



















TEIKOKU ELECTRIC MFG. CO., LTD.

# Ultimately Ecological, Pollution - free, Zero Emission Canned Motor Pump & System

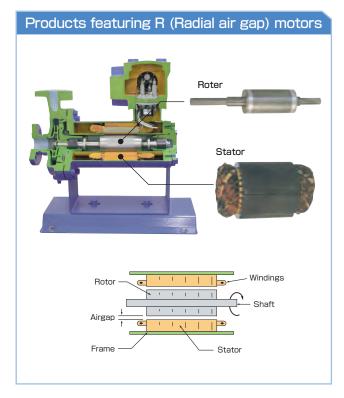
TEIKOKU presents the most edge-cutting canned motor pumps in double containment, leak-free, robust & user-friendly design to the users in desperate need to live up to 21st Century industrial standards on the planet!



TEIKOKU products will prove their hermetic-sealing power in the following fluid-handling segments;

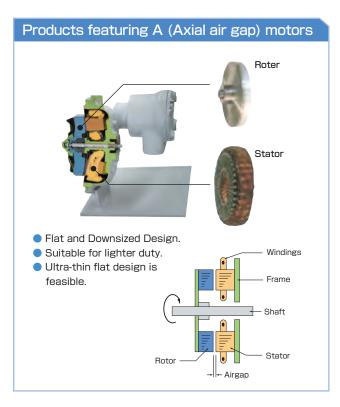
Oil & Gas Refining, Petrochemistry, Chemistry, Food-Processing, Pharmaceutical, Textile, Cosmetics, Airconditioning & Refrigeration, Semiconductor Manufacturing, Thermal or Nuclear Power Plants and more to come....

# The core technology is the hermetically sealed, type R or A Canned Motor



#### Type R motor Products

Motor	Product	No.	Model
		1	Canned Motor Pump Bearing - wear Monitor(TRG & THG)
		2	Type FV Standard Design
		3	Type F-M Multistage Pump
		4	Double Suction Design
		5	Type R Reverse Circulation
		6	Type B for High Temperature Services
		7	Vertical High Pressure Model RW
		8	Higher Heat Resistant Canned Motors, Types U $\&~\mathrm{X}$
		9	Type K-S Jacketed Motor-Pump
c/w Canned Motor	Centrifugal	10	Type G Self Priming
Σ	Single &	11	Type D for Slurry
peu	Multi Stage	12	Type SG / XG for Slurry
anr		13	Regenerative Turbine Pump PT
O >		14	Type BP Vertical Boiler Circulation Pump
S		15	Type BM for High Pressure, High Temperature & High Head
		16	API685 Canned Pump
		17	Type E for LPG
		18	Type N for LPG
		19	Vertical Inline Pump RW, RV, FW & FV
		20	Type L for Absorption type Refrigerators
	Agitator	21	Type R Canned Motor Agitator
	7.61.0101	22	Aerator + Mixer + Reactor
	Other	23	Canned Motor Sludge Crusher
		24	Self-primer for Chemical Waste
oto	Centrifugal	25	Plastic Lined Mag Drive Pump
Ž		26	Type QV for Molten Salts
her	Insulation Oil Pump	27	Type QK / QKD for Insulation Oils
Q		28	Type QK with Elevator Impeller
c/w Other Motor		29	Type TG sealless gear pump
	Blower	30	Type TQ sealless gas blower for SF6 gas
		31	Nuclear Design



# Type A motor products

Motor	Product	No.	Model
pe J	Λαitator	32	Type A Mixer for general use
c/w anne fotc		33	Type A Mixer for sanitary specs
_ ő ≥	Special Pump	34	Type TS Thin & Flat Canned Motor Pump
w ver tor	Inslation Oil Pump	35	Type SK for Insulation Oil Circulation on Trains
<b>€</b> €€	Brake Motor	36	Brake Motor for Hoist & Crane

#### Metering pumps

Product	No.	Model
Diaphragm	37	Simplex Metal Diaphragm Pump
Pump	38	Duplex High Pressure Diaphragm Pump

#### Other products

No.	Model
39	Rotating Direction Indicator for Motors TRC
40	Insulation Oil Cleaner, model TK
41	Electric Magnet

#### **New Product**

No.	Model	
42	Supersize Canned Motor Series	

# 1 \ Canned Motor Pump Bearing - wear Monitor (TRG & THG)

#### **TRG**

TEIKOKU ROTARY GUARDIAN has become Teikoku's signature protection device through its outstanding field services over 30 years on more than 200,000 Teikoku canned motor pumps.

