

# HORIZON



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### IMPORTANT NOTES

**⚠** This symbol highlights crucial information related to the Horizon. Failure to adhere to proper installation, wiring, and setup guidelines may result in malfunction. It is essential to closely review all cautionary notes throughout this manual.

Additionally, Recommendations and **⚠** Notes are provided throughout each section. These suggestions are based on CRC's experience and are generally applicable in most scenarios. However, please verify them against industry standards and project-specific requirements.

### NOTES

Before starting up and commissioning the Horizon, ensure you familiarize yourself with the unit, its controls, options, and accessories. All personnel involved in commissioning should be well-versed in the start-up procedures and have access to the necessary guides and tools for reference.

### LOCAL SUPPORT

For product support, please reach out to your local Critical Room Control channel partner.

Additional information is available at [criticalroom.com](http://criticalroom.com).



## PRODUCT OVERVIEW

The Horizon air valve, utilizing CRC's patented CLV air valve technology, provides a linearized analog output signal proportional to airflow volume (CFM) and accepts an analog input signal for precise airflow modulation. Operating as a standalone device, it delivers highly accurate and reliable control by leveraging the venturi effect. Engineered for optimal performance, it features minimal pressure drop and an industry-leading turndown ratio, ensuring exceptional efficiency and responsiveness.



### VENTURI VALVE DESIGN

The Horizon Venturi Valve incorporates CRC's patented CLV air valve technology, providing precise airflow measurement through indirect static pressure sensing via dedicated inlet and throat manifolds. This advanced design ensures exceptional measurement accuracy and reliable performance, even in contaminated or particulate-laden airstreams.

### ENERGY EFFICIENT – LOW PRESSURE DROP

Engineered for exceptional efficiency, the Horizon operates with minimal pressure drop, requiring only 0.25" max static pressure, making it the most efficient air valve in the industry while delivering substantial energy savings.

### HIGH-CAPACITY AIRFLOW PERFORMANCE

- Single-unit capacity: Up to 4,200 CFM
- Dual-unit capacity: Up to 7,800 CFM
- Highest airflow-to-size ratio compared to alternatives

### VERSATILE BUILD AND ACTUATION OPTIONS

Compatible with both corrosive and non-corrosive environments, the Horizon supports high-speed, standard-speed, fail-safe, and fail-in-place actuation configurations for diverse applications.

### FLEXIBLE INSTALLATION – NO DUCT RESTRICTIONS

Designed for installation in any orientation, the Horizon requires no straight duct runs at the inlet or outlet, allowing for maximum flexibility in system design.

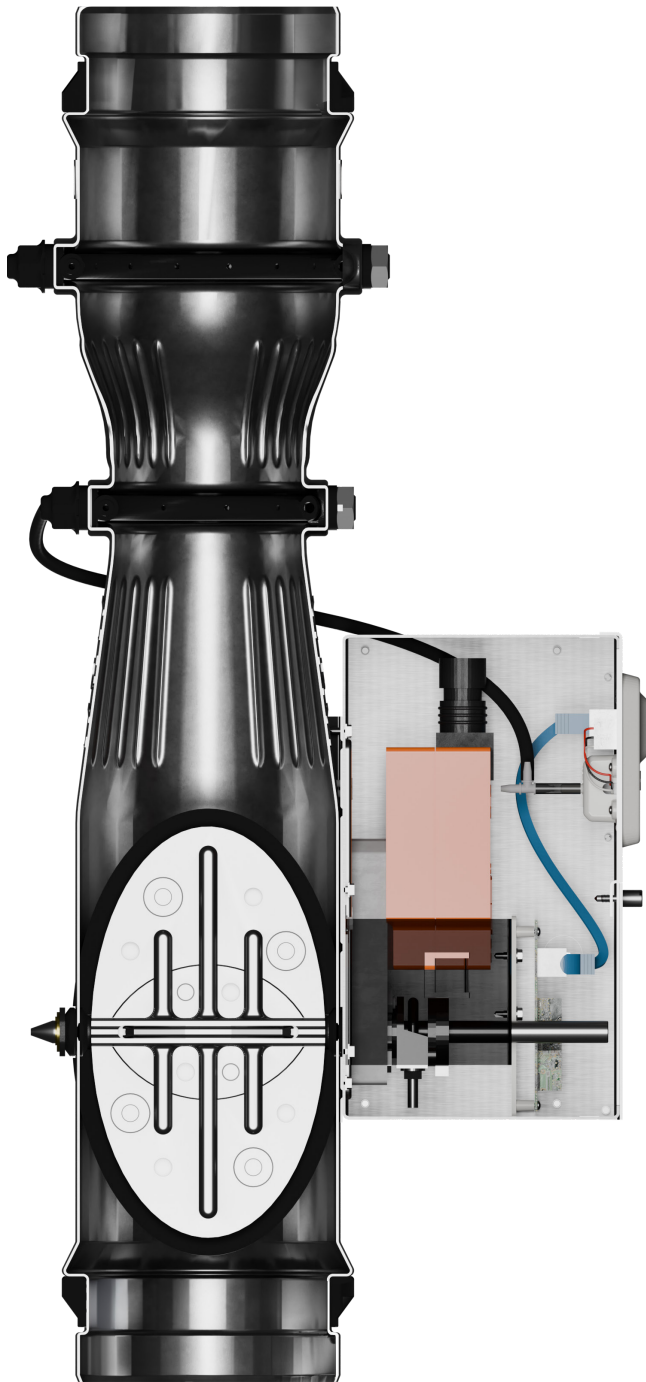
### LOW MAINTENANCE & OPERATION COSTS

Utilizing proven, contamination-resistant technology, the Horizon requires no scheduled maintenance, ensuring long-term reliability and lower operational costs.

### PRECISION AIRFLOW MEASUREMENT

The Horizon Air Valve is a standalone, high-precision airflow control device designed for seamless integration with third-party control systems. Utilizing CRC's patented CLV air valve technology, it delivers maintenance-free, highly accurate airflow management by leveraging the Venturi effect for consistent and repeatable performance.

The valve provides a linearized analog output signal proportional to airflow volume (CFM) and accepts an analog input signal for precise modulation. Engineered for optimal efficiency, it features minimal pressure drop and an industry-leading turndown ratio, ensuring superior responsiveness and energy savings in critical airflow applications.



