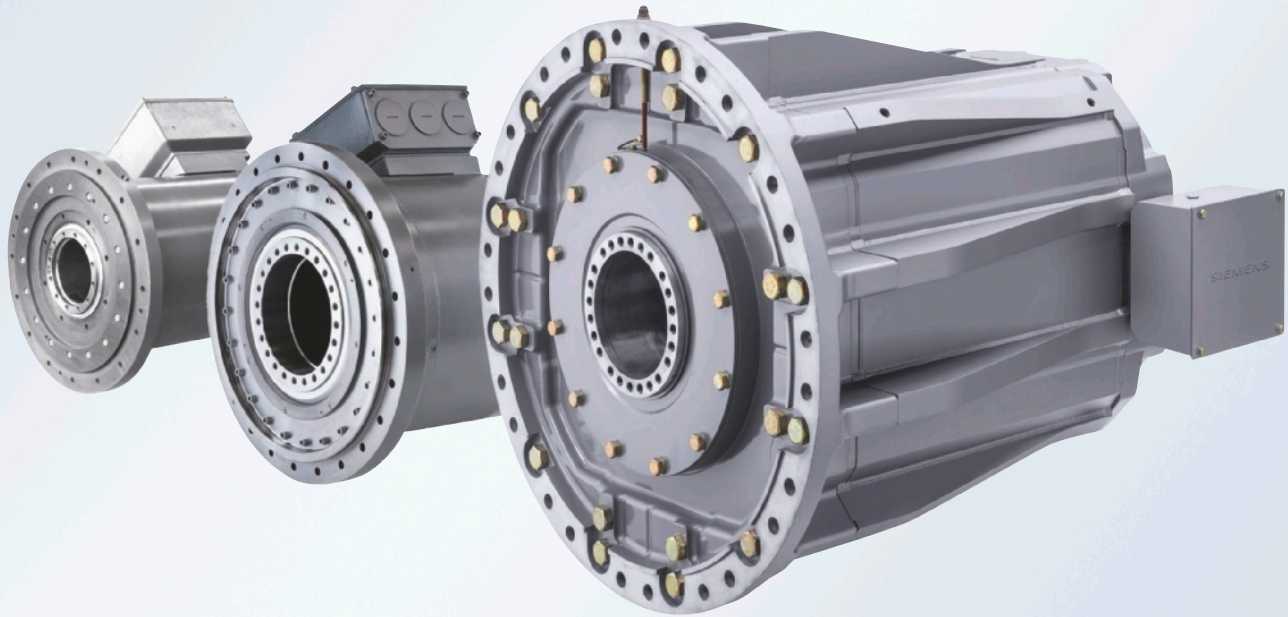


SIEMENS



Compact, dynamic and rugged

Direct drives for harsh operating conditions

SIMOTICS T Heavy Duty Torque Motors

SIMOTICS T – Heavy Duty Torque Motors

Overview

In many machining processes in the industrial environment, the tools and machining equipment are subject to extreme mechanical stress. This is certainly the case in metal forming for example, but also in machining processes in which extremely high forces must be applied.

At the same time, the trend towards greater productivity and more sophisticated products requiring the use of more complex machining techniques demands the use of state-of-the-art but also extremely rugged drive and automation technology.

With the SIMOTICS T-1FW3 Heavy Duty and 1FW4 Heavy Duty torque motors, Siemens offers direct drives that comply with both aspects.

The powerful, permanent-magnet-excited synchronous motors set themselves apart with their high dynamic response and precision. In addition, the motors have a mechanical design that is especially rugged, enabling them to resist shocks of the order of 10 g without any difficulty.

As a consequence, SIMOTICS T-1FW3/1FW4 Heavy Duty torque motors are ideally suited to follow the dynamically demanding motion profiles of higher-level motion controllers even under harsh operating conditions.

In contrast to motor/gearbox combinations, SIMOTICS T-1FWx Heavy Duty torque motors not only set themselves apart as a result of their increased ruggedness, but also thanks to their compactness. As a result of these properties, they are especially suitable as main drives in servo presses, where they have been successfully used since 2008.

Our portfolio with shaft heights 200, 280 and 400 with rated speeds up to 1200 rpm and rated torques up to 15000 Nm can be used in a wide range of motion control applications.

