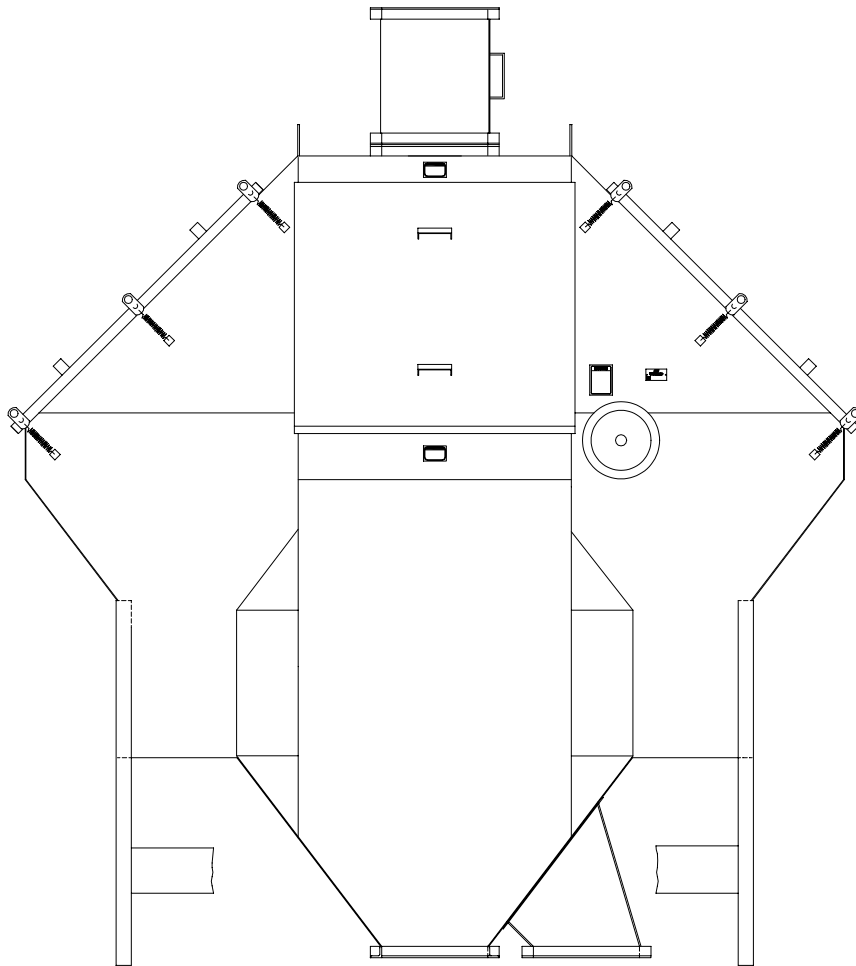




Gravity Screener Manual

Safety
Installation
Operation
Maintenance



Model Number: _____

Serial Number: _____

Date Installed: _____

PC522143-B (3/8/99)

I. General Safety Information

SAFETY FIRST! The symbols shown above are examples of the safety labels and signs to be found on Intersystems equipment. They are affixed to the equipment to warn of danger to persons and of possible equipment damage. THESE SIGNS MUST NEVER BE REMOVED, TAMPERED WITH, PAINTED OVER OR OBSCURED IN ANY WAY.(See Page 4 and 5 for label locations). If labels are damaged or become unreadable, replacement labels are available from Intersystems. User must institute a continuing program to instruct all personnel in safe operating and maintenance procedures and to insure that all safety devices, guards, and covers are intact and operable and that all safety signs are legible.

NEVER PERFORM ANY SERVICE ON THIS SCREENER OR ANY OTHER POWERED EQUIPMENT UNTIL ALL POWER HAS BEEN SHUTOFF AND LOCKED OUT SO THAT IT CANNOT BE RESTORED WITHOUT THE CONSENT AND KNOWLEDGE OF THE PERSON WHO INTERRUPTED POWER. Power includes electrical, fluid, pneumatic, mechanical (cable, belt, chain, shaft, etc.), or gravity where the load or part of the equipment is suspended.

FAILURE TO OBSERVE ALL SAFETY PRECAUTIONS, INCLUDING THOSE DICTATED BY ORDINARY COMMON SENSE, CAN RESULT IN DEATH OR SERIOUS INJURY TO PERSONNEL, LOSS OF PRODUCT, AND DAMAGE OR DESTRUCTION OF THE EQUIPMENT!

NOTE: THESE SIGNS MUST NEVER BE REMOVED, TAMPERED WITH, PAINTED OVER, OR OBSCURED IN ANY WAY. IF LABELS ARE DAMAGED OR BECOME UNREADABLE, REPLACEMENT LABELS ARE AVAILABLE FROM INTERSYSTEMS.

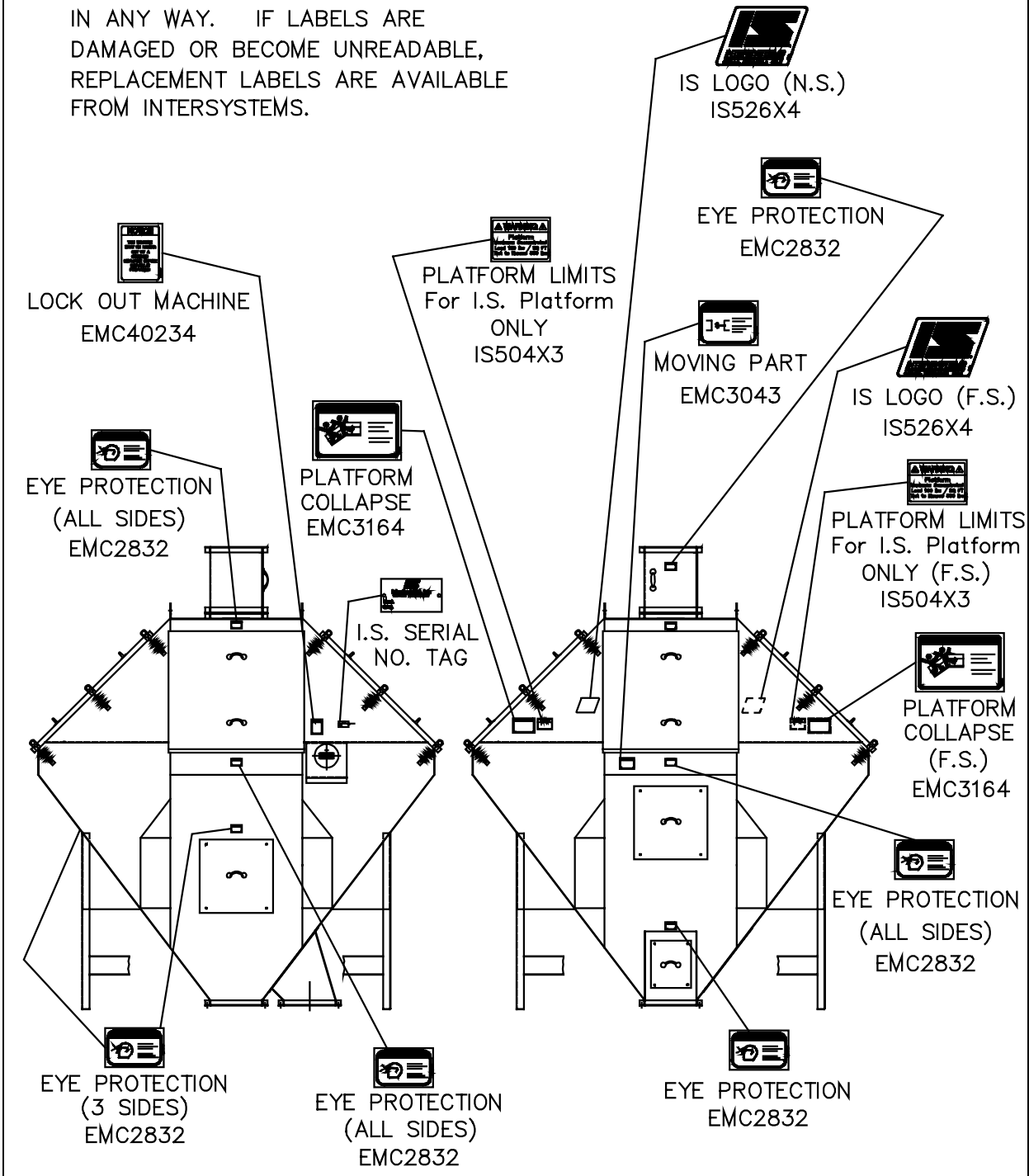


Figure 1-1, Safety Label Locations, Screener Models PC-1500 - PC-11500

NOTE: THESE SIGNS MUST NEVER BE REMOVED, TAMPERED WITH, PAINTED OVER, OR OBSCURED IN ANY WAY. IF LABELS ARE DAMAGED OR BECOME UNREADABLE, REPLACEMENT LABELS ARE AVAILABLE FROM INTERSYSTEMS.

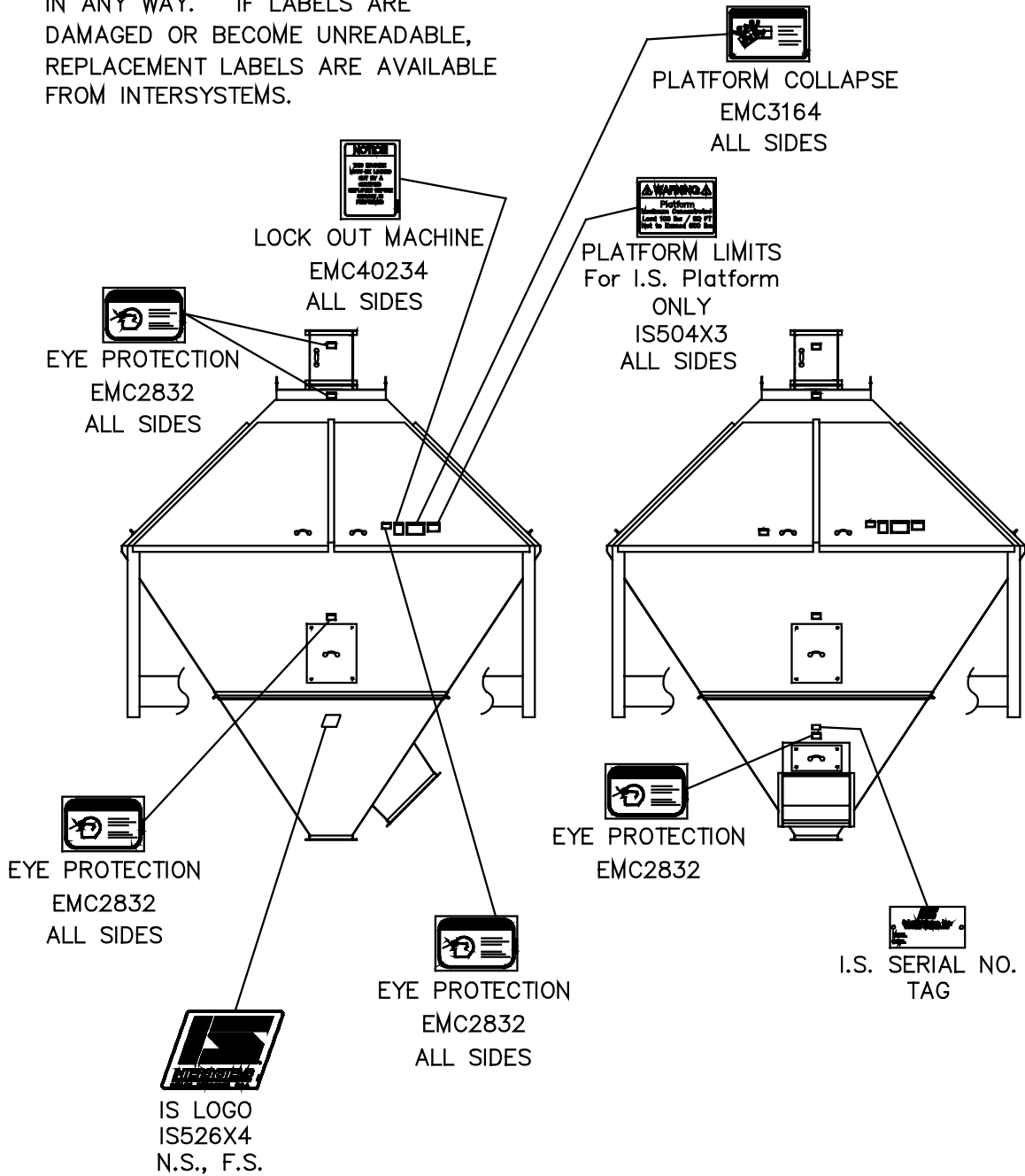


Figure 1-2, Safety Label Locations, Screener Models PC-16000 - PC-30000

II. General Information

2.1 Description

Intersystems Gravity Screeners are simple, efficient devices in which material flows over a sloped set of screens in order to separate smaller particles dust, fines, broken and other foreign material from the stream. As shown in **Figure 2-1A**, material to be cleaned (screened) is admitted through the top of a screener, and flows over upper and lower banks of screens where foreign material (F/M) is separated. Cleaned material (C/M) and F/M are discharged from the bottom of the screener through separate outlets.

