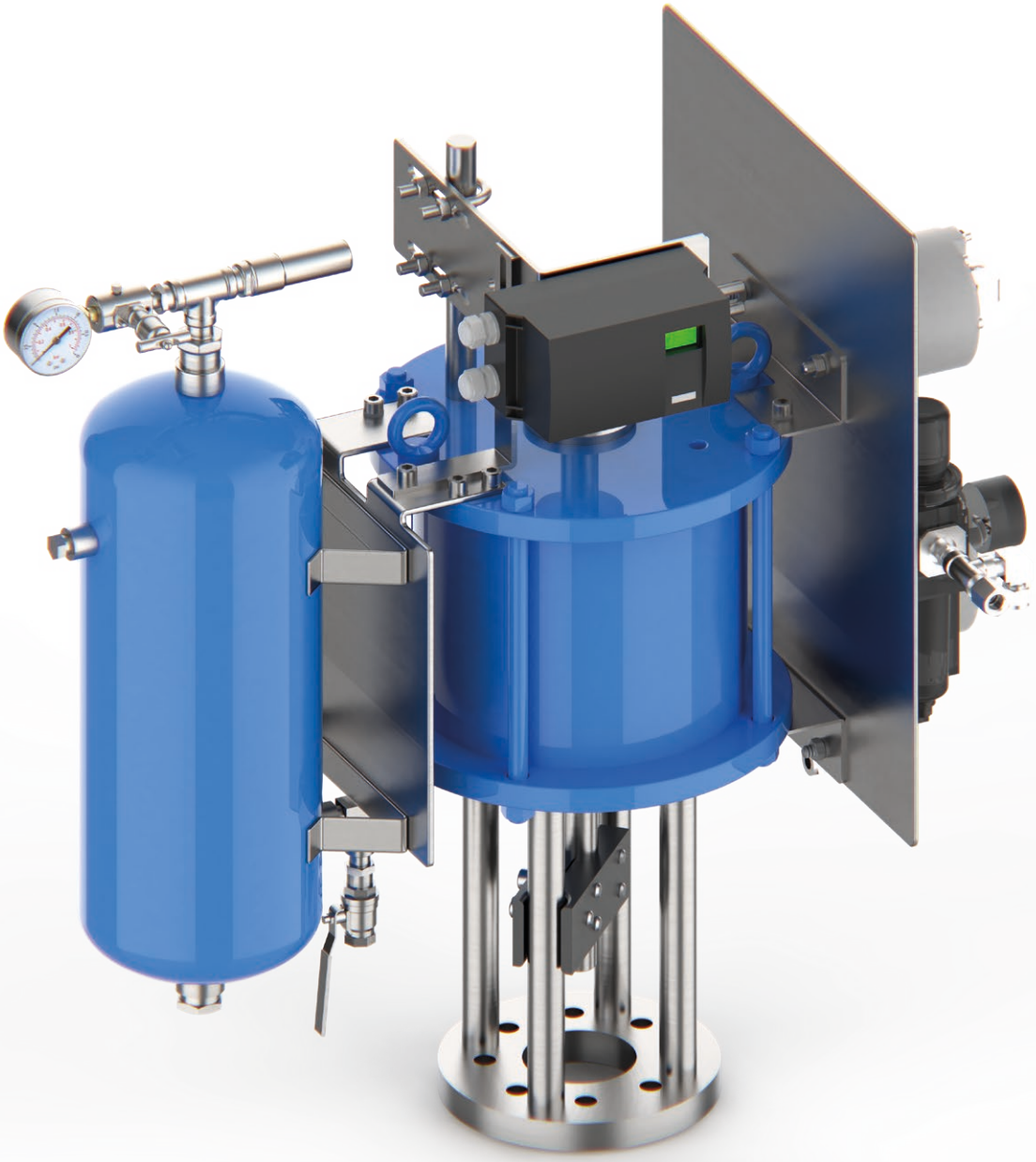
BVT
SWEDEN
VALVE SOLUTIONS

BVT-PD

Linear pneumatic actuator



B-028

BVT-PD

Linear pneumatic actuator

About us

BVT Sweden was started with the ambition of becoming world leading in critical applications in process steam and thermal power plant turbine bypass. Based in Säffle, BVT Sweden employs experts with over 30 years experience in turbine bypass, steam conditioning, temperature control, design and manufacturing processes. We design turbine bypass valves, select actuation to fit our customer's requirements. Our products are optimized on a per-order basis, and we have the experience necessary to design special solutions. These products cover steam conditioning valves, pressure reduction valves, stop valves, desuperheaters and spray water control valves.

BVT-PD

BVT's linear pneumatic actuators are designed for use in power and oil & gas industries, or in any application where steam / water valves are involved.

