

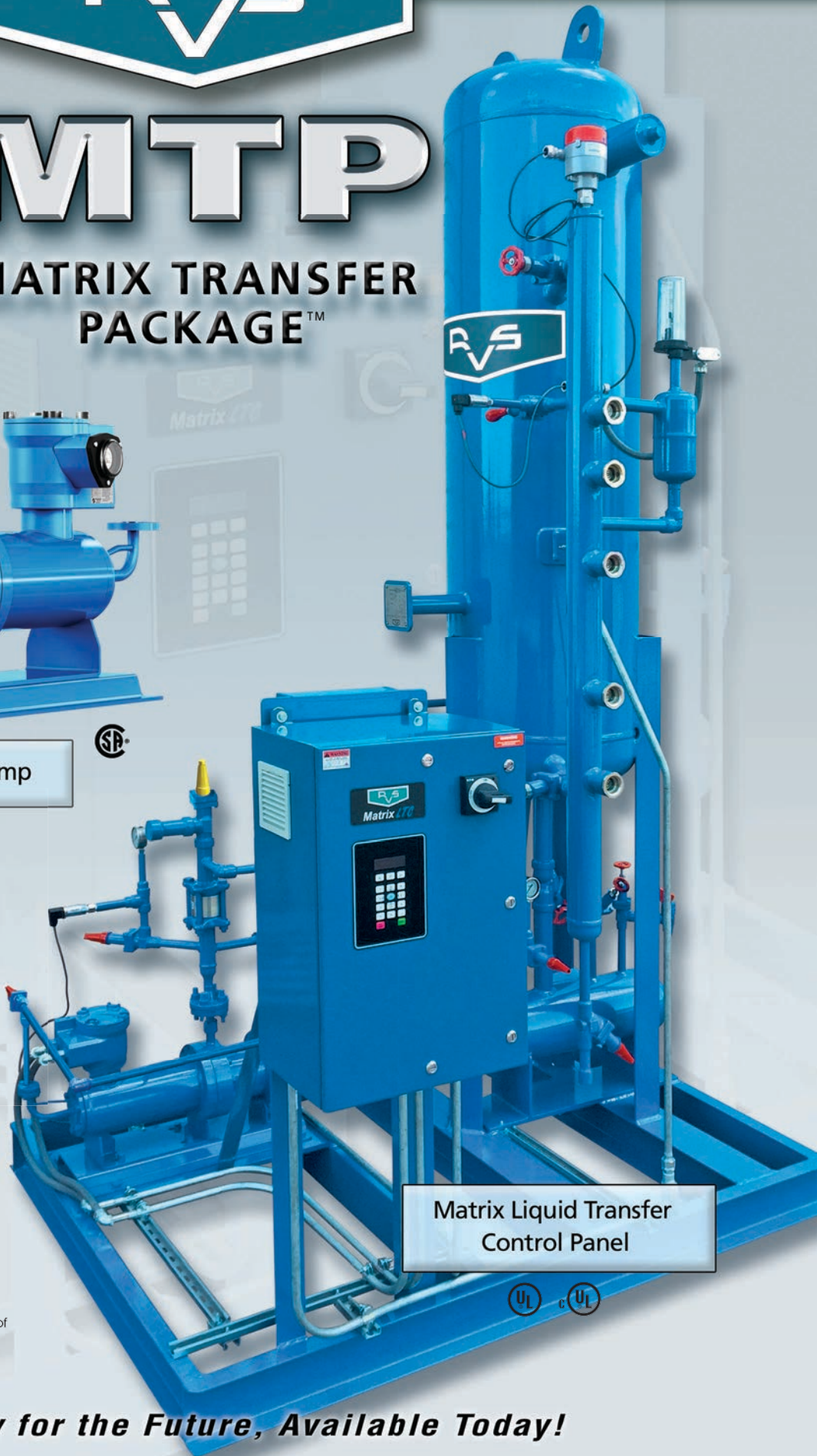
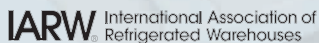


# MTP

## MATRIX TRANSFER PACKAGE™



ALP Transfer Pump



Matrix Liquid Transfer Control Panel



**Technology for the Future, Available Today!**



RVS Corporation, Bryan, TX.

Since its founding in 1983, Refrigeration Vessels and Systems Corporation (RVS) has become the customer preferred supplier of innovative industrial refrigeration products including factory assembled, packaged systems and ASME pressure vessels of all types and sizes.

