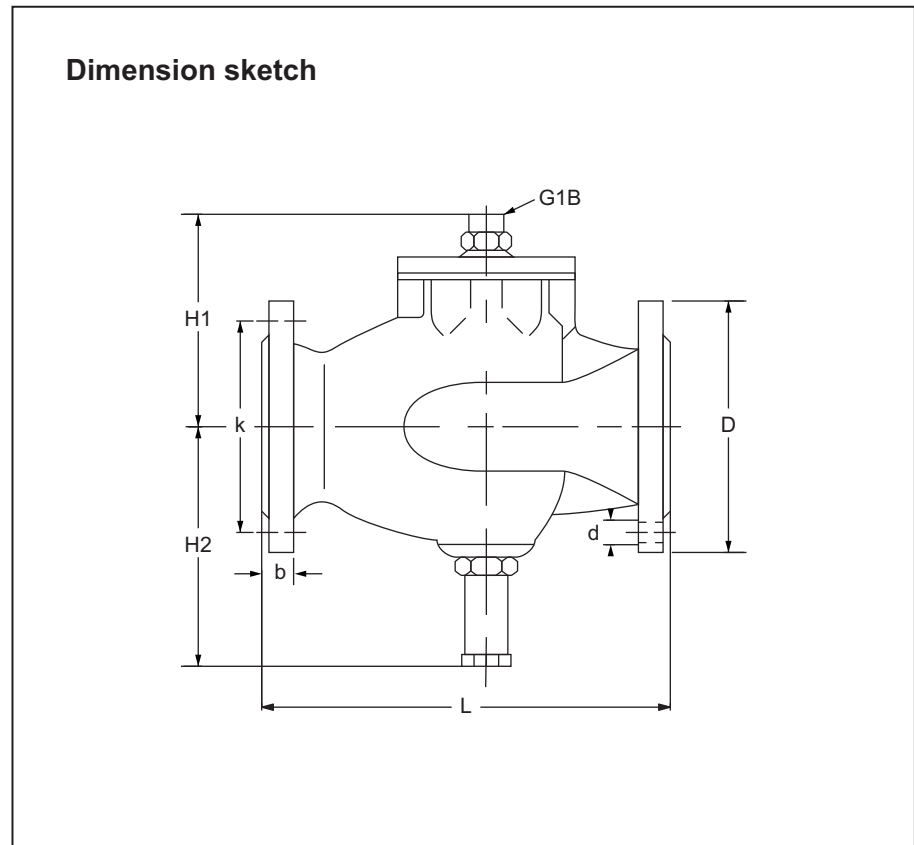


The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling Unit KS-4



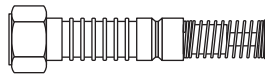
Cooling unit protecting the stuffing box of the electric actuator / thermostat. To be applied at valve temperatures between 170°C and 250°C.



Dimensions

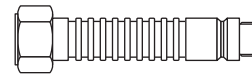
Type	L mm	H1 mm	H2 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
100 H2F	350	185	209	235	24	190	23x(8)
125 H2F	400	240	230	270	26	220	27x(8)
150 H2F	400	240	230	300	28	250	27x(8)

Cooling Unit KS-5



Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Subject to changes without notice.

3-way Control Valves type H3F

Cast steel, PN 40, DN 20 – 65 mm, Flanged ends

2.4.07-L

GB-1

Characteristics

- Nominal pressure PN 40
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Same k_{vs} -value as mixing and diverting valve
- Quadratic/linear characteristic

Applications

Control valves type H3F are designed for control of hot oil, water and other liquids and can be installed in pipe systems as mixing or diverting valves.

The valves are used in conjunction with our temperature regulators for controlling industrial processes, district or central heating plants or marine installations.

Dimensioning

For sizing of control valves and selection of actuators, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seats and cone - are made of stainless steel.

The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1.

The thread for the actuator connection is G1B ISO 228.

The valves have two balanced single seats and are designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

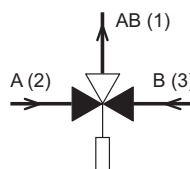
Flange placing

Note that all flanges and the connecting boss for actuators are in the same plane for compact pipe mounting and that the mutual placing of the ports has been changed compared with our other 3-port valves.

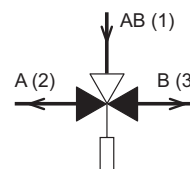
Port numbering

Valves type H3F are marked with the internationally recognized port designations: A, B, AB.

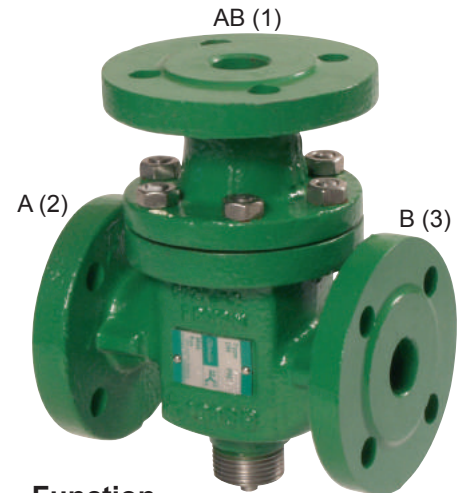
Mixing valve



Diverting valve



Port AB common port always open
 Port A closes by activating the spindle
 Port B opens by activating the spindle



Function

Without an actuator being installed, connection A-AB is fully open and connection B-AB completely closed, by means of a spring.

By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection B-AB is fully open and connection A-AB completely closed.

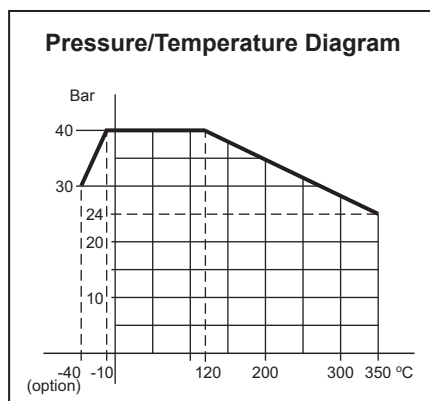
The valve characteristics are as follows:

Port A-AB and AB-A: quadratic
 Port B-AB and AB-B: almost linear
 These characteristics ensure constant total flow under almost all pressure conditions and optimum circulation in the individual circuits.

Technical data

Materials:	
- Valve body	Cast steel GP240GH (GS-C25) (W. No. 1.0619)
- Trim	Stainless steel (W. No. 1.4305)
- Bolts, nuts	Steel (24 CrMo 4/A4)
Nominal pressure	PN 40
Seating	2 balanced single seats
Valve characteristic	Quadratic / linear
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Seat leakage	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges - drilled according to	EN 1092-1 PN 40
Counter flanges	DIN 2635
Colour	Green

Subject to changes without notice.



Specification						
Type	Flange Connection DN in mm	Opening mm	k_{vs} -value * m ³ /h	Lifting height mm	Weight kg	
20 H3F	20	20	6.3	7.5	6	
25 H3F	25	25	10	9	7	
32 H3F	32	32	16	10	10	
40 H3F	40	40	25	11	14	
50 H3F	50	50	38	11.5	18	
65 H3F	65	65	63	14.5	26	

* Same k_{vs} -values for mixing and diverting valves



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3-way Control Valves type H3F

Cast steel, PN 40, DN 20 – 65 mm, Flanged ends

2.4.07-L

GB-2

Definition of k_{VS} -value

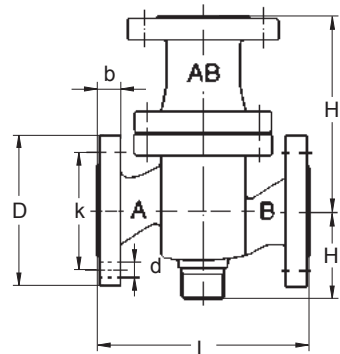
The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

Valve temperature	Cooling unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 350°C	KS-5	Thermostats
250°C - 350°C	KS-6	El. actuators

Dimension sketch



Dimensions

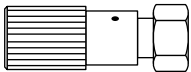
Type	L mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
20 H3F	150	115	63	105	16	75	14x(4)
25 H3F	160	130	70	115	18	85	14x(4)
32 H3F	180	150	75	140	18	100	18x(4)
40 H3F	200	160	85	150	18	110	18x(4)
50 H3F	230	190	95	165	20	125	18x(4)
65 H3F	290	220	110	185	20	145	18x(8)

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

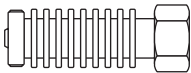
Accessories

Manual adjusting device



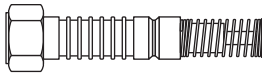
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling unit KS-4



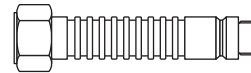
Cooling unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling unit KS-5



Cooling units with built-in bellows glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling unit KS-6



Subject to changes without notice.

3-way Control Valves type H3F

Nodular cast iron, PN 16, DN 80 – 150 mm

2.4.08-A

GB-1

Characteristics

- Nominal pressure PN 16
- Characteristic - almost linear
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- For regulating of process- and central heating plants

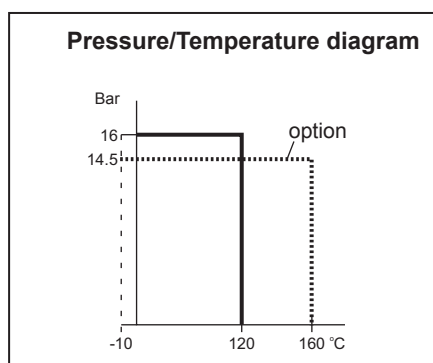
Applications

Control valves type H3F are designed for regulating of hot water, lubricating oil and other liquid media and can be mounted in the pipe system as either mixing or diverting valves. However when mounting as a diverting valve the pressure drop is increased, compared with mounting as a mixing valve. See "Important note" on page 2.

The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.



Design

The valve components - seats and cone - are made of gun metal, the spindle is made of stainless steel.

The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The connection thread for the actuator is G1B ISO 228.

The valves have two balanced single seats and are designed for tight closure.

The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Tight between port 1(AB) og 3(B) is optional.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

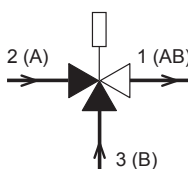
For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Port numbering

The ports of valves type H3F are marked with the figures 1, 2 and 3.

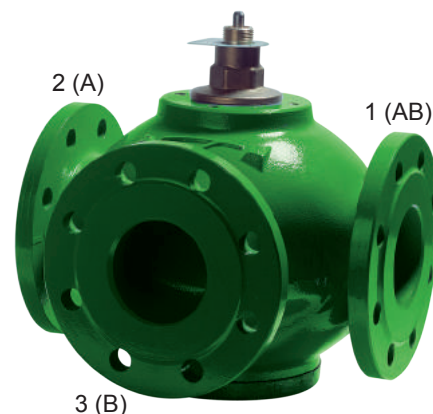
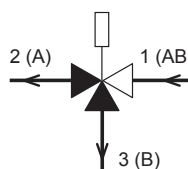
The letters in parentheses refer to the corresponding internationally adapted designations.

Mixing valve



Port 1(AB) common port always open
 Port 2(A) closes at load on spindle
 Port 3(B) opens at load on spindle

Diverting valve



Function

Without an actuator being installed, connection 2-1 is fully open and connection 3-1 completely closed, by means of a spring.

By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection 3-1 is fully open and connection 2-1 completely closed.

Technical data

Materials:

- Valve body	Cast steel GP240GH (GS-C25)
- Seats and cone	Gun metal RG5 CuSn5Zn5Pb5-C
- Spindle	stainless steel (W.no. 1.4436)
Nominal pressure	PN 16
Seating	Two balanced single seats
Valve characteristic	Almost linear
Temperature range	Max. 120°C (160°C option)
Mounting	See page 2
Flanges drilled according to	EN 1092-2 PN 16 or ANSI B16.5 Class 150
Counter flanges	DIN 2633
Colour	Green

Specification						
Type	Flange connection DN in mm	Opening mm	Mixing valve k_{vs} -value m ³ /h	Diverting valve k_{vs} -value m ³ /h	Lifting height mm	Weight kg
80 H3F	80	80	80	69	11	35
100 H3F	100	100	125	108	13	44
125 H3F	125	125	215	185	18	72
150 H3F	150	150	310	267	20	111

Subject to changes without notice.



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3-way Control Valves type H3F

Nodular cast iron, PN 16, DN 80 – 150 mm

2.4.08-A

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{VS} -value will decrease by 14% as against mixing valves.

Mounting

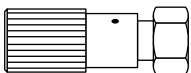
The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 645 mm for mounting and operation of the MT90 Marine motor. See drawing.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Accessories

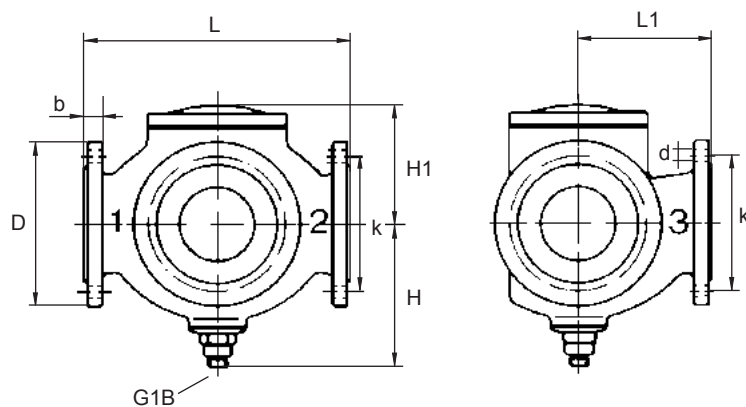
Manual adjusting device



The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Subject to changes without notice.

Dimension sketch



Type	L mm	L1 mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
80 H3F	310	155	180	127	200	19	160	19x(8)
100 H3F	350	175	195	141	220	19	180	19x(8)
125 H3F	400	240	245	171	250	19	210	19x(8)
150 H3F	480	270	280	189	285	24	240	23x(8)

2-way Control Valves type H2FR, Cast steel PN 40, DN 20 – 80 mm, 2 Seats, Reverse acting

2.4.09-I

GB-1

Characteristics

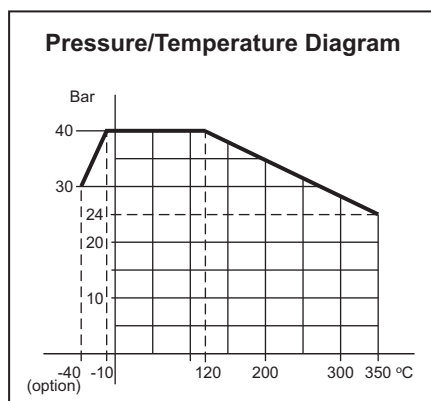
- Nominal pressure PN 40
- Regulating capabilities $\frac{k_{vs}}{k_{vr}} > 25$
- Reverse acting (normally closed)
- For cooling systems or similar
- Adjustable seats

Applications

Valves type H2FR are mainly intended for control of cooling systems.

The valves are used in conjunction with temperature or pressure differential regulators for controlling industrial processes or cooling systems. As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure, Δp_L , against which a valve can close depends on the spring. When opening the valve, the actuator has to overcome the spring force.

The table below shows max. allowable values of Δp_L as well as the max. allowable inlet pressures for opening the valves, p_{1max} , for various actuator forces.



Dimensioning

For sizing of control valves, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components – spindle, seat and cone - are made of stainless steel. The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1. The thread for the actuator connection is G1B ISO 228. The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens.

In connection with our thermostats, the valves act as "cooling" valves, i.e. they open at rising temperatures.

The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.



Technical Data

Materials:

- Valve body	Cast steel GP240GH (GS-C25)
- Trim	Stainless steel
- Nuts, bolts	24 CrMo 4/A4 Nominal pressure PN 40

Seating Double seated

Flow characteristic Quadratic

Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$

Leakage rate $\leq 0.5\%$ of k_{vs}

Function Opening with pressure on spindle

Temperature range See pressure/temperature diagram

Mounting See page 2

Flanges drilled

according to EN 1092-1 PN 40

Counter flanges DIN 2635/BS 4504

Colour Green

Subject to changes without notice.

Specifications									
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Max. Δp_L bar	Actuat. force N	Corresp. p_{1max} bar	Weight kg	
20 H2FR	20	20	5	6.5	8.3	200 400	9.4 25	5	
25 H2FR	25	25	7.5	7	8	200 400	8.8 25	6.5	
32 H2FR	32	32	12.5	8	7	400	16	9	
40 H2FR	40	40	20	9	6.6	400	16	11	
50 H2FR	50	50	30	10	5.8	400	15	16	
65 H2FR	65	65	50	11	10	400 800	10 40	21	
80 H2FR	80	80	80	13	6.7	400 800	10 40	38	

2-way Control Valves type H2FR, Cast steel PN 40, DN 20 – 80 mm, 2 Seats, Reverse acting

2.4.09-I

GB-2

Definition of k_{VS} -value

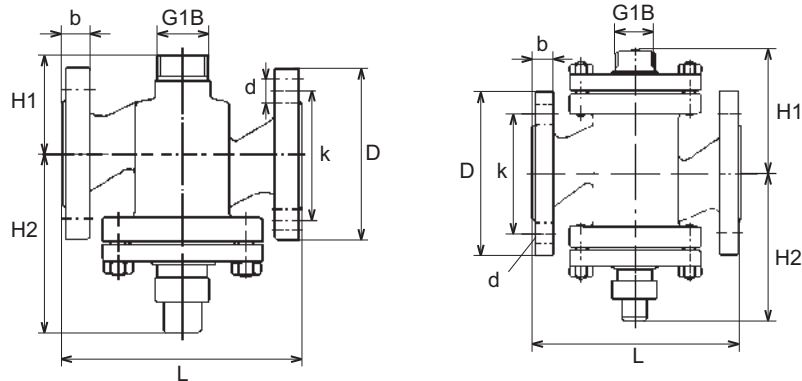
The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 350°C	KS-5	Thermostats
250°C - 350°C	KS-6	El. actuators

Dimension sketch



Type: DN 20 - 65

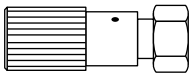
Type: DN 80

Strainer

It is recommended to use a strainer in front of the regulating valve if the liquid contains suspended particles.

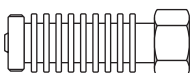
Accessories

Manual Adjusting Device



The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5



Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Dimensions

Type	L mm	H1 mm	H2 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
20 H2FR	150	63	112	105	18	75	14x(4)
25 H2FR	160	70	117	115	18	85	14x(4)
32 H2FR	180	75	151	140	18	100	18x(4)
40 H2FR	200	85	155	150	18	110	18x(4)
50 H2FR	230	95	169	165	20	125	18x(4)
65 H2FR	290	110	180	185	22	145	18x(8)
80 H2FR	310	155	195	200	24	160	18x(8)

Subject to changes without notice.

Characteristics

- Nominal pressure PN 25
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double seated
- Reverse acting (normally closed)
- For cooling water and lubrications

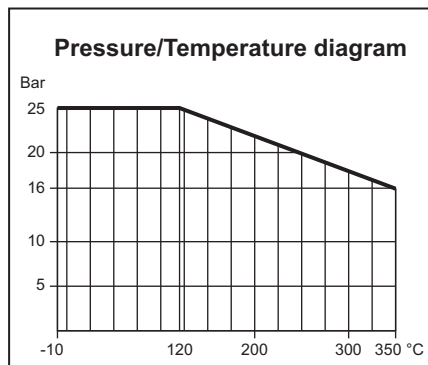
Applications

Valves type H2FR are mainly intended for control of cooling systems.

The valves are used in conjunction with temperature- or pressure differential regulators.

As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure, Δp_L , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force.

Please find below the max. allowable values of Δp_L as well as the max. allowable inlet pressures for opening the valves, p_{1max} for various actuator forces.



Dimensioning

For sizing of control valves, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of cast steel GP240GH (GS-C25) with flanges drilled according to EN 1092-1. The connection thread for the actuator is G1B ISO 228. The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens.

In connection with our thermostats, the valves act as "cooling" valves, i.e. they open at rising temperatures.

The linear characteristic will not cease until the flow has dropped below 4% of the full flow.



Technical data

Materials:

- Valve body	Cast steel GP240GH (GS-C25)
- Trim	Stainless steel
- Bolts, nuts	24 CrMo 4/A4
Nominal pressure	PN 25
Seating	Double seated
Flow characteristic	Almost quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Function	Opening with pressure on spindle
Leakage rate	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges	EN 1092-1 PN 25
Counter flanges	DIN 2635 / DS625
Colour	Green

Note: All Clorius valves are approved in accordance to the Pressure Equipment Directive (PED). Valve type 150 H2FR is only approved for nominal pressure PN 16, but for applications not effected by the PED, valve type 150 H2FR can be delivered for nominal pressure PN 25.

Specifications

Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Max. Δp_L bar	Actuat. force N	Weight kg
100 H2FR	100	100	125	20	12.1	800	39
125 H2FR	125	125	215	20	9	800	73
150 H2FR	150	150	310	20	7.5	800	76

Subject to changes without notice.

Definition of k_{VS} -value

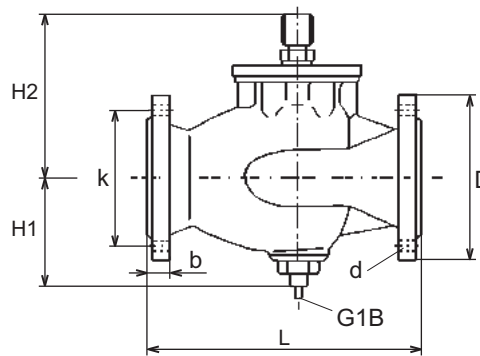
The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with electric actuator/ thermostat downwards, and according to the following instructions:

Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 350°C	KS-5	Thermostats
250°C - 350°C	KS-6	El. actuators

Dimension sketch

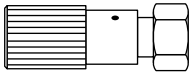


Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

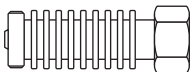
Accessories

Manual Adjusting Device



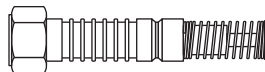
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling Unit KS-4



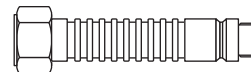
Cooling unit protecting the stuffing box of the electric actuator / thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5



Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Subject to changes without notice.

Dimensions							
Type	L mm	H1 mm	H2 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
100 H2FR	350	145	240	220	24	190	23x8
125 H2FR	400	180	290	250	26	220	27x8
150 H2FR	400	180	290	285	28	250	27x8

2-way Control Valves type G1F

Nodular cast iron, PN 25, DN 15/4 – 50 mm

2.5.02-I

GB-1

Characteristics

- Nominal pressure PN 25
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Single-seated, tight closing
- Quadratic characteristic

Applications

Control valves type G1F are designed for regulating hot water, steam and hot oil systems.

The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

Dimensioning

For sizing of control valves and selection of actuators, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seat and cone - are made of stainless steel.

The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The thread for the actuator connection is G1B ISO 228.

The valves are single-seated and designed for tight closure. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).



Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

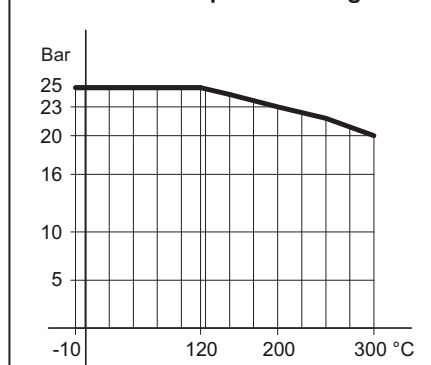
The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Pressure/Temperature diagram



Technical data

Materials:

- Valve body	Nodular cast iron EN-GJS-400-15
- Components	Stainless steel
- Nuts, bolts	24 CrMo 4/A4
Nominal pressure	PN 25
Seating	Single-seated
Valve characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Leakage rate	$\leq 0.05\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges drilled according to	EN 1092-2 or ANSI B16.5 Class 150
Colour	Blue

Subject to changes without notice.

Specifications					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
15/4 G1F	15	4	0.20	6	3.0
15/6 G1F	15	6	0.45	6	3.0
15/9 G1F	15	9	0.95	6	3.1
15/12 G1F	15	12	1.7	6	3.1
15 G1F	15	15	2.75	6	3.1
20 G1F	20	20	5	6.5	4.2
25 G1F	25	25	7.5	7	5.5
32 G1F	32	32	12.5	8	8.1
40 G1F	40	40	20	9	9.7
50 G1F	50	50	30	10	14.0

2-way Control Valves type G1F

Nodular cast iron, PN 25, DN 15/4 – 50 mm

2.5.02-I

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

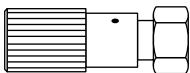
Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	Valve Motors

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

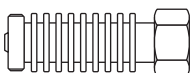
Accessories

Manual Adjusting Device

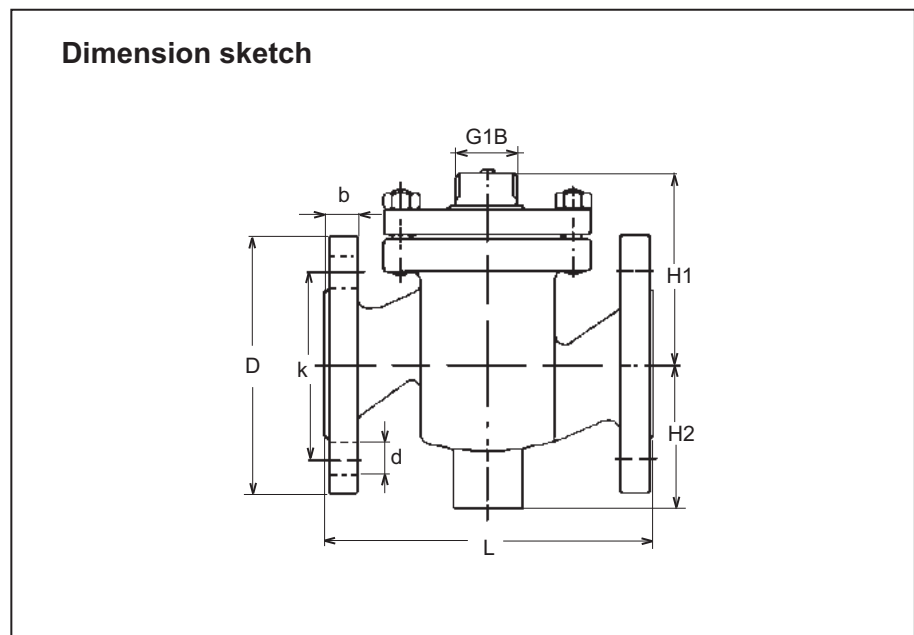


The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the motor/thermostat. To be applied at valve temperatures between 170°C and 250°C.



Dimensions

Type	L	H1	H2	b	EN-1092-2			ANSI B16.5 Class 150		
					D (dia.)	k (dia.)	d mm (number)	D (dia.)	k (dia.)	d mm (number)
	mm	mm	mm	mm	mm	mm	(number)	mm	mm	(number)
15/4 G1F	130	80	60	14	95	65	14x(4)	89	61	16x(4)
15/6 G1F	130	80	60	14	95	65	14x(4)	89	61	16x(4)
15/9 G1F	130	80	60	14	95	65	14x(4)	89	61	16x(4)
15/12 G1F	130	80	60	14	95	65	14x(4)	89	61	16x(4)
15 G1F	130	80	60	14	95	65	14x(4)	89	61	16x(4)
20 G1F	150	85	65	16	105	75	14x(4)	98	70	16x(4)
25 G1F	160	95	70	16	115	85	14x(4)	108	79	16x(4)
32 G1F	180	105	75	18	140	100	18x(4)	118	89	16x(4)
40 G1F	200	110	85	18	150	110	18x(4)	127	98	16x(4)
50 G1F	230	125	95	20	165	125	18x(4)	153	121	19x(4)

Cooling Unit KS-5



Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or valve motor (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Subject to changes without notice.

Balanced 2-way Control Valves type G1FB

Nodular cast iron, PN 25, DN 25 – 65 mm

2.5.03-E

GB-1

Characteristics

- Nominal pressure PN 25
- Pressure balanced valve
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Single-seated, tight closure
- Quadratic characteristic

Applications

Balanced control valves type G1FB are designed for regulating hot water, steam and hot oil systems.

Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable.

The valves are used in conjunction with our temperature- or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

Dimensioning

For sizing of control valves and selection of actuators, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seat, cone and bellow - are made of stainless steel.

The bellows for balancing the pressure are fitted on the valve spindle which reduces the force necessary for closing the valve, as the upstream pressure of the medium through the hollow valve spindle acts outside and the pressure after the valve acts inside the bellow system.

The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228.

The valves are single-seated and designed for tight closure. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

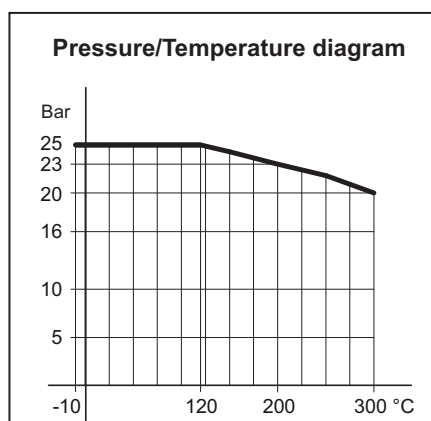
Without an actuator being connected, the valve is held in open position by means of a spring and the bellow system. With pressure on the spindle the valve will close. In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting double-seated valve can be used.

The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.



Technical data

Materials:	
- Valve body	Nodular Cast iron EN-GJS-400-15
- Components	Stainless steel
- Nuts, bolts	24 CrMo 5/A4
Nominal pressure	PN 25
Seating	Single-seated
Valve characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Leakage	$\leq 0.05\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges	EN 1092-2 PN 25
Colour	Blue



Specifications					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
25 G1FB	25	25	7.5	7	6
32 G1FB	32	32	12.5	8	9
40 G1FB	40	40	20	9	13
50 G1FB	50	50	30	10	16
65 G1FB	65	65	50	13	23

Subject to changes without notice.

Balanced 2-way Control Valves type G1FB

Nodular cast iron, PN 25, DN 25 – 65 mm

2.5.03-E

GB-2

Definition of k_{VS} -value

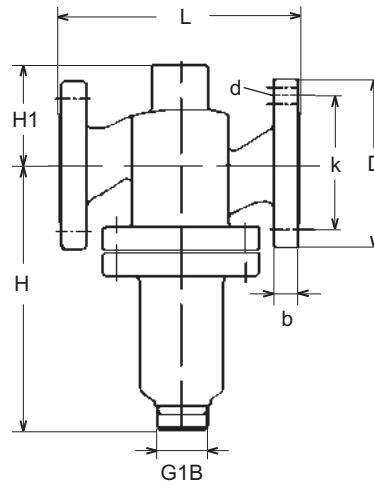
The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

Valve temperature	Cooling unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	Valve Motors

Dimension sketch

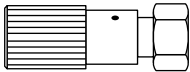


Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

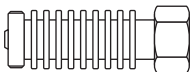
Accessories

Manual adjusting device



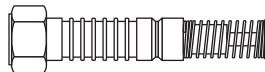
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling unit KS-4



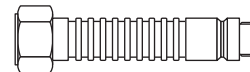
Cooling unit protecting the stuffing box of the motor / thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling unit KS-5



Cooling units with built-in bellows glands, replacing stuffing box of thermostat (KS-5) or valve motor (KS-6). Must be applied at valve temperatures above 250°C.

Cooling unit KS-6



Subject to changes without notice.

Dimensions							
Type	L mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
25 G1FB	160	180	70	115	16	85	14x(4)
32 G1FB	180	195	75	140	18	100	18x(4)
40 G1FB	200	205	85	150	19	110	18x(4)
50 G1FB	230	225	95	165	19	125	18x(4)
65 G1FB	290	260	110	185	19	145	18x(8)

Balanced 2-way Control Valves type G1FBN

Nodular cast iron, PN 25, DN 15 – 80 mm

2.5.03.01-F

GB-1

Characteristics

- Nominal pressure PN 25
- Pressure balanced valve
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Single-seated, balanced
- Quadratic characteristic

Applications

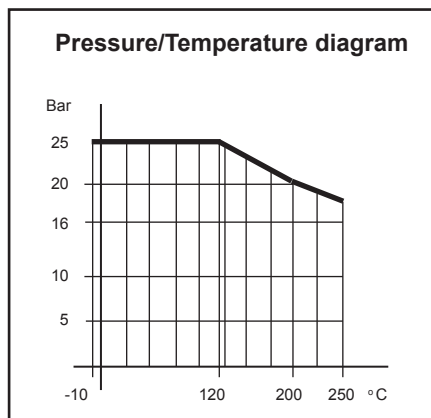
Balanced control valves type G1FBN are designed for regulating hot water, steam and hot oil systems.

Balanced valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a standard single seated valve, and where the leakage rate for a double-seated valve is unacceptable.

The valves are used in conjunction with our temperature- or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

Dimensioning

For sizing of control valves and selection of actuators, please see "Quick Choice" leaflet no. 9.0.00.



Design

The valve components - spindle, seat, cone - are made of stainless steel.

The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The thread for the actuator connection is G1B ISO 228.

The valves are single-seated and designed for tight closure. The leakage rate is less than 0.05% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without an actuator being connected, the valve is held in open position by means of a spring. With force on the spindle the valve will close.

In connection with our thermostats or electric actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting double-seated valve can be used.

The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.

Technical data

Materials:

- Valve body: Nodular Cast iron EN-GJS-400-15
- Components: Stainless steel
- Nuts, bolts: 24 CrMo 5/A4
- Nominal pressure: PN 25
- Seating: Single-seated



Valve characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Leakage	$\leq 0.05\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Flanges drilled according to	EN 1092-2 PN 25 or ANSI B16.5 Class 150
Colour	Blue

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with electric actuator/ thermostat downwards, and according to the following instructions:

Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	El. actuators

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Subject to changes without notice.

Specifications					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m^3/h	Lifting height mm	Weight kg
15 G1FBN	15	15	4	7.5	4
20 G1FBN	20	20	6.3	7.5	5
25 G1FBN	25	25	10	9	6
32 G1FBN	32	32	16	10	9
40 G1FBN	40	40	25	11	13
50 G1FBN	50	50	35	11.5	16
65 G1FBN	65	65	58	14.5	23
80 G1FBN	80	80	80	16	38



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Balanced 2-way Control Valves type G1FBN

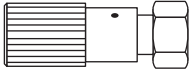
Nodular cast iron, PN 25, DN 15 – 80 mm

2.5.03.01-F

GB-2

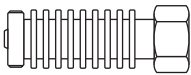
Accessories

Manual adjusting device



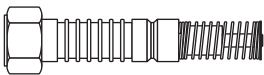
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling unit KS-4

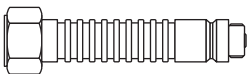


Cooling unit protecting the stuffing box of the electric actuator / thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5

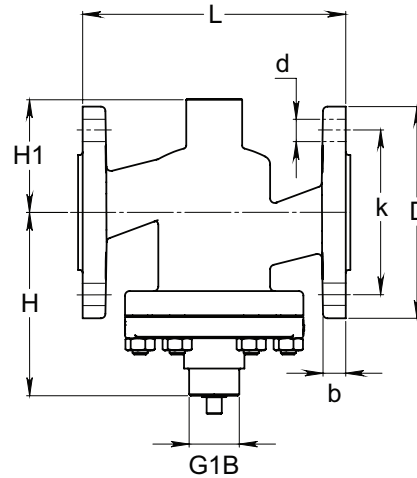


Cooling Unit KS-6



Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Dimension sketch



Dimensions

Type	L mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
15 G1FBN	130	101	80	95	14	65	14x(4)
20 G1FBN	150	107	85	105	16	75	14x(4)
25 G1FBN	160	112	70	115	16	85	14x(4)
32 G1FBN	180	122	75	140	18	100	18x(4)
40 G1FBN	200	125	85	150	19	110	18x(4)
50 G1FBN	230	140	95	165	19	125	18x(4)
65 G1FBN	290	154	110	185	19	145	18x(8)
80 G1FBN	310	164	115	200	19	160	19x(8)

Dimensioning

Type	Water / Steam	Thermostats			Valve actuators		Pressure differential controllers	
		V2	V4	V8	V / AV	VB / VBA	TD66-4	TD66-8
15 G1FBN	Water: Δp_1 & max. p_1 bar	16	16	16	16	16	16	16
	Steam: Δp_1 & max. p_1 bar							
20 G1FBN	Water: Δp_1 & max. p_1 bar							
	Steam: Δp_1 & max. p_1 bar							
25 G1FBN	Water: Δp_1 & max. p_1 bar							
	Steam: Δp_1 & max. p_1 bar							
32 G1FBN	Water: Δp_1 & max. p_1 bar							
	Steam: Δp_1 & max. p_1 bar							
40 G1FBN	Water: Δp_1 & max. p_1 bar	-	10	16	16	16	16	
	Steam: Δp_1 & max. p_1 bar	-	9					
50 G1FBN	Water: Δp_1 & max. p_1 bar	-	9	16	16	16	16	
	Steam: Δp_1 & max. p_1 bar	-	8					
65 G1FBN	Water: Δp_1 & max. p_1 bar	-	7	16	16	16	16	
	Steam: Δp_1 & max. p_1 bar	-	6					
80 G1FBN	Water: Δp_1 & max. p_1 bar	-	5	16	16	16	16	
	Steam: Δp_1 & max. p_1 bar	-	4					

p_1 = absolute pressure

Subject to changes without notice.



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2-way Control Valves type G2F

2.5.04-F

Nodular cast iron, 2 seats, PN 25, DN 20 – 80 mm, Flanged ends

GB-1

Characteristics

- Nominal pressure PN 25
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double-seated
- Adjustable seat interspace
- Quadratic characteristic

Applications

Control valves type G2F are designed for regulating hot water, steam and hot oil systems.

The double-seated valves are used in installations where the system pressure necessitates a closing force greater than available in the actuator programme for a single-seated valve.

The valves are used in conjunction with our temperature or pressure differential regulators for controlling industrial processes, district or central heating plants or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The thread for the actuator connection is G1B ISO 228. The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

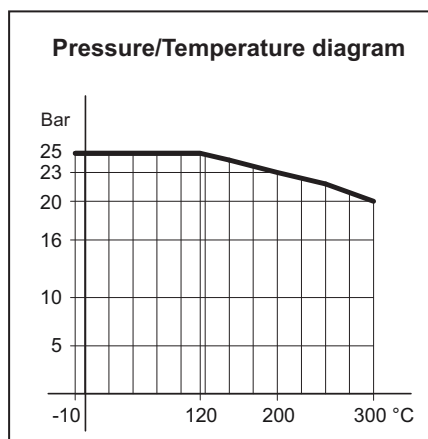
The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.



Technical data

Materials:

- Valve body	Nodular cast iron EN-GJS-400-15
- Components	Stainless steel
- Nuts, bolts	24 CrMo 5/A4
Nominal pressure	PN 25
Seating	Double-seated
Valve characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Leakage rate	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges drilled according to	EN 1092-2 PN 25
Counter flanges	DIN 2634
Colour	Blue



Specifications						
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg	
20 G2F	20	20	5	6.5	5	
25 G2F	25	25	7.5	7	6.5	
32 G2F	32	32	12.5	8	9	
40 G2F	40	40	20	9	11	
50 G2F	50	50	30	10	16	
65 G2F	65	65	50	11	21	
80 G2F	80	80	80	13	38	

Subject to changes without notice.

Definition of kvs-value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

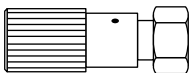
Valve temperature	Cooling unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	Valve Motors

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

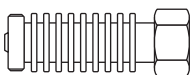
Accessories

Manual adjusting device



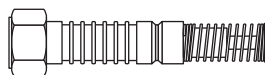
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling unit KS-4



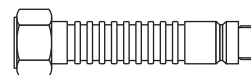
Cooling unit protecting the stuffing box of the motor/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling unit KS-5

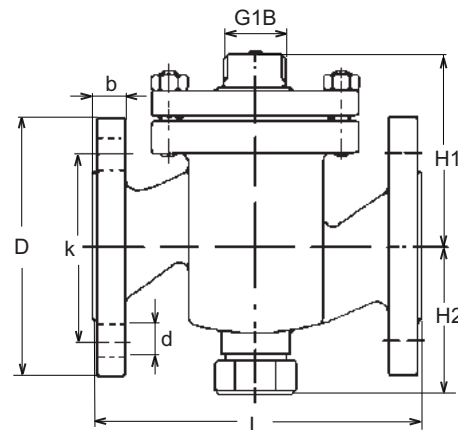


Cooling units with built-in bellow glands, replacing stuffing box of thermostat (KS-5) or valve motor (KS-6). Must be applied at valve temperatures above 250°C.

Cooling unit KS-6



Dimension sketch



Dimensions

Type	L mm	H1 mm	H2 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
20 G2F	150	85	70	105	16	75	14x(4)
25 G2F	160	95	77	115	16	85	14x(4)
32 G2F	180	105	82	140	18	100	19x(4)
40 G2F	200	110	92	150	19	110	19x(4)
50 G2F	230	125	102	165	19	125	19x(4)
65 G2F	290	135	120	185	19	145	19x(8)
80 G2F	310	145	130	200	19	160	19x(8)

Subject to changes without notice.

2-way Control Valves type G2F

Nodular cast iron, PN 16, DN 100 – 150 mm

2.5.05-D

GB-1

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double seated
- Characteristic - almost quadratic

Applications

Control valves type G2F are designed for use in regulating high pressure hot water, steam and heat transfer oil.

The valves are used in conjunction with temperature or pressure differential regulators for controlling district or central heating plants, industrial processes or marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" data sheet no. 9.0.00.

Design

The valve components – spindle, seats and cone – are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The connection thread for the actuator is G1B ISO 228. The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without the actuator being connected, the valve is held in open position by means of a spring. With pressure on the spindle the valve will close.

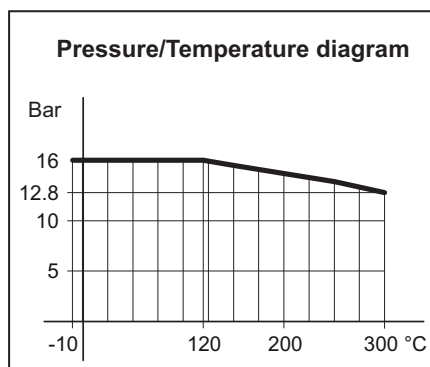
In connection with our thermostats or electronic actuators, the valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used.

The quadratic characteristic will not cease, until the flow has dropped below 4% of the full flow.



Technical data

Materials:	
- Valve body	Nodular cast iron EN-GJS-400-15
- Components	Stainless steel
- Bolts, nuts	24 CrMo 4/A4
Nominal pressure	PN 16
Seating	Double seated
Valve characteristic	Almost quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Function	Closing with pressure on spindle
Leakage rate	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges drilled according to	EN 1092-2
Counter flanges	DIN 2633
Colour	Blue



Specification

Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
100 G2F	100	100	125	20	32
125 G2F	125	125	215	20	50
150 G2F	150	150	310	20	70

Subject to change without notice.

2-way Control Valves type G2F

Nodular cast iron, PN 16, DN 100 – 150 mm

2.5.05-D

GB-2

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with electric actuator/ thermostat downwards, and according to the following instructions:

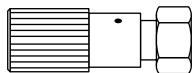
Valve temperature	Cooling unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	El. actuators

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

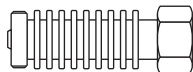
Accessories

Manual adjusting device

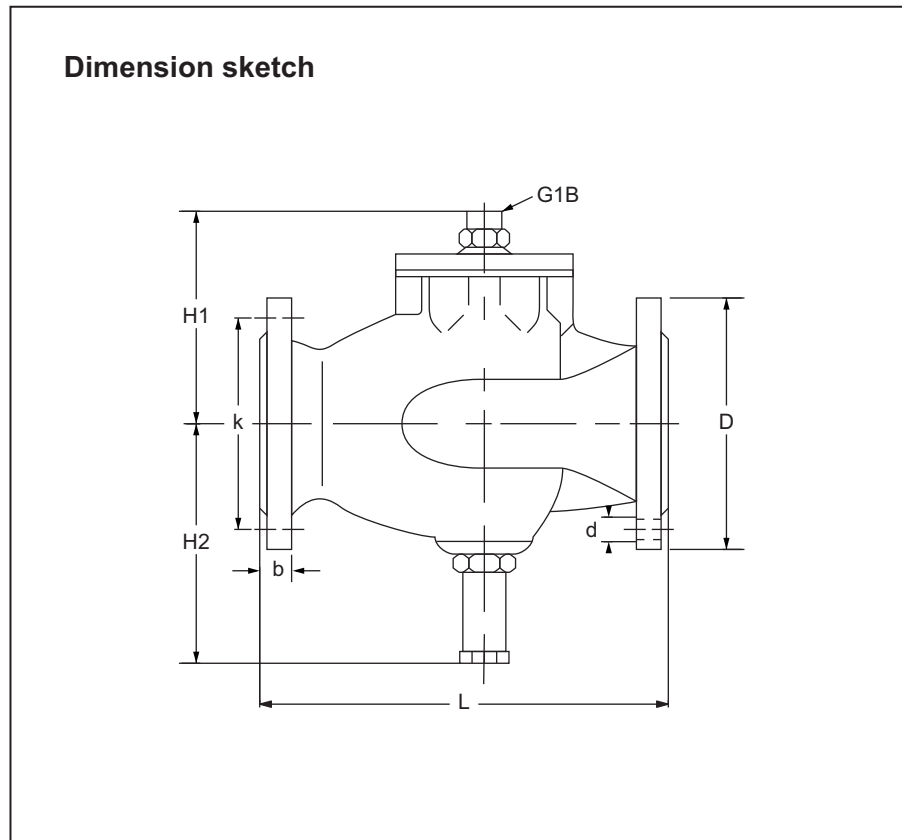


The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling unit KS-4



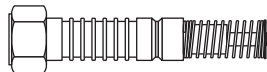
Cooling unit protecting the stuffing box of the electric actuator / thermostat. To be applied at valve temperatures between 170°C and 250°C.



Dimensions

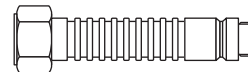
Type	L mm	H1 mm	H2 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
100 G2F	350	185	209	220	19	180	19x(8)
125 G2F	400	205	224	250	19	210	19x(8)
150 G2F	400	240	244	285	19	240	23x(8)

Cooling unit KS-5



Cooling units with built-in bellows glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling unit KS-6



Subject to changes without notice.

2-way Control Valves type G2FM-T

2.5.05.01-D

Nodular cast iron, PN 16, DN 150 – 300 / PN 10, DN 350 – 600 mm

GB-1

Characteristics

- Nominal pressure
DN 150-300 mm:
PN 16, max. 100°C (option 250°C)
DN 350-600 mm:
PN 10, max. 100°C (option 250°C)
- Slide in Nodular cast iron

Applications

Control valve type G2FM-T is a three-way control valve with blocked port making a two-way control valve. The slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media.

The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil quantities.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

Dimensioning

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$
$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

Design

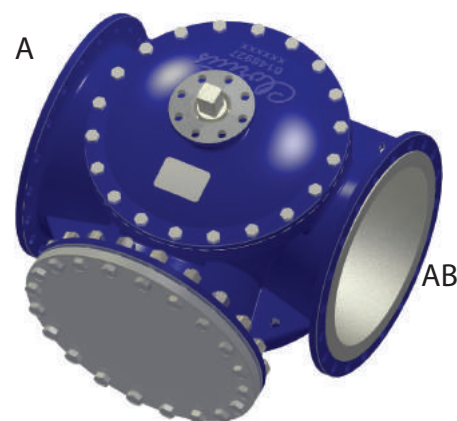
The valve body and the valve slide are made of nodular cast iron.
The valve flanges are drilled according to EN 1092-2 or ANSI Class 150.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.
For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

The slide is firmly connected with the motor spindle. When the slide is in the one extreme position by turning the spindle, connection A-AB is kept fully open. In the other extreme position connection the valve is fully closed. In the intermediate positions the opening degrees change proportionally.
The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.



Technical data

Materials:

- Valve body, slide Nodular cast iron EN-GJS-400-15
- O-ring NBR 70A

Nominal pressure:

- DN 150-300 PN 16
- DN 350-600 PN 10

Valve characteristic Almost linear

Leakage Max. 0.5%

Temperature range Max. 100°C (option 250°C)

Mounting See page 2

Flanges EN 1092-2
PN 10/16

Counter flanges ANSI Class 150
(suggested) DIN 2632 – PN 10
DIN 2633 – PN 16

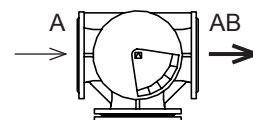
Max. pressure Δp_L , against which the control can close:

- DN 150-300 16 bar

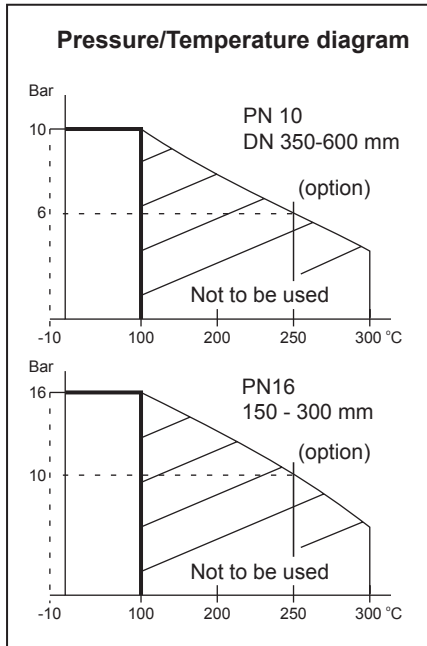
- DN 350-600 10 bar

Specifications				
Type	Flange connection DN in mm	k_{vs} -value m ³ /h	Torque Nm	Weight kg
150 G2FM-T	150	425	135	90
200 G2FM-T	200	1100	330	135
250 G2FM-T	250	1800	450	190
300 G2FM-T	300	2450	700	262
350 G2FM-T	350	3350	780	324
400 G2FM-T	400	3850	880	403
450 G2FM-T	450	4300	1250	507
500 G2FM-T	500	5050	1450	645
600 G2FM-T	600	6020	1750	890

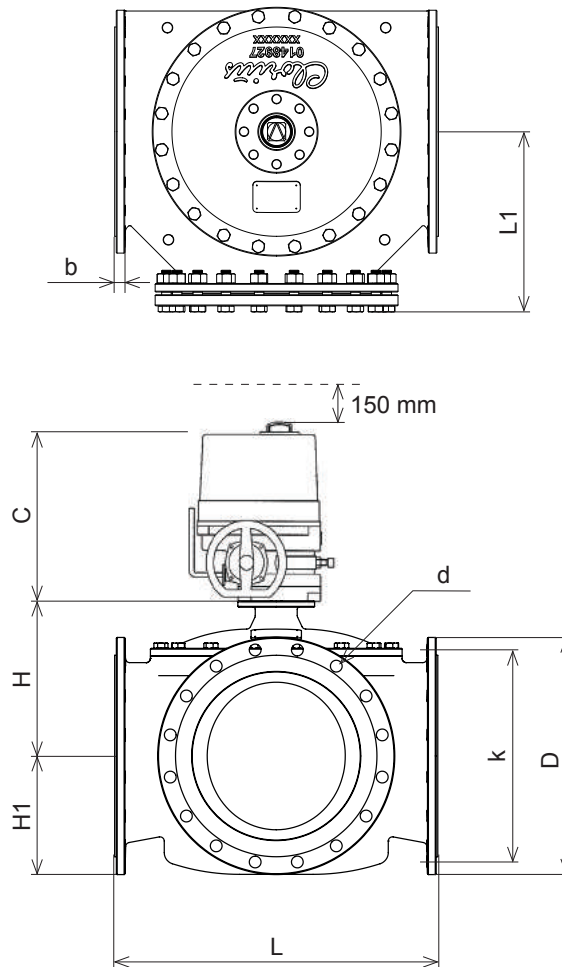
Port numbering



Subject to change without notice.



Dimension sketch



Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

The valve connections are marked A and AB. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Dimensions

Type	L mm	L1 mm	H mm	H1 mm	b mm	C mm	EN 1092-2			ANSI Class 150		
							D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)
150 G2FM-T	438	250	196	139	250	276	290	240	23x (8)	280	241	22x (8)
200 G2FM-T	530	306	236	175	21	361	340	295	23x(12)	343	299	23x(8)
250 G2FM-T	592	340	273	205	23	361	400	355	28x(12)	407	362	26x(12)
300 G2FM-T	649	371	305	230	25.5	361	455	410	28x(12)	483	432	26x(12)
350 G2FM-T	717	403	337	255	25.5	361	505	460	23x(16)	534	477	29x(12)
400 G2FM-T	770	430	375	285	26	361	565	515	28x(16)	597	540	29x(16)
450 G2FM-T	820	457	391	310	26.5	556	615	565	28x(20)	635	578	32x(16)
500 G2FM-T	900	499	425	340	27.5	556	670	620	28x(20)	699	635	32x(20)
600 G2FM-T	1000	553	470	393	31.0	556	780	725	31x(20)	813	750	35x(20)

Subject to change without notice.

2-way Control Valves type G2F, G3F w/ blind flange on port 3 **2.5.05.02-A**

Nodular cast iron, PN 16, DN 80 – 150 mm

GB-1

Characteristics

- Nominal pressure PN 16
- Characteristic - almost linear
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- For regulating of process- and central heating plants

Applications

Control valves type G2F are designed for regulating of water, lubricating oil and other liquid media. The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.

Design

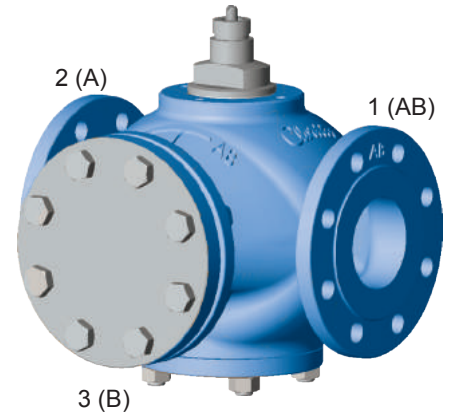
The valve components - seats and cone - are made of gun metal, the spindle is made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The connection thread for the actuator is G1B ISO 228. The valves have two balanced single seats and are designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

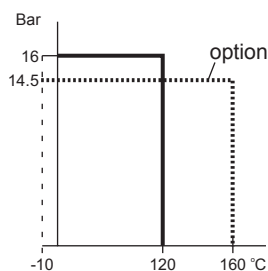
Without an actuator being installed, connection 2-1 is fully open by means of a spring. When the spindle is pressed to the bottom, connection 2-1 is completely closed.



Technical data

Materials:	
- Valve body	Nodular cast iron EN-GJS-400-15
- Seats and cone	Gun metal RG 5 CuSn5Zn5Pb5-C
- Spindle	stainless steel (W.no. 1.4436)
Nominal pressure	PN 16
Seating	Two balanced single seats
Valve characteristic	Almost linear
Temperature range	Max. 120°C (160°C option)
Mounting	See page 2
Flanges drilled according to	EN 1092-2 PN 16 or ANSI B16.5 Class 150
Counter flanges	DIN 2633
Colour	Blue

Pressure/Temperature diagram



Specification

Type	Flange connection DN in mm	Opening mm	Mixing valve k_{vs} -value m ³ /h	Lifting height mm	Weight kg
80 G2F	80	80	80	11	35
100 G2F	100	100	125	13	44
125 G2F	125	125	215	18	72
150 G2F	150	150	310	20	111

Subject to changes without notice.