#### KEY FEATURES

- **Commissioned Accuracy:** Airflow accuracy of less than  $\pm 5\%$  with a minimum of 10 to 1 turndown.
- **Energy Efficient:** Low-pressure-drop design supports static pressures as low as 0.25 inches WC, reducing operating costs.
- **Patented Indirect Sensing Technology:** Maintains unobstructed airflow paths, resistant to duct-borne contaminants.
- **Flexible Installation:** No inlet/outlet restrictions, with unrestricted mounting orientation and axis installation options.
- **Advanced Damper Design:** Engineered for precise airflow control and superior damper authority, with the capability for full closure.
- **Long-Term Repeatability:** Delivers consistent performance with no scheduled maintenance required.
- **High-Capacity Airflow Range:** Supports airflow rates from 0 to 7,800 CFM.
- **Durable Construction:** Built for both corrosive and non-corrosive environments, with stainless steel construction and optional protective coatings for extreme conditions.
- **High-Speed Actuation:** Compatible with both Fail-Safe and Fail-In-Place operation modes for rapid response.
- **Multiple Actuation Options:** Configurable for high-speed actuation to meet various control needs.
- **Fail-Safe & Fail-In-Place Modes:** Provides dependable operation under diverse conditions.

#### APPLICATIONS

- Hospitals
- Laboratories
- Manufacturing facilities
- Vivariums
- Supply air
- Exhaust air
- Snorkel and canopy hood exhaust
- Corrosive environments
- Anywhere maintenance free precision airflow control is required

### TECHNICAL PRODUCT DETAILS

#### CHARACTERISTICS AND PERFORMANCE

<b>Valve Connection</b>	Slip fit w/ band clamps, dual plates, or sheet metal screws
<b>Mounting Orientation</b>	Universal, any orientation or axis
<b>Commissioned Accuracy</b>	±5 % (Pressure independent)
<b>Input Power</b>	24 VAC ±5 %, 50/60 Hz 106 to 116: 30 VA, 212 to 216: 60 VA
<b>Speed of Response</b>	≤ 1 Second
<b>Designed Max APD</b>	0.25 inWC

#### ENVIRONMENTAL LIMITATIONS

<b>Operating Temperature</b>	-4 °F to 175 °F (-20 °C to 79 °C), 5 to 95 % RH non-condensing
<b>Storage Temperature</b>	-40 °F to 175 °F (-40 °C to 79 °C), 5 to 95 % RH non-condensing

#### VALVE CONSTRUCTION

Size	Type	Description	Construction			
			Non-Corrosive		Corrosive	
			Valve Body	Damper & Shaft	Valve Body	Damper & Shaft
106 - 112	Single Valve	Single Valve 6", 8", 10", 12"	E-Coated Galvanized Steel	Stainless Steel	Stainless Steel	Stainless Steel
114 - 116	Single Valve	Single Valve 14" & 16"	Aluminum	Stainless Steel	Stainless Steel	Stainless Steel
212 - 216	Dual valve	Dual Valve 2-12", 2-14", 2-16"	Aluminum	Stainless Steel	Stainless Steel	Stainless Steel

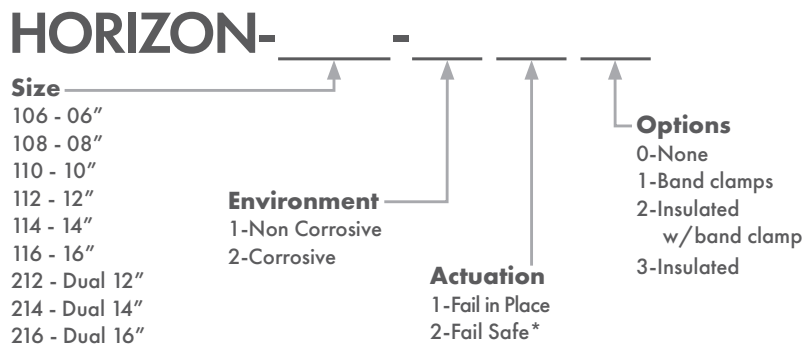
#### VALVE ACTUATION AND ACCESSORIES

Size	Type	Description	Fail Position		Optional Accessories	
			Option 1	Option 2	Band Clamps	Insulation
106 - 112	Single Valve	Single Valve 6", 8", 10", 12"	Fail In Place	Fail Safe	✓	✓
114 - 116	Single Valve	Single Valve 14" & 16"	Fail In Place	Fail Safe	✓	✓
212 - 216	Dual valve	Dual Valve 2-12", 2-14", 2-16"	Fail In Place	Fail Safe	✗	✓

#### VALVE MODEL INFORMATION

Unit Size	K Factor	Flow Range (CFM)	Flow Range (LPS)
106	450	0-600	0-283
108	775	0-1050	0-495
110	1250	0-1700	0-802
112	2600	0-2600	0-1228
114	2275	0-3200	0-1510
116	2967	0-4200	0-1982
212	3377	0-4700	0-2218
214	4597	0-6400	0-3020
216	6000	0-8400	0-3964

#### NOMENCLATURE



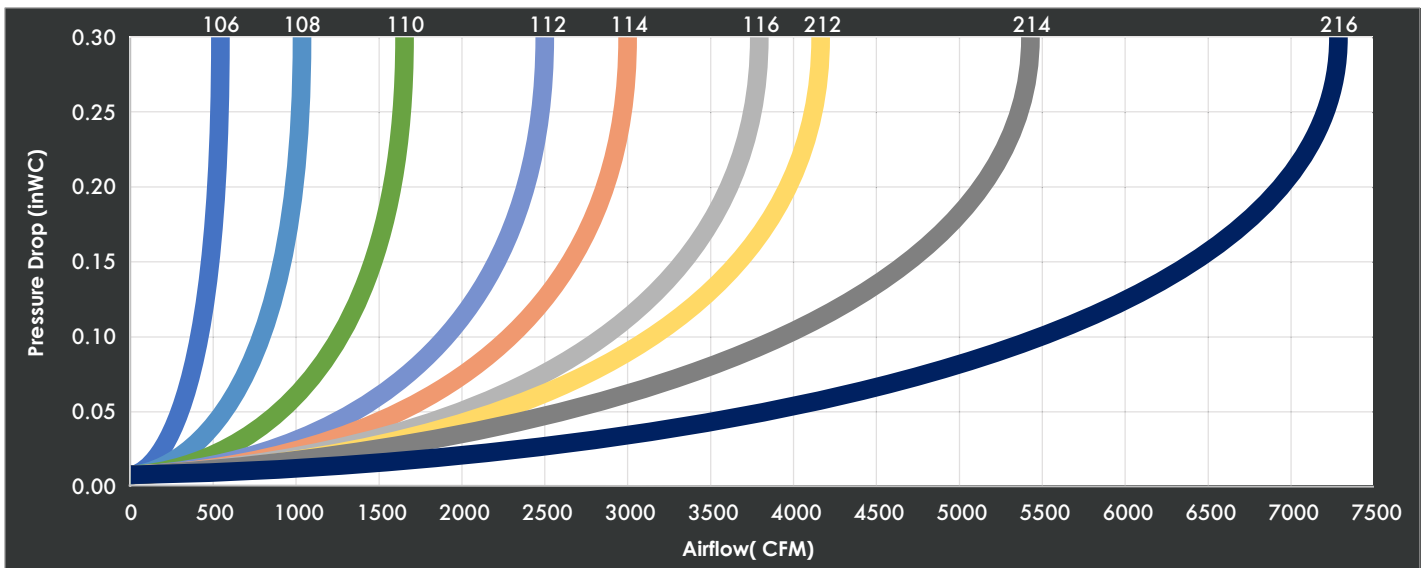
\*Factory default is open, user changeable

