

Quotation

22 Aug 2018

Triumpf
4004 Wesbrook Mall
Vancouver, BC V6T 2A3

Quotation number: TUS1801057
Revision:

Attn: Mae Jang

Project location: Vancouver, BC
Your reference: RFQ - Teikoku Replacement Pump

Thank you for your interest in Teikoku USA's canned motor pump technology for safe and leak free liquid handling. Teikoku USA is pleased with this opportunity to partner with Triumpf once again and looks forward to providing a safe and reliable solution for this service.

Quoted within this proposal is a duplicated Plan 11-S Chempump G-Series canned motor pump for Triumpf's water service, per serial number 2244702-1. All G-Series products offer true secondary containment inherent in their design meaning in the event of a liner breach, no process fluid will leak to the atmosphere. The lead time for this pump is 4-6 weeks from Ohio.

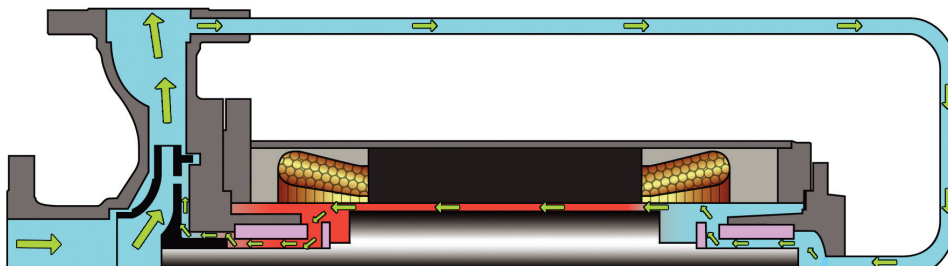
To stay consistent with a canned motor pump's leak proof technology, Teikoku has upgraded the junction box on this pump to the leak proof design now offered as standard on all pumping solutions.

Teikoku has also provided an option to upgrade to include the TRG radial bearing wear monitor. The TRG continuously monitors the running clearances between the stationary and rotating components of the pump. Bearing wear technology is considered standard on all new applications and is highly recommended as an upgrade on existing applications. Literature on the TRG has been included at the end of the proposal as well as a dimensional drawing.

Please do not hesitate to contact Teikoku USA with any questions regarding this quotation.

Sincerely,

Tyler Green
Application Engineer
Warminster, PA
Email : TGreen@teikokupumps.com



Plan 11-S External Circulation Representation



959 Mearns Road
Warminster, PA 18974
(W) www.TeikokuPumps.com
(P) (215)343-6000
(F) (267)486-1037

5880 Bingle Road
Houston, TX 77092
(W) www.TeikokuPumps.com
(P) (713)983-9901
(F) (713)983-9919

P.O. Box 627
Belmont, WV 26134
(W) www.TeikokuPumps.com
(P) (304)684-2459
(F) (304)684-7593

Quotation Summary

The following is a price summary for this quotation. Please see item specific pages for more details.

Item Number	Service	Pump Size	Unit Price	Quantity	Extended price
001	Water	GB-3K-1S	\$ 6,063	1	\$ 6,063
Grand Total					\$ 6,063

VALIDITY: This offer is valid for 30 days from date issued.

PRICE: The price quoted is for all items purchased at one time. Partial orders may be subject to a price adjustment.

Payment Terms: Credit Card payment

FREIGHT: FOB Ohio.

SHIPMENT: Approximately 4-6 weeks after receipt of order.

WARRANTY: 24 months from shipment.

STARTUP SUPPORT: Included.

TERMS AND CONDITIONS: Teikoku's standard terms and conditions are attached and apply.

REPRESENTATIVE NAME: Apex Equipment Ltd

REPRESENTATIVE CONTACT: Rod Chinook

Item number	001	Size / Stages	1x0.75x6.5 GB-2 / 1
Quote number	TUS1801057	Pump speed	3450 rpm

Total

Grand Total	\$ 6,063	Lead Time Total	4-6 wks
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Pump

Qty	Description	Average Unit Price	Extended Price
1	GB-3K-1S	\$ 6,063	\$ 6,063

Pump Construction

Motor Details

Motor List: Motor G 3K 60Hz 460V 2Pole 4.1BHP
 Full Load Input Power: 4.4 kW
 Full Load Current: 6.7 A
 Starting Current: 26.1 A
 TCO Temperature: 425 deg
 Motor Fill: Silicone Oil Filled
 Electrical Junction Box: Leakproof
 Area Classification: NEC Class 1, Div. 2, Group C and D
 NEC Temperature Code: T2D (<=215C)