2-way Control Valves type G2F, G3F w/ blade flange on port 3

2.5.05.02-A

Nodular cast iron, PN 16, DN 80 – 150 mm

GB-2

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

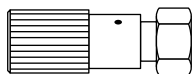
The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Accessories

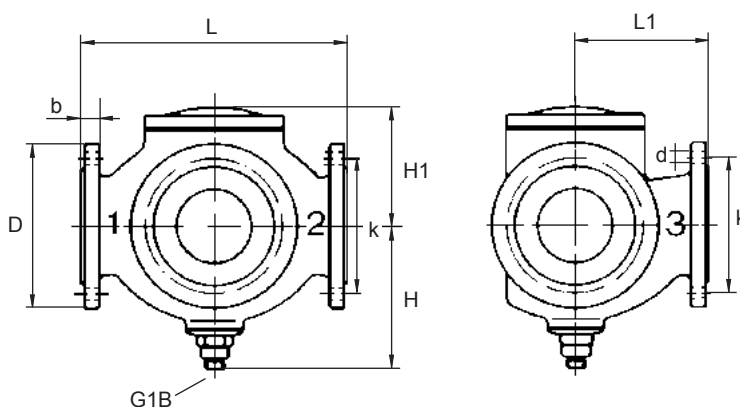
Manual adjusting device



The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Subject to changes without notice.

Dimension sketch



Type	L mm	L1 mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
80 G2F	310	155	180	127	200	19	160	19x(8)
100 G2F	350	175	195	141	220	19	180	19x(8)
125 G2F	400	240	245	171	250	19	210	19x(8)
150 G2F	480	270	280	189	285	24	240	23x(8)

2-way Control Valves type G2FA

2.5.05.03-A

Nodular cast iron, PN 16, DN 200 mm / PN 10, DN 300/250 – 300 mm

GB-1

Characteristics

- Nominal pressure
200 G2FA: PN 16 max. 120/160°C
300/250-300 G2FA: PN 10 max. 120/160°C
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double seated

Applications

Regulating valve type G2FA is designed for regulating of fresh water, lubricating oil and other liquid media.

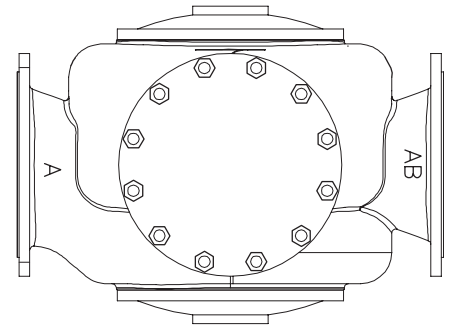
The valves are designed for use in conjunction with large industrial processes, district heating and marine installations. Is used in conjunction with Clorius valve motor type AVM/AVF 234 or Clorius pneumatic actuators.

Dimensioning

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$



Design

The valve components (seats and cone) are made of gun metal, the spindle of stainless steel. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

The valve cone is firmly connected with the motor spindle. The valves will close at rising temperatures. For cooling circuits a reverse acting valve can be used. The linear characteristic will not cease, until the flow has dropped below 4% of the full flow.

Technical Data

Materials:

- Valve body: Nodular cast iron EN-GJS-400-15
- Trim: Gun metal RG 5 CuSn5Zn5Pb5-C
- Valve spindle: Stainless steel (W.no. 1.4436)

Nominal pressure:

- 200 G2FA: PN 16 (max. 120/160°C)
- 300/250-300 G2FA: PN 10 (max. 120/160°C)

Seating

Double seated

Valve characteristic

Almost linear

Leakage

≤ 0.5%

Temperature range

Max. 120°C/160°C

Mounting

See page 2

Flanges

According to

EN 1092-2,

PN 16 & PN 10

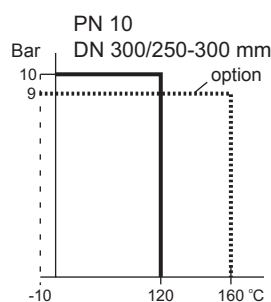
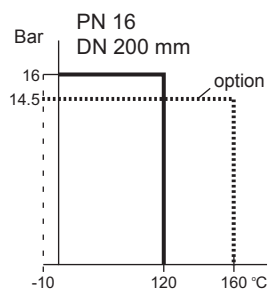
Note !

300/250 G2FA has outer measures and flanges drilled as a 300 G2FA

Counter flanges:

- 200 G2FA: DIN 2633 - PN 16
- 300/250-300 G2FA: DIN 2632 - PN 10

Pressure/Temperature diagram



Specifications

Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Weight kg
200 G2FA	200	200	555	28	160
300/250 G2FA ¹⁾	300	300	865	28	311
300 G2FA	300	300	1250	45	300

¹⁾ Valve type 300/250 G2FA has outer measures and flanges drilled as type 300 G2FA.

Subject to change without notice.

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Mounting

The valves must always be mounted with vertical spindle, preferable with the motor connection over the valve. Besides, the valve should be mounted so that the valve motor is exposed to a minimum of moisture and unnecessary vibrations.

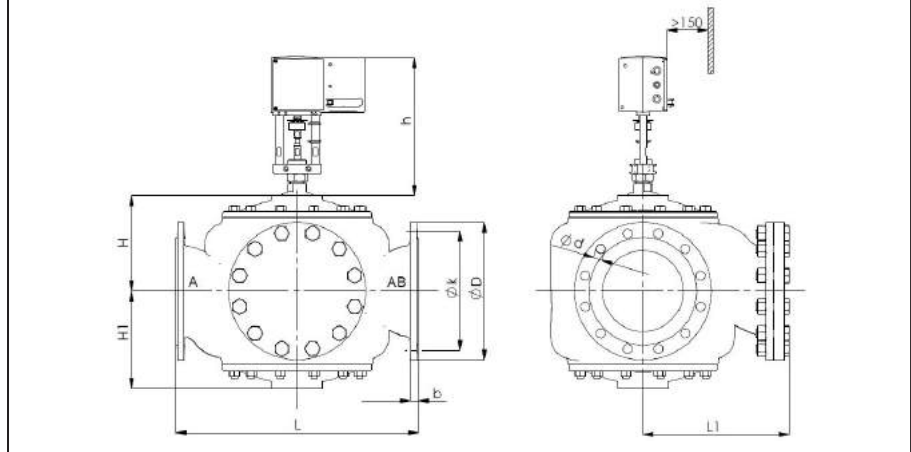
Free height above/below the valve must be minimum 400 mm for mounting and operating of the AVM/AVF 234 motor, otherwise minimum 745 mm for pneumatic actuators.

Strainer

It is recommended to use a strainer in front of the regulating valve if the liquid contains suspended particles.

Subject to change without notice.

Dimension sketch



Type	L mm	L1 mm	H mm	H1 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
200 G2FA	600	380	238	238	26	340	295	22 x (8)
300/250 G2FA ¹⁾	850	510	305	305	28	445	400	23 x (12)
300 G2FA	850	510	305	305	28	445	400	23 x (12)

¹⁾ Valve type 300/250 G2FA has outer measures and flanges drilled as type 300 G2FA.

2-way Control Valves type G2FR

2.5.06-F

Nodular cast iron, PN 25, DN 20 – 80 mm, Reverse acting

GB-1

Characteristics

- Nominal pressure PN 25
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Reverse acting (normally closed)
- For cooling systems or similar
- Adjustable seats

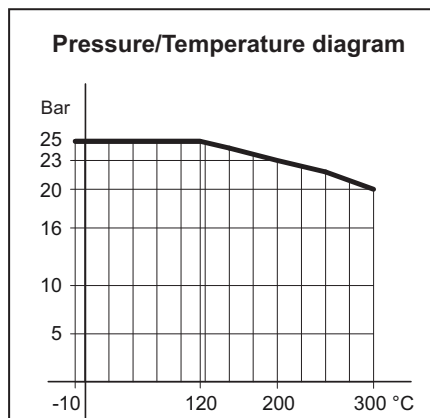
Applications

Valves type G2FR are mainly intended for control of cooling systems.

The valves are used in conjunction with temperature or pressure differential regulators.

As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure, Δp_L , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force.

Please find below the max. allowable values of Δp_L as well as the max. allowable inlet pressures for opening the valves, p_{1max} , for various actuator forces.



Dimensioning

For sizing of control valves, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges according to EN 1092-2. The thread for the actuator connection is G1B ISO 228. The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens.

In connection with our thermostats, the valves act as "cooling" valves, i.e. they open at rising temperatures.

The quadratic characteristic will not cease until the flow has dropped below 4% of the full flow.



Technical data

Materials:	
- Valve body	Nodular Cast iron EN-GJS-400-15
- Trim	Stainless steel
- Nuts, bolts	24 CrMo 5/A4
Nominal pressure	PN 25
Seating	Double-seated
Flow characteristic	Quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Function	Opening with pressure on spindle
Leakage	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges	EN 1092-2 PN 25
Counter flanges	DIN 2634
Colour	Blue

Subject to changes without notice.

Specifications

Type	Flange connection DN in mm	Opening mm	k_{vs} -value m ³ /h	Lifting height mm	Max. Δp_v bar	Actuat. force N	Corresp. p_{1max} bar	Weight kg
20 G2FR	20	20	5	6.5	8.3	200 400	9.4 25	5
25 G2FR	25	25	7.5	7	8	200 400	8.8 25	6.5
32 G2FR	32	32	12.5	8	7	400	27	9
40 G2FR	40	40	20	9	6.6	400	26	11
50 G2FR	50	50	30	10	5.8	400	15	16
65 G2FR	65	65	50	11	10	400 800	10 16	21
80 G2FR	80	80	80	13	6.7	400 800	10 16	38

Definition of k_{VS} -value

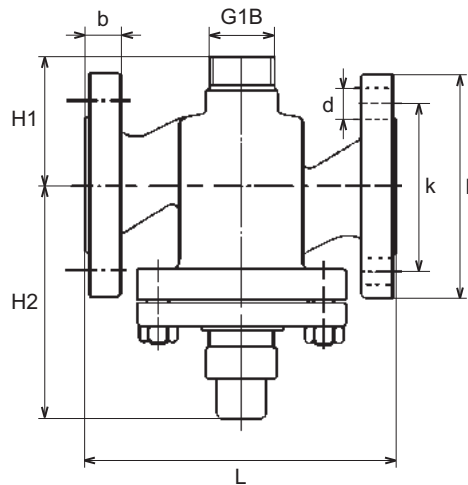
The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

Valve temperature	Cooling unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	Valve Motors

Dimension sketch

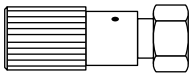


Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

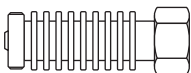
Accessories

Manual adjusting device



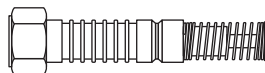
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling unit KS-4



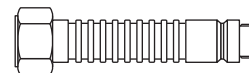
Cooling unit protecting the stuffing box of the motor / thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling unit KS-5



Cooling units with built-in bellows glands, replacing stuffing box of thermostat (KS-5) or valve motor (KS-6). Must be applied at valve temperatures above 250°C.

Cooling unit KS-6



Dimensions							
Type	L mm	H1 mm	H2 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
20 G2FR	150	63	112	105	16	75	14x(4)
25 G2FR	160	70	117	115	16	85	14x(4)
32 G2FR	180	75	151	140	18	100	19x(4)
40 G2FR	200	85	155	150	19	110	19x(4)
50 G2FR	230	95	169	165	19	125	19x(4)
65 G2FR	290	110	180	185	19	145	19x(8)
80 G2FR	310	120	180	200	19	160	19x(8)

Subject to changes without notice.

Characteristics

- Nominal pressure PN 16
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Double seated
- Reverse acting (normally closed)
- For cooling water and lubrications

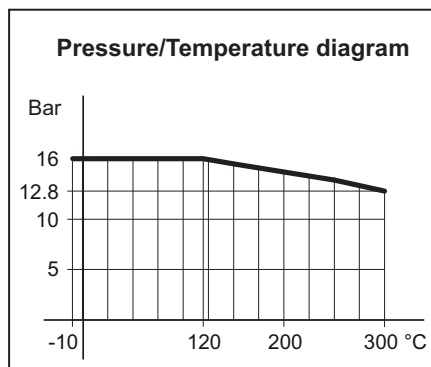
Applications

Valves type G2FR are mainly intended for control of cooling systems.

The valves are used in conjunction with temperature- or pressure differential regulators.

As the reverse acting valves are held in closed position by means of a built-in spring, the max. differential pressure, Δp_L , against which a valve can close depends on the spring and when opening the valve, the actuator has to overcome the spring force.

Please find below the max. allowable values of Δp_L as well as the max. allowable inlet pressures for opening the valves, p_{1max} for various actuator forces.



Dimensioning

For sizing of control valves, please see "Quick Choice" leaflet no. 9.0.00.

Design

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2. The connection thread for the actuator is G1B ISO 228. The valves are double-seated and designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

Without an actuator being connected, the valve is held in closed position by means of a spring. With pressure on the spindle the valve opens.

In connection with our thermostats, the valves act as "cooling" valves, i.e. they open at rising temperatures.

The linear characteristic will not cease until the flow has dropped below 4% of the full flow.



Technical data

Materials:	
- Valve body	Nodular cast iron EN-GJS-400-15
- Trim	Stainless steel
- Bolts, nuts	24 CrMo 4/A4
Nominal pressure	PN 16
Seating	Double seated
Flow characteristic	Almost quadratic
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Function	Opening with pressure on spindle
Leakage rate	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges	EN 1092-2 PN 16
Counter flanges	DIN 2633
Colour	Blue

Specifications							
Type	Flange connection DN in mm	Opening mm	k_{vs} -value m^3/h	Lifting height mm	Max. Δp_L bar	Actuat. force N	Weight kg
100 G2FR	100	100	125	20	12.1	800	39
125 G2FR	125	125	215	20	9	800	53
150 G2FR	150	150	310	20	7.5	800	73

Subject to changes without notice.

Definition of k_{VS} -value

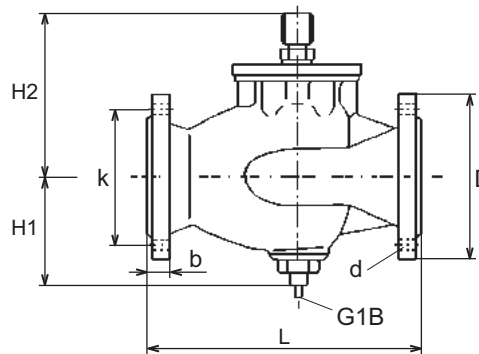
The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with electric actuator/ thermostat downwards, and according to the following instructions:

Valve Temperature	Cooling Unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	El. actuators

Dimension sketch

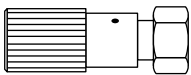


Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

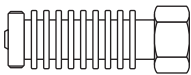
Accessories

Manual Adjusting Device



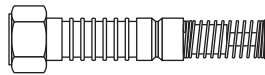
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling Unit KS-4



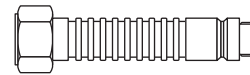
Cooling unit protecting the stuffing box of the electric actuator / thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5



Cooling units with built-in bellows glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling Unit KS-6



Cooling units with built-in bellows glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Subject to changes without notice.

3-way Control Valves type G3F, Nodular cast iron PN 25, DN 20 – 65 mm, Flanged ends

2.5.08-1

GB-1

Characteristics

- Nominal pressure PN 25
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Same k_{vs} -value as mixing and diverting valve
- Quadratic / linear characteristic

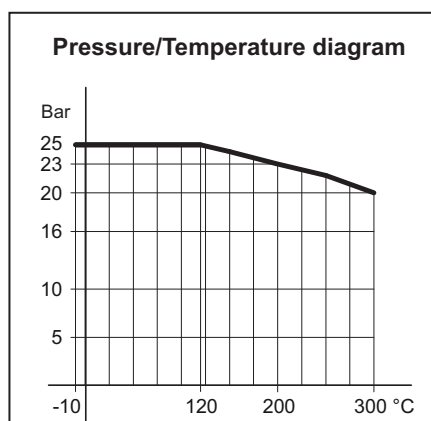
Applications

Control valves type G3F are designed for hot water and hot oil systems and can be installed in pipe systems as mixing or diverting valves.

The valves are used in conjunction with our temperature regulators for controlling industrial processes, district or central heating plants or marine installations.

Dimensioning

For sizing of control valves and selection of actuators, please see "Quick Choice" leaflet no. 9.0.00.



Design

The valve components - spindle, seats and cone - are made of stainless steel. The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2.

The thread for the actuator connection is G1B ISO 228.

The valves have two balanced single seats and are designed for tight closure. The leakage rate is less than 0.5% of the full flow (according to VDI/DE 2174).

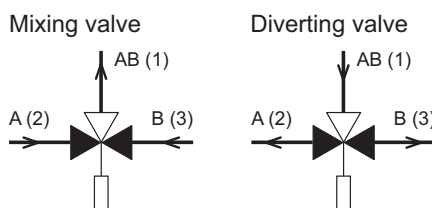
Quality assurance

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

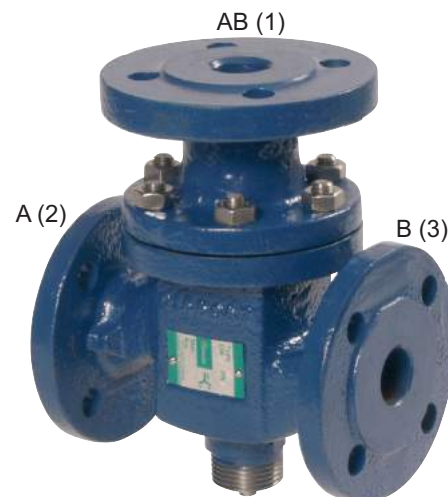
For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Port numbering

Valves type G3F are marked with the internationally recognized port designations: A, B, AB.



Port AB common port always open
Port A closes by activating the spindle
Port B opens by activating the spindle



Function

Without an actuator being installed, connection A-AB is fully open and connection B-AB completely closed, by means of a spring.

By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection B-AB is fully open and connection A-AB completely closed.

The valve characteristics are as follows:

Port A-AB and AB-A: quadratic
Port B-AB and AB-B: almost linear
These characteristics ensure constant total flow under almost all pressure conditions and optimum circulation in the individual circuits.

Technical Data

Materials:	
- Valve body	Nodular cast iron EN-GJS-400-15
- Components	Stainless steel
- Nuts, bolts	24 CrMo 5/A4
Nominal pressure	PN 25
Seating	2 balanced single seats
Valve characteristic	Quadratic / linear
Regulating capability	$\frac{k_{vs}}{k_{vr}} > 25$
Leakage	$\leq 0.5\%$ of k_{vs}
Temperature range	See pressure/temperature diagram
Mounting	See page 2
Flanges - drilled according to	EN 1092-2 PN 25
Counter flanges	DIN 2634
Colour	Blue

Subject to changes without notice.

Specification					
Type	Flange connection DN in mm	Opening mm	k_{vs} -value* m ³ /h	Lifting height mm	Weight kg
20 G3F	20	20	6.3	7.5	6
25 G3F	25	25	10	9	7
32 G3F	32	32	16	10	10
40 G3F	40	40	25	11	14
50 G3F	50	50	38	11.5	18
65 G3F	65	65	63	14.5	26

* Same k_{vs} -values for mixing and diverting valves

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

Up to 170°C the valve can be installed vertically as well as horizontally. For media temperature above 170°C, a cooling unit of type KS has to be applied. It must then be installed with actuator/thermostats downwards, and according to the following instructions:

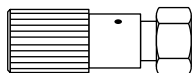
Valve temperature	Cooling unit	Suitable for
170°C - 250°C	KS-4	All actuators
250°C - 300°C	KS-5	Thermostats
250°C - 300°C	KS-6	El. actuators

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

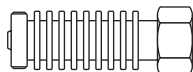
Accessories

Manual adjusting device



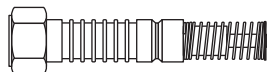
The device has a built-in stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction.

Cooling unit KS-4



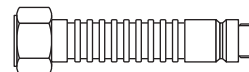
Cooling unit protecting the stuffing box of the electric actuator/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling unit KS-5

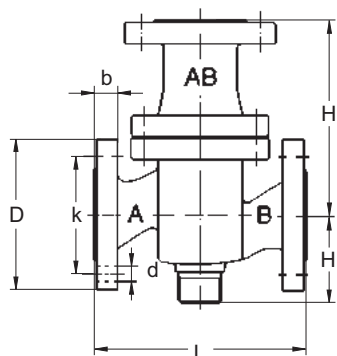


Cooling units with built-in bellows glands, replacing stuffing box of thermostat (KS-5) or electric valve actuator (KS-6). Must be applied at valve temperatures above 250°C.

Cooling unit KS-6



Dimension sketch



Dimensions

Type	L mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
20 G3F	150	115	63	105	16	75	14x(4)
25 G3F	160	130	70	115	16	85	14x(4)
32 G3F	180	150	75	140	18	100	18x(4)
40 G3F	200	160	85	150	18	110	18x(4)
50 G3F	230	190	95	165	20	125	18x(4)
65 G3F	290	220	110	185	20	145	18x(8)

Subject to changes without notice.

3-way Control Valves type G3F

Nodular cast iron, PN 16, DN 80 – 150 mm

2.5.09-E

GB-1

Characteristics

- Nominal pressure PN 16
- Characteristic - almost linear
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- For regulating of process- and central heating plants

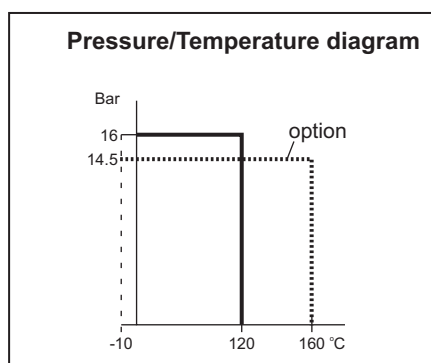
Applications

Control valves type G3F are designed for regulating of water, lubricating oil and other liquid media and can be mounted in the pipe system as either mixing or diverting valves. However when mounting as a diverting valve the pressure drop is increased, compared with mounting as a mixing valve. See "Important note" on page 2.

The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.



Design

The valve components - seats and cone - are made of gun metal, the spindle is made of stainless steel.

The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The connection thread for the actuator is G1B ISO 228.

The valves have two balanced single seats and are designed for tight closure.

The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Tight between port 1(AB) og 3(B) is optional.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

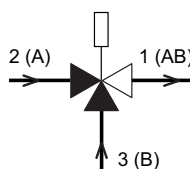
For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Port numbering

The ports of valves type G3F are marked with the figures 1, 2 and 3.

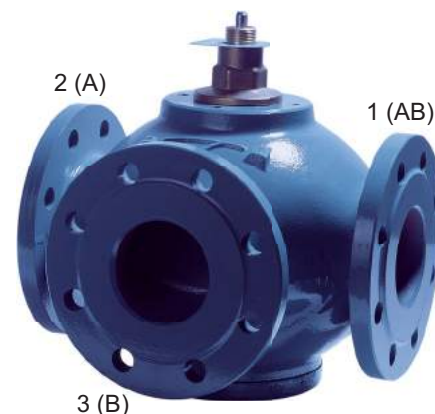
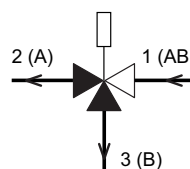
The letters in parentheses refer to the corresponding internationally adapted designations.

Mixing valve



Port 1(AB) common port always open
Port 2(A) closes at load on spindle
Port 3(B) opens at load on spindle

Diverting valve



Function

Without an actuator being installed, connection 2-1 is fully open and connection 3-1 completely closed, by means of a spring.

By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection 3-1 is fully open and connection 2-1 completely closed.

Technical data

Materials:

- Valve body: Nodular cast iron EN-GJS-400-15
- Seats and cone: Gun metal RG 5 CuSn5Zn5Pb5-C
- Spindle: stainless steel (W.no. 1.4436)

Nominal pressure: PN 16
Seating: Two balanced single seats

Valve characteristic: Almost linear
Temperature range: Max. 120°C (160°C option)

Mounting: See page 2
Flanges drilled according to: EN 1092-2 PN 16 or ANSI B16.5 Class 150

Counter flanges: DIN 2633
Colour: Blue

Specification						
Type	Flange connection DN in mm	Opening mm	Mixing valve k_{vs} -value m ³ /h	Diverting valve k_{vs} -value m ³ /h	Lifting height mm	Weight kg
80 G3F	80	80	80	69	11	35
100 G3F	100	100	125	108	13	44
125 G3F	125	125	215	185	18	72
150 G3F	150	150	310	267	20	111

Subject to changes without notice.

3-way Control Valves type G3F

Nodular cast iron, PN 16, DN 80 – 150 mm

2.5.09-E

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{VS} -value will decrease by 14% as against mixing valves.

Mounting

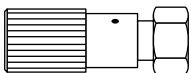
The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 645 mm for mounting and operation of the MT90 Marine motor. See drawing.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Accessories

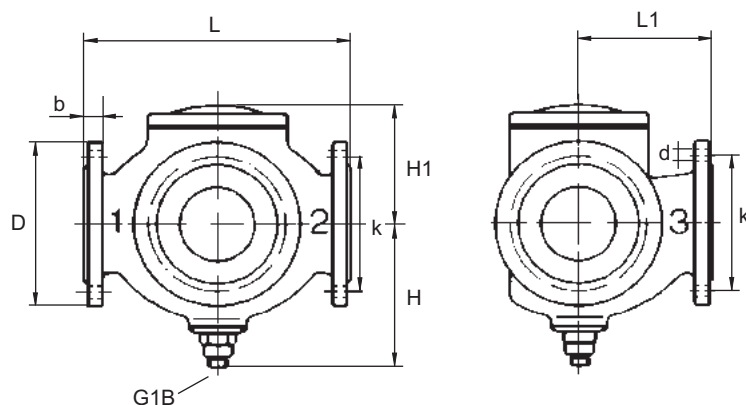
Manual adjusting device



The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Subject to changes without notice.

Dimension sketch



Type	L mm	L1 mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
80 G3F	310	155	180	127	200	19	160	19x(8)
100 G3F	350	175	195	141	220	19	180	19x(8)
125 G3F	400	240	245	171	250	19	210	19x(8)
150 G3F	480	270	280	189	285	24	240	23x(8)

3-way Control Valves type G3F-I (Ports A-AB interchanged) 2.5.09.01-A

Nodular cast iron, PN 16, DN 80 – 150 mm

GB-1

Characteristics

- Nominal pressure PN 16
- Characteristic - almost linear
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- For regulating of process- and central heating plants

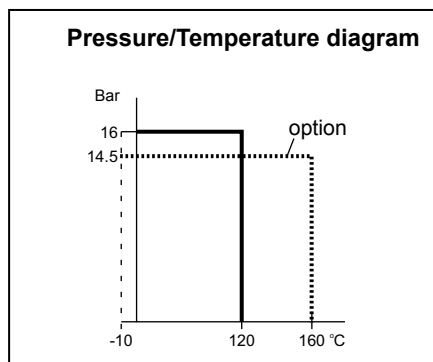
Applications

Control valves type G3F-I are designed for regulating of water, lubricating oil and other liquid media and can be mounted in the pipe system as either mixing or diverting valves. However when mounting as a diverting valve the pressure drop is increased, compared with mounting as a mixing valve. See "Important note" on page 2.

The valves are used in conjunction with our temperature regulators for controlling industrial processes, district and central heating plants and marine installations.

Dimensioning

For sizing of control valves and selection of actuators please see "Quick Choice" leaflet no. 9.0.00.



Design

The valve components - seats and cone - are made of gun metal, the spindle is made of stainless steel.

The valve body is made of nodular cast iron EN-GJS-400-15 with flanges drilled according to EN 1092-2 or ANSI B16.5 Class 150. The connection thread for the actuator is G1B ISO 228.

The valves have two balanced single seats and are designed for tight closure.

The leakage rate is less than 0.5% of the full flow (according to VDI/VDE 2174).

Tight between port 1(AB) og 3(B) is optional.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

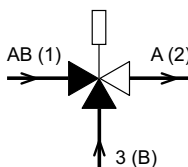
For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Port numbering

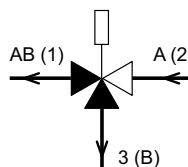
The ports of valves type G3F-I are marked with the figures 1, 2 and 3.

The letters in parentheses refer to the corresponding internationally adapted designations.

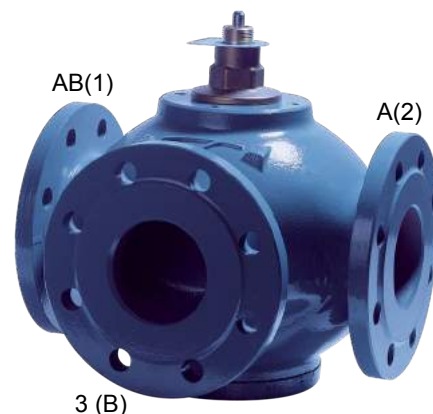
Mixing valve



Diverting valve



Port AB(1) common port always open
 Port A(2) closes at load on spindle
 Port 3(B) opens at load on spindle



Function

Without an actuator being installed, connection 2-1 is fully open and connection 3-1 completely closed, by means of a spring.

By increasing pressure on the spindle, the opening of the ports changes proportionally to the travel of the spindle, and when the spindle is pressed to the bottom, connection 3-1 is fully open and connection 2-1 completely closed.

Technical data

Materials:

- Valve body: Nodular cast iron EN-GJS-400-15
- Seats and cone: Gun metal RG 5 CuSn5Zn5Pb5-C
- Spindle: stainless steel (W.no. 1.4436)

Nominal pressure: PN 16
 Seating: Two balanced single seats

Valve characteristic: Almost linear
 Temperature range: Max. 120°C (160°C option)

Mounting: See page 2

Flanges drilled according to: EN 1092-2 PN 16 or ANSI B16.5 Class 150

Counter flanges: DIN 2633
 Colour: Blue

Specification						
Type	Flange connection DN in mm	Opening mm	Mixing valve k_{vs} -value m ³ /h	Diverting valve k_{vs} -value m ³ /h	Lifting height mm	Weight kg
80 G3F-I	80	80	80	69	11	35
100 G3F-I	100	100	125	108	13	44
125 G3F-I	125	125	215	185	18	72
150 G3F-I	150	150	310	267	20	111

Subject to changes without notice.

3-way Control Valves type G3F-I (Ports A-AB interchanged) 2.5.09.01-A

Nodular cast iron, PN 16, DN 80 – 150 mm

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{VS} -value will decrease by 14% as against mixing valves.

Mounting

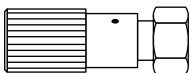
The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 645 mm for mounting and operation of the MT90 Marine motor. See drawing.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Accessories

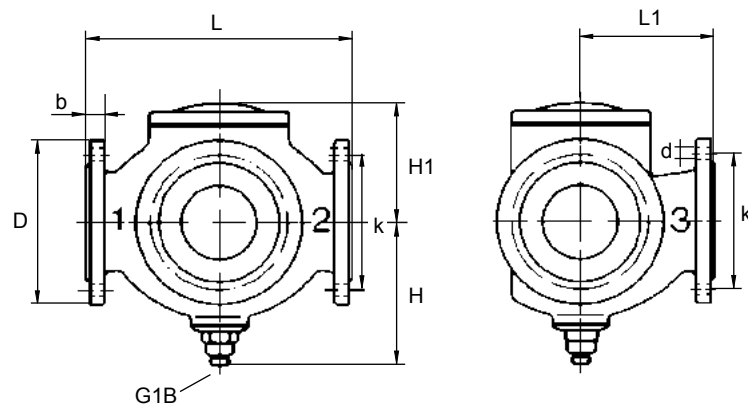
Manual adjusting device



The device has a built-in stuffing box. For tightening and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

Subject to changes without notice.

Dimension sketch



Type	L mm	L1 mm	H mm	H1 mm	D (dia.) mm	b mm	k (dia.) mm	d mm dia. (number)
80 G3F-I	310	155	180	127	200	19	160	19x(8)
100 G3F-I	350	175	195	141	220	19	180	19x(8)
125 G3F-I	400	240	245	171	250	19	210	19x(8)
150 G3F-I	480	270	280	189	285	24	240	23x(8)

3-WAY CONTROL VALVES TYPE Low Leakage

2.5.14-A

NODULAR CAST IRON, DN 80 – 300 mm

GB-1



CHARACTERISTICS

- Nominal pressure
 - DN 80-200 PN 16 max. 150°C
 - DN 300/250 PN 10 max. 150°C
 - DN 80-300/250 JIS 10K (option)
- Regulating capability $\frac{k_{VS}}{k_{VR}} > 25$
- Two balanced single seats
- Soft seat with O-ring
- Leakage class IV

APPLICATIONS

Control valves type Low Leakage are designed for regulating of load dependant cylinder liner (LDCL), cooling water systems.

DESIGN

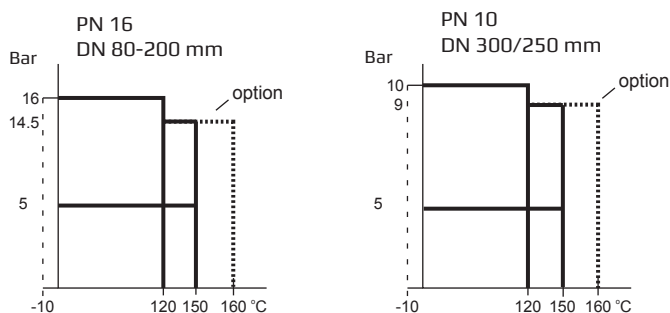
The valve components (seats and cone) are made of gun metal, the spindle of stainless steel. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2 (JIS B 2210 option).

The valve has two balanced single seats and the port AB-B is designed 100 % tight.

QUALITY ASSURANCE

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

PRESSURE/TEMPERATURE DIAGRAM



SPECIFICATIONS

DN	Flange connection DN in mm	Opening mm	k_{VS} -value m^3/h	Lifting height mm	Weight kg
80	80	80	80	11	35
100	100	100	125	13	44
125	125	125	215	18	72
150	150	150	310	22	111
200/175	200	200	425	23	165
200	200	200	555	29	160
300/250	300	300	865	31	306
300	300	300	1250	45	306

¹⁾ The stated k_{VS} values apply for mixing valves. Diverting valves: $0.86 \times (k_{VS}$ -values for mixing valves)

3-WAY CONTROL VALVES TYPE Low Leakage

2.5.14-A

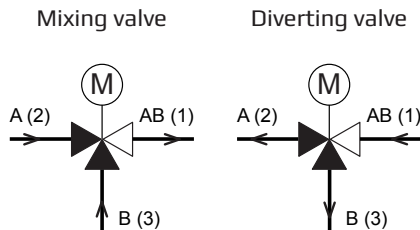
NODULAR CAST IRON, DN 80 – 300 mm

GB-2

PORT NUMBERING

The ports of valves type Low Leakage are marked with the letters AB, A and B.

The letters in parentheses refer to the corresponding internationally adapted designations.



Port AB (1) common port always open

Port A (2) closes at load on spindle

Port B (3) opens at load on spindle

FUNCTION

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed.

In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

MOUNTING

The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture.

Free height above/below the valve must be minimum 700 mm for mounting and operation of the pneumatic actuator.

TECHNICAL DATA

Materials:

- Valve body	Nodular cast iron EN-GJS-400-15
- Trim	Gun metal RG 5 CuSn5Zn5Pb5-C
- Valve spindle	Stainless steel (W.no. 1.4436)

Nominal pressure

DN 80-200	PN 16 (max. 150°C)
DN 300/250-300	PN 10 (max. 150°C)
DN 80-300	JIS 10K (option)

Seats 2 balanced single seats

Valve characteristic Almost linear

Leakage Port AB-B 0.0%

Temperature range Max. 150°C

Mounting See below

Flanges According to EN 1092-2,
PN 16 & PN 10

- option: According to JIS B 2210 10K

Note ! Valve DN 200/175 has outer measures and flanges drilled as valve DN 200.
Valve DN 300/250 has outer measures and flanges drilled as valve DN 300.

Counter flanges (suggested for EN 1092-2)

DN 80-200:	DIN 2633 – PN 16
DN 300/250-300:	DIN 2632 – PN 10

DEFINITION OF K_{VS} -VALUE

The k_{VS} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

STRAINER

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

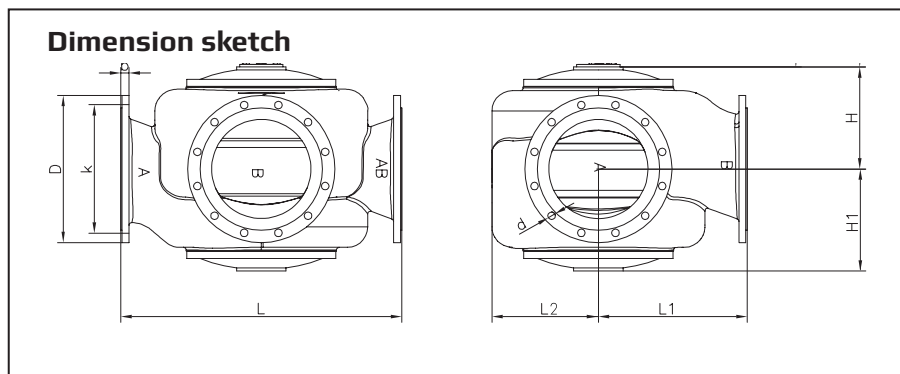
Subject to changes without notice.

3-WAY CONTROL VALVES TYPE Low Leakage

2.5.14-A

NODULAR CAST IRON, DN 80 – 300 mm

GB-3



DIMENSIONS							EN 1092-2			JIS B 2210 10K		
DN	L	L1	L2	H	H1	b	D (dia.)	k (dia.)	d mm dia.	D (dia.)	k (dia.)	d mm dia.
	mm	mm	mm	mm	mm	mm	mm	mm	(number)	mm	mm	(number)
80	310	155	102	117	127	19	200	160	19x(8)	185	150	19x(8)
100	350	175	112	132	141	19	220	180	19x(8)	210	175	19x(8)
125	400	240	138	181	171	19	250	210	19x(8)	250	210	23x(8)
150	480	270	165	216	189	24	285	240	23x(8)	280	240	23x(8)
200/175	600	325	230	238	238	20	340	295	23x(12)	330	290	23x(12)
200	600	325	230	238	238	20	340	295	23x(12)	330	290	23x(12)
300/250	850	450	325	305	305	25	445	400	23x(12)	445	400	25x(16)
300	850	450	325	305	305	25	445	400	23x(12)	445	400	25x(16)

THE VALVE SET:

The valve set for LDCL cooling water systems:

Consists of: 3 way control valve type MAN Low Leakage: 300.01-B
 Pneumatic actuator: 301.01-A
 Filter regulator: 6.08.01-C
 Positioner: Siemens SIPART PS2

3-WAY THERMOSTATIC VALVE TYPE G3FSI

2.5.15-A

NODULAR CAST IRON, DN 50 – 150 mm,

GB-1



CHARACTERISTICS

- Nominal pressure
DN 50-150 mm: PN 10,
- Temperature range 7 to 127 °C

APPLICATIONS

Thermostatic control valve type G3FSI is a three-way control valve unique due to its internal sensor technology. The thermostatic valve is ideal for controlling fluid temperature, in cooling and heat recovery systems, and other temperature controlling applications such as: compressors, industrial engines, marine, power generation, renewable energy among others.

TYPICAL APPLICATIONS - MARINE/OFFSHORE/POWER GENERATION

Engines - lube oil, high and low temperature water, fresh water.

Compressors and Gearboxes - lube oil

Heat Recovery and Fresh Water Generators - water circuits

DIMENSIONING

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{Q \text{ (m}^3 \text{ / h)}}{\sqrt{\Delta p \text{ (bar)}}$$
$$\Delta p \text{ (bar)} = \left(\frac{Q \text{ (m}^3 \text{ / h)}}{k_{vs}} \right)^2$$

DEFINITION OF K_{VS}-VALUE

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

DESIGN

The valve body is made of nodular cast iron, EN GJS 450-10, ASTM A536 grade 65-45-12.

The valve flanges are drilled according to, EN1092-2 (ANSI flanges available on request).

QUALITY ASSURANCE

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

SPECIFICATIONS

Type	Flange connection DN in mm	kvs-value $\text{m}^3 \text{ / h}$	Weight kg
50 G3FSI	50	53	11
65 G3FSI	65	82	22
80 G3FSI	80	86	26
100 G3FSI	100	173	44
125 G3FSI	125	285	55
150 G3FSI	150	389	74

Subject to changes without notice.

3-WAY THERMOSTATIC VALVE TYPE G3FSI

2.5.15-A

NODULAR CAST IRON, DN 50 – 150 mm,

FUNCTION

The thermostatic valve uses the principle of expanding wax, which undergoes large expansion rates within a relatively narrow temperature range. The self-acting element activates a cone, which directs the flow. All Clorius thermostatic valves are factory set at predetermined temperatures: no further adjustments are necessary. A wide range of temperatures are available for water and oil temperature control applications.

When using in a diverting application, on start-up the total fluid flow is routed back to the main system. As fluid temperature rises to the control range, some fluid is diverted to the cooling system. As fluid temperature continues to increase, more flow is diverted. When the thermostat is in a fully stroked condition, all fluid flow is directed to the cooling system. Clorius thermostatic valves may also be used in mixing application.

In a mixing application, port B is the hot by-pass fluid inlet and port C the cold fluid inlet from the cooler. The flows mix and the thermostat adjusts to reach the setpoint temperature of the mixed output flow through port A (common port).

TECHNICAL DATA

Materials:

- Valve body	Nodular Cast iron ASTM A536 Grade 65-45-12 (EN-GJS-450-10)
Temperature range	7 to 127 °C
Flanges	EN1092-2 (ANSI flanges available on request)

Recommended pressure drop 0,15 - 0,5 bar

Max. static pressure	
DN 50-150	10 bar
Optional	Manual override Nickel plated thermostatic elements Wheep holes

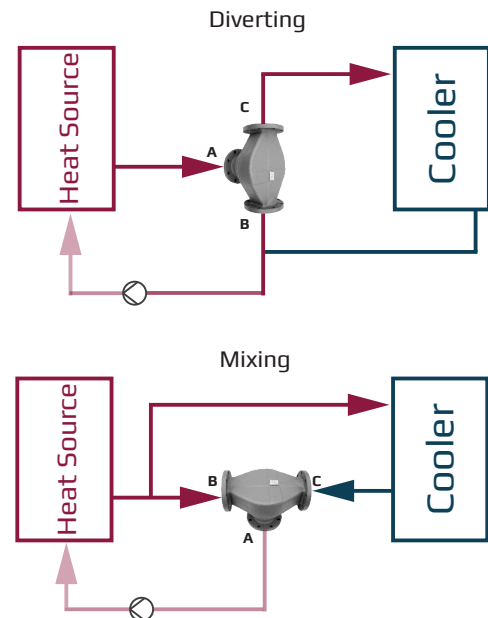
MOUNTING

The valve can be installed in all positions.
No additional space required.

STRAINER

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

PORT NUMBERING



Subject to changes without notice.

3-WAY THERMOSTATIC VALVE TYPE G3FSI

2.5.15-A

NODULAR CAST IRON, DN 50 – 150 mm,

GB-3

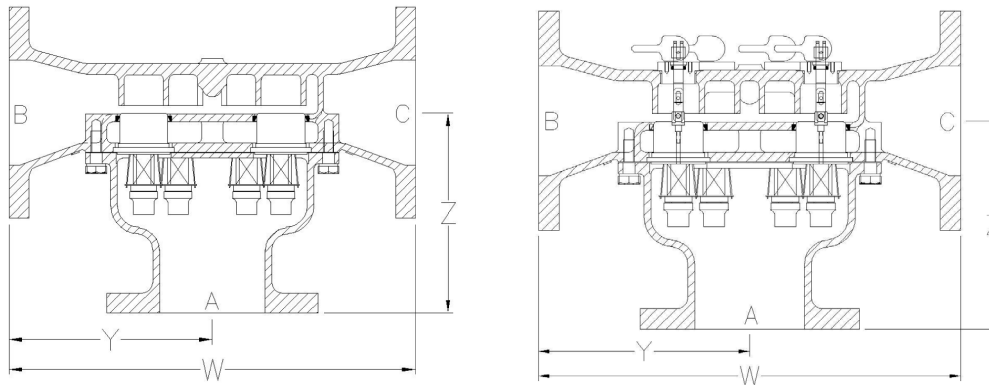
SET POINT TEMPERATURES

DIMENSIONS							
Type	Dimensions			Max. Width in mm	Flange drilling EN 1092-2 in mm		
	Y mm	W mm	Z mm		Outer diameter	Bolt circle	Dia. of holes x no. of holes
50 G3FSI	114	228	153	159	∅159	∅125	∅19 x 4
65 G3FSI	129	259	170	206	∅185	∅145	∅19 x 4
80 G3FSI	136	273	175	203	∅200	∅160	∅19 x 8
100 G3FSI	201	402	217	279	∅220	∅180	∅19 x 8
125 G3FSI	247	494	243	356	∅250	∅210	∅19 x 8
150 G3FSI	245	490	256	406	∅285	∅240	∅23 x 8

Subject to change without notice

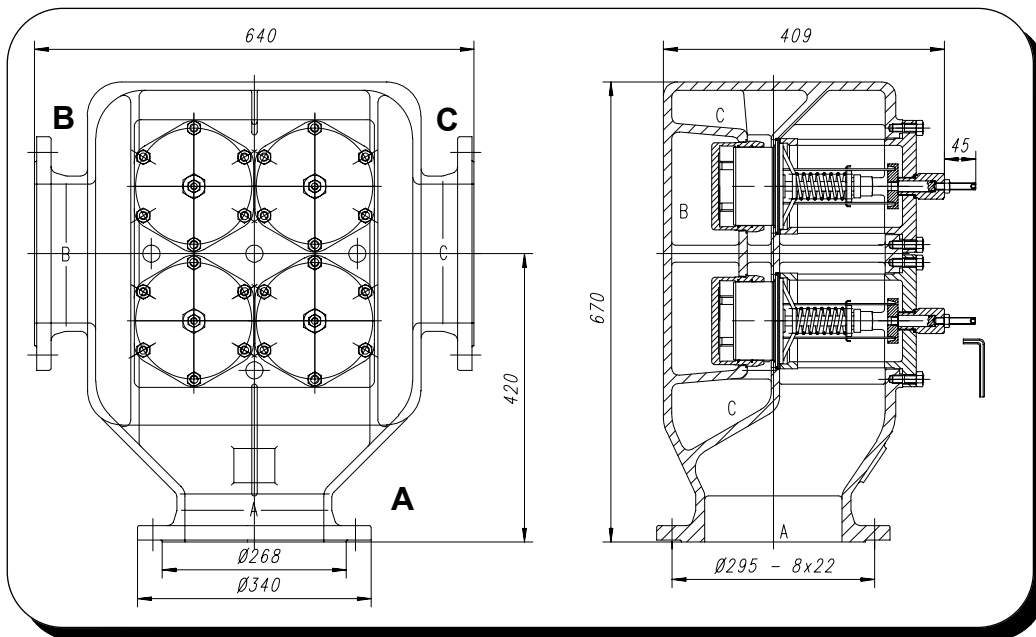
Set Point temperature, deg. C.
7
13
18
24
32
35
38
41
43
46
49
54
57
60
66
68
71
74
77
79
82
85
88
91
96
99
104
110
116
121
127

DIMENSION SKETCH





Clorius Controls Three-Way Temperature Regulator Type Series 226G0121 with manual override deliverable size: 200 mm



Technical Data

material:

- body EN-GJS-400-15 thermostat 237.1121-xxx
- innerparts ss/brass sealing kit NBR
- operation temperature up to 120 °C nominal pressure PN 10
- operation pressure up to 10 bar connection flange EN 1092-2 form B
- adm. differential pressure up to 10 bar manual override

This emergency manual adjustment is not to be used for adjustment during automatic operation.

Installation:			
The installation can be done selectively as follows:			
as divider		as mixing valve	
path A: from motor	path C: from cooler		
path B: to bypass	path B: from bypass		
path C: to cooler	path A: to motor		
The paths have been marked on the connections.			
The temperature regulator may be installed in all positions.			
deliverable temperature ranges			
20 - 32 °C	38 - 49 °C	51 - 62 °C	
27 - 37 °C	40 - 52 °C	57 - 68 °C	
35 - 47 °C	43 - 54 °C	85 - 95 °C	

Application

Clorius Controls Temperature Regulators are suitable for the stabilization of temperatures of media (e. g. water, oils, etc.) and are even applicable as dividing units or mixing valves. Depending on their construction they are distinguished by their low need of maintenance, particular operating convenience and resistance to pressure. A replacement of inner parts is possible on site without having to remove the regulating valve from the piping. A faulty assembly can be excluded. The temperature regulators could be assembled in each fitting position.

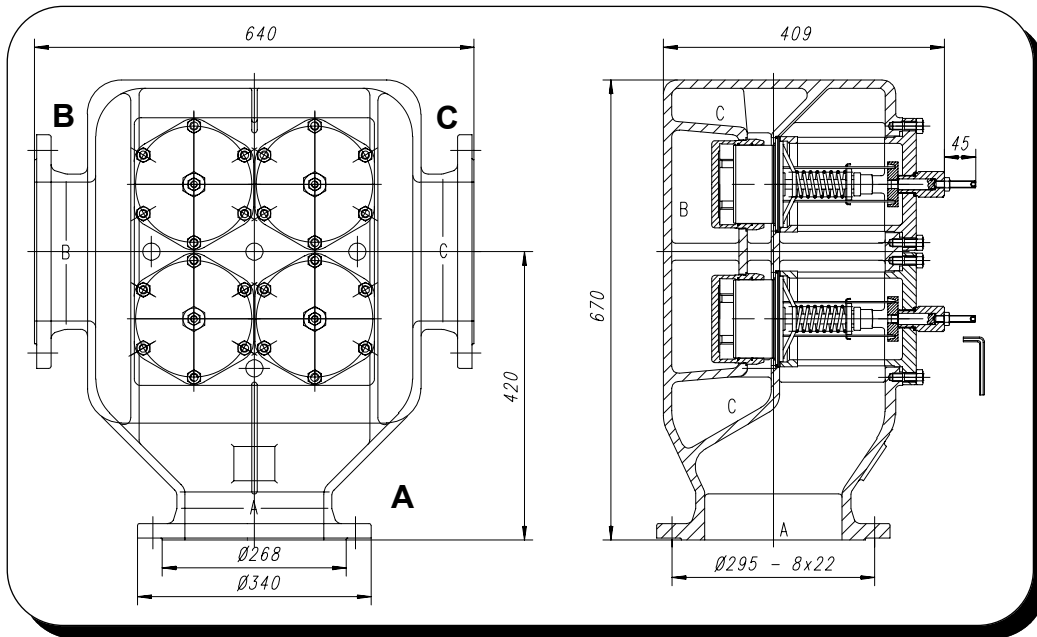
Function

Clorius Controls Temperature Regulators are being equipped with easily replaceable internal wax-filled thermostats that absorb the temperature of the medium surrounding them at the measurement point namely into expansion and thus a change in path or length (the valve stroke). Clorius Controls Temperature Regulators do not require any auxiliary energy. At rising temperature and on excess of the opening temperature, the tube slider is being lifted off of the valve seat and opening path A to C, with the path A to B locking simultaneously in the same ratio. The change is being performed in proportion to the change of temperature of the passing medium.

Manual Override: In order to meet the security demands of the classification societies for greater safety, the manual override was installed. It is not intended for setting the temperature when the regulating valve runs automatically. The manual resetting facility makes it possible to use the control valve as a manual change-over valve. The taper can be brought into any desired position by means of an adjusting screw, so that any operating temperature can be set by observing the thermometer.



Clorius Controls Three-Way Temperature Regulator Type Series 226G1121 with manual override deliverable size: 200 mm



Technical Data

material:

- body EN-GJS-400-15 thermostat 237.1121-xxx
- inner parts ss/brass sealing kit NBR
- operation temperature up to 120 °C nominal pressure PN 16
- operation pressure up to 16 bar connection flange EN 1092-2 form B
- adm. differential pressure up to 16 bar manual override

This emergency manual adjustment is not to be used for adjustment during automatic operation.

Installation:		deliverable temperature ranges			
The installation can be done selectively as follows:					
as divider					
path A: from motor	path C: from cooler	20 - 32 °C	38 - 49 °C	51 - 62 °C	
path B: to bypass	path B: from bypass	27 - 37 °C	40 - 52 °C	57 - 68 °C	
path C: to cooler	path A: to motor	35 - 47 °C	43 - 54 °C	85 - 95 °C	
The paths have been marked on the connections.					
The temperature regulator may be installed in all positions.					

Application

Clorius Controls Temperature Regulators are suitable for the stabilization of temperatures of media (e. g. water, oils, etc.) and are even applicable as dividing units or mixing valves. Depending on their construction they are distinguished by their low need of maintenance, particular operating convenience and resistance to pressure. A replacement of inner parts is possible on site without having to remove the regulating valve from the piping. A faulty assembly can be excluded. The temperature regulators could be assembled in each fitting position.

Function

Clorius Controls Temperature Regulators are being equipped with easily replaceable internal wax-filled thermostats that absorb the temperature of the medium surrounding them at the measurement point namely into expansion and thus a change in path or length (the valve stroke). Clorius Controls Temperature Regulators do not require any auxiliary energy. At rising temperature and on excess of the opening temperature, the tube slider is being lifted off of the valve seat and opening path A to C, with the path A to B locking simultaneously in the same ratio. The change is being performed in proportion to the change of temperature of the passing medium.

Manual Override: In order to meet the security demands of the classification societies for greater safety, the manual override was installed. It is not intended for setting the temperature when the regulating valve runs automatically. The manual resetting facility makes it possible to use the control valve as a manual change-over valve. The taper can be brought into any desired position by means of an adjusting screw, so that any operating temperature can be set by observing the thermometer.

3-way Control Valves type G3FA

Nodular cast iron, DN 80 – 300 mm

2.5.16-A

GB-1

Characteristics

- Nominal pressure
80-200 G3FA: PN 16 max. 120°C / 160°C
300/250-300 G3FA: PN 10 max. 120°C / 160°C
80-300 G3FA: JIS 10K (option)
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Two balanced single seats
- For cooling and heating purposes

Applications

Control valves type G3FA are designed for regulating of fresh water, lubricating oil and other liquid media.

The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary engines. Is used in conjunction with Clorius valve motor type AVM/AVF 234 or Clorius pneumatic actuators.

Dimensioning

For sizing of control valves bigger than DN 150 mm following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

Design

The valve components (seats and cone) are made of gun metal, the spindle of stainless steel. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2 (JIS B 2210 option).

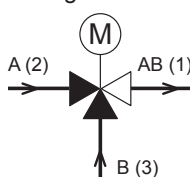
Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

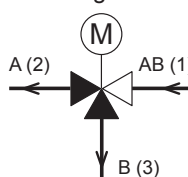
Port numbering

The ports of valves type G3FA are marked with the letters AB, A and B. The letters in parentheses refer to the corresponding internationally adapted designations.

