

# ES749-SYS

## ES749 Flow Computer Condensate Metering System

### FEATURES:

- Large Fiberglass Enclosure Accommodates ES749 Flow Computer, mL-BC Battery Charger, Ayyeka Device and Two 12VDC Batteries
- Internal Connections Pre-Wired Using Screw Terminals
- Light Weight Enclosure
- NEMA 4X Enclosure with Hinged Cover and Quick Release Latches

### NOTE:

This example involves an ES749-ST2 flow computer in a condensate metering application. This system can include any of the ST2 family flow computers for various applications.

### Description

The ES749-SYS is intended to accept the electronic pulse input from a condensate meter, then scale and totalize the flow in pounds of condensate, and then power and communicate with the Ayyeka Communication unit using the KEP Universal Protocol over the RS232 port.

The system is intended to operate from two internal 12VDC sealed batteries that are continuously charged by the mL-BC324 battery charger.

The battery charger is powered by 110 VAC. The battery charger will continuously distribute 24VDC power to the ES749 and 12VDC to the Ayyeka Transceiver.

The customer condensate meter reading will be displayed on the OLED display of the ES749 and can also be accessed wirelessly by the Ayyeka unit via the cellular network. The complete System includes the following:



### ES749 Flow Computer

Part Number: ES749O30P

Description:

ES749 flow computer with OLED Display, 24 VDC Powered, RS-232 Communications, Panel Mount

### MS799 Enclosure

Part Number:

MS799ST4X1-SP-DR-DOCB-TB7-4H2-VT-2XCG-PW-A

Description:

Fiberglass Wall Mount Enclosure, 1 ST cutout, hinged left, Subpanel, 2 DIN Rails, Duplex Outlet with 16 Amp circuit breaker, 7 Position Terminal block with Fused Battery, 4 conduit entries 1/2", battery vent, 2 cable glands, Prewired to ES749 and Ayyeka, Assembled

### mL-BC Battery Charger

Part Number: mL-BC324

Description:

24VDC, 3A Battery Charger

### Two 12VDC Batteries

Part Number: SHR3.6-12

Description:

Two 12 VDC, 3.6AH, Sealed Lead Acid (SLA) Batteries wired in series to provide 12VDC and 24VDC.

Approximately 20 hour standby power with 4 hour recharge cycle

## ES749 Specifications:

The Model ES749 has become the work horse of flow computers for utility metering, solving a wide variety of flow metering challenges. Based on the popular SUPERtrol II, the ES749 accepts common pulse and analog inputs from nearly all of the flow meters commonly encountered in utility metering of steam, heated and chilled water, industrial gases, and liquid flow applications. Two compensation inputs are provided to facilitate the handling of a wide range of standard applications in a single unit. Energy, mass, volume and corrected volume equations can be solved, and a variety of standard outputs, the internal data-logger, and communication options round out the offering.

### Environmental

Operating Temperature: 0 to +50 C  
Storage Temperature: -40 to +85 C  
Humidity : 0-95% Non-condensing  
Materials: UL, CSA, VDE approved

### Display

Type: 2 lines of 20 characters  
Types: Backlit LCD. OLED and VFD ordering options  
Character Size: 0.3" nominal  
User selectable label descriptors and units of measure

### Keypad

Keypad Type: Membrane Keypad  
Keypad Rating: Sealed to Nema 4  
Number of keys: 16

### Enclosure

Enclosure Options: Panel, Wall, Explosion Proof  
Size: See Dimensions  
Depth behind panel: 6.5" including mating connector  
Type: DIN  
Materials: Plastic, UL94V-0, Flame retardant  
Bezel: Textured per matt finish

### Power Input

The factory equipped power option is internally fused. An internal line to line filter capacitor is provided for added transient suppression. MOV protection for surge transient is also supported  
AC Power Option: 85 to 276 Vrms, 50/60 Hz or  
DC Power Option: 24 VDC (16 to 48 VDC)  
Power Consumption  
AC Power: 6.5 V/A  
DC Power: 300 mA max.

### Flow Meter Types:

Linear: Vortex, Turbine, Positive Displacement, Magnetic, GilFlo, ILVA, Mass Flow, Condensate and others  
Square Law: Orifice, Venturi, Nozzle, V-Cone, Wedge, Averaging Pitot, Target, Verabar, Accelabar and others  
Multi-Point Linearization: May be used with all flowmeter types. Including: 16 point, UVC and dynamic compensation.