## PERFORMANCE

### HORIZON PERFORMANCE DATA

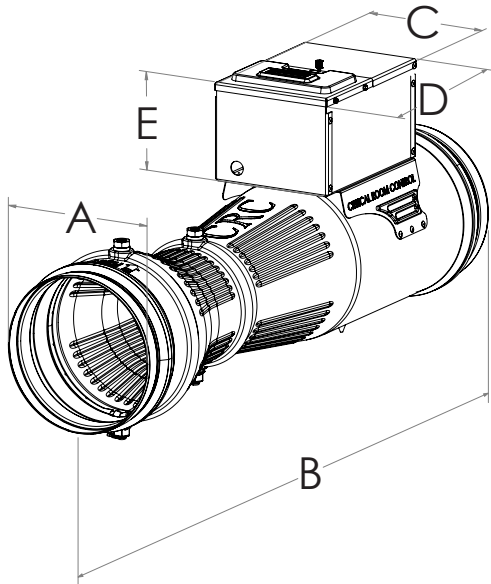
Valve Size	Eng. Units	±20%	≤15%	≤7%	Optimal Performance Design Range									≤1%	Max CFM	Valve Size
					≤5%	≤3%	≤2%	≤1%	≤1%	≤1%	≤1%	≤1%	≤1%			
106	CFM	0-30	30	40	60	100	120	220	300	380	440	480	540	600	106	
108	CFM	0-60	60	80	100	160	200	360	540	680	800	900	980	1050	108	
110	CFM	0-80	80	140	170	300	400	640	900	1140	1320	1440	1600	1700	110	
112	CFM	0-160	160	200	240	380	560	920	1420	1720	2000	2280	2500	2900	112	
114	CFM	0-180	180	240	310	540	800	1200	1720	2100	2420	2700	2960	3100	114	
116	CFM	0-210	210	315	420	700	1000	1580	2210	2730	3125	3520	3850	4200	116	
212	CFM	0-230	230	350	460	660	1100	1760	2520	3040	3520	3800	4100	4600	212	
214	CFM	0-360	360	480	600	1080	1600	2400	3240	4200	4840	5200	5400	6000	214	
216	CFM	0-420	420	630	780	1400	2000	3160	4420	5460	6250	6800	7200	7800	216	
ΔPS	inWC	≤0.005	≤0.005	≤0.005	≤0.005	0.01	0.02	0.05	0.10	0.15	0.20	0.25	0.30	inWC	ΔPS	

### HORIZON PERFORMANCE CHART



⚠ To achieve optimal energy-efficient performance, choose a valve size that maintains a maximum pressure drop of 0.25" at the design airflow rate.

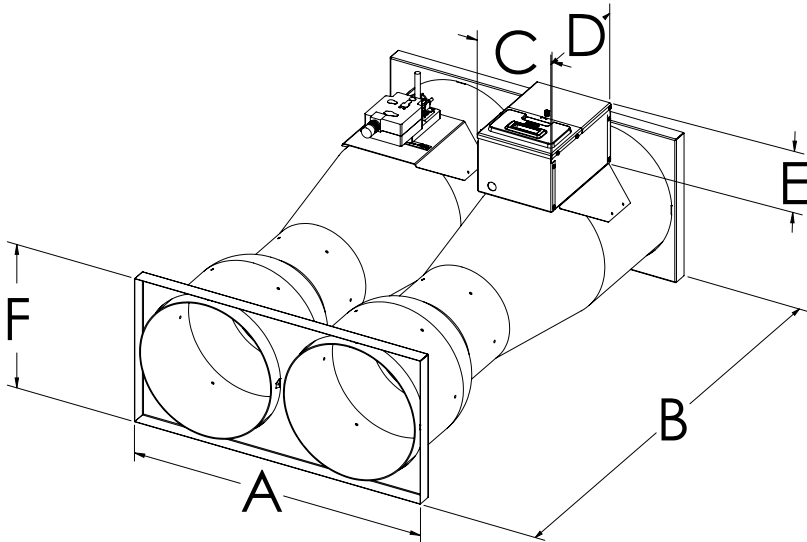
**DIMENSIONAL DATA**



**SINGLE CLV**

Valve Size	A	B	C	D	E
	in [mm]	in [mm]	in [mm]	in [mm]	in [mm]
106	5.9 [149]	28.5 [724]*	7.9 [201]	10.8 [275]	5.4 [138]
108	7.9 [200]	34.8 [884]*	7.9 [201]	10.8 [275]	5.4 [138]
110	9.9 [251]	39.3 [998]*	7.9 [201]	10.8 [275]	5.4 [138]
112	11.9 [302]	40.5 [1029]*	7.9 [201]	10.8 [275]	5.4 [138]
114	13.9 [352]	48.0 [1220]	7.9 [201]	10.8 [275]	5.4 [138]
116	15.9 [381]	48.0 [1220]	7.9 [201]	10.8 [275]	5.4 [138]

\* Measurement is taken from gasket to gasket to account for the slip-fit connection.



**DUAL CLV**

Valve Size	A	B	C	D	E	F
	in [mm]	in [mm]	in [mm]	in [mm]	in [mm]	in [mm]
212	26.0 [660]	48.0 [1220]	7.9 [201]	10.8 [275]	5.4 [138]	13.0 [165]
214	30.0 [762]	48.0 [1220]	7.9 [201]	10.8 [275]	5.4 [138]	15.0 [165]
216	34.0 [864]	48.0 [1220]	7.9 [201]	10.8 [275]	5.4 [138]	17.0 [165]

### RECEIVING/INSTALLATION/MOUNTING

#### SAFETY PRECAUTIONS

- Carefully read all instructions before beginning installation.
- Ensure all installation work, including electrical wiring, complies with applicable codes and standards.
- Adhere to all fire ratings during installation.
- Wear appropriate protective gear, including eyewear, gloves, and clothing, suitable for the working environment.
- The manufacturer assumes no responsibility for personal injury or property damage resulting from improper installation, service, or product handling.
- Deviation from specifications or drawings may lead to product damage, additional site work, and delays in system delivery.

#### RECEIVING INSTRUCTIONS

- Inspect all equipment thoroughly upon receipt for shipping damage. Document any damage with a detailed description.
- Immediately report any damage or loss to the delivering carrier.

#### PRIOR TO INSTALLATION

- Visually inspect the valve for any signs of damage.
- Confirm that the valve size, material, and coatings are appropriate for the installation location.
- Ensure all packing materials are removed from the valve.
- Check the valve label to verify its correct location and function (refer to Figure 1).

