N-Line Valves

Severe Service Control Chokes
N-Line Valves continues to provide the highest levels of quality and value to oil and gas producers throughout the world.

We manufacture severe service control chokes, engineered special application valves and axial flow control valves. Our Mission being to provide engineered products which give a lowest life cycle cost and best value.

By combining original thought, state of the art design and engineering packages together with extensive field experience, our valves provide solutions for in the most severe flow control applications.

3-D modelling and computational fluid dynamics assure valve performance throughout its life.

Our valves are performance tested in controlled conditions such as API 6-A PR-2 and flow tested in a purpose built flow loop to verify product design and assure that each N-Line Valve will provide its predicted performance.
Quality, Certifications and Standards

N-Line maintains ISO 9001-2000 and the API Q-1 quality management program. Additionally, N-Line Valves are qualified for API-6A (ISO-10432), API-17D (ISO 13628-4) and ASME B16.34. Additionally our designs are reviewed and approved by such agencies as ABS, DNV, Lloyds and Bureau Veritas. We routinely design and manufacture to customer, project and country specifications and standards.

N-Line Valves are designed for the changing needs of the oil and gas industries. We take into account that the produced or injected medium will frequently contain free water, chlorides, CO2, H2S, and other corrosive compounds. N-Line Valves are available in a wide range of body materials, varying from carbon steel to nickel alloy based materials. Valve internals to match the design conditions are numerous and include proprietary wear materials such as Tungsten Carbide. To avoid problems related elastomeric explosive decompression the standard seal selection is non-elastomeric PTFE and PEEK. Bonnet seals are double tapered metal for the ultimate in sealing reliability.

Our range of choke designs covers the API, ASME and DIN ratings that are commonly used in the oil and gas industries up to API 20000 and temperature ratings of −150°F to 650°F. Endurance testing and seal performance may include API-6A / PR-2, ISO-15848 and customer specific standards.

Flow testing to ISA 75.02 and sizing to ANSI/ ISA S75.01 and IEC Standard 534-2.

General Arrangements, Weights and Dimensions

As combinations of dimensions vary widely, a separate document lists our standards. Special requirements and combinations of size and actuation are given via General Arrangement and certified dimensional drawing provided by N-Line Valves. Various other publications and standards for materials, processes and testing are available for customer review. Please place requests to your local N-Line Valves office or Representative.
Features

Indicator
A true micrometer barrel type indicator on manual and stepping actuated chokes allows simple and accurate reading of choke trim opening and setting. Standard 316 Stainless Steel material for corrosion resistance and long life in any application.

Dynamic & Static seals
Stem Packing and Pressure Balance Seals use spring energized lip seals incorporating Elgiloy (UNS R30003) springs and include filled PEEK bearings. High Temperature versions of our seal assemblies are used for temperatures to 650F (340C). Static seals are of the same design and materials. Versions are used in applications requiring a low emissions tested stem packing such as ISO-15848.

Stem lock and Travel Stops
Stem lock allows the valve stem position to be locked at any position.

Optional Travel Stops can be used to limit total trim travel and set a maximum or minimum trim opening.

Bonnet seal
The proven double tapered metal to metal seal is the best available. Safety is assured by self relieving prior to final bolting disengagement.

Using high strength materials, it offers the superior sealing in all pressure and temperature classes with no leakage or the problems associated with elastomeric seals or crush type metal seals.
High Flow Plug and Cage Trim

The Plug and Cage trim design gives the maximum flow capacity for a cage trim choke valve. This trim type is proven for its effectiveness in high flow liquid and multiphase flow.

In the closed position, the plug makes contact with a prepared shoulder in the cage to facilitate positive shut off.

For Class V and VI an additional non elastomeric seal is used in the low flow area of the seat for repetitive positive shut off.

This trim is available with Linear Characteristic or Equal Percent in surface hardened Stainless Steel or Solid Tungsten Carbide for erosive service. An optional full carbide plug can be used for extreme solids production.

External Sleeve Trim

The External Sleeve type trim uses a flow sleeve moving over the outside of a ported cage to control flow. A metal to metal seat design on the outside of the flow sleeve, out of the high velocity flow areas assures positive shut off and an extended seat life.

High erosion resistance of this trim design leads to its use in severe service that may include high pressure drops and fluids with entrained solids such as formation sands. This trim is furnished in a proprietary blend HIP Solid Tungsten Carbide with a Equal Percentage characteristic.
N–Trim Single Path- Multi Stage Trim

The N-Trim SP is a severe service trim solution to reduce noise, prevent Cavitation and with the correct material selection, resist erosion.

