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Test Stand Motor Catalog

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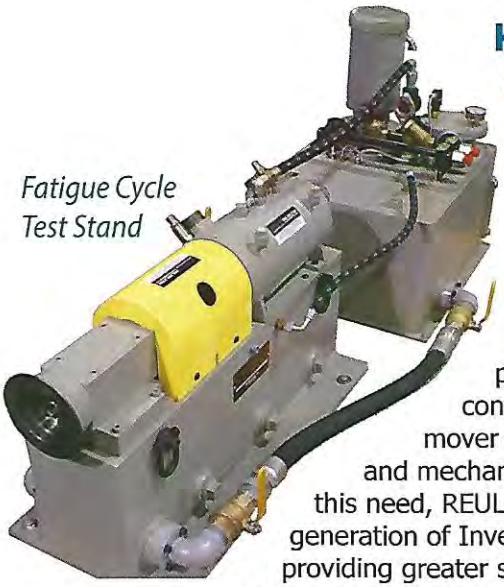
Best In Class Test Stand Motor Solutions

REULAND is a world leader in high-speed motor applications. We are a predominate supplier of Dedicated Test Stand Motors for the Automotive Testing Industry.

- REULAND specializes in the design and manufacturing of high performance AC electric motor systems, dedicated to Test Stand applications.
- We are on the forefront of high power density and high speed asynchronous motor design up to 1,500 Horsepower and 50,000 rpm. We can achieve extremely low inertia values.
- Our design, analysis and manufacturing capabilities allow us to create AC motor systems that exceed others in broad range torque, power and speed performance. Because we design and build these systems ourselves, we have complete knowledge of what goes into them.
- Among other things, we maintain a knowledge of the materials being used, the fit between the rotor and shaft, the electrical design, the natural frequency of the rotor, the bearing stiffness values, the component stress levels and the heat transfer data for various parts of the motor. This allows us to push our designs to their limits.
- Combine all of this with our years of field experience relative to rotating machinery integration and it is easy to see how we can give you the ultimate advantage on your high performance Test Stand Equipment.

Company Infrastructure

- Company started in 1937 and has had stable growth and ownership since that time. This private ownership allows operational management to run the company, while ownership focuses on development of new products and direction setting. This helps keep REULAND leading the way with new technology.
- We manufacture out of two plants in the USA — one in the City of Industry, California, and the other is in Howell, Michigan. Our California plant has approximately 200 employees and is located on 10 acres while our Howell plant is about one-half that size. All motors for the test stand industry are designed and produced in California.
- At our City of Industry facility, we house one of the largest aluminum foundries west of the Mississippi with a fully operational pattern shop. This flexibility allows REULAND to push the envelope on motor frame and housing designs to fit within your design parameters.
- The advantage this gives to REULAND in the manufacturing cycle of custom high-speed motors is flexibility in design. We control the quality and the delivery ourselves while keeping a stringent eye on costs.
- REULAND continues to invest in world class manufacturing technology. Even though we hand-wind all the motors we make, we have computerized equipment for machining motor components and maintaining close tolerances required by the test stand application.



Fatigue Cycle Test Stand

Keeping OEMs Competitive In Changing Times

Demands for increased productivity across all industries and processes are pushing today's conventional prime mover beyond its electrical and mechanical limits. To answer this need, REULAND offers a new generation of Inverter Duty Motors providing greater speed broader performance ranges and higher cycle times in innovative designs that set new benchmarks for quality, reliability and versatility.

Superior Performance By Design

REULAND Inverter Duty Motors maximize horsepower-to-frame ratios offering flexible design parameters that can be tailored to a wide variety of load/ speed ranges. High torque at low speeds and wide constant horsepower ranges are assured together with sustained speeds of 60,000rpm and beyond using REULAND's industry leading cooling and lubrication technology.