The actuator is installed on top of a control valve or an isolation valve with a coupling connecting the actuator piston to the valve stem. It is included as standard on BVT valves where pneumatic actuation is required, and is also sold as an upgrade for existing valves. BVT designs and builds the actuator to match the force requirements of the valve and the stroke time and functional / environmental requirements from the customer.

Operating principle

The illustration below shows a typical setup for an actuator (A) installed on a control valve. Air is supplied to the Air Filter Regulator (AFR) which filters the air and reduces the pressure in order to protect the valve and other components from overpressure.

The positioner (P) uses a set-point signal from DCS and a mechanical / inductive position feedback from the actuator to modulate the actuator. Typically an analogue signal of 4-20 mA, corresponding to 0-100% opening of the valve.

The volume boosters (VB) are used whenever the positioner itself is not powerful enough to provide sufficient modulating stroke speed. They amplify the signal from the positioner and regulates the pressures in the cylinder.

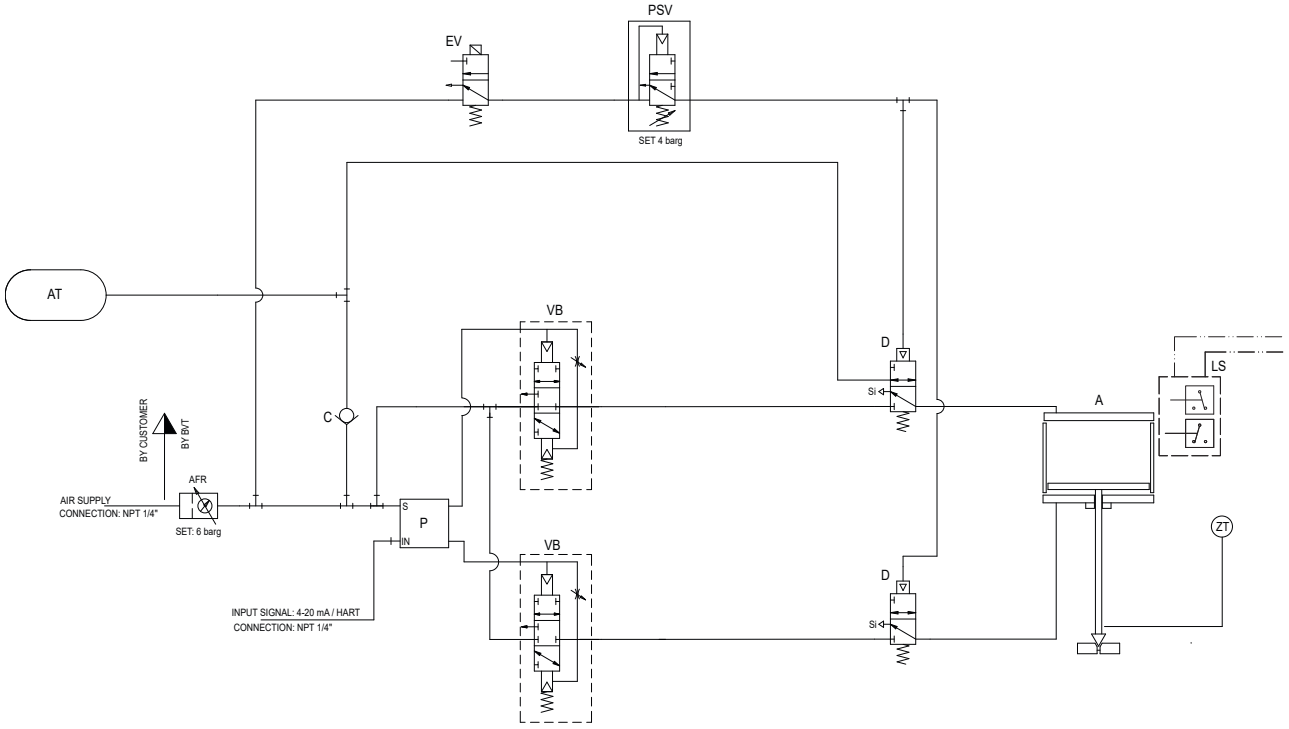
An optional position transmitter (ZT) provides the current valve position to the DCS.

