

We make modern engine technology measurable



Eggers Dynamometer · Power test stands · Consumption meters · Software
Special test stands · Frontec · KL measuring system

Foreword

As the KL-Maschinenbau GmbH & Co. KG, we are the European leader in the development and manufacture of power test stands for agricultural machines and engines. We are your specialist for the production and distribution of the internationally known, mobile PTO-brake EGGERS-Dynamometer. Our products are used world-wide by well-known tractor manufacturers in the final inspection, training, and development. Numerous schools and research facilities, as well as a huge number of agricultural machine dealers rely on our products.

Beginning with the EGGERS dynamometer, a complete product range for customers in the field of engine technology has been developed over the years. Adapted to the requirements of the market, consumption meters, which are compatible with the EGGERS dynamometer, have been developed. These devices are convincing in terms of accuracy, handling, and economy.

Our "PowerControl" software is the perfect complement to our products and makes it for the user easier to work with. In addition to logging tasks, the software can take control of the test stand and automatically determine the performance curve of the connected tractor. When the consumption meter is connected, the actual consumption data of the engine are also displayed in the software and can be viewed in relation to the full load curve.

In addition to the serial production of our tried and tested products, the construction of special test stands has become an important core of KL-Maschinenbau in recent years. Worldwide, customers from various industries, as well as technical colleges and other research facilities, rely on our knowledge and our products in this field.

At the production site in Rendsburg, highly qualified and experienced specialists are working in classical mechanical engineering, as well as in the latest methods and products. The experience, gained in more than 30 years of development and realization, as well as the involvement of experienced specialists of tractor and engine manufacturers and professors of technical colleges, promote a continuous adaptation to technical progress. Special designs of test stands are realized in close consultation with the customer according to their requirements.

Further solutions and products can be found in this product brochure or on the Internet at:
www.kl-maschinenbau.de


MADE IN GERMANY



The quality management standard ISO 9001 is the nationally and internationally most widespread standard in the Quality Management (QM).

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Test benches for electric motors

By taking over WEKA-Elektromotorenprüfstände, we can also offer a complete product portfolio in the field of electric motor test stands.

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Consumption Meters

Our consumption meters are the perfect addition to our test stands. They are, in addition to the compatibility with our dynamometers and our software, above all simple to operate and very precise.

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Software

Our software "PowerControl" offers the perfect addition to our products. It simplifies the work with the dynamometer, the consumption meter and the measurement system of KL-Maschinenbau.

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Special Test Stands

Special machine construction has developed into an important core of KL-Maschinenbau GmbH. Worldwide, technical universities and numerous customers from the industry rely on our know-how in this field.

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Frontec

With our "Frontec" front-PTO additional brake, we offer land and forestry workers in mountain regions a solution to increase economic efficiency and safety when driving downhill.

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KL measuring system

The KL measuring system offers the best solution for advanced measurement, diagnostic and analysis tasks. Numerous sensors, as well as inputs and outputs, provide almost endless configuration possibilities.

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Whether you are an agricultural machine dealer, a technical training centre, a manufacturer of agricultural and construction machinery or an agricultural and forestry trader, we offer products and solutions for all these areas.



EGGERS-Dynamometer 300 kW

Dynamometer 300 kW PT 170 and PT 170 SE

The EGGERS Dynamometer PT 170 impresses with its compactness. It also finds its place in workshops where spatial capacities are limited. It is available as mobile workshop version (PT 170 E), as well as on 80 km / h chassis (PT 170 SE).

With a performance range of up to 300 kW for a rapid test and 170 kW for a full load curve, the Dynamometer PT 170 already covers a large part of the tractors on the market.

Of course, the PT 170 E / SE also offers special wishes by the customer and can be offered as an option. Feel free to contact us!



PT 170 SE



PT 170 E

Dynamometer 300 kW

Technical Data	PT 170 E / SE
Modell versions	PT 170 E: workshoptype, mobile PT 170 SE: road type, on trailer 80 km/h
Brakesystem	1 Retarder (Eddy current brake, maintenance free)
Collant	Aircooled by highpower electric fan (8500 m ³ /h)
Measurement range at 1000 min ⁻¹ and 20°C	300 kW 1 min* 275 kW 2 min* 250 kW 2,5 min* 225 kW 3,5 min* 200 kW 4,5 min* 160 kW 7,5 min* 140 kW 9 min* 110 kW 40 min*
*Measurement time depending upon tractor size and local conditions	
Max. revolutions permissible	2500 1/min optional up to 3600 1/min
Max. torque	3600 Nm
Precision	< 1 %
Display	Digital display, indication revolutions, torque, power (kW), POWER (HP)
DMS Sensor	Standard
Direction of rotation	Both
Electrical Power supply	240V, 16A slow
Frame	Zinc plated
Housing	GRP
Measure and weights	PT 170 E: L 900 mm; B 1000 mm; H 1500 mm; Gew. 525 kg PT 170 SE: L 2350 mm; B 1600 mm; H 1350 mm; Gew. 550 kg
Standard delivery items	Instruction manual, CEE plug 3X16 A
Against additional charge	Spezial cardan shaft 1 3/4" 6Z – 1 3/8", Cardan half shaft 1 3/8" 21T, Cardan half shaft 1 3/4" 20T, Cardan half shaft 1 3/4" 6T, Software "Eggers PowerControl" Bluetooth or cable remote control Large protective hood

EGGERS-Dynamometer 300 kW





EGGERS-Dynamometer 600 kW

Dynamometer 600 kW PT 301 MES, PT 301 MEM, PT 301 MEW and PT 301 K

The EGGERS Dynamometer PT 301 series is convincing thanks to its great versatility and a high braking performance. These are our best-selling models.

The four different model variants allow the customer to select the most suitable dynamometer for his company.

With its 600 kW for the fast test and the 340 kW for the full load curve, our PT 301 series covers nearly all of the currently available on-market tractors and a large part of the harvesters.



