

 **TEIKOKU**  
**CANNED MOTOR PUMPS**

**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.

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## 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.

## 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.

### COMPACT DESIGN

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

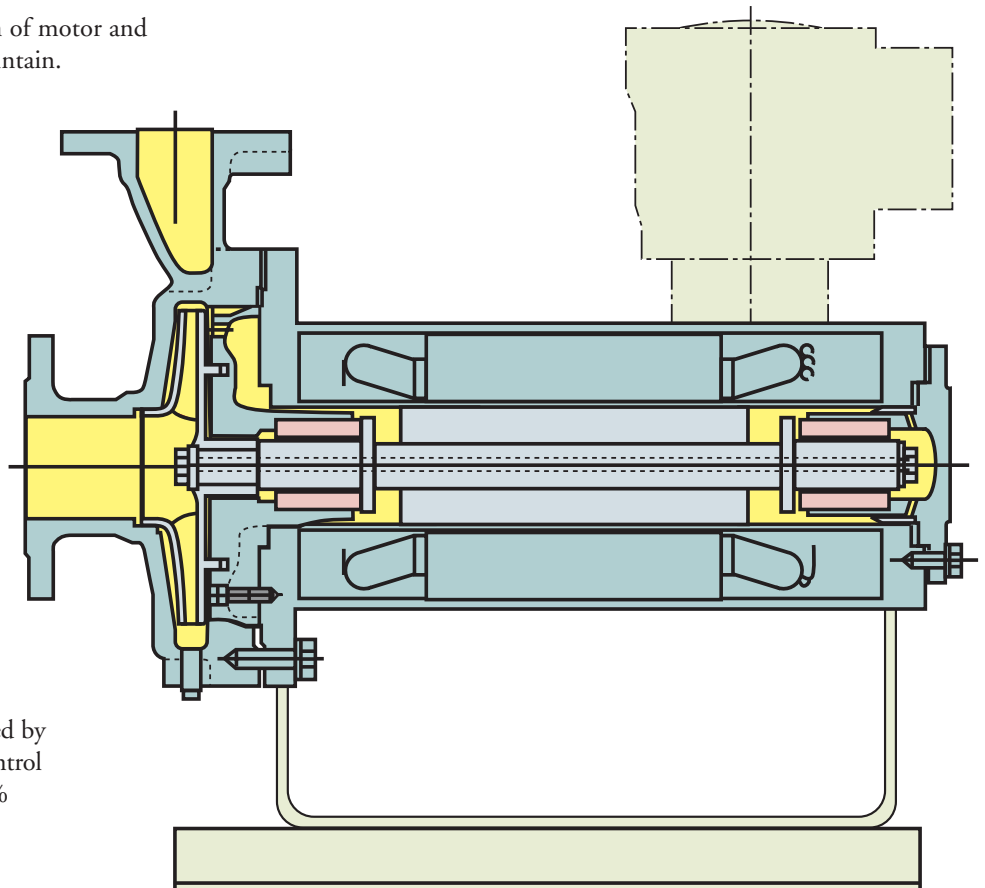
### QUIET OPERATION

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



# 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

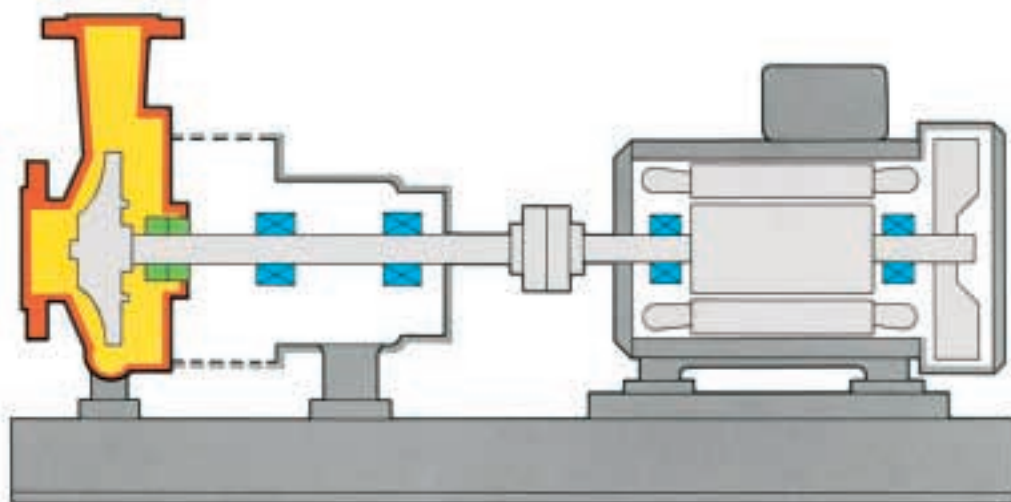
Must constantly be kept in proper alignment. Motor is exposed. A foundation is necessary to support the increased weight and reduce the danger of misalignment.

## 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

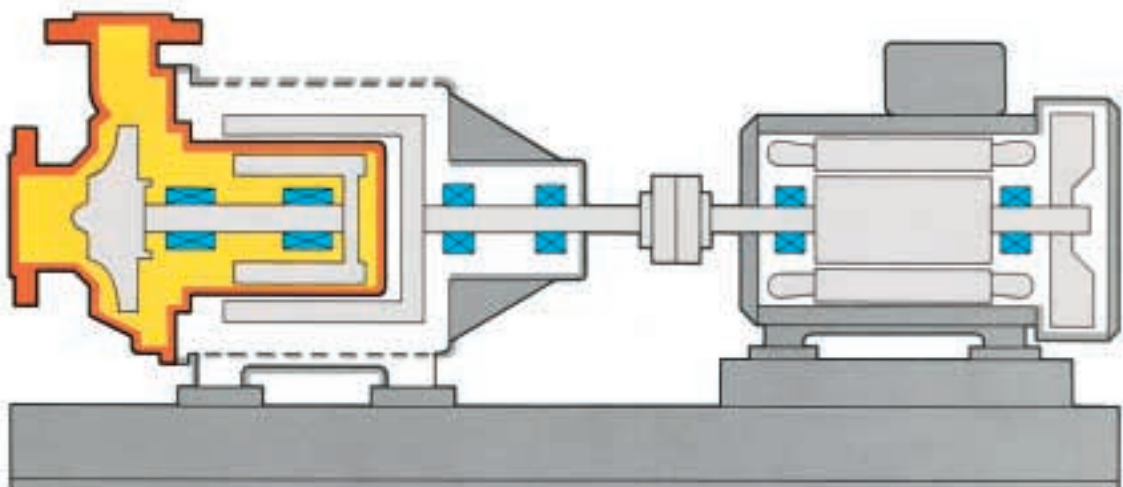
All must be checked frequently for proper lubrication. Bearings within impeller shaft cannot be easily monitored.