Mixing valve



Diverting valve



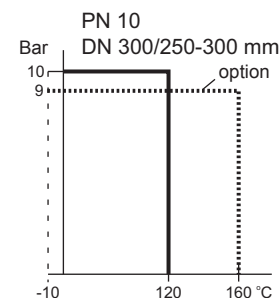
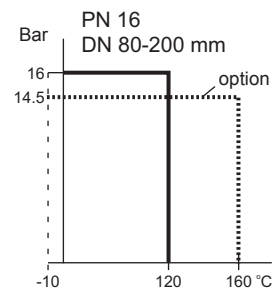
Port AB (1)	common port always open
Port A (2)	closes at load on spindle
Port B (3)	opens at load on spindle

Function

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed. In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.



Pressure/Temperature diagram



Specifications

Type	Flange connection DN in mm	Opening mm	k_{vs} -value ¹⁾ m ³ /h	Lifting height mm	Weight kg
80 G3FA	80	80	80	11	35
100 G3FA	100	100	125	13	44
125 G3FA	125	125	215	18	72
150 G3FA	150	150	310	20	111
200/175 G3FA	200	200	425	22	165
200 G3FA	200	200	555	28	160
300/250 G3FA	300	300	865	28	306
300 G3FA	300	300	1250	45	290

¹⁾ The stated k_{vs} values apply for mixing valves. Diverting valves: 0.86 x (k_{vs} -values for mixing valves).

Subject to change without notice.

3-way Control Valves type G3FA

Nodular cast iron, DN 80 – 300 mm

2.5.16-A

GB-2

Technical data

Materials:

- Valve body	Nodular cast iron EN-GJS-400-15
- Trim	Gun metal RG 5 CuSn5Zn5Pb5-C
- Valve spindle	Stainless steel (W.no. 1.4436)

Nominal pressure

80-200 G3FA:	PN 16 (max.120/160°C)
300/250-300 G3FA:	PN 10 (max.120/160°C)
80-300 G3FA:	JIS 10K (option)

Seats 2 balanced single seats

Valve characteristic Almost linear

Leakage ≤ 0.5%

Temperature range Max. 120°C / 160°C

Mounting See below

Flanges According to EN 1092-2,
PN 16 & PN 10

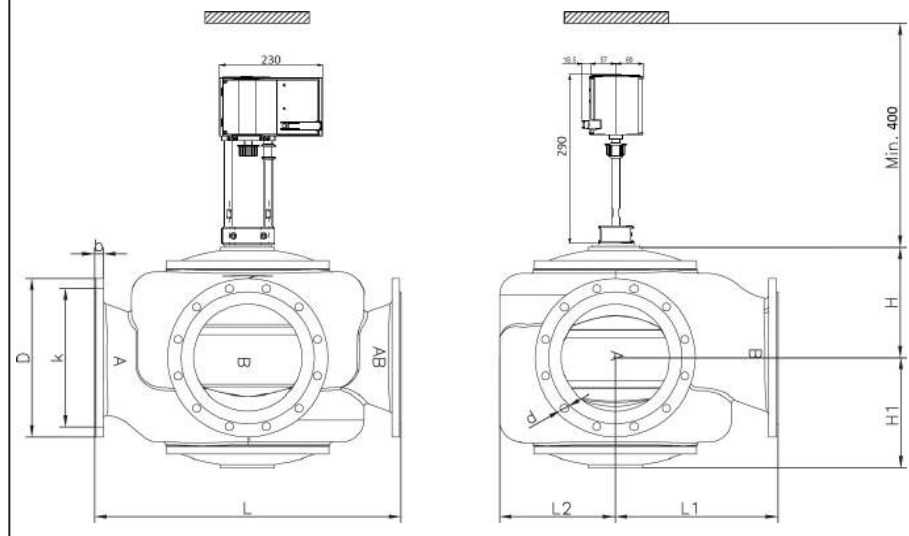
- option: According to JIS B 2210 10K

Note ! Valve type 200/175 G3FA has outer measures and flanges drilled as valve type 200 G3FA.
Valve type 300/250 G3FA has outer measures and flanges drilled as valve type 300 G3FA.

Counter flanges (suggested for EN 1092-2)

80-200 G3FA:	DIN 2633 – PN 16
300/250-300 G3FA:	DIN 2632 – PN 10

Dimension sketch incl. AVF/M 234



Dimensions

Type	L	L1	L2	H	H1	b	EN 1092-2			JIS B 2210 10K		
							D (dia.)	k (dia.)	d mm (number)	D (dia.)	k (dia.)	d mm (number)
80 G3FA	310	155	102	117	127	19	200	160	19x(8)	185	150	19x(8)
100 G3FA	350	175	112	132	141	19	220	180	19x(8)	210	175	19x(8)
125 G3FA	400	240	138	181	171	19	250	210	19x(8)	250	210	23x(8)
150 G3FA	480	270	165	216	189	24	285	240	23x(8)	280	240	23x(8)
200/175 G3FA	600	325	230	238	238	20	340	295	23x(12)	330	290	23x(12)
200 G3FA	600	325	230	238	238	20	340	295	23x(12)	330	290	23x(12)
300/250 G3FA	850	450	325	305	305	25	445	400	23x(12)	445	400	25x(16)
300 G3FA	850	450	325	305	305	25	445	400	23x(12)	445	400	25x(16)

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{VS} -value will decrease by 14% as against mixing valves.

Mounting

The valves can be installed vertical as well as horizontal. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations.

Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor, otherwise minimum 745 mm for pneumatic actuators.

Strainer It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Subject to change without notice.

Clorius
CONTROLS

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3-way Control Valves type G3FA-HT

Nodular cast iron, PN 16, DN 80 – 200 mm / PN 10, DN 300/250 – 300 mm

High temperature (Teflon Graphite sealing)

2.5.17.01-A

GB-1

Characteristics

- Nominal pressure
 - 80-200 mm: PN 16 max. 150°C
 - 300/250-300 mm: PN 10 max. 150°C
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Two balanced single seats
- For cooling and heating purposes

Applications

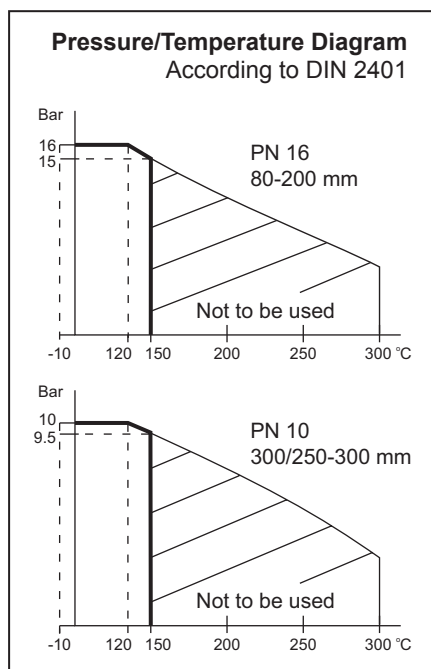
Control valves type G3FA-HT are designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary engines. Is used in conjunction with Clorius valve motor type MT90 Marine.

Dimensioning

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$



Design

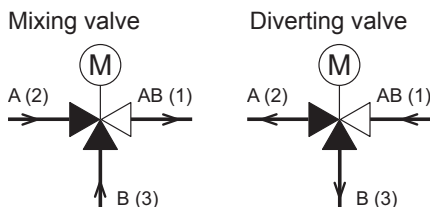
The valve components (seats and cone) are made of gun metal, the spindle of stainless steel. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Port numbering

The ports of valves type G3FA-HT are marked with the letters AB, A and B. The letters in parentheses refer to the corresponding internationally adapted designations.

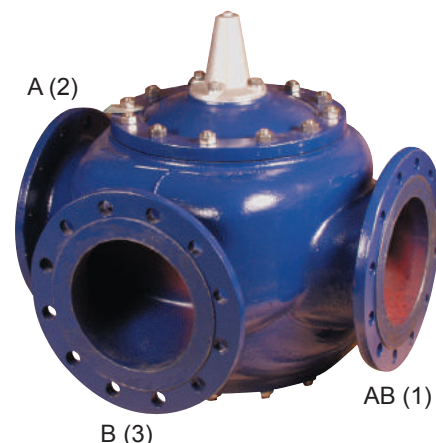


Port AB (1)	common port always open
Port A (2)	closes at load on spindle
Port B (3)	opens at load on spindle

Function

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection A-AB is kept fully open and connection B-AB is fully closed.

In the other extreme position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.



Technical data

Materials	
- Valve body	Nodular cast iron EN-GJS-400-15
- Trim	Gun metal RG 5 CuSn5Zn5Pb5-C
- Valve spindle	Stainless steel (W.no. 1.4436)

Nominal pressure	
80-200 G3FA-HT:	PN 16 (max. 150°C)
300/250-300 G3FA-HT:	PN 10 (max. 150°C)

Seats	2 balanced single seats
Valve characteristic	Almost linear
Leakage	≤ 0.5%
Temperature range	Max. 150°C
Mounting	See page 2
Flanges	According to EN 1092-2, PN 16 & PN 10

Note ! Valve type 200/175 G3FA-HT has outer measures and flanges drilled as valve type 200 G3FA-HT
Valve type 300/250 G3FA-HT has outer measures and flanges drilled as valve type 300 G3FA-HT

Counter flanges (suggested)	
80-200 G3FA-HT:	DIN 2633 - PN 16
300/250-300 G3FA-HT:	DIN 2632 - PN 10

Subject to change without notice.

Specifications

Type	Flange connection DN in mm	Opening mm	k_{vs} -value ¹⁾ m ³ /h	Lifting height mm	Weight kg
80 G3FA-HT	80	80	80	11	35
100 G3FA-HT	100	100	125	13	44
125 G3FA-HT	125	125	215	18	72
150 G3FA-HT	150	150	310	20	111
200/175 G3FA-HT	200	200	425	22	165
200 G3FA-HT	200	200	555	28	160
300/250 G3FA-HT	300	300	865	28	306
300 G3FA-HT	300	300	1250	45	290

¹⁾ The stated k_{vs} values apply for mixing valves. Diverting valves: $0.86 \times (k_{vs}$ -values for mixing valves).

3-way Control Valves type G3FA-HT

Nodular cast iron, PN 16, DN 80 – 200 mm / PN 10, DN 300/250 – 300 mm

High temperature (Teflon Graphite sealing)

2.5.17.01-A

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{VS} -value will decrease by 14% as against mixing valves.

Mounting

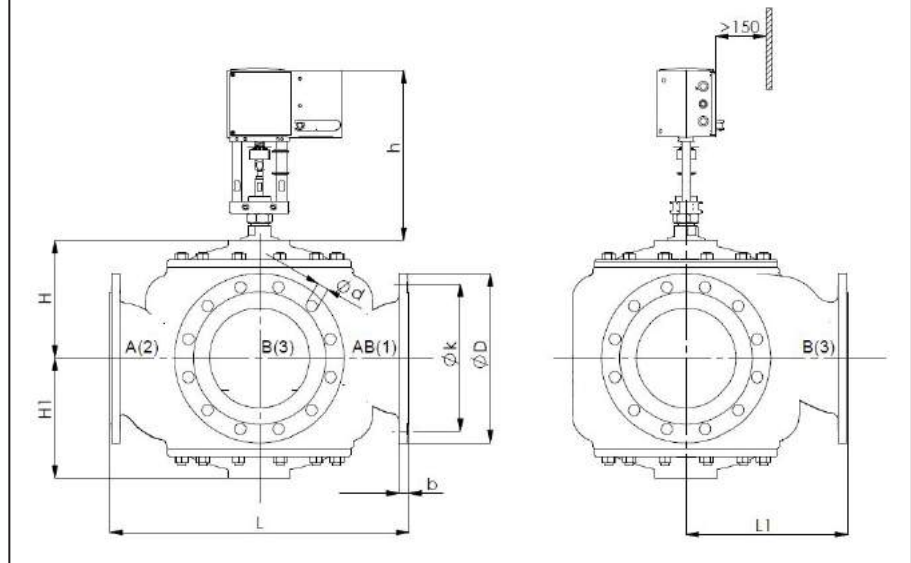
The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations. Free height above / below the valve must be minimum 400 mm for mounting and operation of the AVM/AVF 234 motor. See drawing.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Subject to change without notice.

Dimension sketch



Dimensions

Type	L mm	L1 mm	H mm	H1 mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
80 G3FA-HT	310	155	117	127	19	200	160	19 x (8)
100 G3FA-HT	350	175	132	141	19	220	180	19 x (8)
125 G3FA-HT	400	240	181	171	19	250	210	19 x (8)
150 G3FA-HT	480	270	216	189	24	285	240	23 x (8)
200/175 G3FA-HT	600	325	238	238	20	340	295	23 x (12)
200 G3FA-HT	600	325	238	238	20	340	295	23 x (12)
300/250 G3FA-HT	850	450	305	305	25	445	400	23 x (12)
300 G3FA-HT	850	450	305	305	25	445	400	23 x (12)

Characteristics

- Nominal pressure
200/175-200 G3FA-I:
PN 16 max. 120°C / 160°C
300/250-300 G3FA-I:
PN 10 max. 120°C / 160°C
200/175-300 G3FA-I: JIS 10K (option)
- Regulating capability $\frac{k_{vs}}{k_{vr}} > 25$
- Two balanced single seats
- For cooling and heating purposes

Applications

Control valves type G3FA-I are designed for regulating of fresh water, lubricating oil and other liquid media. The valves are designed for use in conjunction with large industrial processes, district heating and marine installations, e.g. cooling of main and auxiliary engines. Is used in conjunction with Clorius valve motor type AVM/F 234.

Dimensioning

For sizing of control valves following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

Please see datasheet 4.8.05, for max. differential pressure which the actuator type AVM/F 234, can close the valve against.

Design

The valve components (seats and cone) are made of gun metal, the spindle of stainless steel. The valve body is made of nodular cast iron and the valve flanges are drilled according to EN 1092-2 (JIS B 2210 option).

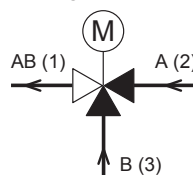
Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

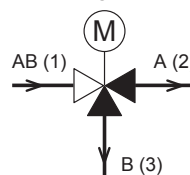
Port numbering

The ports of valves type G3FA-I are marked with the letters AB, A and B. The letters in parentheses refer to the corresponding internationally adapted designations.

Mixing valve



Diverting valve



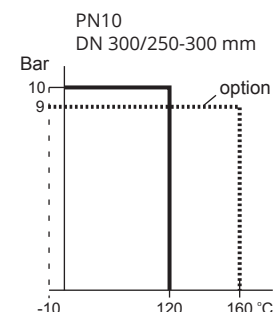
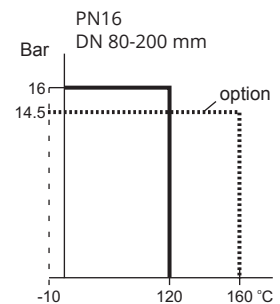
Port AB (1)	common port always open
Port A (2)	opens at load on spindle
Port B (3)	closes at load on spindle

Function

The valve cone is firmly connected with the motor spindle. When the valve cone is in the one extreme position by draw on the spindle, connection B-AB is kept fully open and connection A-AB is fully closed. In the other extreme position connection B-AB is fully closed and connection A-AB is fully open. In the intermediate positions the opening degrees change proportionally.



Pressure/Temperature diagram



Specifications

Type	Flange connection DN in mm	Opening mm	k_{vs} -value ¹⁾ m ³ /h	Lifting height mm	Weight kg
80 G3FA-I	80	80	80	11	35
100 G3FA-I	100	100	125	13	44
125 G3FA-I	125	125	215	18	72
150 G3FA-I	150	150	310	20	111
200/175 G3FA-I	200	200	425	22	165
200 G3FA-I	200	200	555	28	160
300/250 G3FA-I	300	300	865	28	306
300 G3FA-I	300	300	1250	45	290

¹⁾ The stated k_{vs} values apply for mixing valves. Diverting valves: 0.86 x (k_{vs} -values for mixing valves).

Subject to change without notice.

Technical data

Materials:

- Valve body	Nodular cast iron EN-GJS-400-15
- Trim	Gun metal RG 5 CuSn5Zn5Pb5-C
- Valve spindle	Stainless steel (W.no. 1.4436)

Nominal pressure

80-200 G3FA-I:	PN 16 (max.120/160°C)
300/250-300 G3FA-I:	PN 10 (max.120/160°C)
200/175-300 G3FA-I:	JIS 10K (option)

Seats

2 balanced single seats

Valve characteristic

Almost linear

Leakage

≤ 0.5%

Temperature range

Max. 120°C / 160°C

Mounting

See below

Flanges

According to EN 1092-2,
PN 16 & PN 10

- option:

According to JIS B 2210 10K

Note ! Valve type 200/175 G3FA-I has outer measures and flanges drilled as valve type 200 G3FA-I.

Valve type 300/250 G3FA-I has outer measures and flanges drilled as valve type 300 G3FA-I.

Counter flanges (suggested for EN 1092-2)

80-200 G3FA-I:	DIN 2633 - PN 16
300/250-300 G3FA-I:	DIN 2632 - PN 10

Definition of k_{vs} -value

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m³/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Important note

In case the valves are applied as diverting valves, the pressure drop will increase by 35% and the k_{vs} -value will decrease by 14% as against mixing valves.

Mounting

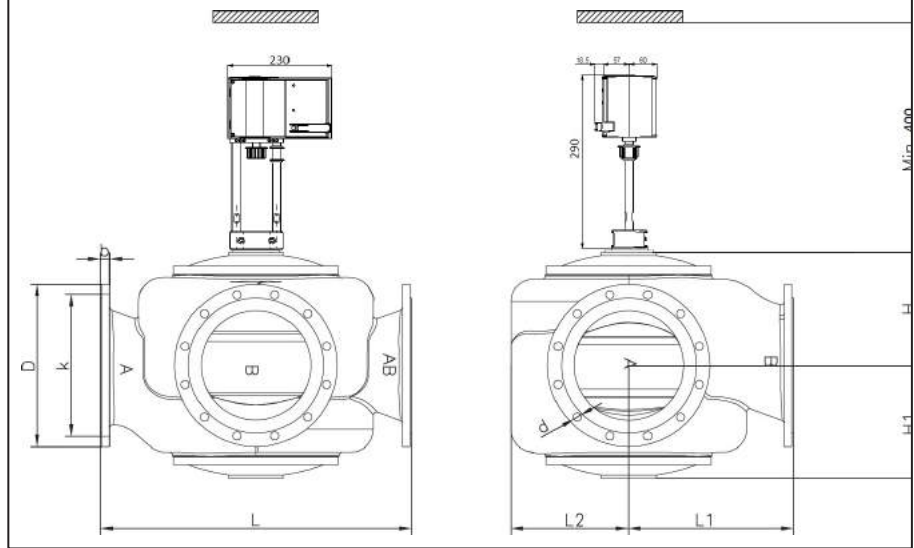
The valves can be installed vertically as well as horizontally. The valves must be mounted in a way that the valve motor will be exposed to a minimum of moisture and unnecessary vibrations.

Free height above/below the valve must be minimum 400 mm for mounting and operating of the AVM/F 234 motor, see drawing.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Dimensions



Dimensions

Type	L	L1	L2	H	H1	b	EN 1092-2			JIS B 2210 10K		
							D (dia.)	k (dia.)	d mm (number)	D (dia.)	k (dia.)	d mm (number)
80 G3FA-I	310	155	102	117	127	19	200	160	19x(8)	185	150	19x(8)
100 G3FA-I	350	175	112	132	141	19	220	180	19x(8)	210	175	19x(8)
125 G3FA-I	400	240	138	181	171	19	250	210	19x(8)	250	210	23x(8)
150 G3FA-I	480	270	165	216	189	24	285	240	23x(8)	280	240	23x(8)
200/175 G3FA-I	600	325	230	238	238	20	340	295	23x(12)	330	290	23x(12)
200 G3FA-I	600	325	230	238	238	20	340	295	23x(12)	330	290	23x(12)
300/250 G3FA-I	850	450	325	305	305	25	445	400	23x(12)	445	400	25x(16)
300 G3FA-I	850	450	325	305	305	25	445	400	23x(12)	445	400	25x(16)

Subject to change without notice.

3-way Control Valves type G3FM-TR (AB-Right) Nodular cast iron, DN 80 – 800 mm

2.6.02-T

GB-1

Characteristics

- Nominal pressure
DN 80-125 mm: PN25 max. 100 °C
DN 150-300 mm: PN 16, max. 100°C (option 250°C)
DN 350-800 mm: PN 10, max. 100°C (option 250°C)
DN 150-800 mm: JIS 5K (option)
- Slide in Nodular cast iron

Applications

Control valve type G3FM-TR is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media.

The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

Dimensioning

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

Design

The valve body and the valve slide are made of nodular cast iron.

The valve flanges are drilled according to EN 1092-2 (JIS B 2210 option).

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

Technical data

Materials:

- Valve body, slide Nodular cast iron
EN-GJS-400-15

- O-ring NBR 70A

Valve characteristic Almost linear

Leakage Max. 0.5%

Temperature range Max. 100°C (option 250°C)

Mounting See page 2

Flanges EN 1092-2

PN 10/16/25

- option JIS B 2210 5K

Counter flanges (suggested for

EN 1092-2) DIN 2632 – PN 10

DIN 2633 – PN 16

DIN 2634 – PN 25

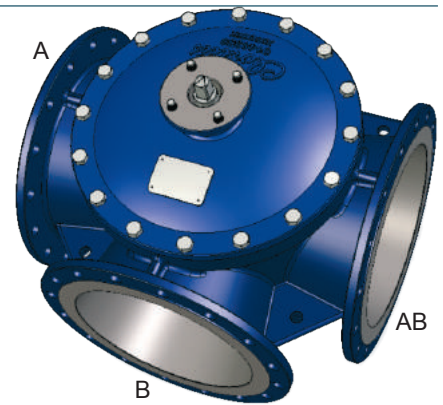
Max. pressure Δp_L , against which the

valve can close:

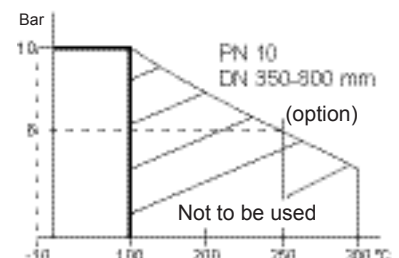
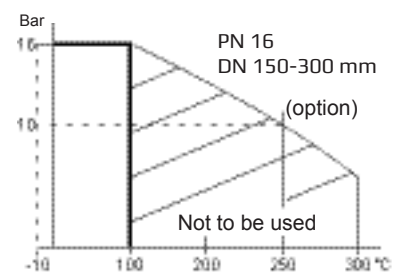
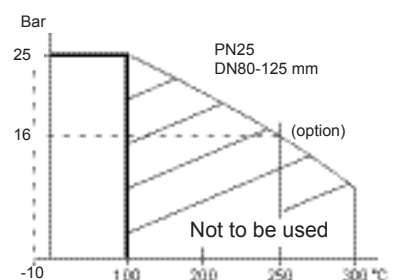
- DN 80 - 125 25 bar

- DN 150-300 16 bar

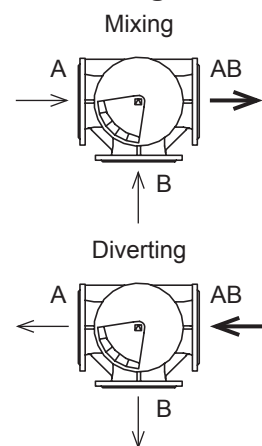
- DN 350-800 10 bar



Pressure/Temperature diagram



Port numbering



Specifications					
Type	Flange connection DN in mm	k_{vs} -value ¹⁾ Mixing valve m ³ /h	k_{vs} -value ¹⁾ Diverting valve m ³ /h	Torque Nm	Weight kg
80 G3FM-TR	80	available from July 2016			
100 G3FM-TR	100	175	220	52	41
125 G3FM-TR	125	245	330	98	58
150 G3FM-TR	150	395	425	135	71
200 G3FM-TR	200	800	1100	330	114
250 G3FM-TR	250	1500	2100	450	159
300 G3FM-TR	300	2000	2650	700	207
350 G3FM-TR	350	2530	3380	780	278
400 G3FM-TR	400	3050	3950	880	346
450 G3FM-TR	450	3680	4480	1250	433
500 G3FM-TR	500	4150	5250	1450	563
600 G3FM-TR	600	4800	6050	1750	816
700 G3FM-TR	700	5500	7000	2150	1150
800 G3FM-TR	800	6200	8000	2550	1400

¹⁾ k_{vs} -value for port A and B 50% open.

Subject to change without notice.

3-way Control Valves type G3FM-TR (AB-Right) Nodular cast iron, DN 80 – 800 mm

2.6.02-T

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

The valve connections are marked A, B and AB. The slide is operating between A and B.

Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

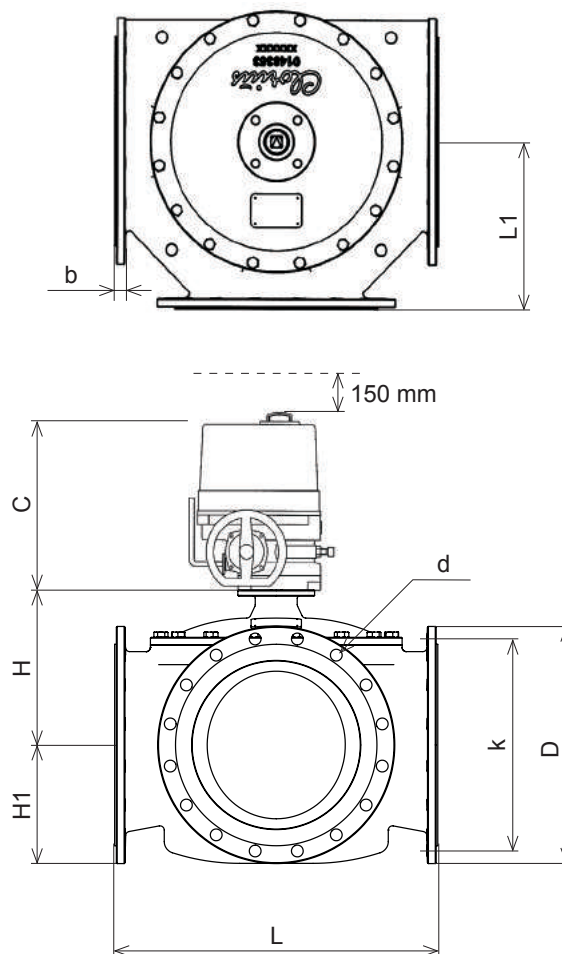
The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

Valves can also be supplied in AB-Left configuration (data sheet 2.6.03).

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Dimension sketch



Dimensions							EN 1092-2			ANSI Class 150			JIS B 2210 5K			JIS B 2210 10K		
Type	L mm	L1 mm	H mm	H1 mm	b mm	C mm	D	k	d mm	D	k	d mm	D	k	d mm	D	k	d mm
							(dia.) mm	(dia.) mm	dia. (number)	(dia.) mm	(dia.) mm	dia. (number)	(dia.) mm	(dia.) mm	dia. (number)	(dia.) mm	(dia.) mm	dia. (number)
80 G3FM-TR																		
100 G3FM-TR	350	175	158	112	17	273	235	190	23x(8)	230	190,9	19x(8)	200	165	19x(8)	210	175	19x(8)
125 G3FM-TR	400	200	179	123	17	273	270	220	28x(8)	255	216	22x(8)	235	200	19x(8)	250	210	23x(8)
150 G3FM-TR	438	219	196	139	20	276	290	240	23x(8)	280	241	22x(8)	265	230	19x(8)	280	240	23x(8)
200 G3FM-TR	530	270	236	175	21	361	340	295	23x(12)	343	299	23x(8)	320	280	23x(8)	320	290	23x(12)
250 G3FM-TR	592	300	273	205	23	361	400	355	28x(12)	407	362	26x(12)	385	345	23x(12)	400	355	25x(12)
300 G3FM-TR	649	330	305	230	25.5	361	455	410	28x(12)	483	432	26x(12)	430	390	23x(12)	445	400	25x(16)
350 G3FM-TR	717	360	337	255	25.5	361	505	460	23x(16)	534	477	29x(12)	480	435	25x(12)	490	445	25x(16)
400 G3FM-TR	770	385	375	285	26	361	565	515	28x(16)	597	540	29x(16)	540	495	25x(16)	560	510	27x(16)
450 G3FM-TR	820	410	391	310	26.5	556	615	565	28x(20)	635	578	32x(16)	605	555	25x(16)	620	565	27x(20)
500 G3FM-TR	900	455	425	340	27.5	556	670	620	28x(20)	699	635	32x(20)	655	605	25x(20)	675	620	27x(20)
600 G3FM-TR	1000	505	470	393	31.0	556	780	725	31x(20)	813	750	35x(20)	770	715	25x(20)	795	730	33x(24)
700 G3FM-TR	1106	553	519	462	34.0	556	895	840	31x(24)	-	-	-	875	820	27x(24)	905	840	33x(24)
800 G3FM-TR	1200	600	579	507	37	556	1015	950	34x(24)	-	-	-	995	930	33x(24)	1020	950	33x(28)

Subject to change without notice.

3-way Control Valves type G3FM-TL (AB-Left)

Nodular cast iron, DN 150 – 800 mm

2.6.03-F

GB-1

Characteristics

- Nominal pressure
 - DN 150-300 mm: PN 16, max. 100°C (option 250°C)
 - DN 350-800 mm: PN 10, max. 100°C (option 250°C)
 - DN 150-800 mm: JIS 5K (option)
- Slide in Nodular cast iron

Applications

Control valve type G3FM-TL is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media.

The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

Dimensioning

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

Design

The valve body and the valve slide are made of nodular cast iron. The valve flanges are drilled according to EN 1092-2 (JIS B 2210 option).

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

Technical data

Materials:

- Valve body, slide Nodular cast iron
EN-GJS-400-15

- O-ring NBR 70A

Valve characteristic Almost linear

Leakage Max. 0.5%

Temperature range Max. 100°C (option 250°C)

Mounting See page 2

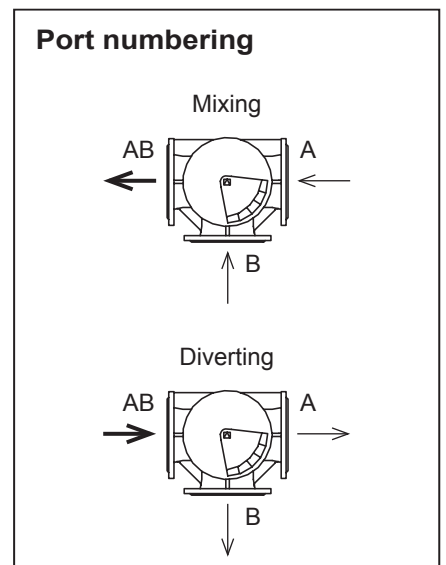
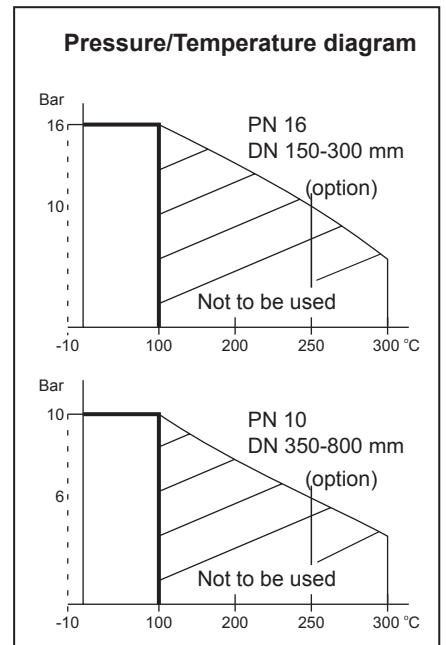
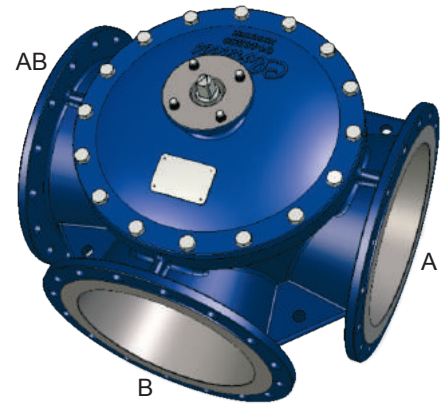
Flanges EN 1092-2 PN 10/16

- option JIS B 2210 5K

Counter flanges (suggested for EN 1092-2) DIN 2632 – PN 10
DIN 2633 – PN 16

Max. pressure Δp_L , against which the valve can close:

- DN 150-300 16 bar
- DN 350-800 10 bar



Subject to change without notice.

Specifications					
Type	Flange connection DN in mm	k_{vs} -value ¹⁾ Mixing valve m ³ /h	k_{vs} -value ¹⁾ Diverting valve m ³ /h	Torque Nm	Weight kg
150 G3FM-TL	150	395	425	035	71
200 G3FM-TL	200	800	1100	330	114
250 G3FM-TL	250	1500	2100	450	159
300 G3FM-TL	300	2000	2650	700	207
350 G3FM-TL	350	2530	3380	780	278
400 G3FM-TL	400	3050	3950	880	346
450 G3FM-TL	450	3680	4480	1250	433
500 G3FM-TL	500	4150	5250	1450	563
600 G3FM-TL	600	4800	6050	1750	816
700 G3FM-TL	700	5500	7000	2150	1150
800 G3FM-TL	800	6200	8000	2550	1400

¹⁾ k_{vs} -value for port A and B 50% open.



3-way Control Valves type G3FM-TL (AB-Left)

Nodular cast iron, DN 150 – 800 mm

2.6.03-F

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

The valve connections are marked A, B and AB. The slide is operating between A and B.

Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

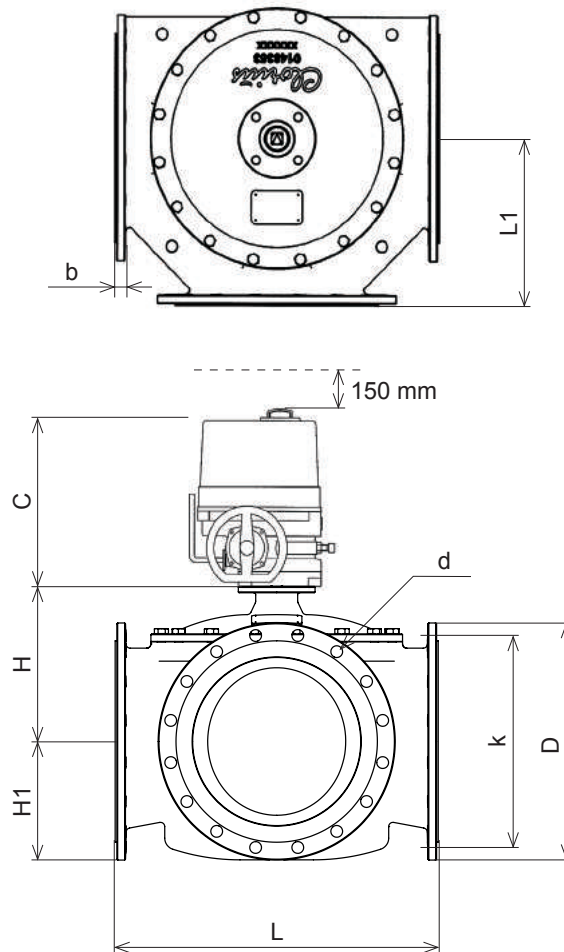
The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

Valves can also be supplied in AB-Right configuration (data sheet 2.6.02).

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Dimension sketch



Dimensions							EN 1092-2			ANSI Class 150			JIS B 2210 5K			JIS B 2210 10K		
Type	L mm	L1 mm	H mm	H1 mm	b mm	C mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)
150 G3FM-TL	438	219	196	139	20	276	290	240	23x(8)	286	241	22x(8)	265	230	19x(8)	280	240	23x(8)
200 G3FM-TL	530	270	236	175	21	361	340	295	23x(12)	343	299	23x(8)	320	280	23x(8)	320	290	23x(12)
250 G3FM-TL	592	300	273	205	23	361	400	355	28x(12)	407	362	26x(12)	385	345	23x(12)	400	355	25x(12)
300 G3FM-TL	649	330	305	230	25.5	361	455	410	28x(12)	483	432	26x(12)	430	390	23x(12)	445	400	25x(16)
350 G3FM-TL	717	360	337	255	25.5	361	505	460	23x(16)	534	477	29x(12)	480	435	25x(12)	490	445	25x(16)
400 G3FM-TL	770	385	375	285	26	361	565	515	28x(16)	597	540	29x(16)	540	495	25x(16)	560	510	27x(16)
450 G3FM-TL	820	410	391	310	26.5	556	615	565	28x(20)	635	578	32x(16)	605	555	25x(16)	620	565	27x(20)
500 G3FM-TL	900	455	425	340	27.5	556	670	620	28x(20)	699	635	32x(20)	655	605	25x(20)	675	620	27x(20)
600 G3FM-TL	1000	505	470	393	31.0	556	780	725	31x(20)	813	750	35x(20)	770	715	25x(20)	795	730	33x(24)
700 G3FM-TL	1106	553	519	462	34.0	556	895	840	31x(24)	-	-	-	875	820	27x(24)	905	840	33x(24)
800 G3FM-TL	1200	600	579	507	37	556	1015	950	34x(24)	-	-	-	995	930	33x(24)	1020	950	33x(28)

Subject to change without notice.



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3-way Control Valves type G3FM-TM (AB-Middle) 2.6.03.02-B

Nodular cast iron, DN 250 & 450 mm

GB-1

Characteristics

- Nominal pressure
DN 250 mm: PN 16, max. 100°C
DN450 mm: PN 10, max. 100°C
- Slide in Nodular cast iron

Applications

Control valve type G3FM-TM is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media.

The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

Dimensioning

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

Design

The valve body and the valve slide are made of nodular cast iron.

The valve flanges are drilled according to EN 1092-2 (JIS B 2210 option).

Specifications					
Type	Flange connection DN in mm	k_{vs} -value ¹⁾ Mixing valve m ³ /h	k_{vs} -value ¹⁾ Diverting valve m ³ /h	Torque Nm	Weight kg
250 G3FM-TM	250	1500	2100	450	159
450 G3FM-TM	450	3680	4450	1250	433

¹⁾ k_{vs} -value for port A and B 50% open.

Quality assurance

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

Function

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally.

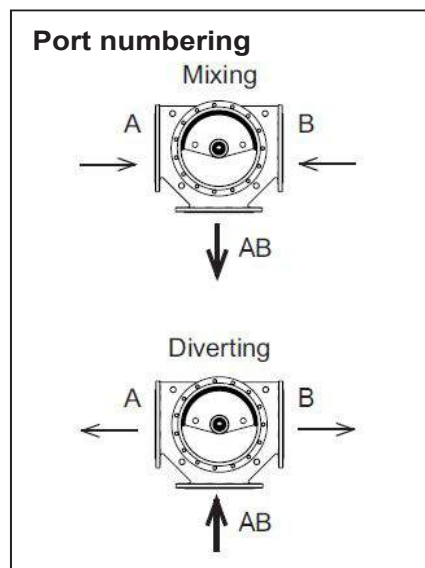
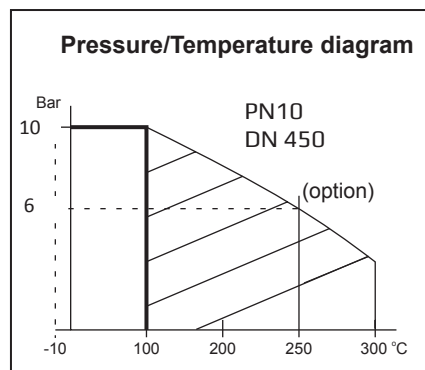
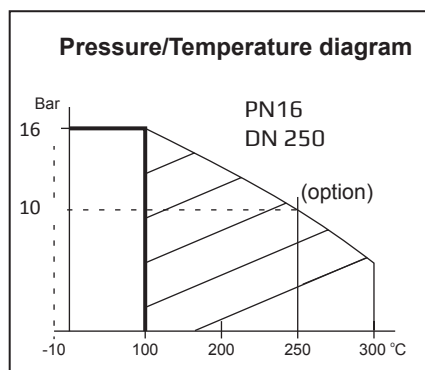
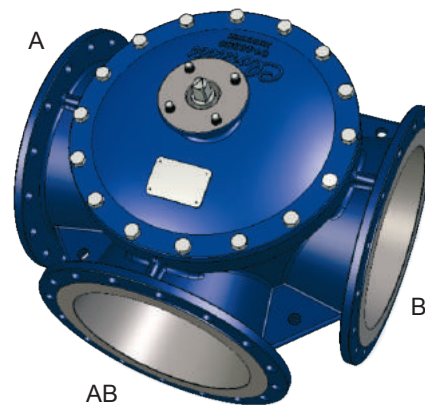
The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

Technical data

Materials:

- Valve body, slide Nodular cast iron
EN-GJS-400-15
- O-ring NBR 70A
- Valve characteristic Almost linear
- Leakage Max. 0.5%
- Temperature range Max. 100°C
- Mounting See page 2
- Flanges EN 1092-2 PN 10/16
- option JIS B 2210 5K
- Counter flanges (suggested for EN 1092-2) DIN 2633 – PN 16
- Max. pressure Δp_L , against which the valve can close:

- DN 250 16 Bar
- DN 450 10 Bar



Subject to change without notice.

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3-way Control Valves type G3FM-TM (AB-Middle) 2.6.03.02-B

Nodular cast iron, DN 250 & 450 mm

GB-2

Definition of k_{VS} -value

The k_{VS} -value is identical to the IEC flow coefficient k_V and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_V , of 1 bar.

Mounting

The valve connections are marked A, B and AB. The slide is operating between A and B.

Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

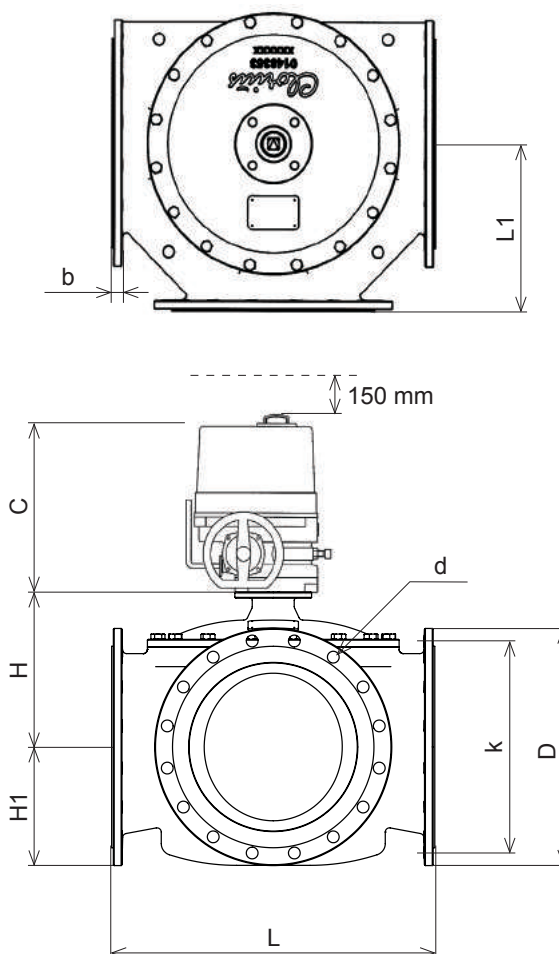
The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

Valves can also be supplied in AB-Right configuration (data sheet 2.6.02.01).

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Dimension sketch



Dimensions

Type	L mm	L1 mm	H mm	H1 mm	b mm	C mm	EN 1092-2			ANSI Class 150			JIS B 2210 5K			JIS B 2210 10K		
							D (dia.) mm	k (dia.) mm	d mm (number)	D (dia.) mm	k (dia.) mm	d mm (number)	D (dia.) mm	k (dia.) mm	d mm (number)	D (dia.) mm	k (dia.) mm	d mm (number)
250 G3FM-TM	592	300	273	205	23	361	400	355	28x(12)	407	362	26x(12)	385	345	23x(12)	400	355	25x(12)
450 G3FM-TM	820	410	391	322	26.5	556	640	585	31x(20)	635	578	32x(16)	605	555	25x(16)	620	565	27x(20)

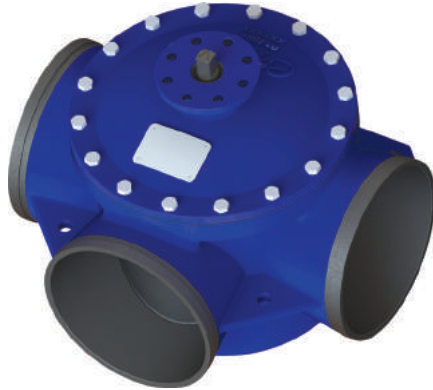
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3-WAY CONTROL VALVES TYPE G3CM-T

NODULAR CAST IRON, DN 100 – 300 MM, GROOVED JOINTS

2.6.05-B
GB-1



TECHNICAL DATA

Materials:

- Valve body, slide Nodular cast iron EN-GJS-400-15
- O-ring NBR 70A
- Valve characteristic Almost linear
- Leakage Max. 0.5%
- Temperature range Max. 100°C
- Mounting See page 2
- Connection Grooved joints acc. to ANSI/AWWA C-606 (Victaulic joints)

Max. pressure Δp_L against which the valve can close 16 bar

CHARACTERISTICS

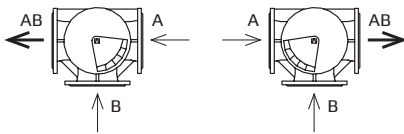
- Nominal pressure PN 16, max. 100°C (option 250°C)
- Slide in Nodular cast iron
- Low leakage

PORT NUMBERING

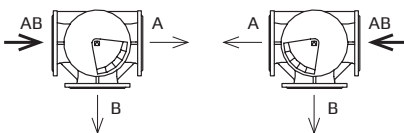
AB-left

AB-right

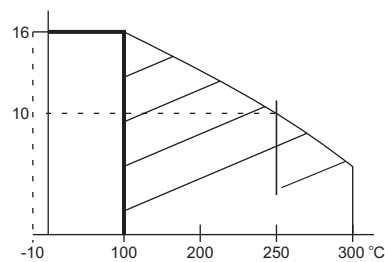
Mixing



Diverting



PRESSURE/TEMPERATURE DIAGRAM



Specifications

Type	Connection DN in mm	k_{VS} -value ¹⁾ Mixing valve m ³ /h	k_{VS} -value ¹⁾ Diverting valve m ³ /h	Weight kg
100 G3CM ²⁾	100	125	107.5	33
150 G3CM	150	310	266.6	88
200 G3CM-T	200	800	1100	86
250 G3CM-T	250	1500	2100	130
300 G3CM-T	300	2000	2650	170

¹⁾ k_{VS} -value for port A and B 50% open. ²⁾ available from 2015

APPLICATIONS

Control valve type G3CM-T is a three-way control valve with a slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media.

The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil volumes:

- Engine Jacket Cooling Water System
- Lubricating Oil Cooling
- Central Cooling Water System, etc.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

DIMENSIONING

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{G(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$
$$\Delta p(\text{bar}) = \left(\frac{G(m^3/h)}{k_{vs}} \right)^2$$

DESIGN

The valve body and the valve slide are made of nodular cast iron.

QUALITY ASSURANCE

All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

DEFINITION OF K_{VS} -VALUE

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

MOUNTING

The valve connections are marked A, B and AB. The slide is operating between A and B. Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

The valves can be installed vertically as well as horizontally. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

STRAINER

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

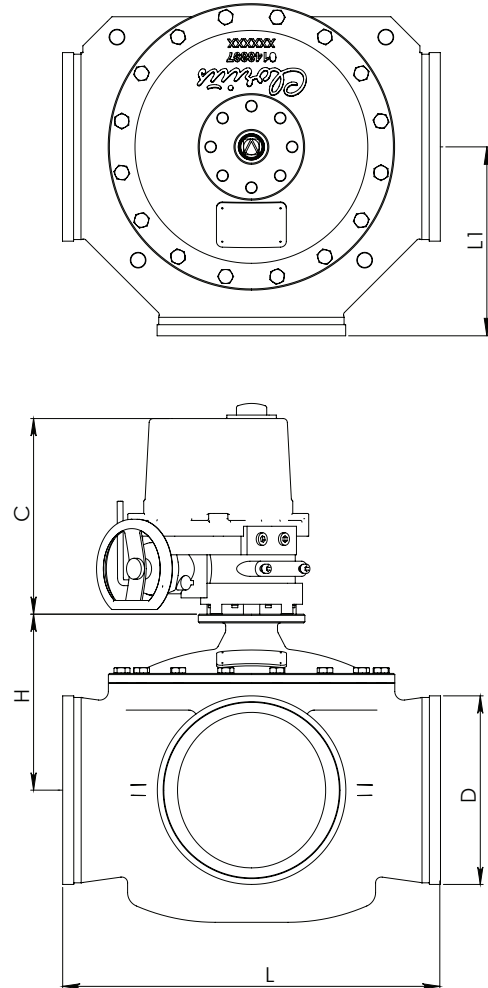
The slide is firmly connected with the motor spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed.

Subject to changes without notice.

3-WAY CONTROL VALVES TYPE G3CM-T
 NODULAR CAST IRON, DN 100 – 300 MM, GROOVED JOINTS

2.6.05-B
 GB-3

DIMENSION SKETCH



Type	Dimensions					
	L mm	L1 mm	H mm	B mm	C mm	D (dia.) mm
100 G3CM	350	175	132	19	470	114
150 G3CM	480	270	216	24	470	168
200 G3CM-T	530	270	236	21	361	219
250 G3CM-T	592	300	273	23	361	273
300 G3CM-T	649	330	305	25.5	361	324

Subject to changes without notice.

3-way Control Valves type S3FM-TR (AB-Right) Stainless Steel, DN 100 – 800 mm

2.7.01-A

GB-1

APPLICATIONS

Control valve type S3FM-T is a three way control valve with a slide for quarter turn operation, designed for most industrial fluids and aggressive media.

DIMENSIONING

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{Q \text{ (m}^3/\text{h)}}{\sqrt{\Delta p \text{ (bar)}}}$$

$$\Delta p \text{ (bar)} = \left(\frac{Q \text{ (m}^3/\text{h)}}{k_{vs}} \right)^2$$

DEFINITION OF K_{VS}-VALUE

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

DESIGN

The valve body and the valve slide are made of stainless steel AISI316. The valve flanges are drilled according to EN 1092-2. Optional: ANSI, JIS and Grooved Victaulic Joints.

Valves can also be supplied in AB-Left configuration (data sheet 2.7.02) and AB-Middle (data sheet 2.7.03)

QUALITY ASSURANCE

All valves are manufactured in accordance to ISO 9001 certification, and are pressure and leakage tested before shipment.

The valves can be supplied with relevant test certificates from recognized classification societies.

FUNCTION

The slide is firmly connected with the actuator spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a minimum gap between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

TECHNICAL DATA

Materials:

- Valve body, slide Stainless steel
- AISI316/
(Option DUPLEX)

- O-ring A75H

Valve characteristic Almost linear

Leakage Max. 0.5%

Temperature range Maximum 250 °C²⁾

Mounting See page 2

Flanges EN 1092-2

PN 10/16

- option JIS B 2210 5K, ANSI,
Grooved Victaulic
Joints

Counter flanges (suggested for EN
1092-2)

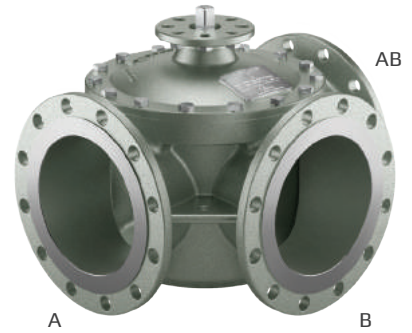
DIN 2632 – PN 10

DIN 2633 – PN 16

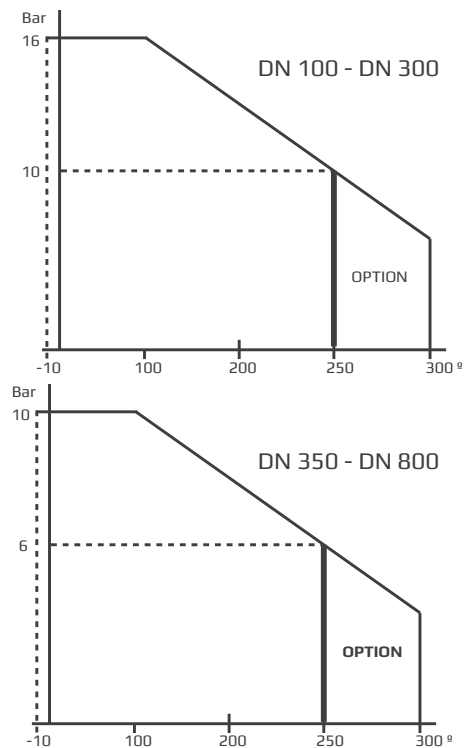
Max. pressure Δp_L against which the
valve can close:

- DN 100-300 16 bar

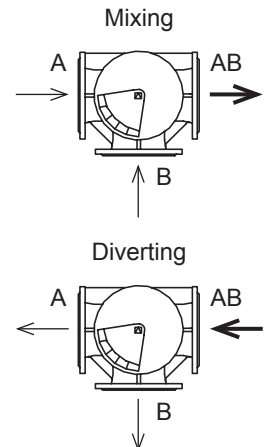
- DN 350-800 10 bar



PRESSURE/TEMPERATURE DIAGRAM



PORT NUMBERING



Subject to change without notice.

SPECIFICATIONS

Type	Flange connection DN in mm	k_{vs} -value ¹⁾ Mixing valve m^3/h	k_{vs} -value ¹⁾ Diverting valve m^3/h	Torque Nm	Weight kg
100 S3FM-TR	100	AVAILABLE FROM JULY 2015			
125 S3FM-TR	125				
150 S3FM-TR	150	395	425	135	75
200 S3FM-TR	200	800	1100	330	114
250 S3FM-TR	250	1500	2100	450	159
300 S3FM-TR	300	2000	2650	700	207
350 S3FM-TR	350	2530	3380	780	278
400 S3FM-TR	400	3050	3950	880	346
450 S3FM-TR	450	3680	4480	1250	433
500 S3FM-TR	500	4150	5250	1450	563
600 S3FM-TR	600	4800	6050	1750	816
700 S3FM-TR	700	5500	7000	2150	1150
800 S3FM-TR	800	6200	8000	2550	1400

¹⁾ k_{vs} -value for port A and B 50% open.

²⁾ For media temperature above 170 °C a cooling unit has to be applied on Clorius actuator

Clorius
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3-way Control Valves type S3FM-TR (AB-Right) Stainless Steel, DN 100 – 800 mm

2.7.01-A

GB-2

CHARACTERISTICS

DN 100-300 mm: PN 16, max. 250°C
DN 350-800 mm: PN 10, max. 250°C

MOUNTING

The valve connections are marked A, B and AB. The slide is operating between A and B.