PT 301 MES

As an ideal addition to the Eggers Dynamometer, the consumption meters from our company need to be mentioned. Compatible with the dynamometer, the consumption can be determined during the performance measurement. Via the "PowerControl" software, the performance curve can then be viewed directly in relation to the consumption.

Dynamometer 600 kW

Technical Data	PT 301 MEW / MEM / MES / K
Modell versions	PT 301 MEW: workshop type, fixed to floor PT 301 MEM: workshop type, mobile, mobil PT 301 MES: road type, on trailer 80 Km/h PT 301 K: Street version in the trailers
Brakesystem	2 Retarder (Eddy current brake, maintenance free)
Collant	Aircooled by highpower electric fan (17.000 m ³ /h)
Measurement range at 1000 min ⁻¹ and 20°C	600 kW 1 min* 550 kW 2 min* 500 kW 2,5 min* 450 kW 3,5 min* 400 kW 4,5 min* 320 kW 7,5 min* 280 kW 9 min* 220 kW 40 min*
*Measurement time depending upon tractor size and local conditions	
Max. revolutions permissible Max. torque	2500 1/min optional up to 3600 1/min 7200 Nm
Precision	<1 %
Display	Digital display, indiction revolutions, torque, power (kW), POWER (HP)
DMS Sensor	Standard
Direction of rotation	Both
Electrical Power supply	400 V/230 V, 16A tr
Frame / Housing	Zinc plated /fibre glass reinforced plastics material
Measure and weights	PT301MEW: L 1810 mm; B 730 mm; H 1540 mm; 1098 kg PT301MEM: L 1830 mm; B 1060 mm; H 1500 mm; 1150 kg PT301MES: L 3100 mm ; B 1800 mm; H 1580 mm; 1300 kg permissible total weight 1800 kg PT301K: 1600 kg, permissible total weight 2000 kg
Standard delivery items	CEE plug 5x16A, and machine manual (large dust cover at 301 MES)
Against additional charge	Cardan half shaft 1 3/8" 21T Cardan half shaft 1 3/4" 20T Cardan half shaft 1 3/4" 6T Software "Eggers PowerControl" Bluetooth or cable remote control Large protective hood

EGGERS-Dynamometer 600 kW



PT 301 MES: road approval, with included cover weather-proof, storage for PTO-shaft on the side possible



PT 301 K: road approval, storage space for PTO-shaft and 3 PTO-shaft halves, weatherproof closed box trailer



PT 301 MEM: Workshop execution, mobile by handhold and wheels



PT 301 MEW: Workshop design, fixed stationary, for the installation of a locally fixed test area / test room



By using the integrated dashboard, the operator always has the full control over the machine



The extendable support feet are monitored by the electronics and ensure the necessary security



EGGERS-Dynamometer 500 kW – 735 kW

EGGERS Dynamometer PT 501 G with generator load

This new EGGERS dynamometer is produced by the manufacturer of the already well-known EGGERS dynamometer: KL-Maschinenbau. Like all other test benches of the manufacturer, it is designed and manufactured in Rendsburg.

A generator as braking medium

in general, the new EGGERS dynamometer works like the proven models on the principle that both - the torque and the rotational speed are measured separately. The generator used to load the engine is therefore provided with a torque measuring hub. This torque measuring hub measures the resulting Torque, a speed sensor senses the revolutions per minute. From these exactly measured values, the control electronics calculates the performance of the test object according to the power formula*. Inaccuracy factors such as constantly changing efficiencies of the generator are eliminated, because this brake medium has only the task to load the engine – but is basically not used for power measurement. This measurement method is physically sound and internationally recognized.

Like all other EGGERS Dynamometers, also the model PT 501 G is calibratable. The time required for this is very low and can be performed expertly by the user.

To achieve a high endurance load, in this new model an electric generator is used as braking medium. The generated electricity is converted into heat by means of heavily dimensioned high-power resistors. The very high continuous braking power of the new EGGERS Dynamometer remains constant and does not decrease at all.

The new EGGERS dynamometer can be shut down without aftercooling – immediately after the test (hot shut down).

*power formula: $\frac{\text{rpm} \times \text{torque}}{9549,3} = \text{power in Kilowatts}$

Dynamometer 500 kW – 735 kW

Technical Data	PT 501 G	PT 501 G+
Modell versions	PT 501 GS: road type PT 501 GW: workshop type, fixed	PT 501 GS+: road type PT 501 GW+: workshop type, fixed
Brakesystem	Generator and load resistance	Generator and load resistance
Collant	Aircooled by highpower electric fan	Aircooled by highpower electric fan
Measurement range at 1000 min-1 and 20°C	All performances sustained until 680 HP (500 kW)	All performances sustained until 680 HP (500 kW)
Measurement range at 1800 min-1 and 20°C	All performances sustained until 680 HP (500 kW)	All performances sustained until 1000 HP (735 kW)
Max. revolutions permissible Max. torque	2200 1/min 4750 Nm	2200 tr/min 4750 Nm
Precision	< 0,5 % of the measured value	< 0,5 % of the measured value
Display	Digital display, indiction revolutions, torque, power (kW), POWER (HP), with PC Software (optional)	Digital display, indiction revolutions, torque, power (kW), POWER (HP), with PC Software (optional)
DMS Sensor	Standard	Standard
Direction of rotation	Both	Both
Electrical Power Supply	230 V, 16 A Safety plug	230 V, 16 A Safety plug
Frame / Housing	Zinc plated / Aluminium	Zinc plated / Aluminium
Measure and weights workshop type road type	2500 kg permissible total weight L: 3000 mm, W: 1400mm, H: 1900 mm L: 4580mm, W: 2050 mm, H: 1900 mm	2600 kg permissible total weight L: 3000 mm, W: 1400mm, H: 1900 mm L: 4580mm, W: 2050 mm, H: 1900 mm
Standard delivery items	Instruction manual, Cardan shaft support, manual control storage, cardan shaft storage	Instruction manual, Cardan shaft support, manual control storage, cardan shaft storage
Against additional charge	Spez. cardan shaft 1 3/4" 6Z – 1 3/8", Cardan half shaft 1 3/8" 21Z, Cardan half shaft 1 3/4" 20Z, Cardan half shaft 1 3/4" 6Z, Software: „Eggers PowerControl“ Bluetooth or cable remote control Fuel consumption indicator	Spez. cardan shaft 1 3/4" 6Z – 1 3/8", Cardan half shaft 1 3/8" 21Z, Cardan half shaft 1 3/4" 20Z, Cardan half shaft 1 3/4" 6Z, Software: „Eggers PowerControl“ Bluetooth or cable remote control Fuel consumption indicator

