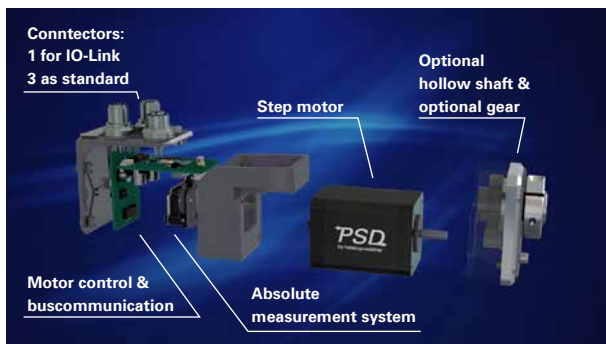# PSD direct drives

for automatic format changeover

DIRECT DRIVES – SMALLER, FASTER, FURTHER

PSD direct drives are mechatronic systems with integrated control, bus interface and absolute measurement system without battery. They are ideal for automatic format changeover.

The stepper motor with integrated control and bus communication permits higher velocities at lower torques. This closes the gap on servo drives with regulators. PSD direct drives offer a significantly more compact design and simpler wiring as they eliminate the need for an external controller – a cost-effective solution for format changeovers.

The new direct drives from halstrup-walcher close the gap on servo systems

Why you need a direct drive

Your machine has to do a quick format changeover and reduce down times. With automatic format changeover you benefit from significant time savings, improved quality, and a self-monitoring system which accurately detects unwanted changes in position. These are major advantages over manual adjustment using hand wheels.

WHAT MAKES OUR DIRECT DRIVES SPECIAL

✓ **Compact design:** Direct drives from halstrup-walcher are exceptionally compact
→ Ideal for your slim machine design

✓ **Maximum flexibility:** The variable alignment of the connectors and optional rotatable attachment housing allow you to attach the direct drives to the machine in any position (see below)
→ **No angle plugs** are required

✓ **Simple assembly:** The **optional hollow shaft** with torque support allows the direct drive to be mounted on the spindle without a coupling

✓ **No reference run:** Precise position feedback thanks to an **absolute measurement system** without battery with a positioning range of 977 .. 4026 rotations

✓ **Powerful know-how:** halstrup-walcher can supply its direct drives with **all commonly used bus systems**[1]:

On request:

[1] All these buses have been available with our positioning system PSx 3 series for a number of years.

FLEXIBILITY THROUGH VARIABLE DESIGN

Already during the design of the direct drives PSD we have made sure that you can use the devices flexibly in your machines. Thus, both the plug connection and the optional attachment housing can be supplied ex works in various directions of rotation.

You will find the corresponding order code at the back of this brochure with illustrations of the respective variant.

PERFORMANCE CURVE OF DIRECT DRIVES
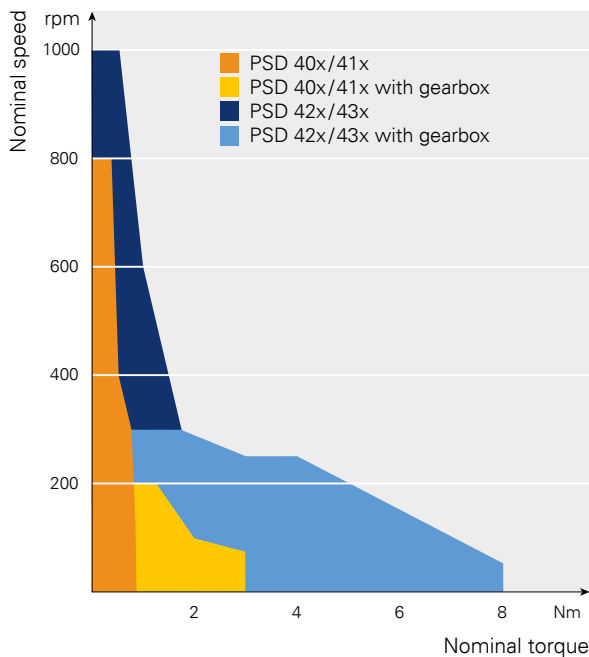
Find the right positioning system

The PSD direct drives from halstrup-walcher fulfil a performance range that is ideal for frequent format changeovers or set-up in the gap.

Example

You need a drive which operates at approx. 800 rpm with a torque of 0.5 Nm. In that case, you can use a direct drive without a gearbox or attached housing.

Do you need a higher torque at lower speed? You can achieve this with an additional gearbox from our range of module kits.