### 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.

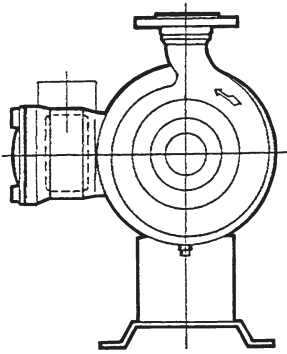
### NOISY FAN

Needed to cool motor.



# TEIKOKU CANNED MOTOR PUMPS

## DESIGNED FOR ZERO LEAKAGE SERVICES IN THE CPI



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

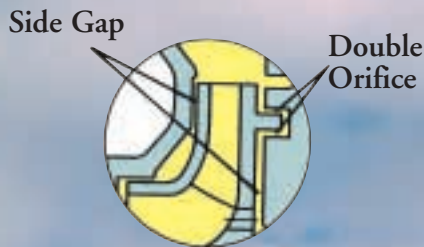
TEIKOKU, the world's largest supplier of canned motor pumps presents a state-of-the-art, sealless pump.

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

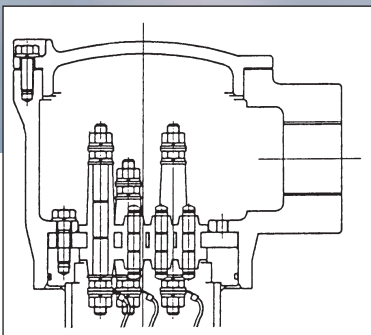
TEIKOKU is unique in that we design and manufacture both pumps and motors, thus insuring our customers total quality control.

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.

### 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.



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.

Vacuum dried, N<sub>2</sub> purged stator with Class C or F insulation



**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

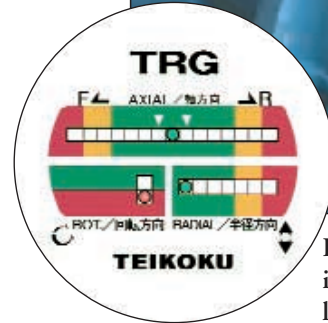
Each Teikoku Canned Motor Pump comes with the patented Teikoku Rotary Guardian (TRG) — an electrical meter that continuously monitors both axial and radial wear. The TRG indicates any serious malfunction of the pump before a failure occurs; many users opt to have the TRG connected to an alarming device.



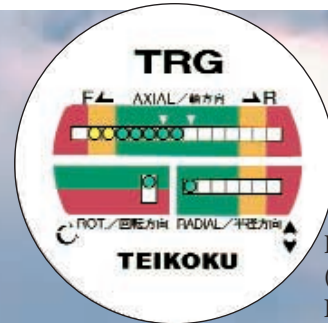
In Teikoku's factory testing lab, all pumps are 100% performance-tested before shipment.



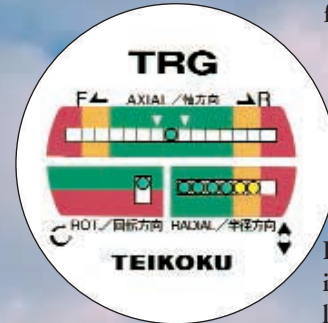
This photograph demonstrates how the Rotary Guardian continuously provides accurate, incremental metering of unseen axial and radial wear. The computer graphic below the TRG illustrates corresponding changes within the monitored pump (these changes would be concealed within an actual canned motor pump).



Incorrect rotation is indicated by light at lower left.



Incorrect rotor position (axial wear) is indicated. Lights at top show that the rotor is situated too far forward.

