ENGINEERING TOMORROW

Data Sheet

Angle-seat externally operated valve Type **AV210A - AV210H**

For use in industrial applications



AV210 is an externally operated valve for use in demanding industrial applications.

The valve can operate at very high medium temperatures and viscosities, and is insensitive to dirt particles in the medium; thus, it is often called a “troubleshooter” valve. The valve is available in bronze and stainless steel.

Features

- For all fluids and gases
- Flow range: 0 – 234 m^3/h / 0 – 275 USgal/min
- Unpressurized closed (NC) bidirectional versions and unpressurized opened (NO) version closing against the flow direction
- The valves can be used for rough vacuum
- Control connection G ⅛
- Valves comply with Pressure Equipment Directive 97/23/EC
- NC version: bi-directional, closing against or closing with the flow direction
- NO version: always closing against the flow direction

1 Portfolio overview

Table 1: Portfolio overview

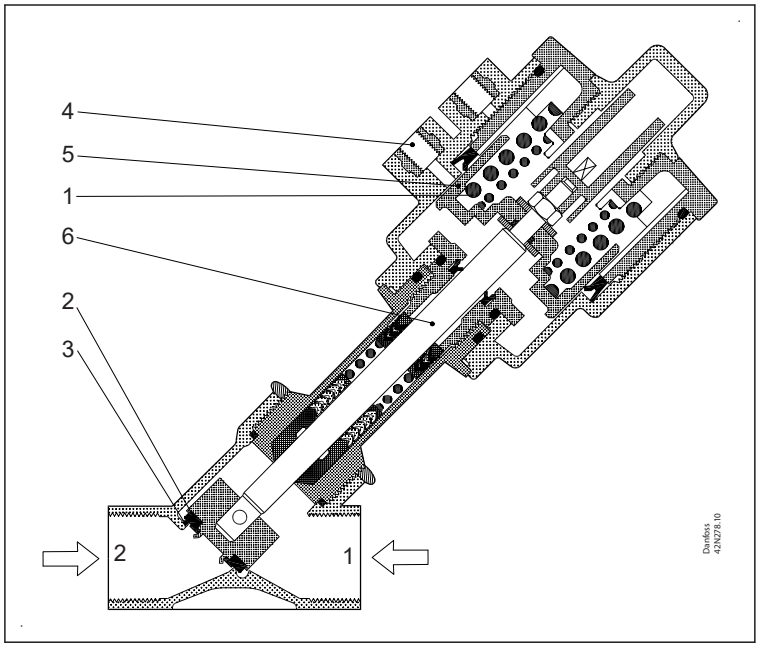
Features	AV210	
		
Body material	Brass	Stainless steel
DN [mm]	15-50	15-50
Connection ISO	G ⅜– G 2	G½-G2
Connection NPT (Only NC)	½-2	½-2
Sealing material	PTFE	PTFE
Function	NC, NO	NC, NO
Kv [m³/h]	4.5-67	4.9-67
Control head diameter [mm]	40, 50, 63, 90, 110	50, 63, 90, 110
Differential pressure range [bar]	0-16	0-16
Control pressure NC [bar]	4-10	4-10
Control pressure NO [bar]	1.8-10	1.8-10
Function NC	Closing against and with the flow	Closing against and with the flow
Function NO	Only closing against the flow	Only closing against the flow
Temperature range [°C]	-30-180	-30-180

2 Functions

2.1 NC ISO / NPT Connection

AV210 unpressurized closed version (NC) bidirectional.

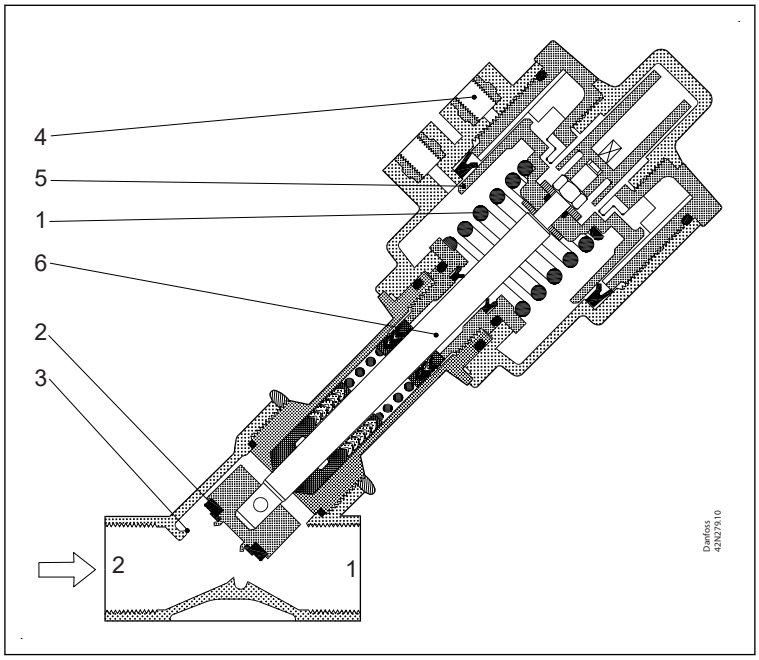
The valve is kept closed by the spring (1), which presses the seat gasket (2) against the valve seat (3). When the pressure is applied to the control connection (4), the control piston (5), the spindle (6) and thus the seat gasket (2) are raised, and the valve opens with or against the pressure of the medium.



1	Spring
2	Seat gasket
3	Valve seat
4	Control connection
5	Control piston
6	Spindle

2.2 NO ISO Connection

AV210 unpressurized open version (NO):
The valve is kept open by the spring (1), which keeps the seat gasket (2) away from the valve seat (3). When pressure is applied to the control connection (4), the control piston (5), the spindle (6) and thus the seat gasket (2) are lowered, and the valve closes against the pressure of the medium.