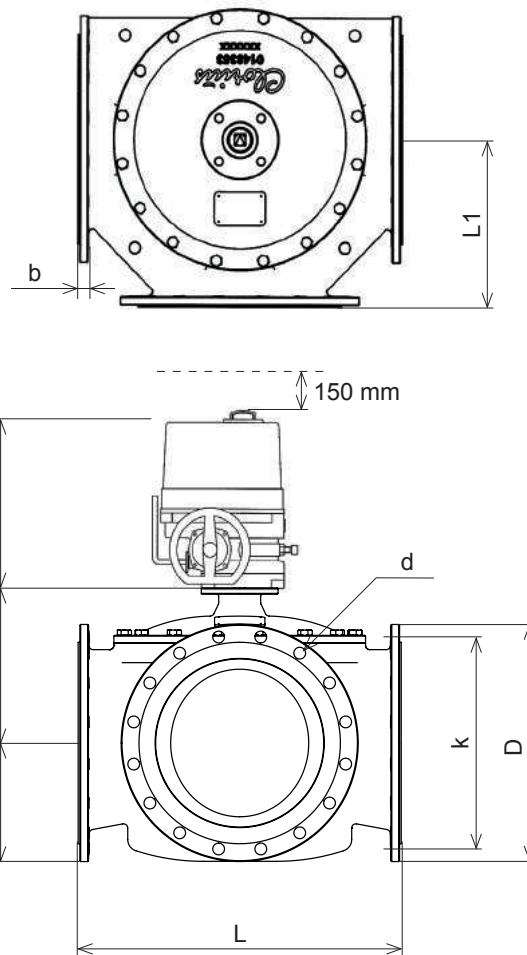
Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

STRAINER

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

DIMENSION SKETCH



DIMENSIONS

Type	L mm	L1 mm	H mm	H1 mm	b mm	C mm	EN 1092-2			ANSI Class 150			JIS B 2210 5K			JIS B 2210 10K		
							D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)
100 S3FM-TR																		
125 S3FM-TR																		
150 S3FM-TR	438	219	196	139	20	276	290	240	23x(8)	280	241	22x(8)	265	230	19x(8)	280	240	23x(8)
200 S3FM-TR	530	270	236	175	21	361	340	295	23x(12)	343	299	23x(8)	320	280	23x(8)	320	290	23x(12)
250 S3FM-TR	592	300	273	205	23	361	400	355	28x(12)	407	362	26x(12)	385	345	23x(12)	400	355	25x(12)
300 S3FM-TR	649	330	305	230	25.5	361	455	410	28x(12)	483	432	26x(12)	430	390	23x(12)	445	400	25x(16)
350 S3FM-TR	717	360	337	255	25.5	361	505	460	23x(16)	534	477	29x(12)	480	435	25x(12)	490	445	25x(16)
400 S3FM-TR	770	385	375	285	26	361	565	515	28x(16)	597	540	29x(16)	540	495	25x(16)	560	510	27x(16)
450 S3FM-TR	820	410	391	310	26.5	556	615	565	28x(20)	635	578	32x(16)	605	555	25x(16)	620	565	27x(20)
500 S3FM-TR	900	455	425	340	27.5	556	670	620	28x(20)	699	635	32x(20)	655	605	25x(20)	675	620	27x(20)
600 S3FM-TR	1000	505	470	393	31.0	556	780	725	31x(20)	813	750	35x(20)	770	715	25x(20)	795	730	33x(24)
700 S3FM-TR	1106	553	519	462	34.0	556	895	840	31x(24)	-	-	-	875	820	27x(24)	905	840	33x(24)
800 S3FM-TR	1200	600	579	507	37	556	1015	950	34x(24)	-	-	-	995	930	33x(24)	1020	950	33x(28)

AVAILABLE FROM JULY 2015

Subject to change without notice



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3-way Control Valves type S3FM-TR (AB-Right) Stainless Steel, DN 100 – 800 mm

2.7.01-A

GB-3

GROOVED VICTAULIC JOINTS SPECIFICATIONS

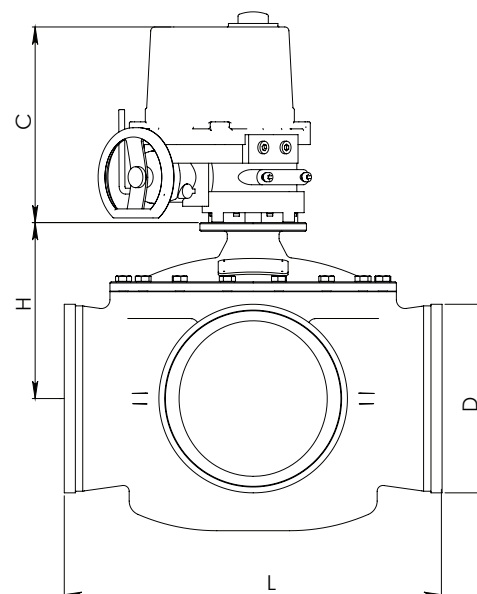
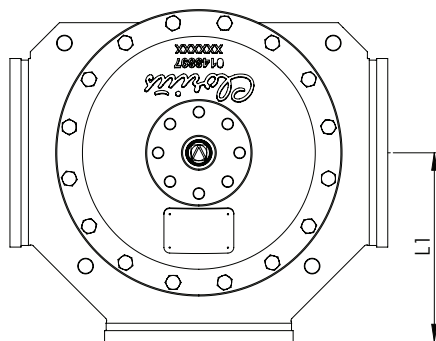
Type	Connection DN in mm	k_{vs} -value ¹⁾ Mixing valve m ³ /h	k_{vs} -value ¹⁾ Diverting valve m ³ /h	Weight kg
100 S3CM-TR	AVAILABLE FROM JULY 2015			
125 S3CM-TR	AVAILABLE FROM JULY 2015			
150 S3CM-TR	150	310	266	65
200 S3CM-TR	200	800	1100	92
250 S3CM-TR	250	1500	2100	130
300 S3CM-TR	300	2000	2650	170

¹⁾ k_{vs} -value for port A and B 50% open.

GROOVED VICTAULIC JOINTS DIMENSIONS

Type	L mm	L1 mm	H mm	B mm	C mm	D (dia.) mm
100 S3CM-TR	AVAILABLE FROM JULY 2015					
125 S3CM-TR	AVAILABLE FROM JULY 2015					
150 S3CM-TR	480	270	216	24	470	168
200 S3CM-TR	530	270	236	21	361	219
250 S3CM-TR	592	300	273	23	361	273
300 S3CM-TR	649	330	305	25	361	324

GROOVED VICTAULIC JOINTS DIMENSION SKETCH



3-way Control Valves type S3FM-TL (AB-Left) Stainless Steel, DN 100 – 800 mm

2.7.02-A

GB-1

APPLICATIONS

Control valve type S3FM-TL is a three way control valve with a slide for quarter turn operation, designed for most industrial fluids and aggressive media.

DIMENSIONING

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{Q \text{ (m}^3/\text{h)}}{\sqrt{\Delta p \text{ (bar)}}}$$

$$\Delta p \text{ (bar)} = \left(\frac{Q \text{ (m}^3/\text{h)}}{k_{vs}} \right)^2$$

DEFINITION OF K_{VS}-VALUE

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

DESIGN

The valve body and the valve slide are made of stainless steel AISI316. The valve flanges are drilled according to EN 1092-2. Optional: ANSI, JIS and Grooved Victaulic Joints

Valves can also be supplied in AB-Right configuration (data sheet 2.7.01) and AB-Middle (data sheet 2.7.03)

QUALITY ASSURANCE

All valves are manufactured in accordance to ISO 9001 certification, and are pressure and leakage tested before shipment.

The valves can be supplied with relevant test certificates from recognized classification societies.

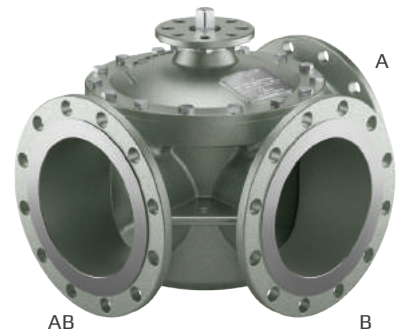
FUNCTION

The slide is firmly connected with the actuator spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a minimum gap between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

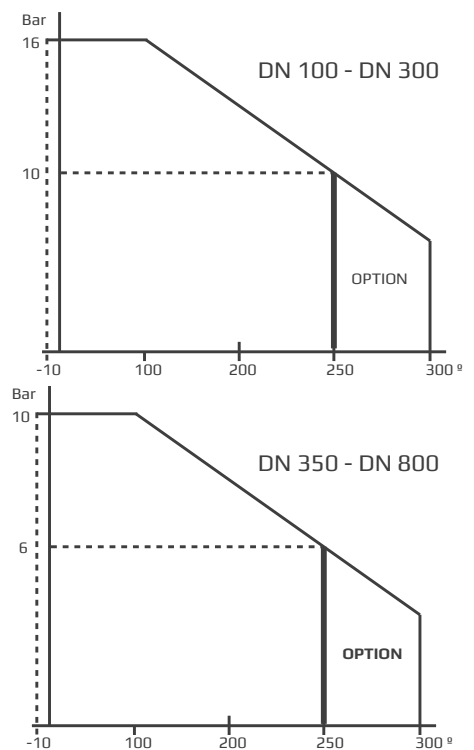
TECHNICAL DATA

Materials:

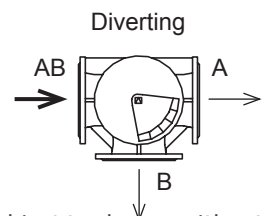
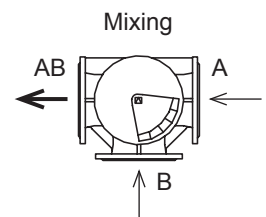
- Valve body, slide Stainless steel
- AISI316
(option DUPLEX)
- O-ring A75H
- Valve characteristic Almost linear
- Leakage Max. 0.5%
- Temperature range Maximum 250 °C²⁾
- Mounting See page 2
- Flanges EN 1092-2
PN 10/16
- option JIS B 2210 5K, ANSI,
Grooved Victaulic
Joints
- Counter flanges (suggested for EN
1092-2)
DIN 2632 – PN 10
DIN 2633 – PN 16
- Max. pressure Δp_L against which the
valve can close:
- DN 100-300 16 bar
- DN 350-800 10 bar



PRESSURE/TEMPERATURE DIAGRAM



PORT NUMBERING



Subject to change without notice.

SPECIFICATIONS

Type	Flange connection DN in mm	k_{vs} -value ¹⁾ Mixing valve m^3/h	k_{vs} -value ¹⁾ Diverting valve m^3/h	Torque Nm	Weight kg
100 S3FM-TL	100	AVAILABLE FROM JULY 2015			
125 S3FM-TL	125				
150 S3FM-TL	150	395	425	135	75
200 S3FM-TL	200	800	1100	330	114
250 S3FM-TL	250	1500	2100	450	159
300 S3FM-TL	300	2000	2650	700	207
350 S3FM-TL	350	2530	3380	780	278
400 S3FM-TL	400	3050	3950	880	346
450 S3FM-TL	450	3680	4480	1250	433
500 S3FM-TL	500	4150	5250	1450	563
600 S3FM-TL	600	4800	6050	1750	816
700 S3FM-TL	700	5500	7000	2150	1150
800 S3FM-TL	800	6200	8000	2550	1400

¹⁾ k_{vs} -value for port A and B 50% open.

²⁾ For media temperature above 170 °C a cooling unit has to be applied on Clorius actuator

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3-way Control Valves type S3FM-TL (AB-Left) Stainless Steel, DN 100 – 800 mm

2.7.02-A

GB-2

CHARACTERISTICS

DN 100-300 mm: PN 16, max. 250°C
DN 350-800 mm: PN 10, max. 250°C

MOUNTING

The valve connections are marked A, B and AB. The slide is operating between A and B.

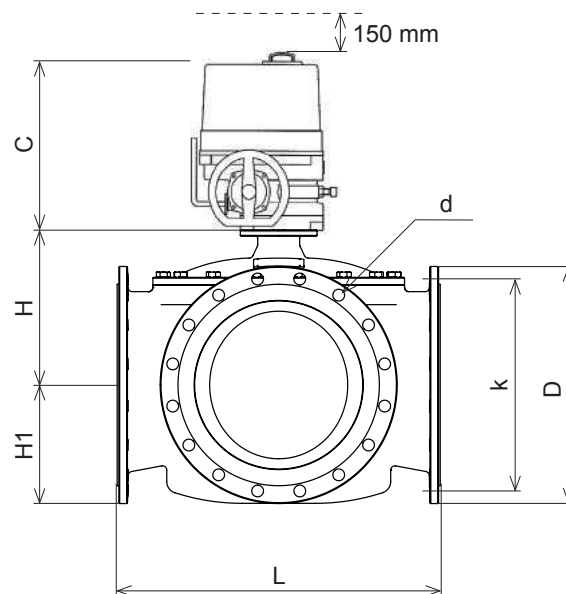
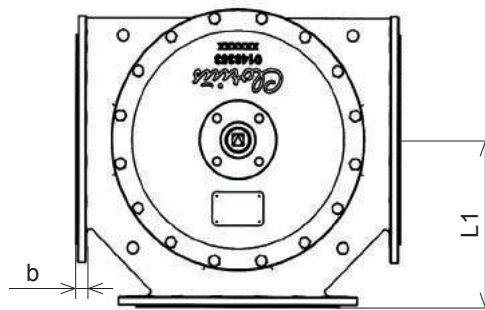
Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

STRAINER

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

DIMENSION SKETCH



DIMENSIONS

Type	L mm	L1 mm	H mm	H1 mm	b mm	C mm	EN 1092-2			ANSI Class 150			JIS B 2210 5K			JIS B 2210 10K		
							D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)
100 S3FM-TL																		
125 S3FM-TL																		
150 S3FM-TL	438	219	196	139	20	276	290	240	23x(8)	280	241	22x(8)	265	230	19x(8)	280	240	23x(8)
200 S3FM-TL	530	270	236	175	21	361	340	295	23x(12)	343	299	23x(8)	320	280	23x(8)	320	290	23x(12)
250 S3FM-TL	592	300	273	205	23	361	400	355	28x(12)	407	362	26x(12)	385	345	23x(12)	400	355	25x(12)
300 S3FM-TL	649	330	305	230	25.5	361	455	410	28x(12)	483	432	26x(12)	430	390	23x(12)	445	400	25x(16)
350 S3FM-TL	717	360	337	255	25.5	361	505	460	23x(16)	534	477	29x(12)	480	435	25x(12)	490	445	25x(16)
400 S3FM-TL	770	385	375	285	26	361	565	515	28x(16)	597	540	29x(16)	540	495	25x(16)	560	510	27x(16)
450 S3FM-TL	820	410	391	310	26.5	556	615	565	28x(20)	635	578	32x(16)	605	555	25x(16)	620	565	27x(20)
500 S3FM-TL	900	455	425	340	27.5	556	670	620	28x(20)	699	635	32x(20)	655	605	25x(20)	675	620	27x(20)
600 S3FM-TL	1000	505	470	393	31.0	556	780	725	31x(20)	813	750	35x(20)	770	715	25x(20)	795	730	33x(24)
700 S3FM-TL	1106	553	519	462	34.0	556	895	840	31x(24)	-	-	-	875	820	27x(24)	905	840	33x(24)
800 S3FM-TL	1200	600	579	507	37	556	1015	950	34x(24)	-	-	-	995	930	33x(24)	1020	950	33x(28)

AVAILABLE FROM JULY 2015

Subject to change without notice



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3-way Control Valves type S3FM-TL (AB-Left) Stainless Steel, DN 100 – 800 mm

2.7.02-A

GB-3

GROOVED VICTAULIC JOINTS SPECIFICATIONS

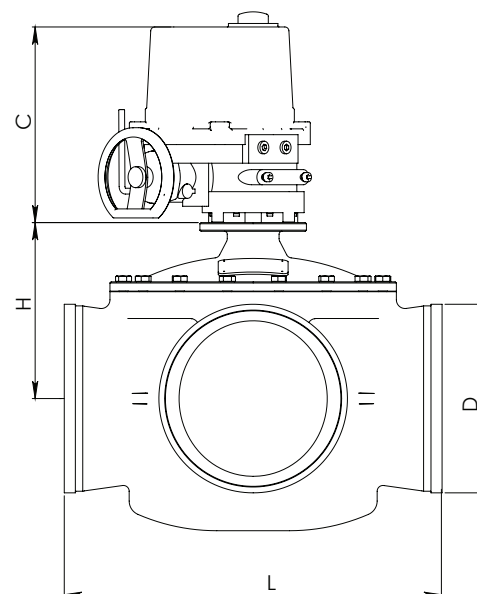
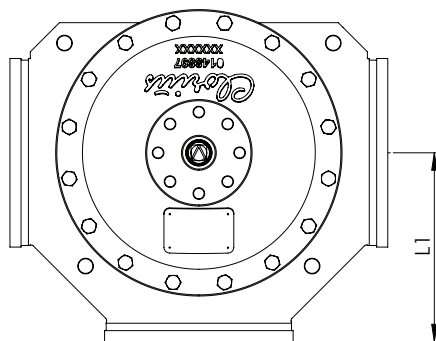
Type	Connection DN in mm	k_{vs} -value ¹⁾ Mixing valve m ³ /h	k_{vs} -value ¹⁾ Diverting valve m ³ /h	Weight kg
100 S3CM-TL	AVAILABLE FROM JULY 2015			
125 S3CM-TL	AVAILABLE FROM JULY 2015			
150 S3CM-TL	150	310	266	65
200 S3CM-TL	200	800	1100	92
250 S3CM-TL	250	1500	2100	130
300 S3CM-TL	300	2000	2650	170

¹⁾ k_{vs} -value for port A and B 50% open.

GROOVED VICTAULIC JOINTS DIMENSIONS

Type	L mm	L1 mm	H mm	B mm	C mm	D (dia.) mm
100 S3CM-TL	AVAILABLE FROM JULY 2015					
125 S3CM-TL	AVAILABLE FROM JULY 2015					
150 S3CM-TL	480	270	216	24	470	168
200 S3CM-TL	530	270	236	21	361	219
250 S3CM-TL	592	300	273	23	361	273
300 S3CM-TL	649	330	305	25	361	324

GROOVED VICTAULIC JOINTS DIMENSION SKETCH



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3-way Control Valves type S3FM-TM (AB-Middle) Stainless Steel, DN 100 – 800 mm

2.7.03-A

GB-1

APPLICATIONS

Control valve type S3FM-TM is a three way control valve with a slide for quarter turn operation, designed for most industrial fluids and aggressive media.

DIMENSIONING

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{Q \text{ (m}^3/\text{h)}}{\sqrt{\Delta p \text{ (bar)}}}$$

$$\Delta p \text{ (bar)} = \left(\frac{Q \text{ (m}^3/\text{h)}}{k_{vs}} \right)^2$$

DEFINITION OF k_{VS} -VALUE

The k_{VS} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

DESIGN

The valve body and the valve slide are made of stainless steel AISI316. The valve flanges are drilled according to EN 1092-2. Optional: ANSI, JIS and Grooved Victaulic Joints

Valves can also be supplied in AB-Right configuration (data sheet 2.7.01) and AB-Left (data sheet 2.7.02)

QUALITY ASSURANCE

All valves are manufactured in accordance to ISO 9001 certification, and are pressure and leakage tested before shipment.

The valves can be supplied with relevant

test certificates from recognized classification societies.

FUNCTION

The slide is firmly connected with the actuator spindle. When the slide is in the one outer position by turning the spindle, connection A-AB is fully open and connection B-AB is fully closed. In the other outer position connection A-AB is fully closed and connection B-AB is fully open. In the intermediate positions the opening degrees change proportionally. The valve has a minimum gap between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.

TECHNICAL DATA

Materials:

- Valve body, slide Stainless steel
- AISI316
(option DUPLEX)

- O-ring A75H

Valve characteristic Almost linear

Leakage Max. 0.5%

Temperature range Maximum 250 °C²⁾

Mounting See page 2

Flanges EN 1092-2

PN 10/16

- option JIS B 2210 5K, ANSI, Grooved Victaulic Joints

Counter flanges (suggested for EN 1092-2)

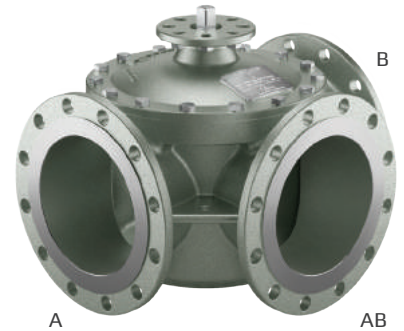
DIN 2632 – PN 10

DIN 2633 – PN 16

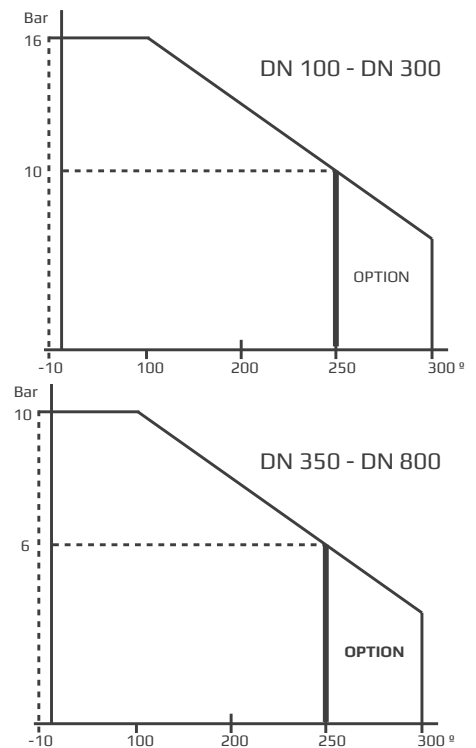
Max. pressure Δp_L against which the valve can close:

- DN 100-300 16 bar

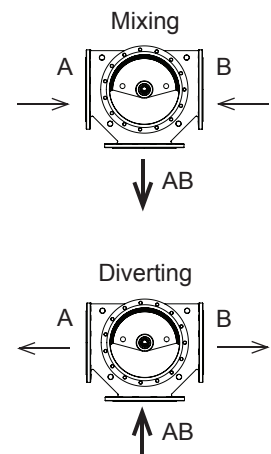
- DN 350-800 10 bar



PRESSURE/TEMPERATURE DIAGRAM



PORT NUMBERING



Subject to change without notice.

SPECIFICATIONS

Type	Flange connection DN in mm	k_{VS} -value ¹⁾ Mixing valve m^3/h	k_{VS} -value ¹⁾ Diverting valve m^3/h	Torque Nm	Weight kg
100 S3FM-TM	100	AVAILABLE FROM JULY 2015			
125 S3FM-TM	125				
150 S3FM-TM	150	395	425	135	75
200 S3FM-TM	200	800	1100	330	114
250 S3FM-TM	250	1500	2100	450	159
300 S3FM-TM	300	2000	2650	700	207
350 S3FM-TM	350	2530	3380	780	278
400 S3FM-TM	400	3050	3950	880	346
450 S3FM-TM	450	3680	4480	1250	433
500 S3FM-TM	500	4150	5250	1450	563
600 S3FM-TM	600	4800	6050	1750	816
700 S3FM-TM	700	5500	7000	2150	1150
800 S3FM-TM	800	6200	8000	2550	1400

¹⁾ k_{VS} -value for port A and B 50% open.

²⁾ For media temperature above 170 °C a cooling unit has to be applied on Clorius actuator

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3-way Control Valves type S3FM-TM (AB-Middle) Stainless Steel, DN 100 – 800 mm

2.7.03-A

GB-2

CHARACTERISTICS

DN 100-300 mm: PN 16, max. 250°C
DN 350-800 mm: PN 10, max. 250°C

MOUNTING

The valve connections are marked A, B and AB. The slide is operating between A and B.

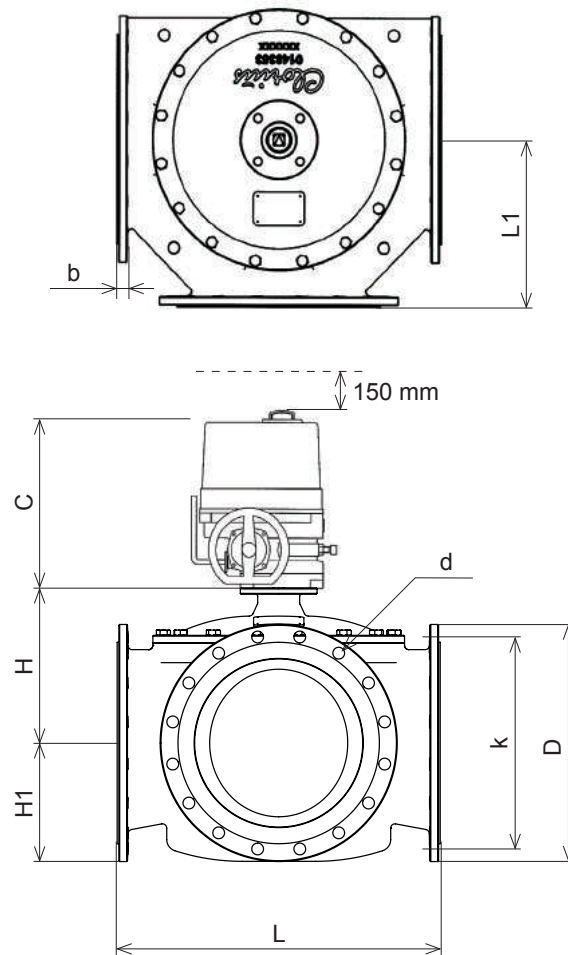
Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

STRAINER

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

DIMENSION SKETCH



DIMENSIONS

Type	L mm	L1 mm	H mm	H1 mm	b mm	C mm	EN 1092-2			ANSI Class 150			JIS B 2210 5K			JIS B 2210 10K		
							D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)	D (dia.) mm	k (dia.) mm	d mm dia. (number)
100 S3FM-TM																		
125 S3FM-TM																		
150 S3FM-TM	438	219	196	139	20	276	290	240	23x(8)	280	241	22x(8)	265	230	19x(8)	280	240	23x(8)
200 S3FM-TM	530	270	236	175	21	361	340	295	23x(12)	343	299	23x(8)	320	280	23x(8)	320	290	23x(12)
250 S3FM-TM	592	300	273	205	23	361	400	355	28x(12)	407	362	26x(12)	385	345	23x(12)	400	355	25x(12)
300 S3FM-TM	649	330	305	230	25.5	361	455	410	28x(12)	483	432	26x(12)	430	390	23x(12)	445	400	25x(16)
350 S3FM-TM	717	360	337	255	25.5	361	505	460	23x(16)	534	477	29x(12)	480	435	25x(12)	490	445	25x(16)
400 S3FM-TM	770	385	375	285	26	361	565	515	28x(16)	597	540	29x(16)	540	495	25x(16)	560	510	27x(16)
450 S3FM-TM	820	410	391	310	26.5	556	615	565	28x(20)	635	578	32x(16)	605	555	25x(16)	620	565	27x(20)
500 S3FM-TM	900	455	425	340	27.5	556	670	620	28x(20)	699	635	32x(20)	655	605	25x(20)	675	620	27x(20)
600 S3FM-TM	1000	505	470	393	31.0	556	780	725	31x(20)	813	750	35x(20)	770	715	25x(20)	795	730	33x(24)
700 S3FM-TM	1106	553	519	462	34.0	556	895	840	31x(24)	-	-	-	875	820	27x(24)	905	840	33x(24)
800 S3FM-TM	1200	600	579	507	37	556	1015	950	34x(24)	-	-	-	995	930	33x(24)	1020	950	33x(28)

AVAILABLE FROM JULY 2015

Subject to change without notice



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3-way Control Valves type S3FM-TM (AB-Middle) Stainless Steel, DN 100 – 800 mm

2.7.03-A

GB-3

GROOVED VICTAULIC JOINTS SPECIFICATIONS

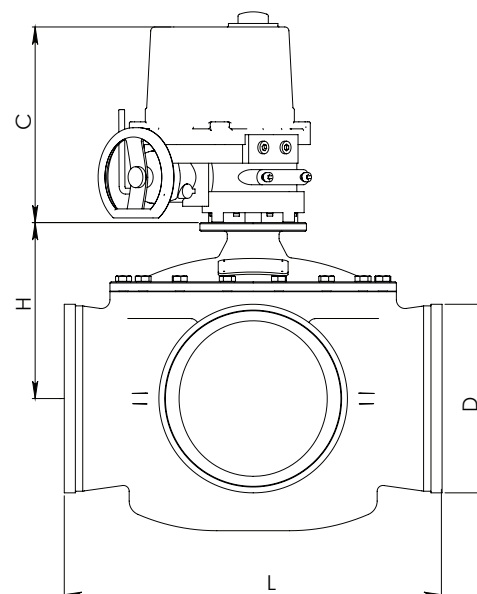
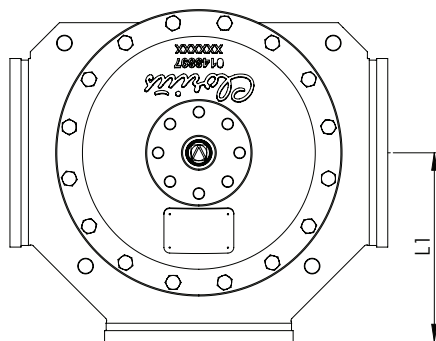
Type	Connection DN in mm	k_{vs} -value ¹⁾ Mixing valve m ³ /h	k_{vs} -value ¹⁾ Diverting valve m ³ /h	Weight kg
100 S3CM-TM	AVAILABLE FROM JULY 2015			
125 S3CM-TM	AVAILABLE FROM JULY 2015			
150 S3CM-TM	150	310	266	65
200 S3CM-TM	200	800	1100	92
250 S3CM-TM	250	1500	2100	130
300 S3CM-TM	300	2000	2650	170

¹⁾ k_{vs} -value for port A and B 50% open.

GROOVED VICTAULIC JOINTS DIMENSIONS

Type	L mm	L1 mm	H mm	B mm	C mm	D (dia.) mm
100 S3CM-TM	AVAILABLE FROM JULY 2015					
125 S3CM-TM	AVAILABLE FROM JULY 2015					
150 S3CM-TM	480	270	216	24	470	168
200 S3CM-TM	530	270	236	21	361	219
250 S3CM-TM	592	300	273	23	361	273
300 S3CM-TM	649	330	305	25	361	324

GROOVED VICTAULIC JOINTS DIMENSION SKETCH



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2-way Control Valves type S2FM-T

2.7.04-A

Stainless Steel, PN 16, DN 100 – 300 / PN 10, DN 350 – 600 mm

GB-1

CHARACTERISTICS

DN 100-300 PN 16, max. 250°C
(Optional 300°C)
DN 350-800 PN 10, max. 250°C
(Optional 300°C)

APPLICATIONS

Control valve type S2FM-T is a three-way control valve with blocked port making a two-way control valve. The slide for quarter turn operation designed for regulating of fresh water, lubricating oil and other liquid media.

The valves are designed for use in conjunction with industrial processes, district heating and marine installations with large water or lubricating oil quantities.

The valves are designed for use in conjunction with valve motor type CAR with handle for manual operation or for use in conjunction with a pneumatic actuator.

DIMENSIONING

For sizing of control valves the following equation can be used:

$$k_{vs} = \frac{Q(m^3/h)}{\sqrt{\Delta p(\text{bar})}}$$

$$\Delta p(\text{bar}) = \left(\frac{Q(m^3/h)}{k_{vs}} \right)^2$$

DEFINITION OF K_{VS} -VALUE

The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

DESIGN

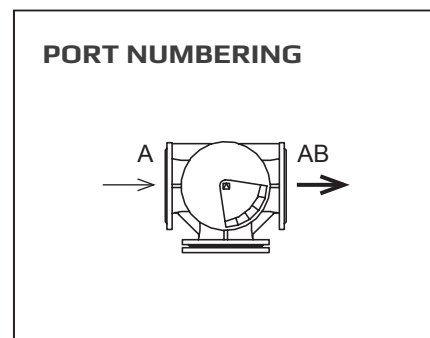
The valve body and the valve slide are made of stainless steel AISI316. The valve flanges are drilled according to EN 1092-2. Optional: ANSI, JIS and Grooved Victalic Joints.

QUALITY ASSURANCE

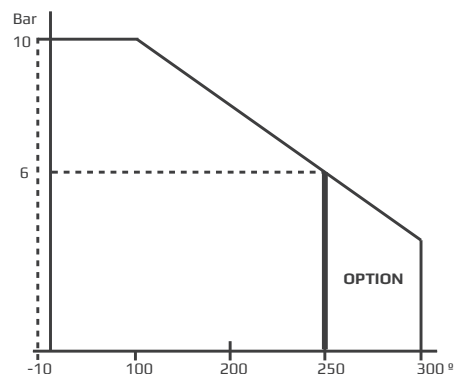
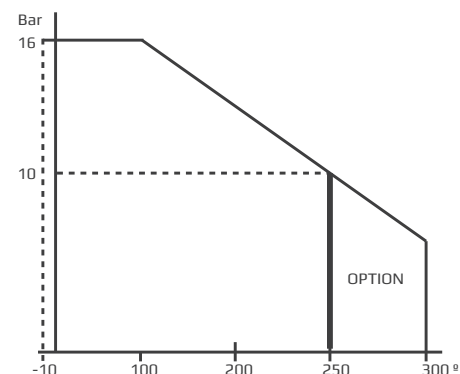
All valves are manufactured under an ISO 9001 certification, and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

FUNCTION

The slide is firmly connected with the motor spindle. When the slide is in the one extreme position by turning the spindle, connection A-AB is kept fully open. In the other extreme position the valve is fully closed. In the intermediate positions the opening degrees change proportionally. The valve has a small tolerance between body and slide. To minimize the leakage an O-ring is mounted in a groove on the slide.



PRESSURE/TEMPERATURE DIAGRAM



Subject to change without notice.

SPECIFICATIONS

Type	Flange connection DN in mm	k_{vs} -value m^3/h	Torque Nm	Weight kg
100 S2FM-T	100	AVAILABLE FROM JULY 2015		
125 S2FM-T	125			
150 S2FM-T	150	685	135	81
200 S2FM-T	200	1100	330	135
250 S2FM-T	250	1800	450	190
300 S2FM-T	300	2450	700	262
350 S2FM-T	350	3350	780	324
400 S2FM-T	400	3850	880	403
450 S2FM-T	450	4300	1250	507
500 S2FM-T	500	5050	1450	645
600 S2FM-T	600	6020	1750	890

2-way Control Valves type S2FM-T

2.7.04-A

Stainless Steel, PN 16, DN 100 – 300 / PN 10, DN 350 – 600 mm

GB-2

TECHNICAL DATA

Materials:

- Valve body, slide Stainless Steel
 - AISI316
 (option DUPLEX)
- O-ring A75H

Nominal pressure:

- 100-300 S2FM-T PN 16
- 350-800 S2FM-T PN 10

Valve characteristic Almost linear

Leakage Max. 0.5%

Temperature range Max. 250°C ¹⁾
 (optional 300 °C)

Mounting See page 2

Flanges EN 1092-2
 PN 10/16

Counter flanges (suggested)
 DIN 2632 – PN 10
 DIN 2633 – PN 16

Max. pressure Δp_L , against which the
control can close:

- 100-300 S2FM-T 16 bar
- 350-800 S2FM-T 10 bar

MOUNTING

The valve connections are marked A and AB.

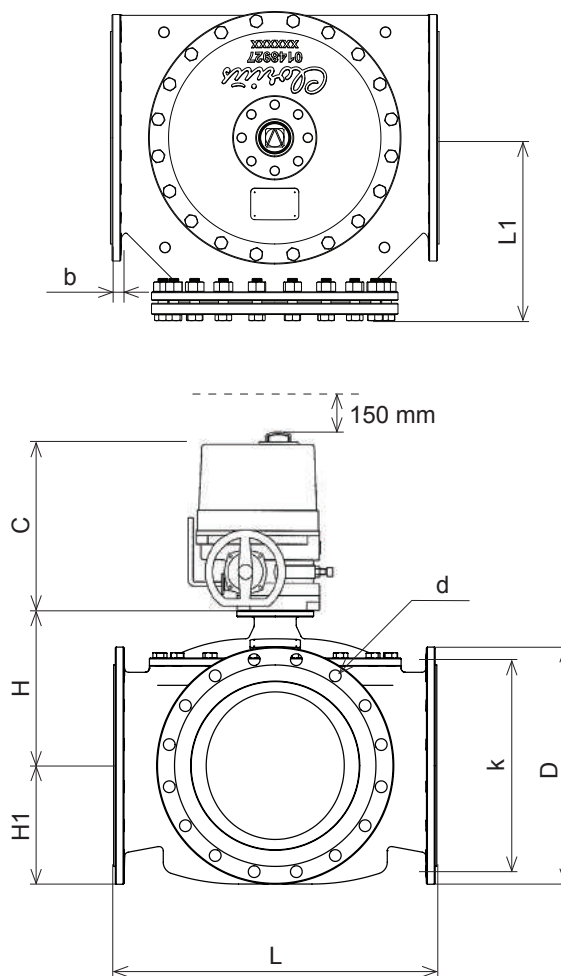
Check slide position before installation in the pipe. The slide position is marked on the top of the shaft.

The valves can be installed with vertical as well as horizontal spindles. The valves must be mounted in a way that the valve actuator will be exposed to a minimum of moisture and unnecessary vibrations.

STRAINER

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

DIMENSION SKETCH



DIMENSIONS

Type	L	L1	H	H1	b	C	D (dia.)	k (dia.)	d mm dia. (number)
	mm	mm	mm	mm	mm	mm	mm	mm	
100 S2FM-T									
125 S2FM-T									
150 S2FM-T	438	219	196	189	20	276	290	240	23 x (8)
200 S2FM-T	530	306	236	175	21	361	340	295	23 x (12)
250 S2FM-T	592	340	273	205	23	361	400	355	28 x (12)
300 S2FM-T	649	371	305	230	25.5	361	455	410	28 x (12)
350 S2FM-T	717	403	337	255	25.5	361	505	460	23 x (16)
400 S2FM-T	770	430	375	285	26	361	565	515	28 x (16)
450 S2FM-T	820	457	391	310	26.5	556	615	565	28 x (20)
500 S2FM-T	900	499	425	340	27.5	556	670	620	28 x (20)
600 S2FM-T	1000	553	470	393	31.0	556	780	725	31 x (20)

AVAILABLE FROM JULY 2015

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¹⁾ For media temperature above 170 °C a cooling unit has to be applied on Clorius actuator



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SECTION 3

Characteristics

- Closing force 400 N, 500 N and 800 N
- For heating or cooling valves
- Sturdy and reliable
- Temperature range 0 to 160°C (-30 to 280°C on request)

Applications

The temperature controller, which consists of a thermostat and a valve, is used for controlling the temperature in central heating systems, district heating systems, industrial plants or industrial processes and in marine systems. It can be used for the control of cold or hot water, steam or oil in heating as well as cooling systems.

Function

The adjusting cylinder of the thermostat is set at the required temperature for the heating medium in °C. This setting can be fixed, if required. The temperature control is carried out by the thermostatically controlled valve reducing or increasing the flow of the heating (or cooling) medium. The sensor and the capillary tube, which are filled with a liquid, constitute - together with the adjusting cylinder - a closed system.

If the temperature of a medium to be heated is above the required level, the temperature of the sensor liquid rises and expands, causing the piston of the thermostat to act upon the valve, reducing the flow of the heating medium.

If the temperature of the medium to be heated is below the required level, the temperature of the sensor liquid falls, reducing the volume of the liquid, so that the piston allows the valve to open under its internal spring, thus increasing the flow of the heating medium.

The neutral zone of a thermostat is the temperature difference which can occur at the sensor without any movement of the valve spindle. This represents the sensitivity of the control system to temperature changes:

V2 = 2.5°C, V4 = 2°C and V8 = 1.5°C.

Design

Thermostat

A thermostat consists of a sensor and a capillary tube, filled with liquid, and an adjusting cylinder.

The thermostat type designations and technical data are specified in fig. 2.

With temperatures above 170°C, a cooling unit must be fitted between the valve and the thermostat - see fig. 1.

The thermostat is self-acting and works on the principle of liquid expansion, it is sturdy in its design, and works with a large closing force.

Sensor

The following sensor types are available - see fig. 4:

- 4.1. Rod/spiral sensor in copper or stainless steel and spiral sensor in copper with threaded connection according to ISO R7/1.
- 4.2. Spiral sensor (copper only) with air duct flange.
- 4.3. Rod/spiral sensor with steel flange DN 50, PN 40 and DN 50, PN 160.
- 4.4. Sensor without connection. Usually used with capillary pack box for temperature control in tanks.

Capillary Tube

The capillary tube is made of copper, stainless steel, or of PVC-coated copper - see fig. 3, but can also be delivered with a flexible iron tube protection.

Valve

A wide range of valve types for heating as well as cooling systems can be delivered. See the "Quick Choice" leaflet no. 9.0.00 and datasheets for the valves in question.



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Choice of Temperature Control

The selection of the correct temperature controller is determined by the sizing of the valve and thermostat respectively, which may be chosen by using the "Quick Choice" leaflet no. 9.0.00.

The designation of the thermostat is determined by using 3 elements, e.g. thermostat type V4.05, where V indicates type V thermostat, 4 indicates 0.01 x the force in Newton by which the thermostat can act upon the connected valve, and 05 relates to the travel of the thermostat spindle in mm by a temperature change of 1°C - see also fig. 2.

Fig. 1 indicates whether the temperature of the heating medium necessitates a cooling unit, and how the thermostat is to be mounted in relation to the valve; for a temperature range -30°C to 170°C the thermostat may be installed both above and below the valve.

Fig. 2 shows the type number of the thermostat, its closing force in N and its setting range in °C.

Fig. 3 shows the choices of length and material for the capillary tubes.

Fig. 4 shows the different types of sensors.

Fig. 5 shows the time coefficients for the sensors.

Fig. 6 shows the choices of sensor materials, etc.

Fig. 7 shows the dimensions and weights of the sensors etc.

Fig. 1. Temperature Limits

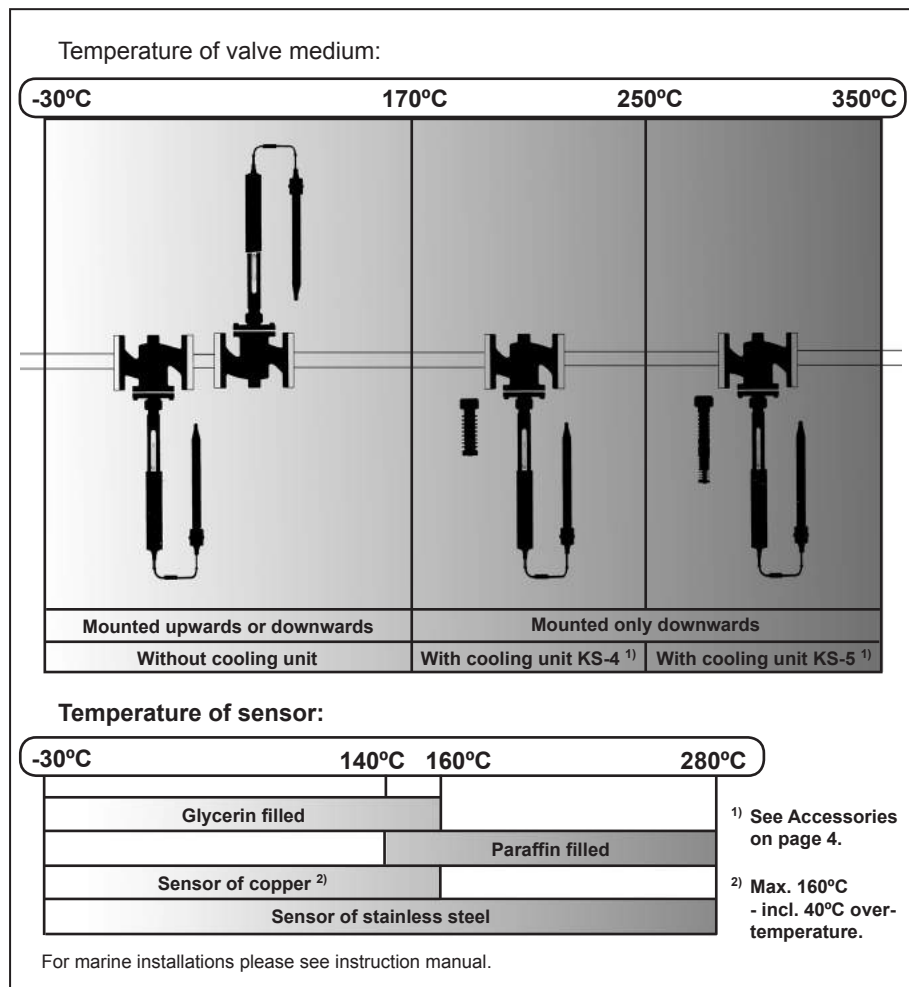


Fig. 2. Thermostat Types

Technical Data		Thermostat Types						
		V2.05	V4.03	V4.05	V4.10	V8.09	V8.18	
Max. closing force	N	400	500	500	500	800	800	
Setting range for standard thermostats ¹⁾	°C	0-60	0-160	0-120	0-60	0-120	0-60	
		30-90		40-160	30-90	40-160	30-90	
		60-120			60-120		60-120	
Neutral zone	°C	2.5	2	2	2	1.5	1.5	
For valves with rated travel up to:	mm	10	21	21	21	21	21	
Travel (amplification) in range:	mm/°C	-30 to 160°C ²⁾	0.5	0.3	0.5	1	0.9	1.8
		140 to 280°C ³⁾	0.7	0.33	0.7	1.33	1.2	2.4

¹⁾ Setting ranges from -30 to 280°C on request. - Excess temp. safety range: 40°C ²⁾ Glycerine ³⁾ Paraffin

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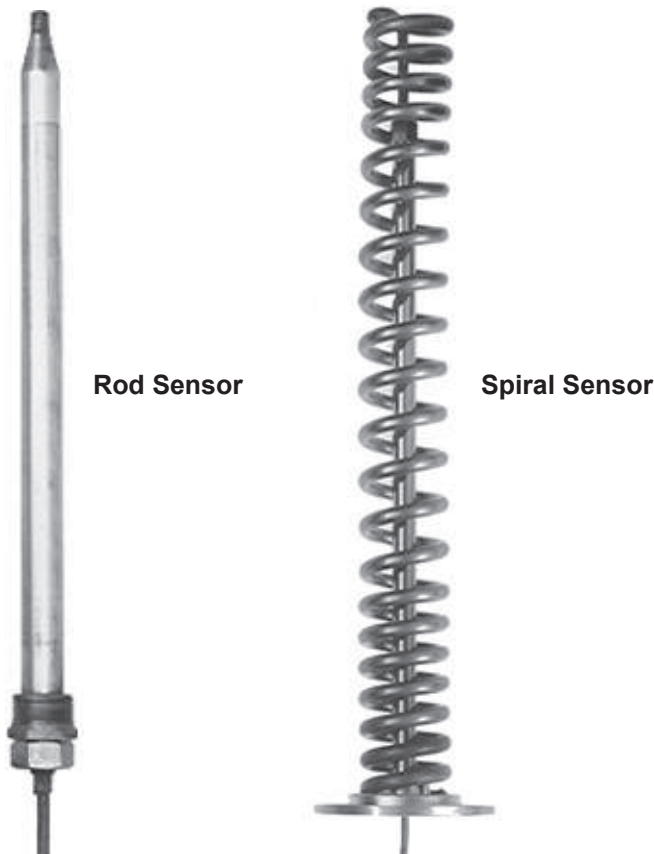


Fig. 3. Capillary Tubes

Choice of capillary tube, length and material, is determined according to the table below, independent of the choice of the thermostat type.

Length	Copper	PVC-coated copper	Stainless steel
3 m	•	•	•
4.5 m			•
6 m	•	•	•
7.5 m			•
9 m	•	•	•
10.5 m			•
12 m	•	•	•
13.5 m			•
15 m	•	•	•
16.5 m			•
18 m	•	•	•
19.5 m			•
21 m	•	•	•

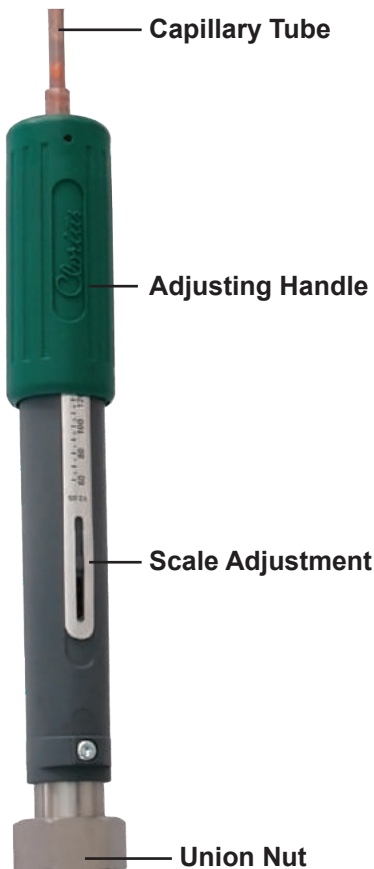
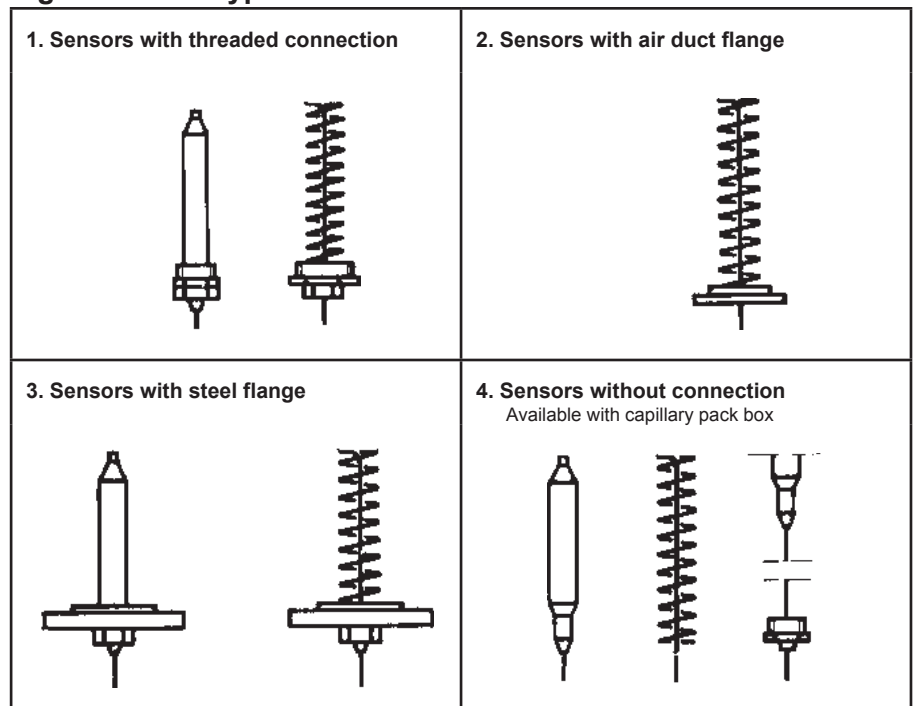
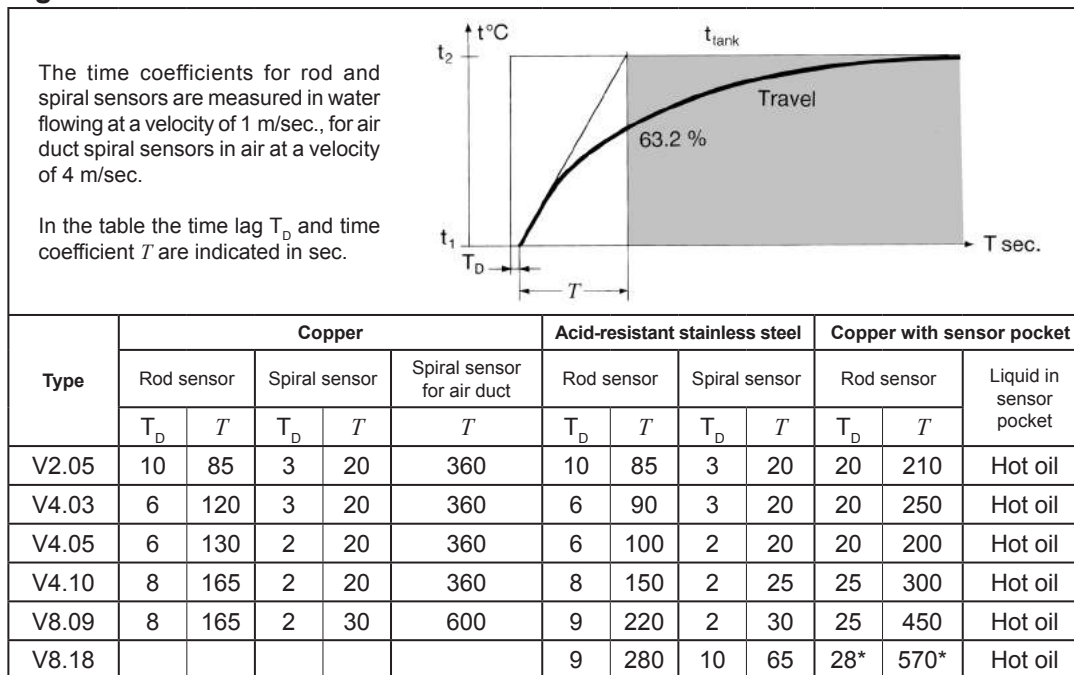


Fig. 4. Sensor Types



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Fig. 5. Time Coefficient for Sensors



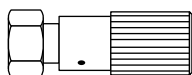
*Stainless Steel sensor with sensor pocket

Fig. 6. Sensor Material etc.

Adjusting cylinder	Copper sensors				Acid-resistant stainless steel sensors				Capillary tubes
									Copper = c Stainless steel = n
	a	b	c	d	e	f	h	k	n
DIN/EN no.	10088	17440	1787	OM-Metal	17100	1725	17440	17440	17440
Material no.	1.4301	1.4305	2.0090	OM-Metal	1.0134	3.2581	1.4436	1.4435	1.4301

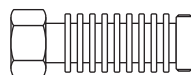
Accessories

Manual Adjusting Device



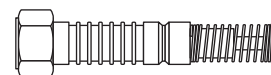
With stuffing box. For tightening and manual operation of the valves, when an actuator has not been fitted, e.g. during periods of construction.

Cooling Unit KS-4



Cooling unit protecting the stuffing box of the motor/thermostat. To be applied at valve temperatures between 170°C and 250°C.

Cooling Unit KS-5



Cooling unit with built-in bellows gland. Replaces the stuffing box of thermostat. Must be applied by valve temperatures between 250°C and 350°C.


