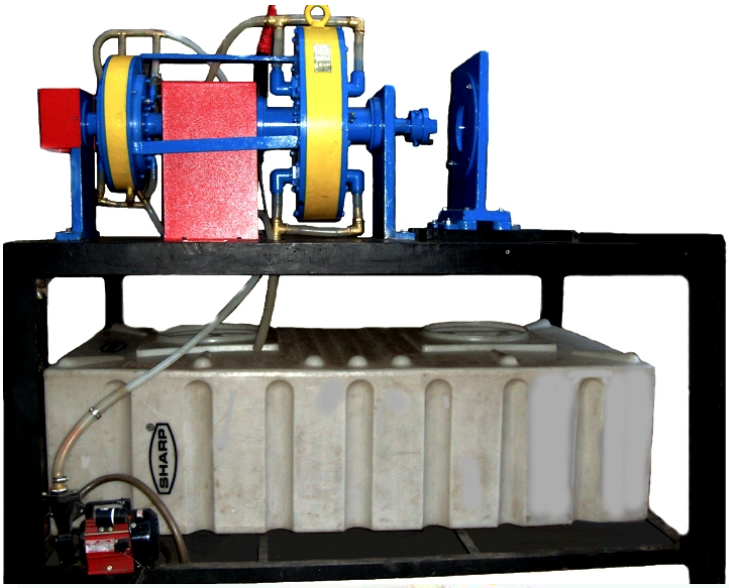
APPLICATION SYSTEMS
अनुप्रयोग प्रणाली
Gawkar Industrial Estate, Panchpakhadi Service Road,
Thane – 400 602. (Maharashtra) INDIA.
Ph No: +91 22 32420541 / 25383001
Email: applicationsystems@gmail.com
applicationsystems@yahoo.co.in
Website:www.applicationsystems.co.in