Pressure vessels and vessel packages are manufactured to ASME requirements in the modern Bryan, Texas facility. With over 100,000 square feet of manufacturing area, (10) overhead cranes, state of the art plasma cutting, plate rolling and welding equipment, RVS has the capacity to handle all types of ASME pressure vessel and vessel package requirements.

From the smallest pressure vessel to the largest packages, RVS is committed to providing superior technical support and the highest quality products with fast, on-time shipments.

RVS was acquired by EVAPCO, Inc. in 1994 as a wholly owned subsidiary. EVAPCO is recognized as the leading supplier of innovative and high quality heat transfer equipment to the Industrial Refrigeration, HVAC, Process Cooling and Power Industries. The success of EVAPCO/RVS has been the result of a continual commitment to product innovation and improvement, quality workmanship, and a dedication to providing unparalleled customer service and satisfaction.

EVAPCO/RVS's powerful combination of financial strength and technical expertise has established the company as a recognized manufacturer of market-leading products on a worldwide basis. EVAPCO/RVS is an employee owned company with a dedicated team committed to excellence.

## MTP Matrix Transfer Package

The MTP Matrix Transfer Package represents the latest innovation in ammonia system design for liquid transfer requirements. The MTP features RVS's NEW Matrix Liquid Transfer Control (LTC) Panel and RVS's NEW Advanced Low-Probability (ALP) ammonia transfer pump by Teikoku. These are combined with RVS's MVA Matrix Vertical Accumulator Package to form the NEW MTP. The MTP provides an all-in-one, factory built, engineered solution to ammonia system liquid transfer requirements from the low pressure to the high pressure side of the system. RVS's single package system eliminates traditional combinations of multiple vessels or packages for liquid transfer, **reducing charge and eliminating the need for hot gas assisted transfers.** The MTP Matrix Transfer Package system with Matrix LTC is state of the art and confidently backed by RVS with an **EXCLUSIVE and COMPREHENSIVE 3-YEAR WARRANTY.**

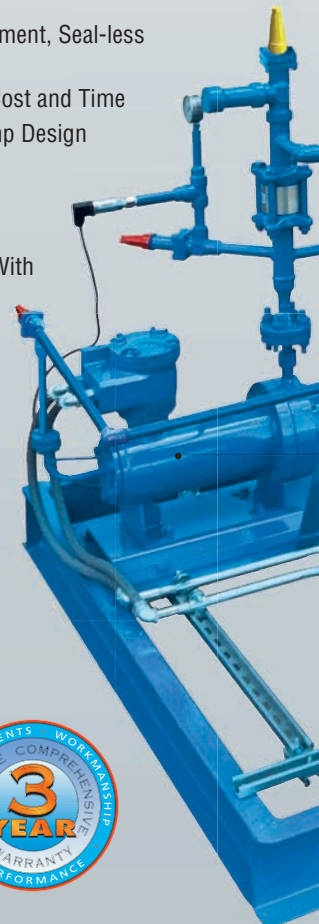
### MTP Features and Benefits

- Eliminates Hot Gas Assisted Transfers and a Separate Transfer Vessel / Package Reducing Charge
- Eliminates Lost Compression Cost Required for Hot Gas Transfer Systems
- Eliminates Breakdown / Maintenance of Transfer Vessel Insulation and Vapor Barrier Associated With Hot Gas Systems
- Eliminates Three Way Valve and Reduces Maintenance of Check Valves with VFD Soft Start
- Reduces Thermal Shock, Stress, and Hammer For a **SAFER** Method of Liquid Transfer
- RVS's NEW and Innovative ALP Pump by Teikoku - Low Flow, High Head, Low NPSHR Performance
- Eliminates Risk of Leaks with a Complete Secondary Containment, Seal-less Design - Meets IIR2 Criteria for a Low-Probability Pump
- Simplifies Required Field Piping Reducing Field Installation Cost and Time
- Saves Floorspace with a Smaller Footprint and Compact Pump Design
- More Efficient, Faster, and Continuous Liquid Transfer
- Complete Protection of the Pump(s) and Automatic Pump On/Off With Matrix LTC Panel
- Digital Liquid Level Display and High/Low Level Monitoring With Safety Cutouts and Alarms
- External Communication and Remote Monitoring
- Factory Wired, Packaged, and Tested – Simple, Ready-To-Go Installation With Single Point Power Connection



