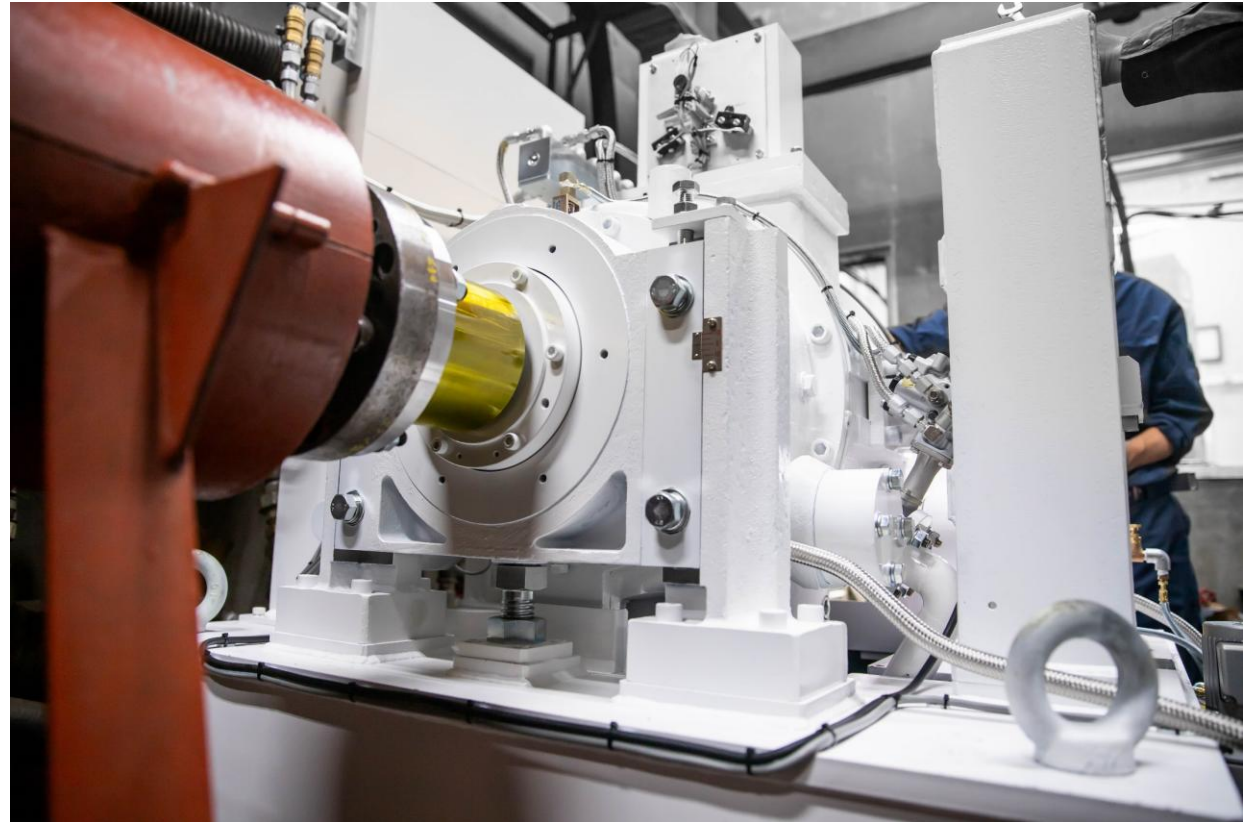




~Advanced Test System and Test Bench Engineering Professional~

Tokyo Plant Co., Ltd.



Introduction Hydraulic Dynamometer

The Tanaka Hydraulic dynamometer is internationally recognized and has been featured in numerous publications, including the Automotive Technology Handbook.

» Award for Technical Excellence

- The Medal with Purple Ribbon (1972) (from Prime Minister)
- Tokyo Governor's Award (1969)
- Holds multiple patents in Japan, the United Kingdom, and the United States.

» Track Record and History:

Over 60 years of experience (first unit produced in 1964)

Initial deliveries made to Komatsu and Hino Motors Cumulative Deliveries:

Over 2,000 units (No. 1 domestic market share)

Destinations: Japan and more than 40 countries worldwide

Major Users: OEMs (Off-Road and Automotive), Component Manufacturers, Gas Companies, Large Engine Maintenance Facilities, and the Self-Defense Forces



» Major Customers (Titles Omitted)

