BELIMO®

Stainless Steel Ball and Stem

5

5-year warranty

Type overview

Type	DN
B249	50

Technical data

Functional data	Valve size [mm]	2" [50]
	Fluid	chilled or hot water, up to 60% glycol
	Fluid Temp Range (water)	0...250°F [-18...120°C]
	Body Pressure Rating	400 psi
	Close-off pressure Δps	200 psi
	Flow characteristic	equal percentage
	Servicing	maintenance-free
	Flow Pattern	2-way
	Leakage rate	0% for A – AB
	Controllable flow range	75°
	Cv	46
Materials	Valve body	Nickel-plated brass body
	Spindle	stainless steel
	Spindle seal	EPDM (lubricated)
	Seat	PTFE
	Characterized disc	TEFZEL®
	Pipe connection	NPT female ends
	O-ring	EPDM (lubricated)
	Ball	stainless steel
Suitable actuators	Non-Spring	ARB(X)
	Spring	AFRB(X)

Safety notes

- WARNING: This product can expose you to lead which is known to the State of California to cause cancer and reproductive harm. For more information go to www.p65warnings.ca.gov

Product features

Application This valve is typically used in air handling units on heating or cooling coils, and fan coil unit heating or cooling coils. Some other common applications include Unit Ventilators, VAV box re-heat coils and bypass loops. This valve is suitable for use in a hydronic system with variable flow.
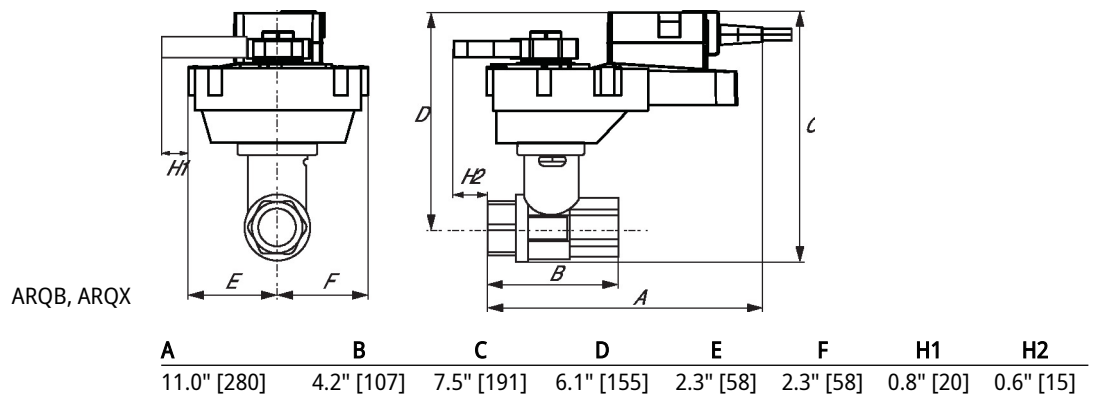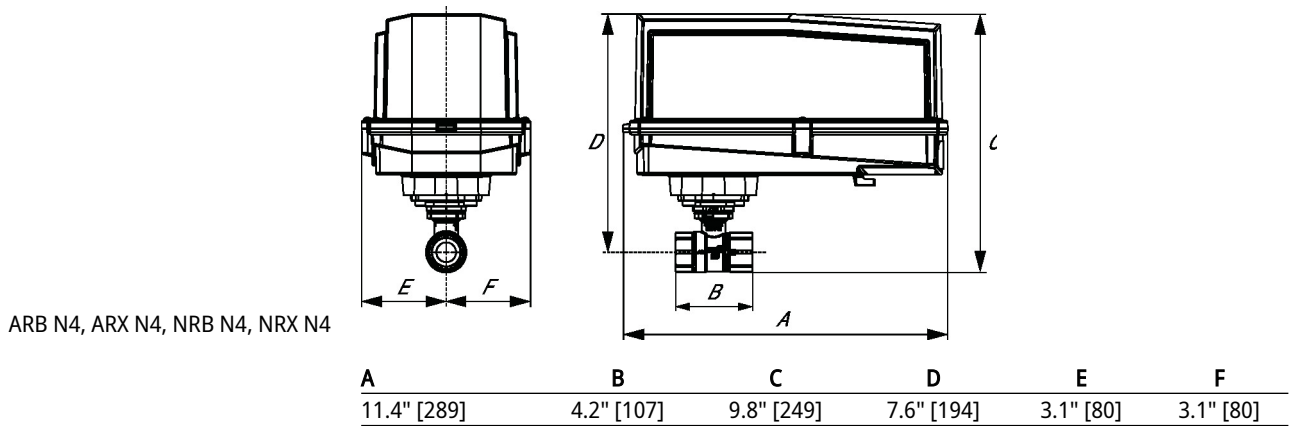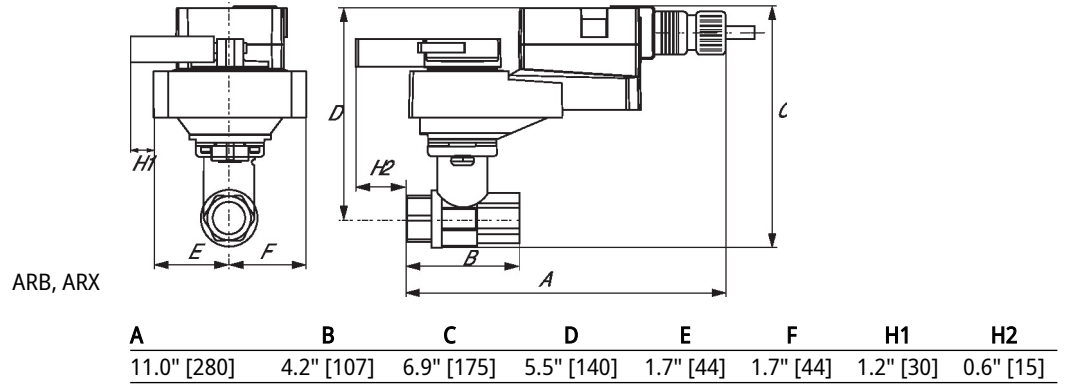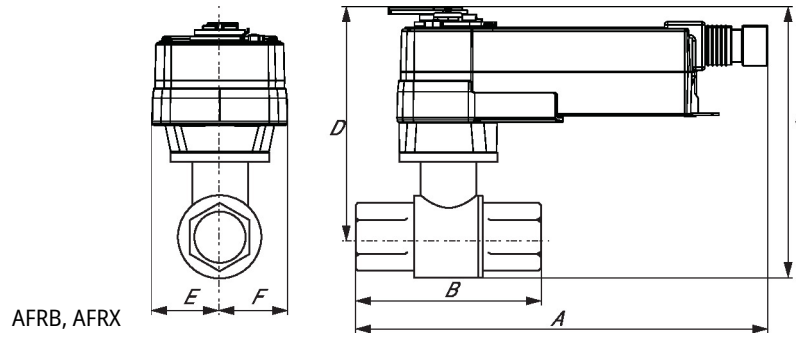
Flow/Mounting details

Two-way valves should be installed with the disc upstream.

