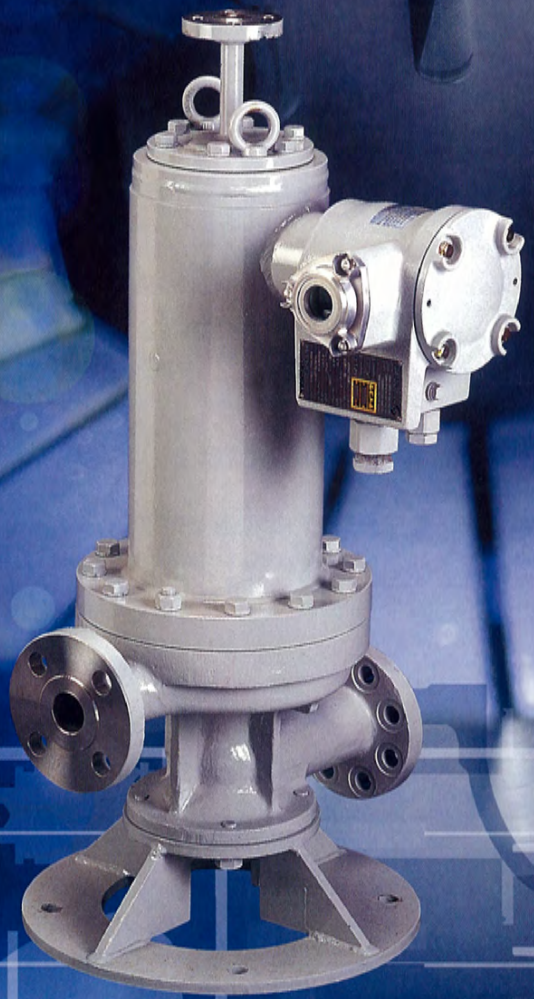
TEIKOKU

CANNED MOTOR PUMPS

World's Largest Manufacturer of Canned Motor Pumps

ISO 9001 CERTIFIED



TEIKOKU ELECTRIC MFG. CO., LTD.

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.

VACUUM to HIGH SYSTEM PRESSURE
Rated to handle conditions from full vacuum to 5,000 psi / 35 MPa.

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.

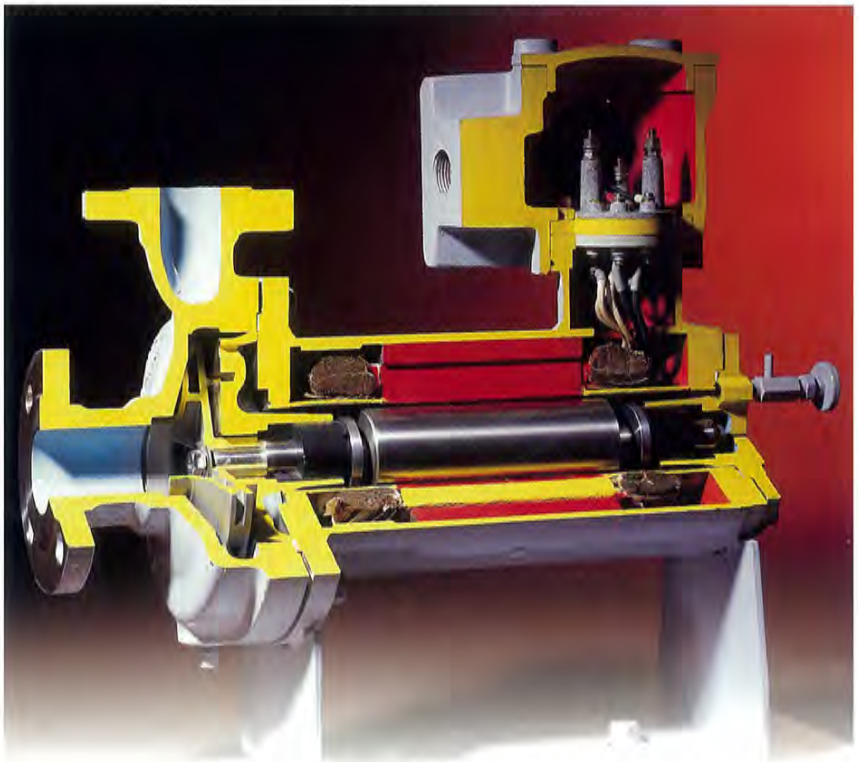
EXPLOSION PROOF
Certified by TIIS(Japan), PTB (Germany) and many other authorities

API 610 NOZZLE LOADS

FIELD REPAIRABLE
All wear parts are easily changed.

ANSI SIZES & ISO2858 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.



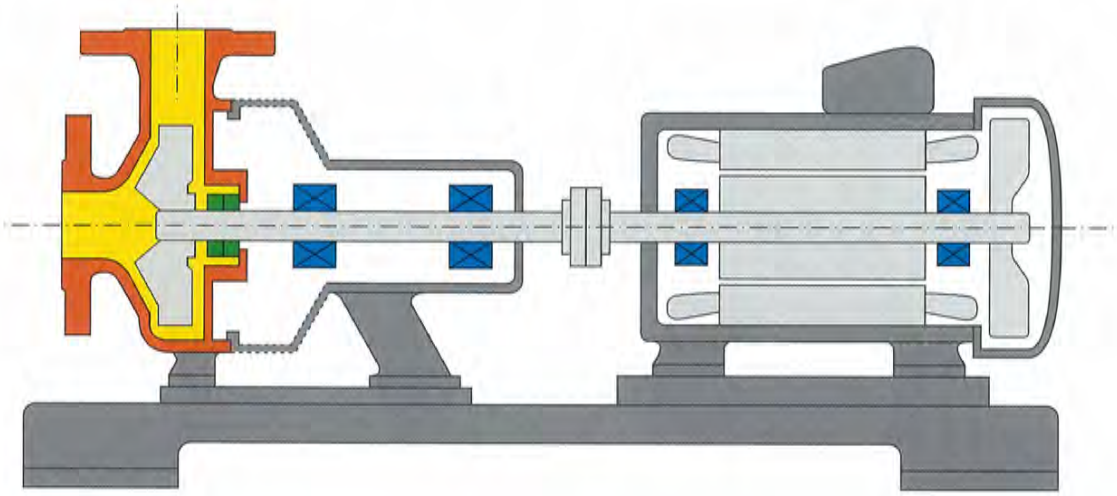
COMPARE TEIKOKU TO:
CENTRIFUGAL PUMPS WITH DOUBLE MECHANICAL SEALS

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.



MAGNET DRIVE PUMPS

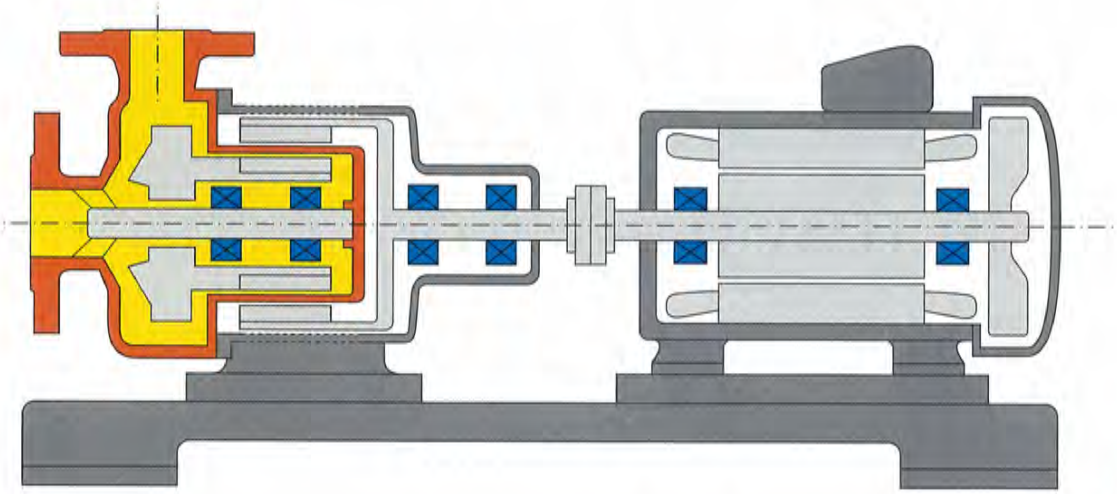
THIN CONTAINMENT SHELL
Subject to damage by magnets and subsequent leakage. No secondary containment.