1	Spring
2	Seat gasket
3	Valve seat
4	Control connection
5	Control piston
6	Spindle

3 Product specification

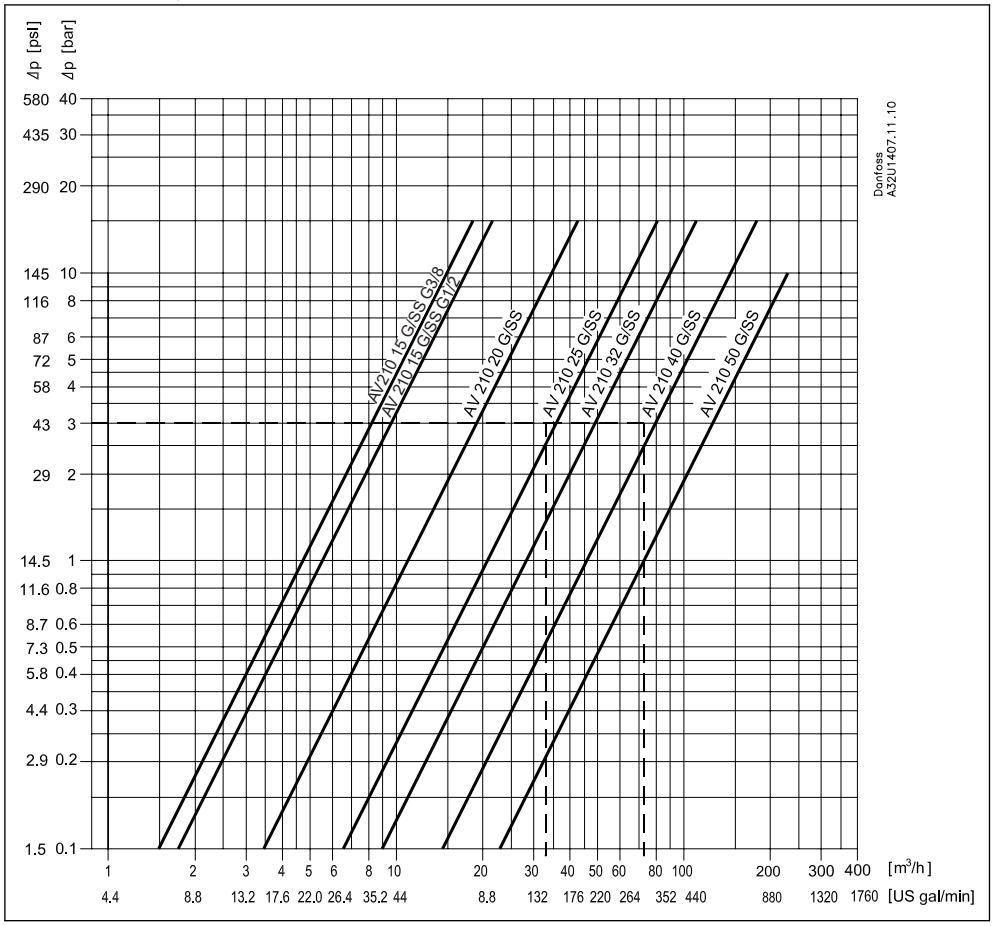
3.1 Technical data

Table 2: Technical data

Media	Bronze	For water, oil and compressed air
	Stainless	For neutral, aggressive liquid and gaseous media
Media temperature [°C] / [°F]	PTFE	-30-180 °C /-22-356 °F
Ambient temperature [°C] / [°F]	-30-60 °C / -22-140 °F	
Pressure	Pressure range can be extended for use in rough vacuum, typically up to 99% vacuum (10 mbar), depending on the application	
Kv value [m^3/h]	DN15	4.5-5.7 m^3/h
	DN20	10 m^3/h
	DN25	20 m^3/h
	DN32	29 m^3/h
	DN40	46 m^3/h
	DN50	67 m^3/h
Min. Opening differential pressure [bar]	0 bar	
Max. Opening differential pressure [bar]	Up to 30 bar	
Max. working pressure [bar]	Up to 30 bar	
Max. test pressure [bar]	DN1.5-4.5	52.5 bar
	DN6-10	37.5 bar
	DN15-25	24 bar
Control medium	Air	
Tightness	Internally / Externally:	Better than 0.4 mbar l/sec (25 ccm air per min.)
Viscosity [cSt]	Max. 600 cSt / 3000 SSU	

Capacity diagram

Figure 1: Capacity diagram, Water



Differential pressure range for NC/NO

Table 3: Differential pressure NC, closing against the flow

Connection ISO228/1	Connection NPT	Orifice	Control head diameter	Max working pressure		Differential pressure, min. to max.		Control pressure[1] (Values for closing against the flow)	
		[mm]	[mm]	[bar]	[psi]	[bar]	[psi]	[bar]	[psi]
G 3/8		15	40	16	232	0-16	0-232	4.2-10	61-145
			50	16	232	0-16	0-232	4-10	58-145
G 1/2	1/2	15	40	16	232	0-16	0-232	4.2-10	61-145
			50	16	232	0-16	0-232	4-10	58-145
G 3/4	3/4	20	50	10	140	0-10	0-140	4-10	58-145
			63	16	232	0-16	0-232	4-10	58-145
G 1	1	25	63	11	160	0-11	0-160	4-10	58-145
			90	16	232	0-16	0-232	4-8	58-116
G 11/4	11/4	32	90	14	203	0-14	0-203	4-8	58-116
G 11/2	11/2	40	90	11	160	0-11	0-160	4-8	58-116
			110	16	232	0-16	0-232	4-8	58-116
G 2	2	50	110	10	140	0-10	0-140	4-8	58-116