It electrically detects Bearings' radial abrasion level of canned motor pumps in operation.



#### **THG**

The latest addition to "TRG Family". It detects Bearings' abrasion level not only radially but also axially, and tells toward which direction the whole rotating unit is moving very visually.





#### Because it's electric-signal-based

- ·Remote monitor type is available as well as standardized local monitor type.
- · Very easy to be integrated to any electronic control instrumentation such as DCS or PLC.



Panel-mounted meter for Remote Monitoring (Optional)



Alarm Device (Optional)

# 2 \ Type FV Standard Design



Chemical service pumps for a wide range of non-slurry liquid. Available in 304 SS, 316 SS and other high alloys. Available with optional heating or cooling jackets for both motor and pump. Available with Explosion Proof motors. Standard performance range:

#### Canned Motor

# $oldsymbol{4}\setminus \mathsf{Double}$ Suction Design



Duplex Parallel Pump Services can be consolidated by this design. It typically caters for Organic / Inorganic chemical pharmaceuticals, vacuum service, high pressure service, or radioactive fluid in nuclear power plants. Suitable for large flow-rate, lower TDH application.

Qmax :  $15 \text{ m}^3/\text{ min}$ TDH max : 90 mkW max : 220 kW

#### Canned Motor

# 6 \ Type B for High Temperature Services



Zero leakage service for hot oils, hot water and for any other high temperature chemicals.

Available either in horizontal or vertical designs with cooling jacket on motor and an integral heat exchanger.

Liquid temp. up to 840(cF/450°C Qmax : 3,430 gpm 13 m³/ min TDHmax: 530 ft 160 m kWmax : 295 HP 220 kW Temp : 842 °F 450°C

Canned Motor

# ▼ Type F-M Multistage Pump



Barrel type casing, low flow, high TDH for general CPI applications, reverse osmosis in electronics, pharmaceutical and semiconductor manufacturing. All canned pump features like extremely low noise and high reliability are maintained

#### Canned Motor

# 5 Type R Reverse Circulation



Self venting and low NPSHr for volatile liquids, liquified gases and refrigerants such as Ammonia and synthetic fluro and chloro hydro carbons.

Available both in horizontal and vertical designs. Extreme low temperature to high temperature services.

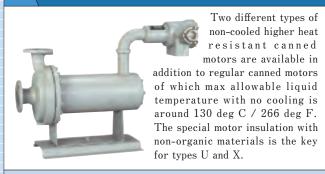
#### Canned Motor \

# Vertical High Pressure Model RW



Model RW designed for sealless, leak-free pumping of volatile fluids at high or low temperature under high system pressure, up to and exceeding, 35 MPa / 5,000 psi. Applications range from nuclear and chemical processes to hot water circulation in testing loops and circulation of super critical fluids.

#### Higher Heat Resistant Canned Motors, Types U & X



Types U and X are best featured in handling high temperature liquids such as Heat Transfer Oils, Hot Water and High Melting Temperature Chemicals with un-comparable easiness. Types U and X need no cooling providing customers with considerable energy and utility savings in high temperature pumping.

Type U Liquid temp: 446 °F 230 °C kWmax : 214 HP 160 kW Type X Liquid temp: 644 °F 340 °C kWmax : 80 HP 60 kW

#### Canned Motor

# 10 Type G Self Priming



Canned motor self-priming pump featuring elimination of priming problems due to leakage at shaft seal. Very pertinent to pumping solvents out of underground tanks and applications involving liquids with entrained or dissolved gas.

Qmax : 790 gpm 3 m³ / min TDHmax: 328 ft 100 m kWmax : 67 HP 50 kW Larger pumps upon request.

#### Canned Motor

# 12 Type SG / XG for Slurry



SG and XG are vertical design pump for relatively large amount of slurry. XG has self circulating sealing liquid in the motor chamber. Type SG features external flushing. Both designs utilize a gas chamber between pump and motor.

Type D is horizontal and for relatively small amount of fine slurry has self-circulating sealing liquid but has no gaschamber.

