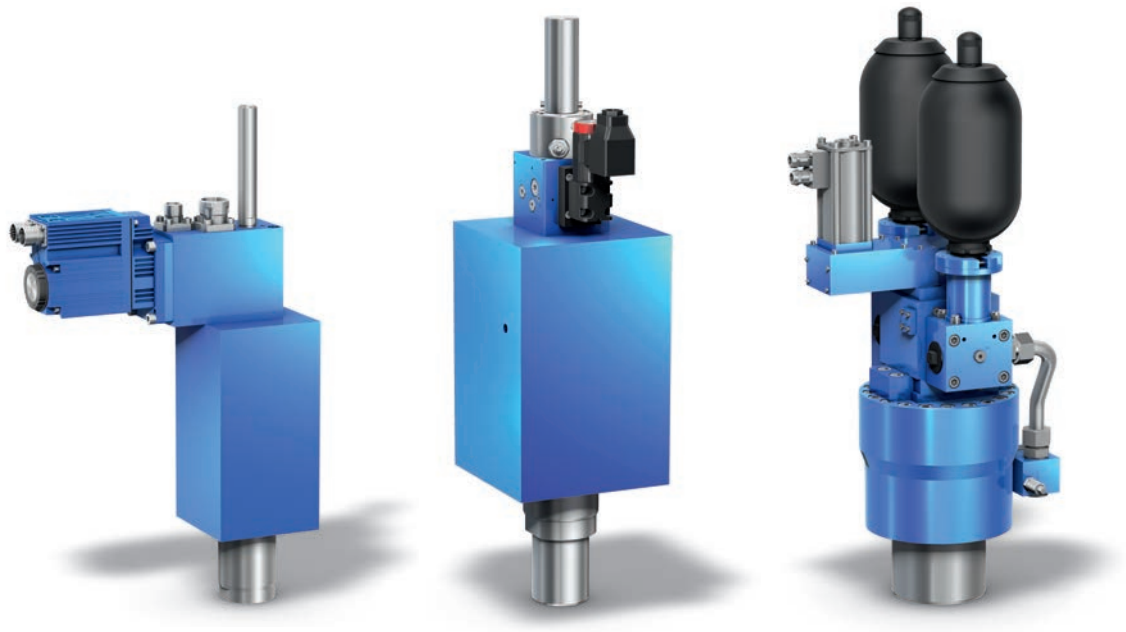
voith.com

Hydraulic servo stroke control units for punching, shearing and cutting machines

Product data sheet



Advantages

+ Highly dynamic drive
+ Controlled movement profiles
+ Optimal power density
+ High availability
+ Easy installation and commissioning

Design and function

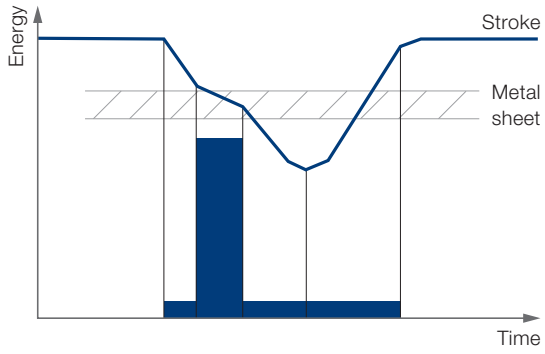
Voith servo stroke control units are modular, highly dynamic hydraulic control units. They consist of a hydraulic actuator with a directly flange-mounted control block with all functions, as an option, an application-optimized hydraulic power pack with efficient and robust internal gear pumps and an electronic control system. The attachment of all necessary valve components directly to the block cylinder offers a compact design and optimum power density, very high hydraulic stiffness of the actuator with low installation effort. The actuator is controlled by a servo control valve in a hydromechanical control loop. The stroke length and stroke position are controlled by the hydromechanical control loop of the hydraulic amplifier and hydraulically amplified in a highly dynamic manner by the servo valve. In the BWSE drive, the stroke length and stroke position of the cylinder are set mechanically at the control valve. The stroke is triggered by an electrically controlled, fast-switching pilot valve. The hydromechanical control eliminates the need for measuring systems and electronic control concepts. This is the basis for system-typical properties such as dynamics, robustness and process reliability. Cylinder design, surface adaptation and installation conditions are directly adapted to the specific requirement profile of the applications.

Voith servo stroke control units offer highly dynamic motion sequences. The expected high performance, force and dynamics are optimally fulfilled with the offered drives. Voith servo stroke control units are very energy efficient and require a low installed electrical power. This is due to the load-controlled, two-pressure system and the accumulator operation.

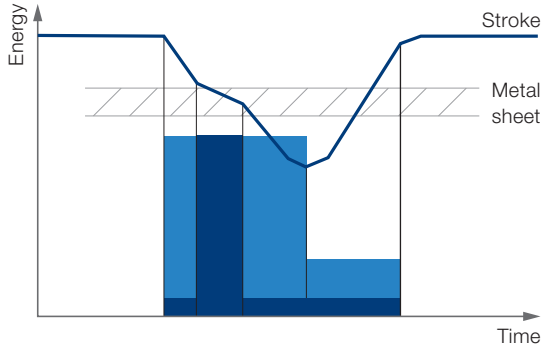
The Voith electronic controls are the electronic link between the punch drives and the machine control system. Via the electronic controls, parameters such as speed, position and travel profile are output to a stepper motor with low electrical power. After cycle start, all hydraulic sensors and actuators are managed by the electronic control.

Energy balance graphic

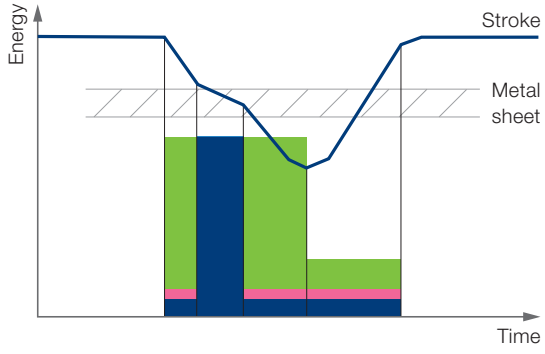
Theoretical energy demand during punch operation



One pressure system energy demand during punch operation



Two pressure system energy demand during punch operation



- Theoretical energy requirement
- Additional energy requirement of an one pressure system to the theoretical energy requirement
- Additional energy requirement of a two pressure system to the theoretical energy requirement
- Saved energy

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Servo drive BWIL

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Hydraulic punch drive BWSE NG 10

Features

- The stroke position (TDC) is independently adjustable
- The stroke length is mechanically adjustable to meet the machine demands
- The piston acceleration and deceleration is smooth and controlled
- The target speed is independent of load and reproducible
- The load variations on the cylinder are compensated steadily
- Very dynamic performance, even for high load forces and large mass load
- Any ram positioning is with closed loop compensation, no hard stops being used
- Positioning is fast, yet smooth
- High process safety, increased availability and dynamics
- Proximity switches E1 and E2 for stroke management are integrated
- The integrated electronic pulse generator offers easy stroke management
- Reduction in pressure peaks through continuous control and thus relieves the sealing elements
- Energy savings through accurate and user-friendly adaptation of the working stroke