### RVS Quality

- Surfaces Prepped to SSPC-SP6
- Vessel Hydrostatically Pressure Tested in Accordance with ASME BPVC, Section VIII, Div. 1
- Factory Package Piping Welded and Tested in Accordance With ASME B31.5
- Entire Assembly is Fully Evacuated to Eliminate Moisture and Charged With Dry Nitrogen
- Entire Assembly is Coated With a High Solids Epoxy Paint
- Controls Wired, Programmed, and Tested







### ASME, 250 PSIG, Accumulator Vessel

- National Board Registration
- Vertical Vessel Configuration Available From 24" to 144" Outside Diameter
- Dual Safety Relief Valve Assembly Set at 250 PSIG (Shipped Loose)
- Pump Vent, Oil Pot Vent and Oil Pot Relief Piping Internally Routed to Vessel Vapor Space
- Stainless Steel Nameplate Bracket and Standoff to Prevent Corrosion

### #5 Liquid Level Column

- Liquid Level Indicating Column With Isolation Valves
- Five Level Indicators With Frost Shields and Oil Drain
- Danfoss Cable Type, Electronic Level Probe
- High Level Shutdown Mechanical Float Switch for Compressor Protection

### ASME, 400 PSIG, Oil Pot

- Oil Pot Mounted and Piped With All Required Service Valves
- Single, Replaceable Cartridge Style, Safety Relief Valve
- Relief Valve Discharge Piped Internal to the Main Vessel Vapor Space
- Optional Dual Relief Assembly

### RVS 20-200-10-ALP Transfer Pump

- Innovative Advanced Low-Probability Transfer Pump Sets the Industry Standard
- Manufactured by Teikoku - Market Leader in Double Containment, Seal-less, Leak Proof Low-Probability Pumps
- High Efficiency Canned Motor Pump
- Exclusive TRG Bearing Wear Monitor
- Low Flow, Low NPSHR, High Head Capability in 460 or 575 Volt Service



ALP Transfer Pump

### Options

- 300 or 350 PSIG Vessel Design Rating
- Second Transfer Pump - For Either Back-up or Simultaneous Operation
- Stainless Steel Vessel, Oil Pot, and/or Level Column Construction
- Sub-Cooling Coil
- Corrosion Allowance on Vessel Shell, Heads, and/or Nozzles
- Post Weld Heat Treatment (PWHT)
- SA333 Grade 6 Low Temperature or Stainless Steel Pipe
- 1.5 kw Oil Pot Heater (Service By Others)
- Radiography of Pipe Welds
- Seismic Design Calculations

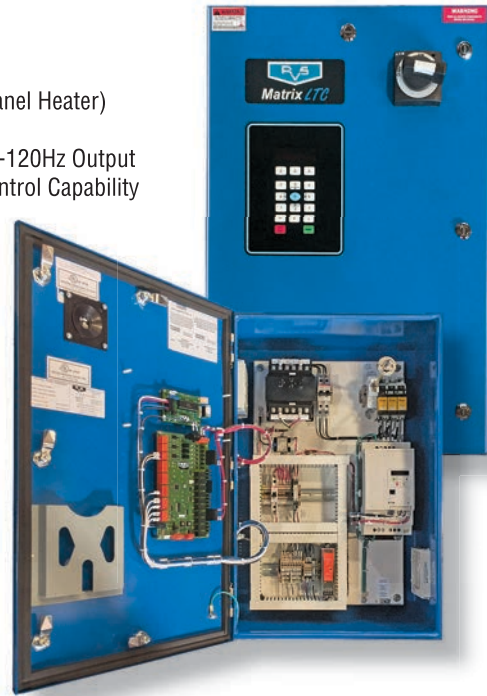


## Matrix LTC - Liquid Transfer Control Panel

### Features

- NEMA Type 1 Enclosure with Filtered Ventilation Inlet/Outlet (Without Panel Heater)
- Door Mounted Rotary Handle with Fused Disconnect
- Variable Frequency Drive for Nominal 10 HP Pump Motor, 380V/3Ph/80-120Hz Output
- Specific Control Design for High Pressure Pump and Liquid Transfer Control Capability
- Simple, Keypad Adjustment of VFD Speed Control (Discharge Pressure)
- Both Vessel and Pump Pressure Monitoring
- Transfer Counts with Operator Reset
- Analog Output (4-20mA Signal) for Vessel Liquid Level to Alternate Devices
- Digital Output for Alarm Notification
- Status Monitoring of Pump Motor Amps and Differential Pressure, Auto Stop/Restart Control of Pump(s)
- Pump Bearing Circuit Board with Reverse Rotational Monitoring
- Vessel High Level Float Switch Monitoring
- Vent Solenoid Control
- Door Mounted High Contrast LCD Display Screen and Navigational Keypad for Monitoring and Set-Point Entry
- Remote Communication Via Modbus RTU (Serial) Read-Only Holding Registers

