

Series 20
Seated Angle Valves for
ANSI 150 – 600 (PN20- 100)
DIN/BS 4504 PN10-PN100

Series 20 Features

General

The Series 20 Angle-type control valves are indispensable to control fluid of high differential pressure, slurry, high viscosity, or adhesive. They are provided with a number of features such as low resistance of passage, antiwear quality within the valve, and easy maintenance and inspection.

Performance :

- High Cv to body size ratio.
- Streamlined flow passages to optimize capacity.
- High Cv to valve weight ratio.
- Excellent flow control rangeability.

Design Flexibility :

- Modular construction design available with a range of different connections and styles.
- All trim components removable from the top for easy of maintenance.
- Wide range of supplementary noise control options.
- Inherently characterized trim offered in equal percentage, linear, quick opening and modified-parabolic (options).
- Multi trim sizes available.
- Full range of body and trim material options.
- Fully rationalized and interchangeable features.
- Full range of bonnet and packing designs to suit various temperatures and fluids.

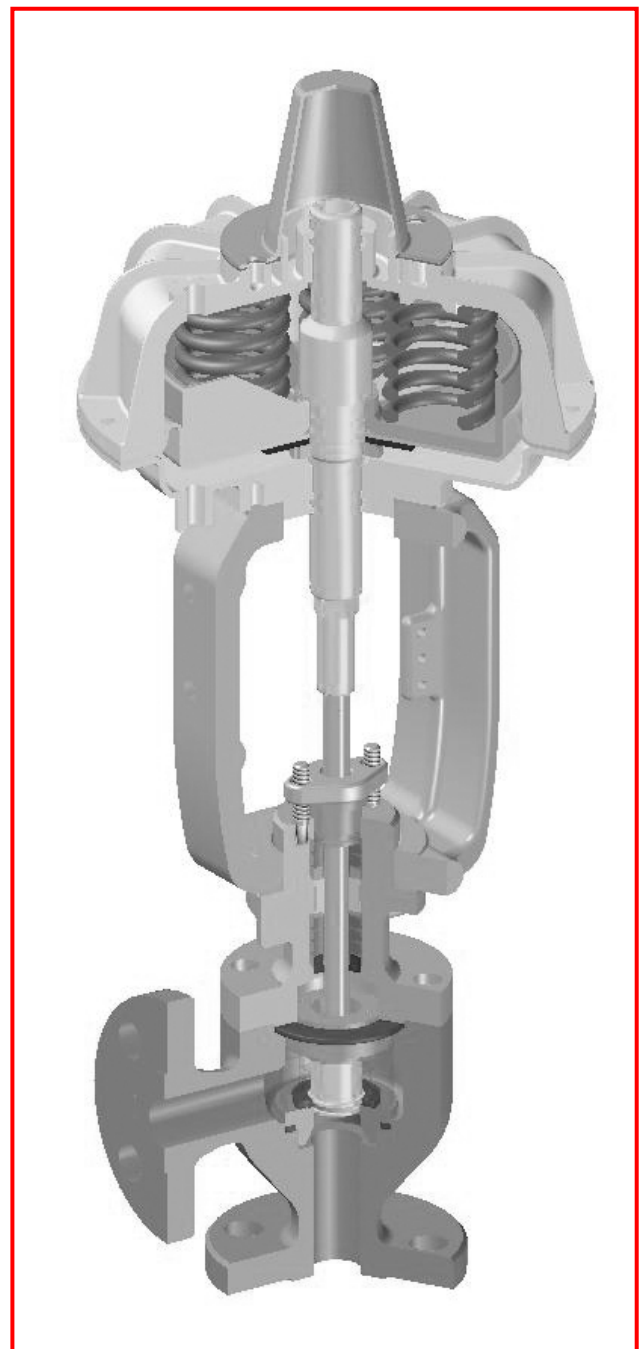


Figure 1. Class Series 20 Valve incorporating Contoured Trim and complete with Series ' 5500' Actuator

Design Integrity :

- Heavy duty top guiding with no bottom guide to obstruct seat bore and potentially trap debris.
- Large diameter stems.
- Clamped bonnet and seat ring gaskets are fully retained for easy maintenance.

Quality Manufacturing :

- Rigorously tested to ensure specified performance on site.
- Quality assurance system in accordance with ISO 9001.
- Optional full NACE MR-01-75 certification.

Scope of Design

End Connection Sizes : 1/2" to 16" (15mm to 400mm)

End Connection Styles :

ANSI, DIN and BS flanged RF, FF, RTJ (and other grooved designs).
Welded profiles including butt weld, socket, etc., clamped and screwed designs. other requirements available on request.