Scope of delivery

- Hydraulic cylinder, optimized for punching and shearing applications
- Control valve with integrated proximity switches
- Electronic pulse generator for valve control

Applications

- Pre-punching plant/line punching plant
- Trash hacker
- Ejector
- Machines and plants for stamping

Options

- Linear actuator with control valve for three-way operation suitable for systems with large moving foreign masses
- Non-standard stroke lengths
- Valve for holding the cylinder in top position

Technical data

General

Ram force	10 to 400 kN (standard design)
Retraction force	approx. 50% ram force
Ambient temperature	-5 to +50 °C
Mounting position	any

Hydraulic

Operating pressure	max. 210 bar
Fluid temperature	-10 to +70 °C
Viscosity range	10 to 300 mm^2/s

Electric

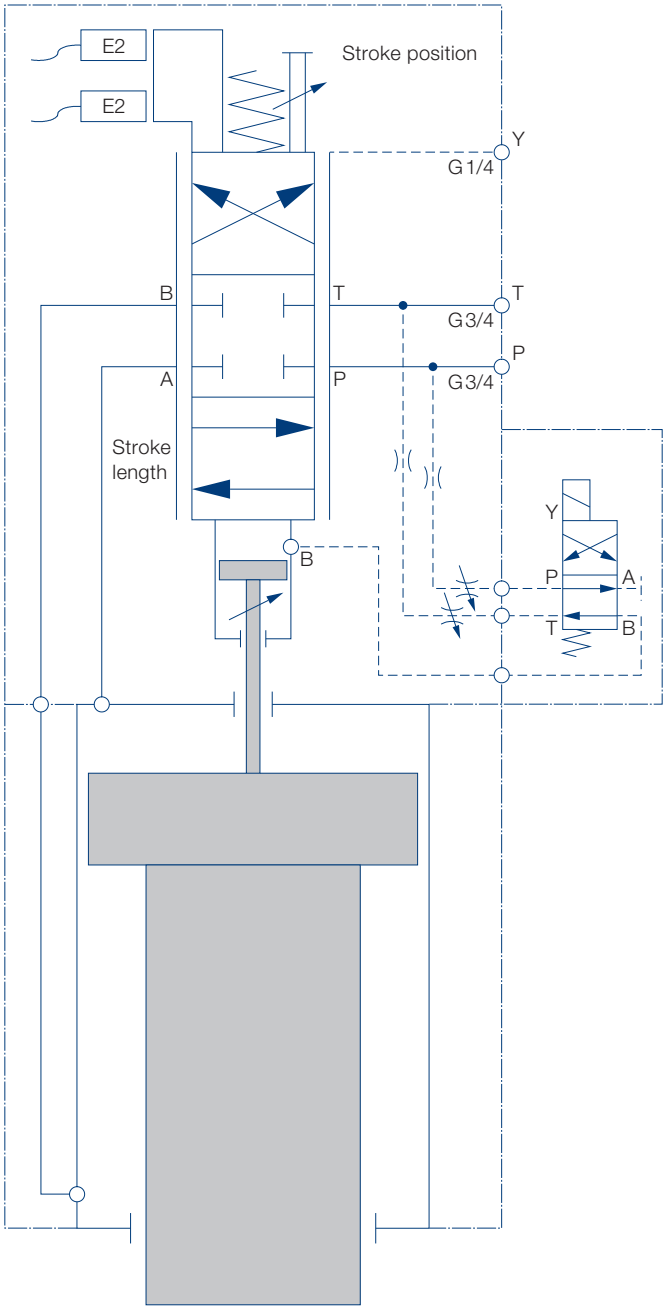
Control	Electronic pulse generator Data sheet 914

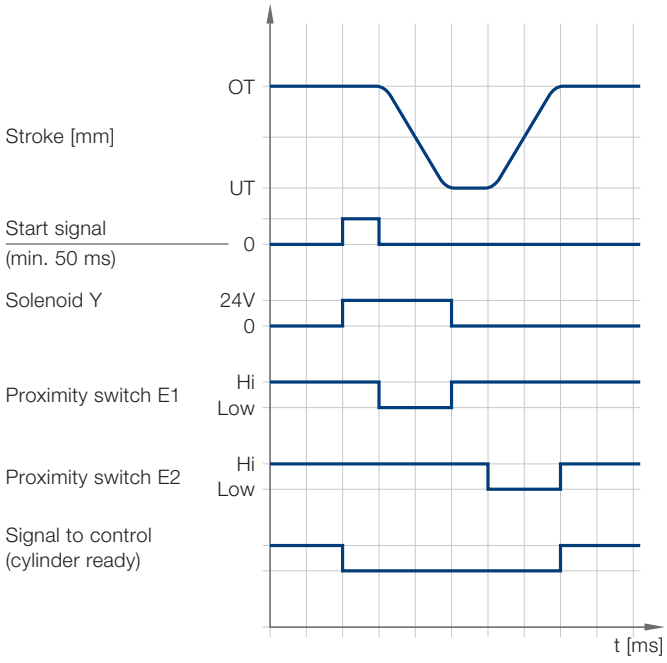
Examples of applications

Application	Specific performance characteristics
Pre-punching plant	• Punching force: 150 kN • Total cycle time at 10 mm stroke: 235 ms
Trash hacker in press plant	• Cutting force: 60 kN • Total cycle time at 6 mm stroke: 75 ms