Options Include a NEMA Type 1 or Type 3R Enclosure with Heater, Two Pump Arrangement, and 575 Volt Service



### Hardware Specifications

#### Input Power

- 460V/3PH/60HZ (Optional 575V/3PH/60HZ Service Available)
- 88 – 125 VAC (Control Included)

#### Environmental – Standard Type 1 Enclosure Without Heater (Optional Type 1 or Type 3R Enclosure With Heater)

- Operating temperature (w/o heater) 32°F to 140°F (0°C to 60°C)
- Low Temp operation (with heater) -20°F / -29°C (minimum ambient)
- Storage temperature -40°F to 158°F (-20°C to 70°C)

#### Display

- Size 2.76" W x 0.825" H (70.16 mm x 20.95 mm)
- Character format 4 Lines x 20 Characters
- Type OLED, 90 cd/m2 Brightness, 2,000:1 Contrast

#### Keypad / Overlay

- Material Polycarbonate with UV coating
- Keys Stainless Steel snap domes

#### Certifications

- Agency Approvals UL 508A, cUL

#### Digital Outputs

- Output Type Relay
- Current 10 Amp Resistive
- Voltage 12 to 140 VAC

#### Digital Inputs

- Voltage 90 to 140 VAC

#### Analog Inputs & Outputs

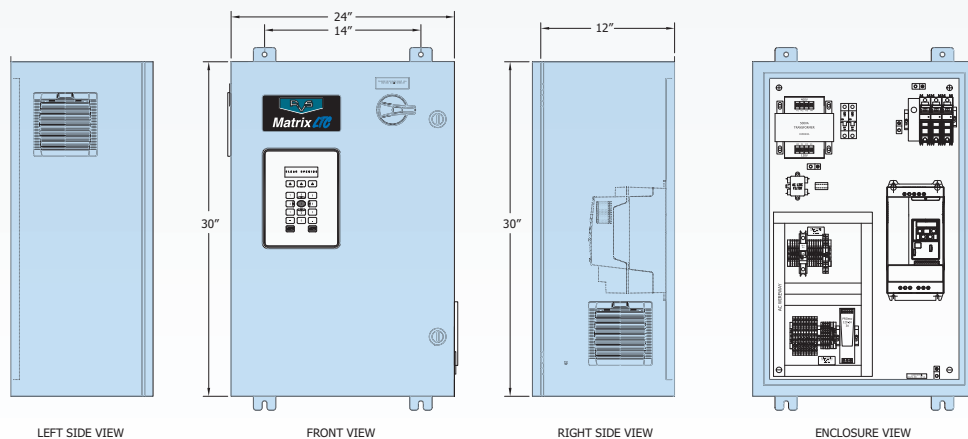
- Type 4-20 mA

#### Motor Current Sensor

- Technology 4-20 mA Transmitter

#### External Communications Ports

- RS-485 (Standard) 2.4K to 57.6K baud
- Protocol MODBUS RTU





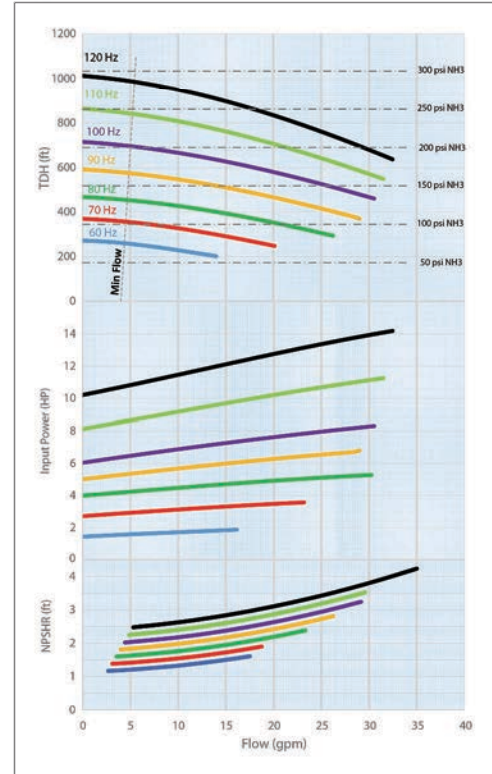
## RVS 20-200-10-ALP Advanced Low-Probability Pump