Materials of Construction

Casing Material: 316 SS
 Impeller Material: 316 SS
 Shaft Material: 316 SS
 Bearing Housing Material: 316 SS
 Bearing Material: Carbon Graphite
 Stator Liner: 316L SS
 Rotor Liner: 316L SS
 Journal: 316 SS
 Gaskets: Teflon Envelope

Design Pressure

Design Pressure: 150 Psi

Connections

Suction Flange: 1", 150# FF
 Discharge Flange: 0.75", 150# FF

Circulation Plans

Circulation Plans: Plan 11-S

Baseplate

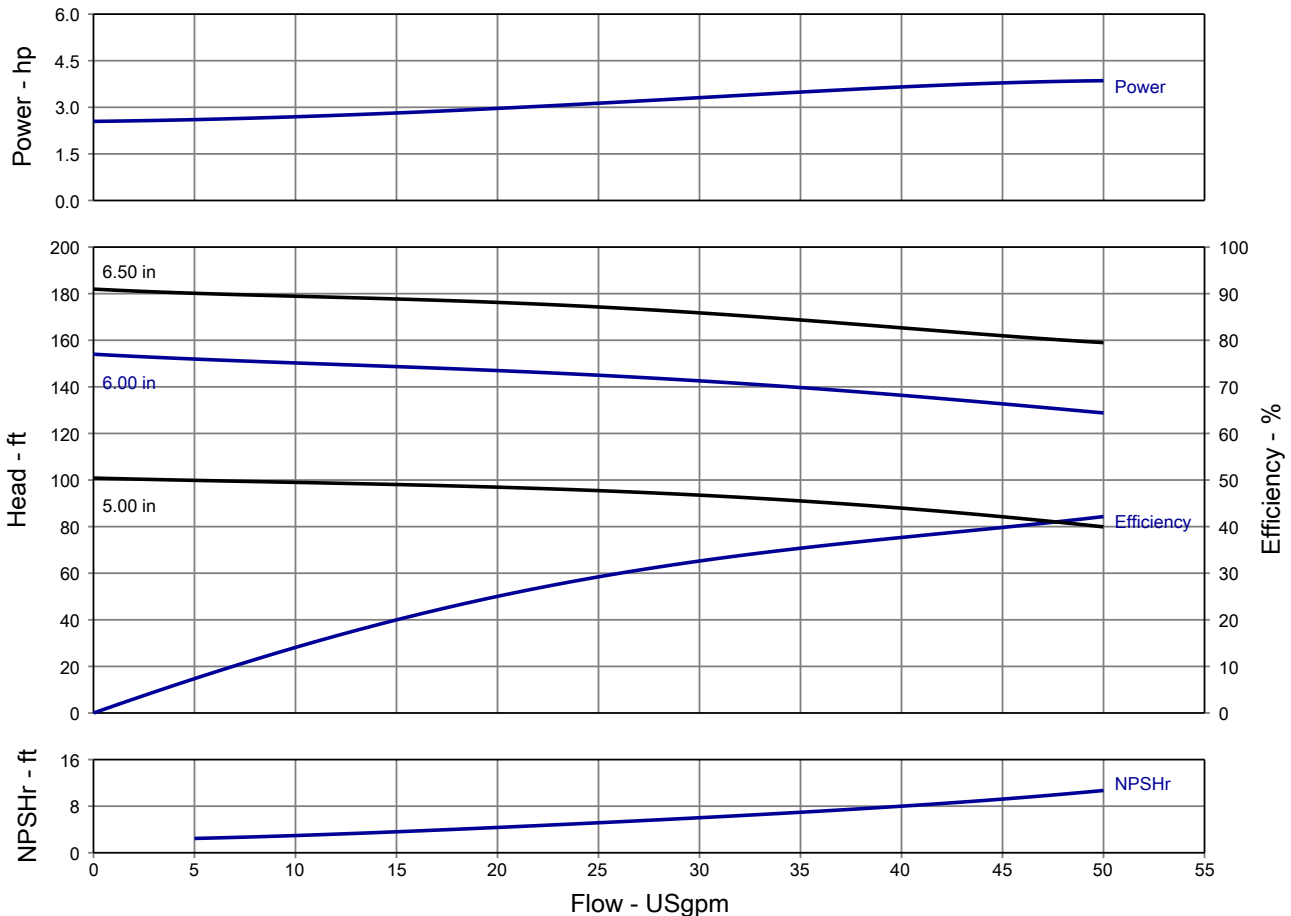
Standard Steel Baseplate

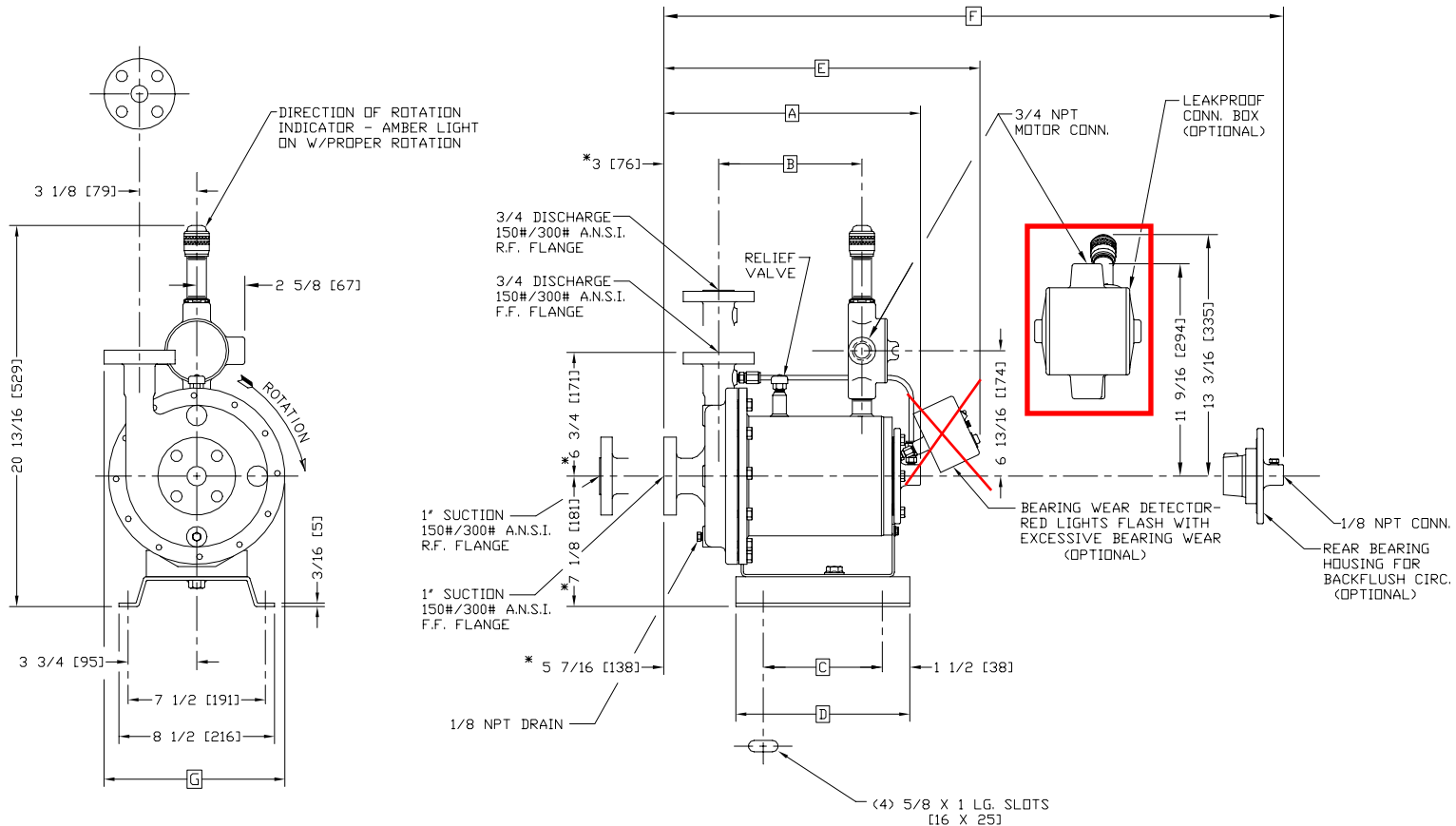
Optional Adders

Qty	Description	Unit Price	Extended Price
1	TRG Radial Bearing Wear Monitor *Add 2 weeks to Lead Time*	\$ 1,550	\$ 1,550

Item number	: 001	Size	: 1x0.75x6.5 GB-2
Service	:	Stages	: 1
Quantity	: 1	Based on curve number	: A-70058
Quote number	: TUS1801057	Date last saved	: 22 Aug 2018 9:03 AM