The upper flow belts evenly distribute the material over the full width of all four screening areas as well as reduce excess dust from entering these areas during full bypass. The lower screen flaps are used to reduce dust and other airborne material from entering the screen areas from below. The vertically adjustable diverter paddles can be easily raised or lowered to regulate the depth of material that flows over the screens on each of the four sides of the screener. Screener Models PC-1500 through PC-11500 the diverter paddles are white UHMW (tephlone). . Screener Models PC-16000 through PC-30000 the diverter paddles are a combination of steel tabs and blue urethane.

An internal bypass gate (if so equipped) allows continuous and infinitely variable control of the percentage of material which is to be cleaned and the percentage to be bypassed (without being cleaned) to achieve the required quality level.

Figure 2-1A illustrates maximum cleaning possible with the bypass gate completely closed, while **Figure 2-1B** shows full by-passing of the material. **Figure 2-1C** illustrates infinitely variable or proportional cleaning by regulating the amount of by-passed material through the internal by-pass gate.

Screener Models PC-1500 through PC-11500, **Figure 1-1**, are shipped completely assembled except for the inlet tube. Models PC-16000, PC-22000, and PC-30000, **Figure 1-2**, are shipped in three sections: the upper main body with shipping stand, the lower discharge outlet section, and the inlet tube.

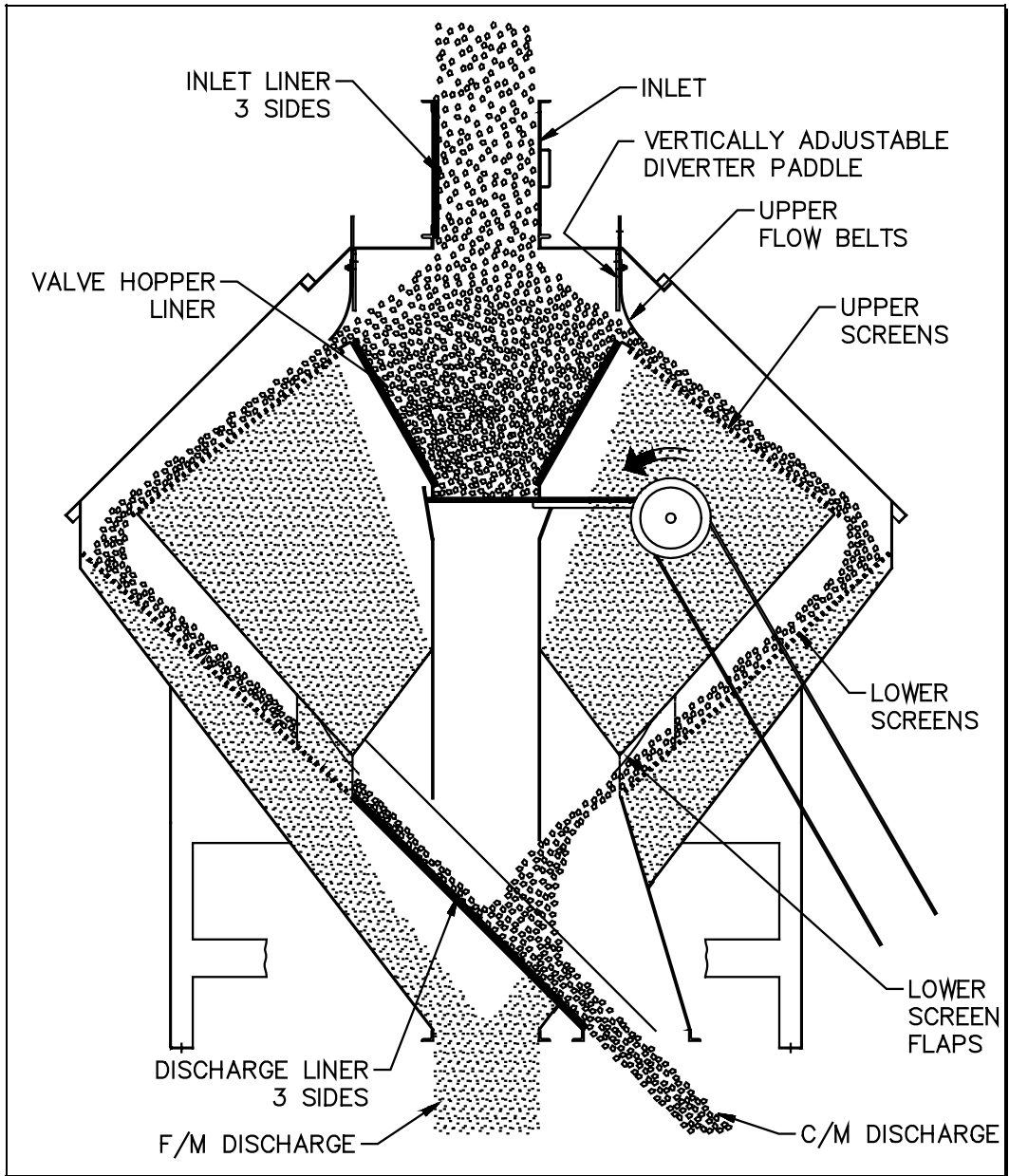


Figure 2-1A, Cleaning Position

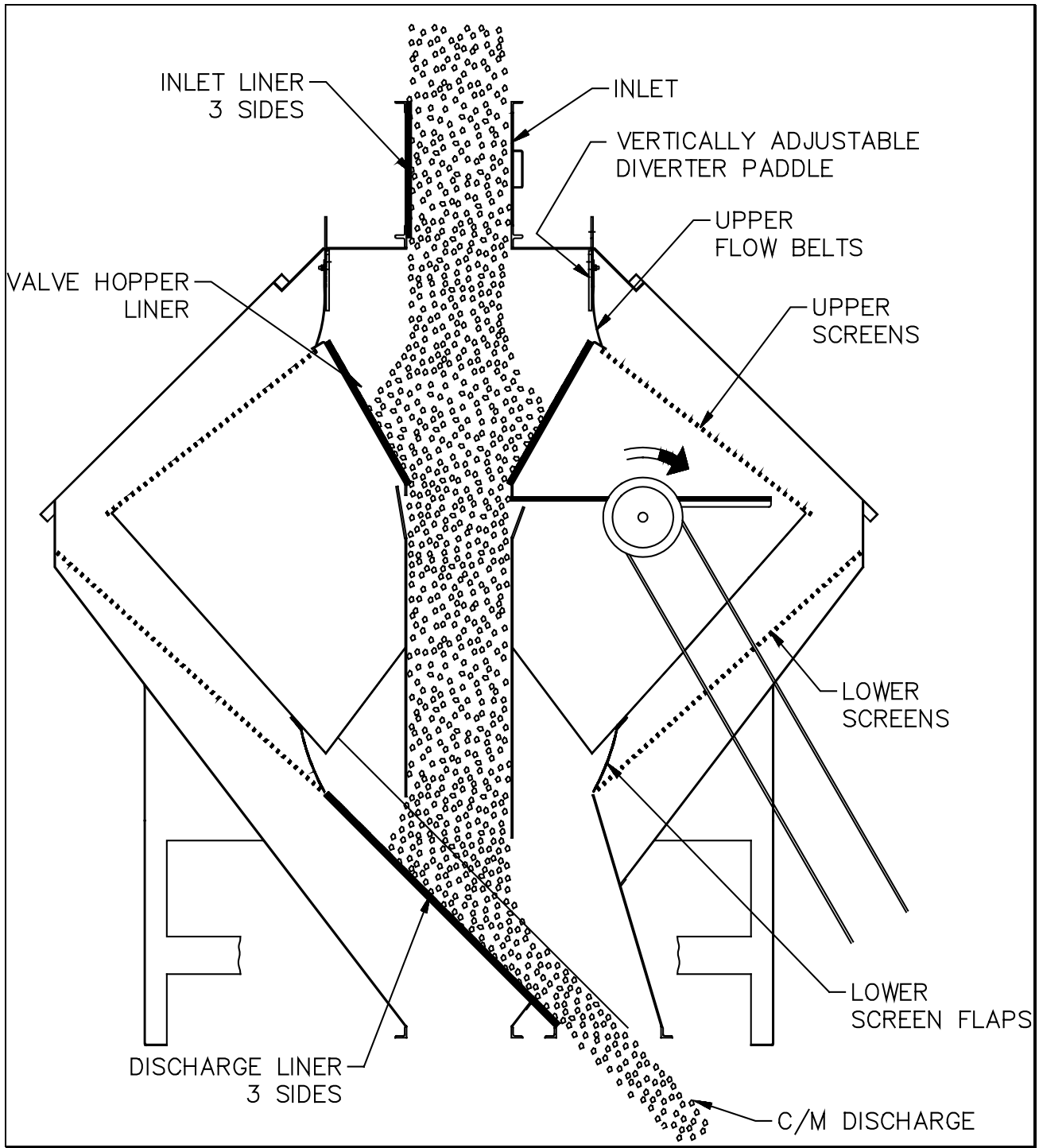


Figure 2-1B, By-Pass Position

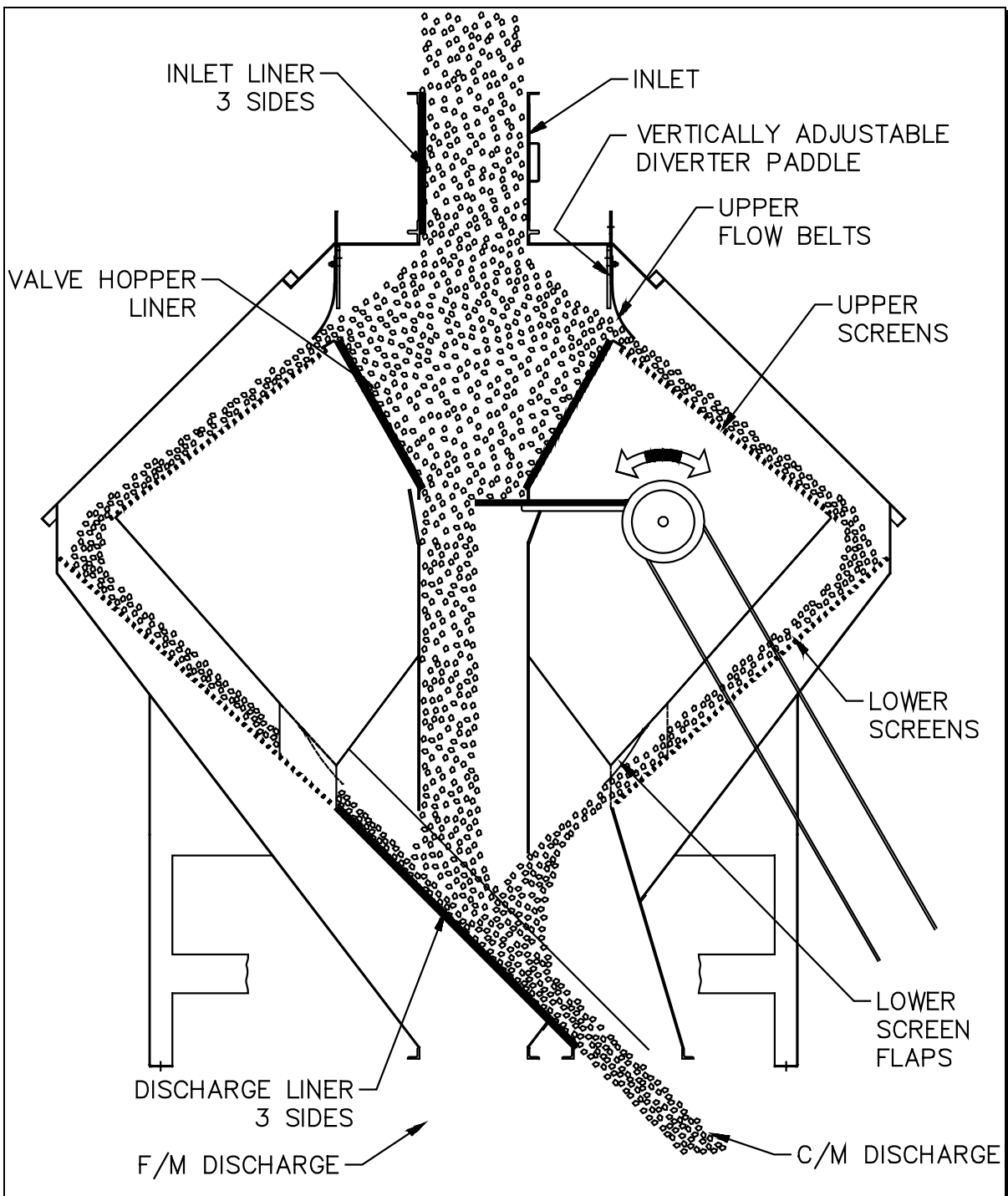


Figure 2-1C, Proportioning Position Infinitely Variable

2.2 Screener Capacities

The model number (PC-) of each screener indicates its MOST EFFICIENT cleaning capacity in BPH. The maximum throughput of a screener is higher but with the penalty of less effective cleaning action.