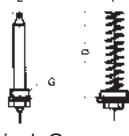

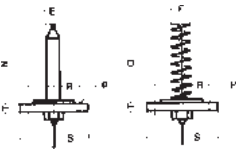
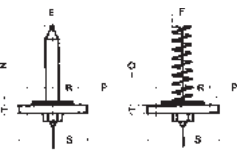
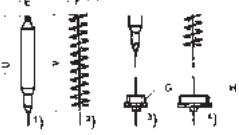
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V2, V4 and V8 Thermostats Self-acting Temperature Controls

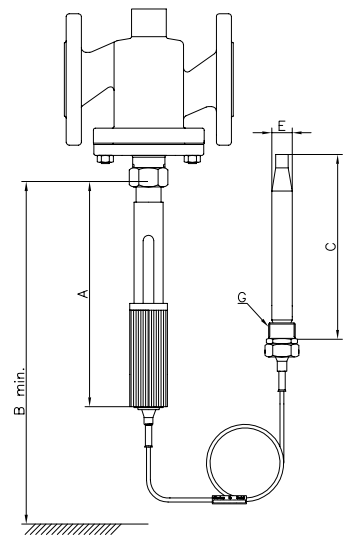
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Fig. 7. Dimensions and Weights

The measurements G and H are pipe threads according to ISO R7/1. All other measurements are mm. Weight: Net. c = Copper sensor. s = Acid-resistant stainless steel sensor.		Thermostat / Sensor material											
		Type V2.05		Type V4.03		Type V4.05		Type V4.10		Type V8.09		Type V8.18	
		c	s	c	s	c	s	c	s	c	s	c	s
Adjusting cylinder 	A	305	305	385	385	385	385	385	385	560	560		560
	B	405	405	525	525	525	525	525	525	740	740		740
Weights: see below													
Sensor with threaded connection 	C	210	190	210	190	390	380	490	515	710	745		800
	D	235	170	235	170	235	250	325	325	425	435		810
	E	22	22	22	22	22	22	28	25	28	25		34
	F	49	49	49	49	49	49	49	49	49	49		49
	G	R $\frac{3}{4}$	R $\frac{3}{4}$	R1	R1	R1	R1	R1	R1	R2	R2		R2
	H	R2	R2	R2	R2	R2	R2	R2	R2	R2	R2		R2
	kg	1.8	1.8	2.4	2.4	2.6	2.6	3.3	3.3	6.3	6.3		7.3
kg	2.3	2.3	2.9	2.9	3.1	3.1	3.8	3.8	6.3	6.3		7.3	
Sensors with air duct flange 	F	49		49		49		49		49			
	I	430		430		430		430		450			
	L	60		60		60		60		60			
	M	95		95		95		95		95			
	kg	1.8		2.4		2.6		3.3		5.8			
Sensor with steel flange DN 50, PN 40 	E	22	22	22	22	22	22	28	25	28	25		34
	F	49	49	49	49	49	49	49	49	49	49		49
	N	200	180	200	180	380	360	480	505	700	735		790
	O	225	160	225	160	225	240	315	315	415	425		800
	P	4x18	4x18	4x18	4x18	4x18	4x18	4x18	4x18	4x18	4x18		4x18
	R	125	125	125	125	125	125	125	125	125	125		125
	S	165	165	165	165	165	165	165	165	165	165		165
	T	22	22	22	22	22	22	22	22	22	22		22
	kg	5.3	5.3	5.9	5.9	6.1	6.1	6.8	6.8	9.3	9.3		10.3
Sensor with steel flange DN 50, PN 160 	E	22	22	22	22	22	22	28	25	28	25		34
	F	49	49	49	49	49	49	49	49	49	49		49
	N	180	160	180	160	360	340	460	485	680	715		770
	O	205	140	205	140	205	220	295	295	395	405		780
	P	4x27	4x27	4x27	4x27	4x27	4x27	4x27	4x27	4x27	4x27		4x27
	R	145	145	145	145	145	145	145	145	145	145		145
	S	195	195	195	195	195	195	195	195	195	195		195
	T	45	45	45	45	45	45	45	45	45	45		45
	kg	11.3	11.3	11.9	11.9	12.1	12.1	12.8	12.8	15.3	15.3		16.3
Sensors without connection Available with capillary pack box in stainless steel (1.4436) 	E	22	22	22	22	22	22	28	25	28	25		34
	F	49	49	49	49	49	49	49	49	49	49		49
	G	R1	R1	R1	R1	R1	R1	R1	R1	R2	R2		R2
	H	R2	R2	R2	R2	R2	R2	R2	R2	R2	R2		R2
	U	250	230	250	230	430	410	535	555	750	785		840
	V	290	220	290	220	290	310	375	370	470	490		860
	kg ¹⁾	1.6	1.6	2.2	2.2	2.3	2.3	3	3	5.5	5.5		6.5
	kg ²⁾	1.6	1.6	2.2	2.2	2.4	2.4	3.1	3.1	5.6	5.6		6.6
	kg ³⁾	1.8	1.8	2.4	2.4	2.6	2.6	3.3	3.3	6.3	6.3		7.3
	kg ⁴⁾	2.3	2.3	2.9	2.9	3.1	3.1	3.8	3.8	6.3	6.3		7.3

Dimensional Sketch



Subject to changes,
without notice.

Characteristics

- Self-acting
- P-controller
- Completely sealed
- Excess temperature protection
- All parts made of stainless steel
- Non-magnetic

Application

The thermostat is particularly suitable for installation in demanding environments such as tank installations, outdoor plants and where it must be non-magnetic, e.g. in submarines.

Function

The adjusting cylinder of the thermostat is set at the temperature in °C for the required heated medium. The temperature is regulated by the thermostatically controlled valve reducing or increasing the flow of the heating medium. Together with the adjusting cylinder, the liquid-filled sensor and capillary tube constitute a closed system.

If the temperature of the medium to be heated is above the required level, the sensor liquid expands, causing the spindle of the thermostat to act upon the valve, thereby reducing the flow of the heating medium.

If the temperature is below the required level, the temperature of the liquid in the sensor decreases and the volume is reduced, thereby the valve spring opens the valve causing an increasing flow of the heating medium.

Construction

The parts of the thermostat are made of stainless steel. The thermostat consists of a liquid-filled sensor, a capillary tube, and an adjusting cylinder.

The adjusting cylinder has O-ring sealings and is sealed with silicone glue at the top for hermetical closure. The thermostat is available with settings between -30°C and +280°C.

At flow temperatures above 170°C, a cooling unit must be installed between the valve and the thermostat. Please see datasheet no. 8.5.00.

Neutral Zone

The neutral zone of the thermostat, which is less than 2°C, is the temperature difference which can occur at the sensor without the thermostat spindle being actuated.

Sensor types

Rod or spiral sensors of stainless steel with pipe thread.

Sensors are also available with a pack-box on the capillary tube for applications where the sensor is to be lowered into a tank etc.

Sensor liquid

Glycerine at a scale range between -30°C and 160°C.

Paraffin at a scale range between 140°C and 280°C.

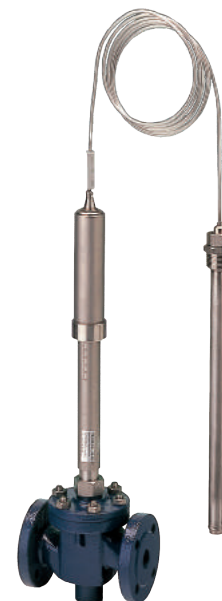
Capillary tube

The capillary tube is made of stainless steel and is available in lengths from 3 m up to 21 m.

Valves

The thermostat may be used for valves up to DN 150 mm for heating and cooling plants.

See data sheet "Quick choice of temperature controller" no. 9.0.00 and data sheet for the particular valve.



Technical data

Max. closing force	500 N
Standard settings:	
-Type V4.03	0-160 °C
-Type V4.05	0-120, 40-160 °C
-Type V4.10	0-60, 30-90, 60-120 °C
Reinforcement (mm/°C):	
(Glycerine)	Type V4.03: 0.3 Type V4.05: 0.5 Type V4.10: 1
(Paraffin)	Type V4.03: 0.33 Type V4.05: 0.7 Type V4.10: 1,33
For valves with lifting height up to	21 mm
Sensor material	W. No. 1.4436
Time constant for rod sensor:	
- Type V4.03:	90 sec.
- Type V4.05:	100 sec.
Time constant for spiral sensor, sec.	20
Neutral zone	< 2°C
Excess temperature protection	40°C

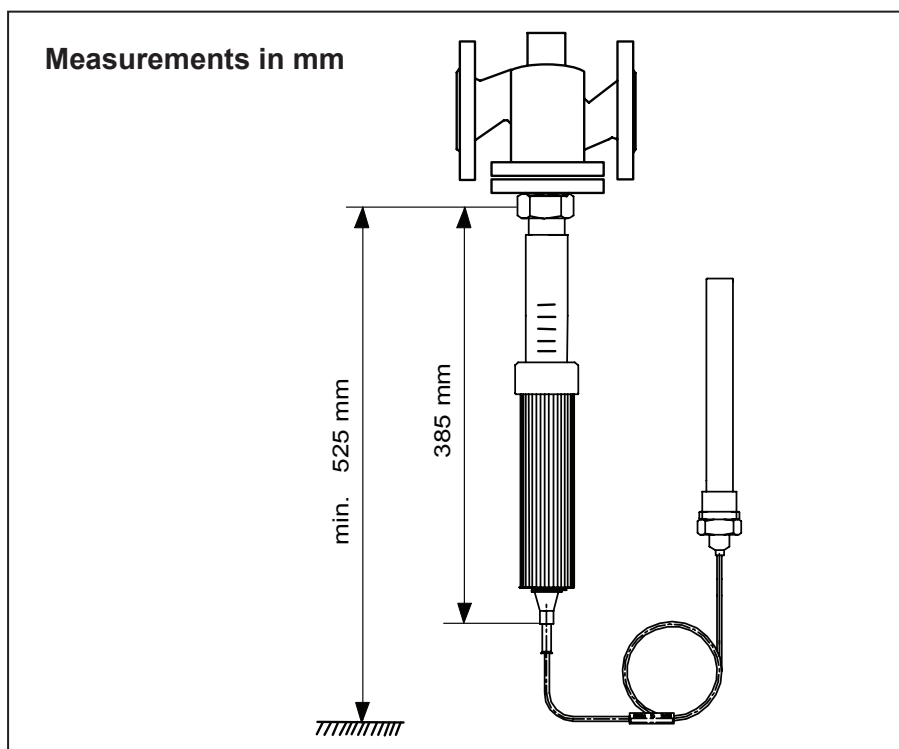
Materials:
Cover: Stainless steel 1.4301
Spring: 1.4401

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Sensors with pipe thread	Type V4.03	Type V4.05	Type V4.10
	C 190 mm D 170 mm E 22 mm F 49 mm G* 1" H* 2"	380 mm 250 mm 22 mm 49 mm 1" 2"	515 mm 325 mm 29 mm 49 mm 1" 2"
Weight including G connection	2.4 kg	2.6 kg	3.3 kg
Weight including H connection	2.9 kg	3.1 kg	3.8 kg

Sensors without connection Available with capillary packbox	Type V4.03	Type V4.05	Type V4.10	
	E 22 mm F 49 mm U 230 mm V 220 mm G* 1" H* 2"	22 mm 49 mm 410 mm 310 mm 1" 2"	29 mm 49 mm 555 mm 370 mm 1" 2"	
Weight	1)	2.2 kg	2.3 kg	3.0 kg
	2)	2.2 kg	2.4 kg	3.1 kg
	3)	2.4 kg	2.6 kg	3.3 kg
	4)	2.9 kg	3.1 kg	3.8 kg

* The measurements G and H are pipe threads according to ISO R7/1.



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Duostats

Self-acting Temperature Controls

3.5.01-F

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Clorius Duostats

Duostats are thermostats, type V, which via two sensing elements in a common hydraulic system act on one and the same control valve.

Two basic types are available:

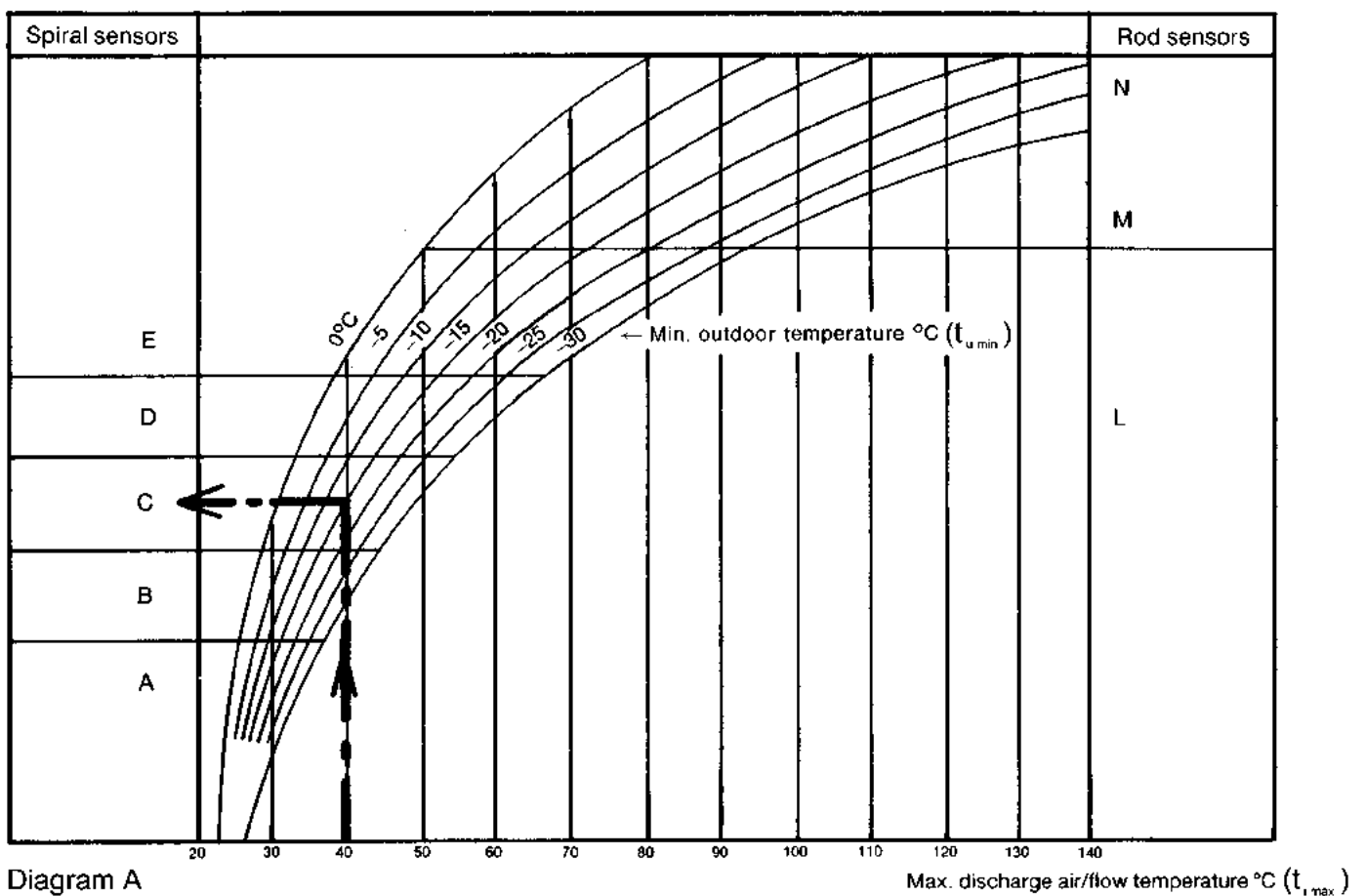
V4.05 or V4.10, depending on the preferable proportional band PB, and the valve size. For more details, see the diagrams in the "Quick Choice" leaflet no. 9.0.00.

The sensing elements are two spiral sensors for the ventilation duct or two rod sensors (a combination of one spiral sensor and one rod sensor may be supplied in certain combinations). The effect, which the two sensing elements have on the adjustment, is proportional to the liquid volume of the individual sensors. Duostats are therefore available with varying proportions between the liquid volumes of the two sensors (sensor proportions) and in that way they can meet

the requirements made by a number of different adjustment problems. As the adjustment result is a weighted average value of the temperatures of the two sensors, no fixed adjustment value can be indicated. Hence, Duostats are not equipped with a temperature scale, but with a marking for adjustment towards higher or lower temperatures, respectively.

Applications

1. Adjustment of discharge air temperatures in hot-air heating plants, dependent on the outdoor temperature.
2. Adjustment of two temperatures which are interdependent. E.g. the hot-water tank of a district heating plant with simultaneous control that the return water temperature does not become too high.



Selection of Duostat Type

Duostats for room heating are supplied with seven different sensor combinations which cover all requirements seen in practice.

On selecting the suitable Duostat, the diagram A is used in the following manner: When the correct basic type (V4.05 or V4.10) has been chosen from the combination diagram in the "Quick Choice" leaflet, look at diagram A for the max. discharge air/flow temperature ($t_{i\ max}$), for which the plant has been dimensioned by the outdoor temperature ($t_{u\ min}$).

From here you follow the vertical lines to the crossing with the respective $t_{u\ min}$ curve. The intersection lies within the area of the suitable sensor combination, the technical data of which are shown on page 4.

Example

A 50 M1F valve combined with a V4.10 thermostat, chosen from the combination diagrams in the "Quick Choice" leaflet, has to regulate by $t_{i\ max} = 40^\circ\text{C}$ and $t_{u\ min} = -15^\circ\text{C}$. The Duostat curve sheet gives the sensor proportion C, and the Duostat will be type V4.10 C, which has the sensor proportion 0.7:1. This value may be calculated from equation 2) and 3) on page 3:

$$\frac{V_s}{V_p} = 1.25 \cdot \frac{\Delta t_i}{\Delta t_u} = 1.25 \cdot \frac{40-20}{20+15} = 0.7$$

If, for instance, a capillary tube of 6 m is required from the adjusting cylinder to the secondary sensor and 3 m to the primary sensor, you specify:

Valve:	50 M1F
Duostat:	V4.10 C
Capillary tube:	
Adjusting cylinder - secondary sensor	6 m
Adjusting cylinder - primary sensor	3 m

Applications

Air Heating Plants

For air heating plants Duostats with two spiral sensing elements for air ducts are used. Fig. 1 shows an example of a plant with Duostat. The primary sensor V_p (red) is the real control sensor which goes into the controlled system.

The secondary sensor V_s (blue) which is located outside the controlled system, registers the outdoor temperature and determines the necessary air temperature by V_p . If there is no supply air duct, where the secondary sensor can be built in, it can be placed in free air. For this purpose a wall bracket is available. In order to determine the correct Duostat, use diagram A where the combinations of spiral sensors for air ducts are found on the left hand.

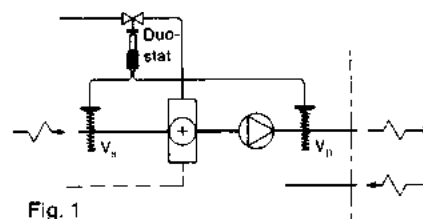


Fig. 1

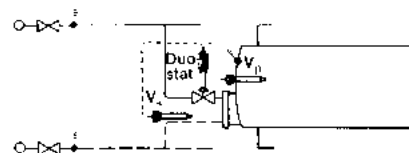


Fig. 2

Other Applications

Duostats are sometimes used for purposes where both sensing elements go into the same controlled system (see examples 2 and 3). The controlled condition will then be a weighted average of the registrations of the two sensors, as shown in the following examples.

In fig. 2 a hot-water tank connected to district heating is adjusted by a Duostat whose one sensor - the primary sensor - controls the temperature of the tank which should be constant. The secondary sensor registers the temperature of the water which is led back to the district heating network. It secures that the valve does not open so much that the temperature of the return water rises in an uncontrolled manner, when a large water consumption reduces the temperature in the tank.

Fig. 3 shows a room heated by hot air. The primary sensor is built into the extract air duct in order to serve as a room thermostat from this place. The secondary sensor is built into the discharge air duct where it counteracts that the discharge air temperature becomes too low - which would feel like a draught - when the room temperature rises as a result of the heat development which may come from persons or heating processes in the room.

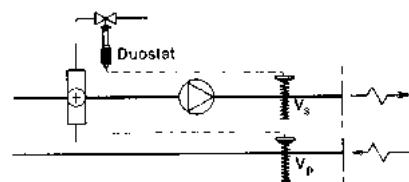


Fig. 3

Theoretical Basis

The theoretical basis for the use of Duostats for room heating plants rests on the balance between the heat brought to the plant, and the thermal loss from the heated rooms to the surroundings. By hot-air plants (fig. 1) this may approximately be expressed by equation 1), but with small changes, these considerations may be applied to central heating plants with water as the heat carrier.

$$1) Lc_p(t_i - t_u) = \Sigma kf(t_r - t_u)$$

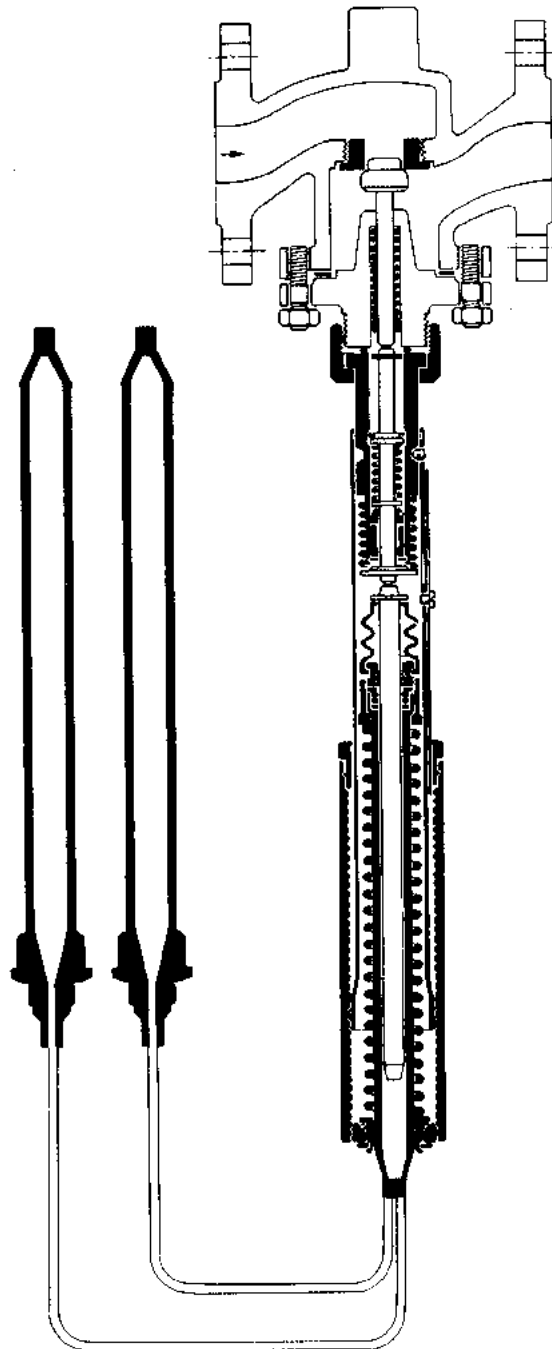
Here L is the quantity of air which is heated from the outdoor temperature t_u to the discharge temperature t_i , and c_p is the specific heat of the air. $k \cdot f$ expresses the sum of transmission surfaces, joints, etc., through which heat is lost to the surroundings by the difference between the temperatures of the heated rooms t_r and the outdoor temperature t_u . As L, c_p , $k \cdot f$ and the room temperature are constant sizes, equation 1) can be converted into:

$$2) \frac{t_{i \max} - t_{i \min}}{t_{u \max} - t_{u \min}} = \frac{\Delta t_i}{\Delta t_u} = n$$

Here $t_{i \max}$ and $t_{u \min}$ are belonging values for the calculated discharge air temperature by the outdoor temperature for which the plant has been dimensioned. In the same way, $t_{i \min}$ and $t_{u \max}$ are interbelonging values by the condition where the thermal loss is 0 (normally 20°C). The size n expresses how many degrees t_i has to be raised, when t_u falls one degree. It is constant for the individual plant, but varies from plant to plant. This problem can be met by supplying the Duostats with different sensor proportions. The proportion between the liquid volume in secondary and primary sensors is:

$$3) \frac{V_s}{V_p} = 1.25n$$

This formula is approximate, as the expansion coefficient of the liquid (glycerine) varies with the temperature, which is compensated for with the factor 1.25.

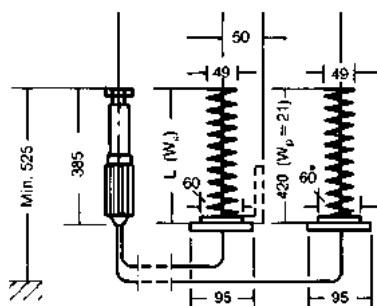


Duostats

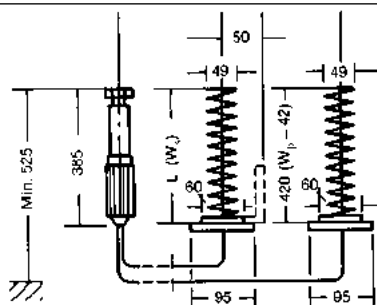
Self-acting Temperature Controls

3.5.01-F

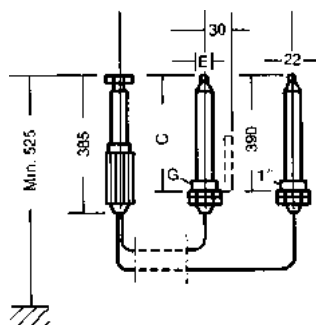
GB-4



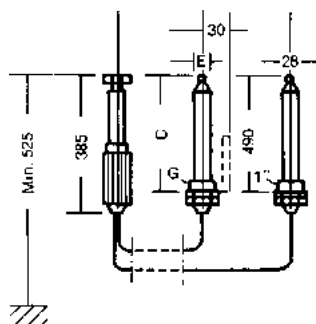
Type		V4.05 A	V4.05 B	V4.05 C	V4.05 D	V4.05 E
Closing power	N	500	500	500	500	500
Length of secondary sensor L	mm	430	430	430	430	430
Secondary sensor's windings W_s		7	10	14	21	29
Secondary sensor's time constant *	sec.	360	360	360	360	360
Primary sensor's time constant *	sec.	360	360	360	360	360
Sensor proportion $V_s : V_p$		0.35:1	0.5:1	0.7:1	1:1	1.4:1
Excess temperature protector	°C	80	80	80	80	80
Max. lifting height	mm	21	21	21	21	21
Travel	mm/°C	0.5	0.5	0.5	0.5	0.5



Type		V4.10 A	V4.10 B	V4.10 C	V4.10 D	V4.10 E
Closing power	N	500	500	500	500	500
Length of secondary sensor L	mm	430	430	430	430	430
Secondary sensor's windings W_s		14	21	29	42	42
Secondary sensor's time constant *	sec.	360	360	360	360	360
Primary sensor's time constant *	sec.	360	360	360	360	360
Sensor proportion $V_s : V_p$		0.35:1	0.5:1	0.7:1	1:1	1.45:1
Excess temperature protector	°C	40	40	40	40	40
Max. lifting height	mm	21	21	21	21	21
Travel	mm/°C	1.0	1.0	1.0	1.0	1.0



Type		V4.05 L	V4.05 M
Closing power	N	500	500
Length of secondary sensor C	mm	390	490
Secondary sensor's diam. E	mm	22	28
Secondary sensor's thread conn. G	ISO 7/1	R 1	R 1
Secondary sensor's time constant *	sec.	130	165
Primary sensor's time constant *	sec.	130	130
Sensor proportion $V_s : V_p$		1:1	2:1
Excess temperature protector	°C	80	80
Max. lifting height	mm	21	21
Travel	mm/°C	0.5	0.5



Type		V4.10 L	V4.10 N
Closing power	N	500	500
Length of secondary sensor C	mm	490	800
Secondary sensor's diam. E	mm	28	34
Secondary sensor's thread conn. G	ISO 7/1	R 1	R 2
Secondary sensor's time constant *	sec.	165	280
Primary sensor's time constant *	sec.	165	165
Sensor proportion $V_s : V_p$		1:1	2.9:1
Excess temperature protector	°C	40	40
Max. lifting height	mm	21	21
Travel	mm/°C	1.0	1.0

} High alloy stainless steel

* The time constants are for spiral sensing elements for air ducts measured in air with a velocity of 4 m/sec. For rod sensing elements they are measured in water with a velocity of 1 m/sec.

Order diagram

By specifications of Duostats, the following information is given:

1. Valve. Dimension and type	Example
2. Duostat. Basic type and sensor proportion	15 M1F
3. Capillary tube from adjusting cylinder to secondary sensor (V_s , blue)	V4.05 C
4. Capillary tube from adjusting cylinder to primary sensor (V_p , red)	6 m
	3 m

Pressure differential controls, type TD, comprise a control valve, a diaphragm unit and 2 connecting capillaries.

Type TDS is supplied fitted to a brass valve and is available in four size/range combinations. For further information, see separate data sheet no. 3.9.02.

The large controls type TD56-2, TD66-4 and TD66-8 can be used with our wide range of 2-way control valves, in sizes from 4 mm up to 80 mm (type TD56-2M up to DN 150 mm). For further information see "Quick Choice" no. 9.0.00 and data sheets for individual valves. TD56-2 is delivered complete with actuator and valve - please see datasheet 3.9.06.01 and 3.9.06.02.

The diaphragm housings are made of cast iron and the diaphragms of synthetic rubber clamped between 2 steel discs. To prevent the diaphragm from being ruptured, a safety overload spring is fitted between the diaphragm and the valve to prevent damage when subjected to excess pressure, forcing the diaphragm against the housing.

The controls are proportional controls. The proportional band is given as a percentage of set pressure value or as a pressure dependant upon the control type and the setting range.

The TD-controls are primarily for use in water systems where they maintain a constant differential pressure across 2 points and ensure stable flow conditions.

With the lower pressure connected to the valve side of the diaphragm and the higher pressure to the other side; the differential pressure across the diaphragm will be balanced by the force exerted by the spring.

Any change in the differential pressure will cause the diaphragm and the valve mechanism to move up or down to restore the set condition.

Working principle of the TD-Controls

Fig. 1. In the control valve the pressure is reduced from P1 to P2, and the control keeps (P2-P3) constant at a set value, although the external pressures "P1" and "P3" or the resistance "R" may be fluctuating.

Sizing of the valve is based on the smallest value of (P1-P2) with the maximum flow. For further information, see "Quick Choice" leaflet no. 9.0.00.

Similarly, fig. 2 shows the TD-control installed after the resistance "R" (in the return flow). In this case, (P2-P3) forms the basis for sizing the valve.

Applications

District Heating - in Housing Circuits without by-passes

The function of the TD-controls is to reduce the high and fluctuating pump head in the district heating system to a suitable and, under all circumstances, a constant differential pressure. It is very important that the TD-controls reduce the water flow as much as possible, to satisfy the design temperature drop across radiators and maintain heat output without excessive water flow.

An inexpensive arrangement for a district heating scheme is to use the TD-control instead of a return by-pass to reduce the flow rate to a minimum. This results in small bore pipework and reduces the need for additional pumps or electrically operated controls.

TDS



TD66



TD56-2



Fig. 1

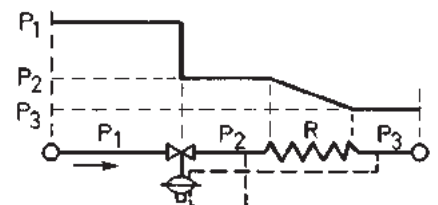
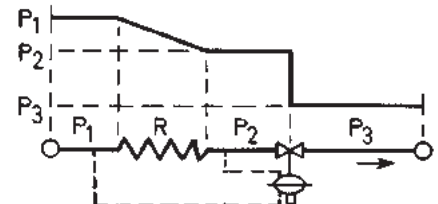


Fig. 2



Subject to change without notice.

Depending on the circumstances, the TD-controls may be installed in the return main (fig. 3) or the flow main (fig. 4). Installation in the return main is preferable where there is a risk of air in the system, and in high buildings where the pressure in the return main does not considerably exceed the static head.

For low buildings, and high flow pressures, it is normally preferable to install the TD in the flow main to reduce the pressure in the radiators to a level almost equivalent to the static head in the return main.

Please also note the TD-control in the district heating circuit of the hot water tank (H.W.T), and that the capillaries are connected across the control valves, maintaining a constant differential pressure across the valves and an optimum control. The H.W.T's control valve should be as small as possible ensuring a slow heating and a good cooling of the district heating water.

Pressure Stabilization for Temperature Control

The TD-controls also apply for heating systems with heat exchangers see fig. 5. When temperatures have to be kept within close limits e.g. in ventilating plants, control may be difficult if the differential pressure in the system is not constant or is very high. This can be overcome by installing a TD-control in front of one or more places to be controlled. Examples are shown in fig. 6, and 7.

Fig. 6 is for district heating, direct supply, whereas fig. 7 is for boiler supply. Note that a by-pass is established by a 3-way valve and a TD control.

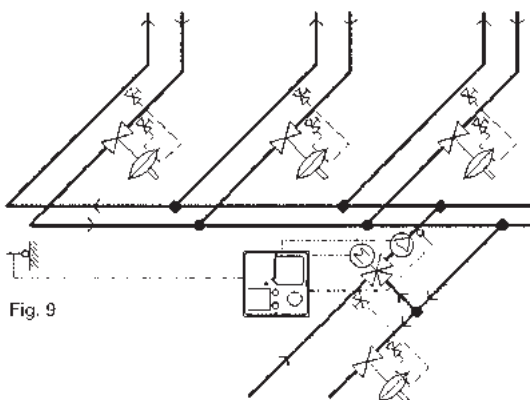
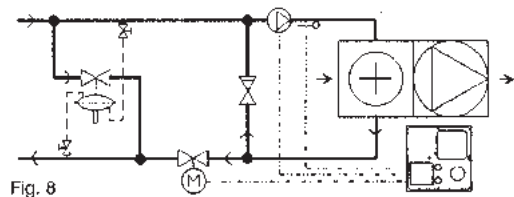
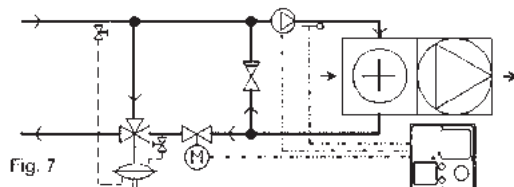
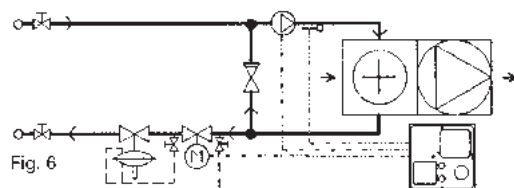
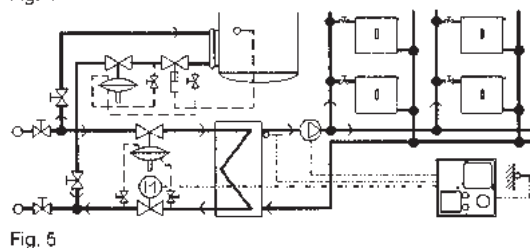
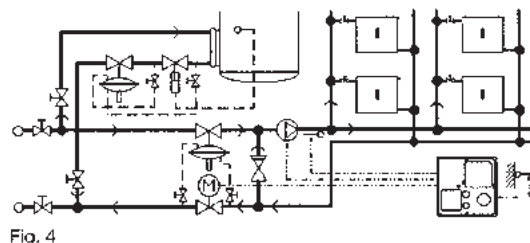
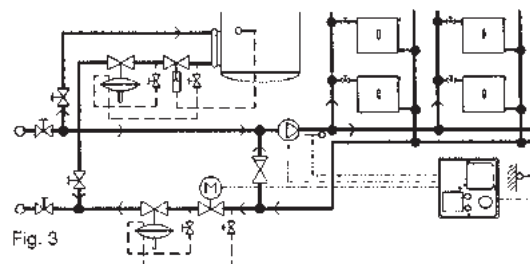
The TD-controls can be used with our range of reverse acting valves in by-pass around pumps or across the flow and return pipes of a circuit - see fig. 8 (boiler supply). This avoids the pump working against a dead head when all the sub-circuits are closed down and stops any bypassing on motorised valves or thermostatic radiator valves.

Noise Prevention

Noise from central heating installations can often be overcome by TD-controls.

The noise arising from a control valve is normally related to the pressure drop across it. Experts recommend that the pressure drop across radiator valves should not exceed 80 mbar, especially in the case of living room applications. In blocks of buildings with a common district heating station, there has, in recent years, been a tendency to increase the main pump head and this often results in valve noise.

Fig. 9 shows an example of the circuit to a block of buildings. The TD-control on the take off from the distribution main reduces the high pump head to suit the local pump head. TD-controls in each individual circuit further reduce the differential pressure across the system to the above mentioned 80 mbar. The pressure differential across the TD-controls itself may exceed 2 bar if the distribution pump head is high. In such cases, to avoid noise problems, the TD-controls should be installed well away from living quarters and the immediate pipework should be well muffled.



Subject to change without notice.

Characteristics

- Small dimensions
- Good regulating accuracy
- Nominal pressure PN 16
- Max. temperature 150°C
- Self-acting
- Low-noise control. (Tested according to ISO/DP 3822/1 - test results on request.)



Applications

The TDS controllers, which are made in four variants, have the following major applications:

Control of differential pressure, noise and dynamic balance. In individual users circuits and sub-mains within a large distribution network. For example in District Heating or Group Heating networks.

Control of by-pass between flow and return where 3-way valves or 2-way zone control valves are installed. To limit volume variations and maximum Δp .

Similarly for low water content boilers and devices requiring a minimum circulation irrespective of load conditions.

With the addition of a miniature solenoid valve in the impulse connection the valve can also be used to isolate a circuit with respect to time or temperature.

Function

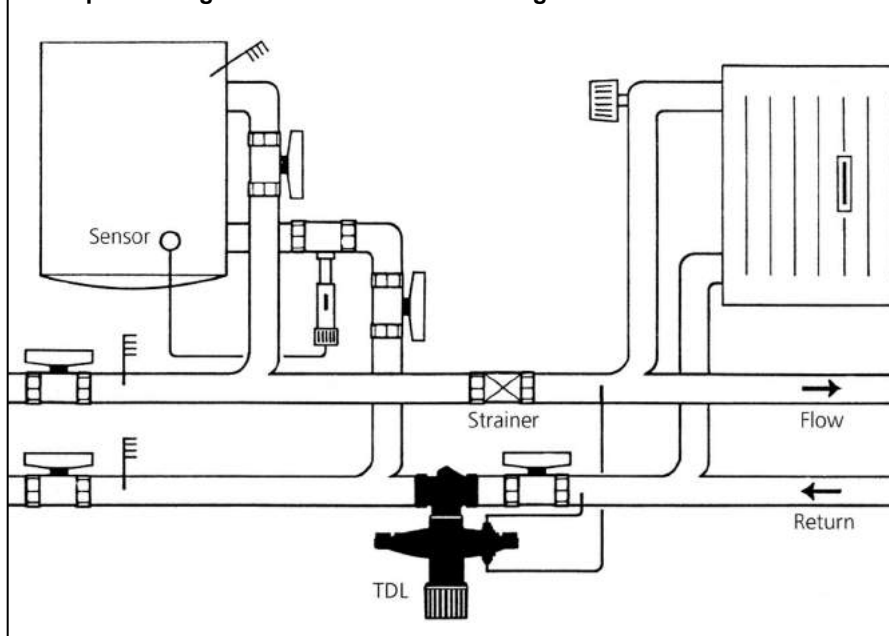
The TDS controller can be installed in either the flow or return of the sub-circuits.

The high pressure line is connected to the adjustment side of the diaphragm housing and the low pressure line to the valve body side of the diaphragm.

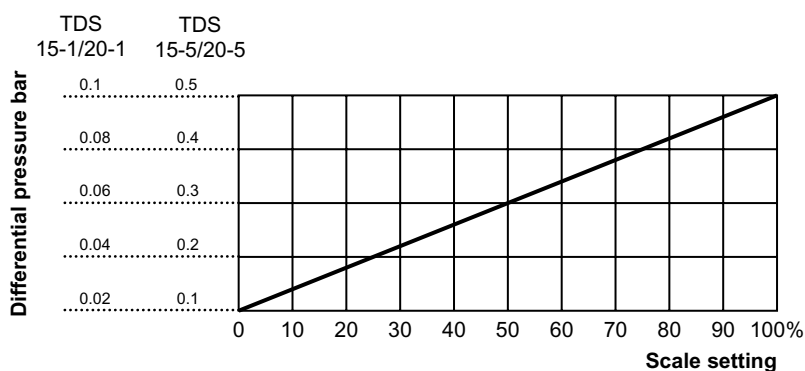
Any change of differential pressure across the diaphragm - which is connected to the valve mechanism - above or below the set point will cause the diaphragm to change its position. If higher than set pressure the valve will move to close, if lower than set pressure the valve will move to open, until the system is once again in balance.

Adjustment of the differential pressure setting is made by rotating the adjusting handle clockwise or anticlockwise until the desired set point is reached (see diagram). The upper edge of the adjustment cap in conjunction with the scale marked on the spring guide tube is an indication of the actual setting. The scale moves into or out of the handle loading the valve and diaphragm. The set pressure is shown on a percentage scale in 10% increments.

Example of integration of TDS into an existing installation



Relation between Scale Setting and Differential Pressure



Design

The TDS controller is a spring loaded self-acting proportional controller consisting of a valve, a diaphragm and housing and two capillary tubes on either side of the diaphragm. The valve body, available in DN15 and DN20, is made of hot-pressed brass, and the seat and cone of stainless steel. The diaphragm housing is made

of nodular cast iron, and the diaphragm itself is made of EPDM rubber with web reinforcement. If required, the TDS controller adjustment handle can be sealed, preventing unauthorised persons from altering the set point.

Subject to change, without notice.

Installation

According to the conditions, the TDS controller can be built into either the return pipe or the flow pipe in a suitable position and the small dimensions of the TDS controller make it easy to mount in most installations.

The diaphragm area is still large enough to give a sensitive response to small pressure variations; it is designed to be a compact controller without sacrificing performance.

Technical Data

Materials:

- Valve body Hot-pressed brass
(W. no. 2.0400 - ASTM B283)
- Seat and cone Stainless steel
(W. no. 1.4305 - AISI 303)
- Diaphragm housing Nodular cast iron
EN-GJS-400-15
(W. no. 0.7040 - ASTM A395)
- Diaphragm EPDM rubber with
web reinforcement
(ASTM D2000)
- Capillary Copper (ASTM B42)
2x1 m
- Type of valve Single seated
- Valve characteristic Linear (approx.)
- Weight, incl. valve 2.5 kg

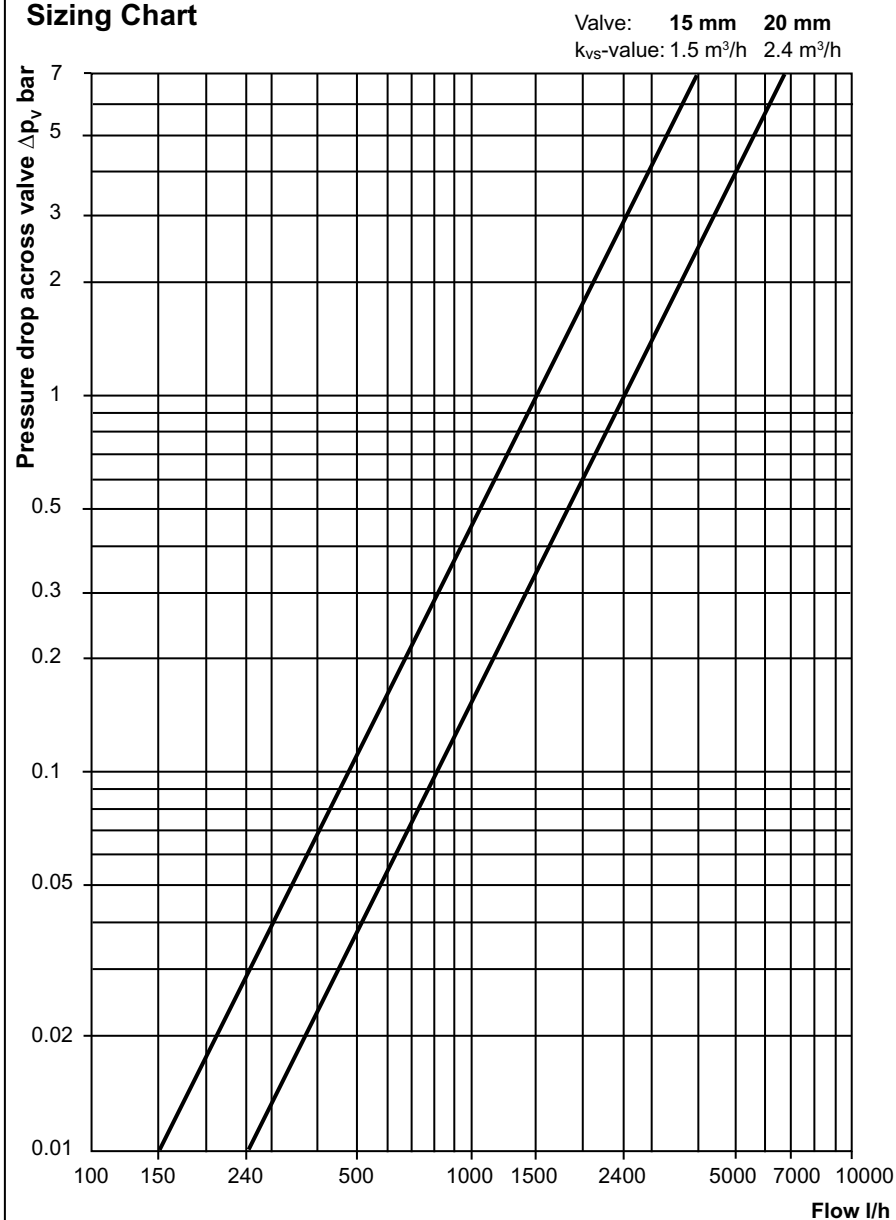
Subject to change, without notice.

Type	TDS			
	TDS15-1 0.02-0.1	TDS15-5 0.1-0.5	TDS20-1 0.02-0.1	TDS20-5 0.1-0.5
Setting range bar				
Proportional band mbar	16	80	16	80
Max. thrust on stem N	200		200	
Nom. pressure PN bar	16		16	
Max. rated travel mm	7		7	
Max. temp. of liquid °C	130 (150) ¹⁾		130 (150) ¹⁾	
Note	Incl. hot pressed brass valve, Rp ½ k _{Vs} =1.5, Δp _L =7 bar		Incl. hot pressed brass valve, Rp ¾ k _{Vs} =2.4, Δp _L =7 bar	

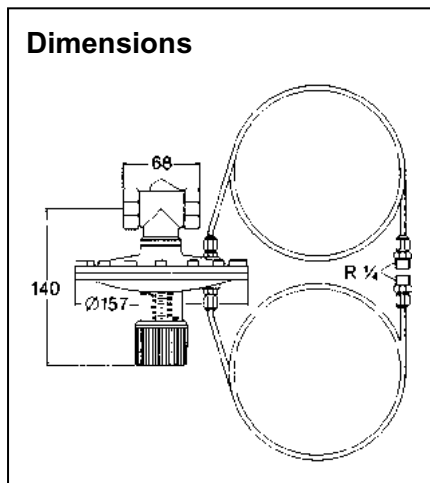
The max. pressure against which the controls can close Δp_L, depends on the valves and it is stated above. To avoid noise problems it is recommended that the pressure drop across valve Δp_V does not exceed 1 bar in living quarters.

¹⁾ 150°C - Only if TD cotroller is installed below the valve.

Sizing Chart



Dimensions



Characteristics

- Small dimensions
- Good regulating accuracy
- Nominal pressure PN 16
- Max. temperature 150°C
- Self-acting

Applications

The TDL controllers which are made in 6 variants have the following major applications:

Control of differential pressure, noise and dynamic balance. In individual users circuits and sub-mains within a large distribution network. For example in District Heating or Group Heating networks.

Control of by-pass between flow and return where 3 port valves or 2 port zone control valves are installed. To limit volume variations and maximum Δp . Similarly for low water content boilers and devices requiring a minimum circulation irrespective of load conditions.

With the addition of a miniature solenoid valve in the impulse connection the valve can also be used to isolate a circuit with respect to time or temperature.

Function

The TDL controller can be installed in either the flow or return of the sub-circuits.

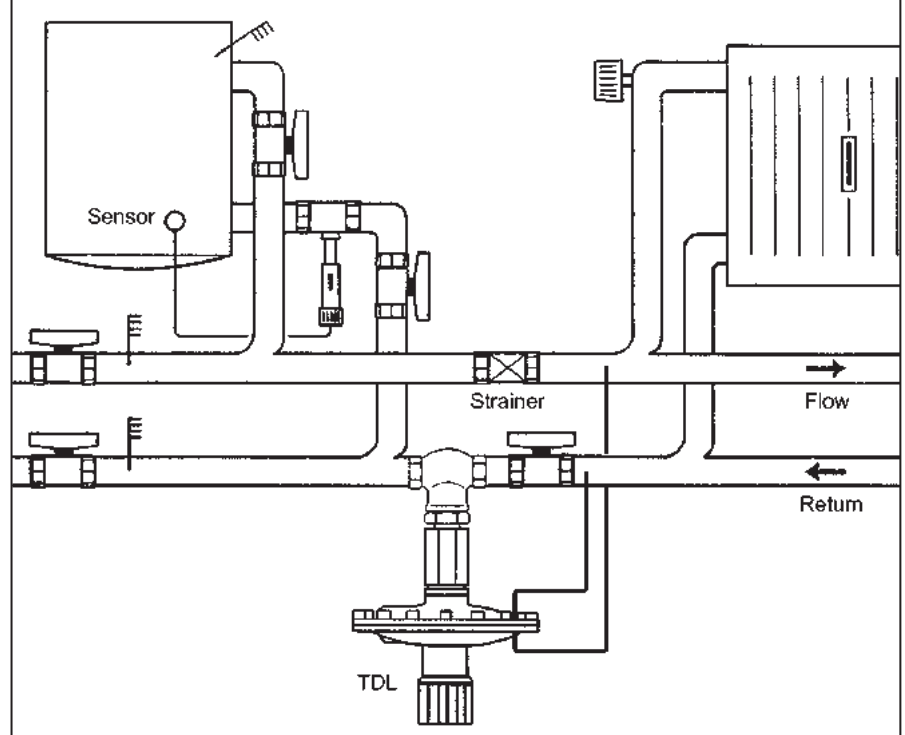
The high pressure line is connected to the adjustment side of the diaphragm housing and the low pressure line to the valve body side of the diaphragm.

Any change of differential pressure across the diaphragm – which is connected to the valve mechanism – above or below the set point will cause the diaphragm to change its position. If higher than set pressure the valve will move to close, if lower than set pressure the valve will move to open, until the system is once again in balance.

Adjustment of the differential pressure setting is made by rotating the adjusting handle clockwise or anticlockwise until the desired set point is reached (see diagram). The upper edge of the adjustment cap in conjunction with the scale marked on the spring guide tube is an indication of the actual setting. The scale moves into or out of the handle loading the valve and diaphragm. The set pressure is shown on a percentage scale in 10 % increments.



Example of integration of TDL into an existing installation



Design

The TDL controller is a self-acting proportional controller consisting of a valve, a diaphragm and housing and two capillary tubes on either side of the diaphragm. The valve body is made of gun metal, and the seat and cone of stainless steel. The diaphragm housing is made of nodular cast iron, and the diaphragm itself is made of EPDM rubber with web reinforcement. If required, the TDL controller adjustment handle can be sealed, preventing unauthorised persons from altering the set point.

Installation

According to the conditions, the TDL controller can be built into either the return pipe or the flow pipe in a suitable position and the small dimensions of the TDL controller make it easy to mount in most installations. The diaphragm area is still large enough to give a sensitive response to small pressure variations; it is designed to be a compact controller without sacrificing performance.

Subject to change without notice.

Pressure Differential Controller

Type TDL, PN 16, DN 20 – 32 mm

3.9.03-E

GB-2

Technical Data

Materials:

Valve body RG5 CuSn5Zn5Pb5-C

Cone Stainless steel

(W.no. 1.4305 – AISI 303)

Diaphragm housing Nodular cast iron

EN-GJS-400-15

(W.no.0.7040 – ASTM A395)

Diaphragm EPDM rubber with

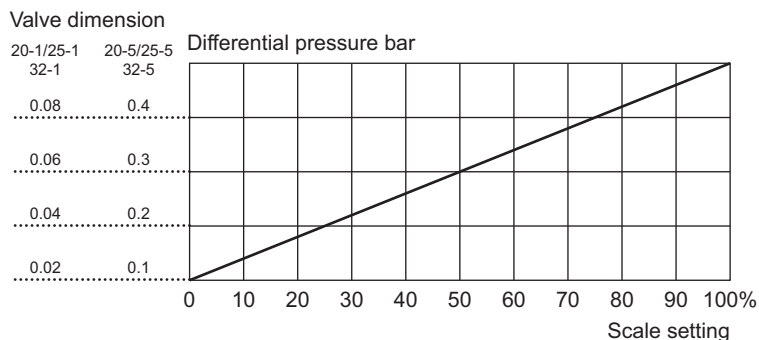
web reinforcement

(ASTM D2000)

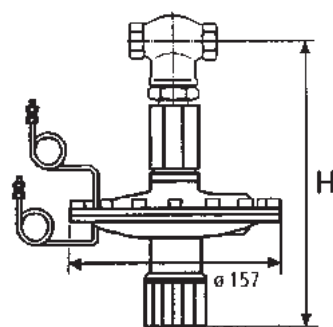
Capillary 2 pieces of 1 m, Cu

Pressure stage PN 16

Relation between scale setting and differential pressure



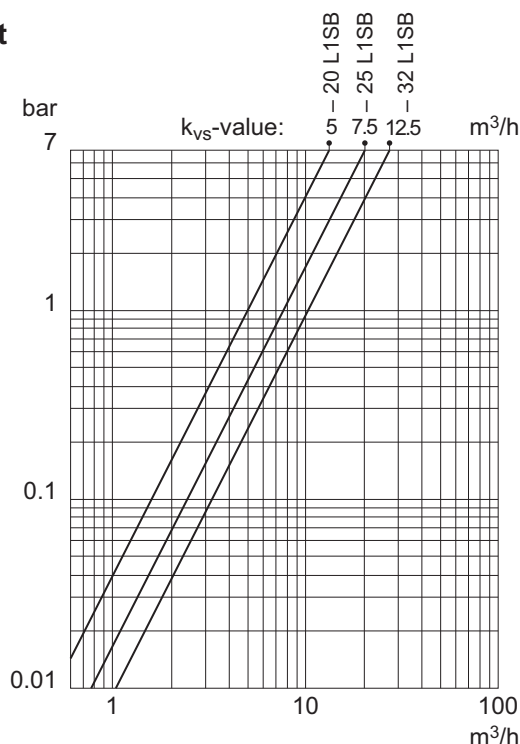
Dimension sketch



H:

DN 20	267 mm
DN 25	277 mm
DN 32	292 mm

Sizing chart



Type designation	TDL 1-20-1	TDL 1-20-5	TDL 1-25-1	TDL 1-25-5	TDL 1-32-1	TDL 1-32-5
Valve type	20 L1SB	20 L1SB	25 L1SB	25 L1SB	32 L1SB	32 L1SB
Pressure stage PN 16	•	•	•	•	•	•
Max. temperature 150°C	•	•	•	•	•	•
Max. diff. pressure, Δp , across the valve in bar	7	7	7	7	7	7
Overall valve length in mm	95	95	105	105	138	138
k_{vs} -value	5	5	7.5	7.5	12.5	12.5
Setting range in bar	0.02-0.1	0.1-0.5	0.02-0.1	0.1-0.5	0.02-0.1	0.1-0.5
Proportional band 10%	•	•	•	•	•	•
Weight in kg, incl. valve	3.7	3.7	4	4	5.3	5.3
2 pcs capillary each 1 m enclosed, connection ISO 7 - R $\frac{1}{4}$	•	•	•	•	•	•

Subject to change without notice.