Valve Body Ratings :

ANSI 150 to ANSI 600 (PN 20 to PN100), DIN/BS4504 PN10 to PN100 as standard. other requirements available on request.

Design Standards :

ANSI B16.34 and ASME section VIII (for body/bonnet bolting)

Trim Design Options :

Full and reduces trim, SP, DP. and BP available as standard.
multi hole cages and attenuate. silencers are available for specific applications.

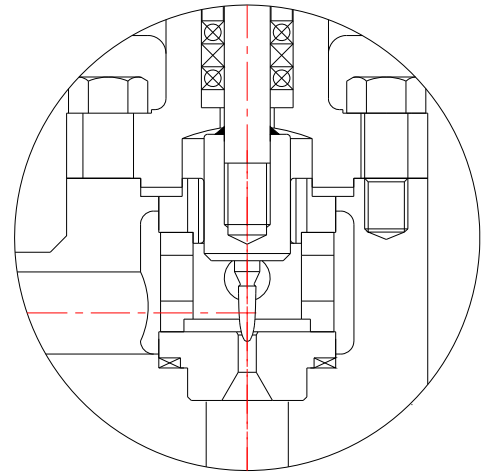


Figure 2. Single contoured plug
(Small Size)

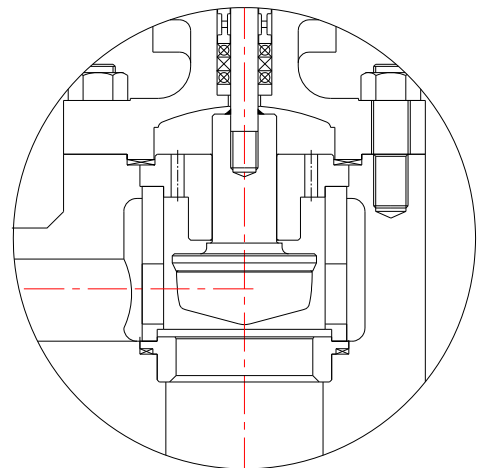


Figure 3. Single contoured plug
Up to 6" (Unbalanced)

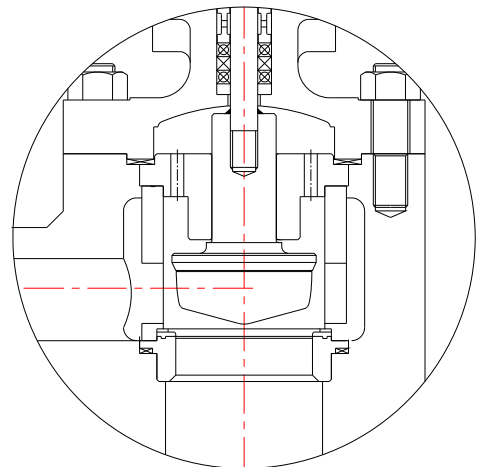


Figure 4. Single contoured plug
(Unbalanced, Soft Seat)

Inherent Characteristics :

Equal percentage, Linear, modified parabolic or quick open.

Material Combinations :

A wide range of body/bonnet and trim materials are available.

Plug Design Options :

Unblanced with metal/metal or resilient seating plus balanced with metal/metal seating and metallic or resilient piston rings.

Bonnet Options

Standard, extension and cryogenic bonnet design options available.

Actuation :

Various types of actuation are available including ;
5500 Series spring opposed pneumatic diaphragm.

‘C’ Series spring opposed pneumatic piston.

‘D’ Series double acting pneumatic piston.

In addition electric, electro-hydraulic, hydraulic and manually operated versions are available.

Sizing/Noise prediction

The procedures for performing valve sizing, velocity and sound pressure level calculations are detailed in both the technical Selection manual.

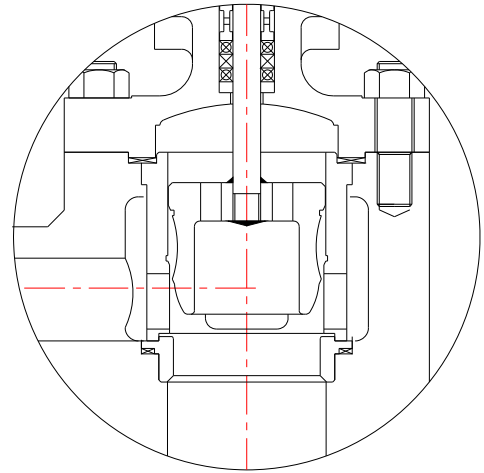


Figure 5. Single Contoured Plug (Balanced)