Yanmar, IHI, Niigata Engine, Komatsu, IPA, Daihatsu Diesel, Mitsubishi Heavy Industries, Hitachi, Ebara Corporation, Kubota, Shinko Machinery, Kanzaki Koki, Tokiwa Manufacturing, Komatsu Construction Machinery Sales, Mitsubishi Heavy Industries Engine Sales System, Mitsubishi Fuso Truck and Bus Corporation, Mitsui E&S, Tominaga Bussan, Okinawa Machinery Maintenance, Ootsuka Diesel, Osaka Gas, Akasaka Iron Works, Kyowa Kogyo, Toyo Internal Combustion Engine Industry, Daito Kousakusho, Maruma Technica, Isuzu Marine Manufacturing, Tokai Kotsu Kikai, Toyota Central R&D Labs, Nissan Motor Co., Ltd., Hino Motors, Ltd., Honda R&D Co., Ltd., Yamaha Motor Co., Ltd., NGK Insulators, Ltd., Mitsuboshi Belting Ltd., Maekawa Manufacturing Co., Ltd., Ishibashi Manufacturing Co., Ltd., IBIDEN Co., Ltd., Nakata Engine Co., Ltd., Ogura Clutch Co., Ltd., Various Universities, Various National Colleges of Technology, Various Domestic and International Research Institutions, Japan Ground Self-Defense Force, Japan Maritime Self-Defense Force Technical School, U.S. Atsugi Base, etc.

(Total: Over 500 Companies)

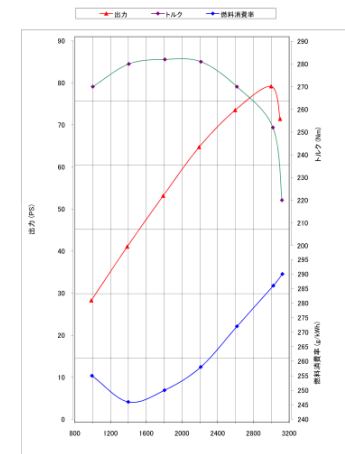
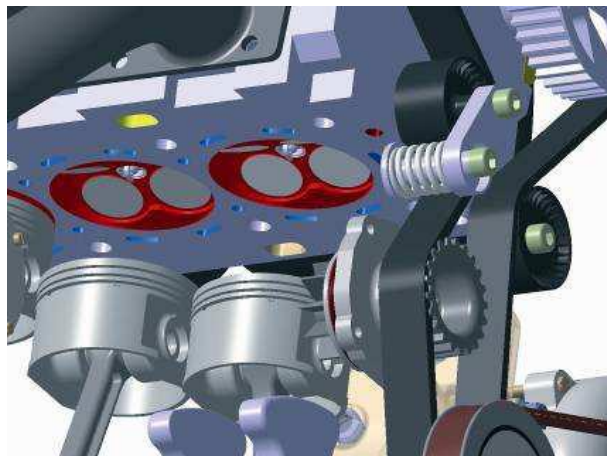
》 Target Applications

Diesel engines, hydrogen engines, generators, gas turbines, construction machinery, agricultural machinery, propeller shafts, etc.



》 Primary Applications

- Durability Performance Testing
- Partial-Load Performance Testing
- Full-Load Performance Testing
- Various Other Performance Tests (Steady-State and Transient)
- Marine Multiplier Control Rapid Load Variation Testing

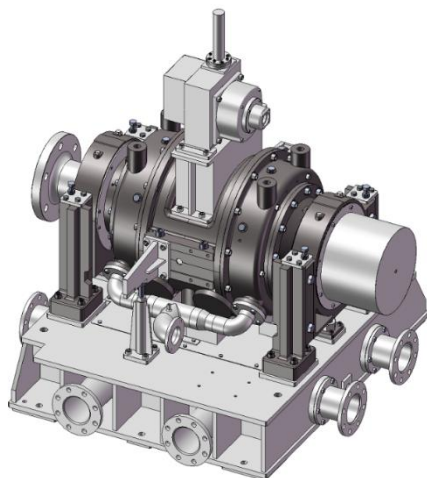


» Output range: 74 kW – 20,000 kW

Japan's No.1 domestic market share.

With a history of approximately 60 years since the 1960s, we have delivered more than 2,000 units to customers in Japan and overseas.

We offer a broad product lineup that enables us to provide the optimal solution for each customer's application.