[1] For NC, closing with the flow: See Diagrams, NC for closing with the flow direction (Port 1 to 2)

Table 4: Differential pressure NO, closing against the flow

Connection ISO228/1	Orifice	Control head diameter	Max working pressure	Differential pressure, min. to max.	Control pressure	
					Min.	Max.
	[mm]	[mm]	[bar]	[bar]	[bar]	
G½	15	50	See Diagrams, NO for closing against the flow direction (Port 2 to 1)			10
G¾	20	50				10
G1	25	63				10
G1½	40	90				8

Diagrams, NC for closing with the flow direction (Port 1 to 2)

Recommended only for compressible media for extended pressure range

Figure 2: Valve connection

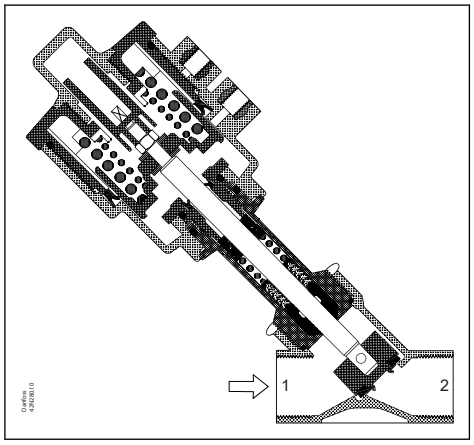


Figure 3: Control head ø40 - ø50 mm / 2 in

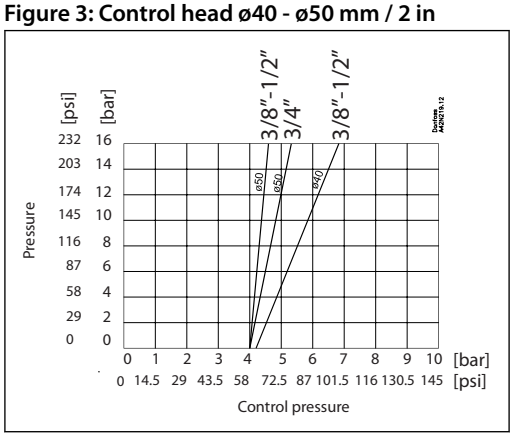


Figure 4: Control head ø63 mm / 2 ½ in

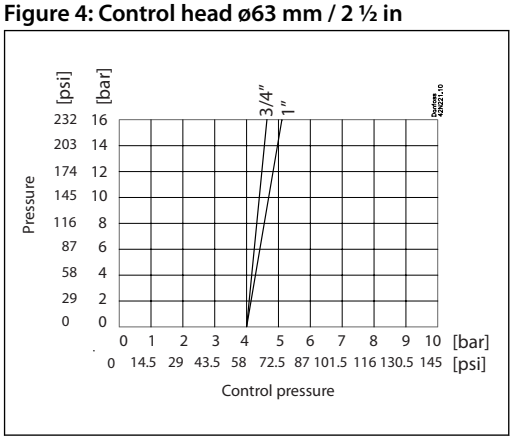


Figure 5: Control head ø90 mm / 3 ½ in

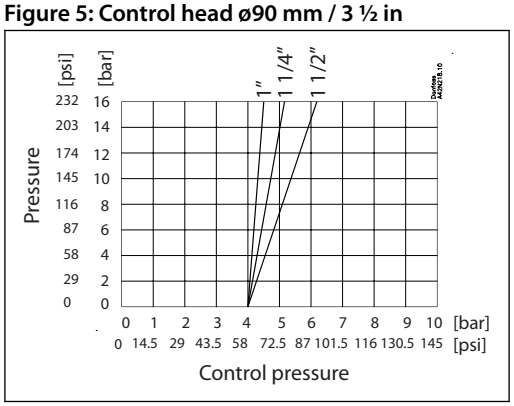
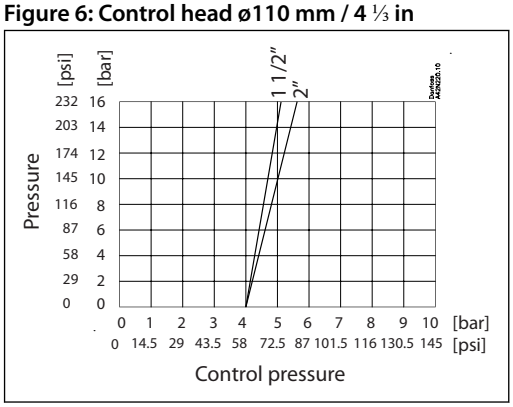


Figure 6: Control head ø110 mm / 4 ⅓ in



Diagrams, NO for closing against the flow direction (Port 2 to 1)