It's also pertinent to pumping polimerization / cristallization-prone, inherently unstable chemicals.

#### Canned Motor

# Type K-S Jacketed Motor-Pump



This series are developed to cater for liquids with nature of high-melting point.

Type K is jacketed and suitable for liquids with relatively low melting point such as Oleic acid, Fatty acid, Acetic acid, Amines, Phenol, Maleic anhydride, Caustic soda, p-Xylene, etc. Type K-S is heavily jacketed for liquids with relatively high melting point such as Maleic acid, Bisphenol, Caprolactam, Phtalic Anhydride Phtalic acid and Naphtalene.

#### Canned Motor

#### 11 Type D for Slurry



Type D is horizontal design for relatively small amount of fine slurry. Pump features a self-circulating sealing liquid but requires no gas-chamber.

Qmax : 2,640 gpm 10 m³ / min TDHmax: 533 ft 160 m kWmax : 161 HP 120 kW Allowable max slurry Content :  $3\sim5$ wt%

#### Canned Motor

#### 13\ Regenerative Turbine Pump PT



Designed for efficient, low flow-high head, leak-free pumping or circulation of volatile and expensive fluids such as cleaning agents and thermal control fluids. Applications are met in both General Industrial and OEM machine applications. PT regenerative turbines pumps are also available with Explosion Proof motors for use in the Chemical Process Industries or any process application where leak-free pumping is preferred or required.

Available in 6 sizes.

Capacity: 2 - 60 I / min

0.5 - 16 GPS : Max. 125 m

Max. 416 ft Motor kw: 0.75 - 3.7

# 14 Type BP Vertical Boiler Circulation Pump



Zero leakage and maintenance free hot water circulation canned motor pumps. Design features vertical mounting orientation with pump above motor for self venting design. The BP design is the best available technology to upgrade and replace wet stator type boiler circulation pumps used in electric generating stations. Users can expect increased motor life. All BP pumps can be manufactured and documented to exacting specifications of the electric utility or authority.

Manufacturing and design specs upon request.

#### Canned Motor

#### 16 API685 Canned Pump



Horizontal center line mount canned motor pump per API685 (API specification for sealless pumps) for higher liquid temperatures. This photo shows a TCMP designed and manufactured to API685 specifications for pumping high temperature hydrocarbons under elevated system pressure in a refinery application. TCMP API685 pumps are available to 220 Kw and 35 MPa / 5000 psi system pressure.

#### Canned Motor

# 18 Type N for LPG



Type N is submersible design for underground storage tanks featuring the elimination of long, bearing supported drive shafts and mechanical seal for zero leakage. Operating speeds can be changed from 4p to 2p speeds and back depending on varying head and capacify requirements. As such, continuous operation with the least energy consumption can be achieved.

Qmax : 80 gpm 300

I/m

TDHmax: 467 ft 140 m kWmax: 15 HP 11 kW

#### Canned Motor

#### Type BM for High Pressure, High Temperature & High Head



Horizontal center line supported multistage pump featuring a high temperature service canned motor and supplied with an integral heat exchanger for accurate temperature control of the internal, self-circulated lubrication flow.

All canned motor pump advantages are inherent in BM designs for the most difficult pumping applications in refineries and petrochemical process plants. Unlike conventional API pumps, BM pumps never require external lubrication, seal flush, couplings or mechanical component alignment.

#### Canned Motor

#### 17 Type E for LPG



Type E reverse circulated and selfventing for vertical installation on a mounting pad. Available with inducer to decrease NPSHR.

Qmax : 1849 gpm 7m³/m TDHmax : 524 ft 160 m kWmax : 161 HP 120 kW

#### Canned Motor

# 19\ Vertical Inline Pump RW, RV, FW & FV



Vertical reverse circulation models RW and RV are designed for high vapor pressure, volatile hydrocarbons. Vertical configuration and reverse circulation offers easier venting and assures stable long life operation in systems with low NPSH available. Canned motor pump design eliminates seal maintenance and associated down time.

Vertical FW and FV are space saving, self venting hollow shaft design. The small and space saving mounting footprint of these models make them very applicable in skid mount and other OEM equipment.