#### INSTALLATION PROCEDURE

- Support all ductwork within 18 inches (18") of the air valve.
- Verify that the airflow direction in the duct matches the airflow direction indicated on the valve (refer to Figure 2).
- Maintain a minimum clearance of 12 inches (12") of free space around the air valve for access.
- Install the air valve in any orientation that allows easy access to the enclosure (refer to Figure 3).

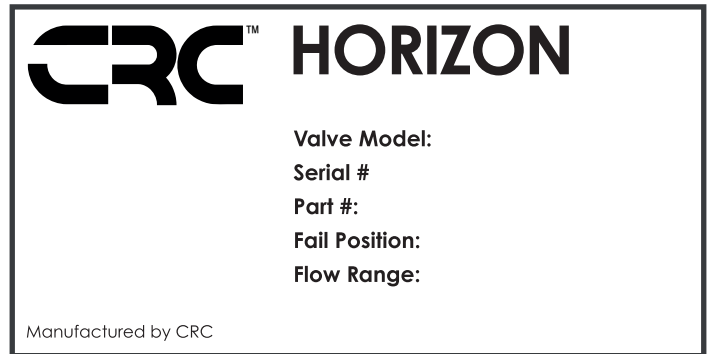


Figure 1

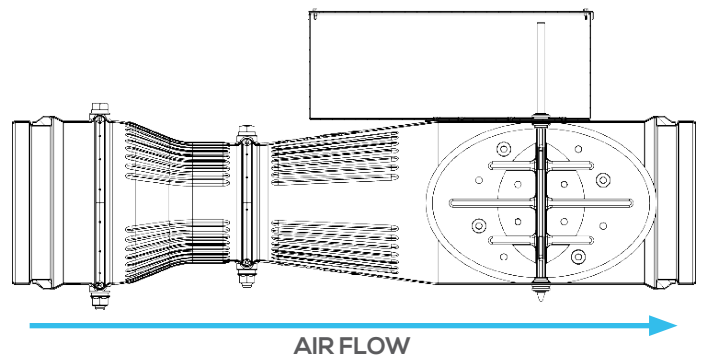


Figure 2



Figure 3

## RECEIVING/INSTALLATION/MOUNTING

### SLIP-FIT CONNECTION INSTRUCTIONS

**1. Valve Installation:**

Insert the Horizon's inlet and outlet into the properly sized ductwork.

**2. Support:**

Secure the ductwork with hangers within 18 inches (18") of both the inlet and outlet of the Horizon.

**3. Fastening:**

Attach the air valve to the ductwork using a minimum of six (6) sheet metal screws (see Figure 4).

Ensure screws do not interfere with the Horizon's operation or airflow.

**4. Sealing:**

Seal the ductwork connections with the specified duct sealer (see Figure 5).

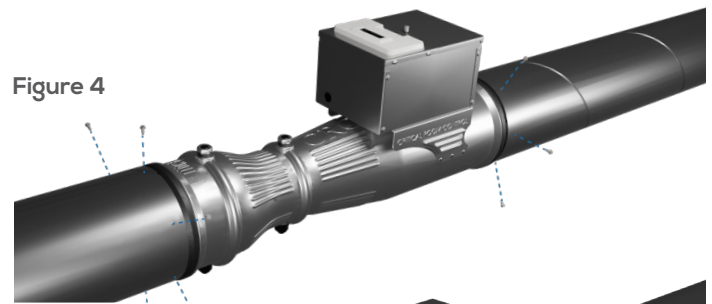


Figure 4

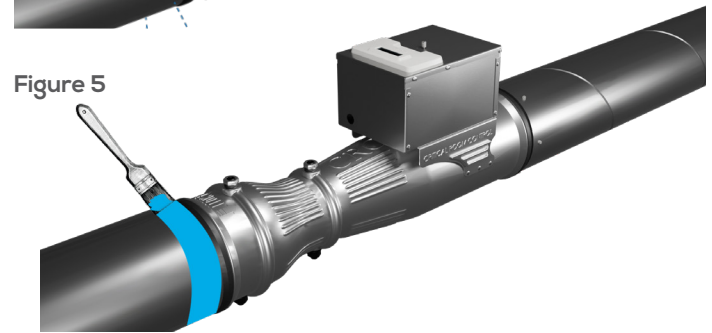


Figure 5

### SLIP-FIT WITH BAND CLAMPS INSTRUCTIONS

**1. Prepare Draw Band Clamps:**

Slide draw band clamps onto the inlet and discharge ductwork (refer to Figure 6).

**2. Valve Installation:**

Insert the Horizon's inlet and outlet into the appropriately sized ductwork.

**3. Seal the Connection:**

Apply duct tape to seal the connection between the Horizon and ductwork as specified.

**4. Support:**

Secure the ductwork with hangers within 18 inches (18") of both the inlet and outlet of the Horizon.

**5. Position Band Clamps:**

Slide the draw band clamps over the connection points between the Horizon and the ductwork (refer to Figure 7).

**6. Tighten Clamps:**

Tighten the draw band clamps around both the Horizon body and the ductwork to secure the connection.

**7. Avoid Screws:**

Do not use screws to secure the band clamps.



Figure 6

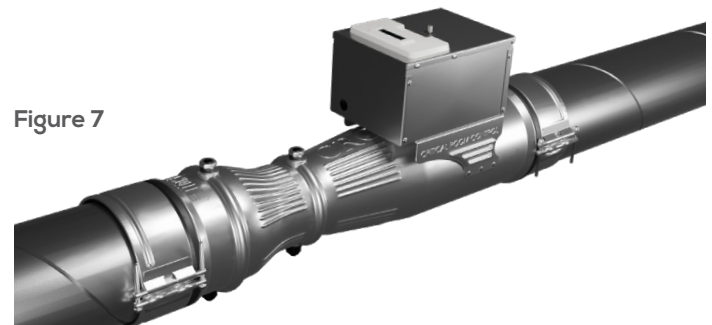


Figure 7

**⚠ Band Clamp Bead Position:** Ensure the band clamp bead is correctly positioned on the duct, not on the air valve body.

### HORIZON INTERFACE

#### HORIZON INTERFACE

The Horizon airflow device is designed for effortless installation, arriving factory-configured for seamless implementation. With no need for field adjustments or additional setup, the Horizon is ready to perform out of the box. Simply connect the wiring, and it's ready to deliver precise and reliable airflow.

The following section of this manual is provided for users who wish to gain a deeper understanding of the Horizon's operation, setup, and configuration parameters. While this detailed information is available for advanced applications or troubleshooting, it's important to note that in a typical installation, accessing the Horizon's menus or adjusting its settings is not required. The factory settings are optimized to ensure hassle-free installation and immediate functionality.