Typical Applications

- Transmission Noise Vibration
- Final Test of Automatic Transmission Engine Test
- Gear Test
- Power Steering Pump
- Clutch Test
- Component Test
- Water Pump, Alternator, Air Compressor
- Drive Train
- Torque Pulse Simulation
- Inertia Simulation
- Durability Test Truck Axle
- Axle
- Chassis

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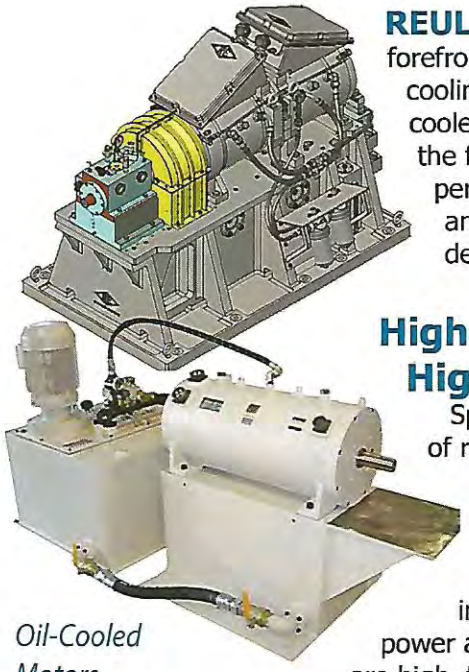
Enhanced Liquid Cooling Advantage



Oil-Cooled Motors

REULAND is at the forefront of advanced liquid cooling of AC motors. Liquid cooled machinery delivers the following superior performance characteristics and is essential for your demanding applications.

High Power and High Speed

Speed dictates the size of rotating machinery. Mechanical stresses are greater at high speeds which drives high speed machinery into smaller packages. If power and speed requirements are high, then enhanced liquid cooling can be used to increase heat transfer efficiency and allow higher power density.

Lower Inertia Capabilities

Designers specify low inertia when they want a responsive system. Low inertia dictates small rotor diameters for electric motors. For a given power rating, a smaller rotor will require enhanced heat transfer through liquid cooling.

Smaller Size and Lower Weight

When the envelope for a machine is small, or weight constraints drive the machine size down, then a liquid cooled machine in a smaller frame size can be utilized.

Low Noise

Liquid cooled machinery is much quieter. The cooling system can pump cooling fluid to the machine from a remote area, thus eliminating ambient noise pollution.

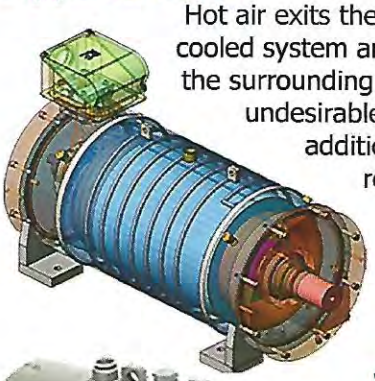
More Reliable / Longer Life

Liquid cooled motors provide more reliable operation. This is due to, better lubrication, a reduction in operating temperature and reduction of temperature gradients in the motor. Temperature gradients result in differential expansion of components. This makes it difficult to hold tight tolerances in the machine construction and can result in high component stresses and increase wear rates.

Well Suited for High Ambient Temp and Contaminated Applications

Liquid cooling provides an alternative to air cooling in high contamination areas or areas with high ambient temperatures. Mining, atomizer systems, injection molding and machines housed in an enclosed space are excellent candidates for liquid cooling.

Well Suited for Confined Area Applications

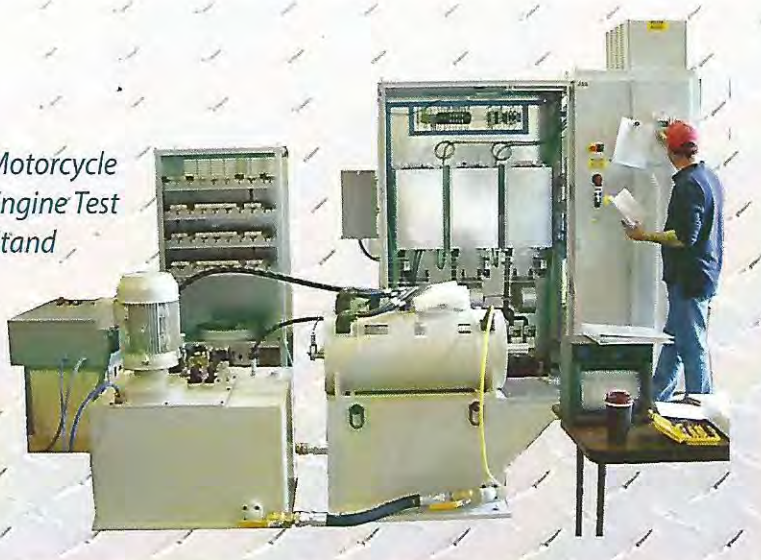


Hot air exits the machine in a typical air cooled system and is allowed to exhaust into the surrounding area. This is particularly undesirable in confined areas where additional ventilation may be required. The waste heat can be dissipated with a liquid cooled system by pumping the hot cooling fluid to a designated external area.