### ALP Advantages

- **NEW** Technology Pump Manufactured by Teikoku
- Meets IAR2 Definition for Low-Probability Pump - Seal-less, Leak Proof Design With Complete Secondary Containment
- No Environmental Risk, Safer Method of Ammonia Transfer
- More Powerful Than Typical Motors Coupled to Fixed Speed Pumps
- Faster Rotation With Enhanced Rotor-Dynamic Effects
- Advanced Hydraulics Can be Tuned to Variable Process Requirements
- Patented TRG Bearing Wear Indicator
- Canned Motor Pump - Non-Magnetic Drive
- No Safety Precautions Required to Service Pump Due to No Magnet
- Less Maintenance Requirements
- No Shaft Alignment or Rigid Foundation Required
- Only (1) Moving Part and (2) Bearings - No Ball Bearings
- Compact Design, Smaller Overall Pump / Motor Package
- Quiet Operation, Energy Efficient, Variable Frequency Drive

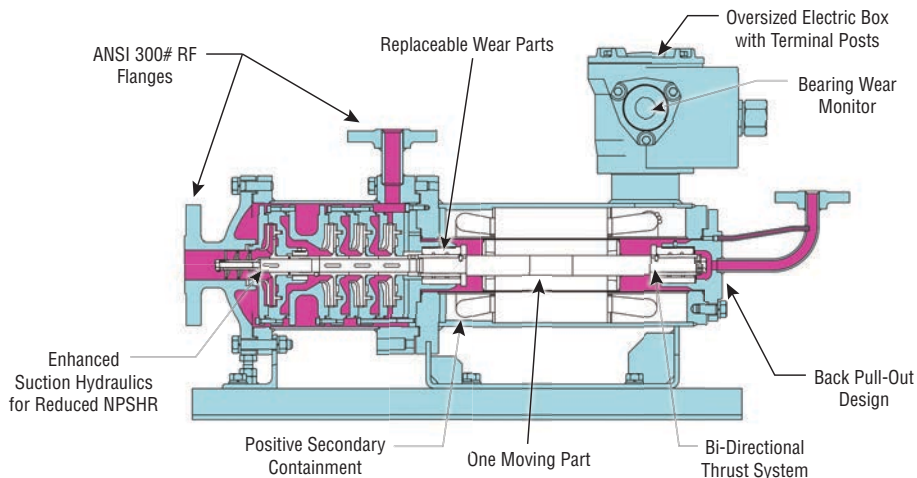


### Performance for NH3 at 20°F



### Nominal Specifications

20 GPM at 200 PSID	Multi-Stage Centrifugal Pump
10 HP, 380V / 3 PH / 110HZ	Reverse Recirculation
3 Feet NPSHR	TRG Bearing Wear Indicator
460 or 575 Volt Service to Panel	CSA Approved





## MTP MATRIX TRANSFER PACKAGE

### SELECTION PROCEDURE

STEP 1: From Table 1, select a model with an accumulator capacity equal to or greater than the required capacity at the given saturated suction temperature.

STEP 2: From Table 2, check the available surge volume for the model selected against the required system surge volume. If the available surge volume is not adequate, select the next larger model with sufficient surge volume (or contact factory).

Optional: If an optional sub-cooling coil is desired, add the suffix 'C' to the model number (i.e., MTPC-36). Contact the factory for assistance.

### WHEN ORDERING PLEASE SPECIFY

- 1) MTP model number (i.e., MTP-36), the required capacity in tons of refrigeration, and the suction temperature.
- 2) Specify one (standard) or two pumps. If a second pump is required, indicate whether it is for stand-by back-up or simultaneous operation. For simultaneous operation, a custom Matrix LTC panel is required, contact the factory for assistance.
- 3) Specify service voltage - either 460 or 575.
- 4) Specify Matrix LTC enclosure type - NEMA Type 1, without heater is standard. Options include NEMA Type 1 or Type 3R with heater. Contact the factory for assistance.