By default, the actuator is fitted with a quick function (open or close) which overrides normal modulating operation and closes or opens the actuator quickly in case the pressure drops below a set level. The air pressure is measured by the pressure sensing valve (PSV).

Optionally, solenoid valve(s) (EV) can be connected in series with the PSV so that the quick function(s) can be enabled manually. Overriding of the modulating operation is handled by the directional valves (D). If the pressure sensing valve or the solenoid(s) closes, the pilot signal feeding these directional valves is shut off, and the valves enable the quick function.

The quick function uses pressurized air stored in the air tank (AT) for double-acting actuators. For single-acting actuators, the directional valves depressurizes the cylinder chamber opposite of a spring installed on top of the cylinder, enabling it to either open or close the valve.

Optional limit switches confirm the actuator position to the DCS.



MODULATING ACTUATOR WITH QUICK / FAIL CLOSE USING AIR TANK

BVT-PD

Linear pneumatic actuator

BVT SWEDEN
VALVE SOLUTIONS

Specifications

Maximum air pressure
10 bar(a)

Standard operating temperature
-20°C to 80°C

Available sizes
Up to 900 mm

Component ingress protection
IP65/IP67

Cylinder corrosion protection
ISO 12944 C4 or
ISO 12944 C5M

Regulatory requirements
ASME, PED, ISO 9001/14001 as standard
ATEX, SIL as option

Tubes and fittings
ANSI 316

Types
Double acting or single acting
Modulating or ON/OFF

Default functions
Fail open/close at low pressure
Air tank sized for 2 complete strokes
Air filter regulator

Options
Quick open, quick close, quick open + quick close
Fail in place
Limit switches
Position transmitter
Multiple solenoids in 1oo3 or 2oo3 configuration
SIL-certified components

Key features

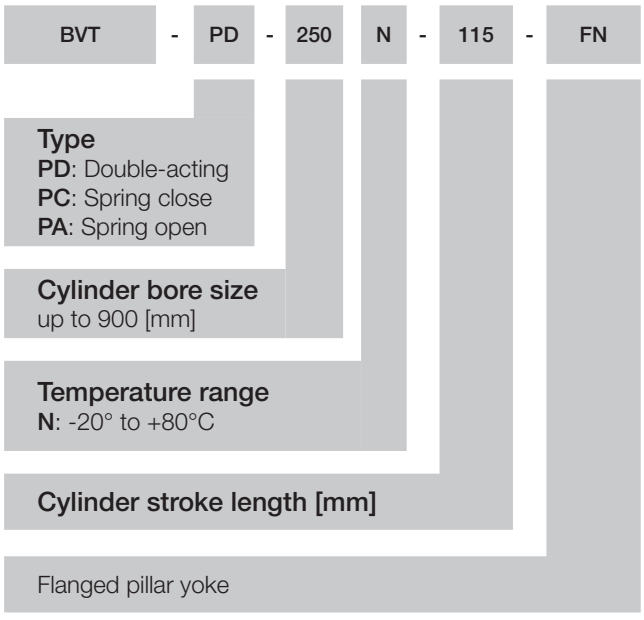
- ✓ Sized and designed based on customer requirements
- ✓ Components calibrated and tested before shipping
- ✓ High linearity and small dead-band
- ✓ Heavy duty for operating in challenging application and environments
- ✓ Positioner and other electrical components are installed away from valve in order to avoid high temperatures
- ✓ High corrosion protection and ingress protection

