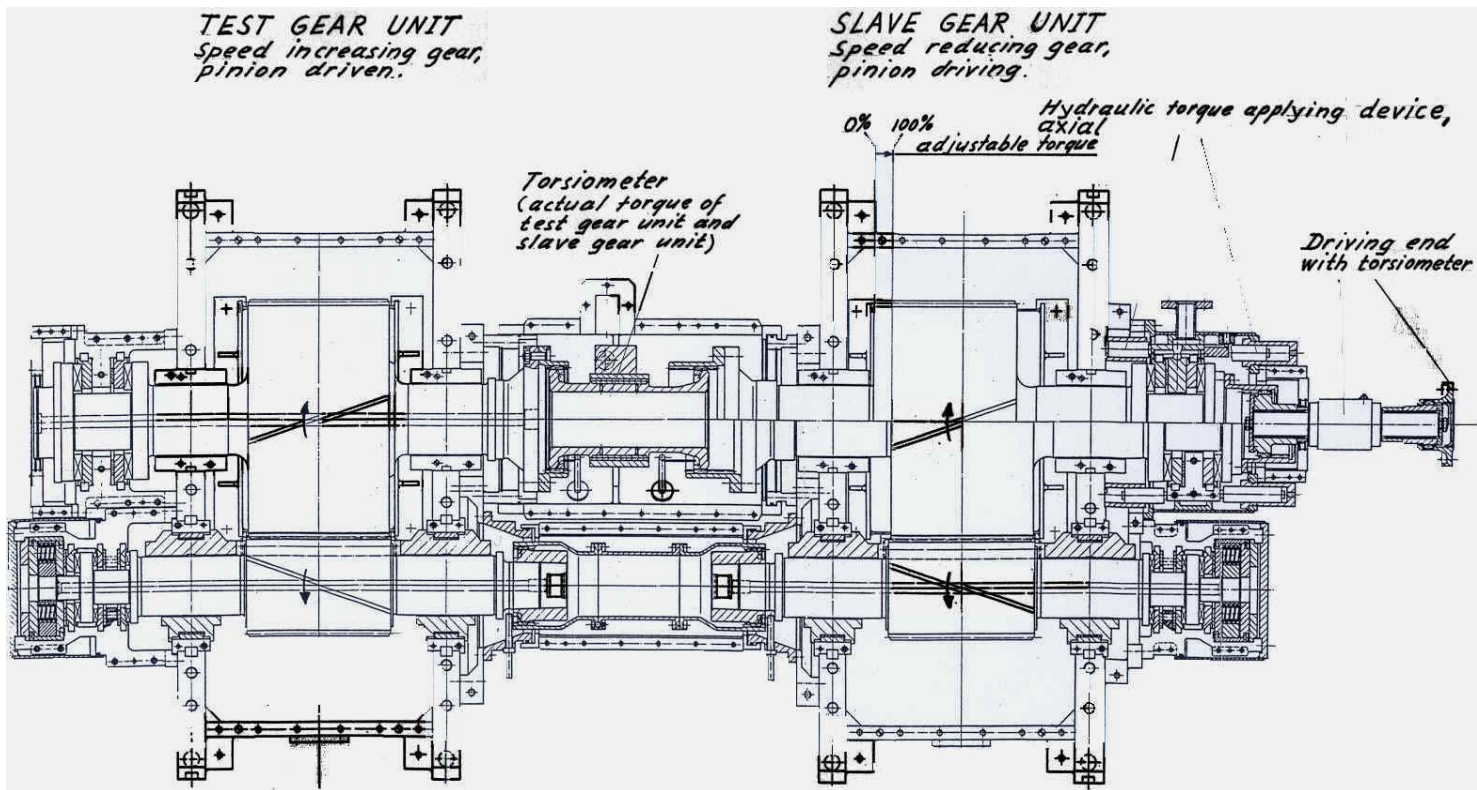


Full Load Back-to-Back Locked Torque Testing

There are numerous issues that require discussion and agreement in regards to back to back, locked torque testing, particularly on units with modified leads.

Back-to-Back Test Illustration of Turbogears



In a back to back test arrangement one gear, referred to as the slave, is running on the normally unloaded tooth flanks. Additionally, the torque path passes through a normally non-coupling shaft end requiring stub shaft extensions. The change in torque path usually requires a larger diameter thrust bearing with higher peripheral speeds and attendant losses to accommodate the larger shaft needed to carry the torque. A special set of radial bearings is required for the slave gear since bearing load directions are different due to the reverse mesh loading. Furthermore, the bearings on both gears are required to start under full load. Lateral and torsional criticals as well as vibration and rotor stability are significantly different as a result of these modifications required for the test.



26 Commerce Drive
North Branford, CT 06471
www.artec-machine.com

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Questions that must be defined are:

- Is the slave gear to be rerun against a different slave to provide a valid test with normal mesh loading?
- Are stub shaft extensions to be cut off after completion of the testing, requiring rebalancing of the rotors?
- Is regrinding to remove the longitudinal flank corrections on the normally unloaded flank of the slave gear required? This is recommended since the unmodified flanks of the teeth are used to set parallel alignment of the rotors.
- Is the thrust bearing size to be reduced to normal after the test to restore long term bearing losses to minimum values?
- Are optional spare rotors to be incorporated in the back to back test program?

Depending on the answers to these and other questions, back to back testing can require from 1 to 2 months additional delivery time. The above pricing should be considered budgetary pending further definition.

Preferred Test Arrangement in lieu of Back-to-Back Testing

Recommendation for a third test procedure which overcomes many of the disadvantages of "B" and "C" above.

Each motor/gearbox could be coupled to the second motor/gearbox with the second motor acting as a generator/load bank.

With this test arrangement no stub shaft extensions would be required, no change in torque path is required, no larger thrust bearings are required, no special torque couplings are required, no special test bearings are required and the units can be started under minimal load. One rotor set would still operate with opposite tooth flanks loaded requiring the removal of the lead modifications from the normally unloaded flank of one pinion.

This test simulates actual operation most closely and also has minimal cost and delivery impact on the gears. It has been used satisfactorily by MAAG on other projects where larger horsepower motor drivers were involved.

All gears would still receive a full speed no load mechanical run test at Maag's facility.



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