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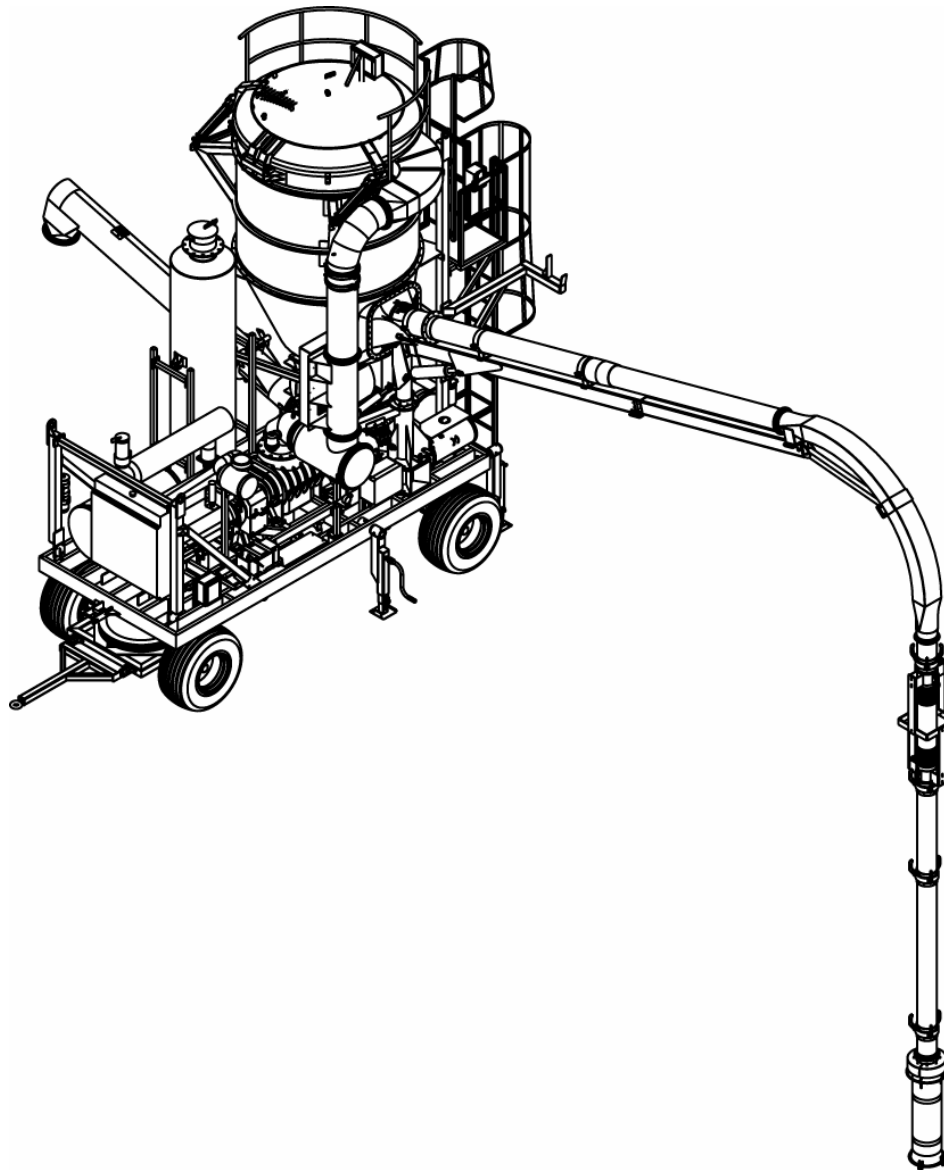
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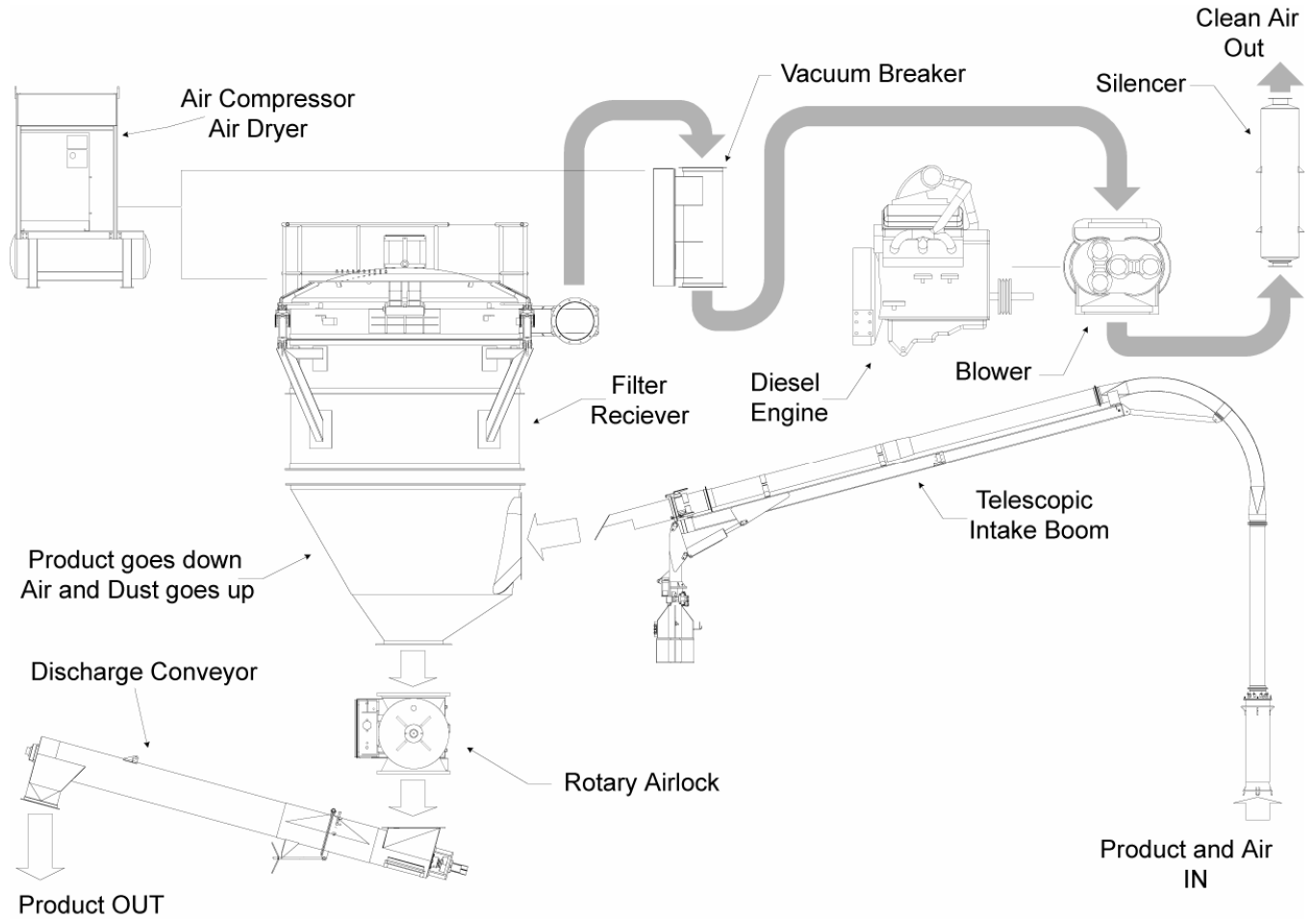
1. GENERAL

