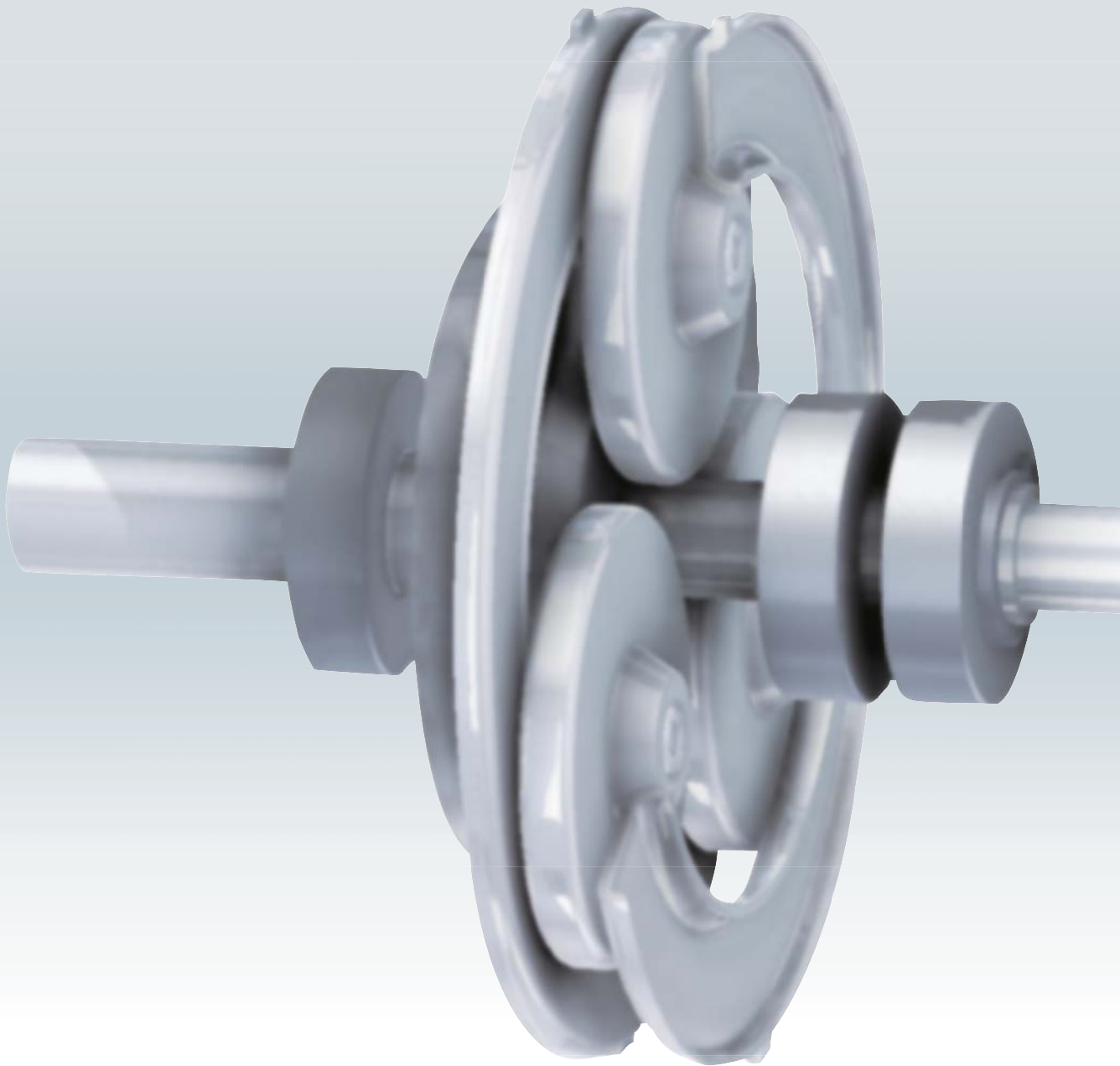


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TRACTION DRIVE

Breaking Through the Limitations of Gear Technology

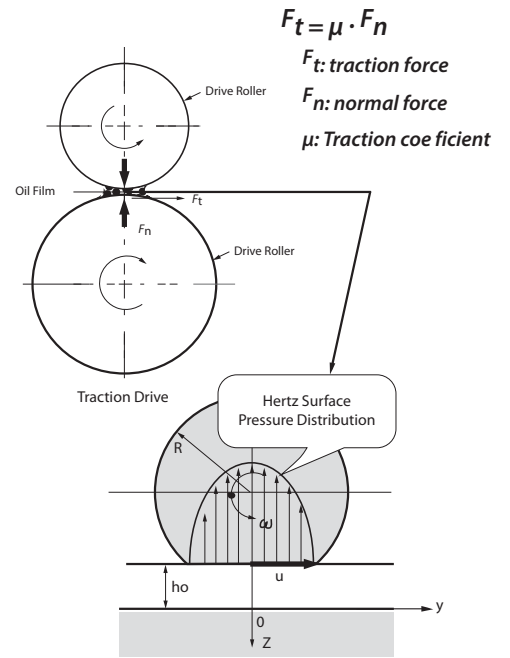


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Why is the technology referred to as the “gearless gearbox?”

The traction drive is a non-gear reduction technology that minimizes vibration and noise. The negligible transmission error makes it the smoothest and most quiet method to mechanically adjust speed and torque. The following is a brief explanation.