Design

The PD is a heavy duty pneumatic cylinder designed and manufactured to operate in demanding installations. It is built from chromium plated carbon steel for corrosion resistance and friction reduction. A PTFE charged slide guarantees perfect drive and alignment of the piston under all load conditions. Chromium plated carbon steel shaft, dynamic floating seals and PTFE charged bushing allow to reduce sliding friction and avoid slick-stip effect. Particular care in material selection and design ensure optimum performance, reduced hysteresis and dead band for accurate control.

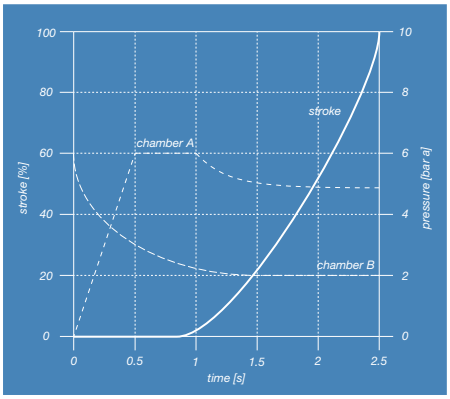
Electrical and control components are mounted on a plate on top of the cylinder, avoiding the high temperatues close to the valve, improving their lifetime. Our actuator uses a through rod cylinder, allowing the positioner and any limit switches to measure the actuator position from above the cylinder house. This also makes the components more accessible.

Smart positioners are used as standard with PS/PD actuators, and the actuator can be designed to work with any brand of linear positioner, including those using linkage-free (magnetic) position feedback.



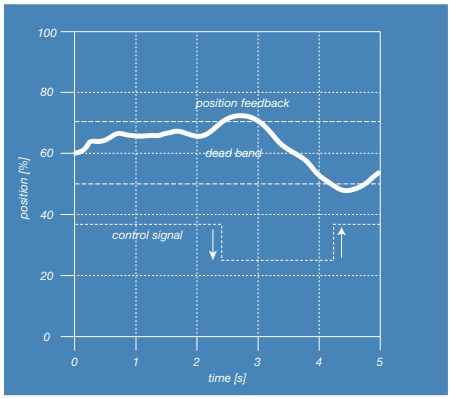
BVT-PD PRODUCT CODE

Control logic



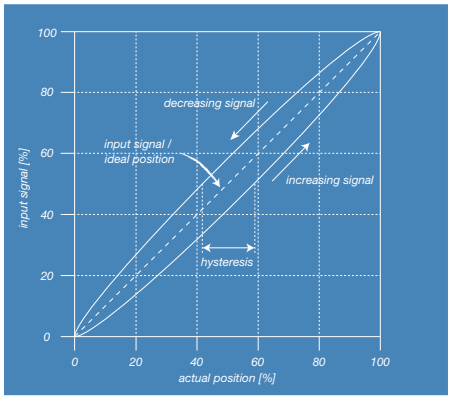
STROKE TIME

Control components are selected to handle the required modulating and trip stroke times based on simulation, and then confirmed by testing.



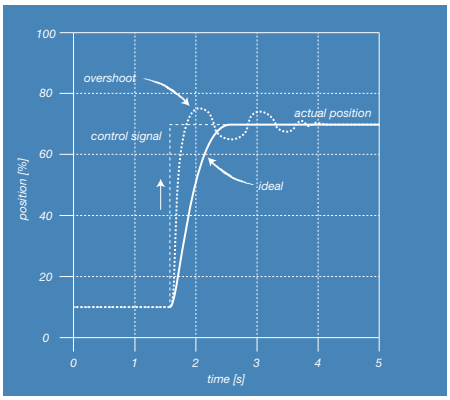
DEAD BAND

Control actuators are tested so that the hysteresis + dead band is smaller than 4%. Linearity is kept within ±5%.