Figure 7: Valve connection

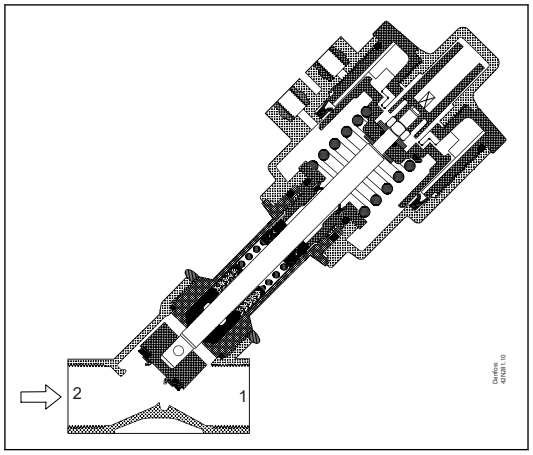


Figure 8: Control head ø50 mm

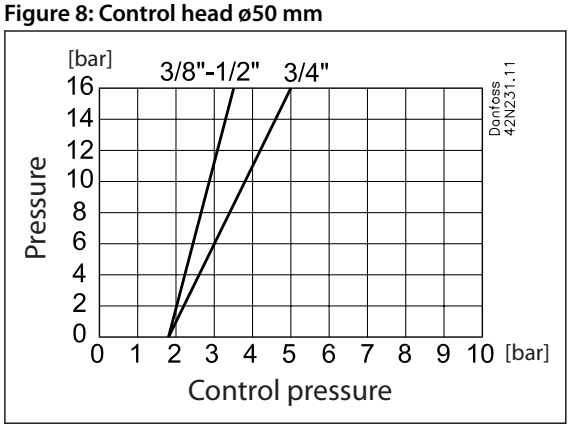


Figure 9: Control head ø63 mm

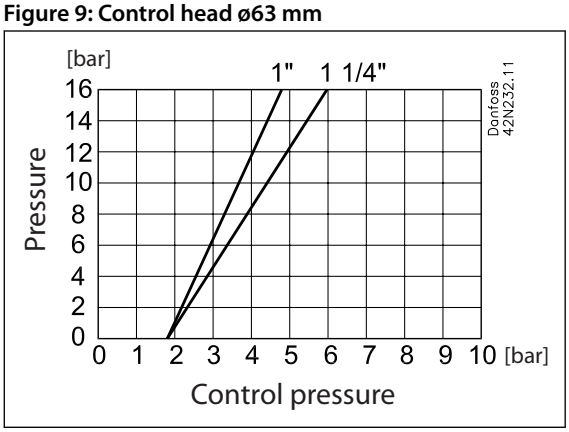


Figure 10: Control head ø90 mm

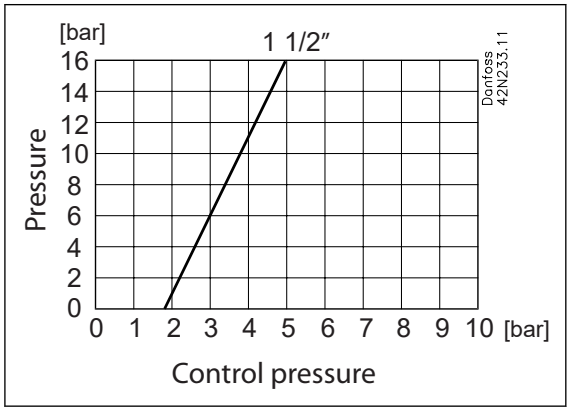
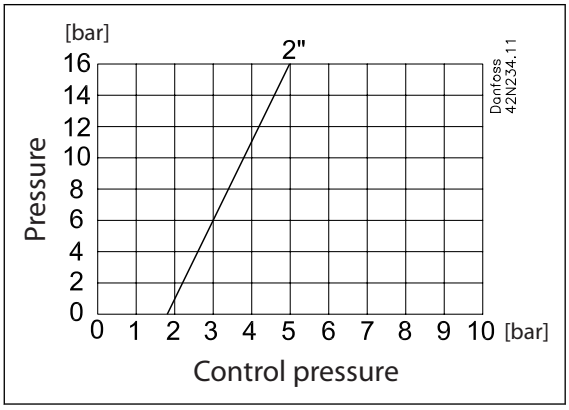


Figure 11: Control head ø110 mm



Time to open/close

Table 5: Time to open/close

Main type	ø50 – 63 mm / 2 – 2 ½ in control head Closing with the flow direction	ø50 – 63 mm / 2 – 2 ½ in control head Closing against the flow direction	ø90 – 110 mm / 3 ½ – 4 ⅓ in control head Closing with the flow direction	ø90 – 110 mm / 3 ½ – 4 ⅓ in control head Closing against the flow direction
Time to open [ms][1]	40 – 180	50 – 350	80 – 780	100 – 460
Time to close [ms][1]	160 – 500	120 – 350	580 – 1270	360 – 790

[1] The times are indicative.

Materials

Table 6: Materials

Components	Materials	Specifications	
Valve body	Bronze	RG 5	
	Stainless steel	AISI 316	
Intermediate piece	Bronze	Brass	W.no.2.0402
	Stainless steel	Stainless steel	AISI 316
Seat control and nut:	Stainless steel	AISI 316	
Spindle	Stainless steel	AISI 316	
Spindle gasket	PTFE		
Gasket	Graphite		
Valve plate unit	PTFE		
Control head	PA66		

