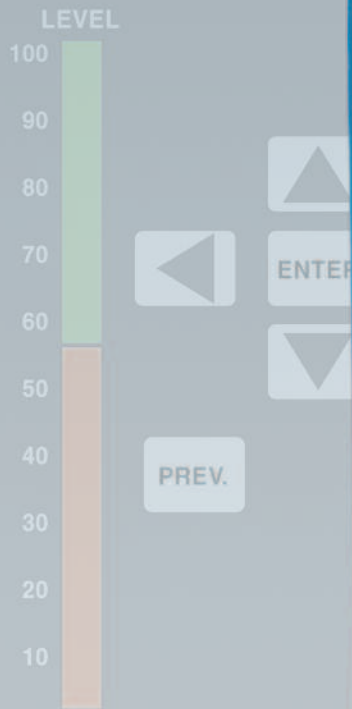




# Matrix *LLC*

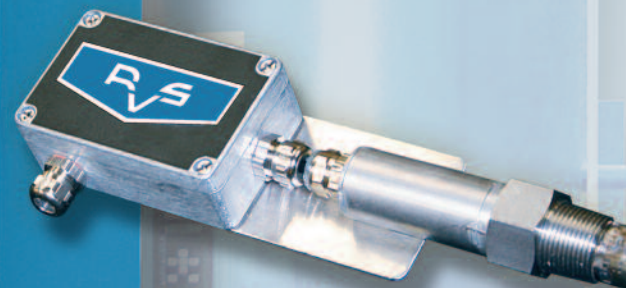
## LEVEL CONTROL

LEVEL = 58%  
AUTO OFF



### The Total Vessel Control Solution:

- Liquid Level Management
- Proportional Feed Valve Control
  - Local and Remote Monitoring and Control



Featuring  
the NEW RVS  
Matrix Level  
Probe



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



# Matrix LLC Control

The Matrix LLC Control utilizes the latest in microprocessor technology to provide a total control solution for refrigeration vessels. The LLC incorporates the functions of liquid level management and proportional feed control into a single industrial-duty panel with full communications capability. Factory packaging assures a completely tested and functional unit, ready-to-go without expensive field wiring, for simplified installation and start-up.

## Operator Interface

- Door-mounted (7) button keypad. No need to open enclosure to change set points
- Easy to read 2 line by 20 character display
- LED dual color level bar graph

## Liquid Level Management

- Reads 4-20mA signal from RVS level probe and provides visual readout in digital display and color bar graph on panel
- Adjustable low and high level alarm and cutout
- Digital outputs for (2) liquid feed solenoid valves

## Proportional Liquid Feed Control

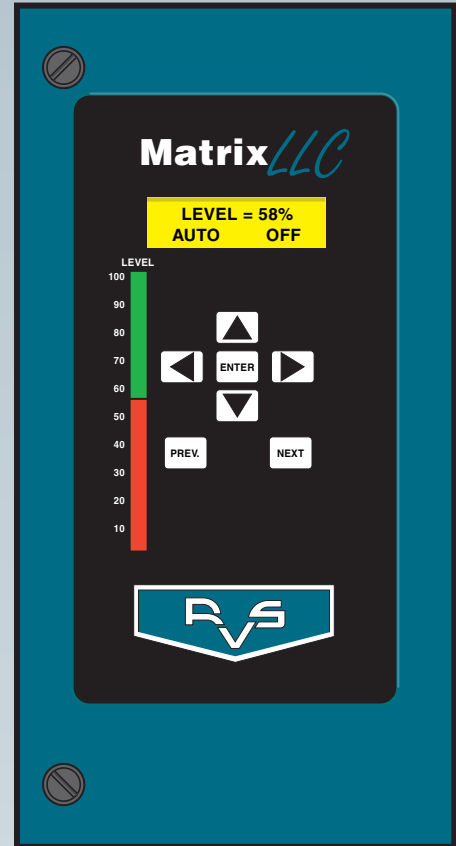
- (2) 4-20mA analog outputs for control of proportional feed valve(s)
- Built in 24 VAC transformer or 24 VDC power supply for motorized proportional valve

## Communications

- Capable of remote monitoring and control of system parameters from plant supervisory system
- Industry standard protocol MODBUS-RTU over RS-485

## Industrial Duty

- NEMA-4 Painted Steel Enclosure
- UL/cUL Certifications
- Optional NEMA-4X Stainless Steel Enclosure



The Matrix LLC includes (3) analog outputs for transmitting liquid level and control of up to (2) proportional feed valves, and (7) digital outputs which can be configured to control (5) basic vessel applications; intercoolers, accumulators, surge drums, liquid transfer systems, and recirculators.