Capacity: Max. 7 m<sup>3</sup>/m

Max. 1,849 GPM Head: Max. 160 m

Max. 524 ft

Motor : Max. 120 kw 161 HP

#### **Type L** for Absorption type Refrigerators



Compact, light weight, extremely low NPSHr, fabricated sealless / leak-free canned motor pumps for operation under high vacuum.

Installation is either flange mount or weld in place.

Qmax : 422 gpm 1.6 m³/m TDHmax : 114 ft 35 m kWmax : 50 HP 37 kW

#### Canned Motor

#### 22 Aerator + Mixer + Reactor



TEIKOKU manufactures sealless reactor package consisting of canned motor mixer, canned motor aerator and reactor. Packaged units require no heavy gear box, no mechanical seal and no seal flush plans as are required on top mount conventional mixer sets. Sealless canned motor assures no contamination of the contained product by lube oil or flush fluid. Short shaft and sealless mount guarantees much easier cleaning and versatility of the reactor in food industry. Typical applications include Hydrogenation, Vacuum Distillation and Gas Injection

#### Regular Motor

# 24\ Self-primer for Chemical Waste



TEIKOKU offers a specialty product that is not a canned motor pump. This self-priming, slurry handling pump incorporates the feature of TCMP gas chambered canned motor slurry pump (see No. 12).

A gas chamber is mounted on top of the self-priming centrifugal pump and a bearing box is isolated on top with a seal for the bearing lube oil.

A standard, commercially available motor on top.

Used in various industrial waste treatment applications.

Capacity: Max. 1.2 m<sup>3</sup>/m : Max. 317 GPM

Head : Max. 50 m Max. 166 ft Motor : Max. 15 kw Max. 20 HP Allowable max slurry content : 60 wt %

#### Canned Motor

# 21\ Type R Canned Motor Agitator



Side or bottom tank entry, zero leakage agitators for high vacuum to high pressure services. Space saving canned motor design requires no alignment and no possibility of ingress or contamination from outside environment ensuring product quality.

Meets application requirements in the food, pharmaceutical and chemical industry for tanks and reactors for regular mixing, homogenization, reaction acceleration, emulsion production, uniform solution formulation and to suspend solids.

High speed mixing at 900/1100 RPM with canned motor driver up to 20 kw.

#### Canned Motor

# 23 Canned Motor Sludge Crusher



One of Chemical Reactors' QC Problems lies in sedimentation and deposit of impurities at the tank-bottom which can be carried over to the downstream.

Our Canned Motor Sludge Crusher, which is evolved from our household canned motor agitator, can provide the solution to this.

Product Range Motor up to 20 kW / 26 HP RPM:1,000/1,200 with 50/60Hz or maximum 3,600 with 60Hz

Wetted parts in stainless steel or other anti-corrosion alloys

(Photo is sample of line mounting)

#### Regular Motor

# 25\ Plastic Lined Mag Drive Pump



Magnetically driven inert plastic lined sealless pump for corrosive applications. All wetted parts are manufactured in either ETFE, PVDF, Rulon and/or Ceramics for superior corrosion resistance against chemicals that attack exotic alloys. Applications include Sulfuric acid (H2SO4), Hydrochloric acid (HCl), Chromic acid (CrO3), Phosphoric acid (H3PO4) and Hydrogen peroxide (H2O2)

Capacity: Max. 1.2 m³/m Max. 317 GPM Head: Max. 42 m Max. 140 ft Motor: Max. 15 kW Max. 20 HP Regular Motor

# Type QV for Molten Salts



Special pump for high temperature molten salts supplied with control box. Vertical design with standard. commercially available motor on top and a mechanical seal.

Examples of application are: cooling hot steel in steel mill, glass processing, and rubber vulcanization.

Manufacturing and design specs upon request.

Max temp: 1,112° F 600°C

Can-less / Sealless Pump

# Type QK / QKD for Insulation Oils



Sealless motor pump with high reliability for circulating insulation oil in large transformers and rectifiers. Design has produced a proven product for reliability, stability and total quality. Available in many sizes and orientations.

: 2,113 gpm 8m<sup>3</sup>/ m Omax TDH max: 65 ft 20m kWmax : 30 HP 22 kW

Can-less / Sealless Pump

# Type QK with Elevator Impeller



An axial flow impeller is mounted on a shaft loose. The impeller moves up when power is applied to pump the oil. Upon shutdown, the impeller moves down and creates the oil path through pump by properly sized thermo-cycle, developing energy saving.