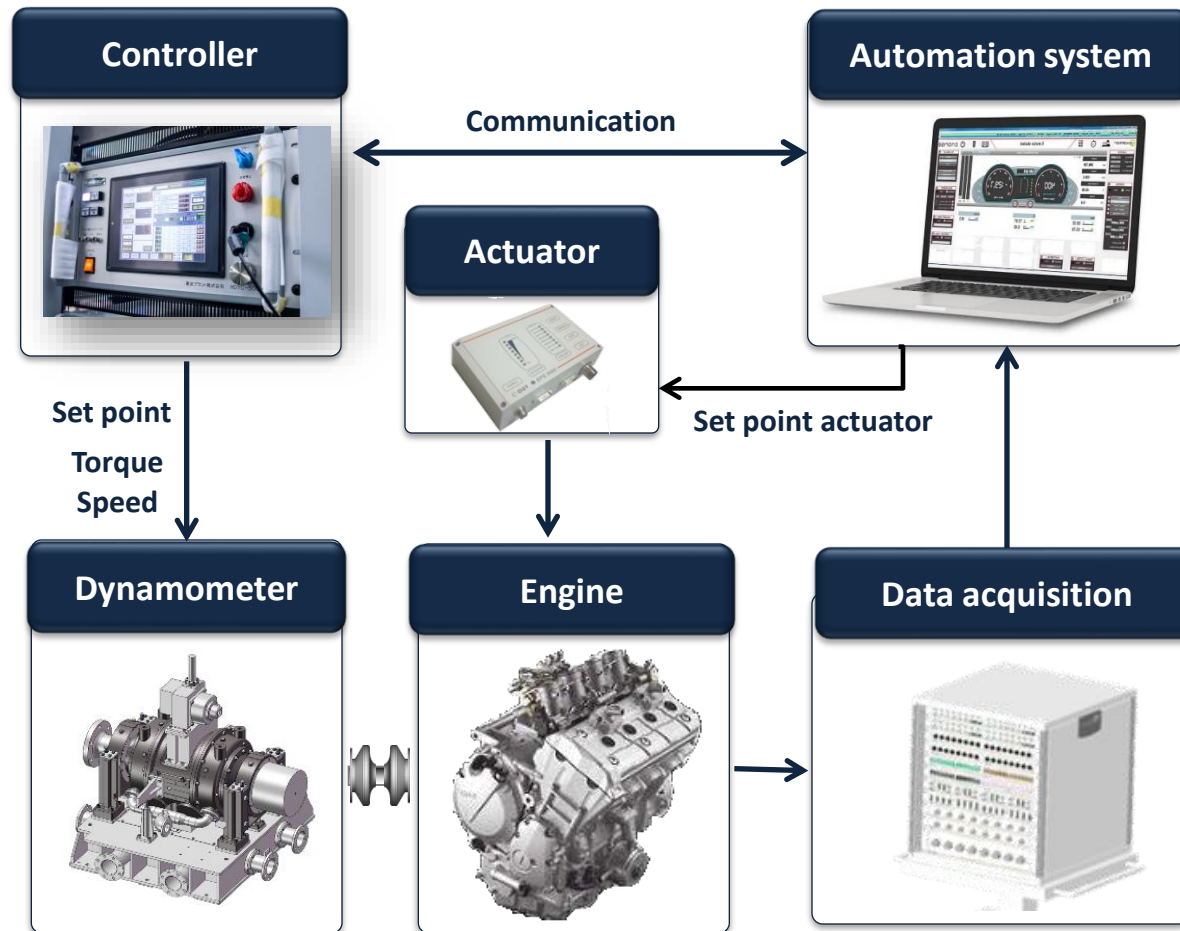


» Product Lineup For details, please refer to the product catalog.

Model	Rotational direction	Main Specifications	Units under test
P type	One-direction	88 ~ 8,000kW / Middle speed range	Commercial vehicles, marine vessels, generators, construction machinery agricultural machinery, and more
PRS type	Bi-direction	74 ~ 4,000kW / Middle speed range	
PD type	One-direction	4000 ~ 20,000kW / low speed range	Marine vessels and generators
PRD type	Bi-direction	4000 ~ 10,000kW / low speed range	
PMS type	One-direction	500 ~ 2,000kW / high speed range	Turbines and related equipment
PHS type	One-direction	2000 ~ 20,000kW / high speed range	

Custom specifications are also available.