### Flow Inputs:

#### Analog Input:

Accuracy: 0.02% FS at 20° C

#### Ranges

Voltage: 0-10 VDC, 0-5 VDC, 1-5 VDC

Current: 4-20 mA, 0-20 mA,  
4-20 mA stacked, 0-20 mA stacked

Basic Measurement Resolution: 16 bit

Update Rate: 4 updates/sec

Automatic Fault detection: Signal over/under-range,  
Current Loop Broken

Calibration: Operator assisted learn mode

Extended calibration: Learns Zero and Full  
Scale of each range

#### Fault Protection:

Fast Transient: 500 V Protection (capacitive clamp)

Reverse Polarity: No ill effects

Over-Voltage Limit: 50 VDC Over voltage  
protection

Over-Current Protection: Internally current limited  
protected to 24VDC

### Pulse Inputs:

Number of Flow Inputs: one

Input Impedance: 10 k  $\Omega$  nominal

Trigger Level: (menu selectable)

High Level Input

Logic On: 2.5 to 30 VDC

Logic Off: 0 to 2 VDC

Low Level Input (mag pickup)

Selectable sensitivity: 10 mV and 100 mV

Minimum Count Speed: 0.01 to 0.25 Hz (to maintain  
rate display)

Maximum Count Speed: Selectable: 0 to 50 kHz

Overvoltage Protection: 50 VDC

### Temperature, Pressure, Density Inputs

The compensation inputs usage are menu selectable for temperature, temperature 2, pressure, density or not used.

Calibration: Operator assisted learn mode

Operation: Ratiometric

Accuracy: 0.02% FS at 20° C

Basic Measurement Resolution: 16 bit

Update Rate: 2 updates/sec minimum

Automatic Fault detection:

Signal Over-range/under-range

Current Loop Broken

RTD short

RTD open

Reverse Polarity: No ill effects

Over-Current Limit

(current input)Internally limited to protect input to  
24 VDC)

Available Input Ranges

Current: 4-20 mA, 0-20 mA

Resistance: 100 Ohms DIN RTD

100 Ohm DIN RTD (DIN 43-760, BS 1904):  
Three Wire Lead Compensation  
Internal RTD linearization learns ice point resistance  
1 mA Excitation current with reverse polarity protection  
Temperature Resolution: 0.1° C  
Temperature Accuracy: ± 0.5° C

#### Stored Information (ROM)

Steam Tables (saturated & superheated),  
Fluid Properties: Water, Air, Natural Gas or Generic

#### User Entered Stored Information (EEPROM / Nonvolatile RAM)

Transmitter Ranges, Signal Types  
Fluid Properties  
(specific gravity, expansion factor, specific heat, viscosity, isentropic exponent, combustion heating value, Z factor)  
Units Selections (English/Metric)

#### Excitation Voltage

24 VDC @ 100 mA (fault protected)

#### Relay Outputs

The relay outputs usage is menu assignable to (Individually for each relay) Hi/Lo Rate Alarm, Hi/Lo Temperature Alarm, Hi/Lo Pressure Alarm, Pulse Output (pulse options), Wet Steam or General purpose warning (security).

Number of relays: 2 (3 optional)  
Contact Style: Form C contacts  
Contact Ratings: 240 V, 5 amp

#### Analog Outputs

The analog outputs are menu assignable to correspond to the Uncompensated Volume Rate, Corrected Volume Rate, Mass Rate, Heat Rate, Temperature, Density, or Pressure.

Number of Outputs: 2  
Type: Isolated Current Sourcing (shared common)  
Available Ranges: 0-20 mA, 4-20 mA (menu selectable)  
Resolution: 16 bit  
Accuracy: 0.05% FS at 20 Degrees C  
Update Rate: 5 updates/sec  
Temperature Drift: Less than 200 ppm/C  
Maximum Load: 1000 ohms  
Compliance Effect: Less than .05% Span  
60 Hz rejection: 40 dB minimum  
EMI: No effect at 3 V/M  
Calibration: Operator assisted Learn Mode  
Averaging: User entry of DSP Averaging constant to cause a smooth control action

**Listing:** CE Compliant

#### Serial Communication

The serial port can be used for printing, datalogging, modem connection and communication with a computer. Power is provided for KEP's MPP2400N (modem) communication accessory.