Operating Conditions		Liquid	
Flow, rated	: Curve	Liquid type	: Water
Differential head / pressure, rated (requested)	: Curve	Additional liquid description	:
Differential head / pressure, rated (actual)	: Curve	Solids diameter, max	: 0.00 in
Suction pressure, rated / max	: 0.00 / 0.00 psi.g	Solids concentration, by volume	: 0.00 %
NPSH available, rated	: Ample	Temperature, max	: N/A
Frequency	: 60 Hz	Fluid density, rated / max	: N/A
Performance		Viscosity, rated	: N/A
Speed, rated	: 3450 rpm	Vapor pressure, rated	: N/A
Impeller diameter, rated	: 6.00 in	Material	
Impeller diameter, maximum	: 6.50 in	Material selected	: 316 Stainless Steel
Impeller diameter, minimum	: 5.00 in	Pressure Data	
Efficiency	: 42.16 %	Maximum working pressure	: 66.65 psi.g
NPSH required / margin required	: 10.70 / 0.00 ft	Maximum allowable working pressure	: 150.0 psi.g
Ns (imp. eye flow) / Nss (imp. eye flow)	: 545 / 4,125 US Units	Maximum allowable suction pressure	: N/A
MCSF	: 7.5 USgpm	Hydrostatic test pressure	: 225.0 psi.g
Head, maximum, rated diameter	: 154.0 ft	Driver & Power Data (@Max density)	
Head rise to shutoff	: 19.57 %	Driver sizing specification	: Rated power
Flow, best eff. point	: 50.00 USgpm	Margin over specification	: 0.00 %
Flow ratio, rated / BEP	: 100.00 %	Service factor	: 1.00
Diameter ratio (rated / max)	: 92.31 %	Power, hydraulic	: 1.63 hp
Head ratio (rated dia / max dia)	: 81.01 %	Power, rated	: 3.86 hp
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 /	Power, maximum, rated diameter	: 3.86 hp
Selection status	1.00 : Acceptable	Minimum recommended motor rating	: 5.00 hp / 3.73 kW





5	425	269	235	311	508	425	251	260
3	394	237	203	279	477	394		
1 1/2	356	199	165	241	439	356		
MOD.	A	B	C	D	E	F	G 150#	G 300#
MILLIMETERS								

5	16 3/4	10 9/16	9 1/4	12 1/4	20	16 3/4	9 7/8	10 1/4
3	15 1/2	9 5/16	8	11	18 3/4	15 1/2		
1 1/2	14	7 13/16	6 1/2	9 1/2	17 1/4	14		
MOD.	A	B	C	D	E	F	G 150#	G 300#
INCHES								