Hydraulic punch drive BWSE NG 10

Diagram

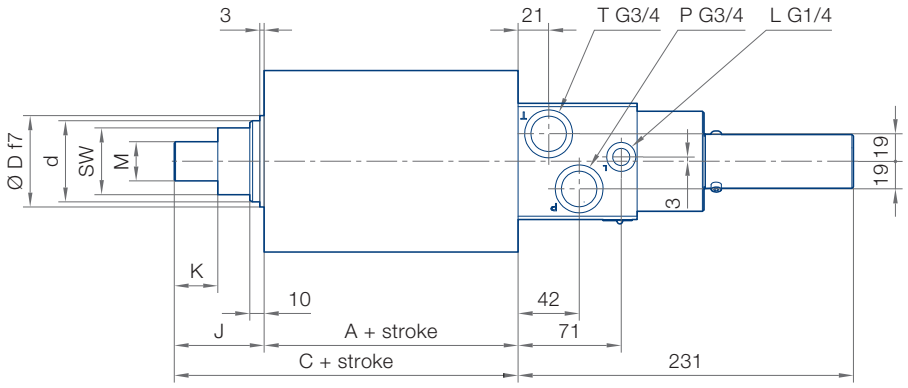

E2
E2
Stroke position
Y
G 1/4
B
T
T
G 3/4
P
A
P
G 3/4
Stroke
length
B
Y
P
A
T
B

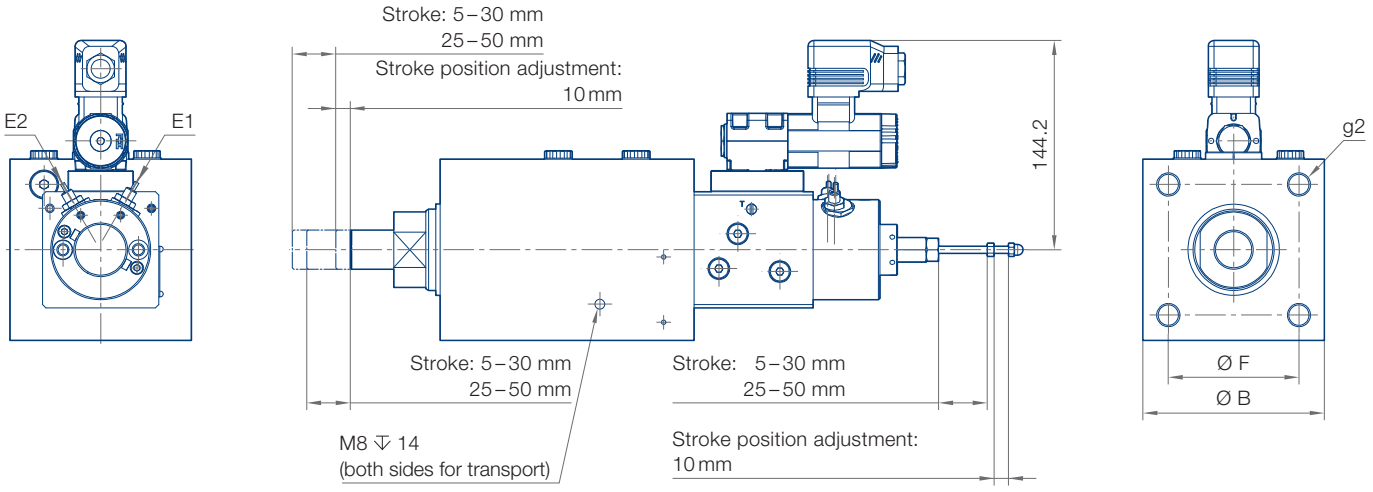

Stroke [mm]
OT
UT
Start signal
(min. 50 ms)
0
Solenoid Y
24V
0
Proximity switch E1
Hi
Low
Proximity switch E2
Hi
Low
Signal to control
(cylinder ready)
t [ms]

Basic dimensional drawing

Force F_{max} [kN]	Ø D	Ø d	A	B	C	F	J	K	M	SW	g2
20	40	28	100	75	144	55	44	30	M20x1.5	22	M10
35	50	35	108	90	143	65	55	35	M27x2	27	M12
55	63	45	130	105	192	70	62	42	M30x2	36	M16
90	80	56	145	125	220	90	75	50	M42x2	46	M16
140	100	70	190	150	280	110	90	60	M48x2	60	M20

Other cylinder dimensions on request
All dimensions in mm
F_{max} depends on the configured operating pressure





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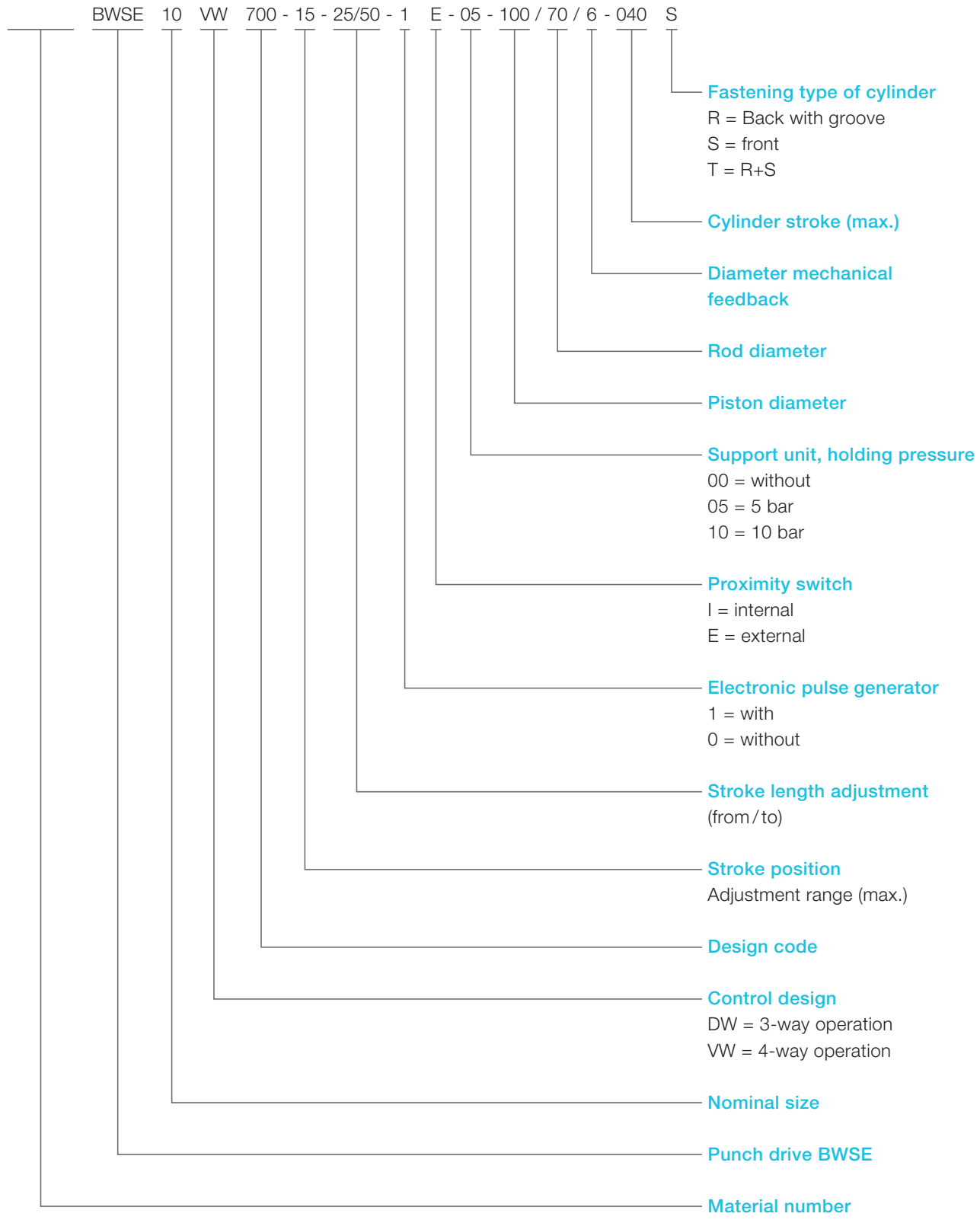

BWSE 10 VW 700 - 15 - 25/50 - 1 E - 05 - 100 / 70 / 6 - 040 S
Fastening type of cylinder
R = Back with groove
S = front
T = R+S
Cylinder stroke (max.)
Diameter mechanical feedback
Rod diameter
Piston diameter
Support unit, holding pressure
00 = without
05 = 5 bar
10 = 10 bar
Proximity switch
I = internal
E = external
Electronic pulse generator
1 = with
0 = without
Stroke length adjustment
(from / to)
Stroke position
Adjustment range (max.)
Design code
Control design
DW = 3-way operation
VW = 4-way operation
Nominal size
Punch drive BWSE
Material number