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

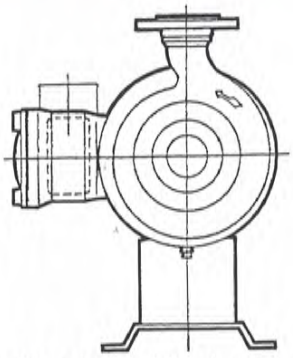
DECOUPLING DUE TO PROCESS UPSET
Decoupling may lead to sudden catastrophic failure.

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



Centered Suction and Discharge for easier piping design and installation, with either ANSI or ISO raised face flanges or other standards as requested.

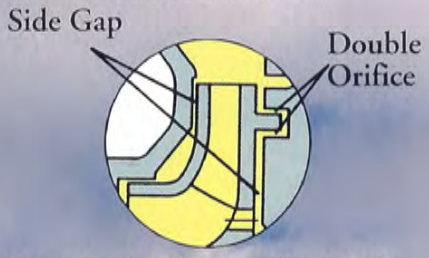
TEIKOKU, the world's largest supplier of canned motor pumps presents a state-of-the-art, sealless pump.

No newcomer to the field, TEIKOKU has provided customers with proven Canned Motor Pumps for 44 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.

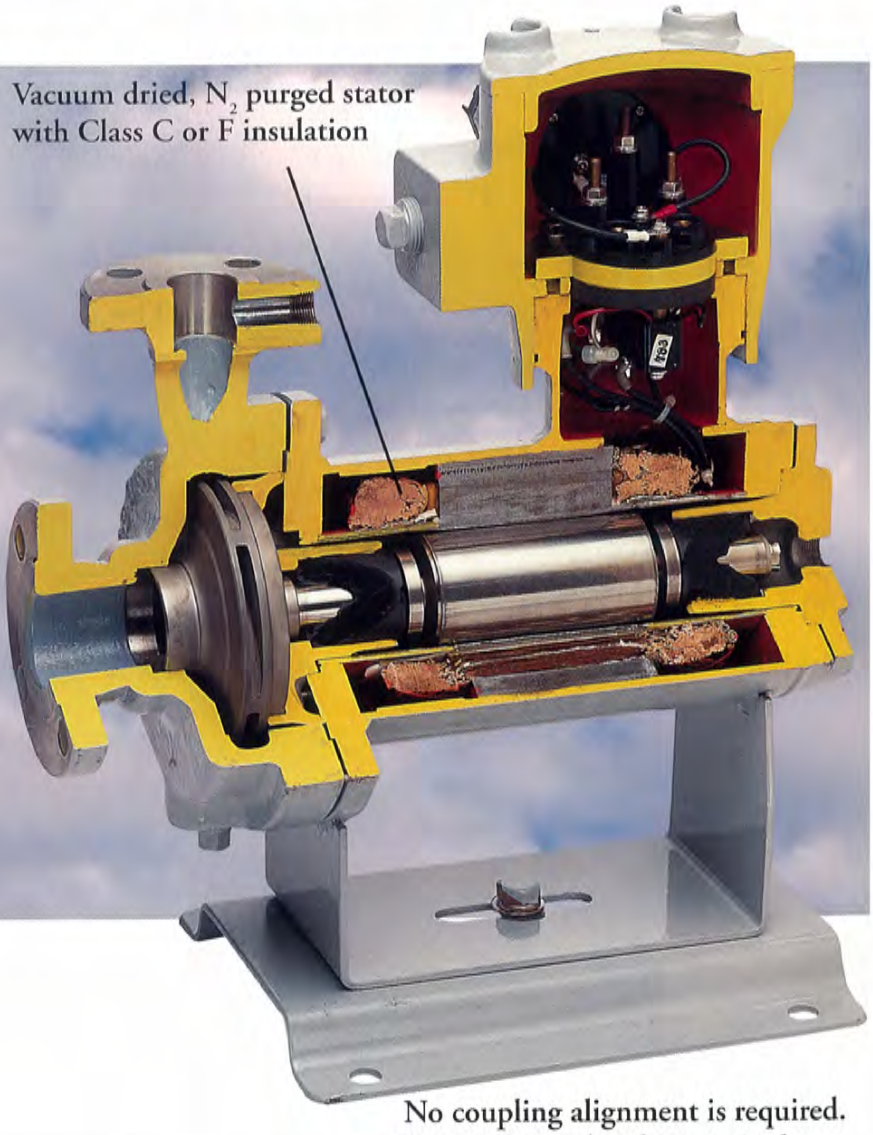
The TEIKOKU Canned Motor Pump replaces conventional sealed pumps providing safer, more efficient operation. This is especially advantageous when pumping hazardous or hard to handle materials.

TEIKOKU THRUST BALANCE SYSTEM

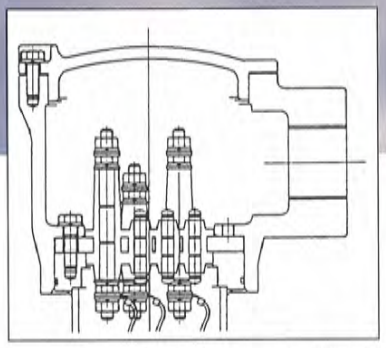


Noncontacting double orifice permits minimum leakage and improves volumetric efficiency. Enclosed impeller with optimum side gap keeps hydraulic losses at a minimum as well.

Vacuum dried, N_2 purged stator with Class C or F insulation



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

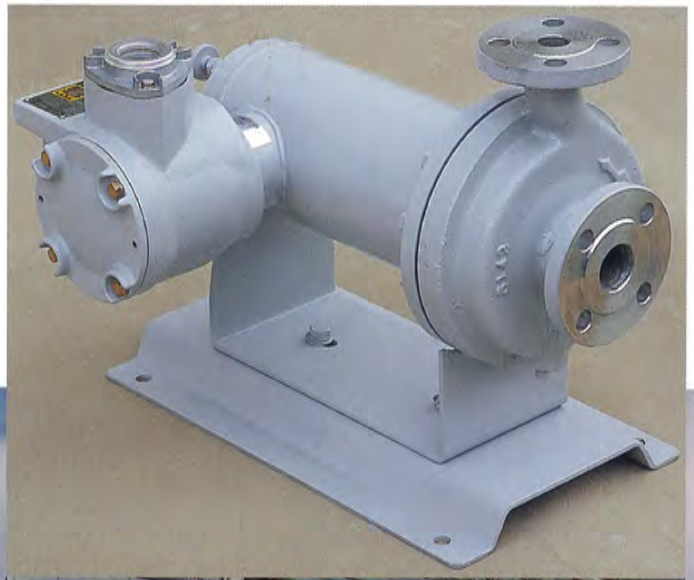


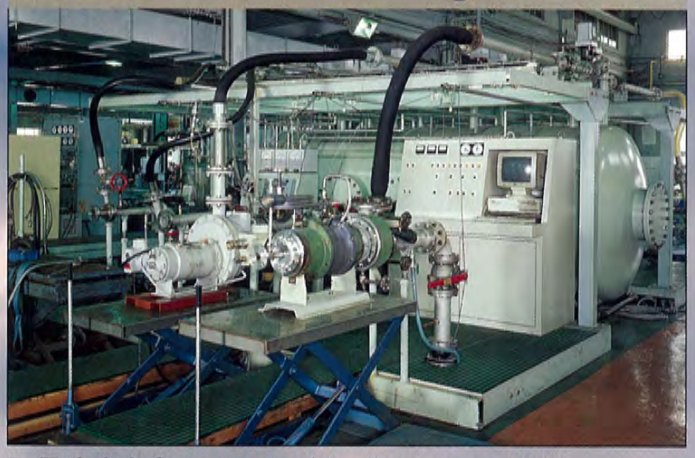
Improved terminal plates seal off higher pressure from inside, and a waterproof terminal box assures safe outdoor operation. All motor-pumps are provided with an explosion proof terminal box.

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 bearing 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.