A → AB 100%   A → AB 100%

Dimensions

Type	DN
B249	50

ARB, ARX

A	B	C	D	E	F	H1	H2
11.0" [280]	4.2" [107]	6.9" [175]	5.5" [140]	1.7" [44]	1.7" [44]	1.2" [30]	0.6" [15]

ARB N4, ARX N4, NRB N4, NRX N4

A	B	C	D	E	F
11.4" [289]	4.2" [107]	9.8" [249]	7.6" [194]	3.1" [80]	3.1" [80]

ARQB, ARQX

A	B	C	D	E	F	H1	H2
11.0" [280]	4.2" [107]	7.5" [191]	6.1" [155]	2.3" [58]	2.3" [58]	0.8" [20]	0.6" [15]

AFRB, AFRX

A	B	C	D	E	F
10.8" [275]	4.2" [107]	9.5" [241]	8.1" [206]	2.0" [51]	2.0" [51]
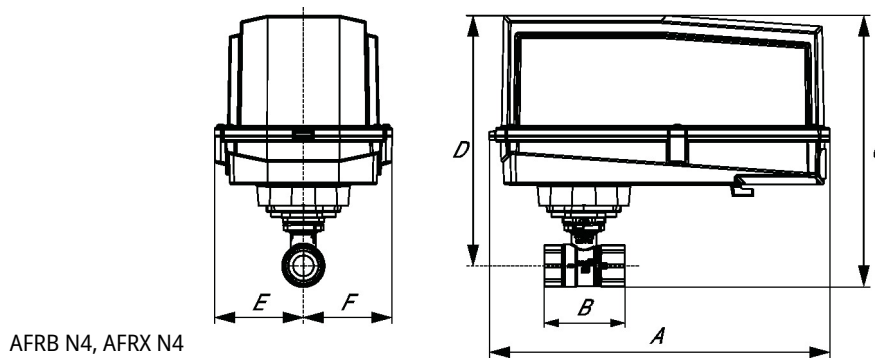
AFRB N4, AFRX N4

A	B	C	D	E	F
13.0" [330]	4.2" [107]	10.3" [262]	9.3" [235]	3.4" [86]	3.4" [86]

BELIMO

Modulating, Spring Return, 24 V, Multi-Function Technology®

5

5-year warranty

LISTED
94 D5
TEMP. IND. &
REG. EQUIP.

Technical data

Electrical data	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Power consumption in operation	7.5 W
	Power consumption in rest position	3 W
	Transformer sizing	10 VA (class 2 power source)
	Electrical Connection	18 GA appliance or plenum cables, 3 ft [1 m], 10 ft [3 m] or 16ft [5 m], with or without 1/2" conduit connector
	Overload Protection	electronic throughout 0…95° rotation
Functional data	Operating range Y	2…10 V
	Operating range Y note	4…20 mA w/ ZG-R01 (500 Ω, 1/4 W resistor)
	Input Impedance	100 kΩ for 2…10 V (0.1 mA), 500 Ω for 4…20 mA, 1500 Ω for PWM, On/Off and Floating point
	Operating range Y variable	Start point 0.5…30 V End point 2.5…32 V
	Options positioning signal	variable (VDC, PWM, on/off, floating point)
	Position feedback U	2…10 V
	Position feedback U note	Max. 0.5 mA
	Position feedback U variable	VDC variable
	Direction of motion motor	selectable with switch
	Direction of motion fail-safe	reversible with cw/ccw mounting
	Manual override	5 mm hex crank (3/16" Allen), supplied
	Angle of rotation	90°
	Running Time (Motor)	150 s / 90°
	Running time motor variable	70…220 s
	Running time fail-safe	<20 s @ 20°C
	Angle of rotation adaptation	off (default)
	Noise level, motor	45 dB(A)
	Noise level, fail-safe	62 dB(A)
	Position indication	Mechanical
Safety data	Degree of protection IEC/EN	IP54
	Degree of protection NEMA/UL	NEMA 2
	Enclosure	UL Enclosure Type 2
	Agency Listing	cULus acc. to UL60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2014/30/EU and 2014/35/EU; Listed to UL 2043 - suitable for use in air plenums per Section 300.22(c) of the NEC and Section 602.2 of the IMC
	Quality Standard	ISO 9001
	Ambient temperature	-22…122°F [-30…50°C]

Safety data	Storage temperature	-40...176°F [-40...80°C]
	Ambient humidity	Max. 95% RH, non-condensing
	Servicing	maintenance-free