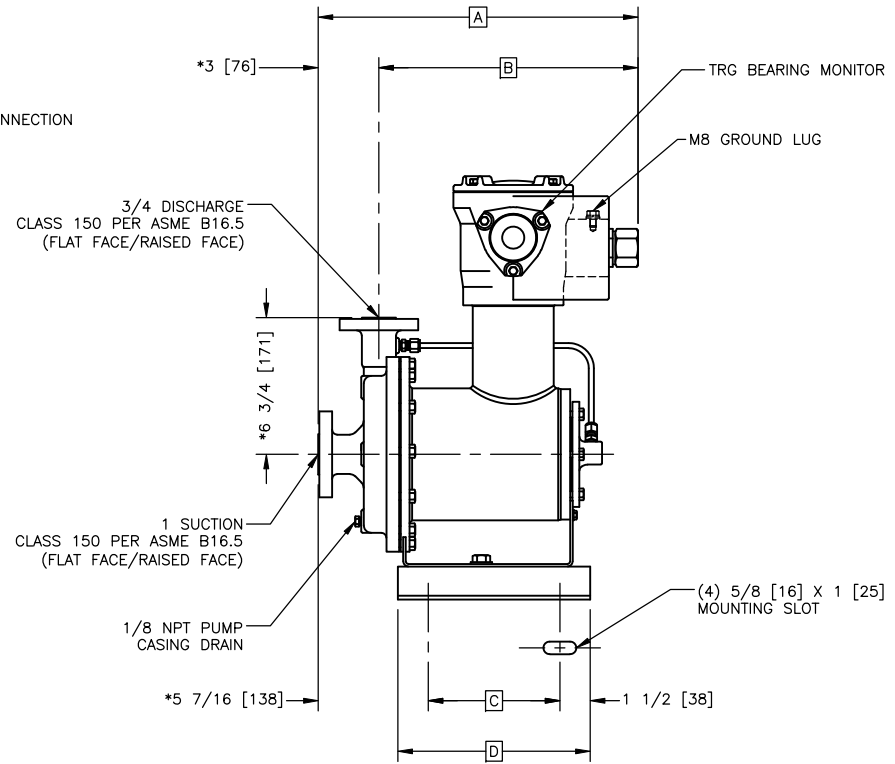
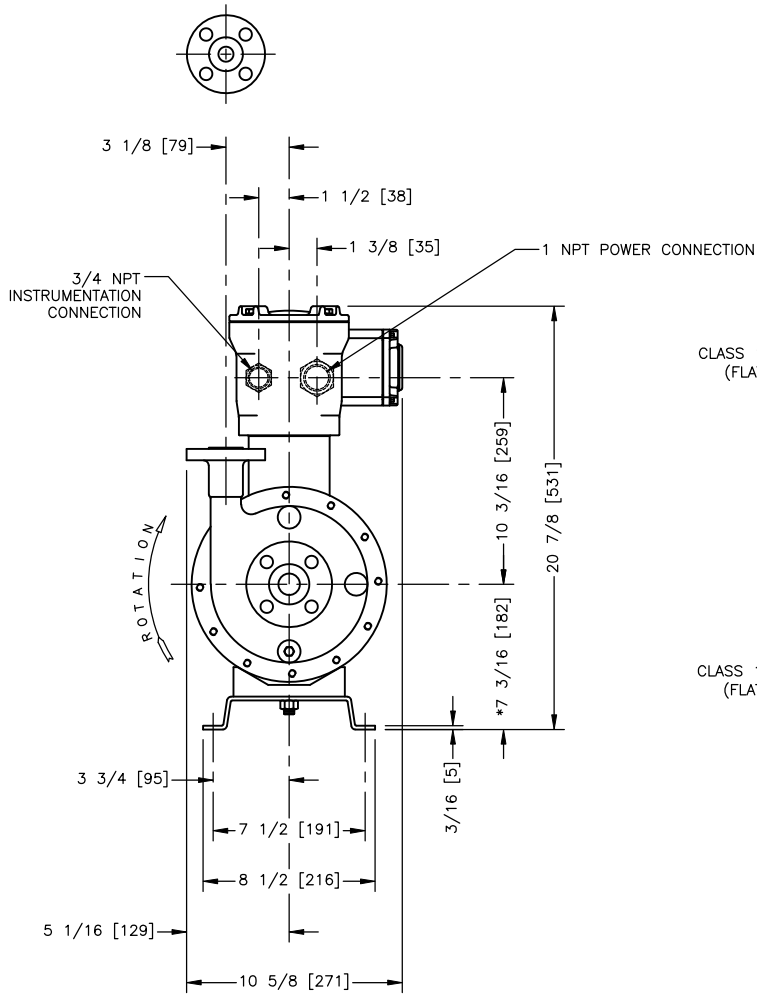
SEE DATA WORK SHEET FOR APPROVAL SIGNATURE

CHEMPUMP
A DIVISION OF TEIKOKU
USA WASHINGTON, PA.


UNLESS OTHERWISE STATED: -ALL UNITS IN INCHES -DIM. IN BRACKETS ARE IN MM -DIM. MARKED + ARE ± 1/16 [1.5] -ALL OTHER DIMS. ARE ± 1/4 [1.0] -ANGLE DIMS. ARE ± 1° NOTE: ROUNDING TO NEAREST 1/32" OR 1mm PRECLUDES INCH/MM CONVERSION.	DRAWN EWM	DATE 1-7-93	TITLE OUTLINE MODEL GB 150# / 300# STD./BACKFL. CIRC.
CHECKED TR	DATE 1-7-93	APPROVED CAC	DATE 1-7-93
REMOVED 2 VENT HOLES	W.M.	DATE 5/12/93	SCALE 1:4
REVISED PRESS. & REV. CIRC	PA	DATE 5/12/93	SCALE
NO. & DATE	REVISIONS	BY	SCALE

DRAWING NO. **C 60456** REV. **3**

PUMP WITH TRG REFERENCE



5K	18 9/16 [472]	15 9/16 [395]	9 1/4 [235]	12 1/4 [311]
3K	17 5/16 [440]	14 5/16 [364]	8 [203]	11 [279]
1-1/2K	15 13/16 [402]	12 13/16 [325]	6 1/2 [165]	9 1/2 [241]
MOTOR	A	B	C	D