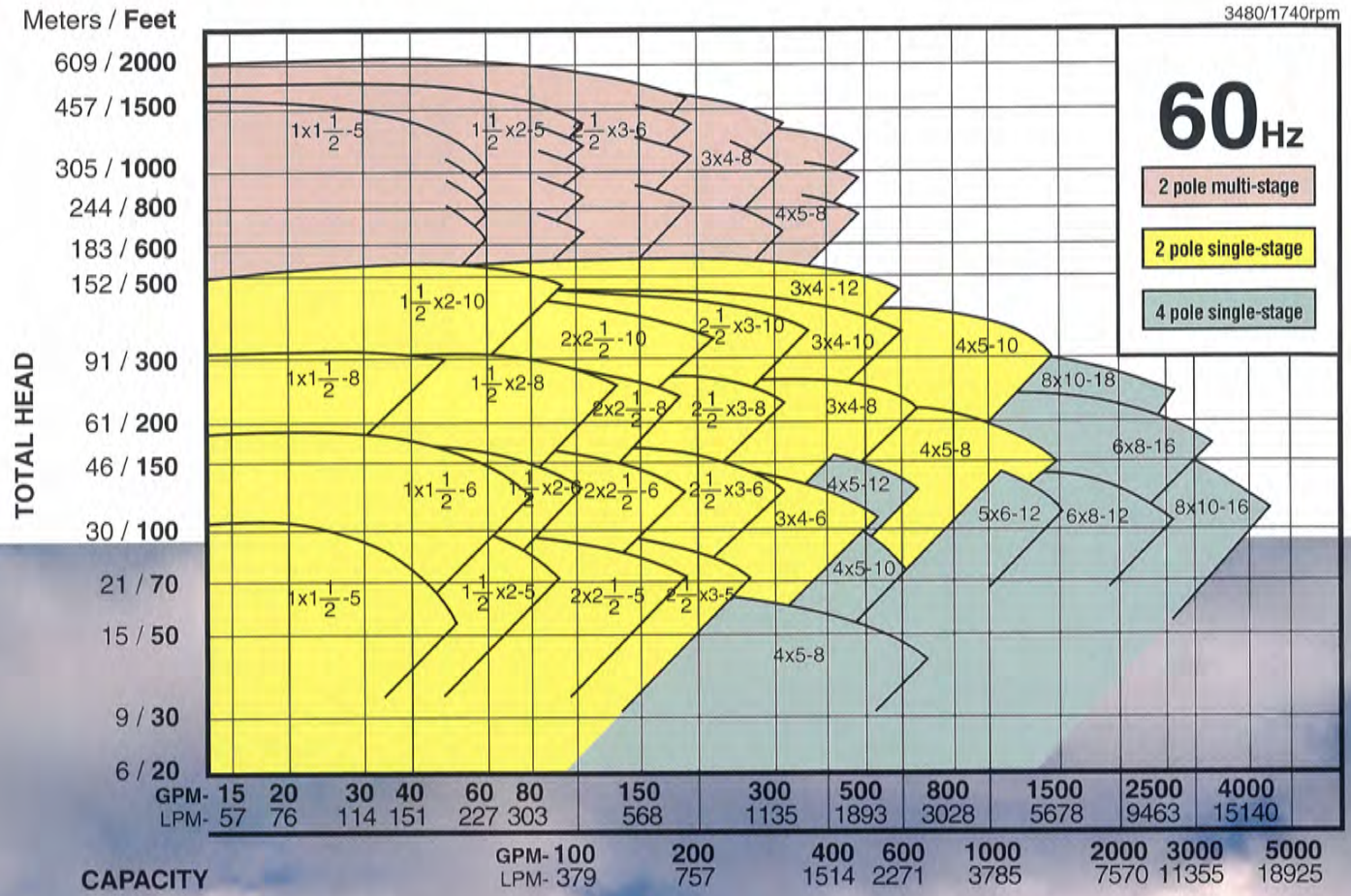
TEIKOKU ROTARY GUARDIAN (TRG)
Takes the "mystery" out of canned motor pump operation ... continuously monitors the critical running clearance between the stator and rotor.

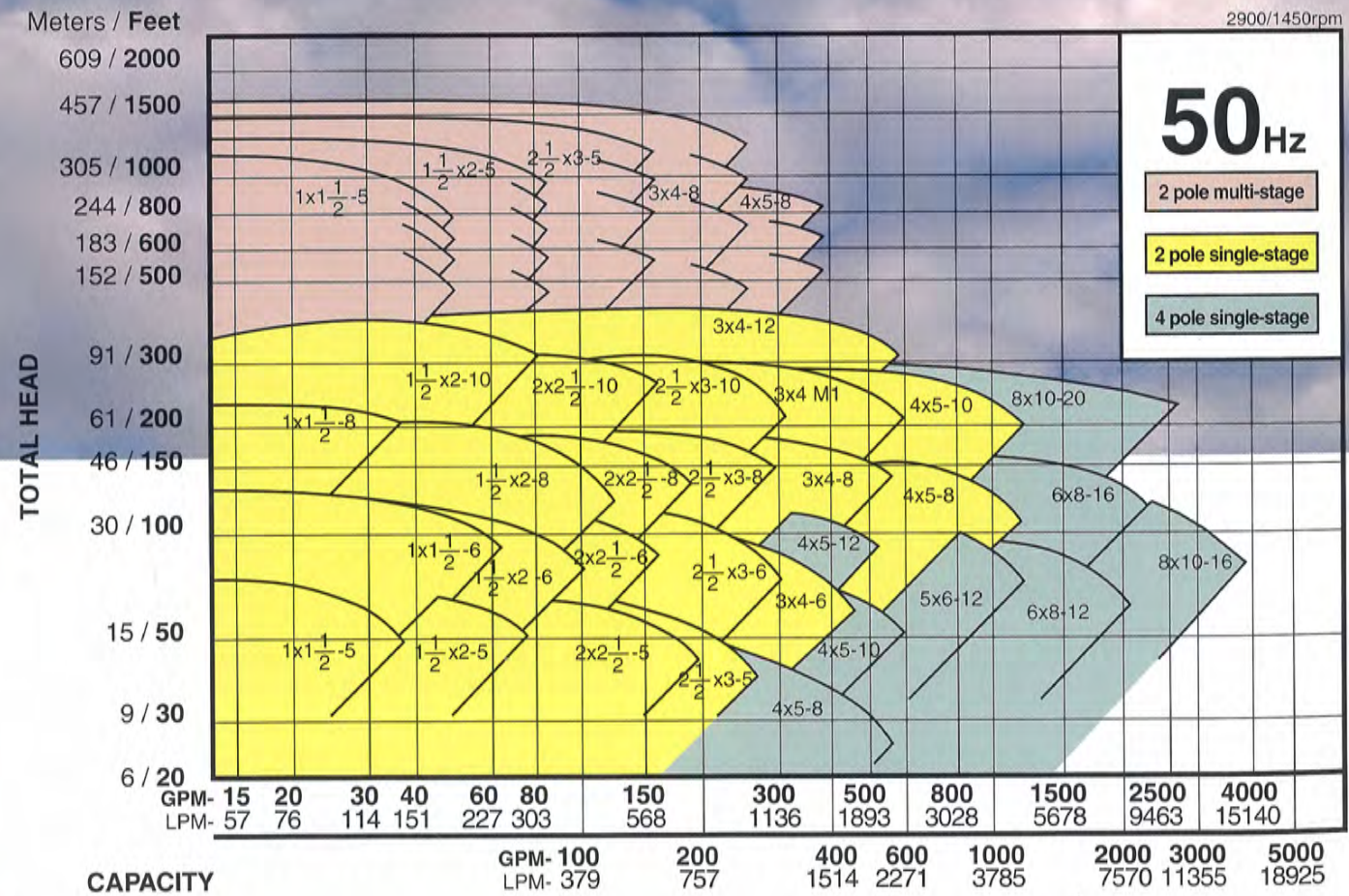
The exclusive TRG system is the only electrical monitoring device available today that not only monitors the running clearance but indicates bearing condition. This allows the operator to plan for pump maintenance.

The exclusive TRG protection system makes TEIKOKU the most reliable canned motor pump in the industry today.

