halstrup walcher

Positioning systems

Professional format adjustment
in mechanical engineering

A FAMILY-OWNED AND HIGHLY INNOVATIVE SUPPLIER OF CUSTOMISED SOLUTIONS

halstrup-walcher GmbH was founded in 1946 and has been in family ownership ever since. We plan for the long-term and see ourselves as a partner. We have close and long-standing relationships not only with our customers but also with our approx. 110 employees, our local community in Kirchzarten and our suppliers.

halstrup-walcher GmbH is a successful company in three areas: we develop and manufacture positioning systems for mechanical engineering applications, pressure and volume flow measurement technology for building technology and OEM customers as well as spur gearboxes and actuators for OEM customers.

halstrup-walcher GmbH manufactures both catalogue products and customer-specific devices. We are renowned for our high level of expertise in development and manufacturing. Our strong quality assurance programme and lean processes have made us a highly professional supplier of customised products with impressive performance in terms of quality, cost and punctuality.

THE HALSTRUP-WALCHER GROUP: SPECIALISTS IN THREE SECTORS

PRESSURE AND VOLUME FLOW MEASUREMENT TECHNOLOGY

You have to regulate the air pressure in your cleanroom to prevent the entry of contaminated air. You have to monitor the air filters or ventilators in your air-conditioning system. Your machine requires a constant over- or underpressure to operate correctly. Or a volume flow or air consumption is to be recorded.

halstrup-walcher offers both standard and customer-specific solutions for performing high precision measurements. We also offer calibration services in our accredited, in-house calibration laboratory. To the highest standards of precision.

POSITIONING SYSTEMS

As a manufacturer of machine tools, your customers expect you to supply highly flexible solutions with minimal retooling times.
Format changes should be performed automatically and as quickly as possible. The positioning systems required to do this must be compatible with all standard bus systems. And, naturally, you want to be able to offer your customer optimum availability of the machine – supported by condition monitoring for your positioning systems.

halstrup-walcher supplies positioning systems with the wide range of forms, features and bus systems required by professional machine tool manufacturers. With a maximum of precision.

SPUR GEARBOXES AND ACTUATORS

You need to make parts move, linear or rotary. Optimised for the existing construction space and with a sharp eye on the costs. With a constantly high level of precision. You need this solution quickly and tailored to your specific requirements. With or without housing. As a motor/gearbox combination. Regulated or with a control system or as a purely mechanical solution. With analog or digital communication.

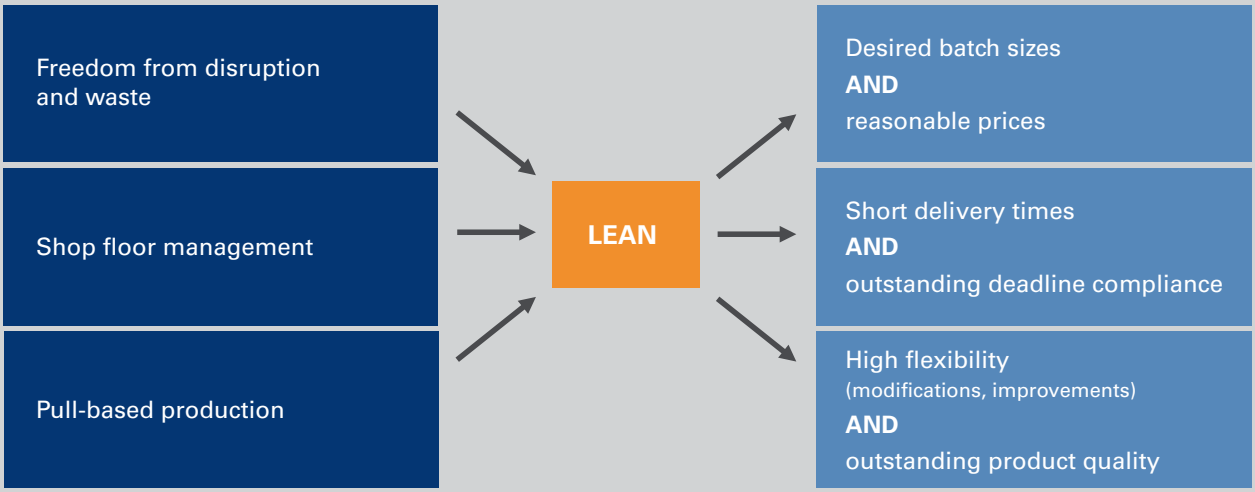
halstrup-walcher offers solutions covering every aspect of spur gearboxes and actuators. We develop mechanical designs, electronics and all the relevant stages of the manufacturing process in-house – from milled gear wheels to assembled SMD circuit boards. Tailor-made.

LEAN MANAGEMENT AT HALSTRUP-WALCHER

Focus on the customer and optimised internal processes

A number of years ago, business theorists spoke of a *"magic triangle"* of quality (Q), costs (C) and punctuality (P). These three factors were considered magical because any measures for improvement could benefit no more than two of them at any time – and these gains could only be obtained at the expense of the third. With the help of lean management, halstrup-walcher has succeeded in breaking the spell of this *"magic triangle"*. We have done so by eliminating errors and failures from all the relevant processes and systematically tackling waste in every area. This liberates the whole team to concentrate fully on the real needs of our customers.

"Shop floor management" has also brought previously unimaginable successes. Employees in every department attend a meeting every working day, where they are able to raise awareness of and discuss current problems. Measures for eliminating these problems immediately and permanently are discussed and agreed at follow-up meetings in the company. These take into account all the relevant information. Everyone contributes, no problem is brushed under the carpet and solutions to the problems are implemented without delay. It is a culture that has won the hearts and minds of both our staff and our customers. halstrup-walcher has now begun *"exporting"* its insights into lean management and offers these as a service to medium-sized enterprises.



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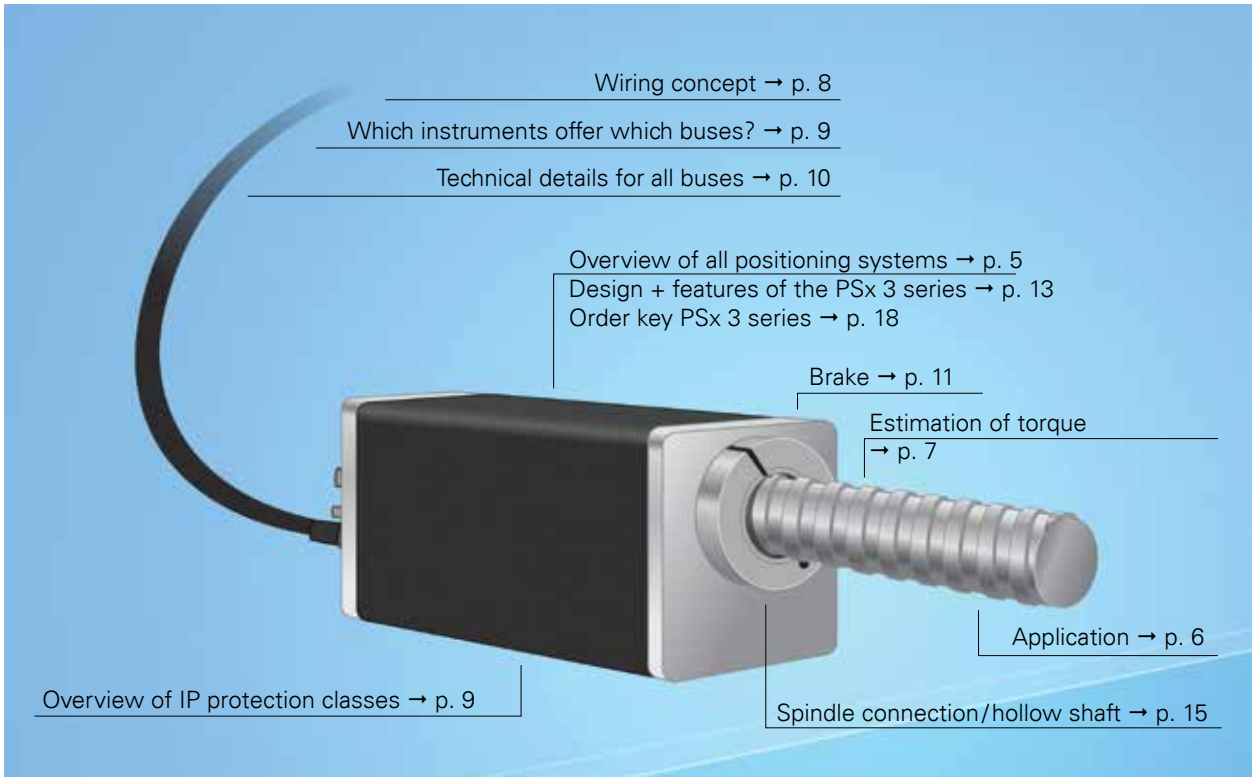
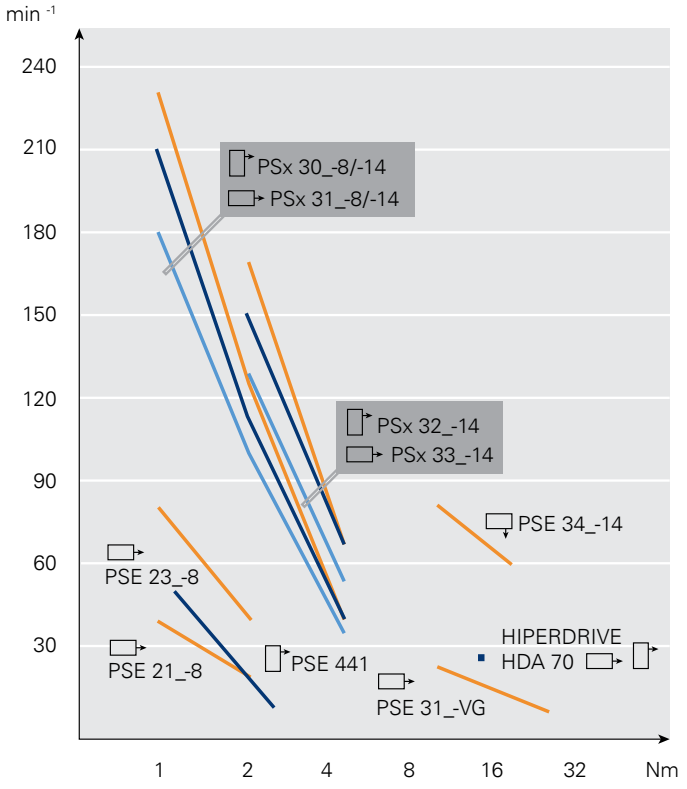


TORQUES AND SPEEDS

You already know your torque / speed (rpm) range and are looking for the appropriate model.

Example 1: You require the protection class IP 54 and a maximum torque of 2 Nm. The speed (rpm) should be greater than 100 min^{-1}. An 8 mm hollow shaft and longitudinal construction meet the requirements of your application → PSE 31_-8



Example 2: IP 68, max. 3 Nm, > 100 min^{-1}, horizontal construction → PSW 32_-14.
See p. 9 for the available buses.

Please note: The graphic always shows the corresponding nominal torque - nominal rated speed combinations.

IP 54 (PSE)
IP 65 (PSS)
IP 68 (PSW)

horizontal design
longitudinal design

PSx-8 hollow/solid shaft [1] 8 mm
PSx-14 hollow/solid shaft [1] 14 mm

[1] solid shaft not for PSE

OVERVIEW OF POSITIONING SYSTEMS

	PSE 3 series	PSS 3 series	PSW 3 series	HIPERDRIVE HDA 70	PSE 441	PSE 2 series	PSE 31_-VG	PSE 34_-14	PSE 100 / 200	PSE 172 / 272	Linear drives: LPE 72	Linear drives: LPE 4310 C
												
Model ▶ **page**	30_-8 ▶ **20** 30_/32_-14 ▶ **21** 31_-8 ▶ **22** 31_/33_-14 ▶ **23**	30_-8 ▶ **24** 30_/32_-14 ▶ **25** 31_-8 ▶ **26** 31_/33_-14 ▶ **27**	30_-8 ▶ **28** 30_/32_-14 ▶ **29** 31_-8 ▶ **30** 31_/33_-14 ▶ **31**	**34**	**36**	**39**	**41**	**40**	**42**	**43**	**44**	**45**
Protection class	IP54	IP65 [8]	IP68 [9]	IP65	IP65	IP54	IP54	IP54	IP55	IP65	IP64	IP54
Bus communication [3]	CA, DP, DN, MB, SE, EC, PN, EI, PL, IO			DP, EC, PN, EI/ RS485 via Hub	RS 485 via Hub/daisy chain	CA, DN, MB	CA, DP, DN, MB, SE, EC, PN, EI, PL, IO	CA, DP, SE, EC, PN, EI, PL	Analog set value: 0..10 V (R_L > 2 kΩ) 0/4..20 mA (R_L < 500 Ω) Supply voltage: 230 VAC		Analog set value: 2..10 V DC (R_L > 2 kΩ) 4..20 mA (R_L < 500 Ω)	CA
Motor	EC-motor			EC-motor	Stepping motor	DC-motor	EC-motor	EC-motor	AC-/DC-motor		DC-motor	Stepping motor
Nominal power output	25/35 W			42 W	6 W	4/8 W	25 W	100 W	0.5/3 W	0.8/6.3 W	6.7 W	20 W
Nominal torque	1..5 Nm			15 Nm	1.5/2.5 Nm	1/2 Nm	10/25 Nm	10/18 Nm	1..10 Nm	0.75..5 Nm	Shear force 100 N (50 % duty cycle)	Shear force 1 000 N
Self-holding torque	0.5..2.5 Nm [6]			25 Nm	-	-	5/12.5 Nm [6]	5..9 Nm [6]	-	-	100 N	1 000 N
Nominal speed (rpm)	40..230 min^{-1}	40..210 min^{-1}	35..180 min^{-1}	27 min^{-1}	10..40 min^{-1}	20..80 min^{-1}	22/9 min^{-1}	60/80 min^{-1}	0.25..30 min^{-1}	2..60 min^{-1}	Upstroke speed 250..4 000 mm/min	Upstroke speed 20 mm/s
Output shaft	8 mm hollow shaft (only for 30_, 31_), 14 mm hollow shaft, 8/14 mm solid shaft (only for PSS/PSW)			10 mm solid shaft, 10/12 mm hollow shaft	10 mm solid shaft with feather key	8 mm solid/ hollow shaft with adjustable collar	14 mm hollow shaft with clamp and feather key	14 mm hollow shaft with clamp and feather key	12 mm solid shaft	8 mm solid shaft	10 H 8 connecting rod M6	Adapter M12 x 1.25
Measurement system [5]	absolute, optical-magnetic			quasi absolute, magnetic-mechanical	absolute, magnetic	quasi absolute, magnetic	absolute, optical-magnetic	absolute, optical-magnetic	absolute	absolute	absolute	absolute
Positioning range	250 rotations [1]			32 000 rotations	250 rotations [1]	Unlimited (quasi absolute measurement system) 64 rotations [1] (absolute measurement system)	250 rotations [1]	250 rotations [1]	50 rotations (PSE 200) 20 rotations (PSE 100)	15 rotations	Upstroke: 120 mm others available upon request	Upstroke: 75 mm others available upon request
Jog keys	Optional via jog key contacts [4]			on board	on board	-	Optional via jog key contacts [4]	Optional via jog key contacts [4] [7]	-	-	-	-
Accuracy	±0.9°			±1°	±2.5°	±0.9°	±0.9°	±0.9°	2 % of positioning range	2 % of positioning range	0.6 % of the nominal upstroke	±0.05 mm
Manual adjustment	Standard, only possible with 14 mm output shaft			-	-	-	-	Standard	-	-	-	-
Brake [2]	Optional (holding brake) for 14 mm output shaft			Not required due to self-holding torque	-	-	-	Optional (friction brake)	-	-	-	-

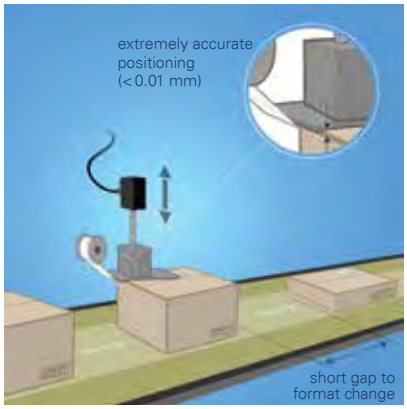
[1] without mechanical limitation
[2] please see brake selection guide on p. 11!
[3] see p. 9 for bus abbreviations
[4] not for Ethernet-based buses, not for PSS/PSW or IO-Link
[5] generally without battery, therefore maintenance-free
[6] with current
[7] only for DP
[8] IP 65 under installed and wired conditions
[9] IP 68 at standstill, IP 66 during rotation (tested with water)

HIPERDRIVE Hub with DP, EC, PN, EI ▶ **35**

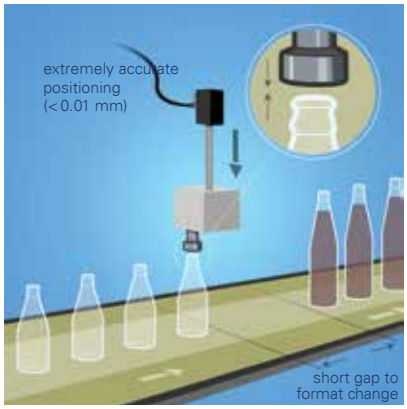
CHANGING FORMAT WITH POSITIONING SYSTEMS

The demand for flexible manufacturing processes is growing in virtually every sector.