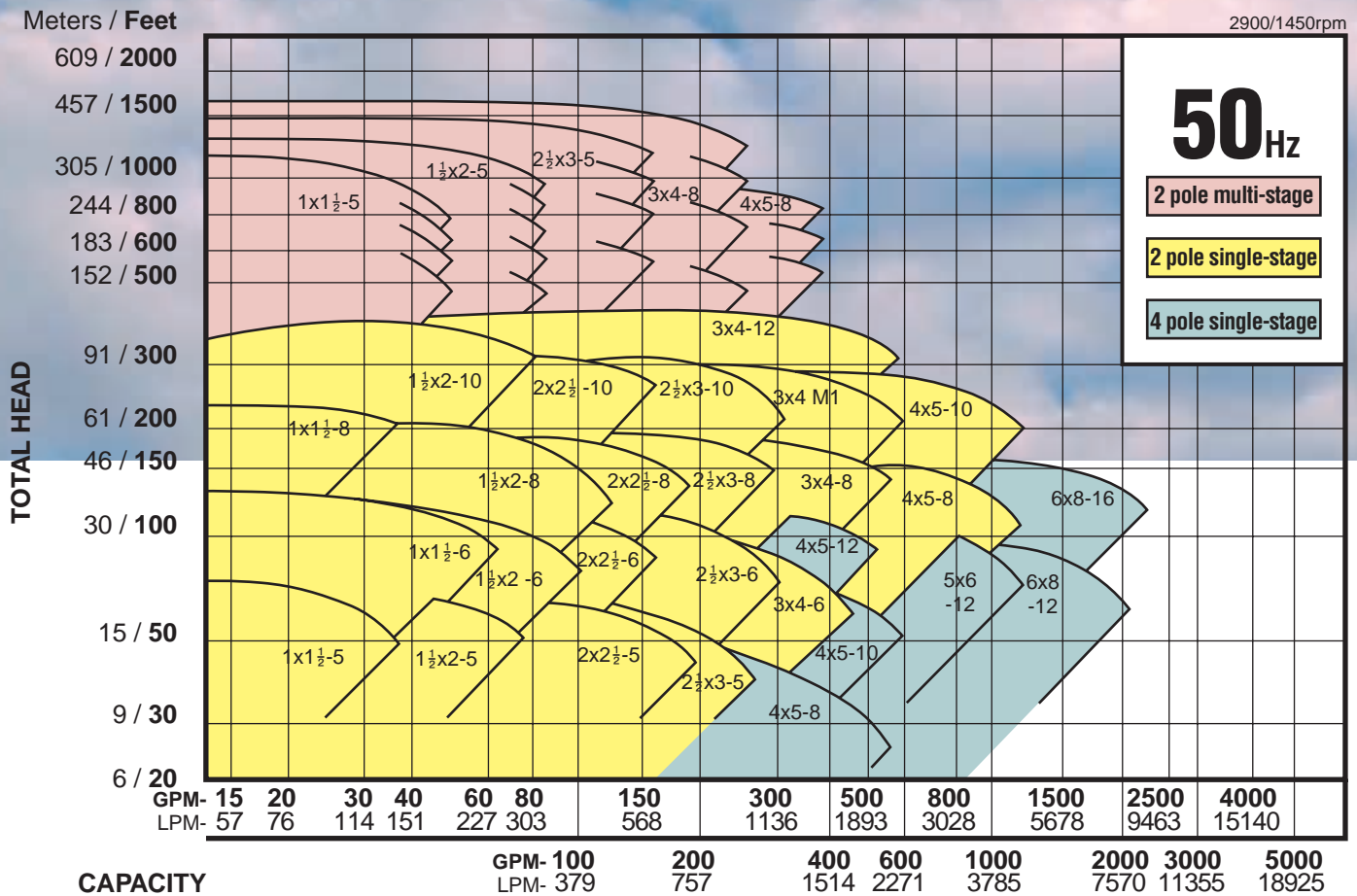
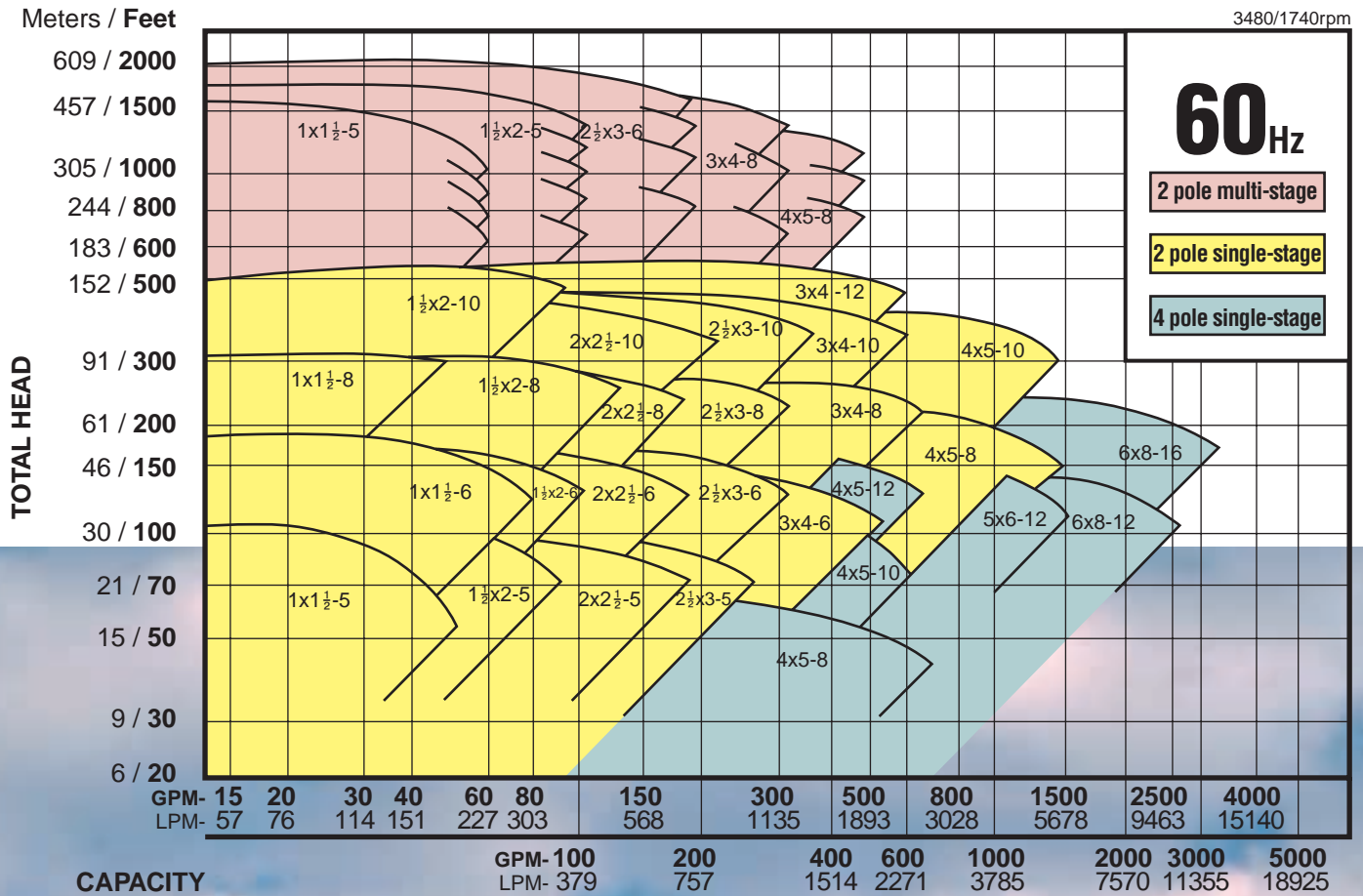


Incorrect radial wear is indicated by lights at lower right.



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



## **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.



Typical installation of a Teikoku canned motor pump in a high temperature application.



Teikoku USA's 2,000 square foot warehouse holds, in stock, a large number of pumps and spare parts within the United States for immediate delivery. Parts and service are available 24 hours a day, 7 days a week.