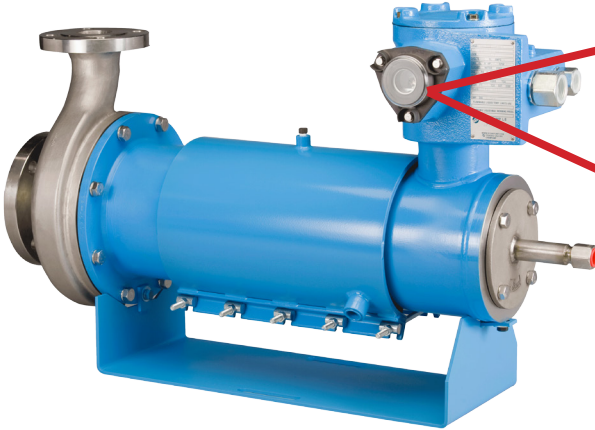

CHEMPUMP
A DIVISION OF TEIKOKU USA INC.
 WARMINSTER, PA. and BELMONT, WY.

UNLESS OTHERWISE STATED, -ALL UNITS IN INCHES -DIM. IN BRACKETS ARE IN mm -DIM. MARKED * ARE ±1/16 [±2] -ALL OTHER DIMS. ARE ±1/4 [±8] -ANGLE DIMS. ARE AS SHOWN NOTE: ROUNDING TO NEAREST 1/32" (1mm) PRECLUDES INCH/MM CONVERSION	DRAWN BY 8/4/15	DATE 8/4/15	TITLE OUTLINE MODEL GB 150# (TRG MONITOR)
NO. & PRO. NO.	DATE	BY	REVISIONS
SCALE 1:4	DRAWING NO. C 60556	REV. 0	

TEIKOKU ROTARY GUARDIAN

The Industry Standard for Sealless Pump Monitoring and Reliability for Over 30 Years

The Teikoku Rotary Guardian (TRG)* takes the “mystery” out of canned motor pump operation by utilizing real time output of critical running clearances to both monitor current conditions and develop data based preventative maintenance schedule.



On-Board Terminal Box Mount

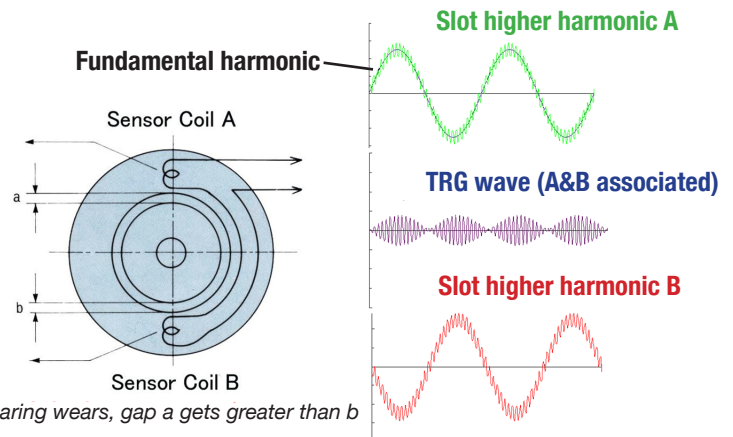
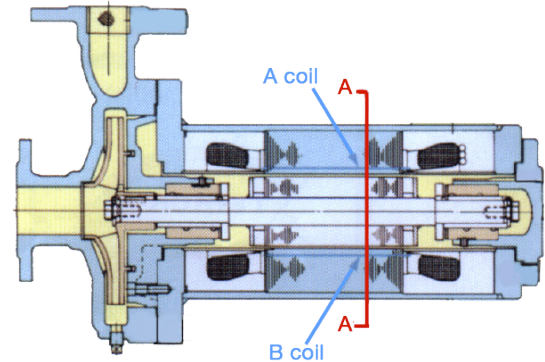


Remote Panel Meter

*US Patent No. 4211973 & 4334189

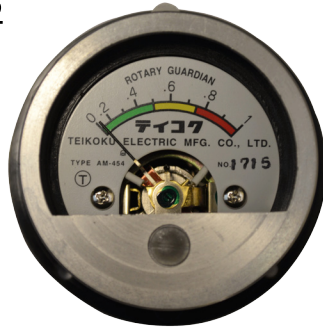
Principle of Operation

1. The TRG meter operates on the principle of induced voltage. A magnetic field is created in the TRG coils by the current flowing through the stator winding. In addition, a magnetic field is created by magnets sealed in the rotor.
2. When the rotor is perfectly centered in the stator, the two magnetic fields are essentially concentric or balanced.
3. When bearing wear occurs and the gap ‘b’ between the rotor and stator decreases, a magnetic flux created by the imbalance in the magnetic fields causes an induce voltage in the TRG coils.
4. This voltage is indicated on the TRG voltmeter. The meter is mounted on the pump terminal box as standard but is available as remote panel-mount.