Can-less / Sealless Pump

#### Type TG sealless gear pump



For insulation oil services.

Small flow, high head, stable and reliable operation is guaranteed for either vacum or pressure.

Qmax : 37 gpm 141 I / m Pd max: 56 psi 0.39 MPa kWmax: 3.4 HP 2.5 kW

Can-less / Sealless Pump

# Type TQ sealless gas blower for SF6 gas



Centrifugal gas blower and electric motor are coupled without shaft seal.

Manufacturing and design specs upon request.

Canned Motor

# **Nuclear Design**



Canned Motor pumps designed, manufactured and documented to a controlled ASME quality program qualifying for affixation of N-Stamp and available from Chempump Division. Pumps are compliant to NCA-4000 and CSA-Z299.3 design criteria and Naval Nuclear Standard. Seismic designs are available to meet varying seismic site requirements worldwide. Nuclear pumps are suitable for replacement under plant recertification requirements and sealed pump upgrades. Commercial unit upgrade program is also available.

# 32\ Type A Mixer for general use



A mixer with A type axial (flat) motor for side or bottom tank entry, zero leakage agitators for high vacuum to high pressure services. Space saving axial motor design requires no alignment and no possibility of contamination from outside environment. Compact and lightweight design will save tank fabrication cost.

Meets applications requirements for mixing and agitation, homogenization, uniform solution formulation, to suspend solids and catalysts and many other agitation applications.

Motor power up to 3.7 kw, rotating speed 900/1,100 rpm.

Canned Motor

#### 34 Type TS Thin & Flat Canned Motor Pump



This newly developed canned motor pump meets liquid cooling and heating thermal fluid circulation requirements for temperature control in electronic devices. This unique pump is designed to meet thermal and size requirements through a lightweight and compact construction in a zero leakage design.

The pump pictured here is only 50 mm (2") in diameter x 10 mm (0.4") thick. Further size reduction is possible if required.

Applications include coolant circulation in fuel cells and computers featuring liquid cooled circuit designs.

Flow range can be from as small as 0.1 l/min / 0.026 GPM to some litters per minute.

Other Product \

# 36 Brake Motor for Hoist & Crane



Type A axial (flat) motor provided with brake shoe on the back of the rotor. Shorter axial length especially suits use in the drum of hoists and cranes.

Motor output up to 3.2 kw.

Canned Motor

# 33 Type A Mixer for sanitary specs







Same basic construction as type A, but with all wetted surfaces finished and polished in compliance to sanitary requirements. The sealless design is especially suited for vacuum tanks, sterile and aseptic processes, closed process and pressurized tanks in food, pharmaceutical, cosmetic and beverage industries.

Can-less / Sealless Pump

#### 35 Type SK for Insulation Oil Circulation on Trains



Oil circulation pump with A type axial (flat) motor for axial space saving and mounting to the primary transformer on Shinkansen or express train cars. Designed and fabricated to the most stringent specifications to meet all requirements for public safety.

Qmax. : 800 l/m 211 GPM TDHmax.: 9.7 m 32 ft kWmax : 3.5 kw 4.6 HP

#### Metering Pumps

# 37\ Simplex Metal Diaphragm Pump



Performs excellent especially in accurate feeding into ultra-high pressure processes. This exquisite hydraulically driven metal diaphragm pump is typically featured in precision feeding of low flow into very high pressure thanks to its mechanical durability with no allowance for process liquid permeation through the diaphragm into the hydraulic chamber.

Product Range Qmax : 260 I/h Pd max. : 120 MPa

#### Metering Pumps

# 38 Duplex High Pressure Diaphragm Pump



PTFE diaphragm pump can produce repeatable flows against discharge pressures up to 35 MPa. Duplex pumps are often used for reducing the pulsation spikes under high pressure operation. All pumps feature manual capacity control via micrometer hand wheel adjustment, to feed different chemical requirements.

This is widely used in various chemical process and foaming process.

# 39 Rotating Direction Indicator for Motors TRC



The TRC is an easy—to—use device to check the rotating direction of Teikoku Canned Motor Pumps whose rotating units are all fully enclosed thus invisible from outside. This pocket sized, portable instrument can also be used to check the direction of rotation of regular induction

66.5W x 92L x 28T Power by battery, 9V

motors.