#### MENU NAVIGATION

**BACK:** Returns the user to the previous menu item and, when pressed repeatedly, ultimately navigates back to the home screen.

**UP:** Scrolls upward through menu items, Increases numerical values when entering settings.

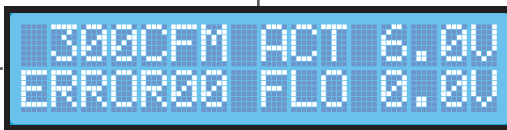
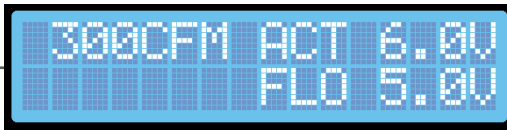
**DOWN:** Scrolls downward through menu items, Decreases numerical values when entering settings.

**ENTER:** Selects menu items and confirms changes to settings.



## HORIZON MENU

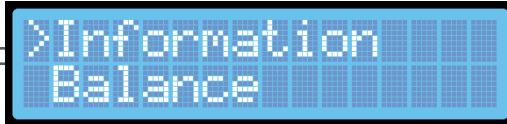
### HOME SCREEN



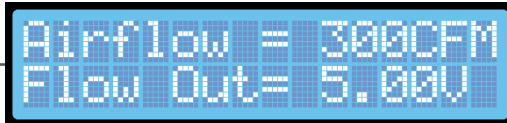
- **Upper Left:** Displays the current airflow of the Horizon in CFM (default), with an option to switch to LPS.
- **Upper Right:** Shows the current voltage signal (VDC) being sent to the Horizon for volume control.
- **Lower Right:** Displays the Horizon's current analog VDC output signal, which represents the current airflow.
- **Lower Left:** Typically unpopulated, this section is primarily used for troubleshooting and factory diagnostics. It indicates if the flow signal or airflow control signal voltages are too low, with the following error messages:
  - **ERROR01:** Horizon is not receiving an external voltage signal for volume control.
  - **ERROR02:** Horizon is not receiving a signal from the flow measurement sensor.

## HORIZON MENU

### HORIZON INFORMATION



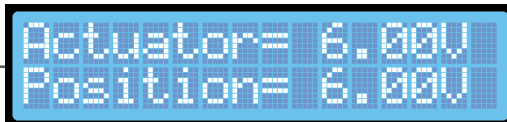
```
>Information
Balance
```



```
Airflow = 300CFM
Flow Out = 5.00V
```



```
Valve = ST106
KFactor = 450
```



```
Actuator = 6.00V
Position = 6.00V
```

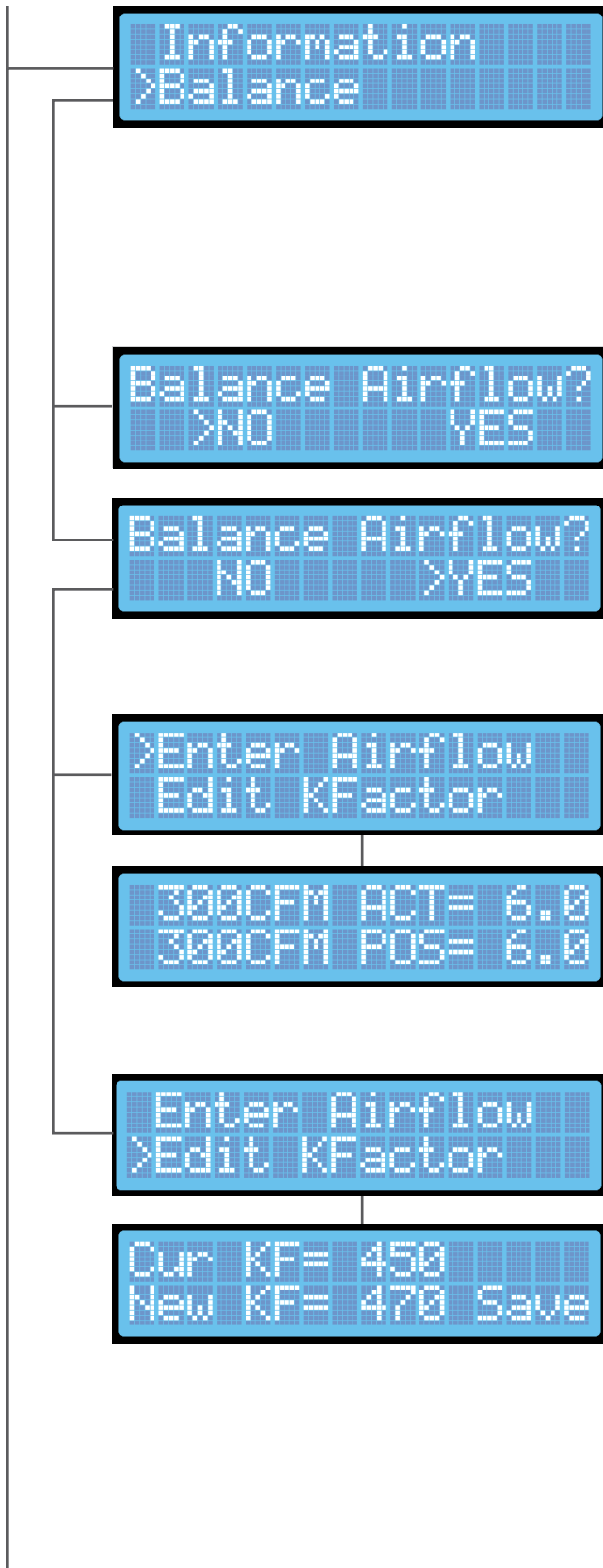


```
Sensor = 2.50V
```

- **Information:** Provides additional product data including software information.
- **Airflow:** Displays the current volumetric airflow of the Horizon.
- **Flow Out:** Shows the linear analog output (default 0-10VDC) representing the Horizon's current airflow. Optional ranges include 2-10V, 0-5V, or 1-5V.
- **Valve:** Identifies the specific Horizon model.
- **KFactor:** Displays the K-Factor used for airflow calculation in the Horizon.
- **Actuator:** Indicates the Horizon's current actuator control analog input signal in VDC. The Horizon operating range 2-10VDC.
- **Position:** Provides feedback on the Horizon's current control damper open position via an analog output signal
  - 2V = closed
  - 10V = open
- **Sensor:** Displays the input voltage from the Horizon flow sensor to the Horizon circuit board, with a sensor operating range of 0.5V to 5.0V.

## HORIZON MENU

### BALANCE



⚠ The Horizon airflow device is factory-configured for immediate operation, requiring no field adjustments or additional setup.

The Balance menu is available for users needing to modify airflow configuration parameters. However, in most installations, accessing the Horizon’s menus or making adjustments is unnecessary, as the factory settings are optimized for typical applications.

