MINIMATIC

COMPACT - COMPETITIVE - FLOW CONTROL

NORTHVALE KORTING LTD

MINIMATIC Control Valves

A range of compact, lightweight, low cost control valves for use on liquid steam or gas applications. Available in 2 way and 3 way body configurations for on/off and modulating control with either pneumatic or electric actuators.

These valves are only part of Northvale's extensive control valve programme and will be of particular interest to end users and contractors whose process control requirements do not necessitate the use of our more sophisticated PARAGON® 600 series of values.

Body Styles

MINIMATIC valves are available with cast bronze bodies with end connections ½" to 2" BSPT or with flanges 15mm to 40mm PN16 for pressures up to 16 bar and 180°C.

For aggressive chemical applications investment cast 316 stainless steel bodies ½", ¾", 1" are available for services up to 25 bar and 180°C.

Valve Trims

Standard on/off valves incorporate built up stainless steel plug and spindle assemblies with ptfe soft inserts with the seat profile machined directly into the body casting.

Modulating valves have solid stainless steel equal percentage or linear characteristic control plug and spindle assemblies with stainless steel screw in body seats. Leakage standards, Class IV for modulating

Gland Sealing

All MINIMATIC valves incorporate our new "Low Fugitive Emission" maintenance free gland seals incorporating a modified spring loaded ptfe chevron ring set and new temperature compensated, split guide bushes widely spaced at the base of the gland and with the upper bush retained in the gland nut.

These self-adjusting maintenance free glands result in improved sealing and extended periods between major overhauls.

Screwed On/Off Control Valves

Fig. 71-72

NORTHVALE MINI RANGE

Fig. 71 2-Way on/off Fail closed
Fig. 72 3-Way mixing or diverting valve, Fails to top seat

Body material	Gunmetal	Stainless steel*
Maximum working pressure	16 bar g	25 bar g
Maximum temperature	180°C	180°C
Saturated steam	9 bar g	9 bar g
Maximum actuator pressure	4 bar g	4 bar g
Trim material	PTFE	PTFE

*Investment cast stainless steel (316) rated at 25 bar g up to size 1" only.