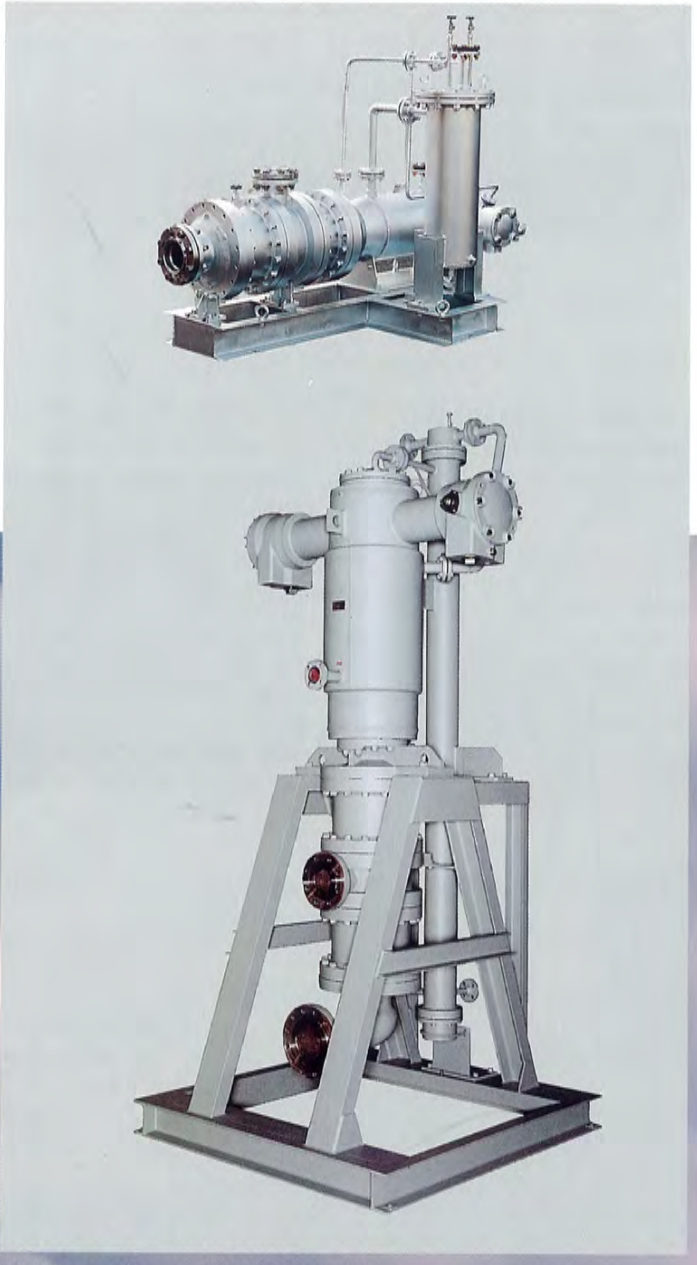
Teikoku's various product lines include zero-leakage canned motor pumps, mixers and accessories. All pumps are available in vertical configuration for longer pump life and minimal space usage in plants and other processing facilities.

PUMP PERFORMANCE CURVE

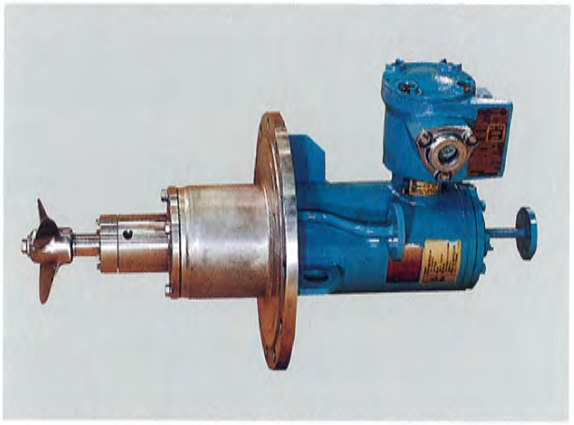




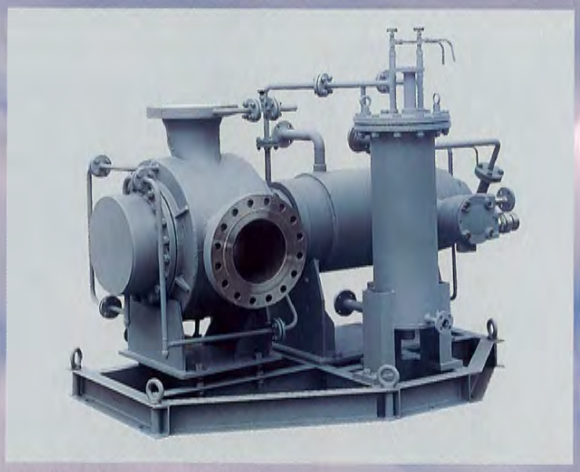
TAILOR MADE TEIKOKU CANNED MOTOR PUMPS FOR DIVERSIFIED CUSTOMER NEEDS



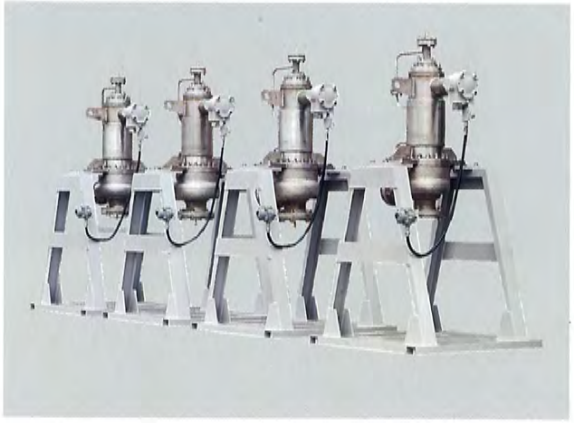
Multistage Canned Motor Pumps
Vertical multistage pump with a 150 kw, 3,000 rpm canned motor pump for feeding 150 deg C feedstock at 100 m3/h and 30 bar differential pressure (bottom).
Horizontal multistage pump with a 120 kw, 3,600 rpm canned motor pump for circulation of hot oil (top).



Canned Motor Sealless Mixer
Teikoku Canned Motor Mixer is a breakthrough in mixing technology.
It eliminates the shaft seal, needs no external lubrication and guarantees leakage-free and maintenance free operation under full vacuum to high tank internal pressure.



Double Suction TCMP
350x350-400 Large flow, low head horizontal double suction TCMP for high temperature service. The pump casing is jacketed for heating and the motor housing is jacketed for cooling. The integrated vertical heat exchanger cools down the internal circulation/lubrication flow to insure motor cooling and bearing lubrication.



Vertical Reverse Circulation TCMPs
Vertical reverse circulation pumps with motor on-top configuration for volatile liquid services at extremely low temperatures. The bearing wear monitor TRG is in an explosion proof box and mounted at a readable level on the pump base. The best solution to solve the seal problems when pumping thin and light liquids, including many hydrocarbons.

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 WITH X MOTOR (CERAMIC INSULATION)

the simplest construction makes it more reliable

Pump size	:	1.5 x 1 x 5	to	4 x 5 x 10
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

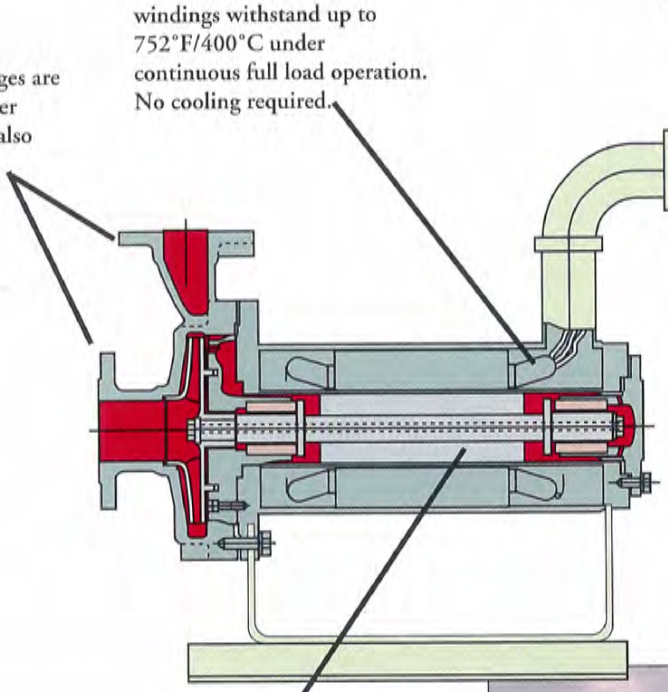
Maximum allowable liquid temperature, 750°F / 400°C. Standard pressure rating up to 430 psi/3 MPa.