**NO:** Returns the Horizon system to the Home Screen.

**YES:** Provides two balancing options:

- **Enter Airflow:** Automatically adjusts the Horizon’s K-Factor to match the field measured airflow value.
- **Edit K-Factor:** Allows manual modification of the Horizon’s current K-Factor.

■ **Enter Airflow:** Automatically adjusts the Horizon’s K-Factor to match the field measured airflow value.

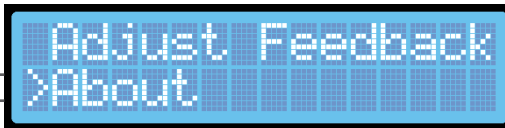
■ **Enter Airflow:** Use the UP/DOWN keys to input the field-measured airflow value for the Horizon.

■ **Edit K-Factor:** Allows manual modification of the Horizon’s current K-Factor.

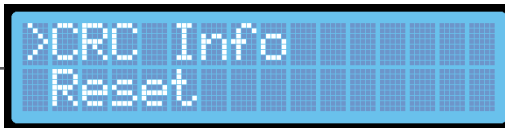
■ **Edit KFactor:** Use the UP/DOWN keys to input your desired K-Factor for the Horizon.

## HORIZON MENU

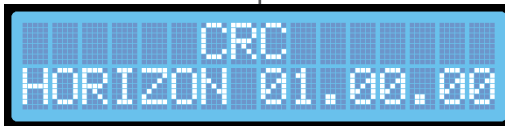
### ABOUT



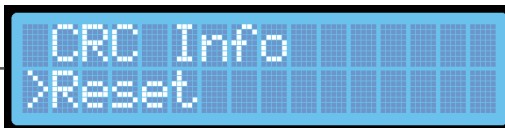
The Horizon's About menu provides access to product information, reset functionality, and sleep time configuration.



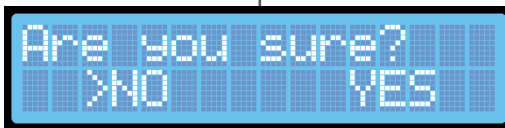
- **CRC Info:** Displays Horizon product details, including the build number.



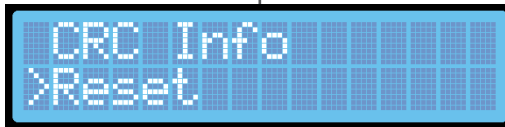
Displays Horizon product details, including the build number.



- **Reset:** Enables users to restore the Horizon to its factory default settings.



**NO:** Selecting NO returns user to Horizon home screen without a Horizon reset

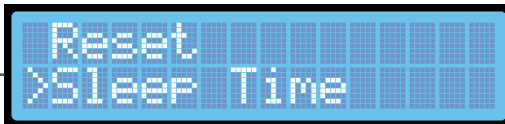


**YES:** Selecting YES resets the following Horizon parameters to factory Default:

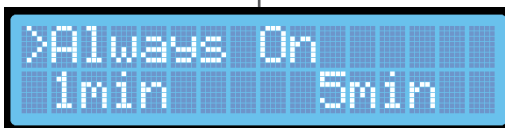
- K-Factor will return to value that corresponds to the Horizon model
- Units to "CFM"
- Sleep Time "Always On"

⚠ Reset will not reset the Horizon model and associated Horizon K-Factor

### EDIT SLEEP TIME



- **Sleep Time:** Configures the device to minimize unnecessary power consumption while maintaining essential operational functions.



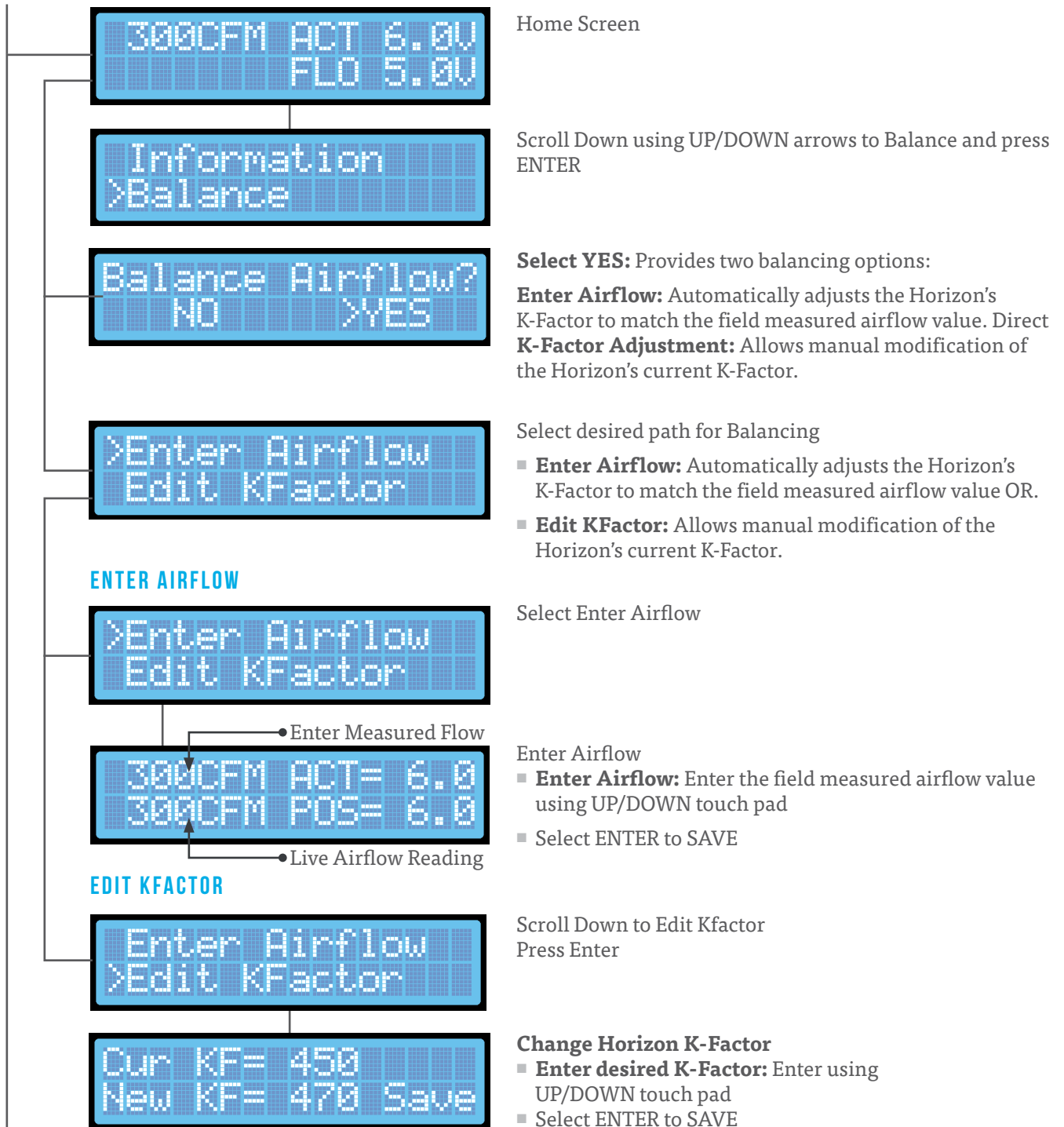
- **Sleep Time:** Configures the device to minimize unnecessary power consumption while maintaining essential operational functions. Option includes Always On, 1 Minute or 5 Minutes

## HORIZON MENU

### FIELD BALANCE

⚠ The Horizon airflow device is factory-configured for immediate operation, requiring no field adjustments or additional setup.