The trim consists of a single path multi stage plug and corresponding seats with the appropriate number of stages to prevent Cavitation. Several mechanisms are utilized in the design to assist with the conversion of energy without problems of Incipient Cavitation in liquids.

The N-Trim SP is typically applied in extreme pressure drop valves in water injection applications.

N–Trim Multi Path- Multi Stage Trim

The N-Trim MP is a severe service trim solution to reduce noise, Reduce velocity and with the correct material selection, resist erosion.

The trim consists of a multi path multi stage cage with the appropriate number of stages to prevent Cavitation and corresponding plug. Several mechanisms are utilized in the design to assist with the conversion of energy during the pressure step down process.

The N-Trim MP is typically applied in extreme pressure drop valves in gas applications.
Type HTS Sleeve and Cage

The High Temperature Closed Cage and Sleeve Assembly uses a metal to metal design to assure shut off. In the full closed position, the sleeve makes contact with the Cage Assembly in an area of low velocity making extended life of the positive seal an inherent design feature. The positive seal is bi-directional by design and will allow for reverse flow in “huff and puff” applications allowing steam injection and production in the same choke. This design is for the most severe service that may entail very high pressure drops, cavitation and entrained solids such as formation sands. This trim is available in different materials with Equal Percentage or Linear Characteristic and is available with all forms of actuators. 2” and 2.5” body sizes and all pressure class and size end connections are available.
1. Plug and Cage, External Sleeve and Positive trims are interchangeable in a standard valve body
2. Accurate and reliable micrometer style position indicator on manual actuated chokes.
3. Bolted bonnet with metal to metal seal is standard for enhanced safety and performance
4. Full range of actuators and mounting kits for ease of automation
5. Standard forged body construction for compliance with API 6A (ISO 10423)
6. Linear non-rotating stem movement optimizes stem packing life
7. Pressure balanced trims minimize actuation forces
8. Blowout proof stem design increases safety
9. Cartridge style trim installation use no internal threads and requires no special tools
10. Body materials from Carbon and Alloy Steels, Stainless Steels, Duplex Stainless Steels and Clad with Corrosion Resistant Alloys
11. Pressure ratings include API to 20,000 and ASME pressure classes to 2500
12. Spring energized lip seals with scrapers and bearings used for all dynamic and static seals enhance reliability of stem and pressure balance sealing
13. Enlarged body gallery maximizes flow capacity of a body size and minimizes potential for body erosion
14. Special dimensions, materials and configuration versions available on request
2.5, 3, 4, 5, 6, 8, 10 and 12 Model C Control Chokes

Model 4C Positive Choke
Model 4C Adjustable Choke
Model 6C Adjustable Choke
Model 8C Adjustable Choke
Model 2.5C Adjustable Choke
Model 5C Adjustable Choke
Type NH Modular Choke System offers a choice of over 4 separate control choke systems that are easily field converted using the same valve body.

By offering a complete range of choke valves from positive through to cage trimmed control chokes, N-Line Valves offers a solution to any flow control requirement. Options include High Temperature Seals, Travel stops and a complete range of actuators

- Torque Nut or Bolted Bonnets
- Available in all flange and connection sizes and pressure classes through ASME 2500 and API 15,000
- Simple field conversion using the same valve body
- Metal to Metal Seals.
- Superior gallery style body for maximum erosion resistance with all trim styles
- Complies with API 6A, ANSI 16.34 and NACE requirements when applicable
- Trim kits available to convert H model chokes to cage trim ‘Control Chokes’ and Gas Lift Chokes

Type NH Positive Choke

The simplest configuration of chokes.

The flow and pressure must be shut in and vented for the fixed orifice flow bean to be changed. An industry standard flow bean is utilized in this design.

Type NH Needle and Seat

The needle and seat design provide one of the simplest designs of adjustable chokes. This design is suitable for low to medium pressure drops, less severe service and applications that do not require positive shutoff. This design does not mitigate Aerodynamic noise.
Type HSC Sleeve and Cage

The Closed Cage and Sleeve Assembly uses a metal to metal design to assure positive shut off. In the full closed position, the sleeve makes contact with the Cage Assembly Carrier in an area of low velocity making extended life of the positive seal an inherent design feature. The positive seal is bi-directional by design. This proven design is for the most severe service that may include very high pressure drops, cavitation and entrained solids such as formation sands or pro-pants. This trim is furnished in Tungsten Carbide with an Equal Percentage Characteristic.
Pneumatic Piston Actuator

The N-Line Valves model P Actuator is a pneumatically powered (Produced Gas or Instrument Air) linear output actuator. The actuator is offered in 3 primary models of Fail Open, Fail Close and Fail Last Position, with optional side mount manual override.

