



~Advanced Test System and Test Bench Engineering Professional~

Tokyo Plant Co., Ltd.



Introduction AC dynamometer

Our group (Tokyo Plant and ENORISE) manufactures AC-type electric dynamometers that offer high accuracy and excellent durability, and they have been adopted by many customers both in Japan and overseas.



» **Product Lineup**

We offer a wide product lineup ranging from 1 kW to 2,500 kW.

» **Performance Record**

Total units delivered: Over 300
Destinations:
Japan and more than 30 countries worldwide

» **Delivery Record (in no particular order)**

Japan)

Komatsu Cummins, Dynax, Yamaha Motor, Daikin Industries, FEV

Overseas)

RENAULT, RENAULT Truck, VOLVO, VOLVO Truck, DAIMLER UNIMOG, BMW, HYUNDAI, PSA Peugeot-Citroën, FIAT Elasis, ZF Sachs (Germany), RSA (France), CETIM Test Center (France), KST, CAT, FEV, HONDA, KIA, JOHN DEERE – SEEC – USA, Various research institutes, racing teams, AIRBUS, SAFRAN, Microturbo, DGA, Arianespace, RUAG, DAHER overseas military organizations, universities, technical colleges, and others
(More than 150 companies in total)

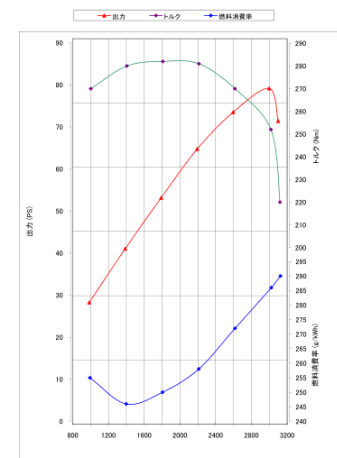
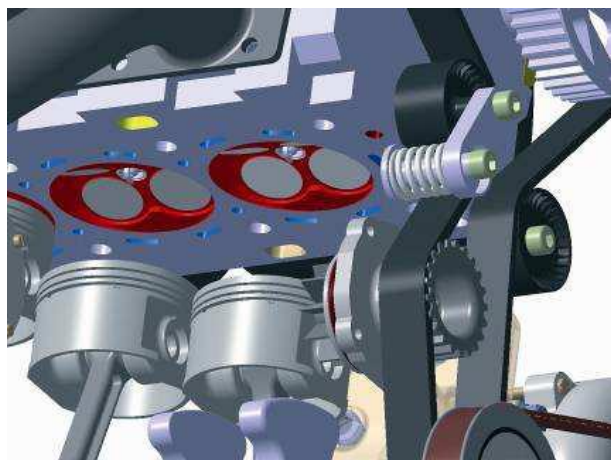
» Target Applications

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



Alternating current(AC) dynamometer

Product & Solution

» Output range : 1kW – 2,500 kW

We offer a wide range of products to provide optimal solutions for our customers' applications.



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

Model	Main Specifications	Units under test
DR type	160kW~600 kW	IC engine
DX type	20,000~30,000 rpm	Electric motors, eAxles, and turbines
DW type	2,500Nm~5,200Nm	IC engine、 Axle performance
S type	1kW~2500kW、 ~40,000rpm We can provide custom-made products tailored to your specific needs.	IC engine, electric motors, e-axles, turbines, VTOL systems, and more

Custom specifications are also available.

» Drive unit ACS series



This is the drive unit designed for use with each AC-type electric dynamometer

PM series



This is the drive unit designed for use with each PM-type electric dynamometer.

■ Main Specifications

Rated Output: 170 kVA to 130 kVA (※)
Power Supply Voltage: 400 V / 480 V / 690
VFrequency: 48-63 HzMotor Connection
Frequency: 0 to ± 300 Hz
Rated Current: 250-1528 A (※)
Operating Temperature Range: -15 to $+50$ °C
Operating Relative Humidity: 5-95%
Heat Dissipation: 12 kW
Noise Level: 75 dBA
Interface Profibus 12 Mbit/s
EtherCAT 100 Mbit/s
Protection Rating IP42
EMC Test Standard EN61800-3

■ Main Specifications (Example)

Communication : EtherCAT, CAN-Bus, Profinet
Primary Power Supply : Three-phase 400 V $\pm 10\%$, 50 Hz

Control Panel (Control Cabinet)

- Power supply with main power switch
- Main power voltage: Three-phase 400 V $\pm 10\%$, 50 Hz
- Control power supply: DC 24 V
- Emergency stop circuit: PNOZ (safety-relay system)