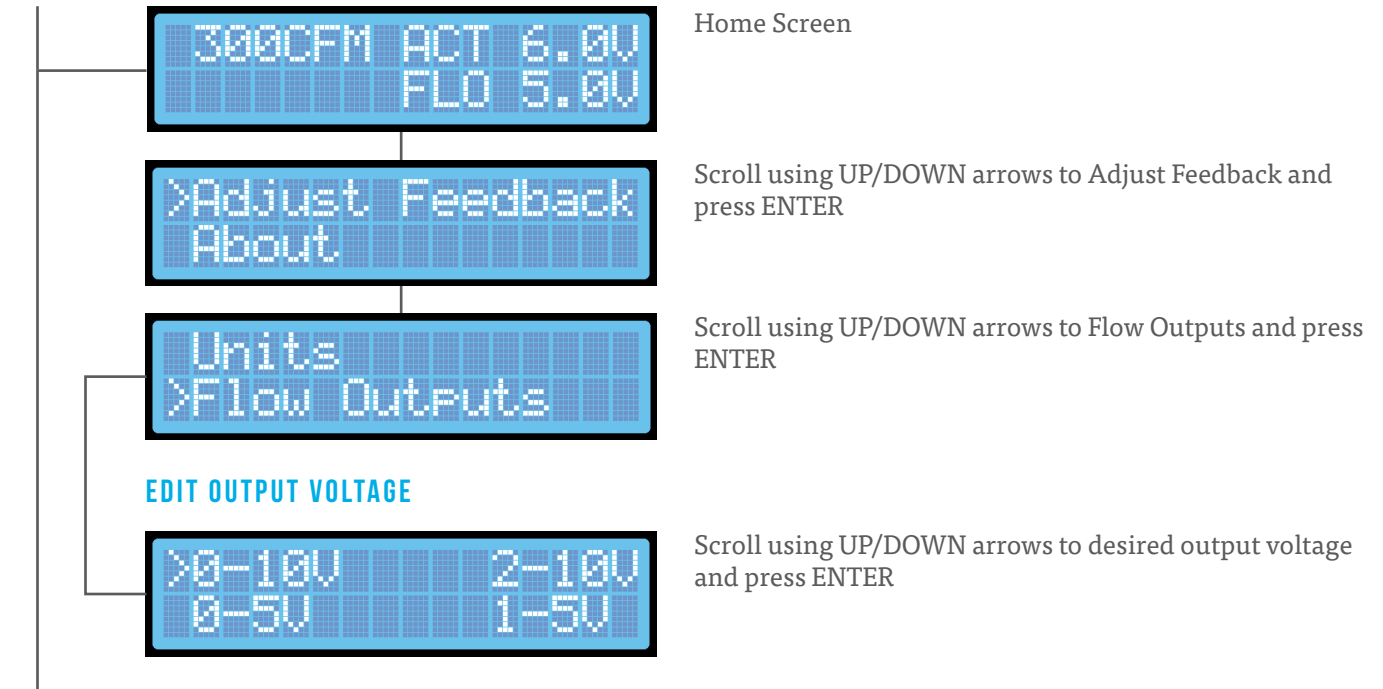
The Balance menu is available for users needing to modify airflow configuration parameters. However, in most installations, accessing the Horizon's menus or making adjustments is unnecessary, as the factory settings are optimized for typical applications.



## HORIZON MENU

### CHANGE FLOW OUTPUT VOLTAGE

⚠ The default linear analog output signal representing airflow is set to 0-10VDC, with optional ranges of 2-10V, 0-5V, or 1-5V available.

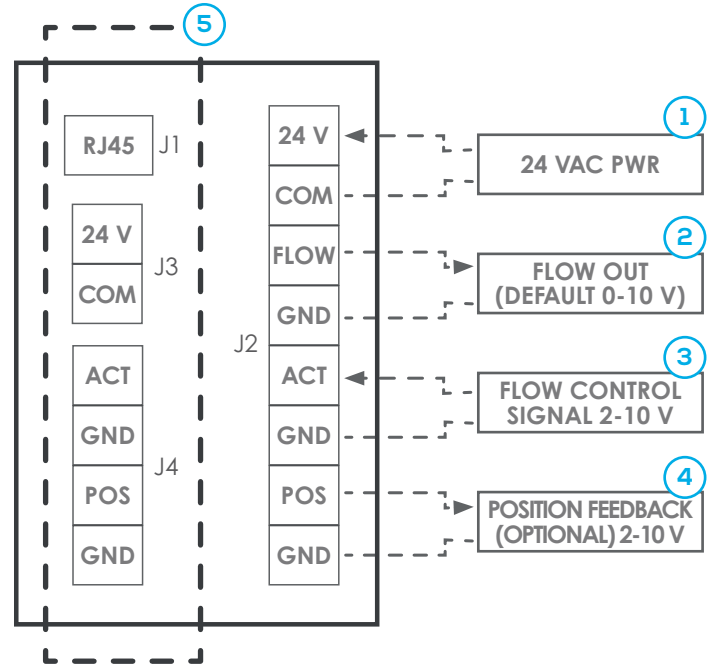


## WIRING

### WIRING INSTRUCTIONS

- 1 **Input Power:** 24 VAC  $\pm 5\%$  50/60 Hz, 106 to 116: 30 VA | 212 to 216: 60 VA (Class II power source)
- 2 **Flow Out:** Linear analog output (default 0-10VDC) representing the Horizon's current airflow. (Optional ranges include 2-10 V, 0-5 V, or 1-5 V)
- 3 **Flow Control:** Airflow control signal (2-10 VDC) from 3rd party device to modulate Horizon airflow.
- 4 **Position:** Provides feedback on the Horizon's current control damper open position via an analog output signal.  
2 V = closed  
10 V = open
- 5 **Factory Wiring:** Factory wiring

⚠ All Horizon electrical terminal connectors are compatible with 14–24 AWG wire sizes.