EGGERS-Dynamometer 500 kW – 735 kW





EGGERS-Dynamometer 900 kW

Dynamometer 900 kW PT 1000 K and PT 1000 W

The EGGERS Dynamometer PT 1000 covers the complete range of all performance classes both for tractors and for harvesting machines. Whether in the functional case trailer (PT 1000 K) for mobile use or stationary in the workshop version (PT 1000 W) – here you get huge performance.

With a power of 900 kW for the quick test and 510 kW for a full load curve, you can easily drive any engine. Equipped with a torque measuring shaft in the drive train, the highest possible accuracies are achieved here.

With the precision and performance of this dynamometer, you are also well prepared and equipped for the future.

With growing agricultural machines and the rising demands on performance test stands, an EGGERS dynamometer PT 1000 is certainly the first choice for future-oriented companies.



Dynamometer 900 kW

Technical Data	PT 1000 / 3 K / W
Modell versions	PT 1000/3 W: workshop type, stationary PT 1000/3 K: road type, based on chassis 80 km/h (optional 100 km/h)
Brakesystem	3 Retarder (Eddy current brake, maintenance free)
Collant	Aircooled by highpower electric fan (17.000 m ³ /h)
Measurement range at 1000 min ⁻¹ and 20°C	900 kW 1 min* 825 kW 2 min* 750 kW 2,5 min* 675 kW 3,5 min* 600 kW 4,5 min* 480 kW 7,5 min* 420 kW 9 min* 330 kW 40 min* 300 kW open end
*Measurement time depending upon tractor size and local conditions	
Max. revolutions permissible Max. torque	2500 1/min optional to 3600 1/min 9000 Nm
Precision	0,5 % of reading
Display	Digital display, speed, torque, power (kW, HP)
DMS Sensor	Measuring hub, standard temperature compensated
Direction of rotation	Both
Electrical Power supply	400 V, 32 A tr
Frame / Housing	Galvanized / walls of multiplex
Chassis	Tandem VIN (BPW) with auto-reverse, 2-leaf rear door, complete galvanized welded frame, folding automatic jockey, 2 grab handles, fender supports, lockable stainless steel lock, storage space for drive shaft and drive shaft halves
Measure and weights	PT 1000/3 K: L 3300 mm; B 1750 mm; H 2000 mm; Weight: 2000 kg, Gross vehicle weight: 2700 kg, only construction: L 2050 mm, B 1330 mm, H 1550 mm
Standard delivery items	Manual, connector Standard colors: white, light grey
Against additional charge	Specific joint shaft 1 3/4" 6Z – 1 3/8" PTO shaft 1 3/8" 21Z PTO shaft 1 3/4" 20Z PTO shaft 1 3/4" 6Z Software "Eggers PowerControl" Bluetooth or cable remote control Colors at additional cost: all RAL colors

EGGERS-Dynamometer 900 kW





EGGERS-Dynamometer 1200 kW

Dynamometer 1200 kW PT 1300 K and PT 1300 W

With always increasing machines having always more powerful engines, the desire for even more braking performance has arisen for some of our customers.

For customers who were no longer satisfied with the performance of the PT 1000 test rig, we also developed the models PT 1300 K (in a covered trailer with road approval) and PT 1300 W (stationary workshop version) with 4 electric eddy current brakes connected via maintenance-free cardan shafts.

As with the PT 1000, the power is measured via a highly precise measuring shaft. The performance of this dynamometer extends up to 1200 kW (1630 hp) in the fast test, as well as 670 kW (910 hp) for a full load curve.

We remain faithful to our motto and make "state-of-the-art engine technology measurable"



PT 1300 W on lift table



PT 1300 K – in closed car trailer and forklift kit

Dynamometer 1200 kW

Technical Data	PT 1300 K / W
Modell versions	PT 1300 K: enclosed road version, based on chassis 80 km/h PT 1300 W: workshop design, stationary
Brakesystem	4 Retarder (Eddy current brake, maintenance free)
Collant	Aircooled by highpower electric fan (25.000 m³/h)
Measurement range at 1000 min-1 and 20°C	1100 kW 2 Minutes 1000 kW 2,5 Minutes 900 kW 3,5 Minutes 800 kW 4,5 Minutes 640 kW 7,5 Minutes 560 kW 9 Minutes 440 kW 40 Minutes 400 kW 24/7 (open end)
*Measurement time depending upon tractor size and local conditions	
Max. revolutions permissible	2500 1/min optional to 3600 1/min
Max. torque	14.000 Nm
Precision	0,5% of reading
Display	Digital display, speed, torque, power (kW, HP)
DMS Sensor	Measuring hub on input shaft
Direction of rotation	Both
Electrical Power supply	400V, 32A, 3 Ph., N, PE, 50/60 Hz
Frame / Housing	Galvanized / walls of multiplex
Chassis	Tandem VIN (BPW) with auto-reverse, 2-leaf rear door, complete. Galvanized welded frame, folding automatic jockey, 2 grab handles, fender supports, lockable stainless steel lock, storage space for drive shaft and drive shaft halves
Measure and weights	PT 1000/3 K: L 3300, B 1750, H 2000, weight 2000 kg, Gross vehicle weight: 2700 kg, only construction: L 2050 W 1330 H 1550
Standard delivery items	Manual, connector Standard colors: white, light grey
Against additional charge	Specific joint shaft 1 3/4" 6Z – 1 3/8" PTO shaft 1 3/8" 21T PTO shaft 1 3/4" 20T PTO shaft 1 3/4" 6Z Software "Eggers Power Control" Bluetooth or cable remote control Colors at additional cost: all RAL colors

