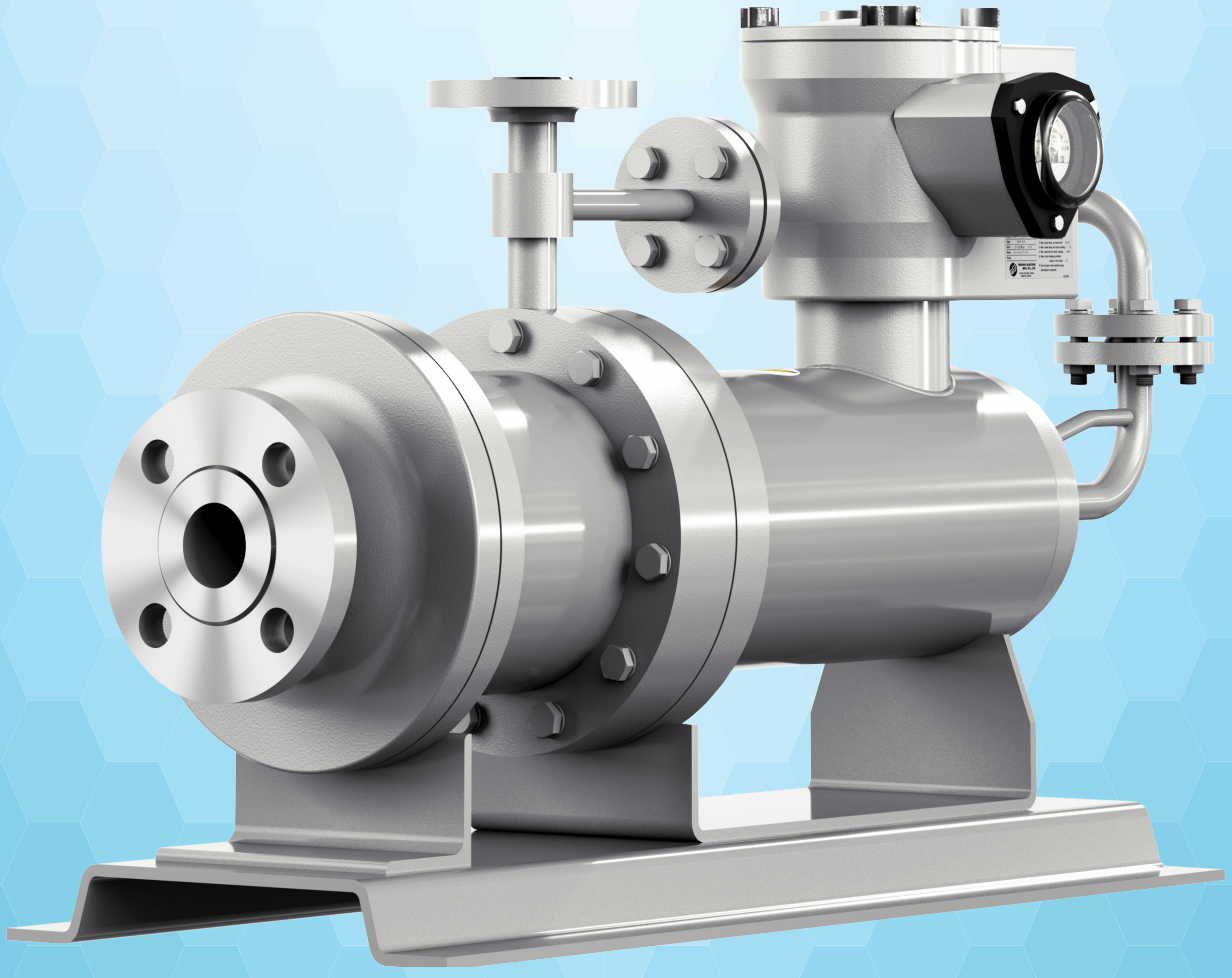
TEIKOKU USA INC
CHEMPUMP
Safety By Design