Standard all steel construction with optional stainless steel construction makes this an ideal actuation for heavy salt spray offshore environments.

The optional external spring cartridge offers a safety advantage in any maintenance situation and allows the actuator to be powered with sour gas and other corrosive media. Piston seal is a superior quad seal to prevent hysteresis and the piston contains a wear ring /bushing for long service life. All internal components are plated, the cylinder is hard chromed and honed and the traveling stems are Stainless Steel. Spring assemblies and housings are coated for corrosion resistance.

Adjustable travel stops are available to limit travel. Actuators are available with a full range of accessories and controllers / positioners. Options also include Gages, Filter Regulators, Solenoid valves and bypass systems. Units can be custom tailored to specific applications on request.
Model 6C w/angle mount actuator for gas production service

Angle Mount actuator allows for trim change or service without actuator removal from the choke and no recalibration requirements, disconnecting lines or electrical connections.
SA-II Surface Stepping Actuator

The N-Line Valves SA-II Stepping Actuator is a pneumatically or hydraulically powered rotary indexing output actuator. The actuator consists of two power cylinder and pawl assemblies, from which the drive wheel and output shaft are driven.

One operating cycle consists first of pressurizing one cylinder thereby extending the pawl to engage the drive wheel and thus incrementally rotate the output shaft in the appropriate direction, the cylinder is then depressurized retracting the pawl to it’s rest position. This single operating cycle rotates the output shaft of the actuator and correspondingly the valve stem by 30°. This operating cycle is repeated until the valve reaches the desired position.

To drive the actuator and the valve in the opposite direction, an operating cycle is repeated using the other cylinder.

When the cylinders are depressurized, the pawls are disengaged from the drive wheel, allowing the drive wheel to be rotated manually through the manual override on the outside of the actuator to position the valve. A spring detent prevents position drift from vibration. Local visual position indication is via a Stainless Steel Micrometer for unequaled accuracy and reliability.

A housing containing limit switches, a position transmitter or controller and terminal strip is mounted externally on the yoke for direct valve stem position feedback via 4-20mA including HART or Foundation Fieldbus All recognized standards for electrical apparatus are available.

The housing is a fully sealed steel housing treated for corrosion resistance and long service life in severe environments.

The SA-II Stepping Actuator is designed to allow in-field retrofit onto existing valves without the requirement to dismantle pressure-containing components.
In addition to Handwheel Overrides as shown above, Accessories such as Solenoid Valves, Controllers, Regulators and specialty items can easily be adapted for application specific requirements. Adaptation to other manufactures chokes as well as other types of valves can be accommodated.

For full details that are application specific, contact N-Line Valves or your local representative.
N-Line Valves’ Chokes can be supplied with a selection of actuator types from rotary electric, linear or rotary stepping hydraulic and linear or rotary stepping pneumatic.

**Pneumatic Actuators**

Linear actuators may also be angle mounted to allow for servicing of valve internals without the requirement to remove the actuator, a range of diaphragm, piston and rotary stepping type pneumatic actuators are available. All are available with positioners and controllers offering common protocols such as Foundation Fieldbus and Hart.
Electric Actuators
A full range of commercial electric actuators such as the one shown are compatible with N-Line Valves.

4C Gas Production Choke
Special Body Configurations and End Connectors

N-Line Valves can provide control chokes with any manner of end connectors and to special dimensions to facilitate replacement of other manufacturers chokes or valves. N-Line Valves is licensed to machine clamp connectors integral to its products for high pressure applications.

Some applications such as Steam Injection, require butt weld ends which are available.
Subsea Valves and Chokes

N-Line Valves has designed, manufactured and supplied specialized subsea products since the company's inception. Products rated at API 15,000 psi and depth rated to 10,000 ft. are the normal. For information on subsea products that are application specific, contact N-Line Valves or your local representative.

Axial Flow Control Valves

N-Line Valves offers its Patented Axial Flow Control Valves in sizes to 12” and pressure ratings to API 10,000 and ASME 2500. This unique design offers the advantages of N-Line Cage Trim with the efficiency of quarter turn operation. As with other N-Line Valves, construction is from Forged Steel and trims in Stainless Steel and Tungsten Carbide provide solutions to the toughest flow control challenges.

For information on Axial Flow Control Valves that are application specific, contact N-Line Valves or your local representative.
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