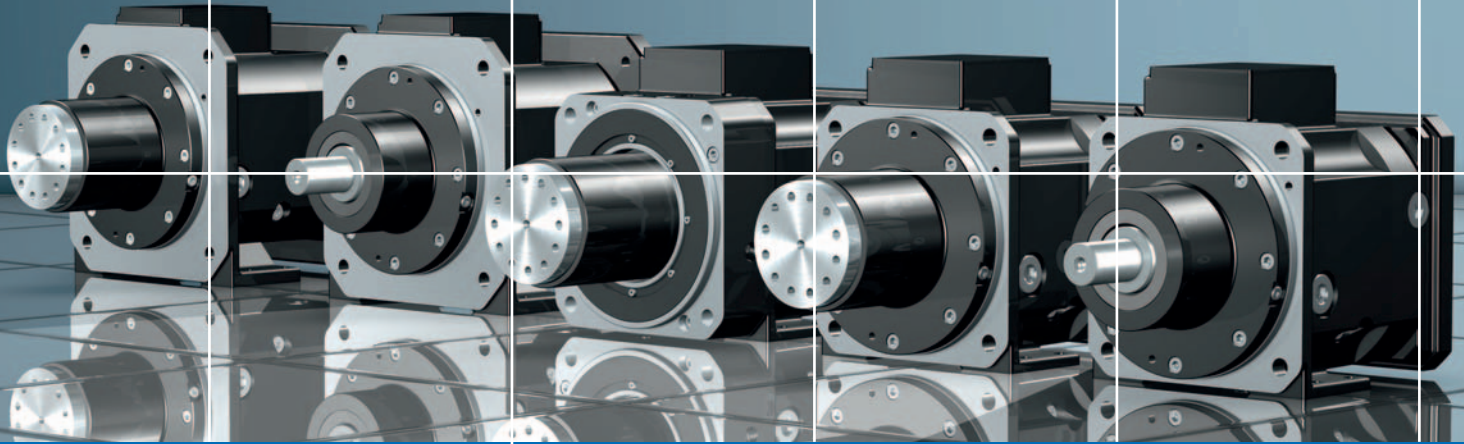


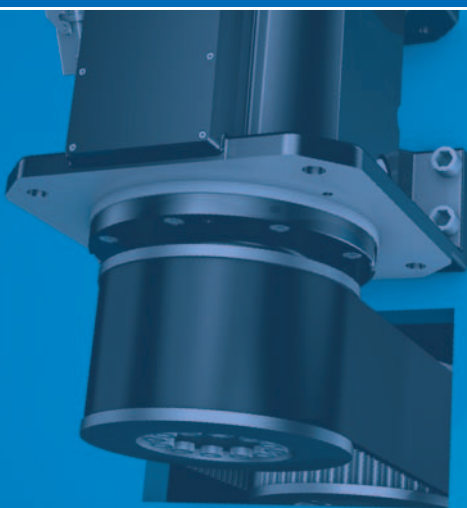
PS Two-speed gear box



POWER²SPEED

For main spindle drives
on machine tools

With efficiency-optimized
direct drive design



FROST & SULLIVAN

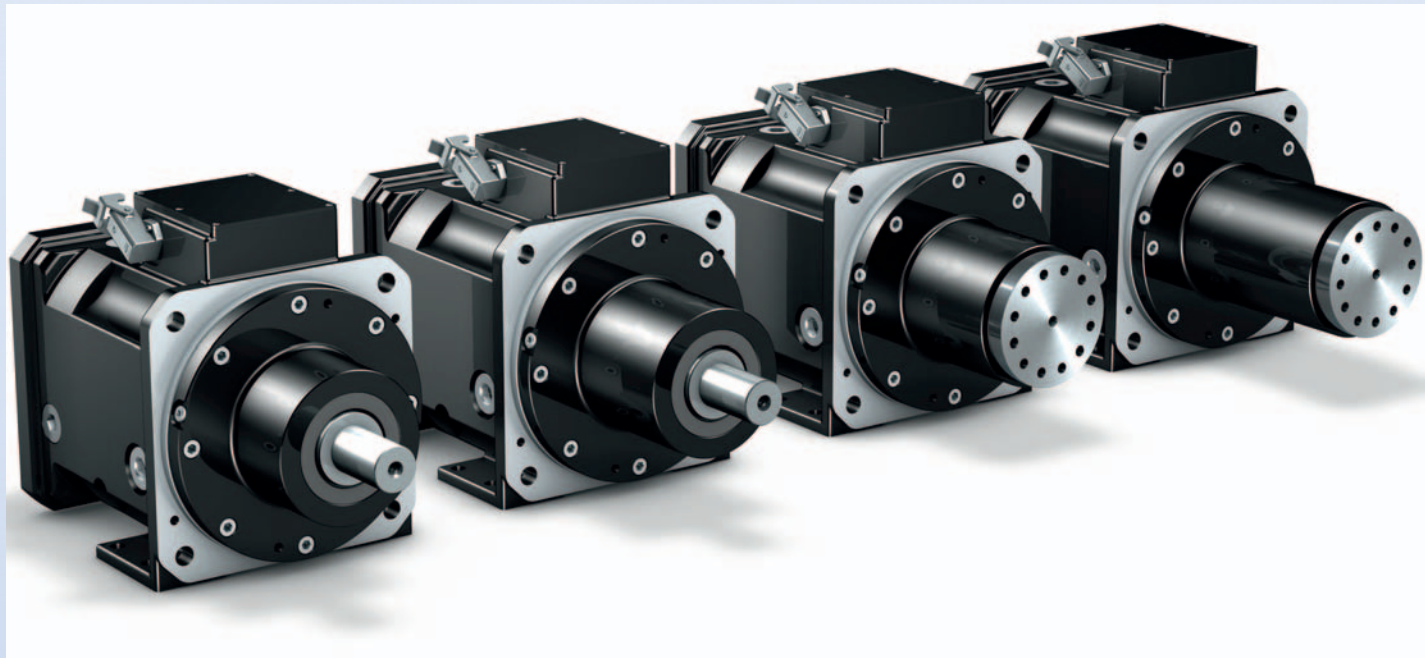
2014 BEST PRACTICES AWARD

GLOBAL GEARBOXES FOR
AUTOMATION AND MACHINE TOOLS
CUSTOMER VALUE LEADERSHIP AWARD



STÖBER

PS 25 / PS 30 Two-speed gear box



PS 25 two-speed gear box

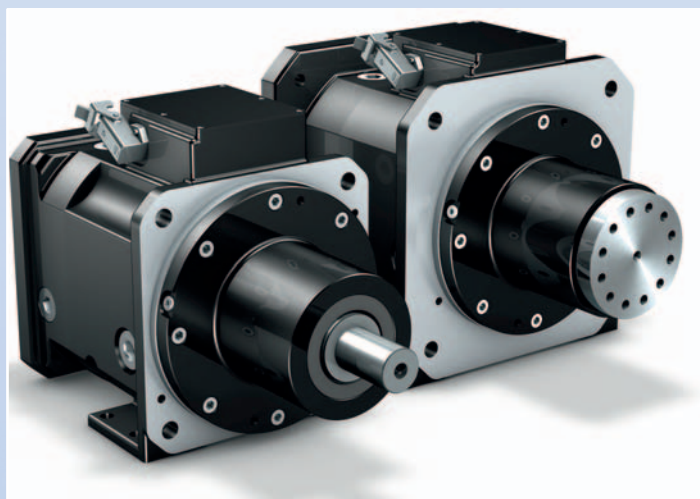
From left to right: output flange type S with solid shaft, type N with solid shaft, type N with flange shaft, type L with flange shaft

Rapid change between high speed and high torque

Modern machine tools and similar applications must be versatile.

Some processes need high cutting speeds and others need high cutting forces. For requirements of this kind, the spindle drives must be equipped with a suitable gear box.

To optimize these spindle drives, STOBBER developed the PS series, a two-speed gear box with an integral planet gear set.