WEKA performance test stands – Test benches for electric motors

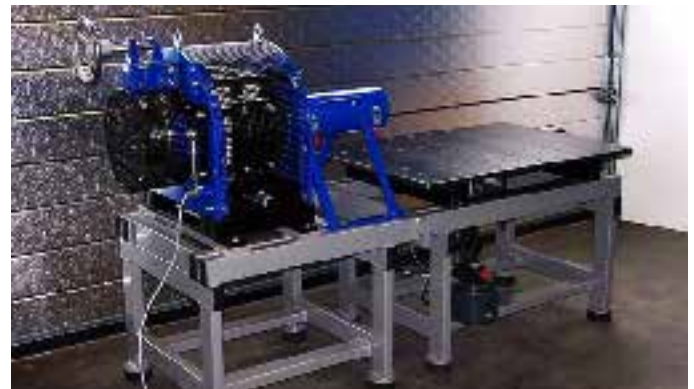
KL-Maschinenbau has taken over the manufacture, development and distribution of the company “WEKA Motorenprüfstände” (WEKA engine test stands) as of 01.06.2017, and has set up a new

business area. This allows us to offer a comprehensive product portfolio for the testing of electric motors.

1. WEKA performance test stand – complete system – Type LPS

With the complete system type LPS, we offer a compact performance test stand with air-cooled eddy current brake, height-adjustable clamping plate and articulated shaft coupling. The test bench is transportable and can be installed without foundation.

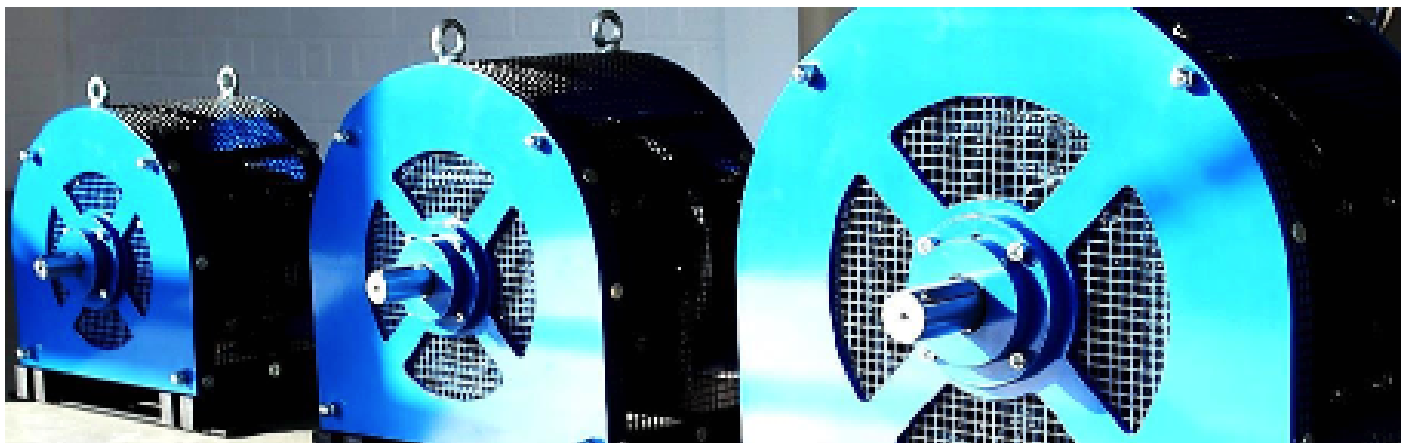
In the “RE-POWER” version the test stands are equipped with an AC / DC generator and with electronic feedback technology. The RE-POWER test bench is always manufactured according to customer specifications.



2. WEKA performance brakes – Type MT

The air-cooled WEKA power brakes consist of an eddy current brake, which is oscillating in the machine housing, with torque and rotational speed measurement technology.

The brakes are manufactured in 9 sizes for power ratings from 0.1 kW (MT5) to 450 kW (MT500).



3. Special test stand construction - we gladly manufacture special test stands according to the customer's requirements.

Special test stand for Stralsund University of Applied Sciences.

With this customer-specific test stand in RE-POWER design, extensive and very special requirements for training and research on electrical drive technology are realized. Year of construction: 2017.



Consumption Meter FM3-100

Consumption Meters

The hardest test for a product is to provide absolutely even accuracy and reliability day by day, month by month, and year by year. To make this accuracy and reliability measurable, we have developed new measuring devices. These are convincing in the high-quality processing, the simple handling, the economic efficiency and above all the unsurpassed accuracy.

Stationary consumption meter FM3-100

New engine generations, which meet the increasingly stringent emission regulations, dominate the market. New high-pressure injection systems are without alternative, by increasing diesel prices and stricter exhaust gas standards.

The high-pressure injection systems common rail, pump nozzle, pump line nozzle and new generations of distributor pumps make problems, when measuring the consumption of fuel on the test stand with conventional consumption meters. To counter this problem, we have developed a fuel consumption meter that meets all requirements. The FM3-100.

With an integrated cooler, the intervention in the system remains as low as possible to generate permanently accurate measured values. To further simplify handling, the additional pump installed in the meter helps to vent the system.

This measuring device works on all tractor engines currently on the market. The latest engine generations can also be measured precisely.

The measuring instruments work on all tractor motors currently on the market. The latest engine generations can also be measured precisely. Our consumption meters can also be used in combination with our EGGERS dynamometers so that the power curve can be viewed directly in relation to the consumption (via our software PowerControl).