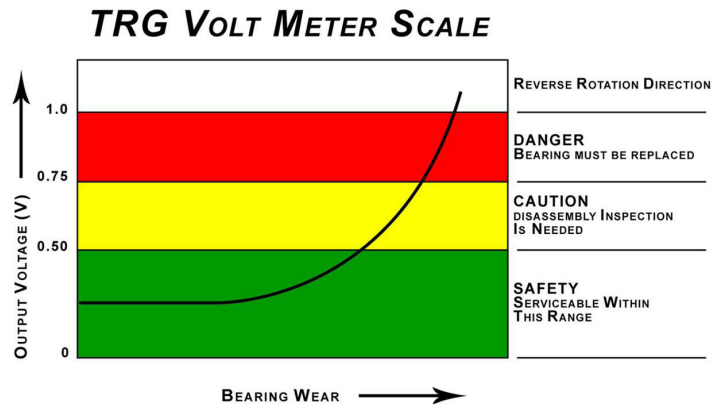


Monitor Running Clearances and Bearing Conditions

Outputs



- Monitors & indicates rate of radial bearing wear
- Detects lost phase
- Shows reverse rotation



Operation *TRG with Phase Sequence Sensor in Operation*

TRG initial indication varies from pump to pump. Users can record the initial value to establish a baseline. This determines a point from which to monitor the wear rate of the bearings and establishes preventative maintenance schedules.

TRG INDICATION ZONE	DIAGNOSIS	USER ACTION
Green	Good	No Action
Yellow > 0.3V over baseline	Bearings Worn Caution Level	Plan Routine Maintenance
Red > 0.5V over baseline	Maintenance Required	Immediate Shutdown Replace Worn Parts

Models

Model	Ex-Proof Box	Panel Mount	RDI*
A-45C	X		
AM-45	X		X
JC-60P		X	
JM-60PK		X	X

*RDI: Rotation Direction Indication

Option



TRG Converter
Converts signal into either analog 4-20mA or 1-5 VDC for various I&E control.

Terms & Conditions of Sale

TEIKOKU USA INC., HEREAFTER SHALL BE REFERRED TO AS TEIKOKU.

1. **TERMS** Payable in United States currency. Net cash 30 days, F.O.B. factory. Payable at the remit to address designated on the invoice. Prices are subject to change without notice. In the event of default of payment when due of any indebtedness created by acceptance of invoiced material, the Seller (Teikoku) shall be entitled to interest on any such indebtedness from the date due at the highest legal rate plus reasonable attorney's fees should an attorney be employed to collect any such indebtedness after default.

2. **ORDERS** All orders subject to acceptance by authorized personnel at Teikoku. (Location accepting order.)

3. **QUOTATIONS** All quotations subject to approval by authorized personnel at Teikoku, Warminster, Pa, Houston, TX or Belmont, WV. This proposal, and the prices and other specifications quoted herein, shall remain firm for a period of thirty days from date, unless otherwise specified in writing by Teikoku.

4. **SHIPMENTS** The shipment date quoted is subject to the following: (1) Prior sale of stock items. (2) Other procurement based on shipping schedule at time of acceptance of an order. (3) All Government regulations and directives that may be imposed or which apply during term of contract.

The performance of contract is contingent upon accidents, fires, strikes, and other causes beyond the control of Teikoku.

Material is subject to shipment in whole or in part at the option of Teikoku and each such shipment is subject to immediate invoicing.

Delivery of material to the common carrier shall constitute delivery thereof to Buyer and, thereafter, material shall be at Buyer's risk. Claims for damage to or loss of material in transit shall be filed by Buyer direct with carrier.

Delivery dates are estimated as closely as possible. Teikoku will use its best efforts to make delivery within the time specified, but in any event, Teikoku will not be liable for damages of any kind, liquidated or unliquidated, on account of failure to meet delivery dates. All errors, clerical or otherwise are subject to correction.

All claims for shortages or inaccurate filling of orders shall be made in writing within ten (10) days after Buyer's receipt of material.

5. **WARRANTY** The following warranty, which is not a consumer warranty, is made in lieu of any and all implied or express warranties including, without limitation, implied warranties of merchantability and fitness for a particular purpose and no other warranty is made or authorized to be made.