WHAT WE OFFER

halstrup-walcher already has over 20 years of experience in the field of automatic format changeover with positioning systems. No other manufacturer supplies such a wide range of bus interfaces. PSD direct drives are built according to a modular design to offer you maximum flexibility.

The direct drive also offers many of the advantages of halstrup-walcher's successful positioning systems. It achieves higher speeds and is ideal for setting up in the application gap. Discover the perfect drive for your requirements in our extensive product range.
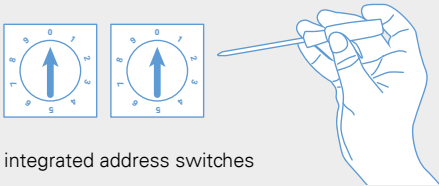
We will be happy to advise you!

USEFUL FUNCTIONS OF PSD DIRECT DRIVES

ADDRESS SWITCHES [1]

Set addresses directly on the device

- ✓ No confusion of many positioning systems when setting up in the control system
- ✓ Simplified exchange during servicing

integrated address switches

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

STAY SAFE EVEN WHEN PROBLEMS OCCUR

The motor and control units have individual power supplies and are galvanically separated.

- ✓ Prevents the control unit from being affected by interferences from the motor
- ✓ Bus communication for status feedback is also available during an **emergency stop**

MANUAL ROTATION

Protection of electronics

- ✓ During slow backward rotation
- ✓ During rapid rotation lasting up to 2 seconds

CUSTOMISED DESIGN

Customised devices available on request, for example

- ✓ In corporate colour
- ✓ With individual labels

STATUS LED

Detect the status on the device

- ✓ Status LEDs continuously display the positioning system's current status
- ✓ No need to check in the control unit

1-CONNECTOR SOLUTION

Save time and money with IO-Link

- ✓ 1 connector
- ✓ Unshielded cables

SELF-MONITORING FUNCTIONS

- ✓ Supports condition monitoring of your machine
- ✓ Enables predictive maintenance

Current and voltage monitoring

- ✓ Adjustment function
- ✓ Avoid failures

Temperature monitoring

- ✓ Monitors the permissible working range of the motor
- ✓ Protection of the drive and components
- ✓ Switch-off function in case of exceeding above the permissible range

SOFTWARE FUNCTIONS

Reference loop / spindle offset run

- ✓ Monitoring with absolute encoder
- ✓ Exact position, despite spindle backlash
- ✓ Automatic correction by second positioning run

Higher start-up current

- ✓ Higher breakaway torque for starting the drives after longer standstills
- ✓ Remove contamination

SOFTWARE MODULES FOR IO-LINK

Due to the lower baud rate, IO-Link is slower than standard data buses. This means that control and feedback may also require longer transmission times, depending on the scope of the desired parameter value changes.
Although these are only in the range of tenths of a second, if changes are frequent they can quickly add up and lead to longer process times.

ELIMINATE TRANSMISSION TIME WITH CHANGEOVER OF PARAMETER SET
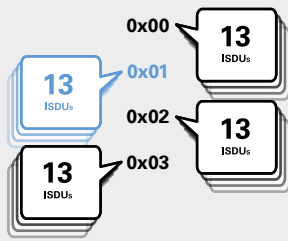
Eliminate long transmission times for acyclic commands (ISDUs) during changes. The "changeover of parameter set" software module allows you to use two bits in the process data to activate one of four different parameter sets immediately after transmission. Switch the running behaviour of the drive (e.g. target speed, acceleration, operating current).

✓ **Change the running behaviour quickly** using predefined parameter sets

✓ 4 parameter sets with 13 ISDU parameter values each

✓ Switch at any time

✓ Store parameter sets in the device

## PRIORITISED PROCESSING OF TARGET SPEED IN PROCESS DATA

If your application requires **frequent changes of the target speed,** this can also be included in the process data. This eliminates the undefined duration of an acyclic ISDU transmission and prioritises the speed change over acyclic commands:

✓ Acyclic access to the target speed via ISDUs becomes superfluous

✓ The change is processed in the drive immediately after transmission

The function "target speed in process data" permits the transfer of **any** target speed. The "changeover of parameter set" software module can be used to select **one** of four predefined speeds.

