TAKEOFF-Boxer - Propeller drive

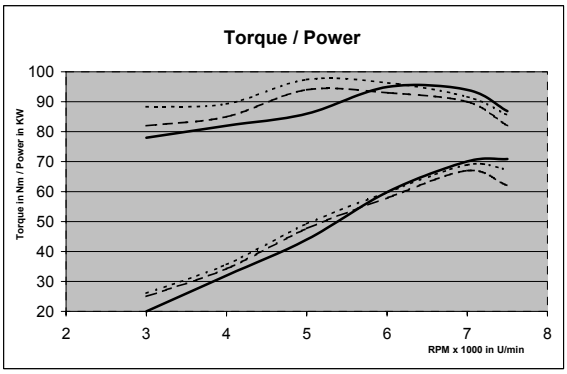
As new flat Boxer engines the 1100 RS/ GS/ have been introduced years ago into the quantity production. It is now time to let this technological top performance of the engine building fly.
As a result of our experiences with The Boxer-engines as aircraft engines since 1988, according to the state of the art we realized our ideas about a modern, high-performance propeller drive.
For ultralight planes this drive has been certified since 4/98. It runs with very few vibration, is quiet, extremely economical and strong.

The Highlights:

Enormous power weight (to 0,77 kg/hp)
Extremely economical consumption (225 g/kW/h)
Processorcontrolled injection
Non-polluting due to regulated 3-way catalytic converter
Height compensation by crusher gage sensor
Continuous duty depending on motor 43 - 74 kW (70 - 100 hp)

Specifications:

Typ	Volumen	Compression	Power
R 1,1 RS	1085 ccm	10,7:1	66 kW/90PS/7200 min^{-1}
R1,15 RS	1130 ccm	11,3:1	70 kW/95PS/7250 min^{-1}
R 1,1 S	1085 ccm	11,5:1	72 kW/99PS/7500 min^{-1}



Consumption: 7 - 10l unleaded at 75 %
Cooling system: 65% oil - 35 % air
Four-valve-technology: separate oil cooling (50 l/h) for the outlet valve

Ignition system: Motronic (characteristic control) with emergency running control in case of breakdown of sensors
Ignition release mechanism: 2 independent Hall generators controlled by the crankshaft
Mixture control: characteristic controlled injection system with sensors for rotational speed, oil temperature, throttle control position, air temperature, air pressure and lambda probe
3 bar pressure system in the injection system to avoid vapor lock
Environmental compatibility: 3-way catalytic converter, HC-reduction about 85%; NOx-reduction about 80%

Gear:
Helical, with hardened and grinded gearwheels. Gear reduction: (2,46; 2,75; 3,05, 3,46 :1 possible)
Springless, one-piece centrifugal automatic-clutch (rotational speed of action 2800 1/min)
Rotational oscillation damper (absorbes rotational oscillations of approx. +/- 10°)
Total weight when ready for take off including exhaust system, gear and coolant: approx. 80 kg

No other two-cylinder four-stroke engine has - caused by the pistons working in an opposite manner - a so perfect mass balancing so that the flat engine works without much vibrations even without weight increasing compensation shafts. The mass balancing gets more optimal at higher rotational speed. For the lower speed range the unfavorable traction combination of the degree of non-uniformity of the engine and the moment of inertia of the propeller is decoupled by a centrifugal clutch.
A rotary oscillation damper prevents resonances between engine, gear and propeller.