Pressure Differential Controls Type TD66

3.9.04-D

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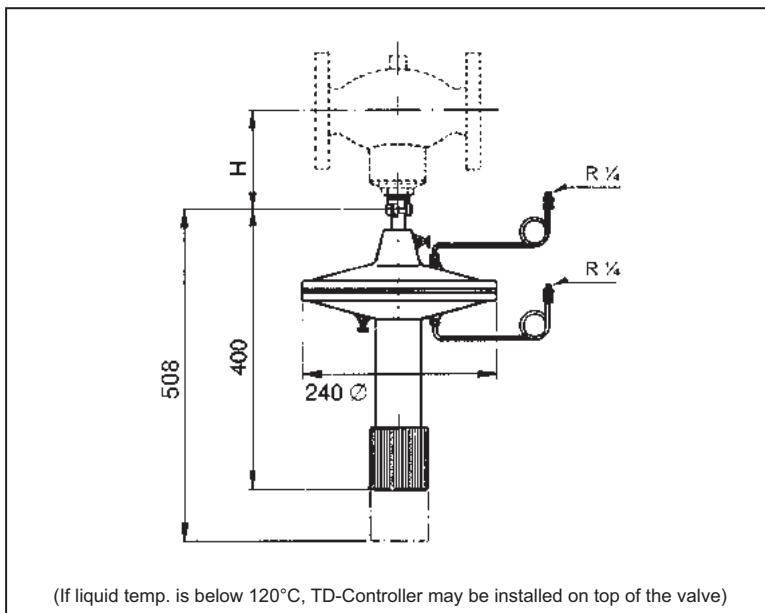
Pressure differential controls, type TD, comprise a control valve, a diaphragm unit and 2 connecting capillaries.

The controls type TD66-4 and TD66-8 can be used with our wide range of 2-way control valves, in sizes from 4 mm up to 80 mm. For further information see technical data, "Quick Choice" no. 9.0.00 and data sheets on individual valves.

Type TD66 (TD66-4 and -8) is spring loaded and is available in several setting ranges. The differential pressure required is set by turning the handle, the upper edge of which acts as a pointer on the scale.



Dimensions



Technical Data

Type	TD66-4	TD66-8			
Setting range bar	0.15-0.3	0.15-0.3	0.2-0.8	0.7-1.3	1.35-1.5
Proportional band	10%	10%	30%	30%	20%
Max. thrust on stem N	400	800			
Nom. pressure PN bar	16 ¹⁾	16 ¹⁾			
Max. rated travel mm	14	14			
Max. temp. of liquid °C	120 (150) ²⁾	120 (150) ²⁾			
Weight kg	13				
Note	Primarily in connection with double seated valves up to DN 80 mm (Single seated valves only up to DN 25 mm, and not balanced valves - type M1FB, G1FB, H1FB) ³⁾				

¹⁾ PN is only valid for the diaphragm housing. See also data sheets for the valves.

²⁾ 150°C - Only if TD controller is installed below the valve.

³⁾ Balanced and larger single seated valves only to be selected if an increased variation of the desired diff. pressure Δp is allowable.
(An increase of the inlet pressure may result in a substantial increase of Δp).

Subject to change without notice.

Characteristics

- Exact regulating
- Nominal pressure PN 25 / PN 16
- Self-acting
- Easy to install and use

Applications

This unit is designed for controlling of differential pressure in individual users circuits and sub-mains within a large distribution network. For instance in district heating or group heating networks. Control of by-pass between flow and return where 3 port valves or 2 port zone control valves are installed to limit volume variations and maximum Δp . Similarly for low water content boilers and devices requiring a minimum circulation irrespective of load conditions.

Function

The medium flows through the free area between the seat and cone in the direction indicated by the arrow on the body. The high pressure line is connected to the diaphragm housing via C1 and the low pressure line to the diaphragm housing via C2. Any change of differential pressure across the diaphragm which

is connected to the valve mechanism – above or below the set point will cause the diaphragm to change its position. If higher than set pressure the valve will move to close, if lower than set pressure the valve will move to open, until the system is once again in balance.

Adjustment of the differential pressure setting is made by rotating the setpoint adjuster clockwise or anticlockwise until the desired set point is reached.

The valve cone is pressure balanced. The pressure acts onto the bottom and top surface of the cone at the same time. In this way, the forces produced by the media are compensated.

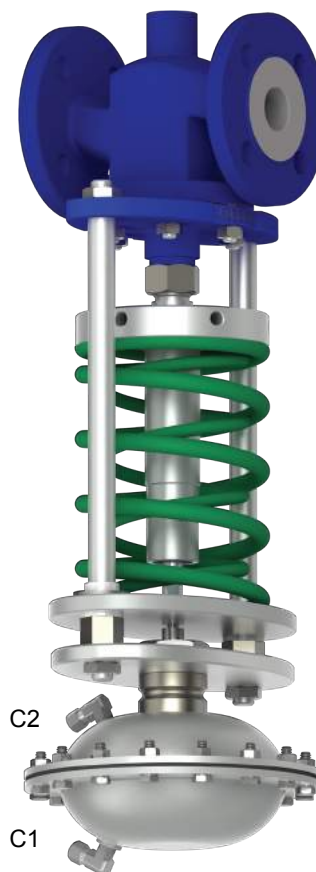
Design

The differential control valve is a self-acting unit consisting of a valve, springs, an actuator and two capillary tube connected on the upper and lower side of the actuator. The valve body is made of nodular cast iron. The seat and cone are made of stainless steel. The diaphragm is made of EPDM or NBR rubber, depending on the medium to be controlled.

Quality assurance

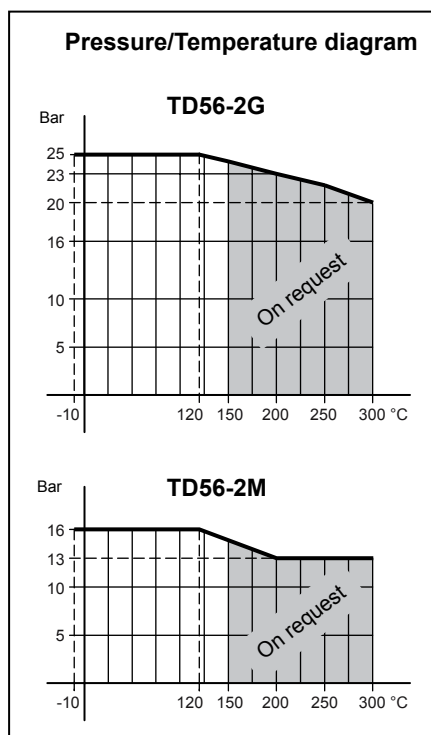
All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment.

For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.



Installation

According to the conditions, the TD56-2 can be built into either the return pipe or the flow pipe in a suitable positions. The diaphragm area is large enough to give a sensitive response to small pressure variations.



Specifications				
Type	Flange connection DN in mm	k_{vs} -value m^3/h	Lifting height mm	Weight kg
15 TD56-2G/M	15	4	7.5	21
20 TD56-2G/M	20	6.3	7.5	23
25 TD56-2G/M	25	10	9	24
32 TD56-2G/M	32	16	10	27
40 TD56-2G/M	40	25	11	29
50 TD56-2G/M	50	35	11.5	33
65 TD56-2G/M	65	58	14.5	38
80 TD56-2G/M	80	80	16	55

Set point	bar	0.4 - 0.8	0.6 - 1.5	1 - 2.5	2 - 5
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Subject to change without notice.

Technical Data

Materials:

- TD56-2M valve body Nodular cast iron
EN-GJS-400-15
- TD56-2G valve body Nodular cast iron
EN-GJS-400-15
- Cone, Seat Stainless steel
- O-ring A70H FEPM
- Bolts, nuts 24 CrMo 4/A4
- Stag bolt, Set point adjuster
St. 42, 1.0503

- Spindle housing Electroplated
St. 42, 1.0503
- Spring Electroplated
W. Nr. 1.4568
powder coated

- Diaphragm housing Steel 1.0122
- Diaphragm NBR / EPDM
- Nominal pressure TD56-2G - 25 bar
TD56-2M - 16 bar

- Seating Single-seated
- Valve characteristic Quadratic
- Leakage rate $\leq 0.05\%$ of k_{vs}
- Temperature range See pressure/
temperature
diagram

Flanges drilled according to:

- TD56-2G EN 1092-2 PN 25
- TD56-2M EN 1092-2 PN 16

Counter flanges DIN 2634

Colour (valve body, cover):

- TD56-2G Blue
- TD56-2M Grey

Definition of k_{vs} -value

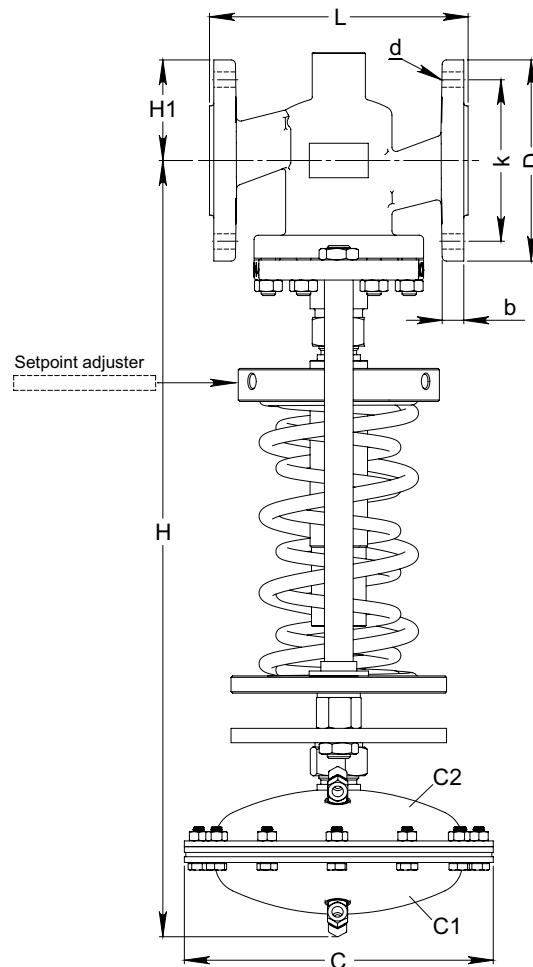
The k_{vs} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Strainer

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

Subject to change without notice.

Dimension sketch

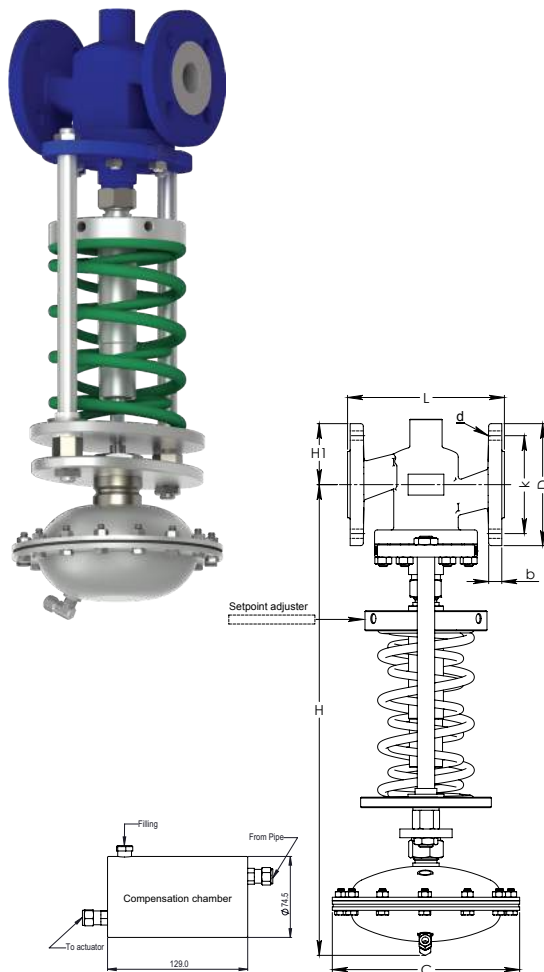


Type	L mm	H1 mm	H mm	C mm	b mm	D (dia.) mm	k (dia.) mm	d mm dia. (number)
15 TD56-2G/M	130	60	582	220	14	95	65	14 x (4)
20 TD56-2G/M	150	65	595	220	16	105	75	14 x (4)
25 TD56-2G/M	160	70	601	220	16	115	85	14 x (4)
32 TD56-2G/M	180	75	618	220	18	140	100	19 x (4)
40 TD56-2G/M	200	85	630	220	19	150	110	19 x (4)
50 TD56-2G/M	230	95	660	220	19	165	125	19 x (4)
65 TD56-2G/M	290	110	685	220	20	185	145	19 x (8)
80 TD56-2G/M	310	155	708	220	20	200	160	19 x (8)

Pressure Reducing Valves type G1PR (PN 25) and H1PR (PN 40), DN 15 – 80 mm

3.9.08-J

GB-1



TECHNICAL DATA

Materials:

- H1PR valve body Cast steel GP240GH (GS-C25)
- G1PR valve body Nodular cast iron EN-GJS-400-15
- Cone, Seat Stainless steel
- O-ring A70H FEPM
- Bolts, nuts 24 CrMo 4/A4
- Stag bolt, Set point adjuster

- Spindle housing St. 42, 1.0503 Electroplated
- Spring W. Nr. 1.4568 powder coated
- Diaphragm housing Steel 1.0122
- Diaphragm NBR / EPDM

Nominal pressure

PN 25 - G1PR
PN 40 - H1PR

Seating

Single-seated

Valve characteristic

Quadratic

Leakage rate

$\leq 0.05\%$ of k_{VS}

Temperature range

See pressure/ temperature diagram

Flanges drilled according to:

- H1PR EN 1092-1 PN 40
- G1PR EN 1092-2 PN 25

Counter flanges

DIN 2634

Colour (valve body, cover):

- H1PR Green
- G1PR Blue

SPECIFICATIONS

Type	L	H1	H	C	b	D	k	d	Flange connection	k_{VS} -value	Lifting height	Weight
	mm	mm	mm	mm	mm	(dia.) mm	(dia.) mm	mm dia. (number)	DN in mm	m^3/h	mm	kg
15 G/H1PR	130	60	582	220	14	95	65	14 x (4)	15	4	7.5	21
20 G/H1PR	150	65	595	220	16	105	75	14 x (4)	20	6.3	7.5	23
25 G/H1PR	160	70	601	220	16	115	85	14 x (4)	25	10	9	24
32 G/H1PR	180	75	618	220	18	140	100	19 x (4)	32	16	10	27
40 G/H1PR	200	85	630	220	19	150	110	19 x (4)	40	25	11	29
50 G/H1PR	230	95	660	220	19	165	125	19 x (4)	50	35	11.5	33
65 G/H1PR	290	110	685	220	20	185	145	19 x (8)	65	58	14.5	38
80 G/H1PR	310	155	708	220	20	200	160	19 x (8)	80	80	16	55

SET POINT	bar	0.4 - 1.2	1 - 2.5	2 - 5	4 - 10	8 - 16
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Maximum allowable differential pressure is 25 bar.

CHARACTERISTICS

- Exact regulating
- Nominal pressure PN 25 / PN 40
- Self-acting
- Easy to install and use

APPLICATIONS

This unit is designed for maintaining the pressure downstream of the valve to an adjusted set point value.

DESIGN

The pressure reducing valve is a self-acting unit consisting of a valve, springs, an actuator and one capillary tube connected on the upper side of the actuator. The valve body is made of nodular cast iron or cast steel. The seat and cone are made of stainless steel. The diaphragm is made of EPDM or NBR rubber, depending on the medium to be controlled.

QUALITY ASSURANCE

All valves are manufactured under an ISO 9001 certification and are pressure and leakage tested before shipment. For marine applications the valves can be supplied with relevant test certificates from recognized classification societies.

FUNCTION

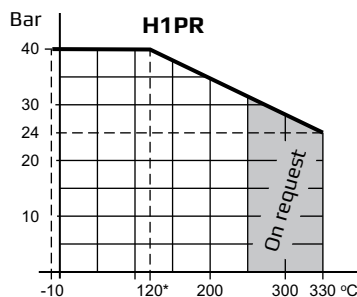
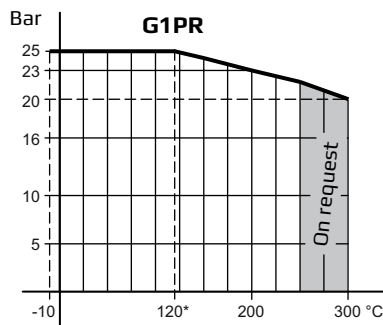
The medium flows through the free area between the seat and cone in the direction indicated by the arrow on the body.

The position of the valve cone determines the flow rate and consequently the pressure ratio across the valve.

The downstream pressure is transmitted through the compensation chamber and the capillary to the diaphragm, where it is converted into a positioning force. This positioning force is adjusting the cone with dependence on the force of the operating springs. The spring force can be adjusted by using the setpoint adjuster. The valve cone is pressure balanced.

The pressure acts onto the bottom and top surface of the cone at the same time. In this way, the forces produced by the media are compensated.

PRESSURE/TEMPERATURE DIAGRAM



*For temperature above 100°C a compensation chamber is needed.

INSTALLATION

The pressure reducing valve must be installed in a horizontal pipe with the actuator directed downwards. The flow through the valve must coincide with the arrow on the valve body.

STRAINER

It is recommended to use a strainer in front of the control valve if the liquid contains suspended particles.

COMPENSATION CHAMBER

For steam applications and media temperature above 100°C a compensation chamber is needed.

DEFINITION OF K_{VS} -VALUE

The k_{VS} -value is identical to the IEC flow coefficient k_v and defined as the water flow rate in m^3/h through the fully open valve by a constant differential pressure, Δp_v , of 1 bar.

Subject to changes without notice.

SECTION 4

Characteristics

- PI and PID performance
- Easy operation
- For heating and cooling systems in maritime and industrial installations
- Manual- / automatic changeover
- Robust self-optimization
- Alarm indicating a deviation from set point, positive or negative
- Only one sensor element Pt 100 required for control and temperature indication
- User-defined operation level
- 2- or 3-positional output for controlling the actuator

Applications

The ER 2000 controller is used for constant temperature control. It is suitable for all heating and cooling control systems. The controller is primarily intended for marine installations and other industrial applications - such as cooling water and lubricating oil installations, flow temperature control etc.

Design

The ER 2000 controller is designed for panel mounting.

For easy start-up it has optimization for automatic determination of favourable control parameters. The optimization starts when changing the set point or when switching over from manual mode to automatic control. The optimization can be disregarded.

For easy operation it has three keys - two for scrolling or changing values and an enter key. Two digital displays show the process variable and the set point. 3 LEDs indicate actuator opens, actuator closes and alarm.

The controller can be switched from auto mode to manual mode. In manual mode the actuator can be opened, closed or stopped in a certain position.

Three different alarm settings are possible:

A: Alarm at a deviation from the set point SP

B: Alarm at a fixed limit value

C: Alarm at leaving a band around the set point SP.

It can operate either as a three position or as a two position controller and has adjustable proportional band, integral action time and derivative action time.

Function

The temperature input comes via a Pt 100 sensor with a single sensing element. The measured value of the controlled variable is compared with the set point value and adjusted via a PI or a PID control structure.

The ER 2000 can act as either a heating controller, the actuator closes at rising temperature, or as a cooling controller, the actuator opens at rising temperature. The ER 2000 permits direct reading of the actual temperature value (PV) and it is secured from failure in the measuring circuit, i.e. the controller can be set to give either a closing, an opening or remain in current position command in case of sensor short circuit or sensor break. The error message Err appears in the LED display PV.

Communication

The controller is equipped with a RS 485 communication module.

Technical Data

Line voltage
 230 V AC }
 115 V AC* } -15 % / +10 %, 50 / 60 Hz
 24 V AC* }
 *- optional (please specify)

Power consumption approx. 7 VA

Weight approx. 1 kg

Permissible ambient temperature
 - Operation 0 to 50°C
 - Transport and storage -25 to + 65°C

Degree of protection
 Front: IP 65 according to DIN 40050
 Terminals: IP00

Design
 For control panel installation
 96 x 96 x 135 mm (W x H x D)
 panel cut out 92 x 92 mm

Installation position arbitrary

Input
 Pt100, 0°C to 300°C
 Connection in three - wire system
 Option: 4-20 mA



Output
 2- or 3-point
 Option: 4-20 mA

Measuring accuracy
 0.1% of the measuring range

Displays
 Two 4 - digit 7 segment displays,
 LED, red,
 character height = 13 mm

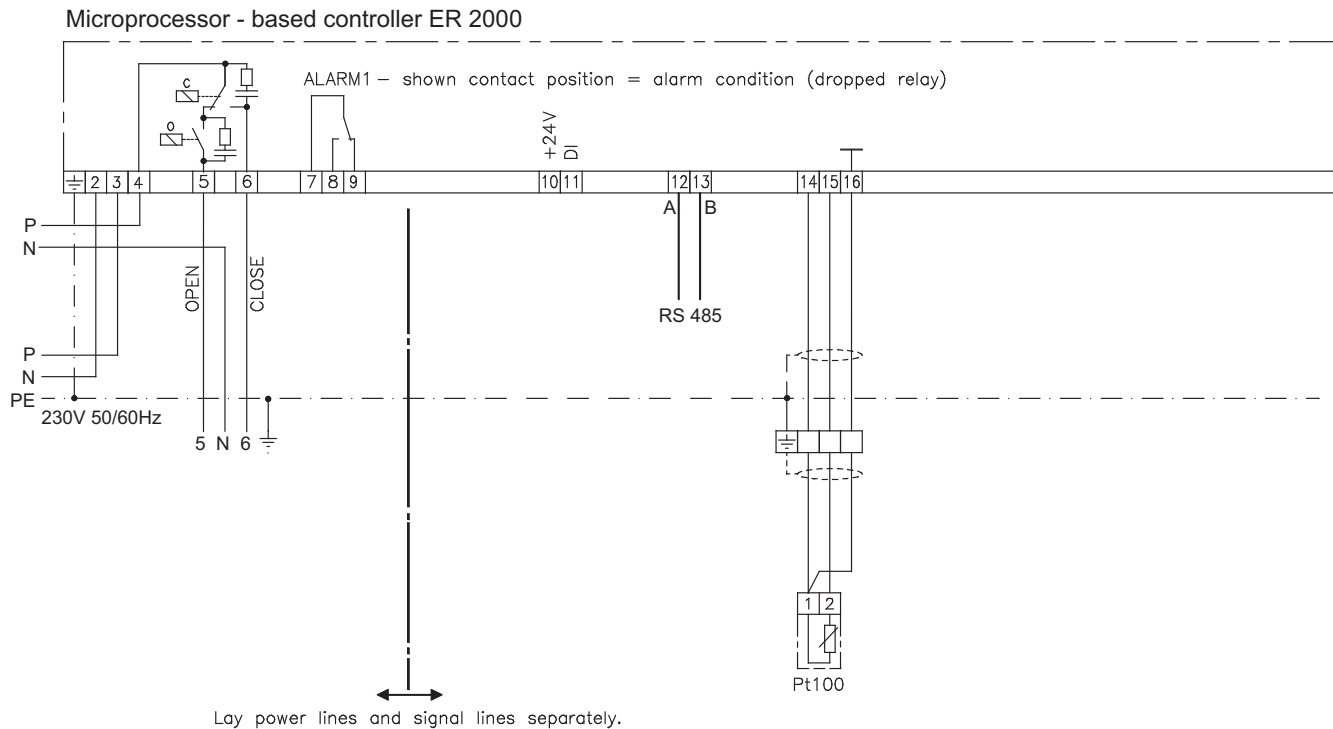
Alarm
 Alarm type A, B, C;
 working contact normally closed
 circuit principle

Relay
 Switching capacity: 250 V AC / 3 A
 Spark quenching element

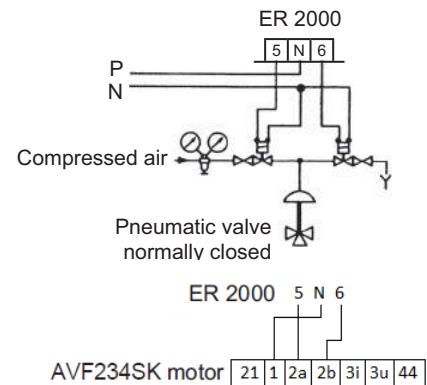
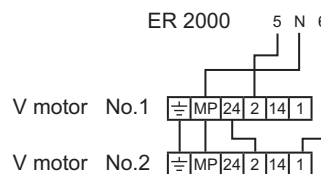
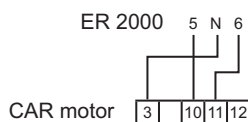
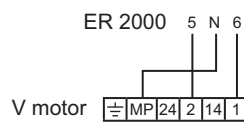
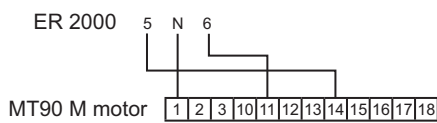
Data protection
 Semi - conductor memory

Subject to changes without notice.

Wiring diagram

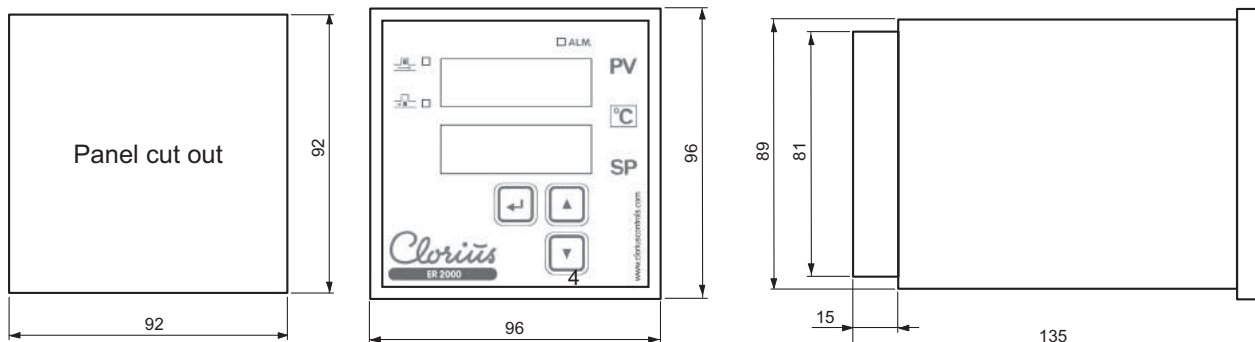


Electrical Connections - Optional external units



Cooling: Remember to set controller into cooling mode.

Dimensions in mm



Subject to changes without notice.

Characteristics

- PI-PID cascade controller
- Easy operation
- For cooling systems in maritime installations
- Manual- / automatic changeover
- Robust self-optimization
- Alarm indicating at deviation from set point, positive or negative
- User-defined operation level
- 2- or 3-positional output for controlling the actuator

Applications

The ER 3000 controller is used for constant temperature control. It is specially designed for large engine jacket cooling water systems where conventional single loop controllers cannot maintain a constant and precise temperature.

Design

The ER 3000 controller is designed for panel mounting.

For easy start-up it has optimization for automatic determination of favourable control parameters. The optimization starts when changing the set point or when switching over from manual mode to automatic control. The optimization can be disregarded.

For easy operation it has four keys - two for scrolling or changing values, an enter key and a key for choosing manual or automatic control. Two digital displays show the process variable and the set point. 7 LEDs indicate alarm, actuator opens, actuator closes, slave control, setpoint raising / lowering and manual mode.

The controller can be switched from auto mode to manual mode. In manual mode the actuator can be opened, closed or stopped in a certain position.

Three different alarm settings are possible:

- A: Alarm at a deviation from the set point SP
- B: Alarm at a fixed limit value
- C: Alarm at leaving a band around the set point SP

The 3 alarm settings include alarm in case of sensor fault.

It can operate either as a three position or as a two position controller and has adjustable proportional band, integral action time and derivative action time.

Function

The controller operates with two sensor inputs. One Pt 100 sensor is placed at the outlet from the engine and one Pt 100 sensor with a built-in 4-20 mA transmitter is placed at the inlet to the engine. The measured values of the controlled variables are compared with the set point value and adjusted via a PI or a PID control structure.

When used for large engine jacket cooling water systems the controller must be set up as a cascade controller

The cascade controller has two process variables - master and slave.

The cascade controller compares the measured master value (outlet from the engine) with its setpoint and adjusts the setpoint of the slave variable (inlet to the engine) if necessary.



Technical Data

Line voltage
 230 V AC }
 115 V AC* } -15 % / +10 %, 50 / 60 Hz
 24 V AC* }
 *- optional (please specify)

Power consumption approx. 7 VA

Weight approx. 1 kg

Permissible ambient temperature
 - Operation 0 to 50°C
 - Transport and storage -25 to + 65°C

Degree of protection
 Front IP 65 according to DIN 40050
 Terminals: IP00

Design
 For control panel installation
 96 x 96 x 135 mm (W x H x D)
 panel cut out 92 x 92 mm

Installation position arbitrary

DI - feed voltage and measuring
 transducer feed voltage
 24 V DC, I_{max} = 60 mA

Analog inputs
 Pt100, 2.4 = 0°C to 300°C
 or 2.2 = 0°C to 400°C
 or 2.50 = -50°C to 250°C
 Connection in three - wire system
 0/4 to 20 mA, input resistance = 50 Ohm
 0/2 to 10 V, input resistance = 100 KOhm

Measuring accuracy
 0.1% of the measuring range

Digital inputs
 high active, R_i = 1 k W;
 0V DC = low
 15 V to 24 V DC = high
 Analog output for process variable
 0 to +10 V corresponds with
 0 to 300°C (2.4) or 0 to 400°C (2.2)
 or -50°C to 250°C (2,50), I_{max} = 2 mA

Displays
 Two 4 - digit 7 segment displays,
 LED, red,
 character height = 13 mm

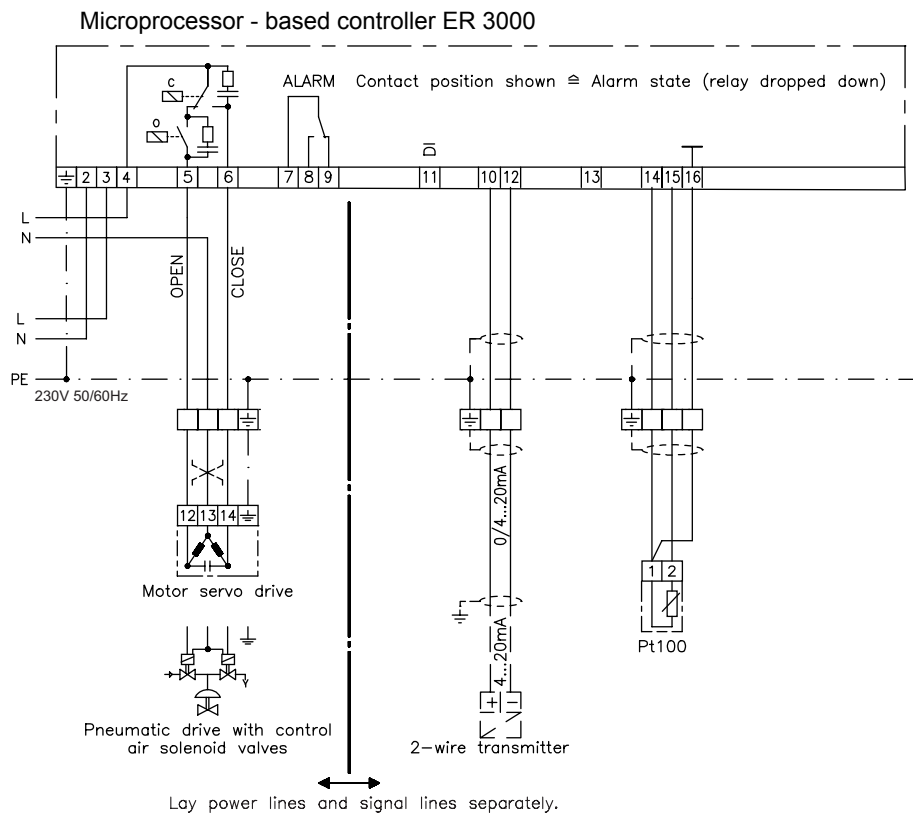
Alarms
 Alarm type A, B, C;
 working contact normally closed
 circuit principle

Relay
 Switching capacity: 250 V AC / 3 A
 Spark quenching element

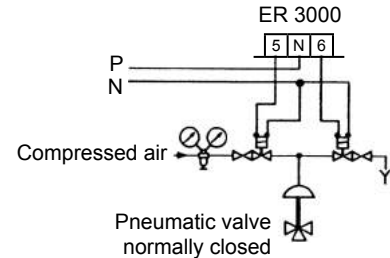
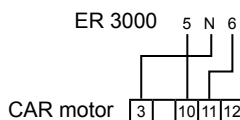
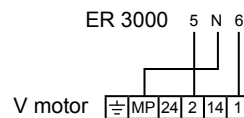
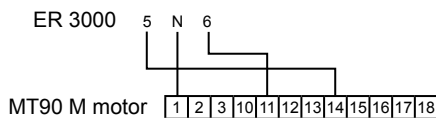
Data protection
 Semi - conductor memory

Subject to changes without notice.

Wiring diagram

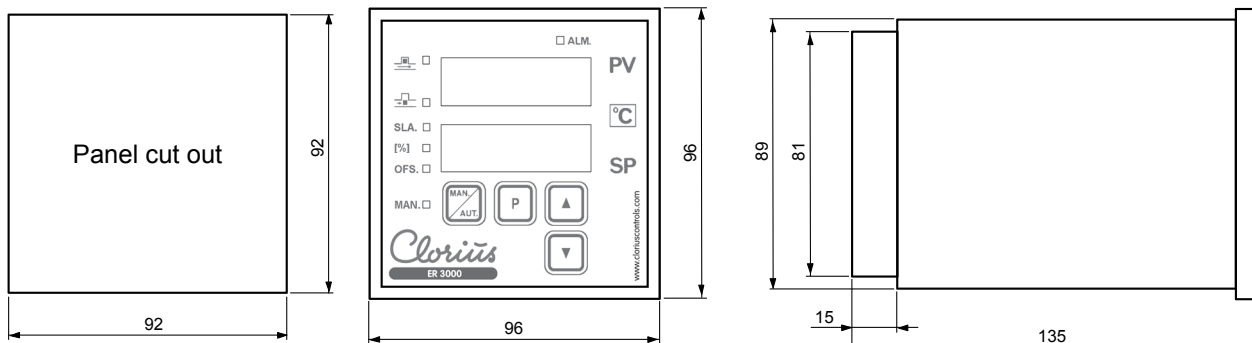


Electrical Connections - Optional external units



Cooling: Remember to set controller into cooling mode.

Dimensions in mm



Subject to changes without notice.

Characteristics

- PI and PID performance
- Easy operation
- For heating, cooling and pressure systems in maritime and industrial installations
- Manual- / automatic changeover
- Robust self-optimization
- Alarm indicating a deviation from set point, positive or negative
- User-defined operation level
- 2- or 3-point output for controlling the actuator

Applications

The ER 2000-P controller is used for constant pressure control. It is suitable for all heating and cooling control systems. The controller is primarily intended for marine installations and other industrial applications.

Design

The ER 2000-P controller is designed for panel mounting.

For easy start-up it has optimization for automatic determination of favourable control parameters. The optimization starts when changing the set point or when switching over from manual mode to automatic control. The optimization can be disregarded.

For easy operation it has three keys - two for scrolling or changing values and an enter key. Two digital displays show the process variable and the set point. 3 LEDs indicate actuator opens, actuator closes and alarm.

The controller can be switched from auto mode to manual mode. In manual mode the actuator can be opened, closed or stopped in a certain position.

Three different alarm settings are possible:

- A: Alarm at a deviation from the set point SP
- B: Alarm at a fixed limit value
- C: Alarm at leaving a band around the set point SP.

It can operate either as a three position or as a two position controller and has adjustable proportional band, integral action time and derivative action time.

Function

The pressure input comes via a 4-20 mA signal. The measured value of the controlled variable is compared with the set point value and adjusted via a PI or a PID control structure.

The ER 2000-P permits direct reading of the actual temperature value (PV) and it is secured from failure in the measuring circuit, i.e. the controller can be set to give either a closing, an opening or remain in current position command in case of sensor short circuit or sensor break. The error message Err appears in the LED display PV.

Communication

The controller is equipped with a RS 485 communication module.

Technical Data

Line voltage
 230 V AC }
 115 V AC* } -15 % / +10 %, 50 / 60 Hz
 24 V AC* }
 *- optional (please specify)

Power consumption approx. 7 VA
 Weight approx. 1 kg
 Permissible ambient temperature
 - Operation 0 to 50°C
 - Transport and storage -25 to + 65°C

Degree of protection
 Front: IP 65 according to DIN 40050
 Terminals: IP00

Design
 For control panel installation
 96 x 96 x 135 mm (W x H x D)
 panel cut out 92 x 92 mm

Installation position arbitrary

Inputs 4-20 mA

Outputs 2- or 3-point
 Option: 4-20 mA

Measuring accuracy
 0.1% of the measuring range



Displays
 Two 4 - digit 7 segment displays,
 LED, red,
 character height = 13 mm

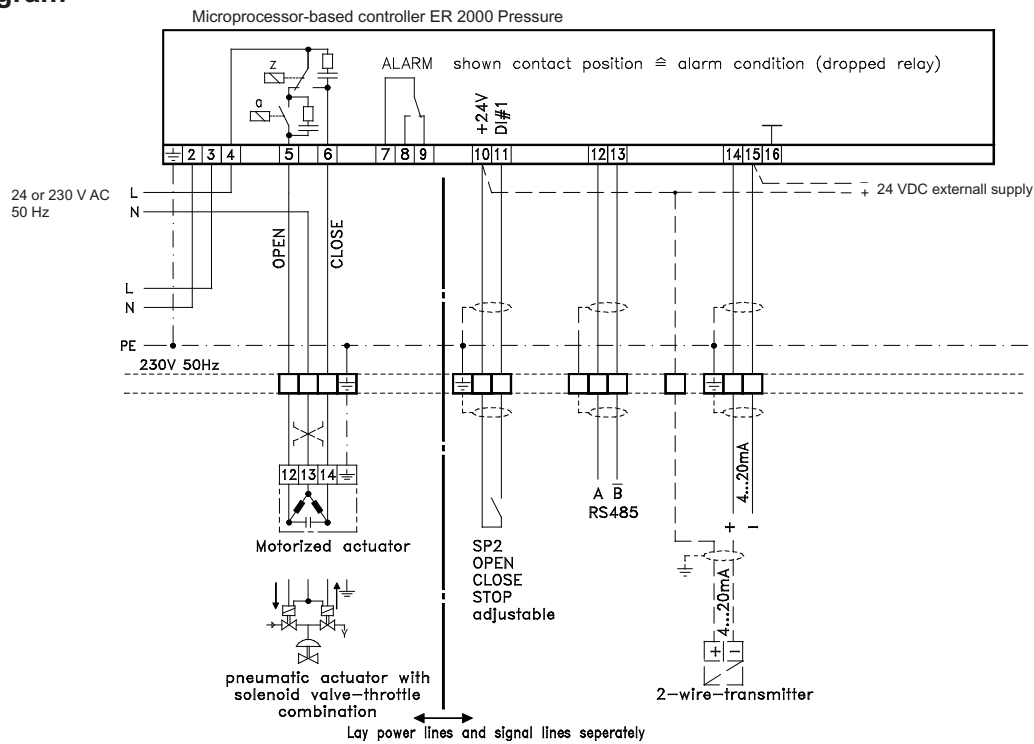
Alarm
 Alarm type A, B, C;
 working contact normally closed
 circuit principle

Relay
 Switching capacity: 250 V AC / 3 A
 Spark quenching element

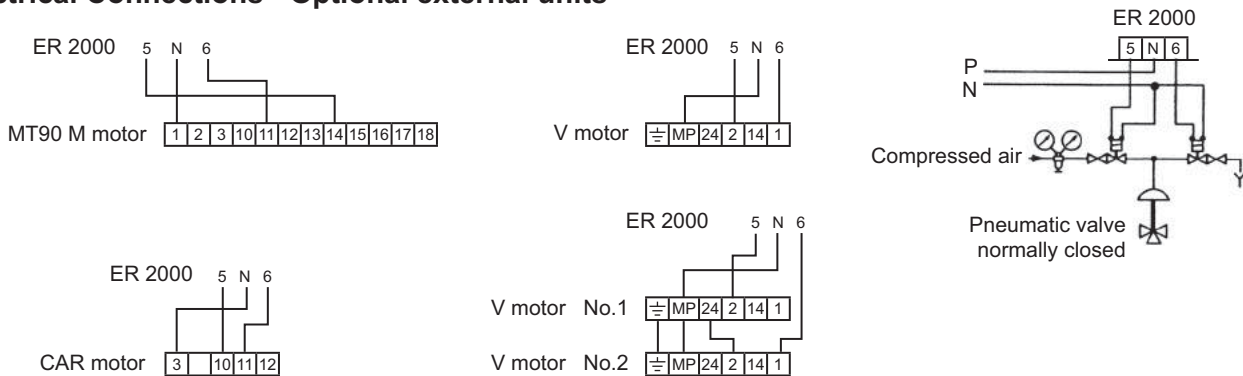
Data protection
 Semi - conductor memory

Subject to changes without notice.

Wiring diagram

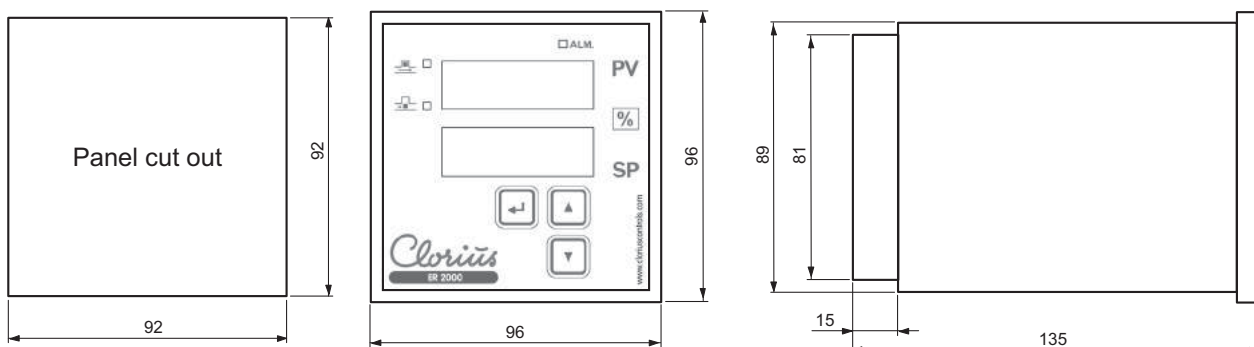


Electrical Connections - Optional external units



Cooling: Remember to set controller into cooling mode.

Dimensions in mm



Subject to changes without notice.

Characteristics

- Resistance sensor Pt 100 $\Omega/0^{\circ}\text{C}$.
- Standardized design according to DIN 43765.
- Robust and reliable sensor for use in gaseous and liquid media, e.g. air, steam, gas, water or oil.
- For medium temperature up to 200°C .
- For pressures up to 50 bar.
- Internationally recognized for marine purposes
- To be used together with ER regulators. See data sheet no. 4.6.01 and 4.6.05.



Applications

The temperature sensors are used for registration of temperatures in tubes, tanks and ducts.

The output signal of the sensor is used as reference for our ER regulators.

Type FF 12-2 / 4-20 mA is equipped with a built-in 2-wire transmitter with 4-20 mA output signals. The sensor is used in conjunction with controller type ER 3000 (see datasheet 4.6.05).

Due to small installation dimensions and internationally widespread measuring element the sensor is especially fitted for marine purposes, just as the applications on land are innumerable.

Design

The sensor consists of a pocket, a connection head and a measuring insert.

The pocket is constructed of acid proof steel and can stand temperature/pressure as stated in the diagram.

The connection head is made of light-alloy metal and complies with IP 65.

The measuring insert contains one or two measuring windings and may be fixed or exchangeable. The supply lines of the measuring insert are insulated from each other and from the insert tube with a ceramic insulator. Exchangeable measuring insert is mounted in the connection head by means of two spring loaded screws. This means that the measuring insert is always pressed towards the bottom of the pocket, and vibrations from the surroundings will not be transferred to the measuring insert, just like different heat evolutions of pocket and measuring insert are adjusted.

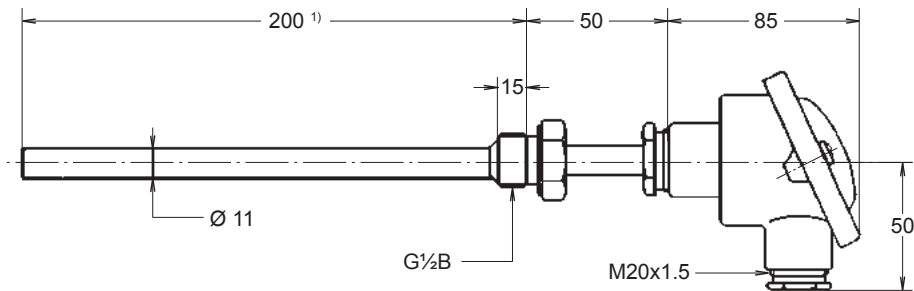
Our standard types are shown in the below diagram.

Standard types

Type	Measuring	Comments
FF 12-2	1 x Pt 100	With exchangeable measuring insert
FF 12-R		Measuring insert for FF 12-2
FF 15-2	2 x Pt 100	With exchangeable measuring insert
FF 15-R		Measuring insert for FF 15-2
FF 12-2 / 4-20 mA	4-20 mA	With exchangeable measuring insert

Subject to change, without notice

Dimension sketch - type FF12-2 (mm)



¹⁾ Alternative lengths are available on request: 100 mm, 150 mm, 200 mm, 250 mm

Data for Pockets

According to DIN 43673
Material X10CrNiMoTi1810
W. No. 1.4571 corresponding to
AISI 316 Ti
Connection: G $\frac{1}{2}$ B.
Permissible torque moment: 50 Nm.
Permissible flow velocities:
Air: 25 m/s
Hot steam: 25 m/s
Water: 3 m/s
Reaction times at liquid velocity:
0.4 m/sec:
t 1/2: 7,5s
t 9/10: 21s
t = total temperature step
Max. pressure: 50 bar
Max. temperature: 200°C
Weight incl. insert: 1 kg

Data for Measuring Insert

According to DIN 43762
The basic value of the measuring
resistance corresponds to DIN 43760.
Measuring range: -50°C to + 200°C
Measuring resistance: 1 x Pt 100 Ω or
2 x Pt 100 Ω
Max. temperature: 200°C.

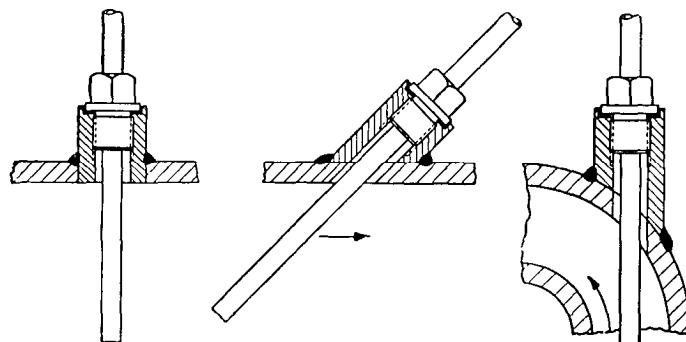
Insulation resistance between measuring
resistance and insert tube is over
1000 M Ω at room temperature. The insert
is made of stainless steel.

Spring travel: 8 mm
Two-core coupling
Resistance of inner cables for supply and
return line of the measuring insert:
 $\leq 0.07 \Omega/m$
Weight of loose insert: 0.06 kg

Data for Connection Head

According to DIN 43729, form B
Material: Light-alloy metal
Seal: IP 65
Ambient temperature: max. 100°C

Examples of mounting



Subject to change, without notice.

Characteristics

- Small outer dimensions in modern design
- Large closing force
- Easy to fit and adjust
- Reversible spring return
- Casing IP 44, splash proof
- Lifetime lubricated gearbox
- 2-4 safety functions
- Build-in potential free alarm relay

Function

Safety Set SM6 is used for heating, cooling, ventilation and industrial systems, no matter whether the medium is water, steam or oil.

Applications

Safety Set SM6 is developed for all Clorius valves up to 150 mm, but may be used for some other valve brands of corresponding size and function, too. It is consequently well suited for modernisation of existing systems.

Dimensioning

For sizing of control valves and for closing pressures, please see "Quick Choice" leaflet no. 9.0.00.

Design

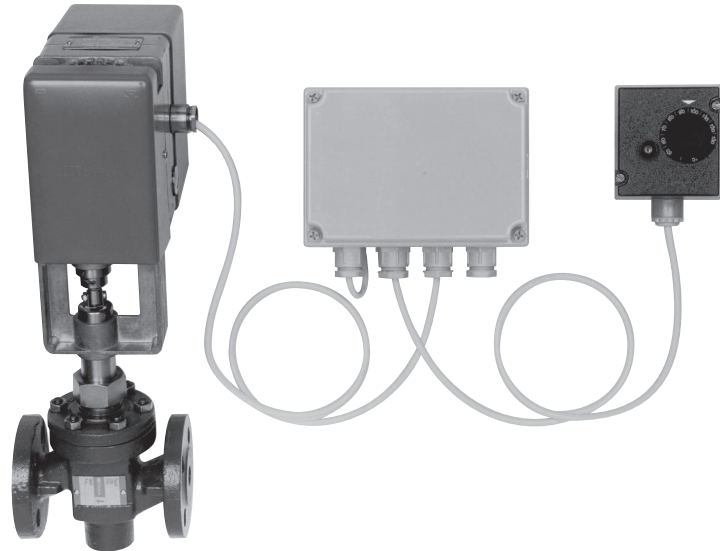
Safety Set SM6 consists of a valve motor, a control box and a dual thermostat.

The valve motor is driven by a gear motor. It is a single phase synchronous motor with capacitor start. The valve motor is delivered for 24 V AC. The build-in spring return ensures a closing time of max. 4 sec. By temperatures higher than 170°C, a KS-4 or KS-6 cooling unit is to be mounted between valve and motor.

The gear is mounted in a closed gearbox of die-cast aluminium. All gear wheels and bearings are life-time lubricated.

The stroke of the valve motor can be adjusted continuously to the valve between 4 and 22 mm by means of a crank mechanism with a scale.

The valve motor is equipped with a replaceable gasket box with a Teflon washer. An overload protection spring is inserted between the crank mechanism and the gasket box.



The spring return is released when the power disappears from the holding coil, closing the valve completely. A timer in the control box ensures that the motor is not turned on again before 10 sec. after a spring return release. This function protects against starting the motor before the spring return function has terminated.

The control box contains:

- a 230/24 V AC transformer for the valve motor
- the 10 sec. timer for the spring return
- a potential free alarm switch
- terminal blocks for connections to the valve motor, the dual thermostat, other safety equipment, an alarm, and power.
- a build-in fuse protecting against overload and short-circuiting.

The dual thermostat is set to the normal close-down temperature, e.g., 90°C, where the valve is to be closed. It further includes an overheating thermostat for spring return emergency close-down at 105°C. This ensures correct function, even if, e.g., the normal thermostat should fail. For additional safety, the overheating thermostat has to be reset manually after a break.

Build-in safety functions

Power failure

The build-in spring return closes the valve. When the power returns, the motor starts again after 10 sec. and moves the valve back to its original position.

Overheating protection

The spring return of the motor closes the valve on a signal from the 105°C overheating thermostat or other safety devices. The overheating thermostat has manual reset.

Other protections possibilities:

Against circulation failure

The motor closes the valve when a flow switch placed in the secondary circuit releases the spring return, e.g. by a pump failure. When circulation returns, the valve reopens automatically after 10 sec.

Against pressure failure

By means of a pressure switch the motor will release the spring return if the water pressure in the secondary circuit is reduced (static pressure).

Alarm function

The build-in potential free alarm relay is activated at emergency close down (spring return).

Subject to change without notice.

Technical data

Valve motor

Power supply	24 V AC +10/-15%, 50/60 Hz
Consumption approx.	9 VA
Casing	IP44, stain protected
Cable union	1 PG 13.5 1 PG 13.5 plug
Closing speed	Max. 4 sec.
Ambient temp.	-15 to +60 °C
Closing force	500 – 1200 N
Stroke	4 – 22 mm
Valve connection	G1 union nut
Weight	3.7 kg

Control box

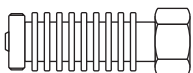
Transformer	230/24 V AC, 10 VA, 50/60 Hz
Timer	10 sec.
External alarm	Potential free switch
Fuse	T 0.5 A / 250 V

Dual thermostat

Adjustable	35 – 95 °C
Overheat protection	95 – 110 °C, Sealed at 105 °C, Manual reset
Thread	½" RG
Immersion-tube	110 mm

Accessories

Cooling unit KS-4



Cooling unit protecting the stuffing box of the motor/thermostat. To be applied at valve temperatures between 170°C and 250°C.

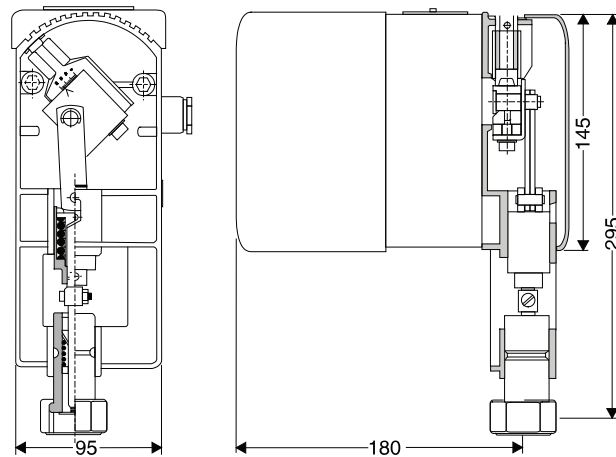
Cooling unit KS-6



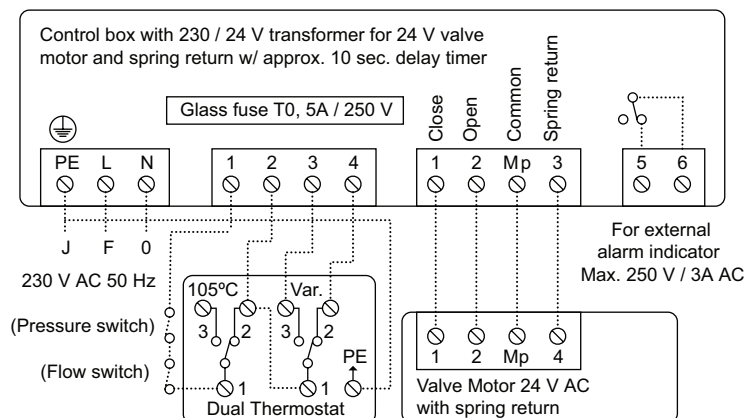
Cooling unit with built-in bellows gland substitutes the stuffing box of the valve motor. Must be applied at valve temperatures above 250°C.