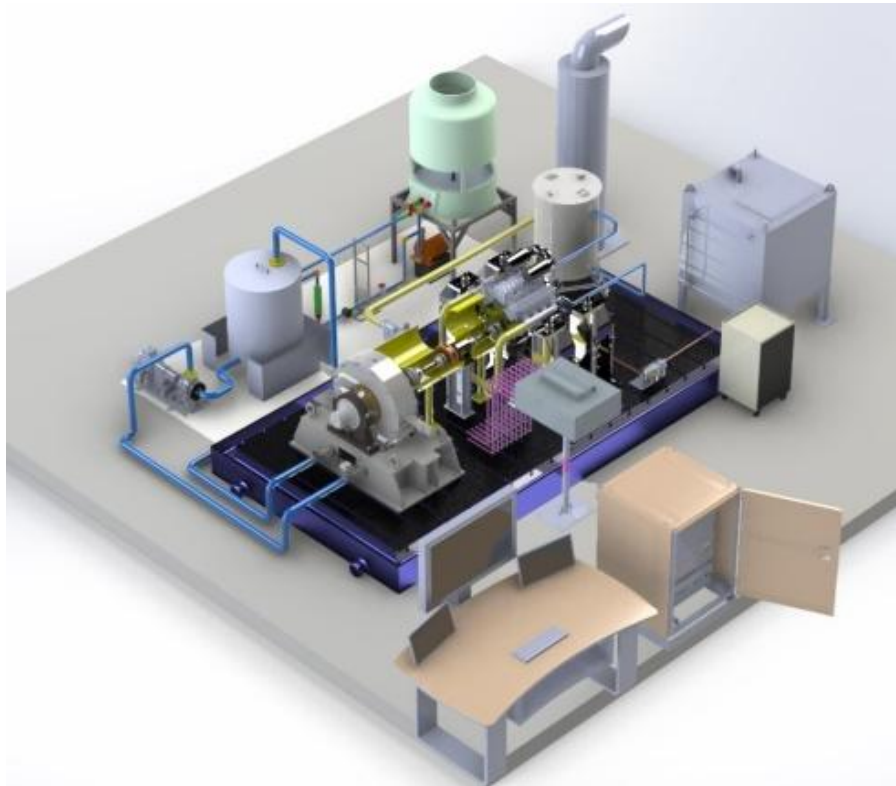
» Diesel engine test



Turnkey-Solution

Product & Solution

» example of test bench



» Project team

Design
company

Construction
company

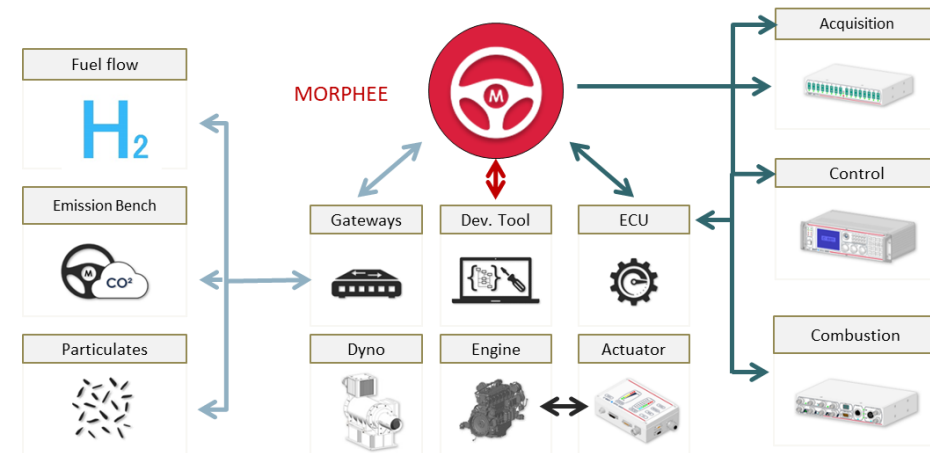
Tokyo plant
Test system

Hydrogen gas
company

Plumbing
contractor

» Hydrogen engine test bench

- ✓Automation system
- ✓Hydraulic dynamometer
- ✓Combustion analysis system
- ✓flow meter
- ✓Emission analyzer
- ✓Engine mount, dumper, shaft



» MORPHEE automation system

MORPHEE can manage all measurement equipment and ensures the safe execution of tests, compliance checks, and other operations.

» Customer's case study (Japan Hydro): Hydrogen engine test bench



» Optional Feature

Torque Flange Type In parallel with the load cell included with the dynamometer, engine output performance testing can be conducted using a torque meter (via an intermediate shaft).

» Customer Benefits

Enables highly accurate output performance testing (Accuracy depends on the specifications of the torque meter.) Provides precise data on fuel efficiency and exhaust emission, making it ideal for regulatory compliance and R&D applications.



Engine



**Intermediate
Bearing system**



Torque meter

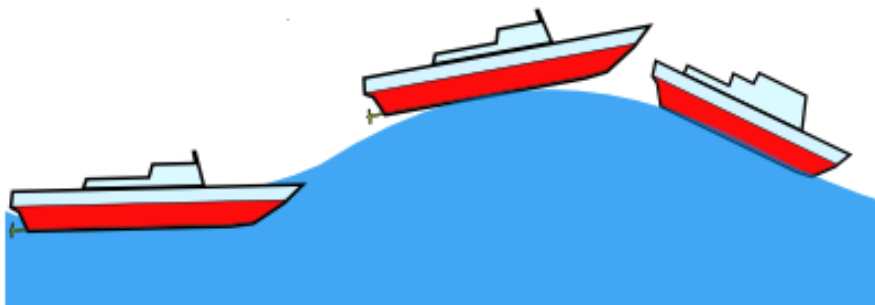


Dynamometer



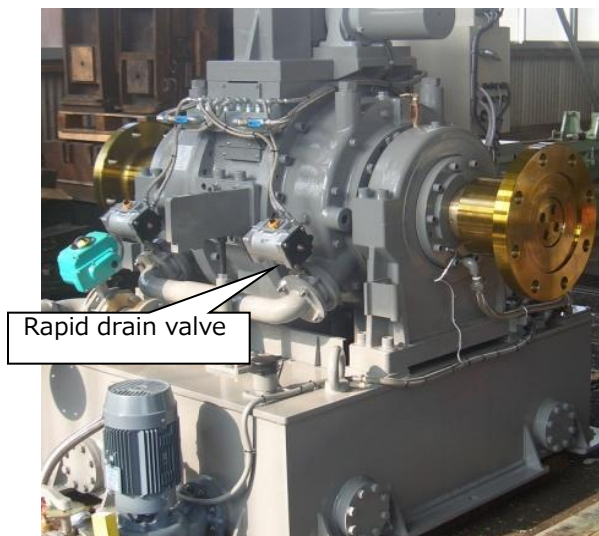
» Optional Feature:

Rapid Load Device Primary Applications Simulates conditions where a propeller is exposed above the water surface as the vessel passes over a wave Simulates rapid load application to a generator.