Contrary to popular belief, a screener DOES NOT do a better job of cleaning grain if operated well below its rated capacity; just the opposite is true. As the BPH rate actually being cleaned falls below the rated capacity, particularly when it falls below 80%, the velocity of the grain over the screens increases. There are a number of undesirable effects:

- A. Grain is damaged due to the velocity at which kernels strike the screens and other internal surfaces.
- B. Air stream velocity in the screener increases, suspending more F/M, less cleaning occurs.
- C. Internal screener wear is accelerated due to high velocity grain impact.
- D. Screen blinding increases as large particles are forcibly driven into the screen mesh.
- E. Elevated work area noise level.

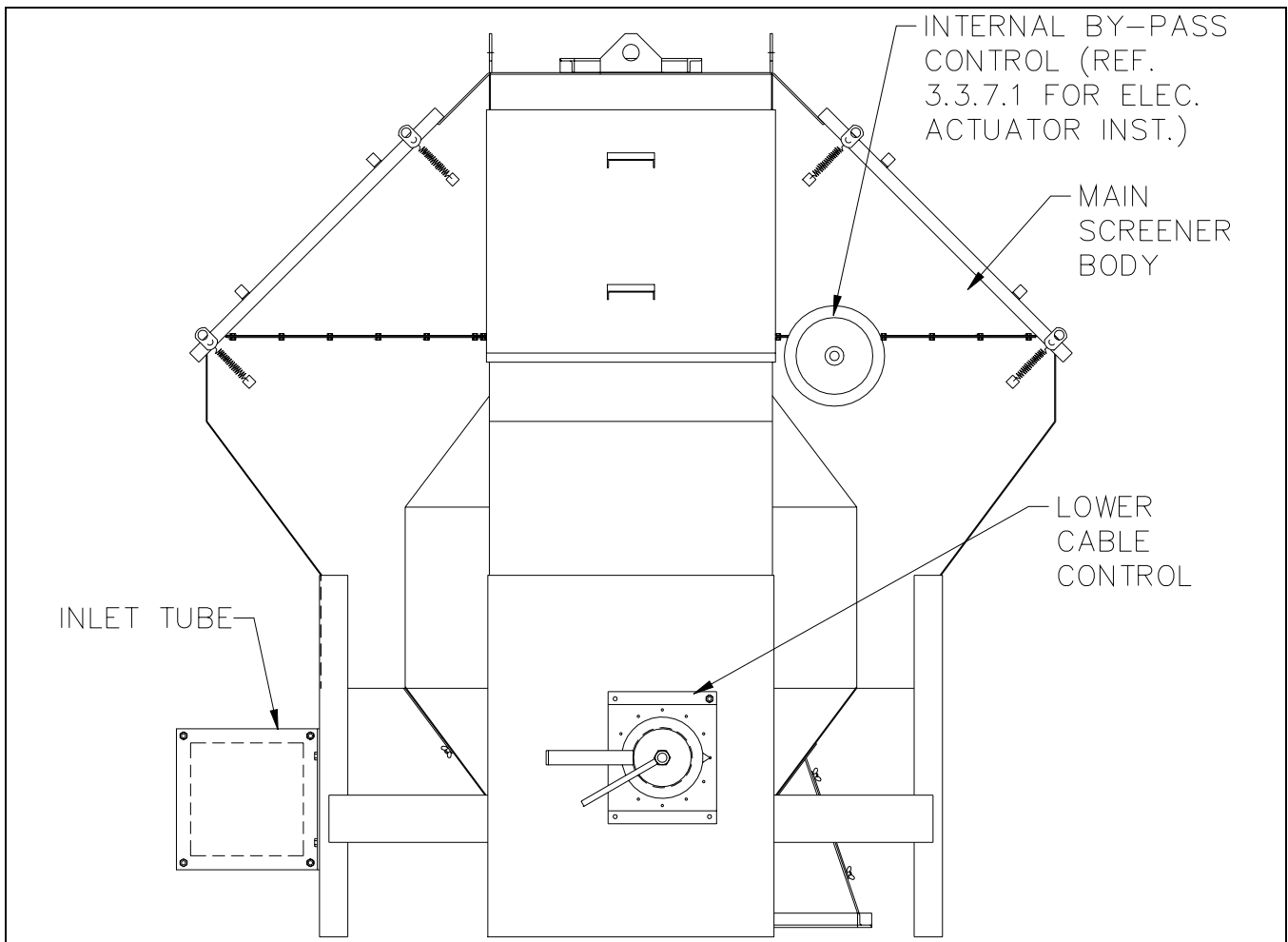


Figure 2-2 Screener Models PC-1500-PC-11500 As Shipped

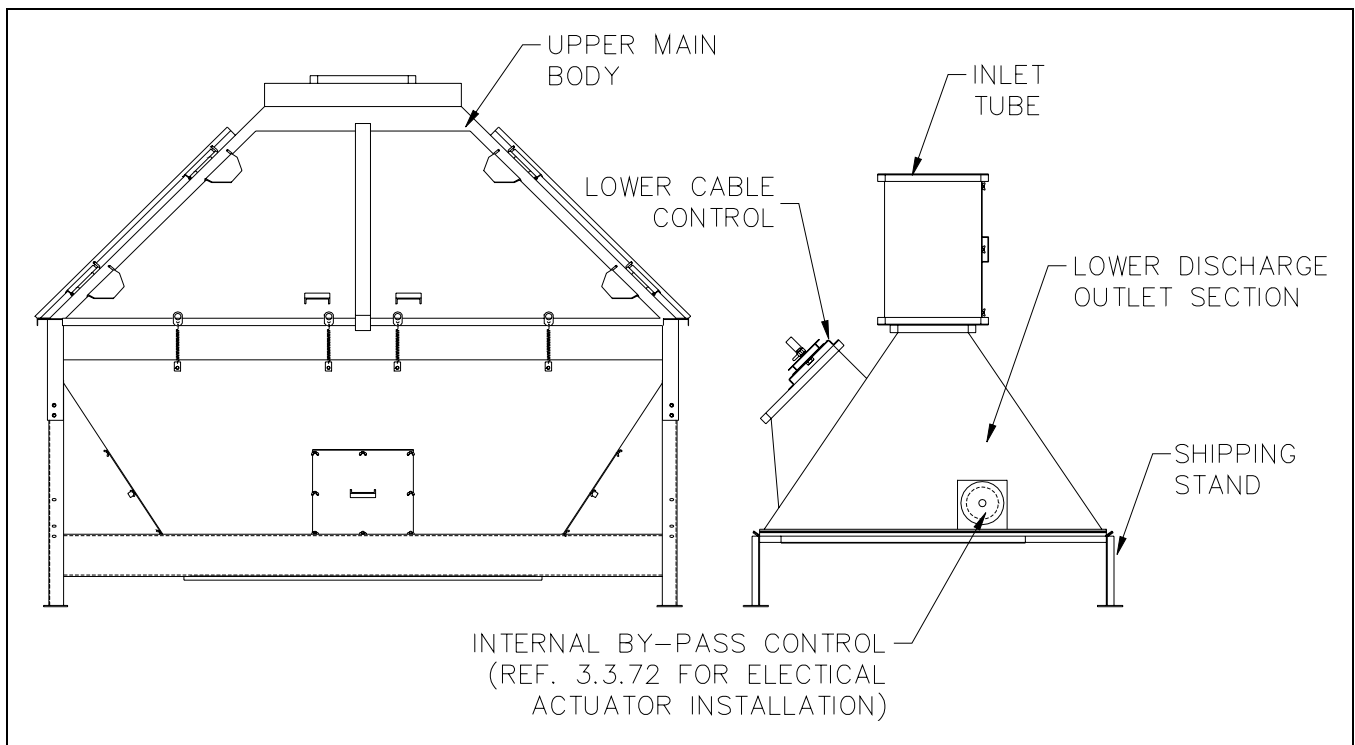


Figure 2-3, Screener Models PC-16000, PC-22000, PC-30000 As Shipped

2.3 Screener Screens Available

Refer to Subsection 6.2, Replacement or Substitute Screens.

2.4 Automatic Bypass Control

All screeners can be supplied with an electric rotary actuator to permit automatic operation of the proportioning gate which controls the percentage of material bypassing the screens between 0% and 100%. An actuator can also be retrofitted to an existing screener. Refer to Paragraph 3.3.7.

III. Installation & Startup

3.1 Receiving Inspection

Carefully inspect the shipment comprising the screener for damage as soon as it is received. Also verify that the quantity of parts or packages actually received corresponds to the quantity shown on the packing slip. If a screener is ordered with extra screens, they will be placed inside the screener, on top of the installed screens. **THE EXTRA SCREENS MUST BE REMOVED BEFORE CLEANING IS STARTED, OTHERWISE LITTLE OR NO CLEANING WILL RESULT.** Report any damage or shortage to the delivering carrier as soon as possible. InterSystems responsibility for damage to the equipment ended with acceptance by the delivering carrier. Refer to the bill of lading. Save all paperwork and all documentation furnished with the screener and its components.



3.2 Pre-Installation Preparation

Before starting screener installation, study this manual, the certified drawing(s) furnished with the screener, and other applicable documents, including but not limited to, OSHA Regulations; the National Electrical Code; and all other applicable federal, state, and local codes and regulations. Unless circumstances dictate otherwise, plan to assemble the optional service platform, if furnished, to the screener **BEFORE** hoisting the screener into position. Refer to Subsection 3.3.5.

3.3 Type of Supporting Structure

Screeners are most often installed immediately below a bucket elevator discharge. Elevators **ARE NOT** designed and **MUST NOT** be used to support the weight of **ANY OTHER** equipment. Consult the elevator manufacturer to determine if their equipment will **SAFELY** support the screener's weight.

The lift eyes welded to each screener **ARE** intended to be used to hoist **ONLY** the screener and I-S built platform into position for installation.

 **DANGER** 

HOISTING A SCREENER WITH ANY OTHER EQUIPMENT OR STRUCTURES ATTACHED WILL CAUSE THE LIFTING BRACKETS TO BREAK OFF, DROPPING THE EQUIPMENT. DEATH OR SERIOUS INJURY CAN RESULT. LIFTING BRACKETS ARE INTENDED TO LIFT **ONLY** THE SCREENER AND INTERSYSTEMS' SUPPLIED PLATFORM.

3.3.1 Screener Support

An Intersystems Screener, Model PC-1500 through PC-11500, is designed to be installed so the weight of the unit bears vertically downward on the factory-welded support frame. The support frame also is the support and attachment point for an optional service platform, if ordered. See **Figure 3-1A** and **3-1B**.

The larger screeners, Models PC-16000, PC-22000, and PC-30000 are shipped in three sections: (See Figure 2-3)

- A. The main structure., resting upon a shipping stand. The stand can be unfastened from the support frame uprights or it can be used as the permanent support when installed.

- B. The lower section including the discharge outlets and the intermediate shaft assembly.
- C. The inlet tube

As with the smaller models, the weight of the screener must bear vertically downward on the support frame as shown in **Figure 3-1A** and **3-1B**.

When assembling a Model PC-16000, PC-22000, or PC-30000 Screener, Intersystems recommends applying a continuous bead of caulking along the joint of the upper and lower sections as shown in **Figure 3-2**.