Water-Cooled Motors

Well Suited for Precision Applications

Process control standards are forcing facilities to control environmental temperatures. Liquid cooling provides superior temperature control to arrest thermal growth problems, control performance variations, and control ambient temperatures in sensitive processes.



Motorcycle Engine Test Stand

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Oil-Cooled Motors

Single-Frame

Model	Power (kW)	Torque (Nm)	Base Speed (rpm)	Maximum Speed (rpm)	Constant Power (rpm)	Inertia (kgm2)
140S-O	55.9	48.5	11000	29000	29000	0.010
140L-O	64.1	63.5	9650	26000	26000	0.013
180S-O	82	94.9	8250	22000	22000	0.023
180L-O	100.7	142.4	6750	20000	20000	0.034
210S-O	119.3	194.7	5850	19000	19000	0.068
210L-O	146.2	290.8	4800	18000	18000	0.099
250S-O	149.1	316.4	4500	17000	17000	0.129
250L-O	182.7	471.4	3700	15000	15000	0.190
280S-O	186.4	494.5	3600	15000	15000	0.213
280L-O	228.2	738.5	2950	14000	14000	0.315
320S-O	234.9	830.7	2700	13500	13500	0.428
320L-O	279.6	1161	2300	13000	13000	0.599
360S-O	298.3	1238.4	2300	12000	12000	0.765
360L-O	357.9	1752.8	1950	12000	12000	1.090
400S-O	380.3	1862.4	1950	12000	12000	1.570
400L-O	451.1	2610.9	1650	11000	11000	2.180
440S-O	559.3	2966.9	1800	9000	9000	2.877
440L-O	671.1	4134.6	1550	8000	8000	4.052
580S-O	872.5	5951	1400	6700	6700	10.006
580L-O	969.4	7714.2	1200	6000	6000	13.238

Tandem-Frame

Model	Power(kW)	Torque(Nm)	Base Speed (rpm)	Maximum Speed (rpm)	Constant Power (rpm)	Inertia
140S-O	111.8	97	11000	29000	29000	.02
140L-O	128.2	127	9650	26000	26000	.026
180S-O	164	189.8	8250	22000	22000	.046
180L-O	201.4	284.8	6750	20000	20000	.068
210S-O	238.6	389.4	5850	19000	19000	.136
210L-O	292.4	581.6	4800	18000	18000	.198
250S-O	298.2	632.8	4500	17000	17000	.258
250L-O	365.4	942.8	3700	15000	15000	.380
280S-O	372.8	989	3600	15000	15000	.426
280L-O	456.4	1477	2950	14000	14000	.630
320S-O	469.8	1661.4	2700	13500	13500	.856
320L-O	559.2	2322	2300	13000	13000	1.198
360S-O	596.6	2476.8	2300	12000	12000	1.530
360L-O	715.8	3505.6	1950	12000	12000	2.18
400S-O	760.6	3724.8	1950	12000	12000	3.14
400L-O	902.2	5221.8	1650	11000	11000	4.36
440S-O	1118.6	5933.8	1800	9000	9000	5.754
440L-O	1342.2	8269.2	1550	8000	8000	8.104
580S-O	1745	11902	1400	6700	6700	20.012
580L-O	1938.8	15428.4	1200	6000	6000	26.476

Performance ratings for Tandem Frame motors are for base reference only. Consult with Reuland for exact Specifications.

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Water-Cooled Motors

Single-Frame (Grease lubrication or Air-Oil lubrication for high power and high speed)

Model	Power (kW)	Torque (Nm)	Base Speed (rpm)	Maximum Speed (rpm)	Constant Power (rpm)	Inertia
140S-W	18.6	27.4	6500	29000	29000	0.010
140L-W	22.4	35.6	6000	26000	26000	0.013
180S-W	26.1	49.8	5000	22000	22000	0.023
180L-W	31.3	66.4	4500	20000	20000	0.034
210S-W	37.3	89.0	4000	19000	19000	0.068
210L-W	48.5	125.1	3700	18000	18000	0.099
250S-W	52.2	142.4	3500	17000	17000	0.129
250L-W	67.1	213.6	3000	15000	15000	0.190
280S-W	74.6	237.3	3000	15000	15000	0.213
280L-W	100.7	356.0	2700	14000	14000	0.315
320S-W	111.9	395.6	2700	13500	13500	0.428
320L-W	145.4	555.4	2500	13000	13000	0.599
360S-W	149.1	569.7	2500	12000	12000	0.765
360L-W	195.4	811.1	2300	12000	12000	1.090
400S-W	197.6	820.4	2300	12000	12000	1.570
400L-W	253.5	1152.9	2100	11000	11000	2.180
440S-W	301.3	1525.9	2100	9000	9000	2.877
440L-W	428.8	2167.2	1900	8000	8000	4.052
580S-W	522	2932	1700	6700	6700	10.006
580L-W	633.8	4035.1	1500	6000	6000	13.238

