



HSIN3000C Mechanically Actuated Two-Door Ceiling Inlet



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General Installation Notes

Make sure that power is disconnected from system prior to servicing.

Installation of this equipment and related OEM equipment should be in accordance with these instructions, OEM's installation instructions and local codes (if applicable). Failure to follow specified instructions may cause damage to equipment and/or personal injury or death.

Take special note of any Warnings or Safety Decals on the equipment and in manuals.

Always wear protective clothing and any applicable Personal Protective Equipment (Safety Glasses and/or Ear Plugs) when working with the equipment.

Discarded materials, equipment and boxes should be recycled in accordance with local and national codes.

Note: Actuator Assembly is to be wired in accordance with all applicable local and national electrical wiring codes. All wiring sizes and fuse capacities are to be sized according to applicable electrical code specifications or other regulations.

SAFETY INSTRUCTIONS

Read all safety messages in this manual and on equipment safety decals. Follow recommended precautions and safe operating practices.

Ground all electrical equipment for safety.

Ground all non-current carrying metal parts to guard against electrical shock.

Always keep safety decals in good condition and replace missing or damaged decals.

Overview

The mechanically actuated HSIN3000C ceiling inlet is designed to maximize the volume and throw of air pulled from the attic of a barn in order to improve air quality conditions. It was also designed to seal tightly in order to help prevent moisture from entering the attic space. The HSIN3000C inlet has been validated through the use of sophisticated computational fluid dynamic software, testing in the Hog Slat wind tunnel, and testing in live animal barns.

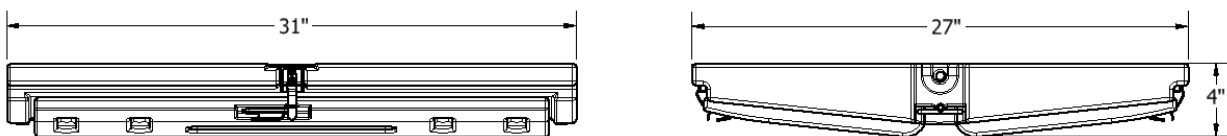
Performance Data

The HSIN3000C two-door inlet has been tested in a highly automated wind tunnel to determine the volume of air (measured in cubic feet per minute) that can be pulled at different combinations of static pressure and opening widths. Table 1 represents testing results.

Table 1: CFM Pull Through HSIN3000C Ceiling Inlet				
Opening Width (In)	Static Pressure (In, H ₂ O)			
	0.05	0.1	0.125	0.15
1	550	700	750	850
2	900	1250	1400	1500
5	1600	2150	2300	2600
8	1900	2500	2750	3000
9	2000	2750	3000	3300
11	2250	3050	3400	3550

