World’s Largest Manufacturer of Canned Motor Pumps

ISO 9001 CERTIFIED
A MODERN PUMP
FOR A NEW MILLENNIUM

Safety Meets Efficiency
The ever-increasing demand for environmental safety at a reasonable cost presents a unique challenge to the Process Industries: find and utilize equipment that, while operating leak-free, performs reliably and efficiently. Teikoku’s Canned Motor Pump more than meets the challenge.

Besides double containment for total fluid control, the pump offers some remarkable performance advantages. Designed to enable long periods of time between maintenance (with pre-planned downtime), it has only a few components that need to be monitored and serviced. It never requires costly alignment procedures or external lubrication. And, because it is sealless, the Teikoku Canned Motor Pump eliminates seal maintenance as well as the demands of complicated seal support systems.

The Teikoku Canned Motor Pump: true secondary containment, reliable operation, cost-efficiency...and continuing environmental concern.

TEIKOKU CANNED MOTOR PUMPS

NO LEAKAGE
Handles toxic, explosive, expensive, hazardous, carcinogenic and corrosive fluids without leaking.

AIRTIGHT
Ideal for vacuum services or for fluids that react to contact with air.

NO SHAFT SEAL
No mechanical seal. No gland packing.

NO EXTERNAL LUBRICATION
Pumped fluid provides cooling and lubrication of motor and bearings. No lubrication levels to check or maintain.

FIELD REPAIRABLE
All wear parts are easily changed.

COMPACT DESIGN
Motor and pump are a single unit. No alignment is necessary. No grouting or elaborate foundation is needed.

QUIET OPERATION
Low noise level since no fan is used to cool motor. All rotating parts are within a thick shell container.

EXPLOSION PROOF
Rated to handle conditions up to 5,000 psi.

API 610 NOZZLE LOADS

ANSI SIZES AVAILABLE

ALL PUMPS PERFORMANCE TESTED
Every component of each pump is manufactured by Teikoku, adhering to strict statistical quality control tolerances, and each pump and motor are 100% performance-tested before shipment.
**COMPARE TEIKOKU TO:**
**CENTRIFUGAL PUMPS WITH DOUBLE MECHANICAL SEALS**

**MECHANICAL SEALS**
Can cause total shutdown when they fail. No secondary containment.

**SEPARATE MOTOR AND PUMP**
Must constantly be kept in proper alignment. Motor is exposed. A foundation is necessary to support the increased weight and reduce the danger of misalignment.

**TIME-CONSUMING MAINTENANCE**
Motor and bearing lubrication levels must be continually monitored.

**ELEVATED NOISE LEVEL**
Separate motor cooling fan is required. Rotating parts greatly add to the noise.

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**MAGNET DRIVE PUMPS**

**THIN CONTAINMENT SHELL**
Subject to damage by magnets and subsequent leakage. No secondary containment.

**MANY BEARINGS**
All must be checked frequently for proper lubrication. Bearings within impeller shaft cannot be easily monitored.

**SEPARATE MOTOR AND PUMP**
Must constantly be kept in proper alignment. Motor is exposed. A foundation is necessary to support the increased weight and reduce the danger of misalignment.

**NOISY FAN**
Needed to cool motor.
TEIKOKU CANNED MOTOR PUMPS
DESIGNED FOR ZERO LEAKAGE SERVICES IN THE CPI

TEIKOKU, the world’s largest supplier of canned motor pumps presents a state-of-the-art, sealless pump.

No newcomer to the field, TEIKOKU has provided customers with proven Canned Motor Pumps for 40 years. Over 400,000 units have been installed worldwide, covering every application.

TEIKOKU is unique in that we design and manufacture both pumps and motors, thus insuring our customers total quality control.

The TEIKOKU Canned Motor Pump replaces conventional sealed pumps providing safer, more efficient operation. This is especially advantageous when pumping hazardous or hard to handle materials.