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

Bearing Monitor (TRG) is standard on all pumps.

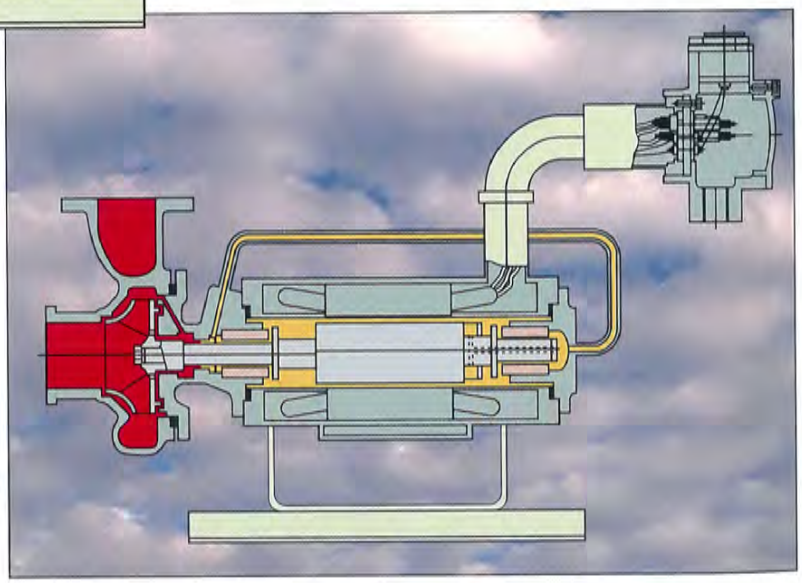
Ceramic insulated motor windings withstand up to 752°F/400°C under continuous full load operation. No cooling required.

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



Sealed terminal plate forms true containment.

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.



TYPE BX (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 temperture 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**

Pump size	:	1.5 x 1 x 5	to	8 x 10 x 15
3,600 RPM motor	:	1.5 HP / 1.1 kw	to	267 HP / 200 kw
1,800 RPM motor	:	3 HP / 2.2 kw	to	213 HP / 160 kw

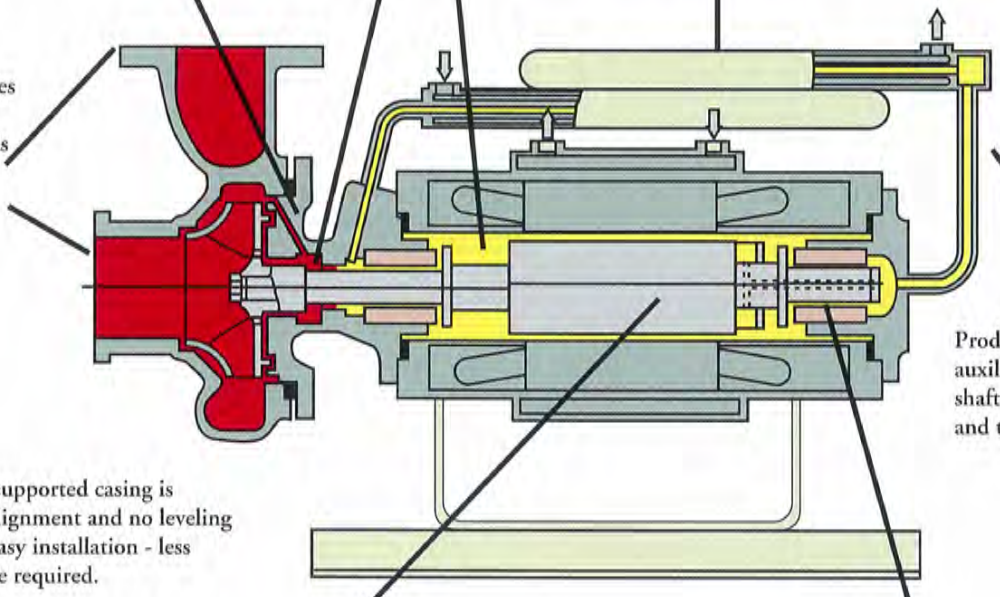
Maximum allowable liquid temperature, 850°F / 455°C regardless of the motor size. Pressure rating up to 5,000 psi/35 MPa.

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.

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

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



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

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

No centerline supported casing is required. No alignment and no leveling are required. Easy installation - less mounting space required.

"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.

MOTOR RATINGS
STANDARD TEIKOKU CANNED MOTORS

2 Pole Motors

Motor Frame #	Rate Output (kw/hp)	Nominal Voltage (V)	60 Hz Rated Amp. (A)	60 Hz Start Amp. (A)	50 Hz Rated Amp. (A)	50 Hz Start Amp. (A)
119	0.75/1	400	2.2	10	2.4	11
		440	2.2	10.5	—	—
	1.1/1.5	400	3.0	10	3	11
		440	2.7	10.5	—	—
	1.3/1.7	440	3	10.5	—	—
215	1.1/1.5	400	3.3	14.5	3.3	17
		440	3.0	16	—	—
	1.5/2	400	3.8	14.5	3.8	17
		440	3.6	16	—	—
	1.7/2.3	440	3.8	22	—	—
216	2.2/2.9	400	—	—	5.5	25
		440	5.1	24	—	—
	2.5/3.3	440	5.5	24	—	—
217	3/4	400	7.5	25	7.5	28
		440	6.7	27	—	—
	3.4/4.5	440	7.5	27	—	—
316	3.7/4.9	400	9	51	10	58
		440	9	55	—	—
	5.5/7.3	400	13	51	13	58
		440	11.5	55	—	—
	6.2/8.3	440	13	55	—	—
317	6.6/8.8	400	16	53	16	61
		400	15	58	—	—
	7.4/9.9	440	16	58	—	—
416	7.5/10	400	16	92	17	106
		440	16	101	—	—
	11/14.7	400	23	92	23	106
		440	21	101	—	—
	12/16	440	23	101	—	—
417	15/20	400	33	119	33	136
		440	30	130	—	—
	17/23	440	33	130	—	—
516	15/20	400	31	137	33	158
		440	31	150	—	—
	18.5/25	400	39	137	39	158
		440	36	150	—	—
	20/27	440	39	150	—	—
518	22/29	400	48	182	48	210
		440	44	200	—	—
	26/35	400	55	182	55	210
		440	51	200	—	—
	29/39	440	55	200	—	—
616	30/40	400	57	229	61	264
		440	57	251	—	—
	37/49	400	74	229	74	264
		440	69	251	—	—
	40/53	440	74	251	—	—
617	45/60	400	90	286	90	331
		440	84	314	—	—
	50/67	440	90	314	—	—
716	55/73	400	102	588	110	690
		440	102	646	—	—
	65/87	400	126	588	126	690
		440	118	646	—	—
	75/100	400	145	588	145	690
		440	134	646	—	—
	85/113	440	145	646	—	—
717	90/120	400	175	774	175	918
		440	162	850	—	—
	105/140	440	185	850	—	—
	110/147	400	210	774	210	918
		440	194	850	—	—
	120/160	440	210	850	—	—
815	120/160	400	262	763	262	884
		440	242	840	—	—
	132/176	440	262	840	—	—
817	180/240	400	370	1270	388	1500
		440	370	1400	—	—
	200/267	400	410	1270	430	1500
		440	410	1400	—	—

4 Pole Motors

Motor Frame #	Rate Output (kw/hp)	Nominal Voltage (V)	60 Hz Rated Amp. (A)	60 Hz Start Amp. (A)	50 Hz Rated Amp. (A)	50 Hz Start Amp. (A)
326	1.5/2	400	8	38	8	43
		440	7	41	—	—
	2.2/2.9	400	8.5	38	8.5	43
		440	8	41	—	—
	3.7/4.9	400	10.5	38	10.5	43
		440	10	41	—	—
	4.2/5.6	400	—	—	—	—
		440	10.5	41	—	—
	5/6.7	440	12	41	—	—
426	5.5/7.3	400	16	69	16	78
		440	15	75	—	—
	7.5/10	400	19	69	19	78
		440	18	75	—	—
	8.5/11.3	440	19	75	—	—
526	11/14.7	400	28	113	28	130
		440	26	124	—	—
	15/20	400	35	113	35	130
		440	32	124	—	—
	17/23	440	35	124	—	—
626	18.5/25	400	43	173	43	200
		440	40	190	—	—
	22/29	400	49	173	49	200
		440	45	190	—	—
	25/33	440	49	190	—	—
726	30/40	400	71	271	71	312
		440	65	297	—	—
	37/49	400	83	271	83	312
		440	77	297	—	—
	40/53	400	83	297	—	—
728	45/60	400	105	450	105	515
		440	95	490	—	—
	55/73	400	124	450	124	515
		440	115	490	—	—
	62/83	440	124	490	—	—
825	65/87	400	140	500	140	500
		440	130	500	—	—
	75/100	400	165	500	165	500
		440	150	500	—	—
	85/113	440	165	500	—	—
829	110/147	400	250	1054	270	1250
		440	250	1160	—	—
	132/176	400	310	1054	310	1250
		440	285	1160	—	—
	145/193	440	310	1160	335	1110
	160/213	440	335	1030	—	—