Service under this warranty is the responsibility of the installing dealer or contractor. In the event service is required, the Buyer should request such service directly from the installing dealer or contractor. If for any reason the installing dealer or contractor is unknown or cannot be located, the Buyer should write Chempump for the name and address of the nearest dealer or contractor.

If within two (2) years following date of delivery, any material supplied by Teikoku hereunder proves defective or fails to meet the agreed specifications, Buyer shall not return it unless requested to do so, but shall immediately notify the installing dealer or contractor, stating full particulars in support of his claim and if faulty workmanship or material is involved, or if material fails to meet the agreed specifications, Teikoku will adjust the matter fairly and promptly. Under no circumstances shall Teikoku be obligated to allow claims for subsequent or consequential damages or for any labor or expense incurred by reason of the use or sale of any material which is defective or fails to meet the agreed specifications. The sole measure of damages shall be the price received therefore by Teikoku.

Defects shall not include decomposition or wear caused

by chemical action. The component materials set forth in a proposal and/or the specifications of an order, are recommended by Teikoku for the particular application, but such recommendations shall not be construed as a warranty against wear and/or corrosion; and, such recommendations are subject in all cases to verifications and acceptance by Purchaser. Warranty on equipment and accessories furnished by outside manufacturers shall be limited to the warranty of the respective equipment and/or accessory manufacturer for such units.

No warranty shall apply to any product which is modified or changed in design or function after leaving the Teikoku factory.

6. PATENT PROTECTION Teikoku will, at its own expense, defend any suits that may be instituted against the buyer for alleged infringement of United States and Japanese patents relating solely to specific devices of Teikoku's manufacture listed herein, provided such alleged infringement shall consist only in the use of such specific device itself and not as a part of any combination of other devices and/or parts, and provided the Buyer gives Teikoku immediate notice in writing of any such suit and permits Teikoku, through its counsel, to answer the charge of alleged infringement and to defend such suit, and provided Buyer gives all needed information, assistance, and authority to enable Teikoku to do so and thereupon in case of a final award of damages in any suit, Teikoku will pay such award but shall not be responsible for any compromise made without its written consent.

7. TAXES Purchaser agrees to bear all taxes of any kind now or hereafter imposed on this contract or upon the manufacture, sale, lease, shipment, ownership, possession or use of the items covered by the proposal.

8. CANCELLATION All orders upon acceptance by Teikoku, and Purchaser shall not be subject to cancellation and revisions or changes therein shall be made only upon the written acceptance thereof by Teikoku which may be granted, withheld, or conditioned upon payment of a cancellation charge at Teikoku's sole discretion.

9. RETURN MATERIAL Buyer shall not return any material delivered by Teikoku without prior authorization from Teikoku.

10. ILLUSTRATIONS Catalog illustrations are actual representation of a certain size of each line of products but do not necessarily represent all sizes in all details. The designs shown are subject to change without notice.

11. EFFECT OF TERMS AND CONDITIONS The terms

and conditions herein contained shall apply to any order or direction received from Buyer and no provision in any such order or direction from Buyer in any way modifying or changing said terms and conditions shall be binding upon Teikoku. No modification shall be effected by Teikoku's shipment of goods following receipt of Buyer's order or request for shipment which may contain revisions contrary to the terms and conditions herein contained.

12. WAIVER Waiver by Teikoku of any breach of these provisions shall not be construed as a waiver of any other breach.

13. MINIMUM CHARGE An order for items for which invoice prices aggregate less than \$50.00 net will be billed at \$50.00.

14. ASSIGNMENT None of Buyer's rights under any order shall be assigned or otherwise transferred by the Buyer to any other person, whether by operation or law or otherwise, without the Seller's prior written approval.

15. WEIGHTS Weights shown in catalogs, price schedules, quotations, or acknowledgments or orders are approximate and are in no sense guaranteed. They represent the average weight of products as made from patterns in use at time weights were compiled.

16. SPECIAL CONDITIONS Any additional cost incurred in packaging or in making any special test or inspection which is requested by Buyer and is in addition to those regularly supplied by Teikoku will be charged to Buyer. Such tests and inspections will be made only at the factory before date of shipment.

Unless stated otherwise on this quotation, Seller's (Teikoku) acknowledgment and acceptance of orders at the price quoted herein are on the basis of the customer's release for production within three (3) months from the date of order and acceptance of shipment thereafter within period quoted. Orders released by the customer after three (3) months from date of order will be invoiced at price in effect at the time of shipment.