3.2 Dimensions and Weights

Dimensions and weight, Bronze valve body

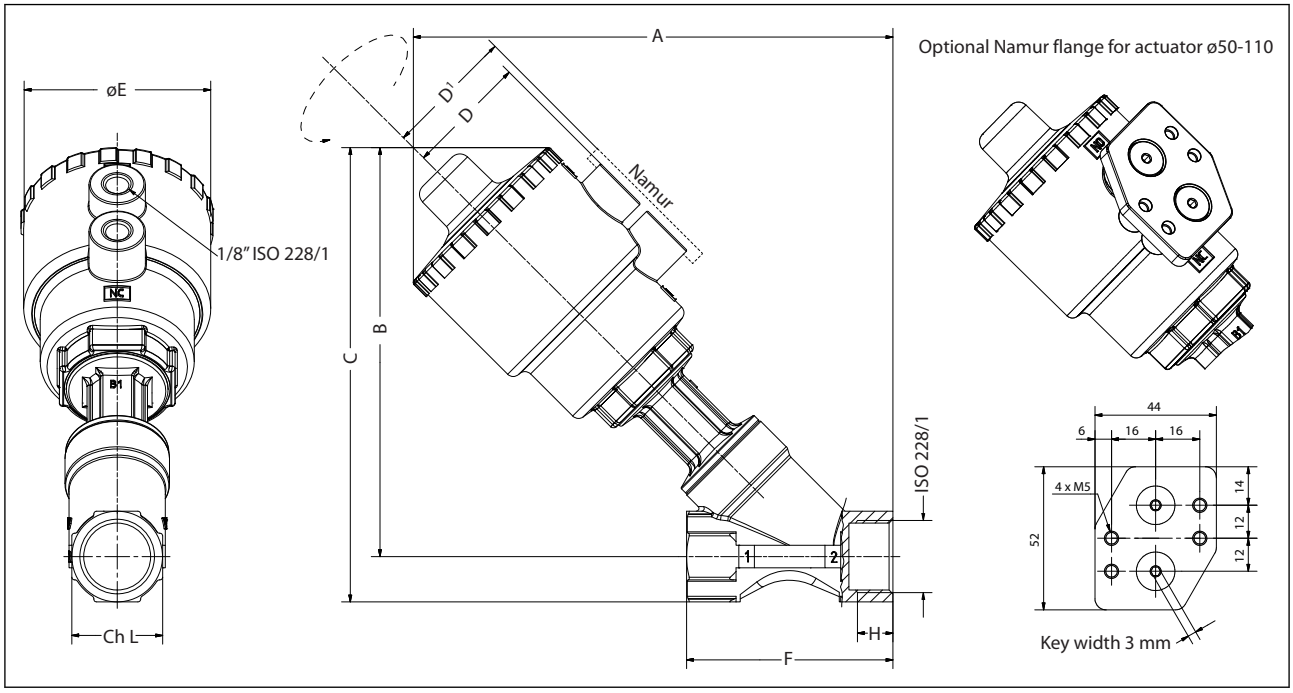
Table 7: ISO Connection

Connection ISO 228/1	Orifice size	Control head diameter	A	B	C	D	D[1]	øE	F	H	ch.L	Weight
[in]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
G ⅜	15	40	144	121	134	35	-	61	65	12	27	1.1
G ⅜	15	50	163	140	153	44	50.5	70	65	12	27	1.1
G ½	15	40	144	121	134	35	-	61	65	13	27	1.0
G ½	15	50	163	140	153	44	50.5	70	65	13	27	1.0
G ¾	20	50	173	147	163	44	50.5	70	75	14.3	27.5	1.2
G ¾	20	63	191	165	181	50.5	57	84.4	75	14.3	27.5	1.2
G 1	25	63	206	176	196	50.5	57	84.4	90	17.5	41	1.6
G 1	25	90	246	216	236	66.2	72.7	116.4	90	17.5	41	1.7
G 1 ¼	32	90	255	220	245	66.2	72.7	116.4	110	19	50	3.0
G 1 ½	40	90	270	235	264	66.2	72.7	116.4	120	18	58	3.4
G 1 ½	40	110	306	271	300	77.4	83.9	140.6	120	18	58	4.0
G 2	50	110	316	276	311	77.4	83.9	140.6	150	20	70	5.3

Table 8: NPT Connection

Conn NPT	Orifice size		Control head diameter		A		B		C		D		D[1]		øE		F		H		ch.L		Weight	
[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[kg]	[lbs]
½	15	½	50	2	163	6.4	140	5.5	153	6.0	44	1.7	50.5	1.99	70	2.8	65	2.6	13	0.5	27	1.1	1.0	2.2
¾	15	¾	50	2	173	6.8	147	5.8	163	6.4	44	1.7	50.5	1.99	70	2.8	75	3.0	14.3	0.6	27.5	1.1	1.2	2.6
1	25	1	63	2 ½	206	8.1	176	6.9	196	7.7	50.5	2.0	57	2.24	84.4	3.3	90	3.5	17.5	0.7	41	1.6	1.6	3.5
1 ¼	32	1 ¼	90	3 ½	255	10.0	220	8.7	245	9.6	66.2	2.6	72.7	2.86	116.4	4.6	110	4.3	19	0.7	50	2.0	3.0	6.6
1 ½	40	1 ½	90	3 ½	270	10.6	235	9.3	264	10.4	66.2	2.6	72.7	2.86	116.4	4.6	120	4.7	18	0.7	58	2.3	3.4	7.5
2	50	2	110	4 ⅓	316	12.4	276	10.9	311	12.2	77.4	3.0	83.9	3.30	140.6	5.5	150	5.9	20	0.8	70	2.8	5.3	11.7