## Digital Output Configuration

Digital Output No.	Intercooler/ Accumulator	Surge Drum	Liquid Transfer System	Recirculator
DO-7	HI-LEVEL SHUTDOWN	HI-LEVEL SHUTDOWN		HI-LEVEL SHUTDOWN
DO-6	HI-LEVEL ALARM	HI-LEVEL ALARM		HI-LEVEL ALARM
DO-5	LIQUID TRANSFER		LIQUID TRANSFER	LIQUID TRANSFER
DO-4	LIQ. SOL. VALVE #1	LIQ. SOL. VALVE #1	HOT GAS SOL. VALVE	LIQ. SOL. VALVE #1
DO-3	LIQ. SOL. VALVE #2	LIQ. SOL. VALVE #2	VENT SOL. VALVE	LIQ. SOL. VALVE #2
DO-2				LO-LEVEL SHUTDOWN
DO-1	ALARM HORN	ALARM HORN	ALARM HORN	ALARM HORN

## Technical Data

**Power Supply:** 105-125 VAC 47-63 Hz (Standard)  
185-250 VAC 47-63 Hz (Optional)

**Signal Output:** 4-20 mA

**DC Power Supply:** 5 VDC @ 2A (10 Watts)  
24 VDC @ 1A (24 Watts)

**Valve AC Power:** 24 VAC @ 12.4A (300 Watts)

**Valve DC Power:** 24 VDC @ 5A (120 Watts)

**Ambient Temp. Range:** -4°F to +131°F

**Certifications:** UL 508A, cUL

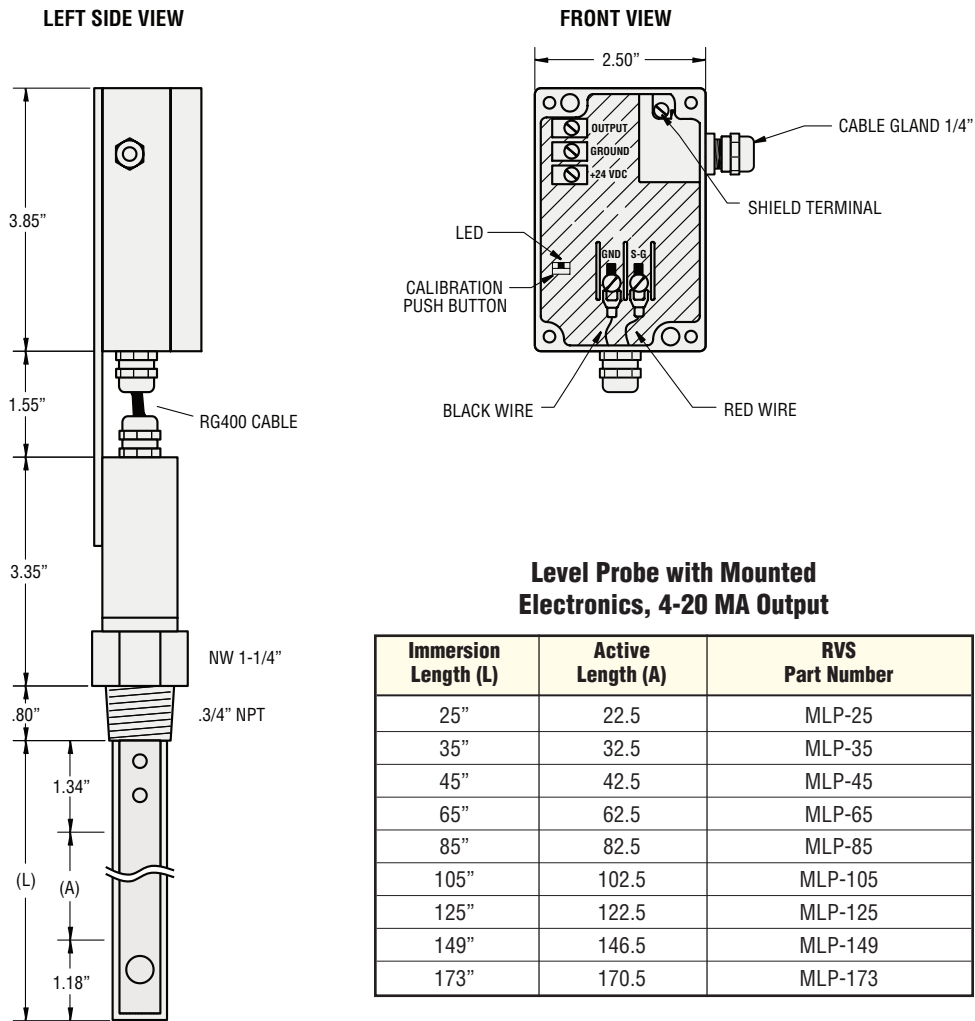
**Dimensions:** 16" x 8" x 6" (40.6cm x 20.3cm x 15.2cm)