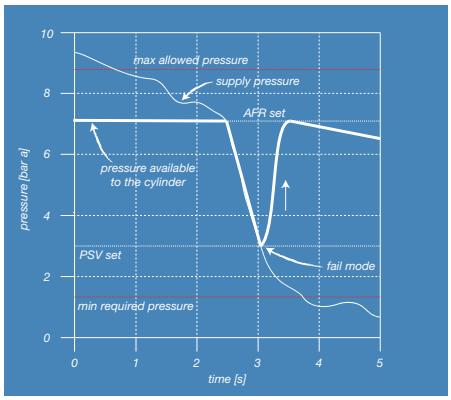
HYSTERESIS

The hysteresis is tested by step-wise opening and closing the actuator, and comparing the actual position.



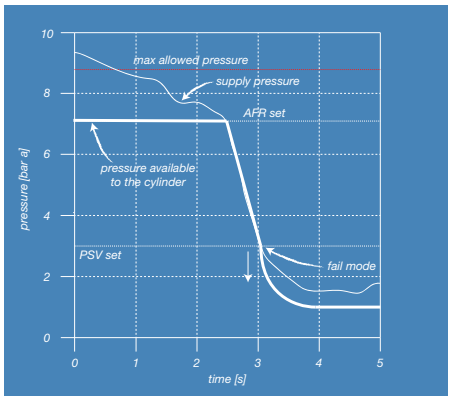
STABILITY

Volume boosters are tuned to result in a required stroke time while avoiding overshoots (which can result in instability).



DOUBLE-ACTING

The AFR limits the pressure to the cylinder to avoid damaging valve internals, while the PSV and directional valves redirect air from the air tank to ensure the cylinder pressure doesn't fall below the minimum required level.



SINGLE-ACTING

For a single-acting actuator, the fail mode action (open, or close) is handled by a spring. The PSV and the directional valves depressurizes the actuator chamber, ensuring that the spring can close the valve.

Certificates

Lloyd's Register

Certificate No. / Zertifikat Nr.: 50329/1

CERTIFICATE
in accordance with the requirements of the Pressure Equipment Directive 2014/68/EU

ZERTIFIKAT
in Übereinstimmung mit den Anforderungen der Druckgeräterichtlinie 2014/68/EU

This is to certify that the quality assurance system of
Hiermit wird bescheinigt, dass das Qualitätssicherungssystem des Unternehmens

BVT Sweden AB
SE-653 46 Karlstad
Sweden / Schweden

has been assessed by LR Deutschland GmbH in accordance with the requirements of Annex III
durch die LR Deutschland GmbH entsprechend den Forderungen des Anhangs III

Module H

to the Pressure Equipment Directive 2014/68/EU and
conforms to the requirements for the products shown below:
der Druckgeräterichtlinie 2014/68/EU geprüft und bewertet wurde und für die folgenden Produkte die Anforderungen erfüllt:

Valves and accessories for power and process applications,
for details see Annex 1 to this certificate.
Ventile und Ausrüstungsteile für Anwendungen in der Wärme- und Verfahrenstechnik,
Einzelheiten siehe Anhang 1 dieses Zertifikates.

Approval is subject to continued maintenance of the quality assurance system
in accordance with the requirements of the above-mentioned directive.
Die Zulassung gilt unter der Voraussetzung, dass das Qualitätssicherungssystem fortlaufend aufrechterhalten wird und
die Forderungen oben genannter Richtlinie erfüllt.