Vacuum dried, N₂ purged stator with Class C or F insulation

Side Gap Double Orifice

Noncontacting double orifice permits minimum leakage and improves volumetric efficiency. Enclosed impeller with optimum side gap keeps hydraulic losses at a minimum as well.

Improved terminal plates seal off higher pressure from inside, and a waterproof terminal box assures safe outdoor operation. All motor-pumps are provided with an explosion proof terminal box.

No coupling alignment is required. No mechanical seal is required.

TEIKOKU provides expertise and assistance in selecting the pump best suited to our customer’s specific needs. We have experience with horizontal standard pumps, vertical designs with either pump top or motor top, pumps and motors jacketed for either cooling or heating, self priming, submerged, slurry design, super-heat resistant pumps and more.
**TEIKOKU ROTARY GUARDIAN
BEARING WEAR MONITOR**

Each Teikoku Canned Motor Pump comes with the patented Teikoku Rotary Guardian (TRG) — an electrical meter that continuously monitors both axial and radial wear. The TRG indicates any serious malfunction of the pump before a failure occurs; many users opt to have the TRG connected to an alarming device.

In Teikoku’s factory testing lab, all pumps are 100% performance-tested before shipment.

This photograph demonstrates how the Rotary Guardian continuously provides accurate, incremental metering of unseen axial and radial wear. The computer graphic below the TRG illustrates corresponding changes within the monitored pump (these changes would be concealed within an actual canned motor pump).

Teikoku’s various product lines include zero-leakage canned motor pumps, mixers and accessories. All pumps are available in vertical configuration for longer pump life and minimal space usage in plants and other processing facilities.
**CORPORATE OVERVIEW**

Teikoku USA, Inc. is a wholly owned subsidiary of Teikoku Electric Manufacturing Company, which was founded in 1939 and is now the largest manufacturer of sealless canned motor pumps in the world. Teikoku manufactures over 20,000 units per year.

**MAIN OFFICE**

**HOUSTON, TEXAS**

Located adjacent to our warehouse, our office houses a full staff of technical advisors and service personnel. Authorized service facilities are located in Geismar, Louisiana and Burlington, New Jersey.
**HIGH TEMPERATURE** service pumps are available in two versions. Type F with ceramic insulated motor windings (no motor cooling is required) and Type B with cooling jacket on motor with class C insulation.

**TYPE F X MOTOR (CERAMIC INSULATION)**
the simplest construction makes it more reliable

<table>
<thead>
<tr>
<th>Pump size</th>
<th>1.5 x 1 x 5</th>
<th>to</th>
<th>4 x 5 x 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,600 RPM motor</td>
<td>2 HP / 1.5 kw</td>
<td>to</td>
<td>75 HP / 55 kw</td>
</tr>
<tr>
<td>1,800 RPM motor</td>
<td>5 HP / 3.7 kw</td>
<td>to</td>
<td>25 HP / 18.5 kw</td>
</tr>
</tbody>
</table>

Maximum allowable liquid temperature, 750°F / 400°C. Standard pressure rating up to 430 psi/30 bar.

- **3,600 RPM motor**: 2 HP / 1.5 kw to 75 HP / 55 kw
- **1,800 RPM motor**: 5 HP / 3.7 kw to 25 HP / 18.5 kw

Dynamically and hydraulically balanced single rotating element is FREE-FLOATING in the hot liquid. This allows no thermal stress or impact on either the shaft or the bearings. No degrading of alignment or coupling problems.

ANSI RF flanges are standard. Other standards are also available.

Ceramic insulated motor windings withstand up to 752°F/400°C under continuous full load operation. No cooling required.

Sealed terminal plate forms true containment.

Extended motor leads to keep heat from reaching terminals and bearing monitors.

Bearing Monitor (TRG) is standard on all pumps.