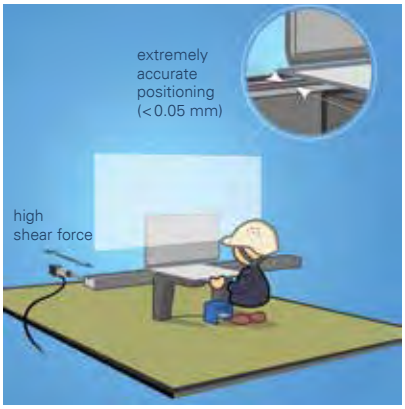
Machinery and equipment manufacturers are under increasing pressure to minimise setup times and also automate format changeovers wherever possible. Take the example of a filling plant: Ever more filling plant operators are demanding a high level of flexibility in terms of the bottle formats that their plants can handle – ideally they want to be able to switch from "*small round bottles*" to "*tall square bottles*" almost instantaneously. These format changeovers affect the positioning of many different components from guide rails to labelling machines to inspection cameras. Moving all these objects precisely and quickly to the new required position – on command – is the job of halstrup-walcher positioning systems.



packaging machines



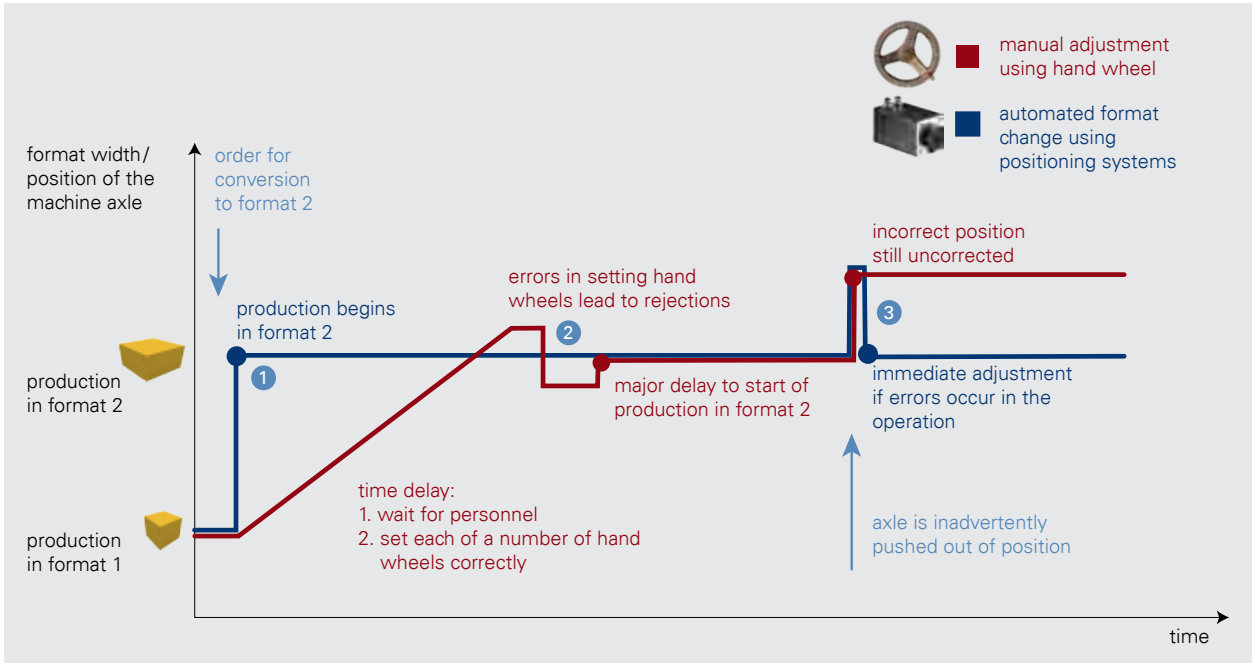
filling plants



machine tools / woodworking

Automation offers many advantages

Automation with halstrup-walcher positioning systems offers many advantages over non-automated format changeovers. Firstly, it saves an **immense amount of time** because production in the new format can begin shortly after the command is given instead of having to wait for the production technician to make the necessary changes (1). Secondly, it **boosts quality** because it is possible to reproduce every format position with absolute accuracy – rather than with slight variations in precision depending on the production technician (2). Position correction also ensures that even if unwanted position changes occur, they are **reset to the desired position immediately** (3). Finally, halstrup-walcher positioning systems have **self-analysis** and **early warning systems** that support condition monitoring – and improve the availability of the machine still further (see also p. 17).



Gain time and avoid errors with automated format changeovers

A FILM SAYS MORE THAN 1000 WORDS

A number of short films are available on our website. These give you a quick overview and also a few insights into some of the most important details.

www.halstrup-walcher.com

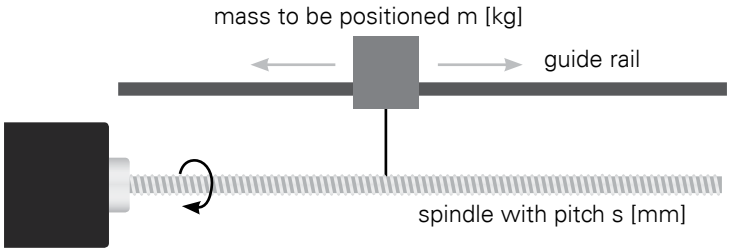
►"Applications"
►"Positioning systems"

On these pages you will find films, among others, on the following subjects:

- **Mechanical engineering** approaches to automation and the concept 10 x 3 = 1 (under "Machine concepts with format changeover")
- **Advantages of automated format changeover** from the viewpoint of the machinery user e.g. in furniture manufacturing (under "Format changeover – wood-processing")
- **Automation in bottle filling**: Precision, preventive maintenance and bus communication flexibility (under "Format changeover – bottling plants ")

FROM THE APPLICATION TO THE TORQUE

You know the mass to be positioned and are looking for the appropriate torque. The following "back-of-an-envelope" calculation allows you to calculate the approx. torque required. Another option (for machines that are already operational) is to measure the actual value using a torque measurement device.



$$\text{torque M [Nm]} \text{ (if unknown)} = \frac{\text{m [kg] x s [mm]}}{630} \times T$$

T = 1.1 for ball screw spindle
= 3.3 for trapezoidal threaded spindle

Example: 50 kg mass, 4 mm spindle pitch, trapezoidal threaded spindle

$$\text{torque M [Nm]} = \frac{50 \times 4}{630} \times 3.3 \text{ Nm} = 1.04 \text{ Nm}$$

→ A positioning system with 2 Nm torque should be selected.

FLEXIBLE WIRING CONCEPTS

The choice is yours: direct wiring or Hub/Gateway

Do you want your control unit to communicate directly with the positioning system or via a hub/gateway? halstrup-walcher positioning systems can be adapted to create the perfect match for your machine concept. This applies not only to the selection of the bus (see p. 9) but also the method of wiring.

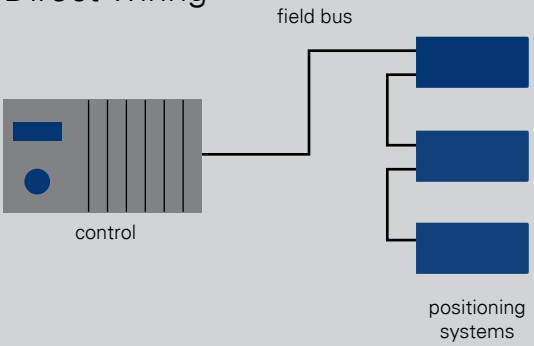
Essentially, there are **two methods**:

1. Direct bus connection (line wiring) from all positioning drives to the control unit
2. Use an intermediate "hub" or a "gateway" (distribution device)

A brief presentation of both methods is provided below.

PSE/PSS/PSW | HIPERDRIVE HDA (with adapter)

Direct wiring



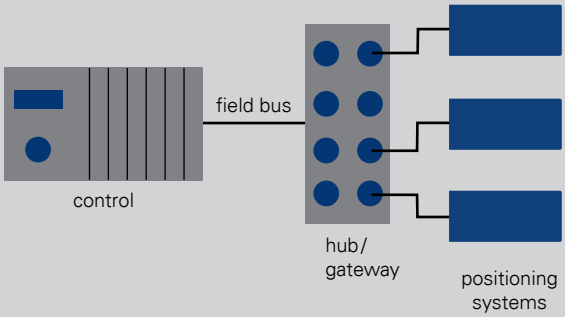
Here, the bus communication is implemented directly from the control to each individual positioning system. The compact design of the PSx range requires only **minimal installation space**. This method is also cheaper than using a Hub.

In addition, the PSx range offers a *wide range of available buses* and a choice of *three different IP protection classes* but with identical installation dimensions. This gives machinery manufacturers maximum flexibility for *adapting the bus or IP class* to customer requirements.

The HIPERDRIVE family also provides an option for direct wiring with the HDA 70.

PSE/PSS/PSW **with IO-Link** | HIPERDRIVE HDA | PSE 441

Wiring via a Hub/Gateway



In this method, the bus communication is implemented from the control to the Hub/gateway while the hub itself communicates with the positioning systems via RS 485 or IO-Link. The power supply to the positioning system is provided using the same cable. If the positioning systems are located in close proximity to each other, this bundling of the cables creates a **"tidier" machine appearance**.

The HIPERDRIVE Hub can control up to eight drives (see also p. 33/35) and also has power fuses, which relieves the load on the control cabinet. IO-Link, on the other hand, is a technology, which has until now been used for sensors. The gateway can therefore also connect other units in the machine with the control module.

If only the bus communication has to be changed from one version of a machine to another (because the positioning systems can remain unchanged), the machine tool manufacturer only has to switch to a Hub/Gateway with the appropriate bus – this minimises time consuming alterations and the need to maintain stocks of different versions of the system.

FLEXIBLE BUS COMMUNICATION AND PROTECTION CLASSES

We speak your language: the appropriate bus system for your machine

Machinery and plant builders frequently have to demonstrate a high level of flexibility in the range of bus communication standards they offer – and meet the wishes of the machine's user. halstrup-walcher supplies the best possible support for meeting these requirements: all standard bus systems are developed and manufactured in-house and supported by our application engineers.

	Bus logo	CANopen	PROFIBUS	DeviceNet ODVA	Modbus	IO-Link	sercos the automation bus	EtherCAT	PROFINET	EtherNet/IP ODVA	ETHERNET POWERLINK	RS 485 (via Hub)
	Abbreviation	CA	DP	DN	MB	IO	SE	EC	PN	EI	PL	
Positioning system	page											
PSE 21_/23_	39	x		x	x							
PSE/PSS/PSW 30_/31_/32_/33_ PSE 31_-VG	20-31 41	x	x	x	x	x	x	x	x	x	x	
PSE 34_	40	x	x				x	x	x	x	x	
HIPERDRIVE HDA 70	34		x					x	x	x		x
PSE 441	36											x
HIPERDRIVE Hub	35		x					x	x	x		↵

Flexibility in IP protection classes

For dry, damp or wet areas:
we have the right solution for you.

The protection required by a component against penetration by moisture and dust / objects is stated using the **IP protection class** (*IP = International Protection Code*).

Many machines are used under normal manufacturing conditions and therefore require **no additional moisture protection** for the positioning system.
Good resistance to dust and robust safety standards are far more important. For applications such as these, standard devices with the protection class **IP 54** are an ideal solution.

Hygienic applications in the food processing and pharmaceutical sectors as well as other **critical applications** require a higher protection class. This is achieved by using more resistant materials (e.g. stainless steel) as well as suitably designed seals.
These measures are relevant to the overall cost of the solutions, so halstrup-walcher offers devices in both the **IP 65** and **IP 68** segments.

	IP 54		IP 65		IP 68	
PSE/PSS/PSW 3 series	PSE 3 series (E = Efficient)	p. 20-23	PSS 3 series (S = Stainless)	p. 24-27	PSW 3 series (W = Washable)	p. 28-31
HIPERDRIVE	-	-	HDA 70, Hub, PSE 441	p. 34-36	-	-
Further products	PSE 21_/23_-8 PSE 34_-14 PSE 31_-VG-14 PSE 100/200 (IP 55) LPE 4310 C	p. 39 p. 40 p. 41 p. 42 p. 45	PSE 172/272 LPE 72 (IP 64)	p. 43 p. 44	-	-

OVERVIEW: BUS COMMUNICATION

Bus	Topology	max. number	Terminating resistance	Connection [1]	Jog keys	Addressing	Bus length @ Baud rate ...	Description of device [2]
PSE 2_								
CANopen	Series (all slaves connected in parallel)	126	2 x 120 Ω not integrated in the device/ attach to cable ends	Spring clamp terminals (Motor power supply (M) + control power supply (S) + data (D)) M12 (M + S) and M12 (D) possible	without	via switch and bus	250 kBaud: 250 m 500 kBaud: 100 m	EDS
DeviceNet		63						
Modbus RTU		247	2 x 390 Ω + 1 x 220 Ω integrated in the device, activation possible				9600 Baud: 500 m 38400 Baud: 50 m	-
PSE / PSS / PSW 30_, 31_, 32_, 33_, PSE 31_-VG								
CANopen	Series (all slaves connected in parallel)	126	2 x 120 Ω not integrated in the device/ attach to cable ends	M12 - A (M + S), 1 ..2 x M12 - B (D) optional: Sub - D9 (D), Sub - D9 (M + S), M12 - B (M + S), 1 ..2 x M12 - A (D)	M8 connector [4]	via switch and bus	250 kBaud: 250 m 500 kBaud: 100 m	EDS
DeviceNet		63		M12 - B (M), 1 ..2 x M12 - A (S + D)				
PROFIBUS DP		32 126 (R) [3]	2 x 390 Ω + 1 x 220 Ω integrated in the device, activation possible	M12 - A (M + S), 1 ..2 x M12 - B (D) optional: Sub - D9 (D)		via switch (and bus)	1.5 MBaud: 200 m 12 MBaud: 100 m	GSD
Modbus RTU		247	2 x 390 Ω + 1 x 220 Ω integrated in the device, activation possible	M12-A (M+S), 1 ..2 x M12-B (D)		via switch and bus	9600 Baud: 500 m 38400 Baud: 50 m	-
IO-Link	Star (point to point)	Limited by the scanner	not required	M12-A (M+S+D)	without	not required	38400 Baud: 20 m	IOOD
Sercos	Series, ring (point to point)	511		M12-A (M+S), 2 x M12-D (D)		via switch and bus	100 MBaud: 100 m	SDDML
EtherCAT		65535		M12-A (M+S), 1 ..2 x M12-D (D)				ESI
PROFINET		limited by PLC						GSDML
EtherNet/IP								EDS
POWER-LINK		239						XDD
PSE 34_								
CANopen	Series (all slaves parallel)	126	2 x 120 Ω not integrated in the device/ attach to cable ends	HAN4A (M+S), 1 ..2 x M12-B (D), optional: 2 x M12-A (D)	without	via switch and bus	250 kBaud: 250 m 500 kBaud: 100 m	EDS
PROFIBUS DP		32 126 (R) [3]	2 x 390 Ω + 1 x 220 Ω integrated in the device, activation possible	HAN4A (M+S), 1 ..2 x M12-B (D)	M8 connector	via switch (and bus)	1.5 MBaud: 200 m 12 MBaud: 100 m	GSD
Sercos	Series, ring (point to point)	511	not required	M12-A (M+S), 2 x M12-D (D)	without	via switch (optional) and bus	100 MBaud: 100 m	SDDML
EtherCAT		65535		M12-A (M+S), 1 ..2 x M12-D (D)				ESI
PROFINET		limited by PLC						GSDML
EtherNet/IP								EDS
POWER-LINK		239						XDD
HIPERDRIVE Hub								
PROFIBUS DP	Series (all slaves parallel)	32 126 (R) [3]	2 x 390 Ω + 1 x 220 Ω not integrated in the device/ attach to cable ends	Cable lug (motor power supply), M12-A (S), 2 x M12-B (D)	can be accessed after opening the housing cover	via switch	1.5 MBaud: 200 m 12 MBaud: 100 m	GSD
EtherCAT	Series, ring (point to point)	65535	not required	Cable lug (motor power supply), M12-A (S), 2 x M12-D (D)		via switch and bus	100 MBaud: 100 m	ESI
PROFINET		limited by PLC					100 MBaud: 100 m	GSDML
EtherNet/IP								EDS
HIPERDRIVE HDA 70								
PROFIBUS DP	Series (all slaves parallel)	32 126 (R) [3]	2 * 390 Ω + 1 * 220 Ω integrated in the device, activation possible	Screw collars (M + S + D), Screw collars (M + S), 2 x M12 - B (D), 7/8" (M + S), 2 x M12 - B (D)	on the exterior of the device	via switch	1.5 MBaud: 200 m 12 MBaud: 100 m	GSD
EtherCAT	Series, ring (point to point)	65535	not required	Screw collars or 7/8" connectors (M + S), 2 x M12-D (D)		via switch and bus	100 MBaud: 100 m	ESI
PROFINET		limited by PLC						GSDML
EtherNet/IP								EDS
RS485	Series	254	2 x 1 kΩ + 1 x 130 Ω not integrated in the device/attach to cable ends/optionally available in the device	Molex series 5557/69 (M + S + D)		only possible via bus	9600 Baud: 500 m 38400 Baud: 50 m	-
PSE441								
RS485	Series (point to point)	254	not required	1 ..2 x M12-A (M+S+D)	on the exterior of the device	via bus	9600 Baud: 500 m 38400 Baud: 50 m	-

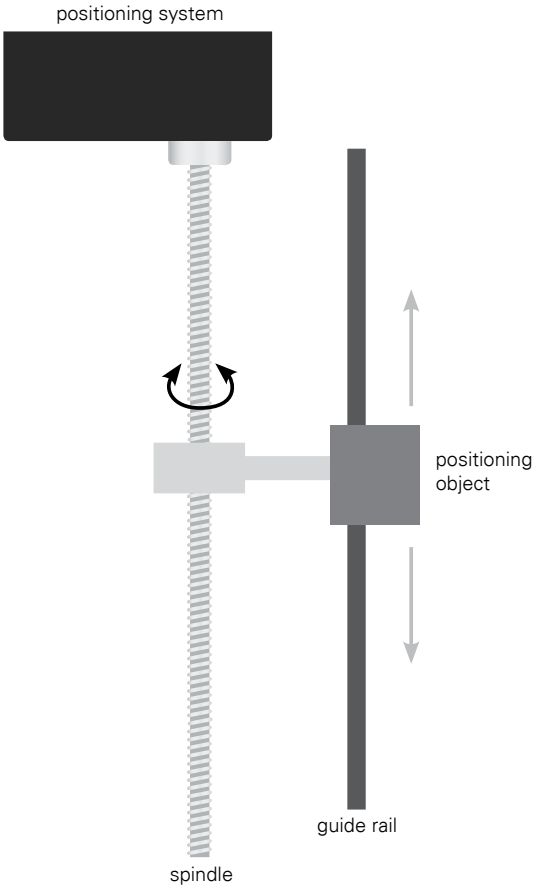
[1] M (motor power supply), S (control power supply), D (data)
[2] description files available to download at www.halstrup-walcher.com
[3] with repeater (R)
[4] not for PSS/PSW

STOP! THE RIGHT BRAKE FOR VERTICAL APPLICATIONS

Selection of the appropriate brake

(relevant for vertical positioning)

When objects have to be positioned vertically, i.e. moved up and down, it should not be forgotten that gravity continues to act when they are at rest. There are various requirements here: It is usually important to prevent objects from slipping for reasons of safety. However, some applications also require the position to be maintained precisely even when the power supply is switched off. The following selection options are listed below to help you make the best possible choice:



Please note the following situations and solutions:

	Requirement	Solution	Technical description
1.	Object needs not to be held in position when power supply is switched off.	• PSE/PSS/PSW without optional brake, with ball screw	• Self-holding torque acts when power supply is active • When the power supply is switched off, the object is not held in position (no braking effect)
2.	Object must be held in approximate position when the power supply is switched off. [1)]	• PSE/PSS/PSW 3_-14 with optional hand brake (holding brake) or • PSE 34_-14 with integrated retarder (friction brake)	• Mechanically held in approximate [1)] position
3.	Object must be held exactly in position even when the power supply is switched off.	• HIPERDRIVE HDA 70 due to very high self-holding torque • PSE/PSS/PSW without optional brake, but with trapezoidal threaded spindle instead of ball screw spindle • PSE/PSS/PSW with external, e.g. pneumatic brake	• Mechanically held in the exact position