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

	Standard		Upon Request	
CAPACITY (max)	4,227 GPM	16 m³/min	10,500 GPM	40 m3/min
TDH (max)	2,000 ft.	609 m	2,500 ft.	750 m
TEMPERATURE*	-112 to 716°F	-80 to 380°C	-328 to 842°F	-200 to 450°C
VISCOSITY (max)	100 cst	100 cst	350 cst	350cst
DESIGN PRESSURE (max)	430 psi	3 MPa	7,900 psi	55 MPa
MOTOR HORSEPOWER (max)	267 HP	200 KW	667 HP	500 KW
MAJOR MATERIALS OF WETTED PARTS	304SS, 316SS		304LSS, Hastelloy, Titanium, alloy 20	

*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	○

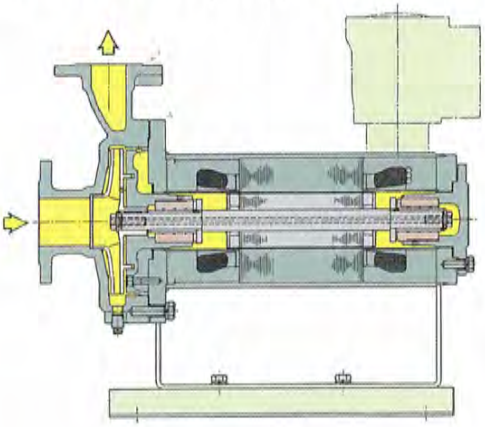
III. OTHERS

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

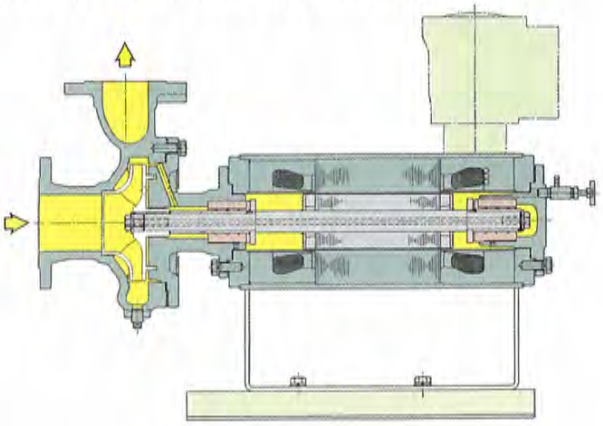
F-V TYPE (BASIC TYPE WITH HOLLOW SHAFT)

Fundamental design of TEIKOKU Motor Pump. Most commonly used for a wide variety of applications.

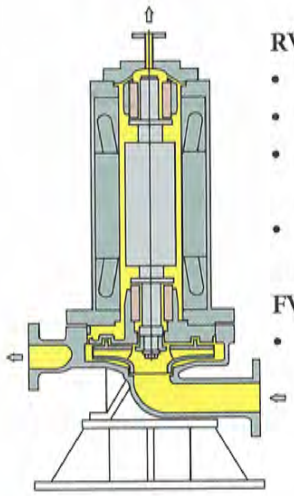


FA-V TYPE (BASIC TYPE WITH HOLLOW SHAFT)

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)

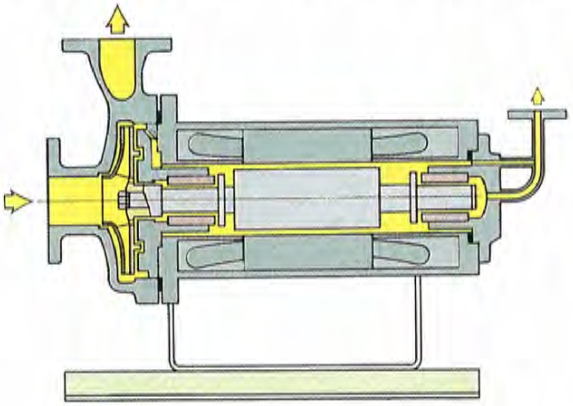
- Improves Venting
- Improves Bearing Load
- Recommended for Low Viscosity and Steep Vapor Pressure Liquids
- Minimum Space Required

FW or FW (Hollow Shaft)

- Minimum Space Required

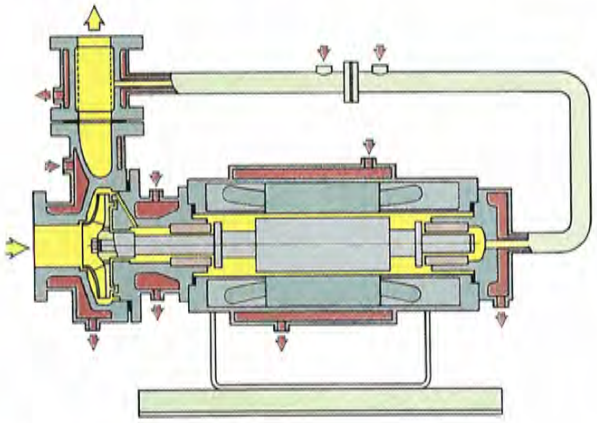
R TYPE (REVERSE CIRCULATION TYPE)

Suitable for handling volatile fluids, such as Ammonia, Freon, and other liquified gases, and for very low NPSH applications.



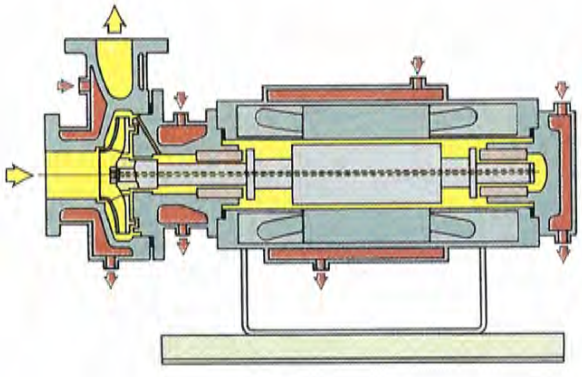
K-S TYPE (FULL-STEAM-JACKET TYPE)

Suitable for handling fluids with high melting points.



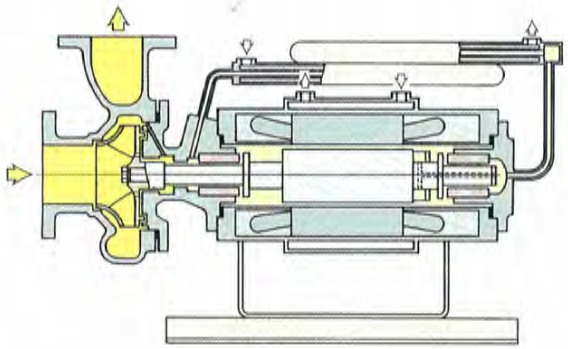
K TYPE (FULL-STEAM JACKET TYPE)

Similar to K-S type, but for fluids with lower melting point.



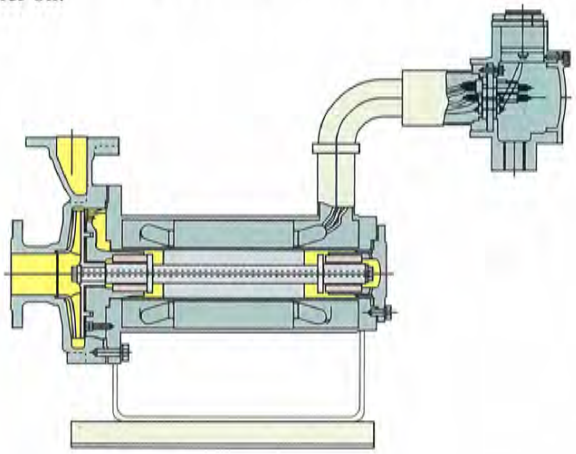
B TYPE (HIGH-TEMPERATURE-INSULATION TYPES)

Suitable for handling high temperature fluids, such as heat transfer oil.