ALP

ADVANCED LOW-PROBABILITY AMMONIA TRANSFER PUMP

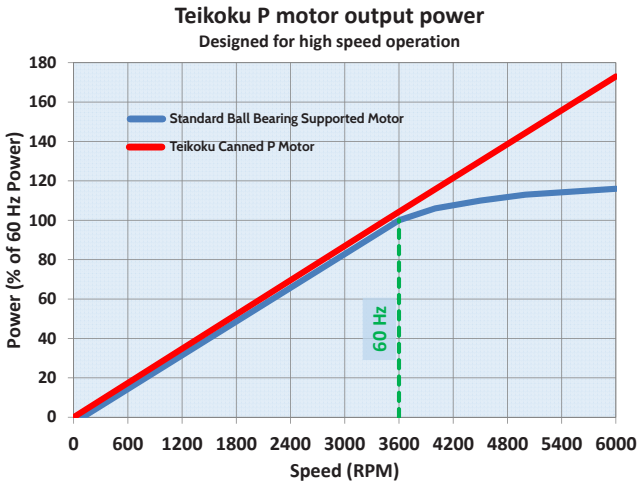


A SINGLE PUMP SOLUTION TO SAFELY MEET ALL YOUR NH_3 TRANSFER NEEDS

HISTORIC INNOVATION IN EMISSION FREE, LOW-PROBABILITY PUMP DESIGN

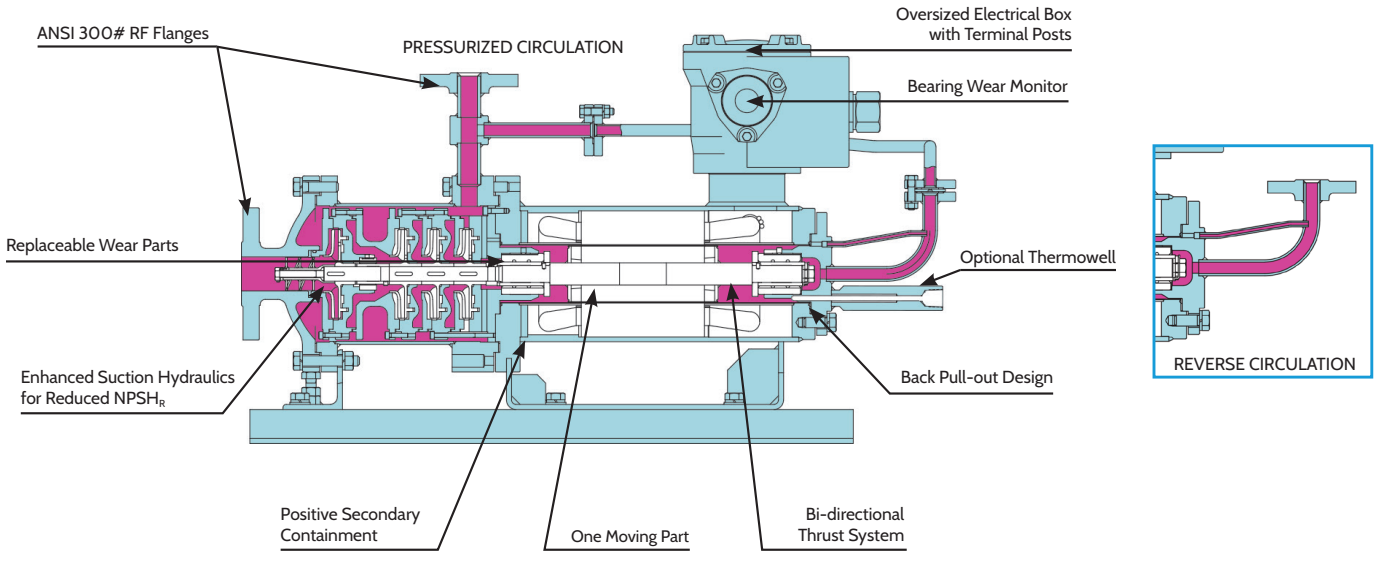
Teikoku's revolutionary ALP pump sets a new industry standard for operating efficiency and safety in ammonia transfer systems. Utilizing a smaller and more powerful motor than those typically coupled to fixed speed pumps, ALP pumps rotate faster in a more compact package with enhanced rotor-dynamic effects. This increases reliability with the same secondary containment features synonymous with all Teikoku pump solutions. Driven by any commercially available variable frequency drive (VFD), ALP pumps feature advanced hydraulics for low flow, high head, low $NPSH_R$ performance that can be tuned to variable process requirements.

ITS ALL ABOUT THE CANNED MOTOR...