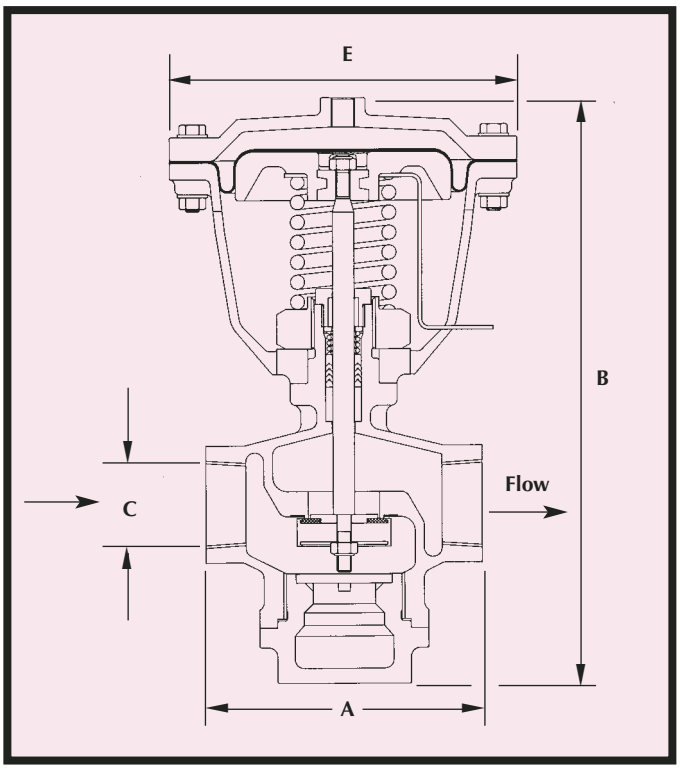


FIG. 71

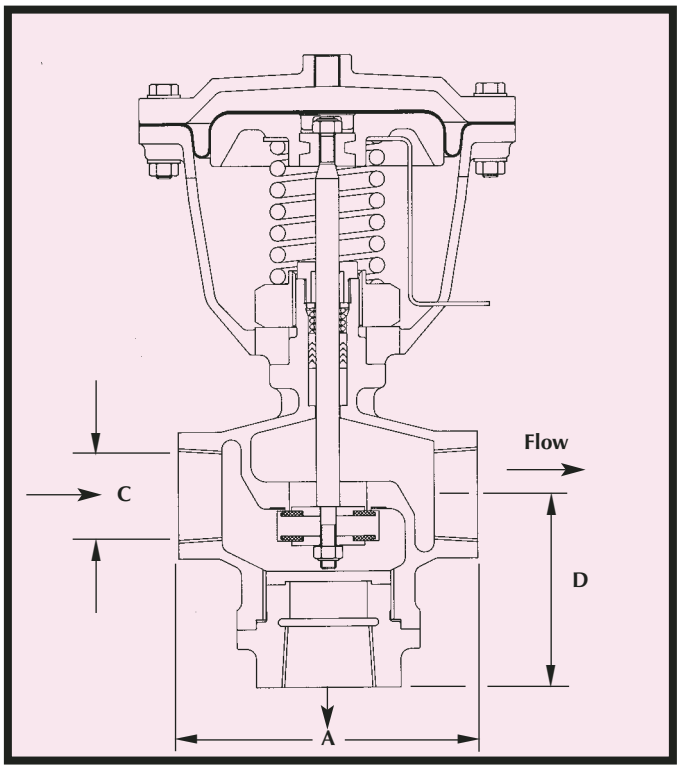


FIG. 72

SIZE	Kv	DIAPHRAGM AREA (sq cm)	A	B	C BSP TAPER	D	TOP COVER DIA. E
1/2"	5	56	88	176	1/2"	54	130ϕ
3/4"	6	56	88	176	3/4"	54	130ϕ
1"	10	56	104	200	1"	66	130ϕ
1 1/2"	25	134	155	325	1 1/2"	99	195ϕ
2"	40	134	178	330	2"	99	195ϕ

Screwed Modulating Control Valves

Fig. 74-75 Proportional Control Valves

NORTHVALE MINI RANGE

Fig. 74AK 2-Way equal percentage, Fail closed
Fig. 75AK 3-Way linear. Fails to top seat

Body material	Gunmetal	Stainless steel*
Maximum working pressure	16 bar g	25 bar g
Maximum temperature	180°C	180°C
Saturated steam	9 bar g	9 bar g
Trim material	316 Stainless Steel	316 Stainless Steel

*Investment cast stainless steel (316) rated at 25 bar g only available in ½", ¾" & 1" sizes

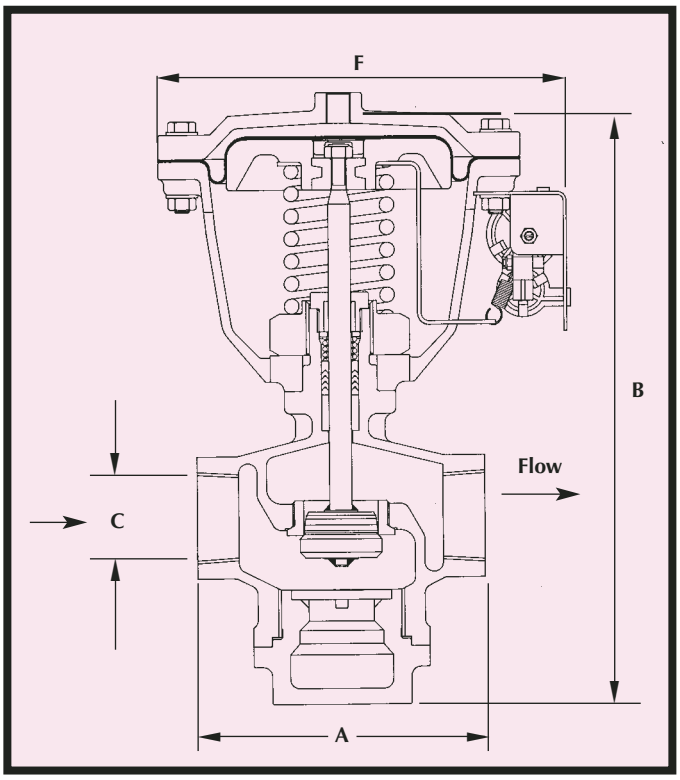


FIG. 74AK

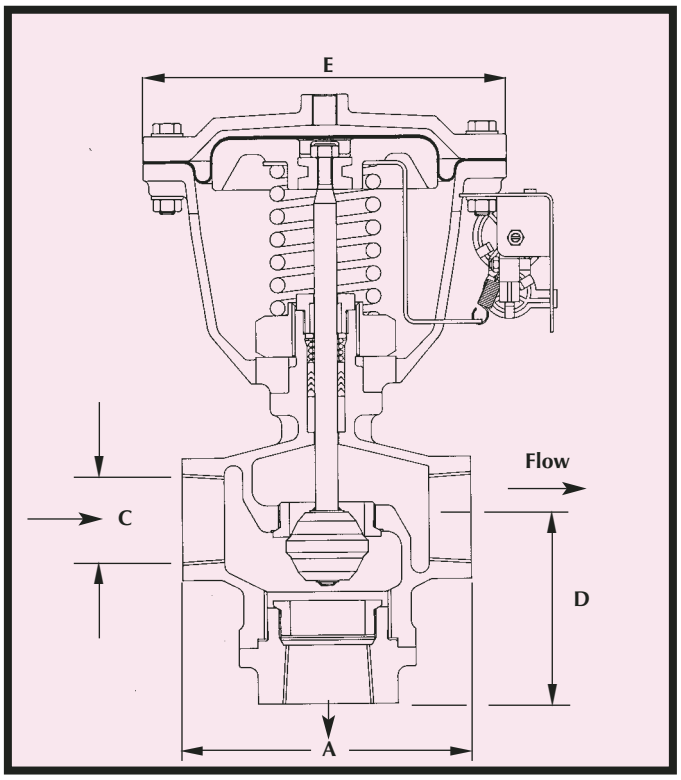


FIG. 75AK

NOTE:
For clarification purposes only, the positioner shown in these dimensions is turned through 90°. Actual mounting is parallel with the body connections as shown in the photograph.