[1)] < 0,5mm

halstrup walcher

positioning systems

3 SERIES

PSE

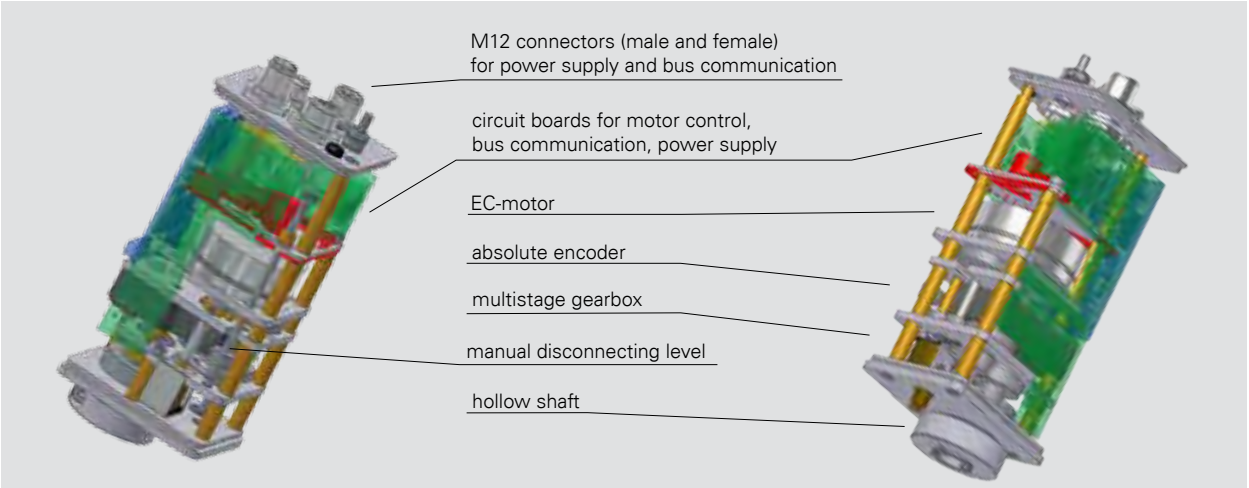
PSS

PSW

PSE / PSS / PSW
THE COMPACT AND FUTURE-PROOF SYSTEM SOLUTION

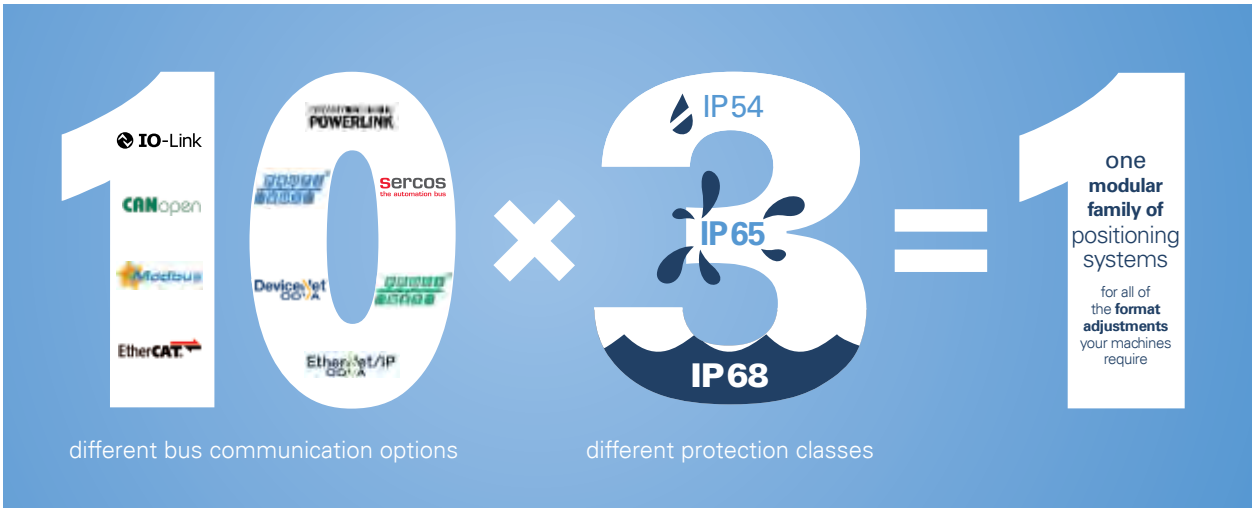
Your machine must offer minimal setup times, high reproducibility and optimum availability. You require flexible bus and IP protection options. And the space available could be larger.

halstrup-walcher has been supplying positioning systems to well-known machinery and equipment manufacturers for over 10 years. The experience we have gathered has been integrated into two new series – PSS (IP 65) and PSW (IP 68) – which complement our successful "PSE" (IP 54) range. All three series are **interchangeable** in terms of their *connection dimensions* and they are available with a wide range of *different bus systems*. The PSx series combines *positioning precision*, *high run speed* and *condition monitoring* with a **uniquely compact design.** All the functions are integrated into a very small space (as shown in these 3D illustrations).
Important information for you as a partner: Not only are all the electronics and mechatronics *developed in-house*, they are also *manufactured in-house* – from the gear wheels to the SMD circuit boards. Because we never compromise on quality!

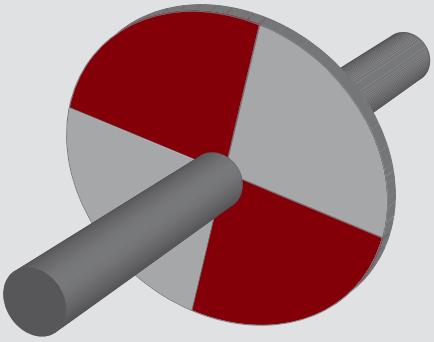


ONE machine concept – in **three** IP classes and with **ten** buses

Our **comprehensive construction kit system** allows machine builders to adapt both the bus communication and also the IP protection class to specific customer wishes – without altering the relevant dimensions. This generates noticeable savings for the machine builder when altering and adapting products for customer-specific machines. This is possible because we have developed a consistent range of products for all **three relevant protection classes**: IP 54 (PSE), IP 65 (PSS) and IP 68 (PSW). All these models function without the need for a bulky additional bus distributor. Nor is there any need for space-wasting "envelopes" for higher IP protection classes. These are welcome advantages for any mechanical engineer – especially considering the restricted size of the installation spaces available.



ABSOLUTE MEASUREMENT SYSTEM



Instead of determining a relative position (distance from a zero-point), the PSx always "*knows*" its exact position. This is measured using a combined encoder developed in-house by halstrup-walcher and is based on

1. **the number of total rotations** (n x 360°),
   - 250 rotations are recorded (not mechanically limited)
   - 8 bit encoder (optical)
   - error = 0 (pure counting function)
2. **the degrees of angle of the last rotation**
   - 400 increments per rotation (magnetic)
   - error = max. 1 increment per 360°, i.e. between 0° and **0.9° total error**

Measurement takes place **directly at the output shaft** so gear backlash does not affect accuracy. No positioning error occurs even if the power supply is interrupted – and **no battery** is required! This absolute measurement system consigns time-consuming **reference runs** to the history books.

POSITIONING ACCURACY

Because any error is only contributed by the "*last rotation*" (max. 0.9° of 360°), the error contribution x in the position is:

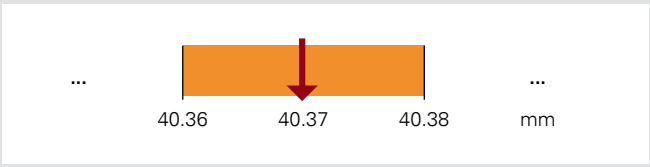
$$\frac{0.9°}{360°} = \frac{x}{5\ mm} \rightarrow x = \text{max. } 0.0125 \text{ mm (spindle pitch 5 mm)}$$

$$\frac{x}{4\ mm} \rightarrow x = \text{max. } 0.0100 \text{ mm (spindle pitch 4 mm)}$$

In practice, there is also an error contribution associated with inconsistencies in the spindle.

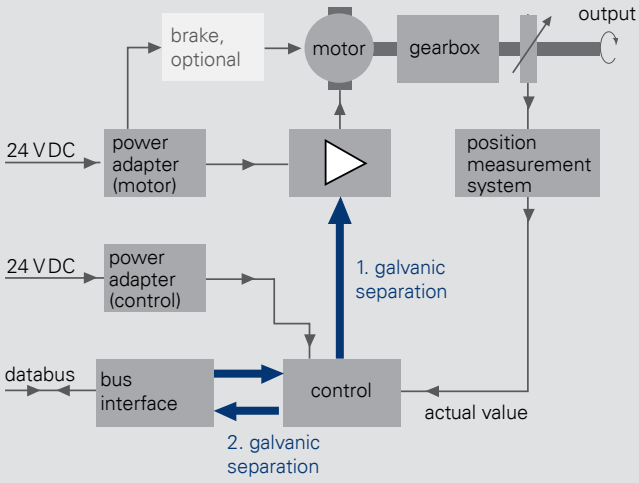
The **encoder** is seated on the output shaft, which eliminates additional errors due to gear backlash in the positioning system.

→ Optimum precision for all positioning applications



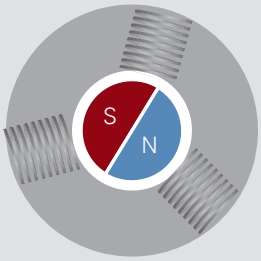
STAY SAFE EVEN WHEN PROBLEMS OCCUR

The motor and control units have separate power supplies and are galvanically separated. This prevents problems due to interferences being passed on from the motor to the control unit. It also guarantees that bus communication remains available even during an emergency stop; it is still possible to read out the status and current actual position.



EC-MOTOR

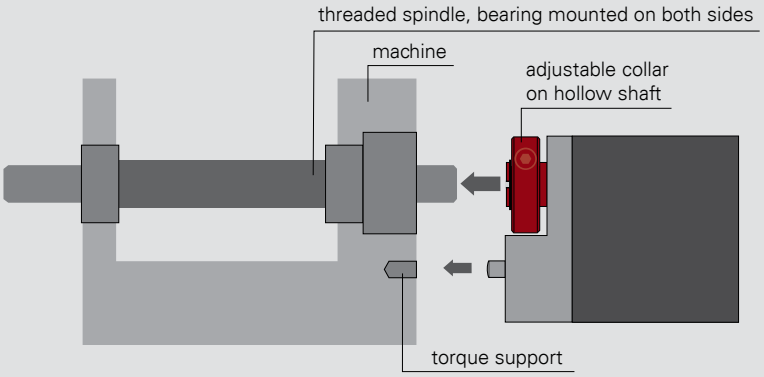
Durability in every detail. We understand the importance of robust design and durability in our positioning drives. This is why we always use high quality brushless EC-motors, which do not wear and which drive the positioning system accurately.



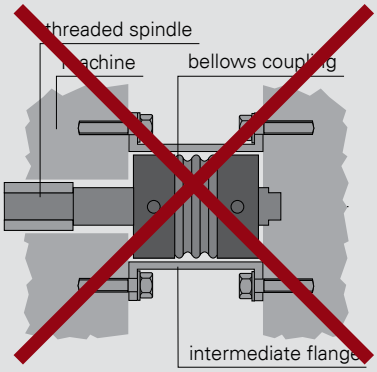
EASY MOUNTING WITH HOLLOW SHAFT

Mechanical adaptations with minimal effort. The output shaft of the positioning system has to be adapted to the application. A hollow shaft with an adjustable collar has proven itself an effective and reliable solution for this task. Torque support is also very easily implemented using a pin. This eliminates the need for a coupling with intermediate flange, which would result in additional costs, longer assembly times and, above all, requires more space.

Mounting with hollow shaft

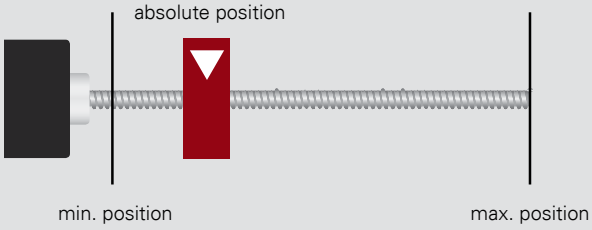


Mounting with solid shaft and coupling



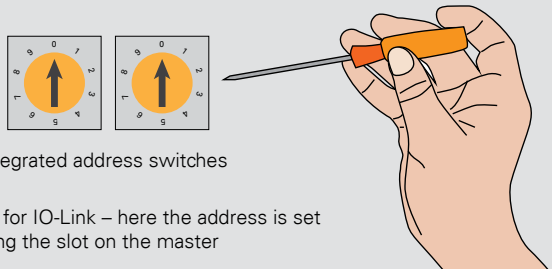
TIME-SAVING SETUP

To set up the system or a replacement, simply install the unit and assign the address using the address selection switches – the positioning system immediately receives all the parameters from the predecessor unit via the control.The absolute encoder removes the need for a reference run.



ADDRESS SWITCHES [1]

Easy address assignment directly on the device. Usually, customers wish to be able to set the address of the individual positioning system directly on the device itself. This avoids the confusion and mistakes that can occur when addresses are set via the control unit. It also simplifies the process of setting the address manually when a device is replaced during servicing or maintenance work.

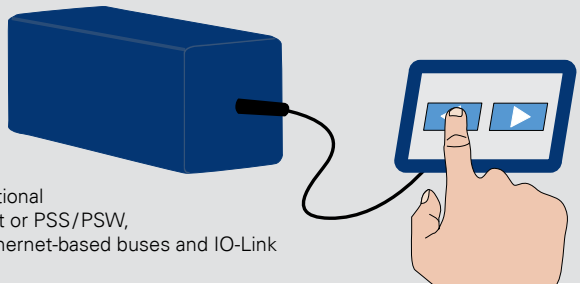


integrated address switches

[1] not for IO-Link – here the address is set using the slot on the master

JOG KEY OPERATION [2]

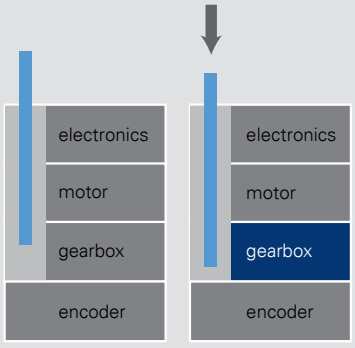
Simplifying setup. When the machine is being set up, the required zero position must first be measured and then programmed into the control. Often, the optimum position is approached in a number of increments. Jog key operation simplifies this process. Using two direction controls, the user can quickly proceed to the appropriate zero position either on-site or using the control panel without the need for bus communication. The PSx 3 series [3] has optional jog key contacts, which can be activated via the machine panel, for example.



[2] optional
[3] not or PSS/PSW, Ethernet-based buses and IO-Link

MANUAL DISCONNECTING LEVER [4]

Manual disconnection of the gearbox. Sometimes it is necessary for the user to be able to turn the spindle connected to the positioning system manually. In this case, the *manual disconnecting lever* can be used to decouple the output shaft from the gearbox. This eliminates the need to disassemble the positioning system (e.g. by opening the adjustable collar of the hollow shaft).

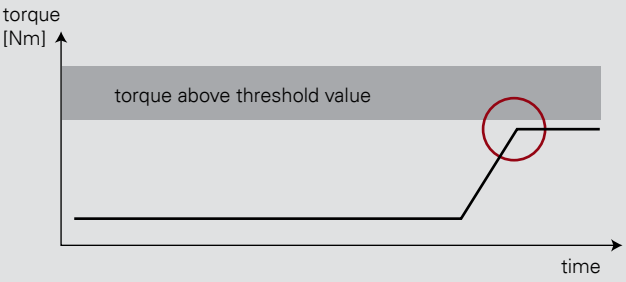


[4] standard for 14 mm shafts, not for 8 mm shafts

LIMITING TORQUE

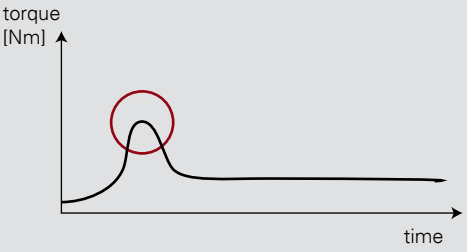
The PSx 3 series is capable of **regulating the torque** so that it does not exceed the threshold value specified in the customer parameters:

- effective overload prevention (gearbox, application,…)
- temporary peak torque levels are deliberately permitted (to avoid unnecessary run aborts)
- the motor stops if the load is too high according to specific conditions!



STRONG BREAKAWAY TORQUE

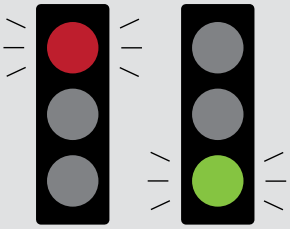
Safe startup even after extended standstills. Machines are not necessarily in continuous use. Sometimes there can be extended periods of inactivity that impair the normal ease of running. When it is time for the machine to start up again, it requires a higher *"breakaway torque."* The PSx series of positioning systems offers this capability, which is significantly higher than the nominal torque!



THE DIFFERENCE BETWEEN OBSTACLES AND DIRT

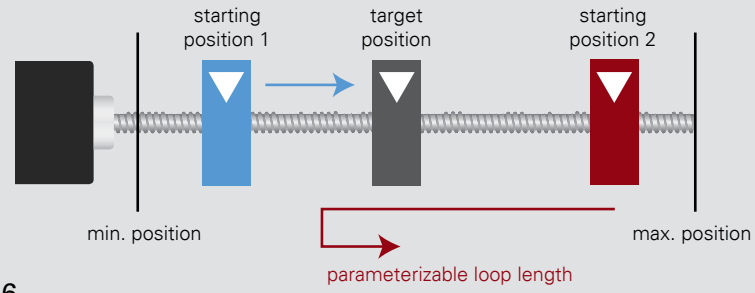
Intelligent running behaviour. In practice, it is always possible that the rotation of the spindle can be obstructed in some way. In the most extreme case, this can be *"running into an obstruction"*, e.g. if the object to be positioned has reached its mechanical limit position. However, dirt or dust on the spindle can cause it to run less easily.

In practical applications, it is important to be able to differentiate between these two scenarios: When the system detects a genuine obstruction it should stop immediately. If the problem is dirt, it should accelerate in order to overcome the blockage effectively. The PSx series of positioning systems can differentiate between these two scenarios within milliseconds and react accordingly.



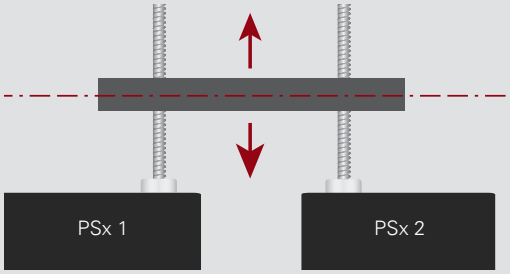
SPINDLE OFFSET RUN

Excluding inconsistencies due to lash in the spindle. Due to dirt or slight inaccuracies, every spindle has a certain element of lash which becomes noticeable during changes in direction. For this reason, the positioning system can be parameterised to ensure that the target position is always approached from the same side (in the diagram: from the left). This eliminates the effect of spindle lash on positioning accuracy. Naturally, the process is monitored to prevent running into an obstruction.



WELL SYNCHRONISED

Parallel movement of an object by two positioning systems. If two positioning systems are required to move a broad or heavy object, they must be perfectly synchronised to avoid tipping.
The PSx series of positioning systems has been performing this task reliably in many applications for years. It is achieved through the use of a very fast drag error control unit.
Find out more on the next page.