Two-cylinder four-stroke engine with spur gear and centrifugal clutch

Price list 3/2003

Order-No.	Description		price in €URO without VAT	with 16% VAT
TBM 10	BOXER-flat engine R 1100 S (72 kW at 7200 1/min) with Motronic-characteristic controlled ignition and lambda probe, starter, alternator (600 W), oil cooler , unleaded and leaded fuel	61 kg	5490,-	6368,40
TBM 11	BOXEER-flat engine R 1150 RS/RT (70 kW at 7200 1/min) with Motronic- characteristic controlled ignition and lambdaprobe, starter, alternator (600 W), oil cooler, unleaded and leaded fuel	61 kg	5490,-	6368,40
TMGo 3,5	Spur gear, helical, hardened and grinded gearwheels, gear reduction (3,5; 2,96; 2,75 and 2,46:1 is possible) matching for BOXER 1100 series	7 kg	1230,-	1426,80
TMGu 3,5	like TMGo 3,5 but propline downside	7,5kg	1325,-	1537,-
TFD 02	Centrifugal clutch, springless, rotational speed of action approx. 2400 1/min incl. integrated torsionally elastic vibration damper	4 kg	795,-	922,20
TEK 11	Cable harness with motor sided wiring and 4m long 12-core line to the cockpit	1 kg	340,-	394,40
TNG 02	Air filter made out of glass fiber-reinforced plastic	1 kg	299,-	346,84
TRA 11	Exhaust system with 2 intakes, 1 outlet	3 kg	435,-	504,60
TRA 12	Exhaust system with 1 catalytic connector intake, 1 oulet	3 kg	435,-	504,60
TKT 12	Component parts for manifold system	1,5 kg	230,-	266,80
TMK 72	Catalytic converter optional, integratable into the exhaust system	0,5 kg	234,-	271,44
TKM 03	4 Vibrating element for the drive seat,	1,5 kg	185,-	214,60
TPM 01	Electrical fuel pump, 3 bar pressure system	0,5 kg	135,-	156,60
TNL 03	Adjustable 3-blade air propeller in pull- and push-version, ∅ 1730 mm	5,6 kg	1180,-	1368,80
TNL 02	Adjustable 2-blade air propeller,	4,5 kg	840,-	974,40
TEP 02	Setting gage for propeller		49,-	56,84
TMA010	Oil temperature indicator with sensor (∅ 52 mm)		92,-	106,72
TMA020	Oil pressure indicator with sensor (∅ 52 mm)		134,-	155,44
TMA030	Revolution counter (∅ 52 mm)		95,-	110,20
TMA040	Operating hours counter (∅ 52 mm)		92,-	106,72

The BOXER-engine 1100 with the TAKE OFF gear variant has been developed for land vehicles. This drive does not conform to the standard of aircraft industry. The drive is not tested or certified for the operation in aircrafts. After tests the manufacturer or experimental manufacturer of the air sports equipment has to decide on his own reponsibility, how far this drive concept can be used in air sports equipment (UL) with safe gliding flight characteristics, that can safely land in case of engine failure. The BOXER-manufacturer and TAKE OFF do not assume any liability for consequential damages that are caused by a drive breakdown of an aircraft or air sports equipment.

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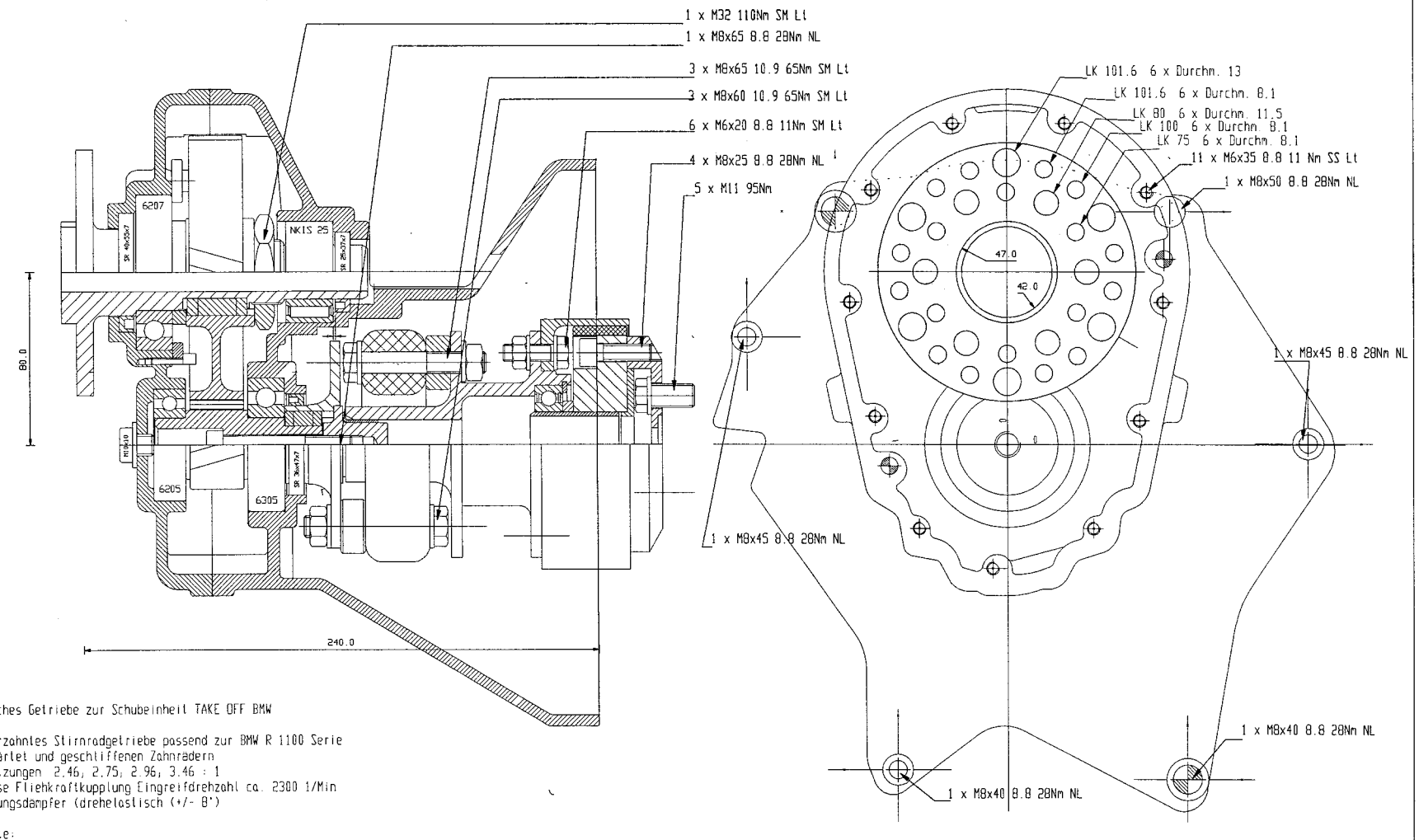