**Table 1**  
**MTP - ACCUMULATOR VESSEL CAPACITY**

MODEL NO.	EVAPORATOR TEMPERATURE °F									
	SINGLE STAGE SUCTION TEMPERATURE*					TWO STAGE SUCTION TEMPERATURE**				
	30°F	20°F	10°F	0°F	-10°F	-20°F	-20°F	-30°F	-40°F	-50°F
MTP-24	145	132	118	105	92	79	93	80	67	56
MTP-30	229	209	188	166	146	126	148	126	107	90
MTP-36	333	303	273	242	212	183	215	184	156	130
MTP-42	456	416	373	331	290	251	295	252	213	179
MTP-48	599	546	490	435	381	329	387	331	280	234
MTP-54	754	687	617	547	479	414	487	416	352	295
MTP-60	934	851	765	678	594	514	603	516	437	366
MTP-72	1,344	1,224	1,100	975	854	739	867	742	628	526
MTP-84	1,838	1,674	1,504	1,334	1,169	1,011	1,187	1,016	860	720
MTP-96	2,410	2,195	1,972	1,750	1,532	1,326	1,556	1,332	1,127	944
MTP-108	3,045	2,774	2,492	2,211	1,936	1,675	1,966	1,683	1,424	1,193
MTP-120	3,739	3,405	3,060	2,714	2,377	2,056	2,414	2,066	1,749	1,465
MTP-144	5,415	4,931	4,431	3,930	3,443	2,978	3,496	2,992	2,532	2,121

**Table 2**  
**SURGE VOLUME**

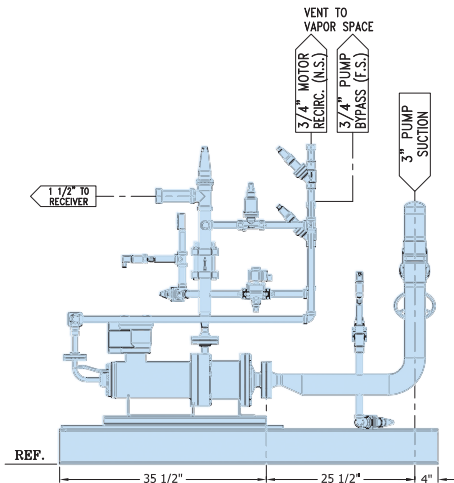
SURGE VOLUME CUBIC FT. (FT <sup>3</sup> )	REFRIGERANT CHARGE CUBIC FT. (FT <sup>3</sup> )
9.0	1.5
21.6	2.7
34.0	2.7
45.3	3.3
84.4	7.8
101.8	9.0
128.4	10.5
171.4	21.5
243.2	26.9
305.8	35.5
352.1	64.2
450.2	73.0
621.2	80.2

\* Single stage capacities based on +95°F liquid supply temperature.

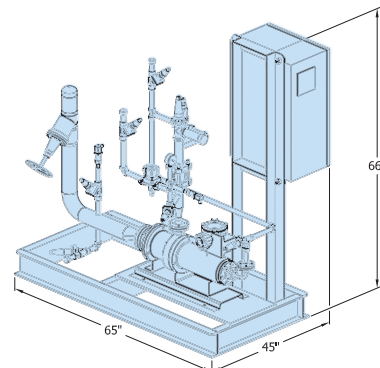
\*\* Two stage capacities based on +25°F liquid supply temperature.

## MTRP MATRIX TRANSFER RETROFIT PACKAGE

For replacement of existing transfer systems or existing installations where liquid transfer is required, RVS offers the MTRP Matrix Transfer Retrofit Package. The MTRP features RVS's Matrix LTC Liquid Transfer Control Panel and RVS's 20-200-10-ALP Advanced Low-Probability Ammonia Transfer Pump by Teikoku mounted on a stand-alone skid. The MTRP is pre-piped with service valves, discharge check valve, pressure transducers, and vent solenoid. It is factory pre-wired, pre-programmed, pressure tested, painted, and shipped with a nitrogen charge – ready for tie-in to an existing system.