Figure 12: Dimensions



Dimensions and weight, Stainless steel valve body

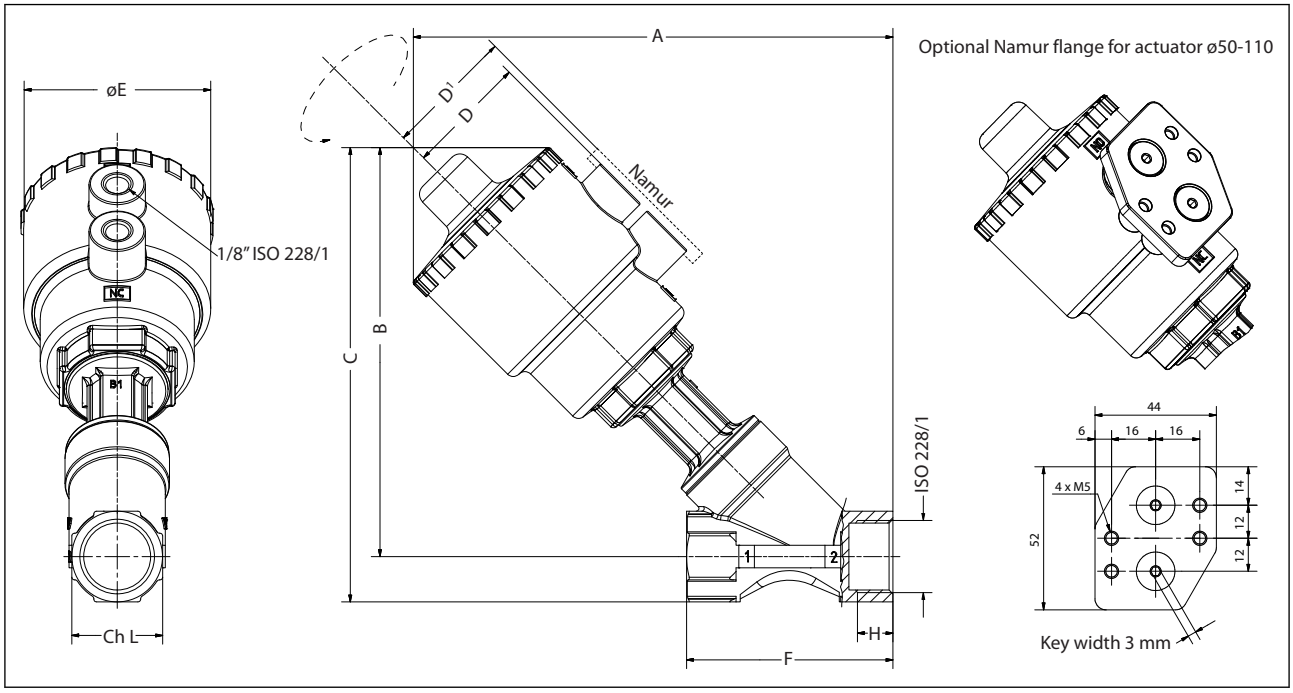
Table 9: ISO Connection

Connection ISO 228/1	Orifice size	Control head diameter	A	B	C	D	D¹	øE	F	H	ch.L	Weight
[in]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
G ⅜	15	40	190	156	169	44	-	70	85	12	25	1.1
G ½	15	50	190	156	169	44	50.5	70	85	15	25	1.0
G ¾	20	50	195	160	176	44	50.5	70	95	16.3	31	1.2
G ¾	20	63	213	178	194.4	50.5	70	84.4	95	16.3	31	1.2
G 1	25	63	219	182	202	50.5	70	84.4	105	19.5	38	1.6
G 1	25	90	259	222	242	66.2	72.7	116.4	105	19.5	38	1.7
G 1 ¼	32	90	266	226	249	66.2	72.7	116.4	120	19	47	3.0
G 1 ½	40	90	271	230	258	66.2	72.7	116.4	130	18	54	3.4
G 1 ½	40	110	307	266	294	77.4	83.9	140.6	130	18	54	4.0
G 2	50	110	321	276	310	77.4	83.9	140.6	150	20	66	5.3

Table 10: NPT Connection

Conn NPT	Orifice size		Control head diameter		A		B		C		D		D¹		øE		F		H		ch.L		Weight	
[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[kg]	[lbs]
½	15	½	50	2	190	7.5	156	6.1	169	6.7	44	1.7	50.5	1.99	70	2.8	85	3.3	15	0.6	25	1.0	1.0	2.2
¾	15	¾	50	2	195	7.7	160	6.3	176	6.9	44	1.7	50.5	1.99	70	2.8	95	3.7	16.3	0.6	31	1.2	1.2	2.6
¾	15	¾	63	2 ½	213	8.4	178	7.0	194.4	7.7	50.5	2.0	57	2.24	84.4	3.3	95	3.7	16.3	0.6	31	1.2	1.2	2.6
1	25	1	63	2 ½	219	8.6	182	7.2	202	8.0	50.5	2.0	57	2.24	84.4	3.3	105	4.1	19.5	0.8	38	1.5	1.6	3.5
1 ¼	32	1 ¼	90	3 ½	266	10.5	226	8.9	249	9.8	66.2	2.6	72.7	2.86	116.4	4.6	120	4.7	19	0.7	47	1.9	3.0	6.6
1 ½	40	1 ½	90	3 ½	271	10.7	230	9.1	258	10.2	66.2	2.6	72.7	2.86	116.4	4.6	130	5.1	18	0.7	54	2.1	3.4	7.5
2	50	2	110	4 ⅓	321	12.6	276	10.9	310	12.2	77.4	3.0	83.9	3.30	140.6	5.5	150	5.9	20	0.8	66	2.6	5.3	11.7