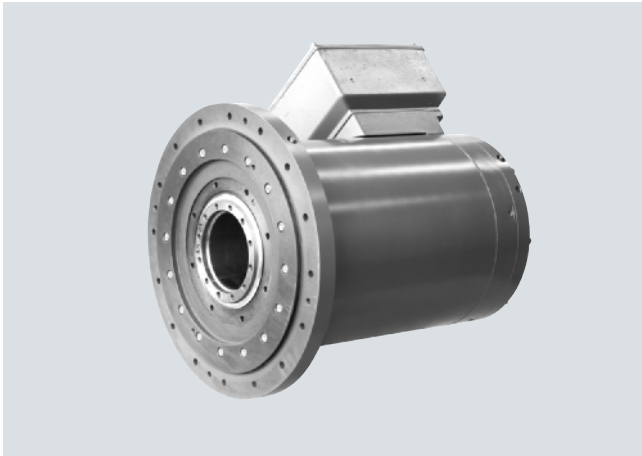
Designed as a complete motor in the IM B5 type of construction with a plug-on shaft, the torque motor is easy to integrate in the machine.

Highlights

- Especially rugged direct drive for use in harsh environments, e.g. in servo presses
- Highly accurate concentricity
- Excellent dynamic performance
- Rated speed up to 1200 rpm, maximum speed up to 1800 rpm
- Rated torque up to 15000 Nm, maximum torque up to 29500 Nm
- Up to 200% overload capability
- Easy to integrate
 - in the mechanical system
 - in the SINAMICS S120 drive system
- Water cooling/plug-on shaft
- Possible applications/application areas:
 - Shredders
 - Ring rolling mills
 - Servo presses

SIMOTICS T-1FW3 Heavy Duty Torque Motors

Shaft heights 200 and 280



SIMOTICS T-1FW3 shaft height 200



SIMOTICS T-1FW3 shaft height 280

SIMOTICS T-1FW3 Heavy Duty torque motors can be used in many motion control applications.

Designed as a complete motor in the IM B5 type of construction with a plug-on shaft, these torque motors are easy to integrate in the machine.

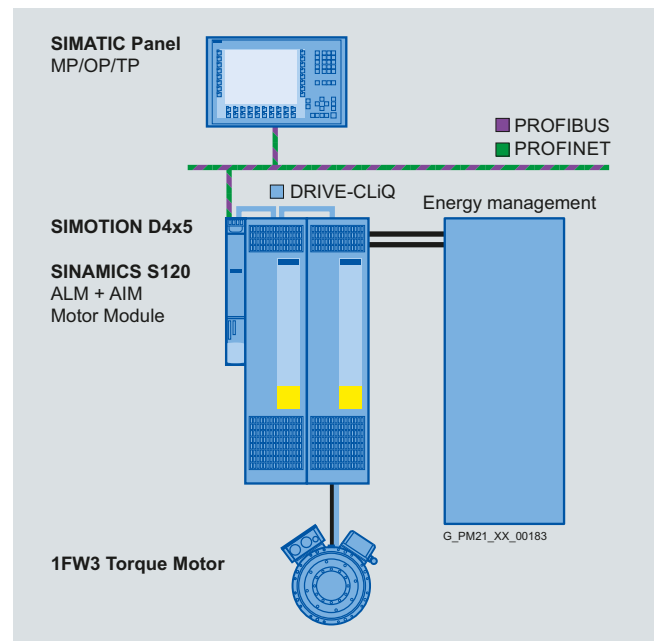
With the optional DRIVE-CLiQ interface and the electronic rating plate, the motors are not only optimized to the SINAMICS S120 drive system, but they can also be easily and reliably commissioned.

Solution for servo presses

- Capacitor modules or
- Flywheel solution

In past years, these versatile Heavy Duty torque motors have especially proven themselves as main drives for servo presses.

Heavy Duty torque motors represent the basis of the successful servo press solutions from Siemens, in addition to SIMOTION, SINAMICS and intelligent energy management which increase efficiency.