### HORIZON DEFAULT VALUES

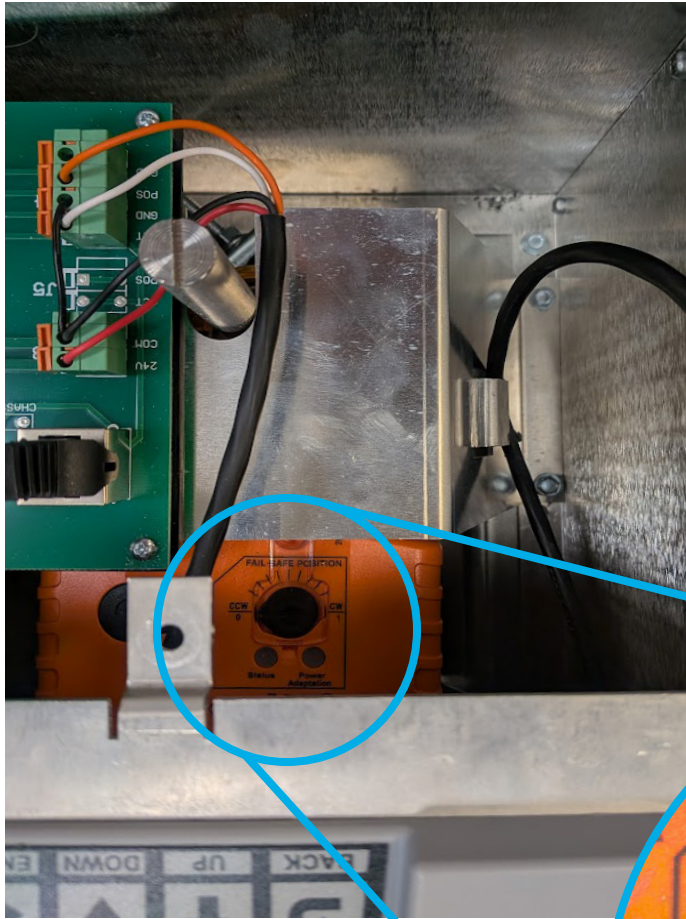
Menu	Setting	Default Value	Optional Values
Balance	K Factor	See Appendix B	N/A
Adjust Feedback	Units	CFM	LPS
Adjust Feedback	Flow Outputs	0-10 V	2-10 V, 0-5 V, 1-5 V
About	Sleep Time	Always On	1 min or 5 min

### FIELD SERVICE

#### CHANGING FAIL SAFE POSITION

Horizon valves with fail-safe actuation are factory default as fail-open. This setting can be field-adjusted as needed to change from fail-open to fail-close.

To adjust this setting, open the Horizon enclosure to access the unit.

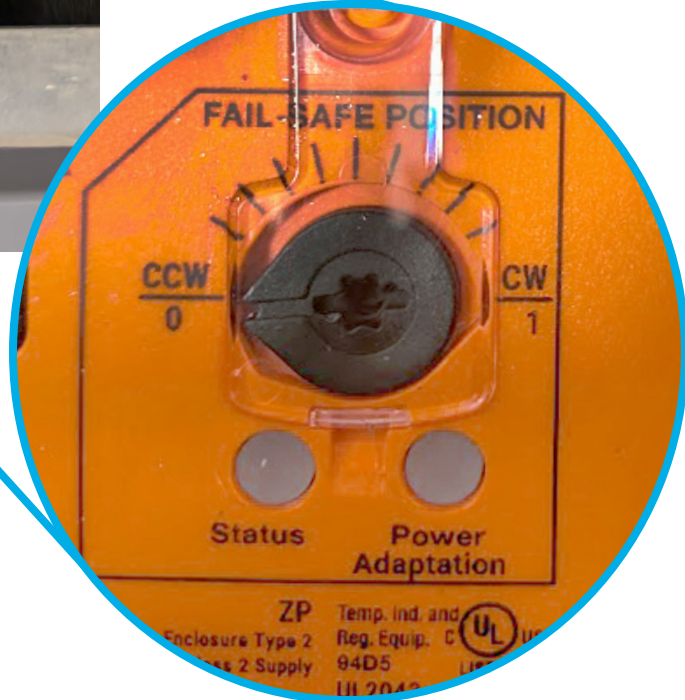


#### FACTORY SETTINGS

**Fail-Open:** CCW/o (Factory Default)

**Fail-Close:** CW/1

1. While the Horizon is powered, disengage the clear plastic cover protecting the Fail-Safe Position dial.
2. Use a Phillips head screwdriver to turn the dial all the way to CW/1 for fail-close.
3. Remove power to the Horizon to confirm the unit closes upon power loss.
4. Repower the unit and secure enclosure closed when complete.

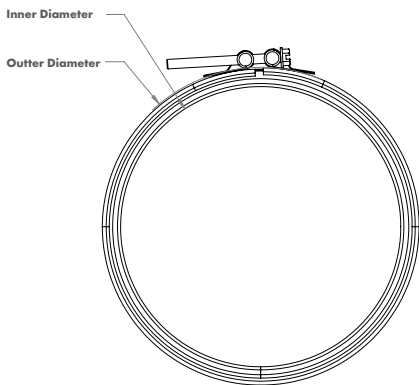


## OPTIONAL ACCESSORIES

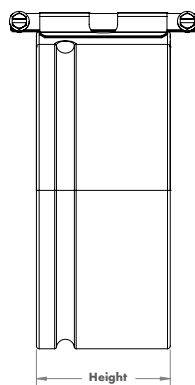
### BAND CLAMPS



Top View



Side View



### CHARACTERISTICS

<b>Material of Construction</b>	Galvanized Steel
<b>Gasket</b>	UL94 Neoprene
<b>Design</b>	Dual-Bolt
<b>Torque</b>	Not to exceed 40 in-lbs
<b>Band Clamps provided in sets of (2)</b>	

### SIZE CHART

Part #	Inner Diameter	Outer Diameter	Height
BC-106	[136.65] 5.38	[159.93] 6.3	[89.33] 3.52
BC-108	[187.45] 7.38	[211.93] 8.34	[89.5] 3.52
BC-110	[238.25] 9.38	[262.73] 10.34	[89.5] 3.52
BC-112	[289.05] 11.38	[313.53] 12.34	[89.5] 3.52
BC-114	[339.85] 13.38	[364.33] 14.34	[89.5] 3.52
BC-116	[390.65] 15.38	[415.13] 16.34	[89.5] 3.52

### INSULATION



### CHARACTERISTICS

<b>Material of Construction</b>	Closed-cell elastomeric thermal insulation
<b>Gasket</b>	0.25" (6.4 mm)
<b>Design</b>	R-1.0

### ENVIRONMENTAL LIMITATIONS

<b>Upper Temperature Limit</b>	220 °F (104 °C)
<b>Lower Temperature Limit</b>	-297 °F (-183 °C)
<b>Flame Spread and Smoke Developed Index</b>	25/50 rated

⚠ Valve insulation is factory installed



Measure What Matters.

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