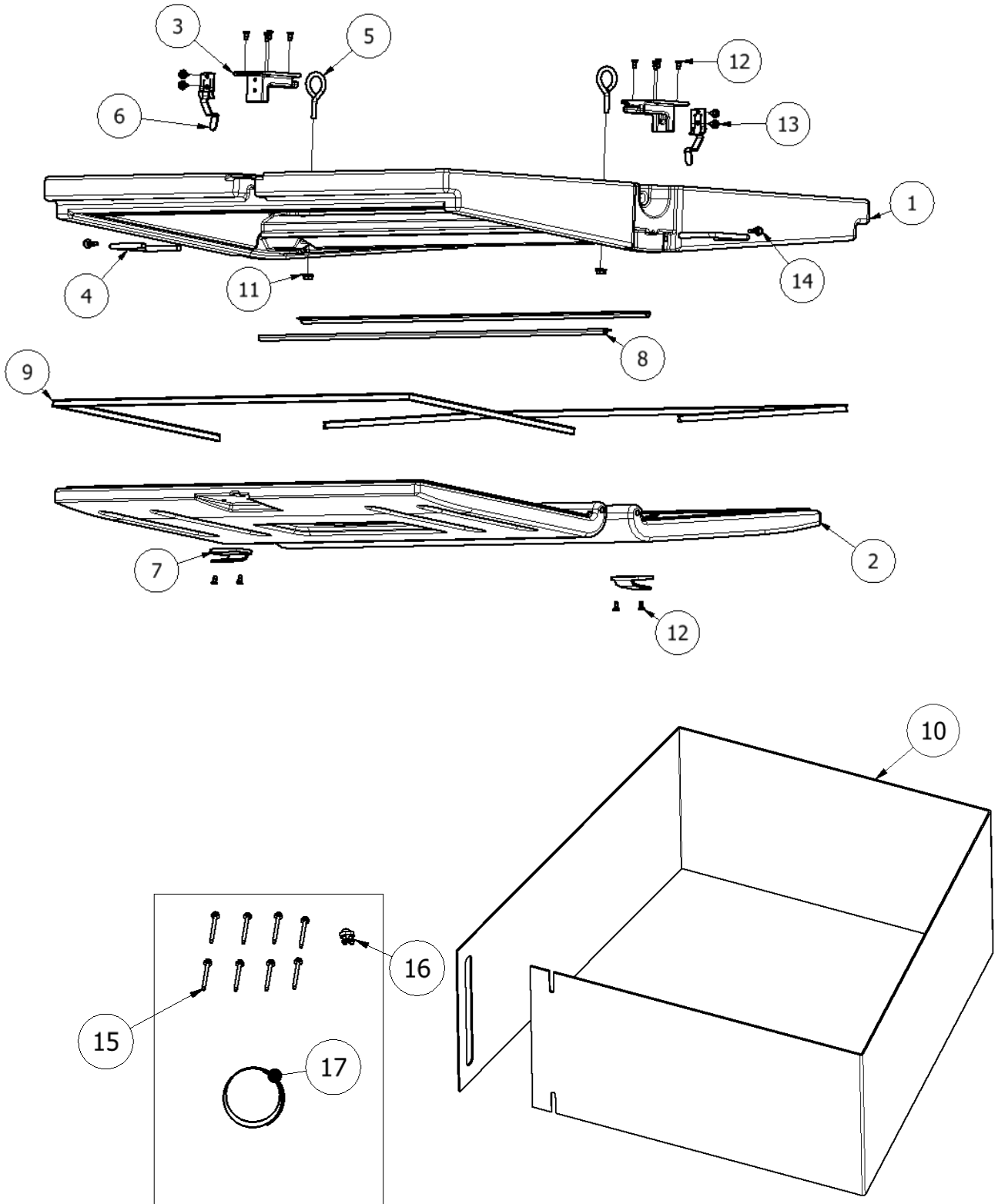
Pre-Installation Requirements

- Install the ceiling inlet so that there is enough clearance between the inlet and any nearby heater. Check the heater manufacturer’s product manual for the minimum allowable distance between the heater and other materials.
- Do not install a ceiling inlet directly over a feeder. Condensation may form on the outside of the inlet and drip into the feed.
- Do not leave the ceiling inlet sitting in direct sun light for long periods of time.
- Do not place temperature sensors directly in the path of the air flow from the ceiling inlet.
- Install the inlet system so that the ceiling inlets will not interfere with feed lines, cables, water lines, or other equipment in the barn.



Outside Dimensions (Figure 1)

Parts List



Exploded View (Figure 2)

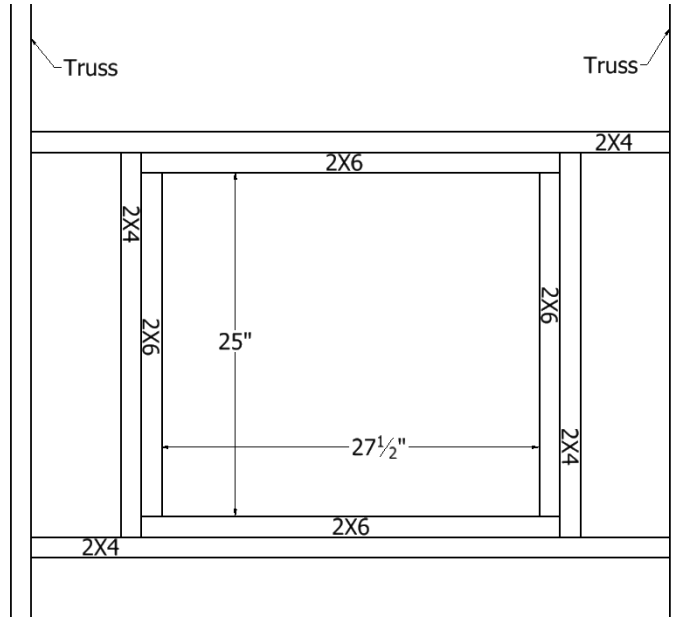
TABLE 2: PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	HSI1- 1	Ceiling Inlet Frame
2	2	HSI1-2	Inlet Door
3	2	HSI1-3	Latch Mount and Cable Guide
4	2	HSI1-4	U Bracket
5	2	HSI1-5	Wire Turned Eyebolt, Stainless Steel, #10-24 X 3/4"
6	2	HSI1-6	Storm Latch
7	2	HSI1-7	Side Entry Cleat
8	2	HSI1-8	Closed Cell Foam P Seal
9	2	HSI1-11	Brush Seal
10	1	HSI1-10	Insulation Stop
11	2	0129150	Nut, Hex, Serrated Flange, 1/4-20, Stainless Steel
12	12	73014	Screw, 8-15 X 1/2", #2 Philips Drive Flat head, Type A Point, Stainless Steel
13	4	60929	Screw, 10-16 X 3/8", Hex Washer Head, Type AB Point, Stainless Steel
14	2	HSH096	Screw, 10-16 X 3/4", Hex Head with Washer, Type AB Point, Stainless Steel
15	8	80503	Screw, 10 X 2", Galvanized
16	1	617321	Clamp, Cable, 1/8", Stainless Steel
17	2	62040-1000	1/8" Diameter, 3' long, Rope

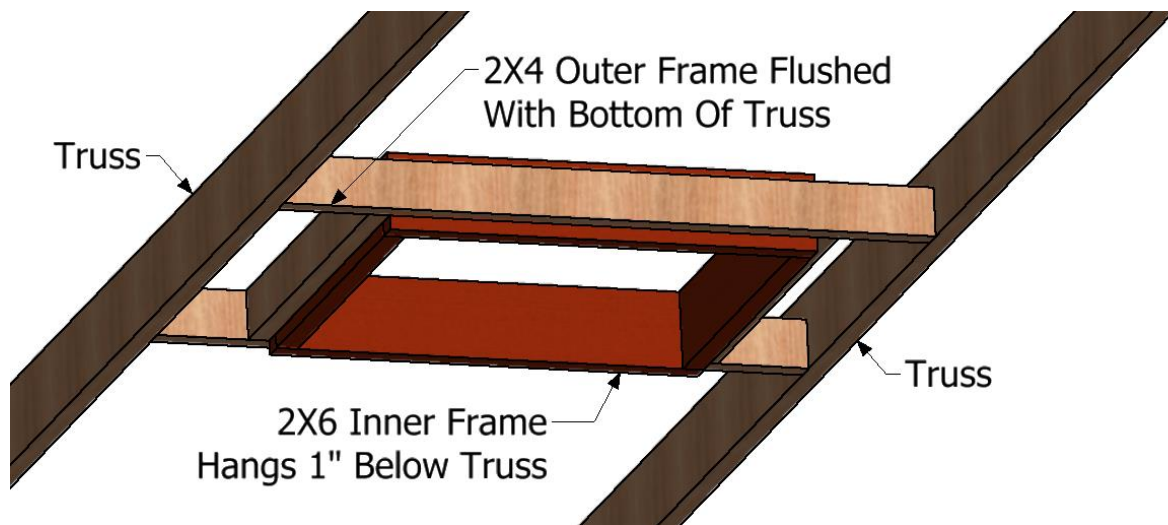
Ceiling Inlet Installation:

