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VOITH

At Home on long-distances

Turbo transmissions for railcars and special purpose vehicles

Turbo transmissions stand out by nearly wear-free components. As a result, they require little maintenance and have a long service life – and all this at extremely high mileages.

Special features

- Long service life
  (at least 1.2 million km until the first major overhaul)
- Automatic and jolt-free adaptation of tractive effort to the prevailing riving condition
- Automatic speed changes under load without interruption of tractive effort
- High power density
- Insensitive towards climatic influences
- Long-term spare parts availability

T 211 re.4 and T 212 bre turbo transmissions

T 211 re.4 turbo transmission

The rail champion

With over 8 000 units, the T 211 is the world's best-selling railcar transmission. It is adapted to the new generation of 6-cylinder diesel engines: with a transmission input power of 350 kW and the new drive control system Voith Turbo Drive Control (VTDC). The drive control is directly installed at the transmission and records operating data. It also has a monitoring and diagnostic function. Optionally available: a hydrodynamic brake that can be integrated into the vehicle braking system (blending).

S111 transmission

The compact transmission

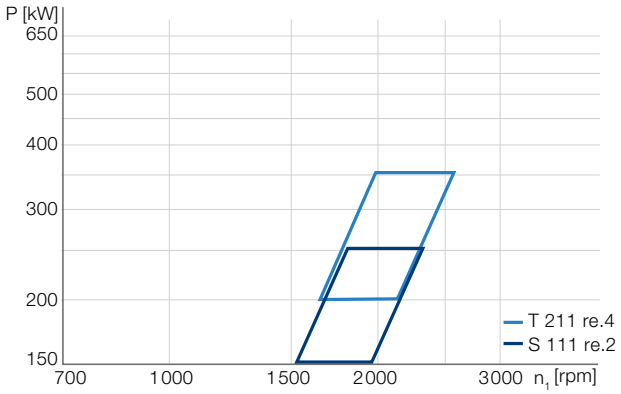
Be it diesel-hydraulic, diesel-mechanical or diesel-electric rail vehicles – as one of the world's leading systems suppliers, Voith offers a solution for all types of diesel drive systems. Our hydrodynamic transmission S111 complements the product range: With a maximum transmission input power of 250 kW, it is designed for small special purpose vehicles. Due to its compact design, which makes it ideal for even the smallest installation spaces, the transmission offers essential advantages in combination with low operating costs.

Technical Data

Type			T 211 re.4	S 111 re.2
Input power P		[kW]	350	250
Input speed n_1		[rpm]	1 800 – 2 400	600
Mass	separate	[kg]	760	672
	flange-mounted	[kg]	840 (900)*	1 200
Oil capacity		[l]	75	38
Power takeoff	M_{max}	[Nm]	800	–
	$n_{Power\ takeof}/n_1$		approx. 1.0	–
Dimensions		[mm] A_1	900	–
		A_2	890	890
		L_1	–	–
		L_2	1 030	1 006
		H_1	335	338,5
		H_2	0	22
		H_3	675	681
		B_1	595	365
		B_2	24.5	–
		B_3	1 095	684

* with hydrodynamic brake

Performance diagram



T 211 re.4

S 111 re.2

T 212 bre and T 312 bre turbo transmissions

Turbo transmission T 212 bre:
Comfort for millions of kilometers

The T 212 bre turbo transmission moves railcars with a speed of up to 160 km/h in single and multiple traction. It is fitted with an integrated retarder. The transmission is ideally suited for high-speed railcars with underfloor equipment and is also available with an optional auxiliary output.

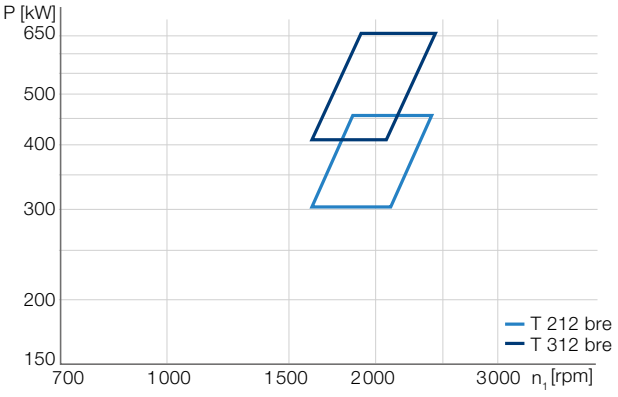
Turbo transmission T 312 bre:
The universal transmission

A three-speed transmission with hydrodynamic torque converter, two hydrodynamic couplings, integrated retarder and mechanical reversing gear: the T 312 bre turbo transmission. High efficiency and input powers of up to 650 kW make the T 312 the state-of-the-art transmission for high-speed railcars with up to 200 km/h. It excels by smooth, virtually wear-free starting. At the same time it automatically adapts the tractive effort jolt-free to the rolling resistance. The transmission is insensitive towards vibrations as well as thermal and mechanical overloads. A convincing argument in its favour: mileages of up to 1.2 million kilometers before the first major overhaul – depending on operating conditions.