SIZE	Kv		DIAPHRAGM AREA (sq.cm)	A	B	C BSP TAPER	D	TOP COVER DIA. E	F AK POS
½"	2.5	5	56	88	200	½"	54	130ϕ	146
¾"	2.5	6	56	88	200	¾"	54	130ϕ	146
1"	10		56	104	220	1"	66	130ϕ	146
1½"	25		134	155	345	1½"	99	195ϕ	212
2"	40		134	178	350	2"	99	195ϕ	212

Flanged On/Off Control Valves

Fig. 77-78

NORTHVALE MINI RANGE

Fig. 77 2-Way on/off valve, Fail closed
Fig. 78 3-Way mixing or diverting valve, Fails to top seat

Body material	Gunmetal
Maximum working pressure	16 bar g
Maximum temperature	180°C
Saturated steam	9 bar g
Maximum actuator pressure	4 bar g
Trim material	Metal seated

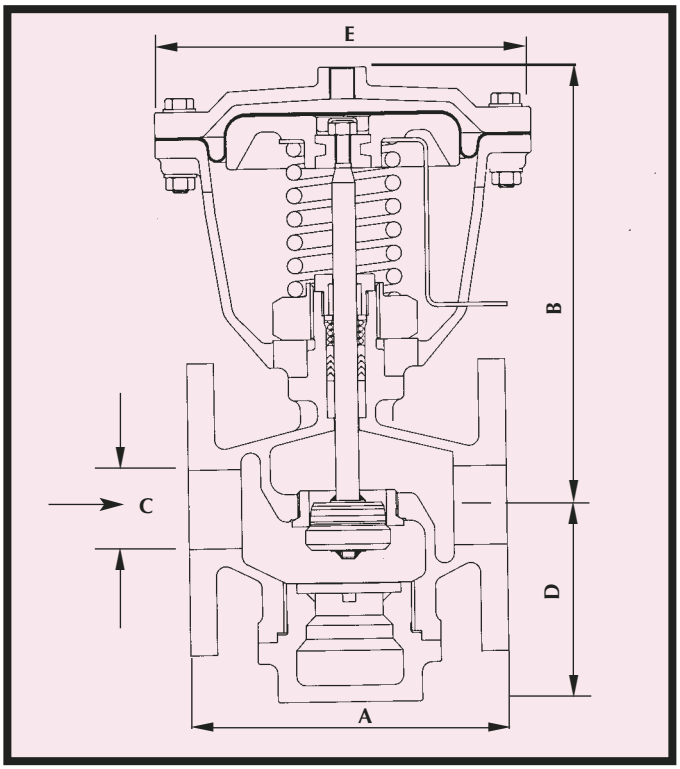


FIG. 77

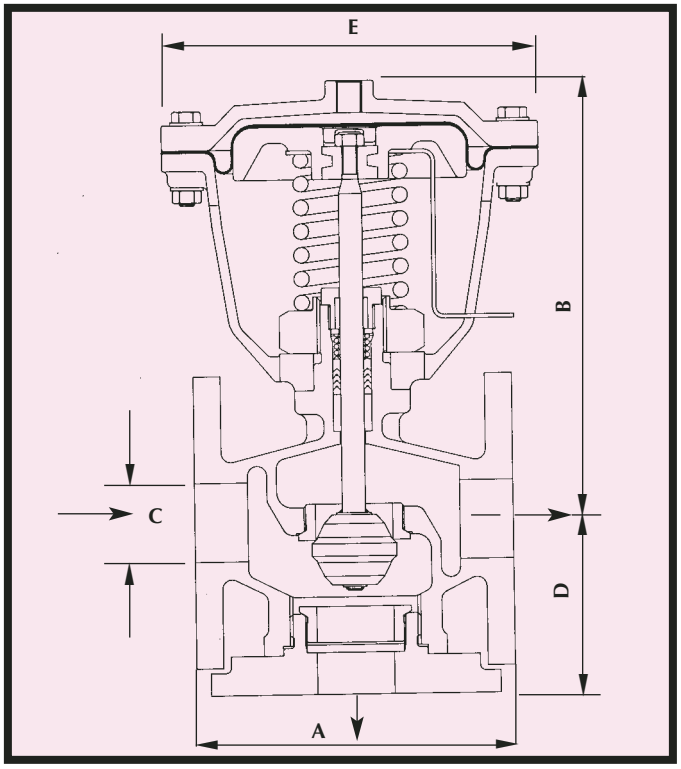


FIG. 78

SIZE	Kv	DIAPHRAGM AREA (sq.cm)	A	B	C	D FIG. 77	D FIG 78	TOP COVER DIA. E
1/2"	5	56	152	122	15	54	70	130
3/4"	6	56	152	122	20	54	70	130
1"	10	56	159	134	25	66	76	130
1 1/2"	25	134	165	226	40	99	89	195

Flanged Modulating Control Valves

Fig. 77AK & 78AK

NORTHVALE MINIMATIC RANGE

Fig. 77AK 2-Way equal percentage. Fails closed.
Fig. 78AK 3-Way linear. Fails to top port.