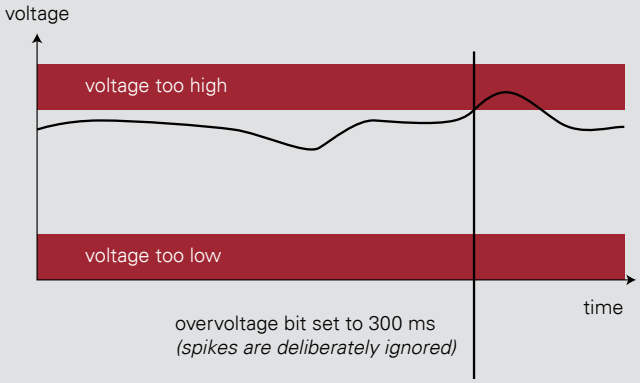


The availability of the machine is critical – and this is supported by condition monitoring.

The machine's central control unit detects problems before they occur and enables technicians to take prompt action. The positioning systems in the PSx series therefore generate a wide range of diagnostic messages. A selection of these are presented on this page.

SUPPLY VOLTAGE

Continuous monitoring of the voltage level. If situations involving excessive or insufficient voltage occur regularly, the causes should be thoroughly investigated. The PSx series of positioning systems are programmed to ignore very short "*spikes*" but report all overvoltage or undervoltage events that exceed a specified duration. This enables the operator to detect errors in the supply chain before they cause damage or standstills.

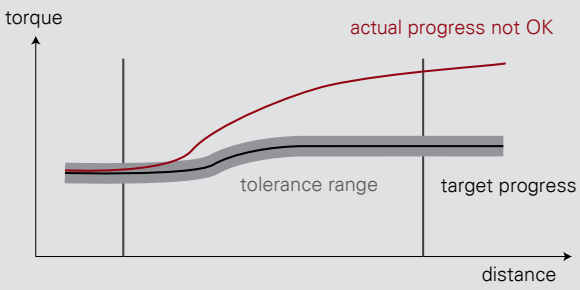


DRAG ERROR

Optimum adjustment of the actual position in accordance with the specified target position is one of the key quality features of the positioning systems in the PSx 3 series. If the control unit detects that one positioning system is falling behind, it accelerates it in order to minimise *"drag errors"*. This ensures that the two systems are well synchronised, as shown on p. 16. The drag error monitor is also used to provide early warnings. Dirt can make it impossible to reach the target position within a specified time. This situation is also passed on to the control unit directly as a *"condition monitoring"* message.

CONTINUOUS MONITORING OF POWER CONSUMPTION AND TORQUE

Monitoring these important values can prevent the positioning system being overloaded. It also allows the application to be protected in specific ways, e.g. against the effects of excessive torque. In principle, any deviation from the normal progress stored in the control unit can provide an indication of a malfunction – this makes it possible actively to avoid problem situations and damage to equipment.



ORDER KEY PSE / PSS / PSW 3 SERIES

All the positioning systems in the PSE / PSS / PSW 3 series share the same order key. To provide the best possible overview and to simplify customer documentation, the diverse range of options available for the PSE/PSS/PSW series has been organised in a shared order key.

Order key PSE / PSS / PSW:

A	B	C	D	E
–	–	–	–	

Examples of orders provided below.

	Protection class	A Design	B Type	C Bus communication (see p. 9)	D Jog keys (see p. 15)	E Brake (see p. 11)
Positioning System **Efficient** (see p. 20-23)	IP54	PS**E**	30**x**-8/-14 (V)[1] 31**x**-8/-14 (V)[1] 32**x**-14 (V)[1] 33**x**-14 (V)[1]	CA CANopen DP PROFIBUS DP DN DeviceNet MB Modbus RTU SE Sercos EC EtherCAT PN PROFINET EI EtherNet/IP PL POWERLINK IO IO-Link	0 = without jog keys T[2] = with jog keys	0 = without brake M[3] = with brake
Positioning System **Stainless** (see p. 24-27)	IP65	PS**S**				
Positioning System **Washable** (see p. 28-31)	IP68	PS**W**				

[1] (V) not for PSE

[2] not for PSS/PSW or Ethernet-based buses or IO-Link

[3] only with 14 mm output shafts

Standard equipment

- second databus connection always provided (not for IO-Link).
- address switches always provided (also IE-buses, not for IO-Link)

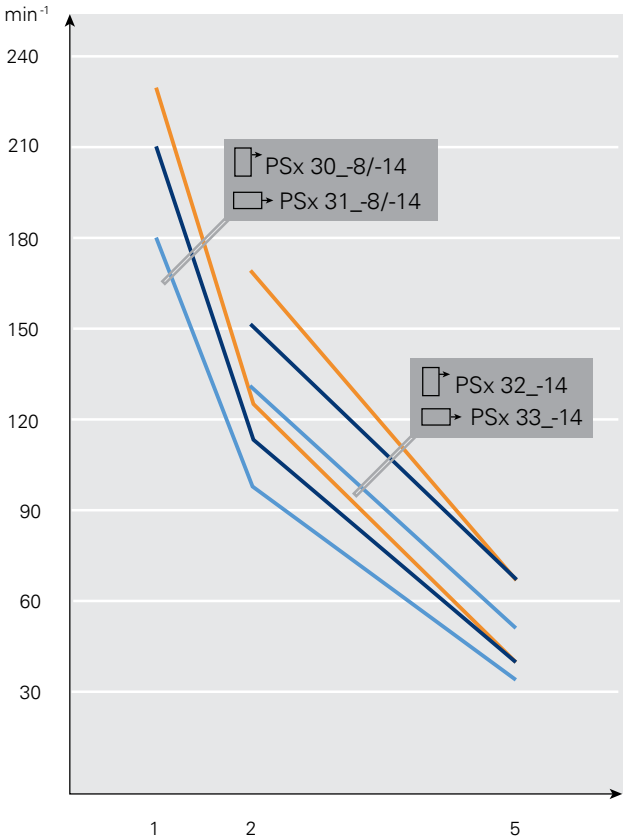
For further information on connections and address settings see also "Overview: bus communication" on p. 10.

Form / Type		Torque	Output shaft
horizontal	30	**x** = 1 Nm **x** = 2 Nm **x** = 5 Nm	8 = 8 mm hollow shaft 14 = 14 mm hollow shaft 8V = 8 mm solid shaft[4] 14V = 14 mm solid shaft[4]
longitudinal	31		
horizontal	32		
longitudinal	33		

[4] only for PSS/PSW

You can find the order key for the products PSE 34_-14 and PSE 31_-VG-14 on the respective product pages (pages 40 and 41).

TORQUES AND SPEEDS



You already know your torque / speed (rpm) range and are looking for the appropriate model.

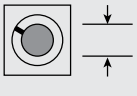
Example 1: You require the protection class IP54 and a maximum torque of 2 Nm. The speed (rpm) should be greater than 100 min^{-1}. An 8 mm hollow shaft and longitudinal construction meet the requirements of your application → PSE 312-8

Example 2: IP68, max. 3 Nm, > 100 min^{-1}, horizontal construction → PSW 32_-14.
See p. 9 for the available buses.

IP54 (PSE)
IP65 (PSS)
IP68 (PSW)

horizontal construction
longitudinal construction

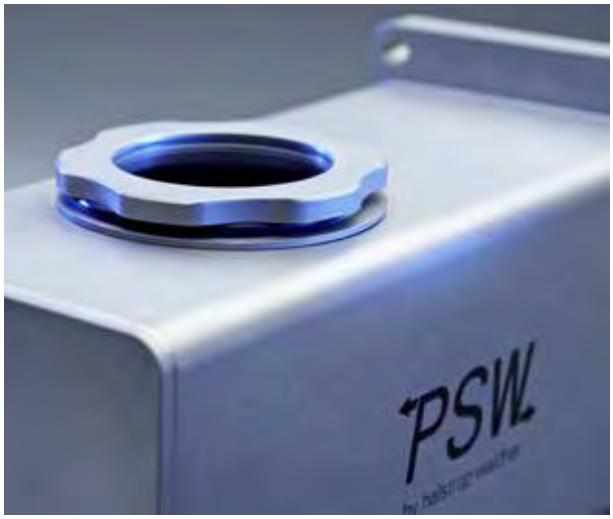
PSx-8 hollow / solid shaft[1] 8 mm
PSx-14 hollow / solid shaft[1] 14 mm



[1] solid shaft not for PSE

PSS/PSW: OPTIMUM HYGIENIC DESIGN

Our stainless steel PSx follows the **hygienic design** recommendations (construction design, selection and treatment of materials) of the Chair of Apparatus and Plant Design at the Technical University of Munich, Weihenstephan Science Centre.



ACCESSORIES PSE/PSS/PSW 3 SERIES

The connectors shown here can be used for all three types of device (PSE/PSS/PSW). This ensures that the PSE (IP 54) and PSS (IP 65) comply with the IP protection classes. We will also be pleased to help you find a suitable mating connector for the PSW (IP 68) if necessary – just ask us!

For all PSx models, we recommend the use of a screw cap to cover the second bus connection if only one bus connection is required.

Order no. 9601.0176

Bus communication	Power supply + databus connector (2x) (for Option 0) [1]	Power supply + databus (2x) + jog key connector [2] (for Option T) [1]
CANopen PROFIBUS DP Modbus RTU	 Order no. 9601.0060	 Order no. 9601.0062
DeviceNet	 Order no. 9601.0088	 Order no. 9601.0090
Sercos EtherCAT PROFINET EtherNet/IP POWERLINK	 Order no. 9601.0112	-
IO-Link [3]	 Order no. 9601.0107 [3]	-

[1] see under "D" in the order key
[2] not for PSS/PSW
[3] Power supply and bus via one cable, without second databus connector

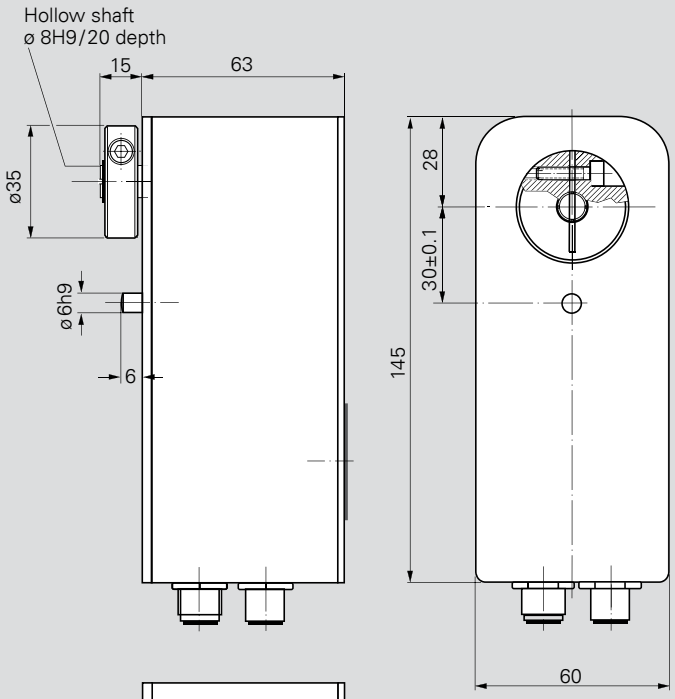
PSE 30_-8

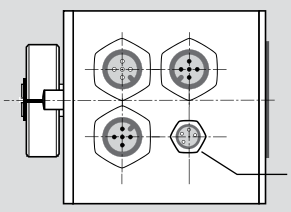
Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSE 301-8	1 Nm	0.5 Nm	210 min^{-1}	25 W
PSE 302-8	2 Nm	1 Nm	115 min^{-1}	25 W
PSE 305-8	5 Nm	2.5 Nm	40 min^{-1}	25 W

Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

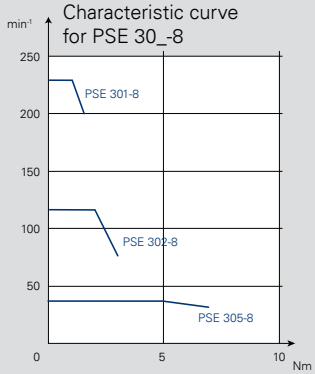
Start-up duration	30 % (basis time 300 s)
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	2.2 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm/ 55..1 000 Hz 10 g/ 10..2 000 Hz 5 g
Output shaft	8 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 54
Weight	650 g
Certificates	CE

The order key and accessories can be found on p. 18 / 19.



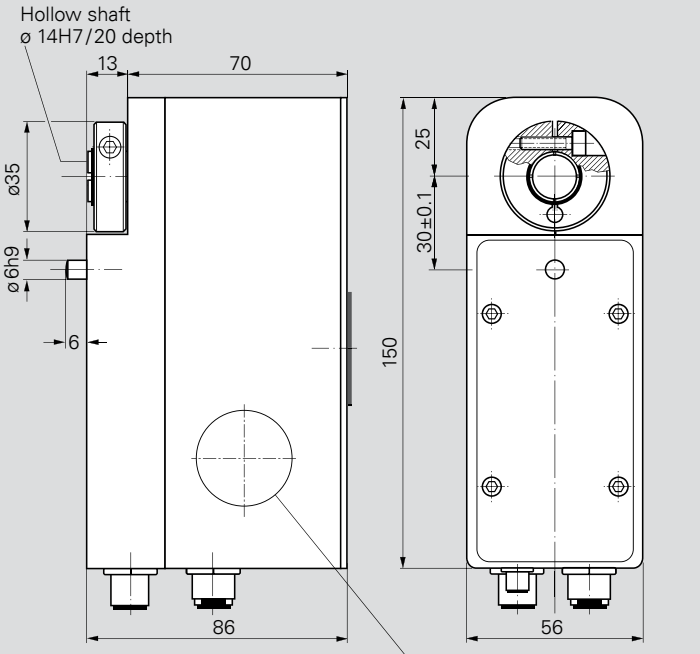


For details of the connections see also p. 10

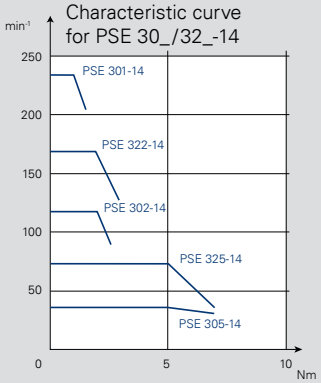


PSE 30_/32_-14

halstrup walcher



For details of the connections see also p. 10



Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSE 301-14	1 Nm	0.5 Nm	210 min^{-1}	25 W
PSE 302-14	2 Nm	1 Nm	100 min^{-1}	25 W
PSE 305-14	5 Nm	2.5 Nm	40 min^{-1}	25 W
PSE 322-14	2 Nm	1 Nm	150 min^{-1}	35 W
PSE 325-14	5 Nm	2.5 Nm	68 min^{-1}	35 W

Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	30 % (basis time 300 s)
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	PSE 30_: 2.4 A, PSE 32_: 3.1 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm/ 55..1 000 Hz 10 g/ 10..2 000 Hz 5 g
Output shaft	14 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 54
Weight	1 200 g
Certificates	CE

The order key and accessories can be found on p. 18 / 19.

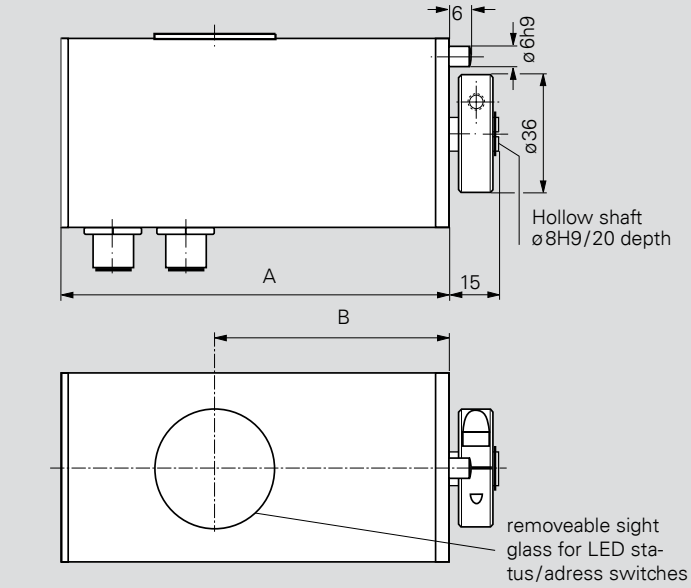
PSE 31_-8

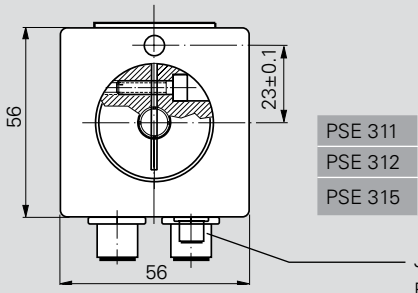
Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSE 311-8	1 Nm	0.5 Nm	210 min^{-1}	25 W
PSE 312-8	2 Nm	1 Nm	115 min^{-1}	25 W
PSE 315-8	5 Nm	2.5 Nm	40 min^{-1}	25 W

Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	30 % (basis time 300 s)
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	2.2 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm/ 55..1 000 Hz 10 g/ 10..2 000 Hz 5 g
Output shaft	8 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 54
Weight	700 g
Certificates	CE

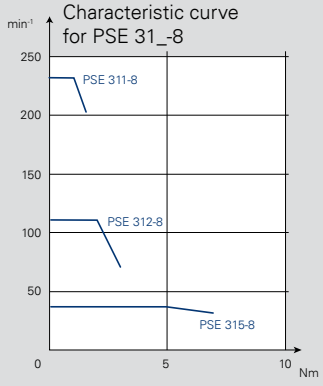
The order key and accessories can be found on p. 18 / 19.



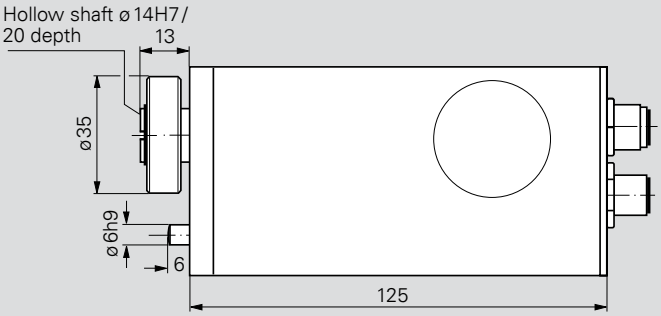


	A with/without optional plugs	B
PSE 311	115/100	70
PSE 312		
PSE 315	127/112	82

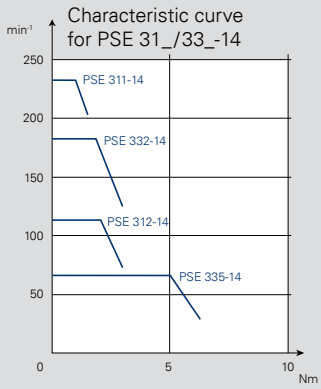
For details of the connections see also p. 10



PSE 31_/33_-14



For details of the connections see also p. 10



Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSE 311-14	1 Nm	0.5 Nm	210 min^{-1}	25 W
PSE 312-14	2 Nm	1 Nm	115 min^{-1}	25 W
PSE 332-14	2 Nm	1 Nm	150 min^{-1}	35 W
PSE 335-14	5 Nm	2.5 Nm	68 min^{-1}	35 W

Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	30 % (basis time 300 s)
Mode of operation	S3
Supply voltage	24 VDC ± 10 % Galvanically separated between control and motor and bus
Nominal current	PSE 31_: 2.4 A, PSE 33_: 3.1 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10 .. 55 Hz 1.5 mm/ 55 .. 1 000 Hz 10 g/ 10 .. 2 000 Hz 5 g
Output shaft	14 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0 .. 45 °C
Storage temperature	-10 .. 70 °C
Protection class	IP 54
Weight	700 g
Certificates	CE

The order key and accessories can be found on p. 18 / 19.

