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 its 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 and terminal strip is mounted externally on the yoke for direct valve stem position feedback via 4-20mA signal including HART or digital protocols. 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.
Technical Description

N-Line Valves SA-II Surface Stepping Actuator
For Production Chokes & Valves

Actuator General Description

- **Actuator type:** Rotary indexing type actuator
- **Failure mode:** Fail in place
- **Manual override:** External, 2” male hexagon
- **Electrical position indication:** 2 - wire position transmitter, 4-20 mA feedback
- **Travel limit switches:** 2 - single pole, double throw switches
- **Solenoid valve isolation:** Electrically wired through travel limit switches
- **Actuator rotation per cylinder cycle:** 30 degrees
- **Cylinder cycle time:**
  - Power extend: 4 second minimum
  - Spring retracts: 6 seconds minimum
  - Total cycle time: 10 seconds minimum
- **Cylinder cycles per valve size:**
  - 2” N-Line Valve: 135 discreet positions
  - 3” N-Line Valve: 108 discreet positions
  - 4” N-Line Valve: 144 discreet positions
  - 5” N-Line Valve: 180 discreet positions
  - 6” N-Line Valve: 216 discreet positions
  - 8” N-Line Valve: 288 discreet positions
  - 12” N-Line Valve: 432 discreet positions

Pneumatic Cylinder Description

- **Cylinder size:** 4” bore, 1-1/2” stroke
- **Cylinder retracts power:** Internal mechanical spring
- **Cylinder ports:** ½” female NPT
- **Actuator supply pressure:** 30 psi minimum, 125 psi maximum
- **Actuator supply media:** Clean dry air, 19 cubic inches per cylinder cycle
- **Media supply rate:** 50 Standard cubic feet per minute minimum
- **Actuator output torque:** 295 lb-ft at 120 psi
- **Actuator weight:** 172 pounds, (Does not include solenoid valves)

Hydraulic Cylinder Description

- **Cylinder size:** 1-1/2” bore, 1-1/2” stroke
- **Cylinder retract power:** Internal mechanical spring
- **Cylinder ports:** ½” female NPT
- **Actuator supply pressure:** 1000 psi minimum, 3000 psi maximum
- **Actuator supply media:** Clean industrial grade hydraulic oil, 2.7 cubic inches per cylinder cycle
- **Media supply rate:** 4.5 GPM minimum
- **Actuator output torque:** 497 lb-ft at 1500 psi
- **Actuator weight:** 165 pounds, (Does not include solenoid valves)
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 its rest position. This single operating cycle rotates the output shaft of the actuator and correspondingly the valve stem through a gearbox assembly. 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 and terminal strip is mounted externally on the gearbox for direct valve stem position feedback via 4-20mA signal including HART or digital protocols. 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.
### Technical Description

#### N-Line Valves SA-II Surface Stepping Actuator

For Axial Flow Production Chokes

<table>
<thead>
<tr>
<th>Actuator General Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Actuator type:</strong></td>
</tr>
<tr>
<td><strong>Failure mode:</strong></td>
</tr>
<tr>
<td><strong>Manual override:</strong></td>
</tr>
<tr>
<td><strong>Electrical position indication:</strong></td>
</tr>
<tr>
<td><strong>Travel limit switches:</strong></td>
</tr>
<tr>
<td><strong>Solenoid valve isolation:</strong></td>
</tr>
<tr>
<td><strong>Cylinder cycle time:</strong></td>
</tr>
</tbody>
</table>
  - Power extend: 4 seconds minimum |
  - Spring retracts: 4 seconds minimum |
  - Total cycle time: 8 seconds minimum |
| **Cylinder cycles per 90 degrees rotation:** |  
  - 3” N-Line AFI: 204 discreet positions |
  - 4” N-Line AFI: 204 discreet positions |
  - 6” N-Line AFI: 204 discreet positions |
  - 8” N-Line AFI: 204 discreet positions |
  - 10” N-Line AFI: 204 discreet positions |
  - 12” N-Line AFI: 204 discreet positions |

#### Pneumatic Cylinder Description

- **Cylinder size:** 4” bore, 1-1/2” stroke
- **Cylinder retracts power:** Internal mechanical spring
- **Cylinder ports:** 3/4” female NPT
- **Actuator supply pressure:** 80 psi minimum, 100 psi maximum
- **Actuator supply media:** Clean dry air, 19 cubic inches per cylinder cycle
- **Media supply rate:** 50 Standard cubic feet per minute minimum
- **Actuator output torque:** Varies with selected gearbox.
- **Actuator weight:** 172 pounds, (Does not include solenoid valves)

#### Hydraulic Cylinder Description

- **Cylinder size:** 1” bore, 1-1/2” stroke
- **Cylinder retracts power:** Internal mechanical spring
- **Cylinder ports:** On application
- **Actuator supply pressure:** 1000 psi minimum, 3000 psi maximum
- **Actuator supply media:** Hydraulic Media as required by application
- **Media supply rate:** Application based
- **Actuator output torque:** Varies with selected gearbox
- **Actuator weight:** 160 pounds, (Does not include solenoid valves)
Represented by:

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