THE "MODULO" FUNCTION ENABLES INFINITE POSITIONING WITHOUT LIMITS

The modulo function offers significant advantages if the drive always operates in the same direction of rotation, e.g. for turntables, tool changers or conveyor belts.
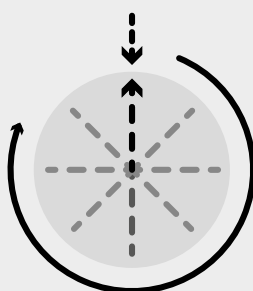
✓ **Unlimited run distance**
  No limitation by absolute measurement system

✓ **Modulo width definable via lower and upper modulo position**
  The lower and upper modulo positions correspond to the same position of the driven unit – independent of the number of rotations.

✓ **Positioning runs to any position** within the modulo width are possible.

✓ **Different operating modes** for predefined clockwise or counter-clockwise direction of rotation for the drive – or for approaching the positions on the shortest way.

PSD 411-8H-1 (1 Nm, 8 mm hollow shaft without gearbox)

PSD 401-5V-S

IP 50

IP 65

40x

41x

PSD 40_/41_	Nominal torque / Nominal rated speed	Self-holding torque[1] (currented)	Max. speed	Positioning range
1-5V	0.8 Nm / 200 rpm	0.4 Nm	800 rpm	4026 rot.
1-8H	0.8 Nm / 200 rpm	0.4 Nm	500 rpm	4026 rot.
1-14H	0.8 Nm / 200 rpm	0.4 Nm	500 rpm	4026 rot.
3-8H	3 Nm / 50 rpm	1.5 Nm	200 rpm	986 rot.
3-14H	3 Nm / 50 rpm	1.5 Nm	200 rpm	986 rot.

[1] at approx. 60 mA supply current and 0.5 A phase current, currentless 0 Nm

Bus communication
CANopen, IO-Link, PROFINET, EtherCAT

Supply voltage	24 V DC ± 10 % galvanically separated between motor and control
Power consumption	max. 48 W
Nominal current	2.0 A
Power consumption (control unit)	0.1 A
Positioning accuracy	± 0.7 ° (for versions with gearbox) ± 1.8 ° (for versions without gearbox)
Absolute measurement system	magnetic, without reference run, without buffer battery
Shock resistance in accordance with IEC/DIN EN 60068-2-27	half sinus (3 axes) 50 g 11 ms ± 3 shocks/axle
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	sliding sinus (1 octave/min, 3 axles) 10..2000 Hz 50 m/s² (approx. 5 g) 10 frequency cycles
Output shaft	5 mm solid shaft with flattening or 8/14 mm hollow shaft [4] with torque support
Maximum axial force	15 N, 20 N with attached housing
Maximum radial force	40 N
Ambient temperature	0..40 °C
Storage temperature	-10..70 °C
Protection class	IP 50 or IP 65 [3]
Weight	max. 1.1 kg (0.8 kg without gearbox)
Certificates	CE

[3] IP 65 installed (motor shaft IP 50)
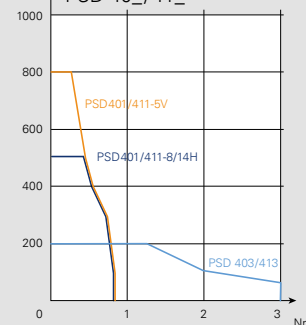
PSD 401-5V (solid shaft)

89
20
4.5±0.15
⌀5h7 (-0.012)
⌀22h7
15±0.25
1.5
IP 50
M3
63.5
31
42
31
42
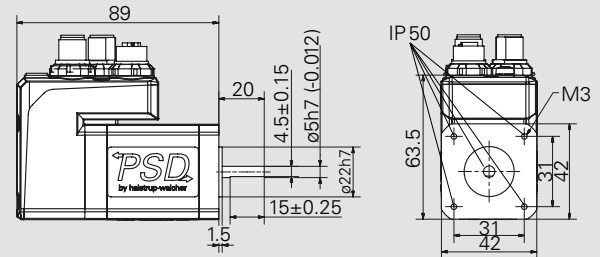
PSD 411-8 / 14H (hollow shaft, 0,8 Nm)