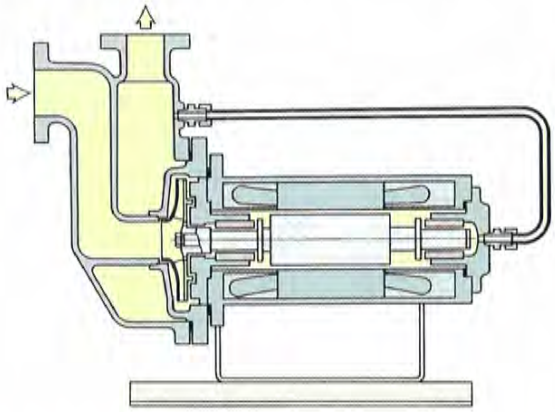
X TYPE (HIGH-TEMPERATURE-INSULATION TYPES)

Suitable for handling high temperature fluids, such as heat transfer oil.



G TYPE (SELF-PRIMING TYPE)

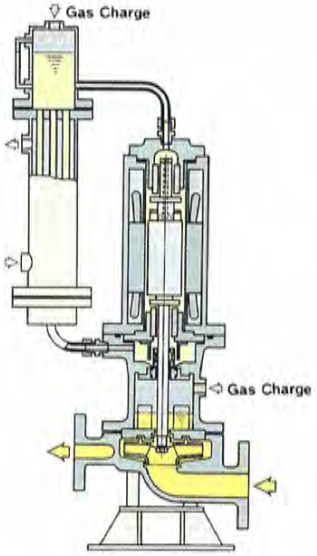
Used for pumping fluids from underground tank or rail/tank truck unloading.



XG TYPE

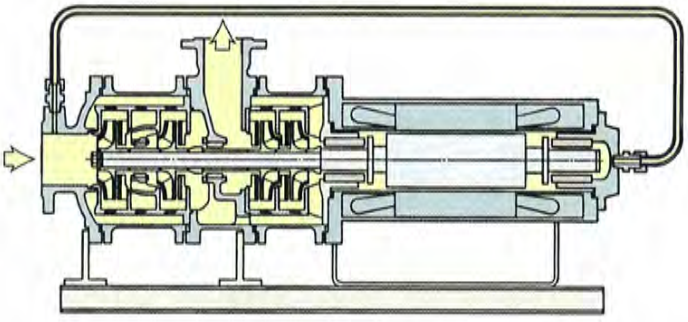
(GAS-SEALEDSLURRY TYPE)

Handles fluid with considerable slurry. Besides XG-type, SG-type with external flushing is also available.



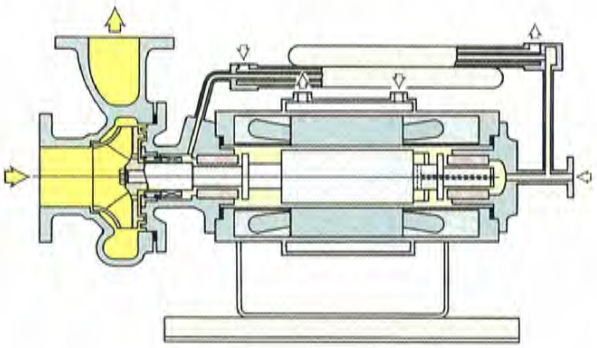
F-M TYPE (MULTI-STAGE TYPE)

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



D TYPE (SLURRY SEAL TYPE)

Suitable for handling fluids containing small amounts of fine solids.



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 potassium
Aluminium potassium sulfate
Aluminium sulfate
2-Aminoethanol
Ammonium carbonate
Ammonium chloride
Ammonium hydrogensulfide
Ammonium sulfate
Ammonium tetrachlorozincate
Ammonium thiocyanate
Aniline
Anisole
Anthracene oil
Aqueous ammonia

Barium sulfide
Barium tetrasulfide
Barium trisulfide
Benzaldehyde
Benzene
Benzen chloride
Benzine
Benzyl alcohol
Benzyl chloride
Boron oxide
1,2-Butadiene
1,3-Butadiene
Butane
1-Butanol
di-2-Butanol
Butyl acetate
Butyl acrylate
tert-Butyl alcohol
Butylaldehyde
Butylamine
dl-sec-Butylamine
tert-Butylamine

Cadmium nitrate
Calcium chlorate
Calcium chloride
Calcium hydroxide
Calcium hypochlorate
Calcium sulfite
Caprolactam
Carbon bisulfide
Carbon dioxide
Carbon tetrachloride
Chloral
L-Chlorine
Chlorine dioxide
Chloroacetic acid
Chloracetone
m-Chloroaniline
o-Chloroaniline
p-Chloroalinine
Chlorobenzene
Choroform
Chlomium (VI) oxide
Chlorosulfuric acid
Citric acid
Coconut oil
Copper (II) hydroxide
Copper (II) sulfate
m-Cresol
o-Cresol
p-Cresol
Croasote oil
Crotonaldehyde
Cyanoacetic acid
Cyclohexane
Cyclohexane
Cyclohexanone
Cyclohexylamine

Developer
Dibutyl phthalate
Dichloroacetic acid
m-Dichlorobenzene
o-Dichlorobenzene
p-Dichlorobenzene
1,1-Dichloroethylene
cis-1,2-Dichloroethylene
trans-1,2-Dichloroethylene
1,1-Dichloropropane
1,2-Dichloropropane
1,3-Dichloropropane
2,2-Dichloropropane
1,1-Dichloropropylene
1,2-Dichloropropylene
2,3-Dichloropropylene
3,3-Dichloropropylene
cis-1,3-Dichloropropylene
trans-1,3-Dichloropropylene
Diethanolamine
Diethylamine
Diethylene glycol
Diethylene glycol
monoethyle ether
Di-2-ethylhexyl phthalate
Diketene
Dimethylamine
2-Dimethylaminoethanol
N,N-Dimethylformamide
2,3-Dimethylphenol
2,4-Dimethylphenol
2,5-Dimethylphenol2,6-
3,4-Dimethylphenol
3,5-Dimethylphenol
2,3-Dimethylpyridine
Dimethyl sulfate
Dimethyl sulfite
1,3-Dioxane
1,4-Dioxane
Dipropylene glycol

Epichlorohydrin
Ethanol
Ehtyl acetate
Ethyl acrylate
Ethylbenzene
Ethyl chloroformate
Ethylene chloride
Ethylenediamine
Ethylene glycol
Ethylene oxide
Ethyl ether
Ethyl chloride
Ethyl-d»lactate
Ethyl methyl ketone
5-Ethyl-2-methylpyridine

Fatty acid
Freon R-11
Freon R-12
Formaldehyde
Formimide
Formic acid
Fuming sulfuric acid
Furfural
Furfuryl alcohol

Gasoline
D-Glucose
Glycerin
Glycine

Heavy Water
Hydrazine
Hydrogen chloride
Hydrogen cyanide
Hydrogen fluoride
Hydrogen peroxide
Hydrogen sulfide
Hudroflouric acid

Iron (II) oxide
Iron (II) sulfate
Isobutyl alcohol
Isobutyl aldehyde

Kerosene
Ketene

Lactic acid (d or l)
dl-Lactic acid
Lactonitrile
Lanthanum hydroxide
Latex
Lauric acid
Lead (II) nitrate
Ligroin
Liquified petroleum gas
Liquid ammonia
Liquid paraffin
Lithium chloride
Lithium bromide

Maleic acid
Maleic anhydride
l-Malic acid
Manganese (II) chloride
Mercury
Methacrylic acid
Methanol
Methyl acetate
Methyl acetoacetate
Methyl acrylate
Methylamine
Methyl bromide
Methyl chloride
Methylchloroform
Methyl chloroformate
Methylchlorophenoxyacetic acid
Methylene chloride
Methyl ether
Methylisobutyl ketone
Methyl methacrylate
2-Methylpyridine
3-Methylpyridine
4-Methylpyridine
Methyl sulfide
Morpholine