SuperPortable ship unloaders are the result of over 35 years of dedicated engineering and product development with continued effort to offer state-of-the-art, reliable and the longest lasting unloader for your application. These modern and unique mobile ship unloading systems are brought to you by Christianson Systems, Inc., the only original manufacturer of pneumatic ship unloaders in the USA.

Within these specifications you will find features and capacities only offered in gantry type unloaders.

SuperPortable ship unloaders are for discharging free-flowing products from ocean going vessels and barges. Three sizes of SuperPortable ship unloaders are available in 200, 250, and 300 metric tons per hour range with various available options. We also manufacture gantry type pneumatic unloaders to your specifications.





1.1. CAPACITY

	Model 200	Model 250	Model 300	Notes
Maximum Capacity (MTPH)	175-200	225-250	275-300	<i>Maximum design capacity. Discharging an uninterrupted supply of free-flowing U.S. No. 2 grade or better wheat.</i>

1.2. MAIN SUCTION - FANLESS™ TECHNOLOGY

A high-efficiency, positive displacement, Roots®-type prime mover with Whispair™ feature for quiet operation creates main suction for the SuperPortable.

**1.3. PERFORMANCE - SUCTION**

15" Hg, continuous-duty capability with virtually constant airflow provides maximum suction power while discharging the lower half of the vessel.

1.4. WEIGHT (APPROXIMATE)

	Model 200	Model 250	Model 300	Notes
Weight (KG)	13.2 T 12 MT	14.3 T 13 MT	15.4 T 14 MT	<i>Without Discharge Conveyor or Discharge Auger.</i>

1.5. DIMENSIONS (APPROXIMATE)

	Model 200	Model 250	Model 300	Notes
Length (cm)	635	652	652	<i>Approximate. Subject to final design.</i>
Width (cm)	240	274	274	
Height (cm)	635	700	700	

1.6. DIESEL POWER (SEE FIGURE 1.7)

The Caterpillar diesel engine powers the Main Suction and Hydraulic Systems. The Caterpillar diesel engine comes complete with city critical exhaust muffler, high ambient radiator, and enclosed instrument panel.

	Model 200	Model 250	Model 300	Notes
Power (HP/kW)	230/ 171.6	280/ 209.0	330/ 246.3	<i>Approximate. Subject to final design.</i>

1.6.1. Fuel Tank/System (Optional – See Figure 1.7.1)

454 liter (120 gallon), painted steel fuel tank with mounting system, plumbing and water separator system.