STEP 1: Determine the inlet location. The location should be decided based on equal spacing of the number of inlets going into the barn and the location of other components (i.e. feed lines, gas lines, etc.).

Step 2: Construct a 25 inch X 27 ½ inch rough opening frame for the ceiling inlet using the trusses for support. Form an outer frame using 2X4 boards flushed with the bottom of the truss. Cut a hole in the ceiling if necessary. Form the inner frame using treated 2X6 boards. The 2X6 frame should hang at least 1 inch below the bottom of the trusses.

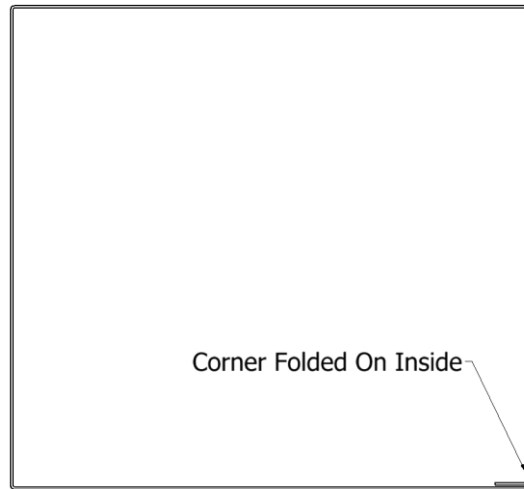


Frame Top View (Figure 3)



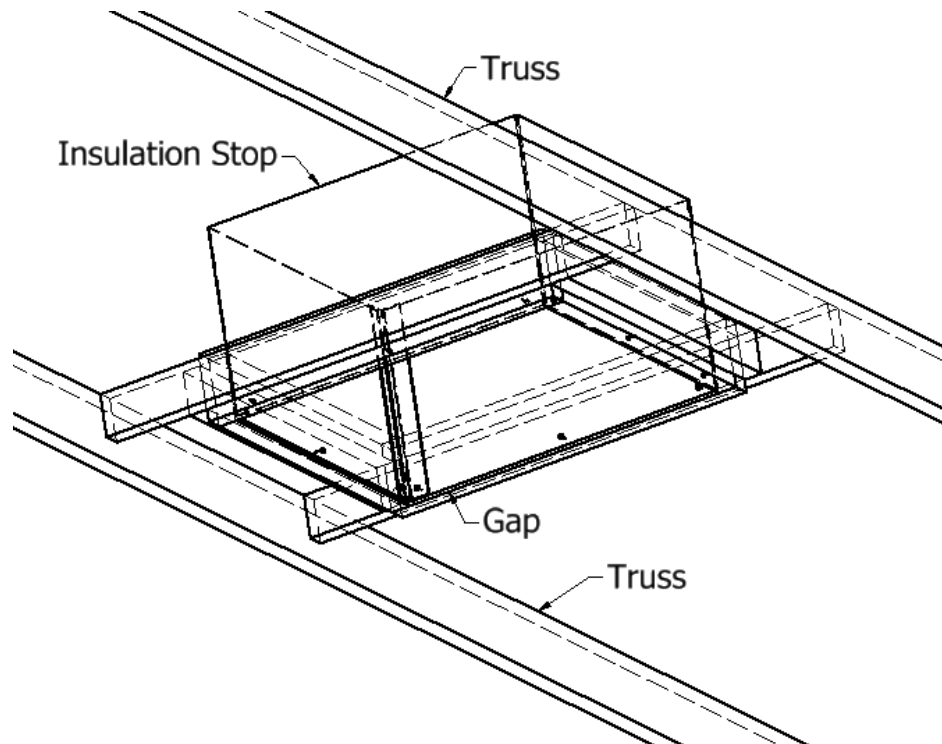
Frame Bottom/Side View (Figure 4)

STEP 3: Pull the tabs on the end of the insulation stop through the slot located on the other end of the insulation stop to form a rectangle. Fold the corner of the insulation stop so that the tabs are tucked into the inside of the rectangle.