PSS 30_-8

Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSS 301-8	1 Nm	0.5 Nm	210 min^{-1}	25 W
PSS 302-8	2 Nm	1 Nm	115 min^{-1}	25 W
PSS 305-8	5 Nm	2.5 Nm	40 min^{-1}	25 W

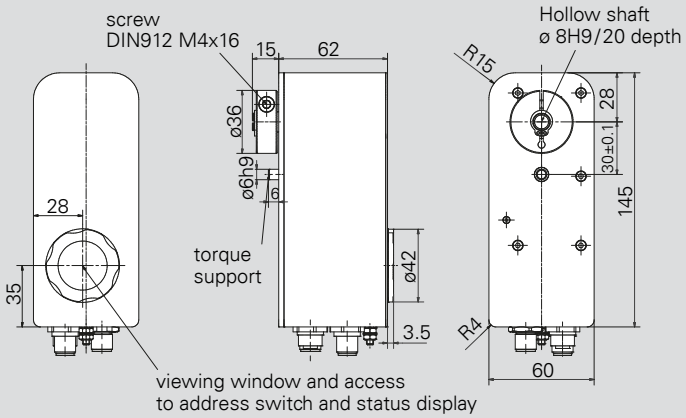
Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	20 % (basis time 600 s) at nominal torque
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	2.2 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm/ 55..1 000 Hz 10 g/ 10..2 000 Hz 5 g
Output shaft	8 mm solid shaft or 8 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 65 under installed and wired conditions*
Material	as for PSE, but with stainless steel housing
Weight	650 g
Certificates	CE

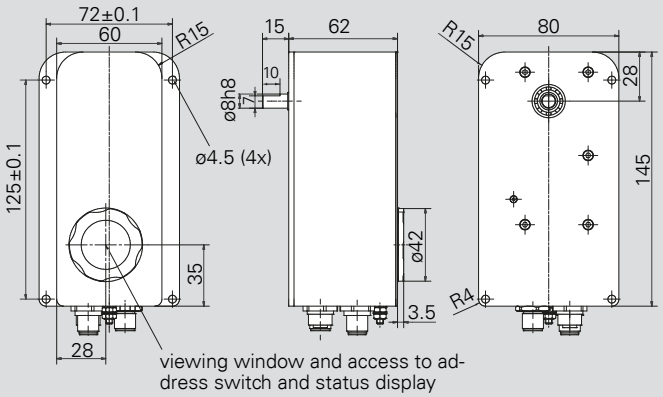
* Welded V2A housing, ball bearings at the output shaft with sealing disc

The order key and accessories can be found on p. 18 / 19.

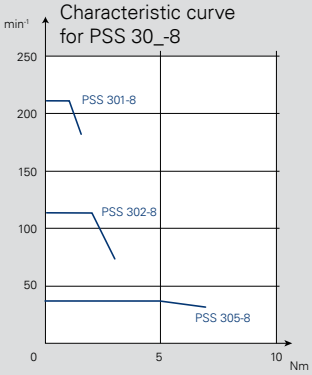
PSS 30_-8 (with hollow shaft)



PSS 30_-8-V (with solid shaft)



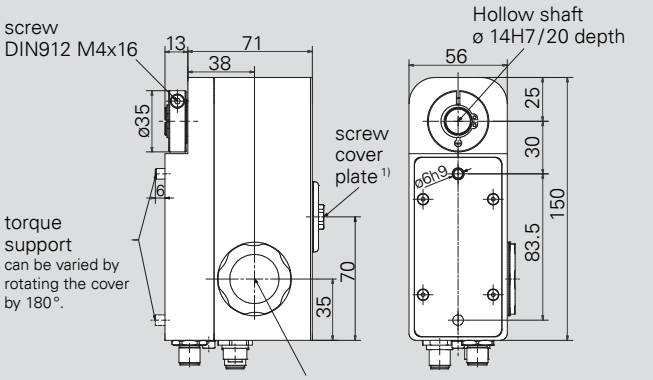
Characteristic curve for PSS 30_-8



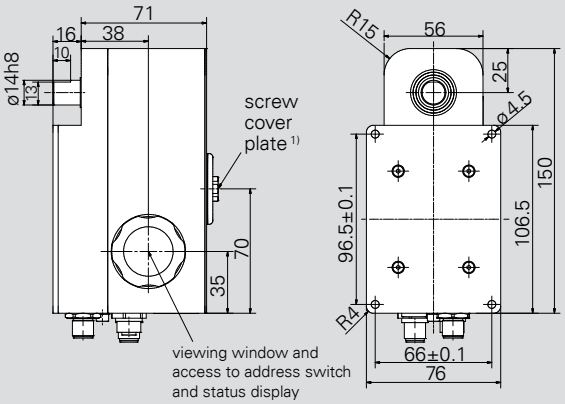
For details of the connections see also p. 10

PSS 30_/32_-14

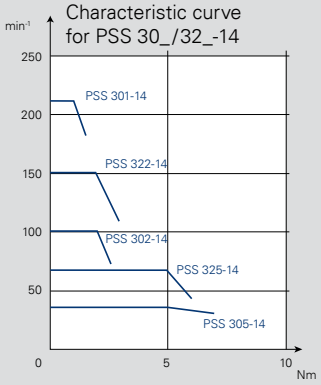
PSS 30_/32_-14 (with hollow shaft)



PSS 30_/32_-14-V (with solid shaft)



Characteristic curve for PSS 30_/32_-14



For details of the connections see also p. 10

1) over a rotating manual adjustment shaft SW6/8 depth hex

Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSS 301-14	1 Nm	0.5 Nm	210 min^{-1}	25 W
PSS 302-14	2 Nm	1 Nm	100 min^{-1}	25 W
PSS 305-14	5 Nm	2.5 Nm	40 min^{-1}	25 W
PSS 322-14	2 Nm	1 Nm	150 min^{-1}	35 W
PSS 325-14	5 Nm	2,5 Nm	68 min^{-1}	35 W

Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	20 % (basis time 600 s) at nominal torque
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	PSS 30_: 2.4 A, PSS 32_: 3.1 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm/ 55..1 000 Hz 10 g/ 10..2 000 Hz 5 g
Output shaft	14 mm solid shaft or 14 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 65 under installed and wired conditions*
Material	As for PSE, but with stainless steel housing
Weight	1 200 g
Certificates	CE

* Welded V2A housing, ball bearings at the output shaft with sealing disc

The order key and accessories can be found on p. 18 / 19.

PSS 31_-8

Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSS 311-8	1 Nm	0.5 Nm	210 min^{-1}	25 W
PSS 312-8	2 Nm	1 Nm	115 min^{-1}	25 W
PSS 315-8	5 Nm	2.5 Nm	40 min^{-1}	25 W

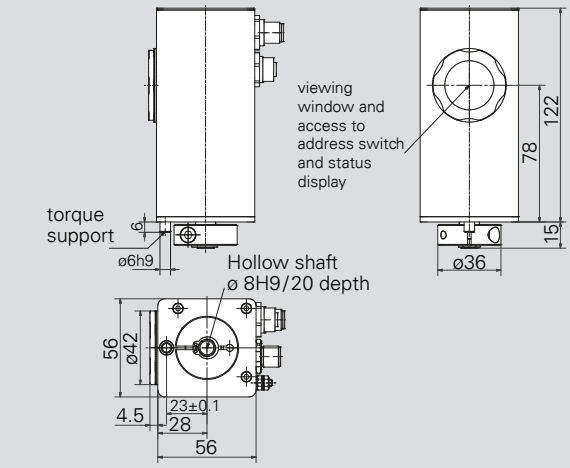
Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	20 % (basis time 600 s) at nominal torque
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	2.2 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm/ 55..1 000 Hz 10 g/ 10..2 000 Hz 5 g
Output shaft	8 mm solid shaft or 8 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 65 under installed and wired conditions*
Material	as for PSE, but with stainless steel housing
Weight	700 g
Certificates	CE

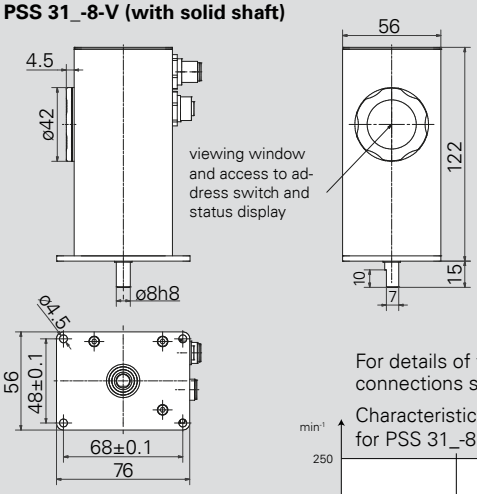
* Welded V2A housing, ball bearings at the output shaft with sealing disc

The order key and accessories can be found on p. 18 / 19.

PSS 31_-8 (with hollow shaft)

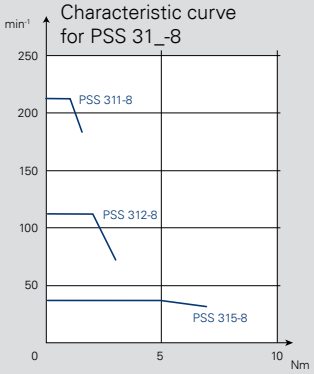


PSS 31_-8-V (with solid shaft)



For details of the connections see also p. 10

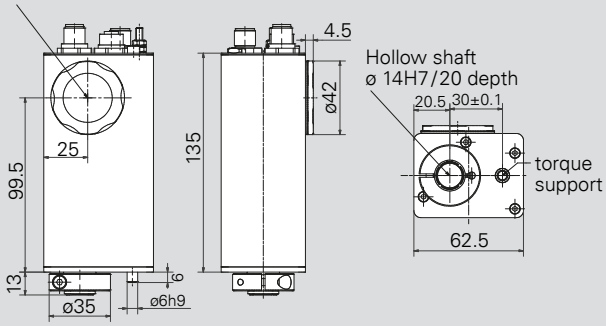
Characteristic curve for PSS 31_-8



PSS 31_/33_-14

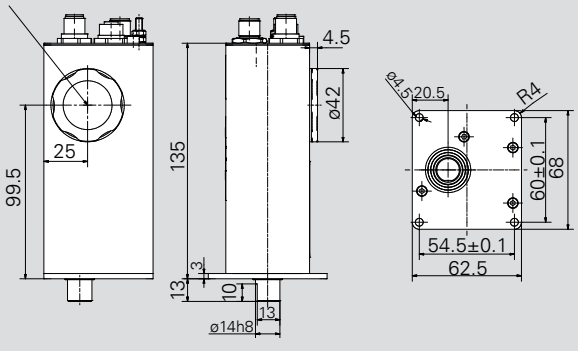
PSS 31_/33_-14 (with hollow shaft)

viewing window and access to address switch and status display

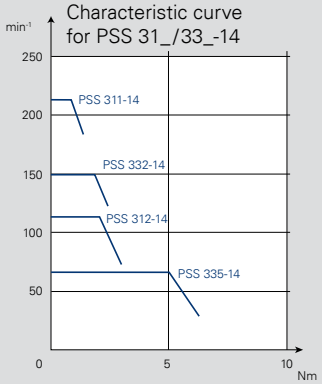


PSS 31_/33_-14-V (with solid shaft)

viewing window and access to address switch and status display



Characteristic curve for PSS 31_/33_-14



For details of the connections see also p. 10

Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSS 311-14	1 Nm	0.5 Nm	210 min^{-1}	25 W
PSS 312-14	2 Nm	1 Nm	115 min^{-1}	25 W
PSS 332-14	2 Nm	1 Nm	150 min^{-1}	35 W
PSS 335-14	5 Nm	2,5 Nm	68 min^{-1}	35 W

Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	20 % (basis time 600 s) at nominal torque
Mode of operation	S3
Supply voltage	24 VDC ± 10 % Galvanically separated between control and motor and bus
Nominal current	PSS 31_: 2.4 A, PSS 33_: 3.1 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	0..55 Hz 1.5 mm/ 55..1 000 Hz 10 g/ 10..2 000 Hz 5 g
Output shaft	14 mm solid shaft or 14 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 65 under installed and wired conditions*
Material	as for PSE, but with stainless steel housing
Weight	700 g
Certificates	CE

* Welded V2A housing, ball bearings at the output shaft with sealing disc

The order key and accessories can be found on p. 18 / 19.

PSW 30_-8

Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSW 301-8	1 Nm	0.5 Nm	180 min^{-1}	25 W
PSW 302-8	2 Nm	1 Nm	100 min^{-1}	25 W
PSW 305-8	5 Nm	2.5 Nm	35 min^{-1}	25 W

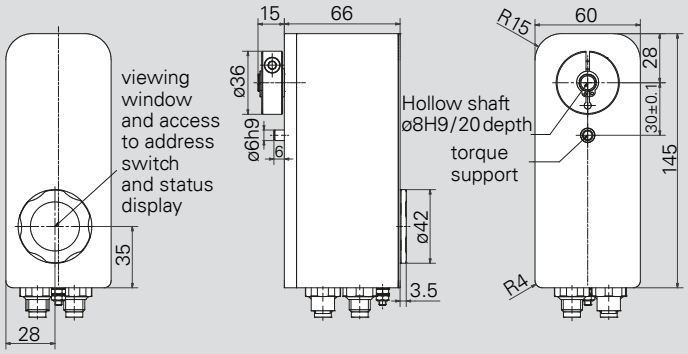
Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	20 % (basis time 600 s) at nominal torque
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	2.2 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10 .. 55 Hz 1.5 mm / 55 .. 1 000 Hz 10 g / 10 .. 2 000 Hz 5 g
Output shaft	8 mm solid shaft or 8 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0 .. 45 °C
Storage temperature	-10 .. 70 °C
Protection class	IP 68 at standstill, IP 66 during rotation (tested with water)*
Material	stainless steel
Weight	650 g
Certificates	CE

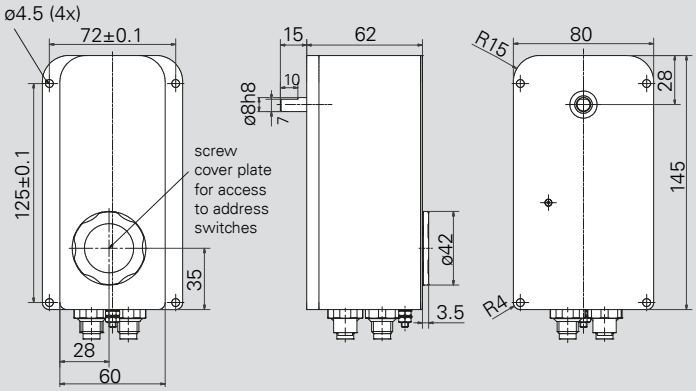
* Welded V2A housing, Output shaft sealed with quad-ring

The order key and accessories can be found on p. 18 / 19.

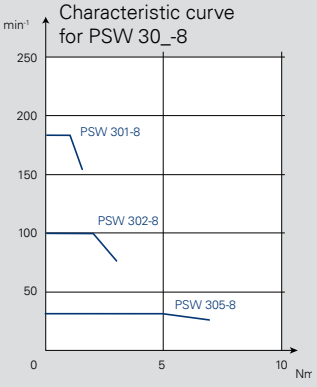
PSW 30_-8 (with hollow shaft)



PSW 30_-8-V (with solid shaft)



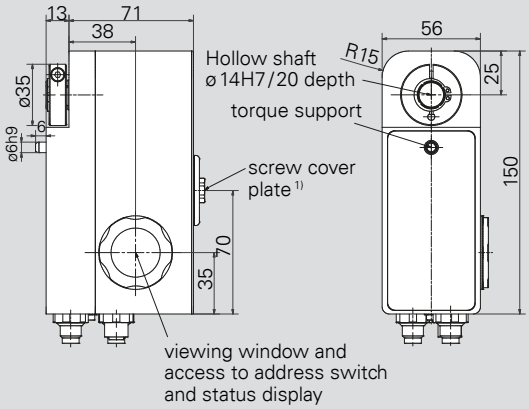
Characteristic curve for PSW 30_-8



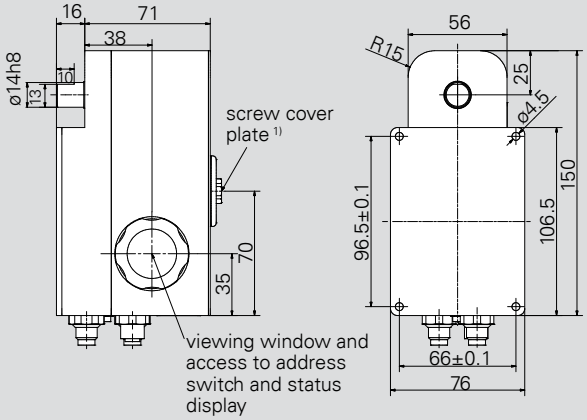
For details of the connections see also p. 10

PSW 30_/32_-14

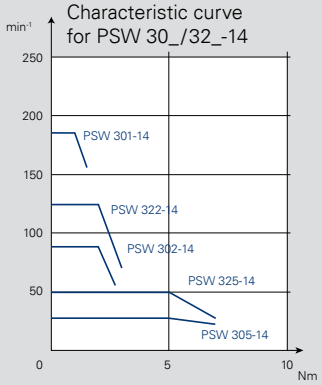
PSW 30_/32_-14 (with hollow shaft)



PSW 30_/32_-14-V (with solid shaft)



Characteristic curve for PSW 30_/32_-14



For details of the connections see also p. 10

1) over a rotating manual adjustment shaft SW6/8 depth hex

Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSW 301-14	1 Nm	0.5 Nm	180 min^{-1}	25 W
PSW 302-14	2 Nm	1 Nm	90 min^{-1}	25 W
PSW 305-14	5 Nm	2.5 Nm	35 min^{-1}	25 W
PSW 322-14	2 Nm	1 Nm	125 min^{-1}	35 W
PSW 325-14	5 Nm	2.5 Nm	50 min^{-1}	35 W

Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	20 % (basis time 600 s) at nominal torque
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	PSW 30_: 2.4 A, PSW 32_: 3.1 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm/ 55..1 000 Hz 10 g/ 10..2 000 Hz 5 g
Output shaft	14 mm solid shaft or 14 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 68 at standstill, IP 66 during rotation (tested with water)*
Material	stainless steel
Weight	1 200 g
Certificates	CE

* Welded V2A housing, Output shaft sealed with quad-ring

The order key and accessories can be found on p. 18 / 19.