Technical Data

Type			T 212 bre	T 312 bre
Input power P		[kW]	450	650
Input speed n_1		[rpm]	1 800 – 2 400	1 800 – 2 400
Mass	separate	[kg]	1 100	1 510 (1 521)
	flange-mounted	[kg]	1 200	–
Ölfüllung		[l]	95	100
Hilfsabtrieb	M_{max}	[Nm]	800	230
	$n_{Power\ takeof}/n_1$		1.0	approx. 1.35
Maße		[mm] A_1	–	1 115
		A_2	994	–
		L_1	–	1 258
		L_2	1 070	–
		H_1	325	327
		H_2	58	63
		H_3	756	765
		B_1	510	557
		B_2	21	25
		B_3	1 055	1 106

Performance diagram



T 212 bre

T 312 bre

DIWARail transmissions

DIWARail:

The hydro-mechanical DIWARail transmission

The hydro-mechanical transmission has been sold more than 4 000 times. It is a worldwide role model for less wear. With its added helical reversing gear it can be used flexibly for a wide range of applications. Originally at home in citybuses, the DIWARail is now the world's best-selling hydro-mechanical transmission in the 320 kW-class.

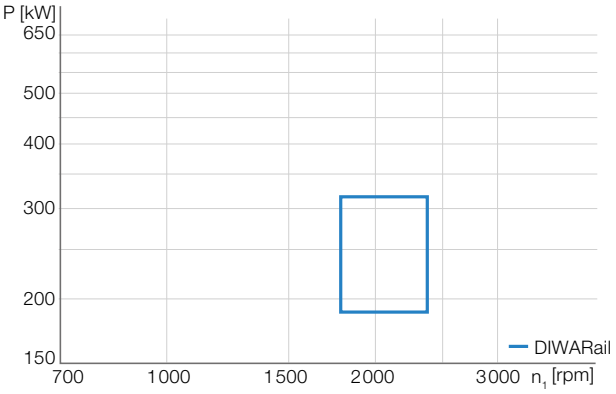
The integrated hydrodynamic brake significantly reduces wear. Due to the power-split principle (in 1st gear via the differential converter, and mechanically up to 4th gear), the DIWARail is ideal for economical rail vehicles with optimized consumption values. The latest version also allows towing while the engine is switched off. It is also possible for the vehicle to coast without being decelerated by a motored engine.

Technical Data

Type		DIWARail D 884.5	DIWARail D 884.5*
Max. transmission input power P_{1max}	[kW]	320	320
Transmission input speed M_{1max}	[Nm]	1 900	1 900
Transmission input speed n_{1max}	[rpm]	2 200	2 200
Retarder braking torque M_{BR}	[Nm]	1 000	1 000
Number of gears		4	4
Transmission mass (dry) including retarder	[kg]	approx. 415	approx. 540

* with parallel shaft reversing transmission

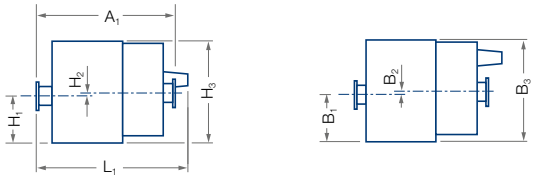
Performance diagram



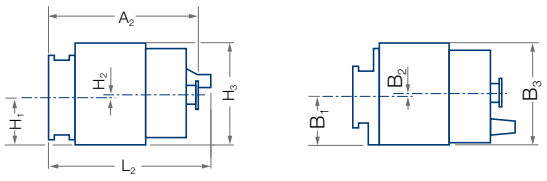
DIWARail

DIWARail

Separately supported version



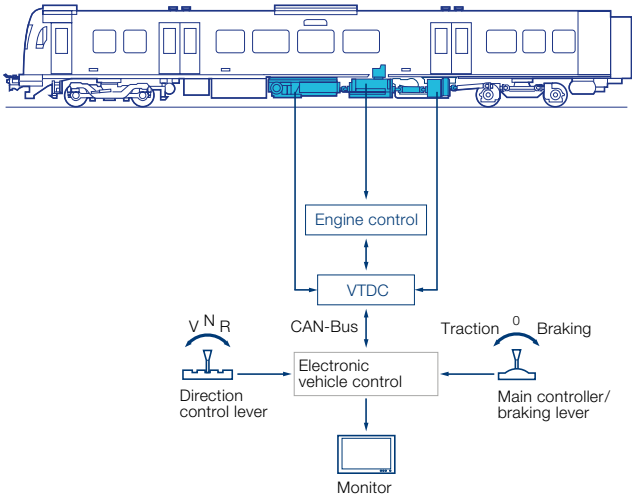
Flange-mounted version



VTDC control

The VTDC control (Voith Turbo Drive Control) has been developed specifically for controlling the drive systems of rail vehicles. The VTDC controls and regulates all functions of the turbo transmission. The VTDC hardware was designed especially for installation in the vehicle underfloor area. It can be mounted directly to the transmission, allowing for easier cabling to the vehicle and higher availability. As an integrated drive control system, the VTDC can also control the cooling system and the diesel engine.

Integrated VTDC drive control



Function

- Driving direction control
- Power transmission control
- Driving stage control
- Limitation of starting tractive effort
- Shunting control
- Constant-speed control
- Braking output control of hydrodynamic brake
- Braking power evaluation
- Braking power limitation
- Protection against wheel spin
- Traction monitoring
- Monitoring the driving direction
- Temperature monitoring
- Oil level measurements
- Overdrive protection
- Operating data recording
- Diagnostic functions
- Emergency operation
- Cooling system control
- Diesel engine control

Interfaces

- CAN-Bus
- MV-Bus
- Discrete interface for digital and analog signals
- RS 232 interface

VTDC control

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VOITH

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