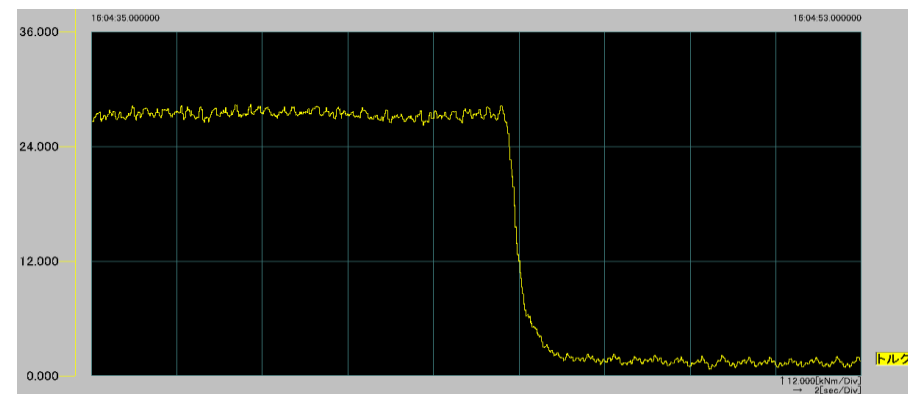
» Main Equipment Configuration

- Pneumatically operated rapid drainage valve ,water supply and solenoid valve unit
- Supply air pressure: 0.4 to 0.7 MPa



» Operating Torque of Rapid Load Device

Illustration showing the load torque response when the rapid load switch is pressed while the system is under load during operation.
(Sample graph shows data at 2-second intervals.)



» Maintenance and after-sales service

Even those who pay attention to their daily health can vaguely judge their physical condition on any given day though, However, without the help of a medical specialist, it is impossible to accurately determine the state of one's internal health.

The testing equipment wears out its many parts very slightly with each repeated test.

The oil used to minimize wear also deteriorates and wears out with frequency of use and the passage of time. Testing equipment that does not have a natural regenerative capacity can be kept in the best condition through periodic maintenance to monitor its health and perform necessary servicing. Periodic maintenance is required to ensure accurate data measurement with the test equipment.



» Regular maintenance prevents breakdowns before they occur.

Especially when the testing equipment is used under severe conditions, such as continuous endurance tests, the bearings and seals of each part are damaged quickly and need to be replaced periodically. After product maintenance, we closely check the condition of the product before shipping, including metrology and operational inspections.

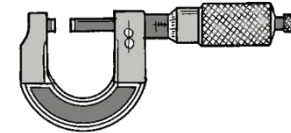
Only test equipment that has passed our strict standards is delivered to our customers again.

» Benefit for customers

- ✓ We will organize and manage the repair history, trouble history, and modification history, which will reduce the burden on the customer.
- ✓ We can prevent breakdowns and minimize damage from accidents and problems.
- ✓ We will prevent any trouble after the overhaul because our professional engineers will carry out the work. After the overhaul is completed, testing can be conducted with confidence.
- ✓ After overhaul, static torque accuracy returns to within $\pm 0.5\%$ F.S.
Therefore, the measurement system can be maintained and accurate test data can be measured.
Restored to like-new condition.
7,000 hours or 5 to 7 years of reliable use until the next maintenance period.
- ※ The maintenance cycle (number of years) varies depending on the customer's frequency of use and the test bench environment.
- ✓ If a full overhaul is performed, the warranty will be extended for an additional year after delivery.

» Main menu of maintenance

- ① Bearing replacement and greasing of rotating parts
- ② Replacement and supply of OIL to lubricating parts
- ③ Measurement of coupling runout and surface runout
- ④ Correction of shaft balance
- ⑤ Replacement and correction of bearing parts
- ⑥ Replacement and correction of seal parts
- ⑦ Checking and correcting electrical components
- ⑧ Checking, correcting and replacing all connectors and cables
- ⑨ Calibration of torque and load (temperature, pressure, and rotation are also possible)
- ⑩ Tightening of bolts
- ⑪ Cleaning and repainting
- ⑫ Calibration and test run inspection



» Maintenance report

After disassembling a product, we photograph, inspect, and test every single part, down to the last bolt.