ISO 9001:2008 CERTIFIED QM-032

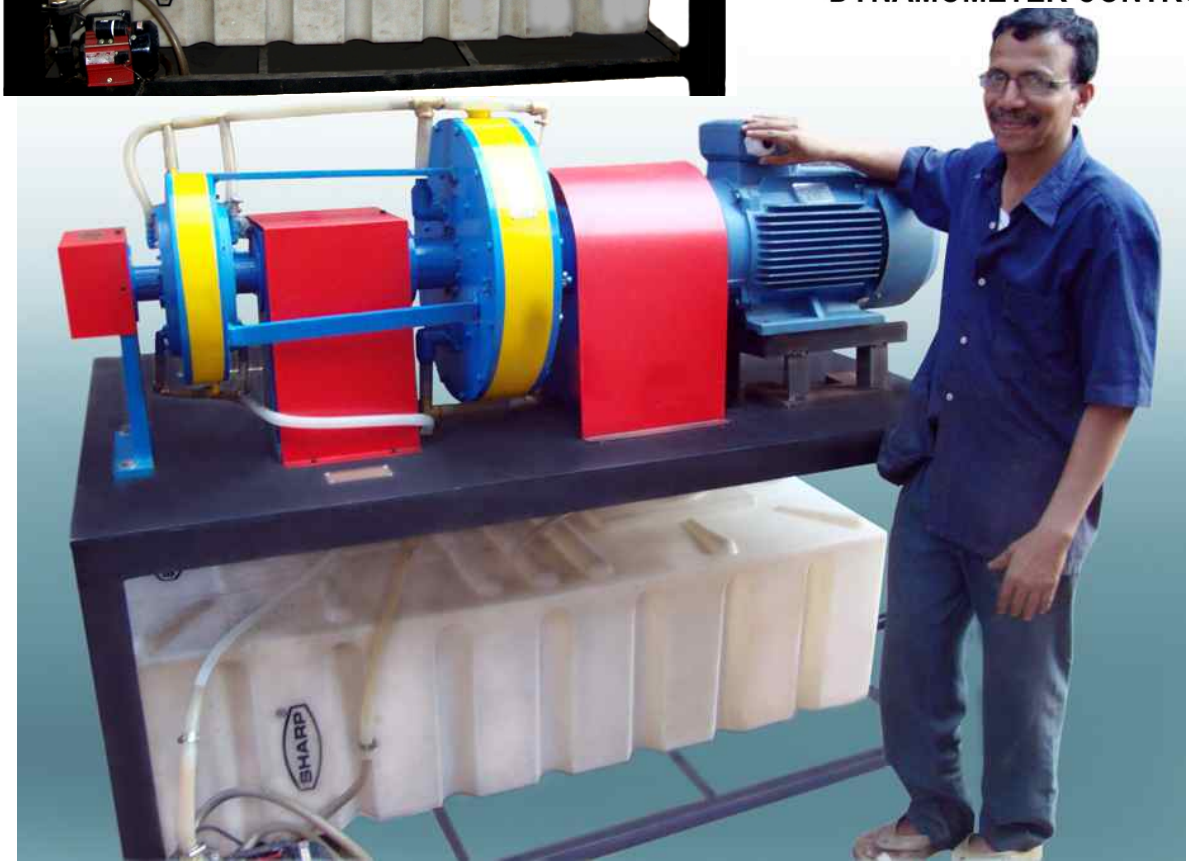
TANDEM DYNAMOMETERS

Tandem Dynamometer – also called as Hybrid Dynamometer, is combination of Powder Dynamometer & Eddy Current Dynamometer

Tandem Dynamometers are used for testing prime mover right from Zero RPM to extended speed range.



DYNAMOMETER CONTROLLER



TANDEM DYNAMOMETERS

- **Powder Dynamometers**, as their name suggests, contain magnetic powder in Dynamometer. The electrical current passing through the coil generates a magnetic field, which changes the property of the powder from free flowing condition at no excitation, to solid rock condition at full excitation. Thus producing a smooth braking torque through friction between rotor and stator – proportional to excitation.

The Powder Dynamometers produces their rated torque at zero speed.
The element to be tested can be loaded at standstill to determine the starting torque. Powder Dynamometer achieves at low control power, a high torque being independent from the slip speed. It distinguishes itself by a simple construction, low weight and small required space. Powder Dynamometers are ideal for applications operating in the low to mid speed range and mid to high torque range up to 125 KgM, 1225 Nm (867 ft. lbs.) of torque. For higher heat dissipation Powder dynamometers are provided with water circulation system for cooling, which passes inside the stator to dissipate heat generated by the braking power with power ratings up to 60 kW. They have system accuracy ratings of typically +/- 0.5% full scale, depending on Dynamometer size and system configuration By changing the exciting power force, the torque to be transmitted can be adjusted infinitely variable in the range 1:50. Powder dynamometers are typically limited to lower RPM due to heat dissipation issues.

- **Eddy Current Dynamometer**, is simple dynamic load system for accurate testing of all type of Electric Motors, Air Motors, Hydraulic Motors, Engines and other rotating machinery's. Eddy Current Dynamometer provides the ideal solution for accurate analysis of Power, Torque, Speed, Fuel and Lubrication consumption and quick pass / fail testing of all type of Electric Motors, Engines, Gears and other Rotating Machineries.

Eddy current adjustable dynamometer absorbs power & measures Torque and Speed characteristics with a unique braking system, which provides frictionless Torque loading (0% to 100%) constant / variable torque load, independent of shaft speed. Torque is transmitted by a magnetic field without friction or wear. It eliminates mechanical contact and shock loading to the prime mover, providing longer life. In Eddy Current Dynamometers torque increases as the speed increases, reaching peak torque at rated speed. EC dynamometers have low inertia as a result of small rotor diameter and a low residual torque of 1%.