Body material	Gunmetal
Maximum working pressure	16 bar g
Maximum temperature	180°C
Saturated steam	9 bar g
Trim Material	316 Stainless Steel

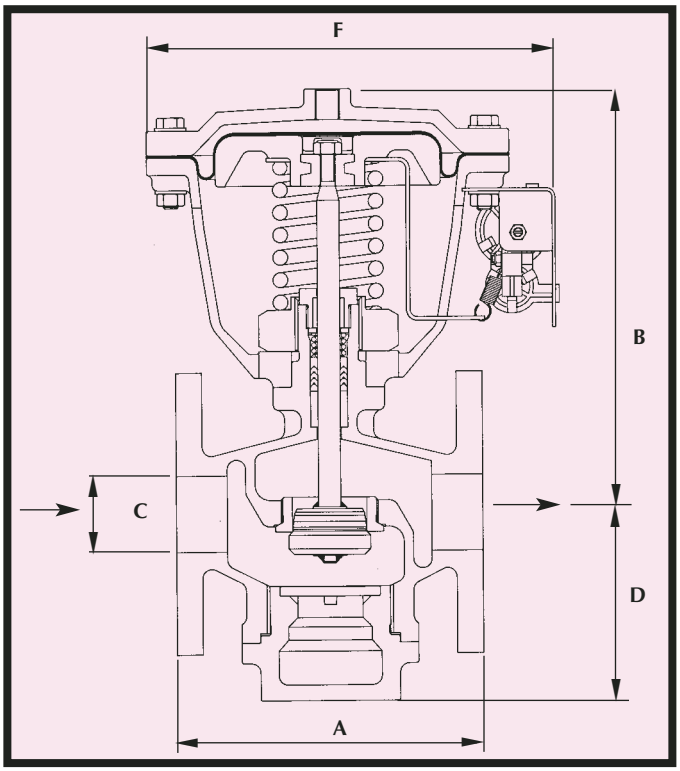


FIG. 77AK

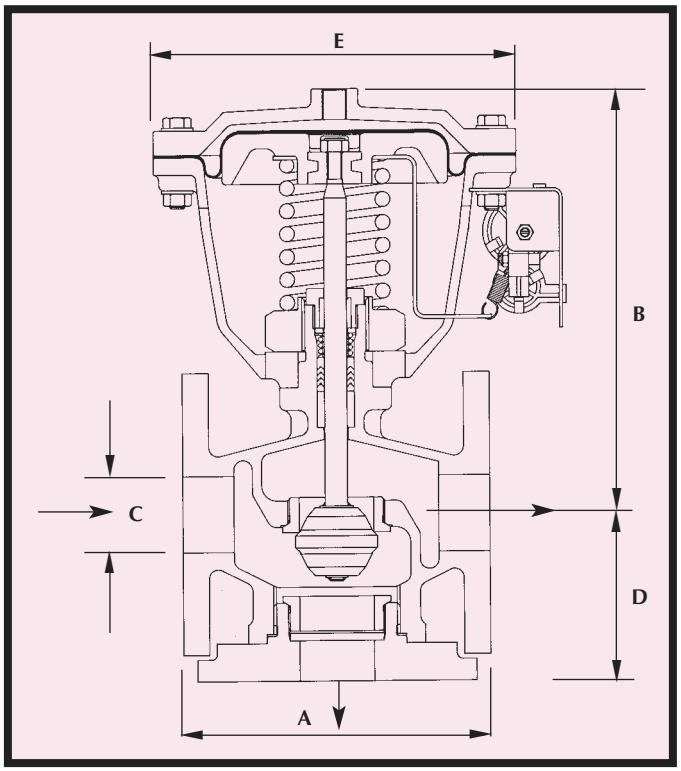


FIG. 78AK

NOTE:
For clarification purposes only, the positioner shown in these dimensions is turned through 90°. Actual mounting is parallel with the body connections as shown in the photograph.

SIZE	Kv		DIAPHRAGM AREA (sq.cm)	A	B	C	D FIG. 77	D FIG. 78	TOP COVER DIA. E	F AK POS
½"	2.5	5	56	152	122	15	54	70	130	146
¾"	2.5	6	56	152	122	20	54	70	130	146
1"	10		56	159	134	25	66	76	130	146
1½"	25		134	165	226	40	99	89	195	212

