

SERIES 100 FLANGE MOUNTED HYDRAULIC DYNAMOMETERS FOR LOAD TESTING AEROSPACE ENGINES

Designed primarily for steady-state and transient performance testing of high speed turboshaft engines, the Kahn Series 100 product line includes five standard models capable of absorbing up to 7000 hp (5220 kW) and operating at rotational speeds up to 23,000 rpm.

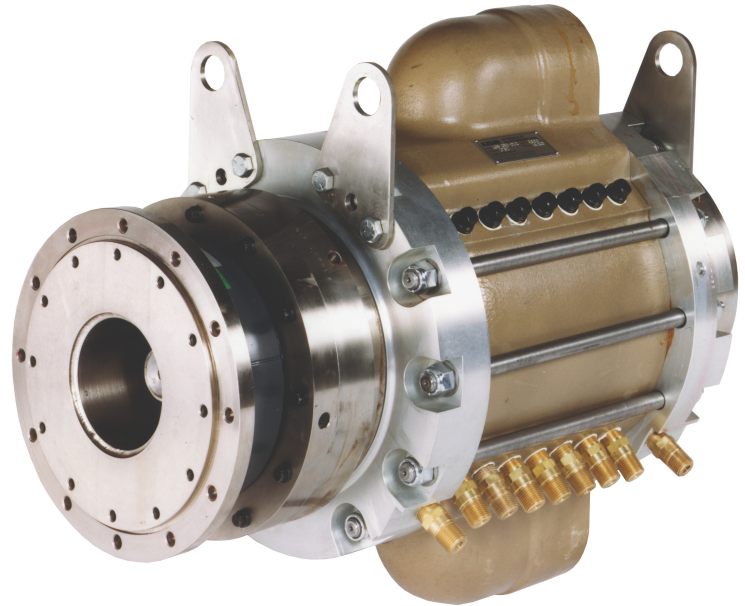
Proven in engine test facilities around the world, the Series 100 offer long service life coupled with minimum maintenance requirements. All units are fully compatible with advanced, fast-response FADEC (Full Authority Digital Electronic Control) engine control systems and meet or exceed the test specifications of the following turboshaft engines:

Honeywell ASE40, ASE50, T55, TF40, TF50
General Electric T58, T64
Isotov TV2-117, TV3-117
Rolls-Royce Gnome.

DESIGN BENEFITS

Built to meet the most demanding engine test requirements, the Kahn Series 100 dynamometers offer a number of important design benefits:

- Easy to install and to operate.
- Flange mounted configuration permits alignment-free installation via adapters directly to the engine.
- Stainless steel power elements are highly cavitation and corrosion resistant providing superior service life.
- Positive sealing assures quick and safe emergency shutdowns.
- Positive sealing permits operation at all attitude positions from horizontal to vertical.
- Perforated disc power elements absorb full power in both directions of rotation.
- Inherently steep, open-loop torque speed characteristic assures stable steady-state operation.
- Low moments of inertia and small internal water volumes permit rapid transient response.



SPECIFICATIONS

Model	Max. Power hp	Max. Speed rpm	Max. Torque lb-ft	Dry Weight lb
106-060	2500	23,000	800	290
106-070	3000	20,000	1150	330
106-080	4800	18,000	2000	360
108-080	6400	18,000	2200	460
106-100	7000	14,000	3800	650

POWER ABSORPTION MECHANISM

The power output from the engine is absorbed by water vortices generated in the perforated disc rotors and stators. The resulting drag applies a moment to the dynamometer housing which is measured by a coaxial strain gage torque reaction sensor.

Absorbed power is controlled by modulating the amount of water in the dynamometer with the inlet and outlet control valves.

CONSTRUCTION

Series 100 hydraulic dynamometers feature six or eight sets of power elements (rotor discs and stators) capable of fully bi-directional operation. No air table or other turning device is needed to accommodate engines which operate in the opposite direction of rotation.

The power elements are made from highly cavitation and corrosion resistant stainless steel. This material is also used for the shaft and other rotating components. The rotor discs are mounted on the shaft by means of a spline connection. This design reduces the stress peaks associated with keyways and eliminates the need for cumbersome heat shrink fits.

