HV 30/1 engine test bed (braking dynamometer), water-cooled, with MP Computer

This engine test bed is intended for testing low-speed internal combustion engines with one or few cylinders.

In the following the basic design is described. A wide variety of standard functions is additionally available.

In its basic design the engine test bed is not supposed to be run unattended, if internal faults of the test bed or external faults may lead to dangerous situations.

Loading system:	low-inertia hydrostatic braking unit	
sense of rotation:	clockwise seen from the engine to the braking unit	
Max. speed (continuously permissible):	5,600	rpm
Min. sensed speed:	100	rpm
Min. permissible speed at max. torque:	50	rpm
Max. torque	150	Nm
Max. torque recommended for long life	100	Nm
Max. power (continuously permissible) within the limits of max. torque at the specified cooling water supply	41	kW
Load-carrying capacity depending on the speed	see table DP 590/102	
Electric supply	380 V, 3-phase, with N and PE, rated current 23 A, max. fuse 32 A Other supply voltages are possible.	
Cooling water supply		
max. pressure	10	bar
min. pressure		bar
min. flow at 41 kW and 30 °C inlet temperature	65	l/min
recommended flow when the control valve is on	160	l/min
Foundation	not required, only solid even floor	
Fixation to the floor	not recommended	
Space required	see drawing „Outline“ (p\109\entwurf7\umriss)	
Max. allowed ambient air temperature without heat radiation	45	°C
Exhaust evacuation:	required, available on request	
Mass without oil	850	kg approx.

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required volume of oil	200 l
kind of hydraulic fluid	mineral oil (hydraulic oil)
Viscosity group of oil	ISO VG 68, when the tank temperature is regulated to approx. 60°C When the tank temperature is regulated to a lower temperature, another viscositiy group is recommended.

A common frame bears the hydrostatic brake unit and the oil supply and cooling equipment (supply unit). The brake unit is equipped by sensors for speed and torque.

The control unit is mounted swivelling over the brake unit.

Engines to be tested are connected to the brake by a cardan shaft. Mobile supports holding the engines are moved to the dynamometer and fixed to it by one or two screws. While moving an engine on its support to the dynamometer, the engine is connected to the brake by sliding together the multiple-spline parts of the cardan shaft.

The cardan shaft is positioned in a solid protective housing fixed to the dynamometer. The brake unit is protected against accidental contact by means of protective gratings.

Control and measurement

The control unit contains:
- the MP Computer,
- the control circuits for the brake unit and the supply unit,
- display and control circuits for the temperature of the oil cooler with a control of the cooling water, and
- the required power supplies.

Protection class of the control unit: IP 55

The control unit is equipped by an air / air heat exchanger.

Rotational speed n, torque M, power P, work (energy) W

Loading of the engine by the dynamometer is controlled by limiting the brake speed. This is achieved by manually entering the desired speed value (analog input) at a manually operated input potentiometer (speed knob). This speed knob controls the brake unit via an analogous control circuit.

The speed knob is installed in a separate hand-control housing and connected to the control unit via a spiral cable in such a way, that it can be operated from any point near the engine.

A speed-stabilizing function of the MP Computer with numerical input of the desired value can be optionally superimposed to the manual speed adjustment and allows fast and precise adjustment of the speed.

Certain engines do not allow adjustment of partial load by speed adjustment of the dynamometer. In such cases programmable torque limitation can be selected.

Speed measurement:	digital incremental pick-up non-sensitive for sense of rotation
Torque measurement:	analog measurement of the reactive torque at the brake unit by strain gage load cell

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The MP Computer displays the following measured and calculated values simultaneously via LEDs 20 mm high:

Speed	display range		9999	rpm
	display resolution		1	rpm
Torque	display range	min.	155	Nm
	display resolution		0.1	Nm
	calibration value		100	Nm
Power	display range		99.99	kW
	display resolution		0.01	kW
Work (energy)	display range (automatic change-over)		9.999	kWh
		or	99.99	kWh
		or	999.9	kWh
		or	9999	kWh
	corresponding display resolution		0.001	kWh
		or	0.01	kWh
		or	0.1	kWh
		or	1	kWh

The work counter (kWh) can be set On/Off or reset.

Setting On/Off of the work counter controls at the same time the

determination of the specific fuel consumption (additional equipment)

Subject to change !

Weinlich GmbH & Co. KG
Industriestr. 6
D - 68799 Reilingen (bei Heidelberg)
Telefon 0 62 05 - 40 25
Telefax 0 62 05 - 1 77 44
int'l 49 62 05 -
email info@weinlich.de
Internet http://www.weinlich.de