Valve Sizing

Fig. 75AK-78AK linear 3-way

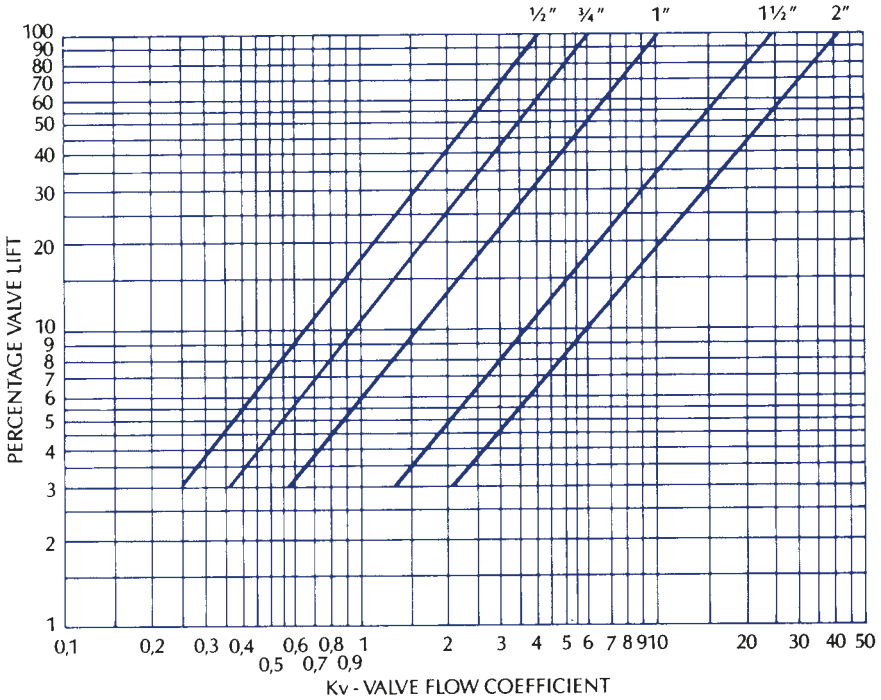
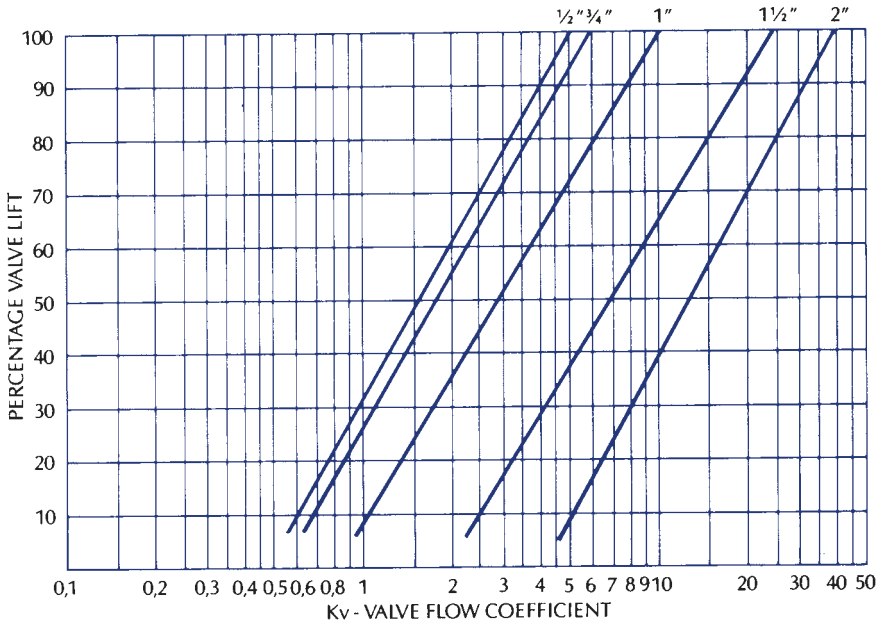


Fig. 74AK-77AK equal percentage 2-way



Valve Sizing
The universal method of valve sizing is by the Kv or Cv method. Both these flow coefficients give a positive indication of a valve's capacity to handle flow. Each line size MINIMATIC has a single fixed Kv valve shown in the relative detail pages in this catalogue.

For practical purposes Northvale uses simplified sizing formulas. More complex formulas for steam and gas will give only minor variations and are only appropriate for severe service conditions.

Having calculated the Kv coefficient required from the following formula the appropriate valve size can be selected from the graphs, taking into account the maximum and minimum flow requirements. MINIMATIC valves have modest turndown ratios and it is good practice to select a valve size which is 80-90% of its full stroke at max Kv requirement and not less than 10% at minimum Kv requirement.

NOTE:
The flow rating of a valve is expressed as the Kv, a coefficient established experimentally. It corresponds to the flow of water in m^3/hr under a pressure differential Δp of 1 bar with the valve fully open.