Configuration example, SIMOTION motion control system, SINAMICS S120 drive system and SIMOTICS T-1FW3 Heavy Duty torque motors with energy buffering via the DC link

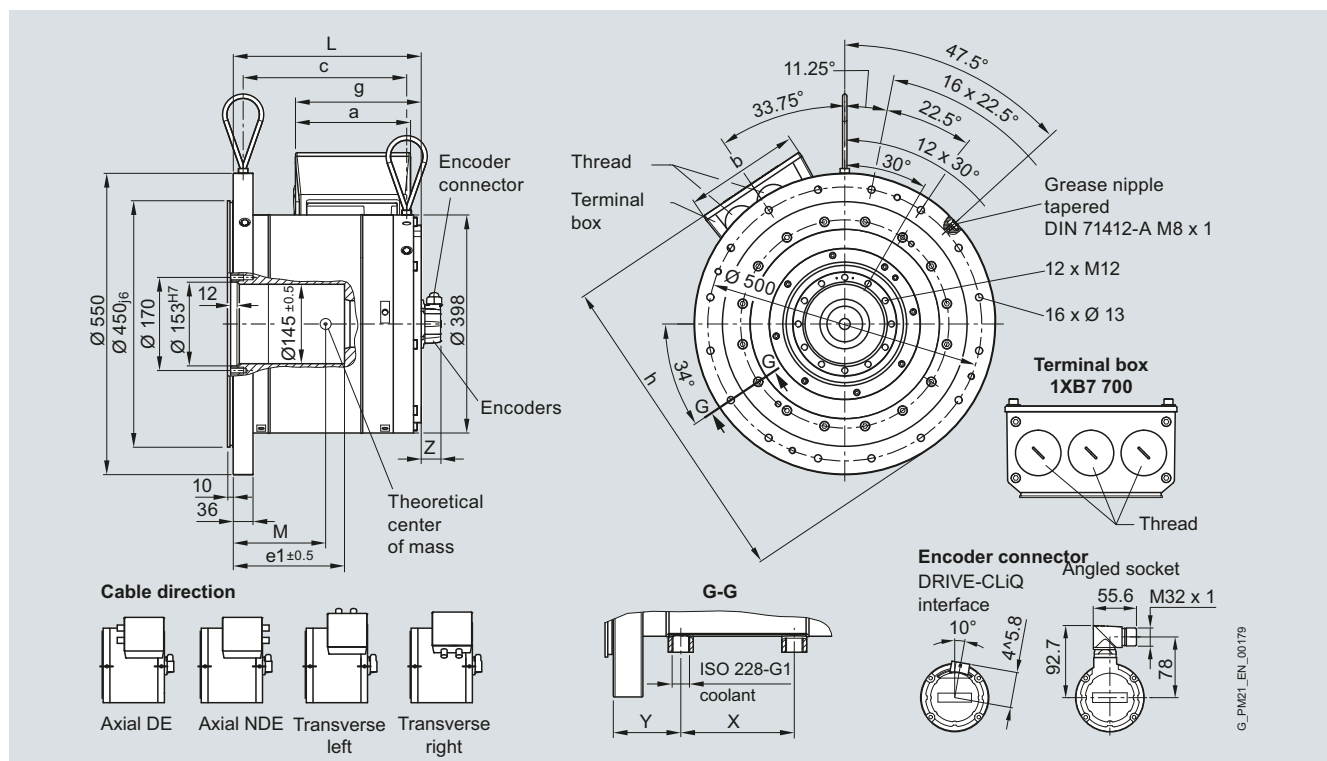
SIMOTICS T-1FW3 Heavy Duty Torque Motors