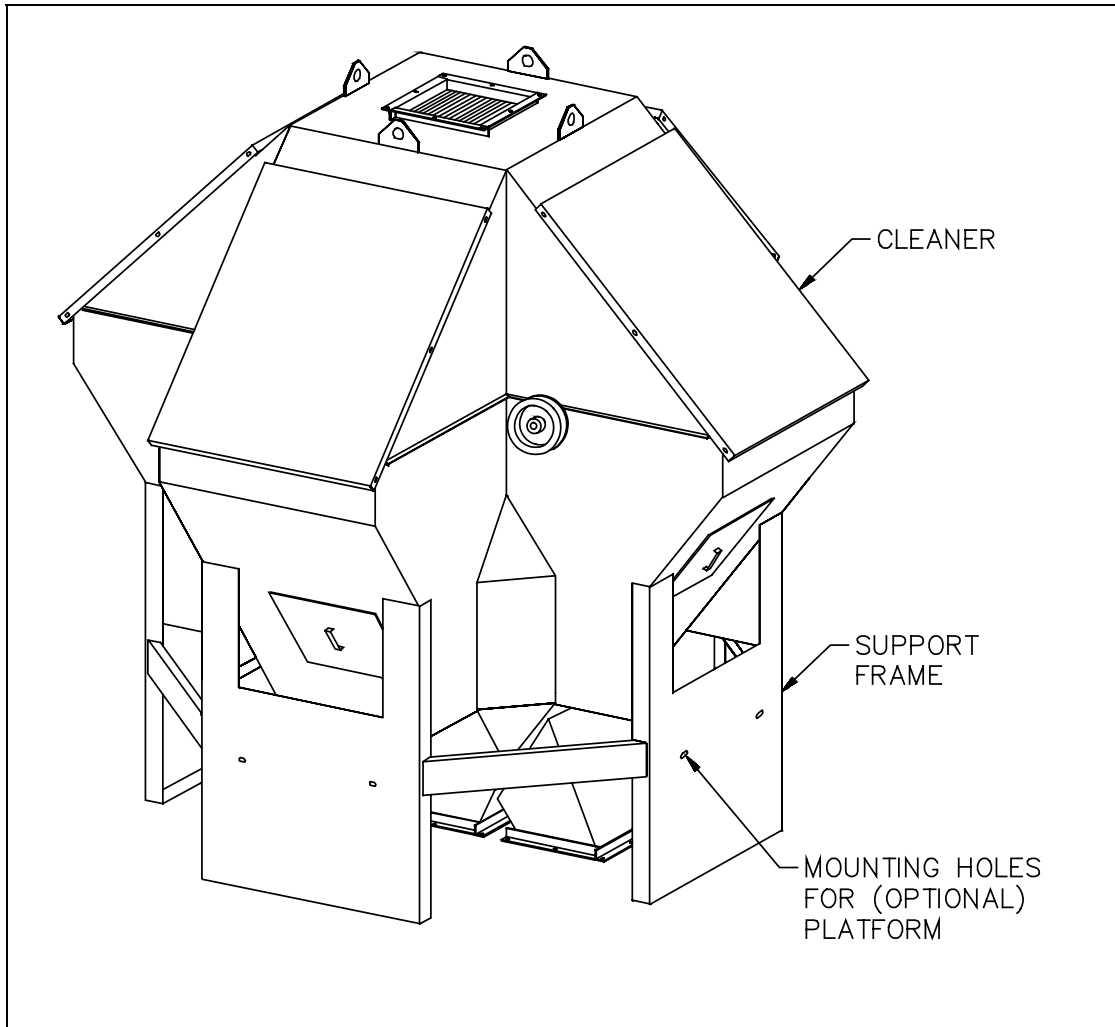


Figure 3-1A, Screener Support, Models PC-1500-PC-11500

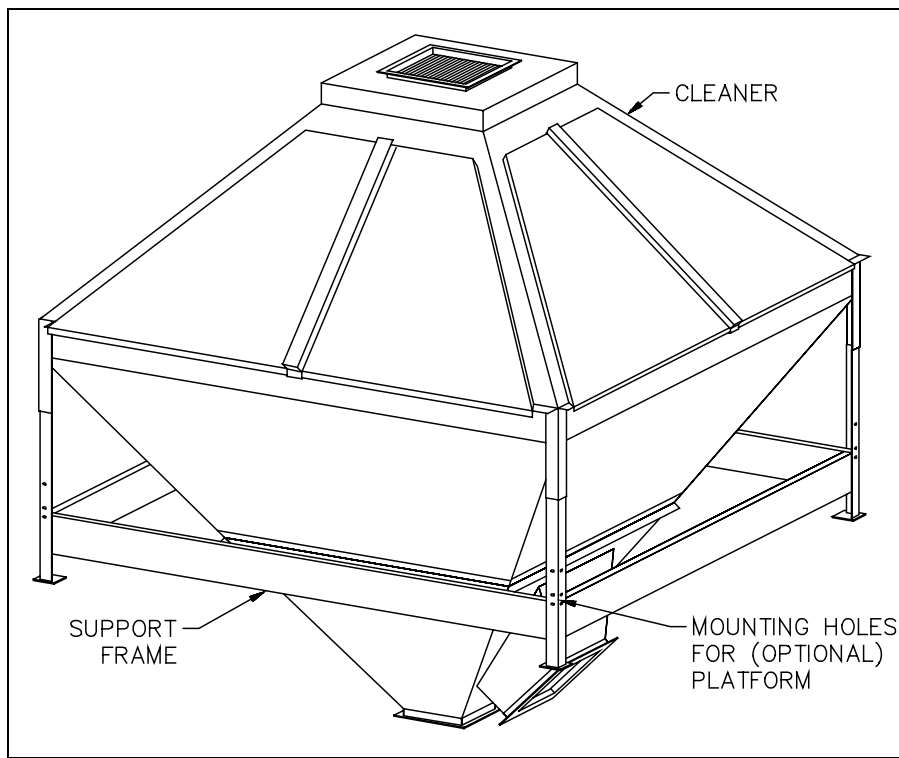


Figure 3-1B, Screener Support, Models PC-16000-PC-30000

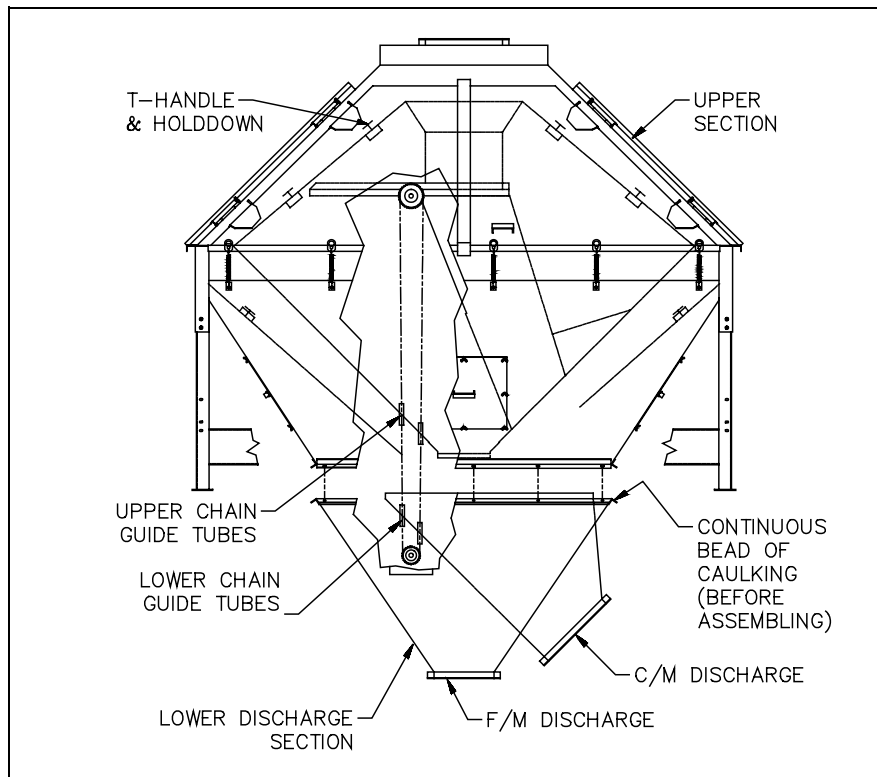


Figure 3-2, Orientation of Screener's Upper and Lower Sections

3.3.2 Screener Inlet Arrangement; (See Figure 3-3A, 3-3B, and 3-3C)

The elevator discharge, spout, chute, screw conveyor, etc. which feeds material into the screener MUST enter the inlet tube at a minimum angle of 45° from horizontal. This is to insure even distribution of material to all screener screens and to prevent clogging the inlet. The inlet tube furnished with the screener HELPS THE MATERIAL FORM A VERTICAL FLOW AND MUST be installed atop the screener inlet. Without the inlet tube installed, it will be difficult or impossible to achieve even distribution of material to all screener screens.

NOTICE

THE OFFSET MATERIAL OUTLET AND CABLE GUIDE TUBES IN THE LOWER SECTION MUST ALIGN WITH THE MATERIAL PASSAGE AND THE GUIDE TUBES IN THE UPPER SECTION AS SHOWN IN **FIGURE 3-2**. DAMAGE WILL RESULT IF THE SECTIONS ARE FORCED TOGETHER WHILE THEY ARE INCORRECTLY ORIENTED.

In nearly all installations, material enters the inlet tube at an angle. The inlet tube is to be attached to the screener so material entering the tube strikes one of the tube's three lined or partially lined sides. The inspection door which forms the fourth side of the inlet tube is not lined. If the force of the incoming material will be directed against the door, it will wear through very quickly. In this case, unbolt the inlet tube and rotate 90° or 180° so the incoming material will contact a lined surface. **OBSERVE ALL SAFETY PRECAUTIONS BEFORE UNBOLTING INLET TUBE.**

NOTICE

A MODEL PC-1500 SCREENER HAS ITS INLET TUBE PERMANENTLY WELDED TO THE TOP OF THE UNIT AT THE FACTORY AND IS ORIENTED SO THE INSPECTION DOOR IS ON THE SAME SIDE OF THE SCREENER AS THE DISCHARGE OUTLET. ORIENT THE SCREENER SO THE MATERIAL WILL CONTACT THE LINED SURFACES OF THE INLET TUBE

3.3.3 Screener Outlet Arrangement

(See **Figure 3-4**) Intersystems Screeners are designed in light of the fact that in most installations, material enters from and is discharged in the same direction, i.e., from an elevator. In ALL cases, the spout, etc., that carries away clean material must exit the screener at a minimum angle of 45° from horizontal. A shallow discharge angle slows material exiting the screener and will very likely block the outlet. The spout or chute that carries away foreign material MUST exit the screener at a minimum angle of 60° from horizontal. Foreign material is almost

always lighter and finer than clean material and has a greater tendency to clump, especially if moist. A shallow discharge angle slows foreign material exiting the screener and will undoubtedly block the outlet.