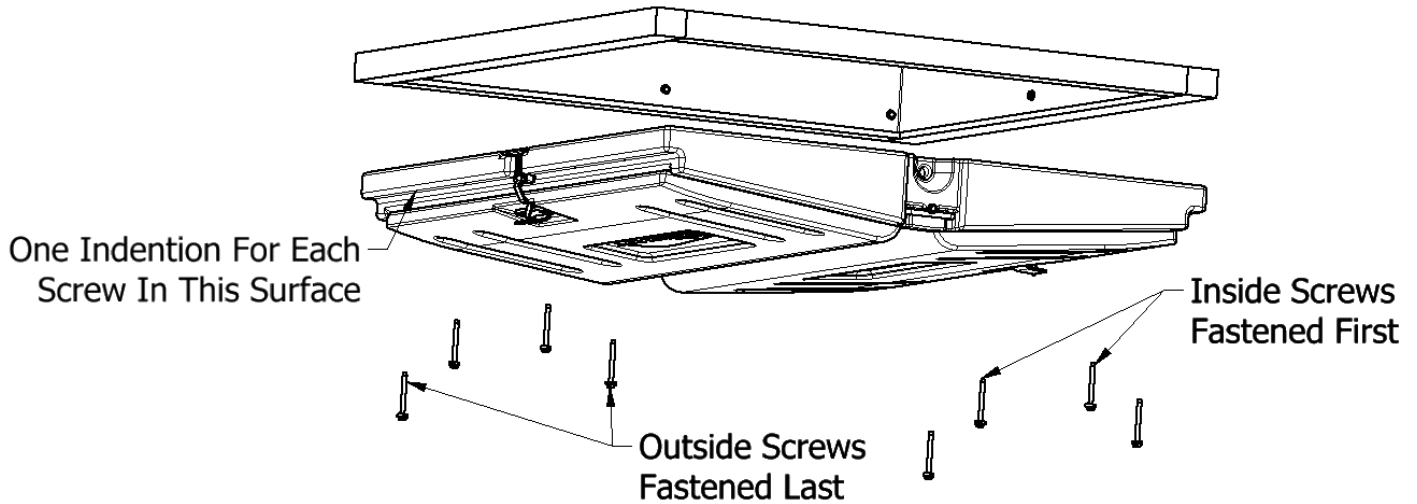
Folded Insulation Stop (Figure 5)

Step 4: Slide the insulation stop inside of the frame. Fasten the insulation stop to the frame using staples, nails, or screws (not provided). Leave a small gap between the lower edge of the 2X6 framing and the bottom edge of insulation stop to avoid interference with the ceiling inlet.



Insulation Stop Bottom/Side View (Figure 6)

STEP 5: Fasten the ceiling inlet to the 2X6 boards using the eight two-inch screws (80503) provided. There are indentations on the outermost surface of the plastic frame which mark the placement of the screws. Secure the screws in the inside indentations on both sides first. Secure the screws in the outside corner indentions last in order to prevent bowing or warping of the frame.



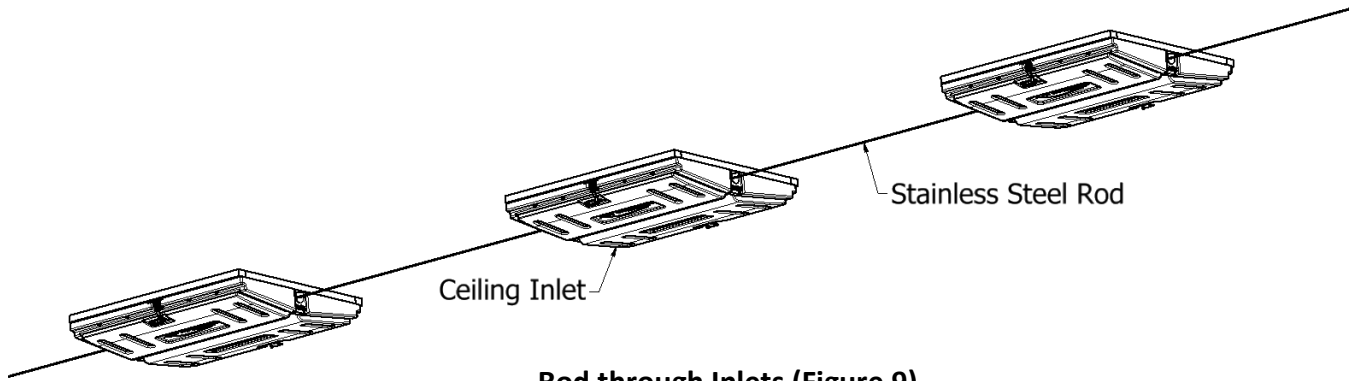
Attachment to Ceiling (Figure 7)

Step 6: Apply caulk to the inside edge where the bottom of the wood frame comes into contact with the top of the ceiling inlet.



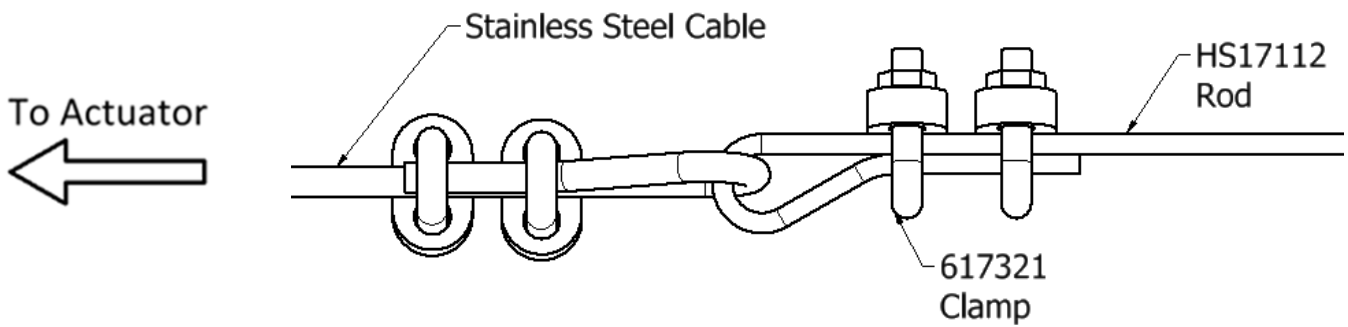
Caulk Along Edge (Figure 8)

Step 7: Run a 1/8 inch diameter stainless steel rod (HS17111 or HS17112) through the center holes of the line of inlets. The rod should pass through both of the eye bolts in each inlet.