RS-232:

Device ID: 01-99  
Baud Rates: 300, 1200, 2400, 9600  
Parity: None, Odd, Even  
Handshaking: None, Software, Hardware  
Print Setup: Configurable print list and formatting,  
Compatible with external dataloggers.

RS-485:

Device ID: 01-247  
Baud Rates: 300, 600, 1200, 2400, 4800, 9600, 19200  
Parity: None, Odd, Even  
Protocol: Modbus RTU (Half Duplex)

#### Data Logging

The data logger captures print list information to internal storage for approximately 5000 transactions. This information can be used for later uploading or printing. Storage format is selectable for Comma-Carriage Return or Printer formats.

#### Isolated Pulse output

The isolated pulse output is menu assignable to Uncompensated Volume Total, Compensated Volume Total, Heat Total or Mass Total.

Pulse Output Form (menu selectable): Open Collector  
NPN or 24 VDC voltage pulse  
Nominal On Voltage: 24 VDC  
Maximum Sink Current: 25 mA  
Maximum Source Current: 25 mA  
Maximum Off Voltage: 30 VDC  
Saturation Voltage: 0.4 VDC  
Pulse Duration: User selectable  
Pulse output buffer: 8 bit  
Fault Protection  
Reverse polarity:  
Shunt Diodes  
Over-current Protected  
Over-voltage Protected

#### Real Time Clock

The Flow Computer is equipped with a non-volatile real time clock with display of time and date.

Format:  
24 hour format for time  
Day, Month, Year for date

## MS799 Specifications:

### Dimensions

Height (In.): 14.0  
Width (In.): 12.0  
Depth (In.): 7.75

Standard Weight (empty): 12.0 Lbs.

### Material:

Cover/Base - Ultraguard® Fiberglass reinforced polyester (Color RAL 7035),  
Fasteners - 304 series stainless steel,  
Back panel inserts - Brass,  
Gasket - Closed cell neoprene,  
Mounting Feet - 304 series stainless steel

### Test Spec:

Construction meets NEMA/EEMAC Type 1, 2, 3, 4, 4X, 12 & 13 UL® 508A listed; Type 1, 2, 3, 3R, 4, 4X, 12, and 13 CSA-C22 No. 14; Type 1, 2, 3, 3R, 4, 4X, 12, and 13 IEC60529 Type IP66

### Ordering Information

#### Part Number:

MS799NEMAST4X0QR - enclosure with no cutouts  
MS799NEMAST4X1QR - enclosure with 1 cutout for ST series  
MS799NEMAST4X2QR - enclosure with 2 cutouts for ST series  
MS799NEMAST4X3QR - enclosure with 3 cutouts for ST series

**NOTE:** QR in part number depicts Quick Release Latches (std)

#### Options:

SP - Sub-Panel (aluminum)  
DR - Single DIN Rail Installed for accessory mounting  
DO - Duplex Outlet  
TB - Terminal Block  
PW - Internal Pre-wired by KEP  
CB - Circuit Breaker  
CG - Cable Gland  
A - Assembled at KEP

*Consult factory for custom conduit hole, fitting and factory wiring options.*

## Battery Specifications:

- 12V 3.6AH Sealed Lead Acid (SLA)
- Absorbent Glass Mat
- Sealed Construction - Will Never leak
- Maintenance Free
- High Rate charge and discharge
- Used in any angle except inverted
- High Quality and Stable Performance
- Expected Battery Life 2-3 years

## mL-BC324 Specifications:

### OUTPUT

24V, 3A: 27.4VDC

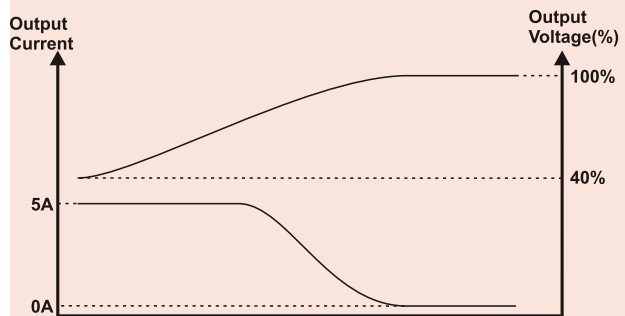
### FAIL OUTPUT

Relay Output

### DISPLAY

Green LED shows the device is charging.  
Red LED shows the device has no AC power present.