**X-TYPE (HIGH-TEMPERATURE-INSULATION TYPES)**
In high temperature and frequent heat-cycle applications, a special tube recirculates the lubrication liquid WITHOUT NEED FOR EXTERNAL COOLING.
TYPE B WITH BUILT-IN HEAT EXCHANGER AND MOTOR COOLING JACKET

- Toughest against temperature changes and all thermal upsets
- Wider selection than any other sealless pumps
- No mechanical seal, no ball bearings, no coupling – No leakage
- Selections can be made from

<table>
<thead>
<tr>
<th>Pump size</th>
<th>1.5 x 1 x 5</th>
<th>to</th>
<th>8 x 10 x 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,600 RPM motor</td>
<td>1.5 HP / 1.1 kw to 233 HP / 175 kw</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,800 RPM motor</td>
<td>3 HP / 2.2 kw to 160 HP / 120 kw</td>
<td></td>
<td></td>
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</tbody>
</table>

Maximum allowable liquid temperature, 850°F / 455°C regardless of the motor size. Pressure rating up to 5,000 psi/350 bar.

Hot liquid as high as 850°F comes in and out of pump casing, but heat conduction to motor is kept to a minimum by the adaptor neck - Casing and motor are thermally isolated, but hydraulically connected.

There is no substantial exchange between Hot main stream and Cooled circulation stream.

Heat exchanger keeps the circulating liquid as low as 300°F/150°C while main stream is 850°F/455°C.

Product is pumped by the auxiliary impeller fixed on the shaft to circulate through bearings and the heat exchanger.

Bearing Monitor (TRG) mounted on terminal box. Sealed terminal plate and true secondary containment.

“Free Floating” single rotating element eliminates problems common with sealed and mag drive pumps.

Back-pull-out design for easier maintenance.

Long lasting and self-lubricating carbon graphite bearings are toughest against heat and thermal impact.

ANSI RF flanges are standard. Other standards are also available.

No centerline supported casing is required. No alignment and no leveling are required. Easy installation - less mounting space required.
### MOTOR RATINGS
STANDARD TEIKOKU CANNED MOTORS

#### 2 Pole Motors

<table>
<thead>
<tr>
<th>Motor Frame #</th>
<th>Rated Output (kw/hp)</th>
<th>Nominal Voltage (V)</th>
<th>60Hz</th>
<th>50Hz</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td>Rated Amp. (A)</td>
<td>Start. Amp. (A)</td>
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<tr>
<td>119</td>
<td>0.75/1</td>
<td>400</td>
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<td>10.5</td>
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<td>1.1/1.5</td>
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<td>2.7</td>
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<td></td>
<td>1.3/1.7</td>
<td>440</td>
<td>3.0</td>
<td>10.5</td>
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<td>(215)</td>
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<td>2.5/3.3</td>
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#### 4 Pole Motors

<table>
<thead>
<tr>
<th>Motor Frame #</th>
<th>Rated Output (kw/hp)</th>
<th>Nominal Voltage (V)</th>
<th>60Hz</th>
<th>50Hz</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td>Start. Amp. (A)</td>
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<td>440</td>
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</table>

**Notes:**

1. For actual voltage and corresponding amperage, refer to the Technical Data Sheet issued for each individual order.

2. Motors are available with insulation class R and with or without cooling/heating jacket.
Product Range/Limitations on Application

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<thead>
<tr>
<th></th>
<th>Standard</th>
<th>Upon Request</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAPACITY (max)</td>
<td>4,227 GPM 16 m³/min</td>
<td>10,500 GPM 40 m³/min</td>
</tr>
<tr>
<td>TDH (max)</td>
<td>2,000 ft. 609 m</td>
<td>2,500 ft. 600 m</td>
</tr>
<tr>
<td>TEMPERATURE*</td>
<td>-112 to 716°F -80 to 380°C</td>
<td>-328 to 842°F -200 to 450°C</td>
</tr>
<tr>
<td>VISCOSITY (max)</td>
<td>100 cst 100 cst</td>
<td>350 cst 350cst</td>
</tr>
<tr>
<td>DESIGN PRESSURE (max)</td>
<td>430 psi 30 bars</td>
<td>5,000 psi 350 bars</td>
</tr>
<tr>
<td>MOTOR HORSEPOWER (max)</td>
<td>230 HP 175 KW</td>
<td>667 HP 500 KW</td>
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<tr>
<td>MAJOR MATERIALS OF WETTED PARTS</td>
<td>304SS, 316SS</td>
<td>304LSS, Hastelloy, Titanium, alloy 20</td>
</tr>
</tbody>
</table>

*temperature of pumped liquid

Quality Assurance
All motors and pumps are designed and manufactured by TEIKOKU under its full quality control program. Every motor-pump is inspected and tested before shipment. The QC program consists of the following tests and inspections.