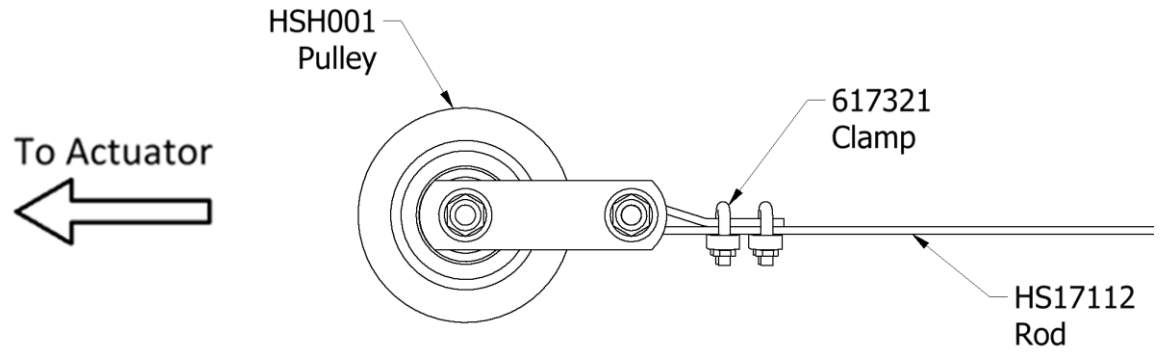
Rod through Inlets (Figure 9)

Step 8: Attach the rod (HS17111 or HS17112) to the cable that runs to the actuator and winch system. Bend the end of the rod to form a loop. Clamp the loop tightly using two 1/8 inch cable clamps (617321). Pull the cable through the loop and clamp the cable using an appropriately sized cable clamps. Route the other end of the cable to the actuation system.



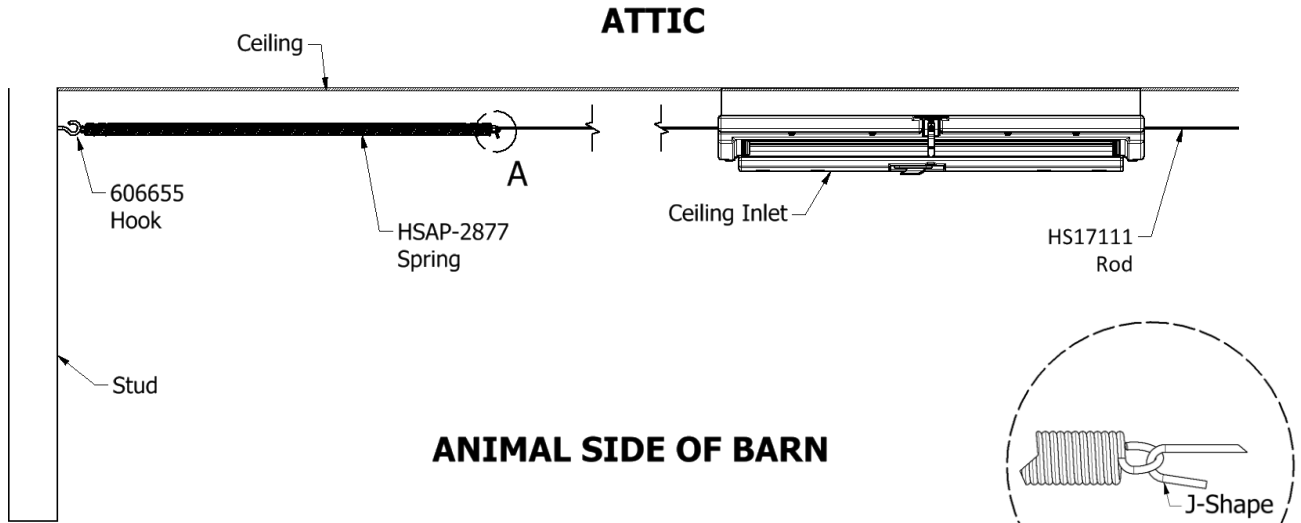
Cable and Rod Connection (Figure 10)

The rod can also be clamped directly to a pulley going to the actuator in some cases if the rod, actuation system, and pulley are in direct alignment with each other.



Pulley and Rod Connection (Figure 11)