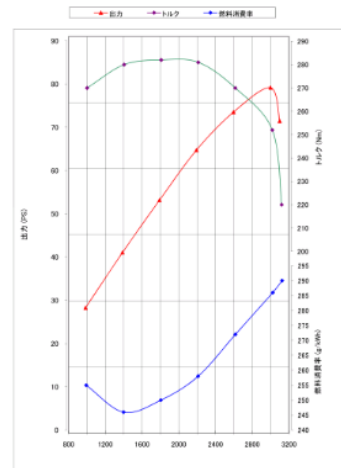
We are confident that the report is free of ambiguities, and our customers can be assured that it is free of ambiguities.

(In addition to the photos, the actual report will be annotated with arrows and notes on the problem areas.)

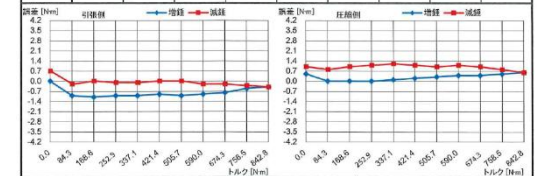


》 Performance test before delivery

Connect the dynamometer to the engine in our test bench and conduct a test run inspection. Mainly, Are there any oil or water leaks, or abnormal vibrations? We deliver the product to the customer after confirming that there are no problems with the product.



基準荷重	検査点	引張側 (CAL値: -)				圧縮側 (CAL値: -)			
		増減		減速		増減		減速	
		トルク	指示値	誤差	指示値	誤差	指示値	誤差	指示値
kg	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm	Nm
0	0.0	0.0	0.0	0.7	0.5	+0.5	1.0	+1.0	
10	84.3	83.3	-1.0	84.1	-0.2	84.3	0.0	85.1	+0.8
20	168.6	167.5	-1.1	168.6	0.0	168.6	0.0	169.6	+1.0
30	252.9	251.9	-1.0	252.8	-0.1	252.9	0.0	254.0	+1.1
40	337.1	336.1	-1.0	337.0	-0.1	337.2	+0.1	338.3	+1.2
50	421.4	420.5	-0.9	421.4	0.0	421.6	+0.2	422.5	+1.1
60	505.7	504.7	-1.0	505.7	0.0	506.0	+0.3	508.7	+1.0
70	590.0	589.1	-0.9	589.8	-0.2	590.4	+0.4	591.1	+1.1
80	674.3	673.5	-0.8	674.1	-0.2	674.7	+0.4	675.3	+1.0
90	758.5	758.0	-0.5	758.2	-0.3	759.0	+0.5	759.3	+0.8
100	842.8	842.4	-0.4			843.4	+0.6		



》 Proposal maintenance planning

The test equipment can be used for a span of 20 years or more with continuous maintenance.

We propose appropriate maintenance plans based on the frequency of use, operating hours, and other factors. If you need a plan for running costs and maintenance before or after purchasing our products, please feel free to contact us.

when you need a plan for running costs and maintenance.



» Recommendation annual inspection on site

Failure to perform daily, monthly, and annual inspections of the product could, in the worst case, result in the death of an employee due to shattering of the rotating parts.

In addition, correct measurement data is essential for the development, experimentation, and testing of your application. When test equipment ages, high accuracy cannot be maintained and proper data cannot be obtained.

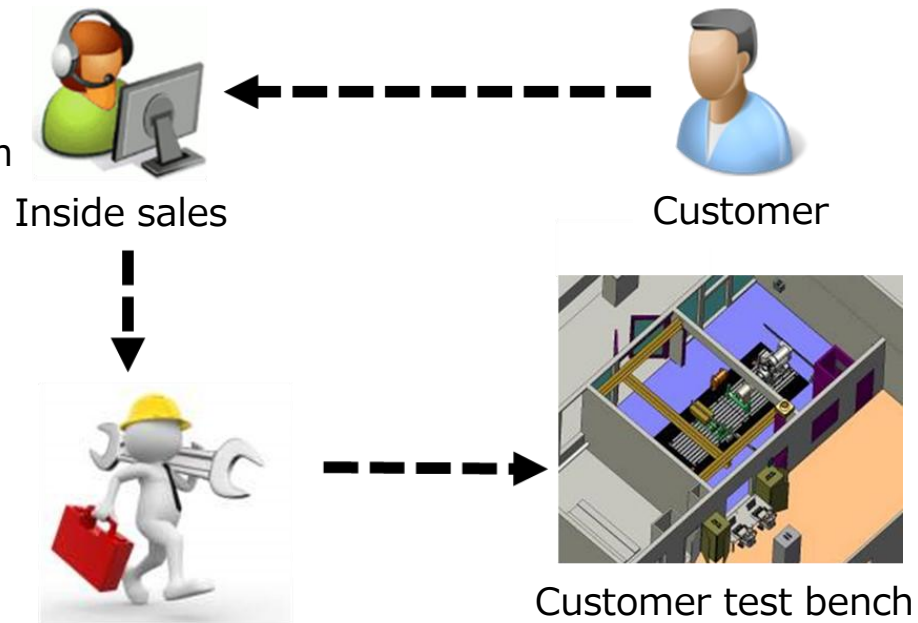
We recommend annual inspections to prevent these things from happening and to ensure safe use of our testing equipment.