- **Applied to all pumps, data furnished to customer if required.**
- **Applied to all pumps, no data available to customer.**
- **Applied to all pumps, data submitted to customer.**
- **Test done only upon customer request, data submitted to customer.**

I. MOTOR

1-1 Measurement of resistance between terminals (main power coils)
1-2 No load test
1-3 Locked rotor test
1-4 Surge test
1-5 Insulation test
1-6 Dielectric strength test
1-7 Temperature rise test
1-8 Measurement of resistance between terminals (TRG coils)

II. PUMP PERFORMANCE

2-1 Capacity vs head, current, input
2-2 NPSH test
2-3 Capacity vs TRG output measurement
2-4 Thrust force and circulation flow measurement
2-5 TRG output check for reverse rotation

III. OTHERS

3-1 Vibration test
3-2 Noise test
3-3 Dimensional check
3-4 Hydrostatic test
3-5 Pneumatic test
3-6 Vacuum test
3-7 Halogen leak test
3-8 Mechanical seal leak test (slurry design)
3-9 Priming test (for type G only)
3-10 Mill certificate on metallic materials
3-11 ND tests on metals and weldings
**BASIC VERSIONS**

**F-V TYPE (BASIC TYPE WITH HOLLOW SHAFT)**
Fundamental design of TEIKOKU Motor Pump. Most commonly used for a wide variety of applications.

**FA-V TYPE (BASIC TYPE WITH HOLLOW SHAFT)**
Fundamental design of TEIKOKU Motor Pump, but with adapter to increase motor and pump combinations.

**RW/RV AND/OR FW/FV (VERTICAL IN-LINE)**

**RW or RV (Reverse Circulation)**
- Improves Venting
- Improves Bearing Load
- Recommended for Low Viscosity and Steep Vapor Pressure Liquids
- Minimum Space Required

**FW or FW (Hollow Shaft)**
- Minimum Space Required

**K-S TYPE (FULL-STEAM-JACKET TYPE)**
Suitable for handling fluids with high melting points.

**R TYPE (REVERSE CIRCULATION TYPE)**
Suitable for handling volatile fluids, such as Ammonia, Freon, and other liquified gases, and for very low NPSH applications.

**K TYPE (FULL-STEAM JACKET TYPE)**
Similar to K-S type, but for fluids with lower melting point.
**B TYPE (HIGH-TEMPERATURE-INSULATION TYPES)**
Suitable for handling high temperature fluids, such as heat transfer oil.

**D TYPE (SLURRY SEAL TYPE)**
Suitable for handling fluids containing small amounts of fine solids.

**G TYPE (SELF-PRIMING TYPE)**
Used for pumping fluids from underground tank or rail/tank truck unloading.

**F-M TYPE (MULTI-STAGE TYPE)**
Higher head, higher efficiency pump. Besides F-M type, R-M (Reverse Circulation) type and B-M (High Temp-Insulation) type are also available.

**XG TYPE (GAS-SEALED SLURRY TYPE)**
Handles fluid with considerable slurry. Besides XG-type, SG-type with external flushing is also available.