Shaft height 200

Technical specifications of SIMOTICS T-1FW3 Heavy Duty

Motor type		SIMOTICS T-1FW3 Heavy Duty									
		1FW3 202-3 (Length 2)		1FW3 203-3 (Length 3)		1FW3 204-3 (Length 4)		1FW3 206-3 (Length 6)		1FW3 208-3 (Length 8)	
Main Order No.	Length varies	P winding	S winding	P winding	S winding	P winding	S winding	P winding	S winding	P winding	S winding
Rated speed n_N	rpm	800	1200	800	1200	800	1200	800	1200	800	1200
Rated torque M_n	Nm	470	440	680	630	930	860	1360	1210	1900	1700
Rated current I_n	A	69	92	96	131	137	191	192	270	270	385
Maximum torque M_{max}	Nm	860	860	1210	1210	1700	1700	2400	2400	3300	3300
Frame length L	mm	338	338	384.5	384.5	453.5	453.5	546	546	661	661
Rotor moment of inertia J	kg/m ²	0.4	0.4	0.52	0.52	0.69	0.69	0.94	0.94	1.24	1.24
Motor weight	kg	214	214	246	246	287	287	365	365	436	436
Vibration resistance	10 g radial and 5 g axial acceleration as a result of shock for a frequency range from 0 to 2 kHz.										
Type of construction	IM B5										
Degree of protection	IP54										
Shaft design	Plug-on shaft										
Cooling method	Water cooling										
Encoders	22-bit absolute encoder with DRIVE-CLiQ interface										

Dimension drawing, SIMOTICS T-1FW3 Heavy Duty



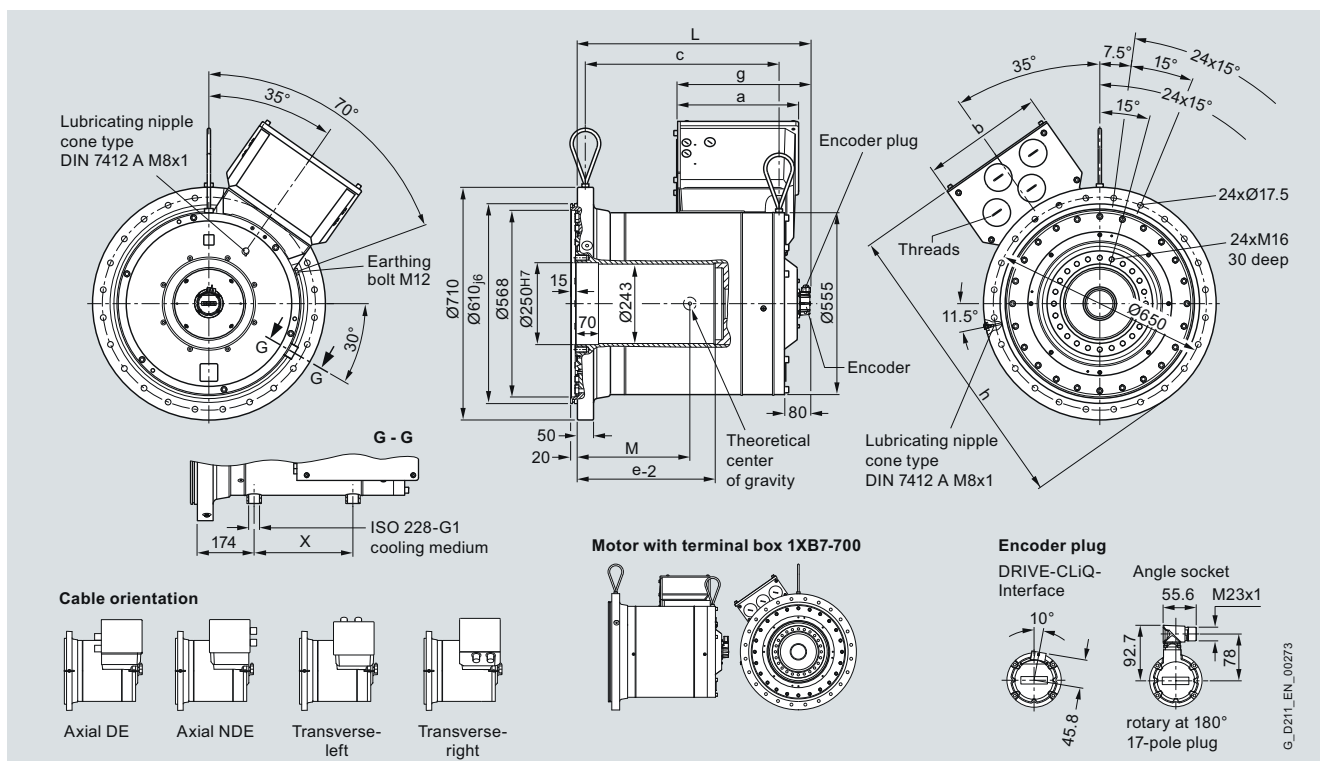
SIMOTICS T-1FW3 Heavy Duty Torque Motors