Naptha
Naphthalene
Nickel (II) chloride
Nickel (II) nitrate
Nitric acid
Nitrobenzene
Nitrogen dioxide
m-Nitrotoluene
o-Nitrotoluene
p-Nitrotoluene
w-Nitrotoluene
2-Nitro-m-xylene
4-Nitro-m-xylene
5-Nitro-m-xylene
3-Nitro-o-xylene
4-Nitro-o-xylene
2-Nitro-o-xylene
1-Octanol
Octyl chloride
Oleic acid
Orthoboric acid
Oxalic acid

Paraffin
Paraldehyde
Pentachloroethane
Phenol
m-Phenosulfonic acid
o-Phenosulfonic acid
p-Phenosulfonic acid
Phosgene
Phosphorus trichloride
Phosphoryl chloride
Phthalic acid
Phthalic anhydride
Polythylene glycols
Potassium carbonate
Potassium chlorate
Potassium cyanide
Potassium hydroxide
Potassium permanganate
Potassium phosphate
Potassium sulfate
Propane
1,2-Propanediol
1,3-Propanediol
2-Propanol
Propionaldehyde
Propionic acid
Propylene
Propylene oxide
Pyridine

Racemic acid

Sea water
Silicone oil
Silicone tetrachloride
Sodium acetate
Sodium carbonate
Sodium chlorate
Sodium chloride
Sodium cyanide
Sodium dithionate
Sodium formate
Sodium hydrogensulfate
Sodium hydrogensulfite
Sodium hydroxide
Sodium hypochlorite
Sodium metaphosphate
Sodium molybdate
Sodium nitrite
Sodium peroxide
Sodium silicate
Sodium sulfate
Sodium sulfide
Sodium sulfite
Sodium thiosulfate
Solvent naphtha
Soy
Stearic acid
Styrene
Sulfur
Sulphur dichloride
Sulphur dioxide
Sulphur trioxide
Sulfuric acid

Tallow
Tetrahydrofuran
2,3,4,5-Tetrahydrophthalic acid
3,4,5,6-Tetrahydrophthalic acid
Thinner
Thiourea
Tin (II) chloride
Titanium (IV) chloride
Toluene
m-Toluidine
o-Toluidine
p-Toluidine
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
1,3,5-Trichlorobenzene
1,1,2-Trichloroethane
Trichloroethylane
Tri-m-cresyl phosphate
Tri-o-cresyl phosphate
Tri-p-cresyl phosphate
Triethylamine
Trethylene glycol
Trimethylamine

Urea

Vinegar
Vinyl acetate
Vinyl chloride
Vinylidine chloride

Water
m-Xylene
o-Xylene
p-Xylene
p-Xylidine
sym, m-Xylidine
unsym, m-Xylidine
unsym, o-Xylidine
vic, m-Xylidine
vic, 0-Xylidine

Zinc oxide

SAFETY OPTIONS

TRG AMPLIFIER FOR ALARM & PROTECTOIN FROM DRY RUN

To achieve the optimum protection for TEIKOKU canned motor pumps against contingent failures, protection devices can be provided in addition to the visual type TRG meter.

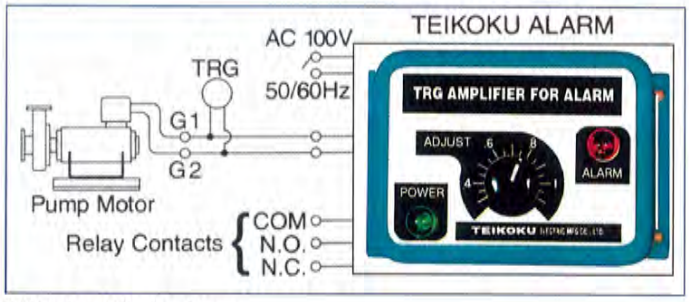
The TRG output voltage can be connected to either an optical or acoustic alarm circuit, and/or to the main power with pump shut down capability.

The TRG amplifier contains an adjustable dial that provides a more flexible protection program.

Installed on the control panel as part of the electrical wiring, the Low Flow Alarm automatically cuts off the main power to the TEIKOKU canned motor when the pump runs dry. It also protects canned motor pumps from excessive cavitation. Typical uses include:

1. Unloading tank trucks.
2. Pumping from storage tanks.
3. Batch operations.
4. Any other application where pump can possibly run dry.

Protection from Dry Run



TRG Amplifer for Alarm

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

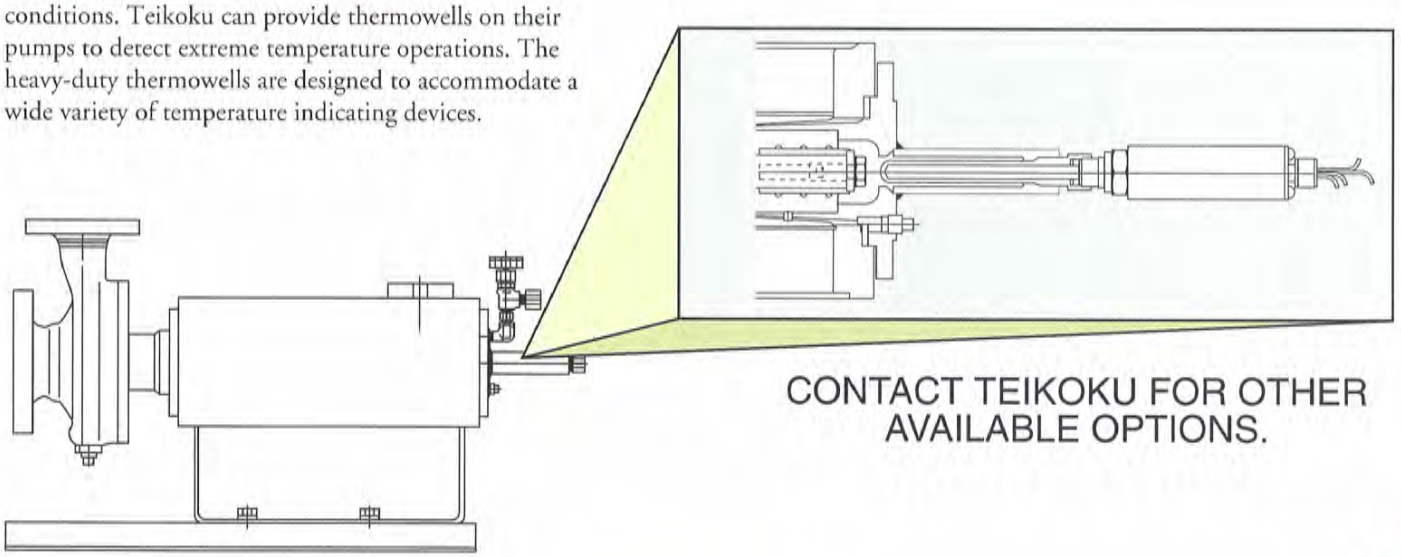
Filter Out Nuisance Trips

- 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.

TEIKOKU Group Global Network

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

Plant & Business Headquarters

Postcode 679-4395
60 Hirano, Shingu-Cho, Tatsuno-Shi, Hyogo-Ken, Japan
Phone : +81-791-75-0411
Fax : +81-791-75-4190

International Business Headquarters

Postcode 110-0015
6F Shitaya Bldg.
2-5, 5-chome, Higashi-Ueno, Taito-Ku, Tokyo, Japan
Phone : +81-3-3841-9311
Fax : +81-3-3841-7334
E-mail : ibd-tokyo@teikokudenki.co.jp

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

TEIKOKU USA INC.

7010 Empire Central Dr. Houston, TX 77040-3214
Phone +1-713-983-9901
Fax +1-713-983-9919
E-mail info@teikoku-usa.com
Web 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
Fax +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
Fax +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
Fax +65-6861-4521
E-mail info@teikoku-sa.com.sg
Web (see US website)

TEIKOKU KOREA CO., LTD.

3F Hannam Tower Annex Bldg. II, #730
Hannam-dong, Yongsan-gu, Seoul, Korea
Phone +82-2-790-7012
Fax +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
Fax +886-2-2568-2670
E-mail ttpco@ms32.hinet.net
Web (see US website)

ISO 9001
ISO 14001
BUREAU VERITAS
Certification

PTB
ATEX

Catalog No. CAT-0025B May. 2010