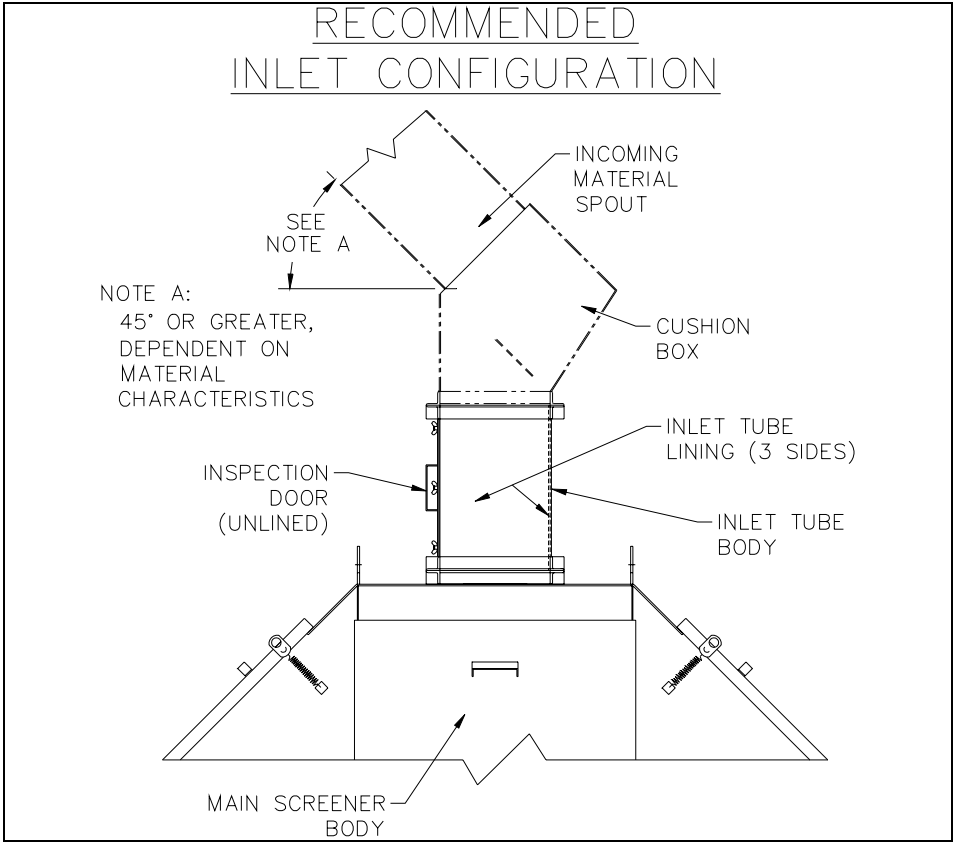


Figure 3-3A, Recommended Inlet Configuration

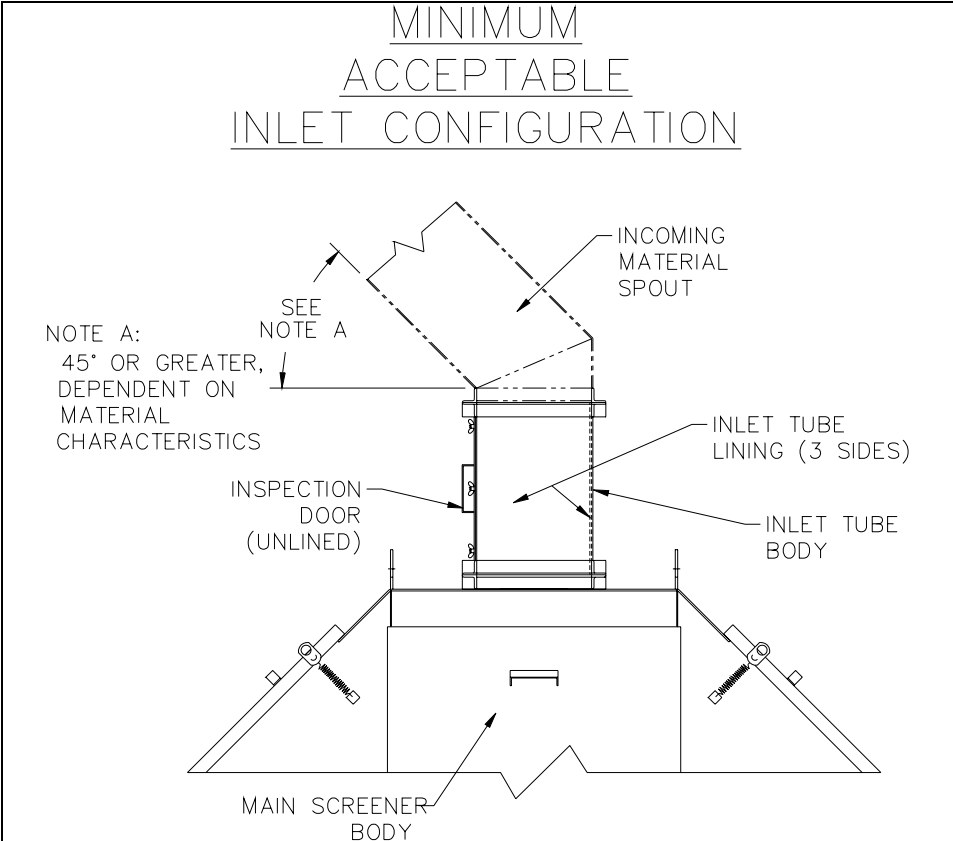


Figure 3-3B, Minimum Acceptable Inlet Configuration

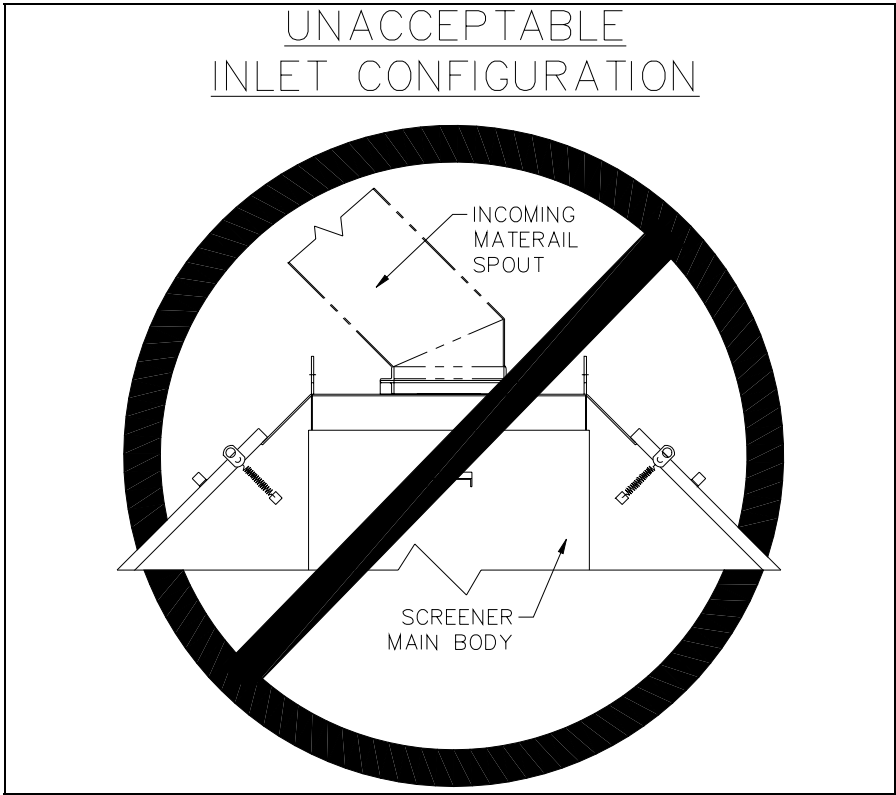


Figure 3-3C, Unacceptable Inlet Configuration

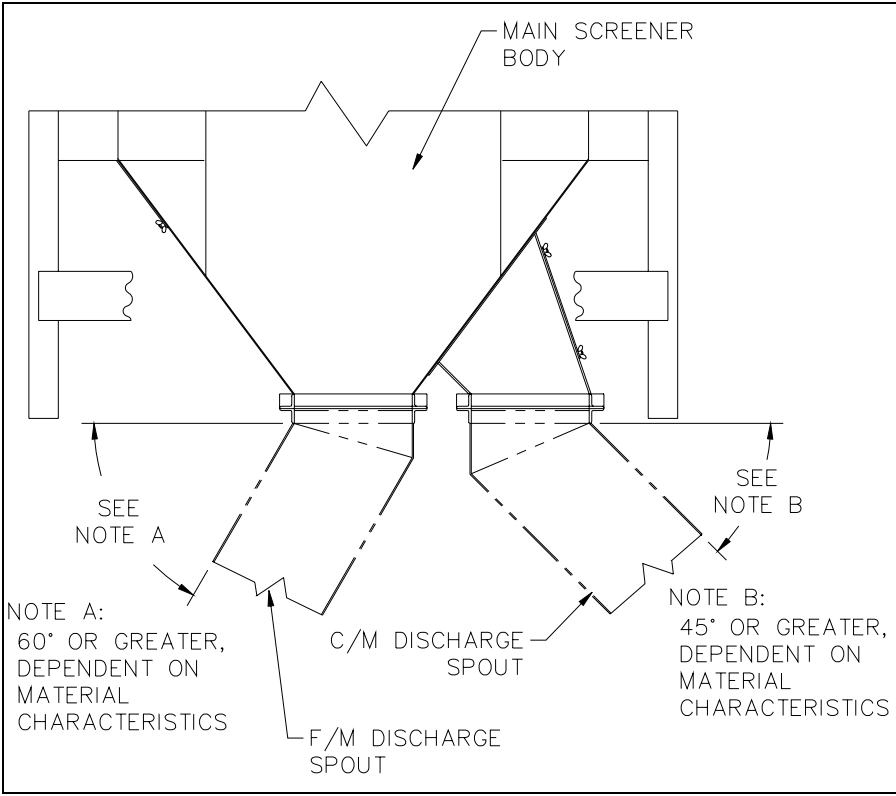


Figure 3-4, Screener Outlet Arrangement

3.3.4 Screener Vertical Alignment

A screener must be vertically plumb within 1° for maximum efficiency and throughput. Significant tilt prevents even distribution of material to all four screens and may interfere with material and F/M discharge.

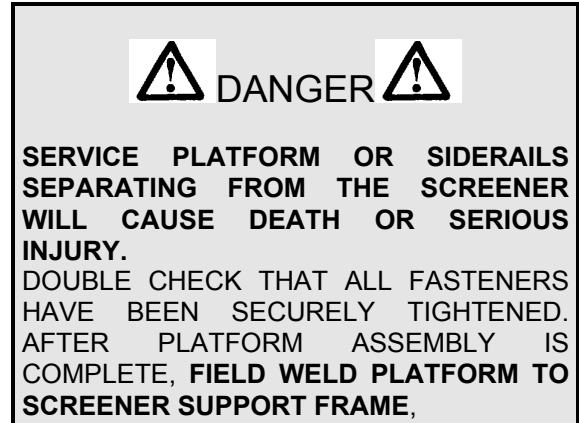
3.3.5 Platform Assembly and Installation

3.3.5.1 Models PC-1500 Through PC-11500

See **Figure 3-5**. Notice that the narrow section of deck is to be positioned on the clean material discharge outlet side of the screener.

3.3.5.2 Models PC-16000, PC-22000, And PC-30000

See **Figure 3-6**. These platforms are symmetrical unless special cutouts are provided to clear an obstruction in your installation.



3.3.6 Lower Control Assembly, Manual Gate

3.3.6.1 Screeners, Model PC-1500, PC-3500, PC-5500, PC-8500, And PC-11500

When the screener is secured in its installed position, unfasten the lower control sheave assembly from the screener. Then determine the permanent location for the control assembly which will be connected to the upper sheave on the gate shaft by means of a loop of aircraft cable.

A straight line-of-sight cable path between the upper and lower sheaves is recommended. If site conditions make a dogleg cable path necessary, each cable strand should be supported at each bend by a ball-bearing cable sheave to minimize friction and prevent rapid cable fraying.

As shown in **Figure 3-7**, the cable should be wound around the sheaves in a 540° loop to prevent cable slippage. Rather than a plain cable splice, InterSystems recommends forming the ends of the cable into loops with cable clips and thimbles. An extension spring can then be used to connect the cable ends; the spring maintains tension on the cable to compensate for variations in cable length due to temperature variations or permanent stretch.