Materials	Housing material	Galvanized steel and plastic housing

Footnotes	†Rated Impulse Voltage 800V, Type of action 1.AA, Control Pollution Degree 3

Accessories

Gateways	Description	Type
	Gateway MP to BACnet MS/TP	UK24BAC
	Gateway MP to Modbus RTU	UK24MOD
	Gateway MP to LonWorks	UK24LON

Electrical accessories	Description	Type
	Service Tool, with ZIP-USB function, for programmable and communicative Belimo actuators, VAV controller and HVAC performance devices	ZTH US

Service tools	Description	Type
	Connection cable 10 ft [3 m], A: RJ11 6/4 ZTH EU, B: 3-pin Weidmüller and supply connection	ZK4-GEN
	Service Tool, with ZIP-USB function, for programmable and communicative Belimo actuators, VAV controller and HVAC performance devices	ZTH US

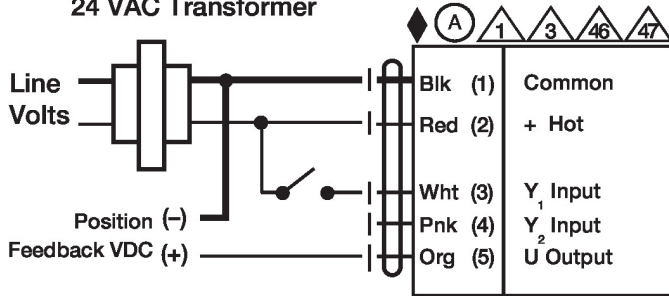## Electrical installation

⚒ INSTALLATION NOTES

(A) Actuators with appliance cables are numbered.

⚠1 Provide overload protection and disconnect as required.

⚠3 Actuators may also be powered by DC 24 V.

⚠5 Only connect common to negative (-) leg of control circuits.

⚠7 A 500 Ω resistor (ZG-R01) converts the 4...20 mA control signal to 2...10 V.

⚠8 Control signal may be pulsed from either the Hot (Source) or Common (Sink) 24 V line.

⚠10 For triac sink the Common connection from the actuator must be connected to the Hot connection of the controller. Position feedback cannot be used with a triac sink controller; the actuator internal common reference is not compatible.

⚠12 IN4004 or IN4007 diode. (IN4007 supplied, Belimo part number 40155).

⚠46 Actuators may be controlled in parallel. Current draw and input impedance must be observed.

⚠47 Master-Slave wiring required for piggy-back applications. Feedback from Master to control input(s) of Slave(s).

◆ Meets cULus requirements without the need of an electrical ground connection.

⚠ Warning! Live electrical components!

During installation, testing, servicing and troubleshooting of this product, it may be necessary to work with live electrical components. Have a qualified licensed electrician or other individual who has been properly trained in handling live electrical components perform these tasks. Failure to follow all electrical safety precautions when exposed to live electrical components could result in death or serious injury.
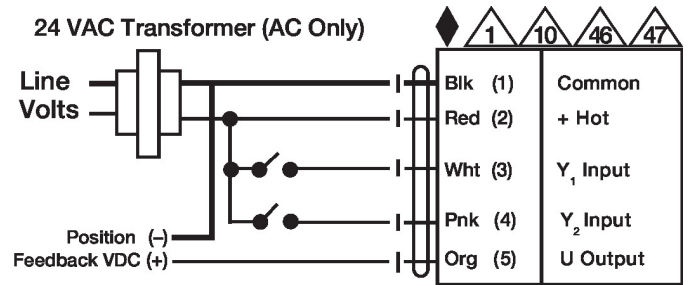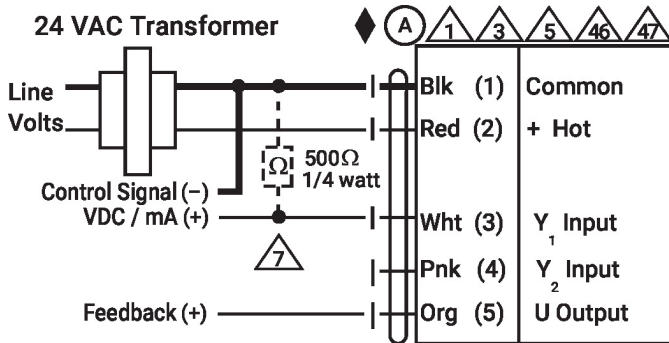
Wiring diagrams