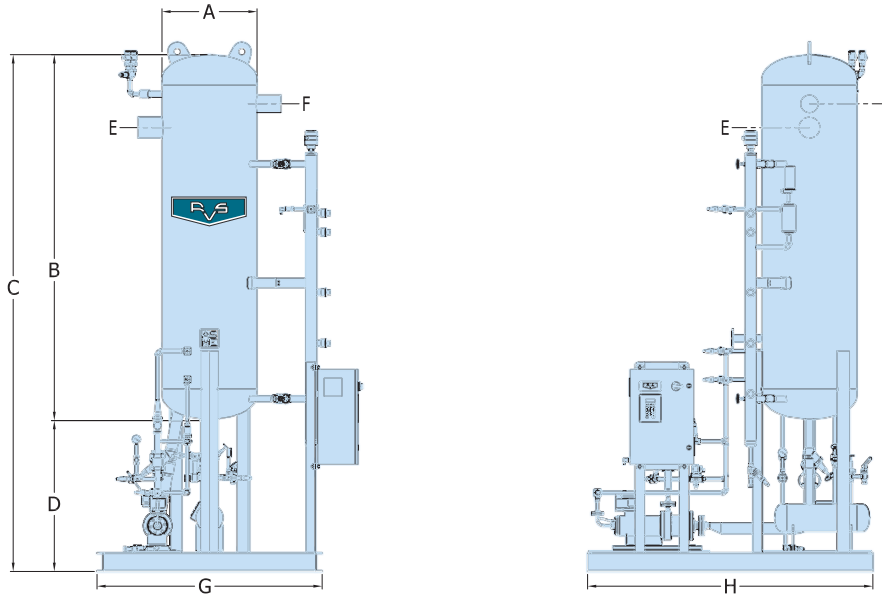


\* Overall Shipping Dimensions - Ship Weight is 975 lbs





### MTP MATRIX TRANSFER PACKAGE



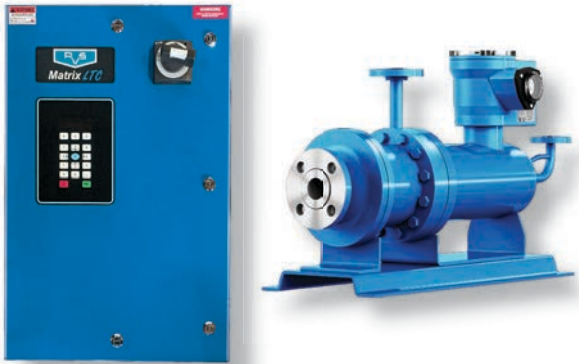
MODEL NUMBER	A Vessel Diameter	B Vessel Length	C Overall Height	D Floor to Btm. of Vessel	E Wet Return	F Dry Gas Outlet	G Base Width	H Base Length	SHIPPING WT. (lbs.)	
									w/1 PUMP	w/2 PUMPS
MTP-24V	24	88-1/2	141	48	5	4	60	87	2,790	3,390
MTP-30V	30	115	167	48	6	5	71	90	3,400	4,035
MTP-36V	36	118	170	48	6	6	76	97	4,000	4,635
MTP-42V	42	121	172	48	8	6	70	99	4,390	5,050
MTP-48V	48	147	198	48	8	8	74	104	5,310	6,000
MTP-54V	54	150	201	48	10	8	74	104	6,855	7,590
MTP-60V	60	153	202	48	10	8	74	106	7,495	8,235
MTP-72V	72	159	215	56	12	10	86	113	10,810	11,550
MTP-84V	84	165	221	56	12	10	96	125	13,440	14,180
MTP-96V	96	171	229	58	14	12	108	136	17,475	18,215
MTP-108V	108	177	243	58	16	12	95	138-1/2	21,425	22,190
MTP-120V	120	183	248	58	16	14	103-1/2	148	30,245	31,035
MTP-144V	144	195	265	62-3/8	20	16	124	164	43,580	44,355

All dimensions are given in inches and are for reference only. Contact factory for certified drawing.

### MATRIX LTC and RVS 20-200-10-ALP PUMP (SHIP LOOSE)

RVS also offers as a new or existing system retrofit option the Matrix LTC Liquid Control Transfer panel, the RVS 20-200-10-ALP transfer pump with TRG board, and pressure transducers (pump suction and discharge) as ship loose components (with or without valves and no piping included) to be installed, piped, and wired in the field by others per RVS's piping guidelines.

The Matrix LTC and RVS 20-200-10-ALP transfer pump system can also be added to and factory installed on new equipment packages such as the MRP or MVI. Contact the factory for assistance.





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Development Center  
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**EVAPCO, Inc. — World Headquarters & Research/Development Center**

EVAPCO, Inc. • P.O. Box 1300 • Westminster, MD 21158 USA  
PHONE: 410-756-2600 • FAX: 410-756-6450 • E-MAIL: marketing@evapco.com

**EVAPCO North America**

**EVAPCO, Inc.**  
World Headquarters  
P.O. Box 1300  
Westminster, MD 21158 USA  
Phone: 410-756-2600  
Fax: 410-756-6450  
E-mail: marketing@evapco.com

**Refrigeration Vessels & Systems Corporation**  
*A wholly owned subsidiary of EVAPCO, Inc.*  
1520 Crosswind Dr.  
Bryan, TX 77808 USA  
Phone: 979-778-0095  
Fax: 979-778-0030  
sales@rvscorp.com  
[www.rvscorp.com](http://www.rvscorp.com)