Cooling is provided by a water circulation system, which passes inside the stator to dissipate heat generated by the braking power. The water cooling in the EC Dynamometer provides high continuous power ratings & has typical accuracy ratings of ±0.3% to ±0.5% full scale, depending on size and system configuration and a very long lifetime. Mounting orientation of EC Dynamometers is in any direction, Horizontal, Vertical or inclined.

Eddy Current Dynamometer has Ferro- magnetic, Spoke structured – Low inertia - Pole is surrounded by stator plates. & excitation coil is placed around stator & Pole. Until the pole structure is energized by stationary excitation coil, the Pole rotor can spin freely on its shaft bearings. When a magnetizing force from the field coil is applied to the pole structure, the air gap becomes a flux field and the rotor is

magnetically restrained, providing a braking action between pole structure and stator plates.

Eddy current dynamometer possesses certain unique features, which gives it a clear advantage over conventional loading systems. Ruggedness and Reliability. Eddy current dynamometer functions without the need for mechanical contact. This eliminates the main cause of wear. Further, the stationery coil is protected against adverse atmospheric conditions, the use of commutators, carbon brushes and slip rings is avoided, control is affected at a relatively low power level. Electronic controller provides finger-tip operation and flexible control of the eddy current dynamometer from 0% to 100% torque load.
In Eddy Current Dynamometers rated torque is developed at approximately 15% to 25% of maximum speed capability depending on models.

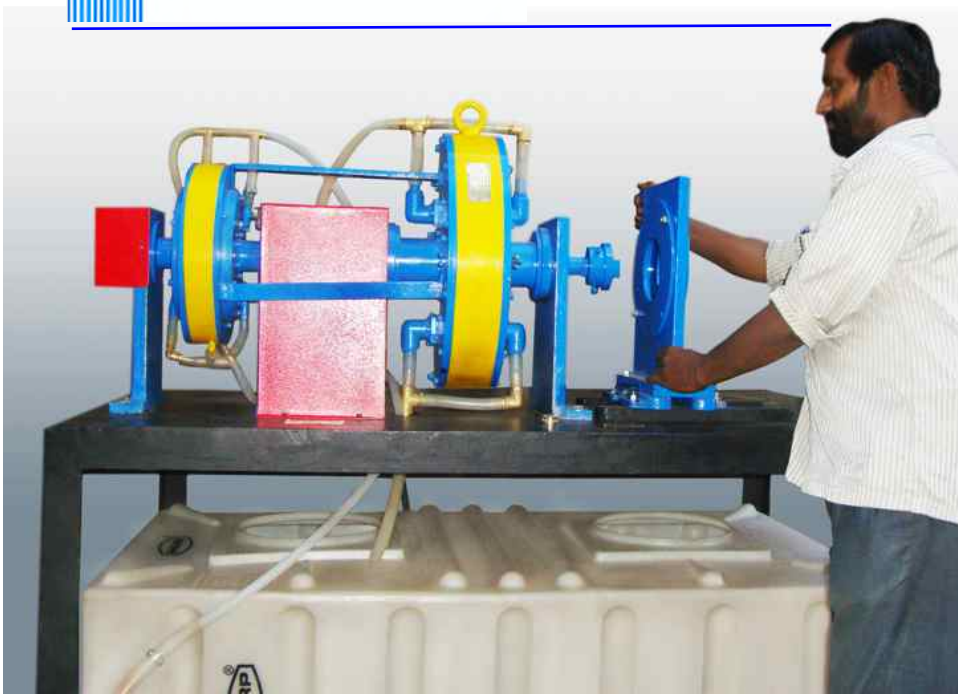
Advantage of Powder Dynamometer is that it controls Torque right from Zero RPM but has poor heat dissipation capacity (due to higher speed), whereas Eddy Current Dynamometer operating range is 300 RPM onwards to 18000 /30000RPM, but below 300 RPM it doesn't produce rated braking torque.