Electrohydraulic power rod

Features
- Programmable speed, position and tool feed profiles
- Hydromechanical closed loop
- Direction-sensing overload display
- Smooth rod movement
- No measuring systems are required

Applications
- Bending
- Cutting
- Stamping
- Shearing
- Blanking

Options
- Integrated stepper motor driver
- BDC/TDC position unit to reduce cycle times
- Electronic control of stepper motor, improved performance
- Design modifications for special safety requirements

Technical data

General

Stroke length	70 / 150 mm
Return force	approx. 10% to 20% rod force
Programmable step size	0.1-0.004 mm
Max. rod speed	500 mm/s
Ambient temperature	-5 to +50 °C
Mounting position	any

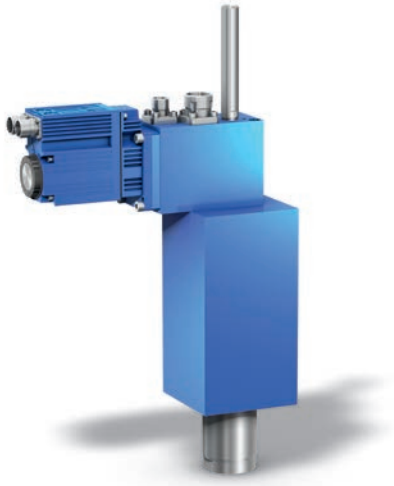
Hydraulic

Operating pressure	max. 250 bar
Oil temperature	-10 to +70 °C
Viscosity range	10 to 300 mm^2/s

Electric

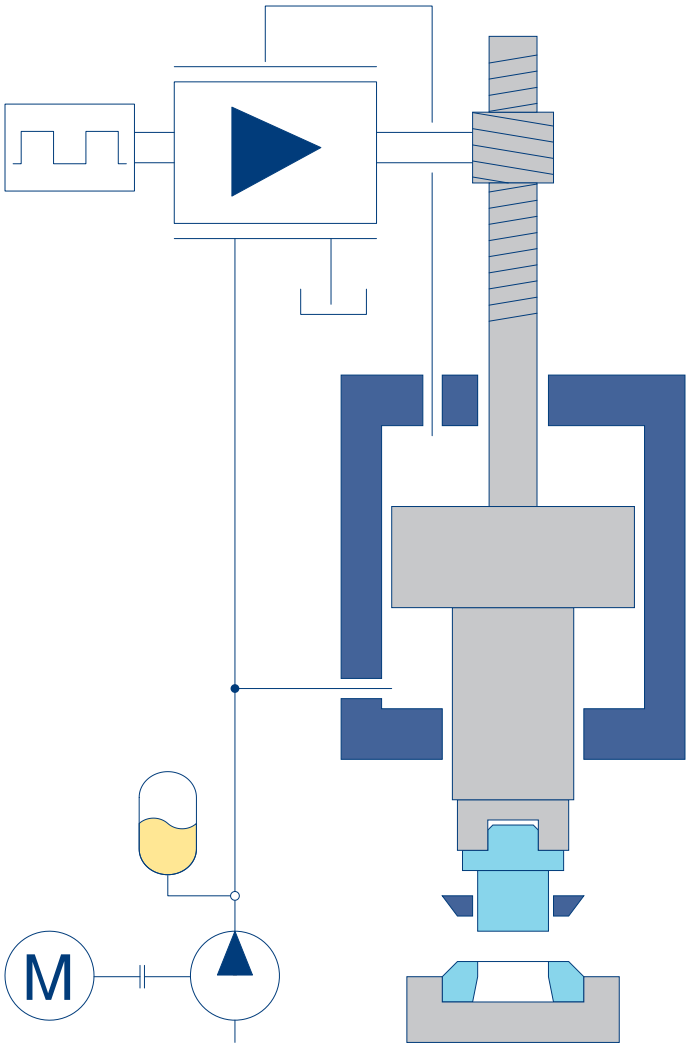
Control	2-phase amplifier digital / analog

Electrohydraulic power rod



Servo-mechanical fineblanking press

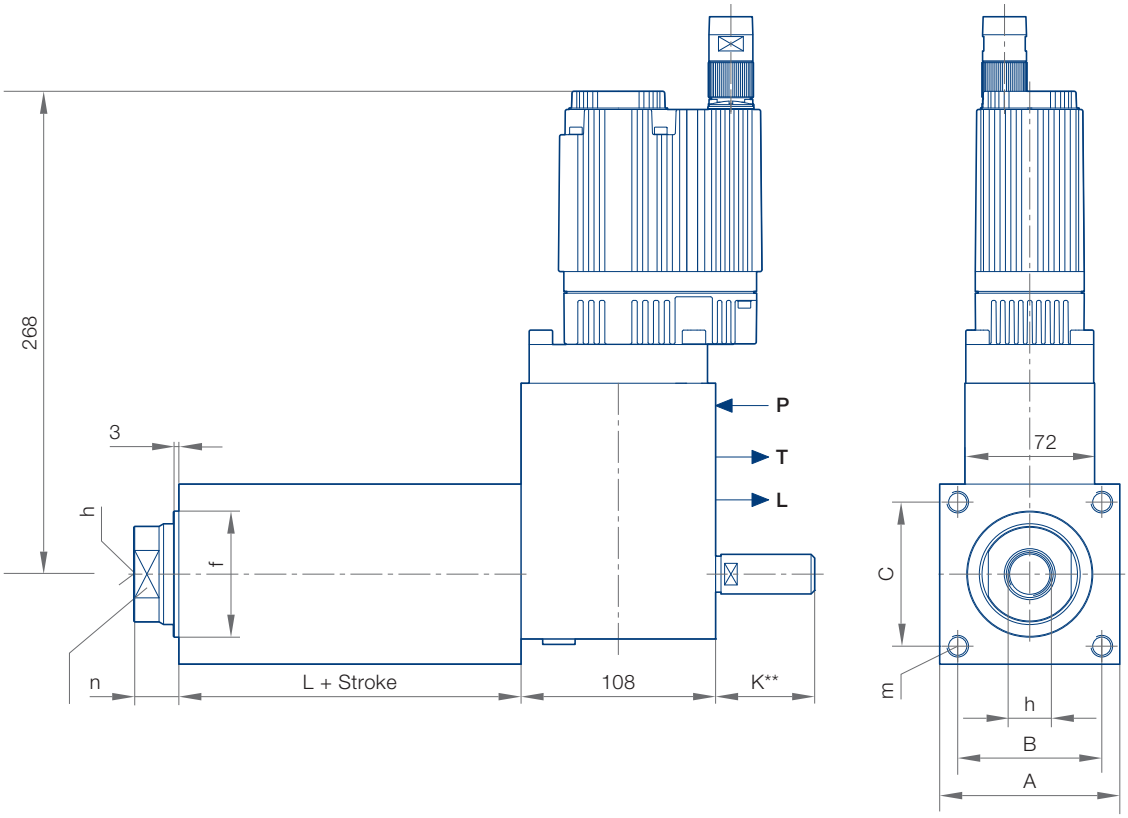
Diagram



Basic dimensional drawing

Ø Piston	Ø Rod	L+stroke*	A	B / C	Ø f	h	m	n
40	36	110	76	56	50	M16x1.5	M10	18
50	45	110	76	56	65	M20x1.5	M12	20
63	56	120	100	80	70	M24x1.5	M12	25
80	70	125	130	100	90	M24x1.5	M16	25
100	90	170	160	120	110	M42x1.5	M16	30
110	100	170	170	130	120	M42x1.5	M16	35
120	105	175	180	140	140	M48x1.5	M24	35
140	125	205	200	140	140	M48x1.5	M24	40
160	140	210	240	190	170	M64x1.5	M30	40

electric connection plug not included
*measurements given are minimum
**measure K on request
All dimensions in mm