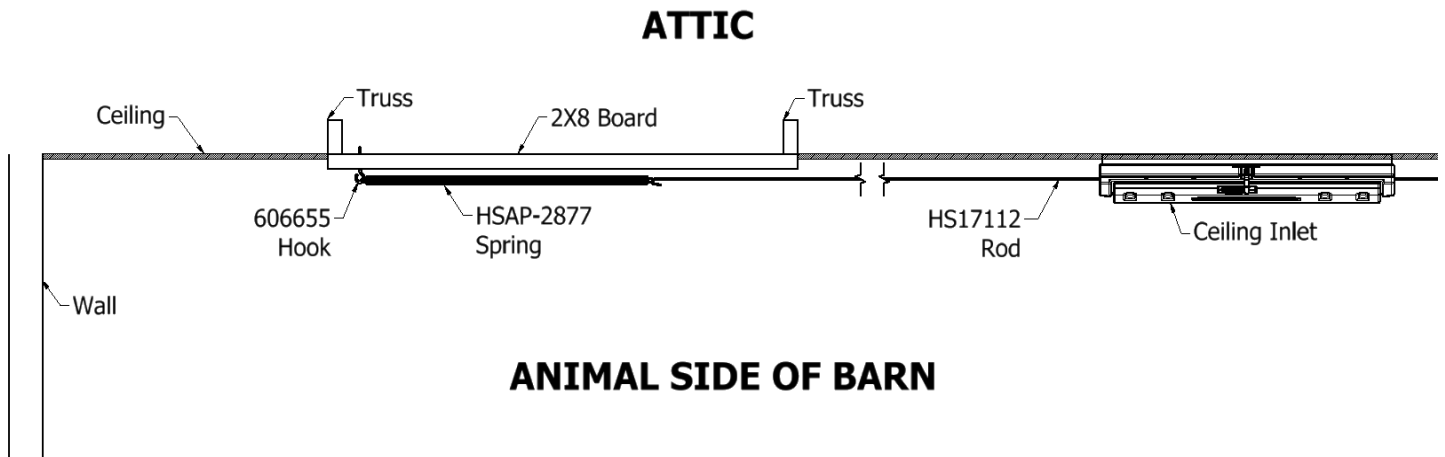
Step 9: Bend the other end of the stainless steel rod (HS17111 or HS17112) into a “J-shape” (See Figure A) or form a closed loop as shown in *Figure 10* and *Figure 11* in *Step 8*. Hook one end of the spring (HSAP-2877) to the end of the rod. Connect the other end of the spring to an eye hook (606655) anchored in a stud aligned with the spring and rod.



Spring Connection to Wall (Figure 12)

Figure A

If a stud is not in line with the ceiling inlets, then the eye hook (606655) can be attached to the ceiling. Fasten a 2X8 Board between the trusses and anchor the eye hook into the board.



Spring Connection to Ceiling (Figure 13)

Step 8: Remove the two pieces of 1/8 inch diameter rope (62040-1000) and the cable clamp (617321) from the hardware bag included with the inlet. Open the inlet doors if they are not already open. Secure the two pieces of rope to the steel rod with the clamp. The clamp should be located 1-3 inches away from the eye bolt furthest away from the actuator. Pull the two pieces of rope through the eye bolt.



Rope Connection to Rod (Figure 14)

NOTE: There are two eyebolts so that the inlet can be oriented in either direction when attached to the ceiling.

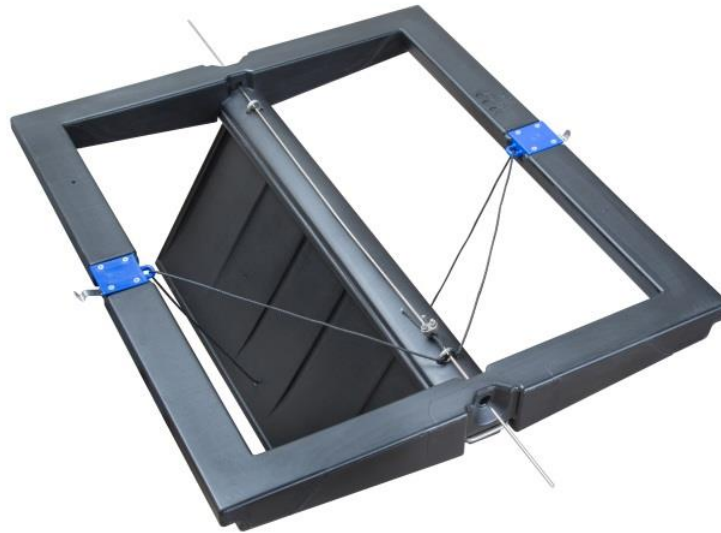
Step 9: Pull each piece of rope through the blue loop of the latch mount and cable guide (HSI1-3), slide it through the center hole in the inlet doors, and secure it tightly in the side entry cleat (HSI1-7). Figures 15 and 16 are shown with the inlet door closed for clarity.



Rope through Blue Loop (Figure 15)

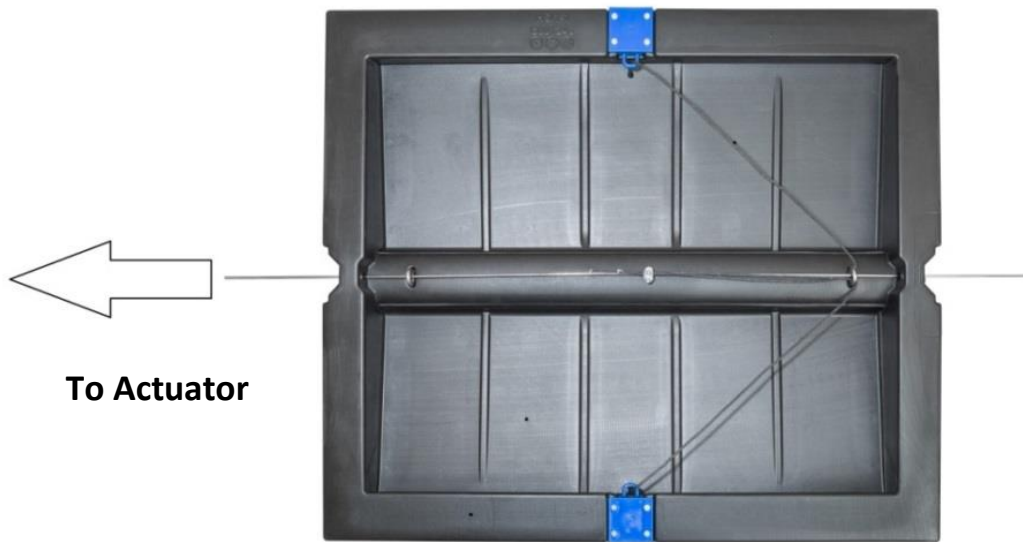


Side Entry Cleat (Figure 16)