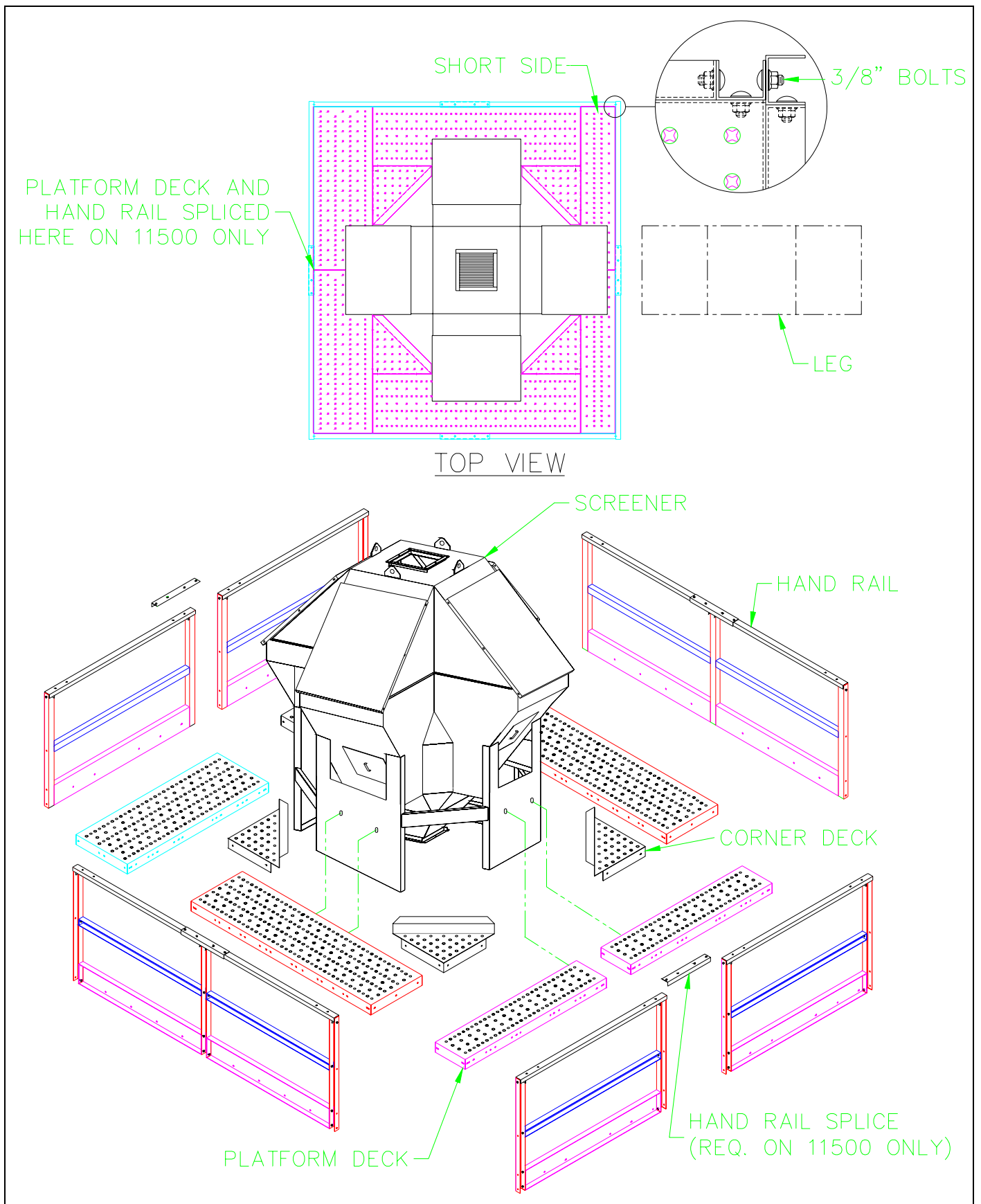


Figure 3-5, Platform Assembly and Installation, Models PC-1500 Through PC-11500

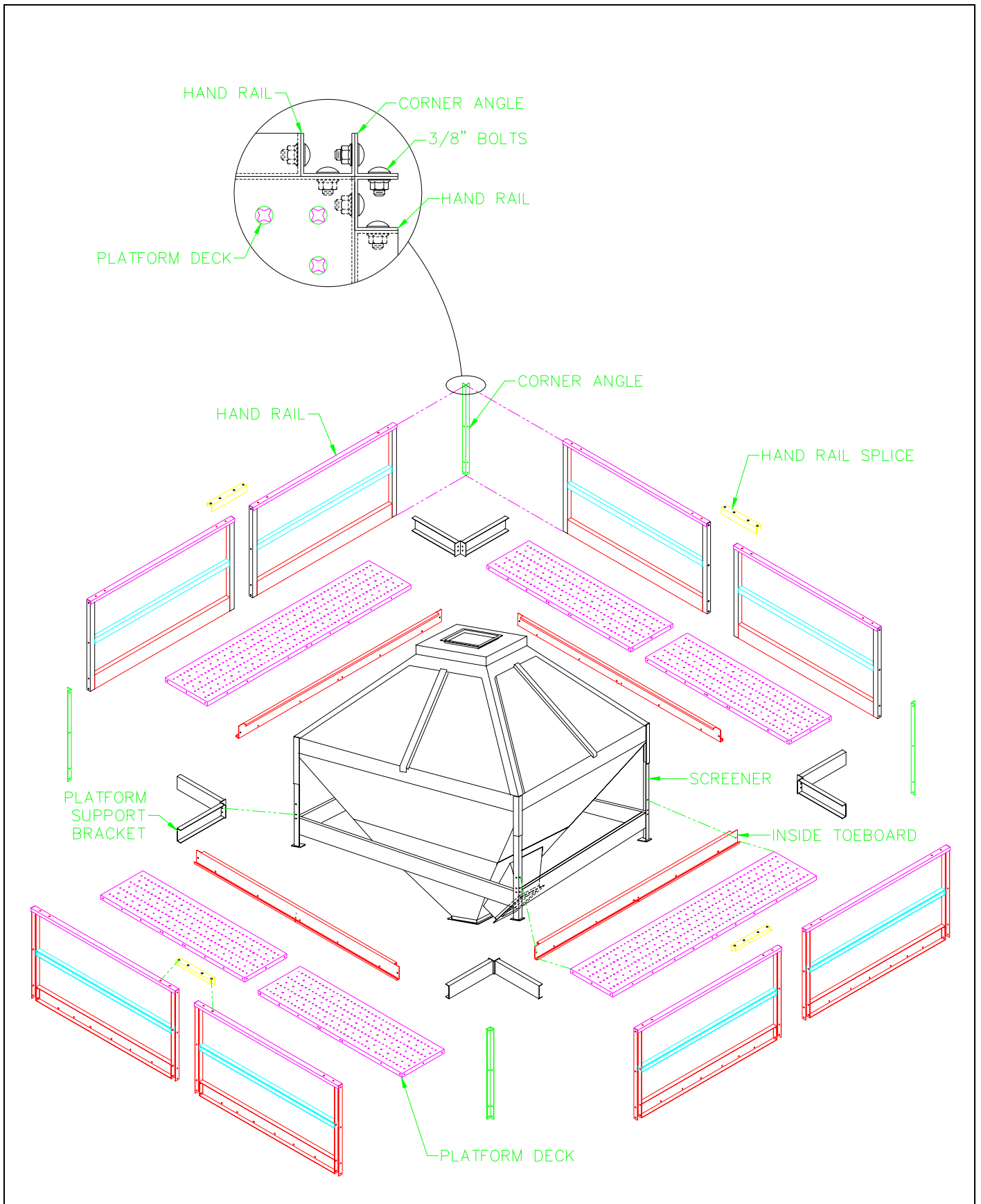


Figure 3-6, Platform Assembly and Installation, Models PC-16000, PC-22000, and PC-30000

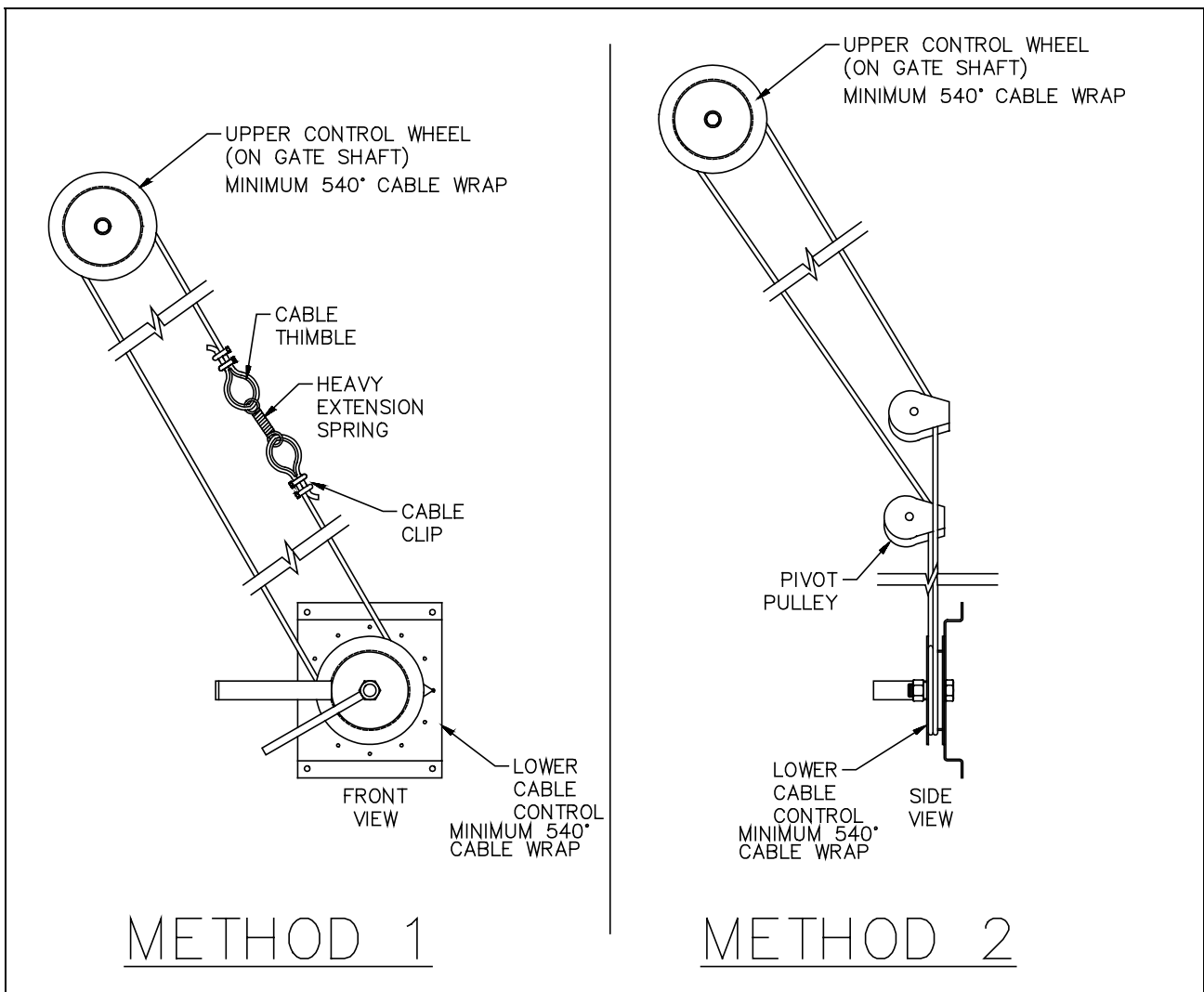


Figure 3-7, Control Cable Assembly and Routing, Models PC-1500 Through PC-11500

Regardless of the method employed to splice or connect cable ends, the connector should be positioned to permit full bypass gate movement between fully open and completely closed.

Notice that the lower sheave has a pointer and a series of holes drilled in the mounting bracket. These holes are a handy reference to indicate discrete increments of bypass gate movement between fully open and fully closed. Operators customarily mark or label the bracket in light of their experience after the screener has been operated for a period of time.

NOTICE

1. WITH THE SHEAVES INSTALLED PER THESE INSTRUCTIONS, CLOCKWISE ROTATION OF THE POINTER OPENS THE BYPASS GATE AND COUNTER-CLOCKWISE ROTATION CLOSES IT.

2. THE HOLES IN THE LOWER SHEAVE MOUNTING BRACKET DO NOT INDICATE ANY PERCENTAGE OF FLOW. THEY ARE FOR REFERENCE ONLY. THE SCREENER OPERATOR MUST ASSIGN THE SIGNIFICANCE TO THE HOLES AND IDENTIFY THEM ACCORDINGLY.

3. IT IS NOT NECESSARY TO ALIGN THE POINTER WITH THE HOLES. GATE POSITION IS INFINITELY VARIABLE BETWEEN FULLY OPEN AND COMPLETELY CLOSED.

3.3.6.2 Screeners, Model PC-16000, PC-22000, And PC-30000

These screeners all feature a lower control assembly consisting of a cable sheave with a crank handle and a locking lever mounted on a mounting plate. The control assembly is attached to the screener for shipping.

3.3.6.2.1 Gate Control Chain Assembly

These larger size screeners employ a chain assembly and sprockets to connect the upper and intermediate gate control shafts. See **Figure 3-2** and **3-8**.

- A. Turn the upper gate shaft so the gate is fully open.
- B. Route the chain assembly around the sprockets and through the guide tubes as shown in **Figures 3-2 and 3-8**. The chain tightener must be positioned to the right of the sprocket and 2" below the centerline of the upper sprocket.
- C. Block the gate to prevent its moving. Tighten the adjuster to eliminate MOST of the slack from the chain.

NOTICE

APPLY ONLY ENOUGH TENSION TO PREVENT THE CHAIN FROM JUMPING SPROCKET TEETH. EXCESSIVE TENSION WILL CAUSE THE CHAIN, SPROCKETS, AND SHAFT BEARINGS TO WEAR RAPIDLY. EXCESSIVE TENSION WILL ALSO BEND THE SHAFTS AND CAUSE THE GATE TO JAM.

3.3.6.2.2. Lower To Intermediate Shaft Cable

Follow procedure outlined in 3.3.5.1 for installation of lower cable control assembly.

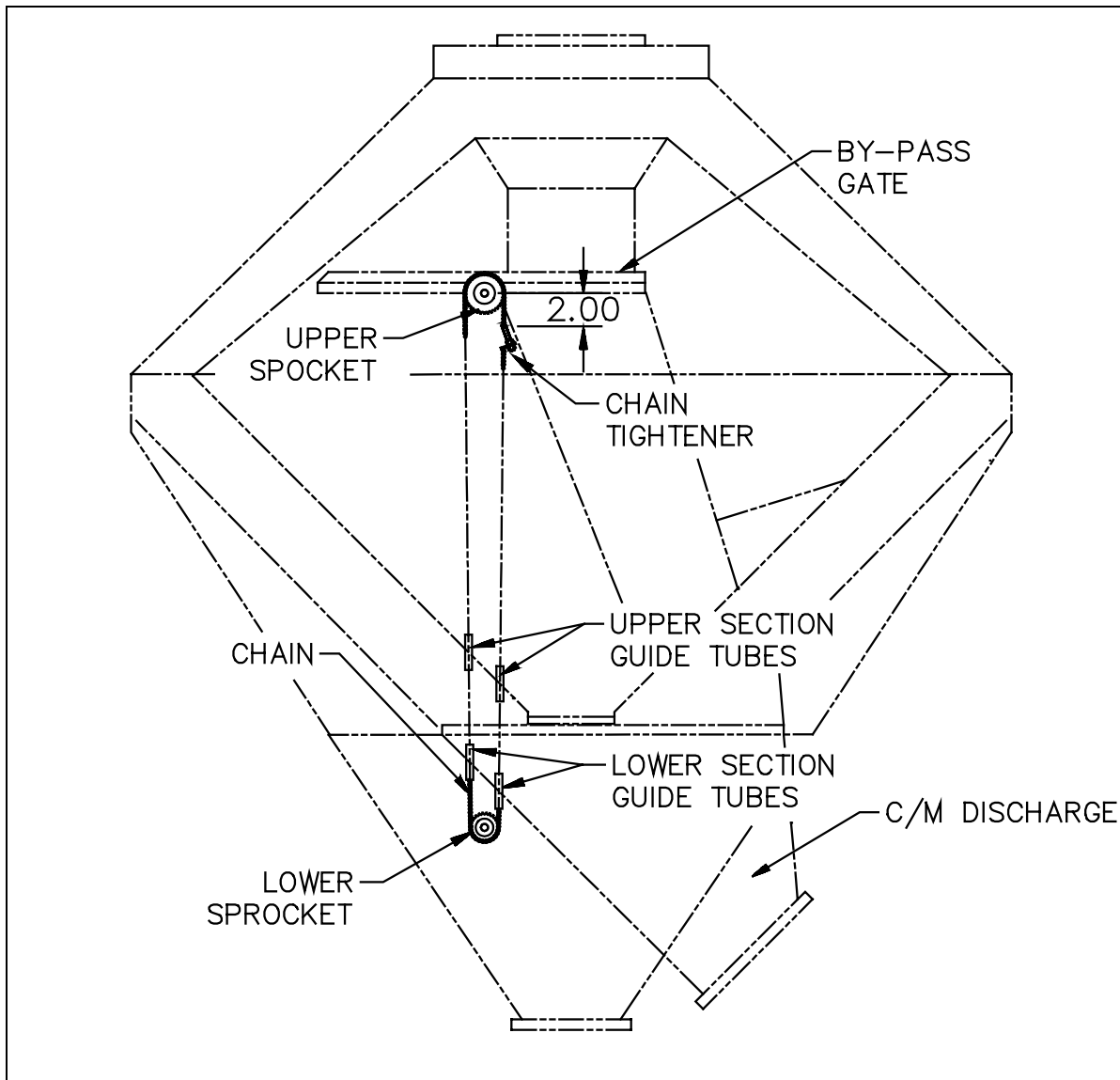


Figure 3-8, Internal Chain Assembly Models PC-16000, PC-22000, and PC-30000

3.3.7 Electrically-Actuated Bypass Gates

All Intersystems Screeners can be ordered with the bypass gate operated by an electric rotary actuator. An actuator can also be retrofitted to an existing screener. All screeners, as shipped, are arranged for manual gate control. The screener gate can be manually controlled and later retrofitted with electric controls. Follow instructions which come with each actuator. All actuators are factory adjusted to zero distance travel to avoid stripping gears upon initial installation and use. Calibrate the actuator to the proper stroke after installation.