Subject to change without notice.

Dimension sketch

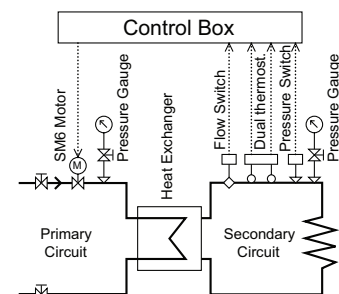


Wiring diagram, Safety Set SM6



Equipment diagram

for steam/hot-water heating systems, where the primary circuit is dimensioned for the maximum pressure of the steam/hot-water.



ELECTRIC VALVE ACTUATOR TYPE CAR

4.11.08-G

FOR 2 & 3-WAY VALVES TYPE G/L/M/S 2FM-T & G/L/M/S 3FM-T

GB-1



TECHNICAL DATA

Casing:	Watertight IP67, Nema 4 and 6
Ambient temp.:	-30°C to +70°C, 150°C/1 hr.
Power Supply:	120/230 VAC, 1-Phase (50Hz/60Hz) 380/400/440 VAC, 3-Phase (50Hz/60Hz) 24 VDC (CAR 015-028)
Torque switches:	Open/Close
Limit switches:	Open/Close, additional limit switches on request
Stall protection:	Built-in Thermal Protection Cut-off at 150°C ± 5°C / Reset at 97°C ± 15°C
Travel angle:	90° ± 5°
Indicator:	Continuous Position Indicator
Manual override:	AUTO Decutching Mechanism
Worm gear:	Permanently lubricated and Self-locking
Mechanical stops:	External Adjustable Limit Stops
Space heater:	20 W (115/230 VAC, 24 VDC) Anti-Condensation
Cabeling:	2 x R ¾"
Lubrication:	Grease NLGI Grade 2 (EP-Type)
Materials:	Steel, Aluminium Alloy, Al Bronze
External coating:	Anodizing and Dry Powder Epoxy
Duty Cycle:	On-Off: 52 50% Modulating: 54 75%

RECOMMENDED ACTUATOR TYPES FOR G3FM-T VALVES

Valve size	Actuator type		
	DP 5 bar	DP 10 bar	DP 16 Bar
DN 65			CAR 009
DN 80	CAR 009	CAR 009	CAR 009
DN100			CAR 019
DN125	CAR 019	CAR 019	CAR 019
DN 150		CAR 028	CAR 028
DN 200	CAR 028	CAR 060	CAR 060
DN 250	CAR 028	CAR 060	CAR 060
DN 300	CAR 060		CAR 100
DN 350	CAR 100	CAR 100	X
DN 400			
DN 450			
DN 500	CAR 200	CAR 200	
DN 600			

APPLICATION

Electric valve actuator type CAR is specially designed to meet the demands of the powerful low frequency vibration environments in marine installations.

The main applications are cooling of freshwater, sea water and lubricating oil systems for main and auxiliary engines. The actuator is used for Clorius 2 or 3-way valves type L3FM-T, M3FM-T, G3FM-T and S3FM-T

MOUNTING

For mounting and starting up, the instructions delivered with the actuator must be followed carefully.

SERVICE

No special service is needed. It is recommended to check and grease the actuator at every docking or every three years.

SPECIFICATIONS

Type	Max. torque Nm	Operating time sek/90° (50/60 Hz)	Weight kg	No. of handle turns	Current draw max. A (1-phase 120V)	Current draw max. A (1-phase 230V)	Current draw max. A (3-ph 400V)	Current draw max. A (24 VDC)
CAR 009	90	17/14	11	8.5	1,2	0,6	0,18	2,2
CAR 019	186	17/20	13	10	1,5	0,7	0,28	-
CAR 028	274	24/20	17	12.5	2	0,7	0,3	7
CAR 060	588	29/24	22	14.5	3.1	1.18	0.5	-
CAR 100	981	29/24	25	14.5	4.5	2	0.87	-
CAR 150	1471	87/72	68	43.5	3.1	1.18	0.5	-
CAR 200	1962	87/72	70	43.5	4.5	1.8	0.8	-

ELECTRIC VALVE ACTUATOR TYPE CAR

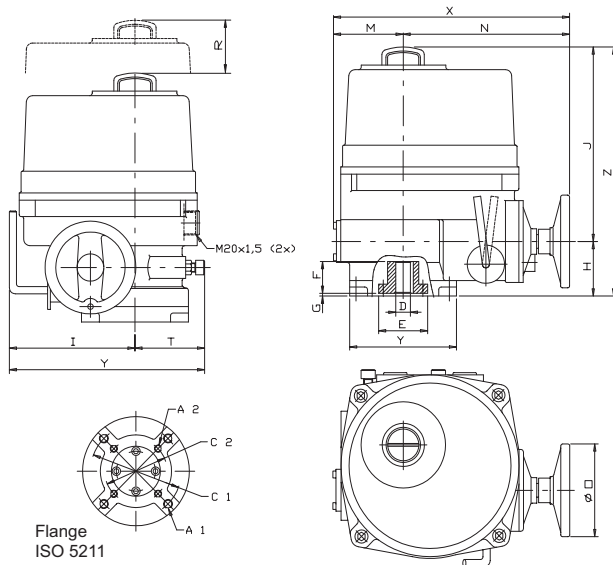
4.11.08-G

FOR 2 & 3-WAY VALVES TYPE G/L/M/S 2FM-T & G/L/M/S 3FM-T

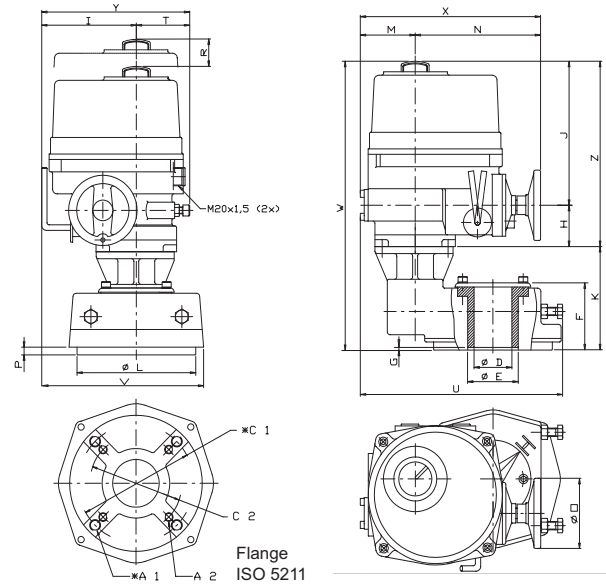
GB-2

DIMENSION SKETCH

CAR 009 - 100



CAR 150 - 200



Type	CAR 009	CAR 019	CAR 028	CAR 060	CAR 100	CAR 150	CAR 200
Flange	F07	F07, F10	F12, F10	F14, F12		F16, F14*	
C1	-	102	125	140		165	
C2	82	70	102	125		140*	
A1	-	M10	M12	M16		M14*/M16*	
A2	M8	M8	M10	M12		M20	
B	12	15	18	22		30	
D(Max**)	22	22	32	42		75	
E	55	57	75	85		100	
F	43	43	52	59		126	
G	2	2	2	2		7	
H	60	60	70	78		78	
I	113	139	159	191		191	
J	213	213	250	283		283	
K	-	-	-	-		195	
L	102	120	145	175		266	
M	56	77	83	99		99	
N	175	184	202	226		226	
O	102	102	125	170		170	
P	-	-	-	-		16	
R	108	108	130	178		178	
T	68	85	99	116		116	
U	-	-	-	-		388	
V	-	-	-	-		318	
W	-	-	-	-		556	
X	231	261	285	325		325	
Y	181	224	258	307		307	
Z	273	273	320	361		361	

* For optional alternative flanges

** Maximum dimension including keyway

ACCESSORIES

CAR PROPORTIONAL CONTROL UNIT PCU PB90

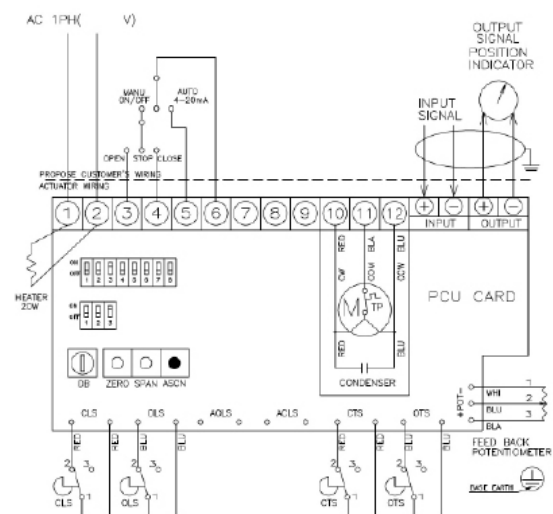
CAR 009-200

Command signal input	4-20 mA, nominal input impedance 150 Ohm, jumpers I1 and I2 0-10 V, nominal input impedance 260k Ohm, jumper V1
Analogue feedback signal	4-20 mA, self powered, can drive up to 300 Ohm
Fuse	3,15 AT 5x20 mm, mounted on the PB90 card
Resolution	Approx. 0,3%
Conversion	12 bit maximum. Normal range (4-20 mA) = 1/3200.

Position board. Characteristic of feedback element and actuator system response affect the true performance.

CLS : CLOSE LIMIT SWITCH (250VAC 15A)
 OLS : OPEN LIMIT SWITCH (250VAC 15A)
 CTS : CLOSE TORQUE SWITCH (250VAC 15A)
 OTS : OPEN TORQUE SWITCH (250VAC 15A)
 TP : THERMAL PROTECTOR (250VAC 15A)

	CLOSE	OPEN
CLS 1-2	_____	_____
CLS 1-3	_____	_____
OLS 1-2	_____	_____
OLS 1-3	_____	_____
CTS 1-3	* CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS DURING CLOSING CYCLE	
OTS 1-3	* OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS DURING OPENING CYCLE	



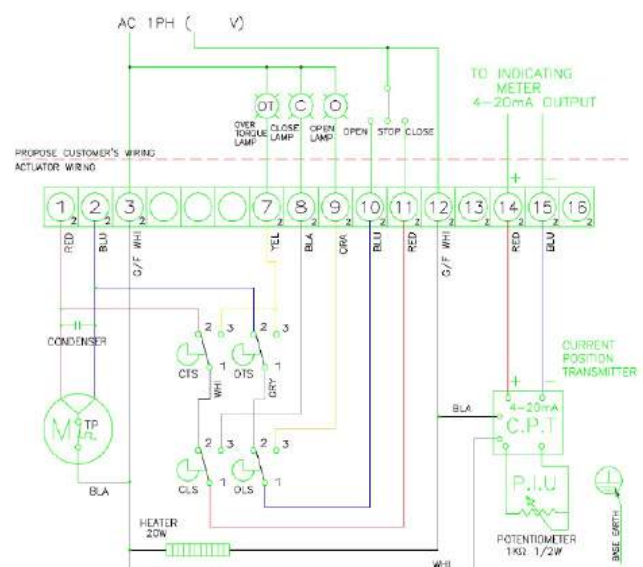
CAR CURRENT POSITION TRANSMITTER CPT

CAR 009-200

- For continuous, analogue feed back signal 4-20 mA
- R/I Transmitter
- The electronic components are protected against dirt and similar

CLS : CLOSE LIMIT SWITCH (250VAC 6A)
 OLS : OPEN LIMIT SWITCH (250VAC 6A)
 CTS : CLOSE TORQUE SWITCH (250VAC 6A)
 OTS : OPEN TORQUE SWITCH (250VAC 6A)
 TP : THERMAL PROTECTOR (250VAC 15A)

	CLOSE	OPEN
CLS 1-2	_____	_____
CLS 1-3	_____	_____
OLS 1-2	_____	_____
OLS 1-3	_____	_____
CTS 1-3	* CLOSING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS DURING CLOSING CYCLE	
OTS 1-3	* OPENING TORQUE SWITCH INTERRUPTS CONTROL IF MECHANICAL OVERLOAD OCCURS DURING OPENING CYCLE	



Subject to changes without notice.

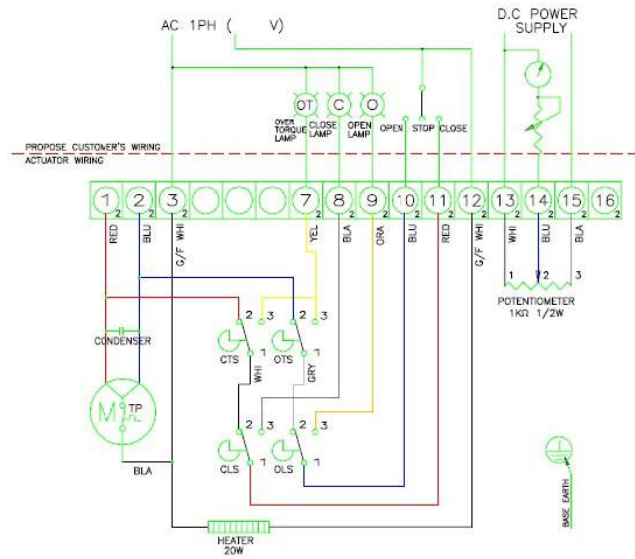
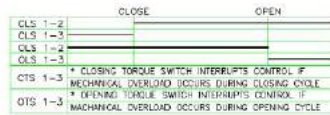
ACCESSORIES

CAR 009-200

CAR POTENTIOMETER PIU

- For CAR 009 - CAR 250
- For continuous position feedback from 0° to 90°
- The whole unit is built into the actuator
- Potentiometer 1k Ohm, senses the actuator position during the whole turning movement
- Mounting details included
- Resistance 1k Ohm
- Resistance tolerance ±20%
- Linearity ±1%
- Max load 1W at +70 °C

CLS : CLOSE LIMIT SWITCH (250VAC 6A)
 OLS : OPEN LIMIT SWITCH (250VAC 6A)
 CTS : CLOSE TORQUE SWITCH (250VAC 6A)
 OTS : OPEN TORQUE SWITCH (250VAC 6A)
 TP : THERMAL PROTECTOR (250VAC 15A)



Subject to changes without notice.

SECTION 6

Characteristics

- Linear characteristic.
- Multispring diaphragm actuator.
- Compact design with low weight.
- Diaphragm with vulcanised terylene support secures a long and safe life-time.

The pneumatic actuator is powerful with a high control speed compared to electric actuators.

The linear actuator has a simple and light design with a minimum of moving parts. The pneumatic actuators are also low maintenance due to the simple design and the few moving parts.

The linear actuator is ideal for on/off and control functions of globe valves.

The spring loaded actuator offers the possibility for a fail-safe function, the safety installation is low cost compared to example battery backup.

The pneumatic actuator can be used in Ex areas, without extraordinary encapsulation or other precautions.

Applications

Pneumatic actuator for actuating and control of Clorius valves in various environments.

Relevant datasheets for accessories to the S actuators:

- Positioners 6.6.01, 6.6.02
- Filter regulators 6.8.01
- Controller ER2000 4.6.01
- Sensor PT100 4.7.01
- Pneumatic controller S80 6.7.01

Design

Compact pneumatic actuator with rolling diaphragm and multiple internal compression springs for operating Clorius valves. Reinforced rolling diaphragm guarantees long lifetime and reliable, safe operation. Maintenance or change of operating method does not require any special tools.



Technical Data

Material:

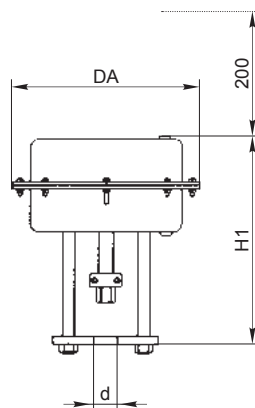
- Body Polyester coated steel
- Stem Stainless steel 1.4301
- Tie rods Stainless steel AISI 316
- Mounting plate Polyester coated steel
- O-rings NBR (Nitrile rubber)
- Diaphragm Neoprene rubber w/terylene support
- Springs Galvanized steel
- Air quality Dry and filtrated air, non aggressive gasses

Air supply Max. 6 bar
Air supply connect. 1/8" RG Female
Temperature -25°C to +115°C

Acting mode:

- Type SC: Spring close / Air open (NC)
- Type SO: Spring open / Air close (NO)

Dimension sketch



Type	d Ø mm	DA Ø mm	H1 mm	Travel mm
S16	25	160	237	20
S25	35	250	277.5	20
S34	32	340	350	33,5

Subject to changes without notice.

Actuator	Type	Force	Travel (max)	Min. pressure to close valve	Min. pressure to open valve
S16	SC	1270 N	20mm	-	1,1 Bar
	SO	925 N	20mm	0,8 Bar	-
S25	SC	9090 N	20mm	-	2,9 Bar
	SO	1740 N	20mm	0,6 Bar	-
S34	SC	16100 N	33,5mm	-	3,2 Bar
	SO	-	-	-	-

Note: Max. pressure for actuator is 6 Bar.

Selection of linear pneumatic actuators

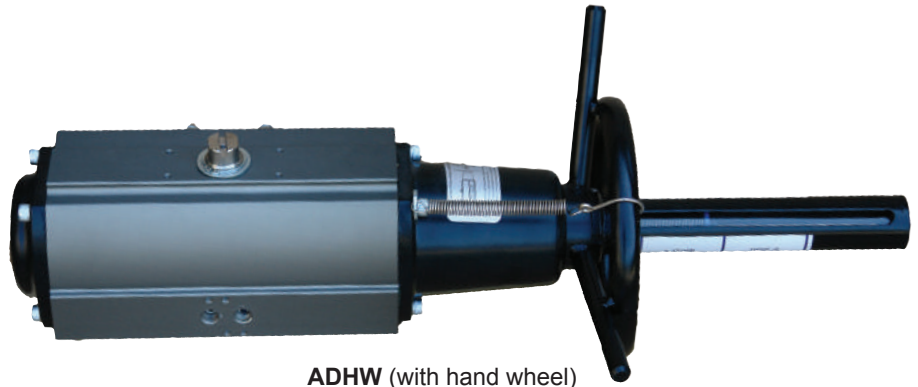
Valve size DN	Valve type	Max. ΔP across valve	Pneumatic actuator type
15	L1S, L1SB, M1F, M1FBN, G1F, G1FBN, H1F, H1FBN	16	S16
20	L2S, M1FBN, M2F, G1FBN, G2F, H1FBN, H2F	16	S16
	L1S, L1SB, L3S	10	
	M1F, G1F, H1F	7,5	
25	L1SB, L2S, M1FBN, M2F, G1FBN, G2F, G1FB, H1FBN, H2F, H1FB	16	S16
	M1F, G1F, H1F	5	
32	L1SB, L2S, G1FBN, G2F, H1FBN, H2F, M1FBN, M2F	16	S16
	L3S, M3F, G3F, H3F	10	
40	L2S, G2F, M2F, H2F	16	S16
	M1FBN, G1FBN, H1FBN	10	
	M3F, G3F, H3F	7,5	
	L3S	5	
50	L2S, G2F, M2F, H2F	14	S16
	M1FBN, G1FBN, H1FBN	7,5	
	L3S, M3F, G3F, H3F	5	
65	L3F, M1FBN, M2F, M3F, G1FBN, G2F, G3F, H1FBN, H2F	16	S25
80	L3F, M1FBN, M2F, M3F, G1FBN, G2F, G3F, H1FBN, H2F	16	S25
100	L3F, M2F, M3F, G2F, G3F, H2F	16	S25
125	L3F, M2F, M3F, G2F, G3F, H2F	16	S25
150	L3F, M2F, M3F, G2F, G3F, H2F	16	S25
200	L3FM, M3FM, G3FM	16	S34
250	L3FM, M3FM, G3FM	10	S34
300	L3FM, M3FM, G3FM	10	S34 (on request)

Where the differential pressure is higher than noted S16 must be replaced with S25.

Where manual override is needed S16 must be replaced with S25



AD



ADHW (with hand wheel)

The AD actuators are made according to the Scotch Yoke principle, which is characteristic for its high torque when required - at the beginning and end of each operation. This increases safety and reduces the energy consumption.

Characteristics

- Increased torque where required. The Scotch Yoke actuator gives approx. 50% higher starting and closing torque (0°) compared to the rack and pinion actuator.
- Compact measures. Approx. 30% smaller than rack and pinion actuators.
- Low air consumption. Approx. 30% less than rack and pinion actuators.
- Low maintenance, long life.
- Good regulating features. No play in force transmission and low friction because the transmission passes over bearings.
- Favourable force transmission, gives favourable action in the regulation area. This provides lower turning speed when approaching the end positions.
- The actuators have low weight and small external dimensions for their torque output.

Quality

The actuators are made under strict quality control and comply with all international standard requirements.

The AD actuators are CE-marked according to PED and ATEX. Simple, robust design and easy assembly according to ISO 5211.

Recommended actuators for G2FM-T/G3FM-T valves		
Valve	Actuator	
	DP 5 bar	Max. DP
DN 100	AD65	AD100
DN 125		
DN 150		
DN 200	AD100	AD125
DN 250		
DN 300	AD125	AD140
DN 350		
DN 400	AD140	AD160
DN 450		
DN 500	AD160	AD160
DN 600		

DP - Differential Pressure at valve

Sizing at 5 bar control air.

Other relevant data sheets for AD actuators:

- 2-way valves G2FM-T 2.5.05.01
- 3-way valves G3FM-T 2.6.02, 2.6.03
- Positioners 6.6.01, 6.6.02
- Filter regulators 6.8.01
- Controller ER2000 4.6.01
- Sensor PT100 4.7.01
- Pneumatic controller S80 6.7.01

Mounting

For mounting and starting up, the instructions delivered with the actuator must be followed carefully.

Technical Data

Materials:

- Body aluminium, anodized
 - Piston aluminium alloy
 - End Caps aluminium, anodized
 - Shaft steel, AISI 304 (A2)
 - O-rings NBR (rubber)
 - Springs Pre-compressed Cartridges, epoxy painted
- Actuat. flange ISO 5211
- Air supply Dry or lubricated filtered compressed air, non aggressive gases
- Temperature -20 °C to +80 °C
- Feeding pressure 3-7 bar continuous
- Rotation range 90° ± 5°
- Hand wheel (option) Hand wheel (HW) integrated in the end cap of the actuator is optional.

Subject to changes without notice.

Pneumatic actuators type AD and ADHW

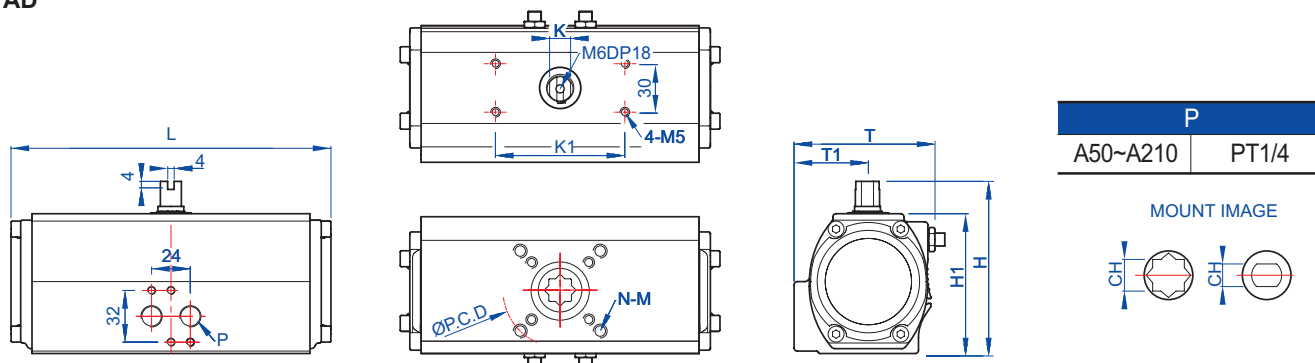
Double acting. For valves type G2FM-T and G3FM-T

6.5.13-B

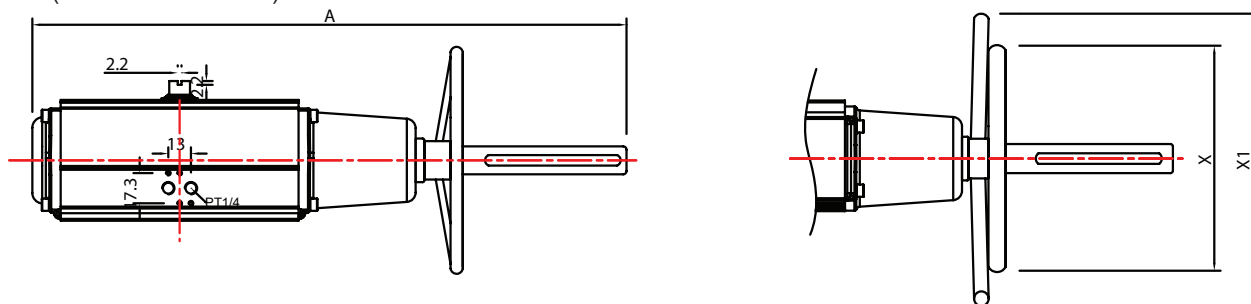
GB-2

Dimension sketch (mm)

AD



ADHW (AD with hand wheel)



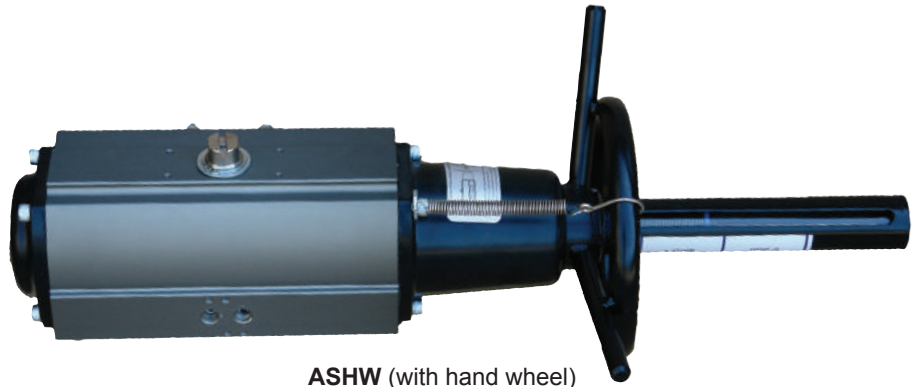
Type	K1	ISO	P.C.D(Ø)	N-G	K	L	A*	X* / X1*	T	T1	H	H1	CH	DTH	Weight kg
AD65	80	F07	70	4-M8	13	198	456	202	85	46	107	87	14*14	17	2.7
AD100	80	F07/F10	70/102	4-M8/M10	22	311	574	200/332	129	61.5	148	128	22*22	26	7.5
AD125	80	F07/F10	70/102	4-M8/M10	22	390	653	200/332	151	71.5	174	154	22*22	26	11.6
AD140	80	F10/F12	102/125	4-M10/M12	24	431	694	300/440	164	77	192	172	27*27	30	18.9
													22*22	26	
AD160	80	F14	140	4-M16	32	506	810	300/440	188	89	216	196	36*36	30	26.3
		F10/F12	102/125	4-M10/M12									27*27		
AD210	130	F16	165	4-M20	36	605	948	300/584	231	115	284	254	46*46	60	47.2

* HW option

Subject to changes without notice.



AS



ASHW (with hand wheel)

The AS actuators are made according to the Scotch Yoke principle, which is characteristic for its high torque when required - at the beginning and end of each operation. This increases safety and reduces the energy consumption.

Characteristics

- Increased torque where required. The Scotch Yoke actuator gives approx. 50% higher starting and closing torque (0°) compared to the rack and pinion actuator.
- Compact measures. Approx. 30% smaller than rack and pinion actuators.
- Low air consumption. Approx. 30% less than rack and pinion actuators.
- Low maintenance, long life.
- Good regulating features. No play in force transmission and low friction because the transmission passes over bearings.
- Favourable force transmission, gives favourable action in the regulation area. This provides lower turning speed when approaching the end positions.
- The actuators have low weight and small external dimensions for their torque output.

Quality

The actuators are made under strict quality control and comply with all international standard requirements.

The AS actuators are CE-marked according to PED and ATEX. Simple, robust design and easy assembly according to ISO 5211.

Recommended actuators for G2FM-T/G3FM-T valves		
Valve	Actuator	
	DP 5 bar	Max. DP
DN 100	AS065	AS100
DN 125		
DN 150	AS100	AS125
DN 200	AS125	AS140
DN 250	AS125	AS160
DN 300	AS140	AS160
DN 350	AS160	AS160
DN 400	AS160	AS210
DN 450	AS210	AS210
DN 500	AS210	-
DN 600	-	-

DP - Differential Pressure at valve

Sizing at 5 bar control air.

Other relevant data sheets for AS actuators:

- 2-way valves G2FM-T 2.5.05.01
- 3-way valves G3FM-T 2.6.02, 2.6.03
- Positioners 6.6.01, 6.6.02
- Filter regulators 6.8.01
- Controller ER2000 4.6.01
- Sensor PT100 4.7.01
- Pneumatic controller S80 6.7.01

Mounting

For mounting and starting up, the instructions delivered with the actuator must be followed carefully.

Technical Data

Materials:

- Body aluminium, anodized
 - Piston aluminium alloy
 - End Caps aluminium, anodized
 - Shaft steel, AISI 304 (A2)
 - O-rings NBR (rubber)
 - Springs Pre-compressed Cartridges, epoxy painted
- Actuat. flange ISO 5211
- Air supply Dry or lubricated filtered compressed air, non aggressive gases
- Temperature -20 °C to +80 °C
- Feeding pressure 3-7 bar continuous
- Rotation range 90° ± 5°
- Hand wheel (option) Hand wheel (HW) integrated in the end cap of the actuator is optional.

Subject to changes without notice.

Pneumatic actuators type AS and ASHW

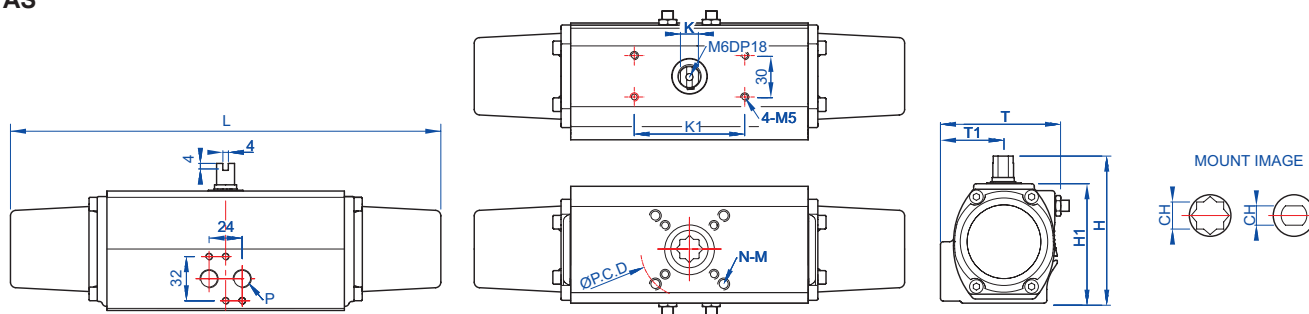
Single acting. For valves type G2FM-T and G3FM-T

6.5.14-B

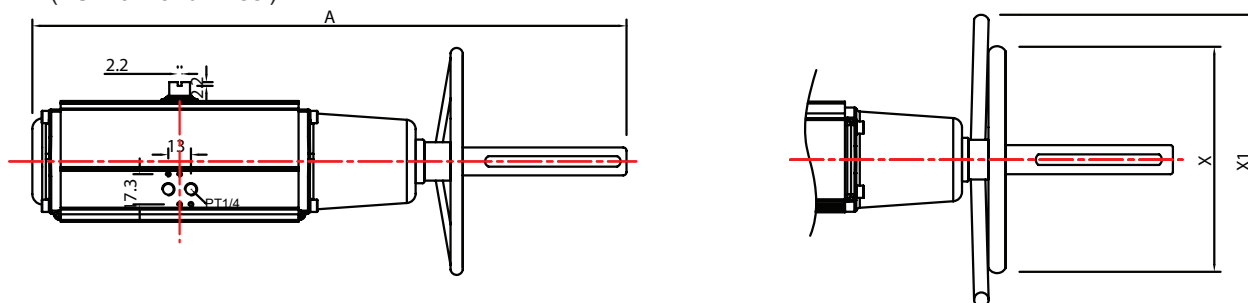
GB-2

Dimension sketch (mm)

AS



ASHW (AS with hand wheel)



Type	K1	ISO	P.C.D(Ø)	N-G	K	L	A*	X* / X1*	T	T1	H	H1	CH	DTH	Weight kg
AS65	80	F05/F07	50/70	4-M6/M8	13	312	456	202	85	46	107	87	14*14	17	3.4
AS100	80	F07/F10	70/102	4-M8/M10	22	500	763	200/332	129	61.5	148	128	22*22	26	10.6
AS125	80	F07/F10	70/102	4-M8/M10	22	606	869	200/332	151	71.5	174	154	22*22	26	17.9
AS140	80	F10/F12	102/125	4-M10/M12	24	682	945	300/440	164	77	192	172	27*27	30	25.2
													22*22	26	
AS160	80	F14	140	4-M16	32	781	1085	300/440	188	89	216	196	36*36	30	36.8
		F10/F12	102/125	4-M10/M12									27*27		
AS210	130	F16	165	4-M20	36	982	1325	300/584	231	115	284	254	46*46	60	76.9

* HW option

Subject to changes without notice.

Pneumatic-pneumatic positioners

PPL and PPR series

6.6.01-B

GB-1

PPL and PPR series are robust control devices that provide dependability in difficult environments.

Characteristics

- Easy maintenance
- Precise calibration with simple SPAN and ZERO adjustments
- Simple conversion to direct acting or reverse acting
- ½ split range available
- Rugged aluminium housing with corrosion-resistant coating
- Vibration resistant design
- Stainless steel gauges standard
- Restricted pilot valve orifice kit for small actuators included



PPL (Linear Type)

Specifications

	PPL		PPR	
	Linear type (lever feedback)		Rotary type (cam feedback)	
	Single	Double	Single	Double
Input Signal	0.2-1.0 bar (3-15 psi) ¹⁾			
Supply Air Pressure	Max. 7.0 bar (100 psi)			
Standard Stroke	10-80 mm ²⁾		60-100° ³⁾	
Pneumatic Connections	Rc ¼ (NPT ¼)			
Ambient Temperature	-20°C ... +70°C			
Pressure Gauge	Stainless Steel			
Output Characteristics	Linear			
Linearity	Within ±1.0% F.S		Within ±1.5% F.S	
Sensitivity	Within ±0.2% F.S		Within ±0.5% F.S	
Hysteresis	Within ±0.5% F.S		Within ±1.0% F.S	
Repeatability	Within ±0.5% F.S			
Air Consumption	5 LPM (Sup. 1.4 bar)			
Flow Capacity	80 LPM (Sup. 1.4 bar)			
Body Material	Aluminium Diecast			
Weight	2.9 kg			



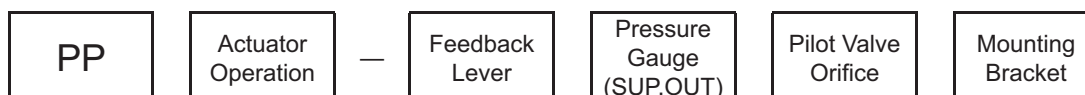
PPR (Rotary Type)

¹⁾ ½ split range can be adjusted.

²⁾ Feedback lever is available for stroke 80-150 mm (PPL).

³⁾ Stroke can be adjusted to 0°-60° or 0°-100° (PPR).

How to order

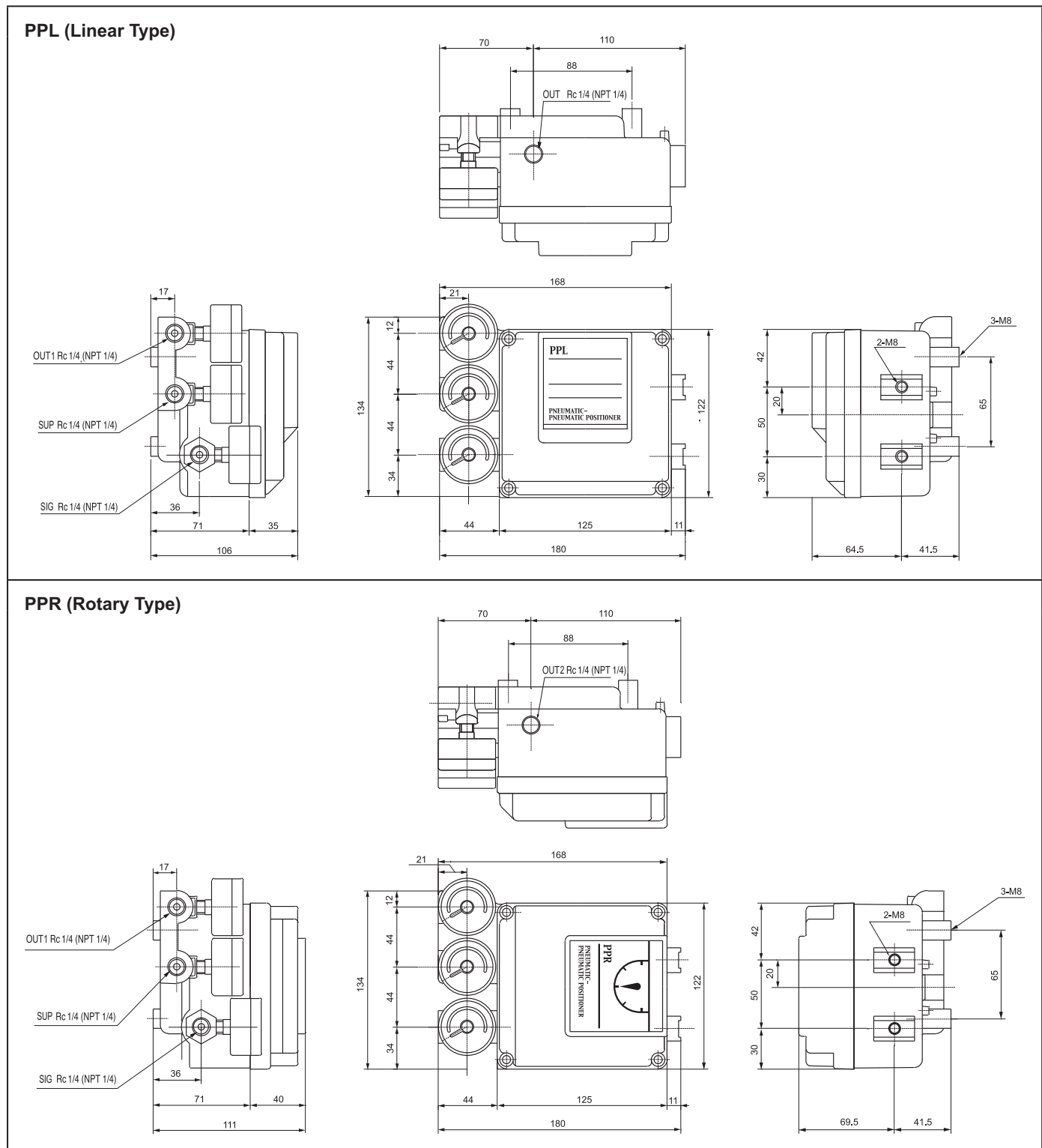


Description	Code
Actuator Operation:	L : Linear type R : Rotary type
Feedback lever:	A : Stroke (10-80 mm) A : Fork lever M6 × 40L B : Fork lever other size on request N : Namur shaft (direct mounting)
Pressure gauge:	0 : 2 bar (30 psi) 1 : 6 bar (90 psi) 2 : 10 bar (150 psi)

Description	Code
Pilot valve Orifice:	S : Standard (actuator volume over 180 cm ³) M : Small Orifice (∅ 1.0 or ∅ 0.7) (actuator volume 90-180 cm ³)
Mounting bracket:	N : None L : DIN / IEC534 (for PPL) R : DIN VDI / VDE3845 (for PPR) F : DHCT bracket 80 × 30

Subject to change without notice.

Dimensions (mm)



Subject to change without notice.

Electro-pneumatic positioners

EPL and EPR series

6.6.02-D

GB-1

EPL and EPR series are the rugged control devices which stand up to harsh environments and engineered to meet the highest and most demanding control performance that the process industries of today require.

Characteristics

- Easy maintenance
- Precise calibration with simple SPAN and ZERO adjustments
- Simple conversion to direct acting or reverse acting
- ½ split range available
- Rugged aluminium housing with corrosion-resistant coating
- Vibration resistant design
- Stainless steel gauges standard
- Restricted pilot valve orifice kit for small actuators included

Options available

- Position transmitter (4-20 mA output signal)
- Two limit switches (open and close) - only for EPR
- Certificate for ATEX Ex Eex md IIB T5 (05 ATEX 1076X) by NEMKO in conformance with EN 50014:1997, EN 50018:2000 and EN 50028:1987
- Certificate for EMC (K1046 / E04) in conformance with EN 61000-6-2:2001 and EN 61000-6-4:2001 by RWTUV
- Certificate for Ex md IIB T6 (99-1075-Q1), Ex md IIC T6 (2000-1057-Q1) and Ex ia IIB T6 (2000-1056-Q1) by KOSHA

EPL (Linear Type)



EPR (Rotary Type)



Specifications

	EPL		EPR	
	Linear type (lever feedback)		Rotary type (cam feedback)	
	Single	Double	Single	Double
Input signal	4-20 mA, 24 V DC ¹⁾			
Input resistance	235 ±15 Ω			
Supply air pressure	Max. 7.0 bar (100 psi)			
Standard stroke	10-80 mm ²⁾		60-100° ³⁾	
Pneumatic connections	Rc ¼ or NPT ¼			
Electrical connections	G½ or NPT ½			
Protection class	IP66			
Ambient temperature	-20° ... +70°			
Pressure gauge	Stainless Steel			
Output characteristics	Linear			
Linearity	Within ±1.0% F.S.		Within ±1.5% F.S.	
Sensitivity	Within ±0.2% F.S.		Within ±0.5% F.S.	
Hysteresis	Within ±0.5% F.S.		Within ±1.0% F.S.	
Repeatability	Within ±0.5% F.S.			
Air consumption	5 LPM (Sup. 1.4 kgf/cm ²)			
Flow capacity	80 LPM (Sup. 1.4 kgf/cm ²)			
Body material	Aluminium Diecast			
Weight	2.9 kg (with a terminal box)			

¹⁾ ½ split range can be adjusted.

²⁾ Feedback lever is available for strike 80-150 mm (EPL).

³⁾ Stroke can be adjusted to 0-60° or 0-100° (EPR).

Subject to changes without notice.

Electro-pneumatic positioners


EPL and EPR series

6.6.02-D

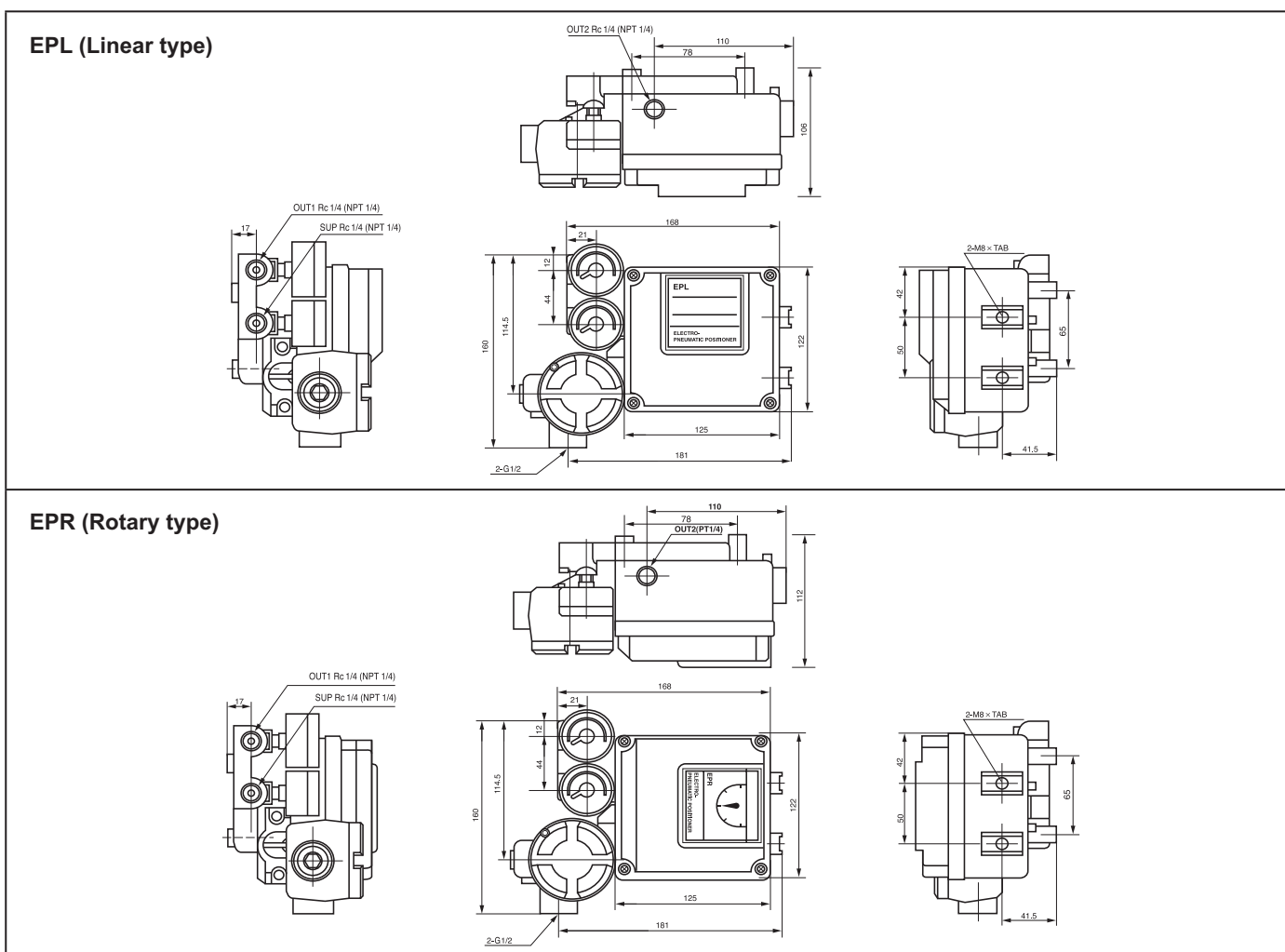
GB-2

How to order

EP	Actuator Operation	Protection Class	Feedback Lever	Pressure Gauge (SUP.OUT)	Pilot Valve Orifice	Position Feedback	Mounting Bracket
----	-----------------------	---------------------	-------------------	--------------------------------	------------------------	----------------------	---------------------

Description	Code	Description	Code
Actuator operation:	L : Linear type R : Rotary type	Pilot valve orifice:	S : Standard (actuator volume over 180 cm ³) M : Small orifice (∅ 1.0 or ∅ 0.7) (actuator volume 90-180 cm ³)
Protection class:	F : Flameproof (Ex md IIB T6/Ex md IIC T6) I : Intrinsic Safety (Exia IIB T6) W : Weatherproof to IP66 A : Flameproof (Eex md IIB T5 for ATEX )	Position feedback: (only for weather-proof)	N : None O : Position transmitter (4-20 mA output signal) L : Two SPDT limit switches (only for EPR)
Feedback lever:	• Linear type A : Stroke (10-80 mm) B : Stroke (70-150mm)	Mounting bracket:	N : None L : DIN/IEC534 (for EPL) R : DIN VDI/VDE3845 (for EPR) F : DHCT bracket 80 × 30
• Rotary type A : Fork level M6 × 40L B : Fork level other size on request N : Namur Shaft (direct mounting)			
Pressure gauge:	1 : 6 bar (90 psi) 2 : 10 bar (150 psi)		

Dimensions (mm)



Subject to changes without

Applications

For the control of temperature and pressure in industrial or process plants. The indicating controller is used for control of liquid, gaseous or vaporous media. The instrument senses the temperature/ pressure of the measured medium directly, displays the operating value, compares the measured variable with the set point and puts out a pneumatic signal in the

standard range of 0.2 to 1 bar or 3 to 15 psi. This output pressure actuates the final control element. Four control forms are available: ON-OFF, P, P+I, P+I+D. The units can also be used for remote control of processes operating whether with a pneumatic transmitter (output 0.2-1 bar or 3-15 psi) or as a receiver controller (input 0.2-1 bar, 3-15 psi).



Technical data

Body	Die cast aluminium with anti corrosive paint	
Cover	ABS	
Degree of protection	IP55	
Mounting	Wall or panel	
Pneumatic connections	¼" NPT	
Supply air pressure	20±1.5 psi / 1.4 ± 0.1 bar	
Output	3-15 psi / 0.2-1 bar	
Proportional action	Proportional band ∞...200%	
Integral action	>0...>10 rep. /min.	
Derivative action	0...>5 min. rep	
Steady state air consumption	Air supply 20 psi / 1,4 bar	0,13 Nm³/h
Max. air delivery	Air supply 20 psi / 1,4 bar	2,6 Nm³/h
Accuracy	≤ 1% deviation	
Histeresis	≤ 0.5%	
Non linearity	≤ 0.5%	
Repeatability	≤ 0.5%	
Control range	0...150 °C	
Permissible ambient temperature	-20...+ 80 °C	
Weight	~3 kg	

Options

- External set point knob
- Box for tropical conditions
- Output signal 6 to 30 psi / 0.4 to 2 bar

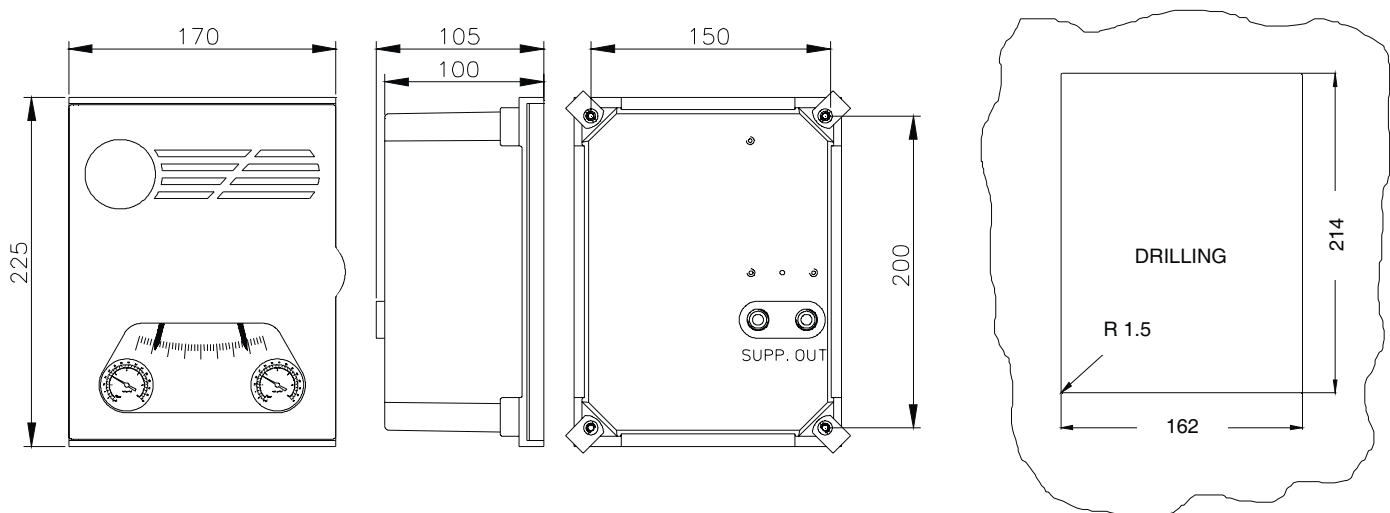
Subject to changes without notice.

Temperature element

Sensor for gasses	Sensor for liquids
<p style="text-align: center;">R12 - W23</p>	<p style="text-align: center;">R11 - W23</p>
Temperature sensing nitrogen-filled, 2 m capillary length, conn. ISO 228 - G $\frac{3}{4}$ B, material: S.S. ASTM A240 Type 316L	Temperature sensing nitrogen-filled, 5 m capillary length, conn. ISO 228 - G $\frac{3}{4}$ B, material: S.S. ASTM A240 Type 316L

SPAN	25°C	30°C	40°C	50°C	60°C	70°C	80°C	100°C	120°C	130°C	150°C	200°C	250°C	300°C	400°C	500°C
A1	250	250	250	200	200	200	200	200	200	200	200	200	200	200	200	200
L1	170	170	170	120	120	120	120	120	120	120	120	120	120	120	120	120
D1	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
A2	250	250	250	200	200	200	200	200	200	200	200	200	200	200	200	200
L2	170	170	170	130	130	120	120	120	120	120	120	120	120	120	120	120
D2	16	16	16	16	16	14	14	14	14	14	14	14	14	14	14	14

Dimensions



Subject to changes without notice.

AW 20K-FO2CE-H FILTER REGULATOR AW20K

6.8.01-C
GB-1



■ Integrated filter and regulator units save space and require less piping.

■ With the backflow function it incorporates a mechanism to exhaust the air pressure in the outlet side reliably and quickly.

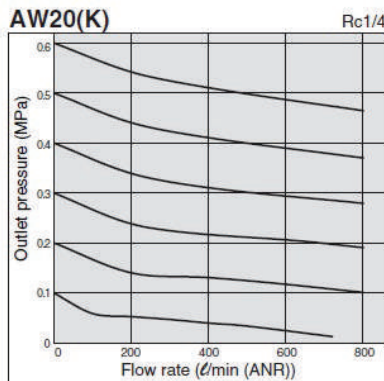
EXAMPLE

When the air supply is cut off and releasing the inlet pressure to the atmosphere, the residual pressure release of the outlet side can be ensured for a safety purpose.

TECHNICAL DATA:

■ With backflow function	YES
■ Thread type	G 1/8
■ Port Size	1/4
■ Float type auto drain	Float type auto drain N.C. type-0.1 MPa (AD27)
■ Pressure gauge	Square embedded type pressure gauge (with limit indicator)

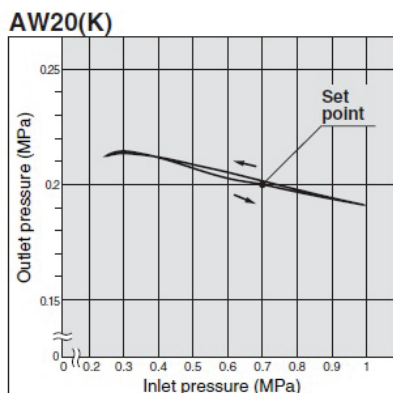
FLOW CHARACTERISTICS



■ Body	Material Zinc die-cast	Color Platinum Silver
■ Bonnet	Polyacetal	Black

■ Port Size	1/4
■ Pressure gauge port size	1/8
■ Fluid	Air
■ Ambient and fluid temperature	-5 to 60°C
■ Proof pressure	1.5 MPa
■ Maximum operating pressure	1.0 MPa
■ Set pressure range	0.05 to 0.85 MPa
■ Relief pressure at relief flow rate of 0.1	Set pressure + 0.05 MPa
■ Nominal filtration rating	
■ Drain capacity (cm ³)	8
■ Bowl material	Polycarbonate
■ Bowl guard	Semi-standard
■ Construction	Relieving type
■ Mas (kg)	0.32

PRESSURE CHARACTERISTICS



OPTIONS/PART NO.