Kv can be related to the US coefficient Cv which is in USgpm at Δp=1psi as follows: Cv = 0.866 x Kv

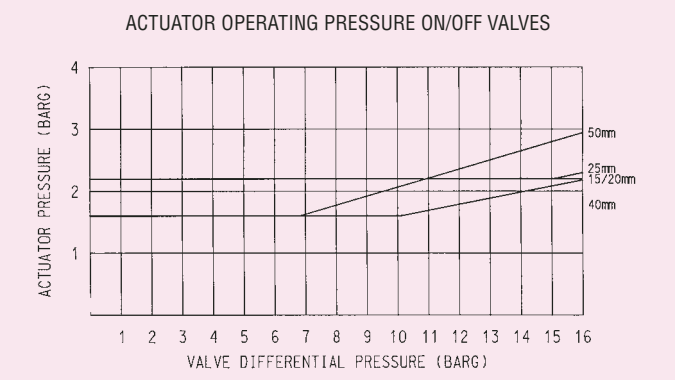
$$\text{Liquid Kv} = \frac{Q\sqrt{Sg}}{\sqrt{\Delta p}}$$

$$\text{Steam Kv} = \frac{W}{22.4\ \sqrt{\Delta p x P2}}$$

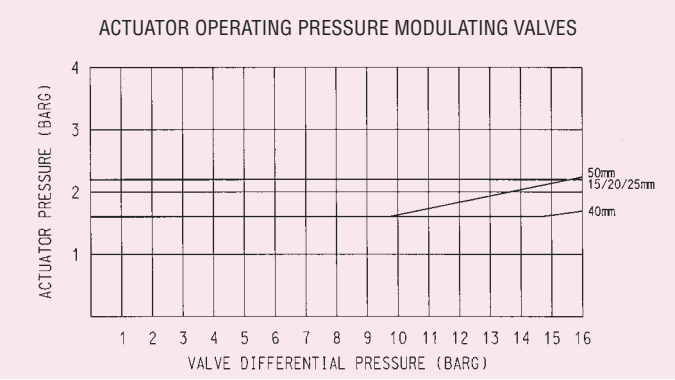
Valve Actuator Characteristics

1. Actuator Pressure

The actuator pressure required to operate the valve can be determined from the graphs below. The straight line portion of the graph shows the minimum actuator pressure required to compress the valve spring.



3-WAY ON/OFF VALVE (DIVERTING DUTY) SUBJECT TO THE FOLLOWING LIMITING BREAKAWAY LINE PRESSURES	
½" ¾"	16 bar g
1"	13.2 bar g
1½"	11.2 bar g
2"	6.9 bar g



3-WAY LINEAR VALVE ARE SUBJECT TO THE FOLLOWING LIMITING BREAKAWAY LINE PRESSURE	
~~½" ¼" 1"~~	~~16 bar g~~
~~1½"~~	~~12 bar g~~

NOTE:
For the three sizes of stainless steel valve at max pressure rating of 25 bar you would require a higher actuator air pressure.

	Soft Seated	Metal Seated
½", ¾"	2.4 bar	2.2 bar
1"	3.3 bar	2.5 bar

Valve Positioner

AK Positioner

General Description

In the AK model, a positive positioner pneumatic relay is used to accurately position an actuator stroke with respect to signal pressure from the controller. The unit makes automatic correction for deviations from the true valve position, caused by factors such as stem friction or valve loading. The correcting action is affected by sensing the true stem position through the feedback lever.

The positioner is constructed of non-corrodable materials, with the housing being "Polysultone", and the diaphragm "Neoprene".

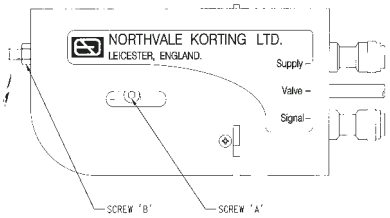
Adjustments

The AK performs the control functions outlined under the General Description. The positioner is calibrated and bench set up during assembly in our factory, however, if after installation it is necessary to reset the positioner to match a controller signal you may carry out the following adjustments.

(a) With the signal pressure at the required start point, turn the start point adjusting screw until the valve just begins to move Screw (B)
(b) Vary the signal pressure over the range and position the "Span adjusting slide screw" until the valve stroke gives the required span – Screw (A)

Specifications:

Control Action Proportional Direct Acting



Air Pressures

(a) Main air – See graphs above
(b) Instrument signal 0,2 to 1,0 bar or split ranges 0,2 to 0,6 bar or 0,6 to 1,0 bar (3-15psi, 3-9psi or 9-15psi).

Field Adjustments

Both the start point and the proportional band can be adjusted over the range of 0.14 to 0.86 bar (2 to 13psi).

Maximum Air Consumption 0.0493m³/hr (1.7 scfh)

Maintenance and Repair

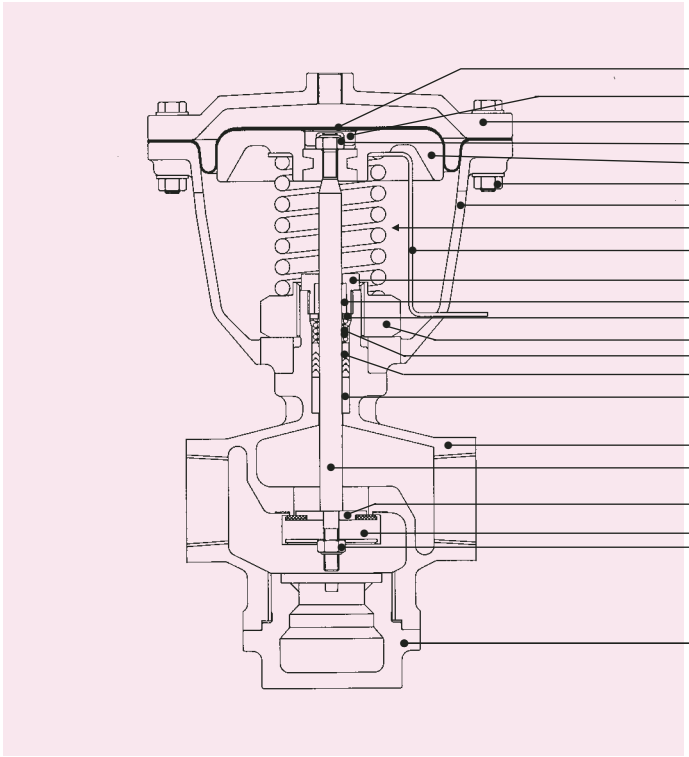
Do not field repair the positioner. It should be replaced if not operating correctly.