Both traditional reverse circulation, Plan 13-SE, and advanced pressurized circulation, Plan 1-SD, versions are available. Plan 1-SD pumps are especially suitable for replacing existing sealed or troublesome Mag Drive pumps for easy, low probability upgrades. With speed ranges from 3000 to 7200 RPM, one ALP pump can meet any and all changing ammonia transfer requirements in a single, smaller pump/motor package.

And of course, with Teikoku's seal-less, leak-proof designs, environmental risk is eliminated and safety is maximized because ALP pumps cannot leak. Teikoku leads the market in providing double containment, low-probability pumps. Minimize complexity, variation, process changes and environmental risk by specifying Teikoku ALP pumps for all of your ammonia transfer applications.



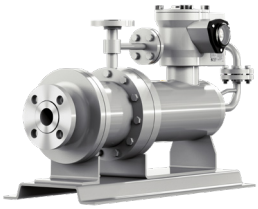
TWO ALP PUMP MODELS TO MEET YOUR TRANSFER PUMP PROJECT REQUIREMENTS

MODEL R42-217P4BL-0104QM4-J

Reverse Circulation – API 685 Plan 13-SE

ADVANTAGES:

- Prevents Anhydrous NH_3 from vaporizing in the primary containment
- Lower cost construction
- Operator-friendly in traditional Teikoku refrigeration pump design



MODEL F42-217P4BL-0104QM4-JR

Pressurized Circulation – API 685 Plan 1-SD

ADVANTAGES:

- Prevents Anhydrous NH_3 from vaporizing by unique internal pressurization system
- Keeps pressure in primary containment above boiling point of liquid at all times
- Eliminates extra piping, flow control and associated costs to pipe to low pressure area

VARIABLE SPEED OPERATION AND DRIVE

Variable Frequency Drives (VFDs) provide adjustable speed control for AC induction motors. In centrifugal pumps, VFD operation provides benefits over conventional, fixed speed drivers including:

- Control of flow and pressure of a pump
  - Flow increases linearly with speed
  - Discharge pressure increases by the square of the speed (4x)
- Power savings at system design point
- Soft starting against pressure

Teikoku flux density controlled, P motors are sealless pump drivers requiring variable frequency and voltage control that offer:

- Enhanced reliable operation with a speed range up to 120 HZ
- Enhanced load capability of thin-film, liquid lubricated sleeve bearings at higher speeds
- Enhanced efficiency and power savings at higher speeds
- Smaller motors for design conditions

TEIKOKU TSG P-MOTOR DRIVE

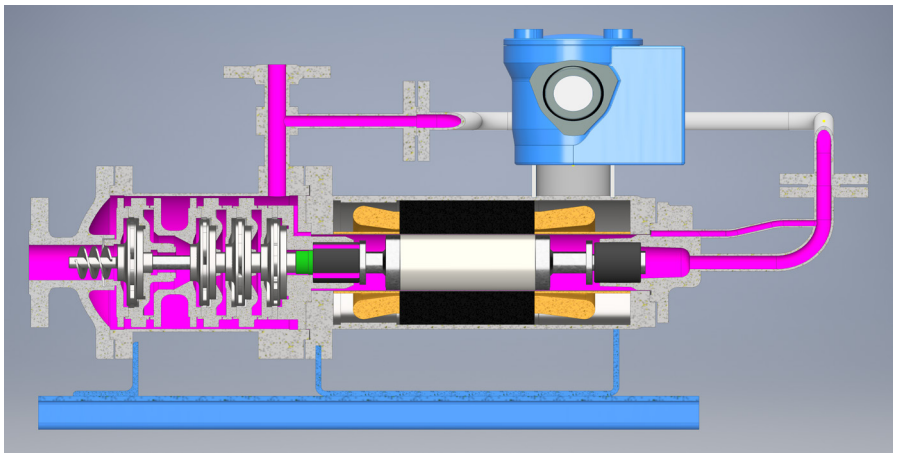
Teikoku offers a pre-programmed VFD for ALP pumps, housed in an Ammonia Transfer System Pump Control Panel with the following features:

- 15HP VFD, 460V/3ph/60Hz input 380v/3ph/50-120hz motor output
- Programmed for variable torque / 50 to 120 HZ / 3000 to 7200 RPM
- NEMA 4 enclosure with through-door main rotary, non-fused disconnect
- Over-Current Protection for VFD
- Control power transformer
- Panel door mounted Hand-Off-Auto switch
- Manual operation by panel door mounted potentiometer or fixed programmed speed
- Auto start by contact closure or analog instrument follower for level, pressure or flow interface
- Low level stop interlock for dry run protection
- Green Running Light on door
- Two filtered ventilation louvers
- Panel heater with thermostat
- Control relays, terminals, circuit breakers & pre-wiring

ALP PUMP ADVANTAGES

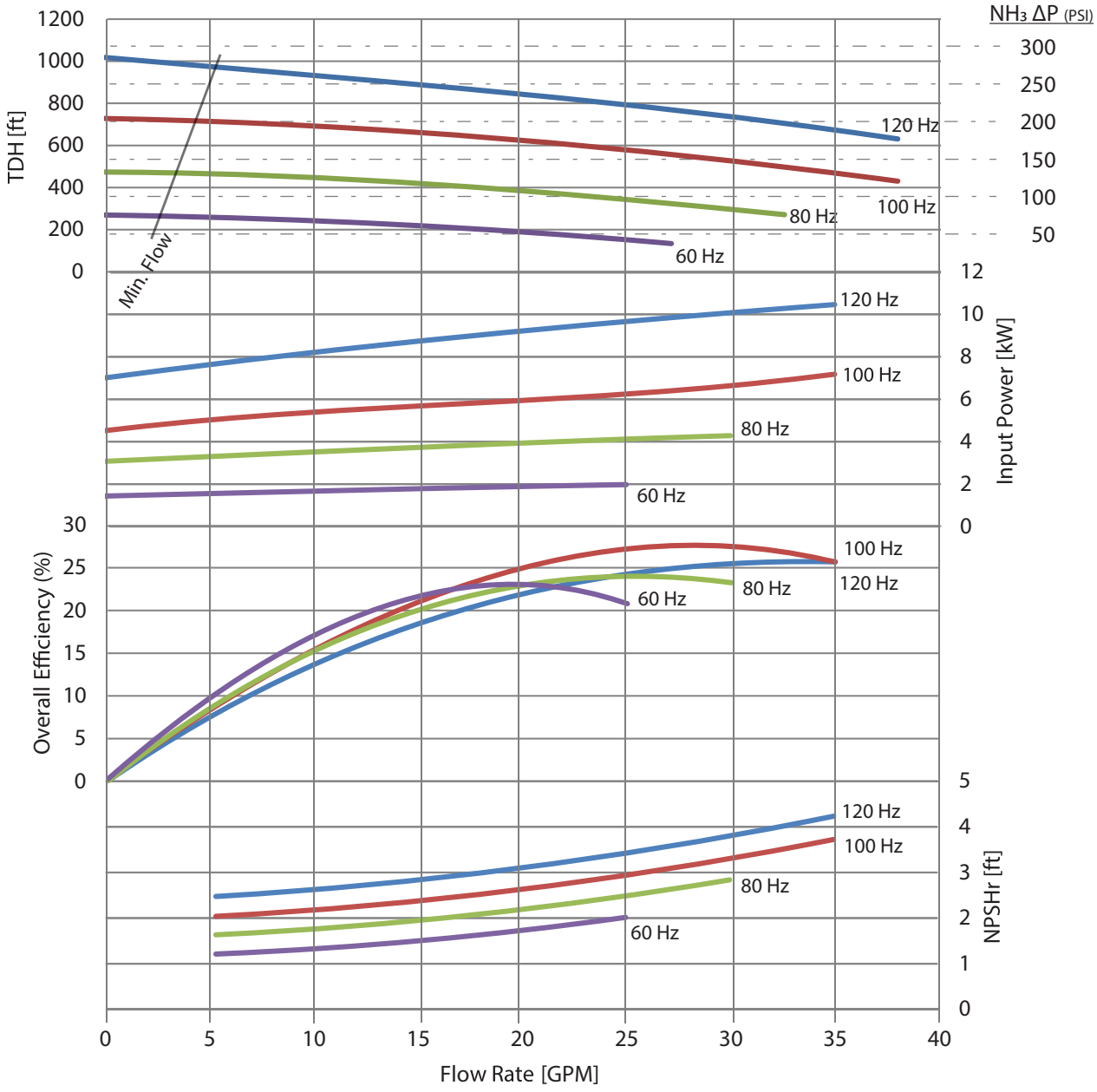
FEATURES	ALP CANNED MOTOR PUMP	MAG-DRIVE PUMPS
DIAGNOSTICS	Bearing wear monitor (TRG)	None
SECONDARY CONTAINMENT	Yes	No
SHAFT ALIGNMENT	Not Required	Required on Power Frame Units
NUMBER OF BEARINGS	Only 2	4 to 6
NUMBER OF BALL BEARINGS	None	2 to 4
NUMBER OF MOVING PARTS	1	2 to 3
LENGTH BASED ON 10HP MULTISTAGE PUMP	30 inches	47 inches (Close Coupled) 65 inches (Long Coupled)
FOUNDATION REQUIREMENTS	None	Rigid On Long Coupled Units
OVERHUNG LOAD	Minimized, with no special bearings required	Requires additional ball bearings in power frames
MAINTENANCE SAFETY REQUIREMENTS	None	- High risk of injury to hands due to magnet attraction. - Magnetic field affects electrical devices such as pacemakers and magnetic media on credit, bank, & ID cards. - Requires non-ferrous work area and guide bolts & rods.
MOUNTING	Vertical or Horizontal	Horizontal