On/Off

24 VAC Transformer

Line Volts

Position (−)
Feedback VDC (+)

◆ Ⓐ /1/ /3/ /46/ /47/

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y₁ Input
Pnk	(4)	Y₂ Input
Org	(5)	U Output

Floating Point

24 VAC Transformer (AC Only)

Line Volts

Position (−)
Feedback VDC (+)

◆ /1/ /10/ /46/ /47/

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y₁ Input
Pnk	(4)	Y₂ Input
Org	(5)	U Output

VDC/mA Control

24 VAC Transformer

Line Volts

Control Signal (−)
VDC / mA (+)

500 Ω
1/4 watt

/7/

Feedback (+)

◆ Ⓐ /1/ /3/ /5/ /46/ /47/

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y₁ Input
Pnk	(4)	Y₂ Input
Org	(5)	U Output

PWM Control

24 VAC Transformer (AC only)

Line Volts

Position (−)
Feedback VDC (+)

◆ Ⓐ /1/ /8/ /46/ /47/

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y₁ Input
Pnk	(4)	Y₂ Input
Org	(5)	U Output
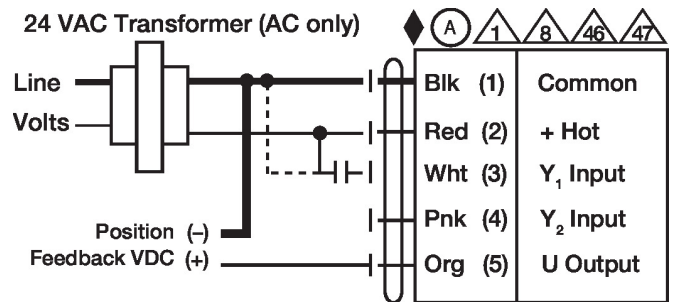
Override Control

24 VAC Transformer (AC Only)

Line Volts

Control Signal (−)
VDC / mA (+)

A
B
C

/7/ /12/

◆ /1/ /2/ /5/ /18/

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y₁ Input
Pnk	(4)	Y₂ Input
Org	(5)	U Output
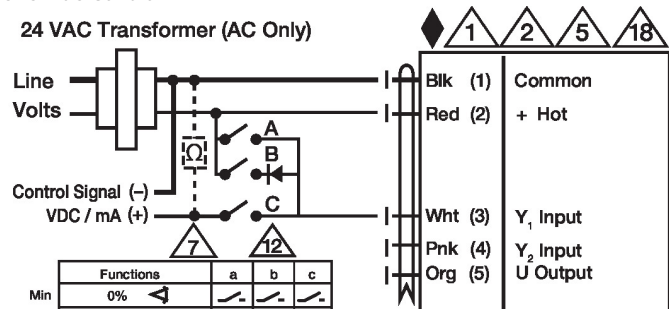
Functions		a	b	c
Min	0%			
Mid	50%			
Max	100%			
Normal	Control mode acc. to Y₁			

Master - Slave

24 VAC Transformer

Line Volts

Control Signal

(−)
(+)

/7/

Master ◆ /1/ /5/ /46/ /47/

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y₁ Input
Org	(5)	U Output

Slave ◆ /1/

Blk	(1)	Common
Red	(2)	+ Hot
Wht	(3)	Y₁ Input
Org	(5)	U Output