116
14
6
⌀6m6
35
62.8
30±0.111.7
42.3
torque support
hollow shaft 8/14H [4]

sealing plate 1.5 thick
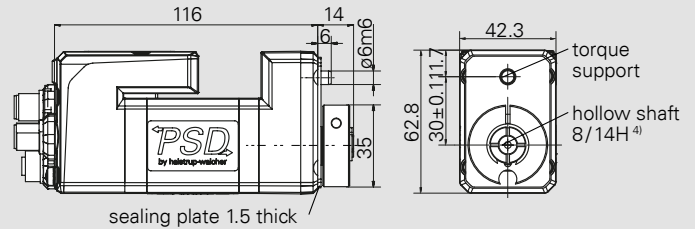
PSD 413-8 / 14H (hollow shaft, 3 Nm)
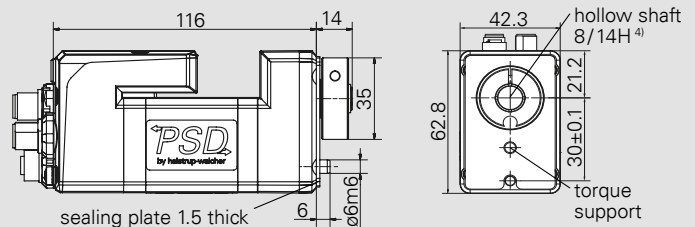
116
14
35
62.8
30±0.1
6
⌀6m6
42.3
21.2
hollow shaft 8/14H [4]
torque support

sealing plate 1.5 thick

Characteristic curve
PSD 40_/41_

rpm
1000
800
600
400
200
0
PSD401/411-5V
PSD401/411-8/14H
PSD 403/413
0   1   2   3   Nm

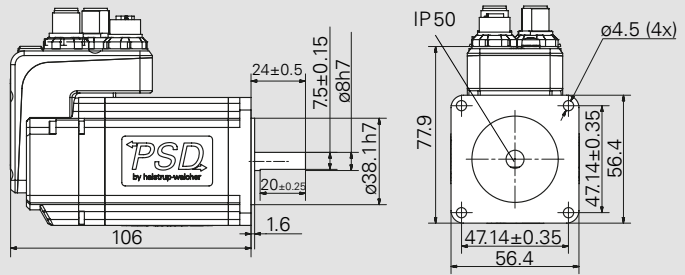| [4] Hollow shaft	⌀8	⌀14
Tolerance	H7	H7
Plug depth	20	
Cylinder screw	DIN 912 M4 x 16	

Dimensions in mm

PSD 42_/43_

IP 50

IP 65

42x

43x

PSD 426-14H-S (6 Nm, 14 mm hollow shaft with gearbox)

PSD 432-8V-S

PSD 422-8V (solid shaft)

IP 50

24±0.5
7.5±0.15
ø8h7
ø38.1h7
20±0.25
1.6
106

ø4.5 (4x)
77.9
47.14±0.35
56.4
47.14±0.35
56.4

PSD 432-8/14H (hollow shaft, 2 Nm)

135
14
ø6m6
76.9
35

torque support

85.9
30±0.1
28.4
56.7

sealing plate 1.5 thick
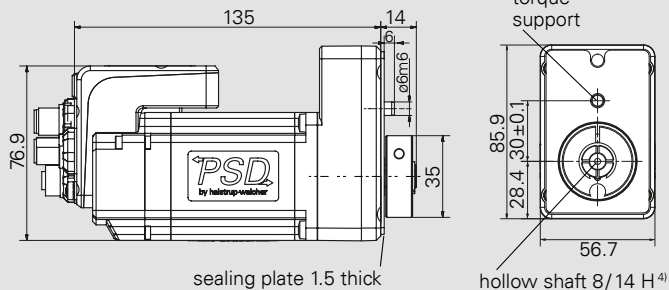
hollow shaft 8/14 H [4]

PSD 426-8/14H (hollow shaft, 6 and 8 Nm)

134
14
ø6m6
77.9
35
6

hollow shaft 8/14 H [4]
56.7
28.4
85.9
50±0.1

torque support

sealing plate 1.5 thick

Characteristic curve PSD 42_/43_

rpm
1000
800
600
400
200
0
0   5   10   Nm

PSD 422/432-8V
PSD 422/432-8/14H
PSD 428/438
PSD 426/436
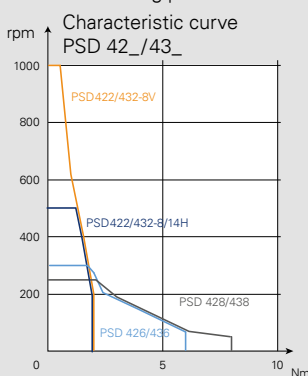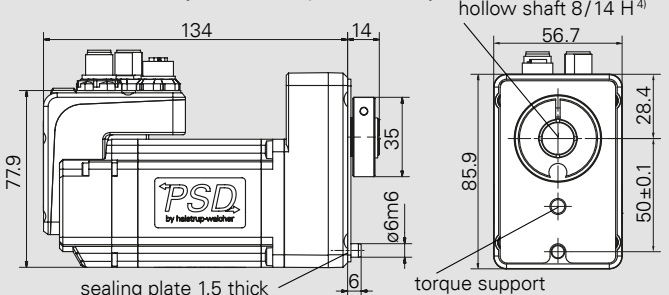
[4] Hollow shaft	ø8 [5]	ø14
Tolerance	H7	H7
Plug depth	20	
Cylinder screw	DIN 912 M4 x 16	