**X TYPE (HIGH-TEMPERATURE-INSULATION TYPES)**
Suitable for handling high temperature fluids, such as heat transfer oil.
FLUIDS PUMPED BY TEIKOKU

Acetaldehyde
Acetic acid
Acetic anhydride
Acetone
Acetone cyanhydrin
Acetonitrile
Acrolein
Acrylic acid
Acrylonitrile
A-Heavy oil
Aldol
 Allyl alcohol
Allyl chloride
Aluminium hydroxide
Aluminium oxide
Aluminium potassium
Aluminium hydroxide
Aluminium sulfate
2-Aminooethanol
Ammonium carbonate
Ammonium chloride
Ammonium hydrogensulfide
Ammonium sulfate
Ammonium tetrafluoroborate
Aniline
Anisole
Anthracinone oil
Aqueous ammonia
Barium sulfate
Barium trichloride
Benzaldehyde
Benzene
Benzen chloride
Benzylic alcohol
Benzyl chloride
Boron oxide
1,2-Butadiene
1,3-Butadiene
Butane
1-Butanol
di-2-Butanol
Butyl acrylate
tert-Butyl alcohol
Butylaldehyde
Butylamine
di-sec-Butylamine
tert-Butylamine
Cadmium nitrate
Calcium carbonate
Calcium chloride
Calcium hydroxide
Calcium hypochlorite
Calcium sulfate
Caprolactam
Carbon bisulfide
Carbon dioxide
Carbon tetrachloride
Chloral
L-Chlorine
Chlorine dioxide
Chloroacetic acid
Chloroacetic acid
m-Chloroaniline
o-Chloroaniline
p-Chloroaniline
Chlorobenzene
Chloroform
Chloromium (VI) oxide
Chlorosulfuric acid
Citric acid
Coconut oil
Copper (II) hydroxide
Copper (II) sulfate
m-Cresol
o-Cresol
p-Cresol
Crotonic oil
Crotonealdehyde
Cyanoacetic acid
Cyclohexane
Cyclohexane
Cyclohexanone
Cyclohexylamine
Developer
Dibutyl phthalate
Dichloroacetic acid
m-Dichlorobenzene
o-Dichlorobenzene
p-Dichlorobenzene
1,1-Dichloroethylen
cis-1,2-Dichloroethylen
trans-1,2-Dichloroethylen
1,1-Dichloropropene
1,2-Dichloropropene
1,3-Dichloropropene
2,2-Dichloropropene
1,1-Dichloropropylene
1,2-Dichloropropylene
2,3-Dichloropropylene
3,3-Dichloropropylene
trans-1,3-Dichloropropylene
Dithanolamine
Diethylene glycol
Diethylene glycol
Monooxyethylene ether
Di-2-ethylhexyl phthalate
Diketene
Dimethylamine
2-Dimethylaminoethanol
N,N-Dimethylformamide
2,3-Dimethylphenol
2,4-Dimethylphenol
2,5-Dimethylphenol, 2,6-
3,4-Dimethylphenol
3,5-Dimethylphenol
2,3-Dimethylpyridine
Dimeyl sulfate
Dimethyl sulfite
1,3-Dioxane
1,4-Dioxane
Dipropylene glycol
Epichlorohydrin
Ethanol
Ethyl acetate
Ethyl acrylate
Ethylbenzene
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NEW COMPACT DIGITAL PUMP LOAD CONTROL

Detect Loss of Load
• Dry running
• No prime
• Cavitation

Detect Overload
• Jammed impeller
• Bad bearings

2 Adjustable Set Points
LOW TRIP - When load is below the Low Trip, the built-in relay will trip.
• Dry running
• Loss of prime
• Plugged or closed inlet

HIGH TRIP - When the load is above the High Trip, the built-in relay will trip.
• Jammed impeller
• Bearing failure

Filter Out Nuisance Trips
• Adjustable Digital On-Delay Timers: Trip won’t activate until the selected delay time is exceeded.

• Adjustable Digital Start-up Timer: no false trips while motor is starting

THERMOWELL

Certain applications demand extra attention to thermal conditions. Teikoku can provide thermowells on their pumps to detect extreme temperature operations. The heavy-duty thermowells are designed to accommodate a wide variety of temperature indicating devices.

CONTACT TEIKOKU FOR OTHER AVAILABLE OPTIONS.
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