Consumption meter FM3-100

Technical specifications	
Power supply	230 V / 50 Hz
Supply from the tank to the unit	Self-priming
From the device to the examinee	Adjustable from 0,3 – 7 bar
Pressure indicator	0 – 10 bar
Fuel cooler	Integrated
Pulse suppression	By compensating membrane
Venting process	By bypass valve and suction glass
Dimensions	L = 570 mm; B = 460 mm; H = 585 mm
Mass	40 kg
Options	Fuel Control display, display available by pressing the button, Stationary consumption meter FM3-100 rear view





Mobile consumption meter FCM-100

The mobile fuel consumption meter FCM-100 is a consumption meter designed for installation in vehicles and stationary engines. Despite the small size, an accuracy of less than 1% is achieved. The electronics are housed in an additional housing and are connected to the measuring instrument via cable. As a result, the electronics box can be safely stored in the driver's cab, protected from high temperatures and weather influences.

The meter is very easy to install and has been designed for tractors, harvesting machines, cars, and trucks. It thus offers a solution for fuel consumption measurement for mobile vehicle measurement technology.

The possibilities are the literary fuel billing, trainings, driving training, exact vehicle comparison tests and many more.

For training purposes, the FCM-100 can also be delivered with a wireless connection. The measured data such as consumption and rpm are then transmitted to the used PC wireless. The corresponding evaluation software records the data and stores it for subsequent evaluation. The range of the connection is about 4000 m in open terrain, so that it can be used under realistic conditions. The analysis of the data with the driver is then no problem and you can make him aware of possible driving mistakes.

Through training with this system, the drivers achieved savings potential of more than 20%, only through a customized driving style. The measuring device works on all tractor engines currently on the market. The latest engine generations can also be measured precisely.

Advantages

- ✓ Ultra-easy installation
- ✓ Boosts driver awareness of fuel-saving
- ✓ Suitable for all conventional fuel supply systems
- ✓ For diesel, biodiesel and RME
- ✓ For tractors, harvesters, passenger cars, trucks, stationary engines etc.
- ✓ Leak-free quick-action coupler
- ✓ Detached electronics (securely protected against heat and vibrations)
- ✓ RS232 socket
- ✓ USB socket
- ✓ Configurable inputs for consumption, speed and temperature signals
- ✓ Indicator for current and total fuel consumption
- ✓ Radio transmission of measurement data (up to 4 transmitters on a single receiver) optional
- ✓ Measurement cell made of rustproof aluminium, stainless steel oval wheels

Consumption meter FCM-100

Dimensions of measurement device	130 x 130 x 40 mm
Dimensions of display	Around 100 x 100 x 60 mm
Weight of measurement device	Around 1,5 kg
Weight of display	Around 0,7 kg
Protection glass	IP 54
Temperature range	-20° – 80° C
Media	Diesel, Biodiesel, RME, other media on request
Impulses	2000 / l (optional 4000 / l)
Measurement range	1 – 100 l/h (optional 15 – 500 l/h)
Measurement accuracy	1% from actual value
Reproducibility	0,03 %
Working pressure	Max. 5 bar
Power supply	8 – 30 V DC
Outputs	RS232, USB
Inputs	Consumption signal, temperature (PT 1000), speed (square-wave signal)
Display	Current consumption, total consumption (optionally available with memory card, to enable consumption within a specific period to be determined).



Software

We offer our software "PowerControl" to all test stands. In addition to documentation tasks, the software also takes over the complete control of the EGGERS dynamometer and automatically performs customer-specific measurements.

Automatic Measurement

The software "PowerControl" allows an automatic test sequence via the item "automatic measurement" to obtain comparable measuring results and powerful performance curves.

Special Measurement

With the help of the special measurement, it is possible to create an automatic test sequence directly according to your own requirements in PowerControl. Any points can be approached. If rpm speed values and associated holding times are specified, this process is automatically executed.

The special measurement can also be used very well for long-term tests, since e.g. a rotational speed value can be preset, for example, for one hour and this will be held automatically.

Compatible with consumption meters

When using one of our consumption meters, the consumption curve can also be measured and displayed in the software at the same time as the performance curve.

Data Transfer

Depending on the customer's requirements, the data is transferred directly to the PC / laptop / tablet via a Bluetooth connection or USB cable. Updates are available free of charge online, and are provided for download. All Windows based systems are supported.

Compensation of weather data

By entering the current weather data, the power is standardized to obtain comparable results. It is possible to check the tractor's plant specifications, which are based on the same standards.

Power Control app for Android

Recently, we also offer our software as an app for tablet computers with an Android operating system. The connection to the dynamometer can be established via Bluetooth and all functions, as known from the PC, can be used.

A dropbox can be set up, in which all measurement results are stored automatically. In the workplace in the office, this dropbox can also be accessed, so that all measurement results can be retrieved at any time for further processing.

Software for special test stands

In the field of special machine construction, customers usually have their own wishes and ideas, regarding the software. We are pleased to offer individual adaptations in our software. To ensure compatibility with the existing systems of the customer, of course, other software solutions are possible.



**NEW as
an app!**

- Control the test bench
- Document the measurement
- View Data

Download now!



Number	Revolutions	Speed [RPM]	Torque [Nm]	Power [kW]	Consumption [g/kWh]	Consumption spec. Comment
1	2480	1192	14	4	15.4	2350.6
2	2447	1176	130	35	15.7	427.5
3	2424	1168	187	46	15.1	515.5
4	2397	1162	248	52	21.5	297.1
5	2372	1160	295	75	23.5	278.5
6	2347	1128	332	52	25.2	270.0
7	2320	1115	344	53	27.5	270.0
8	2297	1104	345	53	27.0	270.5
9	2247	1090	327	54	25.4	260.2
10	2197	1090	305	54	25.4	264.4
11	2095	1007	321	54	25.4	250.3
12	1997	950	325	53	25.0	271.0
13	1899	912	407	51	25.4	265.5
14	1793	854	410	70	23.0	250.4
15	1693	810	426	76	22.1	245.1
16	1596	767	429	73	21.1	242.0
17	1496	719	487	70	20.0	242.0
18	1396	671	422	66	18.0	230.9
19	1298	624	426	62	17.1	232.4
20	1196	575	460	58	15.2	228.7
21	1094	528	468	57	14.0	220.1
22	985	478	488	51	12.8	221.8
23	887	431	521	42	12.4	219.0
24	787	382	418	38	12.2	213.0



Special Test Stands



Final inspection with recessed pit test rig



Chainsaw test stand



Drive-roll stand for adjustment work

Special Test Stands

In recent years, the construction of special test stands has become an important core of KL-Maschinenbau. Worldwide, customers from various industries, as well as technical universities, rely on our knowledge and our products.