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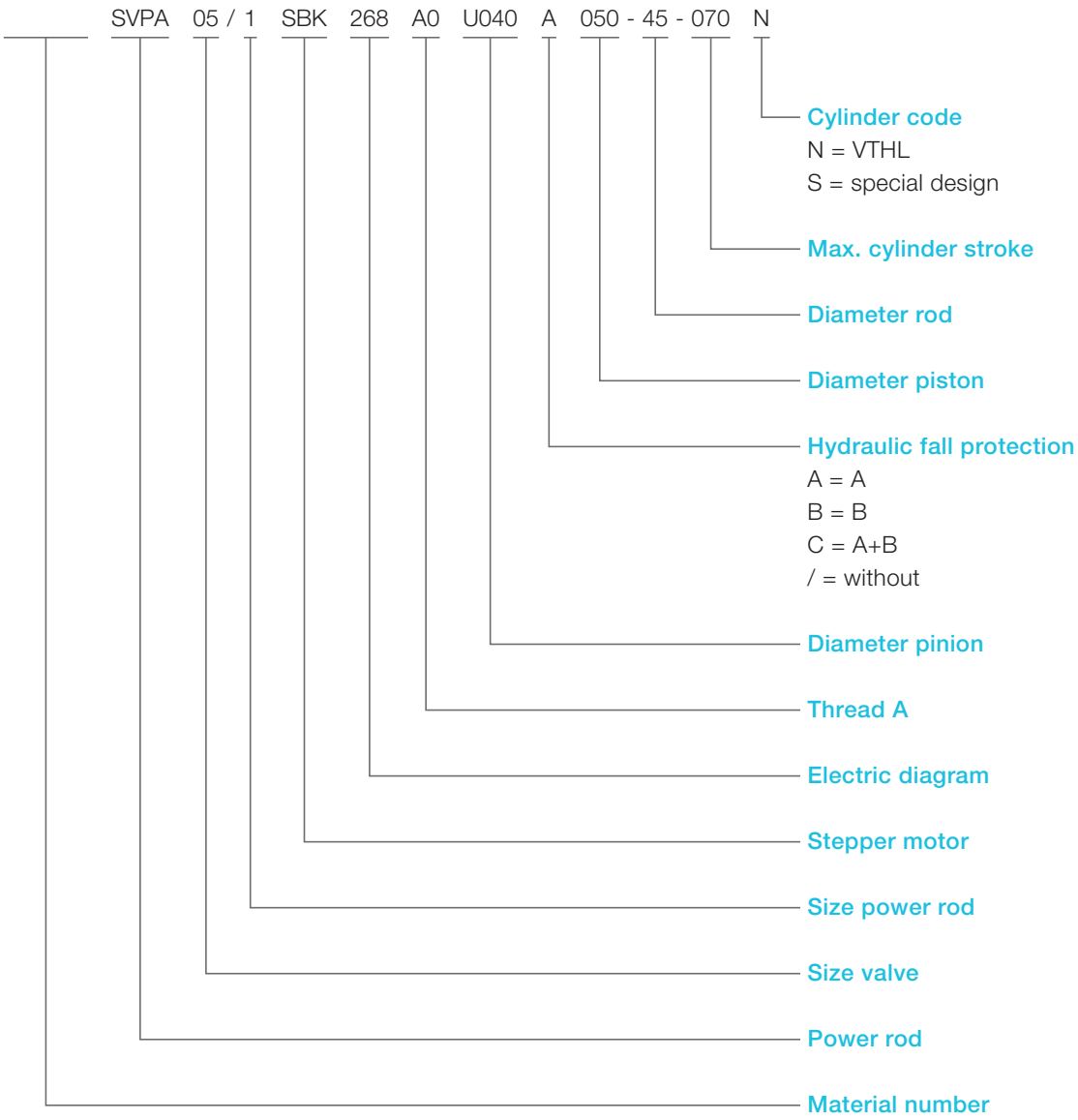

SVPA 05 / 1 SBK 268 A0 U040 A 050 - 45 - 070 N
Cylinder code
N = VTHL
S = special design
Max. cylinder stroke
Diameter rod
Diameter piston
Hydraulic fall protection
A = A
B = B
C = A+B
/ = without
Diameter pinion
Thread A
Electric diagram
Stepper motor
Size power rod
Size valve
Power rod
Material number

Servo drive BWIL

Features
- Hydromechanic closed loop
- High dynamic even with high forces and external masses
- Programmable start position, working stroke, speed and other free choosable parameters
- Process safety by monitored cycle sequence
- Robust valve technology
- High availability

Applications
- Drive for positioning (active downholder for presses)
- Combination drive for punching, shearing and stamping
- Servo drive for forming machines

Options
- Demand-driven high/low pressure switching
- Safety modules (e.g., Performance Level d)
- Power pack
- Special designs
- Customer's setpoint control

Scope of delivery
- Servo drive BWIL
  - Optimized hydraulic cylinder
  - Control valve
  - High retention valve, in accordance with specific requirements
    - Accumulator
    - Voith servo motor
- Electronic control HS4-SV1
  - Intelligent drive control and diagnosis
  - Data interface: RS-232, CAN Bus, Profibus, Ethernet, USB
- Linear position measuring system (incremental or absolute)
- Cable kit for servo motor

Servo drive BWIL

Technical data

General

Ram force	200 to 2 000 kN (standard design)
Return force	10% to 20% of ram force
Ambient temperature	-5 to +50 °C
Mounting position	mountable in any position

Hydraulic

Operating pressure	max. 250 bar
Flow rate BWIL 25	max. 350 l/min
Flow rate BWIL 32	max. 750 l/min
Flow rate BWIL 40	max. 1.500 l/min
Fluid temperature	-10 to +70 °C
Viscosity range	10 to 300 mm^2/s