NOTICE

DO NOT REMOVE ACTUATOR FROM THE SHIPPING CONTAINER UNTIL READY FOR FINAL INSTALLATION. ACTUATORS ARE SUBJECT TO DAMAGE FROM MOISTURE AND ARE NOT WATERTIGHT UNTIL COMPLETELY INSTALLED, INCLUDING CONDUIT CONNECTIONS. AS SHOWN IN **FIGURE 3-9 AND 3-10**, MAKE SURE THAT THERE IS AT LEAST 6-7/8" CLEARANCE BEHIND THE ACTUATOR TO PERMIT REMOVAL OF THE COVER FOR REPAIR AND ADJUSTMENT.

3.3.7.1 Actuator Installation, PC-1500 Through PC-11500

(See **Figure 3-9**)

- A. Loosen the setscrew securing the upper sheave to the gate shaft. Remove the sheave. Save it for emergency use in case of actuator malfunction.

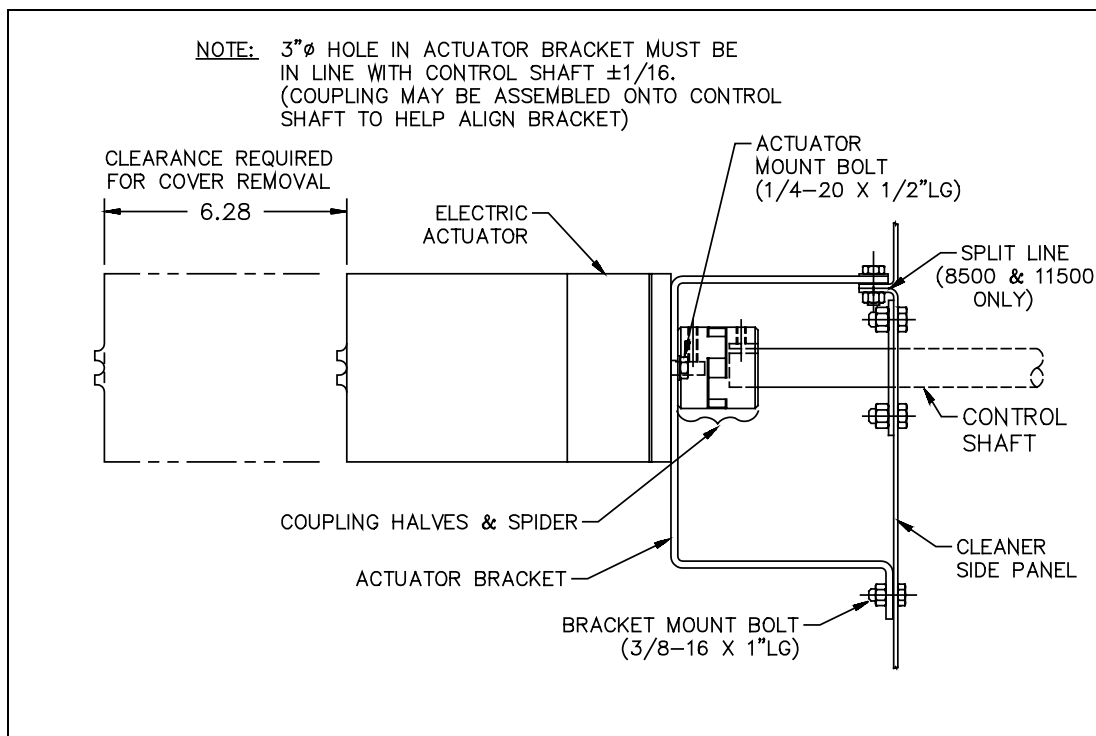


Figure 3-9. Rotary Actuator Installation, Models PC-1500 Through PC-11500;

- B. Fasten the rotary actuator to the actuator bracket. Three 3/8"-16 x 3/4" hex head capscrews and lockwashers are provided.
- C. Assemble a 3/8" bore coupling to the actuator shaft. Make sure the flange setscrew bears on the flat of the actuator's output shaft.
- D. Mate the coupling spider and the 1" bore coupling half to the actuator shaft.
- E. Slip the actuator, bracket and coupling over the end of the gate shaft so the actuator bracket rests against the screener's side panel.

- F. Position the bracket until both coupling flanges are concentric within 1/16". Use a small straight edge for this alignment rather than sight. Improper alignment will cause the actuator and gate shaft bearings and coupling spider to fail prematurely.
- G. Mark or transfer punch the location of the mounting holes on to the screener side panel.
- H. Drill 13/32" holes in the screener side panel.
- I. Rotate the gate shaft clockwise until the gate is fully open.
- J. While observing all safety precautions, temporarily wire the actuator per the instructions furnished with it. Run the actuator until its output shaft has rotated to the open position, counter-clockwise limit when viewed from the end of the output shaft. Disconnect the motor controls.
- K. Temporarily bolt the bracket with the actuator to the screener with the 1" bore coupling flange engaging the gate shaft. Use the 3/8"-16 x 1" hex head capscrews, nuts, and washers furnished.
- L. Thread the 5/16" bolt into the gate shaft coupling flange to transfer the screw hole position mark to the shaft.
- M. Remove the actuator and bracket. Spotface the gate shaft with a 5/16" diameter drill approximately 1/4" deep to form a seat for the coupling bolt to lock the flange on the shaft.
- N. Reassemble the actuator, bracket and coupling to the screener, fastening it securely in position. Be sure to thread the 5/16" bolt through the coupling flange and into the spotface on the gate shaft.
- O. Reconnect the wiring and test the actuator to verify that the gate moves smoothly between fully open and completely closed.

NOTICE

TO AVOID POSSIBLE DAMAGE TO ACTUATOR, RECHECK LIMIT SWITCHES TO ENSURE THAT ACTUATOR IS DE-ENERGIZED AT EACH END OF STROKE.

3.3.7.2 Actuator Installation, PC-16000 Through PC30000 (See Figure 3-10)

- A. Loosen the setscrew securing the cable sheave to the intermediate shaft, not the gate shaft. Remove the sheave. Save it for possible emergency use.
- B. Fasten the rotary actuator to the actuator bracket. Three 3/8"-16 x 3/4" hex head capscrews and lockwashers are provided.
- C. Assemble one of the coupling flanges to the actuator shaft. Both flanges have 1" bores. Make sure the flange setscrew bears on the flat of the actuator's output shaft.
- D. Mate the coupling spider and the other coupling half to the actuator.
- E. Slip the coupling over the end of the intermediate shaft so that the actuator bracket rests against the screener's sloping side panel (the lower section which includes the discharge outlets).
- F. Shift the bracket until both coupling flanges are concentric within 1/16". Improper alignment will cause the actuator and gate shaft bearings and coupling spider to fail prematurely.
- G. Mark or transfer punch the location of the mounting holes.
- H. Drill 13/32" or 7/16" holes in the screener's lower side panel.

- I. Rotate intermediate shaft counter-clockwise until the gate is fully open.
- J. While observing all safety precautions, temporarily wire the actuator per the instructions furnished with it. Run the actuator until its output shaft has rotated to the open position, clockwise limit when viewed from the end of the output shaft. Disconnect the motor controls.

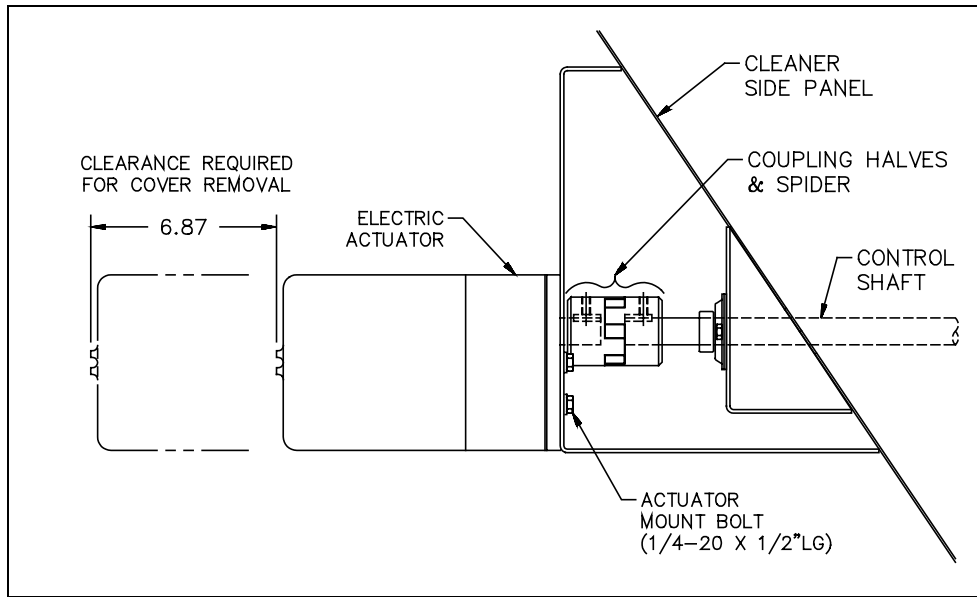


Figure 3-10, Rotary Actuator Installation, Models PC-16000, PC-22000, And PC-30000

- K. Temporarily bolt the bracket with the actuator to the screener with the coupling engaging the gate shaft or the intermediate shaft. Use the 3/8"-16 x 1" hex head capscrews, nuts, and washers furnished.
- L. Thread the 5/16" hex socket head capscrew into the intermediate shaft coupling flange sufficiently tight to mark the shaft OR transfer punch the screw hole on the shaft.
- M. Remove the actuator and bracket. Spotface the gate or intermediate shaft with a 5/16" diameter drill approximately 1/4" deep to form a seat for the capscrew to lock the flange on the shaft.
- N. Reassemble the actuator, bracket and coupling to the screener, fastening it securely in position. Be sure to thread the 5/16" capscrew through the coupling flange and into the spotface on the gate shaft. Double check tightness of all other fasteners.
- O. Reconnect the wiring and test the actuator to verify that the gate moves smoothly between fully open and completely closed.

NOTICE

TO AVOID POSSIBLE DAMAGE TO ACTUATOR, RECHECK LIMIT SWITCHES TO ENSURE THAT ACTUATOR IS DE-ENERGIZED AT EACH END OF STROKE.

IV. Operation



DANGER

FAILURE TO OBSERVE ALL SAFETY RULES, WRITTEN, IMPLIED, AND THOSE SUGGESTED BY OBVIOUS COMMON SENSE, CAN RESULT IN DEATH, SERIOUS INJURY, AND/OR EQUIPMENT DAMAGE!

4.1 Before Startup

Perform these tests and checks before each startup and after any maintenance or repair has been performed.

- A. Check the condition of screens. Replace any screens that are worn through, that have bent edging, or that have been damaged. Check that all screens rest flat on their supports and that all the flexible plastic belts are lapping over the tops of the screens.

- B. Check the screens for blinding. Some blinding or clogging is normal; usually 10% to 15% of openings. However, if wet material has been run through the screener, screens can become mostly or entirely blinded by caked material and F/M will have to be removed and cleaned.
- C. Verify that the bypass gate opens and closes completely.
- D. Periodically inspect the urethane wear liners. Replace any that are nearly worn through. If a liner wears through, the material will very quickly wear through the metal structure of the screener itself.

NOTICE

A LOWER SCREEN SET FOR A MODEL PC-16000, PC-22000, OR PC-30000 SCREENER CONSISTS OF THREE LONG SCREENS AND ONE SHORT SCREEN. THE SHORT SCREEN MUST BE INSTALLED IN THE CLEAN MATERIAL DISCHARGE OUTLET SIDE OF THE SCREENER. IF A SHORT SCREEN IS INSTALLED IN THE WRONG SIDE OF THE SCREENER, THERE WILL BE A GAP OF SEVERAL INCHES AT THE BOTTOM SCREEN EDGE. GOOD MATERIAL WILL BE LOST INTO FINES TANKS IF SCREENS ARE WORN OR IMPROPERLY INSTALLED.

- E. Replace any missing or worn plastic paddles or urethane belts. These help control the velocity and distribution of material in the screener and are vital to optimum screener performance.

4.2 Operation

- A. Use the manual control sheave or the automatic controls to open or close the gate for the desired ratio of cleaned and bypassed material. The ratio can be infinitely varied between 0% and 100%.