Figure 1.7

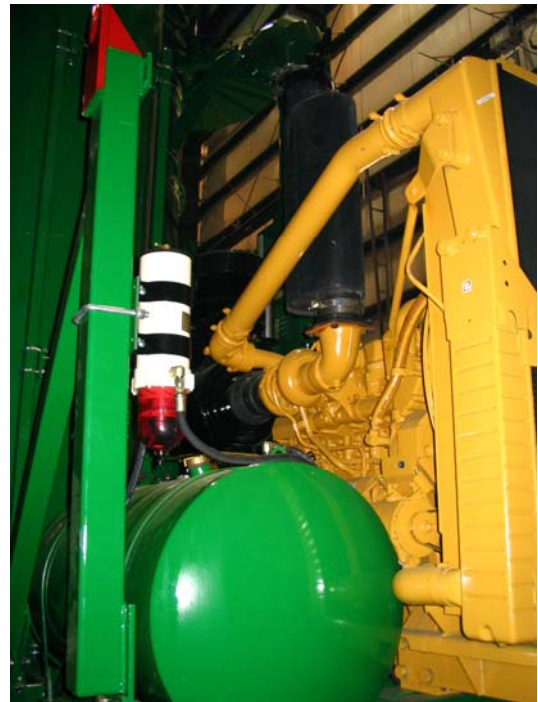


Figure 1.7.1

2. STRUCTURAL

2.1. CHASSIS

Heavy-duty chassis features front turn-table steering, pneumatic tires, and intake boom stabilizers. Turn-table steering allows for easy turning and positioning of the SuperPortable. (See Figures 2.1.1, 2.1.2, and 2.1.3)



