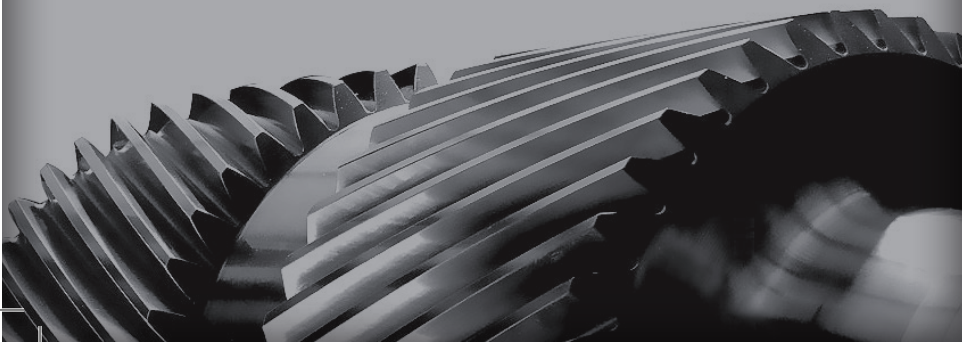




Power Generation

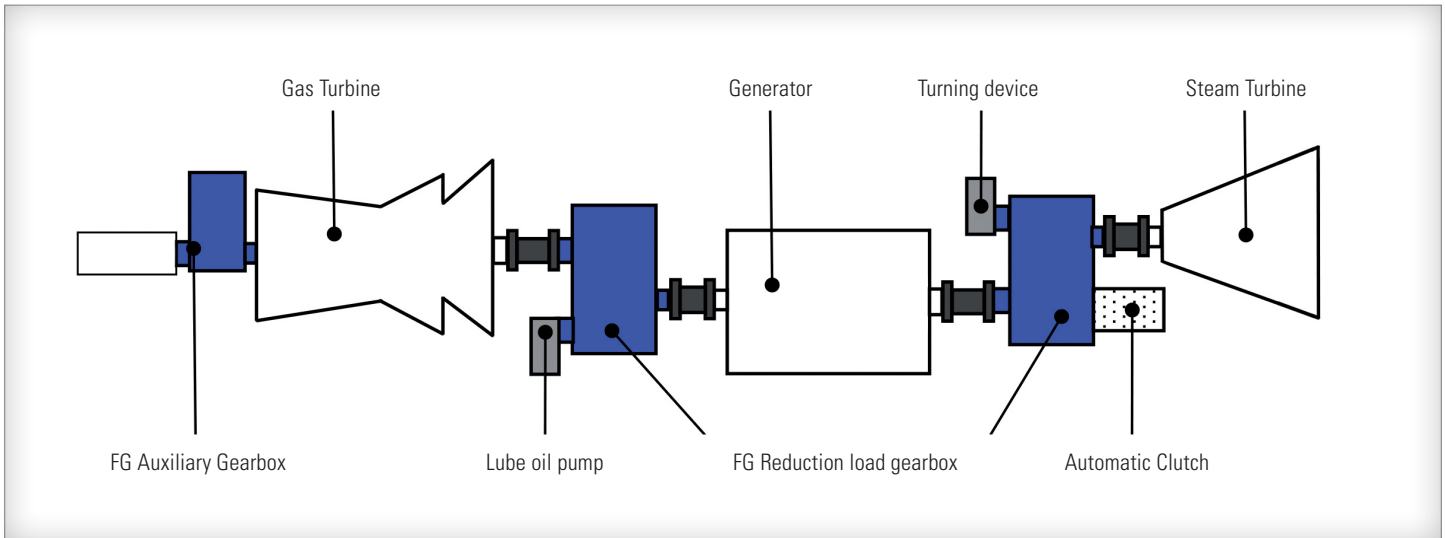
FLENDER
GRAFFENSTADEN




HIGH PERFORMANCE TRANSMISSION FOR ENERGY

Power Generation

With more than 60 years experience, Flender-Graffenstaden gearboxes are used in all processes in power plants, refineries, oil & gas offshore and onshore installations, chemical and petrochemical plants and industrial process plants throughout the world.



Design

Flender-Graffenstaden gear units are designed to your power transmission needs:

- Horizontal and vertical offset parallel shaft gearboxes
- Customised multi-stage gearboxes
- Planetary gearboxes
- Standard gearboxes for auxiliary drives
- Welded steel plate and cast iron casing
- Single helical, double helical or thrust collar arrangements

Applications

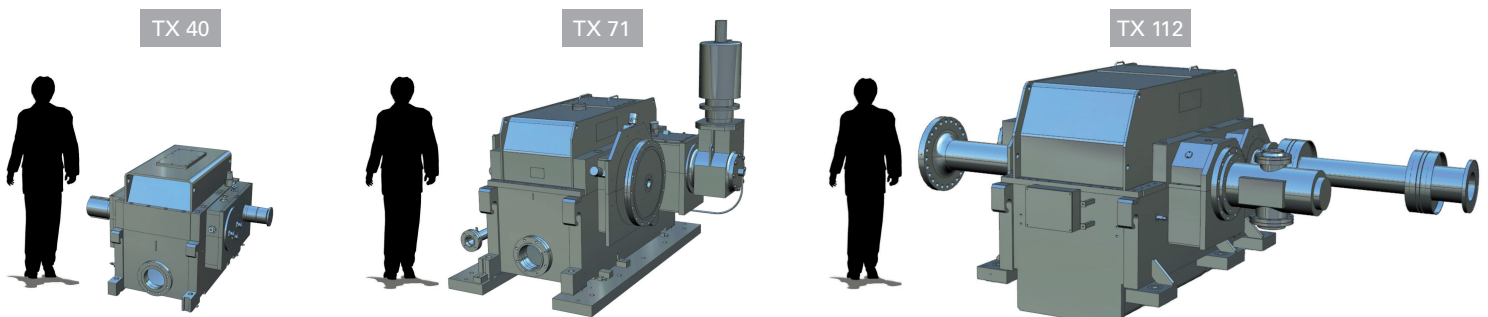
Flender-Graffenstaden gear units are located wherever energy is needed onshore and offshore for single-cycle, combined cycle and cogeneration applications:

- Standard industrial power generation gas turbines
- Power generation gas turbines on platforms and FPSO
- Combined heat and power solutions
- Steam turbines for solar applications
- Steam turbines for waste-to-energy and for waste biomass power plants

Scope of supply

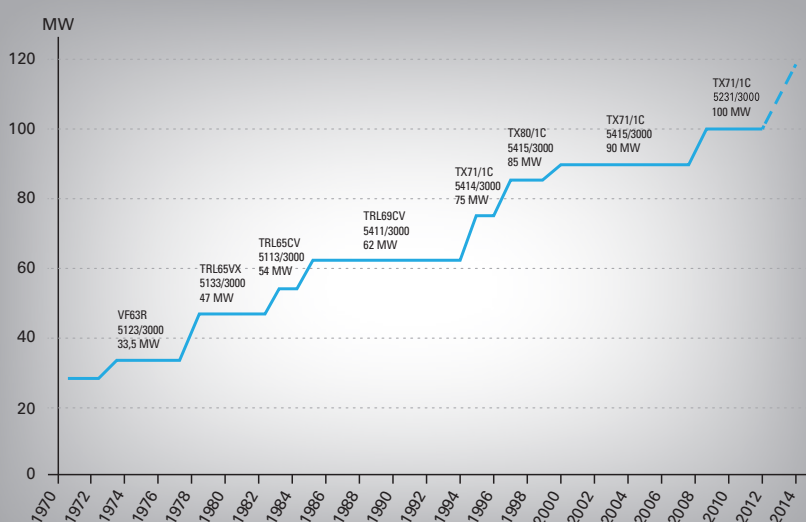
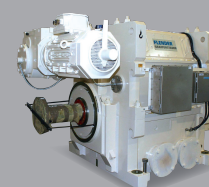
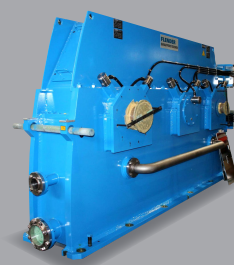
Flender-Graffenstaden gear units can be completed according to your on-site requirements:

- Lubricating oil pumps
- Turning device for start-up and slow roll
- Couplings, quillshafts and adapted coupling guards
- Nitrogen container for spare parts preservation
- Instrumentation for temperature, vibration and oil pressure monitoring



Load gearbox reference list for gas turbine/generator application

GEAR RATED POWER (MW)	TURBINE TYPE	2 POLES GENERATOR		4 POLES GENERATOR	
		50Hz (3000 rpm)	60Hz (3600 rpm)	50Hz (1500 rpm)	60Hz (1800 rpm)
1,3	Makila	X	X	TR25VX1	TR25VX4
6,4	SGT-100 / Typhon	X	X	PF90D	X
7,5	GE5	X	X	PF100D	X
11	LM1600	TX45/2CV	X	X	X
15	GE10	X	X	PF100D	PF100D
15	LM2500	X	X	X	TX56/2CV
17,5	SGT-400 / Cyclone	X	X	PF127D	X
22,5	SGT-500 / GT35	X	X	TX80/2C	TX80/3C
29	SGT-600 / GT10B	X	X	TX90/5C	TX90/4C
30	LM2500+G4	TX50/1CV	X	X	TX71/1C
31,5	FRAME 5	VF63	VF63	TX80/3C	TX80/2C
33	LM2500RD	X	X	X	TX112/2C
33,4	RB211-GT62 / 61	X	X	TX71/3C	TX63/2C
37	PGT25+G4	X	X	TX90/4C	TX71/3C
37	SGT-700 / GT10C	X	X	TX90/4C	TX90/3C
45	RB211-H63	X	X	TX90/4C	TX80/3C
48	SGT-750	X	X	TX100/4C	TX90/3C
52,2	LM 6000 PC-PD	TX61/1CV	X	TX80/2CV	X
54	FRAME 6B	TRL65CV - TX61/1CV	TRL65CV - TX61/1CV	TX90/3C	TX90/2C
55-60	SGT-800 / GTX100	X	X	TX112/4C	TX100/3C
55-60	SGT-800 BPack	X	X	TX112/4C	X
62,75	LM 6000 PG-PH	TX61/1CV	X	X	X
85	SGT-1000F / V64.3A	TX80/1C	X	X	X
90	FRAME 6FA	TX71/1C	X	X	X
100	FRAME 6FA+e	TX71/1C	X	X	X



Manufacturing processes

Flender-Graffenstaden gear units benefit from 60 years of experience combined to state of the art manufacturing technology:

- Carburizing and nitriding
- ISO and AGMA grade 4 or better gear grinding
- CNC machine tools for cylindrical turning and high accuracy teeth grinding of bearing seats and shaft ends

Engineering

Flender-Graffenstaden gear units are tailored to meet your « turbo » expectations:

- Ratings according API 613, AGMA 421, AGMA 6011, ISO 6336
- Hydrodynamic bearings with dedicated performance determination
- Lateral vibration calculation and analysis of every unit
- Meshing load distribution calculation according AGMA 927
- Modal and structural finite-element analysis of casings
- Torsional analysis of complete shaft lines

Testing

Flender-Graffenstaden gear units are individually tested according to requirements:

- Standard full speed tests according API 613
- Partial load tests
- Back to back tests

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