### CURRENT-VOLTAGE CURVE



### ELECTROMAGNETIC COMPATIBILITY

- EN 61000-6-4:2007 EMC Generic Emission Standard for Industrial Environments
- EN 61000-6-2:2006 EMC Generic Immunity Standard for Industrial Environments
- EN 61010-1 :2003 Safety Requirements for electrical equipment for measurement, control and laboratory use

### POWER SUPPLY

90-290VAC 50/60 Hz

**Operation Temperature:** -30 ... 60°C

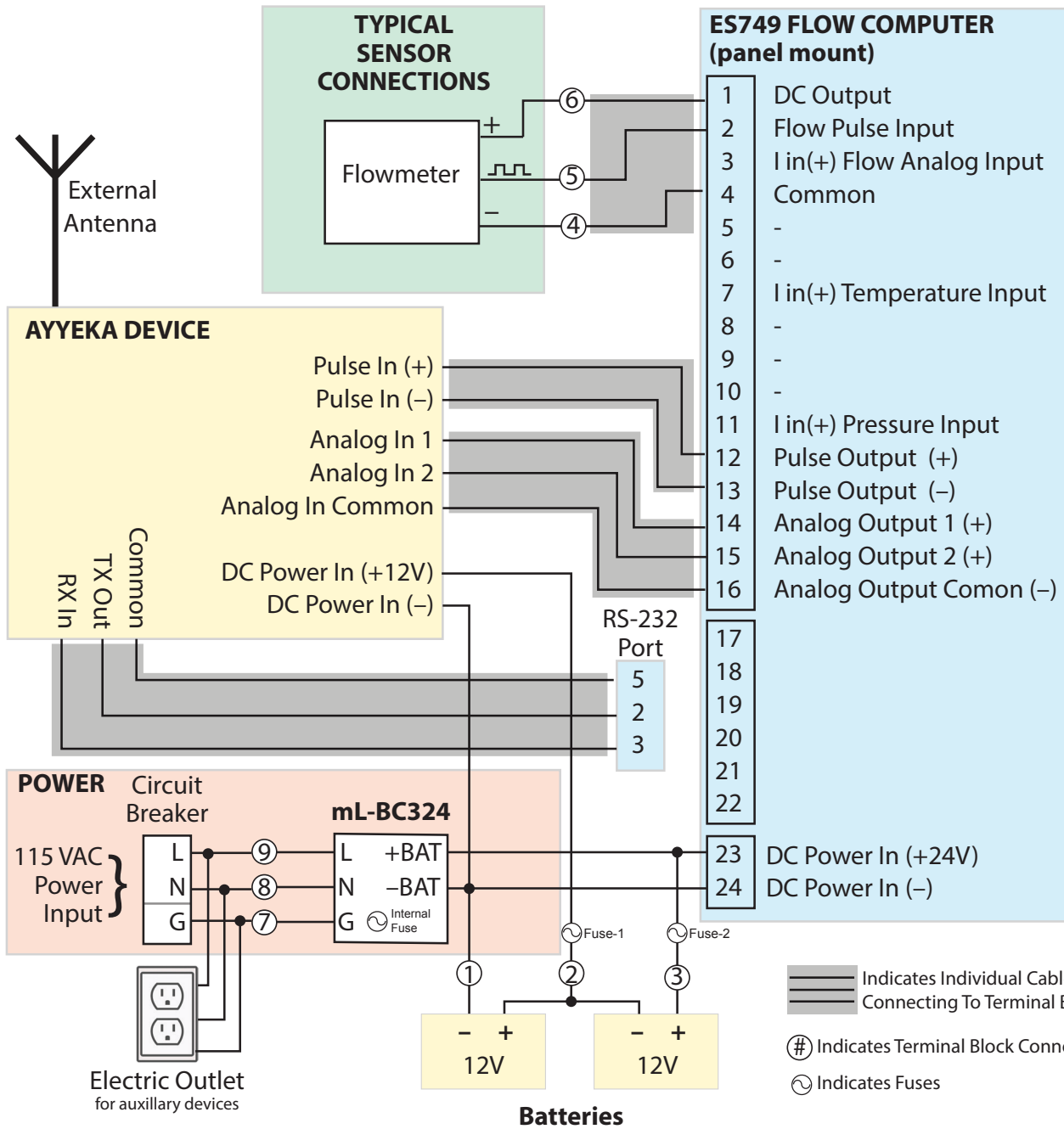
**Humidity:** 0-95%RH (non condensing)