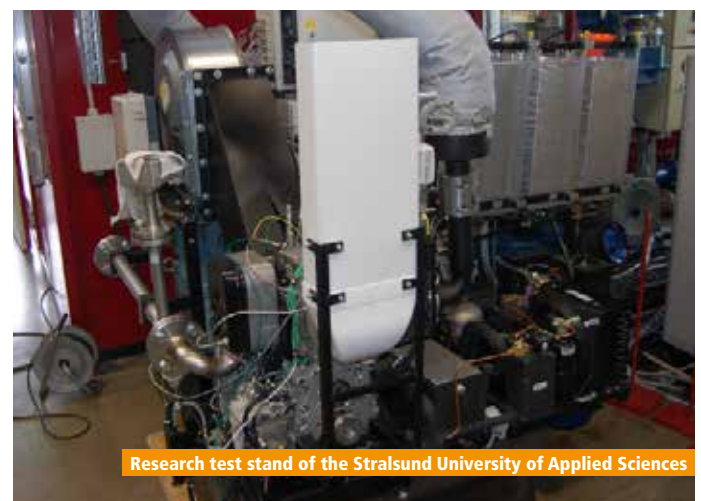
Whether in research, development, or final control, we offer tailor-made solutions according to customer requirements. Our special field is test stands for the measurement of force, rotational speed, and power. The range of application is very wide, practically, a measurement can be carried out statically or dynamically on each shaft that transmits the force. The torque range can be between 1 and 50,000 Nm. Speed (rpm) measurements and controls for all common rotational speeds are possible.

Test benches for the hydraulic pressure and flow measurement as well as temperature measurements are, of course, also possible. The control can be carried out manually, via an adaptation of our standard software, or via a completely new software for operating the test bench according to customer requirements.

Because of our size, we have very short distances between planning and production. This allows us to react quickly to customer requirements, even during ongoing production.

Especially interesting for technical colleges: we are happy to offer you a complete solution for research purposes.

In addition to our measurement technology, this also includes the providing of the test motor(s). The delivery of all components from a single source ensures a uniform overall project with a central contact person.

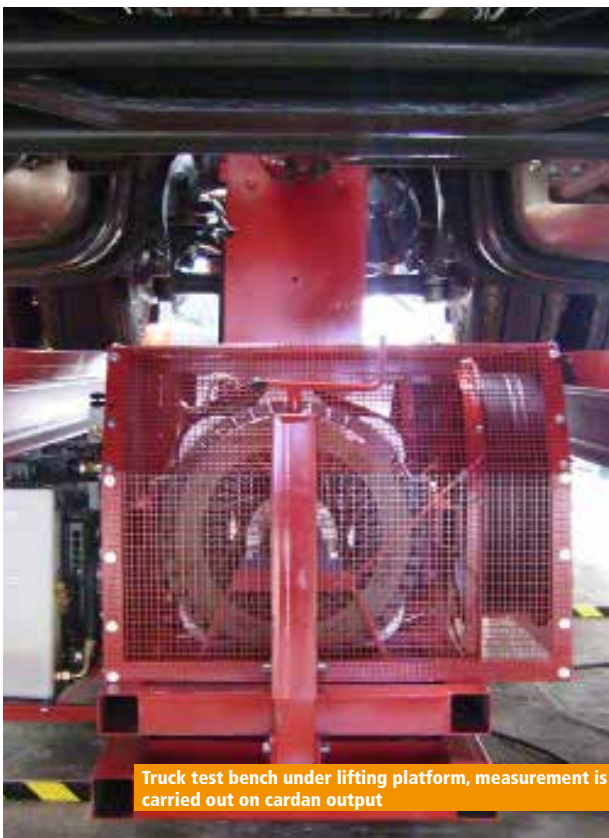


Research test stand of the Stralsund University of Applied Sciences



Header Simulator for the combine harvester Final inspection at Agco

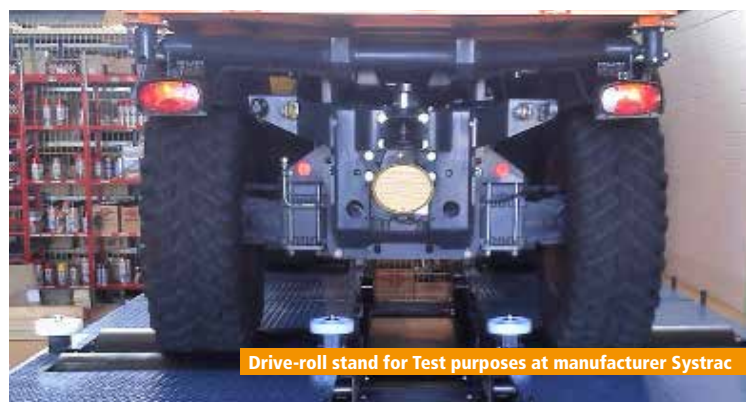
We also realize your special test stand project! Please contact us!
For further information and credentials, please visit our website at www.kl-maschinenbau.de



Truck test bench under lifting platform, measurement is carried out on cardan output



Roller test bench for the trial department at Atlas Weycor



Drive-roll stand for Test purposes at manufacturer Systrac



Frontec - PTO additional brake

Why Frontec?

With our front-PTO auxiliary brake "Frontec", we offer our customers in mountain regions a solution to increase the profitability and safety of the ride on the sloping terrain. These objectives are achieved by the higher driving speed and lower stress on the braking system of the tractor. The Frontec additional brake for tractors was developed by us to enable a fast and safe downhill run. It serves to relieve the tractors braking system and prevents the engine from turning over during a descent into the downhill terrain or overheating the brakes.