PS 25 two-speed gear box
with solid shaft
Output flange in standard length (type N)

PS 30 two-speed gear box
with flanged shaft
Output flange in standard length (type N)

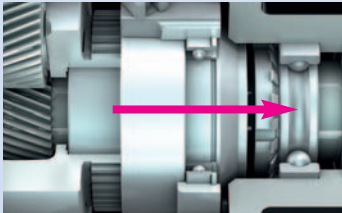
Two housing sizes

The energy-saving solution for main spindle drives

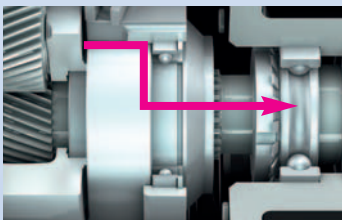
Direct mode (mode 1) – for high speed

This mode is designed as a direct drive (ratio $i = 1$).

A new feature of the STOBER design is that the planet gear set is fully decoupled at this stage and therefore power loss is prevented. The motor torque is transmitted almost without loss, as if there were no gearbox in between.



Position ratio $i = 1$, optimized direct drive



Position with planetary gear unit in operation ratio $i = 4$ (5.5)

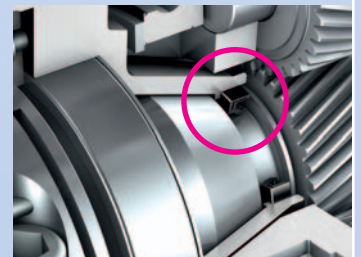
Reduction mode (mode 2) – for high torque

High torque levels are needed for the cutting of hard materials or for heavy-duty machining. Mode 2 activates the integral helical planetary gear unit (ratio $i = 4$ or 5.5) to obtain torque of up to 2 200 Nm.