**Design:** NEMA 4

# Matrix Level Probe

The RVS Matrix Level Probe (MLP) accurately measures refrigerant liquid level and transmits a 4-20mA signal to the Matrix LLC Panel. The probe may also be used to transmit a 4-20mA level signal directly to a central system computer or PLC.

## MLP Probe Drawing & Dimensions with Wiring Diagram



LEVEL PROBE ASSEMBLY

### Level Probe with Mounted Electronics, 4-20 MA Output

Immersion Length (L)	Active Length (A)	RVS Part Number
25"	22.5	MLP-25
35"	32.5	MLP-35
45"	42.5	MLP-45
65"	62.5	MLP-65
85"	82.5	MLP-85
105"	102.5	MLP-105
125"	122.5	MLP-125
149"	146.5	MLP-149
173"	170.5	MLP-173

### Features

- May be inserted directly into vessel or any diameter level column.
- No field calibration required.
- All electronics are located in the transmitter which can be replaced without recalibration.
- Replacing a transmitter does not require evacuation of the vessel or level column.
- Probe is factory selected for R-717 (NH3). Other refrigerants are pre-programmed into the probe electronics and may be field selected.

### Technical Data

Power Requirements: 24VDC, 1.5 Watt

Signal Output: 4-20 mA

Max. Load Resistance: 500 ohm

Refrigerants: R-717 (factory setting), R-22, R-404, R-134A, R-507

Operating Temp. Range: -76F to +212F

Ambient Temp. Range: -40F to +158F

Maximum Pressure: 500 psig

Connection: 3/4" NPT



The Matrix LLC Level Control is available in (3) standard models to meet your specific control needs:

- **Model LLC** for applications that do not require power for a motorized valve.
- **Model LLC-AC** with built-in 24VAC power transformer for applications requiring 24VAC to power a Hansen motorized valve.
- **Model LLC-DC** with built-in 24VDC power transformer for applications requiring 24VDC to power a Danfoss motorized valve.
- Optional panel heater available for outdoor applications.

**When Ordering Please Specify:**

Control model number, voltage, and probe model number. If factory setup is desired please specify application mode (surge drum, recirculator, etc.), number of liquid feed solenoid valves (1 or 2), and number of proportional motorized valves (0, 1, or 2).

**Typical Specification**

Adjustable refrigerant liquid level controls shall be UL/cUL listed with solid-state electronics, digital readouts and adjustable setpoints and shall be housed in a NEMA 4 industrial duty steel enclosure. Level controls shall be supplied with full communications capability for remote and local monitoring and control of system parameters. Level controls shall be Matrix LLC as manufactured by Refrigeration Vessels & Systems Corporation or approved equal.



# Matrix LLC

The Total Vessel Control Solution.

## Refrigeration Vessels & Systems Corporation

*A wholly owned subsidiary of EVAPCO, Inc.*

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