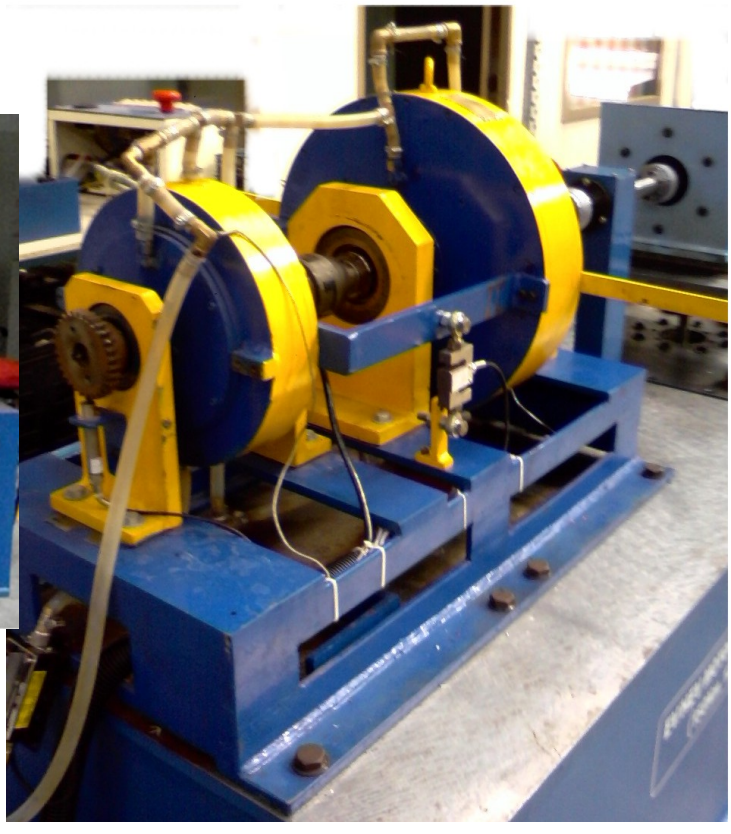
Hence, to apply Torque loading from Zero RPM to full speed - Tandem Dynamometer – at lower speed Powder Dynamometer is in operation, whereas at higher speeds Eddy Current Dynamometer are in use. Powder Dynamometer & Eddy Current Dynamometer are constructed in line, has one output shaft, to be coupled to unit under test.
Electronic dual channel Controller switches Excitation Voltage from Powder Dynamometer to EC Dynamometer & vice a versa at preset transfer speed, for bump less, jerk free Torque loading

The unique features of each type of dynamometer are utilized allowing for broad torque and speed range capabilities. A judicious selection and sizing of units provide a combination with extended speed and power ranges as needed for load testing of hydraulic motors, servo motors, AC & DC motors, AC & DC Electronic Dives and so on.

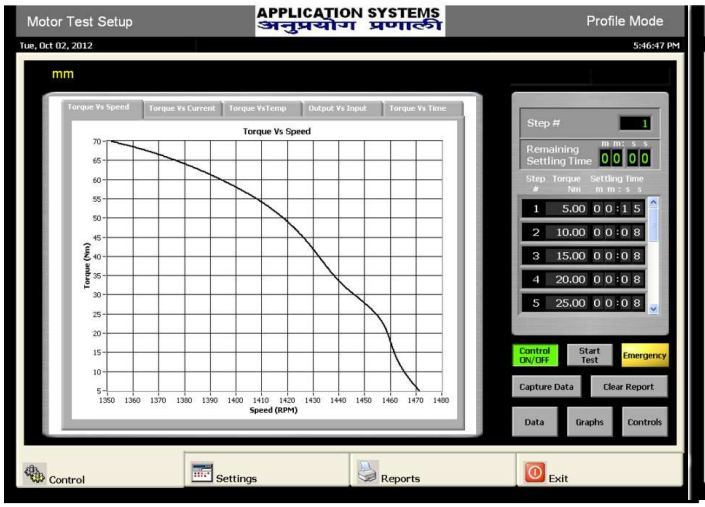
Tandem Dynamometers are offered with basic controls of Torque & Speed by Manual Controller as well with PC based, computerized controls for data acquisition & post test analysis in graphical & tabled reports, useful for monitoring Performance & Endurance data of Tests performed, in R&D, Engineering & Production departments.