Figure 2.1.1



Figure 2.1.2



Figure 2.1.3

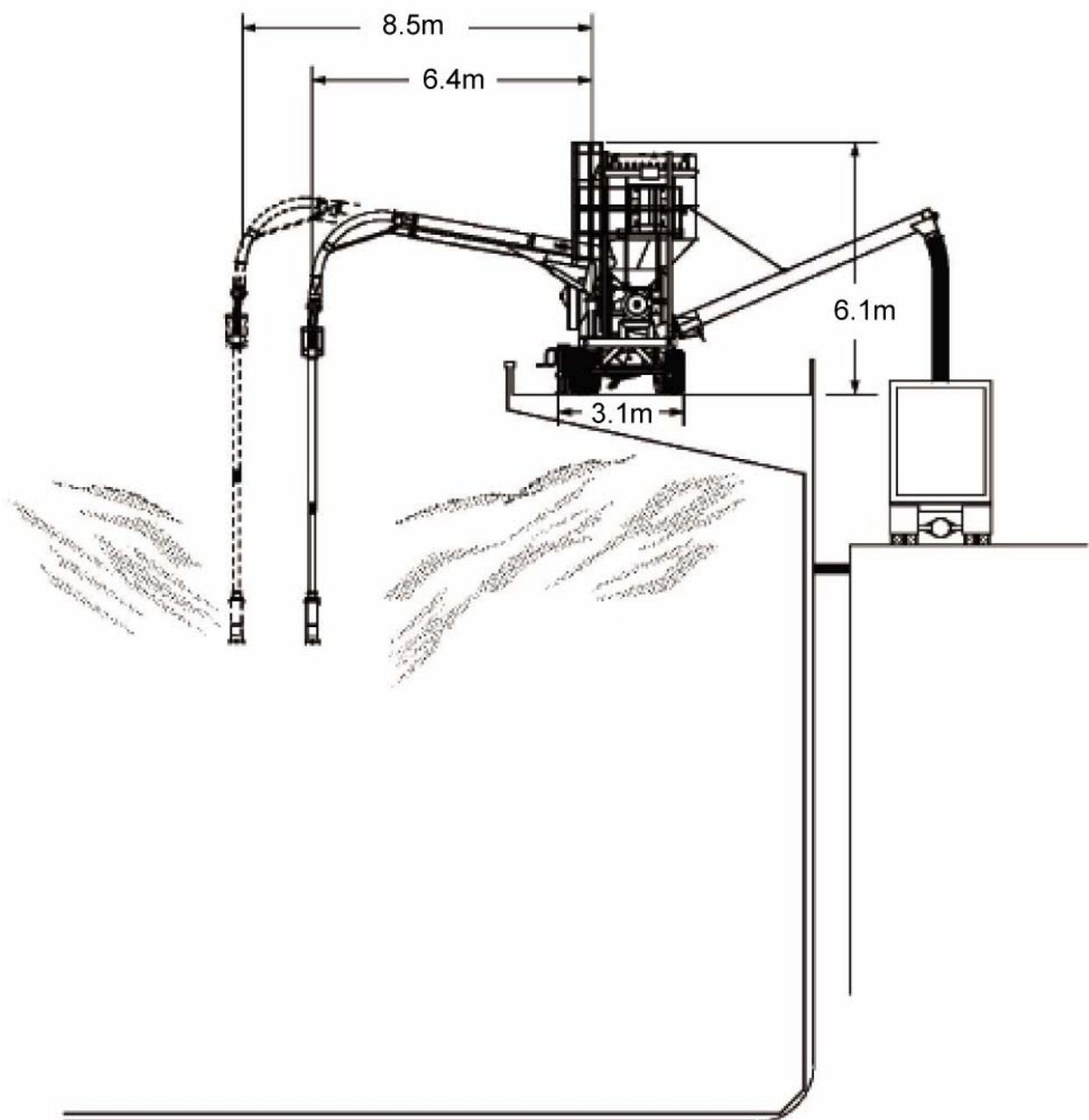
2.2. INTAKE BOOM

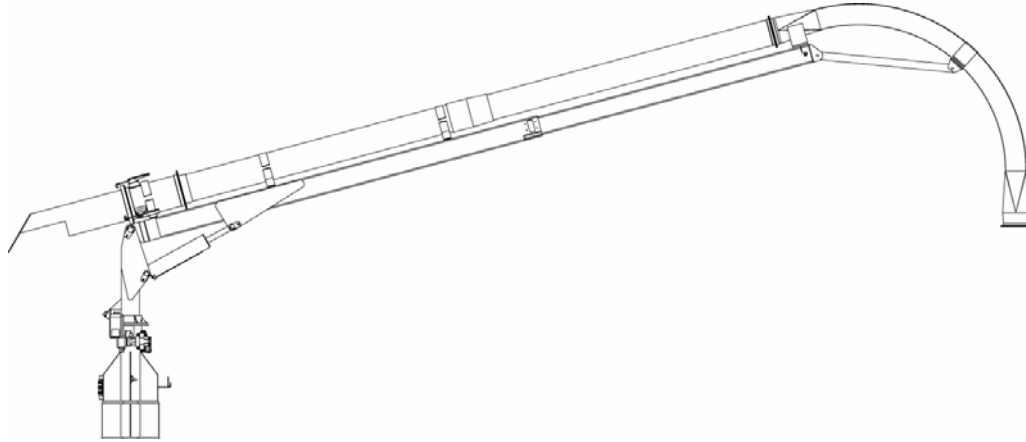
Rectangular tube design. The Intake Boom is constructed of high-strength steel members in a telescopic arrangement.

Includes six (6)-direction, electro-hydraulic remote control with pendant operation.

Integral safety valve for protection in the event of hydraulic line failure.

Exclusive pivot design allows the boom to be folded back into storage position for ease of transportation and storage.





2.2.1. Luffing

Boom Luffing Range: -15° to $+40^{\circ}$

One (1), high-capacity hydraulic cylinder raises and lowers the boom.

2.2.2. Slewing

Boom Slewing Range: -30° to $+30^{\circ}$

2.2.3. Length

Maximum Extension at 0° : 8.5 meters (28.1 feet)

Minimum Retraction at 0° : 6.4 meters (21.1 feet)

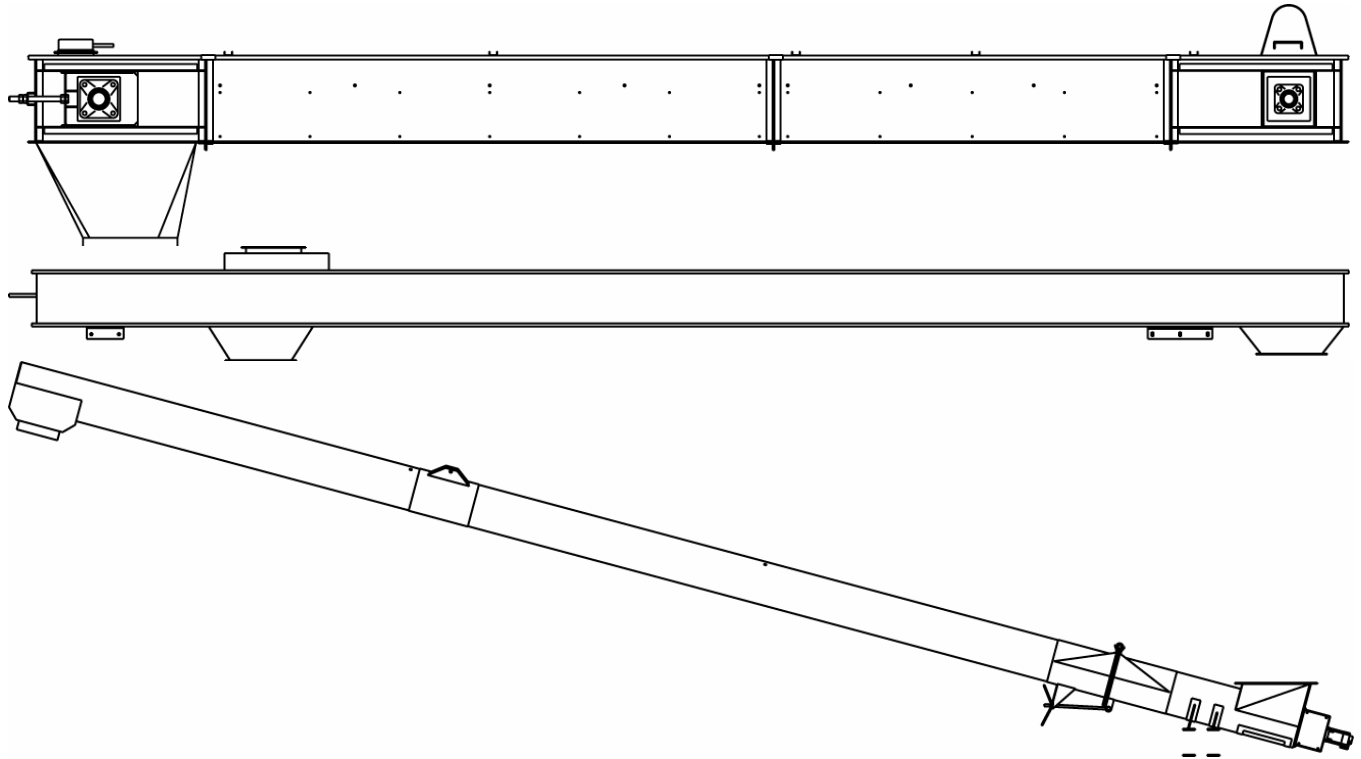
2.2.4. Ten (10) Meter Boom Upgrade (Optional)

Maximum Extension at 0° : 10.0 meters (32.8 feet)

Minimum Retraction at 0° : 7.9 meters (25.9 feet)

2.3. DISCHARGE (OPTIONAL)

Screw type (auger), chain conveyor, or belt conveyor in various lengths available.