**Protection Class:** IP20

**Weight:** 370 gr.

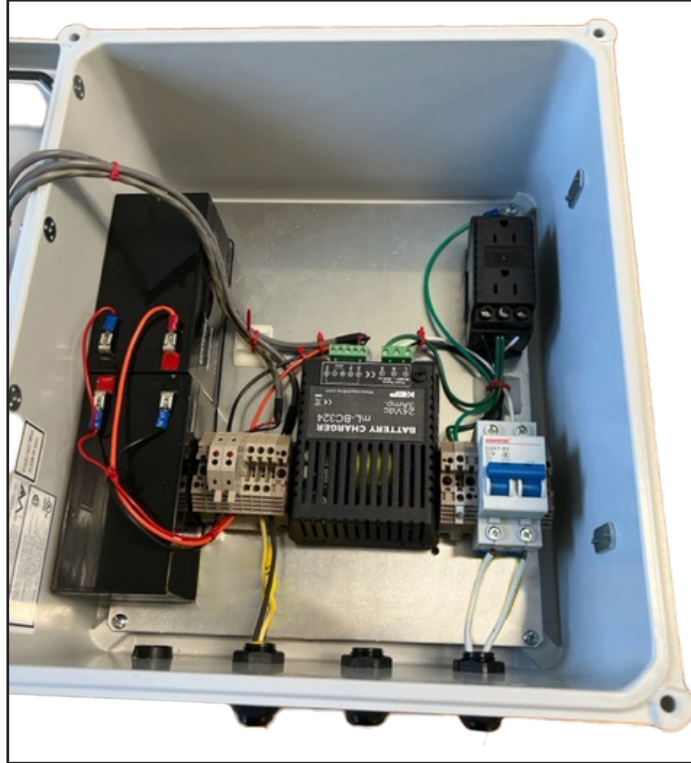
**Dimensions:** 125mm 195mm 156 mm

# System Block Diagram

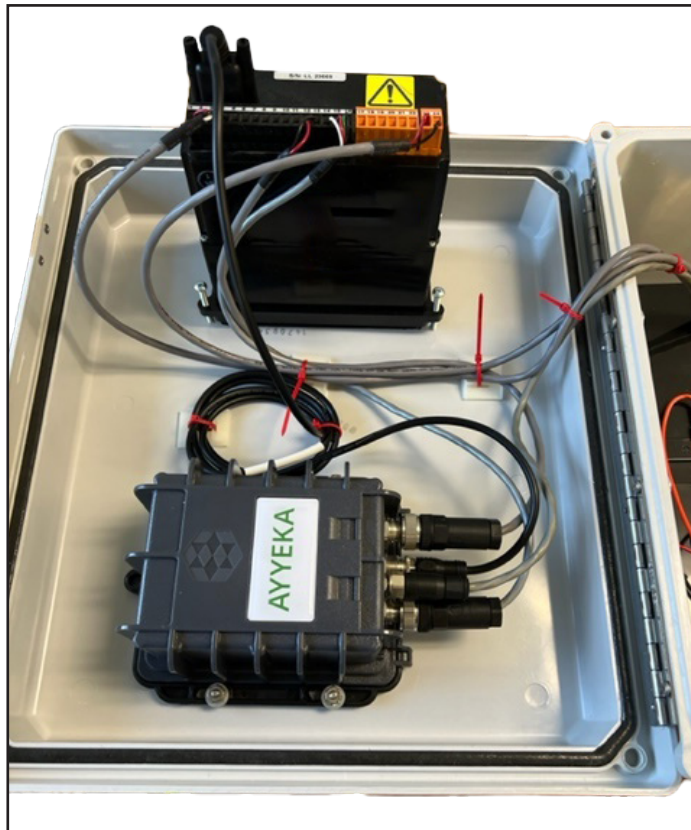