The braking force of the Frontec is produced completely without wear via a retarder (eddy current brake). This technology has long been used in trucks, omnibuses, trains, cableways, and many other applications. The Frontec operates in four, very softly switching, braking stages. The force-transmitting components, such as the PTO-shaft, PTO-shaft coupling, engine, and gearing, are not overloaded by intermittent switching on and off. Vehicles with variable speed gearboxes or manual gearboxes can also be equipped with a Frontec auxiliary brake.



Traffic safety is improved:

- ✓ To prevent the engine from stalling, the Frontec automatically switches off when an engine speed of less than e.g. 1000 rpm is exceeded (threshold can be set).
- ✓ When the brake of the tractor is activated, the Frontec also switches off and remains switched off. In this way, it is avoided that the steering ability in dangerous situations is impaired.
- ✓ The tractors own brakes remain cold and can thus be fully used in dangerous moments

In addition to safety, our Frontec significantly increases the profitability:

- ✓ Shorter turnaround times, as you can drive faster. With the Frontec you can slow down the vehicle very gently, without the wheels of the tractor slipping.
- ✓ The brake system is relieved by the additional brake, which significantly reduces the wear of the tractors own braking system.

4-step operating unit

The control of the Frontec scores thanks to its simple operation.

The 5 green status LEDs on the front panel indicate the operability and the brake levels 1 - 4.

The braking force is increased by means of the upper switching rocker. The lower switching rocker reduces the braking force, or completely shuts it off in the lowest step. The brake can also be switched off by a longer pressure on any key, or via the functions already mentioned in the safety features, for example the actuation of the brake pedal. In addition to the integrated rocker switch, a further switch is included, which can be connected to the rear of the control unit and can be installed at any position in the driver's cab.



Frontec – PTO additional brake

Frontec 40 | up to 73 kW (100 HP)

Operating voltage:	12 volts
Power consumption:	max. 116 A
Weight:	ca. 110 kg
Rotational Speed:	max. 7000 1/min
Braking force cold:	max. 400 Nm
Braking force hot:	max. 160 Nm
Rotational direction:	cw and ccw
Shaft connection:	1 3/8" – 6 Z

Frontec 65 | from 73 kW (100 HP)

Operating voltage:	12 volts
Power consumption:	max. 148 A
Weight:	ca. 136 kg
Rotational Speed:	max. 4000 1/min
Braking force cold:	max. 600 Nm
Braking force hot:	max. 240 Nm
Rotational direction:	cw and ccw
Shaft connection:	1 3/8" – 6 Z

Frontec 80 | from 88 kW (120 HP)

Operating voltage:	12 volts
Power consumption:	max. 164 A
Weight:	ca. 160 kg
Rotational Speed:	max. 7000 1/min
Braking force cold:	max. 784 Nm
Braking force hot:	max. 312 Nm
Rotational direction:	cw and ccw
Shaft connection:	1 3/8" – 6 Z

Frontec 100 | from 110 kW (150 HP)

Operating voltage:	12 volts
Power consumption:	max. 188 A
Weight:	ca. 182 kg
Rotational Speed:	max. 7000 1/min
Braking force cold:	max. 1000 Nm
Braking force hot:	max. 400 Nm
Rotational direction:	cw and ccw
Shaft connection:	1 3/8" – 6 Z

Frontec 120 | from 147 kW (200 HP)

Operating voltage:	12 volts
Power consumption:	max. 248 A
Weight:	ca. 215 kg
Rotational Speed:	max. 6300 1/min
Braking force cold:	max. 1200 Nm
Braking force hot:	max. 240 Nm
Rotational direction:	cw and ccw
Shaft connection:	1 3/8" – 6 Z

Frontec 160 | from 184 kW (250 HP)

Operating voltage:	12 volts
Power consumption:	max. 260 A
Weight:	ca. 260 kg
Rotational Speed:	max. 5000 1/min
Braking force cold:	max. 1600 Nm
Braking force hot:	max. 640 Nm
Rotational direction:	cw and ccw
Shaft connection:	1 3/4" – 6 Z



Special requirements on request. We reserve the right to make technical alterations which serve the purpose of progress. Dimensions, weight, and technical data are subject to the latest changes and are thus non-binding.





Measuring system KL 0020

Measuring and diagnostic system

The continuous efforts of the manufacturers to optimize the machine under the goal of increasing the longevity and economy led us to develop a measuring and diagnostic system, which makes it possible, that the many system components of machines can be measured and tested under real conditions.

With the measurement and diagnosis system KL 0020, we have achieved this goal. The result is a unit with which all relevant data from the engine, gearbox and hydraulics can be noticed. Besides the connection of EGGERS dynamometer and consumption meter, this system offers numerous interfaces for e.g. rotational speed, pressure, flow and temperature sensors, CAN modules, weather modules and exhaust gas detectors. It is also possible to record GPS data in mobile mode. This can provide conclusive results.

Due to the large number of possible measuring inputs, the user can modify the software to his individual machine test procedure. Individual channels can be switched on or off.

The measured values can be displayed and evaluated directly in the protocol as a table or graphic. Alternatively, it is also possible to record the values on SD card for mobile use, to carry out the evaluation in post-processing.

Whether for F + E, end-of-line, test, or repair of the machine - in conjunction with the software the KL measuring unit provides meaningful information about the decisive parameters.

The EGGERS dynamometer can also be controlled with the measuring unit. Different load cycles or the full load curve can be driven. All selected parameters are recorded to the corresponding operating point.

Measuring system - Sensors & accessories

The measuring system allows the connection of all common sensors to be able to monitor almost all physical quantities. Here are some examples.

- Revolution sensor
- Gas sensor for crankcase
- Ampère gauge
- Hydraulic flow sensor
- Infrared Thermometer
- Pultab

Other compatible sensors and devices are, for example, various pressure sensors, exhaust gas detectors, weather modules, temperature sensors and many more.