Type	Means of Transporting	Length	Available on Models
Integral Discharge Auger	Detachable	9 meters (30 feet)	200, 250, 300
Belt-Type Discharge Conveyor	Detachable	9 meters (30 feet)	200, 250, 300
Chain-Type Discharge Conveyor	Detachable	9 meters (30 feet)	200, 250, 300
Integral Folding Discharge Auger	Fold Up	12 meters (40 feet)	200

Optional lengths
Available

2.3.1. Drive

Hydraulically driven.

3. PNEUMATIC SYSTEM

3.1. INTAKE NOZZLE (Part of Piping Package)

Exclusive Intake Nozzle is designed to optimize conveying efficiency. The Intake Nozzle is constructed of heavy steel to withstand normal wear and abuse that may occur during final Bobcat cleaning.

3.1.1. Remote Control Intake Nozzle (Optional)

Maximum ship discharging capacity of the SuperPortable is achieved by maintaining the proper suction level at the nozzle.

The optional Remote Control Intake Nozzle features an adjustment mechanism operated via the control pendant to maintain optimum conveying rates.

A digital readout located on the pendant provides the operator with system suction levels.

3.2. VERTICAL PIPE (Part of Piping Package)

The Vertical Pipe consists of sections of straight pipe with gasketed connections.

3.3. VERTICAL JOINT (Part of Piping Package)

The Vertical Joint is made of a heavy-duty flex pipe fitted into a double-pivot support frame to maintain a controlled bend. This Vertical Joint has a galvanized steel exterior, with a heavy-duty stainless-steel interior liner.

3.4. SQUARE BACK INTAKE ELBOW (Part of Piping Package)

The one (1) piece, heavy-duty Square Back Intake Elbow is constructed of abrasion-resistant steel.

3.5. HORIZONTAL TELESCOPING PIPE (Part of Piping Package)

The Horizontal Telescoping Pipe features a two (2)-section, steel construction. The Horizontal Telescoping Pipe is extended and contracted by hydraulic cylinder. Telescoping operation of the pipe is controlled remotely via the Remote Cable Control Pendant.

Telescoping Travel: \cong 2.1 meters (7 feet)

A proprietary seal is fitted between inner and outer telescoping sections to minimize vacuum loss.

3.6. FILTER RECEIVER JOINT

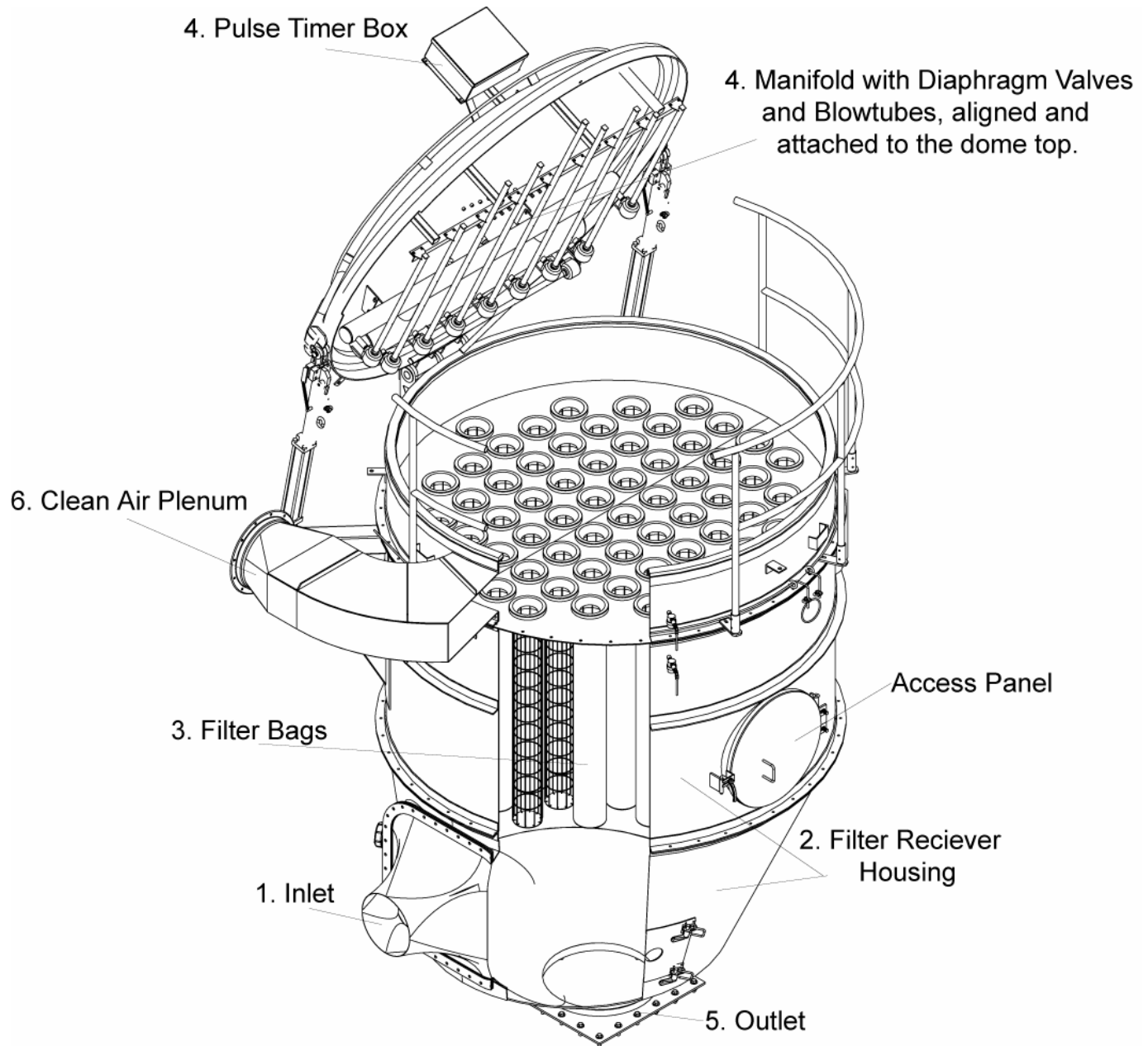
Straight-pipe design with high-vacuum membrane is designed to eliminate the typical grain damage caused in conventional flexible joints.