APPLICATION SYSTEMS

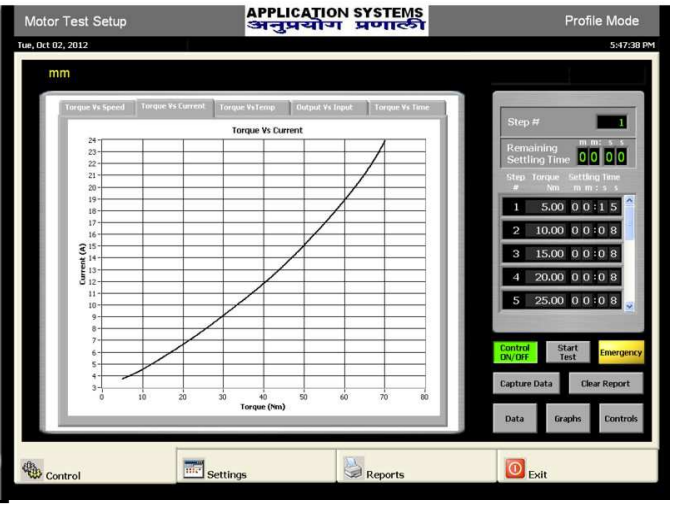




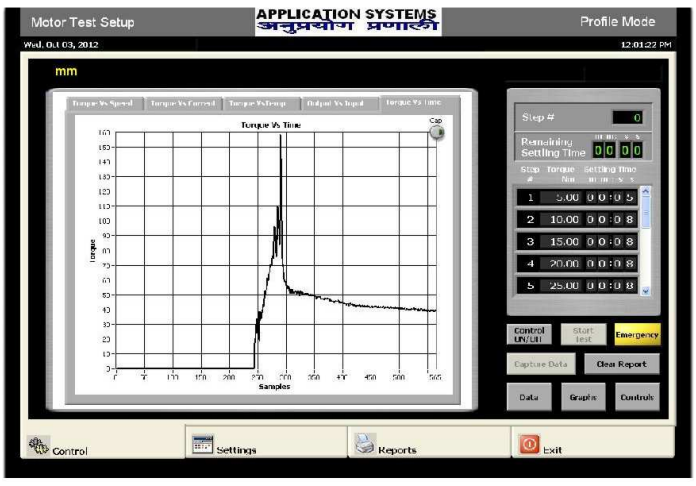
Screen Shots- Motor Test with Computerized Control panel.



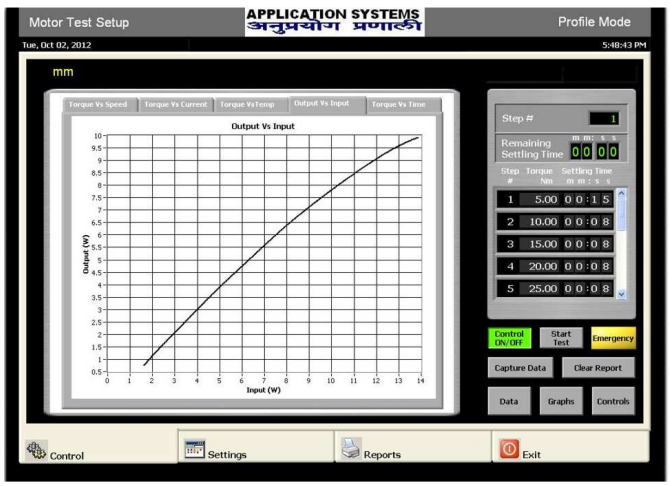
Motor Torque – Speed Curve



Motor Torque – Current Curve



Motor Torque V/s Time Curve



Efficiency – Input V/s Output Curve