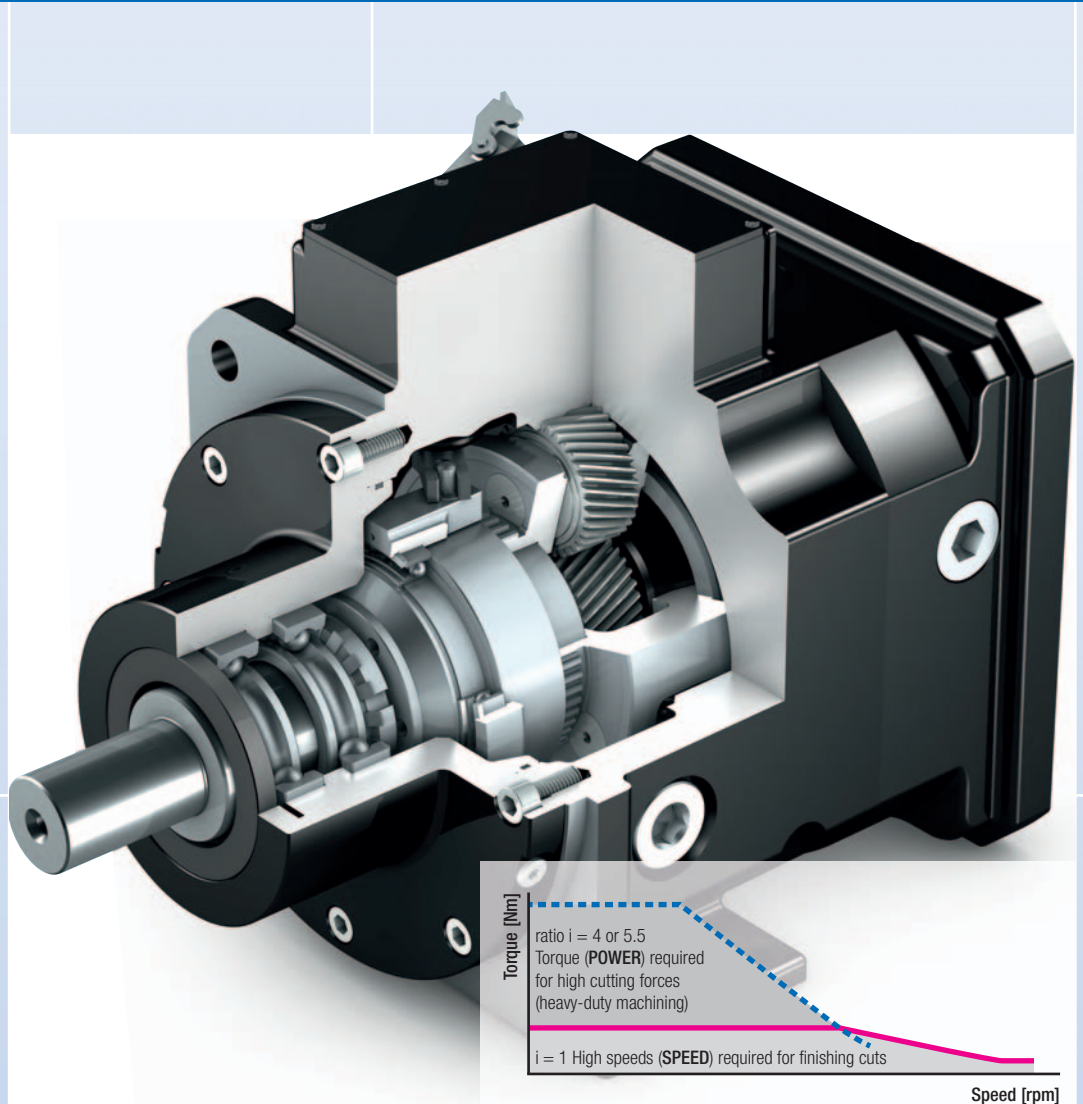


This newly designed two-speed gear box improves the energy efficiency of machine tools

The almost optimized operation in direct drive mode, the friction minimized helical planet gear set in reduction mode and the small-size oil seal create the conditions for significantly improving the energy efficiency and noise emissions of a spindle drive.

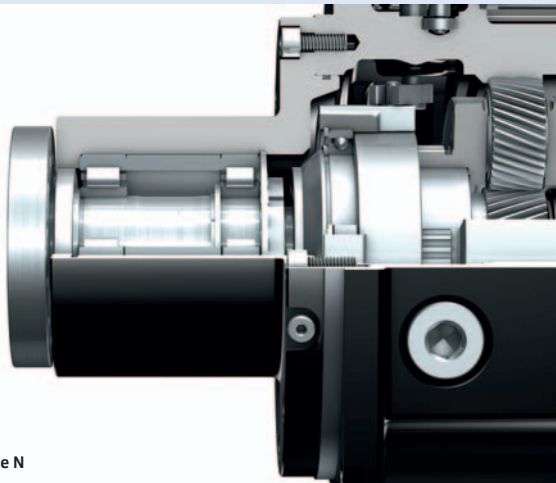


Oil seal at the coupling hub with small diameter for low friction or potential use of higher speeds



PS 25 two-speed gear box with short solid shaft output

Modular output design



Output flange type N

Application: Flanged shaft for belt drives

For transmission of high torque levels, the conventional design with belt drive offers the advantage of minimizing vibration in the system.

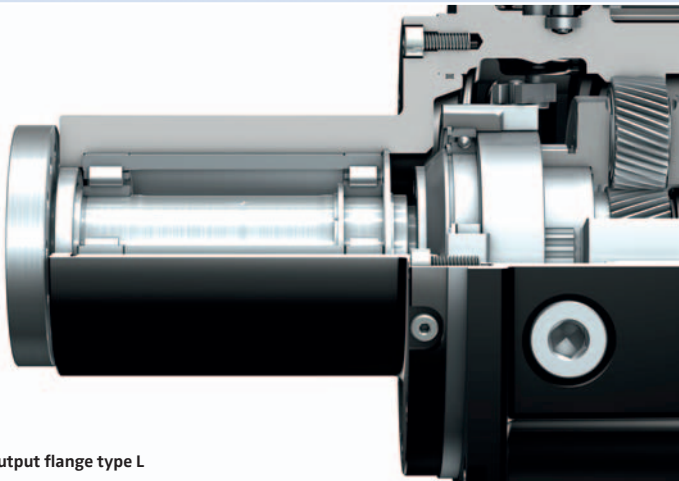
Output flange in standard length (N)

This design is suitable for standard belt pulleys. The overhung loads are absorbed by cylindrical roller bearings.