PSW 31_-8

Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSW 311-8	1 Nm	0.5 Nm	180 min^{-1}	25 W
PSW 312-8	2 Nm	1 Nm	100 min^{-1}	25 W
PSW 315-8	5 Nm	2.5 Nm	35 min^{-1}	25 W

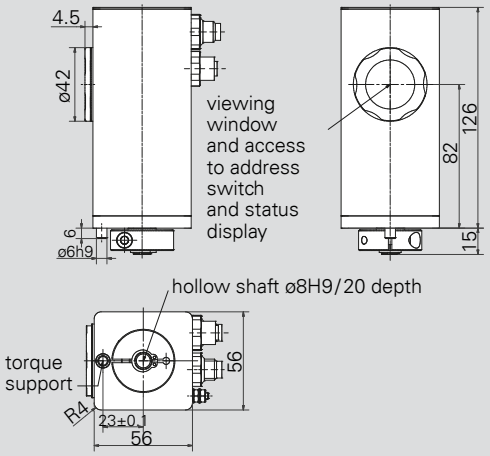
Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	20 % (basis time 600 s) at nominal torque
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	2.2 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm/ 55..1 000 Hz 10 g/ 10..2 000 Hz 5 g
Output shaft	8 mm solid shaft or 8 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 68 at standstill, IP 66 during rotation (tested with water)*
Material	stainless steel
Weight	700 g
Certificates	CE

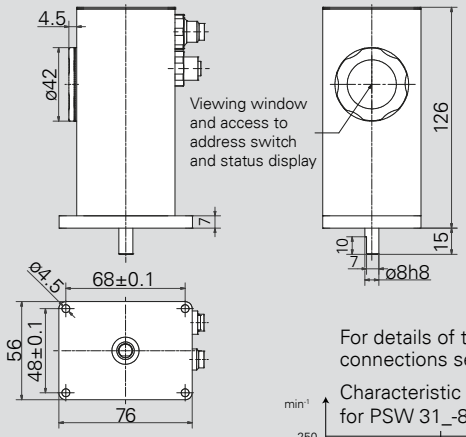
* Welded V2A housing, Output shaft sealed with quad-ring

The order key and accessories can be found on p. 18 / 19.

PSW 31_-8 (with hollow shaft)

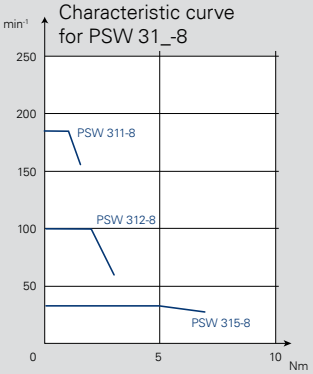


PSW 31_-8-V (with solid shaft)



For details of the connections see also p. 10

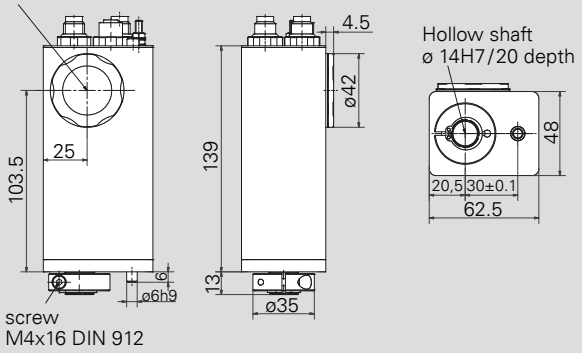
Characteristic curve for PSW 31_-8



PSW 31_/33_-14

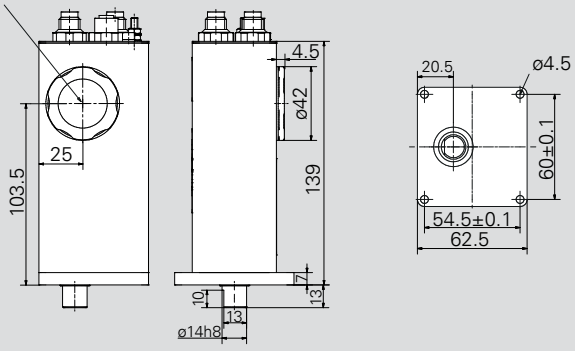
PSW 31_/33_-14 (with hollow shaft)

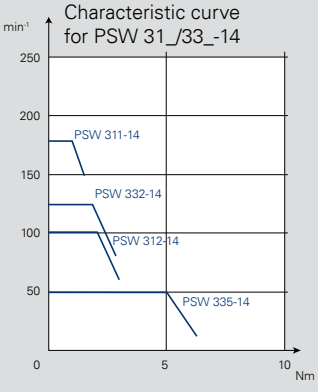
viewing window and access to address switch and status display



PSW 31_/33_-14-V (with solid shaft)

viewing window and access to address switch and status display





Characteristic curve for PSW 31_/33_-14

For details of the connections see also p. 10

Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
PSW 311-14	1 Nm	0.5 Nm	180 min^{-1}	25 W
PSW 312-14	2 Nm	1 Nm	100 min^{-1}	25 W
PSW 332-14	2 Nm	1 Nm	125 min^{-1}	35 W
PSW 335-14	5 Nm	2.5 Nm	50 min^{-1}	35 W

Data interfaces
CANopen, PROFIBUS DP, DeviceNet, Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP, POWERLINK, IO-Link

Start-up duration	20 % (basis time 600 s) at nominal torque
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	PSW 31_: 2.4 A, PSW 33_: 3.1 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm/ 55..1 000 Hz 10 g/ 10..2 000 Hz 5 g
Output shaft	14 mm solid shaft or 14 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 68 at standstill, IP 66 during rotation (tested with water)*
Material	stainless steel
Weight	700 g
Certificates	CE

* Welded V2A housing, Output shaft sealed with quad-ring

The order key and accessories can be found on p. 18 / 19.

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HIPERDRIVE

positioning systems

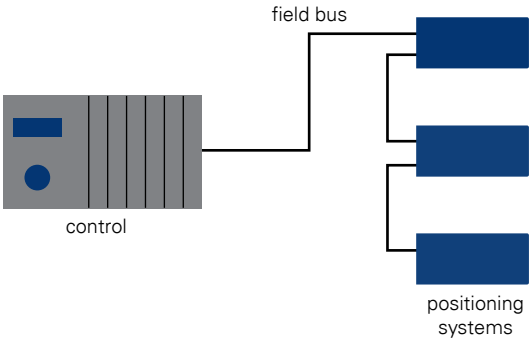
HDA 70

HDA Hub

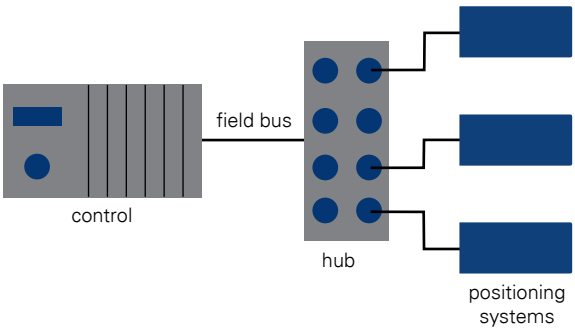
PSE 441

HIPERDRIVE POSITIONING SYSTEMS

The HIPERDRIVE series facilitates both direct wiring and indirect wiring via a Hub *(see p. 8)*.



A direct wiring ("adapter") → *see p. 34*



B indirect wiring via Hub → *see p. 35*

ACCESSORIES FOR HIPERDRIVE HDA 70 AND PSE 441

	HDA 70 with bus communication (Industrial Ethernet [1] and PROFIBUS DP)			
A	Bus cable for Industrial Ethernet with an M12 connector (D-cod.) 10 m: Order no. 9508.0045 20 m: Order no. 9508.0046		Power supply cable with a 7/8" connector socket 10 m: Order no. 9508.0043 20 m: Order no. 9508.0044	
	Bus cable for PROFIBUS DP with an M12 connector socket (B-cod.) 10 m: Order no. 9508.0011 25 m: Order no. 9508.0017		Connector for PROFIBUS DP M12 connector socket (B-cod.) Order no. 9508.0027	
	Connector set for PROFIBUS DP: 7/8" power supply connector + databus connector and socket Order no. 9508.0034		Connector for PROFIBUS DP M12 connector (B-cod.) Order no. 9508.0012 with terminating resistors: Order no. 9508.0013	
	HDA 70 with RS 485 (for indirect cabling via Hub)			
B	Simple flange adapter with cable: 1 m: Order no. 9508.0038 2 m: Order no. 9508.0033 5 m: Order no. 9508.0019 10 m: Order no. 9508.0010 15 m: Order no. 9508.0008		Connecting cable (with crimp contacts at one end) without adapter 2.5 m: Order no. 9508.0030	
			Adapter without cable Order no. 9508.0009	
	PSE 441 with RS 485			
	Power supply and bus cable with an M12 connector socket (A-cod.) 10 m: Order no. 9508.0022 15 m: Order no. 9508.0035		Connector M12 connector socket (A-cod.) for PSE 441 master Order no. 9601.0144	
			Connector M12 connector (A-cod.) for PSE 441 slave drive Order no. 9601.0152	

[1] EtherCAT, PROFINET, EtherNet/IP

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HIPERDRIVE HDA 70

For direct wiring (with adapter)

Start-up duration	30 % (basis time 300 s)
Mode of operation	S3
Supply voltage	24 V DC ± 15 %
Nominal current	4.8 A
Positioning accuracy	± 1 °
Positioning range	32 000 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	10 g 30 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10 .. 150 Hz 10 g
Insulation class	B (120 °)
Maximum axial force	axial shaft: 150 N radial shaft: 165 N
Maximum radial force	axial shaft: 200 N radial shaft: 440 N
Ambient temperature	max. 45 °C
Storage temperature	-25 .. 75 °C
Protection class	IP 65
Weight	axial 2.8 kg / radial 3.2 kg
Certificates	CE

Product	Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output
HDA 70	15 Nm	25 Nm	27 min^{-1}	42 W

Data interfaces	A
PROFIBUS DP	DP
EtherCAT	EC
PROFINET	PN
EtherNet/IP	EI
RS 485 *	I

* for control via HUB

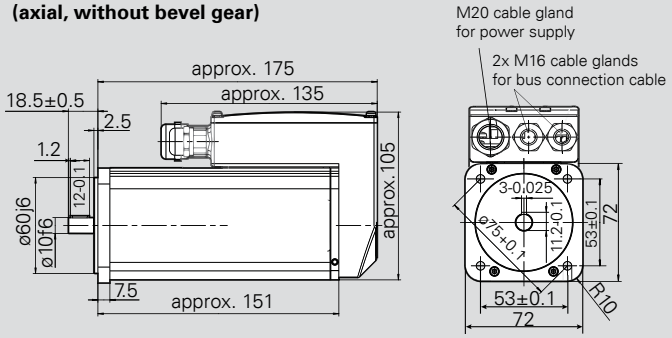
Shaft position	B
axial, without bevel gear	L
radial, with bevel gear, position type 1	1
radial, with bevel gear, position type 2	2
radial, with bevel gear, position type 3	3
radial, with bevel gear, position type 4	4

Connections	C
Cable gland (only DP and EC)	B
Connector, 6-pin (RS 485 without Hub)	E
Connector, 6-pin (RS 485 with Hub)	H
Cable gland for 24 V DC, 2 x M12 female connector for bus in/out	S
Male connector (7/8") for 24 V DC, 2 x M12 female connector for bus in/out	T

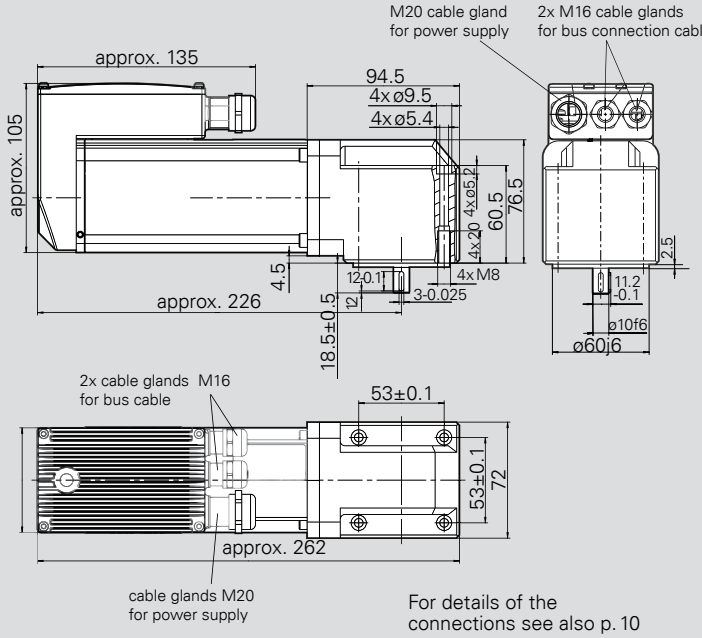
Output shaft design	D
10 mm solid shaft with feather key (radial/axial)	S
10 mm hollow shaft (only radial, with bevel gear)	H10
12 mm hollow shaft (only radial, with bevel gear)	H12

Order code	A	B	C	D
HDA 70	–	–	–	–

HDA 70 with adapter (axial, without bevel gear)

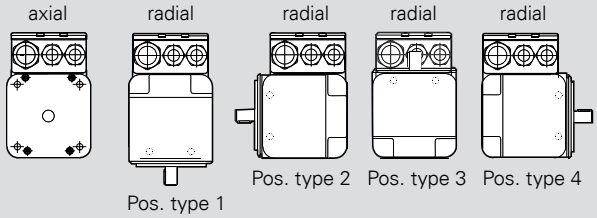


HDA 70 with adapter (radial, with bevel gear)



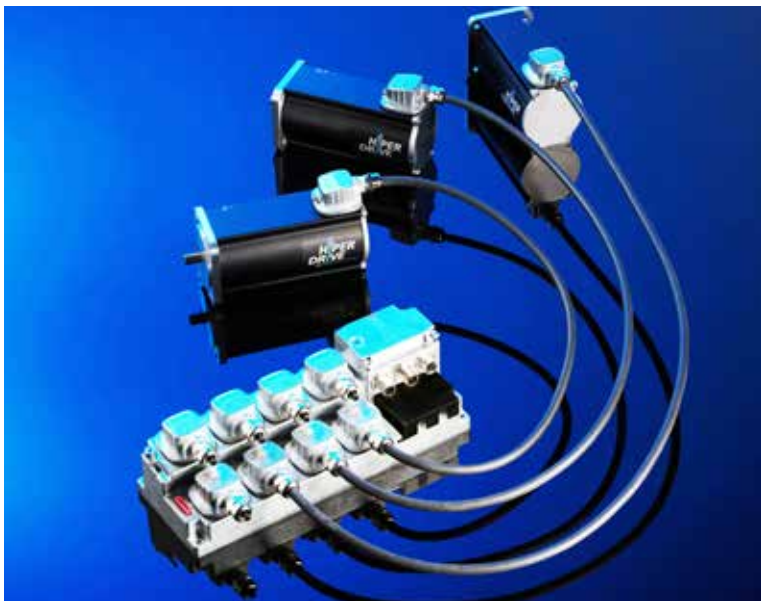
For details of the connections see also p. 10

Shaft position



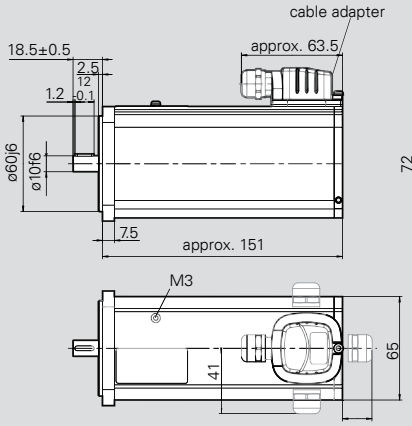
HIPERDRIVE HDA 70

Wiring via HUB

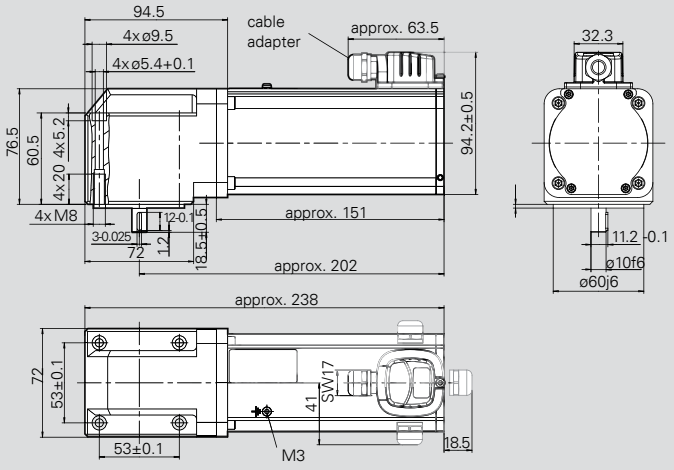


Supply voltage	24 V DC ± 15 %
Power consumption (control unit)	300 mA
Shock resistance in accordance with IEC/DIN EN 60068-2-27	8 g 20 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10 .. 500 Hz 10 mm
Certificates	CE
Motor connection cables, Operating voltage for data X-D1 .. 8	6 x adjustable collar max. cross-section of conductor 1.5 mm²
Operating voltage connection, motors X-A+, X-A-, Equipotential bonding	Cable lug M6
Bus terminating resistor	Via external terminal resistance
Bus connection	M12, 5-pin Type B (PROFIBUS DP) 2x M12, 5-poin Type D (Ethernet-based buses) 2x
Address range adjustable via switches	0 .. 125 (0 .. 99 for Ethernet-based buses)
Housing	Die-cast zinc
Ambient temperature	0 .. 45 °C
Storage temperature	-25 .. 75 °C
Protection class with IEC 60529	IP 65
Weight	4.5 kg

HDA 70 (axial, without bevel gear)

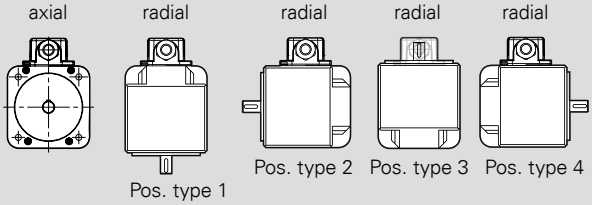


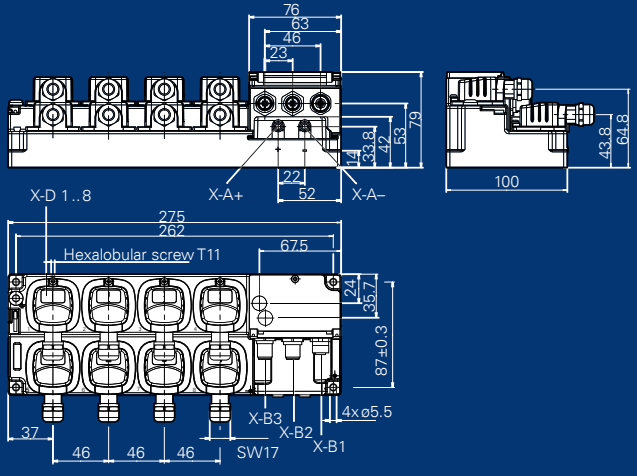
HDA 70 (radial, with bevel gear)



For details of the connections see also p. 10

Shaft position





Data interfaces *	A
PROFIBUS DP	DP
EtherCAT	EC
PROFINET	PN
EtherNet/IP	EI

* via RS 485 between HUB and HDA/PSE 441

Order code	A
Hub	–

PSE 441

Start-up duration	30 % (basis time 300 s)
Mode of operation	S3
Supply voltage	24 V DC ± 10 %
Nominal current	0.8 A
Positioning accuracy Measurement of position taken directly at the output shaft	± 2.5 °
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	30 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10 .. 150 Hz 10g
Output shaft	10 mm solid shaft with feather key
Maximum axial force	20 N
Maximum radial force	50 N
Ambient temperature	10 .. 45 °C
Storage temperature	-10 .. 70 °C
Protection class	IP 65
Housing	Plastic
Weight	600 g
Certificates	CE