 REFER TO USER MANUAL FOR DETAILS

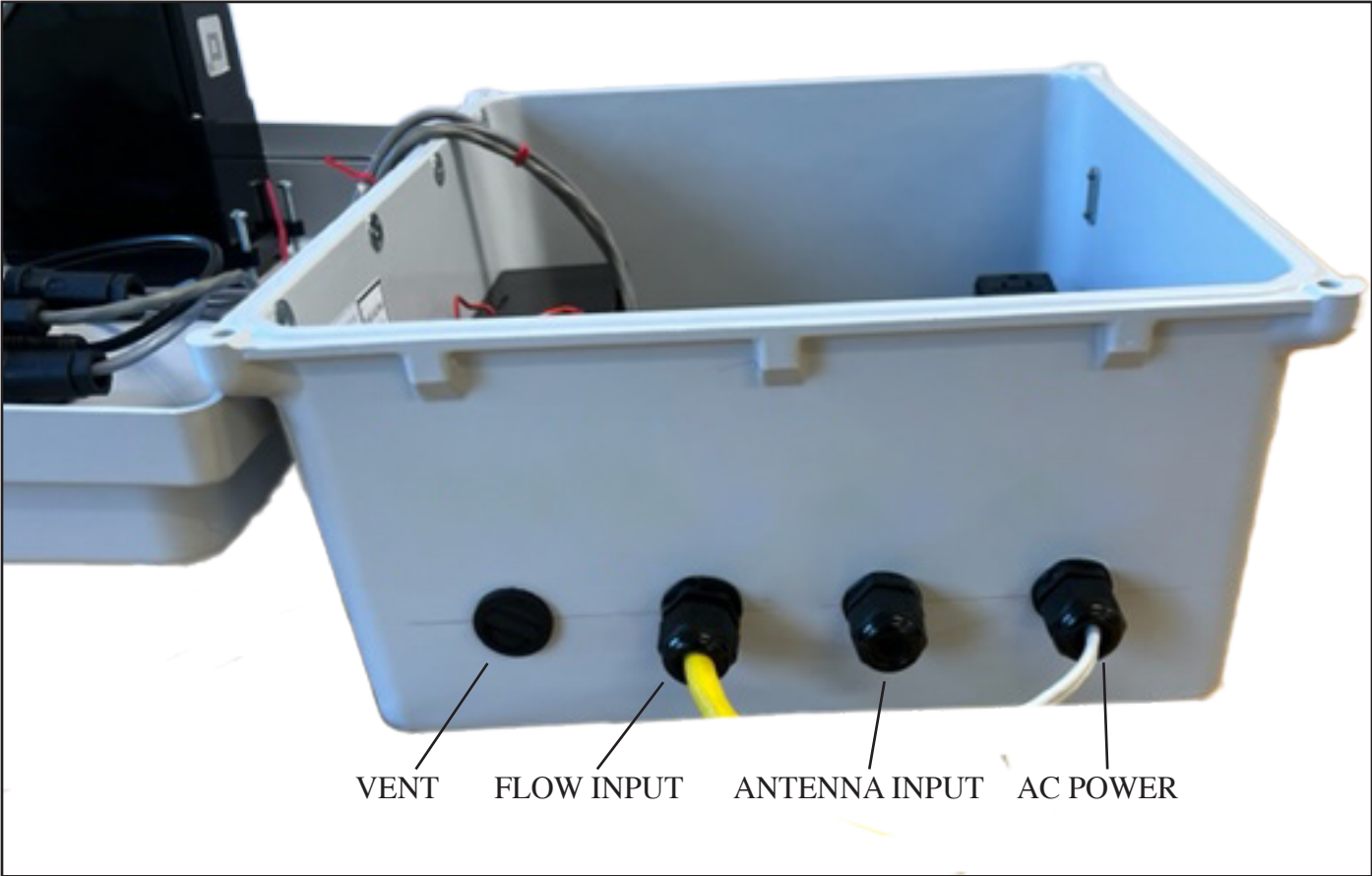
**Internal Wiring 1**



**Internal Wiring 2**



Knockouts With Compression Fittings



**Dimensions**