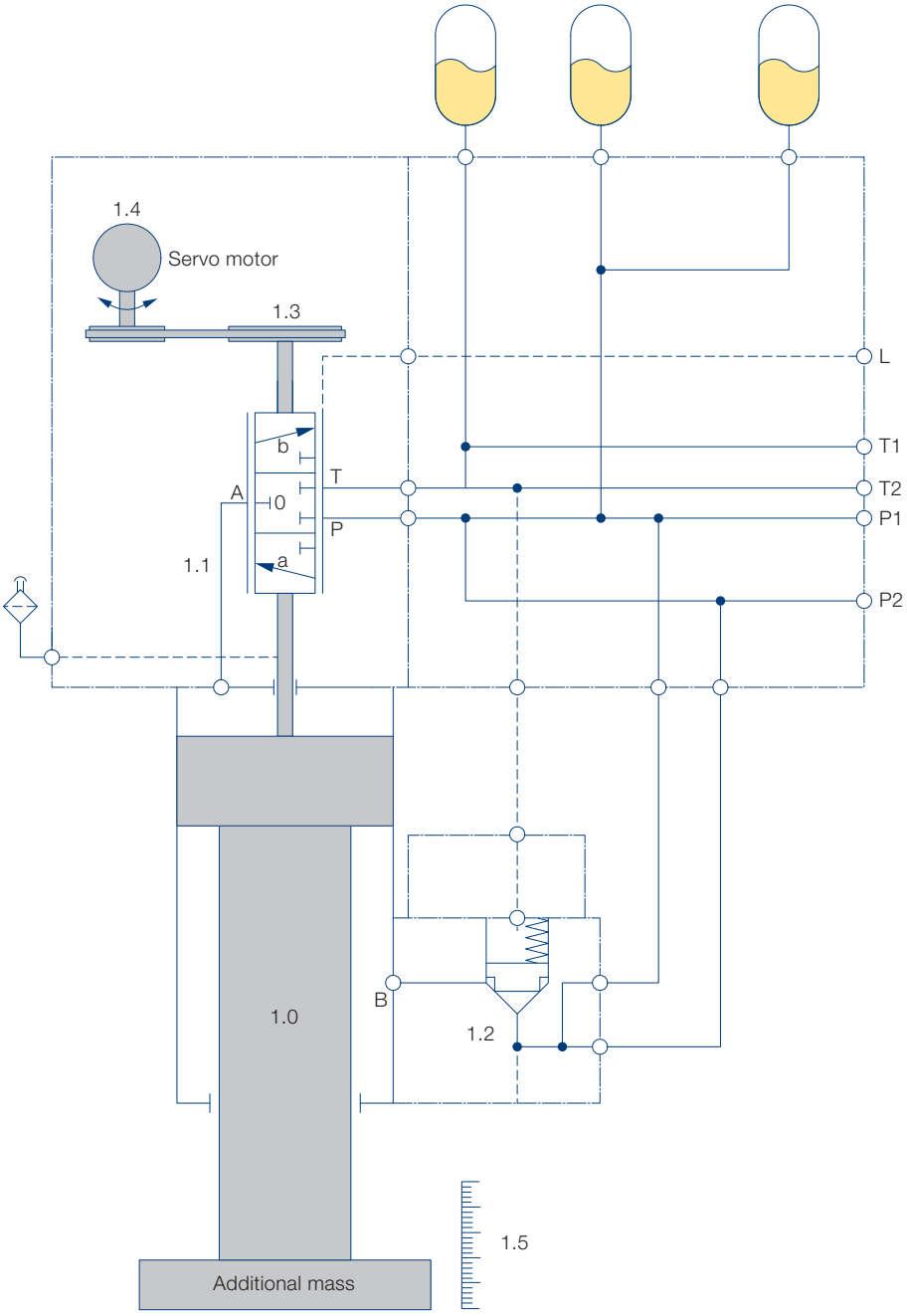
Electric

Control	HS4, data sheet 915

Force/cylinder dimensions

Force* [kN]	Piston diameter ØD [mm]	Rod diameter Ød [mm]
210	120	110
300	140	130
400	160	150
480	180	165
600	200	185
740	220	205
850	240	220
1 020	260	240
1 190	280	260
1 390	300	280
1 590	320	300
1 820	340	320
1 960	360	335
2 210	380	355
2 470	400	375
2 680	420	390

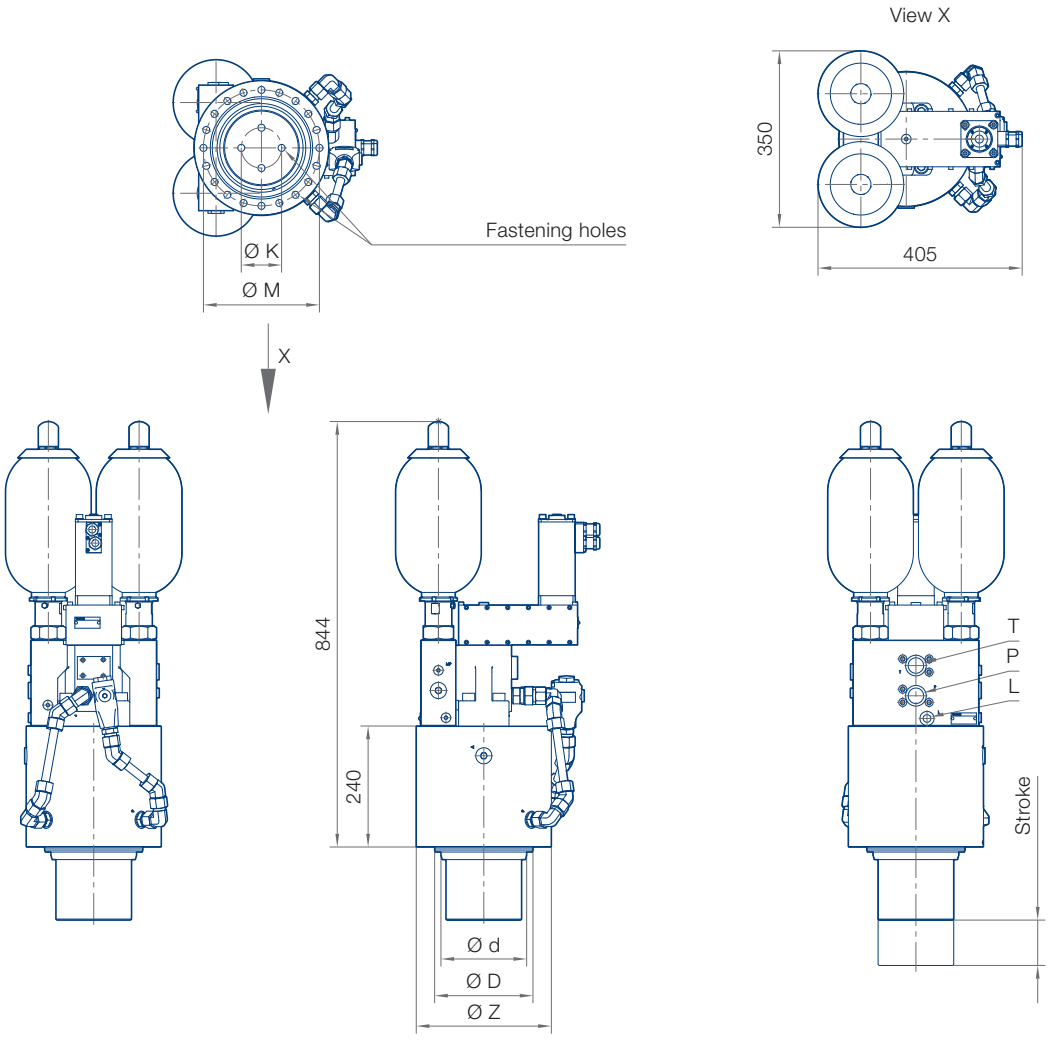
Diagram



Principle of operation

The servo motor 1.4 specifies the setpoint via a toothed belt drive 1.3 to the control valve 1.1 on. In the valve, the rotational movement is converted into linear motion and is amplified by the hydraulic cylinder many times 1.0. The actual position of the working piston is guided directly on these back through the mechanical connection between the hydraulic cylinder and control valve. Thus, the hydro-mechanical control loop is closed. When switched, the attached high holding valve 1.2 will keep the cylinder, and the mass attached to it, in the starting position.