The Filter Receiver Joint is virtually maintenance-free. The high-vacuum membrane does not come into contact with grain.



3.7. FILTER RECEIVER

Efficient automatic self-cleaning Filter Receiver minimizes airborne dust. A series of timed reverse pulses of compressed air send shock waves through the filter bags to remove the outer layer of dust that drops down and flows out with the grain.



When conveying grain, dust is removed from the vacuum air stream by a series of filter bags located inside the filter receiver. Bags are cleaned automatically with a reverse pulsation of high-pressure air.

1. Dust laden air travels with the material being conveyed as it enters the filter receiver cone inlet.
2. The heaviest dust drops downward with the material and continues through the conveying system.
3. The prime mover pulls the remaining dusty air upward through the filter receiver housing. The dust becomes trapped on the surface of the filter bags.
4. The air compressor charges the manifold. The pulse timer signals the diaphragm valves, which then release the compressed air into the blow-tubes.
5. Compressed air is directed out a series of holes along the bottom of the blow-tubes into filter bag venturi chamber creating shock waves that travel down the bags, shaking the heaviest dust particles off the bags. (The layer of dust will be left on the bags and acts as additional filtration.) These dust particles then drop downward, pass through the airlock, and travel the remainder of the conveying system.
6. The cleaned air is drawn from the filter receiver housing into the clean air plenum and onto the prime mover. The prime mover then exhausts the filtered air into the atmosphere.

3.7.1. Filter Receiver Top

The Filter Receiver Top features an exclusive (patent pending), dome-top design with integral blowpipes and stainless steel air manifold to simplify inspection and maintenance.

Dome top is hinged for easy service access.

3.7.2. Blowpipes and Stainless Steel Compressed Air Manifold

Blowpipes are attached to the interior of the dome top, and consequently, need not be manually removed to service bags and cages.

The Compressed Air Manifold is constructed of stainless steel for longer life and virtually maintenance-free operation.

Since the Blowpipes and Compressed Air Manifold are mounted on the interior of the dome top, corrosion of these components is minimized.

3.7.3. Filter Receiver Housing

The Filter Receiver Housing contains the filter bags and bag cages.