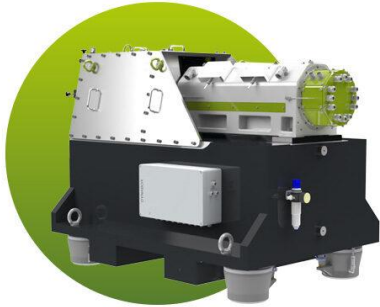
Active Front End (AFE)

- Overload capability: 120%
- (Allows 30 seconds of overload operation within a 10-minute period)
- DC bus voltage: 650 VDC
- Switching frequency: 6 kHz

Motor Inverter

- Rated performance: Continuous current 1435 A (S1 operation)
- Overload capability: 120%
- (1760 A for 30 seconds within a 10-minute period)
- DC bus voltage: 650 VDC
- Switching frequency: 12 kHz

» Motor evaluation test bench



» Scope of the project

- ✓ Automation system MORPHEE
- ✓ AC dynamometer (High speed type)
- ✓ Bear box
- ✓ Environmental temperature chamber
- ✓ Angle plate, spindle unit
- ✓ Frame (sliding type)

Feature)

A broad variety of components can be evaluated as part of our electrification support.

» End of line test bench



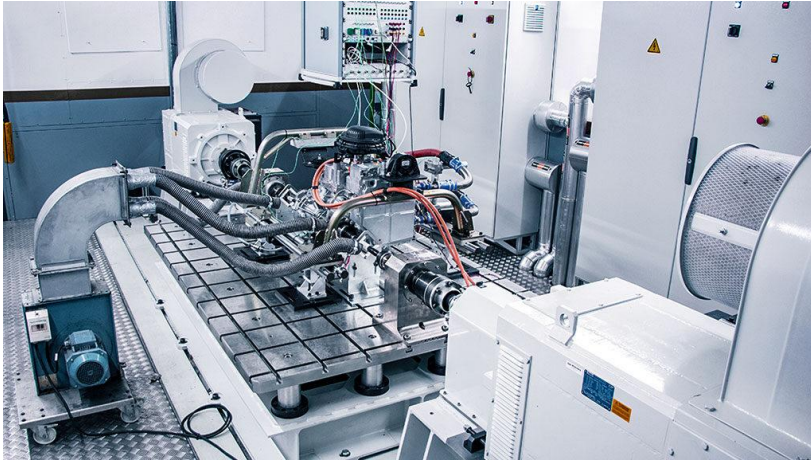
» Scope of the project

- ✓ AC dynamometer
- ✓ Drive unit
- ✓ Coupling flange , shaft
- ✓ Shaft guard

Feature)

High-output and high-torque ranges are covered, and regenerative power reduces the customer's energy costs.

» eAXLE test bench



» Scope of the project

- ✓Automation system MORPHEE
- ✓2sets of AC dynamometer
- ✓Drive unit
- ✓2sets of Drive shafts

Feature)

Performance evaluation testing of the e-AXLE can be conducted using two dynamometers. By utilizing power regeneration, the system reduces the customer's overall energy cost.

» Wheel test bench



» Scope of the project

- ✓Automation system MORPHEE
- ✓4sets of PM dynamometers
- ✓Drive unit
- ✓4sets of shafts

Feature)

By directly connecting four dynamometers to the vehicle axles, the system can reproduce actual driving conditions, enabling exhaust-emission measurement, fuel-consumption testing, and performance evaluation of components such as the e-AXLE and transmission.

» Transmission test bench



» Scope of the project

- ✓ 2 sets of dynamometers
- ✓ 2 sets of drive unit
- ✓ Automation system
- ✓ Cabinet
- ✓ Sensor terminal box (MIO)
- ✓ Calibration tools
- ✓ Commissioning

Feature)

- ✓ It measures both driving and driven torque as well as rotational speed.
- ✓ Because automatic operation and automatic measurement are supported, it helps improve the efficiency of your testing operations.
- ✓ Detailed specifications will be determined according to your specific requirements.

» 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.

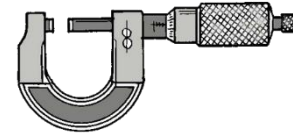
Only test equipment that has passed our strict standards is delivered to our customers again.

» 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.

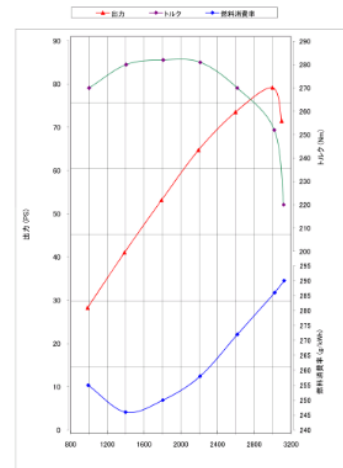
We are confident that the report is free of ambiguities, and our customers can be assured that it is free of ambiguities.