PS 25 two-speed gear box
Output flange type L

External liquid cooling flange with large pulley for the main spindle drive

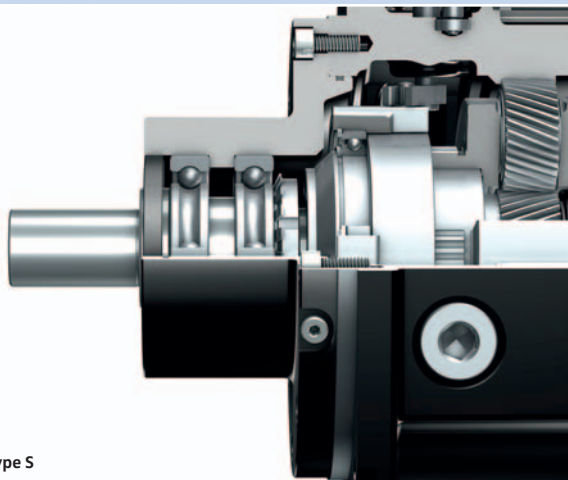


Output flange type L

Output flange in long version (L) with wide bearing base

This version is suitable for use with very large pulleys. When the cooling flange is installed the neck length is reduced, it then corresponds to that of the output flange type N.

To absorb the high overhung loads, the cylindrical roller bearing base is made to the maximum width.



Output flange type S

Application: Solid shaft for direct mounting (S)

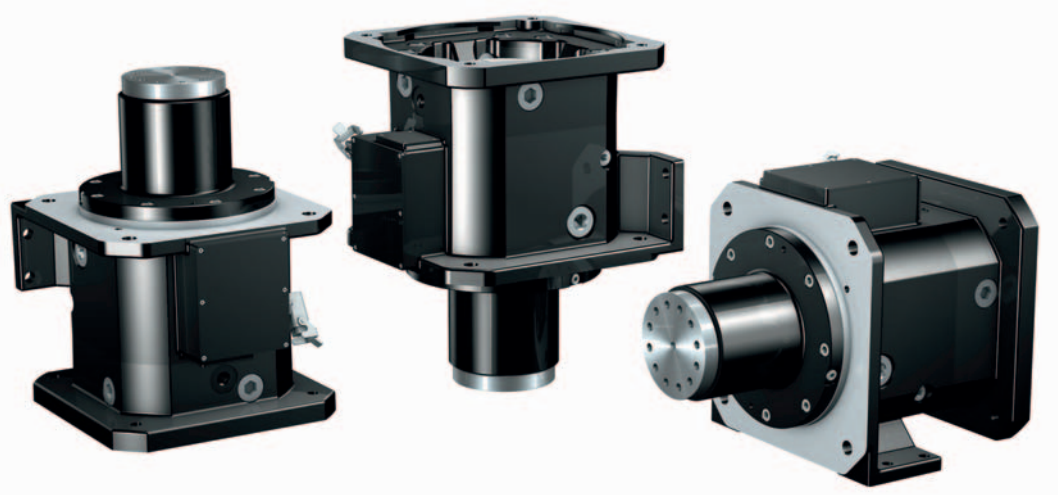
If the machine tool is used predominantly for processes at high speeds, direct mounting of the gearbox with solid shaft is available.

Universally usable

Suitable for vertical and horizontal installation

The variety of mounting positions enables the gearbox to be used horizontally (for lathes) or vertically (for machining centres).

Good use can also be made of the specific advantages of this type of gearbox in special purpose machine manufacture.