Basic dimensional drawing BWIL 25

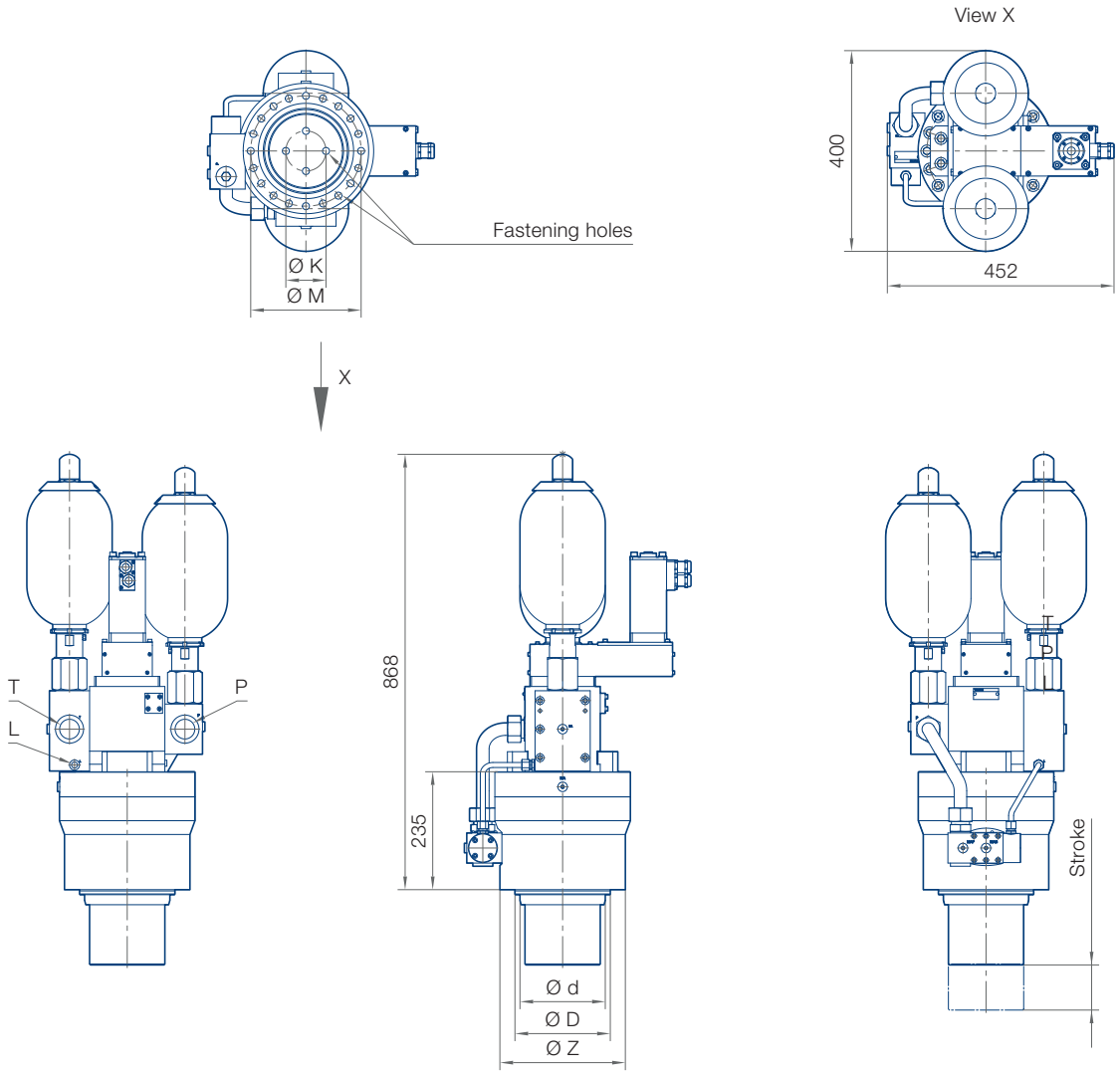


Example

BWIL 25 with cylinder diameter 180/170/16 – 60 mm stroke.
The dimensions given are to be considered as guidelines.
Dimensions and port sizes are defined project-specific basis.