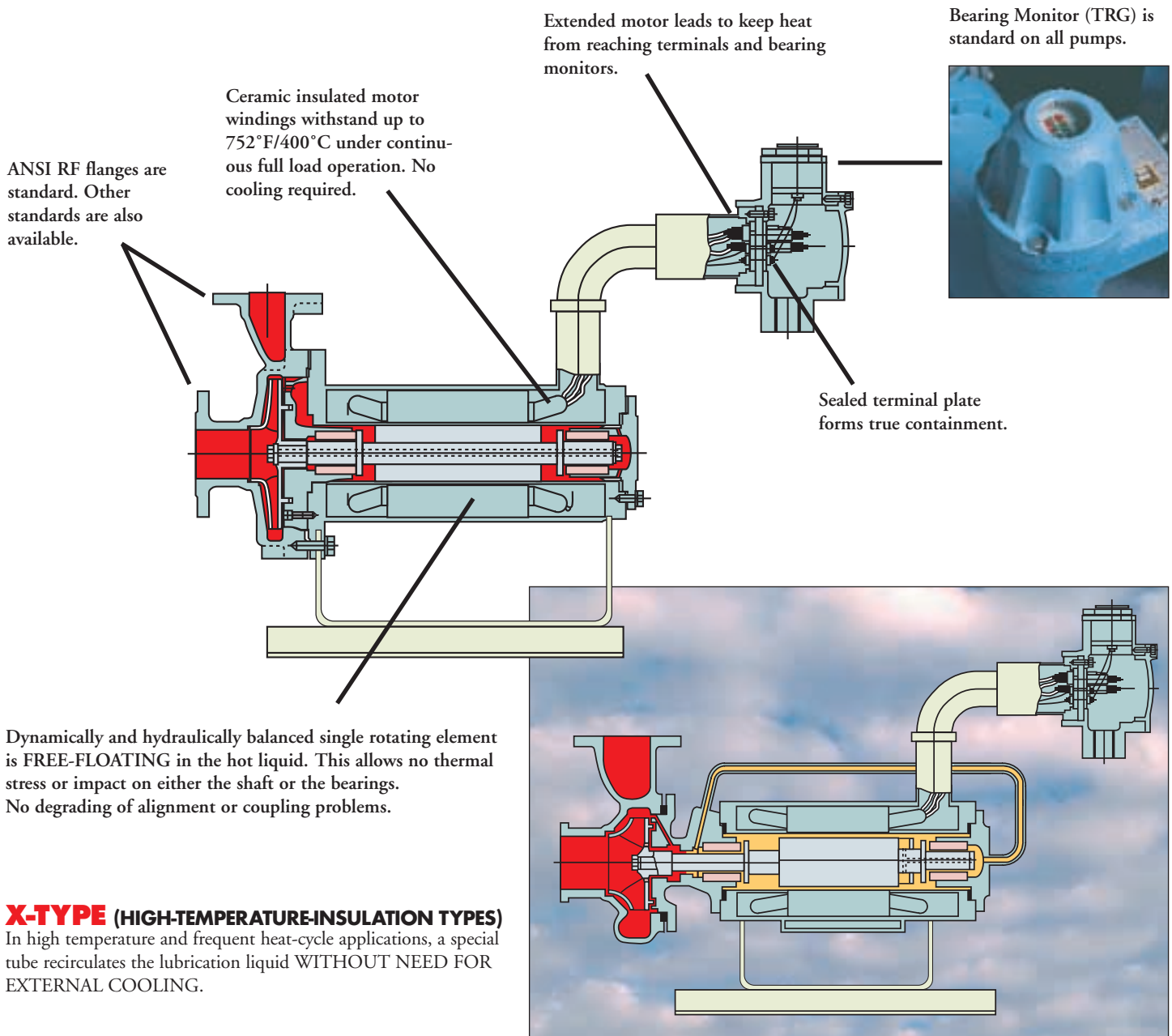
## **MAIN OFFICE HOUSTON, TEXAS**

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

**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/30 bar.





# 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**

<b>Pump size</b>	:	1.5 x 1 x 5	to	8 x 10 x 15
<b>3,600 RPM motor</b>	:	1.5 HP / 1.1 kw	to	233 HP / 175 kw
<b>1,800 RPM motor</b>	:	3 HP / 2.2 kw	to	160 HP / 120 kw

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.

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.

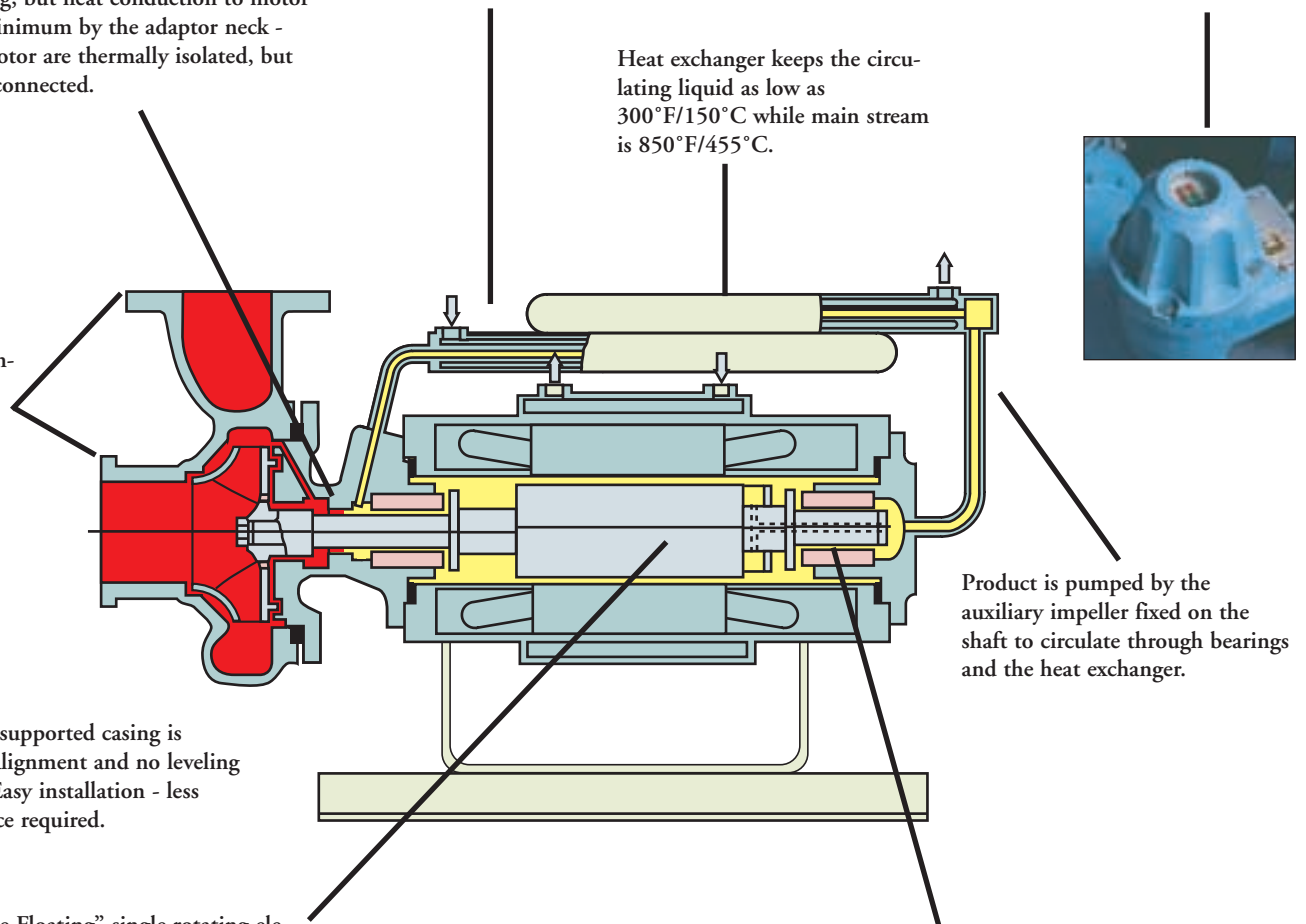
No centerline supported casing is required. No alignment and no leveling are required. Easy installation - less mounting space required.