Mounting positions

Fixing



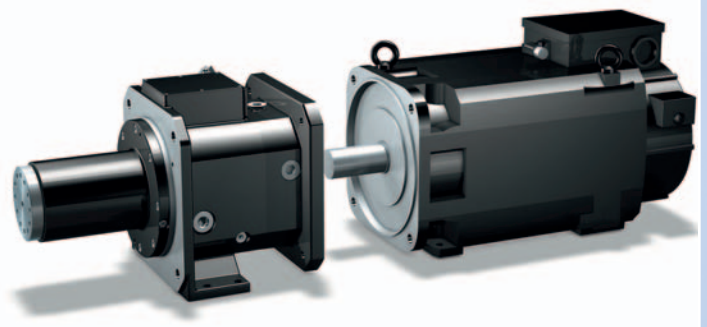
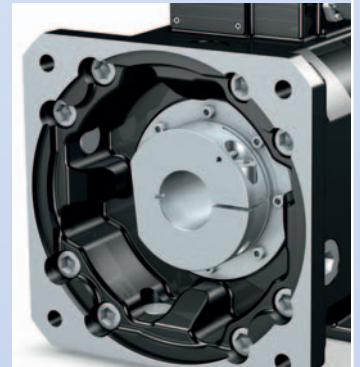
Mounting holes on the housing foot (above) or for fitting on the bearing housing with centring (below)

Highly rigid, self-centring motor connection

ME motor adapter with balanced EasyAdapt® coupling for the attachment of motors with plain shaft (standard version).

Sealed design with hub bearing and oil seal.

Standard motor connection with ME motor adapter and EasyAdapt® coupling



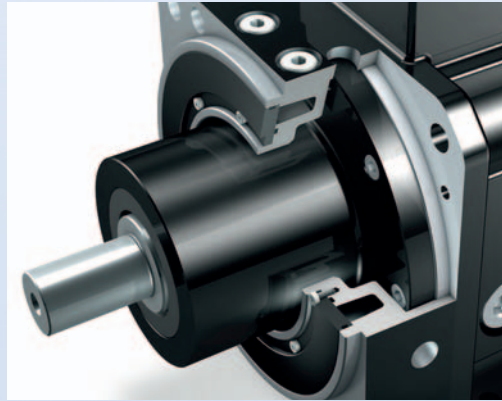
Lubrication, cooling, electrical connection

Optional liquid cooling

For applications with very high heat development, the cooling effect of the splash or recirculating lubrication may not be sufficient. With the optional cooling flange, liquid cooling can be supplied to the gearbox.

The liquid cooling option also reduces the heat given off to the machine spindle or machine.

When the cooling flange is installed the usable neck length of the output flange then requires attention.



Section: Optional cooling flange for liquid cooling on a PS 25 two-speed gear box

Splash lubrication

For standard applications with frequent alternation of the two speed modes; interval speed changes and when the machine is idle due to re-tooling operations, splash lubrication in the sealed gear housing is most suitable.

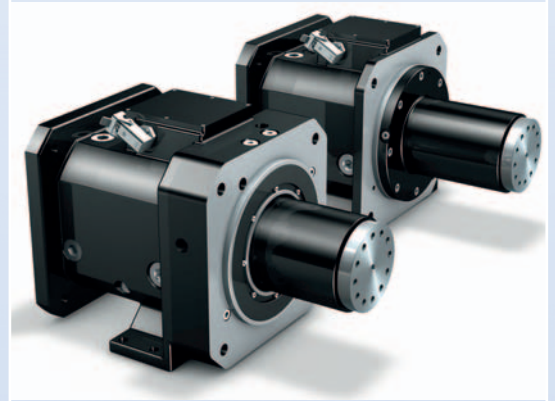


Oil sight glass

Recirculating lubrication

With high heat development it might be available (at maximum heat levels) to add lubrication for heat dissipation. The capacity of the external tank must then be at least ten times the volume of the gearbox fill. If required, the tank fill can be brought to an optimum operating temperature through an additional heat exchanger.

The oil inlet and outlet positions depend on the selected mounting position.



PS 30 two-speed gear box with long output flange. Due to the cooling flange adaptation (front of photo), the usable length of the flange is reduced