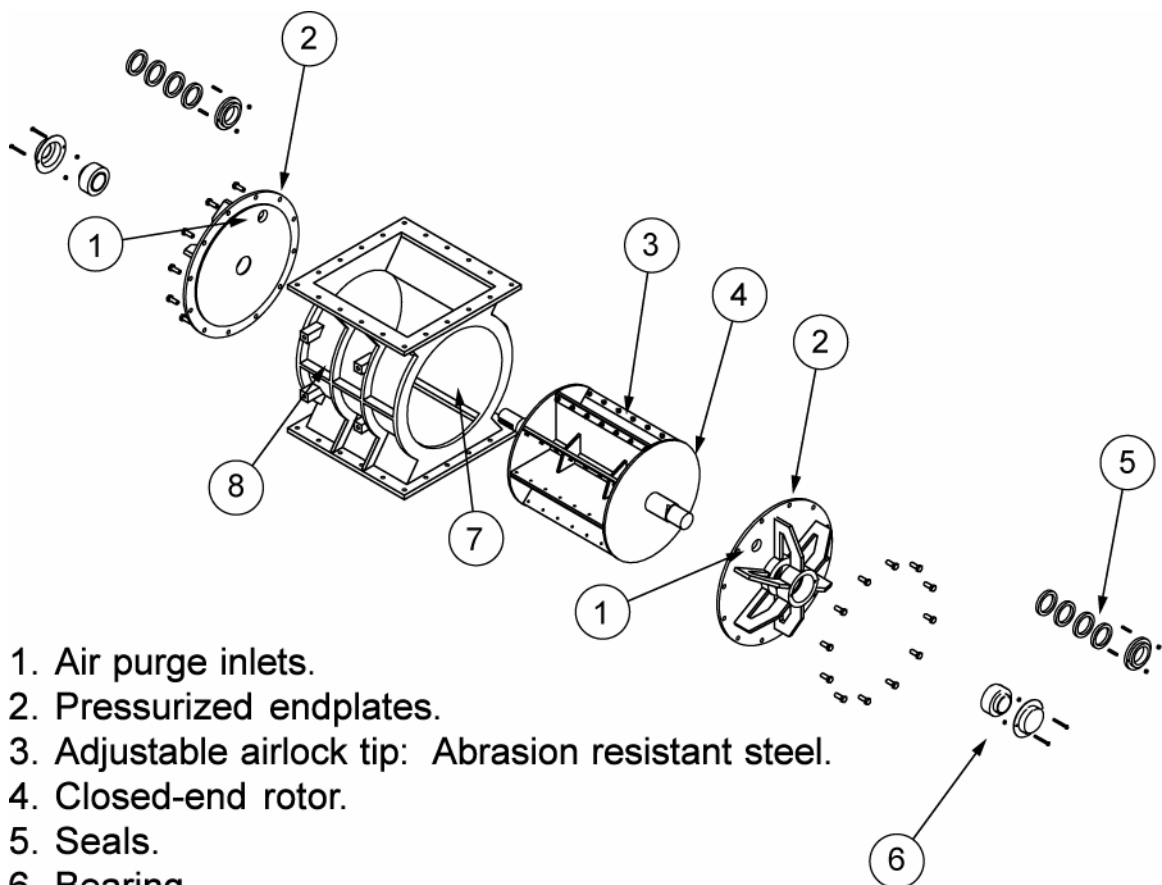
The anti-static polyester filter bags are cleaned by pulsed compressed air at approximately 7 KG/cm² (100 PSI), which is supplied by the optional Portable Compressed Air/Dryer System. Filter bag cages are constructed of galvanized steel for longer life.

3.7.4. Receiving Hopper

The Receiving Hopper is located below the Filter Receiver Housing. Replaceable urethane wear liner is installed where grain first enters the hopper, thus enhancing the service life of the Receiving Hopper.

3.8. ROTARY AIRLOCK

Exclusive Christianson design. Made in U.S.A.



1. Air purge inlets.
2. Pressurized endplates.
3. Adjustable airlock tip: Abrasion resistant steel.
4. Closed-end rotor.
5. Seals.
6. Bearing.
7. Interior walls of airlock housing: Nickel-chrome hardened for extra abrasion resistance.
8. Airlock housing.

3.8.1. Volume

Large volume Rotary Airlock revolves slowly, thus reducing maintenance and enhancing service life. Size varies with each model.



3.8.2. Housing

Heavy-duty, cast iron ribbed design provides maximum strength to the Airlock Housing.

The wall thickness of the Housing is typically 1.9 cm to 2.54 cm (0.75" to 1.0"). The flange thickness is approximately 2.54 cm (1.0").

The Housing interior walls are hardened for superior abrasion resistance.

3.8.3. Rotor

Closed end type.

3.8.4. End Plates

Endplates are constructed of cast iron. Chambers between Rotor and End Plates are pressurized, thus reducing abrasion from grain and feed particles.

3.8.5. Tips

Abrasion resistant steel construction Tips are adjustable to maintain proper tolerances.

3.8.6. Drive

Anti-friction, heavy-duty, spherical roller bearings are mounted outboard to eliminate contamination.

Hydraulic drive with pressure relief controls and field adjustable speed control.

The hydraulic drive enables the Rotary Airlock to be operated in forward, reverse (for clearing obstruction), and neutral positions.

3.8.7. Safety

Obstruction sensor automatically opens the Suction Breaker/Relief Valve should an obstruction stop the Rotary Airlock.

3.9. PRIME MOVER

The heart of the pneumatic system is the positive displacement Prime Mover designed to operate continuously at 15" Hg. The greater energy efficiency of the SuperPortable is due to the mechanical advantages of the Fanless positive displacement Prime Mover.

**FANLESS POSITIVE DISPLACEMENT PRIME MOVER
OPERATING PRINCIPLE**

Inside the Fanless Prime Mover, two figure-eight-type impellers are mounted on parallel shafts and rotate in opposite directions.

As each impeller lobe passes by the Prime Mover inlet, it traps a positive volume of air and carries it around the casing to the Prime Mover outlet.

This cycle repeats four times for every complete revolution the drive shaft, creating powerful vacuum at the Prime Mover inlet and pressure at the Prime Mover outlet.

The positive displacement Prime Mover delivers up to twice vacuum and pressure of conventional turbo multi-fan blowers. A much higher volume of grain is conveyed with less air, giving greater efficiency while minimizing grain damage.