Tandem-Frame (Grease lubrication or Air-Oil lubrication for high power and high speed)

Model	Power (kW)	Torque (Nm)	Base Speed (rpm)	Maximum Speed (rpm)	Constant Power (rpm)	Inertia (kgm2)
140S-W	37.2	54.8	6500	29000	29000	.02
140L-W	44.8	71.2	6000	26000	26000	.026
180S-W	52.2	99.6	5000	22000	22000	.046
180L-W	62.6	132.8	4500	20000	20000	.068
210S-W	74.6	178	4000	19000	19000	.136
210L-W	97	250.2	3700	18000	18000	.198
250S-W	104.4	284.8	3500	17000	17000	.258
250L-W	134.2	427.2	3000	15000	15000	.380
280S-W	149.2	474.6	3000	15000	15000	.426
280L-W	201.4	712	2700	14000	14000	.630
320S-W	223.8	791.2	2700	13500	13500	.856
320L-W	290.8	1110.8	2500	13000	13000	1.198
360S-W	298.2	1139.4	2500	12000	12000	1.530
360L-W	390.8	1622.2	2300	12000	12000	2.18
400S-W	395.2	1640.8	2300	12000	12000	3.14
400L-W	507	2305.8	2100	11000	11000	4.36
440S-W	602.6	3051.8	2100	9000	9000	5.754
440L-W	857.6	4334.4	1900	8000	8000	8.104
580S-W	1044	5864	1700	6700	6700	20.012
580L-W	1267.6	8070.2	1500	6000	6000	26.476

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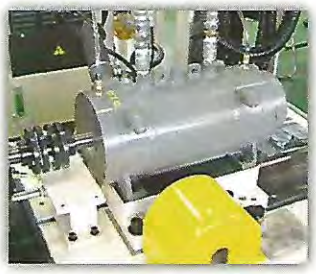
Dynamometer & Test Stand Applications



30,000rpm Ultra High-Speed Oil-Cooled Motor Testing

In response to the hybrid electric vehicle development in recent years, REULAND has developed new ultra-high-speed oil-cooled motor.

Maximum speed	: 30,000 rpm
Rated speed	: 15,000 rpm
Maximum power	: 15-75 kW

** 50,000 rpm capacity available; consult factory*

20,000 rpm Electric Vehicle Motor Testing

This test stand is to test EV and Hybrid prototype Traction Motors that will be implemented in the cars. It is being used to absorb the loads generated by the Traction Motors and monitor the torque outputs.

Maximum power	: 15 - 210 kW
Constant power	: 6,000 - 20,000 rpm
Overload	: 200%, 1 min

Aircraft Starter/ Generator Simulation

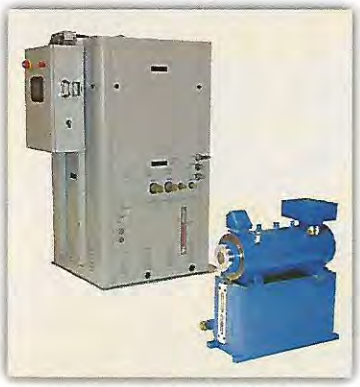
This test stand is used by a major aircraft component manufacturer to simulate the power and quick acceleration generated by commercial airline starter/generators. The test stands have been running 24/7 since they were commissioned, only being turned off for scheduled maintenance. This test stand showcases REULAND'S tandem motor configuration design, where two motors are coupled together to allow for double the torque at a given speed. The fluid recirculating system is integrated into the 4 ton cast base.

60,000 rpm Aerospace Bearing Test

This test stand incorporates a high speed internally oil cooled motor and a gearbox to be able to deliver 60,000 RPM along with high power. Data acquisition panel is used to monitor the temperature and vibration of both the motor and the gearbox. The motor is cooled by an oil recirculating system. The test stand is used to test bearings for aerospace applications.