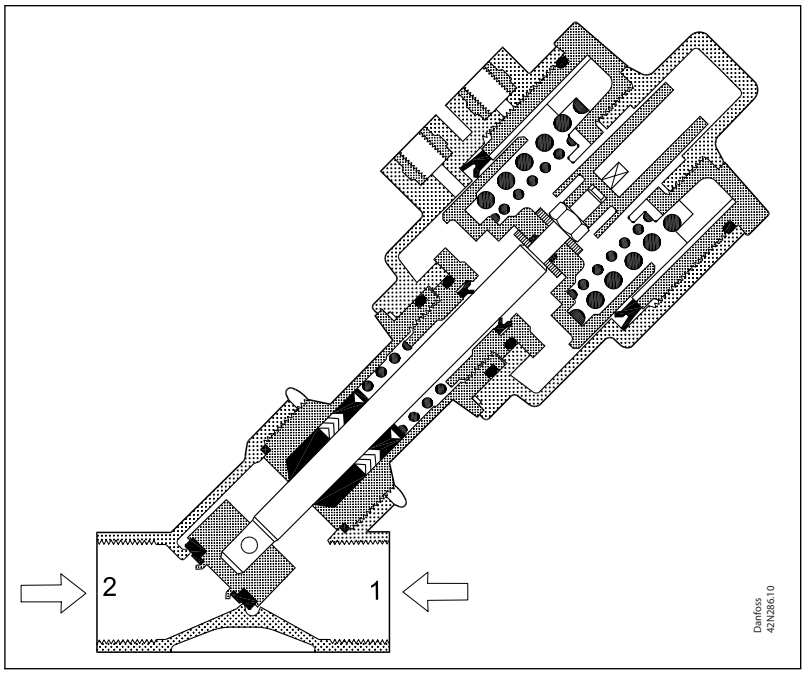
Figure 13: Dimensions



3.3 Mounting

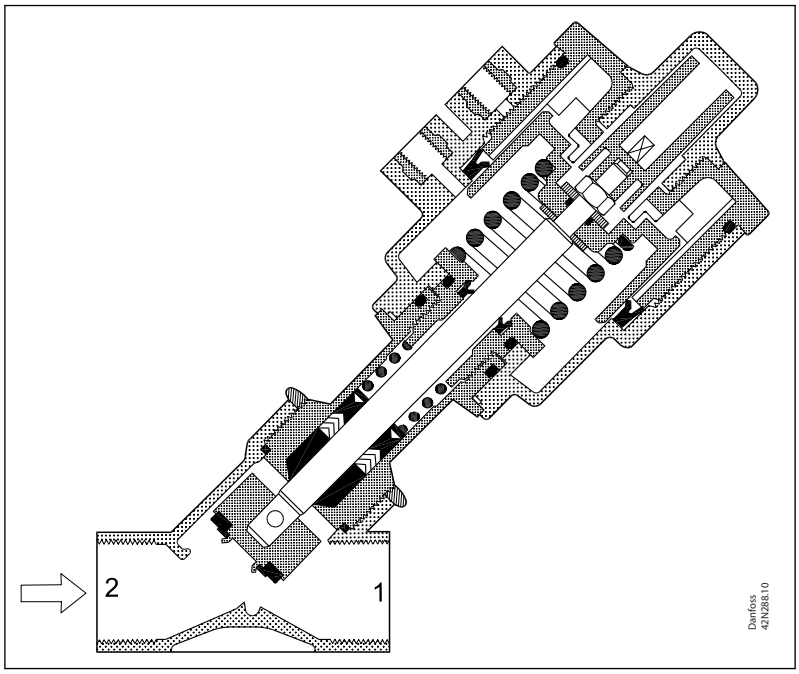
NC

Mounting: Bi-directional
Closing against the flow (Port 2 to 1), recommended to avoid water hammer.
Closing with the flow direction (Port 1 to 2), recommended only for compressible fluids for extended pressure range.



NO

Mounting
Closing against the flow (Port 2 to 1), recommended to avoid water hammer.


2
1
Danfoss
42N288.10

4 Ordering

4.1 Parts program

Table 11: Bronze/SS, AV210 with ISO thread connection NC/NO

Connection ISO228/1	Orifice	Kv value	Control head diameter	Sealing	Function			
					Bronze		SS	
	[mm]	[m³/h]	[mm]		NC	NO	NC	NO
G ⅜	15	4.5	40	PTFE	042N4400			
		4.9	50		042N4401		042N4450	
G ½	15	5.3	40		042N4402			
		5.7	50		042N4403	042N4431	042N4451	042N4481
G ¾	20	10	50		042N4404	042N4432	042N4452	042N4482
			63		042N4405		042N4453	
G 1	25	20	63		042N4406	042N4433	042N4454	042N4483
			90		042N4407		042N4455	
G 1¼	32	29	90		042N4408		042N4456	
G 1½	40	46	90		042N4409	042N4435	042N4457	042N4485
			110		042N4410		042N4458	
G 2	50	67	110		042N4411	042N4436	042N4459	042N4486

Table 12: Bronze/SS, AV210 with NPT thread connection NC/NO

Connection NPT	Orifice	Flow value		Control head diameter	Sealing	Function	
						Bronze	SS
	[mm]	Kv [m³/h]	Cv [USgal/ min]	[mm]		NC	NC
½	15	5.7	6.5	50	PTFE	042N4503	042N4551
¾	20	10	11.5	50		042N4504	042N4552
1	25	20	23	63		042N4506	042N4554
1¼	32	29	33	90		042N4508	
1½	40	46	53	90		042N4509	042N4557
2	50	67	77	110		042N4511	042N4559

4.2 Accessories

Position indicator

Figure 14: Position indicator



Features

The control box to check the open/closed positions with two mechanical limit switches is suitable for assembling on the whole range of valves.