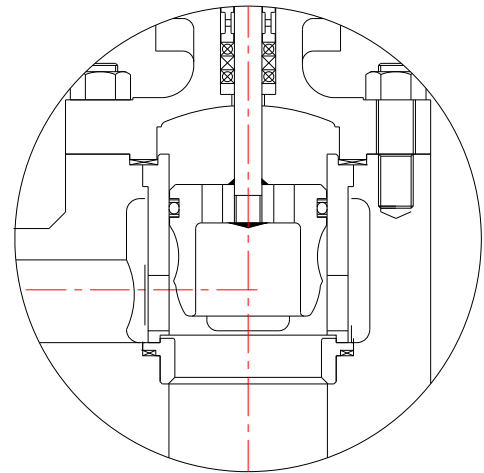


Figure 6. Double Contoured Plug (Over 2")

Guide to Trim Options Available

Modular Design

Series 20 has been designed around a modular manufacturing concept. Using this philosophy, a centre body module selected to most suit the specified flow conditions and operating data, is combined with end connection size/rating, selected to support that module. This design feature allows not only the selection of full size ends, to offer oversize end connections to suit a particular requirement.

Unbalance Trim

Single Contoured Unbalance Port(SP) are up to 6".
Ports are guided by heavy guide.

Balance Trim

Pressure balance ports are used to reduced the thrust on the port.

Single contoured balance port (BP) are over 2" are standard and under 2" are available for specific applications.

Double Contoured Balance port (DP) are over 2" for high pressure drop.

Soft seats are used in application requirement ANSI Class VI ' BUBBLE-TIGHT ' shutoff and FIRE SAFE design. It's design consist of an elastomer sandwiched between two metal piece, insert retainer and metal seat. The soft seat can be done by Installing the insert and soft seat between seat retainer and seat. Therefore it can be used for fire safe function.