Gas Turbine Simulation

This test stand is used to precisely simulate a gas turbine. This test stand embodies the highest performance available in the world. The system is comprised of a high speed internally oil cooled motor, multiple VFD's, multiple fluid recirculating systems, a custom cast base, a spindle to transfer the load to the test article.



Engine Torque Pulse Simulation (ETPS)

This system is used in a test stand to simulate torque pulses created when the cylinders fire in an internal combustion engine. Real-world simulation of this nature is achieved through combining a low inertia motor with fast processing variable frequency drive. The high performance motor in this system can be used to test various engine components; simply changing parameters in the VFD software allows technicians to simulate different types of engines.

Ram Air Turbine Test Stand

Shown here is the prime mover for a commercial aircraft emergency power generating turbine development test stand. The motor base is integrated into the oil cooling system. The entire unit has a small footprint, less than 0.56 m2. Notice the custom mounting interface integrated into the design.

Helicopter Gearbox Test Stand

These motors are installed at a US Army test center. The motors still run flawlessly today, two of which are simulating engine inputs into the gearbox and the third is absorbing the output loads sent to the tail rotor on a US Army apache helicopter gearbox.

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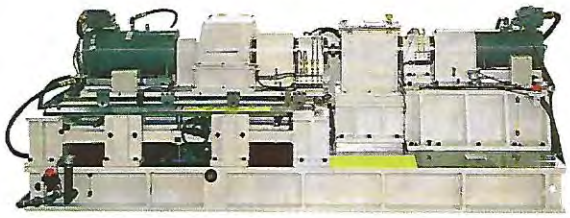
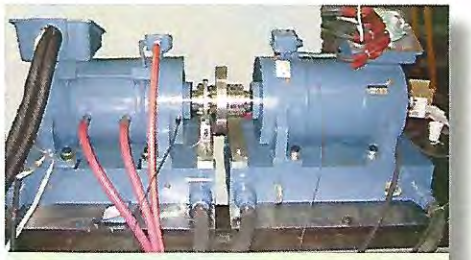
Partial List of Customers

NTN Bearing Japan

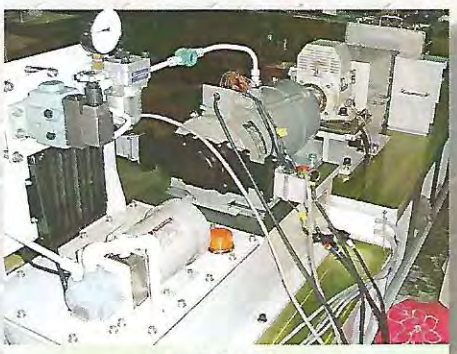


Unico Japan (Torque Pulse Simulation Test Bench)



Anderson USA (Tandem 400 Frame Motors)

Customer	Application	Location
CHRYSLER CORP.	Final Test, Automatic Transmission	Kokomo, Indiana, USA
GENERAL MOTORS CORP.	Final Test, Automatic Transmission	Toledo, Ohio, USA
	Final Test, Automatic Transmission	Windsor, Ontario, Canada
	Transmission Test Stand	Ypsilanti, Michigan, USA
	Gear Test	Romulas, Michigan, USA
	Component Test Stand	Pontiac, Michigan, USA
	Northstar Engine Test Stand	Livonia, Michigan, USA
	Transmission Test Stand	Warren, Michigan, USA
	Super Cell	Warren, Michigan, USA
FORD MOTOR CO.	NVH Test Cell	Llivonia, Michigan, USA
	Cold Cell Test Dyno	Livonia, Michigan, USA
	Final Test, Automatic Transmission	Sharonville, Ohio, USA
	Final Test, Automatic Transmission	Utica, Michigan, USA
	Durability Test Truck Axle	Sterling Heights, Michigan, USA
	Water Pump, Alternator, Air, Compressor Test Stand	Allen Park, Michigan, USA
	Clutch Test	Livonia, Michigan, USA
JAPAN AIRLINES	747 Fuel Pump Test	Japan
SANG YOUNG	Final Test	Korea
KIA MOTORS	Transmission Test Stand	Korea
BORG WARNER CORP.	Clutch Test	
DELPHI CORP.	Power Steering Pump Test	Saginaw, Michigan, USA



Takachiho Japan

Southwest Research USA (Tilt & Roll Test Stand)

Yaskawa Japan