The rotor assembly is supported by spring-loaded high speed ball bearings. To assure smooth, vibration-free operation, the rotor assembly is dynamically balanced in accordance with ANSI Standard S2.19-1999, grade 2.5. Depending on the particular dynamometer model, two methods of lubrication are offered:

- Oil-Jet Lubrication
- Oil-Mist Lubrication

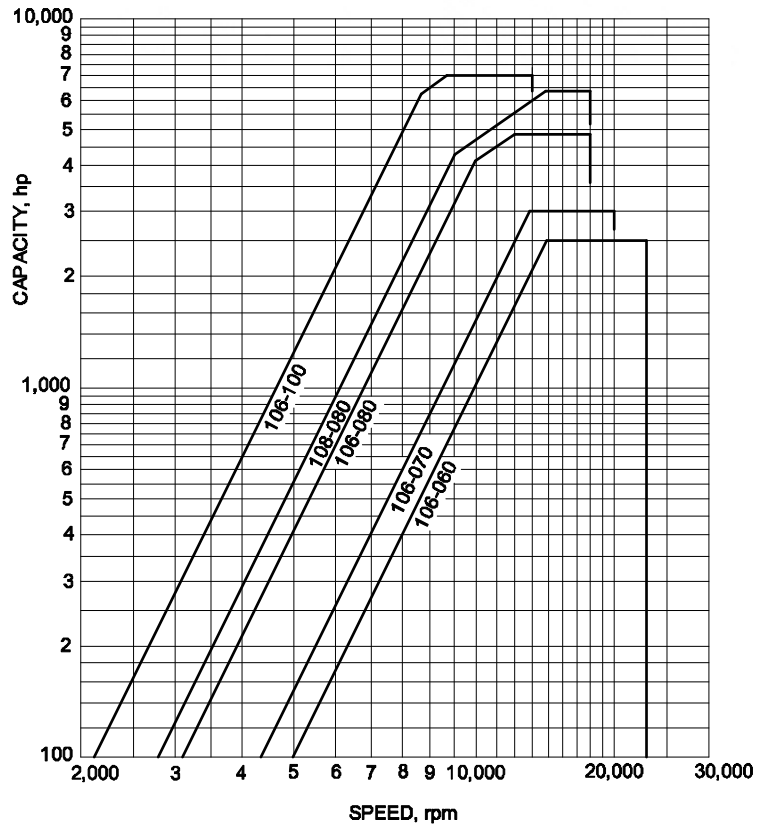
Two oil injectors are provided for each bearing. This arrangement provides an additional margin of safety in case one of the oil injectors becomes clogged. Each bearing housing is equipped with a thermocouple port that permits continuous monitoring of bearing temperatures. Synthetic aircraft engine oils, such as MIL-L-23699, are recommended for bearing lubrication.

Positive sealing between the water and bearing compartments is accomplished with mechanical carbon face seals. This feature permits operation of the dynamometer under all conditions including zero speed. Unlike with labyrinth seals, there is no need to unload the dynamometer during shutdowns to prevent water from entering the bearings.

To assure long service life, all stationary materials inside the dynamometer are manufactured from highly cavitation-and corrosion-resistant materials.

In contrast to other high speed dynamometers which require selective assembly procedures and feature cumbersome hydraulic or heat shrink fits, the Series 100 do not need to be returned to the factory for overhaul. Their simple design requires only minimum maintenance and allows for quick field overhaul, saving money and downtime.

OPERATING RANGE



WATER SYSTEM REQUIREMENTS

A continuous flow of water through the dynamometer is required to provide resistance to rotation and to remove the heat generated by the power absorption process. Based on a maximum water outlet temperature of 140° F (60° C), the water flow requirements are:

Specific Water Flow Rate	6.0 gal/hr hp (30 l/hr kW)
Water Supply Pressure	50 psig (3.5 bar)
Water Inlet Temperature	90° F (32° C)
Water Outlet Temperature	140° F (60° C)
Filtration	40-mesh screen (340 micron)

NOTE: The information included herein was correct at the time of publication and supersedes all previous data. It is our policy to continually improve our products to insure even better performance. Consequently, current Kahn products may incorporate modifications not shown on these pages.

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