Figure 4-1 is a nomograph indicating the approximate removal rates of all InterSystems screeners. Removal rates are based upon 100% of material being routed over the cleaning screens (0% bypass) of screeners operated at at least 80% of rated capacity. Rates as graphed are the composite performance of several units being used on a job and represent the minimum level of all models but are not guaranteed removal rates. A rule of thumb to approximate cleaning is that 60% of fines will be removed. In other words, if you begin with 10% fines, you will remove 60% of that, or 6%, leaving you with 4% fines after cleaning.

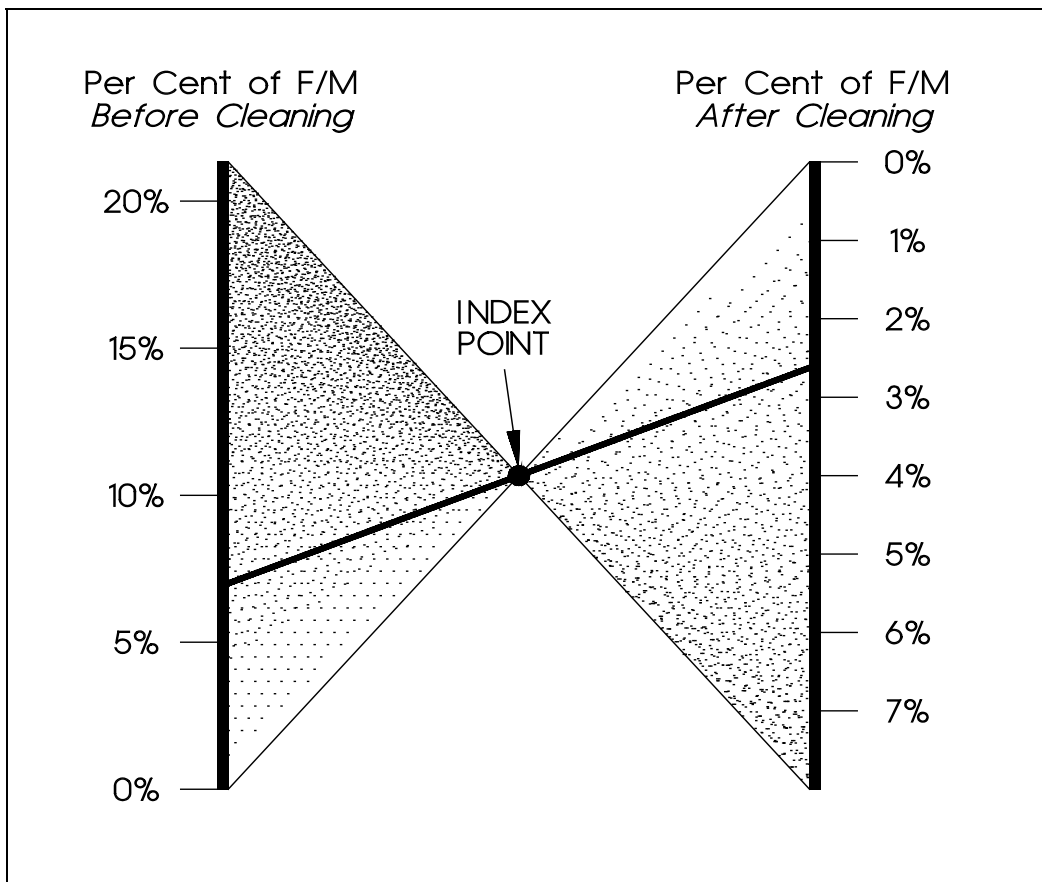


Figure 4-1, F/M Removal Nomograph

The example graphed in **Figure 4-1** depicts one lot of material containing 7.5% F/M before cleaning and approximately 2.75% after cleaning. To determine other removal ratios, first select a Per Cent of F/M Before Cleaning on the left-hand scale. Then draw a straight line from the selected percentage before cleaning through the Index Point. Finally, read the Per Cent of F/M After Cleaning on the right-hand scale.

- B. Determine the rate in BPH at which material will be fed into the screener. If the rate is less than 80% of the screener's rated capacity, consider adjusting one or more of the rigid UHMW paddles to block one or more sets of screens.

NOTICE

THE NUMERIC PORTION OF THE SCREENER MODEL NUMBER INDICATES THE CAPACITY, IN BPH, OF THE MOST EFFICIENT CLEANING RATE, NOT THE MAXIMUM THROUGHPUT RATE. A MODEL 8500 WILL REMOVE THE HIGHEST PERCENTAGE OF F/M AT 8500 BPH.

Lowering a paddle forces more grain from the associated set of screens. Begin with the paddle on the opposite side of the screener from which material enters the screener. Contrary to popular belief, a screener DOES NOT do a better job of cleaning if operated well below its rated capacity. The best cleaning occurs when the material flows over the screen in a layer, which limits bouncing and traps dust from flying.. As the BPH rate actually being cleaned falls below the rated capacity, particularly below 80%, the velocity of the material over the screens increases., causing a number of undesirable effects:

1. Material is damaged due to the velocity at which particles strike the screens and other internal surfaces.
 2. Air stream velocity in the screener increases, releasing more F/M into the airflow and allowing less cleaning to occur.
 3. Internal screener wear is accelerated due to high velocity grain impact.
 4. Screen blinding increases as large particles are forcibly driven into the screen mesh.
 5. Elevated noise level in the work area.
- C. The bypass gate can be adjusted at any time if the proper screens are installed for the commodity being cleaned. It is not necessary to interrupt cleaning while adjusting the gate, either manually or automatically.
- D. It is entirely normal that approximately 10%- 15% of the screen area be blinded or clogged. The capacity of the screeners has in fact been calculated with this in mind. Over a period of time, particles lodged in the screen mesh will abrade and drop through into the F/M passages and will be replaced by other particles. The percentage of blinded screen area should remain fairly constant.
- E. While the screener is operating at or near capacity, check to see that material is distributed evenly to all four sides of the screener.

NOTICE

WEAR APPROPRIATE EYE PROTECTION AS WELL AS AN ASPIRATOR MASK TO PROTECT AGAINST POSSIBLE AIRBORN MATERIAL ESCAPING THE SCREENER.

4.3 Post-Operation

Whenever the screener is idle, the bypass gate should be adjusted to the full open position. If the gate is left closed or only partially open, dust and material will accumulate in the screener. If allowed to build up, accumulated dust and material attracts pests, vermin; and moisture which in-turn leads to rust, corrosion, and fungus growth.

V. Maintenance

5.1 General Maintenance

A good screener maintenance program involves thorough general housekeeping and periodic inspections.

5.2 Periodic Inspection

At regularly scheduled intervals, while observing all safety precautions, observe the conveyor as it operates. Inspect for:

- A. Loose or missing hardware. Pay particular attention to:
 - 1. Broken or missing extension spring clips which hold covers in place.
 - 2. Loose or missing T-handles and upper and lower screen holddowns on Model PC-16000 - PC-22000 & PC-30000
- B. Screen damage
 - 1. Screens with bent edging that prevent the screens from lying flat on the supports.
 - 2. Damaged or worn screens. These defects allow clean grain to flow under or through screens into F/M passages. Loss of clean grain is an unnecessary expense that can be prevented by timely inspection and replacement of defective screens.

**DANGER**

FAILURE TO OBSERVE ALL SAFETY RULES, WRITTEN, IMPLIED, AND THOSE SUGGESTED BY OBVIOUS COMMON SENSE, CAN RESULT IN DEATH, SERIOUS INJURY, AND/OR EQUIPMENT DAMAGE! REVIEW SECTION I - GENERAL SAFETY INFORMATION - BEFORE PERFORMING ANY MAINTENANCE ON SCREENER.

NOTICE

A LOWER SCREEN SET FOR A MODEL PC-16000, PC-22000, OR PC-30000 SCREENER CONSISTS OF THREE LONG SCREENS AND ONE SHORT SCREEN. THE SHORT SCREEN MUST BE INSTALLED IN THE CLEAN GRAIN DISCHARGE OUTLET SIDE OF THE SCREENER. IF A SHORT SCREEN IS INSTALLED IN THE WRONG SIDE OF THE SCREENER, THERE WILL BE A GAP OF SEVERAL INCHES AT THE BOTTOM SCREEN EDGE. GOOD MATERIAL WILL BE LOST INTO FINES TANKS IF SCREENS ARE WORN OR IMPROPERLY INSTALLED.

- C. Bypass gate that won't close completely, allowing material to bypass the screens, thereby reducing overall cleaning efficiency. A gate that won't open fully, interferes which free passage of material through the screener when no cleaning is intended and allows material and dust to accumulate. If allowed to build up, accumulated dust and material attracts pests, vermin, and moisture which in-turn leads to rust, corrosion, and fungus growth.
- D. Damaged wiring, including exposed conductors and connections on screeners with an electric actuator.
- E. Missing, damaged, or incorrectly adjusted rigid paddles and flexible belts; screener efficiency is lower and damage to the grain and the screener will result.

- F. Defective seals. Inspect, and when indicated replace the seals on the screener covers and inspection doors. The seals prevent the escape of dust from the screener.
- G. Abrasion-resistant liner condition. Any liner that appears to be worn through 75% of the original thickness should be replaced. If replacement is deferred, the liner can wear through completely, resulting in wear to the structure of the screener itself.
- H. Structural damage
- I. Rust or corrosion
- J. Recheck limit switch settings on optional electric actuator to prevent damage from driving past gate travel.

5.3 Lubrication

The flange bearings and/or pillow blocks supporting bypass gate shafts of ALL screeners were permanently lubricated by the manufacturer. No further lubrication is possible. If a bearing fails, replace it.

5.3.1 Optional Electric Bypass Gate Actuator

Refer to the OEM manufacturers technical literature furnished with the actuator.

5.4 General Housekeeping

At frequent and regular intervals, remove the accumulated material residue and dirt from the F/M passages and the areas of the clean material passages which are not scoured by the movement of material. If allowed to build up, accumulated dust and material attracts pests, vermin, and moisture which in-turn leads to rust, corrosion, and fungus growth.

5.5 Screener Liner Replacement

Certain high-wear areas of the screener are lined with expanded metal-backed urethane plastic sheeting. Liners are held in place by elevator bolts. When replacing a liner, tighten the nuts to draw the flat bolt heads down flush or nearly flush with the liner surface. It is neither necessary nor desirable to countersink the bolt holes in the liners, as this deforms the liner surface and causes premature wear.

VI. Spare Parts

6.1 Scope

The section identifies components likely to require replacement. Replacements for any other components, including the various urethane liner panels and structural members can be supplied upon request.

6.2 Replacement or Substitute Screens

As indicated in Table 6-1, screens for all models of grain screeners can be furnished in any of three standard mesh sizes to accommodate most grains. Other meshes and wire sizes are available as special order options.

TABLE 6-1, SCREENER SCREEN

SCREENER MODEL #	AREA = SQ IN.*
PC-1500	1596
PC-3500	3040
PC-5500	4972
PC-8500	8008
PC-11500	11500
PC-16000	28964
PC-22000	33930
PC-30000	38896
*Active Screen Area, Does not include edging	

GRAIN	MESH SIZE	WIRE DIAMETERS
CORN	Mesh Size 3-1/2	.063 Wire x .2277 Opening (3-1/2 Openings/Inch)
SOYBEAN	Mesh Size 5	.047 Wire x .1530 Opening (5 Openings/Inch)
WHEAT	Mesh Size 7	.041 Wire x .1019 Opening (7 Openings/Inch)
CONSULT INTERSYSTEMS ENGINEERING FOR MATERIALS NOT LISTED HERE.		

DATA

6.3 Ordering Parts

Parts orders or requests for technical assistance to your sales representative or to:

Intersystems

9575 N 109th Ave
Omaha, NE 68142

Phone 402.330.1500
Fax 402.330.3350

Please have available the Model Number, Serial Number, and CUSTOMER ORDER NUMBER of the equipment in question as well as the location where the equipment is INSTALLED.

VII. Warranty

Intersystems reserves the right to make changes in design or in construction of equipment and components without obligation to incorporate such changes in equipment and components previously ordered.

WARRANTY, LIMITATION OF LIABILITY, DISCLAIMER OR IMPLIED WARRANTIES: Intersystems manufactured equipment and components are guaranteed against defects in workmanship or materials for one year from date of shipment. The obligation of Intersystems with respect to any goods is limited to replacement or repair of defective parts and equipment provided those parts are returned, shipping costs prepaid, to Intersystems' factory and provided the product has not been subject to misuse, negligence, or accident, or repaired or altered outside of our factory, or other than by an Authorized Service Representative. This warranty does not cover the replacement of parts inoperative because of wear occasioned by use, the cost of replacing parts by a person other than an Intersystems employee or an Authorized Service Representative, or the adjustment of a product where the product was improperly adjusted by the purchaser. In addition, this warranty does not cover components manufactured by others such as motors, drives, clutches, cylinders, valves, blowers, and the like: On those components, the standard manufacturer's warranty applies. In any event, liability is limited to the purchase price paid, and Intersystems shall, under no circumstances, be responsible for special or consequential damages, or for incidental damages.

INTERSYSTEMS NEITHER MAKES NOR AUTHORIZES ANY WARRANTY OTHER THAN AS HEREIN CONTAINED. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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