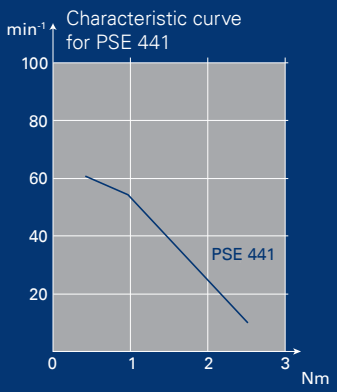
Nominal torque	Peak torque	Nominal power output	A
1.5 Nm	2.5 Nm	6 W	441
@ 40 min^{-1}	@ 10 min^{-1}		

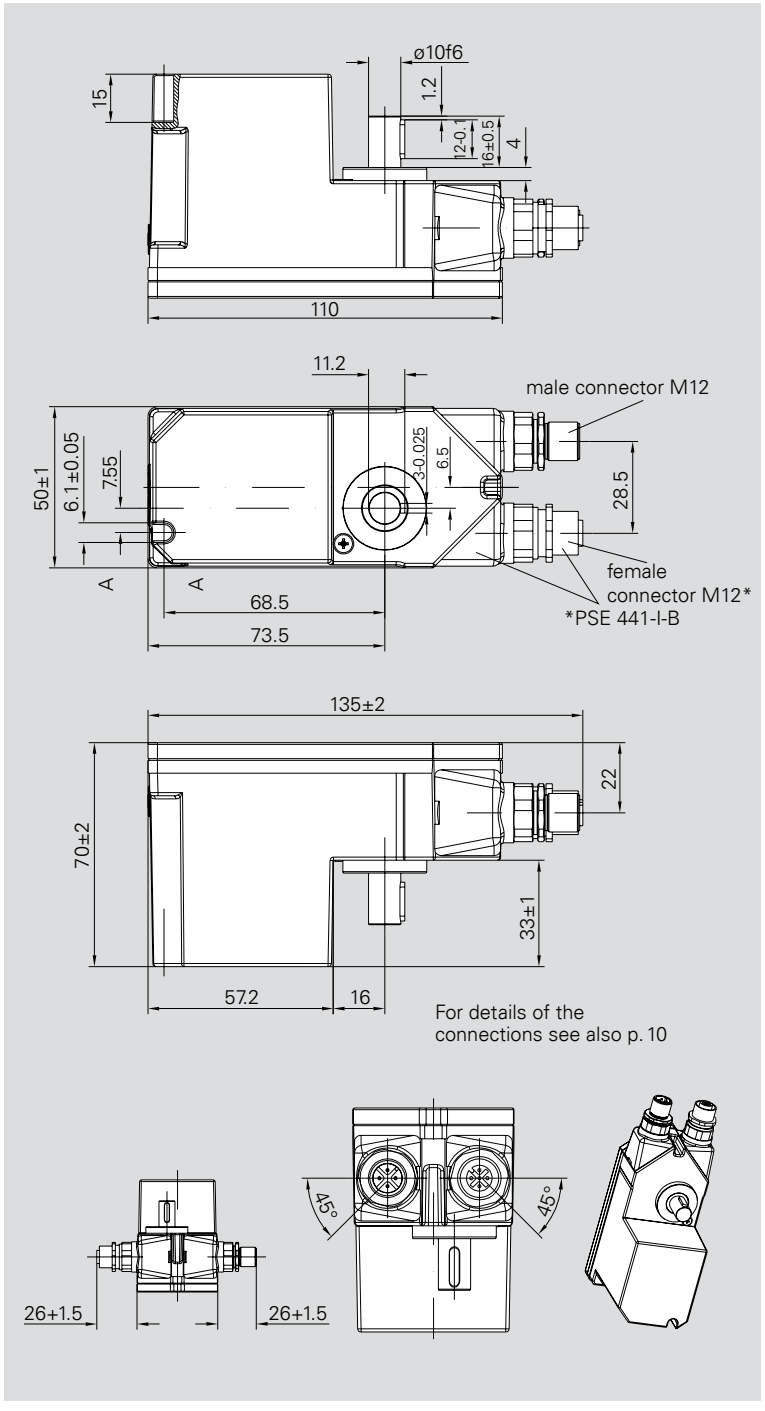
Data interfaces	B
RS 485	I

Connections	C
Standard for connection to the Hub (one shared connector for the power supply and bus)	S
Standard + 2nd connection for further device, power supply looped through, bus: daisy chain RS 485 *	B

* A "daisy chain" is only possible if the control is used as the bus master, not possible using the Hub.

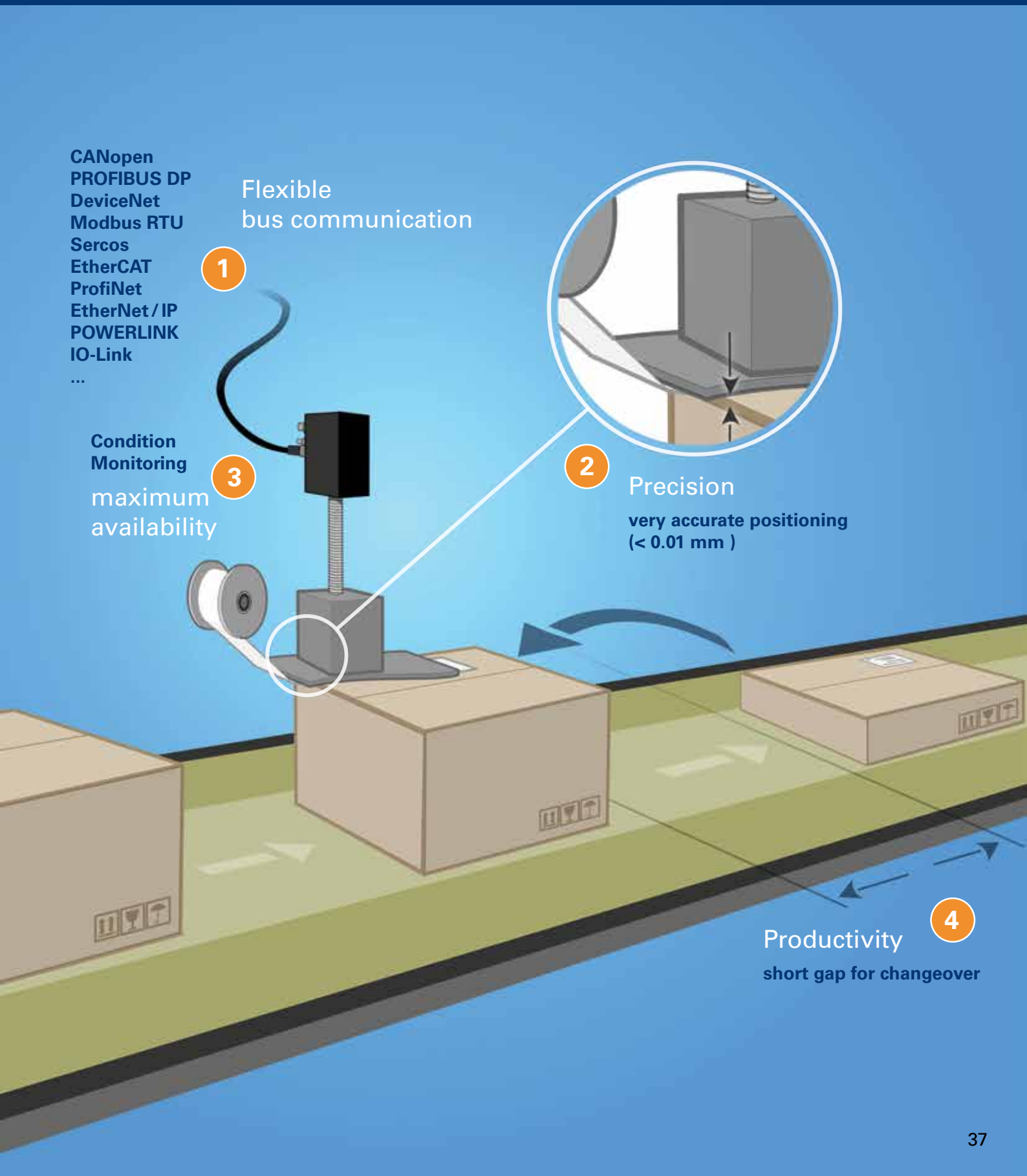
Order code	A	B	C
PSE	441	I	





Application example
Format changeover in packaging machines

FOUR WINNING SOLUTIONS



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further positioning systems

PSE 21_/23_-8

PSE 34_-14

PSE 31_-VG-14

PSE 100/200

PSE 172/272

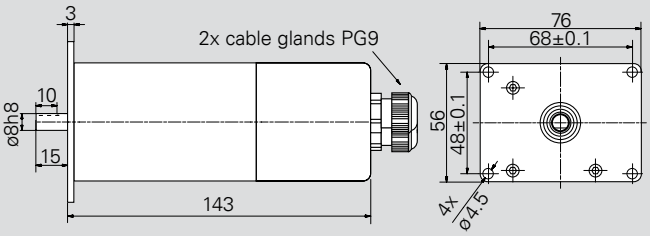
LPE 72

LPE 4310 C

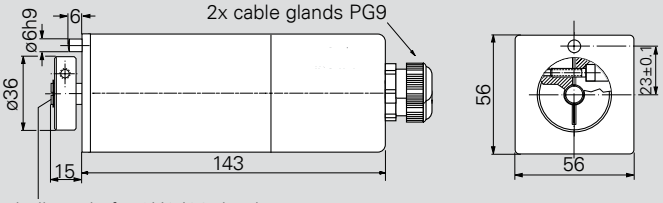
PSE 21_/23_-8

Start-up duration	50 % (basis time 300 s)
Supply voltage	24 V DC ± 10 %
Nominal current	0.7 A
Power consumption (motor control unit)	0.1 A
Positioning accuracy Measurement of position taken directly at the output shaft	0.9°
Positioning range quasi absolute measurement system: absolute measurement system:	 unlimited 64 rotations
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm / 55..1 000 Hz 10 g / 10..2 000 Hz 5 g
Output shaft	8 mm solid shaft or 8 mm hollow shaft with adjustable collar
Maximum axial force	20 N
Maximum radial force	40 N
Connections	Electrical connections via terminal bar (max. 1.5 mm²)
Ambient temperature	0..45 °C
Storage temperature	-10..70 °C
Protection class	IP 54
Weight	500 g
Certificates	CE

PSE 21_/23_-8 with solid shaft



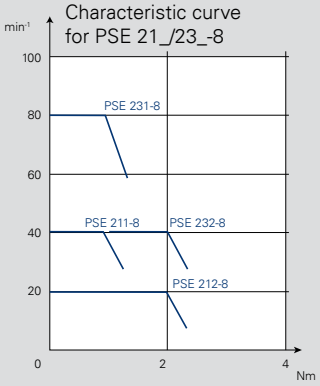
PSE 21_/23_-8 with hollow shaft

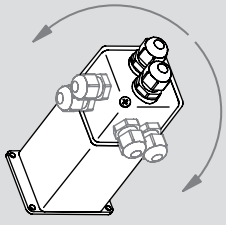


hollow shaft ø8H9/20 depth

For details of the connections see also p. 10

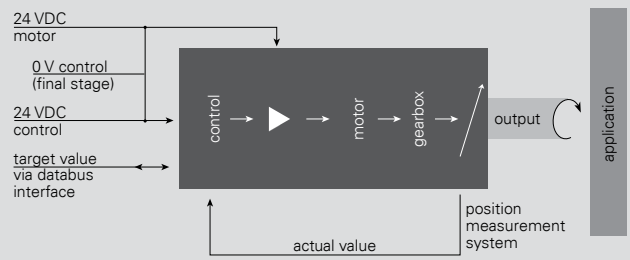
Characteristic curve for PSE 21_/23_-8





The cable gland can be moved into different positions by turning the cover by 90°.

Functional block diagram PSE 21_/23_-8



Nominal torque	Nominal rated speed	Nominal power output	A
1 Nm	40 min⁻¹	4 W	211-8
2 Nm	20 min⁻¹	4 W	212-8
1 Nm	80 min⁻¹	8 W	231-8
2 Nm	40 min⁻¹	8 W	232-8

Data interfaces	B
CANopen	CA
DeviceNet	DN
Modbus RTU	MB

Address switches / baud rate switches	C
without address switches/baud rate switches	O
with address switches/baud rate switches adjustable baud rate, 500 kBaud, 250 kBaud, 125 kBaud	A

Output shaft	D
8 mm solid shaft	W
8 mm hollow shaft with adjustable collar	H

Measurement system	E
Quasi absolute measurement system	0
Absolute measurement system, 64 rotations	1

Order code	A	B	C	D	E
PSE	–	–	–	–	–

PSE 34_-14

Start-up duration	20 % (basis time 300 s)
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	7.8 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10 .. 55 Hz 1.5 mm / 55 .. 1 000 Hz 10 g / 10 .. 2 000 Hz 5 g
Output shaft	14 mm hollow shaft with clamp and feather key
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0 .. 45 °C
Storage temperature	-10 .. 70 °C
Protection class	IP 54
Weight	1 900 g
Certificates	CE

Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output	A
10 Nm	5 Nm	80 min^{-1}	100 W	3410-14
18 Nm	9 Nm	60 min^{-1}	100 W	3418-14

Data interfaces	B
CANopen	CA
PROFIBUS DP	DP
Sercos	SE
EtherCAT	EC
PROFINET	PN
EtherNet/IP	EI
POWERLINK	PL

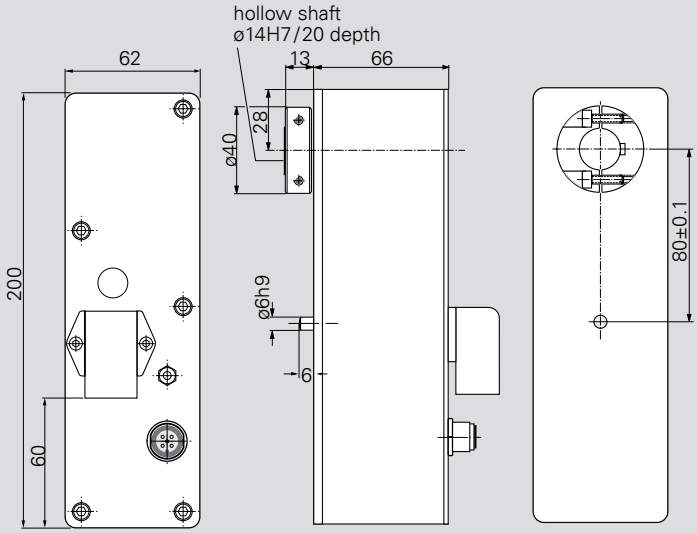
Jog keys	C
without jog keys	0
with jog keys [1]	T

[1] only for PROFIBUS DP

Brake	D
No brake	0
With brake (holding torque is the same as the nominal torque)	M

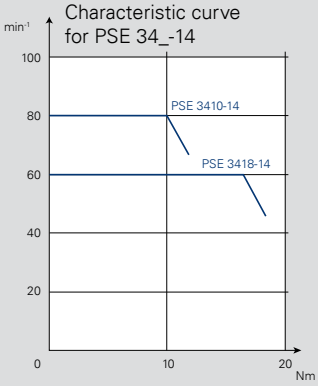
Order code	A	B	C	D
PSE	–	–	–	–

Accessories:
Set of connectors Order no. 9601.0093
(Harting and round plugs for power supply and bus + second databus connector)



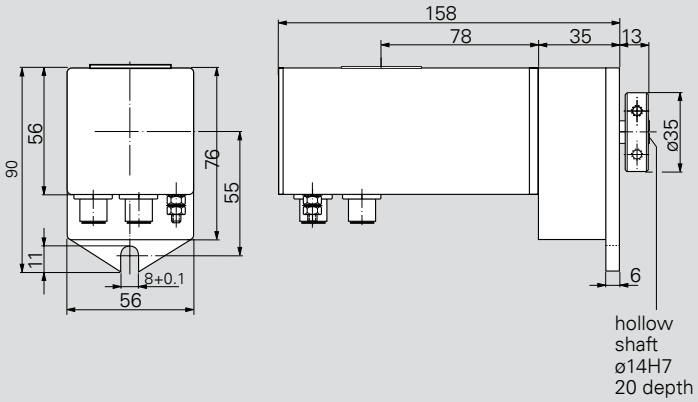
For details of the connections see also p. 10

Characteristic curve for PSE 34_-14

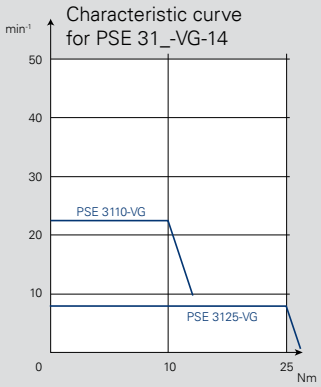


Functional block diagram PSE 34_-14 see p. 14

PSE 31_-VG-14



For details of the connections see also p. 10



Functional block diagram PSE 31_-VG-14 see p. 14

Start-up duration	30 % (basis time 300 s)
Mode of operation	S3
Supply voltage	24 V DC ± 10 % Galvanically separated between control and motor and bus
Nominal current	2.2 A
Power consumption (control unit)	0.1 A
Positioning accuracy Absolute measurement of position taken directly at the output shaft	0.9°
Positioning range	250 rotations not subject to mechanical limits
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10 .. 55 Hz 1.5 mm / 55 .. 1 000 Hz 10 g / 10 .. 2 000 Hz 5 g
Output shaft	14 mm hollow shaft with clamp and feather key
Maximum axial force	20 N
Maximum radial force	40 N
Ambient temperature	0 .. 45 °C
Storage temperature	-10 .. 70 °C
Protection class	IP 54
Weight	1 200 g
Certificates	CE

Nominal torque	Self-holding torque	Nominal rated speed	Nominal power output	A
10 Nm	5 Nm	22 min^{-1}	25 W	PSE 3110-VG
25 Nm	12.5 Nm	9 min^{-1}	25 W	PSE 3125-VG

Data interfaces	B
CANopen	CA
PROFIBUS DP	DP
DeviceNet	DN
Modbus RTU	MB
Sercos	SE
EtherCAT	EC
PROFINET	PN
EtherNet/IP	EI
POWERLINK	PL
IO-Link	IO

Jog keys	C
without jog keys [1]	0
with jog keys [2]	T

[1] with IO-Link there is only one connection and no second databus connection (power supply and bus via one cable)
[2] not for Modbus RTU, Sercos, EtherCAT, PROFINET, EtherNet/IP or IO-Link

Order code	A	B	C
PSE	–	–	–

For accessories, see p. 19

PSE 100/200

Nominal current	PSE 100: 0.2 A PSE 200: 1 A
No-load current	0.2 A
Positioning resolution	0.5 % of positioning range
Positioning accuracy	2 % of positioning range
Positioning range	PSE 100: max. 20 rotations PSE 200: max. 50 rotations
Voltage output "actual value"	0..10 V, 0..20 mA, 4..20 mA
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm / 55..1 000 Hz 10 g / 10..2 000 Hz 5 g
Output shaft	12 mm solid shaft
Maximum axial force	20 N
Maximum radial force	30 N
Ambient temperature	0..50 °C
Storage temperature	-10..70 °C
Protection class	IP 55
Weight	900 g
Certificates	CE