**EVAPCO East**  
5151 Allendale Lane  
Taneytown, MD 21787 USA  
410-756-2600 p | 410-756-6450 f  
marketing@evapco.com

**EVAPCO East**  
Key Building  
Taneytown, MD USA  
410-756-2600 p  
marketing@evapco.com

**EVAPCO Midwest**  
Greenup, IL USA  
217-923-3431 p  
evapcomw@evapcomw.com

**EVAPCO West**  
Madera, CA USA  
559-673-2207 p  
contact@evapcowest.com

**EVAPCO Iowa**  
Lake View, IA USA  
712-657-3223 p

**EVAPCO Iowa**  
Sales & Engineering  
Medford, MN USA  
507-446-8005 p  
evapcomn@evapcomn.com

**EVAPCO Newton**  
Newton, IL USA  
618-783-3433 p  
evapcomw@evapcomw.com

**EVAPCO IL**  
Greenup, IL USA  
217-923-3431 p  
evapcomw@evapcomw.com

Bulletin 5100A  
1000/0320/YGS

**EVAPCO Europe**

**EVAPCO Europe BVBA**  
European Headquarters  
Heersteveldweg 19  
Industrieterrein Oost  
3700 Tongeren, Belgium  
Phone: (32) 12-395029  
Fax: (32) 12-238527  
E-mail: evapco.europe@evapco.be

**EVAPCO Europe, S.r.l.**  
Milan, Italy  
(39) 02-939-9041 p  
evapcoeu@evapco.it

**EVAPCO Europe, S.r.l.**  
Sondrio, Italy

**EVAPCO Europe GmbH**  
Meerbusch, Germany  
(49) 2159 6956 18 p  
info@evapco.de

**EVAPCO Air Solutions**  
*A wholly owned subsidiary of EVAPCO, Inc.*  
Aabybro, Denmark  
(45) 9824 4999 p  
info@evapco.dk

**EVAPCO Air Solutions GmbH**  
Garbsen, Germany  
(49) 5137 93875-0 p  
info@evapcoas.de

**Evap Egypt Engineering Industries Co.**  
*A licensed manufacturer of EVAPCO, Inc.*  
Nasr City, Cairo, Egypt  
2 02 24022866/2 02 24044997 p  
primacool@link.net / shady@primacool.net

**EVAPCO Middle East DMCC**  
Dubai, United Arab Emirates  
+971 4 448 7242 p  
info@evapco.ae

**EVAPCO S.A. (Pty.) Ltd.**  
*A licensed manufacturer of EVAPCO, Inc.*  
Isando 1600, Republic of South Africa  
(27) 11-392-6630 p  
evapco@evapco.co.za

**EVAPCO Asia/Pacific**

**EVAPCO Asia/Pacific Headquarters**  
1159 Luoning Rd. Baoshan Industrial Zone  
Shanghai 200949, P.R. China  
Phone: (86) 21-6687-7786  
Fax: (86) 21-6687-7008  
marketing@evapcochina.com

**EVAPCO (Shanghai) Refrigeration Equipment Co., Ltd.**  
Baoshan Industrial Zone Shanghai, P.R. China  
(86) 21-6687-7786 p  
marketing@evapcochina.com

**Beijing EVAPCO Refrigeration Equipment Co., Ltd.**  
Huirou District Beijing, P.R. China  
010-6166-7238 p  
evapcobj@evapcochina.com

**EVAPCO Air Cooling Systems (Jiaxing) Company, Ltd.**  
Building 10, 1133 Taoyuan Road,  
Jiaxing, Zhejiang, China  
(86) 573 83119379  
info@evapcoacs.cn

**EVAPCO Australia (Pty.) Ltd.**  
Riverstone NSW 2765, Australia  
(61) 2 9627-3322 p  
sales@evapco.com.au

**EvapTech Asia Pacific Sdn. Bhd**  
*A wholly owned subsidiary of EvapTech, Inc.*  
Puchong, Selangor, Malaysia  
(60-3) 8070-7255 p

**South America**

**EVAPCO Brasil**  
**Equipamentos Industriais Ltda.**  
Al. Vênus, 151 – CEP: 13347-659  
Indaiatuba – São Paulo – Brasil  
(55+11) 6681-2000 p  
vendas@evapco.com.br

**Fan Technology Resources**  
Cruz das Almas – Indaiatuba  
São Paulo, Brasil 13308-200  
55 (11) 4025-1670  
fantr@fantr.com

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