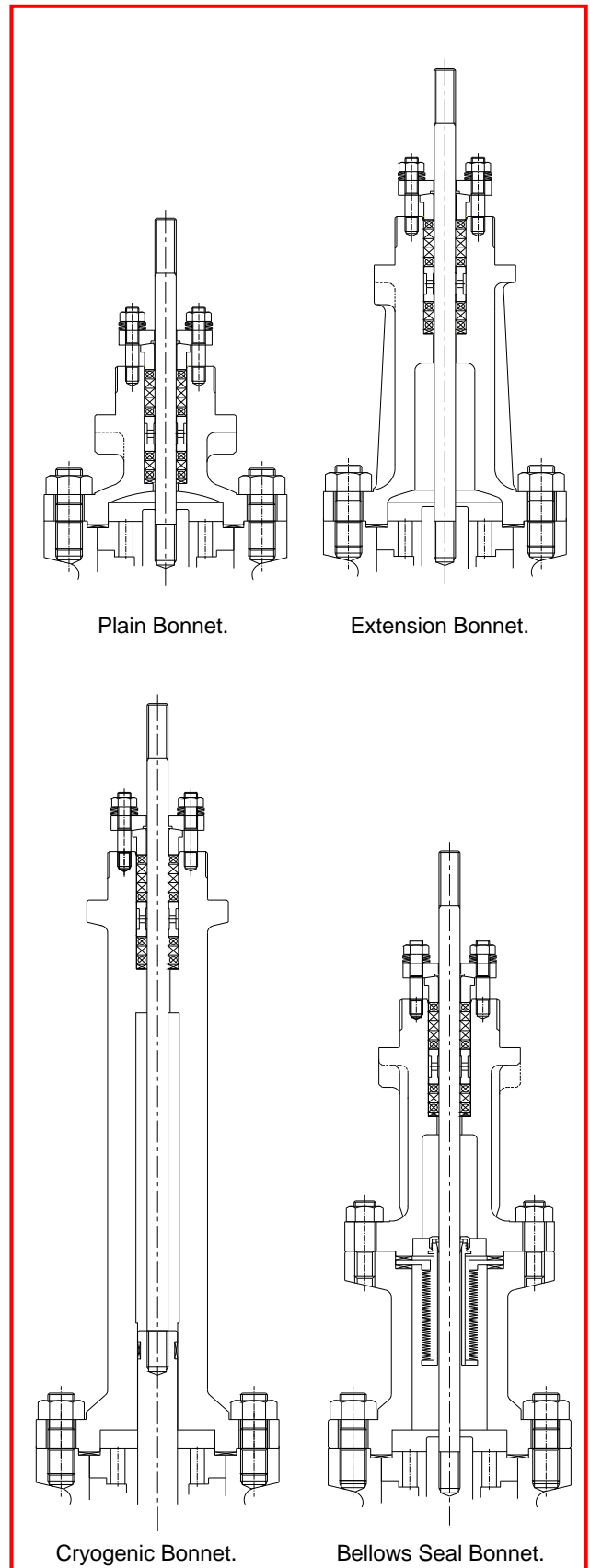


Figure 7. Bonnet design option

Series 20 Design Cv Values

Table 1. Small Flow

| Valve Size | | Lift | Trim Size Number | Linear |
|------------|----|------|------------------|--------|
| in | mm | | | |
| 1/2" | 15 | 15 | No. 5 | 0.007 |
| 3/4" | 20 | | No. 4 | 0.014 |
| 1" | 25 | | No. 3 | 0.025 |
| | | | No. 2 | 0.037 |
| | | | No. 1 | 0.056 |

Note : Special small flow(optional)is available.

Table 2. Single contoured up to 1"Valve Size

| Connection Size | | Trim Size | Lift | Eq% Linear | Quick Opening |
|-----------------|----|-----------|------|------------|---------------|
| in | mm | | | | |
| 1/2" | 15 | 3 | 15 | 0.09 | 0.09 |
| | | 4 | | 0.15 | 0.15 |
| | | 6 (1/8) | | 0.4 | 0.4 |
| | | 7 (3/16) | | 0.8 | 0.8 |
| | | 8 (1/4) | | 1.5 | 1.5 |
| | | 10 (3/8) | | 3.0 | 3.0 |
| | | 15 (1/2) | | 5.2 | 5.2 |
| 3/4" | 20 | 3 | 15 | 0.09 | 0.09 |
| | | 4 | | 0.15 | 0.15 |
| | | 6 (1/8) | | 0.4 | 0.4 |
| | | 7 (3/16) | | 0.8 | 0.8 |
| | | 8 (1/4) | | 0.15 | 0.15 |
| | | 10 (3/8) | | 3.0 | 3.0 |
| | | 15 (1/2) | | 5.2 | 5.2 |
| 1" | 25 | 20 (3/4) | 15 | 9.0 | 9.0 |
| | | 3 | | 0.09 | 0.09 |
| | | 4 | | 0.15 | 0.15 |
| | | 6 (1/8) | | 0.4 | 0.4 |
| | | 7 (3/16) | | 0.8 | 0.8 |
| | | 8 (1/4) | | 1.5 | 1.5 |
| | | 10 (3/8) | | 3.0 | 3.0 |
| | | 15 (1/2) | | 5.2 | 5.2 |
| | | 20 (3/4) | | 9.0 | 9.0 |
| | | 25 (1) | | 14 | 14 |

Note : The above design Cv values apply to valves with body rating ANSI 150 to ANSI 600

Table 3. Contoured Cv valve 1"- 4" Valves Size(Unbalanced)

| Connection Size | Full Ported | | | |
|-----------------|-------------|------|------------|---------------|
| | Trim Size | Lift | Eq% Linear | Quick Opening |
| 1" | 1" | 15 | 14 | 14 |
| 1.1/2" | 1.1/2" | 20 | 32 | 36 |
| 2" | 2" | 25 | 52 | 58 |
| 2.1/2" | 2.1/2" | 25 | 78 | 88 |
| 3" | 3" | 38 | 116 | 130 |
| 4" | 4" | 38 | 195 | 220 |

Table 4. Gage Guided Cv valves 1"- 6" Valves Size(Balanced)

| Connection Size | Full Ported | | | |
|-----------------|-------------|------|------------|---------------|
| | Trim Size | Lift | Eq% Linear | Quick Opening |
| 1.1/2" | 1.1/2" | 20 | 34 | 38 |
| 2" | 2" | 25 | 56.2 | 67.2 |
| 2.1/2" | 2.1/2" | 25 | 83 | 93.5 |
| 3" | 3" | 38 | 125 | 135 |
| 4" | 4" | 38 | 210 | 235 |
| 5" | 5" | 50 | 276 | 368 |
| 6" | 6" | 50 | 424 | 547 |

Velocity Limitations

In selecting a valve for either a liquid or gas / vapor application one of the major considerations is the effect of fluid velocity. high velocity could lead to operational problems including erosion, excessive vibration and instability. the following tables indicate the maximum recommended velocity values for liquid and gas / vapor services.