(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.



》 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.

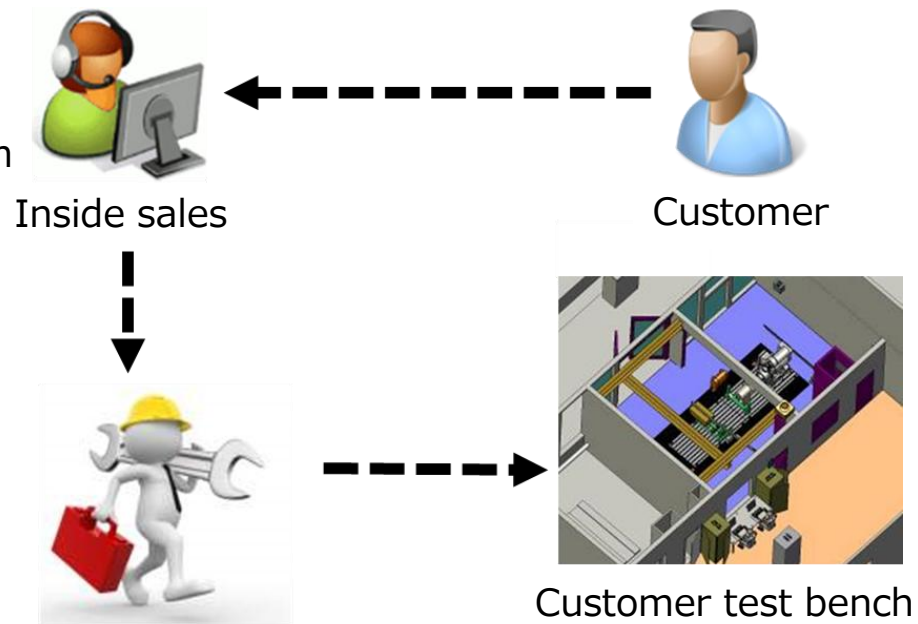
We recommend annual inspections to prevent these things from happening and to ensure safe use of our testing equipment.

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

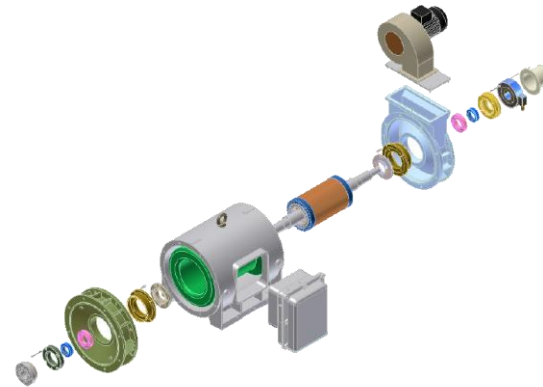


» Spare parts and calibration

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.

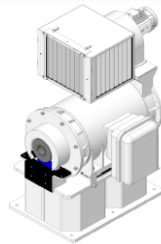
Contract



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

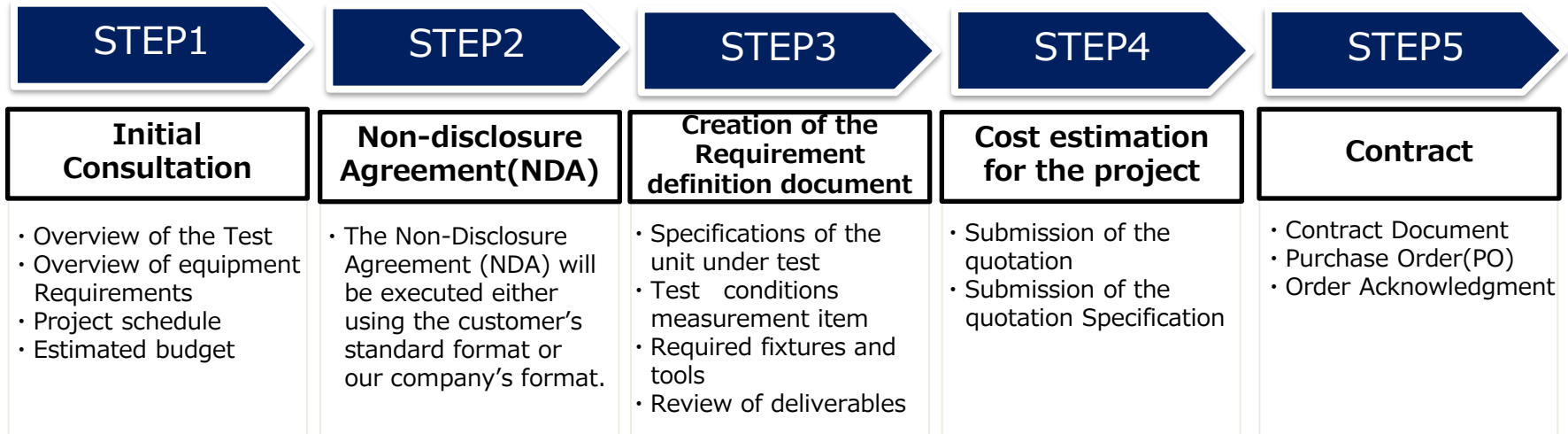


We provide long-term support even after product delivery.