[5] only up to 5 Nm possible

Dimensions in mm

PSD 42_/43_	Nominal torque / Nominal rated speed	Self-holding torque [1] (currented)	Max. speed	Positioning range
2-8V	2 Nm/200 rpm	1 Nm	1000 rpm	4026 rot.
2-8H	2 Nm/200 rpm	1 Nm	500 rpm	4026 rot.
2-14H	2 Nm/200 rpm	1 Nm	500 rpm	4026 rot.
6-14H	6 Nm/63 rpm	3 Nm	300 rpm	1274 rot.
8-14H	8 Nm/50 rpm	4 Nm	250 rpm	977 rot.

[1] at approx. 100 mA supply current and 1,2 A phase current, currentless 0 Nm

Bus communication

CANopen, IO-Link, PROFINET, EtherCAT

|	
Supply voltage	24 V DC ± 10 % galvanically separated between motor and control
Power consumption	max. 96 W
Nominal current	4.0 A
Power consumption (control unit)	0.1 A
Positioning accuracy	± 0.7 ° (for versions with gearbox) ± 1.8 ° (for versions without gearbox)
Absolute measurement system	magnetic, without reference run, without buffer battery
Shock resistance in accordance with IEC/DIN EN 60068-2-27	half sinus (3 axes) 50 g 11 ms ± 3 shocks/axle
Vibration resistance in accordance with IEC/DIN EN 60068-2-6	sliding sinus (1 octave/min, 3 axles) 10..2000 Hz 50 m/s² (approx. 5 g) 10 frequency cycles
Output shaft	8 mm solid shaft with flattening or 8/14 mm hollow shaft [4] with torque support
Maximum axial force	30 N, 20 N with attached housing
Maximum radial force	90 N, 40 N with attached housing
Ambient temperature	0..40 °C
Storage temperature	-10..70 °C
Protection class	IP 50 or IP 65 [3]
Weight	max. 2 kg (1.5 kg without gearbox)
Certificates	CE

[3] IP 65 installed (motor shaft IP 50)

ORDER KEY DIRECT DRIVES PSD

Order key	A	B	C	D	E	F	G	H
PSD	–	–	–	–	–	–	–	–

A Type	B Torque/ Output shaft	C Rotation shaft/ Housing	D Bus communication	E Electical connections [1]	F Protection class	G Software modules	H Certificates
40: horizontal	1-5V 1-8H 1-14H 3-8H 3-14H	S: direct or 0° 1: 90° 2: 180° 3: 270°	CA: CANopen IO: IO-Link PN: PROFINET EC: EtherCAT	0: standard	50: IP 50 65: IP 65 [2]	1: standard M: with modulo function [3] S: with changeover of parameter set [3] P: with target speed in process data [3] Z: with modulo function and changeover of parameter set and target speed in process data [3]	0: CE
41: vertical							
42: horizontal	2-8V 2-8H 2-14H 6-14H 8-14H						
43: vertical							

[1] **Standard equipment**
3 plugs/sockets
with IO-Link: 1 plug

[2] IP 65 installed
(motor shaft IP 50)

[3] only for IO-Link
devices

B Key	Torque	Output shaft	C Rotation shaft/Housing			
B1-B2	B1	B2	S	1	2	3
1-5V	1: 0.8 Nm	5V: 5 mm solid shaft		–	–	–
1-8H 1-14H	1: 0.8 Nm	8H: 8 mm hollow shaft 14H: 14 mm hollow shaft				
3-8H 3-14H	3: 3 Nm	8H: 8 mm hollow shaft 14H: 14 mm hollow shaft				
2-8V	2: 2 Nm	8V: 8 mm solid shaft		–	–	–
2-8H 2-14H	2: 2 Nm	8H: 8 mm hollow shaft 14H: 14 mm hollow shaft				
6-14H	6: 6 Nm	14H: 14 mm hollow shaft				
8-14H	8: 8 Nm					