Level of protection : IP65

Ambient temperature: from -20 – 70 °C (-4 – 158 °F)

Access lead nr.2 PG11

Body material: Polyamide (cap in Lexan/polycarbonate)

Figure 15: Valve

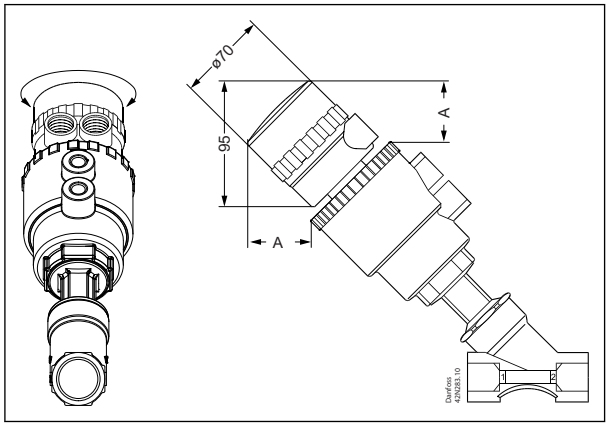
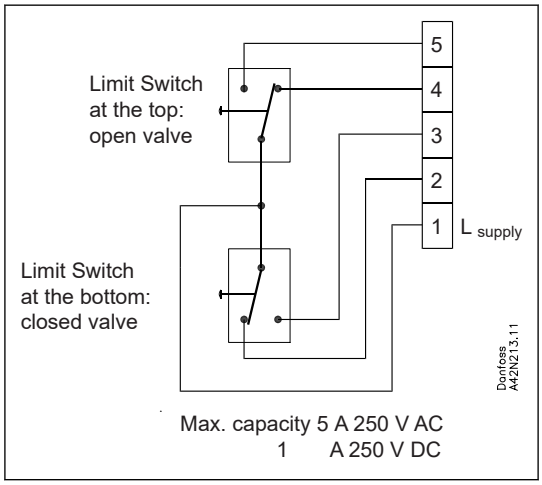


Table 13: Position indicator ordering

Actuator size		A		Code number
[mm]	[in]	[mm]	[in]	
ø50	2	52.1	2.1	042N4820
ø63	2½	47.5	1.9	042N4821
ø90	3½	37.7	1.5	042N4822
ø110	4⅓	29.5	1.2	042N4823

* Limit Switch Box incl. 2 switches

Figure 16: Wiring diagram for position indicator



Namur flange

Namur flange for actuator ø50-110:

- for assembly of 3/2 solenoid valves
- according to EN 15714-3

Figure 17: Namur flange

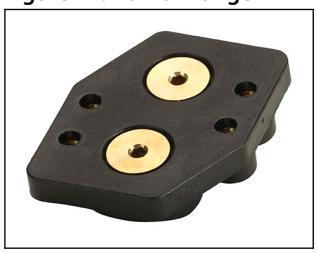


Table 14: Namur flange ordering

Actuator size	Code number
ø50-110	042N4811

Repair kit

The repair kit contains :

1. Two gaskets (1) (On actuator size 40 (diameter control head) only one gasket included).
2. One complete valve plate unit (plug and pin) (2).

NOTE:

One gasket is for bronze, and one is for stainless steel.

Figure 18: Kit



Figure 19: Valve

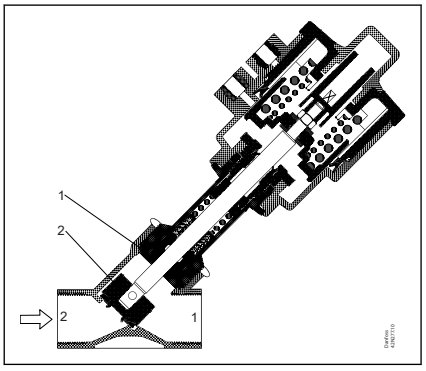


Table 15: Repair kit ordering, bronze/stainless steel

Connection		Control head diameter	Material		Code number
ISO 228/1 [in]	NPT [in]	[mm]	Valve plate unit	Gasket	
G ⅜		40	PTFE	Graphite	042N4800
G ⅜		50	PTFE	Graphite	042N4801
G ½		40	PTFE	Graphite	042N4802
G ½	½	50	PTFE	Graphite	042N4803
G ¾	¾	50 – 63	PTFE	Graphite	042N4804
G 1	1	63	PTFE	Graphite	042N4805
G 1		90	PTFE	Graphite	042N4806
G 1¼	1¼	90	PTFE	Graphite	042N4807
G 1½	1½	90 – 110	PTFE	Graphite	042N4808
G 2	2	110	PTFE	Graphite	042N4809

Control valves, types EV310A and EV310B

Figure 20: Type EV310A

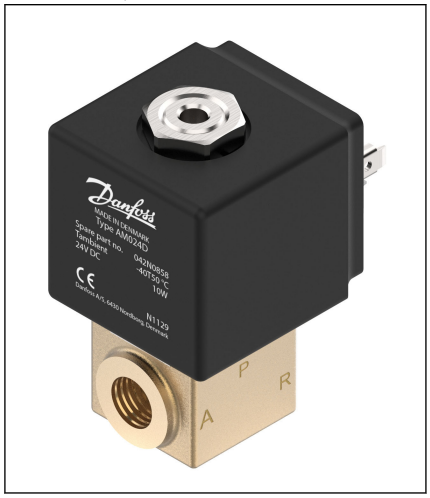
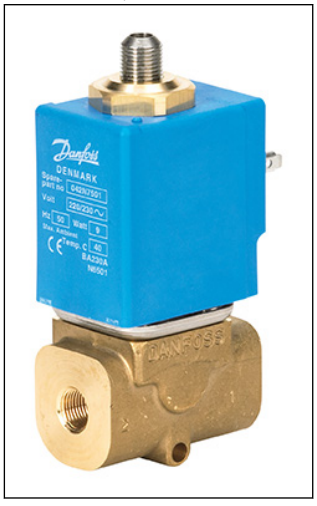


Figure 21: Type EV310B



- Valves for industrial applications
- Available in de-energized closed and de-energized open versions
- Available with or without manual operation

See separate data sheets regarding code numbers, technical data and coil options for Danfoss EV310A and EV310B valves.

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