Environment

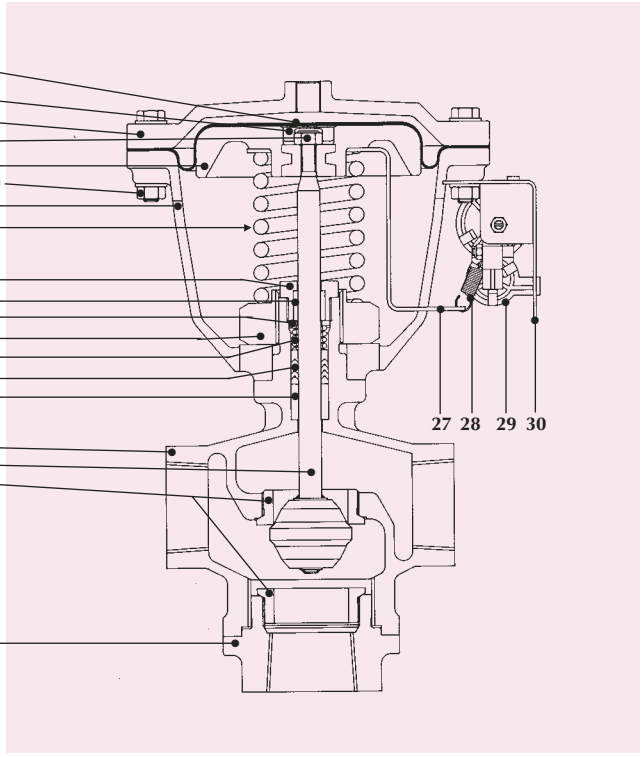
Not suitable for external installations. Environmental range is 0 to 40°C continuously and –20° to 60°C for unsustained periods.

Parts List
On/Off and Modulating

The parts list numbers apply to both screwed and flanged valves for 2-way and 3-way styles although only the Fig. 71 and Fig. 75AK are shown here for example purposes only.



On/Off Soft Seat
Fig 71



Modulating 3-Way
Fig 75AK

Components and Materials

1	Body	Bronze or Stainless Steel
2	Bottom Cover 2 way	Bronze or Stainless Steel
3	Bottom Cover 3 way	Bronze or Stainless Steel
4	Actuator Yoke	Cast Aluminium (Plastic Coated)
5	Actuator Cover	Cast Aluminium (Plastic Coated)
6	Actuator Disc	Cast Aluminium (Plastic Coated)
7	Diaphragm	Nylon Reinforced Epichlorhydrin
8	Diaphragm Spacer	Epichlorhydrin
9	Actuator Spring	Chrome Vanadium Steel
10	Yoke Retaining Nut	Steel Zinc Plated
11	Gland Nut	Brass or Stainless Steel
12	Header Guide Bush	Carbon Reinforced ptfe
13	Packing Spring Washer	Brass or Stainless Steel
14	Packing Spring	Stainless Steel
15	Gland Seal Set	ptfe Chevron Rings
16	Lower Guide Bush	Carbon Reinforced ptfe
17	Hex Head Bolt	Steel Zinc Plated
18	Plain Washer	Steel Zinc Plated
19	Hex Nut	Stainless Steel
20	Locknut	Stainless Steel
21	Spindle/Plug Assy	Stainless Steel
22	Valve Seat	Stainless Steel
23	Insert Retaining Ring	Stainless Steel
24	Soft Seat Insert	Glass Filled ptfe
25	Plug	Stainless Steel
26	Stroke Indicator Arm	Steel Zinc Plated
27	Stroke Take Off Arm	Steel Zinc Plated
28	Range Spring	Stainless Steel
29	AK Positioner	Polysulphone
30	Mounting Bracket	Steel Plastic Coated

Electric Valves

On/Off and Modulating Control
To meet the growing demand for electrically operated valves Northvale introduced a range of lightweight, high output, linear electric actuators to fit all sizes of MINIMATIC valves. Available in 2 way and 3 way body styles with soft seats for on/off and profiled stainless steel trim for modulating control.