“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.

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



# MOTOR RATINGS

## STANDARD TEIKOKU CANNED MOTORS

### 2 Pole Motors

Motor Frame #	Rated Output (kw/hp)	Nominal Voltage (V)	60Hz		50Hz	
			Rated Amp. (A)	Start. Amp. (A)	Rated Amp. (A)	Start. Amp. (A)
<b>119</b>	0.75/1	400	—	—	2.4	11
		440	2.2	10.5	—	—
<b>(215)</b>	1.1/1.5	400	—	—	3	11
		440	2.7	10.5	—	—
<b>216</b>	1.3/1.7	440	3	10.5	—	—
		400	—	—	4.2	25
<b>(215)</b>	1.1/1.5	440	3.8	24	—	—
		400	—	—	4.7	25
<b>216</b>	1.5/2	440	4.2	24	—	—
		400	—	—	5.5	25
<b>(215)</b>	2.2/2.9	440	5.1	24	—	—
		440	5.5	24	—	—
<b>217</b>	3/4	400	—	—	7.5	28
		440	6.7	27	—	—
<b>(215)</b>	3.4/4.5	440	7.5	27	—	—
		400	—	—	10	58
<b>316</b>	3.7/4.9	440	9	55	—	—
		400	—	—	13	58
<b>(215)</b>	5.5/7.3	440	11.5	55	—	—
		440	13	55	—	—
<b>317</b>	6.6/8.8	400	—	—	16	61
		400	15	58	—	—
<b>(215)</b>	7.4/9.9	440	16	58	—	—
		400	—	—	17	106
<b>416</b>	7.5/10	440	16	101	—	—
		400	—	—	23	106
<b>(215)</b>	11/14.7	440	21	101	—	—
		440	23	101	—	—
<b>417</b>	15/20	400	—	—	33	136
		440	30	130	—	—
<b>(215)</b>	17/23	440	33	130	—	—
		400	—	—	33	158
<b>516</b>	15/20	440	31	150	—	—
		400	—	—	—	158
<b>(215)</b>	18.5/25	440	36	150	33	—
		440	39	150	—	—
<b>518</b>	22/29	400	—	—	39	210
		440	44	200	—	—
<b>(215)</b>	26/35	400	—	—	—	210
		440	51	200	48	—
<b>616</b>	29/39	440	55	200	—	—
		400	—	—	55	264
<b>(215)</b>	30/40	440	57	251	—	—
		400	—	—	—	264
<b>616</b>	37/49	440	69	251	61	—
		440	74	251	—	—
<b>617</b>	45/60	400	—	—	74	331
		440	84	319	—	—
<b>(215)</b>	55/73	440	90	319	—	—
		400	102	588	90	690
<b>716</b>	65/87	440	102	646	—	—
		400	126	588	—	690
<b>(215)</b>	75/100	440	118	646	110	—
		400	145	588	—	690
<b>717</b>	85/113	440	134	646	126	—
		440	145	646	—	—
<b>(215)</b>	90/120	400	175	774	145	918
		440	162	850	—	—
<b>815</b>	105/140	440	185	850	—	—
		400	210	774	175	918
<b>(215)</b>	110/147	440	194	850	—	—
		440	210	850	—	—
<b>815</b>	132/176	440/400	262	840	210	884
		440	284	840	—	—
<b>816</b>	145/193	440/400	314	988	340	1040
		440/400	340	988	422	1280

### 4 Pole Motors

Motor Frame #	Rated Output (kw/hp)	Nominal Voltage (V)	60Hz		50Hz	
			Rated Amp. (A)	Start. Amp. (A)	Rated Amp. (A)	Start. Amp. (A)
<b>326</b>	1.5/2	400	—	—	8	43
		440	7	41	—	—
<b>(215)</b>	2.2/2.9	400	—	—	8.5	43
		440	8	41	—	—
<b>326</b>	3.7/4.9	400	—	—	10.5	43
		440	10	41	—	—
<b>(215)</b>	4.2/5.6	400	—	—	—	—
		440	10.5	41	—	—
<b>426</b>	5/6.7	440	12	41	—	—
		400	—	—	16	78
<b>(215)</b>	5.5/7.3	440	15	75	—	—
		400	—	—	19	78
<b>426</b>	7.5/10	440	18	75	—	—
		440	19	75	—	—
<b>526</b>	11/14.7	400	—	—	28	130
		440	26	124	—	—
<b>(215)</b>	15/20	400	—	—	35	130
		440	32	124	—	—
<b>626</b>	17/23	440	35	124	—	—
		400	—	—	43	200
<b>(215)</b>	18.5/25	440	40	190	—	—
		400	—	—	49	200
<b>626</b>	22/29	440	45	190	—	—
		440	49	190	—	—
<b>726</b>	30/40	400	—	—	71	312
		440	65	297	—	—
<b>(215)</b>	37/49	400	—	—	83	312
		440	77	297	—	—
<b>726</b>	40/52	400	83	297	—	—
		440	—	—	105	515
<b>728</b>	45/60	440	95	490	—	—
		400	—	—	124	515
<b>(215)</b>	55/73	440	115	490	—	—
		440	124	490	—	—
<b>825</b>	65/87	400	—	—	140	500
		440	130	500	—	—
<b>(215)</b>	71/100	400	—	—	165	500
		440	150	500	—	—
<b>825</b>	85/113	440	165	500	—	—
		400	—	—	121	760
<b>826</b>	90/120	440	195	720	—	—
		400	—	—	252	760
<b>(215)</b>	110/147	440	232	720	—	—
		400	—	—	—	—
<b>826</b>	120/160	440	252	720	—	—
		440	—	—	—	—

#### 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 m <sup>3</sup> /min	10,500 GPM	40 m <sup>3</sup> /min
TDH (max)	2,000 ft.	609 m	2,500 ft.	600 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	30 bars	5,000 psi	350 bars
MOTOR HORSEPOWER (max)	230 HP	175 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.....	