We can dispatch engineers to any location in Japan upon your request.

(※This service is available for a fee.)

» Main menu of onsite inspection

- ① Torque and load calibration work (also available for temperature, pressure, and rotation)
- ② Appearance inspection
- ③ Oil change
- ④ Bolt tightening
- ⑤ Calibration of control and measurement system
- ⑥ Confirmation of trial operation
- ⑦ Submission of inspection report



» Spare parts and calibration

We can also supply single items of sensors such as spare parts for dynamometers, load cells, and rotation detectors. We also offer pick-up calibration of load cells and indicator meters.

Please contact us when you need them for your company's quality management.

(Advance booking is required).



» How to inquiry

✓ Please inform us of the product name and serial number.

(Example: Model P-55A hydraulic dynamometer, serial number: 4-digit number)

✓ The serial number is a 4-digit number engraved on the nameplate of the product itself.

✓ Please let us know the name of the necessary parts. If you do not know the name of the part, we will send you a cross-sectional drawing of the part.

We will participate in your project from the planning phase onward.

We provide seamless support throughout every stage — from creating requirement specifications and design documents, to product design, manufacturing, commissioning, and delivery. Rest assured, we also provide prompt and reliable after-sales service following delivery.

Planning



Please let us know your requirements, specifications, and requests. We can provide a variety of proposals based on your budget and testing needs.

We will also align with the customer's project goals to ensure successful achievement. A non-disclosure agreement will be concluded if necessary.

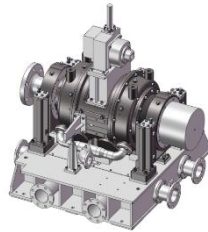
Contract



After the product manufacturing specifications, service requirements, definitions, and project amount are finalized, the contracting process will begin.

We will work closely with the customer to ensure that the project is executed in accordance with the agreed schedule.

Design, production



We will proceed with product manufacturing under strict delivery and safety control, ensuring compliance with the customer's defined requirements, functionality, and quality standards.

Also, conducting Pre-commissioning at our test bench.

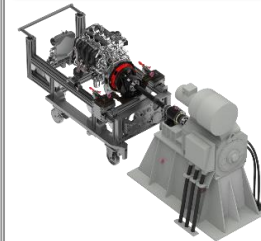
Delivery Civil work



After packing, we deliver the products with the utmost care to ensure that they remain secure and intact during transportation.

We also carry out civil engineering work such as installation, piping, and wiring as requested by the customer.

Commissioning Acceptance



System configuration is carried out, followed by reproducible testing and final adjustments at the customer's test bench.

After service

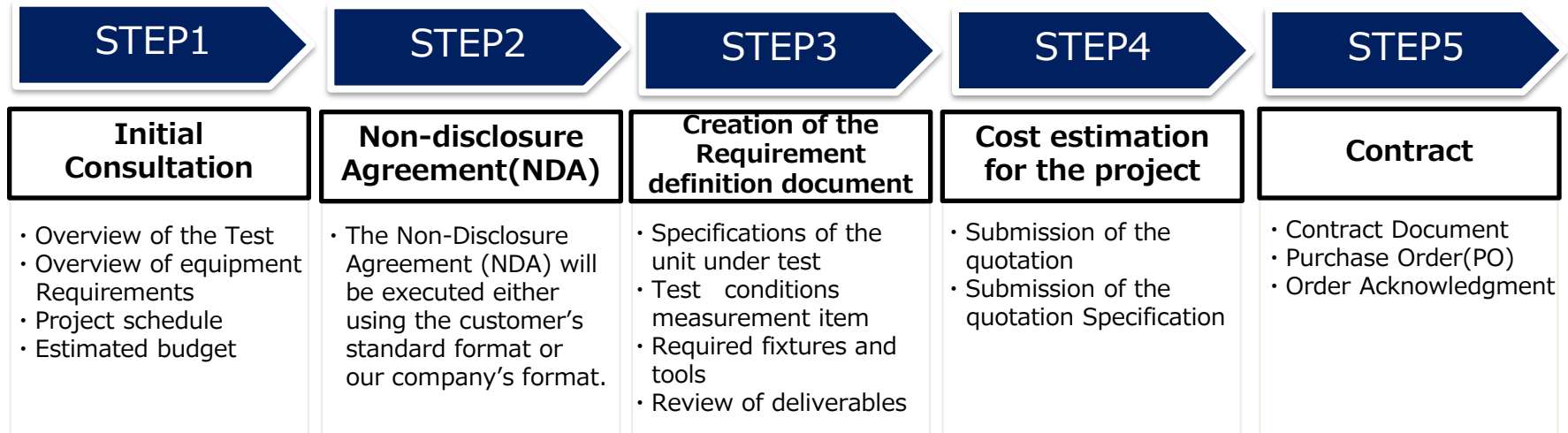


We provide long-term support even after product delivery.