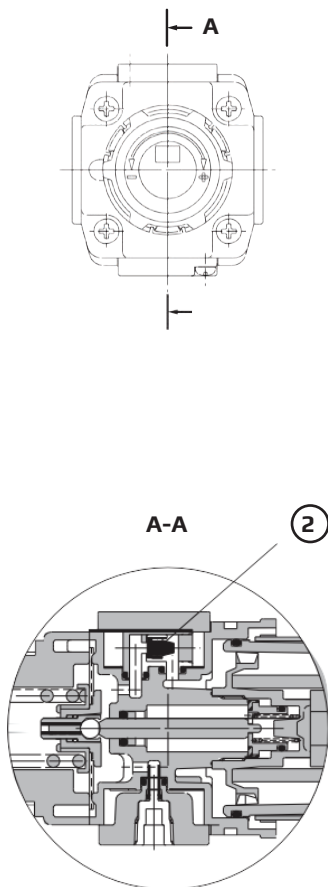
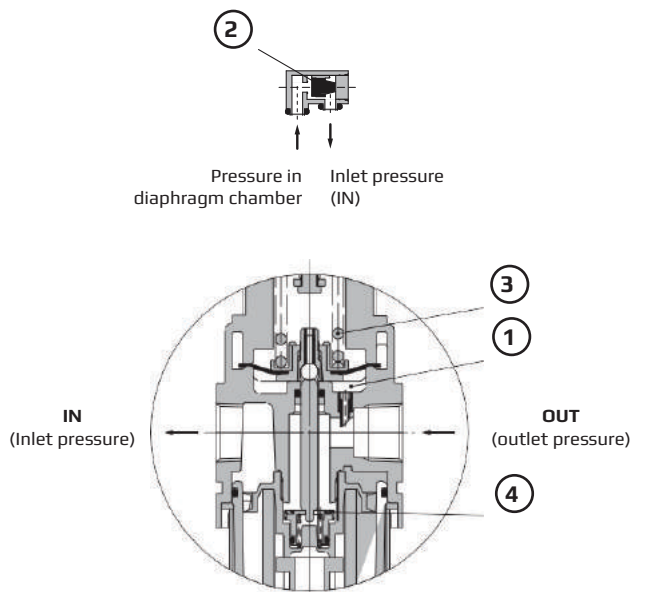
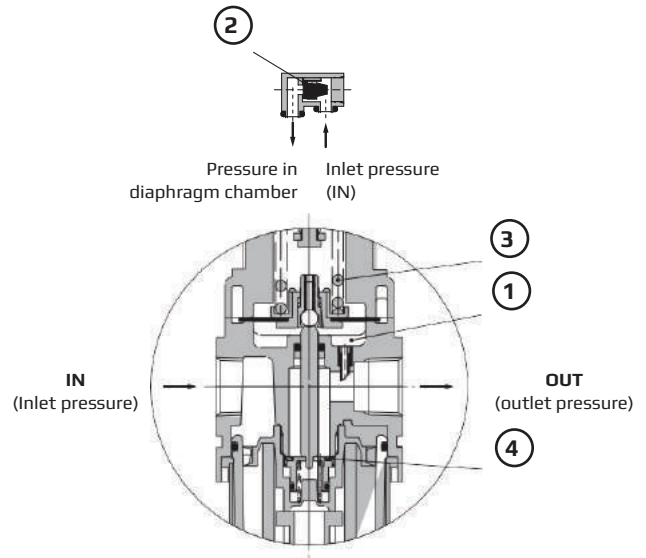
	note
Float type auto drain ^{1,2}	AD27

- 1 Minimum operating pressure: N.O. type-0.1 MPa; (AD27)
- 2 Please consult Clorius Controls for details on drain piping to fit NPT or G port sizes

WORKING PRINCIPLE

When the inlet pressure is higher than the regulating pressure, check valve (2) closes and operates as a normal regulator (Figure 1). When the inlet pressure is shut off and released, check valve (2) opens and the pressure in the diaphragm chamber (1) is released in the inlet side (Figure 2).

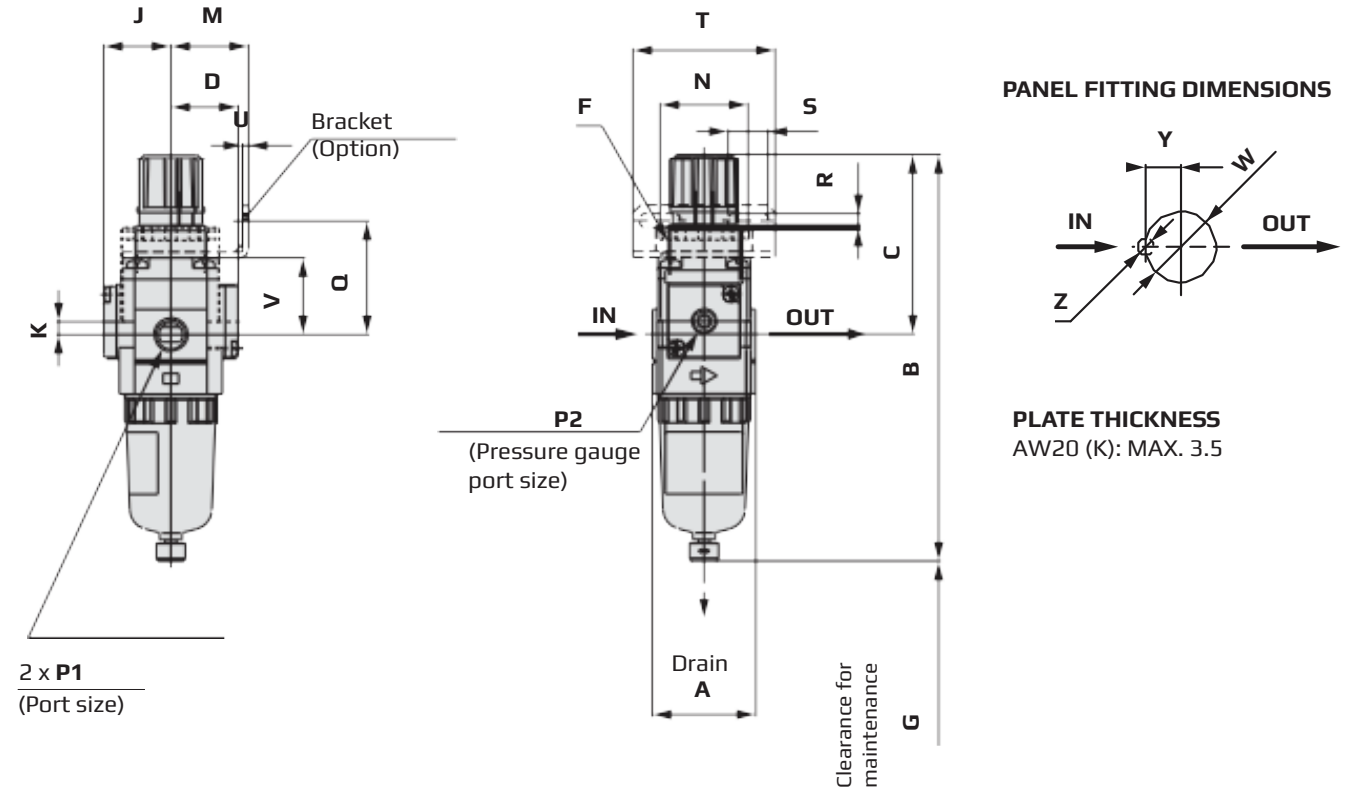
This lowers the pressure in diaphragm chamber (1) and the force generated by pressure regulator spring (3) lifts the diaphragm. Valve (4) opens through the stem, and the outlet pressure is released to the inlet side (Figure 2).



AW 20K-FO2CE-H FILTER REGULATOR AW20K

6.8.01-C
GB-1

DIMENSIONS



Model	Standard specifications										
	P1	P2	A	B ^(note)	C	D	E	F	G	J	K
AW20K	1/8	1/8	40	160	73	26	-	M28x1	40	26	5

Model	Optional specifications											
	Bracket mount							Panel Mount				With auto drain
	M	N	Q	R	S	T	U	V	W	Y	Z	B ^(note)
AW20K	30	34	44	5.4	15.4	55	2.3	30	28.5	14	6	177

Note) The total length of B dimension is the length when the filter regulator knob is unlocked.

SPECIFIC PRODUCT PRECAUTIONS

MAINTENANCE

WARNING

1. Replace the regulator when the pressure drop becomes 0.1 MPa.

MOUNTING AND ADJUSTING

WARNING

1. Set the regulator while verifying the displayed values of the inlet and outlet pressure gauges. Turning the regulator knob excessively can cause damage to the internal parts.
2. The pressure gauge included with regulators for 0.02 to 0.2 MPa setting is for up to 0.2 MPa use only. Exceeding 0.2 MPa of pressure can damage the gauge.
3. Do not use tools on the pressure regulator knob as this may cause damage. It must be operated manually.

CAUTION

1. Be sure to unlock the knob before adjusting the pressure and lock it after setting the pressure. Failure to follow this procedure can cause damage to the knob and the outlet pressure may fluctuate.
 - Pull the pressure regulator knob to unlock. (You can visually verify this with the "orange mark" that appears in the gap.)
 - Push the pressure regulator knob to lock. When the knob is not easily locked, turn it left and right a little and then push it (when the knob is locked, the "orange mark", i.e. the gap will disappear).



2. A knob cover is available to prevent careless operation of the knob. Refer to page 90 for details.

SECTION 8

Description

The Y strainers are applicable to all types of steam, water, oil and air systems. Their purpose is to protect traps, regulating valves, piping, etc. from dirt which often cause damage and consequently energy loss in fluid systems. Connections are female screwed or flanged.

Characteristics

- Screen made of stainless steel
- Compact settlement
- Environment-friendly
- Cleaning of screen without disassembling
- Face-to-face dimension according to EN 558-1 series 1
- Flanges drilled according to EN 1092-1 for body material F (H-F821F)
- Flanges drilled according to EN 1092-2 for body material A (M-F821A), C (G-F821C)
- Closing tightness acc. EN 12266-1

Application

Saturated steam, water, oil, air and other compatible fluids.

Installation

Horizontal or vertical downstream installation.

Screens

Type		Mesh (mm)
M-F821A	DN 15-50	1
	DN 65-150	1.25
	DN 200	1.6
G-F821C H-F821F	DN 15-50	1
	DN 65-80	1.25
	DN 100-200	1.6

Meshes in 0.6, 0.5, 0.4, 0.32 and 0.2 mm are available on request.

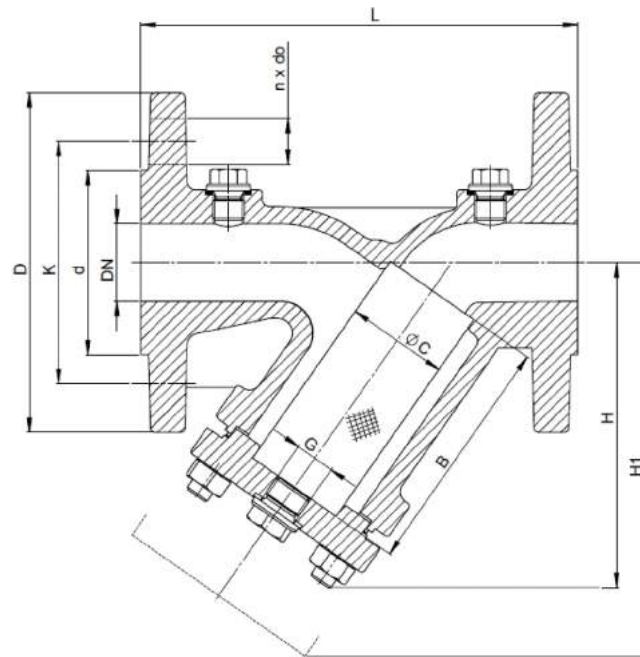


Specifications

Type	Body material	Nominal pressure PN bar	Nominal diameter DN mm	Max. temperature °C
M-F821A	A: Grey cast iron	16	15-200	300
G-F821C	C: Nodular cast iron	25		350
H-F821F	F: Cast steel	40		400

Subject to changes without notice.

Dimension sketch



Type M-F821A, PN 16								Type G-F821C, PN 25					Type H-F821F, PN 40									
DN	L	H	H1	G	C	B	Kv	D	d	K	n x do	Weight	D	d	K	n x do	Weight	D	d	K	n x do	Weight
mm	mm	mm	mm	mm	mm	mm	m ³ /h	mm	mm	mm	mm	kg	mm	mm	mm	mm	kg	mm	mm	mm	mm	kg
15	130	90	135	3/8	23	56	5.7	95	46	65	4x14	2.6	95	46	65	4x14	2.6	95	45	65	4x14	2.7
20	150	100	150	3/8	28	68	10.4	105	56	75	4x14	3	105	56	75	4x14	3	105	58	75	4x14	3.6
25	160	115	180	3/4	36	82	16.4	115	65	85	4x14	4.3	115	65	85	4x14	4.3	115	68	85	4x14	4.5
32	180	135	215	3/4	42	98	27.3	140	76	100	4x19	6.8	140	76	100	4x19	6.8	140	78	100	4x18	6.3
40	200	150	240	1	50	114	42	150	84	110	4x19	8.8	150	84	110	4x19	9	150	88	110	4x18	8.7
50	230	160	250	1	61.5	119	64.7	165	99	125	4x19	11	165	99	125	4x19	11	165	102	125	4x18	11
65	290	180	285	1	78.5	134	98	185	118	145	4x19	14.6	185	118	145	8x19	16.8	185	122	145	8x18	18.5
80	310	215	330	1	89.5	149	149	200	132	160	8x19	18.6	200	132	160	8x19	19.5	200	138	160	8x18	23.5
100	350	235	365	1 1/2	109.5	169	234	220	156	180	8x19	27	235	156	190	8x23	29.6	235	162	190	8x22	33
125	400	280	425	1 1/2	137.5	199	376	250	184	210	8x19	38.5	270	184	220	8x28	42.5	270	188	220	8x26	54
150	480	320	480	1 1/2	160	224	454	285	211	240	8x23	54.5	300	211	250	8x28	56	300	218	250	8x26	75
200	600	405	610	1 1/2	210	284	853	340	266	295	12x23	110	360	274	310	12x28	110	375	285	320	12x30	137

Subject to changes without notice.

Sensor Pockets for Clorius V-thermostats

8.3.41-E

GB-1

Application

Sensor pockets of stainless steel can be supplied to all Clorius self-acting thermostats with rod sensors. They are used where it is impossible to empty the system or the tank.

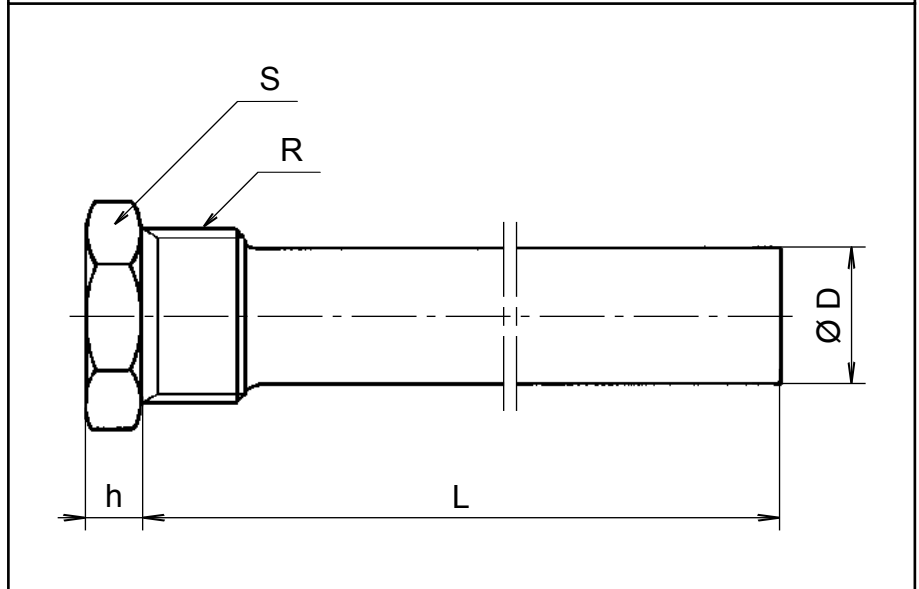
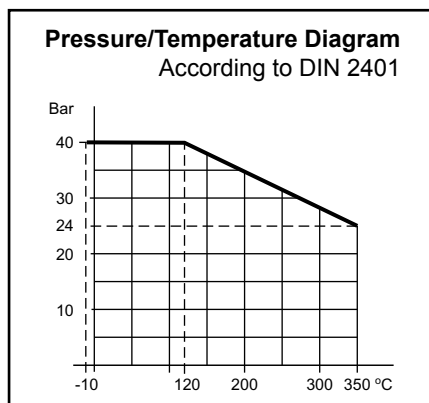
Use of sensor pockets imply delay of heat transfer to the rod sensors and thus a longer reaction time for the controllers. This is to some extent counteracted by filling up the sensor pockets with paste or oil.

Mounting

The installation site for the sensor pocket is arbitrary when paste is applied. When using oil the sensor pocket must point somewhat downwards.

Material

High alloy stainless steel.
Werkstoff No. 1.4436.



For thermostat type	Clorius product number	Dimensions in mm				ISO 7/1 (tapered)
		Ø D	L	h	S	
V 2.05	3290069	25	215	9	36	R 1
V 4.03	3290182			10	50	R 1¼
V 4.05	3290077	25	390	10	50	R 1¼
V 4.10	3290085	34	512	10	50	R 1¼
V 8.09	3290093	34	740	12	80	R 2½
V 8.18	3290204	38	805	12	80	R 2½

Kølestykker

Anvendelse

Kølestykker anvendes i forbindelse med reguleringsventiler, termostater og ventilmotorer for beskyttelse af henholdsvis termostatsens/ventilmotorens pakdåse. Ved ventiltemperaturer over 170°C anvendes kølestykker af typen KS installeret med tilslutning nedad. Valg af type sker efter nedenstående retningslinier:

Type KS-4

Kølestykke, som beskytter motorens/termostatsens pakdåse. Anvendes ved ventiltemperaturer mellem 170°C og 250°C. For højere temperaturer se hhv. KS-5 og KS-6.

Type KS-5

Kølestykke med indbygget bælgætning, erstatter termostatsens pakdåse. Obligatorisk ved ventiltemperaturer mellem 250°C og 350°C.

Type KS-6

Kølestykke med indbygget bælgætning, erstatter ventilmotorens pakdåse. Obligatorisk ved ventiltemperaturer mellem 250°C og 350°C.

Håndforstillere

Håndforstilleren har en indbygget termostatpakdåse. Til tætning og manuel betjening af ventilerne, når en aktuator ikke er monteret, som f.eks. i byggeperioder (max. 170°C).

Cooling Units

Application

The cooling units are used in connection with control valves, thermostats and valve motors to protect the stuffing box. At valve temperatures above 170°C a cooling unit of type KS connected downwards should be applied of type according to the following:

Type KS-4

Cooling unit protecting the stuffing box of the motor/thermostat. To be applied at valve temperatures between 170°C and 250°C. For higher temperatures please see type KS-5 and type KS-6.

Type KS-5

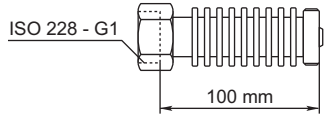
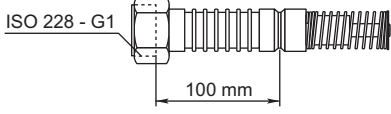
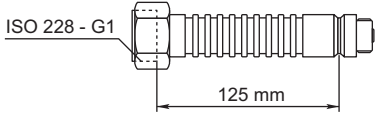
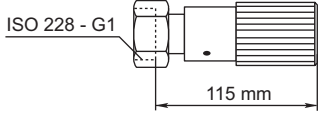
Cooling unit with a built-in bellow gland, replacing the stuffing box of the thermostat. To be applied at valve temperatures between 250°C and 350°C.

Type KS-6

Cooling unit with a built-in bellow gland, replacing the stuffing box of the valve motor. To be applied at valve temperatures between 250°C and 350°C.

Manual Adjusting Device

The device has a built-in thermostat stuffing box. For sealing and manual operation of valves when an actuator has not been fitted, e.g. during periods of construction (max. 170°C).

<p>Kølestykke KS-4/ Cooling Unit KS-4</p>  <p>Vægt/Weight: 0,5 kg</p>
<p>Kølestykke KS-5/ Cooling Unit KS-5</p>  <p>Vægt/Weight: 0,5 kg</p>
<p>Kølestykke KS-6/ Cooling Unit KS-6</p>  <p>Vægt/Weight: 0,5 kg</p>
<p>Håndforstillere/ Manual Adjusting Device</p>  <p>Vægt/Weight: 0,6 kg</p>

SECTION 9

GB Product Data Sheet

AVM234S: 2500N Actuator with analog SUT positioner

Areas of use

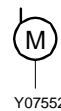
For use with two or three-way. For controllers with continuous output (0...10 V or 4...20 mA) or switching output (2-point or 3-point control).

How energy efficiency is improved

Automatic adaptation to valve, precision control and high energy efficiency with minimal operating noise.

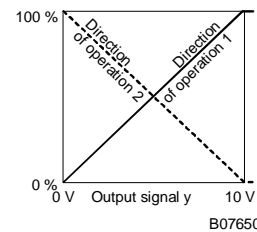
Features

- Pushing force of at least 2500 N
- Stepping motor with SUT (Superior Universal Technology) electronic control unit and electronic load-dependent cut-off
- Automatic detection of control signal applied (continuous or switching), indicated by two LEDs
- The type of characteristic (linear, quadratic or equal-percentage) can be set on the actuator
- Automatically adapts to valve stroke between 8 and 49 mm; captive even in the event of a power failure
- Direction of travel can be selected via screw terminals when making electrical connection or remotely
- Coding switches for selecting the characteristic and the running time (2, 4 or 6 s/mm)
- Lever for external manual adjustment, with motor cut-off, and for triggering a re-initialisation
- Easy assembly with valve; spindle is connected automatically when control voltage is applied
- The availability of numerous adaptors enables the actuator to be fitted to third-party valves



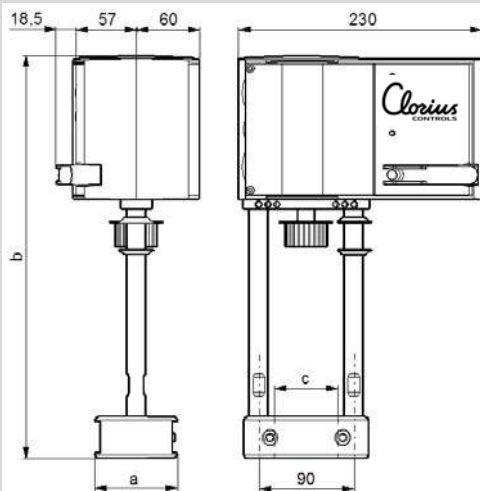
Technical description

- Power supply 230 V with modules or direct connection for 24 V~ or 24 V=; continuous activation also permissible at 230 V
- Two-part housing made of fire-retardant yellow plastic and seals to IP66
- Maintenance-free gearbox of sintered steel, gearbox plate of steel
- Patented actuator–valve coupling
- Mounting column made of stainless steel; mounting bracket (for fitting the valve) of cast light alloy
- Electrical connections (max. 2.5 mm²) with screw terminals
- Three pre-scored cable inlets for M20×1.5 (2x) and M16×1.5
- Installation position: vertically upright to horizontal, but not upside down



Type	Positioning time (s/mm)	Nominal stroke (mm)
AVM234SK002	2 / 4 / 6	49

Dimension drawing



Technical data

Type	Run time s/mm	Stroke mm	Pushing force N	Power supply ¹⁾	Weight kg
AVM 234S K002	2 / 4 / 6	14...40	2500	24 V~/=	4.1

Positioner: ¹⁾				
Control signal 1	0...10 V, R _i > 100 kΩ	Starting point U ₀	0 or 10 V	
Control signal 2	4...20 mA, R _i = 50 Ω	Control span ΔU	10 V	
Position feedback signal	0...10 V, load > 2.5 kΩ	Switching range X _{Sh}	300 mV	
Power supply	24 V~ ± 20%, 50...60 Hz	Degree of protection	IP 66 (EN 60529)	
	24 V= ± 15%	Protection class	III (IEC 60730)	
with accessories	230 V~ ± 15%	Response time for 3-point	200 ms	
Power consumption	10 W 18 VA ²⁾	Wiring diagram	A10357	
Stroke	8...49 mm	Dimension drawing	M10356	
Max. temperature of medium	130 °C ³⁾	Fitting instructions	99.70.01	
Permitted ambient temperature	-10...55 °C	Material declaration	MD 51.377	
Permitted ambient humidity	< 95% rh without condensation			

1) Also for 2-point or 3-point depending on the connection for 24 V~

2) Design the transformers for this value, otherwise functional faults may occur.

3) If the temperature of the medium is higher (from 130 °C to 240 °C), an adaptor is required (see accessories)

CE conformity

EMC Directive 2004/108/EC
EN 61000-6-2 ¹⁾
EN 61000-6-4

Low-Voltage Directive 2006/95/EC
EN 60730-1
EN 60730-2-14
Over-voltage category III
Degree of pollution III

Accessories

Type	Description
1-0152285	Temperature adaptor for media temperature > 130 °C ... 240 °C
1-0152287	Potentiometer 1000 Ω , 1 W, 24 V; installation as per MV 505894
1-0152289	Auxiliary change-over contacts (2 pcs. each) 12...250 V Infinitely variable, min. 100 mA and 12 V, additional load 6(2) A, MV 505866
1-0152281	230V Module, plug-in type , for 2-/3-point and continuous activation, additional power 2 VA 230 V ± 15% power supply, MV 505901
	4-20mA Position feedback signal , for 24VAC/DC, output load resistor max. 600 ohm
	Cable gland M20×1.5
	Cable gland M16×1.5

Clorius
CONTROLS

AVM321/AVM322: 1000N Actuator for 2-point or 3-point control

Areas of use

For actuation of 2- and 3-way valves. For controllers with a switching output (2-point or 3-point control)

Improving energy efficiency

Automatic adaptation to valve, optimal operator convenience, precision control and high energy efficiency with minimal operating noise.

Features

- Synchronous motor with electronic control unit and load-dependent cut-off
- Direction of operation and positioning time can be set using coding switches
- Crank handle for external manual adjustment with motor cut-off
- Very low operating noise
- Simple assembly with valve; spindle is automatically connected after nominal voltage is applied
- Electrical parallel operation of 5 actuators

Technical description

- Power supply 24 V~/= or 230 V~
- Three-piece housing of flame retardant yellow/black plastic and seals with degree of protection IP54
- Maintenance-free gearbox made of plastic, threaded spindle and gearbox base-plates made of steel
- Patented drive-valve coupling
- Mounting column made of aluminium
- Fixing bracket made of cast light alloy for the valve fitting with 20 mm and made of plastic for the valve fitting with 10 mm stroke
- Electrical connections (max. 1.5 mm²) with screw terminals
- Two break-out cable inlets for metric screw fitting made of plastic M20×1.5
- Fitting position, vertically upright to horizontal, not hanging

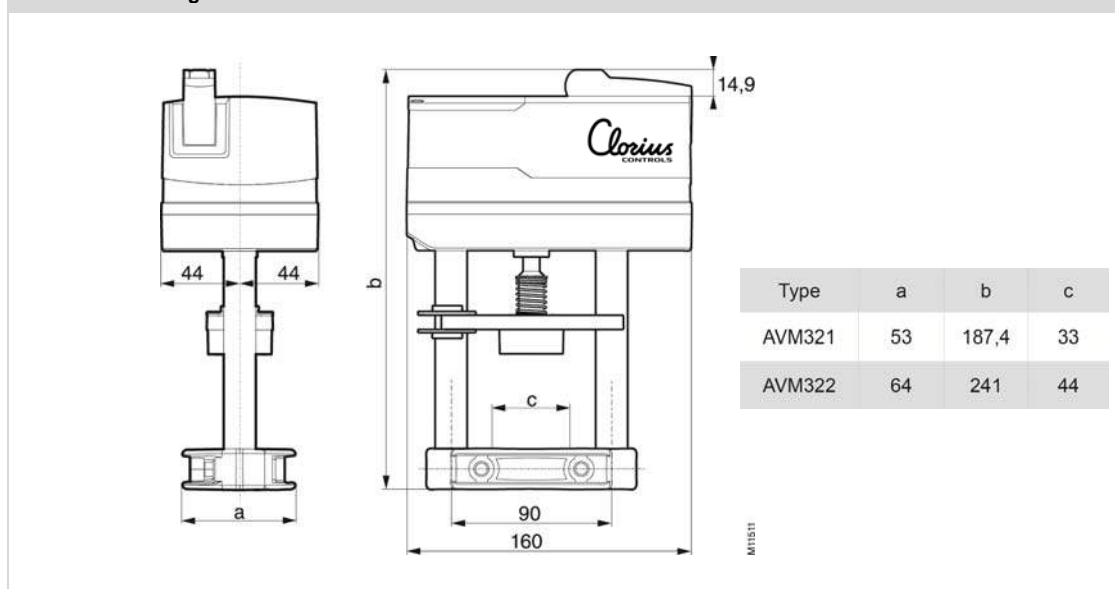


Products

Type	Positioning time (s/mm)	Nominal stroke (mm)	Nominal voltage (V)
AVM321K001	12 (6)	10	230 V~
AVM321K002*)	12 (6)	10	24 V~/=
AVM322K001	6 (12)	20	230 V~
AVM322K002*)	6 (12)	20	24 V~/=

*) CSA-certified actuators on request (only for devices with nominal voltage 24 V~/=)

Dimension drawing



Technical data

Power supply		
Operating voltage		
	24 V~	±20%, 50...60 Hz
	24 V=	-10%...+20%
	230 V~	±15%
Power consumption (at nominal voltage, with movement)		
AVM * K001	< 2.0 W	< 3.0 VA
AVM * K002	< 2.4 W	< 4.0 VA

Parameters	
Nominal force ¹⁾	1000 N
Operating noise ²⁾ (at nominal force)	< 30 dB(A)
Response time	Approx. 200 ms
Max. media temperature ³⁾	0...100 °C

Admissible ambient conditions

Operating temperature	-10...55 °C
Storage and transport temperature	-40...80 °C
Humidity	5...85% rh
	No condensation

1) Actuating power 1000 N under nominal conditions (24 V or 230 V, 25 °C ambient temperature, 50 Hz).

With boundary conditions (19.2 V~ / 28.8 V~ / 21.6 V= / 28.8 V=, -10 °C / 55 °C, 60 Hz) and positioning time, the actuating tensile force is minimised to 800 N

2) Operating noise with the slowest positioning time, test distance 1m

3) Use the appropriate accessory when the temperature of the medium is > 100 °C (temperature adaptor).

Installation	
Dimensions W x H x D (mm)	AVM321: 60x187x88 AVM 322: 160x241x88
Weight (kg)	AVM321: 1.5 AVM322: 1.6

Standards and directives	
Degree of protection	IP 54 (EN 60529)
Protection class	II EN60730 III EN60730

Additional information	
Fitting instructions	99.70.03
Declaration on materials and the environment	MD 51.374
Declaration of incorporation	P100012470
Manual & electrical connection diagram	99.70.05.01

Power consumption at nominal voltage

Type	Positioning time (s/mm)	Status	Active power P (W)	Apparent power S (VA)
AVM * K001	6 (12)	Standstill ^{*)}	< 0,35	≥ 5,0
		Sizing		
AVM * K002	6 (12)	Operation	< 2,4	< 4,0
		Standstill ^{*)}	< 0,3	≥ 4,0
	12 (6)	Sizing		≥ 4,0
		Operation	< 2,0	< 3,0

*) Standstill = actuator in the end position, voltage applied to terminal 1 or 2, motor switched off.

CE conformity

EMC Directive 2004/108/EC
EN 61000-6-1
EN 61000-6-2
EN 61000-6-3
EN 61000-6-4
Low-voltage Directive 2006/95/EC
EN 60730-1
EN 60730-2-14
Over-voltage category III
Degree of contamination II
Maximum altitude. 2000 m
Machinery Directive 2006/42/EC in accordance with Annex II B
EN 12100

Accessories

Type	Description
1-0152285	Temperature adaptor for media temperature > 100 °C ... 240 °C
	Cable glands M20×1.5



AVM321S/AVM322S: 1000N Actuator with analog SUT positioner**Areas of use**

For actuation of 2- and 3-way valves. For controllers with constant output (0...10 V / 4...20 mA) or switching output (2-point or 3-point control)

Improving energy efficiency

Automatic adaptation to valve, optimal operator convenience, precision control and high energy efficiency with minimal operating noise.

Features

- BLDC motor (brushless DC) with electronic control unit SUT (Superior Universal Technology) of the third generation and electronic load-dependent cut-off
- Automatic recognition of applied control signal (constant or switched), operating display with bi-coloured LED
- Independent adaptation to the stroke of the valve between 10 and 20 mm
- Very low operating noise
- With the built-in absolute distance measurement system, the position is always maintained in case of power failure
- The direction of operation, characteristic (linear / equal percentage), positioning time and control signal (voltage/current) can be adjusted with coding switches
- Integrated forced operation can be set with coding switches (with selectable direction of operation)
- Easy re-initialisation using a coding switch
- Crank handle for external manual adjustment with motor cut-off
- Simple assembly with valve; spindle is automatically connected after control voltage is applied
- Electrical parallel operation of 5 actuators
- Parameterisation option available through bus interface

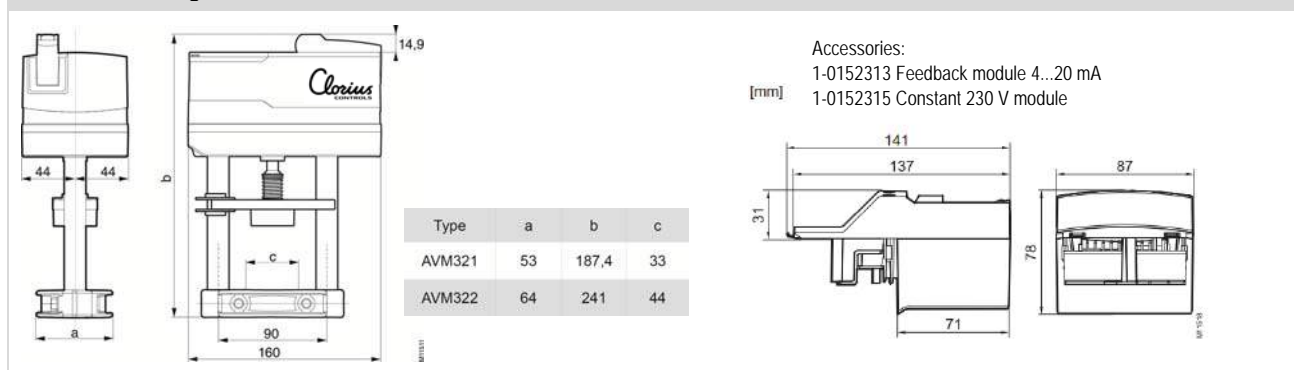
**Technical description**

- Power supply 24 V~ or 24 V=
- Three-piece housing of flame retardant yellow/black plastic and seals with degree of protection IP54
- Maintenance-free gearbox made of plastic; threaded spindle and gearbox base-plates made of steel
- Patented drive-valve coupling
- Mounting column made of aluminium
- Fixing bracket made of cast light alloy for the valve fitting with 20 mm stroke and made of plastic for the valve fitting with 8 mm stroke
- Electrical connections (max. 1.5 mm²) with screw terminals
- Two break-out cable inlets for metric screw fittings made of plastic M20×1.5
- Fitting position, vertically upright to horizontal, not hanging
- Nominal thrust 1000 N²

Products

Type	Positioning time (s/mm)	Nominal stroke (mm)
AVM321SK001*)	12 (4)	10
AVM322SK001*)	6 (4)	20

*) CSA-certified actuators on request

Dimension drawing

Technical data

Power supply		Admissible ambient conditions		
Operating voltage	24 V~	±20%, 50...60 Hz	Operating temperature	-10...55 °C
	24 V=	-10%...+20%	Storage and transport temperature	-40...80 °C
with accessory module	230 V~	±15%	Humidity	5...85% rh
Power consumption (at nominal voltage, with movement)		< 1.7 W, < 3.5 VA		No condensation
Parameters		Installation		
Nominal force ¹⁾	1000 N	Dimensions W x H x D (mm)	AVM321S 160x187x88	
Operating noise ²⁾ (at nominal force)	< 30 dB(A)		AVM322S 160x241x88	
Response time	> 200 ms	Degree of protection	IP 54 (EN 60529)	
Media temperature ³⁾	0...100 °C	Weight (kg)		
Nominal voltage	24 V~/=	AVM321S	1.5	
Characteristic	Linear / equal percentage	AVM322S	1.6	
Positioner ⁴⁾		Standards and directives		
Control signal y	0...10 V, R _i ≥ 50 kΩ	Protection class	III (EN 60730-1), EN60730-2-14	
Control signal y	4...20 mA, R _i ≤ 50 Ω	Additional information		
Positional feedback signal y ₀	0...10 V, load ≥ 5 kΩ	Fitting instructions	99.70.03	
		Declaration on materials and the environment	MD 51.375	
Starting point U ₀	0 or 10 V	Declaration of incorporation	P100012470	
Starting point I ₀	4 or 20 mA	Manual & connection diagram	99.70.06.01	
Control span ΔU	10 V			
Hysteresis Xsh	160 mV			
Control span ΔI	16 mA			
Hysteresis Xsh	0.22 mA			

1) Actuating power 1000 N under nominal conditions (24 V, 25 °C ambient temperature, 50 Hz).

With boundary conditions (19.2 V~ / 28.8 V~ / 21.6 V= / 28.8 V=, -10 °C / 55 °C, 60 Hz) and positioning time, the actuating tensile force is minimised to 800 N

2) Noise level with the slowest positioning time, test distance 1m

3) Use the appropriate accessory when the temperature of the medium is > 100 °C (temperature adaptor).

4) Also for 2- or 3-point, depending on type of connection

Power consumption at nominal voltage

Type	Positioning time (s/mm)	Status	Active power P (W)	Apparent power S (VA)
AVM321S	12 / (4)	Operation	< 1.7	< 3.5
AVM322S	6 / (4)	Standstill *	< 0.45	
		Sizing		≥ 4.5

*) Standstill = actuator in the end position, voltage applied to terminal 1 or 2, motor switched off.

CE Conformity

EMC Directive 2004/108/EC
EN 61000-6-1
EN 61000-6-2
EN 61000-6-3
EN 61000-6-4
Low-voltage Directive 2006/95/EC
EN 60730-1
EN 60730-2-14
Over-voltage category III
Degree of contamination II
Maximum altitude. 2000 m
Machinery Directive 2006/42/EC in accordance with Annex II B
EN 12100

Accessories

Type	Description
1-0152285	Temperature adaptor for media temperature > 100 °C ... 240 °C
1-0152313*	4...20 mA feedback module
1-0152315*	Constant 230 V module
	Cable glands M20×1.5

*) Dimension drawing or connection diagram is available under the same number



GB Product Data Sheet

AVF234S: 2000N Actuator with analog SUT positioner and spring return

Areas of use

For use with two or three-way. For controllers with continuous output (0...10 V or 4...20 mA) or switching output (2-point or 3-point control). For applications where a fail-safe function is required.

How energy efficiency is improved

Automatic adaptation to valve, precision control and high energy efficiency with minimal operating noise.

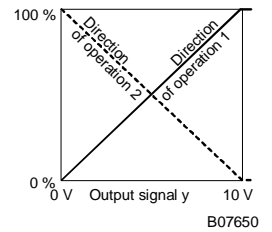
Features

- Actuator with spring return action and pushing force of at least 2000 N with actuator extending or retracting spindle versions.
- Stepping motor with SUT (Superior Universal Technology) electronic control unit and electronic load-dependent cut-off
- Automatic detection of control signal applied (continuous or switching), indicated by two LEDs
- The type of characteristic (linear, quadratic or equal-percentage) can be set on the actuator
- Automatically adapts to valve stroke between 8 and 49 mm; captive even in the event of a power failure
- Direction of travel can be selected via screw terminals when making electrical connection or remotely
- Coding switches for selecting the characteristic and the running time (2, 4 or 6 s/mm)
- Lever for external manual adjustment, with motor cut-off, and for triggering a re-initialisation
- Easy assembly with valve; spindle is connected automatically when control voltage is applied
- The availability of numerous adaptors enables the actuator to be fitted to third-party valves



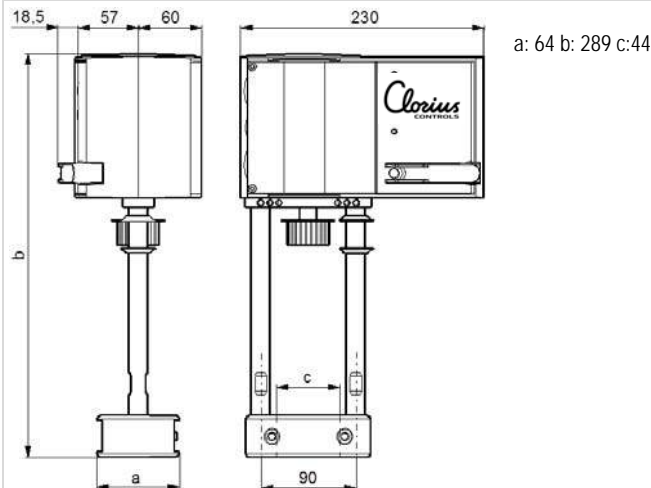
Technical description

- Power supply 230 V with modules or direct connection for 24 V~ or 24 V=; continuous activation also permissible at 230 V
- Two-part housing made of fire-retardant yellow plastic and seals to IP66
- Maintenance-free gearbox of sintered steel, gearbox plate of steel
- Patented actuator–valve coupling
- Spring assembly in stainless steel. Mounting column made of stainless steel; mounting bracket (for fitting the valve) of cast light alloy
- Electrical connections (max. 2.5 mm²) with screw terminals
- Three pre-scored cable inlets for M20x1.5 (2x) and M16x1.5
- Installation position: vertically upright to horizontal, but not upside down



Type	Positioning time (s/mm)	Nominal stroke (mm)
AVF234SK008 Actuator spindle normally retracted	2 / 4 / 6	49
AVF234SK009 Actuator spindle normally extended		

Dimension drawing



Technical data

Type	Run time s/mm	Stroke mm	Pushing force N	Power supply ¹⁾	Weight kg
AVF 234S K008 AVF 234S K009	2 / 4 / 6	14...49	2000	24 V~/=	5.6

Positioner: ¹⁾				
Control signal 1	0...10 V, R _i > 100 kΩ	Starting point U ₀	0 or 10 V	
Control signal 2	4...20 mA, R _i = 50 Ω	Control span ΔU	10 V	
Position feedback signal	0...10 V, load > 2.5 kΩ (Optional: 4-20mA)	Switching range X _{Sh}	300 mV	
Power supply	24 V~ ± 20%, 50...60 Hz	Degree of protection	IP 66 (EN 60529)	
	24 V= ± 15%	Protection class	III (IEC 60730)	
with accessories	230 V~ ± 15%	Response time for 3-point	200 ms	
Power consumption	10 W 18 VA ²⁾	Manual and wiring diagram	99.70.02.02	
Stroke	8...49 mm	Dimension drawing	M10356	
Number of spring returns	>40.000	Fitting instructions	99.70.02	
Spring return time ³⁾	15...30s	Material declaration	MD 51.377	
Max. temperature of medium	130 °C ⁴⁾			
Permitted ambient temperature	-10...55 °C			
Permitted ambient humidity	< 95% rh without condensation			

- 1) Also for 2-point or 3-point depending on the connection for 24 V~
- 2) Design the transformers for this value, otherwise functional faults may occur.
- 3) The return time corresponds to a stroke of 14 to 40mm and does not depend on the set run time
- 4) If the temperature of the medium is higher (from 130 °C to 240 °C), an adaptor is required (see accessories)

CE conformity

EMC Directive 2004/108/EC
EN 61000-6-2 ¹⁾
EN 61000-6-4

Low-Voltage Directive 2006/95/EC
EN 60730-1
EN 60730-2-14
Over-voltage category III
Degree of pollution III

Accessories

Type	Description
1-0152285	Temperature adaptor for media temperature > 130 °C ... 240 °C
1-0152287	Potentiometer 1000 Ω , 1 W, 24 V; installation as per MV 505894
1-0152289	Auxiliary change-over contacts (2 pcs. each) 12...250 V Infinitely variable, min. 100 mA and 12 V, additional load 6(2) A, MV 505866
1-0152281	230V Module, plug-in type , for 2-/3-point and continuous activation, additional power 2 VA 230 V ± 15% power supply, MV 505901
	4-20mA Position feedback signal , for 24VAC/DC, output load resistor max. 600 ohm
	Cable gland M20x1.5
	Cable gland M16x1.5

Clorius
CONTROLS

SECTION 10

Advantages

- **Saving of energy and water**
Less transmission loss and limited waste of heat and water through drain. Besides, a better utilization of the capacity of the hot water tank is obtained.
- **Comfort**
Constant temperature. Even at variable consumption.
- **Safety**
The bath water cannot scald.
- **Minimum maintenance**
The Evertemper System is robust and eliminates scale.

The Evertemper System

It consists of a Clorius 3-way valve with thermostat type V and a mixing tank in which water from the hot water tank is – centrally – mixed with cold water and return water from the circulation of the system. Irrespective of the drain-off quantity and the temperature of the hot water tank the bath water always has the desired temperature.

Evertemper can be mounted in two ways:

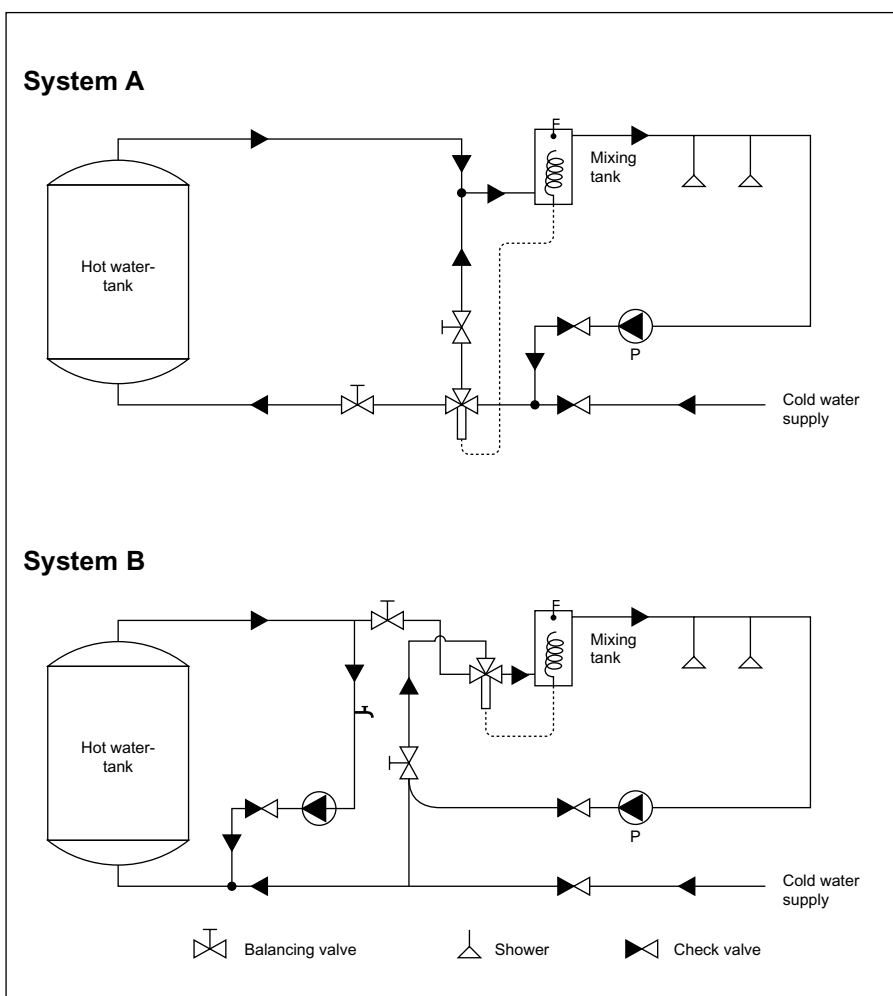
System A

The 3-way valve distributes cold water
As the valve – in cold water – is less exposed to scale deposits and heat strains, this system is preferred provided that large quantities of hot water are not being drained off directly from the hot water tank for other uses. Balancing valves should be mounted on both outlets of the 3-way valve in order to give equal resistance in both circuits to the mixing tank.

System B

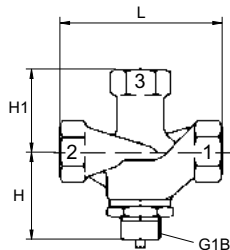
Hot and cold water is mixed in the 3-way valve

This system is used where parallel with warmed water for bathing – hot water is also necessary, e.g. for use in the kitchen. In system B the valve is both exposed to heat strains and scale as it at the same time is exposed to cold and hot water. Balancing valves should be mounted on both inlets to the mixing valve to secure equal resistance in both circuits. For mixing of cold water and return water a lateral Y-piece must be used. Please see drawing.

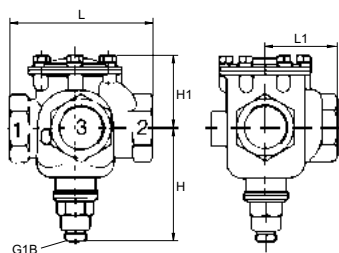


Subject to changes without notice.

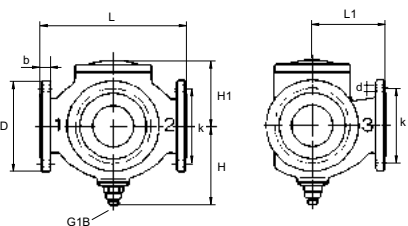
Valve 15 - 20 L3S



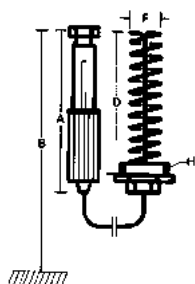
Valve 25 - 50 L3S



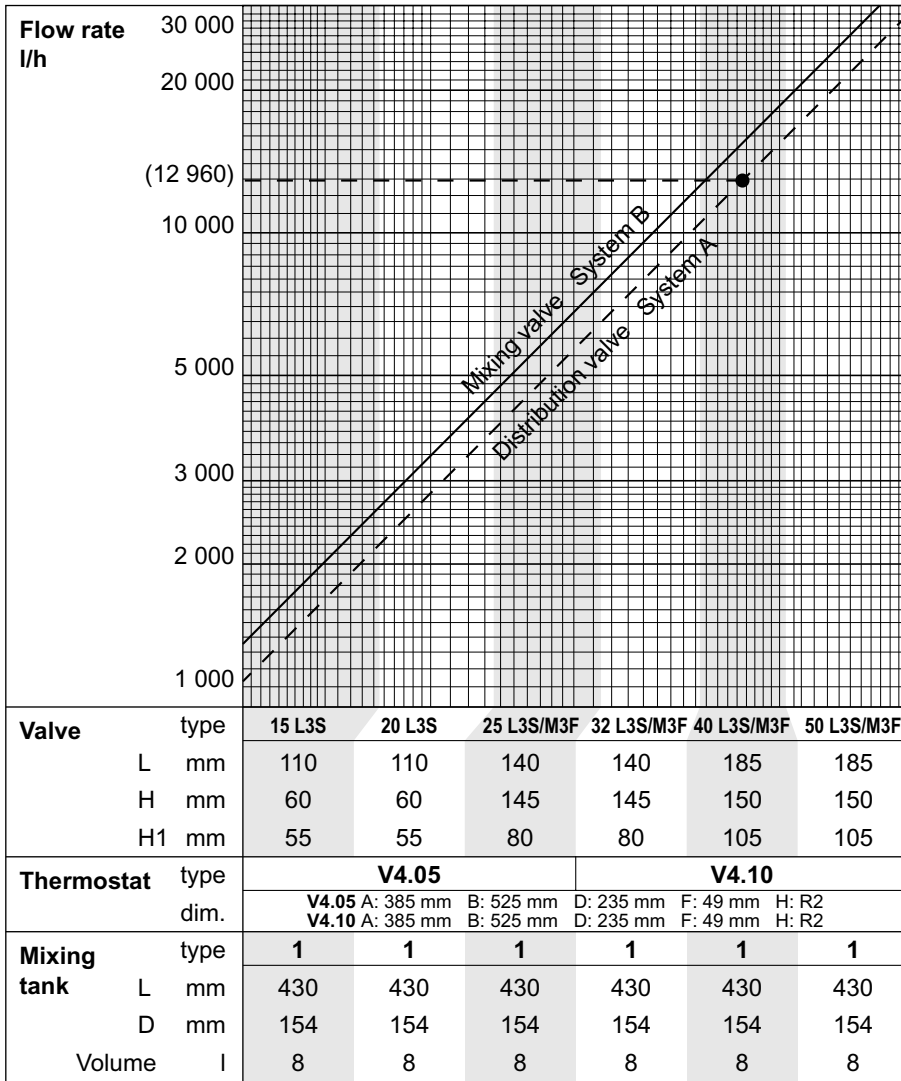
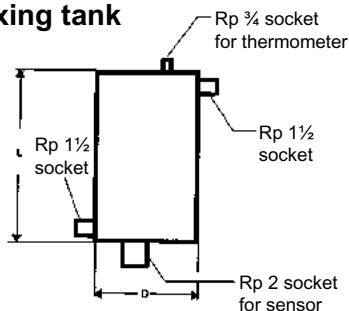
Valve M3F



Thermostat V4.05 - V4.10



Mixing tank



Sizing of System

The above diagram can be used to size the components of the Evertemper System. If the desired pressure drop over the 3-way valve differs from 0.5 bar please refer to our datasheet for 3-way valves no. 2.2.07.

For both system A and B, it is very important that valves are correctly dimensioned and also that the circulating pumps (P) are suitable sized to circulate at least 20% of the flow rate for which the plant is dimensioned.

Mixing tank

Should you manufacture the mixing tank yourselves, it is important to keep the dimensions stated above.

Example:

A plant in accordance to system "A" consists of 18 showers with a capacity of 0.2 l/sec, in total 12960 l/h. This flow rate is found on the left side of the above diagram from where a horizontal line is followed until it intersects with the line "Distribution Valve System A". This intersection is within the vertical grey area marked 40 L3S/M3F and below this the other components and their dimensions are shown. The Evertemper System in this example will consist of one 40 mm valve type L3S/M3F, one thermostat type V4.10 and one mixing tank. The minimum flow rate circulated by the pump is 2590 l/h.

Subject to changes without notice.

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PRODUCT CATALOGUE 2016

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