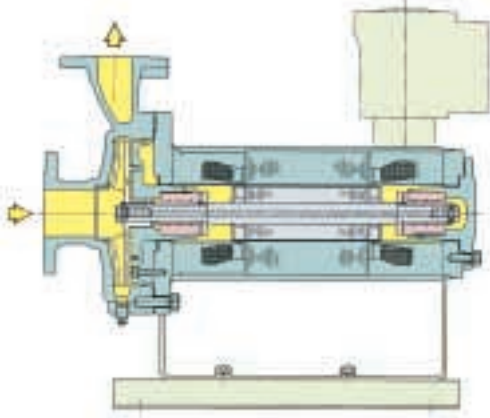
### III. OTHERS

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

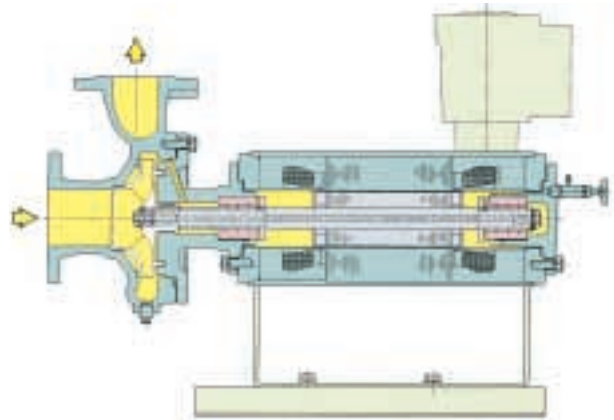
## F-V TYPE (BASIC TYPE WITH HOLLOW SHAFT)

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

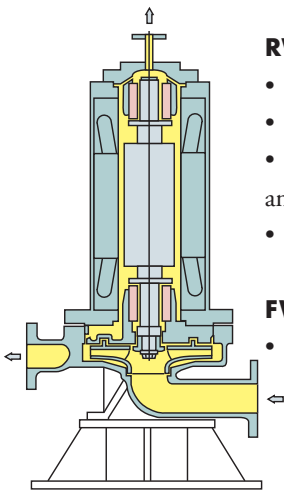


## FA-V TYPE (BASIC TYPE WITH HOLLOW SHAFT)

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)

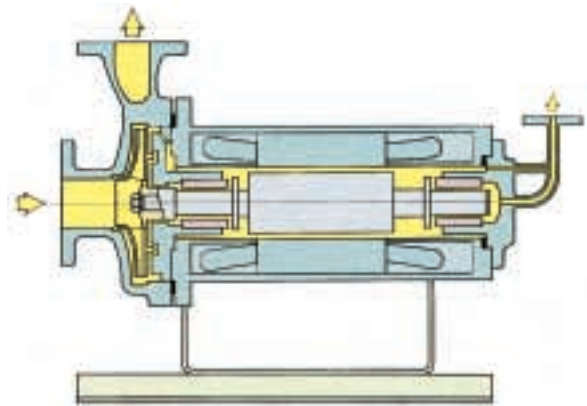
- Improves Venting
- Improves Bearing Load
- Recommended for Low Viscosity and Steep Vapor Pressure Liquids
- Minimum Space Required

### FW or FV (Hollow Shaft)

- Minimum Space Required

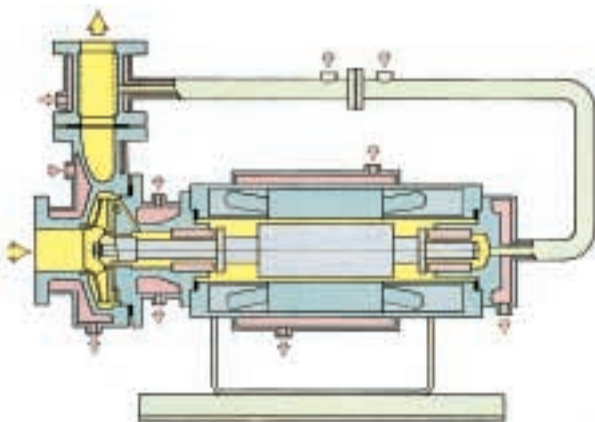
## R TYPE (REVERSE CIRCULATION TYPE)

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



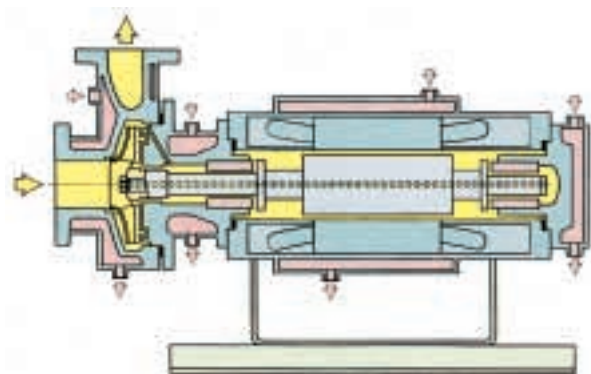
## K-S TYPE (FULL-STEAM-JACKET TYPE)

Suitable for handling fluids with high melting points.



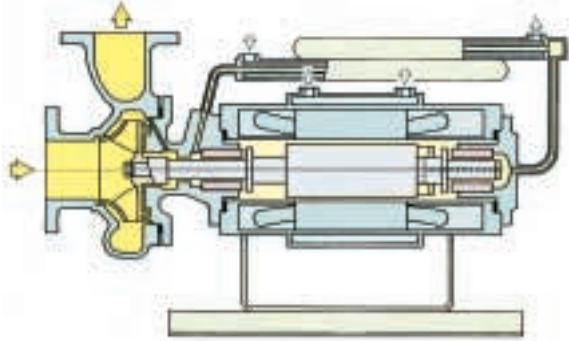
## K TYPE (FULL-STEAM JACKET TYPE)