Product	Nominal torque	Nominal rated speed	A
PSE 100	2.5 Nm	2 min^{-1}	100/1
	5 Nm	1 min^{-1}	100/2
	10 Nm	0.5 min^{-1}	100/3
	10 Nm	0.25 min^{-1}	100/4
PSE 200	1 Nm	30 min^{-1}	200/1
	5 Nm	5 min^{-1}	200/2
	10 Nm	2 min^{-1}	200/3
	10 Nm	1 min^{-1}	200/4
	10 Nm	0.5 min^{-1}	200/5
	10 Nm	0.25 min^{-1}	200/6

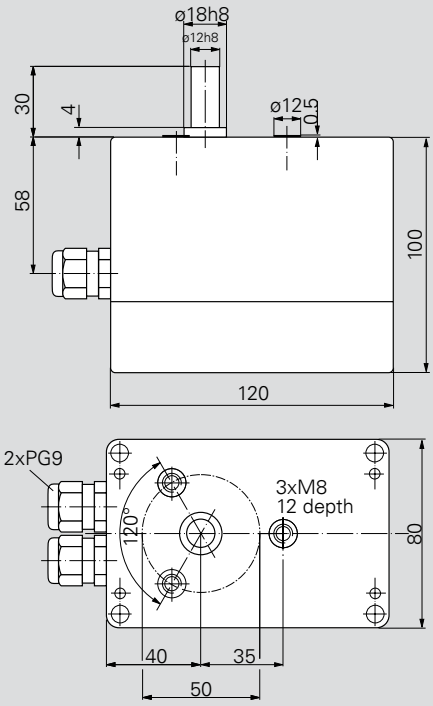
Default analog target value	B
0..10 VDC (R_L > 2 kΩ)	A
0..20 mA (R_L < 500 Ω)	B
4..20 mA (R_L < 500 Ω)	C

Supply voltage		C
PSE 200	24 VDC (+20/-15 %)	A
PSE 100	24 VAC (+6/-15 % 50 Hz)	B
	115 VAC (+6/-15 % 50 Hz)	C
	230 VAC (+6/-15 % 50 Hz)	D

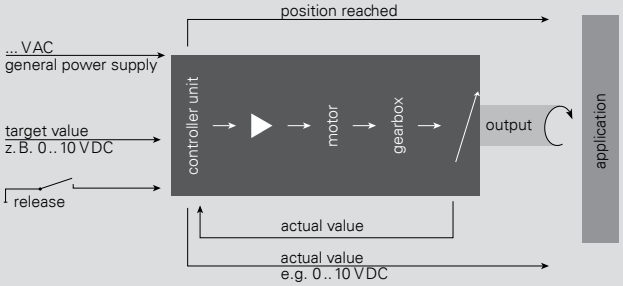
Positioning range [1]	D
max. 50 rotations (PSE 200) max. 20 rotations (PSE 100)	

[1] Value in rotations, max. 50 (20) possible. For < 1 rotation, conversion of the angle. Example: 270° = 0.75 rotations.

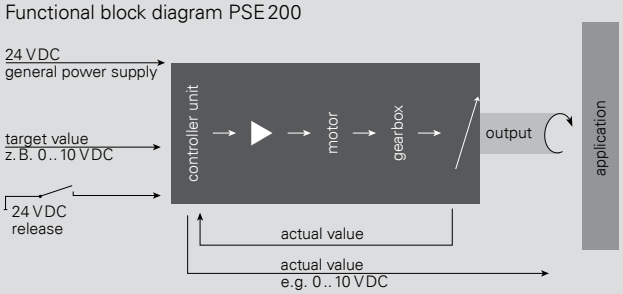
Order code	A	B	C	D
PSE	–	–	–	–



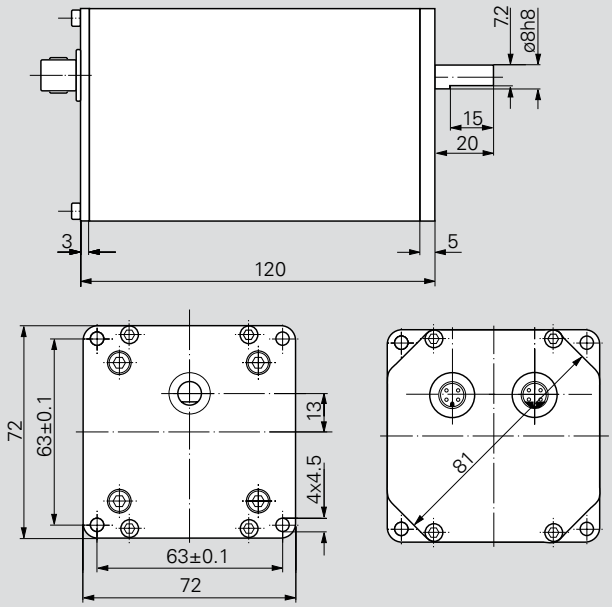
Functional block diagram PSE 100



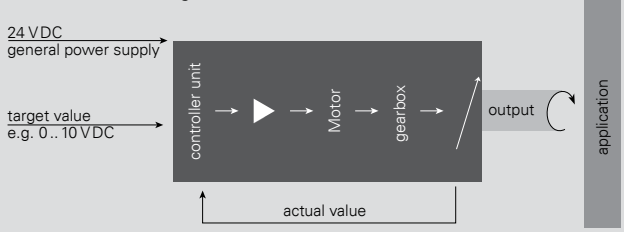
Functional block diagram PSE 200



PSE 172/272



Functional block diagram PSE 172/272



Start-up duration	100 %
Nominal current	PSE 172: 0.3 A PSE 272: 0.5 A
No-load current	PSE 172: 0.03 A PSE 272: 0.2 A
Positioning resolution	0.5 % of positioning range
Positioning accuracy	2 % of positioning range
Positioning range	max. 15 rotations
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10..55 Hz 1.5 mm / 55..1 000 Hz 10 g / 10..2 000 Hz 5 g
Output shaft	8 mm solid shaft
Maximum axial force	20 N
Maximum radial force	30 N
Ambient temperature	0..50 °C
Storage temperature	-10..70 °C
Protection class	IP 65
Weight	800 g
Certificates	CE

Product	Nominal torque	Nominal rated speed	A
PSE 172	0.75 Nm	10 min^{-1}	172/1
	1.5 Nm	5 min^{-1}	172/2
	3.5 Nm	2 min^{-1}	172/3
PSE 272	1 Nm	60 min^{-1}	272/1
	2 Nm	30 min^{-1}	272/2
	4 Nm	15 min^{-1}	272/3
	5 Nm	7.5 min^{-1}	272/4

Default analog target value	B
0..10 VDC (R_L > 2 kΩ)	A
0..20 mA (R_L < 500 Ω)	B
4..20 mA (R_L < 500 Ω)	C

Positioning range [1]	C
max. 15 rotations	

[1] Value in rotations, max. 15 possible. For < 1 rotation, conversion of the angle. Example: 270° = 0.75 rotations.

Supply voltage		D
PSE 272	24 VDC (+20/-15 %)	A
PSE 172	24 VAC (+6/-15 % 50 Hz)	B
	115 VAC (+6/-15 % 50 Hz)	C
	230 VAC (+6/-15 % 50 Hz)	D

Order code	A	B	C	D
PSE	–	–	–	–

Accessories:
Mating connector Order no. 9601.0048
(A encoded socket and one B encoded socket, 4-pole)

halstrup walcher

LPE 72

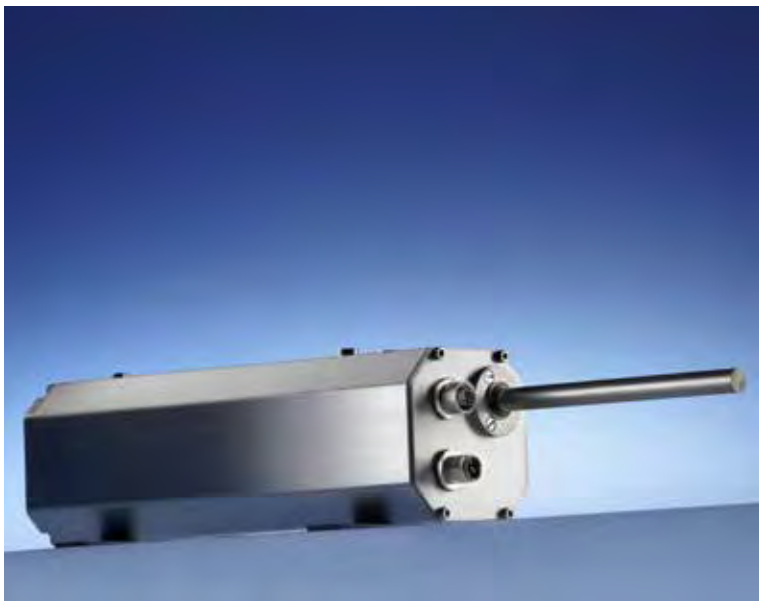
Lifting force	100 N (50 % duty cycle)
Self-holding power	100 N
Supply voltage	24 VDC +30/-25 %
Nominal current	2.5 A
No-load current	0.5 A
Upstroke	120 mm (others on request)
Positioning resolution	0.2 % of the nominal upstroke
Positioning accuracy	0.6 % of the nominal upstroke
Shock resistance in accordance with IEC/DIN EN 60068-2-27	-
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	30 Hz 4 g 90 min
Output shaft	10 mm solid shaft with M6
Maximum axial force	300 N
Maximum radial force	50 N
Ambient temperature	0..50 °C
Storage temperature	-10..70 °C
Protection class	IP 64
Weight	1800 g
Certificates	CE

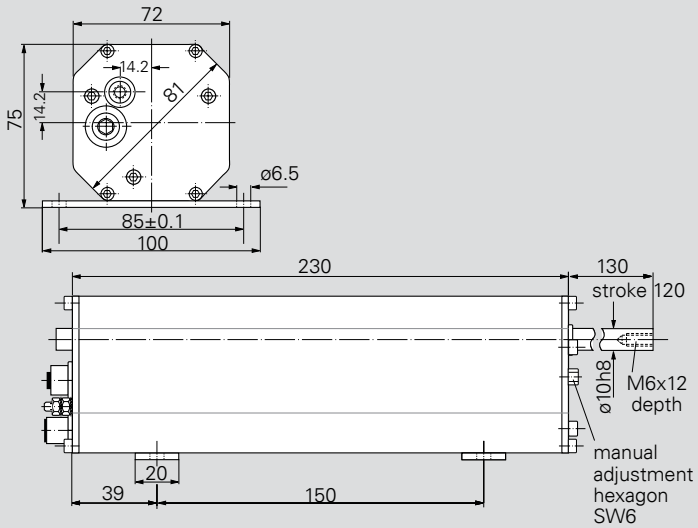
Upstroke speed	**A**
max. 4000 mm/min	72/1
max. 1000 mm/min	72/2
max. 500 mm/min	72/3
max. 250 mm/min	72/4

Default analog target value	**B**
2..10 VDC (R_L > 2 kΩ)	A
4..20 mA (R_L < 500 Ω)	B

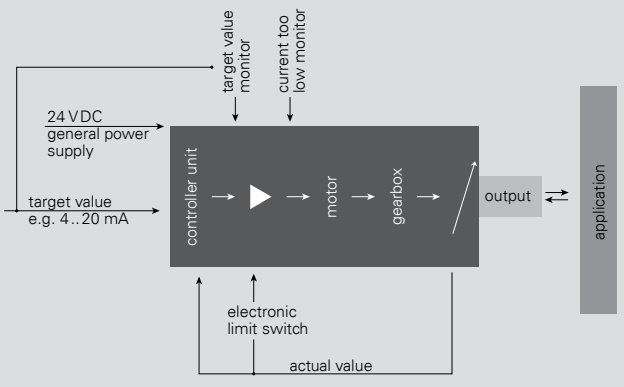
Order code	**A**	**B**
LPE	–	–

Accessories:
Mating connector Order no. 9601.0024
(one A encoded male connector and one A encoded female connector, 5-pole)

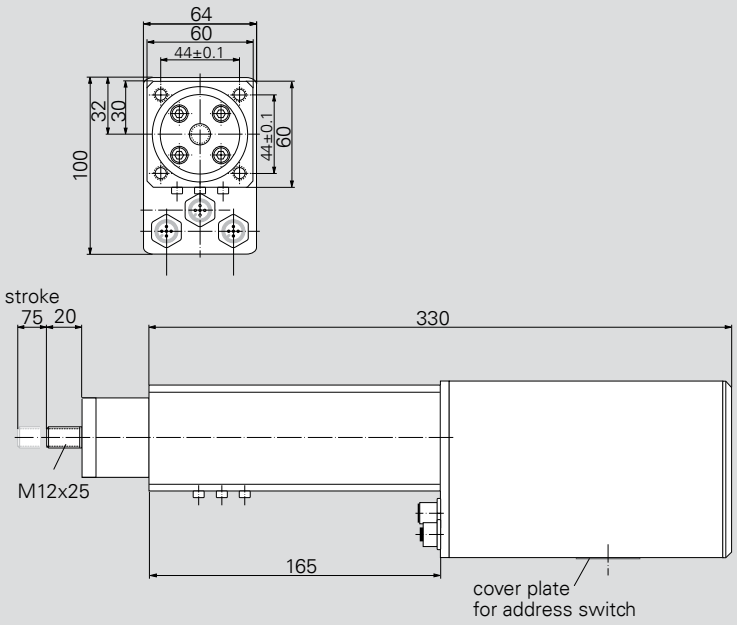




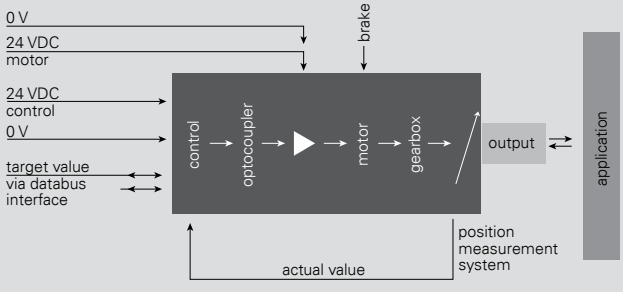
Functional block diagram LPE 72



LPE 4310 C



Functional block diagram LPE 3410 C



Lifting force	1 000 N
Self-holding power	1 000 N
Upstroke speed	20 mm/s
Nominal power output	20 W (30 % duty cycle, basis time 600 s)
Supply voltage	24 V DC ± 25 %
Nominal current, motor	3 A
Nominal current, control unit electronics	0.1 A
Upstroke	75 mm (others on request)
Positioning accuracy	± 0.05 mm
Interface	CANopen
Shock resistance in accordance with IEC/DIN EN 60068-2-27	50 g 11 ms
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	10 .. 55 Hz 1.5 mm / 55 .. 1 000 Hz 10 g / 10 .. 2 000 Hz 5 g
Piston	Adapter M 12 x 1.25
Maximum axial force	1 000 N
Maximum radial force	100 N
Ambient temperature	0 .. 45 °C
Storage temperature	-10 .. 70 °C
Protection class	IP 54
Weight	4 500 g
Certificates	CE

Order code
LPE 4310 C

Accessories:
Mating connector Order no. 9601.0064
(two A encoded male connector and one A encoded female connector)

THE CREATION OF MODERN INTERIOR DESIGNS – BY ROBUST AND FLEXIBLE MACHINES

Fig. 1: Becherer in Elzach is not just a modern company on the outside

Mention a woodworking business in the Black Forest to an architect, hotelier or house builder in a major city such as Frankfurt or Berlin and he will probably imagine an ancient workshop teaming with carpenters plying their humble trade with traditional tools.

The reality is quite different. Becherer Möbel-Innenausbau GmbH in Elzach is the perfect antidote to this outdated picture. Here, in a workspace covering an area of 4,000 square meters, 45 highly motivated employees manufacture modern wooden furniture and interior furnishings. A handsome administration building completes the ensemble – and the adjacent logistics hall has even won an architectural award. Is this truly the home of a Black Forest carpenter?

Fig. 2: Managing director Magnus Becherer in conversation

Magnus Becherer and his cousin Benedikt are the fourth generation of the family to manage the company, together with Wendelin and Rochus from its third generation. Magnus willingly divulges the secret of the company's success. "*We have designed our business to provide precisely what our customers demand. They not only want boards cut to measure but also a reliable partner who supplies them with the products they need quickly, flexibly and punctually – and all with outstanding levels of quality and care.*"

In other words, the company's customers are sophisticated. In order to satisfy their high standards, Becherer employs its own interior designers and technical draughtsmen. It has also used CAD programs in every aspect of its design processes and modern CNC machines in its manufacturing for many years. The spacious production hall is home to a large number of highly automated woodworking machines made by the renowned manufacturer HOMAG. These are notable for both their robust and flexible design.

As well as CNC processing, one of the most important elements is the edge banding machine. Each chipboard element, whether it is destined to become part of a table, wardrobe, ceiling element or room divider, has cut edges which must be covered with the appropriate veneer or solid wood edge banding. This requires a remarkable degree of flexibility because, in many cases, only 3 or 5 pieces will receive the same type of edge banding before the machine has to be adjusted yet again, e.g. from a narrow to a broad edge. In order to reduce costs

Fig. 3: Becherer's production hall – striving for maximum flexibility every day

Fig. 4: This edge banding machine made by HOMAG has been in operation for many years at Becherer

and the time needed for these adjustments, all HOMAG edge banding machines are fitted with "*positioning systems*" from halstrup-walcher.

These positioning systems are responsible for executing every format change to the next type of edge banding precisely and quickly. In practice, the machine operator simply inserts the new edge banding and enters the correct width into the control panel. The mitre saw, the slitting knife and other tools move to the new horizontal and vertical positions in just a few seconds.

The machines never cease to amaze Magnus Becherer. "*It is fascinating to see how such a large and powerful machine can operate with such extraordinary precision! For example, this HOMAG machine has been in operation here every day for over ten years without any unscheduled stoppages or significant problems. The PSE positioning systems from halstrup-walcher, in particular, are utterly reliable. These are the hard-working field components, which are the key to automating the machinery! Obviously, it is vital for us to avoid rejects and mistakes because the edge banding is often applied to parts that have already been processed using sophisticated and expensive machines. However, we know that with HOMAG – and therefore also with halstrup-walcher – we are in the best hands!*"

Magnus Becherer's gaze wanders briefly with satisfaction around his inviting office. But he has little time to savour the view: his telephone rings. A customer has a few last minute changes to some measurements although the parts are due to be manufactured this very afternoon. Mr Becherer remains entirely relaxed – his company has the flexibility to cope with last minute alterations like these with ease! It is all a matter of the right attitude. And, last but not least, the right equipment!

You can find a short film on the topic at **www.halstrup-walcher.com**

- **"Applications"**
- **"Positioning systems"**
- **"Format changeover – wood-processing"**

Fig. 5: The PSE positioning systems from halstrup-walcher have been executing high precision format changes faultlessly – for over 10 years

Fig. 6: The PSE positioning system from halstrup-walcher: precise, robust, compact

halstrup walcher

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