The Fanless Prime Mover features front and rear oil reservoirs for the best lubrication. Hardened gears, heavy-duty seals and bearings provide long life, high performance efficiency and low maintenance.



of

the

3.9.1. Casing

One (1) piece, close-grained cast iron construction with separate head plates. The casing is suitably ribbed to prevent distortion under the most severe operating conditions and incorporates the Whispair feature for reduced pulsation, noise, and horsepower levels.

3.9.2. Impellers

The impellers are made from ductile iron with a tensile strength of 60,000 PSI. They are statically and dynamically balanced.

3.9.3. Shafts

The prime mover shafts are alloy steel forgings, flange connected to the impeller body with high-tensile socket head cap screws. Labyrinth seals are machined into the shafts to minimize air leakage.

3.9.4. Seal Sleeves

Seal sleeves are used under each lip seal to prevent shaft wear. The sleeves are made of hard-chromed, 300 series stainless steel with a hardness of 60 Rc.

3.9.5. Timing Gears

The impellers are timed by a pair of machine-forged steel gears that operate in an oil bath. The wide-faced spur gears are manufactured to AGMA standards, and are carburized and ground with a hardness of 58-60 Rc. The gears are secured to the shafts with a taper locking device providing an easily adjustable and releasable mechanical shrink fit.

3.9.6. Bearings

The impeller/shaft assemblies are supported at each end by double-row, spherical roller bearings designed for long life.

3.9.7. Lubrication

The bearings and gears are lubricated by a splash lubrication system integral to the prime mover unit.

3.10. PRIME MOVER DRIVE

Direct Prime Mover Drive delivers power from the diesel engine to the Prime Mover via a flexible coupling, thus eliminating the maintenance of belts, shafts, and associated bearings.

3.11. SUCTION BREAKER/RELIEF VALVE

The SuperPortable is equipped with a combination Suction Breaker/Relief Valve, which is located between the Filter Receiver and the Prime Mover. The Suction Breaker/Relief Valve automatically opens during the starting of the Prime Mover Motor.

The Suction Breaker/Relief Valve can be actuated from the Remote Cable Control Pendant control to immediately interrupt the conveying of material.

3.12. SAFETY FILTER

A backup Safety Filter located between the Filter Receiver and the inlet of the Prime Mover protects the Prime Mover from damage in the event of filter bag breakage.

3.13. PORTABLE COMPRESSED AIR SYSTEM (OPTIONAL)

A continuous supply of clean, dry, compressed air is required to clean the filter bags in the Filter Receiver. Minimum supply is 37 cfm (cubic feet per minute) at 100 psi (pounds per square inch) with an 80 g (gallon) tank.

The Portable Compressed Air/Dryer System consists of a reciprocating-type air compressor that is normally powered by outside electric power supply.

Complete system including air compressor, air dryer, air storage tank and required controls are part of this option.

Note: Clean, dry compressed air is required for operation of the SuperPortable.



3.14. HYDRAULIC SYSTEM

The self-contained Hydraulic System powers the Intake Boom, Rotary Airlock, Compressed Air System and Integral Folding Discharge Auger or Belt- or Chain-Type Discharge Conveyor. Powered by the Diesel Engine.

4. ELECTRICAL

4.1. CONTROL PANEL

The Control Panel consists of inputs from the Diesel Engine, Remote Cable Control Pendant, and other switches/sensors as required. Gauges and switches in this control panel are enclosed in a dust tight enclosure.

Includes:

Key Ignition Switch
Amp Gauge
Tachometer
Hour Meter
Safety Shutdown Switch for High Temperature and Low Oil Pressure

4.1.1. Remote Cable Control Pendant

Functions:

Boom Luffing:	Raise, Lower
Boom Slewing:	Left, Right
Horizontal Telescoping:	Extend, Retract
Suction Breaker/Relief Valve:	Open, Close

4.2. POWER

Electrical power from an outside generator or other source is required for optional Portable Compressed Air/Dryer System.

5. MISCELLANEOUS

5.1. LIFTING HARNESS ASSEMBLY

The Lifting Harness Assembly allows for the secure lifting of the SuperPortable to and from the ship's deck. The assembly includes a four (4)-point lifting structure, which is incorporated into the design of the chassis.

5.1.1. Wire Rope Sling

The Wire Rope Sling is specially made to match the four (4)-point lifting structure on the SuperPortable for balanced lifts.

5.2. PIPING PACKAGE (OPTIONAL)

The Piping Package includes a set of intake pipe suitable for discharging a vertical suction distance of up to 12 meters (40 feet).

5.3. SPARE PARTS BUDGET (OPTIONAL)

A Spare Parts Budget is suggested to provide a good selection of spares that may be required in a commercial discharging application.

5.4. TOOL SET (OPTIONAL)

A set of tools and toolbox are available to carry out routine maintenance on the SuperPortable.

5.5. STORAGE CHEST (OPTIONAL)

Painted steel construction for storage of tools, grease gun, etc. fitted to the chassis of the SuperPortable.

5.6. SHOP PAINTING

Surfaces are cleaned and prepared in accordance with SSPC-SP-6, Commercial Blast Cleaning.

After proper preparation, surfaces are primed and painted for salt air conditions per Christianson paint quality standards.

5.7. ELECTRICAL STANDARDS

National Electric Safety Code is followed where appropriate.