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



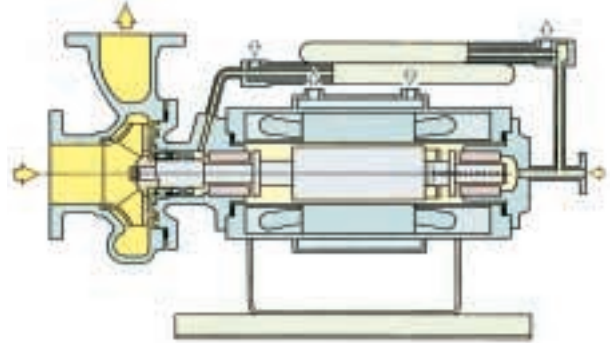
**B TYPE (HIGH-TEMPERATURE-INSULATION TYPES)**

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



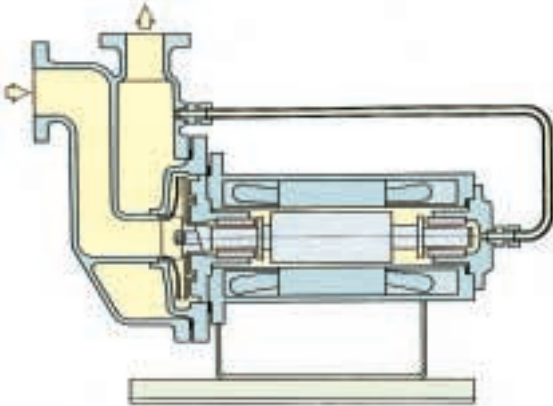
**D TYPE (SLURRY SEAL TYPE)**

Suitable for handling fluids containing small amounts of fine solids.