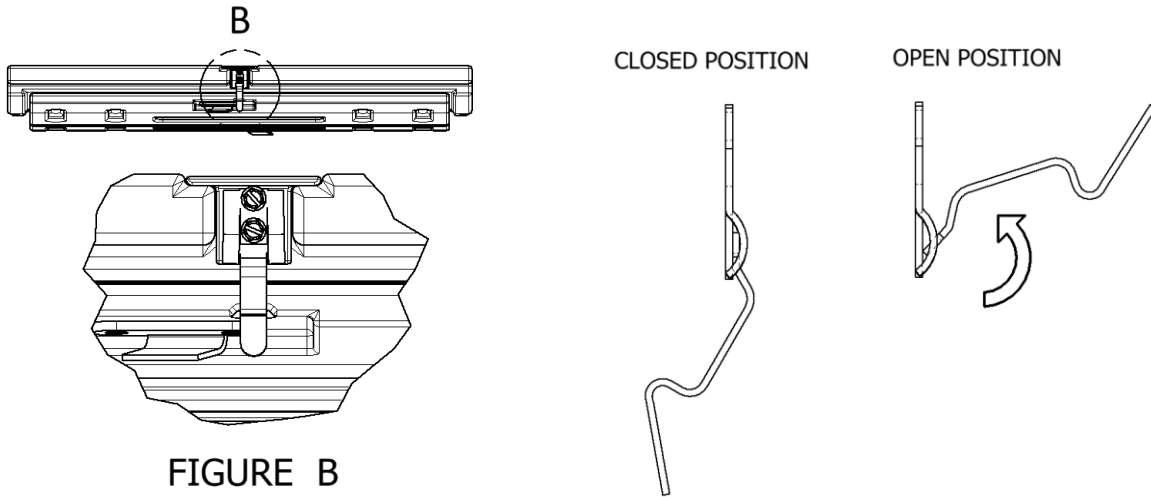
Inlet Connected and Fully Open (Figure 17)

IMPORTANT: Make sure that all ropes are looped through the same eyebolt in all inlets, and make sure that they are looped through the eye bolt furthest from the actuation system. *The actuation system must pull the doors closed when activated.*



Inlet Pulled Closed (Figure 18)

Step 12: Every inlet has two preinstalled storm latches (HSI1-6). The latch should be in the open position when the inlets are being used. Close the latches when the doors should not open.



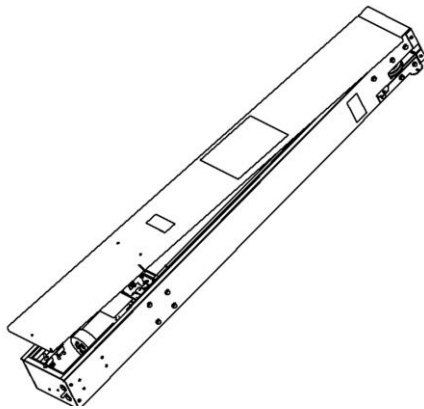
Latch View (Figure 19)

Step 13: Make any necessary adjustments to the inlets and/or the actuation system to ensure that inlets close at the same time and open to the correct width at the desired pressure.

Connection to Actuation System

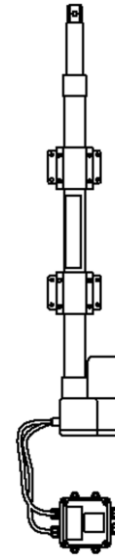
Selecting an Actuation System:

Either the GrowerSELECT curtain machine (HS583E) or the linear actuator (HS667-24) can be used to actuate the ceiling inlet system in conjunction with the winch (DL61737).



HS583E Curtain Machine (Figure 20)

Max Load: 2,000 lbs
Max Speed: 15 RPM
Length: 24"



HS667-24 Linear Actuator (Figure 21)

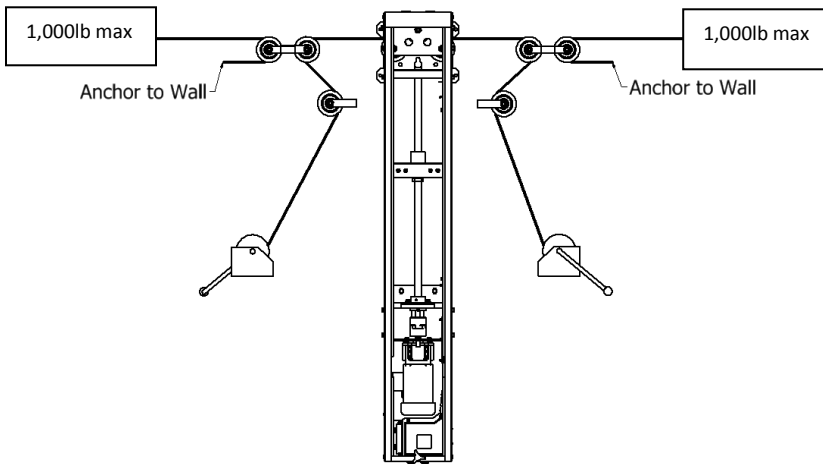
Max Load: 772 lbs
Max Speed: 1/4" per second
Stroke Length: 24"

*Note: The rating is based on HS583E-2415.
Other models can be used and will have a different rating.*

Pulley Systems:

The ceiling inlet and actuation system can be set up to run in a 1:1 or a 2:1 pulley system. The 1:1 configurations allows for shorter open/close times. The 2:1 configuration allows for a greater load capacity. Figures 22 and 23 provide an explanation of both systems.