Shaft height 280

Technical specifications of SIMOTICS T-1FW3 Heavy Duty

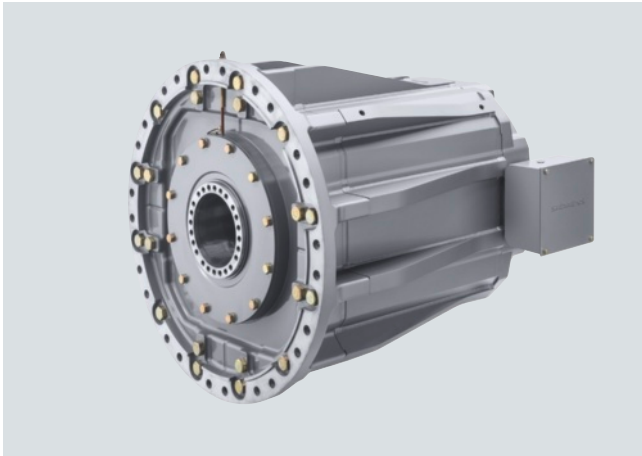
Motor type	SIMOTICS T-1FW3 Heavy Duty								
	Main Order No.	1FW3 281-3 (Length 1)		1FW3 283-3 (Length 3)		1FW3 285-3 (Length 5)		1FW3 287-3 (Length 7)	
Length varies									
Winding design		J winding	M winding	J winding	M winding	J winding	M winding	J winding	M winding
Rated speed n_N	rpm	400	600	400	600	400	600	400	600
Rated torque M_n	Nm	2350	2200	3300	3100	4700	4400	6600	6050
Rated current I_n	A	188	255	275	355	375	470	500	700
Maximum torque M_{max}	Nm	4050	4050	5700	5700	8150	8150	11400	11400
Frame length L	mm	629	629	713	713	839	839	1008	1008
Rotor moment of inertia J	kg/m ²	3.60	3.60	4.50	4.50	5.86	5.86	7.66	7.66
Motor weight	kg	755	755	854	854	1005	1005	1207	1207
Vibration resistance	10 g radial and 5 g axial acceleration as a result of shock for a frequency range from 0 to 2 kHz.								
Type of construction	IM B5								
Degree of protection	IP54								
Shaft design	Plug-on shaft								
Cooling method	Water cooling								
Encoders	22-bit absolute encoder with DRIVE-CLiQ interface								

Dimension drawing, SIMOTICS T-1FW3 Heavy Duty



SIMOTICS T-1FW4 Heavy Duty Torque Motors

Shaft height 400

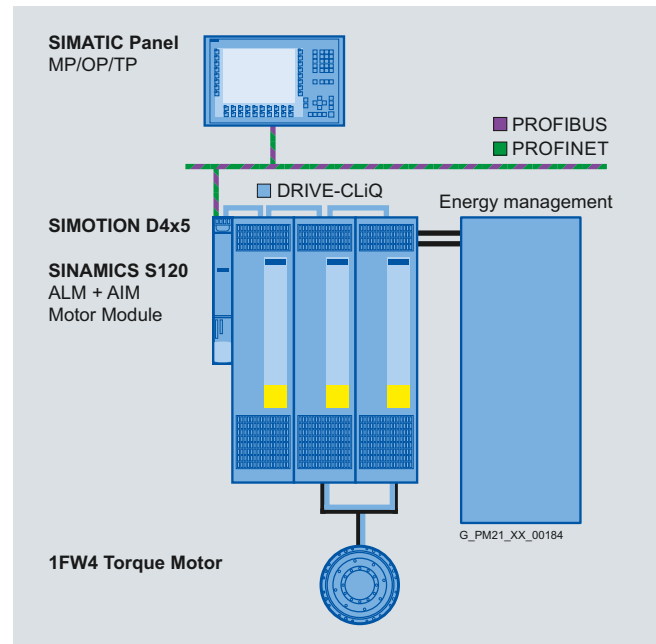


SIMOTICS T-1FW4 Heavy Duty

Different from the concept of the SIMOTICS T-1FW3 Heavy Duty torque motor, the 1FW4 Heavy Duty is fed from two SINAMICS motor modules.