Measuring card

- Sturdy 19" aluminum housing
- Power supply 110/230V, 50/60Hz, 12V DC, 24V DC
- Suitable for mobile and stationary use

Sensor inputs

- 2x DMS
- 16x analogue in 4-20mA (eg pressure sensors)
- 1x Analog in -10V to + 10V
- 6x PT 100
- 16x digital in (e.g., EGGERS dynamometer, KL0020 weather module)

Outputs:

- 8 x digital out
- 2 x 0-20 mA oder 0-10 V
- 1 x USB
- 4 x RS 232
- 1 x RS 422/485
- 3 x Canbus
- Optional additional inputs available



Software:

The software package includes the standard version "PowerControl" and the following extensions:

- Connection for Dynamometer via RS-232
- Measuring channels can be switched on or off
- Recording interval from 1 second steps upward
- Directly readout of every value
- Readout as graphic and table
- Individual designation of the channels
- Configuration of the sensors
- Offset for the sensors



Dealers for agricultural machinery

The EGGERS Dynamometer has been a term for our customers in the field of agricultural machinery trade for more than 30 years. Excellent reliability with the highest degree of measurement accuracy is what distinguishes KL-Maschinenbau's PTO performance test rigs from the competition, and has become a major factor in the industry for decades.



Technical Schools, Technical Colleges and Universities

Training centers such as vocational schools, technical colleges and universities are using KL-Maschinenbau technology since many years. The vocational schools mainly rely on the dynamometers, which are produced in serial production, where the students are prepared and trained for the later working life in the agricultural machinery business. Technical colleges and universities often have higher demands on the measurement technology for motors and drive components, and require test stands in special design and function, to meet the respective measuring tasks. The required test motors can also be procured and ordered by KL Maschinenbau. This means that the entire research object can be supplied from one source, configured and implemented according to customer requirements.



Manufacturers of agricultural and construction machinery

Numerous manufacturers of agricultural and construction machines as well as manufacturers from other areas of mechanical engineering rely on the well-known EGGERS dynamometers. Especially in research and development, but also in the end of line inspection, the standard products are often no longer sufficient to test the machines thoroughly. For this reason, special machine construction has become an important part of our business for many years. With short service routes, a wealth of know-how and experience in the construction of special test stands as well as direct contact persons, we can produce special test stands in close consultation and directly according to the wishes of the customer.



Companies in agriculture and forestry

With the Frontec front-PTO accessory brake, KL-Maschinenbau has also become a term for land and forestry workers in mountain regions. Going downhill safe and fast is solved with our system in a simple and highly economical manner. A wear-free eddy current brake takes over the braking, so that the engine and the brake system of the tractor can be protected. The additional brake convinces with its simple operation, many different sizes and a low price.

Dealer list

Using the dealer list, you can find a trading partner in your area, who offers you the best advice.

Location: **Belgium**
Yves Lefèvre Verolub NV
Klaverbladstraat 2A, B - 3560 Lummen
Phone: 0032/ 01346 0800
Fax: 0032/ 01346 0809
eMail: y.lefevre@verolub.be
Web: www.verolub.be

Location: **Brazil**
Dipl.-Ing. Gerd Henrique Keese
Caixa Postal 413, 96010-971 Pelotas RS Brasil
Phone: 0055/ 53 8109 2390
Mobile: 0055/ 31 8608 2069
eMail: henrique@dinamometro-eggers.com
Web: www.dinamometro-eggers.com

Location: **Germany, Italy, Austria and Denmark**
Christiansen Werksvertretungen
Dorfstraße 28, 24977 Grundhof
Phone: 0049/ 0 463 6976 8150
Fax: 0049/ 0 463 6976 8151
Mobile: 0049/ 0 17 1731 3775
eMail: gerd.christiansen@t-online.de

Location: **England**
Lynx engineering - Nick Ewbank
Wharf Works Long Buckby, Northampton NN6 7PP
Phone: 0044/ 1327 843215
eMail: info@lynx-engineering.co.uk

Location: **Estonia, Latvia and Lithuania**
Animo LTD
Parka Str. 21, LV-4701 Valka
Phone: 0037/ 1 2941 5678
eMail: animo@apollo.lv

Location: **France**
Serma
8 rue des Chênes, 67670 Mommenheim
Phone: 0033/ 3 8896 7920
Fax: 0033/ 3 8869 5132
eMail: ch.jung@serma67.fr

Location: **Ireland**
Kevin Killeen
Clonfeight Inch, Co. Clare Ennis, Ireland
Phone: 00353/ 87 3711 156
eMail: rallykevo@yahoo.com

Location: **Liechtenstein**
Bäurle Agrotechnik GmbH
Barzinger gasse 4, 8240 Thayngen
Phone: 0041/ 52 649 3513
Mobile: 0041/ 79 47 88566
eMail: paul.baeurle@baeurle.ch

Location: **Luxembourg**
Dijkstra Technical Support
Noordermeerweg 49c, 8313 PW Rutten
Phone: 0031/ 52726 2957
Mobile: 0031/ 6266 40471
eMail: info@dijkstratechnicalsupport.nl
Web: www.dijkstratechnicalsupport.nl

Location: **Netherlands**
Dijkstra Technical Support
Noordermeerweg 49c, 8313 PW Rutten
Phone: 0031/ 52726 2957
Fax: 0031/ 6266 40471
eMail: info@dijkstratechnicalsupport.nl
Web: www.dijkstratechnicalsupport.nl

Location: **Poland and Eastern Europe**
Truck Serwis Robert Pliszka
Ul. W. Witosa 98, 76-251 Kobylnica
Phone: 0048/ 5984 10906
Mobile: 0048/ 601 648613
eMail: truck_serwis@wp.pl

Location: **Russia**
ALNOVA UG, Alexey Layer
Phone: 0049/0 7214539839
Fax: 0049/0 7214538149
eMail: www.alfa-sensor.ru
Web: www.alfa-sensor.ru

Location: **Switzerland**
Bäurle Agrotechnik GmbH
Barzinger gasse 4, 8240 Thayngen
Phone: 0041/ 52649 3513
Mobile: 0041/ 7947 88566
eMail: paul.baeurle@baeurle.ch

Location: **South America**
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