Valve Options

	On/Off	Modulating
2 way screwed	Fig 71E	Fig 74E
3 way screwed	Fig 72E	Fig 75E
2 way flanged	Fig 7700E	Fig 77E
3 way flanged	Fig 7800E	Fig 78E

Actuator Options
Actuators can be selected to suit different supply conditions and functions.
(a) On/Off valves – 24 and 220/240 volt ac
(b) Modulating valves – 24 volt ac only

Standard actuators will remain "Stay Put" in their last position in the event of a power supply failure, for both 24 volt and 220/240 volt systems.

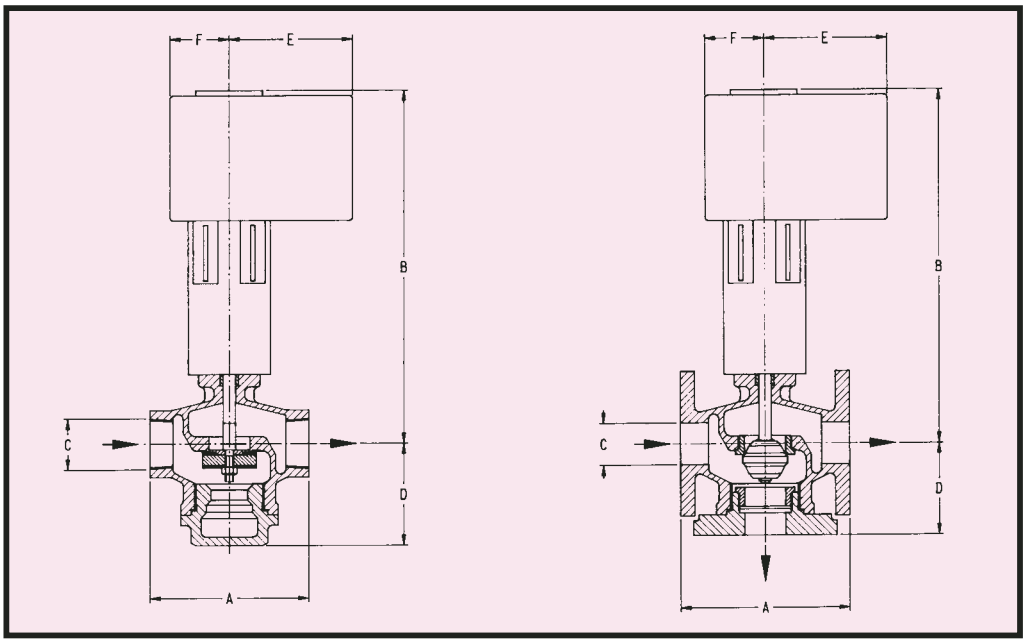
Spring return actuators are available for 24 volt supply systems only and can be arranged to fail open or closed in the event of a power supply failure.

Control Signals
Modulating valves can be controlled by input signals either 0-10 volt dc or 4-20mA by simply selecting the appropriate connections on the terminal strip within the enclosure. Valves can be easily changed from one system to the other without the need to return them to the factory.

Dimensions

The drawings depict Fig 72E and Fig 78E valve arrangements but are typical for all the models detailed in the table below.

Installation
Valves may be installed with the actuators in the horizontal position but never with the actuator upside down below the valve.



Screwed Valves Fig 71E, 72E, 74E, 75E

Size	Kv		A	B	C BSP Taper	D 2-Way	D 3-Way	E	F
½"	2.5	5	88	313	½"	54	70	109	70
¾"	2.5	6	88	318	¾"	54	54	109	70
1"	10		104	319	1"	66	66	109	70
1½"	25		155	338	1½"	99	99	109	70
2"	40		178	343	2"	99	99	109	70

Flanged Valves Fig 77E, 78E, 7700E, 7800E

Size	Kv		A	B	C	D 2-Way	D 3-Way	E	F
15	2.5	5	152	313	15	54	70	109	70
20	2.5	6	152	313	20	54	70	109	70
25	10		159	319	25	66	76	109	70
40	10		165	338	40	99	89	109	70

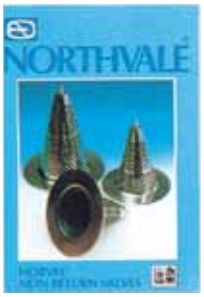
Max Δp across Valve bar g

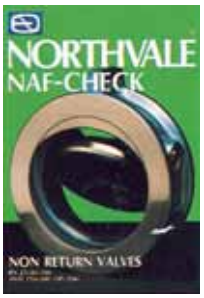
Size	Stay Put Actuator	Spring Return Actuator
½"	16	8
¾"	16	8
1"	12	5
1½"	12	5
2"	8	3.5

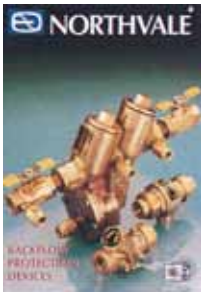
Pressure Drop Capability
The standard actuators are capable of handling the maximum pressure differentials shown in the table. Unlike diaphragm actuators these values apply to both 2 way and 3 way valves.

Note:
Reduced trim Kv=2.5 only available on Fig 74E and 7700E

THE FOLLOWING CATALOGUES ARE AVAILABLE ON REQUEST







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