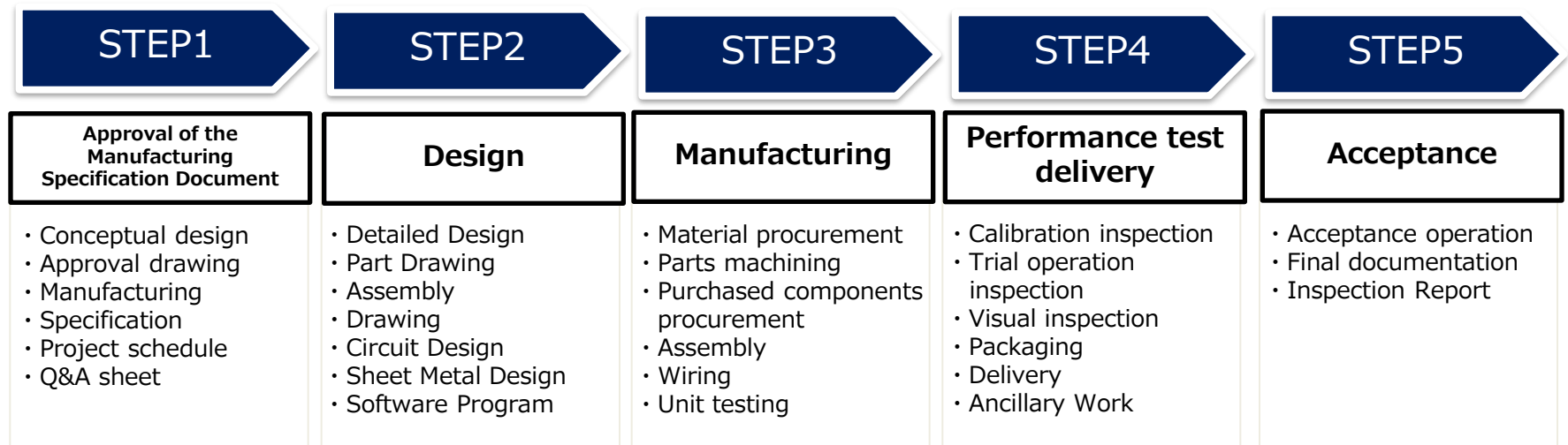
We offer prompt assistance anywhere as needed.

In addition, we propose product upgrades and maintenance planning to ensure continued optimal performance.

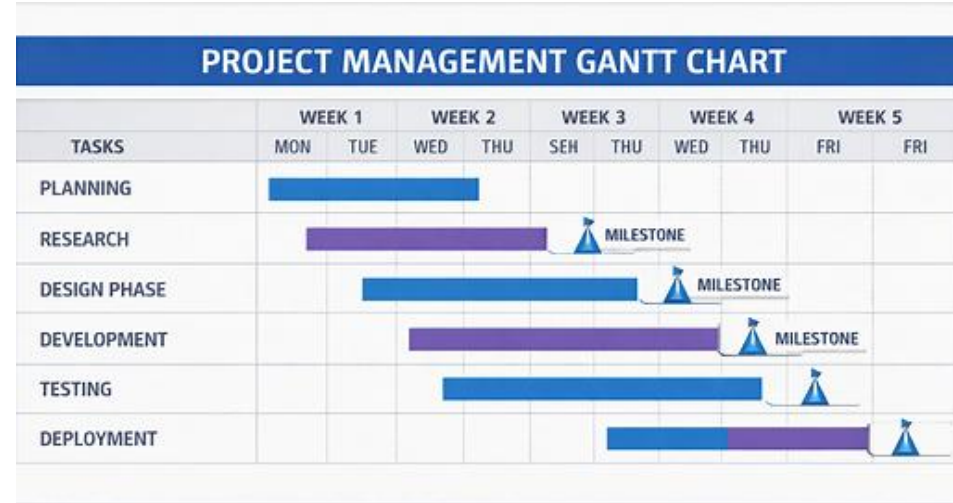
» Process from initial inquiry to contract finalization



» Process from project initiation to completion



» Project execution framework



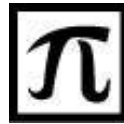
✓Project Leader and Assigned Members

We assign a Project Leader (responsible person) and project members according to the project's scale and type—whether it is a new installation, repair work, or on-site inspection.

✓Project Management

With clearly defined requirements and a firm commitment to achieving QCD (Quality, Cost, Delivery), we approach every project with the same passion as our customers and work sincerely toward its success.





Since 1948



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