Mechanisches Getriebe zur Schubeinheit TAKE OFF BMW

Schrägverzahntes Stirnradgetriebe passend zur BMW R 1100 Serie
-mit gehärtet und geschliffenen Zahnrädern
-Untersetzungen 2.46, 2.75, 2.96, 3.46 : 1
-federlose Fliehkraftkupplung Eingreifdrehzahl ca. 2300 1/Min
-Schwingungsdämpfer (drehelastisch (+/- 8°)

Grenzwerte:

Drehzahl:	7500 1/min
Dauerdrehmoment:	95 Nm
Maximaldrehmoment:	150 Nm
Massenträgheitsmoment:	6000 kg/cm2

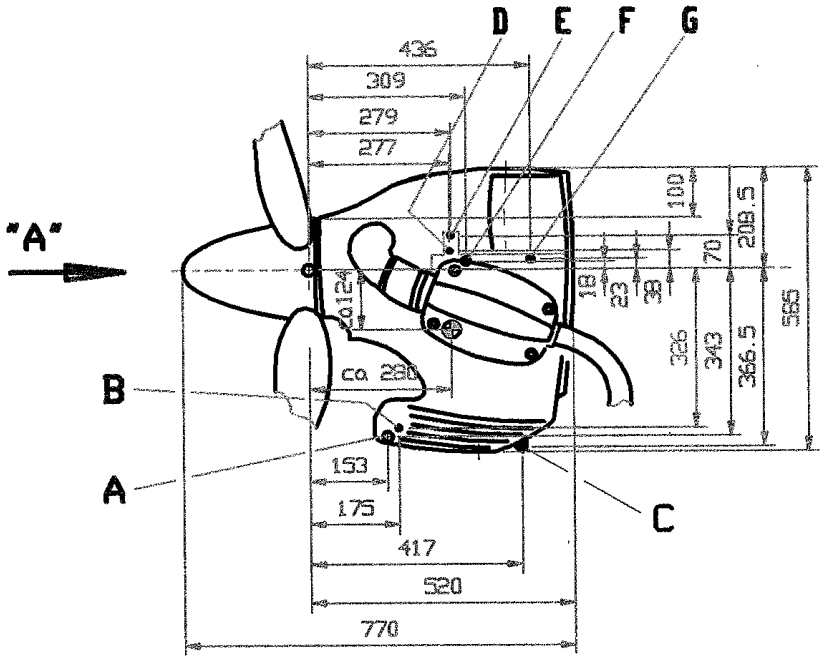
Gewichte:

Getriebe:	7 kg
Fliehkraftkupplung mit Dämpfer	3.5 kg

Legende:

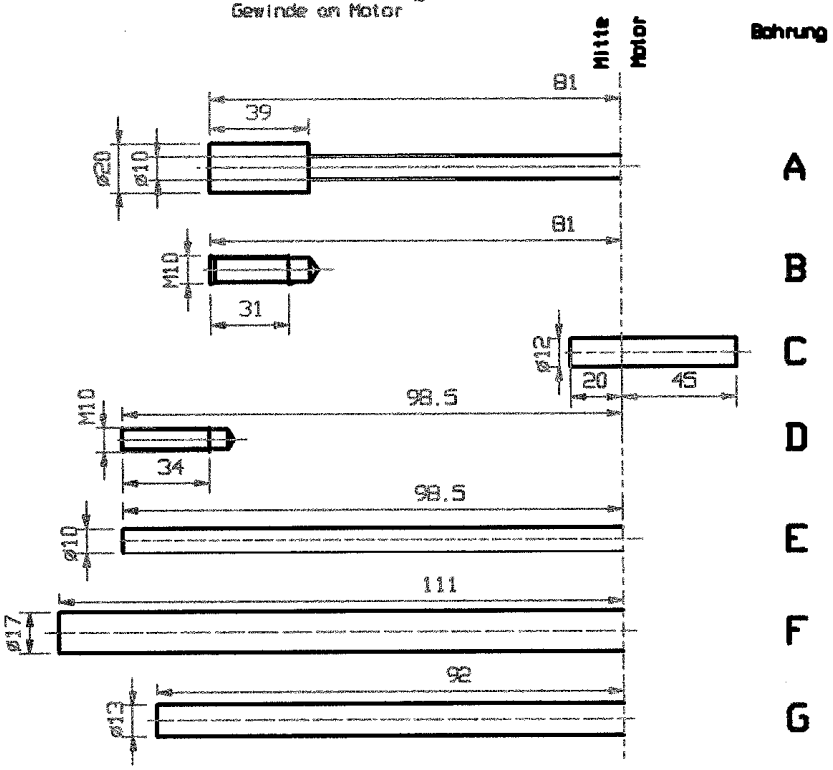
SM = Stopmutter
Lt = Kleben (mittelfest)
NL = Nord Lock
(Doppelunterlegscheiben)
SS = Schnorr-Unterlegscheiben

				Maßstab
Werkstoff				Merlin 1100
Bearb.	Datum	Name		
Gepr.	5.98	Blei		Getriebe Anzugsmomente
Norm.				
TAKE OFF				Z.-Nr. Getriebe Blatt

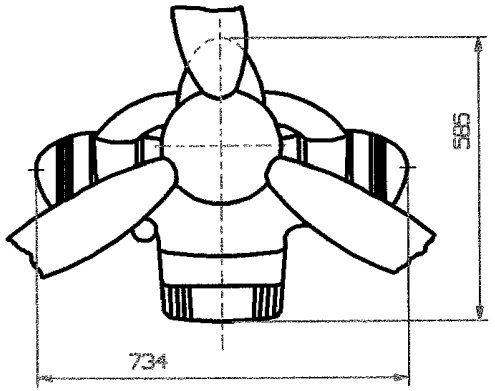


Ansicht "A"

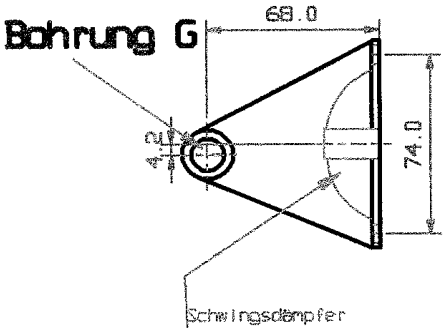
vorhandene Bohrungen und Gewinde am Motor



Ansicht "A"

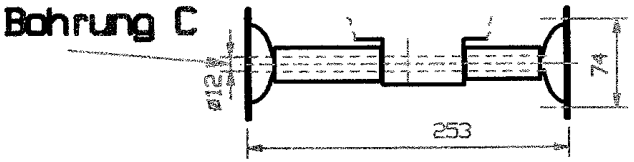


Bohrung G



Abstand der zwei Schwingungsdämpferbohrungen zueinander 300 mm

Bohrung C



			Maßstab 1:10 / 1:2	
Werkstoff: -			Merlin 1100	
Bearb.	Datum	Name	Motoransicht kmpl.	
Gepr.				
Norm				
TAKE OFF			Z.-Nr. Motor 011	Blatt 1 / 1