- › The traction drive assembly consists of two smooth rollers held in fixed position with mechanical properties that include high hardness
- › (F_n) Power is transmitted from the driven roller to the passive roller through viscous film
- › When under pressure, this oil film will have a higher friction coefficient
- › The speed differential between the rollers creates a tangential force (traction force, F_t) that shears the oil film
- › The reduction ratio is determined by diameter of inner ring that contains the roller assembly and the number of planetary rollers, among other minor factors
- › When the normal force (F_n) is deficient slippage can occur; we can control through close loop feedback



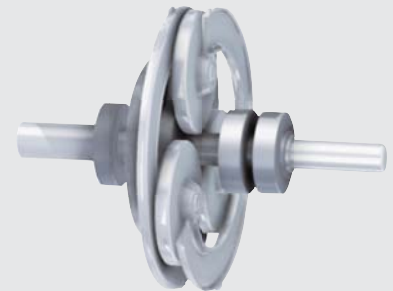
Primary Advantages of the Traction Drive

Negligible Transmission Error

- › Smooth rolling contact allows for negligible transmission error
- › Eliminates speed irregularity inherent in gear transmissions
- › Great fit in application where the angular velocity ratio is important

Minimal Noise Generated



- › Removal of the gear mesh minimizes noise and vibration
- › The noise generated will be in the 40–50 dB-A range
- › In comparison to gear transmissions which generally fall in the 60–80 dB-A range



Well Suited for Fine Precision

- › Very low noise and vibration for input speeds up to 10,000rpm
- › Exceptional rotational accuracy and fine precision of <5 arc-sec
- › Extremely compact and achieves up to a 20:1 reduction ratio in a single stage
- › Currently available in frame sizes up to 1kW; all designs are customized for the OEM
- › A potential technological improvement in many applications such as the following;
 - Collaborative or mobile service robots
 - High quality imaging, or high speed printing
 - 3D printing or precision measurement
 - Medical equipment, or mobility assist

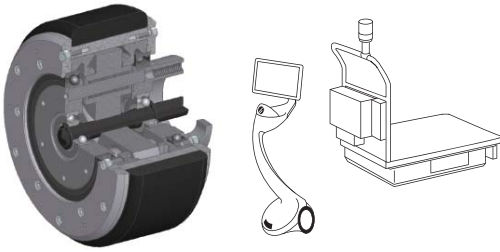
Comparison between the Traction Drive and a Planetary Gearbox

Characteristic		
Noise	Excessive	Quiet
Backlash	≥ 1 arc-min	$\leq .08$ arc-min
Vibration	Unavoidable	Negligible
Input Rotation Speed	$\leq 6,000$ rpm	10,000 rpm
Allowable Torque	Large	Moderate

Examples of Applications

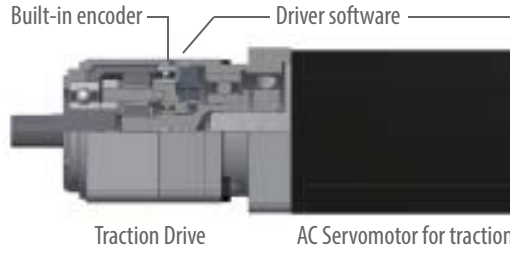
A Type

For a wheel drive assembly



B Type

For high speed, industrial application

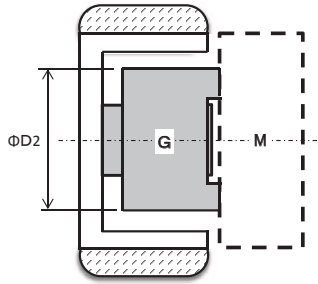


Corresponding range

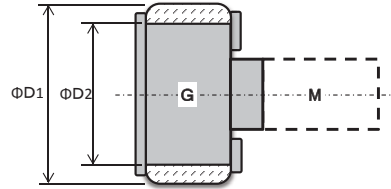
	200W	400W	750W
1/5	B □52	C	
1/9	C □78		D □98

A Type

Frame	Capacity [W]	Type	Wheel diameter mm	Drive outer dia mm	Reduction ratio	Rated output torque [Nm]	Peak output torque [Nm]
A200	200	Output from gear holder	130	100	1/17	9.74	19.5
		Output from internal gear	--		1/16	9.16	18.3
A100	100	--	--	--	--	--	--
A50	50	--	--	--	--	--	--



Output from gear holder



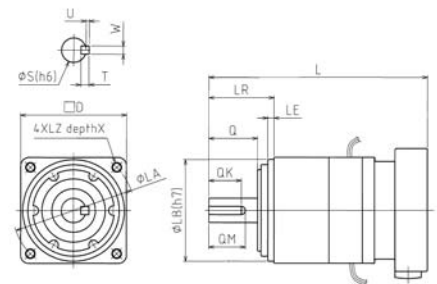
Output from internal gear

B Type

Reduction ratio	Frame	Motor capacity [W]	Rated output torque [Nm]	Peak output torque [Nm]	Maximum output torque [Nm]
1/5	B	200	2.65	8.04	2.84
	C	400	5.39	16.2	6.57
	C	750	10.7	32.1	11.5
1/5	C	200	3.72	11.3	9.70
	C	400	9.51	28.5	9.70
	D	750	18.2	54.7	18.2



Frame	Reduction ratio	Motor capacity [W]	Length L	Output shaft							Flange						
				LR	S	Q	QM	QK	W×U	T	D	LB	LE	LA	LZ	X	
B	5	200	107.5	32	12	20	18	16	4×2.5	4	52	50	3	60	M5	12	
C	5-9	200	140	50	19	30	26	22	6×3.5	6	6	78	70	3	90	M6	20
		400	140														
		750	156														
D	9	750	171	61	24	40	35	30	8×4	7	98	90	5	115	M8	20	



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