# 40\ Insulation Oil Cleaner, model TK



Cleaning unit for the insulation / cooling oil in transformers at power generating and transmission facilities.

The insulation cooling oil in transformers gets deteriorated by the contaminant such as carbon/metallic particle which is mostly the result of arcs generated by the switch over. The cleaner unit primarily, consists of a pump and a filter to trap these residues and restore the oil back to its virgin quality.

Filtration capability: 0.03  $\mu m$ Filtration capacity: Carbon 400 g Moisture 200 ml

Filter flow rate :10 I/mSize : 525L x 588W x 877H

# 41\ Electric Magnet

This magnet is for use in electron-accelerators weighing from just a few kgs to as much as 1,000 kgs. Several types has been developed such as deflection-type, 4-poles type, steering-type, or septum-type.

Photo shows a layer-built skewed 4-poles electric magnet used in a storagering of SPring-8 and is tailor-made to fit the relevant vacuum chamber. SPring-8 is reportedy the world largest radiation-beam R&D complex located in Hyogo, Japan.



# The largest Canned Motor Pump on the globe.

Max. 550kw Canned Motor which surpassed the previous largest of 220kw by far can be coupled with various pump-types of F, R, B and so on.

Power supply shall range from 400V (LV) to 3KV (HV). Typically used in Petrochemistry, Nuclear, or Boiler Circulation.

> **Product Range** Q max : 25 m<sup>3</sup>/min TDH max : 150 m kW max: 550kw



**Canned Motor** 

# **TEIKOKU** Group Global Network

#### TEIKOKU Electric Mfg.Co., Ltd. (Japan)

Plant & Business Headquarters Post Code: 679-4395

> 60 Hirano, Shingu-Cho, Tatsuno-Shi, Hyogo-Ken, Japan Phone : +81-791-75-0411 Fax: +81-791-75-4190

International Business Headquarters Post Code: 110-0015

6F Shitaya Bldg. 2-5, 5-chome, Higashi-Ueno, Taito-Ku, Tokyo, Japan

Fax: +81-3-3841-7334 Phone : +81-3-3841-9311

E-mail: ibd-tokyo@teikokudenki.co.jp

#### TEIKOKU USA INC. & CHEMPUMP Div. (North & South America)

TEIKOKU USA INC. 5880 Bingle Road, Houston, Texas 77092

> Phone: +1-713-983-9901 Fax: +1-713-983-9919

E-mail: info@teikoku-usa.com : www.teikoku-usa.com

CHEMPUMP Div. 959 Mearns Road, Warminster, PA 18974

> Phone : +1-215-343-6000 Fax: +1-267-486-1037

E-mail : chempump@chempump.com Web : www.teikoku-usa.com

#### TEIKOKU Electric GmbH (Europe)

Nuernberger Strasse 24, D-40599

Duesseldorf Germany Phone: +49-211-700-6778 : +49-211-749-0011 E-mail: info@teikoku-electric.de Web: www.teikokupump.de

#### DALIAN TEIKOKU CANNED MOTOR PUMP CO., LTD. (China)

中国大連三澗堡工業科技園区

Sanjianpu Science & Technology Industry

Area, Dalian, China

Phone: +86-411-8626-9657 : +86-411-8626-9292 Web : www.teikoku-china.com

TEIKOKU SOUTH ASIA PTE LTD. No.15, Joo Koon Crescent, Singapore 629015

Phone: +65-6861-4121 : +65-6861-4521

E-mail: info@teikoku-sa.com.sg Web : ( see US website )

#### TEIKOKU KOREA CO., LTD.

3F Woonam-bldg., 197-19 Nonhyun-dong, Gangnam-gu, Seoul, 135-010, Korea

Phone: +82-2-790-7012 : +82-2-790-7014

E-mail: webmaster@teikokukorea.co.kr Web: www.teikokukorea.co.kr





# TAIWAN TEIKOKU PUMP CO., LTD.

9F-1, No.5, Jinzhou st., Zhongshan District,

Taipei City 104, Taiwan, R.O.C. Phone: +886-2-2567-9800 : +886-2-2568-2670 E-mail: ttpco@ms32.hinet.net Web : ( see US website )