1-SD CIRCULATION & PERFORMANCE DETAILS

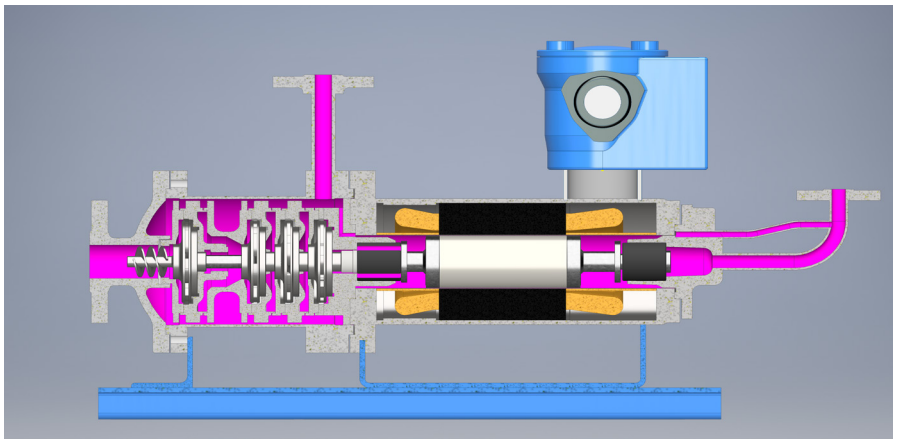


PRESSURIZED CIRCULATION
F42-217P4BL-0104QM4-JR

1-SD Variable Speed Performance for Anhydrous NH_3 at 20˚ F