For applications, which up until now, required the use of several SIMOTICS T-1FW3 motors, the SIMOTICS T-1FW4 Heavy Duty has been developed to supplement the Heavy Duty motor family.

As a result of its high power density and its high peak torque, the SIMOTICS T-1FW4 Heavy Duty is the ideal motor for large machines.



Configuration example, SIMOTION motion control system, SINAMICS S120 drive system and SIMOTICS T-1FW4 Heavy Duty torque motors with energy buffering via the DC link

Energy management:

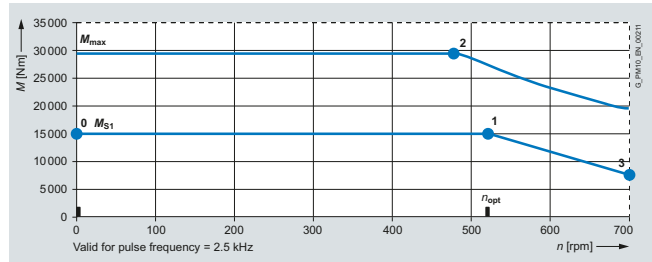
The energy management system, mentioned several times in this flyer, is an innovation that provides the possibility of maintaining energy in the system for machines with a cyclic load profile. As a consequence, this allows the infeed power of the complete system to be optimized or minimized. In practice, this means that the infeed to the machine ideally only has to supply the process power and losses for a system equipped with energy management. Energy differences as result of different speeds, resulting from the machine motion profile, are stored in the system and are not mapped to the line side. Siemens offers this technology with capacitive (capacitor bank) or kinetic (rotating moment of inertia) energy storage devices.

SIMOTICS T-1FW4 Heavy Duty Torque Motors

Shaft height 400

Technical specifications of SIMOTICS T-1FW4 Heavy Duty

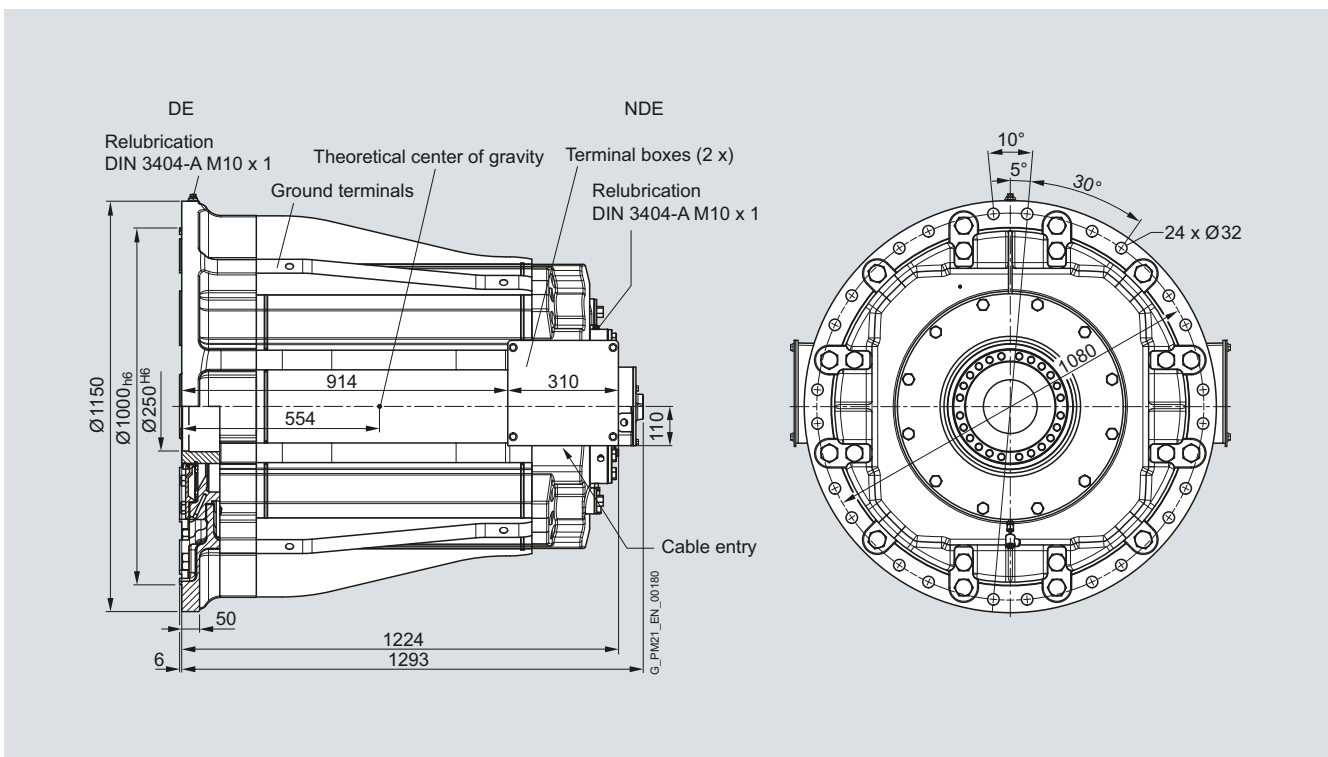
Motor type	SIMOTICS T-1FW4 Heavy Duty	
Order No.	1FW4 407-1KM81-1BC0	
Rated speed n_N	rpm	520
Rated torque M_n	Nm	15000
Rated current I_n	A	1300
Maximum torque M_{max}	Nm	29500
Frame length L	mm	1293
Rotor moment of inertia J	kg/m ²	37
Motor weight	kg	3200
Vibration resistance	10 g radial and 5 g axial acceleration as a result of shock for a frequency range from 0 to 2 kHz.	
Type of construction	IM B5	
Degree of protection	IP54	
Shaft design	Plug-on shaft	
Cooling method	Water cooling	
Encoders	22-bit absolute encoder	