Connection



Connector for 24V electronic speed changer

POWER 2 SPEED

Product profile

Summary of user benefits

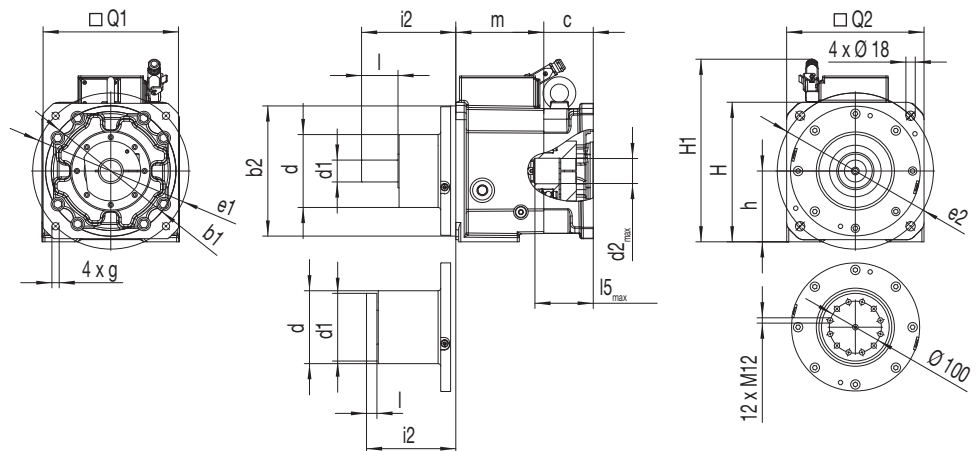
- Two-speed gear box with focus of performance either on *high speed or high torque*
- Direct drive (mode 1)
Almost optimized direct drive (electrical speed change)
- Reduction mode (mode 2) is based on a high-quality helical planetary gear unit
- Either shaft model for belt drive (types N + L) or direct mounting with solid shaft (types S + N) to the main machine spindle
- Suitable for any mounting position
- Easy motor mounting by ME motor adapter with balanced EasyAdapt® coupling
- Liquid cooling and recirculating lubrication optional
- Helical planetary gear unit for maximum running smoothness

Technical data

		PS 25			PS 30		
Gear ratio	[i]	1	4	5.5	1	4	5.5
Rated power	[kW]	39/47 *1			47		
Rated speed	[rpm]	1 500			1 500		
Rated torque M2	[Nm]	300	1 200	1 650	300	1 200	1 650
Maximum torque	[Nm]	400	1 600	2 200	400	1 600	2 200
Max. radial load (cyl. roller bearings)	[N]	30 000			30 000		
Drive speed max. *2	[rpm]	10 000	7 000	7 000	10 000	7 000	7 000
Backlash standard	[arcmin]	30			30		
Backlash reduced	[arcmin]	20			20		
Power consumption	[W]	60			60		
Supply voltage	[V]	24			24		
Current consumption at 24V	[A]	2.5			2.5		

*1 flange mounting only

*2 with circulation lubrication



Motor connecting dimensions

	b1 ^{H7}	e1	c	□Q1	g	d2 _{max}	l5 _{max}
PS25	230	265	95	250	M12	55	110
	250	300	95	260	M16	55	110
PS30	300	350	95	315	M16	55	110
	300	350	125	315	M16	60	140

Gearbox dimensions

	d	d1 _{k6}	l	b2 _{h6}	i2	m	h	H	H1	□Q2	e2
PS25...S...G	140	42	70	250	181	169	136	268	350	265	300
PS25...N...F	140	130	20	250	171.5	169	136	268	350	265	300
PS30...S...G	140	42	70	250	181	169	164	324	380	320	350
PS30...N...F	140	130	20	250	171.5	169	164	324	380	320	350



STOBER offers consistent solutions

As a system supplier STOBER has a complete product range for digital drive technology. The MC6 motion controller uses the CODESYS programming software to keep up with the trend towards open systems in the world of automation.

In combination with digital servo axes, STOBER solutions can be used for small or more extensive drive applications.

Note on the design of axes and drives

For optimum axis design, it makes sense to focus primarily on the gear units or geared motors. A useful aid is the design software SERVOfsoft®.

For an overall approach, use the specific expertise of the STOBER application consultants.

Contact and advice:
applications@stober.de

Service

The STOBER service system comprises 38 expert partners in Germany and more than 80 companies in the STOBER SERVICE NETWORK worldwide.

This service concept guarantees local expertise and availability when needed.

In general, the service specialists can be reached at any time via a 24/7 service hotline.

When necessary, a problem can be addressed immediately.

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