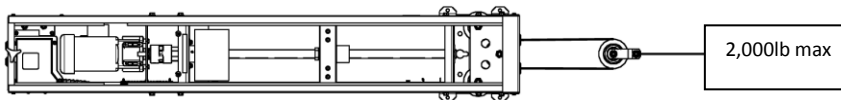
1:1 Ratio (Figure 22)



For each **(1)** inch travel of the machine there is **(1)** inch travel of the Load.

1,000lb max each side = 2,000lb total load.

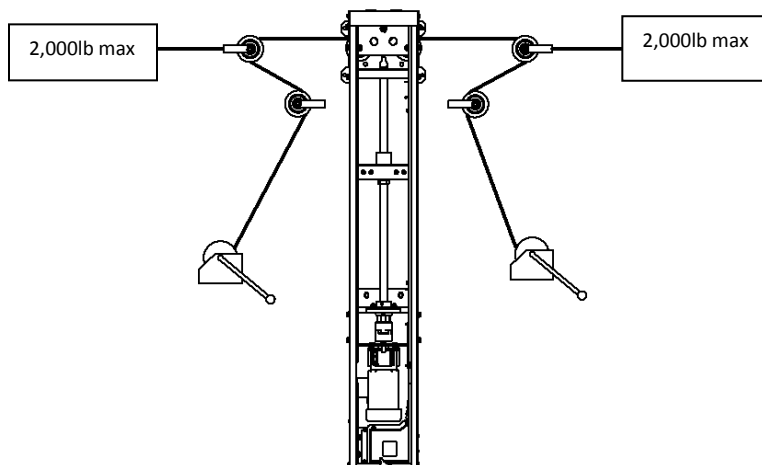
1:1 Ratio Direct Pull (Figure 23)



For each **(1)** inch travel of the machine there is **(1)** inch travel of the Load.

2,000lb one side total load

2:1 Ratio (Figure 24)

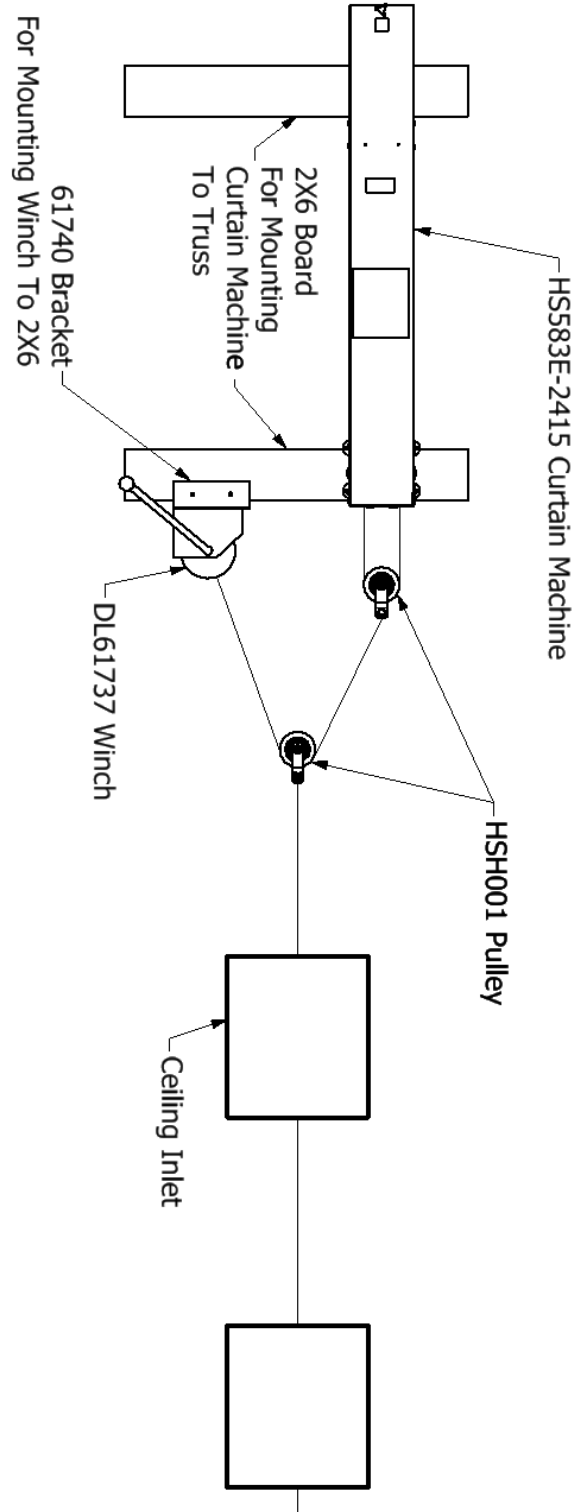


For each **(2)** inch travel of the machine there is **(1)** inch travel of the Load.

2,000 max each side = 4,000lb total load

Placement of Actuation System:

The figure below shows a possible layout of the ceiling inlet actuation system in a barn. The curtain machine (HS583E) and winch (DL61737) are mounted to the ceiling and connected to the inlets in a 2:1 pulley ratio.



Bottom View of Ceiling Inlet Actuation Layout (Figure 25)

Notes

This equipment must be installed in accordance with all State and Local Codes and applicable Regulations which should be followed in all cases. Authorities having jurisdiction should be consulted before installations are made.



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