Motor data

		0	1	2	3
Torque	M/Nm	15300	15000	29500	7500
Speed	n/rpm	0	520	480	700
Power	P/kW	0	817	1483	550
Voltage	U/V	7	405	420	420
Current	I/A	1305	1300	2600	845
Efficiency	η /%	-	96.4	-	-
Power factor	$\cos \phi$ -	-	0.93	-	-

Dimension drawing, SIMOTICS T-1FW4 Heavy Duty



Ordering data

SIMOTICS T-1FW3/1FW4 Heavy Duty

Note when ordering SIMOTICS T-1FW3 Heavy Duty

The SIMOTICS T-1FW3 Heavy Duty torque motor is a special version of the standard SIMOTICS T-1FW3 torque motor. See Catalog PM 21, direct drives.

The available variants of SIMOTICS T-1FW3 Heavy Duty can be ordered as follows:

AH 200: 1FW3 20-3C65-AP0-Z Z=L03

Shaft height 200 Lengths: 2, 3, 4, 6 or 8
see table Technical Specifications

Winding design:
P: Winding rated speed 800
S: Winding rated speed 1200

Position of terminal box and cable outlet
5 – Terminal box top, radial right
6 – Terminal box top, radial left
7 – Terminal box top, axial NDE
8 – Terminal box top, axial DE

Necessary additional entry for motor type SIMOTICS T-1FW3 Heavy Duty

AH 280: 1FW3 28-3C65-AP0-Z Z=L03

Shaft height 280 Lengths: 1, 3, 5 or 7
see table Technical Specifications

Winding design:
J: Winding rated speed 400
M: Winding rated speed 600

Position of terminal box and cable outlet
5 – Terminal box top, radial right
6 – Terminal box top, radial left
7 – Terminal box top, axial NDE
8 – Terminal box top, axial DE

Necessary additional entry for motor type SIMOTICS T-1FW3 Heavy Duty

Other windings on request.

Other options, for example motor protection, paint finish: see Catalog PM 21 or on the internet directly at www.siemens.com/industrymall

Note when ordering SIMOTICS T-1FW4 Heavy Duty

The available version of the SIMOTICS T-1FW4 Heavy Duty can be ordered as follows:

1FW4 407-1KM81-1BC0

Other options, for example motor protection, paint finish: on the internet directly at www.siemens.com/industrymall

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Motion Control
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