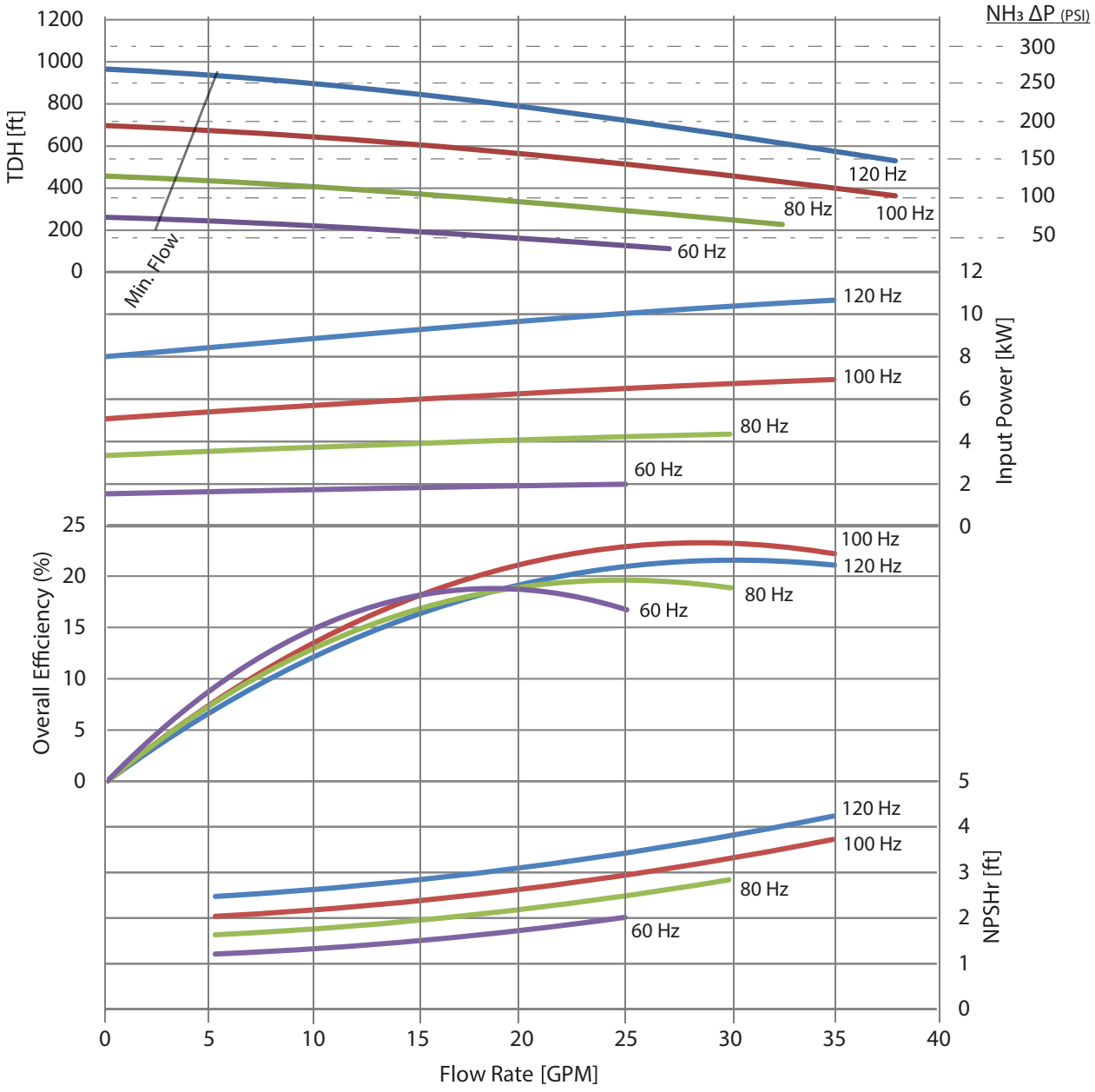


13-SE CIRCULATION & PERFORMANCE DETAILS



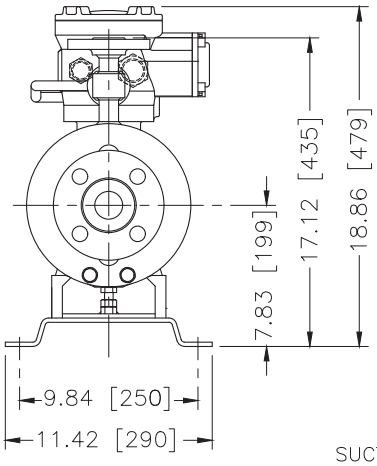
REVERSE CIRCULATION
R42-217P4BL-0104QM4-J