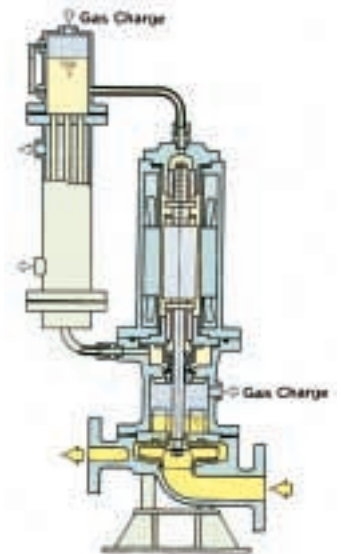
**G TYPE (SELF-PRIMING TYPE)**

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



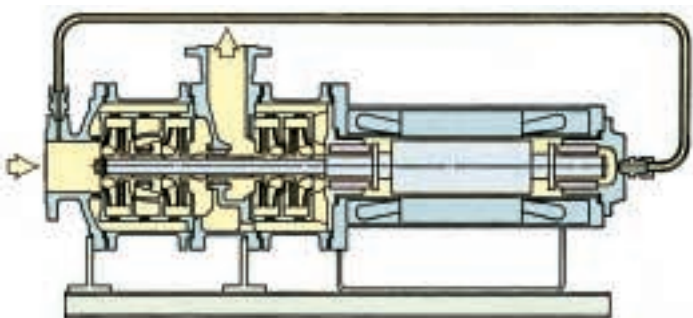
**XG TYPE (GAS-SEALED SLURRY TYPE)**

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



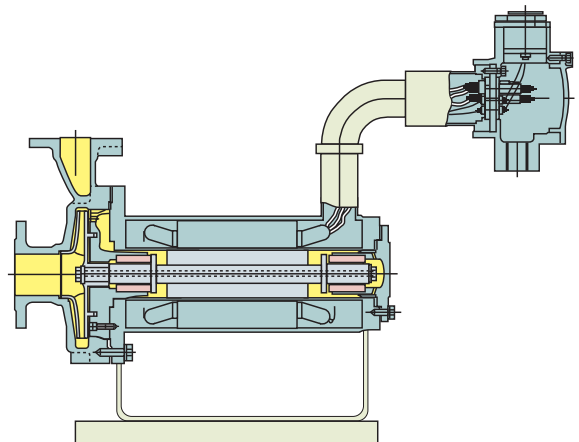
**F-M TYPE (MULTI-STAGE TYPE)**

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



**X TYPE (HIGH-TEMPERATURE-INSULATION TYPES)**

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



# FLUIDS PUMPED BY TEIKOKU

Acetaldehyde	Cyclohexylamine	Kerosene	1,2-Propanediol
Acetic acid	Developer	Ketene	1,3-Propanediol
Acetic anhydride	Dibutyl phthalate	Lactic acid (d or l)	2-Propanol
Acetone	Dichloroacetic acid	dl-Lactic acid	Propionaldehyde
Acetone cyanhydrin	m-Dichlorobenzene	Lactonitrile	Propionic acid
Acetonitrile	o-Dichlorobenzene	Lanthanum hydroxide	Propylene
Acrolein	p-Dichlorobenzene	Latex	Propylene oxide
Acrylic acid	1,1-Dichloroethylene	Lauric acid	Pyridine
Acrylonitrile	cis-1,2-Dichloroethylene	Lead (II) nitrate	Racemic acid
A-Heavy oil	trans-1,2-Dichloroethylene	Ligroin	Sea water
Aldol	1,1-Dichloropropane	Liquified petroleum gas	Silicone oil
Allyl alcohol	1,2-Dichloropropane	Liquid ammonia	Silicone tetrachloride
Allyl chloride	1,3-Dichloropropane	Liquid paraffin	Sodium acetate
Aluminium hydroxide	2,2-Dichloropropane	Lithium chloride	Sodium carbonate
Aluminium potassium	1,1-Dichloropropylene	Lithium bromide	Sodium chlorate
Aluminium potassium sulfate	1,2-Dichloropropylene	Maleic acid	Sodium chloride
Aluminium sulfate	2,3-Dichloropropylene	Maleic anhydride	Sodium cyanide
2-Aminoethanol	3,3-Dichloropropylene	1-Malic acid	Sodium dithionate
Ammonium carbonate	cls-1,3-Dichloropropylene	Manganese (II) chloride	Sodium formate
Ammonium chloride	trans-1,3-Dichloropropylene	Mercury	Sodium hydrogensulfate
Ammonium hydrogensulfide	Diethanolamine	Methacrylic acid	Sodium hydrogensulfite
Ammonium sulfate	Diethylamine	Methanol	Sodium hydroxide
Ammonium tetrachlorozincate	Diethylene glycol	Methyl acetate	Sodium hypochlorite
Ammonium thiocyanate	Diethylene glycol monoethyl ether	Methyl acetoacetate	Sodium metaphosphate
Aniline	Di-2-ethylhexyl phthalate	Methyl acrylate	Sodium molybdate
Anisole	Diketene	Methylamine	Sodium nitrite
Anthracene oil	Dimethylamine	Methyl bromide	Sodium peroxide
Aqueous ammonia	2-Dimethylaminoethanol	Methyl chloride	Sodium silicate
Barium fluoride	N,N-Dimethylformamide	Methylchloroform	Sodium sulfate
Barium tetrasulfide	2,3-Dimethylphenol	Methyl chloroformate	Sodium sulfide
Barium trisulfide	2,4-Dimethylphenol	Methylchlorophenoxyacetic acid	Sodium sulfite
Benzaldehyde	2,5-Dimethylphenol2,6-	Methylene chloride	Sodium thiosulfate
Benzene	3,4-Dimethylphenol	Methyl ether	Solvent naphtha
Benzen chloride	3,5-Dimethylphenol	Methylisobutyl ketone	Soy
Benzine	2,3-Dimethylpyridine	Methyl methacrylate	Stearic acid
Benzyl alcohol	Dimethyl sulfate	2-Methylpyridine	Styrene
Benzyl chloride	Dimethyl sulfite	3-Methylpyridine	Sulfur
Boron oxide	1,3-Dioxane	4-Methylpyridine	Sulphur dichloride
1,2-Butadiene	1,4-Dioxane	Methyl sulfide	Sulphur dioxide
1,3-Butadiene	Dipropylene glycol	Morpholine	Sulphur trioxide
Butane	Epichlorohydrin	Naptha	Sulfuric acid
1-Butanol	Ethanol	Naphthalene	Tallow
di-2-Butanol	Ethyl acetate	Nickel (II) chloride	Tetrahydrofuran
Butyl acetate	Ethyl acrylate	Nickel (II) nitrate	2,3,4,5-Tetrahydrophthalic acid
Butyl acrylate	Ethylbenzene	Nitric acid	3,4,5,6-Tetrahydrophthalic acid
tert-Butyl alcohol	Ethyl chloroformate	Nitrobenzene	Thinner
Butylaldehyde	Ethylene chloride	Nitrogen dioxide	Thiourea
Butylamine	Ethylenediamine	m-Nitrotoluene	Tin (II) chloride
dl-sec-Butylamine	Ethylene glycol	o-Nitrotoluene	Titanium (IV) chloride
tert-Butylamine	Ethylene oxide	p-Nitrotoluene	Toluene
Cadmium nitrate	Ethyl ether	w-Nitrotoluene	m-Toluidine
Calcium chlorate	Ethyl chloride	2-Nitro-m-xylene	o-Toluidine
Calcium chloride	Ethyl=d=lactate	4-Nitro-m-xylene	p-Toluidine
Calcium hydroxide	Ethyl methyl ketone	5-Nitro-m-xylene	1,2,3-Trichlorobenzene
Calcium hypochlorate	5-Ethyl-2-methylpyridine	3-Nitro-o-xylene	1,2,4-Trichlorobenzene
Calcium sulfite	Fatty acid	4-Nitro-o-xylene	1,3,5-Trichlorobenzene
Caprolactam	Freon R-11	2-Nitro-o-xylene	1,1,2-Trichloroethane
Carbon bisulfide	Freon R-12	1-Octanol	Trichloroethylene
Carbon dioxide	Formaldehyde	Octyl chloride	Tri-m-cresyl phosphate
Carbon tetrachloride	Formimide	Oleic acid	Tri-o-cresyl phosphate
Chloral	Formic acid	Orthoboric acid	Tri-p-cresyl phosphate
L-Chlorine	Fuming sulfuric acid	Oxalic acid	Triethylamine
Chlorine dioxide	Furfural	Paraffin	Trethylene glycol
Chloroacetic acid	Furfuryl alcohol	Paraldehyde	Trimethylamine
Chloracetone	Gasoline	Pentachloroethane	Urea
m-Chloroaniline	D-Glucose	Phenol	Vinegar
o-Chloroaniline	Glycerin	m-Phenosulfonic acid	Vinyl acetate
p-Chloroaniline	Glycine	o-Phenosulfonic acid	Vinyl chloride
Chlorobenzene	Heavy Water	p-Phenosulfonic acid	Vinylidene chloride
Chloroform	Hydrazine	Phosgene	Water
Chromium (VI) oxide	Hydrogen chloride	Phosphorus trichloride	m-Xylene
Chlorosulfuric acid	Hydrogen cyanide	Phosphoryl chloride	o-Xylene
Citric acid	Hydrogen fluoride	Phthalic acid	p-Xylene
Coconut oil	Hydrogen peroxide	Phthalic anhydride	p-Xylidine
Copper (II) hydroxide	Hydrogen sulfide	Polythylene glycol	sym, m-Xylidine
Copper (II) sulfate	Hudrofleuric acid	Potassium carbonate	unsym, m-Xylidine
m-Cresol	Iron (II) oxide	Potassium chlorate	unsym, o-Xylidine
o-Cresol	Iron (II) sulfate	Potassium permanganate	vic, m-Xylidine
p-Cresol	Isobutyl alcohol	Potassium phosphate	vic, 0-Xylidine
Croasote oil	Isobutyl aldehyde	Potassium sulfate	Zinc oxide
Crotonaldehyde		Propane	
Cyanoacetic acid			
Cyclohexane			
Cyclohexane			
Cyclohexanone			

# OPTIONS

## 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

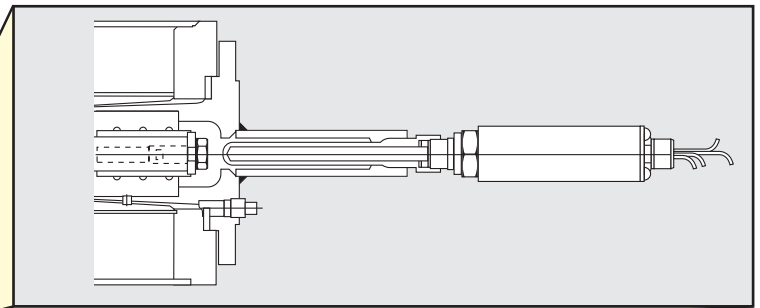
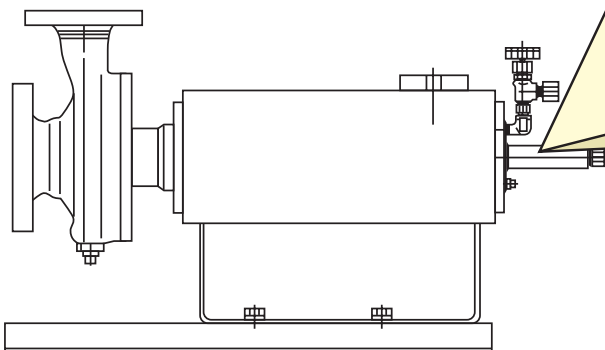
- Adjustable Digital On-Delay Timers:  
Trip won't activate until the selected delay time is exceeded.
- Adjustable Digital Start-up Timer: no false trips while motor is starting



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## 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.



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