All dimensions in mm

Basic dimensional drawing BWIL 32

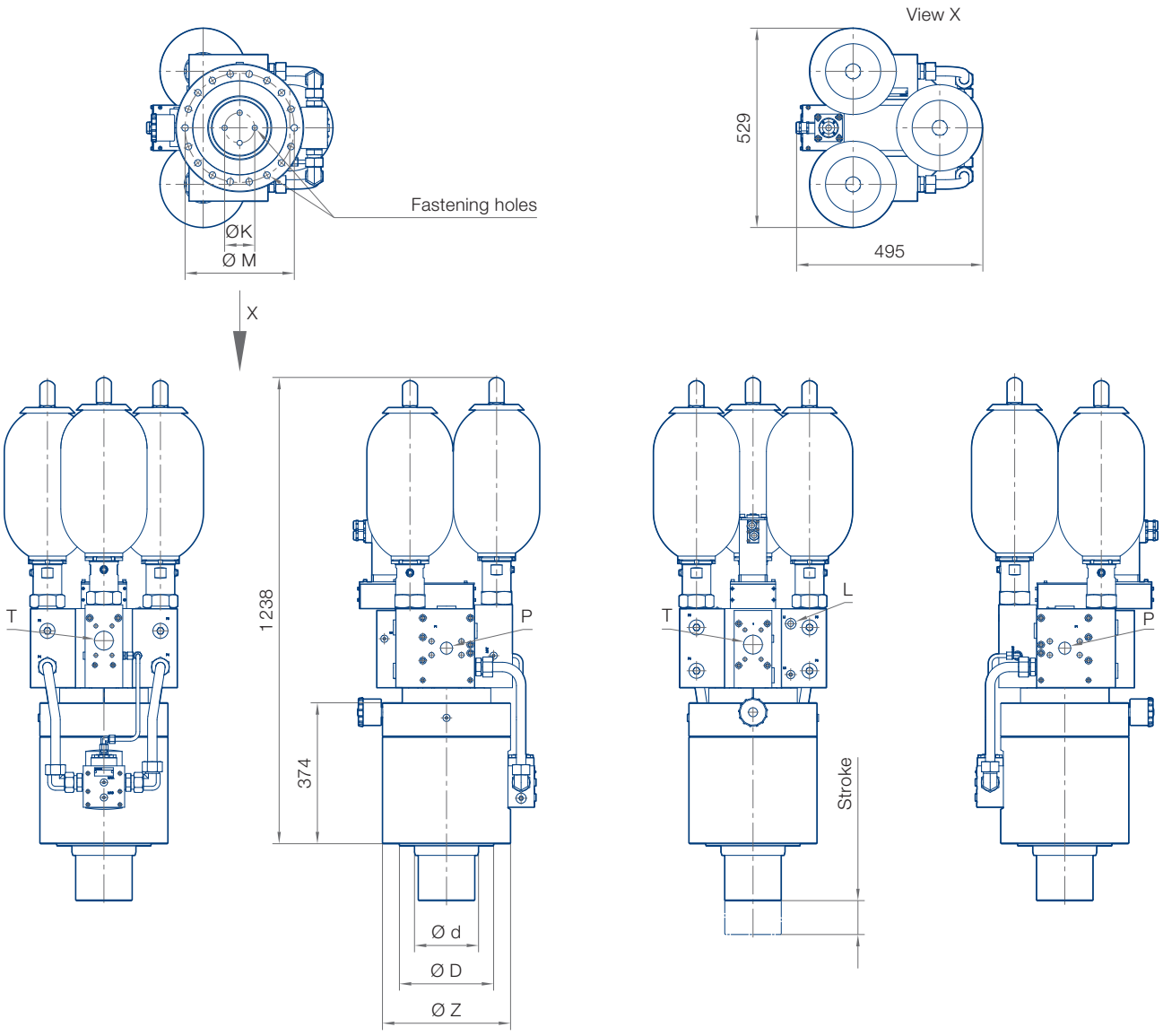


Example

BWIL 32 with cylinder diameter 180/160/32 – 25mm stroke.
The dimensions given are to be considered as guidelines.
Dimensions and port sizes are defined project-specific basis.

All dimensions in mm

Basic dimensional drawing BWIL 40

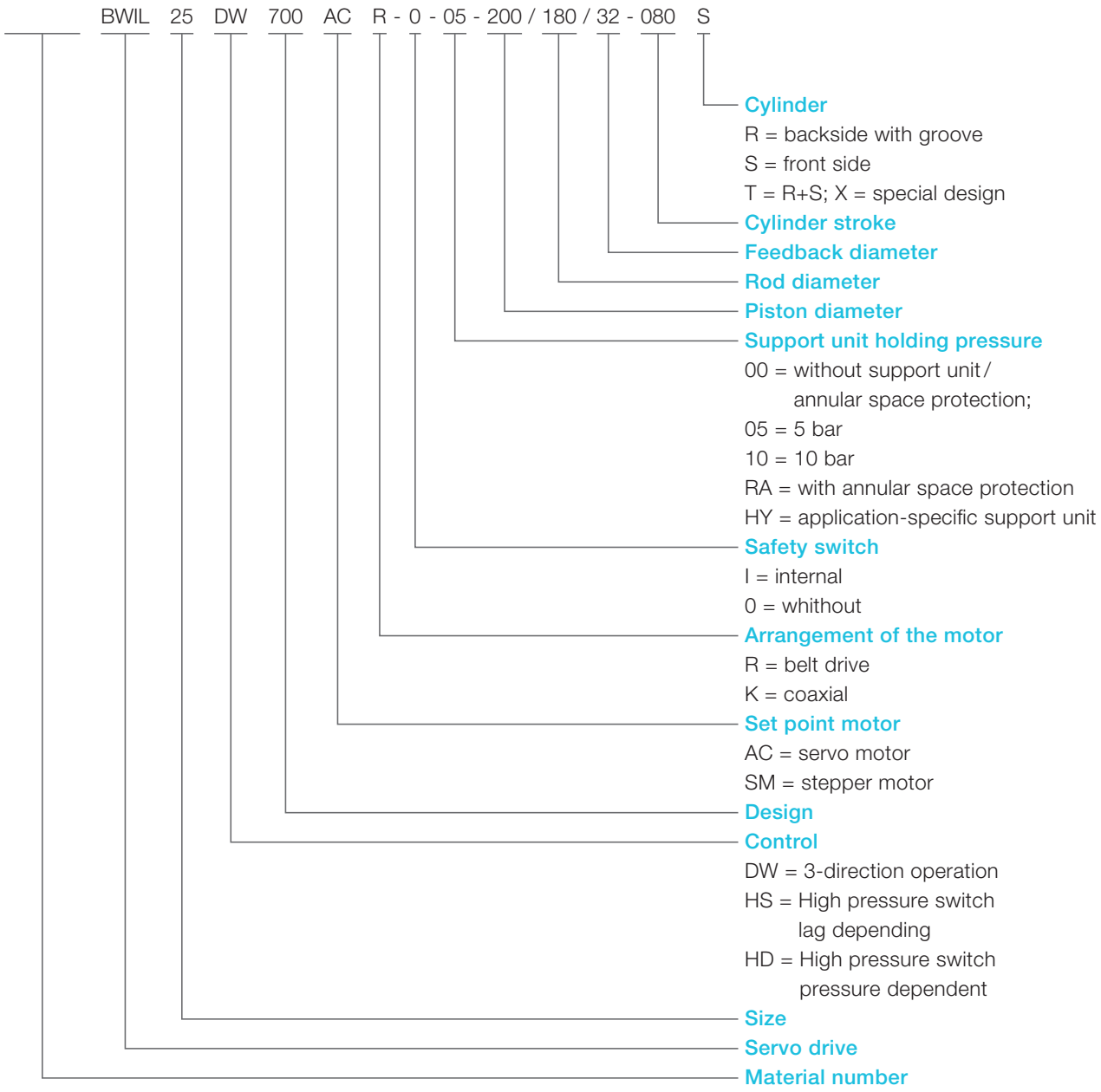


Example

BWIL 40 with cylinder diameter 240/220/60 – 50mm stroke.
The dimensions given are to be considered as guidelines.
Dimensions and port sizes are defined project-specific basis.

All dimensions in mm

Type code


BWIL 25 DW 700 AC R - 0 - 05 - 200 / 180 / 32 - 080 S
Cylinder
R = backside with groove
S = front side
T = R+S; X = special design
Cylinder stroke
Feedback diameter
Rod diameter
Piston diameter
Support unit holding pressure
00 = without support unit / annular space protection;
05 = 5 bar
10 = 10 bar
RA = with annular space protection
HY = application-specific support unit
Safety switch
I = internal
0 = whithout
Arrangement of the motor
R = belt drive
K = coaxial
Set point motor
AC = servo motor
SM = stepper motor
Design
Control
DW = 3-direction operation
HS = High pressure switch lag depending
HD = High pressure switch pressure dependent
Size
Servo drive
Material number

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