13- SE Variable Speed Performance for Anhydrous NH_3 at 20˚ F

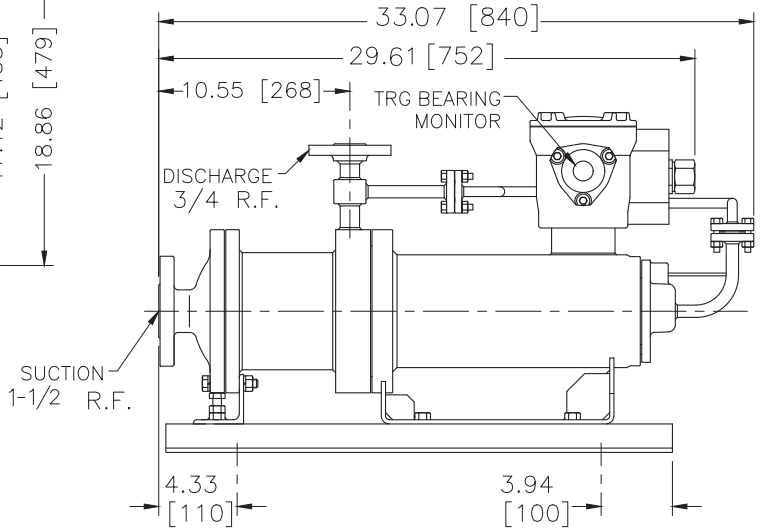


CRITICAL DIMENSIONS FOR AMMONIA TRANSFER SYSTEM INTERFACE

1-SD

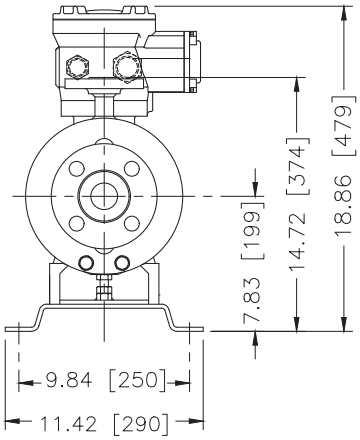


240 lbs

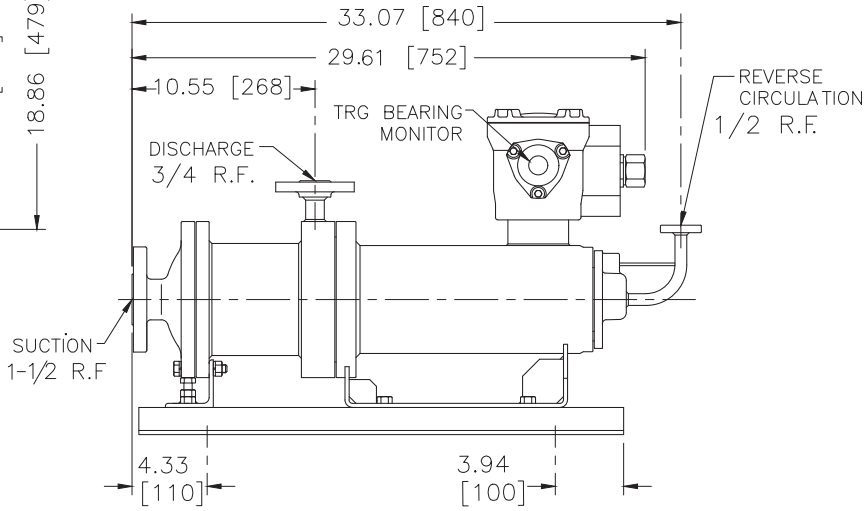


F42-217P4BL-0104QM4-JR

13-SE



235 lbs



R42-217P4BL-0104QM4-J

MOTOR CHARACTERISTICS

GENERAL RATINGS	
VOLTAGE	380
OUTPUT (kW)	8.1
POLES	2
CURRENT (A)	21
STARTING CURRENT (A)	58
THERMAL CLASS	220

MAXIMUM SPEED MOTOR CHARACTERISTICS - TYPE 217P*					
% LOAD	0	25	50	75	100
kW AT 120 Hz	0	1.4	3.56	5.76	8.1
CURRENT (A)	6.23	9.23	12.78	14.8	21
INPUT (kW)	1.67	2.7	5.4	8.1	10.8
EFFICIENCY (%)	0	52	66	70.7	75
SPEED (RPM)	7200	7066	6914	6702	6608

*Data presented is for estimating purposes only. Actual operating characteristics may vary slightly per individual installation.

C SA® US

Certified for use with Pulse Width Modulated (PWM) Variable Frequency Drive (VFD) power option under CAN/CSA C22.2 No. 108-14 and UL 778 for 50HZ to 120 HZ operation.

BEARING WEAR MONITOR

A standard feature supplied on all ALP pumps is Teikoku USA's patented bearing wear monitor, the Teikoku Rotary Guardian or "TRG". The TRG takes the mystery out of pump reliability by continuously monitoring the critical running clearances between the pump's rotating and stationary components.

The bearing wear monitor is mounted on the ALP pump's electrical junction box as standard. Output options for remote monitoring and control are also available. This information allows the user to perform planned maintenance and replacement of simple wear parts long before costly failure occurs.

TERMINAL-BOX-MOUNT TRG METER
(Local Monitoring)

TRG METER ON PANEL
(Remote Monitoring)

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

TEIKOKU USA INC
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