Authorisation is hereby given to use the below-mentioned Notified Body Identification Number
of LR Deutschland GmbH in accordance with the requirements of the specified directive
in relation to the products as named above:
Hiermit wird die Genehmigung erteilt, folgende Kennnummer der LR Deutschland GmbH als Notifizierte Stelle
in Übereinstimmung mit der angegebenen Richtlinie in Bezug auf die oben genannten Produkte zu verwenden:

CE 0525

Certificate expiry date / Zertifikatsgültigkeit bis: **31.01.2022**

Hamburg, 01.11.2019
Place and Date
Ort und Datum

K. Wolf
Name, Signature, Certifier
Name, Unterschrift, Zertifizierer

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ZE-1110 en Rev. 3, (08/19) Lloyd's Register Deutschland GmbH, Überseeallee 10, D-20457 Hamburg, Deutschland T: +49 349 700 10-100 F: +49 950 69 2625 Email: PressureSystems.Germany@lr.org Seite 1 von 1

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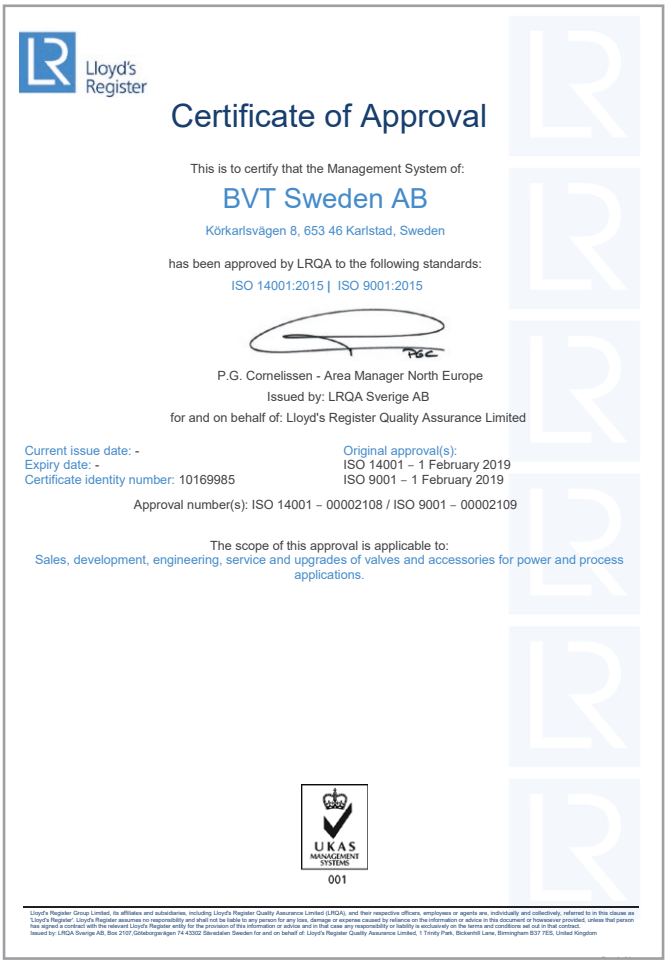
MODULE H



Lloyd's Register

Certificate of Approval

This is to certify that the Management System of:

BVT Sweden AB

Körkarlsvägen 8, 653 46 Karlstad, Sweden

has been approved by LRQA to the following standards:

ISO 14001:2015 | ISO 9001:2015

P.G. Cornelissen - Area Manager North Europe
Issued by: LRQA Sverige AB
for and on behalf of: Lloyd's Register Quality Assurance Limited

Current issue date: -
Expiry date: -
Certificate identity number: 10169985

Original approval(s):
ISO 14001 – 1 February 2019
ISO 9001 – 1 February 2019

Approval number(s): ISO 14001 – 00002108 / ISO 9001 – 00002109

The scope of this approval is applicable to:
Sales, development, engineering, service and upgrades of valves and accessories for power and process applications.

UKAS MANAGEMENT SYSTEMS
001

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Issued by: LRQA Sverige AB, Box 2107, Göteborgsvägen 74 43302 Sävedalen Sweden for and on behalf of: Lloyd's Register Quality Assurance Limited, 1 Trinity Park, Bickenhill Lane, Birmingham B37 7ES, United Kingdom

ISO 14001 AND ISO 9001