Table 4. Recommended Maximum Velocities for Liquid Service .

| Valve Size | | | | Maximum Velocity | | | |
|------------|-----------|--------------|------|------------------|------|------------------------|-----|
| | | Carbon Steel | | Alloy Steel | | Bronze, Cu / Ni Alloys | |
| in | Mm | ft/s | m/s | ft/s | m/s | ft/s | m/s |
| 0.5 - 2 | 15 – 50 | 41 | 12.5 | 46 | 14 | 25 | 7.6 |
| 3 - 6 | 80 – 150 | 34 | 10.4 | 34 | 10.4 | 20 | 6.2 |
| 8 -12 | 200 – 300 | 29 | 8.9 | 29 | 8.9 | 17 | 5.2 |

Table 5. Recommended maximum velocities for Gas/ Vapor services

| Valve Size | | Maximum Inlet Velocity | | Maximum Outlet Velocity | | Max. Outlet Mach Number for Required Noise Level | | |
|------------|-----------|------------------------|-----|-------------------------|-----|--|---------|---------|
| in | Mm | ft/s | m/s | ft/s | m/s | >95 dBA | <95 dBA | <85 dBA |
| 0.5 - 2 | 15 – 50 | 340 | 104 | 830 | 253 | 0.65 | 0.5 | 0.3 |
| 3 - 6 | 80 – 150 | 294 | 90 | | | | | |
| 8 - 12 | 200 – 300 | 265 | 81 | | | | | |

Inherent Rangeability

The inherent rangeability of a control valve is the ratio between maximum and minimum flow with in the working characteristic at constant pressure drop.

Table 6. Rangeability Values

| Trim Size(ins) / Trim Number | Maximum Rangeability | |
|------------------------------|----------------------|------------------------|
| Trim N0. 1 – 5 | 10 : 1 | * 50 : 1 100 : 1 |
| Trim size 1/16" – 3/4" | 30 : 1 | |
| Trim size 1" - 16" | 50 : 1 | |

* Special

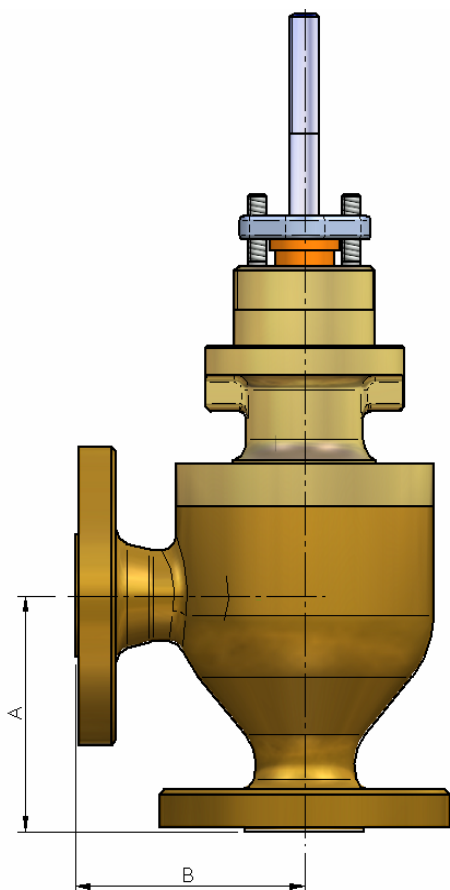


Figure 9. Series 20 dimensions

Table 8. Series 20 outline dimensions up to ANSI 600 rating

Unit : mm

| Pressure Rating Body Size (mm) | A, B | | |
|-----------------------------------|-------------------------------------|---|------------------------|
| | JIS 10K, 20K ANSI 150RF 300RF | JIS 30K, 40K ANSI 300 RJ 400, 600RF | ANSI 400RJ 600RJ |
| 20 | 97 | 103 | 103 |
| 25 | 98 | 105 | 105 |
| 40 | 117 | 125 | 125 |
| 50 | 133 | 143 | 145 |
| 65 | 146 | 156 | 158 |
| 80 | 159 | 168 | 170 |
| 100 | 184 | 197 | 200 |
| 125 | 212 | 228 | 230 |
| 150 | 237 | 254 | 256 |

MOTOYAMA

Korea : KOREA MOTOYAMA INC.

457-11 Changgi-dong, Kimpo-city, Korea.Kyunggi-Do,Korea

Tel : 82-31-985-8947 Fax : 82-31-985-1110

E-mail : motoyama@unitel.co.k

Web : <http://www.komoto.co.kr>

Japan : MOTOYAMA INC.

14-26, 1-Chome, Haginaka, Ohtaku, Tokyo, Japan

Tel : 81-03-3732-3696

Fax : 81-03-3738-9371