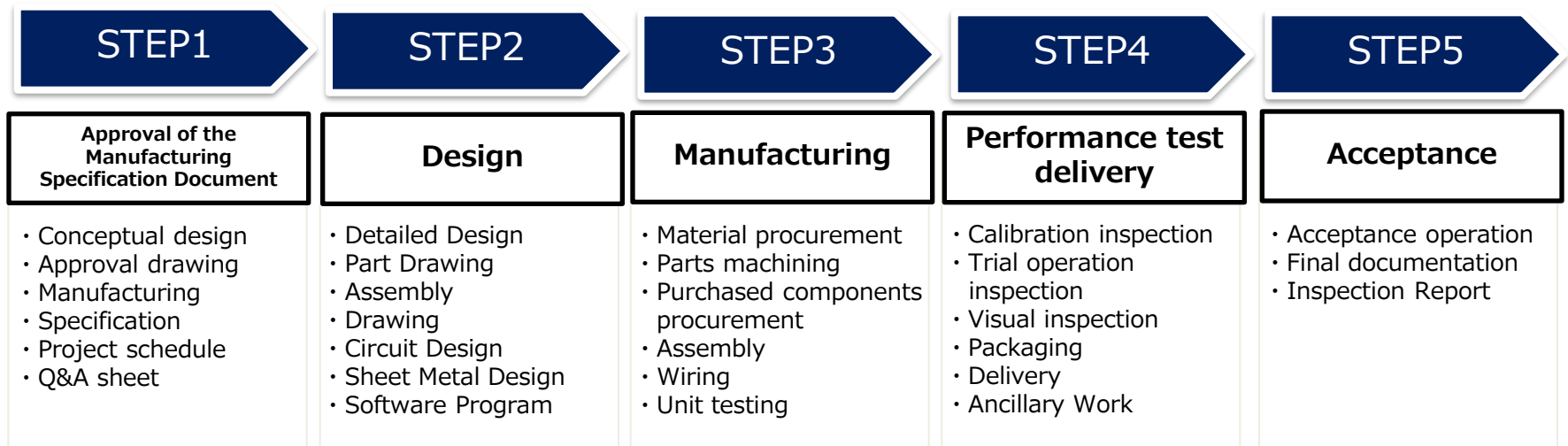
We offer prompt assistance anywhere as needed.

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

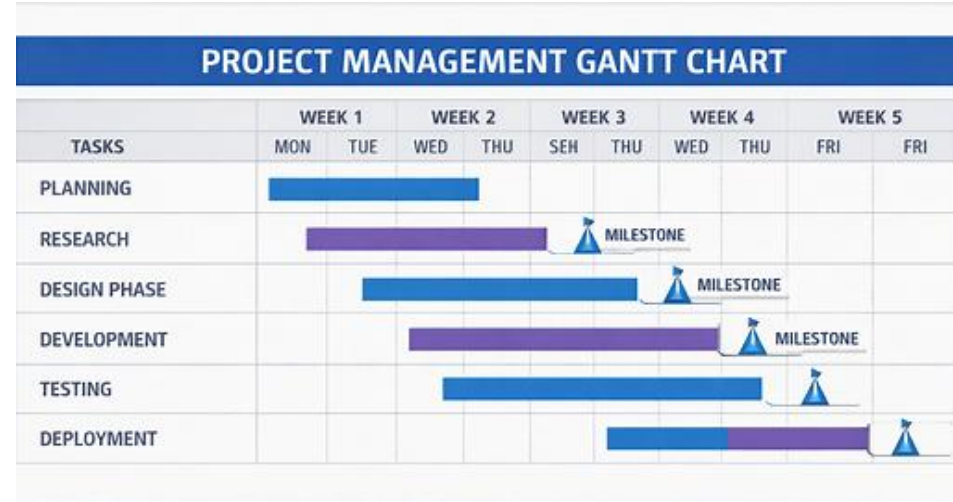
» Process from initial inquiry to contract finalization



» Process from project initiation to completion



» Project execution framework



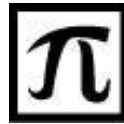
✓Project Leader and Assigned Members

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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